Supporting Information

Ir/f-Ampha Complex Catalyzed Asymmetric Sequential Hydrogenation of Enones: A General Access to Chiral Alcohols with Two Contiguous Chiral Centers

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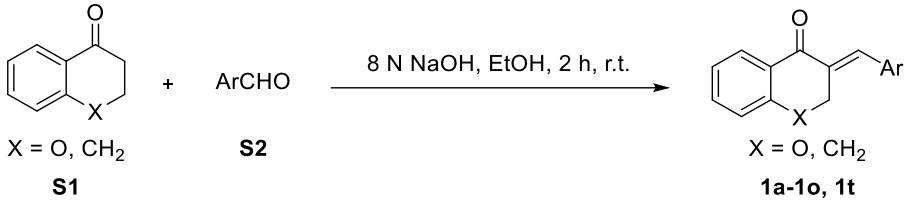
I. General Remarks

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 EtOH, ^{i}PrOH, TFE, DCM, 1,4-dioxane, Hexane were purchased from J&K. DCE were freshly distilled from calcium hydride. Solvents were transferred by syringe. Melting point (m.p.) was determined by RY-1 Melting Point Apparatus. ^{1}H, ^{13}C and 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 ^{1}H NMR) or 77.0 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 and analyses were run with decoupling. Optical rotation was determined using a Perkin Elmer 343 polarimeter. HPLC analysis was conducted on an Agilent 1260 Series instrument. Column Chromatography was performed with silica gel Merck 60 (300-400 mesh).

II. Preparation and physical data of enones

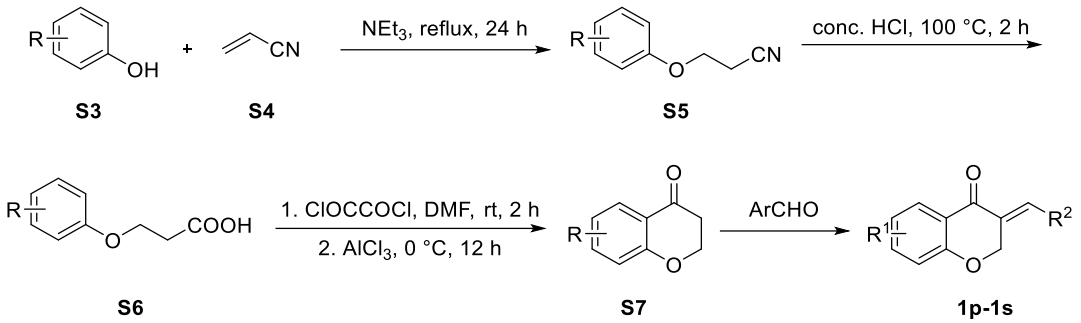
Preparation of Substrates 1a-1o and 1t



Prepared according to a previously reported procedure.[1]

To a solution of tetralone derivatives **S1** (10 mmol) and appropriate aldehyde **S2** (10 mmol) in ethanol (4 mL) was slowly added an aqueous solution of NaOH (0.0024 mol, 8 N) at room temperature. The mixture was stirred for 2 h. The solid precipitate was collected by filtration and then washed with cold ethanol (4 mL) three times. The solid was dried in vacuo to give target substrates (**1a-1o** and **1t**).

Preparation of substrates 1p-1s

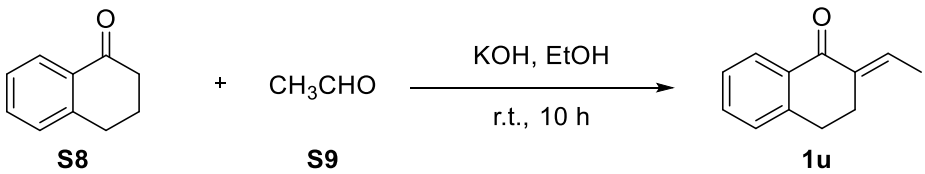


A mixture of compound **S3** (40 mmol), acrylonitrile **S4** (4.5 g, 84.8 mmol) and triethylamine (0.9 g, 8.8 mmol) was refluxed for 24 hours. After completion of the reaction, the mixture was poured into cold water (50 mL) and extracted with ethyl ether (25 mL × 3). The combined organic layer was successively washed with 10% aqueous NaOH (30 mL), 2N HCl (30 mL), and brine (30 mL). The organic layer was then dried over sodium sulfate. After the solvent is evaporated to obtain compound **S5** as a yellow solid.

A mixture of compound **S5** and concentreated HCl (40 mL) was refluxed for 2 hours. Afte r being cooled, the mixture was filtered and the precipitate was dried overnight under vacuu m to give compound **S6** as a white powder.

To the solution of **S6** in dry CH_2Cl_2 (4.5 mL/mmol) was added one drop of DMF at 0 °C. Oxalyl chloride (1.5 eq) was then added dropwise under nitrogen atmosphere at 0 °C. The reaction was stirred at 0 °C for 1.5 hours and the mixture was concentrated at high vacuum to give the desired acid chloride, which was directly use without further purification. To the acid chloride in dry CH_2Cl_2 (4.5 mL/mmol) was added $AlCl_3$ (1.5 eq) slowly at 0 °C. The mixture was stirred at 0 °C for 1.5 hours and quenched with water followed by extraction with CH_2Cl_2. The combined organic layer was dried over anhydrous Na_2SO_4, filtered and concentrated. The residue was purified by column chromatography to give the desired product **S7**. **1p-1s**were prepared from **S7** and benzaldehyde using the same procedure as for **1a-1o**.

Preparation of Substrate 1u

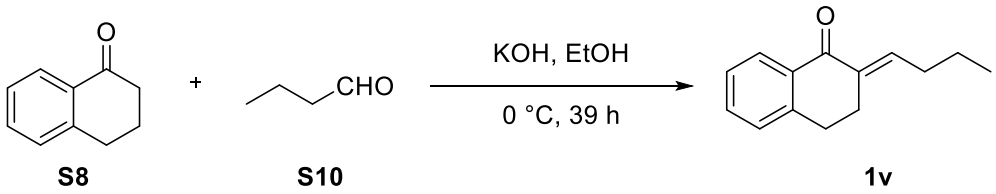


Prepared according to a previously reported procedure.[2]

In a round bottomed flask containing a stirred mixture of potassium hydroxide (6.4 mmol) in ethanol (29 mL) were successively added 1-tetralone **S8** (5.8 mmol) and acetaldehyde **S9** (5.8 mmol). After stirring at room temperature for 10 hours, water was added and the mixture

was extracted with diethyl ether. The organic layer was dried over magnesium sulfate. After filtration and evaporation of the solvent, the residue was purified by flash-chromatography (eluant: petroleum/ethedethyl acetate 30:1) to give the desired product **1u**.

Preparation of Substrate 1v

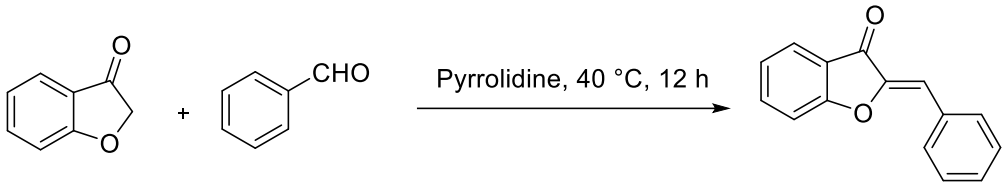


S8 **S10** **1v**

Prepared according to a previously reported procedure.[2]

In a round bottomed flask containing a stirred mixture of potassium hydroxide (6.4 mmol) in ethanol (29 mL) were successively added 1-tetralone **S8** (5.8 mmol) and butyraldehyde **S10** (5.8 mmol). After stirring at 0 °C for 42 hours, water was added and the mixture was extracted with diethyl ether. The organic layer was dried over magnesium sulfate. After filtration and evaporation of the solvent, the residue was purified by flash-chromatography (eluant: petroleum/ethedethyl acetate 30:1) to give the desired product **1v**.

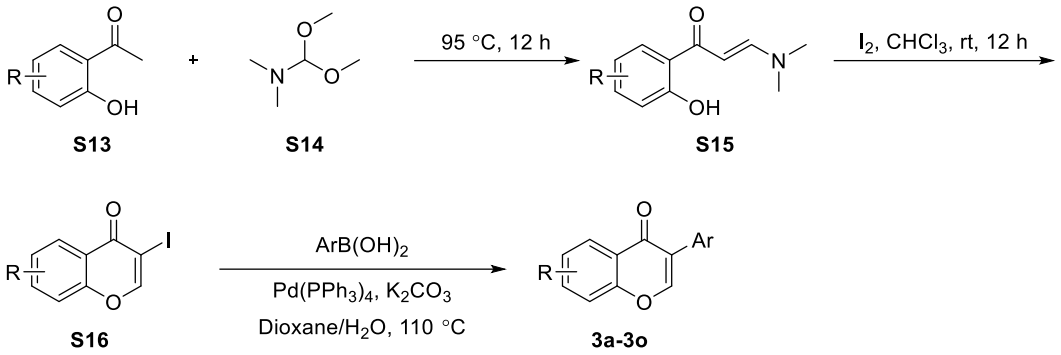
Preparation of Substrate 1w



S11 **S12** **1w**

A mixture of 1-methyl-4-piperidone **S11** (10 mmol) and pyrrolidine (24 mmol) in CH_2Cl_2 (100 mL) was stirred about 5 min at room temperature. Then, benzaldehyde **S12** (10 mmol) was added and the mixture was stirred for 12 h at 40 °C. After completion of the reaction (TLC), the solvent was removed under vacuum. The crude product was subjected to column chromatography on silica gel using petroleum ether/ethyl acetate (PE/EA = 30:1) as the eluent to give **1w**.

Preparation of Substrates 3a-3o



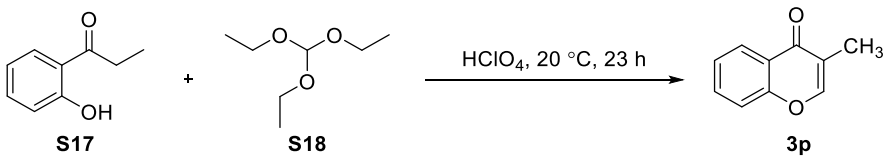
Prepared according to a previously reported procedure.[3]

A mixture of a substituted 2-hydroxyacetophenone **S13** (20 mmol) and *N*,*N*-dimethylformamide dimethylacetal **S14** (30 mmol) was heated at 95 °C overnight. The reaction mixture is cooled to room temperature and excess methanol and dimethylformamide dimethyl acetal are removed in vacuo to leave a light brown solid. The solid is chromatographed over silica gel with ethyl acetate as the eluent to the desired product **S15**.

To a solution of a substituted 3-(dimethylamino)-1-(2-hydroxyphenyl)propenone **S15** (10 mmol) in $CHCl_3$ (30 mL) was added a chloroform solution of iodine (10 mmol) dropwise over several minutes. After complete addition of iodine, the reaction mixture is diluted with water (30 mL) and vigorously stirred for 5 min. The organic layer is then separated, dried with magnesium sulfate, and solvent removed in vacuo to give a yellow solid. This solid is chromatographed over silica gel with 5% ethyl acetate as the eluent to the desired product **S16**.

3-Iodo-4H-1-benzopyran-4-one (5 mmol) **S16**, K_2CO_3 (15 mmol, 3 eq), boronic acid (9 mmol, 1.2 eq) and $Pd(PPh_3)_4$ (0.5 mmol, 10 mol%) were taken in a round-bottom flask and 1,4-dioxane (15 mL) and H_2O (2.5 mL) were added to the mixture. The mixture was heated at 110 °C for 18-24 h until complete consumption of the substrate as indicated by TLC. It was cooled to rt and concenterated under reduced pressure. The mixture was extracted with EtOAc (2 × 50 mL) and washed with water (2 × 25 mL) and brine (1 × 25 mL), dried with anhyd. Na_2SO_4, and concentrated under reduced pressure. The column chromatographic purification of crude mass was performed on silica gel using EtOAc- petroleum ether (25-40%) as eluting solvent to afford the isoflavones **3a-3o**.

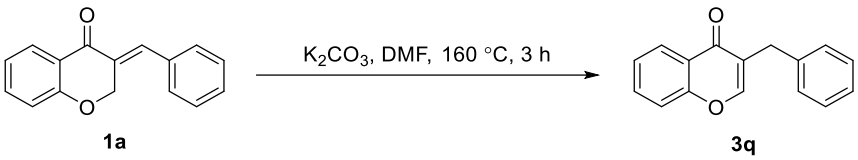
Preparation of Substrate 3p



Prepared according to a previously reported procedure.[4]

Concentrated $HClO_4$ (3.1 g, 30.8 mmol, 2.64 mL, 1.7 eq) was added dropwise to a solution of 2'-hydroxypropiophenone **S17** (2.7 g, 18 mmol, 1 eq) in triethyl orthoformate **S18** (26.6 g, 180 mmol, 30 mL, 10 eq). The reaction mixture was then stirred for 23 h at room temperature. After addition of water (10 mL) and dichloromethane (10 mL) the phases were separted and the aqueous phase was extracted with dichloromethane (3 × 20 mL). The combined organic phases were dried over Na_2SO_4 and evaporated to dryness. The crude product was then purified by flash chromatography (petroleum ether/ethyl acetate 3:1) yielding the corresponding product **3p**.

Preparation of Substrate 3q

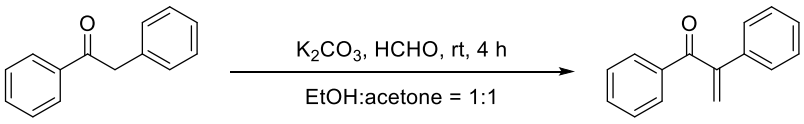


1a **3q**

Prepared according to a previously reported procedure.[5]

A mixture of *E*-3-benzylidenechromanone (**1a**) (708 mg, 3 mmol), anh. K_2CO_3 (704 mg, 5.1 mmol) and abs. DMF (36 mL) was refluxed for 3 h, then poured into brine and extracted with ethyl acetate (3 × 50 mL). After drying, the solvent was removed under reduced pressure and the residue was submitted to column chromatography (eluent: petroleum ether/ethyl acetate 15:1) to afford 340 mg (48%) of pure **3q** as brownish prisms.

Preparation of Substrate 3r

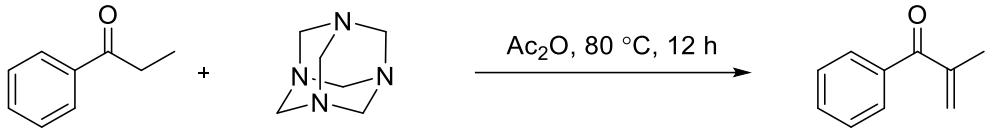


S19 **3r**

Prepared according to a previously reported procedure.[6]

1,2-Diphenylethan-1-one **S19** (1.96 g, 10 mmol) and K_2CO_3 (1.48 g, 10.7 mmol) were added in 50 mL EtOH:acetone (v:v = 1:1). Then formaldehyde (1.5 mL, 18.0 mmol) was added at room temperature. After 4 h, the aqueous layer was extracted with ethyl acetate (3 × 50 mL) and the combined organic layer was dried over anhydrous Na_2SO_4, filtered and concentrated under reduced pressure. The residue was purified by chromatography (petroleum ether/ethyl acetate, v:v = 50:1) to afford product **3r**.

Preparation of Substrate 3s

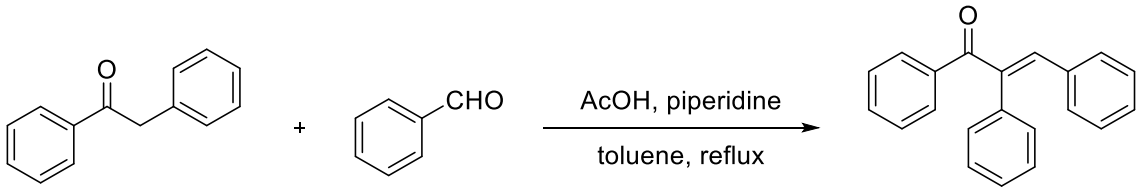


S20 **S21** **3r**

Prepared according to a previously reported procedure.[7]

To a mixture of the acetophenone **S20** (10 mmol) and acetic anhydride (2.24 g, 22 mmol), under an argon atmosphere, was added hexamethylenetetramine **S21** (1.96 g, 14 mmol). The reaction mixture was heated overnight at 80 °C, then allowed to cool to room temperature and quenched into a stirred mixture of dichloromethane (200 mL) and 2 M sodium hydroxide (200 mL). The organic layer was separated and washed with 1 M HCl (100 mL), brine and water. The organic phase was dried with $MgSO_4$, filtered and evaporated. The crude material was purified by flash chromatography (petroleum ether/ethyl acetate 20:1) and the solvent was evaporated to afford the product **3r**.

Preparation of Substrate 3t

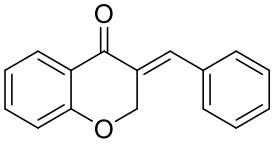


S19 **S12** **3t**

Prepared according to a previously reported procedure.[6]

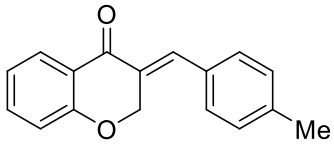
A solution of 1,2-diphenylethan-1-one **S19** (1.96 g, 10 mmol), benzaldehyde **S12** (1.06 g, 10 mmol), AcOH (0.5 mL) and piperidine (0.2 mL) in 25 mL toluene was refluxed overnight using a Dean-stark apparatus. After cooling to room temperature, the reaction was quenched by the addition of saturated aqueous $NaHCO_3$ solution (10 mL). Theaqueous layer was extracted with ethyl acetate (3 × 50 mL) and the combined organic layer was dried over anhydrous Na_2SO_4, filtered and concentrated under reduced pressure. The residue was purified by chromatography (petroleum ether/ethyl acetate, v:v = 50:1) to afford product **3t**.

(*E*)-3-Benzylidenechroman-4-one **(1a)**



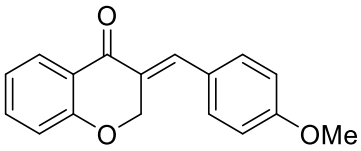
White solid, 32% yield, 0.8 g, mp 108-112 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (dd, *J* = 7.9, 1.6 Hz, 1H), 7.89 (s, 1H), 7.54-7.38 (m, 4H), 7.35-7.28 (m, 2H), 7.12-7.04 (m, 1H), 6.97 (d, *J* = 8.2 Hz, 1H), 5.36 (d, *J* = 1.7 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.3, 161.1, 137.5, 135.9, 134.3, 130.9, 130.0, 129.5, 128.7, 127.9, 122.0, 121.9, 117.9, 67.6. HRMS (EI) m/z Calcd. for $C_{16}H_{12}NaO_2$ ([M+Na]): 259.0730. Found: 259.0730.

(*E*)-3-(4-Methylbenzylidene)chroman-4-one **(1b)**



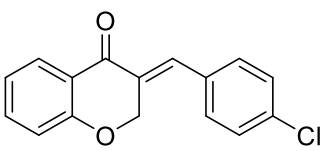
White solid, 27% yield, 0.3 g, mp 116-120 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.95 (dd, *J* = 7.9, 1.7 Hz, 1H), 7.79 (s, 1H), 7.41 (ddd, *J* = 8.4, 7.2, 1.8 Hz, 1H), 7.22-7.12 (m, 4H), 7.03-6.97 (m, 1H), 6.89 (dd, *J* = 8.3, 0.7 Hz, 1H), 5.30 (d, *J* = 1.9 Hz, 2H), 2.34 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 181.3, 160.0, 138.9, 136.6, 134.8, 130.5, 129.1, 129.0, 128.5, 126.9, 121.0, 120.8, 116.8, 66.7, 20.5. HRMS (EI) m/z Calcd. for $C_{17}H_{14}NaO_2$ ([M+Na]): 273.0886. Found: 273.0889.

(*E*)-3-(4-Methoxybenzylidene)chroman-4-one **(1c)**



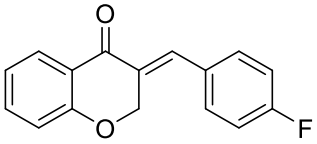
Yellow solid, 32% yield, 0.9 g, mp 142-145 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (dd, *J* = 7.9, 1.6 Hz, 1H), 7.84 (s, 1H), 7.48 (ddd, *J* = 8.4, 7.2, 1.8 Hz, 1H), 7.31-7.26 (m, 2H), 7.10-7.04 (m, 1H), 7.01-6.94 (m, 3H), 5.38 (d, *J* = 1.8 Hz, 2H), 3.87 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.2, 160.9, 160.7, 137.4, 135.7, 132.1, 128.9, 127.9, 127.0, 122.1, 121.8, 117.8, 114.2, 67.8, 55.4. HRMS (EI) m/z Calcd. for $C_{17}H_{14}NaO_3$ ([M+Na]): 289.0835. Found: 289.0837.

(*E*)-3-(4-Chlorobenzylidene)chroman-4-one **(1d)**



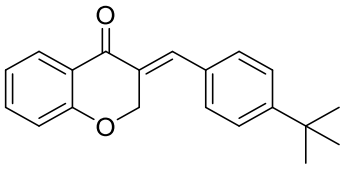
White solid, 60% yield, 1.6 g, mp 172-175 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (dd, *J* = 7.9, 1.6 Hz, 1H), 7.81 (s, 1H), 7.50 (ddd, *J* = 8.8, 7.3, 1.7 Hz, 1H), 7.46-7.40 (m, 2H), 7.26-7.22 (m, 2H), 7.12-7.05 (m, 1H), 6.98 (d, *J* = 8.3 Hz, 1H), 5.32 (d, *J* = 1.8 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.0, 161.1, 136.1, 136.0, 135.6, 132.8, 131.4, 131.2, 129.1, 128.0, 122.0, 121.9, 117.9, 67.4. HRMS (EI) m/z Calcd. for $C_{16}H_{11}ClNaO_2$ ([M+Na]): 293.0340. Found: 293.0343.

(*E*)-3-(4-Fluorobenzylidene)chroman-4-one **(1e)**



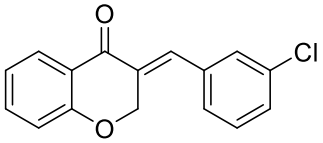
White solid, 46% yield, 1.2 g, mp 144-147 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (dd, *J* = 7.9, 1.6 Hz, 1H), 7.83 (s, 1H), 7.50 (ddd, *J* = 8.4, 7.2, 1.8 Hz, 1H), 7.34-7.28 (m, 2H), 7.19-7.12 (m, 2H), 7.11-7.05 (m, 1H), 6.98 (dd, *J* = 8.3, 0.6 Hz, 1H), 5.33 (d, *J* = 1.8 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.1, 163.2 (d, *J* = 252.5 Hz), 161.0, 136.3, 136.0, 132.0 (d, *J* = 8.5 Hz), 130.7 (d, *J* = 2.0 Hz), 130.5 (d, *J* = 3.0 Hz), 127.9, 122.0, 121.9, 117.9, 116.0 (d, *J* = 21.2 Hz), 67.5. HRMS (EI) m/z Calcd. for $C_{16}H_{11}FNaO_2$ ([M+Na]): 277.0635. Found: 277.0637.

(*E*)-3-(4-(Tert-butyl)benzylidene)chroman-4-one **(1f)**



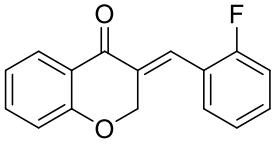
Yellow solid, 33% yield, 0.9 g. mp 144-147 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.03 (dd, *J* = 7.9, 1.7 Hz, 1H), 7.87 (brs, 1H), 7.51-7.44 (m, 3H), 7.30-7.24 (m, 2H), 7.10-7.04 (m, 1H), 6.97 (dd, *J* = 8.3, 0.7 Hz, 1H), 5.38 (d, *J* = 1.9 Hz, 2H), 1.35 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.3, 161.1, 153.1, 137.5, 135.8, 131.6, 130.2, 130.1, 128.0, 125.75, 122.1, 121.9, 117.9, 67.8, 34.9, 31.2. HRMS (EI) m/z Calcd. for $C_{20}H_{20}NaO_2$ ([M+Na]): 315.1356. Found: 315.1362.

(*E*)-3-(3-Chlorobenzylidene)chroman-4-one **(1g)**



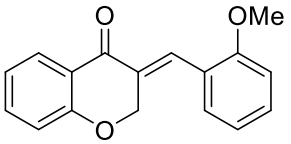
White solid, 65% yield, 1.8 g, mp 124-128 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (dd, *J* = 7.9, 1.6 Hz, 1H), 7.81-7.77 (m, 1H), 7.51 (ddd, *J* = 8.5, 7.2, 1.8 Hz, 1H), 7.42-7.36 (m, 2H), 7.29 (s, 1H), 7.22-7.16 (m, 1H), 7.13-7.05 (m, 1H), 6.98 (dd, *J* = 8.3, 0.6 Hz, 1H), 5.31 (d, *J* = 1.9 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.0, 161.2, 136.1, 136.1, 135.8, 134.8, 132.1, 130.0, 129.7, 129.5, 128.0, 138.0, 122.1, 121.9, 118.0, 67.4. HRMS (EI) m/z Calcd. for $C_{16}H_{11}ClNaO_2$ ([M+Na]): 293.0340. Found: 293.0342.

(*E*)-3-(2-Fluorobenzylidene)chroman-4-one **(1h)**



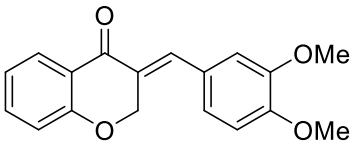
White solid, 56% yield, 1.4 g, mp 129-132 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04 (dd, *J* = 7.9, 1.7 Hz, 1H), 7.87-7.84 (m, 1H), 7.50 (ddd, *J* = 8.5, 7.2, 1.8 Hz, 1H), 7.45-7.37 (m, 1H), 7.25-7.20 (m, 2H), 7.20-7.13 (m, 1H), 7.12-7.05 (m, 1H), 6.98 (dd, *J* = 8.3, 0.6 Hz, 1H), 5.20 (t, *J* = 1.6 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.0, 161.4, 160.5 (d, *J* = 252.5 Hz), 136.0, 132.8, 131.5 (d, *J* = 8.4 Hz), 130.9 (d, *J* = 2.6 Hz), 130.4 (d, *J* = 2.9 Hz), 128.0, 124.2 (d, *J* = 3.7 Hz), 122.4 (d, *J* = 14.4 Hz), 122.0, 121.9, 118.0, 116.1 (d, *J* = 21.2 Hz), 67.9 (d, *J* = 5.7 Hz). HRMS (EI) m/z Calcd. for $C_{16}H_{11}FNaO_2$ ([M+Na]): 277.0635. Found: 277.0637.

(*E*)-3-(2-Methoxybenzylidene)chroman-4-one **(1i)**



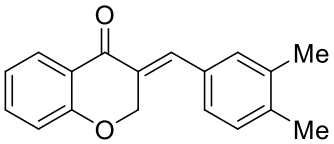
White solid, 48% yield, 1.3 g, mp 112-116 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08-7.99 (m, 2H), 7.48 (ddd, *J* = 8.4, 7.2, 1.8 Hz, 1H), 7.44-7.36 (m, 1H), 7.10-7.03 (m, 2H), 7.03-6.98 (m, 1H), 6.98-6.93 (m, 2H), 5.23 (d, *J* = 1.8 Hz, 2H), 3.87 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.5, 161.3, 158.2, 135.7, 134.0, 131.2, 130.8, 130.5, 128.0, 123.5, 122.2, 121.8, 120.3, 117.9, 110.9, 68.1, 55.5. HRMS (EI) m/z Calcd. for $C_{17}H_{14}NaO_3$ ([M+Na]): 289.0835. Found: 289.0837.

(*E*)-3-(3,4-Dimethoxybenzylidene)chroman-4-one **(1j)**



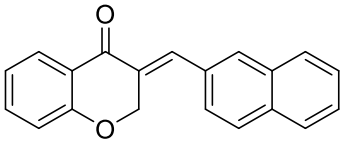
Yellow solid, 9% yield, 0.3 g, mp 121-124 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (dd, *J* = 7.9, 1.6 Hz, 1H), 7.83 (s, 1H), 7.49 (ddd, *J* = 8.5, 7.2, 1.8 Hz, 1H), 7.11-7.04 (m, 1H), 6.99-6.92 (m, 2H), 6.92-6.85 (m, 2H), 5.40 (d, *J* = 1.8 Hz, 2H), 3.93 (d, *J* = 8.8 Hz, 6H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.1, 160.9, 150.4, 148.9, 137.5, 135.7, 129.2, 127.9, 127.2, 123.6, 123.0, 121.89, 117.8, 113.2, 111.0, 67.8, 56.0, 56.0. HRMS (EI) m/z Calcd. for $C_{18}H_{16}NaO_4$ ([M+Na]): 319.0941. Found: 319.0945.

(*E*)-3-(3,4-Dimethylbenzylidene)chroman-4-one **(1k)**



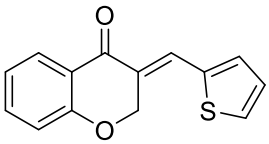
White solid, 30% yield, 0.4 g, mp 118-120 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (dd, *J* = 7.9, 1.6 Hz, 1H), 7.84 (s, 1H), 7.48 (ddd, *J* = 8.4, 7.2, 1.8 Hz, 1H), 7.21 (d, *J* = 7.8 Hz, 1H), 7.11 (s, 1H), 7.09-7.03 (m Hz, 2H), 6.96 (dd, *J* = 8.3, 0.6 Hz, 1H), 5.37 (d, *J* = 1.8 Hz, 2H), 2.31 (s, 6H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.4, 161.09, 138.8, 137.9, 137.1, 135.8, 132.0, 131.5, 130.0, 129.9, 127.9, 127.7, 122.1, 121.9, 117.9, 67.8, 19.89, 19.9. HRMS (EI) m/z Calcd. for $C_{18}H_{16}NaO_2$ ([M+Na]): 287.1043. Found: 287.1042.

(*E*)-3-(Naphthalen-2-ylmethylene)chroman-4-one **(1l)**



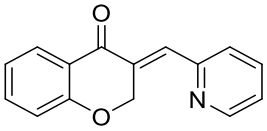
Yellow solid, 33% yield, 0.5 g, mp 135-138 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.08-8.01 (m, 2H), 7.93-7.84 (m, 3H), 7.76 (s, 1H), 7.59-7.53 (m, 2H), 7.53-7.47 (m, 1H), 7.43 (dd, *J* = 8.5, 1.6 Hz, 1H), 7.12-7.06 (m, 1H), 6.98 (d, *J* = 8.3 Hz, 1H), 5.46 (d, *J* = 1.8 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.3, 161.1, 137.6, 135.9, 133.4, 133.0, 131.9, 131.0, 130.1, 128.5, 128.4, 128.0, 127.8, 127.4, 127.0, 126.8, 122.0, 122.0, 118.0, 67.7. HRMS (EI) m/z Calcd. for $C_{20}H_{14}NaO_2$ ([M+Na]): 309.0886. Found: 309.0889.

(*E*)-3-(Thiophen-2-ylmethylene)chroman-4-one **(1m)**



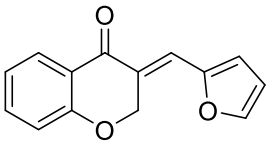
Yellow solid, 56% yield, 1.4 g, mp 132-135 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.04-7.98 (m, 2H), 7.61 (d, *J* = 5.1 Hz, 1H), 7.49 (ddd, *J* = 8.5, 7.2, 1.8 Hz, 1H), 7.35 (d, *J* = 3.4 Hz, 1H), 7.20-7.16 (m, 1H), 7.10-7.04 (m, 1H), 6.99 (dd, *J* = 8.3, 0.6 Hz, 1H), 5.47 (d, *J* = 2.0 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 181.4, 161.0, 137.6, 135.8, 134.04, 131.1, 128.8, 128.3, 127.9, 127.2, 121.9, 117.9, 67.8. HRMS (EI) m/z Calcd. for $C_{14}H_{10}NaO_2S$ ([M+Na]): 265.0294. Found: 265.0299.

(*E*)-3-(Pyridin-2-ylmethylene)chroman-4-one **(1n)**



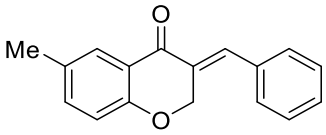
Yellow solid, 40% yield, 1.2 g, mp 144-146 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.72 (dd, *J* = 4.6, 0.8 Hz, 1H), 8.02 (dd, *J* = 7.9, 1.6 Hz, 1H), 7.75 (td, *J* = 7.7, 1.8 Hz, 1H), 7.71 (t, *J* = 2.1 Hz, 1H), 7.54-7.47 (m, 2H), 7.29-7.22 (m, 2H), 7.10-7.03 (m, 1H), 7.00 (dd, *J* = 8.3, 0.5 Hz, 1H), 5.92 (d, *J* = 2.1 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.36, 161.70, 154.12, 149.68, 136.60, 136.01, 134.26, 133.37, 127.96, 127.91, 123.22, 121.80, 121.67, 118.10, 68.39. HRMS (EI) m/z Calcd. for $C_{15}H_{11}NNaO_2$ ([M+Na]): 260.0682. Found: 260.0683.

(*E*)-3-(Furan-2-ylmethylene)chroman-4-one **(1o)**



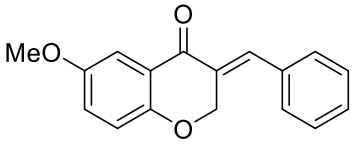
Yellow solid, 74% yield, 1.7 g, mp 127-129 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00 (dd, *J* = 7.9, 1.6 Hz, 1H), 7.62 (d, *J* = 1.6 Hz, 1H), 7.53-7.51 (m, 1H), 7.49 (ddd, *J* = 8.4, 7.2, 1.8 Hz, 1H), 7.09-7.03 (m, 1H), 6.99 (dd, *J* = 8.3, 0.6 Hz, 1H), 6.76 (d, *J* = 3.5 Hz, 1H), 6.55 (dd, *J* = 3.5, 1.8 Hz, 1H), 5.61 (d, *J* = 1.8 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 181.5, 161.2, 151.1, 145.4, 135.4, 127.6, 126.4, 121.7, 121.6, 121.5, 118.4, 117.6, 112.4, 67.7. HRMS (EI) m/z Calcd. for $C_{14}H_{10}NaO_3$ ([M+Na]): 249.0522. Found: 249.0526.

(*E*)-3-Benzylidene-6-methylchroman-4-one **(1p)**



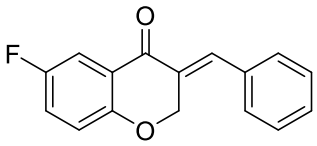
Yellow solid, 45% yield, 1.5 g, mp 152-155 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.87 (s, 1H), 7.82 (d, *J* = 1.5 Hz, 1H), 7.49-7.37 (m, 3H), 7.34-7.28 (m, 3H), 6.87 (d, *J* = 8.4 Hz, 1H), 5.32 (d, *J* = 1.8 Hz, 2H), 2.34 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.5, 159.2, 137.4, 137.0, 134.4, 131.4, 131.1, 130.0, 129.4, 128.7, 127.5, 121.6, 117.7, 67.5, 20.5. HRMS (EI) m/z Calcd. for $C_{17}H_{14}NaO_2$ ([M+Na]): 273.0886. Found: 273.0887.

(*E*)-3-Benzylidene-6-methoxychroman-4-one **(1q)**



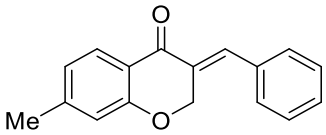
Yellow solid, 5% total yield, 0.3 g, mp 123-128 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.88 (s, 1H), 7.49-7.40 (m, 4H), 7.34-7.29 (m, 2H), 7.11 (dd, *J* = 9.0, 3.2 Hz, 1H), 6.91 (d, *J* = 9.0 Hz, 1H), 5.31 (d, *J* = 1.8 Hz, 2H), 3.84 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.3, 155.8, 154.5, 137.5, 134.4, 131.0, 130.0, 129.5, 128.7, 125.2, 122.0, 119.3, 108.1, 67.6, 55.8. HRMS (EI) m/z Calcd. for $C_{17}H_{14}NaO_3$ ([M+Na]): 289.0835. Found: 289.0841.

(*E*)-3-Benzylidene-6-fluorochroman-4-one **(1r)**



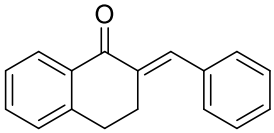
Yellow solid, 2% total yield, 0.2 g, mp 128-132 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.90 (s, 1H), 7.67 (dd, *J* = 8.3, 3.2 Hz, 1H), 7.51-7.39 (m, 3H), 7.35-7.28 (m, 2H), 7.21 (ddd, *J* = 9.0, 7.8, 3.2 Hz, 1H), 6.96 (dd, *J* = 9.0, 4.2 Hz, 1H), 5.34 (d, *J* = 1.8 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 181.6, 157.6 (d, *J* = 242.4 Hz), 157.3, 138.2, 134.2, 130.2, 130.0, 129.7, 128.8, 123.4 (d, *J* = 24.2 Hz), 122.5 (d, *J* = 6.7 Hz), 119.6 (d, *J* = 7.4 Hz), 112.9 (d, *J* = 23.2 Hz), 67.7. HRMS (EI) m/z Calcd. for $C_{16}H_{11}FNaO_2$ ([M+Na]): 277.0635. Found: 277.0634.

(*E*)-3-Benzylidene-7-methylchroman-4-one **(1s)**



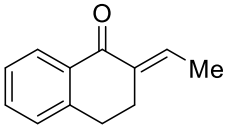
White solid, 11% total yield, 0.8 g, mp 97-99 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.92 (d, *J* = 8.0 Hz, 1H), 7.86 (s, 1H), 7.49-7.37 (m, 3H), 7.34-7.28 (m, 2H), 6.89 (dd, *J* = 8.0, 0.8 Hz, 1H), 6.77 (s, 1H), 5.33 (d, *J* = 1.8 Hz, 2H), 2.37 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.0, 161.1, 147.5, 137.1, 134.5, 131.0, 130.0, 129.4, 128.7, 127.8, 123.3, 119.7, 117.9, 67.6, 22.0. HRMS (EI) m/z Calcd. for $C_{17}H_{14}NaO_2$ ([M+Na]): 273.0886. Found: 273.0889.

(*E*)-3-(Pyridin-2-ylmethylene)chroman-4-one **(1t)**



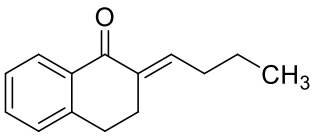
Yellow solid, 71% yield, 1.7 g, mp 111-115 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.14 (dd, *J* = 7.8, 1.1 Hz, 1H), 7.88 (s, 1H), 7.50 (td, *J* = 7.5, 1.4 Hz, 1H), 7.47-7.40 (m, 4H), 7.40-7.33 (m, 2H), 7.28-7.23 (m, 1H), 3.14 (td, *J* = 6.5, 1.7 Hz, 2H), 3.02-2.90 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 188.0, 143.3, 136.7, 135.9, 135.5, 133.5, 133.3, 129.9, 128.6, 128.5, 128.3, 128.2, 127.1, 28.9, 27.2. HRMS (EI) m/z Calcd. for $C_{17}H_{14}NaO$ ([M+Na]): 257.0937. Found: 257.0938.

(*E*)-2-Ethylidene-3,4-dihydronaphthalen-1(2*H*)-one (**1u**)[2]



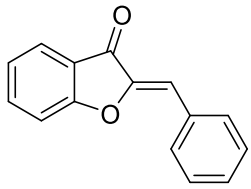
Yield oil, 30% yield, 0.3g. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (dd, *J* = 7.8, 1.5 Hz, 1H), 7.46 (td, *J* = 7.5, 1.4 Hz, 1H), 7.36-7.30 (m, 1H), 7.24 (d, *J* = 7.6 Hz, 1H), 7.07 -6.99 (m, 1H), 2.98-2.93 (t, *J* = 6.4 Hz, 2H), 2.79 (t, *J* = 6.4 Hz, 2H), 1.89 (d, *J* = 7.2 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 187.4, 143.7, 135.9, 134.8, 133.6, 133.0, 128.2, 128.2, 126.9, 28.9, 25.2, 14.0.

(*E*)-2-Butylidene-3,4-dihydronaphthalen-1(2*H*)-one (**1v**) [2]



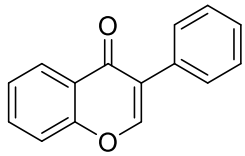
Yield oil, 30% yield, 0.3g. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (dd, *J* = 7.8, 1.5 Hz, 1H), 7.46 (td, *J* = 7.4, 1.5 Hz, 1H), 7.33 (td, *J* = 7.6, 1.2 Hz, 1H), 7.28-7.21 (m, 1H), 6.99-6.91 (m, 1H), 2.95 (t, *J* = 6.0 Hz, 2H), 2.79 (t, *J* = 6.1 Hz, 2H), 2.24 (q, *J* = 7.5 Hz, 2H), 1.54 (m, 2H), 0.97 (t, *J* = 7.4 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 187.57, 143.72, 140.02, 135.12, 133.62, 132.98, 128.20, 128.16, 126.87, 30.22, 29.11, 25.61, 22.09, 13.94.

(*Z*)-2-Benzylidenebenzofuran-3(2*H*)-one **(1w)**



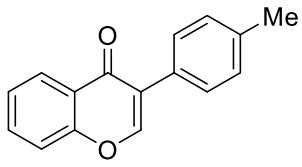
Yellow solid, 58% yield, 1.3 g, mp 116-120 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.98-7.90 (m, 2H), 7.82 (dd, *J* = 7.7, 0.8 Hz, 1H), 7.70-7.63 (m, 1H), 7.50-7.38 (m, 3H), 7.37-7.32 (m, 1H), 7.26-7.20 (m, 1H), 6.91 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 184.9, 166.2, 146.9, 137.0, 132.3, 131.6, 129.9, 128.9, 124.7, 123.5, 121.6, 113.1, 113.0. HRMS (EI) m/z Calcd. for $C_{15}H_{10}NaO_2$ ([M+Na]): 245.0573. Found: 245.0574.

3-Phenyl-4*H*-chromen-4-one (**3a**)[8]



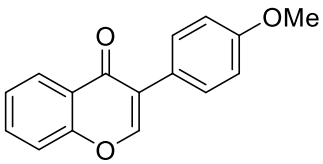
White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.32 (dd, *J* = 8.0, 1.7 Hz, 1H), 8.03 (s, 1H), 7.72-7.65 (m, 1H), 7.61-7.54 (m, 2H), 7.52-7.36 (m, 5H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 176.2, 156.2, 153.1, 133.6, 131.9, 129.0, 128.5, 128.2, 126.5, 125.4, 125.3, 124.6, 118.1.

3-(*p*-Tolyl)-4*H*-chromen-4-one (**3b**)[8]



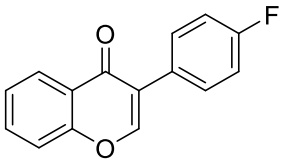
White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.32 (ddd, *J* = 8.0, 1.7, 0.5 Hz, 1H), 8.01 (s, 1H), 7.71-7.65 (m, 1H), 7.50-7.40 (m, 4H), 7.29-7.22 (m, 2H), 2.40 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 176.4, 156.2, 152.8, 138.1, 133.5, 129.2, 128.9, 128.8, 126.5, 125.4, 125.2, 124.6, 118.0, 21.3.

3-(4-Methoxyphenyl)-4*H*-chromen-4-one (**3c**)[9]



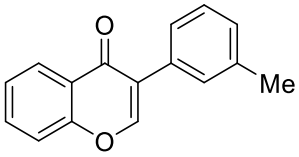
White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (dd, *J* = 8.0, 1.7 Hz, 1H), 7.99 (s, 1H), 7.70-7.64 (m, 1H), 7.54-7.49 (m, 2H), 7.49-7.45 (m, 1H), 7.45-7.39 (m, 1H), 7.00-6.96 (m, 2H), 3.84 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 176.5, 159.7, 156.2, 152.5, 133.5, 130.1, 126.4, 125.2, 125.0, 124.6, 124.1, 118.0, 114.0, 55.4.

3-(4-Fluorophenyl)-4*H*-chromen-4-one (**3d**)[8]



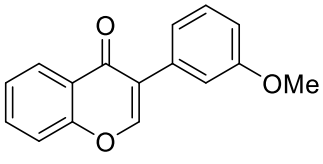
Yellow solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (dd, *J* = 7.9, 1.7 Hz, 1H), 8.01 (s, 1H), 7.73-7.66 (m, 1H), 7.61-7.52 (m, 2H), 7.52-7.40 (m, 2H), 7.17-7.10 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 176.2, 162.8 (d, *J* = 248.5), 156.2, 152.9, 133.7, 130.7 (d, *J* = 9.1), 127.8 (d, *J* = 3.0), 126.4, 125.4, 124.6, 124.5, 118.1, 115.5 (d, *J* = 21.2).

3-(*m*-Tolyl)-4*H*-chromen-4-one (**3e**)[8]



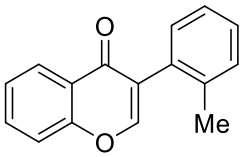
White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.32 (dd, *J* = 8.0, 1.7 Hz, 1H), 8.02 (s, 1H), 7.72-7.66 (m, 1H), 7.49 (dd, *J* = 8.5, 1.0 Hz, 1H), 7.47-7.41 (m, 1H), 7.40 (s, 1H), 7.37-7.31 (m, 2H), 7.24-7.17 (m, 1H), 2.41 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 176.4, 156.2, 153.1, 138.2, 133.6, 131.7, 129.7, 129.0, 128.5, 126.5, 126.0, 125.5, 125.3, 124.6, 118.1, 21.5.

3-(3-Methoxyphenyl)-4*H*-chromen-4-one (**3f**)[9]



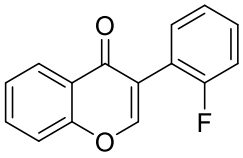
White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.32 (dd, *J* = 8.0, 1.7 Hz, 1H), 8.04 (s, 1H), 7.72-7.66 (m, 1H), 7.49 (dd, *J* = 8.4, 1.0 Hz, 1H), 7.47-7.40 (m, 1H), 7.35 (t, *J* = 7.9 Hz, 1H), 7.19-7.15 (m, 1H), 7.15-7.10 (m, 1H), 6.97-6.91 (m, 1H), 3.85 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 176.2, 159.6, 156.2, 153.2, 133.7, 133.2, 129.5, 126.5, 125.3, 125.3, 124.6, 121.2, 118.1, 114.5, 114.1, 55.3.

3-(*o*-Tolyl)-4*H*-chromen-4-one (**3g**)[10]



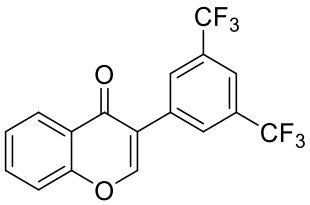
White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (dd, *J* = 8.0, 1.7 Hz, 1H), 7.89 (s, 1H), 7.74-7.67 (m, 1H), 7.51 (d, *J* = 8.5, 1H), 7.47-7.41 (m, 1H), 7.35-7.27 (m, 2H), 7.27-7.21 (m, 1H), 7.21-7.16 (m, 1H), 2.26 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 176.0, 156.5, 153.6, 138.1, 133.6, 131.6, 130.5, 130.2, 128.7, 126.6, 126.5, 125.8, 125.2, 124.4, 118.1, 20.1.

3-(2-Fluorophenyl)-4*H*-chromen-4-one (**3h**) [11]



White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.31 (dd, *J* = 8.0, 1.7 Hz, 1H), 8.06 (d, *J* = 1.3 Hz, 1H), 7.74-7.66 (m, 1H), 7.53-7.47 (m, 2H), 7.47-7.41 (m, 1H), 7.42-7.34 (m, 1H), 7.22 (td, *J* = 7.5, 1.3 Hz, 1H), 7.20-7.13 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 175.6, 160.3 (d, *J* = 242.4), 156.2, 154.5 (d, *J* = 3.0), 133.8, 132.0 (d, *J* = 3.0), 130.2 (d, *J* = 9.1), 126.4, 125.4, 124.5, 124.1 (d, *J* = 4.0), 120.3, 119.5 (d, *J* = 15.2), 118.1, 115.9 (d, *J* = 23.2).

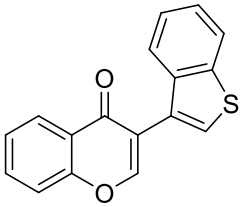
3-(3,5-Bis(trifluoromethyl)phenyl)-4*H*-chromen-4-one (**3i**)



White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.32 (dd, *J* = 8.0, 1.7, 1H), 8.14 (s, 1H), 8.07 (brs, 2H), 7.90 (brs, 1H), 7.78-7.72 (m, 1H), 7.54 (dd, *J* = 8.4, 1.3 Hz, 1H), 7.52-7.46 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 175.5, 156.2, 153.8, 134.3, 134.0, 131.9 (q, *J* = 33.3), 129.1

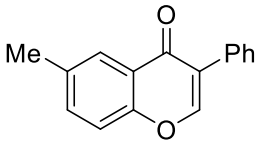
(m), 126.4, 125.9, 124.3, 123.3 (q, J = 273.7), 123.1, 122.0 (q, J = 4.0), 118.2. HRMS (EI) m/z Calcd. for $C_{17}H_9F_6O_2$ ([M+H]): 359.0501. Found: 359.0495.

3-(Benzo[b]thiophen-3-yl)-4H-chromen-4-one (**3j**)



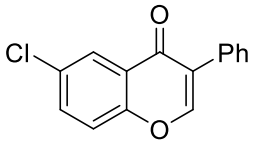
Yellow solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.34 (dd, J = 8.0, 1.5 Hz, 1H), 8.16 (s, 1H), 7.94-7.87 (m, 1H), 7.78-7.69 (m, 2H), 7.64 (s, 1H), 7.56-7.51 (m, 1H), 7.51-7.42 (m, 1H), 7.41-7.35 (m, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 176.1, 156.3, 153.9, 140.1, 138.1, 133.9, 127.2, 126.7, 126.5, 125.5, 124.5, 124.4, 124.4, 122.9, 120.7, 118.2. HRMS (EI) m/z Calcd. for $C_{17}H_{11}O_2S$ ([M+H]): 279.0474. Found: 279.0473.

6-Methyl-3-phenyl-4*H*-chromen-4-one (**3k**)[12]



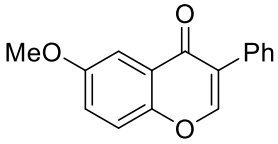
Yellow solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.10 (d, J = 1.3 Hz, 1H), 8.00 (s, 1H), 7.59-7.54 (m, 2H), 7.49 (dd, J = 8.6, 2.3 Hz, 1H), 7.47-7.41 (m, 2H), 7.41-7.35 (m, 2H), 2.48 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 176.3, 154.5, 153.0, 135.2, 134.9, 132.1, 129.0, 128.5, 128.1, 125.7, 125.2, 124.3, 117.8, 21.0.

6-Chloro-3-phenyl-4*H*-chromen-4-one (**3l**)[8]



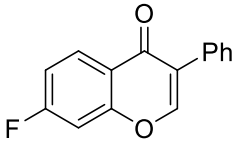
Yellow solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.28 (d, J = 2.6 Hz, 1H), 8.02 (s, 1H), 7.63 (dd, J = 8.9, 2.6 Hz, 1H), 7.58-7.53 (m, 2H), 7.48-7.37 (m, 4H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 175.1, 154.6, 153.2, 133.9, 131.4, 131.3, 128.9, 128.6, 128.5, 125.8, 125.5, 125.5, 119.8.

6-Methoxy-3-phenyl-4*H*-chromen-4-one (**3m**)[10]



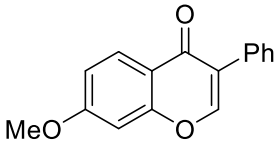
Yellow solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.02 (s, 1H), 7.68 (d, *J* = 3.1 Hz, 1H), 7.60-7.55 (m, 2H), 7.48-7.36 (m, 4H), 7.28 (dd, *J* = 9.1, 3.1 Hz, 1H), 3.92 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ176.0, 157.0, 152.9, 151.1, 132.0, 129.0, 128.5, 128.1, 125.2, 124.6, 123.8, 119.5, 105.4, 56.0.

7-Fluoro-3-phenyl-4*H*-chromen-4-one (**3n**)[11]



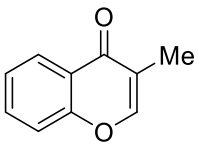
White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.33 (dd, *J* = 9.6, 6.3 Hz, 1H), 8.00 (s, 1H), 7.59-7.52 (m, 2H), 7.48-7.37 (m, 3H), 7.20-7.13 (m, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 175.4, 165.6 (d, *J* = 9.1), 157.2 (d, *J* = 13.1), 153.1, 131.4, 129.1, 129.0, 128.8 (d, *J* = 38.4), 128.4, 125.6, 121.5 (d, *J* = 3.0), 114.1 (d, *J* = 22.2), 104.7 (d, *J* = 25.2) .

7-Methoxy-3-phenyl-4*H*-chromen-4-one (**3o**)[8]



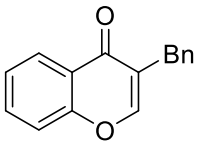
White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.22 (d, *J* = 8.9 Hz, 1H), 7.95 (s, 1H), 7.59-7.54 (m, 2H), 7.47-7.41 (m, 2H), 7.41-7.35 (m, 1H), 7.00 (dd, *J* = 8.9, 2.4 Hz, 1H), 6.86 (d, *J* = 2.4 Hz, 1H), 3.92 (s, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ175.7, 164.0, 158.0, 152.6, 131.9, 128.99, 128.5, 128.1, 127.8, 125.3, 118.4, 114.7, 100.1, 55.9.

3-Methyl-4*H*-chromen-4-one (**3p**)[4]



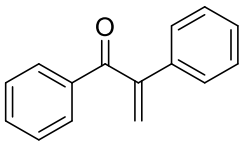
White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.24 (dd, *J* = 8.0, 1.7 Hz, 1H), 7.80 (m, 1H), 7.67-7.60 (m, 1H), 7.44-7.40 (m, 1H), 7.40-7.35 (m, 1H), 2.04 (d, *J* = 1.2 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ178.3, 156.7, 151.7, 133.3, 125.8, 124.8, 123.6, 120.7, 118.0, 11.3.

3-Benzyl-4H-chromen-4-one (**3q**)[5]



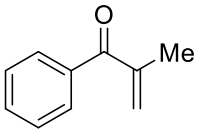
Yellow solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.23 (dd, *J* = 8.0, 1.5 Hz, 1H), 7.67-7.61 (m, 1H), 7.61-7.59 (m, 1H), 7.43-7.35 (m, 2H), 7.33-7.28 (m, 4H), 7.25-7.20 (m, 1H), 3.82 (d, *J* = 0.9 Hz, 2H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 177.5, 156.5, 153.1, 138.6, 133.4, 129.1, 128.6, 126.5, 126.0, 125.0, 124.7, 123.9, 118.0, 31.7.

1,2-Diphenylprop-2-en-1-one (**3r**)[6]



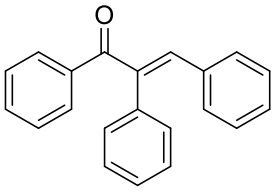
Yellow solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.93-7.91 (m, 1H), 7.90-7.89 (m, 1H), 7.58-7.52 (m, 1H), 7.46-7.40 (m, 4H), 7.38-7.29 (m, 3H), 6.07 (s, 1H), 5.64 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 197.6, 148.3, 137.1, 137.0, 133.1, 130.0, 128.6, 128.5, 128.4, 127.1, 121.0.

2-Methyl-1-phenylprop-2-en-1-one (**3s**)[7]



Colorless oil. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.77-7.70 (m, 2H), 7.56-7.50 (m, 1H), 7.46-7.40 (m, 2H), 5.91 (m, 1H), 5.64-5.61 (m, 1H), 2.08 (dd, *J* = 1.5, 0.9 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 198.4, 143.8, 137.7, 132.0, 129.4, 128.2, 127.1, 18.7.

(*E*)-1,2,3-Triphenylprop-2-en-1-one (**3t**) [6]



White solid. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.89-7.83 (m, 2H), 7.57-7.50 (m, 1H), 7.48-7.41 (m, 2H), 7.39- 7.31 (m, 3H), 7.31-7.26 (m, 2H), 7.25-7.14 (m, 4H), 7.12-7.05 (m, 2H); ^{13}C

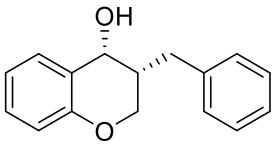
NMR (101 MHz, $CDCl_3$) δ 197.6, 140.8, 140.2, 138.2, 136.5, 134.8, 132.2, 130.4, 129.8, 129.7, 129.0, 128.8, 128.3, 128.3, 127.9.

III. General procedure for asymmetric hydrogenation of enones

To a 4.0 mL vial was added the catalyst precursor $[Ir(COD)Cl]_2$ (3.4 mg, 5.0×10^{-3} mmol), ligand **L3** (7.5 mg, 1.0×10^{-2} mmol) and anhydrous ^{i}PrOH (2.0 mL) under argon atmosphere. The mixture was stirred at 25 °C for 30 min, giving orange solution in the argon-filled glovebox. The resulting solution (100 μL) transferred by syringe into a 5.0 mL vial charged with different substrates (0.5 mmol) and NaOH (0.025 mmol, 1 mg) in 2.0 mL anhydrous *n*-hexane. The vials were transferred to an autoclave, which was then charged with 50 atm of H_2 and stirred at room temperature for 12-24 h. The hydrogen gas was released slowly in a well-ventilated hood and the solution was concentrated and passed through a short column of silica gel to give target product. The product was analyzed by chiral HPLC for ee values. The dr value and yield was determined by ^{1}H NMR analysis.

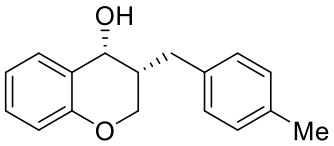
The racemic products were prepared by reduction of corresponding enones or α-substituted ketones with $NaBH_4$.

(3*R*,4*R*)-3-Benzylchroman-4-ol **(2a)**



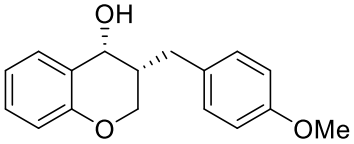
White solid, >99% yield, 119.8 mg; mp 120-122 °C, 99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +161.1 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S, S*) = 12.44 min (minor), t_R (*R, R*) = 14.92 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.36-7.30 (m, 2H), 7.30-7.23 (m, 3H), 7.23-7.17 (m, 2H), 6.89 (t, *J* = 7.4 Hz, 1H), 6.86-6.82 (m, 1H), 4.51 (s, 1H), 4.12-4.09 (m, 1H), 4.09-4.06 (m, 1H), 2.89 (dd, *J* = 13.6, 8.4 Hz, 1H), 2.68 (dd, *J* = 13.6, 7.3 Hz, 1H), 2.41-2.26 (m, 1H), 1.72 (d, *J* = 8.5 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.3, 139.2, 130.2, 123.0, 129.1, 128.6, 126.4, 124.2, 120.5, 116.9, 65.0, 65.0, 40.0, 32.8. HRMS (EI) m/z Calcd. for $C_{16}H_{16}NaO_2$ ([M+Na]): 263.1043. Found: 263.1053.

(3*R*,4*R*)-3-(4-Methylbenzyl)chroman-4-ol **(2b)**



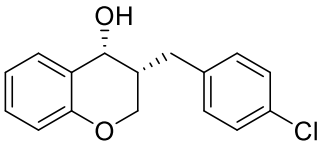
Yellow solid, >99% yield, 126.5 mg; mp 109-112 °C, 99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +137.4 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S*, *S*) = 10.45 min (minor), t_R (*R*, *R*) = 11.47 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.23-7.18 (m, 2H), 7.18-7.11 (m, 4H), 6.92-6.86 (m, 1H), 6.86-6.81 (m, 1H), 4.51 (s, 1H), 4.10-4.08 (m, , 1H), 4.07 (s, 1H), 2.84 (dd, *J* = 13.7, 8.5 Hz, 1H), 2.64 (dd, *J* = 13.7, 7.2 Hz, 1H), 2.38-2.25 (m, 4H), 1.73-1.66 (m, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.4, 136.0, 135.9, 130.2, 129.9, 129.3, 129.0, 124.2, 120.5, 116.9, 65.0, 64.9, 40.0, 32.4, 21.0. HRMS (EI) m/z Calcd. for $C_{17}H_{18}NaO_2$ ([M+Na]): 277.1199. Found: 277.1190.

(3*R*,4*R*)-3-(4-Methoxybenzyl)chroman-4-ol **(2c)**



Yellow solid, >99% yield, 134.6 mg; mp 129-131 °C, >99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +111.4 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S*, *S*) = 15.87 min (minor), t_R (*R*, *R*) = 18.46 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.24-7.16 (m, 4H), 6.92-6.81 (m, 4H), 4.50 (s, 1H), 4.10-4.08 (m, 1H), 4.07 (s, 1H), 3.80 (s, 3H), 2.82 (dd, *J* = 13.8, 8.5 Hz, 1H), 2.62 (dd, *J* = 13.8, 7.2 Hz, 1H), 2.35-2.22 (m, 1H), 1.79-1.65 (m, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.1, 154.4, 131.1, 130.2, 130.0, 123.0, 124.2, 120.5, 116.9, 114.0, 65.0, 64.9, 55.3, 40.1, 31.9. HRMS (EI) m/z Calcd. for $C_{17}H_{18}NaO_3$ ([M+Na]): 293.1148. Found: 293.1145.

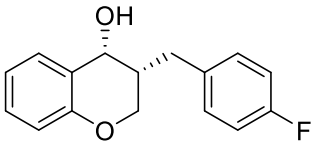
(3*R*,4*R*)-3-(4-Chlorobenzyl)chroman-4-ol **(2d)**



White solid, >99% yield, 136.5 mg; mp 110-112 °C, >99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +113.3 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H

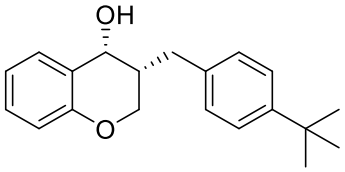
column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S*, *S*) = 12.68 min (minor), t_R (*R*, *R*) = 13.64 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.32-7.27 (m, 2H), 7.24-7.17 (m, 4H), 6.90 (td, *J* = 7.5, 1.1 Hz, 1H), 6.84 (d, *J* = 8.0 Hz, 1H), 4.48 (s, 1H), 4.12-4.04 (m, 2H), 2.86 (dd, *J* = 13.7, 8.6 Hz, 1H), 2.64 (dd, *J* = 13.7, 7.1 Hz, 1H), 2.36-2.19 (m, 1H), 1.68 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.3, 137.6, 132.1, 130.5, 130.1, 130.0, 128.7, 124.1, 120.7, 117.0, 64.9, 64.7, 40.0, 32.2. HRMS (EI) m/z Calcd. for $C_{16}H_{14}ClO_2$ ([M-H]): 273.0688. Found: 273.0711.

(3*R*,4*R*)-3-(4-Fluorobenzyl)chroman-4-ol **(2e)**



White solid, >99% yield, 128.4 mg; mp 132-137 °C, 99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +91.0 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S*, *S*) = 11.92 min (minor), t_R(*R*, *R*) = 12.74 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.29-7.17 (m, 4H), 7.06-6.96 (m, 2H), 6.92-6.87 (m, 1H), 6.84 (d, *J* = 8.3 Hz, 1H), 4.48 (t, *J* = 3.5 Hz, 1H), 4.12-4.03 (m, 2H), 2.86 (dd, *J* = 13.7, 8.6 Hz, 1H), 2.64 (dd, *J* = 13.7, 7.2 Hz, 1H), 2.34-2.20 (m, 1H), 1.70 (d, *J* = 4.5 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 161.6 (d, *J* = 245.4 Hz), 154.3, 134.8 (d, *J* = 3.2 Hz), 130.5 (d, *J* = 8.1 Hz), 130.1, 130.0, 124.1, 120.6, 117.0, 115.5 (d, *J* = 21.2 Hz), 64.9, 65.0, 40.1, 32.0. HRMS (EI) m/z Calcd. for $C_{16}H_{15}FNaO_2$ ([M+Na]): 281.0948. Found: 281.0924.

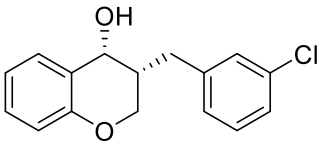
(3*R*,4*R*)-3-(4-(Tert-butyl)benzyl)chroman-4-ol **(2f)**



Yellow solid, >99% yield, 147.4 mg; mp 32-34 °C. >99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +104.0 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 95:5; flow rate = 0.4 mL/min; UV detection at 210 nm; t_R (*S*, *S*) = 26.84 min (major), t_R(*R*, *R*) = 35.14 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.37-7.32 (m, 2H), 7.23-7.16 (m, 4H), 6.87 (ddd, *J* = 21.7, 10.9, 4.5 Hz, 1H), 6.86-8.82 (m, 1H), 4.52 (s, 1H), 4.11-4.06 (m, 2H), 2.85 (dd, *J* = 13.7, 8.3 Hz, 1H), 2.64 (dd, *J* = 13.7, 7.4 Hz, 1H), 2.39-2.24

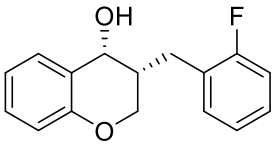
(m, 1H), 1.71 (d, *J* = 4.1 Hz, 1H), 1.32 (s, 9H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.4, 149.2, 136.0, 130.2, 130.0, 128.8, 125.5, 124.2, 120.5, 117.0, 65.0, 40.0, 34.5, 32.3, 31.4. HRMS (EI) m/z Calcd. for $C_{20}H_{24}NaO_2$ ([M+Na]): 313.1669. Found: 313.1668.

(3*R*,4*R*)-3-(3-Chlorobenzyl)chroman-4-ol **(2g)**



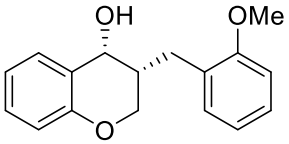
White solid, >99% yield, 134.8 mg; mp 62-66 °C, 99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +110.7 (c=1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S, S*) = 12.34 min (minor), t_R (*R, R*) = 12.97 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.29-7.26 (m, 1H), 7.25-7.18 (m, 4H), 7.18-7.13 (m, 1H), 6.90 (td, *J* = 7.5, 1.1 Hz, 1H), 6.87-6.81 (m, 1H), 4.49 (t, *J* = 3.3 Hz, 1H), 4.16-4.02 (m, 2H), 2.87 (dd, *J* = 13.6, 8.5 Hz, 1H), 2.64 (dd, *J* = 13.6, 7.2 Hz, 1H), 2.37-2.23 (m, 1H), 1.74-1.66 (m, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.3, 141.3, 134.4, 130.1, 129.8, 129.3, 127.4, 126.6, 124.0, 120.7, 117.0, 64.8, 62.7, 39.9, 32.5. HRMS (EI) m/z Calcd. for $C_{16}H_{14}ClO_2$ ([M-H]): 273.0688. Found: 273.0685.

(3*R*,4*R*)-3-(2-Fluorobenzyl)chroman-4-ol **(2h)**



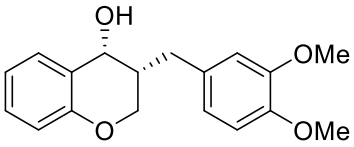
White solid, >99% yield, 128.1 mg; mp 119-121 °C, 99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +135.2 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S, S*) = 10.06 min (minor), t_R(*R, R*) = 10.87 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.29 (td, *J* = 7.6, 1.6 Hz, 1H), 7.25-7.18 (m, 3H), 7.11 (td, *J* = 7.4, 0.8 Hz, 1H), 7.08-7.02 (m, 1H), 6.89 (td, *J* = 7.5, 1.1 Hz, 1H), 6.87-6.82 (m, 1H), 4.51 (t, *J* = 3.2 Hz, 1H), 4.17-4.04 (m, 2H), 2.91 (dd, *J* = 13.6, 8.1 Hz, 1H), 2.74 (dd, *J* = 13.7, 7.3 Hz, 1H), 2.44-2.30 (m, 1H), 1.89-1.75 (m, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 161.4 (d, *J* = 245.4 Hz), 154.3, 131.6 (d, *J* = 4.8 Hz), 130.2, 130.0, 128.3 (d, *J* = 8.2 Hz), 126.1 (d, *J* = 15.8 Hz), 124.2 (d, *J* = 4.0 Hz), 124.0, 120.6, 117.0, 115.5 (d, *J* = 22.2 Hz), 65.1, 64.8, 38.9, 26.6 (d, *J* = 2.1 Hz). HRMS (EI) m/z Calcd. for $C_{16}H_{15}FNaO_2$ ([M+Na]): 281.0948. Found: 281.0955.

(3*R*,4*R*)-3-(2-Methoxybenzyl)chroman-4-ol **(2i)**



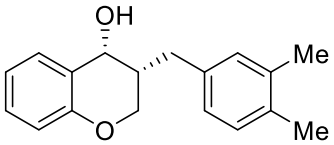
White solid, 99% yield, 133.0 mg; mp 172-175 °C, 98% ee; >20:1 dr; $[\alpha]_D^{25}$ = +50.8 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S, S*) = 13.32 min (minor), t_R(*R, R*) = 27.24 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.28-7.15 (m, 4H), 6.99-6.90 (m, 2H), 6.89-6.80 (m, 2H), 4.36 (s, 1H), 4.23-4.06 (m, 2H), 3.88 (s, 3H), 2.91 (dd, *J* = 13.4, 9.9 Hz, 1H), 2.83 (d, *J* = 3.0 Hz, 1H), 2.61 (dd, *J* = 13.4, 5.8 Hz, 1H), 2.39-2.26 (m, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 157.2, 154.5, 131.2, 130.8, 129.7, 127.87, 127.2, 123.7, 121.2, 120.4, 116.8, 110.6, 65.4, 64.6, 55.6, 39.9, 27.1. HRMS (EI) m/z Calcd. for $C_{17}H_{18}NaO_3$ ([M+Na]): 293.1148. Found: 293.1148.

(3*R*,4*R*)-3-(3,4-Dimethoxybenzyl)chroman-4-ol **(2j)**



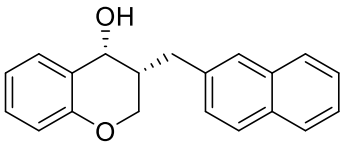
Yellow solid, >99% yield, 149.5 mg; mp 100-108 °C, >99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +99.2 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S, S*) = 31.97 min (minor), t_R(*R, R*) = 35.25 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.25-7.18 (m, 2H), 6.90 (td, *J* = 7.5, 1.1 Hz, 1H), 6.87-6.78 (m, 4H), 4.52 (s, 1H), 4.15-4.04 (m, 2H), 3.88 (s, 6H), 2.83 (dd, *J* = 13.7, 8.5 Hz, 1H), 2.64 (dd, *J* = 13.7, 7.2 Hz, 1H), 2.38-2.23 (m, 1H), 1.71 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.4, 149.0, 147.5, 131.6, 130.2, 130.0, 124.2, 121.0, 120.6, 116.9, 112.2, 111.3, 65.0, 64.9, 56.0, 55.9, 40.1, 32.5. HRMS (EI) m/z Calcd. for $C_{18}H_{20}NaO_4$ ([M+Na]): 323.1254. Found: 323.1255.

(3*R*,4*R*)-3-(3,4-Dimethylbenzyl)chroman-4-ol **(2k)**



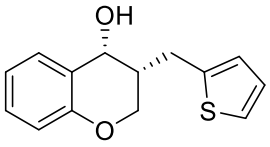
White solid, >99% yield, 133.0 mg; mp 108-110 °C. >99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +28.9 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S*, *S*) = 11.74 min (major), t_R(*R*, *R*) = 16.39min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.24-7.17 (m, 2H), 7.12-7.06 (m, 1H), 7.04 (s, 1H), 7.03-6.98 (m, 1H), 6.92-6.86 (m, 1H), 6.86-6.82 (m, 1H), 4.53 (t, *J* = 3.6 Hz, 1H), 4.12-4.05 (m, 2H), 2.81 (dd, *J* = 13.7, 8.4 Hz, 1H), 2.62 (dd, *J* = 13.7, 7.2 Hz, 1H), 2.37-2.28 (m, 1H), 2.26 (s, 6H), 1.75-1.65 (m, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.4, 136.7, 136.5, 134.5, 130.4, 130.2, 129.9, 129.8, 126.5, 124.2, 120.5, 116.9, 65.1, 65.0, 40.0, 32.3, 19.8, 19.4. HRMS (EI) m/z Calcd. for $C_{18}H_{20}NaO_2$ ([M+Na]): 291.1356. Found: 291.1359.

(3*R*,4*R*)-3-(Naphthalen-2-ylmethyl)chroman-4-ol **(2l)**



Yellow solid, >99% yield, 144.5 mg; mp 135-138 °C, >99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +98.9 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak AS-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S*, *S*) =14.15 min (minor), t_R(*R*, *R*) = 20.77 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.86-7.78 (m, 3H), 7.73 (s, 1H), 7.51-7.42 (m, 2H), 7.42-7.38 (m, 1H), 7.24-7.14 (m, 2H), 6.91-6.82 (m, 2H), 4.52 (s, 1H), 4.22-4.07 (m, 2H), 3.04 (dd, *J* = 13.7, 8.6 Hz, 1H), 2.84 (dd, *J* = 13.7, 7.1 Hz, 1H), 2.52-2.37 (m, 1H), 1.80-1.70 (m, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.4, 136.7, 133.6, 132.2, 130.2, 130.0, 128.3, 127.7, 127.6, 127.5, 127.5, 126.1, 125.5, 124.2, 120.58, 117.0, 65.1, 64.9, 39.9, 33.0. HRMS (EI) m/z Calcd. for $C_{20}H_{18}NaO_2$ ([M+Na]): 313.1199. Found: 313.1207.

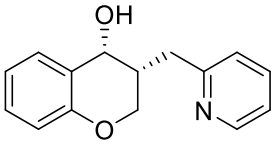
(3*R*,4*R*)-3-(Thiophen-2-ylmethyl)chroman-4-ol **(2m)**



Yellow solid, >99% yield, 122.6 mg; mp 115-118 °C, >99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +129.4 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S*, *S*)

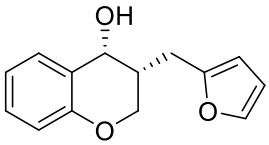
=13.24 min (minor), t_R(*R, R*) = 14.71 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.24-7.16 (m, 3H), 6.98-6.95 (m, 1H), 6.94-6.88 (m, 2H), 6.85 (d, *J* = 8.0 Hz, 1H), 4.61 (s, 1H), 4.18-4.02 (m, 2H), 3.13 (dd, *J* = 14.8, 8.3 Hz, 1H), 2.90 (dd, *J* = 14.8, 7.3 Hz, 1H), 2.41-2.30 (m, 1H), 1.80-1.70 (m, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.3, 141.6, 130.2, 130.0, 127.0, 125.7, 124.0, 123.8, 120.7, 117.0, 64.8, 64.8, 40.5, 27.1. HRMS (EI) m/z Calcd. for $C_{20}H_{13}O_2S$ ([M-H]): 245.0642. Found: 245.0642.

(3*R*,4*R*)-3-(Pyridin-2-ylmethyl)chroman-4-ol **(2n)**



Yellow solid, >99% yield, 119.9 mg; mp 110-112 °C >99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +147.2 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S, S*) =34.88 min (minor), t_R(*R, R*) = 37.07 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.58-8.50 (m, 1H), 7.67 (td, *J* = 7.7, 1.8 Hz, 1H), 7.30 (dd, *J* = 7.6, 1.5 Hz, 1H), 7.28 -7.14 (m, 3H), 6.90 (td, *J* = 7.5, 1.0 Hz, 1H), 6.83 (d, *J* = 8.2 Hz, 1H), 4.43 (d, *J* = 3.6 Hz, 1H), 4.14-4.09 (m, 2H), 3.00 (dd, *J* = 13.4, 10.8 Hz, 1H), 2.84 (dd, *J* = 13.4, 5.1 Hz, 1H), 2.47-2.34 (m, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 159.2, 154.5, 148.8, 137.3, 131.0, 129.3, 123.9, 123.7, 121.8, 120.6, 116.58, 65.9, 63.9, 39.8, 35.3. HRMS (EI) m/z Calcd. for $C_{15}H_{15}NO_2$ ([M-H]): 240.1030 Found: 240.1033.

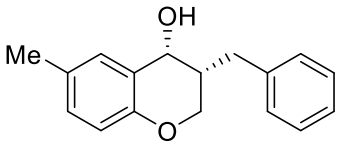
(3*R*,4*R*)-3-(Furan-2-ylmethyl)chroman-4-ol **(2o)**



Yellow solid, >99% yield, 114.9 mg; mp 68-70 °C. >99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +142.9 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S, S*) =11.29 min (minor), t_R(*R, R*) = 11.91 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.35 (dd, *J* = 1.8, 0.7 Hz, 1H), 7.27-7.18 (m, 3H), 6.91 (td, *J* = 7.4, 1.1 Hz, 1H), 6.85 (d, *J* = 8.3 Hz, 1H), 6.33 (dd, *J* = 3.1, 1.9 Hz, 1H), 6.12 (dd, *J* = 3.1, 0.6 Hz, 1H), 4.58 (s, 1H), 4.14-4.02 (m, 2H), 2.92 (dd, *J* = 15.1, 8.1 Hz, 1H), 2.72 (dd, *J* = 15.1, 7.4 Hz, 1H), 2.48-2.38 (m, 1H), 1.90 (d, *J* = 4.0 Hz,

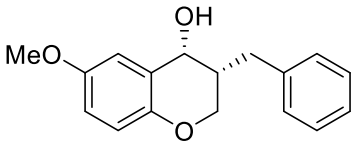
1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.3, 153.2, 141.5, 130.3, 130.0, 123.9, 120.6, 117.0, 110.4, 106.6, 65.2, 64.8, 37.9, 25.5. HRMS (EI) m/z Calcd. for $C_{14}H_{14}NaO_3$ ([M+Na]): 253.0835. Found: 253.0838.

(3*R*,4*R*)-3-Benzyl-6-methylchroman-4-ol **(2p)**



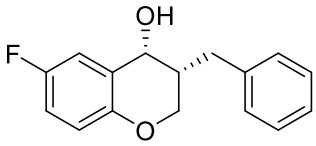
Yellow solid, >99% yield, 126.1 mg; mp 147-150 °C, >99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +83.9 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S*, *S*) =10.76 min (minor), t_R(*R*, *R*) = 13.00 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.36-7.20 (m, 5H), 7.04-6.98 (m, 2H), 6.77-6.72 (m, 1H), 4.47 (s, 1H), 4.11-4.00 (m, 2H), 2.88 (dd, *J* = 13.6, 8.4 Hz, 1H), 2.67 (dd, *J* = 13.6, 7.3 Hz, 1H), 2.37-2.28 (m, 1H), 2.25 (s, 3H), 1.67 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 152.1, 139.2, 130.7, 130.3, 129.8, 129.1, 128.6, 126.3, 123.8, 116.7, 65.0, 65.0, 40.2, 32.9, 20.4. HRMS (EI) m/z Calcd. for $C_{17}H_{18}NaO_2$ ([M+Na]): 277.1199. Found: 277.1181.

(3*R*,4*R*)-3-Benzyl-6-methoxychroman-4-ol **(2q)**



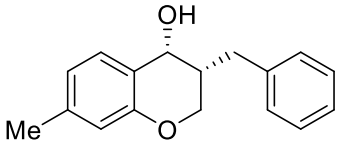
Yellow solid, >99% yield, 132.1 mg; mp 157-159 °C, >99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +55.8 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S*, *S*) =18.10 min (minor), t_R(*R*, *R*) =22.30 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.36-7.30 (m, 2H), 7.30-7.21 (m, 3H), 6.82-6.73 (m, 3H), 4.49 (t, *J* = 3.6 Hz, 1H), 4.07-4.02 (m, 2H), 3.74 (s, 3H), 2.88 (dd, *J* = 13.6, 8.5 Hz, 1H), 2.67 (dd, *J* = 13.6, 7.3 Hz, 1H), 2.41-2.25 (m, 1H), 1.71 (d, *J* = 4.8 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.5, 148.3, 139.2, 129.1, 128.6, 126.4, 124.3, 117.7, 116.7, 113.8, 65.3, 65.0, 55.8, 40.2, 32.7. HRMS (EI) m/z Calcd. for $C_{17}H_{18}NaO_3$ ([M+Na]): 293.1148. Found: 293.1153.

(3*R*,4*R*)-3-Benzyl-6-fluorochroman-4-ol **(2r)**



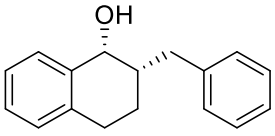
Yellow solid, >99% yield, 128.4 mg; mp 104-107 °C, 99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +116.5 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S, S*) =12.70 min (minor), t_R(*R, R*) = 15.23 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.37-7.30 (m, 2H), 7.29-7.22 (m, 3H), 6.95-6.88 (m, 2H), 6.81-6.76 (m, 1H), 4.49 (t, *J* = 3.5 Hz, 1H), 4.10-4.02 (m, 2H), 2.87 (dd, *J* = 13.7, 8.3 Hz, 1H), 2.67 (dd, *J* = 13.7, 7.4 Hz, 1H), 2.36-2.26 (m, 1H), 1.80-1.74 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 156.7 (d, *J* = 239.4 Hz), 150.3, 139.0, 129.1, 128.7, 126.5, 124.8 (d, *J* = 6.6 Hz), 118.0 (d, *J* = 7.8 Hz), 116.9 (d, *J* = 23.2 Hz), 115.7 (d, *J* = 22.2 Hz), 65.1, 64.9, 39.9, 32.6. HRMS (EI) m/z Calcd. for $C_{16}H_{15}NaO_2$ ([M+Na]): 281.0948. Found: 281.0936.

(3*R*,4*R*)-3-Benzyl-7-methylchroman-4-ol **(2s)**



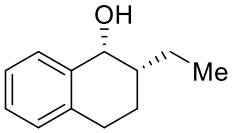
Yellow solid, >99% yield, 126.4 mg; mp 150-152 °C, 97% ee; >20:1 dr; $[\alpha]_D^{25}$ = +125.0 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S, S*) =17.41 min (minor), t_R(*R, R*) = 22.17 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.38-7.20 (m, 5H), 7.09 (d, *J* = 7.7 Hz, 1H), 6.71 (d, *J* = 7.8 Hz, 1H), 6.66 (s, 1H), 4.48 (s, 1H), 4.16-3.99 (m, 2H), 2.88 (dd, *J* = 13.6, 8.4 Hz, 1H), 2.67 (dd, *J* = 13.6, 7.3 Hz, 1H), 2.38-2.24 (m, 4H), 1.63 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.2, 140.2, 139.3, 129.9, 129.2, 128.6, 126.3, 121.6, 121.4, 117.2, 65.0, 64.7, 40.2, 32.9, 21.3. HRMS (EI) m/z Calcd. for $C_{17}H_{18}NaO_2$ ([M+Na]): 277.1199. Found: 277.1166.

(1*R*,2*S*)-2-Benzyl-1,2,3,4-tetrahydronaphthalen-1-ol **(2t)**[13]



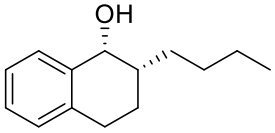
Yellow oil, >99% yield, 119.0 mg; 92% ee; >20:1 dr; $[\alpha]_D^{25}$ = +67.4 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S, S*) =10.60 min (minor), t_R(*R, R*) = 11.66 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.35-7.09 (m, 9H), 4.51 (s, 1H), 2.95 (dd, *J* = 13.5, 7.8 Hz, 1H), 2.92-2.83 (m, 1H), 2.80-2.68 (m, 2H), 2.09-1.96 (m, 1H), 1.90-1.76 (m, 1H), 1.75-1.65 (m, 1H), 1.59 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 140.7, 138.5, 137.0, 130.1, 129.3, 129.2, 128.4, 128.1, 126.2, 126.0, 69.4, 41.76, 38.2, 29.2, 22.6. HRMS (EI) m/z Calcd. for $C_{17}H_{18}NaO$ ([M+Na]): 261.1250. Found: 261.1270.

(1*R*,2*R*)-2-Ethyl-1,2,3,4-tetrahydronaphthalen-1-ol **(2u)**[14]



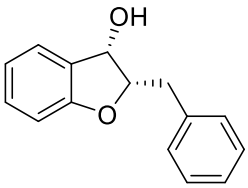
Yellow oil, 90% yield, 79 mg, >99% ee; 10:1 dr; $[\alpha]_D^{20}$ = +91.6 (c = 1.00, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 90:10; flow rate = 0.3 mL/min; UV detection at 210 nm; t_R (*R, R*) =21.50 min (major), t_R(*S, S*) = 22.67 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.36-7.32 (m, 1H), 7.20 (m, 2H), 7.12 (m, 1H), 4.65 (s, 1H), 2.91-2.70 (m, 2H), 1.76-1.67 (m, 2H), 1.67-1.56 (m, 2H), 1.50-1.39 (m, 2H), 1.04 (t, *J* = 7.3 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 138.7, 137.2, 130.1, 129.1, 127.9, 126.1, 69.7, 41.4, 29.3, 24.4, 22.8, 11.7. HRMS (EI) m/z Calcd. for $C_{12}H_{16}NaO$ ([M+Na]): 199.1077. Found: 199.1099.

(1*R*,2*R*)-2-Butyl-1,2,3,4-tetrahydronaphthalen-1-ol (**2v**)[15]



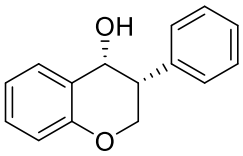
Colorless oil, 80% yield, 32.6 mg, 86% ee; 8:1 dr; $[\alpha]_D^{20}$ = +44.5 (c=1.00, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 98:2; flow rate = 0.5 mL/min; UV detection at 210 nm; t_R (*R, R*) =42.47 min (major), t_R(*S, S*) = 46.42 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.35-7.33 (m, 1H), 7.24-7.17 (m, 2H), 7.15-7.11 (m, 1H), 4.64 (s, 1H), 2.89-2.72 (m, 2H), 1.81-1.62 (m, 4H), 1.38-1.32 (m, 6H), 0.94 (t, J = 7.1 Hz, 3H).^{13}C NMR (101 MHz, $CDCl_3$) δ 138.7, 137.1, 130.0, 129.1, 127.9, 126.1, 70.1, 39.5, 31.3, 29.3, 29.2, 23.0, 14.1.

(2*S*,3*S*)-2-Benzyl-2,3-dihydrobenzofuran-3-ol **(2w)**[16]



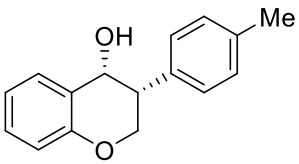
Yellow solid, >99% yield, 113.0 mg; mp 106-109 °C, 93% ee; >20:1 dr; $[\alpha]_D^{25}$ = -6.4 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 0.8 mL/min; UV detection at 210 nm; t_R (*R*, *R*) =17.86 min (minor), t_R(*S*, *S*) = 22.02 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.44-7.38 (m, 3H), 7.38-7.32 (m, 2H), 7.30-7.22 (m, 2H), 6.93 (td, *J* = 7.4, 0.8 Hz, 1H), 6.87 (d, *J* = 8.1 Hz, 1H), 5.03 (d, *J* = 3.5 Hz, 1H), 4.67-4.60 (m, 1H), 3.30 (dd, *J* = 14.1, 6.9 Hz, 1H), 3.20 (dd, *J* = 14.1, 7.5 Hz, 1H), 1.65 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 159.8, 138.0, 130.9, 129.4, 129.1, 128.6, 126.6, 125.8, 121.18, 110.78, 87.8, 72.3, 34.5. HRMS (EI) m/z Calcd. for $C_{15}H_{14}NaO_2$ ([M+Na]): 249.0886. Found: 249.0888.

(3*R*,4*R*)-3-Phenylchroman-4-ol (**4a**)[17]



Colorless oil, 99% yield, 45 mg, 99% ee; >20:1 dr; $[\alpha]_D^{20}$ = +192.5 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IC-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R*, *R*) =10.06 min (major), t_R(*S*, *S*) = 15.10 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.42-7.35 (m, 2H), 7.34-7.22 (m, 5H), 6.98 -6.89 (m, 2H), 4.81 (s, 1H), 4.61 (dd, *J* = 11.7, 10.5 Hz, 1H), 4.34 (ddd, *J* = 10.5, 3.6, 1.3 Hz, 1H), 3.34 (dt, *J* = 11.8, 3.3 Hz, 1H), 1.79 (d, *J* = 3.5 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.3, 137.8, 130.6, 130.0, 128.9, 128.4, 127.5, 123.6, 120.7, 117.0, 67.2, 64.1, 44.2.

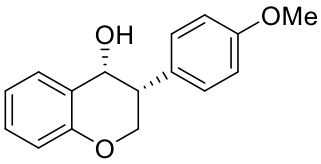
(3*R*,4*R*)-3-(*p*-Tolyl)chroman-4-ol (**4b**)



Colorless oil, 99% yield, 47.6 mg, >99% ee; >20:1 dr; $[\alpha]_D^{20}$ = +166.7 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IC-H column, hexane:

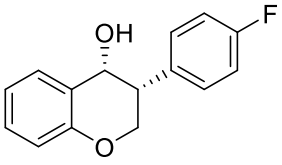
isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R*, *R*) =11.47 min (major), t_R(*S*, *S*) = 17.20 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.30 (dd, *J* = 7.6, 1.6 Hz, 1H), 7.28-7.22 (m, 1H), 7.21-7.15 (m, 4H), 6.97-6.88 (m, 2H), 4.78 (t, *J* = 2.7 Hz, 1H), 4.59 (dd, *J* = 11.7, 10.5 Hz, 1H), 4.32 (ddd, *J* = 10.4, 3.6, 1.3 Hz, 1H), 3.31 (dt, *J* = 11.8, 3.4 Hz, 1H), 2.35 (s, 3H), 1.77 (d, *J* = 3.6 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.3, 137.2, 134.6, 130.6, 130.0, 129.6, 128.2, 123.7, 120.6, 116.9, 67.2, 64.2, 43.8, 21.1. HRMS (EI) m/z Calcd. for $C_{16}H_{15}O_2$ ([M-H]): 239.1066. Found: 239.1056.

(3*R*,4*R*)-3-(4-Methoxyphenyl)chroman-4-ol (**4c**)



Colorless oil, 99% yield, 51 mg, 96% ee; >20:1 dr; $[\alpha]_D^{20}$ = +201.8 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IC-H column, hexane: isopropanol = 90:10; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R*, *R*) =12.94 min (major), t_R(*S*, *S*) = 17.35 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.30 (dd, *J* = 7.6, 1.7 Hz, 1H), 7.25 (m, 1H), 7.22-7.19 (m, 2H), 6.98-6.88 (m, 4H), 4.77 (t, *J* = 2.7 Hz, 1H), 4.56 (dd, *J* = 11.7, 10.5 Hz, 1H), 4.31 (ddd, *J* = 10.5, 3.6, 1.4 Hz, 1H), 3.81 (s, 3H), 3.29 (dt, *J* = 11.7, 3.4 Hz, 1H), 1.78 (d, *J* = 3.7 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 159.0, 154.2, 130.6, 130.0, 129.6, 129.4, 123.7, 120.6, 116.9, 114.3, 67.2, 64.3, 55.3, 43.4. HRMS (EI) m/z Calcd. for $C_{16}H_{16}NaO_3$ ([M+Na]): 279.0991. Found: 279.0984.

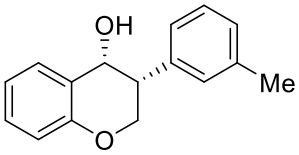
(3*R*,4*R*)-3-(4-Fluorophenyl)chroman-4-ol (**4d**)



Yellow oil, 99% yield, 48.5 mg, >99% ee; >20:1 dr; $[\alpha]_D^{20}$ = +196.9 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IC-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R*, *R*) =8.92 min (major), t_R(*S*, *S*) = 12.62 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.32-7.23 (m, 4H), 7.11-7.03 (m, 2H), 6.95 (td, *J* = 7.4, 1.2 Hz, 1H), 6.91 (d, *J* = 8.2 Hz, 1H), 4.78 (s, 1H), 4.56 (t, *J* = 11.1 Hz, 1H), 4.30 (ddd, *J* = 10.5, 3.6, 1.3 Hz, 1H), 3.31 (dt, *J* = 11.7, 3.4 Hz, 1H), 1.77 (d, *J* = 3.5 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 162.2 (d, *J* = 246.4 Hz), 154.1, 133.5 (d, *J* = 4.0 Hz), 130.4,

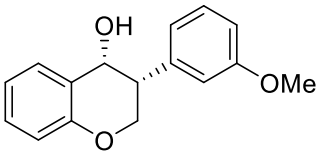
130.1, 130.0 (d, *J* = 8.1 Hz), 123.6, 120.8, 117.0, 115.7 (d, *J* = 21.2 Hz), 67.1, 64.2, 43.5. HRMS (EI) m/z Calcd. for $C_{15}H_{14}FO_2$ ([M+H]): 245.0972. Found: 245.0994.

(3*R*,4*R*)-3-(*m*-Tolyl)chroman-4-ol (**4e**)



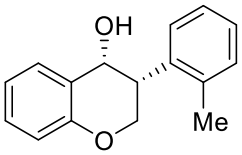
Yellow oil, 99% yield, 47.7 mg, 99% ee; >20:1 dr; $[\alpha]_D^{20}$ = +188.2 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IC-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R, R*) =9.93 min (major), t_R(*S, S*) = 14.24 min (minor). ^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.32-7.22 (m, 3H), 7.15-7.06 (m, 3H), 6.98-6.89 (m, 2H), 4.80 (s, 1H), 4.61 (dd, *J* = 11.9, 10.4 Hz, 1H), 4.34 (ddd, *J* = 10.4, 3.6, 1.4 Hz, 1H), 3.31 (dt, *J* = 11.9, 3.4 Hz, 1H), 2.37 (s, 3H), 1.77 (d, *J* = 3.4 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.3, 138.6, 137.6, 130.7, 130.0, 129.1, 128.8, 128.3, 125.3, 123.6, 120.64, 117.0, 67.2, 64.0, 44.1, 21.5. HRMS (EI) m/z Calcd. for $C_{16}H_{15}O_2$ ([M-H]): 239.1066. Found: 279.1081.

(3*R*,4*R*)-3-(3-Methoxyphenyl)chroman-4-ol (**4f**)



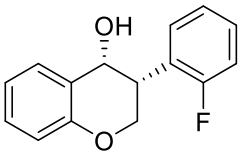
Colorless oil, 99% yield, 51.0 mg, 99% ee; >20:1 dr; $[\alpha]_D^{20}$ = +116.8 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IB-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R, R*) =19.99 min (major), t_R(*S, S*) = 36.81 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.33-7.28 (m, 2H), 7.28-7.22 (m, 1H), 6.95 (td, *J* = 7.4, 1.2 Hz, 1H), 6.91 (m, 1H), 6.89-6.83 (m, 3H), 4.83-4.79 (m, 1H), 4.59 (dd, *J* = 11.8, 10.4 Hz, 1H), 4.34 (ddd, *J* = 10.4, 3.6, 1.4 Hz, 1H), 3.81 (s, 3H), 3.32 (dt, *J* = 11.7, 3.3 Hz, 1H), 1.81 (d, *J* = 3.6 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 159.9, 154.3, 139.3, 130.6, 130.0, 129.9, 123.6, 120.7, 120.6, 116.9, 114.5, 112.5, 67.1, 64.0, 55.3, 44.2. HRMS (EI) m/z Calcd. for $C_{16}H_{15}O_3$ ([M-H]): 255.1016. Found: 255.1010.

(3*R*,4*R*)-3-(*o*-Tolyl)chroman-4-ol (**4g**)



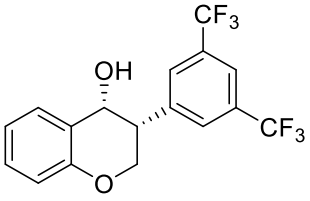
Yellow oil, 99% yield, 47.6 mg, 95% ee; >20:1 dr; $[\alpha]_D^{20}$ = +258.7 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IC-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R, R*) =10.16 min (major), t_R(*S, S*) = 17.69 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.32-7.28 (m, 1H), 7.28-7.18 (m, 4H), 7.17-7.12 (m, 1H), 6.99-6.91 (m, 2H), 4.79-4.75 (m, 1H), 4.66 (dd, *J* = 11.9, 10.4 Hz, 1H), 4.25 (ddd, *J* = 10.3, 3.3, 1.5 Hz, 1H), 3.56 (dt, *J* = 12.0, 3.1 Hz, 1H), 2.37 (s, 3H), 1.78 (d, *J* = 3.2 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.4, 136.6, 135.7, 131.0, 131.0, 130.0, 127.5, 127.3, 126.3, 123.8, 120.7, 117.1, 65.2, 64.3, 40.3, 19.7. HRMS (EI) m/z Calcd. for $C_{16}H_{16}NaO_2$ ([M+Na]): 263.1042. Found: 263.1055.

(3*R*,4*R*)-3-(2-Fluorophenyl)chroman-4-ol (**4h**)



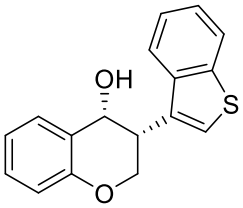
Yellow oil, 99% yield, 48.6 mg, 98% ee; >20:1 dr; $[\alpha]_D^{20}$ = +199.4 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IC-H column, hexane: isopropanol = 90:10; flow rate = 0.5 mL/min; UV detection at 210 nm; t_R (*R, R*) =11.53 min (major), t_R(*S, S*) = 14.11 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.34-7.23 (m, 4H), 7.19-7.07 (m, 2H), 6.96 (td, *J* = 7.4, 1.2 Hz, 1H), 6.92 (dd, *J* = 8.2, 1.1 Hz, 1H), 4.87 (s, 1H), 4.62 (ddd, *J* = 11.9, 10.4, 1.5 Hz, 1H), 4.31 (ddd, *J* = 10.4, 3.5, 1.4 Hz, 1H), 3.70 (dt, *J* = 12.0, 3.3 Hz, 1H), 1.78 (d, *J* = 3.8 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 160.88 (d, *J* = 247.5), 154.2, 130.6, 130.1, 129.1 (d, *J* = 4.0), 128.9 (d, *J* = 8.1), 124.9 (d, *J* = 14.1), 124.3 (d, *J* = 4.0), 123.7, 120.77, 117.1, 115.6 (d, *J* = 22.2), 66.0, 63.6 (d, *J* = 1.3), 37.1 (d, *J* = 2.1). HRMS (EI) m/z Calcd. for $C_{16}H_{14}O_2$ ([M+H]): 245.0972. Found: 245.0982.

(3*R*,4*R*)-3-(3,5-Bis(trifluoromethyl)phenyl)chroman-4-ol (**4i**)



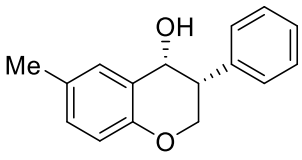
Yellow oil, 99% yield, 72.0 mg, >99% ee; >20:1 dr; $[\alpha]_D^{20}$ = +103.8 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IC-H column, hexane: isopropanol = 95:5; flow rate = 0.5 mL/min; UV detection at 210 nm; t_R (*R, R*) =8.34 min (major), t_R(*S, S*) = 8.97 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.83 (s, 1H), 7.80 (s, 2H), 7.32-7.26 (m, 2H), 6.98 (td, *J* = 7.5, 1.0 Hz, 1H), 6.94 (d, *J* = 8.2 Hz, 1H), 4.86 (s, 1H), 4.60 (dd, *J* = 11.7, 10.6 Hz, 1H), 4.32 (ddd, *J* = 10.5, 3.6, 1.3 Hz, 1H), 3.42 (dt, *J* = 11.8, 3.3 Hz, 1H), 1.86 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.8, 140.7, 131.8 (q, *J* = 33.3 Hz), 130.5, 130.0, 129.0, 123.5, 123.3 (q, *J* = 273.7 Hz), 121.4, 121.1, 117.2, 66.5, 63.7, 44.0. HRMS (EI) m/z Calcd. for $C_{17}H_{12}NaF_6O_2$ ([M+Na]): 385.0634. Found: 385.0636.

(3*R*,4*R*)-3-(Benzo[*b*]thiophen-3-yl)chroman-4-ol (**4j**)



Yellow oil, 99% yield, 56.1 mg, 96% ee; >20:1 dr; $[\alpha]_D^{20}$ = +221.7 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IB-H column, hexane: isopropanol = 95:5; flow rate = 0.5 mL/min; UV detection at 210 nm; t_R (*R, R*) =36.48 min (major), t_R(*S, S*) = 46.26 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.94-7.89 (m, 1H), 7.82-7.77 (m, 1H), 7.44-7.37 (m, 2H), 7.34 (brs, 1H), 7.34-7.26 (m, 2H), 7.00-6.92 (m, 2H), 4.94 (t, *J* = 3.8 Hz, 1H), 4.64 (dd, *J* = 11.3, 10.6 Hz, 1H), 4.39 (ddd, *J* = 10.4, 3.5, 1.3 Hz, 1H), 3.82 (dt, *J* = 11.5, 3.2 Hz, 1H), 1.85 (d, *J* = 3.8 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.2, 139.1, 137.4, 130.6, 129.6, 129.1, 123.8, 123.3, 122.5, 122.3, 122.1, 120.2, 119.8, 116.0, 64.3, 63.0, 37.4. HRMS (EI) m/z Calcd. for $C_{17}H_{14}NaF_6O_2S$ ([M+Na]): 305.0607. Found: 305.0603.

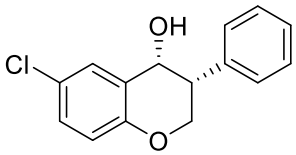
(3*R*,4*R*)-6-Methyl-3-phenylchroman-4-ol (**4k**)



Yellow oil, 99% yield, 47.7 mg, 99% ee; >20:1 dr; $[\alpha]_D^{20}$ = +179.0 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R, R*) =14.89 min (major), t_R(*S, S*) = 24.11 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.41-7.35 (m, 2H), 7.34

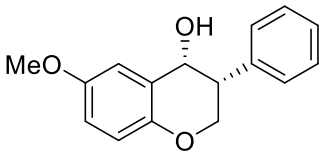
-7.30 (m, 1H), 7.29-7.26 (m, 2H), 7.12-7.03 (m, 2H), 6.81 (d, *J* = 8.3 Hz, 1H), 4.76 (s, 1H), 4.58 (dd, *J* = 11.7, 10.4 Hz, 1H), 4.31 (ddd, *J* = 10.4, 3.5, 1.4 Hz, 1H), 3.32 (dt, *J* = 11.8, 3.3 Hz, 1H), 2.29 (s, 3H), 1.76 (d, *J* = 3.6 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 152.0, 137.9, 130.8, 129.9, 128.9, 128.4, 127.5, 123.2, 116.7, 67.2, 64.1, 44.4, 20.5. HRMS (EI) m/z Calcd. for $C_{16}H_{15}O_2$ ([M-H]): 239.1066. Found: 239.1064.

(3*R*,4*R*)-6-Chloro-3-phenylchroman-4-ol (**4l**)



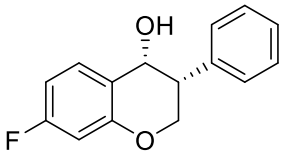
Colorless oil, 99% yield, 51.7 mg, >99% ee; >20:1 dr; $[\alpha]_D^{20}$ = +175.4 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R, R*) =18.52 min (major), t_R(*S, S*) = 31.99 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.42-7.36 (m, 2H), 7.35 -7.30 (m, 1H), 7.30-7.23 (m, 3H), 7.20 (dd, *J* = 8.8, 2.6 Hz, 1H), 6.85 (d, *J* = 8.8 Hz, 1H), 4.76 (t, *J* = 3.9 Hz, 1H), 4.58 (dd, *J* = 11.5, 10.6 Hz, 1H), 4.34 (ddd, *J* = 10.5, 3.6, 1.3 Hz, 1H), 3.31 (dt, *J* = 11.5, 3.4 Hz, 1H), 1.82 (d, *J* = 3.9 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 152.9, 137.1, 130.13, 130.0, 129.0, 128.4, 127.7, 125.3, 124.9, 118.4, 66.8, 64.3, 44.0. HRMS (EI) m/z Calcd. for $C_{15}H_{13}NaClO_2$ ([M+Na]): 283.0496. Found: 283.0504.

(3*R*,4*R*)-6-Methoxy-3-phenylchroman-4-ol (**4m**)



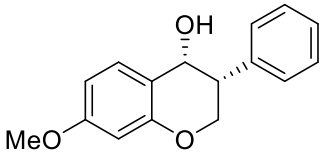
Yellow oil, 99% yield, 50.8 mg, 96% ee; >20:1 dr; $[\alpha]_D^{20}$ = +208.3 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IB-H column, hexane: isopropanol = 90:10; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R, R*) =10.89 min (major), t_R(*S, S*) = 14.91 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.41-7.36 (m, 2H), 7.35-7.30 (m, 1H), 7.30-7.24 (m, 2H), 6.86-6.83 (m, 3H), 4.82-4.76 (m, 1H), 4.55 (dd, *J* = 11.4, 10.6 Hz, 1H), 4.31 (ddd, *J* = 10.5, 3.5, 1.3 Hz, 1H), 3.77 (s, 3H), 3.33 (dt, *J* = 11.4, 3.4 Hz, 1H), 1.78 (d, *J* = 4.0 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.6, 148.2, 137.0, 128.9, 128.4, 127.5, 123.8, 117.7, 116.8, 114.3, 67.3, 64.2, 55.8, 44.4. HRMS (EI) m/z Calcd. for $C_{16}H_{15}O_3$ ([M-H]): 255.1016. Found: 255.1010.

(3*R*,4*R*)-7-Fluoro-3-phenylchroman-4-ol (**4n**)



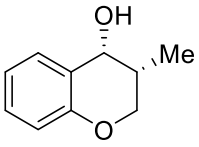
Yellow oil, 99% yield, 48.2 mg, 97% ee; >20:1 dr; $[\alpha]_D^{20}$ = +183.9 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R*, *R*) =16.26 min (major), t_R(*S*, *S*) = 27.53 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.42-7.36 (m, 2H), 7.35-7.30 (m, 1H), 7.30-7.22 (m, 3H), 6.70-6.64 (m, 1H), 6.64-6.60 (m, 1H), 4.80-4.76 (m, 1H), 4.61 (dd, *J* = 11.9, 10.4 Hz, 1H), 4.35 (ddd, *J* = 10.5, 3.6, 1.4 Hz, 1H), 3.32 (dt, *J* = 11.8, 3.4 Hz, 1H), 1.77 (d, *J* = 3.5 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 163.6 (d, *J* = 247.5 Hz), 155.5 (d, *J* = 13.1 Hz), 137.4, 131.8 (d, *J* = 10.1 Hz), 129.0, 128.3, 127.7, 119.7 (d, *J* = 3.0 Hz), 108.1 (d, *J* = 22.2 Hz), 103.9 (d, *J* = 25.3 Hz), 66.7, 64.1, 44.0. HRMS (EI) m/z Calcd. for $C_{15}H_{14}FO_2$ ([M+H]): 245.0972. Found: 245.0971.

(3*R*,4*R*)-7-Methoxy-3-phenylchroman-4-ol (**4o**)[17]



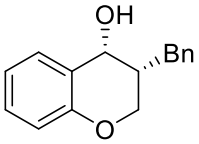
Colorless oil, 99% yield, 50.8 mg, 97% ee; >20:1 dr; $[\alpha]_D^{20}$ = +136.2 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IB-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R*, *R*) =16.88 min (major), t_R(*S*, *S*) = 25.21 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.41-7.36 (m, 2H), 7.34-7.26 (m, 3H), 7.20 (d, *J* = 8.5 Hz, 1H), 6.54 (dd, *J* = 8.4, 2.5 Hz, 1H), 6.45 (d, *J* = 2.5 Hz, 1H), 4.77 (s, 1H), 4.61 (dd, *J* = 11.9, 10.4 Hz, 1H), 4.33 (ddd, *J* = 10.4, 3.6, 1.3 Hz, 1H), 3.79 (s, 3H), 3.32 (dt, *J* = 11.9, 3.3 Hz, 1H), 1.70 (d, *J* = 3.3 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 161.1, 155.3, 137.9, 131.3, 128.9, 128.4, 127.5, 116.2, 108.0, 101.2, 66.8, 64.1, 55.4, 44.4.

(3*R*,4*R*)-3Methylchroman-4-ol (**4p**)[18]



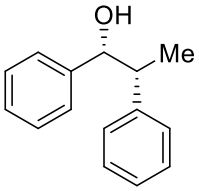
Colorless oil, 85% yield, 28.0 mg, 99% ee; 11:1 dr; $[\alpha]_D^{20}$ = +110.3 (c = 1.00, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R, R*) =11.23 min (major), t_R(*S, S*) = 13.20 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.27 (dd, *J* = 7.6, 1.6 Hz, 1H), 7.21 (ddd, *J* = 8.9, 7.4, 1.7 Hz, 1H), 6.91 (td, *J* = 7.4, 1.1 Hz, 1H), 6.84 (dd, *J* = 8.2 Hz, 1.0Hz, 1H), 4.56 (s, 1H), 4.07-3.93 (m, 2H), 2.22-2.10 (m, 1H), 1.71 (s, 1H), 1.09 (d, *J* = 7.0 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 154.2, 130.1, 129.8, 124.4, 120.5, 116.9, 66.9, 66.5, 32.7, 11.7.

(3*R*,4*R*)-3-Benzylchroman-4-ol (**4q**)



White solid, >99% yield, 47.8 mg; mp 120-122 °C, 99% ee; >20:1 dr; $[\alpha]_D^{25}$ = +163.4 (c = 1.00, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S, S*) = 13.28 min (minor), t_R (*R, R*) = 16.13 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.36-7.30 (m, 2H), 7.29-7.23 (m, 3H), 7.23-7.17 (m, 2H), 6.89 (td, *J* = 7.4, 1.2 Hz, 1H), 6.88-6.82 (m, 1H), 4.51 (t, *J* = 4.6 Hz, 1H), 4.15-4.03 (m, 2H), 2.89 (dd, *J* = 13.6, 8.4 Hz, 1H), 2.68 (dd, *J* = 13.6, 7.3 Hz, 1H), 2.38-2.28 (m, 1H), 1.69 (d, *J* = 4.6 Hz, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.3, 138.1, 129.1, 128.9, 128.1, 127.5, 125.3, 123.1, 119.5, 115.9, 63.9, 63.9, 39.0, 31.8. HRMS (EI) m/z Calcd. for $C_{16}H_{16}NaO_2$ ([M+Na]): 263.1043. Found: 263.1053.

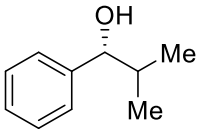
(1*R*,2*R*)-1,2-Diphenylpropan-1-ol (**4r**)[19]



White solid, >99% yield, 42.0 mg, 98% ee; >20:1 dr; $[\alpha]_D^{20}$ = +51.2 (c = 1.00, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R(*S, S*) = 15.44 min (minor), t_R (*R, R*) =17.37 min (major),. ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.39-7.32 (m, 6H), 7.32 -7.24 (m, 4H), 4.66 (dd, *J* = 8.7, 2.3 Hz, 1H), 3.06-2.97 (m, 1H), 1.84 (d, *J* = 2.4 Hz, 1H), 1.07

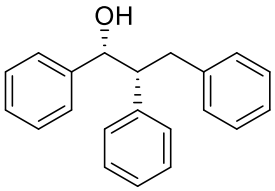
(d, *J* = 7.1 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 143.4, 142.5, 128.7, 128.3, 128.1, 127.8, 127.0, 126.9, 79.7, 48.2, 18.4.

(*R*)-2-Methyl-1-phenylpropan-1-ol (**4s**)[20]



Colorless oil, >99% yield, 29.8 mg, 98% ee; $[\alpha]_D^{20}$ = +21.9 (c = 1.00, CH_2Cl_2). The enantiomeric excess was determined by HPLC on Chiralpak IC-H column, hexane: isopropanol = 95:5; flow rate = 1.0 mL/min; UV detection at 210 nm; t_R (*R*) =5.28 min (major), t_R(*S*) = 5.82 min (minor). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.35-7.22 (m, 5H), 4.33 (d, *J* = 6.9 Hz, 1H), 1.99-1.89 (m, 2H), 0.99 (d, *J* = 6.7 Hz, 3H), 0.79 (d, *J* = 6.8 Hz, 3H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 143.7, 128.2, 127.4, 126.6, 80.1, 35.3, 19.0, 18.3.

(1*R*,2*R*)-1,2,3-Triphenylpropan-1-ol (**4t**)[21]



white soild, 86% yield, 50.0 mg, mp 80-81 °C, >99% ee; >20:1 dr; $[\alpha]_D^{20}$ = +3.2 (c = 1.00, $CHCl_3$). The enantiomeric excess was determined by HPLC on Chiralpak IC-H column, hexane: isopropanol = 98:2; flow rate = 0.5 mL/min; UV detection at 210 nm; t_R (*S*,*S*) =24.10 min (minor), t_R(*R*,*R*) = 27.18 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 7.36-7.31 (m, 2H), 7.31-7.24 (m, 4H), 7.23-7.17 (m, 2H), 7.14-7.06 (m, 5H), 6.91-6.85 (m, 2H), 4.86 (d, *J* = 7.4 Hz, 1H), 3.21-3.12 (m, 1H), 2.95-2.79 (m, 2H), 1.85 (s, 1H); ^{13}C NMR (101 MHz, $CDCl_3$) δ 142.8, 140.3, 140.1, 129.2, 129.1, 128.5, 128.2, 127.9, 127.1, 127.0, 125.9, 77.4, 56.3, 38.8.

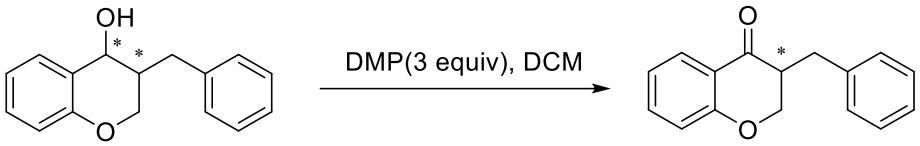
Procedure for asymmetric hydrogenation of 1a on gram-scale with low catalyst loading (S/C = 20 000)

To a 4.0 mL vial was added the catalyst precursor $[Ir(COD)Cl]_2$ (3.4 mg, 5.0×10^{-3} mmol), ligand **L3** (7.5 mg, 1×10^{-2} mmol) and anhydrous ^{i}PrOH (2.0 mL) under argon atmosphere. The mixture was stirred at 25 ^{o}C for 30 min, giving orange solution in the argon-filled glovebox. The resulting solution (50 μL) transferred by syringe into a 100 mL vial charged with **1a** (1.2 g, 5 mmol) and NaOH (10 mg, 0.25 mmol) in 16 mL anhydrous *n*-hexane. The vials were

transferred to an autoclave, which was then charged with 80 atm of H_2 and stirred at room temperature for 96 h. The hydrogen gas was released slowly in a well-ventilated hood and the solution was concentrated, the crude material was purified by flash column chromatography (SiO_2, EtOAc/hexane, 20:1) to give **2a** as a white solid.

IV Determination of absolute configuration

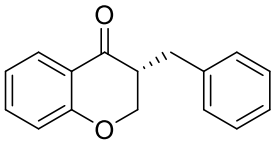
The relative configuration of product **2a** was determined by comparison of the ^1H and ^{13}C NMR spectra with the literature data.[22] The absolute configuration of the product **2a** was assigned by comparison of the optical rotation and retention time of HPLC with the literature data for oxidation product **2a'**,[23] which was prepared from product **2a**.



2a
>20:1 dr, 99% ee

2a'

To a stirred solution of **2a** (0.208 mmol) in CH_2Cl_2 (5 mL) was added Dess-Martin periodinane (0.624 mmol, 3 equiv.) at 0 °C. The reaction mixture was stirred for 1 h at 0 °C, and quenched with saturated aqueous $NaHCO_3$. The organic materials were extracted with CH_2Cl_2. The combined organic layer was washed with saturated aqueous $NaHCO_3$, and dried over Na_2SO_4. After evaporation of solvents, the residue was purified by preparative thin layer chromatography (hexane/ethyl acetate = 4/1 as eluent) to afford the oxidation product **2a'**.

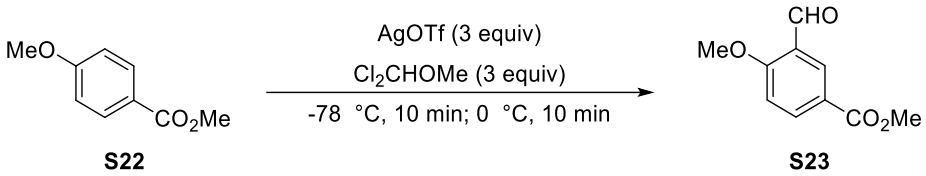


2a'

White solid, 97% yield, 48.6 mg; 95% ee; >20:1 dr; $[\alpha]_D^{25}$ = -9.0 (c = 1.00, MeOH). {lit. $[\alpha]_D^{25}$ = –10.5 (c =1.00, MeOH, 98% ee for (*R*)-isomer)}[23]; The enantiomeric excess was determined by HPLC on Chiralpak OD-H column, hexane: isopropanol = 95:5; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*R*) = 7.90 min (major). t_R (*S*) = 8.66 min (minor). ^1H NMR (400 MHz, $CDCl_3$) δ 7.94 (dd, *J* = 7.9, 1.7 Hz, 1H), 7.52-7.44 (m, 1H), 7.37-7.29 (m, 2H), 7.29-7.20 (m, 3H), 7.09-7.00 (m, 1H), 6.97 (dd, *J* = 8.4, 0.5 Hz, 1H), 4.37 (dd, *J* = 11.5, 4.3 Hz, 1H), 4.18 (dd, *J* = 11.5, 8.4 Hz, 1H), 3.29 (dd, *J* = 13.9, 4.4 Hz, 1H), 2.98-2.89 (m, 1H),

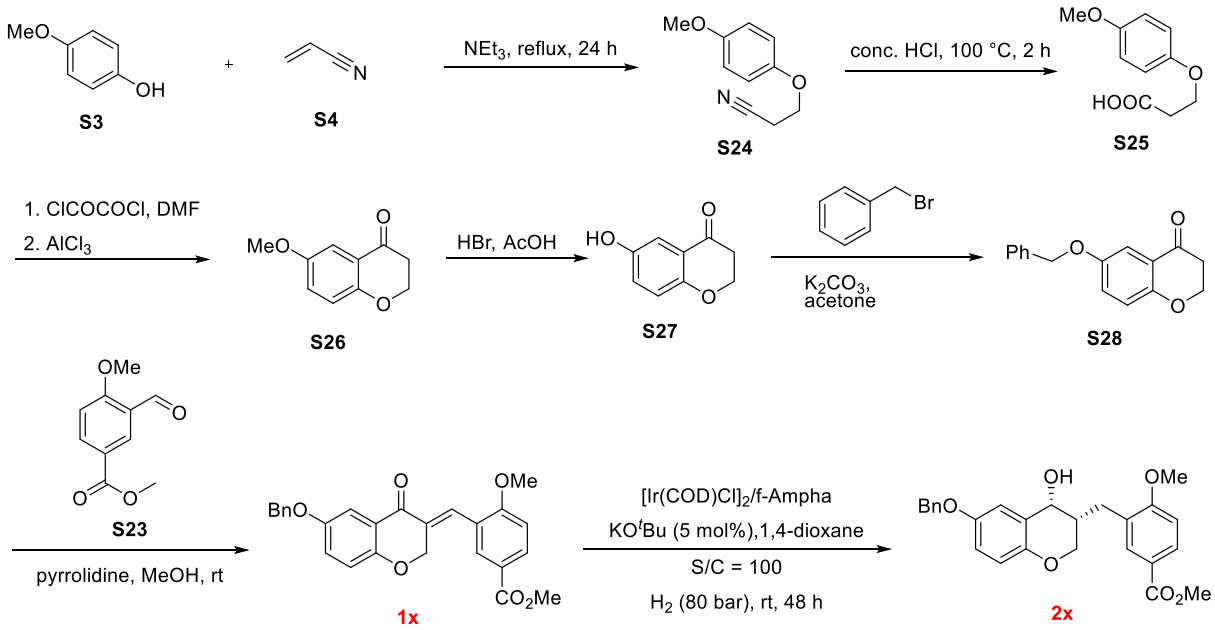
2.71 (dd, *J* = 13.9, 10.5 Hz, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 193.9, 161.6, 138.3, 136.0, 129.1, 128.7, 127.5, 126.7, 121.5, 120.5, 117.8, 69.4, 47.7, 32.4.

V. Application in drug synthesis



S22 **S23**

The compound **S23** was prepared according to the literature procedure.[24] To a suspension of substrate **S22** (3.2 mmol) and AgOTf (9.6 mmol, 3.0 eq) in dry CH_2Cl_2 (1.5 mL/ mmol) was added a solution of Cl_2CHOMe (3.00 mmol, 3.0 equiv.) in dry CH_2Cl_2 (0.5 mL/mmol) at −78 °C under an argon atmosphere. After being stirred for 10 min, then The reaction was stirred at 0 °C for another 10 min. the reaction mixture was quenched with saturated aqueous $NaHCO_3$. After being stirred at room temperature for 30 min, the reaction mixture was filtered through a pad of celite. The organic layer was separated and the aqueous layer was extracted twice with EtOAc. The combined organic layers were washed with brine, dried with $MgSO_4$, and filtered. The filtrate was concentrated in vacuo, and the resulting residue was purified by flash column chromatography on silica gel (eluted with hexane/EtOAc = 50/1-1/4) to afford the desired benzaldehyde derivative **S23** with 0.9 g and 97% yield.



The compound **S26** was prepared according to the preparation of Substrates **1p-1s**.

The compound **S27** was prepared according to the literature procedure[25]: A mixture of 4.38 g (24.6 mmol) of compound **S26** in 30 mL 48% HBr aqueous solution and 30 mL acetic acid was heated to reflux under N_2. After 4 hours, the reaction mixture was cooled to room temperature and 86 ml H_2O was added. The suspension was kept at 0° C overnight. The mixture was filtered, and the precipitate washed two times with H_2O, two times with hexanes and then dried under vacuum to give 1.5 g of the target product as a dark purple/black solid.

The compound **S28** was prepared according to the literature procedure[25]: A mixture of 1.49 g (9.08 mmol) of compound **S27**, 1.69 g (12.22 mmol) of K_2CO_3, and 1.59 g (9.33 mmol) of benzyl bromide in 9 mL acetone was heated to reflux under N_2. After 20 hours, the reaction mixture was cooled to room temperature, diluted with 1.5 L ethyl acetate, and filtered through celite (trademark). The filtrate was concentrated to obtain compound **S28** with 2.2 g and 95% yield.

The compound **1x** was prepared according to the literature procedure[25]: 1.6 g (8 mmol) of **S23** was added to a room temperature suspension of 2.0 g (8 mmol) of **S28** and 0.57 g (8 mmol) of pyrrolidine in 350 mL CH_3OH. After stirring 20 hours at room temperature, the reaction mixture was filtered, washed two times with CH_3OH and the precipitate dried under vacuum to give 3.2 g of the compound **1x** as a yellow powder (94 % yield). mp 172-174 °C. ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.09 (dd, *J* = 8.7, 2.1 Hz, 1H), 7.96 (s, 1H), 7.75 (d, *J* = 1.9 Hz, 1H), 7.55 (d, *J* = 3.1 Hz, 1H), 7.49-7.43 (m, 2H), 7.43-7.37 (m, 2H), 7.36-7.31 (m, 1H), 7.17 (dd, *J* = 9.0, 3.2 Hz, 1H), 6.98 (d, *J* = 8.7 Hz, 1H), 6.91 (d, *J* = 9.0 Hz, 1H), 5.20 (d, *J* = 1.8 Hz, 2H), 5.09 (s, 2H), 3.93 (s, 3H), 3.91 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 182.1, 166.4, 161.7, 156.2, 153.6, 136.7, 133.0, 132.6, 131.8, 131.8, 128.6, 128.1, 127.7, 125.7, 123.5, 122.3, 122.0, 119.3, 110.5, 109.6, 70.6, 67.9, 55.9, 52.2.

The synthesis of **2x:** To a 4.0 mL vial was added the catalyst precursor $[Ir(COD)Cl]_2$ (3.4 mg, 5.0×10^{-3} mmol), ligand **L3** (7.5 mg, 1.0×10^{-2} mmol) and anhydrous ^{i}PrOH (1.0 mL) under argon atmosphere. The mixture was stirred for 30 min at 25 ^{o}C giving orange solution in the argon-filled glovebox. The resulting solution (200 μL) transferred by syringe into a 5.0 mL vial charged with compound **1x** (0.2 mmol) and KO^{t}Bu (0.02 mmol, 2.2 mg) in 2.0 mL anhydrous 1,4-Dioxane. The vials were transferred to an autoclave, which was then charged with 80 atm of H_2 and stirred at room temperature for 28 h. The hydrogen gas was released slowly in a well-ventilated hood and the solution was concentrated, The crude material was purified by flash column chromatography (SiO_2, EtOAc/hexane, 20:1) to give the **2x** (76 mg, 88 % yield, 19:1

dr) as a White solid. mp 52-54 °C. >99% ee. $[\alpha]_D^{25}$ = +61.8 (c=0.25, MeOH). The enantiomeric excess was determined by HPLC on Chiralpak AD-H column, hexane: isopropanol = 80:20; flow rate = 1 mL/min; UV detection at 210 nm; t_R (*S*, *S*) =28.25 min (minor), t_R(*R*, *R*) = 35.77 min (major). ^{1}H NMR (400 MHz, $CDCl_3$) δ 8.00-7.88 (m, 2H), 7.43-7.33 (m, 4H), 7.33 -7.28 (m, 1H), 6.92 (d, *J* = 8.6 Hz, 1H), 6.88-6.81 (m, 2H), 6.76 (d, *J* = 8.8 Hz, 1H), 5.02-4.91 (m, 2H), 4.36 (s, 1H), 4.14-4.00 (m, 2H), 3.91 (s, 3H), 3.89 (s, 3H), 2.90 (dd, *J* = 13.5, 9.1 Hz, 1H), 2.67 (dd, *J* = 13.5, 6.3 Hz, 1H), 2.45 (s, 1H), 2.40-2.30 (m, 1H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 166.9, 161.1, 152.6, 148.6, 137.2, 132.6, 130.2, 128.6, 127.9, 127.5, 127.5, 124.1, 122.8, 117.7, 117.6, 115.4, 110.1, 70.7, 65.2, 65.1, 55.8, 52.0, 39.2, 27.2. HRMS (EI) m/z Calcd. for $C_{26}H_{26}NaO_6$ ([M+Na]): 457.1622. Found: 457.1621.

VI. Computational studies

DFT calculations were performed using the Gaussian 16 package.[26] All the structures are optimized using the B3LYP-D3(BJ) functional[27] with the basis set SDD for Ir and Fe,[28] 6-31+G* for Na and O, and 6-31G* for other main group atoms.[29] Polarization functions (ζf = 0.938) and (ζf = 2.462) were added for Ir and Fe respectively.[30] Geometric structures of all species were optimized at T = 298.15 K. H_2 was optimized at hydrogen pressure of 50 bar. An entropy correction of -2.6 kcal/mol was made for two-to-one transformations. Frequency calculations were performed to verify the optimized structures as local minima or transition states. Transition state structures were confirmed to connect appropriate reactants or products by intrinsic reaction coordinate (IRC) calculations.[31] Solvent effects were considered using the SMD mode[32] at the B3LYP-D3(BJ)/6-311++G** level with SDD for Ir and Fe.

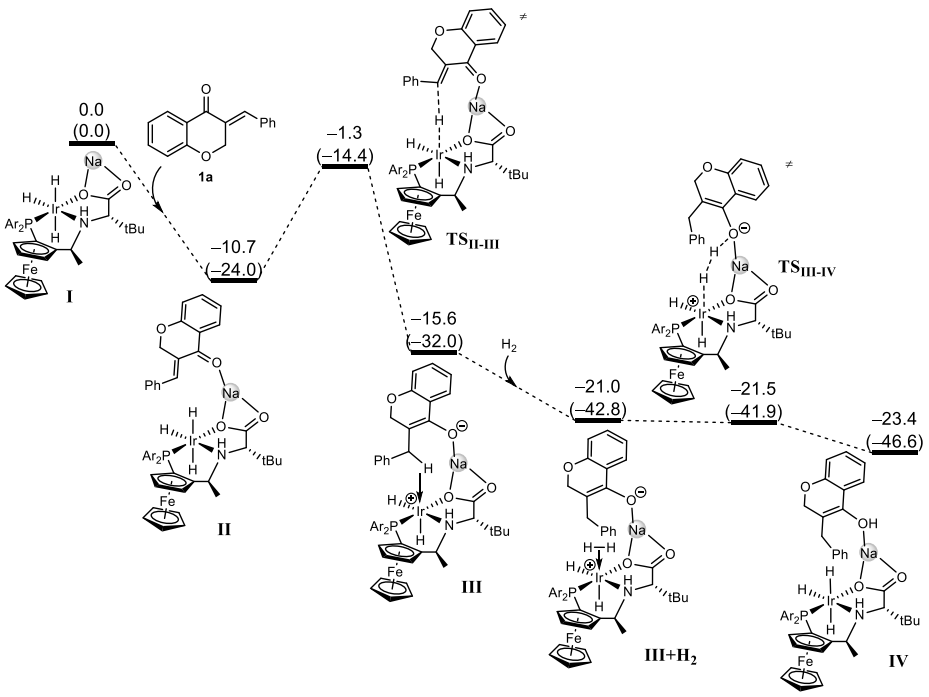


Figure S1. Energy profile for the 1,4-addition of **1a**. The relative Gibbs free energies and electronic energies (in parentheses) are given in kcal/mol.

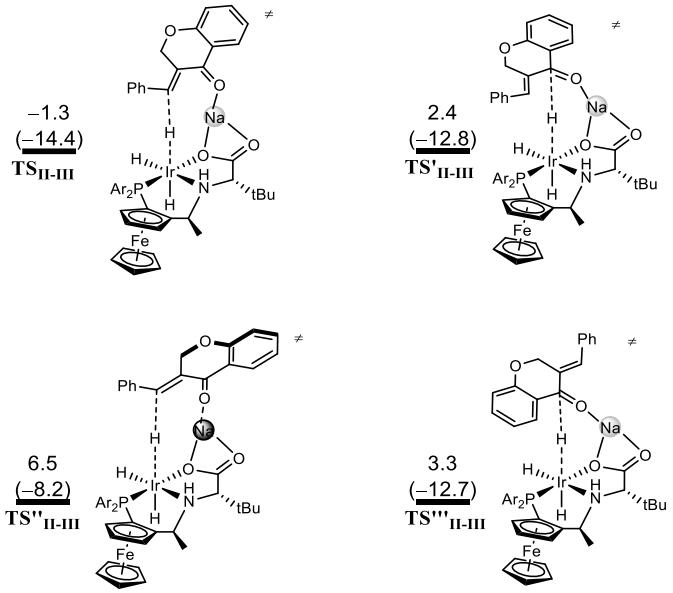


Figure S2. Transition states and relative Gibbs free energies and electronic energies (in parentheses) in kcal/mol calculated for the hydride transfer to the enone **1a**.

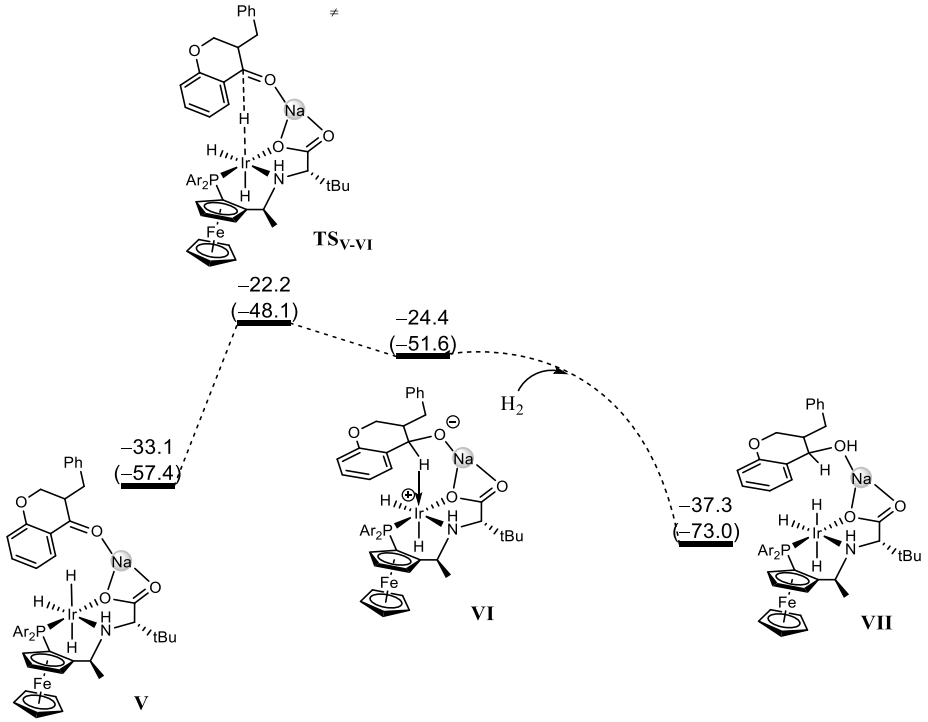


Figure S3. Energy profile for the hydrogenation of **2a'**. The relative Gibbs free energies and electronic energies (in parentheses) are given in kcal/mol. We could not locate the transition state from VI to VII, even the intermediate of H_2 coordination to **VI**. Because H_2 activation between Ir(III) and the enolate anion is barrierless.

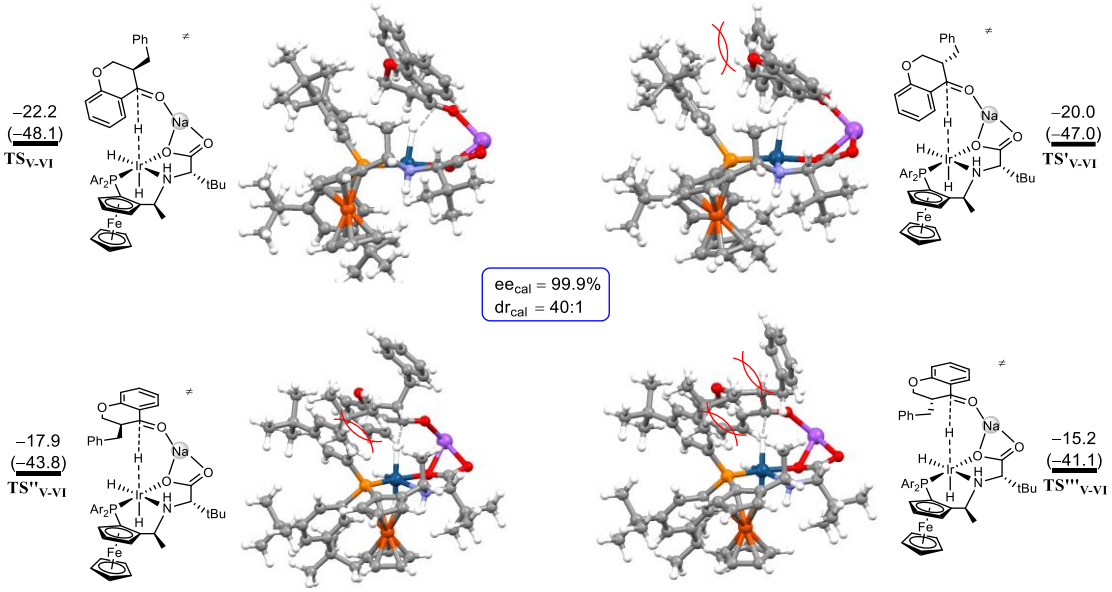
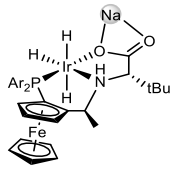


Figure S4. The structures of the transition stats for DKR of **2a'**.

DFT-calculated Cartesian Coordinates

I



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N	-2.96964000	-0.84478100	0.33562900
C	-4.19559700	-1.51009100	-0.20794600
H	-4.44886300	-2.34930300	0.44332600
C	-1.45585000	-0.52179800	2.26432100
C	-0.24189800	0.00139200	1.68257500
C	0.49757100	0.63681300	2.73637900
H	1.42733900	1.17130900	2.61047700
C	-0.23773400	0.51025600	3.94705300
H	0.03707000	0.93275900	4.90459500
C	-1.43917500	-0.19739200	3.65609800
H	-2.23138700	-0.42811300	4.35710400
C	1.20940600	1.39535000	-0.37334700
C	2.46531500	1.58179900	0.21323400
H	2.89478800	0.78133700	0.80566700
C	3.18131900	2.76706500	0.02344600
C	2.60350600	3.76310600	-0.77815400
H	3.14458300	4.68587300	-0.93406100
C	1.35978900	3.59335400	-1.40150400
C	0.67436500	2.38973000	-1.19109900
H	-0.28244200	2.19550300	-1.66254200
C	1.61729900	-1.37254700	0.01951000
C	1.85278800	-2.14260300	1.15670900
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C	3.70770600	-3.20140100	0.05777800
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C	-3.08152900	2.51864300	1.97495300
H	-4.03946700	2.05952200	1.77711300
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C	-0.96330700	3.39108200	1.69688400
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C	-2.05335300	2.76948400	1.01701400
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H	-1.74346100	-3.21650600	2.50826500
Ir	-1.45383200	-0.65227600	-1.33559600
H	-0.54231500	-0.46764800	-2.64278600
H	-1.10366400	-2.87261000	0.87733200
H	-1.91302700	0.93097200	-1.51384900
C	-2.50726100	-1.40196000	1.63766500
H	-3.36814200	-1.40735200	2.32279600
O	-3.26757000	-1.32573700	-2.42916100
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H	-7.50200300	-0.71319700	-0.90471100
H	-6.35797900	-1.47574800	-2.02107200
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C	-5.14524700	0.74514500	-1.00075600
H	-6.06368000	1.34096900	-1.05755400
H	-4.39062900	1.36016500	-0.49986800
H	-4.77924700	0.55220200	-2.01129200
C	-5.86800700	-0.26556900	1.19511100
H	-6.17378100	-1.18106900	1.71549200
H	-5.06478600	0.19627900	1.77970800
H	-6.71840600	0.42563100	1.20073300

H	-3.17505400	0.13487900	0.50990800
H	-0.99870700	-2.31656900	-1.24776000
Na	-1.95982400	-3.04202200	-2.99462300
C	4.39027700	-2.54861900	-2.34378100
C	3.52528800	-2.94143500	-3.56172200
C	5.05673700	-1.17977200	-2.60695600
C	5.49838000	-3.60158000	-2.17969700
H	3.04168900	-3.91092700	-3.39474300
H	2.74129200	-2.20259400	-3.75526200
H	4.14617800	-3.01831200	-4.46260100
H	5.68154800	-0.88352400	-1.75706700
H	5.69224000	-1.22835400	-3.49958900
H	4.31332300	-0.39187100	-2.76315500
H	6.10429900	-3.64407300	-3.09147600
H	6.16842000	-3.35905400	-1.34741400
H	5.08540600	-4.60186900	-2.00732000
C	3.11954500	-3.89517400	2.47071800
C	3.40533300	-2.93255400	3.64514500
C	1.84464700	-4.71183300	2.77674100
C	4.30085800	-4.87090600	2.34690700
H	4.30749400	-2.34146300	3.45081400
H	2.57640300	-2.23593000	3.80728100
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H	1.61991100	-5.40183900	1.95568900
H	1.97792900	-5.29969100	3.69299000
H	0.97329700	-4.06425500	2.91604700
H	4.41435400	-5.43343000	3.28011300
H	4.14518500	-5.59443600	1.53888500
H	5.24357500	-4.34489600	2.15937500
C	4.56503600	2.91369300	0.67163200
C	4.43371100	2.75397400	2.20234900
C	5.49541800	1.81014600	0.11955600
C	5.20733500	4.28001900	0.38299900
H	3.76521200	3.51754100	2.61653400
H	4.03371200	1.77152600	2.47388200
H	5.41317800	2.85910000	2.68413600
H	5.60714900	1.90557700	-0.96614700
H	6.49023700	1.88445600	0.57537600
H	5.10240500	0.80941700	0.32552900
H	6.18742900	4.33745400	0.86912100
H	5.35963800	4.43736600	-0.69039800
H	4.59612700	5.10448500	0.76700600
C	0.73418700	4.65793000	-2.31310600
C	0.57689200	4.06851400	-3.73250500
C	-0.65732400	5.04765100	-1.76817800
C	1.59171500	5.93041700	-2.40461600
H	1.55213800	3.78707900	-4.14590200
H	-0.05735900	3.17654400	-3.72765200
H	0.12007600	4.80660400	-4.40291700
H	-0.58282200	5.45304700	-0.75292900
H	-1.11518000	5.81073500	-2.40884800
H	-1.33365700	4.18851000	-1.73625200
H	1.09983800	6.65939700	-3.05775300
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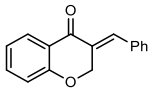
1a



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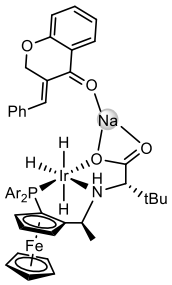
C	-2.39708100	-0.89795800	-0.23143900
C	-2.40134200	0.46658400	0.11300900
C	-3.63110200	1.13378100	0.24010900
O	-1.24010000	-1.60055100	-0.39423800
C	-0.10032600	-1.12075800	0.33973100
C	0.10577700	0.36417600	0.20768300
C	-1.12734000	1.20266600	0.24488600
O	-1.08865600	2.42917700	0.35573000
C	1.29697500	0.98383200	0.06285100
C	2.63778200	0.40216100	0.03115800

C	3.62213900	1.03179500	-0.75499500
C	4.90954300	0.51199100	-0.84158800
C	5.25092200	-0.63550300	-0.12081800
C	4.29804200	-1.25093900	0.69255400
C	3.00460700	-0.73859100	0.77001800
H	-5.77311600	0.98388500	0.13046900
H	-5.73513100	-1.42231800	-0.50712300
H	-3.56395000	-2.62415600	-0.73719200
H	-3.60898700	2.18746800	0.49781800
H	0.74499300	-1.68339200	-0.05574700
H	-0.24535600	-1.40387900	1.39419400
H	1.24236700	2.06335500	-0.06936100
H	3.35842100	1.92768200	-1.31045500
H	5.65028700	1.00473300	-1.46457900
H	6.25794800	-1.03781000	-0.18097300
H	4.56499000	-2.12638600	1.27741100
H	2.29092600	-1.19693300	1.44594300

II



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N	-2.19564800	-2.73498800	0.52026700
C	-2.03549700	-4.20830600	0.28774300
H	-1.83997800	-4.68438000	1.25114700
C	-2.67200300	-0.92413300	2.14622700
C	-2.17674900	0.27405600	1.50924700
C	-2.80675600	1.39140000	2.15517800
H	-2.68885500	2.42549600	1.86686900
C	-3.66573300	0.90036700	3.17736300
H	-4.31326200	1.49854600	3.80495000
C	-3.58549000	-0.52181100	3.16883800
H	-4.14476600	-1.19789400	3.80316400
C	-1.52701300	1.80316400	-0.83567000
C	-1.34125300	3.08747200	-0.31493800
H	-0.83896600	3.20292500	0.63881800
C	-1.75900500	4.22017600	-1.01718600
C	-2.36753500	4.03121200	-2.26745000
H	-2.69658200	4.89759200	-2.82421300
C	-2.54038800	2.75811800	-2.82825000
C	-2.10443100	1.64645800	-2.09439300
H	-2.19396000	0.63944900	-2.48682400
C	0.52932500	1.02268800	0.87351300
C	0.59539900	1.43442900	2.20003200
H	-0.24481400	1.23814700	2.85421500
C	1.70864200	2.14405800	2.68177000
C	2.74142700	2.42333400	1.78549000
H	3.59484900	2.99538800	2.12798900
C	2.70578500	2.01578200	0.43808800
C	1.59586000	1.29458900	0.00276600
H	1.51461800	0.96195600	-1.02507900
C	-5.51630600	-0.98753100	0.17371500
H	-5.54293300	-2.06672900	0.13337800
C	-6.25760500	-0.16929600	1.07857300
H	-6.91664800	-0.52054900	1.86164100
C	-5.94274200	1.19298700	0.79224800
H	-6.31211900	2.05563900	1.33133900
C	-5.00215700	1.21530700	-0.28127900
H	-4.52518400	2.09109400	-0.69774400
C	-4.73703500	-0.13395300	-0.66313000
H	-4.01562100	-0.45959500	-1.39990800
C	-0.80003800	-4.50588700	-0.59728500
O	-0.09865000	-5.48862800	-0.35130000
C	-0.86272200	-2.54922300	2.63770300
H	-0.48690000	-3.56823300	2.50030900
H	-0.96705100	-2.35731100	3.71079500
Ir	-0.82976000	-1.62962400	-0.85695100

H	0.07516000	-0.95276300	-2.01130500	C	2.56494700	-2.03539800	4.20717600
H	-0.13351100	-1.85780100	2.21752800	C	3.48999000	-1.25672700	4.90632300
H	-2.13921900	-1.37678200	-1.85714300	C	4.45014300	-0.52163900	4.20597900
C	-2.21933700	-2.35030200	1.95978500	C	4.50688500	-0.58606300	2.81580100
H	-2.95692000	-2.99056000	2.46440800	H	6.64511500	-0.30660200	-5.49877200
O	-0.59733800	-3.68356900	-1.58749700	H	8.60652300	0.55982800	-4.23304200
C	-3.33264000	-4.85788900	-0.29049200	H	8.74632800	0.25194700	-1.76683200
C	-3.07604000	-6.35003300	-0.56992500	H	4.79271900	-1.43691800	-4.25822000
H	-4.01474300	-6.83421300	-0.86397300	H	6.26259100	-1.76434000	1.38303000
H	-2.35064900	-6.49253800	-1.37479200	H	6.50303900	-2.87384000	0.01567300
H	-2.68764200	-6.86105700	0.31741100	H	2.64466500	-1.53912800	0.17559800
C	-3.77735400	-4.17624100	-1.59796200	H	1.89558200	-2.69031900	2.26394800
H	-4.65955500	-4.69051500	-1.99682700	H	1.80167400	-2.59193100	4.74283000
H	-4.04596100	-3.12370100	-1.46136000	H	3.45254100	-1.20759100	5.99076900
H	-2.98143900	-4.20287700	-2.34621700	H	5.15227800	0.10840000	4.74436400
C	-4.45033600	-4.75577700	0.76604500	H	5.22712700	0.01858800	2.27552500
H	-4.18647100	-5.31511800	1.67163300	C	1.68812700	2.69840000	4.11254600
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H	-5.38270900	-5.17583900	0.37168400	C	1.16405200	1.64177700	5.10683200
H	-3.09433800	-2.44330600	0.14680100	C	3.08333400	3.14642800	4.58139100
H	0.56889300	-1.98626500	0.06647700	H	1.08607400	4.69139300	3.43114200
Na	1.47189500	-2.89646900	-1.89025700	H	-0.27495900	3.63006900	3.83144200
C	6.69908200	-0.43803500	-4.42301300	H	0.68874000	4.35931500	5.13179700
C	7.80418100	0.05139600	-3.70605800	H	1.77670900	0.73701300	5.07361300
C	7.89312100	-0.11057500	-2.32991300	H	1.19153800	2.04351700	6.12667500
C	6.86724000	-0.77163500	-1.64468900	H	0.12875500	1.35627600	4.89697700
C	5.73572000	-1.24725600	-2.34597000	H	3.03580100	3.47473700	5.62555800
C	5.67655300	-1.07607700	-3.74280400	H	3.80422800	2.32461500	4.51481900
O	7.01173100	-0.90915300	-0.30132800	H	3.46459400	3.98794100	3.99325600
C	6.13598800	-1.87907000	0.31043400	C	3.82074900	2.45933000	-0.52053300
C	4.71107500	-1.71640200	-0.13978900	C	5.20326100	2.06520500	0.03588600
C	4.56932700	-1.75765000	-1.61109600	C	3.66463600	1.83488400	-1.91753100
O	3.53263200	-2.11597500	-2.19327000	C	3.74925000	3.99615500	-0.66606200
C	3.62803100	-1.54193900	0.64812000	H	5.39800900	2.52032900	1.01247400
C	3.60259100	-1.39468100	2.10680300	H	5.28394300	0.98180700	0.14522700
C	2.61215200	-2.09306600	2.81660900	H	5.99605100	2.39162100	-0.64734700

H	2.75086600	2.17795400	-2.41436900
H	4.51480800	2.11710500	-2.54826000
H	3.63175400	0.74321000	-1.87267800
H	4.52292300	4.35180600	-1.35766700
H	2.77181000	4.30216900	-1.05458700
H	3.89879800	4.49704500	0.29632200
C	-1.50191400	5.60508500	-0.40695400
C	-2.17972300	5.69117100	0.97844100
C	0.02217800	5.80230900	-0.24014000
C	-2.04806500	6.74317000	-1.28371100
H	-3.26081400	5.53160000	0.89317800
H	-1.78058600	4.94290100	1.67116700
H	-2.01362600	6.67869800	1.42542800
H	0.52683600	5.75225700	-1.21165500
H	0.23553800	6.78129700	0.20622400
H	0.46261300	5.03368800	0.40330300
H	-1.84799100	7.70808900	-0.80496200
H	-1.57284500	6.75752200	-2.27070600
H	-3.13134400	6.65964000	-1.42652300
C	-3.16479500	2.53723100	-4.21279800
C	-2.11730900	1.86805200	-5.13047200
C	-4.39138600	1.60823800	-4.08087500
C	-3.62067300	3.85062400	-4.86854800
H	-1.23557000	2.50911500	-5.24425900
H	-1.78536200	0.90732600	-4.72459400
H	-2.54199000	1.68803600	-6.12562200
H	-5.14691300	2.04637500	-3.41918100
H	-4.85017400	1.44369200	-5.06321900
H	-4.11594000	0.63160800	-3.67253900
H	-4.06410400	3.63869400	-5.84758100
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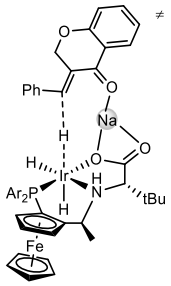
TS$_{II\text{-}III}$



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H	0.65671200	-4.59838200	1.52672600
C	-2.01106700	-1.68680000	1.99320300
C	-2.03769200	-0.40982400	1.32165300
C	-3.20298600	0.28931600	1.78581200
H	-3.53318000	1.25478600	1.43409900
C	-3.88759100	-0.53554100	2.72056900
H	-4.82899700	-0.30489400	3.20184300
C	-3.15874600	-1.75297500	2.84179300
H	-3.43145900	-2.60483900	3.45190000
C	-1.77666600	1.24931200	-1.00512100
C	-2.35700900	2.44201300	-0.56134900
H	-2.15809800	2.78183200	0.44879100
C	-3.16543200	3.21017800	-1.40333700
C	-3.36935300	2.75522600	-2.71495700
H	-3.99247200	3.33809100	-3.37878400
C	-2.77401900	1.58247300	-3.19825100
C	-1.97070200	0.83965000	-2.32318900
H	-1.47559100	-0.06871000	-2.64681400
C	0.01840900	1.52532400	1.13687100
C	-0.21412800	1.63898600	2.50738600
H	-0.81014400	0.88453200	3.00051800
C	0.27900300	2.72898000	3.23844500
C	1.01197300	3.69641800	2.54517700
H	1.37599300	4.56388900	3.08372700
C	1.26169300	3.61662300	1.16344700
C	0.77584100	2.50203800	0.47432600

H	0.94043700	2.39855200	-0.59137900	H	-1.38269600	-3.21773000	0.10787500
C	-4.18040200	-3.05844500	-0.38805300	H	1.76578000	-1.08301300	0.28130800
H	-3.70539100	-4.02825300	-0.38383900	Na	3.53979900	-3.61746300	-1.89432900
C	-5.33765800	-2.69343700	0.36394500	C	5.76641500	1.19889400	-4.72272400
H	-5.86930800	-3.32503300	1.06350500	C	5.50713600	2.52996800	-4.36364200
C	-5.64557900	-1.33409300	0.05641700	C	5.04539900	2.84607100	-3.09091200
H	-6.44336200	-0.75011200	0.49656500	C	4.84300800	1.82274700	-2.15921300
C	-4.67526100	-0.85843100	-0.87711300	C	5.06833400	0.47632500	-2.51033000
H	-4.59680100	0.14727900	-1.26583400	C	5.53851900	0.18617700	-3.80212300
C	-3.76868000	-1.92497800	-1.15052900	O	4.39237600	2.17312900	-0.92594500
H	-2.88120700	-1.86554500	-1.76444400	C	4.68420100	1.21292100	0.11037900
C	1.50156000	-4.17070400	-0.37717900	C	4.27438500	-0.18695700	-0.25688600
O	2.49561900	-4.92210100	-0.25342000	C	4.66933100	-0.60299100	-1.58404500
C	0.27104800	-2.23148100	2.83492200	O	4.65114100	-1.79353500	-1.99230200
H	1.05707600	-2.98813300	2.90737100	C	3.63530500	-1.07358300	0.58321800
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Ir	0.38731700	-1.46224300	-0.67930200	C	3.81888600	-2.04191500	2.83763000
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H	-0.78968000	-1.83115000	-1.79487500	C	2.85386000	0.25939200	4.05979800
C	-0.91742100	-2.72443400	2.00928100	C	2.95146600	0.20474800	2.67243000
H	-1.33345000	-3.61275700	2.50260500	H	6.13380900	0.96393000	-5.71690400
O	1.45484400	-3.25663700	-1.28197000	H	5.67543400	3.32741200	-5.08213100
C	-0.58811100	-5.57554500	0.04616200	H	4.84898100	3.87056100	-2.79338400
C	0.23913500	-6.87337800	0.08828800	H	5.70069300	-0.85556300	-4.05790200
H	-0.40146000	-7.72095100	-0.18296500	H	4.18035900	1.58965900	0.99365400
H	1.08649700	-6.84359300	-0.59848200	H	5.77080200	1.26294300	0.28604000
H	0.63589900	-7.05556400	1.09348100	H	3.60596000	-2.09869100	0.23308500
C	-1.08829500	-5.34165400	-1.39213100	H	4.18061000	-2.94716200	2.35616800
H	-1.75383000	-6.15848500	-1.69343900	H	4.00668000	-2.84656500	4.82370900
H	-1.63818300	-4.40161800	-1.50595900	H	3.15800300	-0.77946400	5.92714600
H	-0.25402400	-5.30308200	-2.09925800	H	2.45750000	1.15472300	4.52362700
C	-1.78595600	-5.76514600	0.99814700	H	2.57741200	1.03002200	2.07977900
H	-1.44614100	-5.98038800	2.01805800	C	-0.10713300	2.93212700	4.71205000
H	-2.44345700	-4.89291800	1.04063100	C	-1.32379200	3.88621900	4.74320100
H	-2.39020700	-6.61572300	0.66297700	C	-0.50670300	1.60743100	5.39183900

C	1.03997600	3.56685600	5.52377600
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H	-1.42304900	1.18808000	4.96412500
H	0.73739000	3.67585700	6.57134700
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H	1.30443100	4.56338000	5.15761700
C	1.98639200	4.77587700	0.46210400
C	3.42964300	4.88555900	0.99811900
C	2.03291800	4.58705200	-1.06347200
C	1.23459900	6.09453400	0.75295400
H	3.44529200	5.01764800	2.08552900
H	4.00479800	3.99033100	0.74842700
H	3.93657500	5.74790500	0.54800700
H	1.02452800	4.53868600	-1.49042500
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H	1.21191600	6.33083800	1.82158700
C	-3.77045300	4.51491200	-0.86669800
C	-4.65268200	4.20253100	0.36220400
C	-2.62505100	5.46182100	-0.44398300
C	-4.63663800	5.23499800	-1.91245000
H	-5.46271100	3.51443500	0.09416100
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H	-1.99692800	5.01285300	0.33185800
H	-5.04576600	6.15598500	-1.48273000
H	-4.05479200	5.51149700	-2.79853800
H	-5.48011300	4.61493300	-2.23621200
C	-2.95038300	1.09355600	-4.64216900
C	-1.57125900	1.09375300	-5.33862600
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H	-1.15014500	2.10517700	-5.36547500
H	-0.85936900	0.44727500	-4.81590400
H	-1.66499400	0.73325300	-6.37038500
H	-4.48142700	-0.38369200	-4.11821400
H	-3.65769700	-0.70162400	-5.65969300
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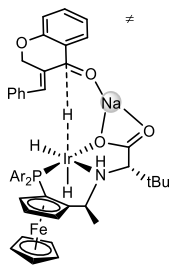
TS'$_{II-III}$



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C	1.62562200	-4.01446600	0.10553200
H	2.54117300	-3.97819300	0.70255600
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C	-1.76011000	-0.00144800	2.86682800
H	-2.49852600	0.77151300	2.72007500
C	-1.54715000	-0.72941900	4.06951400
H	-2.09656700	-0.60438600	4.99326200
C	-0.54369100	-1.70653200	3.81462500
H	-0.17460100	-2.44341300	4.51667400
C	-2.48300400	0.46458900	-0.32950600
C	-3.13951500	1.53299400	0.29029400
H	-2.59091200	2.15922100	0.98420600

C	-4.47571800	1.82494900	0.00796900	O	1.46883700	-2.95465200	-2.09647200
C	-5.13956600	1.02321800	-0.93330800	C	0.97081000	-5.42419900	0.31945800
H	-6.17444300	1.23521400	-1.16264000	C	1.96097500	-6.55428900	-0.01985800
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C	-3.15710800	-0.28972200	-1.28817400	H	2.22997300	-6.56336300	-1.07576100
H	-2.61234200	-1.08118100	-1.78831000	H	2.88742100	-6.45113600	0.55619200
C	-0.12493900	1.77422200	0.33116300	C	-0.27641000	-5.56648200	-0.57379900
C	0.22781700	2.29749500	1.57155100	H	-0.76294600	-6.53085600	-0.38935900
H	0.25420400	1.64341600	2.43460200	H	-1.02024500	-4.78177400	-0.39928900
C	0.49207000	3.66997100	1.72740400	H	-0.00642500	-5.51956800	-1.63377100
C	0.40767900	4.48111300	0.59693200	C	0.59034000	-5.59640500	1.80392900
H	0.58905900	5.54367200	0.69606300	H	1.48266600	-5.56875200	2.44041100
C	0.07511300	3.97811000	-0.67614300	H	-0.10301400	-4.83413300	2.16610000
C	-0.17650000	2.61288200	-0.79492200	H	0.11173500	-6.57169800	1.94860700
H	-0.44435000	2.17960100	-1.75100800	H	-0.20979500	-3.26312100	0.63145900
C	-2.73652700	-3.88160100	1.90093700	H	1.93213500	-0.46061700	-1.13113300
H	-2.08845600	-4.72391400	1.71497500	Na	3.42646100	-2.87393400	-3.30552900
C	-3.35590100	-3.56665000	3.14682100	C	1.99243200	1.07229400	-5.14733100
H	-3.22633900	-4.10461500	4.07666100	C	2.37864800	2.41891000	-5.12453000
C	-4.14682600	-2.39419200	2.95614500	C	2.93413200	2.96854100	-3.97460500
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C	-3.13323500	-2.89871700	0.94622900	O	3.62509500	2.77499400	-1.72209300
H	-2.79284600	-2.83139900	-0.07662500	C	3.37108500	2.07839900	-0.47689800
C	2.07314300	-3.81855500	-1.35507500	C	3.82372800	0.65245300	-0.56906700
O	3.02472100	-4.50358200	-1.78871700	C	3.28650800	-0.10439400	-1.75817000
C	2.30349600	-1.45703400	1.84743900	O	3.87131600	-1.18924200	-2.10307600
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Ir	0.36012100	-1.40218900	-1.10423000	C	6.63726200	0.20840700	1.79642100
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H	2.13163700	-0.59926300	1.19663500	C	6.50016100	1.44063000	3.87201700
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C	1.06133800	-2.34393700	1.89852600	C	4.58511200	1.32639100	2.39771300
H	1.25797600	-3.17420400	2.58804700	H	1.51976900	0.65096200	-6.02969700

H	2.22468600	3.04688500	-5.99761800
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H	1.91670800	-0.76220700	-4.02230300
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H	3.92679200	2.64098300	0.27084800
H	5.02879500	-0.94562900	-0.08534500
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C	-1.16493400	5.96847900	-1.55669200
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C	0.77723000	4.22341600	3.12983300
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H	-1.34558000	4.40135600	3.62853000
H	-0.63293500	2.85558900	4.11885200
H	-0.27402900	4.32440400	5.04298000
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C	-5.05345000	2.82277200	2.24235700
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C	-6.61977900	3.17372700	0.32862500
H	-5.55124100	1.89467300	2.54631400
H	-4.01499000	2.77830700	2.58714800
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H	-4.44493900	4.47385100	-0.76259500
H	-4.83471700	5.17792100	0.82033600
H	-3.33188400	4.26432400	0.59570800
H	-7.05088200	4.02845200	0.86119500
H	-6.74301100	3.35568000	-0.74456100
H	-7.20365400	2.28544000	0.59502400
C	-5.19406500	-0.88296000	-2.66863700
C	-4.47169200	-0.68047100	-4.01915700
C	-5.11427000	-2.37198700	-2.26634600
C	-6.67474700	-0.50946700	-2.84522200
H	-4.52124400	0.36845500	-4.33244700
H	-3.41583400	-0.96208500	-3.95476000
H	-4.94039800	-1.29402200	-4.79812300
H	-5.58482000	-2.54163600	-1.29149100
H	-5.62824100	-2.99346600	-3.00920500
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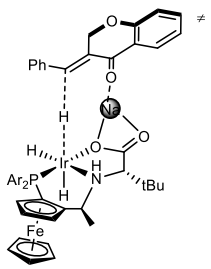

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C	3.26432100	-2.31586700	-0.07615800	C	-1.33390800	-3.89711500	0.74883800
H	4.02161700	-1.73613600	0.46243000	H	-1.07341400	-3.62172200	-0.26332500
C	0.51139900	-1.22499900	2.30907700	C	3.49310100	-1.97903000	-1.56420000
C	-0.71081500	-0.71594000	1.72992300	O	4.59342300	-2.26089600	-2.09037400
C	-1.71138000	-0.75822700	2.75959600	C	2.50948600	0.16570900	1.73879600
H	-2.74724700	-0.48375400	2.63928500	H	3.55092700	0.15493700	1.40492800
C	-1.13217200	-1.29176500	3.94249700	H	2.48301900	0.58143300	2.75166500
H	-1.65273300	-1.49462900	4.86921600	Ir	0.80208400	-0.68739100	-1.22532300
C	0.23156400	-1.58592900	3.66281600	H	0.08849000	-0.04338800	-2.49943800
H	0.94453500	-2.03073900	4.34544100	H	1.94285900	0.80321300	1.05912800
C	-2.59998400	-0.73763900	-0.45224300	H	0.13612400	-2.16320400	-1.57870700
C	-3.75158800	-0.32313900	0.23851700	C	1.90944800	-1.23944800	1.74486700
H	-3.66373100	0.45095400	0.98797600	H	2.51109000	-1.85711400	2.41945300
C	-4.99706900	-0.88086200	-0.04199600	O	2.57999100	-1.36439000	-2.22962000
C	-5.07375300	-1.84571700	-1.06533200	C	3.51955400	-3.83667700	0.22327700
H	-6.03835800	-2.28509700	-1.28871300	C	4.99589400	-4.20960600	-0.01996900
C	-3.95760600	-2.24235400	-1.80204100	H	5.16506400	-5.24137600	0.31191800
C	-2.71636700	-1.66936000	-1.47708900	H	5.27326300	-4.12167300	-1.06863500
H	-1.81537000	-1.94854500	-2.01052900	H	5.66024500	-3.55603800	0.55854300
C	-1.34079500	1.65305700	0.33670500	C	2.61547000	-4.69750400	-0.67904200
C	-0.90060200	2.29197000	1.49480400	H	2.73122700	-5.75892500	-0.43205800
H	-0.23624000	1.76223900	2.16825400	H	1.55374500	-4.44595700	-0.57547800
C	-1.34035100	3.58168100	1.82082800	H	2.87844300	-4.56570600	-1.73354800
C	-2.24777600	4.20318200	0.95665500	C	3.23609300	-4.15233600	1.70598100
H	-2.62166800	5.18530200	1.21065400	H	3.92040000	-3.60230600	2.36257100
C	-2.68848800	3.59822400	-0.23190200	H	2.21430900	-3.92448400	2.01496300
C	-2.20358700	2.32480900	-0.53554300	H	3.40103200	-5.22127600	1.88300100
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H	-0.78332900	-5.05244300	3.85239200	C	7.38102400	0.57282900	2.05060300
C	-2.46974200	-4.06662100	2.75047300	C	6.60156500	1.72880200	2.08014000
H	-3.22538400	-3.95136300	3.51661500	C	5.75057300	2.00665200	1.00950900
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O	5.02131300	3.15848900	1.03644100	H	-2.84948800	6.23070600	-1.14362800
C	3.72456200	3.11905200	0.40995500	C	-0.84584600	4.23108800	3.12114800
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C	2.54432900	2.26560300	-1.68677200	H	-2.37530300	3.27562400	4.35720100
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C	1.03370200	4.09094700	-0.75970900	H	-1.02123300	6.07030900	4.25519200
H	7.92048300	-1.21007100	0.95413800	H	-1.12457900	6.31794300	2.50663300
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H	6.63413700	2.41669300	2.91864600	C	-6.26527900	-0.49383900	0.73138300
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H	3.47935200	4.16855700	0.22799300	C	-5.98978100	0.56579500	1.81174800
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H	2.68499200	1.67868200	-2.58572300	H	-7.08893700	-2.53313500	0.70374000
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H	-0.83298900	6.34187300	-2.50106600	H	-5.59078400	1.49129000	1.38473000
H	-0.14576700	5.78445000	-0.17691100	H	-6.92251700	0.81277300	2.33057900
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H	-2.52917000	4.25614800	-2.92240600	C	-3.58524500	-2.59581800	-4.25292700
H	-3.62717600	2.87221300	-2.83267900	C	-3.06567800	-4.44172700	-2.61914500
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H	-5.34439000	3.84875300	0.35256500	H	-4.25541600	-1.76626000	-4.50564100
H	-5.94111900	4.06456000	-1.30724800	H	-2.56871200	-2.19698900	-4.17753200
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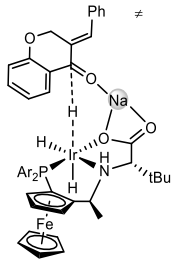

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H	-2.74724700	-0.48375400	2.63928500
C	-1.13217200	-1.29176500	3.94249700
H	-1.65273300	-1.49462900	4.86921600
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C	-2.59998400	-0.73763900	-0.45224300
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H	-3.66373100	0.45095400	0.98797600
C	-4.99706900	-0.88086200	-0.04199600
C	-5.07375300	-1.84571700	-1.06533200
H	-6.03835800	-2.28509700	-1.28871300
C	-3.95760600	-2.24235400	-1.80204100
C	-2.71636700	-1.66936000	-1.47708900
H	-1.81537000	-1.94854500	-2.01052900
C	-1.34079500	1.65305700	0.33670500
C	-0.90060200	2.29197000	1.49480400
H	-0.23624000	1.76223900	2.16825400
C	-1.34035100	3.58168100	1.82082800
C	-2.24777600	4.20318200	0.95665500
H	-2.62166800	5.18530200	1.21065400
C	-2.68848800	3.59822400	-0.23190200
C	-2.20358700	2.32480900	-0.53554300
H	-2.53795900	1.81431000	-1.43040300
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C	-2.56811100	-3.60712000	1.40297700
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C	3.49310100	-1.97903000	-1.56420000
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H	3.55092700	0.15493700	1.40492800
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Ir	0.80208400	-0.68739100	-1.22532300
H	0.08849000	-0.04338800	-2.49943800
H	1.94285900	0.80321300	1.05912800
H	0.13612400	-2.16320400	-1.57870700
C	1.90944800	-1.23944800	1.74486700
H	2.51109000	-1.85711400	2.41945300
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H	5.27326300	-4.12167300	-1.06863500
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C	2.61547000	-4.69750400	-0.67904200
H	2.73122700	-5.75892500	-0.43205800

H	1.55374500	-4.44595700	-0.57547800	H	-0.83298900	6.34187300	-2.50106600
H	2.87844300	-4.56570600	-1.73354800	H	-0.14576700	5.78445000	-0.17691100
C	3.23609300	-4.15233600	1.70598100	H	1.29398000	3.84820200	0.26073400
H	3.92040000	-3.60230600	2.36257100	C	-3.76636700	4.24312700	-1.11634700
H	2.21430900	-3.92448400	2.01496300	C	-3.52705700	3.93864700	-2.60948700
H	3.40103200	-5.22127600	1.88300100	C	-5.12907200	3.64224800	-0.70217300
H	1.30287100	-2.64817800	0.42783400	C	-3.82232900	5.77162100	-0.93954900
H	1.53515600	0.89459400	-1.06353100	H	-2.52917000	4.25614800	-2.92240600
Na	4.19798500	-0.63336000	-3.60824600	H	-3.62717600	2.87221300	-2.83267900
C	7.32032900	-0.30521200	0.96125200	H	-4.26950500	4.46749700	-3.21833200
C	7.38102400	0.57282900	2.05060300	H	-5.34439000	3.84875300	0.35256500
C	6.60156500	1.72880200	2.08014000	H	-5.94111900	4.06456000	-1.30724800
C	5.75057300	2.00665200	1.00950900	H	-5.12762300	2.55563700	-0.84006600
C	5.70033100	1.14961700	-0.10362100	H	-4.55244700	6.19846400	-1.63592200
C	6.48915400	-0.01015800	-0.11578800	H	-4.13209300	6.06040300	0.07015300
O	5.02131300	3.15848900	1.03644100	H	-2.84948800	6.23070600	-1.14362800
C	3.72456200	3.11905200	0.40995500	C	-0.84584600	4.23108800	3.12114800
C	3.66947900	2.32373500	-0.87279400	C	-1.28318700	3.35627500	4.31758400
C	4.76315700	1.45512600	-1.19985700	C	0.69555500	4.32769800	3.09691500
O	4.91778600	0.91542600	-2.32828400	C	-1.41137500	5.64597400	3.32363900
C	2.54432900	2.26560300	-1.68677200	H	-2.37530300	3.27562400	4.35720100
C	1.50151200	3.29281000	-1.81599500	H	-0.87622200	2.34243000	4.24797400
C	1.03589200	3.56965600	-3.11422600	H	-0.93711100	3.79620100	5.26072900
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C	-0.19751200	5.48216300	-2.30952700	H	1.06760600	4.75170800	4.03706300
C	0.20044600	5.17842000	-1.00719400	H	1.16205500	3.34590000	2.96600600
C	1.03370200	4.09094700	-0.75970900	H	-1.02123300	6.07030900	4.25519200
H	7.92048300	-1.21007100	0.95413800	H	-1.12457900	6.31794300	2.50663300
H	8.03468200	0.35120200	2.88978800	H	-2.50464500	5.63998100	3.39392600
H	6.63413700	2.41669300	2.91864600	C	-6.26527900	-0.49383900	0.73138300
H	6.41385300	-0.67340100	-0.97129600	C	-6.83277500	-1.75140300	1.42573200
H	3.47935200	4.16855700	0.22799300	C	-5.98978100	0.56579500	1.81174800
H	3.01344400	2.74004400	1.15784200	C	-7.31677600	0.07267300	-0.24706400
H	2.68499200	1.67868200	-2.58572300	H	-7.08893700	-2.53313500	0.70374000
H	1.35932900	2.93544000	-3.93503000	H	-6.10049400	-2.16948900	2.12634600
H	-0.12330400	4.86735100	-4.37710100	H	-7.74072600	-1.50176900	1.98775600

H	-5.59078400	1.49129000	1.38473000
H	-6.92251700	0.81277300	2.33057900
H	-5.28018500	0.20180700	2.56393000
H	-8.23438300	0.33930200	0.29086400
H	-6.93997400	0.97236700	-0.74535400
H	-7.58152800	-0.65390900	-1.02182900
C	-4.02468700	-3.27289700	-2.93600100
C	-3.58524500	-2.59581800	-4.25292700
C	-3.06567800	-4.44172700	-2.61914500
C	-5.43905000	-3.84340900	-3.12631000
H	-4.25541600	-1.76626000	-4.50564100
H	-2.56871200	-2.19698900	-4.17753200
H	-3.60683000	-3.31791800	-5.07821000
H	-3.33054800	-4.91917600	-1.66912600
H	-3.11628000	-5.19886100	-3.41081800
H	-2.02757400	-4.10269100	-2.54732800
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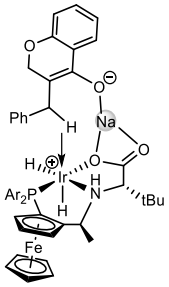
H	-6.16125200	-3.06136800	-3.38674500

III



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H	0.70756900	-4.62381700	0.97318900
C	-1.86185700	-1.76245100	2.07388100
C	-1.96146800	-0.41795700	1.54687400
C	-3.04052500	0.22912300	2.23769100
H	-3.40668500	1.22371000	2.03560200
C	-3.60067800	-0.68698000	3.16827300
H	-4.46230500	-0.50572000	3.79704100
C	-2.88024200	-1.90965800	3.06460900
H	-3.07810300	-2.81811800	3.61912200
C	-2.06874700	1.36777700	-0.72022400
C	-2.64148800	2.49623100	-0.12353200
H	-2.33229700	2.77875900	0.87630900
C	-3.57757000	3.27746200	-0.80630900
C	-3.91575600	2.90403800	-2.11604600
H	-4.63986700	3.49726300	-2.65612700
C	-3.32896200	1.80486500	-2.75577600
C	-2.39548200	1.04676500	-2.03743800
H	-1.90027600	0.20327700	-2.50093700
C	0.07674100	1.55180700	1.12756000
C	0.30403700	1.44367800	2.50164300
H	-0.10769300	0.59994500	3.03902900
C	1.03968200	2.42272900	3.18037000
C	1.50947900	3.51495700	2.44124800
H	2.05046900	4.29847300	2.96025300
C	1.30558000	3.64923100	1.05972300
C	0.59450500	2.63686900	0.40869800
H	0.42257000	2.68971000	-0.65883700
C	-4.36757300	-2.91536000	-0.07369000
H	-3.91683600	-3.88632300	-0.21678300
C	-5.39541200	-2.60416800	0.86592100
H	-5.82900100	-3.28677300	1.58470900
C	-5.72126200	-1.22302800	0.71512100
H	-6.43636000	-0.67227600	1.31190300
C	-4.89110300	-0.67833100	-0.30982100
H	-4.85843100	0.35378200	-0.62934000
C	-4.05385700	-1.72579400	-0.79625600
H	-3.29238400	-1.62350400	-1.55432100
C	1.26332200	-4.02865200	-0.99126900
O	2.21918300	-4.81268400	-1.12627700
C	0.49452000	-2.39042800	2.55907500
H	1.29241300	-3.12808600	2.44399000

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H	0.64920100	-0.22882400	-1.90715900	C	4.41904300	-3.19694500	2.85784100
H	0.86149700	-1.44276400	2.16630100	C	4.36293000	-2.33867600	3.95659200
H	-1.12103400	-1.53182200	-1.72498700	C	3.86142700	-1.04545300	3.79155000
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H	-1.15656400	-3.73250800	2.31103300	H	7.44382000	1.34852600	-4.99911300
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H	-0.64264700	-7.58890200	-0.80758200	H	3.12235500	1.62141200	0.52125900
H	0.77839900	-6.68494400	-1.37400600	H	4.87936900	1.40187800	0.59041600
H	0.58610800	-7.03195800	0.34420300	H	2.94523300	-1.93945700	-0.56039000
C	-1.45917400	-5.11080800	-1.70781200	H	4.00936700	-3.43785200	0.75694100
H	-2.14805000	-5.91210400	-1.99656600	H	4.80849700	-4.20538000	2.97090900
H	-2.04201700	-4.18461800	-1.64564000	H	4.70800200	-2.67122700	4.93165600
H	-0.73329500	-4.97940400	-2.51628400	H	3.81587400	-0.37222700	4.64275500
C	-1.81427800	-5.74059800	0.71123000	H	3.00596100	0.38531800	2.43162000
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H	-2.45341700	-4.87785900	0.91854900	C	0.47156700	3.46728300	5.38135200
H	-2.46689300	-6.56185100	0.39503100	C	0.87171700	0.99734600	5.28640400
H	-1.50959600	-3.13386200	-0.00004300	C	2.79127000	2.57003600	4.98773400
H	1.90998700	-0.66821500	0.16091300	H	0.75344600	4.45792700	5.00919400
Na	3.25455700	-3.21638600	-2.59543700	H	-0.59999200	3.33109400	5.19595900
C	6.75505900	1.54873200	-4.18278600	H	0.63679900	3.45215400	6.46541000
C	6.48548700	2.86521100	-3.79854000	H	1.39842200	0.16600600	4.80624000
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C	5.00462800	2.05953300	-2.07508800	H	-0.20586100	0.82500800	5.18688900
C	5.24598100	0.72734900	-2.46023700	H	2.98105900	2.48015900	6.06365000
C	6.13029500	0.49372000	-3.51866300	H	3.40716700	1.83001900	4.46742200
O	4.12386900	2.35448100	-1.06793600	H	3.13159900	3.56172200	4.67490800
C	3.99297800	1.32191100	-0.06663200	C	1.80675000	4.90449700	0.33136400
C	3.81403200	-0.04428300	-0.65559300	C	3.30452300	5.13535100	0.62658700
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O	4.50854900	-1.54567000	-2.38142900	C	0.99062300	6.11394300	0.84000300
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H	3.90251000	4.30054900	0.25296700
H	3.64123200	6.05058700	0.12502500
H	0.57506000	4.70678800	-1.47545400
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C	-4.17557300	4.50747400	-0.10968700
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H	-5.58992300	6.11230600	-0.45342500
H	-4.73297800	5.61568600	-1.91789700
H	-6.03879400	4.60535800	-1.26367700
C	-3.65288600	1.41416100	-4.20396200
C	-2.37121900	1.55199100	-5.05550500
C	-4.13855300	-0.05152100	-4.24516800
C	-4.74707900	2.30184500	-4.81874000
H	-2.00975300	2.58618200	-5.04958600
H	-1.56598500	0.91393300	-4.67746600
H	-2.57188300	1.26455500	-6.09447700
H	-5.02586400	-0.19066600	-3.61748300
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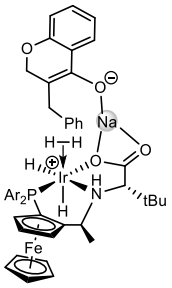
III+H_2



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C	-3.15201300	-0.90160900	3.65498700
H	-3.89750700	-0.77295400	4.42845000
C	-2.37453100	-2.07079200	3.42572600
H	-2.40532500	-2.98334400	4.00742200
C	-2.51011500	1.18036400	-0.47372800
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H	-2.65385900	2.60627400	1.12512500
C	-4.20411600	2.92292100	-0.33626300
C	-4.70514300	2.47843000	-1.56972500
H	-5.56640700	2.97702100	-1.99103400
C	-4.11600200	1.42697600	-2.28357900
C	-3.00694500	0.78692600	-1.71598500
H	-2.50953600	-0.02349200	-2.23400100
C	-0.07901700	1.57043200	0.98821000
C	0.51777400	1.41978000	2.24550300
H	0.26031000	0.55958200	2.84981500
C	1.42744900	2.36942800	2.71431600
C	1.70387500	3.47728000	1.89691100
H	2.40712200	4.21864100	2.25392600
C	1.11023800	3.66223000	0.64410000
C	0.21813100	2.67957300	0.19696200

H	-0.25118600	2.77418000	-0.77516000	H	-1.46709600	-3.16727000	0.11127700
C	-4.18681500	-2.04334100	-0.17232000	H	5.37112400	-0.05075600	2.20169900
H	-3.55981900	-1.90662700	-1.04100900	Na	3.53308500	-2.38160400	-1.72190900
C	-4.30081300	-3.23406500	0.60605100	C	3.98078100	2.90311600	-3.97762700
H	-3.81072400	-4.17519700	0.40687000	C	4.58857700	4.07309600	-3.51726300
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H	-6.27203000	-1.10060100	2.27705900	C	3.82731400	1.81693300	-3.11380200
C	-5.00824500	-1.04314400	0.42885400	O	5.26288000	3.21619500	-0.03559500
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O	2.47683700	-4.44098000	-1.07161900	C	4.12091000	0.73493000	-0.85668500
C	0.86938700	-2.46539100	2.39879800	O	3.42289700	-0.29881800	-1.25689400
H	1.64592700	-3.16489400	2.07456400	C	4.74769000	-0.31210000	1.33297800
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Ir	-0.00638100	-1.23917900	-0.90693900	C	6.22273800	-1.67333100	-0.24021500
H	0.25307000	-0.12266900	-2.01131100	C	6.64923100	-2.88955300	-0.77954700
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C	-0.50517000	-2.85885200	1.84879900	C	4.72676900	-2.85134400	1.23034400
H	-0.78158700	-3.82193900	2.30172100	H	3.62351300	2.83882600	-5.00166400
O	1.21128700	-2.77576100	-1.82164500	H	4.71235700	4.92423400	-4.18146700
C	-0.62992200	-5.33284100	-0.71966000	H	5.49924400	5.06363500	-1.81317500
C	0.23500700	-6.47509100	-1.28318100	H	3.33734300	0.90298100	-3.43404100
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H	0.81698900	-6.15622200	-2.15118500	H	6.70679200	1.80142900	0.35154700
H	0.93971000	-6.85003000	-0.53409200	H	3.73925200	-0.48386700	1.73885000
C	-1.50449700	-4.76837700	-1.85490200	H	6.61184600	-0.73591600	-0.62622200
H	-2.07444000	-5.58243100	-2.31645900	H	7.40278700	-2.89569200	-1.56337600
H	-2.22989400	-4.02506500	-1.50758300	H	6.42612600	-5.04137600	-0.74916700
H	-0.89399300	-4.28919500	-2.62534000	H	4.69769400	-4.99763100	1.03896500
C	-1.51369000	-5.91399400	0.40092700	H	3.96380900	-2.83781800	2.00533000
H	-0.90262500	-6.42924200	1.15131500	C	2.09615800	2.25559900	4.09069800
H	-2.09598400	-5.14569600	0.91888500	C	1.60256800	3.41476400	4.98371900
H	-2.22089400	-6.64155900	-0.01287400	C	1.76456600	0.92578400	4.78917100

C	3.62890300	2.34213500	3.93417100
H	1.84735500	4.38797000	4.54606500
H	0.51525900	3.36918100	5.11414400
H	2.06975700	3.36221300	5.97461200
H	2.09421400	0.06688900	4.19340000
H	2.27854400	0.87884600	5.75549800
H	0.69068800	0.81976300	4.98032700
H	4.11474500	2.26775700	4.91457700
H	3.99549900	1.52807600	3.30318600
H	3.94168600	3.28477000	3.47556300
C	1.35525100	4.91612300	-0.20496100
C	2.63339900	5.65765300	0.22588500
C	1.47950800	4.54342400	-1.69685500
C	0.14291600	5.85685700	-0.02058000
H	2.53837100	6.08081800	1.23267200
H	3.50535000	4.99809800	0.20787300
H	2.82051700	6.49198700	-0.45886500
H	0.53348900	4.17338100	-2.10592300
H	1.76122100	5.42725200	-2.27927700
H	2.24044700	3.77761300	-1.85425600
H	0.27305000	6.76980500	-0.61462600
H	-0.78437200	5.37039800	-0.34277000
H	0.02482700	6.14617600	1.03037100
C	-4.82041200	4.09682300	0.43752400
C	-5.25745900	3.60937500	1.83683200
C	-3.76309300	5.21212400	0.59030700
C	-6.05006900	4.68630100	-0.27227600
H	-5.99066300	2.79858100	1.75551100
H	-4.40760500	3.23974600	2.42015200
H	-5.71527500	4.42971800	2.40193600
H	-3.44115800	5.57878500	-0.39048900
H	-4.17778400	6.05750700	1.15210400
H	-2.87351900	4.85967100	1.12144700
H	-6.45481900	5.51402300	0.31991800
H	-5.79636000	5.08054100	-1.26232400
H	-6.84585000	3.94248700	-0.39201500
C	-4.62670100	0.96202400	-3.65381000
C	-3.51796500	1.19627000	-4.70381000
C	-4.96218900	-0.54452800	-3.59335800
C	-5.88861600	1.72005700	-4.09648300
H	-3.26581500	2.26033900	-4.77210300
H	-2.60341900	0.65020800	-4.45125900
H	-3.85231200	0.85873600	-5.69206800
H	-5.71912700	-0.74905500	-2.82794600
H	-5.35039400	-0.88482000	-4.56042600
H	-4.07803800	-1.14661800	-3.36152500
H	-6.21815700	1.34685400	-5.07198900
H	-6.71493400	1.58001400	-3.39011500
H	-5.70250800	2.79480100	-4.19992100
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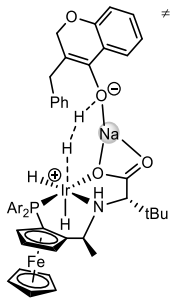
H	1.43495100	-0.88277100	0.16468300

$TS_{III+H2-IV}$



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H	0.89303100	-4.66118900	0.79239400
C	-1.50436100	-1.88274200	2.27923000
C	-1.82005000	-0.56480900	1.76777200
C	-2.81221100	-0.00062100	2.63857300
H	-3.29654300	0.95342000	2.49977100
C	-3.11298400	-0.94073000	3.66016100
H	-3.86122400	-0.82158900	4.43254800
C	-2.31449600	-2.09685500	3.43681400
H	-2.32934600	-3.00724800	4.02253600

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C	-3.11559000	2.20240300	0.18586600	C	-0.43080100	-2.85997300	1.86564200
H	-2.68911200	2.55583100	1.11796800	H	-0.69070100	-3.82436000	2.32620100
C	-4.24300900	2.83372400	-0.34732600	O	1.29061900	-2.76676000	-1.79999800
C	-4.73036400	2.37643700	-1.58163500	C	-0.50760300	-5.35082000	-0.68806500
H	-5.60228000	2.85390900	-2.00558500	C	0.37859100	-6.48081000	-1.24320200
C	-4.11472600	1.33820400	-2.29235700	H	-0.25549600	-7.32139000	-1.54787000
C	-2.99276400	0.72469700	-1.72079700	H	0.95687300	-6.15666900	-2.11173900
H	-2.47517800	-0.07601200	-2.23451000	H	1.08808600	-6.83917000	-0.49048100
C	-0.09027600	1.57632600	0.98500400	C	-1.39002000	-4.80918200	-1.82825900
C	0.50469000	1.44385500	2.24477100	H	-1.94339900	-5.63639300	-2.28674800
H	0.27133800	0.57525800	2.84673200	H	-2.12941600	-4.07732400	-1.48674800
C	1.38240600	2.42050600	2.71919600	H	-0.78683300	-4.32219100	-2.59952500
C	1.62900400	3.53700400	1.90426200	C	-1.38288400	-5.94148200	0.43418300
H	2.30450400	4.30146200	2.26688200	H	-0.76410400	-6.44133700	1.18869300
C	1.03721000	3.70365100	0.64760700	H	-1.97951900	-5.18061500	0.94655700
C	0.17832700	2.69404000	0.19547500	H	-2.07621000	-6.68396400	0.02328900
H	-0.28869500	2.77383300	-0.77887000	H	-1.38504600	-3.19460200	0.12828700
C	-4.11955300	-2.11945300	-0.16302200	H	5.39703100	0.11042800	2.18125300
H	-3.48951200	-1.97542700	-1.02843500	Na	3.60159100	-2.36037700	-1.72000700
C	-4.21516100	-3.30798000	0.62120800	C	3.73609000	2.85680000	-4.02347400
H	-3.70714100	-4.24097500	0.42893000	C	4.35041600	4.04527700	-3.62366400
C	-5.10747700	-3.05392900	1.70513400	C	4.84055200	4.18072100	-2.32250200
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H	-6.22988500	-1.20143900	2.27448600	C	3.62224100	1.79815700	-3.12000000
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O	2.58164800	-4.40801000	-1.04099700	C	4.02395200	0.79475600	-0.84520700
C	0.93640400	-2.43799500	2.41311500	O	3.35524400	-0.28430200	-1.20601900
H	1.72091300	-3.13825400	2.10983000	C	4.75259100	-0.19095000	1.34154300
H	0.89661900	-2.42006700	3.50667700	C	5.28587500	-1.49810700	0.77335700
Ir	0.03791600	-1.24298300	-0.89987500	C	6.26214100	-1.50612800	-0.23494900
H	0.29710000	-0.11979200	-1.99716900	C	6.71839300	-2.70823200	-0.78149200
H	1.21221000	-1.44422300	2.05778400	C	6.20554500	-3.93035600	-0.32881100

C	5.24230100	-3.93519600	0.68234600
C	4.79382500	-2.72882200	1.22790600
H	3.34354700	2.75589700	-5.03136000
H	4.44393700	4.87461800	-4.31946400
H	5.30633800	5.10092200	-1.98441900
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H	5.50971300	2.45090300	1.64043100
H	6.60159800	1.94998500	0.34219400
H	3.76742900	-0.39203900	1.78602500
H	6.63185700	-0.55860500	-0.61539600
H	7.47330300	-2.69146700	-1.56378900
H	6.54720000	-4.86508900	-0.76367300
H	4.81507600	-4.87356700	1.02149000
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C	2.04484200	2.32620000	4.10031400
C	1.51778600	3.47496600	4.98767000
C	1.74093500	0.99059700	4.80043100
C	3.57616600	2.44967800	3.95473500
H	1.74272700	4.45312500	4.55043300
H	0.43093900	3.40382500	5.10961800
H	1.97831300	3.43488500	5.98228900
H	2.09386800	0.13792800	4.20909200
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H	0.66869700	0.85978200	4.98477800
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H	3.86833800	3.39590700	3.48967800
C	1.24524000	4.96974600	-0.19362700
C	2.53289900	5.71457700	0.20387400
C	1.31952500	4.62071000	-1.69440100
C	0.03409600	5.89972900	0.04517800
H	2.46717200	6.12952700	1.21625800
H	3.40710400	5.05975900	0.15475900
H	2.69435700	6.55612900	-0.47875500
H	0.35906100	4.26134900	-2.07846300
H	1.58507300	5.51325900	-2.27119900
H	2.07197100	3.85503400	-1.88968500
H	0.13773500	6.82201900	-0.53973400
H	-0.89992300	5.41065800	-0.25227200
H	-0.04993300	6.17311200	1.10357900
C	-4.89101800	3.99147600	0.42503200
C	-5.32481700	3.49070800	1.82066000
C	-3.86160900	5.13114300	0.58689600
C	-6.12998900	4.55370300	-0.29071600
H	-6.03798300	2.66290500	1.73304600
H	-4.46984400	3.13963800	2.40792600
H	-5.80529400	4.29860000	2.38500500
H	-3.54183400	5.50706600	-0.39113800
H	-4.29969600	5.96559200	1.14734300
H	-2.96778100	4.79860200	1.12364800
H	-6.55671800	5.37133400	0.30013900
H	-5.87995100	4.95453100	-1.27907400
H	-6.90794900	3.79210800	-0.41551100
C	-4.61103000	0.85847500	-3.66268800
C	-3.50466900	1.11409200	-4.71018400
C	-4.91310200	-0.65498800	-3.59856000
C	-5.88805700	1.58713500	-4.11126000
H	-3.27627100	2.18338700	-4.78112400
H	-2.57901200	0.58948700	-4.45280600
H	-3.82833000	0.76599800	-5.69839600
H	-5.66804700	-0.87362500	-2.83507800
H	-5.29018800	-1.00705100	-4.56588200
H	-4.01660300	-1.23618100	-3.36113300
H	-6.20612900	1.20446200	-5.08694700
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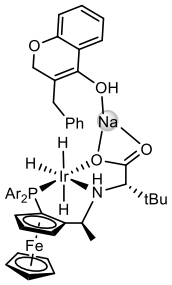
IV



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C	-1.48719000	-1.89277400	2.30476000
C	-1.66185700	-0.54540600	1.80297700
C	-2.58823400	0.11180800	2.68137900
H	-2.97222600	1.11112400	2.55261300
C	-2.98278500	-0.79695900	3.69962300
H	-3.71254300	-0.60473900	4.47513700
C	-2.30933700	-2.02813300	3.46658200
H	-2.41639000	-2.93601400	4.04674200
C	-2.21079300	1.18558600	-0.45578000
C	-2.78433000	2.27487800	0.21086800
H	-2.37329500	2.58947800	1.16317000
C	-3.86606500	2.96959000	-0.33906300
C	-4.33735700	2.56612200	-1.59842400
H	-5.17308600	3.09359700	-2.03606900
C	-3.75212100	1.51294900	-2.31086300
C	-2.68191800	0.83079900	-1.71867300
H	-2.19817800	0.00073900	-2.22011900
C	0.21041000	1.46121800	1.02346800
C	0.82832600	1.24776500	2.25947400
H	0.64766400	0.31523900	2.77801000
C	1.64355000	2.22821100	2.83298500
C	1.79845900	3.43808300	2.14078700
H	2.38314300	4.22775400	2.60039200
C	1.21078300	3.67822700	0.89181200
C	0.42937700	2.65778900	0.33417400
H	-0.04412500	2.79951100	-0.62848400
C	-4.08663000	-1.87027000	-0.12986100
H	-3.42137500	-1.78524700	-0.97782100
C	-4.29939000	-3.04157300	0.65780100
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C	-5.17582500	-2.70314900	1.73222800
H	-5.50155000	-3.36724200	2.52200700
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H	-4.85233300	0.21720900	0.11052500
C	1.33028600	-4.04314300	-0.98929800
O	2.40884900	-4.66393100	-0.90773500
C	0.87267900	-2.71682200	2.42808400
H	1.55354400	-3.54241200	2.19615100
H	0.82193300	-2.60934900	3.51626200
Ir	0.06587300	-1.41938400	-0.87747000
H	0.43998000	-0.32135400	-1.97437700
H	1.28085100	-1.80736300	1.98488500
H	-1.27472000	-1.73534800	-1.80453800
C	-0.53389800	-2.98392000	1.88220400
H	-0.90189100	-3.91271200	2.34390000
O	1.15008900	-3.07588700	-1.82443200
C	-0.79568100	-5.45664100	-0.69440200
C	0.02698600	-6.62858000	-1.26030600
H	-0.65012700	-7.42484100	-1.59033800
H	0.63286600	-6.32167800	-2.11721800
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C	-1.63296400	-4.84285200	-1.83118200
H	-2.23232600	-5.62814500	-2.30623500
H	-2.32592000	-4.07106300	-1.48194600
H	-0.99531600	-4.37731900	-2.58685500
C	-1.71770600	-6.00644600	0.41084900
H	-1.14099700	-6.55545700	1.16475600
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H	-1.52131600	-3.24396400	0.14469700	C	3.80364500	2.37869700	4.13373300
H	5.21429600	0.36772900	1.85281100	H	1.72012700	4.04435000	4.90428300
Na	3.38151900	-2.61698200	-1.70461800	H	0.54453200	2.77762800	5.28878400
C	2.61702300	2.93822100	-4.09854400	H	2.05940300	2.89336200	6.21042200
C	3.45247600	4.04677200	-3.93693800	H	2.59920700	-0.12041900	4.03656600
C	4.33859800	4.11567000	-2.85940600	H	2.67466300	0.50647500	5.69172500
C	4.38016700	3.06897200	-1.94260100	H	1.10989300	0.32729300	4.89008000
C	3.56898800	1.93193500	-2.10814100	H	4.26689700	2.26441800	5.12081100
C	2.68208300	1.88126800	-3.19025500	H	4.31688100	1.70680400	3.43854100
O	5.27190900	3.13897800	-0.90176600	H	3.98146200	3.40577800	3.80102700
C	4.89391300	2.42175500	0.28675100	C	1.33402700	5.06026300	0.22959700
C	4.37682600	1.03194000	0.00879300	C	2.78679000	5.57677600	0.25931500
C	3.71886800	0.83752900	-1.14912200	C	0.86322700	5.03675800	-1.23535400
O	3.17906200	-0.37150200	-1.51106700	C	0.44498200	6.04437000	1.02306500
C	4.53490900	-0.01953100	1.08043200	H	3.17937400	5.65495900	1.27827600
C	5.06655200	-1.35918800	0.60294900	H	3.45179700	4.93050100	-0.31604600
C	6.05267400	-1.43883900	-0.39192400	H	2.82975500	6.57883700	-0.18323600
C	6.51837300	-2.67893200	-0.83674600	H	-0.20663200	4.81433600	-1.31477300
C	6.00681700	-3.86292100	-0.29028600	H	1.02759000	6.02009600	-1.68967100
C	5.03353600	-3.79365200	0.71011200	H	1.41487400	4.29866400	-1.82505700
C	4.57177500	-2.54973300	1.15266900	H	0.49427100	7.04676300	0.58041300
H	1.91949600	2.89567700	-4.92954100	H	-0.59960800	5.71877600	1.01541400
H	3.40763300	4.87078500	-4.64334700	H	0.76815000	6.11751500	2.06749100
H	4.98649800	4.97325900	-2.71023100	C	-4.50395400	4.12077400	0.45205200
H	2.04993100	1.00612300	-3.29912700	C	-5.07840700	3.56280900	1.77339800
H	4.14605800	3.01562800	0.83324500	C	-3.43110100	5.18309700	0.77076900
H	5.80414400	2.38635200	0.89106500	C	-5.64532900	4.80320700	-0.31952600
H	3.57272100	-0.18116100	1.58311000	H	-5.82991800	2.79023100	1.57460000
H	6.42882700	-0.52323500	-0.83912600	H	-4.29500600	3.11719600	2.39540300
H	7.27999800	-2.72145900	-1.61109300	H	-5.55305000	4.36218400	2.35514100
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H	4.60489400	-4.70400900	1.11580600	H	-3.87005500	6.01566300	1.33336200
H	3.79257300	-2.50183900	1.90792400	H	-2.61778500	4.76656800	1.37249500
C	2.29872500	2.04463900	4.20954900	H	-6.05859000	5.62071900	0.28125500
C	1.61498000	2.99903500	5.21324200	H	-5.29520300	5.22907100	-1.26625900
C	2.15762500	0.60380000	4.73073800	H	-6.46224000	4.10662000	-0.53791700

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H	-1.37678300	2.31632900	-0.36069400
H	-1.67214900	1.51184500	-1.89567000
H	-1.51525200	0.21385800	1.64117700
H	-3.34333000	-1.09830100	2.68261600
H	-5.42655000	-1.56429300	1.40502900
H	-5.66442100	-0.70258200	-0.91616200
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H	1.55335300	2.50952200	1.18551500

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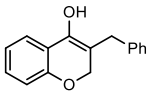

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O	0.99596600	-1.53921800	-0.63931300
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O	0.90677500	2.44800400	0.46519300
C	-1.43438000	1.33209600	-0.83696000
C	-2.55649300	0.51552900	-0.21658500
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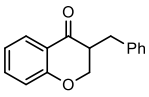

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C	-3.66069800	1.05547500	0.00581900
O	-1.13878700	-1.64009900	0.05325000
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O	-1.17983400	2.46880900	-0.20141200
C	1.34250500	1.20686700	-0.53054900
C	2.65477800	0.52889800	-0.21162300
C	3.32247300	-0.24495700	-1.16805300
C	4.51494800	-0.90021700	-0.85476400
C	5.05792600	-0.78962300	0.42533200
C	4.40271000	-0.01795200	1.38785500

C	3.21259700	0.63452100	1.06983900
H	-5.78709200	0.78944500	0.17530500
H	-5.62224000	-1.68497200	0.39821600
H	-3.39902700	-2.80555300	0.32848400
H	-3.69337000	2.13689600	-0.07746000
H	0.83528300	-1.54971600	-0.37694500
H	-0.22690500	-0.84637300	-1.62171800
H	0.29421500	0.33508100	1.14912700
H	1.32825700	2.22989900	-0.14394000
H	1.21030600	1.28523300	-1.61671300
H	2.90608100	-0.33002800	-2.16921000
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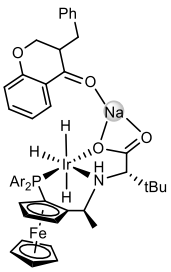
V



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H	-2.01683000	2.09653200	2.59444400
C	-2.29964400	0.30893800	3.90789300
H	-2.71776700	0.73373800	4.81102700
C	-2.09977700	-1.07721300	3.64698900
H	-2.31748200	-1.89325000	4.32441500
C	-1.90510700	1.93809900	-0.43543600
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H	-0.90406000	3.27657800	0.91243500
C	-2.44565600	4.29681000	-0.18676500
C	-3.43355700	4.13069500	-1.17621800
H	-4.02653000	4.99120700	-1.46182400
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H	-2.97153400	0.84577100	-1.91300000
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H	0.78000200	0.88214800	2.47937500
C	2.45055200	2.10445900	1.86891500
C	3.02000500	2.77996700	0.78346100
H	3.92025000	3.35715400	0.93854700
C	2.45890300	2.73353700	-0.50362400
C	1.30808600	1.96396100	-0.69039900
H	0.84653800	1.89606800	-1.67066100
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C	-5.39279400	-0.83305800	2.71891400
H	-5.69222400	-1.35300000	3.61941000
C	-5.30559000	0.58181500	2.55413200
H	-5.51388900	1.32262100	3.31507300
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H	-4.60410200	1.81863200	0.81806200
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H	-4.20093200	-0.54800700	-0.40396100
C	-0.68932900	-4.24602500	-1.46083600
O	-0.03206600	-5.25709900	-1.71997500
C	0.41183600	-2.64194000	1.87001800
H	0.78086200	-3.59475200	1.48286300
H	0.70902700	-2.55986600	2.92047900
Ir	-0.91190400	-1.32910200	-1.20314400
H	-0.53611400	-0.41667800	-2.48695300
H	0.88249800	-1.84482500	1.29464200
H	-2.51814500	-1.16550800	-1.63868500

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C	-2.82847100	-4.90354900	-0.19372500	H	3.98268500	-3.62444300	2.91531300
C	-2.63169900	-6.34770500	-0.69014000	H	2.52451200	-4.81620200	-1.68532600
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H	-2.27434000	-6.38077700	-1.72093900	H	2.64314700	-0.56170800	0.34271800
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H	-4.74155500	-4.71608600	-1.20203500	H	7.63619000	1.80313000	1.87036100
H	-4.00867300	-3.14848500	-0.84177200	H	8.16320600	3.49356700	0.12189200
H	-3.36836000	-4.11377800	-2.15918900	H	7.61054000	3.01637200	-2.25598000
C	-3.43862300	-4.97878400	1.22001400	H	6.51963700	0.88123400	-2.87253000
H	-2.80029800	-5.56720800	1.89008900	C	3.01850200	3.54411000	-1.68118100
H	-3.58138700	-3.99492300	1.67605300	C	3.39310700	2.59402800	-2.83825900
H	-4.41919300	-5.46676100	1.17920600	C	1.92714100	4.53017600	-2.15789000
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C	3.68390600	-3.90801400	1.91180400	H	2.29758800	5.13339500	-2.99554800
C	3.72657200	-2.94432900	0.90010400	H	1.02397000	4.00818700	-2.48885500
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C	2.85800000	-4.57575000	-0.68291600	H	4.04416400	5.08554400	-0.50965200
O	4.12385400	-1.69202000	1.24359300	H	5.07949700	3.70973900	-0.94888900
C	3.73150100	-0.66017300	0.31209800	C	3.04744000	2.15403000	3.28175900
C	4.18538700	-1.00142500	-1.09667900	C	2.04913500	2.87730000	4.21338300
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O	3.16978800	-2.50926300	-2.66834900	C	4.38977000	2.90308500	3.32258700
C	5.72955800	-1.14417100	-1.22772700	H	1.86266200	3.89911600	3.86369800
C	6.44882600	0.13019900	-0.85641100	H	1.08748000	2.35466200	4.25087800
C	6.77803000	0.40377400	0.47871800	H	2.44588400	2.93042800	5.23444700
C	7.38758900	1.60850100	0.83078700	H	3.98744500	0.17473800	3.16524400
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H	5.13028700	2.44067200	2.66020600
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C	-1.79589100	6.66572300	-0.68733700
H	-4.33125900	6.24594300	0.39116100
H	-3.80889700	5.49329400	1.90575200
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H	-0.13133200	5.34169100	1.05820000
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H	-1.32810400	4.99562400	2.32130700
H	-1.61731500	7.66461500	-0.27131900
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C	-4.70057000	2.72183400	-2.92285500
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H	-6.44512000	1.46459400	-3.28942400
H	-5.17166200	0.64792000	-2.37126500
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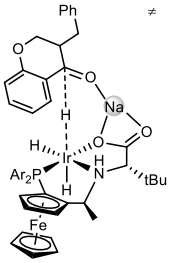
TS$_{V\text{-}VI}$



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H	-0.66259600	-4.62719100	0.55766300
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C	-2.32014200	1.06720600	2.56803500
H	-2.37952100	2.13521000	2.42320600
C	-2.92349900	0.33456100	3.62668300
H	-3.52356900	0.74989500	4.42560200
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H	-3.01664400	-1.87164700	4.01040000
C	-1.62247500	1.99864300	-0.52558700
C	-1.61640200	3.22575300	0.15751600
H	-1.02434200	3.31927500	1.05758700
C	-2.32919100	4.32049700	-0.32580100
C	-3.05724300	4.15907200	-1.51983500
H	-3.61714000	5.00457400	-1.90073100
C	-3.06050700	2.96167900	-2.23716400
C	-2.32084200	1.88382600	-1.72263200
H	-2.27458200	0.93975700	-2.25117500
C	0.72031300	1.39806200	0.91252700
C	1.09253100	1.16889300	2.23358900
H	0.50581500	0.48859600	2.83854900
C	2.22033500	1.79588500	2.78636800
C	2.92641500	2.69068800	1.98224600
H	3.78381900	3.20512200	2.39640000
C	2.57465100	2.94625000	0.64282200
C	1.47492900	2.27214700	0.11548900
H	1.17444600	2.42684500	-0.91343800

C	-5.06211300	-1.36538500	0.69411000	H	1.25815900	-1.66621600	-0.75488800
H	-5.00202000	-2.42317800	0.48714300	Na	1.14161300	-3.98452300	-3.40911200
C	-5.70511100	-0.77265500	1.82177400	C	2.66673400	-5.23523100	1.24795500
H	-6.18158900	-1.30340400	2.63544000	C	3.36376700	-4.70420800	2.34023900
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H	-4.53201200	1.90048900	0.16299100	C	2.44393300	-4.44115900	0.12684700
C	-4.52581700	-0.31807900	-0.11298000	O	4.14184800	-1.34854800	1.17898400
H	-3.93263900	-0.44533900	-1.00669900	C	3.53203700	-0.41107500	0.26545300
C	-0.61714600	-4.17135900	-1.51825300	C	3.44740400	-0.95430900	-1.14964900
O	-0.17644900	-5.25745600	-1.95391500	C	2.66671000	-2.27819900	-1.16655400
C	0.20285400	-2.53402900	2.14902200	O	2.54948400	-2.87785200	-2.28343300
H	0.65312300	-3.50087700	1.91604200	C	4.84170400	-1.20185600	-1.77537400
H	0.30374000	-2.36341500	3.22569300	C	5.63756200	0.06221100	-1.98712700
Ir	-0.48184000	-1.24491700	-1.09289700	C	6.74590800	0.36665600	-1.18716800
H	0.13692700	-0.33145400	-2.24587500	C	7.49928400	1.52102100	-1.41272300
H	0.76172700	-1.76769700	1.61112400	C	7.14923900	2.39642000	-2.44088900
H	-1.96705200	-0.96654300	-1.68134300	C	6.03419900	2.11519600	-3.23396900
C	-1.27796200	-2.48844800	1.77062600	C	5.28722200	0.95986100	-3.00692200
H	-1.79105500	-3.27881400	2.32903300	H	2.30683200	-6.25986000	1.26924200
O	-0.49458100	-3.08367500	-2.19571300	H	3.54341400	-5.31112300	3.22353000
C	-2.68315900	-4.91426600	-0.21082800	H	4.38619500	-2.96490700	3.12831900
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H	-3.38178700	-6.95261000	-0.42888900	H	4.15008300	0.48348600	0.32382600
H	-1.93750600	-6.59799500	-1.40716000	H	2.53699500	-0.18021900	0.63870600
H	-1.78703500	-6.83009500	0.33631800	H	5.40446800	-1.89224200	-1.13706800
C	-3.55795900	-4.35698100	-1.35067100	H	7.02320300	-0.31627000	-0.38800200
H	-4.54051700	-4.84188700	-1.34513600	H	8.35979100	1.73468800	-0.78441700
H	-3.71993200	-3.27618800	-1.26908000	H	7.73487900	3.29390300	-2.61921600
H	-3.09724600	-4.53985900	-2.32673500	H	5.74881200	2.79421000	-4.03298200
C	-3.43790700	-4.80017300	1.12859200	H	4.42841500	0.73787200	-3.63665800
H	-2.85444500	-5.23481600	1.94843600	C	3.37466500	3.97090900	-0.17128400
H	-3.68948600	-3.77207300	1.39961200	C	3.00232900	3.94073400	-1.66354900
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H	-2.45764700	-2.43293300	0.13318300	C	4.88477700	3.68353800	-0.04952800

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H	1.95435500	4.21350400	-1.83019100
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H	3.33544600	5.45458100	1.44547700
H	3.63243300	6.14111600	-0.16337800
H	1.99953700	5.60940800	0.29203000
H	5.45398000	4.39027800	-0.66311700
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H	5.12252300	2.67586000	-0.39895200
C	2.62546800	1.46031300	4.22658300
C	1.47441400	1.84122700	5.18312200
C	2.89984400	-0.05789900	4.32311200
C	3.89342900	2.20934100	4.66608700
H	1.26948000	2.91694500	5.13641700
H	0.54880400	1.31237600	4.93305600
H	1.73823500	1.58755900	6.21683900
H	3.68350900	-0.35756800	3.62023700
H	3.21670000	-0.32235700	5.33940600
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H	3.75381500	3.29606200	4.63993500
C	-2.31775600	5.68143700	0.38281400
C	-3.76144000	6.07661900	0.76043700
C	-1.46946300	5.66278200	1.66583500
C	-1.72297200	6.74153200	-0.57013100
H	-4.40740800	6.14533700	-0.12060600
H	-4.19989700	5.33737900	1.44081500
H	-3.77276400	7.05182700	1.26161000
H	-0.42344900	5.41030000	1.45923800
H	-1.48698800	6.65341700	2.13303000
H	-1.85508600	4.94434800	2.39842900
H	-1.70618300	7.72516100	-0.08577900
H	-0.69581200	6.47857300	-0.84740900
H	-2.30638200	6.83038500	-1.49209900
C	-3.81598900	2.78143700	-3.56018400
C	-2.79426800	2.48749400	-4.68100600
C	-4.79247400	1.59135000	-3.43566400
C	-4.62295500	4.03057700	-3.94885800
H	-2.09340100	3.32208400	-4.79576100
H	-2.21147900	1.58630700	-4.46536100
H	-3.30996900	2.33821600	-5.63741000
H	-5.51106800	1.75532100	-2.62494900
H	-5.35197200	1.46080600	-4.36958500
H	-4.26417700	0.65535100	-3.23043600
H	-5.15113800	3.84951200	-4.89123200
H	-5.37277400	4.28067200	-3.18954400
H	-3.97658400	4.90332200	-4.09453800
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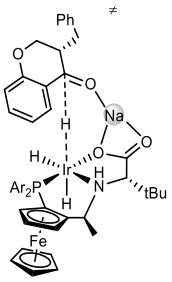
TS'$_{V\text{-}VI}$



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H	4.55760300	1.37509300	0.37099800
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C	0.62464300	-1.41512200	1.71984300
C	0.06332300	-2.34549300	2.65787700
H	-0.90389600	-2.81600200	2.57012200
C	1.02327200	-2.60242400	3.67421100
H	0.91213100	-3.30397800	4.49048700
C	2.18586700	-1.83595100	3.37834700
H	3.10909600	-1.82807400	3.94378100
C	-1.20239900	-2.12557000	-0.39244000

C	-2.28269900	-2.62838500	0.35141600	C	2.89211900	-0.01682400	1.69247200
H	-2.55944800	-2.13294700	1.27132800	H	3.84529100	-0.17758900	2.20713400
C	-3.01942300	-3.72136700	-0.09845500	O	2.94315600	0.87066800	-2.30017800
C	-2.64451000	-4.31307300	-1.31970200	C	5.57342900	-0.39203100	-0.40961700
H	-3.20922500	-5.16663500	-1.67460500	C	6.84400900	0.42445100	-0.71291200
C	-1.59215500	-3.82324300	-2.09423800	H	7.71182600	-0.24601200	-0.72165700
C	-0.88293700	-2.70996500	-1.61330600	H	6.78179200	0.93761600	-1.67199600
H	-0.07225200	-2.27976500	-2.18757900	H	7.01223100	1.18264900	0.06122700
C	-1.51808200	0.27515500	1.06119600	C	5.35255400	-1.42878600	-1.52846900
C	-1.31660600	0.80908000	2.33174700	H	6.17934500	-2.14755900	-1.54655500
H	-0.37879600	0.62518900	2.84099900	H	4.42254300	-1.99477500	-1.40178600
C	-2.30908900	1.57463100	2.96313800	H	5.30427200	-0.94611200	-2.50980700
C	-3.52209400	1.74392600	2.29437600	C	5.81945800	-1.11788500	0.92819000
H	-4.31118600	2.31175300	2.77099600	H	6.02528500	-0.40340700	1.73351500
C	-3.77339300	1.18514000	1.02735000	H	4.98448800	-1.74992100	1.24019100
C	-2.74166300	0.48286200	0.40586900	H	6.69925100	-1.76385900	0.82970800
H	-2.88927000	0.04835700	-0.57453000	H	3.21447200	-1.13826500	0.04750500
C	3.26901300	-3.96064500	0.64218700	H	0.99944300	1.98741200	-0.84531100
H	4.20607500	-3.49647800	0.37400400	Na	3.10861200	2.70706700	-3.56419500
C	3.03702600	-4.76137500	1.80039800	C	3.83910800	4.63474500	1.11507600
H	3.75487700	-4.97598800	2.58104000	C	3.10762700	5.04155500	2.23725400
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O	4.83709000	2.00367600	-2.17433000	C	1.05513700	3.50711200	-1.23745000
C	2.37737000	1.36830400	2.08049700	O	1.63837800	3.63126100	-2.36484400
H	3.09269000	2.15294000	1.82836700	C	-1.22615000	3.00723600	-2.23989900
H	2.20679000	1.40048700	3.16129200	C	-2.61856400	3.49331500	-2.58413800
Ir	1.29729700	0.18558300	-1.11243200	C	-3.10402800	4.76456300	-2.25310000
H	0.18460000	0.32004000	-2.24190500	C	-4.38689200	5.16787700	-2.63406200
H	1.44333900	1.58921200	1.56292300	C	-5.21185100	4.30756300	-3.35660700
H	1.61471200	-1.30464500	-1.65063000	C	-4.74145400	3.03707500	-3.69657000

C	-3.46257000	2.63953200	-3.31187900
H	4.92209900	4.71746600	1.10310600
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H	1.13229300	5.27123100	3.09233000
H	3.71704000	3.82792000	-0.87597800
H	-2.04468300	3.86688600	0.29529500
H	-0.87274600	2.55731600	0.51195300
H	-0.61406000	3.00524200	-3.15051800
H	-2.48294900	5.45384900	-1.69014600
H	-4.74026500	6.15794500	-2.35853400
H	-6.21038600	4.61996800	-3.64884300
H	-5.37378400	2.35233800	-4.25548200
H	-3.10115200	1.64879500	-3.58013900
C	-5.16530100	1.33197600	0.39824600
C	-5.29404800	0.53233700	-0.90859500
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H	-4.60184700	0.89316700	-1.67298500
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H	-6.30834700	0.64297900	-1.30763700
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H	-2.69614100	0.33719400	5.39939400
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H	-1.59503900	1.35863700	6.34797900
H	-0.89966000	3.84995400	3.59479200
H	-0.56953700	3.45783300	5.30183100
H	0.11164300	2.46625600	4.00346900
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H	-4.12356500	2.41481900	4.97996400
C	-4.22579100	-4.26847700	0.67588000
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C	-5.48782200	-4.14973700	-0.20666300
H	-3.83057100	-6.36305900	0.13608900
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H	-4.83646600	-6.16020800	1.57898200
H	-4.68245700	-2.43328000	1.79056100
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H	-3.62867300	-3.56046000	2.66671300
H	-6.36426800	-4.53923000	0.32484400
H	-5.68190100	-3.10256300	-0.46523200
H	-5.38354300	-4.71151400	-1.14034300
C	-1.19072900	-4.43334600	-3.44326000
C	-1.39142400	-3.37429000	-4.54991300
C	0.29713100	-4.84530700	-3.39558900
C	-2.02579100	-5.67452100	-3.79637600
H	-2.44255300	-3.07014400	-4.60992200
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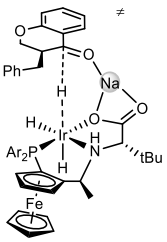
TS''V-VI



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H	2.20837200	1.75503500	-2.71946600
C	1.96896700	0.03026200	-4.11374500
H	2.44537000	0.38446400	-5.01840300
C	1.43141900	-1.27087700	-3.90201400
H	1.40174600	-2.07675400	-4.62442400
C	2.22289100	1.41382800	0.33900400
C	2.44576600	2.66220100	-0.25163700
H	1.73410900	3.03701500	-0.97816400
C	3.54931100	3.44355600	0.10158700
C	4.42638700	2.94216700	1.07548000
H	5.28672800	3.53310900	1.35661000
C	4.21115500	1.71198500	1.70999400
C	3.09151400	0.96057100	1.33080900
H	2.87107800	0.00982500	1.80068700
C	-0.46547700	1.64281900	-0.48696200
C	-1.21357700	1.65309300	-1.66145100
H	-1.01294900	0.90893100	-2.42272000
C	-2.22085500	2.60821100	-1.87213700
C	-2.42176800	3.56998500	-0.88132000
H	-3.18303800	4.32555500	-1.02837200
C	-1.68544700	3.58706400	0.31866400
C	-0.71495300	2.60282000	0.50606200
H	-0.13769700	2.56582000	1.42129600
C	4.26231800	-2.43109600	-1.92745700
H	4.00205600	-3.46628700	-1.77094100
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C	4.98974600	-0.48156400	-2.91942400
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C	-0.29387300	-4.35699800	1.14497300
O	-0.91184300	-5.37864600	1.52297400
C	-1.33993100	-2.20802100	-2.03382000
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H	-1.67756400	-1.98185200	-3.05051000
Ir	0.33237000	-1.44184800	0.98727800
H	0.26674800	-0.53821700	2.29234300
H	-1.53023800	-1.35003100	-1.38787900
H	1.92078100	-1.71020800	1.26115600
C	0.15594600	-2.53181900	-2.04610600
H	0.32066300	-3.35888700	-2.74832900
O	-0.12362900	-3.34279200	1.91850900
C	1.43466900	-5.34405400	-0.48046800
C	0.97915900	-6.78442000	-0.17982400
H	1.79505200	-7.47546700	-0.42412800
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C	2.60033100	-4.98233700	0.45960900
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H	2.29640800	-5.06301600	1.50833300
C	1.90120800	-5.32156800	-1.95013900
H	1.09765100	-5.65299100	-2.61858000
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C	-1.86571700	-0.13255100	5.11359700	H	-3.66336500	5.44519000	2.48633100
C	-2.56979300	1.07699300	5.18134500	H	-0.10016700	4.46197700	2.50452100
C	-3.31755000	1.51164800	4.09276400	H	-1.42683900	5.22345200	3.38908500
C	-3.37331000	0.73298100	2.92959600	H	-1.44206400	3.47284300	3.11971600
C	-2.71757300	-0.50746000	2.86164500	H	-1.74229300	6.84552500	1.49640300
C	-1.95089000	-0.90852900	3.96367800	H	-0.46139400	6.05184000	0.55718000
O	-4.09752400	1.22143600	1.87861700	H	-2.07261700	6.26814200	-0.14698000
C	-3.64411000	0.71775200	0.60377200	C	-3.04271500	2.55136700	-3.16697700
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C	-5.22504000	-1.27813100	0.61005400	H	-1.64044600	3.79749600	-4.29375800
C	-5.99384100	-0.83097900	-0.60859000	H	-1.29864400	2.06375400	-4.40998200
C	-6.74103200	0.35460400	-0.60285500	H	-2.66169700	2.75608500	-5.30786000
C	-7.38125600	0.80451200	-1.75943400	H	-4.37281000	0.94821200	-2.47994800
C	-7.28870900	0.07022500	-2.94268700	H	-4.26662200	1.09657900	-4.23628000
C	-6.55193000	-1.11609800	-2.96047100	H	-2.93821800	0.35862100	-3.33082400
C	-5.90946100	-1.55805000	-1.80418700	H	-4.73394000	3.50734500	-4.12494700
H	-1.24777000	-0.45529700	5.94624100	H	-4.87045400	3.44909200	-2.36274100
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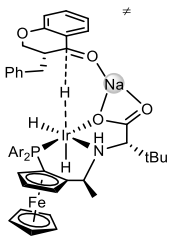
H	-3.85370800	2.45467600	4.11358200	C	3.73977100	4.81154700	-0.56813700
H	-1.36332600	-1.81742300	3.88061000	C	3.85064200	4.62187400	-2.09705800
H	-2.60927700	1.02332200	0.47198000	C	2.51600900	5.69960200	-0.24955600
H	-4.26580200	1.21221900	-0.13905600	C	5.00537100	5.53410200	-0.07927200
H	-5.21233100	-2.36901500	0.68501100	H	4.70013300	3.97617700	-2.34777000
H	-6.81445700	0.92830100	0.31786000	H	2.94627200	4.16726800	-2.51468500
H	-7.95434900	1.72752300	-1.73438800	H	3.99650000	5.58838600	-2.59399200
H	-7.78696100	0.41826400	-3.84316300	H	2.41882800	5.85120000	0.83137100
H	-6.47664000	-1.69656300	-3.87616200	H	2.61995100	6.68195600	-0.72578500
H	-5.33120100	-2.47932200	-1.82322800	H	1.58520500	5.24811700	-0.60729900
C	-1.96206500	4.67710100	1.36242700	H	5.09749000	6.50084100	-0.58620500
C	-3.46982400	4.71015900	1.69578400	H	4.97112600	5.72640400	0.99865200
C	-1.18352400	4.43597500	2.66705200	H	5.91115500	4.95676100	-0.29607300
C	-1.53425500	6.04184000	0.77969200	C	5.13768200	1.16600100	2.80455100

C	4.33589900	1.04088100	4.11914400
C	5.65534000	-0.22871900	2.38910900
C	6.35016200	2.07695800	3.05516000
H	3.96288200	2.01975800	4.44100300
H	3.47482000	0.37545900	4.00095100
H	4.97155400	0.63659800	4.91631800
H	6.19778100	-0.17936600	1.43832700
H	6.33557300	-0.62368600	3.15307000
H	4.83572700	-0.94421100	2.27141300
H	6.98406700	1.64011900	3.83441500
H	6.96292400	2.19312700	2.15384600
H	6.04715600	3.07344300	3.39558400
H	-3.34412900	-1.12929100	-0.41649500
H	-5.69147400	-0.88959300	1.52205100

TS'''V-VI



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C	0.45449500	-1.60237100	-2.54352700
C	1.00370300	-0.40387900	-1.95187700
C	1.77672800	0.25033100	-2.96968700
H	2.35493000	1.15066500	-2.83577000
C	1.72419000	-0.52750300	-4.15750500
H	2.25505600	-0.31931900	-5.07705700
C	0.91833000	-1.66987900	-3.89315500
H	0.70221200	-2.47560400	-4.58332500
C	2.33633400	0.95215300	0.21808400
C	2.85075200	2.06514600	-0.45639900
H	2.24281400	2.55426300	-1.20800700
C	4.11914400	2.57110500	-0.15822500
C	4.85920200	1.94031100	0.85343300
H	5.84243200	2.31884600	1.09487200
C	4.35633100	0.84998300	1.57387600
C	3.08337800	0.37014700	1.24178700
H	2.64874400	-0.46357600	1.77777200
C	-0.26259100	1.72303100	-0.63818100
C	-1.08623300	1.75011600	-1.76305600
H	-1.13764100	0.87823800	-2.40337300
C	-1.83885400	2.88894700	-2.08580400
C	-1.69929400	4.01055800	-1.26790300
H	-2.25001000	4.91052900	-1.51062600
C	-0.85876700	4.02697400	-0.14068100
C	-0.16931300	2.85768200	0.18241300
H	0.47004000	2.82164600	1.05491000
C	3.99856400	-2.98366800	-3.13275100
H	3.97393800	-3.57330900	-4.03966000
C	4.56547300	-1.68143300	-2.99129600
H	5.03174400	-1.10437400	-3.77912700
C	4.34691400	-1.24369900	-1.65007700
H	4.60998100	-0.27933200	-1.23827400
C	3.64680900	-2.27746700	-0.96113700
H	3.29361500	-2.22945100	0.05810200
C	3.43608700	-3.35304300	-1.87447300
H	2.94604700	-4.28890100	-1.65285100
C	-1.33469900	-4.09135700	1.31000300
O	-2.19743000	-4.87234800	1.76712500
C	-1.96724700	-1.91076200	-2.01653200
H	-2.73094100	-2.61134500	-1.66482900
H	-2.22443100	-1.60946100	-3.03692500
Ir	-0.06507400	-1.41375300	1.03115100
H	0.23051500	-0.52268300	2.30217700
H	-1.98640500	-1.03380200	-1.36760600
H	1.43043400	-2.00176400	1.10680600
C	-0.58122600	-2.55199200	-1.99666800

H	-0.60017400	-3.41871900	-2.66839500	H	-0.06716200	0.86550400	5.99604900
O	-0.78632700	-3.18265000	2.04162300	H	-0.52142100	3.29142400	5.60679700
C	-0.01905200	-5.52733200	-0.34518200	H	-1.99424300	3.98388000	3.72615300
C	-0.82819100	-6.79265800	-0.00464800	H	-1.14041700	-0.82375300	4.51211500
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H	-1.13298200	-6.81703700	1.04169400	H	-4.12603500	1.99515600	0.33664100
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C	1.22011700	-5.45962700	0.56798300	H	-6.41268700	1.09877000	0.92181300
H	1.86821800	-6.32418100	0.38599300	H	-8.12929700	1.85139900	-0.67564200
H	1.81886000	-4.55635400	0.40764100	H	-8.23596200	0.87145700	-2.96084900
H	0.93281100	-5.46761300	1.62414400	H	-6.59441200	-0.88312800	-3.61708600
C	0.41729700	-5.65373500	-1.81840600	H	-4.86413200	-1.62018300	-2.01589600
H	-0.45250000	-5.75531600	-2.47812100	C	-0.70745000	5.32588600	0.66179600
H	1.00923900	-4.80468500	-2.16832500	C	-2.08632000	5.75058500	1.21252000
H	1.03057700	-6.55365000	-1.94092200	C	0.28012900	5.17041900	1.83059200
H	0.78493800	-3.18535300	-0.66440500	C	-0.16934400	6.43560000	-0.26932500
H	-1.79554200	-0.74968800	1.40677500	H	-2.78001200	5.99873000	0.40186400
Na	-2.49243200	-3.44135600	3.51698300	H	-2.53801200	4.94461200	1.79551500
C	-0.70690200	1.18024400	5.17672600	H	-1.98519200	6.63996100	1.84637600
C	-0.95839600	2.53946800	4.95528100	H	1.28355500	4.91143200	1.47410600
C	-1.77256200	2.93729100	3.90038500	H	0.35527000	6.11818900	2.37547400
C	-2.32907300	1.97892400	3.04271700	H	-0.03920800	4.40056900	2.53800200
C	-2.11784300	0.61117300	3.27435700	H	-0.06296800	7.37514800	0.28604800
C	-1.30065100	0.23625400	4.34637100	H	0.81290400	6.16650400	-0.67307200
O	-3.11037400	2.44644200	2.02171200	H	-0.84127400	6.62060400	-1.11359800
C	-3.39564300	1.49913700	0.97481700	C	-2.75484500	2.85861100	-3.31603800
C	-3.91993500	0.19699100	1.55535700	C	-1.90700700	2.56369400	-4.57328400
C	-2.85141900	-0.43441300	2.46679800	C	-3.80826600	1.74615900	-3.13309400
O	-3.17852800	-1.51775700	3.06822600	C	-3.49230800	4.19019400	-3.52938100
C	-4.43490600	-0.80756800	0.52455200	H	-1.15120100	3.34279000	-4.72479400
C	-5.50326600	-0.31629400	-0.42905800	H	-1.38664700	1.60340700	-4.49590700
C	-6.44295900	0.66034400	-0.07131500	H	-2.54647000	2.52871300	-5.46346900
C	-7.41755500	1.08677100	-0.97536500	H	-4.43511400	1.93038900	-2.25532600
C	-7.47960100	0.53722100	-2.25628400	H	-4.46595300	1.69048800	-4.00831600
C	-6.55910000	-0.44590200	-2.62265500	H	-3.34376800	0.76453000	-3.00370100
C	-5.58282200	-0.86150200	-1.71808000	H	-4.13602700	4.11635700	-4.41265200

H	-4.13009200	4.43914100	-2.67409300
H	-2.79588600	5.02032700	-3.69346400
C	4.64011700	3.78839400	-0.93520700
C	4.69714300	3.44471400	-2.44021900
C	3.67678000	4.97586300	-0.71827700
C	6.04645700	4.21504000	-0.48463900
H	5.35578300	2.58693500	-2.61858100
H	3.70641000	3.19748600	-2.83570000
H	5.08077200	4.29662300	-3.01414900
H	3.62192600	5.24296900	0.34286700
H	4.01973500	5.85567900	-1.27580800
H	2.66263000	4.73879000	-1.05438400
H	6.37172500	5.08485100	-1.06565200
H	6.06421900	4.49699200	0.57379700
H	6.78173400	3.41752900	-0.63975000
C	5.13096000	0.17281100	2.71206700
C	4.33411300	0.34125500	4.02504100
C	5.28823700	-1.33191100	2.40038500
C	6.53137200	0.77538500	2.90787000
H	4.21454400	1.40180700	4.27330900
H	3.33488300	-0.09886500	3.94690800
H	4.85836900	-0.14896400	4.85439300
H	5.81742000	-1.48367000	1.45290900
H	5.85851000	-1.82641800	3.19570200
H	4.31742900	-1.83211700	2.32724500
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H	7.14652000	0.67260000	2.00654600
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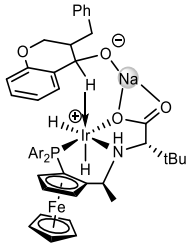
VI



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C	-1.83814800	-1.22606900	2.21610300
C	-1.69405300	0.10595200	1.67790000
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H	-2.49261700	2.06490100	2.41488600
C	-2.94557900	0.24400300	3.62632300
H	-3.56732400	0.63161200	4.42251200
C	-2.61910100	-1.12457400	3.40752500
H	-2.92582000	-1.96173600	4.02159800
C	-1.72085000	1.94913600	-0.53469200
C	-1.76620100	3.17930800	0.14124300
H	-1.17393700	3.30414100	1.03753000
C	-2.53009800	4.23766200	-0.34499200
C	-3.25537400	4.03605200	-1.53455900
H	-3.85418300	4.85319400	-1.91782000
C	-3.20726100	2.83633800	-2.24636800
C	-2.41795000	1.79597600	-1.72860500
H	-2.33014300	0.85679700	-2.25961500
C	0.65876500	1.46052500	0.89344100
C	1.03279700	1.28376300	2.22195000
H	0.46345200	0.60833000	2.84857600
C	2.14683700	1.95355000	2.75167600
C	2.83283200	2.83551200	1.91665900
H	3.68127300	3.37852500	2.31177800
C	2.47912600	3.03636300	0.56843500
C	1.39291000	2.32321800	0.06533600
H	1.09269200	2.43191400	-0.96961400

C	-4.99755100	-1.58112900	0.71037000	H	1.49313700	-1.66871000	-0.88557800
H	-4.88508500	-2.63598400	0.51023500	Na	1.30062600	-3.89412700	-3.40600100
C	-5.66327900	-1.01397100	1.83774200	C	2.83376400	-5.14732500	1.18141800
H	-6.10609500	-1.56301000	2.65817200	C	3.51688400	-4.62342000	2.28456800
C	-5.60605000	0.40616500	1.70960600	C	3.93813300	-3.29747600	2.27381300
H	-5.98575900	1.12274200	2.42604800	C	3.66446000	-2.48253100	1.16777300
C	-4.89850900	0.71723200	0.50966900	C	2.95616200	-2.98171200	0.06131000
H	-4.64160300	1.70483900	0.15287200	C	2.57393800	-4.32658000	0.08503800
C	-4.52165600	-0.51261800	-0.10675300	O	4.15167900	-1.20519200	1.22129000
H	-3.94073200	-0.61310300	-1.01131200	C	3.54222100	-0.27487100	0.30418100
C	-0.48427900	-4.16925000	-1.52341500	C	3.47853000	-0.80763000	-1.11516700
O	-0.03848100	-5.23491800	-1.99202900	C	2.62997400	-2.10593900	-1.15576900
C	0.33190000	-2.45686400	2.14088100	O	2.63857900	-2.73512700	-2.31013500
H	0.83664500	-3.39570700	1.90639700	C	4.87413000	-1.08297900	-1.70933600
H	0.43947600	-2.27252400	3.21443200	C	5.69590300	0.16673900	-1.90129200
Ir	-0.45099900	-1.24568800	-1.08884100	C	6.75131900	0.48629600	-1.03717800
H	0.10553300	-0.30841100	-2.25385800	C	7.52023800	1.63562700	-1.23450200
H	0.83918300	-1.65849200	1.59718100	C	7.24085000	2.49207300	-2.29991100
H	-1.91924600	-1.01193800	-1.62339100	C	6.18005700	2.19579900	-3.15927300
C	-1.15376600	-2.49964500	1.78506200	C	5.41706000	1.04584000	-2.95911200
H	-1.61268500	-3.31210400	2.35715800	H	2.51726700	-6.18672800	1.17106500
O	-0.40326900	-3.06553500	-2.18776000	H	3.72844400	-5.24789100	3.14854800
C	-2.45475700	-5.02384900	-0.13598800	H	4.48248400	-2.86842900	3.10950700
C	-2.11296900	-6.51163100	-0.34390100	H	2.06727800	-4.73079800	-0.78333500
H	-3.03308000	-7.10579300	-0.28909100	H	4.14511800	0.62944700	0.37879900
H	-1.63079000	-6.68967800	-1.30436300	H	2.53969600	-0.05695000	0.66995900
H	-1.43555400	-6.86687900	0.44179600	H	5.40997600	-1.78507400	-1.06088600
C	-3.38460000	-4.54899100	-1.26970900	H	6.97366700	-0.18178200	-0.20875200
H	-4.33741700	-5.08836400	-1.22964800	H	8.33871900	1.86007200	-0.55553500
H	-3.60856700	-3.47740900	-1.21007700	H	7.83957700	3.38507200	-2.45678500
H	-2.93527200	-4.73183100	-2.25092500	H	5.95026500	2.85869000	-3.98945900
C	-3.19064100	-4.92126000	1.21490000	H	4.60074500	0.81160000	-3.63897100
H	-2.56791900	-5.29849000	2.03411200	C	3.26398800	4.04102100	-0.28444800
H	-3.50274400	-3.90433700	1.46551600	C	2.92072700	3.92099100	-1.77930500
H	-4.09427600	-5.54014600	1.17859300	C	2.90439700	5.46457500	0.19551600
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H	3.13382400	2.91562300	-2.15724500
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H	3.15153200	5.60175400	1.25394700
H	3.45588200	6.21577300	-0.38270300
H	1.83171500	5.65756700	0.07281000
H	5.33599700	4.49689300	-0.76930600
H	5.11861800	3.97322600	0.90242100
H	5.05497200	2.79051400	-0.41539800
C	2.56571300	1.66894800	4.19876100
C	1.41435100	2.05989300	5.15070900
C	2.86552900	0.15863000	4.33858000
C	3.82405900	2.45148100	4.60639800
H	1.19243500	3.13060100	5.07481100
H	0.49571000	1.50954400	4.92149100
H	1.68763800	1.83984000	6.18958000
H	3.64049600	-0.15426900	3.63170800
H	3.20354100	-0.06765300	5.35715300
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H	4.08802900	2.21043900	5.64181600
H	4.68109400	2.19213900	3.97525200
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C	-2.57857100	5.60145000	0.35627700
C	-4.03694700	5.92723000	0.74386900
C	-1.71943200	5.63067100	1.63183900
C	-2.04417900	6.68407700	-0.60705200
H	-4.69271500	5.95876100	-0.13206300
H	-4.43300400	5.17183100	1.43249200
H	-4.09192000	6.90374800	1.23933500
H	-0.66433600	5.42778400	1.41698800
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H	-2.06386800	4.89909900	2.37195200
H	-2.07178400	7.66952900	-0.12718300
H	-1.00764600	6.47060200	-0.89160500
H	-2.63881500	6.74021000	-1.52439500
C	-3.95746800	2.61669700	-3.56656700
C	-2.92717500	2.36151000	-4.68905300
C	-4.88236600	1.38697500	-3.43342800
C	-4.81822700	3.82823200	-3.95899200
H	-2.26234200	3.22420300	-4.80913800
H	-2.30583800	1.48648000	-4.47294900
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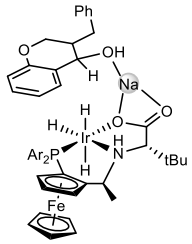
H	-5.60437200	1.52333100	-2.62065200
H	-5.43911700	1.22881200	-4.36453200
H	-4.31448800	0.47443600	-3.22741300
H	-5.34025200	3.61992100	-4.89905000
H	-5.57640900	4.04972700	-3.19914200
H	-4.21012100	4.72695400	-4.11076200
H	2.97030100	-0.05945000	-1.73466400
H	4.71509400	-1.58981000	-2.66560300

VII



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C	-1.54132300	-4.43572000	-0.25935800
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C	-2.45325800	-1.62624300	2.18283600
C	-2.02602000	-0.28831700	1.82513600
C	-2.74402600	0.62318500	2.67047000
H	-2.68950800	1.69955000	2.61945800
C	-3.59557500	-0.11964500	3.53097600
H	-4.29613600	0.29381000	4.24449900
C	-3.41873500	-1.49845400	3.23048100
H	-3.94701000	-2.32513100	3.68848700
C	-1.56173300	1.65658700	-0.28522700
C	-1.76575000	2.85882600	0.41297000

H	-1.43642800	2.93460400	1.43984600	H	-2.74985400	-3.69963500	2.03554000
C	-2.35286500	3.95946400	-0.20983500	O	0.03115800	-3.45859100	-1.81434500
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C	-2.53535200	2.65642000	-2.28406700	H	-3.12206300	-6.81748000	-2.24429600
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H	-1.74807900	0.64002000	-2.14079500	H	-1.89699000	-7.03465400	-0.97653900
C	0.56449200	0.85343100	1.49925900	C	-3.10247500	-4.04191600	-2.26562500
C	1.07386100	0.05584100	2.52577000	H	-3.86191800	-4.51863800	-2.89612000
H	0.61474900	-0.90537800	2.71588000	H	-3.53012700	-3.10345400	-1.89811100
C	2.16053700	0.46830600	3.30327200	H	-2.24048700	-3.77891600	-2.88310500
C	2.71319500	1.72721400	3.03857200	C	-3.91473900	-5.26083600	-0.20995500
H	3.53545200	2.07599400	3.64862800	H	-3.68282200	-6.02735500	0.53895600
C	2.22558100	2.56213300	2.02202600	H	-4.22858100	-4.35844200	0.32509500
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H	0.78390500	2.70018400	0.42845400	H	-2.70509500	-2.73722800	-0.12164100
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H	-5.17051700	-2.54943700	-0.08282100	Na	2.23053600	-3.78961000	-1.62399700
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H	4.02712500	4.70008300	-3.65782600
H	1.64309000	5.31332400	-3.29583600
H	0.05853800	3.60816700	-2.40033300
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C	2.51567500	4.53799300	0.43892300
C	2.06139900	4.88976900	2.88148000
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H	2.93671500	3.89199000	-0.33592600
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H	2.41462000	5.92499400	2.79900700
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H	4.65134200	5.07813400	1.95020800
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H	4.84998900	3.39413100	1.44279300
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C	1.53216700	-0.73229300	5.41420200
C	3.14604400	-1.79125900	3.79544200
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H	0.68143800	-1.22117200	4.92912000
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H	-4.49625300	4.04868600	-3.78161400
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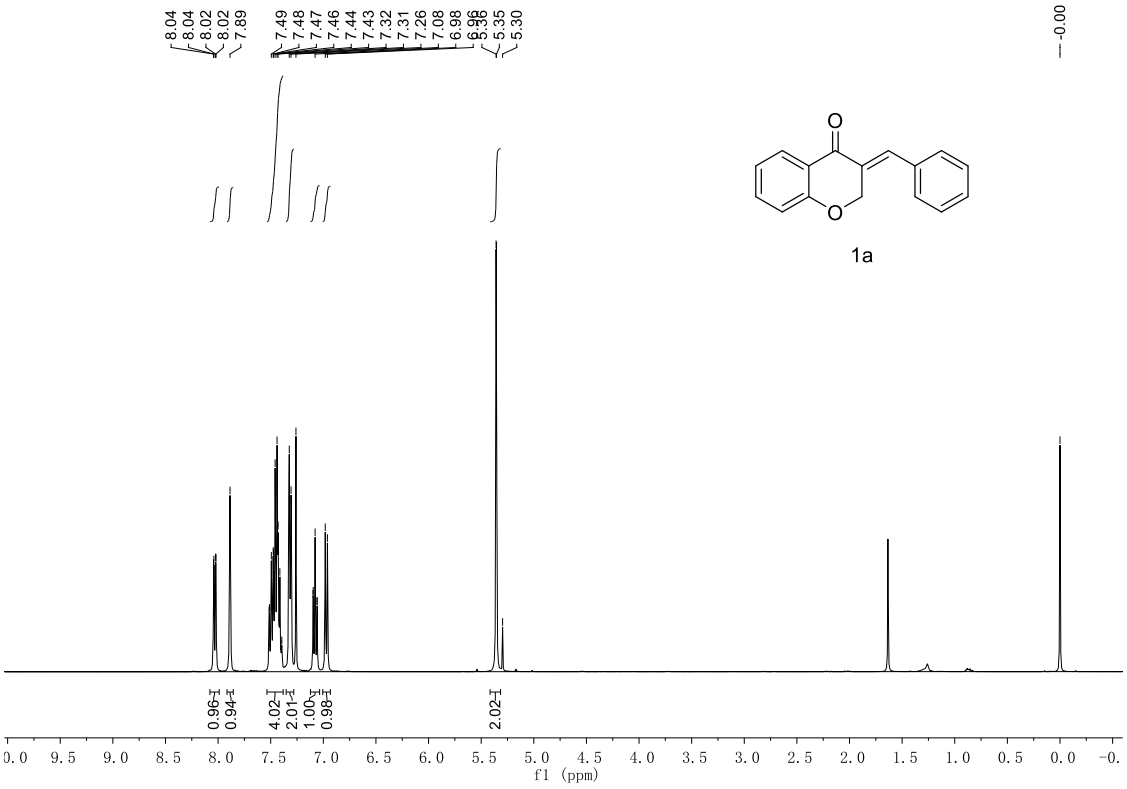
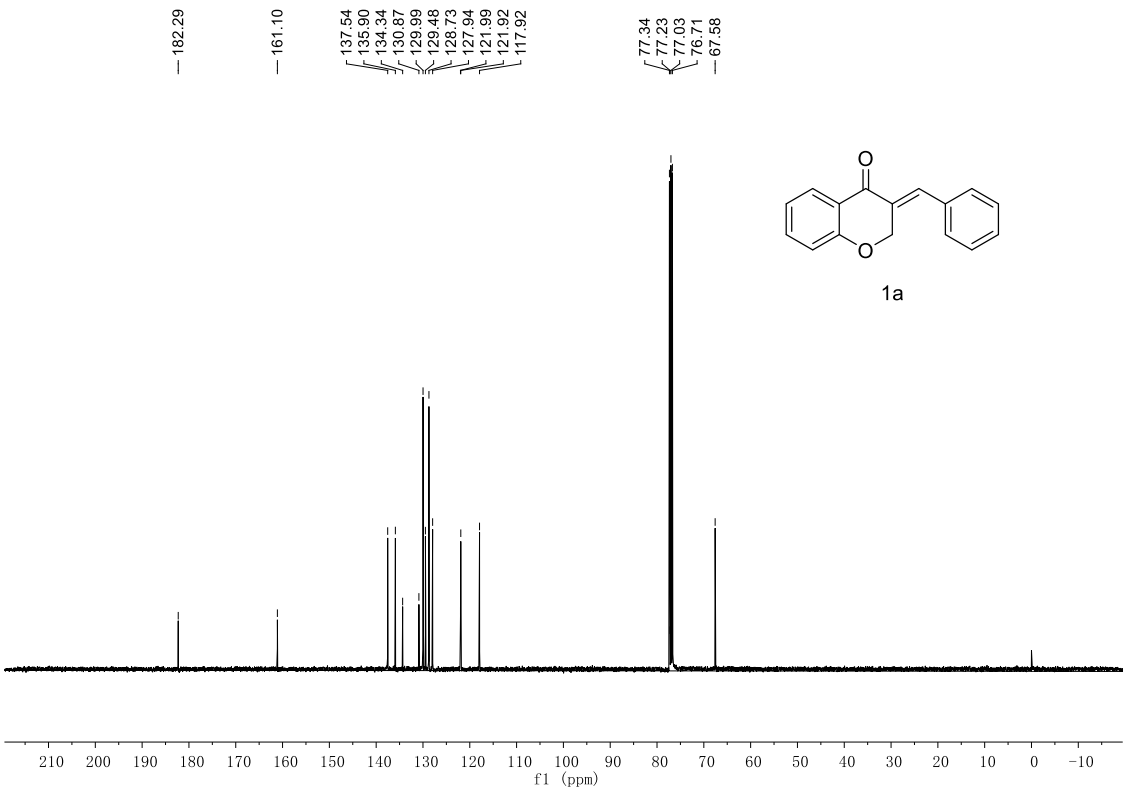
VII. NMR spectra of enones and hydrogenation product

^{1}H and ^{13}C-NMR of 1a





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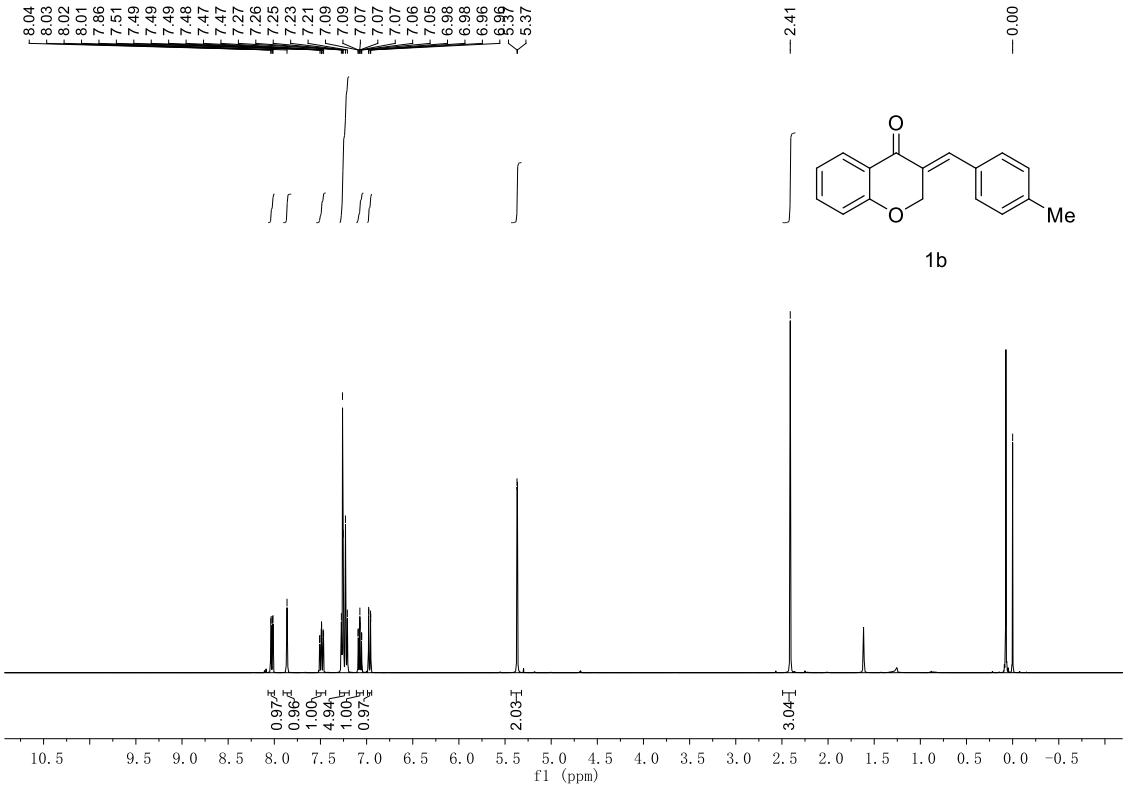

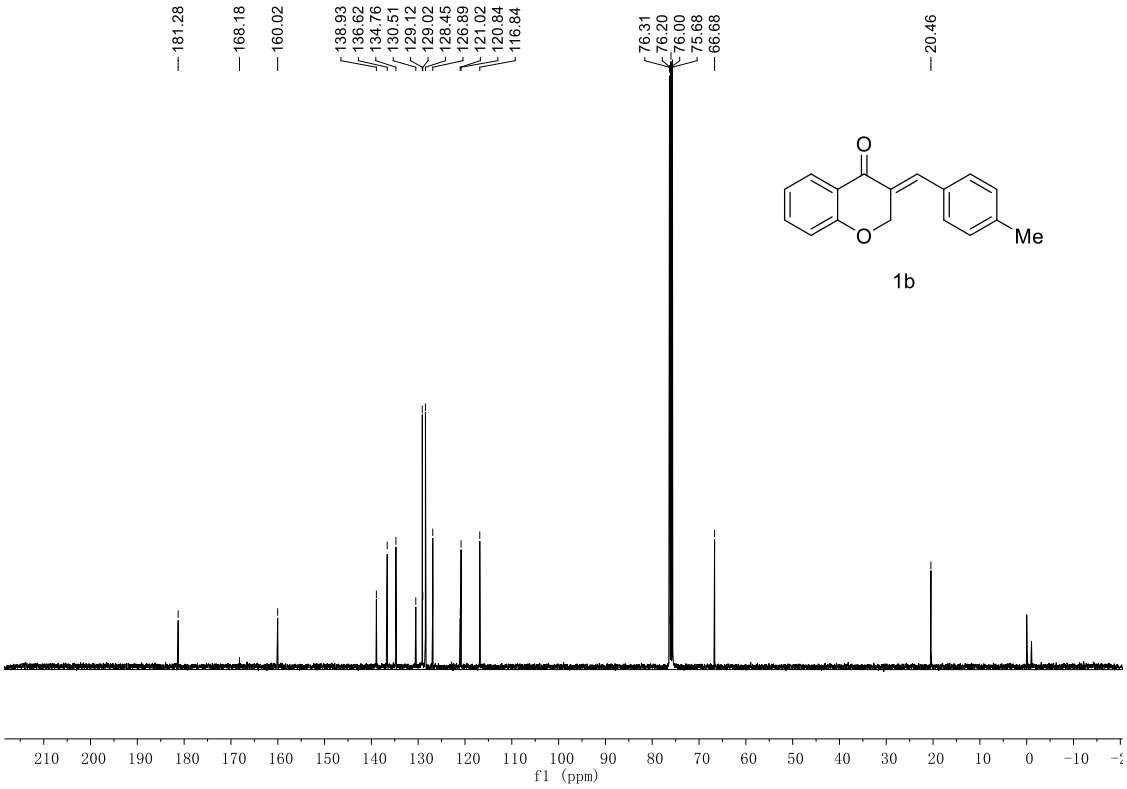

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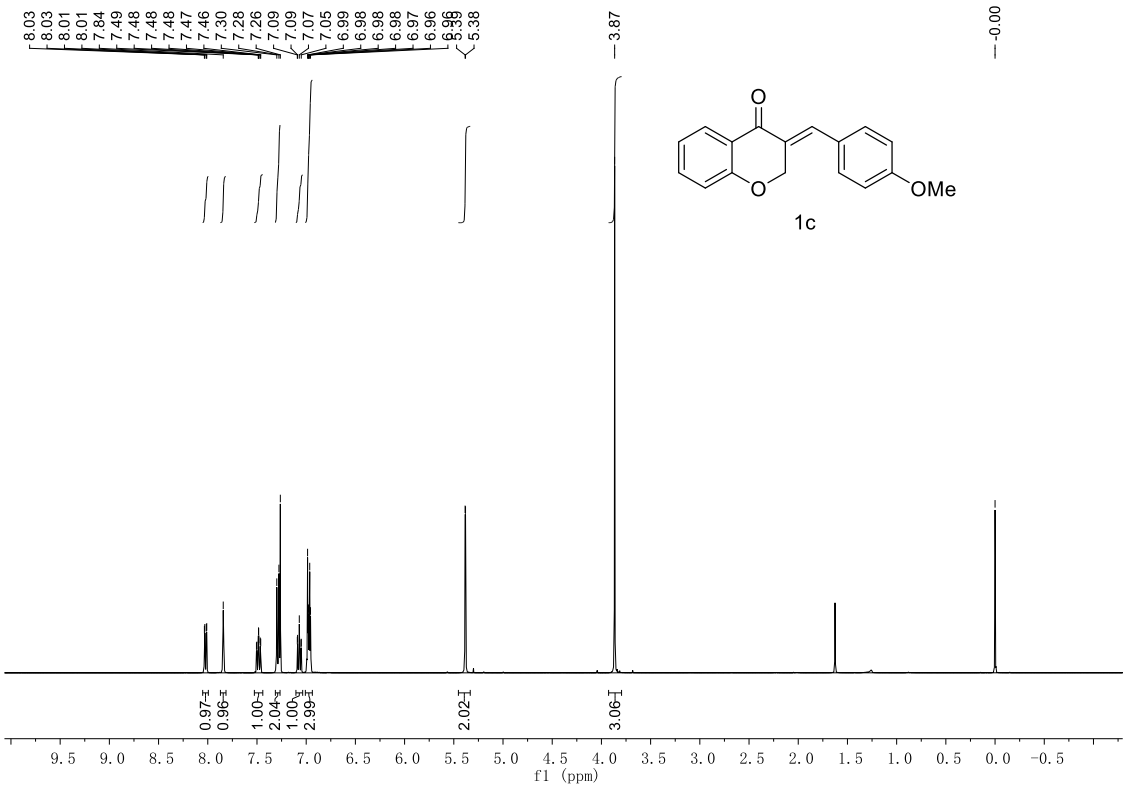
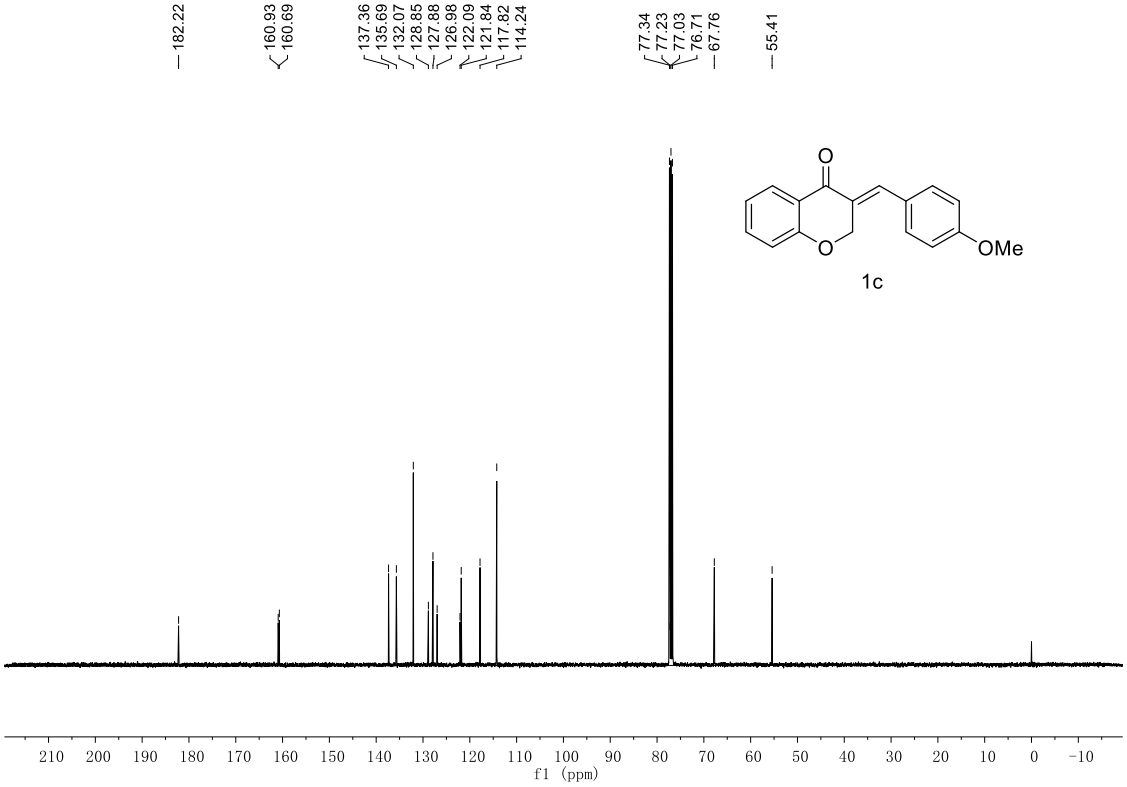
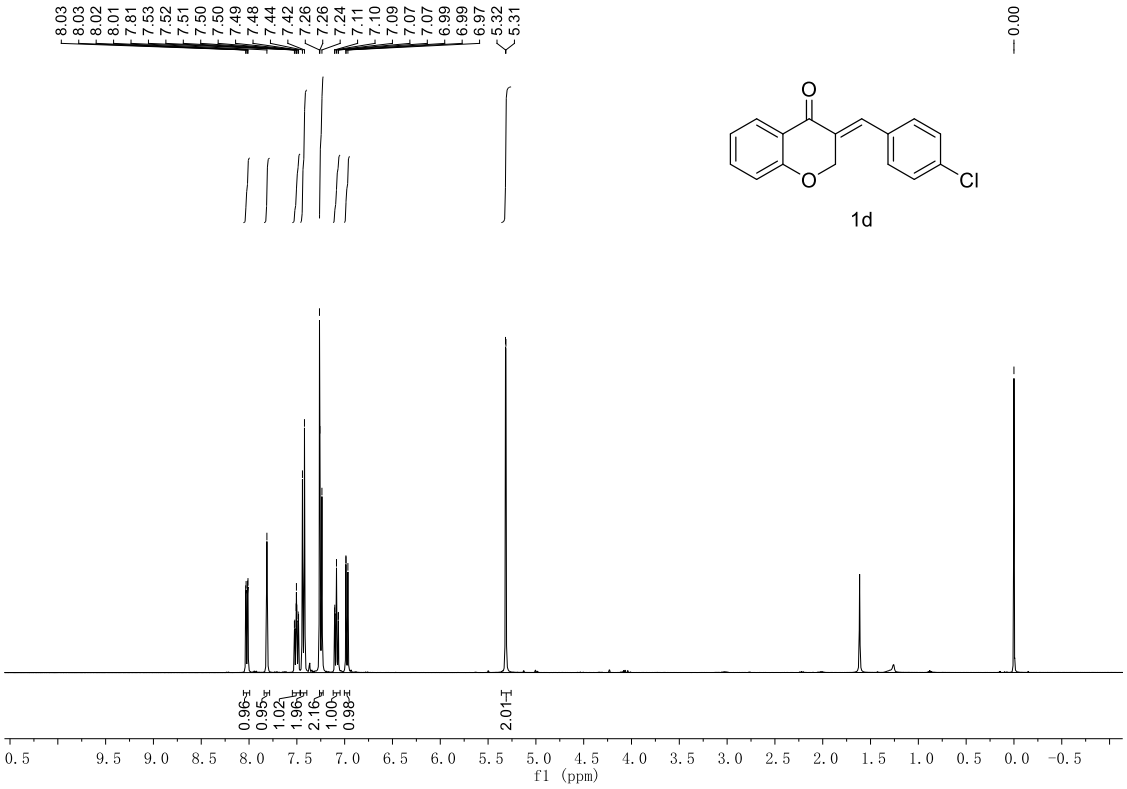
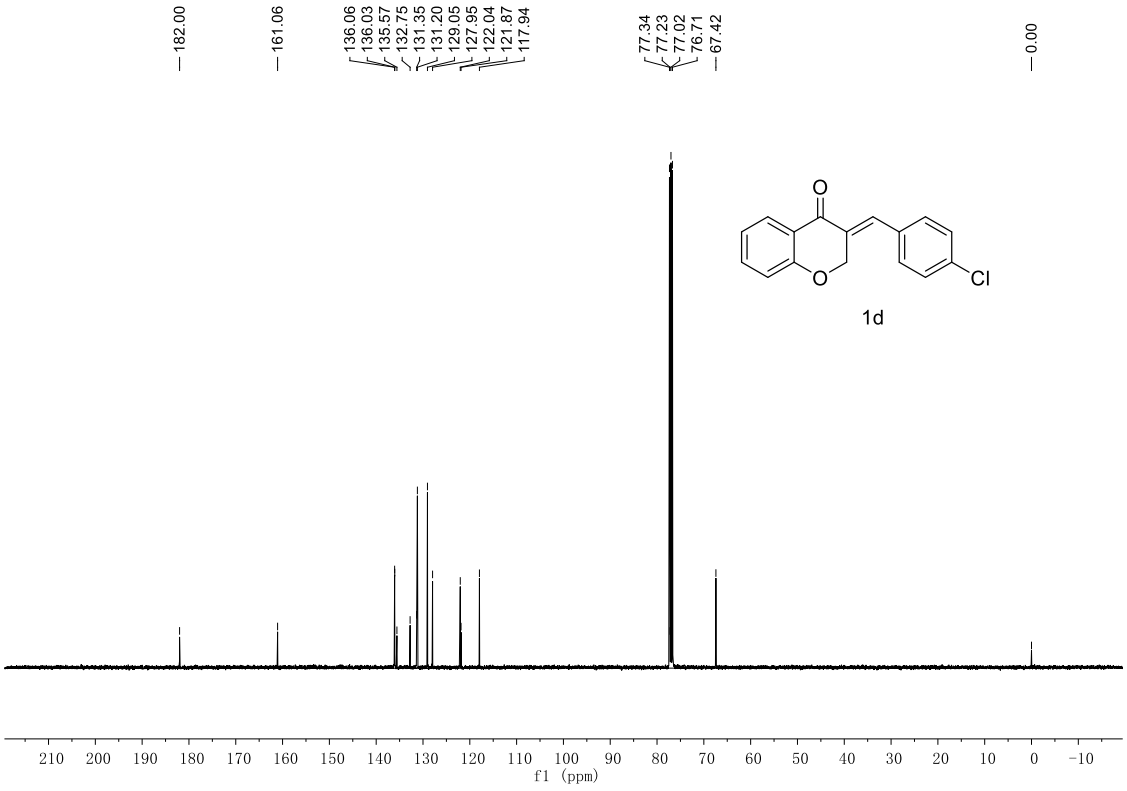


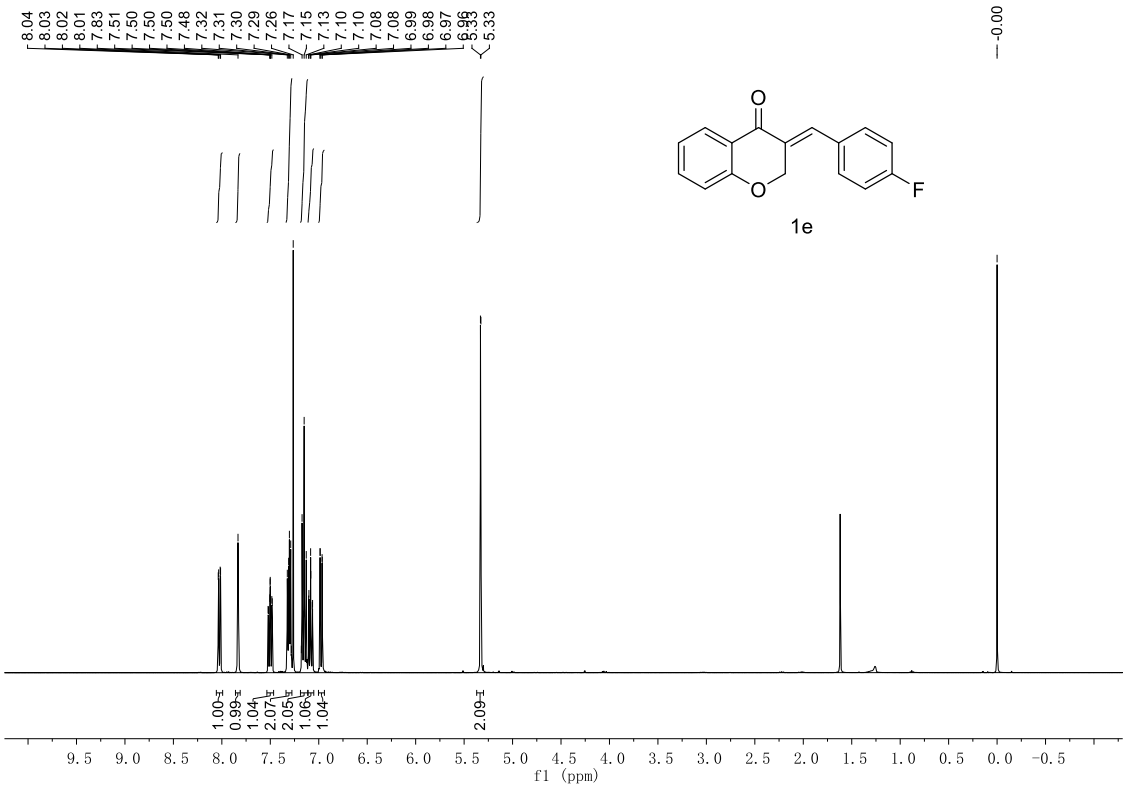


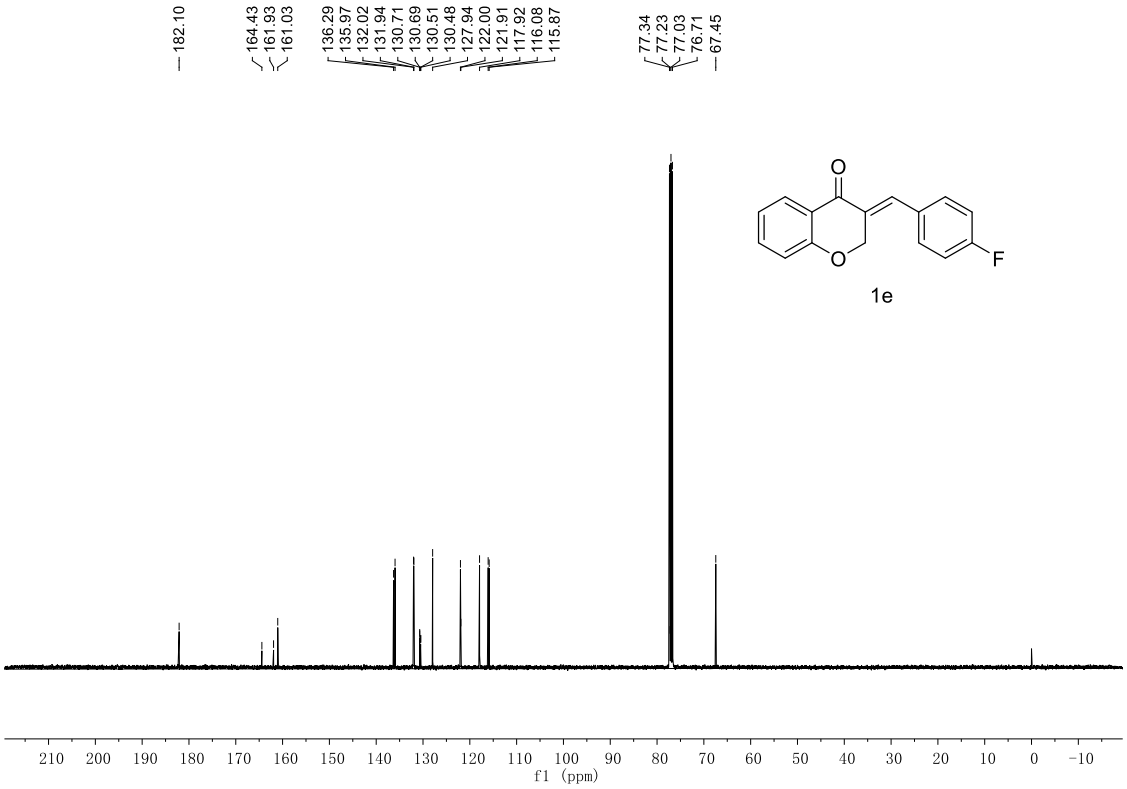
^{1}H and ^{13}C-NMR of 1d



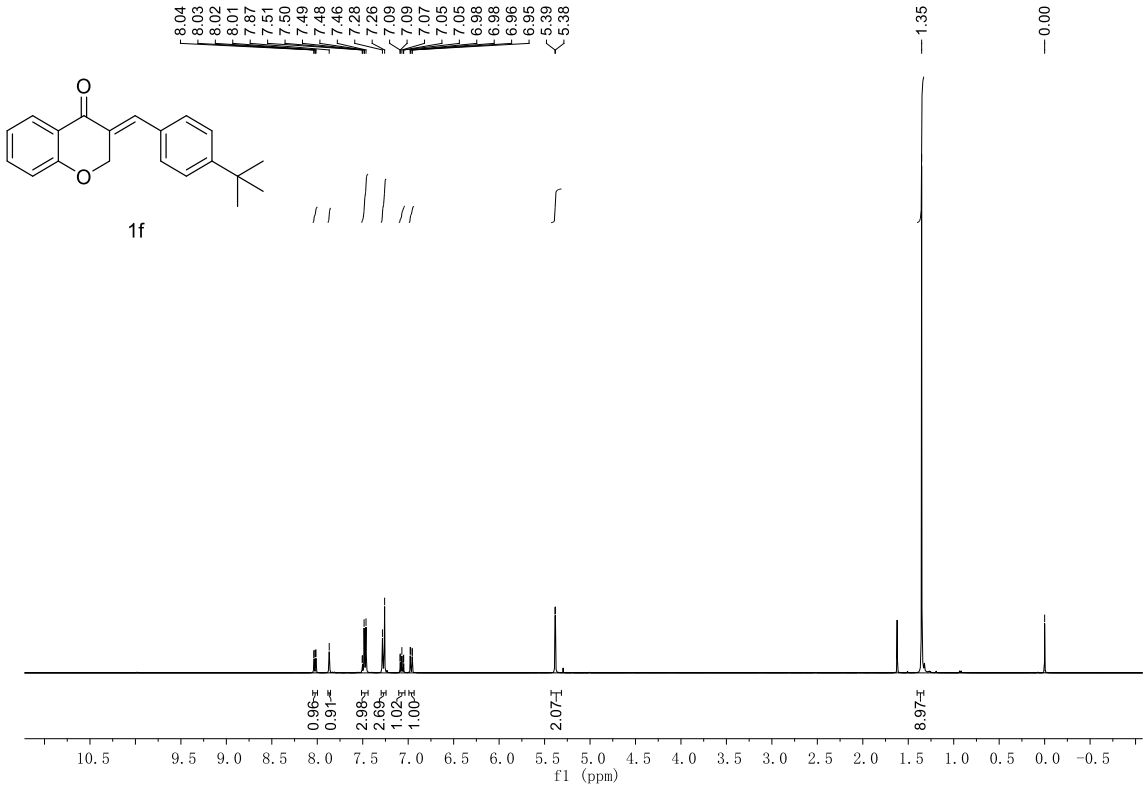


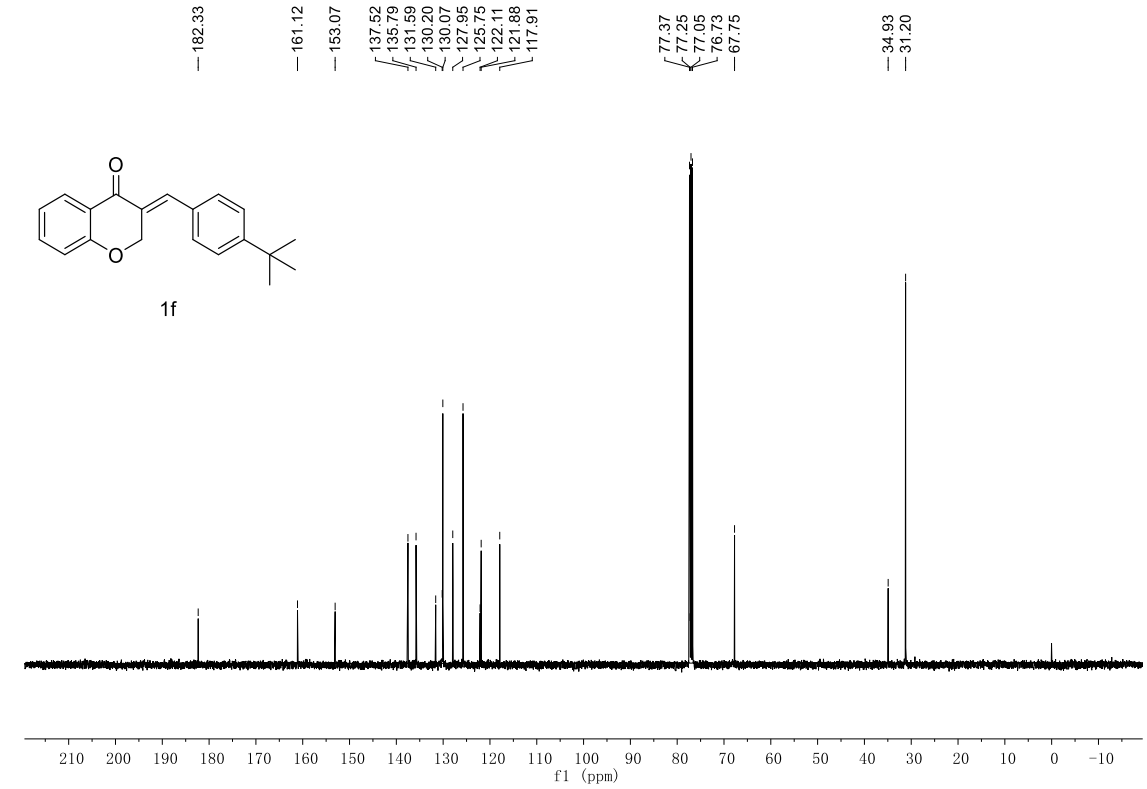
^{1}H and ^{13}C-NMR of 1e



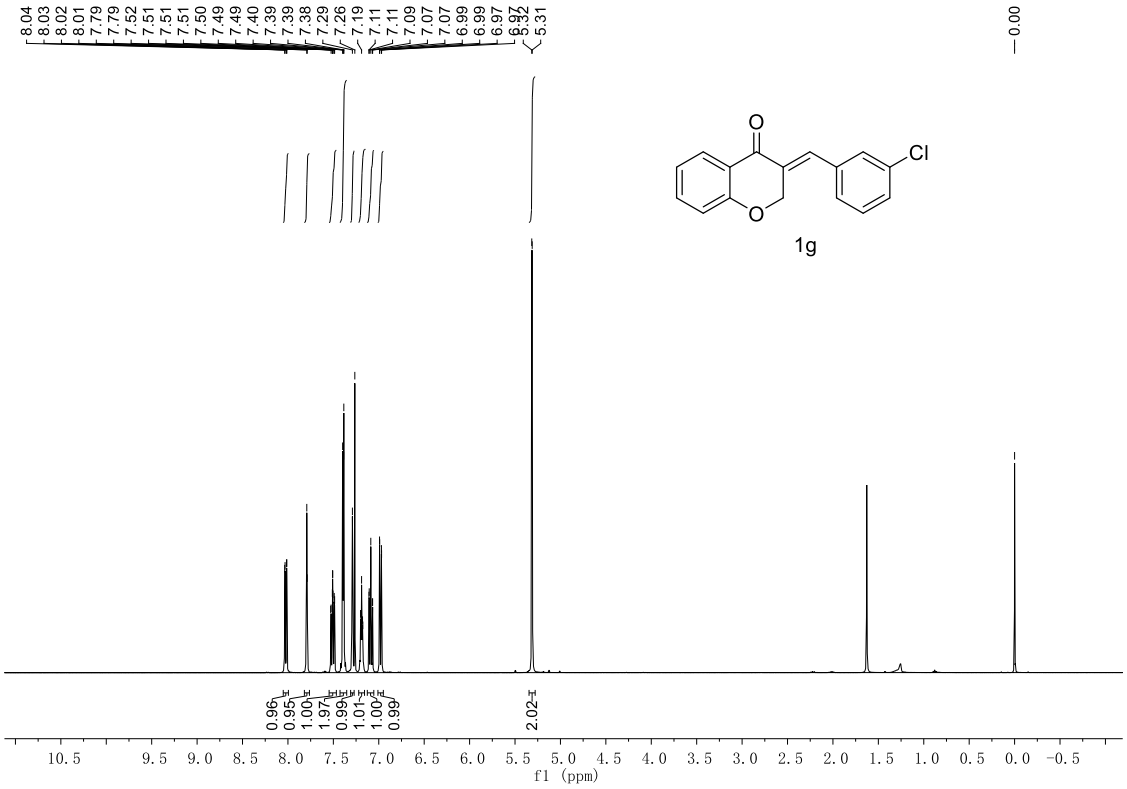


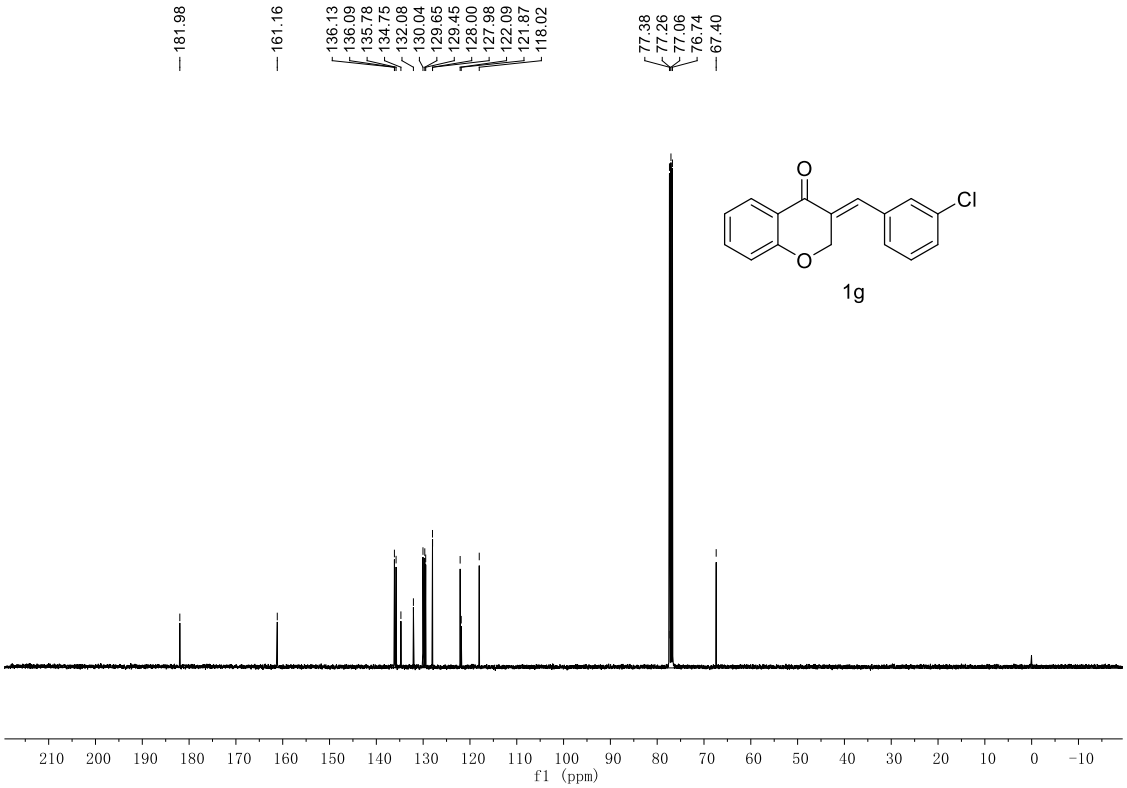
^{1}H and ^{13}C-NMR of 1f



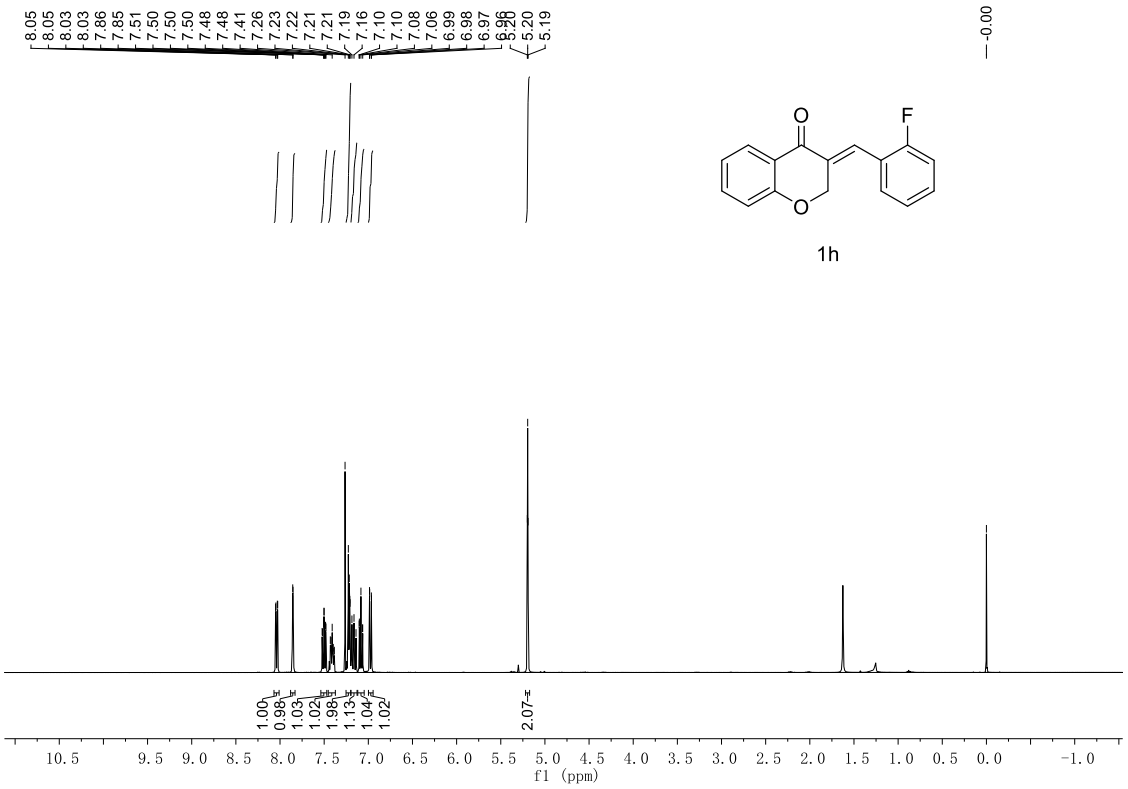


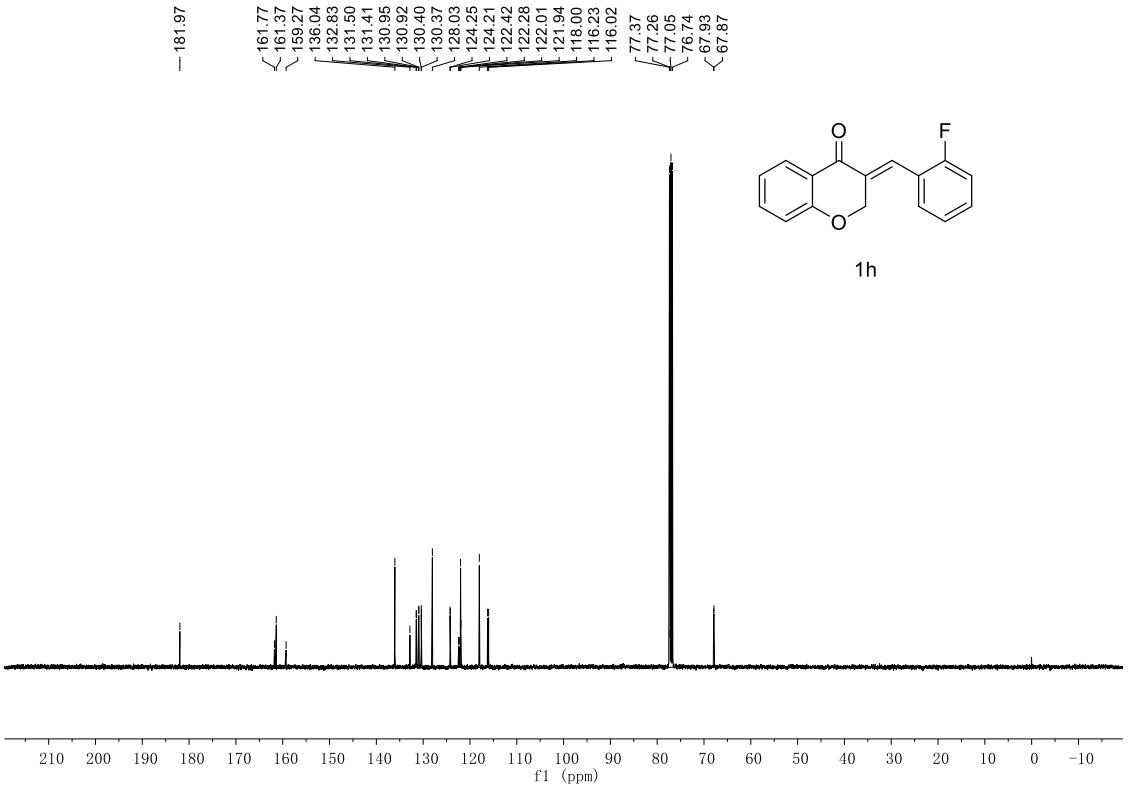
^{1}H and ^{13}C-NMR of 1g



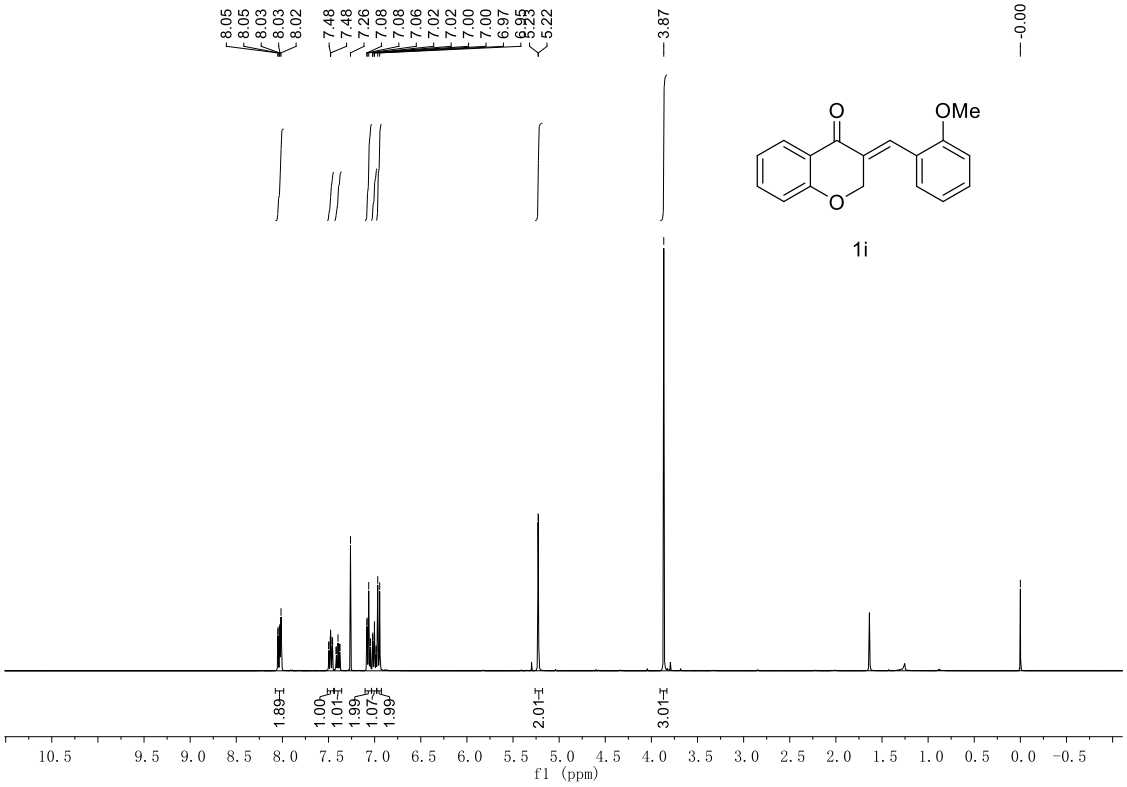


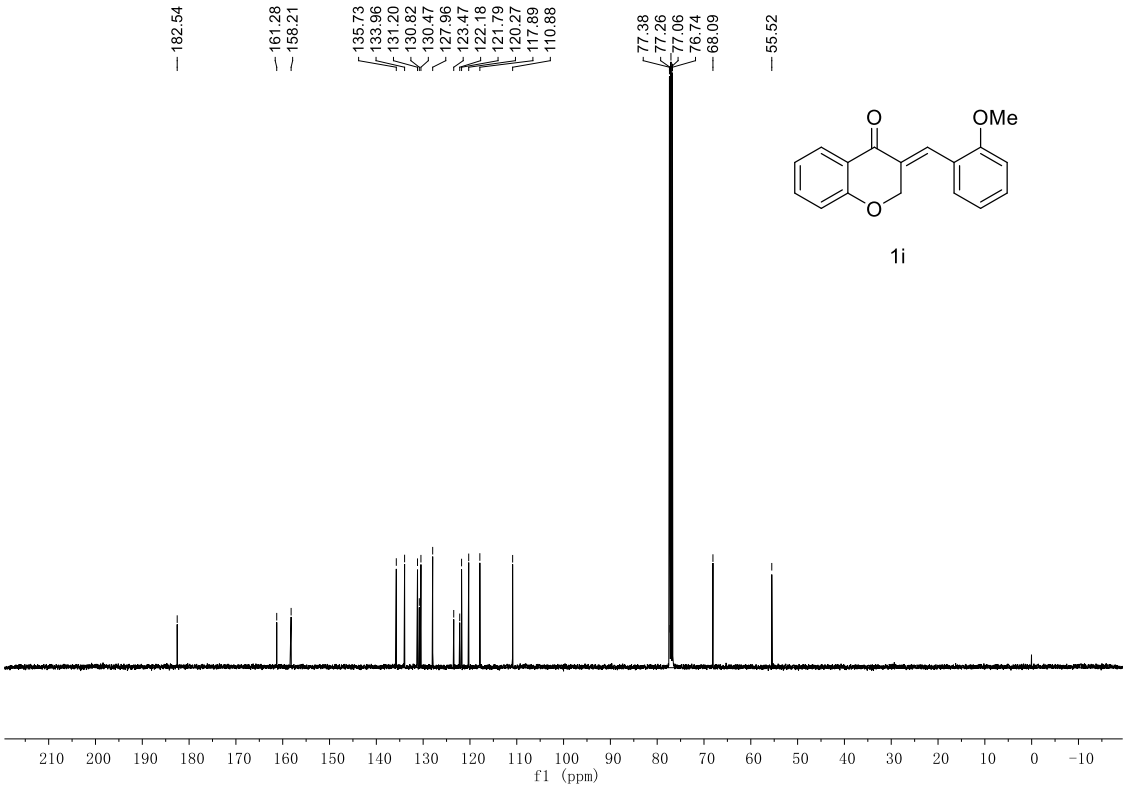
^{1}H and ^{13}C-NMR of 1h



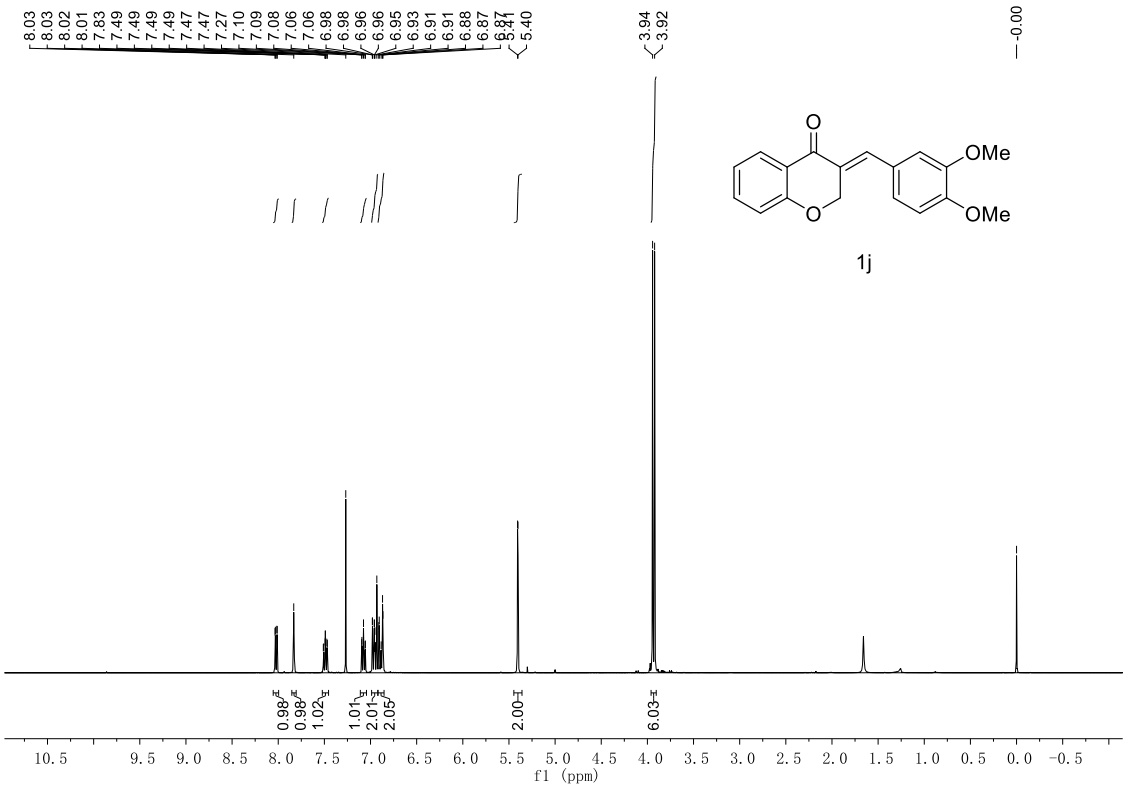


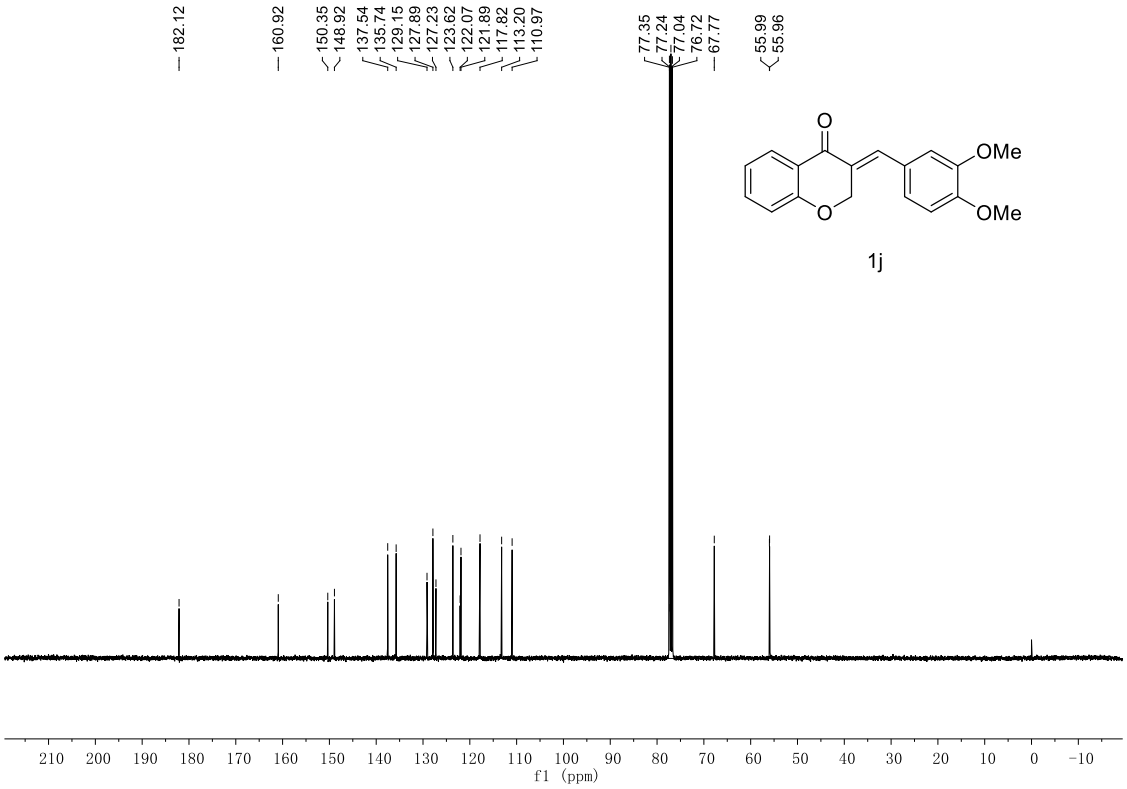
^{1}H and ^{13}C-NMR of 1i



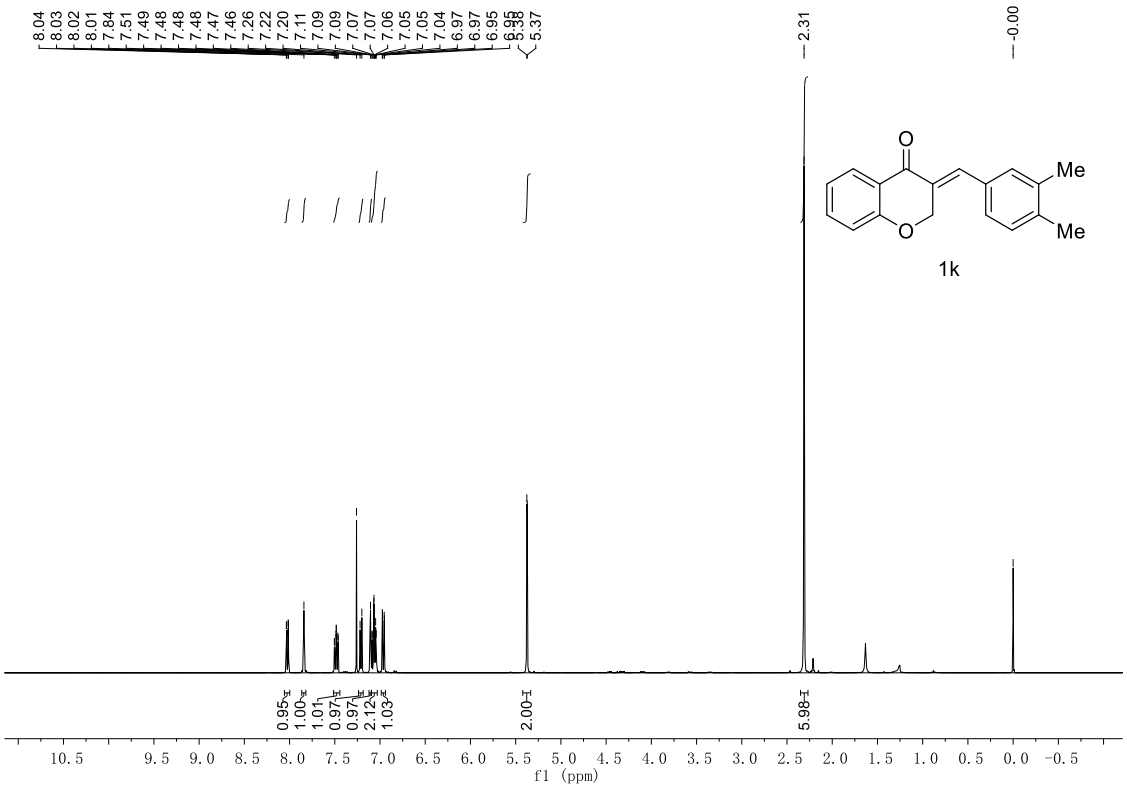


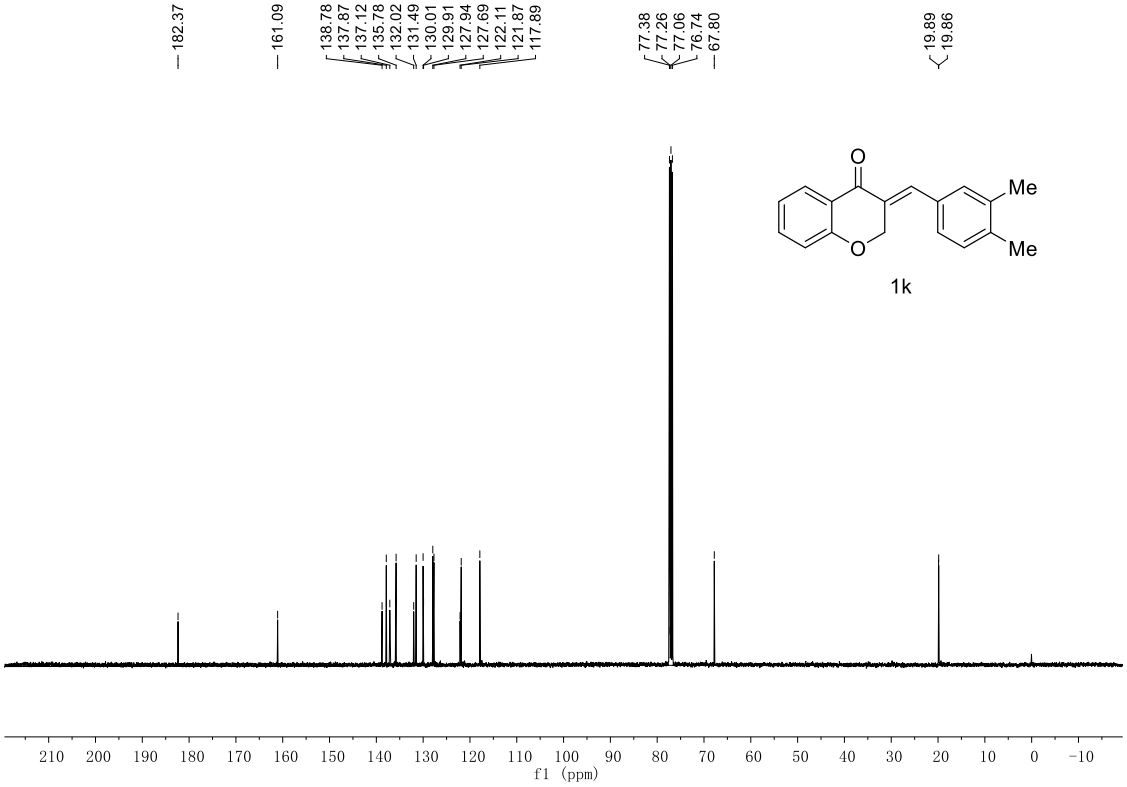
^{1}H and ^{13}C-NMR of 1j



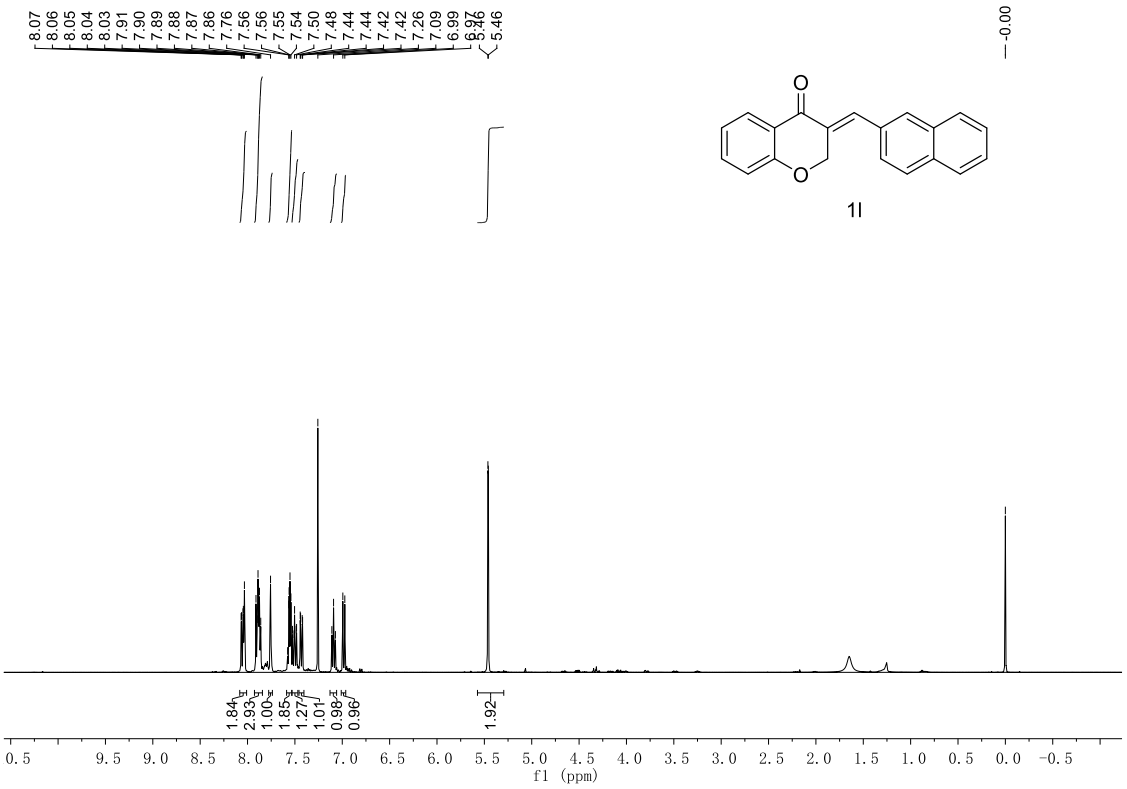


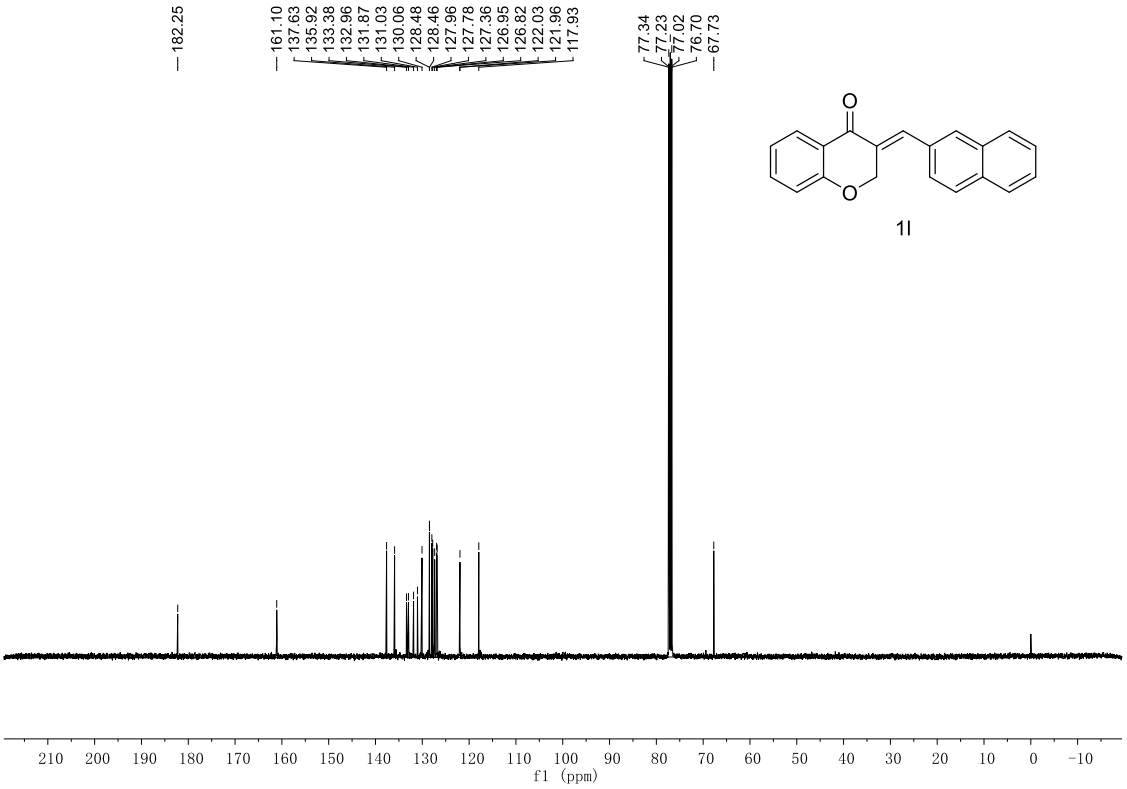
^{1}H and ^{13}C-NMR of 1k



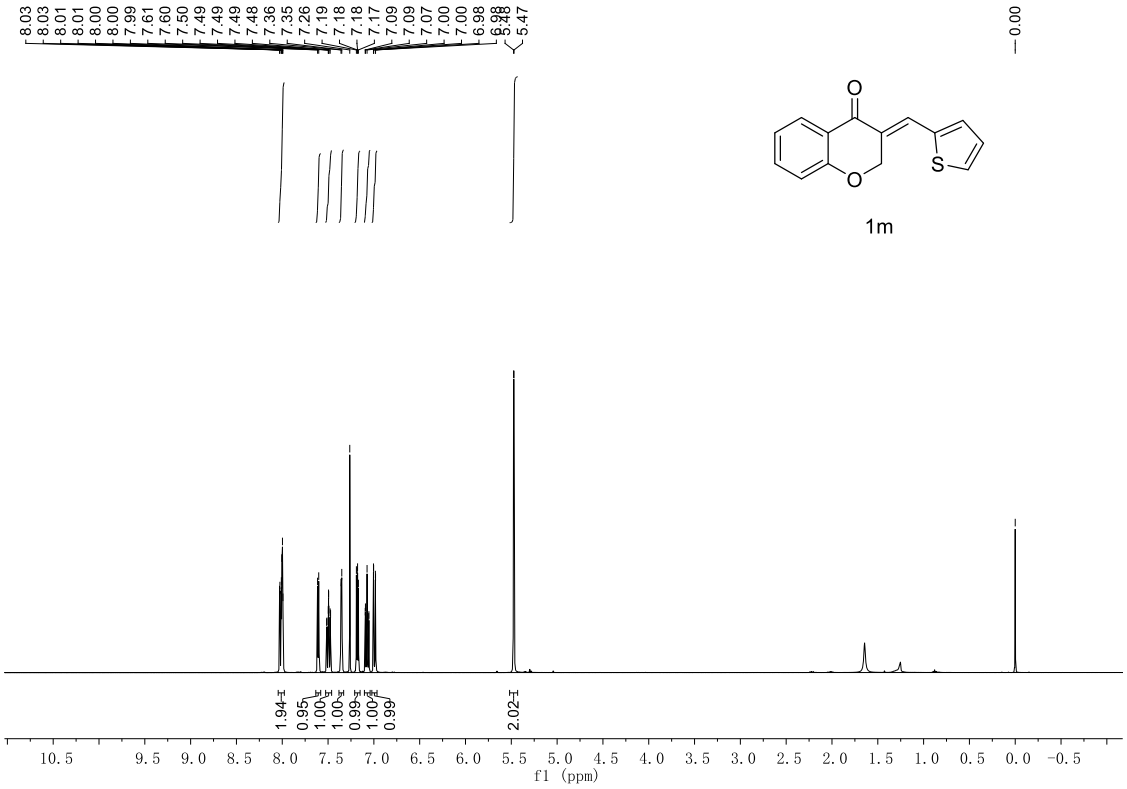


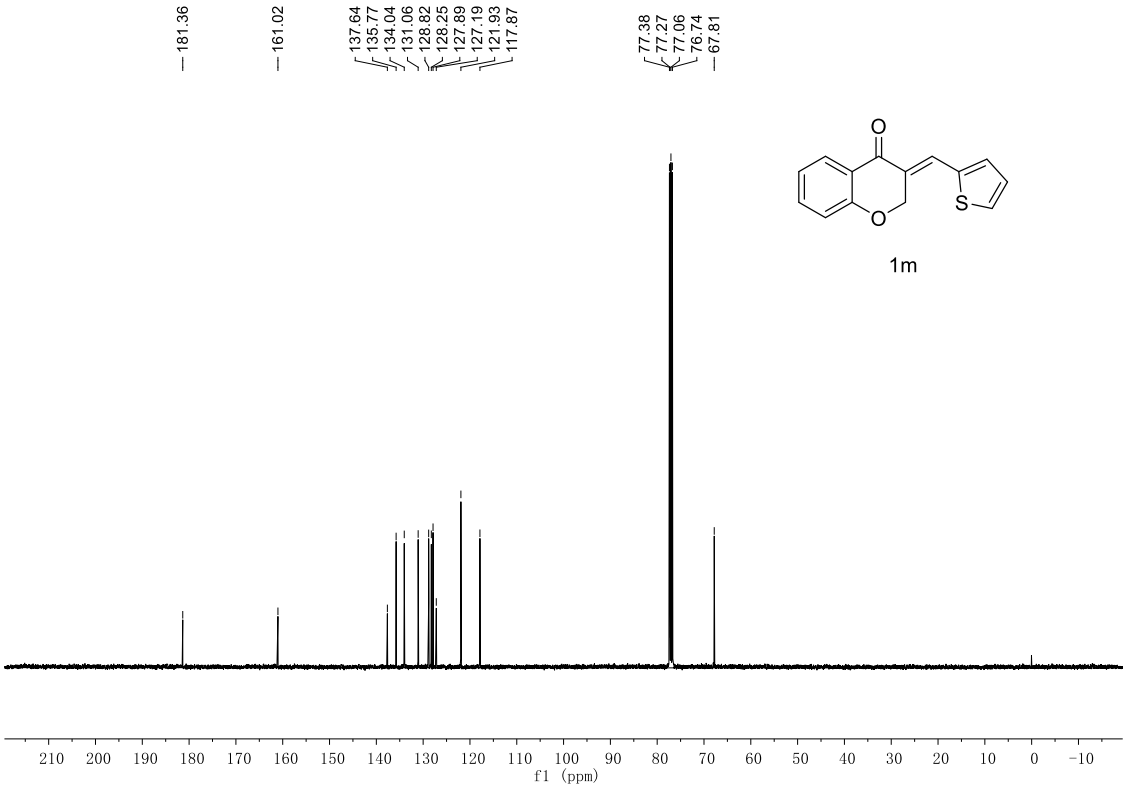
^{1}H and ^{13}C-NMR of 1l



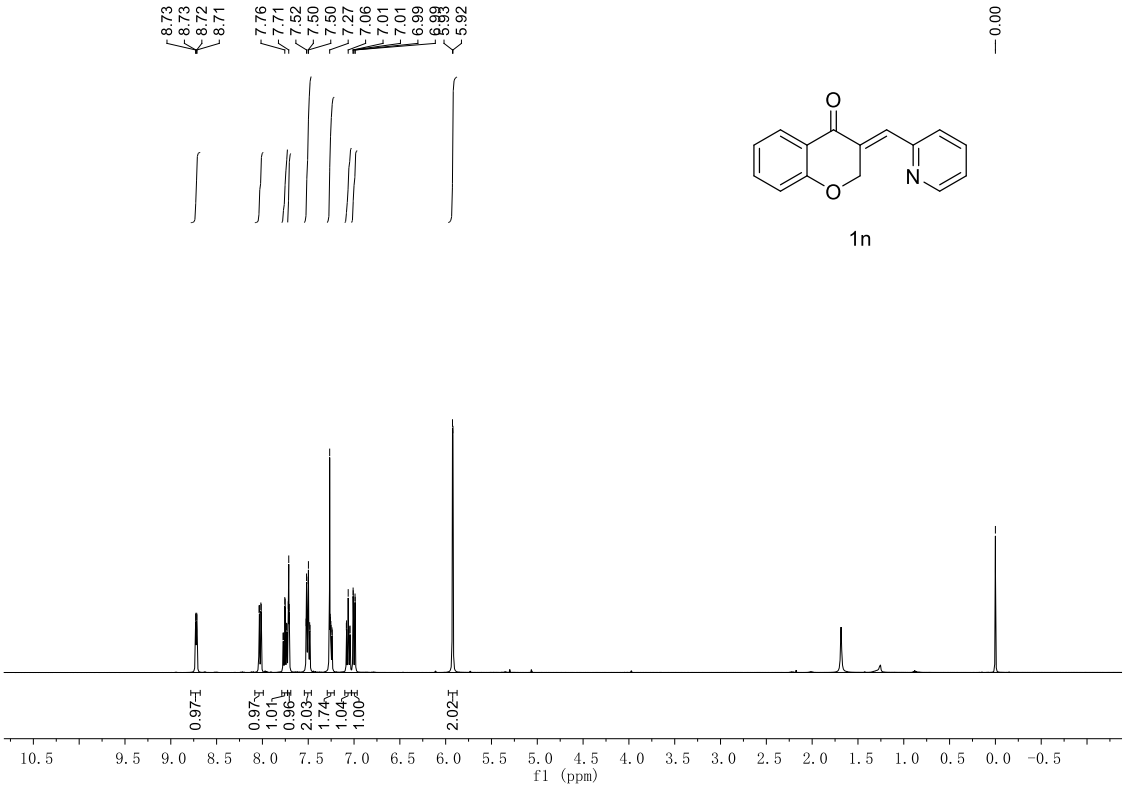


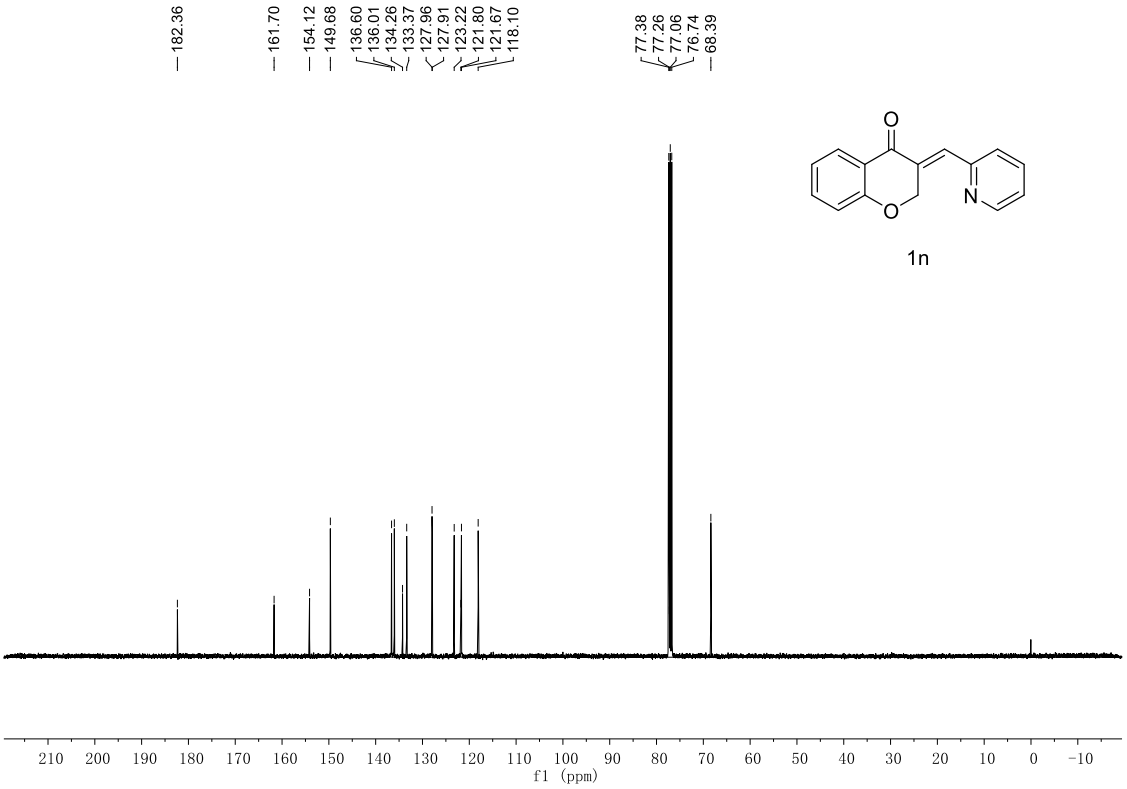
^{1}H and ^{13}C-NMR of 1m



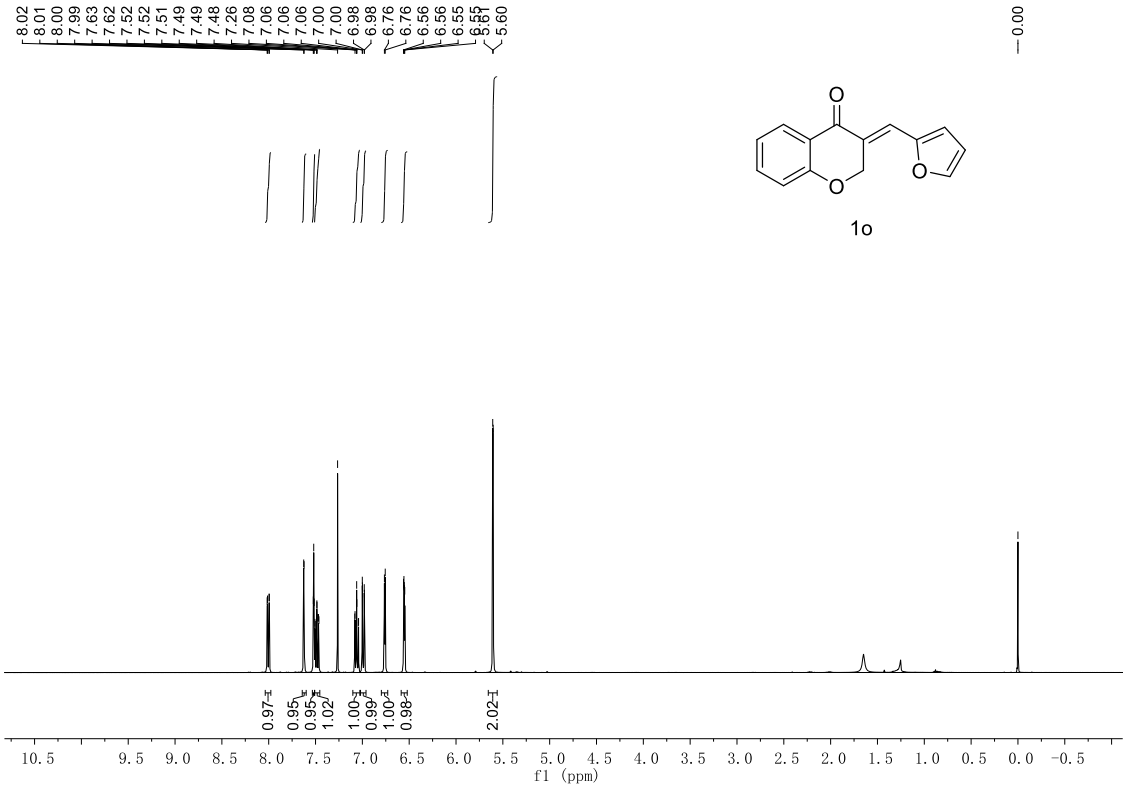


^{1}H and ^{13}C-NMR of 1n

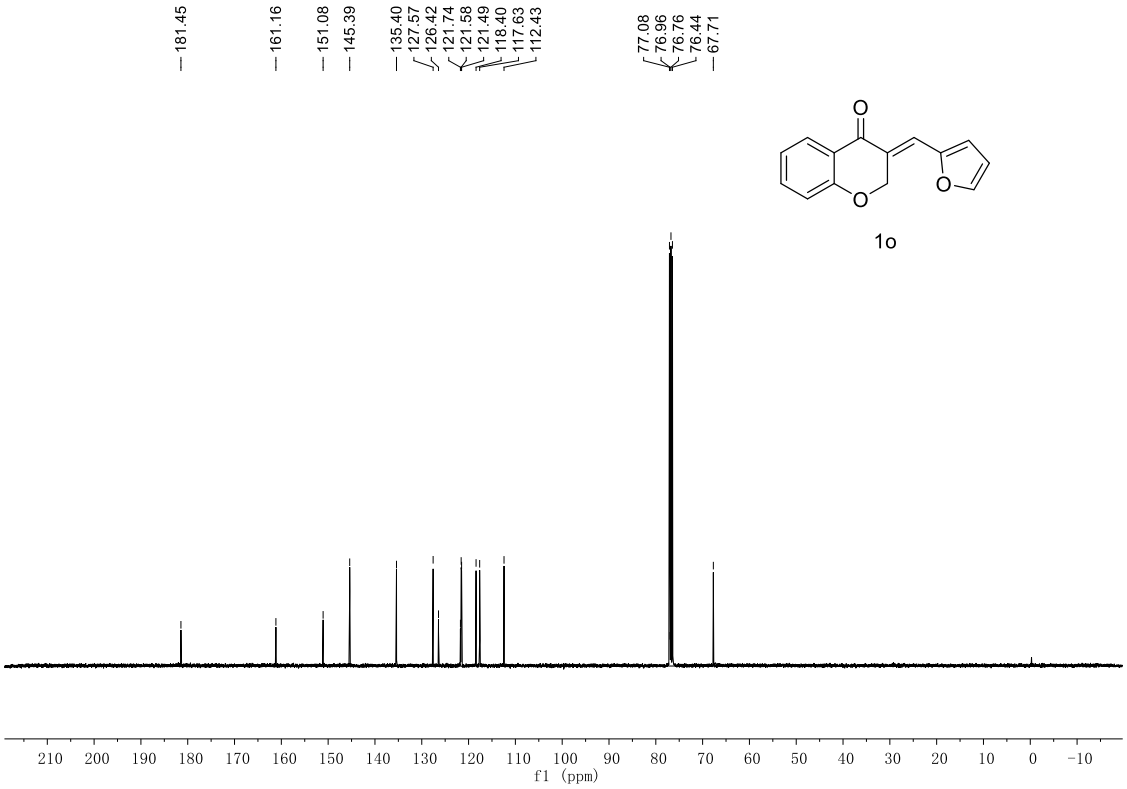




^{1}H and ^{13}C-NMR of 1o

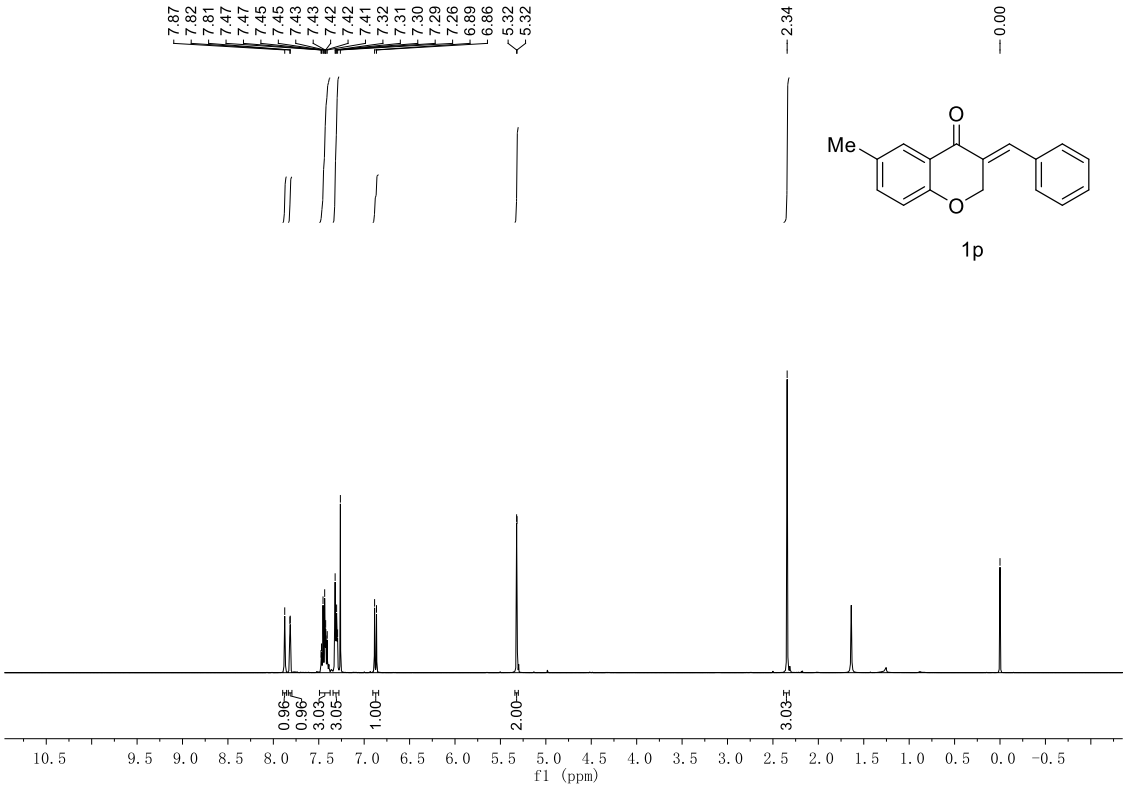


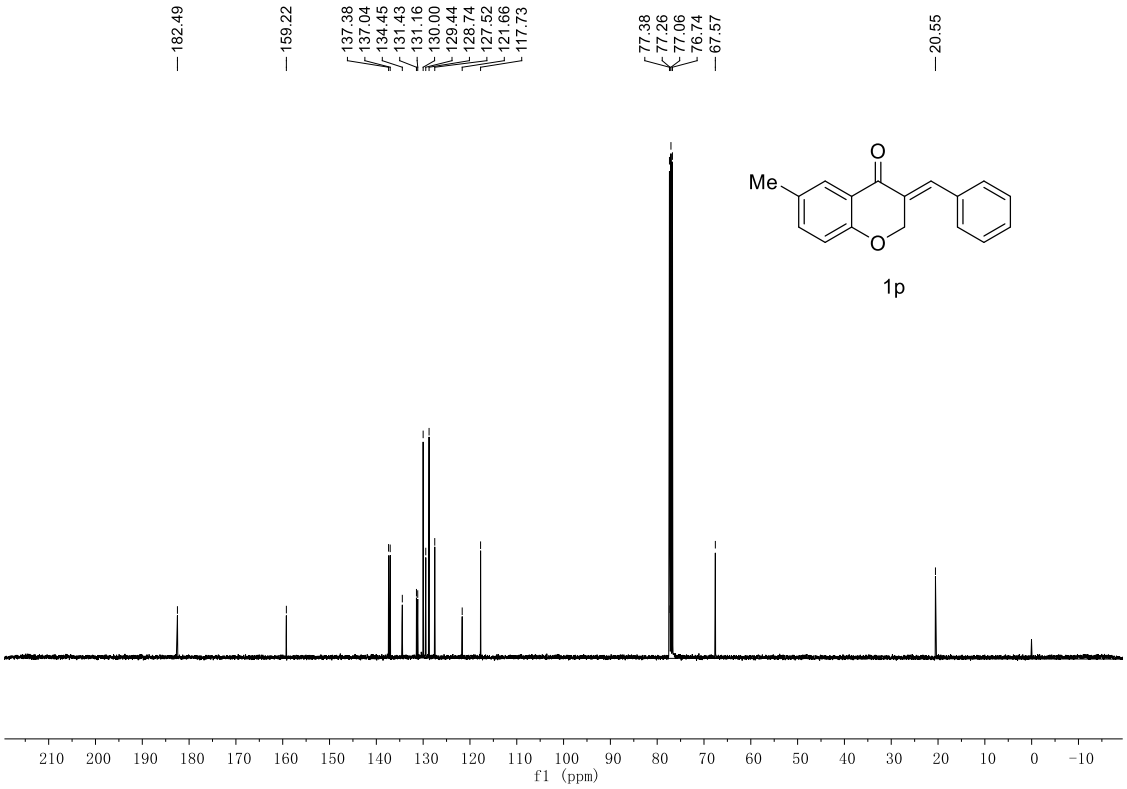
1o



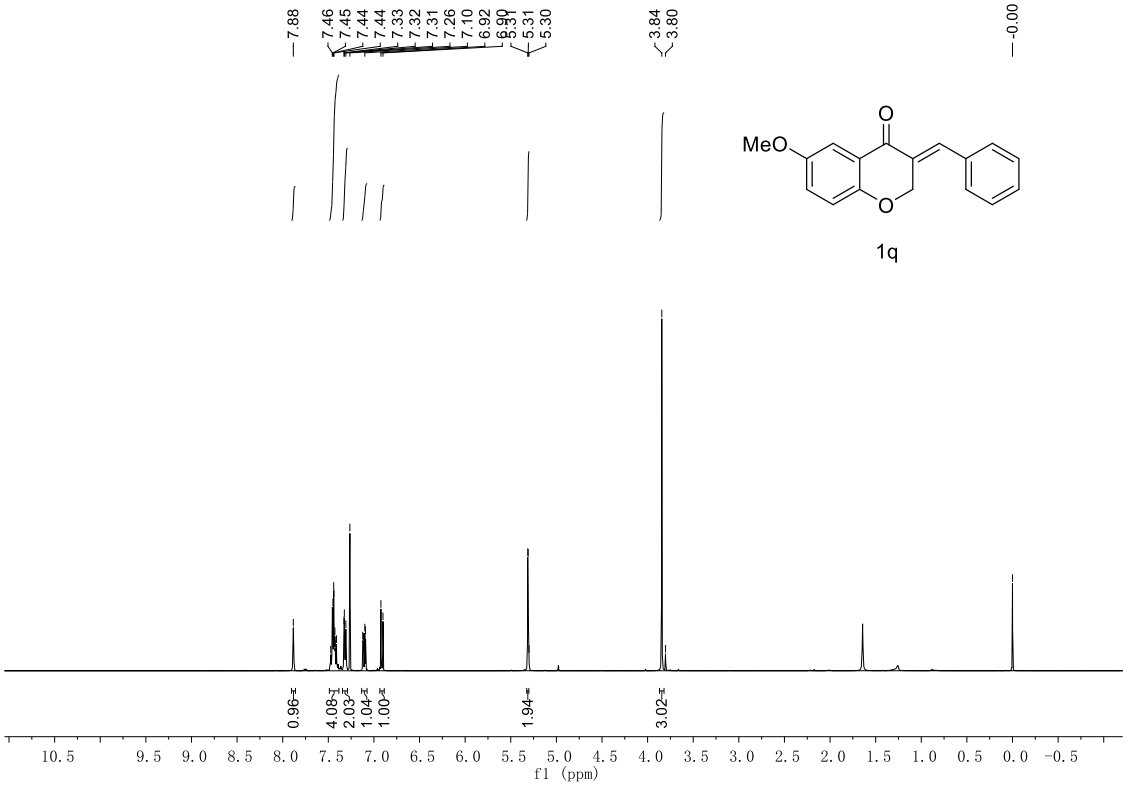
1o

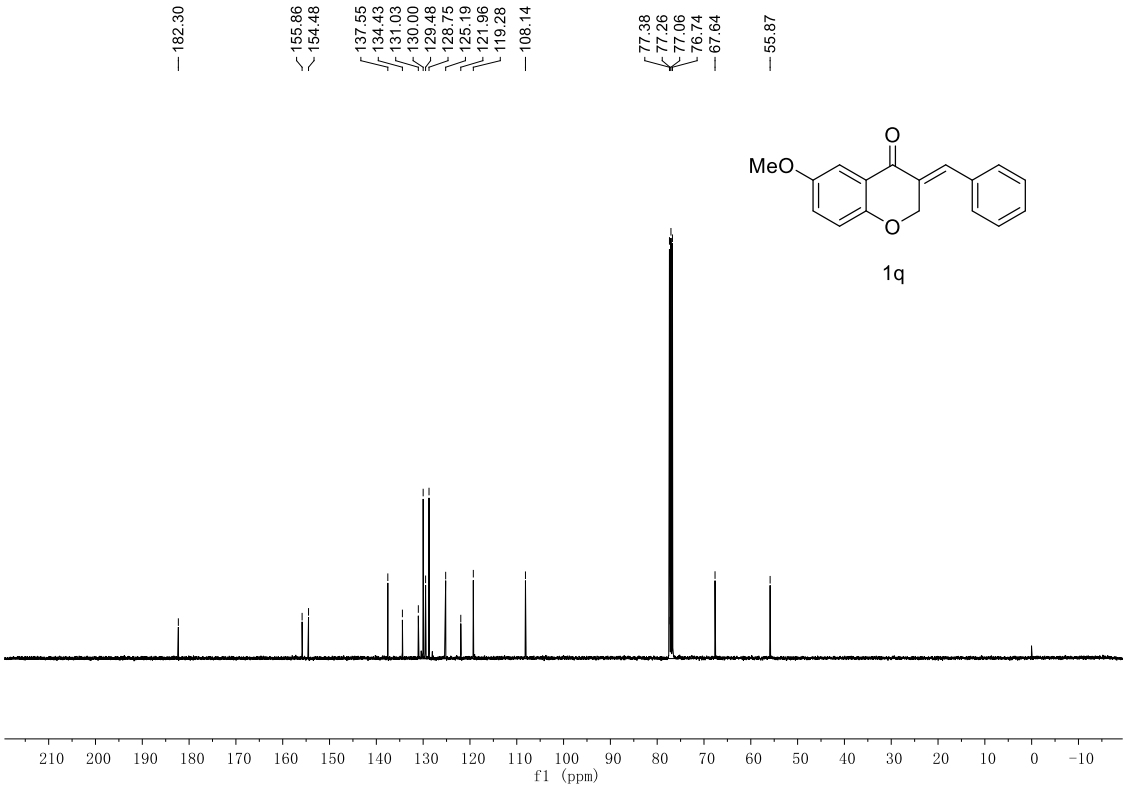
^{1}H and ^{13}C-NMR of 1p



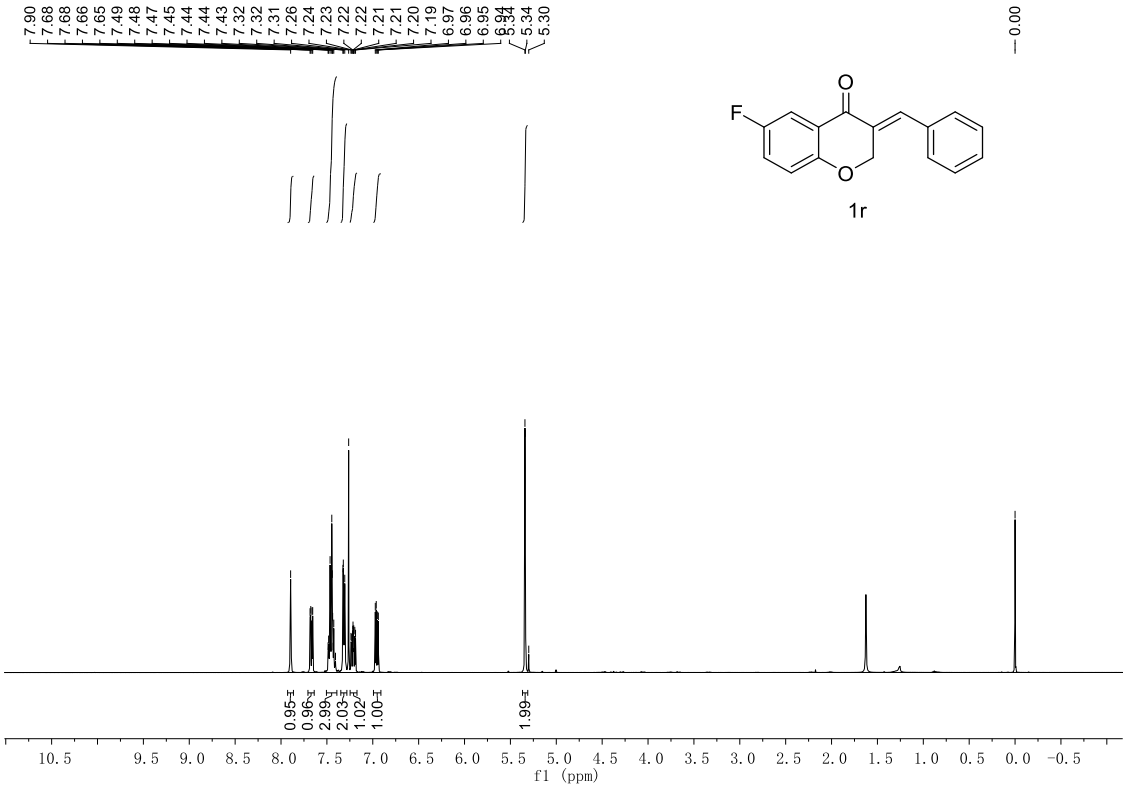


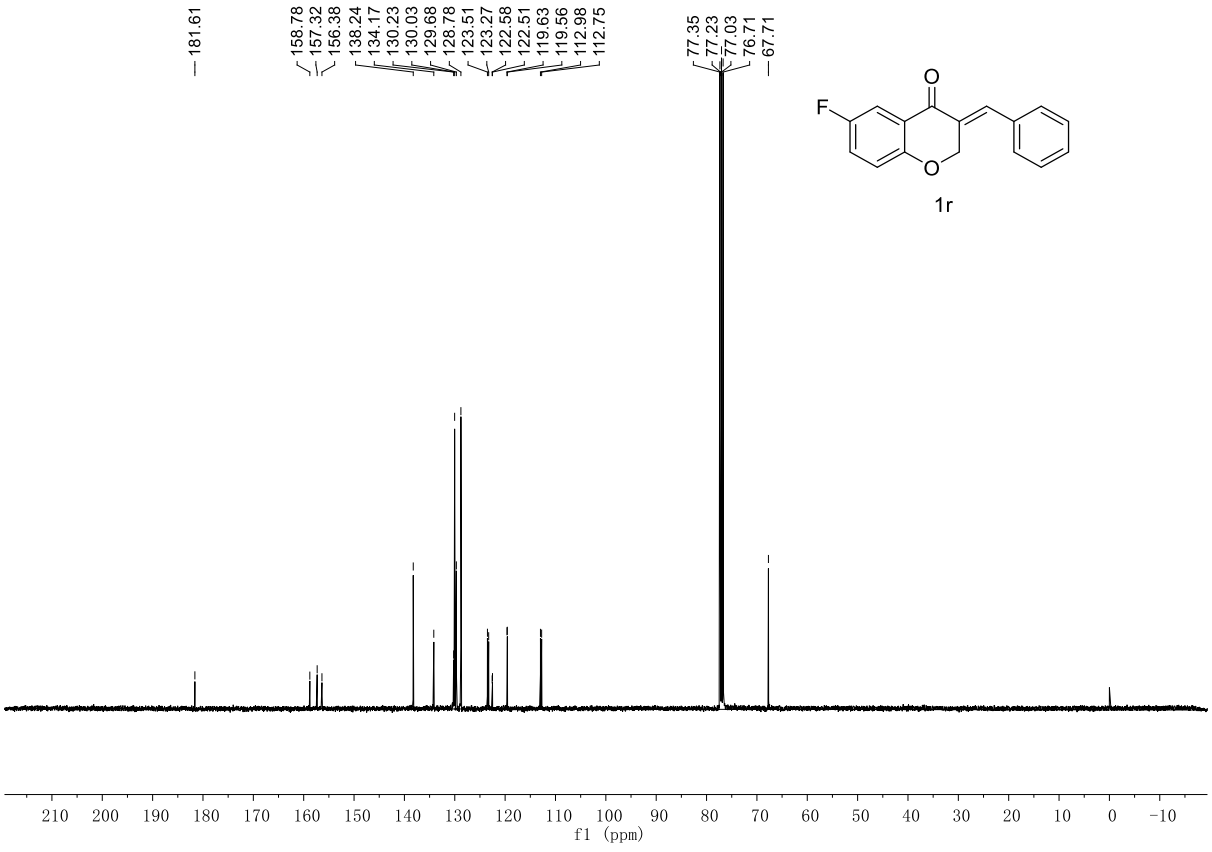
^{1}H and ^{13}C-NMR of 1q



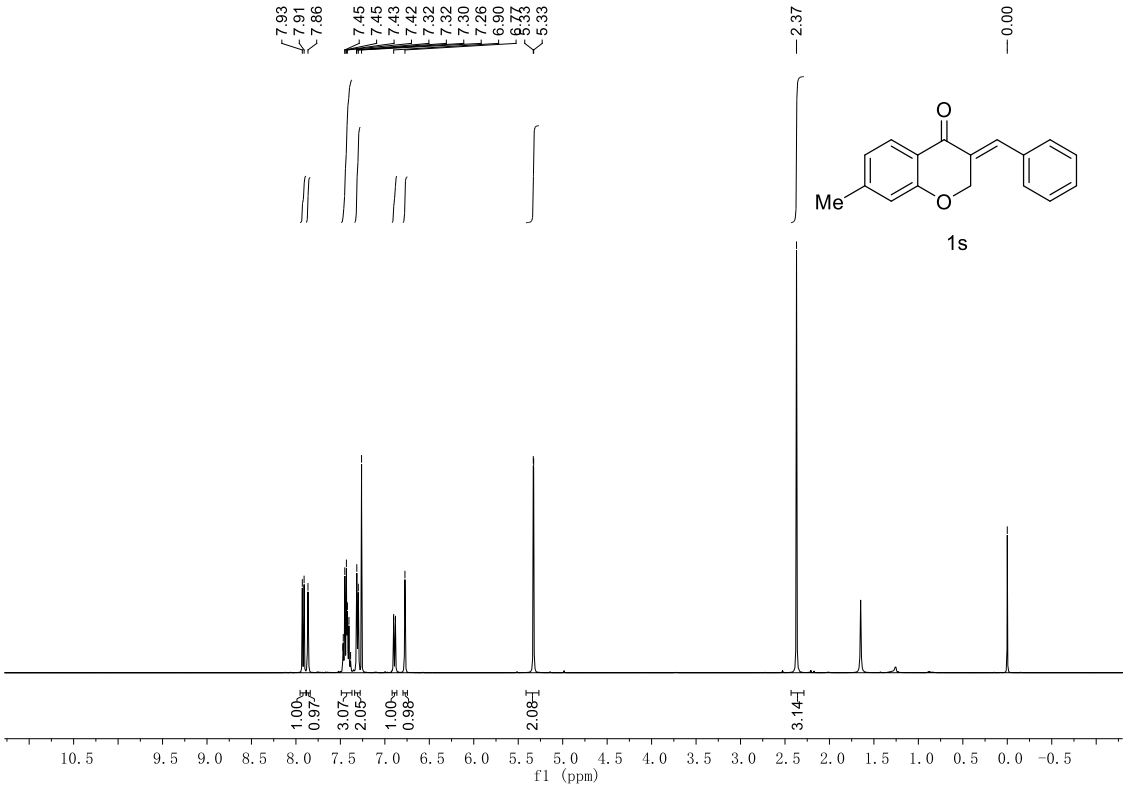


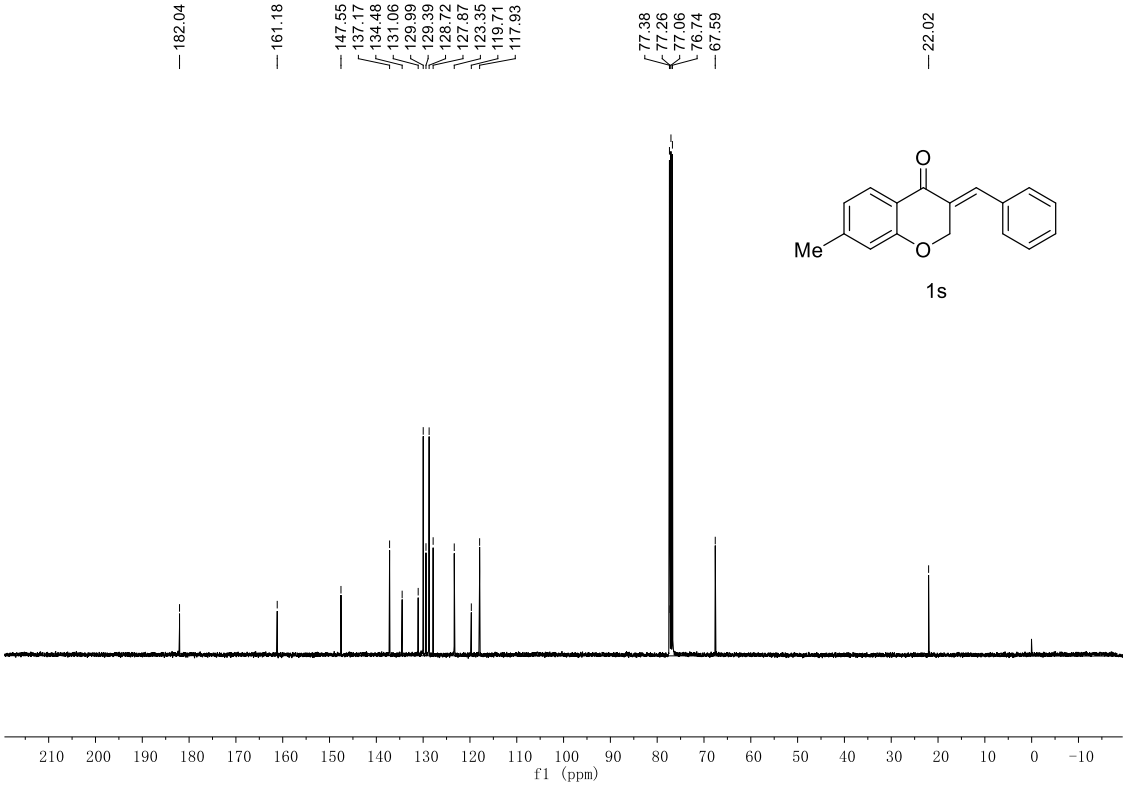
^{1}H and ^{13}C-NMR of 1r



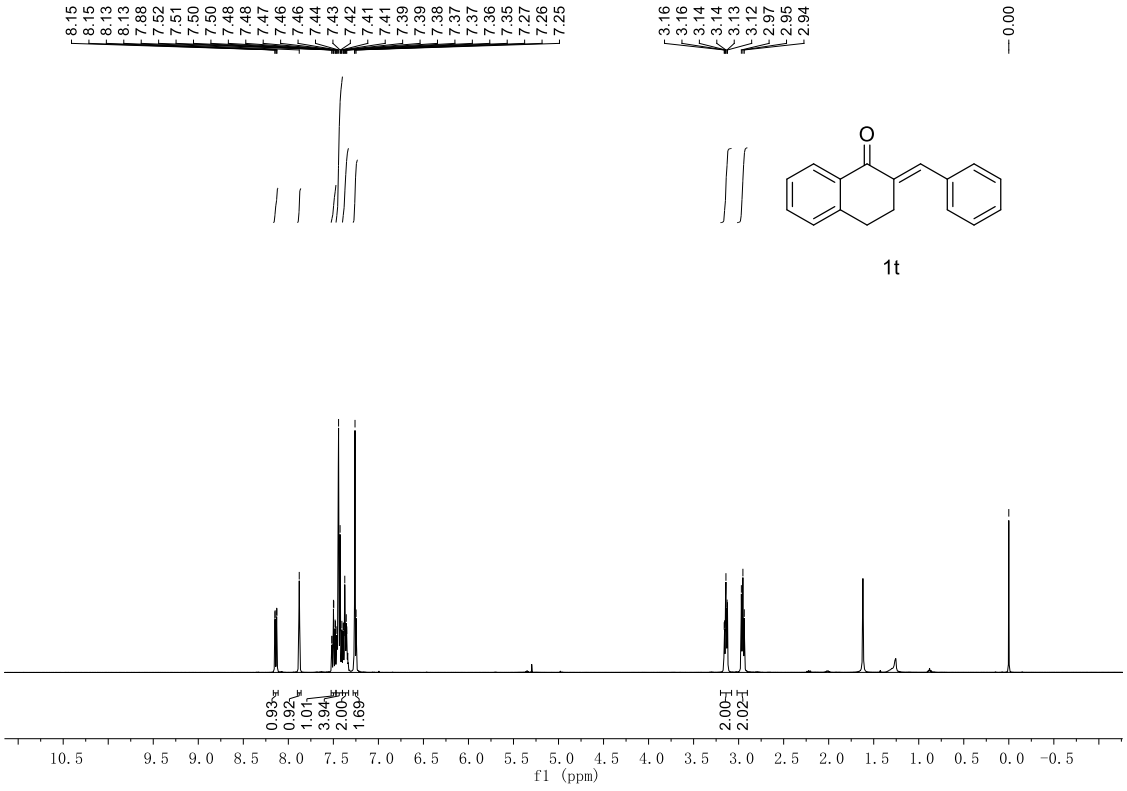


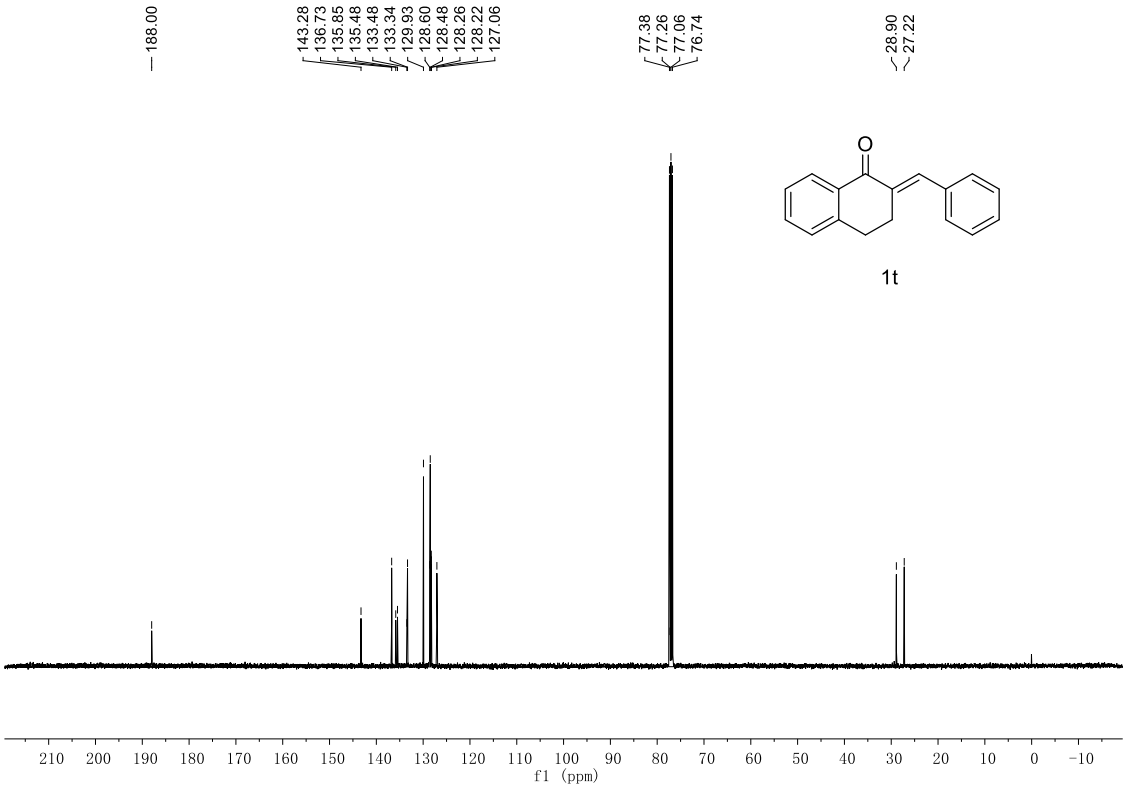
^{1}H and ^{13}C-NMR of 1s



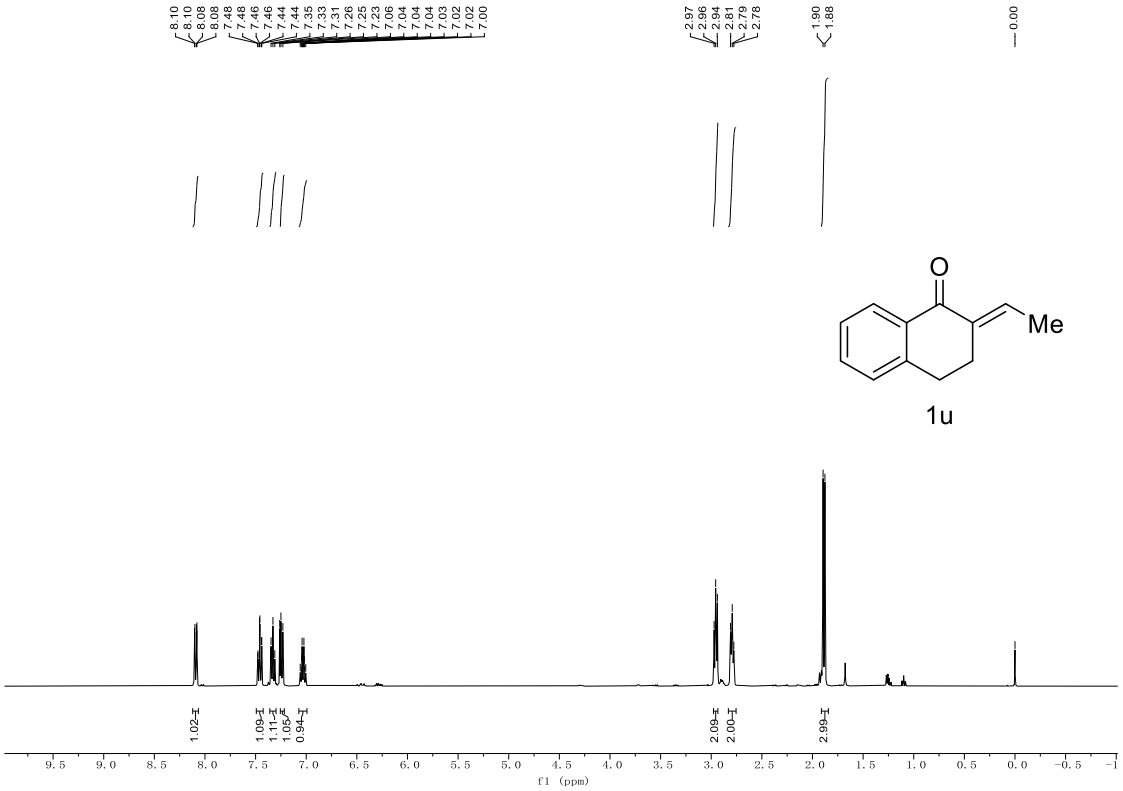


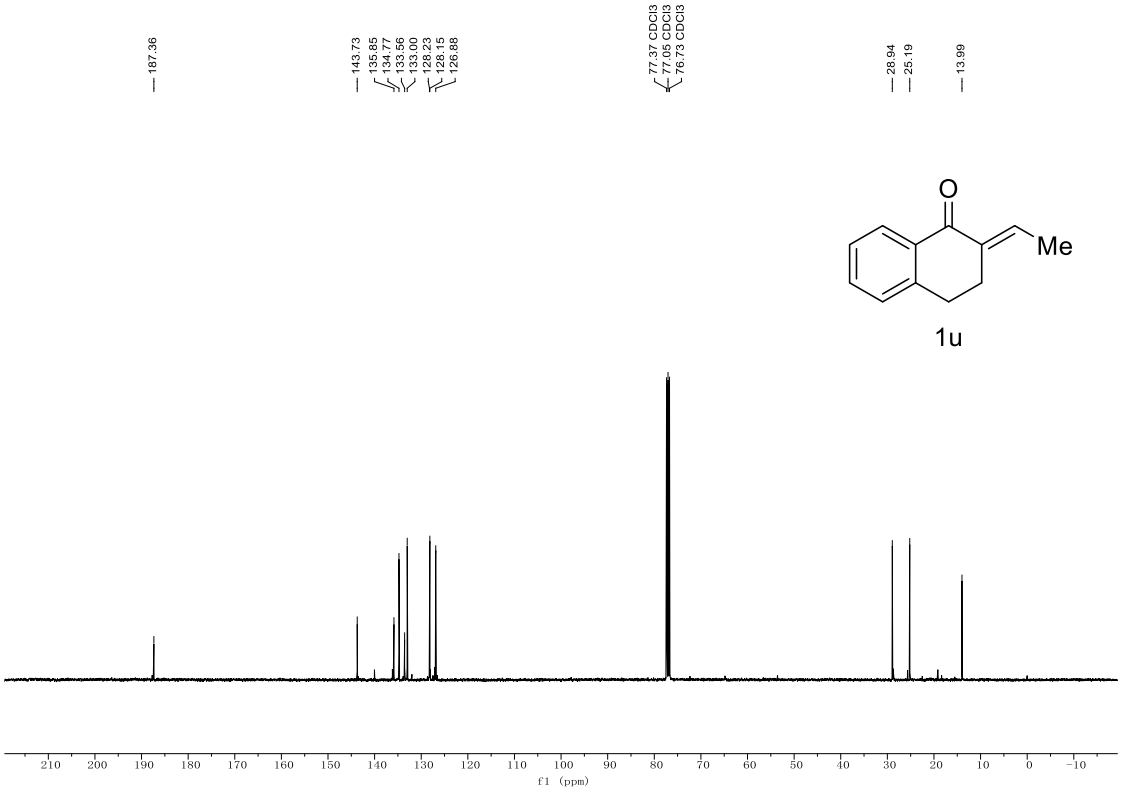
^{1}H and ^{13}C-NMR of 1t



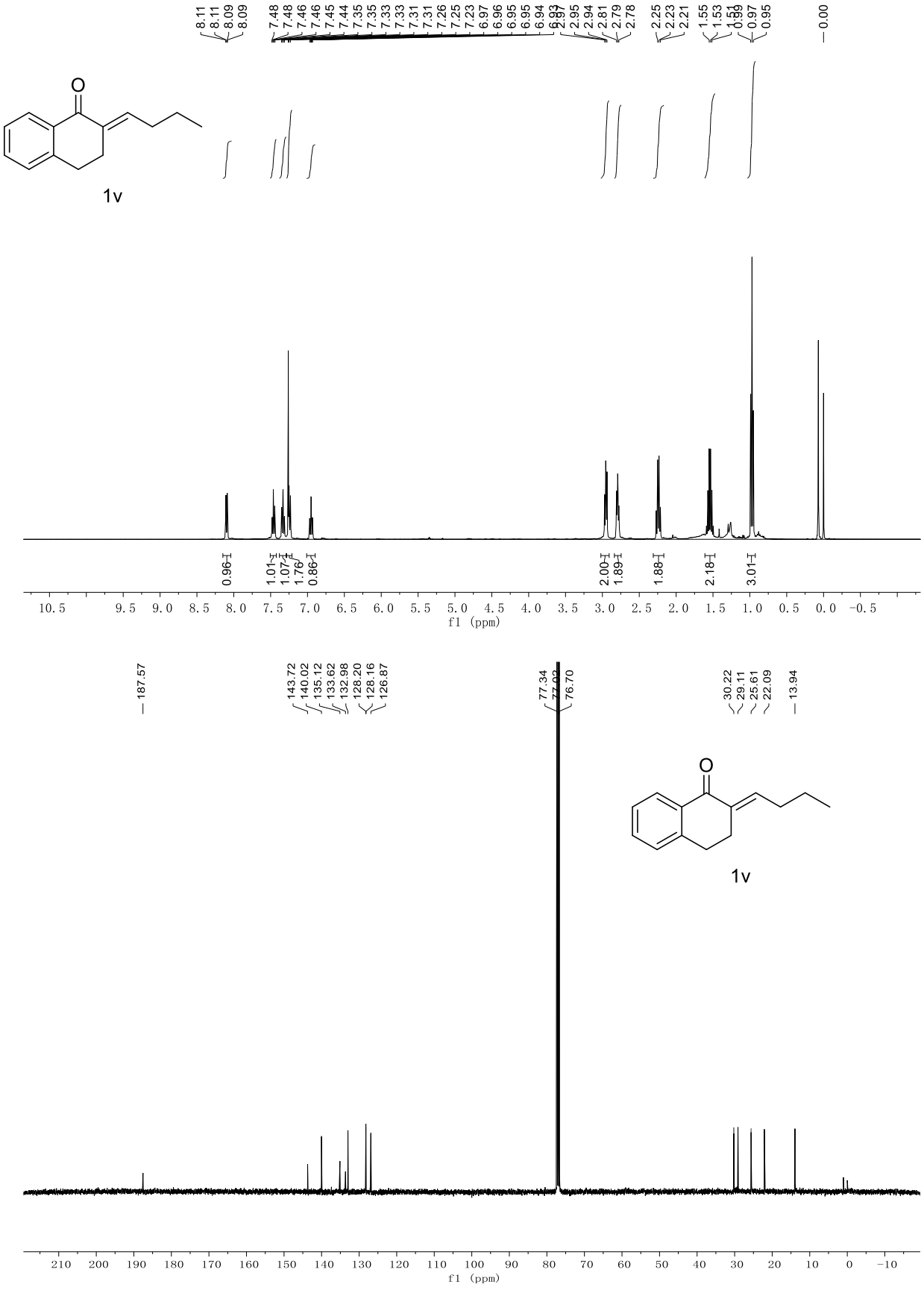


^{1}H and ^{13}C-NMR of 1u

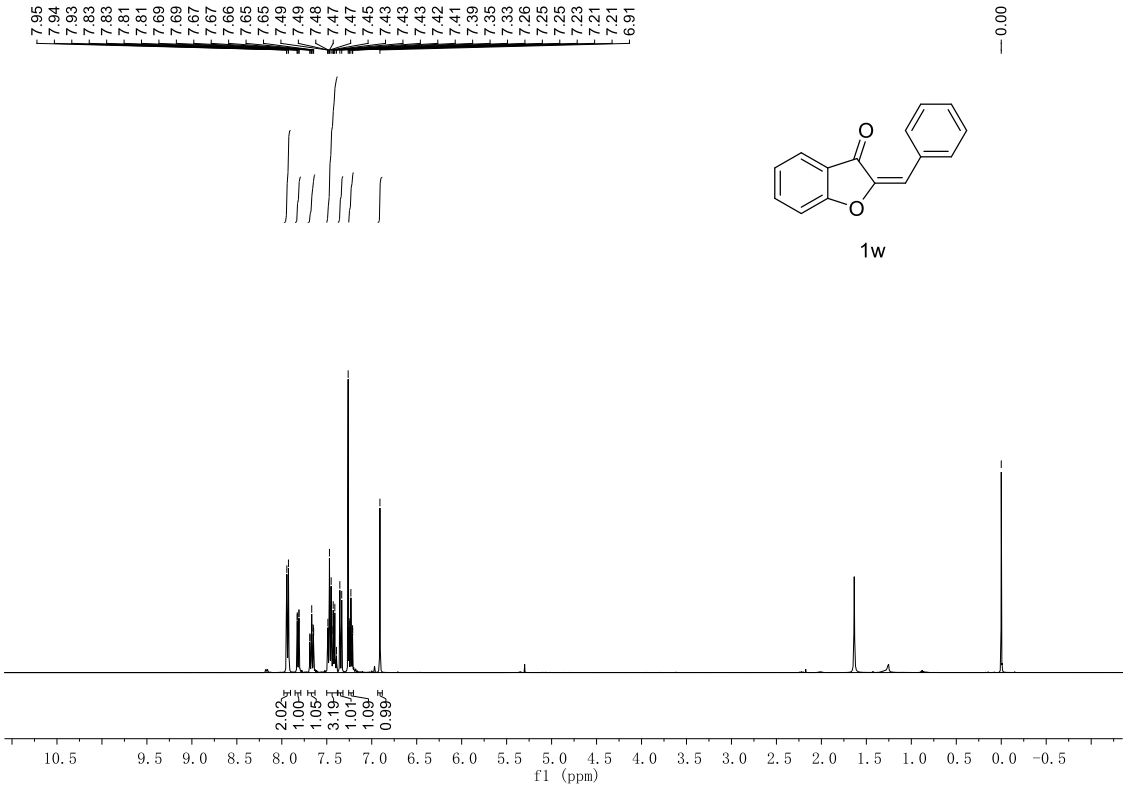


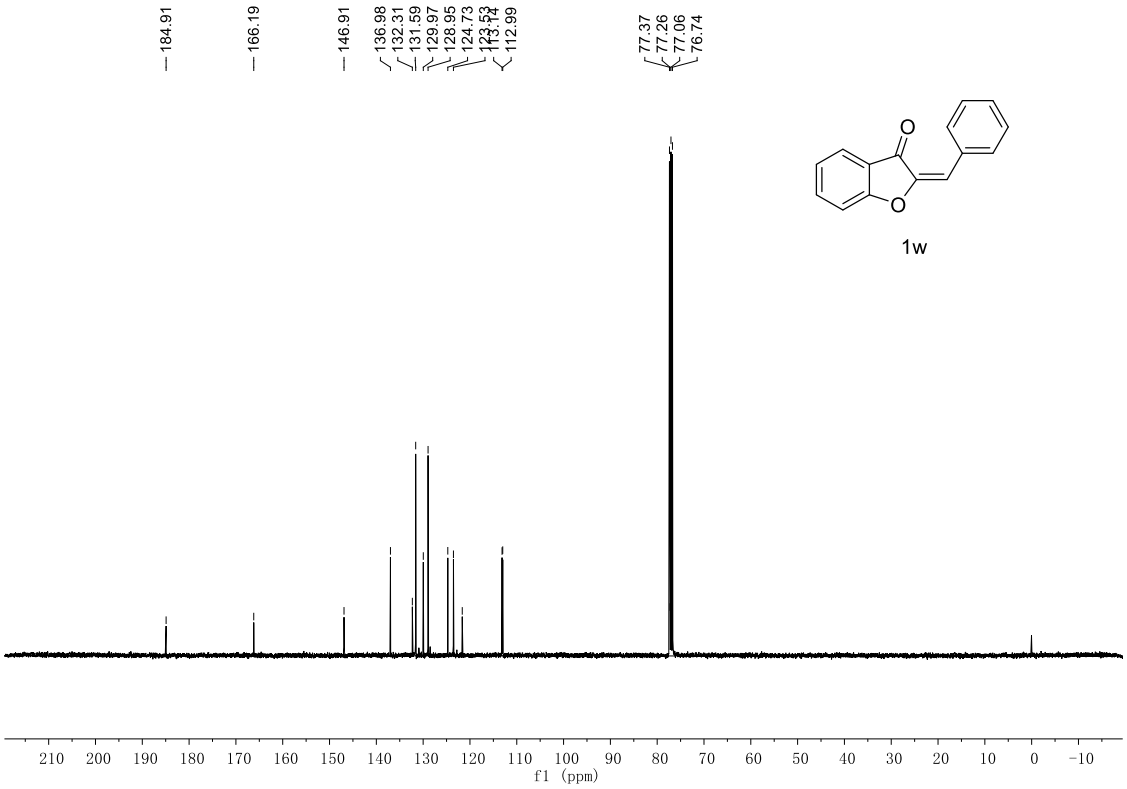


^{1}H and ^{13}C-NMR of 1v

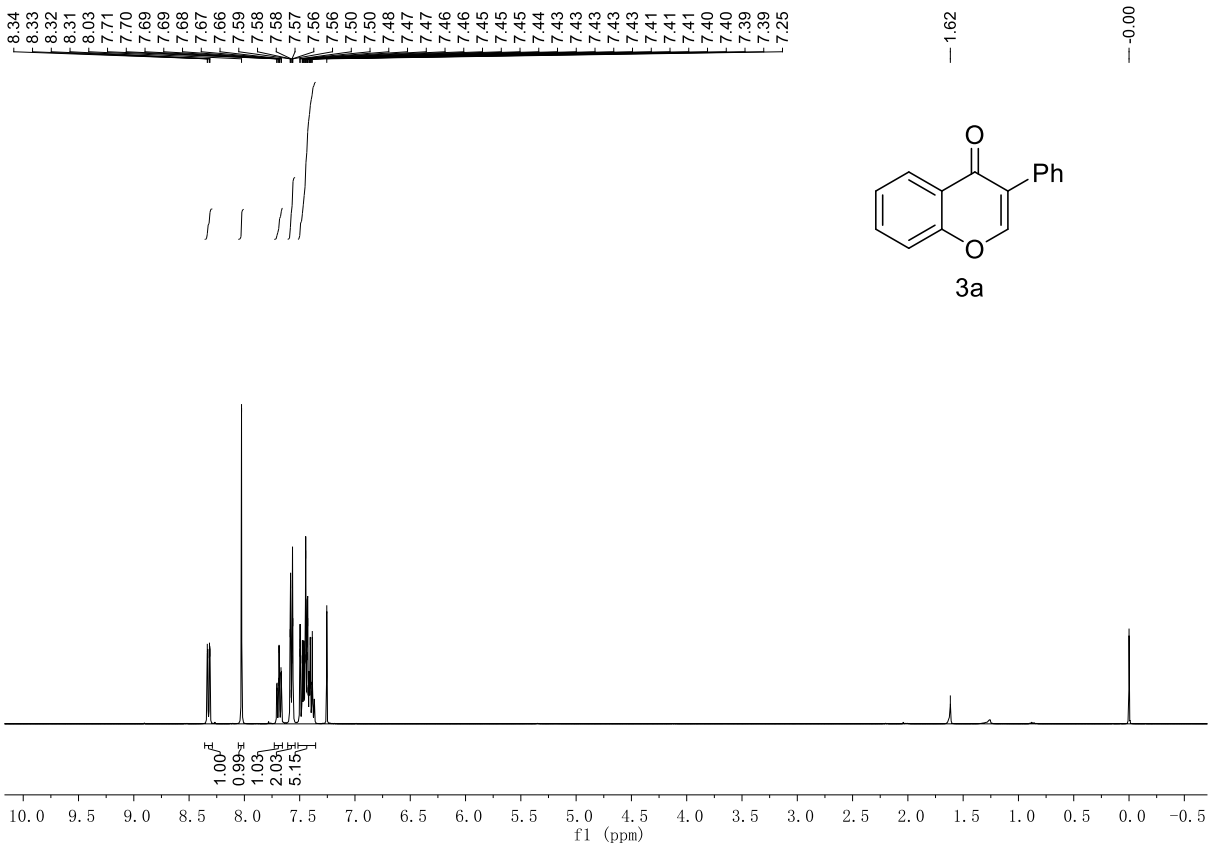


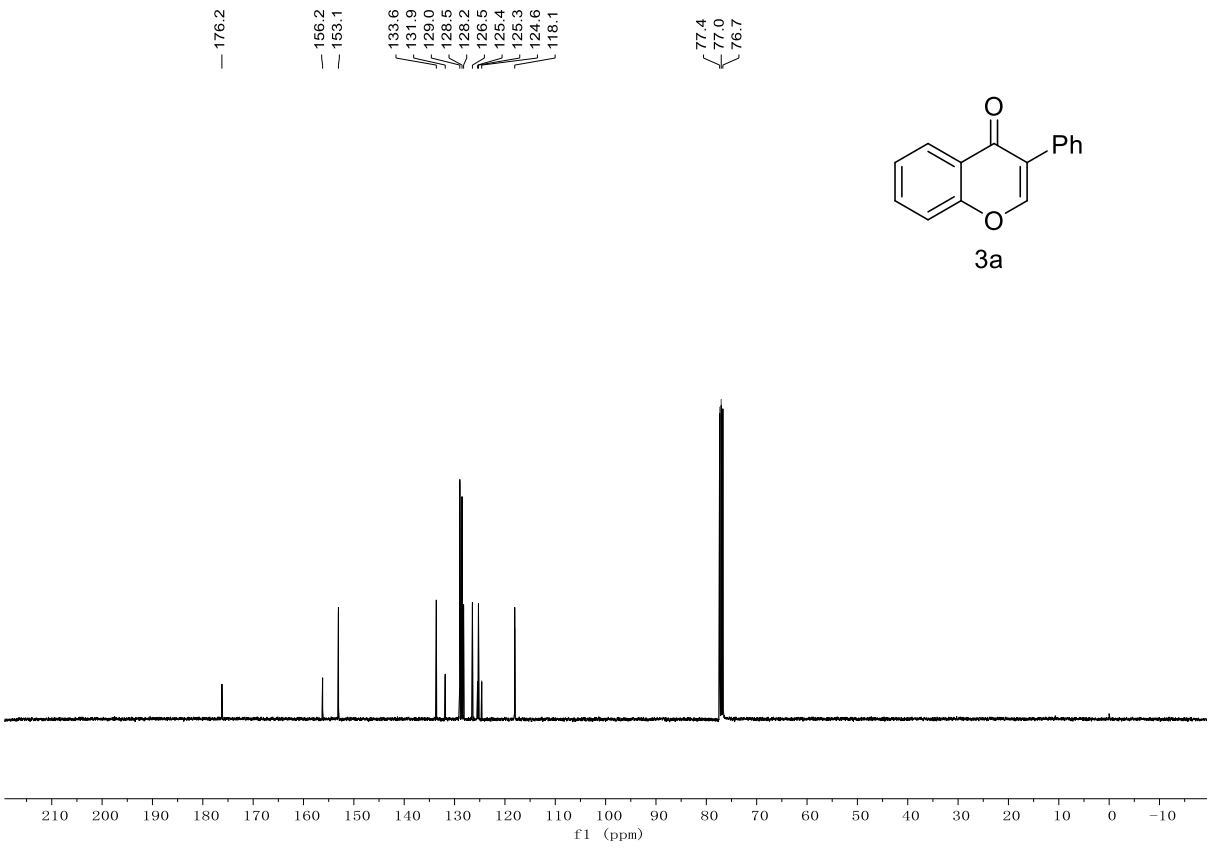
^{1}H and ^{13}C-NMR of 1w



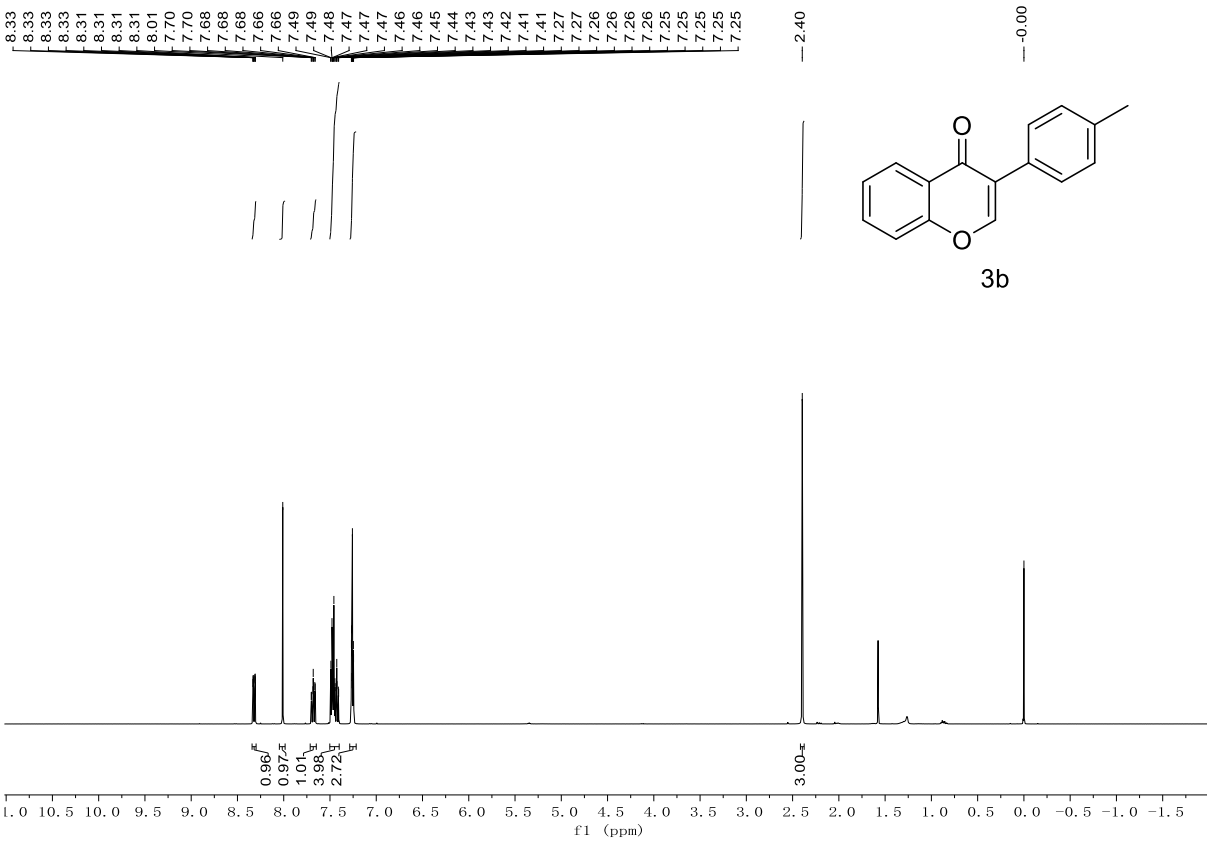


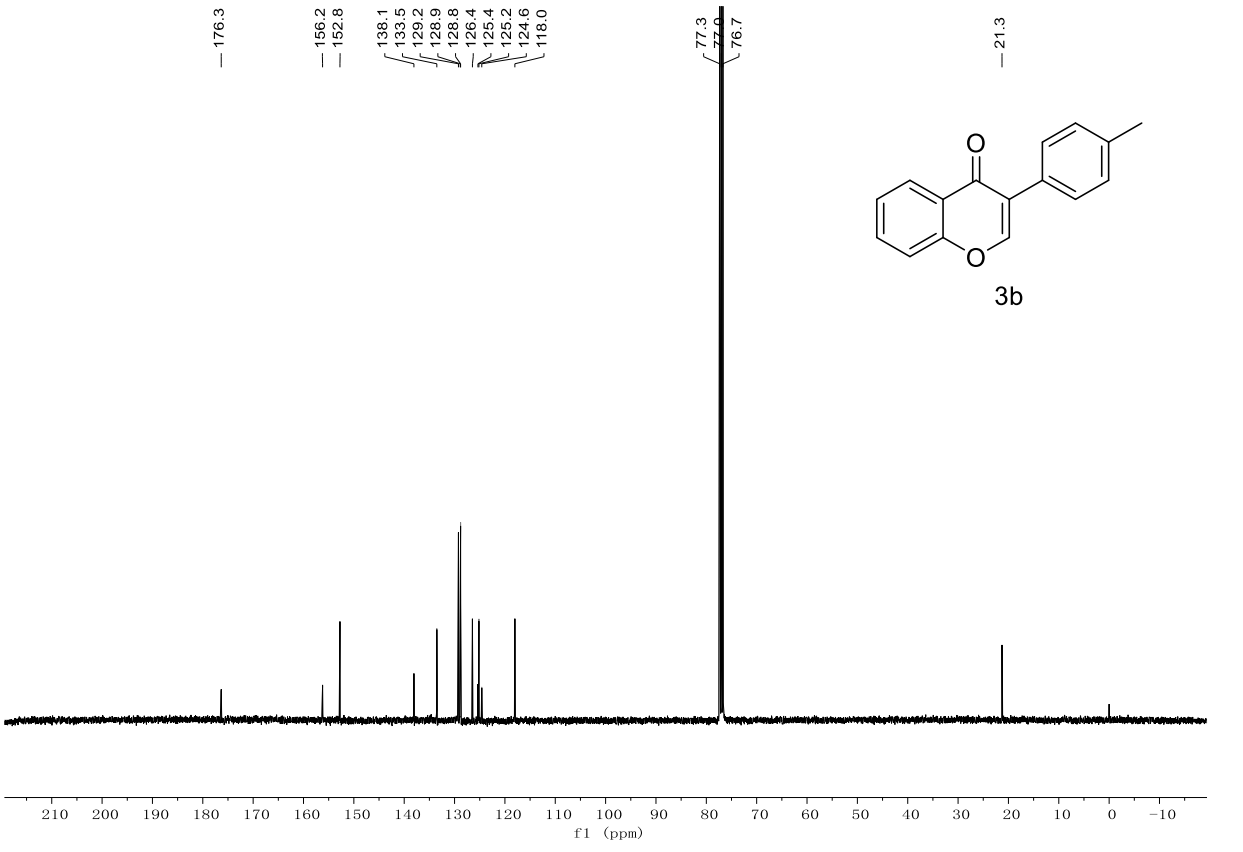
^{1}H and ^{13}C-NMR of 3a



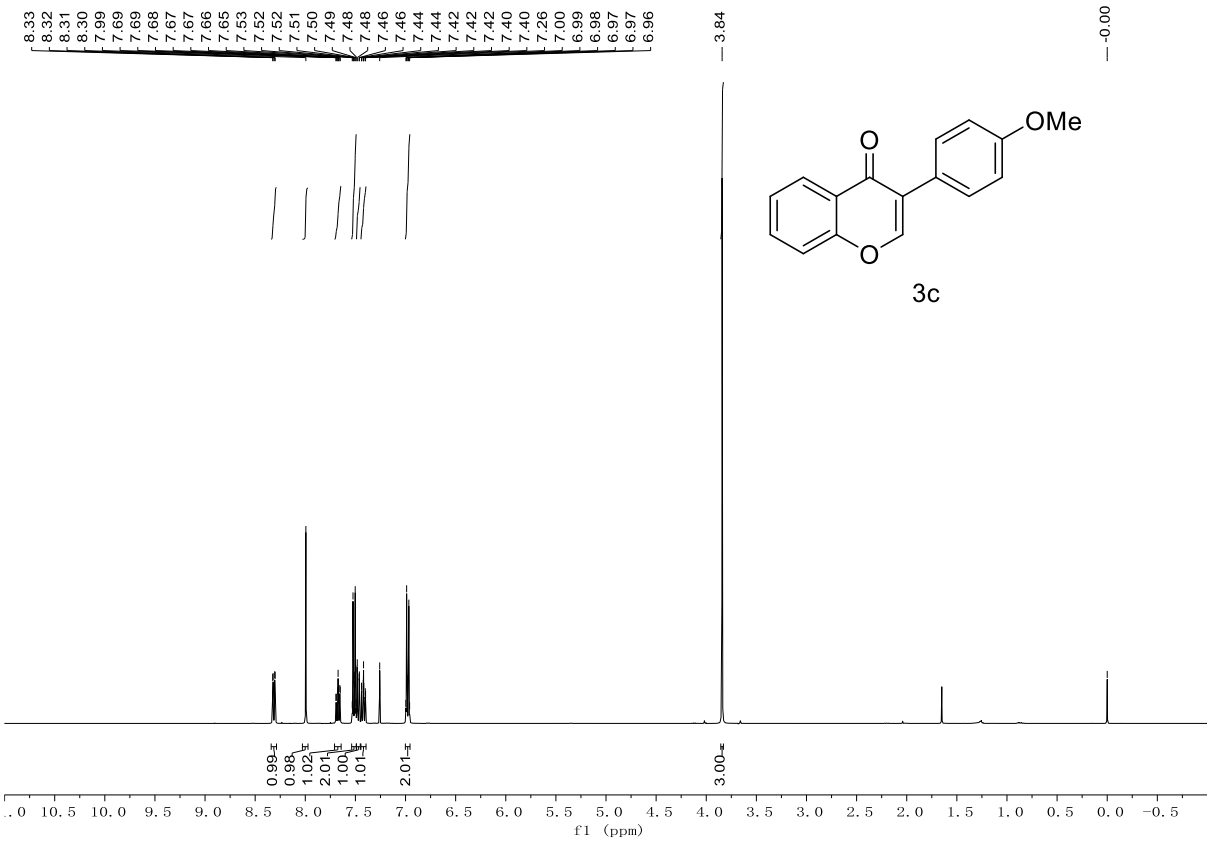


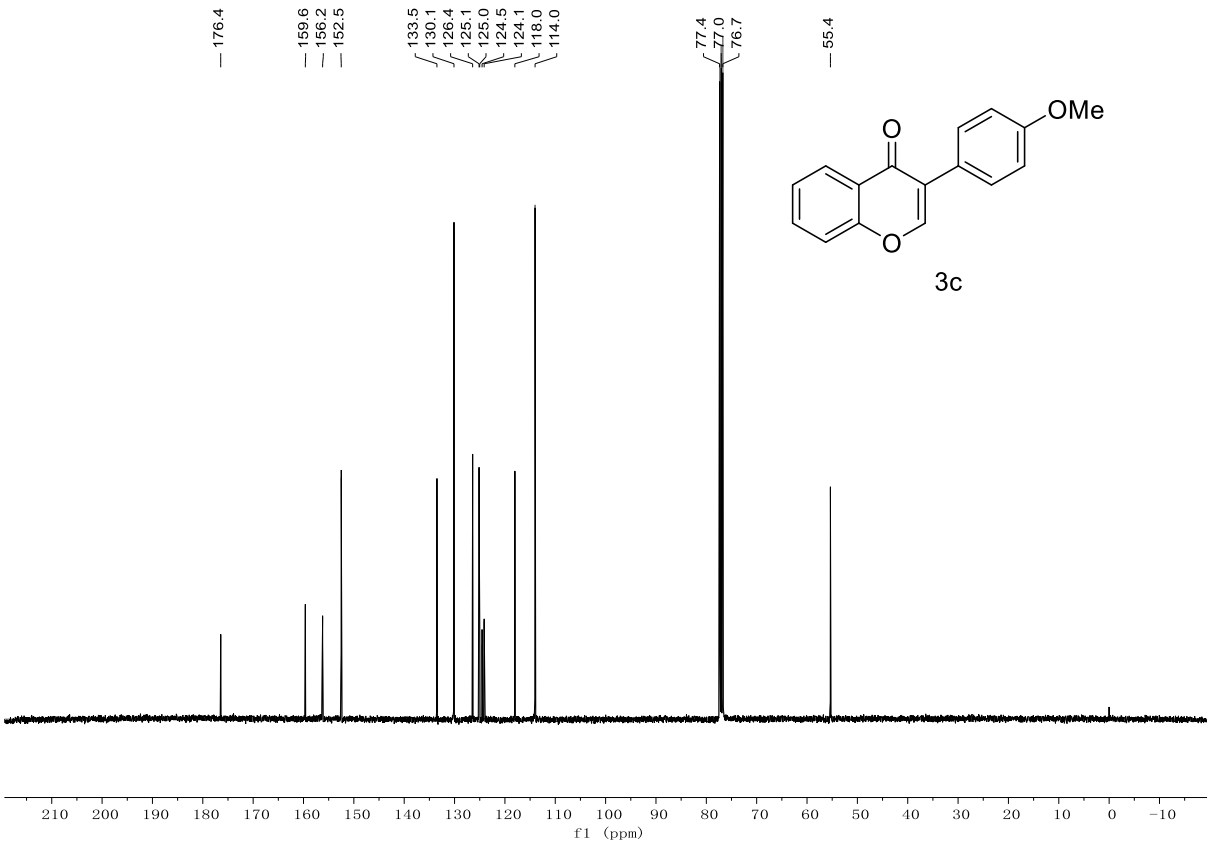
^{1}H and ^{13}C-NMR of 3b



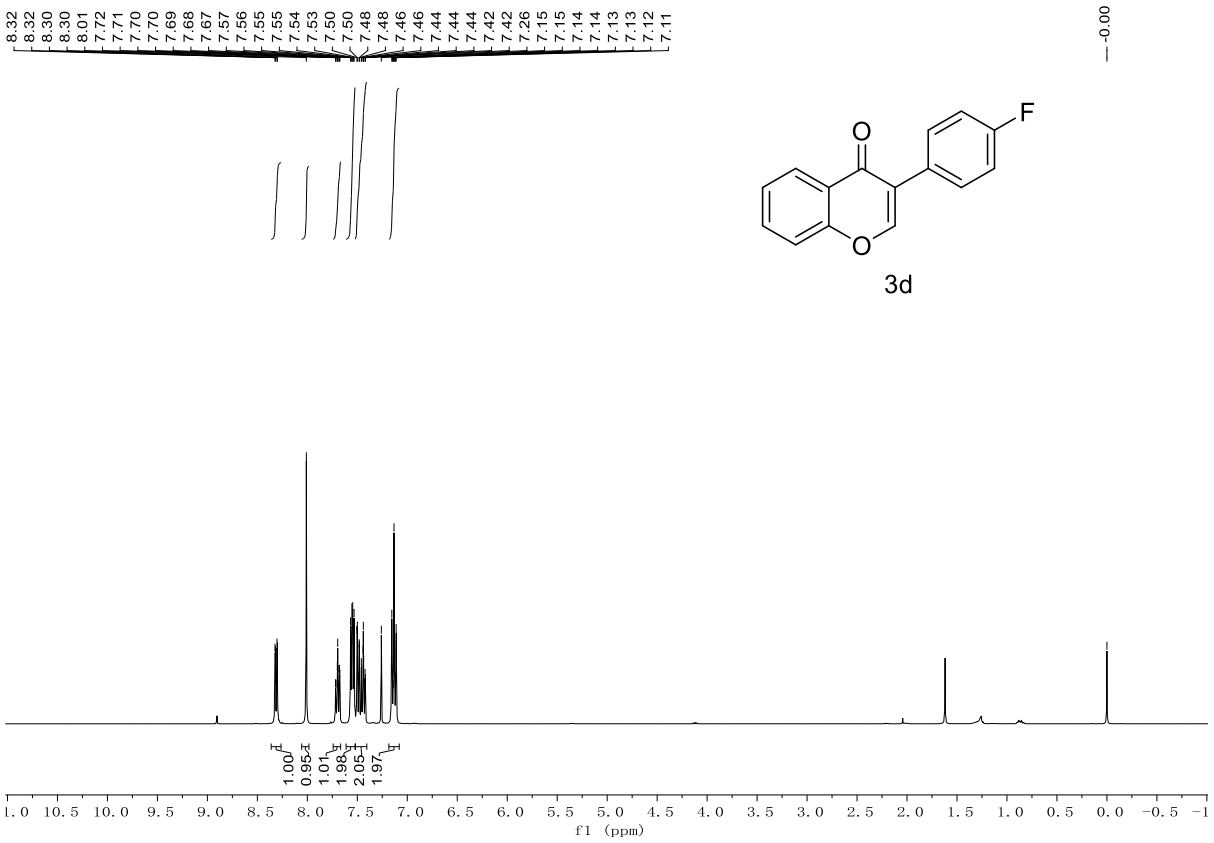


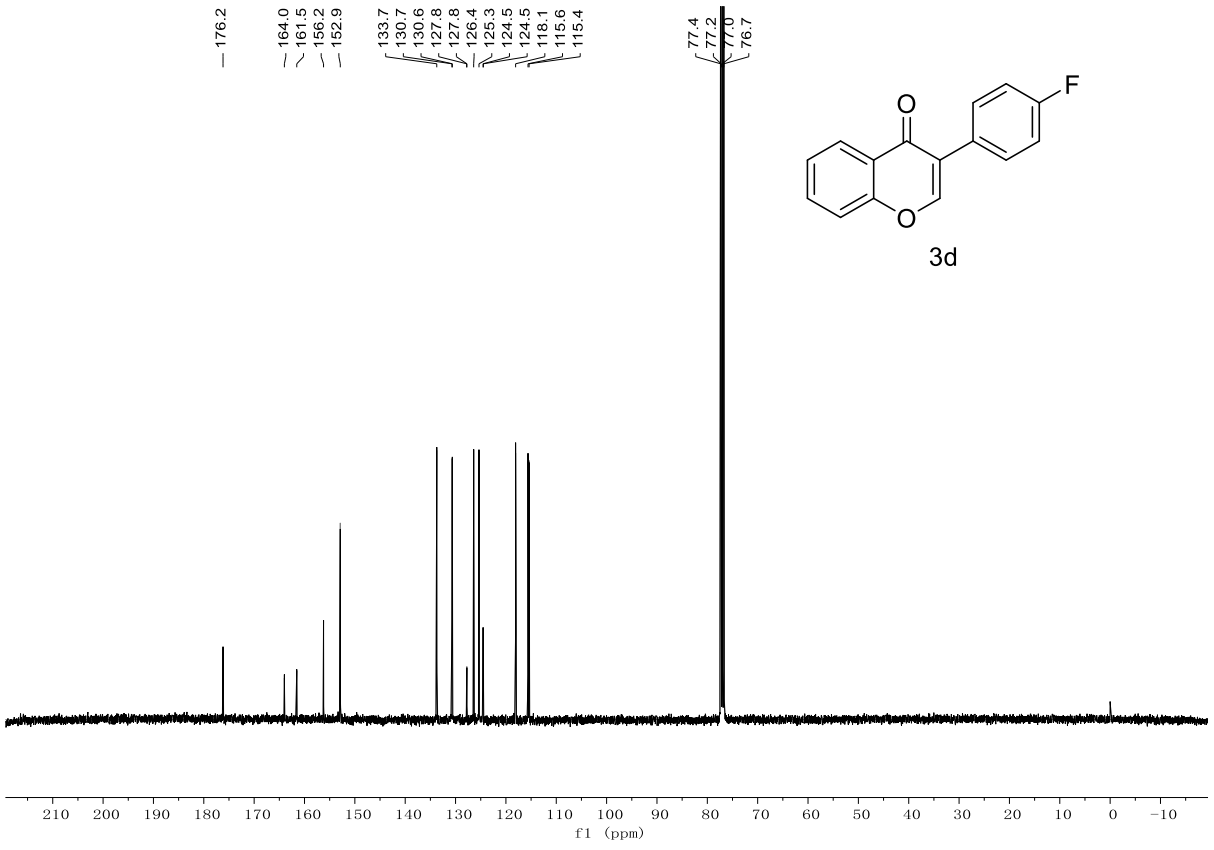
^{1}H and ^{13}C-NMR of 3c



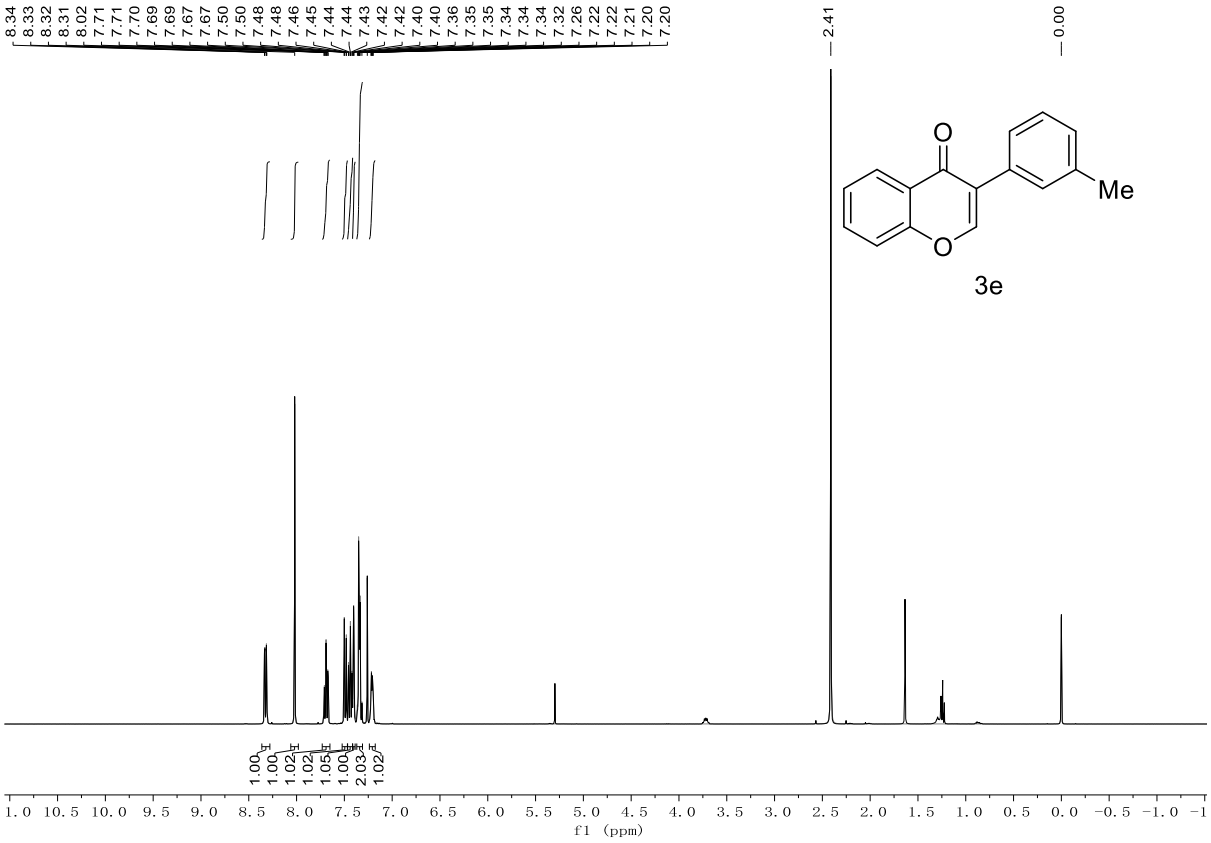


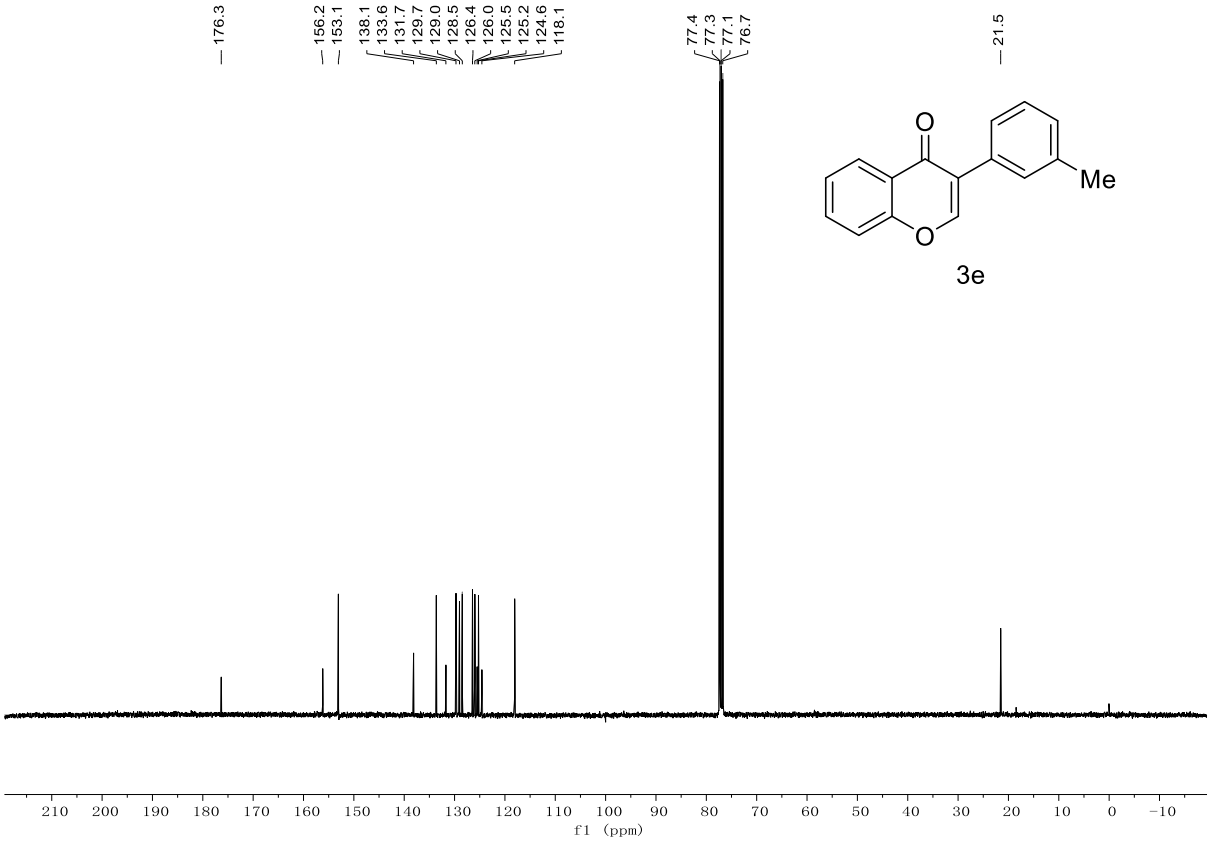
^{1}H and ^{13}C-NMR of 3d



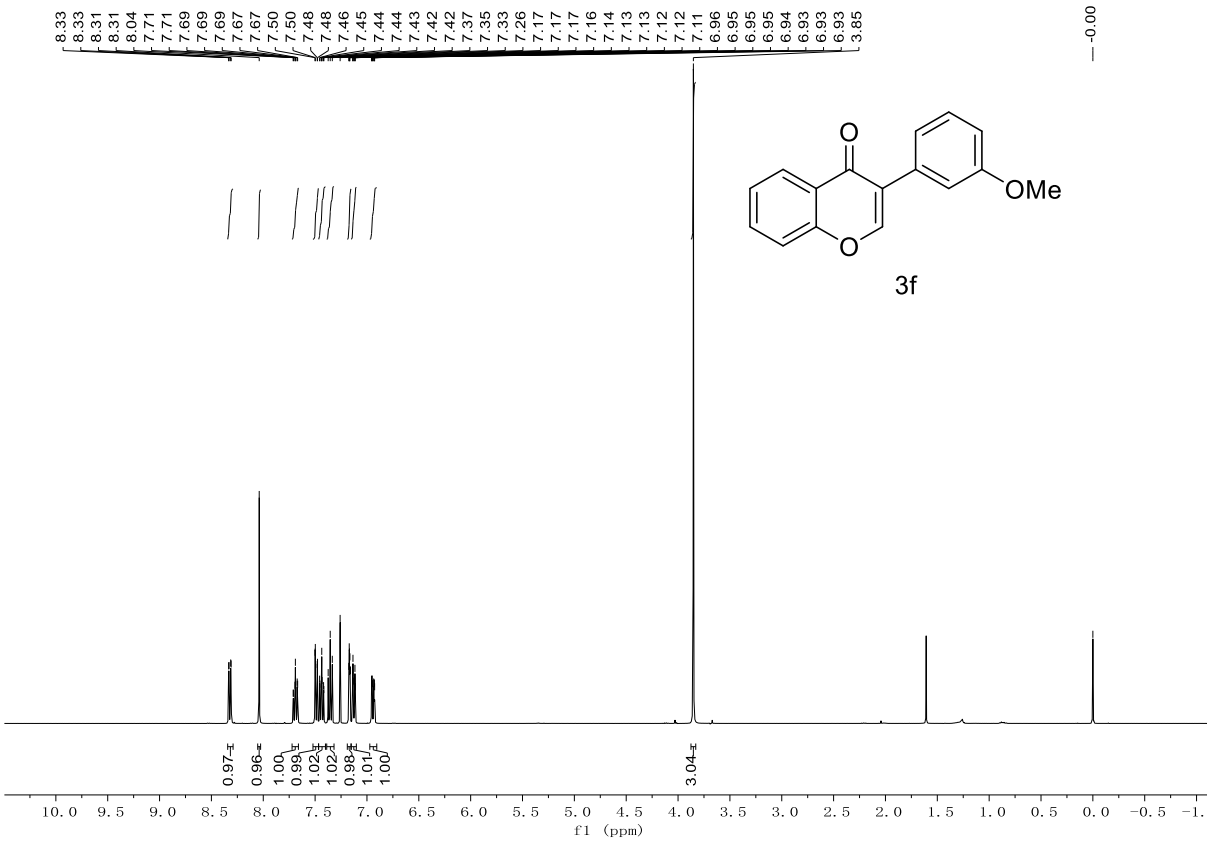


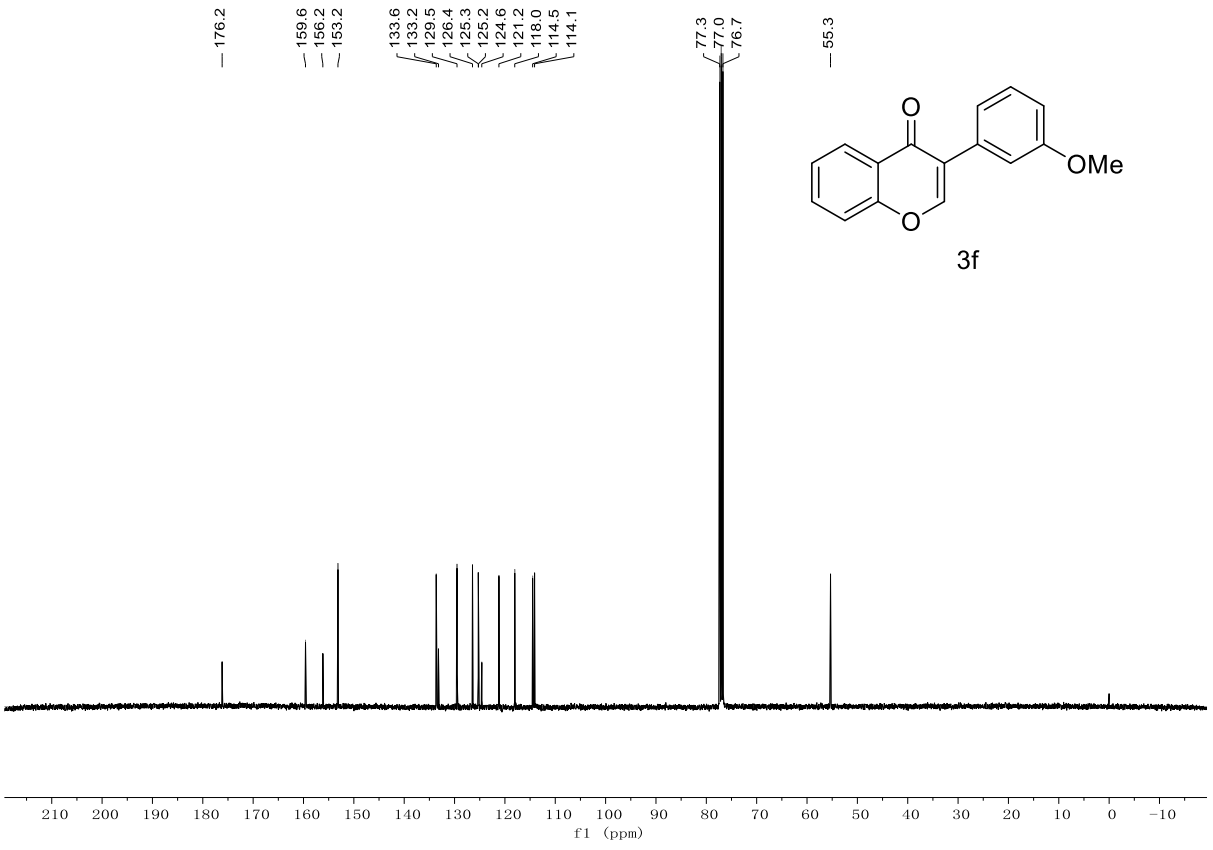
^{1}H and ^{13}C-NMR of 3e



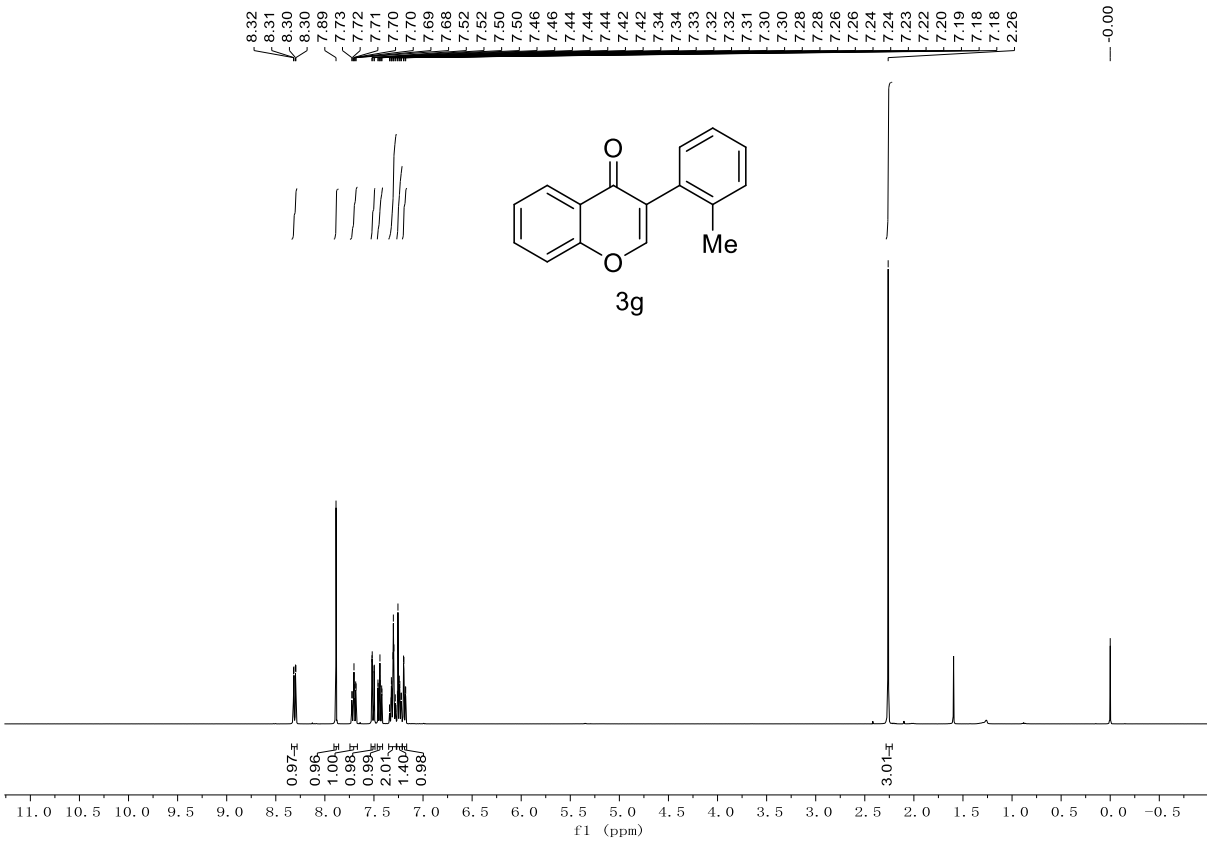


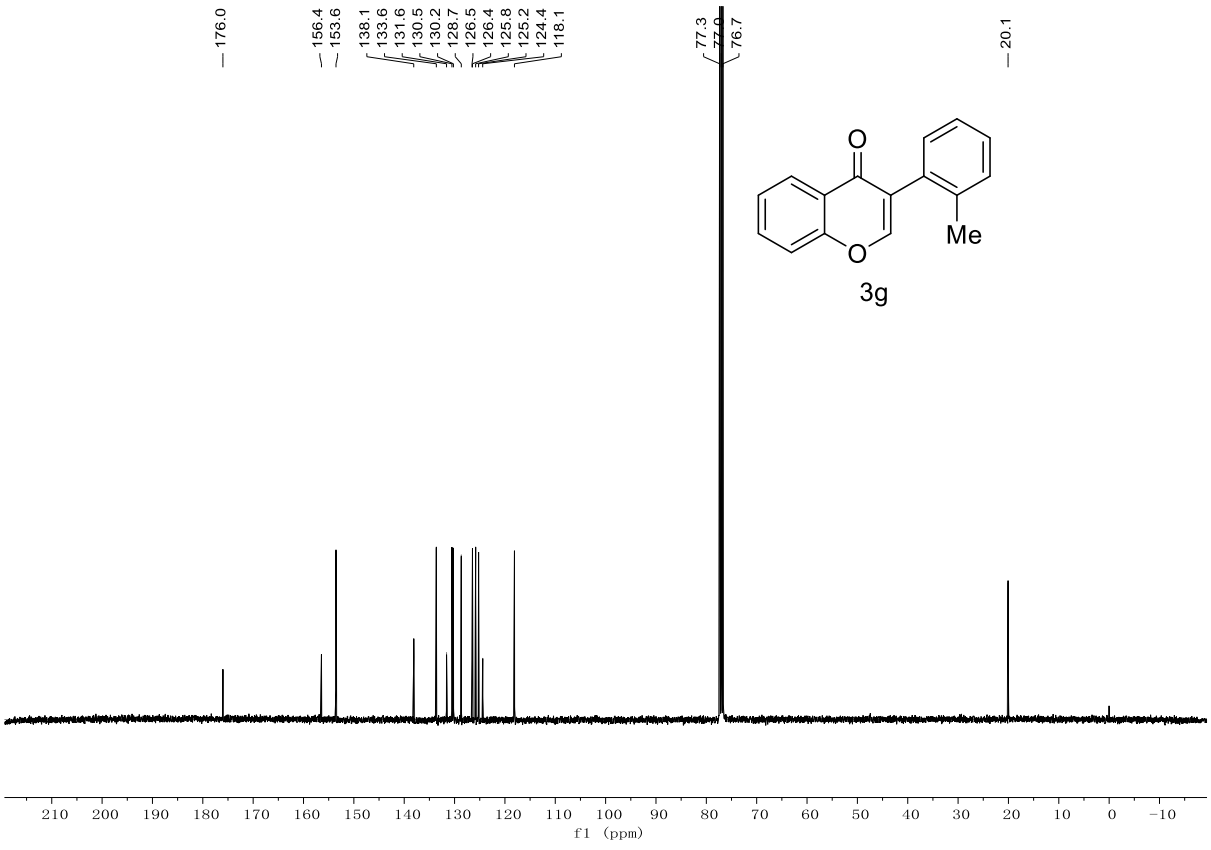
^{1}H and ^{13}C-NMR of 3f



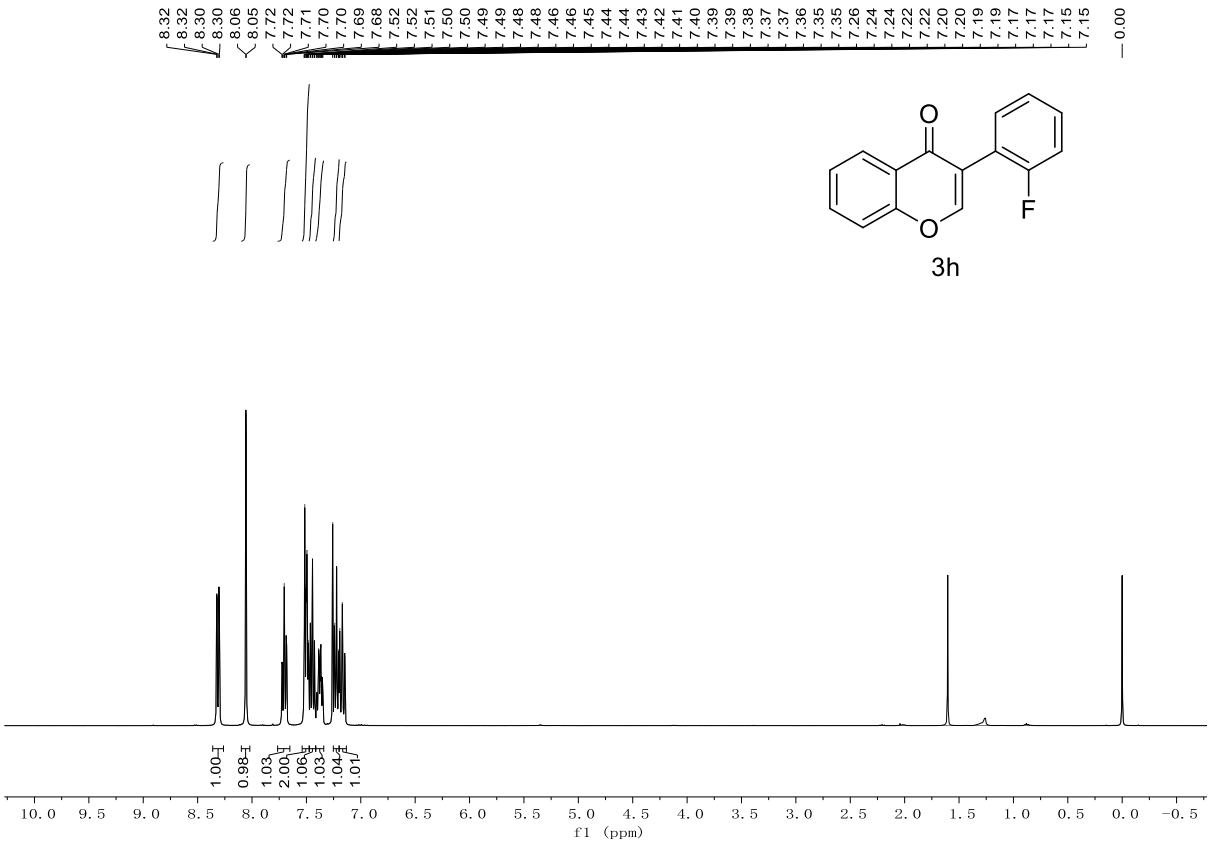


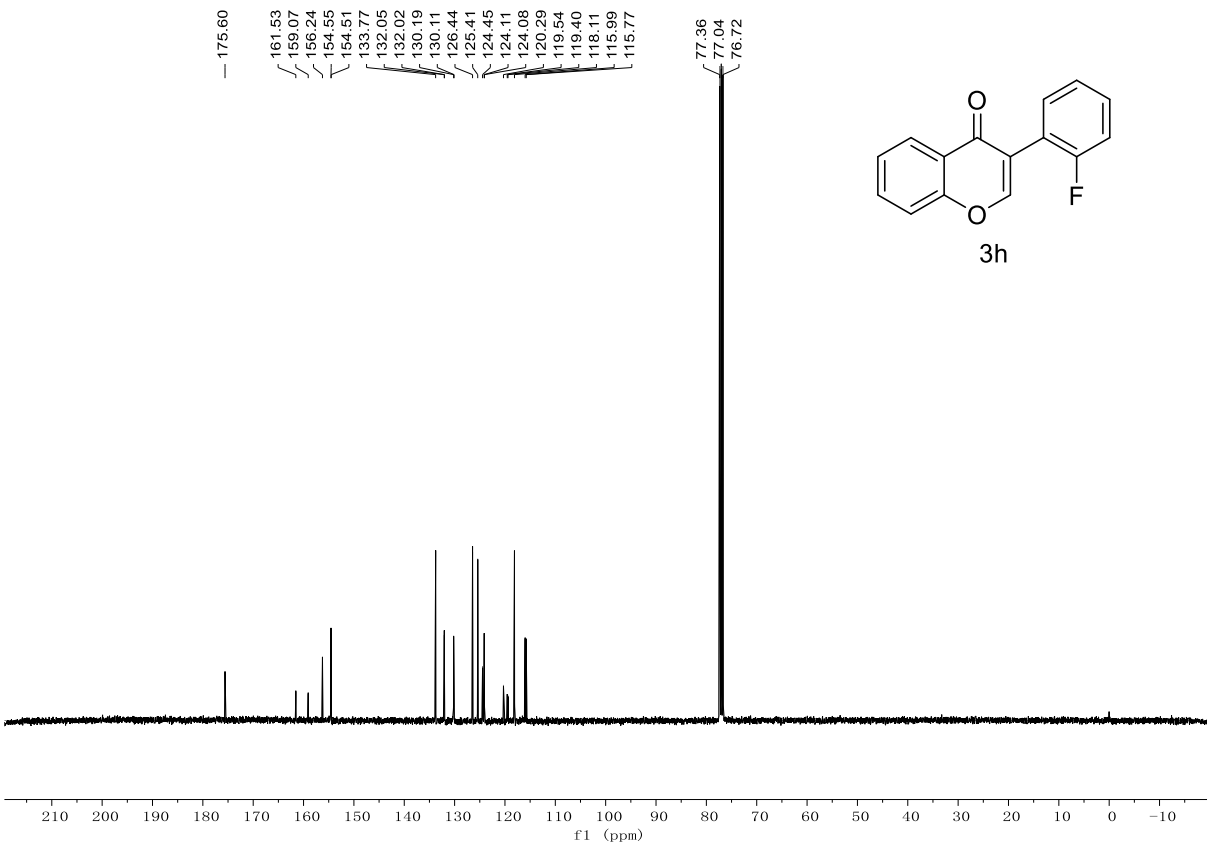
^{1}H and ^{13}C-NMR of 3g



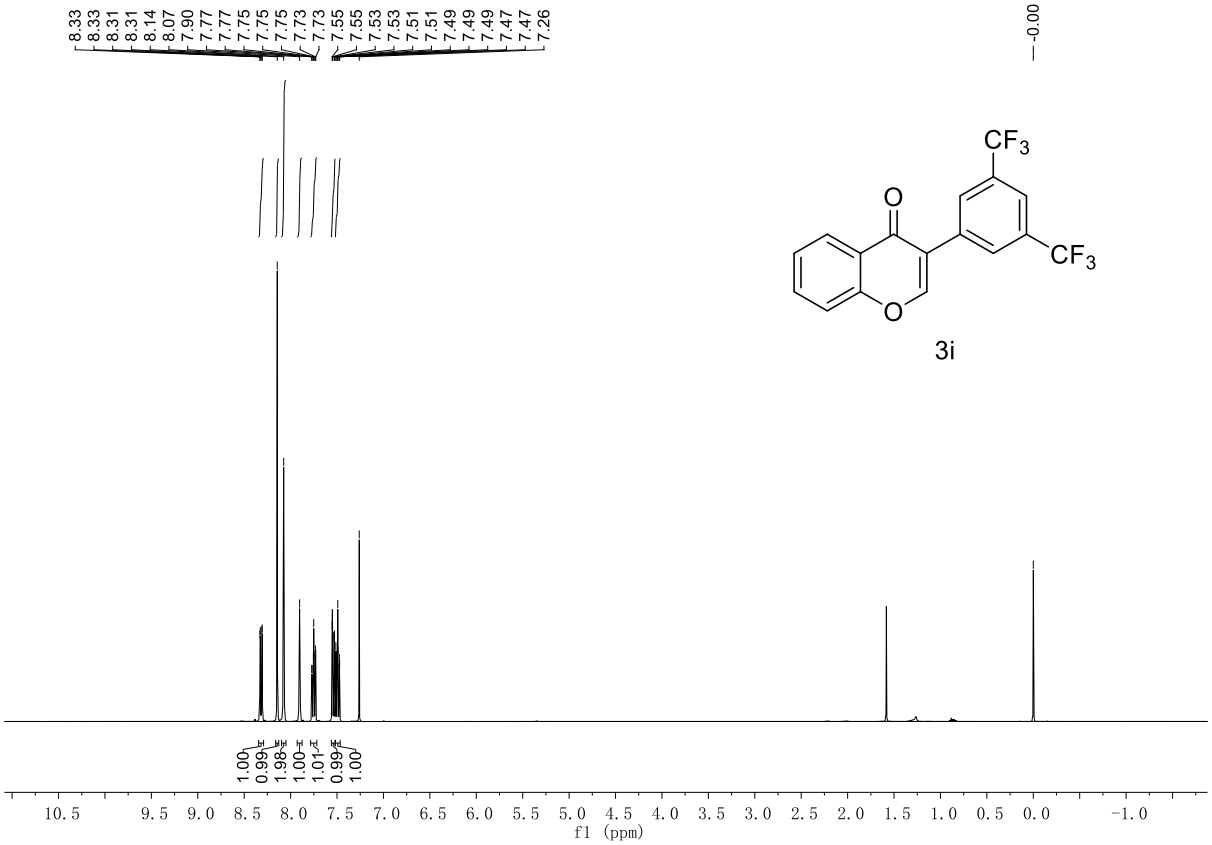


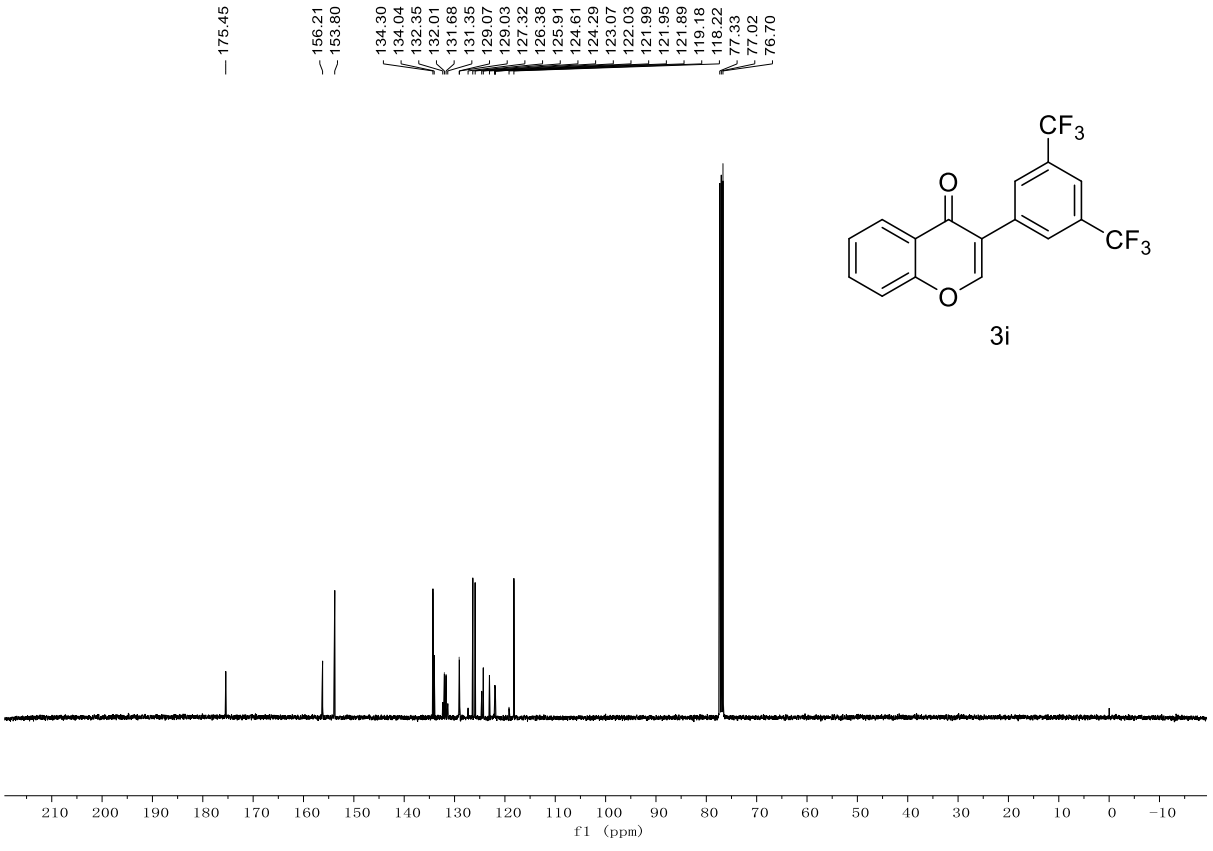
^{1}H and ^{13}C-NMR of 3h



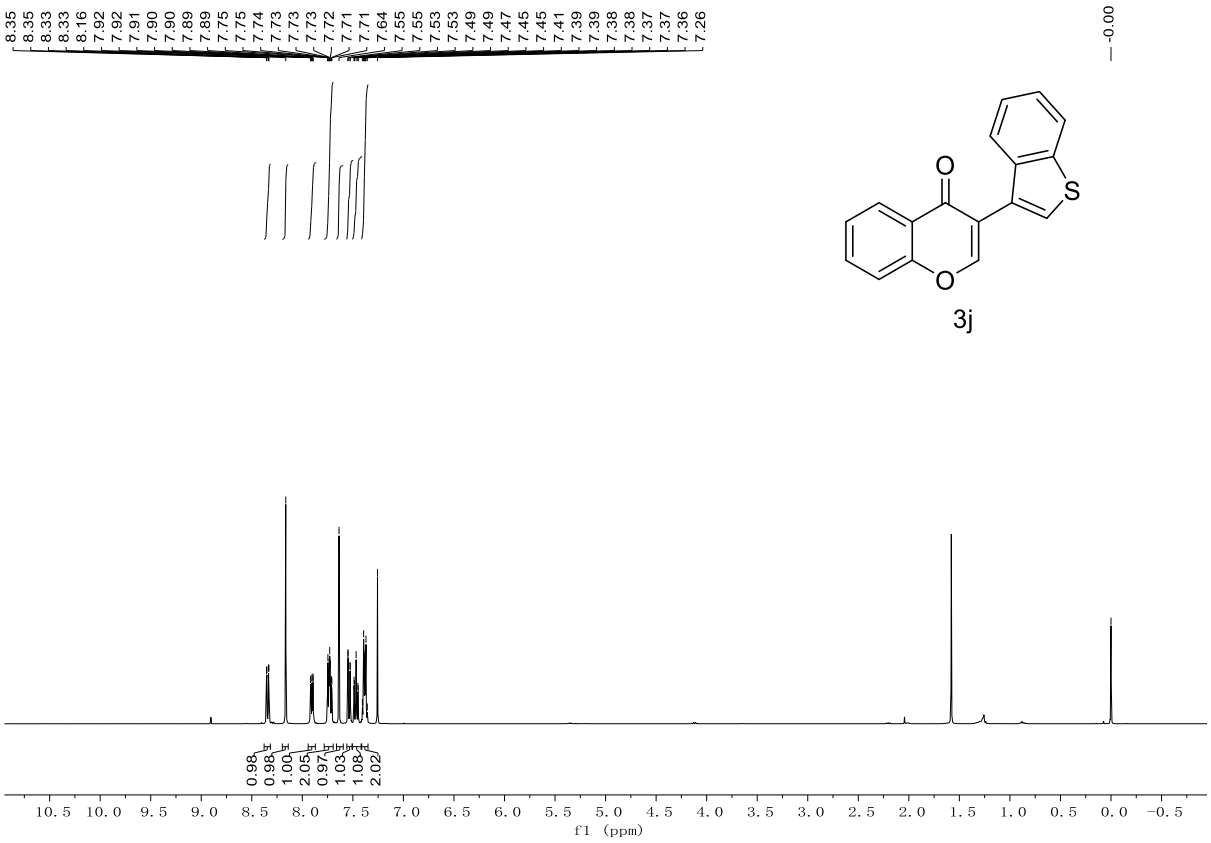


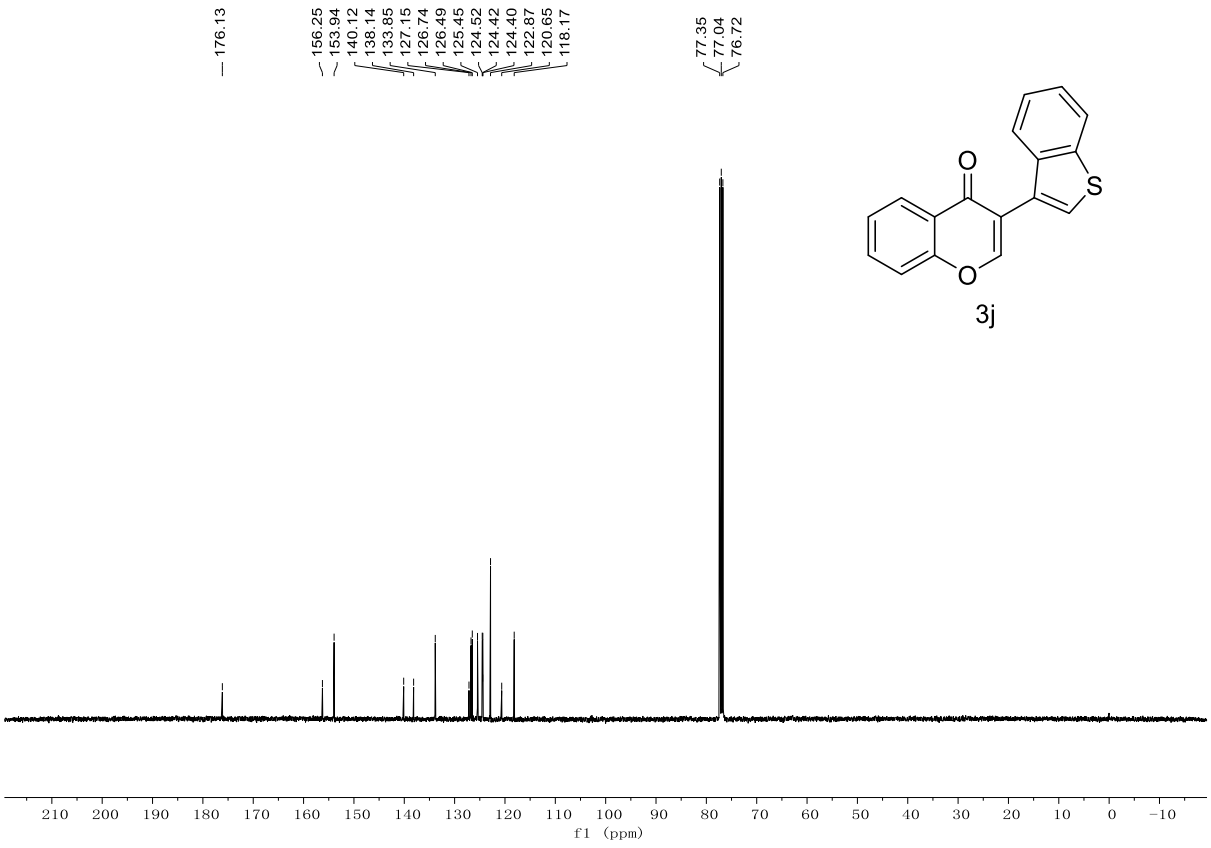
^{1}H and ^{13}C-NMR of 3i



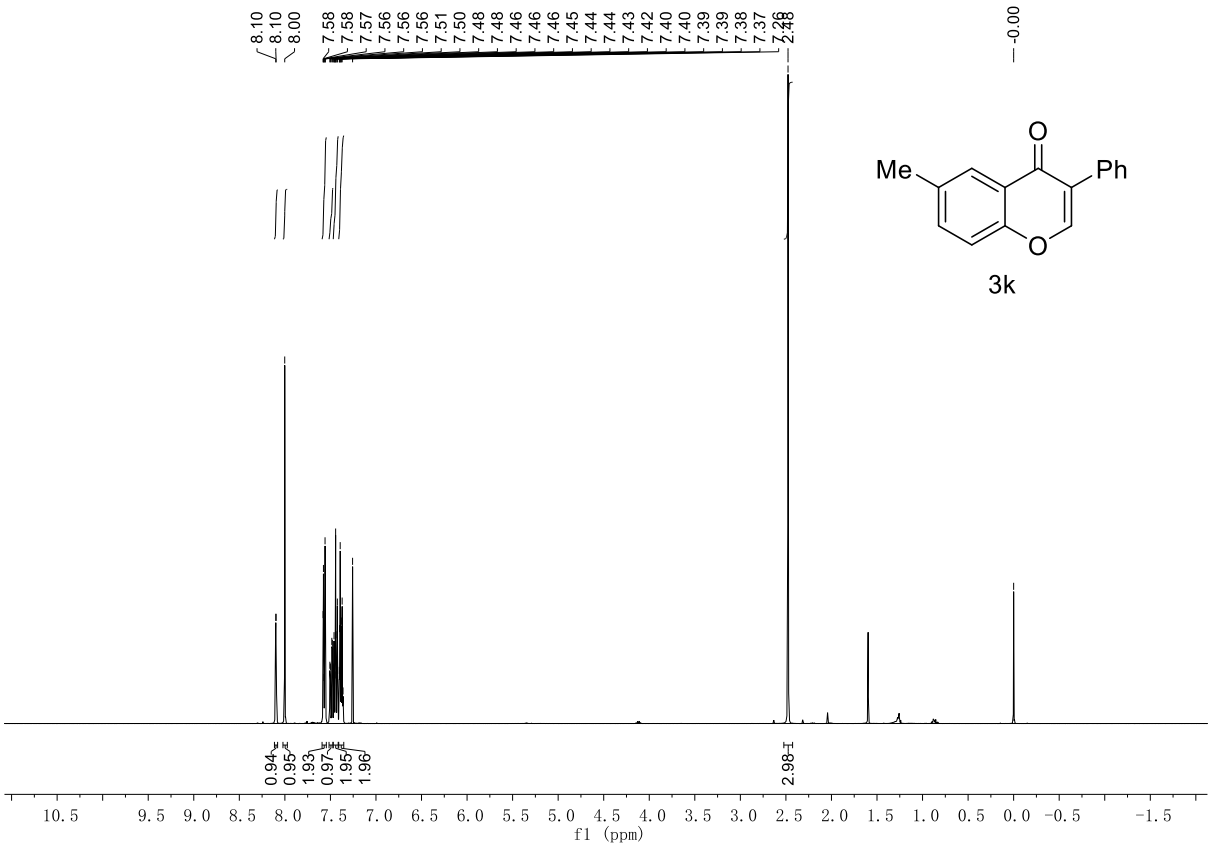


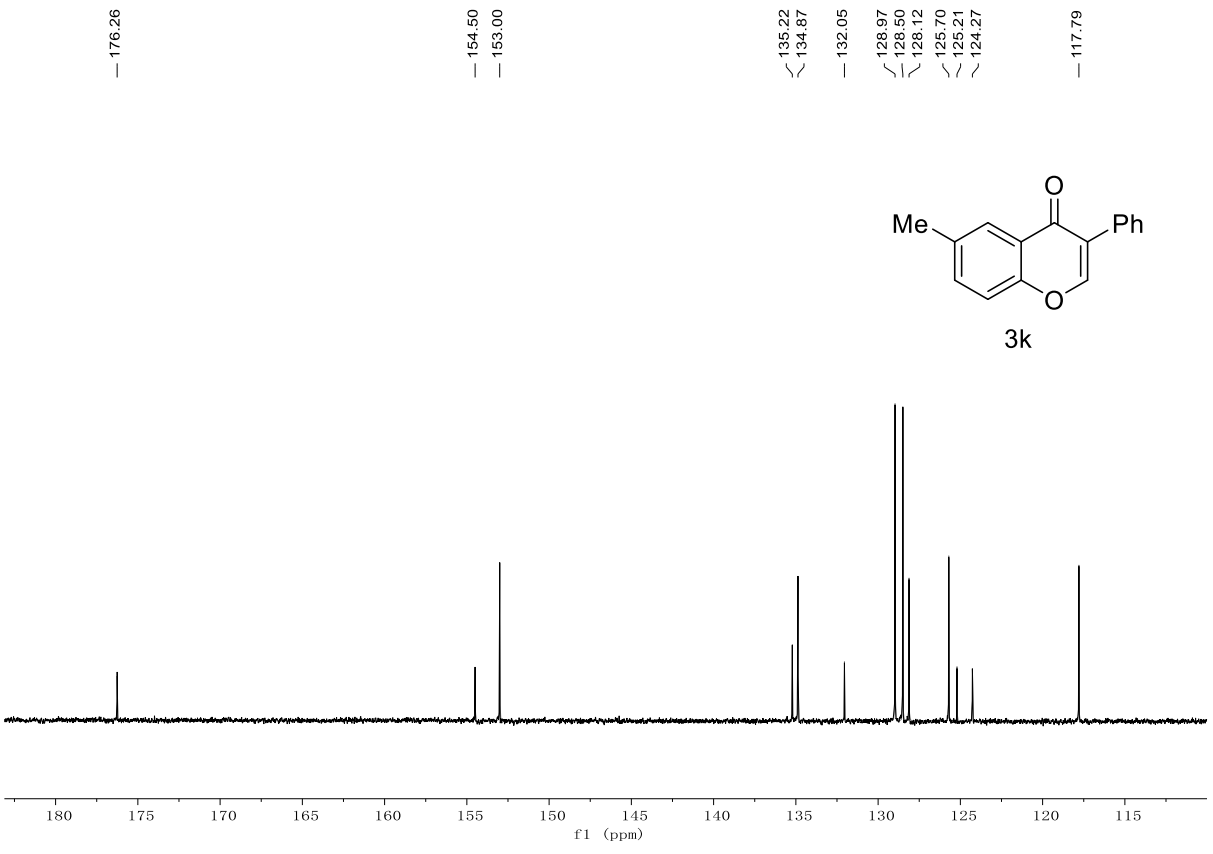
^{1}H and ^{13}C-NMR of 3j



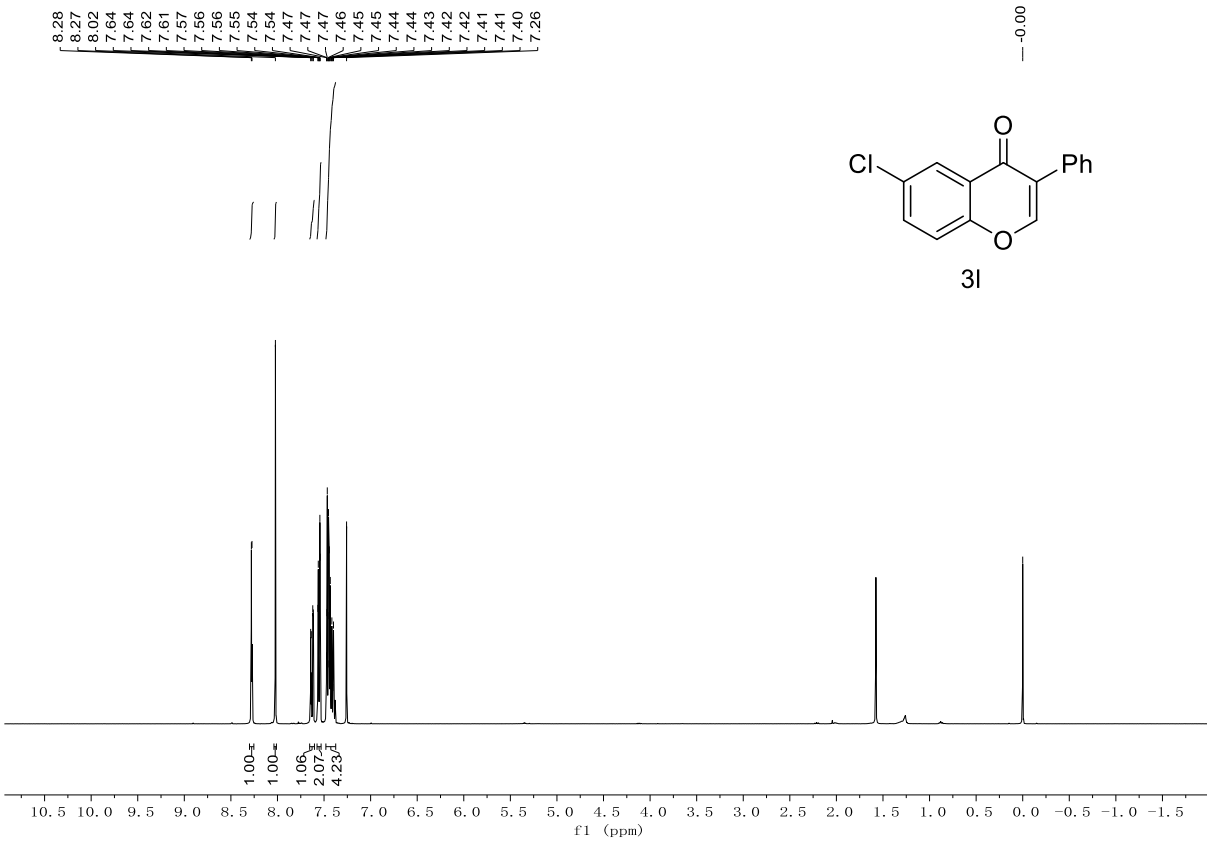


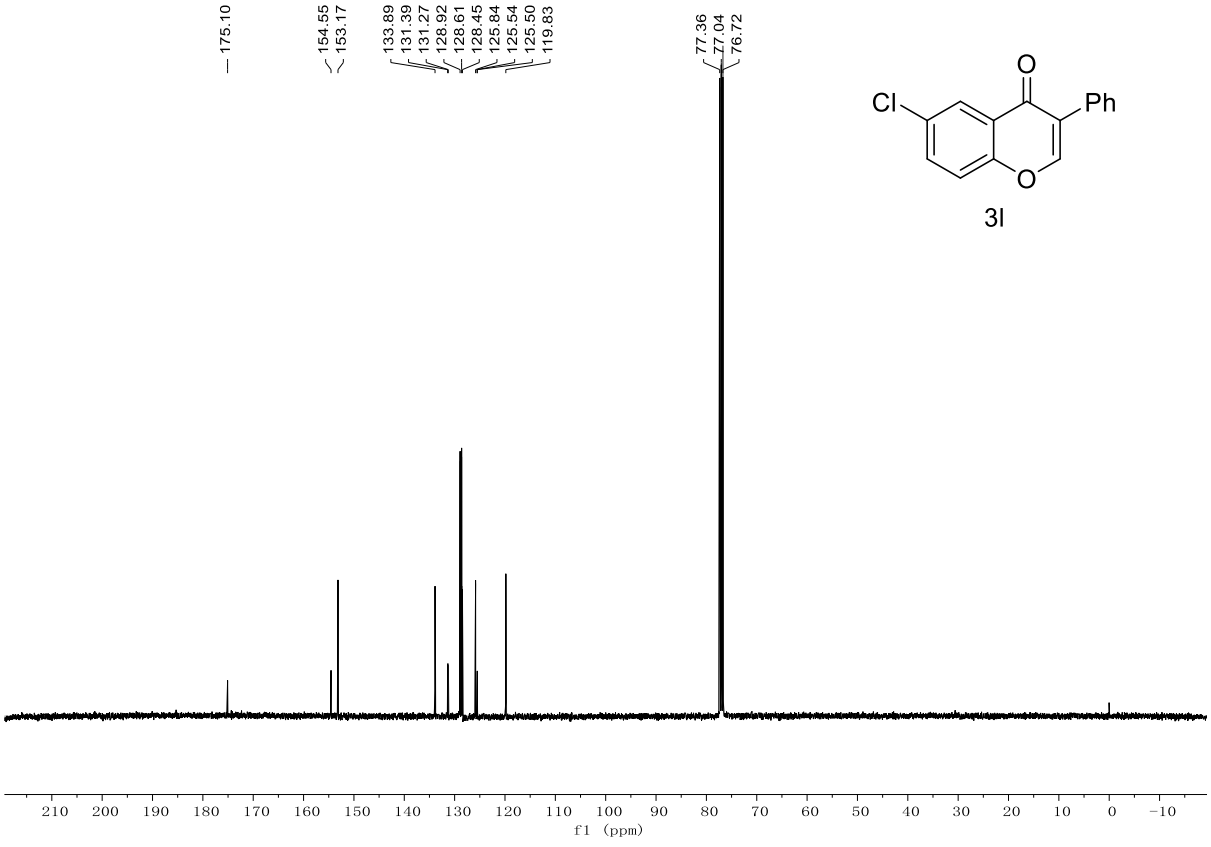
^{1}H and ^{13}C-NMR of 3k



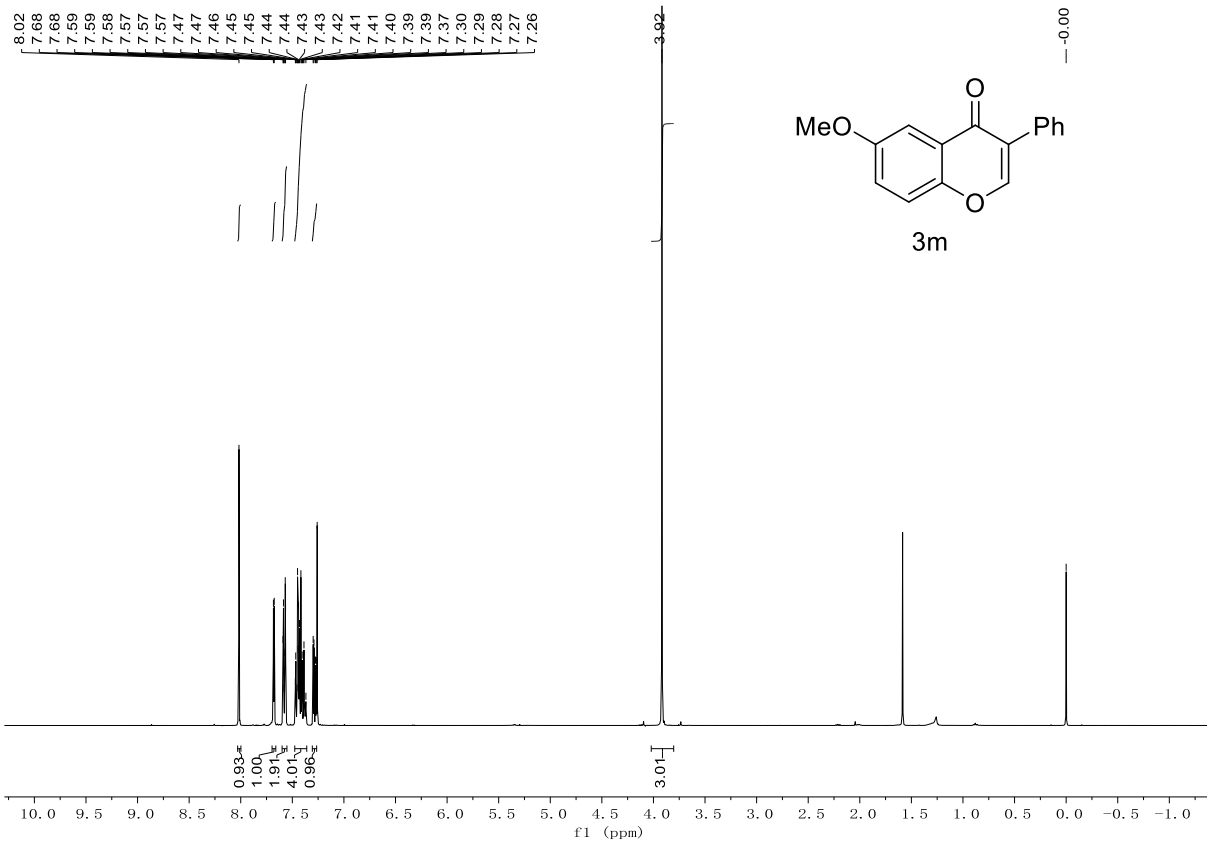


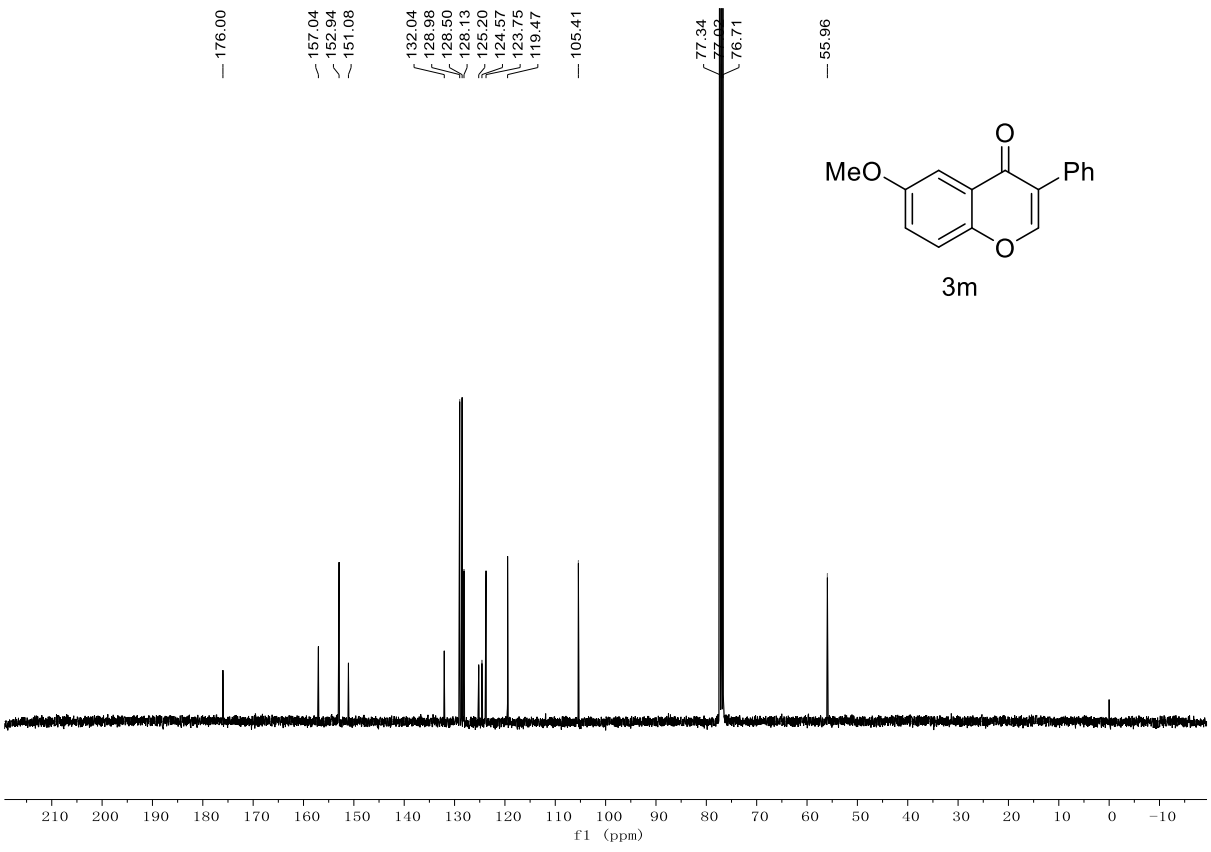
^{1}H and ^{13}C-NMR of 3l



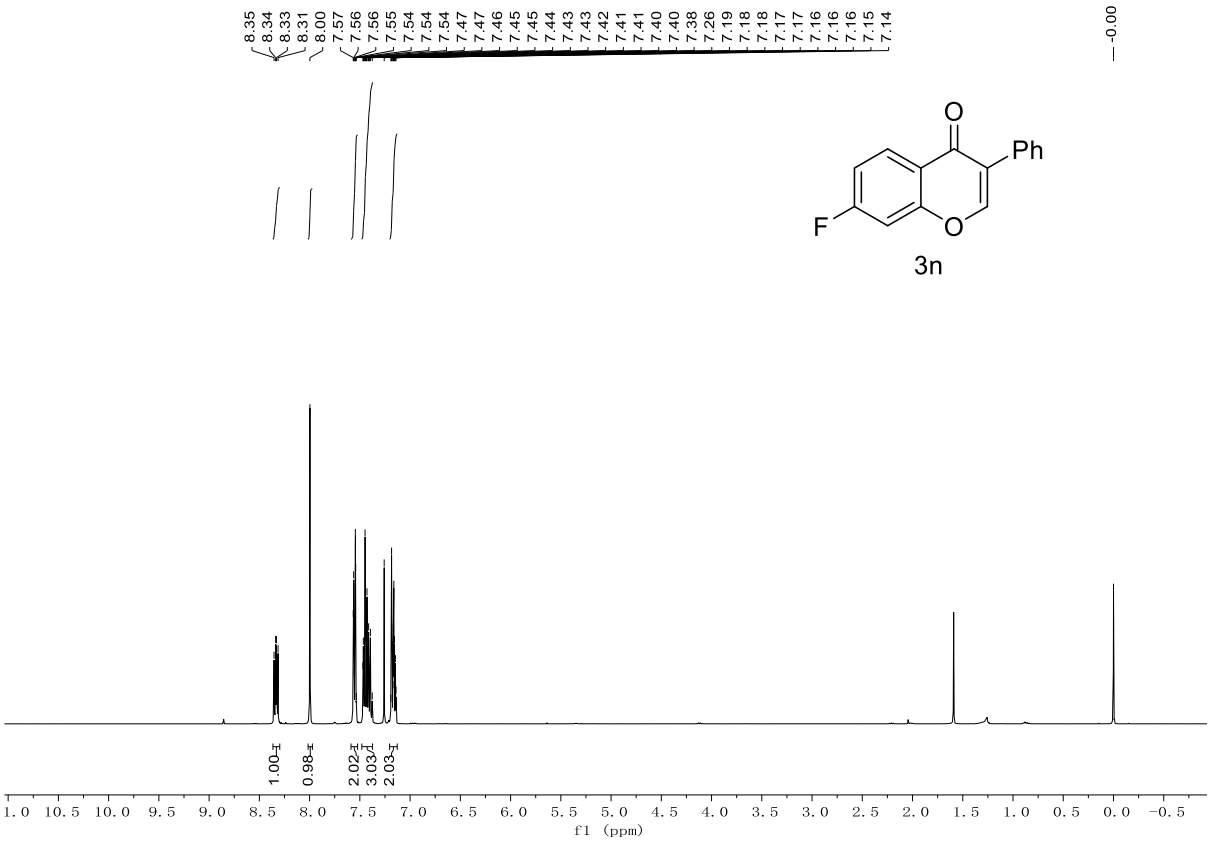


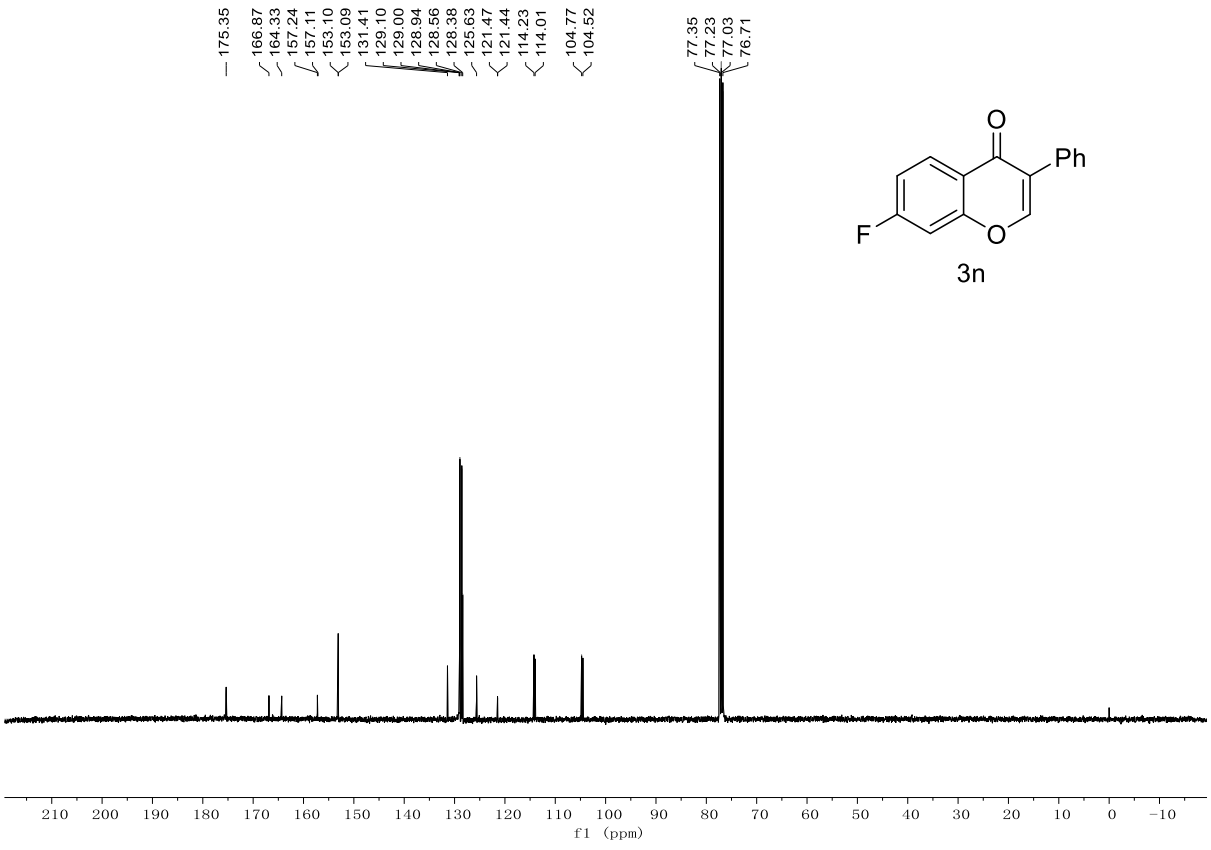
^{1}H and ^{13}C-NMR of 3m



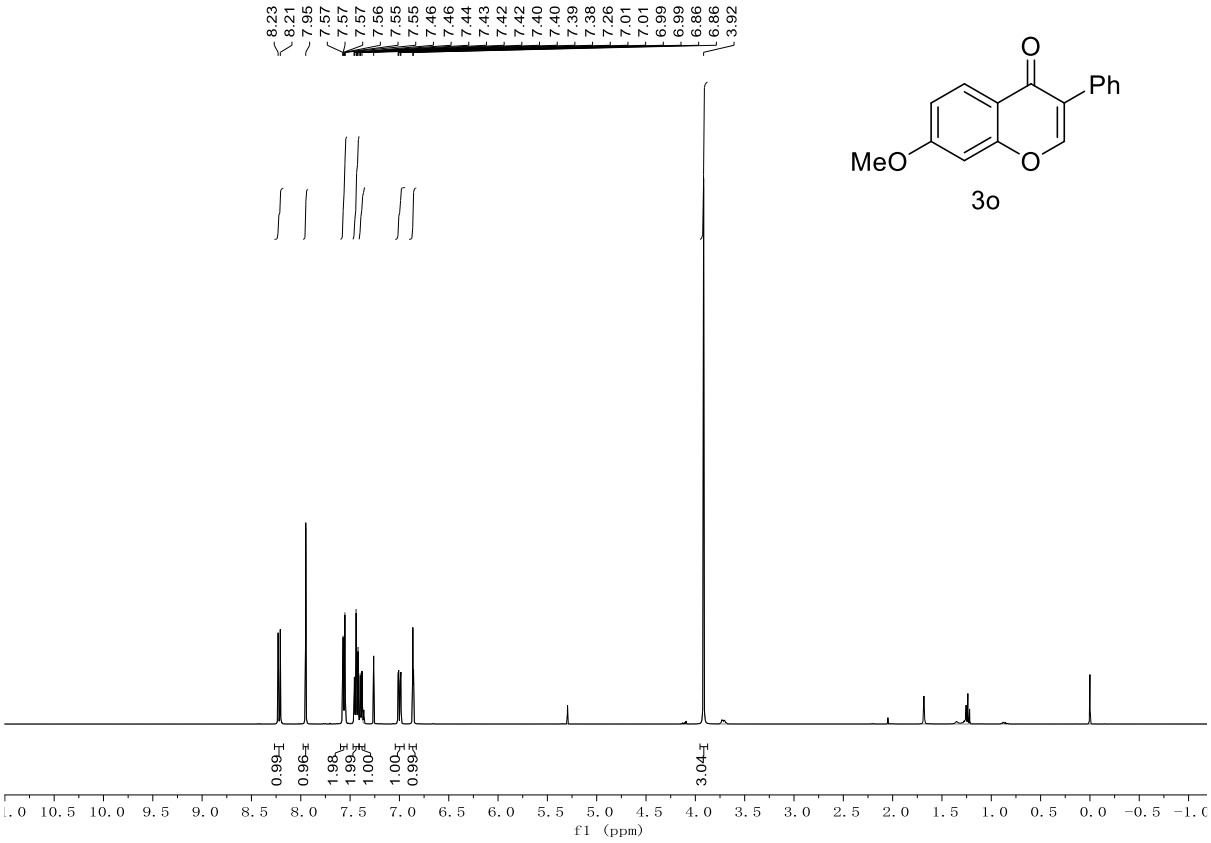


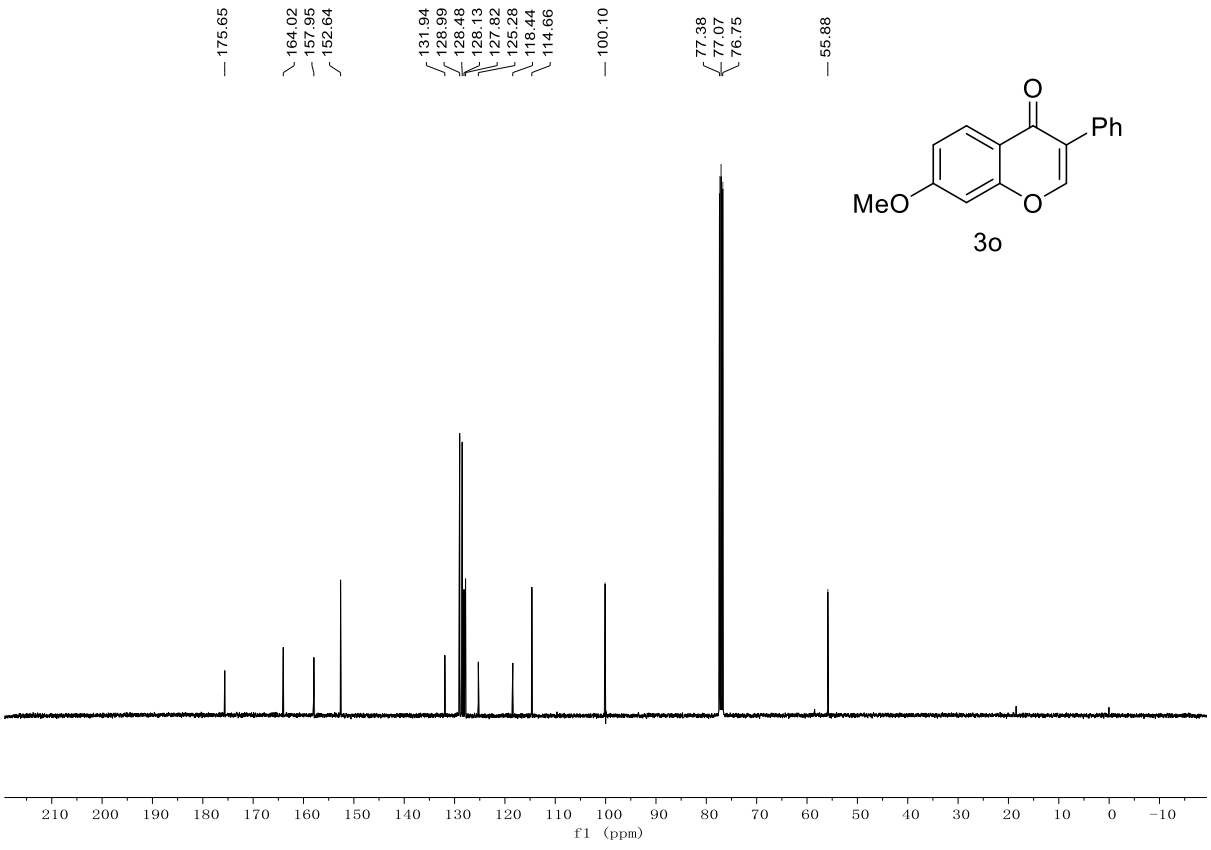
^{1}H and ^{13}C-NMR of 3n



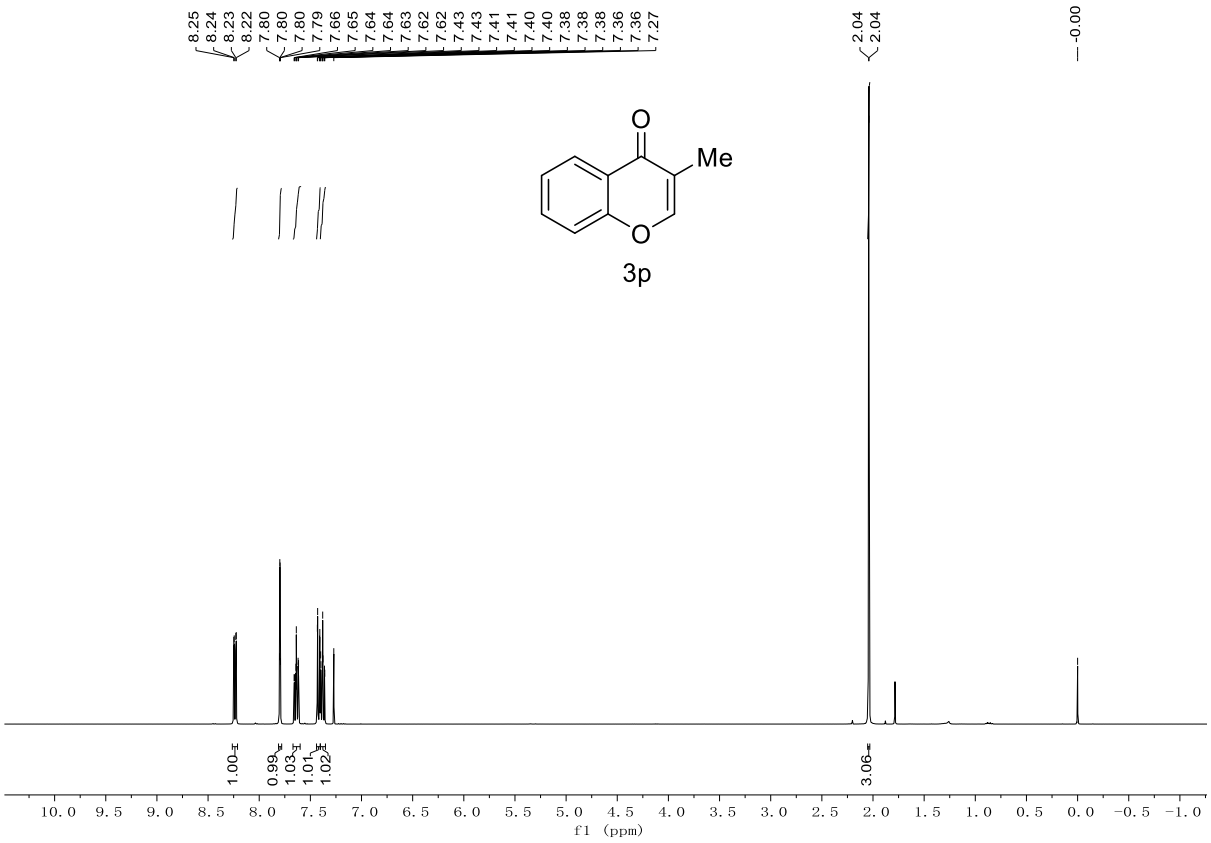


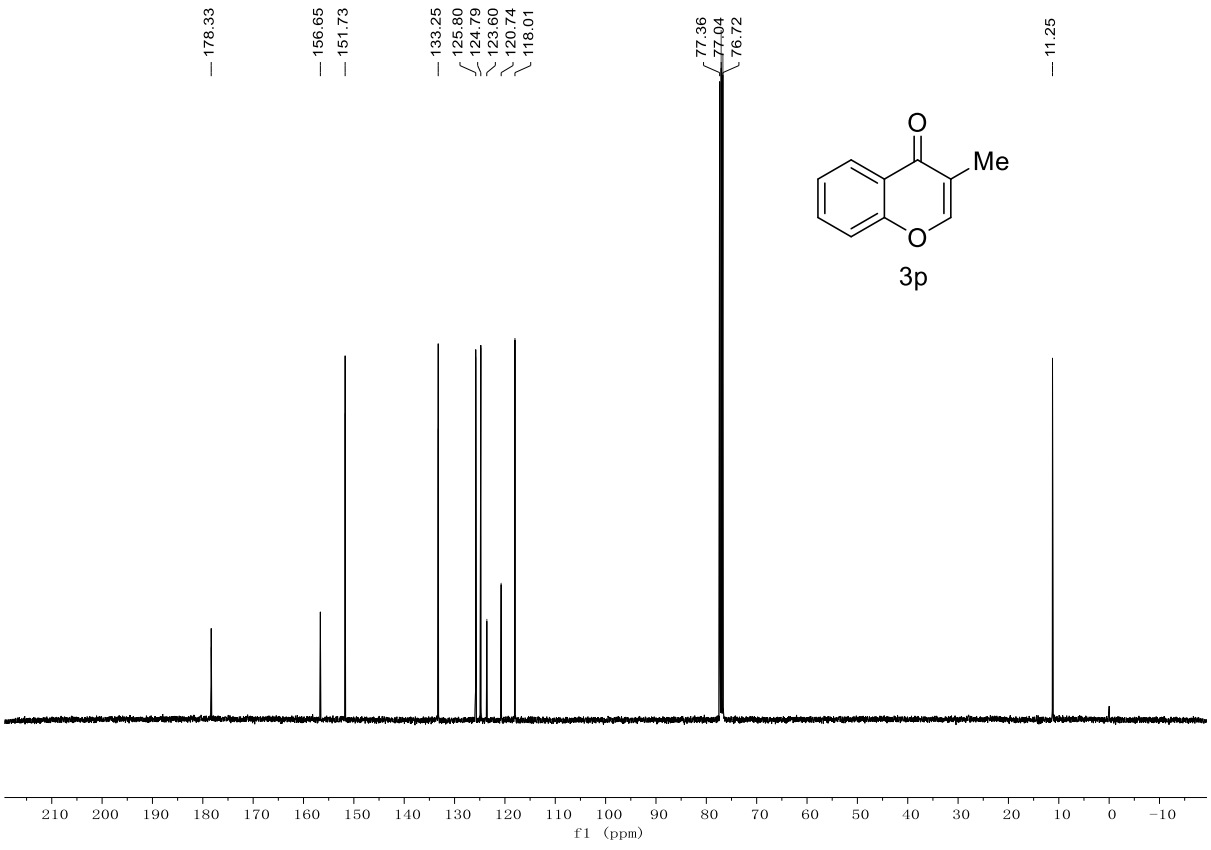
^{1}H and ^{13}C-NMR of 3o



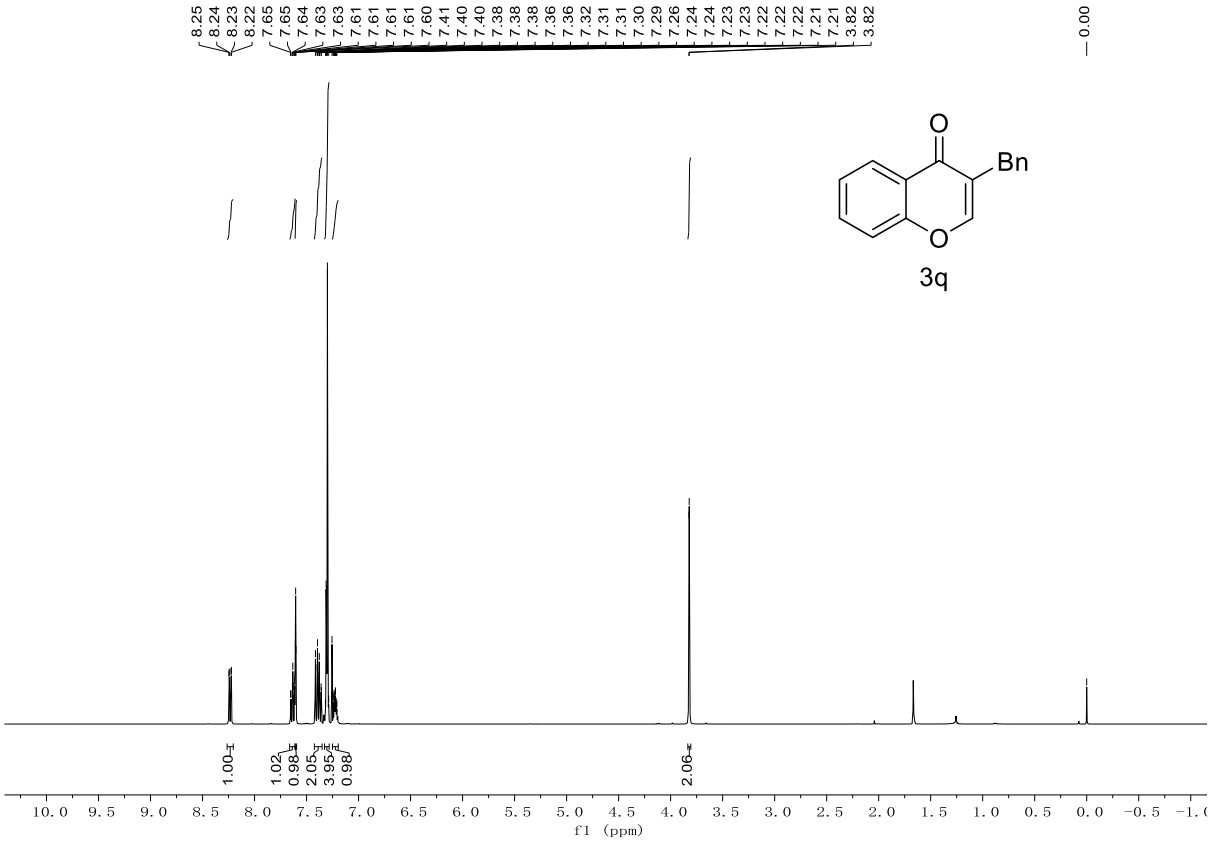


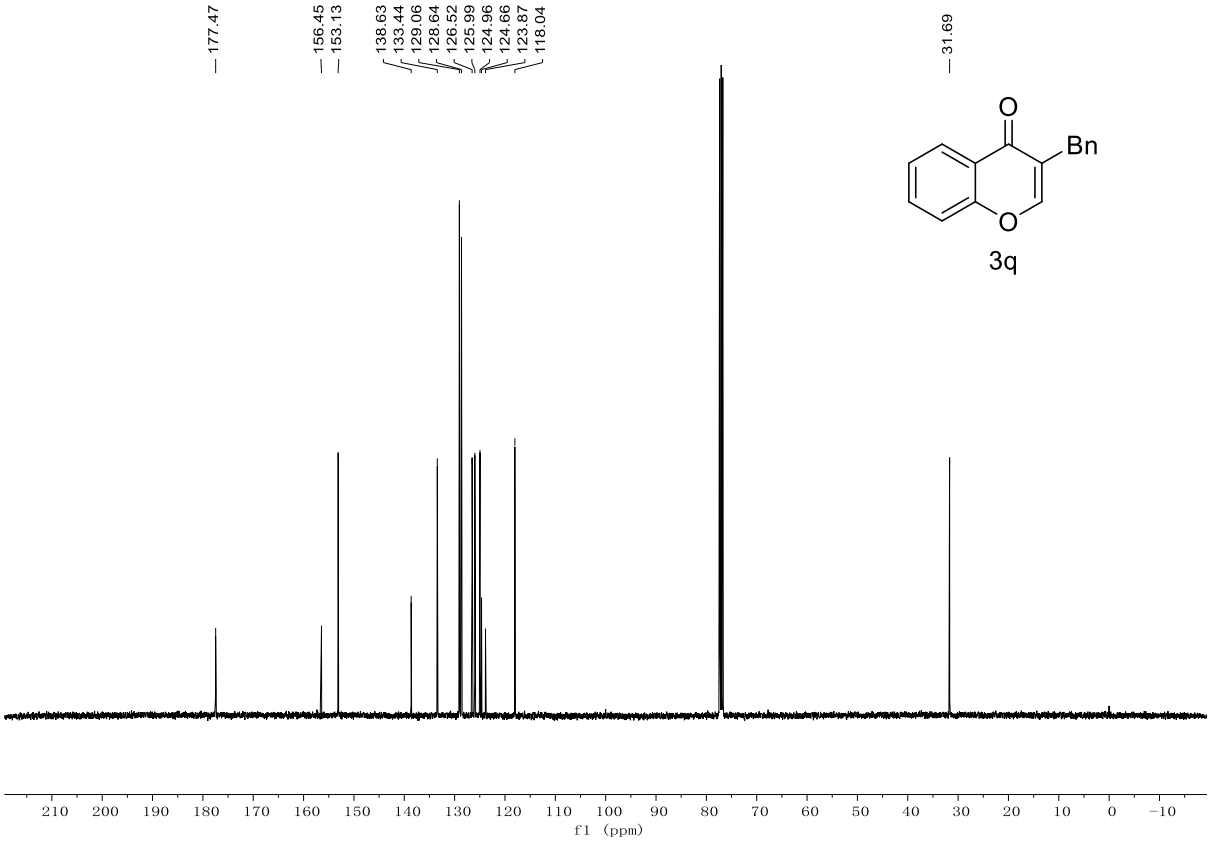
^{1}H and ^{13}C-NMR of 3p



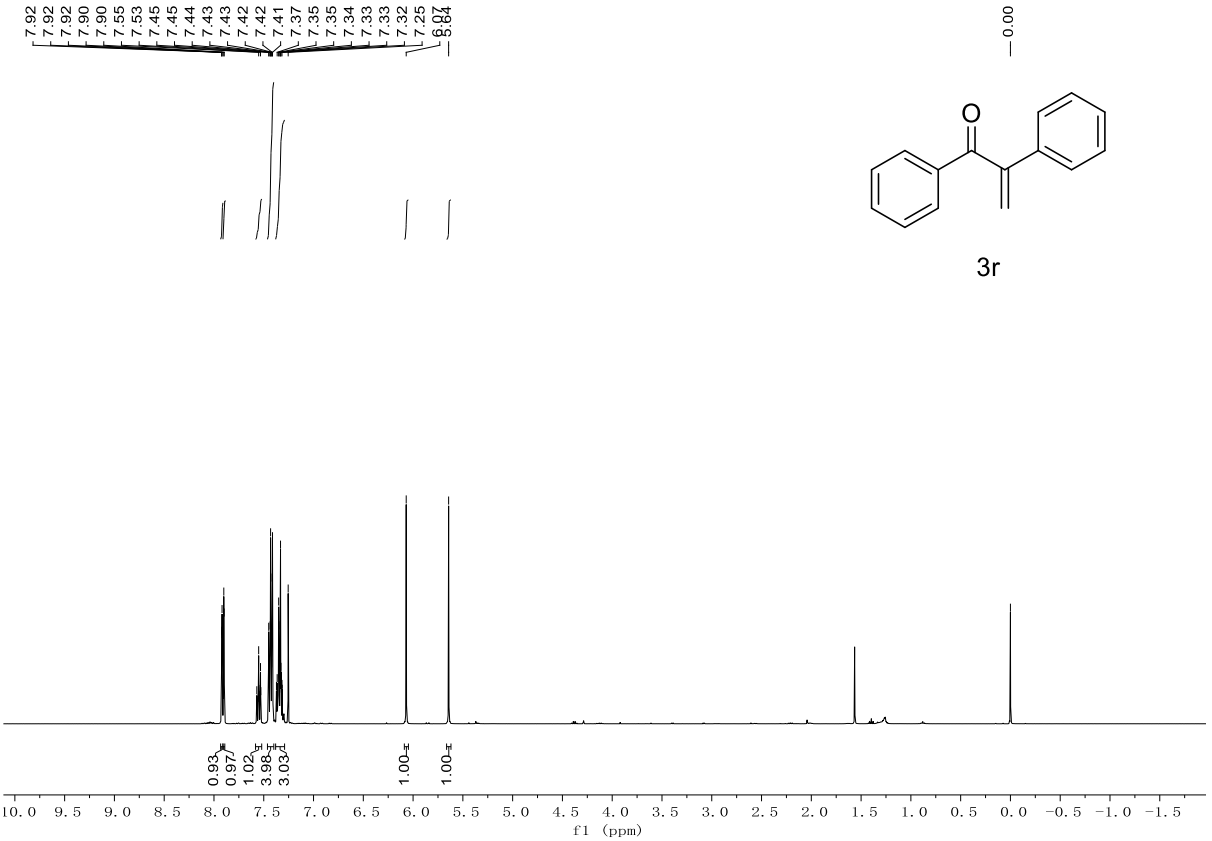


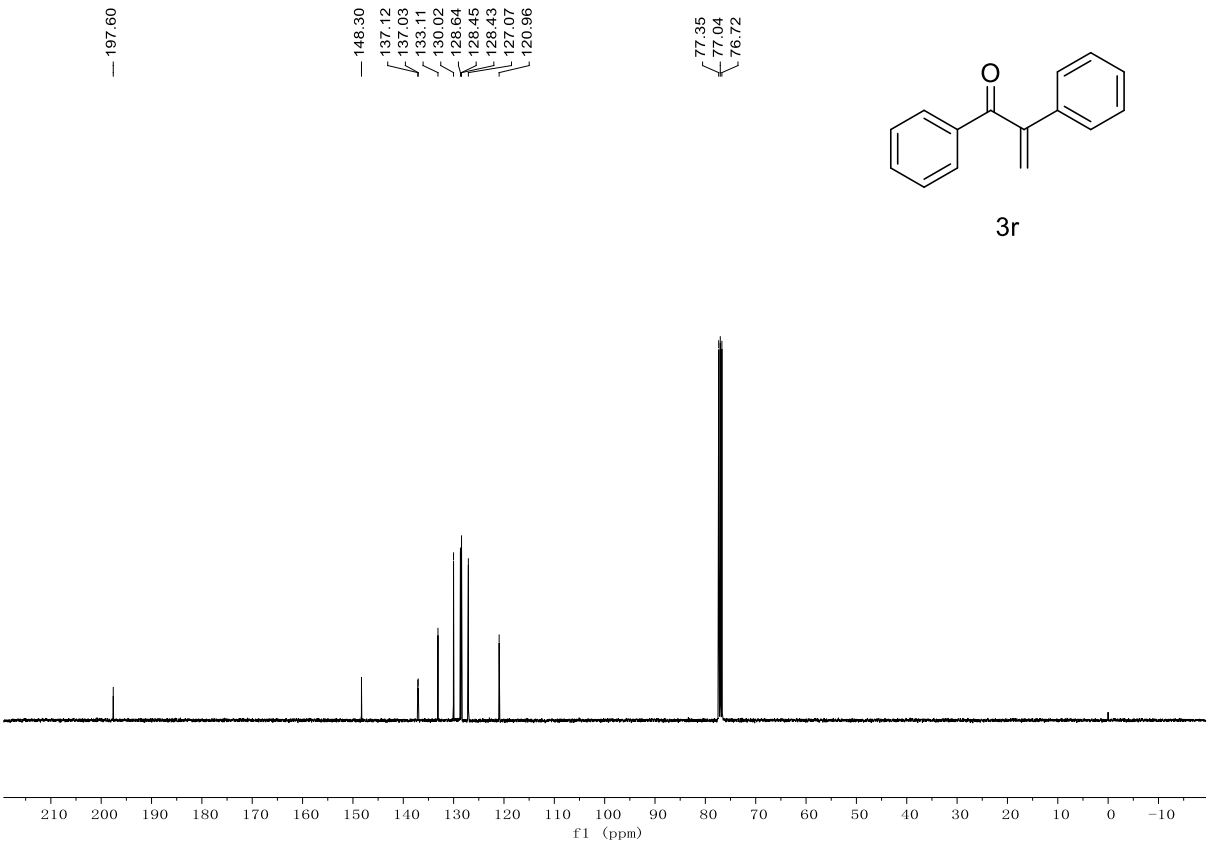
^{1}H and ^{13}C-NMR of 3q



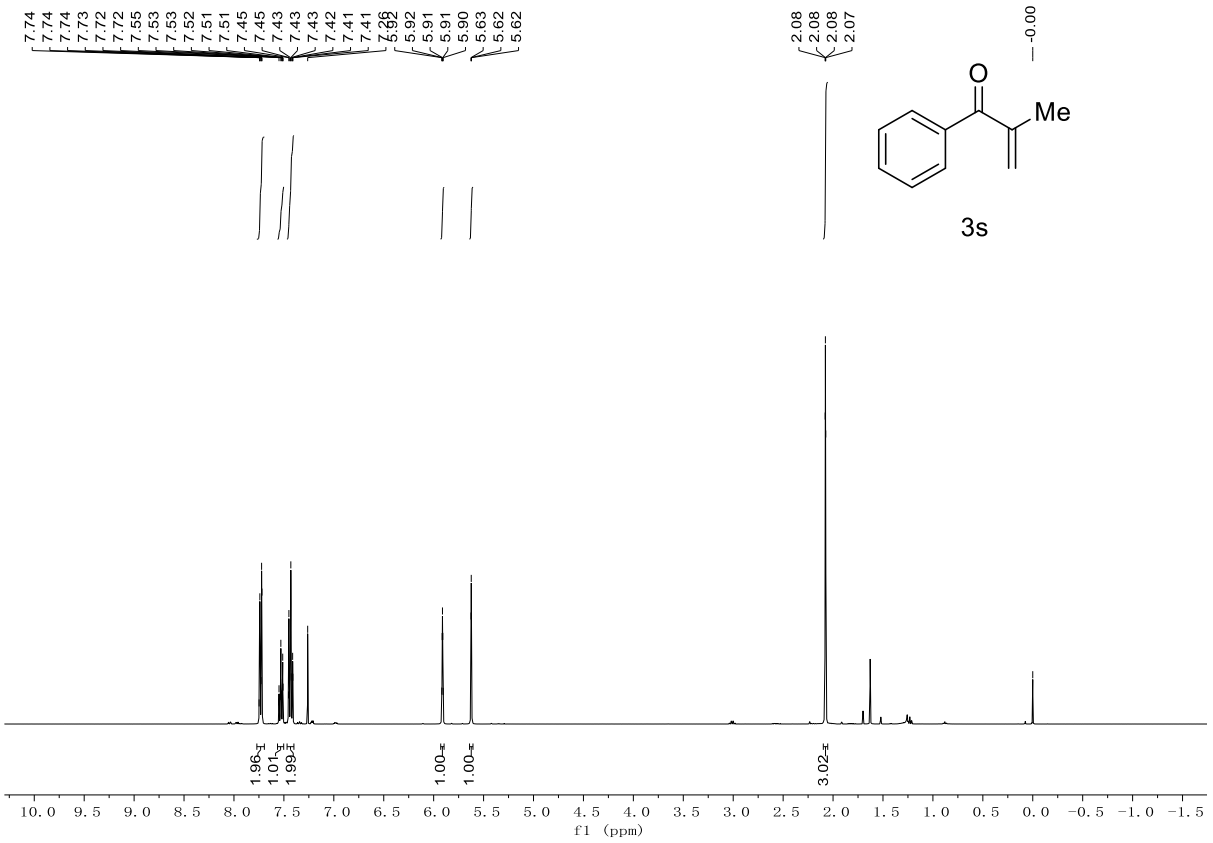


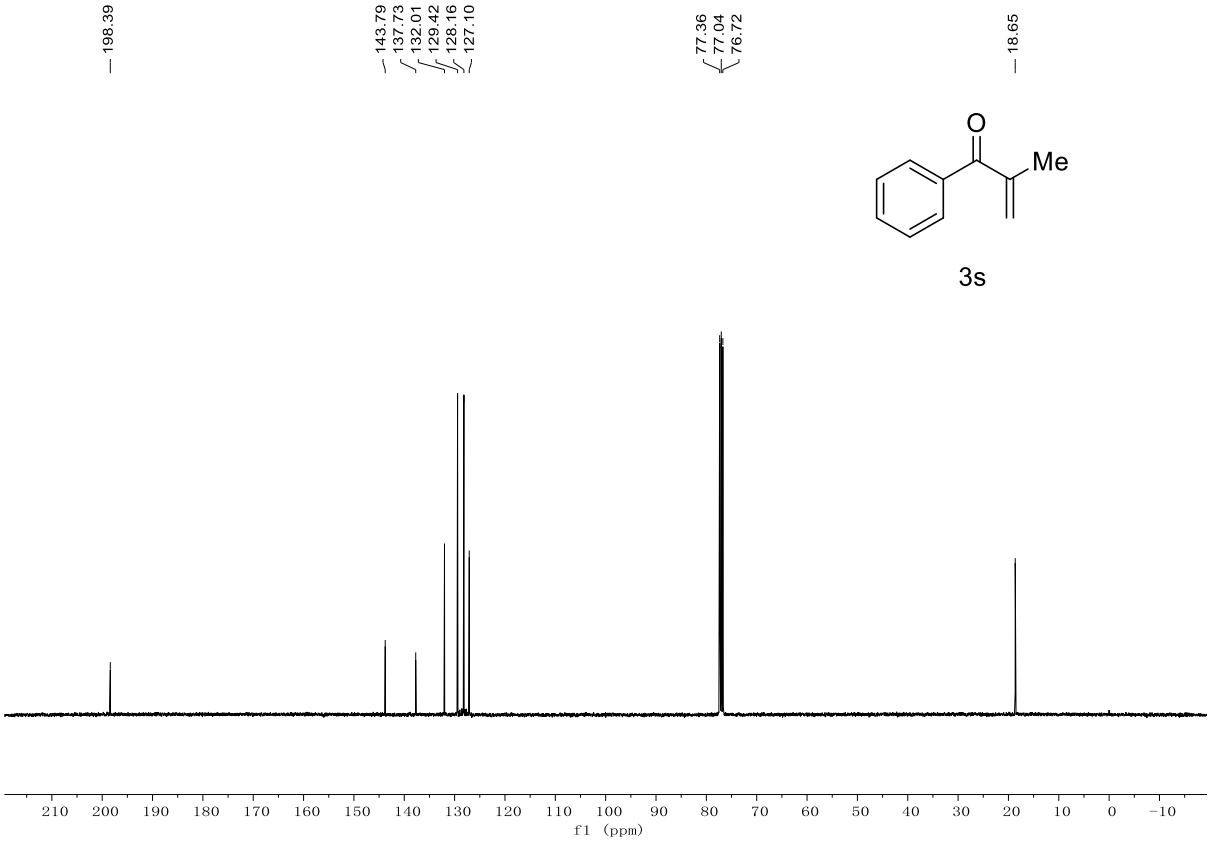
^{1}H and ^{13}C-NMR of 3r



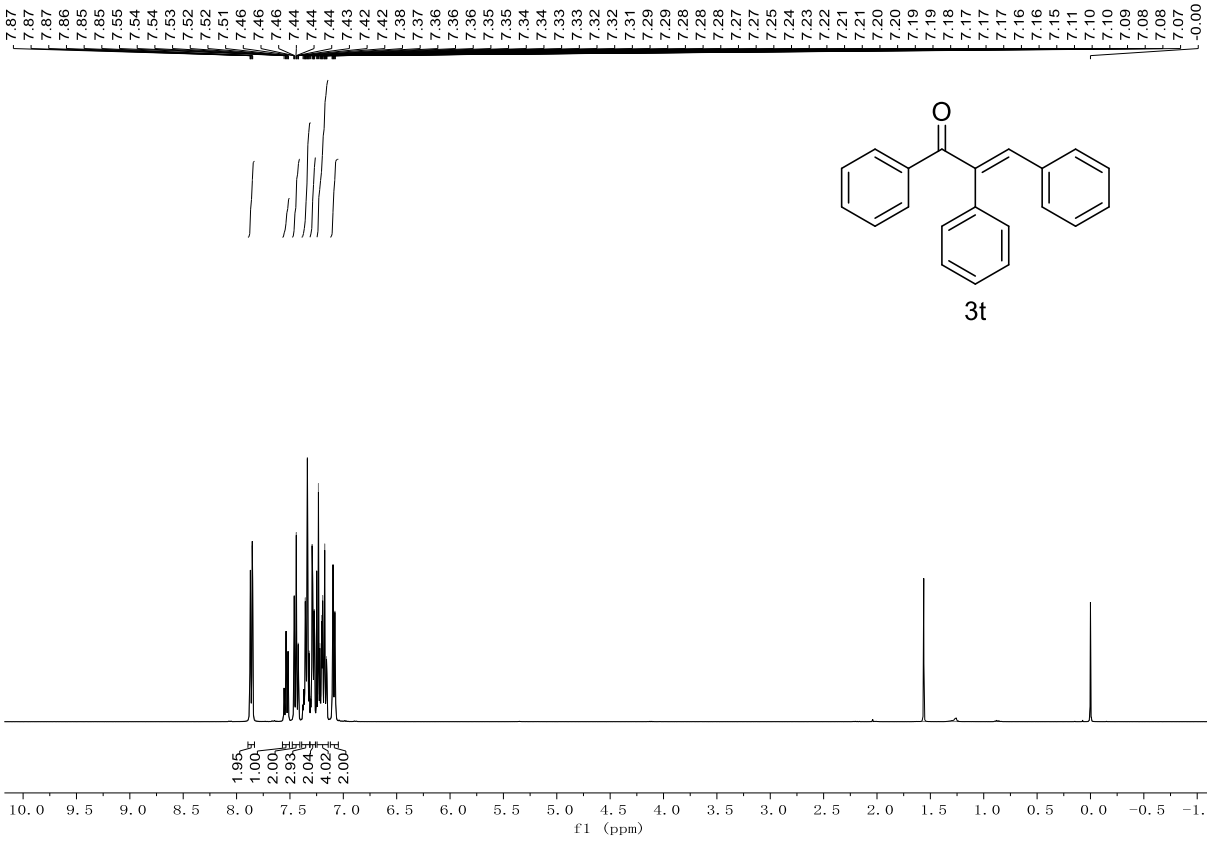


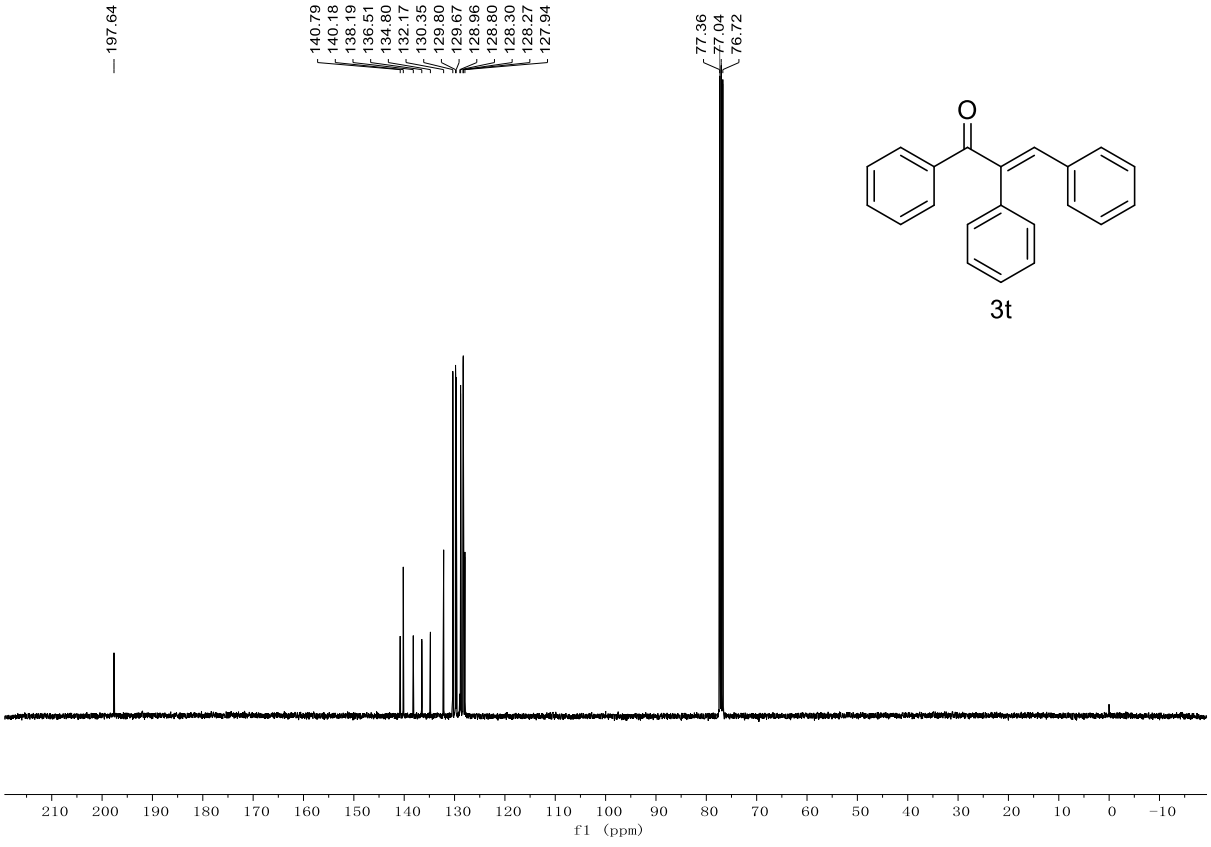
^{1}H and ^{13}C-NMR of 3s



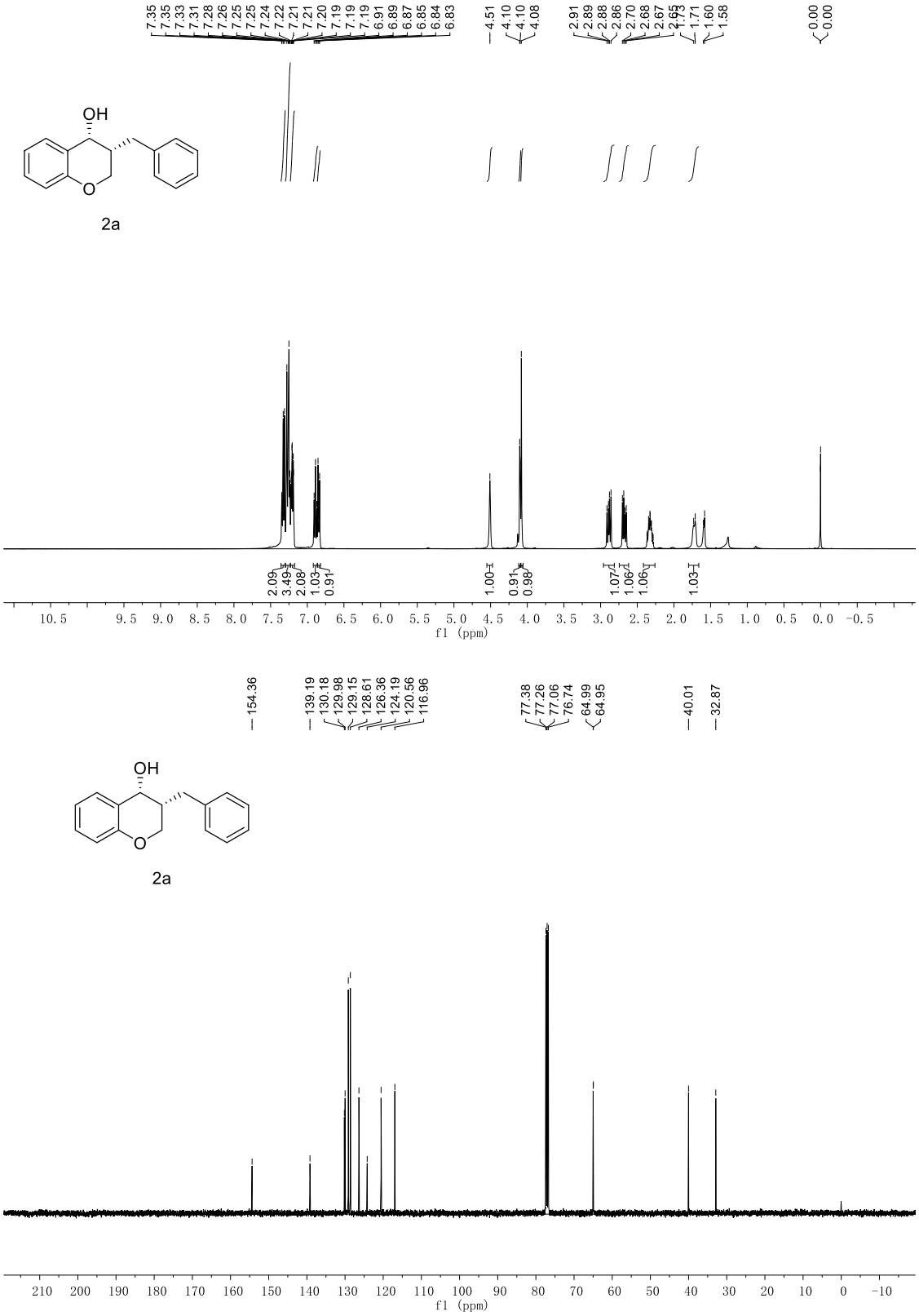


^{1}H and ^{13}C-NMR of 3t

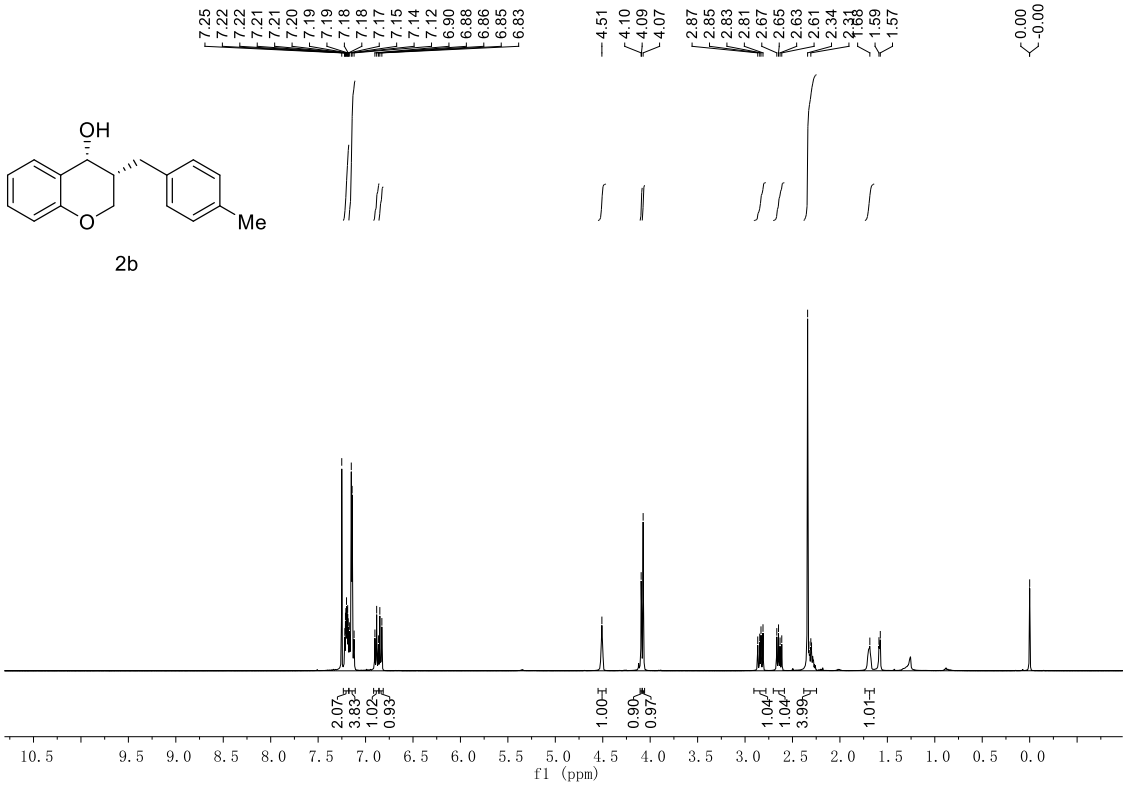


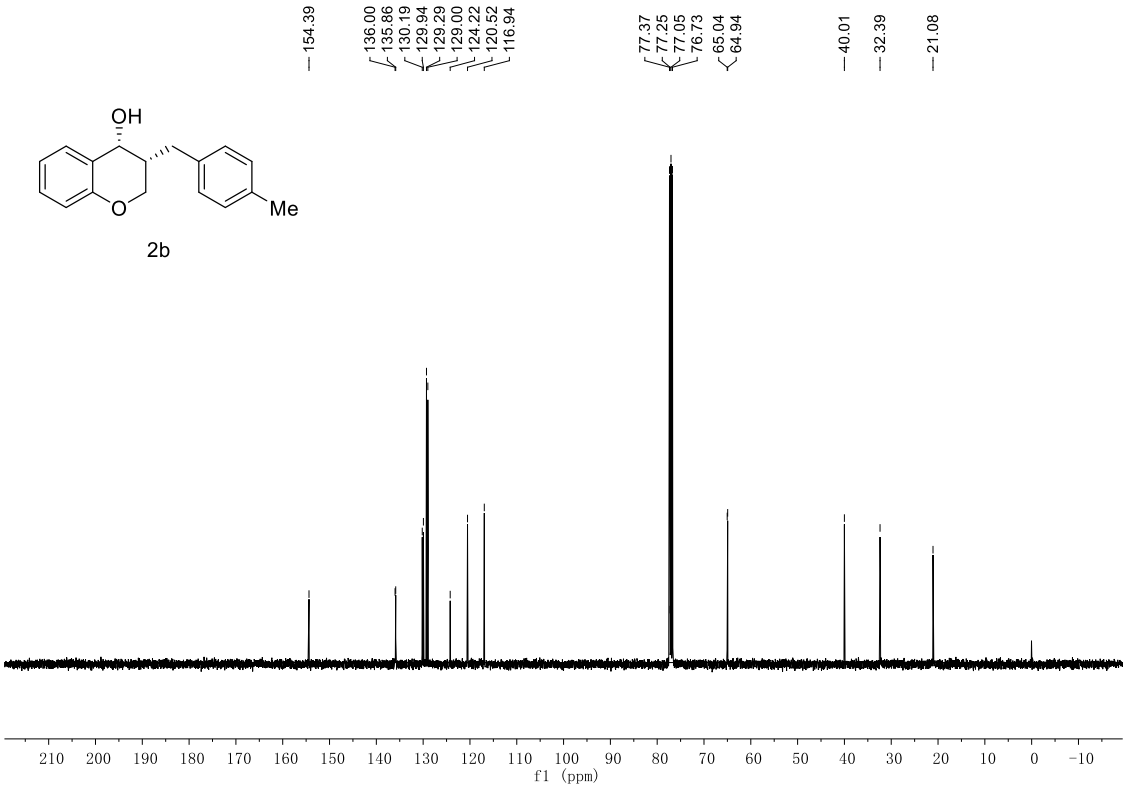


^{1}H and ^{13}C-NMR of 2a

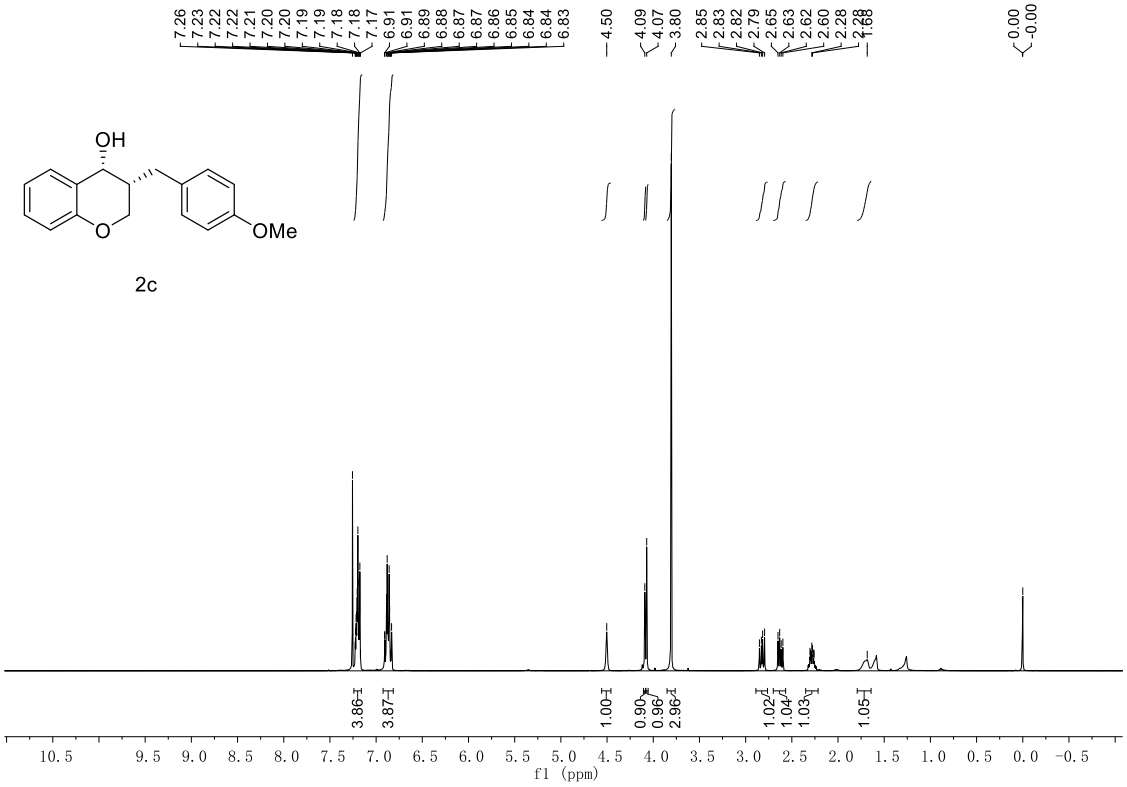


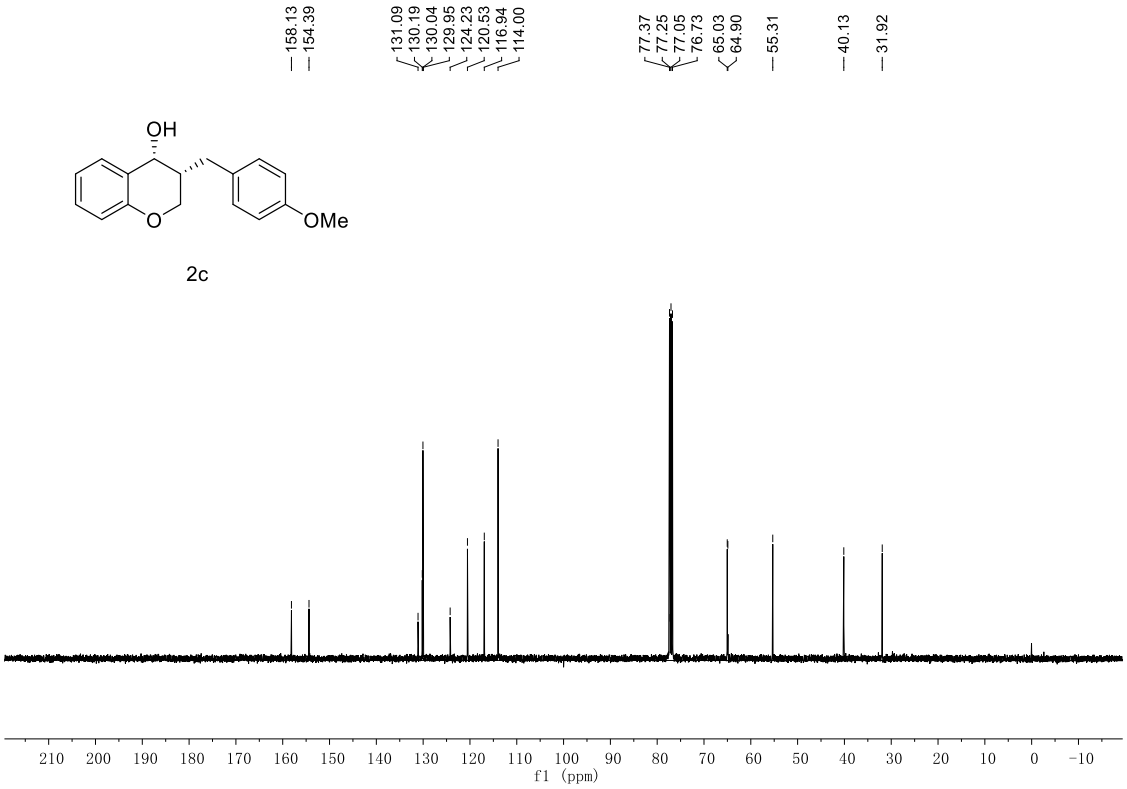
^{1}H and ^{13}C-NMR of 2b



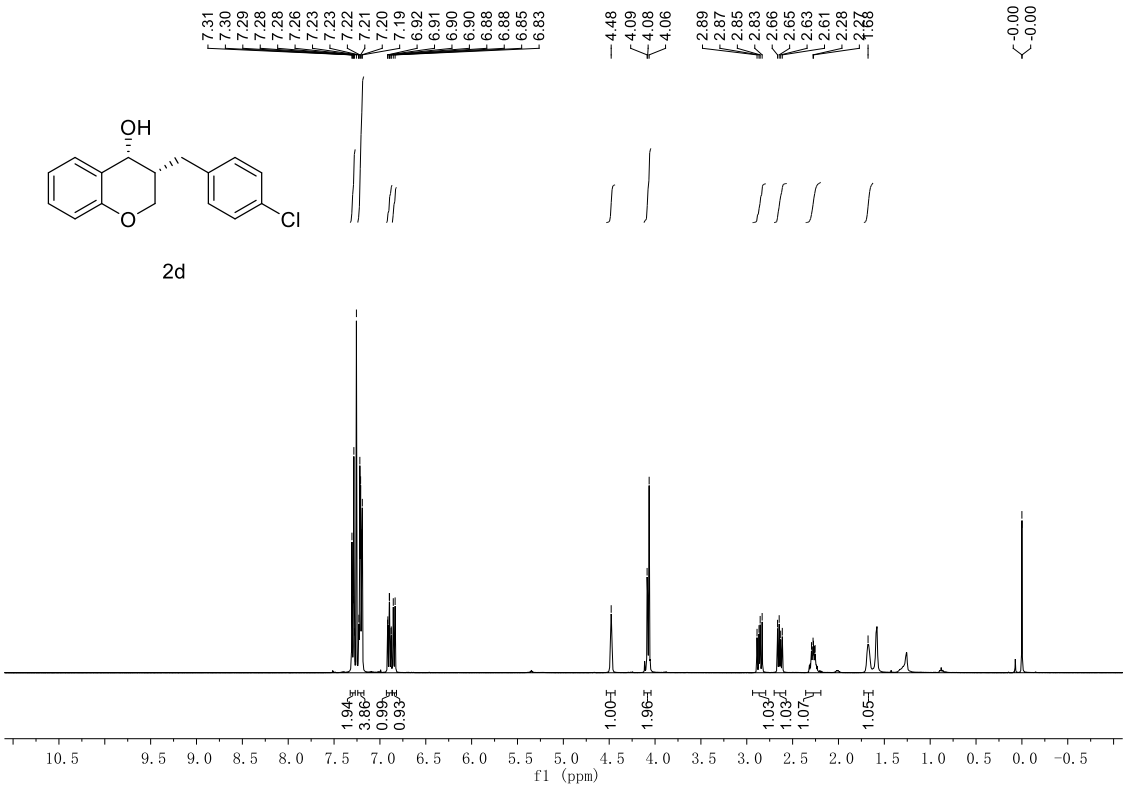


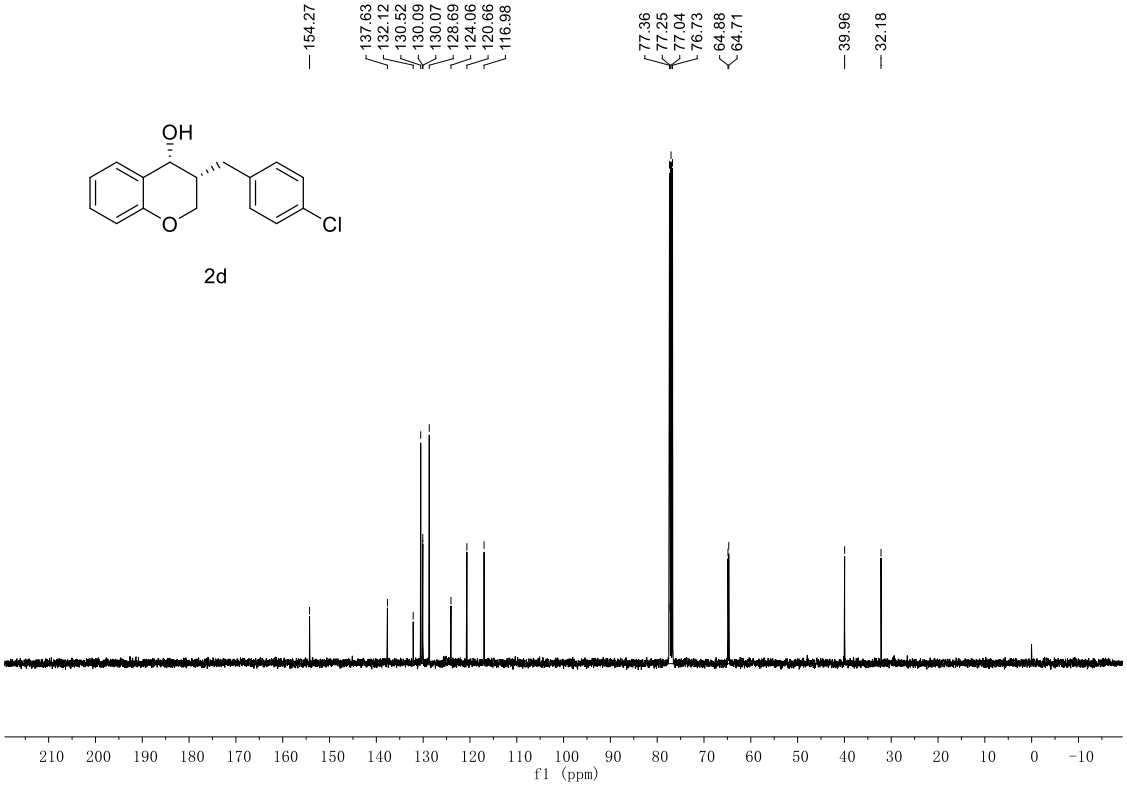
^{1}H and ^{13}C-NMR of 2c



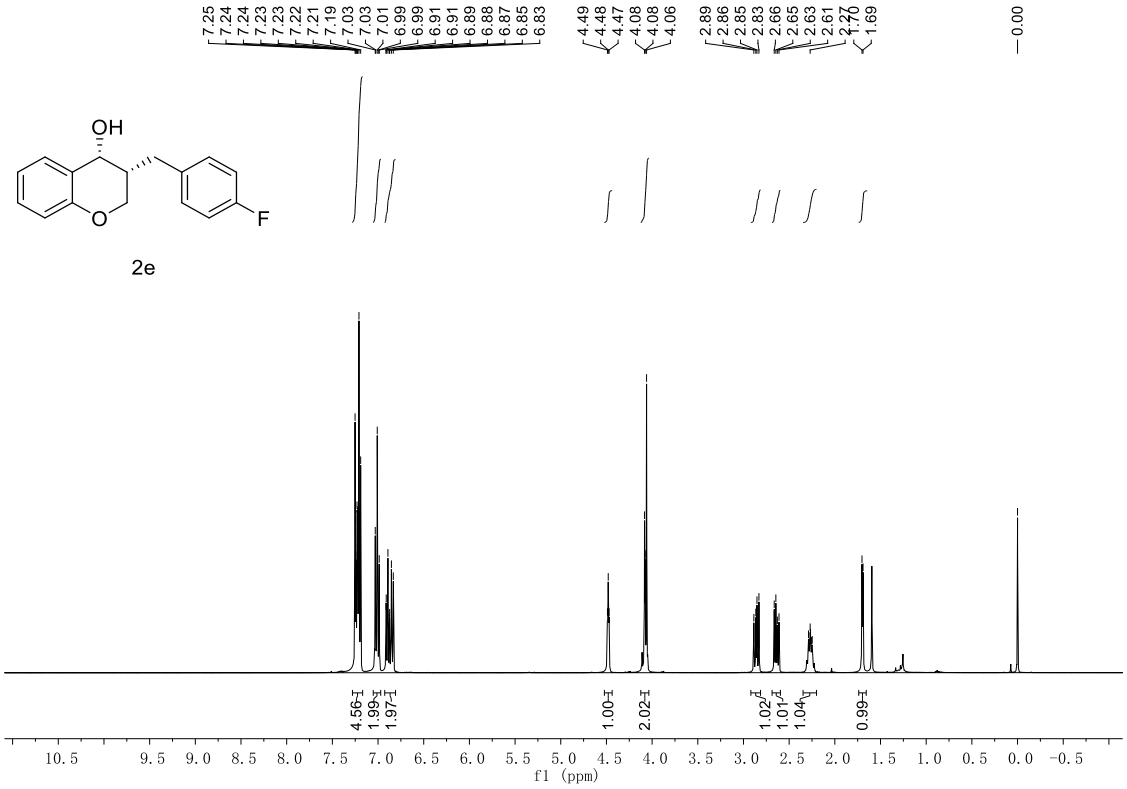


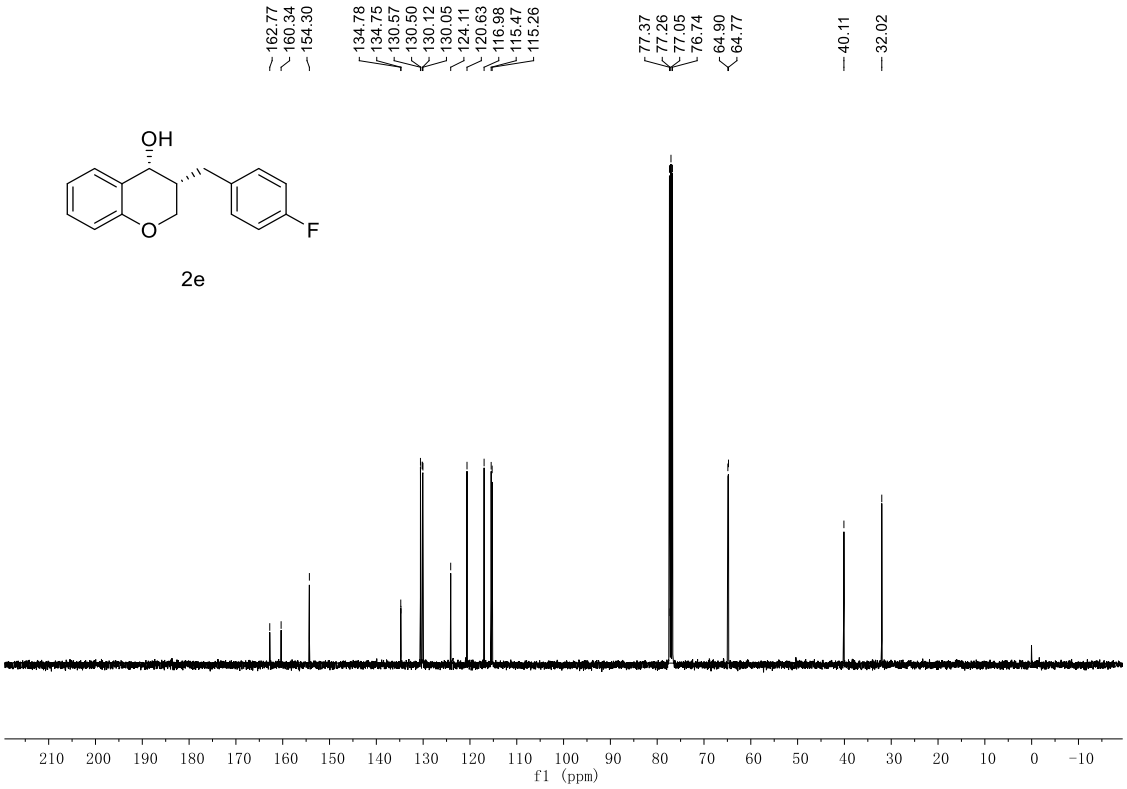
^{1}H and ^{13}C-NMR of 2d



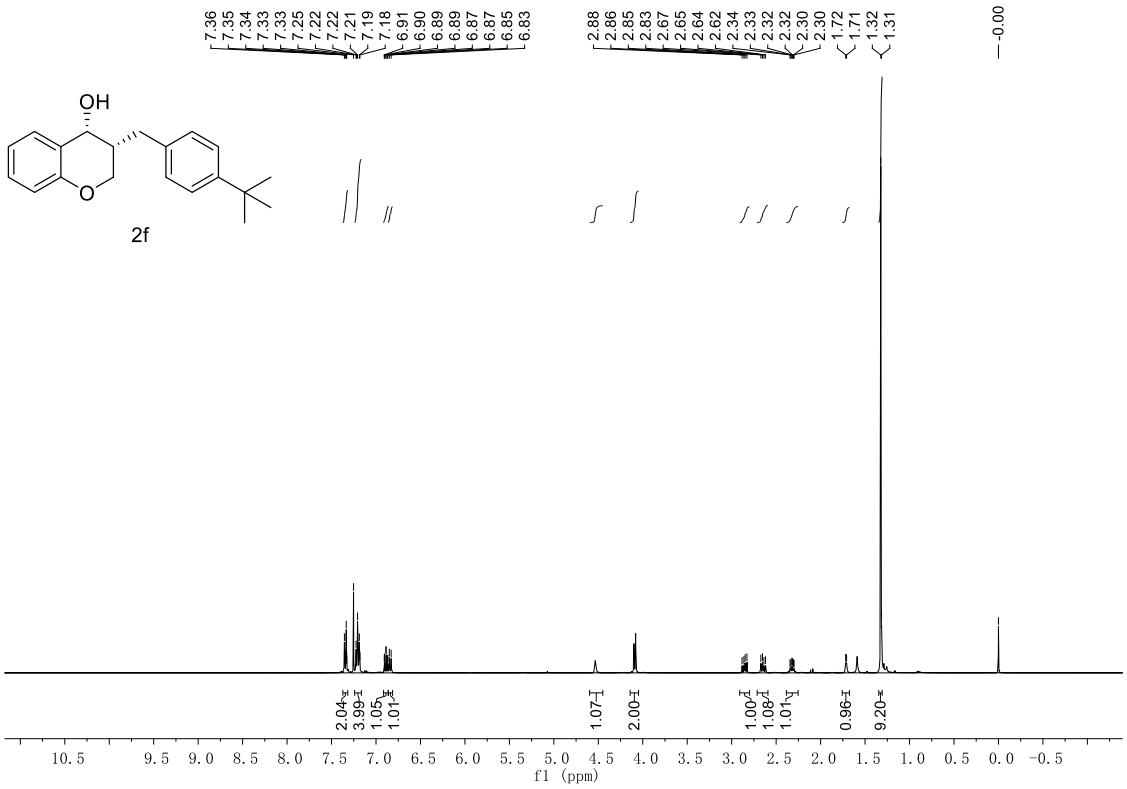


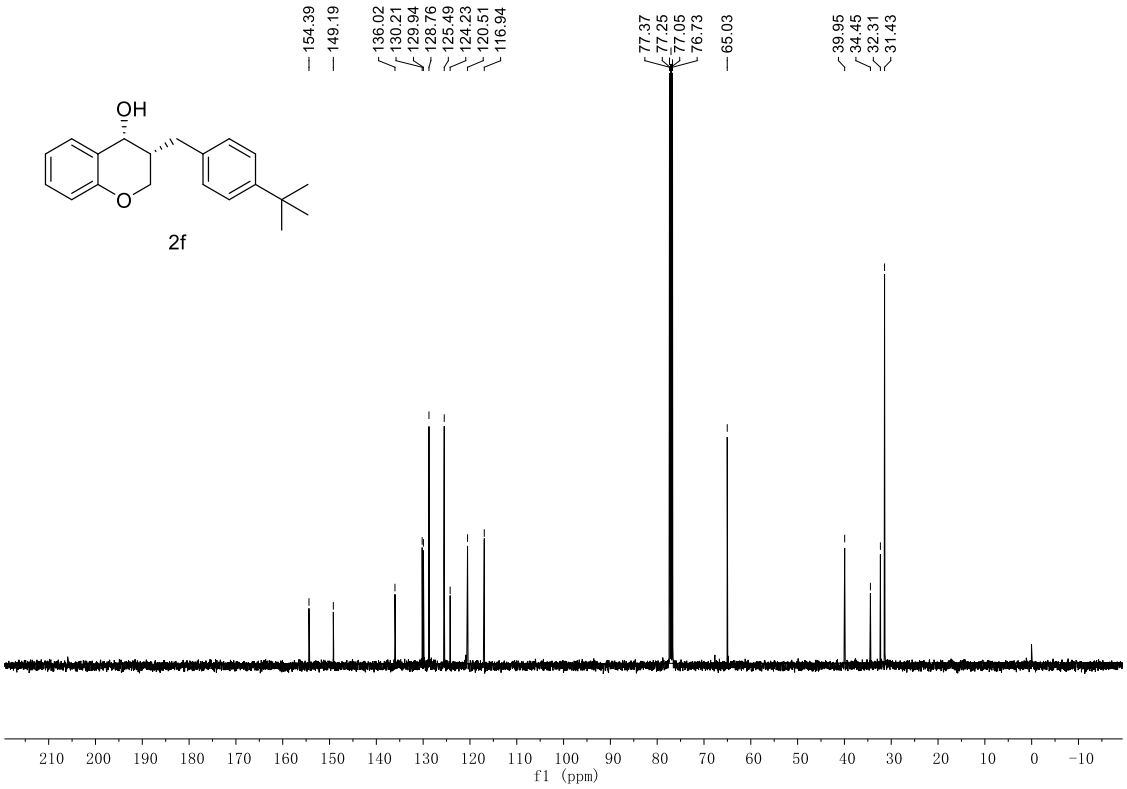
^{1}H and ^{13}C-NMR of 2e



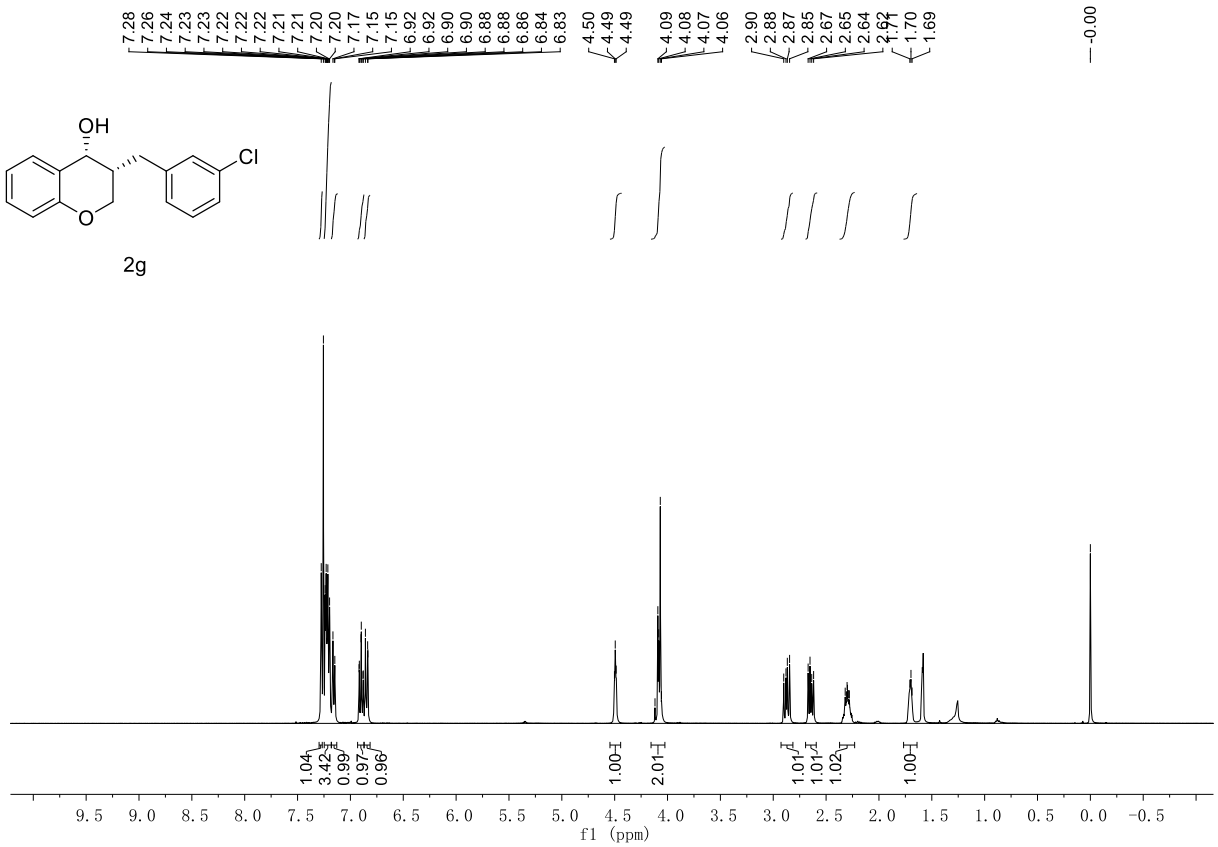


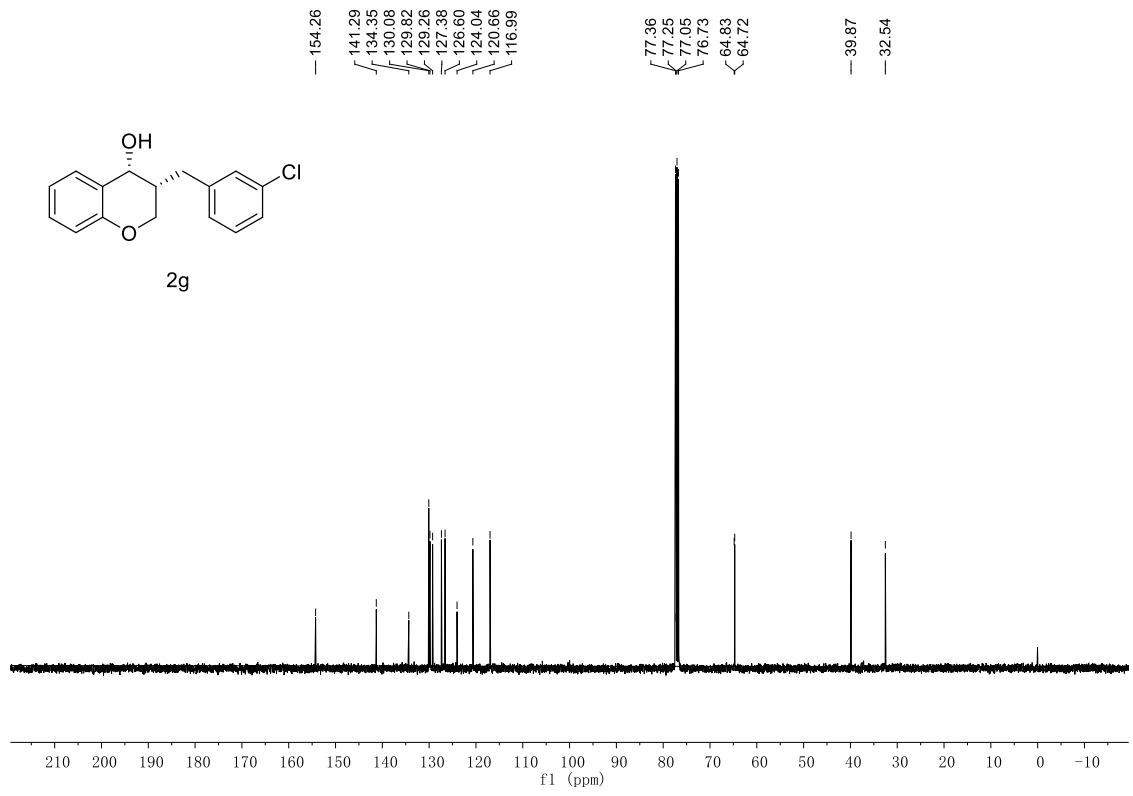
^{1}H and ^{13}C-NMR of 2f



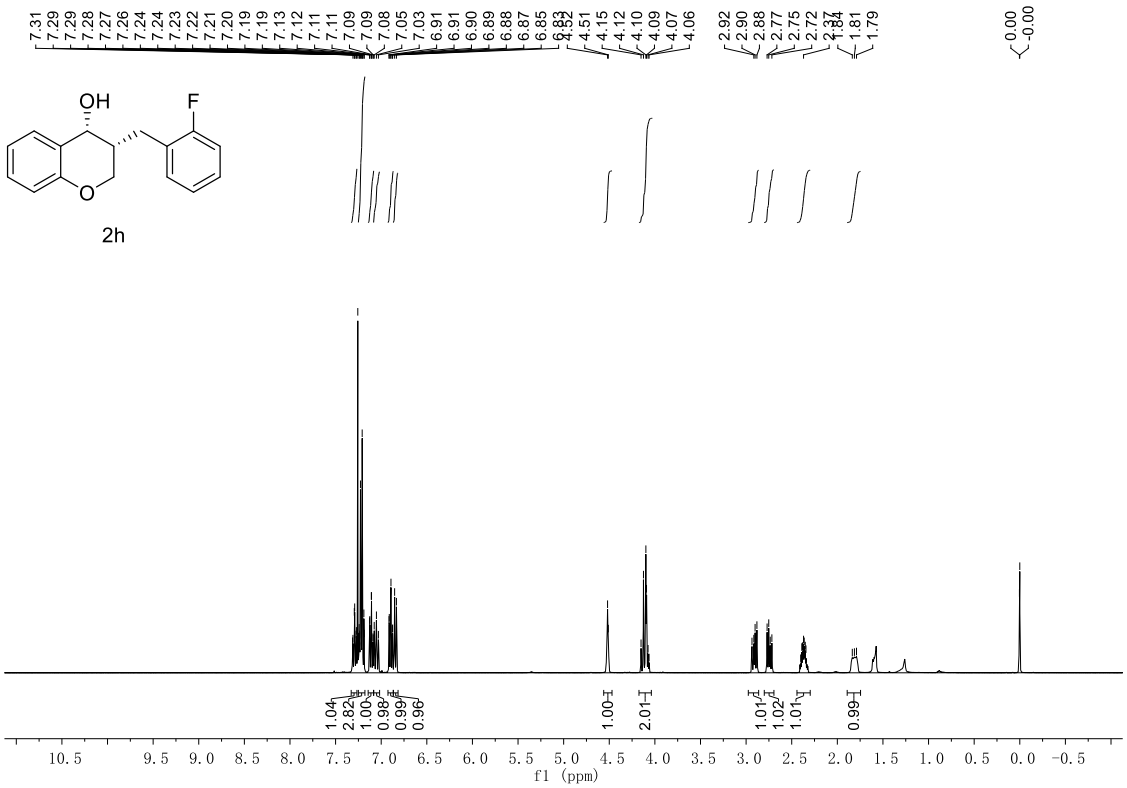


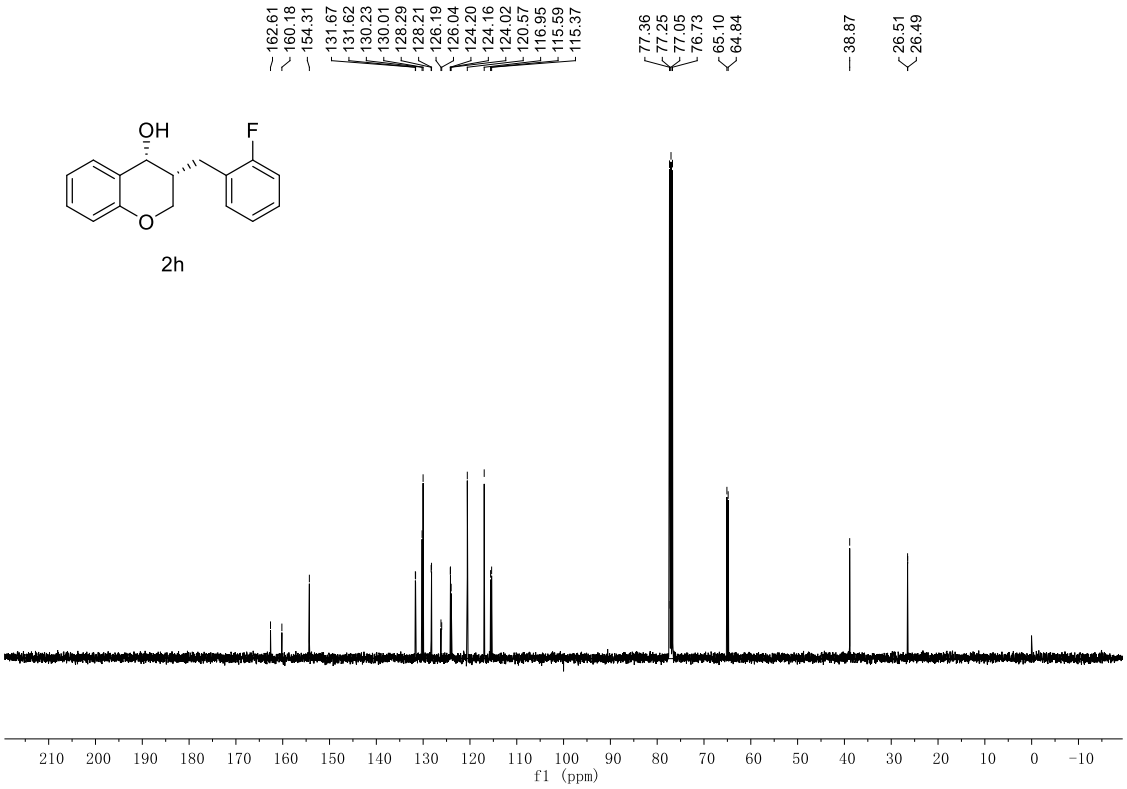
^{1}H and ^{13}C-NMR of 2g



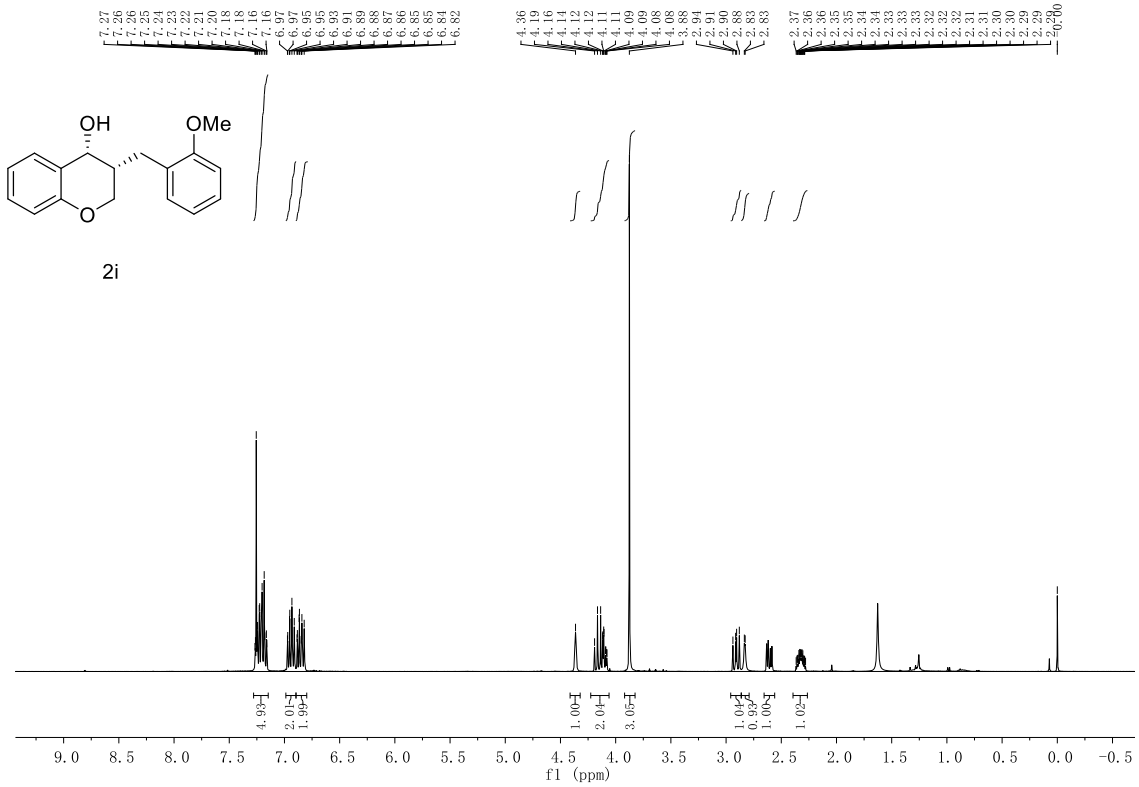


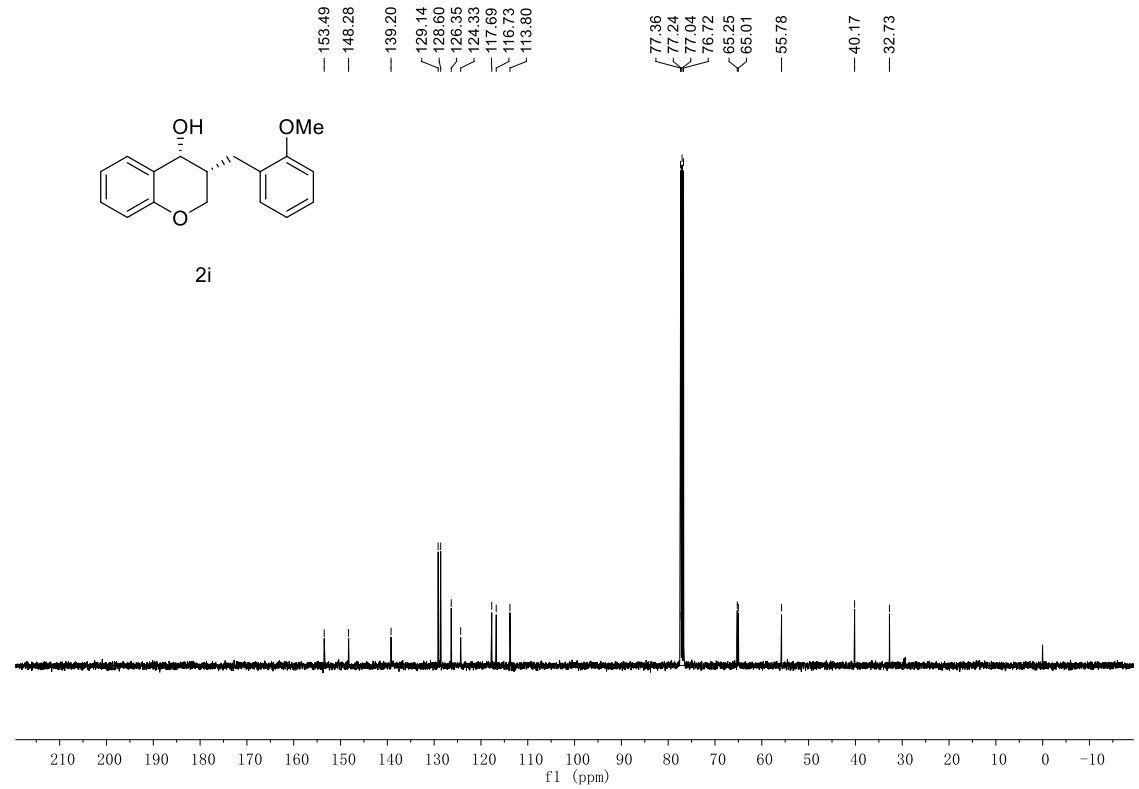
^{1}H and ^{13}C-NMR of 2h



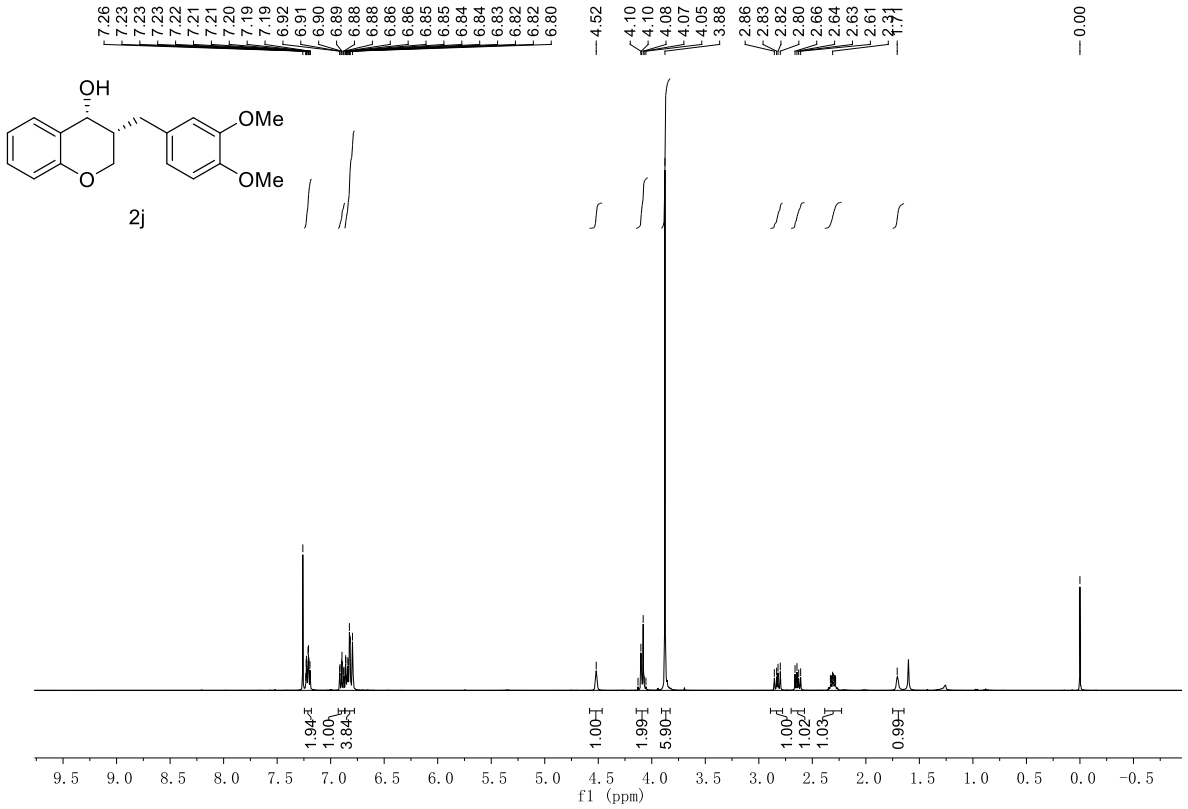


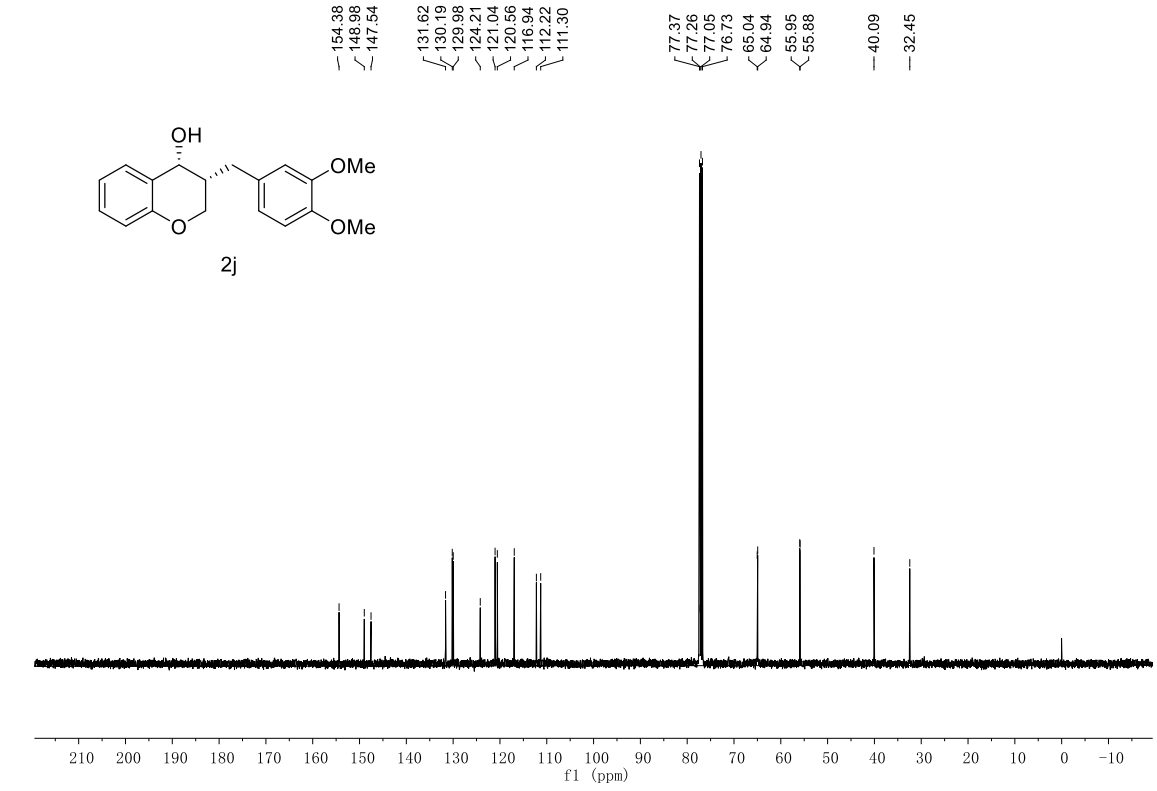
^{1}H and ^{13}C-NMR of 2i



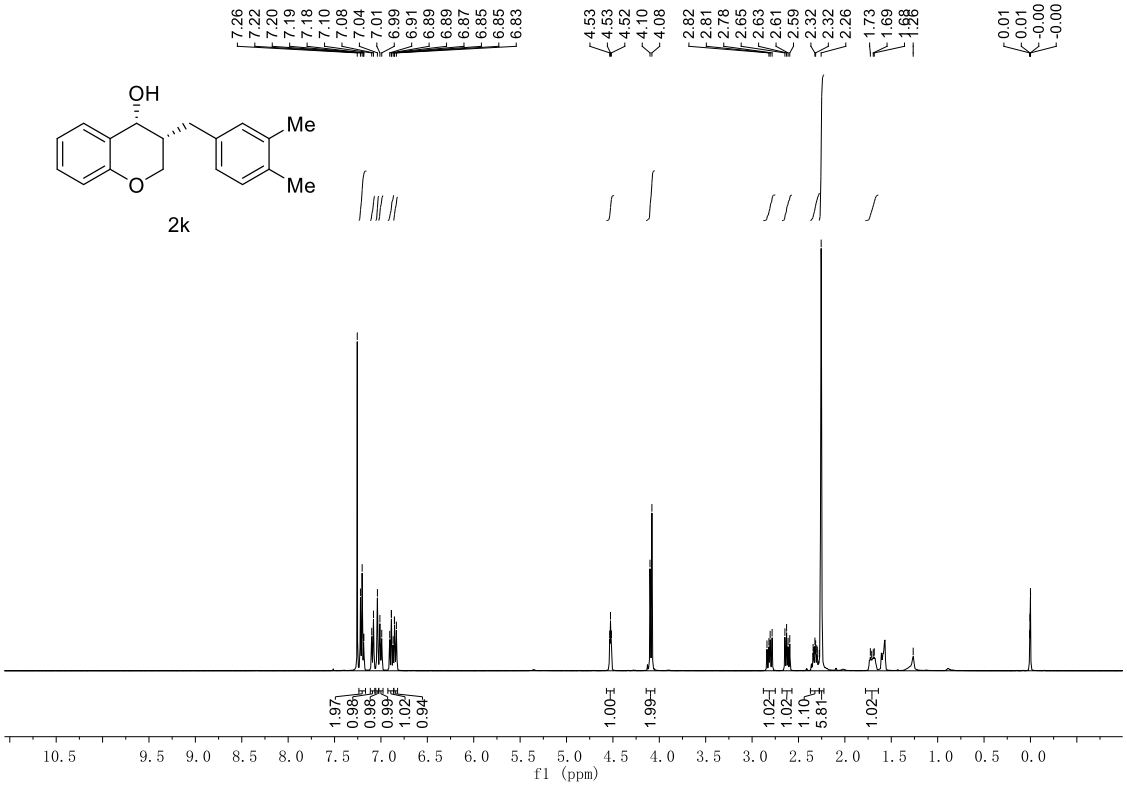


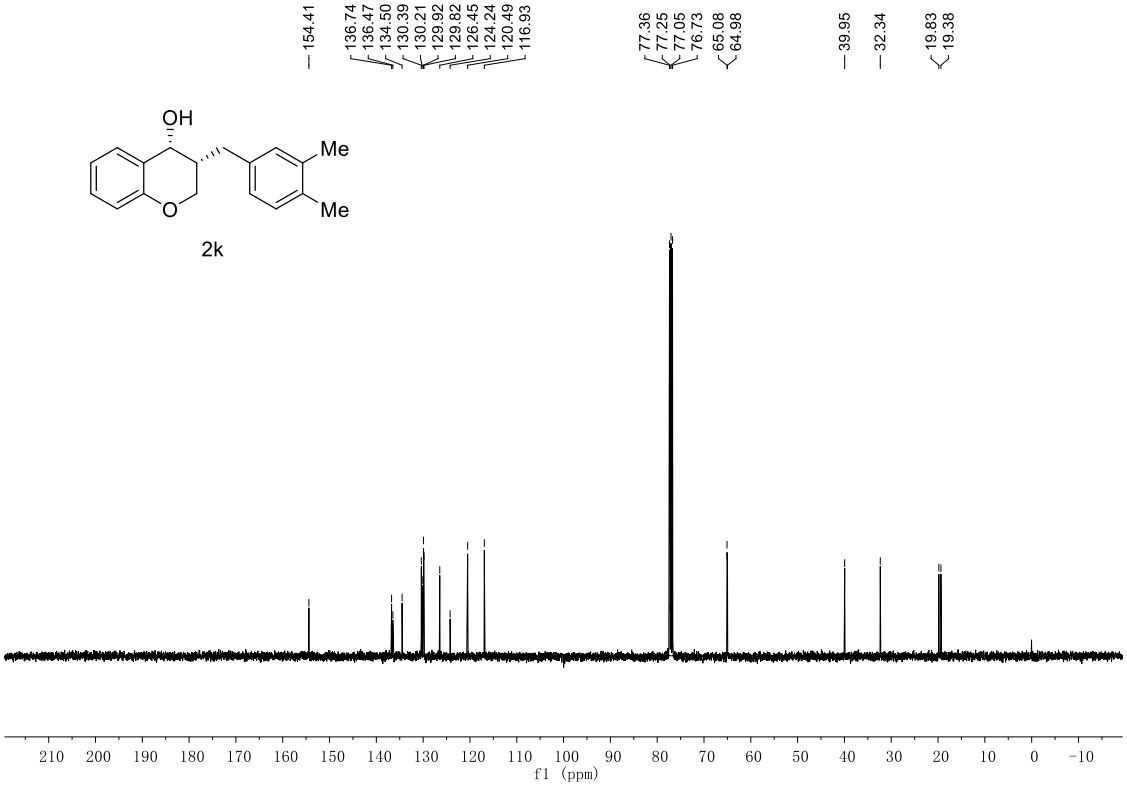
^{1}H and ^{13}C-NMR of 2j



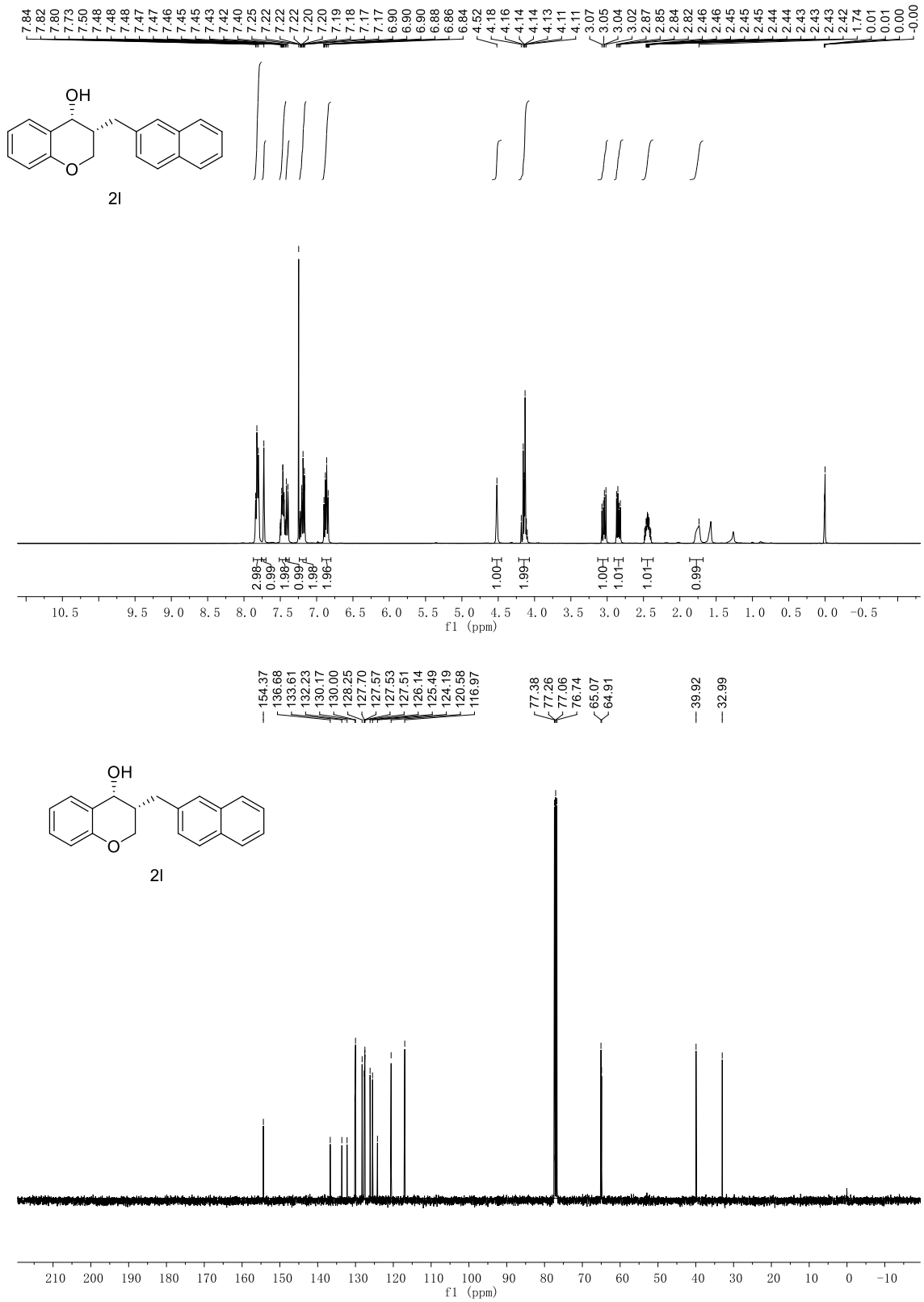


^{1}H and ^{13}C-NMR of 2k

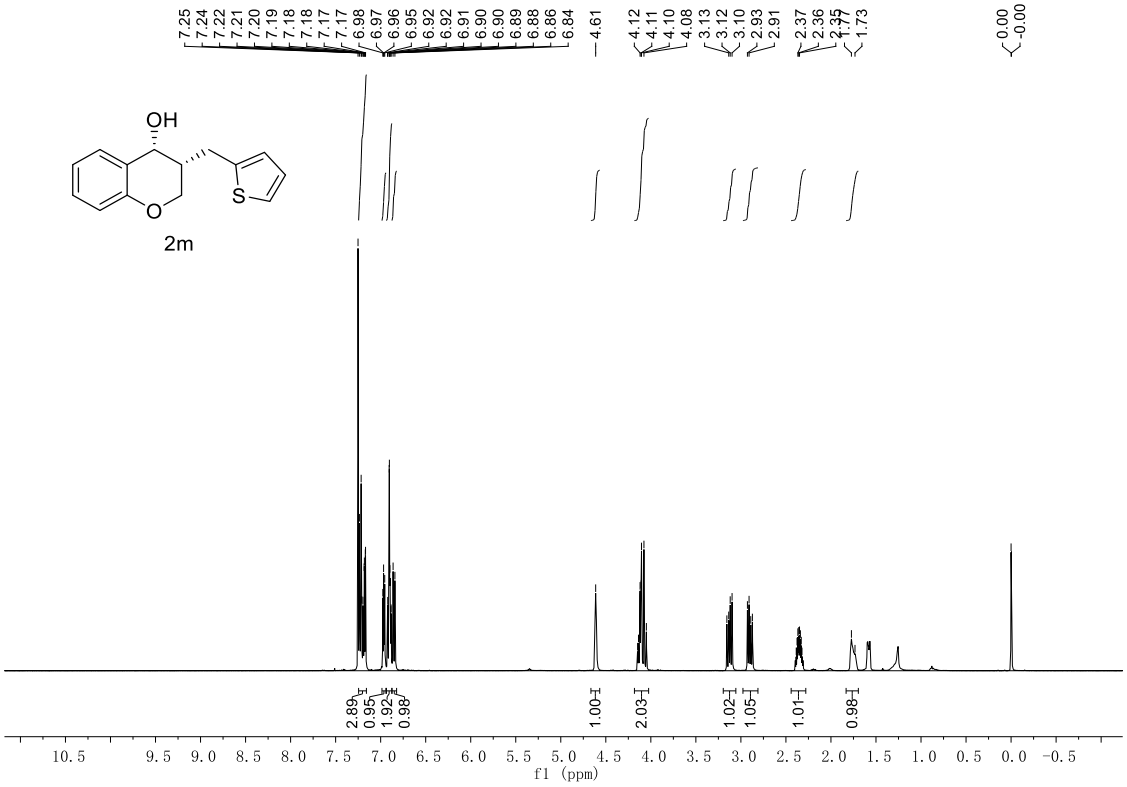


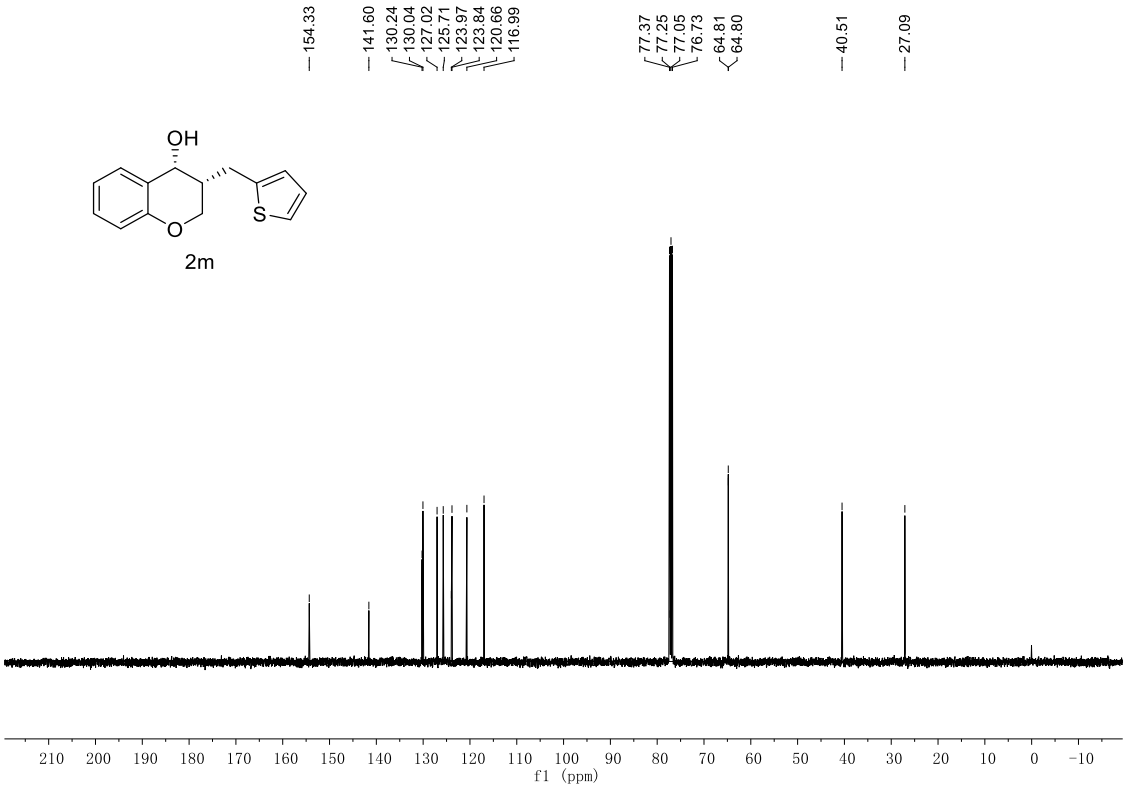


^{1}H and ^{13}C-NMR of 2l

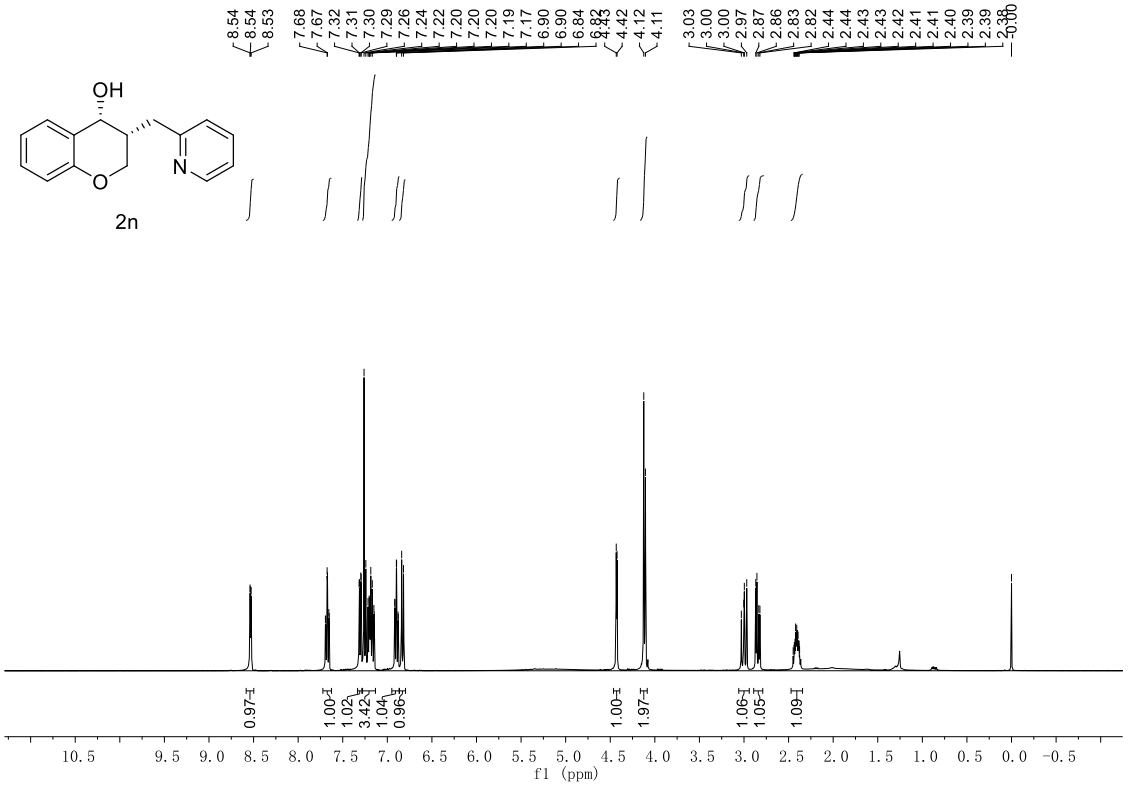


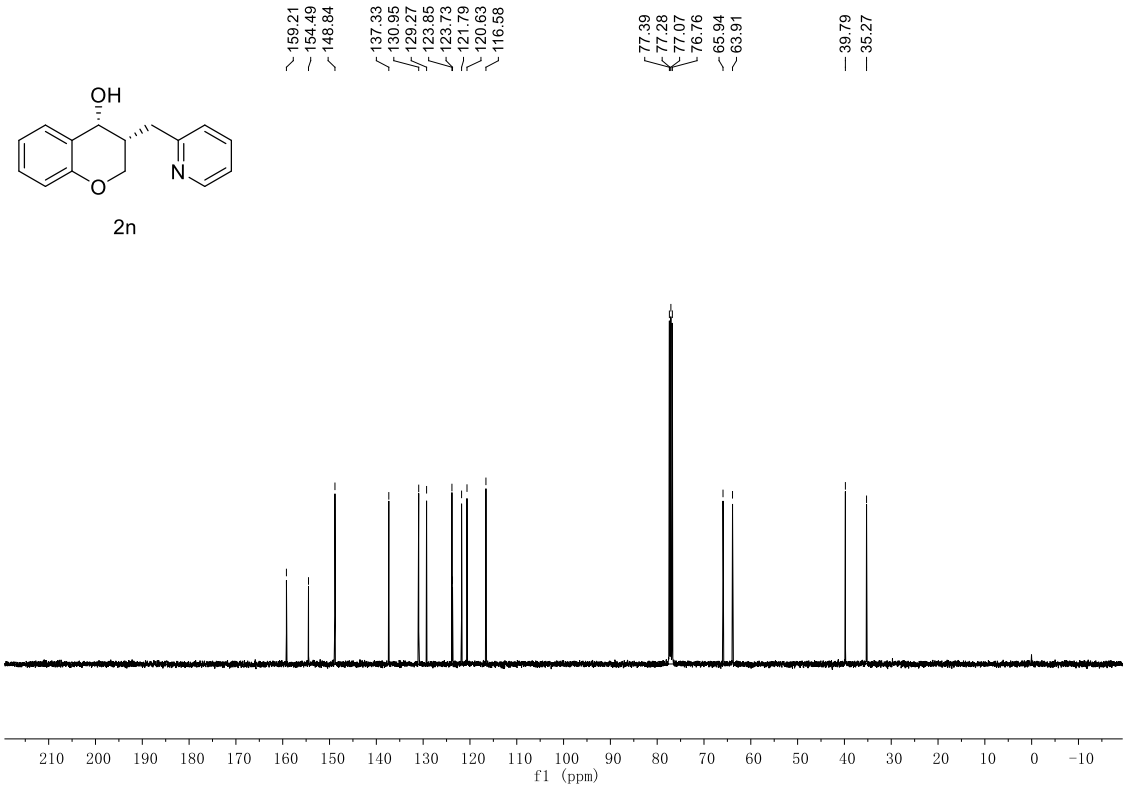
^{1}H and ^{13}C-NMR of 2m



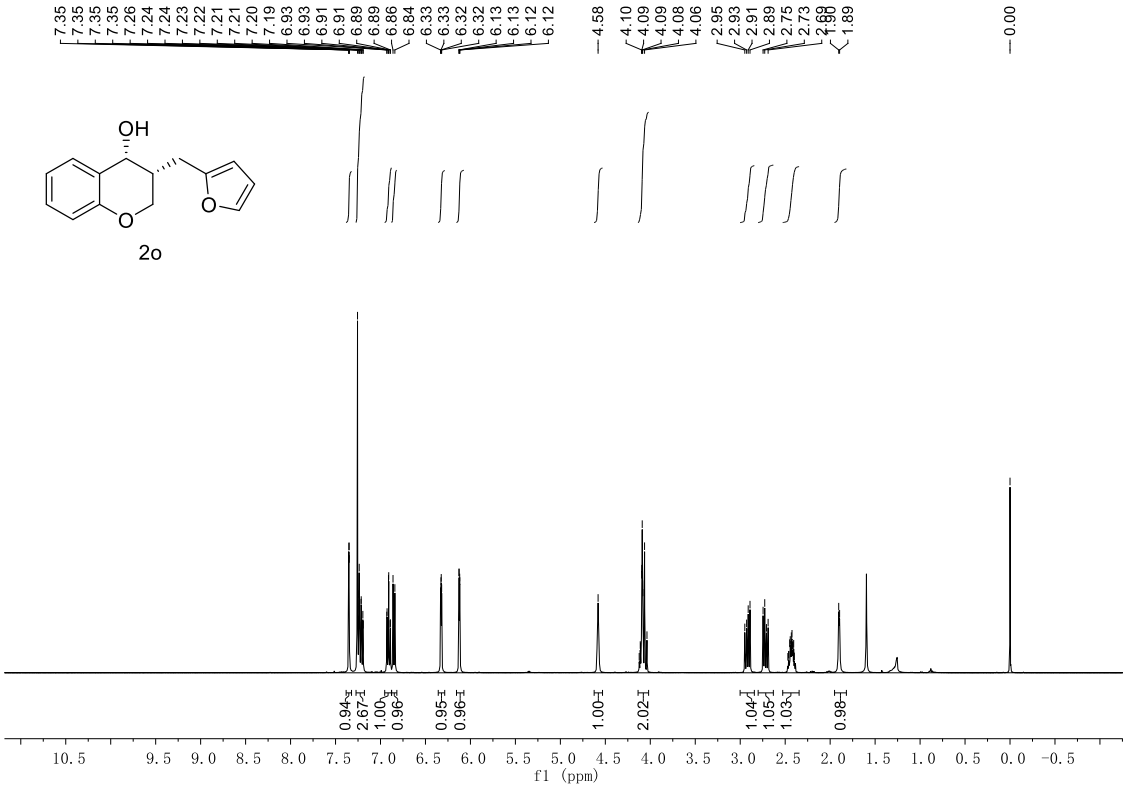


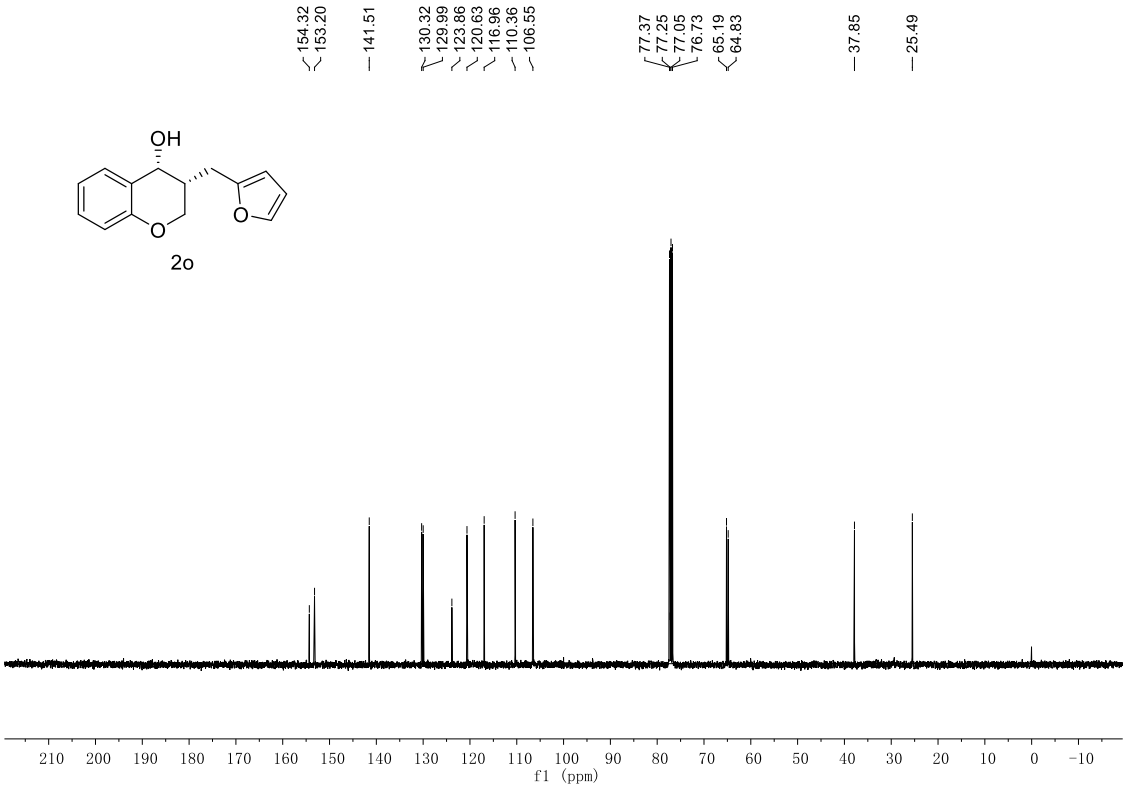
^{1}H and ^{13}C-NMR of 2n



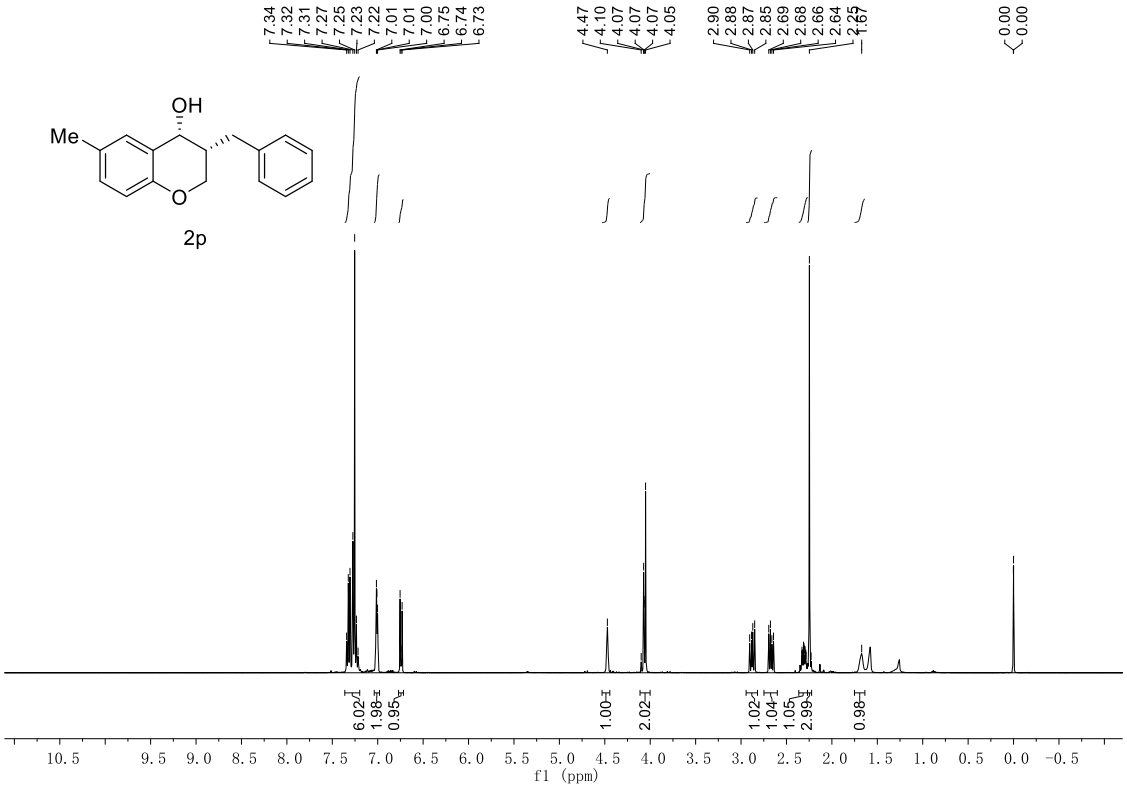


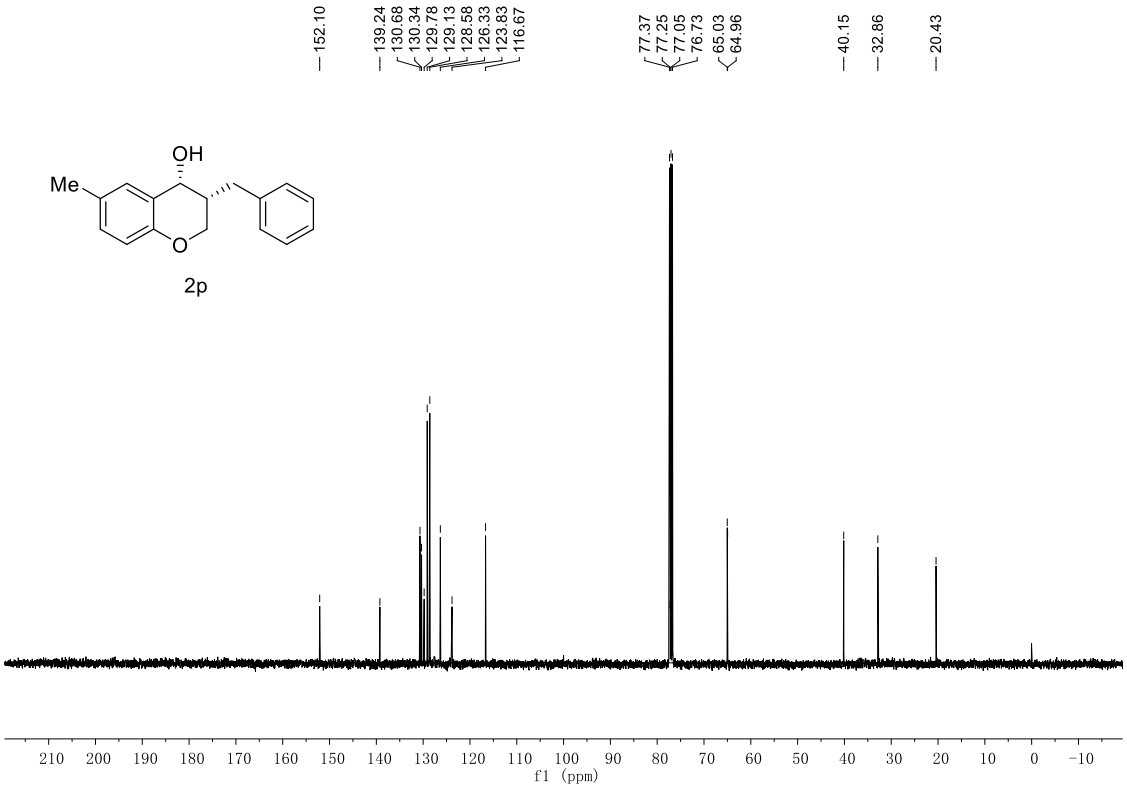
^{1}H and ^{13}C-NMR of 2o



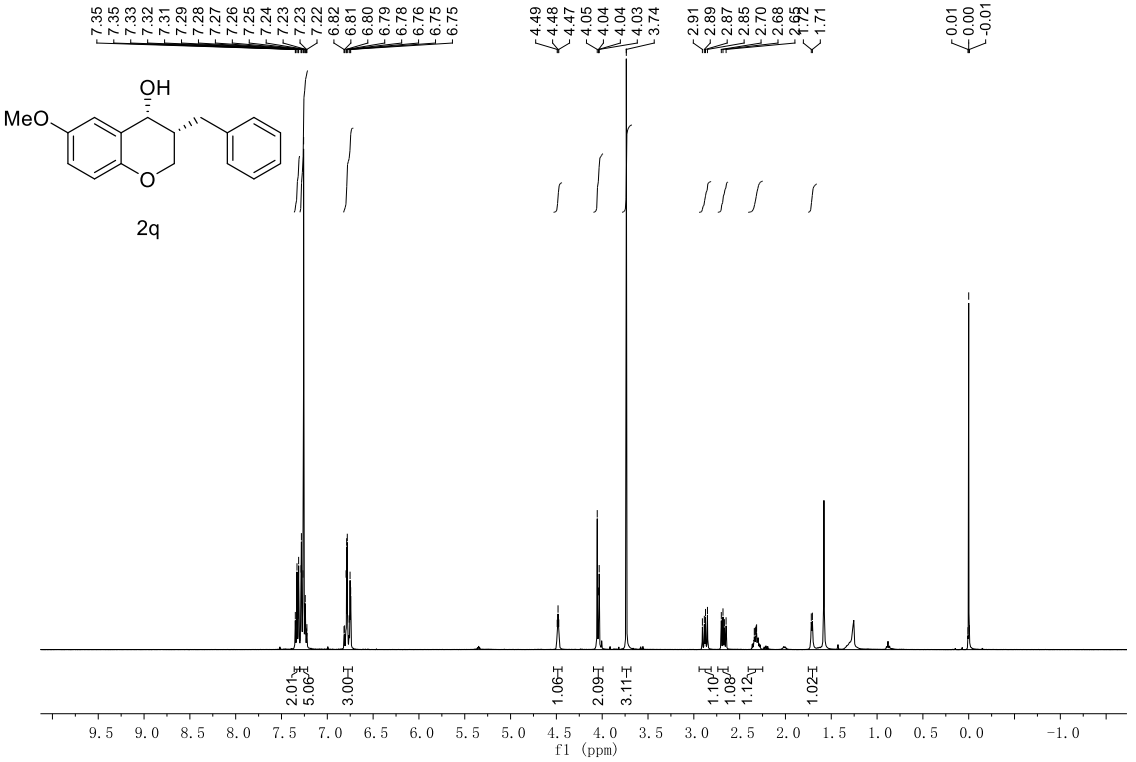


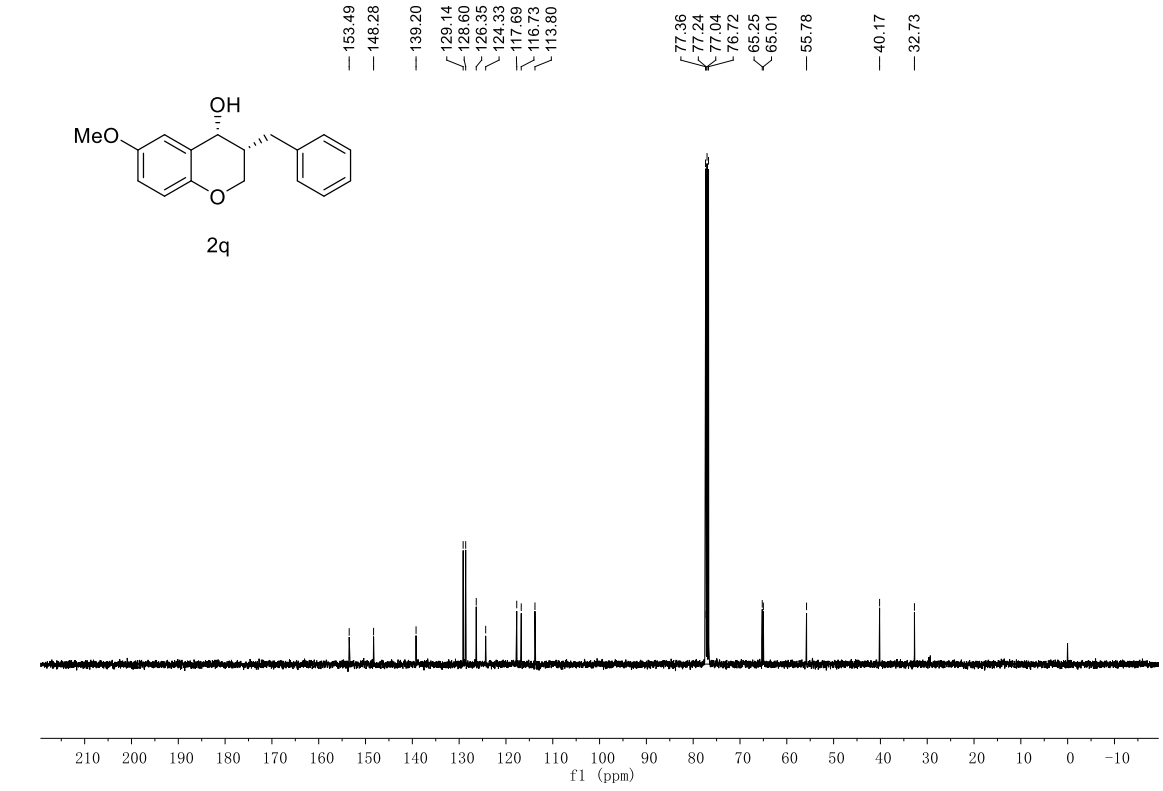
^{1}H and ^{13}C-NMR of 2p



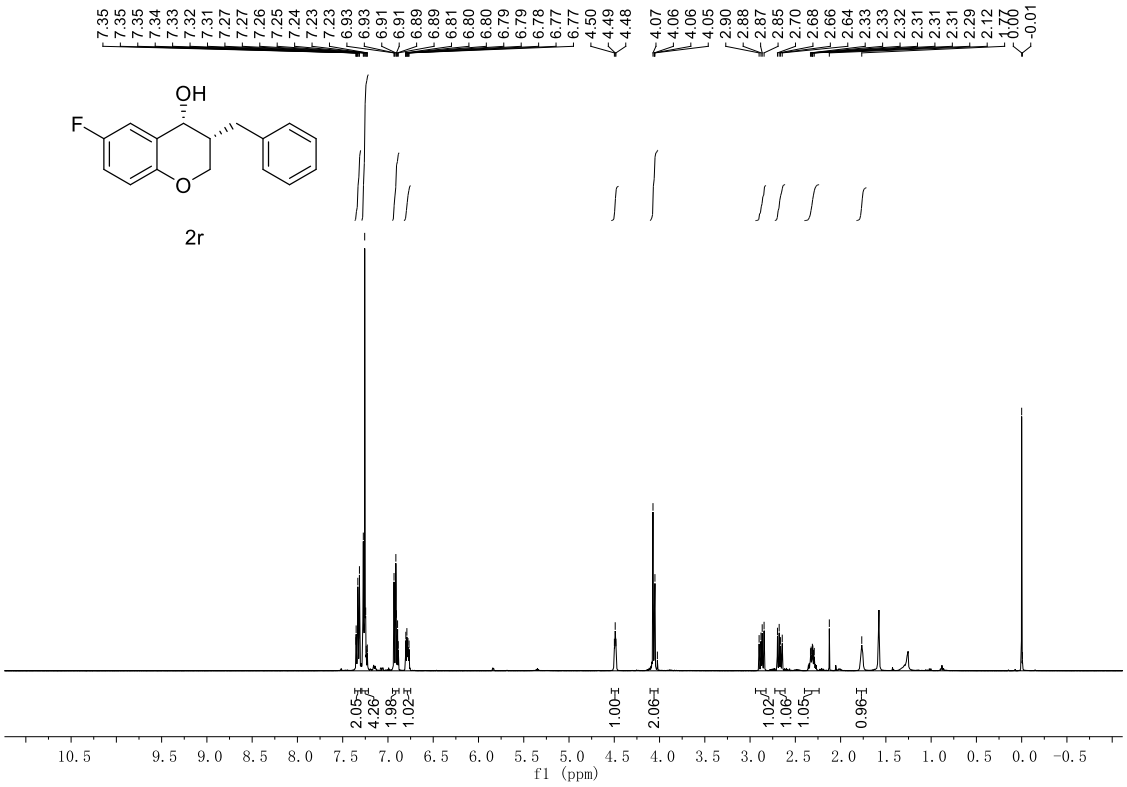


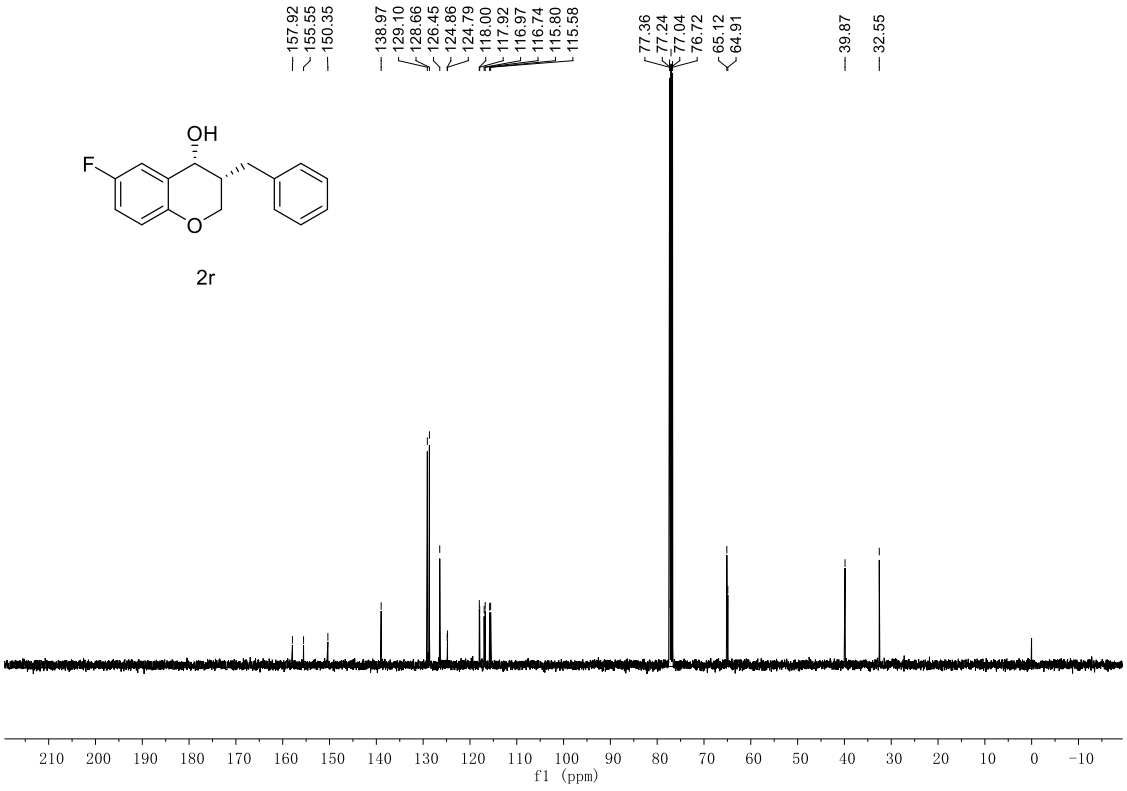
^{1}H and ^{13}C-NMR of 2q



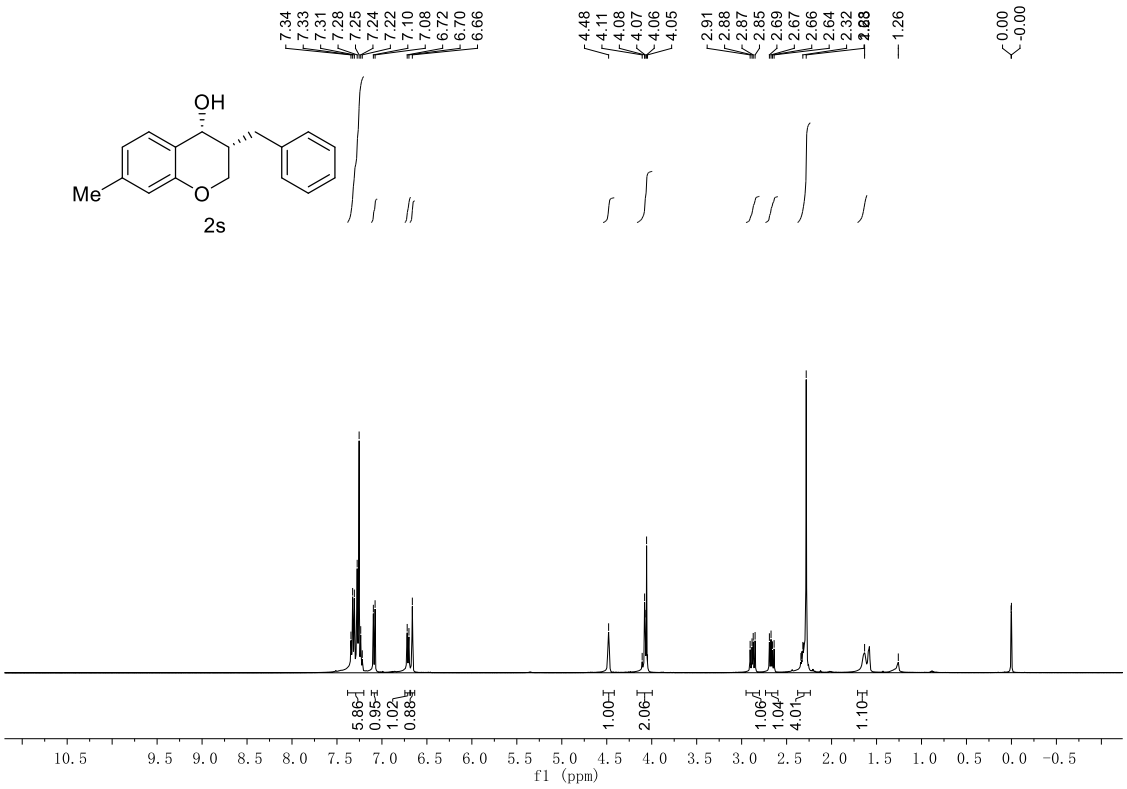


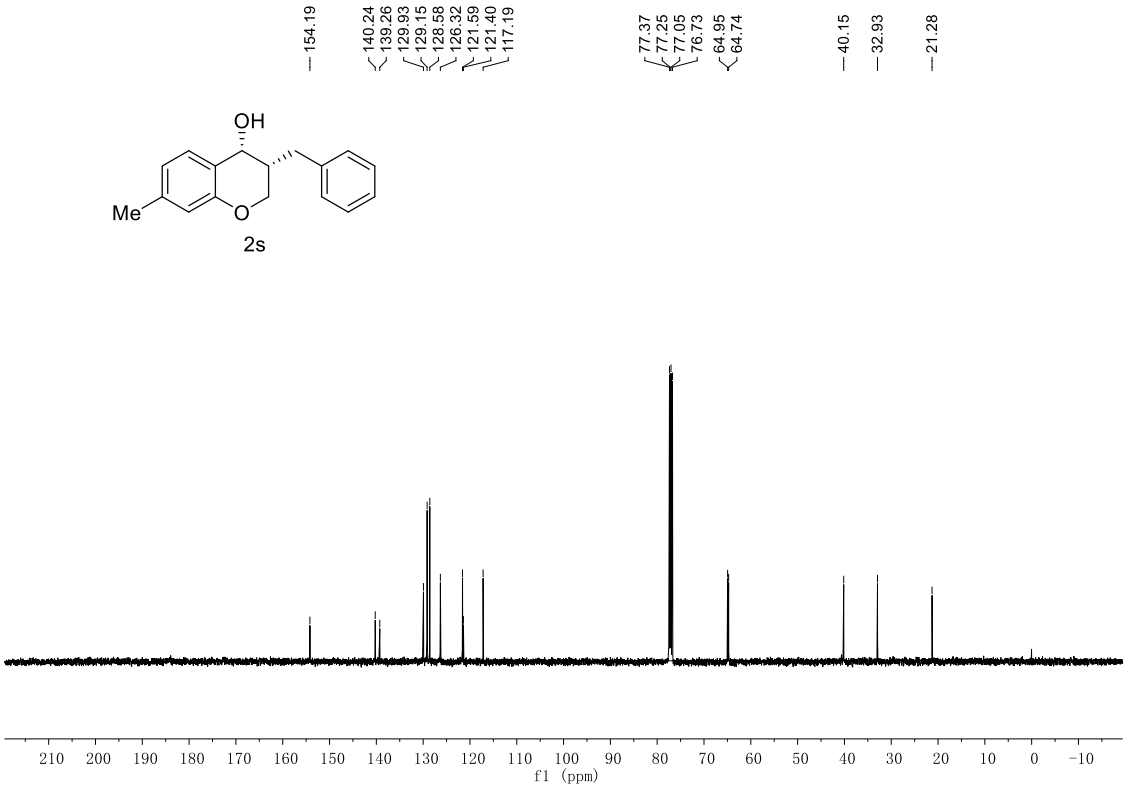
^{1}H and ^{13}C-NMR of 2r



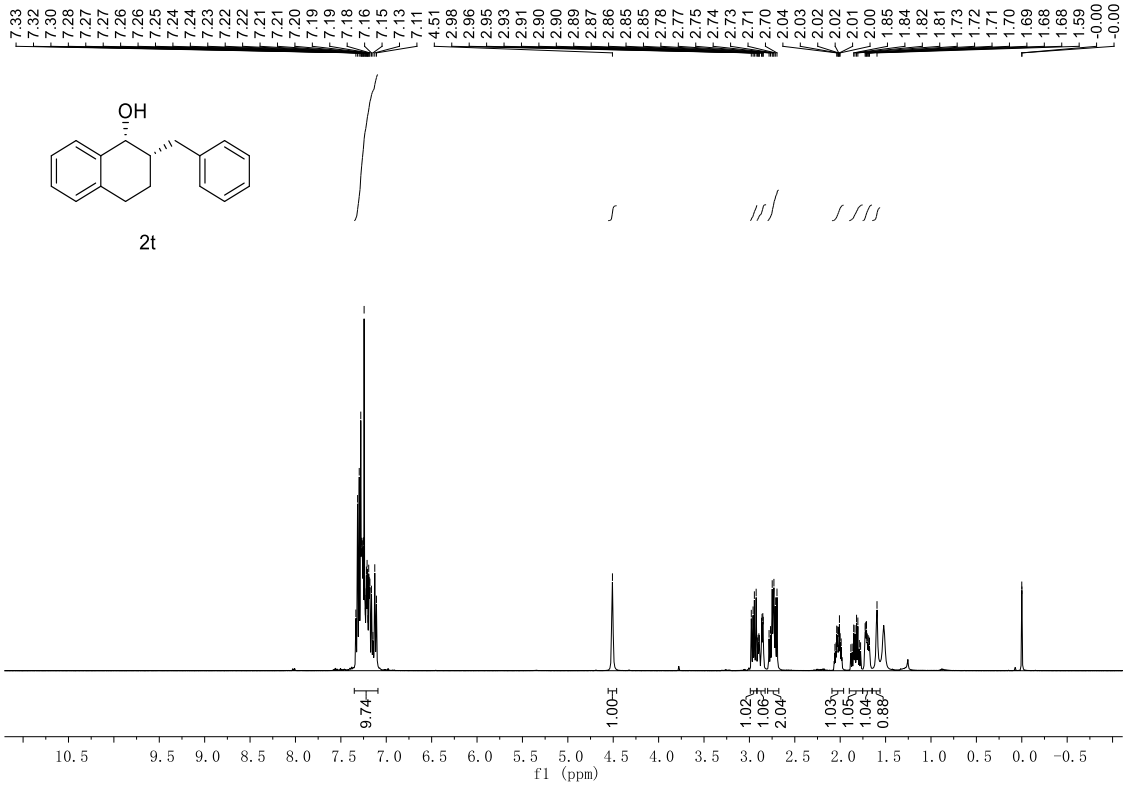


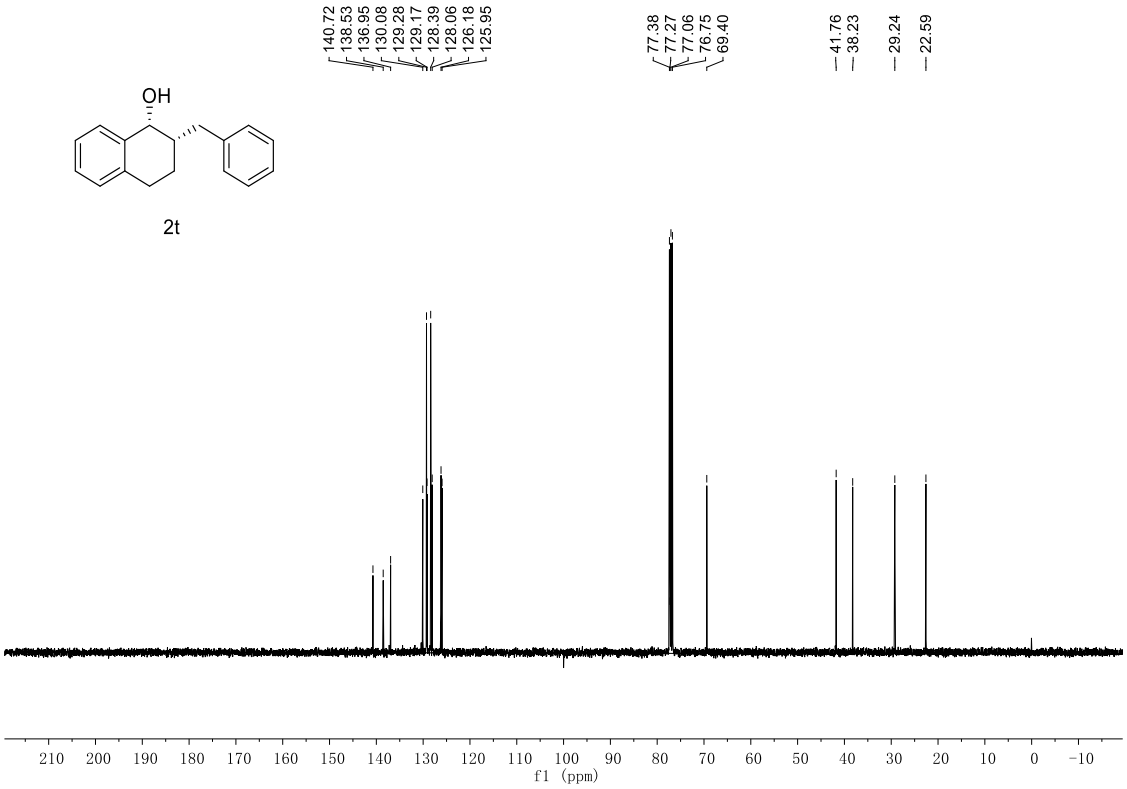
^{1}H and ^{13}C-NMR of 2s



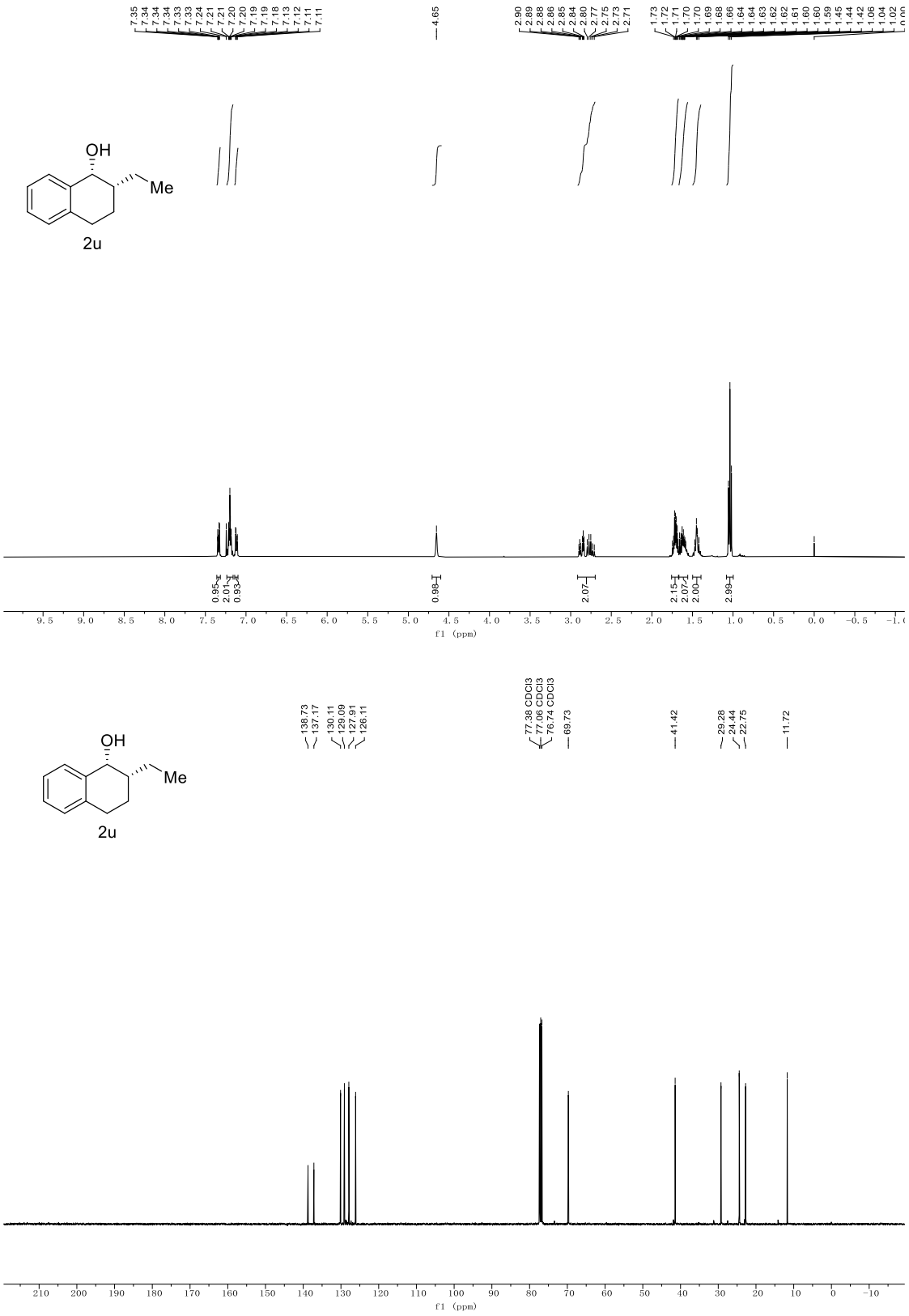


^{1}H and ^{13}C-NMR of 2t

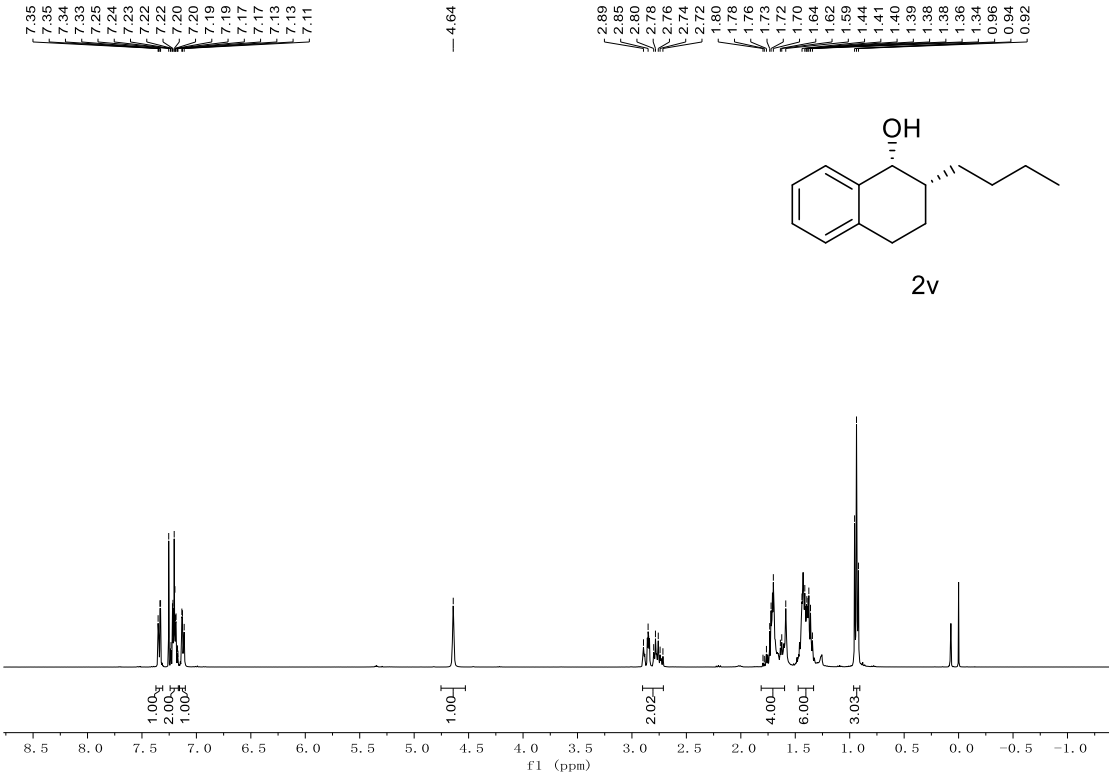


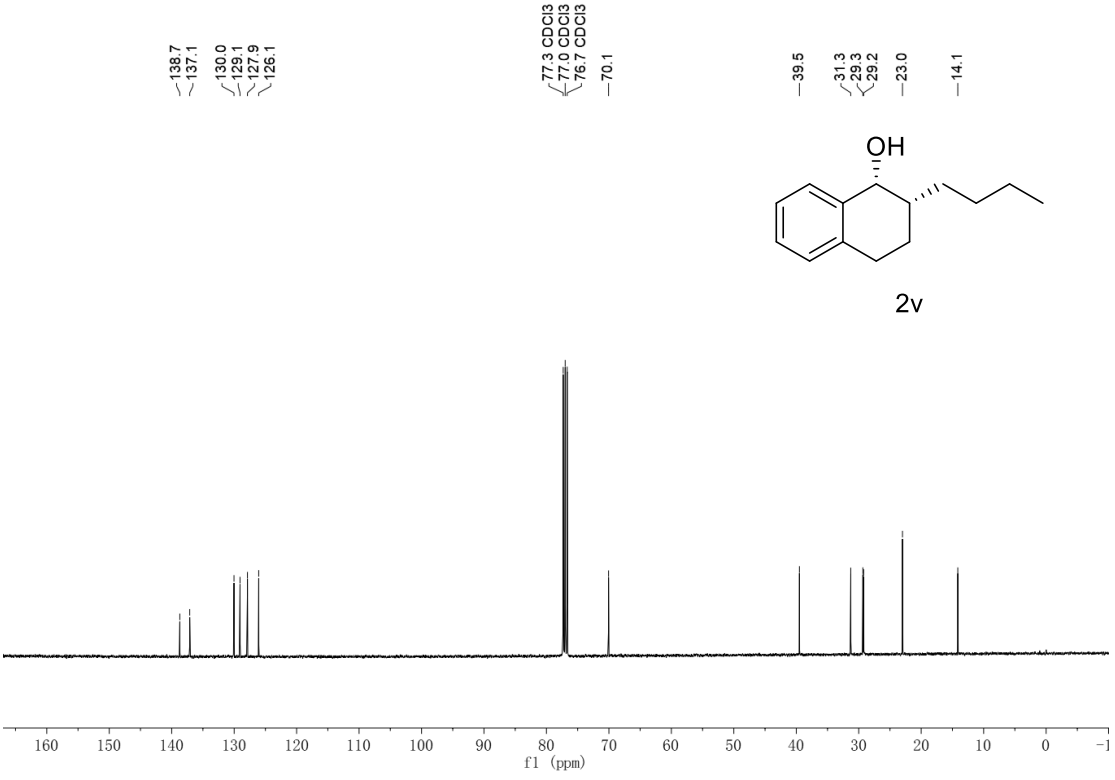


^{1}H and ^{13}C-NMR of 2u

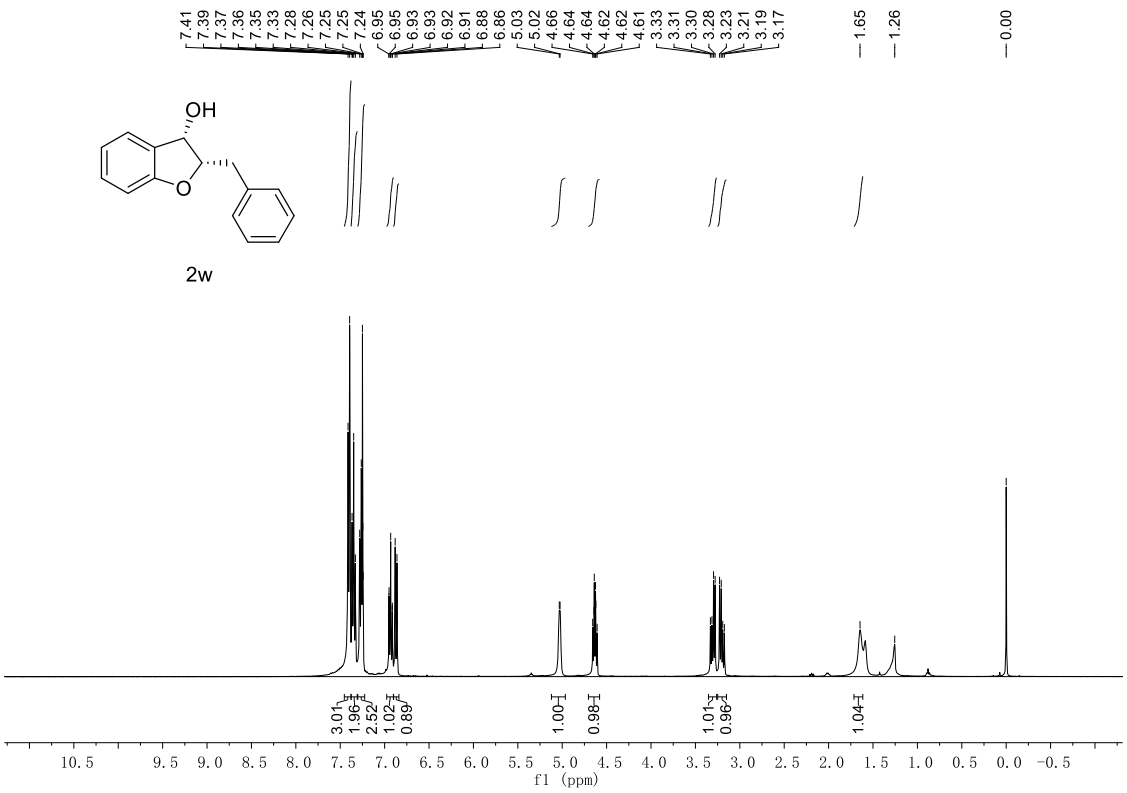


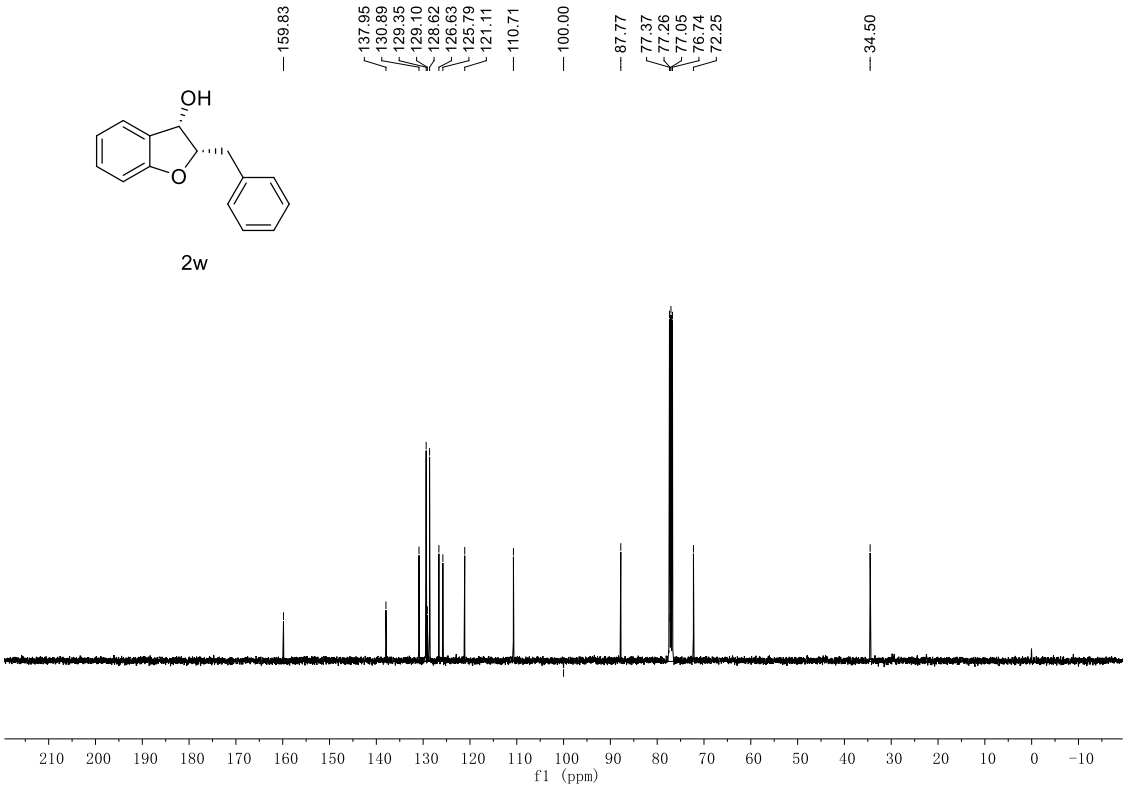
^{1}H and ^{13}C-NMR of 2v



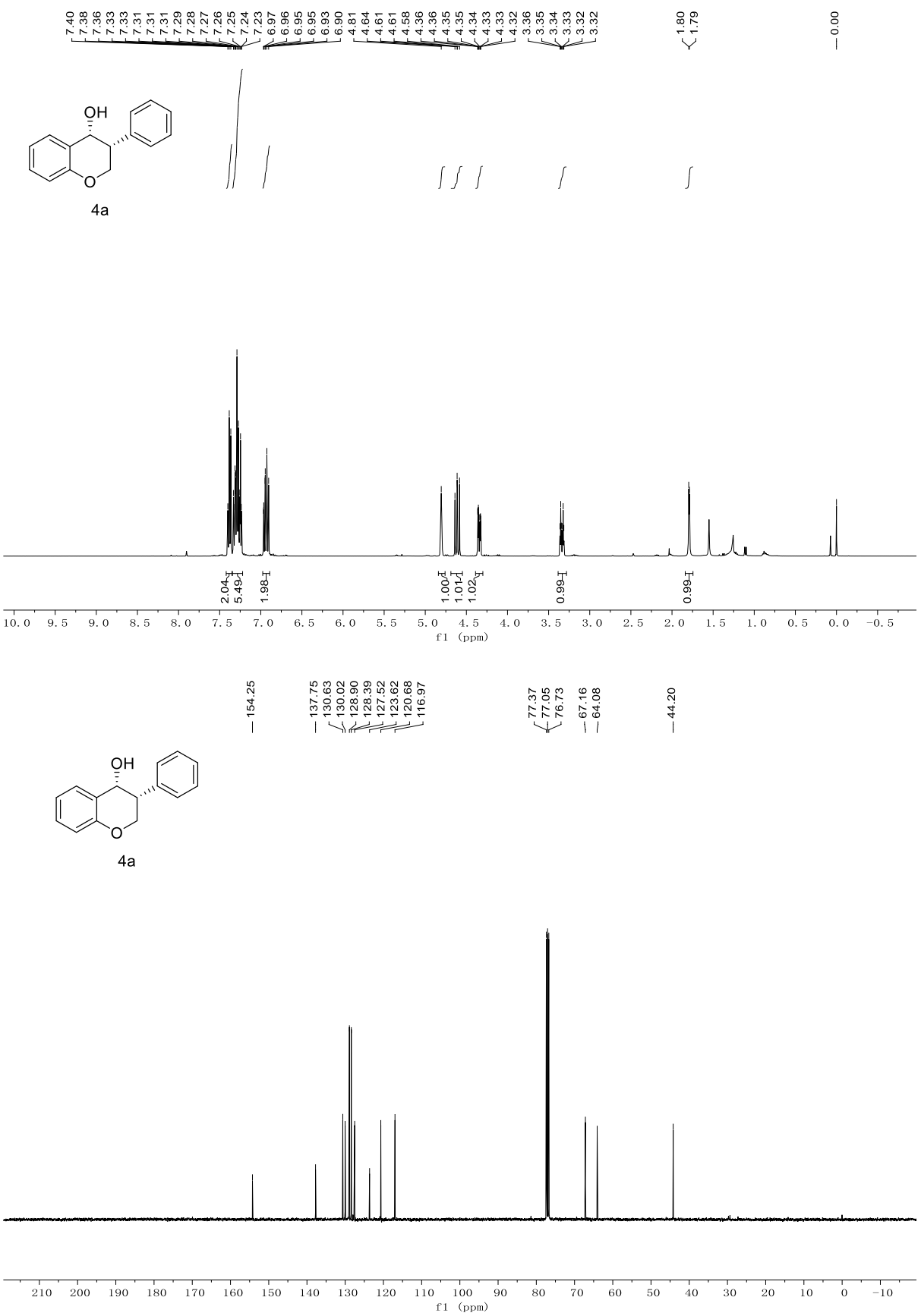


^{1}H and ^{13}C-NMR of 2w

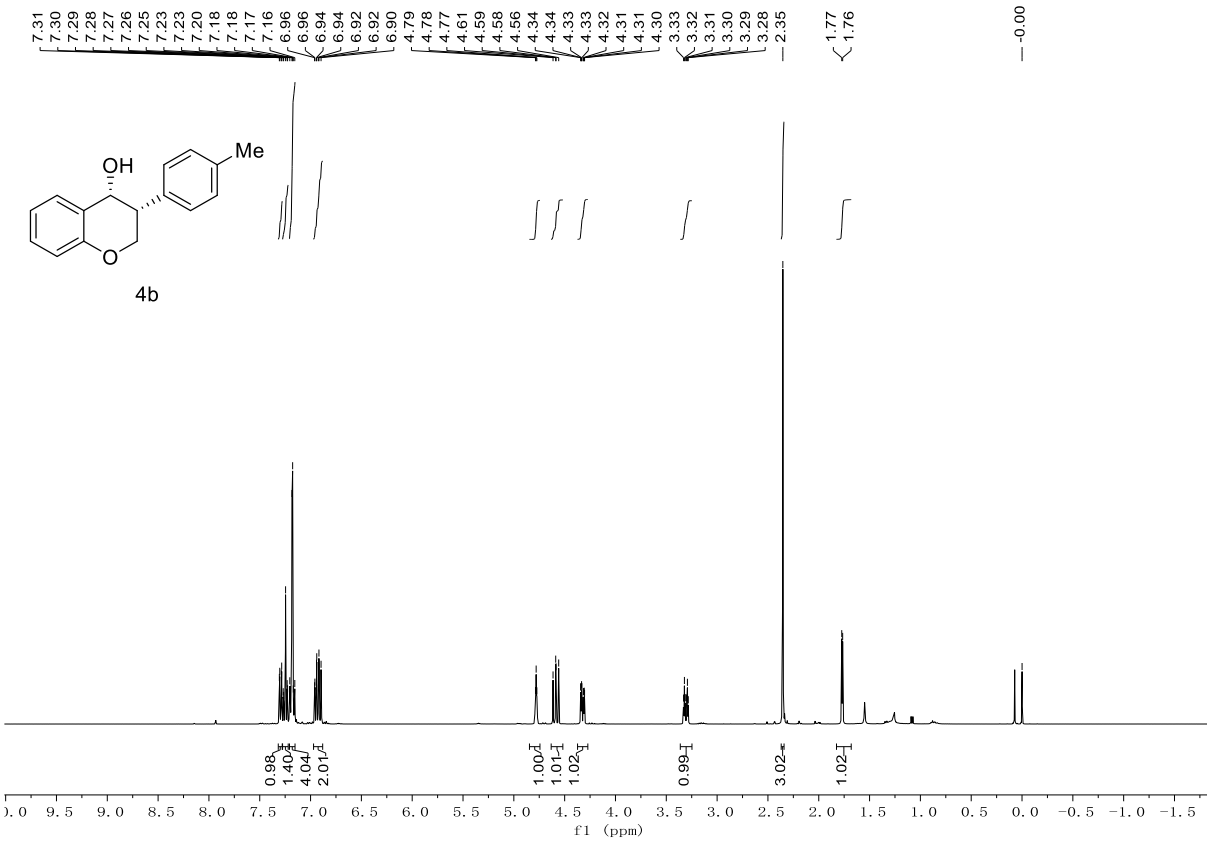


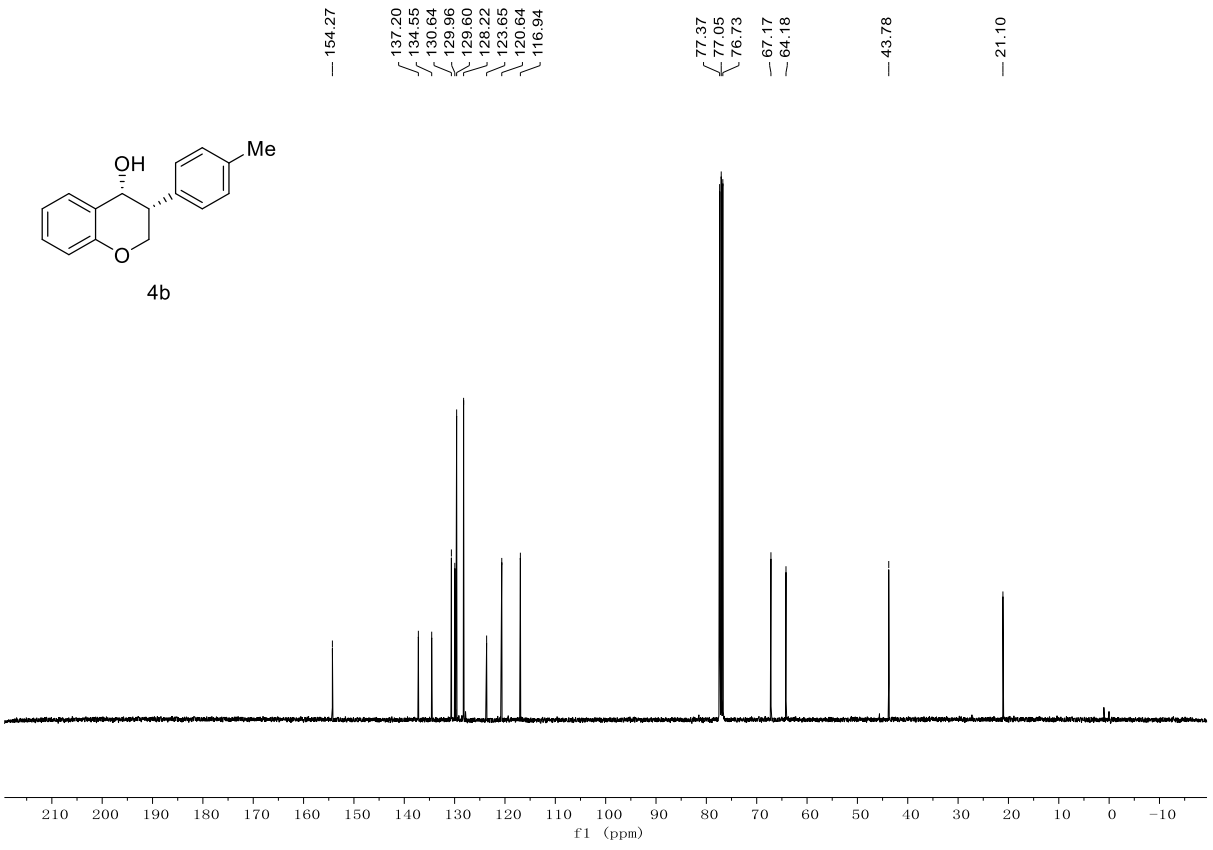


^{1}H and ^{13}C-NMR of 4a

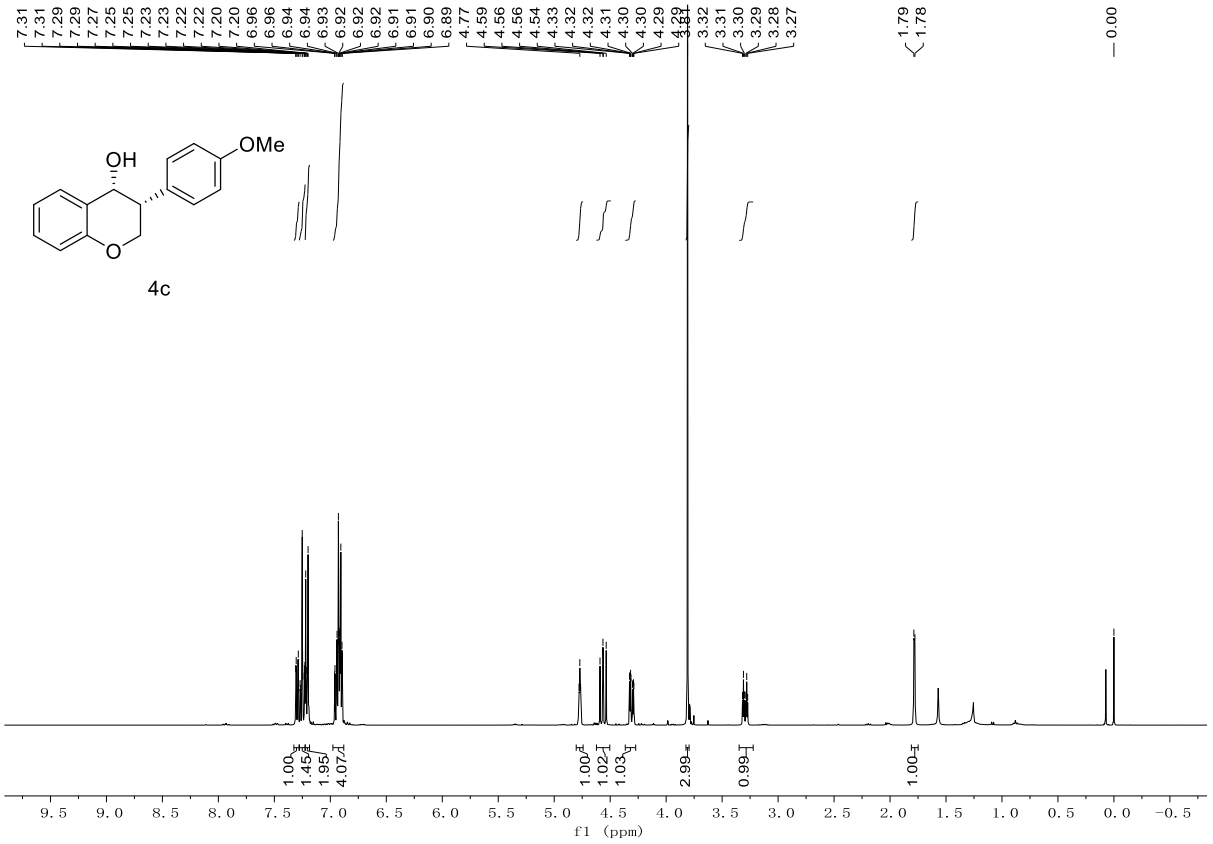


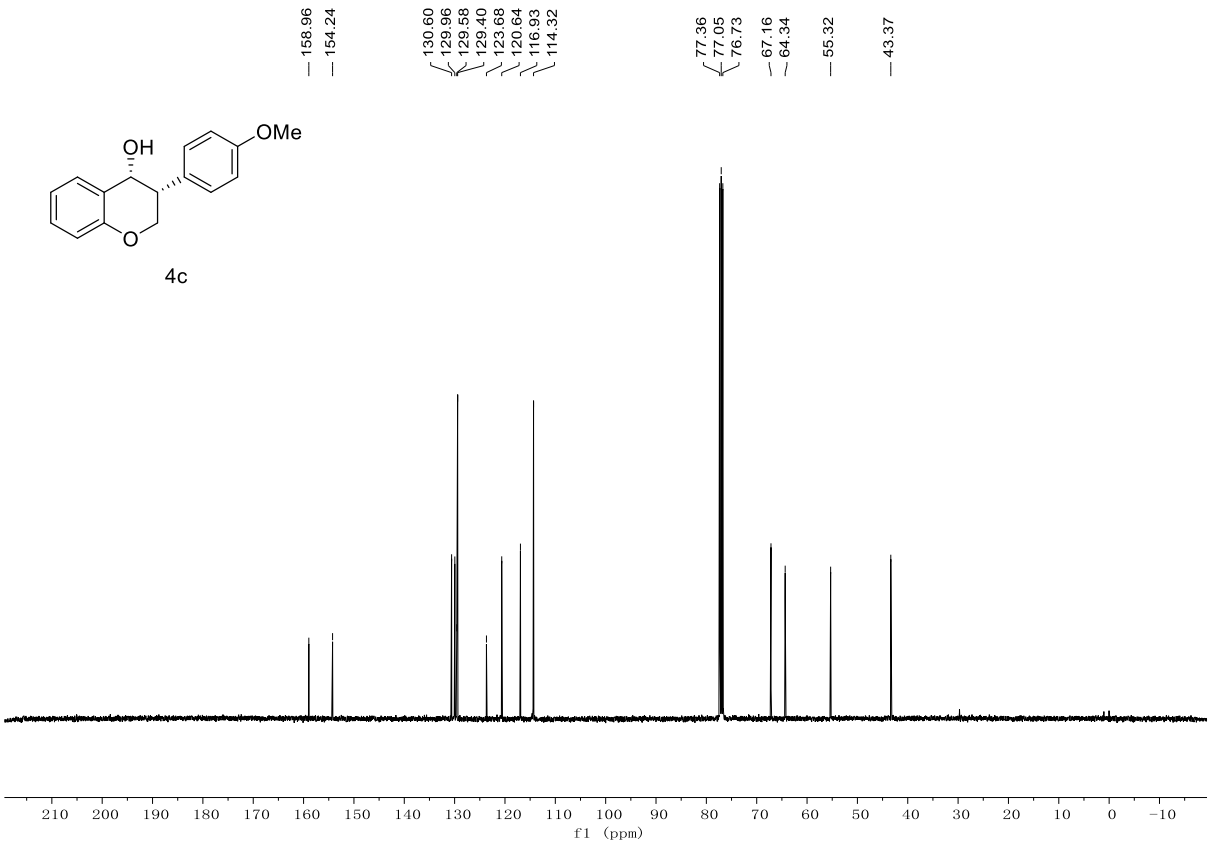
^{1}H and ^{13}C-NMR of 4b



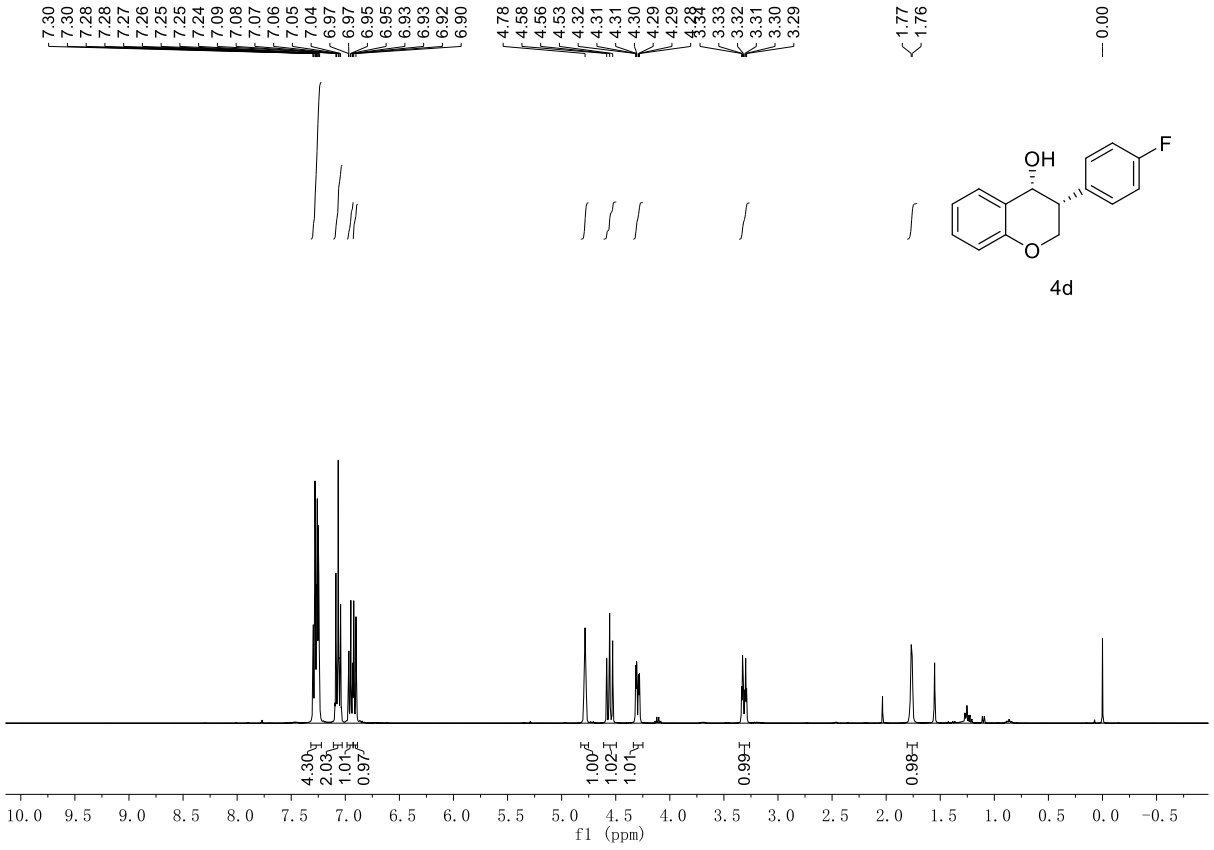


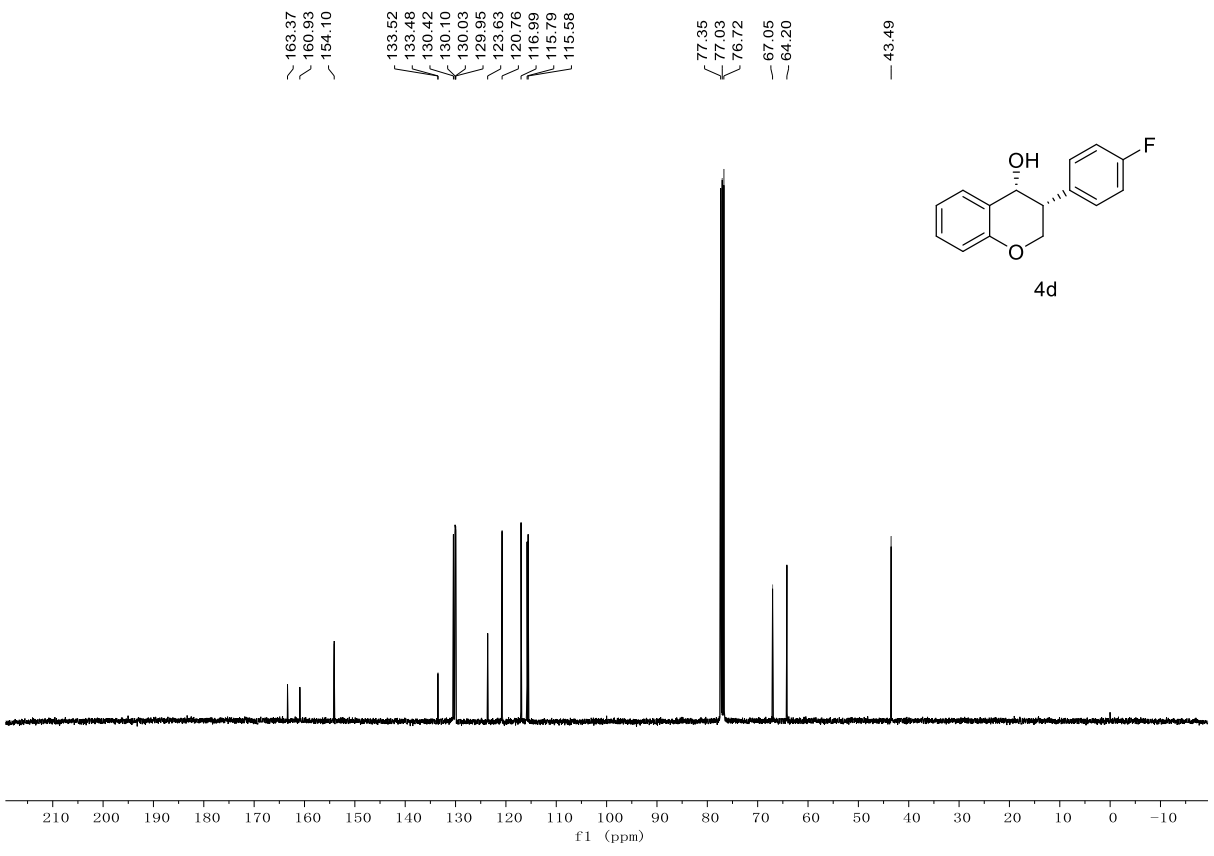
^{1}H and ^{13}C-NMR of 4c



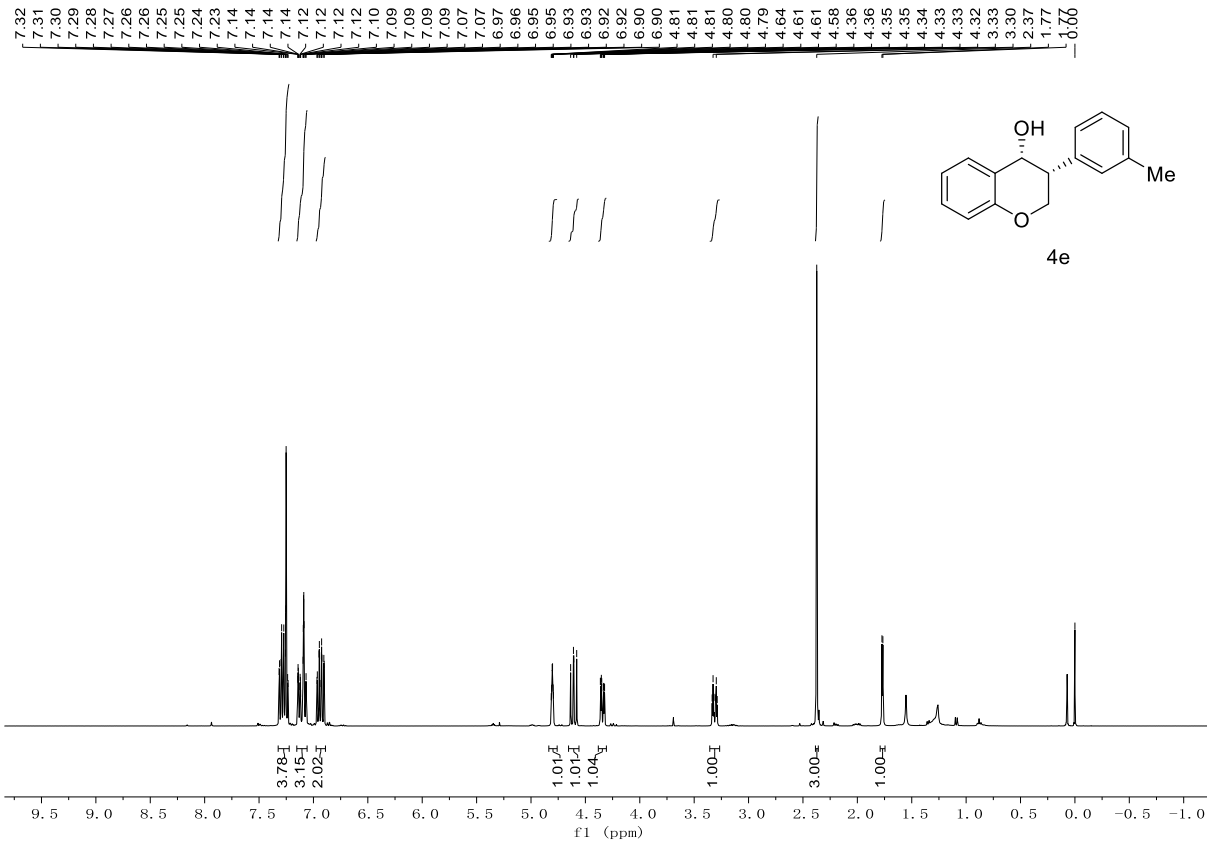


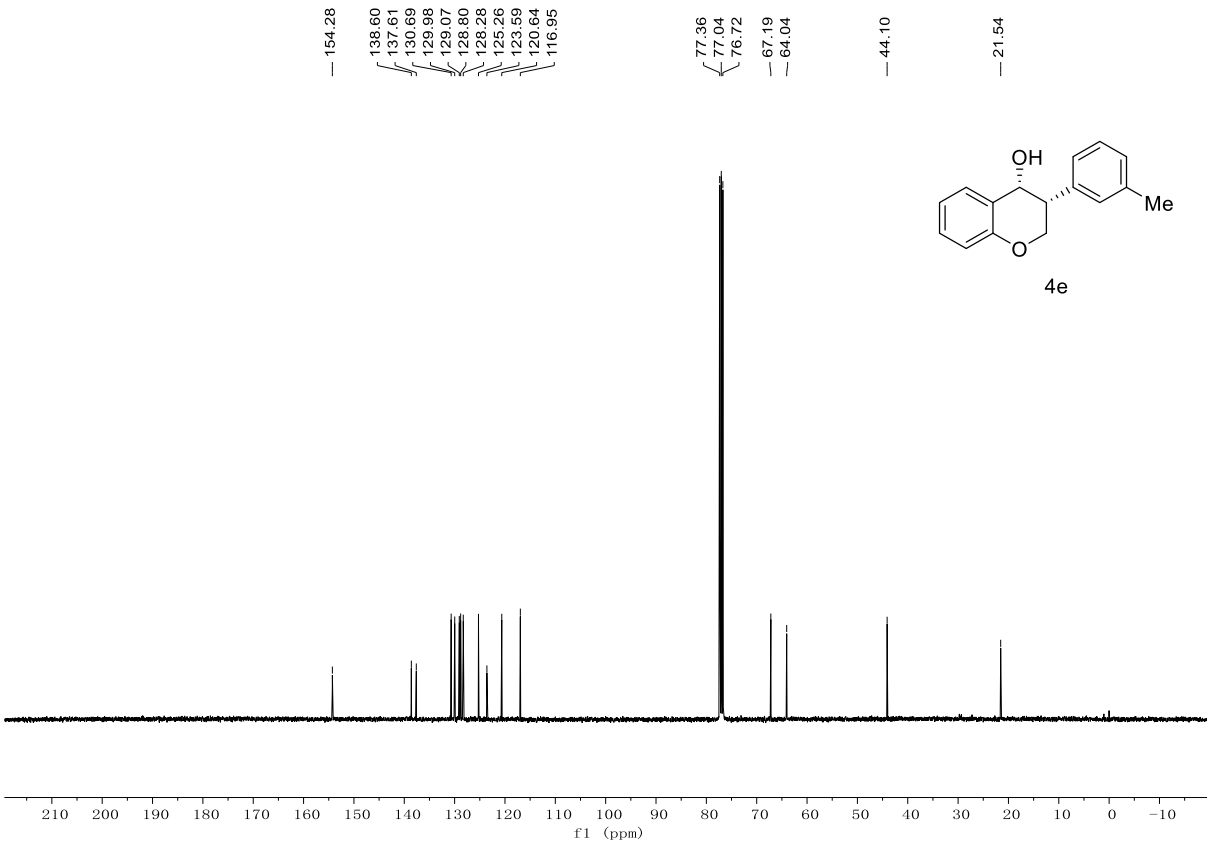
^{1}H and ^{13}C-NMR of 4d



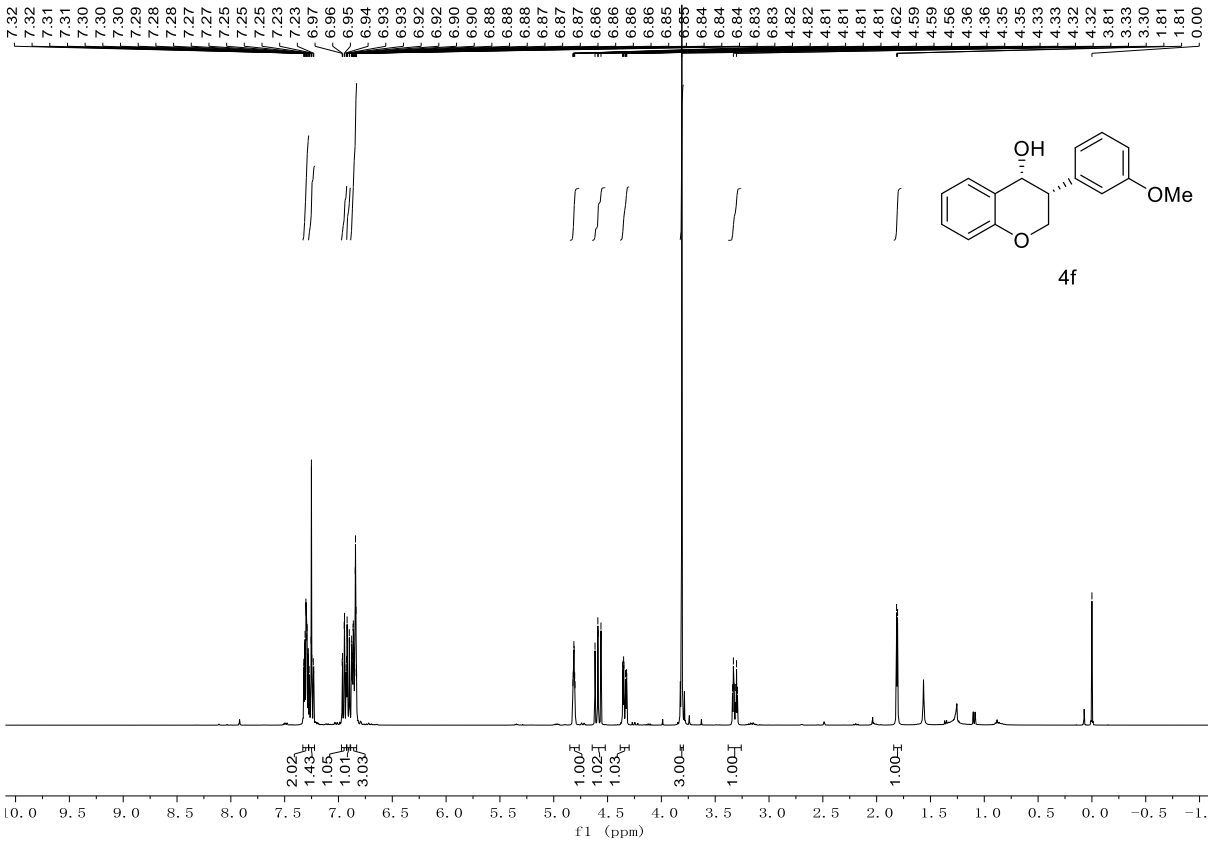


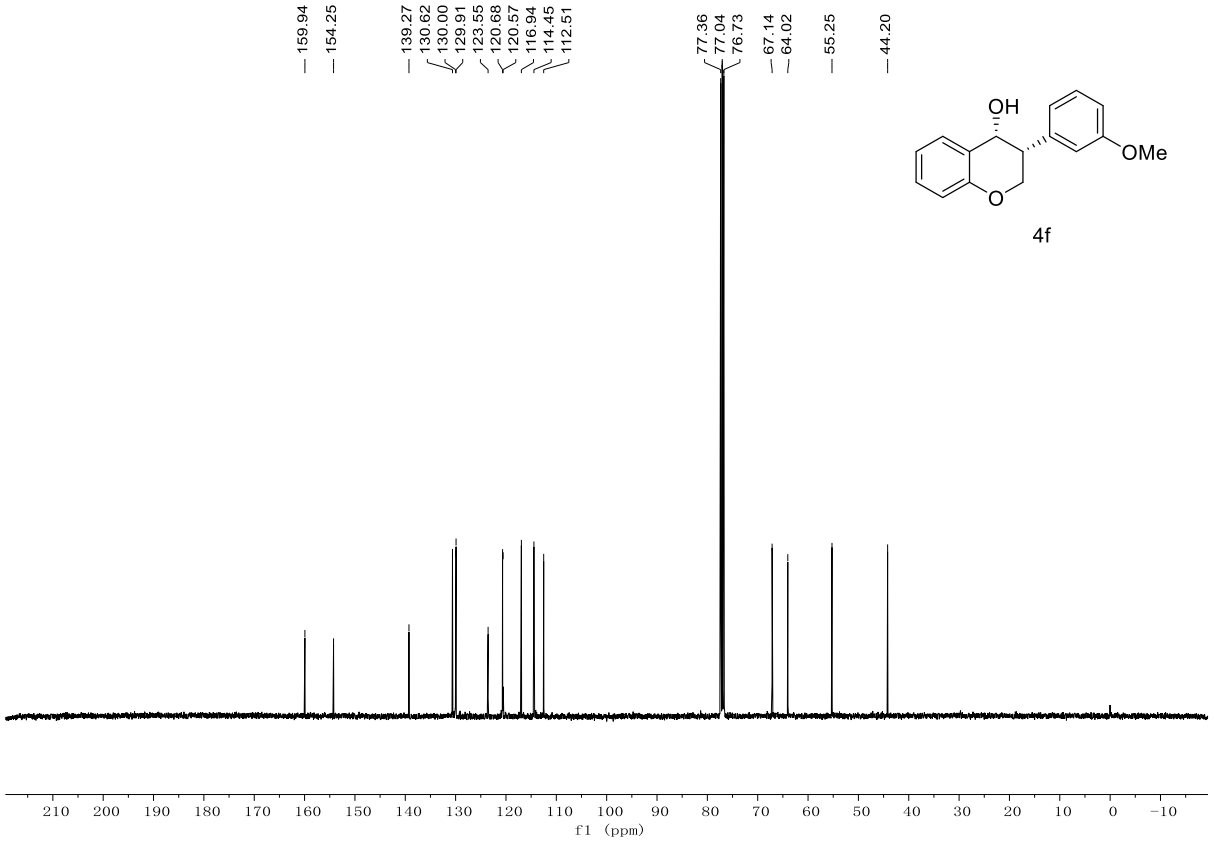
^{1}H and ^{13}C-NMR of 4e



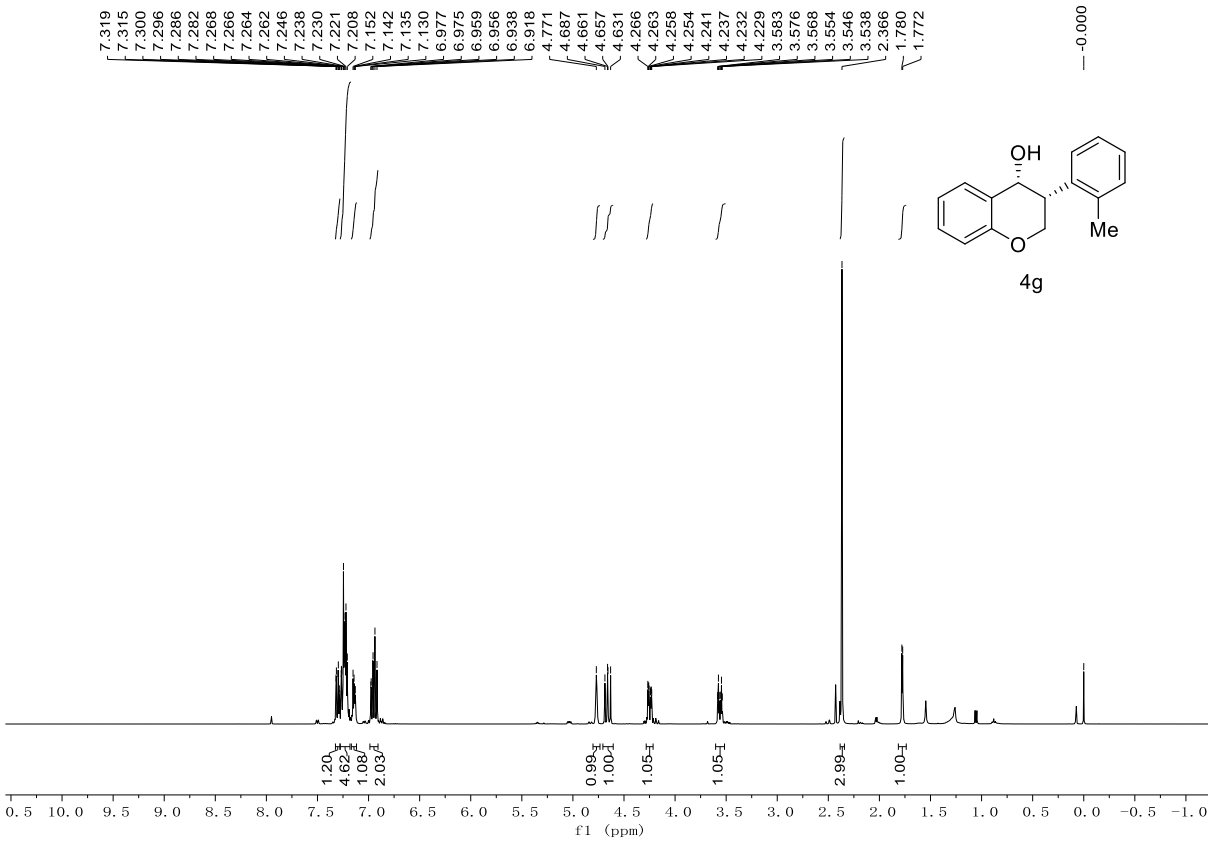


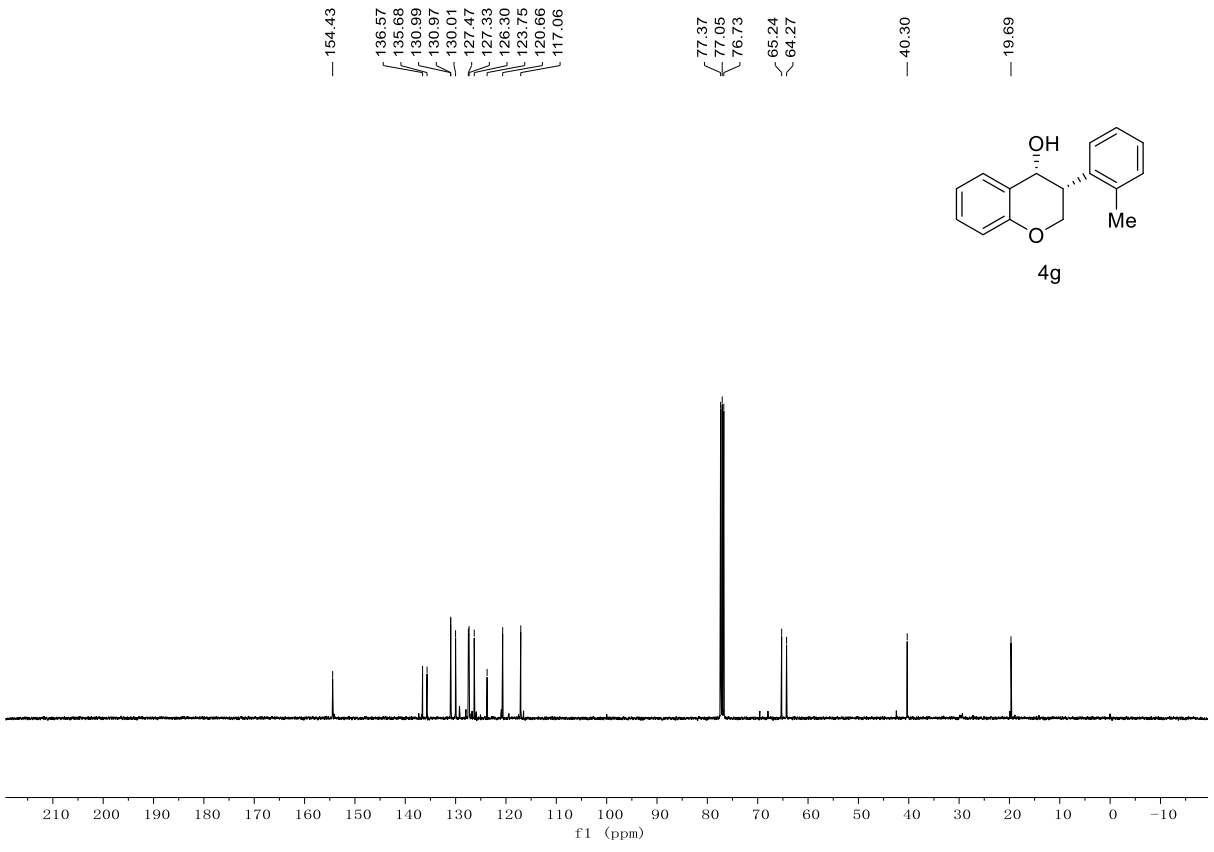
^{1}H and ^{13}C-NMR of 4f



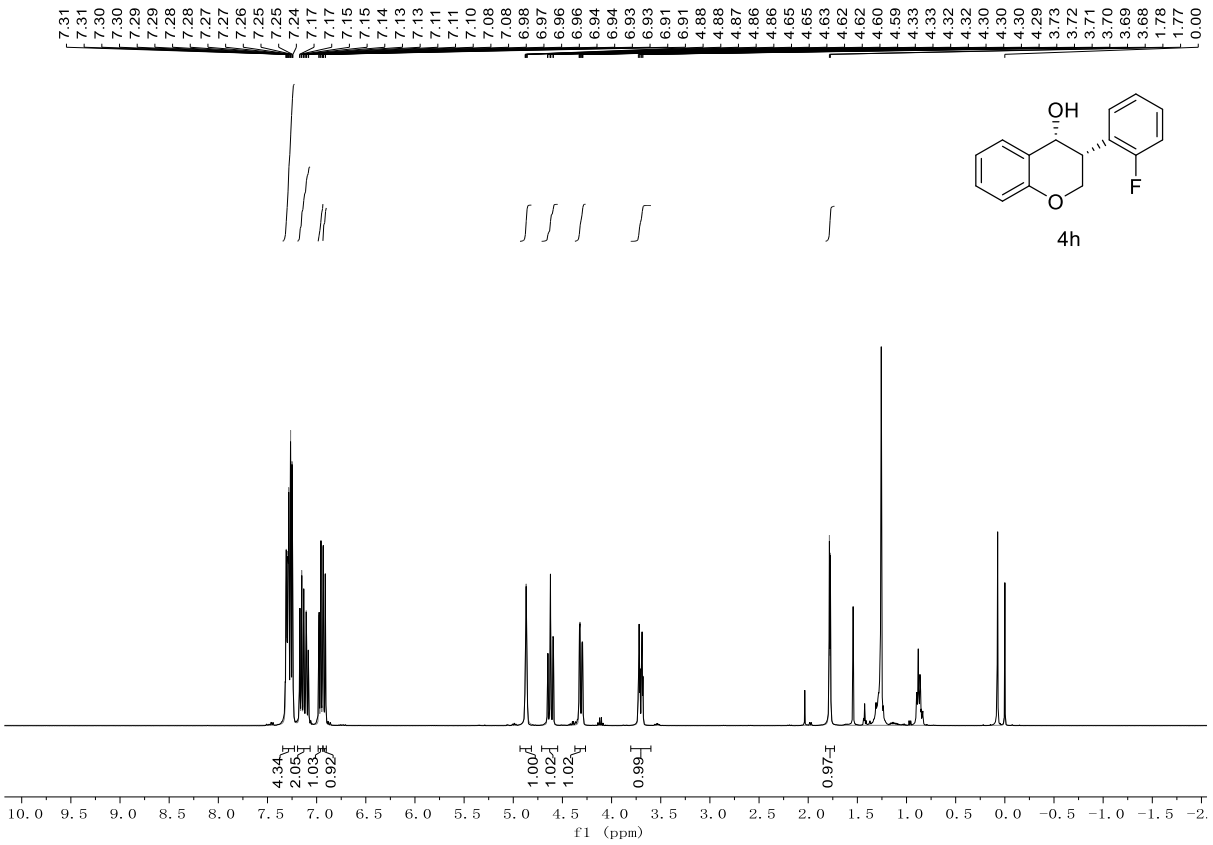


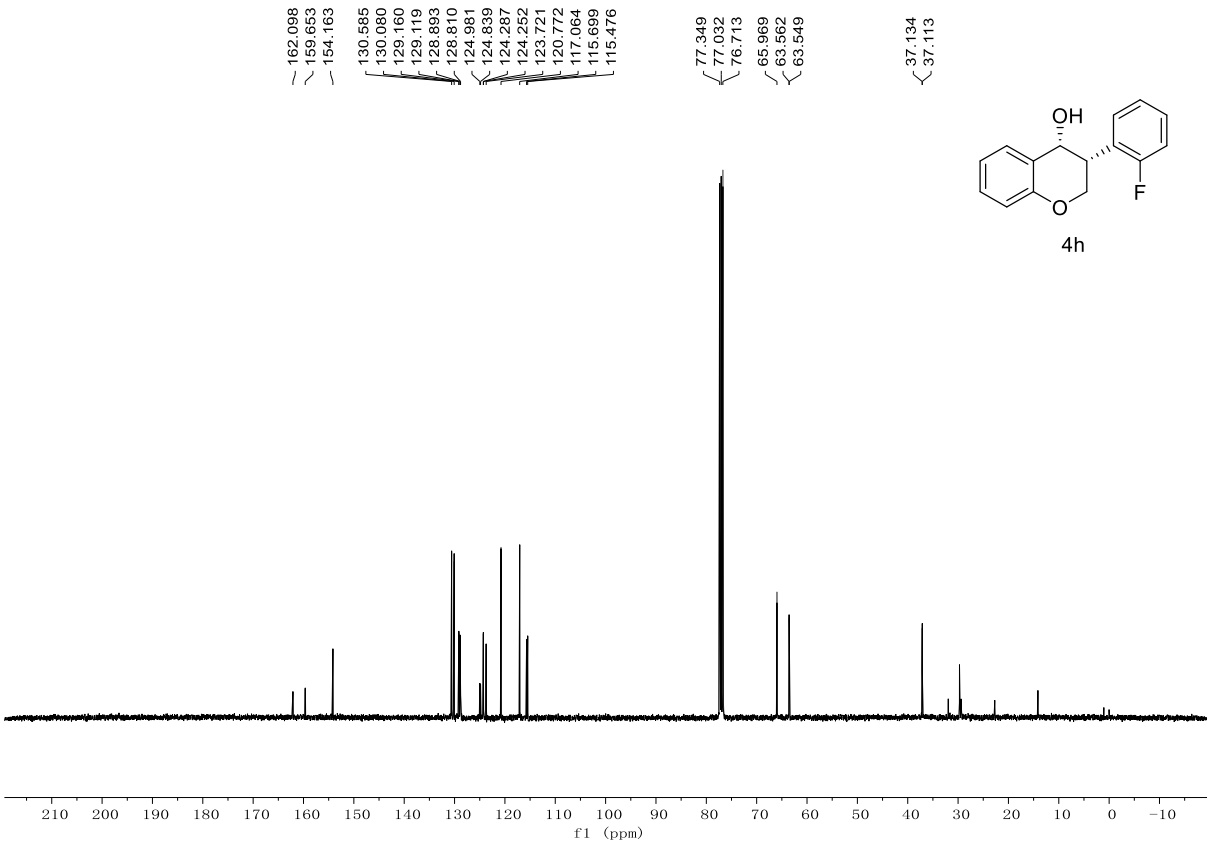
^{1}H and ^{13}C-NMR of 4g



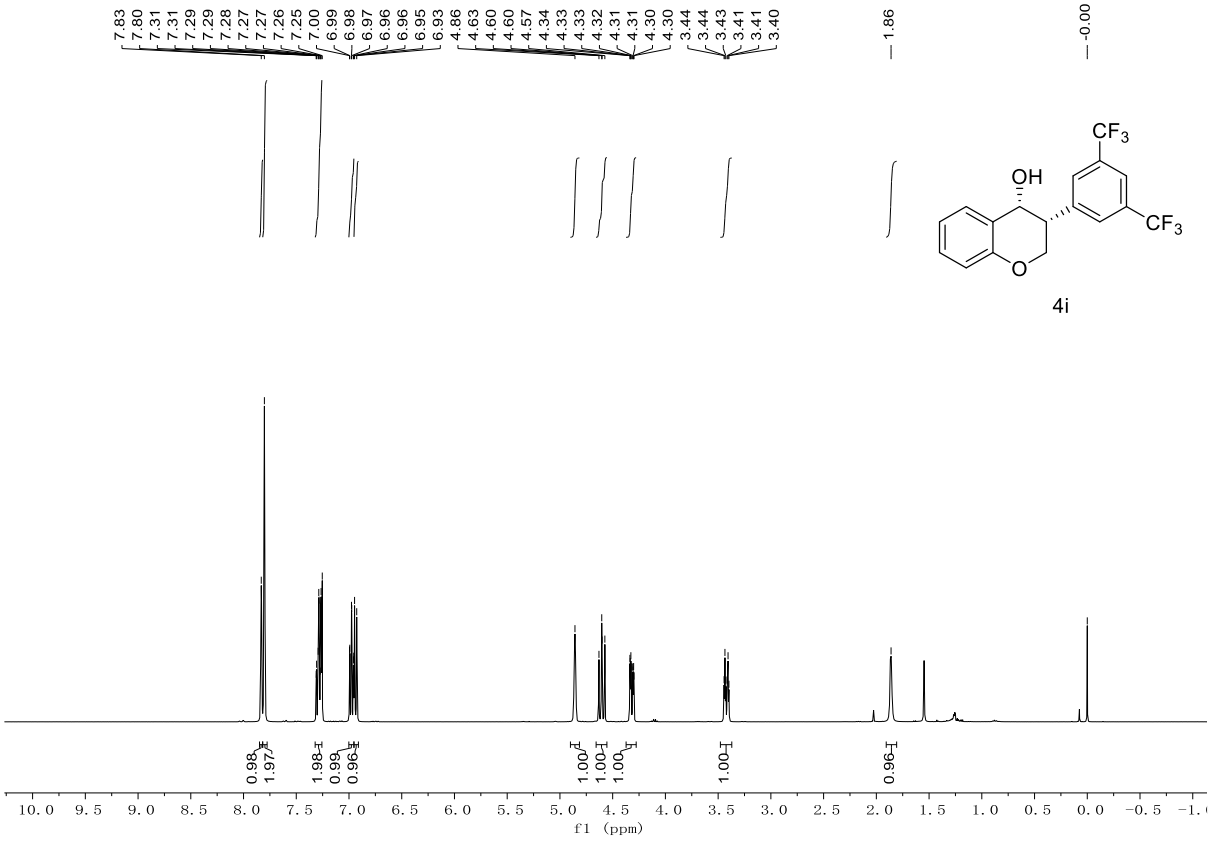


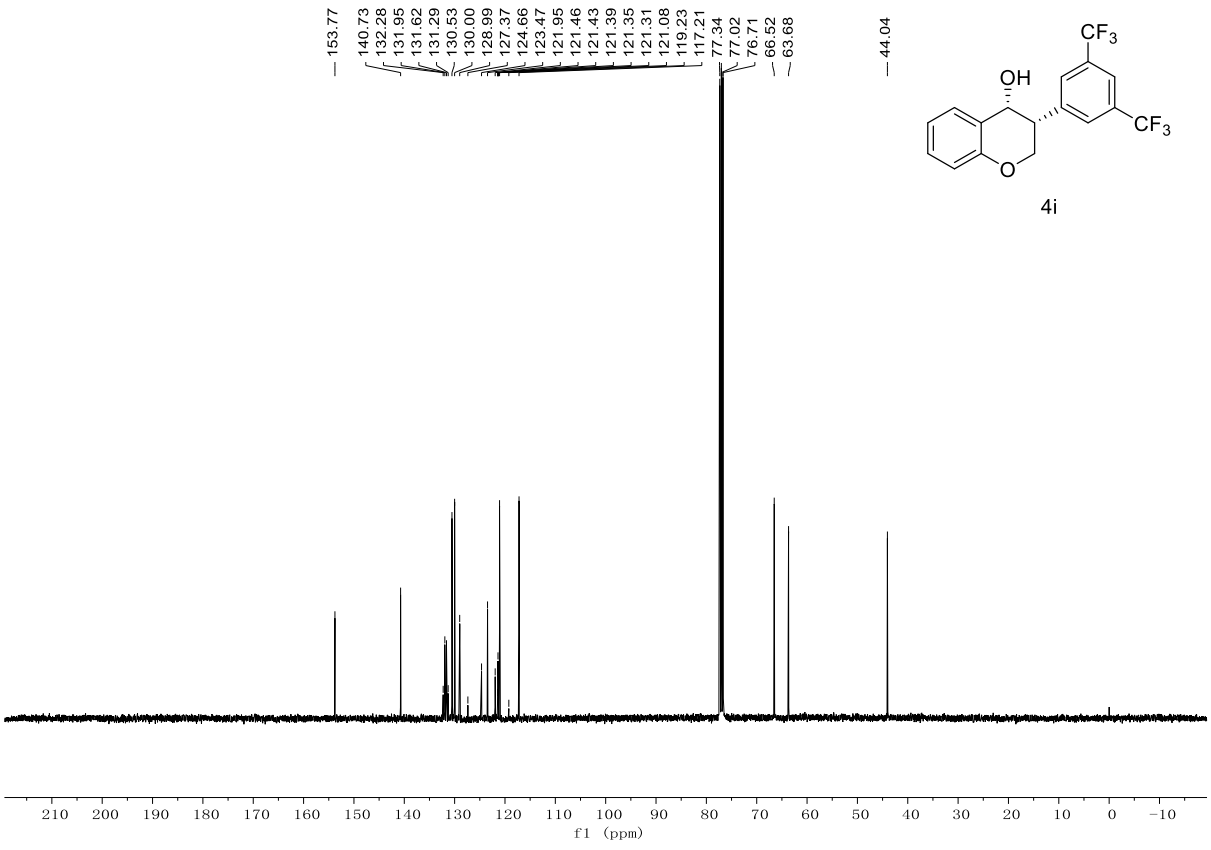
^{1}H and ^{13}C-NMR of 4h



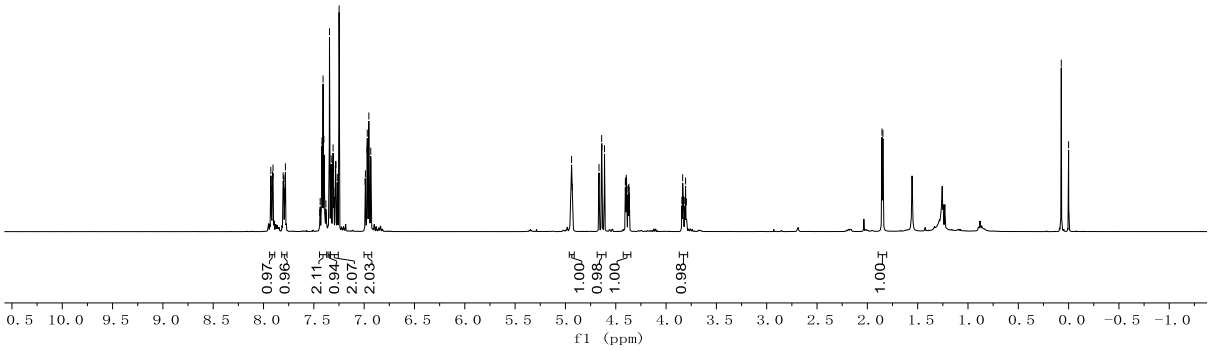


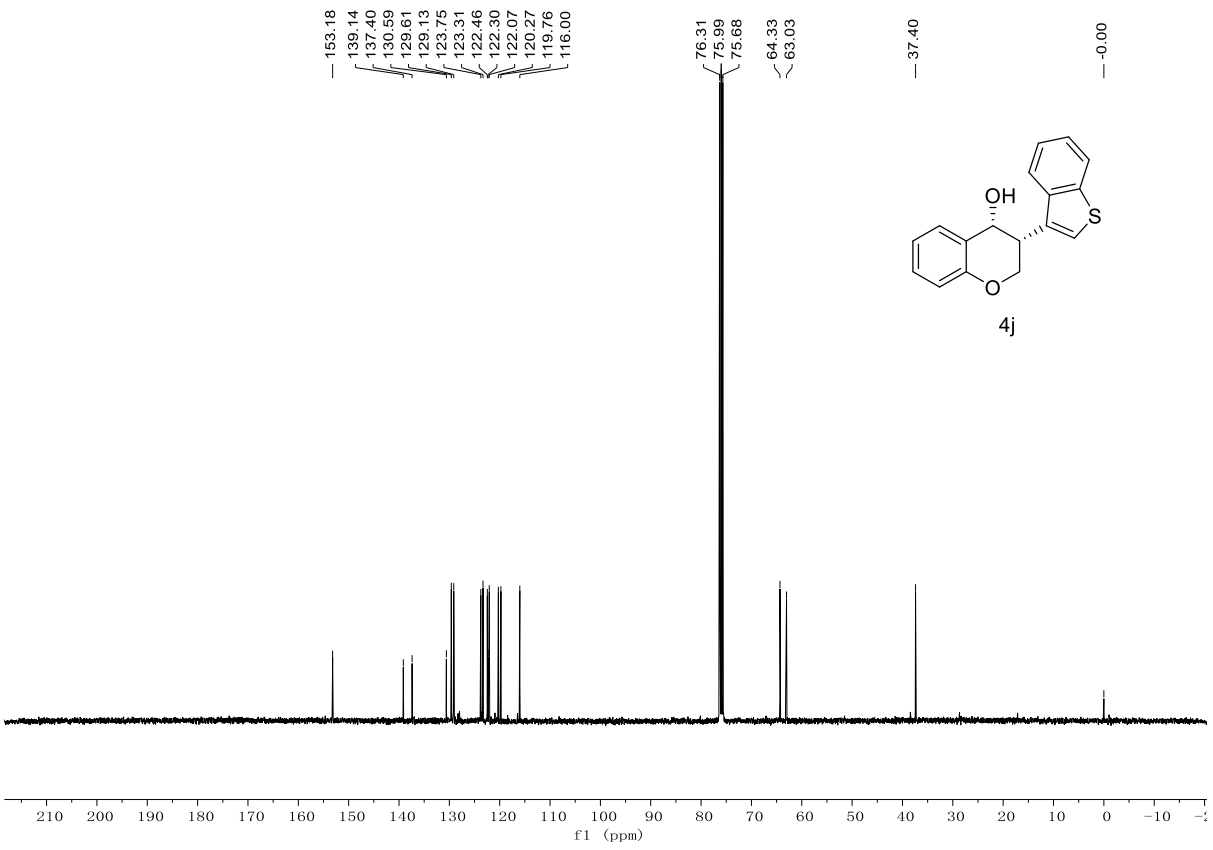
^{1}H and ^{13}C-NMR of 4i



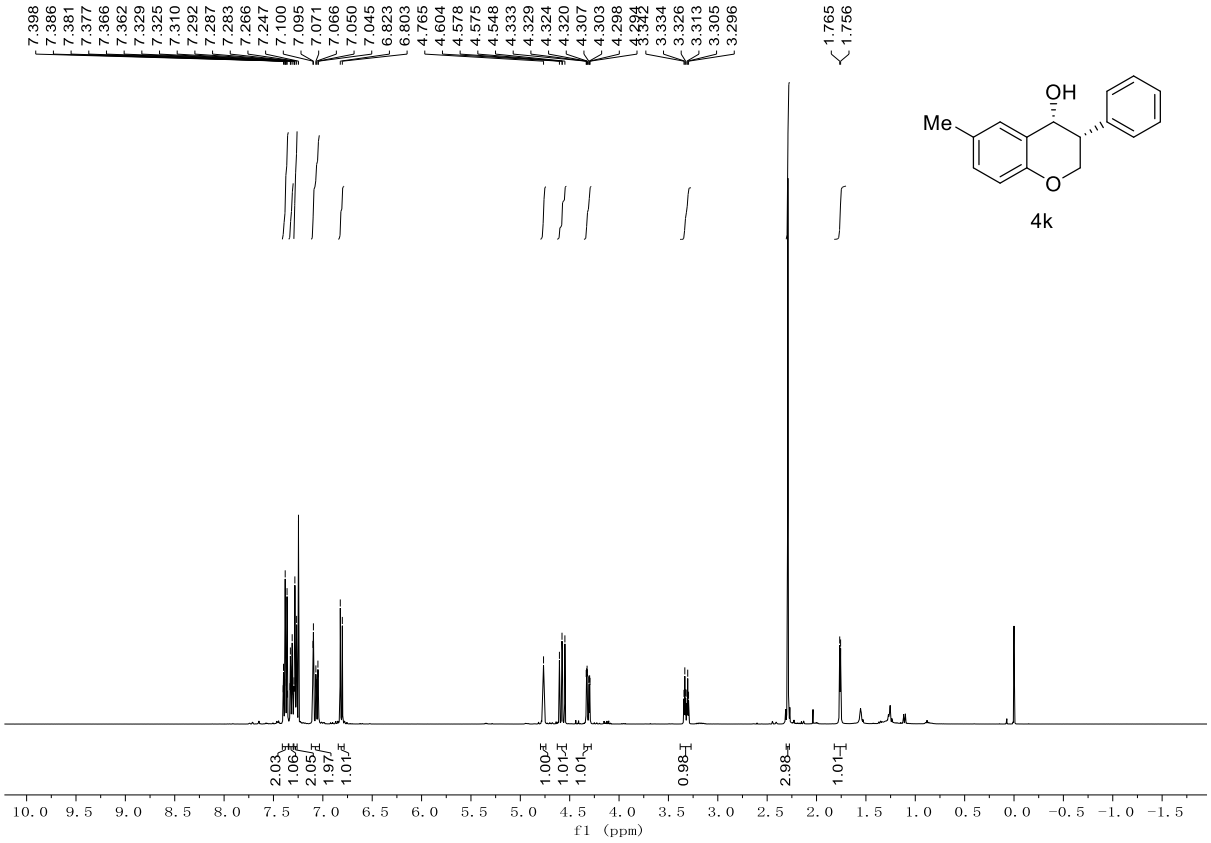


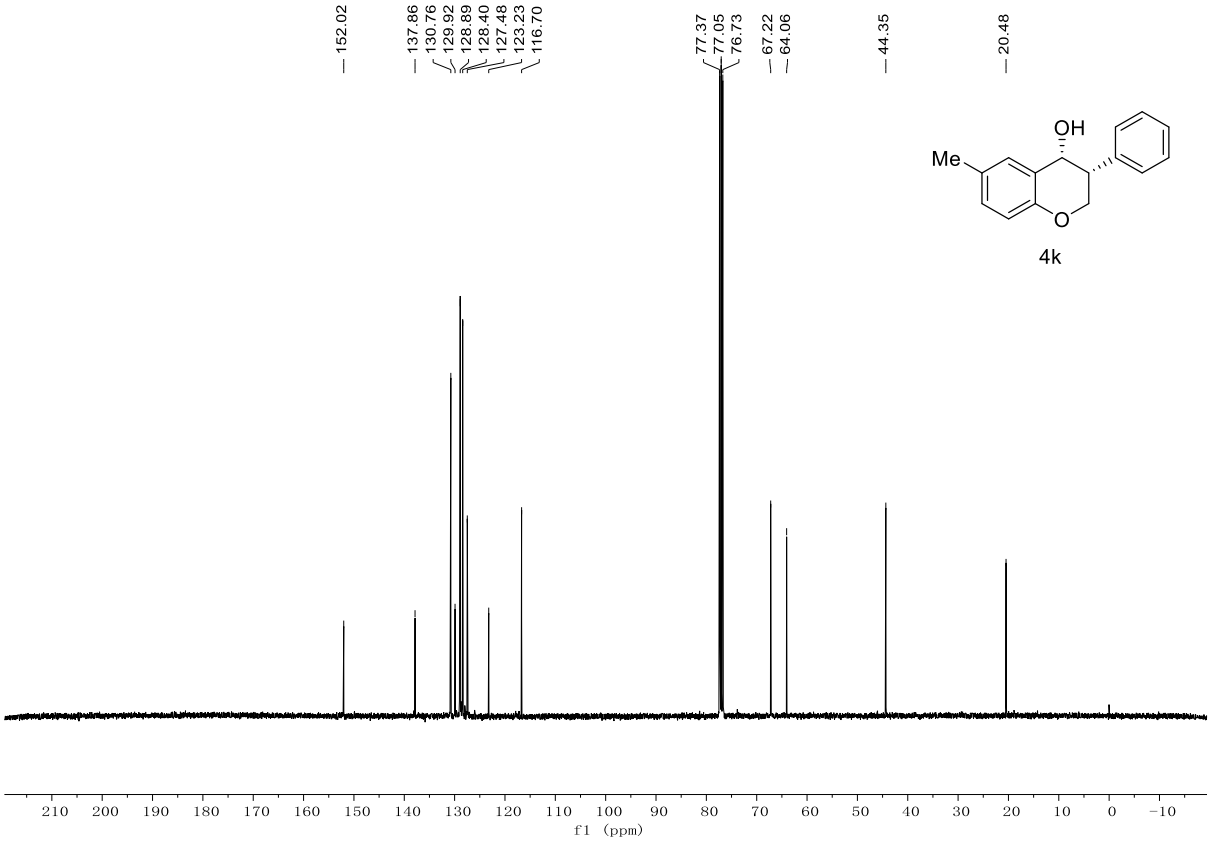
^{1}H and ^{13}C-NMR of 4j



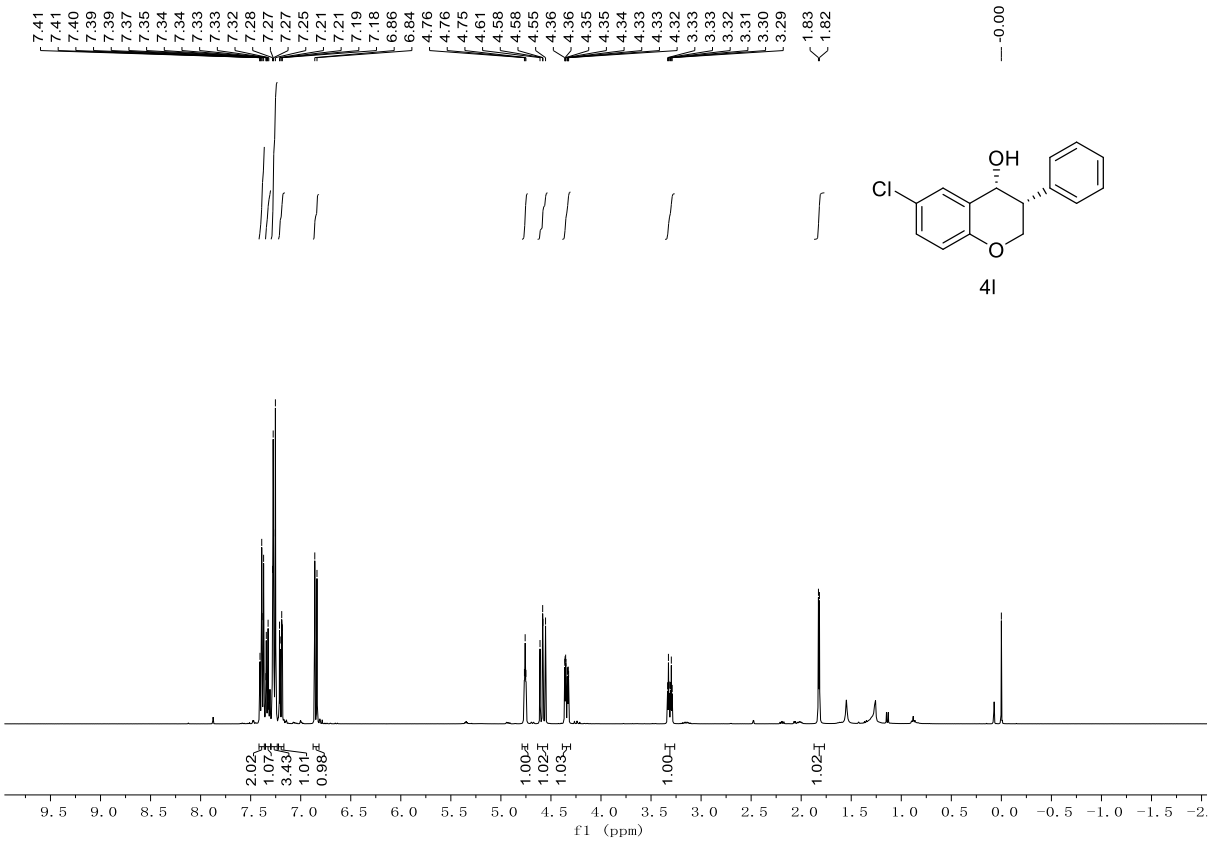


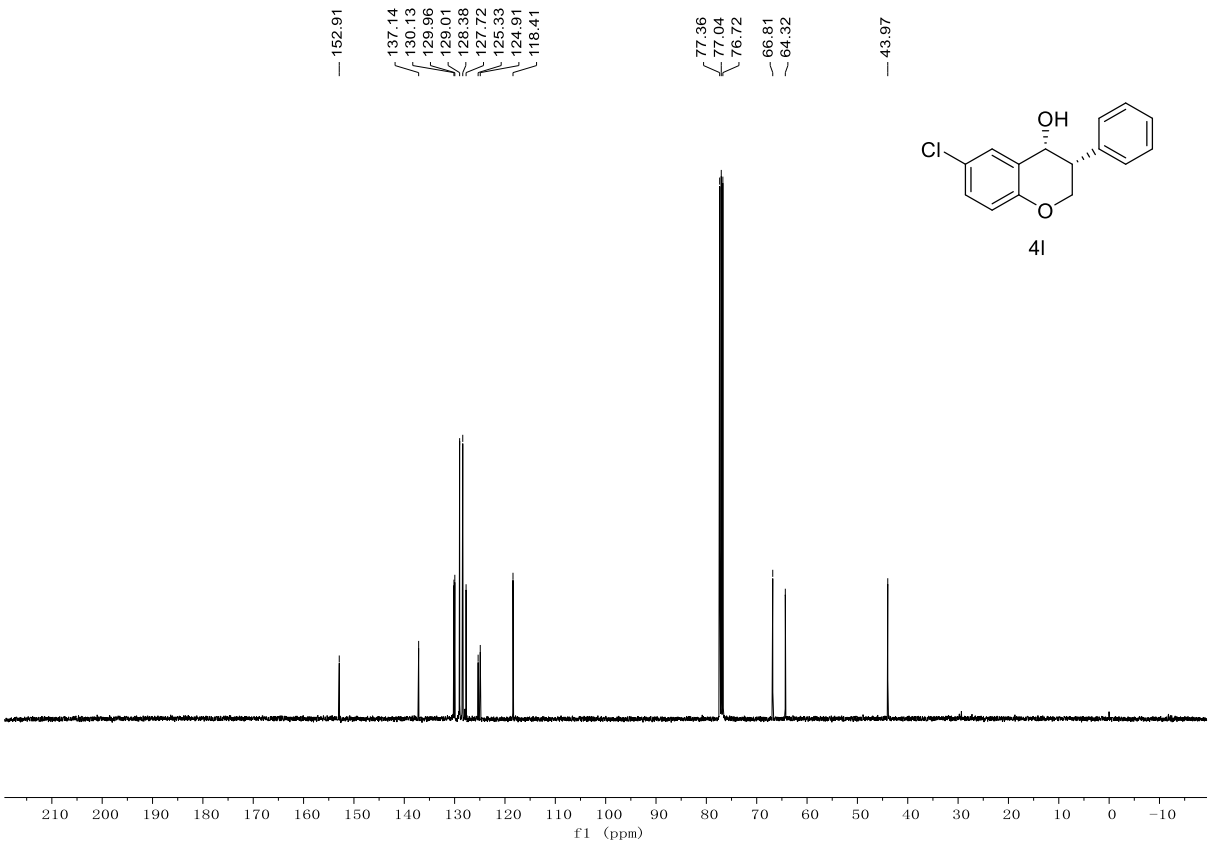
^{1}H and ^{13}C-NMR of 4k



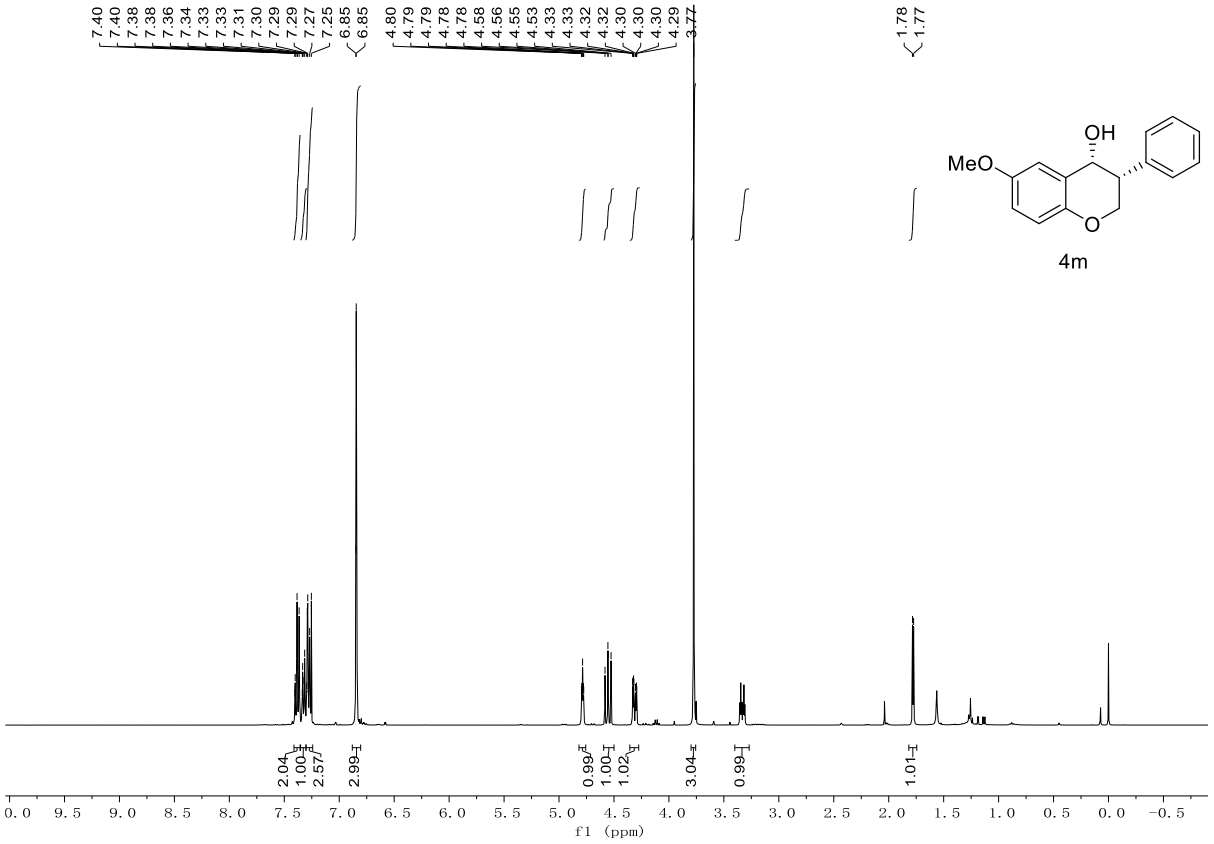


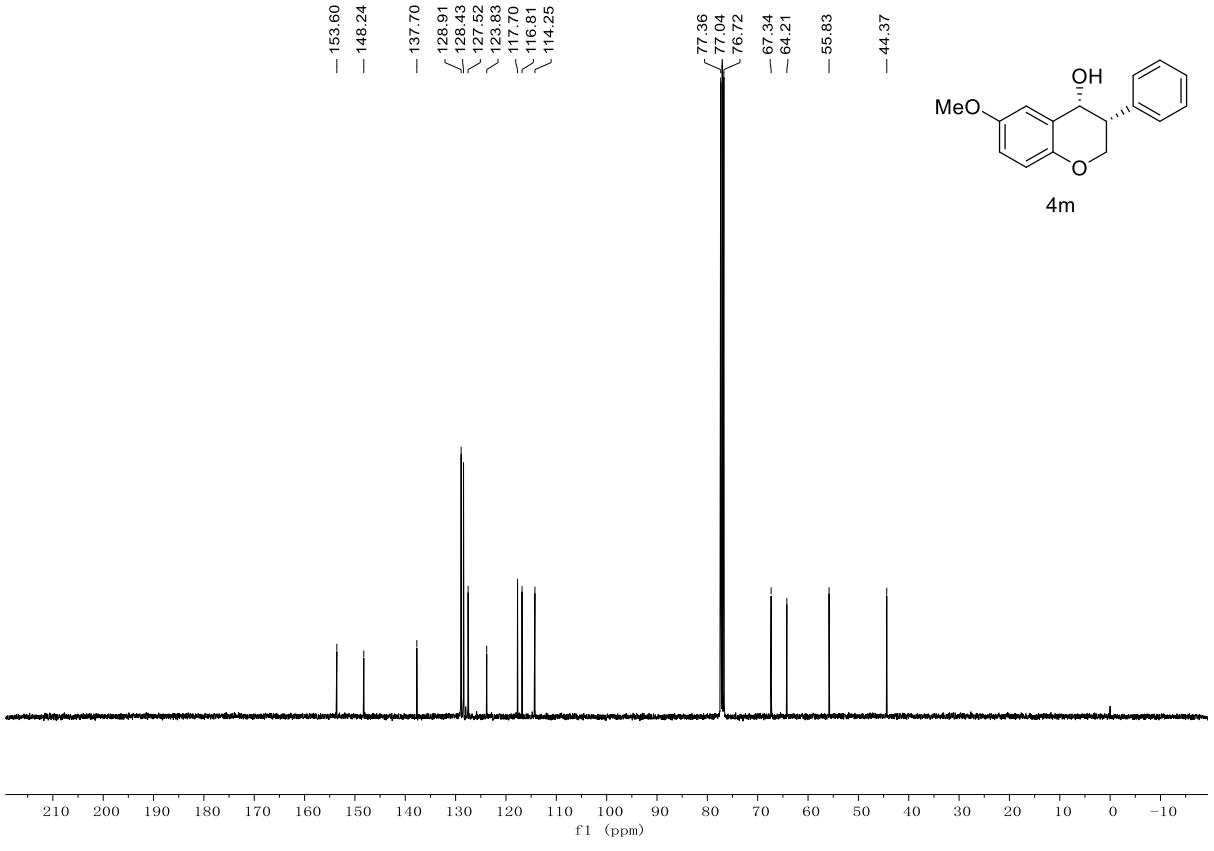
^{1}H and ^{13}C-NMR of 4l



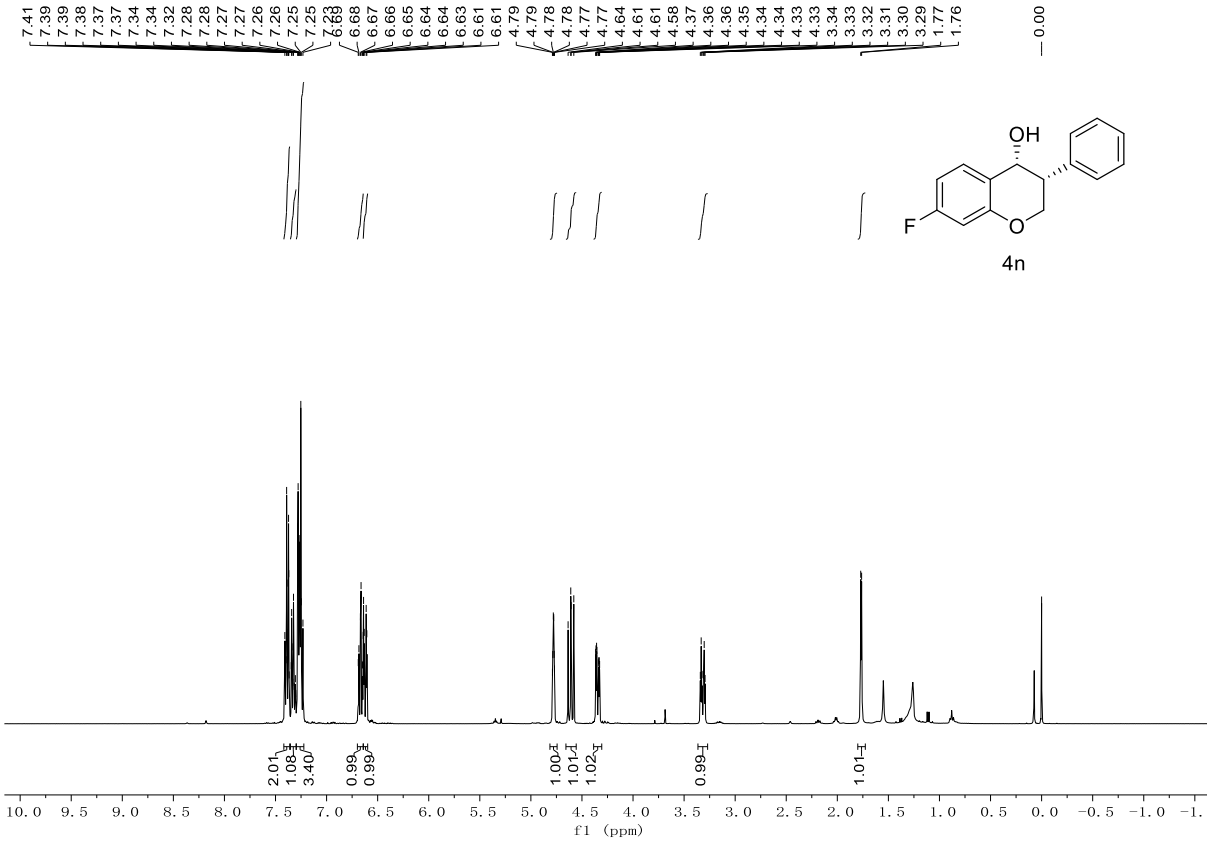


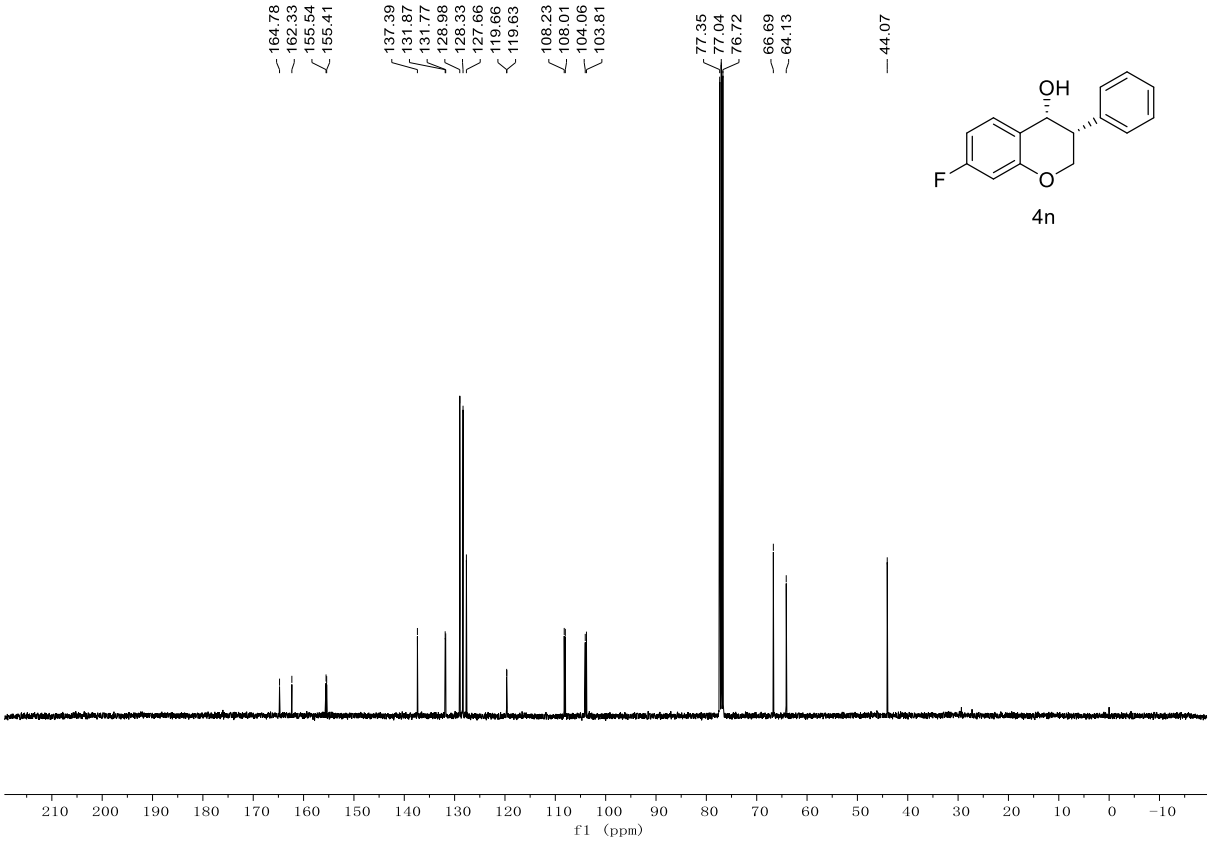
^{1}H and ^{13}C-NMR of 4m



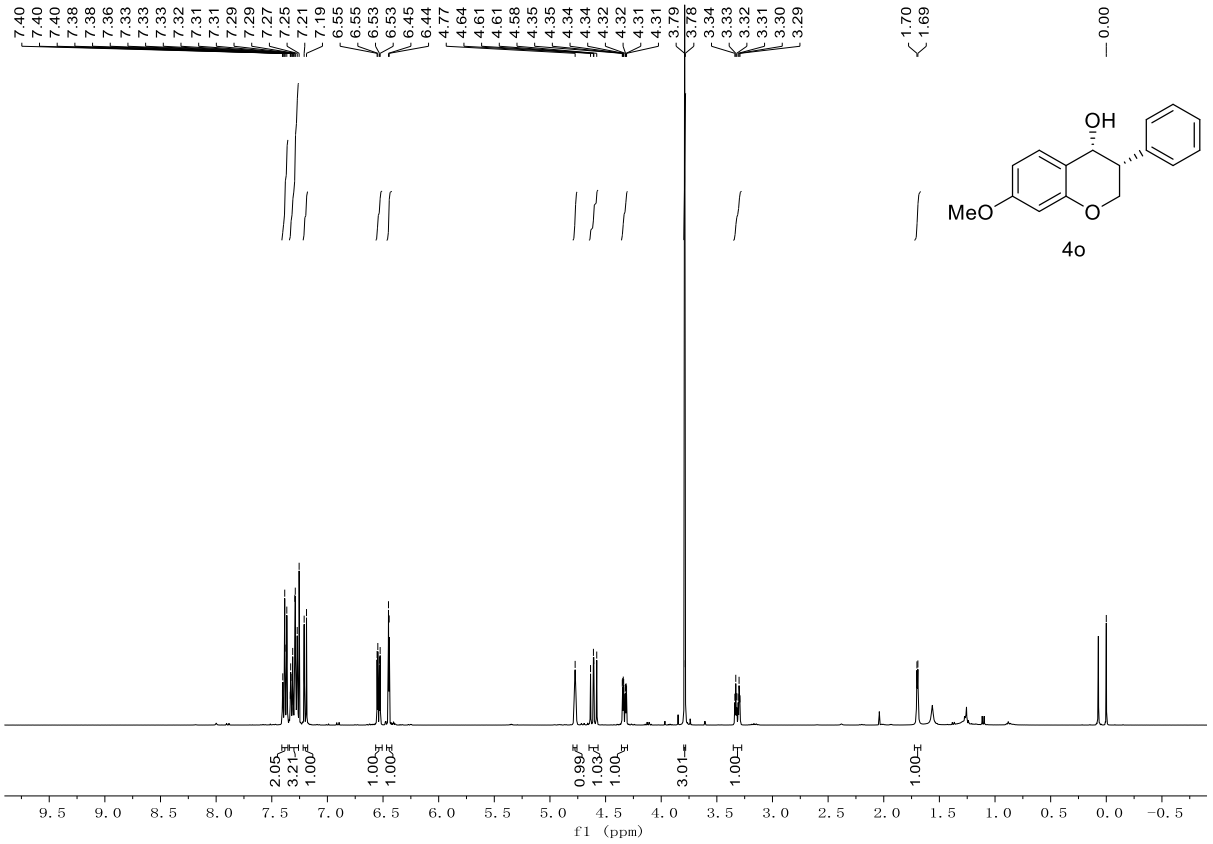


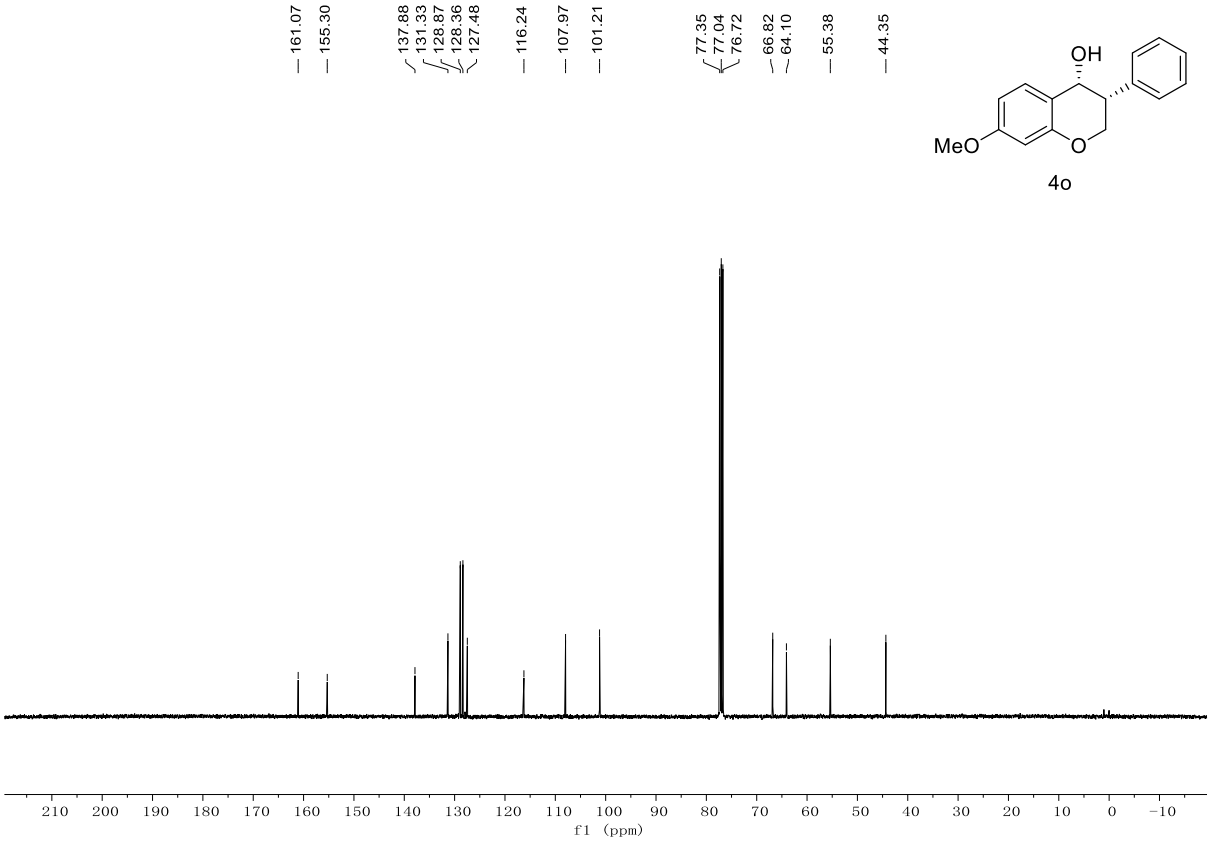
^{1}H and ^{13}C-NMR of 4n



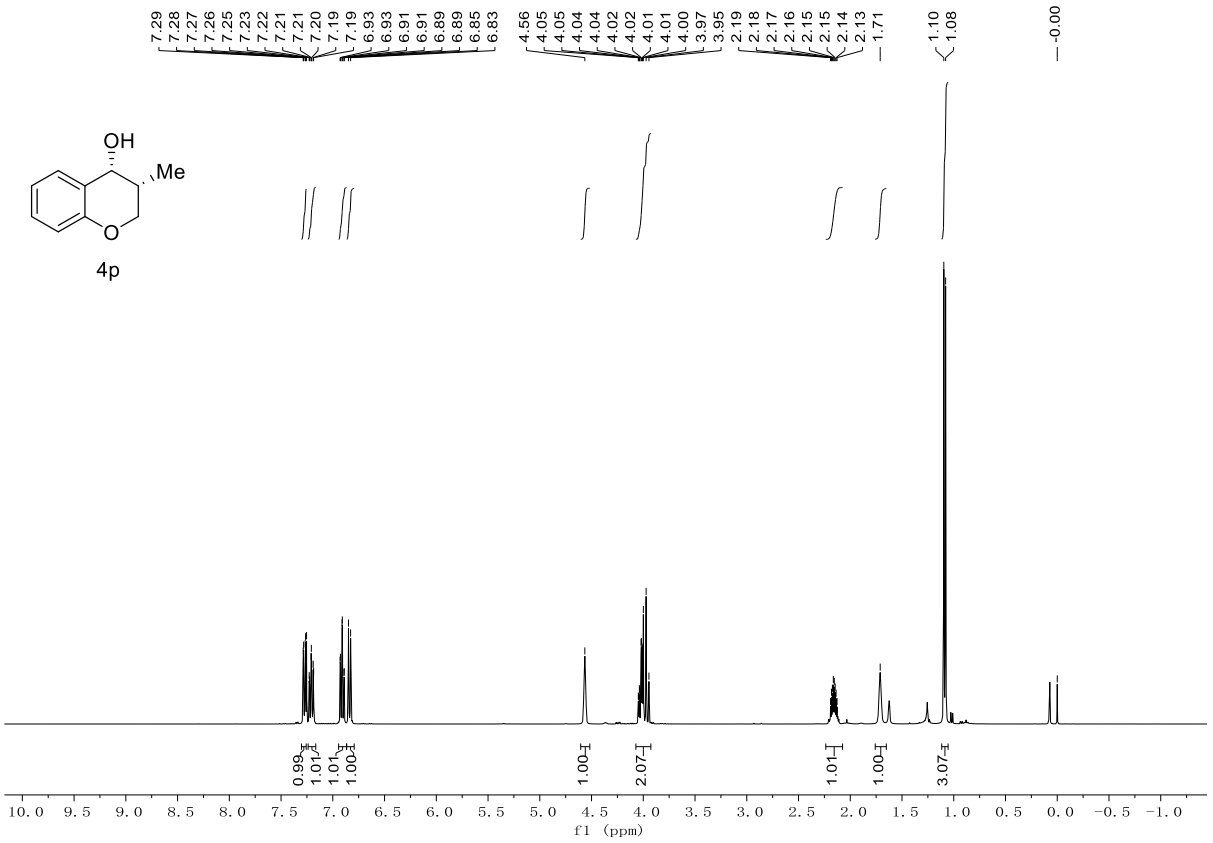


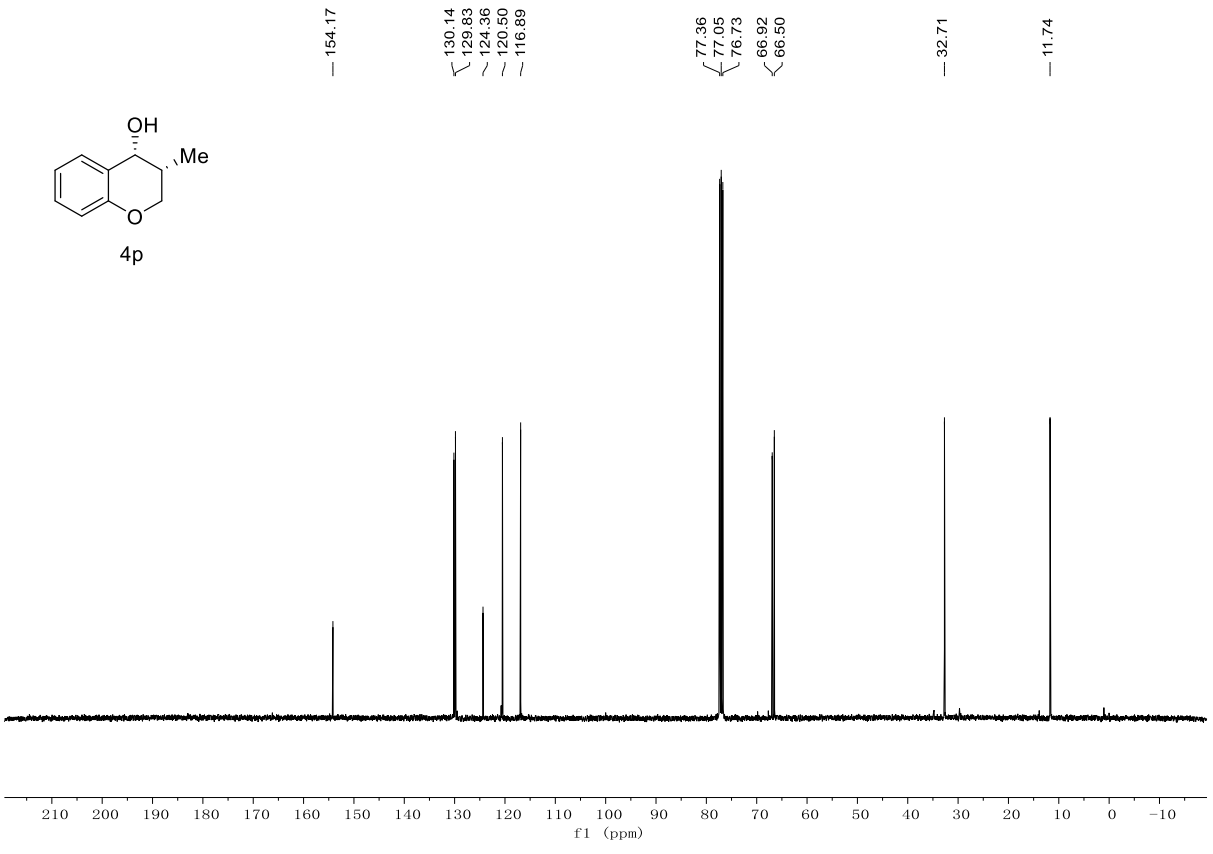
^{1}H and ^{13}C-NMR of 4o



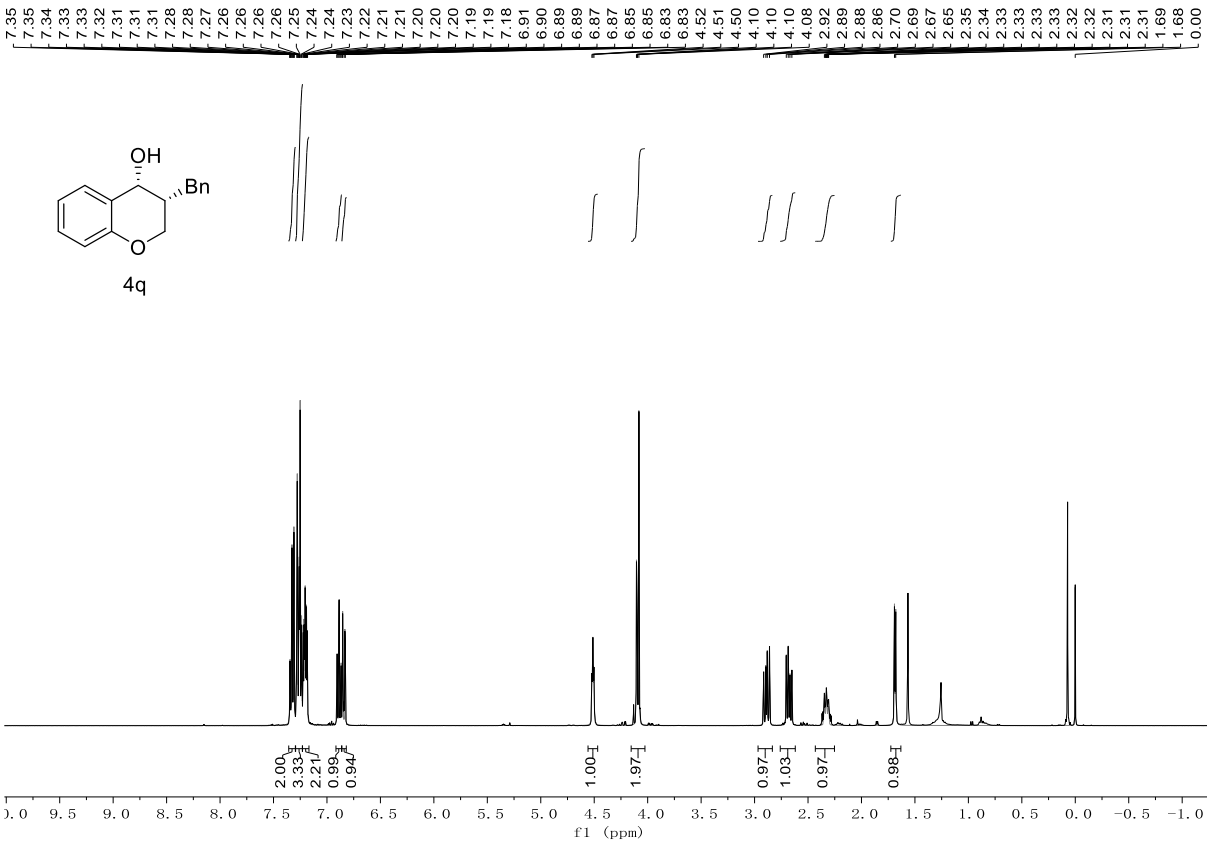


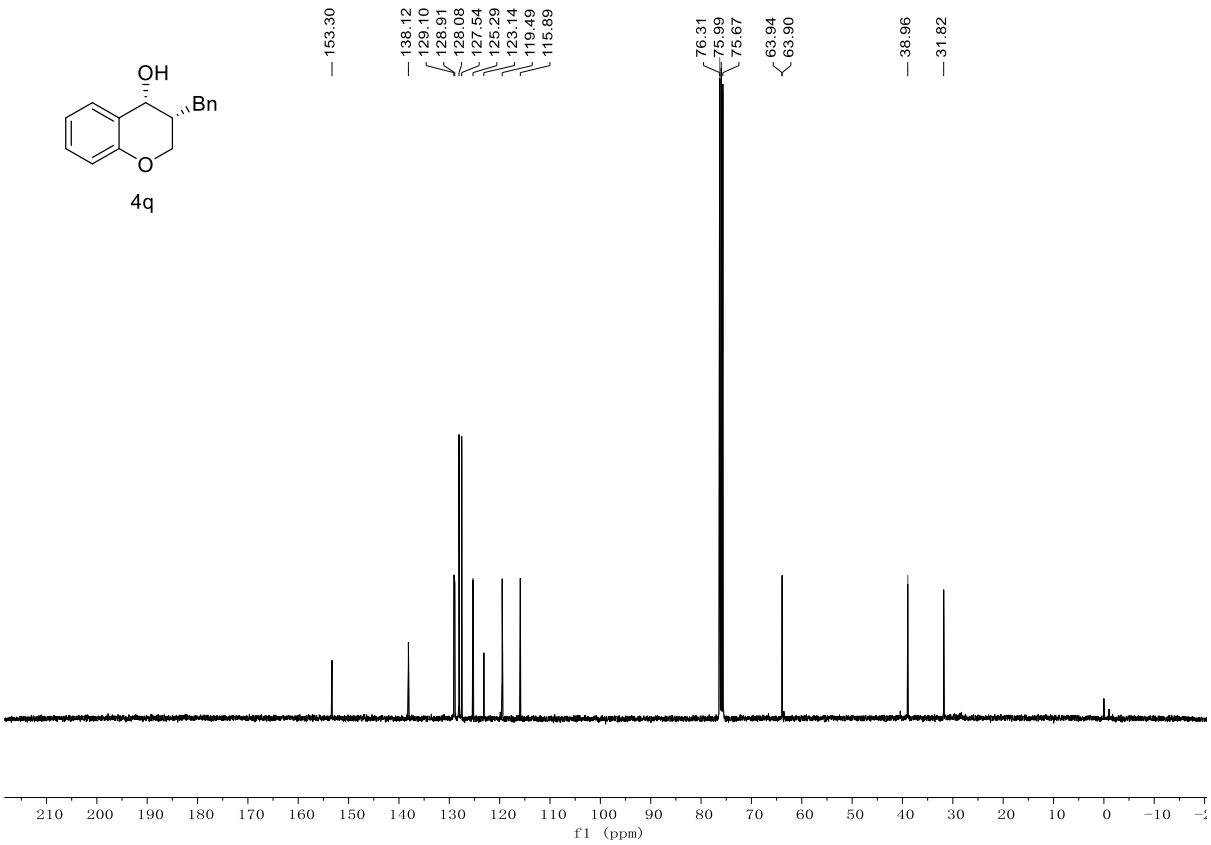
^{1}H and ^{13}C-NMR of 4p



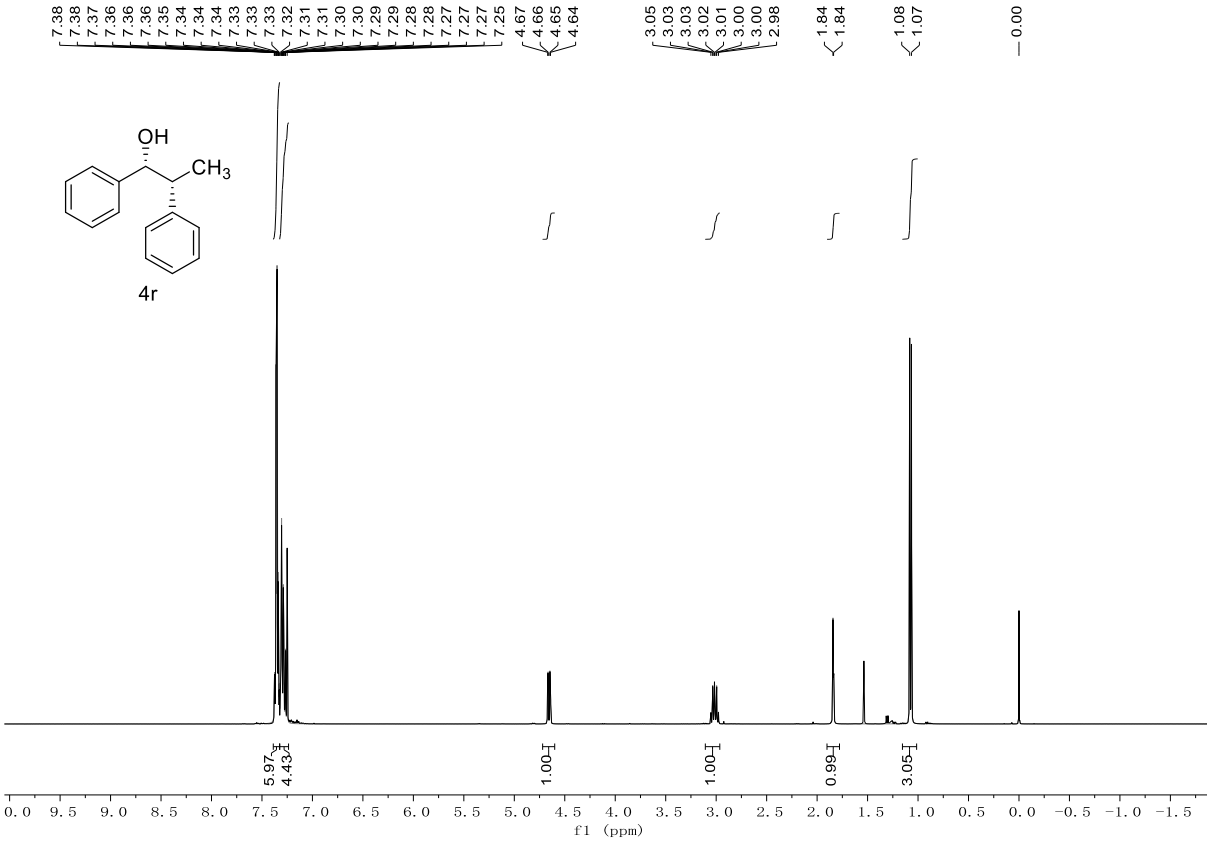


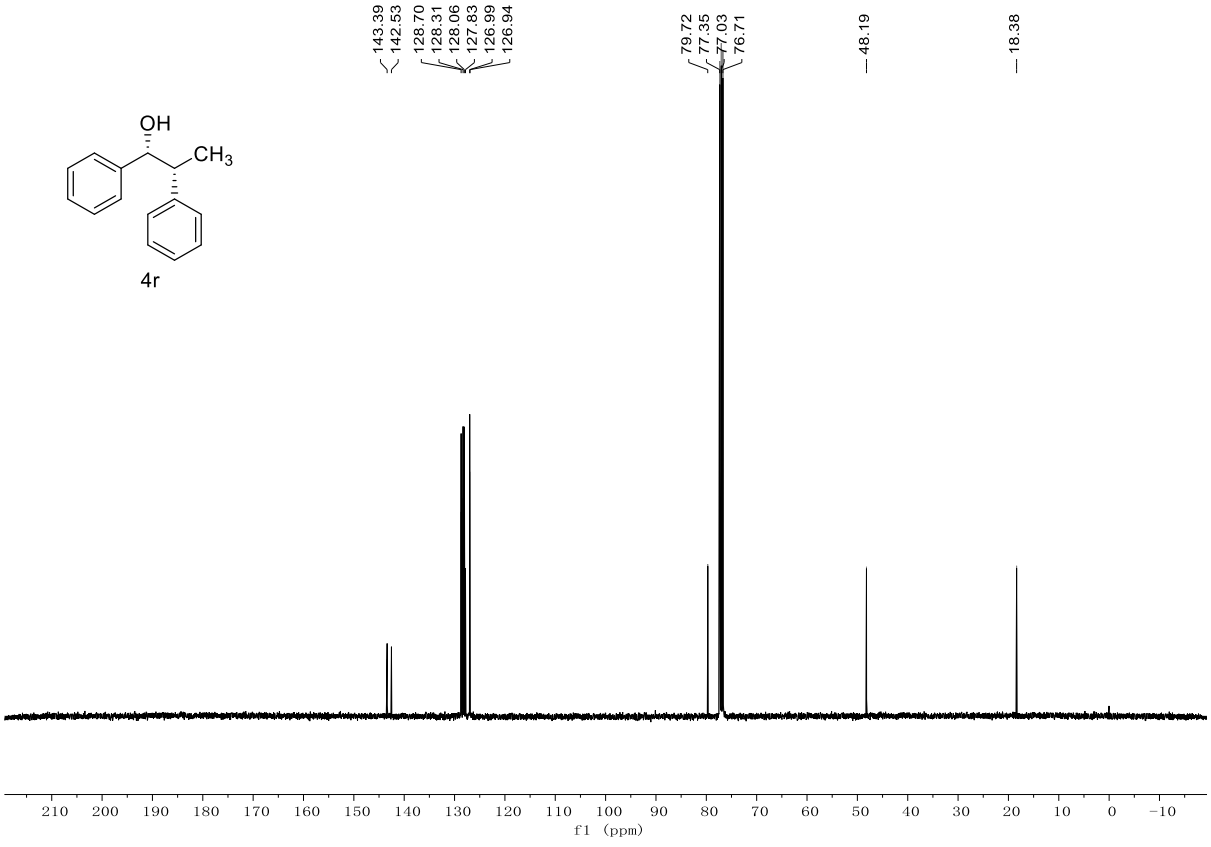
^{1}H and ^{13}C-NMR of 4q



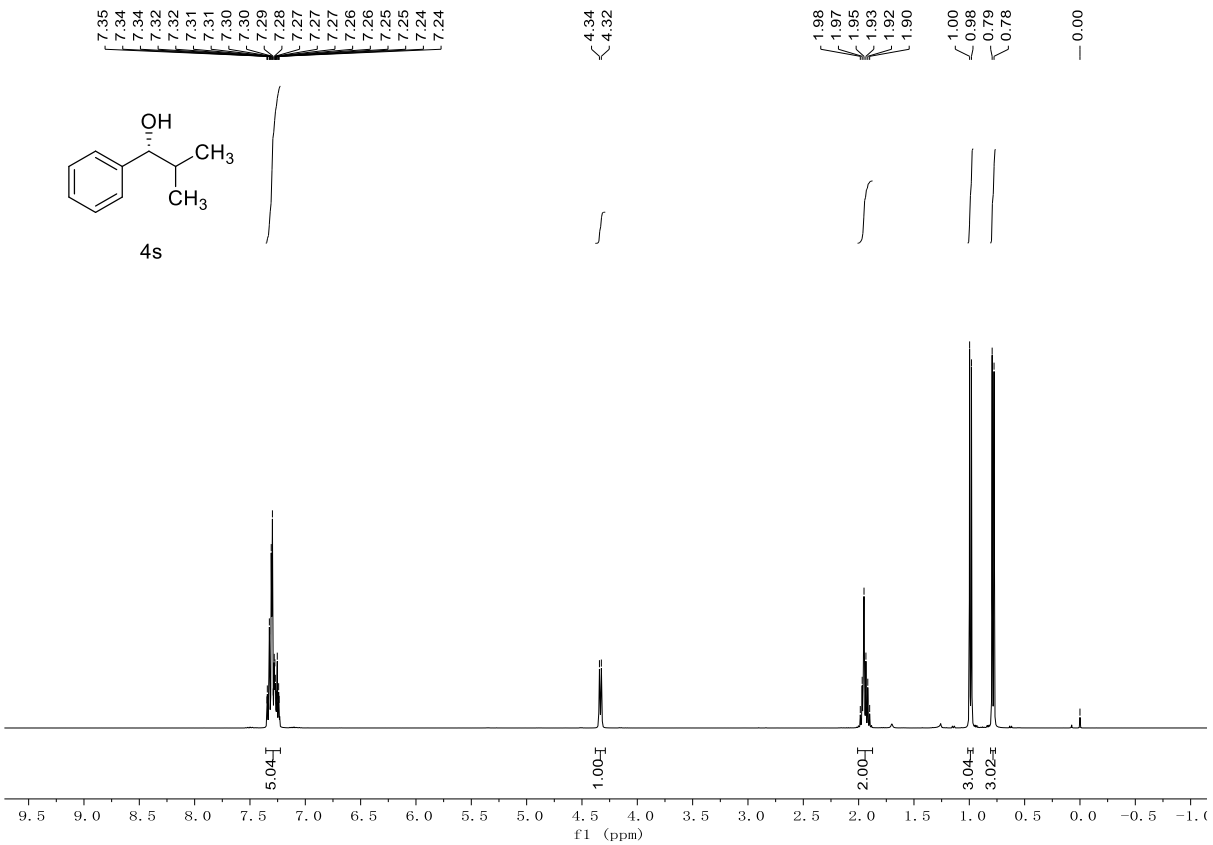


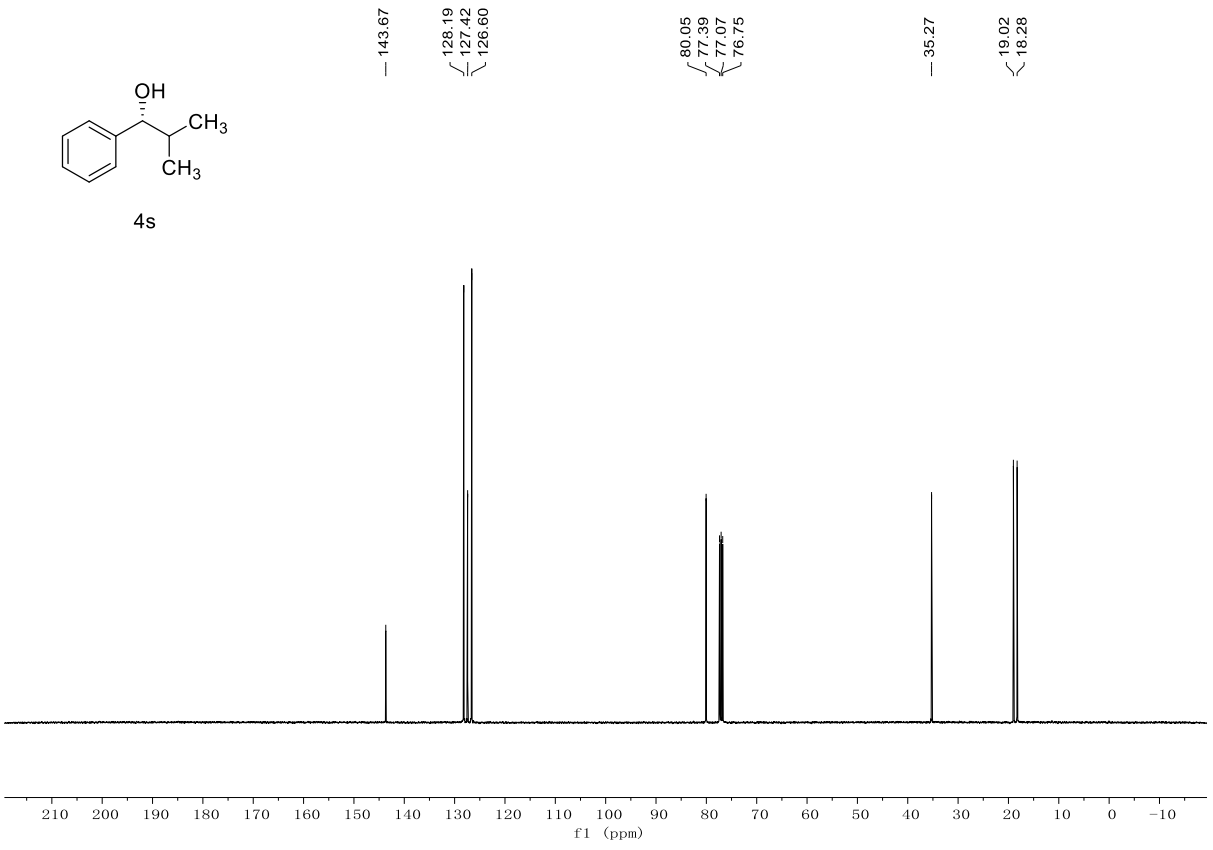
^{1}H and ^{13}C-NMR of 4r



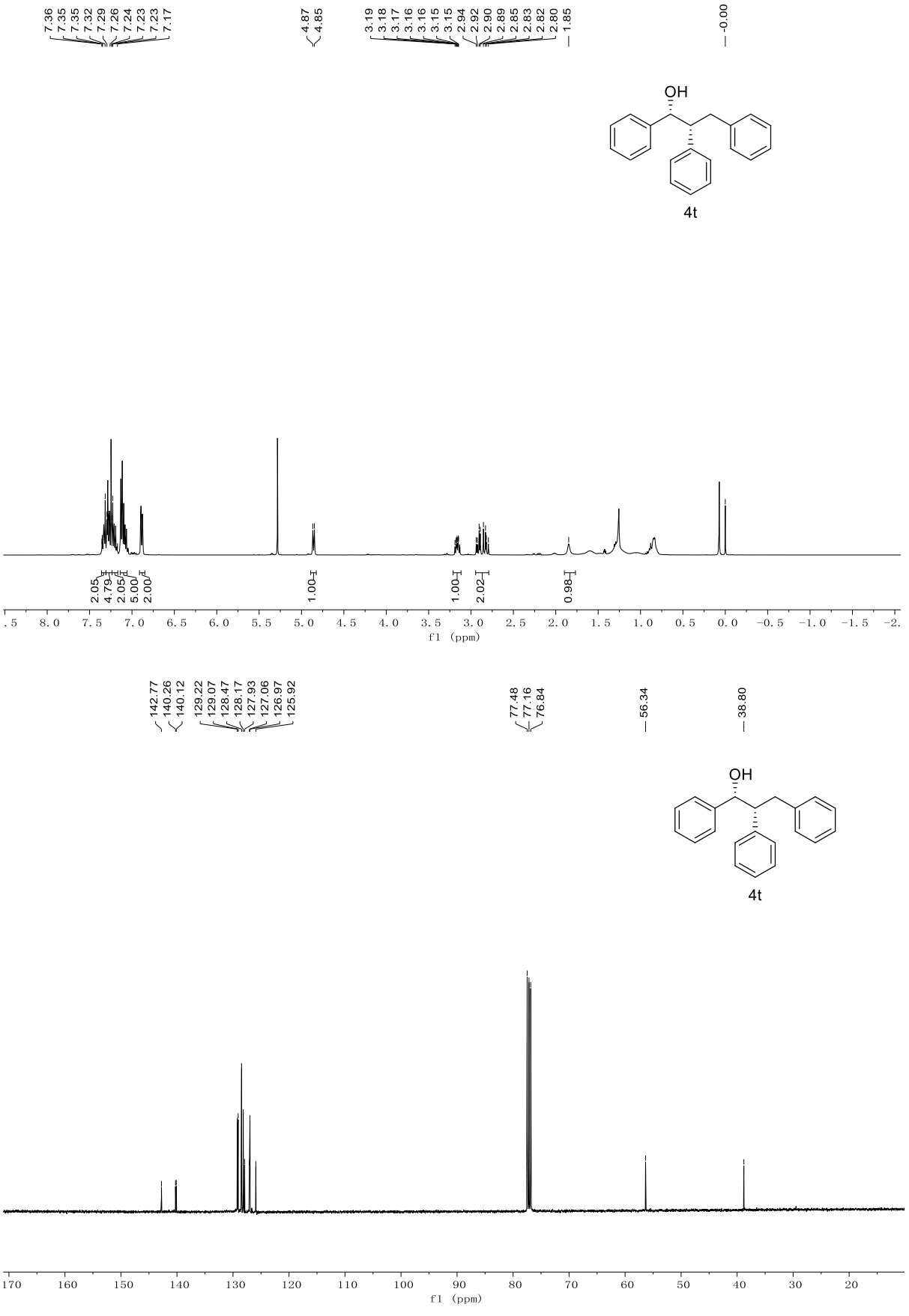


^{1}H and ^{13}C-NMR of 4s

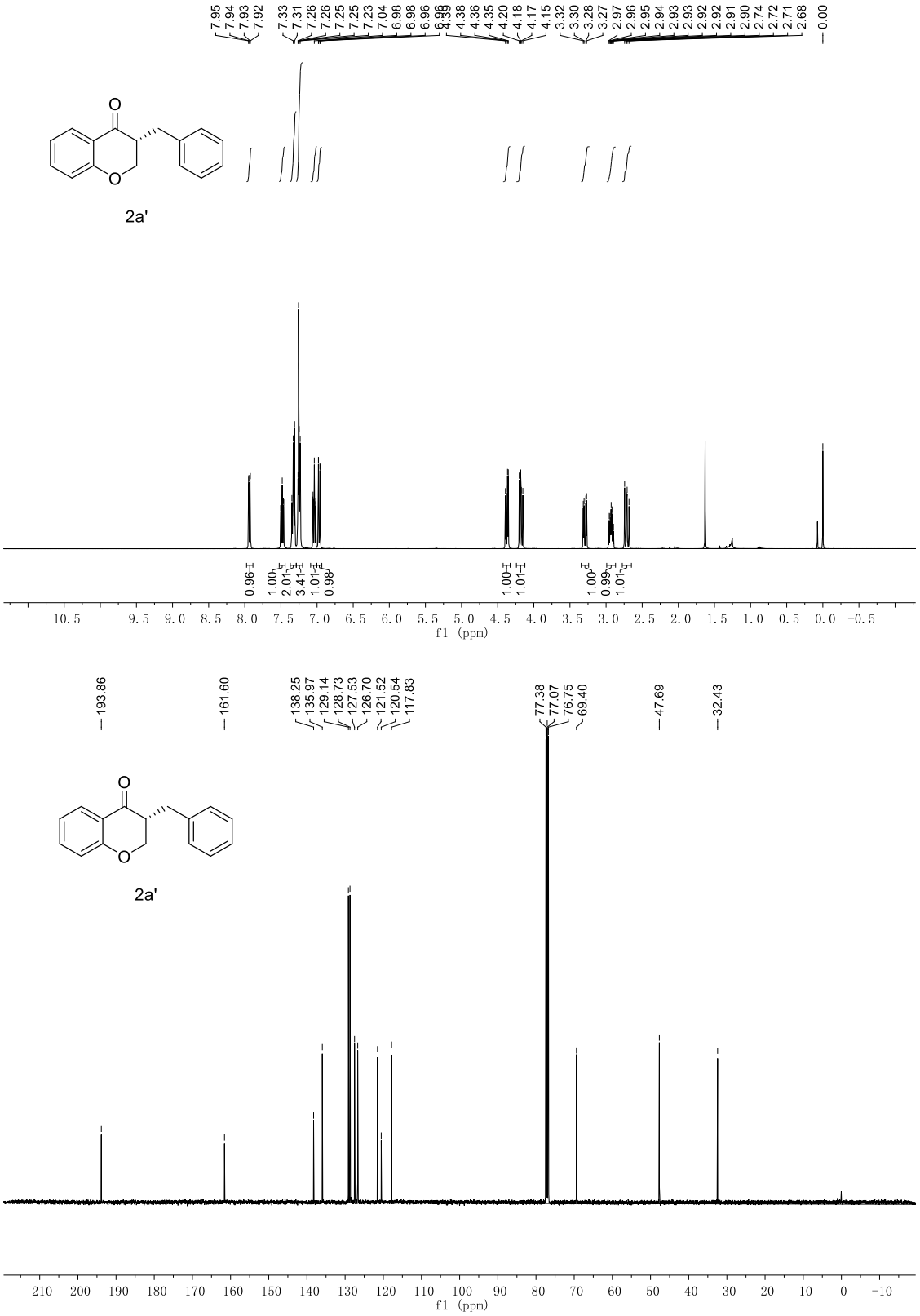




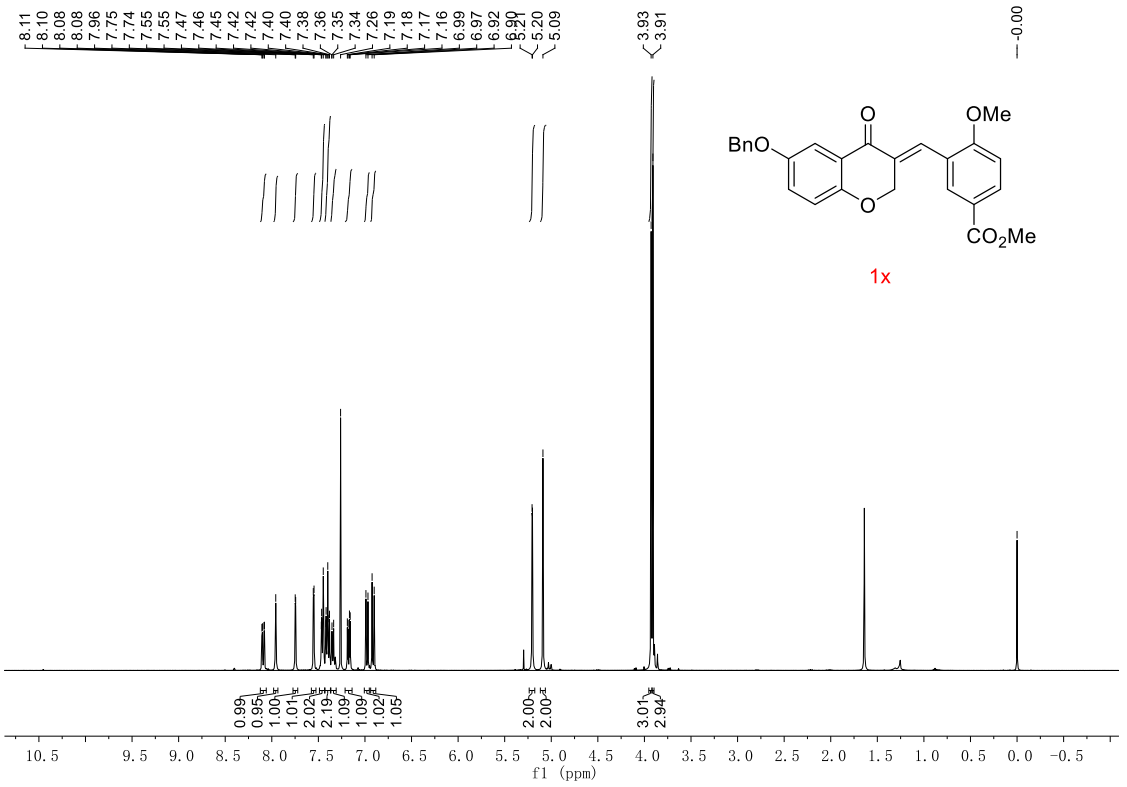
^{1}H and ^{13}C-NMR of 4t

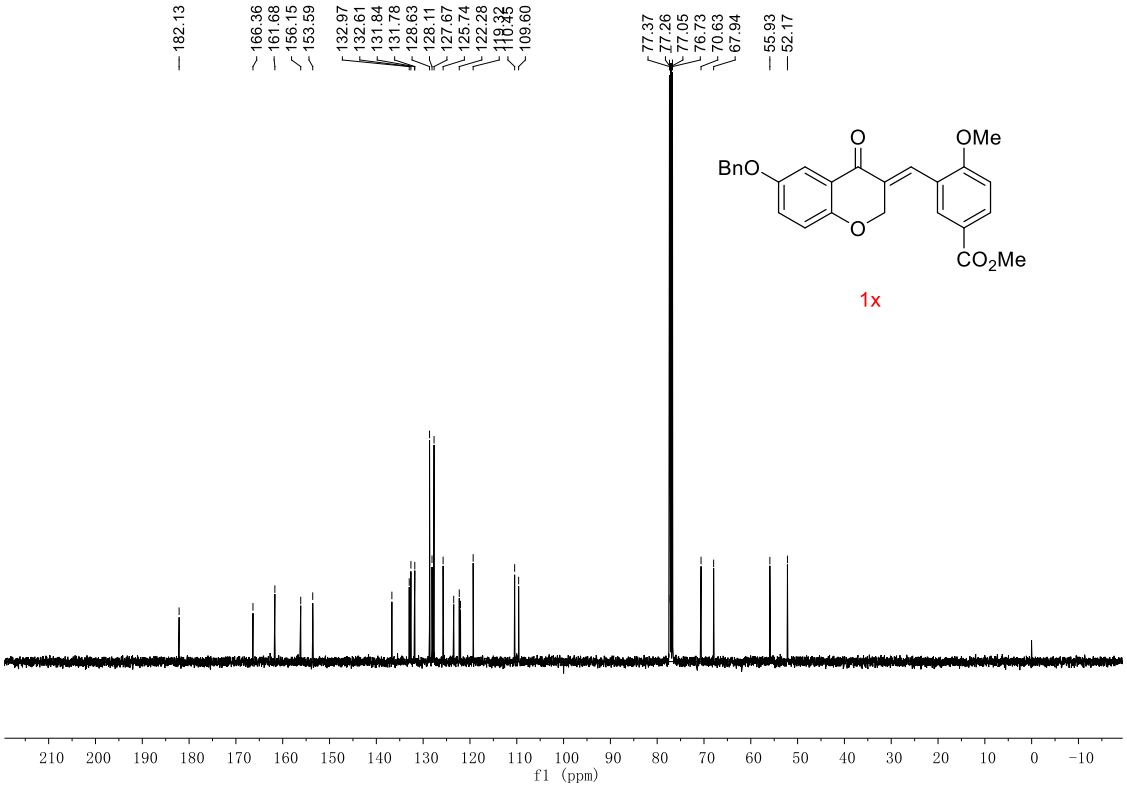


^{1}H and ^{13}C-NMR of 2a’

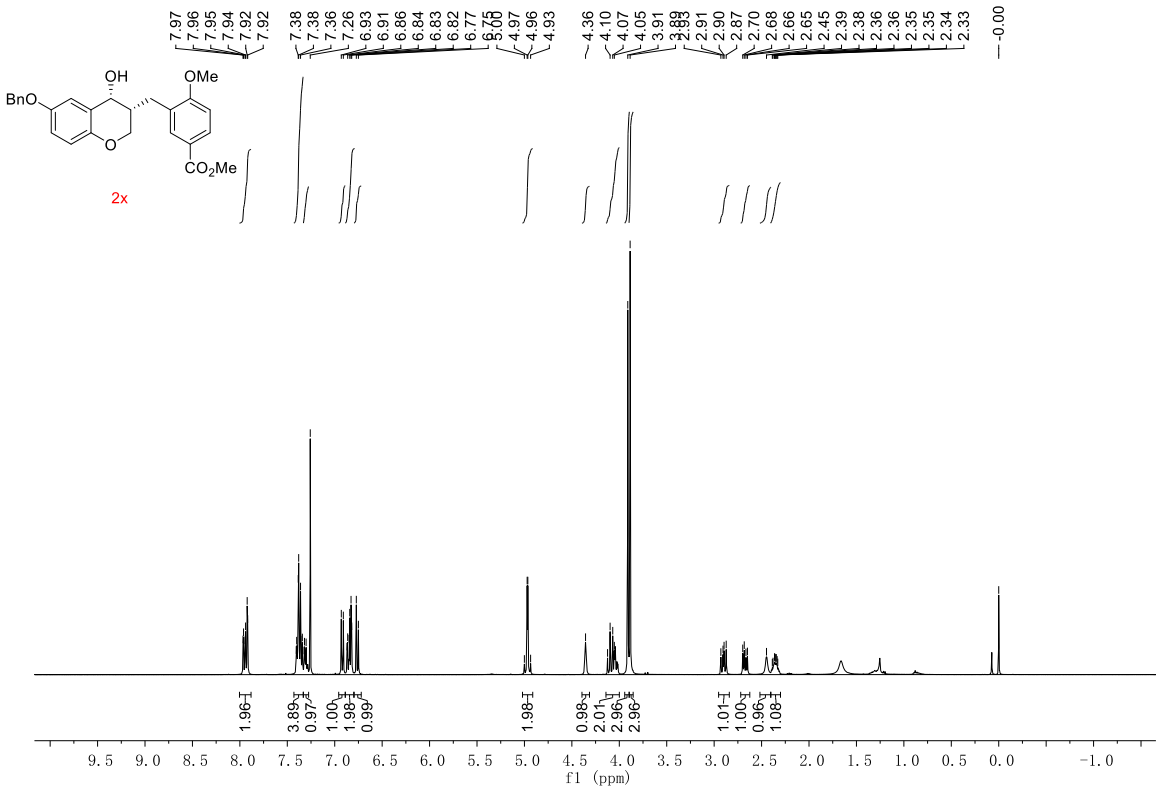


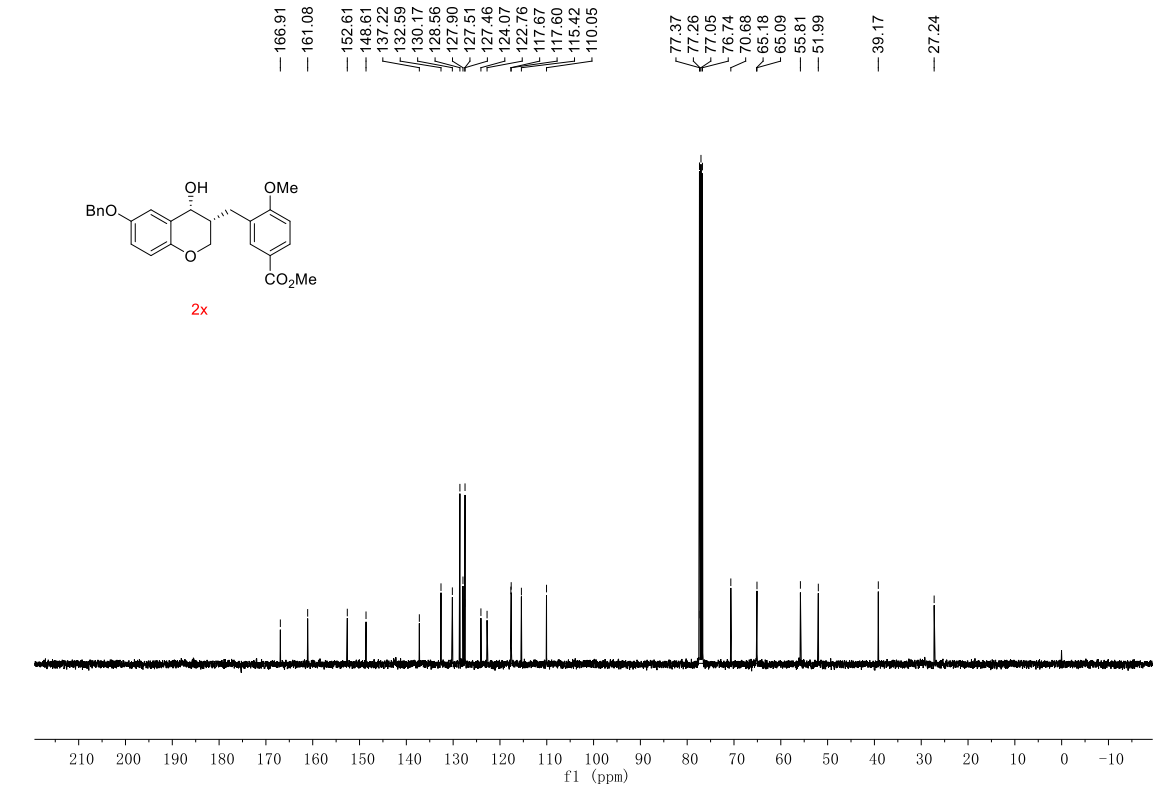
^{1}H and ^{13}C-NMR of 1x





^{1}H and ^{13}C-NMR of 2x

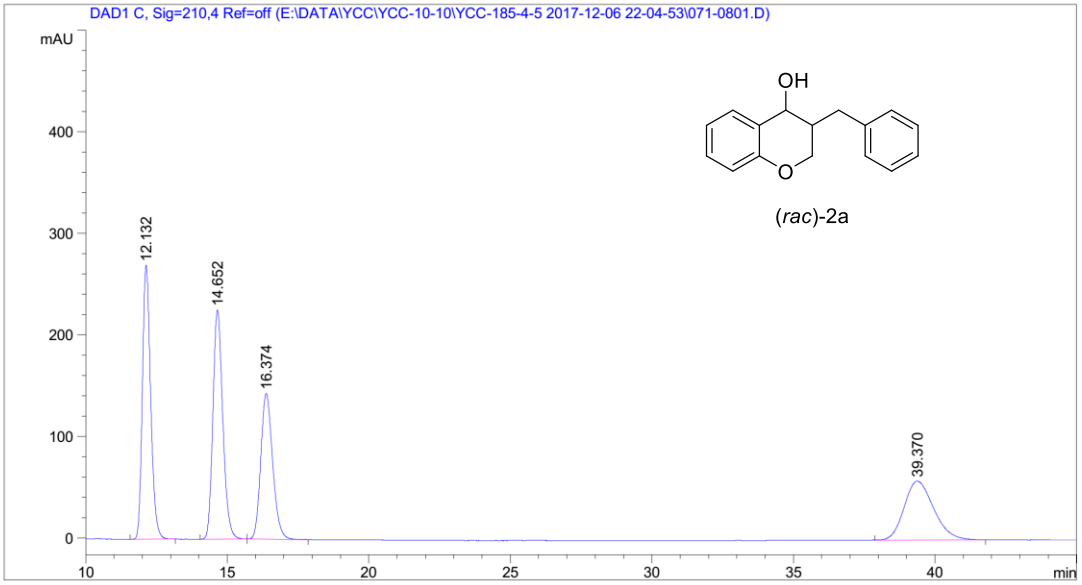




VIII. HPLC charts for hydrogenation products and derivatives

```
Data File E:\DATA\YCC\YCC-10-10\YCC-185-4-5 2017-12-06 22-04-53\071-0801.D
Sample Name: LWD-3-63-1-RAC

    ======================================================================
    Acq. Operator    : SYSTEM                          Seq. Line :   8
    Acq. Instrument : 1260HPLC-DAD                      Location : Vial 71
    Injection Date   : 12/7/2017 1:22:21 AM                  Inj :   1
                                                      Inj Volume : 3.000 µl
    Acq. Method      : E:\DATA\YCC\YCC-10-10\YCC-185-4-5 2017-12-06 22-04-53\DAD-OD(1-2)-95-5-3UL-
                       1ML-60MIN.M
    Last changed     : 12/6/2017 10:38:05 PM by SYSTEM
    Analysis Method : E:\DATA\YCC\YCC-10-10\YCC-185-4-5 2017-12-06 22-04-53\DAD-OD(1-2)-95-5-3UL-
                       1ML-60MIN.M (Sequence Method)
    Last changed     : 7/27/2018 9:31:57 AM by SYSTEM
                       (modified after loading)
    Additional Info : Peak(s) manually integrated
```




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

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

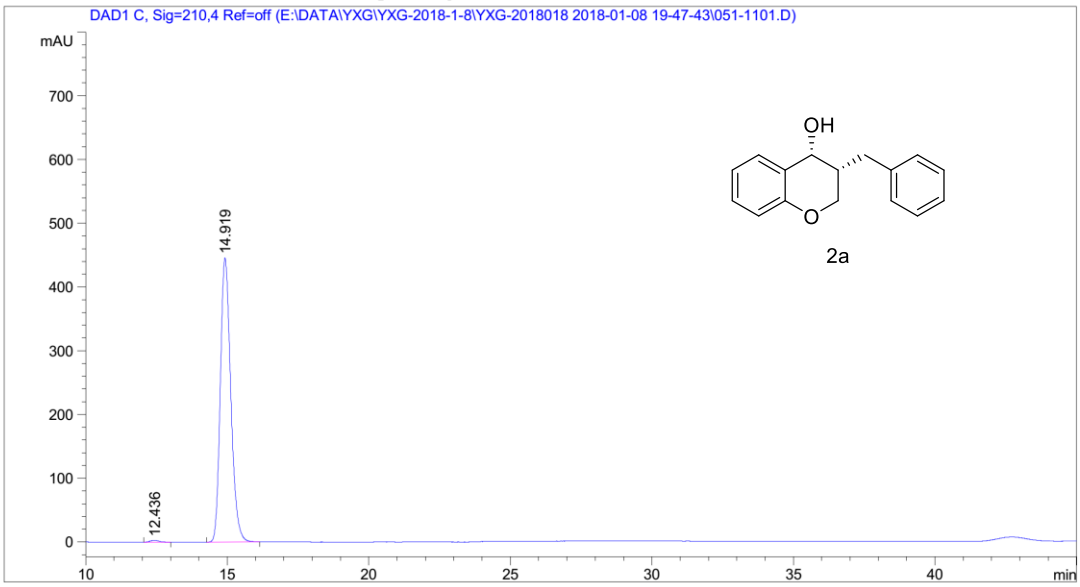

    Signal 1: DAD1 C, Sig=210,4 Ref=off

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  12.132 BB    0.3128 5470.74756  269.58752  28.2879
       2  14.652 BB    0.3754 5479.71826  225.54536  28.3343
       3  16.374 BB    0.4509 4191.28711  143.43248  21.6721
       4  39.370 BB    0.9739 4197.80078   57.89387  21.7058

1260HPLC-DAD 7/27/2018 9:32:03 AM SYSTEM                    Page   1 of 2
```

Data File E:\DATA\YXG\YXG-2018-1-8\YXG-2018018 2018-01-08 19-47-43\051-1101.D
Sample Name: LWD-3-89-1

```
    ======================================================================
    Acq. Operator   : SYSTEM                        Seq. Line :  11
    Acq. Instrument : 1260HPLC-DAD                  Location : Vial 51
    Injection Date  : 1/9/2018 1:20:13 AM                 Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YXG\YXG-2018-1-8\YXG-2018018 2018-01-08 19-47-43\DAD-OD(1-2)-95-5-
                      3UL-1ML-60MIN.M
    Last changed    : 1/8/2018 10:01:28 PM by SYSTEM
    Analysis Method : E:\DATA\YXG\YXG-2018-1-8\YXG-2018018 2018-01-08 19-47-43\DAD-OD(1-2)-95-5-
                      3UL-1ML-60MIN.M (Sequence Method)
    Last changed    : 7/27/2018 9:48:28 AM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```




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

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


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

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  12.436 BB    0.2903   64.16340    3.03893   0.5602
       2  14.919 BB    0.3923 1.13886e4   445.42419  99.4398

    Totals :                  1.14528e4   448.46312
```

Data File E:\DATA\YCC\YCC-10-10\YCC-185-4-5 2017-12-06 22-04-53\072-0901.D
Sample Name: LWD-3-63-2-RAC

```
    ======================================================================
    Acq. Operator   : SYSTEM                        Seq. Line :   9
    Acq. Instrument : 1260HPLC-DAD                   Location : Vial 72
    Injection Date  : 12/7/2017 2:23:14 AM                Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YCC\YCC-10-10\YCC-185-4-5 2017-12-06 22-04-53\DAD-OD(1-2)-95-5-3UL-
                      1ML-60MIN.M
    Last changed    : 12/6/2017 10:38:05 PM by SYSTEM
    Analysis Method : E:\DATA\YCC\YCC-10-10\YCC-185-4-5 2017-12-06 22-04-53\DAD-OD(1-2)-95-5-3UL-
                      1ML-60MIN.M (Sequence Method)
    Last changed    : 7/27/2018 9:36:47 AM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
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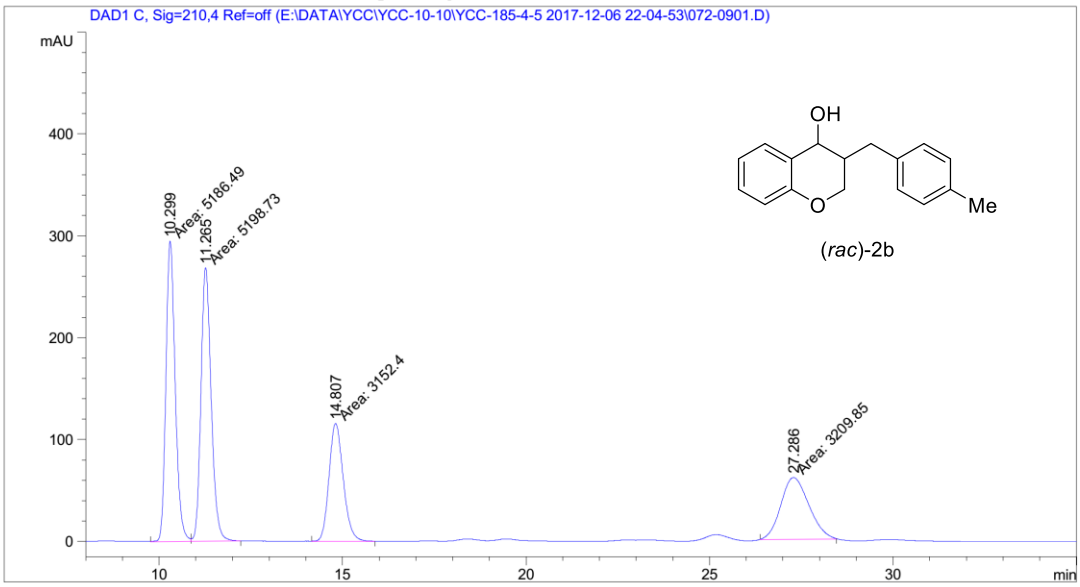


```
    ======================================================================
                              Area Percent Report
    ======================================================================

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


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

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  10.299 MF    0.2932 5186.49023  294.83160  30.9688
       2  11.265 FM    0.3230 5198.72705  268.27664  31.0419
       3  14.807 MM    0.4529 3152.39868  116.00610  18.8231
       4  27.286 MM    0.8832 3209.84521   60.57419  19.1662
```

Data File E:\DATA\YXG\YXG-2018-1-8\YXG-2018018 2018-01-08 19-47-43\052-1201.D
Sample Name: LWD-3-89-2

```
    ======================================================================
    Acq. Operator   : SYSTEM                        Seq. Line :  12
    Acq. Instrument : 1260HPLC-DAD                  Location : Vial 52
    Injection Date  : 1/9/2018 2:21:09 AM                Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : E:\DATA\YXG\YXG-2018-1-8\YXG-2018018 2018-01-08 19-47-43\DAD-OD(1-2)-95-5-
                      3UL-1ML-60MIN.M
    Last changed    : 1/8/2018 10:01:28 PM by SYSTEM
    Analysis Method : E:\DATA\YXG\YXG-2018-1-8\YXG-2018018 2018-01-08 19-47-43\DAD-OD(1-2)-95-5-
                      3UL-1ML-60MIN.M (Sequence Method)
    Last changed    : 7/27/2018 9:51:22 AM by SYSTEM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
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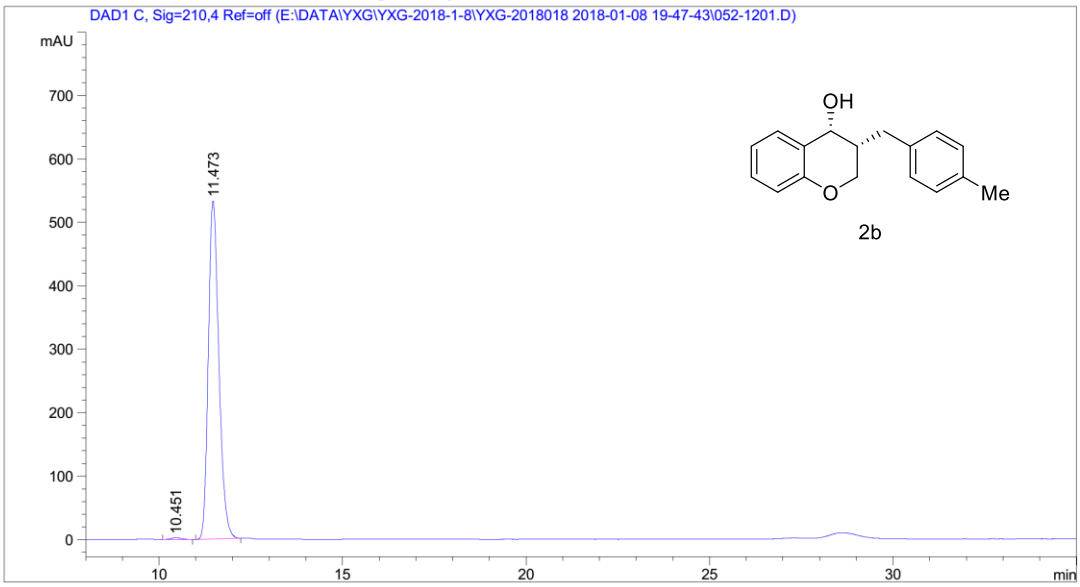


```
    ======================================================================
                              Area Percent Report
    ======================================================================

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


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

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  10.451 BB    0.2444   49.99823    2.79935   0.4676
       2  11.473 BB    0.3090 1.06433e4   532.92218  99.5324

    Totals :                  1.06933e4   535.72153
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\025-0701.D
Sample Name: LWD-3-189-3-RAC

```
=====================================================================
Acq. Operator   :                              Seq. Line :   7
Acq. Instrument : Instrument 2                  Location : Vial 25
Injection Date  : 8/16/2018 1:53:34 PM               Inj :   1
                                               Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  3UL-ALL-50MIN.M
Last changed    : 8/16/2018 9:43:15 AM
Analysis Method : D:\METHOD\ZXH\DAD-OJ(1-6)-99-1-0.5ML-1UL-220NM-10MIN.M
Last changed    : 6/16/2020 8:31:12 PM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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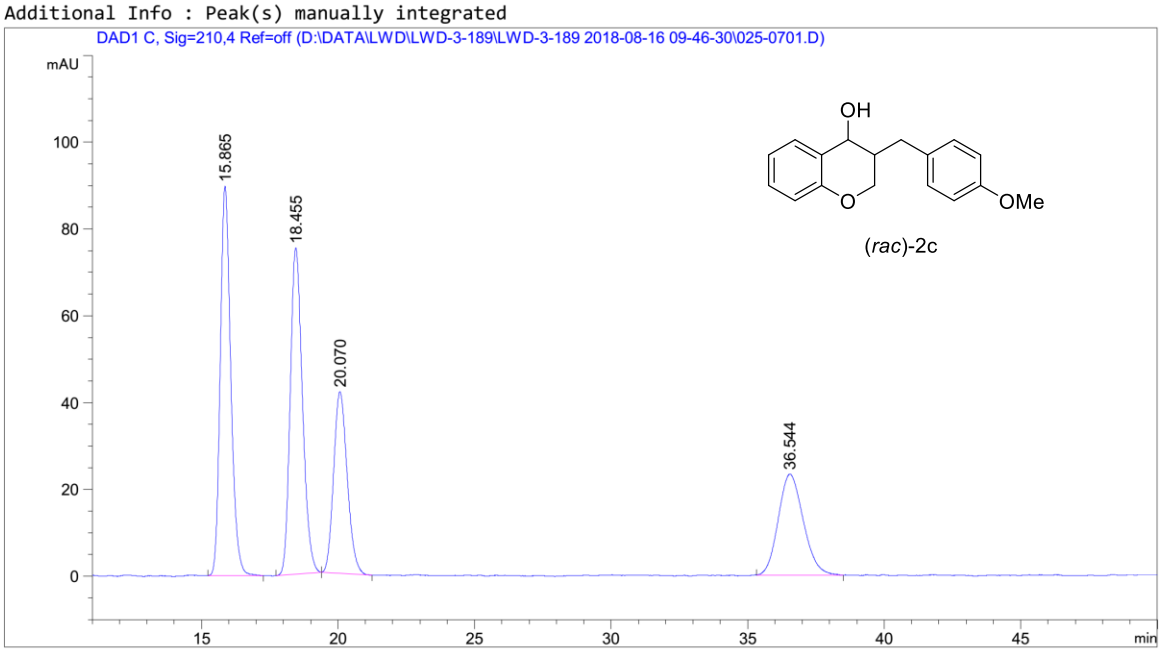



```
=====================================================================
                        Area Percent Report
=====================================================================

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

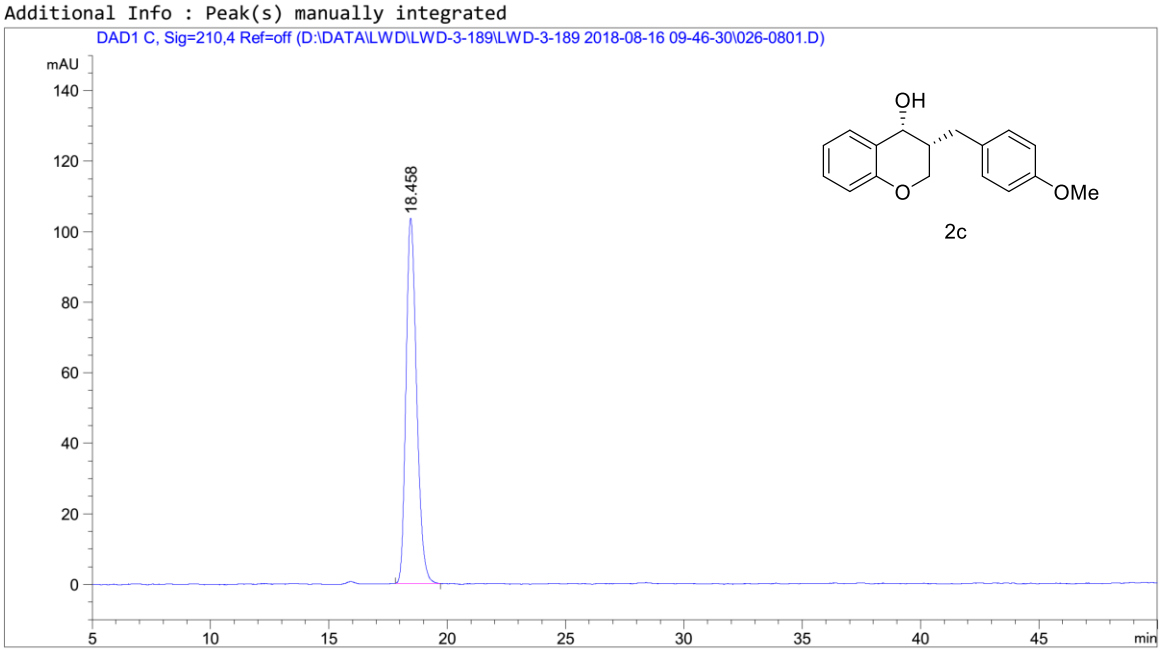

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  15.865 BB    0.4064 2401.82007   89.68475  31.3015
   2  18.455 BB    0.4792 2340.66846   75.19595  30.5046
   3  20.070 BB    0.5301 1450.59705   41.87537  18.9048
   4  36.544 BB    0.7957 1480.08142   23.28203  19.2891

Totals :                 7673.16699  230.03810
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\026-0801.D
Sample Name: LWD-3-189-3-EE

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :   8
    Acq. Instrument : Instrument 2                  Location : Vial 26
    Injection Date  : 8/16/2018 2:44:34 PM               Inj :   1
                                                  Inj Volume : 1.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                      1UL-ALL-50MIN.M
    Last changed    : 8/16/2018 11:20:59 AM
    Analysis Method : D:\METHOD\ZXH\DAD-OJ(1-6)-99-1-0.5ML-1UL-220NM-10MIN.M
    Last changed    : 6/16/2020 8:32:47 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

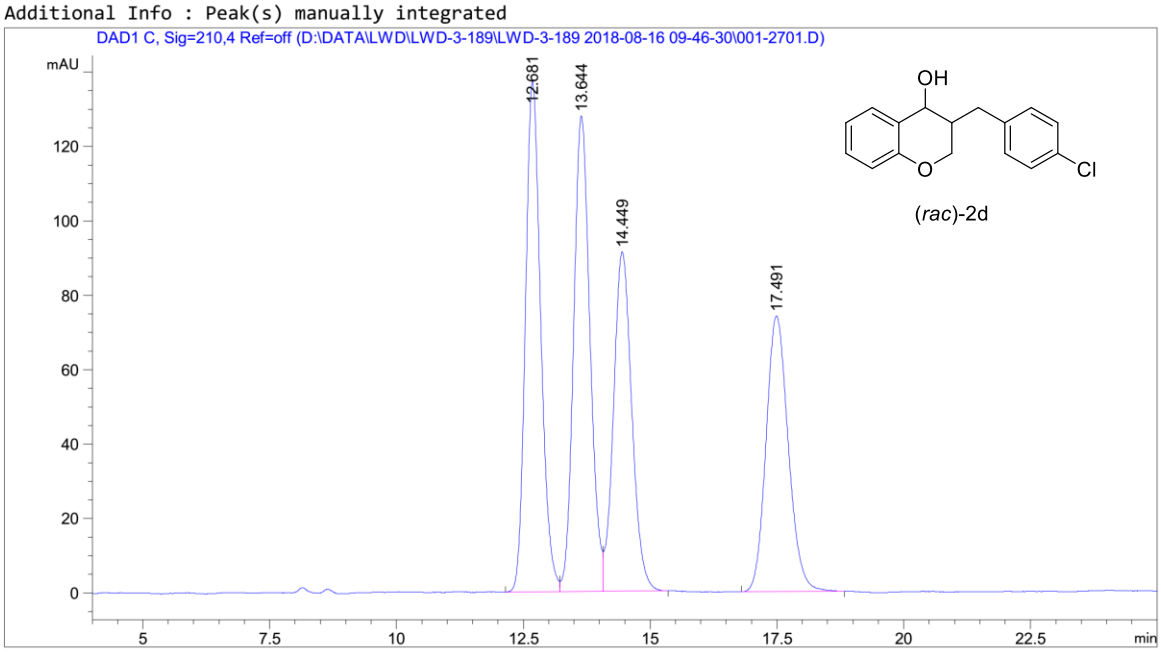
    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  18.458 BB    0.4858 3230.73218  103.59892 100.0000

    Totals :                  3230.73218  103.59892


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

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\001-2701.D
Sample Name: LWD-3-89-4-RAC

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  27
    Acq. Instrument : Instrument 2                  Location : Vial 1
    Injection Date  : 8/17/2018 1:33:24 AM               Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                      3UL-ALL-25MIN.M
    Last changed    : 8/16/2018 8:31:25 PM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/17/2018 9:21:10 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

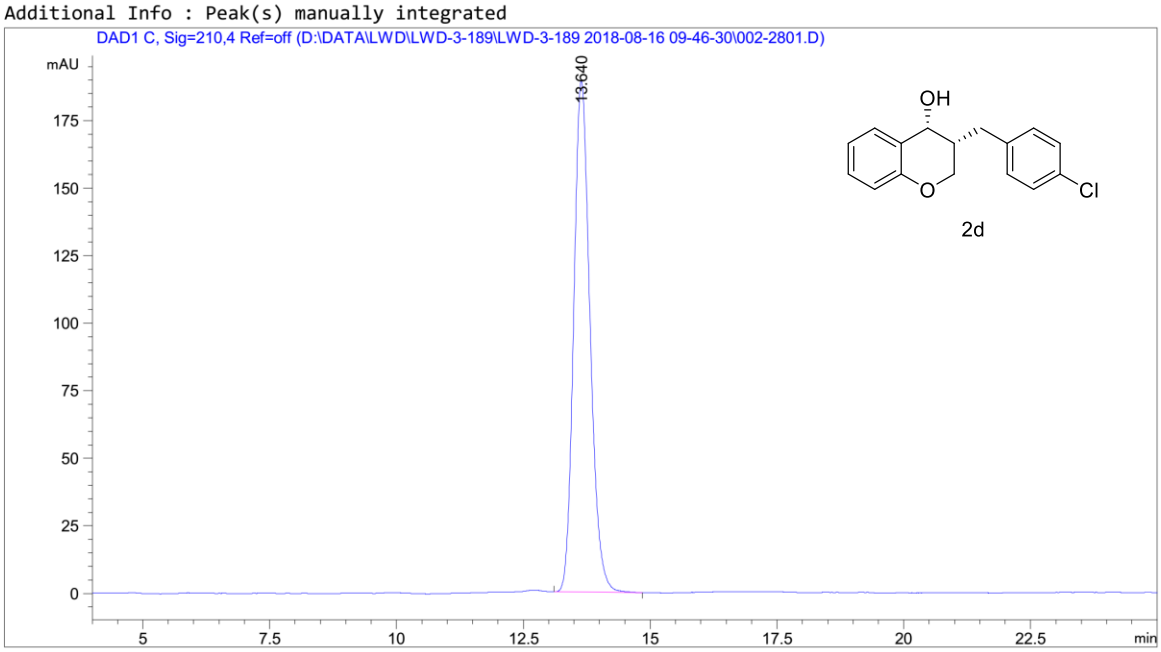

    Signal 1: DAD1 C, Sig=210,4 Ref=off

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  12.681 BV    0.3252 2886.75928  137.36119  28.0147
       2  13.644 VV    0.3457 2869.42822  127.93890  27.8465
       3  14.449 VB    0.3844 2287.50684   91.26032  22.1992
       4  17.491 BB    0.4656 2260.74805   74.16558  21.9395

    Totals :                  1.03044e4   430.72599
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\002-2801.D
Sample Name: LWD-3-89-4-EE

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  28
    Acq. Instrument : Instrument 2                  Location : Vial 2
    Injection Date  : 8/17/2018 1:59:22 AM               Inj :   1
                                                  Inj Volume : 1.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                      1UL-ALL-25MIN.M
    Last changed    : 8/16/2018 8:31:59 PM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/17/2018 9:21:49 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

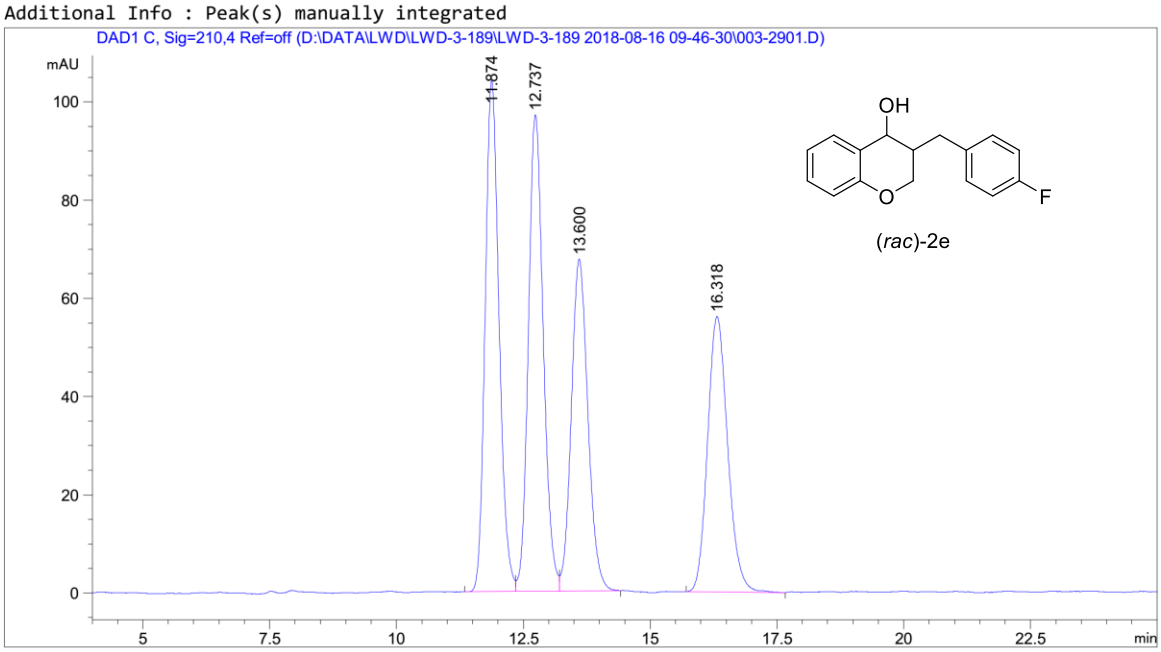
    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  13.640 BB    0.3424 4222.12842  189.19876 100.0000

    Totals :                  4222.12842  189.19876


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

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\003-2901.D
Sample Name: LWD-3-89-5-RAC

```
=====================================================================
Acq. Operator   :                              Seq. Line :  29
Acq. Instrument : Instrument 2                  Location : Vial 3
Injection Date  : 8/17/2018 2:25:20 AM               Inj :   1
                                               Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  3UL-ALL-25MIN.M
Last changed    : 8/16/2018 8:31:25 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 9:23:47 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

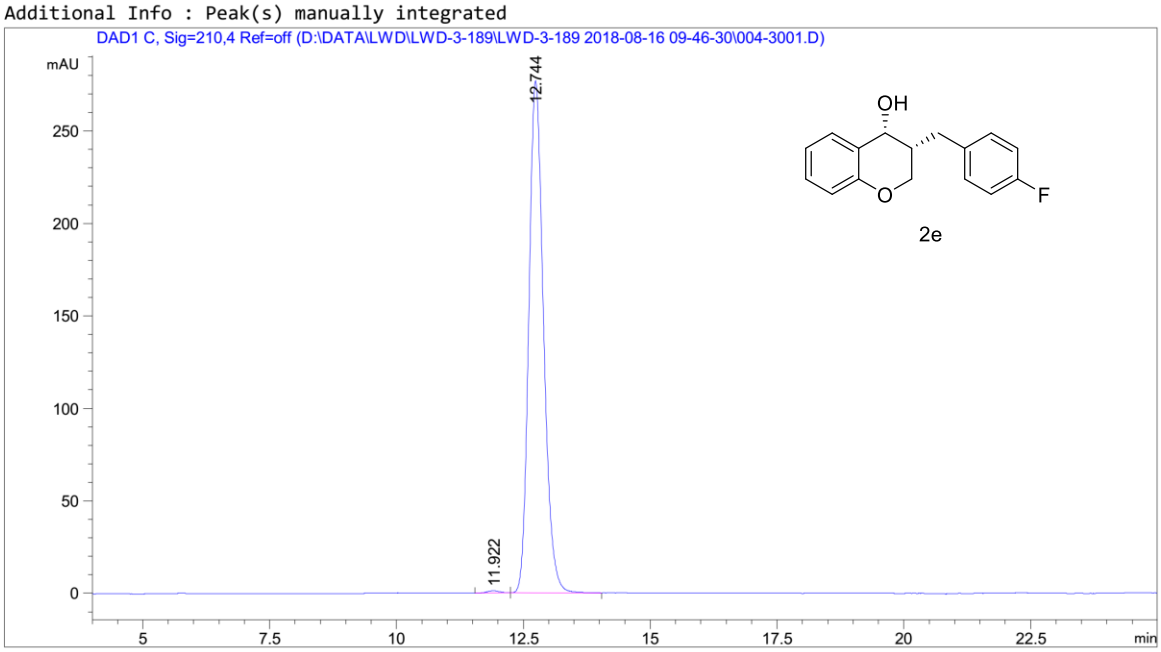

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  11.874 BV    0.2919 1977.30127  103.95918  28.0715
   2  12.737 VV    0.3161 1980.18604   97.02351  28.1125
   3  13.600 VB    0.3518 1538.59961   67.52583  21.8433
   4  16.318 BB    0.4259 1547.70764   56.09602  21.9726

Totals :                  7043.79456  324.60453
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\004-3001.D
Sample Name: LWD-3-89-5-EE

```
======================================================================
Acq. Operator   :                              Seq. Line :  30
Acq. Instrument : Instrument 2                  Location : Vial 4
Injection Date  : 8/17/2018 2:51:20 AM               Inj :   1
                                               Inj Volume : 1.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  1UL-ALL-25MIN.M
Last changed    : 8/16/2018 8:31:59 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 9:24:45 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

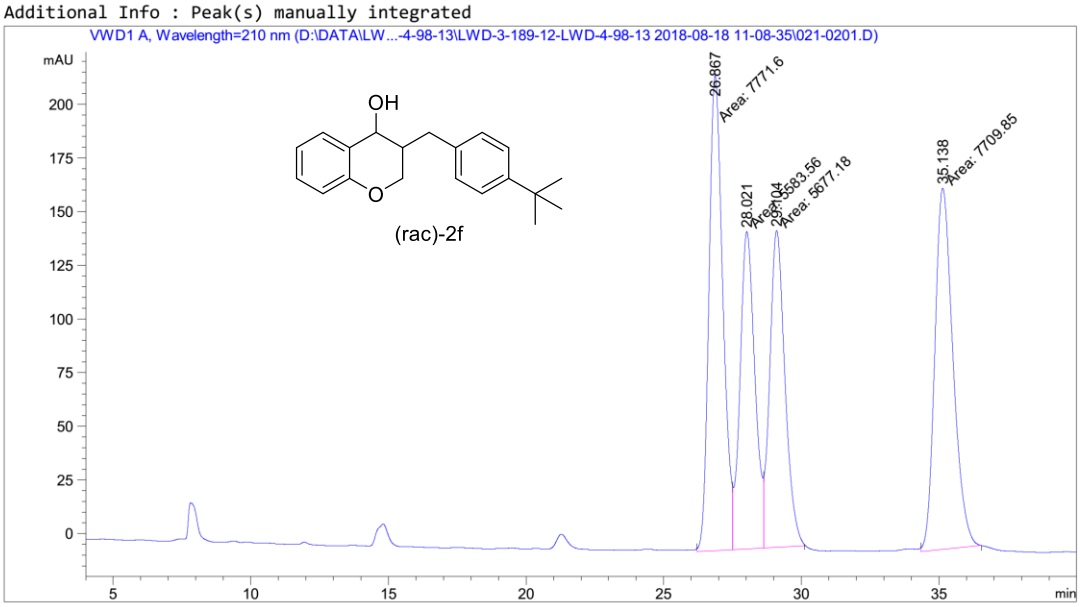

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  11.922 BB    0.2330   20.02549    1.15061   0.3577
   2  12.744 BB    0.3092 5578.69580  276.72086  99.6423

Totals :                  5598.72129  277.87146
```

Data File D:\DATA\LW...LWD-4-98-13\LWD-3-189-12-LWD-4-98-13 2018-08-18 11-08-35\021-0201.D
Sample Name: LWD-4-98-13-RAC

```
======================================================================
Acq. Operator   :                                Seq. Line :   2
Acq. Instrument : Instrument 1                    Location : Vial 21
Injection Date  : 8/18/2018 11:52:12 AM               Inj :   1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189-12-LWD-4-98-13\LWD-3-189-12-LWD-4-98-13 2018-08-18 11
                  -08-35\VWD-AD(1-2)-95-5-0.4ML-3UL-210NM-40MIN.M
Last changed    : 8/18/2018 10:35:23 AM
Analysis Method : D:\METHOD\LWD\VWD-AD(1-2)-95-5-1ML-1UL-210NM-10MIN.M
Last changed    : 8/18/2018 3:35:15 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

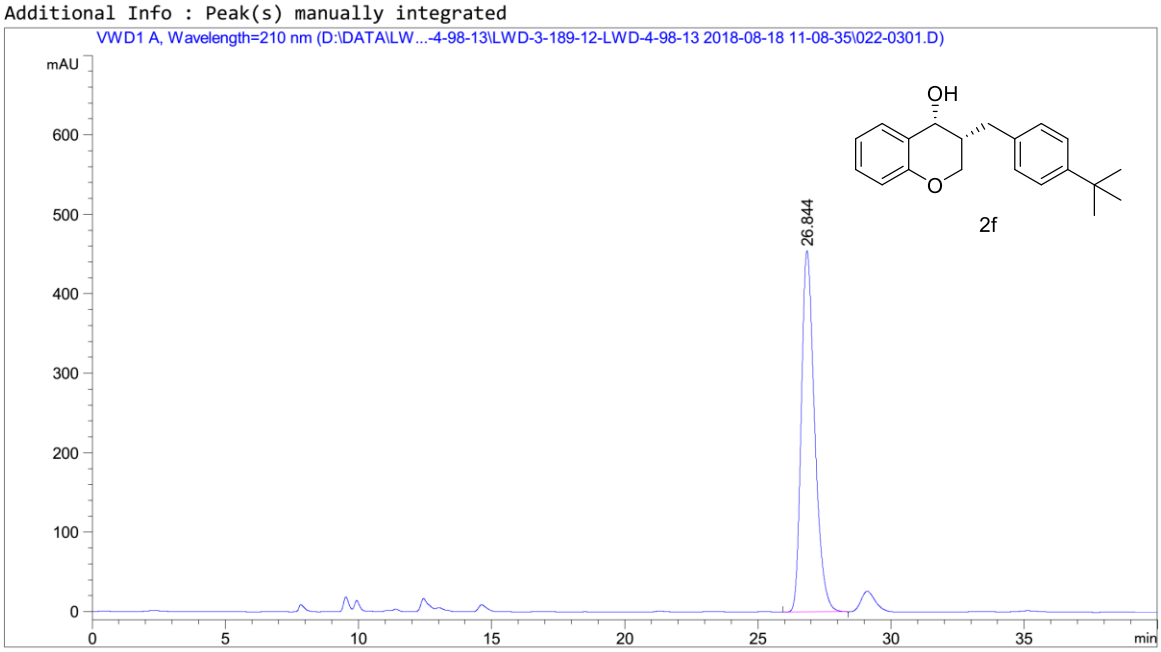

Signal 1: VWD1 A, Wavelength=210 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  26.867 MF    0.5852 7771.59521  221.34901  29.0612
   2  28.021 MF    0.6298 5583.55957  147.74948  20.8792
   3  29.104 FM    0.6415 5677.17871  147.49840  21.2293
   4  35.138 MM    0.7637 7709.84619  168.25645  28.8303

Totals :                  2.67422e4   684.85335
```

Data File D:\DATA\LW...LWD-4-98-13\LWD-3-189-12-LWD-4-98-13 2018-08-18 11-08-35\022-0301.D
Sample Name: LWD-4-98-13-EE

```
=====================================================================
Acq. Operator   :                              Seq. Line :   3
Acq. Instrument : Instrument 1                  Location : Vial 22
Injection Date  : 8/18/2018 12:33:03 PM              Inj :   1
                                               Inj Volume : 1.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189-12-LWD-4-98-13\LWD-3-189-12-LWD-4-98-13 2018-08-18 11
                  -08-35\VWD-AD(1-2)-95-5-0.4ML-1UL-210NM-40MIN.M
Last changed    : 8/18/2018 10:34:57 AM
Analysis Method : D:\METHOD\LSL\VWD-IB(1-6)-97-3-0.3ML-3UL-220-60MIN.M
Last changed    : 6/16/2020 8:19:08 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

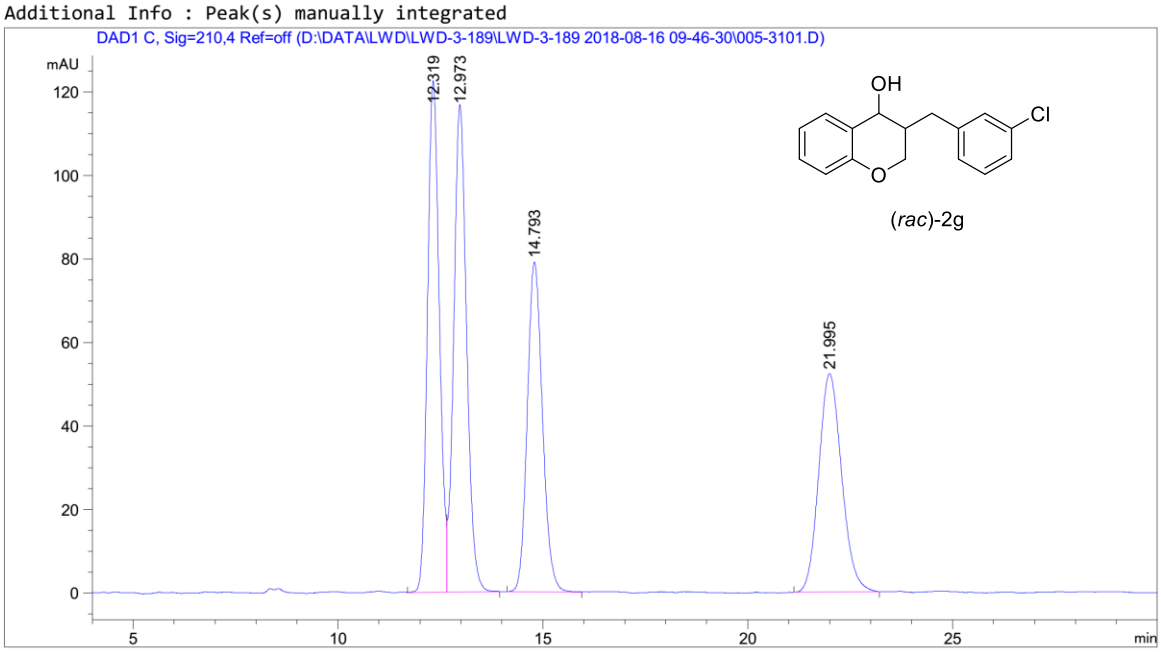
Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  26.844 BB    0.5339 1.58910e4   454.54175 100.0000

Totals :                  1.58910e4   454.54175


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

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\005-3101.D
Sample Name: LWD-3-89-6-RAC

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  31
    Acq. Instrument : Instrument 2                  Location : Vial 5
    Injection Date  : 8/17/2018 3:17:21 AM               Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                      3UL-ALL-30MIN.M
    Last changed    : 8/16/2018 8:35:08 PM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/17/2018 9:26:29 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

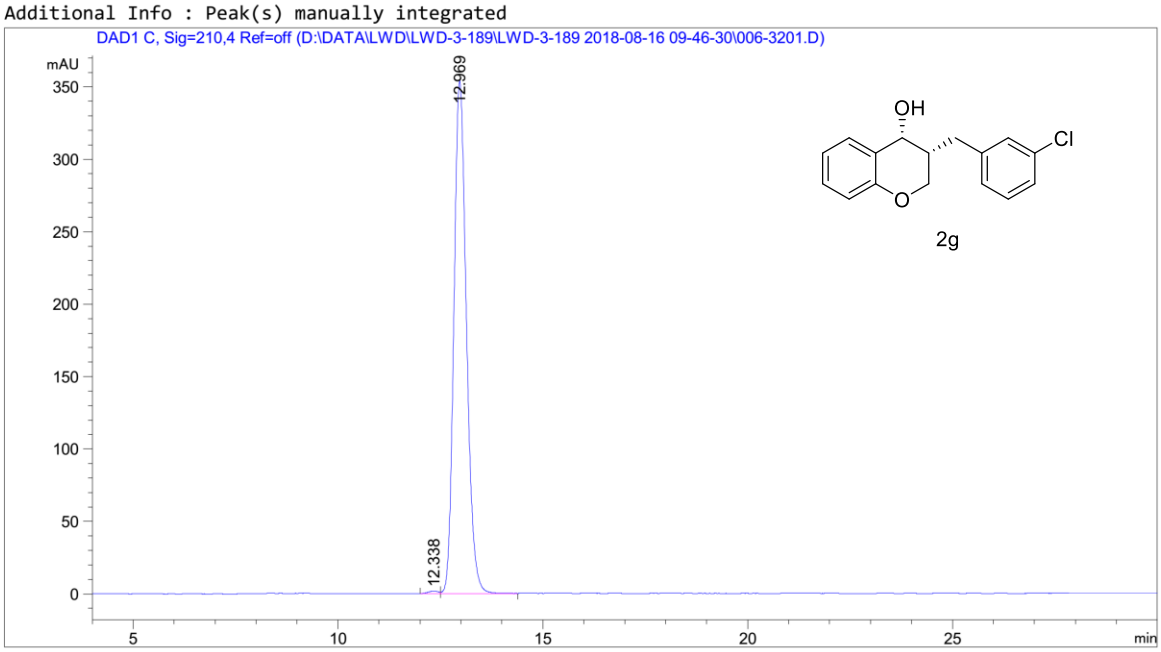

    Signal 1: DAD1 C, Sig=210,4 Ref=off

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  12.319 BV    0.3103 2460.51685  122.50787  27.1184
       2  12.973 VB    0.3341 2544.44434  116.80338  28.0434
       3  14.793 BB    0.3941 2031.87805   78.99819  22.3942
       4  21.995 BB    0.5940 2036.38672   52.33509  22.4439

    Totals :                  9073.22595  370.64452
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\006-3201.D
Sample Name: LWD-3-89-6-EE

```
=====================================================================
Acq. Operator   :                              Seq. Line :  32
Acq. Instrument : Instrument 2                  Location : Vial 6
Injection Date  : 8/17/2018 3:48:21 AM               Inj :   1
                                               Inj Volume : 1.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  1UL-ALL-30MIN.M
Last changed    : 8/16/2018 8:35:37 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 9:27:17 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

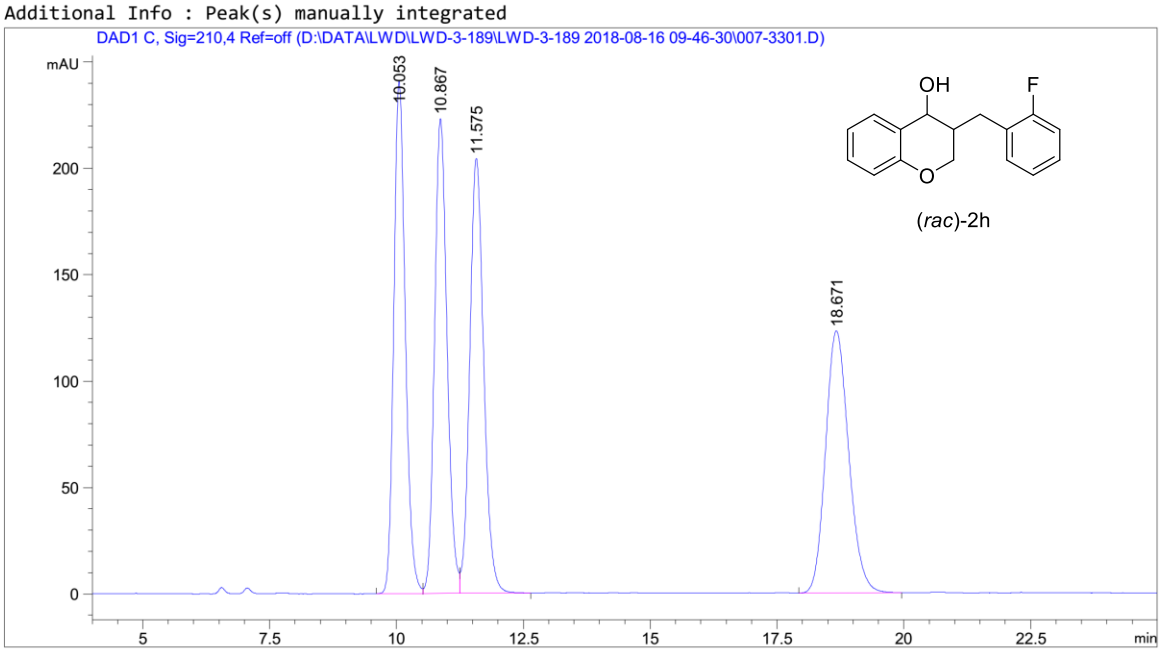

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  12.338 BV    0.2163   28.47222    1.70995   0.3776
   2  12.969 VB    0.3277 7512.15430  353.84998  99.6224

Totals :                  7540.62651  355.55992
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\007-3301.D
Sample Name: LWD-3-89-7-RAC

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  33
    Acq. Instrument : Instrument 2                  Location : Vial 7
    Injection Date  : 8/17/2018 4:19:20 AM               Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                      3UL-ALL-25MIN.M
    Last changed    : 8/16/2018 8:31:25 PM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/17/2018 9:27:58 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

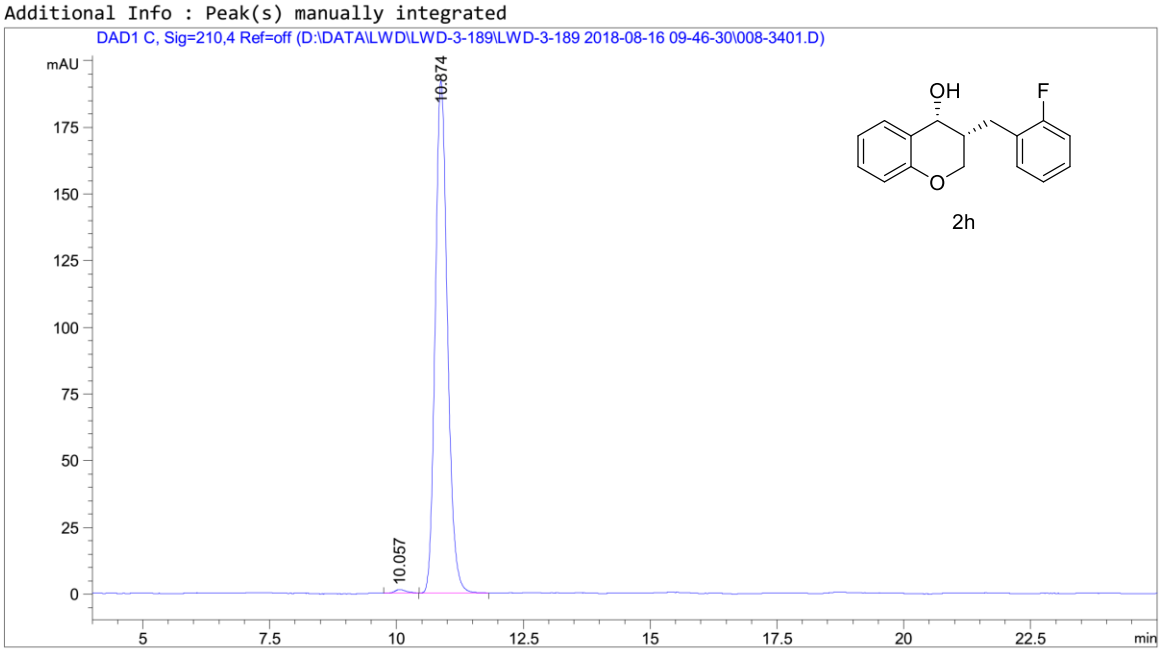

    Signal 1: DAD1 C, Sig=210,4 Ref=off

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  10.053 BV    0.2451 3825.17505  241.06880  24.6990
       2  10.867 VV    0.2634 3815.69019  223.22298  24.6378
       3  11.575 VB    0.2962 3929.52832  204.45416  25.3728
       4  18.671 BB    0.4927 3916.76416  123.27117  25.2904

    Totals :                  1.54872e4   792.01711
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\008-3401.D
Sample Name: LWD-3-89-7-EE

```
=====================================================================
Acq. Operator   :                              Seq. Line :  34
Acq. Instrument : Instrument 2                  Location : Vial 8
Injection Date  : 8/17/2018 4:45:18 AM               Inj :   1
                                               Inj Volume : 1.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  1UL-ALL-25MIN.M
Last changed    : 8/16/2018 8:31:59 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 9:28:53 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

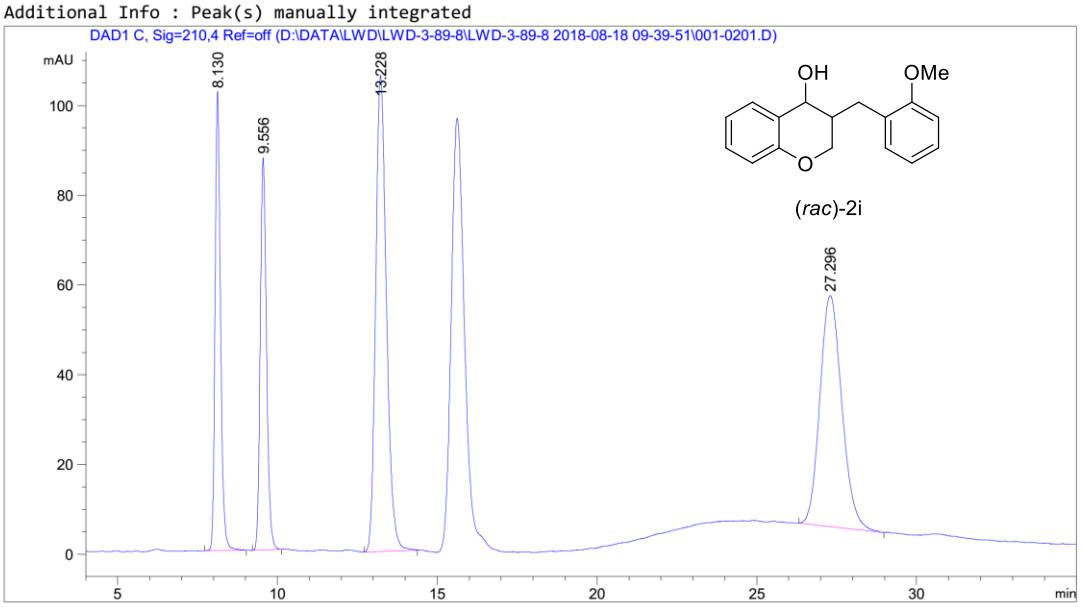

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  10.057 BB    0.2063   21.71116    1.35928   0.6709
   2  10.874 BB    0.2573 3214.42261  191.99089  99.3291

Totals :                  3236.13377  193.35017
```

Data File D:\DATA\LWD\LWD-3-89-8\LWD-3-89-8 2018-08-18 09-39-51\001-0201.D
Sample Name: LWD-3-89-8-RAC

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :   2
    Acq. Instrument : Instrument 2                    Location : Vial 1
    Injection Date  : 8/18/2018 10:00:50 AM                Inj :   1
                                                    Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-89-8\LWD-3-89-8 2018-08-18 09-39-51\DAD-OD(1-2)-95-5-1ML-
                      3UL-ALL-35MIN.M
    Last changed    : 8/16/2018 9:44:17 AM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/18/2018 11:13:52 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

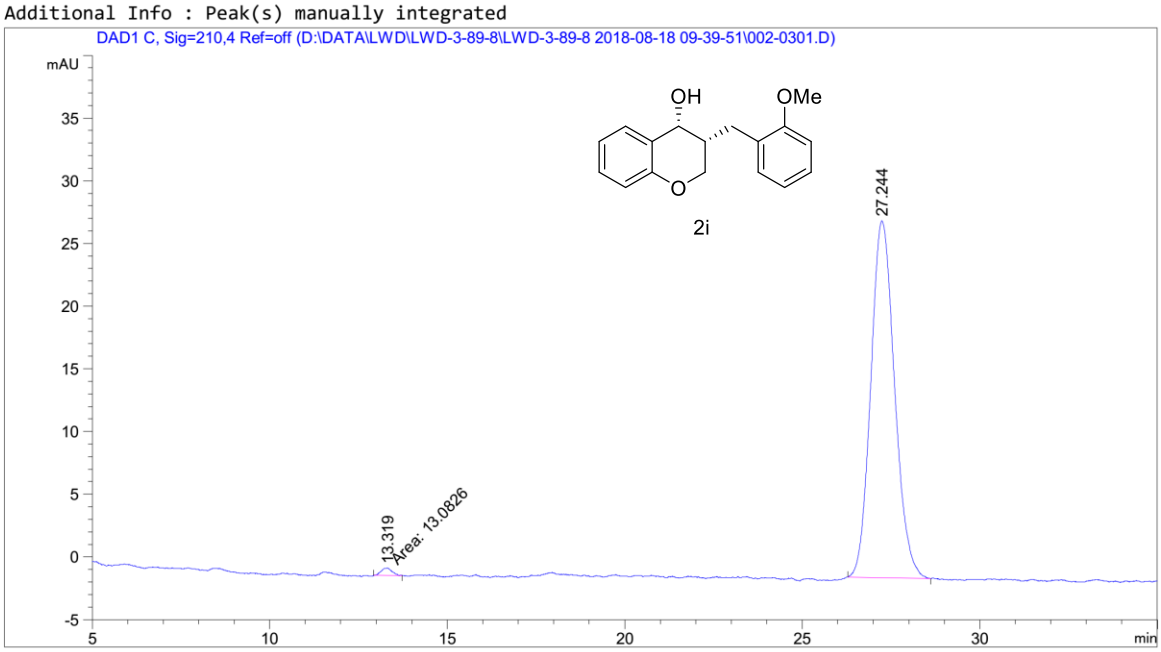

    Signal 1: DAD1 C, Sig=210,4 Ref=off

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1   8.130 BB    0.1801 1211.78320  102.38054  16.5264
       2   9.556 BB    0.2087 1188.78333   87.37602  16.2127
       3  13.228 BB    0.3588 2478.68750  106.01793  33.8046
       4  27.296 BB    0.7124 2453.15161   51.43679  33.4563

    Totals :                  7332.40564  347.21128
```

Data File D:\DATA\LWD\LWD-3-89-8\LWD-3-89-8 2018-08-18 09-39-51\002-0301.D
Sample Name: LWD-3-89-8-EE

```
=====================================================================
Acq. Operator   :                              Seq. Line :   3
Acq. Instrument : Instrument 2                  Location : Vial 2
Injection Date  : 8/18/2018 10:36:49 AM              Inj :   1
                                               Inj Volume : 1.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-89-8\LWD-3-89-8 2018-08-18 09-39-51\DAD-OD(1-2)-95-5-1ML-
                  1UL-ALL-35MIN.M
Last changed    : 8/16/2018 11:23:38 AM
Analysis Method : D:\METHOD\LSL\VWD-IB(1-6)-97-3-0.3ML-3UL-220-60MIN.M
Last changed    : 6/16/2020 8:21:58 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

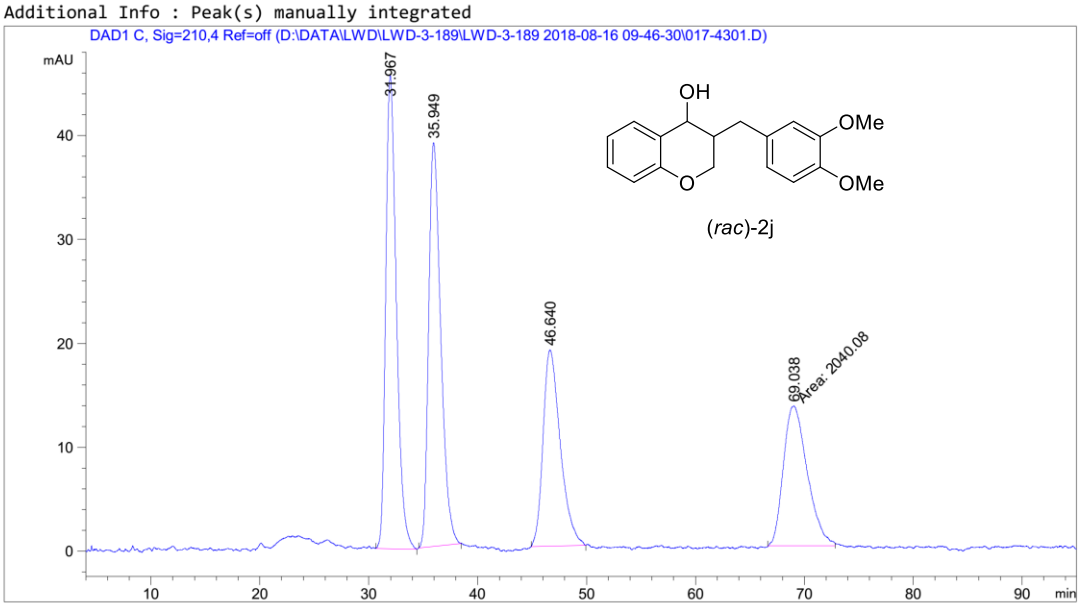

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  13.319 MM    0.3561   13.08259 6.12347e-1   0.9777
   2  27.244 BB    0.6851 1325.05298   28.46449  99.0223

Totals :                  1338.13557   29.07683
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\017-4301.D
Sample Name: LWD-3-115-2-RAC

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :  43
    Acq. Instrument : Instrument 2                    Location : Vial 17
    Injection Date  : 8/17/2018 10:49:26 AM               Inj :   1
                                                    Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                      3UL-ALL-95MIN.M
    Last changed    : 8/16/2018 8:53:33 PM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/17/2018 3:31:24 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

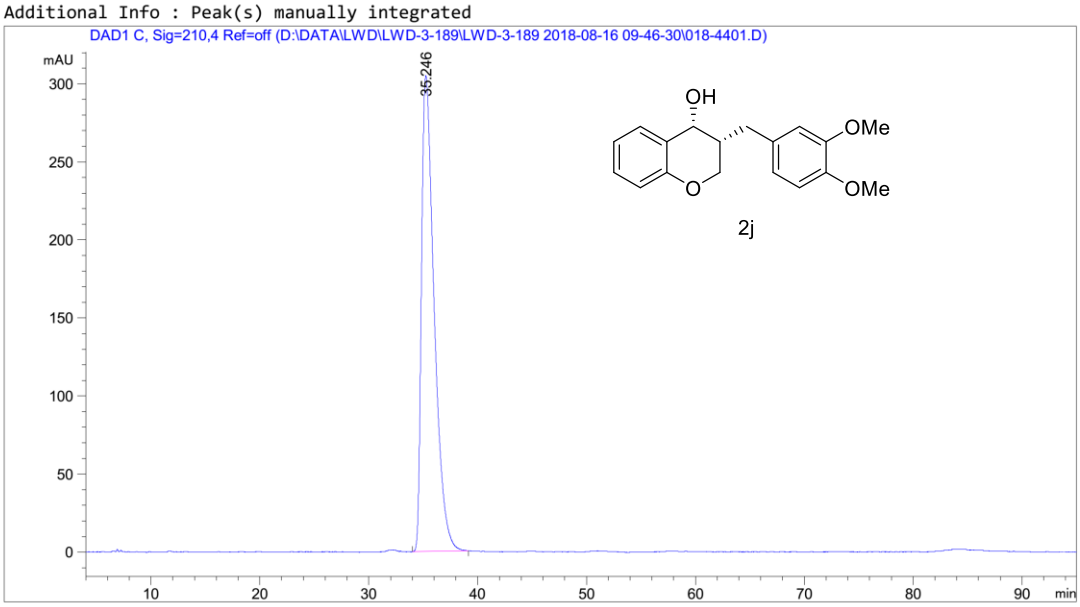

    Signal 1: DAD1 C, Sig=210,4 Ref=off

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  31.967 BB    0.9717 3072.13232   45.50124  30.1453
       2  35.949 BB    0.9279 3001.54224   38.82710  29.4526
       3  46.640 BB    1.2953 2077.33569   18.88595  20.3838
       4  69.038 MM    2.5312 2040.08081   13.43263  20.0183

    Totals :                  1.01911e4   116.64692
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\018-4401.D
Sample Name: LWD-3-115-2-EE

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :  44
    Acq. Instrument : Instrument 2                    Location : Vial 18
    Injection Date  : 8/17/2018 12:25:25 PM                Inj :   1
                                                     Inj Volume : 1.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                      1UL-ALL-95MIN.M
    Last changed    : 8/16/2018 8:54:13 PM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/17/2018 3:32:29 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

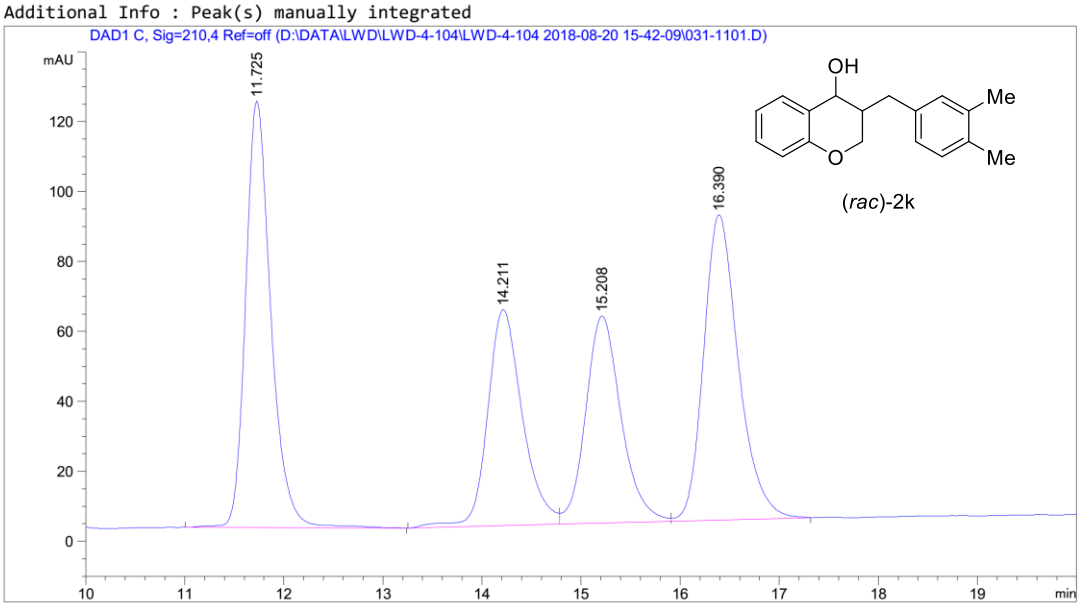
    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  35.246 BB    1.1998 2.46171e4   304.93997 100.0000

    Totals :                  2.46171e4   304.93997


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

Data File D:\DATA\LWD\LWD-4-104\LWD-4-104 2018-08-20 15-42-09\031-1101.D
Sample Name: LWD-3-113-6-RAC

```
======================================================================
Acq. Operator   :                                Seq. Line :  11
Acq. Instrument : Instrument 2                    Location : Vial 31
Injection Date  : 8/20/2018 10:05:09 PM               Inj :   1
                                                 Inj Volume : 5.000 µl
Acq. Method     : D:\DATA\LWD\LWD-4-104\LWD-4-104 2018-08-20 15-42-09\DAD-AD(1-6)-95-5-1ML-
                  5UL-ALL-20MIN.M
Last changed    : 8/20/2018 8:15:42 PM
Analysis Method : D:\METHOD\LG\DAD-IA(1-2)-80-20-1ML-2UL-ALL-10MIN.M
Last changed    : 12/11/2018 9:52:09 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

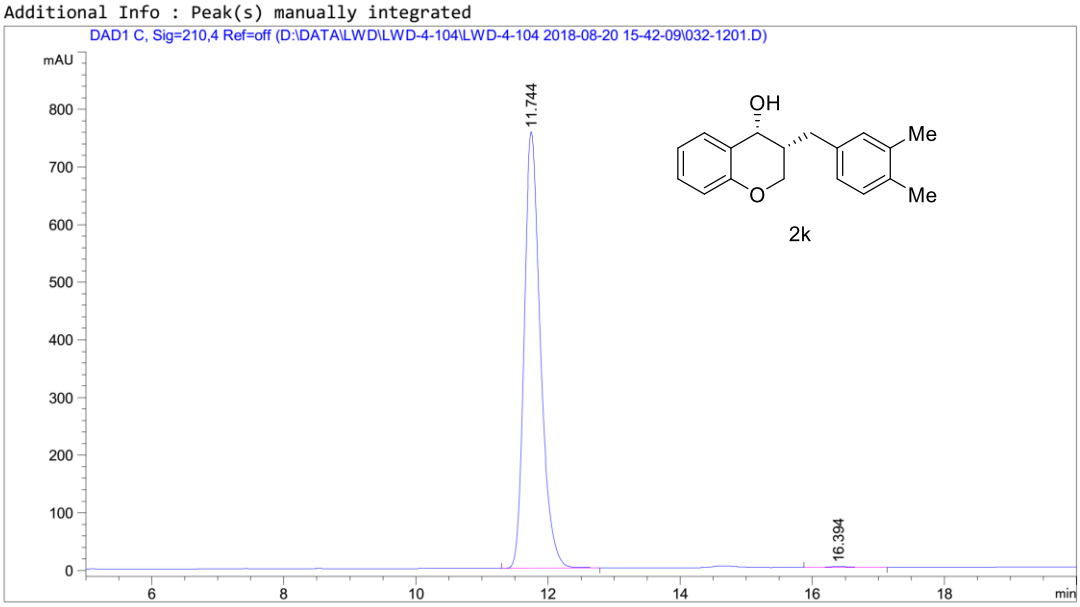

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  11.725 BB    0.2695 2168.51489  121.91917  29.8056
   2  14.211 BV    0.3663 1506.76208   61.82644  20.7100
   3  15.208 VV    0.3814 1470.22156   59.26291  20.2078
   4  16.390 VB    0.3708 2130.02246   87.24282  29.2766

Totals :                  7275.52100  330.25135
```

Data File D:\DATA\LWD\LWD-4-104\LWD-4-104 2018-08-20 15-42-09\032-1201.D
Sample Name: LWD-3-113-6-EE

```
======================================================================
Acq. Operator   :                                Seq. Line :  12
Acq. Instrument : Instrument 2                    Location : Vial 32
Injection Date  : 8/20/2018 10:26:10 PM               Inj :   1
                                                 Inj Volume : 2.000 µl
Acq. Method     : D:\DATA\LWD\LWD-4-104\LWD-4-104 2018-08-20 15-42-09\DAD-AD(1-6)-95-5-1ML-
                  2UL-ALL-20MIN.M
Last changed    : 8/20/2018 8:16:41 PM
Analysis Method : D:\METHOD\LG\DAD-IA(1-2)-80-20-1ML-2UL-ALL-10MIN.M
Last changed    : 12/11/2018 9:53:15 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

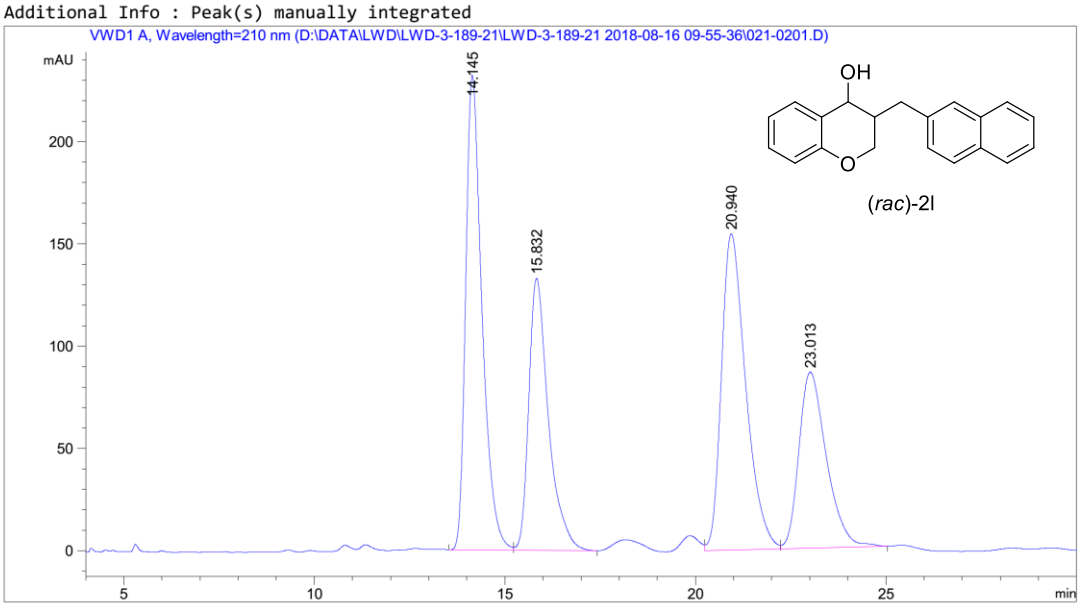

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  11.744 BB    0.2588 1.28971e4   756.83026  99.6767
   2  16.394 BB    0.3110   41.82529    1.71203   0.3233

Totals :                  1.29389e4   758.54229
```

Data File D:\DATA\LWD\LWD-3-189-21\LWD-3-189-21 2018-08-16 09-55-36\021-0201.D
Sample Name: LWD-3-189-21-RAC

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :   2
    Acq. Instrument : Instrument 1                    Location : Vial 21
    Injection Date  : 8/16/2018 10:12:19 AM               Inj :   1
                                                    Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189-21\LWD-3-189-21 2018-08-16 09-55-36\VWD-AS(1-6)-95-5-
                      1ML-3UL-210NM-30MIN.M
    Last changed    : 8/16/2018 9:54:17 AM
    Analysis Method : D:\METHOD\LWD\VWD-AD(1-2)-98-2-1ML-3UL-210NM-60MIN.M
    Last changed    : 8/17/2018 9:38:46 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

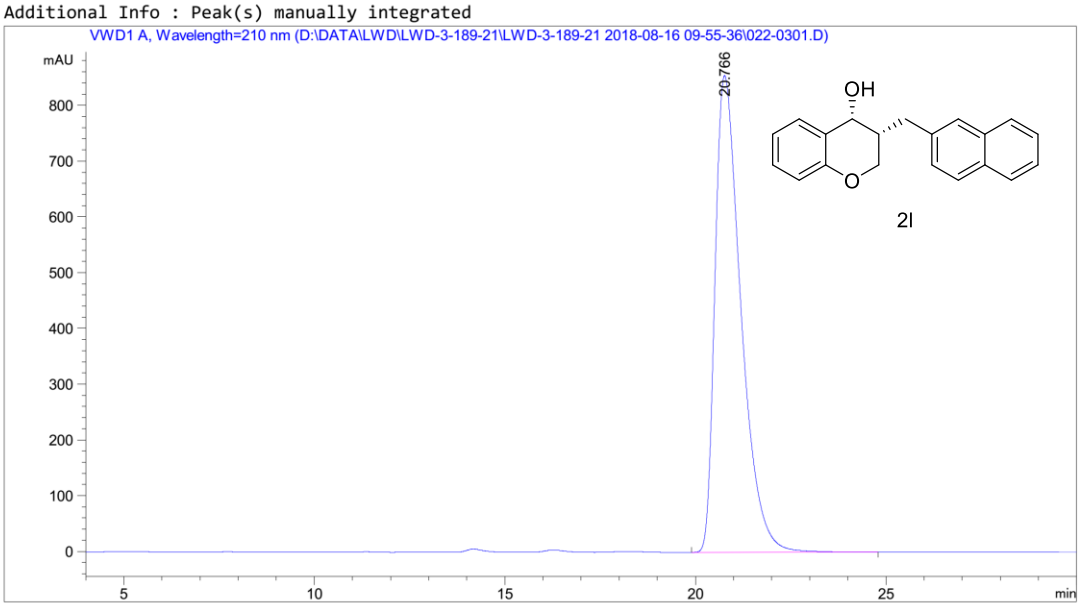

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  14.145 BV    0.4469 6896.69531  231.93311  30.1734
       2  15.832 VB    0.5359 4765.39600  133.02962  20.8488
       3  20.940 VV    0.6735 6866.52197  154.80162  30.0414
       4  23.013 VB    0.7610 4328.27881   86.17262  18.9364

    Totals :                  2.28569e4   605.93696
```

Data File D:\DATA\LWD\LWD-3-189-21\LWD-3-189-21 2018-08-16 09-55-36\022-0301.D
Sample Name: LWD-3-189-21-EE

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :   3
    Acq. Instrument : Instrument 1                    Location : Vial 22
    Injection Date  : 8/16/2018 10:43:09 AM               Inj :   1
                                                    Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189-21\LWD-3-189-21 2018-08-16 09-55-36\VWD-AS(1-6)-95-5-
                      1ML-3UL-210NM-30MIN.M
    Last changed    : 8/16/2018 9:54:17 AM
    Analysis Method : D:\METHOD\LWD\VWD-AD(1-2)-98-2-1ML-3UL-210NM-60MIN.M
    Last changed    : 8/17/2018 9:40:04 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: VWD1 A, Wavelength=210 nm

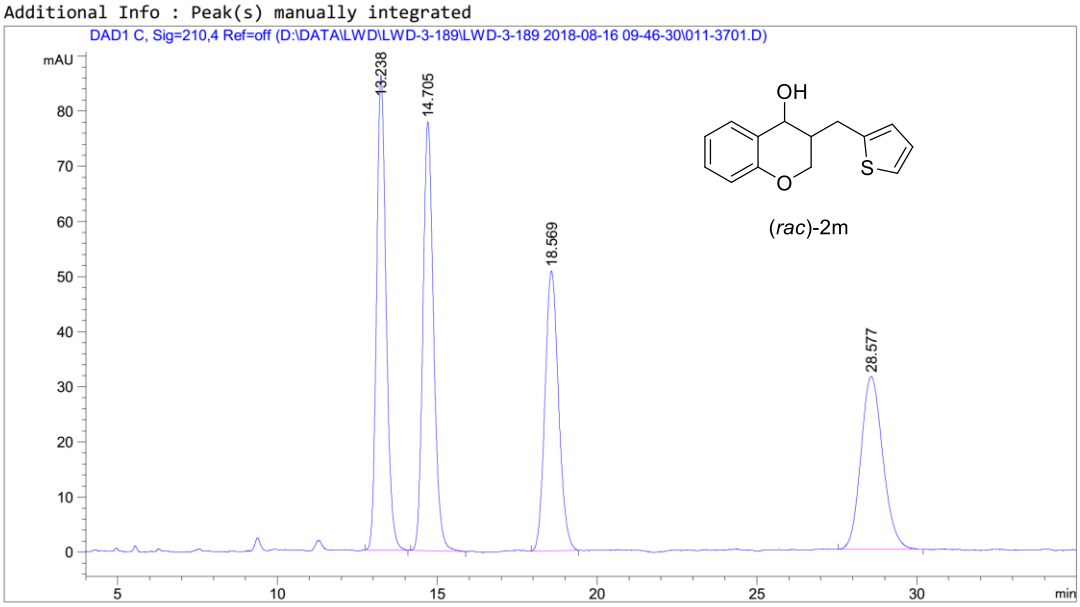
    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  20.766 BB    0.7255 4.04923e4   855.04865 100.0000

    Totals :                  4.04923e4   855.04865


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

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\011-3701.D
Sample Name: LWD-3-113-1-RAC

```
======================================================================
Acq. Operator   :                                Seq. Line :  37
Acq. Instrument : Instrument 2                    Location : Vial 11
Injection Date  : 8/17/2018 6:23:27 AM                 Inj :   1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  3UL-ALL-35MIN.M
Last changed    : 8/16/2018 9:44:17 AM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 9:31:09 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

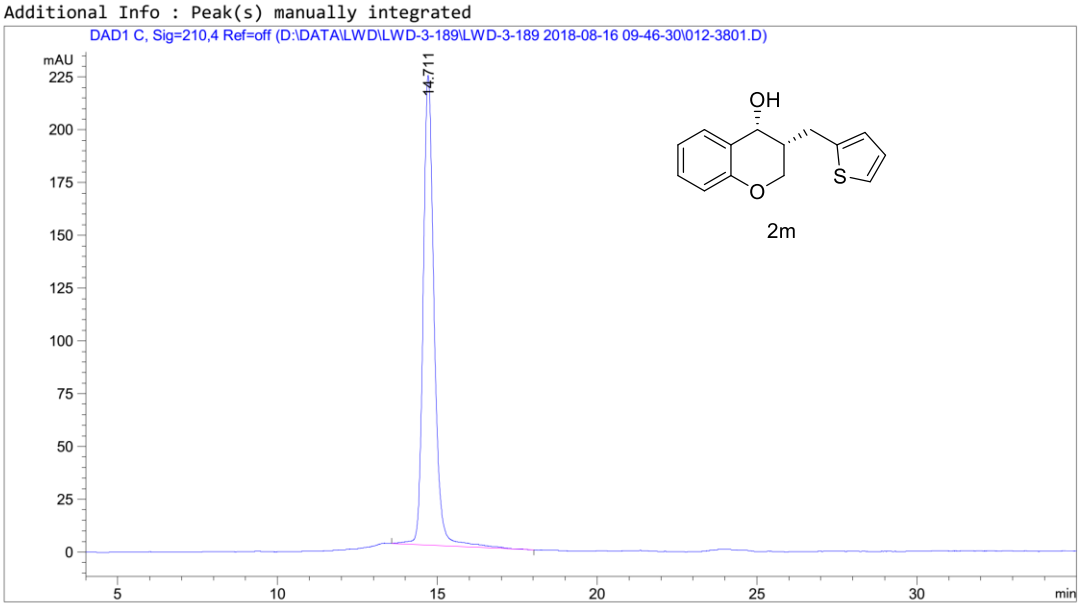

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  13.238 BB    0.3196 1781.92883   86.05817  27.0936
   2  14.705 BB    0.3576 1796.73987   77.76508  27.3188
   3  18.569 BB    0.4523 1499.78674   50.82487  22.8037
   4  28.577 BB    0.7152 1498.47693   31.37714  22.7838

Totals :                 6576.93237  246.02526
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\012-3801.D
Sample Name: LWD-3-113-1-EE

```
======================================================================
Acq. Operator   :                                Seq. Line :  38
Acq. Instrument : Instrument 2                    Location : Vial 12
Injection Date  : 8/17/2018 6:59:24 AM                 Inj :   1
                                                 Inj Volume : 1.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  1UL-ALL-35MIN.M
Last changed    : 8/16/2018 11:23:38 AM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 9:32:10 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

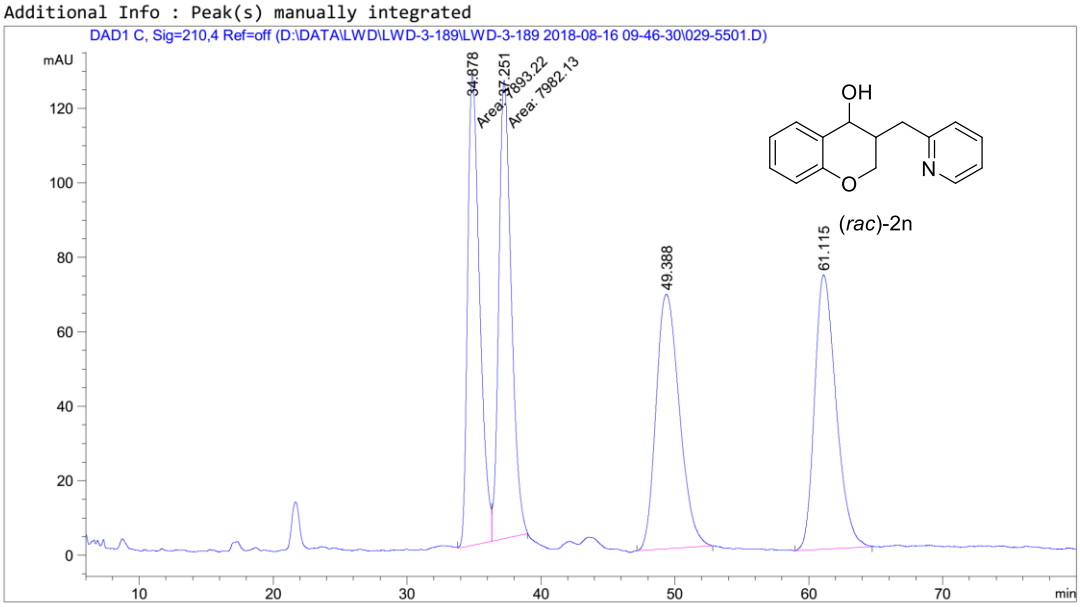
Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  14.711 BB    0.3651 5319.56396  222.34158 100.0000

Totals :                  5319.56396  222.34158


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

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\029-5501.D
Sample Name: LWD-3-176-3-RAC

```
======================================================================
Acq. Operator   :                                Seq. Line :  55
Acq. Instrument : Instrument 2                    Location : Vial 29
Injection Date  : 8/18/2018 12:11:33 AM               Inj :   1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-97-3-0.8ML-
                  10UL-ALL-80MIN.M
Last changed    : 8/16/2018 9:06:17 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/18/2018 9:23:28 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

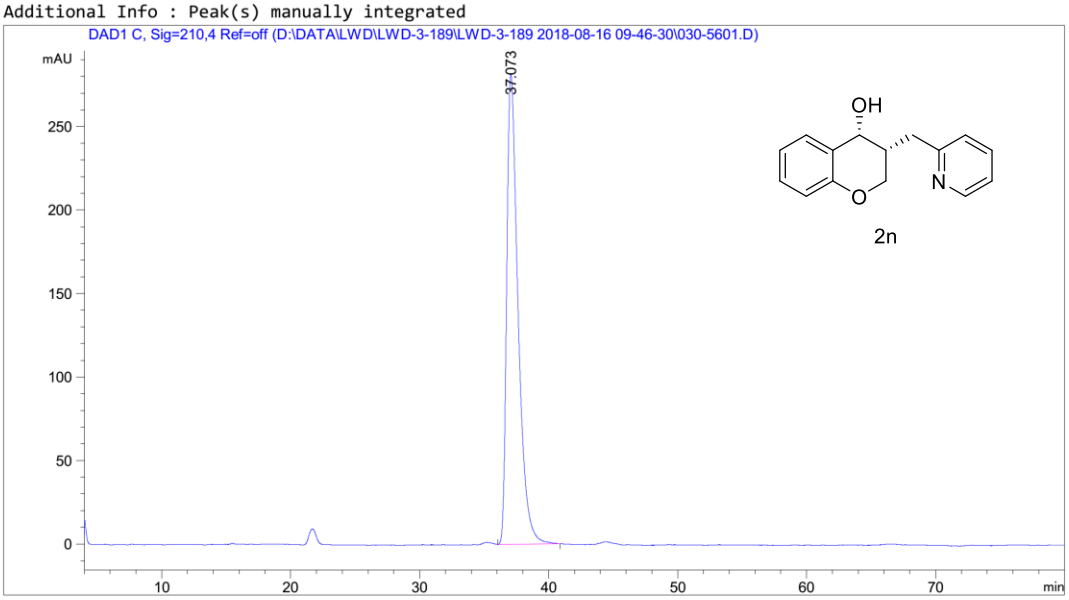

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  34.878 MF    1.0423 7893.22314  126.21693  24.3571
   2  37.251 FM    1.0804 7982.13281  123.13682  24.6315
   3  49.388 BB    1.4397 8313.06738   68.40965  25.6527
   4  61.115 BB    1.4638 8217.76660   73.64771  25.3586

Totals :                  3.24062e4   391.41111
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\030-5601.D
Sample Name: LWD-3-176-3-EE

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :  56
    Acq. Instrument : Instrument 2                    Location : Vial 30
    Injection Date  : 8/18/2018 1:32:41 AM                 Inj :   1
                                                     Inj Volume : 1.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-97-3-0.8ML-
                      1UL-ALL-80MIN.M
    Last changed    : 8/16/2018 9:06:45 PM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/18/2018 9:02:41 AM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```



2n

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

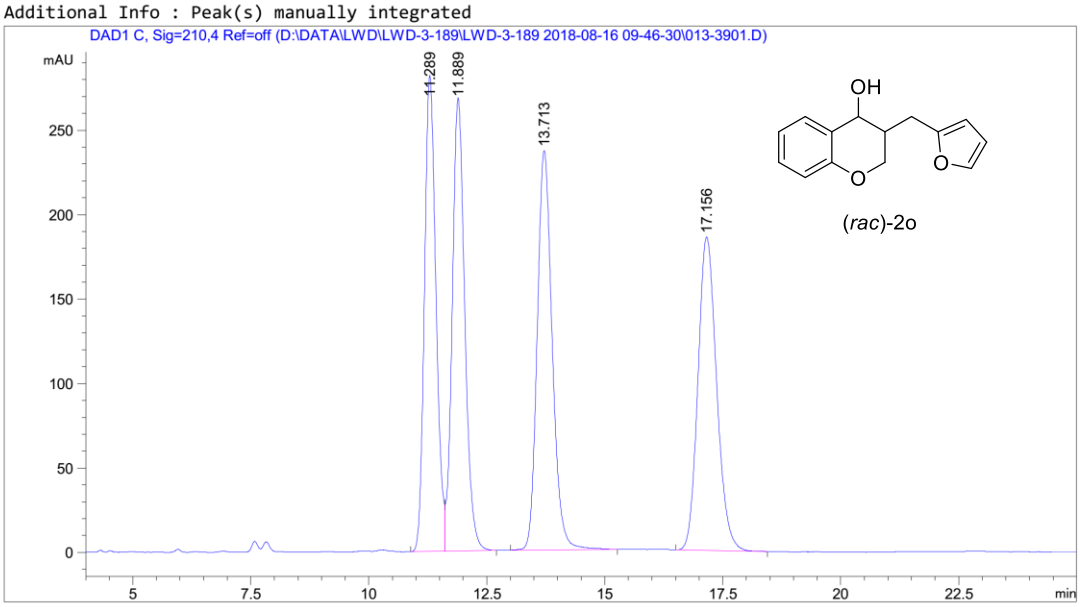
    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  37.073 BB    0.8958 1.71783e4   281.54138 100.0000

    Totals :                  1.71783e4   281.54138


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

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\013-3901.D
Sample Name: LWD-3-113-2-RAC

```
======================================================================
Acq. Operator   :                                Seq. Line :  39
Acq. Instrument : Instrument 2                    Location : Vial 13
Injection Date  : 8/17/2018 7:35:25 AM                 Inj :   1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  3UL-ALL-25MIN.M
Last changed    : 8/16/2018 8:31:25 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 9:34:51 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

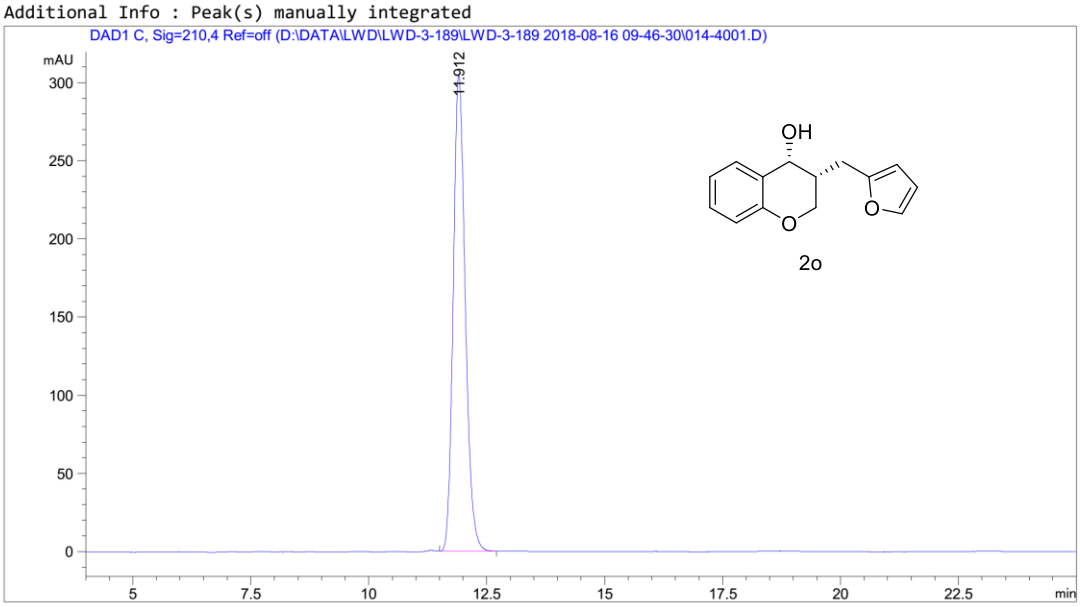

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  11.289 BV    0.2619 4781.29688  281.82632  23.8316
   2  11.889 VB    0.2813 4948.68945  268.18326  24.6660
   3  13.713 BB    0.3395 5218.85400  236.44759  26.0126
   4  17.156 BB    0.4274 5113.98486  185.65912  25.4899

Totals :                  2.00628e4   972.11629
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\014-4001.D
Sample Name: LWD-3-113-2-EE

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :  40
    Acq. Instrument : Instrument 2                    Location : Vial 14
    Injection Date  : 8/17/2018 8:01:25 AM                 Inj :   1
                                                     Inj Volume : 1.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                      1UL-ALL-25MIN.M
    Last changed    : 8/16/2018 8:31:59 PM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/17/2018 9:36:23 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

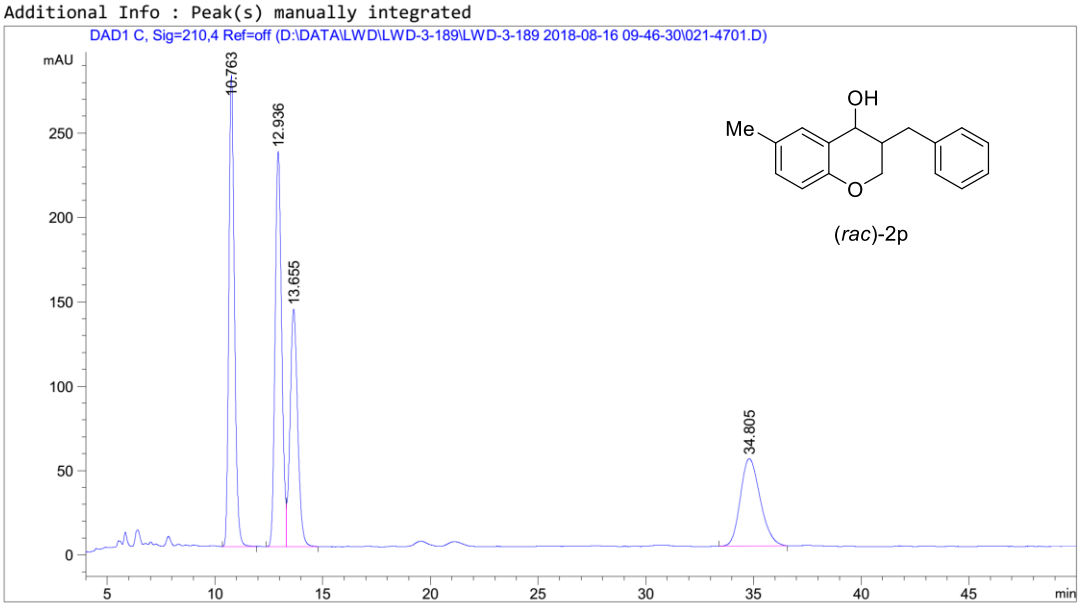
    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  11.912 BB    0.2732 5405.20313  304.32196 100.0000

    Totals :                  5405.20313  304.32196


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

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\021-4701.D
Sample Name: LWD-3-176-5-RAC

```
    ====================================================================
    Acq. Operator   :                                Seq. Line :  47
    Acq. Instrument : Instrument 2                    Location : Vial 21
    Injection Date  : 8/17/2018 3:23:34 PM                 Inj :   1
                                                     Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                      3UL-ALL-50MIN.M
    Last changed    : 8/16/2018 9:43:15 AM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/17/2018 5:10:06 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

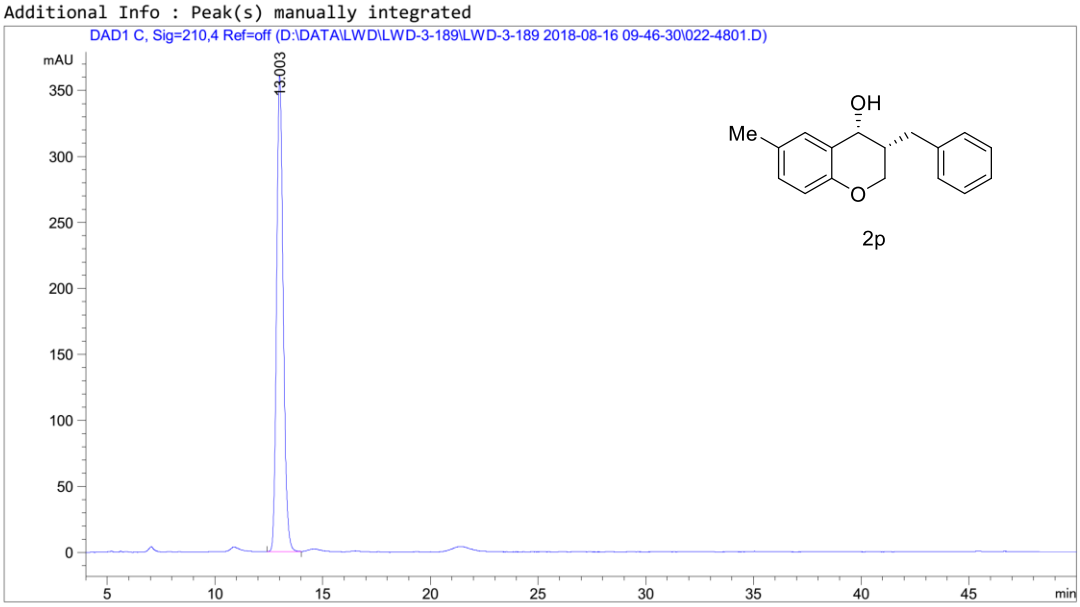

    Signal 1: DAD1 C, Sig=210,4 Ref=off

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  10.763 BB    0.2788 5042.55859  279.13034  30.0341
       2  12.936 BV    0.3282 4977.77734  234.00815  29.6483
       3  13.655 VB    0.3744 3452.58105  140.63708  20.5640
       4  34.805 BB    0.9308 3316.52222   51.81445  19.7536

    Totals :                  1.67894e4   705.59002
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\022-4801.D
Sample Name: LWD-3-176-5-EE

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :  48
    Acq. Instrument : Instrument 2                    Location : Vial 22
    Injection Date  : 8/17/2018 4:14:30 PM                 Inj :   1
                                                     Inj Volume : 1.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                      1UL-ALL-50MIN.M
    Last changed    : 8/16/2018 11:20:59 AM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/17/2018 5:11:41 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

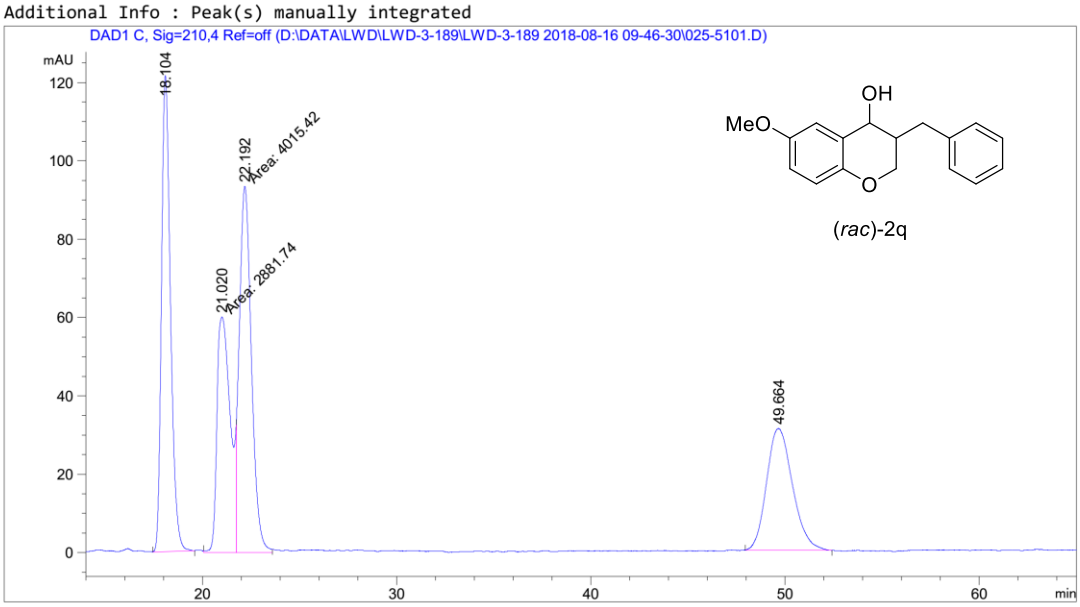
    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  13.003 BB    0.3286 7684.91162  360.65469 100.0000

    Totals :                  7684.91162  360.65469


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

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\025-5101.D
Sample Name: LWD-3-176-7-RAC

```
======================================================================
Acq. Operator   :                                Seq. Line :  51
Acq. Instrument : Instrument 2                    Location : Vial 25
Injection Date  : 8/17/2018 7:17:29 PM                 Inj :   1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  3UL-ALL-65MIN.M
Last changed    : 8/16/2018 8:59:30 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 10:11:16 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

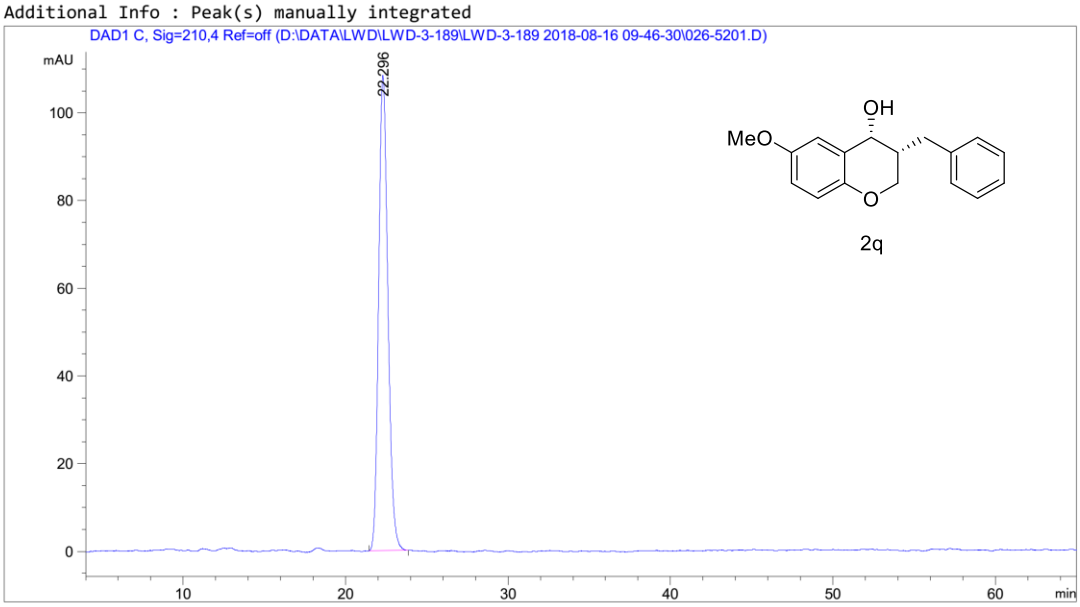

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  18.104 BB    0.4908 3903.32056  121.49027  28.5186
   2  21.020 MF    0.7996 2881.74097   60.06852  21.0547
   3  22.192 FM    0.7163 4015.41528   93.42863  29.3375
   4  49.664 BB    1.0981 2886.47388   31.06365  21.0892

Totals :                  1.36870e4   306.05107
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\026-5201.D
Sample Name: LWD-3-176-7-EE

```
======================================================================
Acq. Operator   :                                Seq. Line :  52
Acq. Instrument : Instrument 2                    Location : Vial 26
Injection Date  : 8/17/2018 8:23:30 PM                 Inj :   1
                                                 Inj Volume : 1.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  1UL-ALL-65MIN.M
Last changed    : 8/16/2018 8:59:56 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 10:11:53 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 C, Sig=210,4 Ref=off

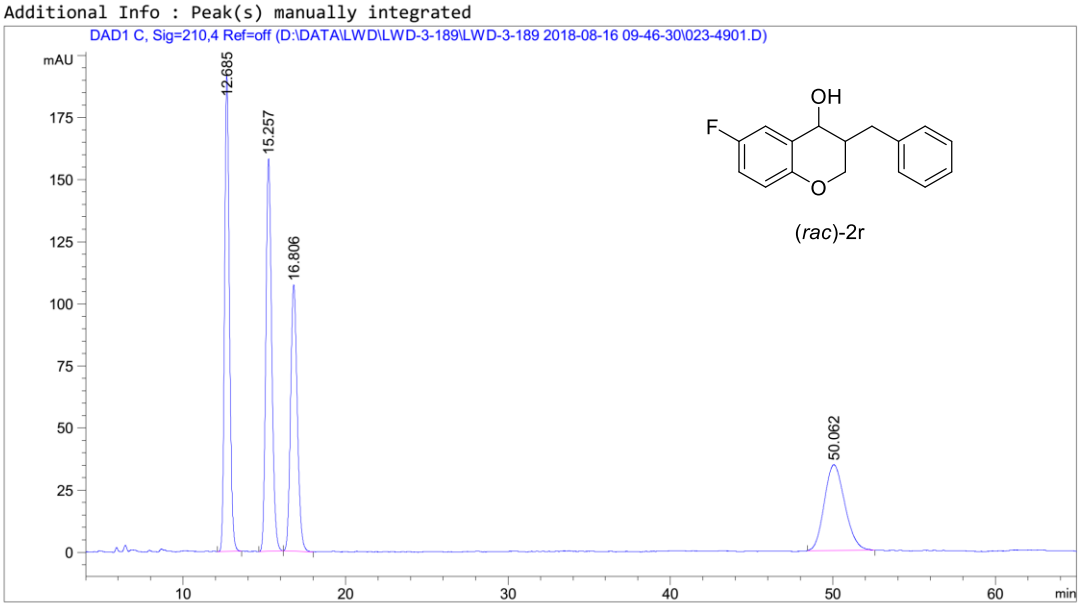
Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  22.296 BB    0.6150 4299.39746  108.33426 100.0000

Totals :                  4299.39746  108.33426


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

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\023-4901.D
Sample Name: LWD-3-176-6-RAC

```
======================================================================
Acq. Operator   :                                Seq. Line :  49
Acq. Instrument : Instrument 2                    Location : Vial 23
Injection Date  : 8/17/2018 5:05:31 PM                 Inj :   1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  3UL-ALL-65MIN.M
Last changed    : 8/16/2018 8:59:30 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 7:24:41 PM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```




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

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

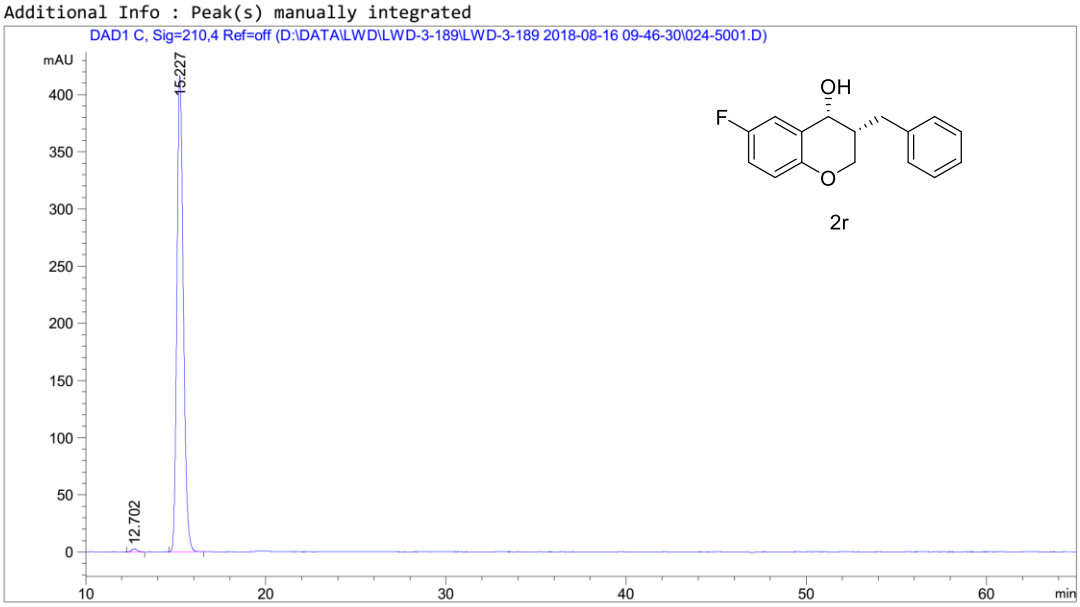

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  12.685 BB    0.3211 3991.95093  191.60632  28.3920
   2  15.257 BB    0.3872 3968.84009  157.90181  28.2277
   3  16.806 BB    0.4447 3076.16479  107.22281  21.8787
   4  50.062 BB    1.0429 3023.15820   34.54823  21.5017

Totals :                  1.40601e4   491.27917
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\024-5001.D
Sample Name: LWD-3-176-6-EE

```
======================================================================
Acq. Operator   :                                Seq. Line :  50
Acq. Instrument : Instrument 2                    Location : Vial 24
Injection Date  : 8/17/2018 6:11:29 PM                 Inj :   1
                                                 Inj Volume : 1.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  1UL-ALL-65MIN.M
Last changed    : 8/16/2018 8:59:56 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 7:26:21 PM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```




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

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

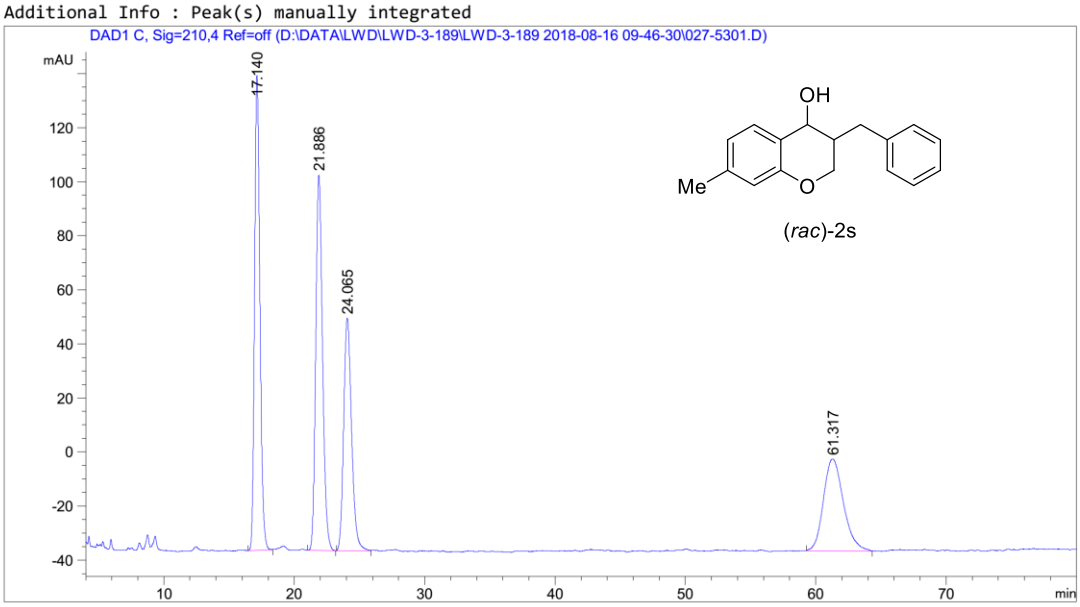

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  12.702 BB    0.3027   60.94179    2.79111   0.5841
   2  15.227 BB    0.3846 1.03726e4   416.47278  99.4159

Totals :                  1.04336e4   419.26389
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\027-5301.D
Sample Name: LWD-3-176-4-RAC

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :  53
    Acq. Instrument : Instrument 2                    Location : Vial 27
    Injection Date  : 8/17/2018 9:29:28 PM                 Inj :   1
                                                     Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-97-3-1ML-
                      2UL-ALL-80MIN.M
    Last changed    : 8/16/2018 9:02:21 PM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/18/2018 8:57:03 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

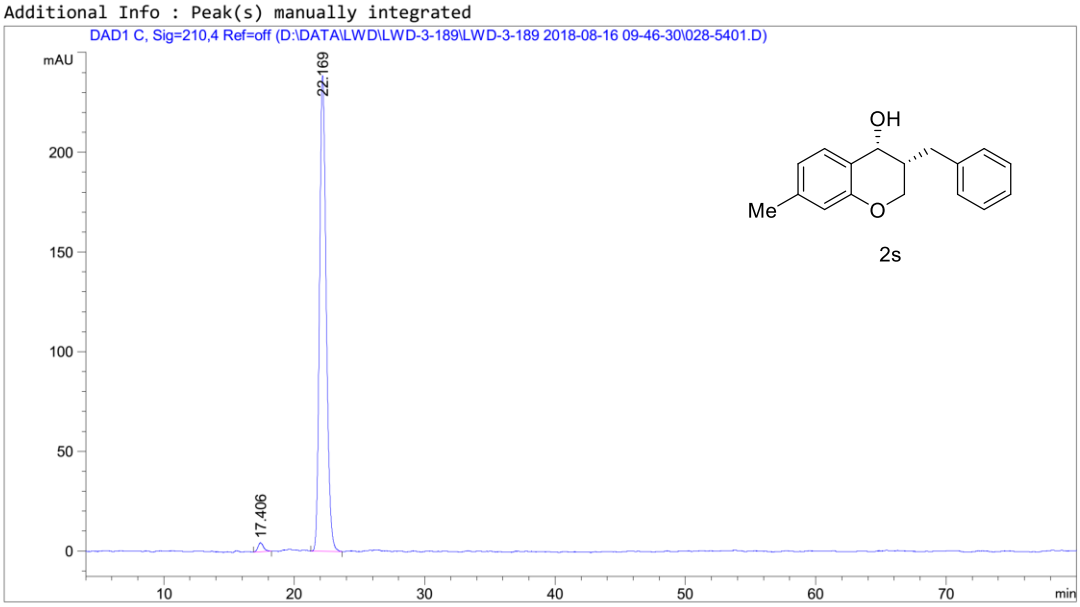

    Signal 1: DAD1 C, Sig=210,4 Ref=off

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  17.140 BB    0.4382 5000.33057  175.63075  29.0382
       2  21.886 BB    0.5563 5004.27197  138.91711  29.0611
       3  24.065 BB    0.6420 3610.64722   85.97623  20.9680
       4  61.317 BB    1.2491 3604.56665   33.99368  20.9327

    Totals :                  1.72198e4   434.51778
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\028-5401.D
Sample Name: LWD-3-176-4-EE

```
======================================================================
Acq. Operator   :                                Seq. Line :  54
Acq. Instrument : Instrument 2                    Location : Vial 28
Injection Date  : 8/17/2018 10:50:28 PM               Inj :   1
                                                 Inj Volume : 1.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-97-3-1ML-
                  1UL-ALL-80MIN.M
Last changed    : 8/16/2018 9:02:52 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/18/2018 8:59:10 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

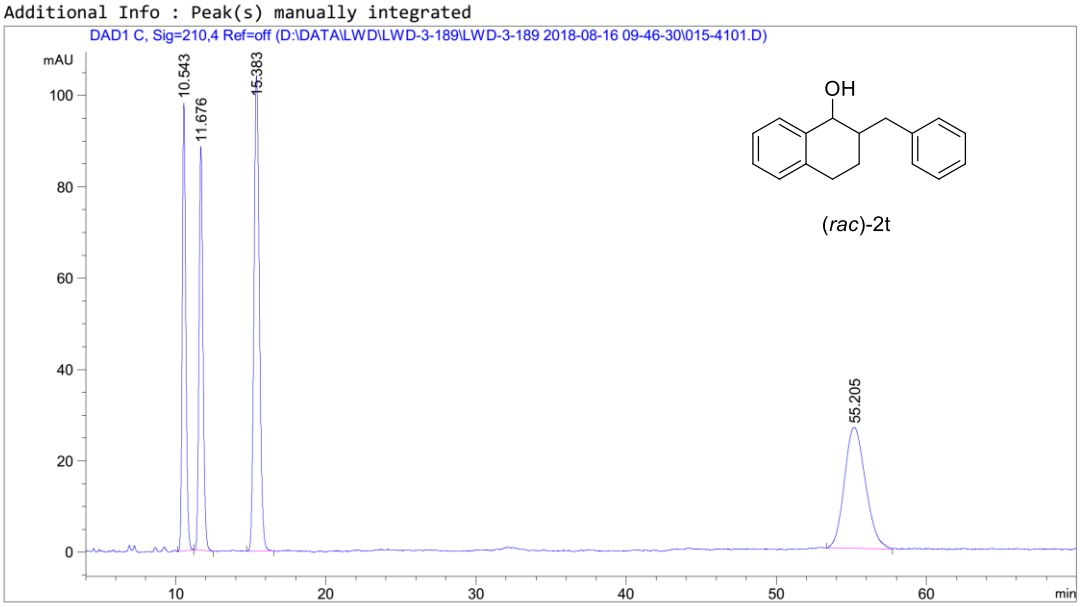

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  17.406 BB    0.3777  131.24475    4.50790   1.5225
   2  22.169 BB    0.5470 8489.13770  238.62573  98.4775

Totals :                  8620.38245  243.13363
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\015-4101.D
Sample Name: LWD-3-113-3-RAC

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :  41
    Acq. Instrument : Instrument 2                    Location : Vial 15
    Injection Date  : 8/17/2018 8:27:25 AM                 Inj :   1
                                                     Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                      3UL-ALL-70MIN.M
    Last changed    : 8/16/2018 8:43:07 PM
    Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
    Last changed    : 8/17/2018 11:03:20 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

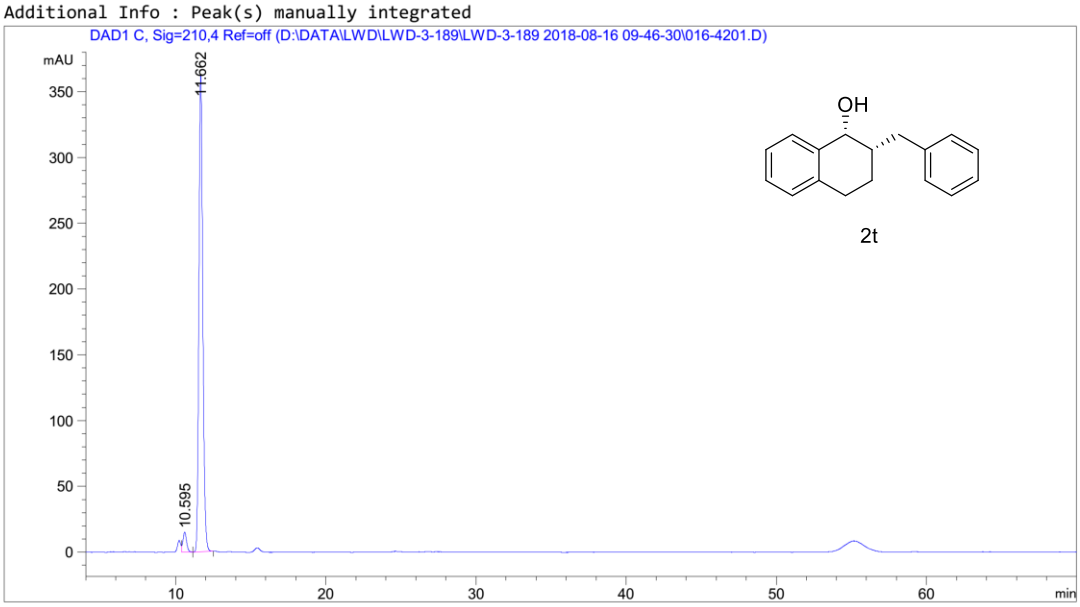

    Signal 1: DAD1 C, Sig=210,4 Ref=off

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  10.543 BB    0.2545 1618.92737   98.13342  19.1970
       2  11.676 BB    0.2845 1624.93506   88.39839  19.2682
       3  15.383 BB    0.3857 2603.46802  104.11540  30.8715
       4  55.205 BB    1.1522 2585.91626   26.50550  30.6634

    Totals :                  8433.24670  317.15272
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\016-4201.D
Sample Name: LWD-3-113-3-EE

```
======================================================================
Acq. Operator   :                                Seq. Line :  42
Acq. Instrument : Instrument 2                    Location : Vial 16
Injection Date  : 8/17/2018 9:38:25 AM                 Inj :   1
                                                 Inj Volume : 1.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-1ML-
                  1UL-ALL-70MIN.M
Last changed    : 8/16/2018 8:43:33 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 11:04:53 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

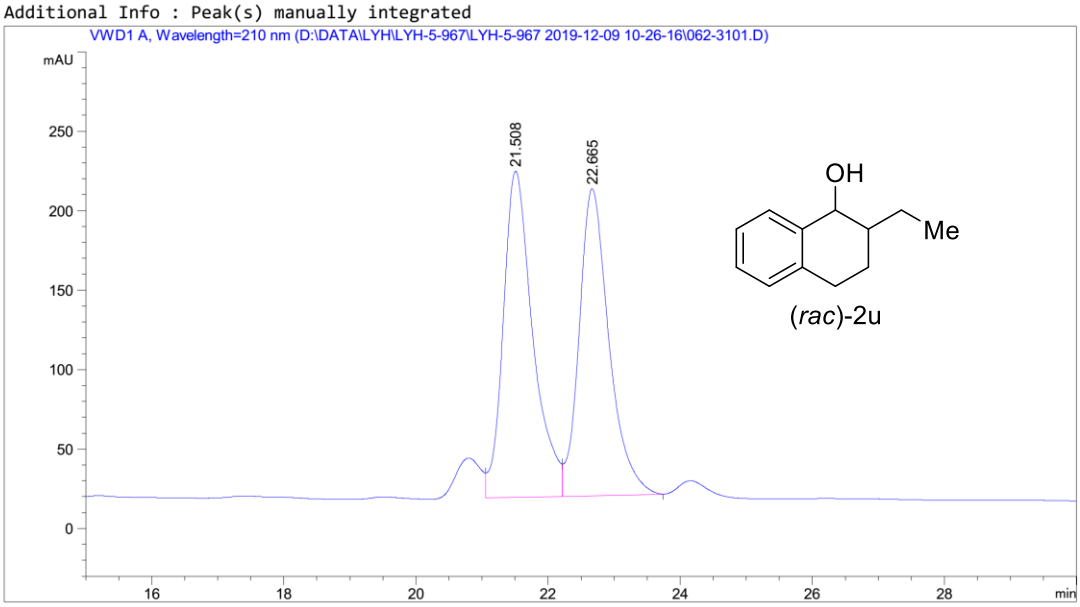

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  10.595 VB    0.2587  258.90076   15.20095   3.8273
   2  11.662 BB    0.2777 6505.61768  361.96060  96.1727

Totals :                  6764.51843  377.16155
```

Data File D:\DATA\LYH\LYH-5-967\LYH-5-967 2019-12-09 10-26-16\062-3101.D
Sample Name: LWD-6-110-2-DIAN1

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :  31
    Acq. Instrument : Instrument 1                    Location : Vial 62
    Injection Date  : 12/9/2019 9:53:48 PM                 Inj :   1
                                                     Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LYH\LYH-5-967\LYH-5-967 2019-12-09 10-26-16\VWD-AD(1-2)-90-10-0.3ML
                      -1UL-210NM-30MIN.M
    Last changed    : 12/9/2019 8:58:55 PM
    Analysis Method : D:\METHOD\LWD\VWD-AD(1-2)-90-10-0.3ML-1UL-210NM-30MIN.M
    Last changed    : 12/10/2019 8:52:00 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

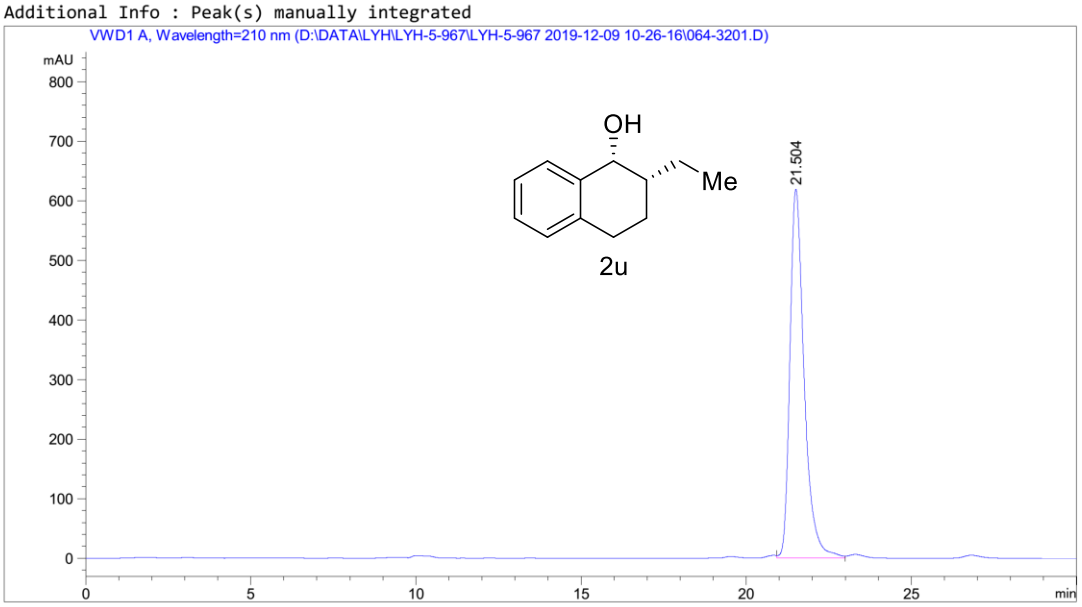

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  21.508 VV    0.4673 6409.29297  205.23256  51.3639
       2  22.665 VB    0.4736 6068.91553  193.12845  48.6361

    Totals :                  1.24782e4   398.36101
```

Data File D:\DATA\LYH\LYH-5-967\LYH-5-967 2019-12-09 10-26-16\064-3201.D
Sample Name: LWD-6-118-1

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :  32
    Acq. Instrument : Instrument 1                    Location : Vial 64
    Injection Date  : 12/9/2019 10:24:37 PM               Inj :   1
                                                     Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LYH\LYH-5-967\LYH-5-967 2019-12-09 10-26-16\VWD-AD(1-2)-90-10-0.3ML
                      -1UL-210NM-30MIN.M
    Last changed    : 12/9/2019 8:58:55 PM
    Analysis Method : D:\METHOD\LWD\VWD-AD(1-2)-90-10-0.3ML-1UL-210NM-30MIN.M
    Last changed    : 12/10/2019 8:54:10 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

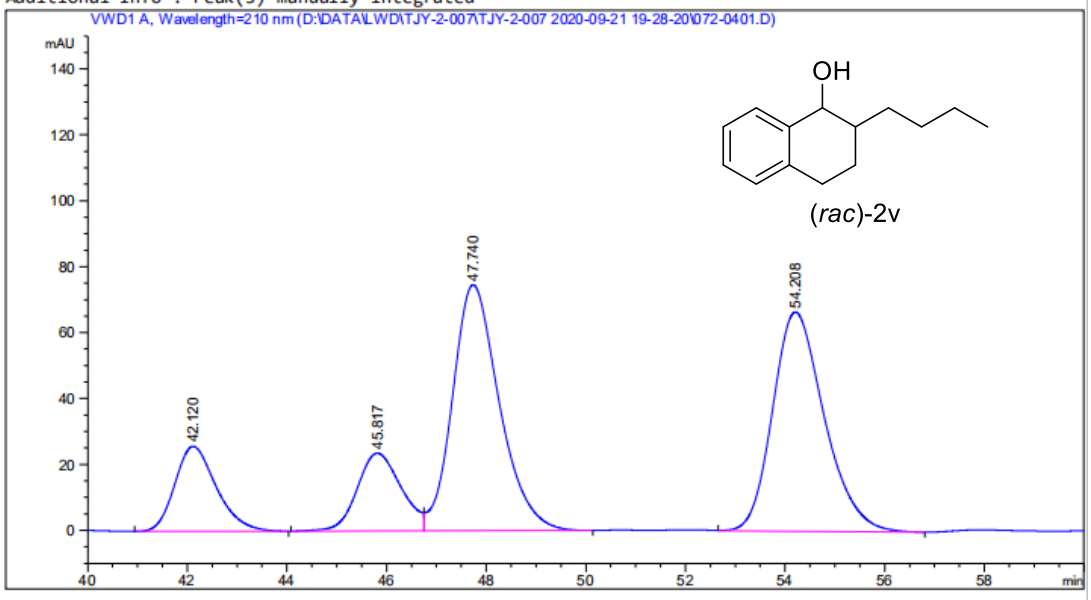

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  21.504 VV    0.4549 1.85533e4   618.62714 100.0000

    Totals :                  1.85533e4   618.62714


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

```
Acq. Operator   :                                   Seq. Line :   4
Acq. Instrument : Instrument 1                      Location : Vial 72
Injection Date  : 9/21/2020 9:17:53 PM                  Inj :   1
                                                  Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\TJY-2-007\TJY-2-007 2020-09-21 19-28-20\VWD-AD(1-2)-98-2-0.5ML-
                  3UL-210NM-80MIN.M
Last changed    : 9/21/2020 7:32:20 PM
Analysis Method : D:\METHOD\LWD\VWD-AD(1-2)-98-2-0.5ML-3UL-210NM-80MIN.M
Last changed    : 9/22/2020 11:03:10 AM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```



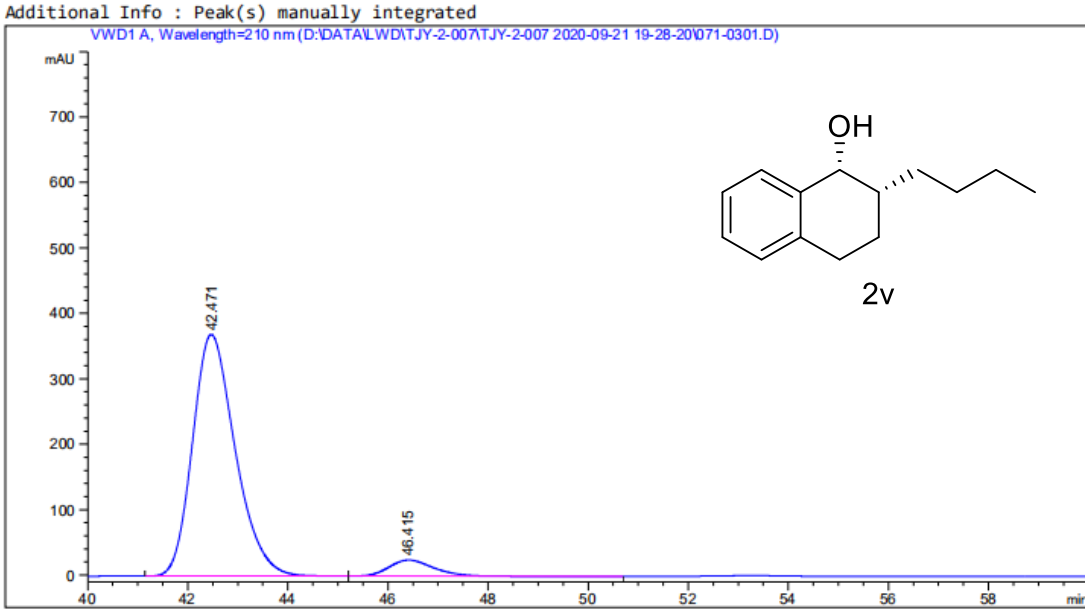

```
=====================================================================
                      Area Percent Report
=====================================================================

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


Signal 1: VWD1 A, Wavelength=210 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  42.120 BB    0.8837 1492.80615   25.77412  11.8415
   2  45.817 BV    0.9390 1446.75659   23.60618  11.4763
   3  47.740 VB    0.9931 4869.16016   74.64176  38.6241
   4  54.208 VB    1.1047 4797.80322   66.57867  38.0581
```

```
Acq. Operator   :                                Seq. Line :   3
Acq. Instrument : Instrument 1                    Location : Vial 71
Injection Date  : 9/21/2020 7:57:04 PM                 Inj :   1
                                                 Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\TJY-2-007\TJY-2-007 2020-09-21 19-28-20\VWD-AD(1-2)-98-2-0.5ML-
                  3UL-210NM-80MIN.M
Last changed    : 9/21/2020 7:32:20 PM
Analysis Method : D:\METHOD\LWD\VWD-AD(1-2)-98-2-0.5ML-3UL-210NM-60MIN.M
Last changed    : 9/24/2020 9:06:45 AM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```




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

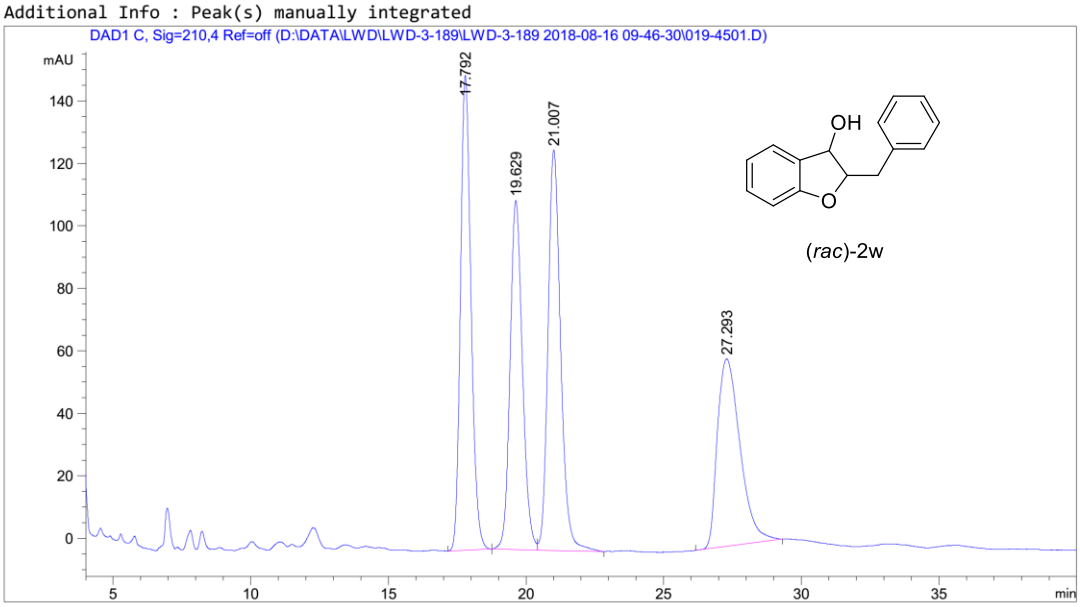
Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


Signal 1: VWD1 A, Wavelength=210 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  42.471 BB    0.9048 2.18616e4   369.23816  93.3530
   2  46.415 BB    0.9538 1556.60498   24.64851   6.6470
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\019-4501.D
Sample Name: LWD-3-118-2-RAC

```
======================================================================
Acq. Operator   :                                Seq. Line :  45
Acq. Instrument : Instrument 2                    Location : Vial 19
Injection Date  : 8/17/2018 2:01:26 PM                 Inj :   1
                                                 Inj Volume : 5.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-0.8ML-
                  5UL-ALL-40MIN.M
Last changed    : 8/16/2018 8:56:08 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 3:33:24 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

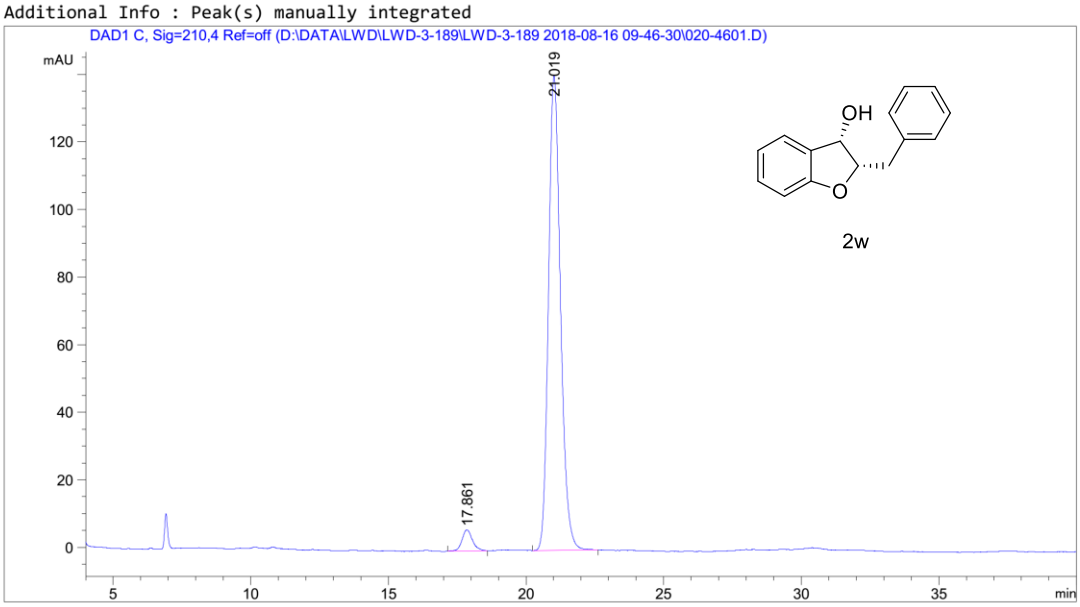

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  17.792 BB    0.4071 4025.33838  151.91904  26.8361
   2  19.629 BV    0.4765 3470.39746  111.68341  23.1364
   3  21.007 VB    0.4871 4078.22510  128.20007  27.1887
   4  27.293 BB    0.8586 3425.73730   59.95417  22.8387

Totals :                  1.49997e4   451.75669
```

Data File D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\020-4601.D
Sample Name: LWD-3-118-2-EE

```
======================================================================
Acq. Operator   :                                Seq. Line :  46
Acq. Instrument : Instrument 2                    Location : Vial 20
Injection Date  : 8/17/2018 2:42:29 PM                 Inj :   1
                                                 Inj Volume : 1.000 µl
Acq. Method     : D:\DATA\LWD\LWD-3-189\LWD-3-189 2018-08-16 09-46-30\DAD-OD(1-2)-95-5-0.8ML-
                  1UL-ALL-40MIN.M
Last changed    : 8/16/2018 8:56:41 PM
Analysis Method : D:\METHOD\LWD\DAD-OD(1-2)-97-3-0.8ML-1UL-ALL-80MIN.M
Last changed    : 8/17/2018 3:34:50 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

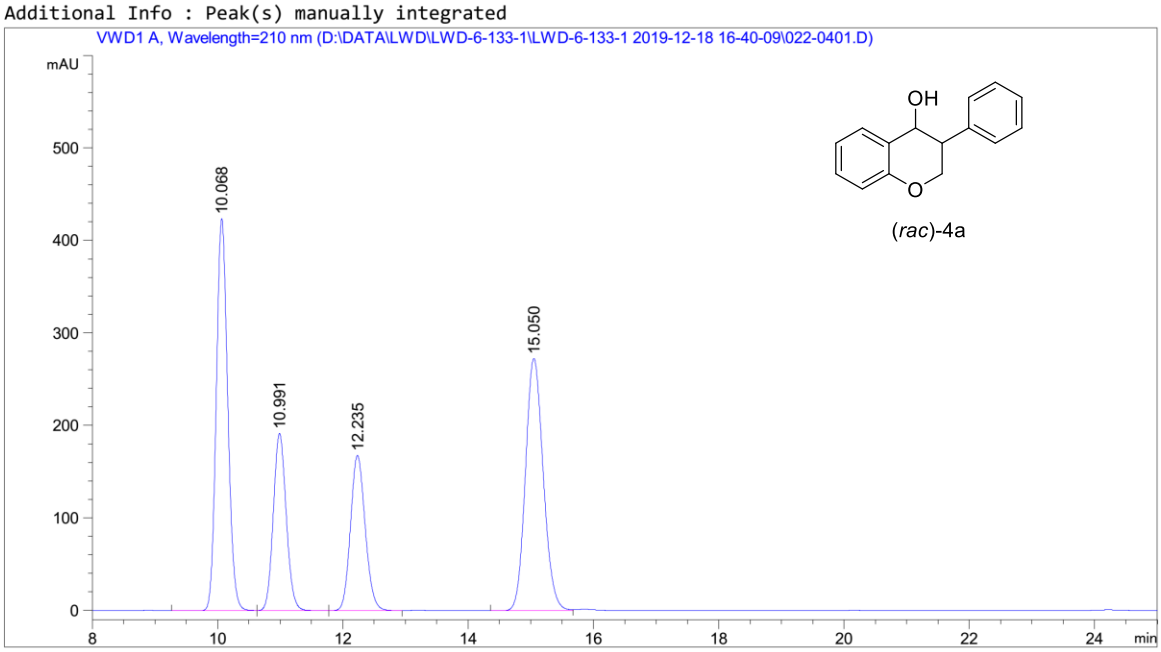

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  17.861 BB    0.3850  165.14426    6.27488   3.7346
   2  21.019 BB    0.4653 4256.80518  140.56371  96.2654

Totals :                  4421.94943  146.83859
```

Data File D:\DATA\LWD\LWD-6-133-1\LWD-6-133-1 2019-12-18 16-40-09\022-0401.D
Sample Name: LWD-6-238-2-RAC

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :   4
    Acq. Instrument : Instrument 1                  Location : Vial 22
    Injection Date  : 12/18/2019 5:43:26 PM              Inj :   1
                                                  Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-6-133-1\LWD-6-133-1 2019-12-18 16-40-09\VWD-IC(1-2)-95-5-
                      1ML-2UL-210NM-30MIN.M
    Last changed    : 12/18/2019 4:38:02 PM
    Analysis Method : D:\METHOD\LSL\DAD-OJ(1-6)-99-1-0.5ML-5UL-ALL-60MIN.M
    Last changed    : 12/30/2020 9:13:19 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

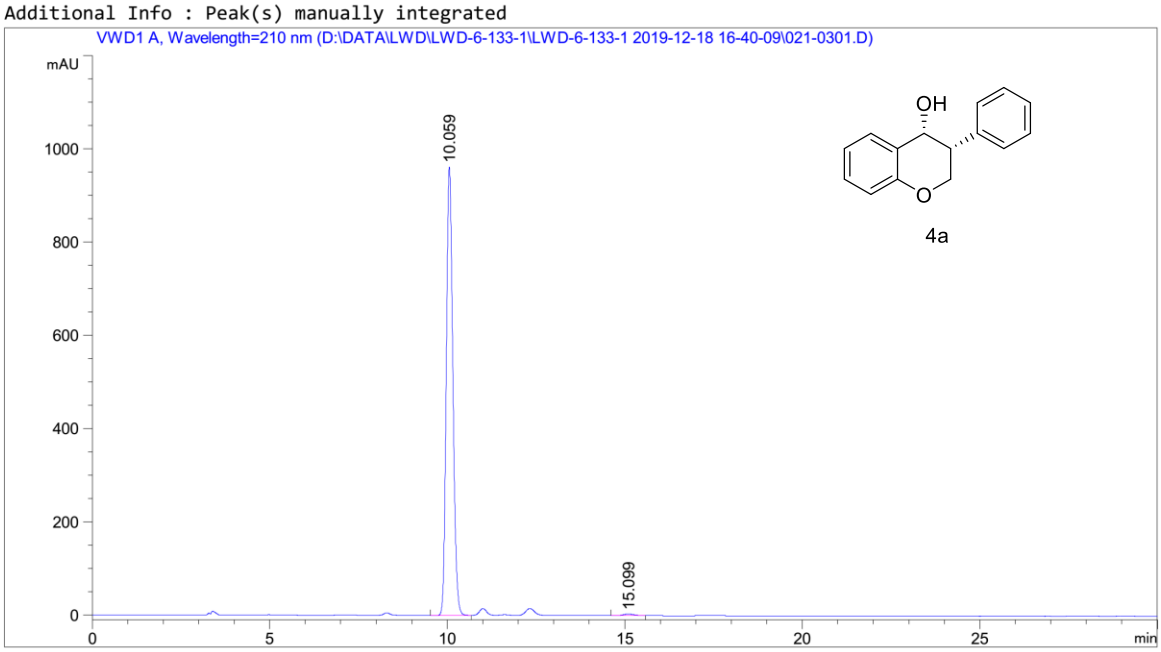

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  10.068 BB    0.1959 5370.57617  423.68130  33.0362
       2  10.991 BB    0.2222 2743.30005  191.40637  16.8749
       3  12.235 BB    0.2527 2741.24854  167.73990  16.8623
       4  15.050 BV    0.3060 5401.53174  272.85406  33.2266

    Totals :                  1.62567e4  1055.68164
```

Data File D:\DATA\LWD\LWD-6-133-1\LWD-6-133-1 2019-12-18 16-40-09\021-0301.D
Sample Name: LWD-6-133-1

```
=====================================================================
Acq. Operator   :                              Seq. Line :   3
Acq. Instrument : Instrument 1                  Location : Vial 21
Injection Date  : 12/18/2019 5:12:38 PM              Inj :   1
                                               Inj Volume : 2.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-133-1\LWD-6-133-1 2019-12-18 16-40-09\VWD-IC(1-2)-95-5-
                  1ML-2UL-210NM-30MIN.M
Last changed    : 12/18/2019 4:38:02 PM
Analysis Method : D:\METHOD\LSL\DAD-OJ(1-6)-99-1-0.5ML-5UL-ALL-60MIN.M
Last changed    : 12/30/2020 9:15:47 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

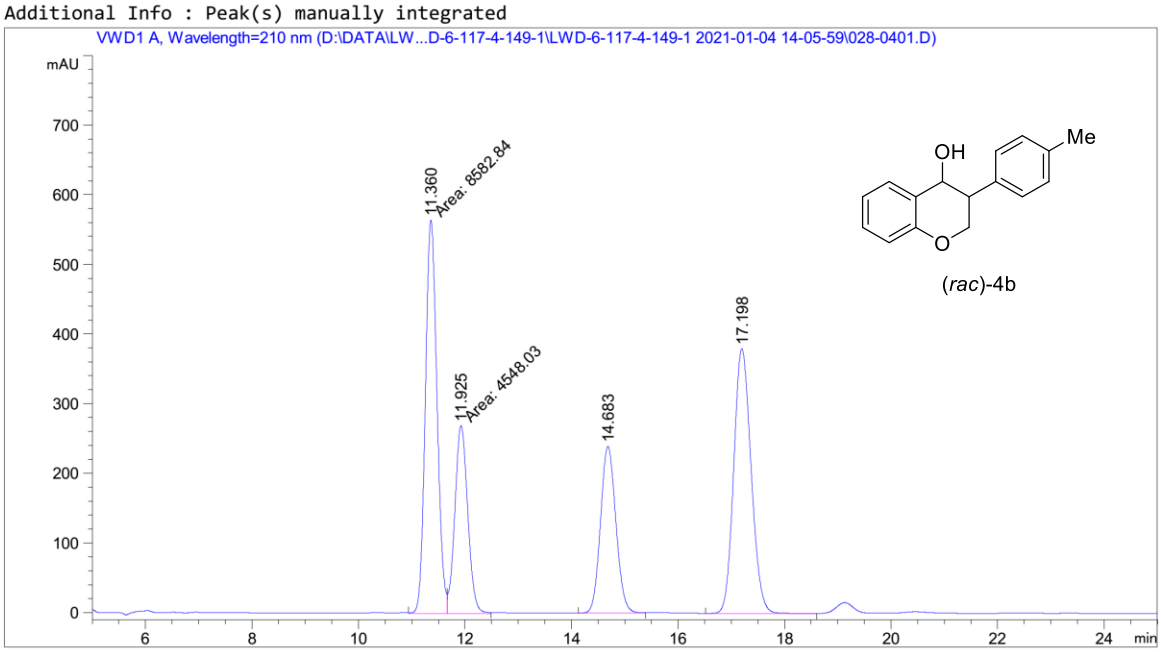

Signal 1: VWD1 A, Wavelength=210 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  10.059 BV    0.1996 1.23387e4   961.94116  99.3882
   2  15.099 BB    0.3238   75.95415    3.60568   0.6118

Totals :                  1.24147e4   965.54684
```

Data File D:\DATA\LWD\LWD-6-117-4-149-1\LWD-6-117-4-149-1 2021-01-04 14-05-59\028-0401.D
Sample Name: LWD-6-238-1-RAC

```
======================================================================
Acq. Operator   :                          Seq. Line :   4
Acq. Instrument : Instrument 1              Location : Vial 28
Injection Date  : 1/4/2021 2:59:25 PM            Inj :   1
                                          Inj Volume : 5.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-117-4-149-1\LWD-6-117-4-149-1 2021-01-04 14-05-59\VWD-IC(
                  1-6)-95-5--1ML-5UL-210-25MIN.M
Last changed    : 12/31/2020 3:40:07 PM
Analysis Method : D:\METHOD\LWD\VWD-IC(1-6)-95-5--0.5ML-1UL-210-10MIN.M
Last changed    : 1/4/2021 3:37:08 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

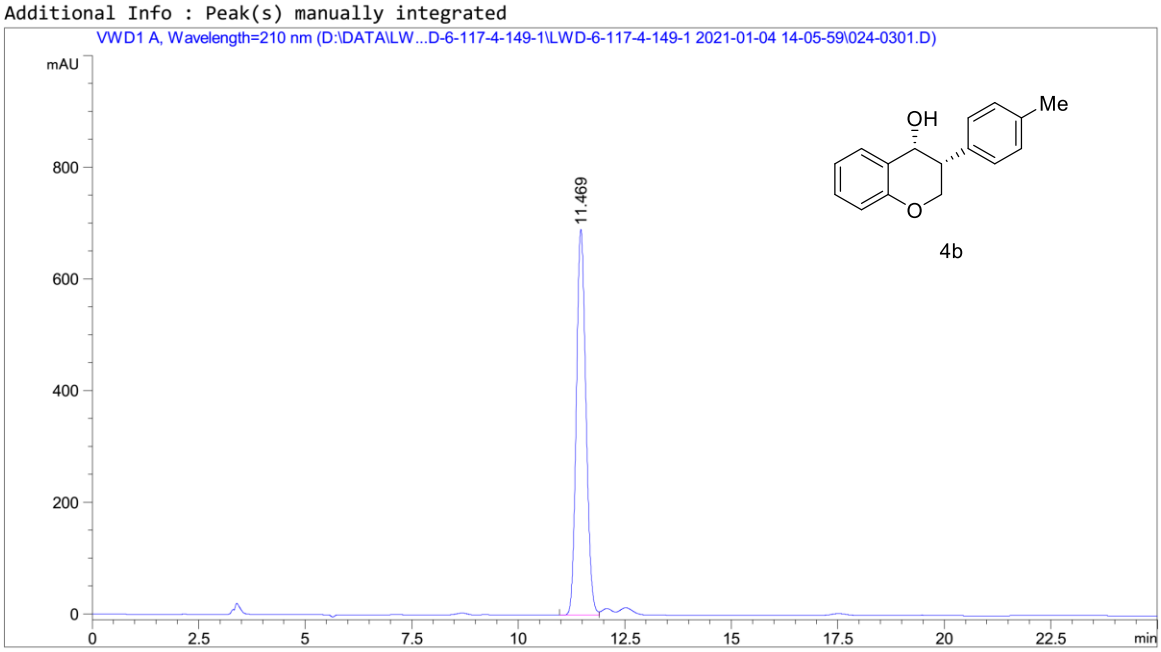

Signal 1: VWD1 A, Wavelength=210 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  11.360 MF    0.2532 8582.84082  564.85565  32.3158
   2  11.925 FM    0.2809 4548.02637  269.82861  17.1241
   3  14.683 VV    0.3131 4821.59766  239.27100  18.1541
   4  17.198 BB    0.3523 8606.79102  379.92047  32.4060

Totals :                 2.65593e4  1453.87573
```

Data File D:\DATA\LWD\LWD-6-117-4-149-1\LWD-6-117-4-149-1 2021-01-04 14-05-59\024-0301.D
Sample Name: LWD-6-149-1

```
=====================================================================
Acq. Operator   :                              Seq. Line :   3
Acq. Instrument : Instrument 1                  Location : Vial 24
Injection Date  : 1/4/2021 2:33:35 PM                Inj :   1
                                              Inj Volume : 5.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-117-4-149-1\LWD-6-117-4-149-1 2021-01-04 14-05-59\VWD-IC(
                  1-6)-95-5--1ML-5UL-210-25MIN.M
Last changed    : 12/31/2020 3:40:07 PM
Analysis Method : D:\METHOD\LWD\VWD-IC(1-6)-95-5--0.5ML-1UL-210-10MIN.M
Last changed    : 1/4/2021 3:38:25 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

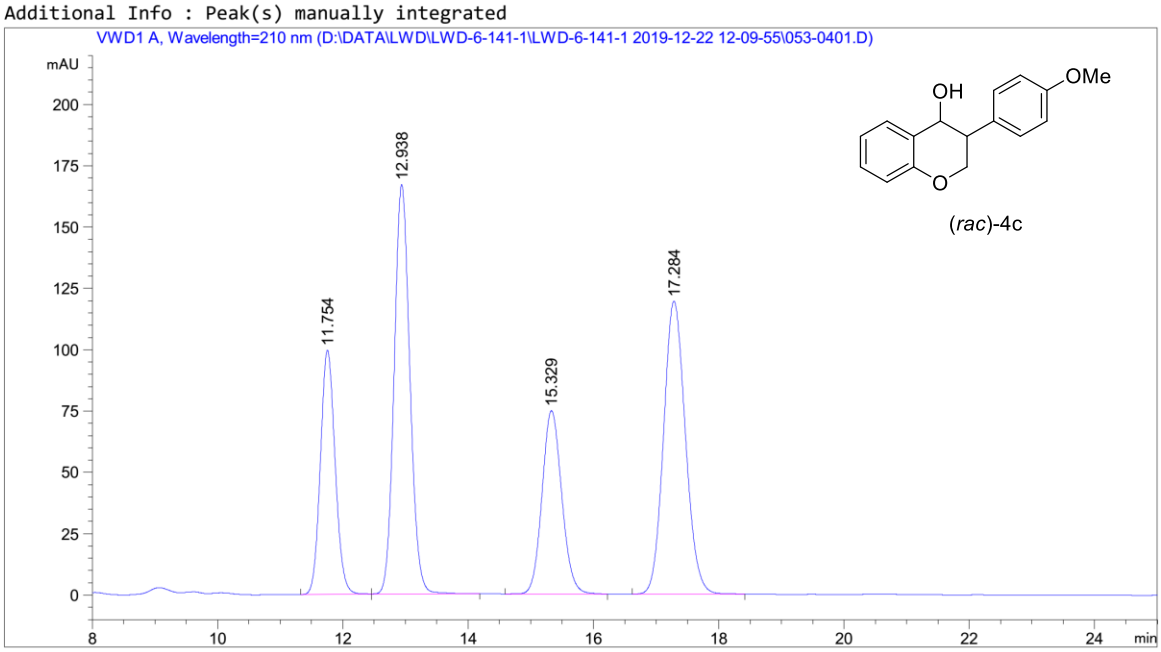
Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  11.469 BV    0.2450 1.08309e4   690.41827 100.0000

Totals :                  1.08309e4   690.41827


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

Data File D:\DATA\LWD\LWD-6-141-1\LWD-6-141-1 2019-12-22 12-09-55\053-0401.D
Sample Name: LWD-6-141-1-RAC

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :   4
    Acq. Instrument : Instrument 1                  Location : Vial 53
    Injection Date  : 12/22/2019 2:05:48 PM              Inj :   1
                                                  Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-6-141-1\LWD-6-141-1 2019-12-22 12-09-55\VWD-IC(1-2)-90-10-
                      1ML-2UL-210NM-60MIN.M
    Last changed    : 12/21/2019 7:30:34 PM
    Analysis Method : D:\METHOD\LSL\DAD-OJ(1-6)-99-1-0.5ML-5UL-ALL-60MIN.M
    Last changed    : 12/30/2020 9:03:36 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

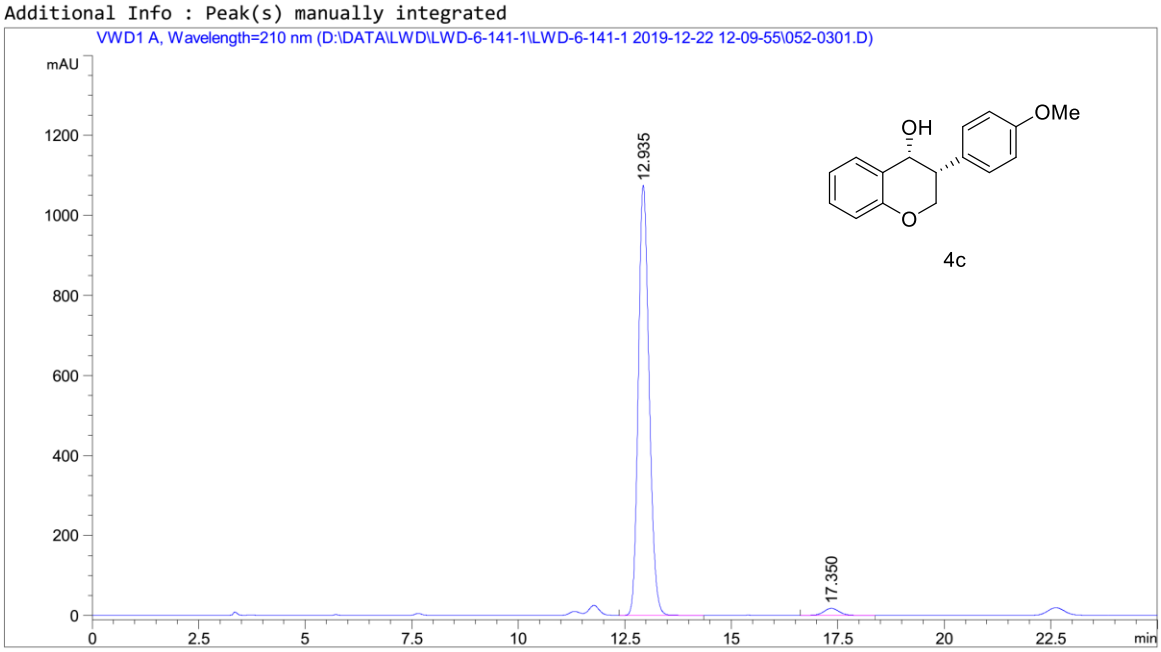

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  11.754 BB    0.2524 1623.97180   99.52227  17.9126
       2  12.938 BB    0.2703 2908.48389  166.89293  32.0810
       3  15.329 BB    0.3392 1633.34399   74.68367  18.0160
       4  17.284 BB    0.3764 2900.26465  119.41504  31.9903

    Totals :                  9066.06433  460.51391
```

Data File D:\DATA\LWD\LWD-6-141-1\LWD-6-141-1 2019-12-22 12-09-55\052-0301.D
Sample Name: LWD-6-141-1-EE

```
=====================================================================
Acq. Operator   :                              Seq. Line :   3
Acq. Instrument : Instrument 1                  Location : Vial 52
Injection Date  : 12/22/2019 1:04:58 PM              Inj :   1
                                               Inj Volume : 2.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-141-1\LWD-6-141-1 2019-12-22 12-09-55\VWD-IC(1-2)-90-10-
                  1ML-2UL-210NM-60MIN.M
Last changed    : 12/21/2019 7:30:34 PM
Analysis Method : D:\METHOD\LSL\DAD-OJ(1-6)-99-1-0.5ML-5UL-ALL-60MIN.M
Last changed    : 12/30/2020 9:06:05 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

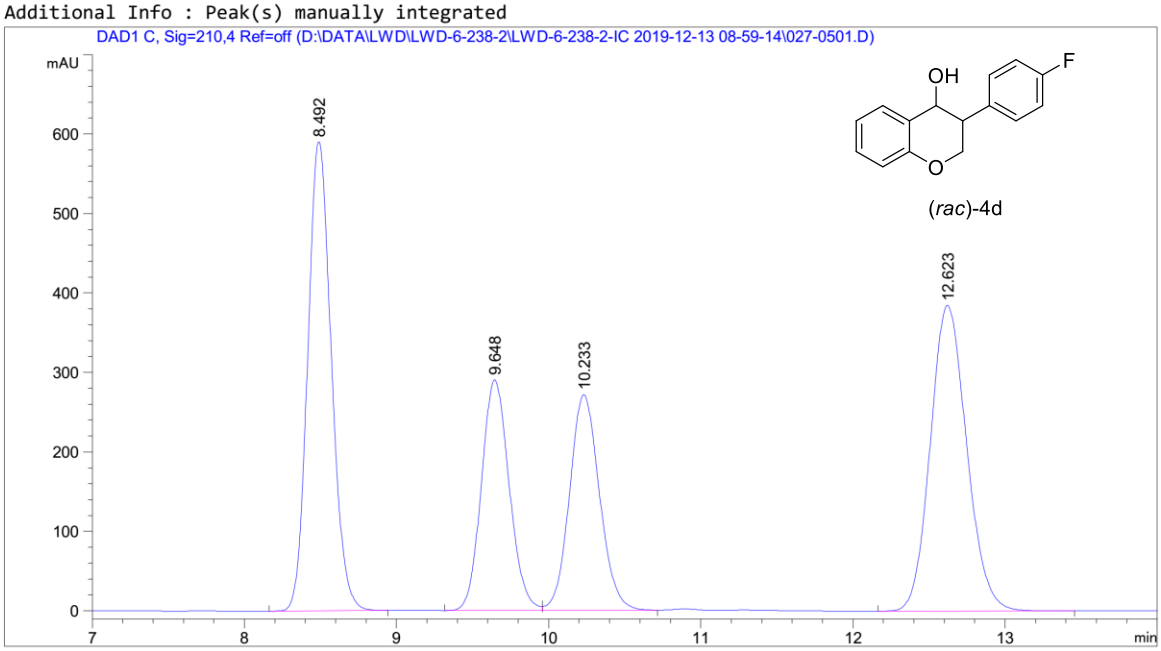

Signal 1: VWD1 A, Wavelength=210 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  12.935 BB    0.2757 1.90471e4  1075.22815  97.7275
   2  17.350 BB    0.3823  442.90363   17.73792   2.2725

Totals :                  1.94900e4  1092.96607
```

Data File D:\DATA\LWD\LWD-6-238-2\LWD-6-238-2-IC 2019-12-13 08-59-14\027-0501.D
Sample Name: LWD-6-238-3

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :   5
    Acq. Instrument : Instrument 2                  Location : Vial 27
    Injection Date  : 12/13/2019 10:29:30 AM             Inj :   1
                                                  Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-6-238-2\LWD-6-238-2-IC 2019-12-13 08-59-14\DAD-IC(1-6)-95-5
                      -1ML-2UL-ALL-40MIN.M
    Last changed    : 12/13/2019 10:42:22 AM
                      (modified after loading)
    Analysis Method : D:\METHOD\ZXH\DAD-OD(1-2)-98-2-1.0ML-1UL-220NM-80MIN.M
    Last changed    : 12/18/2019 9:13:10 AM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```




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

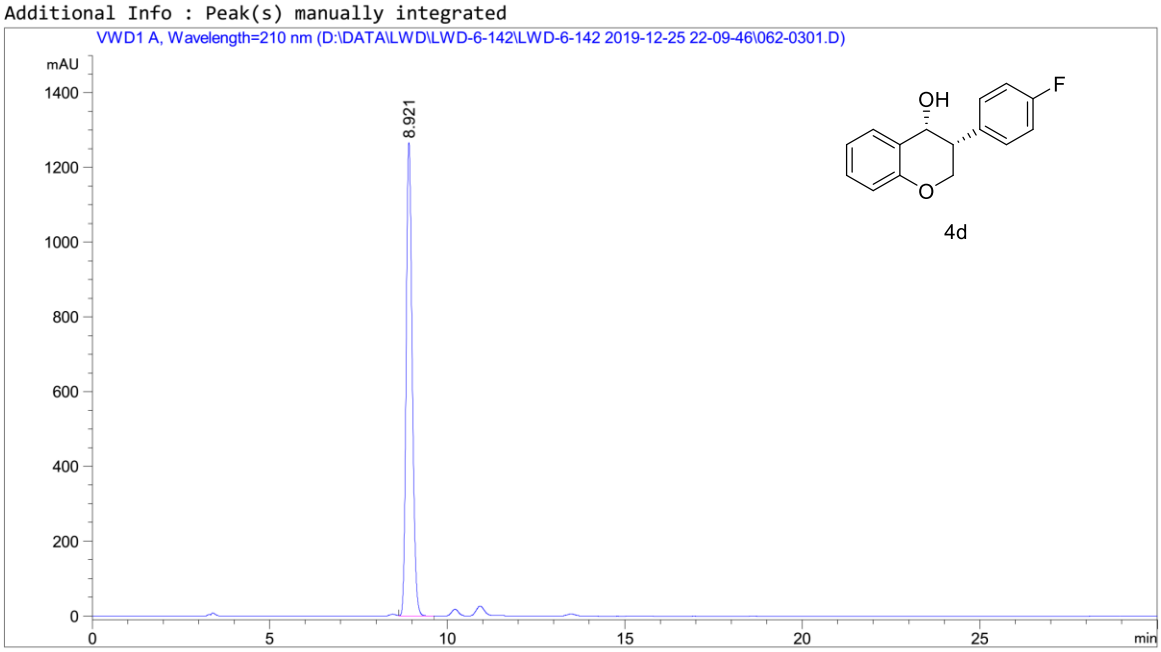
    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


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

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1   8.492 BB    0.1656 6353.20557  590.30145  31.5473
       2   9.648 BV    0.1980 3682.42773  290.25793  18.2854
       3  10.233 VB    0.2116 3714.69189  271.58087  18.4456
       4  12.623 BB    0.2578 6388.34912  384.61862  31.7218
```

Data File D:\DATA\LWD\LWD-6-142\LWD-6-142 2019-12-25 22-09-46\062-0301.D
Sample Name: LWD-6-142-1

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :   3
    Acq. Instrument : Instrument 1                  Location : Vial 62
    Injection Date  : 12/25/2019 11:03:04 PM             Inj :   1
                                                  Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-6-142\LWD-6-142 2019-12-25 22-09-46\VWD-IC(1-2)-95-5-1ML-
                      2UL-210NM-40MIN.M
    Last changed    : 12/18/2019 9:03:42 PM
    Analysis Method : D:\METHOD\LSL\DAD-OJ(1-6)-99-1-0.5ML-5UL-ALL-60MIN.M
    Last changed    : 12/30/2020 9:18:35 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: VWD1 A, Wavelength=210 nm

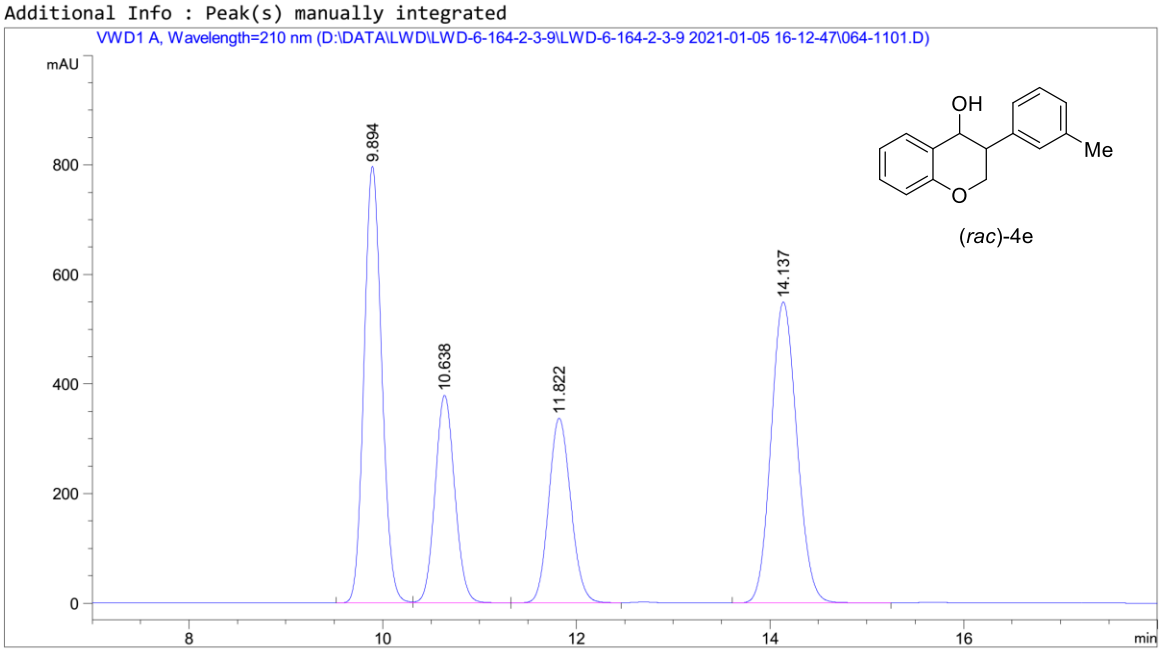
    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1   8.921 VB    0.1840 1.49987e4  1267.61719 100.0000

    Totals :                  1.49987e4  1267.61719


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

Data File D:\DATA\LWD\LWD-6-164-2-3-9\LWD-6-164-2-3-9 2021-01-05 16-12-47\064-1101.D
Sample Name: LWD-6-238-18-RAC

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  11
    Acq. Instrument : Instrument 1                  Location : Vial 64
    Injection Date  : 1/5/2021 8:41:08 PM                Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-6-164-2-3-9\LWD-6-164-2-3-9 2021-01-05 16-12-47\VWD-IC(1-6)
                      -95-5--1ML-3UL-210-30MIN.M
    Last changed    : 1/5/2021 4:11:37 PM
    Analysis Method : D:\METHOD\LWD\VWD-IC(1-6)-95-5--1ML-3UL-210-40MIN.M
    Last changed    : 1/5/2021 9:12:59 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```



(*rac*)-4e

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

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

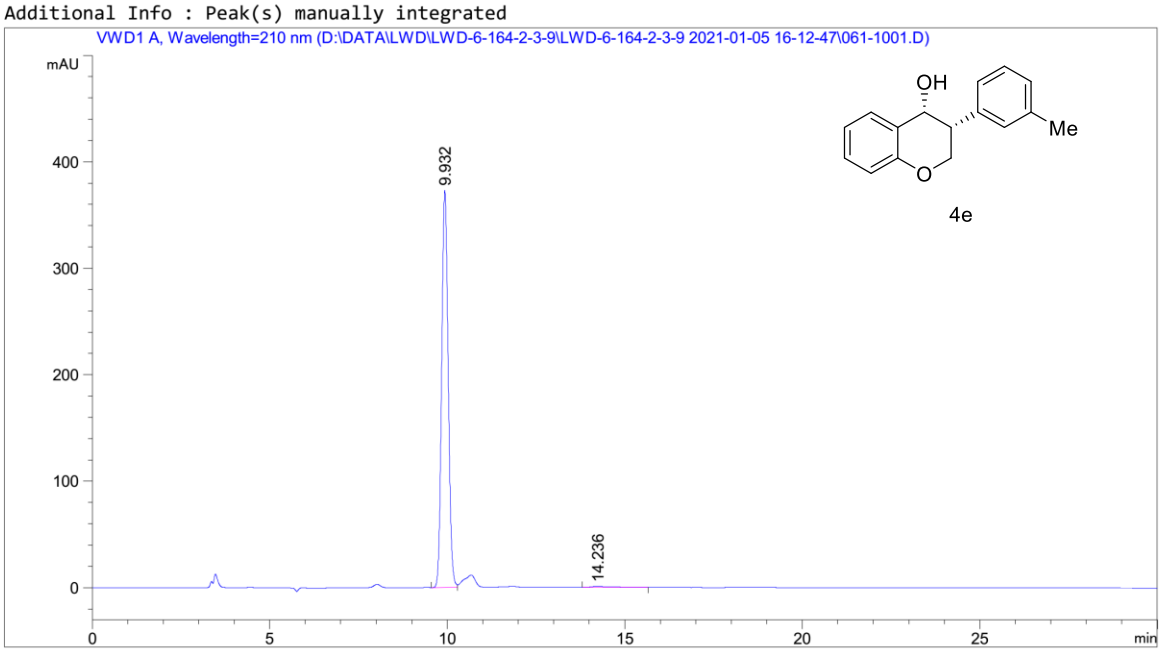

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1   9.894 BV    0.1982 1.01206e4   796.88885  32.5840
       2  10.638 VB    0.2212 5361.64551  378.71051  17.2622
       3  11.822 BV    0.2475 5358.87891  337.06647  17.2533
       4  14.137 BV    0.2891 1.02189e4   549.18060  32.9005

    Totals :                  3.10600e4  2061.84644
```

Data File D:\DATA\LWD\LWD-6-164-2-3-9\LWD-6-164-2-3-9 2021-01-05 16-12-47\061-1001.D
Sample Name: LWD-6-164-2

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  10
    Acq. Instrument : Instrument 1                  Location : Vial 61
    Injection Date  : 1/5/2021 8:10:18 PM                Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-6-164-2-3-9\LWD-6-164-2-3-9 2021-01-05 16-12-47\VWD-IC(1-6)
                      -95-5--1ML-3UL-210-30MIN.M
    Last changed    : 1/5/2021 4:11:37 PM
    Analysis Method : D:\METHOD\LWD\VWD-IC(1-6)-95-5--1ML-3UL-210-40MIN.M
    Last changed    : 1/5/2021 9:14:51 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```




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

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

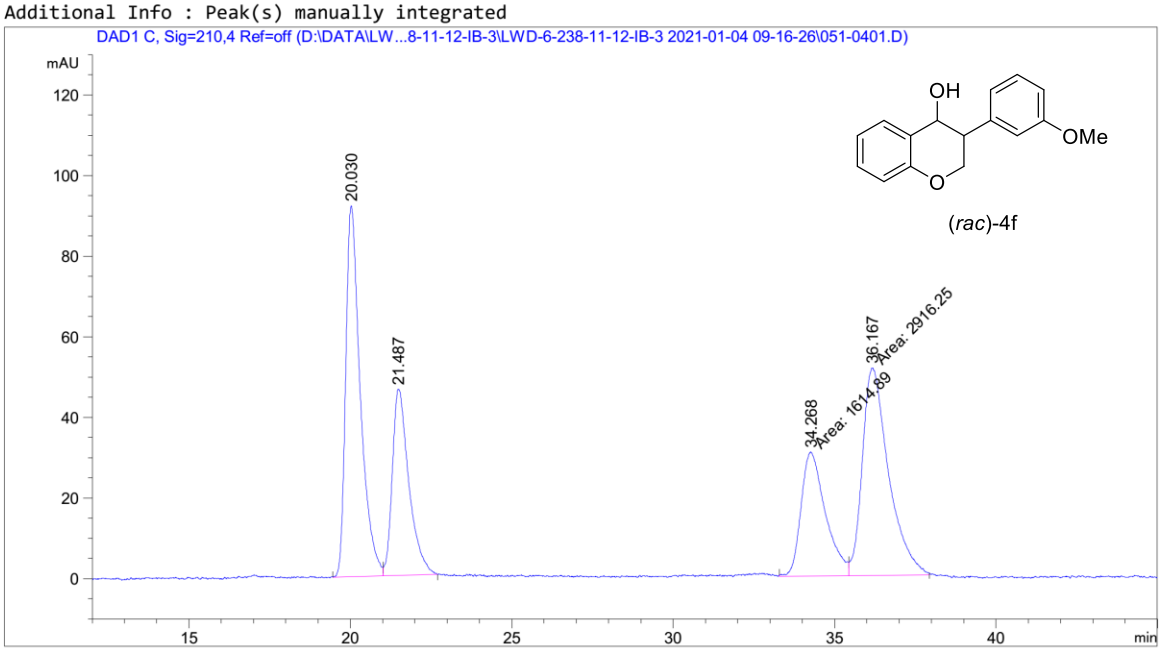

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1   9.932 BV    0.1992 4771.45068  373.22333  99.3336
       2  14.236 VB    0.4166   32.00837    1.08985   0.6664

    Totals :                  4803.45906  374.31318
```

Data File D:\DATA\LW...-238-11-12-IB-3\LWD-6-238-11-12-IB-3 2021-01-04 09-16-26\051-0401.D
Sample Name: LWD-6-238-11

```
======================================================================
Acq. Operator   :                              Seq. Line :   4
Acq. Instrument : Instrument 2                  Location : Vial 51
Injection Date  : 1/4/2021 10:33:48 AM               Inj :   1
                                               Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-238-11-12-IB-3\LWD-6-238-11-12-IB-3 2021-01-04 09-16-26
                  \DAD-IB(1-6)-95-5-1ML-3UL-ALL-60MIN.M
Last changed    : 1/4/2021 11:16:56 AM
                  (modified after loading)
Analysis Method : D:\METHOD\LWD\DAD-IB(1-6)-95-5-1ML-3UL-ALL-60MIN.M
Last changed    : 1/4/2021 11:21:48 AM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```




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

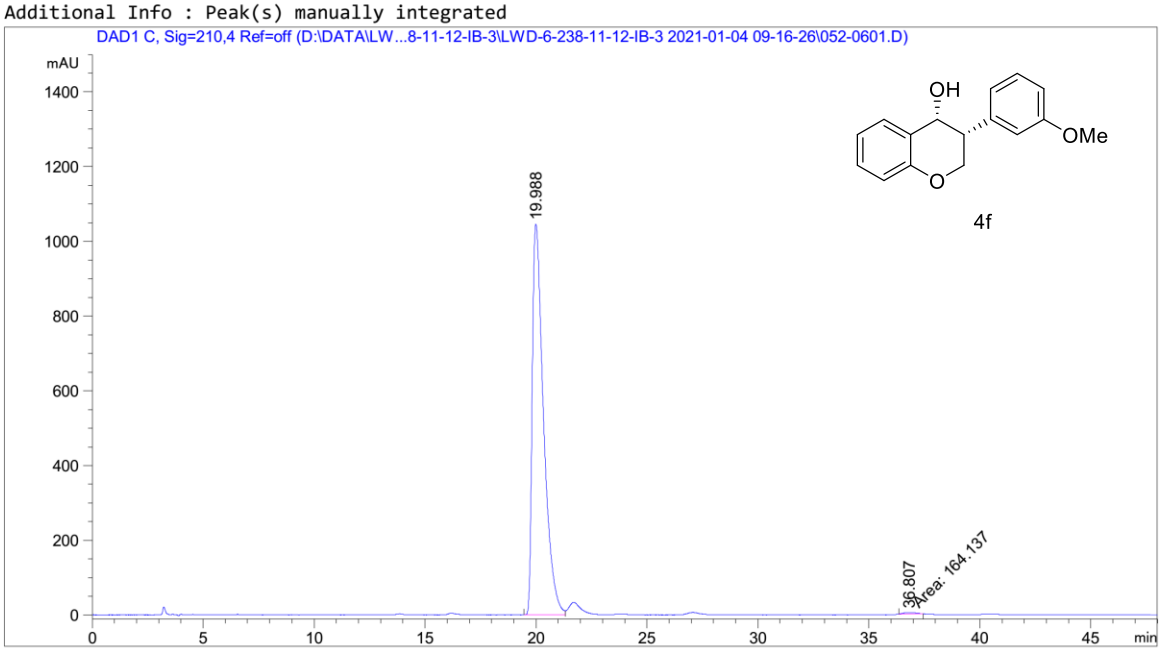
Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


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

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]        %
----|-------|----|-------|----------|----------|--------|
   1  20.030 BV    0.4455 2898.64941   92.00972  31.9165
   2  21.487 VB    0.4608 1652.19043   46.24879  18.1920
   3  34.268 MF    0.8762 1614.88525   30.71714  17.7812
   4  36.167 FM    0.9435 2916.24951   51.51293  32.1103
```

Data File D:\DATA\LW...-238-11-12-IB-3\LWD-6-238-11-12-IB-3 2021-01-04 09-16-26\052-0601.D
Sample Name: LWD-6-149-4

```
=====================================================================
Acq. Operator   :                              Seq. Line :   6
Acq. Instrument : Instrument 2                  Location : Vial 52
Injection Date  : 1/4/2021 11:56:48 AM               Inj :   1
                                               Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-238-11-12-IB-3\LWD-6-238-11-12-IB-3 2021-01-04 09-16-26
                  \DAD-IB(1-6)-95-5-1ML-3UL-ALL-60MIN.M
Last changed    : 1/4/2021 12:44:51 PM
                  (modified after loading)
Analysis Method : D:\METHOD\LWD\DAD-IB(1-6)-95-5-1ML-3UL-ALL-60MIN.M
Last changed    : 1/4/2021 12:46:00 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

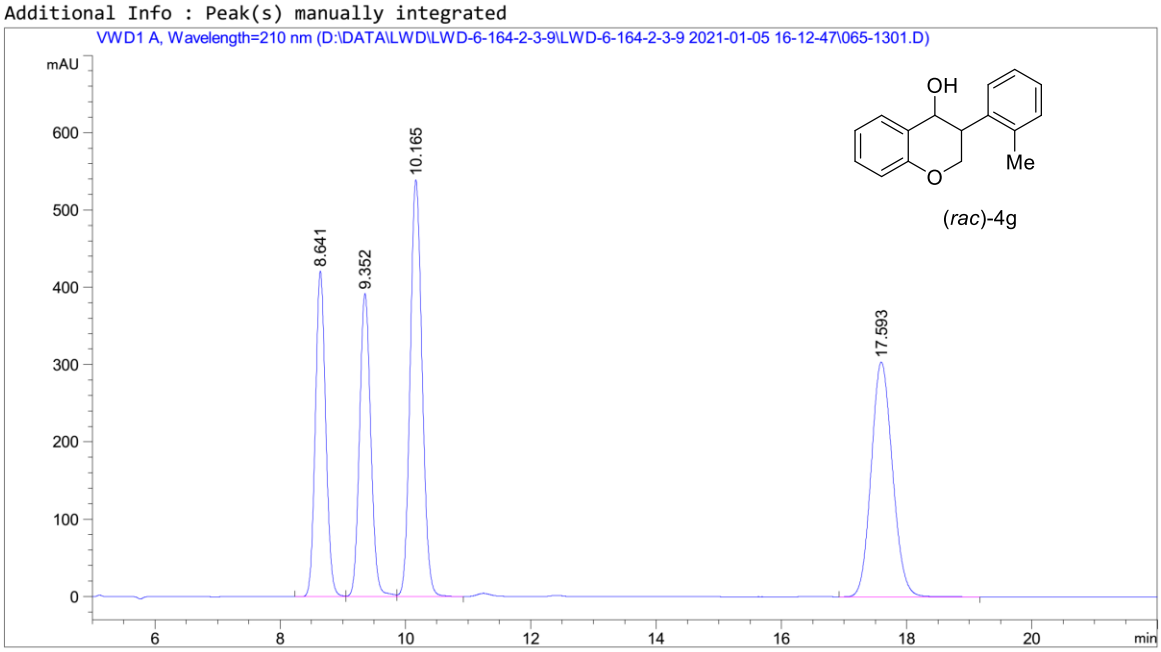

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  19.988 BV    0.5000 3.70890e4  1045.09094  99.5594
   2  36.807 MM    0.6851  164.13708    3.99314   0.4406

Totals :                  3.72531e4  1049.08408
```

Data File D:\DATA\LWD\LWD-6-164-2-3-9\LWD-6-164-2-3-9 2021-01-05 16-12-47\065-1301.D
Sample Name: LWD-6-238-9-RAC

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  13
    Acq. Instrument : Instrument 1                  Location : Vial 65
    Injection Date  : 1/5/2021 9:42:47 PM                Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-6-164-2-3-9\LWD-6-164-2-3-9 2021-01-05 16-12-47\VWD-IC(1-6)
                      -95-5--1ML-3UL-210-30MIN.M
    Last changed    : 1/5/2021 4:11:37 PM
    Analysis Method : D:\METHOD\LCZ\VWD-OD(1-2)-98-2--1ML-5UL-220-80MIN.M
    Last changed    : 1/6/2021 9:25:47 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

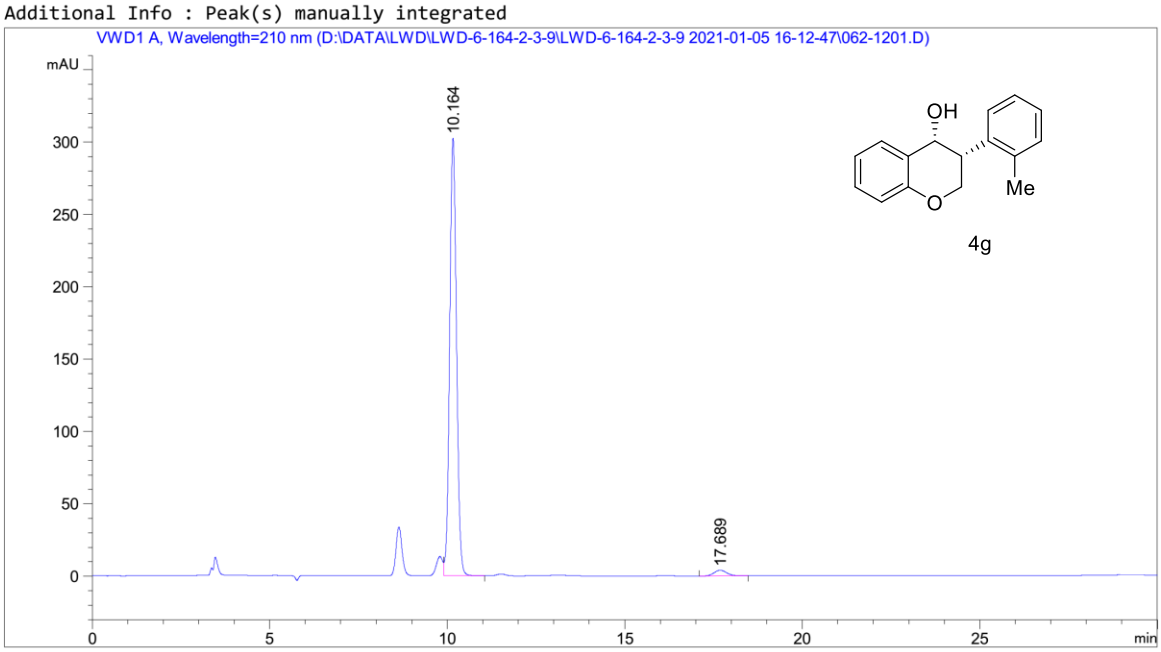

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1   8.641 BV    0.1781 4840.77100  421.00116  20.1223
       2   9.352 VV    0.1935 4893.10547  392.22614  20.3398
       3  10.165 VB    0.2058 7151.54590  539.13275  29.7278
       4  17.593 BB    0.3676 7171.37793  303.62662  29.8102

    Totals :                  2.40568e4  1655.98666
```

Data File D:\DATA\LWD\LWD-6-164-2-3-9\LWD-6-164-2-3-9 2021-01-05 16-12-47\062-1201.D
Sample Name: LWD-6-164-4

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  12
    Acq. Instrument : Instrument 1                  Location : Vial 62
    Injection Date  : 1/5/2021 9:11:56 PM                Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-6-164-2-3-9\LWD-6-164-2-3-9 2021-01-05 16-12-47\VWD-IC(1-6)
                      -95-5--1ML-3UL-210-30MIN.M
    Last changed    : 1/5/2021 4:11:37 PM
    Analysis Method : D:\METHOD\LCZ\VWD-OD(1-2)-98-2--1ML-5UL-220-80MIN.M
    Last changed    : 1/6/2021 9:26:34 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

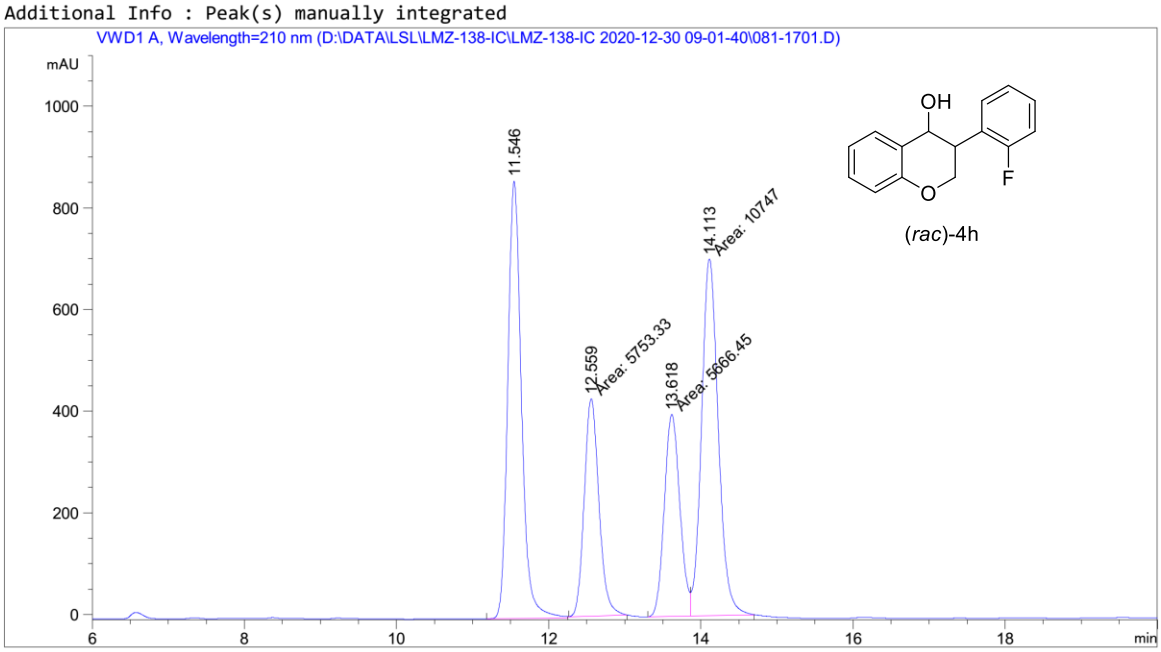

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  10.164 VB    0.2074 4054.71411  302.43280  97.6082
       2  17.689 BB    0.3819   99.35859    3.95759   2.3918

    Totals :                  4154.07270  306.39039
```

Data File D:\DATA\LSL\LMZ-138-IC\LMZ-138-IC 2020-12-30 09-01-40\081-1701.D
Sample Name: LWD-6-238-19

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  17
    Acq. Instrument : Instrument 1                  Location : Vial 81
    Injection Date  : 12/30/2020 7:13:21 PM              Inj :   1
                                                  Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LSL\LMZ-138-IC\LMZ-138-IC 2020-12-30 09-01-40\VWD-IC(1-6)-90-10--0.
                      5ML-2UL-210-60MIN.M
    Last changed    : 12/30/2020 2:24:25 PM
    Analysis Method : D:\METHOD\LSL\DAD-OJ(1-6)-99-1-0.5ML-5UL-ALL-60MIN.M
    Last changed    : 12/31/2020 1:19:26 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

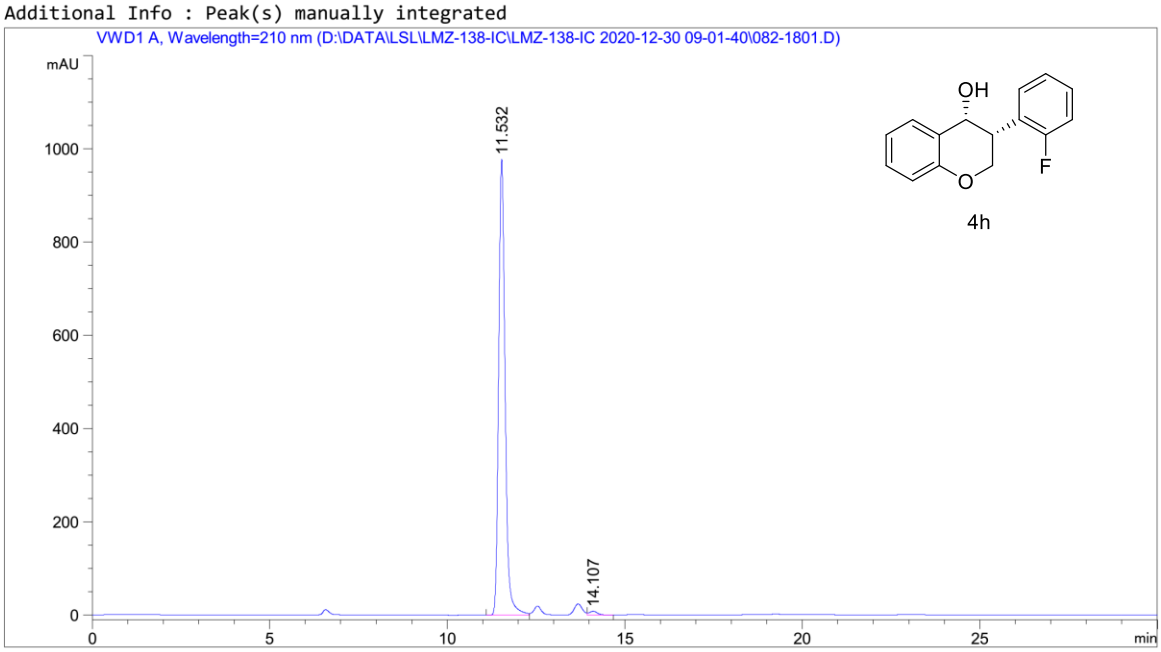

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  11.546 BV    0.1914 1.07218e4   860.32983  32.6004
       2  12.559 MM    0.2240 5753.32813  428.05359  17.4934
       3  13.618 MF    0.2373 5666.45068  398.06229  17.2292
       4  14.113 FM    0.2552 1.07470e4   701.84137  32.6769

    Totals :                  3.28886e4  2388.28708
```

Data File D:\DATA\LSL\LMZ-138-IC\LMZ-138-IC 2020-12-30 09-01-40\082-1801.D
Sample Name: LWD-6-149-3-EE

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  18
    Acq. Instrument : Instrument 1                  Location : Vial 82
    Injection Date  : 12/30/2020 8:14:06 PM              Inj :   1
                                                  Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LSL\LMZ-138-IC\LMZ-138-IC 2020-12-30 09-01-40\VWD-IC(1-6)-90-10--0.
                      5ML-2UL-210-60MIN.M
    Last changed    : 12/30/2020 2:24:25 PM
    Analysis Method : D:\METHOD\LWD\VWD-IC(1-6)-90-10--0.4ML-2UL-210-60MIN.M
    Last changed    : 12/31/2020 8:54:54 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

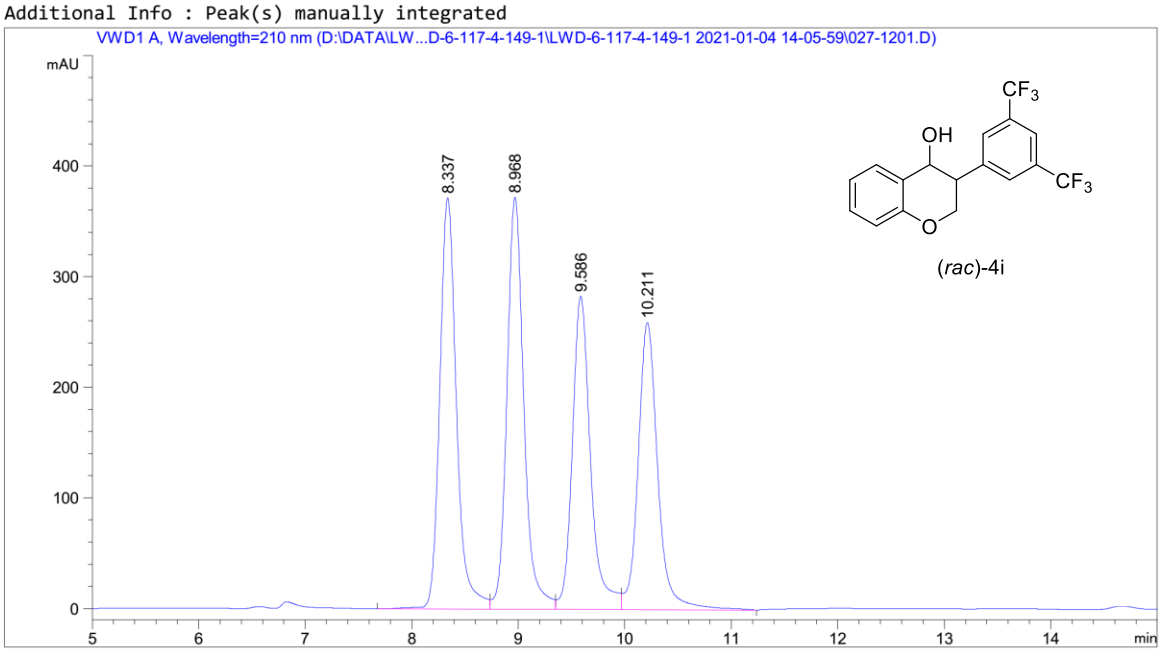

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  11.532 BV    0.1932 1.23423e4   978.45062  99.0067
       2  14.107 VB    0.2374  123.82002    7.92111   0.9933

    Totals :                  1.24661e4   986.37173
```

Data File D:\DATA\LWD\LWD-6-117-4-149-1\LWD-6-117-4-149-1 2021-01-04 14-05-59\027-1201.D
Sample Name: LWD-6-238-4-RAC

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  12
    Acq. Instrument : Instrument 1                  Location : Vial 27
    Injection Date  : 1/4/2021 6:26:12 PM                Inj :   1
                                                  Inj Volume : 1.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-6-117-4-149-1\LWD-6-117-4-149-1 2021-01-04 14-05-59\VWD-IC(
                      1-6)-95-5--0.5ML-1UL-210-25MIN.M
    Last changed    : 12/31/2020 4:26:33 PM
    Analysis Method : D:\METHOD\LWD\VWD-IC(1-6)-95-5--0.5ML-1UL-210-10MIN.M
    Last changed    : 1/4/2021 6:55:27 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```




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

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

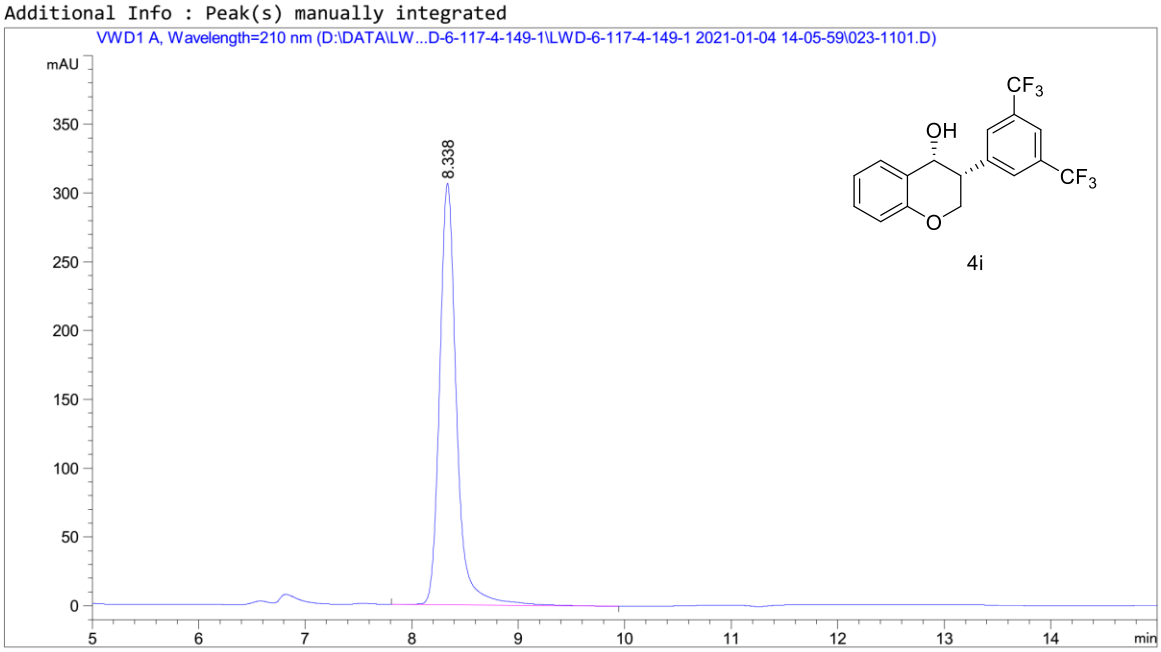

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1   8.337 BV    0.1673 4055.16455  371.71115  27.2967
       2   8.968 VV    0.1686 4102.79590  372.29910  27.6173
       3   9.586 VV    0.1811 3374.65723  283.00702  22.7159
       4  10.211 VB    0.1954 3323.28735  259.49707  22.3701

    Totals :                  1.48559e4  1286.51434
```

Data File D:\DATA\LWD\LWD-6-117-4-149-1\LWD-6-117-4-149-1 2021-01-04 14-05-59\023-1101.D
Sample Name: LWD-6-117-4

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  11
    Acq. Instrument : Instrument 1                  Location : Vial 23
    Injection Date  : 1/4/2021 6:00:26 PM                Inj :   1
                                                  Inj Volume : 1.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-6-117-4-149-1\LWD-6-117-4-149-1 2021-01-04 14-05-59\VWD-IC(
                      1-6)-95-5--0.5ML-1UL-210-25MIN.M
    Last changed    : 12/31/2020 4:26:33 PM
    Analysis Method : D:\METHOD\LWD\VWD-IC(1-6)-95-5--0.5ML-1UL-210-10MIN.M
    Last changed    : 1/4/2021 6:56:30 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

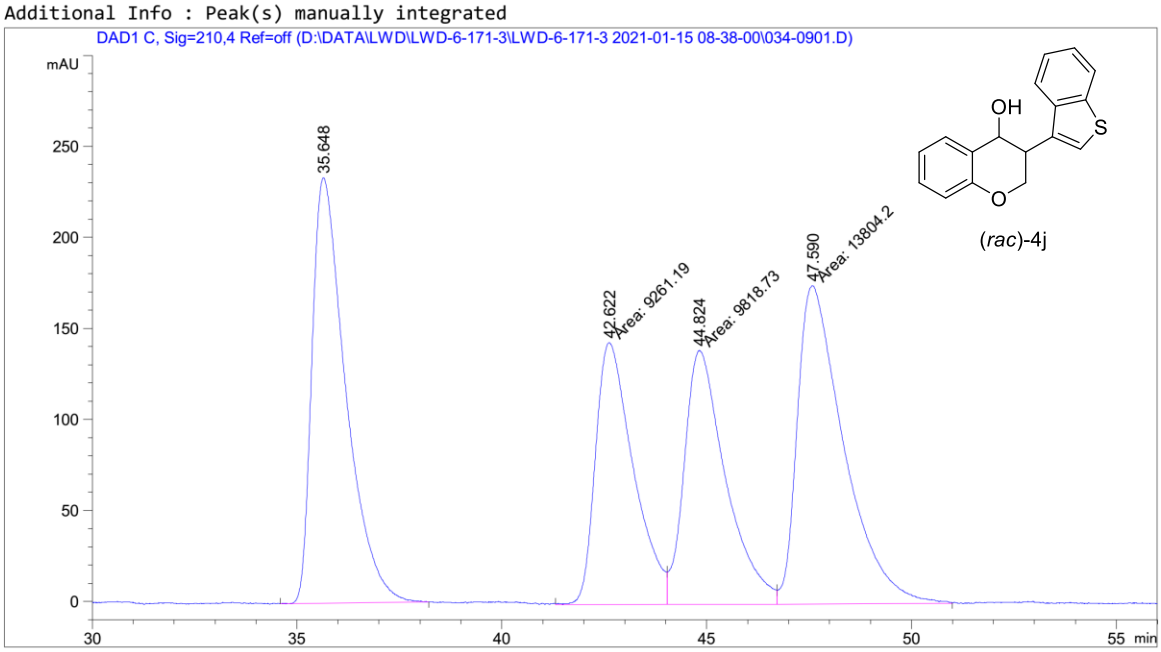
    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1   8.338 BB    0.1687 3376.16040  306.10257 100.0000

    Totals :                  3376.16040  306.10257


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

Data File D:\DATA\LWD\LWD-6-171-3\LWD-6-171-3 2021-01-15 08-38-00\034-0901.D
Sample Name: LWD-6-171-4

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :   9
    Acq. Instrument : Instrument 2                  Location : Vial 34
    Injection Date  : 1/15/2021 12:18:33 PM              Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-6-171-3\LWD-6-171-3 2021-01-15 08-38-00\DAD-IB(1-2)-95-5-0.
                      5ML-3UL-ALL-60MIN.M
    Last changed    : 1/15/2021 9:55:11 AM
    Analysis Method : D:\METHOD\LWD\DAD-IB(1-2)-95-5-0.5ML-3UL-ALL-60MIN.M
    Last changed    : 1/15/2021 3:19:22 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

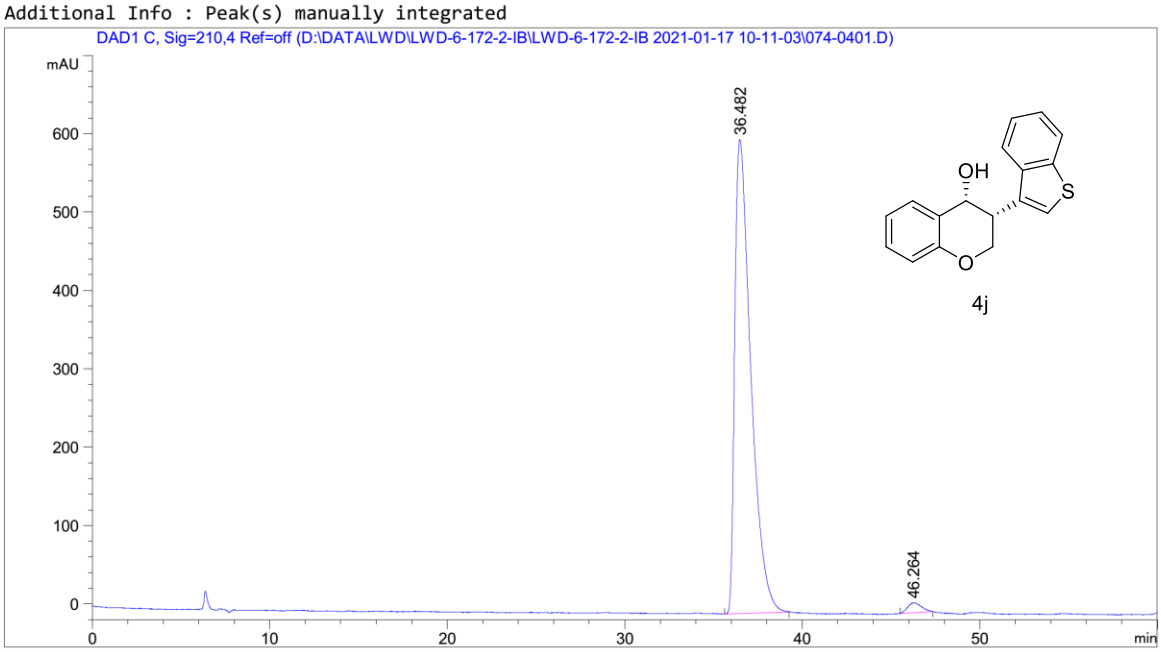

    Signal 1: DAD1 C, Sig=210,4 Ref=off

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  35.648 BB    0.8394 1.33767e4   233.83585  28.9158
       2  42.622 MF    1.0725 9261.18555  143.91989  20.0195
       3  44.824 MF    1.1730 9818.72852  139.51012  21.2248
       4  47.590 FM    1.3156 1.38042e4   174.87128  29.8399

    Totals :                  4.62607e4   692.13713
```

Data File D:\DATA\LWD\LWD-6-172-2-IB\LWD-6-172-2-IB 2021-01-17 10-11-03\074-0401.D
Sample Name: LWD-6-172-2

```
======================================================================
Acq. Operator   :                              Seq. Line :   4
Acq. Instrument : Instrument 2                  Location : Vial 74
Injection Date  : 1/17/2021 10:45:56 AM              Inj :   1
                                               Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-172-2-IB\LWD-6-172-2-IB 2021-01-17 10-11-03\DAD-IB(1-2)-
                  95-5-0.5ML-3UL-ALL-60MIN.M
Last changed    : 1/15/2021 9:55:11 AM
Analysis Method : D:\METHOD\LSL\DAD-OJ(1-6)-100-0-0.5ML-5UL-ALL-120MIN.M
Last changed    : 1/17/2021 11:50:35 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

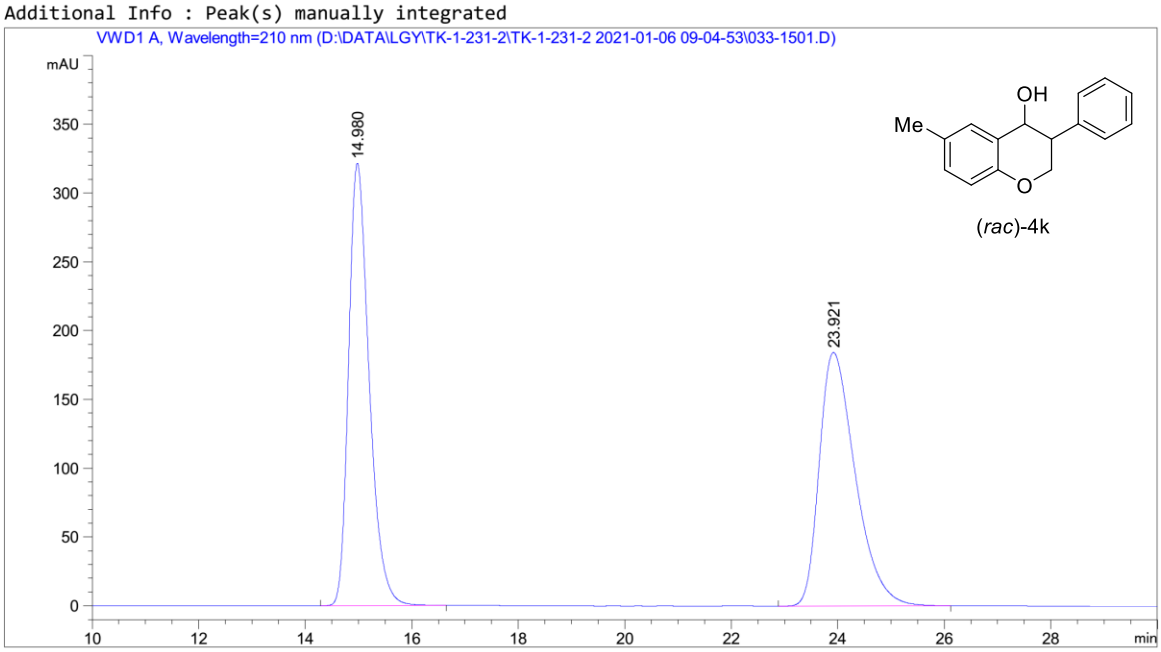

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  36.482 BB    0.7375 3.79268e4   604.89648  98.2258
   2  46.264 BV    0.6311  685.05054   12.78541   1.7742

Totals :                  3.86119e4   617.68189
```

Data File D:\DATA\LGY\TK-1-231-2\TK-1-231-2 2021-01-06 09-04-53\033-1501.D
Sample Name: LWD-6-238-21-RAC-OD

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  15
    Acq. Instrument : Instrument 1                  Location : Vial 33
    Injection Date  : 1/6/2021 4:47:48 PM                Inj :   1
                                                  Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LGY\TK-1-231-2\TK-1-231-2 2021-01-06 09-04-53\VWD-OD(1-2)-95-5--1ML
                      -2UL-210-45MIN.M
    Last changed    : 1/6/2021 9:44:21 AM
    Analysis Method : D:\METHOD\LWD\VWD-OD(1-2)-95-5--1ML-2UL-210-45MIN.M
    Last changed    : 1/6/2021 5:49:23 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

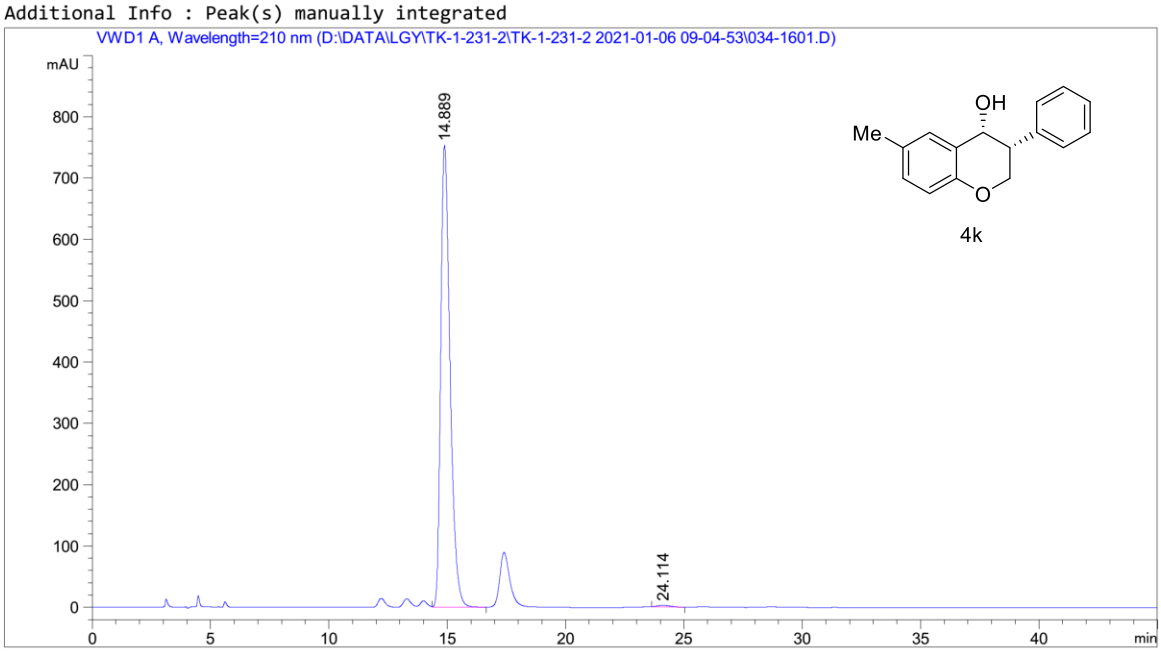

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  14.980 BB    0.4105 8609.57129  321.47183  49.8713
       2  23.921 BB    0.7190 8654.01172  184.22775  50.1287

    Totals :                  1.72636e4   505.69958
```

Data File D:\DATA\LGY\TK-1-231-2\TK-1-231-2 2021-01-06 09-04-53\034-1601.D
Sample Name: LWD-6-149-10-009555

```
=====================================================================
Acq. Operator   :                              Seq. Line :  16
Acq. Instrument : Instrument 1                  Location : Vial 34
Injection Date  : 1/6/2021 5:33:37 PM                Inj :   1
                                              Inj Volume : 2.000 µl
Acq. Method     : D:\DATA\LGY\TK-1-231-2\TK-1-231-2 2021-01-06 09-04-53\VWD-OD(1-2)-95-5--1ML
                  -2UL-210-45MIN.M
Last changed    : 1/6/2021 9:44:21 AM
Analysis Method : D:\METHOD\TK\VWD-OD(1-2)-97-3--0.75ML-5UL-254-10MIN.M
Last changed    : 1/6/2021 6:54:44 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

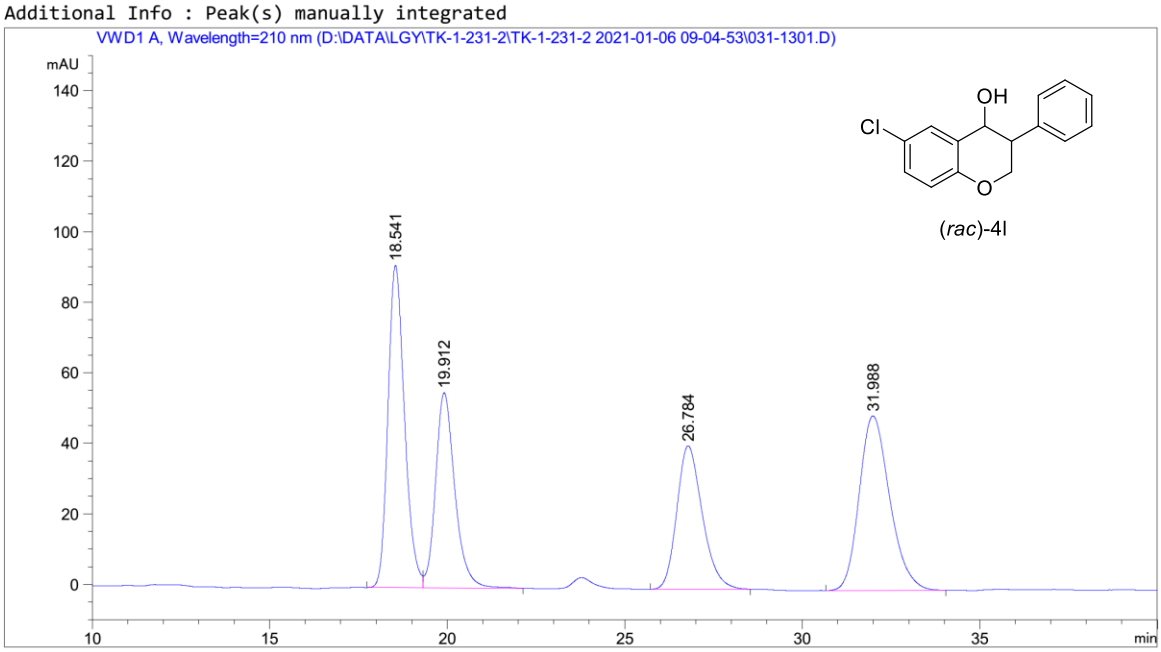

Signal 1: VWD1 A, Wavelength=210 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  14.889 VB    0.4198 2.06305e4   752.60175  99.4894
   2  24.114 BB    0.5175  105.88883    2.83658   0.5106

Totals :                  2.07364e4   755.43832
```

Data File D:\DATA\LGY\TK-1-231-2\TK-1-231-2 2021-01-06 09-04-53\031-1301.D
Sample Name: LWD-6-238-13-RAC-OD

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  13
    Acq. Instrument : Instrument 1                  Location : Vial 31
    Injection Date  : 1/6/2021 3:16:14 PM                Inj :   1
                                                  Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LGY\TK-1-231-2\TK-1-231-2 2021-01-06 09-04-53\VWD-OD(1-2)-95-5--1ML
                      -2UL-210-45MIN.M
    Last changed    : 1/6/2021 9:44:21 AM
    Analysis Method : D:\METHOD\LWD\VWD-OD(1-2)-95-5--1ML-2UL-210-45MIN.M
    Last changed    : 1/6/2021 5:47:17 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

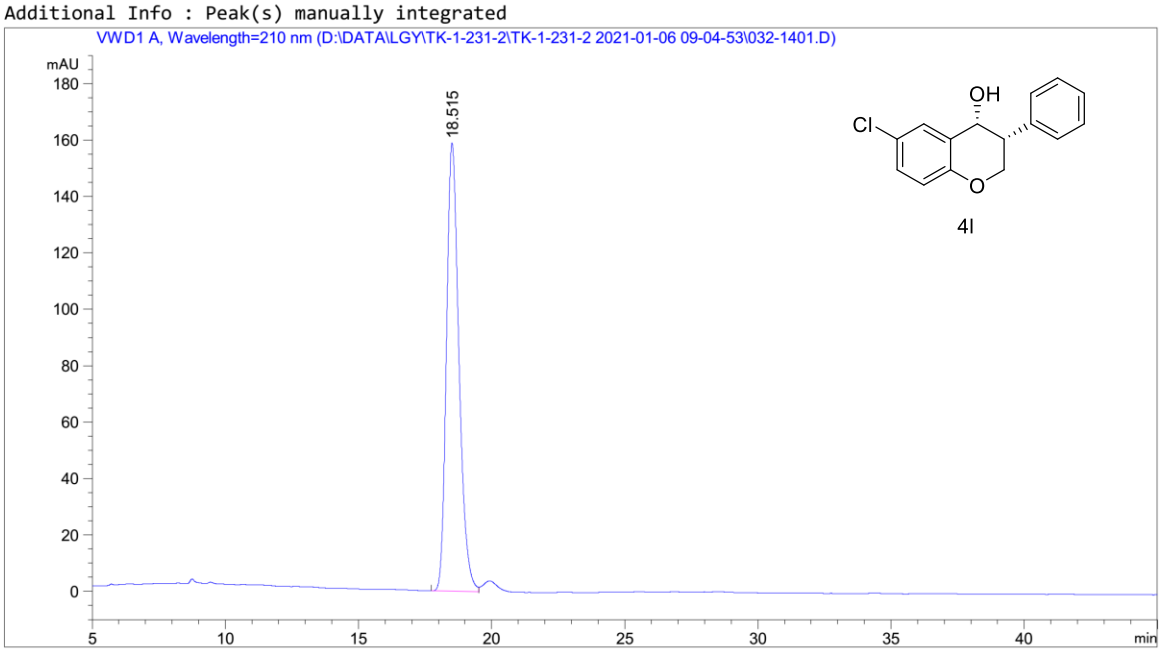

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  18.541 BV    0.4990 2969.23389   91.40263  29.5607
       2  19.912 VB    0.5747 2091.02563   55.35147  20.8175
       3  26.784 BB    0.7610 2028.52393   40.66510  20.1953
       4  31.988 BB    0.9118 2955.76465   49.48739  29.4266

    Totals :                  1.00445e4   236.90659
```

Data File D:\DATA\LGY\TK-1-231-2\TK-1-231-2 2021-01-06 09-04-53\032-1401.D
Sample Name: LWD-6-164-9

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  14
    Acq. Instrument : Instrument 1                  Location : Vial 32
    Injection Date  : 1/6/2021 4:02:00 PM                Inj :   1
                                                  Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LGY\TK-1-231-2\TK-1-231-2 2021-01-06 09-04-53\VWD-OD(1-2)-95-5--1ML
                      -2UL-210-45MIN.M
    Last changed    : 1/6/2021 9:44:21 AM
    Analysis Method : D:\METHOD\LWD\VWD-OD(1-2)-95-5--1ML-2UL-210-45MIN.M
    Last changed    : 1/6/2021 5:48:27 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```



4l

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

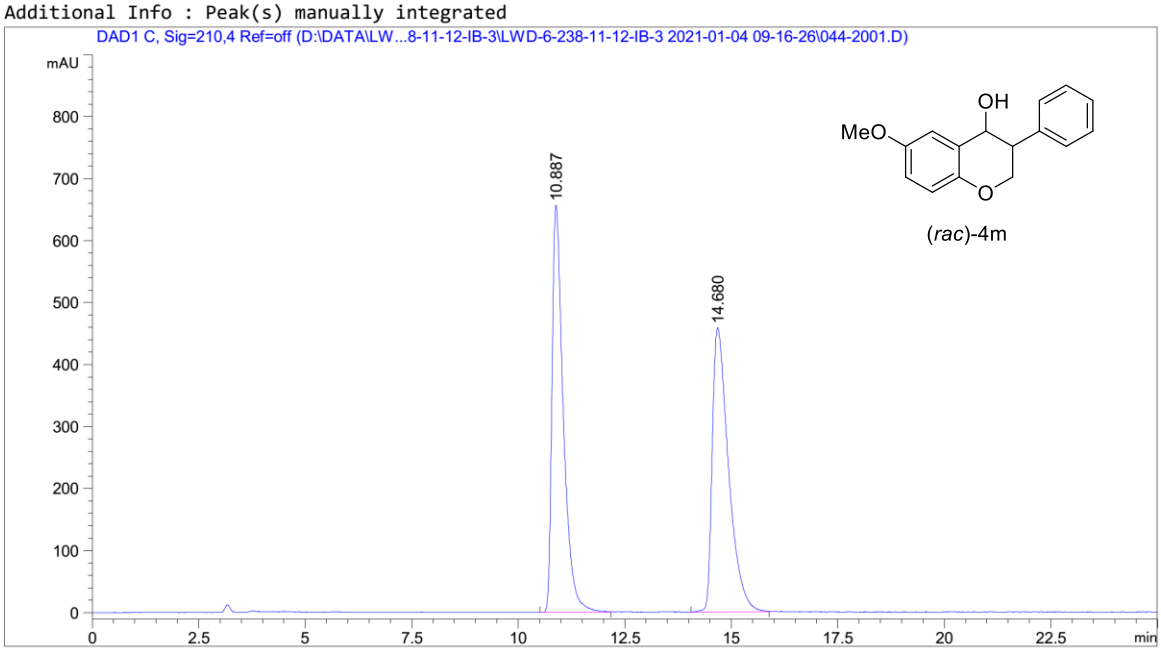
    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  18.515 BV    0.5012 5177.97266  158.88605 100.0000

    Totals :                  5177.97266  158.88605


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

Data File D:\DATA\LW...-238-11-12-IB-3\LWD-6-238-11-12-IB-3 2021-01-04 09-16-26\044-2001.D
Sample Name: LWD-6-163-3-DIAN1

```
======================================================================
Acq. Operator   :                              Seq. Line :  20
Acq. Instrument : Instrument 2                  Location : Vial 44
Injection Date  : 1/4/2021 5:54:46 PM                Inj :   1
                                              Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-238-11-12-IB-3\LWD-6-238-11-12-IB-3 2021-01-04 09-16-26
                  \DAD-IB(1-6)-90-10-1ML-3UL-ALL-50MIN.M
Last changed    : 1/4/2021 6:37:28 PM
                  (modified after loading)
Analysis Method : D:\METHOD\LWD\DAD-IB(1-6)-90-10-0.3ML-3UL-ALL-60MIN.M
Last changed    : 1/4/2021 6:40:10 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

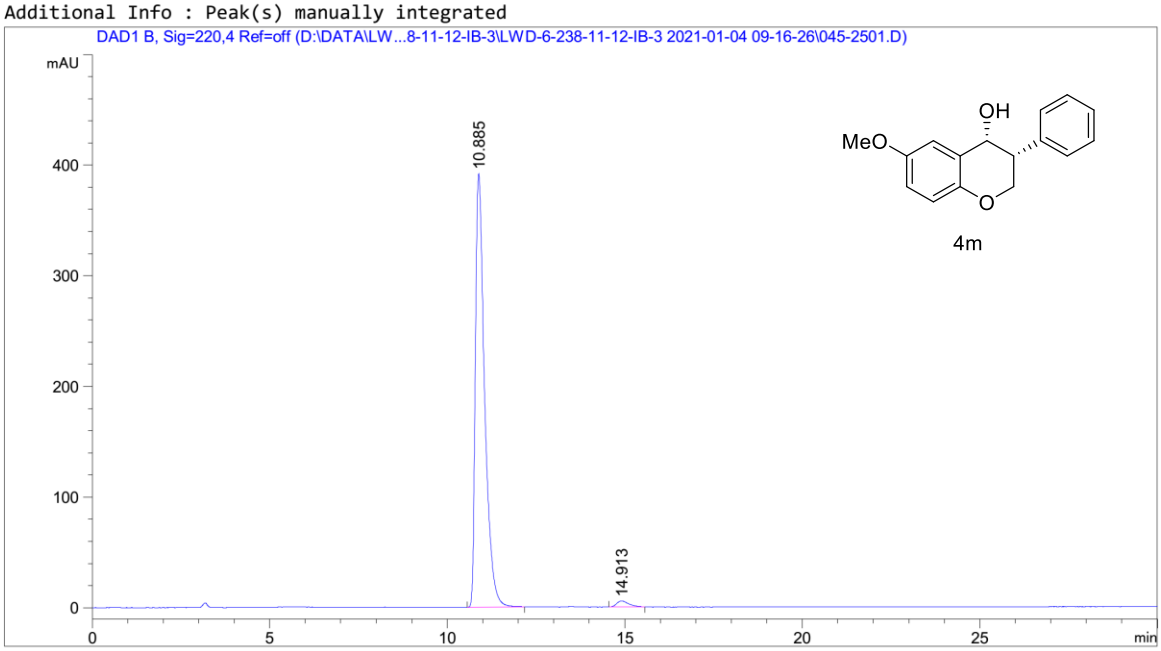

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  10.887 BV    0.2751 1.21088e4   656.65869  49.8601
   2  14.680 BV    0.3939 1.21767e4   458.44376  50.1399

Totals :                  2.42855e4  1115.10245
```

Data File D:\DATA\LW...-238-11-12-IB-3\LWD-6-238-11-12-IB-3 2021-01-04 09-16-26\045-2501.D
Sample Name: LWD-6-149-11

```
==========================================================================
Acq. Operator   :                              Seq. Line :  25
Acq. Instrument : Instrument 2                  Location : Vial 45
Injection Date  : 1/4/2021 9:02:43 PM                Inj :   1
                                              Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-238-11-12-IB-3\LWD-6-238-11-12-IB-3 2021-01-04 09-16-26
                  \DAD-IB(1-6)-90-10-1ML-3UL-ALL-50MIN.M
Last changed    : 1/4/2021 9:29:29 PM
                  (modified after loading)
Analysis Method : D:\METHOD\LWD\DAD-IB(1-6)-90-10-0.3ML-3UL-ALL-60MIN.M
Last changed    : 1/4/2021 9:33:56 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

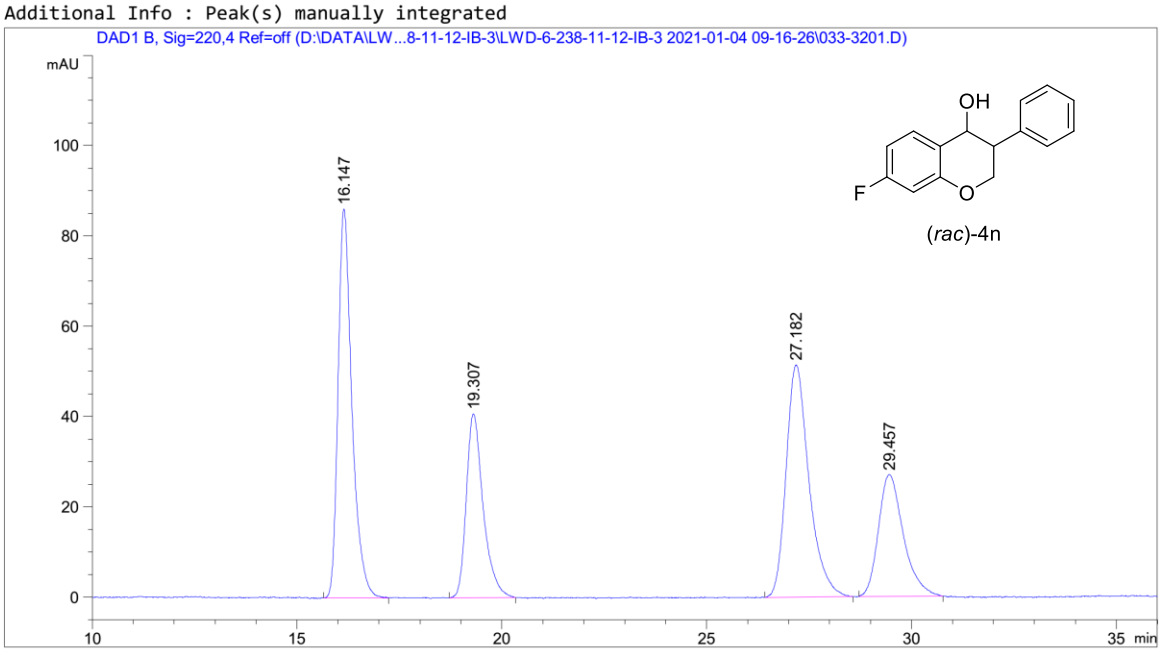

Signal 1: DAD1 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  10.885 BB    0.2694 7095.53418  391.65707  98.1687
   2  14.913 BB    0.3032  132.36275    5.53064   1.8313

Totals :                  7227.89693  397.18771
```

Data File D:\DATA\LW...-238-11-12-IB-3\LWD-6-238-11-12-IB-3 2021-01-04 09-16-26\033-3201.D
Sample Name: LWD-6-238-20

```
==================================================================
Acq. Operator   :                              Seq. Line :  32
Acq. Instrument : Instrument 2                  Location : Vial 33
Injection Date  : 1/4/2021 11:50:09 PM               Inj :   1
                                               Inj Volume : 2.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-238-11-12-IB-3\LWD-6-238-11-12-IB-3 2021-01-04 09-16-26
                  \DAD-AD(1-2)-95-5-1ML-2UL-ALL-60MIN.M
Last changed    : 1/4/2021 9:39:12 PM
Analysis Method : D:\METHOD\LWD\DAD-AD(1-2)-95-5-1ML-5UL-ALL-60MIN.M
Last changed    : 1/5/2021 8:24:57 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

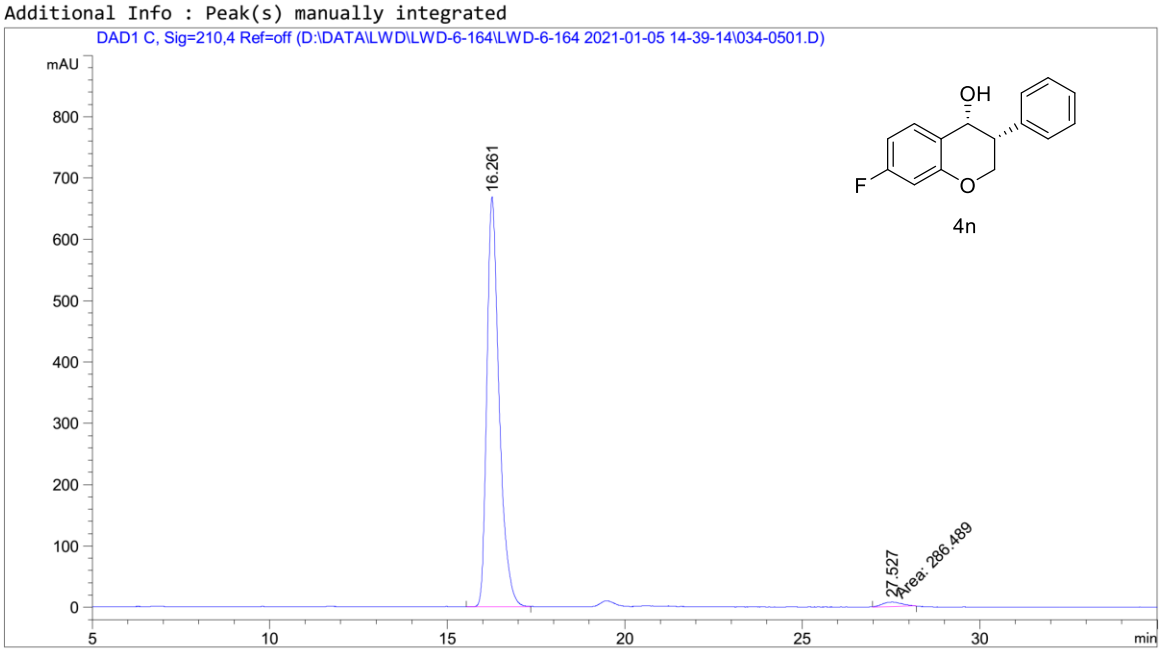

Signal 1: DAD1 B, Sig=220,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  16.147 BB    0.3563 2025.76831   86.17216  31.9332
   2  19.307 BB    0.4131 1170.46936   40.75436  18.4507
   3  27.182 BB    0.5327 2005.71643   51.46304  31.6171
   4  29.457 BB    0.5396 1141.82410   26.98804  17.9991

Totals :                  6343.77820  205.37761
```

Data File D:\DATA\LWD\LWD-6-164\LWD-6-164 2021-01-05 14-39-14\034-0501.D
Sample Name: LWD-6-164-3

```
=====================================================================
Acq. Operator   :                              Seq. Line :   5
Acq. Instrument : Instrument 2                  Location : Vial 34
Injection Date  : 1/5/2021 3:54:27 PM                Inj :   1
                                              Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-164\LWD-6-164 2021-01-05 14-39-14\DAD-AD(1-2)-95-5-1ML-
                  3UL-ALL-35MIN.M
Last changed    : 11/15/2018 8:24:06 PM
Analysis Method : D:\METHOD\LWD\DAD-IB(1-6)-80-20-1ML-3UL-ALL-10MIN.M
Last changed    : 1/5/2021 4:30:44 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

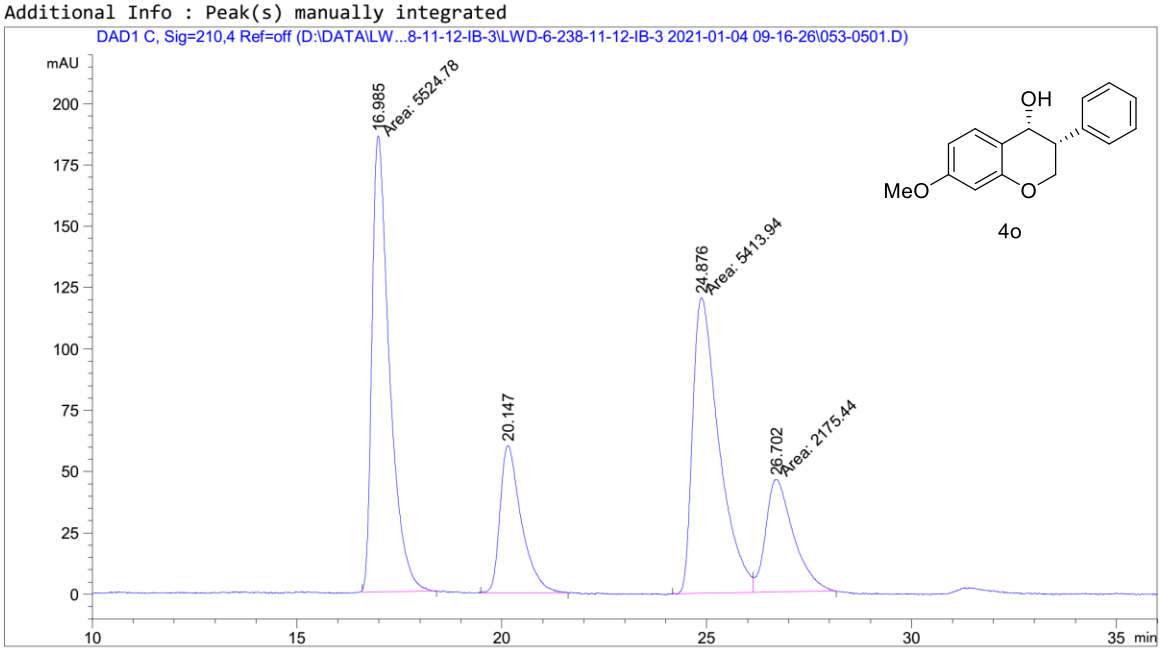

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  16.261 BB    0.3590 1.60957e4   668.33484  98.2512
   2  27.527 MM    0.6363  286.48865    7.50443   1.7488

Totals :                  1.63822e4   675.83927
```

Data File D:\DATA\LW...-238-11-12-IB-3\LWD-6-238-11-12-IB-3 2021-01-04 09-16-26\053-0501.D
Sample Name: LWD-6-238-12

```
=====================================================================
Acq. Operator   :                              Seq. Line :   5
Acq. Instrument : Instrument 2                  Location : Vial 53
Injection Date  : 1/4/2021 11:19:48 AM               Inj :   1
                                               Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-238-11-12-IB-3\LWD-6-238-11-12-IB-3 2021-01-04 09-16-26
                  \DAD-IB(1-6)-95-5-1ML-3UL-ALL-60MIN.M
Last changed    : 1/4/2021 11:54:35 AM
                  (modified after loading)
Analysis Method : D:\METHOD\LWD\DAD-IB(1-6)-95-5-1ML-3UL-ALL-60MIN.M
Last changed    : 1/4/2021 11:58:39 AM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```




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

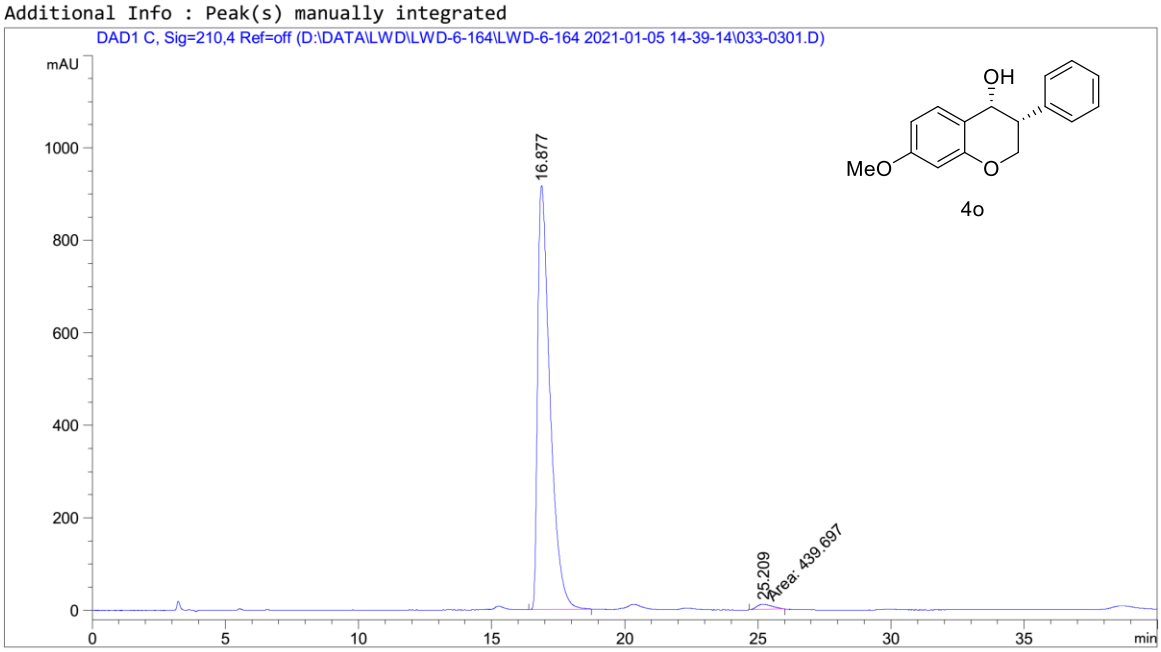
Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


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

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  16.985 MM    0.4951 5524.77734  185.98650  36.1532
   2  20.147 BB    0.4977 2167.40356   59.96283  14.1831
   3  24.876 MF    0.7488 5413.94238  120.50600  35.4279
   4  26.702 FM    0.7911 2175.44067   45.83366  14.2357
```

Data File D:\DATA\LWD\LWD-6-164\LWD-6-164 2021-01-05 14-39-14\033-0301.D
Sample Name: LWD-6-164-1

```
=====================================================================
Acq. Operator   :                              Seq. Line :   3
Acq. Instrument : Instrument 2                  Location : Vial 33
Injection Date  : 1/5/2021 3:02:22 PM                Inj :   1
                                              Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-164\LWD-6-164 2021-01-05 14-39-14\DAD-IB(1-6)-95-5-1ML-
                  3UL-ALL-40MIN.M
Last changed    : 1/5/2021 2:37:35 PM
Analysis Method : D:\METHOD\LWD\DAD-IB(1-6)-80-20-1ML-3UL-ALL-10MIN.M
Last changed    : 1/5/2021 4:04:56 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

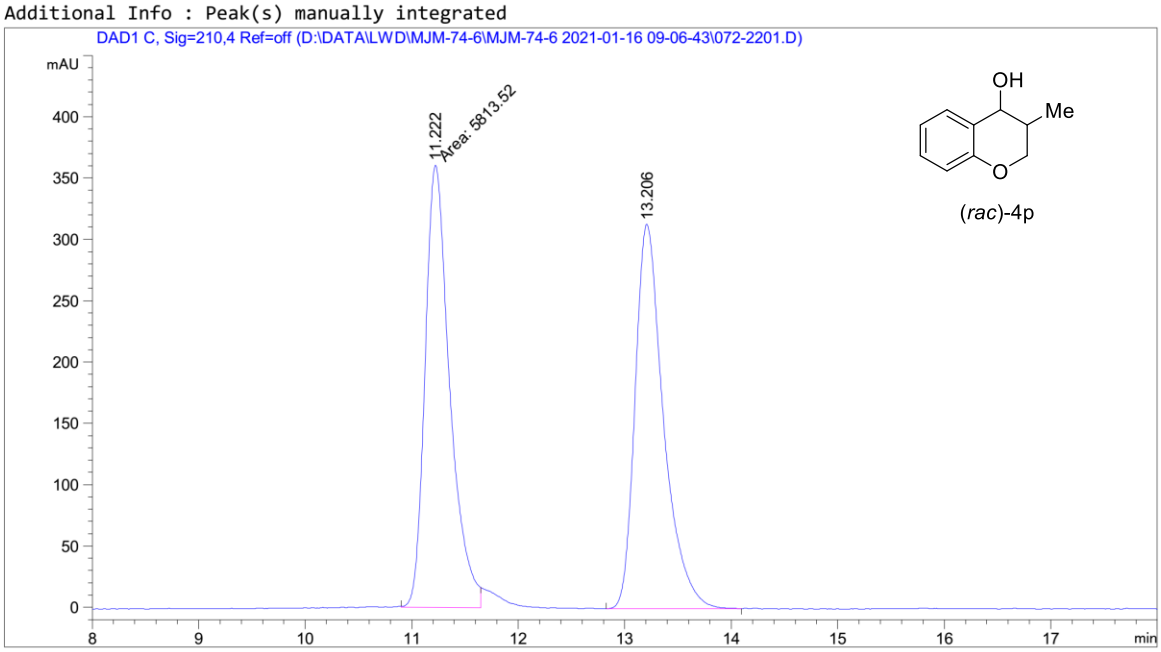

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  16.877 BV    0.4644 2.95906e4   917.06512  98.5358
   2  25.209 MM    0.6544  439.69656   11.19787   1.4642

Totals :                  3.00303e4   928.26299
```

Data File D:\DATA\LWD\MJM-74-6\MJM-74-6 2021-01-16 09-06-43\072-2201.D
Sample Name: LWD-6-171-10-DIAN1

```
=====================================================================
Acq. Operator   :                              Seq. Line :  22
Acq. Instrument : Instrument 2                  Location : Vial 72
Injection Date  : 1/16/2021 9:30:45 PM               Inj :   1
                                               Inj Volume : 2.000 µl
Acq. Method     : D:\DATA\LWD\MJM-74-6\MJM-74-6 2021-01-16 09-06-43\DAD-AD(1-2)-95-5-1ML-2UL-
                  ALL-60MIN.M
Last changed    : 1/4/2021 9:39:12 PM
Analysis Method : D:\METHOD\LSL\DAD-OJ(1-6)-100-0-0.5ML-5UL-ALL-120MIN.M
Last changed    : 1/17/2021 9:59:15 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

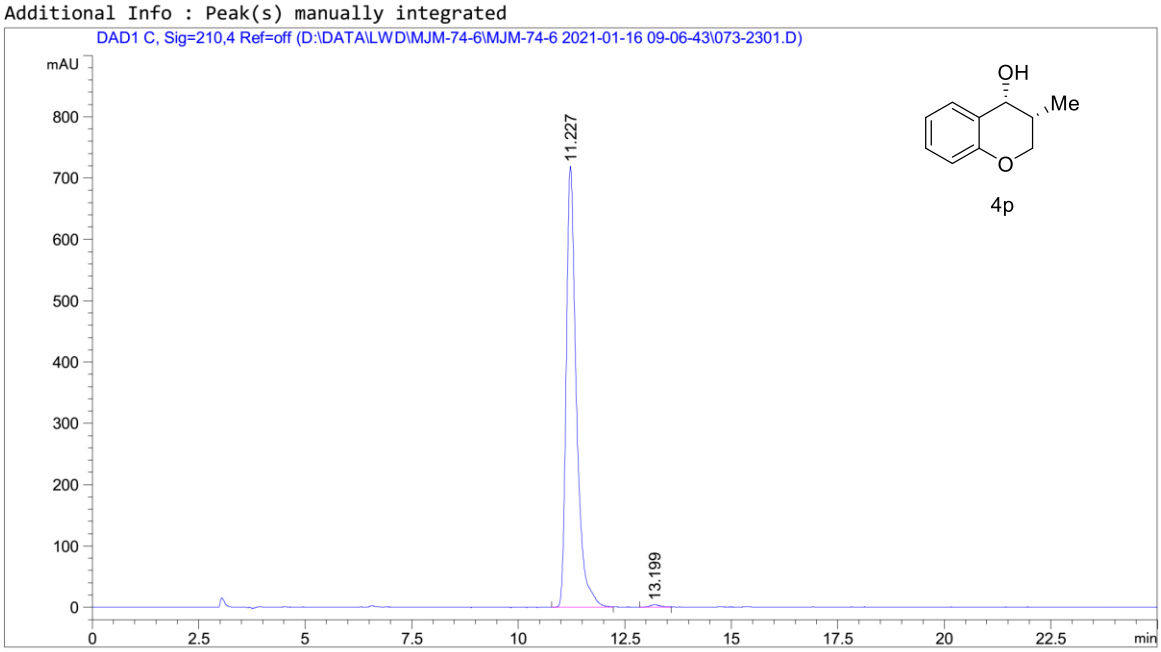

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  11.222 MF    0.2685 5813.52490  360.83945  49.9605
   2  13.206 BB    0.2766 5822.70947  313.59488  50.0395

Totals :                  1.16362e4   674.43433
```

Data File D:\DATA\LWD\MJM-74-6\MJM-74-6 2021-01-16 09-06-43\073-2301.D
Sample Name: LWD-6-167-12

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  23
    Acq. Instrument : Instrument 2                  Location : Vial 73
    Injection Date  : 1/16/2021 10:31:43 PM              Inj :   1
                                                  Inj Volume : 2.000 µl
    Acq. Method     : D:\DATA\LWD\MJM-74-6\MJM-74-6 2021-01-16 09-06-43\DAD-AD(1-2)-95-5-1ML-2UL-
                      ALL-60MIN.M
    Last changed    : 1/4/2021 9:39:12 PM
    Analysis Method : D:\METHOD\LSL\DAD-OJ(1-6)-100-0-0.5ML-5UL-ALL-120MIN.M
    Last changed    : 1/17/2021 10:00:47 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

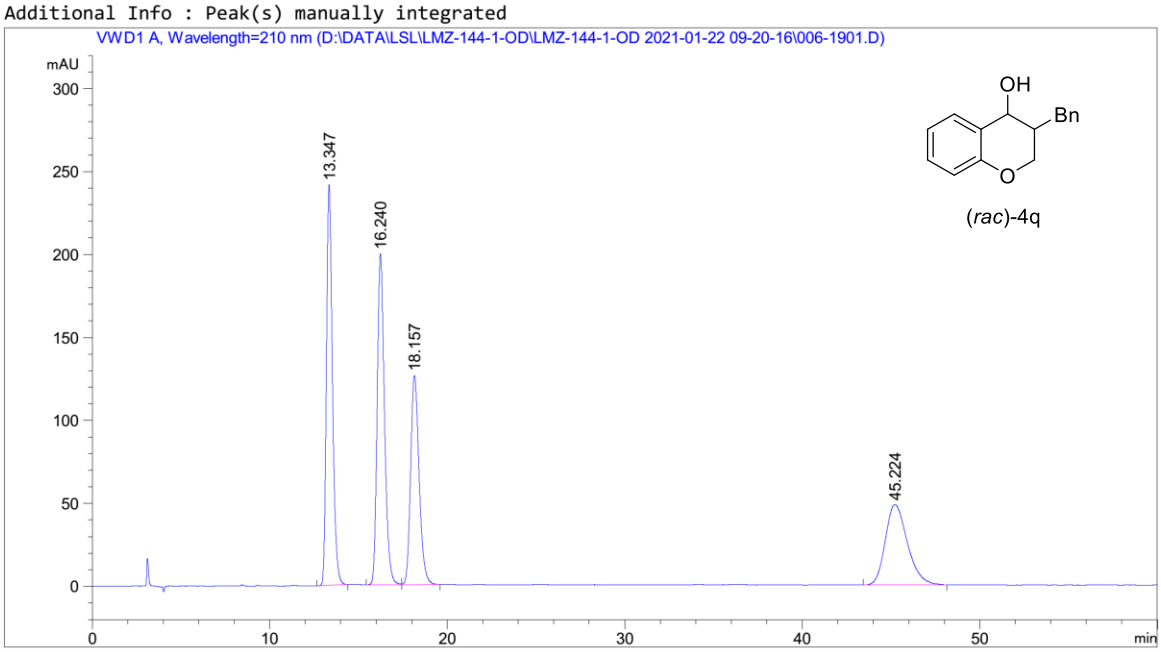

    Signal 1: DAD1 C, Sig=210,4 Ref=off

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  11.227 BV    0.2476 1.19373e4   719.36694  99.4027
       2  13.199 BV    0.2072   71.73116    4.24284   0.5973

    Totals :                  1.20091e4   723.60978
```

Data File D:\DATA\LSL\LMZ-144-1-OD\LMZ-144-1-OD 2021-01-22 09-20-16\006-1901.D
Sample Name: LWD-6167-13-RAC

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  19
    Acq. Instrument : Instrument 1                  Location : Vial 6
    Injection Date  : 1/22/2021 7:44:03 PM               Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LSL\LMZ-144-1-OD\LMZ-144-1-OD 2021-01-22 09-20-16\VWD-OD(1-2)-95-5-
                      1ML-3UL-210NM-60MIN.M
    Last changed    : 1/14/2021 10:11:39 AM
    Analysis Method : D:\METHOD\LWD\VWD-OD(1-2)-97-3--1ML-3UL-210-10MIN.M
    Last changed    : 1/22/2021 9:19:43 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

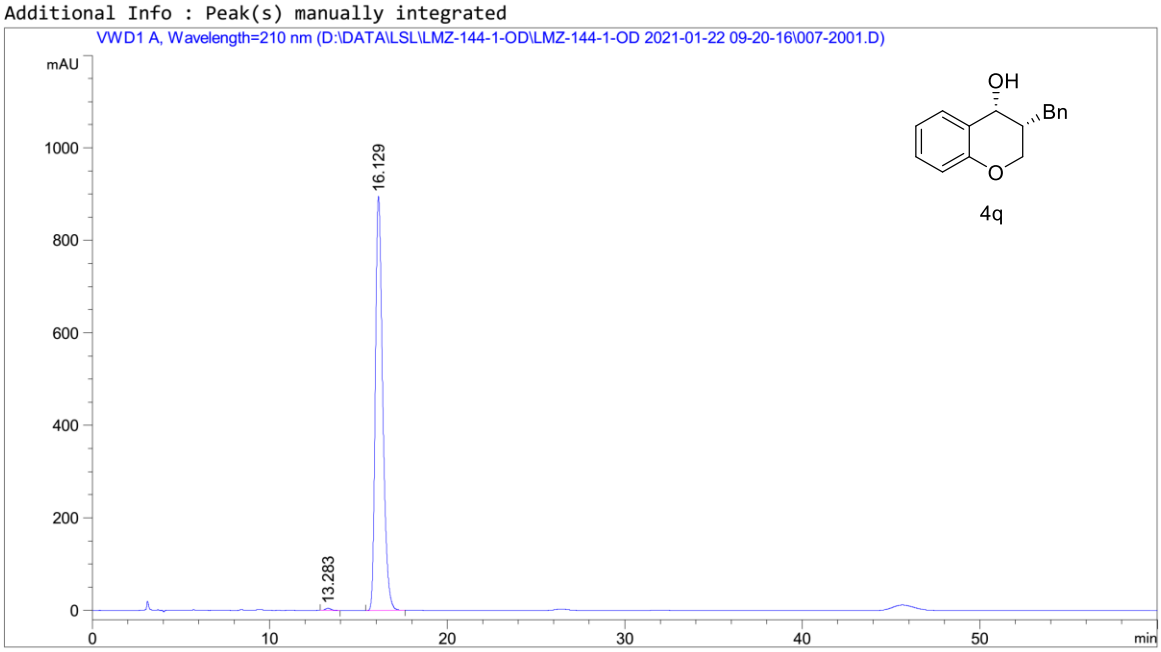

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  13.347 BB    0.3590 5651.01904  241.46303  28.7214
       2  16.240 BV    0.4358 5668.40869  199.33913  28.8098
       3  18.157 VB    0.5116 4184.05420  125.94888  21.2655
       4  45.224 BB    1.3251 4171.80762   48.37503  21.2033

    Totals :                  1.96753e4   615.12606
```

Data File D:\DATA\LSL\LMZ-144-1-OD\LMZ-144-1-OD 2021-01-22 09-20-16\007-2001.D
Sample Name: LWD-6167-13-EE

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :  20
    Acq. Instrument : Instrument 1                  Location : Vial 7
    Injection Date  : 1/22/2021 8:44:53 PM               Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LSL\LMZ-144-1-OD\LMZ-144-1-OD 2021-01-22 09-20-16\VWD-OD(1-2)-95-5-
                      1ML-3UL-210NM-60MIN.M
    Last changed    : 1/14/2021 10:11:39 AM
    Analysis Method : D:\METHOD\LWD\VWD-OD(1-2)-97-3--1ML-3UL-210-10MIN.M
    Last changed    : 1/22/2021 9:52:10 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

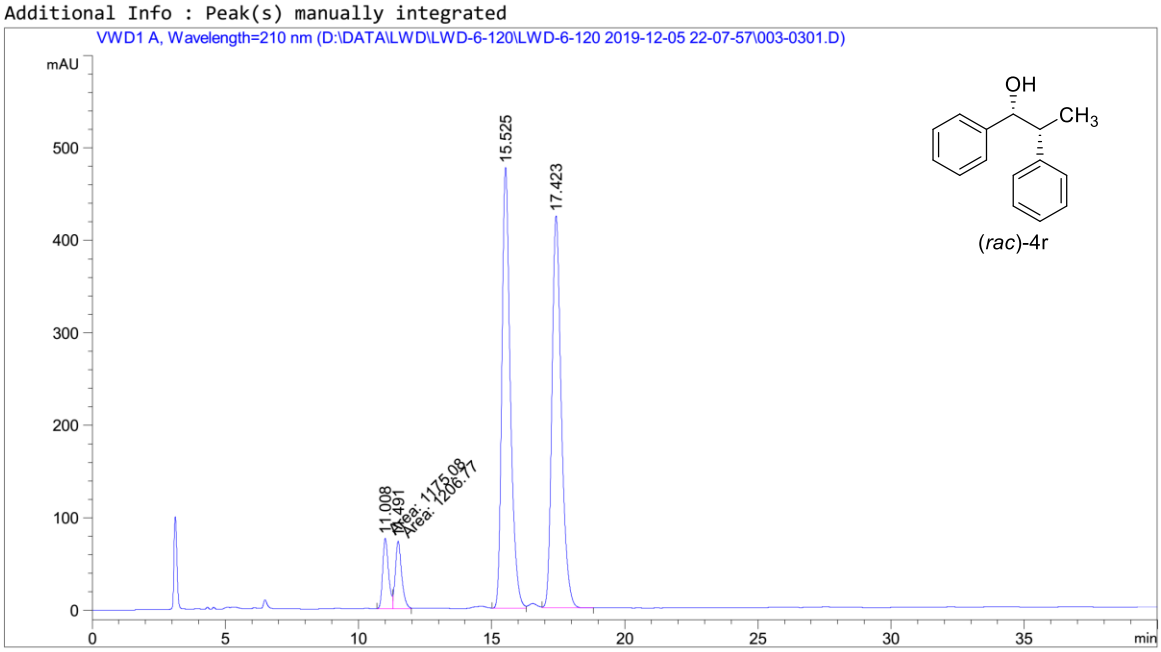

    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  13.283 BB    0.3508  104.81422    4.56545   0.4042
       2  16.129 BB    0.4437 2.58238e4   894.81628  99.5958

    Totals :                  2.59286e4   899.38173
```

Data File D:\DATA\LWD\LWD-6-120\LWD-6-120 2019-12-05 22-07-57\003-0301.D
Sample Name: LWD-6-120-RAC

```
=====================================================================
Acq. Operator   :                              Seq. Line :   3
Acq. Instrument : Instrument 1                  Location : Vial 3
Injection Date  : 12/5/2019 10:31:58 PM              Inj :   1
                                               Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-120\LWD-6-120 2019-12-05 22-07-57\VWD-AD(1-2)-95-5-1ML-
                  3UL-210NM-60MIN.M
Last changed    : 9/3/2018 10:35:53 AM
Analysis Method : D:\METHOD\LSL\DAD-OD(1-2)-95-5-1ML-5UL-ALL-20MIN.M
Last changed    : 12/6/2019 9:01:24 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

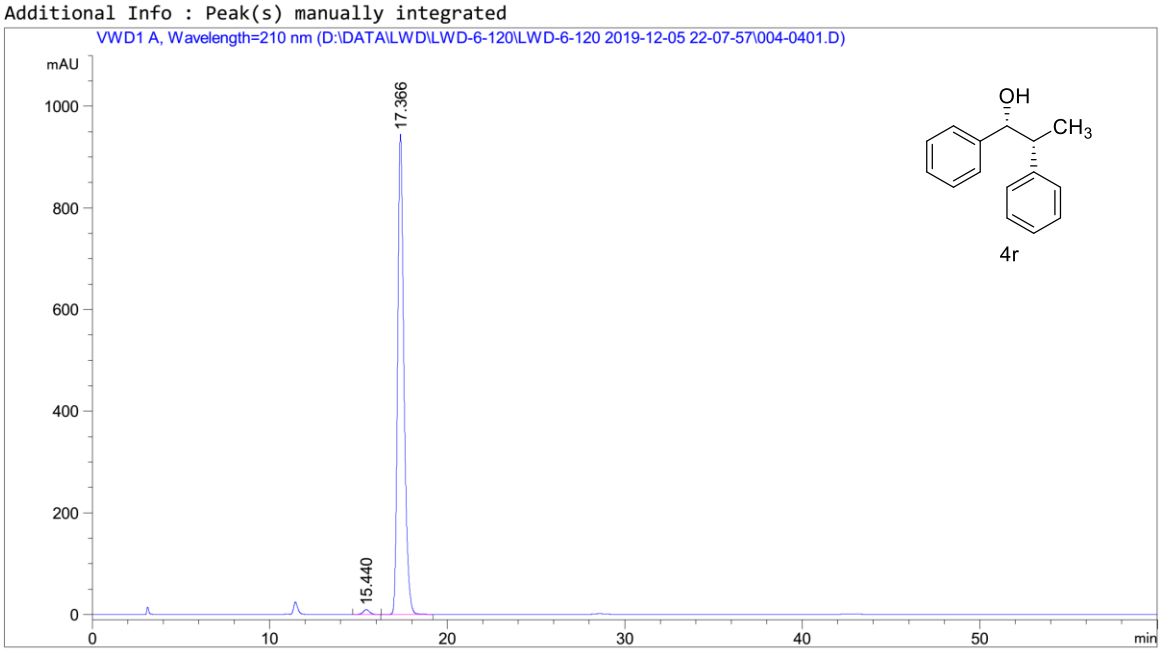

Signal 1: VWD1 A, Wavelength=210 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  11.008 MF    0.2575 1175.08167   76.06036   5.0613
   2  11.491 FM    0.2757 1206.76550   72.95611   5.1977
   3  15.525 BV    0.3313 1.04668e4   476.36560  45.0825
   4  17.423 VB    0.3705 1.03684e4   423.66904  44.6585

Totals :                  2.32171e4  1049.05111
```

Data File D:\DATA\LWD\LWD-6-120\LWD-6-120 2019-12-05 22-07-57\004-0401.D
Sample Name: LWD-6-120

```
=====================================================================
Acq. Operator   :                              Seq. Line :   4
Acq. Instrument : Instrument 1                  Location : Vial 4
Injection Date  : 12/5/2019 11:32:47 PM              Inj :   1
                                               Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-120\LWD-6-120 2019-12-05 22-07-57\VWD-AD(1-2)-95-5-1ML-
                  3UL-210NM-60MIN.M
Last changed    : 9/3/2018 10:35:53 AM
Analysis Method : D:\METHOD\LSL\DAD-OD(1-2)-95-5-1ML-5UL-ALL-20MIN.M
Last changed    : 12/6/2019 9:02:47 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

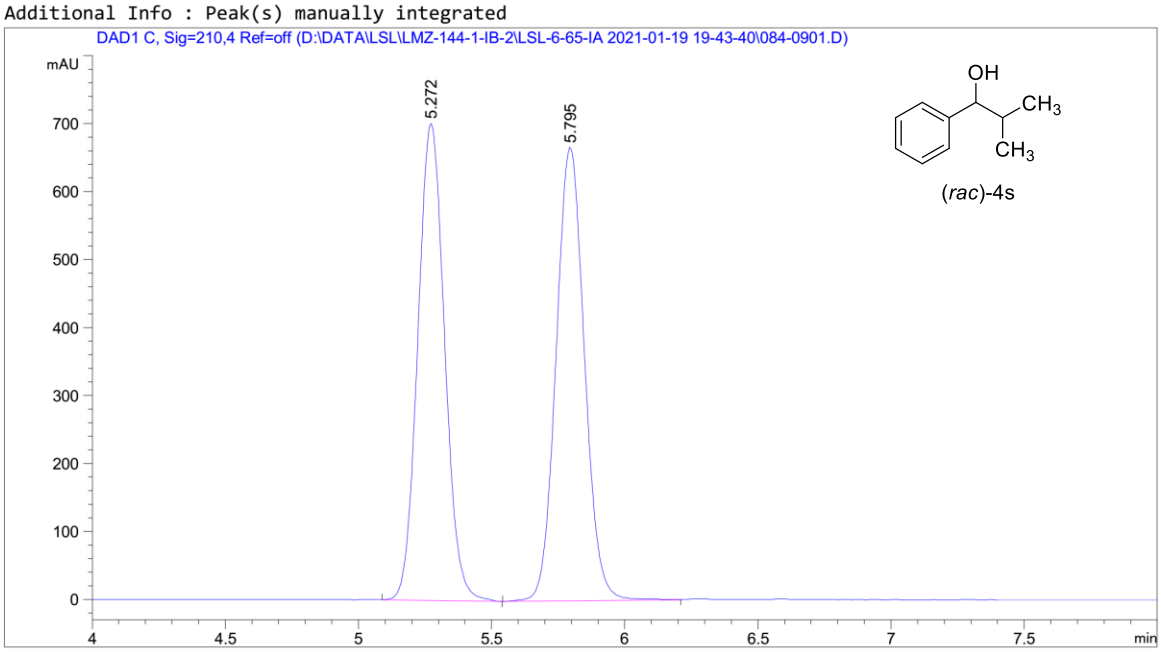

Signal 1: VWD1 A, Wavelength=210 nm

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  15.440 BB    0.3668  242.16133    9.85193   1.0305
   2  17.366 BB    0.3731 2.32566e4   944.95715  98.9695

Totals :                  2.34988e4   954.80908
```

Data File D:\DATA\LSL\LMZ-144-1-IB-2\LSL-6-65-IA 2021-01-19 19-43-40\084-0901.D
Sample Name: LWD-6-171-13-RAC

```
    ======================================================================
    Acq. Operator   :                              Seq. Line :   9
    Acq. Instrument : Instrument 2                  Location : Vial 84
    Injection Date  : 1/19/2021 10:54:13 PM              Inj :   1
                                                  Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LSL\LMZ-144-1-IB-2\LSL-6-65-IA 2021-01-19 19-43-40\DAD-IC(1-2)-95-5
                      -1ML-3UL-ALL-20MIN.M
    Last changed    : 1/18/2021 8:54:41 AM
    Analysis Method : D:\METHOD\LWD\DAD-IA(1-6)-95-5-1ML-2UL-ALL-10MIN.M
    Last changed    : 1/20/2021 8:53:28 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

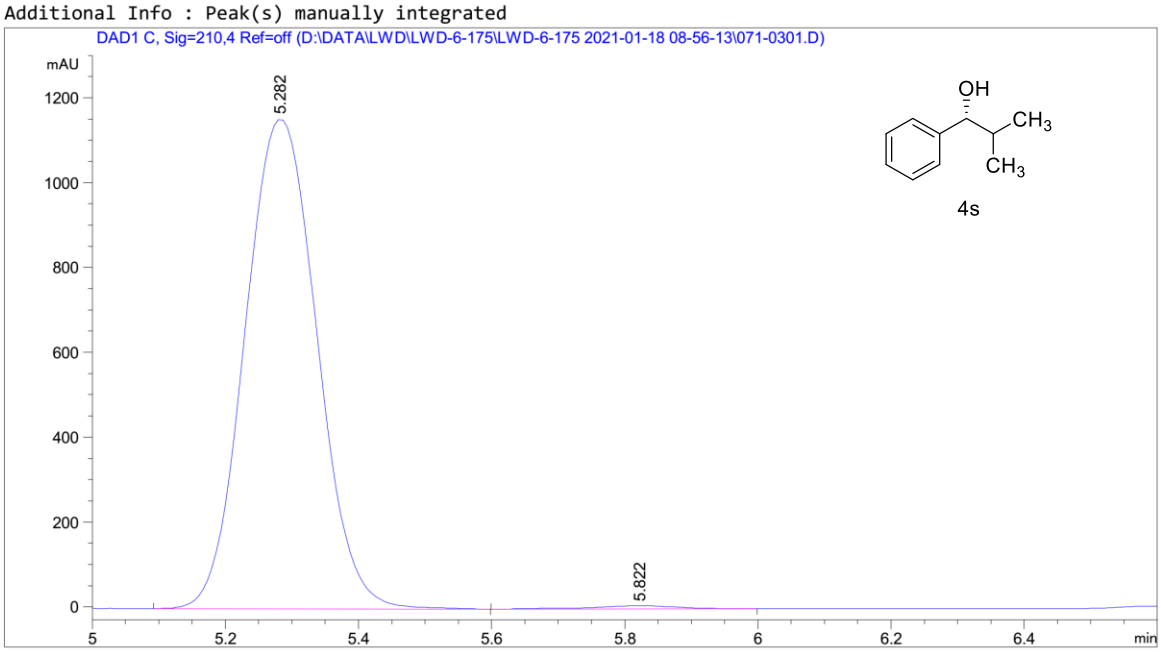

    Signal 1: DAD1 C, Sig=210,4 Ref=off

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1   5.272 VB    0.1094 4901.08301  702.11841  49.7264
       2   5.795 BV    0.1166 4955.01270  667.40308  50.2736

    Totals :                  9856.09570 1369.52148
```

Data File D:\DATA\LWD\LWD-6-175\LWD-6-175 2021-01-18 08-56-13\071-0301.D
Sample Name: LWD-6-175-1

```
======================================================================
Acq. Operator   :                              Seq. Line :   3
Acq. Instrument : Instrument 2                  Location : Vial 71
Injection Date  : 1/18/2021 9:20:04 AM               Inj :   1
                                               Inj Volume : 3.000 µl
Acq. Method     : D:\DATA\LWD\LWD-6-175\LWD-6-175 2021-01-18 08-56-13\DAD-IC(1-2)-95-5-1ML-
                  3UL-ALL-20MIN.M
Last changed    : 1/18/2021 8:54:41 AM
Analysis Method : D:\METHOD\LWD\DAD-IA(1-6)-95-5-1ML-2UL-ALL-10MIN.M
Last changed    : 1/19/2021 8:23:04 PM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```




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

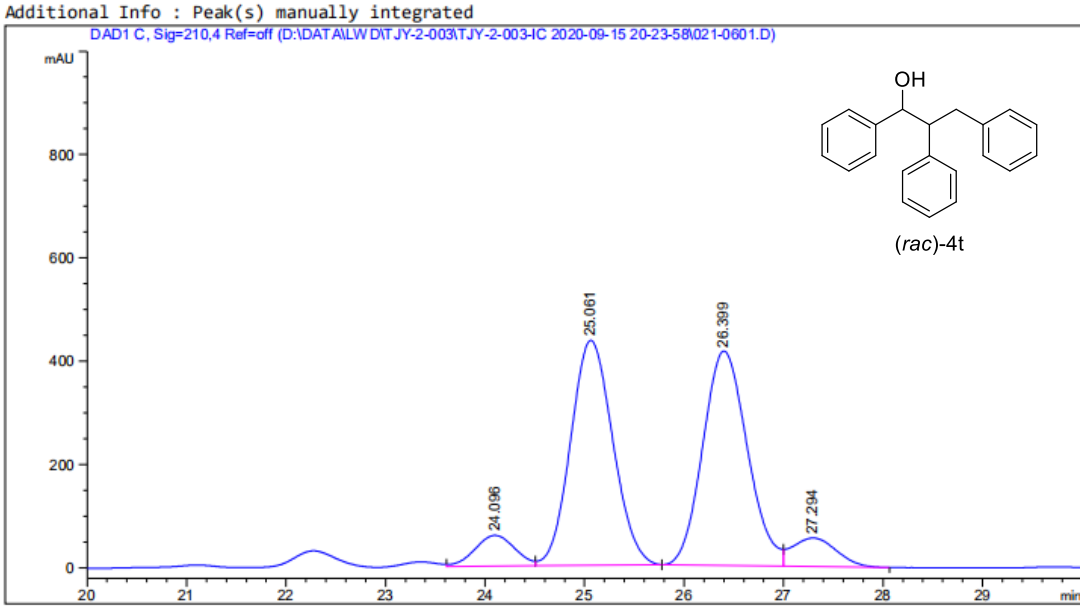
Sorted By             :      Signal
Multiplier            :      1.0000
Dilution              :      1.0000
Use Multiplier & Dilution Factor with ISTDs


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

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1   5.282 BB    0.1192 8634.29688 1154.75830  99.2365
   2   5.822 BB    0.1325   66.42905    7.41661   0.7635

Totals :                  8700.72592 1162.17491
```

```
Acq. Operator   :                                Seq. Line :   6
Acq. Instrument : Instrument 2                    Location : Vial 21
Injection Date  : 9/15/2020 10:50:09 PM               Inj :   1
                                                 Inj Volume : 2.000 µl
Acq. Method     : D:\DATA\LWD\TJY-2-003\TJY-2-003-IC 2020-09-15 20-23-58\DAD-IC(1-6)-98-2-0.
                  5ML-2UL-ALL-80MIN.M
Last changed    : 9/10/2020 8:49:16 AM
Analysis Method : D:\METHOD\LYH\DAD-OD(1-2)-90-10-0.5ML-1UL-ALL-60MIN.M
Last changed    : 9/16/2020 10:16:57 AM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```



(*rac*)-4t

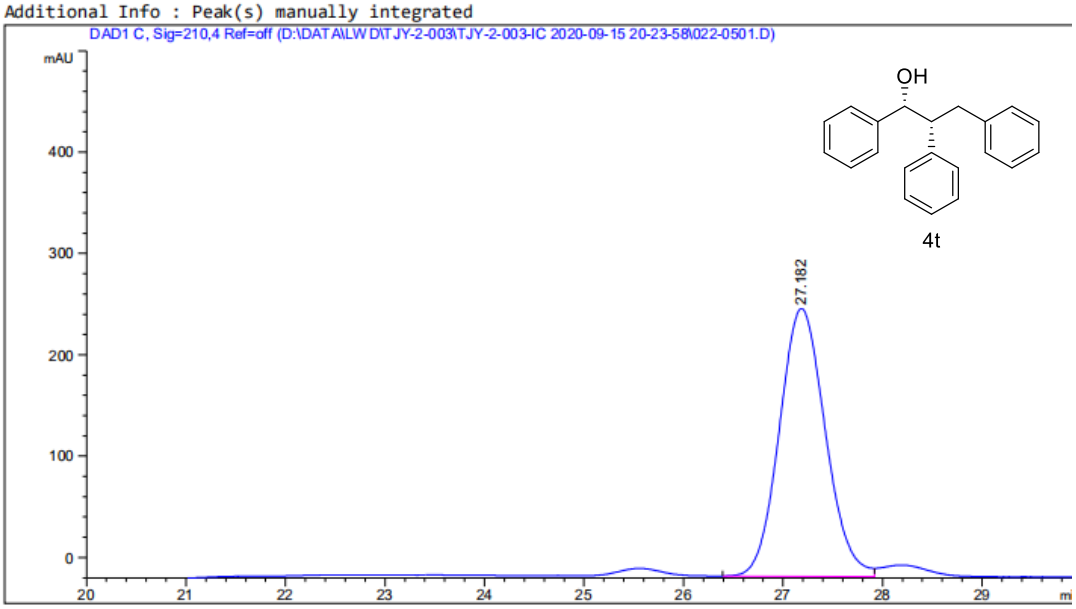
```
=====================================================================
                      Area Percent Report
=====================================================================

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  24.096 VV    0.4422 1667.80310   59.65076   5.7262
   2  25.061 VB    0.4595 1.28238e4   435.51529  44.0286
   3  26.399 BV    0.4835 1.29255e4   414.85364  44.3777
   4  27.294 VB    0.4720 1708.95447   55.37924   5.8675
```

```
Acq. Operator   :                              Seq. Line :   5
Acq. Instrument : Instrument 2                  Location : Vial 22
Injection Date  : 9/15/2020 9:29:11 PM               Inj :   1
                                              Inj Volume : 2.000 µl
Acq. Method     : D:\DATA\LWD\TJY-2-003\TJY-2-003-IC 2020-09-15 20-23-58\DAD-IC(1-6)-98-2-0.
                  5ML-2UL-ALL-80MIN.M
Last changed    : 9/10/2020 8:49:16 AM
Analysis Method : D:\METHOD\LYH\DAD-OD(1-2)-90-10-0.5ML-1UL-ALL-60MIN.M
Last changed    : 9/16/2020 10:24:35 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

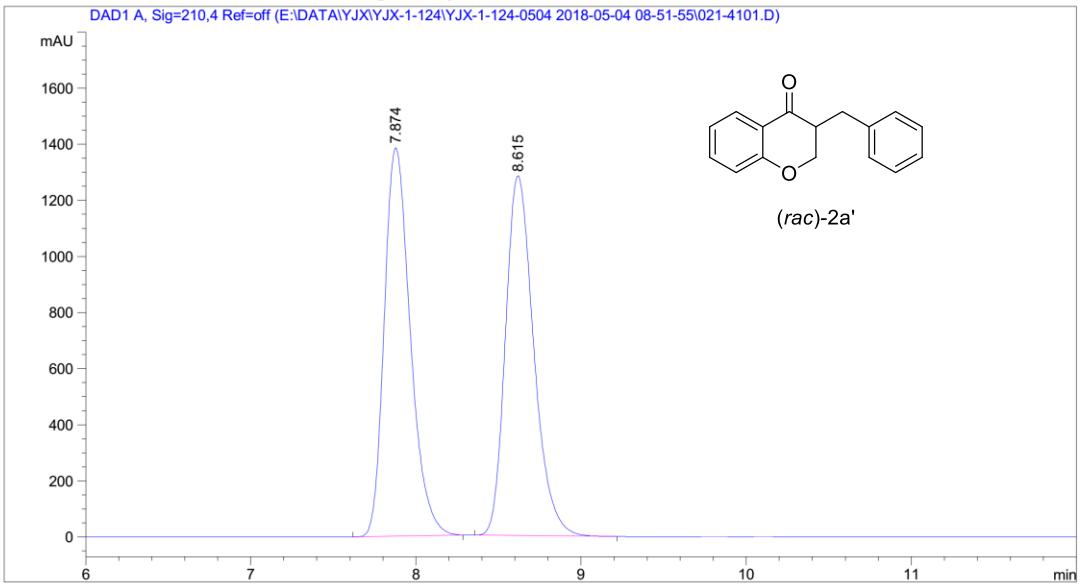

Signal 1: DAD1 C, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1  27.182 BV    0.4978 8464.92480  264.18637 100.0000

Totals :                  8464.92480  264.18637
```

Data File E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\021-4101.D
Sample Name: LWD-4-37-1

```
==========================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  41
Acq. Instrument : 1260HPLC-DAD                    Location : Vial 21
Injection Date  : 5/5/2018 10:45:21 AM                 Inj :   1
                                                 Inj Volume : 3.000 µl
Acq. Method     : E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\DAD-OD(1-2)-95-5-
                  1ML-3UL-ALL-15MIN.M
Last changed    : 5/5/2018 10:15:59 AM by SYSTEM
Analysis Method : E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\DAD-OD(1-2)-95-5-
                  1ML-3UL-ALL-15MIN.M (Sequence Method)
Last changed    : 7/27/2018 11:46:37 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```




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

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

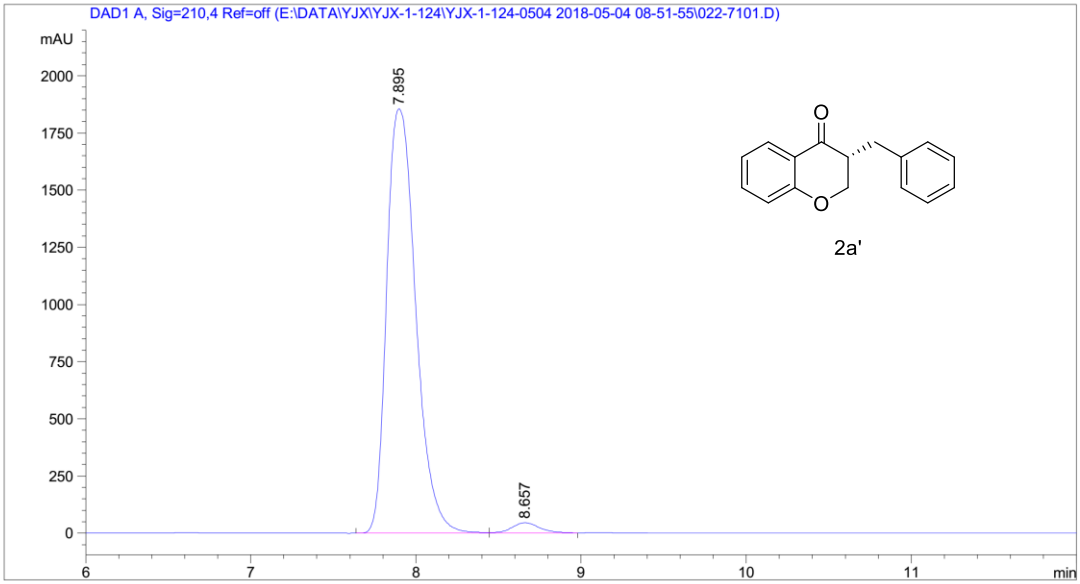

Signal 1: DAD1 A, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1   7.874 BB    0.1696 1.51469e4  1384.87122  49.8046
   2   8.615 BB    0.1848 1.52657e4  1282.89966  50.1954

Totals :                  3.04126e4  2667.77087
```

Data File E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\022-7101.D
Sample Name: LWD-4-35-2

```
======================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  71
Acq. Instrument : 1260HPLC-DAD                    Location : Vial 22
Injection Date  : 5/6/2018 3:17:56 AM                  Inj :   1
                                                 Inj Volume : 3.000 µl
Acq. Method     : E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\DAD-OD(1-2)-95-5-
                  1ML-3UL-ALL-15MIN.M
Last changed    : 5/5/2018 10:15:59 AM by SYSTEM
Analysis Method : E:\DATA\YJX\YJX-1-124\YJX-1-124-0504 2018-05-04 08-51-55\DAD-OD(1-2)-95-5-
                  1ML-3UL-ALL-15MIN.M (Sequence Method)
Last changed    : 7/27/2018 11:47:23 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```




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

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

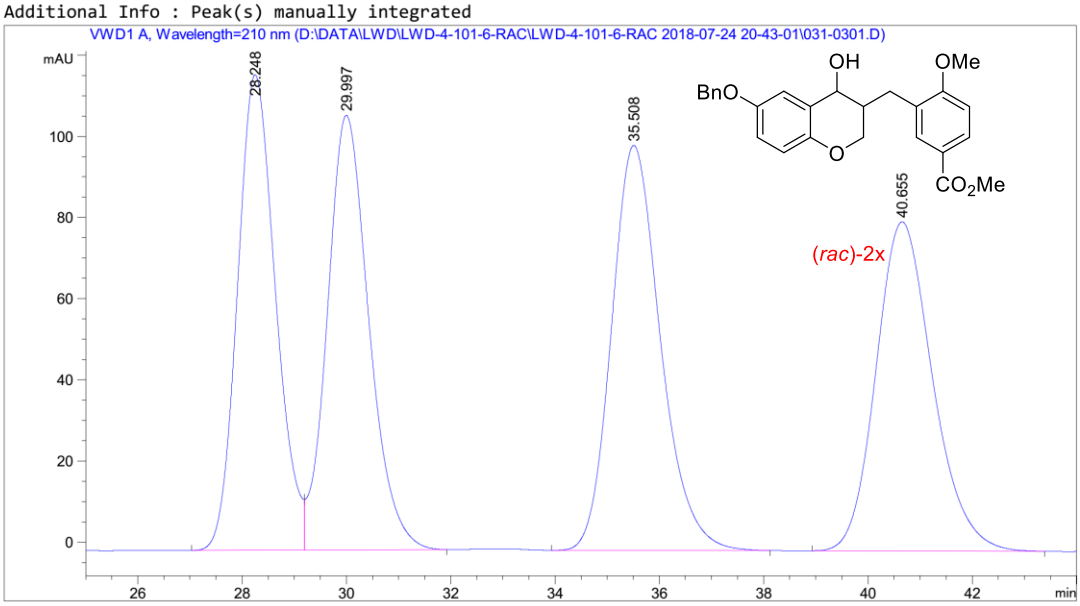

Signal 1: DAD1 A, Sig=210,4 Ref=off

Peak RetTime Type  Width     Area      Height     Area
  #   [min]        [min]   [mAU*s]     [mAU]       %
----|-------|----|-------|----------|----------|--------|
   1   7.895 BV    0.1907 2.26907e4  1855.42444  97.6244
   2   8.657 VV    0.1849  552.16425   45.72316   2.3756

Totals :                  2.32429e4  1901.14760
```

Data File D:\DATA\LWD\LWD-4-101-6-RAC\LWD-4-101-6-RAC 2018-07-24 20-43-01\031-0301.D
Sample Name: LWD-4-101-6-RAC

```
    ======================================================================
    Acq. Operator   :                                Seq. Line :   3
    Acq. Instrument : Instrument 1                    Location : Vial 31
    Injection Date  : 7/24/2018 9:15:40 PM                 Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\LWD\LWD-4-101-6-RAC\LWD-4-101-6-RAC 2018-07-24 20-43-01\VWD-AD(1-2)
                      -80-20-1ML-3UL-210NM-60MIN.M
    Last changed    : 7/24/2018 9:58:41 PM
                      (modified after loading)
    Analysis Method : D:\METHOD\CZY\DAD-OD(1-2)-98-2-1ML-3UL-ALL-30MIN.M
    Last changed    : 7/27/2018 12:01:03 PM
                      (modified after loading)
    Additional Info : Peak(s) manually integrated
```




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

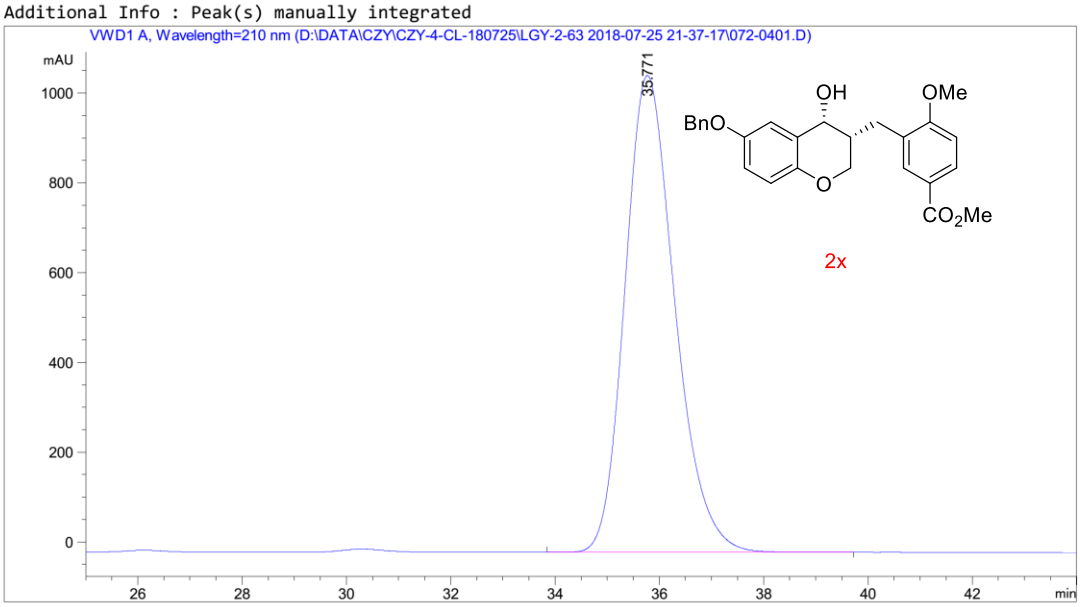
    Sorted By             :      Signal
    Multiplier            :      1.0000
    Dilution              :      1.0000
    Use Multiplier & Dilution Factor with ISTDs


    Signal 1: VWD1 A, Wavelength=210 nm

    Peak RetTime Type  Width     Area      Height     Area
      #   [min]        [min]   [mAU*s]     [mAU]       %
    ----|-------|----|-------|----------|----------|--------|
       1  28.248 BV    0.7821 5942.21094  117.09351  24.2602
       2  29.997 VB    0.8449 5945.02393  107.04466  24.2717
       3  35.508 BB    0.9988 6506.79639   99.78468  26.5652
       4  40.655 BB    1.1595 6099.63574   81.09895  24.9029
```

Data File D:\DATA\CZY\CZY-4-CL-180725\LGY-2-63 2018-07-25 21-37-17\072-0401.D
Sample Name: LWD-4-100-5-100-6

```
    ======================================================================
    Acq. Operator   :                               Seq. Line :   4
    Acq. Instrument : Instrument 1                   Location : Vial 72
    Injection Date  : 7/25/2018 11:00:52 PM               Inj :   1
                                                   Inj Volume : 3.000 µl
    Acq. Method     : D:\DATA\CZY\CZY-4-CL-180725\LGY-2-63 2018-07-25 21-37-17\VWD-AD(1-2)-80-20-
                      1ML-3UL-210NM-60MIN.M
    Last changed    : 7/24/2018 8:42:32 PM
    Analysis Method : D:\METHOD\CZY\DAD-OD(1-2)-98-2-1ML-3UL-ALL-30MIN.M
    Last changed    : 7/27/2018 12:02:34 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  35.771 BB    1.0189 7.04453e4  1062.01050 100.0000

    Totals :                  7.04453e4  1062.01050


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

IV. Reference

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