Enantioselective synthesis of 1-aminoindene derivatives via asymmetric Brønsted acid catalysis

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1. General information S2
2. Procedure for the synthesis of substrates 1 and 3 ..... S2
3. In situ imine formation/cyclisation S7
4. Characterizations for the substrates 1 and 3. ..... S7
5. General procedure for the synthesis of 2 and 4. ..... S14
6. Characterizations for the products 2 and 4. ..... S14
7. Procedure for the synthesis of 7. ..... S23
8. Characterizations for the products 5, 6 and 7. ..... S23
9. X-ray Single Crystal Data for 2e S25
10. X-ray Single Crystal Data for 4e S26
11. NMR spectra for substrates, products, 5, 6 and 7. ..... S27
12. HPLC spectra for products, 5, 6 and 7. ..... S89

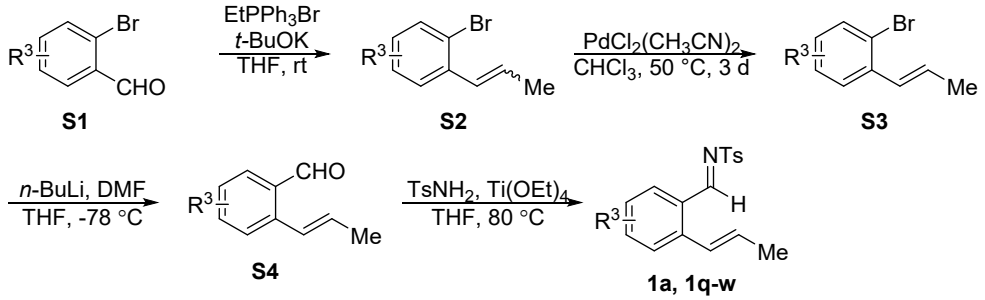
1. General information

General data: NMR spectra were recorded on Bruker-400 MHz spectrometer or Bruker-500 MHz spectrometer. Chemical shifts (δ) are given in ppm relative to TMS. The residual solvent signals were used as references and the chemical shifts converted to the TMS scale (CDCl3: δH = 7.26 ppm, δC = 77.16 ppm). The high resolution mass spectra were recorded on a Thermo LTQ Orbitrap XL (ESI+). Enantiomeric excesses were measured on Waters-Breeze (2487 Dual λ Absorbance Detector and 1525 Binary HPLC Pump, UV detection monitored at 254 nm or 230nm). Chiralpak AD-H and IE columns were purchased from Daicel Chemical Industries, LTD. Optical rotations were measured at 589 nm (sodium D line) by using a Perkin-Elmer 343 polarimeter.

Materials: Analytical grade solvents for the column chromatography were used as received. Starting materials were purchased from commercial suppliers (Aldrich, Alfa, TCI, Adamas-beta, Energychemical, and Accela) and used as supplied unless otherwise stated. All solvents were purified and dried according to standard methods prior to use, unless stated otherwise.

2. Procedure for the synthesis of substrates 1 and 3.

General procedure for the synthesis of substrates 1a, 1q-w.



The mixture of ethyltriphenylphosphonium bromide (5.569 g, 15 mmol), *t*-BuOK (1.683 g, 15 mmol), THF (50 mL) was added to a 100 mL flask under nitrogen atmosphere and stirred at 0 °C for 30 minutes. Then the reaction mixture was warmed to room temperature and stirred for 1.5 hours. Subsequently, 2-bromobenzaldehydes **S1** (5 mmol) was added dropwise to the reaction mixture and stirred for additional 6 hours. Then the reaction was quenched by water (50 mL) and THF was removed under reduced pressure. The residue was filtered and extracted with Ethyl acetate (50 mL × 3). The combined organic layer was washed with brine (50 mL × 2) and dried over anhydrous Na_2SO_4. After the solvent was removed under reduced pressure, the crude product was purified by flash column chromatography on silica gel and eluted with petroleum ether to afford **S2**.

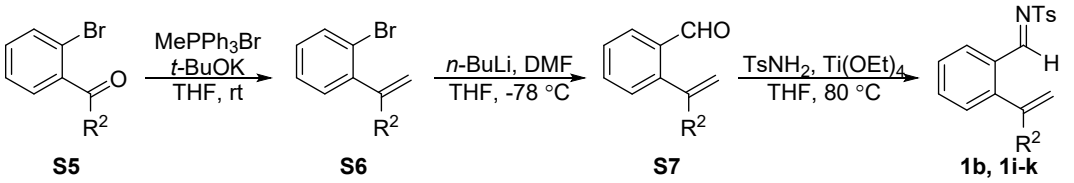
To a solution of **S2** (4 mmol) in chloroform (20 mL) was added bis(acetonitrile)-dichloropalladium (0.041 g, 0.16 mmol). The solution was stirred at 50 °C for 3 days. The reaction mixture was passed through a plug of silica gel (Et_2O as eluent) and concentrated to give **S3**.

n-BuLi (1.6 M solution in hexanes, 4.4 mmol) was added slowly to a solution of **S3** (4 mmol) in THF (20 mL) at -78 °C, then stirred for 30 min at this temperature. DMF (4.8 mmol) was then added dropwise to the mixture and stirred for a further 5 h. Saturated aqueous NH_4Cl (25 mL) was added and the mixture was extracted with Et_2O (30 mL × 3). The combined organic phase was washed with saturated aqueous NaCl and dried over $MgSO_4$, then concentrated in vacuo. The crude residue

was purified by silica chromatography (EtOAc: Petroleum ether = 1: 25 - 1: 10) to give the aldehydes **S4**.

A 50 mL vial equipped with a stirrer was charged with aldehyde **S4** (5 mmol), sulfonamide (6 mmol), dry THF (20 mL), and $Ti(OEt)_4$ (5 mL). The vial was closed and heated at 80 °C for 24 h. After completion, the mixture was cooled to room temperature and quenched with water (50 mL). The mixture was extracted with CH_2Cl_2 (50 mL × 3). The combined organic layer was dried over Na_2SO_4 and concentrated in vacuo. The crude product was purified by flash column chromatography (EtOAc: Petroleum ether = 1: 10 - 1: 4) on silica gel to afford **1a**, **1q-w**.

General procedure for the synthesis of substrates 1b, 1i-k.



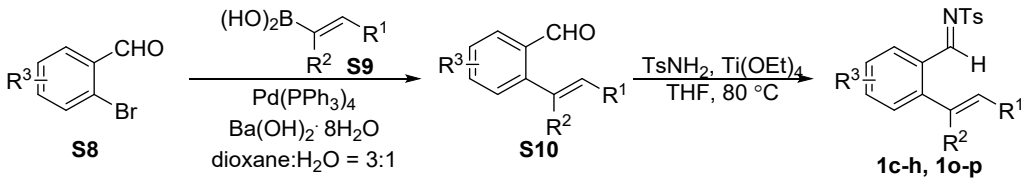
S5 **S6** **S7** **1b, 1i-k**

The mixture of methyltriphenylphosphonium bromide (5.344 g, 15 mmol), *t*-BuOK (1.683 g, 15 mmol), THF (50 mL) was added to a 100 mL flask under nitrogen atmosphere and stirred at 0 °C for 30 minutes. Then the reaction mixture was warmed to room temperature and stirred for 1.5 hours. Subsequently, **S5** (5 mmol) was added dropwise to the reaction mixture and stirred for additional 6 hours. Then the reaction was quenched by water (50 mL) and THF was removed under reduced pressure. The residue was filtered and extracted with Ethyl acetate (50 mL × 3). The combined organic layer was washed with brine (50 mL × 2) and dried over anhydrous Na_2SO_4. After the solvent was removed under reduced pressure, the crude product was purified by flash column chromatography on silica gel and eluted with petroleum ether to afford **S6**.

n-BuLi (1.6 M solution in hexanes, 4.4 mmol) was added slowly to a solution of **S6** (4 mmol) in THF (20 mL) at -78 °C, then stirred for 30 min at this temperature. DMF (4.8 mmol) was then added dropwise to the mixture and stirred for a further 5 h. Saturated aqueous NH_4Cl (25 mL) was added and the mixture was extracted with Et_2O (30 mL × 3). The combined organic phase was washed with saturated aqueous NaCl and dried over $MgSO_4$, then concentrated in vacuo. The crude residue was purified by silica chromatography (EtOAc: Petroleum ether = 1: 25 - 1: 10) to give the aldehydes **S7**.

A 50 mL vial equipped with a stirrer was charged with aldehyde **S7** (5 mmol), sulfonamide (6 mmol), dry THF (20 mL), and $Ti(OEt)_4$ (5 mL). The vial was closed and heated at 80 °C for 24 h. After completion, the mixture was cooled to room temperature and quenched with water (50 mL). The mixture was extracted with CH_2Cl_2 (50 mL × 3). The combined organic layer was dried over Na_2SO_4 and concentrated in vacuo. The crude product was purified by flash column chromatography (EtOAc: Petroleum ether = 1: 10 - 1: 4) on silica gel to afford **1b**, **1i-k**.

General procedure for the synthesis of substrates 1c-h, 1o-p.



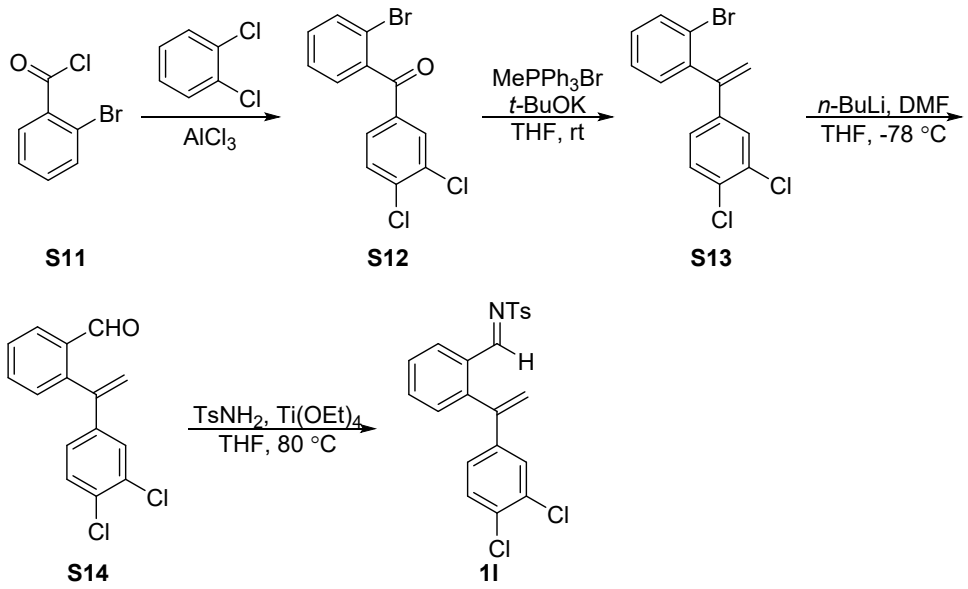
S8 **S10** **1c-h, 1o-p**

Under N_2 gas, 2-bromobenzaldehydes **S8** was added to the solution of boronic acids **S9** (10

mmol), $Pd(PPh_3)_4$ (0.25 mmol) and $Ba(OH)_2 \cdot 8H_2O$ (10 mmol) in dioxane (30 mL) and H_2O (10 mL). The mixture was refluxed for 40 h. After completion, the mixture was cooled to room temperature and quenched with HCl (1M, 40 mL). The mixture was extracted with CH_2Cl_2 (50 mL × 3). The combined organic layer was dried over Na_2SO_4 and concentrated in vacuo. The crude product was purified by flash column chromatography (EtOAc: Petroleum ether = 1: 25) on silica gel to afford **S10**.

A 50 mL vial equipped with a stirrer was charged with aldehyde **S10** (5 mmol), sulfonamide (6 mmol), dry THF (20 mL), and $Ti(OEt)_4$ (5 mL). The vial was closed and heated at 80 °C for 24 h. After completion, the mixture was cooled to room temperature and quenched with water (50 mL). The mixture was extracted with CH_2Cl_2 (50 mL × 3). The combined organic layer was dried over Na_2SO_4 and concentrated in vacuo. The crude product was purified by flash column chromatography (EtOAc: Petroleum ether = 1: 10 - 1: 4) on silica gel to afford **1c-h**, **1o-p**.

Procedure for the synthesis of substrate 1l.



A mixture of 1,2-dichlorobenzene (5 mL, 6.53 g, 44.4 mmol), 3-chlorobenzoyl chloride (4.358 g, 20 mmol) and anhydrous aluminium chloride (5.334 g, 40 mmol) was stirred at 120 °C for 3 h. The reaction mixture was poured onto crushed ice (50 g). The mixture was extracted with CH_2Cl_2 (50 mL × 3). The combined organic layer was dried over Na_2SO_4 and concentrated in vacuo. The crude product was purified by flash column chromatography (EtOAc: Petroleum ether = 1: 50) on silica gel to afford **S12**.

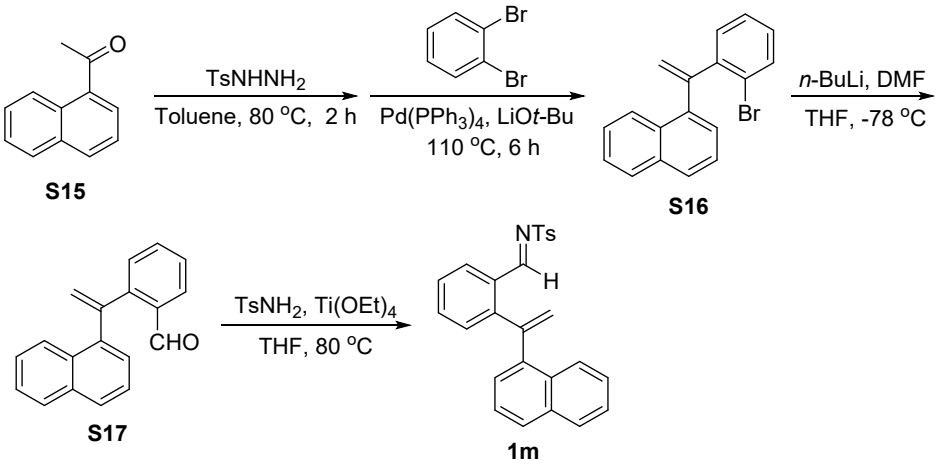
The mixture of methyltriphenylphosphonium bromide (5.344 g, 15 mmol), *t*-BuOK (1.683 g, 15 mmol), THF (50 mL) was added to a 100 mL flask under nitrogen atmosphere and stirred at 0 °C for 30 minutes. Then the reaction mixture was warmed to room temperature and stirred for 1.5 hours. Subsequently, **S12** (5 mmol) was added dropwise to the reaction mixture and stirred for additional 6 hours. Then the reaction was quenched by water (50 mL) and THF was removed under reduced pressure. The residue was filtered and extracted with Ethyl acetate (50 mL × 3). The combined organic layer was washed with brine (50 mL × 2) and dried over anhydrous Na_2SO_4. After the solvent was removed under reduced pressure, the crude product was purified by flash column chromatography on silica gel and eluted with petroleum ether to afford **S13**.

n-BuLi (1.6 M solution in hexanes, 4.4 mmol) was added slowly to a solution of **S13** (4 mmol)

in THF (20 mL) at -78 °C, then stirred for 30 min at this temperature. DMF (4.8 mmol) was then added dropwise to the mixture and stirred for a further 5 h. Saturated aqueous NH_4Cl (25 mL) was added and the mixture was extracted with Et_2O (30 mL × 3). The combined organic phase was washed with saturated aqueous NaCl and dried over $MgSO_4$, then concentrated in vacuo. The crude residue was purified by silica chromatography (EtOAc: Petroleum ether = 1: 25 - 1: 10) to give the aldehydes **S14**.

A 50 mL vial equipped with a stirrer was charged with aldehyde **S14** (5 mmol), sulfonamide (6 mmol), dry THF (20 mL), and $Ti(OEt)_4$ (5 mL). The vial was closed and heated at 80 °C for 24 h. After completion, the mixture was cooled to room temperature and quenched with water (50 mL). The mixture was extracted with CH_2Cl_2 (50 mL × 3). The combined organic layer was dried over Na_2SO_4 and concentrated in vacuo. The crude product was purified by flash column chromatography (EtOAc: Petroleum ether = 1: 10) on silica gel to afford **1l**.

Procedure for the synthesis of substrate 1m.



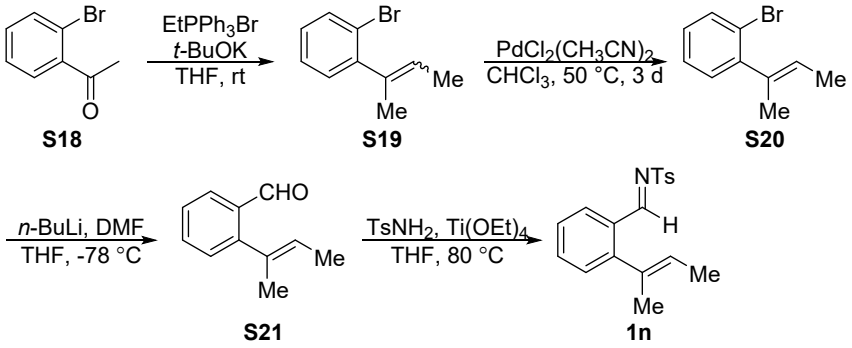
The mixture of acetylnaphthalene **S15** (1.70 g, 10 mmol) and tosylhydrazide (2.326g, 12.5 mmol) in 50 mL of toluene was stirred at 80 ºC for 2 h. Lithium tert-butoxide (2.0 g, 25 mmol), 1,2-dibromobenzene (20 mmol) and $Pd(PPh_3)_4$ (0.577 g, 0.5 mmol) were added to the reaction mixture. The system was heated under reflux at 90 ºC for 6 h. After the completion of the reaction, the reaction mixture was allowed to cool to room temperature. Saturated aqueous $NaHCO_3$ (50 mL) was added and the mixture was extracted with Et_2O (50 mL × 3). The combined organic phase was washed with saturated aqueous NaCl and dried over $MgSO_4$, then concentrated in vacuo. The crude product was purified by flash column chromatography on silica gel and eluted with petroleum ether to afford **S16**.

n-BuLi (1.6 M solution in hexanes, 4.4 mmol) was added slowly to a solution of **S16** (4 mmol) in THF (20 mL) at -78 °C, then stirred for 30 min at this temperature. DMF (4.8 mmol) was then added dropwise to the mixture and stirred for a further 5 h. Saturated aqueous NH_4Cl (25 mL) was added and the mixture was extracted with Et_2O (30 mL × 3). The combined organic phase was washed with saturated aqueous NaCl and dried over $MgSO_4$, then concentrated in vacuo. The crude residue was purified by silica chromatography (EtOAc: Petroleum ether = 1: 25) to give the aldehydes **S17**.

A 50 mL vial equipped with a stirrer was charged with aldehyde **S17** (5 mmol), sulfonamide (6 mmol), dry THF (20 mL), and $Ti(OEt)_4$ (5 mL). The vial was closed and heated at 80 °C for 24 h. After completion, the mixture was cooled to room temperature and quenched with water (50 mL).

The mixture was extracted with CH_2Cl_2 (50 mL × 3). The combined organic layer was dried over Na_2SO_4 and concentrated in vacuo. The crude product was purified by flash column chromatography (EtOAc: Petroleum ether = 1: 10) on silica gel to afford **1m**.

Procedure for the synthesis of substrate 1n.



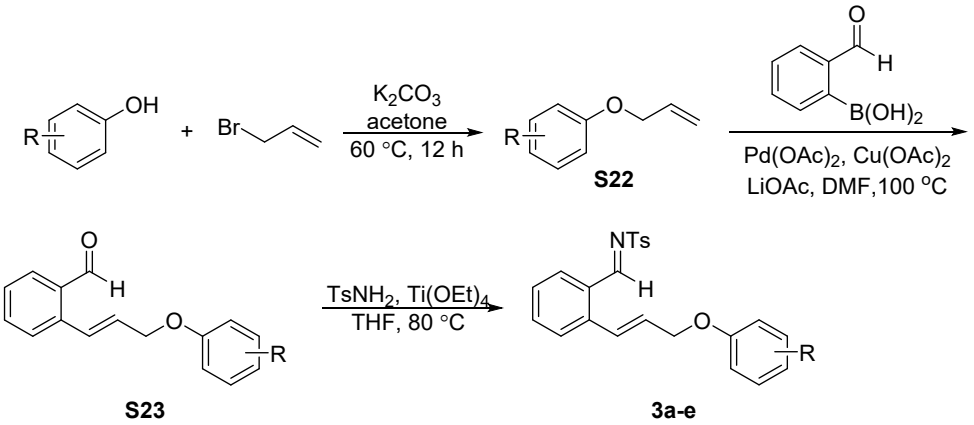
The mixture of ethyltriphenylphosphonium bromide (5.569 g, 15 mmol), *t*-BuOK (1.683 g, 15 mmol), THF (50 mL) was added to a 100 mL flask under nitrogen atmosphere and stirred at 0 °C for 30 minutes. Then the reaction mixture was warmed to room temperature and stirred for 1.5 hours. Subsequently, 1-(2-bromophenyl)ethan-1-one **S18** (5 mmol) was added dropwise to the reaction mixture and stirred for additional 6 hours. Then the reaction was quenched by water (50 mL) and THF was removed under reduced pressure. The residue was filtered and extracted with Ethyl acetate (50 mL × 3). The combined organic layer was washed with brine (50 mL × 2) and dried over anhydrous Na_2SO_4. After the solvent was removed under reduced pressure, the crude product was purified by flash column chromatography on silica gel and eluted with petroleum ether to afford **S19**.

To a solution of **S19** (4 mmol) in chloroform (20 mL) was added bis(acetonitrile)-dichloropalladium (0.041 g, 0.16 mmol). The solution was stirred at 50 °C for 3 days. The reaction mixture was passed through a plug of silica gel (Et_2O as eluent) and concentrated to give **S20**.

n-BuLi (1.6 M solution in hexanes, 4.4 mmol) was added slowly to a solution of **S20** (4 mmol) in THF (20 mL) at -78 °C, then stirred for 30 min at this temperature. DMF (4.8 mmol) was then added dropwise to the mixture and stirred for a further 5 h. Saturated aqueous NH_4Cl (25 mL) was added and the mixture was extracted with Et_2O (30 mL × 3). The combined organic phase was washed with saturated aqueous NaCl and dried over $MgSO_4$, then concentrated in vacuo. The crude residue was purified by silica chromatography (EtOAc: Petroleum ether = 1: 25) to give the aldehydes **S21**.

A 50 mL vial equipped with a stirrer was charged with aldehyde **S21** (5 mmol), sulfonamide (6 mmol), dry THF (20 mL), and $Ti(OEt)_4$ (5 mL). The vial was closed and heated at 80 °C for 24 h. After completion, the mixture was cooled to room temperature and quenched with water (50 mL). The mixture was extracted with CH_2Cl_2 (50 mL × 3). The combined organic layer was dried over Na_2SO_4 and concentrated in vacuo. The crude product was purified by flash column chromatography (EtOAc: Petroleum ether = 1: 10) on silica gel to afford **1n**.

General procedure for the synthesis of substrate 3a-e.

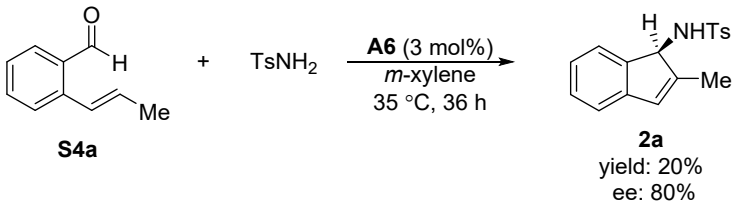


Potassium carbonate (20 mmol) was added to the solution of phenols (10 mmol) and allyl bromide (20 mmol) in acetone. The solution was stirred at 60 °C for 12 h. After reaction completion volatiles evaporated and the crude was partitioned between water and ethyl acetate (80 mL × 3). The combined organic layer was dried over Na_2SO_4 and concentrated in vacuo. The crude product was purified by flash column chromatography (Petroleum ether) on silica gel to afford **S22**.

Under N_2 gas, to the solution of 2-formylphenylboronic acid (12 mmol), $Pd(OAc)_2$ (1 mmol), $Cu(OAc)_2$ (20 mmol) and LiOAc (30 mmol) in DMF (30 mL) was added **S22** (10 mmol). The mixture was heated to 100 °C and stirred for a further 12 h. The mixture was cooled to room temperature. Et_2O (80 mL) and water (80 mL) were added. The aqueous phase was extracted with Et_2O (50 mL × 3). The combined organic layer was washed with water (80 mL), dried over Na_2SO_4 and concentrated in vacuo. The crude product was purified by flash column chromatography (EtOAc: Petroleum ether = 1: 10) on silica gel to afford **S23**.

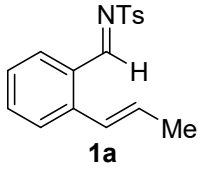
A 50 mL vial equipped with a stirrer was charged with aldehyde **S23** (5 mmol), sulfonamide (6 mmol), dry THF (20 mL), and $Ti(OEt)_4$ (5 mL). The vial was closed and heated at 80 °C for 24 h. After completion, the mixture was cooled to room temperature and quenched with water (50 mL). The mixture was extracted with CH_2Cl_2 (50 mL × 3). The combined organic layer was dried over Na_2SO_4 and concentrated in vacuo. The crude product was purified by flash column chromatography (EtOAc: Petroleum ether = 1: 10) on silica gel to afford **3a-e**.

3. In situ imine formation/cyclisation



4. Characterizations for the substrates 1 and 3.

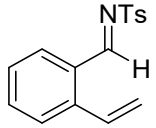
4-methyl-N-((E)-2-((E)-prop-1-en-1-yl)benzylidene)benzenesulfonamide (**1a**)



^{1}**H NMR** (500 MHz, $CDCl_3$) δ 9.39 (s, 1H), 8.05 (dd, *J* = 7.9, 0.8 Hz, 1H), 7.89 (d, *J* = 8.3 Hz, 2H), 7.55 – 7.48 (m, 1H), 7.44 (d, *J* = 7.5 Hz, 1H), 7.35 (d, *J* = 8.2 Hz, 2H), 7.31 – 7.24 (m, 1H), 6.89 (dd, *J* = 15.5, 1.5 Hz, 1H), 6.08 (dq, *J* = 15.4, 6.7 Hz, 1H), 2.44 (s, 3H), 1.96 (dd, *J* = 6.7, 1.7 Hz, 3H). ^{13}**C NMR** (126

MHz, $CDCl_3$) δ 168.61, 144.61, 142.90, 135.39, 134.61, 133.66, 129.89, 129.46, 128.83, 128.12, 127.81, 127.29, 126.60, 21.77, 19.17. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{17}H_{18}NO_2S$: 300.1058, found: 300.1056.

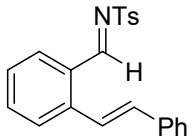
(E)-4-methyl-N-(2-vinylbenzylidene)benzenesulfonamide (**1b**)



1b

^{1}**H NMR** (400 MHz, $CDCl_3$) δ 9.41 (s, 1H), 8.07 (dd, *J* = 7.9, 1.3 Hz, 1H), 7.92 – 7.86 (m, 2H), 7.54 (ddd, *J* = 9.6, 7.3, 1.3 Hz, 2H), 7.39 – 7.32 (m, 3H), 7.31 – 7.22 (m, 1H), 5.63 (dd, *J* = 17.3, 1.0 Hz, 1H), 5.56 (dd, *J* = 11.0, 1.0 Hz, 1H), 2.44 (s, 3H). ^{13}**C NMR** (101 MHz, $CDCl_3$) δ 168.53, 144.70, 142.52, 135.42, 134.66, 132.94, 129.95, 129.36, 128.21, 127.82, 121.07, 21.81. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{16}H_{16}NO_2S$: 286.0902, found: 286.0901.

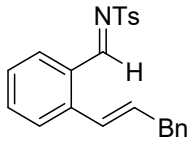
4-methyl-N-((E)-2-((E)-styryl)benzylidene)benzenesulfonamide (**1c**)



1c

^{1}**H NMR** (500 MHz, $CDCl_3$) δ 9.38 (s, 1H), 8.04 (dd, *J* = 7.9, 1.1 Hz, 1H), 7.90 (d, *J* = 8.3 Hz, 2H), 7.68 (d, *J* = 10.1 Hz, 1H), 7.65 (s, 1H), 7.58 (dt, *J* = 7.9, 1.2 Hz, 1H), 7.50 (d, *J* = 7.3 Hz, 2H), 7.41 – 7.38 (m, 2H), 7.37 – 7.35 (m, 1H), 7.34 – 7.32 (m, 3H), 6.93 (d, *J* = 16.1 Hz, 1H), 2.42 (s, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 168.48, 144.71, 141.89, 136.60, 135.21, 135.16, 134.56, 130.96, 129.93, 129.36, 128.92, 128.71, 128.21, 127.88, 127.70, 127.10, 124.21, 21.77. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{22}H_{20}NO_2S$: 362.1215, found: 362.1211.

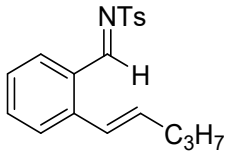
4-methyl-N-((E)-2-((E)-3-phenylprop-1-en-1-yl)benzylidene)benzenesulfonamide (**1d**)



1d

^{1}**H NMR** (400 MHz, $CDCl_3$) δ 9.39 (s, 1H), 8.05 – 8.00 (m, 1H), 7.86 (d, *J* = 8.3 Hz, 2H), 7.52 – 7.45 (m, 2H), 7.39 – 7.28 (m, 5H), 7.28 – 7.22 (m, 3H), 6.98 (d, *J* = 15.5 Hz, 1H), 6.19 (dt, *J* = 15.5, 6.9 Hz, 1H), 3.62 (d, *J* = 6.9 Hz, 2H), 2.42 (s, 3H). ^{13}**C NMR** (101 MHz, $CDCl_3$) δ 168.70, 144.61, 142.33, 139.36, 136.83, 135.41, 134.54, 130.00, 129.90, 129.12, 128.80, 128.79, 128.14, 127.97, 127.60, 126.78, 126.58, 39.80, 21.77. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{23}H_{22}NO_2S$: 376.1371, found: 376.1364.

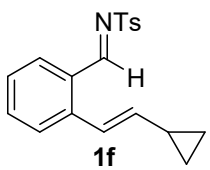
4-methyl-N-((E)-2-((E)-pent-1-en-1-yl)benzylidene)benzenesulfonamide (**1e**)



1e

^{1}**H NMR** (500 MHz, $CDCl_3$) δ 9.38 (s, 1H), 8.04 (dd, *J* = 7.9, 0.9 Hz, 1H), 7.89 (d, *J* = 8.3 Hz, 2H), 7.54 – 7.48 (m, 1H), 7.45 (d, *J* = 7.6 Hz, 1H), 7.34 (d, *J* = 8.1 Hz, 2H), 7.31 – 7.24 (m, 1H), 6.87 (d, *J* = 15.6 Hz, 1H), 6.05 (dt, *J* = 15.5, 7.0 Hz, 1H), 2.44 (s, 3H), 2.29 – 2.20 (m, 2H), 1.59 – 1.46 (m, 2H), 0.99 (t, *J* = 7.4 Hz, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 168.69, 144.59, 142.95, 139.01, 135.41, 134.53, 129.88, 129.62, 128.95, 128.13, 127.91, 127.28, 125.54, 35.59, 22.41, 21.76, 13.87. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{19}H_{22}NO_2S$: 328.1371, found: 328.1371.

N-((E)-2-((E)-2-cyclopropylvinyl)benzylidene)-4-methylbenzenesulfonamide (**1f**)

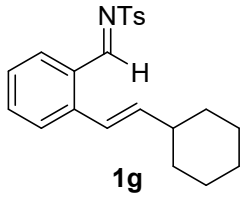


1f

^{1}**H NMR** (400 MHz, $CDCl_3$) δ 9.42 (s, 1H), 8.02 (dd, *J* = 7.9, 1.1 Hz, 1H), 7.89 (d, *J* = 8.3 Hz, 2H), 7.52 – 7.45 (m, 1H), 7.41 (d, *J* = 7.3 Hz, 1H), 7.34 (d, *J* = 8.1 Hz, 2H), 7.26 – 7.20 (m, 1H), 6.97 (d, *J* = 15.5 Hz, 1H), 5.54 (dd, *J* =

15.5, 9.3 Hz, 1H), 2.43 (s, 3H), 1.67 (qt, *J* = 9.1, 4.7 Hz, 1H), 0.95 – 0.86 (m, 2H), 0.61 – 0.53 (m, 2H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 168.71, 144.56, 143.08, 142.75, 135.52, 134.54, 129.88, 129.63, 128.59, 128.08, 127.44, 127.01, 122.59, 21.76, 15.41, 7.98. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{19}H_{20}NO_2S$: 326.1215, found: 326.1211.

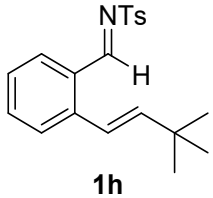
N-((E)-2-((E)-2-cyclohexylvinyl)benzylidene)-4-methylbenzenesulfonamide (**1g**)



1g

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.36 (s, 1H), 8.07 – 7.97 (m, 1H), 7.89 (d, *J* = 8.3 Hz, 2H), 7.53 – 7.47 (m, 1H), 7.44 (d, *J* = 7.2 Hz, 1H), 7.34 (d, *J* = 8.2 Hz, 2H), 7.27 – 7.26 (m, 1H), 6.81 (d, *J* = 15.7 Hz, 1H), 5.97 (dd, *J* = 15.7, 7.0 Hz, 1H), 2.44 (s, 3H), 2.26 – 2.14 (m, 1H), 1.90 – 1.75 (m, 4H), 1.75 – 1.67 (m, 1H), 1.42 – 1.28 (m, 2H), 1.28 – 1.11 (m, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 168.75, 144.90, 144.58, 143.16, 135.41, 134.44, 129.87, 129.77, 129.05, 128.16, 127.95, 127.22, 123.03, 41.72, 32.77, 26.14, 21.76. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{22}H_{26}NO_2S$: 368.1684, found: 368.1682.

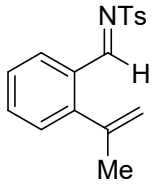
N-((E)-2-((E)-3,3-dimethylbut-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**1h**)



1h

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.30 (s, 1H), 8.02 (dd, *J* = 7.9, 1.2 Hz, 1H), 7.89 (d, *J* = 8.3 Hz, 2H), 7.51 (dt, *J* = 7.8, 1.3 Hz, 1H), 7.47 – 7.41 (m, 1H), 7.35 (d, *J* = 8.0 Hz, 2H), 7.29 (t, *J* = 7.5 Hz, 1H), 6.75 (d, *J* = 15.9 Hz, 1H), 6.01 (d, *J* = 15.9 Hz, 1H), 2.44 (s, 3H), 1.14 (s, 9H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 168.82, 150.10, 144.61, 143.29, 135.30, 134.37, 130.09, 129.90, 129.21, 128.22, 128.18, 127.23, 120.74, 34.32, 29.47, 21.76. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{20}H_{24}NO_2S$: 342.1528, found: 342.1524.

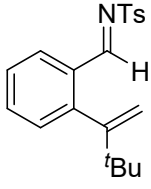
(E)-4-methyl-N-(2-(prop-1-en-2-yl)benzylidene)benzenesulfonamide (**1i**)



1i

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.27 (s, 1H), 8.12 (d, *J* = 7.9 Hz, 1H), 7.87 (d, *J* = 7.7 Hz, 2H), 7.53 (t, *J* = 7.4 Hz, 1H), 7.34 (d, *J* = 7.5 Hz, 4H), 5.43 (s, 1H), 4.78 (s, 1H), 2.42 (s, 3H), 2.13 (s, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 169.66, 148.94, 144.57, 141.89, 135.39, 134.14, 129.87, 129.53, 128.89, 128.26, 128.07, 127.65, 120.13, 24.93, 21.73. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{17}H_{18}NO_2S$: 300.1058, found: 300.1052.

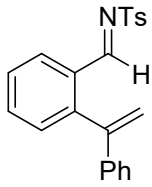
(E)-N-(2-(3,3-dimethylbut-1-en-2-yl)benzylidene)-4-methylbenzenesulfonamide (**1j**)



1j

^{1}H NMR (500 MHz, $CDCl_3$) δ 9.11 (s, 1H), 8.18 (dd, *J* = 8.0, 1.2 Hz, 1H), 7.84 (d, *J* = 8.3 Hz, 2H), 7.51 (dt, *J* = 7.6, 1.4 Hz, 1H), 7.36 – 7.33 (m, 3H), 7.21 (dd, *J* = 7.7, 0.7 Hz, 1H), 5.44 (d, *J* = 1.0 Hz, 1H), 4.81 (d, *J* = 0.9 Hz, 1H), 2.44 (s, 3H), 1.06 (s, 9H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 170.05, 154.50, 148.04, 144.63, 134.97, 133.44, 130.60, 130.52, 129.92, 128.31, 128.20, 127.45, 115.76, 36.65, 29.60, 21.75. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{20}H_{23}NNaO_2S$: 364.1347, found: 364.1344.

(E)-4-methyl-N-(2-(1-phenylvinyl)benzylidene)benzenesulfonamide (**1k**)

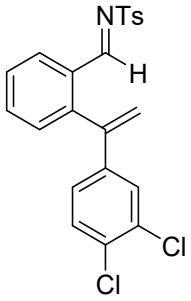


1k

^{1}H NMR (500 MHz, DMSO) δ 8.75 (s, 1H), 7.93 (d, *J* = 7.9 Hz, 1H), 7.55 (t, *J* = 7.6 Hz, 1H), 7.39 – 7.35 (m, 3H), 7.26 – 7.15 (m, 6H), 7.03 (d, *J* = 7.4 Hz, 2H), 5.87

(s, 1H), 5.10 (s, 1H), 2.21 (s, 3H). **^{13}C NMR** (126 MHz, DMSO) δ 168.77, 146.30, 145.38, 144.53, 140.21, 134.86, 133.93, 130.71, 129.94, 129.77, 128.71, 128.59, 128.26, 128.03, 127.56, 126.55, 118.56, 21.01. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{22}H_{20}NO_2S$: 362.1215, found: 362.1213.

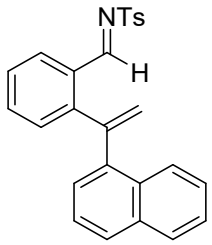
(E)-N-(2-(1-(3,4-dichlorophenyl)vinyl)benzylidene)-4-methylbenzenesulfonamide (**1l**)



1l

^{1}H NMR (500 MHz, $CDCl_3$) δ 8.97 (s, 1H), 8.17 (d, *J* = 7.8 Hz, 1H), 7.63 – 7.60 (m, 3H), 7.47 (t, *J* = 7.6 Hz, 1H), 7.36 (d, *J* = 8.4 Hz, 1H), 7.33 (d, *J* = 7.6 Hz, 1H), 7.29 (d, *J* = 8.1 Hz, 2H), 7.23 (d, *J* = 2.1 Hz, 1H), 7.05 (dd, *J* = 8.4, 2.1 Hz, 1H), 5.96 (s, 1H), 5.31 (s, 1H), 2.43 (s, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 168.99, 145.27, 144.75, 144.25, 140.76, 134.71, 134.63, 133.05, 132.52, 130.88, 130.76, 130.69, 129.93, 129.47, 128.93, 128.79, 128.07, 126.28, 119.94, 21.82. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{22}H_{18}Cl_2NO_2S$: 430.0435, found: 430.0428.

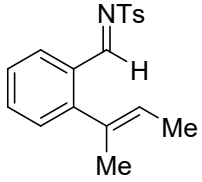
(E)-4-methyl-N-(2-(1-(naphthalen-1-yl)vinyl)benzylidene)benzenesulfonamide (**1m**)



1m

^{1}H NMR (500 MHz, $CDCl_3$) δ 9.40 (s, 1H), 7.93 (s, 1H), 7.92 – 7.86 (m, 3H), 7.79 (d, *J* = 8.4 Hz, 1H), 7.52 – 7.46 (m, 2H), 7.43 – 7.40 (m, 1H), 7.39 – 7.32 (m, 4H), 7.23 – 7.14 (m, 2H), 6.94 – 6.93 (m, 1H), 6.16 (d, *J* = 2.0 Hz, 1H), 5.20 (d, *J* = 9.5 Hz, 1H), 4.89 (d, *J* = 9.5 Hz, 1H), 2.44 (s, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 169.08, 145.45, 143.88, 143.68, 143.55, 138.06, 133.76, 133.38, 132.37, 131.43, 130.06, 128.71, 128.54, 128.48, 127.38, 126.61, 126.41, 126.17, 126.15, 125.89, 125.48, 124.06, 121.52, 21.71. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{26}H_{22}NO_2S$: 412.1371, found: 412.1372.

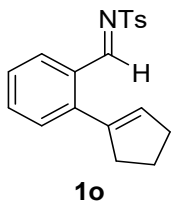
N-((E)-2-((E)-but-2-en-2-yl)benzylidene)-4-methylbenzenesulfonamide (**1n**)



1n

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.05 (s, 1H), 8.14 (t, *J* = 11.5 Hz, 1H), 7.87 (d, *J* = 7.6 Hz, 2H), 7.57 (t, *J* = 7.5 Hz, 1H), 7.35– 7.32 (m, 3H), 7.21 (d, *J* = 7.7 Hz, 1H), 5.78 (q, *J* = 6.7 Hz, 1H), 2.44 (s, 3H), 2.02 (s, 3H), 1.30 (d, *J* = 6.8 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 169.60, 147.85, 144.59, 135.41, 134.84, 133.49, 129.89, 129.52, 129.23, 128.41, 128.17, 127.48, 125.97, 26.61, 21.77, 14.96. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{18}H_{20}NO_2S$: 314.1215, found: 314.1210.

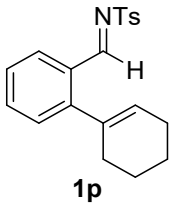
(E)-N-(2-(cyclopent-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**1o**)



1o

^{1}H NMR (500 MHz, $CDCl_3$) δ 9.20 (s, 1H), 8.09 (dd, *J* = 7.9, 1.0 Hz, 1H), 7.87 (d, *J* = 8.3 Hz, 2H), 7.53 (dt, *J* = 7.7, 1.4 Hz, 1H), 7.35 (d, *J* = 8.0 Hz, 3H), 7.31 (t, *J* = 7.6 Hz, 1H), 5.60 – 5.51 (m, 1H), 2.72 (tt, *J* = 9.8, 2.1 Hz, 2H), 2.62 – 2.55 (m, 2H), 2.44 (s, 3H), 2.11 – 2.01 (m, 2H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 169.69, 144.59, 143.63, 140.27, 136.26, 135.17, 134.04, 130.05, 129.90, 129.00, 128.19, 128.04, 127.30, 36.79, 34.27, 23.85, 21.76. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{19}H_{20}NO_2S$: 326.1215 found: 326.1211.

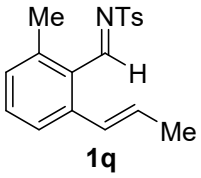
(E)-4-methyl-N-((2',3',4',5'-tetrahydro-[1,1'-biphenyl]-2-yl)methylene)benzenesulfonamide (**1p**)



1p

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.07 (s, 1H), 8.09 (d, *J* = 8.2 Hz, 1H), 7.86 (d, *J* = 8.3 Hz, 2H), 7.51 (dt, *J* = 7.6, 1.4 Hz, 1H), 7.35 (d, *J* = 8.0 Hz, 2H), 7.30 (t, *J* = 8.1 Hz, 2H), 5.51 – 5.39 (m, 1H), 2.44 (s, 3H), 2.30 – 2.23 (m, 2H), 2.23 – 2.15 (m, 2H), 1.82 – 1.72 (m, 2H), 1.72 – 1.64 (m, 2H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 169.67, 149.90, 144.58, 135.43, 135.01, 134.04, 132.37, 129.90, 129.77, 128.84, 128.45, 128.29, 127.17, 30.75, 25.75, 22.82, 21.80, 21.75. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{20}H_{22}NO_2S$: 340.1371, found: 340.1367.

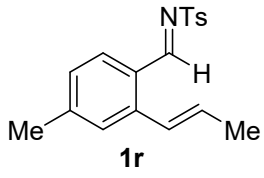
4-methyl-N-((E)-2-methyl-6-((E)-prop-1-en-1-yl)benzylidene)benzenesulfonamide (**1q**)



1q

^{1}H NMR (500 MHz, $CDCl_3$) δ 9.40 (s, 1H), 7.89 (d, *J* = 8.2 Hz, 2H), 7.36 – 7.33 (m, 3H), 7.25 (d, *J* = 8.6 Hz, 1H), 7.12 (d, *J* = 7.5 Hz, 1H), 6.78 (d, *J* = 15.5 Hz, 1H), 5.92 (dq, *J* = 13.3, 6.6 Hz, 1H), 2.53 (s, 3H), 2.44 (s, 3H), 1.89 (dd, *J* = 6.6, 1.2 Hz, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 170.08, 144.53, 143.35, 141.54, 135.73, 133.12, 132.81, 130.47, 129.88, 128.74, 128.07, 127.71, 126.24, 22.25, 21.77, 19.06. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{18}H_{20}NO_2S$: 314.1215, found: 314.1215.

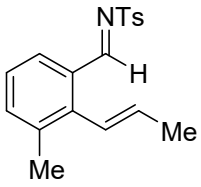
4-methyl-N-((E)-4-methyl-2-((E)-prop-1-en-1-yl)benzylidene)benzenesulfonamide (**1r**)



1r

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.35 (s, 1H), 7.96 (d, *J* = 8.1 Hz, 1H), 7.90 – 7.86 (m, 2H), 7.34 (dd, *J* = 8.6, 0.6 Hz, 2H), 7.26 – 7.24 (m, 1H), 7.09 (d, *J* = 8.1 Hz, 1H), 6.88 (dd, *J* = 15.5, 1.7 Hz, 1H), 6.08 (dq, *J* = 15.5, 6.7 Hz, 1H), 2.43 (s, 3H), 2.39 (s, 3H), 1.95 (dd, *J* = 6.7, 1.8 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 168.47, 145.86, 144.43, 143.03, 135.79, 133.27, 129.87, 129.73, 128.43, 128.36, 128.10, 126.75, 126.51, 22.08, 21.78, 19.15. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{18}H_{20}NO_2S$: 314.1215, found: 314.1211.

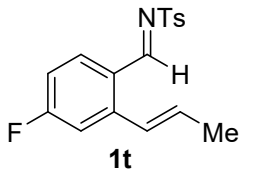
4-methyl-N-((E)-3-methyl-2-((E)-prop-1-en-1-yl)benzylidene)benzenesulfonamide (**1s**)



1s

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.22 (s, 1H), 7.97 – 7.92 (m, 1H), 7.90 – 7.83 (m, 2H), 7.38 – 7.31 (m, 3H), 7.22 (dd, *J* = 14.9, 7.2 Hz, 1H), 6.53 (dd, *J* = 15.7, 1.6 Hz, 1H), 5.48 (dq, *J* = 15.7, 6.5 Hz, 1H), 2.44 (s, 3H), 2.30 (s, 3H), 1.98 (dd, *J* = 6.5, 1.8 Hz, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 170.72, 144.48, 143.35, 137.22, 137.15, 135.48, 135.41, 130.60, 129.87, 128.14, 127.06, 126.83, 126.14, 21.74, 20.09, 19.17. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{18}H_{20}NO_2S$: 314.1215, found: 314.1210.

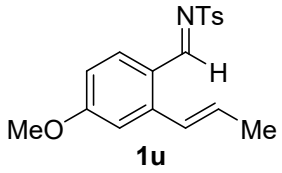
N-((E)-4-fluoro-2-((E)-prop-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**1t**)



1t

^{1}H NMR (400 MHz, $CDCl_3$) δ 9.32 (s, 1H), 8.07 (dd, *J* = 8.8, 6.1 Hz, 1H), 7.88 (d, *J* = 8.1 Hz, 2H), 7.34 (d, *J* = 8.1 Hz, 2H), 7.12 (dd, *J* = 9.9, 2.4 Hz, 1H), 7.00 – 6.92 (m, 1H), 6.87 (d, *J* = 15.5 Hz, 1H), 6.14 (dq, *J* = 13.4, 6.7 Hz, 1H), 2.42 (s, 3H), 1.96 (d, *J* = 6.7 Hz, 3H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 167.02, 166.62 (d, *J* = 257.1 Hz), 145.70 (d, *J* = 9.5 Hz), 144.64, 135.35, 134.65, 132.46 (d, *J* = 10.0 Hz), 129.88, 128.08, 125.61 (d, *J* = 2.0 Hz), 125.24 (d, *J* = 2.5 Hz), 115.07 (d, *J* = 22.4 Hz), 114.11 (d, *J* = 22.3 Hz), 21.73, 19.08. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{17}H_{17}FNO_2S$: 318.0964, found: 318.0962.

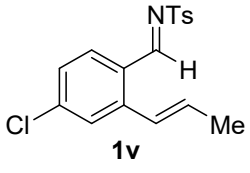
N-((E)-4-methoxy-2-((E)-prop-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**1u**)



1u

^{1}**H NMR** (400 MHz, $CDCl_3$) δ 9.28 (s, 1H), 8.04 (d, *J* = 8.9 Hz, 1H), 7.90 – 7.83 (m, 2H), 7.32 (dd, *J* = 8.5, 0.6 Hz, 2H), 6.93 – 6.86 (m, 2H), 6.80 (dd, *J* = 8.8, 2.5 Hz, 1H), 6.11 (dq, *J* = 15.5, 6.7 Hz, 1H), 3.86 (s, 3H), 2.42 (s, 3H), 1.95 (dd, *J* = 6.7, 1.7 Hz, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 167.55, 164.89, 145.50, 144.21, 136.05, 133.44, 132.12, 129.77, 127.90, 126.62, 122.08, 114.02, 111.96, 55.66, 21.71, 19.05. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{18}H_{20}NO_3S$: 330.1164, found: 330.1161.

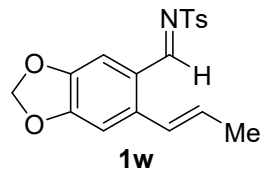
N-((E)-4-chloro-2-((E)-prop-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**1v**)



1v

^{1}**H NMR** (500 MHz, $CDCl_3$) δ 9.32 (s, 1H), 7.98 (d, *J* = 8.5 Hz, 1H), 7.88 (d, *J* = 8.3 Hz, 2H), 7.43 (d, *J* = 2.0 Hz, 1H), 7.35 (d, *J* = 8.0 Hz, 2H), 7.23 (dd, *J* = 8.5, 2.0 Hz, 1H), 6.84 (dd, *J* = 15.5, 1.6 Hz, 1H), 6.14 (dq, *J* = 15.4, 6.7 Hz, 1H), 2.43 (s, 3H), 1.96 (dd, *J* = 6.7, 1.7 Hz, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 167.26, 144.77, 144.17, 141.08, 135.23, 134.85, 130.88, 129.94, 128.17, 127.69, 127.65, 127.27, 125.48, 21.78, 19.15. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{17}H_{17}ClNO_2S$: 334.0669, found: 334.0665.

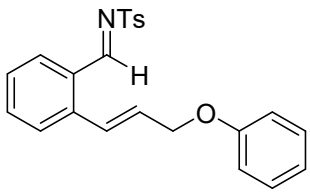
4-methyl-N-((E)-(6-((E)-prop-1-en-1-yl)benzo[d][1,3]dioxol-5-yl)methylene)benzenesulfonamide (**1w**)



1w

^{1}**H NMR** (400 MHz, $CDCl_3$) δ 9.29 (s, 1H), 7.87 (d, *J* = 8.2 Hz, 2H), 7.51 (s, 1H), 7.33 (d, *J* = 8.1 Hz, 2H), 6.81 (d, *J* = 15.4 Hz, 1H), 6.10 – 5.95 (m, 3H), 2.43 (s, 3H), 1.94 (dd, *J* = 6.6, 0.9 Hz, 3H). ^{13}**C NMR** (101 MHz, $CDCl_3$) δ 166.98, 153.79, 147.57, 144.33, 141.14, 135.95, 132.98, 129.83, 127.97, 126.00, 123.43, 107.19, 106.94, 102.25, 21.77, 19.06. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{18}H_{18}NO_4S$: 344.0957, found: 344.0954.

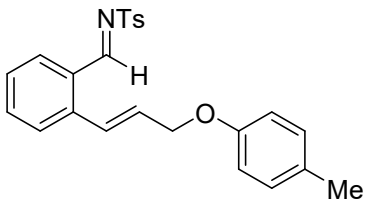
4-methyl-N-((E)-2-((E)-3-phenoxyprop-1-en-1-yl)benzylidene)benzenesulfonamide (**3a**)



3a

^{1}**H NMR** (500 MHz, $CDCl_3$) δ 9.37 (s, 1H), 8.04 (d, *J* = 7.7 Hz, 1H), 7.88 (d, *J* = 8.3 Hz, 2H), 7.59 – 7.49 (m, 2H), 7.41 – 7.28 (m, 6H), 7.03 – 6.95 (m, 3H), 6.27 (dt, *J* = 15.8, 5.4 Hz, 1H), 4.76 (dd, *J* = 5.4, 1.5 Hz, 2H), 2.42 (s, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 168.41, 158.44, 144.71, 141.25, 135.27, 134.62, 131.76, 130.31, 129.93, 129.72, 129.40, 128.25, 128.21, 128.18, 128.11, 121.27, 114.87, 68.13, 21.76. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{23}H_{22}NO_3S$: 392.1320, found: 392.1321.

4-methyl-N-((E)-2-((E)-3-(p-tolyloxy)prop-1-en-1-yl)benzylidene)benzenesulfonamide (**3b**)

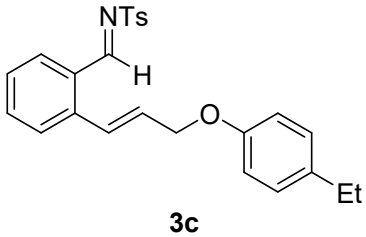


3b

^{1}**H NMR** (500 MHz, $CDCl_3$) δ 9.29 (s, 1H), 7.97 (d, *J* = 7.8 Hz, 1H), 7.81 (d, *J* = 8.2 Hz, 2H), 7.46 (q, *J* = 7.9 Hz, 2H), 7.33 – 7.15 (m, 5H), 7.05 (d, *J* = 8.4 Hz, 2H), 6.80 (d, *J* = 8.5 Hz, 2H), 6.18 (dt, *J* = 15.8, 5.4 Hz, 1H), 4.65 (dd, *J* = 5.3, 1.2 Hz, 2H), 2.34 (s, 3H), 2.23 (s, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ

168.45, 156.34, 144.71, 141.33, 135.30, 134.62, 132.02, 130.53, 130.28, 130.16, 129.94, 129.83, 129.41, 128.20, 128.12, 126.58, 114.76, 68.33, 21.78, 20.64. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{24}H_{24}NO_3S$: 406.1477, found: 406.1473.

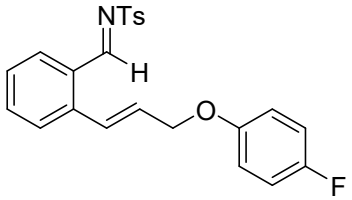
N-((E)-2-((E)-3-(4-ethylphenoxy)prop-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**3c**)



3c

^{1}**H NMR** (500 MHz, $CDCl_3$) δ 9.37 (s, 1H), 8.04 (d, *J* = 7.7 Hz, 1H), 7.88 (d, *J* = 8.3 Hz, 2H), 7.59 – 7.50 (m, 2H), 7.39 – 7.27 (m, 4H), 7.15 (d, *J* = 8.6 Hz, 2H), 6.97 – 6.84 (m, 2H), 6.26 (dt, *J* = 15.8, 5.4 Hz, 1H), 4.73 (dd, *J* = 5.4, 1.6 Hz, 2H), 2.61 (q, *J* = 7.6 Hz, 2H), 2.42 (s, 3H), 1.23 (t, *J* = 7.6 Hz, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 168.46, 156.52, 144.71, 141.34, 137.06, 135.30, 134.62, 132.05, 130.29, 129.94, 129.41, 128.98, 128.20, 128.12, 114.77, 68.34, 28.12, 21.77, 15.99. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{25}H_{26}NO_3S$: 420.1633, found: 420.1633.

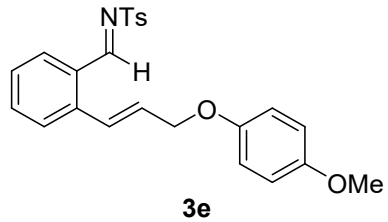
N-((E)-2-((E)-3-(4-fluorophenoxy)prop-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**3d**)



3d

^{1}**H NMR** (500 MHz, $CDCl_3$) δ 9.36 (s, 1H), 8.04 (d, *J* = 7.7 Hz, 1H), 7.88 (d, *J* = 8.3 Hz, 2H), 7.57 –7.52 (m, 2H), 7.38 – 7.29 (m, 4H), 7.06 – 6.97 (m, 2H), 6.95 – 6.88 (m, 2H), 6.25 (dt, *J* = 15.8, 5.4 Hz, 1H), 4.72 (dd, *J* = 5.4, 1.5 Hz, 2H), 2.42 (s, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 168.42, 157.59 (d, *J* = 238.9 Hz), 154.56, 144.75, 141.16, 135.31, 134.65, 131.49, 130.43, 129.95, 129.44, 128.48, 128.29, 128.18, 128.11, 116.07 (d, *J* = 31.2 Hz), 116.01, 68.89, 21.78. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{23}H_{21}FNO_3S$: 410.1226, found: 410.1228.

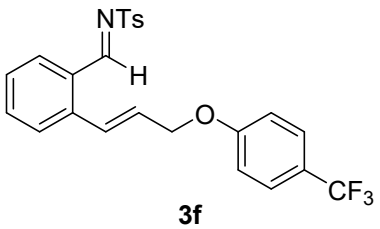
N-((E)-2-((E)-3-(4-methoxyphenoxy)prop-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**3e**)



3e

^{1}**H NMR** (500 MHz, $CDCl_3$) δ 9.36 (s, 1H), 8.06 – 8.02 (m, 1H), 7.91 – 7.85 (m, 2H), 7.57 – 7.50 (m, 2H), 7.38 – 7.31 (m, 3H), 7.28 (d, *J* = 15.8 Hz, 1H), 6.97 – 6.83 (m, 4H), 6.25 (dt, *J* = 15.8, 5.4 Hz, 1H), 4.70 (dd, *J* = 5.4, 1.7 Hz, 2H), 3.79 (s, 3H), 2.42 (s, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 168.32, 154.17, 152.51, 144.59, 141.24, 135.26, 134.50, 131.99, 130.18, 129.83, 129.35, 128.09, 128.02, 115.87, 114.79, 68.88, 55.75, 21.66. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{24}H_{24}NO_4S$: 422.1426, found: 422.1421.

4-methyl-N-((E)-2-((E)-3-(4-(trifluoromethyl)phenoxy)prop-1-en-1-yl)benzylidene)benzenesulfonamide (**3f**)



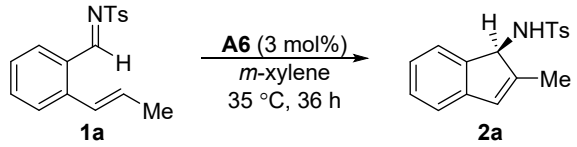
3f

^{1}**H NMR** (500 MHz, $CDCl_3$) δ 9.37 (s, 1H), 8.04 (d, *J* = 7.8 Hz, 1H), 7.88 (d, *J* = 8.1 Hz, 2H), 7.63 – 7.50 (m, 4H), 7.41 – 7.28 (m, 4H), 7.04 (d, *J* = 8.5 Hz, 2H), 6.26 (dt, *J* = 15.8, 5.4 Hz, 1H), 4.80 (d, *J* = 4.7 Hz, 2H), 2.42 (s, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 168.44, 160.87, 144.81, 140.92, 135.30,

134.67, 130.66, 129.96, 129.47, 129.09, 128.43, 128.17, 128.14, 127.18 (q, J = 3.5 Hz), 126.68 (q, J = 271.2 Hz), 123.40 (q, J = 32.3 Hz), 114.89, 68.37, 21.77. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{24}H_{21}F_3NO_3S$: 460.1194, found: 460.1194.

5. General procedure for the synthesis of 2 and 4.

Synthesis of 2a is described as a typical procedure.

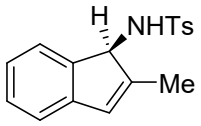


1a **2a**

To a flame-dried and Ar-purged Schlenk tube (10 mL) were added **1a** (0.1 mmol, 29.9 mg), **A6** (0.003 mmol, 2.6 mg), m-xylene (1 mL) and a stirring bar. The Schlenk tube was then evacuated and filled with argon. The mixture was stirred at 35 °C for 36 h. The solution was concentrated and the residue was purified by flash column chromatography (petroleum ether/EtOAc = 4 : 1) on silica gel to afford the **2a**.

6. Characterizations for the products 2 and 4.

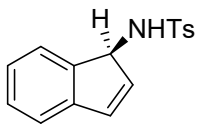
(S)-4-methyl-N-(2-methyl-1H-inden-1-yl)benzenesulfonamide (**2a**)



2a

Yield: 91%, 27.2 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.86 (d, J = 8.2 Hz, 2H), 7.36 (d, J = 8.1 Hz, 2H), 7.15 (t, J = 7.4 Hz, 1H), 7.06 (d, J = 7.4 Hz, 1H), 6.95 (t, J = 7.4 Hz, 1H), 6.75 (d, J = 7.4 Hz, 1H), 6.31 (s, 1H), 4.68 (d, J = 9.6 Hz, 1H), 4.60 (d, J = 9.6 Hz, 1H), 2.48 (s, 3H), 1.89 (s, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 146.10, 143.72, 143.50, 143.28, 138.58, 129.94, 128.48, 127.87, 127.33, 124.99, 123.44, 120.35, 62.49, 21.71, 13.97. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{17}H_{18}NO_2S$: 300.1058, found: 300.1046. $[\alpha]^{20}_D$ = -63.9 (c = 0.72, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 92% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 7.97 min, t_R (minor) = 11.40 min. The absolute configuration was assigned tentatively by analogy.

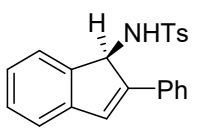
(S)-N-(1H-inden-1-yl)-4-methylbenzenesulfonamide (**2b**)



2b

Yield: 69%, 19.7 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.85 (d, J = 8.3 Hz, 2H), 7.35 (d, J = 8.0 Hz, 2H), 7.26 – 7.18 (m, 3H), 7.12 (dt, J = 7.4, 1.3 Hz, 1H), 6.67 (dd, J = 5.6, 1.3 Hz, 1H), 6.04 (dd, J = 5.6, 1.9 Hz, 1H), 4.90 (d, J = 9.6 Hz, 1H), 4.68 (d, J = 9.6 Hz, 1H), 2.47 (s, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 143.76, 143.13, 142.41, 137.92, 135.10, 133.28, 129.93, 128.53, 127.30, 126.18, 123.77, 121.57, 60.41, 21.65. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{16}H_{16}NO_2S$: 286.0902, found: 286.0894. $[\alpha]^{20}_D$ = -64.7 (c = 0.51, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 82% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 11.33 min, t_R (minor) = 12.74 min. The absolute configuration was assigned tentatively by analogy.

(R)-4-methyl-N-(2-phenyl-1H-inden-1-yl)benzenesulfonamide (**2c**)

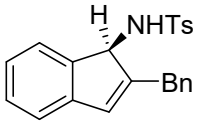


2c

Yield: 68%, 24.6 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.83 (d, J = 8.3 Hz, 2H), 7.35 (d, J = 8.0 Hz, 2H), 7.31 – 7.27 (m, 2H), 7.27 – 7.22 (m, 4H), 7.21 – 7.17

(m, 2H), 7.13 – 7.07 (m, 1H), 7.00 (d, *J* = 1.0 Hz, 1H), 5.44 (dd, *J* = 9.1, 0.7 Hz, 1H), 4.47 (d, *J* = 9.1 Hz, 1H), 2.50 (s, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 146.35, 144.28, 143.85, 142.27, 138.52, 133.36, 129.96, 128.90, 128.79, 128.69, 128.01, 127.66, 127.01, 126.42, 124.82, 121.48, 59.67, 21.76. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{22}H_{20}NO_2S$: 362.1215, found: 362.1205. **$[\alpha]^{20}_D$** = -74.0 (c = 0.45, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 83% ee; (CHIRALPAK AD-H, hexane/i-PrOH = 80/20, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 17.11 min, t_R (minor) = 18.73 min. The absolute configuration was assigned tentatively by analogy.

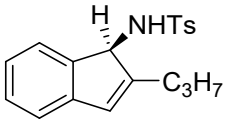
(S)-N-(2-benzyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2d**)



2d

Yield: 67%, 25.2 mg. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.85 (d, *J* = 8.3 Hz, 2H), 7.35 (d, *J* = 8.0 Hz, 2H), 7.31 – 7.26 (m, 2H), 7.25 – 7.20 (m, 1H), 7.18 – 7.11 (m, 3H), 7.06 (d, *J* = 7.4 Hz, 1H), 6.96 (dt, *J* = 7.5, 1.0 Hz, 1H), 6.79 (d, *J* = 7.4 Hz, 1H), 6.20 (d, *J* = 0.9 Hz, 1H), 4.81 (d, *J* = 9.7 Hz, 1H), 4.58 (d, *J* = 9.7 Hz, 1H), 3.68 (d, *J* = 16.6 Hz, 1H), 3.51 (d, *J* = 16.5 Hz, 1H), 2.48 (s, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 149.55, 143.83, 143.60, 142.89, 138.93, 138.50, 130.02, 129.18, 128.85, 128.59, 127.39, 126.42, 125.41, 123.70, 120.83, 61.58, 34.61, 21.75. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{23}H_{22}NO_2S$: 376.1371, found: 376.1366. **$[\alpha]^{20}_D$** = -79.7 (c = 0.48, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 93% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 8.50 min, t_R (minor) = 10.56 min. The absolute configuration was assigned tentatively by analogy.

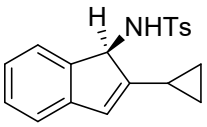
(S)-4-methyl-N-(2-propyl-1H-inden-1-yl)benzenesulfonamide (**2e**)



2e

Yield: 85%, 27.8 mg. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.88 (d, *J* = 8.3 Hz, 2H), 7.36 (d, *J* = 8.1 Hz, 2H), 7.17 (t, *J* = 7.4 Hz, 1H), 7.09 (d, *J* = 7.3 Hz, 1H), 6.96 (dt, *J* = 7.5, 0.8 Hz, 1H), 6.79 (d, *J* = 7.4 Hz, 1H), 6.33 (s, 1H), 4.75 (d, *J* = 9.7 Hz, 1H), 4.50 (d, *J* = 9.7 Hz, 1H), 2.48 (s, 3H), 2.28 – 2.07 (m, 2H), 1.54 – 1.34 (m, 2H), 0.87 (t, *J* = 7.3 Hz, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 150.57, 143.79, 143.55, 143.23, 138.64, 129.98, 128.54, 127.41, 126.96, 125.11, 123.62, 120.51, 61.42, 30.14, 21.72, 21.62, 14.06. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{19}H_{22}NO_2S$: 328.1371, found: 328.1365. **$[\alpha]^{20}_D$** = -78.3 (c = 0.44, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 91% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 6.74 min, t_R (minor) = 7.54 min. The absolute configuration was assigned tentatively by analogy.

(S)-N-(2-cyclopropyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2f**)

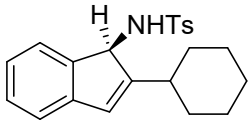


2f

Yield: 67%, 21.8 mg. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.90 (d, *J* = 8.2 Hz, 2H), 7.36 (d, *J* = 8.0 Hz, 2H), 7.16 (t, *J* = 7.4 Hz, 1H), 7.06 (d, *J* = 7.4 Hz, 1H), 6.96 (dt, *J* = 7.5, 0.9 Hz, 1H), 6.82 (d, *J* = 7.4 Hz, 1H), 6.08 (s, 1H), 4.86 (d, *J* = 9.5 Hz, 1H), 4.59 (d, *J* = 9.5 Hz, 1H), 2.47 (s, 3H), 1.46 – 1.36 (m, 1H), 0.92 – 0.78 (m, 1H), 0.76 – 0.66 (m, 1H), 0.62 – 0.47 (m, 2H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 152.99, 143.64, 143.41, 142.90, 138.52, 129.84, 128.47, 127.33, 124.92, 123.44, 122.84, 120.40, 62.19, 21.63, 9.28, 8.84, 8.32. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{19}H_{19}NNaO_2S$: 348.1034, found: 348.1027. **$[\alpha]^{20}_D$** = -63.2 (c = 0.28, acetone). **The product was analyzed by**

HPLC to determine the enantiomeric excess: 84% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 7.93 min, t_R (minor) = 8.91 min. The absolute configuration was assigned tentatively by analogy.

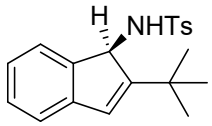
(S)-N-(2-cyclohexyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2g**)



2g

Yield: 88%, 32.3 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.88 (d, *J* = 8.3 Hz, 2H), 7.36 (d, *J* = 8.0 Hz, 2H), 7.17 (dt, *J* = 7.1, 1.4 Hz, 1H), 7.10 (d, *J* = 7.4 Hz, 1H), 7.02 – 6.93 (m, 2H), 6.30 (s, 1H), 4.84 (d, *J* = 9.8 Hz, 1H), 4.49 (d, *J* = 9.8 Hz, 1H), 2.47 (s, 3H), 2.11 (t, *J* = 11.3 Hz, 1H), 1.79 (t, *J* = 14.4 Hz, 2H), 1.65 (d, *J* = 12.3 Hz, 1H), 1.57 (dd, *J* = 12.1, 6.3 Hz, 2H), 1.40 – 1.30 (m, 1H), 1.24 (ddt, *J* = 12.8, 9.6, 3.2 Hz, 1H), 1.18 – 1.00 (m, 2H), 0.96 – 0.83 (m, 1H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 155.55, 143.67, 143.60, 143.01, 138.46, 129.88, 128.41, 127.35, 125.11, 123.83, 120.53, 60.04, 36.23, 34.23, 31.39, 26.50, 26.32, 26.22, 21.61. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{22}H_{26}NO_2S$: 368.1684, found: 368.1675. $[\alpha]^{20}_D$ = -129.4 (c = 0.63, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 91% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 6.64 min, t_R (minor) = 7.18 min. The absolute configuration was assigned tentatively by analogy.

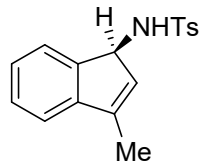
(S)-N-(2-(tert-butyl)-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2h**)



2h

Yield: 44%, 15.0 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.88 (d, *J* = 8.3 Hz, 2H), 7.37 (d, *J* = 8.0 Hz, 2H), 7.15 (t, *J* = 7.3 Hz, 1H), 7.09 (d, *J* = 7.2 Hz, 1H), 6.91 (dt, *J* = 7.5, 1.1 Hz, 1H), 6.65 (d, *J* = 7.5 Hz, 1H), 6.43 (d, *J* = 0.9 Hz, 1H), 5.12 (d, *J* = 10.3 Hz, 1H), 4.35 (d, *J* = 10.3 Hz, 1H), 2.49 (s, 3H), 1.22 (s, 9H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 157.50, 144.43, 143.86, 142.32, 138.99, 130.04, 128.43, 127.43, 126.67, 125.44, 123.69, 120.64, 60.68, 33.86, 30.26, 21.76. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{20}H_{23}NNaO_2S$: 364.1347, found: 364.1342. $[\alpha]^{20}_D$ = -42.1 (c = 0.34, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 82% ee; (CHIRALPAK AD-H, hexane/i-PrOH = 80/20, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 5.86 min, t_R (minor) = 7.36 min. The absolute configuration was assigned tentatively by analogy.

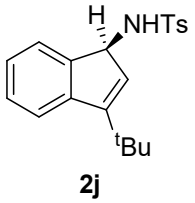
(S)-4-methyl-N-(3-methyl-1H-inden-1-yl)benzenesulfonamid (**2i**)



2i

Yield: 94%, 28.1 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.86 (d, *J* = 8.3 Hz, 2H), 7.36 (d, *J* = 8.1 Hz, 2H), 7.29 (t, *J* = 7.4 Hz, 1H), 7.23 (d, *J* = 7.0 Hz, 1H), 7.16 (dd, *J* = 13.3, 7.1 Hz, 2H), 5.76 – 5.67 (m, 1H), 4.87 (d, *J* = 9.7 Hz, 1H), 4.47 (d, *J* = 9.7 Hz, 1H), 2.48 (s, 3H), 2.02 (t, *J* = 1.7 Hz, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 144.06, 143.88, 143.78, 142.08, 138.16, 130.00, 129.64, 128.52, 127.41, 126.27, 123.67, 119.41, 59.47, 21.75, 12.96. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{17}H_{17}NNaO_2S$: 322.0878, found: 322.0870. $[\alpha]^{20}_D$ = -69.1 (c = 0.32, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 87% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 21.43 min, t_R (minor) = 20.62 min. The absolute configuration was assigned tentatively by analogy.

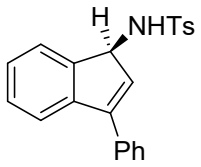
(S)-N-(3-(tert-butyl)-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2j**)



2j

Yield: 99%, 33.8 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.87 (d, *J* = 8.3 Hz, 2H), 7.46 (d, *J* = 7.7 Hz, 1H), 7.36 (d, *J* = 8.0 Hz, 2H), 7.28 – 7.20 (m, 2H), 7.13 (dt, *J* = 7.4, 3.7 Hz, 1H), 5.73 (d, *J* = 2.1 Hz, 1H), 4.80 (dd, *J* = 9.5, 1.9 Hz, 1H), 4.53 (d, *J* = 9.5 Hz, 1H), 2.47 (s, 3H), 1.26 (s, 9H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 155.02, 145.16, 143.75, 142.09, 138.14, 129.94, 128.05, 127.44, 127.18, 125.66, 124.00, 122.67, 58.80, 33.17, 29.09, 21.71. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{20}H_{23}NNaO_2S$: 364.1347, found: 364.1341. $[\alpha]^{20}_D$ = +46.0 (c = 0.57, acetone).**The product was analyzed by HPLC to determine the enantiomeric excess**: 76% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 7.97 min, t_R (minor) = 11.40 min. The absolute configuration was assigned tentatively by analogy.

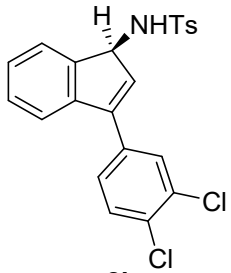
(S)-4-methyl-N-(3-phenyl-1H-inden-1-yl)benzenesulfonamide (**2k**)



2k

Yield: 93%, 33.6 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.89 (d, *J* = 8.3 Hz, 2H), 7.48 – 7.46 (m, 2H), 7.45 – 7.38 (m, 4H), 7.38 – 7.36 (m, 2H), 7.33 – 7.28 (m, 2H), 7.21 (dt, *J* = 7.4, 0.8 Hz, 1H), 6.08 (d, *J* = 2.2 Hz, 1H), 5.03 (dd, *J* = 9.6, 1.9 Hz, 1H), 4.66 (d, *J* = 9.6 Hz, 1H), 2.47 (s, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 146.26, 144.33, 143.89, 142.00, 138.06, 134.54, 131.08, 130.05, 128.79, 128.53, 128.50, 127.64, 127.42, 126.59, 124.30, 121.00, 59.56, 21.74. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{22}H_{19}NNaO_2S$: 384.1034, found: 384.1034. $[\alpha]^{20}_D$ = +56.4 (c = 0.37, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 81% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 14.91 min, t_R (minor) = 12.86 min. The absolute configuration was assigned tentatively by analogy.

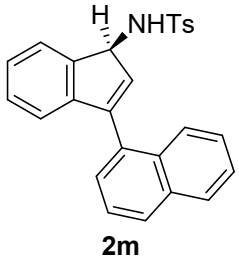
(S)-N-(3-(3,4-dichlorophenyl)-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2l**)



2l

Yield: 99%, 42.6 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.87 (d, *J* = 8.3 Hz, 2H), 7.54 (d, *J* = 2.0 Hz, 1H), 7.49 (d, *J* = 8.3 Hz, 1H), 7.37 (d, *J* = 8.0 Hz, 2H), 7.35 – 7.28 (m, 4H), 7.22 (dt, *J* = 7.0, 1.4 Hz, 1H), 6.13 (d, *J* = 2.2 Hz, 1H), 5.00 (dd, *J* = 9.5, 2.0 Hz, 1H), 4.69 (d, *J* = 9.5 Hz, 1H), 2.48 (s, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 144.08, 144.07, 144.05, 141.15, 137.90, 134.51, 133.01, 132.56, 132.50, 130.83, 130.10, 129.47, 128.72, 127.43, 126.99, 126.92, 124.47, 120.65, 59.51, 21.76. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{22}H_{17}Cl_2NNaO_2S$: 452.0255, found: 452.0256. $[\alpha]^{20}_D$ = +95.0 (c = 0.36, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 87% ee; (CHIRALPAK AD-H, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 7.97 min, t_R (minor) = 11.40 min. The absolute configuration was assigned tentatively by analogy.

(S)-4-methyl-N-(3-(naphthalen-1-yl)-1H-inden-1-yl)benzenesulfonamide (**2m**)

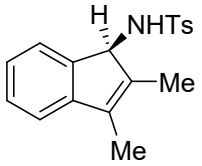


2m

Yield: 91%, 37.4 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.95 – 7.86 (m, 4H), 7.78 (d, *J* = 8.5 Hz, 1H), 7.52 – 7.49 (t, *J* = 7.6 Hz, 2H), 7.43 – 7.33 (m, 5H), 7.23 – 7.16 (m, 2H), 6.93 (dd, *J* = 5.8, 2.5 Hz, 1H), 6.16 (d, *J* = 2.0 Hz, 1H), 5.21 (d, *J* = 9.5 Hz, 1H), 4.81 (d, *J* = 9.5 Hz, 1H), 2.44 (s, 3H). ^{13}**C NMR**

(126 MHz, $CDCl_3$) δ 145.51, 143.92, 143.71, 143.56, 138.09, 133.79, 133.40, 132.39, 131.46, 130.09, 128.73, 128.58, 128.51, 127.41, 126.64, 126.43, 126.19, 126.16, 125.89, 125.50, 124.07, 121.56, 60.00, 21.73. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{26}H_{21}NNaO_2S$: 434.1191, found: 434.1182. **$[\alpha]^{20}_D$** = -3.2 (c = 0.31, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 80% ee; (CHIRALPAK AD-H, hexane/i-PrOH = 95/5, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 29.22 min, t_R (minor) = 25.27 min. The absolute configuration was assigned tentatively by analogy.

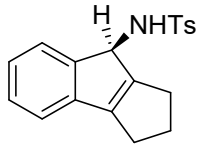
(S)-N-(2,3-dimethyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2n**)



2n

Yield: 98%, 30.7 mg. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.88 (d, *J* = 8.3 Hz, 2H), 7.37 (d, *J* = 8.3 Hz, 2H), 7.22 (t, *J* = 7.5 Hz, 1H), 7.07 (d, *J* = 7.4 Hz, 1H), 6.98 (t, *J* = 7.4 Hz, 1H), 6.77 (d, *J* = 7.3 Hz, 1H), 4.68 (d, *J* = 9.6 Hz, 1H), 4.42 (d, *J* = 9.7 Hz, 1H), 2.48 (s, 3H), 1.94 (s, 3H), 1.81 (s, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 145.31, 143.71, 142.87, 138.76, 138.05, 134.17, 129.98, 128.45, 127.41, 125.18, 123.09, 118.42, 62.49, 21.75, 11.25, 10.46. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{18}H_{19}NNaO_2S$: 336.1034, found: 336.1031. **$[\alpha]^{20}_D$** = -59.2 (c = 0.53, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 77% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 8.30 min, t_R (minor) = 8.58 min. The absolute configuration was assigned tentatively by analogy.

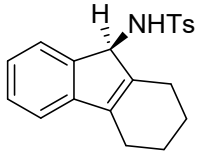
(S)-4-methyl-N-(1,2,3,8-tetrahydrocyclopenta[a]inden-8-yl)benzenesulfonamide (**2o**)



2o

Yield: 85%, 27.7 mg. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.85 (d, *J* = 8.2 Hz, 2H), 7.34 (d, *J* = 8.2 Hz, 2H), 7.19 (t, *J* = 7.5 Hz, 1H), 7.13 (d, *J* = 7.3 Hz, 1H), 7.03 (dd, *J* = 16.9, 7.4 Hz, 2H), 4.71 (d, *J* = 9.4 Hz, 1H), 4.57 (d, *J* = 9.5 Hz, 1H), 2.51 – 2.43 (m, 2H), 2.46 (s, 3H), 2.31 – 2.23 (m, 2H), 2.22 – 2.16 (m, 1H), 2.14 – 2.05 (m, 1H). **^{13}C NMR** (101 MHz, $CDCl_3$) δ 150.88, 149.59, 148.60, 143.67, 140.01, 138.36, 129.89, 128.32, 127.40, 125.16, 124.10, 119.15, 56.56, 27.72, 27.65, 26.59, 21.73. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{19}H_{19}NNaO_2S$: 348.1034, found: 348.1027. **$[\alpha]^{20}_D$** = +6.1 (c = 0.52, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 87% ee; (CHIRALPAK IG, hexane/i-PrOH = 70/30, flow rate: 0.5 mL/min, T = 30 °C, 254 nm), t_R (major) = 19.95 min, t_R (minor) = 17.79 min. The absolute configuration was assigned tentatively by analogy.

(S)-4-methyl-N-(2,3,4,9-tetrahydro-1H-fluoren-9-yl)benzenesulfonamide (**2p**)



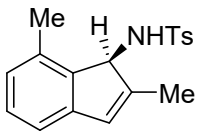
2p

Yield: 65%, 22.0 mg. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.89 – 7.86 (m, 2H), 7.36 (d, *J* = 8.0 Hz, 2H), 7.21 (t, *J* = 7.5 Hz, 1H), 7.05 (d, *J* = 7.4 Hz, 1H), 7.03 – 6.96 (m, 1H), 6.89 (dd, *J* = 7.3, 0.5 Hz, 1H), 4.70 (d, *J* = 9.5 Hz, 1H), 4.46 (d, *J* = 9.5 Hz, 1H), 2.48 (s, 3H), 2.37 – 2.18 (m, 3H), 1.96 (dd, *J* = 16.7, 13.0 Hz, 1H), 1.80 – 1.61 (m, 4H).

^{13}C NMR (126 MHz, $CDCl_3$) δ 144.08, 143.66, 143.37, 141.20, 138.59, 137.76, 129.93, 128.36, 127.38, 125.23, 123.33, 118.00, 61.23, 22.89, 22.82, 22.32, 22.12, 21.75. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{20}H_{21}NNaO_2S$: 362.1191, found: 362.1181. **$[\alpha]^{20}_D$** = -49.4 (c = 0.32, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 94% ee; (CHIRALPAK IE, hexane/i-PrOH = 80/20, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R

(major) = 11.81 min, t_R (minor) = 12.68 min. The absolute configuration was assigned tentatively by analogy.

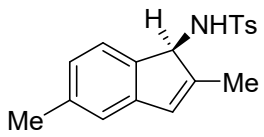
(S)-N-(2,7-dimethyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2q**)



2q

Yield: 79%, 24.8 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.76 (d, *J* = 8.2 Hz, 2H), 7.28 (d, *J* = 8.1 Hz, 2H), 7.08 (t, *J* = 7.5 Hz, 1H), 6.90 (d, *J* = 7.3 Hz, 1H), 6.79 (d, *J* = 7.6 Hz, 1H), 6.26 (s, 1H), 4.88 (d, *J* = 9.5 Hz, 1H), 4.37 (d, *J* = 9.5 Hz, 1H), 2.43 (s, 3H), 2.13 (s, 3H), 1.71 (s, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 146.33, 143.51, 143.44, 140.15, 139.37, 134.63, 129.70, 128.81, 128.45, 127.37, 127.09, 118.10, 62.53, 21.68, 18.14, 14.56. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{18}H_{20}NO_2S$: 314.1215, found: 314.1208. **$[\alpha]^{20}_D$** = -42.1 (c = 0.46, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 84% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 6.56 min, t_R (minor) = 7.68 min. The absolute configuration was assigned tentatively by analogy.

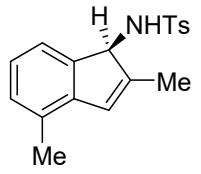
(S)-N-(2,5-dimethyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2r**)



2r

Yield: 84%, 26.3 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.87 (d, *J* = 8.1 Hz, 2H), 7.36 (d, *J* = 8.0 Hz, 2H), 6.90 (s, 1H), 6.76 (d, *J* = 7.5 Hz, 1H), 6.59 (d, *J* = 7.5 Hz, 1H), 6.27 (s, 1H), 4.66 (d, *J* = 9.6 Hz, 1H), 4.49 (d, *J* = 9.6 Hz, 1H), 2.48 (s, 3H), 2.28 (s, 3H), 1.89 (s, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 146.34, 143.72, 143.58, 140.59, 138.66, 138.38, 129.95, 127.86, 127.38, 125.62, 123.15, 121.28, 62.26, 21.73, 21.52, 14.05. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{18}H_{20}NO_2S$: 314.1215, found: 314.1209. **$[\alpha]^{20}_D$** = +83.5 (c = 0.46, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 95% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 8.66 min, t_R (minor) = 15.86 min. The absolute configuration was assigned tentatively by analogy.

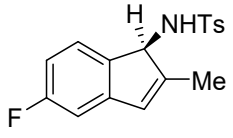
(S)-N-(2,4-dimethyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2s**)



2s

Yield: 75%, 23.5 mg. ^{1}**H NMR** (400 MHz, $CDCl_3$) δ 7.87 (d, *J* = 7.8 Hz, 2H), 7.36 (d, *J* = 7.8 Hz, 2H), 6.96 (d, *J* = 7.5 Hz, 1H), 6.86 (t, *J* = 7.4 Hz, 1H), 6.57 (d, *J* = 7.3 Hz, 1H), 6.43 (s, 1H), 4.69 (d, *J* = 9.5 Hz, 1H), 4.51 (d, *J* = 9.5 Hz, 1H), 2.48 (s, 3H), 2.28 (s, 3H), 1.92 (s, 3H). ^{13}**C NMR** (101 MHz, $CDCl_3$) δ 145.52, 143.73, 143.38, 141.93, 138.65, 129.97, 129.70, 129.61, 127.36, 126.10, 125.08, 120.85, 62.78, 21.74, 18.15, 14.12. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{18}H_{19}NNaO_2S$: 336.1034, found: 336.1029. **$[\alpha]^{20}_D$** = +34.0 (c = 0.40, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 89% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 8.20 min, t_R (minor) = 9.37 min. The absolute configuration was assigned tentatively by analogy.

(S)-N-(5-fluoro-2-methyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2t**)

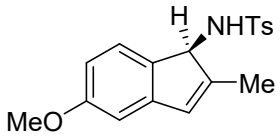


2t

Yield: 50%, 15.9 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.86 (d, *J* = 8.2 Hz, 2H), 7.36 (d, *J* = 8.1 Hz, 2H), 6.76 (dd, *J* = 8.7, 2.2 Hz, 1H), 6.72 (dd, *J* = 8.1, 5.1 Hz, 1H), 6.66 – 6.59 (m, 1H), 6.27 (s, 1H), 4.65 (d, *J* = 9.7 Hz, 1H), 4.60 (d, *J* = 9.7 Hz, 1H), 2.48 (s, 3H), 1.88 (s, 3H). ^{13}**C NMR** (126 MHz,

$CDCl_3$) δ 163.52 (d, *J* = 244.6 Hz), 148.46, 145.38 (d, *J* = 9.3 Hz), 143.91, 138.83 (d, *J* = 2.6 Hz), 138.46, 130.01, 127.35, 127.27 (d, *J* = 2.7 Hz), 124.45 (d, *J* = 9.2 Hz), 111.38, 111.20, 108.03, 107.85, 61.87, 21.73, 14.12. **^{19}F NM**R (471 MHz, $CDCl_3$) δ -114.19. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{17}H_{16}FNNaO_2S$: 340.0783, found: 340.0776. **$[\alpha]^{20}_D$** = -84.0 (c = 0.29, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 95% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 6.89 min, t_R (minor) = 9.60 min. The absolute configuration was assigned tentatively by analogy.

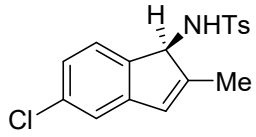
(S)-N-(5-methoxy-2-methyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2u**)



2u

Yield: 74%, 24.4 mg. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.87 (d, *J* = 8.1 Hz, 2H), 7.36 (d, *J* = 8.1 Hz, 2H), 6.64 (d, *J* = 2.2 Hz, 1H), 6.60 (d, *J* = 8.2 Hz, 1H), 6.46 (dd, *J* = 8.2, 2.2 Hz, 1H), 6.27 (s, 1H), 4.65 (d, *J* = 9.6 Hz, 1H), 4.49 (d, *J* = 9.6 Hz, 1H), 3.75 (s, 3H), 2.48 (s, 3H), 1.90 (s, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 160.33, 147.51, 144.88, 143.64, 138.55, 135.30, 129.87, 127.62, 127.27, 123.91, 109.54, 106.89, 61.86, 55.43, 21.63, 14.03. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{18}H_{19}NNaO_3S$: 352.0983, found: 352.0983. **$[\alpha]^{20}_D$** = +36.1 (c = 0.32, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 92% ee; (CHIRALPAK AD-H, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 7.71 min, t_R (minor) = 9.93 min. The absolute configuration was assigned tentatively by analogy.

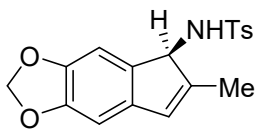
(S)-N-(5-chloro-2-methyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2v**)



2v

Yield: 45%, 15.0 mg. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.95 – 7.78 (m, 2H), 7.36 (dd, *J* = 8.5, 0.6 Hz, 2H), 7.06 (d, *J* = 1.9 Hz, 1H), 6.93 (dd, *J* = 7.9, 1.9 Hz, 1H), 6.72 – 6.69 (m, 1H), 6.28 (dt, *J* = 1.6, 0.6 Hz, 1H), 4.73 – 4.60 (m, 1H), 4.55 (d, *J* = 9.7 Hz, 1H), 2.48 (s, 3H), 1.88 (d, *J* = 0.7 Hz, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 148.01, 145.03, 143.98, 141.75, 138.42, 134.47, 130.04, 127.37, 127.18, 124.90, 124.44, 120.73, 62.08, 21.75, 14.09. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{17}H_{17}ClNO_2S$: 334.0669, found: 334.0661. **$[\alpha]^{20}_D$** = +68.5 (c = 0.40, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 95% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 7.38 min, t_R (minor) = 13.05 min. The absolute configuration was assigned tentatively by analogy.

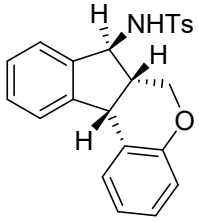
(S)-4-methyl-N-(6-methyl-5H-indeno[5,6-d][1,3]dioxol-5-yl)benzenesulfonamide (**2w**)



2w

Yield: 93%, 40.4 mg. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.86 (d, *J* = 8.3 Hz, 2H), 7.36 (dd, *J* = 8.6, 0.6 Hz, 2H), 6.57 (s, 1H), 6.30 (s, 1H), 6.21 – 6.17 (m, 1H), 5.87 (d, *J* = 1.4 Hz, 1H), 5.87 (d, *J* = 1.4 Hz, 1H), 4.57 (s, 2H), 2.47 (s, 3H), 1.83 (d, *J* = 1.5 Hz, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 147.78, 145.60, 144.96, 143.86, 138.57, 137.22, 136.97, 130.00, 127.40, 127.34, 105.59, 101.85, 101.12, 62.18, 21.72, 13.97. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{18}H_{17}NNaO_4S$: 366.0776, found: 366.0768. **$[\alpha]^{20}_D$** = -83.9 (c = 0.29, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 93% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 7.97 min, t_R (minor) = 11.40 min. The absolute configuration was assigned tentatively by analogy.

4-methyl-N-((6aR,7S,11bS)-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)benzenesulfonamide (**4a**)

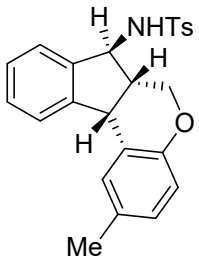


4a

Yield: 73%, 28.6 mg. ^{1}**H NMR** (400 MHz, $CDCl_3$) δ 7.87 (d, *J* = 8.2 Hz, 2H), 7.44 (d, *J* = 7.6 Hz, 1H), 7.35 (d, *J* = 8.0 Hz, 3H), 7.23 (d, *J* = 7.5 Hz, 1H), 7.17 – 7.05 (m, 2H), 6.91 (t, *J* = 7.5 Hz, 1H), 6.84 (d, *J* = 8.1 Hz, 2H), 4.97 (d, *J* = 8.7 Hz, 1H), 4.90 – 4.81 (m, 1H), 4.45 (d, *J* = 7.8 Hz, 1H), 4.08 (dd, *J* = 11.3, 3.1 Hz, 1H), 3.98 (dd, *J* = 11.3, 5.0 Hz, 1H), 2.81 – 2.69 (m, 1H), 2.46 (s, 3H). ^{13}**C NMR** (101 MHz, $CDCl_3$) δ 154.67, 144.73, 143.88, 140.74, 138.01, 130.08, 129.80, 129.07, 128.05, 127.76, 127.24, 125.26, 124.77, 123.41, 121.51, 117.80, 64.55, 58.71, 47.74, 41.37, 21.74. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{23}H_{22}NO_3S$: 392.1320, found: 392.1320.

$[\alpha]^{20}_D$ = -39.5 (c = 0.34, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 91% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 14.27 min, t_R (minor) = 12.20 min. The absolute configuration was assigned tentatively by analogy.

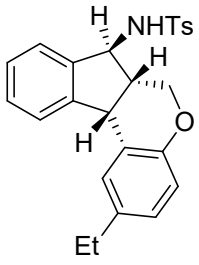
4-methyl-N-((6aR,7S,11bS)-2-methyl-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)benzenesulfonamide (**4b**)



4b

Yield: 63%, 25.5 mg. ^{1}**H NMR** (400 MHz, $CDCl_3$) δ 7.90 – 7.83 (m, 2H), 7.45 (d, *J* = 7.6 Hz, 1H), 7.35 (d, *J* = 8.0 Hz, 2H), 7.28 – 7.22 (m, 1H), 7.13 (dt, *J* = 10.2, 5.0 Hz, 2H), 6.89 (dd, *J* = 8.3, 2.1 Hz, 1H), 6.84 (d, *J* = 7.6 Hz, 1H), 6.74 (d, *J* = 8.3 Hz, 1H), 4.99 (d, *J* = 8.8 Hz, 1H), 4.92 – 4.83 (m, 1H), 4.40 (d, *J* = 7.9 Hz, 1H), 4.04 (dd, *J* = 11.3, 3.1 Hz, 1H), 3.96 (dd, *J* = 11.3, 4.8 Hz, 1H), 2.77 – 2.66 (m, 1H), 2.46 (s, 3H), 2.26 (s, 3H). ^{13}**C NMR** (101 MHz, $CDCl_3$) δ 152.42, 144.76, 143.84, 140.87, 138.05, 130.71, 130.06, 129.95, 129.01, 128.48, 127.99, 127.23, 125.28, 124.73, 123.07, 117.53, 64.52, 58.66, 47.93, 41.37, 21.73, 20.83. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{24}H_{24}NO_3S$: 406.1477, found: 406.1473. **$[\alpha]^{20}_D$** = -20.9 (c = 0.093, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 91% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 14.57 min, t_R (minor) = 10.30 min. The absolute configuration was assigned tentatively by analogy.

N-((6aR,7S,11bS)-2-ethyl-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)-4-methylbenzenesulfonamide (**4c**)

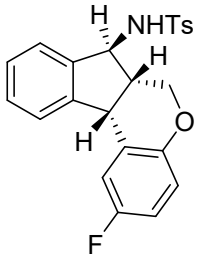


4c

Yield: 63%, 26.4 mg. ^{1}**H NMR** (500 MHz, $CDCl_3$) δ 7.87 (d, *J* = 8.0 Hz, 2H), 7.45 (d, *J* = 7.5 Hz, 1H), 7.35 (d, *J* = 7.9 Hz, 2H), 7.31 – 7.21 (m, 1H), 7.17 (s, 1H), 7.13 (t, *J* = 7.5 Hz, 1H), 6.92 (d, *J* = 8.2 Hz, 1H), 6.86 (d, *J* = 7.5 Hz, 1H), 6.77 (d, *J* = 8.3 Hz, 1H), 4.94 (d, *J* = 8.7 Hz, 1H), 4.91 – 4.82 (m, 1H), 4.42 (d, *J* = 7.8 Hz, 1H), 4.05 (dd, *J* = 11.2, 2.6 Hz, 1H), 3.96 (dd, *J* = 11.2, 4.9 Hz, 1H), 2.77 – 2.70 (m, 1H), 2.56 (q, *J* = 7.5 Hz, 2H), 2.46 (s, 3H), 1.20 (t, *J* = 7.6 Hz, 3H). ^{13}**C NMR** (126 MHz, $CDCl_3$) δ 152.63, 144.84, 143.85, 140.85, 138.07, 137.24, 130.06, 129.04, 128.82, 127.99, 127.28, 127.26, 125.26, 124.77, 123.08, 117.58, 64.58, 58.74, 47.86, 41.47, 28.27, 21.73, 15.95. **HRMS** (ESI) m/z $(M+H)^+$:

calculated for $C_{25}H_{26}NO_3S$: 420.1633, found: 420.1636. **$[\alpha]^{20}_D$** = -44.6 (c = 0.25, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 91% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 12.74 min, t_R (minor) = 17.37 min. The absolute configuration was assigned tentatively by analogy.

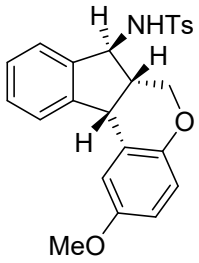
N-((6aR,7S,11bS)-2-fluoro-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)-4-methylbenzenesulfonamide (**4d**)



4d

Yield: 56%, 22.9 mg. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.87 (d, *J* = 8.3 Hz, 2H), 7.42 (d, *J* = 7.6 Hz, 1H), 7.35 (d, *J* = 8.1 Hz, 2H), 7.30 – 7.22 (m, 1H), 7.15 (t, *J* = 7.5 Hz, 1H), 7.07 – 6.98 (m, 1H), 6.83 (d, *J* = 7.6 Hz, 1H), 6.78 (dd, *J* = 7.5, 1.8 Hz, 2H), 4.95 – 4.83 (m, 2H), 4.41 (d, *J* = 7.9 Hz, 1H), 4.04 (d, *J* = 3.7 Hz, 2H), 2.77 – 2.72 (m, 1H), 2.46 (s, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 157.38 (d, *J* = 239.5 Hz), 150.74, 144.06, 143.97, 140.88, 138.02, 130.12, 129.26, 128.35, 127.27, 125.19, 124.71, 118.90 (d, *J* = 8.1 Hz), 115.43 (d, *J* = 22.9 Hz), 114.81, 114.63, 64.72, 58.61, 47.96, 41.63, 21.76. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{23}H_{21}FNO_3S$: 410.1226, found: 410.1228. **$[\alpha]^{20}_D$** = -36.2 (c = 0.5, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 92% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 11.32 min, t_R (minor) = 9.53 min. The absolute configuration was assigned tentatively by analogy.

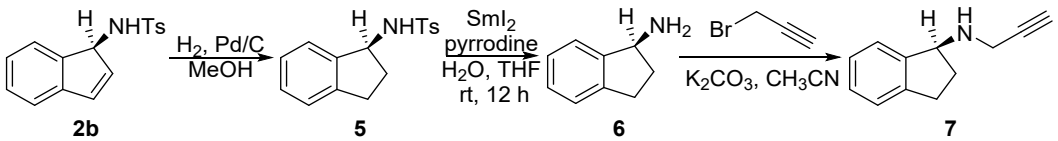
N-((6aR,7S,11bS)-2-methoxy-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)-4-methylbenzenesulfonamide (**4e**)



4e

Yield: 61%, 25.7 mg. **^{1}H NMR** (500 MHz, $CDCl_3$) δ 7.87 (d, *J* = 8.3 Hz, 2H), 7.44 (d, *J* = 7.6 Hz, 1H), 7.35 (d, *J* = 8.0 Hz, 2H), 7.24 (t, *J* = 7.6 Hz, 1H), 7.13 (t, *J* = 7.4 Hz, 1H), 6.88 (d, *J* = 2.8 Hz, 1H), 6.83 (d, *J* = 7.5 Hz, 1H), 6.78 (d, *J* = 8.9 Hz, 1H), 6.66 (dd, *J* = 8.9, 2.9 Hz, 1H), 4.95 – 4.83 (m, 2H), 4.41 (d, *J* = 8.0 Hz, 1H), 4.06 – 3.96 (m, 2H), 3.75 (s, 3H), 2.75 – 2.70 (m, 1H), 2.46 (s, 3H). **^{13}C NMR** (126 MHz, $CDCl_3$) δ 154.05, 148.67, 144.53, 143.87, 140.96, 138.06, 130.07, 129.08, 128.11, 127.25, 125.21, 124.71, 124.23, 118.37, 114.52, 113.42, 64.66, 58.68, 55.83, 48.07, 41.75, 21.74. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{24}H_{24}NO_4S$: 422.1426, found: 422.1426. **$[\alpha]^{20}_D$** = -50.6 (c = 0.40, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 92% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 24.94 min, t_R (minor) = 14.96 min. The absolute configuration was assigned tentatively by analogy.

7. Procedure for the synthesis of 7.



2b **5** **6** **7**

To the Schlenk tube charged with a solution of **2b** (2.8 mmol, 0.8 g, 83% ee) in anhydrous CH_3OH (10 mL) were added 10% Pd/C (0.1 equiv, 0.28 mmol, 280 mg) and a stir ball. After being stirred at 25 °C under a H_2 atmosphere overnight, the mixture was filtrated with silica gel and concentrated

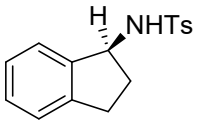
in vacuo. The residue was purified by flash column chromatography on silica gel (EtOAc: Petroleum ether = 1 : 10) to give **5** (0.740 g) in 95% yield.

To a round bottom flask containing compound **5** (0.114 g, 0.4 mmol) was added solution of SmI_2 (40 mL, 0.1 M, 4 mmol), H_2O (0.108 g, 6 mmol), and pyrrolidine (0.284 g, 2 mmol). The solution was stirred at room temperature for 12 h. The mixture was diluted with EtOAc, washed with $NaHCO_3$, extracted with EtOAc, dried over Na_2SO_4, and filtered. The filtrate was evaporated under reduced pressure and the resulting residue was purified by flash column chromatography (EtOAc: Petroleum ether = 1: 20) on silica gel to afford **6** (0.040 g) in 76% yield.

Potassium carbonate (0.028 g, 0.2 mmol) was added to a solution of **6** (0.026 g, 0.2 mmol) in acetonitrile (5 mL). Propargyl bromide (0.024 g, 0.2 mmol) was added to the reaction mixture with stirring at room temperature. After stirring at 30 °C for 12 h, potassium carbonate was filtered off, and acetonitrile was removed by evaporation under reduced pressure. Water (10 mL) was added to the mixture. The mixture was extracted with Et_2O (10 mL × 3). The combined organic phase was washed with saturated aqueous NaCl and dried over $MgSO_4$, then concentrated in vacuo. The crude residue was purified by silica chromatography (EtOAc: Petroleum ether = 1: 40) to give **7** (0.027 g) in 79% yield.

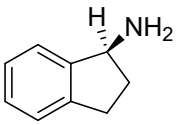
8. Characterizations for the products 5, 6 and 7.

(S)-N-(2,3-dihydro-1H-inden-1-yl)-4-methylbenzenesulfonamide (**5**)



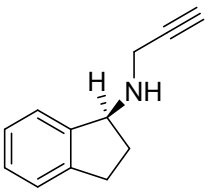
Yield: 95%, 0.74 g. ^{1}**H NMR** (400 MHz, $CDCl_3$) δ 7.83 (d, *J* = 8.3 Hz, 2H), 7.34 (d, *J* = 8.1 Hz, 2H), 7.24 – 7.11 (m, 3H), 7.08 (d, *J* = 7.4 Hz, 1H), 4.88 – 4.67 (m, 2H), 2.89 (ddd, *J* = 16.0, 8.7, 3.6 Hz, 1H), 2.77 – 2.69 (m, 1H), 2.45 (s, 3H), 2.37 – 2.27 (m, 1H), 1.79 – 1.70 (m, 1H). ^{13}**C NMR** (101 MHz, $CDCl_3$) δ 143.61, 142.96, 142.11, 138.30, 129.93, 128.43, 127.27, 126.99, 124.94, 124.21, 58.85, 34.87, 30.09, 21.71. **HRMS** (ESI) m/z $(M+Na)^+$: calculated for $C_{16}H_{17}NNaO_2S$: 310.0878, found: 310.0871. $[\alpha]^{20}_D$ = -23.9 (c = 0.53, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 83% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) =24.14 min, t_R (minor) = 36.99 min. The absolute configuration was assigned tentatively by analogy.

(S)-2,3-dihydro-1H-inden-1-amine (**6**)



Yield: 76%, 40.0 mg. ^{1}**H NMR** (400 MHz, $CDCl_3$) δ 7.34 – 7.32 (m, 1H), 7.25 – 7.17 (m, 3H), 4.36 (t, *J* = 7.5 Hz, 1H), 2.96 (ddd, *J* = 15.8, 8.6, 3.2 Hz, 1H), 2.89 – 2.73 (m, 1H), 2.54 – 2.47 (m, 1H), 1.74 – 1.64 (m, 3H). ^{13}**C NMR** (101 MHz, $CDCl_3$) δ 147.48, 143.14, 127.24, 126.54, 124.73, 123.36, 57.31, 37.39, 30.16. **HRMS** (ESI) m/z $(M+H)^+$: calculated for C9H12N: 134.0970, found: 134.0970. $[\alpha]^{20}_D$ = -53.4 (c = 0.5, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 88% ee; (CHIRALPAK IE, hexane/i-PrOH = 70/30, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 7.97 min, t_R (minor) = 11.40 min. The absolute configuration was assigned tentatively by analogy.

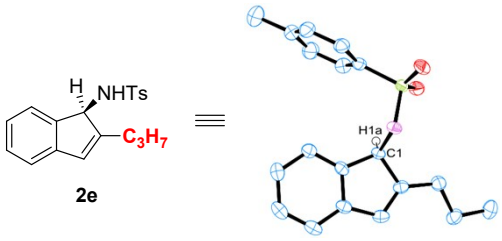
(S)-N-(prop-2-yn-1-yl)-2,3-dihydro-1H-inden-1-amine (**7**)



Yield: 79%, 27.0 mg. ^{1}**H NMR** (400 MHz, $CDCl_3$) δ 7.35 (d, *J* = 6.6 Hz, 1H), 7.26 – 7.15 (m, 3H), 4.42 (t, *J* = 6.0 Hz, 1H), 3.61 – 3.44 (m, 2H), 3.10 – 2.98

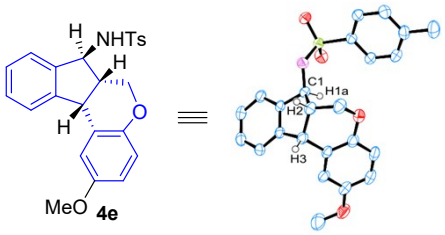
(m, 1H), 2.90 – 2.77 (m, 1H), 2.45 – 2.26 (m, 1H), 2.26 (s, 1H), 1.91 –1.83 (m, 1H), 1.54 (brs, 1H). ^{13}**C NMR** (101 MHz, $CDCl_3$) δ 144.61, 143.94, 127.76, 126.38, 125.00, 124.31, 82.60, 71.52, 61.98, 36.29, 33.45, 30.58. **HRMS** (ESI) m/z $(M+H)^+$: calculated for $C_{12}H_{14}N$: 172.1126, found: 172.1110. $\mathbf{[\alpha]^{20}_D}$ = -4.2 (c = 0.54, acetone). **The product was analyzed by HPLC to determine the enantiomeric excess**: 89% ee; (CHIRALPAK AS, hexane/i-PrOH = 97/3, flow rate: 1.0 mL/min, T = 30 °C, 254 nm), t_R (major) = 5.18 min, t_R (minor) = 5.95 min. The absolute configuration was assigned tentatively by analogy.

9. X-ray Single Crystal Data for 2e



Identification code	191118shc	
Empirical formula	C19 H21 N O2 S	
Formula weight	327.43	
Temperature	170.02 K	
Wavelength	1.34139 Å	
Crystal system	Triclinic	
Space group	P1	
Unit cell dimensions	a = 5.1578(3) Å	α= 92.623(2)°.
	b = 8.9611(4) Å	β= 103.7520(10)°.
	c = 9.5418(5) Å	γ = 95.143(2)°.
Volume	425.62(4) $Å^3$	
Z	1	
Density (calculated)	1.277 Mg/m^3	
Absorption coefficient	1.140 mm^{-1}	
F(000)	174	
Crystal size	0.08 x 0.06 x 0.05 mm^3	
Theta range for data collection	5.790 to 54.965°.	
Index ranges	-6<=h<=6, -10<=k<=10, -11<=l<=11	
Reflections collected	7143	
Independent reflections	3092 [R(int) = 0.0477]	
Completeness to theta = 53.594°	98.5 %	
Absorption correction	Semi-empirical from equivalents	
Max. and min. transmission	0.7508 and 0.5114	
Refinement method	Full-matrix least-squares on F^2	
Data / restraints / parameters	3092 / 3 / 214	
Goodness-of-fit on F^2	1.071	
Final R indices [I>2sigma(I)]	R1 = 0.0368, wR2 = 0.0916	
R indices (all data)	R1 = 0.0374, wR2 = 0.0922	
Absolute structure parameter	0.048(11)	
Extinction coefficient	n/a	
Largest diff. peak and hole	0.384 and -0.232 e.$Å^{-3}$	

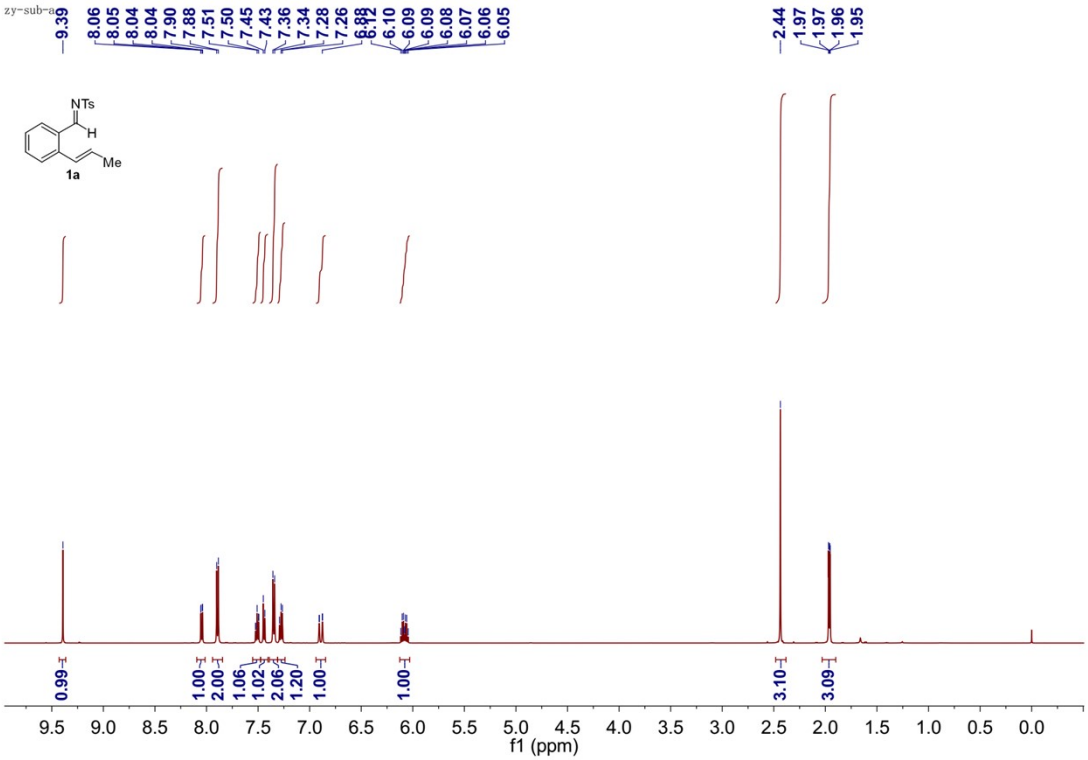
10. X-ray Single Crystal Data for 4e

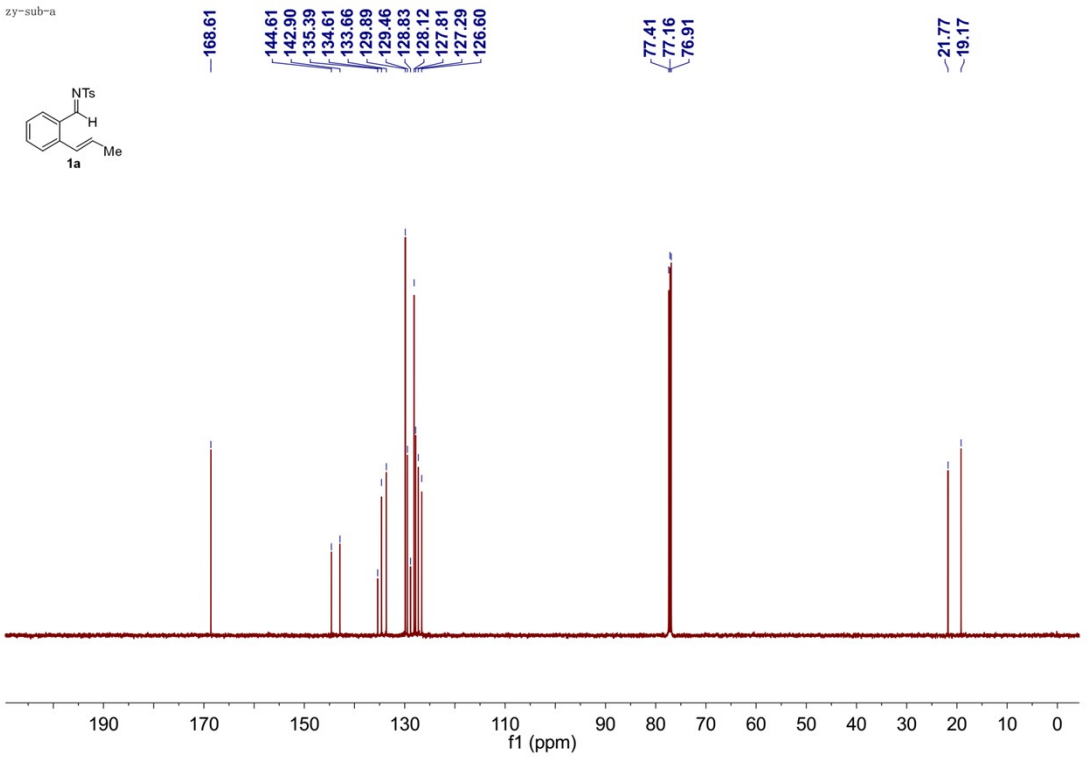


Identification code	200110dd_0m	
Empirical formula	C24 H23 N O4 S	
Formula weight	421.49	
Temperature	200 K	
Wavelength	1.34139 Å	
Crystal system	Monoclinic	
Space group	P 1 21 1	
Unit cell dimensions	a = 8.1788(3) Å	α= 90°.
	b = 7.7926(3) Å	β= 103.581(2)°.
	c = 16.7712(6) Å	γ = 90°.
Volume	1039.01(7) $Å^3$	
Z	2	
Density (calculated)	1.347 Mg/m^3	
Absorption coefficient	1.064 mm^{-1}	
F(000)	444	
Crystal size	0.1 x 0.08 x 0.006 mm^3	
Theta range for data collection	4.720 to 54.960°.	
Index ranges	-9<=h<=9, -9<=k<=9, -20<=l<=20	
Reflections collected	13886	
Independent reflections	3912 [R(int) = 0.0470]	
Completeness to theta = 53.594°	99.5 %	
Absorption correction	Semi-empirical from equivalents	
Max. and min. transmission	0.7508 and 0.6256	
Refinement method	Full-matrix least-squares on F^2	
Data / restraints / parameters	3912 / 1 / 273	
Goodness-of-fit on F^2	1.048	
Final R indices [I>2sigma(I)]	R1 = 0.0356, wR2 = 0.0896	
R indices (all data)	R1 = 0.0389, wR2 = 0.0926	
Absolute structure parameter	0.037(10)	
Extinction coefficient	n/a	
Largest diff. peak and hole	0.286 and -0.320 $e.Å^{-3}$	

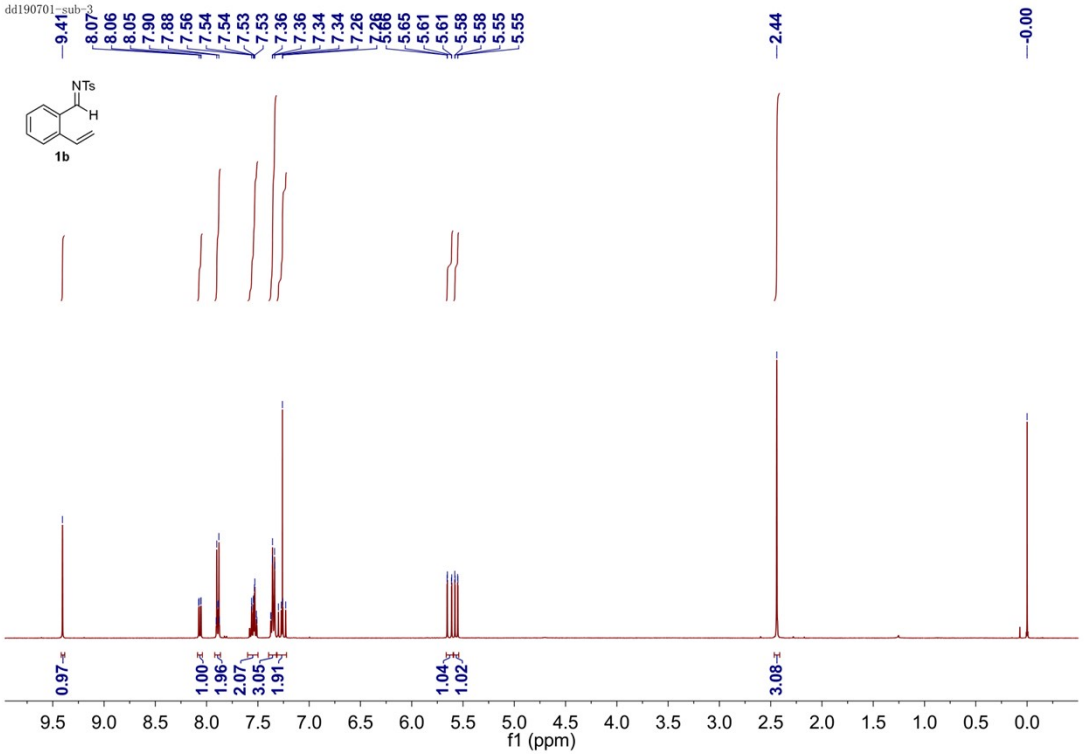
11. NMR spectra for substrates, products, 5, 6 and 7.

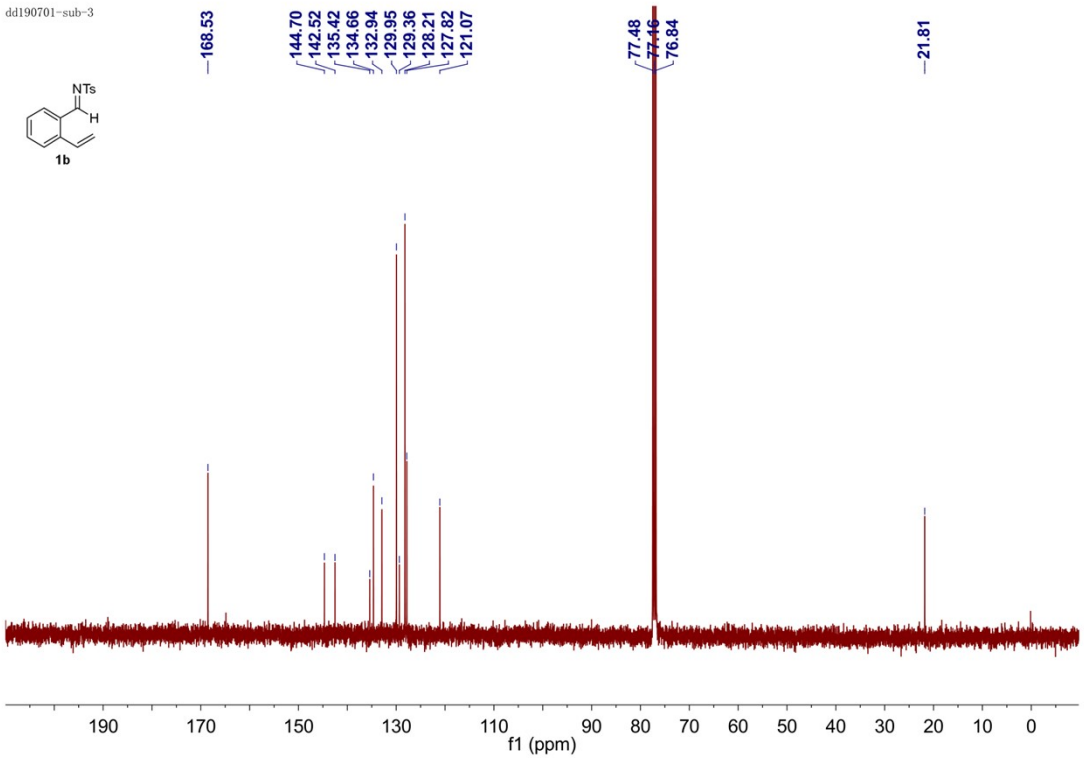
4-methyl-N-((E)-2-((E)-prop-1-en-1-yl)benzylidene)benzenesulfonamide (**1a**)



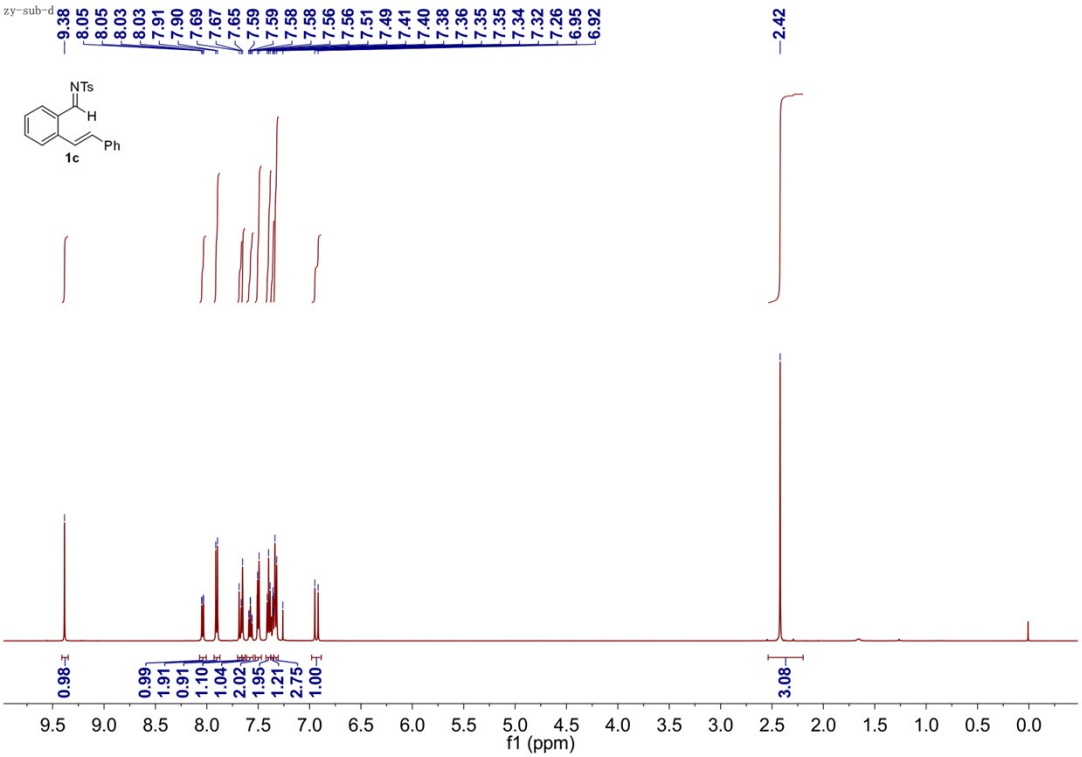


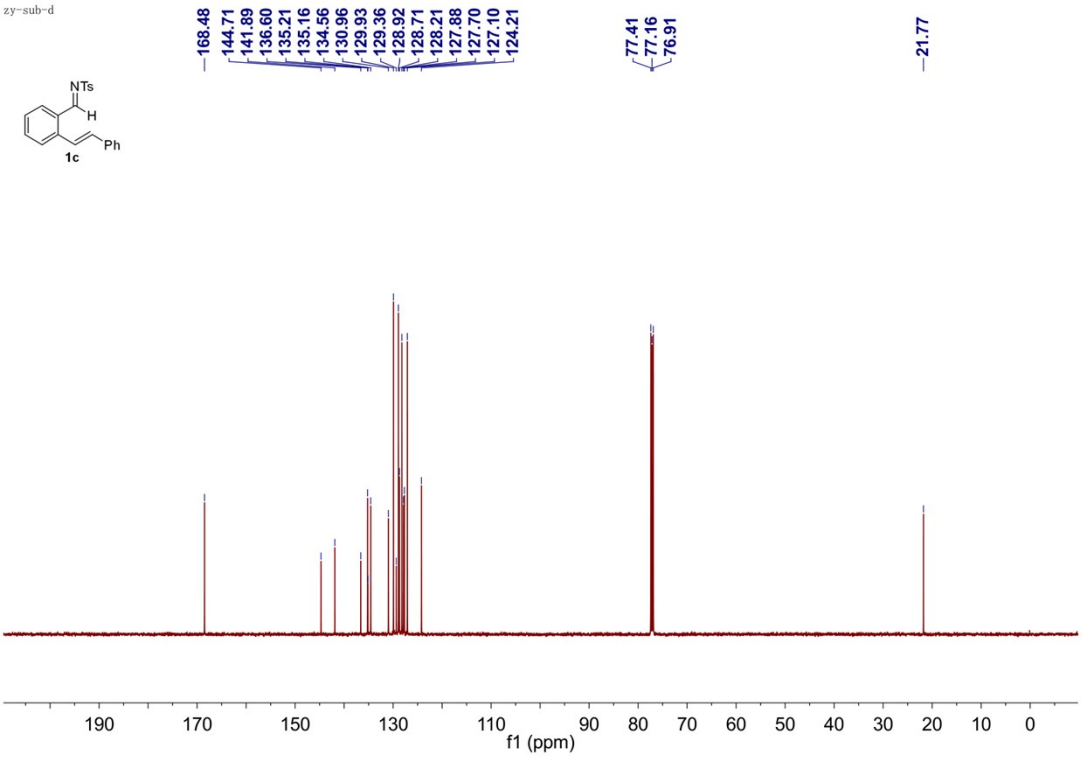
4-methyl-N-((E)-2-((E)-prop-1-en-1-yl)benzylidene)benzenesulfonamide (**1b**)



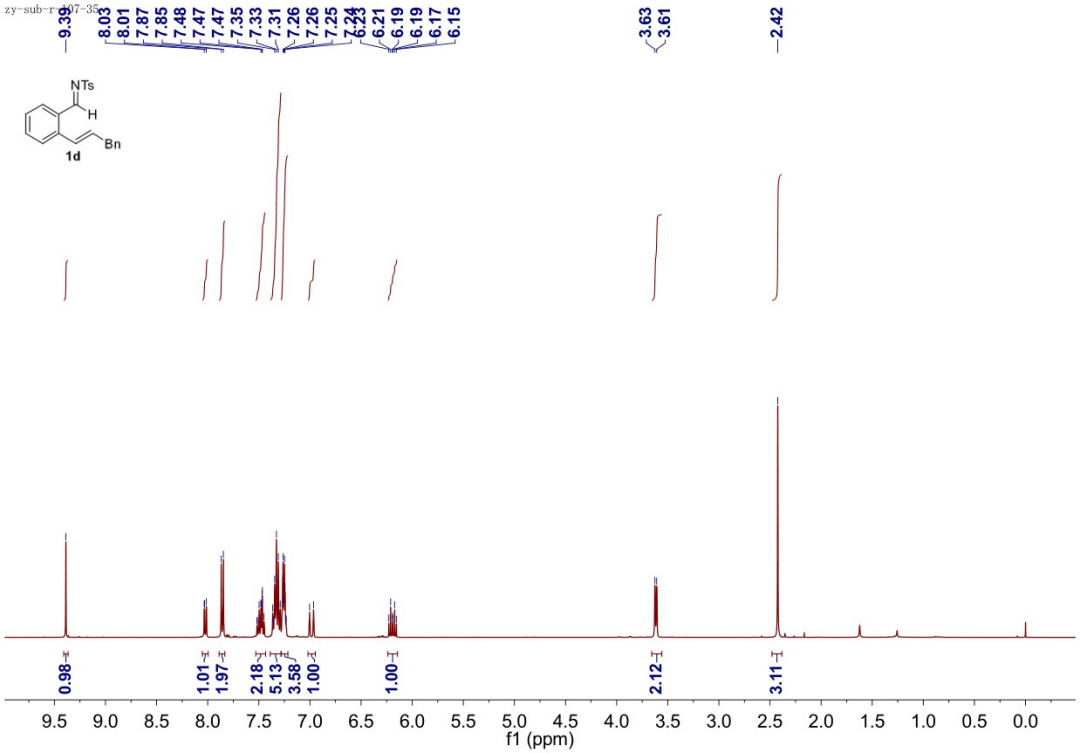


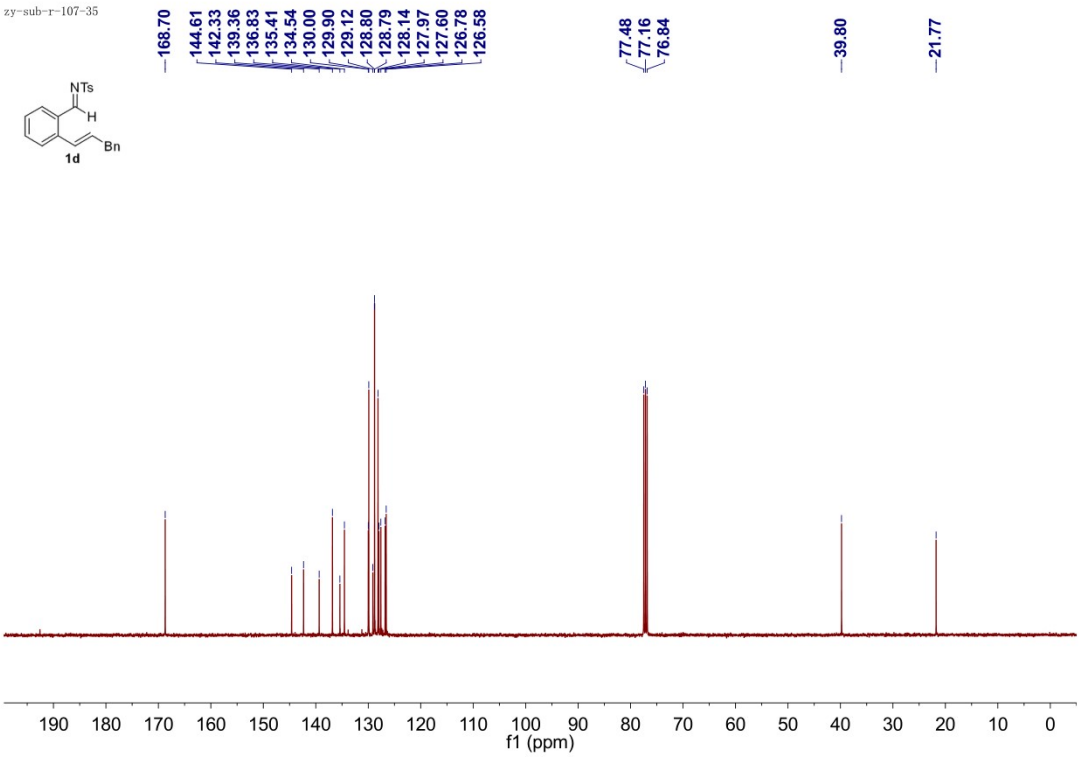
4-methyl-N-((E)-2-((E)-styryl)benzylidene)benzenesulfonamide (**1c**)



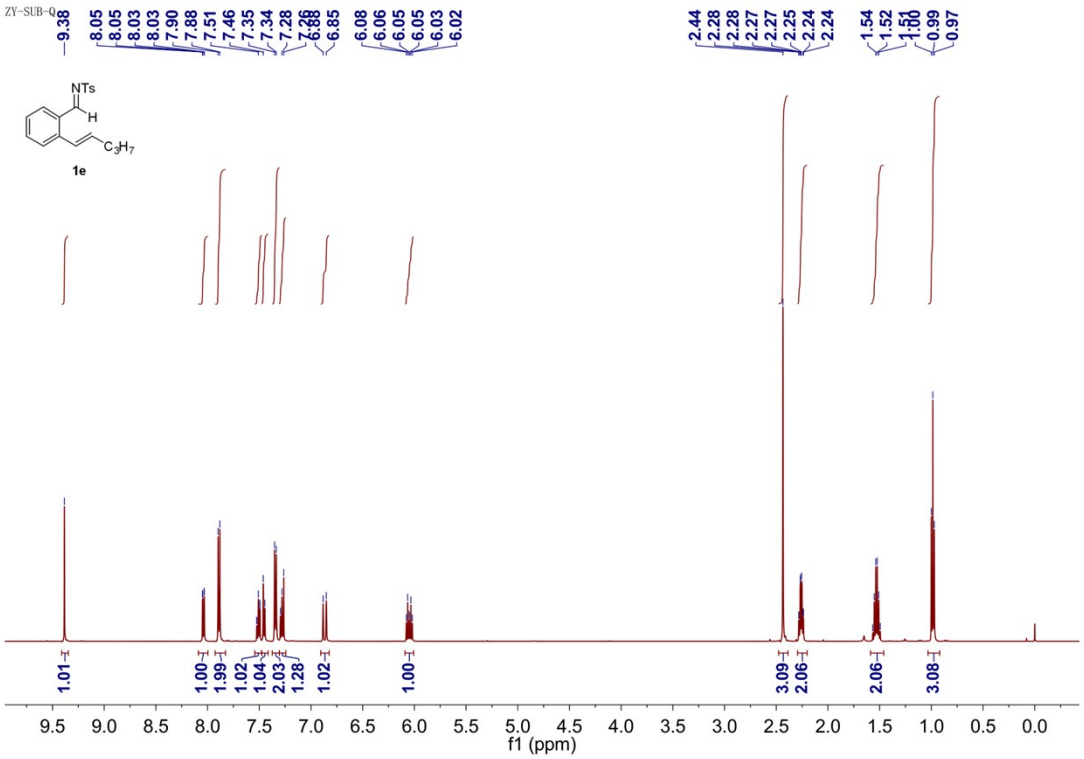


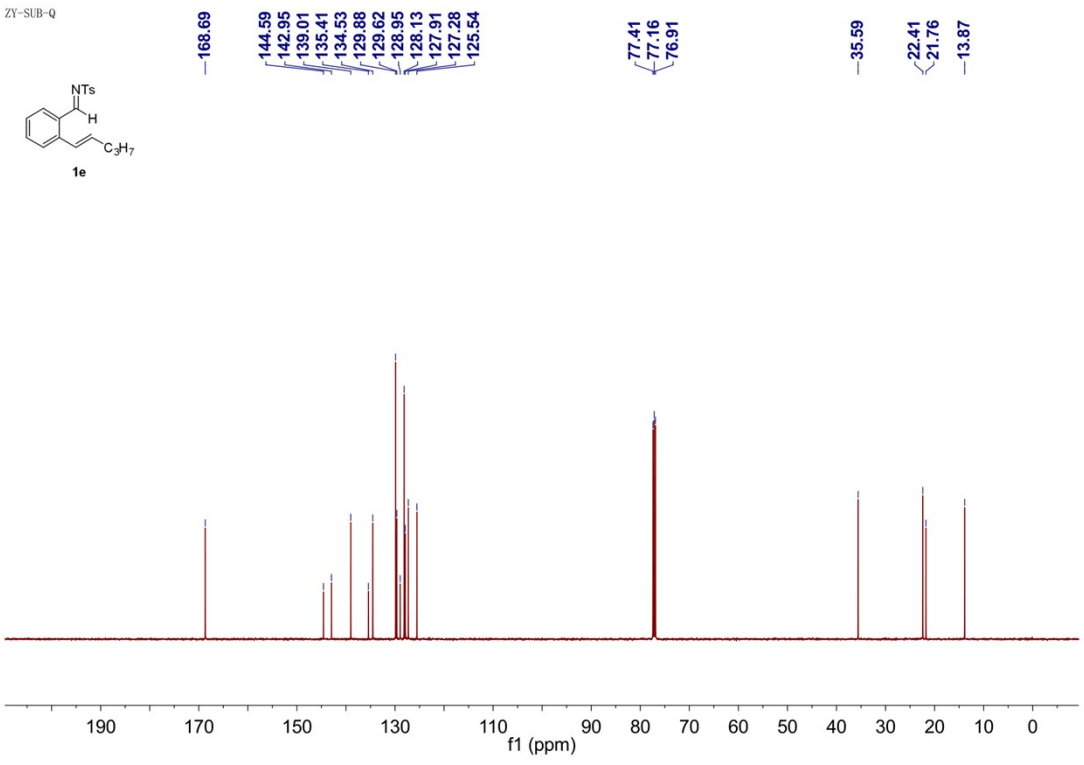
4-methyl-N-((E)-2-((E)-3-phenylprop-1-en-1-yl)benzylidene)benzenesulfonamide (**1d**)



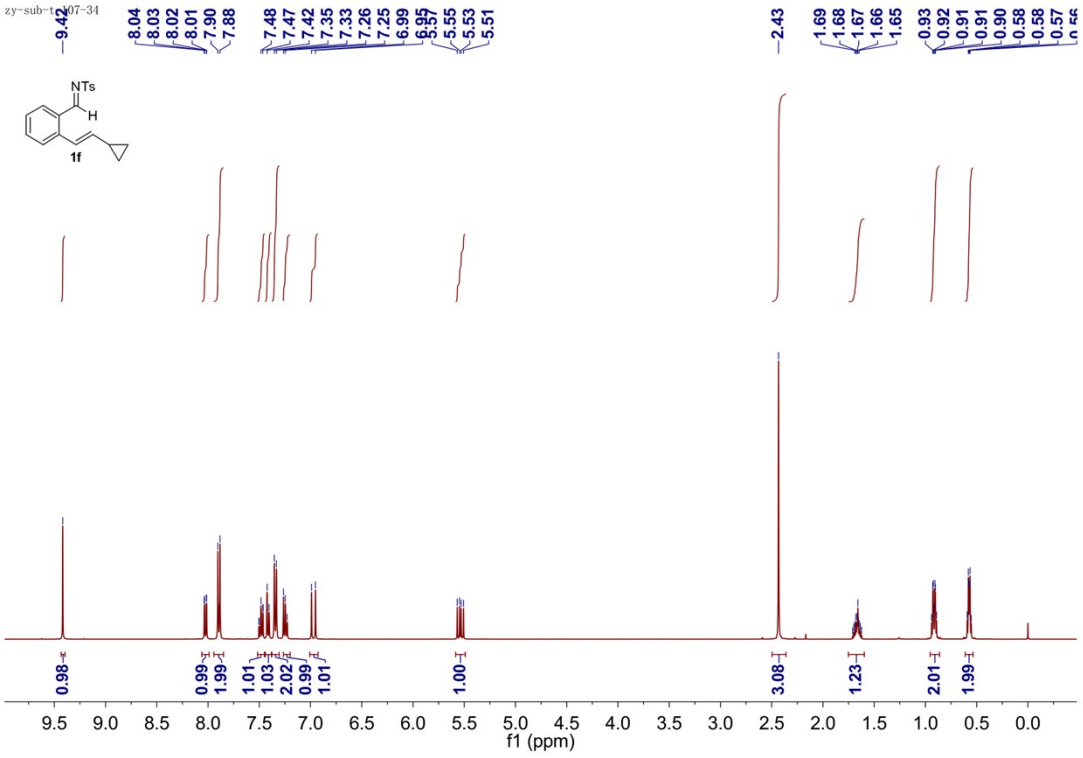


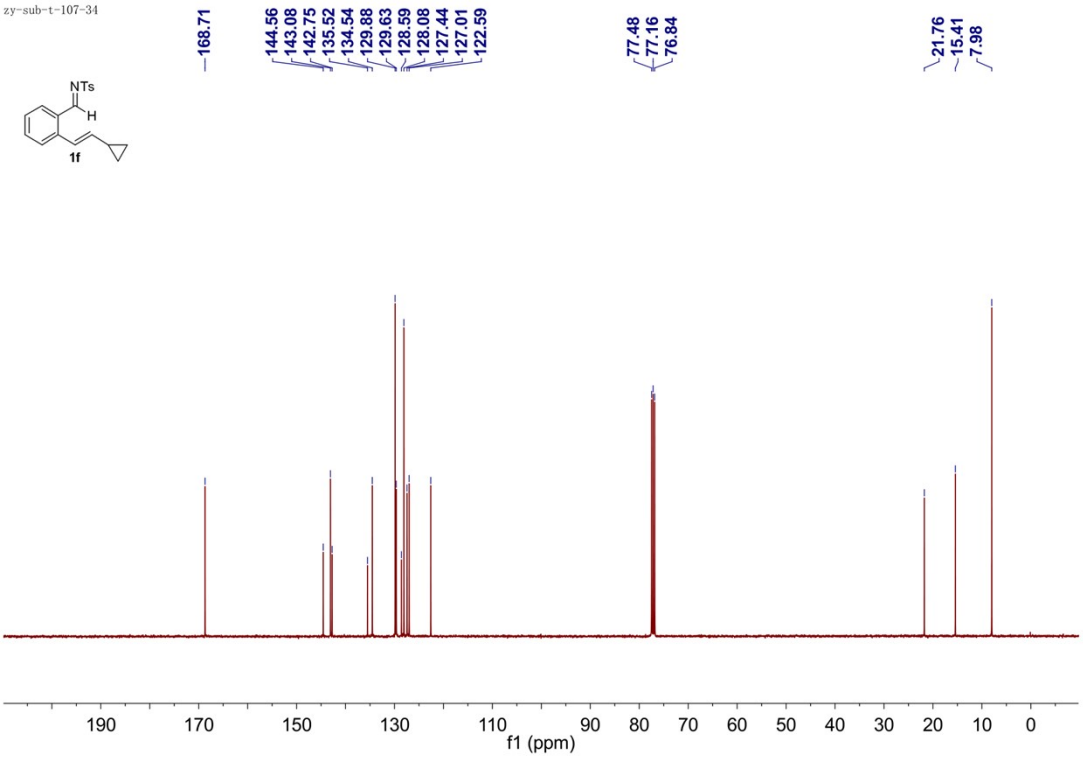
4-methyl-N-((E)-2-((E)-pent-1-en-1-yl)benzylidene)benzenesulfonamide (**1e**)



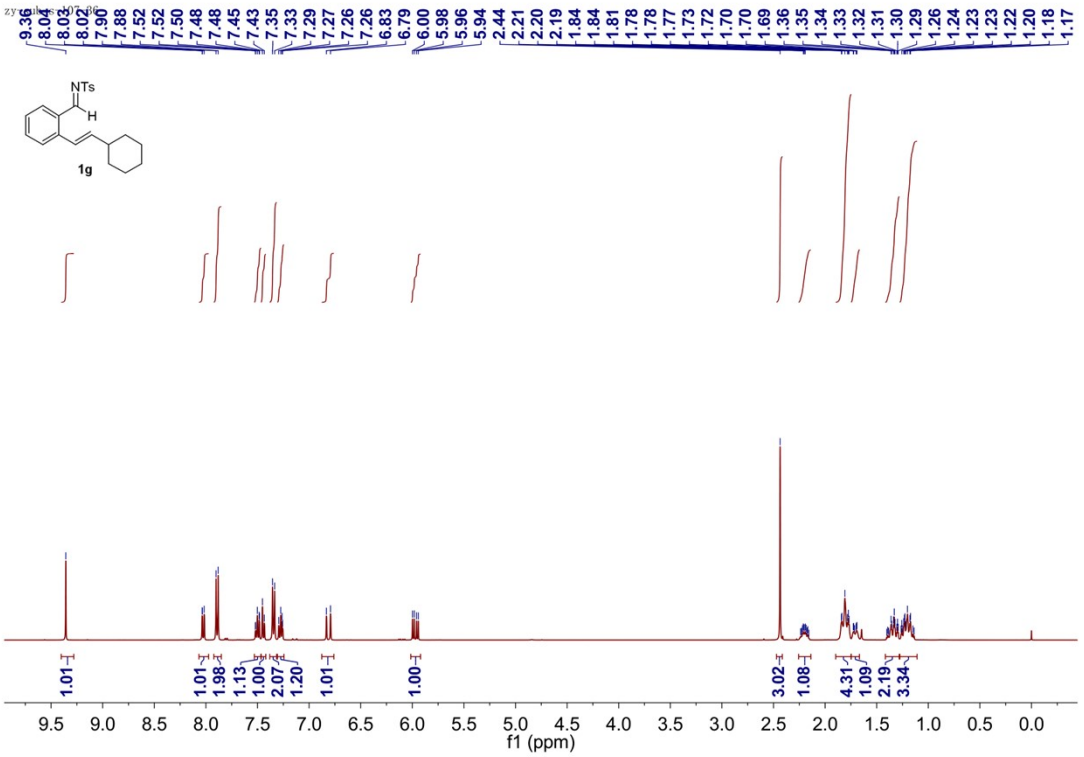


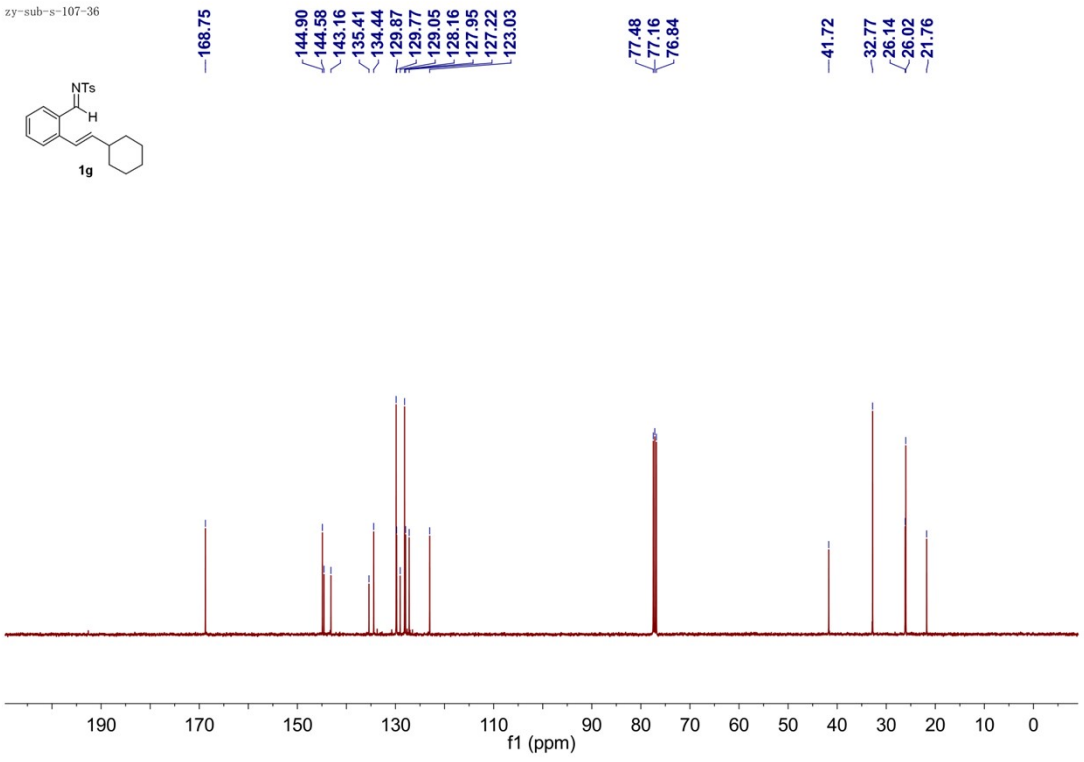
N-((E)-2-((E)-2-cyclopropylvinyl)benzylidene)-4-methylbenzenesulfonamide (**1f**)



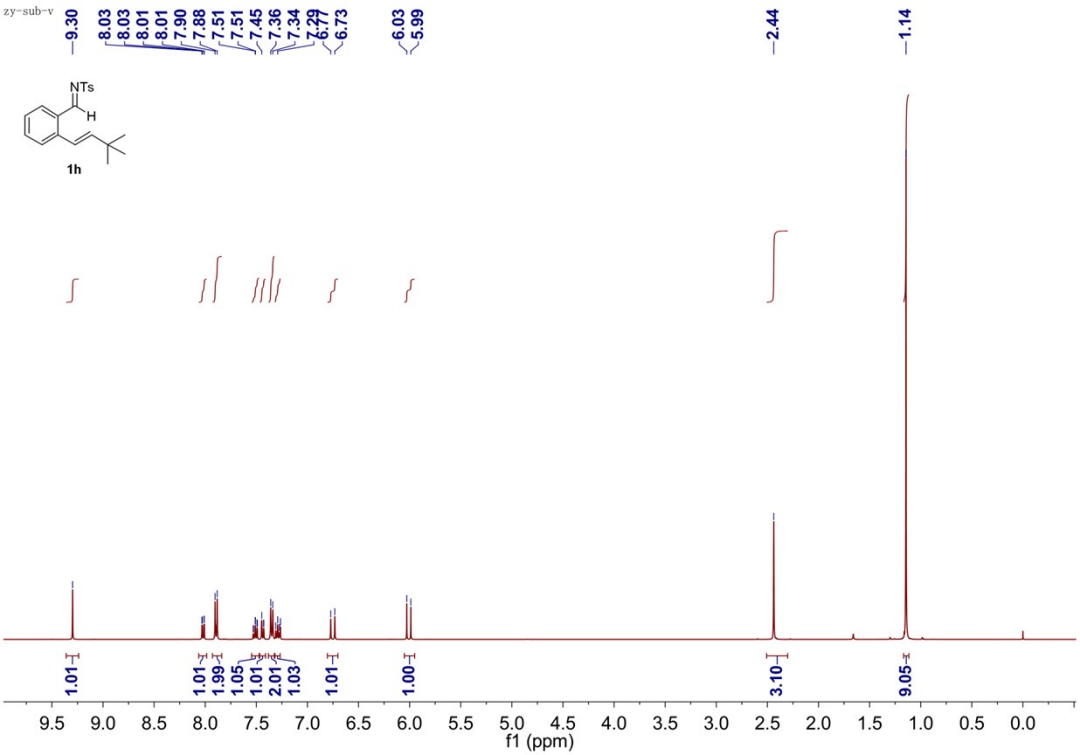


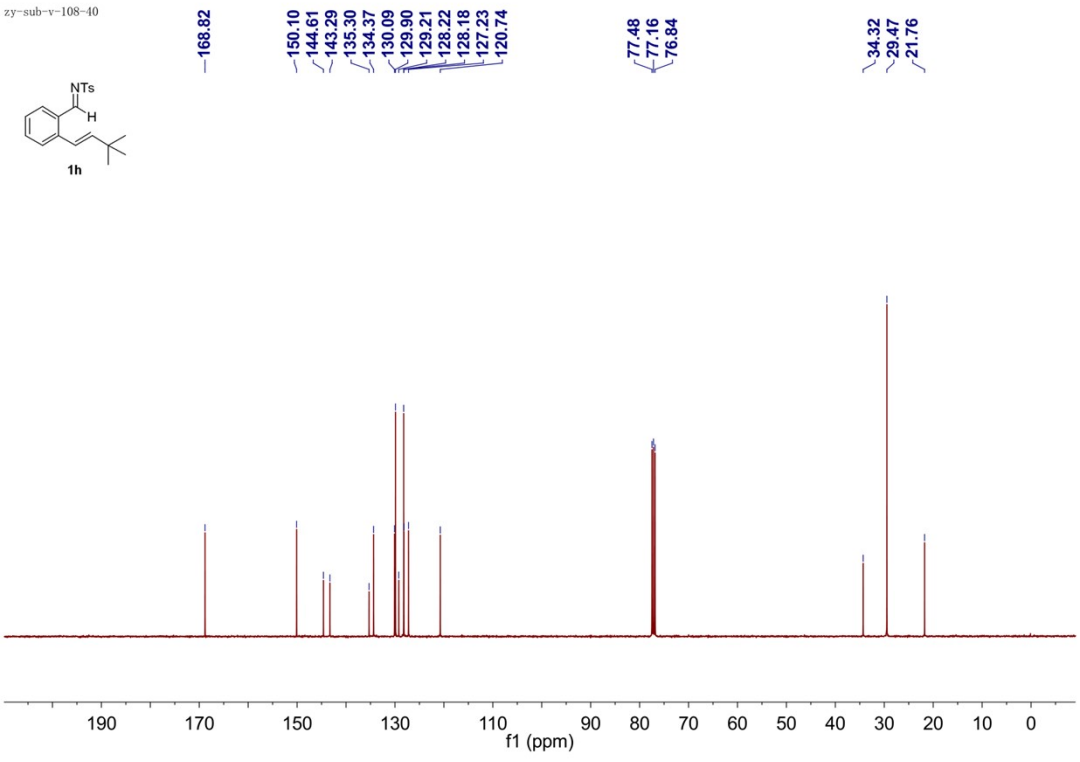
N-((E)-2-((E)-2-cyclohexylvinyl)benzylidene)-4-methylbenzenesulfonamide (**1g**)



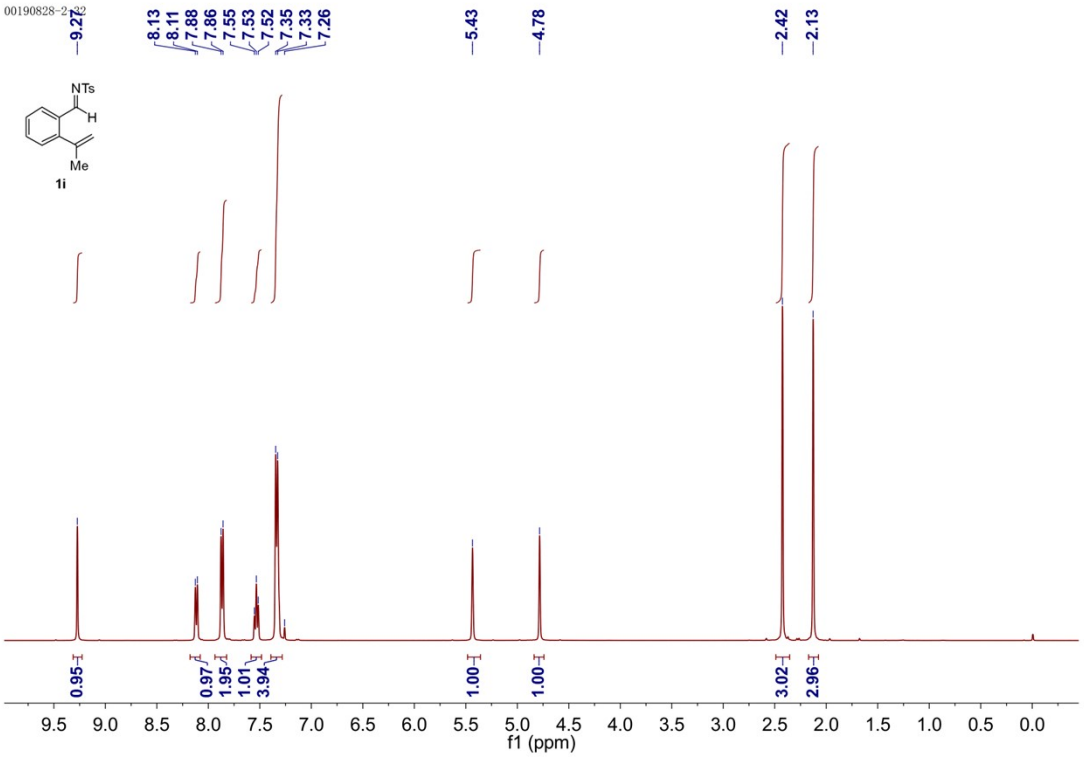


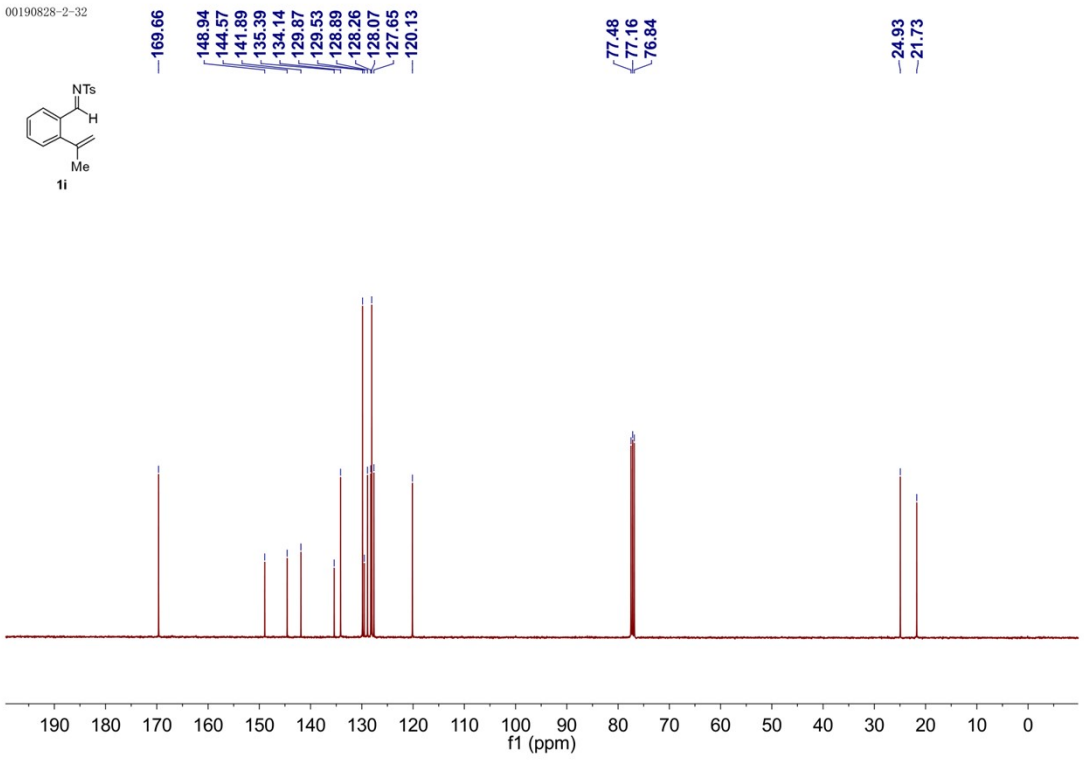
N-((E)-2-((E)-3,3-dimethylbut-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**1h**)



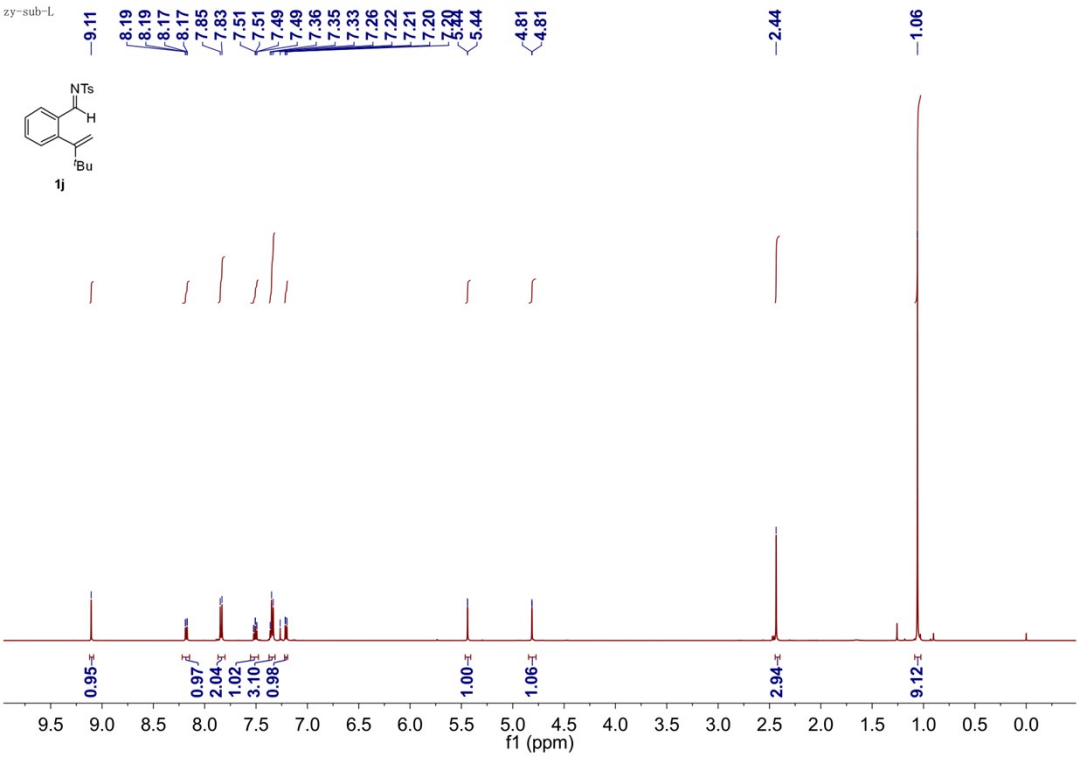


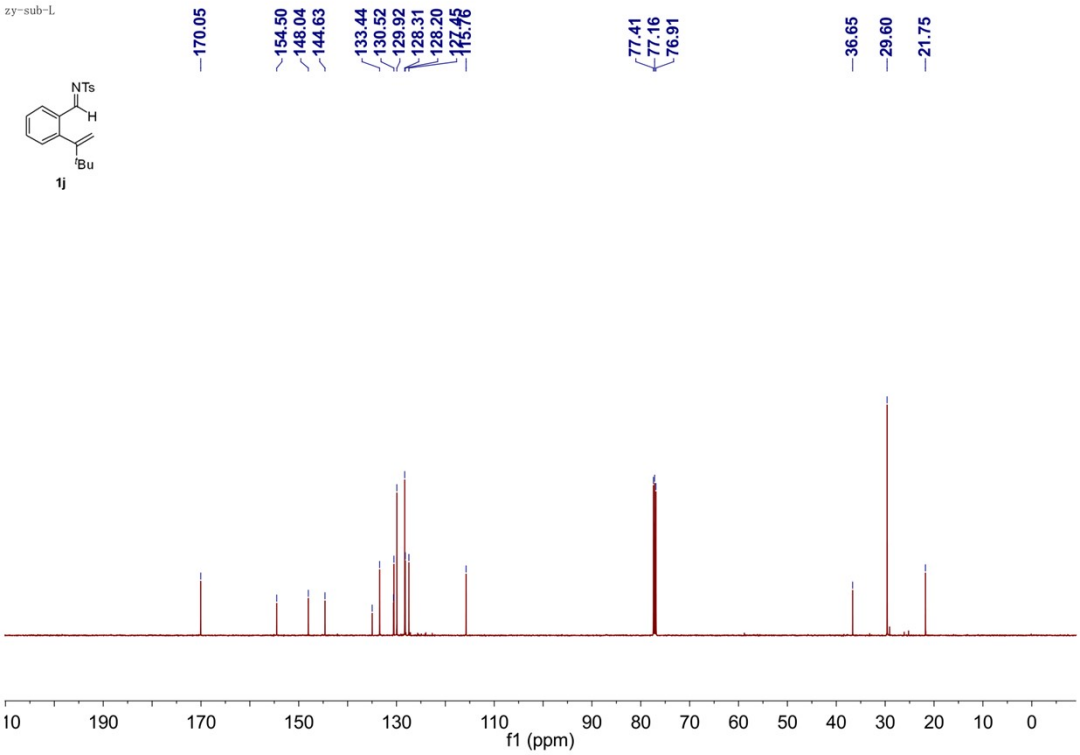
(E)-4-methyl-N-(2-(prop-1-en-2-yl)benzylidene)benzenesulfonamide **(1i)**



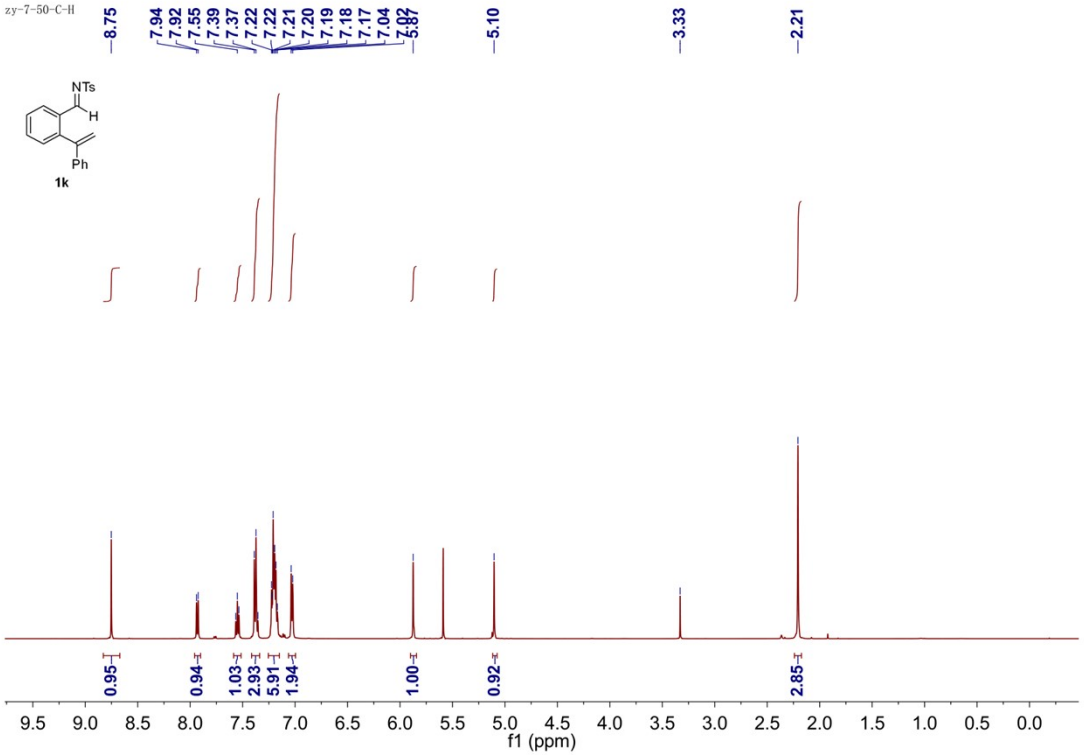


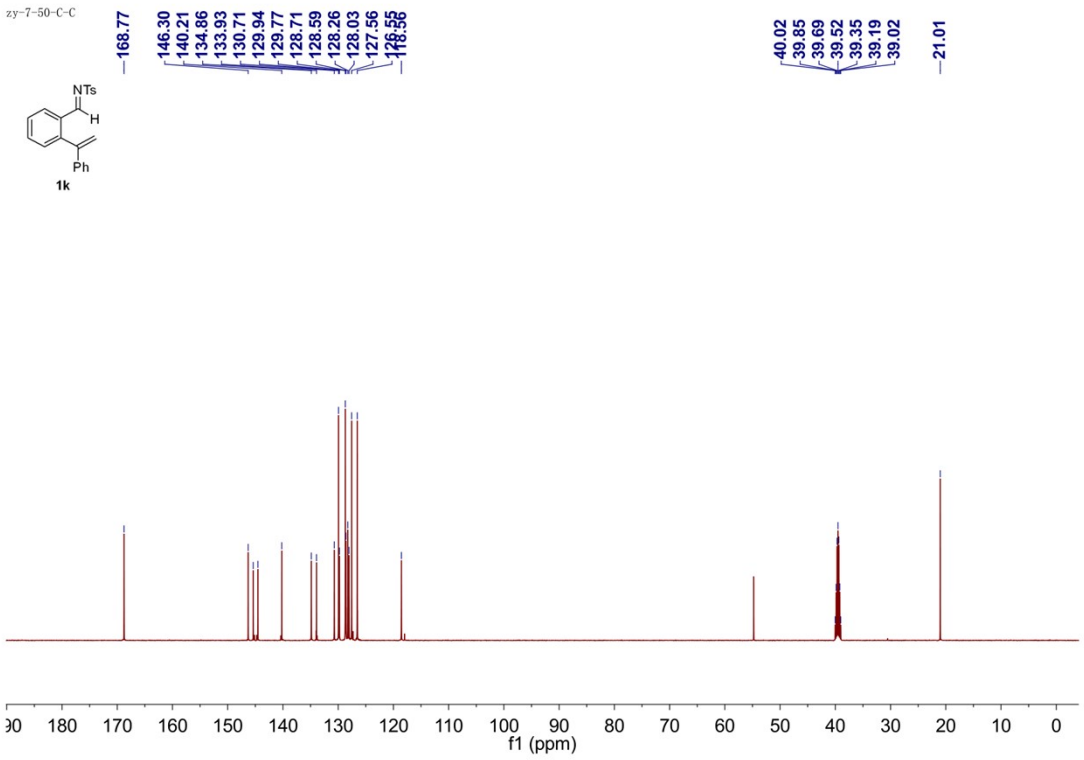
(E)-N-(2-(3,3-dimethylbut-1-en-2-yl)benzylidene)-4-methylbenzenesulfonamide **(1j)**



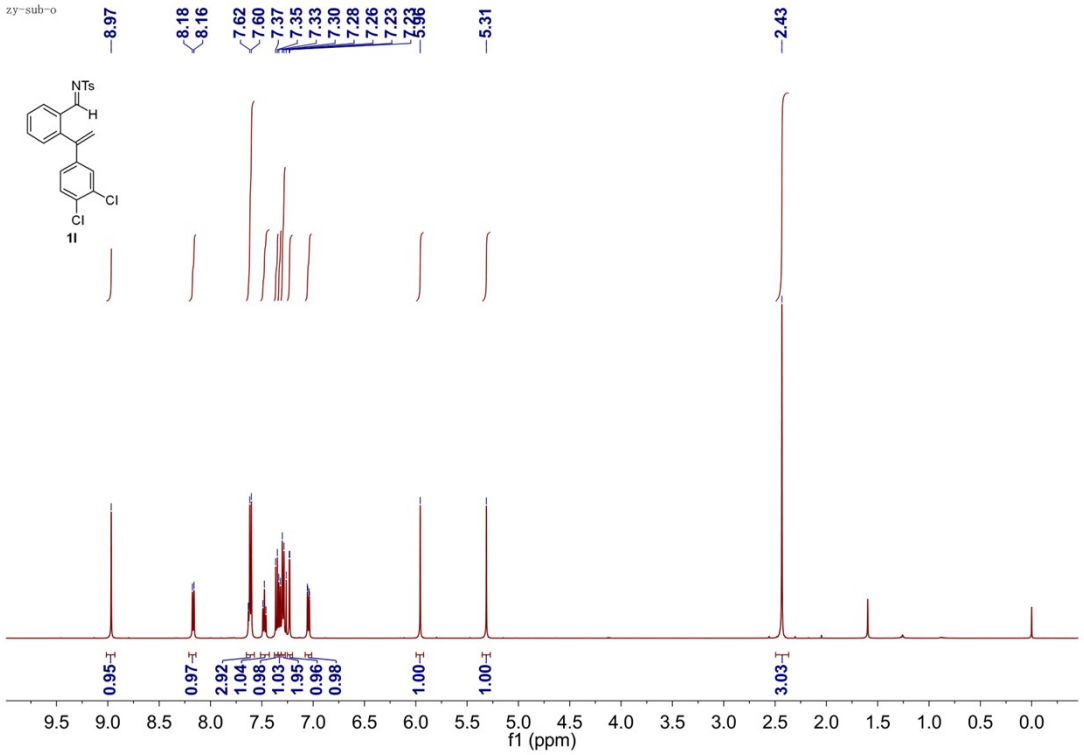


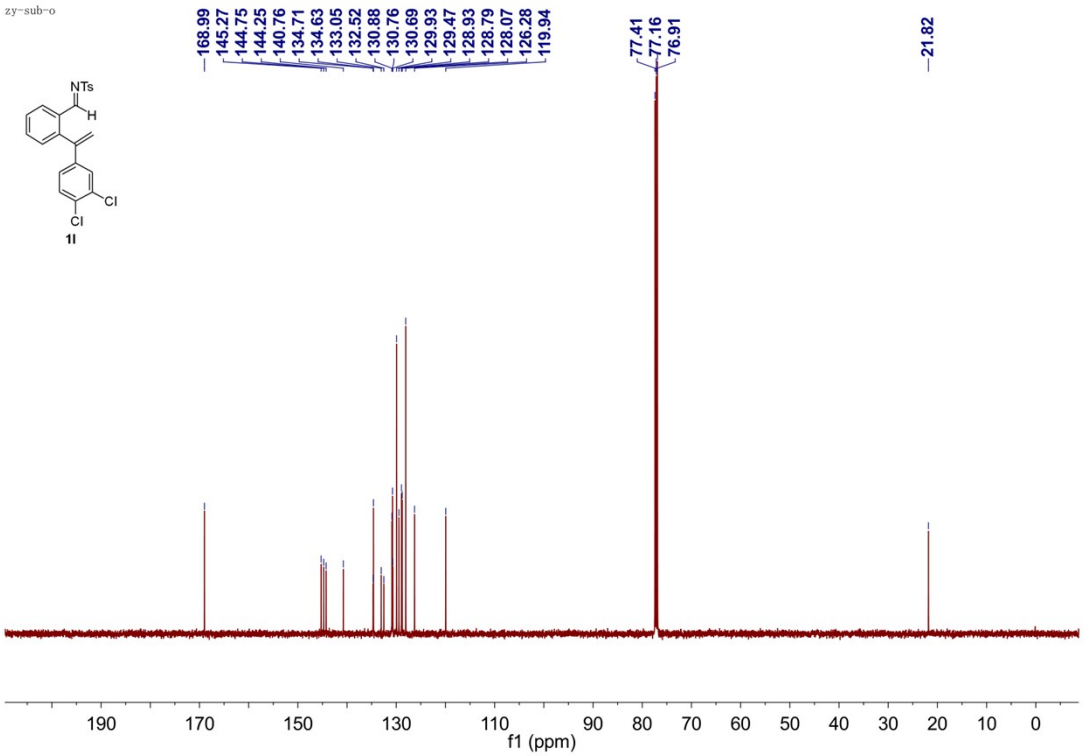
(E)-4-methyl-N-(2-(1-phenylvinyl)benzylidene)benzenesulfonamide **(1k)**



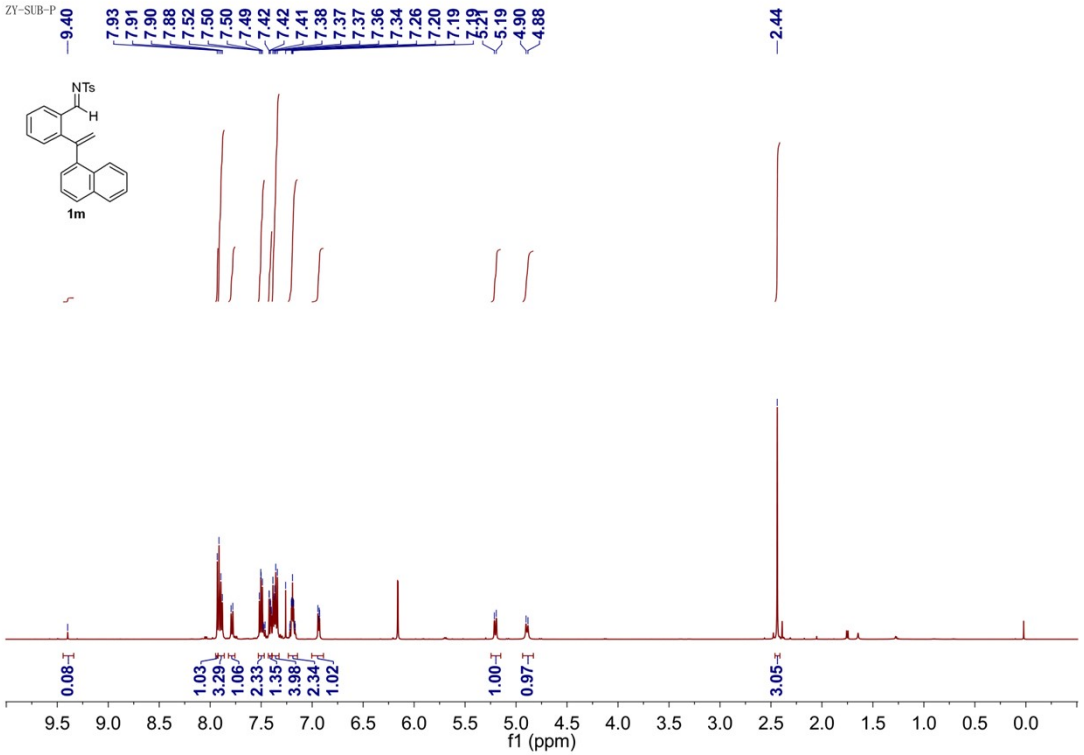


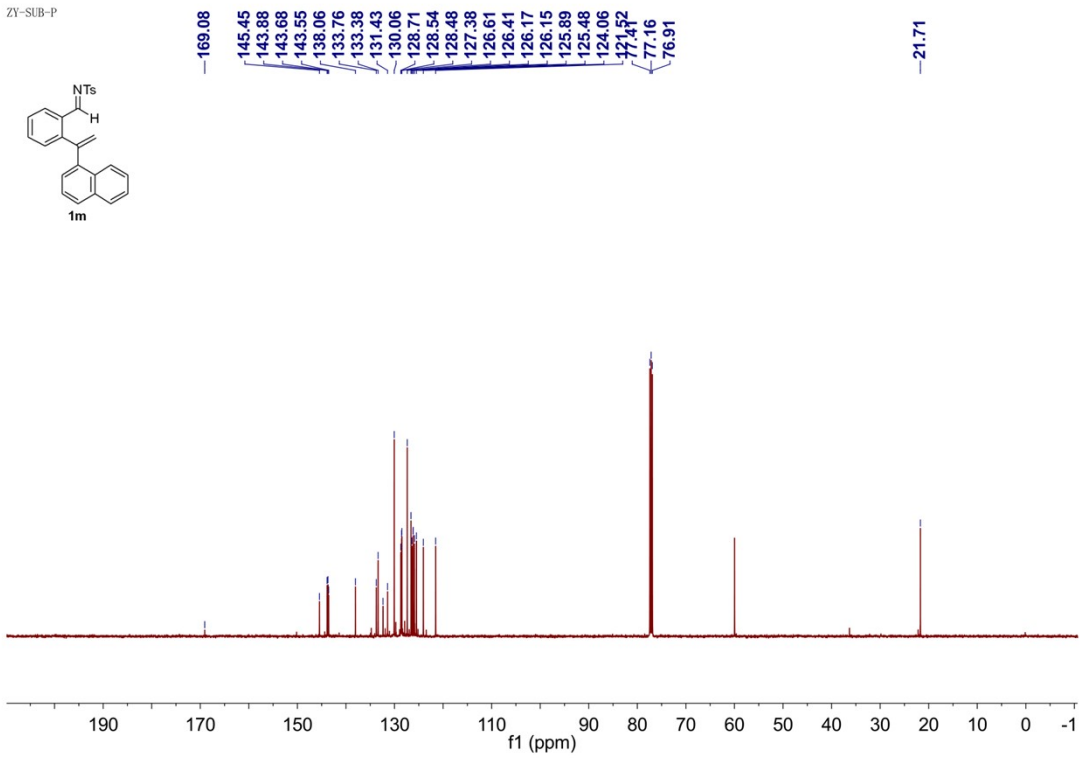
(E)-N-(2-(1-(3,4-dichlorophenyl)vinyl)benzylidene)-4-methylbenzenesulfonamide (**1l**)



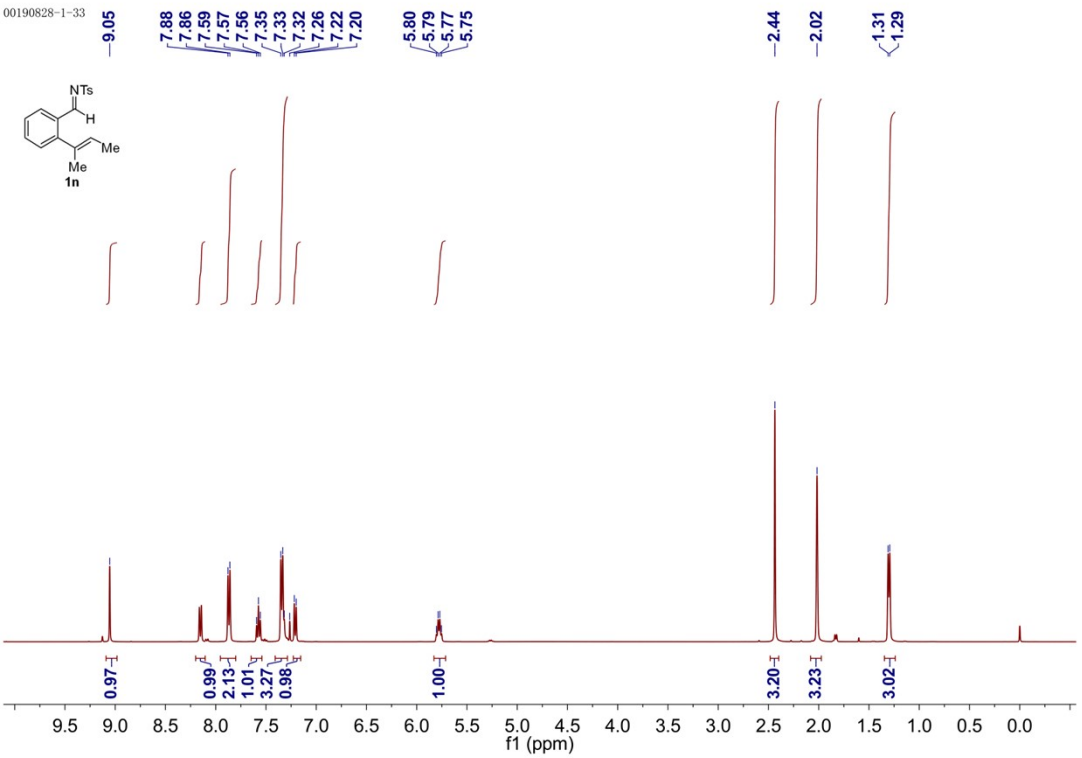


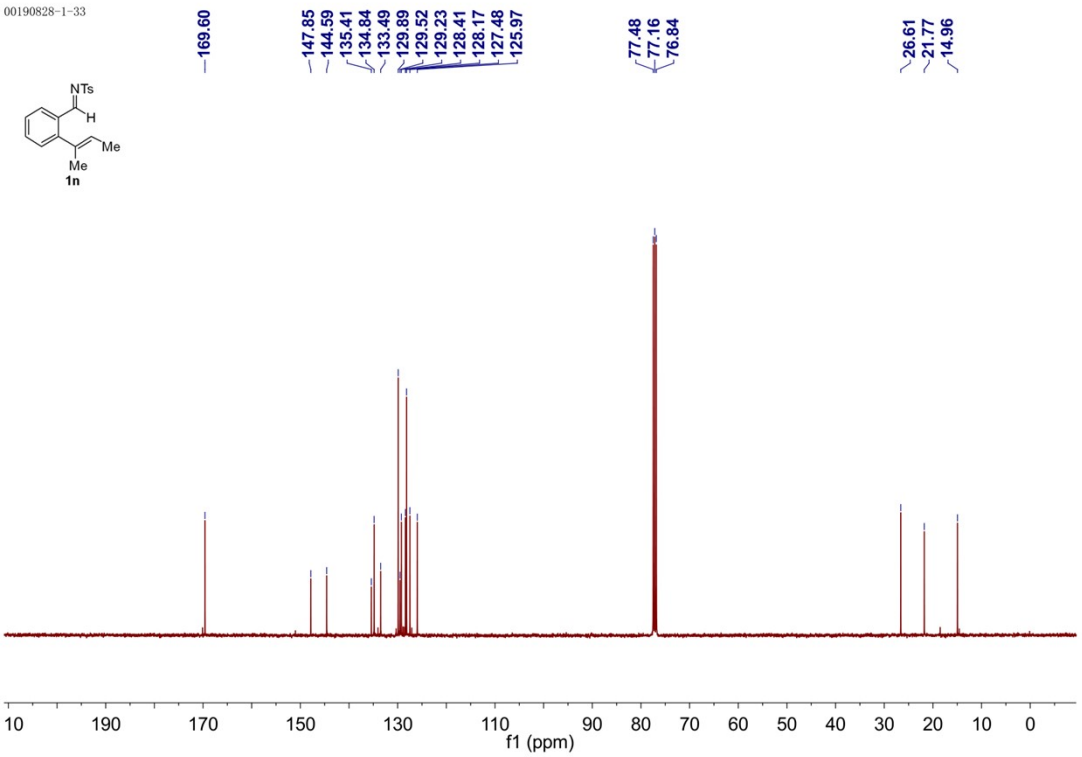
(E)-4-methyl-N-(2-(1-(naphthalen-1-yl)vinyl)benzylidene)benzenesulfonamide (**1m**)



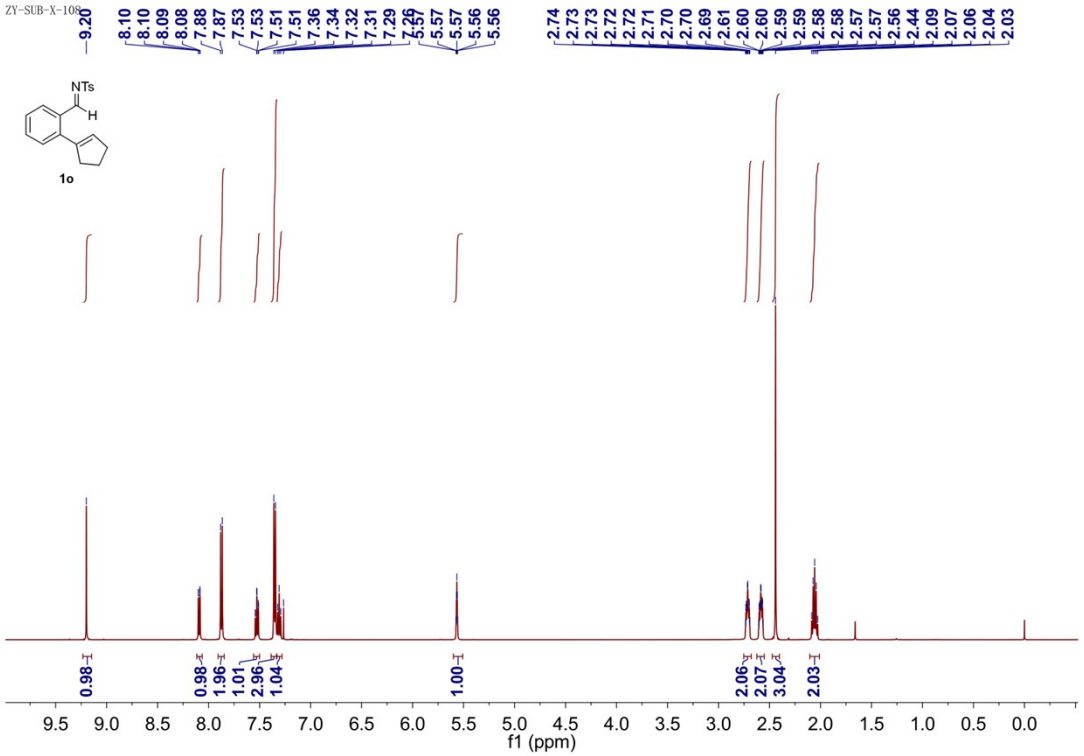


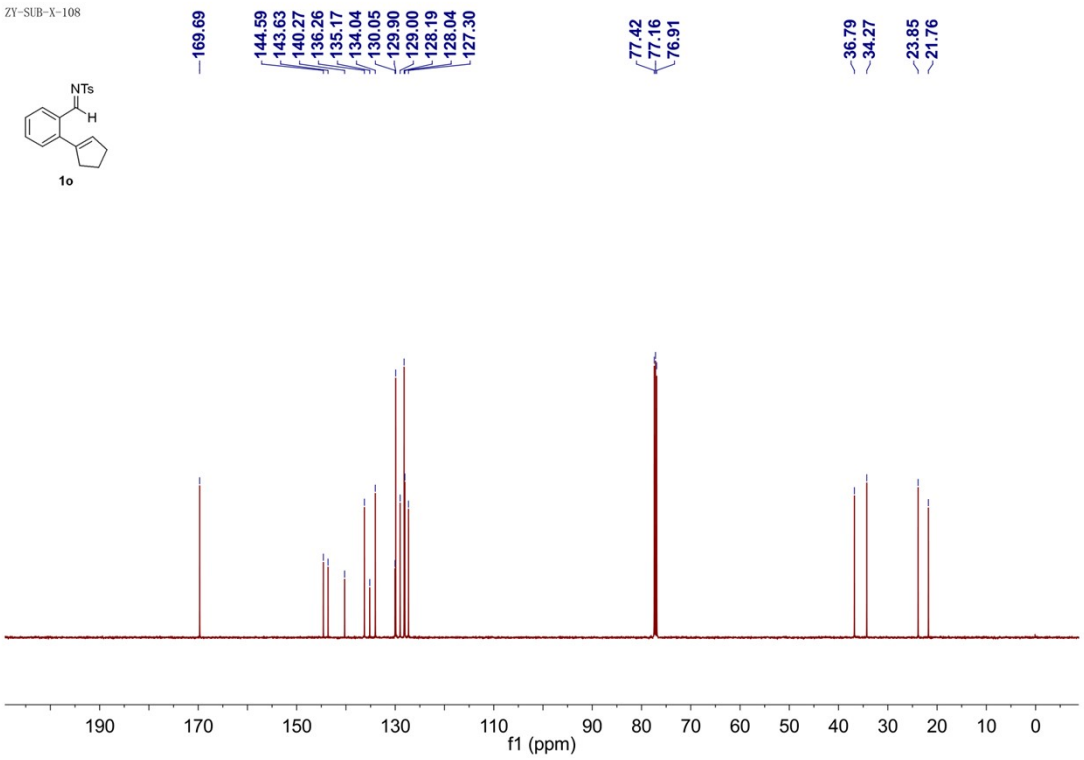
N-((E)-2-((E)-but-2-en-2-yl)benzylidene)-4-methylbenzenesulfonamide (**1n**)



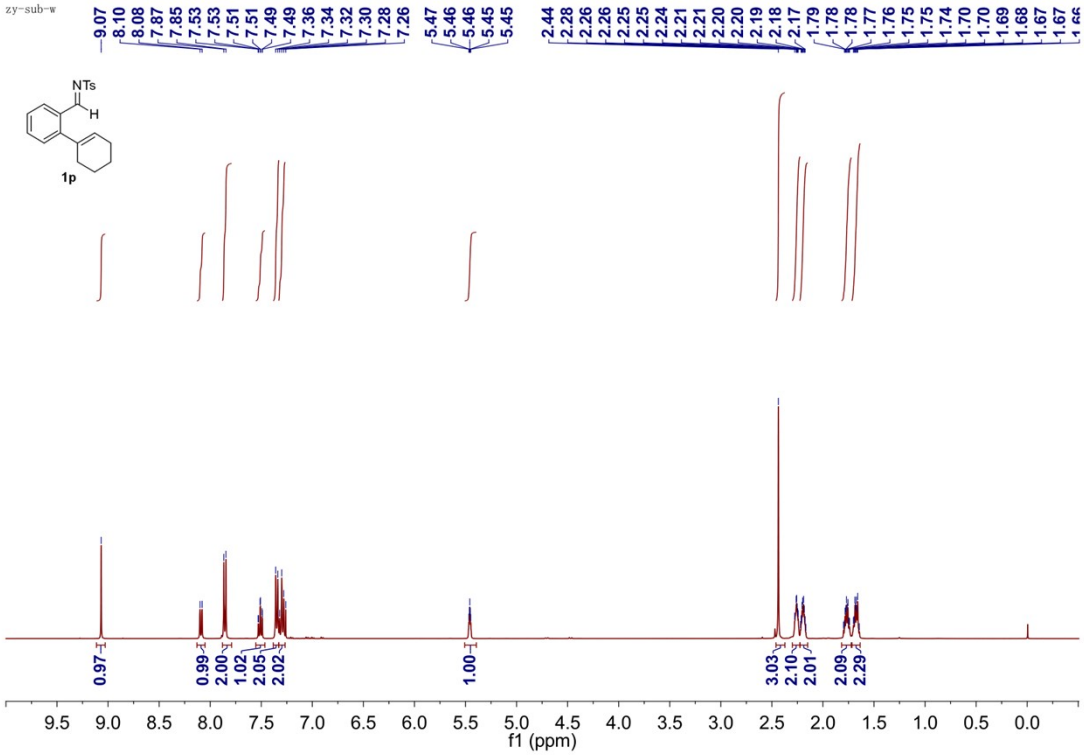


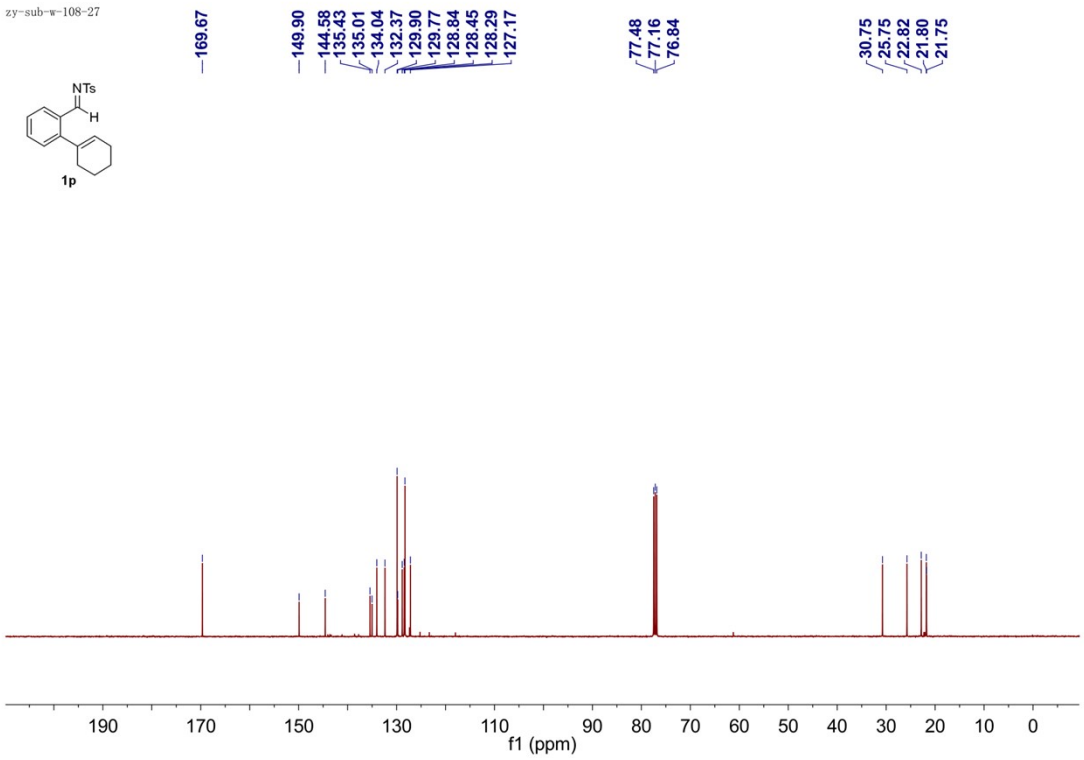
(E)-N-(2-(cyclopent-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**1o**)



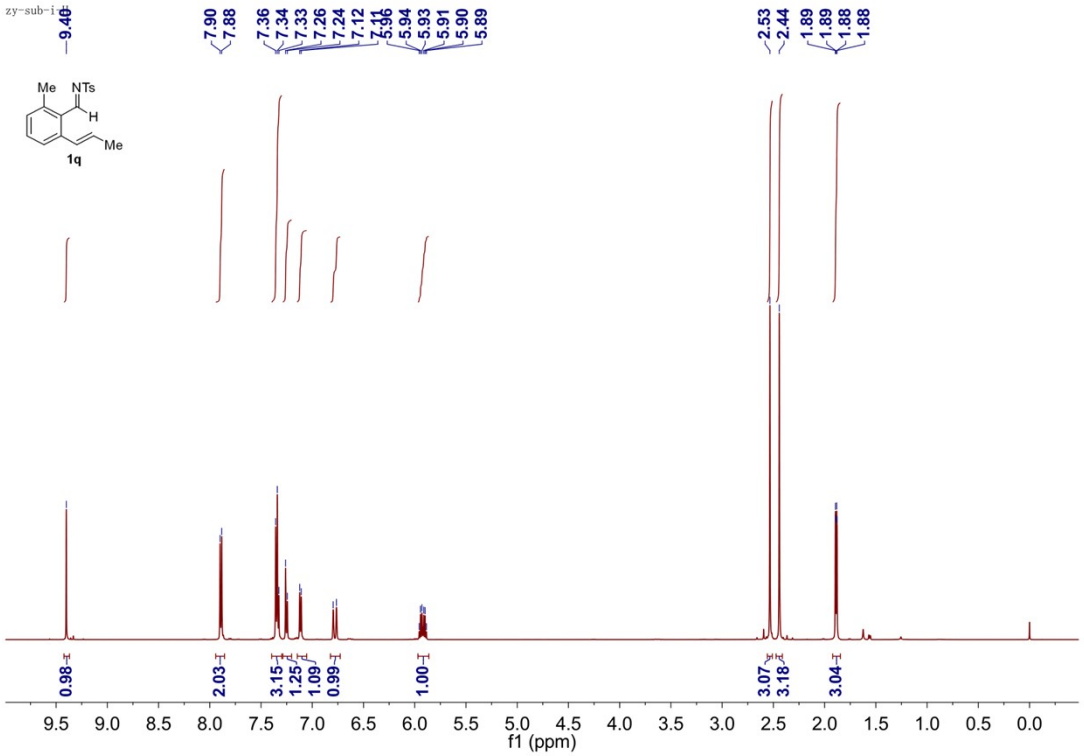


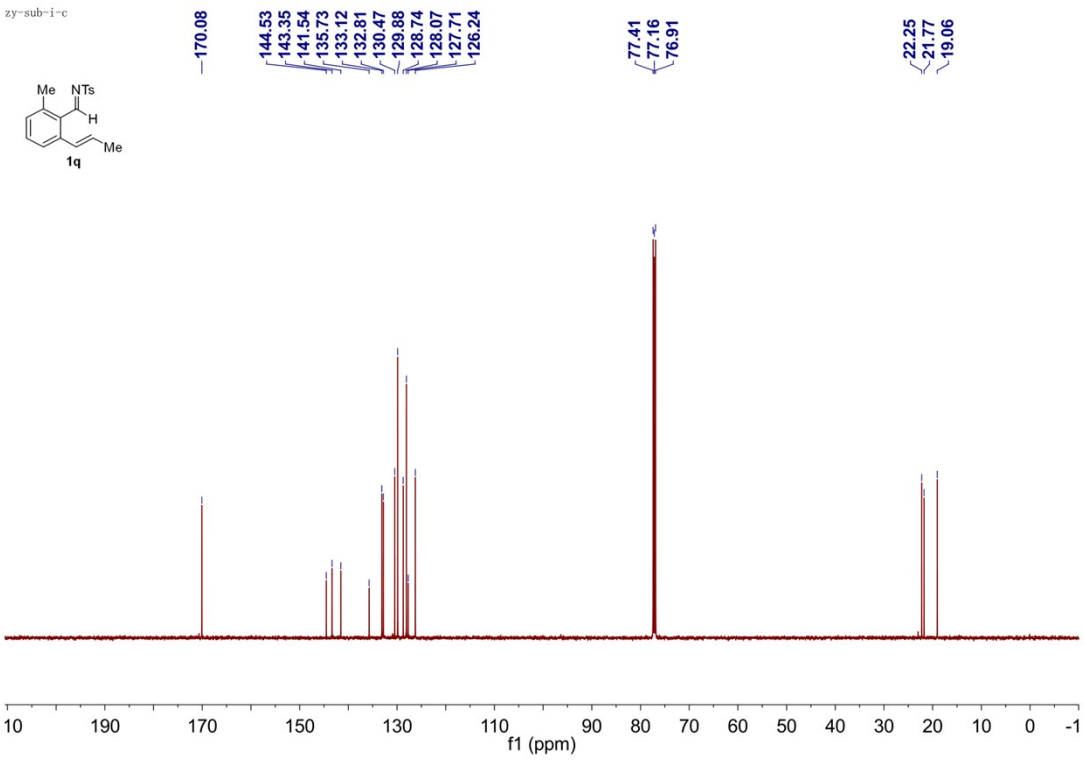
(E)-4-methyl-N-((2',3',4',5'-tetrahydro-[1,1'-biphenyl]-2-yl)methylene)benzenesulfonamide (**1p**)



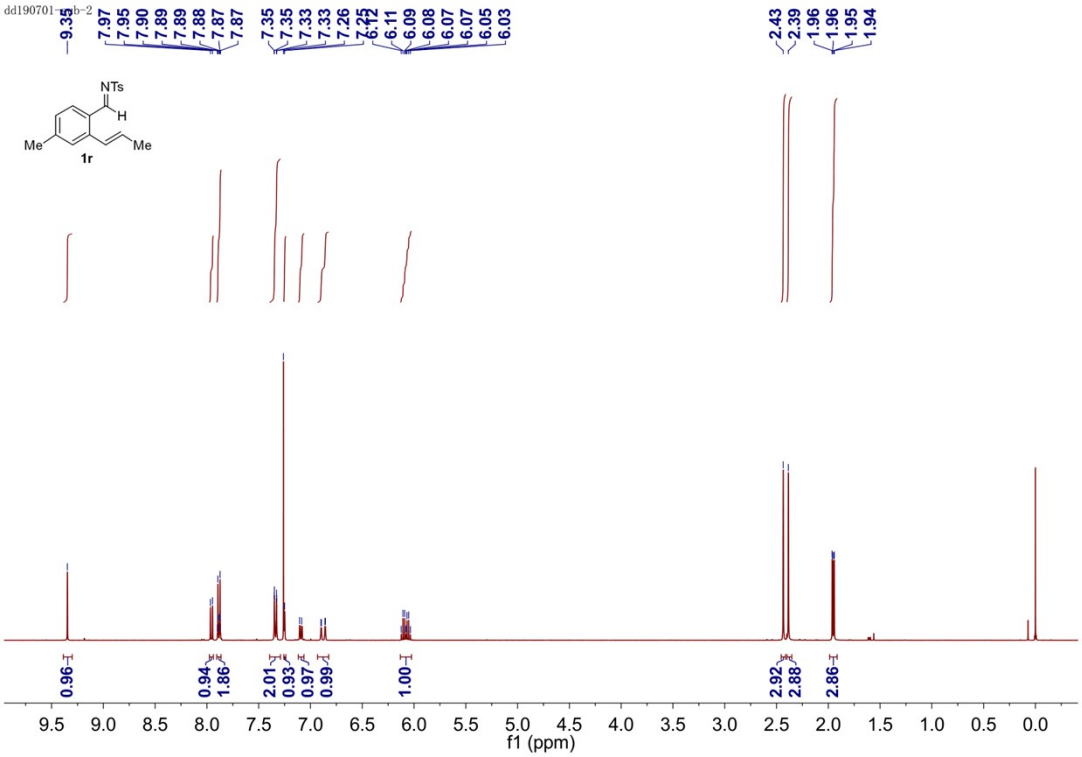


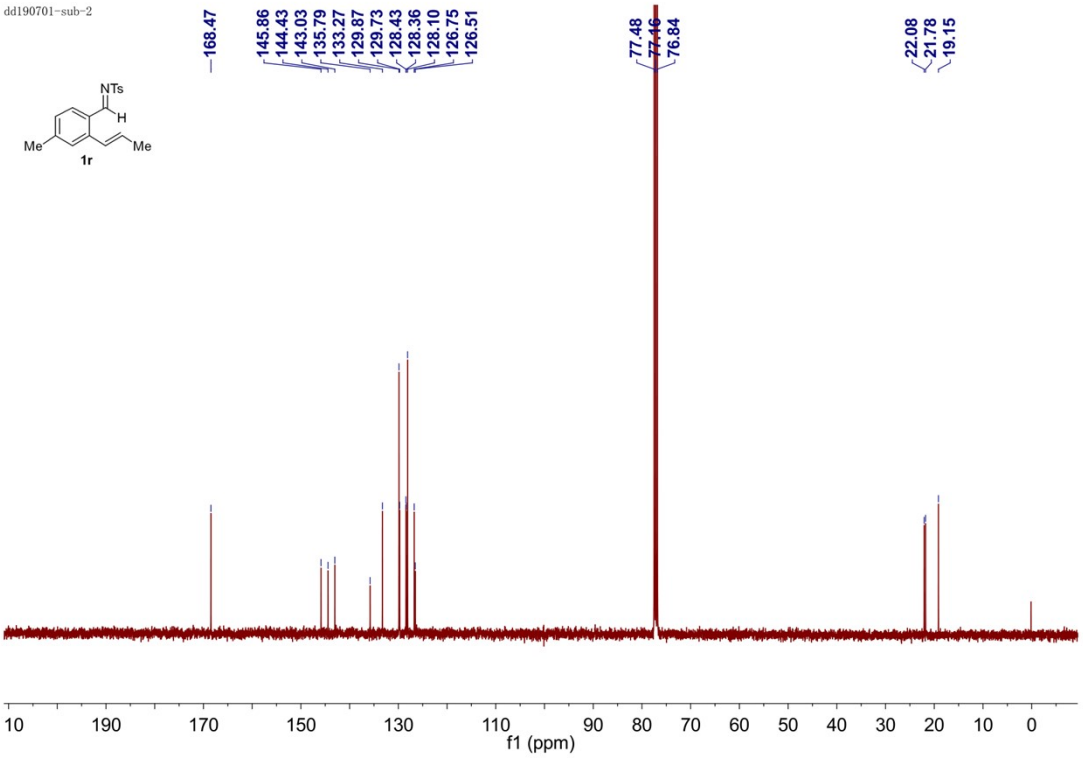
4-methyl-N-((E)-2-methyl-6-((E)-prop-1-en-1-yl)benzylidene)benzenesulfonamide **(1q)**



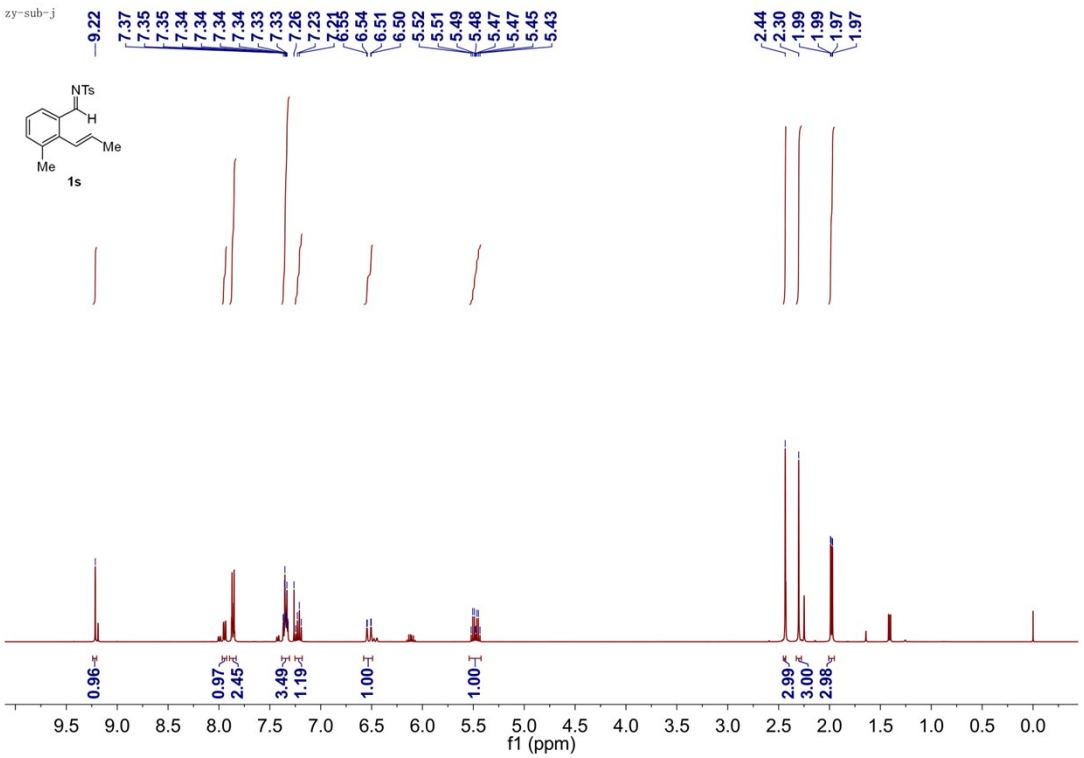


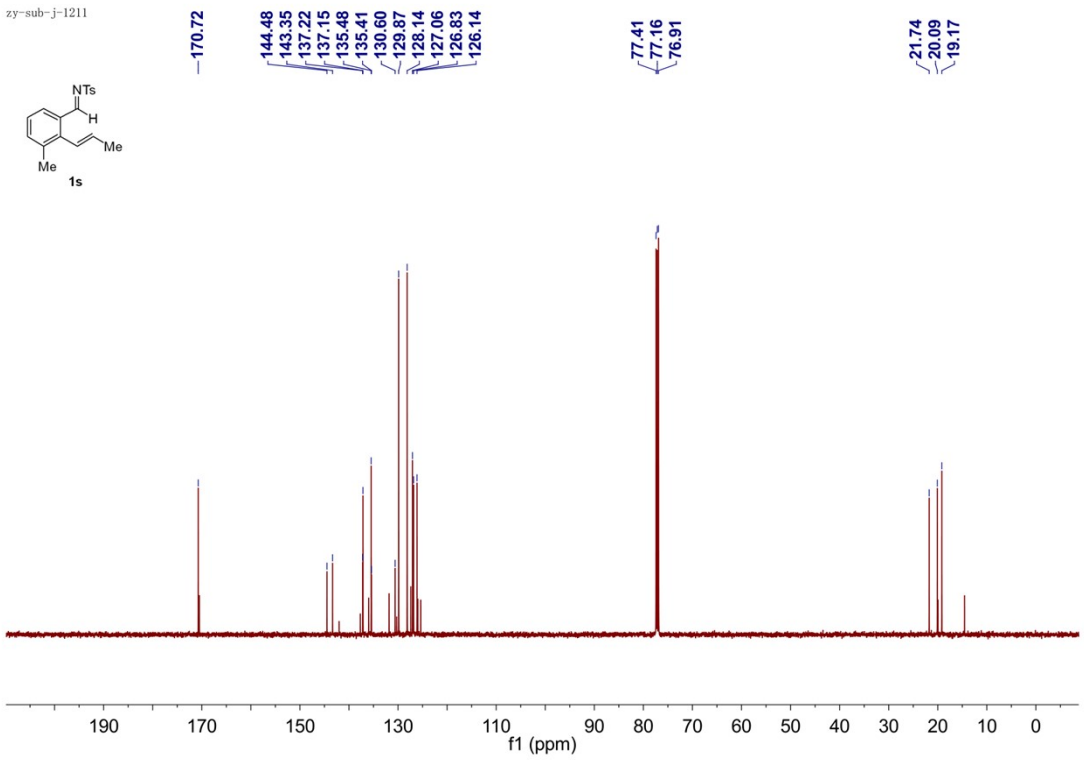
4-methyl-N-((E)-4-methyl-2-((E)-prop-1-en-1-yl)benzylidene)benzenesulfonamide **(1r)**



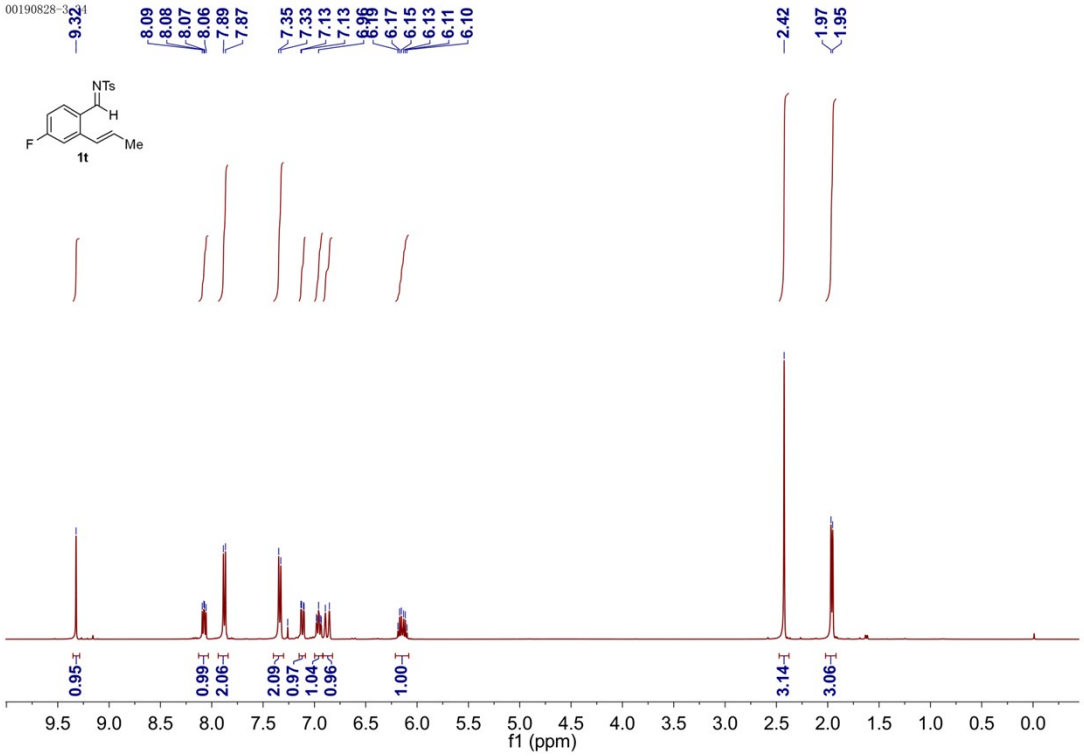


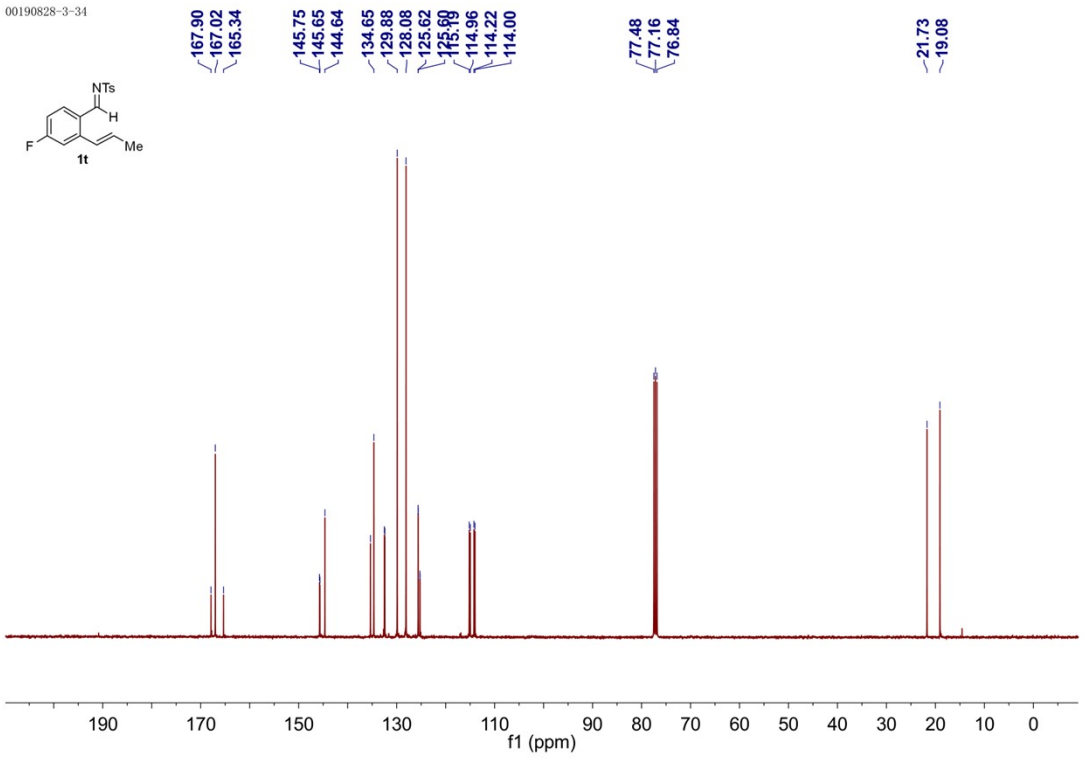
4-methyl-N-((E)-3-methyl-2-((E)-prop-1-en-1-yl)benzylidene)benzenesulfonamide (**1s**)



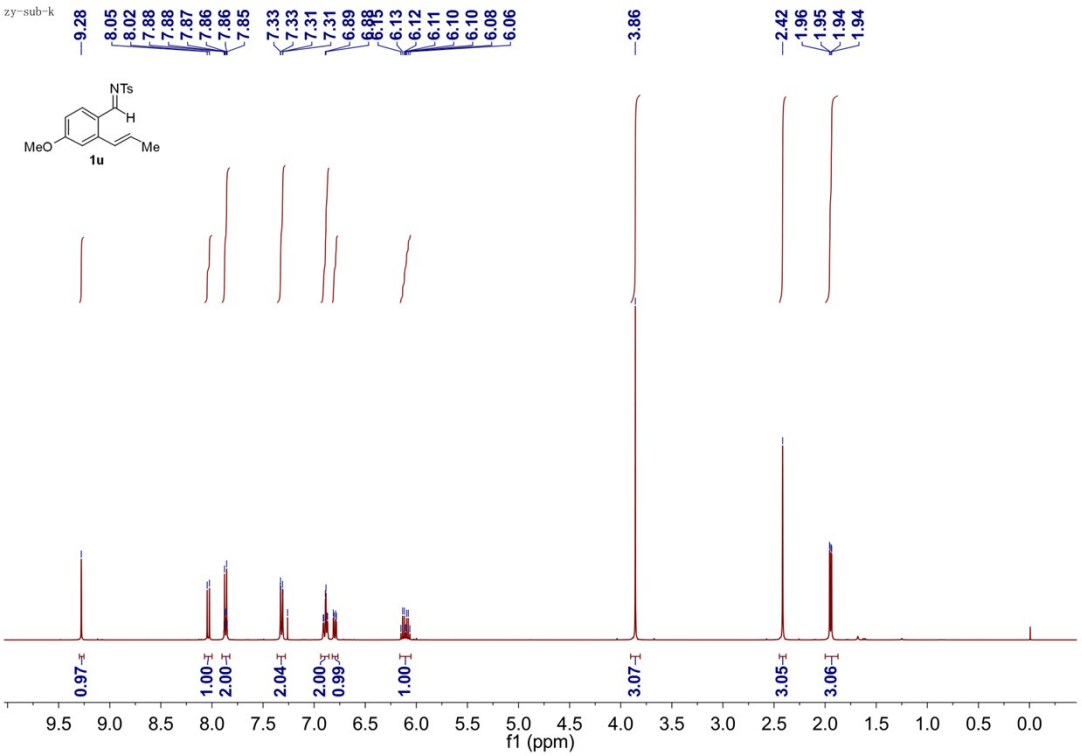


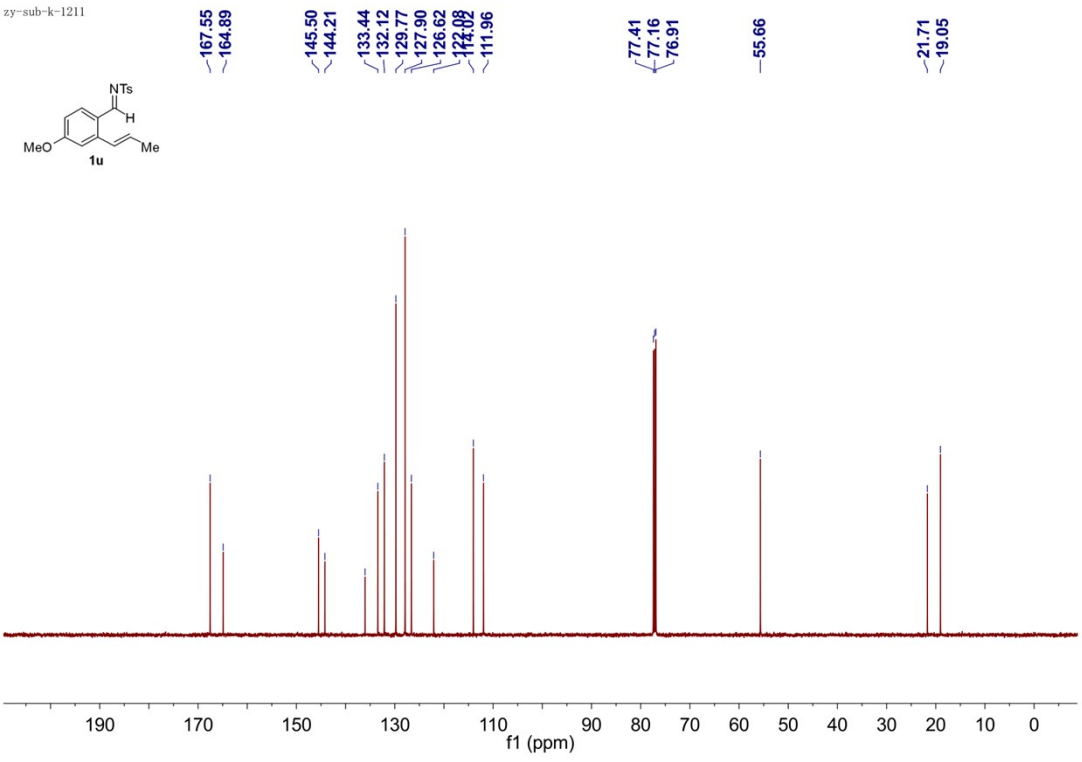
N-((E)-4-fluoro-2-((E)-prop-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide **(1t)**



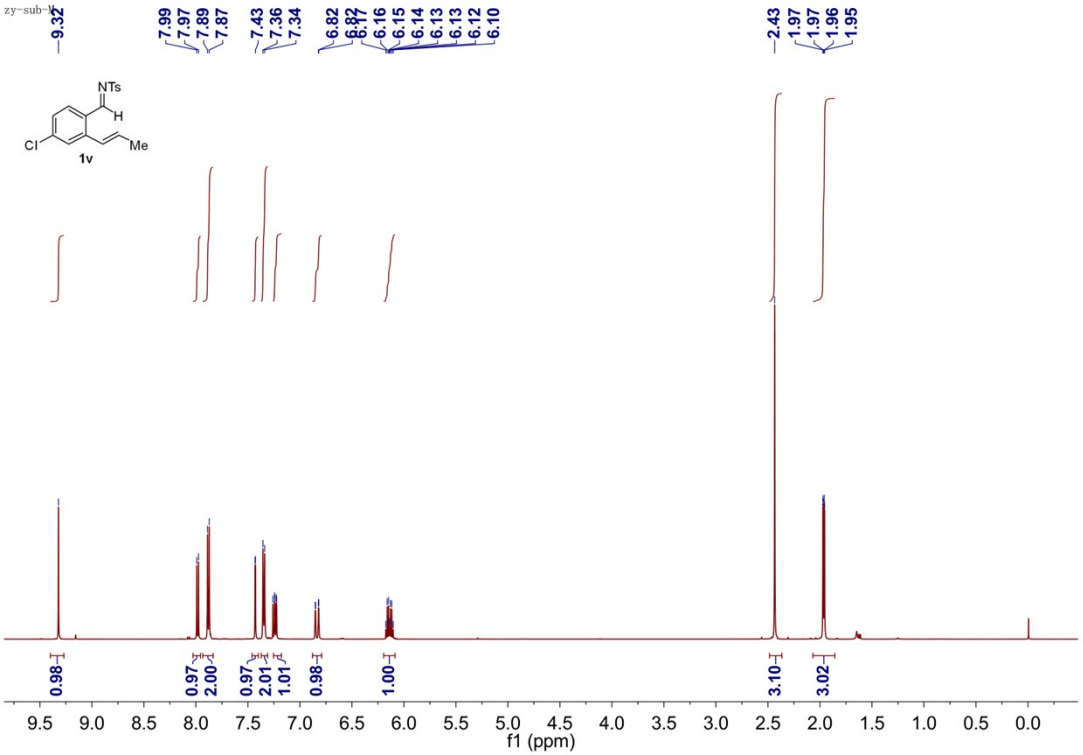


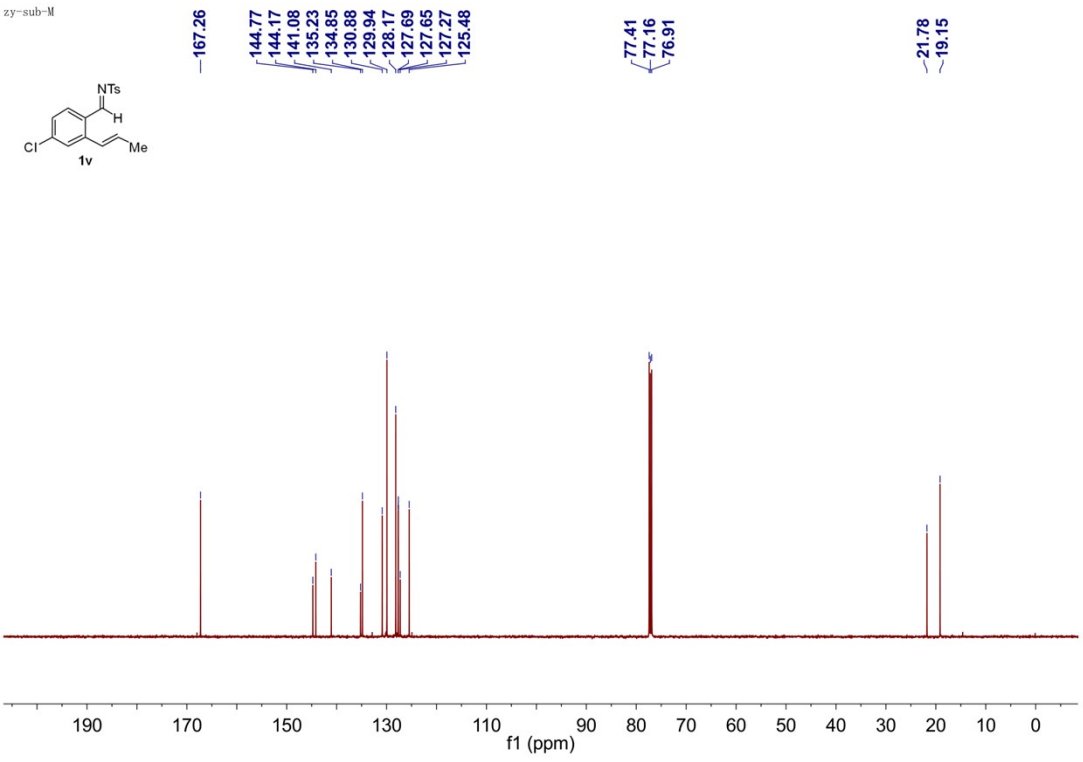
N-((E)-4-methoxy-2-((E)-prop-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**1t**)



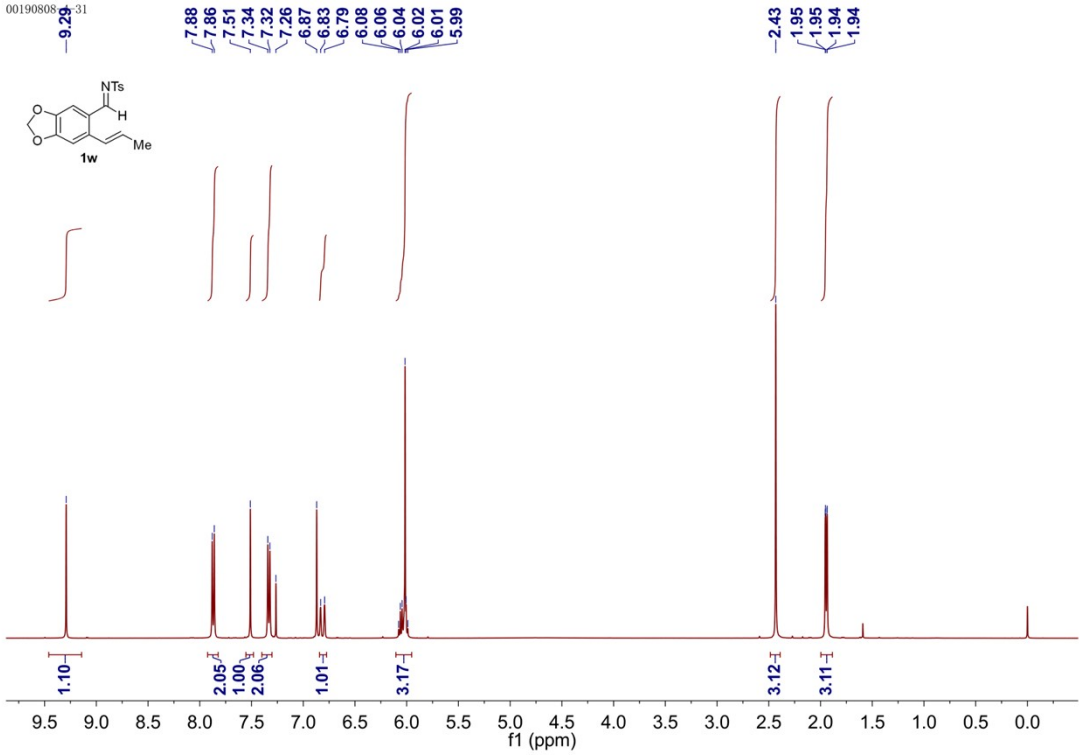


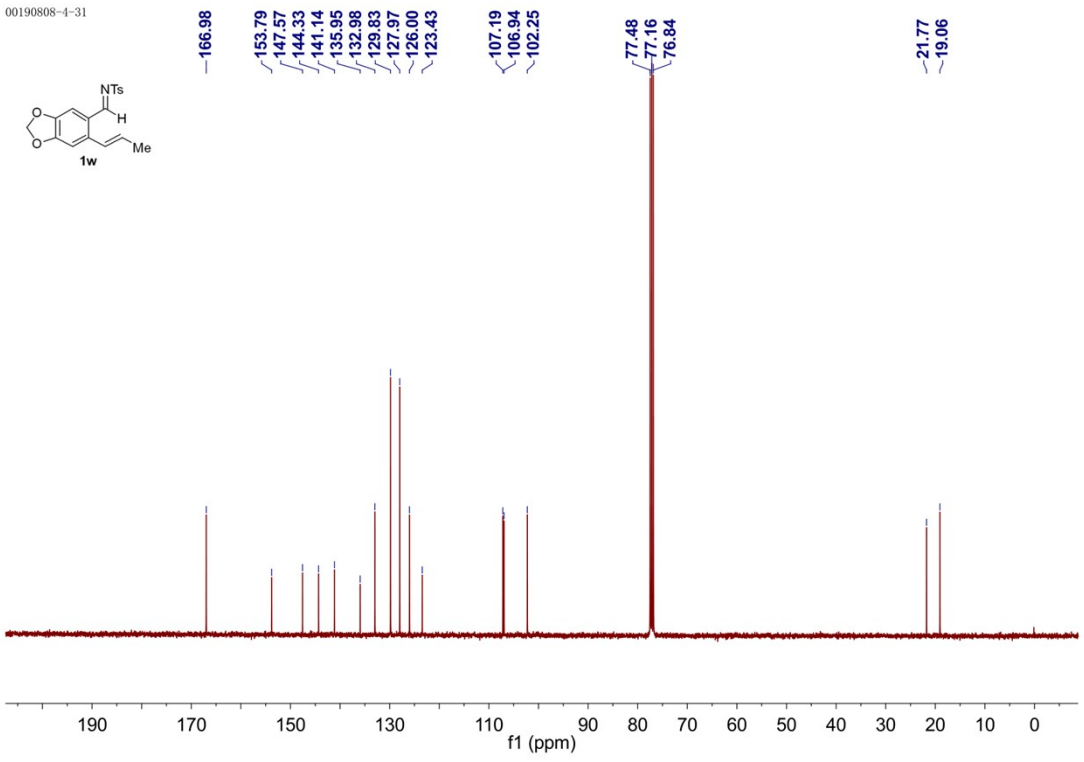
N-((E)-4-chloro-2-((E)-prop-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**1v**)



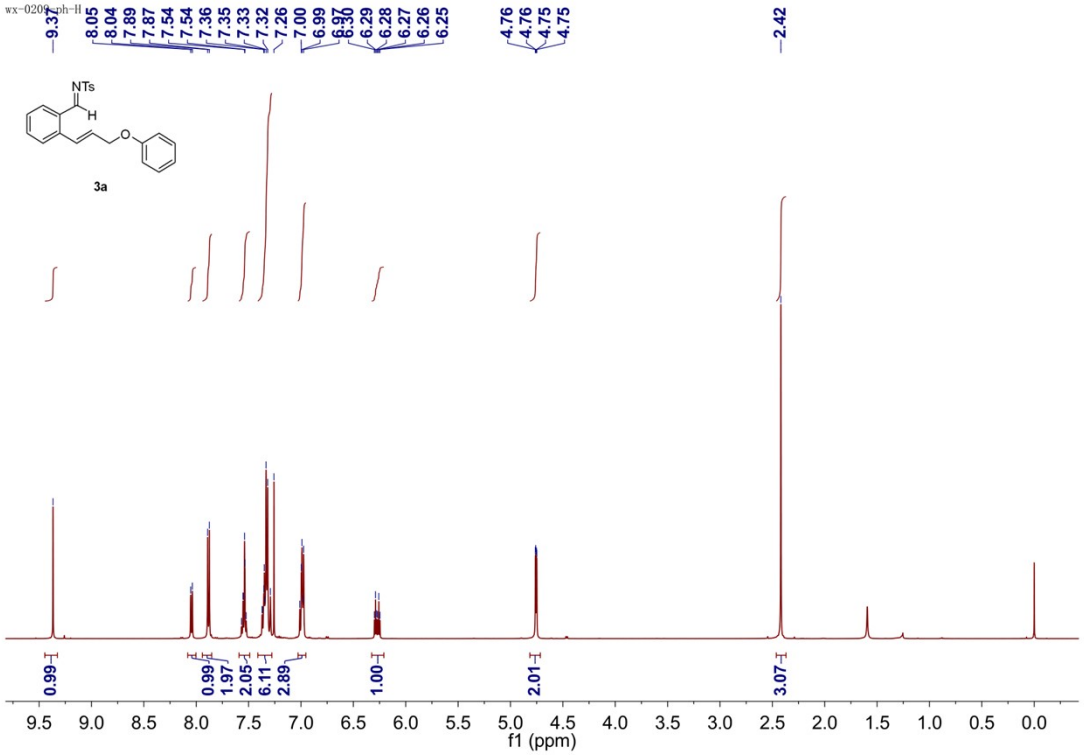


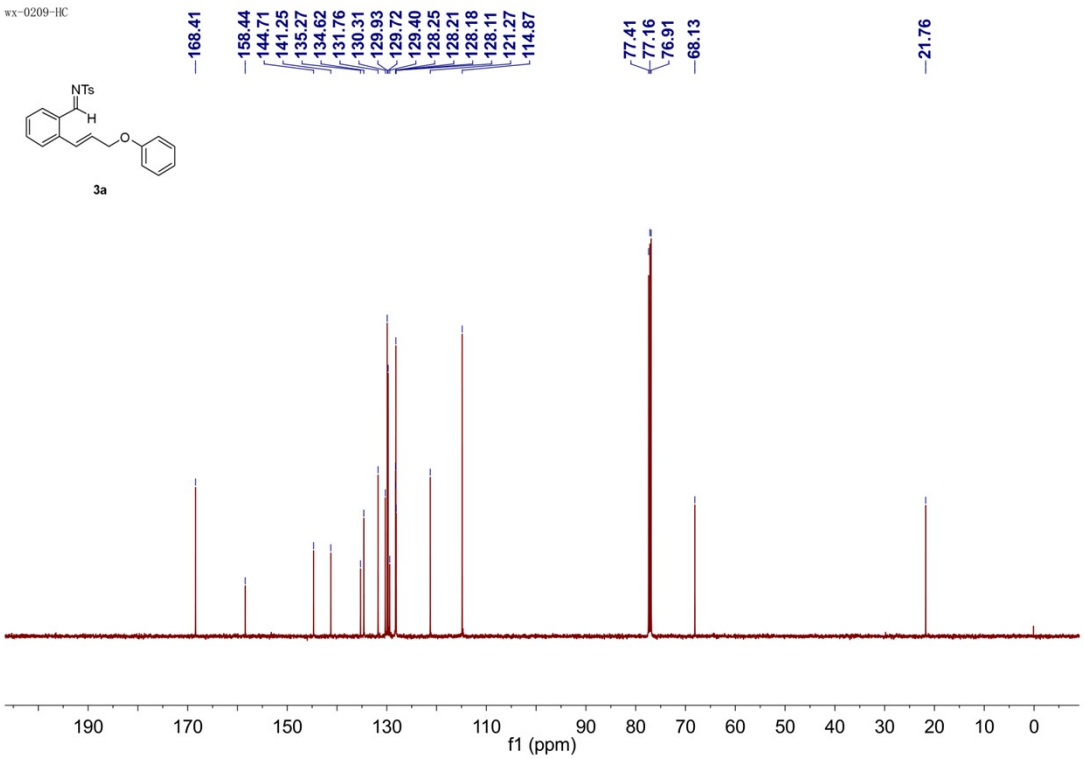
4-methyl-N-((E)-(6-((E)-prop-1-en-1-yl)benzo[d][1,3]dioxol-5-yl)methylene)benzenesulfonamide (**1w**)



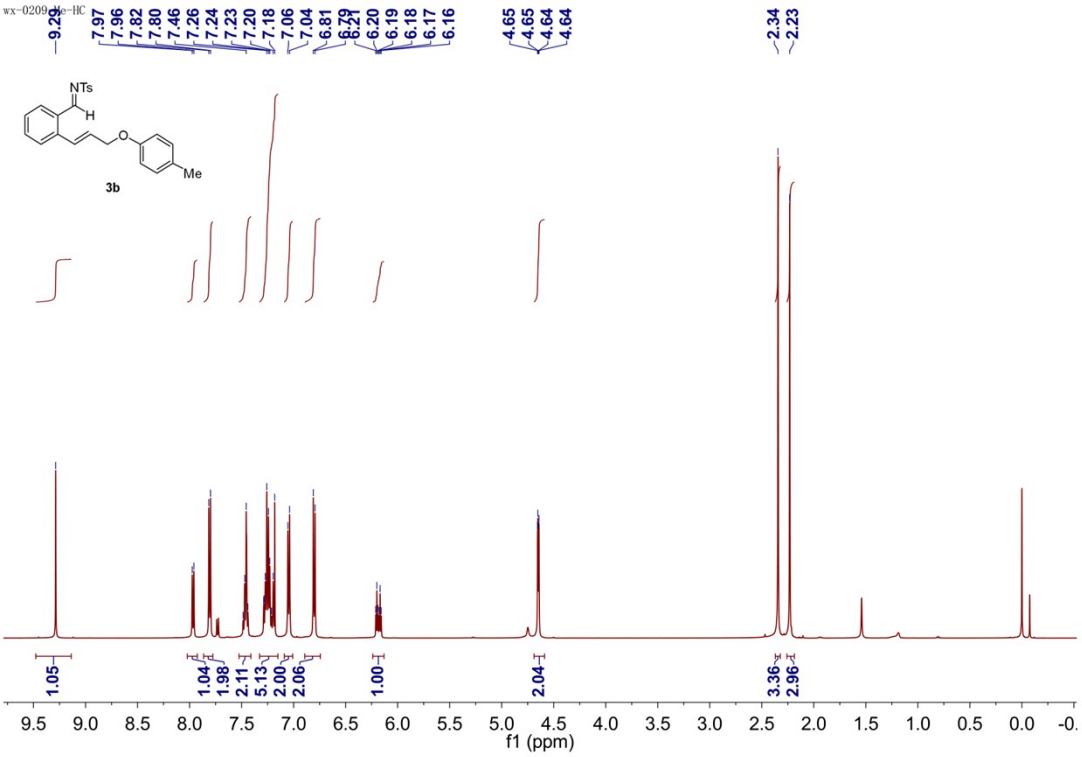


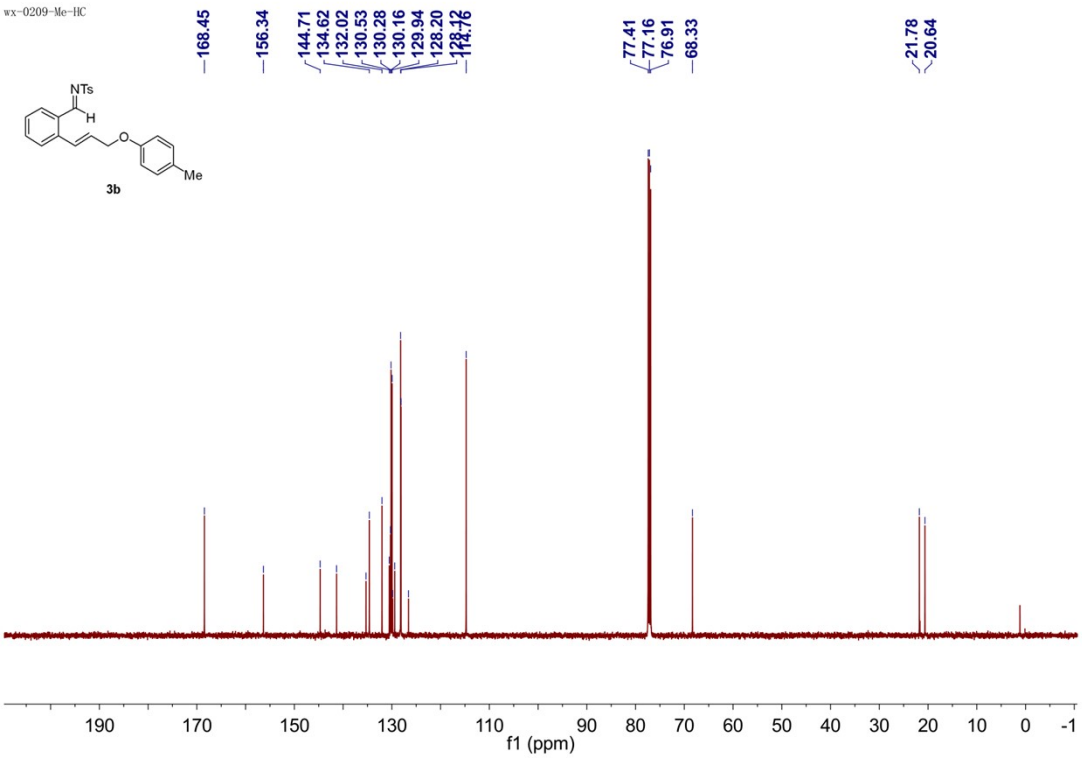
4-methyl-N-((E)-2-((E)-3-phenoxyprop-1-en-1-yl)benzylidene)benzenesulfonamide (**3a**)



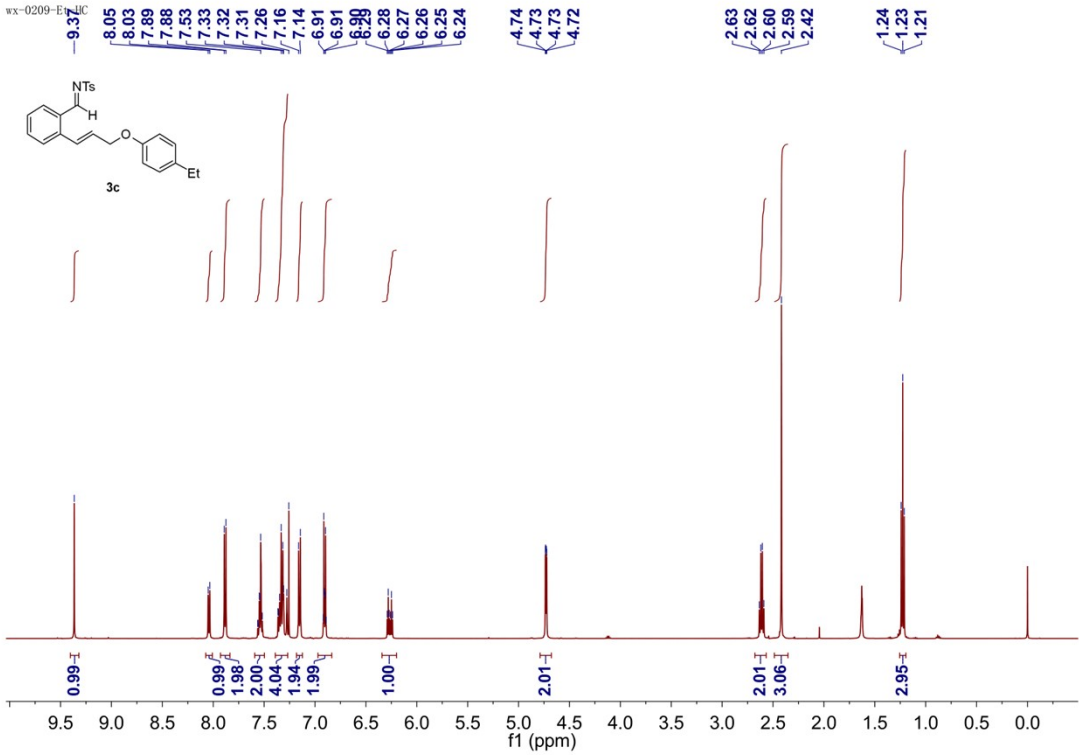


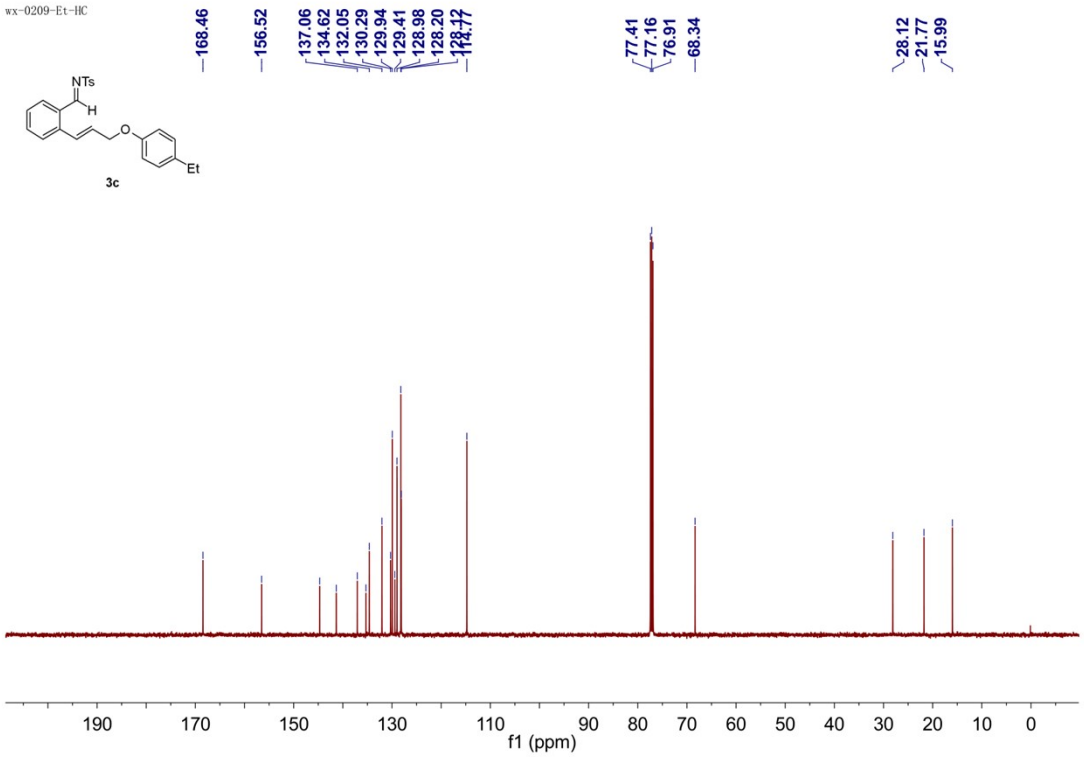
4-methyl-N-((E)-2-((E)-3-(p-tolyloxy)prop-1-en-1-yl)benzylidene)benzenesulfonamide (**3b**)



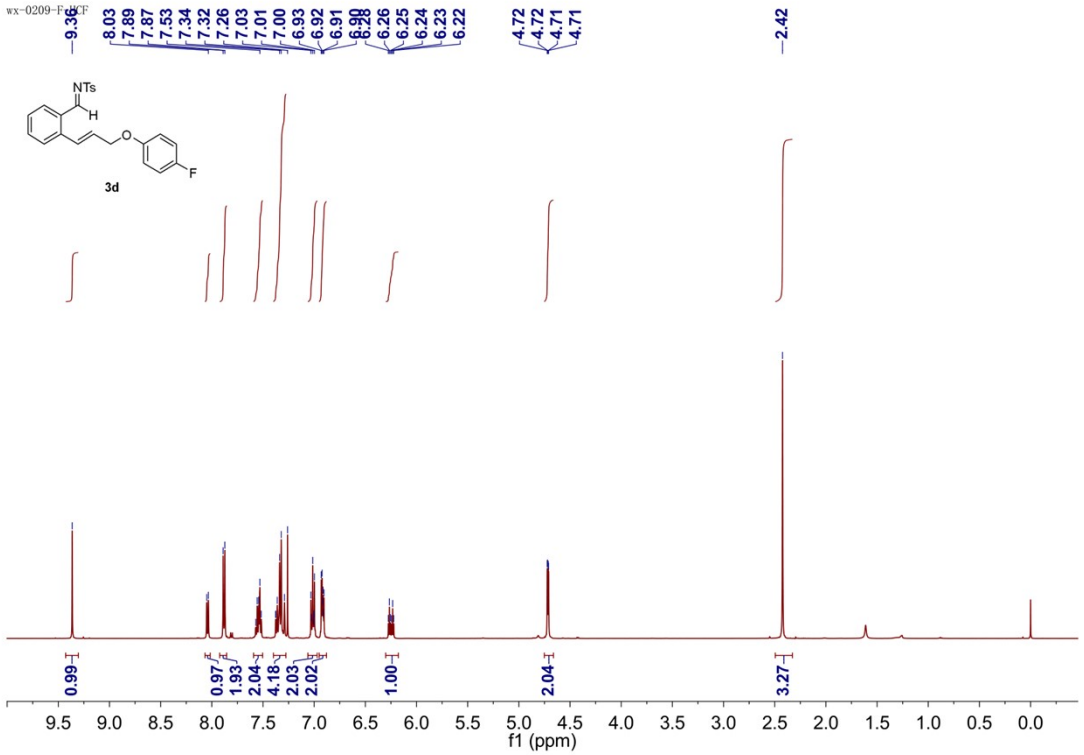


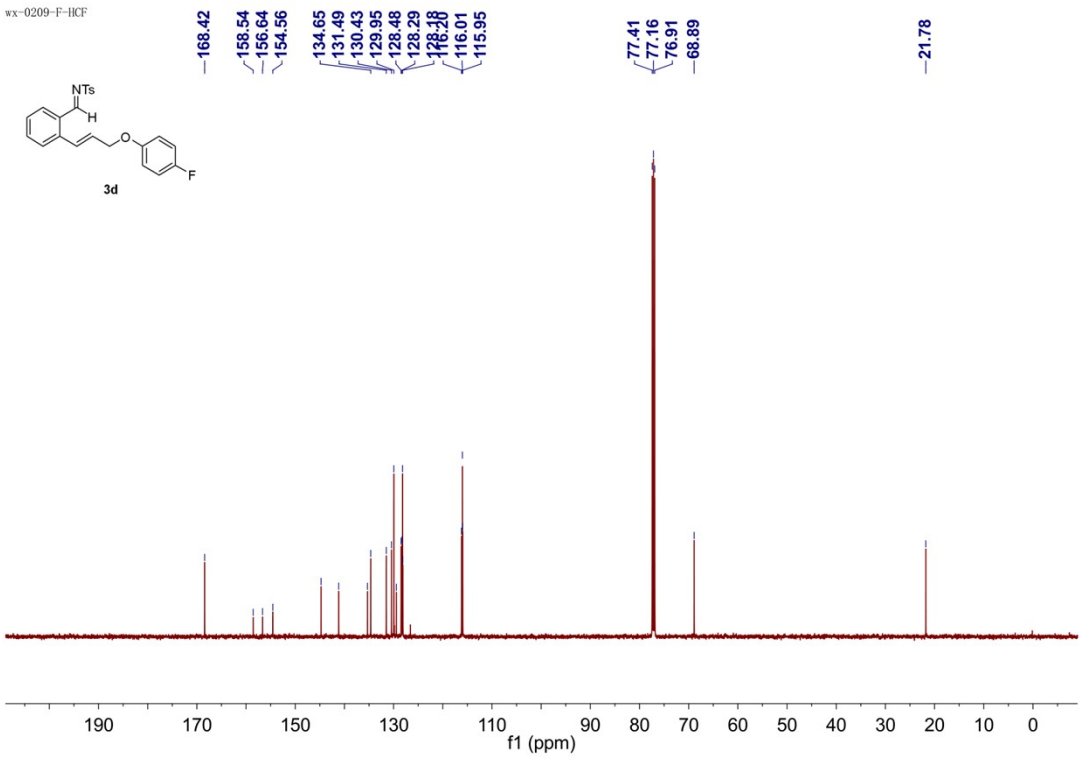
N-((E)-2-((E)-3-(4-ethylphenoxy)prop-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**3c**)



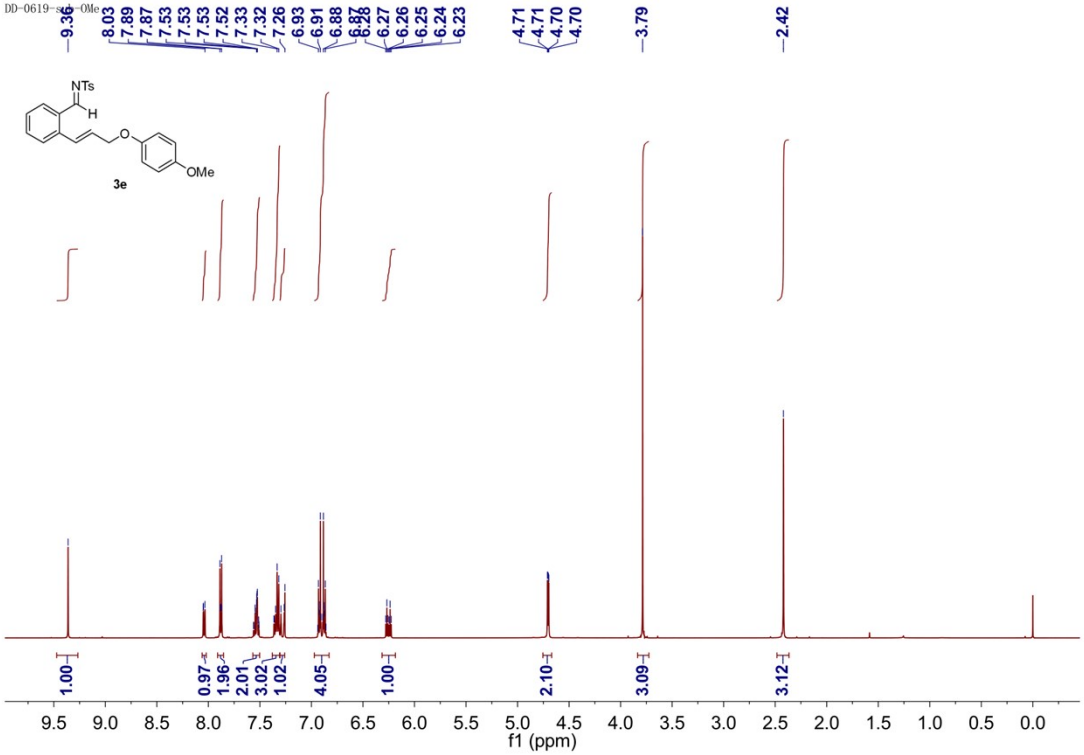


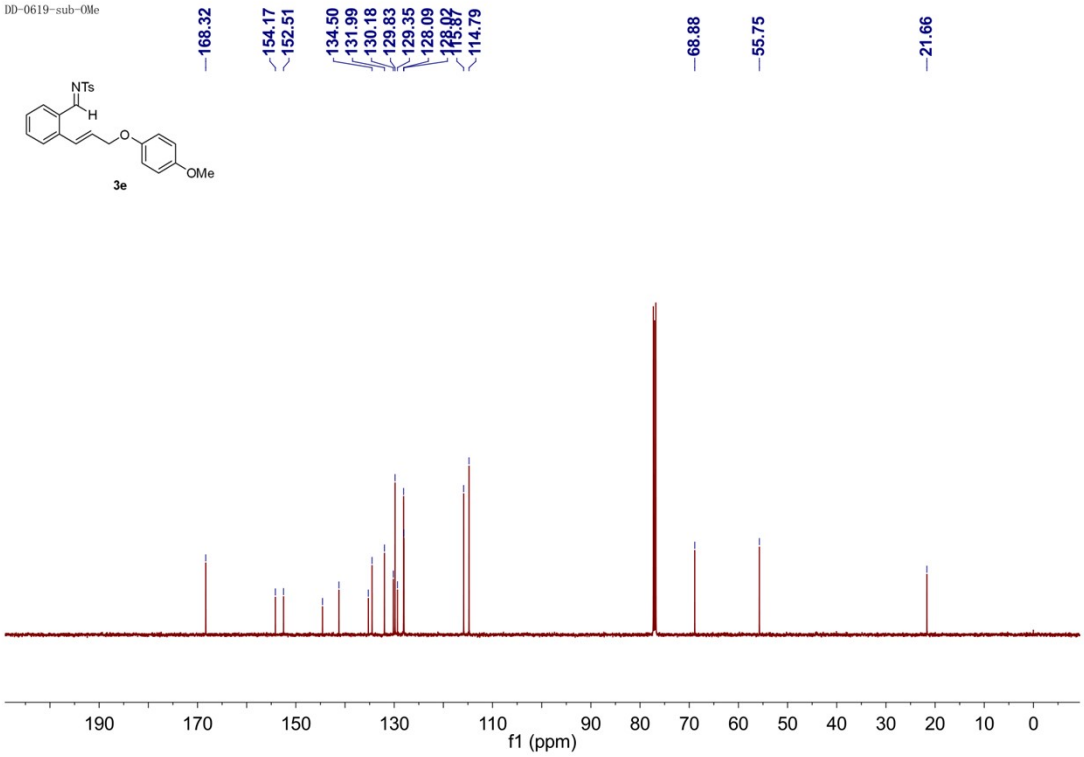
N-((E)-2-((E)-3-(4-fluorophenoxy)prop-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**3d**)



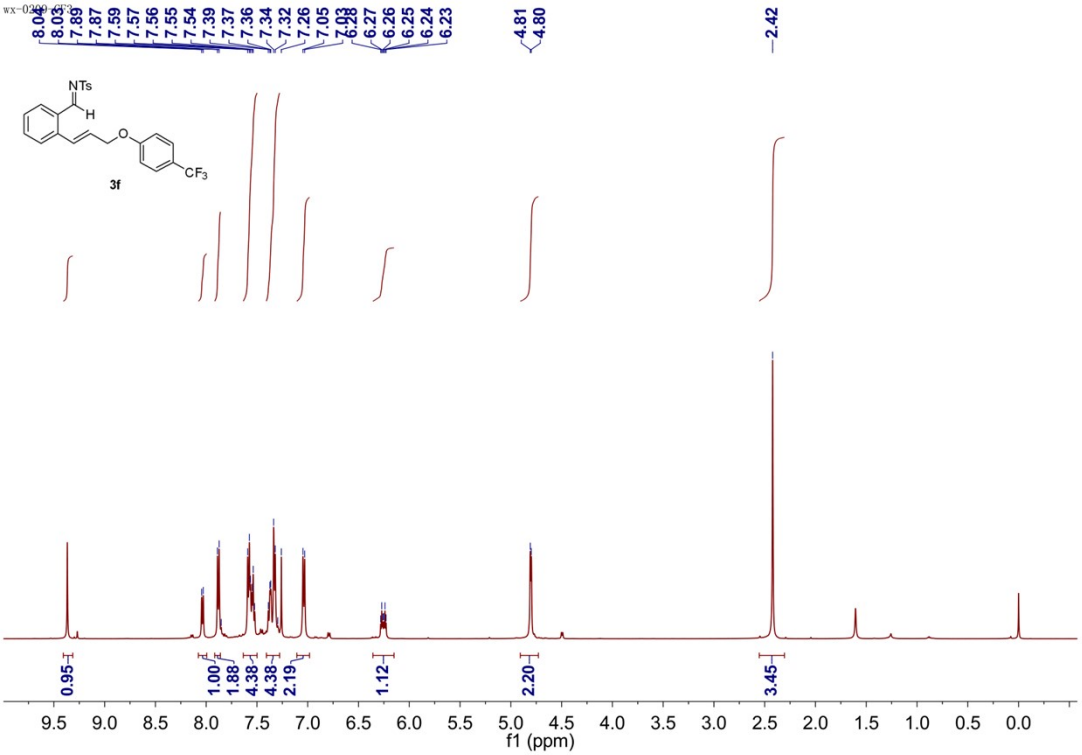


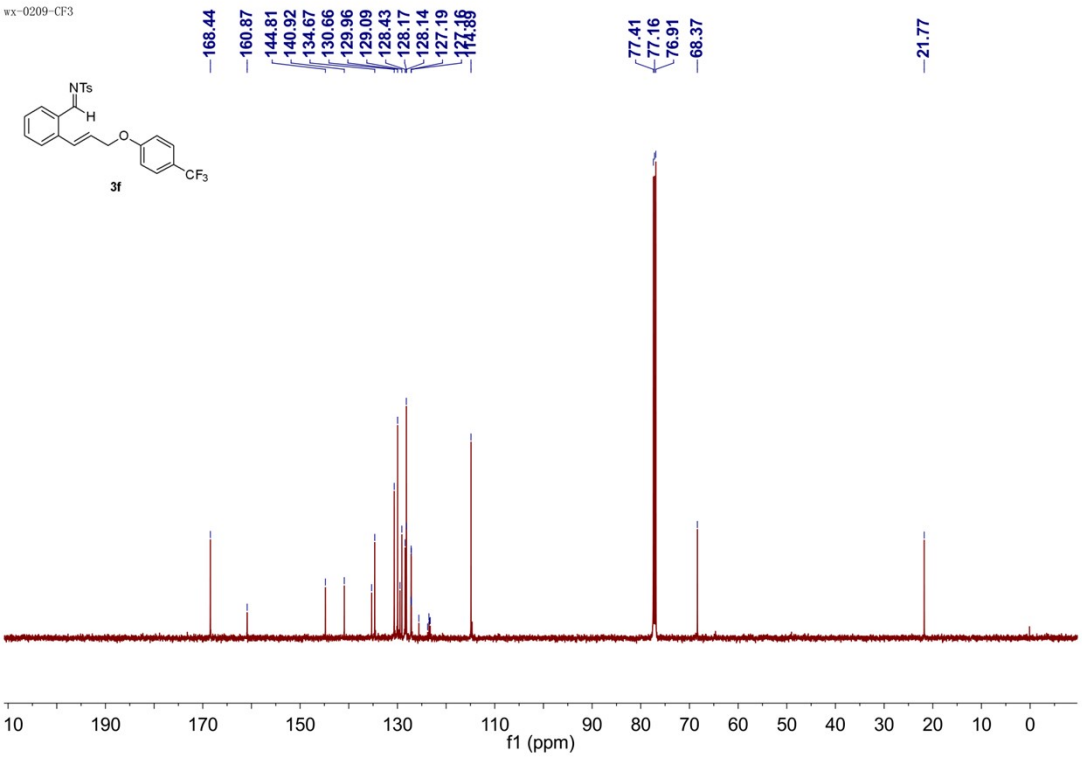
N-((E)-2-((E)-3-(4-methoxyphenoxy)prop-1-en-1-yl)benzylidene)-4-methylbenzenesulfonamide (**3e**)



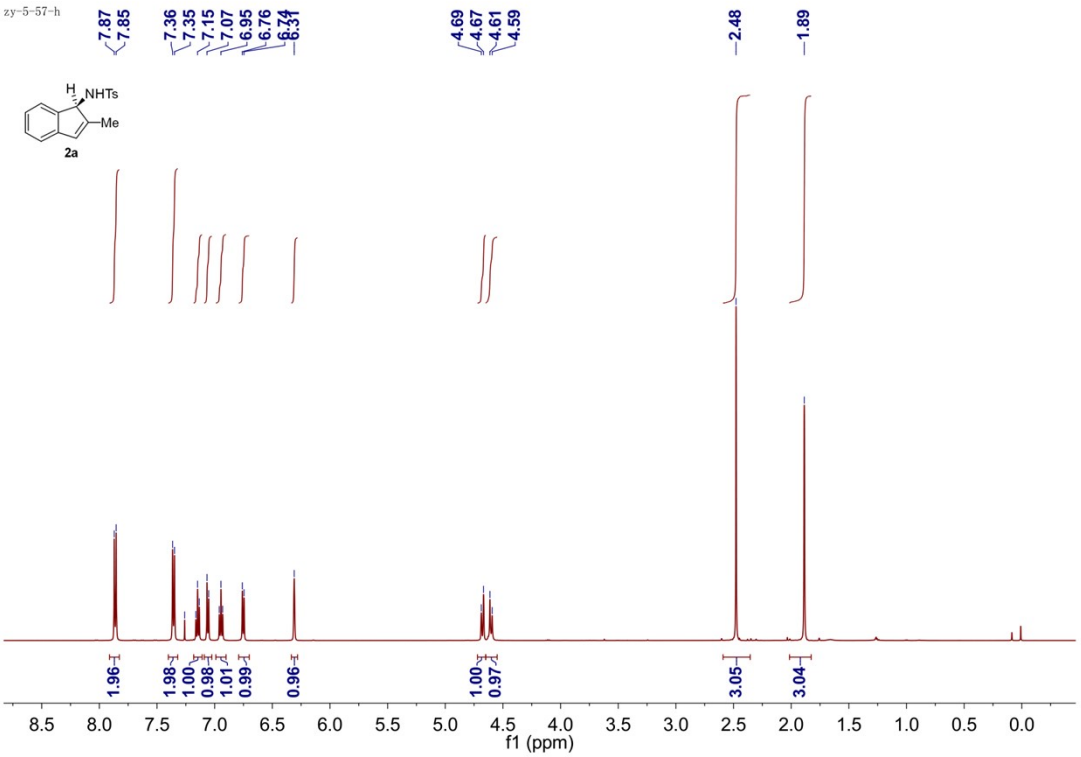


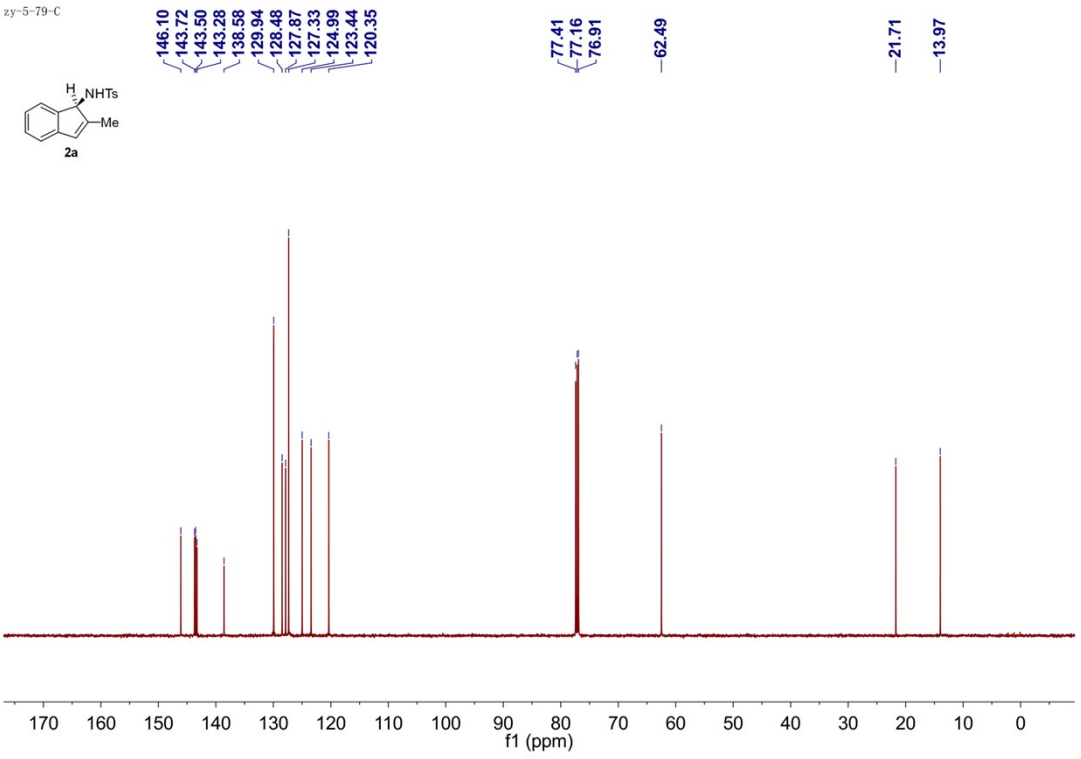
4-methyl-N-((E)-2-((E)-3-(4-(trifluoromethyl)phenoxy)prop-1-en-1-yl)benzylidene)benzenesulfonamide (**3f**)



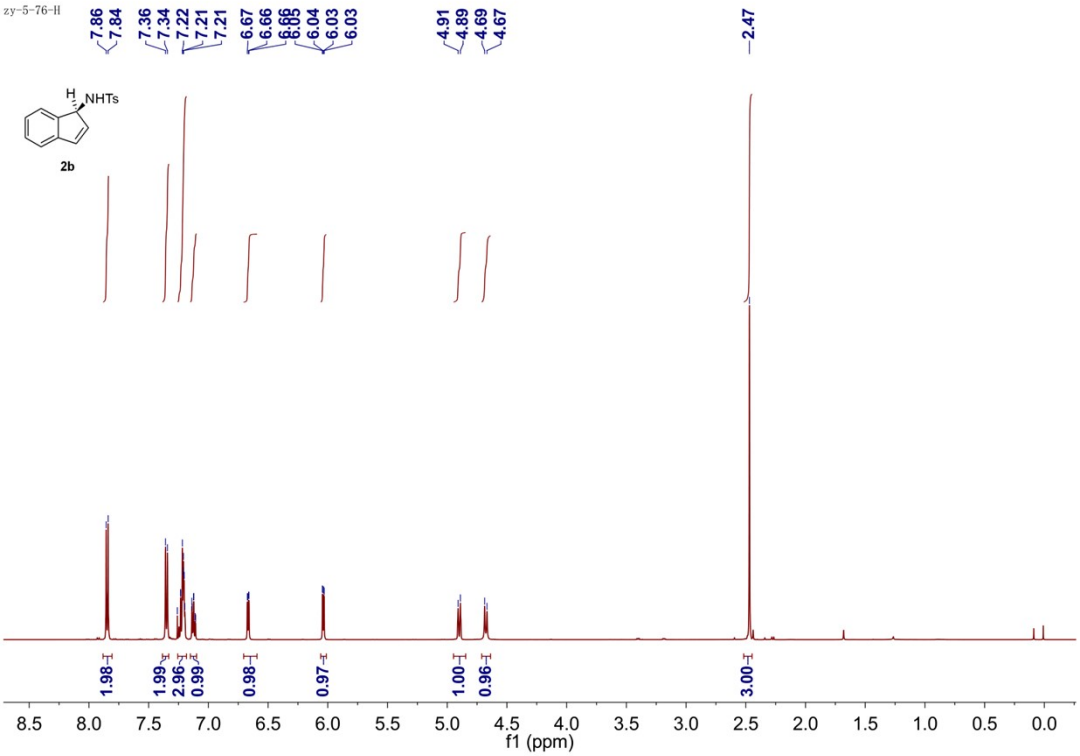


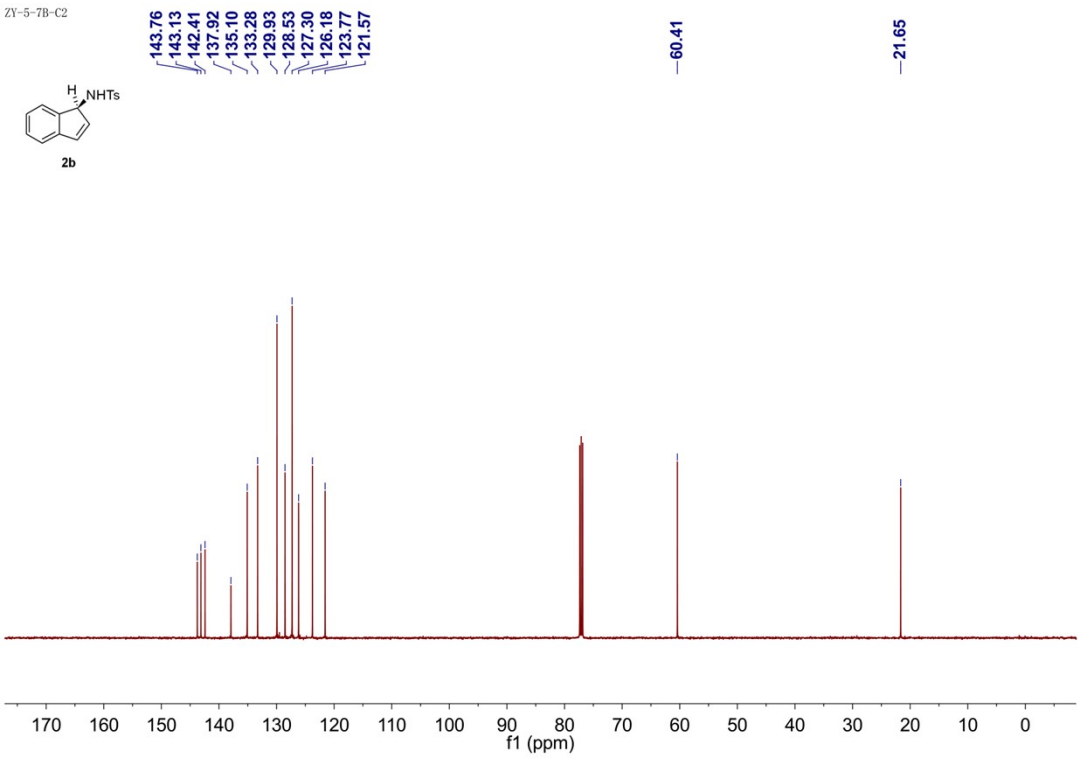
(S)-4-methyl-N-(2-methyl-1H-inden-1-yl)benzenesulfonamide (**2a**)



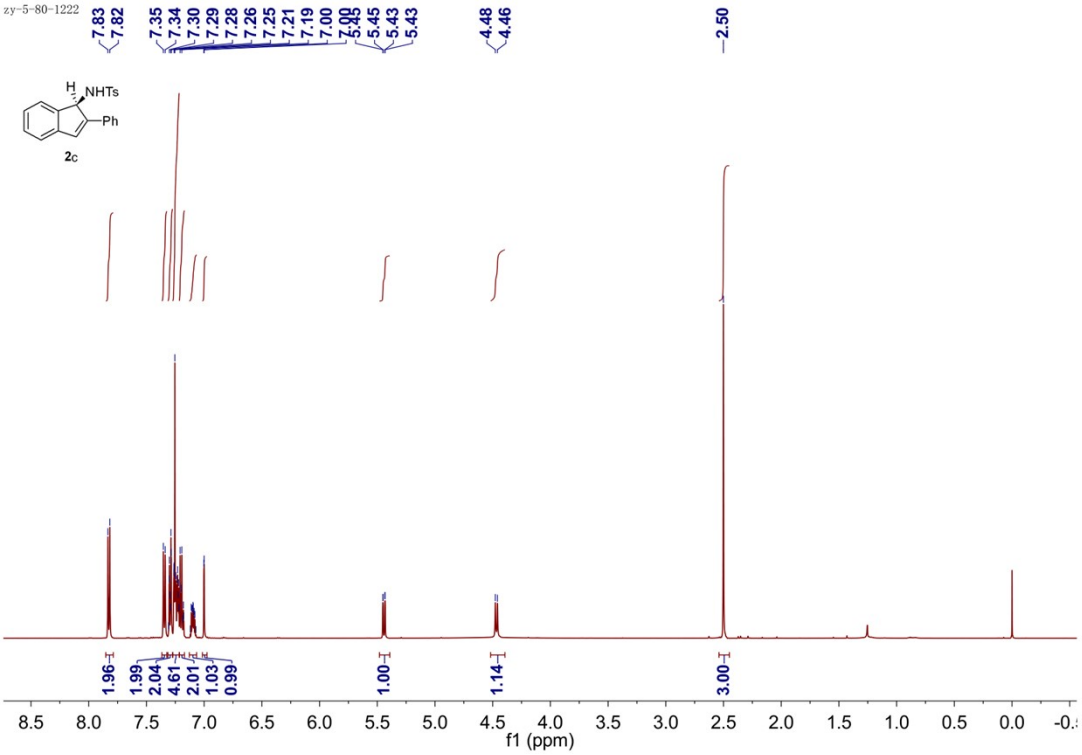


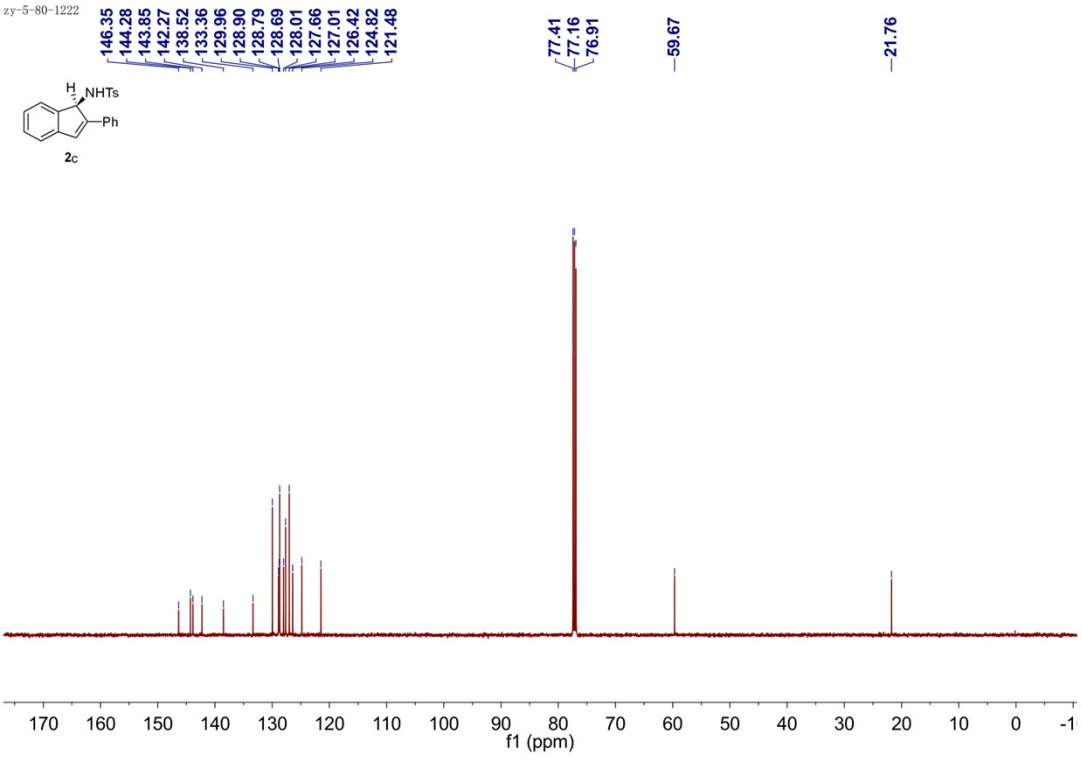
(S)-N-(1H-inden-1-yl)-4-methylbenzenesulfonamide (**2b**)



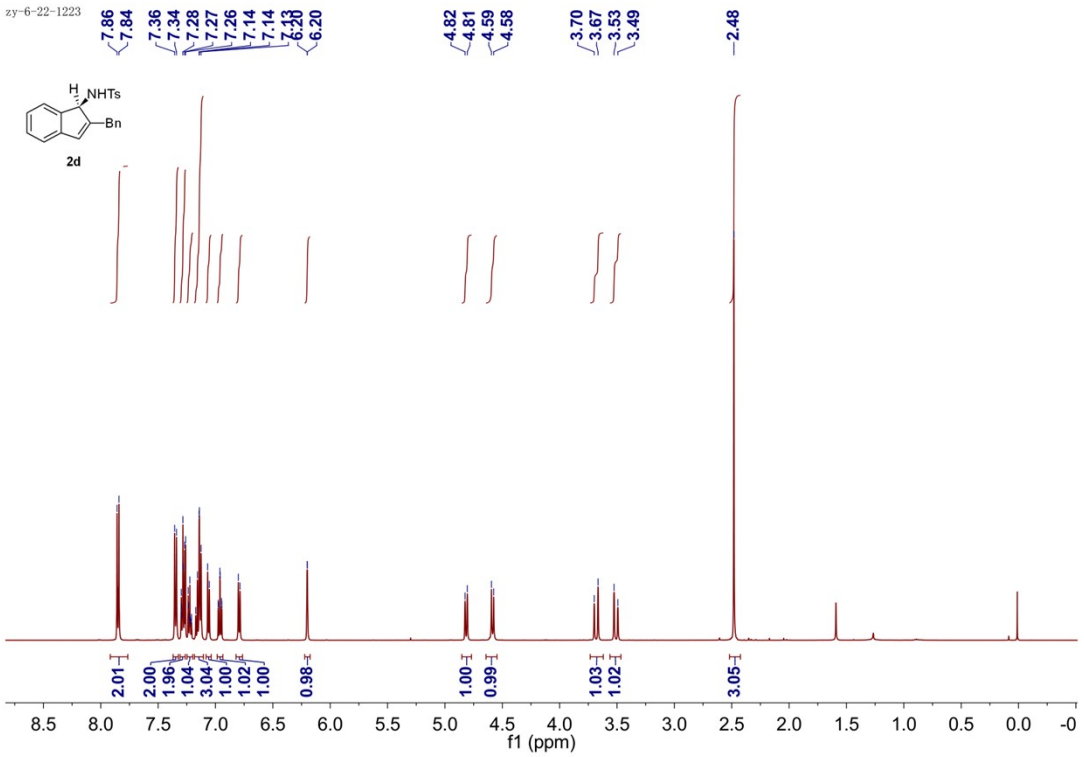


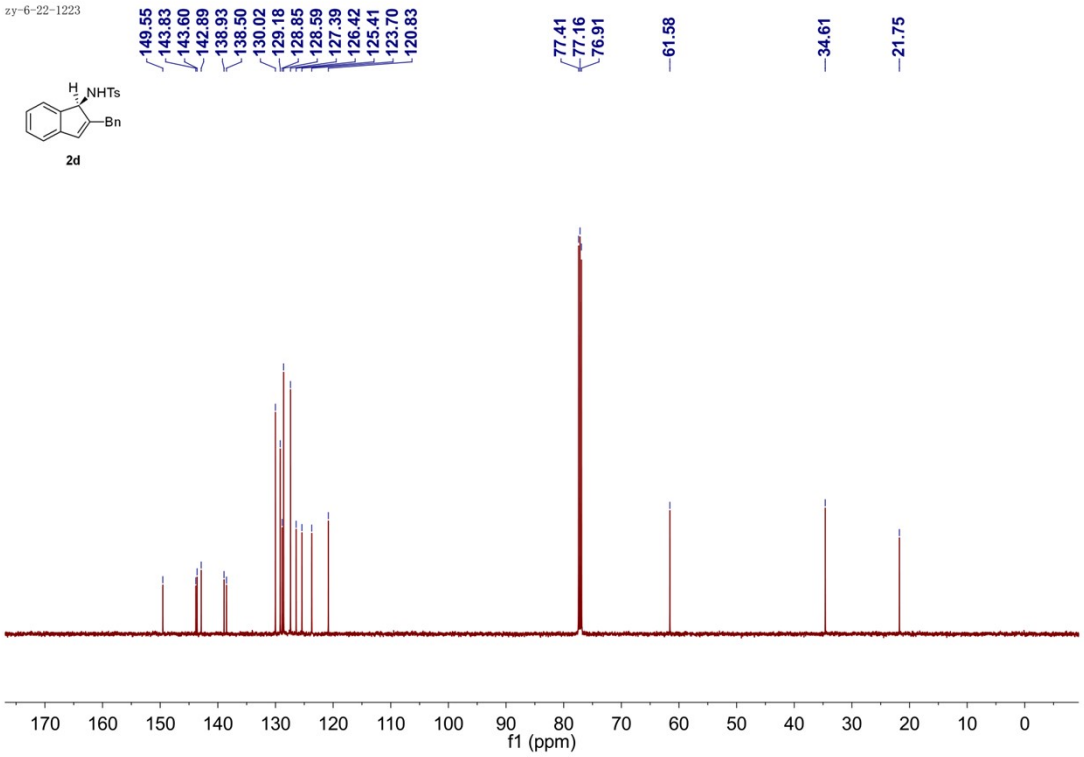
(R)-4-methyl-N-(2-phenyl-1H-inden-1-yl)benzenesulfonamide (**2c**)



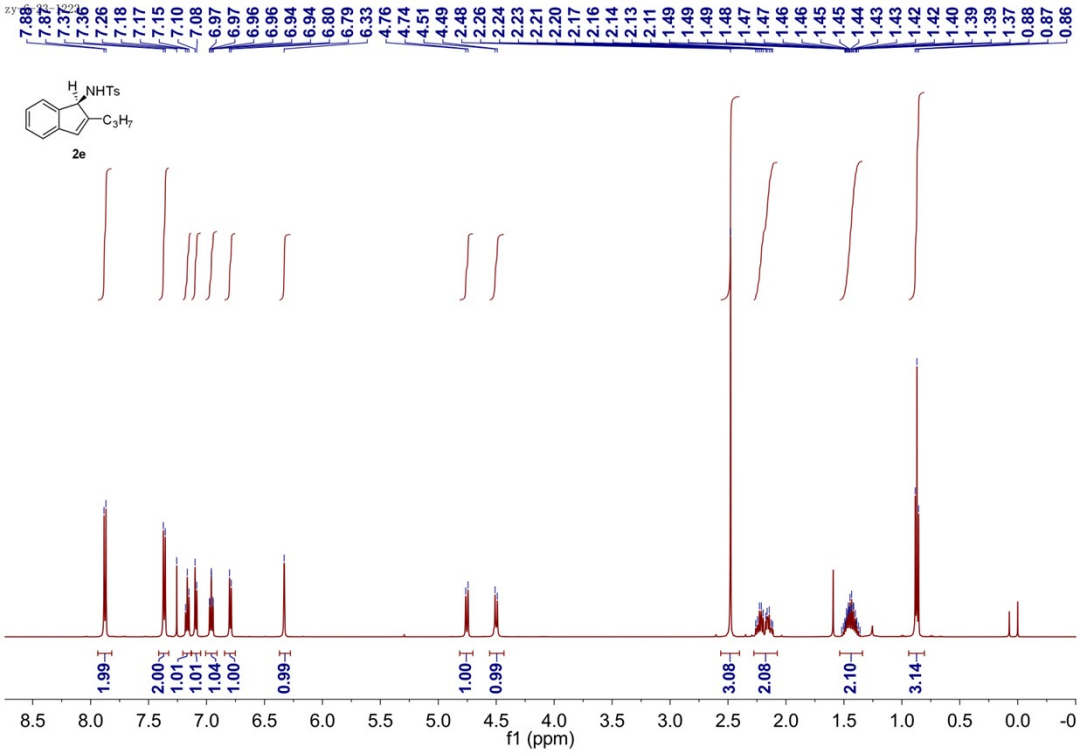


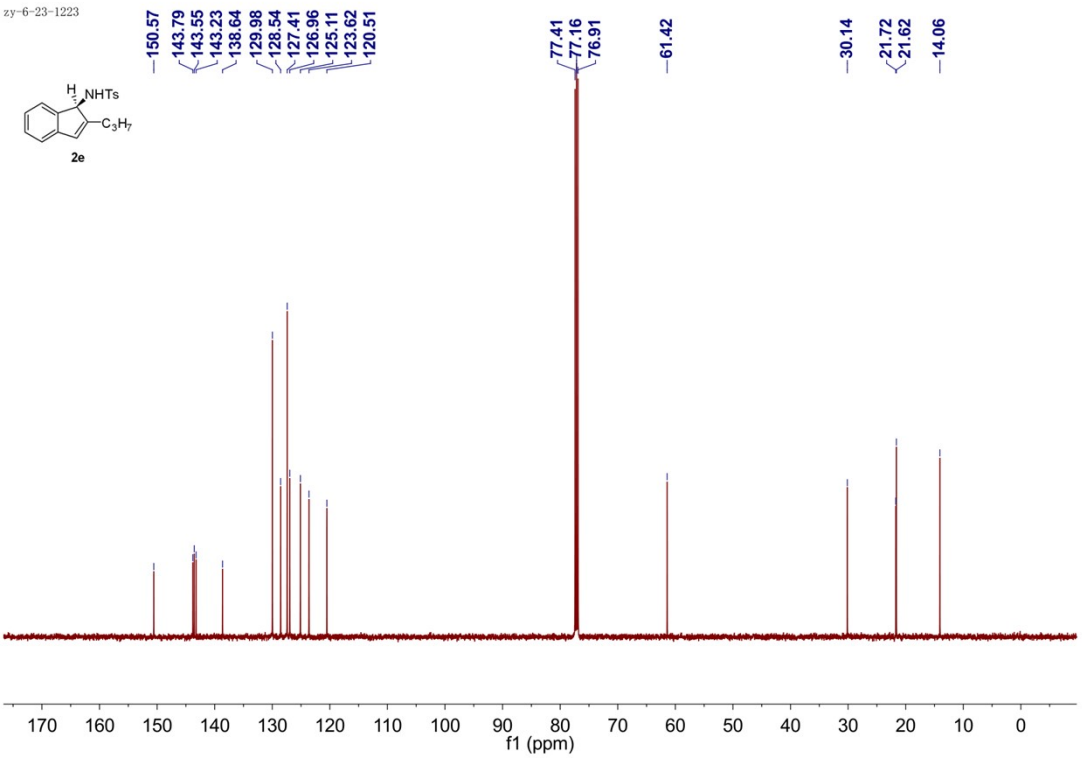
(S)-N-(2-benzyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2d**)



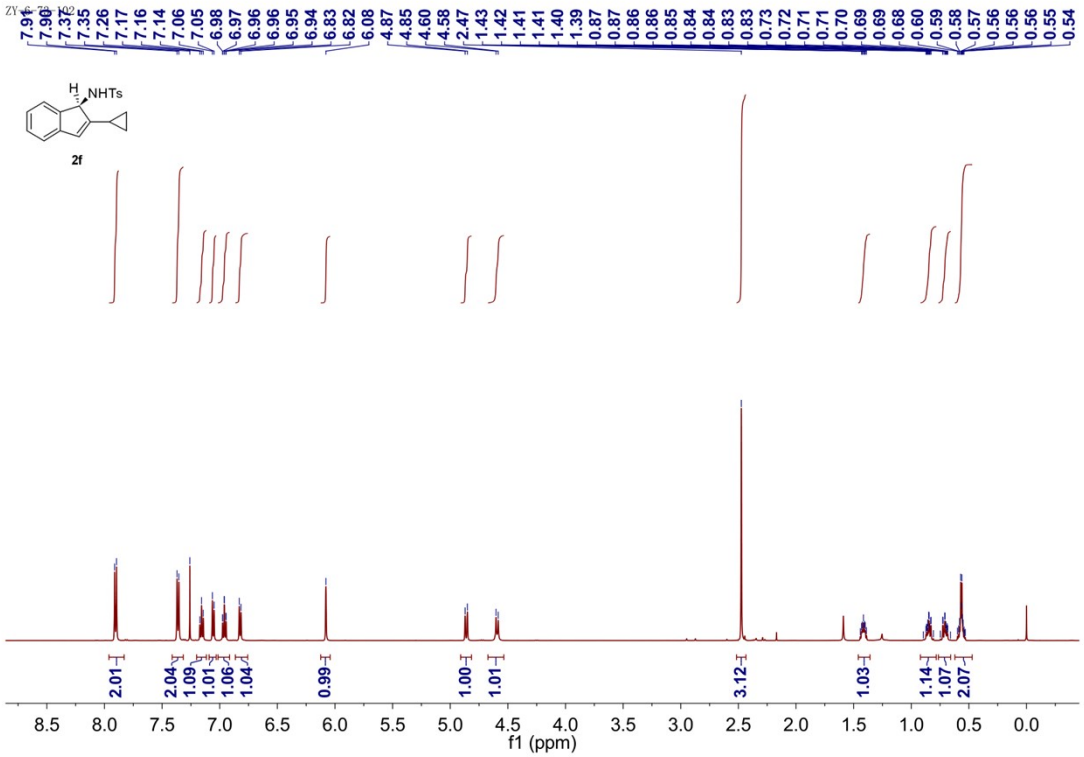


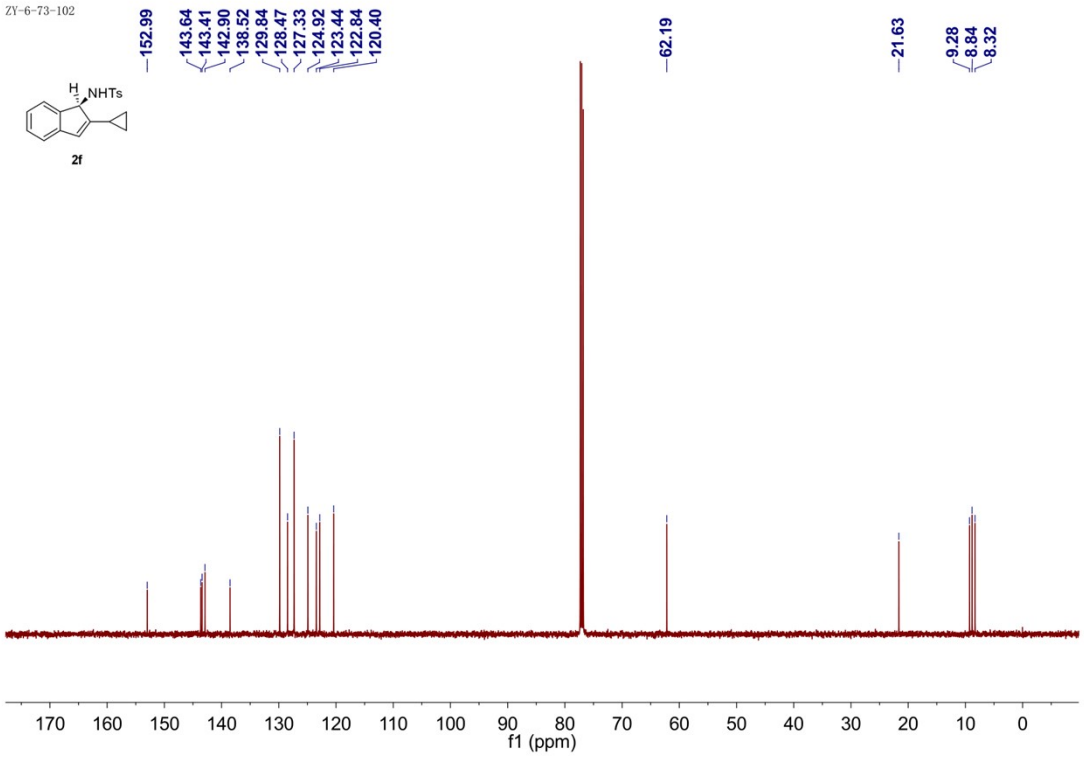
(S)-4-methyl-N-(2-propyl-1H-inden-1-yl)benzenesulfonamide (**2e**)



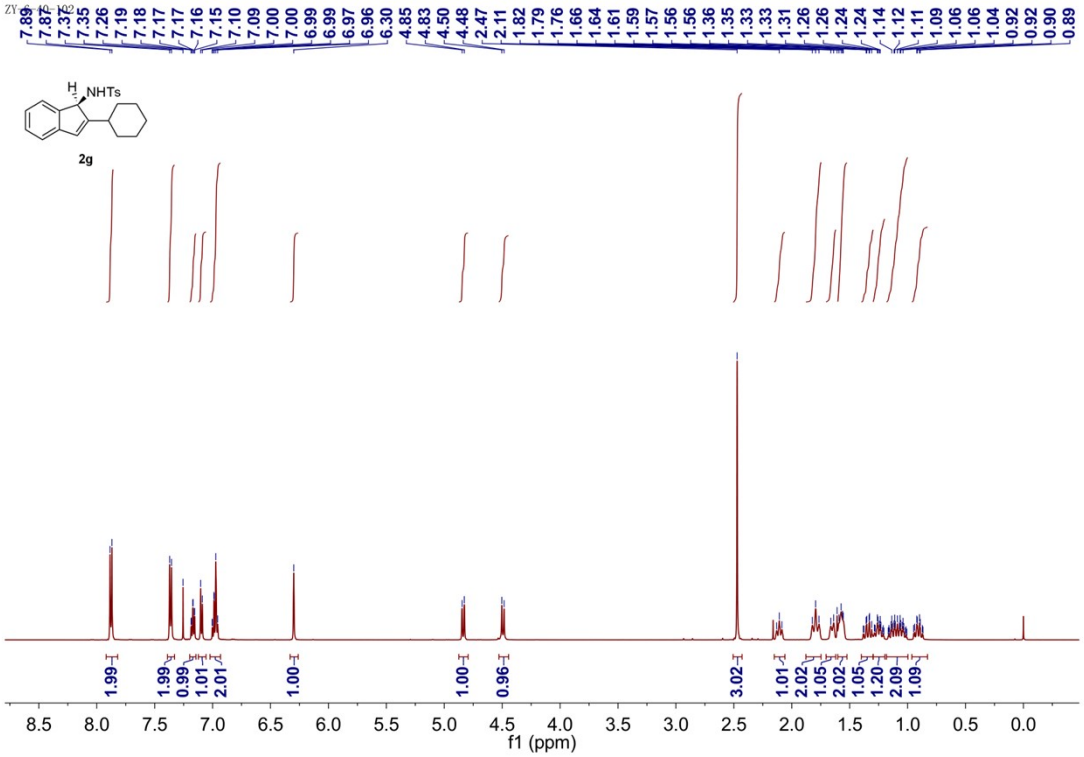


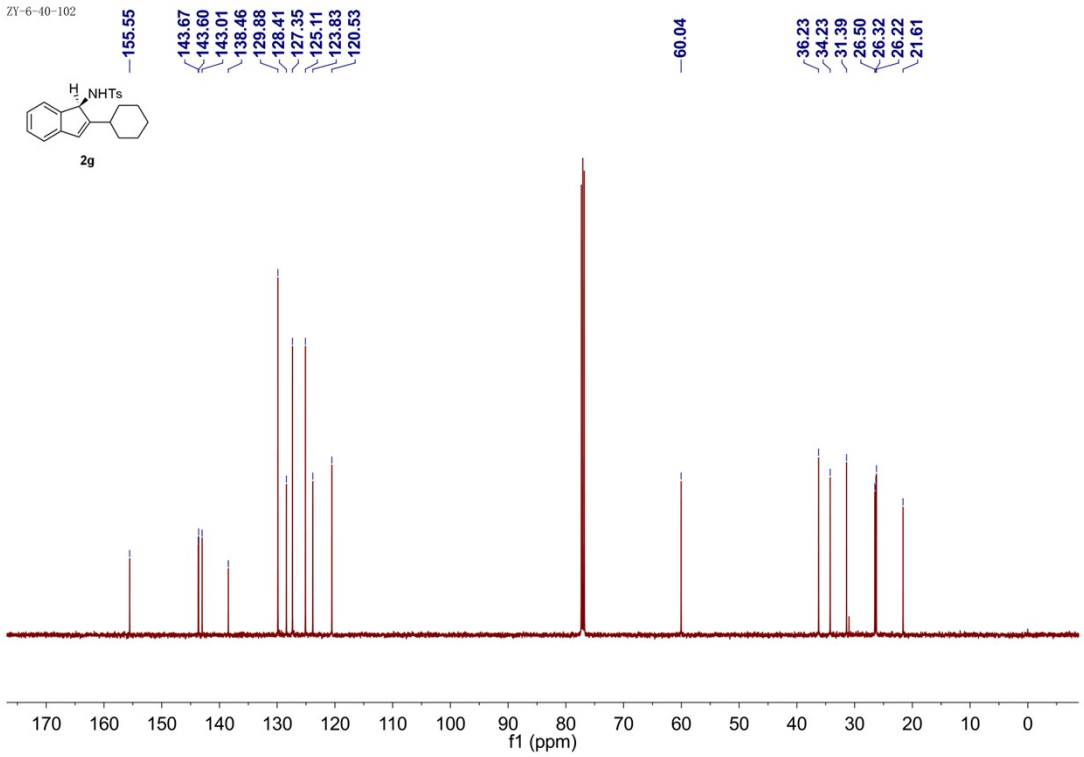
(S)-N-(2-cyclopropyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2f**)



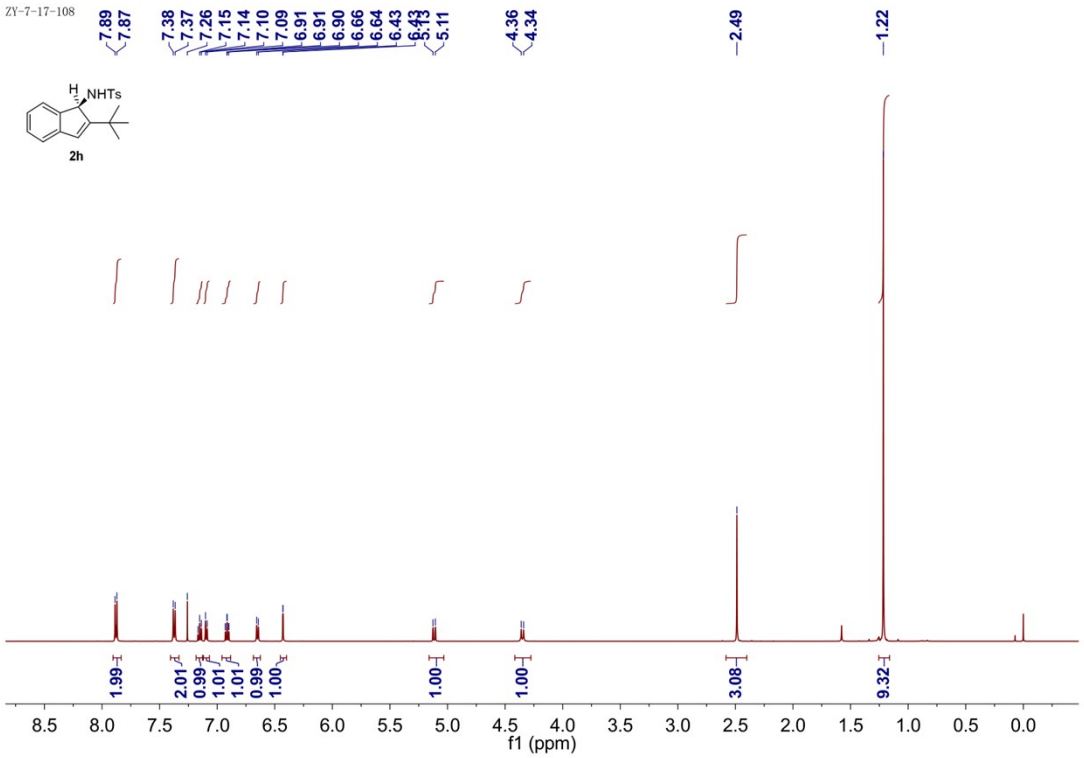


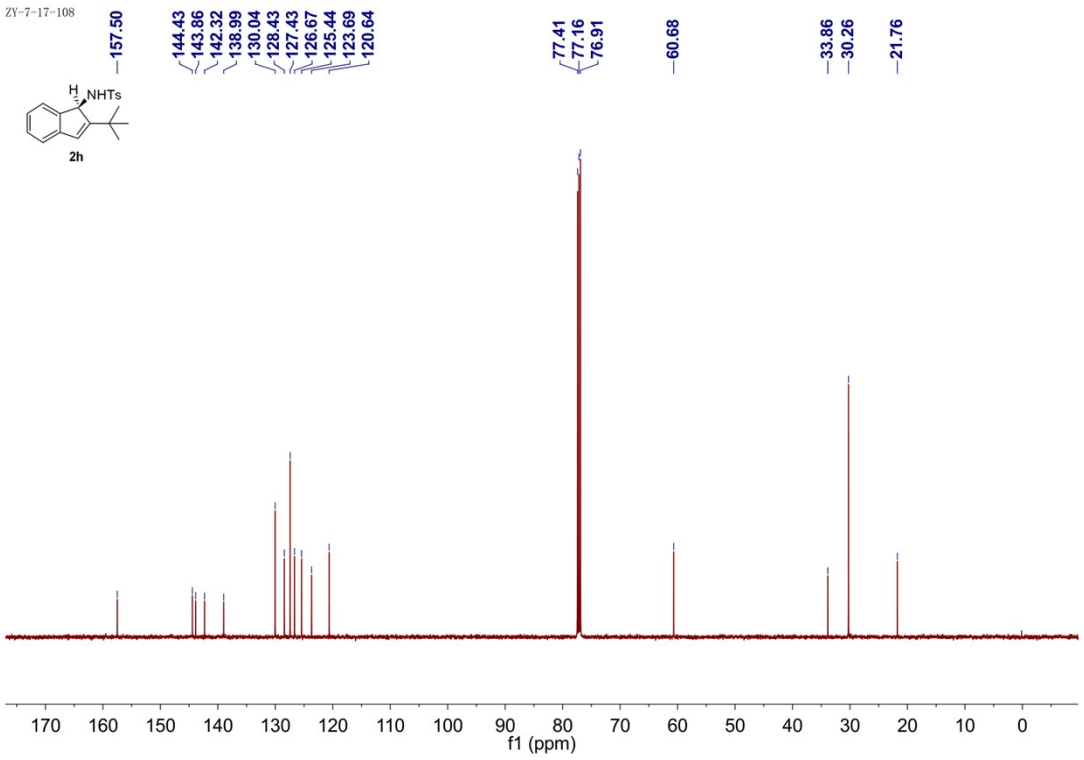
(S)-N-(2-cyclohexyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2g**)



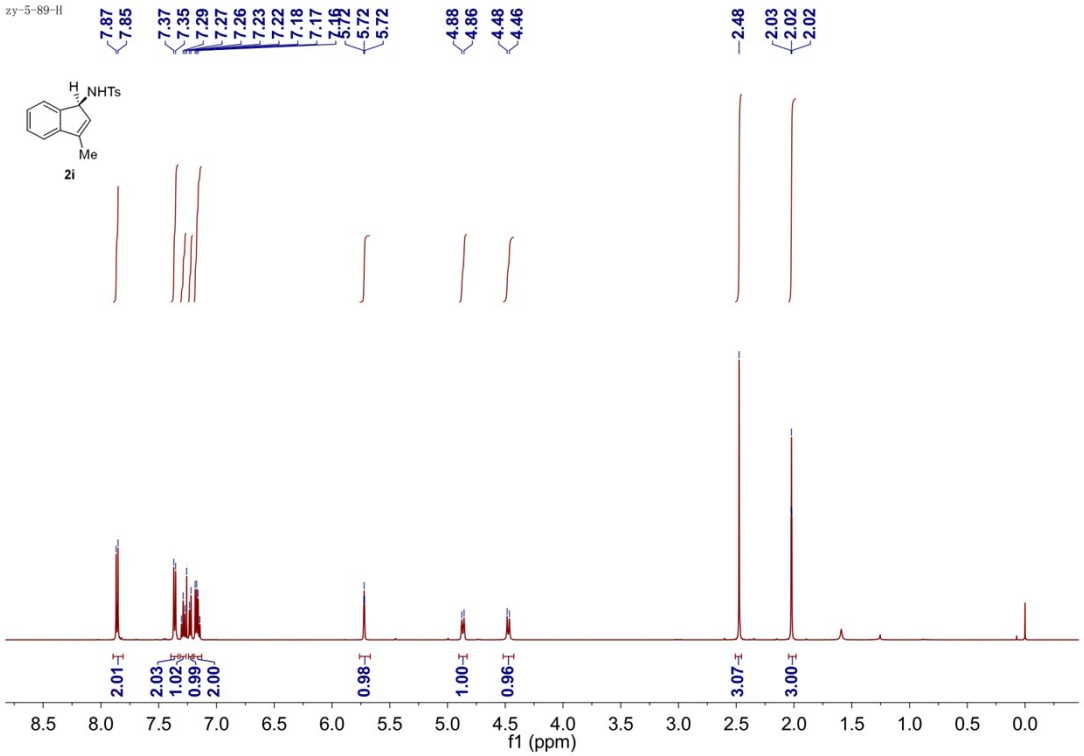


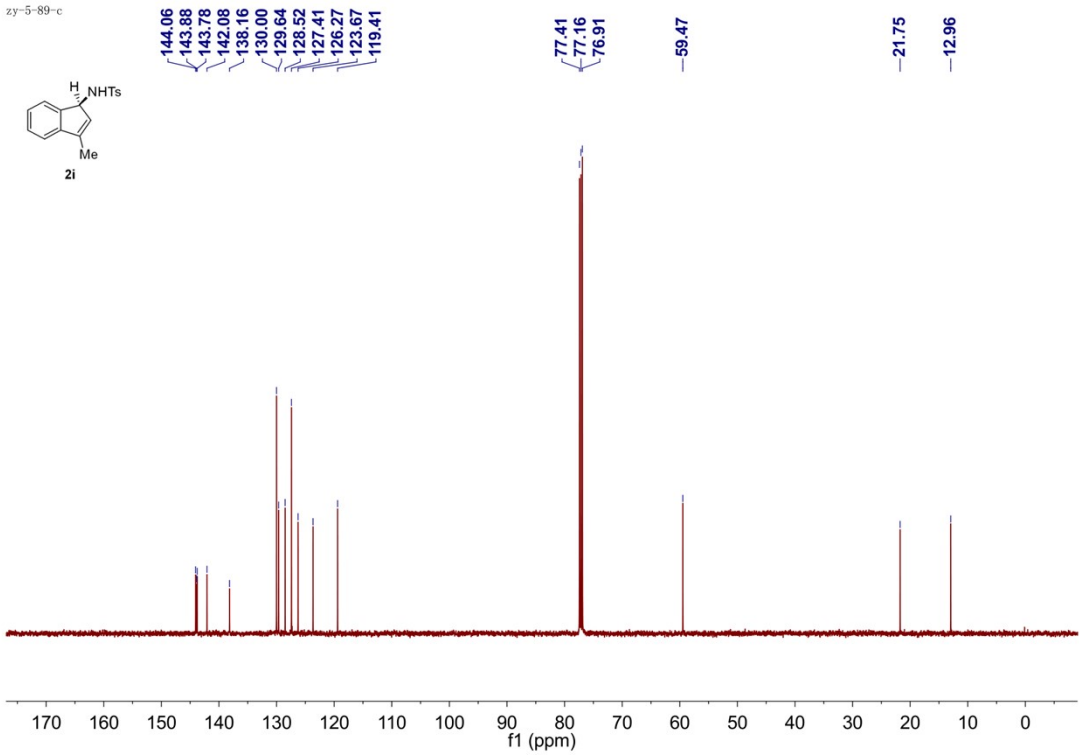
(S)-N-(2-(tert-butyl)-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2h**)



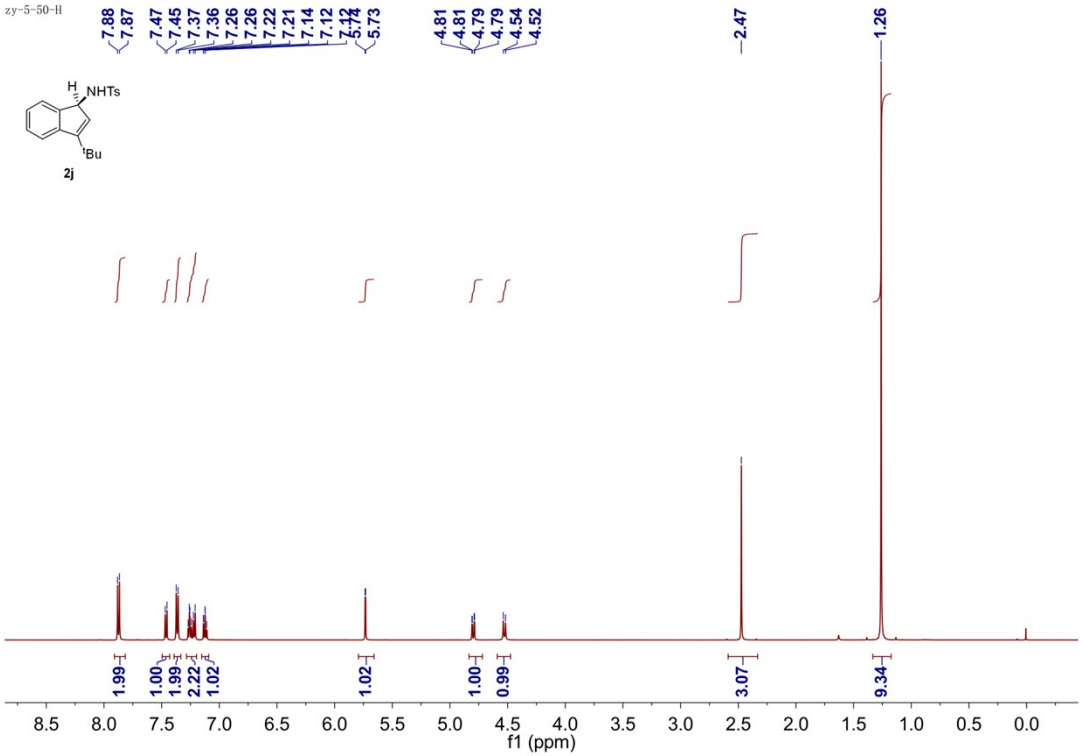


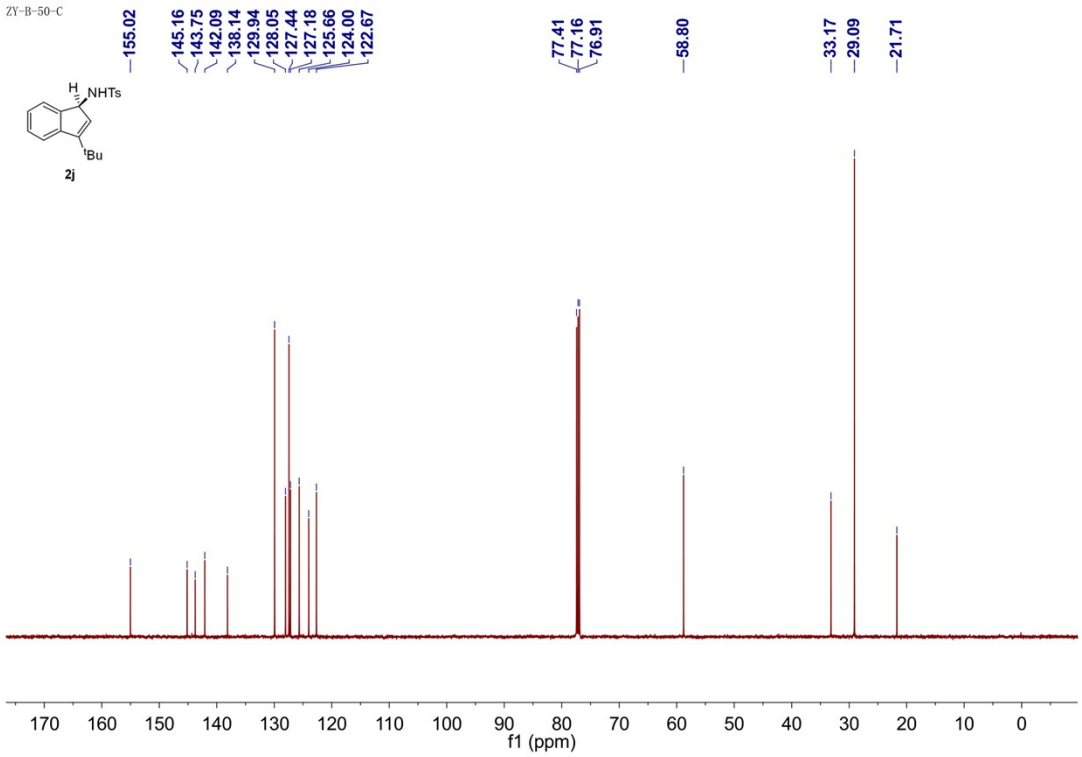
(S)-4-methyl-N-(3-methyl-1H-inden-1-yl)benzenesulfonamid (**2i**)



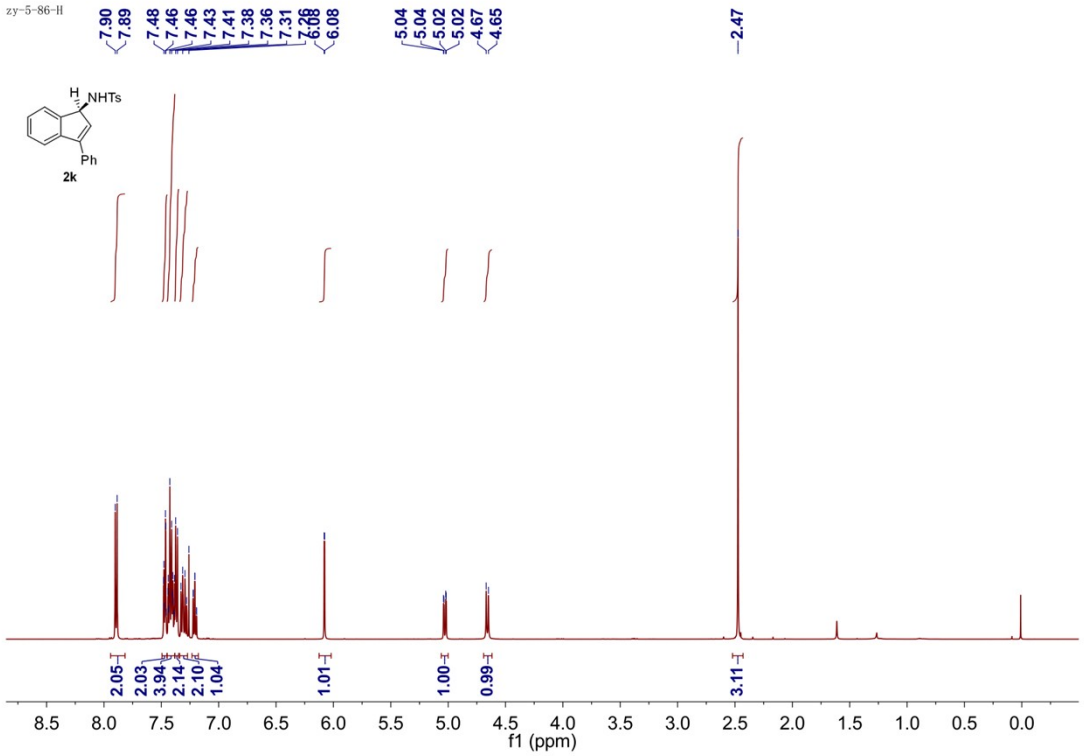


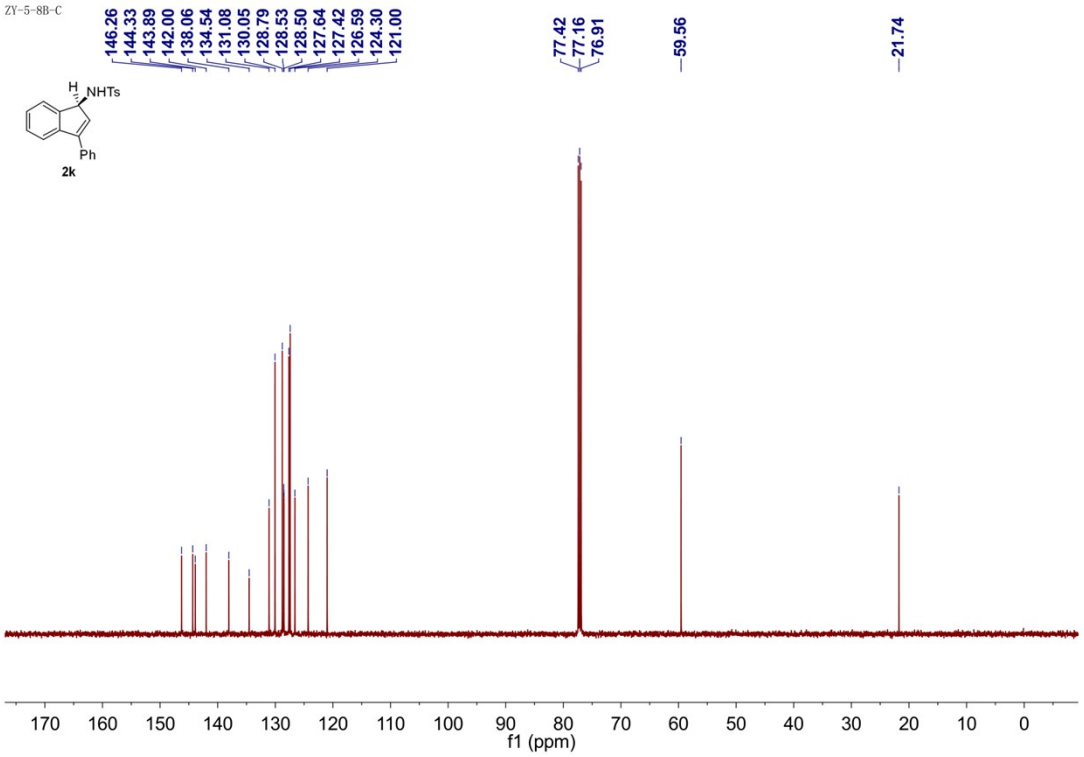
(S)-N-(3-(tert-butyl)-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2j**)



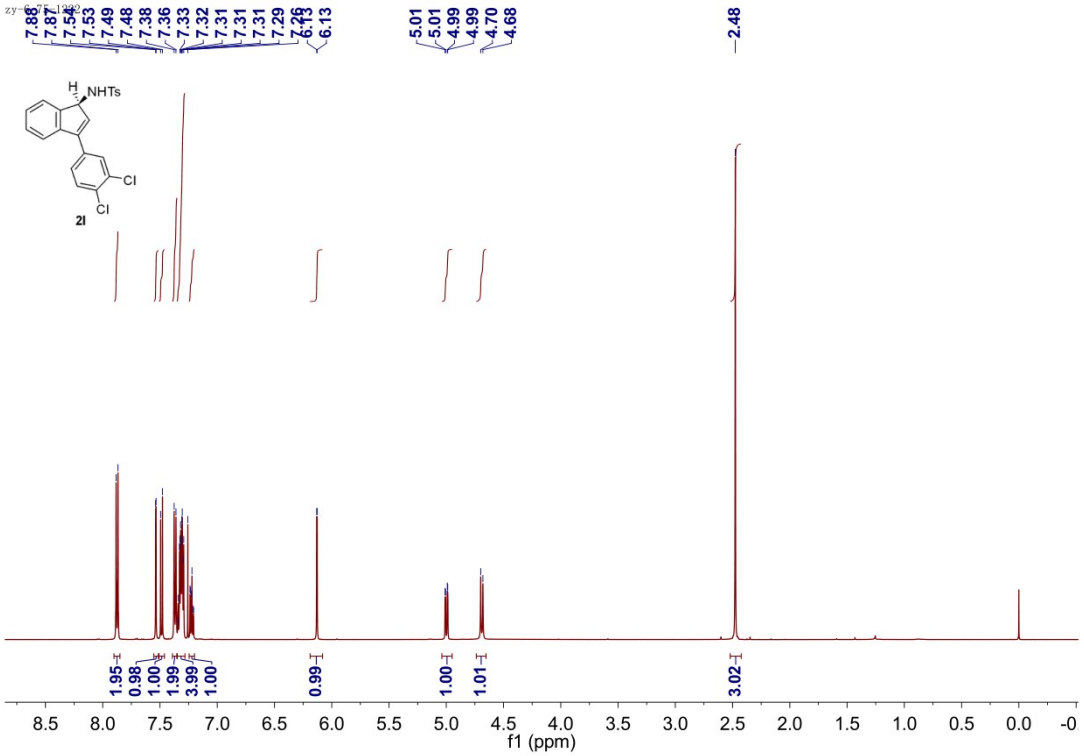


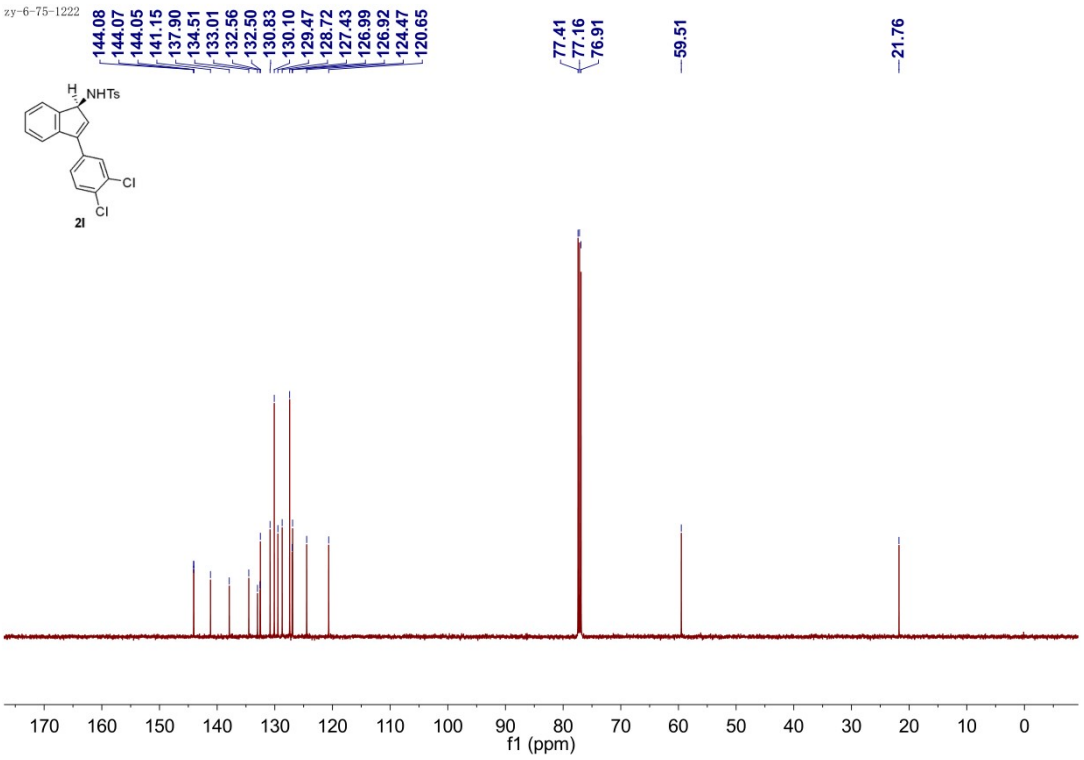
(S)-4-methyl-N-(3-phenyl-1H-inden-1-yl)benzenesulfonamide (**2k**)



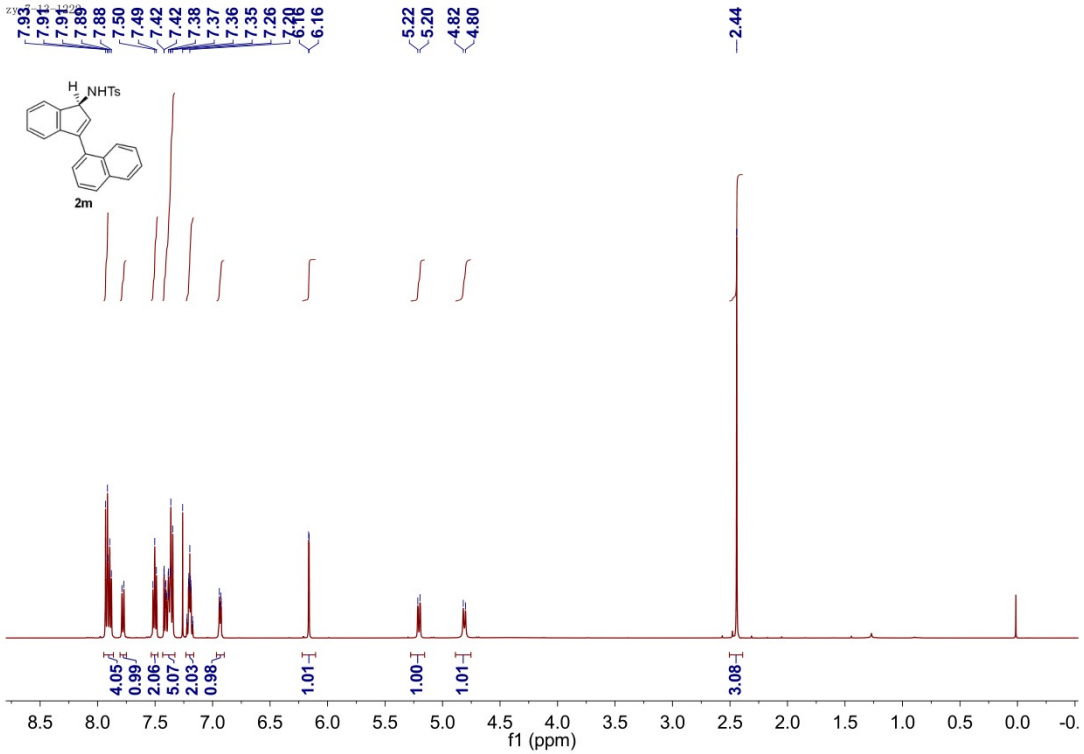


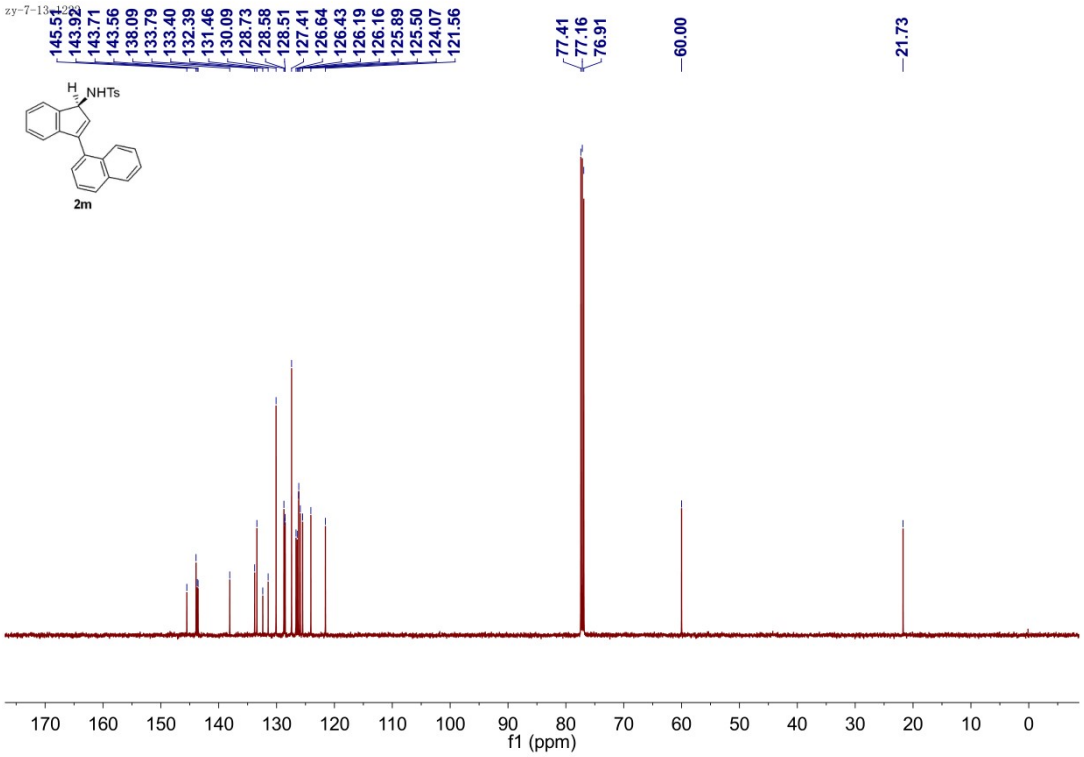
(S)-N-(3-(3,4-dichlorophenyl)-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2l**)



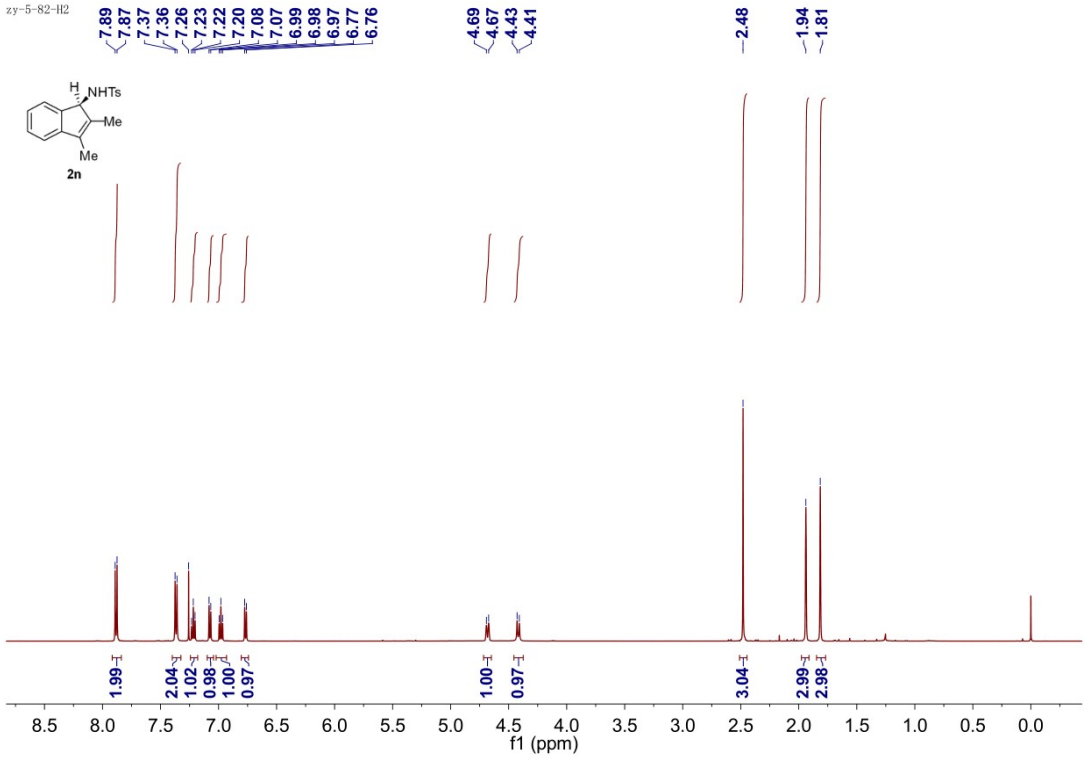


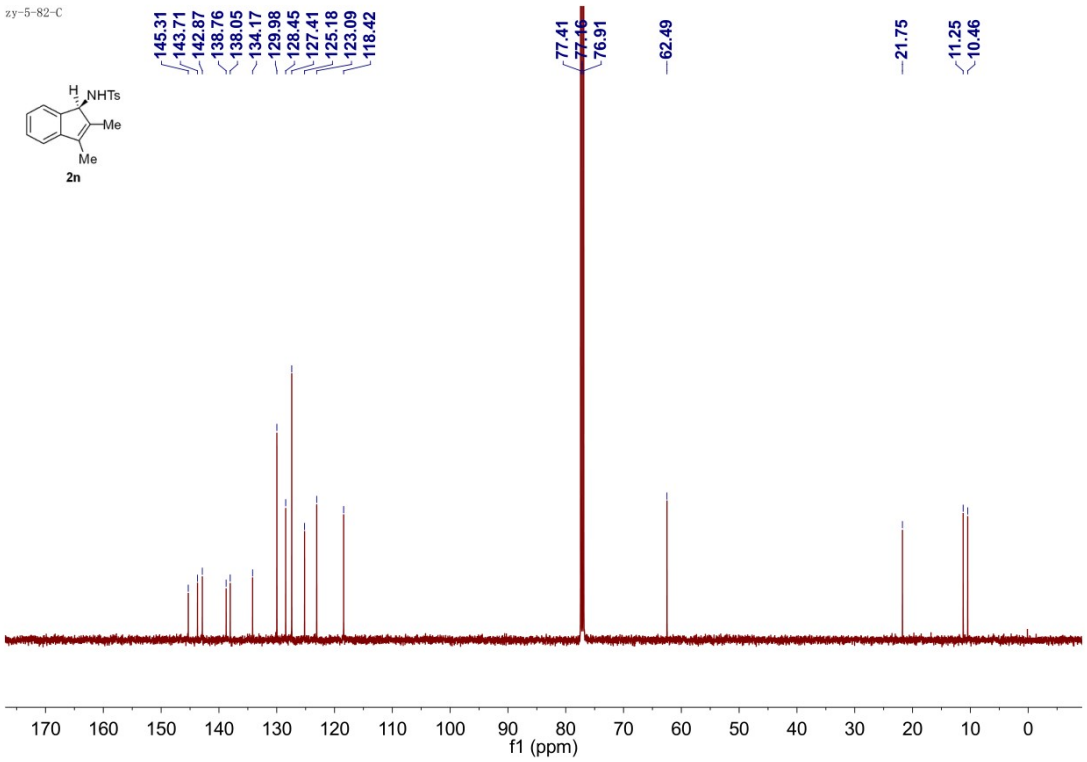
(S)-4-methyl-N-(3-(naphthalen-1-yl)-1H-inden-1-yl)benzenesulfonamide (**2m**)



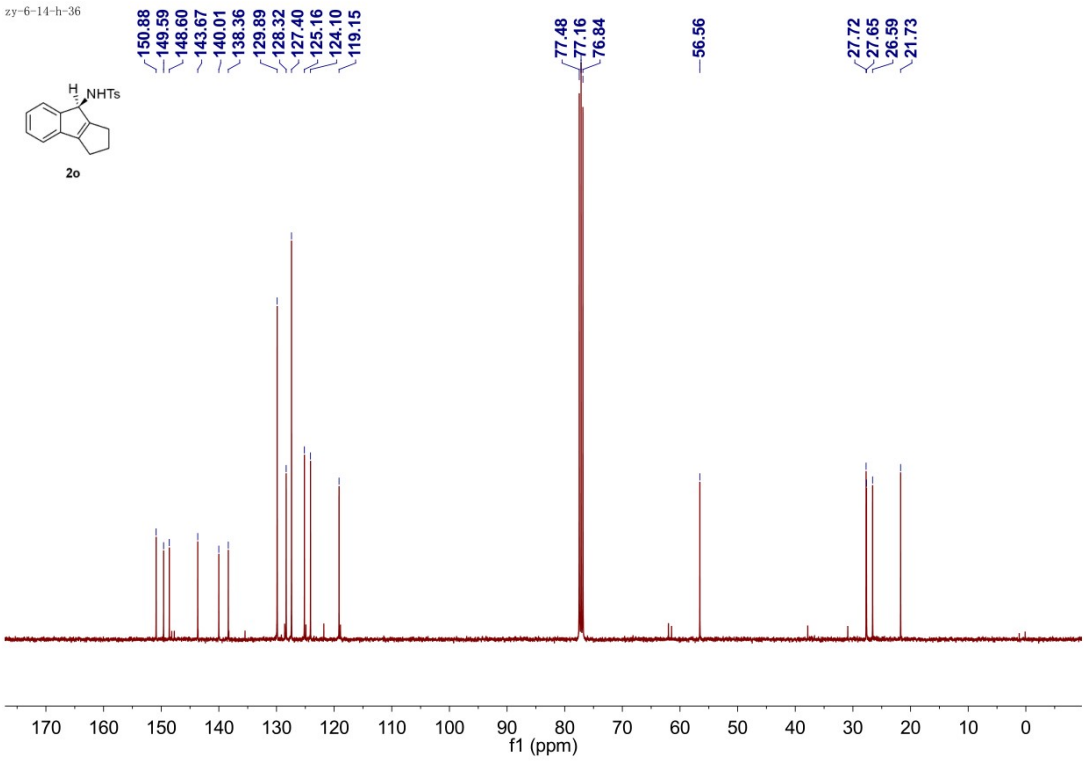


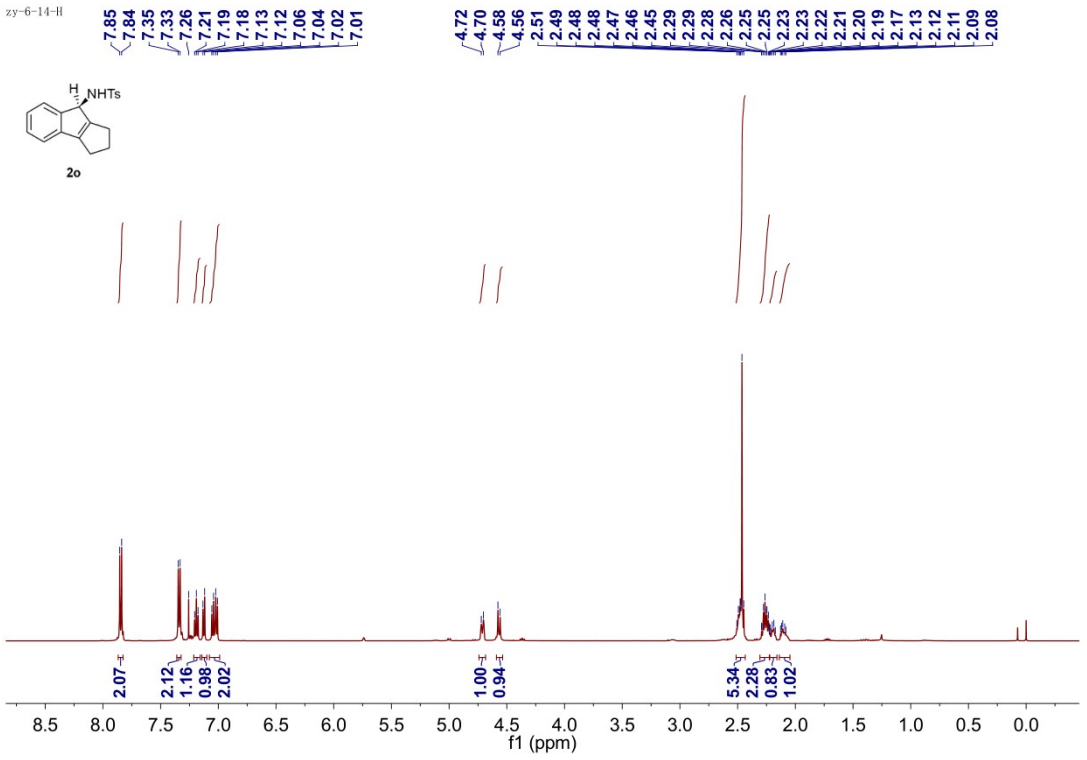
(S)-N-(2,3-dimethyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2n**)



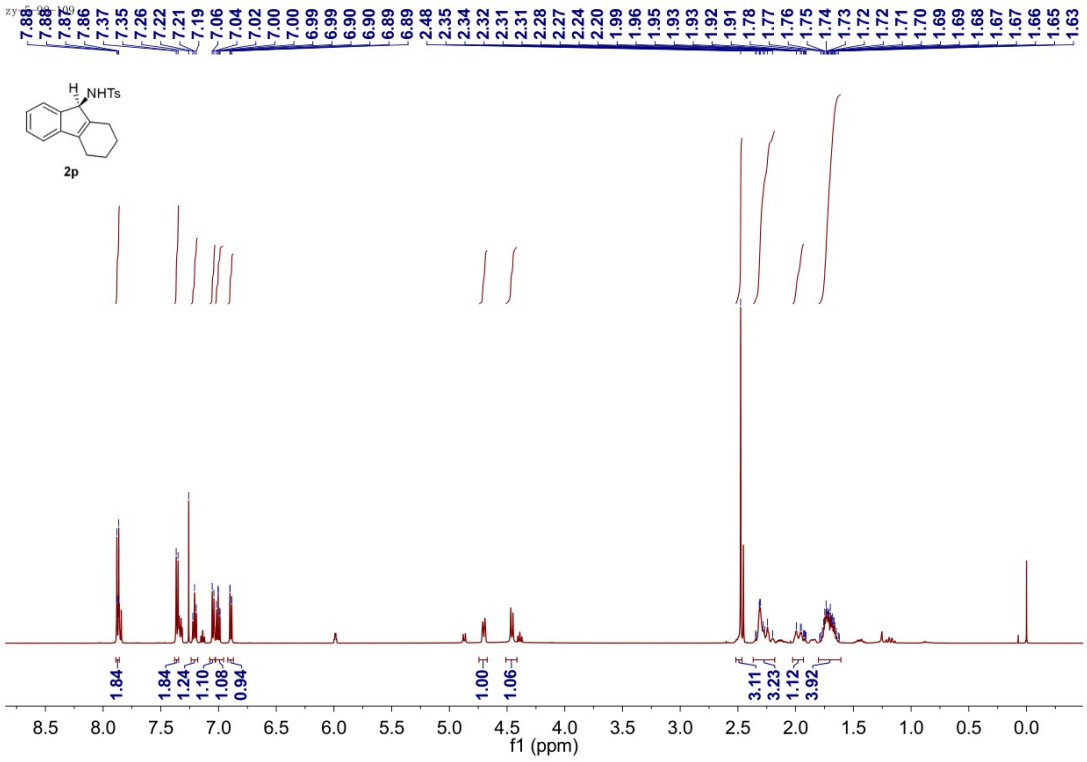


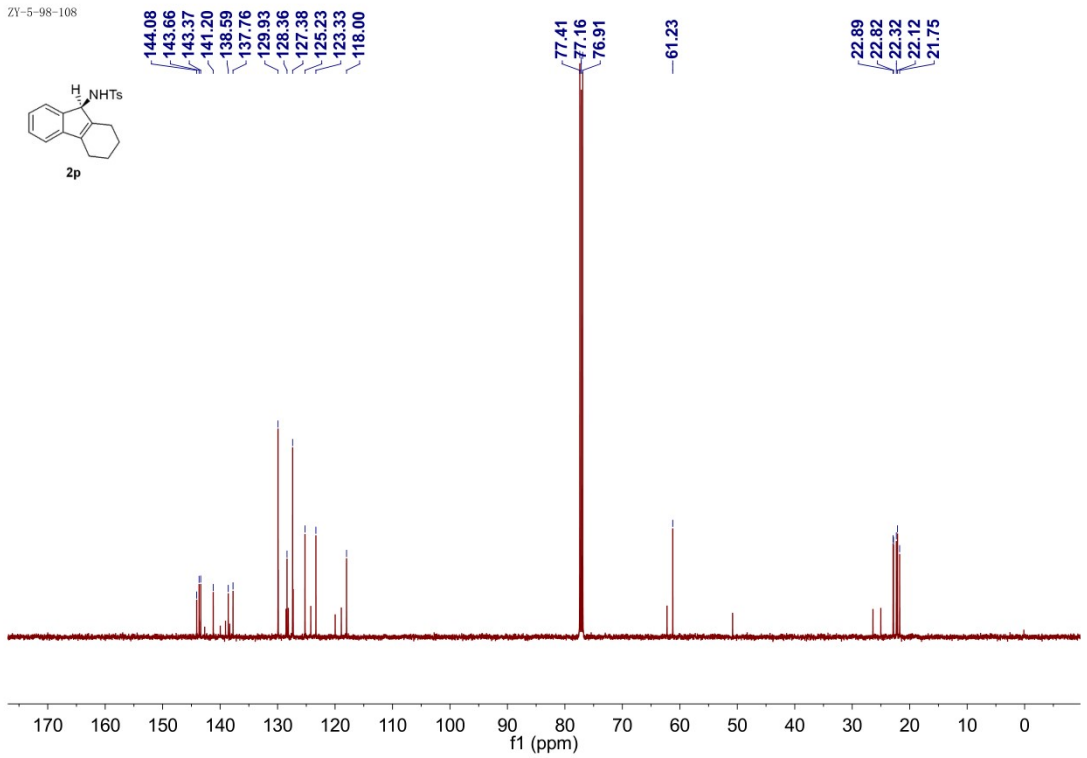
(S)-4-methyl-N-(1,2,3,8-tetrahydrocyclopenta[a]inden-8-yl)benzenesulfonamide (**2o**)



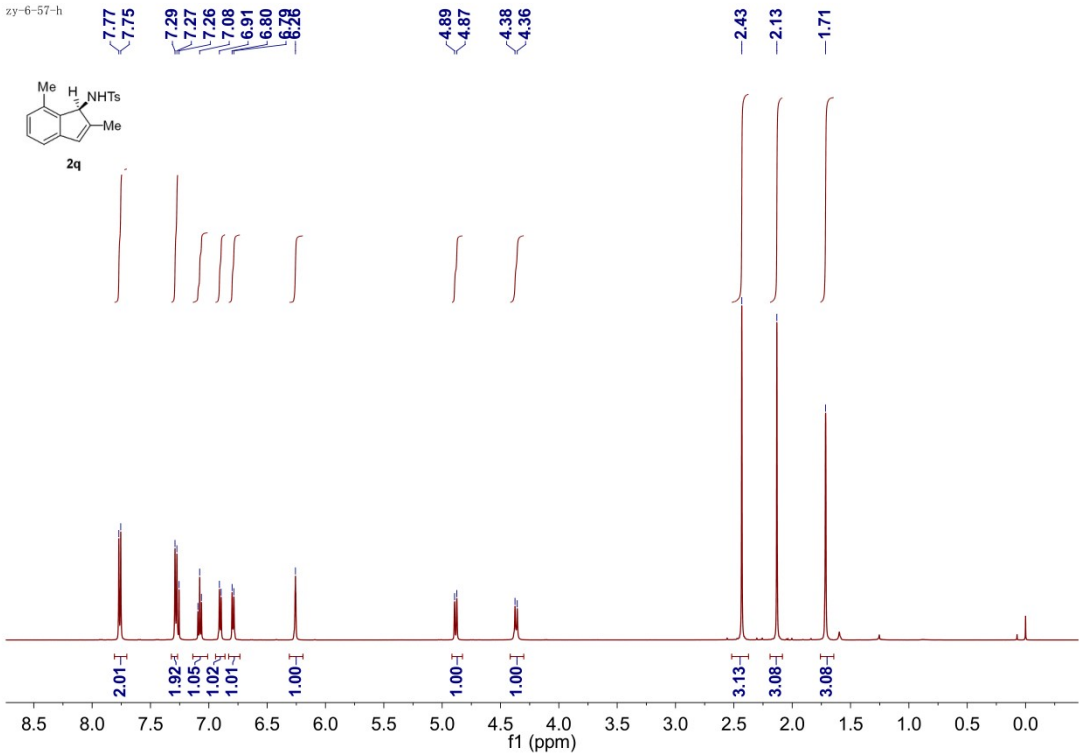


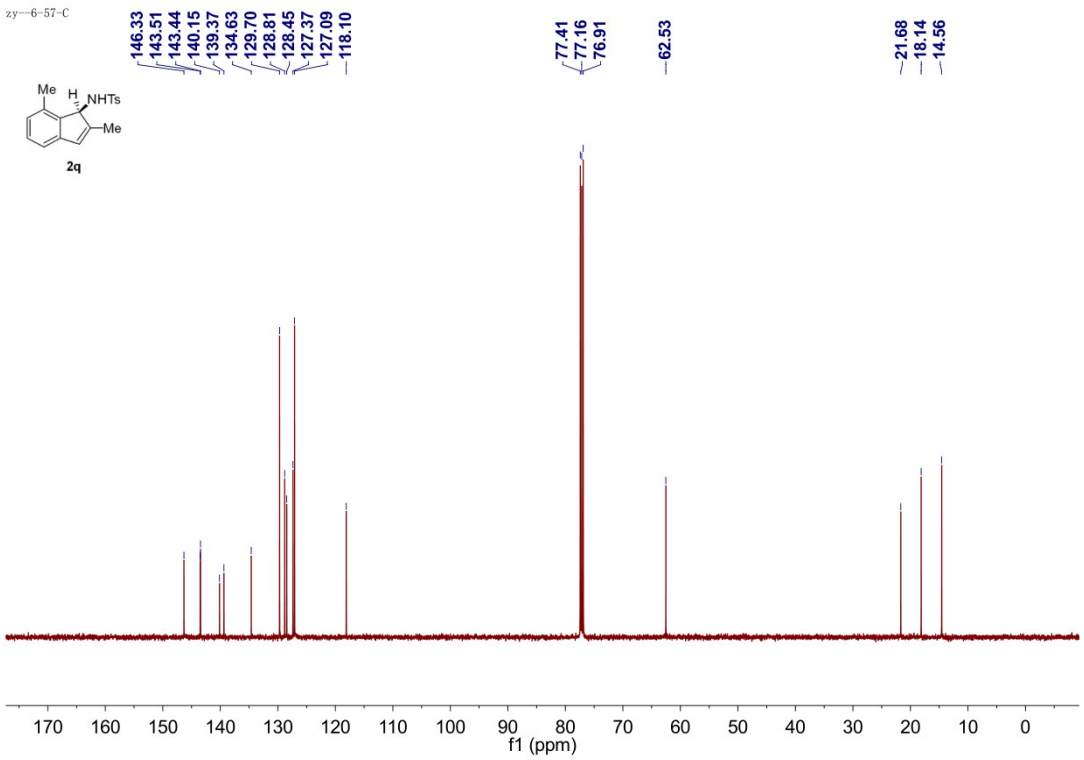
(S)-4-methyl-N-(2,3,4,9-tetrahydro-1H-fluoren-9-yl)benzenesulfonamide (**2p**)



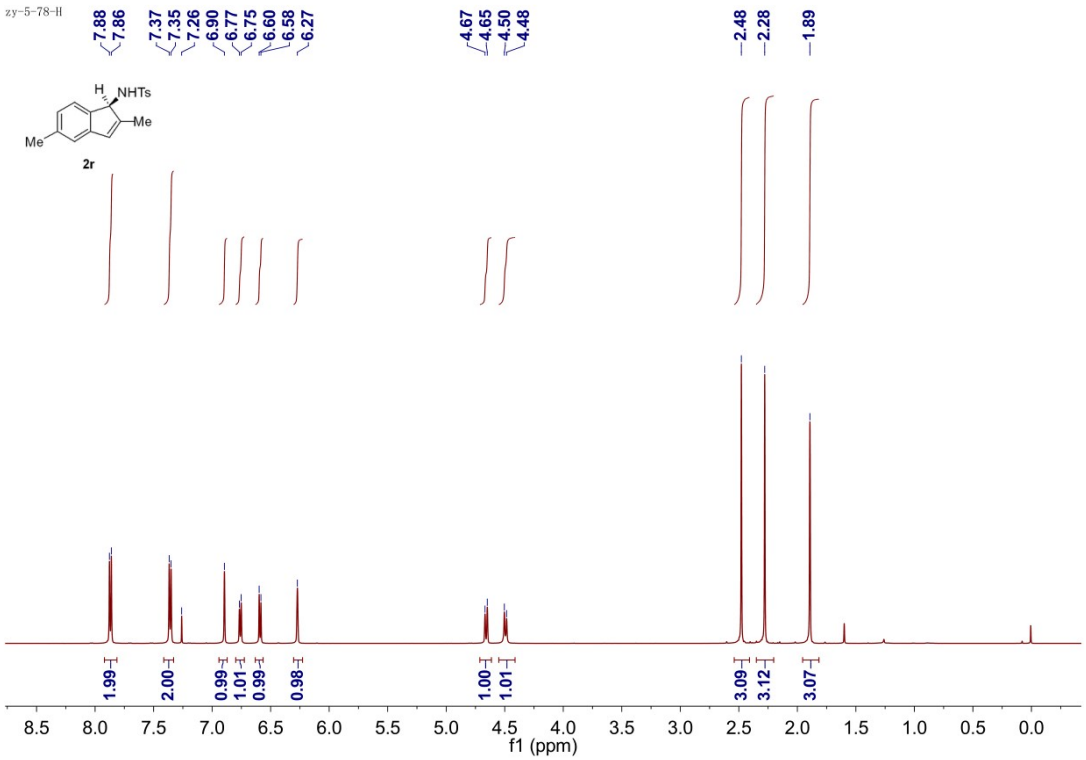


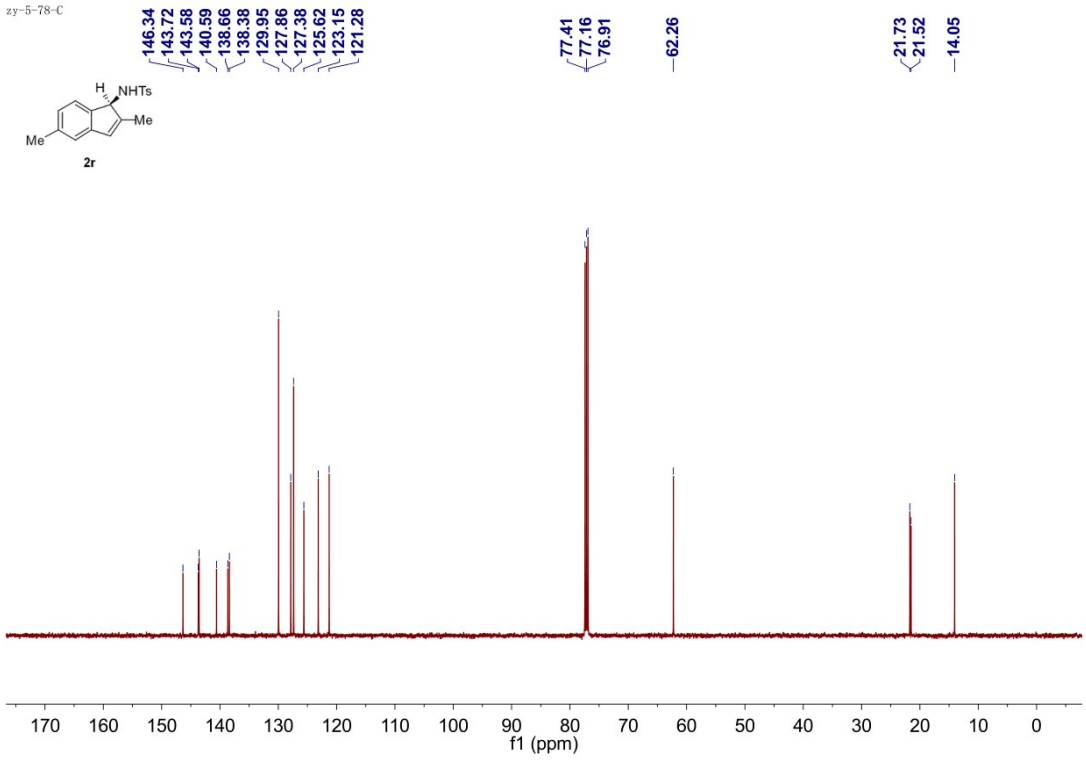
(S)-N-(2,7-dimethyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2p**)



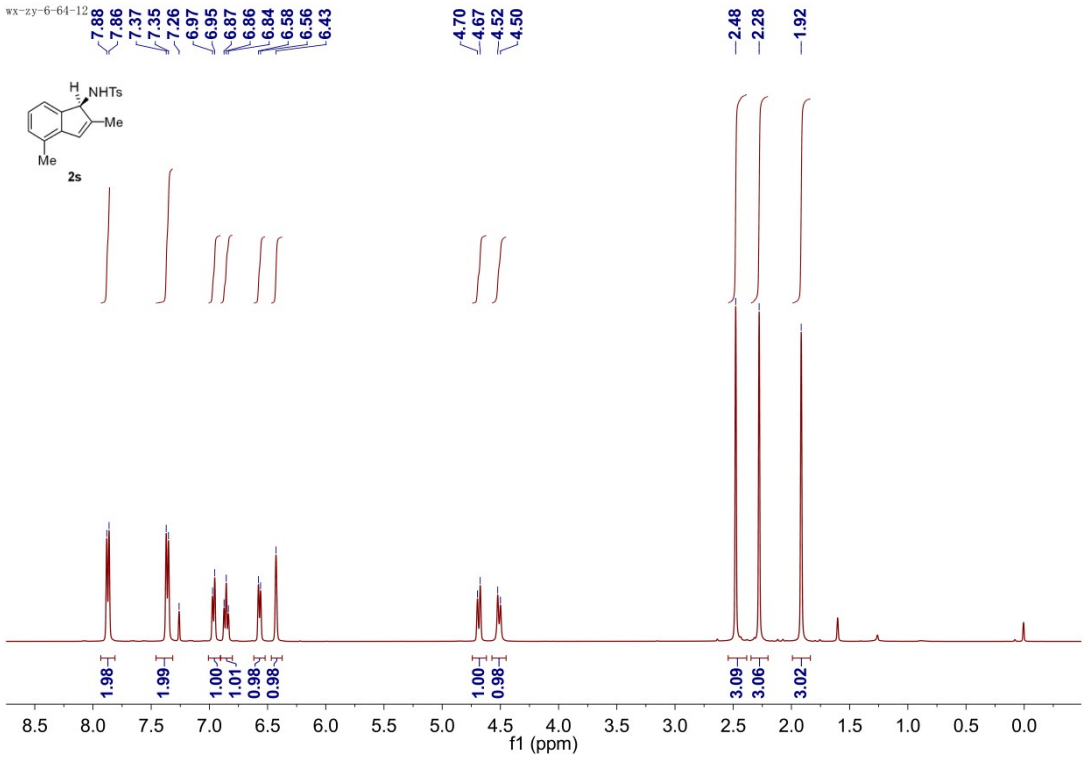


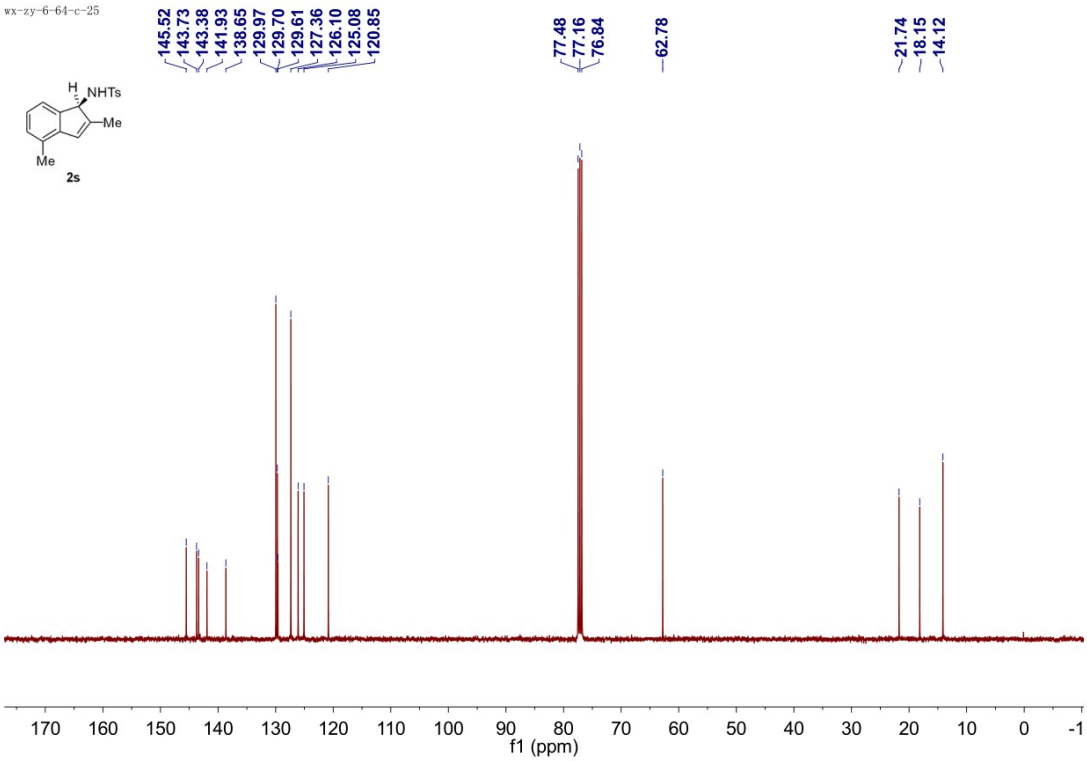
(S)-N-(2,5-dimethyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2r**)



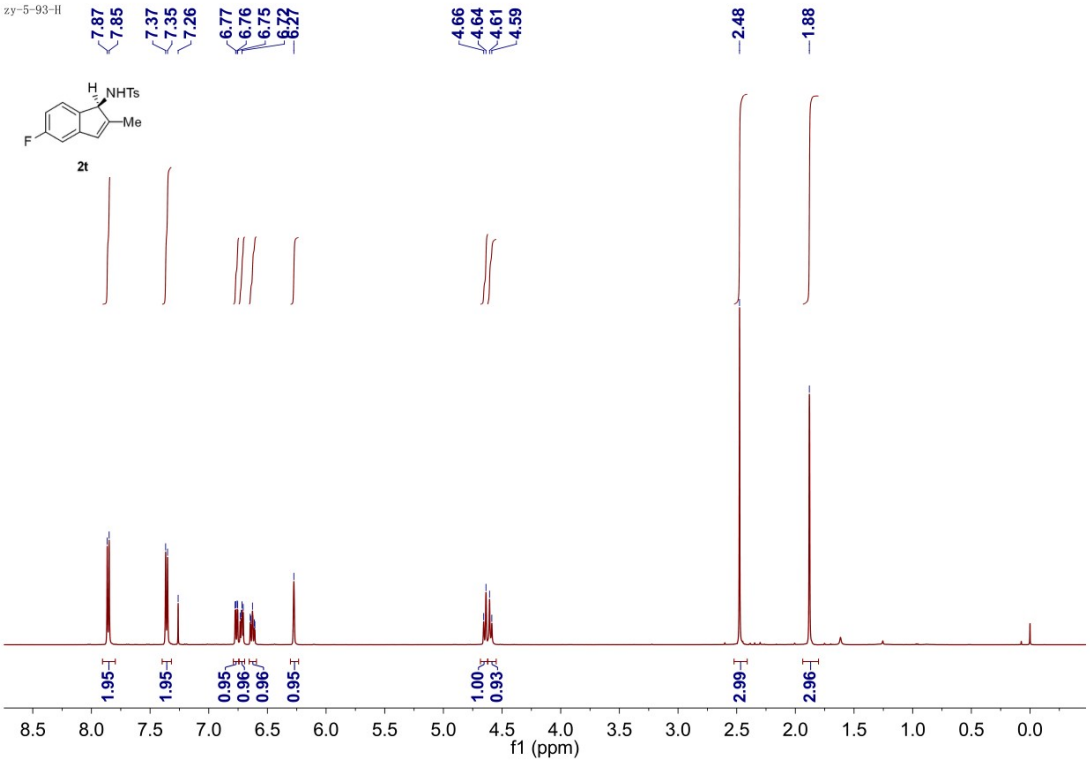


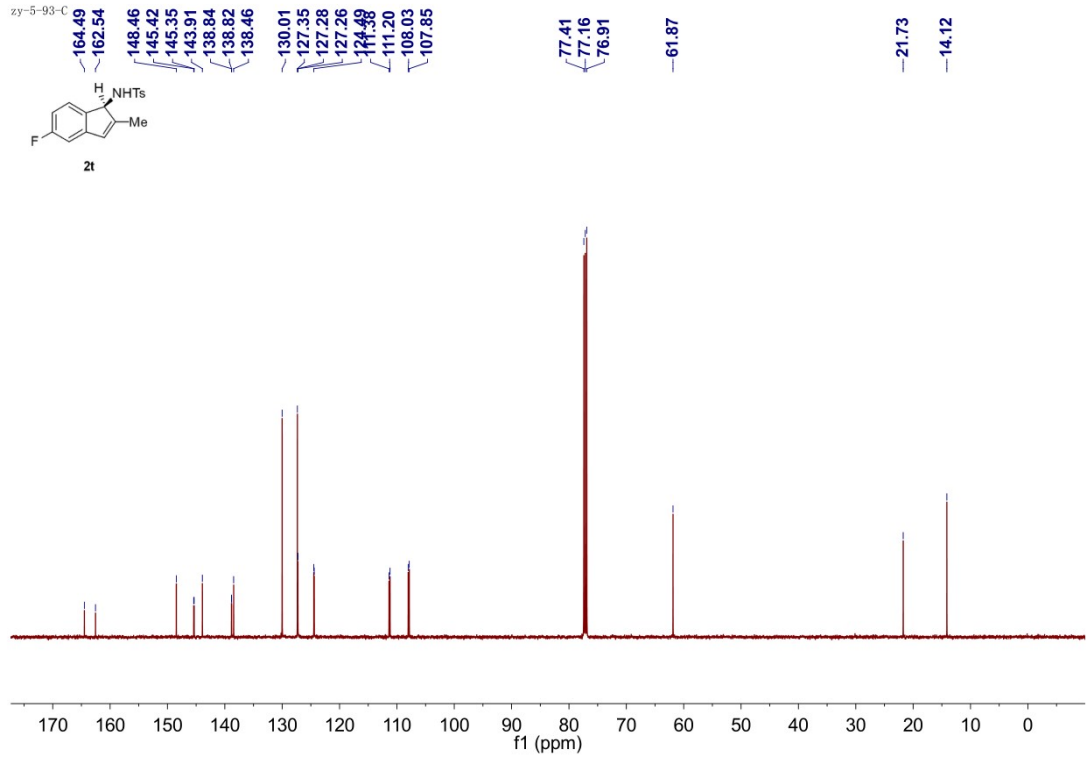
(S)-N-(2,4-dimethyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2s**)

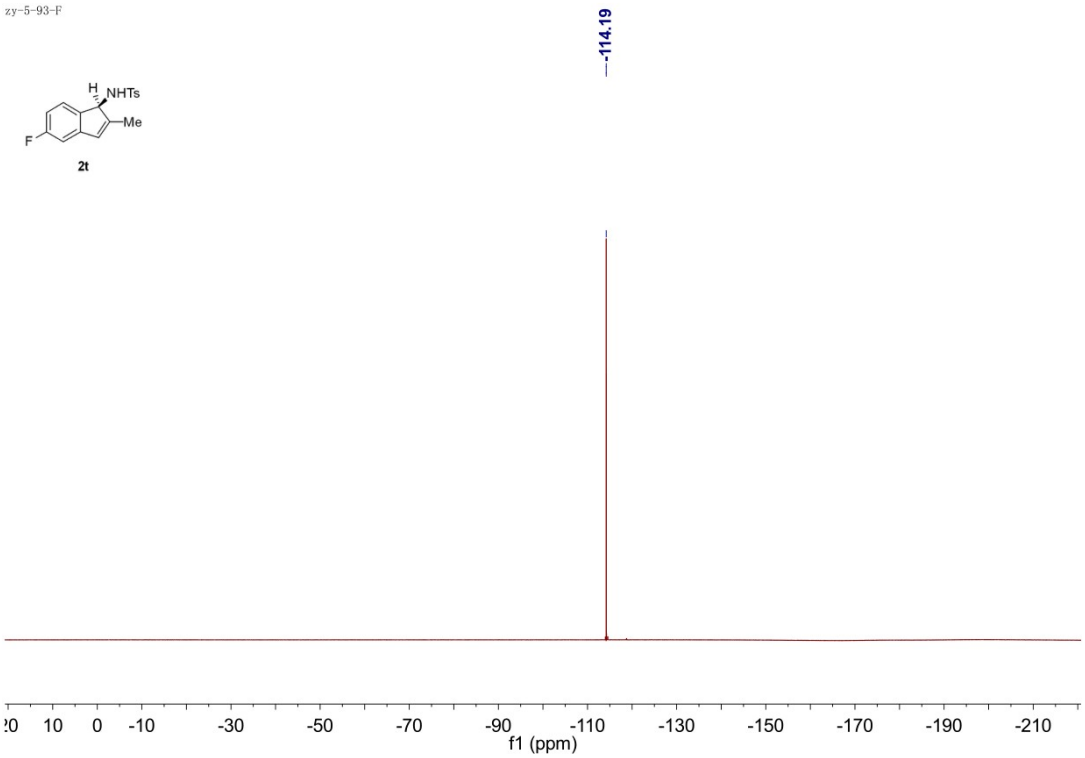




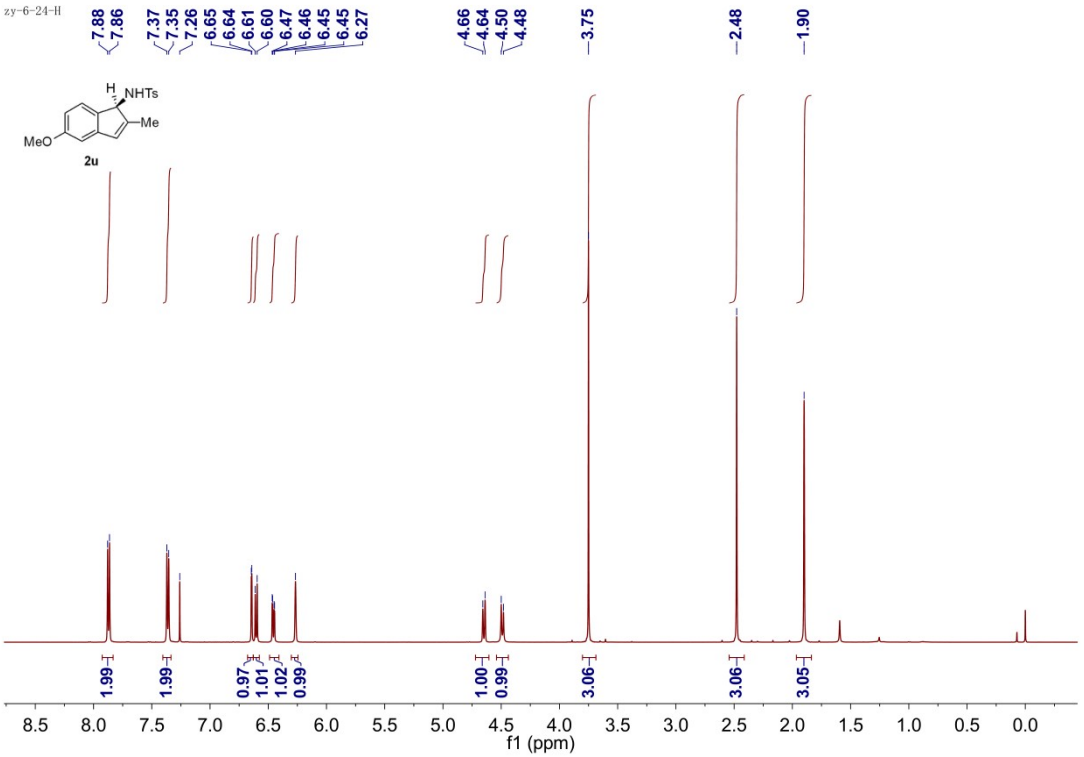
(S)-N-(5-fluoro-2-methyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2t**)

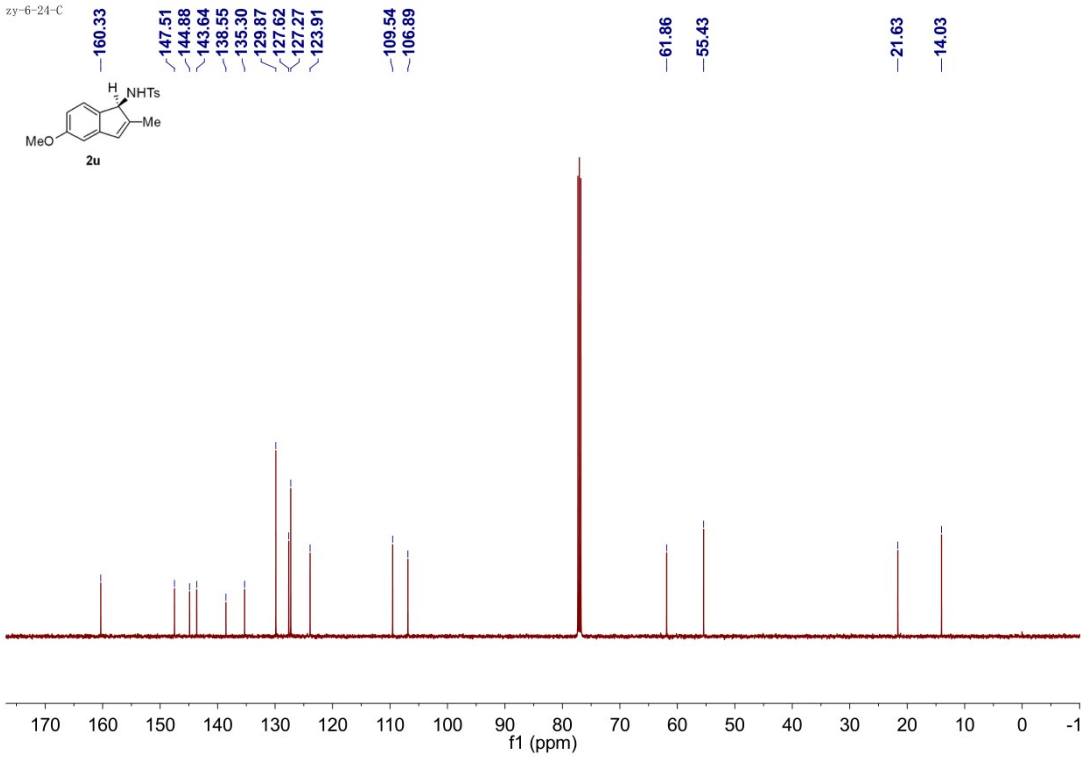




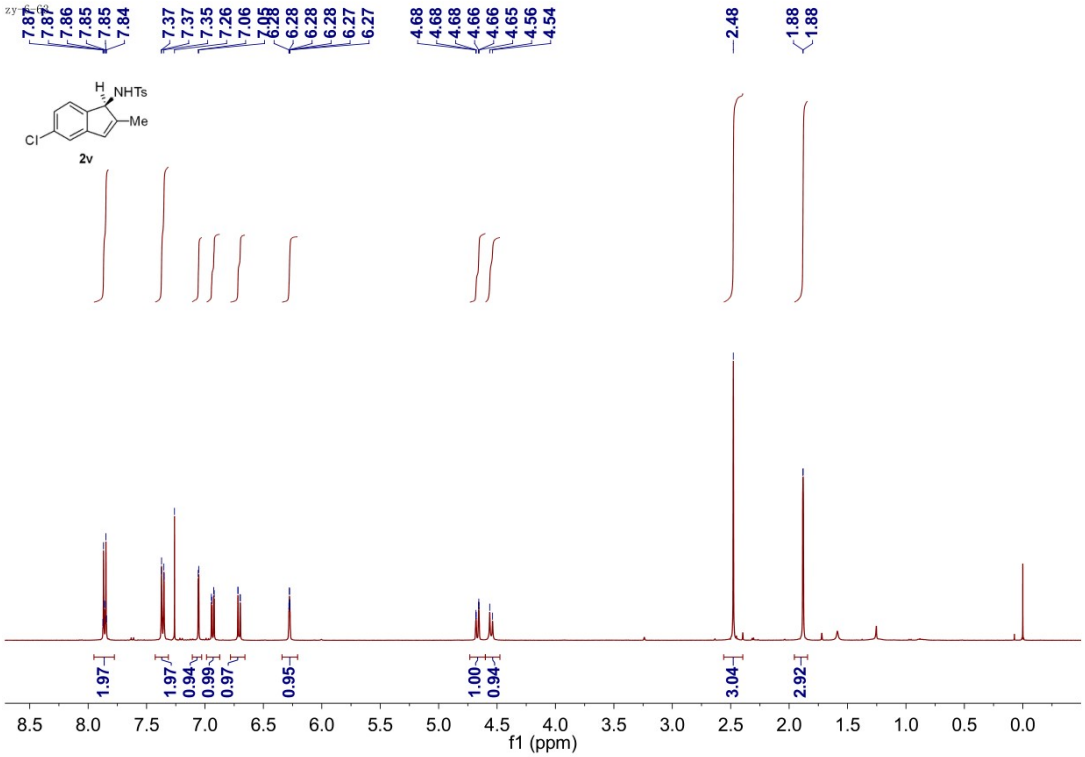

zy-5-93-F
-114.19
H
NHTs
Me
F
2t
10
0
-10
-30
-50
-70
-90
-110
-130
-150
-170
-190
-210
f1 (ppm)

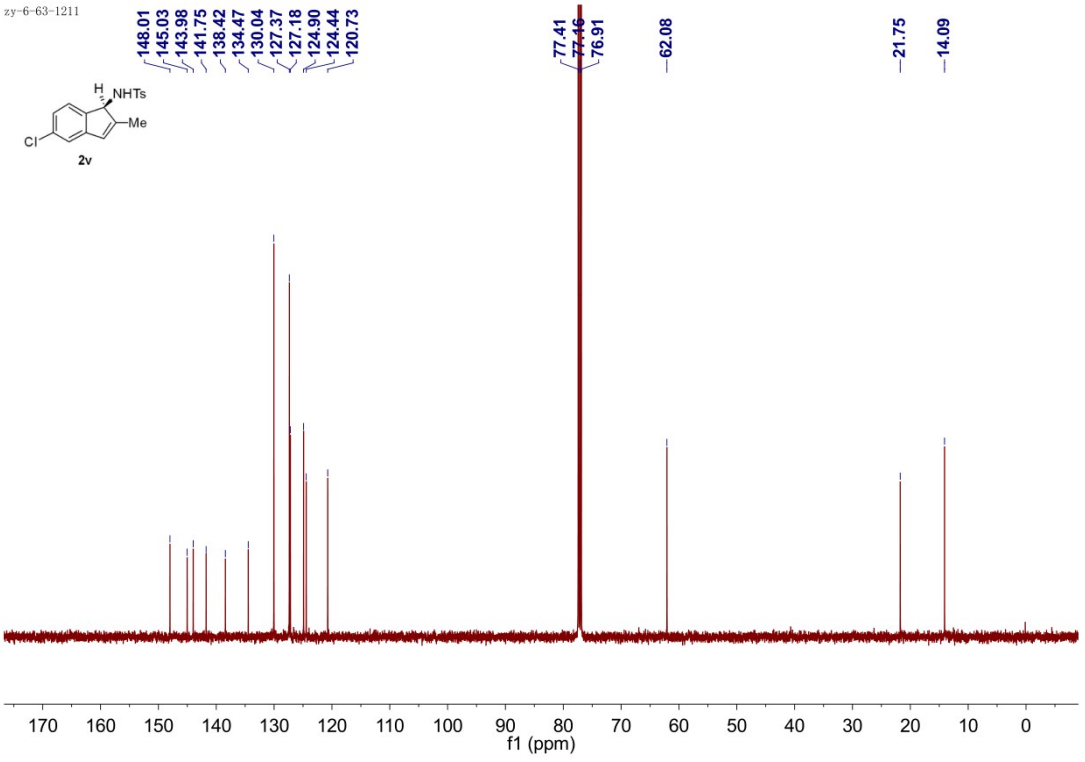
(S)-N-(5-methoxy-2-methyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2u**)



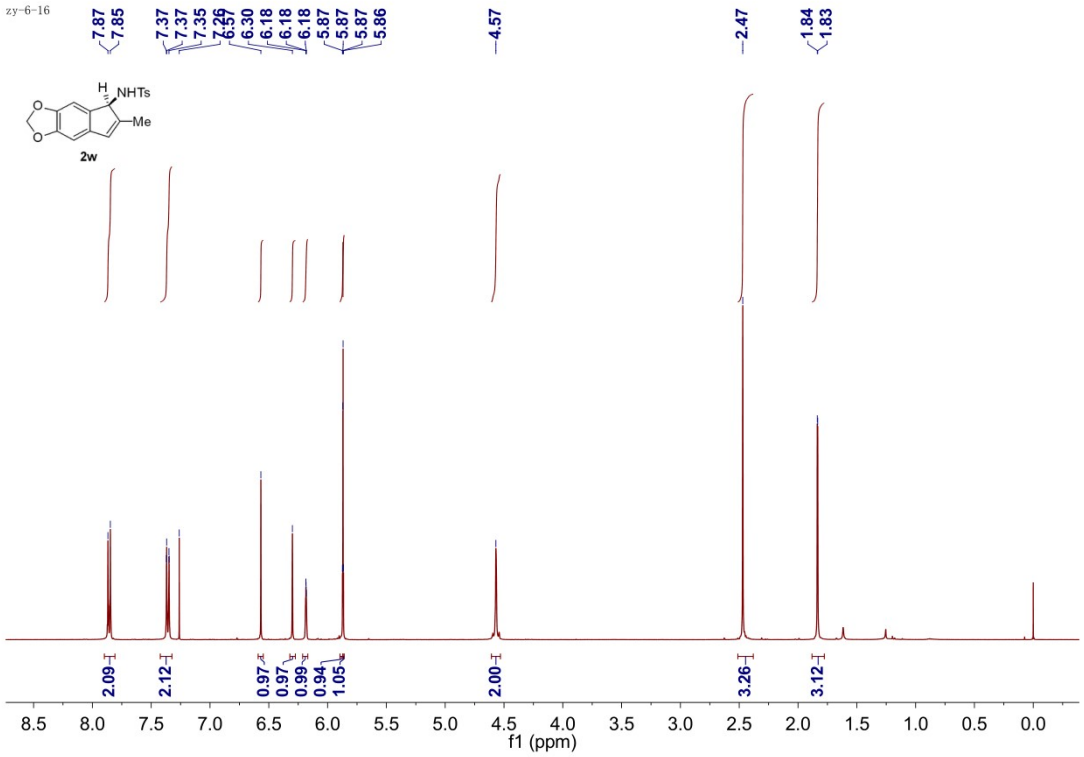


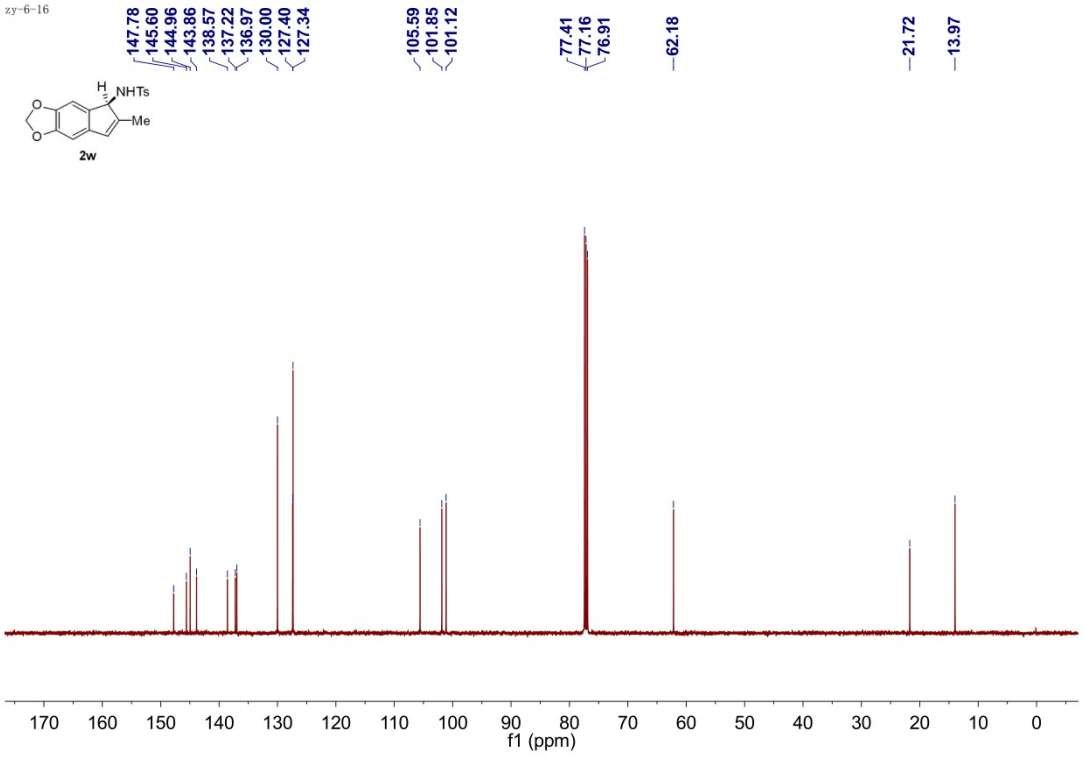
(S)-N-(5-chloro-2-methyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2v**)



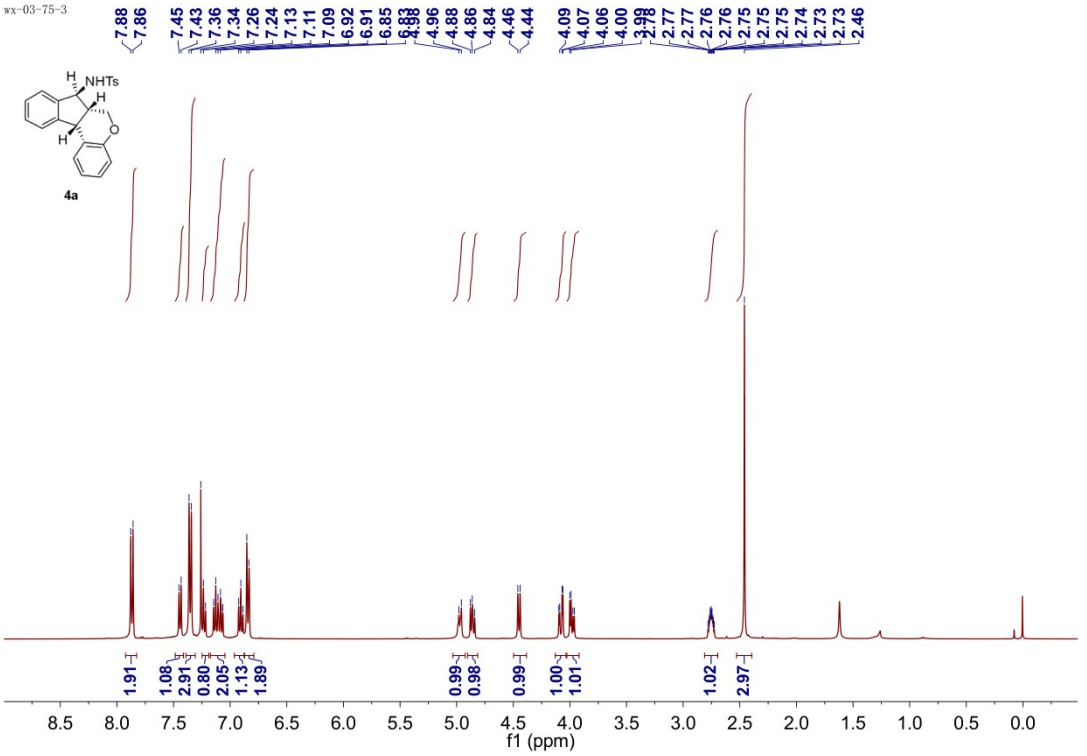


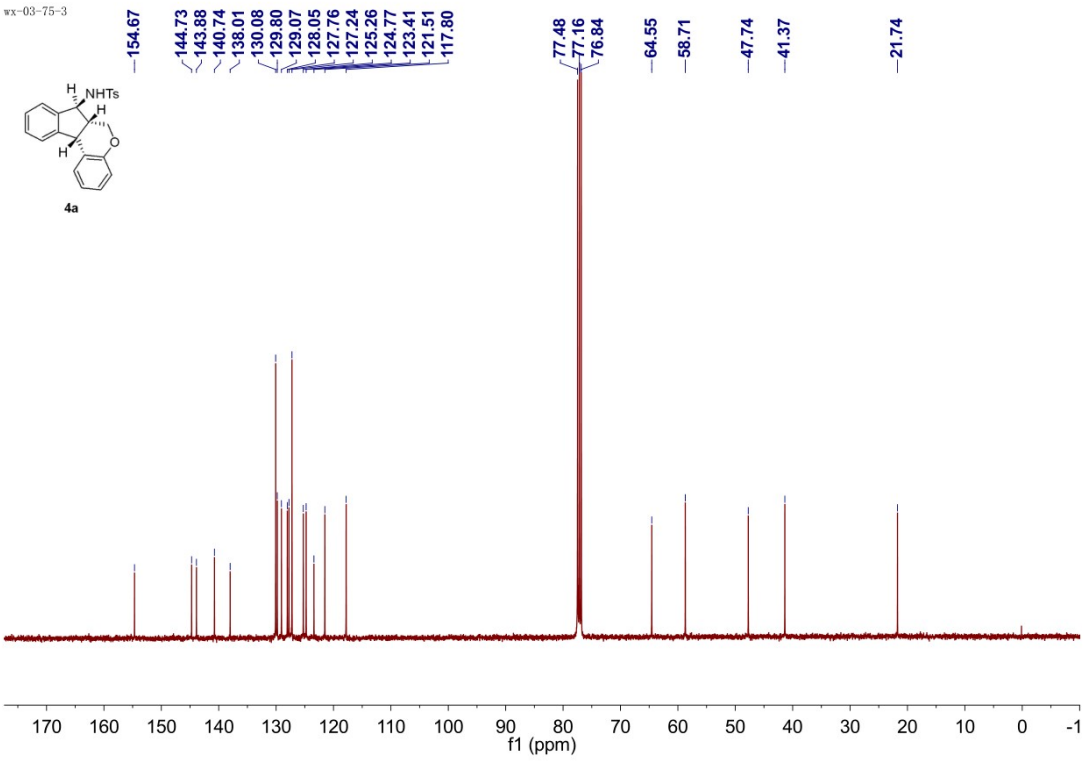
(S)-4-methyl-N-(6-methyl-5H-indeno[5,6-d][1,3]dioxol-5-yl)benzenesulfonamide (**2w**)



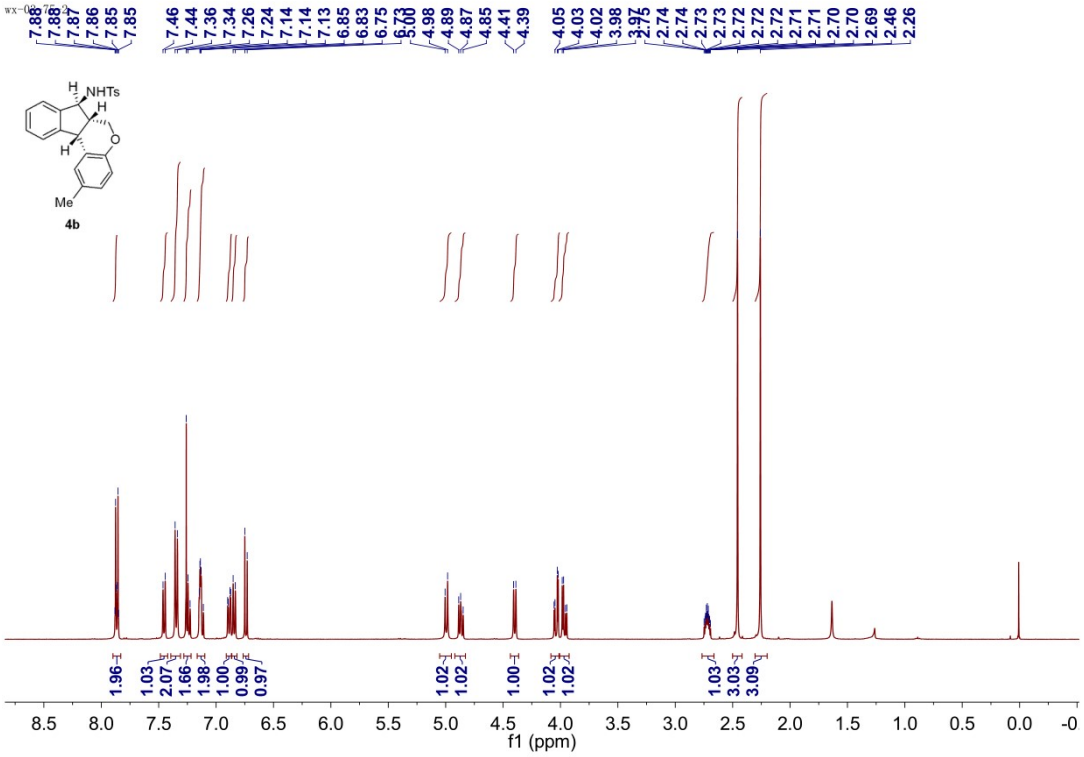


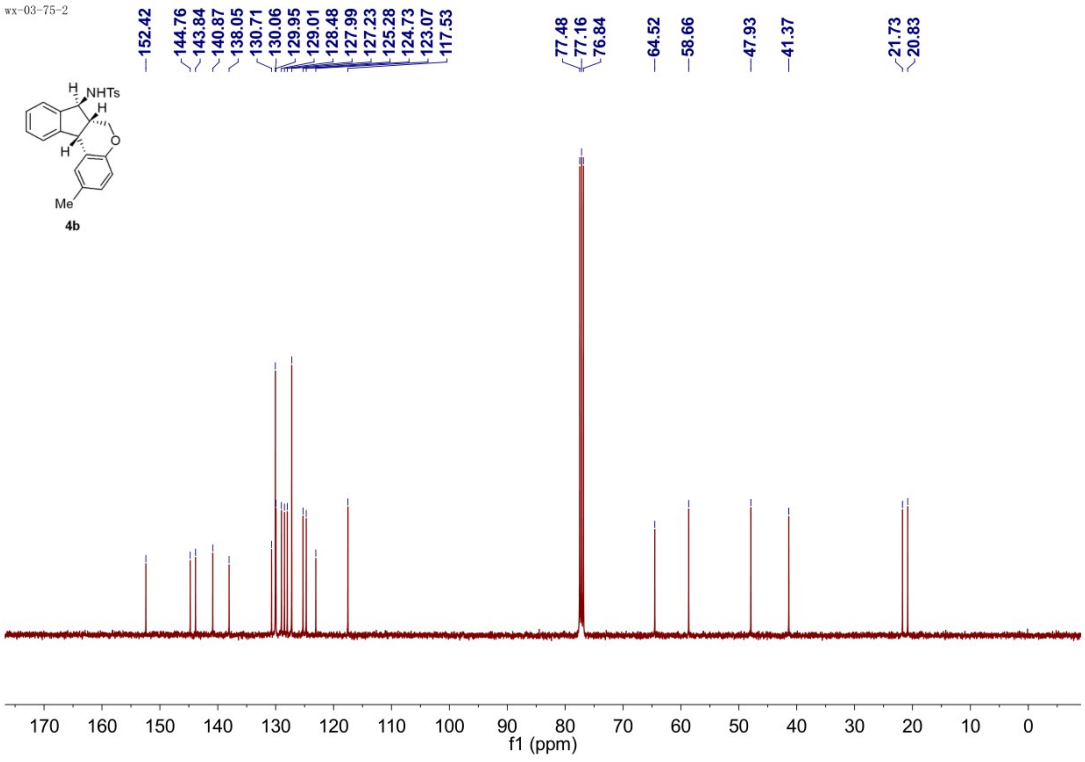
4-methyl-N-((6aR,7S,11bS)-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)benzenesulfonamide (**4a**)



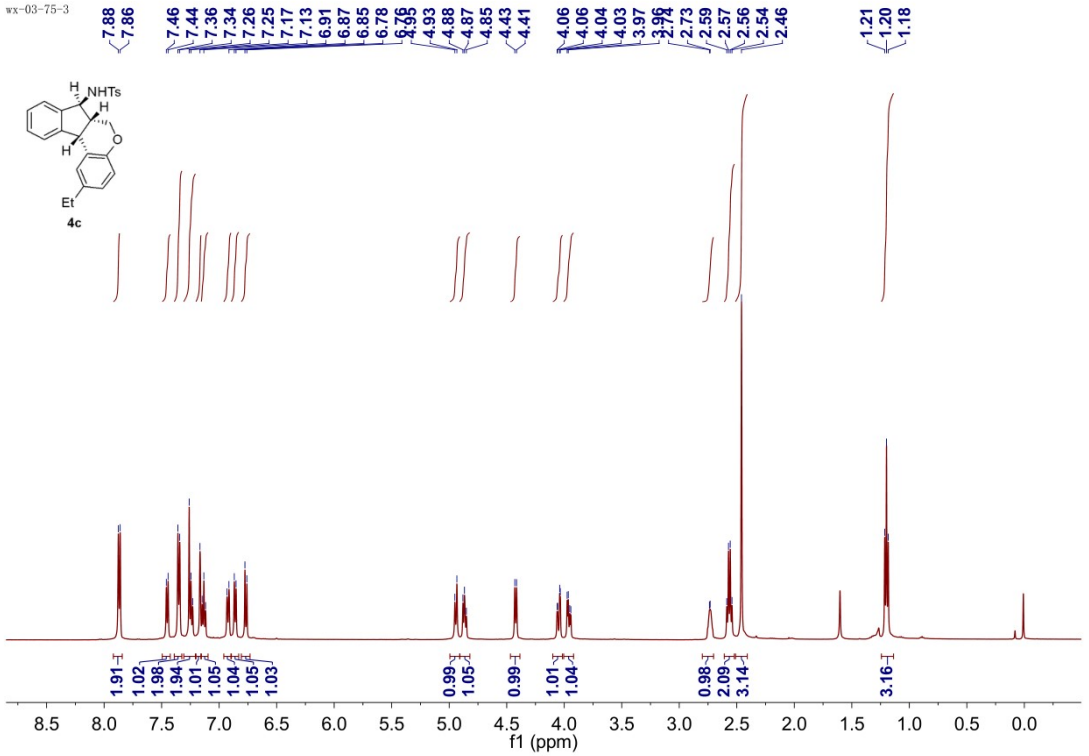


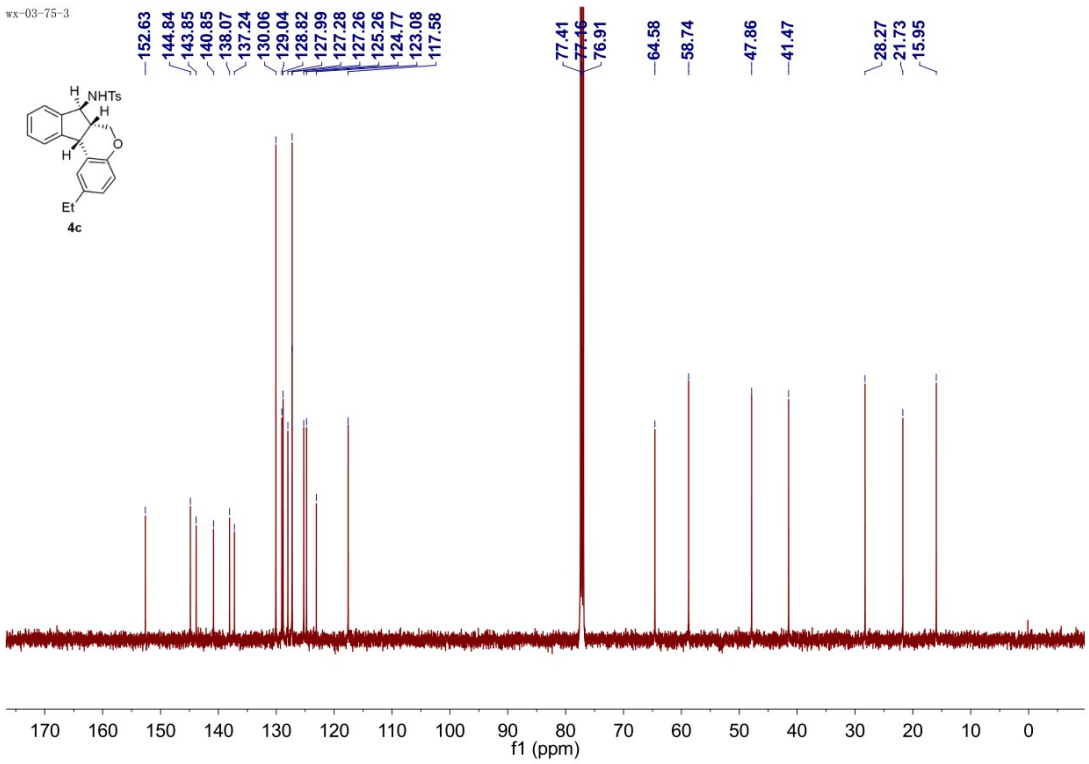
4-methyl-N-((6aR,7S,11bS)-2-methyl-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)benzenesulfonamide (**4b**)



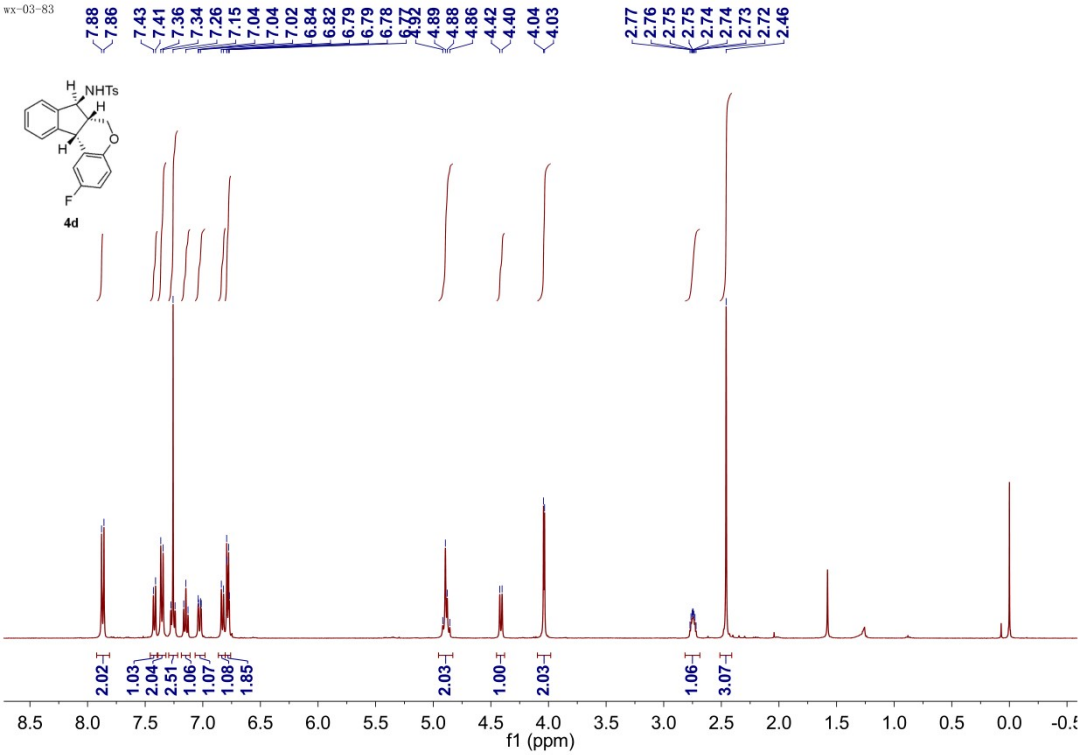


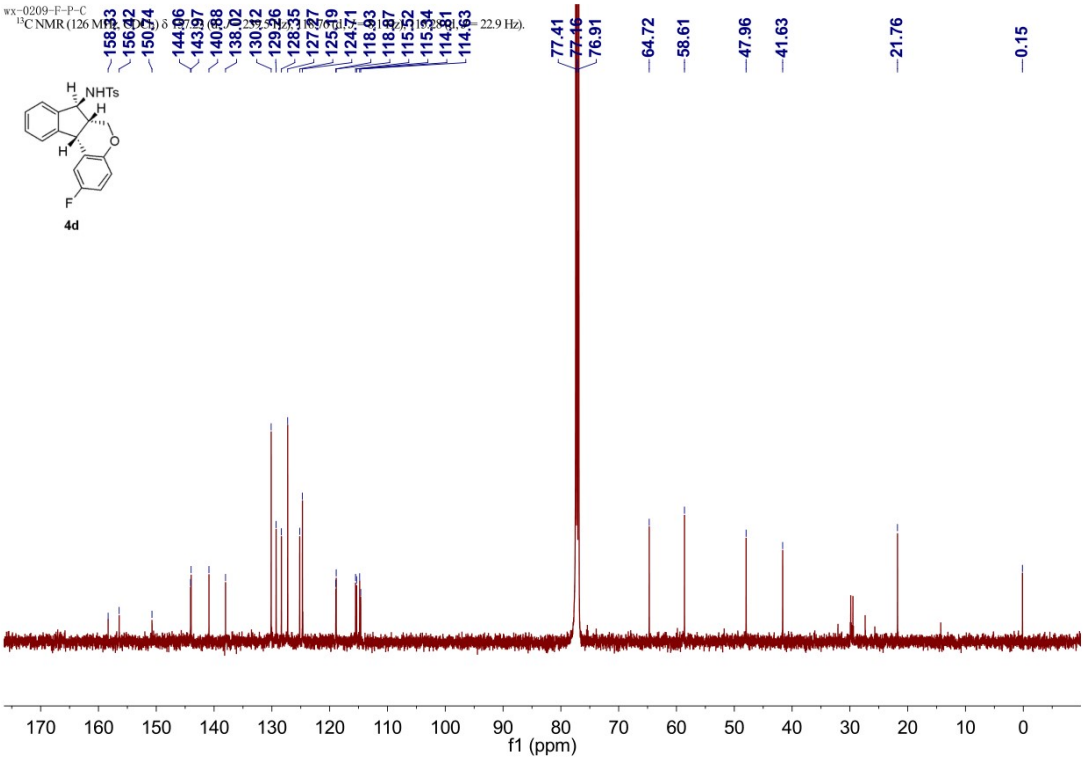
N-((6aR,7S,11bS)-2-ethyl-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)-4-methylbenzenesulfonamide (**4c**)

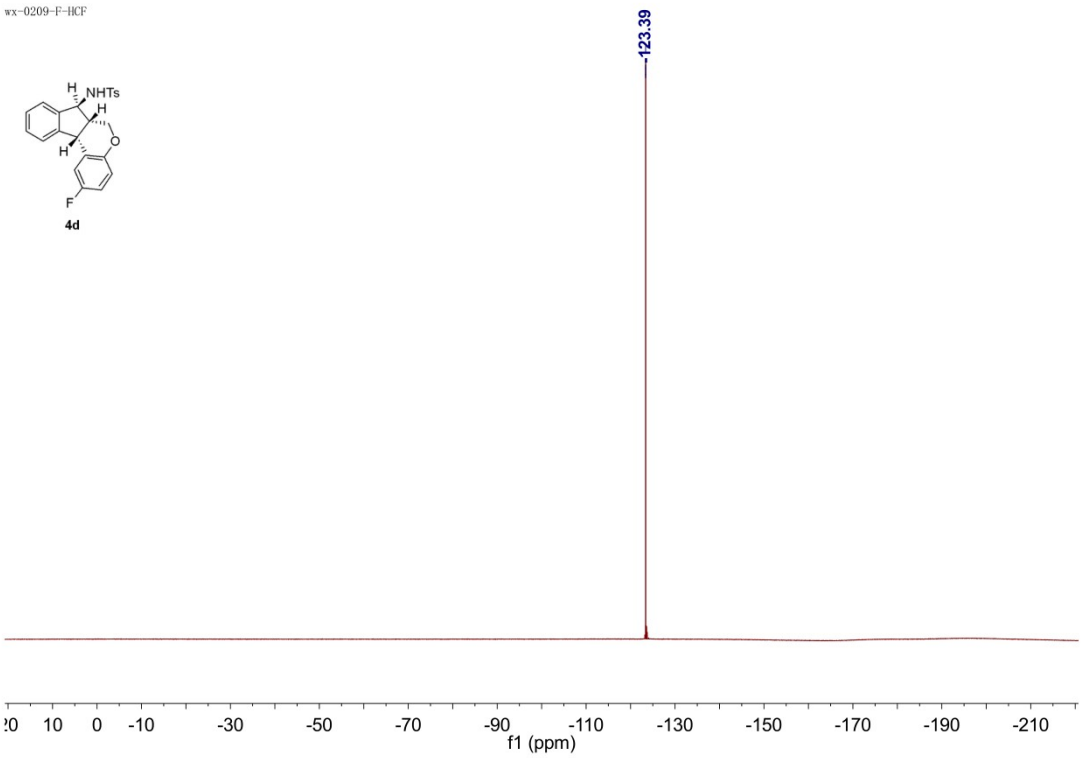




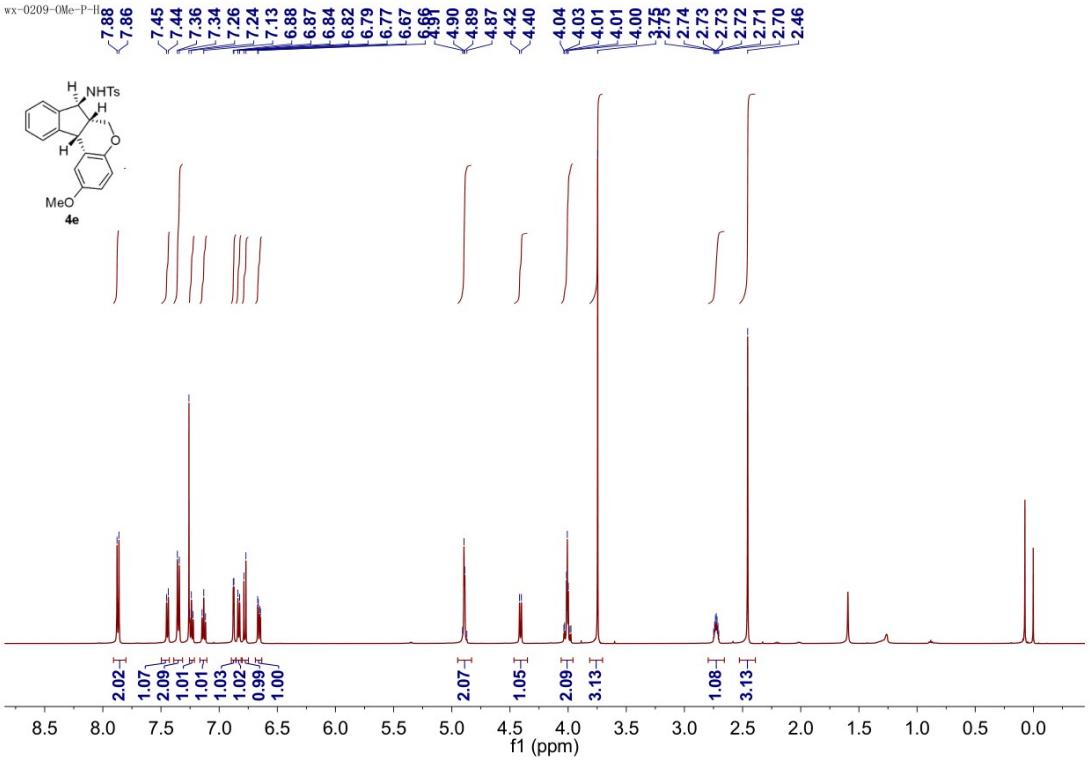
N-((6aR,7S,11bS)-2-fluoro-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)-4-methylbenzenesulfonamide (**4d**)

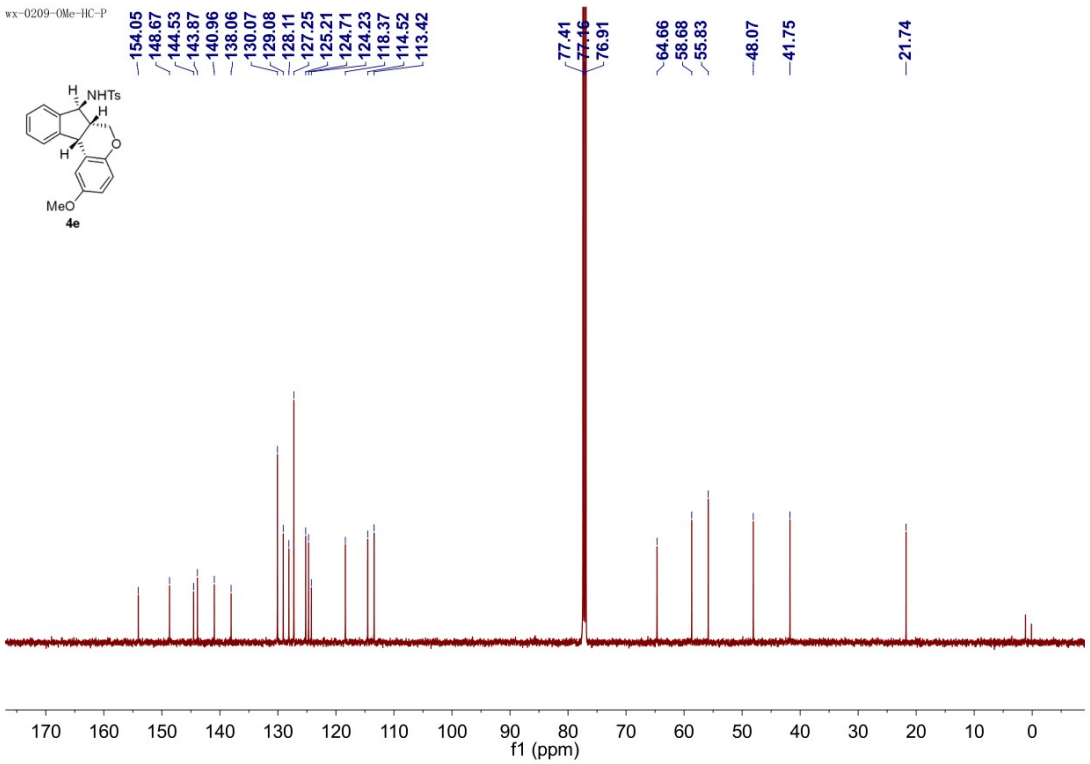




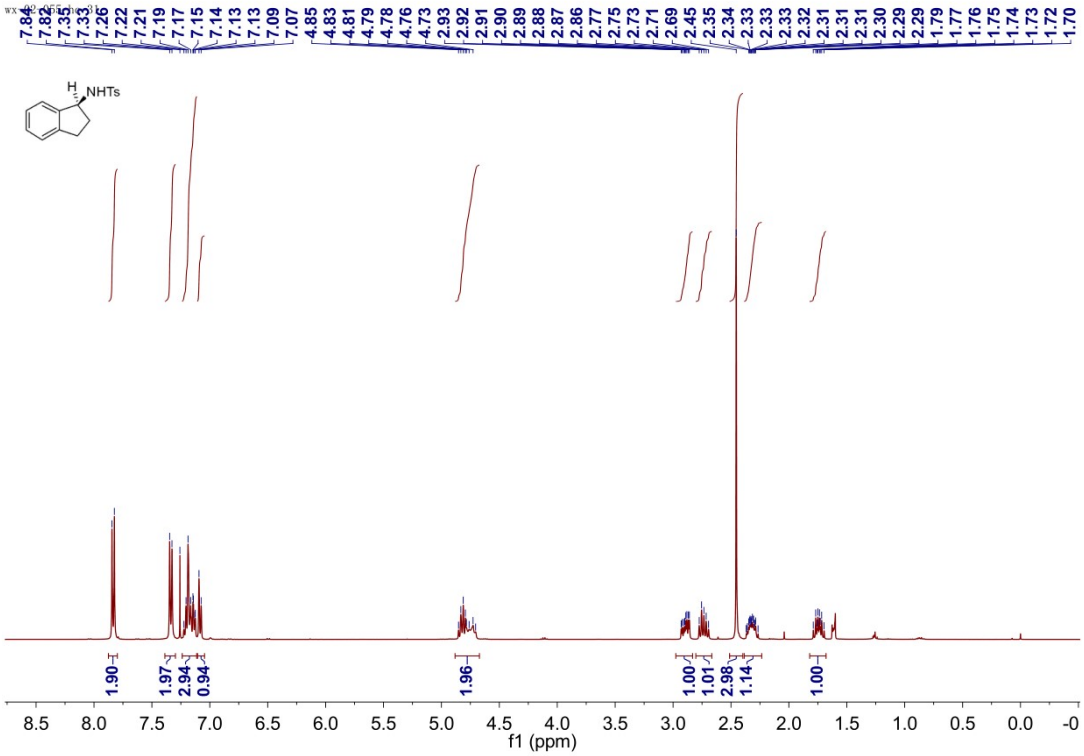

wx-0209-F-HCF
123.39
NHTs
H
H
H
O
F
4d
10
0
-10
-30
-50
-70
-90
-110
-130
-150
-170
-190
-210
f1 (ppm)

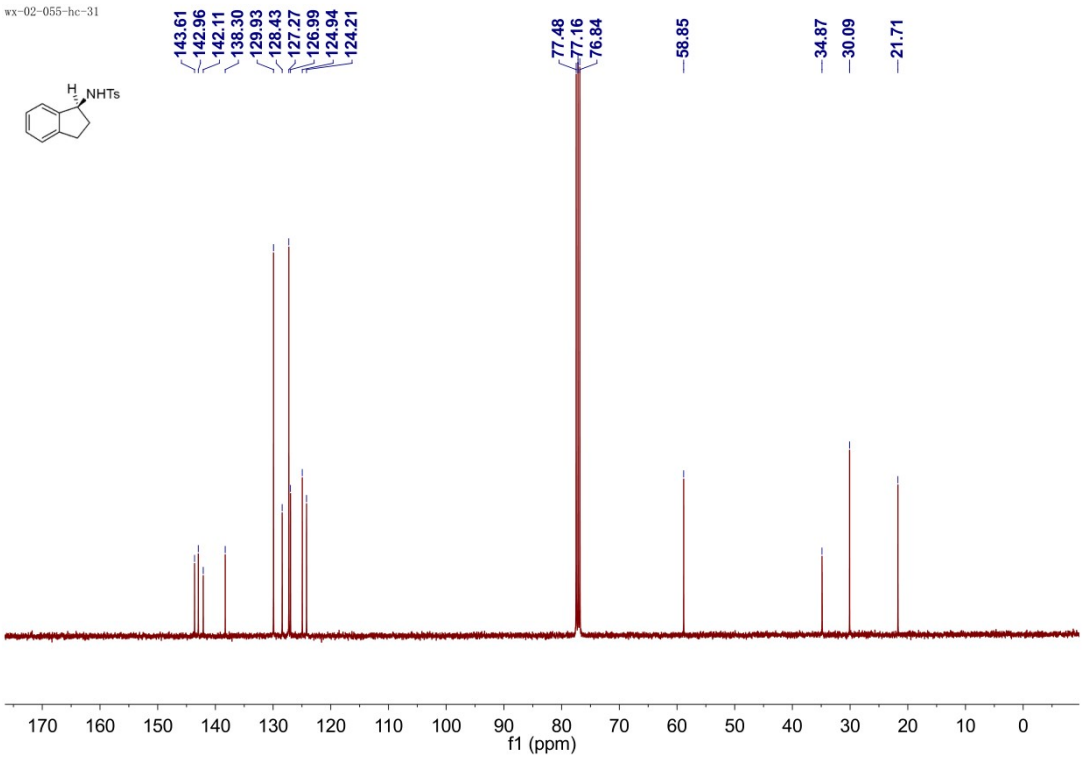
N-((6aR,7S,11bS)-2-methoxy-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)-4-methylbenzenesulfonamide (**4e**)



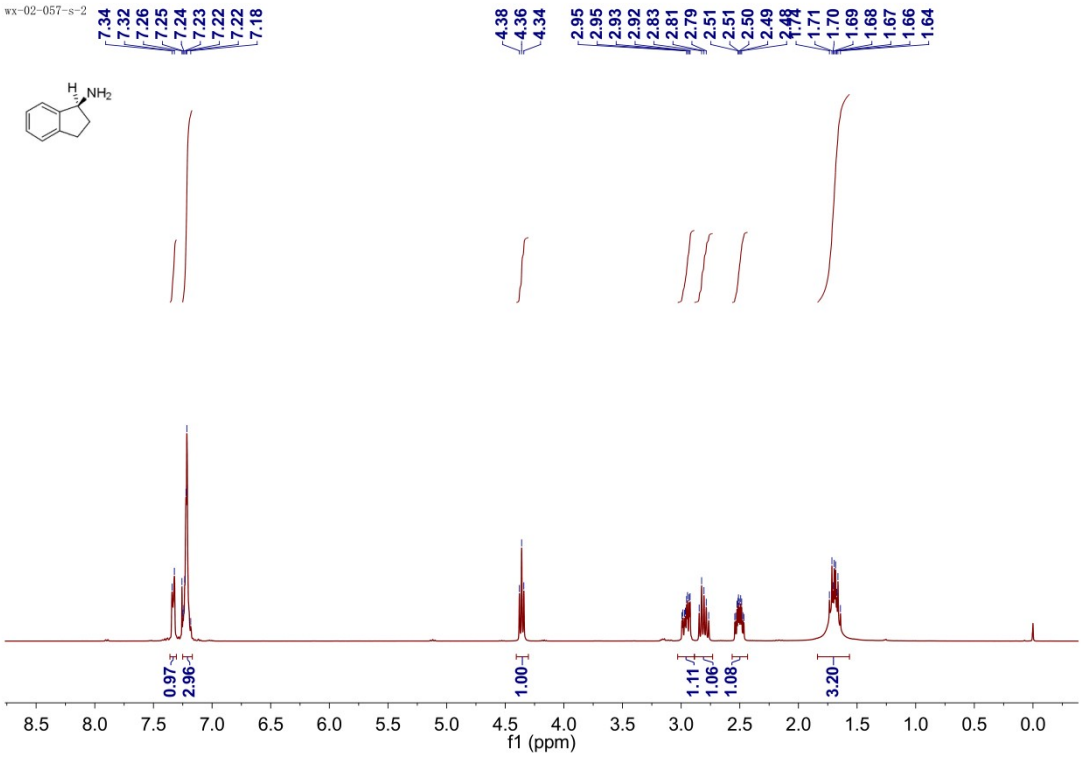


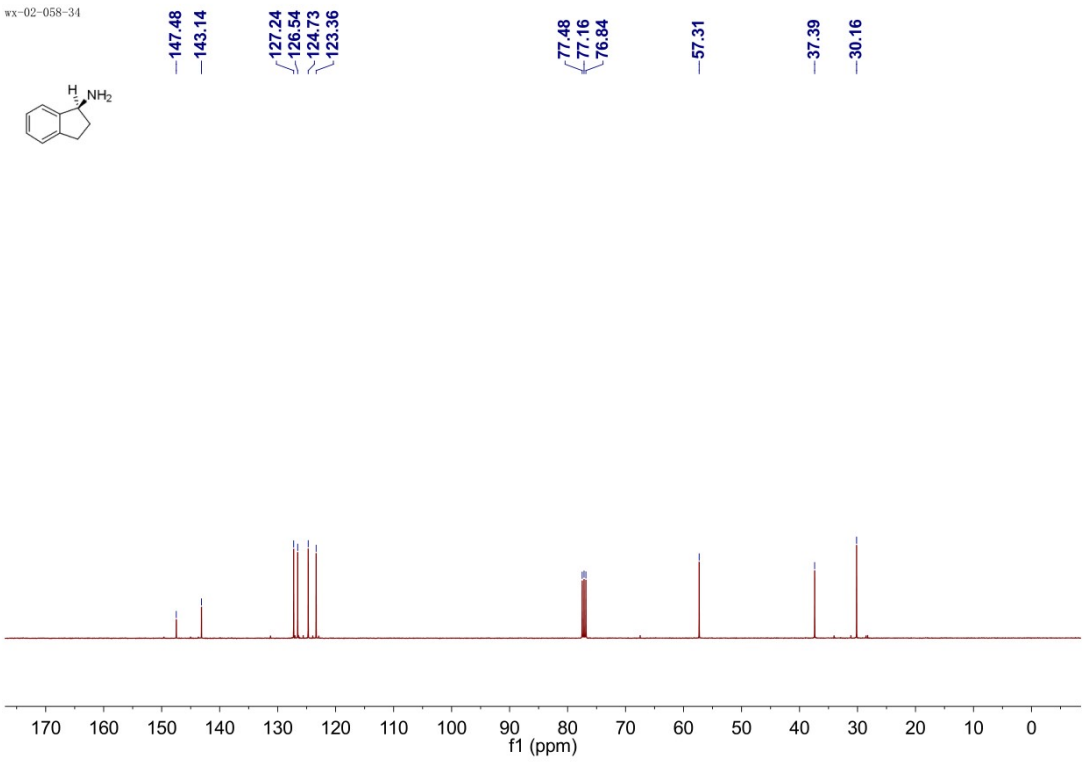
(S)-N-(2,3-dihydro-1H-inden-1-yl)-4-methylbenzenesulfonamide (**5**)



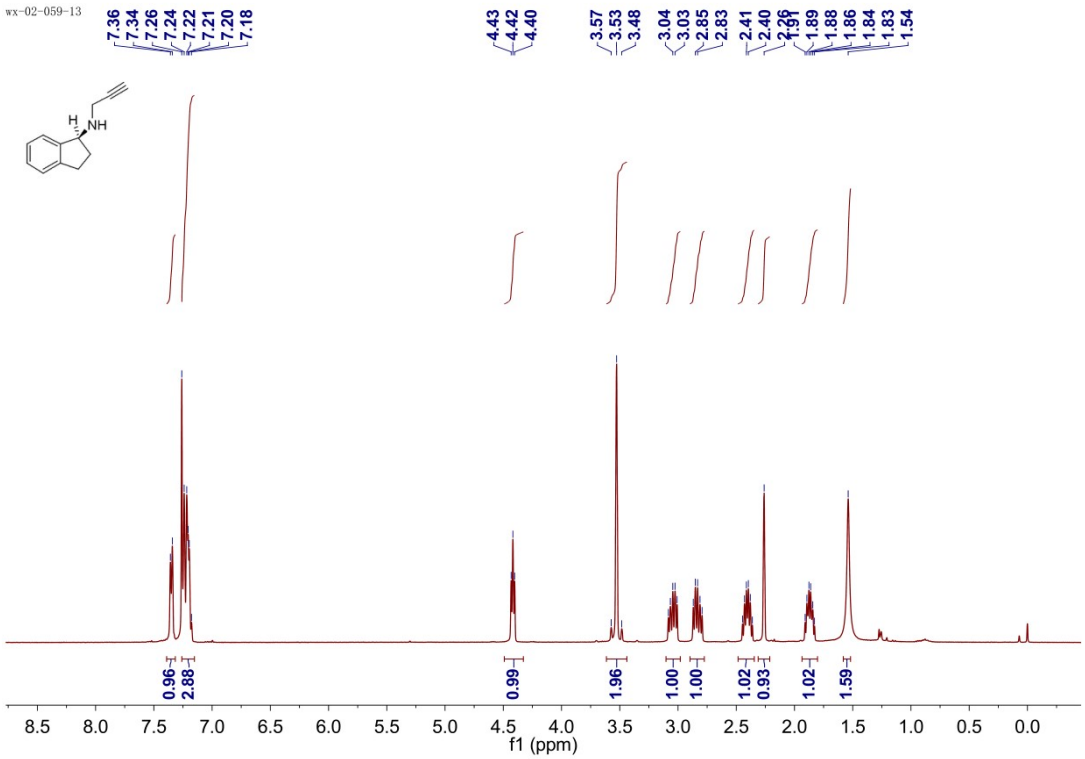


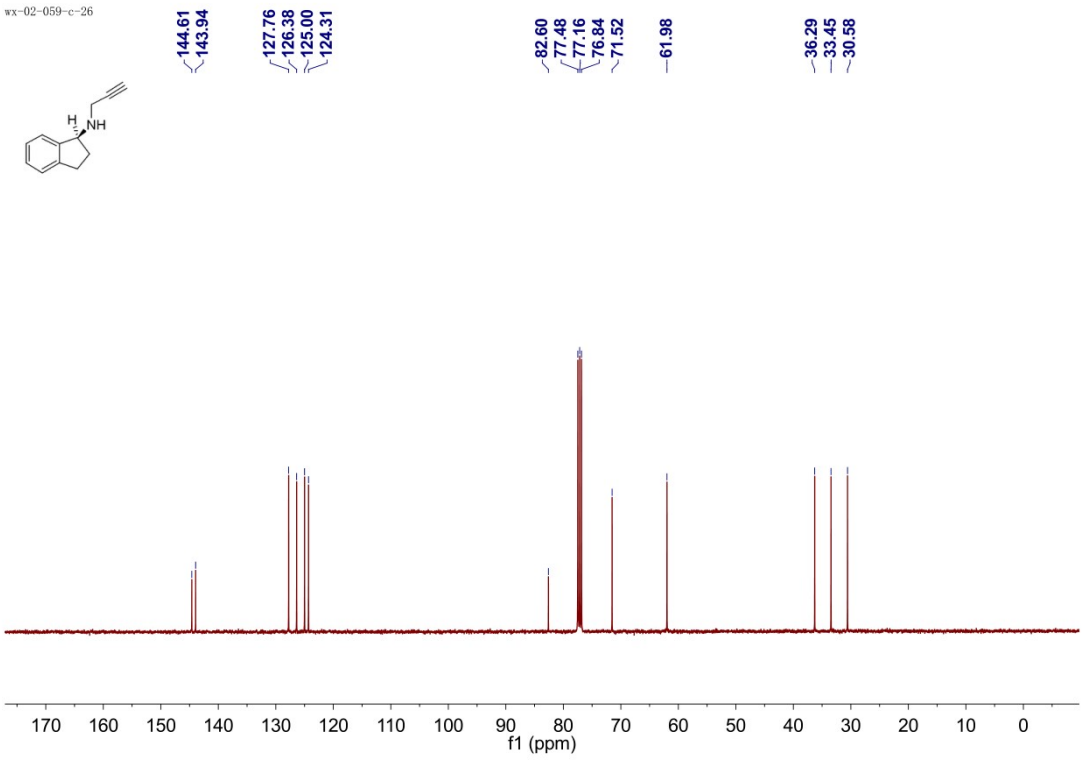
(S)-2,3-dihydro-1H-inden-1-amine (**6**)





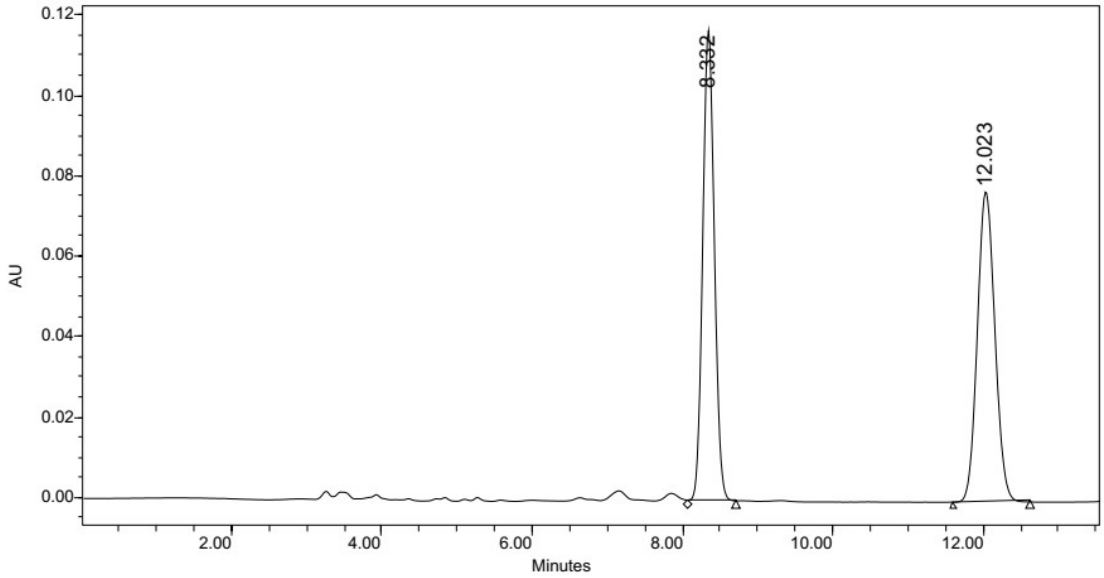
(S)-N-(prop-2-yn-1-yl)-2,3-dihydro-1H-inden-1-amine (**7**)



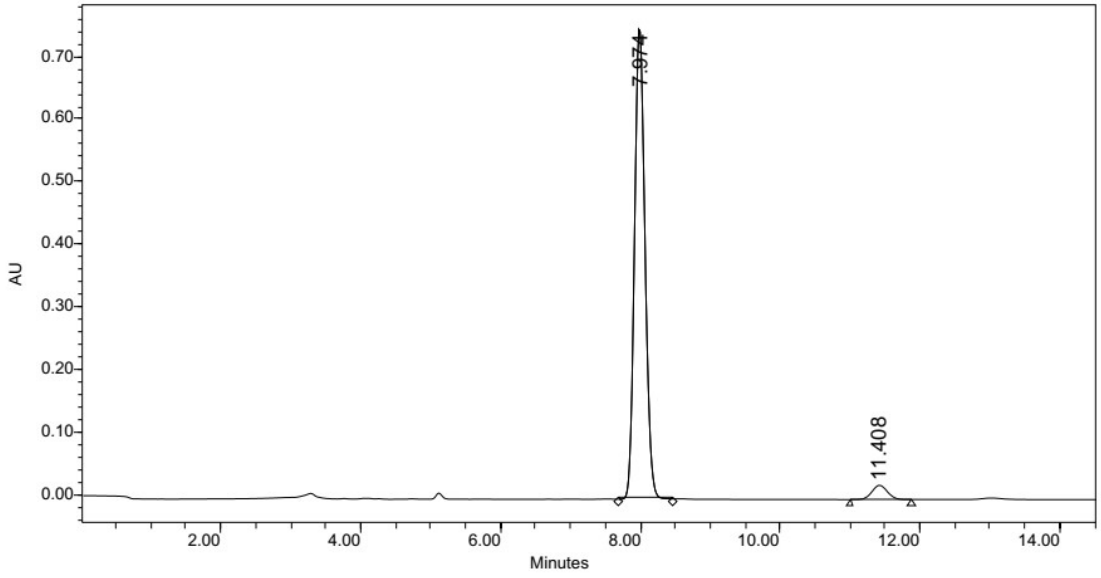


12. HPLC spectra for products, 5, 6 and 7.

(S)-4-methyl-N-(2-methyl-1H-inden-1-yl)benzenesulfonamide (**2a**)

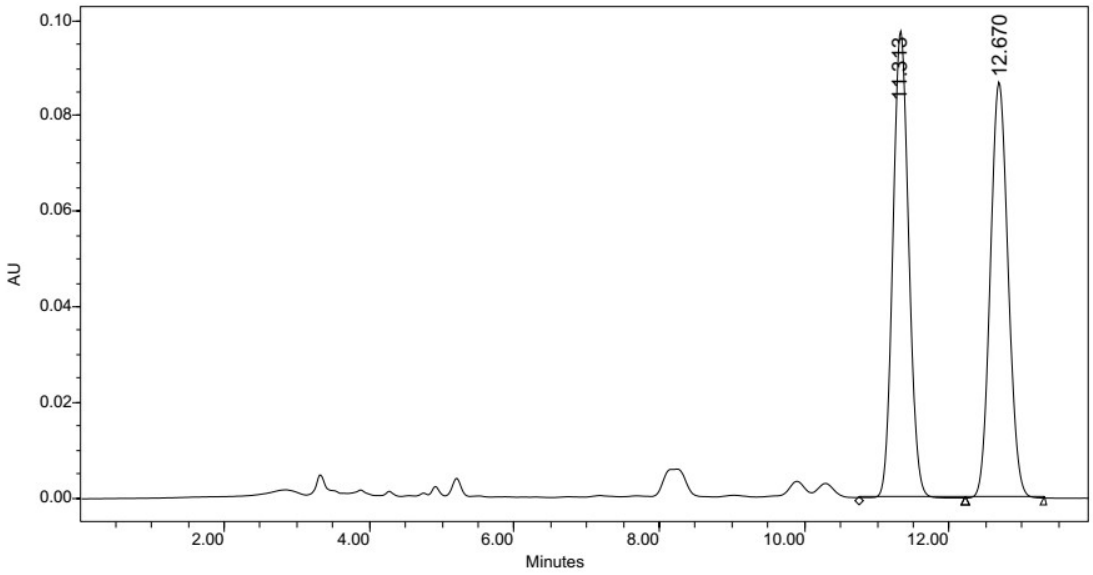


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.332	1254317	50.01	116830	60.22
2	12.023	1253720	49.99	77189	39.78

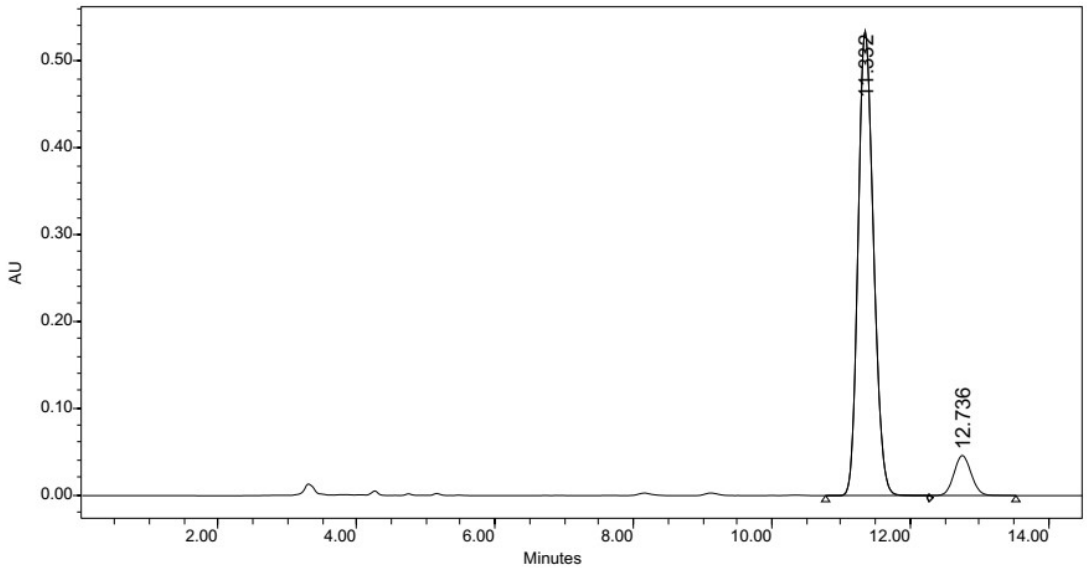


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	7.974	7857792	95.75	753865	97.09
2	11.408	349055	4.25	22631	2.91

(S)-N-(1H-inden-1-yl)-4-methylbenzenesulfonamide (**2b**)

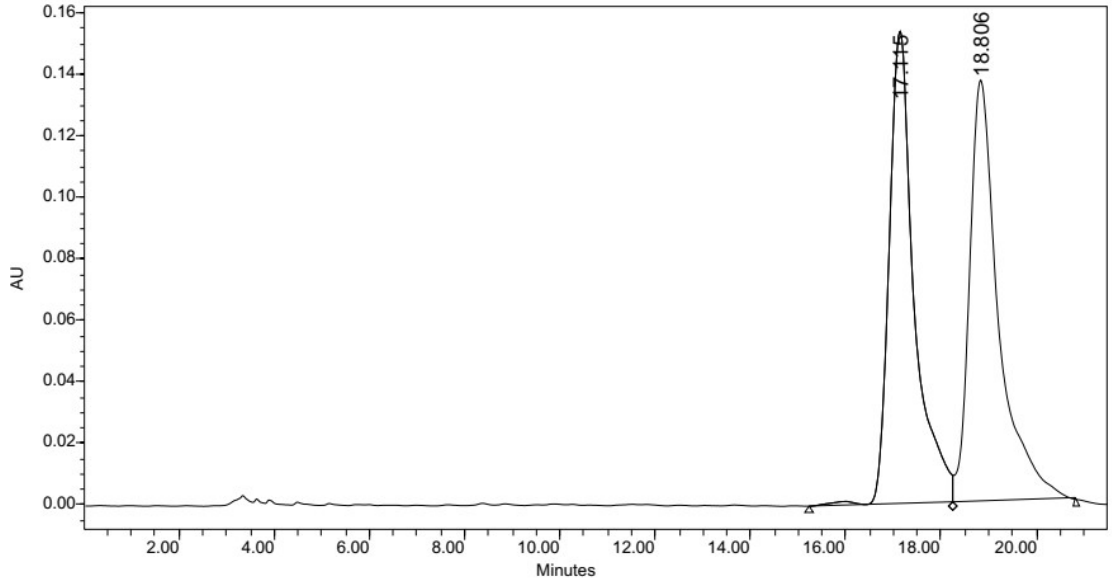


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	11.313	1486314	50.00	97789	52.89
2	12.670	1486031	50.00	87116	47.11

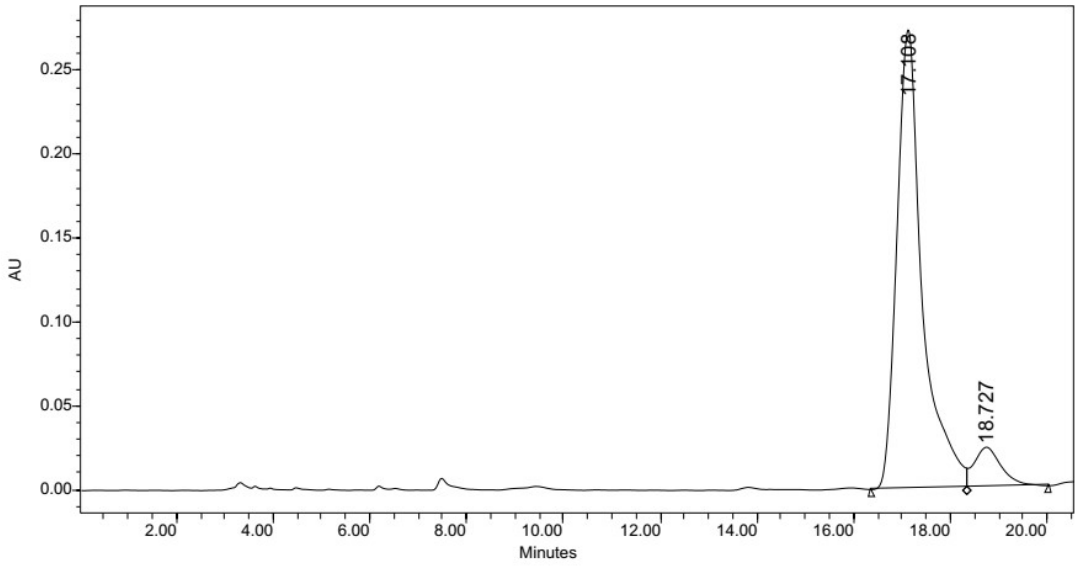


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	11.332	8307523	91.17	535794	92.06
2	12.736	805025	8.83	46218	7.94

(R)-4-methyl-N-(2-phenyl-1H-inden-1-yl)benzenesulfonamide (**2c**)

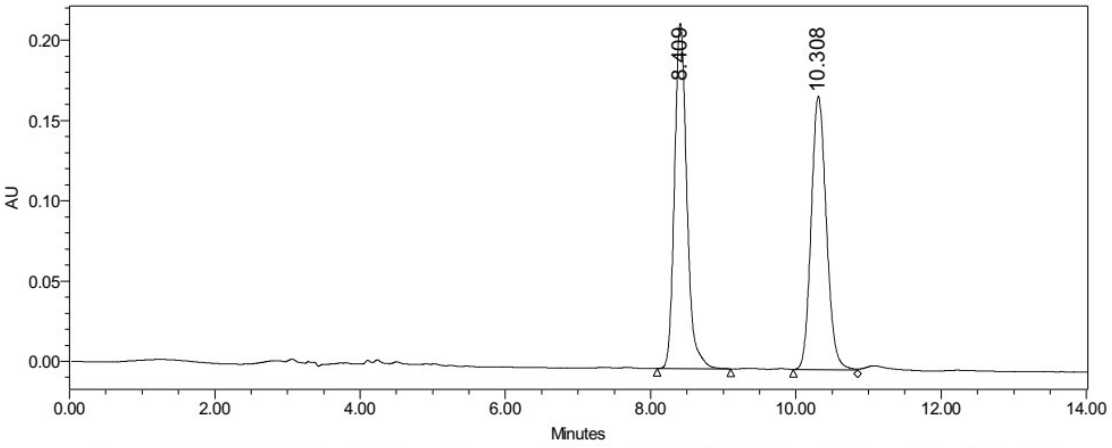


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	17.115	5654668	49.13	153692	52.83
2	18.806	5853770	50.87	137246	47.17



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	17.108	10039621	91.45	273722	92.02
2	18.727	938499	8.55	23749	7.98

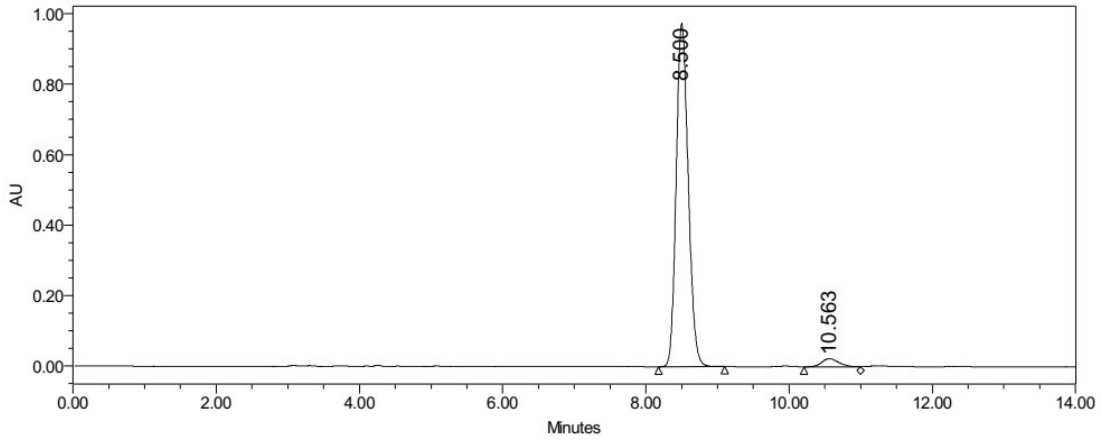
(S)-N-(2-benzyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2d**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1509;
Processing Method: 6 22 1 rac

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	8.409	2530110	50.59	214849
2	2998 Ch1 254nm@4.8nm	10.308	2471068	49.41	170246

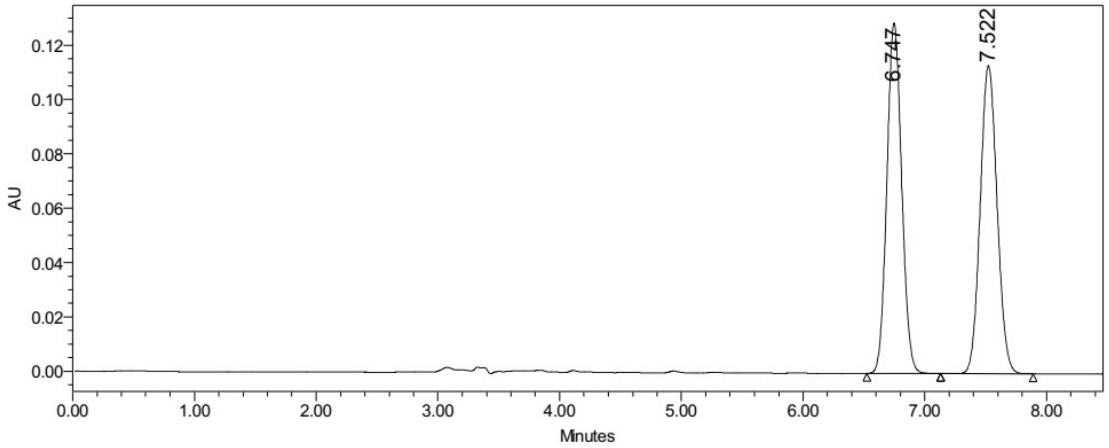


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1527;
Processing Method: 6 22 2

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	8.500	11373917	96.73	974414
2	2998 Ch1 254nm@4.8nm	10.563	384588	3.27	23282

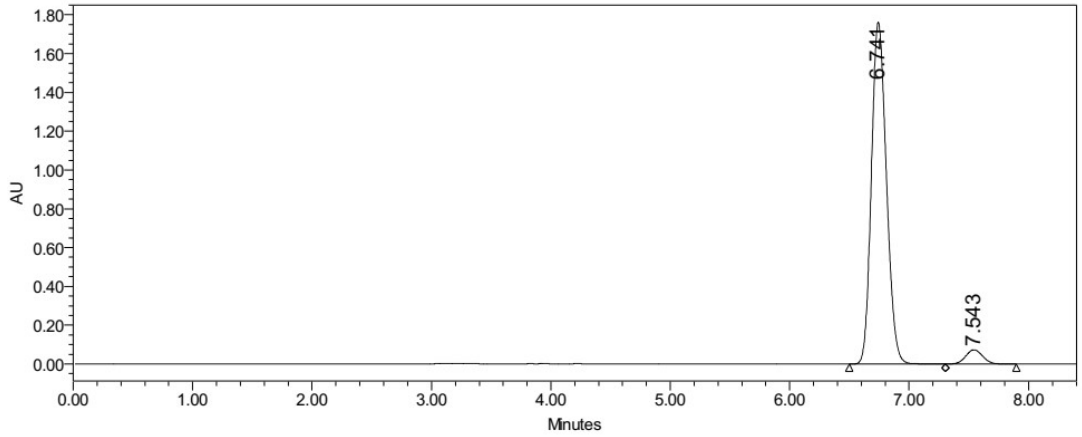
(S)-4-methyl-N-(2-propyl-1H-inden-1-yl)benzenesulfonamide (**2e**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1515;
Processing Method: 6 23 1 rac

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	6.747	1092434	50.01	128955
2	2998 Ch1 254nm@4.8nm	7.522	1092052	49.99	113402

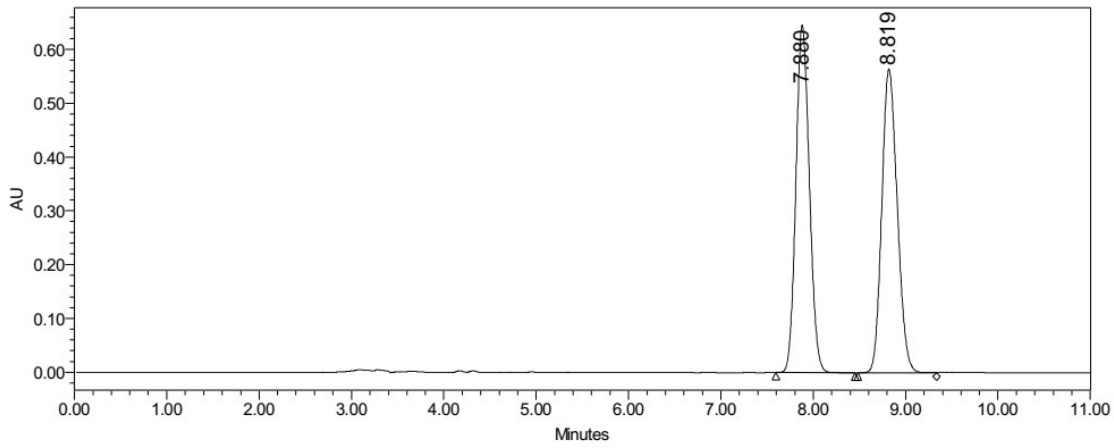


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1529;
Processing Method: 6 23 2

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	6.741	15416457	95.50	1761809
2	2998 Ch1 254nm@4.8nm	7.543	726499	4.50	73760

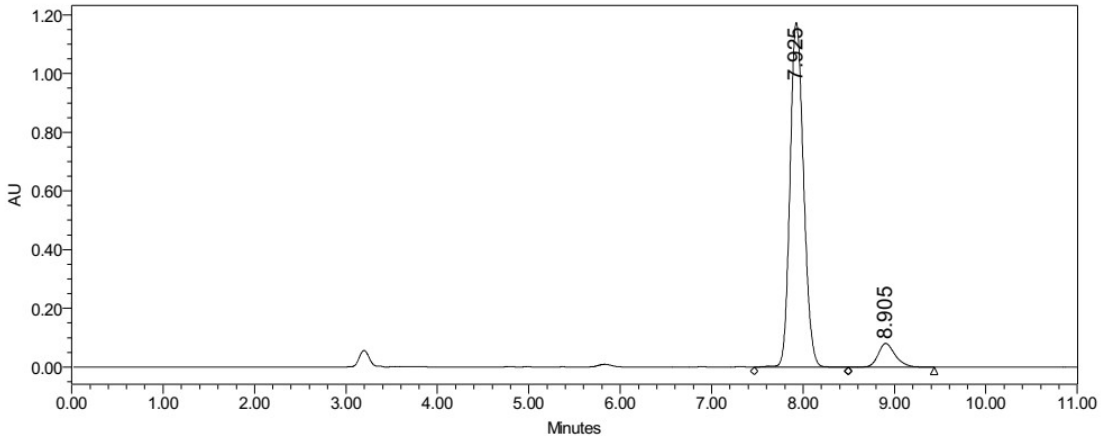
(S)-N-(2-cyclopropyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2f**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1989;
Processing Method: 6 73 1

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	7.880	6547608	49.87	646055
2	2998 Ch1 254nm@4.8nm	8.819	6581355	50.13	564755

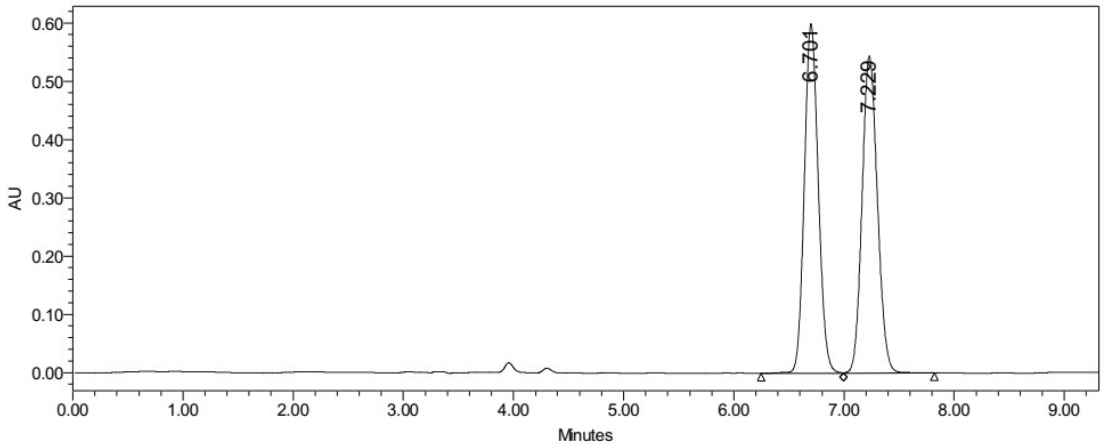


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1995;
Processing Method: 6 73 2

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	7.925	12082457	91.98	1173408
2	2998 Ch1 254nm@4.8nm	8.905	1053219	8.02	80757

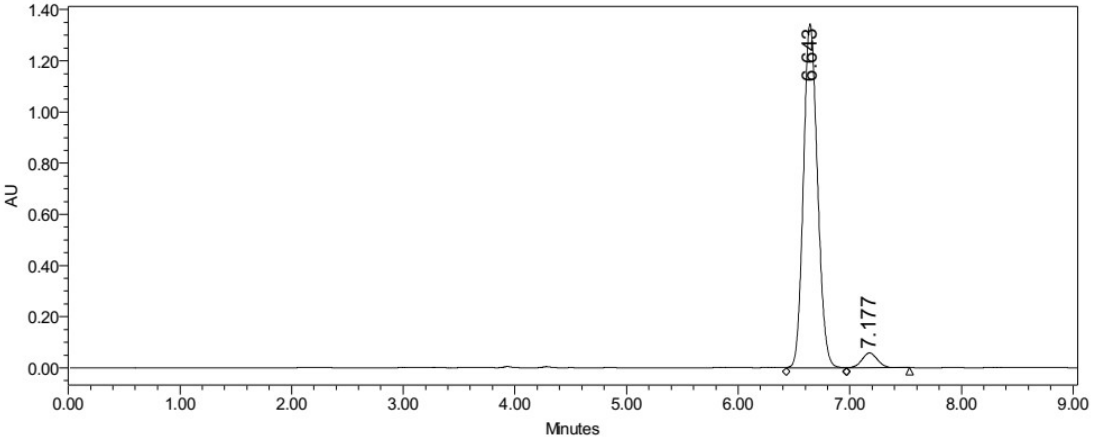
(S)-N-(2-cyclohexyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2g**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1649;
Processing Method: 6 40 1 rac

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	6.701	5289009	50.07	599493
2	2998 Ch1 254nm@4.8nm	7.229	5274604	49.93	544316

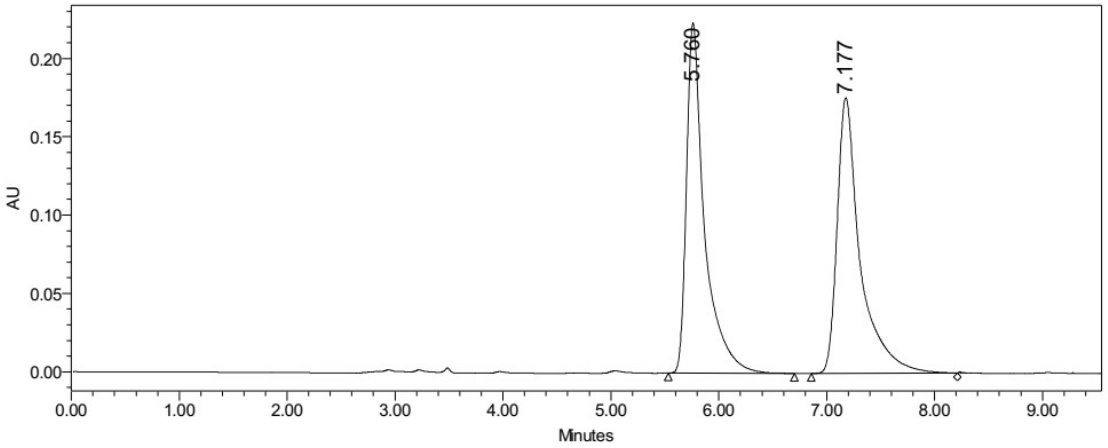


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1923;
Processing Method: 6 40 2

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	6.643	11768714	95.45	1344490
2	2998 Ch1 254nm@4.8nm	7.177	560426	4.55	57863

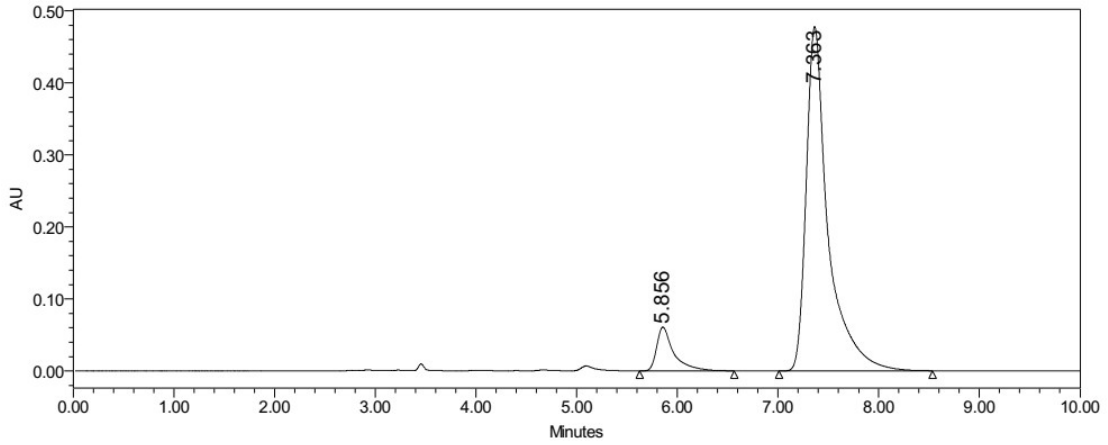
(S)-N-(2-(tert-butyl)-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2h**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 2301;
Processing Method: 6 80 1

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	5.760	2592459	49.86	223434
2	2998 Ch1 254nm@4.8nm	7.177	2607444	50.14	175848

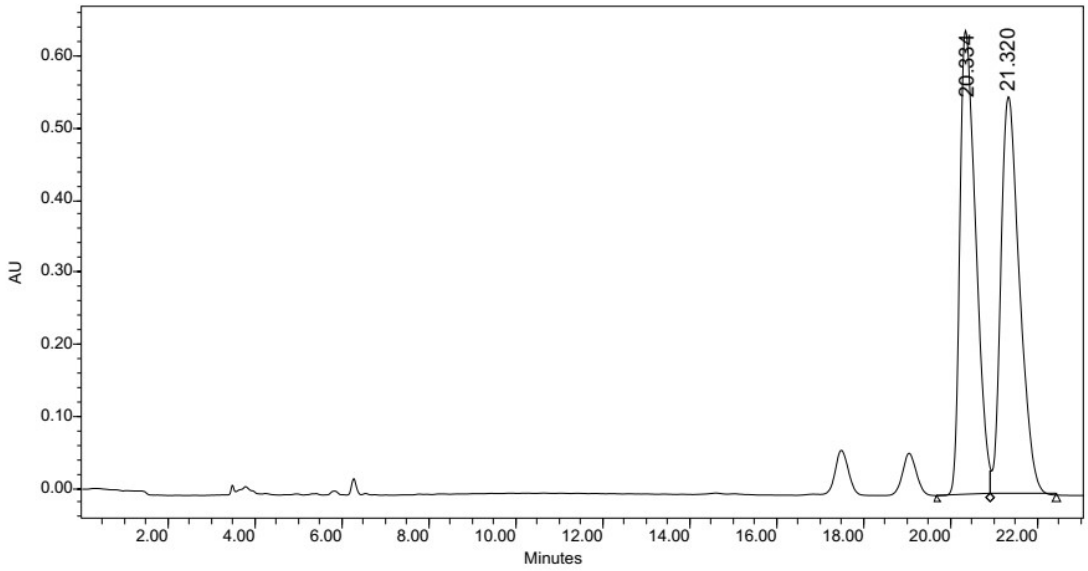


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 2315;
Processing Method: 7 17 1n

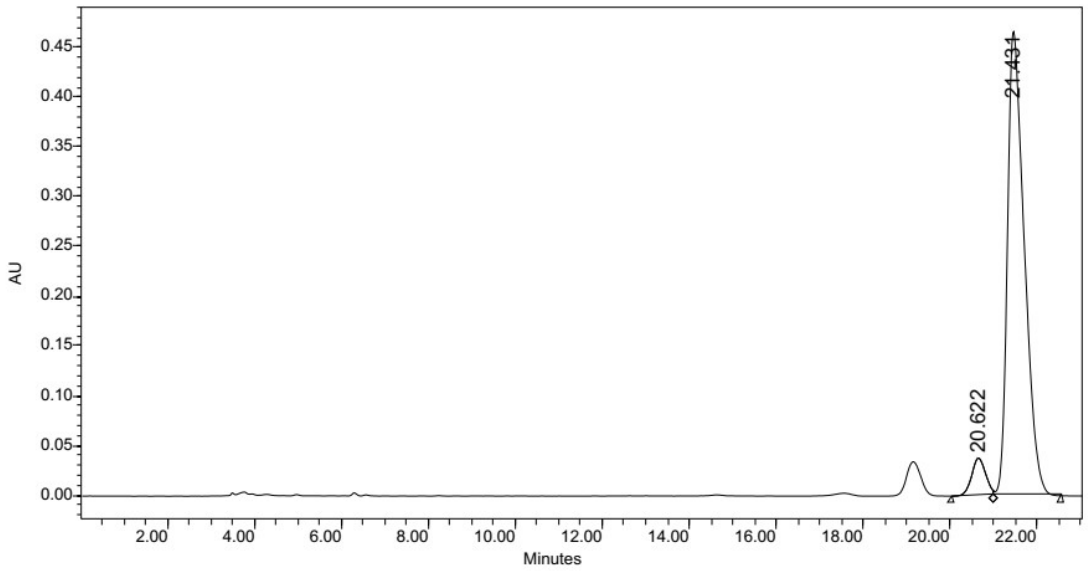
Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	5.856	713978	9.00	60742
2	2998 Ch1 254nm@4.8nm	7.363	7217258	91.00	478071

(S)-4-methyl-N-(3-methyl-1H-inden-1-yl)benzenesulfonamid (**2i**)

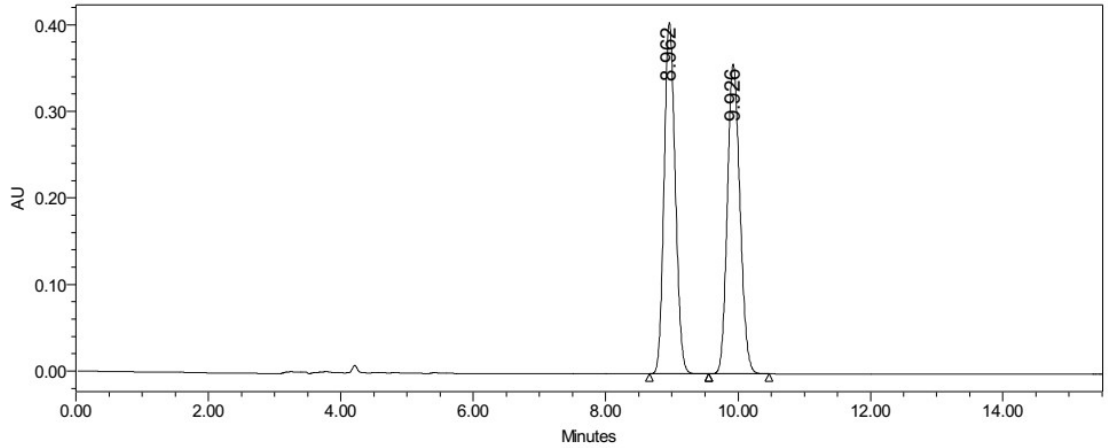


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	20.334	16552816	49.94	645366	53.83
2	21.320	16589604	50.06	553543	46.17



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	20.622	872625	6.48	38183	7.56
2	21.431	12601963	93.52	466744	92.44

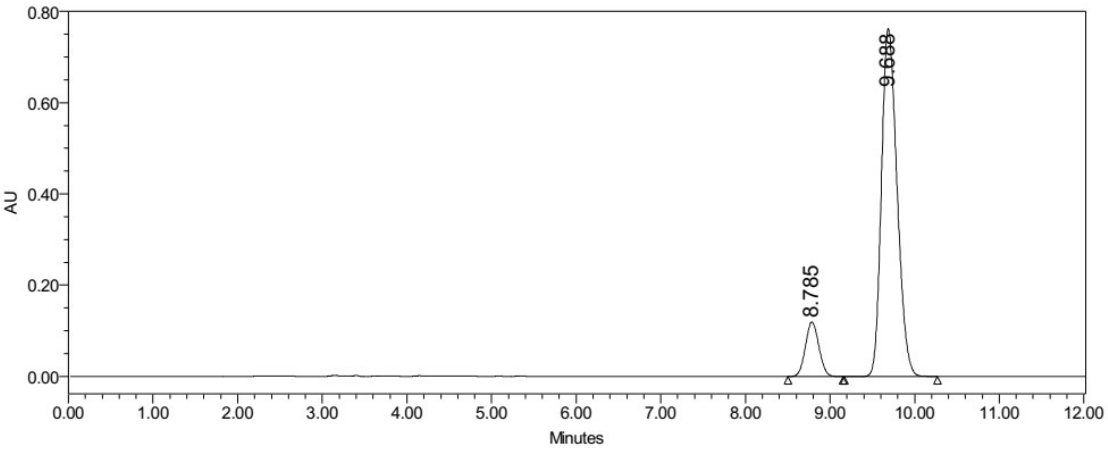
(S)-N-(3-(tert-butyl)-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2j**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1799; Processing Method: 6 50 1

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	8.962	4724464	50.00	405806
2	2998 Ch1 254nm@4.8nm	9.926	4723882	50.00	357877

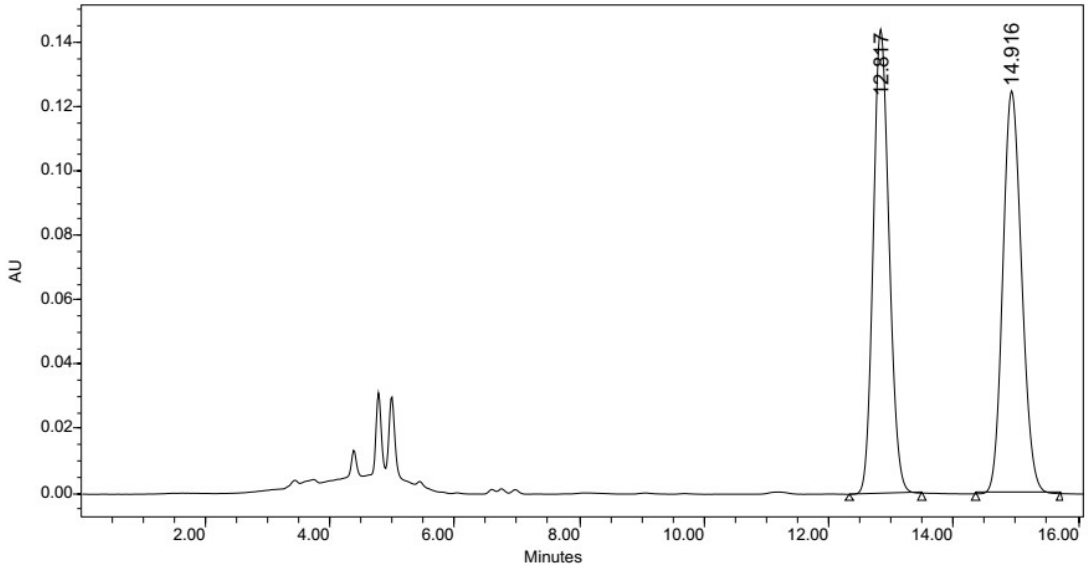


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1797; Processing Method: 6 50 2

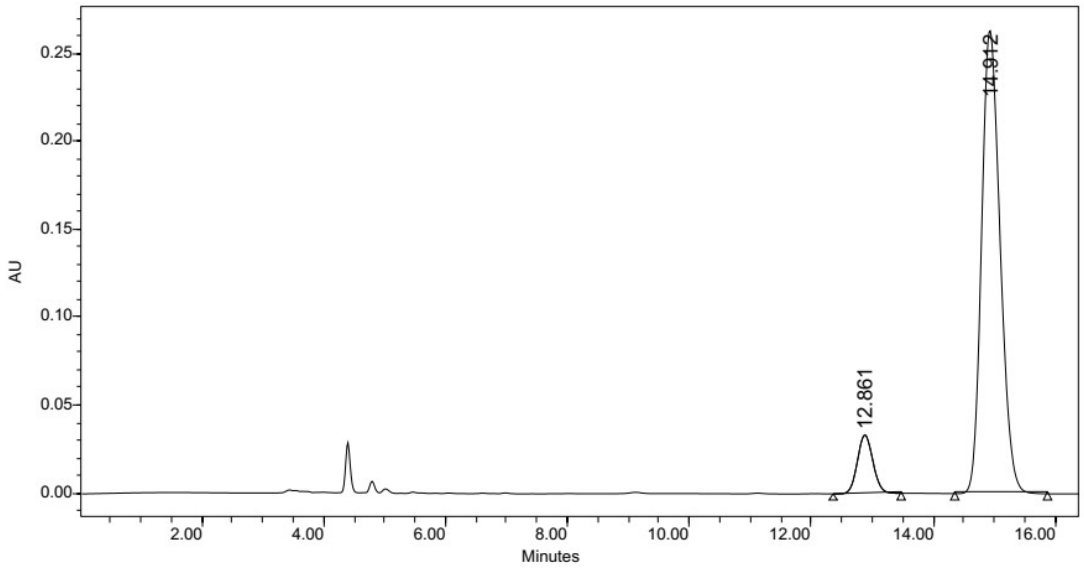
Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	8.785	1321030	11.93	119727
2	2998 Ch1 254nm@4.8nm	9.688	9752973	88.07	761872

(S)-4-methyl-N-(3-phenyl-1H-inden-1-yl)benzenesulfonamide (**2k**)

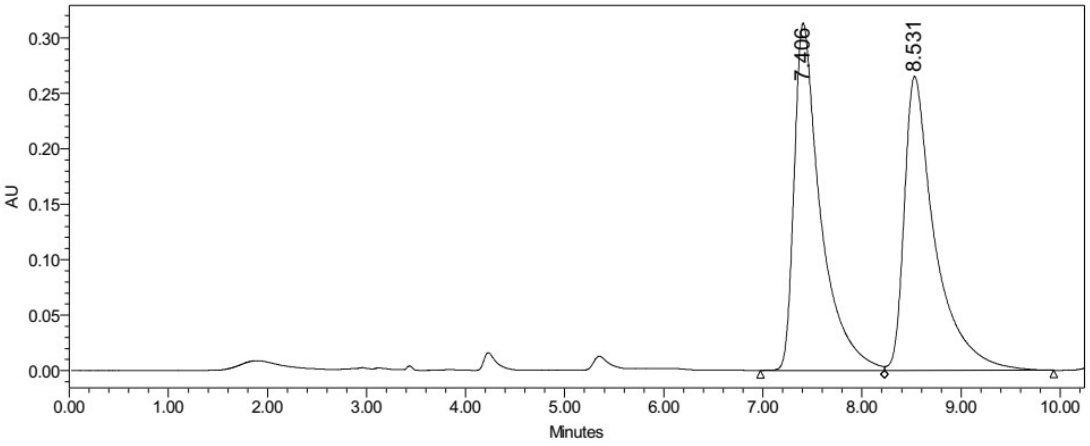


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	12.817	2556767	49.36	144139	53.55
2	14.916	2622966	50.64	125042	46.45



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	12.861	590114	9.58	33298	11.22
2	14.912	5571225	90.42	263459	88.78

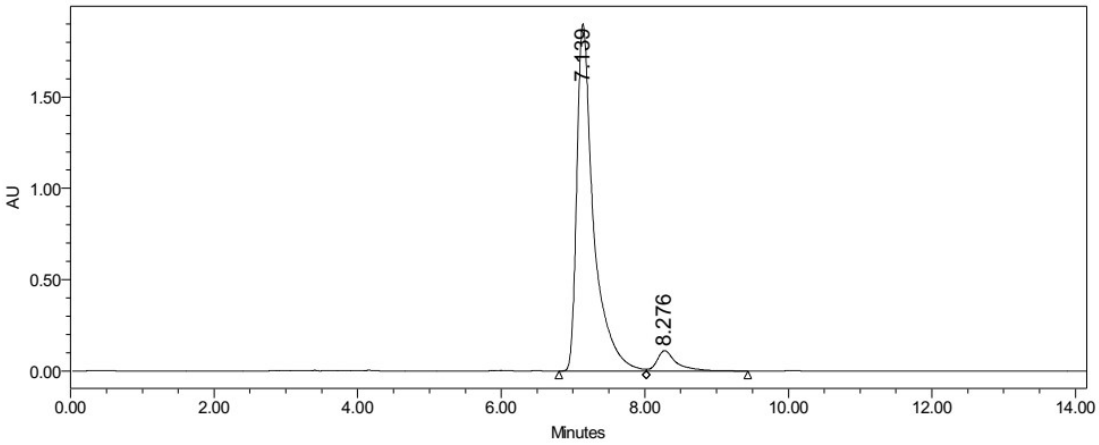
(S)-N-(3-(3,4-dichlorophenyl)-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2l**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1839;
Processing Method: 6 56 1

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	7.406	5800538	50.42	313198
2	2998 Ch1 254nm@4.8nm	8.531	5703666	49.58	265125

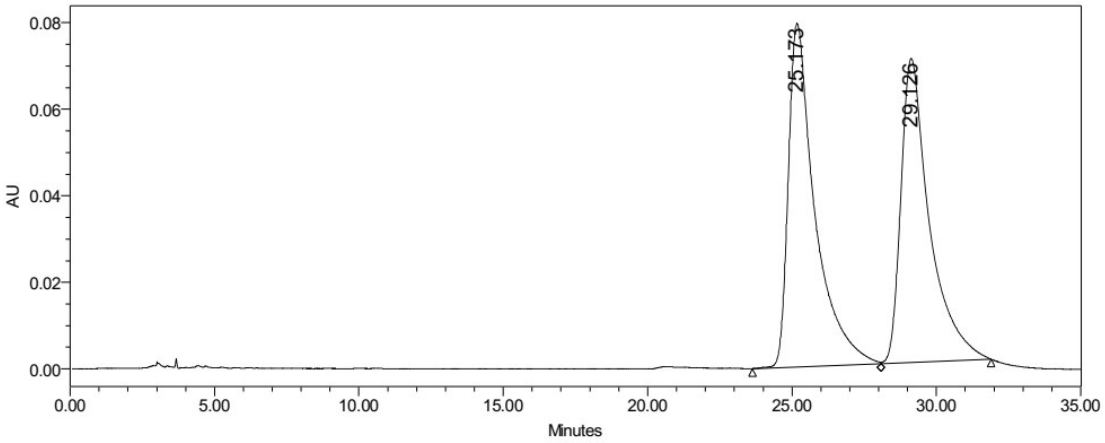


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 2073;
Processing Method: 6 56 4

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	7.139	30859901	93.57	1902491
2	2998 Ch1 254nm@4.8nm	8.276	2119554	6.43	112363

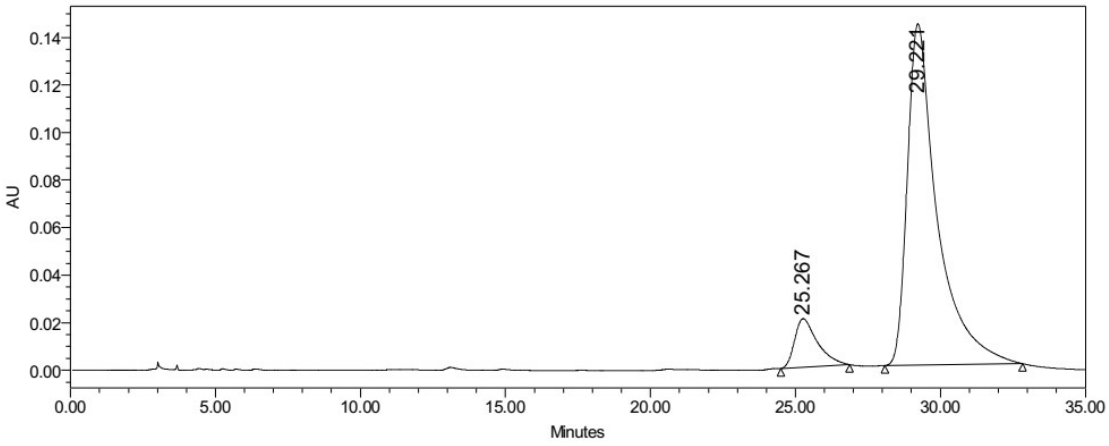
(S)-4-methyl-N-(3-(naphthalen-1-yl)-1H-inden-1-yl)benzenesulfonamide (**2m**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 2278;
Processing Method: 7 13 1

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	25.173	5077955	51.25	79412
2	2998 Ch1 254nm@4.8nm	29.126	4829934	48.75	70236

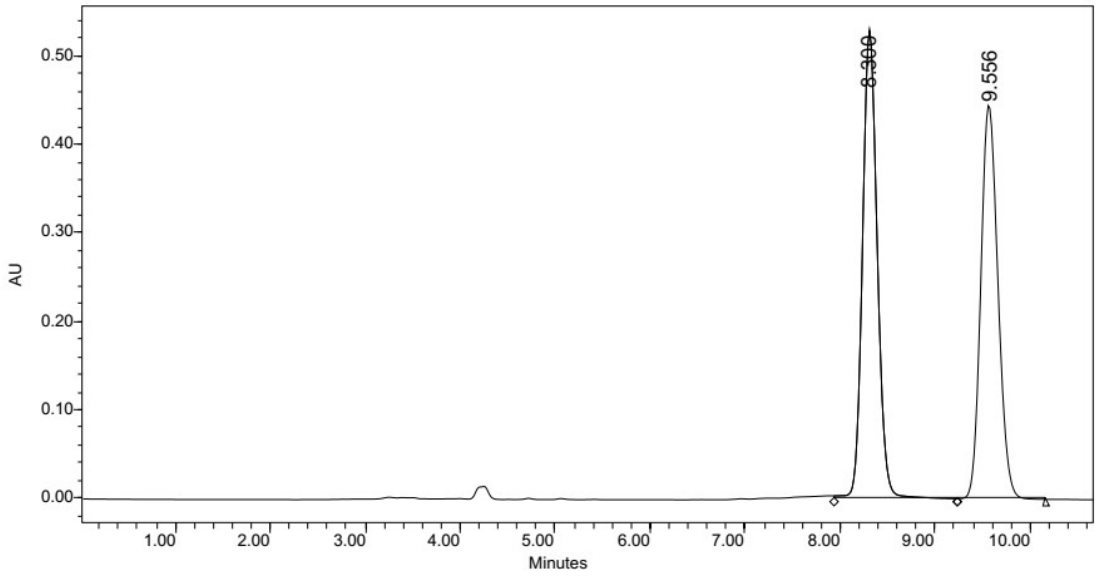


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 2290;
Processing Method: 7 13 2

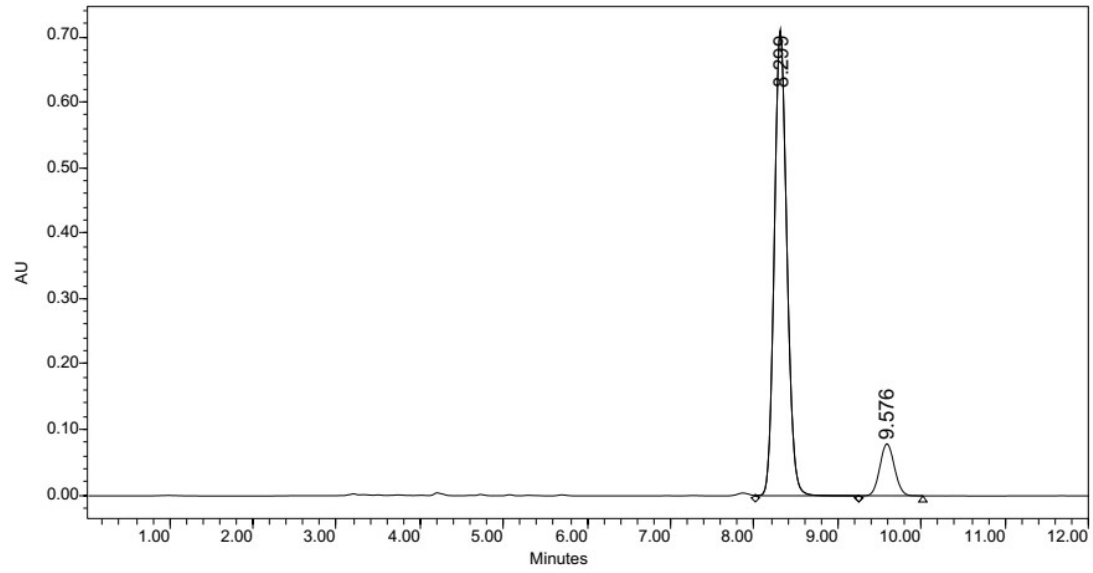
Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	25.267	1123497	9.82	20457
2	2998 Ch1 254nm@4.8nm	29.221	10320377	90.18	143672

(S)-N-(2,3-dimethyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2n**)

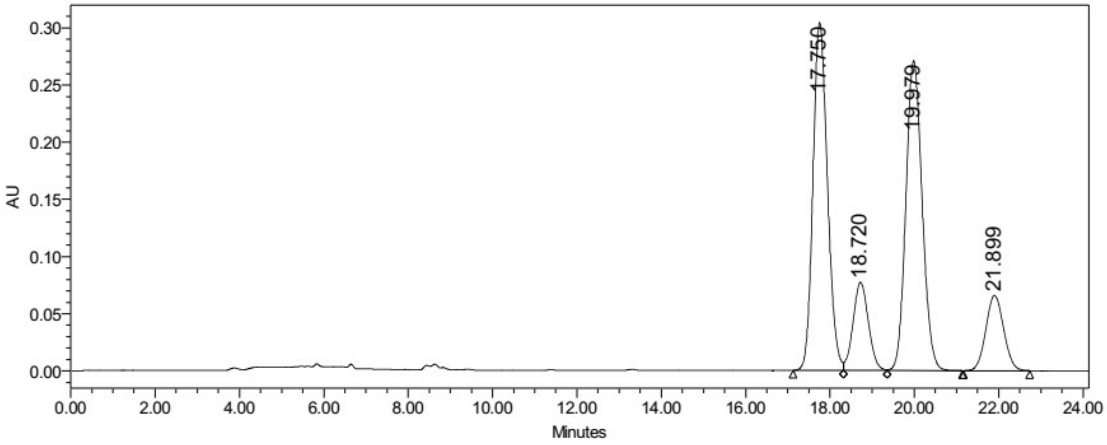


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.300	5820278	50.96	529846	54.27
2	9.556	5601678	49.04	446419	45.73



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.299	7436395	88.45	709796	89.92
2	9.576	970739	11.55	79557	10.08

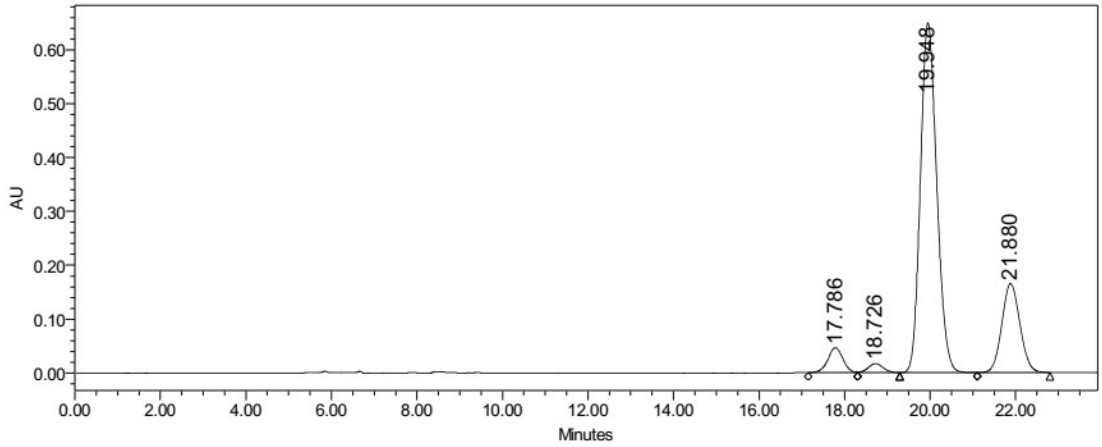
(S)-4-methyl-N-(1,2,3,8-tetrahydrocyclopenta[a]inden-8-yl)benzenesulfonamide (**2o**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1458;
Processing Method: 6 14 1 rac

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	17.750	7220419	39.30	303967
2	2998 Ch1 254nm@4.8nm	18.720	1946099	10.59	77068
3	2998 Ch1 254nm@4.8nm	19.979	7268686	39.56	270952
4	2998 Ch1 254nm@4.8nm	21.899	1936897	10.54	66001

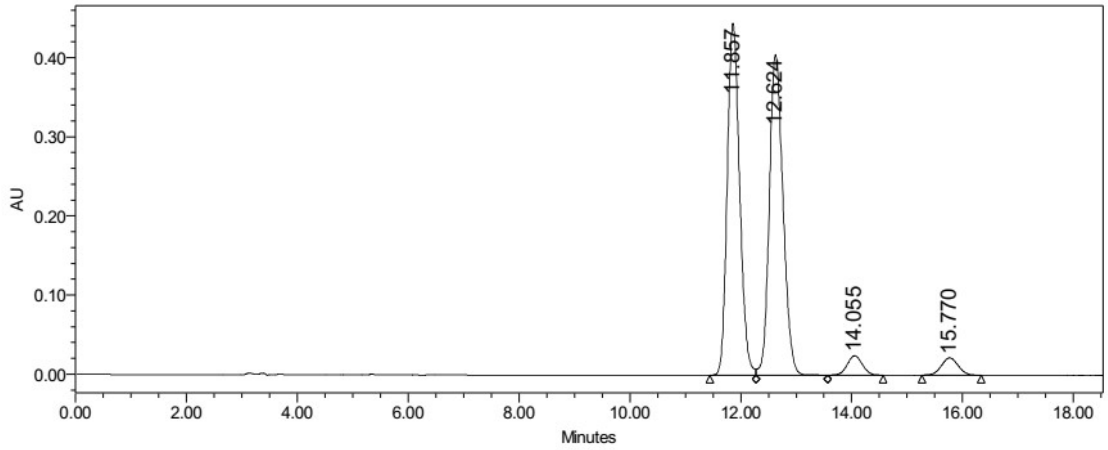


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1460;
Processing Method: 6 14 2

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	17.786	1153881	4.89	46664
2	2998 Ch1 254nm@4.8nm	18.726	413407	1.75	16888
3	2998 Ch1 254nm@4.8nm	19.948	17214170	72.89	648877
4	2998 Ch1 254nm@4.8nm	21.880	4836413	20.48	164989

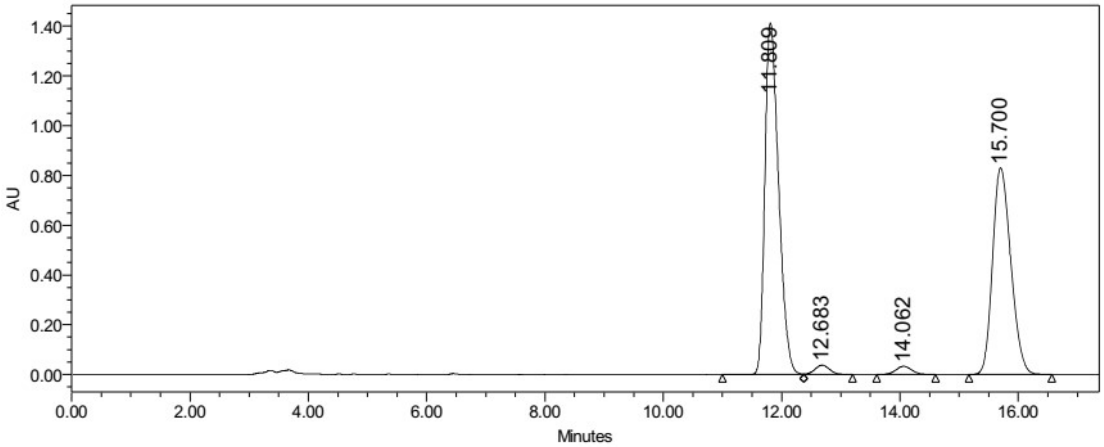
(S)-4-methyl-N-(2,3,4,9-tetrahydro-1H-fluoren-9-yl)benzenesulfonamide (**2p**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1433;
Processing Method: 5 98 rac

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	11.857	6903638	46.76	444646
2	2998 Ch1 254nm@4.8nm	12.624	6935018	46.97	405228
3	2998 Ch1 254nm@4.8nm	14.055	465332	3.15	24532
4	2998 Ch1 254nm@4.8nm	15.770	460372	3.12	21846

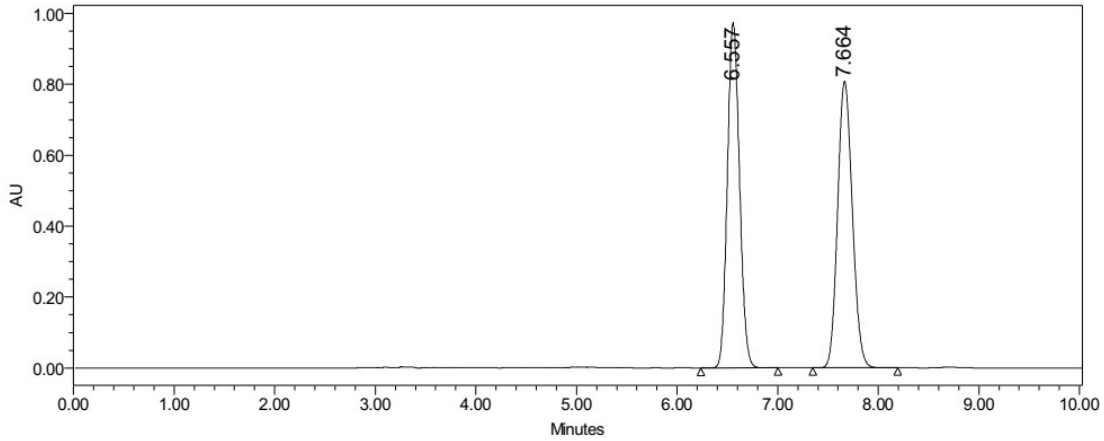


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1435;
Processing Method: 5 98 2

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	11.809	22729630	54.33	1412283
2	2998 Ch1 254nm@4.8nm	12.683	649970	1.55	37692
3	2998 Ch1 254nm@4.8nm	14.062	617111	1.48	32853
4	2998 Ch1 254nm@4.8nm	15.700	17838341	42.64	830880

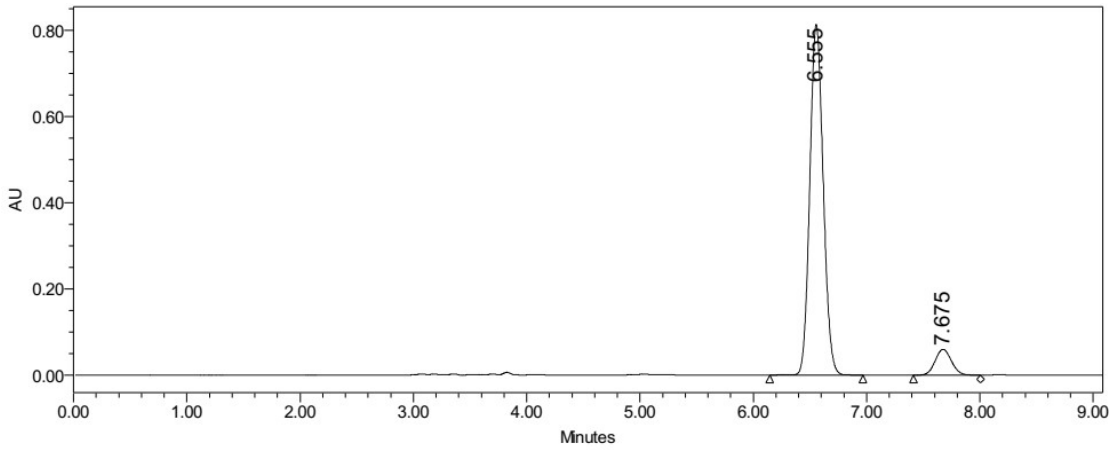
(S)-N-(2,7-dimethyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2q**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1813;
Processing Method: 6 57 1

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	6.557	8150513	49.89	973884
2	2998 Ch1 254nm@4.8nm	7.664	8186296	50.11	808384

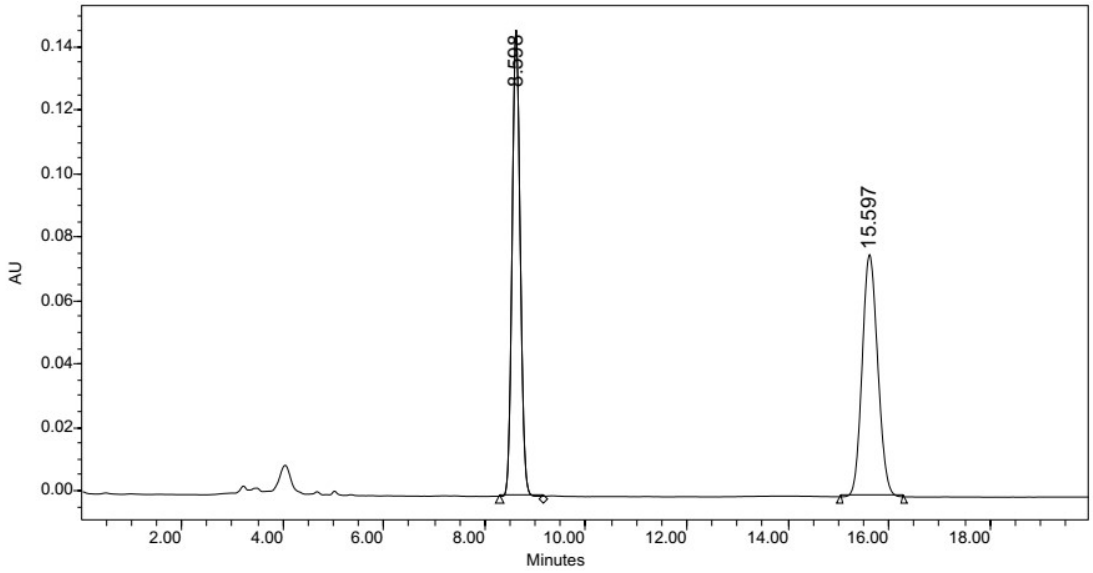


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1833;
Processing Method: 6 57 2

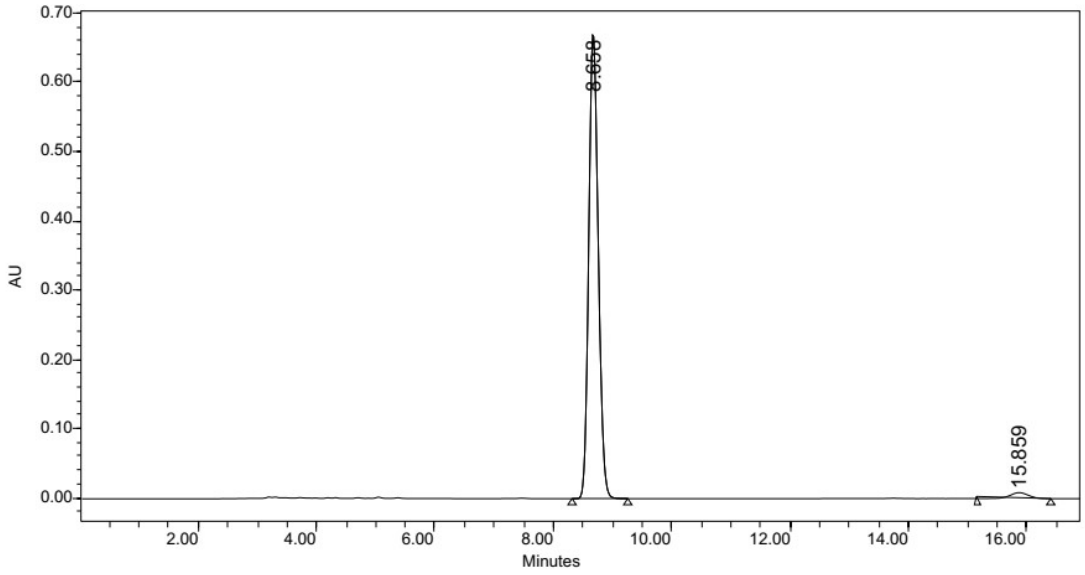
Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	6.555	6699795	91.81	813499
2	2998 Ch1 254nm@4.8nm	7.675	597559	8.19	60015

(S)-N-(2,5-dimethyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2r**)

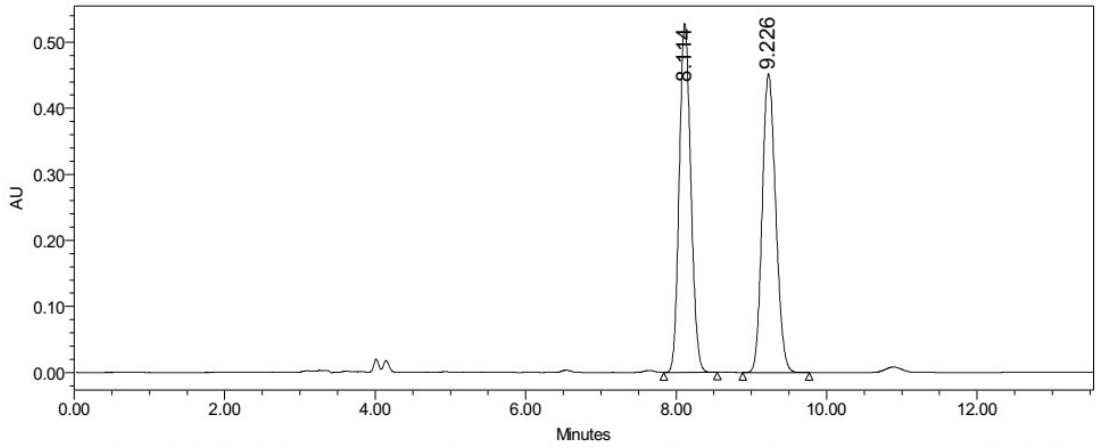


	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.598	1636816	49.96	146963	65.80
2	15.597	1639557	50.04	76397	34.20



	RT (min)	Area (V*sec)	% Area	Height (V)	% Height
1	8.658	7505637	97.52	672259	98.73
2	15.859	190666	2.48	8614	1.27

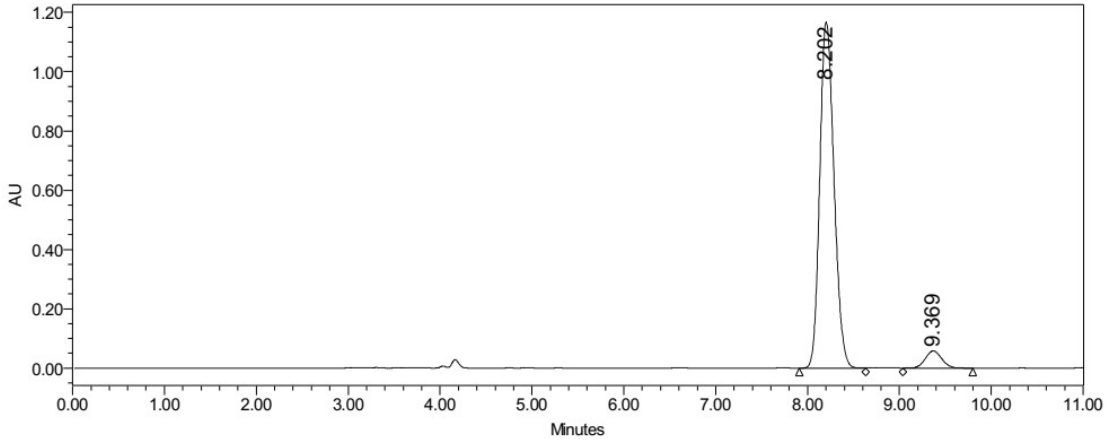
(S)-N-(2,4-dimethyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2s**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1873;
Processing Method: 6 64 1

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	8.114	5635081	49.94	528181
2	2998 Ch1 254nm@4.8nm	9.226	5647556	50.06	452455

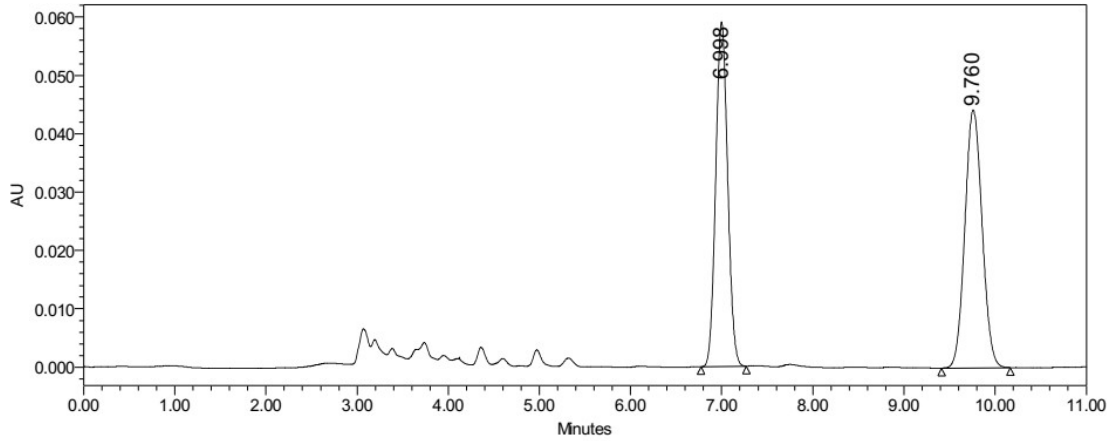


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1921;
Processing Method: 6 64 2

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	8.202	12570365	94.58	1167737
2	2998 Ch1 254nm@4.8nm	9.369	720979	5.42	57816

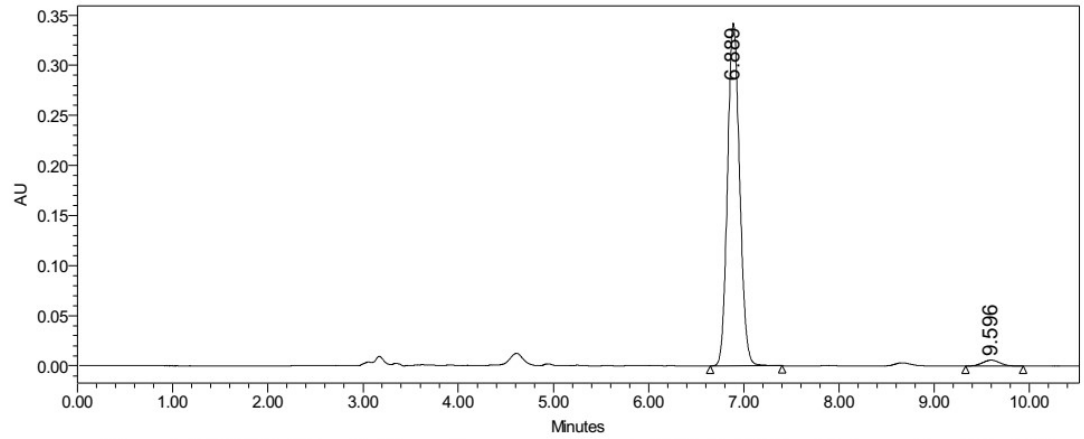
(S)-N-(5-fluoro-2-methyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2t**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1173;
Processing Method: ZY 5 93 3 RAC

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	6.998	534988	48.06	59000
2	2998 Ch1 254nm@4.8nm	9.760	578072	51.94	44195

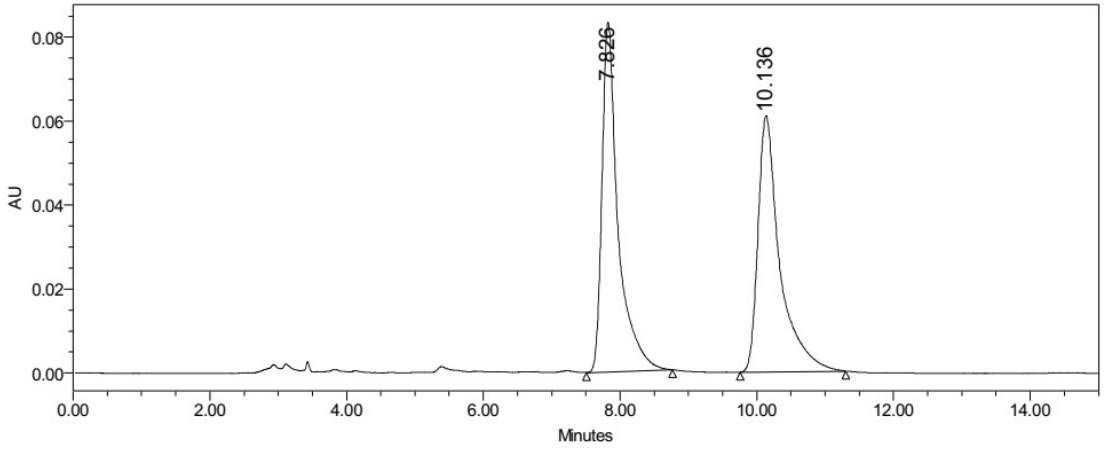


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1171;
Processing Method: ZY 5 93 3 ASY

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	6.889	3022651	97.58	342158
2	2998 Ch1 254nm@4.8nm	9.596	74943	2.42	5910

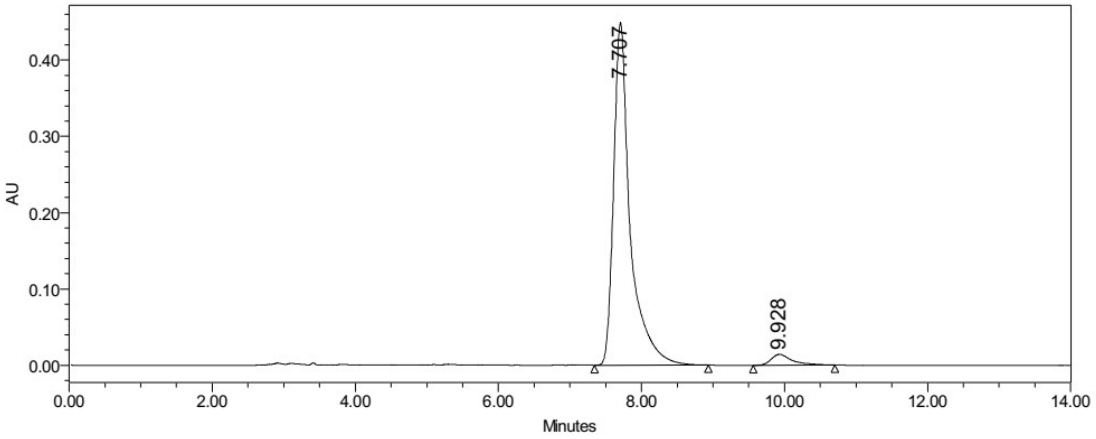
(S)-N-(5-methoxy-2-methyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2u**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1319;
Processing Method: zy 6 5 1 rac

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	7.826	1356760	50.14	83286
2	2998 Ch1 254nm@4.8nm	10.136	1349058	49.86	61006

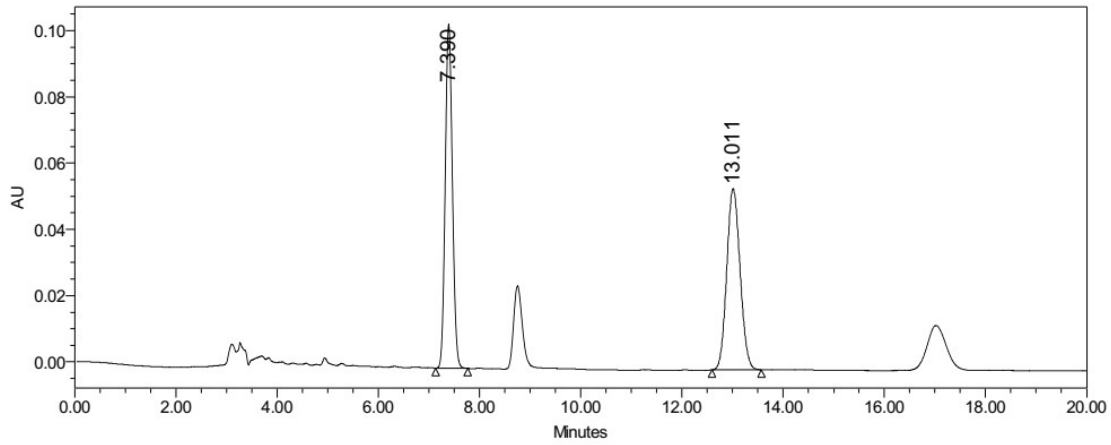


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1571;
Processing Method: 6 24 3

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	7.707	7191441	96.08	449075
2	2998 Ch1 254nm@4.8nm	9.928	293164	3.92	14243

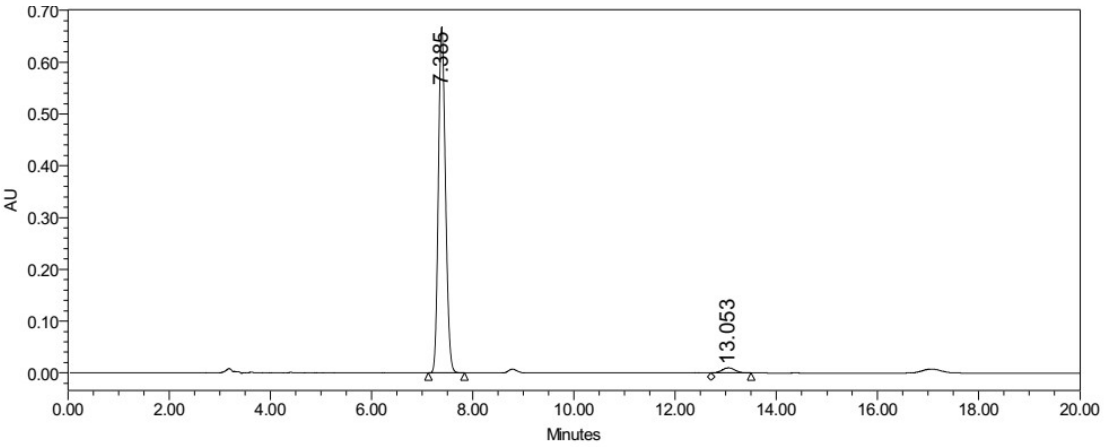
(S)-N-(5-chloro-2-methyl-1H-inden-1-yl)-4-methylbenzenesulfonamide (**2v**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1953;
Processing Method: 6 63 1n

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	7.390	1015648	50.39	103821
2	2998 Ch1 254nm@4.8nm	13.011	1000071	49.61	54700

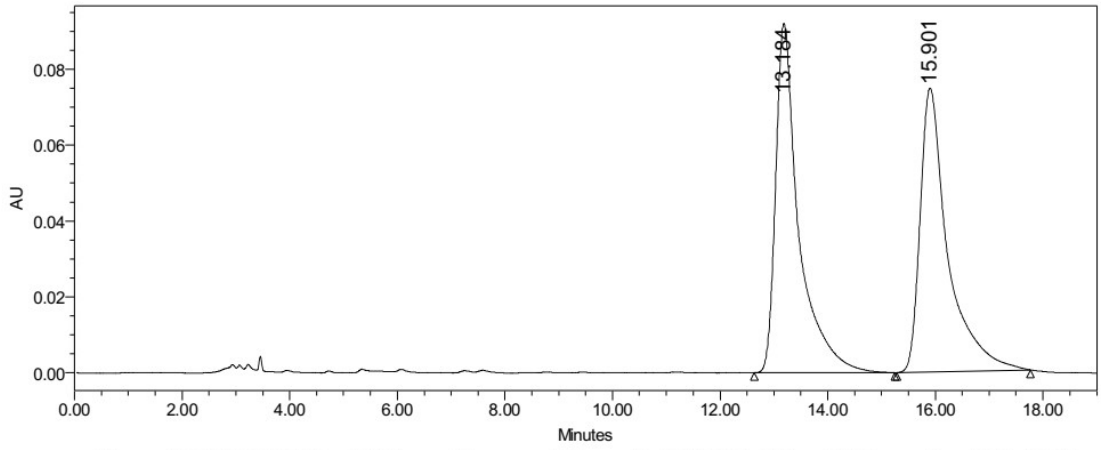


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1925;
Processing Method: 6 63 2

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	7.385	6517240	97.30	667641
2	2998 Ch1 254nm@4.8nm	13.053	180582	2.70	10024

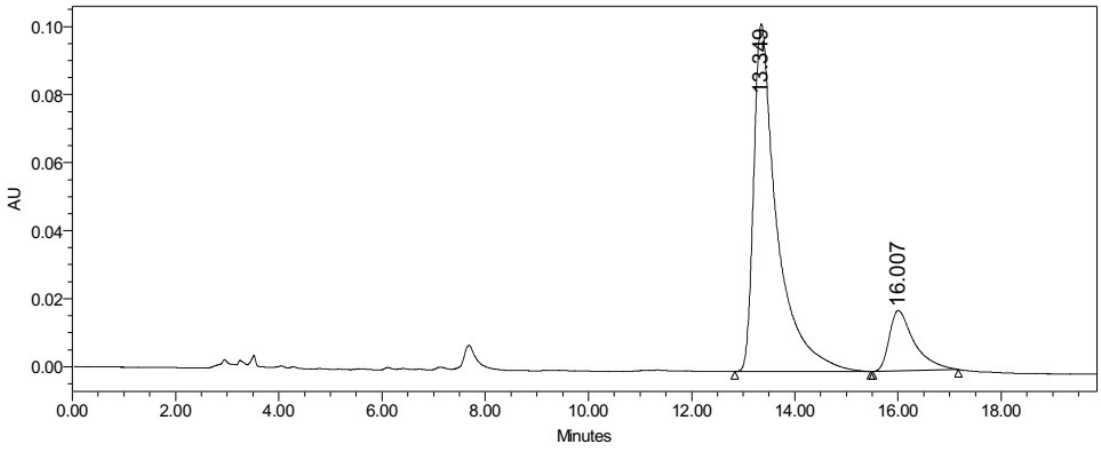
(S)-4-methyl-N-(6-methyl-5H-indeno[5,6-d][1,3]dioxol-5-yl)benzenesulfonamide (**2w**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1321;
Processing Method: 6 2 1 rac

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	13.184	2751405	50.77	92062
2	2998 Ch1 254nm@4.8nm	15.901	2667971	49.23	74809

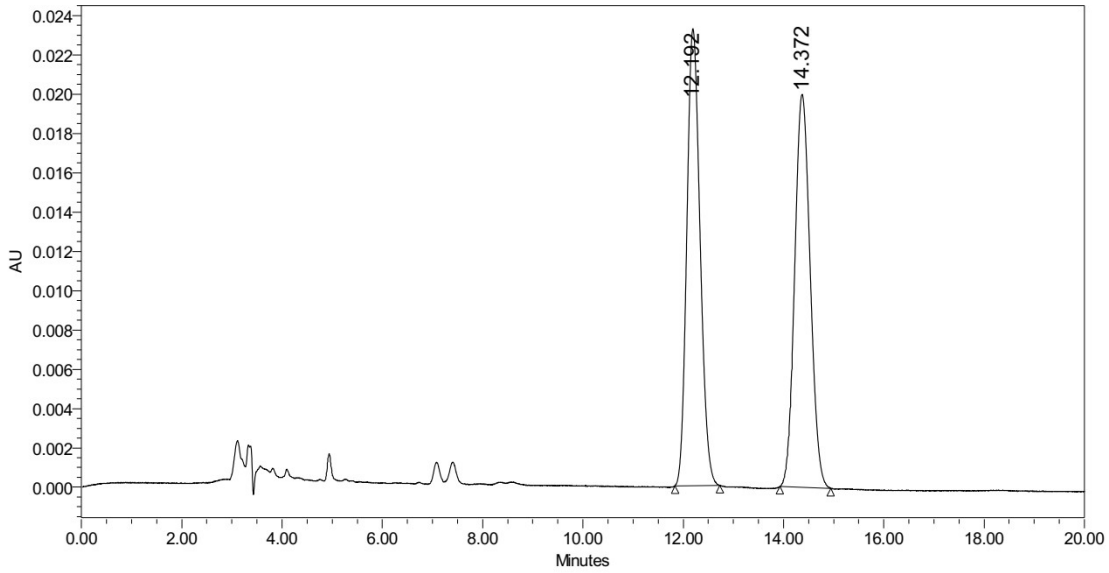


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 1485;
Processing Method: 6 16 3

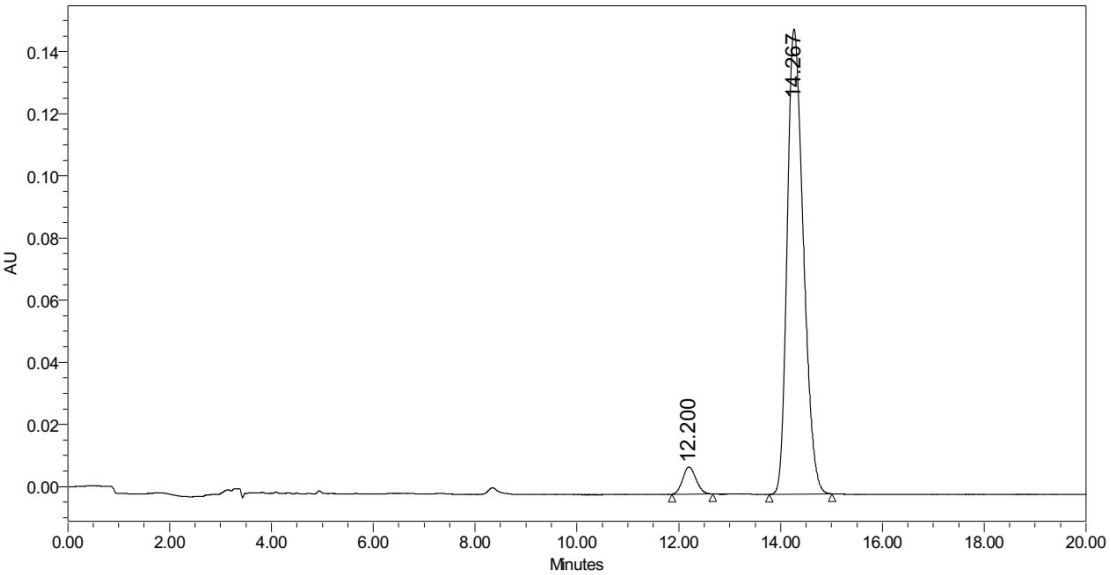
Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	13.349	3207784	84.25	102184
2	2998 Ch1 254nm@4.8nm	16.007	599753	15.75	17785

4-methyl-N-((6aR,7S,11bS)-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)benzenesulfonamide (**4a**)

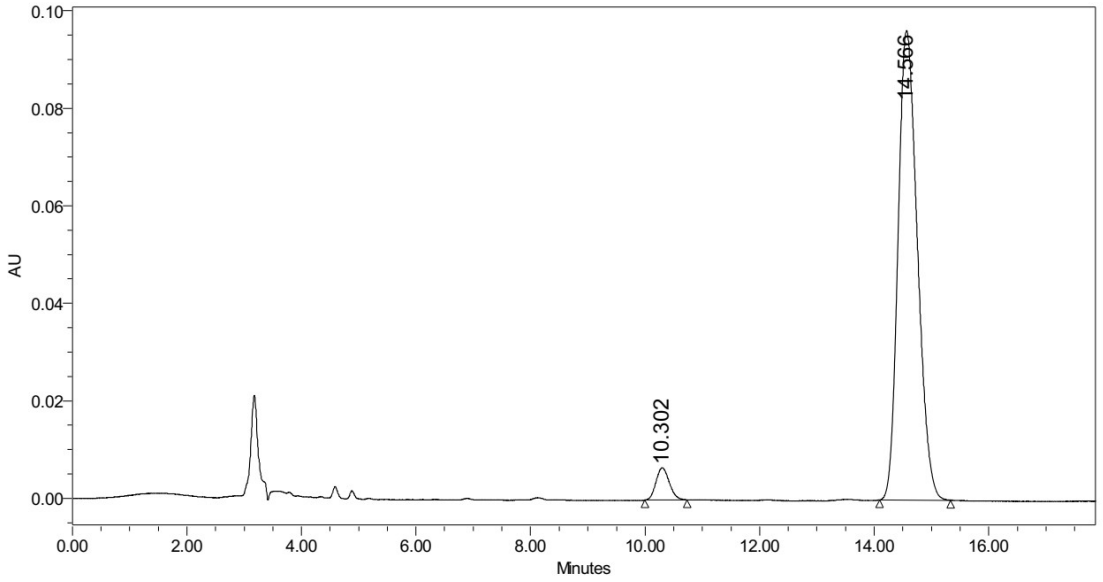


	RT	Area	% Area	Height
1	12.192	425702	49.85	23253
2	14.372	428238	50.15	20001

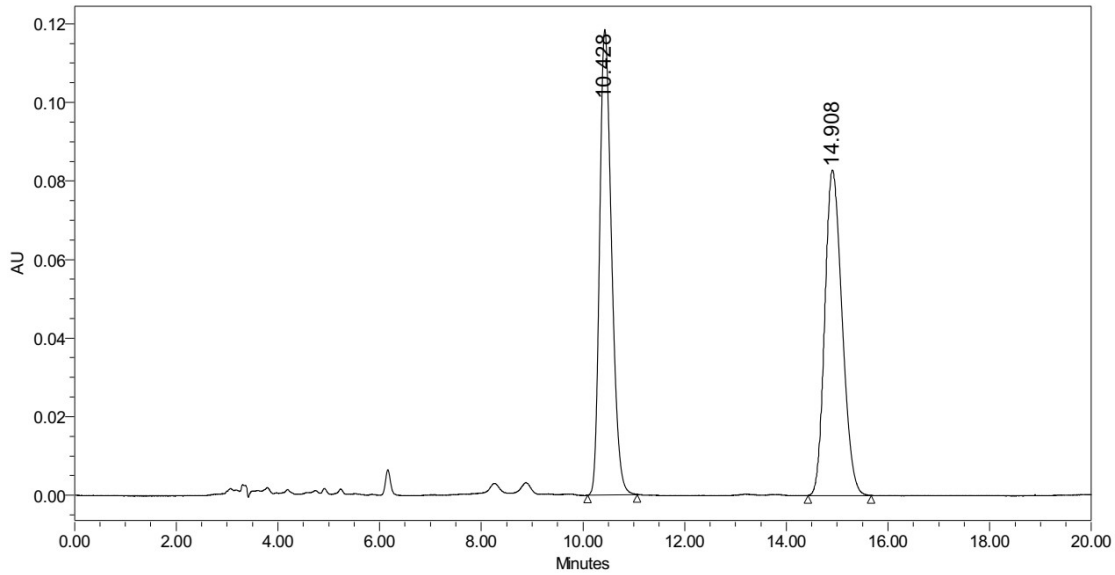


	RT	Area	% Area	Height
1	12.200	158237	4.57	8717
2	14.267	3303475	95.43	149605

4-methyl-N-((6aR,7S,11bS)-2-methyl-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)benzenesulfonamide (**4b**)

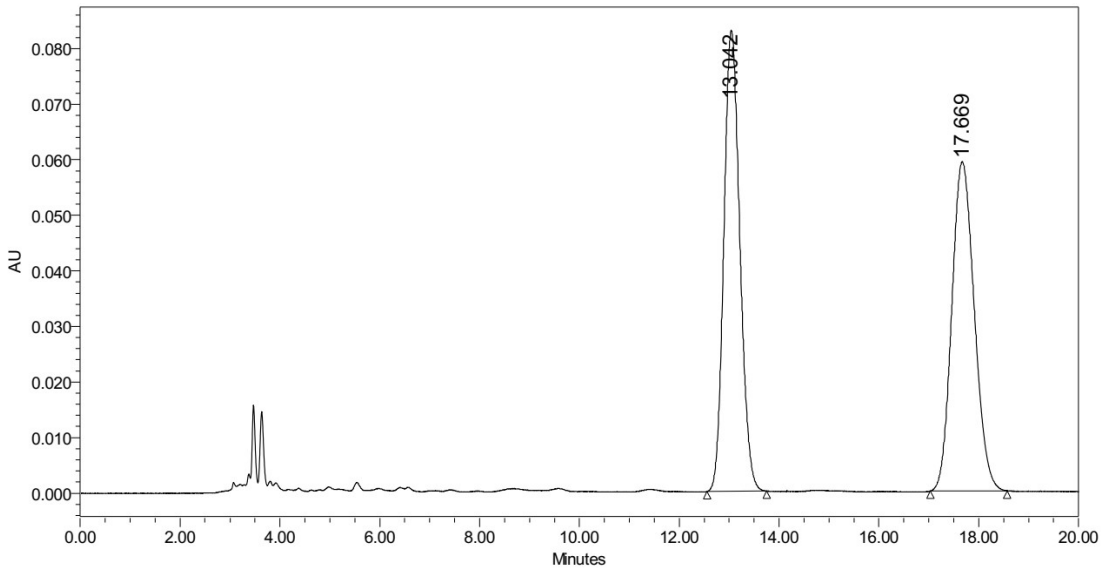


	RT	Area	% Area	Height
1	10.302	106256	4.53	6603
2	14.566	2239519	95.47	96280

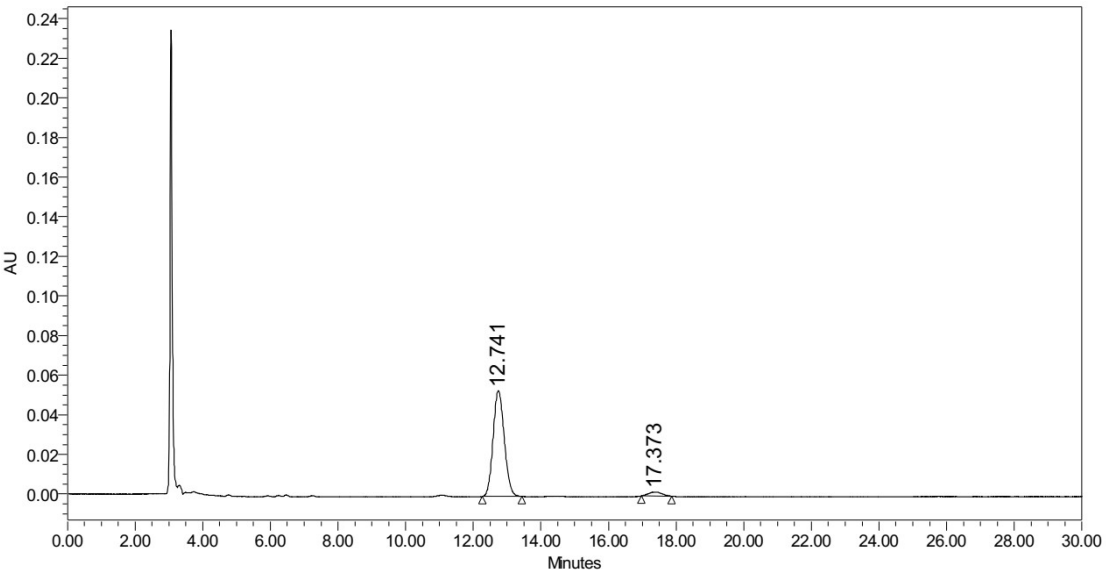


	RT	Area	% Area	Height
1	10.428	1937786	49.83	118453
2	14.908	1951030	50.17	82812

N-((6aR,7S,11bS)-2-ethyl-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)-4-methylbenzenesulfonamide (**4c**)

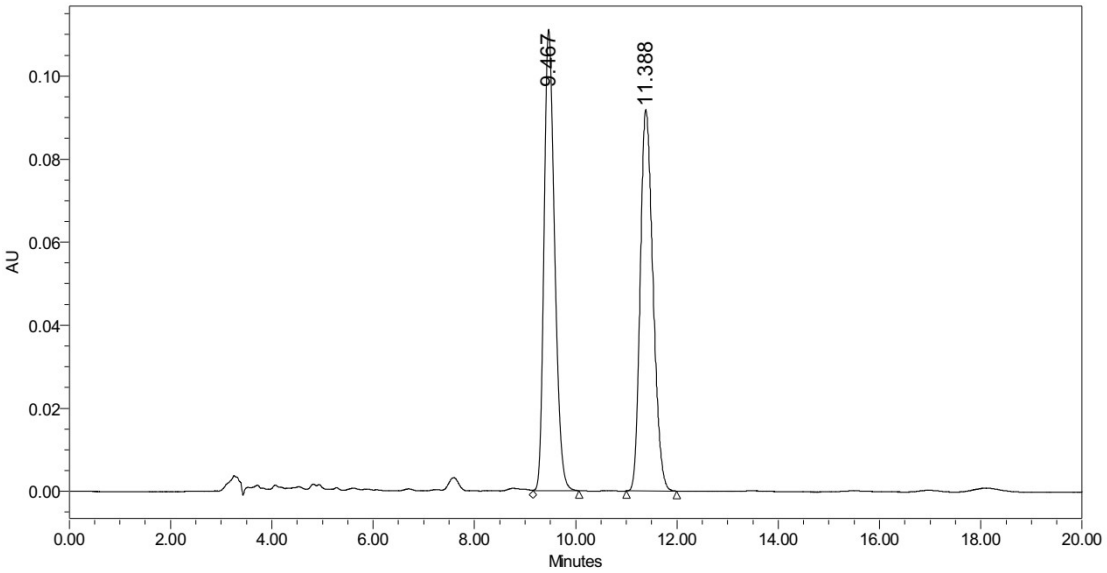


	RT	Area	% Area	Height
1	13.042	1854721	49.94	82983
2	17.669	1859510	50.06	59256

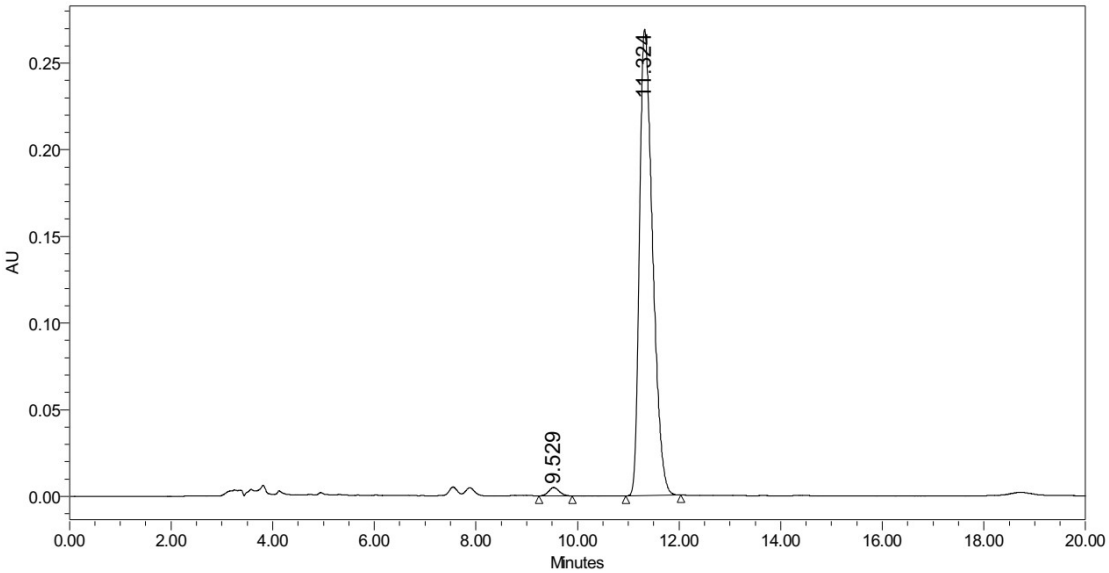


	RT	Area	% Area	Height
1	12.741	1212371	95.49	53292
2	17.373	57290	4.51	2082

N-((6aR,7S,11bS)-2-fluoro-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)-4-methylbenzenesulfonamide (**4d**)

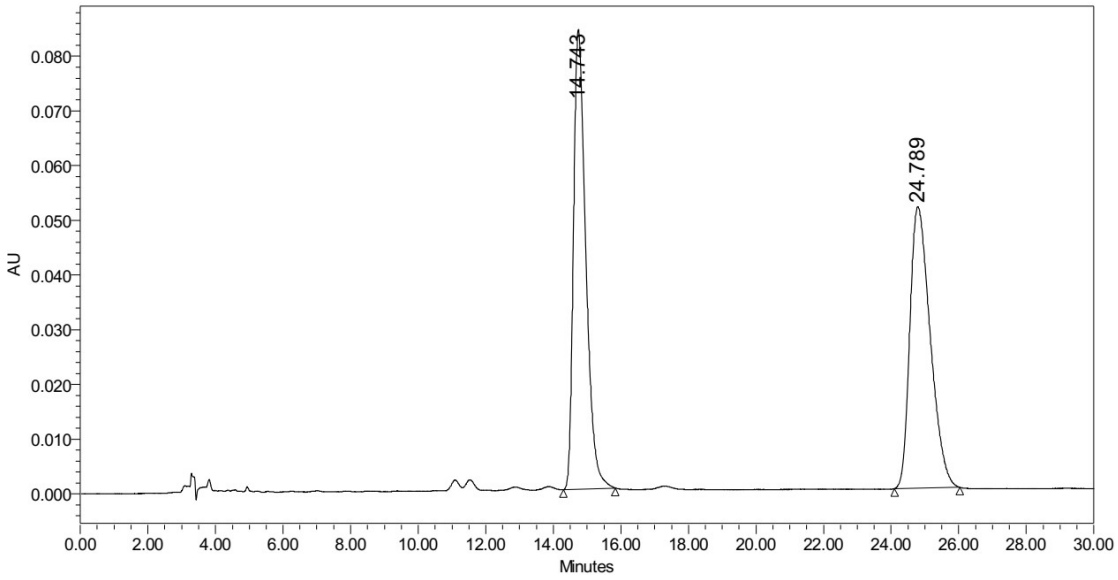


	RT	Area	% Area	Height
1	9.467	1618969	50.31	111087
2	11.388	1598810	49.69	91844

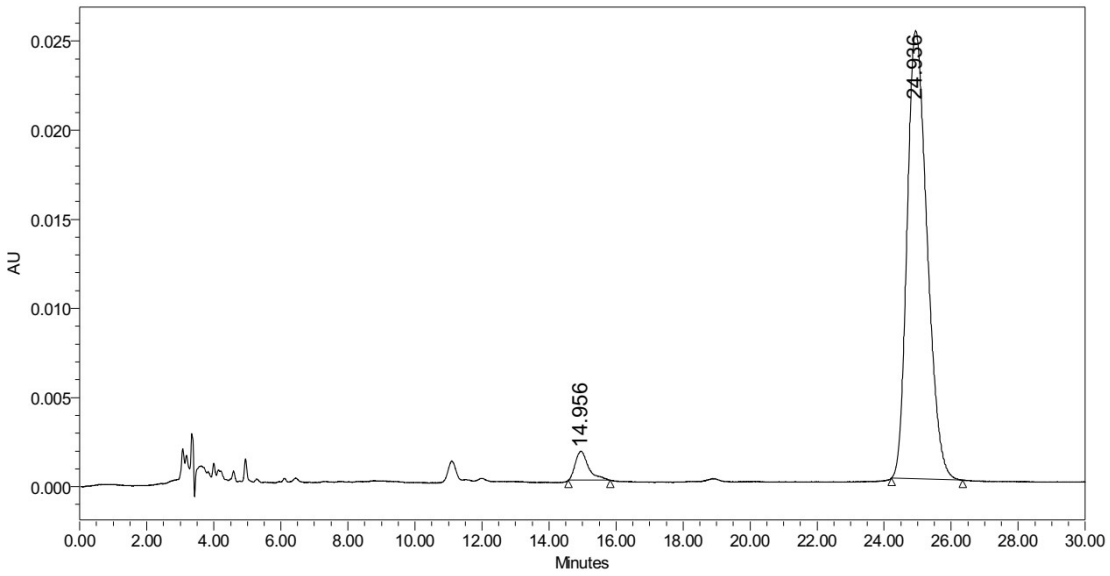


	RT	Area	% Area	Height
1	9.529	69820	1.44	4789
2	11.324	4792653	98.56	269048

N-((6aR,7S,11bS)-2-methoxy-6,6a,7,11b-tetrahydroindeno[2,1-c]chromen-7-yl)-4-methylbenzenesulfonamide (**4e**)

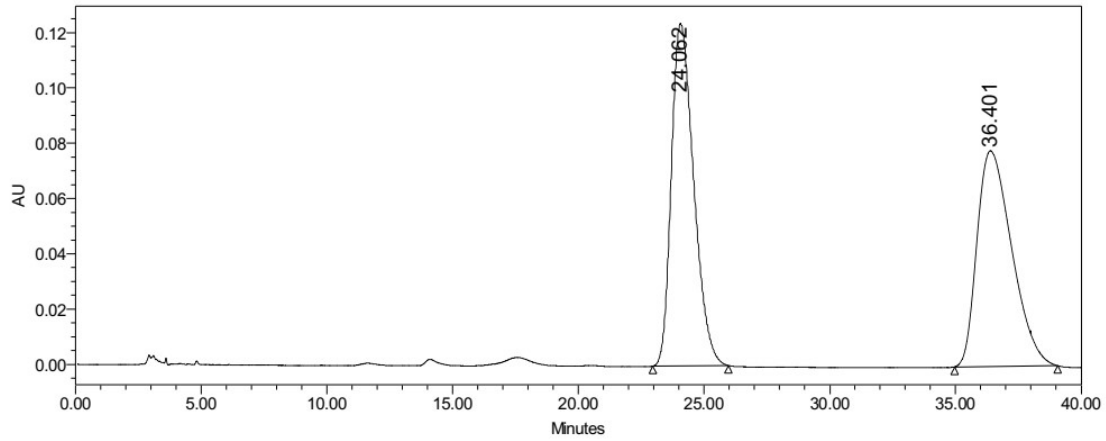


	RT	Area	% Area	Height
1	14.743	2132877	49.71	83999
2	24.789	2157407	50.29	51437



	RT	Area	% Area	Height
1	14.956	44781	4.13	1625
2	24.936	1038829	95.87	25154

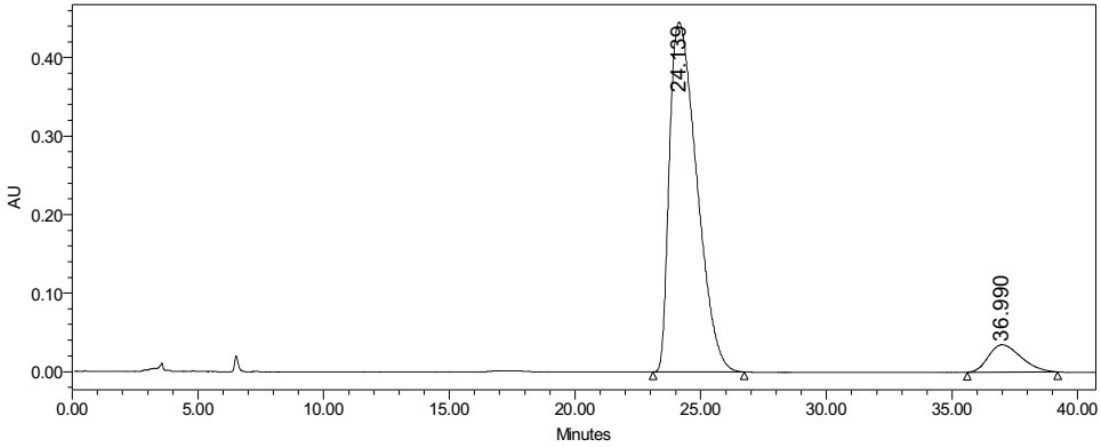
(S)-N-(2,3-dihydro-1H-inden-1-yl)-4-methylbenzenesulfonamide (**5**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 2788;
Processing Method: wx 55 rac

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	24.062	7659300	50.53	123865
2	2998 Ch1 254nm@4.8nm	36.401	7499761	49.47	78013

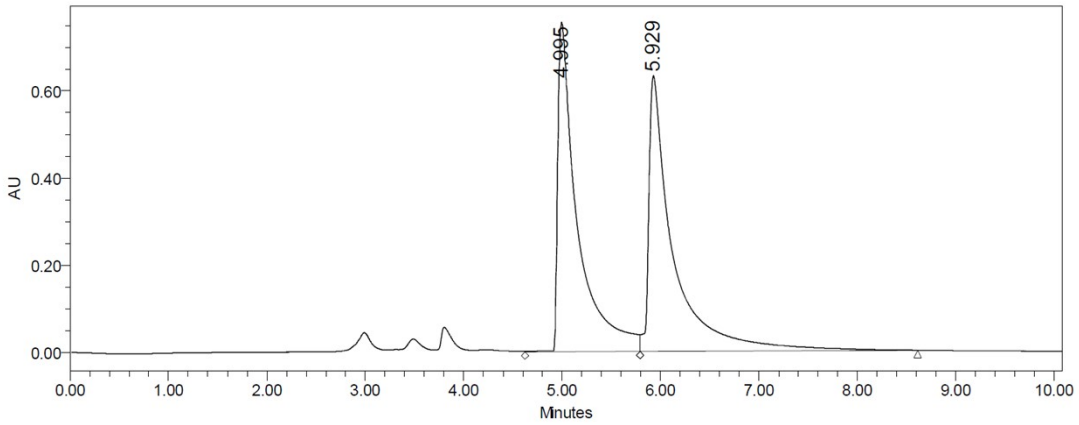


Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 2830;
Processing Method: wx 55 asy

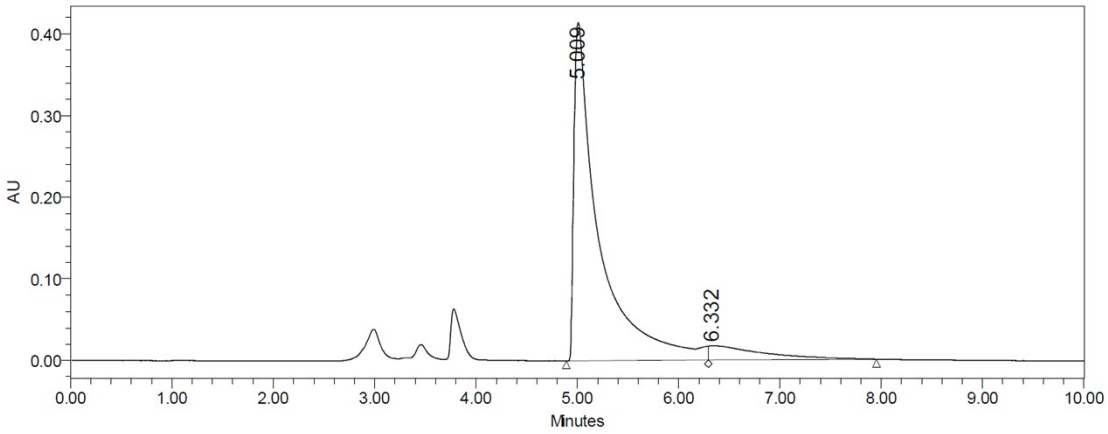
Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	24.139	33645766	91.51	445588
2	2998 Ch1 254nm@4.8nm	36.990	3120393	8.49	34750

(S)-2,3-dihydro-1H-inden-1-amine (**6**)

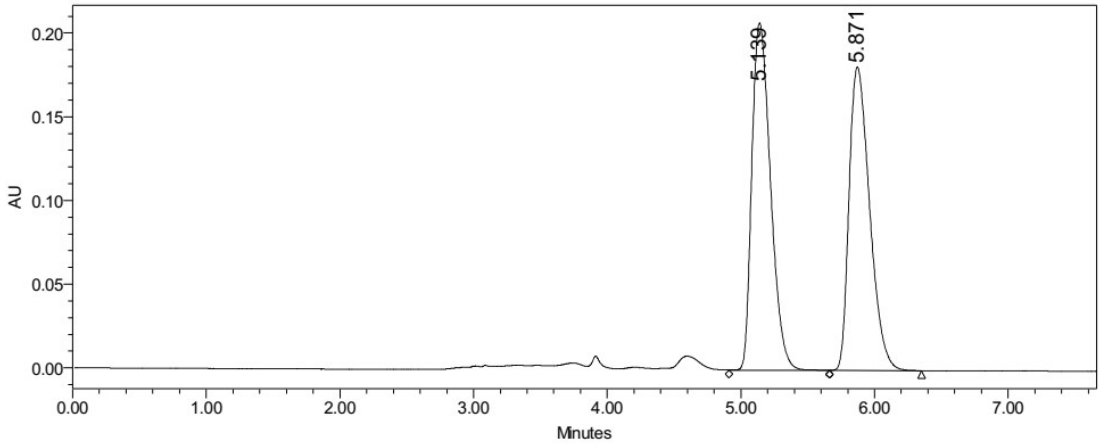


	RT	Area	% Area	Height
1	4.995	10444194	49.05	757139
2	5.929	10850852	50.95	633134



	RT	Area	% Area	Height
1	5.009	7064589	91.65	414052
2	6.332	643881	8.35	17451

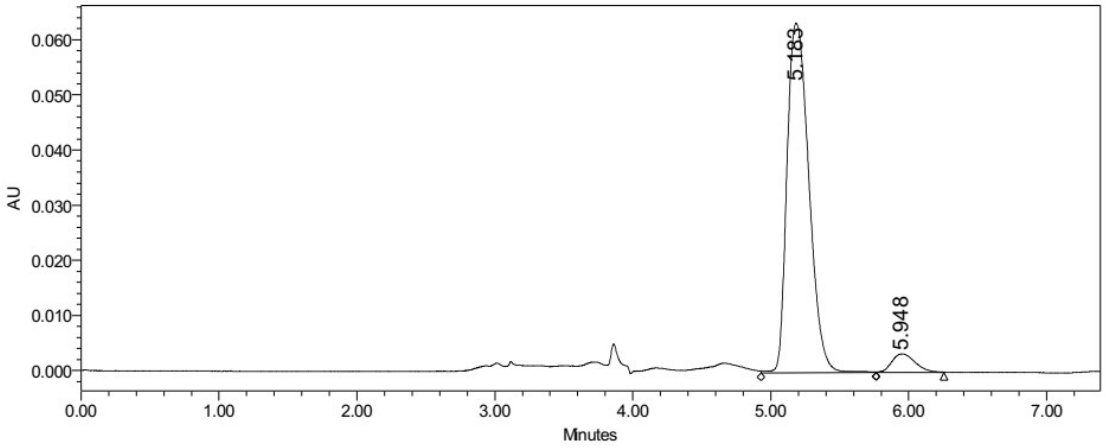
(S)-N-(prop-2-yn-1-yl)-2,3-dihydro-1H-inden-1-amine (**7**)



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 2762;
Processing Method: wx 59 rac

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	5.139	2012860	50.98	207478
2	2998 Ch1 254nm@4.8nm	5.871	1935330	49.02	181231



Channel: 2998 Ch1 254nm@4.8nm; Processed Channel: 2998 Ch1 254nm@4.8nm; Result Id: 2820;
Processing Method: wx 62 asy

Processed Channel Descr.: 2998 Ch1 254nm@4.8nm

	Processed Channel Descr.	RT	Area	% Area	Height
1	2998 Ch1 254nm@4.8nm	5.183	699202	94.64	63443
2	2998 Ch1 254nm@4.8nm	5.948	39572	5.36	3375