

Supporting Information

Electrochemical oxidative selenocyclization of olefinic amides towards the synthesis of iminoisobenzofurans

Hao Li^{+,a}, Fangling Lu^{+,a}, Jie Xu^a, JianGuo Hu^a, Hesham Alhumade^d Lijun Lu^{*b}, Aiwen Lei^{*,a,b,c}

^aNational Research Center for Carbohydrate Synthesis, Jiangxi Normal University, Nanchang, Jiangxi 330022, P. R. China

^bCollege of Chemistry and Molecular Sciences, Engineering Research Center of Organosilicon Compounds & Materials (Ministry of Education), Wuhan University, Wuhan, Hubei 430072, P. R. China.

^cKing Abdulaziz University, Jeddah, Saudi Arabia.

^dDepartment of Chemical and Materials Engineering, Faculty of Engineering, King Abdulaziz University, Center of Research Excellence in Renewable Energy and Power Systems, King Abdulaziz University, Jeddah 21589, Saudi Arabia.

E-mail: aiwenlei@whu.edu.cn; ljlu@whu.edu.cn

Hao Li^{+,a} and Fangling Lu^{+,a} contributed equally to this work.

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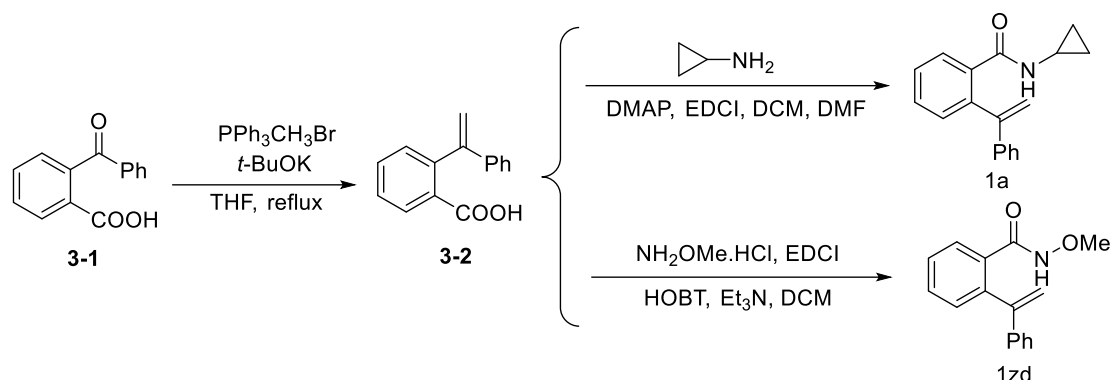
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General information

Unless otherwise noted, materials were obtained from commercial suppliers and used without further purification. The instrument for electrolysis was dual display potentiostat (DJS-292B) (made in China). The anodic electrode was graphite rod (ϕ 6 mm) and cathodic electrode was platinum plate (15 mm \times 15 mm \times 0.3 mm). Thin layer chromatography (TLC) employed glass 0.25 mm silica gel plates. Flash chromatography columns were packed with 300-400 mesh silica gel in petroleum (boiling point was between 60-90 °C). Gradient flash chromatography was conducted eluting with a continuous gradient from petroleum to the indicated solvent, and they were listed as volume/volume ratios. The NMR spectra was recorded on a Bruker spectrometer at 400 MHz (^1H NMR), 101 MHz (^{13}C NMR), 376 MHz (^{19}F NMR). Chemical shifts were reported relative to tetramethylsilane, dimethyl sulfoxide (2.50 ppm for ^1H , 39.6 ppm for ^{13}C) and chloroform (7.26 ppm for ^1H , 77.6 ppm for ^{13}C). And all ^1H , ^{13}C and ^{19}F NMR data spectra were reported in delta (δ) units, parts per million (ppm) downfield from the internal standard. Coupling constants are reported in Hertz (Hz). GC-MS spectra were recorded on a Shimadzu GC-MS QP2010 Ultra.

Experimental procedure

General procedure for the preparation of 3a ~ 3zl:³⁻⁵



A suspension of potassium tert-butoxide (15.0 g, 2.6 equiv.) in THF (69.0 mL) was added to a suspension of methyltriphenylphosphonium bromide (34.3 g, 1.6 equiv.) in THF (138.0 mL). The resulting yellow solution was stirred at room temperature for 1.5 h, upon which **3-1** (13.5 g, 60.0 mmol, 1.0 equiv.) was added. After the solution was refluxed overnight, the reaction mixture was cooled to room temperature and quenched with acetic acid, followed by addition of EtOAc. The organic layer was extracted with a saturated aqueous solution of NaHCO_3 . The combined aqueous layers were acidified to $\text{pH} = 1$ with concentrated HCl and the organic layer extracted with EtOAc. The combined organic layers were washed with water, brine, dried with Na_2SO_4 , and concentrated in vacuo to afford the crude olefin product. Purification by column chromatography afforded **3-2** as a white solid.

In an oven-dried 100 mL round bottom flask equipped with a stir bar, **3-2** (2.5 mmol, 1.0 equiv.), cyclopropylamine (3.0 mmol, 1.2 equiv.), DMF (0.5 mL) was injected into the flask by syringe. Then DCM (5 mL) was injected into the flask by syringe. The mixture was cooled to 0°C . DMAP (61.0 mg, 0.5 mmol) and 1-ethyl-3-(3-dimethylaminopropyl) carbodiimide (528.0 mg, 3.4 mmol) was then added. The mixture was allowed to warm to room temperature and was further stirred overnight. The mixture was washed with saturated NaHCO_3 and then neutralized with HCl (1.0 M) until $\text{pH} = 7.0$. The mixture was then dried over anhydrous Na_2SO_4 . After removal of the solvent under reduced pressure, the residue was purified by silica-gel column chromatography to give the products **1a**.

In an oven-dried 100 mL round bottom flask equipped with a stir bar, **3-2** (2.5 mmol, 1 equiv.)

NH₂OMe•HCl (1.5 equiv.), triethylamine (5.0 equiv.). Then DCM (5 mL) was injected into the flask by syringe it. After stirring for 10 min, EDCI (1.5 equiv.) and HOBT (1.5 equiv.) were added. When the reaction was completed, the resulting mixture was extracted with DCM. The organic phase was washed with aqueous HCl (1.0 M), saturated NaHCO₃ solution, brine, dried over Na₂SO₄, filtered and concentrated in vacuo. The residue was purified by silica gel column chromatography to get substrate **1zd**.

Analogues **1b** ~ **1zl** were synthesized by using similar procedures.

General procedure for the preparation of 3a-3zl:

In an oven-dried undivided three-necked bottle (25.0 mL) equipped with a stir bar, Vinylanilides **1** (0.5 mmol), 1,2-diphenyldisilane **2a** (0.5 mmol), ⁿBu₄NBF₄ (0.1 mmol, 32.9 mg), MeCN (11.0 mL) was added. The bottle was equipped with graphite rod (ϕ 6 mm, about 15 mm immersion depth in solution) as the anode and platinum plate (15 mm × 15 mm × 0.3 mm) as the cathode. The reaction mixture was stirred and electrolyzed at a constant current of 30 mA under N₂ atmosphere at 40 °C for 6 h. After completion of the reaction, as indicated by TLC and GC-MS, the pure product was obtained by flash column chromatography on silica gel (petroleum ether : ethyl acetate = 100 : 1).

General procedure for the preparation of 4a-4d:

In an oven-dried undivided three-necked bottle (25.0 mL) equipped with a stir bar, N-phenyl-2-(1-phenylvinyl)benzamide **1a** (0.5 mmol), disilane **3** (0.5 mmol), ⁿBu₄NBF₄ (0.1 mmol, 32.9 mg), MeCN (11.0 mL) was added. The bottle was equipped with graphite rod (ϕ 6 mm, about 15 mm immersion depth in solution) as the anode and platinum plate (15 mm × 15 mm × 0.3 mm) as the cathode. The reaction mixture was stirred and electrolyzed at a constant current of 20 or 30 mA under N₂ atmosphere at 40 °C for 6 h. After completion of the reaction, as indicated by TLC and GC-MS, the pure product was obtained by flash column chromatography on silica gel (petroleum ether : ethyl acetate = 100 : 1).

Procedure for the preparation of 5a:

Method 1: In an oven-dried undivided three-necked bottle (25.0 mL) equipped with a stir bar, methyl 2-(1-phenylvinyl)benzoate (0.5 mmol), 1,2-diphenyldisilane (0.5 mmol), ⁿBu₄NBF₄ (0.1 mmol, 32.9 mg), MeCN (11.0 mL) was added. The bottle was equipped with graphite rod (ϕ 6 mm,

about 15 mm immersion depth in solution) as the anode and platinum plate (15 mm × 15 mm × 0.3 mm) as the cathode. The reaction mixture was stirred and electrolyzed at a constant current of 30 mA under N₂ atmosphere at 40 °C for 6.0 h. After completion of the reaction, as indicated by TLC and GC-MS, the pure product was obtained by flash column chromatography on silica gel to give the corresponding product **4a** in 91% yield. (petroleum ether : ethyl acetate = 100 : 1).

Method 2: To a solution of **3a** in 1,2-dimethoxyethane at 0 °C was added 10% aq. HCl. The mixture was then heated at reflux for 30 min. Upon completion of the reaction, the resulting mixture was diluted with EtOAc and washed with aq. NH₄Cl and brine, dried over Na₂SO₄. The solvent was then removed under vacuo. The residue was purified by column chromatography on silica gel to give the corresponding product **5a** in 80% yield.

Procedure for the preparation of 8a:

Method 1: In an oven-dried undivided three-necked bottle (25.0 mL) equipped with a stir bar, (2-(prop-1-en-2-yl)phenyl)methanol (0.5 mmol), 1,2-diphenyldisilane (0.5 mmol), ⁿBu₄NBF₄ (0.1 mmol, 32.9 mg), MeCN (11.0 mL) was added. The bottle was equipped with graphite rod (ϕ 6 mm, about 15 mm immersion depth in solution) as the anode and platinum plate (15 mm × 15 mm × 0.3 mm) as the cathode. The reaction mixture was stirred and electrolyzed at a constant current of 20 mA under N₂ atmosphere at 40 °C for 3.0 h. After completion of the reaction, as indicated by TLC and GC-MS, the pure product was obtained by flash column chromatography on silica gel to give the corresponding product **8a** in 82% yield. (petroleum ether : ethyl acetate = 100 : 1).

Procedure for gram scale synthesis of 3a:

In an oven-dried undivided three-necked bottle (250.0 mL) equipped with a stir bar, N-phenyl-2-(1-phenylvinyl)benzamide **1a** (5.00 mmol, 1496.9 mg), 1,2-diphenyldisilane **2a** (5.00 mmol, 1560.8mg), ⁿBu₄NBF₄ (5.0 mmol, 329.7 mg), MeCN (110.0 mL) was added. The bottle was equipped with graphite rod (ϕ 6 mm, about 15 mm immersion depth in solution) as the anode and platinum plate (15 mm × 15 mm × 0.3 mm) as the cathode. The reaction mixture was stirred and electrolyzed at a constant current of 30 mA under N₂ atmosphere 40 °C temperature for 28 h, After completion of the reaction, as indicated by TLC and GC-MS, The residue was purified by column chromatography on silica gel to give the corresponding product **3a** in 88% yield.

Mechanism research

CV experiments:

Cyclic voltammetry was performed in a three-electrode cell connected to a schlenk line under air at room temperature. The working electrode was a glassy carbon electrode, the counter electrode a platinum wire. The reference was an Ag/AgCl electrode submerged in saturated aqueous KCl solution. 10 mL of CH₃CN containing 0.01 M ⁿBu₄NBF₄ were poured into the electrochemical cell in all experiments. The scan rate is 0.1 V/s, ranging from 0 V to 3.5 V. The peak potentials vs Ag/AgCl for used. An obvious oxidation peak of *N*-phenyl-2-(1-phenylvinyl)benzamide (**1a**) was observed at 2.2 V. The oxidation peak of 1,2-diphenyldisilane (**2a**) could also be observed at 2.0 V. So, **2a** was oxidized preferentially at the anode.

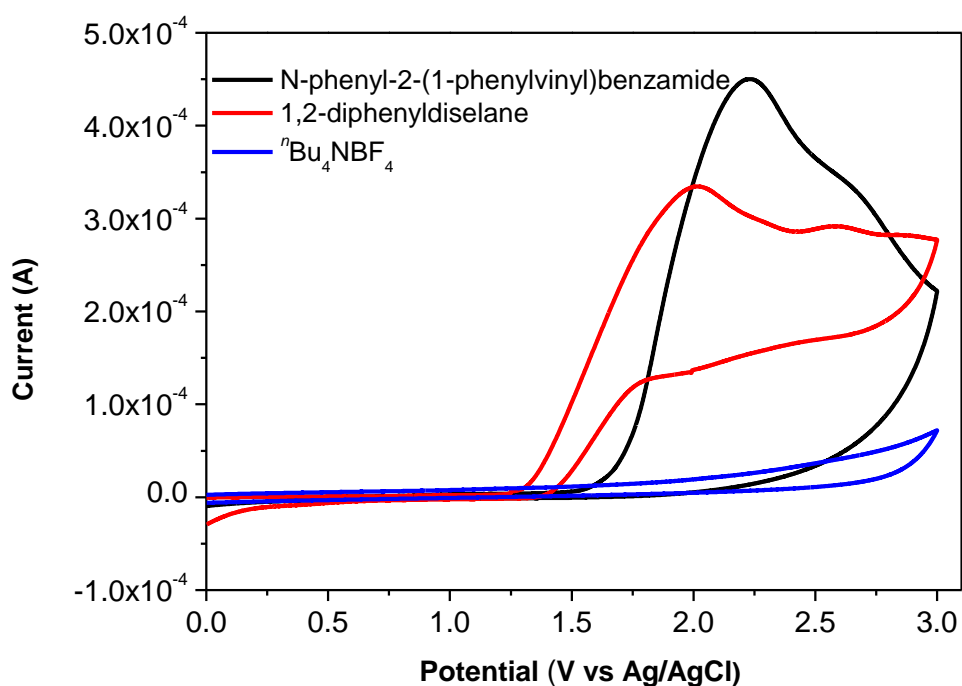
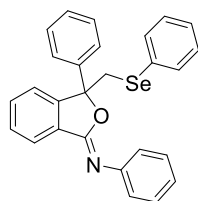


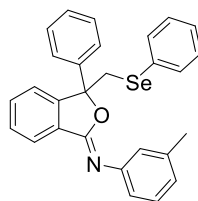
Figure S1 Cyclic voltammogram

Detail descriptions for products:



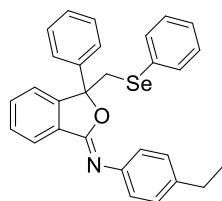
(Z)-N,3-diphenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine

(3a) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3a in 90% yield (204.5 mg) as a colorless oil. **¹H NMR** (400 MHz, DMSO-*d*₆) δ 7.90-7.88 (m, 2H), 7.69-7.67 (m, 1H), 7.59-7.49 (m, 4H), 7.38-7.28 (m, 7H), 7.21-7.06 (m, 6H), 4.20 (d, *J* = 12.0 Hz, 1H), 4.04 (d, *J* = 16.0 Hz, 1H); **¹³C NMR** (101 MHz, DMSO-*d*₆) δ 156.68, 148.40, 146.24, 141.19, 132.64, 131.84, 130.20, 130.09, 129.60, 129.15, 128.95, 128.86, 128.36, 126.90, 124.96, 124.04, 123.44, 123.40, 122.63, 91.59, 37.52. **HRMS (ESI)** calcd for [C₂₇H₂₂N₂OSe]⁺: 456.0861 [M+H]⁺, found:456.0863

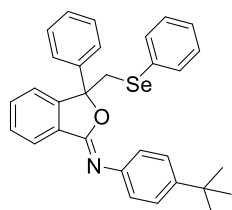


(Z)-3-phenyl-3-((phenylselanyl)methyl)-N-(m-tolyl)isobenzofuran-1(3H)-imine

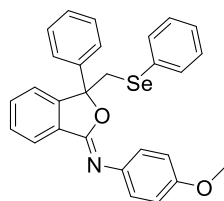
(3b) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3b in 75% yield (180.4 mg) as a light brown oil. **¹H NMR** (400 MHz, DMSO-*d*₆) δ 7.92-7.90 (m, 1H), 7.69-7.67 (m, 1H), 7.60 (d, *J* = 8.0 Hz, 2H), 7.52-7.51 (m, 2H), 7.38-7.34 (m, 4H), 7.30-7.26 (m, 1H), 7.21-7.06 (m, 6H), 6.90 (d, *J* = 4.0 Hz, 1H), 4.20 (d, *J* = 12.0 Hz, 1H), 4.03 (d, *J* = 16.0 Hz, 1H), 2.27 (s, 3H); **¹³C NMR** (101 MHz, DMSO-*d*₆) δ 156.41, 148.30, 146.17, 141.15, 137.87, 132.50, 131.83, 130.17, 130.11, 129.52, 129.06, 128.87, 128.58, 128.28, 126.83, 124.91, 124.67, 124.02, 123.32, 122.57, 120.26, 91.38, 37.62, 21.23. **HRMS (ESI)** calcd for [C₂₈H₂₄N₂OSe]⁺: 470.1018 (M+H⁺), found:470.1019.



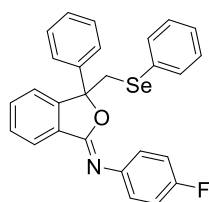
(Z)-N-(4-ethylphenyl)-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3c) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3c in 90% yield (217.1 mg) as a colorless oil. ¹H NMR (400 MHz, DMSO-*d*₆) δ 7.86-7.84 (m, 1H), 7.69-7.68 (m, 1H), 7.59-7.49 (m, 4H), 7.39-7.28 (m, 5H), 7.17-7.11 (m, 7H), 4.19 (d, *J* = 12.0 Hz, 1H), 4.5 (d, *J* = 12.0 Hz, 1H), 2.58 (d, *J* = 60.0 Hz, 2H), 1.19 (t, *J* = 30.0 Hz, 3H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 156.14, 148.20, 143.65, 141.22, 139.43, 132.37, 131.82, 130.22, 130.13, 129.46, 129.04, 128.85, 128.24, 128.05, 126.80, 124.90, 123.54, 123.26, 122.55, 91.40, 37.52, 27.82, 15.78. **HRMS (ESI)** calcd for [C₂₉H₂₆N₂OSe]⁺: 484.1174 (M+H⁺), found: 484.1176.



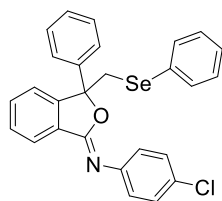
(Z)-N-(4-(tert-butyl)phenyl)-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3d) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3d in 77% yield (190.4 mg) as a colorless oil. ¹H NMR (400 MHz, DMSO-*d*₆) δ 7.90-7.88 (m, 1H), 7.67-7.65 (m, 1H), 7.61 (d, *J* = 8.0 Hz, 2H), 7.51-7.49 (m, 2H), 7.36-7.25 (m, 9H), 7.14-7.08 (m, 3H), 4.18 (d, *J* = 12.0 Hz, 1H), 4.04 (d, *J* = 12.0 Hz, 1H), 1.27 (s, 9H); ¹³C NMR (101 MHz, DMSO) δ 156.16, 148.13, 146.27, 143.35, 141.16, 132.28, 131.96, 130.31, 130.09, 129.37, 128.96, 128.79, 128.17, 126.75, 125.39, 124.90, 123.35, 123.28, 122.47, 91.38, 37.73, 34.09, 31.31. **HRMS (ESI)** calcd for [C₃₁H₃₀N₂OSe]⁺: 512.1487 (M+H⁺), found: 512.1486.



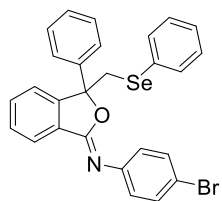
(Z)-N-(4-methoxyphenyl)-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3e) Prepared according to general condition, but at a constant current of 20 mA, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3e in 48% yield (116.4 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.85-7.83 (m, 1H), 7.70-7.68 (m, 1H), 7.60-7.58 (m, 1H), 7.54-7.48 (m, 1H), 7.39-7.35 (m, 4H), 7.31-7.27 (m, 3H), 7.17-7.12 (m, 3H), 6.88 (d, $J = 8.0$ Hz, 2H), 4.18 (d, $J = 12.0$ Hz, 1H), 4.08 (d, $J = 16.0$ Hz, 1H), 3.75 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 156.13, 155.39, 147.95, 141.28, 138.76, 132.15, 131.81, 130.45, 130.14, 129.41, 129.04, 128.83, 128.20, 126.80, 125.33, 124.88, 123.12, 122.52, 113.93, 91.39, 55.21, 37.58. **HRMS (ESI)** calcd for $[\text{C}_{28}\text{H}_{23}\text{KNO}_2\text{Se}]^+$: 524.0526 ($\text{M}+\text{H}^+$), found: 524.0527.



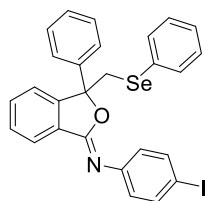
(Z)-N-(4-fluorophenyl)-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3f) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3f in 68% yield (160.6 mg) as a white solid. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.77 (d, $J = 8.0$ Hz, 1H), 7.68 (m, $J = 4.0$ Hz, 1H), 7.59-7.49 (m, 4H), 7.39-7.28 (m, 5H), 7.25-7.21 (m, 2H), 7.16-7.08 (m, 5H), 4.20 (d, $J = 12.0$ Hz, 1H), 4.08 (d, $J = 12.0$ Hz, 1H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 158.95 (d, $J = 242.4$ Hz), 156.75, 148.29, 142.38 (d, $J = 3.03$ Hz), 141.07, 132.61, 131.76, 130.12 (d, $J = 6.06$ Hz), 129.56, 129.10, 128.93, 128.34, 126.86, 125.32 (d, $J = 7.07$ Hz), 124.95, 123.37, 122.61, 115.49, 115.27, 91.83, 37.41; $^{19}\text{F NMR}$ (376 MHz, $\text{DMSO-}d_6$) δ -118.88. **HRMS (ESI)** calcd for $[\text{C}_{27}\text{H}_{21}\text{FNOSe}]^+$: 474.0767 ($\text{M}+\text{H}^+$), found: 474.0768.



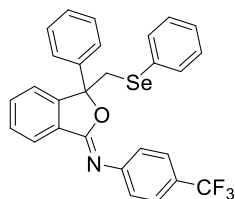
(Z)-N-(4-chlorophenyl)-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3g) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3g in 78% yield (190.7 mg) as a light yellow oil. ¹H NMR (400 MHz, DMSO-*d*₆) δ 7.88 (d, *J* = 4.0 Hz, 1H), 7.69 (d, *J* = 8.0 Hz, 1H), 7.58-7.50 (m, 4H), 7.39-7.28 (m, 7H), 7.17-7.11 (m, 5H), 4.21 (d, *J* = 16.0 Hz, 1H), 4.06 (d, *J* = 12.0 Hz, 2H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 157.31, 148.43, 145.07, 140.95, 132.78, 131.72, 130.15, 129.90, 129.61, 129.11, 128.94, 128.70, 128.38, 128.04, 126.86, 125.23, 124.95, 123.47, 122.64, 91.98, 37.34. **HRMS (ESI)** calcd for [C₂₇H₂₁ClNOSe]⁺: 490.0471(M+H⁺), found: 490.0470.



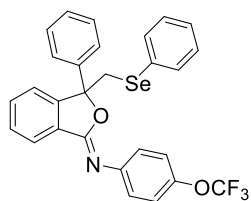
(Z)-N-(4-bromophenyl)-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3h). Prepared according to general condition, but at a constant current of 20 mA for 6 h, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3h in 63% yield (168.0 mg) as a light yellow oil. ¹H NMR (400 MHz, DMSO-*d*₆) δ 7.89 (d, *J* = 8.0 Hz, 1H), 7.68-7.67 (m, 1H), 7.58-7.55 (m, 2H), 7.54-7.49 (m, 2H), 7.45-7.42 (m, 2H), 7.38-7.27 (m, 5H), 7.16-7.10 (m, 5H), 4.19 (d, *J* = 16.0 Hz, 1H), 4.06 (d, *J* = 12.0 Hz, 1H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 157.24, 148.32, 145.48, 140.83, 132.67, 131.74, 131.55, 130.08, 129.89, 129.52, 129.02, 128.85, 128.29, 126.79, 125.58, 124.90, 123.43, 122.57, 116.21, 91.90, 37.45. **HRMS (ESI)** calcd for [C₂₇H₂₁BrNOSe]⁺: 533.9966(M+H⁺), found: 533.9966.



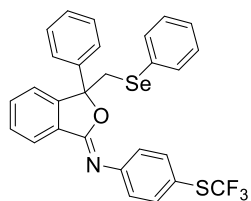
(Z)-N-(4-iodophenyl)-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-im-ine (3i) Prepared according to general condition, but at a constant of 20 mA for 6 h, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3i in 55% yield (159.6 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.87-7.85 (m, 1H), 7.71-7.69 (m, 1H), 7.62-7.52 (m, 6H), 7.40-7.30 (m, 5H), 7.21-7.12 (m, 3H), 6.97-6.93 (m, 2H), 4.20 (d, $J = 12.0$ Hz, 1H), 4.06 (d, $J = 12.0$ Hz, 1H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 157.20, 148.40, 145.97, 140.90, 137.44, 132.73, 131.66, 130.08, 129.81, 129.57, 129.05, 128.88, 128.32, 126.79, 125.80, 124.90, 123.41, 122.61, 91.88, 88.27, 37.25. **HRMS (ESI)** calcd for $[\text{C}_{27}\text{H}_{21}\text{INOSe}]^+$: 581.9828 ($\text{M}+\text{H}^+$), found: 581.9829.



(Z)-3-phenyl-3-((phenylselanyl)methyl)-N-(4-(trifluoromethyl)phenyl)isobenzofuran-1(3H)-imine (3j) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3j in 55% yield (143.6 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.91-7.89 (m, 1H), 7.70-7.69 (m, 1H), 7.62-7.52 (m, 6H), 7.40-7.36 (m, 2H), 7.32-7.29 (m, 3H), 7.25 (d, $J = 8.0$ Hz, 2H), 7.17-7.09 (m, 3H), 4.24 (d, $J = 12.0$ Hz, 1H), 4.05 (d, $J = 16.0$ Hz, 2H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 158.06, 150.29, 148.69, 140.81, 133.08, 131.63, 130.14, 129.70, 129.57, 129.08, 128.97, 128.44, 126.81, 125.98 (q, $J = 3.03$ Hz), 124.99, 123.80 (q, $J = 32.32$ Hz), 123.64, 123.54, 123.32, 122.71, 92.23, 37.18. **HRMS (ESI)** calcd for $[\text{C}_{28}\text{H}_{21}\text{F}_3\text{NOSe}]^+$: 524.0735 ($\text{M}+\text{H}^+$), found: 524.0737.

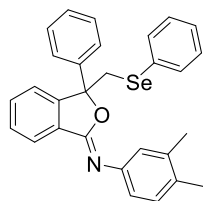


(Z)-3-phenyl-3-((phenylselanyl)methyl)-N-(4(trifluoromethoxy)phenyl)isobenzofuran-1(3H)-imine (3k) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3k in 72% yield (193.8 mg) as a light yellow oil. ¹H NMR (400 MHz, DMSO-*d*₆) δ 7.87 (d, *J* = 8.0 Hz, 1H), 7.69-7.68 (m, 1H), 7.59-7.49 (m, 4H), 7.39-7.28 (m, 5H), 7.25-7.21 (m, 2H), 7.16-7.08 (m, 5H), 4.20 (d, *J* = 12.0 Hz, 1H), 4.08 (d, *J* = 12.0 Hz, 1H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 158.96 (d, *J* = 242.4 Hz), 156.75, 148.29, 142.38 (d, *J* = 3.03 Hz), 141.07, 132.61, 131.76, 130.12 (d, *J* = 6.06 Hz), 129.56, 129.10, 128.93, 128.34, 126.86, 125.33 (d, *J* = 7.07 Hz), 124.95, 123.37, 122.61, 115.49, 115.27, 91.83, 37.41. ¹⁹F NMR (376 MHz, DMSO-*d*₆) δ -118.88. **HRMS (ESI)** calcd for [C₂₈H₂₀F₃NO₂Se]⁺: 540.0684 (M+H⁺), found: 540.0686.



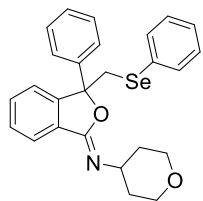
(Z)-3-phenyl-3-((phenylselanyl)methyl)-N-(4-((trifluoromethyl)thio)phenyl)isobenzofuran-1(3H)-imine (3l) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3l in 78% yield (216.5 mg) as a colorless oil. ¹H NMR (400 MHz, DMSO-*d*₆) δ 7.89 (d, *J* = 8.0 Hz, 1H), 7.69-7.68 (m, 2H), 7.61-7.52 (m, 6H), 7.40-7.37 (m, 2H), 7.33-7.31 (m, 3H), 7.24-7.22 (m, 2H), 7.16-7.08 (m, 3H), 4.24 (d, *J* = 12.0 Hz, 1H), 4.06 (d, *J* = 8.0 Hz, 1H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 157.88, 149.48, 148.63, 140.75, 137.14, 132.99, 131.65, 131.31, 130.07, 129.63, 128.99, 128.92, 128.39, 128.25, 126.75, 124.96, 124.58, 123.57, 122.63, 116.96, 92.27, 37.15; ¹⁹F NMR (377MHz, DMSO-*d*₆) δ -42.56. **HRMS (ESI)** calcd for [C₂₈H₂₁F₃NOSSe]⁺: 556.0456 (M+H⁺), found:

556.0457.



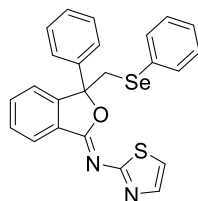
(Z)-N-(3,4-dimethylphenyl)-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3m) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3m in 78% yield (180.9 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.89-7.87 (m, 1H), 7.70-7.68 (m, 1H), 7.61-7.59 (m, 2H), 7.53-7.50 (m, 2H), 7.38-7.35 (m, 4H), 7.30-7.27 (m, 1H), 7.17-7.11 (m, 4H), 7.07-7.02 (m, 2H), 4.18 (d, $J=12.0$ Hz, 1H), 4.04 (d, $J=12.0$ Hz, 1H), 2.19 (s, 3H), 2.18 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 156.00, 148.12, 143.79, 141.21, 136.26, 132.26, 131.89, 131.82, 130.31, 130.19, 129.69, 129.42, 129.02, 128.80, 128.19, 126.79, 124.91, 124.87, 123.23, 122.51, 120.82, 91.22, 37.81, 19.71, 19.00.

HRMS (ESI) calcd for $[\text{C}_{29}\text{H}_{25}\text{NOSe}]^+$: 484.1174 ($\text{M}+\text{H}^+$), found: 484.1176.

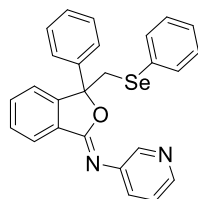


(Z)-3-phenyl-3-((phenylselanyl)methyl)-N-(tetrahydro-2H-pyran-4yl)isobenzofuran-1(3H)-imine (3n) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3n in 75% yield (173.4 mg) as a white solid. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.66 (t, $J=8.0$ Hz, 2H), 7.61-7.69 (m, 2H), 7.49 (t, $J=8.0$ Hz, 1H), 7.44-7.37 (m, 5H), 7.30-7.28 (m, 1H), 7.24-7.17 (m, 3H), 4.14 (d, $J=12.0$ Hz, 1H), 4.08 (d, $J=16.0$ Hz, 1H), 3.86-3.83 (m, 1H), 3.78-3.75 (m, 1H), 3.68-3.61 (m, 1H), 3.36-3.30 (m, 1H), 3.28-3.21 (m, 1H), 1.74-1.71 (m, 1H), 1.57-1.41 (m, 2H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 156.45, 148.69, 142.30, 132.11, 131.40, 130.97, 130.22, 129.43, 129.33, 129.13, 128.38, 126.82, 125.13, 123.11, 122.71, 90.61, 66.10, 52.39, 37.46, 33.99. **HRMS (ESI)** calcd for $[\text{C}_{26}\text{H}_{26}\text{NO}_2\text{Se}]^+$: 464.1123

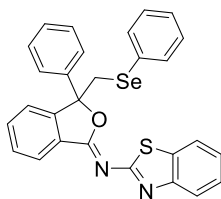
(M+H⁺), found: 464.1125.



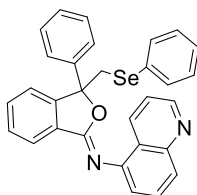
(Z)-3-phenyl-3-((phenylselanyl)methyl)-N-(thiazol-2-yl)isobenzofuran-1(3H)-imine (3o) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3o in 80% yield (184.6 mg) as a white solid. ¹H NMR (400 MHz, DMSO-*d*₆) δ 7.98-7.96 (m, 1H), 7.80-7.78 (m, 1H), 7.71-7.69 (m, 3H), 7.61-7.54 (m, 2H), 7.52 (d, *J* = 4.0 Hz, 1H), 7.41-7.37 (m, 2H), 7.33-7.29 (m, 3H), 7.08-7.03 (m, 3H), 4.24 (d, *J* = 12.0 Hz, 1H), 4.12 (d, *J* = 16.0 Hz, 1H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 164.46, 160.23, 148.64, 139.91, 139.83, 133.51, 132.20, 130.04, 129.65, 129.09, 129.00, 128.97, 128.61, 126.97, 124.99, 123.75, 122.93, 118.76, 94.73, 37.84. **HRMS (ESI)** calcd for [C₂₄H₁₉N₂OSSe]⁺: 463.0378 (M+H⁺), found: 463.0378.



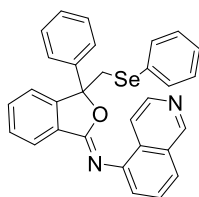
(Z)-3-phenyl-3-((phenylselanyl)methyl)-N-(pyridin-3-yl)isobenzofuran-1(3H)-imine (3p) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3p in 57% yield (129.8 mg) as a white solid. ¹H NMR (400 MHz, DMSO-*d*₆) δ 8.50 (d, *J* = 2.40 Hz, 1H), 8.30 (dd, *J* = 1.20 Hz, *J* = 4.80 Hz, 1H), 7.92-7.90 (m, 1H), 7.70-7.69 (m, 1H), 7.60-7.52 (m, 5H), 7.40-7.36 (m, 2H), 7.33 - 7.28 (m, 4H), 7.16-7.08 (m, 3H), 4.20 (d, *J* = 12.0 Hz, 1H), 4.09 (d, *J* = 16.0 Hz, 1H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 158.44, 148.54, 145.16, 144.96, 142.39, 140.77, 132.96, 131.80, 130.23, 130.02, 129.70, 129.68, 129.06, 128.97, 128.43, 126.90, 124.98, 123.79, 123.59, 122.70, 92.34, 37.39. **HRMS (ESI)** calcd for [C₂₆H₂₁N₂OSe]⁺: 457.0814 (M+H⁺), found: 457.0815.



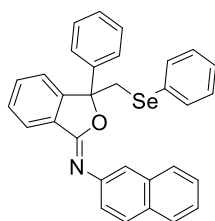
(Z)-N-(benzo[d]thiazol-2-yl)-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3q) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3q in 90% yield (230.2 mg) as a white solid. $^1\text{H NMR}$ (400 MHz, DMSO- d_6) δ 8.01-7.96 (m, 2H), 7.99 (d, $J = 8.0$ Hz, 1H), 7.82-7.81 (m, 1H), 7.74-7.72 (m, 2H), 7.68-7.61 (m, 2H), 7.50-7.31 (m, 7H), 7.05-6.97 (m, 3H), 4.31 (d, $J = 16.0$ Hz, 1H), 4.16 (d, $J = 12.0$ Hz, 1H); $^{13}\text{C NMR}$ (101 MHz, DMSO- d_6) δ 163.88, 162.44, 150.18, 148.98, 139.65, 134.65, 134.05, 132.22, 130.15, 129.61, 129.02, 128.91, 128.69, 126.88, 126.10, 125.04, 124.62, 124.13, 122.96, 122.02, 121.70, 95.33, 37.63. **HRMS (ESI)** calcd for $[\text{C}_{28}\text{H}_{21}\text{N}_2\text{OSe}]^+$: 513.0534(M+H $^+$), found: 513.0535.



(Z)-3-phenyl-3-((phenylselanyl)methyl)-N-(quinolin-5-yl)isobenzofuran-1(3H)-imine (3r) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3r in 29% yield (73.2 mg) as a white solid. $^1\text{H NMR}$ (400 MHz, DMSO- d_6) δ 8.81 (d, $J = 2.8$ Hz, 1H), 8.20 (d, $J = 8.0$ Hz, 1H), 7.94-7.92 (m, 2H), 7.73-7.71 (m, 1H), 7.68 (d, $J = 1.6$ Hz, 1H), 7.61-7.54 (m, 5H), 7.48 (dd, $J = 4.0$ Hz, $J = 8.0$ Hz, 1H), 7.39-7.28 (m, 5H), 7.12-7.07 (m, 3H), 4.24 (d, $J = 12.0$ Hz, 1H), 4.06 (d, $J = 12.0$ Hz, 1H); $^{13}\text{C NMR}$ (101 MHz, DMSO- d_6) δ 157.54, 149.19, 148.46, 145.27, 144.40, 140.90, 135.61, 135.61, 132.80, 131.68, 130.13, 129.90, 129.62, 129.26, 129.01, 128.89, 128.48, 128.32, 127.38, 126.74, 124.94, 123.48, 122.65, 121.56, 119.67, 91.90, 37.40. **HRMS (ESI)** calcd for $[\text{C}_{30}\text{H}_{22}\text{N}_2\text{OSe}]^+$: 529.0790 (M+Na $^+$), found: 527.0791.

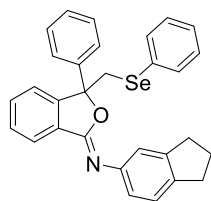


(Z)-N-(isoquinolin-5-yl)-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3s) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3s in 46% yield (116.4 mg) as a white solid. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 9.18 (s, 1H), 8.46 (d, $J = 8.0$ Hz, 1H), 8.03 (d, $J = 8.0$ Hz, 1H), 7.90 (d, $J = 12.0$ Hz, 1H), 7.61 (s, 1H), 7.57-7.50 (m, 3H), 7.46-7.43 (m, 3H), 7.36-7.29 (m, 4H), 7.24-7.23 (m, 2H), 7.12-7.08 (m, 1H), 7.03-6.99 (m, 2H), 3.87-3.84 (m, 2H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 158.44, 152.02, 148.78, 147.94, 143.06, 140.46, 136.89, 133.37, 132.39, 131.14, 130.27, 129.54, 129.01, 128.91, 128.60, 128.23, 127.39, 125.57, 125.23, 124.26, 122.20, 120.45, 118.37, 91.91, 39.89, 29.82. **HRMS (ESI)** calcd for $[\text{C}_{30}\text{H}_{22}\text{N}_2\text{OSe}]^+$: 507.0970 ($\text{M}+\text{H}^+$), found: 507.0972.

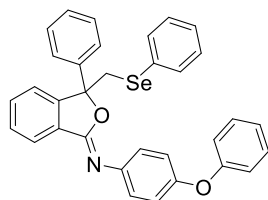


(Z)-N-(naphthalen-2-yl)-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3t) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3t in 63% yield (159.0 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO}-d_6$) δ 7.97-7.95 (m, 1H), 7.87-7.83 (m, 2H), 7.78 (d, $J = 8.0$ Hz, 1H), 7.72-7.69 (m, 2H), 7.61-7.60 (m, 2H), 7.58-7.53 (m, 2H), 7.48-7.35 (m, 7H), 7.30-7.27 (m, 1H), 7.14-7.06 (m, 3H), 4.22 (d, $J = 12.0$ Hz, 1H), 4.05 (d, $J = 12.0$ Hz, 1H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO}-d_6$) δ 157.06, 148.35, 144.01, 141.01, 133.71, 132.63, 131.88, 130.44, 130.14, 130.08, 129.58, 129.07, 129.04, 128.87, 128.87, 128.26, 127.55, 127.48, 126.83, 126.17, 124.92, 123.93, 123.44, 122.62, 119.85, 91.68, 37.70. **HRMS (ESI)** calcd for $[\text{C}_{31}\text{H}_{24}\text{NOSe}]^+$: 506.1018 ($\text{M}+\text{H}^+$), found:

506.1020.

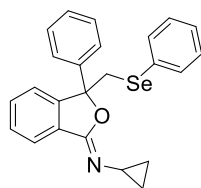


(Z)-N-(2,3-dihydro-1H-inden-5-yl)-3-phenyl-3((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3u) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3u in 63% yield (131.7 mg) as a colorless oil. **¹H NMR** (400 MHz, DMSO-*d*₆) δ 7.86-784 (m, 1H), 7.69-7.67 (m, 1H), 7.58-7.48 (m, 4H), 7.38-7.34 (m, 4H), 7.31-7.27 (m, 1H), 7.18-7.11 (m, 4H), 7.08 (s, 1H), 7.00-6.97 (m, 1H), 4.20 (d, *J* = 16.0 Hz, 1H), 4.02 (d, *J* = 12.0 Hz, 1H), 2.80 (q, *J* = 8.0 Hz, 4H), 2.00 (p, *J* = 8.0 Hz, 2H); **¹³C NMR** (101 MHz, DMSO-*d*₆) δ 155.91, 148.19, 144.31, 144.13, 141.26, 139.32, 132.30, 131.76, 130.30, 130.21, 129.43, 129.04, 128.83, 128.22, 126.77, 124.88, 124.19, 123.23, 122.49, 121.55, 119.32, 91.24, 37.58, 32.60, 31.99, 25.36. **HRMS (ESI)** calcd for [C₃₀H₂₆N₂OSe]⁺: 496.1174 (M+H⁺), found: 496.1176.



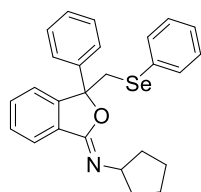
(Z)-N-(4-phenoxyphenyl)-3-phenyl-3((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3v) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3v in 78% yield (213.2 mg) as a colorless oil. **¹H NMR** (400 MHz, DMSO-*d*₆) δ 7.86 (d, *J* = 8.0 Hz, 1H), 7.70-7.68 (m, 1H), 7.61-7.53 (m, 5H), 7.38-7.27 (m, 10H), 7.13 (s, 7.13), 7.02 (d, *J* = 8.0 Hz, 2H), 6.94 (d, *J* = 8.0 Hz, 2H), 4.20 (d, *J* = 16.0 Hz, 1H), 4.08 (d, *J* = 12.0 Hz, 1H); **¹³C NMR** (101 MHz, DMSO-*d*₆) δ 157.14, 156.24, 152.91, 148.18, 141.51, 141.12, 132.42, 131.73, 130.25, 130.14, 130.06, 129.48, 129.01, 128.87, 128.26, 126.74, 125.43, 124.94, 123.26, 122.55, 119.07, 118.36, 91.71, 37.39. **HRMS (ESI)** calcd for [C₃₃H₂₆NO₂Se]⁺:

548.1123 (M+H⁺), found: 548.1126.



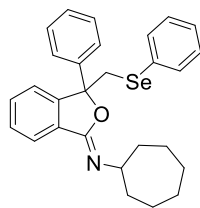
(Z)-N-cyclopropyl-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine

(3w) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3w in 66% yield (138.1 mg) as a colorless oil. ¹H NMR (400 MHz, DMSO-*d*₆) δ 7.67-7.60 (m, 4H), 7.48-7.37 (m, 6H), 7.32-7.28 (m, 1H), 7.23-7.20 (m, 3H), 4.07 (d, *J* = 16.0 Hz, 1H), 4.02 (d, *J* = 12.0 Hz, 1H), 3.25-3.19 (m, 1H), 0.81-0.61 (m, 4H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 157.50, 147.88, 141.95, 132.03, 131.48, 130.53, 129.82, 129.17, 129.08, 128.81, 128.10, 126.81, 124.90, 122.53, 122.33, 90.21, 38.00, 29.72, 8.08. **HRMS (ESI)** calcd for [C₂₄H₂₃NOSe]⁺: 420.0861 (M+H⁺), found: 420.0862.



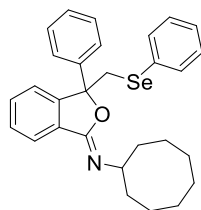
(Z)-N-cyclopentyl-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine

(3x) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3x in 45% yield (107.0 mg) as a colorless oil. ¹H NMR (400 MHz, DMSO-*d*₆) δ 7.67-7.62 (m, 4H), 7.48-7.36 (m, 6H), 7.31-7.27 (m, 1H), 7.23-7.17 (m, 3H), 4.08 (d, *J* = 12.0 Hz, 1H), 4.03 (d, *J* = 16.0 Hz, 1H), 3.99-3.96 (m, 1H), 1.92-1.87 (m, 1H), 1.70-1.66 (m, 3H), 1.54-1.43 (m, 4H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 155.93, 148.22, 142.12, 131.65, 131.50, 130.52, 129.99, 129.02, 128.97, 128.72, 127.96, 126.61, 124.75, 122.64, 122.36, 89.85, 57.20, 37.87, 34.17, 34.00, 23.98, 23.95. **HRMS (ESI)** calcd for [C₂₆H₂₅NNaOSe]⁺: 470.0994 (M+Na⁺), found: 470.0995.



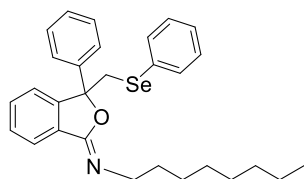
(Z)-N-cycloheptyl-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine

(3y) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give **3y** in 41% yield (92.3 mg) as a colorless oil. **¹H NMR** (400 MHz, DMSO-*d*₆) δ 7.66-7.60 (m, 4H), 7.48-7.36 (m, 6H), 7.31-7.27 (m, 1H), 7.21-7.19 (m, 3H), 4.09 (d, *J* = 16.0 Hz, 1H), 4.02 (d, *J* = 16.0 Hz, 1H), 3.76 (s, 1H), 1.84-1.80 (m, 1H), 1.65-1.29 (m, 11H); **¹³C NMR** (101 MHz, DMSO-*d*₆) δ 148.22, 142.16, 131.52, 131.34, 130.63, 130.18, 129.04, 129.00, 128.76, 128.00, 126.58, 124.79, 122.70, 122.38, 89.75, 56.97, 37.76, 35.99, 35.80, 28.15, 28.05, 24.08. **HRMS (ESI)** calcd for [C₂₈H₃₀N₁OSe]⁺: 476.1487 (M+H⁺), found: 479.1489.



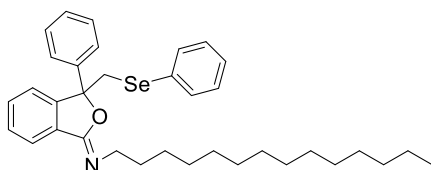
(Z)-N-cyclooctyl-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine

(3z) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give **3z** in 53% yield (129.5 mg) as a colorless oil. **¹H NMR** (400 MHz, DMSO-*d*₆) δ 7.66-7.60 (m, 4H), 7.49-7.37 (m, 6H), 7.31-7.27 (m, 1H), 7.21-7.18 (m, 3H), 4.10 (d, *J* = 12.0 Hz, 1H), 4.02 (d, *J* = 12.0 Hz, 1H), 3.83-3.81 (m, 1H), 1.74-1.38 (m, 14H); **¹³C NMR** (101 MHz, DMSO-*d*₆) δ 154.66, 148.26, 142.14, 131.55, 131.29, 130.66, 130.16, 129.05, 129.01, 128.77, 128.01, 126.57, 124.77, 122.72, 122.40, 89.77, 55.95, 37.81, 33.30, 33.11, 27.17, 27.10, 25.19, 23.79, 23.43. **HRMS (ESI)** calcd for [C₂₉H₃₁NNaOSe]⁺: 512.1463 (M+Na⁺), found: 512.1465.



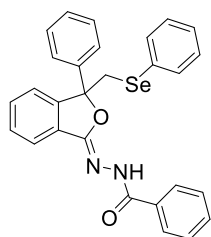
(Z)-N-octyl-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine

(3za) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3za in 77% yield (189.1 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.67-7.64 (m, 2H), 7.62-7.60 (m, 2H), 7.49-7.35 (m, 6H), 7.31-7.28 (m, 1H), 7.20-7.19 (m, 3H), 4.07 (d, $J = 16.0$ Hz, 1H), 4.01 (d, $J = 16.0$ Hz, 1H), 3.35-3.30 (m, 1H), 3.24-3.17 (m, 1H), 1.58-1.43 (m, 2H), 1.29-1.24 (m, 10H), 0.85–0.81 (m, 3H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 156.46, 148.26, 141.98, 131.58, 130.57, 129.97, 129.09, 128.96, 128.70, 128.00, 126.60, 124.81, 122.57, 122.44, 89.89, 46.69, 37.78, 31.39, 30.56, 28.98, 28.85, 27.18, 22.21, 14.05. **HRMS (ESI)** calcd for $[\text{C}_{29}\text{H}_{24}\text{NOSe}]^+$: 492.1800 ($\text{M}+\text{H}^+$), found: 492.1802.

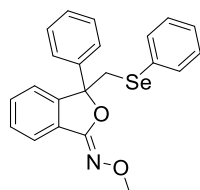


(Z)-3-phenyl-3-((phenylselanyl)methyl)-N-tetradecylisobenzofuran-1(3H)-imine

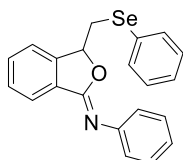
(3zb) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3zb in 80% yield (230.0 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, CDCl_3) δ 7.84 (d, $J = 8.0$ Hz, 1H), 7.50-7.47 (m, 2H), 7.39-7.23 (m, 8H), 7.19-7.11 (m, 3H), 3.87 (d, $J = 12.0$ Hz, 1H), 3.75 (d, $J = 12.0$ Hz, 1H), 3.53-3.40 (m, 2H), 1.72-1.65(m, 2H), 1.38–1.26 (m, 22H), 0.89-0.86 (m, 3H); $^{13}\text{C NMR}$ (101 MHz, CDCl_3) δ 157.78, 147.77, 141.48, 133.31, 131.12, 130.98, 130.65, 128.97, 128.87, 128.68, 128.13, 127.12, 125.07, 123.32, 121.84, 89.89, 47.68, 39.95, 39.58, 31.99, 31.02, 29.78, 29.73, 29.65, 29.43, 27.78, 22.76, 14.22. **HRMS (ESI)** calcd for $[\text{C}_{35}\text{H}_{46}\text{NOSe}]^+$: 576.2739 ($\text{M}+\text{H}^+$), found: 576.2742.



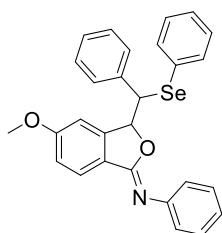
(Z)-N'-(3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)ylidene)benzohydrazide (3zc) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3zc in 88% yield (218.9 mg) as a white solid. **¹H NMR** (400 MHz, DMSO-*d*₆) δ 10.38 (s, 1H), 7.81-7.74 (m, 5H), 7.69-7.66 (m, 1H), 7.59-7.56 (m, 1H), 7.52-7.48 (m, 4H), 7.43-7.38 (m, 4H), 7.34-7.31 (m, 1H), 7.14-7.10 (m, 2H), 7.07-7.04 (m, 1H), 4.24 (d, *J* = 12.0 Hz, 1H), 4.00 (d, *J* = 16.0 Hz, 1H); **¹³C NMR** (101 MHz, DMSO-*d*₆) δ 163.28, 153.58, 147.27, 141.00, 134.02, 131.79, 131.70, 131.46, 130.41, 129.57, 129.01, 128.72, 128.54, 128.37, 128.30, 127.81, 126.78, 125.23, 122.68, 121.81, 93.46, 37.94. **HRMS (ESI)** calcd for [C₂₈H₂₃N₂O₂Se]⁺: 513.0534 (M+H⁺), found: 513.0535.



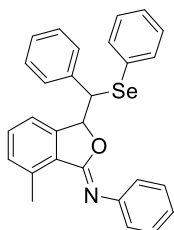
(Z)-3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-one O-methyl oxime (3zd) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3zd in 94% yield (192.3 mg) as a colorless oil. **¹H NMR** (400 MHz, DMSO-*d*₆) δ 7.62-7.58 (m, 4H), 7.44-7.43 (m, 6H), 7.32-7.29 (m, 1H), 7.20-7.17 (m, 3H), 4.08 (d, *J* = 12.0 Hz, 1H), 4.00 (d, *J* = 12.0 Hz, 1H), 3.84 (s, 3H); **¹³C NMR** (101 MHz, DMSO-*d*₆) δ 154.43, 146.06, 141.04, 132.32, 131.19, 130.18, 129.47, 129.05, 128.81, 128.34, 127.90, 126.95, 124.96, 122.77, 121.06, 92.96, 62.07, 37.89. **HRMS (ESI)** calcd for [C₂₂H₂₀NO₂Se]⁺: 410.0654 (M+H⁺), found: 410.0655.



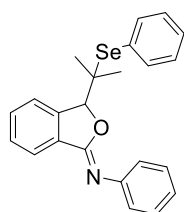
N-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3ze) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3ze in 54% yield (102.2 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.86-7.84 (m, 1H), 7.63-7.53 (m, 3H), 7.42-7.40 (m, 2H), 7.28-7.19 (m, 5H), 7.09-7.03 (m, 3H), 6.01 (t, $J = 4.0$ Hz, 1H), 3.78-3.58 (m, 2H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 157.61, 146.40, 145.60, 132.23, 131.71, 130.84, 129.92, 129.31, 129.18, 128.61, 126.83, 123.68, 123.28, 123.18, 122.47, 82.52, 31.57. **HRMS (ESI)** calcd for $[\text{C}_{21}\text{H}_{18}\text{NOSe}]^+$: 380.0548 ($\text{M}+\text{H}^+$), found: 380.0549.



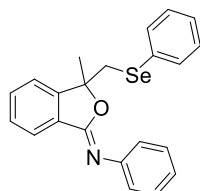
(Z)-5-methoxy-N-phenyl-3-(phenyl(phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3zf) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3zf in 41% yield (100.0 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.52-7.48 (m, 3H), 7.39-7.35 (m, 2H), 7.31-7.25 (m, 8H), 7.10-7.04 (m, 4H), 6.93-6.91 (m, 1H), 6.10 (d, $J = 4.0$ Hz, 1H), 5.32 (d, $J = 3.2$ Hz, 1H), 3.82 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 162.94, 157.24, 146.97, 137.51, 133.24, 129.69, 129.17, 128.22, 127.92, 127.85, 124.81, 124.06, 123.71, 123.35, 116.95, 107.60, 85.74, 56.26, 49.33. **HRMS (ESI)** calcd for $[\text{C}_{28}\text{H}_{23}\text{KNOSe}]^+$: 524.0526 ($\text{M}+\text{K}^+$), found: 524.0527.



(Z)-7-methyl-N-phenyl-3-(phenyl(phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3zg) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3zg in 36% yield (84.3 mg) as a colorless oil. ¹H NMR (400 MHz, DMSO-*d*₆) δ 7.52-7.48 (m, 4H), 7.38-7.34 (m, 2H), 7.27-7.20 (m, 8H), 7.13-7.07 (m, 4H), 6.11 (d, *J* = 4.0 Hz, 1H), 5.22 (d, *J* = 4.0 Hz, 1H), 2.36 (s, 3H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 157.07, 146.41, 144.58, 142.22, 137.29, 132.96, 130.14, 129.35, 129.30, 129.20, 128.77, 128.23, 127.88, 127.56, 127.43, 123.84, 123.36, 122.87, 85.55, 49.32, 21.53. HRMS (ESI) calcd for [C₂₈H₂₄NOSe]⁺: 470.1018 (M+H⁺), found: 470.1019.

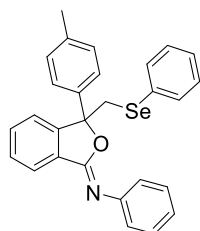


(Z)-N-phenyl-3-(2-(phenylselanyl)propan-2-yl)isobenzofuran-1(3H)-imine (3zh) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3zh in 49% yield (130.0 mg) as a colorless oil. ¹H NMR (400 MHz, DMSO-*d*₆) δ 8.05-8.03 (m, 1H), 7.36-7.27 (m, 8H), 7.22-7.18 (m, 2H), 7.06-7.00 (m, 3H), 4.84 (s, 1H), 1.56 (s, 3H), 1.30 (s, 3H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 150.81, 146.86, 138.29, 135.87, 131.13, 129.02, 128.49, 128.36, 128.16, 127.71, 127.51, 127.39, 126.25, 123.24, 122.88, 80.15, 50.21, 28.22, 26.36. HRMS (ESI) calcd for [C₂₃H₂₂NOSe]⁺: 408.0861 (M+H⁺), found: 408.0862.



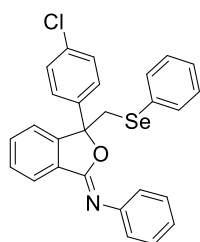
(Z)-3-methyl-N-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3zi) Prepared according to general condition, after work-up, but at a constant current of 40 mA for 4 h, the crude residue was purified by flash column chromatography on silica

gel (petroleum ether: ethyl acetate = 100:1) to give 3zi in 67% yield (131.67 mg) as a colorless oil. **¹H NMR** (400 MHz, CDCl₃) δ 7.95 (d, *J* = 8.0 Hz, 1H), 7.47-7.43 (m, 1H), 7.41-7.37 (m, 1H), 7.33-7.24 (m, 6H), 7.18-7.13 (m, 2H), 7.11-7.06 (m, 3H), 3.48-3.41 (m, 2H), 1.72 (s, 1H); **¹³C NMR** (101 MHz, CDCl₃) δ 157.45, 148.90, 146.68, 133.36, 131.83, 131.42, 130.37, 129.15, 129.00, 128.63, 127.27, 123.97, 123.93, 123.76, 120.82, 88.95, 39.49, 26.40.



(Z)-N-phenyl-3-((phenylselanyl)methyl)-3-(p-tolyl)isobenzofuran-1(3H)-imine

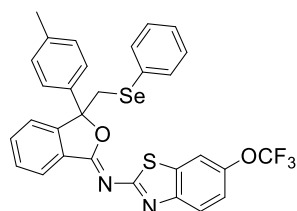
(3zj) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3zj in 87% yield (203.8 mg) as a colorless oil. **¹H NMR** (400 MHz, DMSO-*d*₆) δ 7.87-7.86 (m, 1H), 7.65-7.63 (m, 1H), 7.52 (s, 1.96), 7.44-7.42 (m, 2H), 7.34-7.27 (m, 4H), 7.19-7.06 (m, 8H), 4.15 (d, *J* = 16.0 Hz, 1H), 4.02 (d, *J* = 12.0 Hz, 1H), 2.24 (s, 3H); **¹³C NMR** (101 MHz, DMSO-*d*₆) δ 156.61, 148.42, 146.23, 138.13, 137.64, 132.44, 131.79, 130.16, 130.09, 129.40, 129.33, 129.03, 128.73, 126.78, 124.88, 123.88, 123.33, 122.52, 91.50, 37.49, 20.63. **HRMS (ESI)** calcd for [C₂₈H₂₄N₂OSe]⁺: 470.1018 (M+H⁺), found:470.1019.



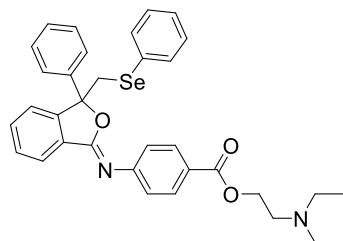
3-(4-Chlorophenyl)-N-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-

imi-ne (3zk) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3d in 85% yield (207.8 mg) as a colorless oil. **¹H NMR** (400 MHz, DMSO-*d*₆) δ 7.88-7.86 (m, 1H), 7.70-7.68 (m, 1H), 7.60-7.51 (m, 4H),

7.45-7.43 (m, 2H), 7.34-7.27 (m, 4H), 7.18-7.07 (m, 6H), 4.17 (d, $J = 16.0$ Hz, 1H), 4.05 (d, $J = 16.0$ Hz, 1H); ^{13}C NMR (101 MHz, $\text{DMSO-}d_6$) δ 156.25, 147.92, 146.04, 140.06, 133.07, 132.66, 131.84, 129.96, 129.68, 129.06, 128.83, 128.79, 126.96, 126.86, 124.03, 123.44, 123.34, 122.54, 91.08, 37.23. **HRMS (ESI)** calcd for $[\text{C}_{30}\text{H}_{22}\text{F}_3\text{N}_2\text{OSSe}]^+$: 611.0519 ($\text{M}+\text{H}^+$), found: 611.0521.

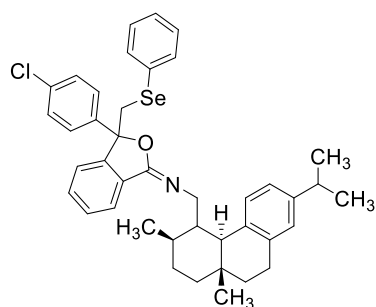


(Z)-3-((phenylselanyl)methyl)-3-(p-tolyl)-N-(6(trifluoromethoxy)benzo[d]thiazol-2-yl)isobenzofuran-1(3H)-imine (3zl) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3d in 53% yield (161.7 mg) as a colorless oil. ^1H NMR (400 MHz, $\text{DMSO-}d_6$) δ 8.10 (d, $J = 0.16$ Hz, 1H), 8.01-7.95 (m, 2H), 7.78-7.77 (m, 1H), 7.49-7.39 (m, 5H), 7.69-7.61 (m, 2H), 7.58-7.54 (m, 2H), 7.47-7.45 (m, 1H), 7.32-7.30 (m, 2H), 7.24-7.22 (m, 2H), 7.03-6.94 (m, 3H), 4.30 (d, $J = 12.0$ Hz, 1H), 4.16 (d, $J = 12.0$ Hz, 1H); 2.28 (s, 3H); ^{13}C NMR (101 MHz, $\text{DMSO-}d_6$) δ 165.53, 163.19, 149.25, 149.08, 144.84, 138.25, 136.50, 135.71, 134.23, 132.20, 130.15, 129.60, 129.52, 128.90, 128.78, 126.81, 125.05, 124.20, 123.09, 122.96, 119.88, 114.90, 95.76, 37.51, 20.68. ^{19}F NMR (376 MHz, $\text{DMSO-}d_6$) δ -56.96. **HRMS (ESI)** calcd for $[\text{C}_{34}\text{H}_{35}\text{N}_2\text{O}_3\text{Se}]^+$: 599.1807 ($\text{M}+\text{H}^+$), found: 599.1810.



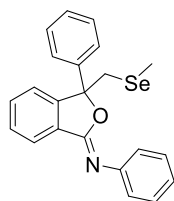
2-(diethylamino)ethyl(Z)-4-((3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-ylidene)amino)benzoate (3zm) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3zm in 45% yield (134.5 mg) as a

colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.90-7.85 (m, 3H), 7.72-7.70 (m, 1H), 7.61-7.53 (m, 4H), 7.39-7.29 (m, 5H), 7.18-7.11 (m, 5H), 4.29 (t, $J = 12.0$ Hz, 2H), 4.22 (d, $J = 12.0$ Hz, 1H), 4.04 (d, $J = 12.0$ Hz, 1H), 2.76 (t, $J = 12.0$ Hz, 2H), 2.54 (d, $J = 8.0$ Hz, 4H); 0.97 (t, $J = 8.0$ Hz, 6H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 165.58, 157.72, 151.13, 148.60, 140.77, 132.98, 131.62, 130.08, 129.65, 129.03, 128.89, 128.36, 126.74, 125.05, 124.92, 123.56, 123.09, 122.66, 92.09, 62.96, 50.83, 47.10, 37.23, 23.14, 19.31, 13.58, 12.13. **HRMS (ESI)** calcd for $[\text{C}_{34}\text{H}_{35}\text{N}_2\text{O}_3\text{Se}]^+$: 599.1807 ($\text{M}+\text{H}^+$), found: 599.1810.



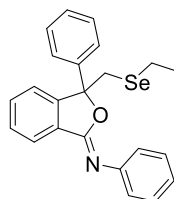
(Z)-3-(4-chlorophenyl)-N-(((4S,4aR,10aS)-7-isopropyl-4,10a-dimethyl-1,2,3,4,4a,9,10,10a-octahydrophenanthren-4-yl)methyl)-3-

((phenylselanyl)methyl)isobenzofuran-1(3H)-imine (3zn) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 3zn in 34% yield (116.0 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.68-7.58 (m, 4H), 7.50-7.36 (m, 6H), 7.22-7.12 (m, 4H), 6.94-6.91 (m, 1H), 6.77-6.74 (m, 1H), 4.09-4.00 (m, 2H), 3.28 (d, $J = 12.0$ Hz, 1H), 3.00 (d, $J = 12.0$ Hz, 1H), 2.77-2.69 (m, 2H), 2.25-2.20 (m, 1H), 1.76-1.49 (m, 6H), 1.38-1.22 (m, 3H), 1.14-1.11 (m, 8H), 0.91-0.89 (m, 3H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 156.04, 144.88, 140.98, 134.62, 132.83, 131.72, 131.56, 131.37, 130.52, 129.34, 129.06, 128.75, 126.93, 126.65, 124.35, 122.68, 89.38, 57.68, 44.63, 40.23, 40.02, 39.81, 39.60, 39.39, 39.18, 38.97, 38.35, 37.13, 36.99, 33.00, 30.16, 25.35, 24.06, 19.49, 18.65, 18.26; **HRMS (ESI)** calcd for $[\text{C}_{41}\text{H}_{45}\text{ClINOSe}]^+$: 682.2349 ($\text{M}+\text{H}^+$), found: 682.2348.



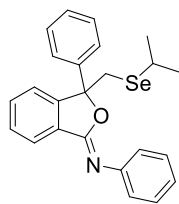
(Z)-3-((methylselanyl)methyl)-N,3-diphenylisobenzofuran-1(3H)-imine

(4a) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 4a in 48% yield (94.2 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.88 (d, $J = 8.0$ Hz, 1H), 7.75 (d, $J = 4.0$ Hz, 1H), 7.63 (t, $J = 8.0$ Hz, 1H), 7.58-7.53 (m, 3H), 7.40-7.28 (m, 7H), 7.10 (t, $J = 8.0$ Hz, 1H), 3.76 (d, $J = 12.0$ Hz, 1H), 3.60 (d, $J = 12.0$ Hz, 1H), 1.72 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 156.87, 148.72, 146.57, 141.42, 132.50, 130.16, 129.40, 128.86, 128.79, 128.12, 124.88, 123.91, 123.36, 123.18, 122.61, 92.27, 35.20, 5.93. **HRMS (ESI)** calcd for $[\text{C}_{22}\text{H}_{19}\text{NOSe}]^+$: 394.0705 ($\text{M}+\text{H}^+$), found: 394.0706.



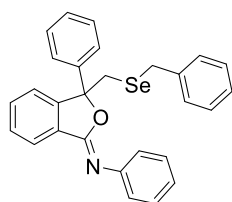
(Z)-3-((ethylselanyl)methyl)-N,3-diphenylisobenzofuran-1(3H)-imine

(4b) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 4b in 80% yield (163.0 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.87 (d, $J = 8.0$ Hz, 1H), 7.77-7.75 (m, 2H), 7.65-7.61 (m, 1H), 7.59-7.53 (m, 3H), 7.40-7.35 (m, 4H), 7.32-7.28 (m, 3H), 7.12-7.08 (m, 1H), 3.75 (d, $J = 16.0$ Hz, 1H), 3.60 (d, $J = 16.0$ Hz, 1H), 2.38-2.24 (m, 2H), 1.09 (t, $J = 8.0$ Hz, 3H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 156.89, 148.82, 146.59, 141.48, 132.54, 130.13, 129.41, 128.84, 128.80, 128.12, 124.90, 123.90, 123.35, 123.15, 122.54, 92.10, 33.17, 18.54, 15.65. **HRMS (ESI)** calcd for $[\text{C}_{23}\text{H}_{22}\text{NOSe}]^+$: 408.0861 ($\text{M}+\text{H}^+$), found: 408.0862.



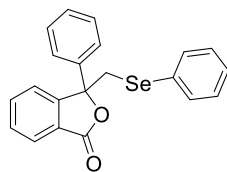
(Z)-3-((isopropylselanyl)methyl)-N,3-diphenylisobenzofuran-1(3H)-imine (4c)

Prepared according to general condition, but at a constant current of 20 mA for 6 h, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 4c in 38% yield (79.9 mg) as a colorless oil. ¹H NMR (400 MHz, DMSO-*d*₆) δ 7.86 (d, *J* = 8.0 Hz, 1H), 7.78-7.76 (m, 1H), 7.65-7.54 (m, 4H), 7.40-7.30 (m, 7H), 7.12-7.08 (m, 1H), 3.74 (d, *J* = 12.0 Hz, 1H), 3.62 (d, *J* = 12.0 Hz, 1H), 2.90-2.80 (m, 1H), 1.18 (dd, *J* = 8.0 Hz, *J* = 12.0 Hz, 3H), 1.09 (dd, *J* = 8.0 Hz, *J* = 16.0 Hz, 3H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 156.86, 148.87, 146.56, 141.52, 132.54, 130.09, 129.39, 128.80, 128.11, 124.91, 123.90, 123.32, 123.17, 122.52, 91.96, 32.70, 30.12, 24.59, 24.39. HRMS (ESI) calcd for [C₂₂H₁₉NOSe]⁺: 394.0705 (M+H⁺), found: 394.0706.

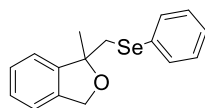


(Z)-3-((benzylselanyl)methyl)-N,3-diphenylisobenzofuran-1(3H)-imine (4d)

Prepared according to general condition, but at a constant current of 20 mA for 6 h, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 4d in 78% yield (182.7 mg) as a colorless oil. ¹H NMR (400 MHz, DMSO-*d*₆) δ 7.93-7.91 (m, 1H), 7.74-7.72 (m, 1H), 7.65-7.54 (m, 4H), 7.41-7.29 (m, 7H), 7.21-7.08 (m, 4H), 7.03-7.02 (m, 2H), 3.71-3.64 (m, 2H), 3.56-3.49 (m, 2H); ¹³C NMR (101 MHz, DMSO-*d*₆) δ 156.84, 148.72, 146.52, 141.38, 138.89, 132.63, 130.15, 129.45, 128.89, 128.85, 128.79, 128.38, 128.17, 126.65, 124.86, 124.00, 123.41, 123.24, 122.55, 92.31, 33.67, 28.05. HRMS (ESI) calcd for [C₂₈H₂₄NOSe]⁺: 470.1018 (M+H⁺), found: 470.1019.



3-phenyl-3-((phenylselanyl)methyl)isobenzofuran-1(3H)-one (5a) Prepared according to general condition, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 5a in 91% yield (172.5 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.86 (d, $J = 4.0$, 1H), 7.72-7.70 (m, 1H), 7.64-7.52 (m, 4H), 7.40-7.30 (m, 5H), 7.19-7.14 (m, 3H), 4.20 (d, $J = 12.0$ Hz, 1H), 4.02 (d, $J = 12.0$ Hz, 1H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 169.01, 151.31, 139.94, 134.63, 132.12, 130.00, 129.89, 129.10, 128.94, 128.56, 127.05, 125.32, 125.16, 125.07, 123.16, 88.43, 37.45. **HRMS (ESI)** calcd for $[\text{C}_{21}\text{H}_{16}\text{NNaOSe}]^+$: 403.0208 ($\text{M}+\text{Na}^+$), found: 403.0209.



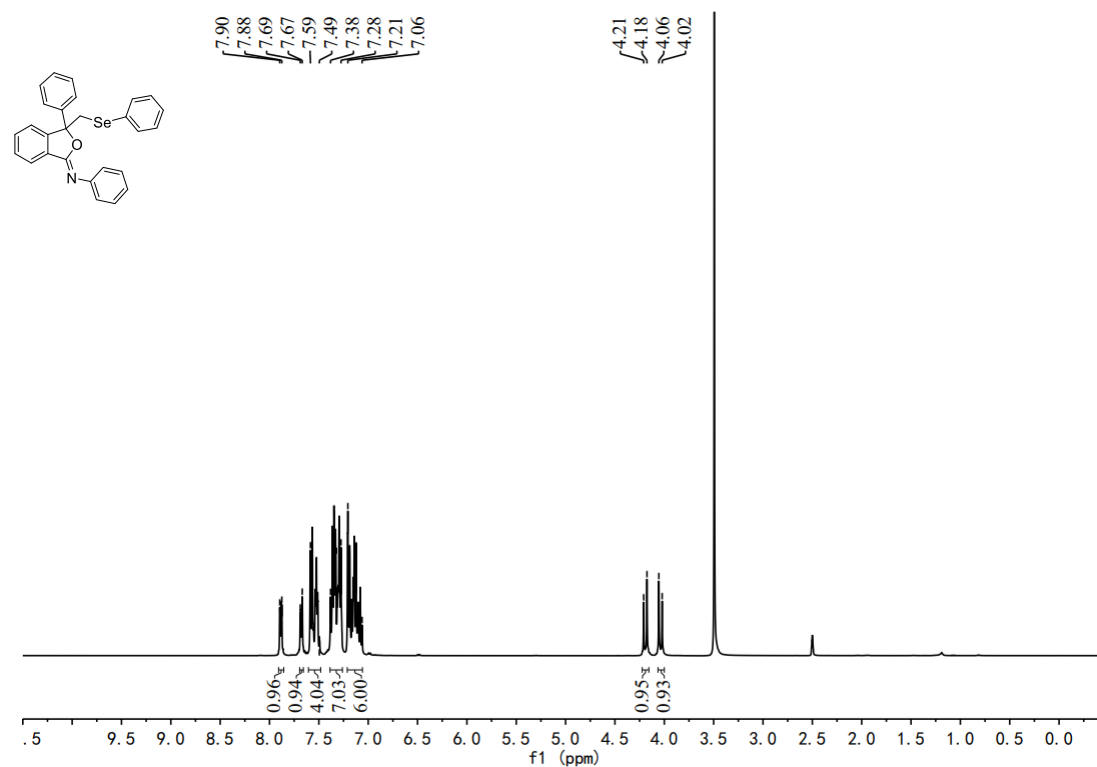
1-phenyl-1-((phenylselanyl)methyl)-1,3,3a,4-tetrahydroisobenzofuran (8a) Prepared according to general condition, but at a constant current of 20 mA for 4 h, after work-up, the crude residue was purified by flash column chromatography on silica gel (petroleum ether: ethyl acetate = 100:1) to give 8a in 82% yield (150.6 mg) as a colorless oil. $^1\text{H NMR}$ (400 MHz, $\text{DMSO-}d_6$) δ 7.42-7.39 (m, 2H), 7.31-1.18 (m, 7H), 5.00 (dd, $J = 12.0$ Hz, $J = 16.0$ Hz, 2H), 3.44 (s, 3H); $^{13}\text{C NMR}$ (101 MHz, $\text{DMSO-}d_6$) δ 144.34, 138.92, 131.38, 131.25, 129.02, 127.70, 127.30, 126.29, 121.20, 121.07, 87.21, 71.35, 27.04. **HRMS (ESI)** calcd for $[\text{C}_{16}\text{H}_{16}\text{KOSe}]^+$: 342.9998 ($\text{M}+\text{K}^+$), found: 342.9998.

References

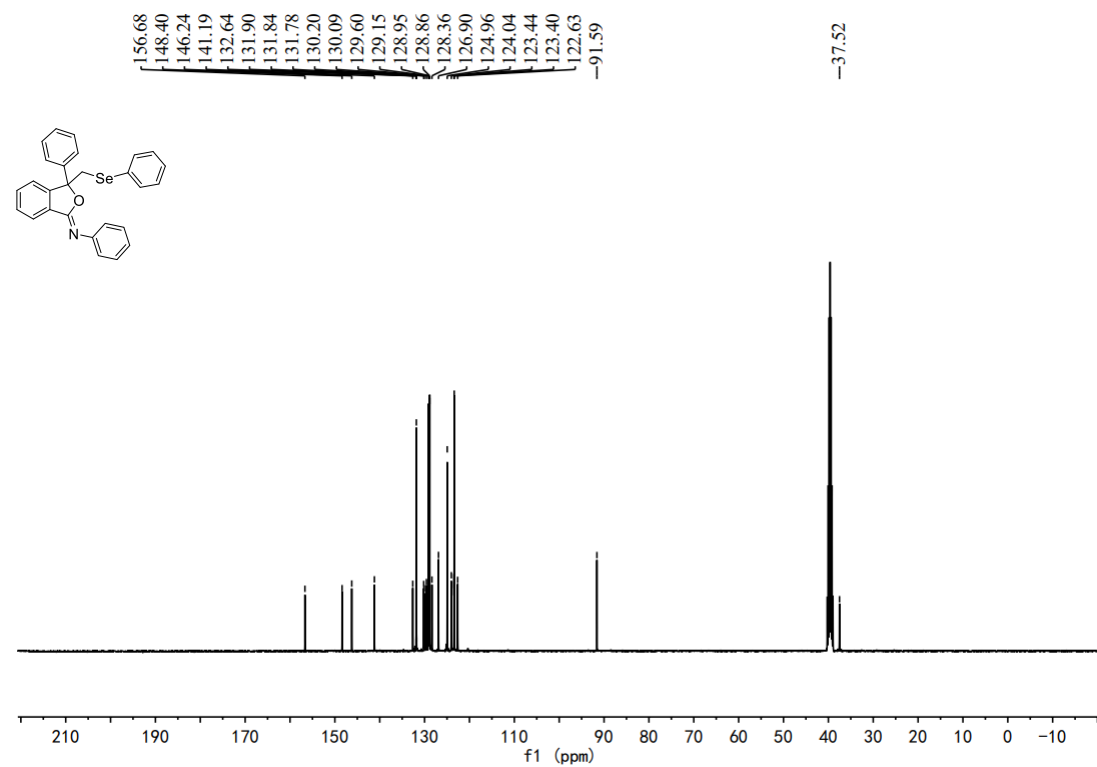
- (1) J. Guo, Y. Hao, G. Li, Z. Wang, Y. Liu, Y. Li and Q. Wang, *Org. Biomol. Chem.*, **2020**, 18, 1994-2001.
- (2) J. Li, R. Oost, B. Maryasin, L. González, N. Maulide, *Nat. Commun.*, **2019**, 10, 2327.
- (3) B. N. Hemric, K. Shen, and Q. Wang, *J. Am. Chem. Soc.*, **2016**, 138, 18, 5813-5816.
- (4) Z. Liu, Q. Zhao, J. Chen, Q. Tang, J. Chen, W. Xiao, *Adv. Synth. Catal.*, **2018**, 360, 11, 2087-2092.
- (5) C. Xu and Q. Shen, *Org. Lett.*, **2015**, 17, 18, 4561-4563.
- (6) G. C. Senadi, B. Guo, W. Hu and J. Wang, *Chem. Commun.*, **2016**, 52, 11410-11413.

Copies of ^1H NMR, ^{13}C NMR and ^{19}F NMR spectra

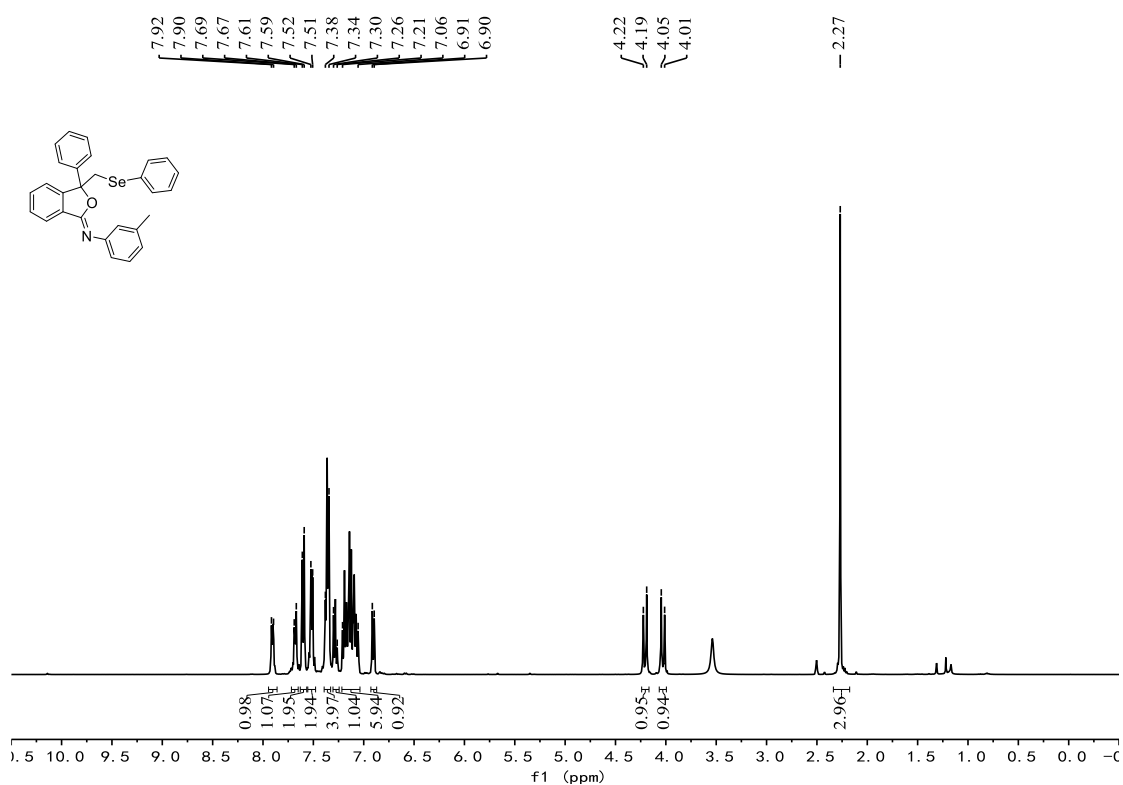
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21072401) of compound **3a**



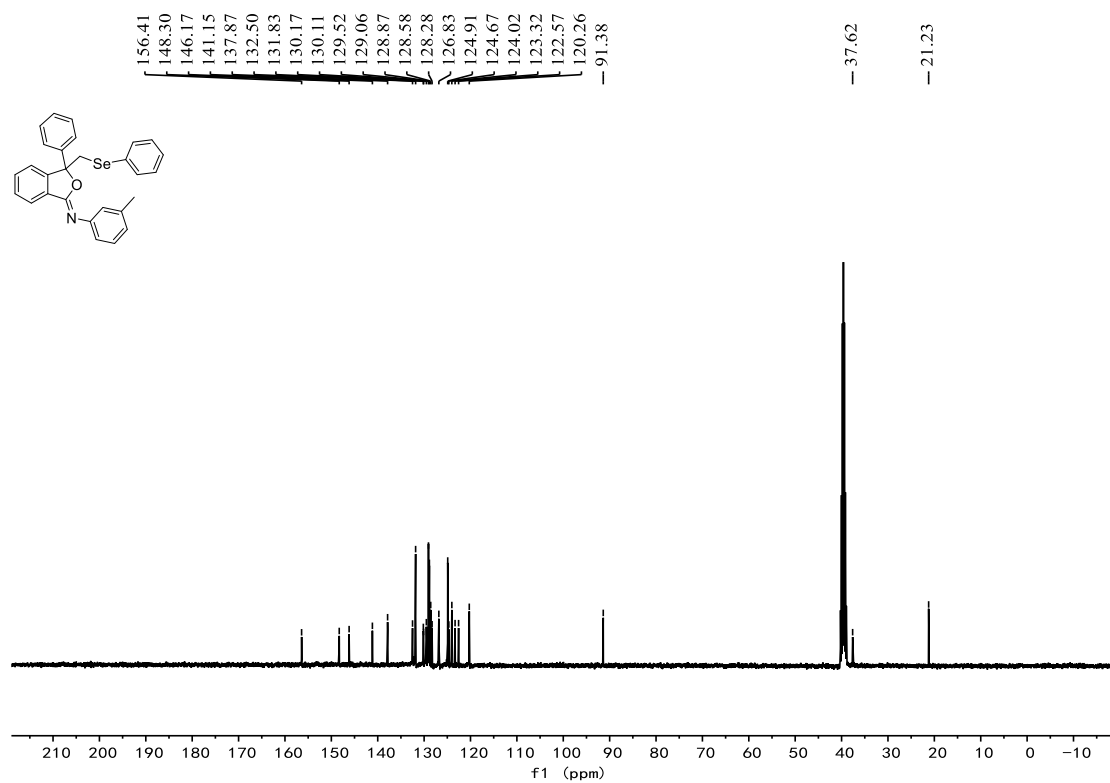
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21072401) of compound **3a**



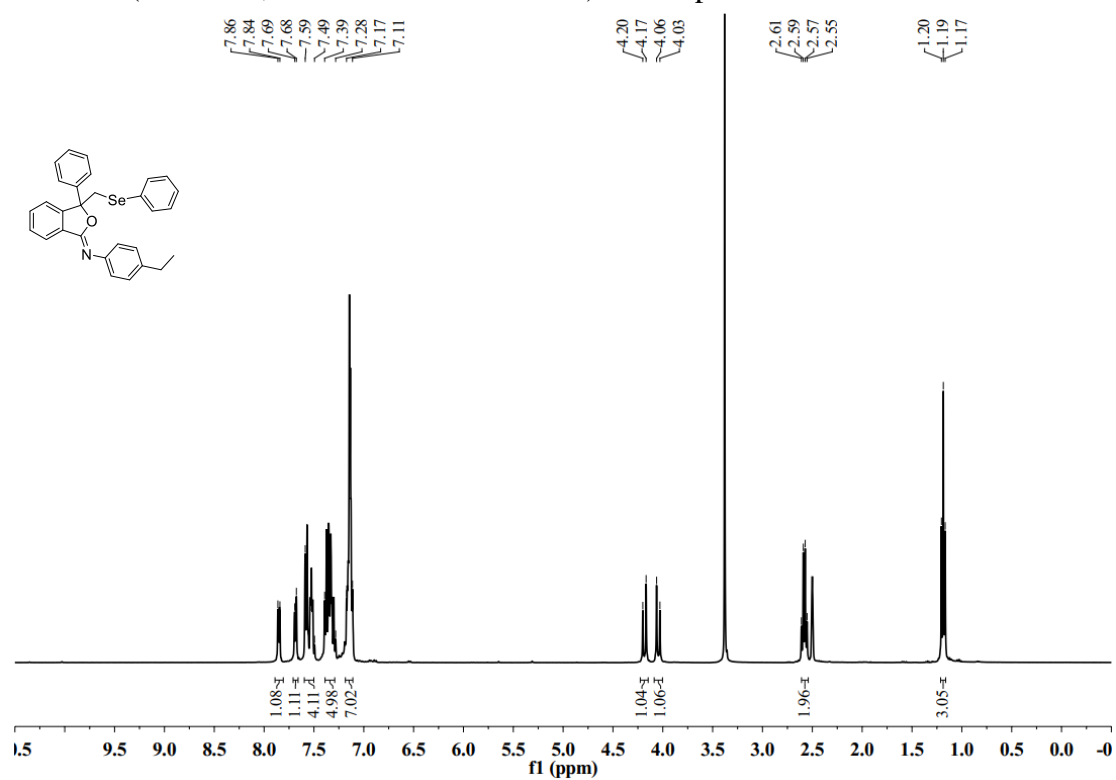
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21061910) of compound **3b**



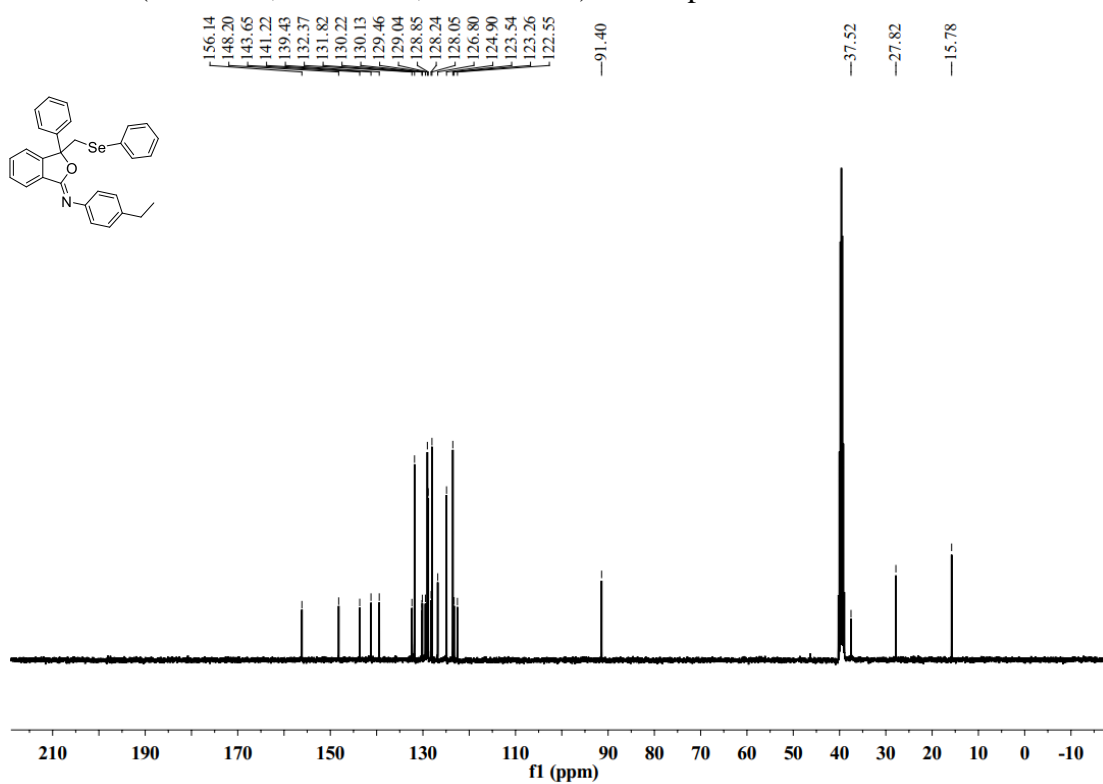
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21061910) of compound **3b**



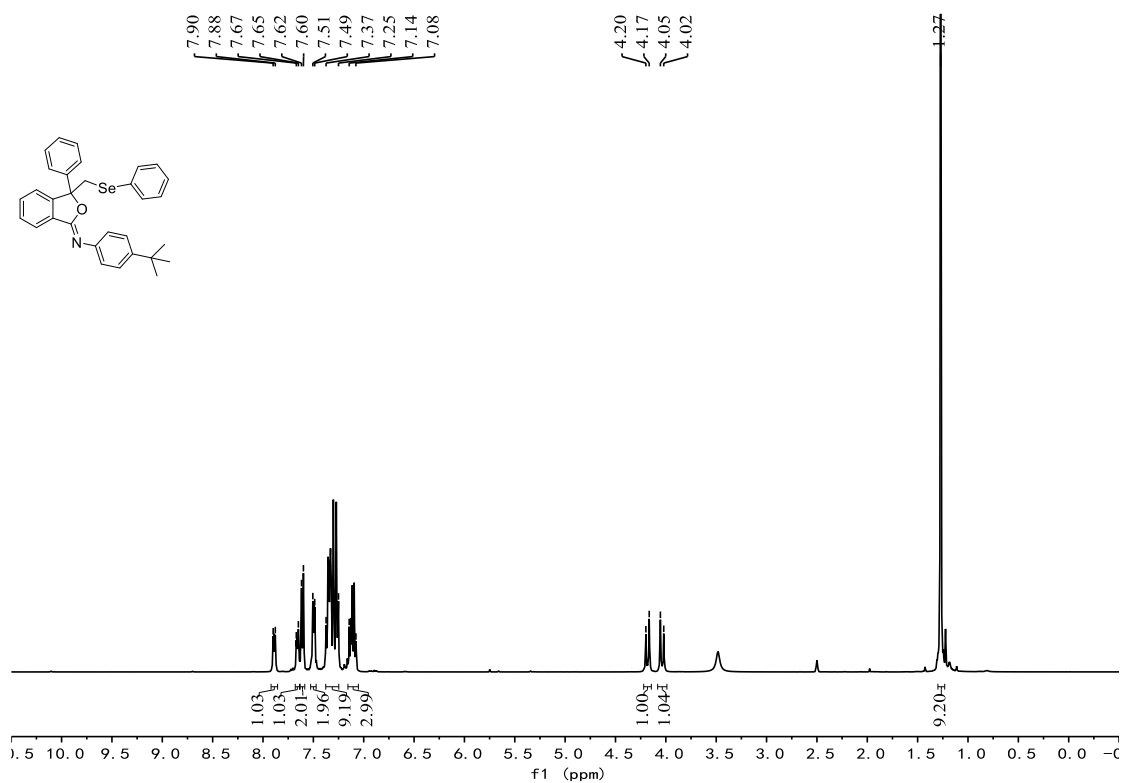
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH-186-4) of compound **3c**



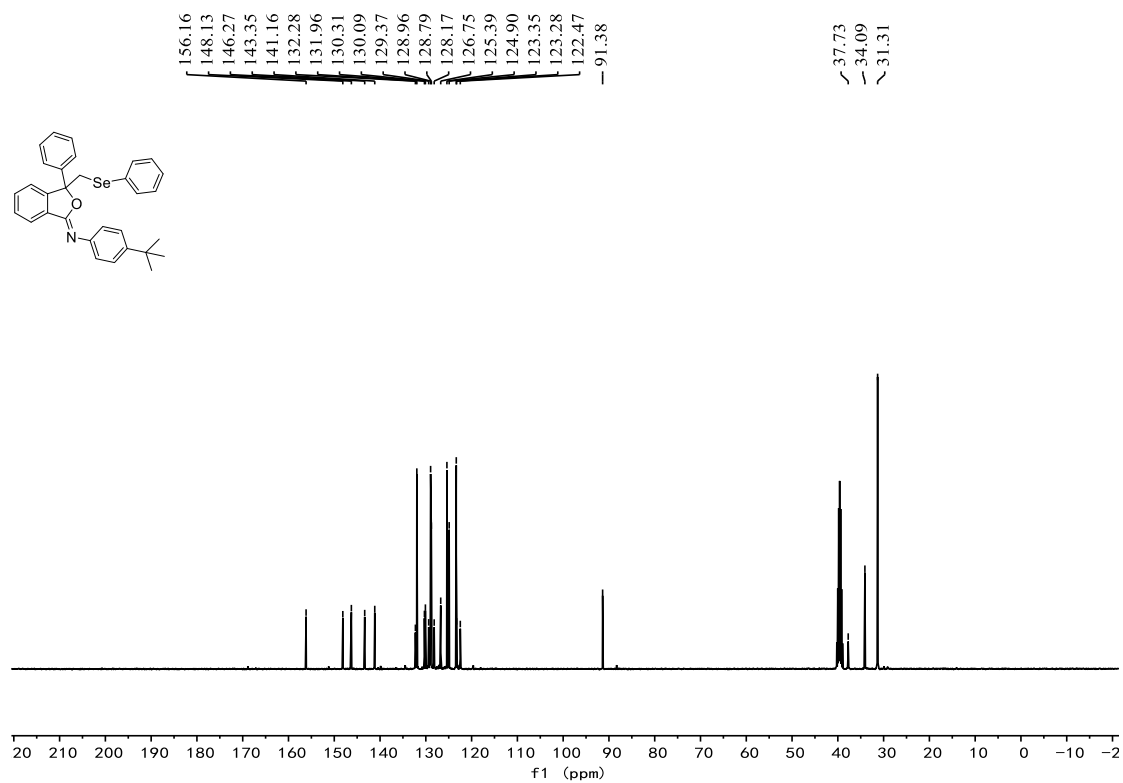
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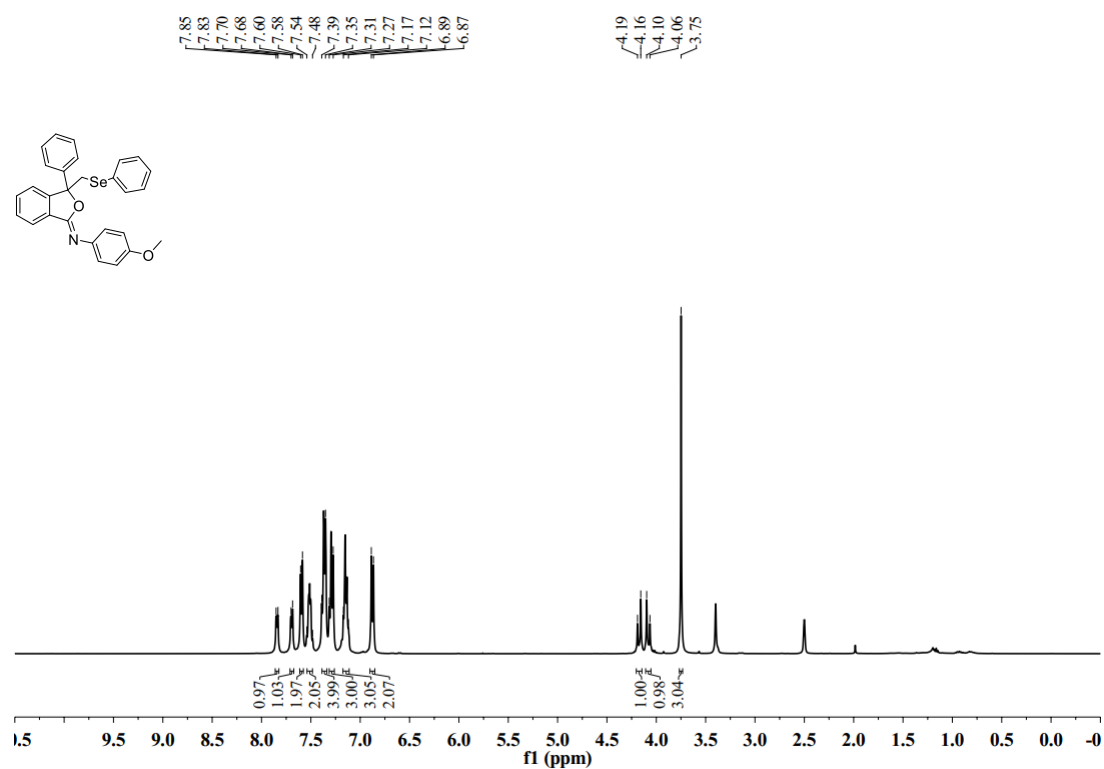
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21052402) of compound **3d**



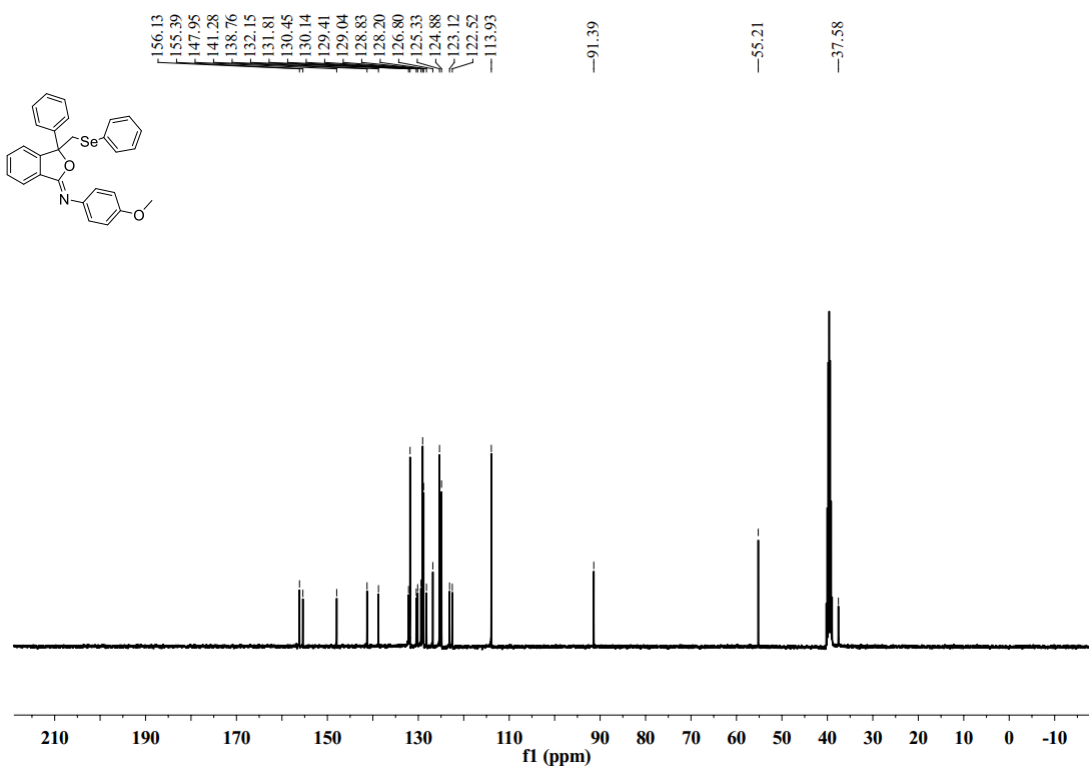
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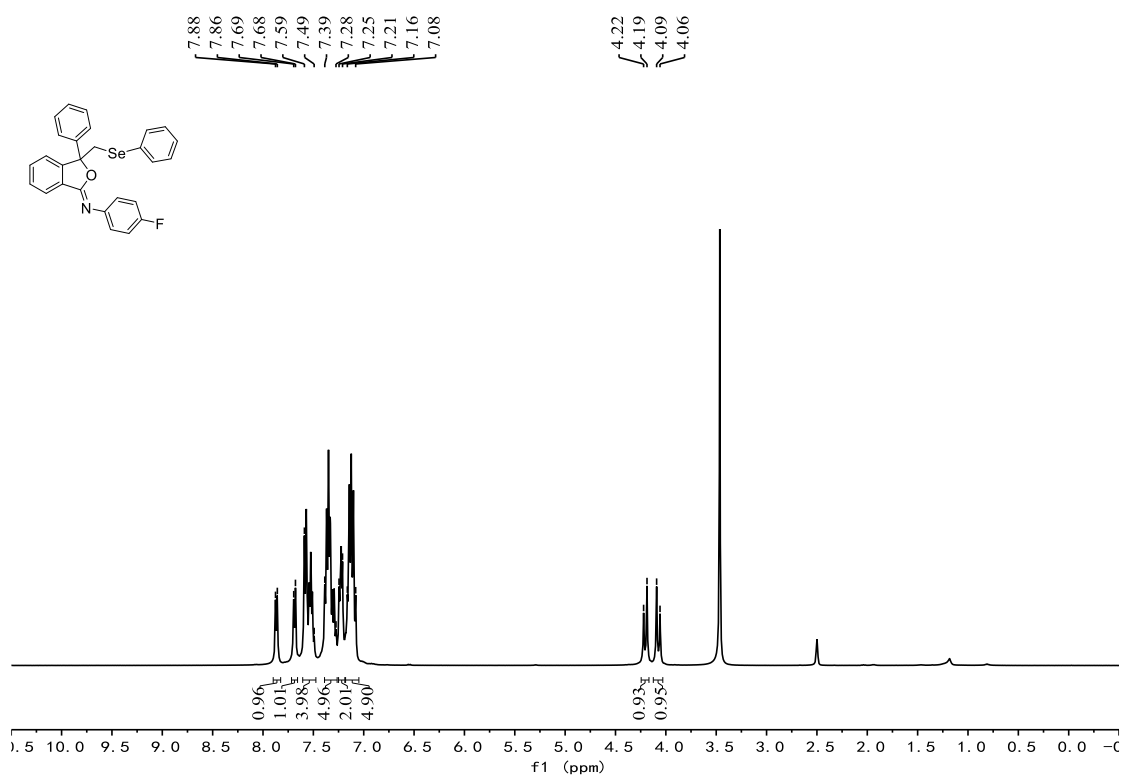
¹H NMR (400 MHz, DMSO-*d*₆, LLH-71-2) of compound **3e**



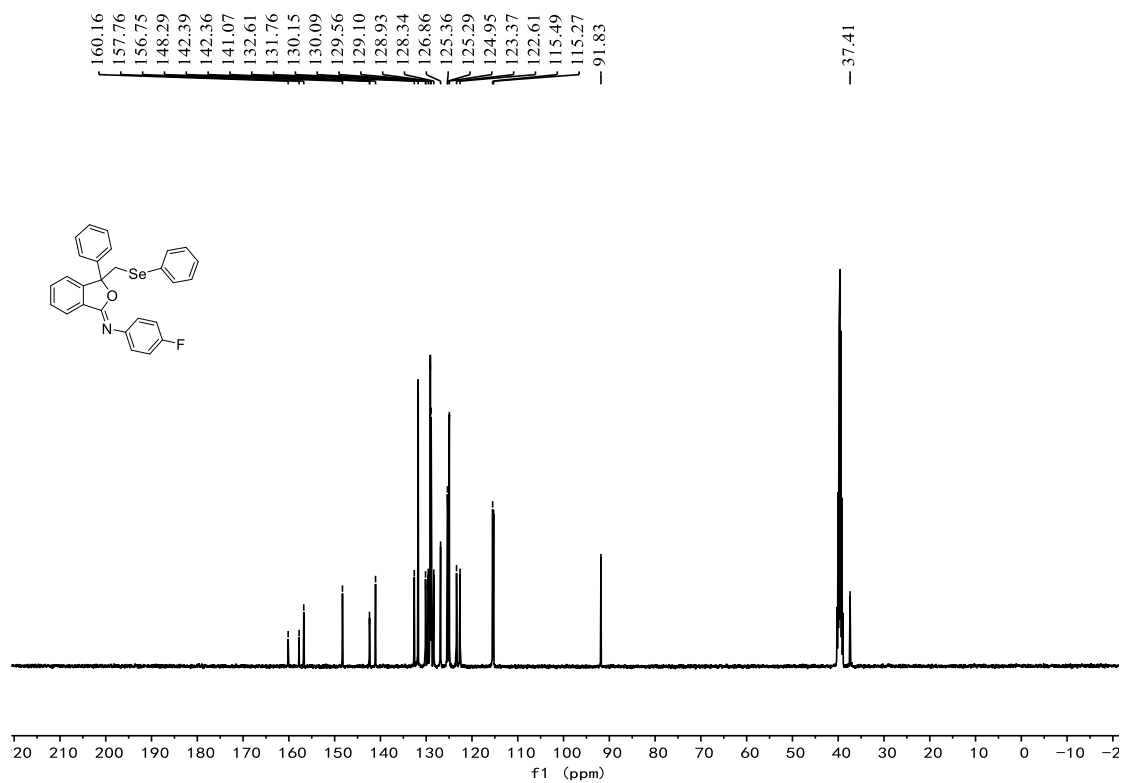
¹³C NMR (101 MHz, DMSO-*d*₆, LLH-71-2) of compound **3e**



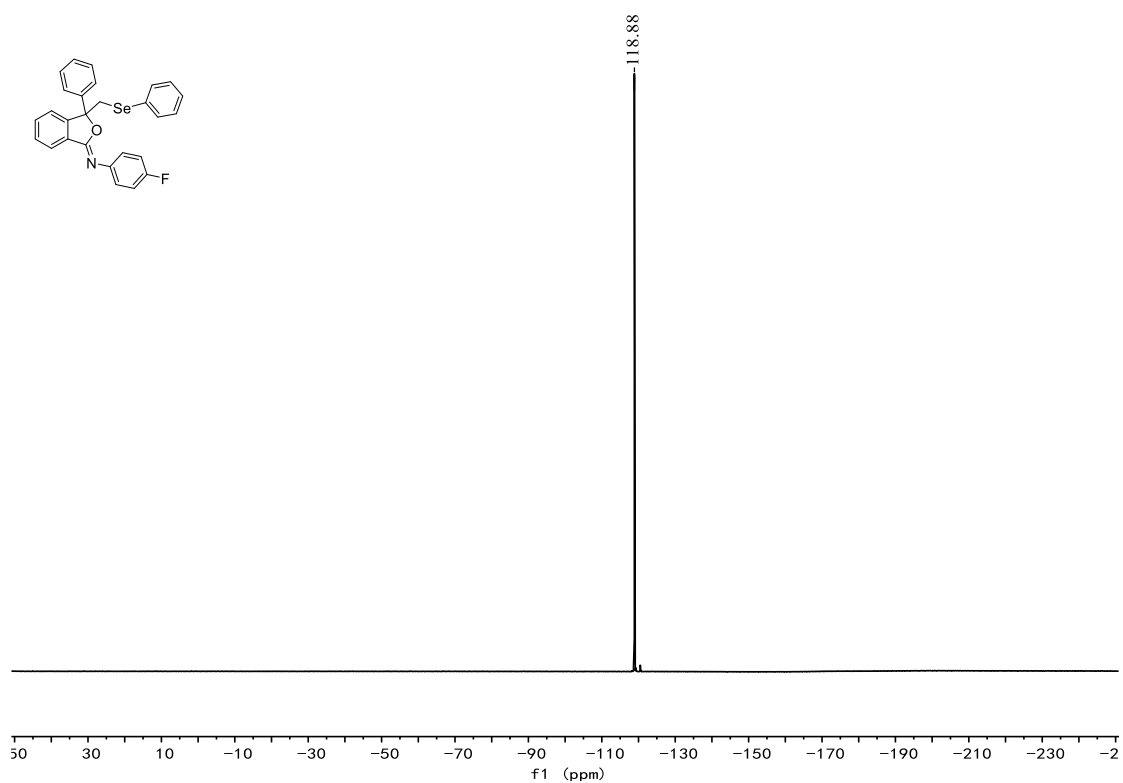
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21072701) of compound **3f**



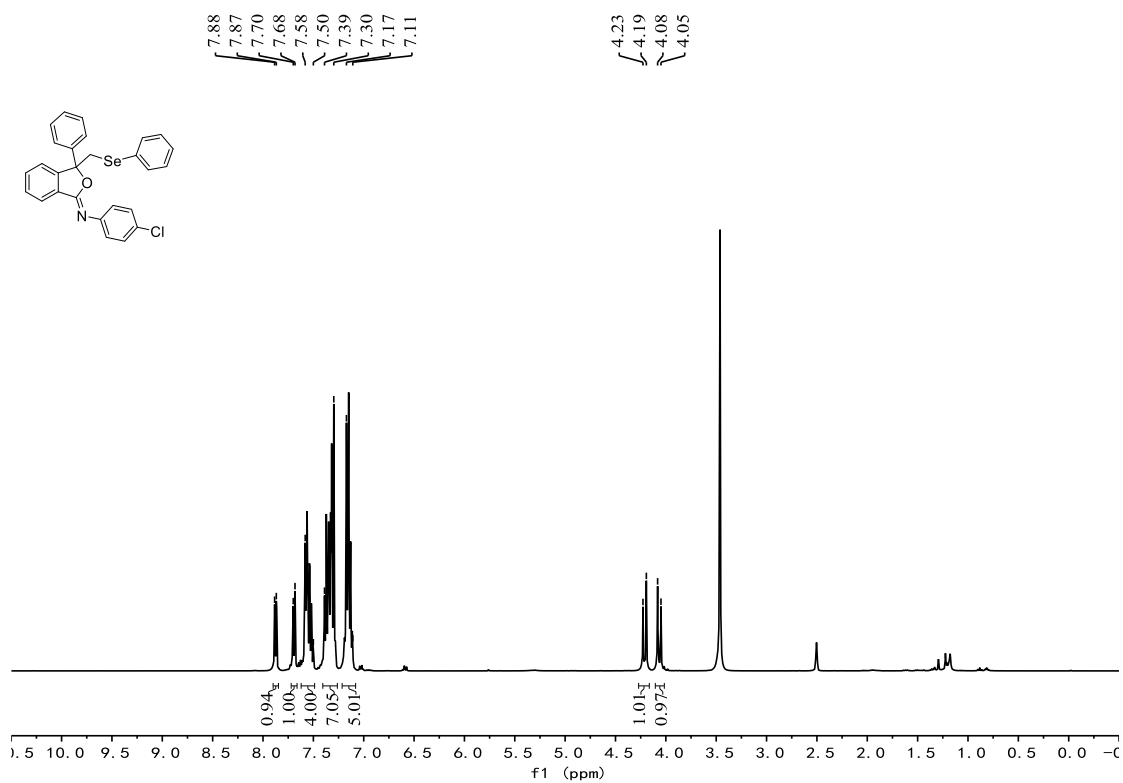
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21072701) of compound **3f**



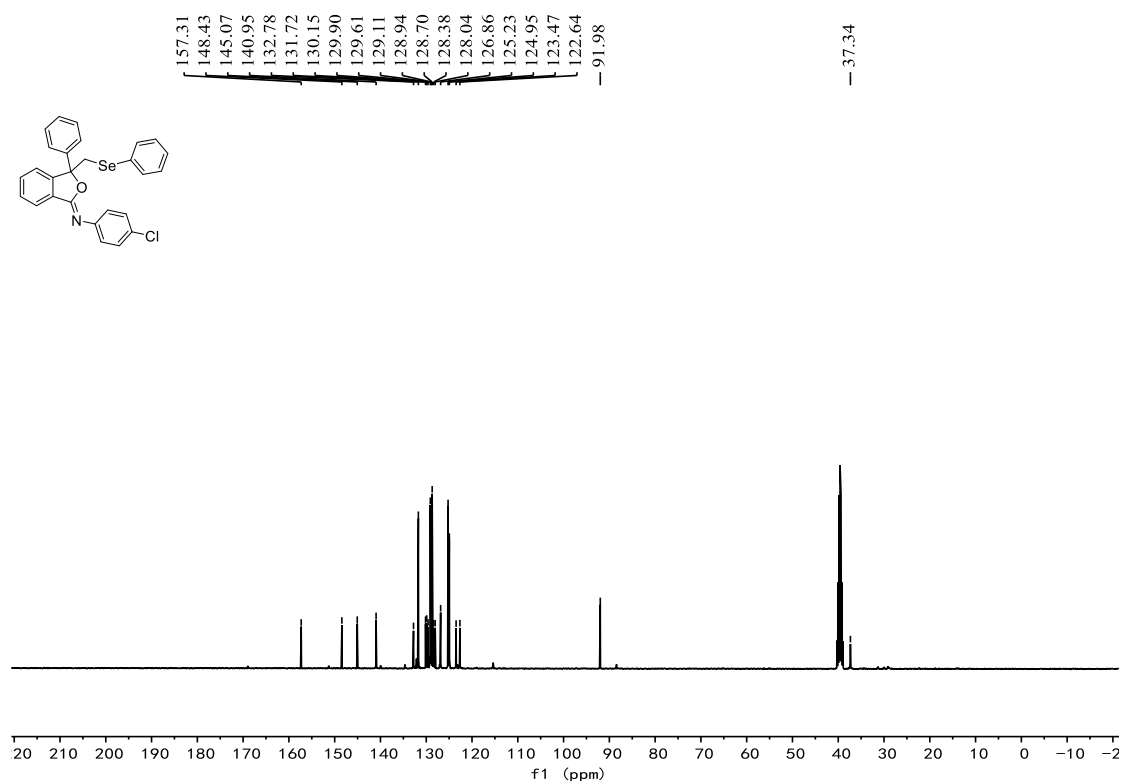
^{19}F NMR (376 MHz, $\text{DMSO-}d_6$, LLH21072701) of compound **3f**



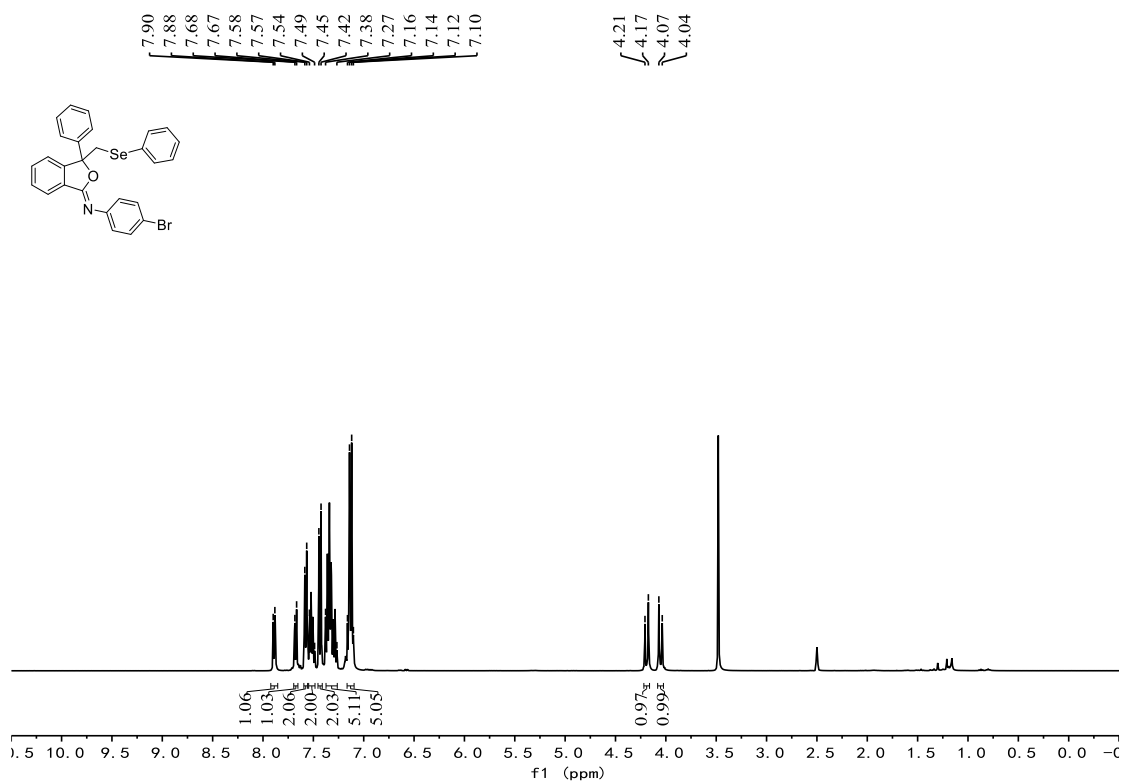
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21061907) of compound **3g**



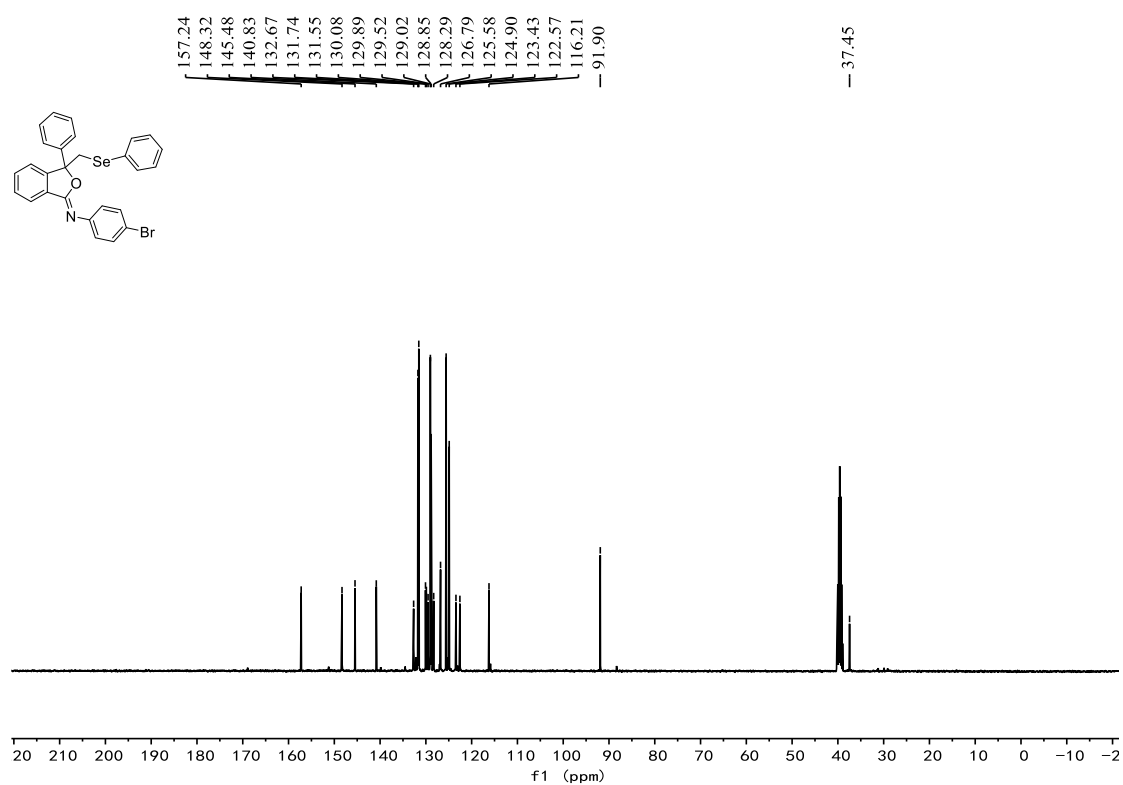
^{13}C NMR (101 MHz, DMSO- d_6 , LLH21061907) of compound **3g**



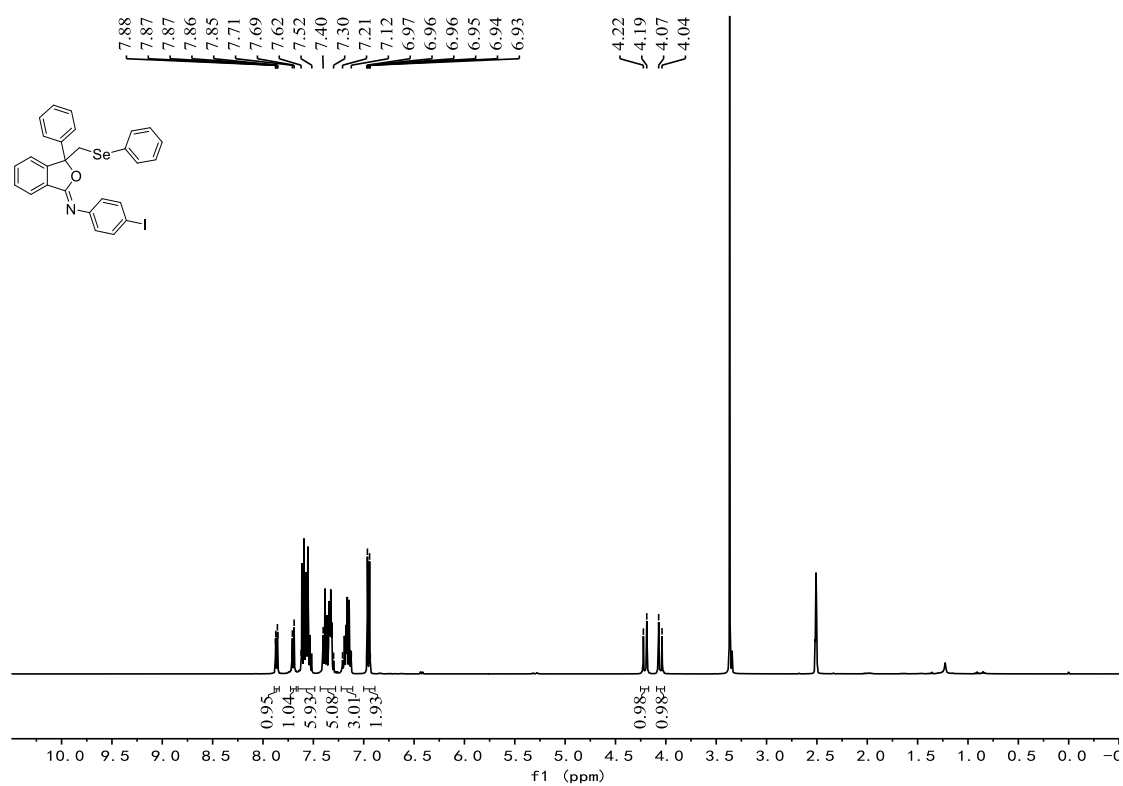
^1H NMR (400 MHz, DMSO- d_6 , LLH21061907) of compound **3h**



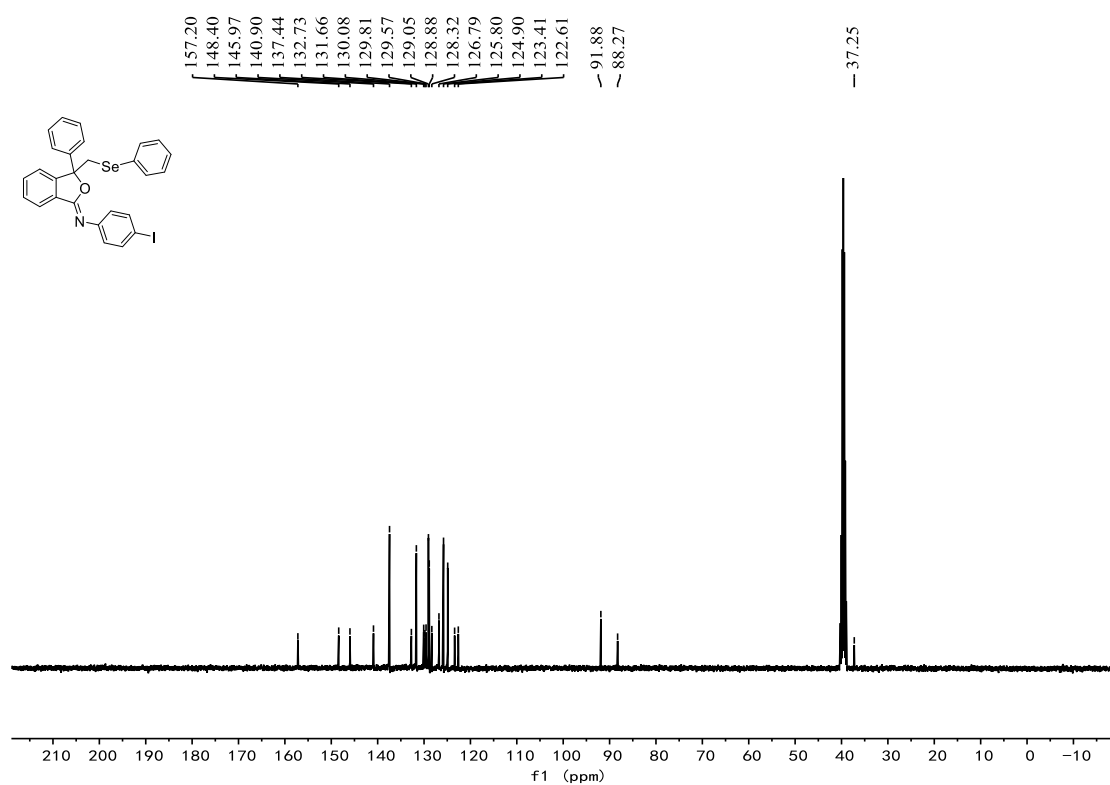
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21071605) of compound **3h**



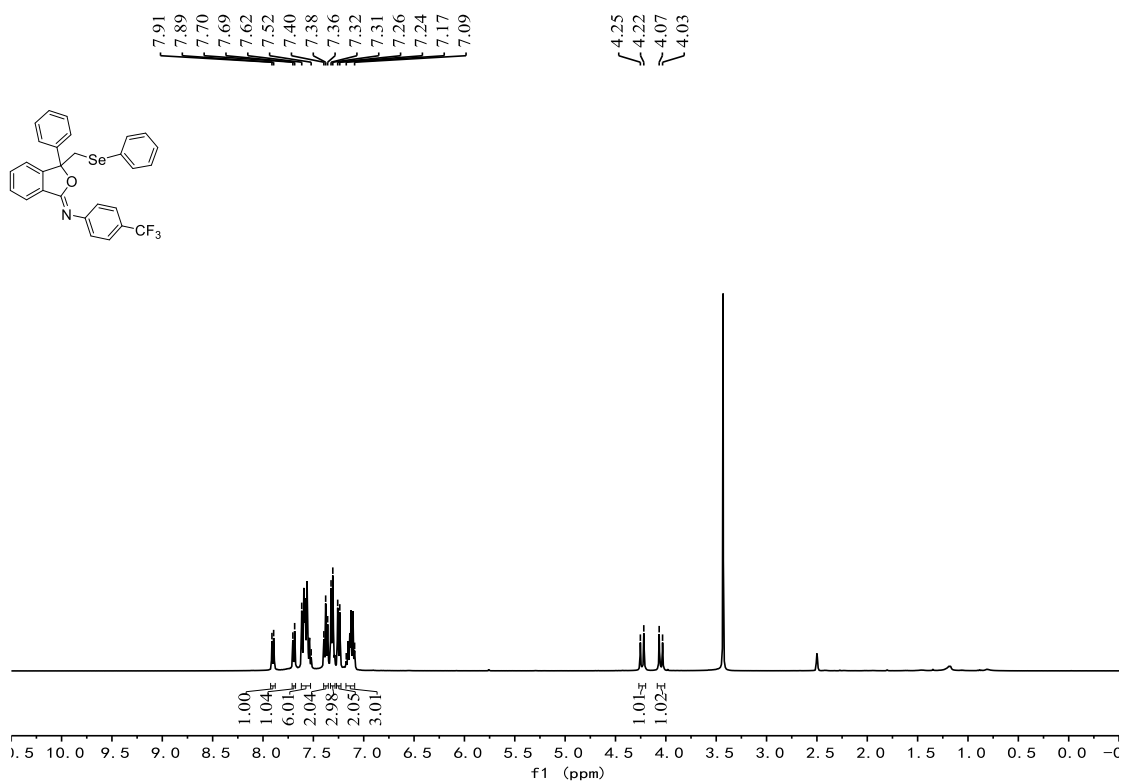
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21071605) of compound **3i**



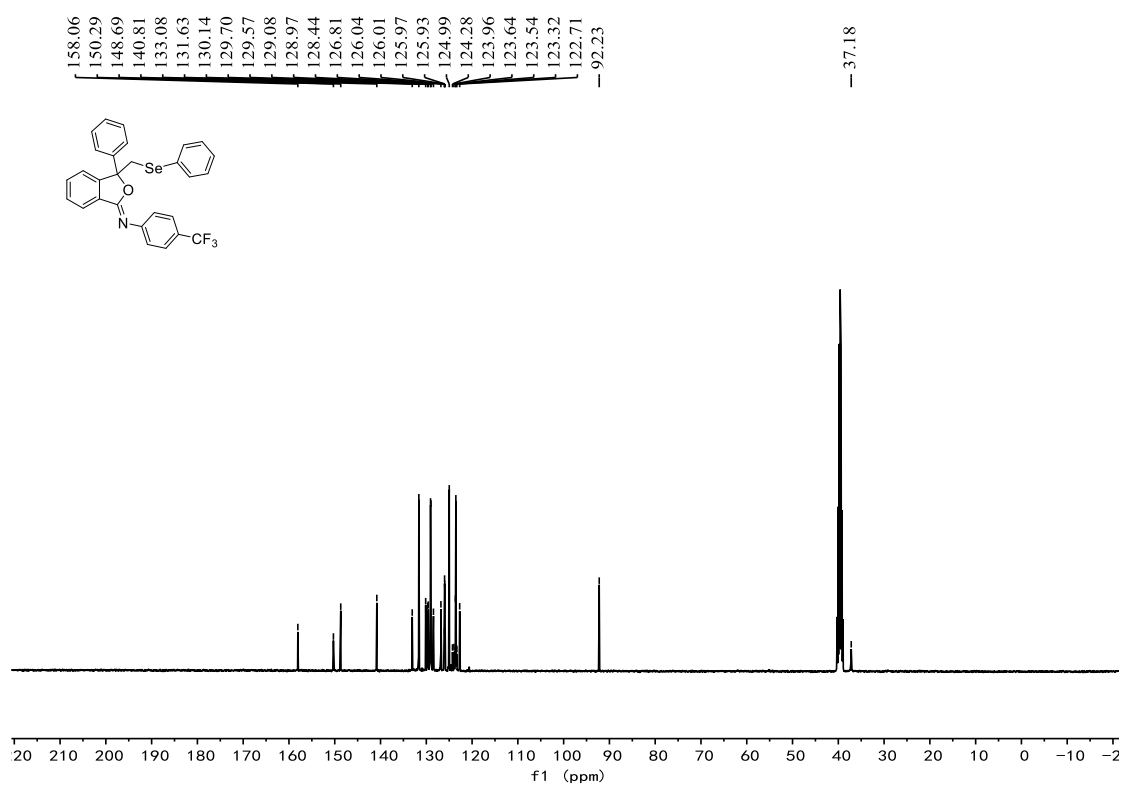
¹³C NMR (101 MHz, DMSO-*d*₆, LLH-14-30) of compound **3i**



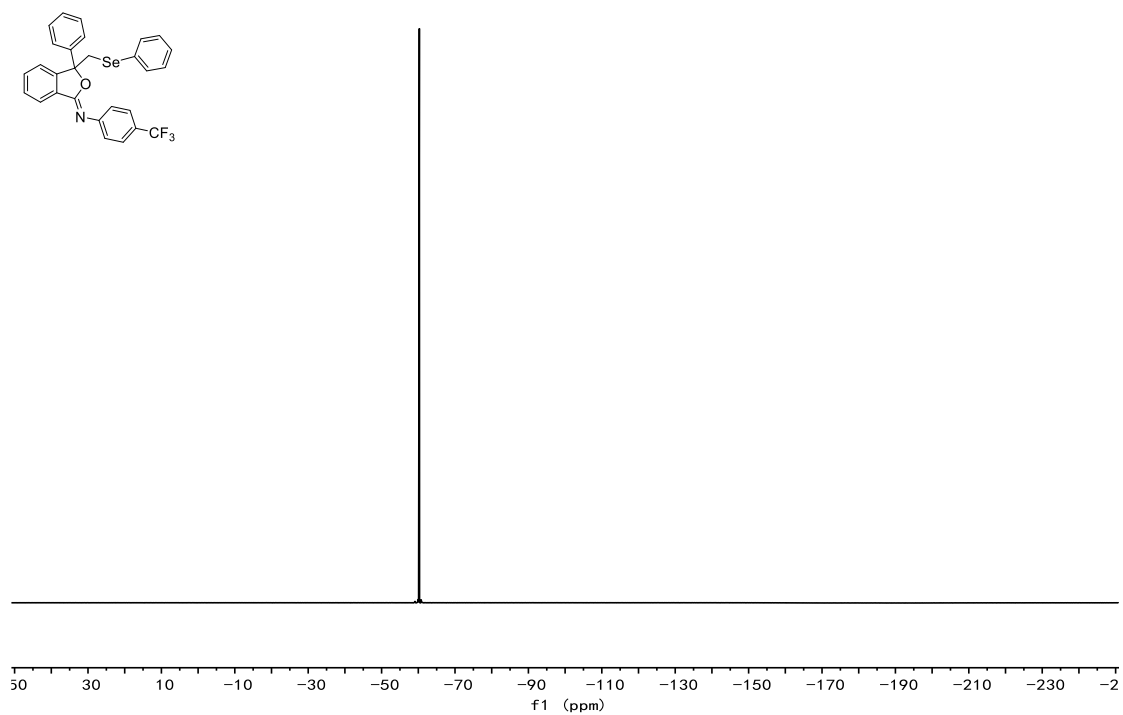
¹H NMR (400 MHz, DMSO-*d*₆, LLH21061906) of compound **3j**



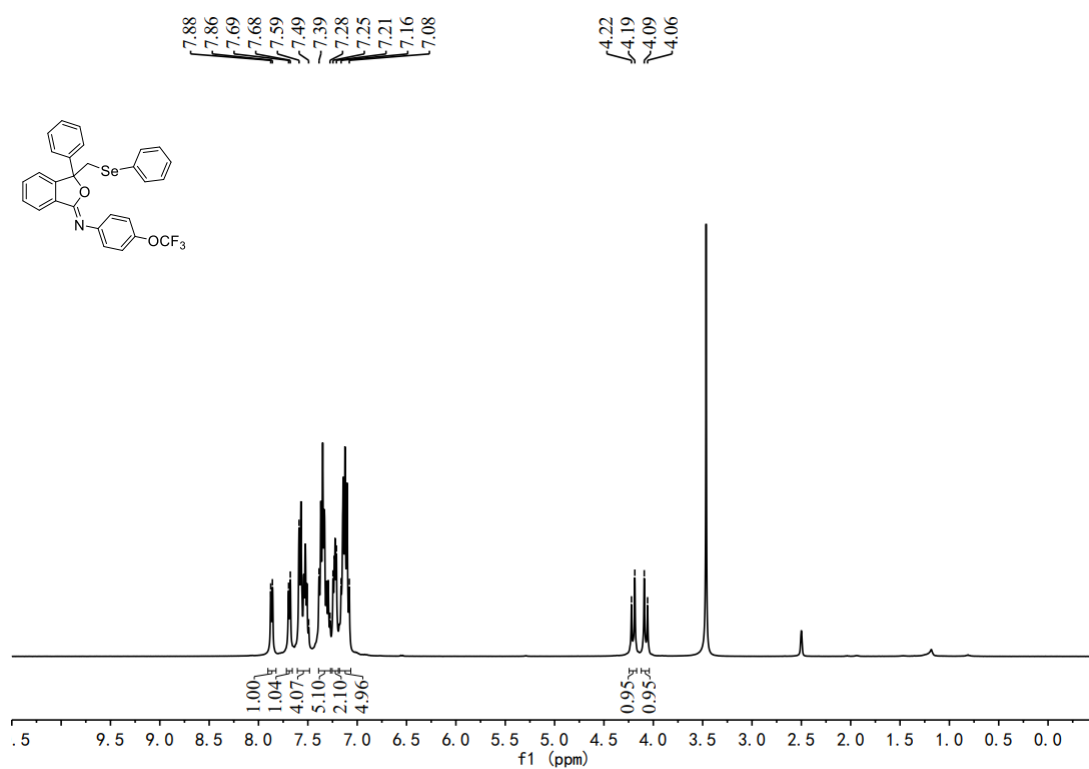
¹³C NMR (101 MHz, DMSO-*d*₆, LLH21061906) of compound **3j**



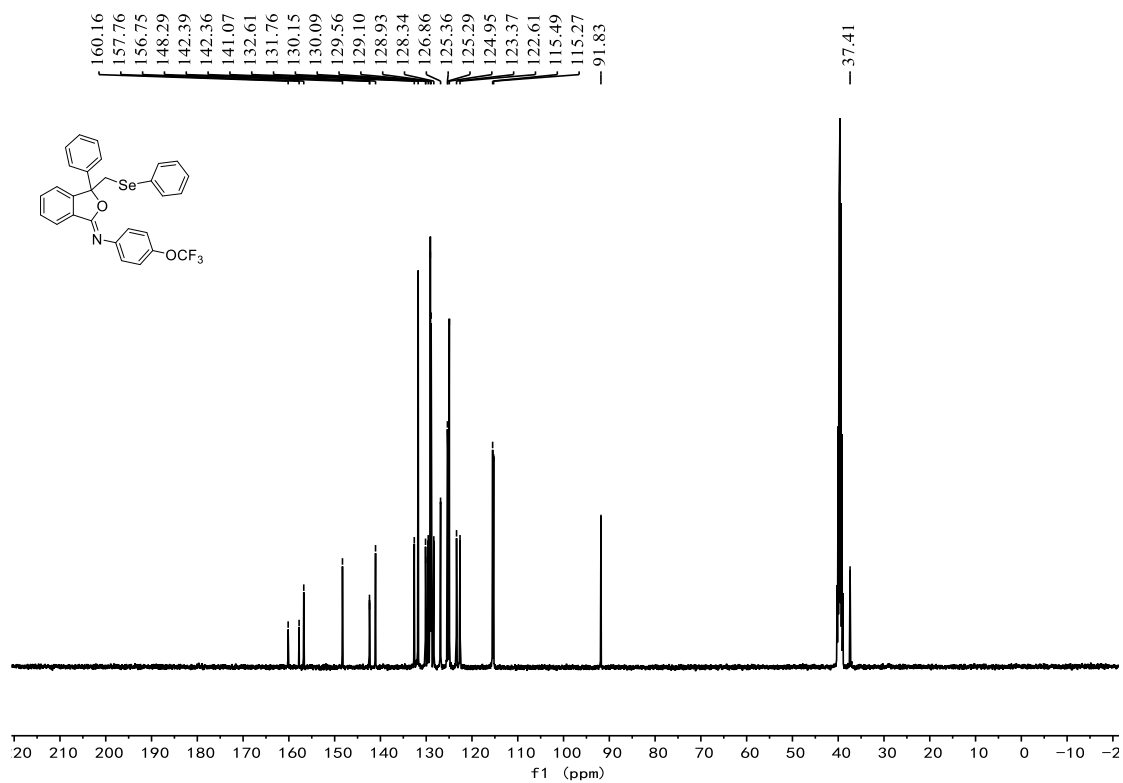
¹⁹F NMR (376 MHz, DMSO-*d*₆, LLH21061906) of compound **3j**



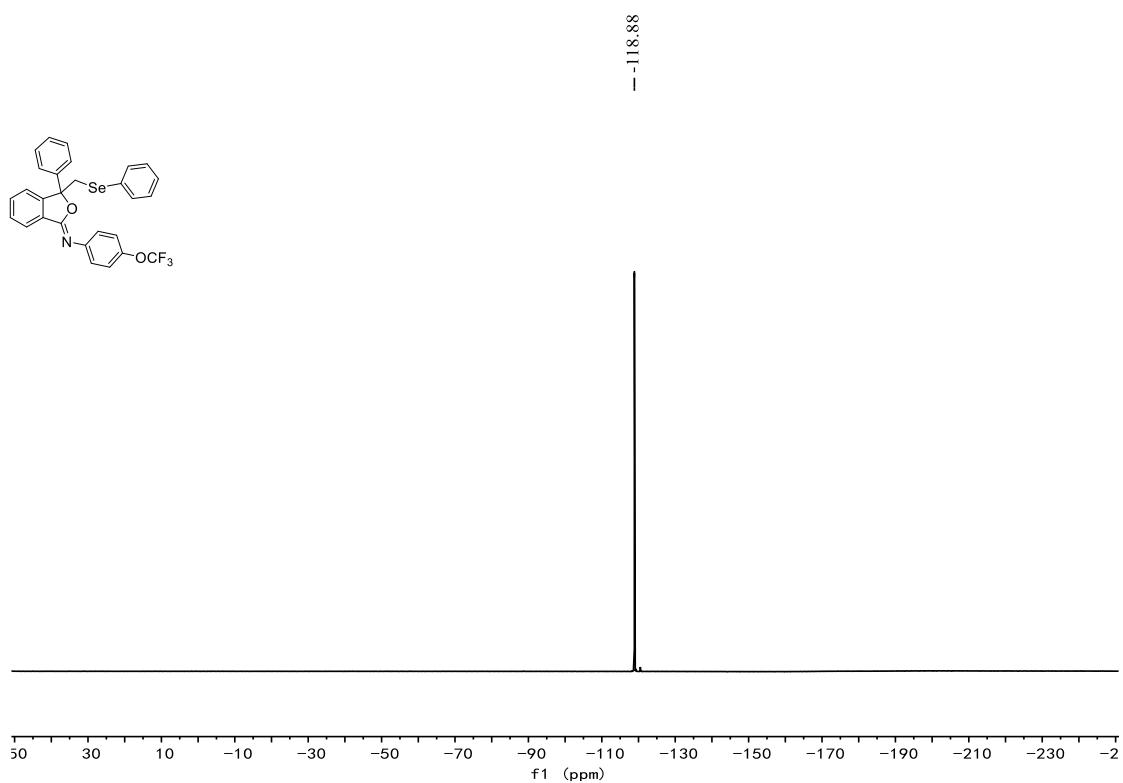
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21072701) of compound **3k**



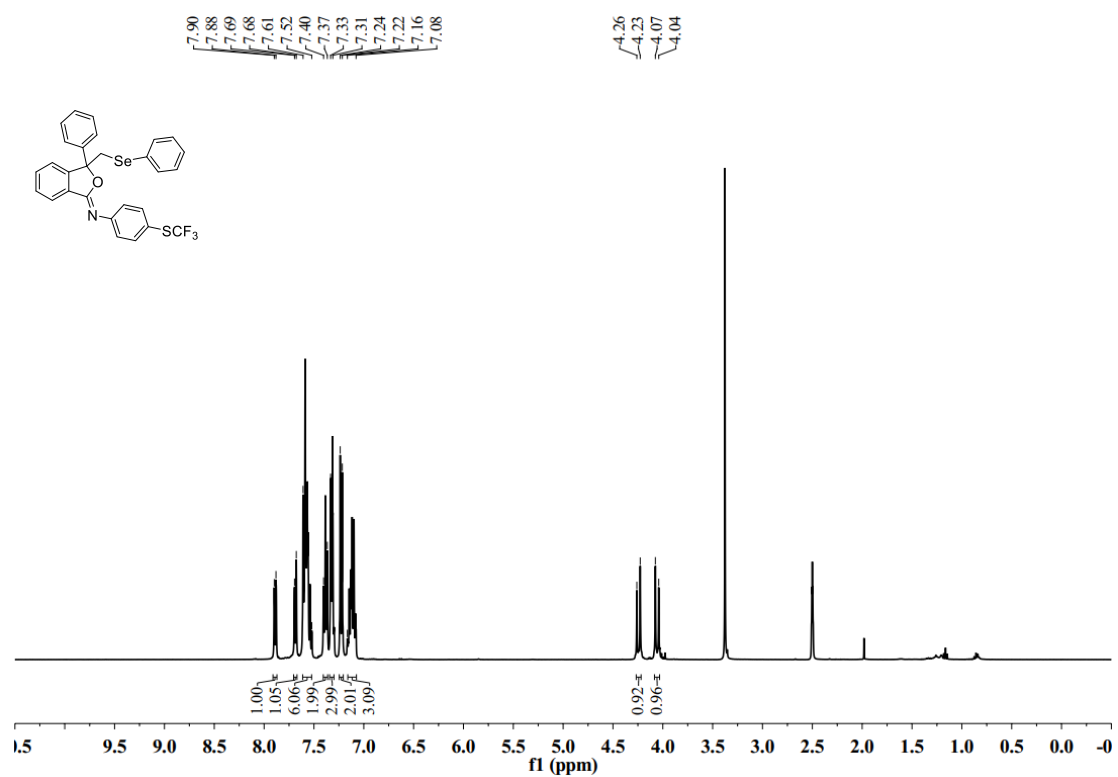
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21072701) of compound **3k**



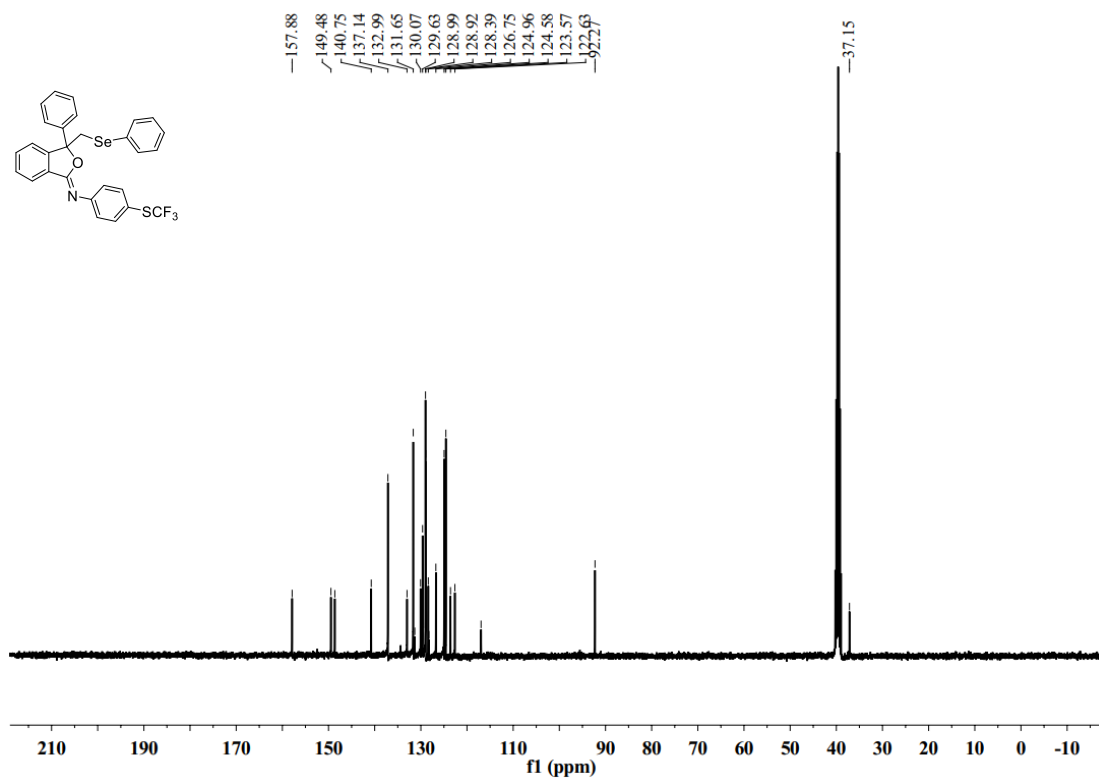
^{19}F NMR (376 MHz, $\text{DMSO-}d_6$, LLH21072701) of compound **3k**



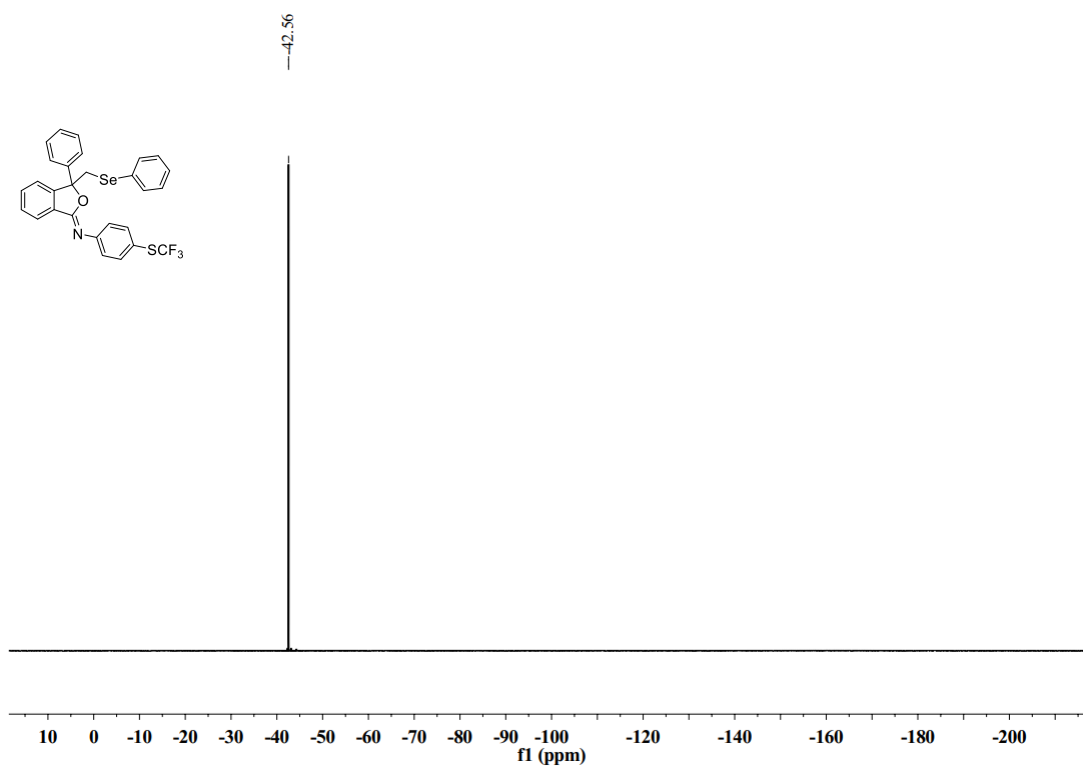
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH-185-8) of compound **3l**



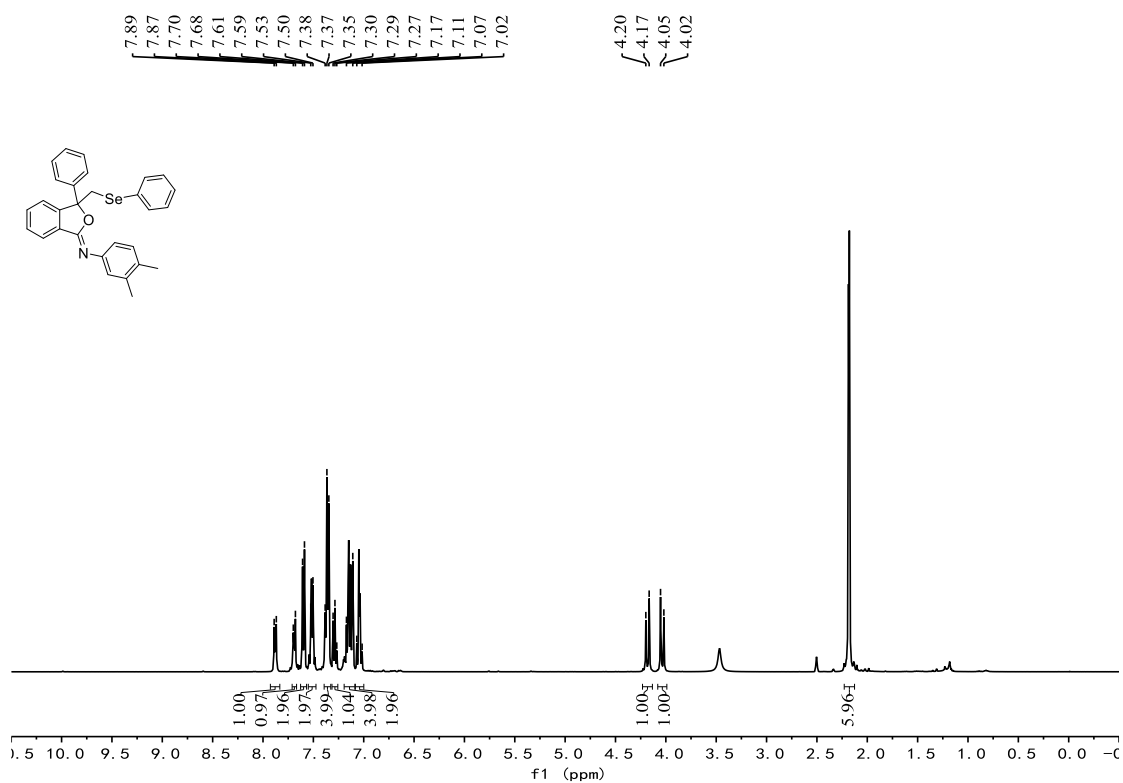
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH-185-8) of compound **3I**



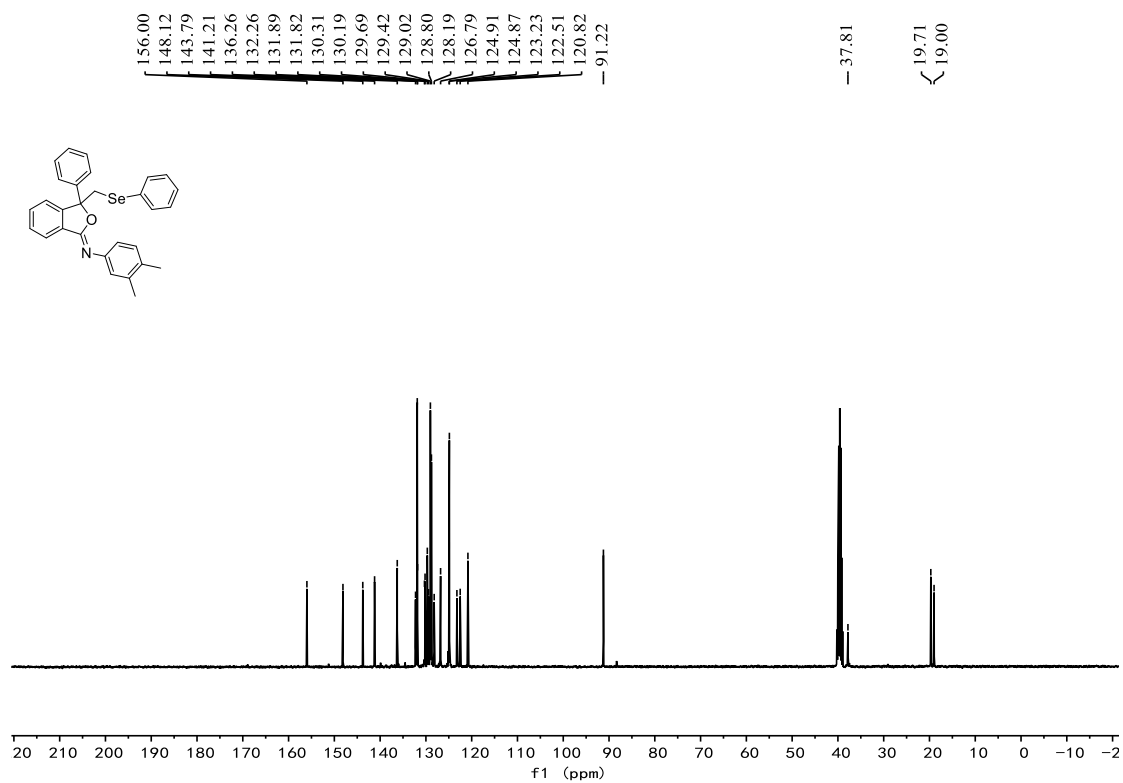
^{19}F NMR (376 MHz, $\text{DMSO-}d_6$, LLH-185-8) of compound **3I**



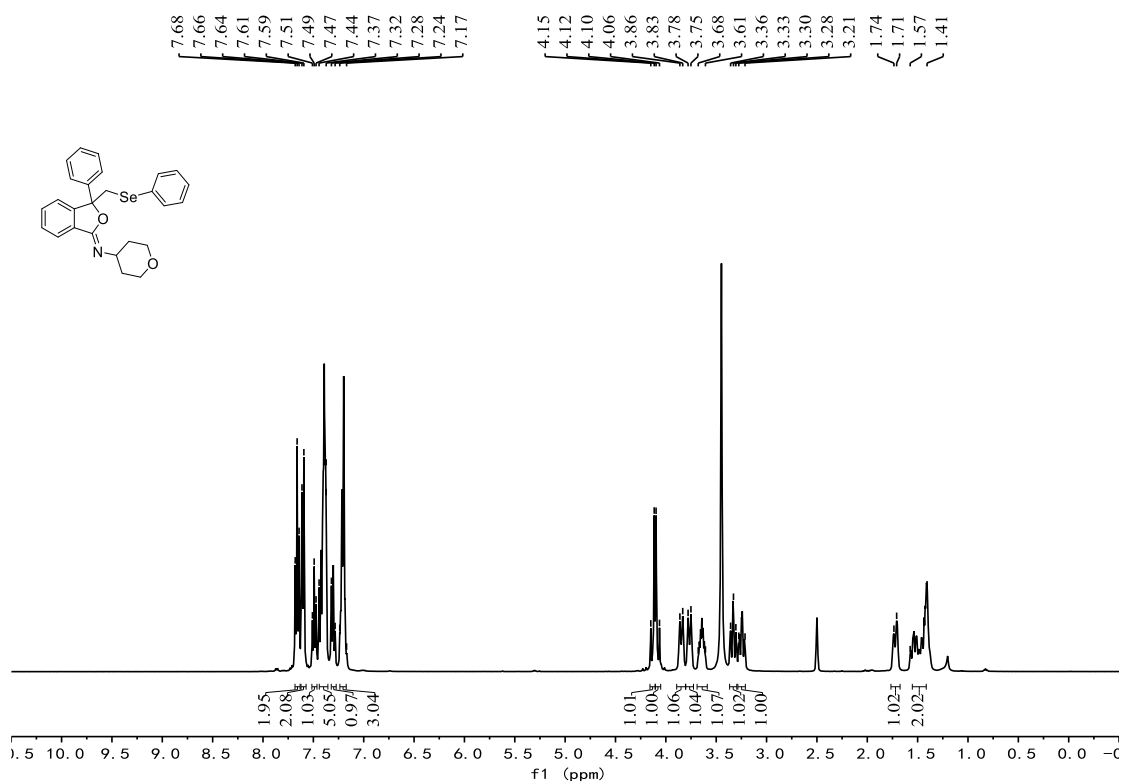
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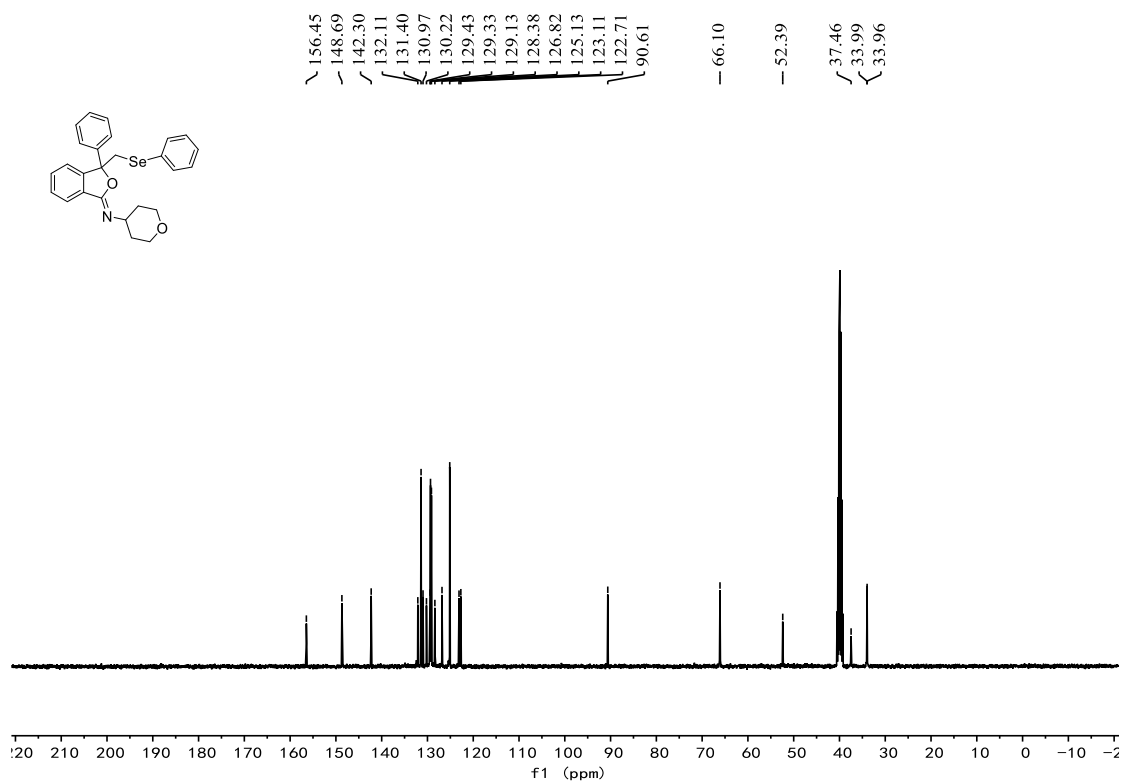
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21052405) of compound **3m**



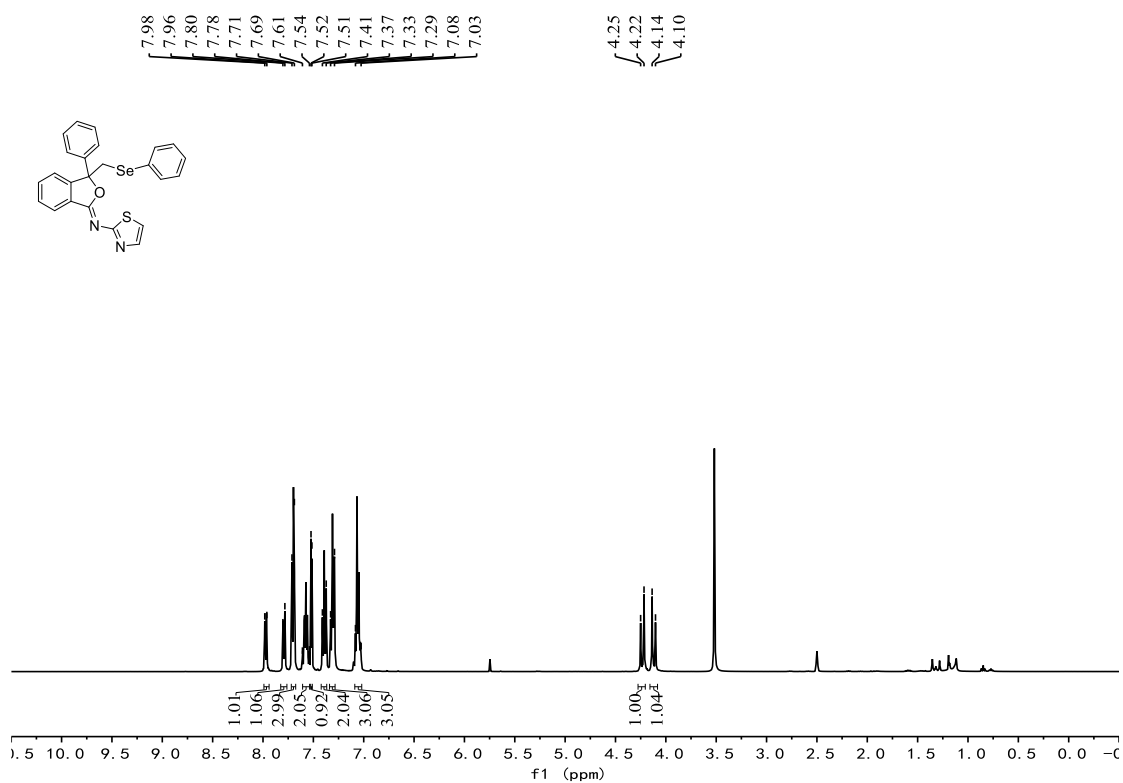
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21060301) of compound **3n**



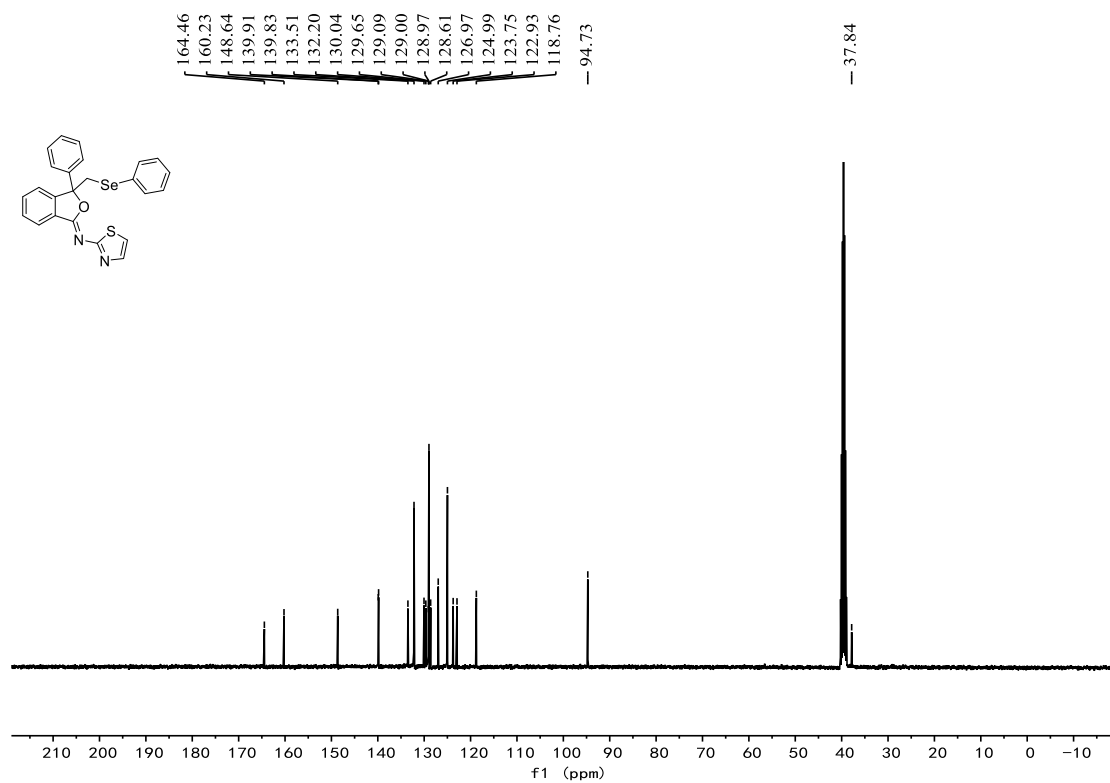
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21060301) of compound **3n**



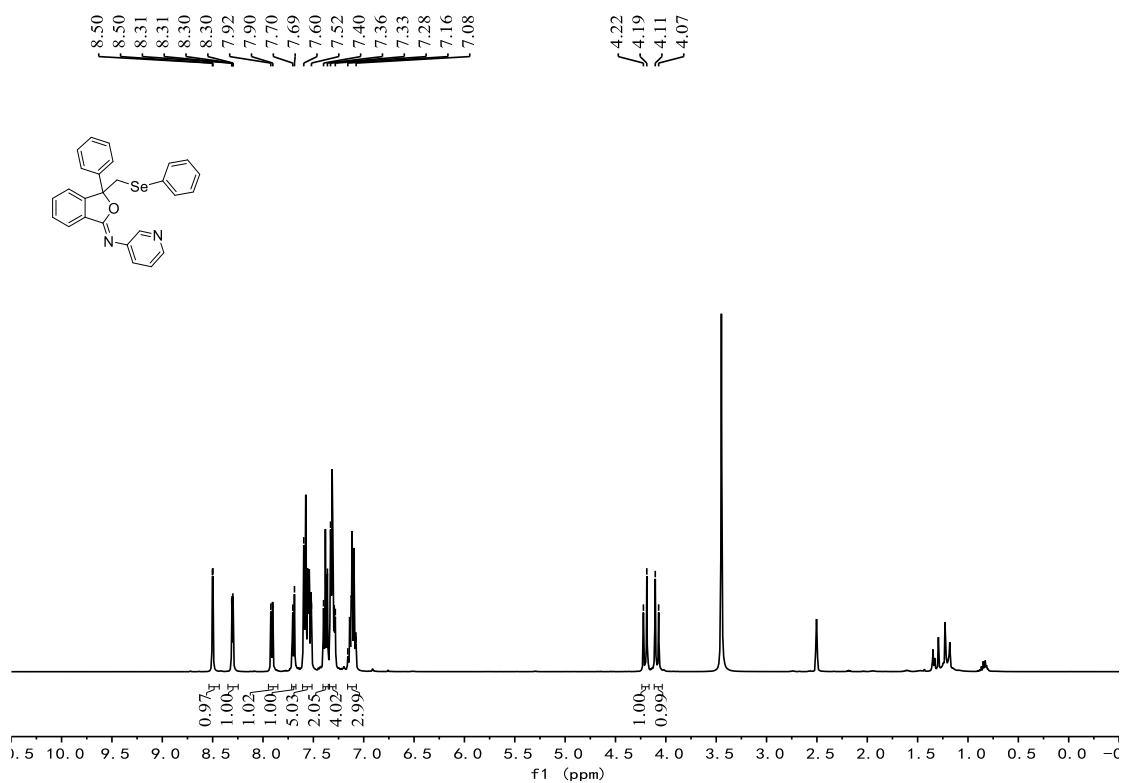
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21071604) of compound **3o**



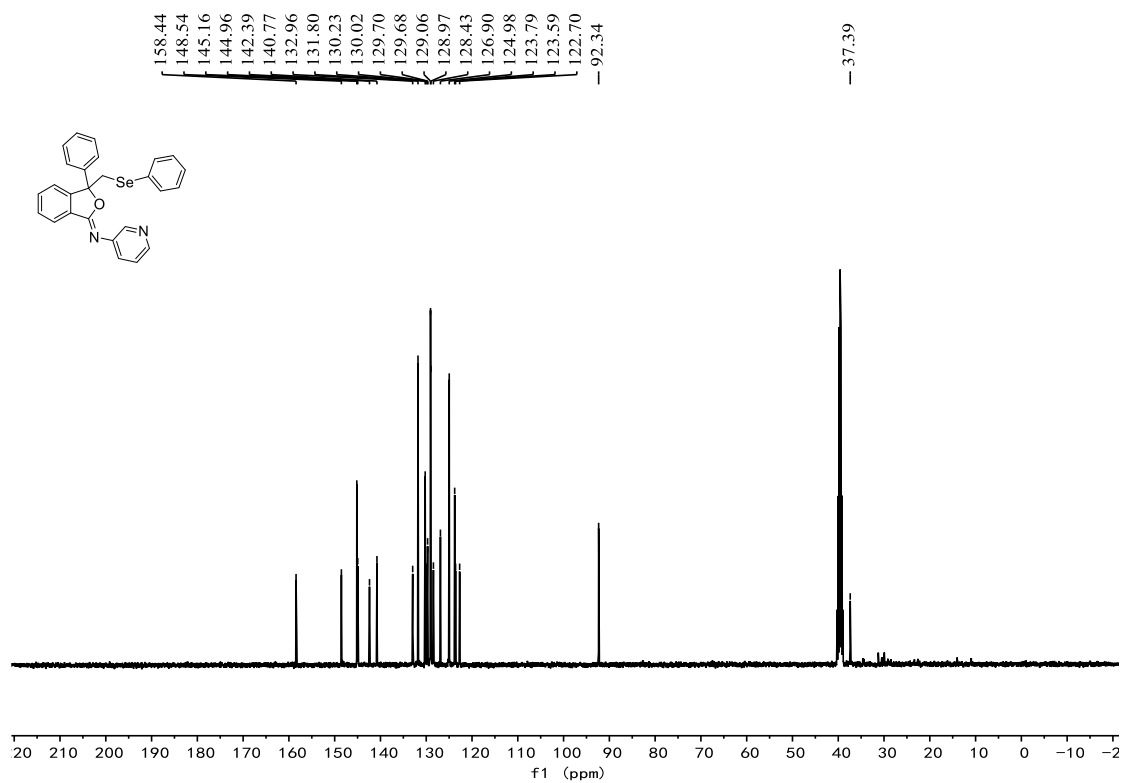
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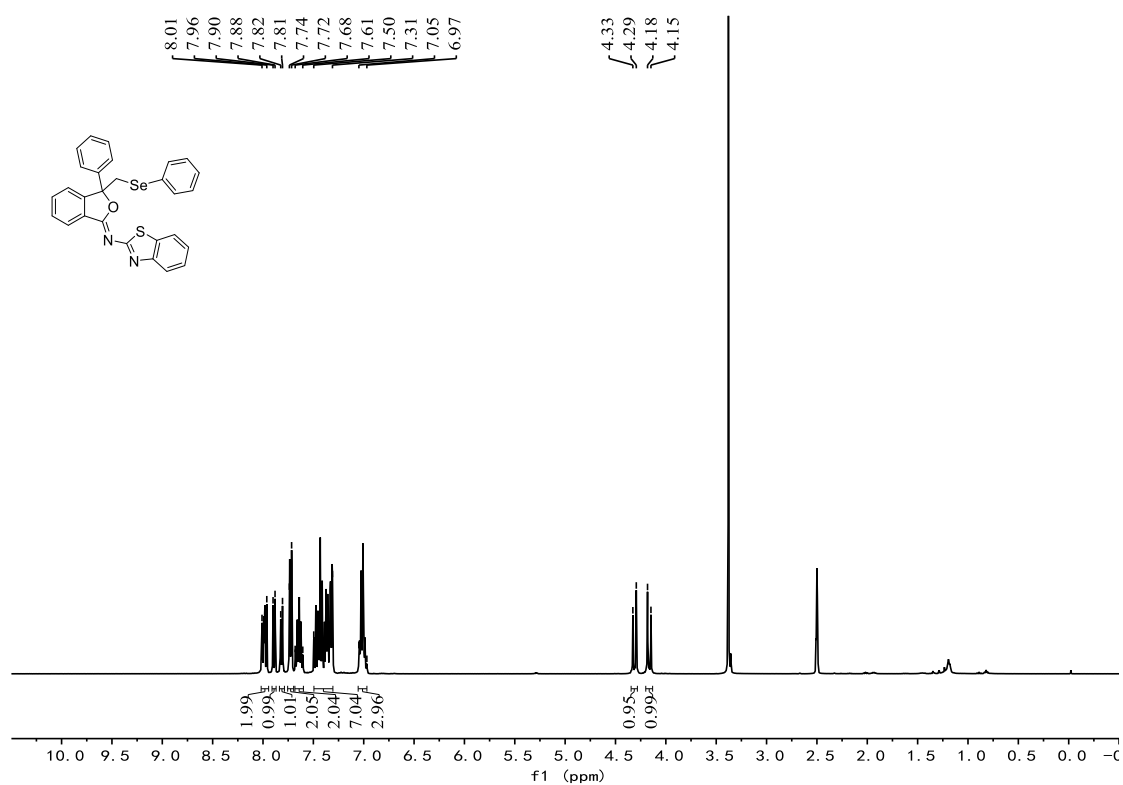
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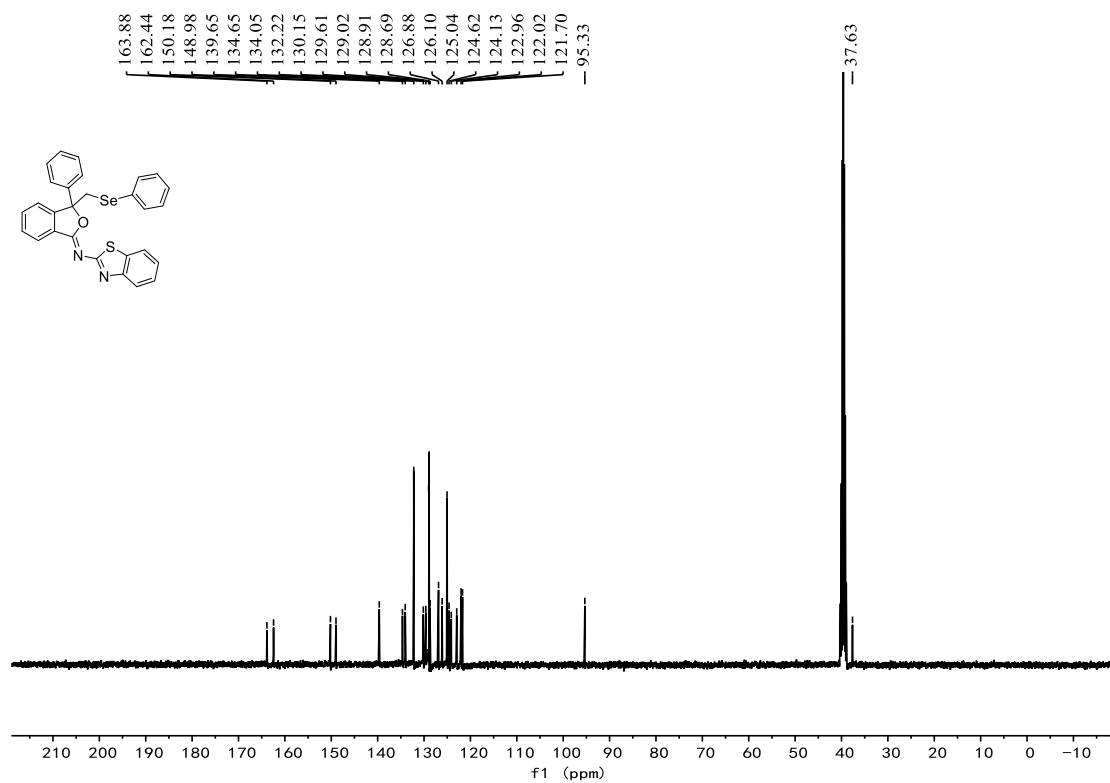
^{13}C NMR (400 MHz, $\text{DMSO-}d_6$, LLH21071601) of compound **3p**



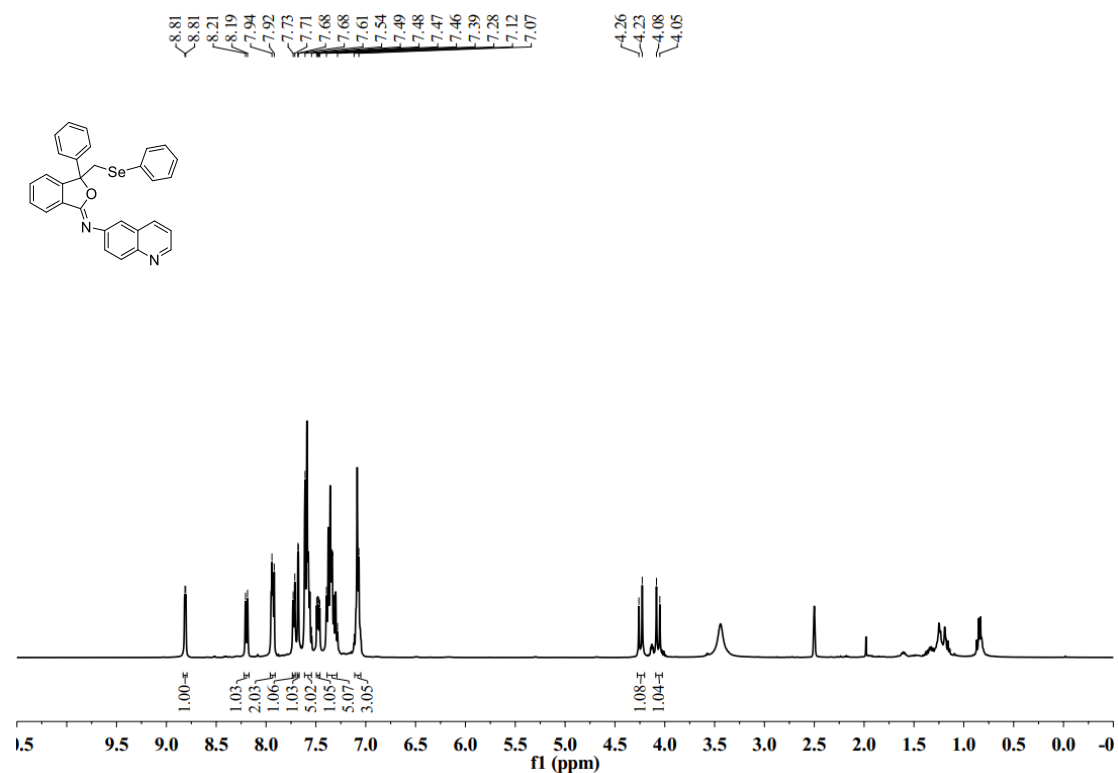
^1H NMR (400 MHz, $\text{DMSO-}d_6$, llh-14-7) of compound **3q**



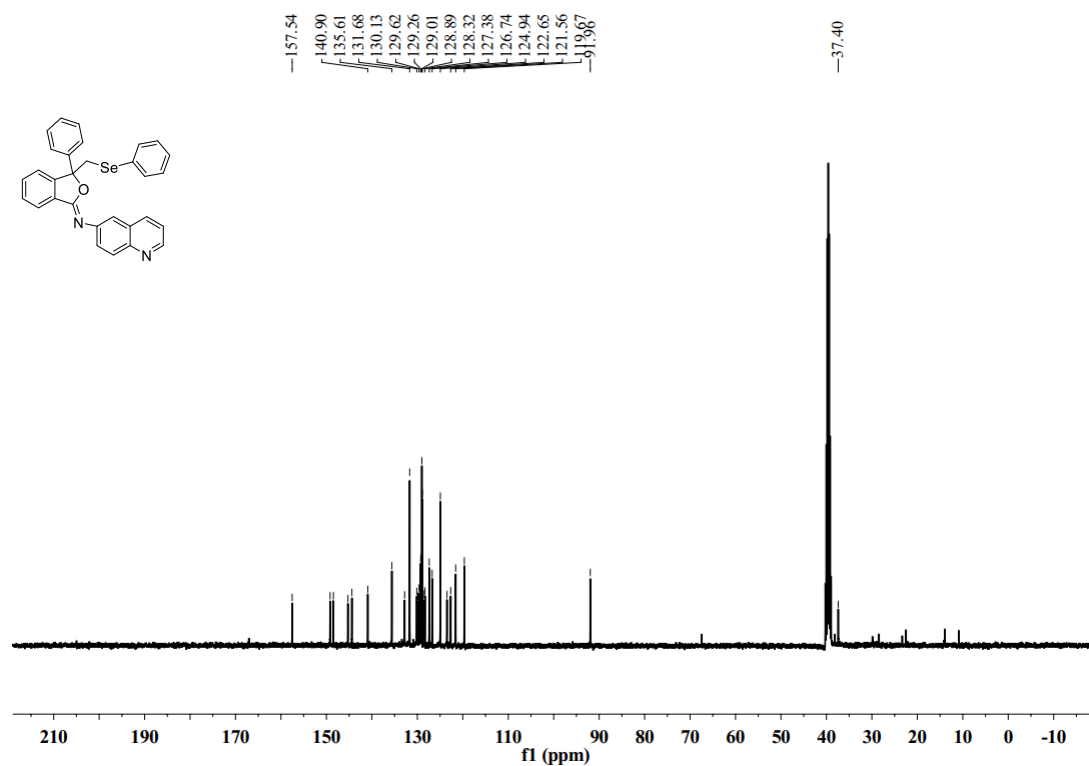
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, llh-14-7) of compound **3q**



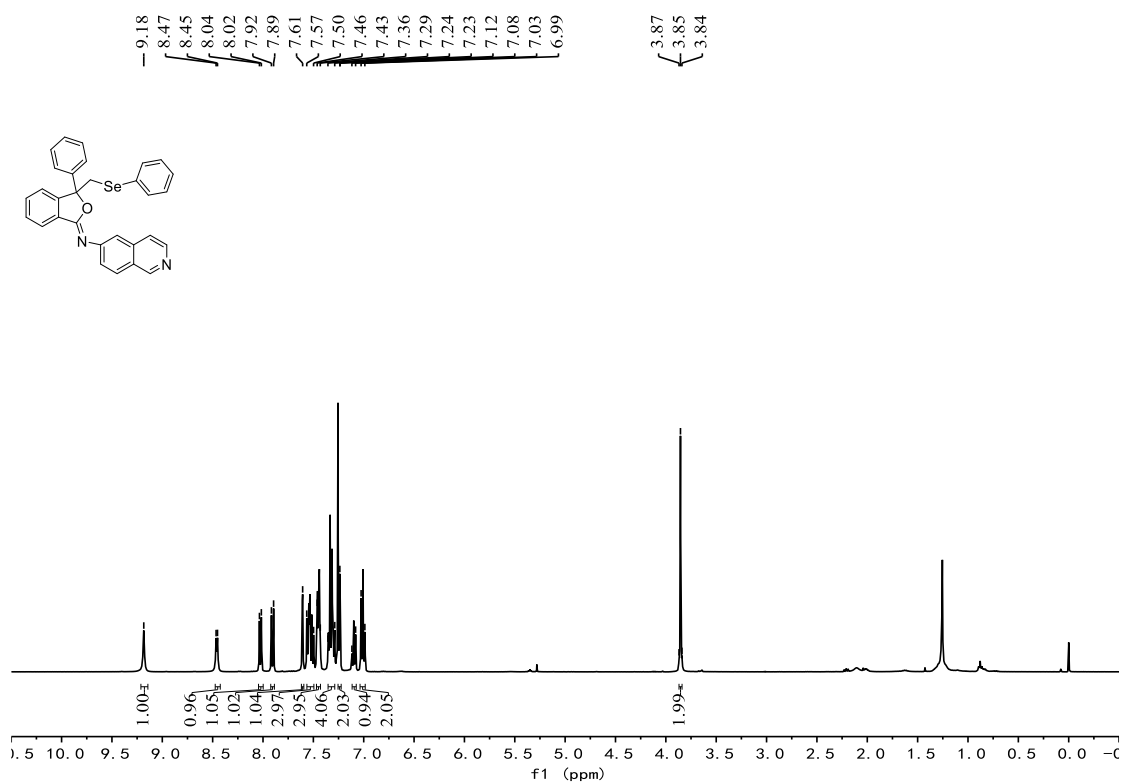
^1H NMR (400MHz, $\text{DMSO-}d_6$, LLH-186-5) of compound **3r**



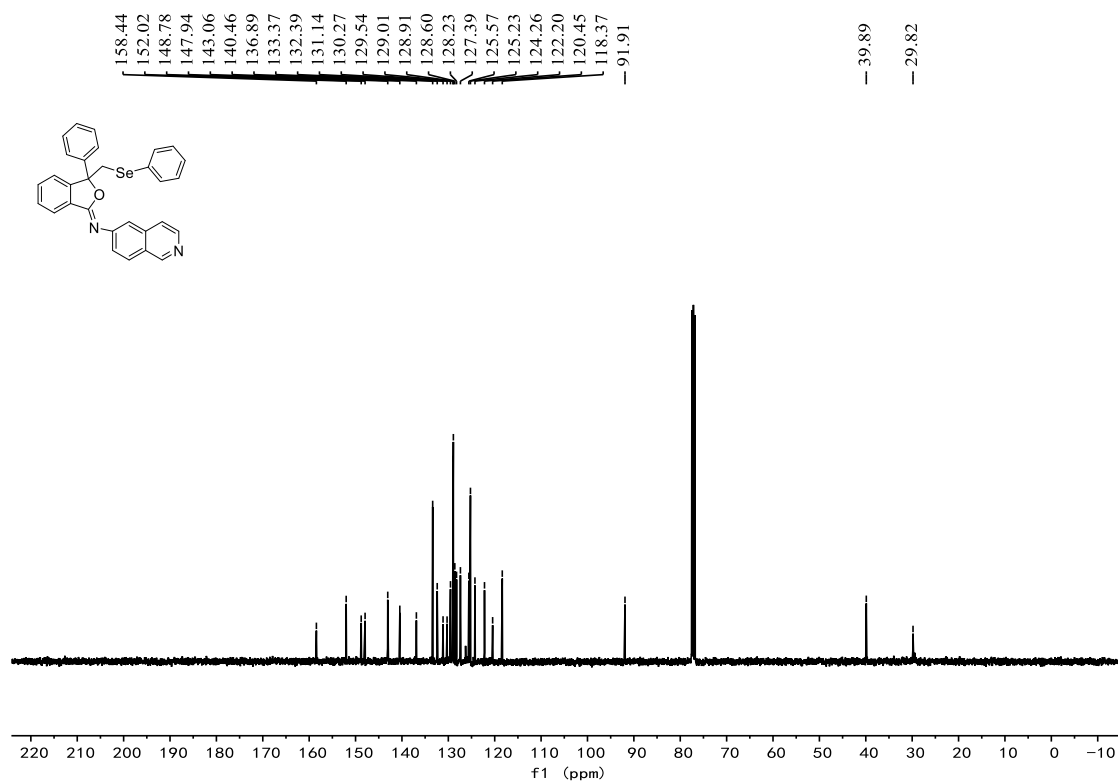
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH-186-5) of compound **3r**



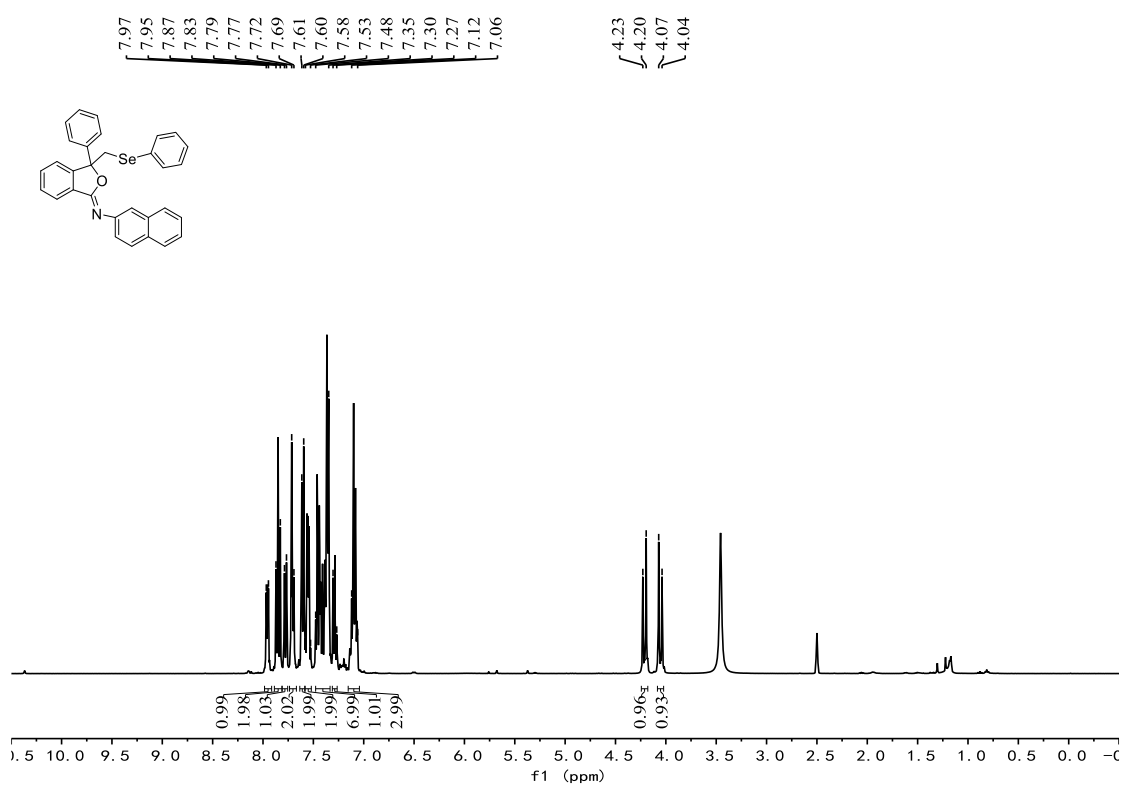
^1H NMR (400MHz, $\text{DMSO-}d_6$, llh-13-61) of compound **3s**



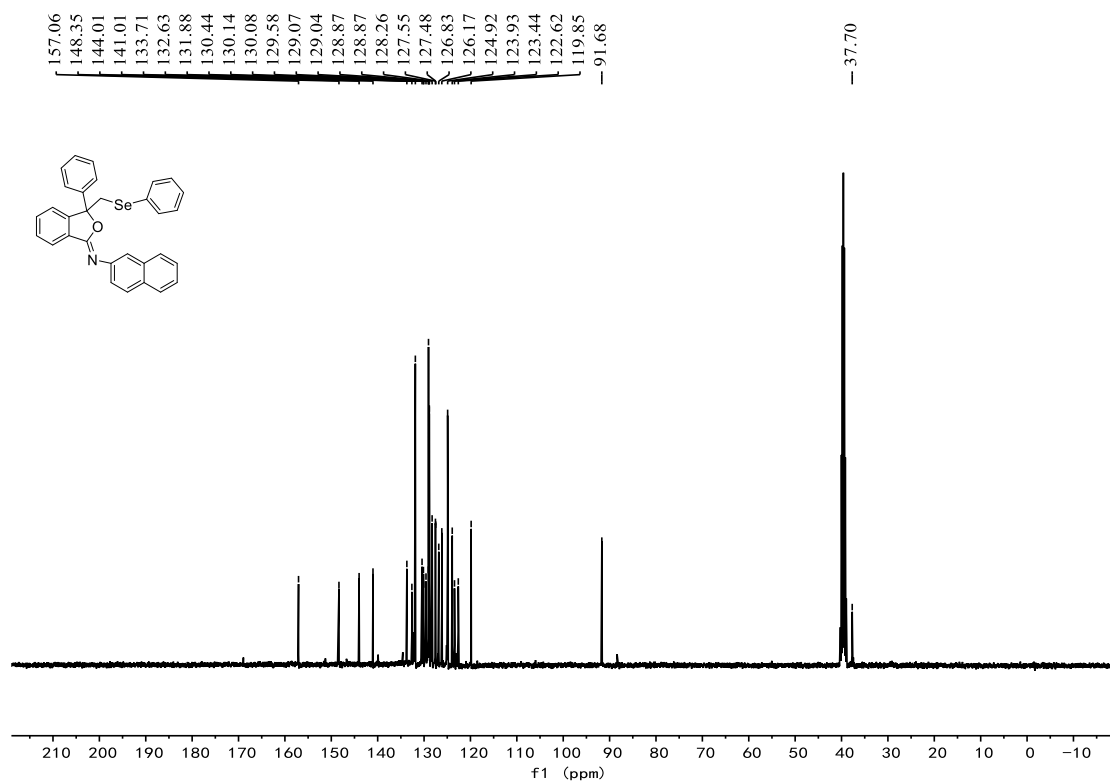
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, llh-13-61) of compound **3s**



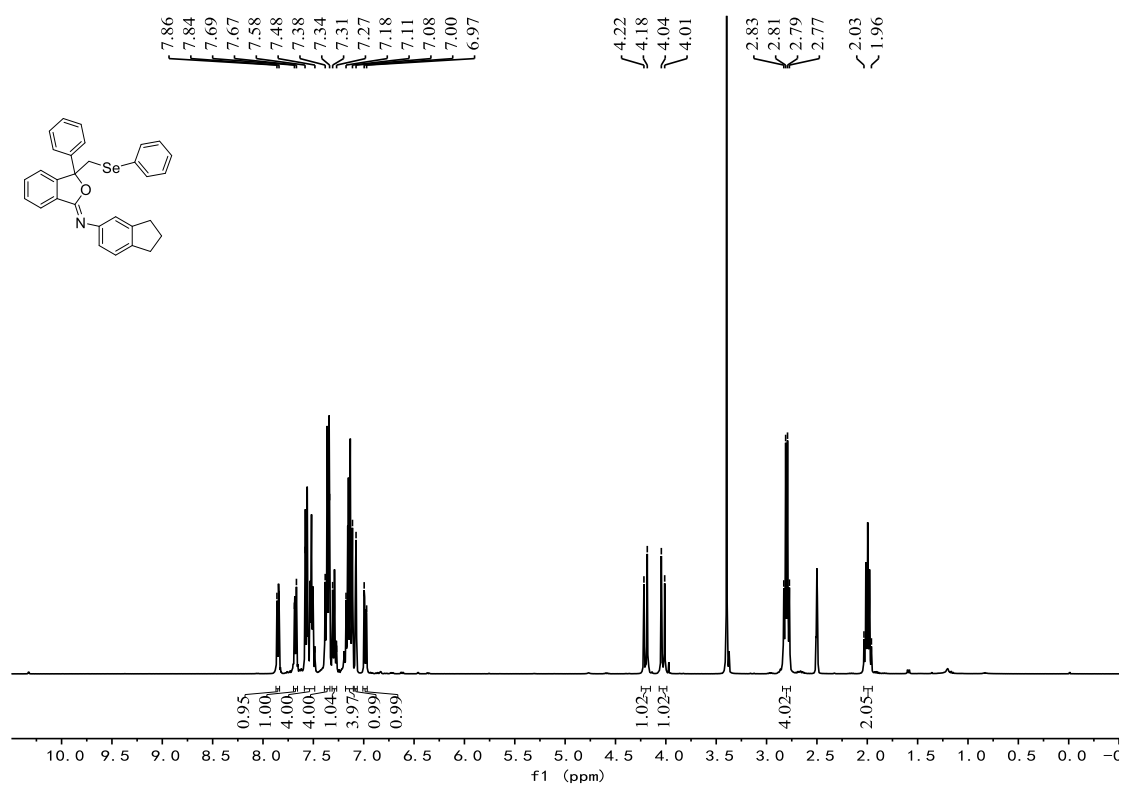
¹H NMR (400 MHz, DMSO-*d*₆, LLH21061003) of compound **3t**



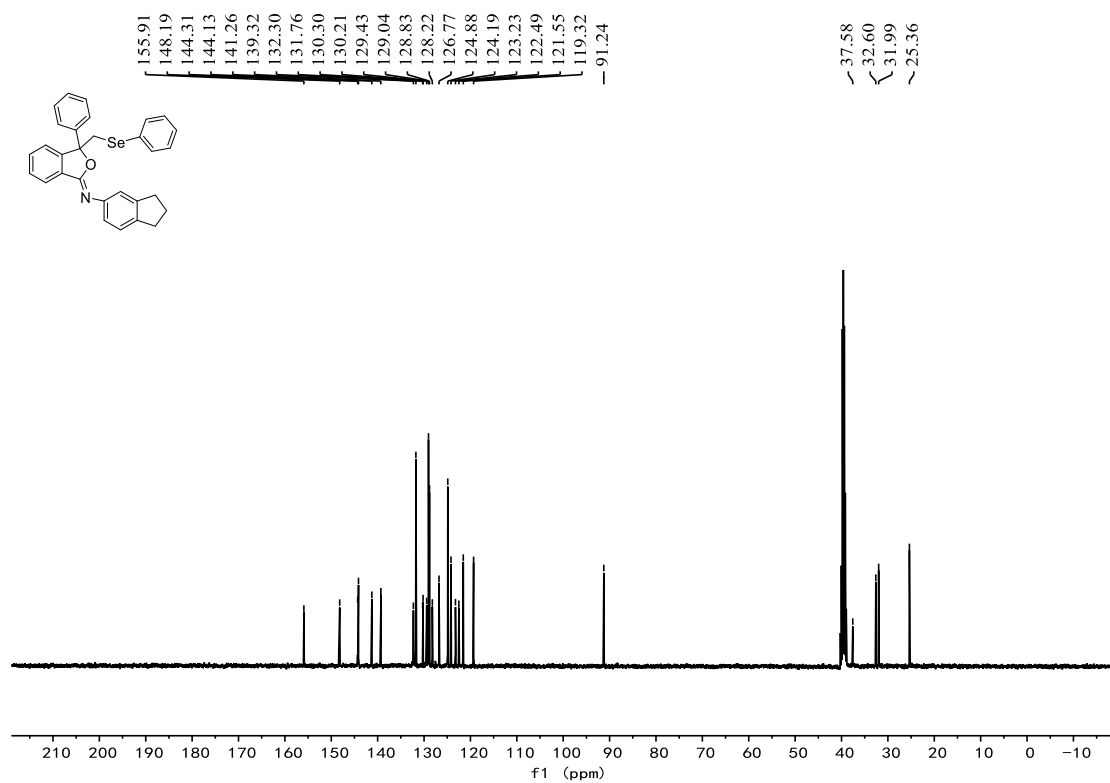
¹³C NMR (101 MHz, DMSO-*d*₆, LLH21061003) of compound **3t**



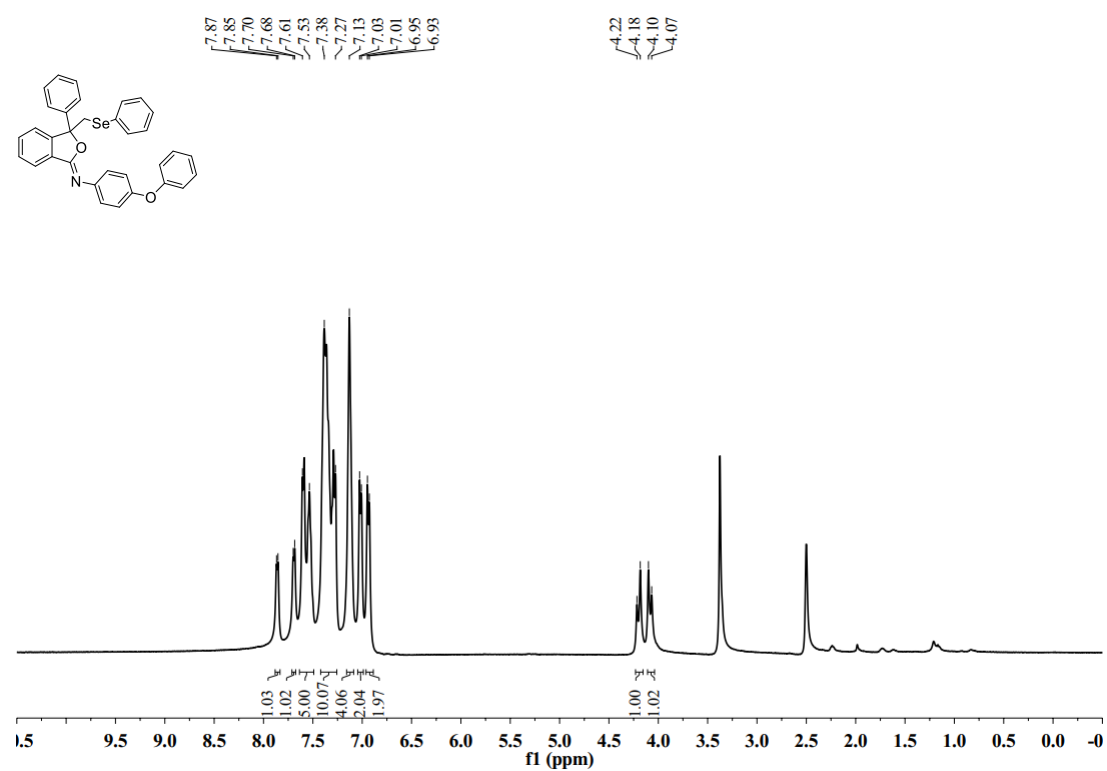
^1H NMR (400 MHz, $\text{DMSO-}d_6$, lh21092301) of compound **3u**



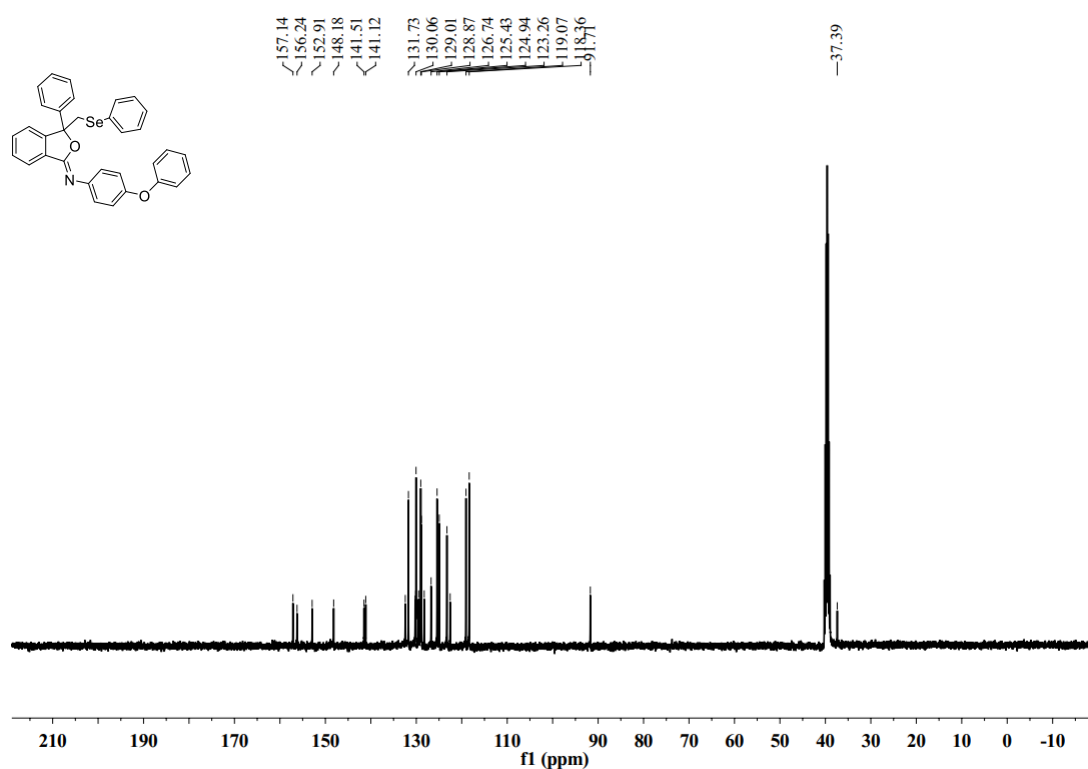
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, lh21092301) of compound **3u**



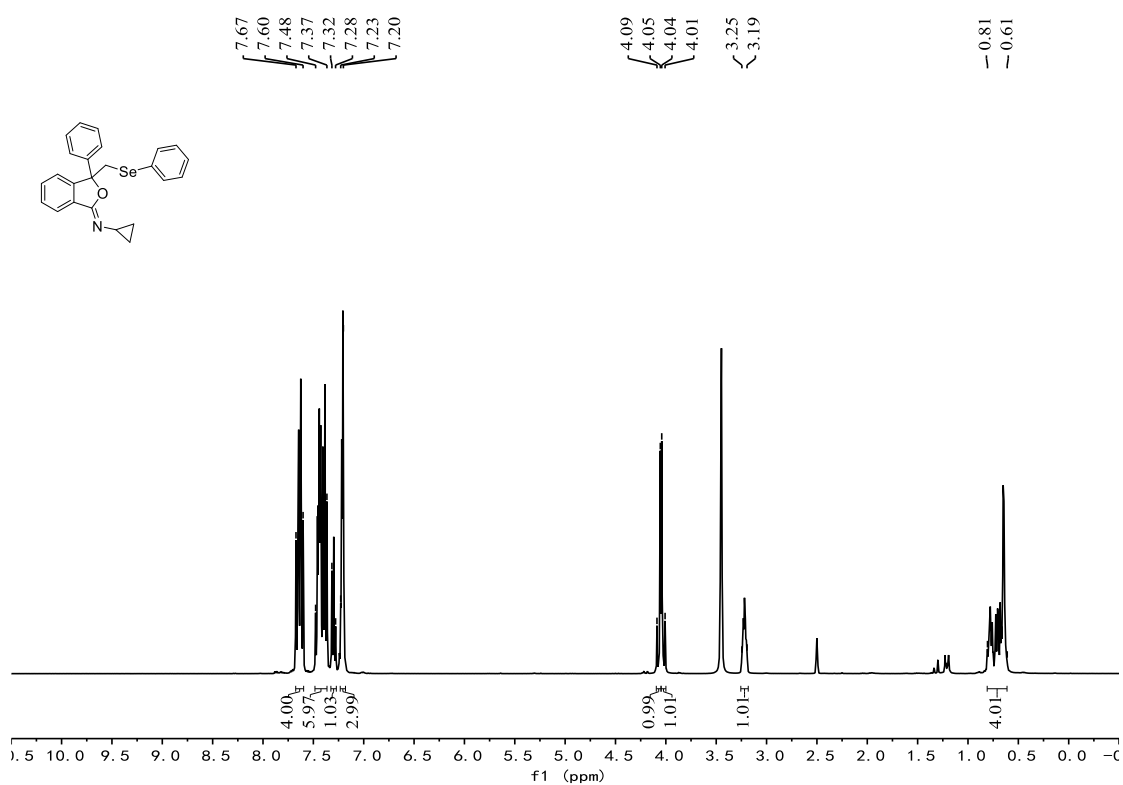
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH-174-2) of compound **3v**



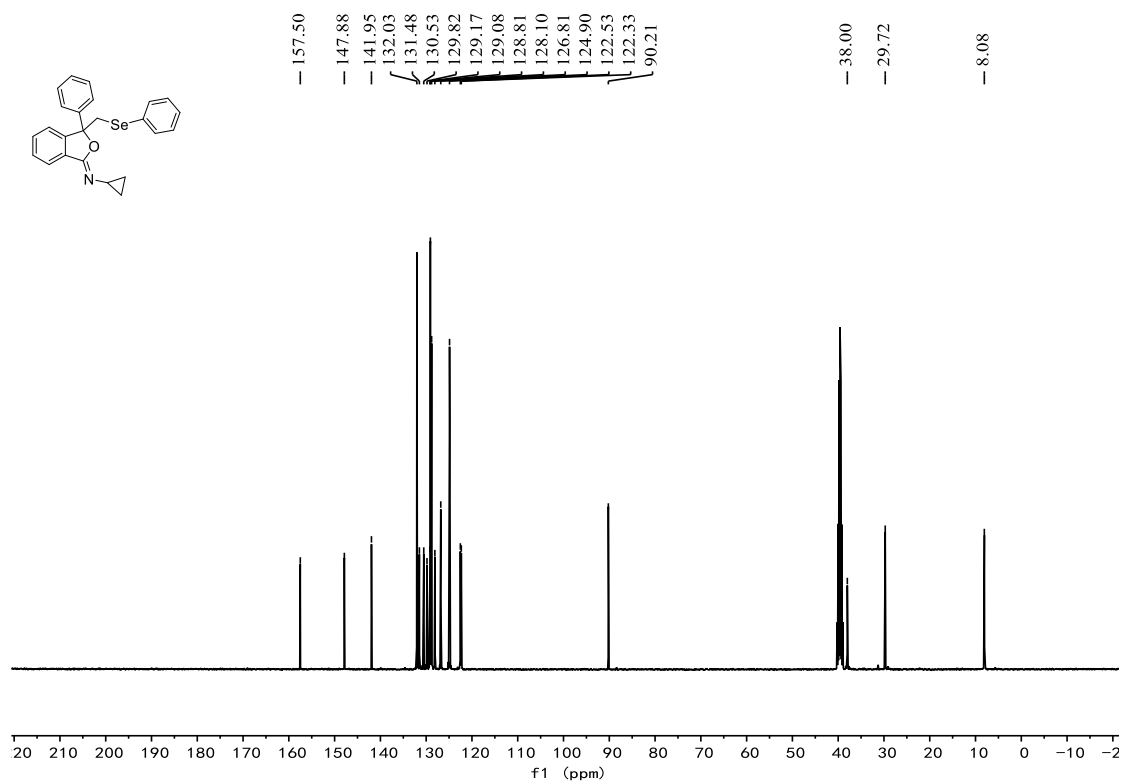
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH-174-2) of compound **3v**



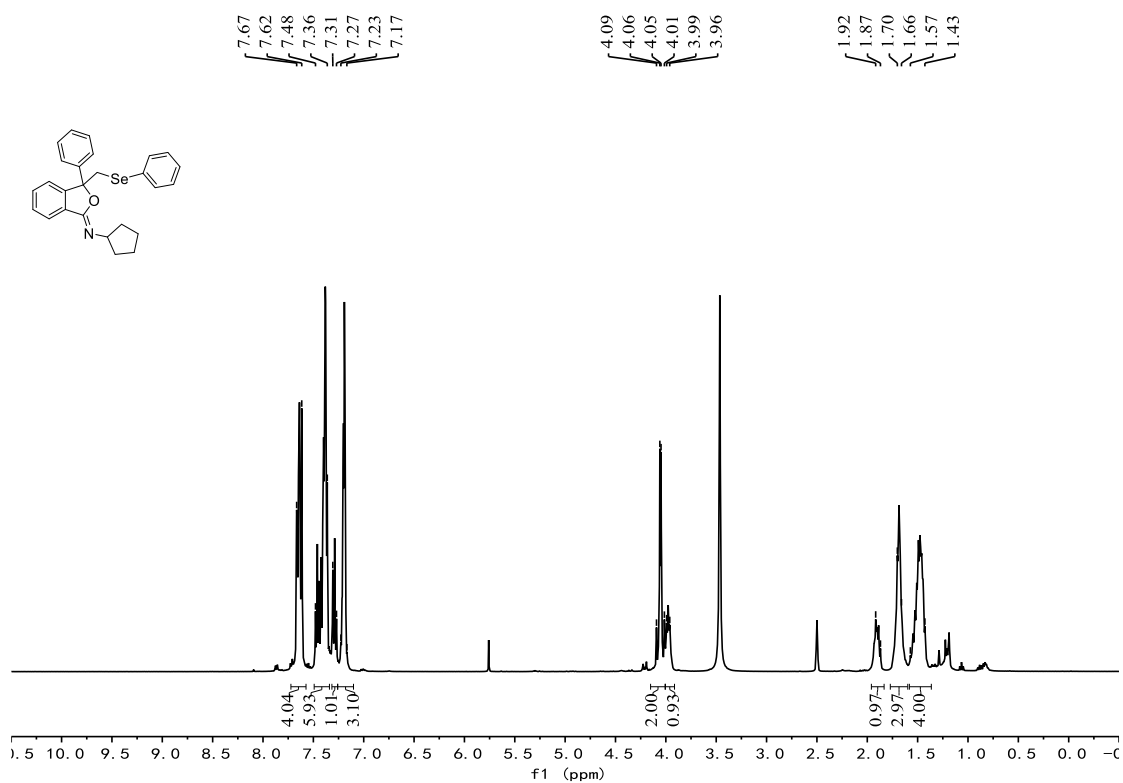
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21061001) of compound **3w**



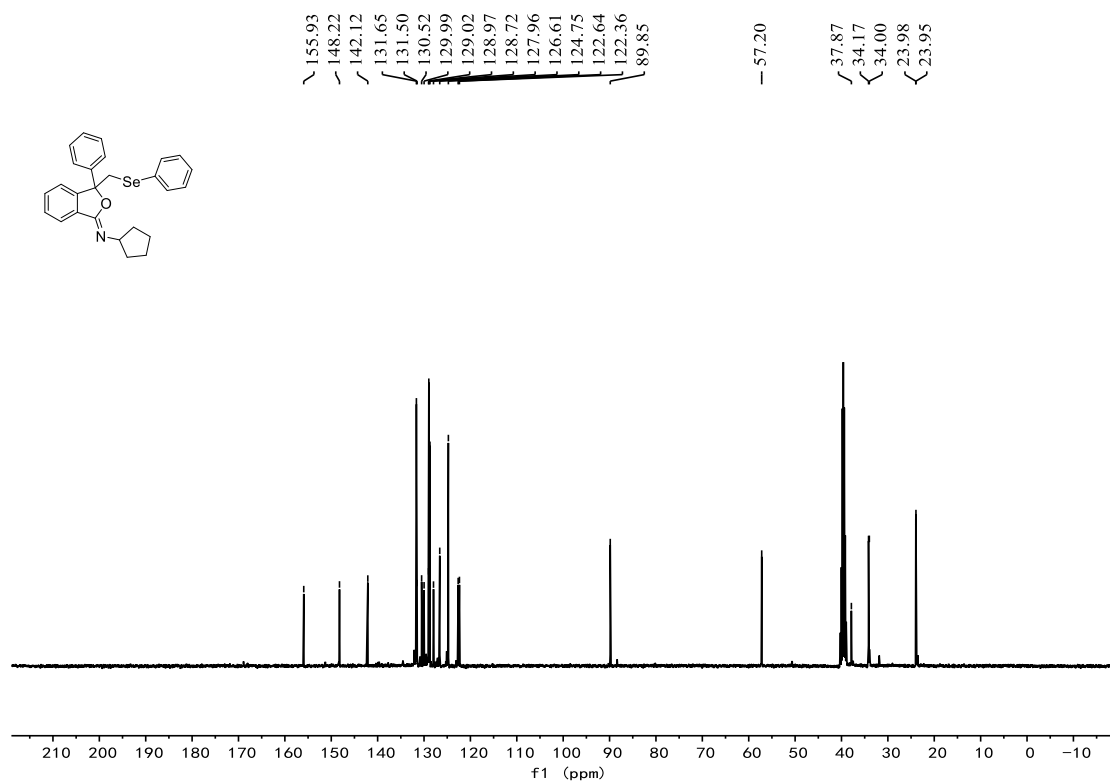
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21061001) of compound **3w**



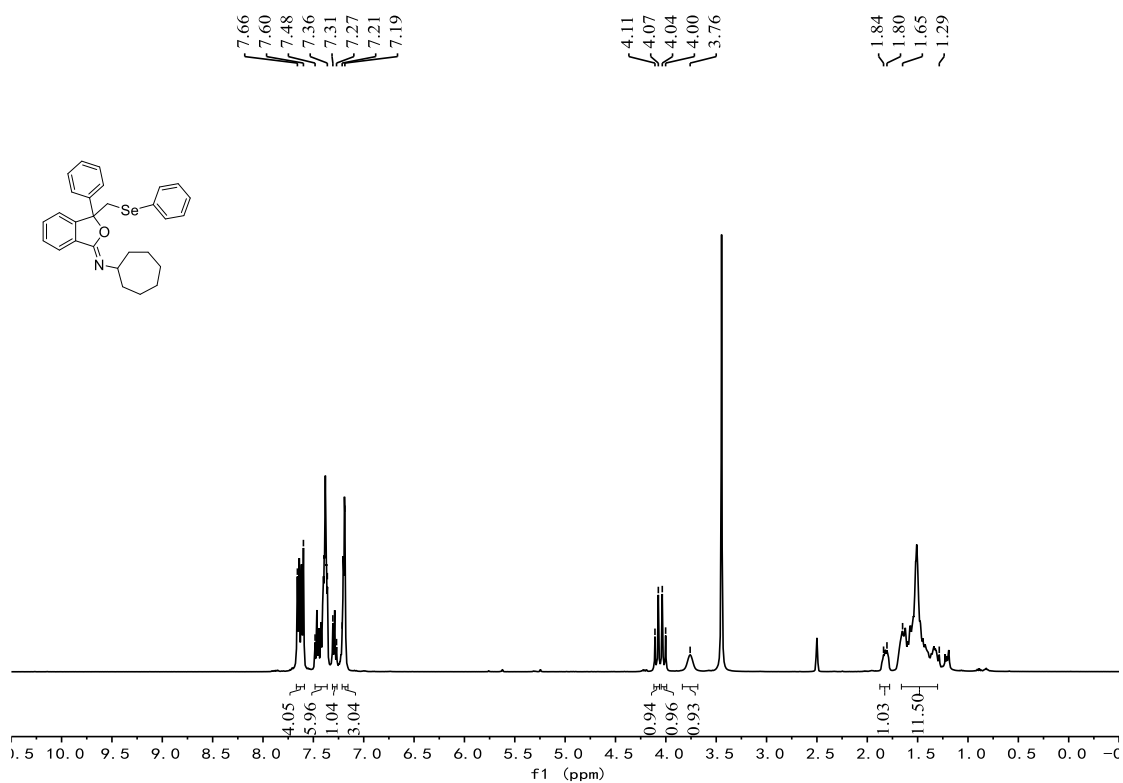
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21052602) of compound **3x**



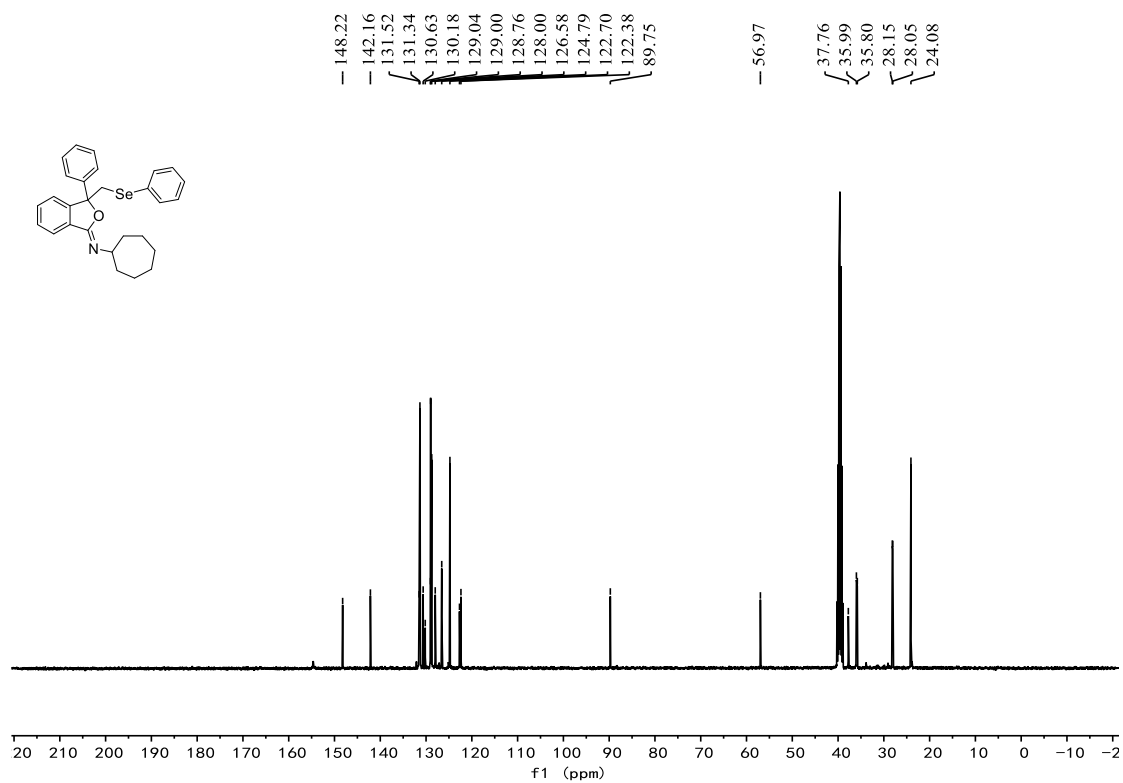
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21052602) of compound **3x**



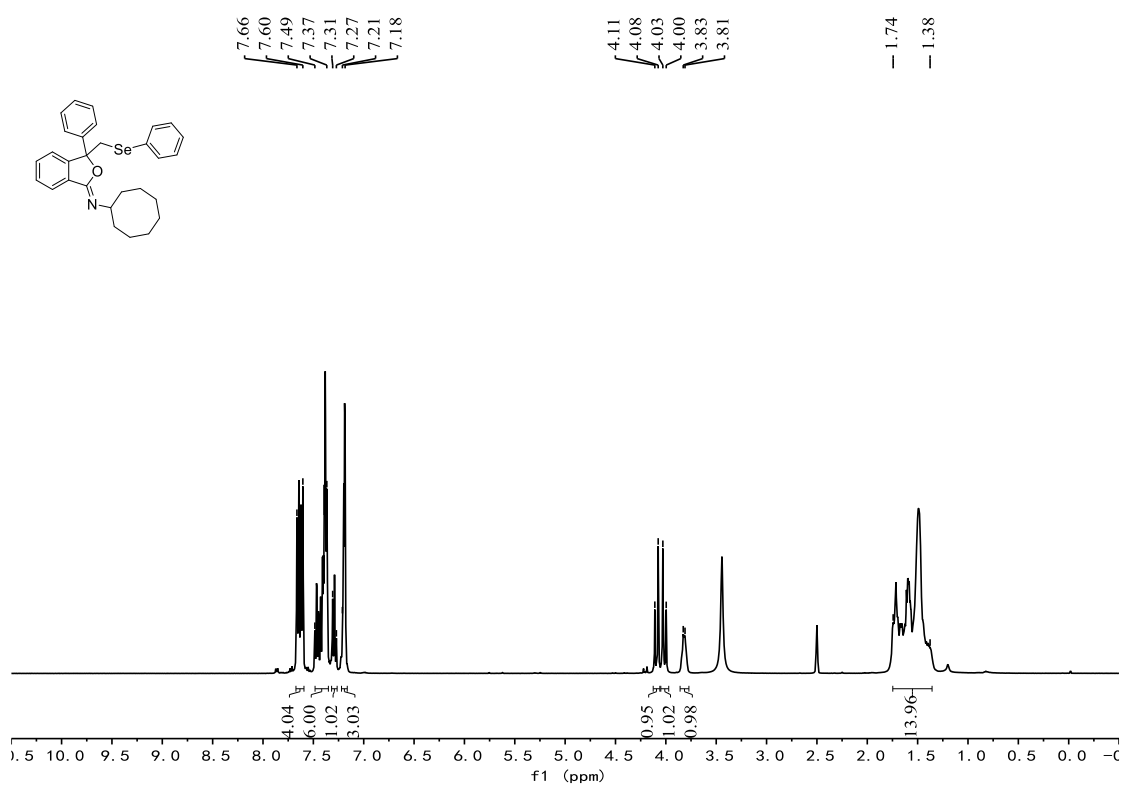
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21052601) of compound **3y**



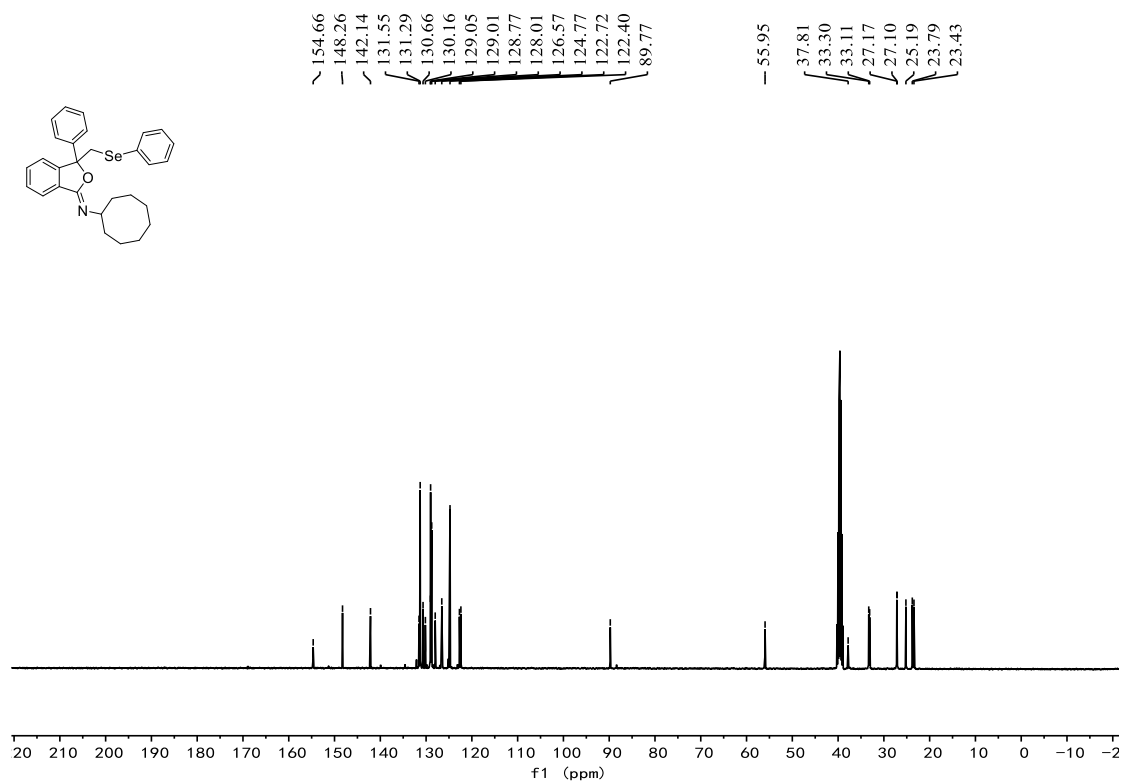
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21052601) of compound **3y**



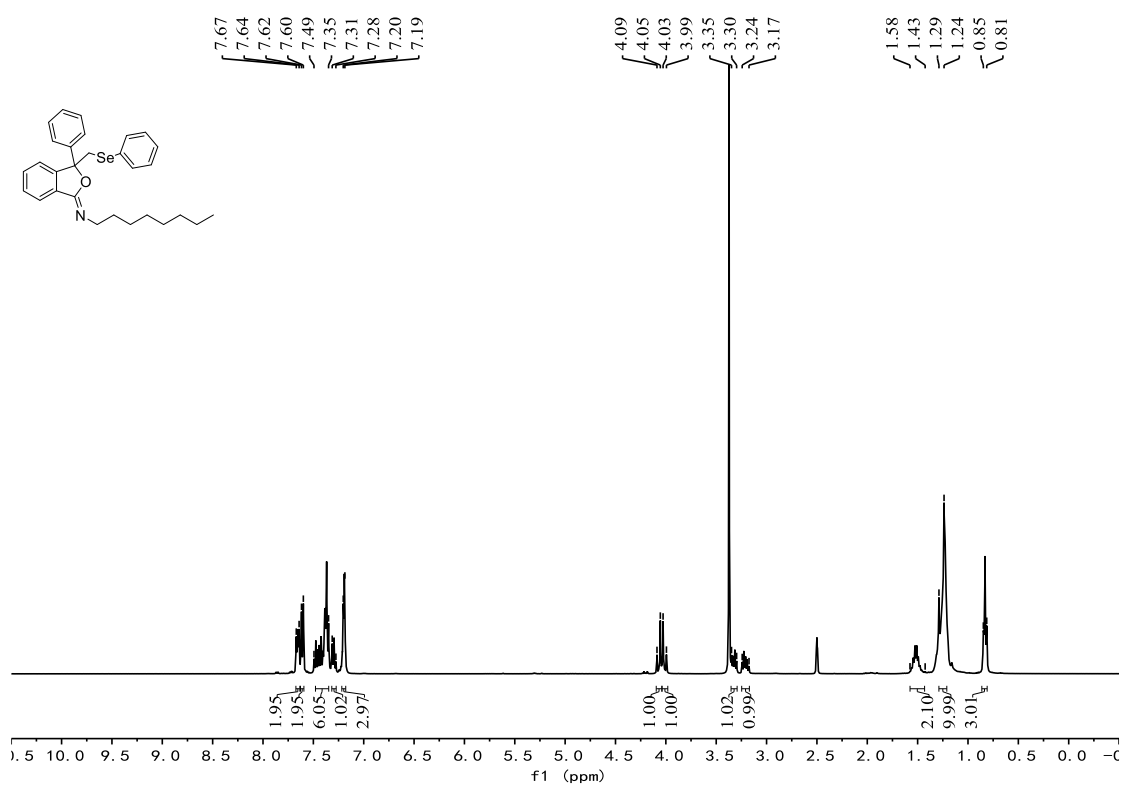
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21051804) of compound **3z**



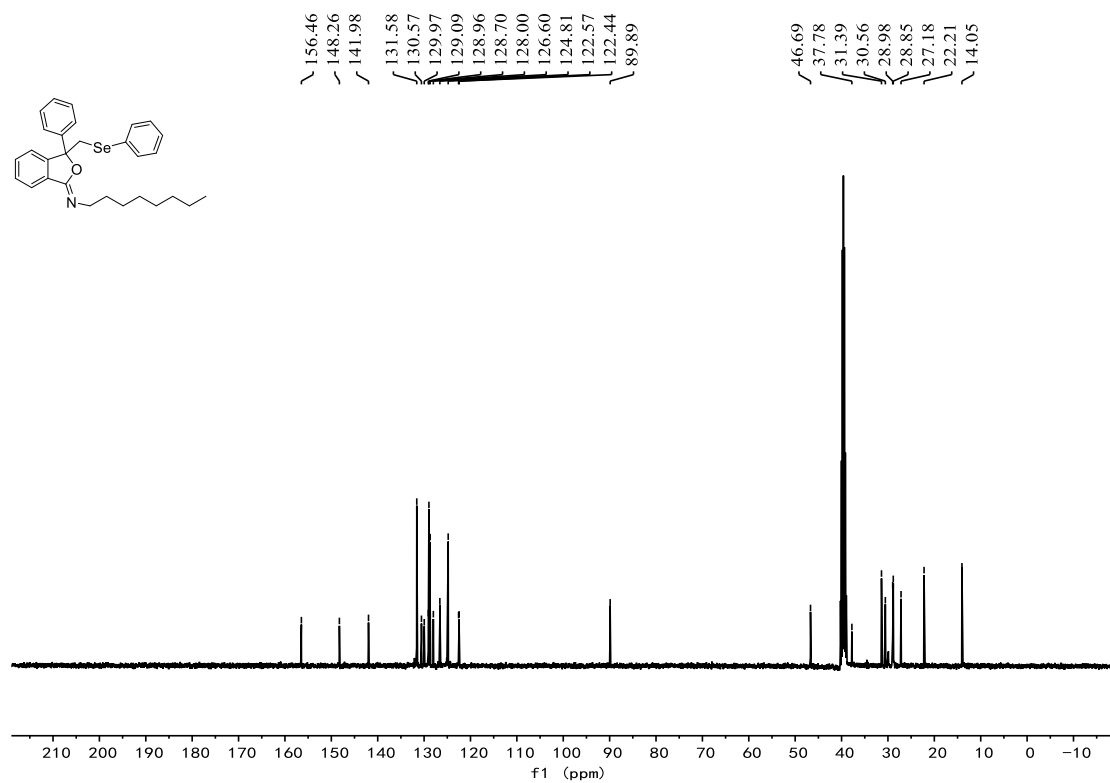
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21051804) of compound **3z**



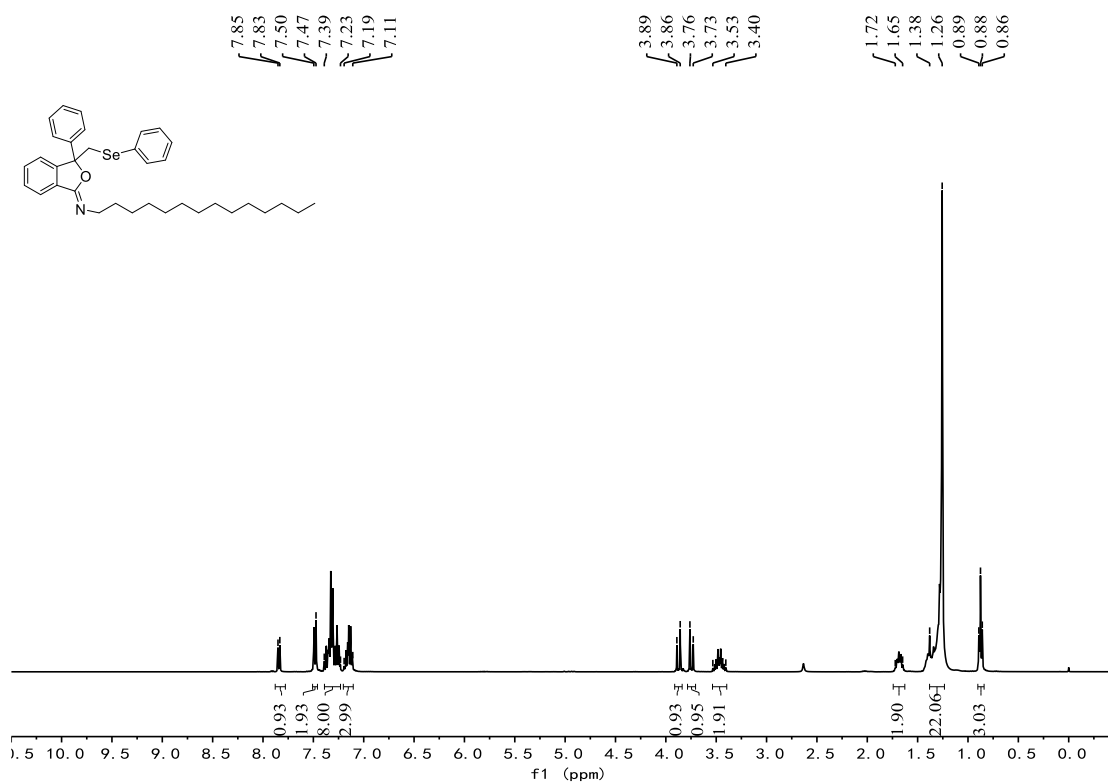
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21071605) of compound **3za**



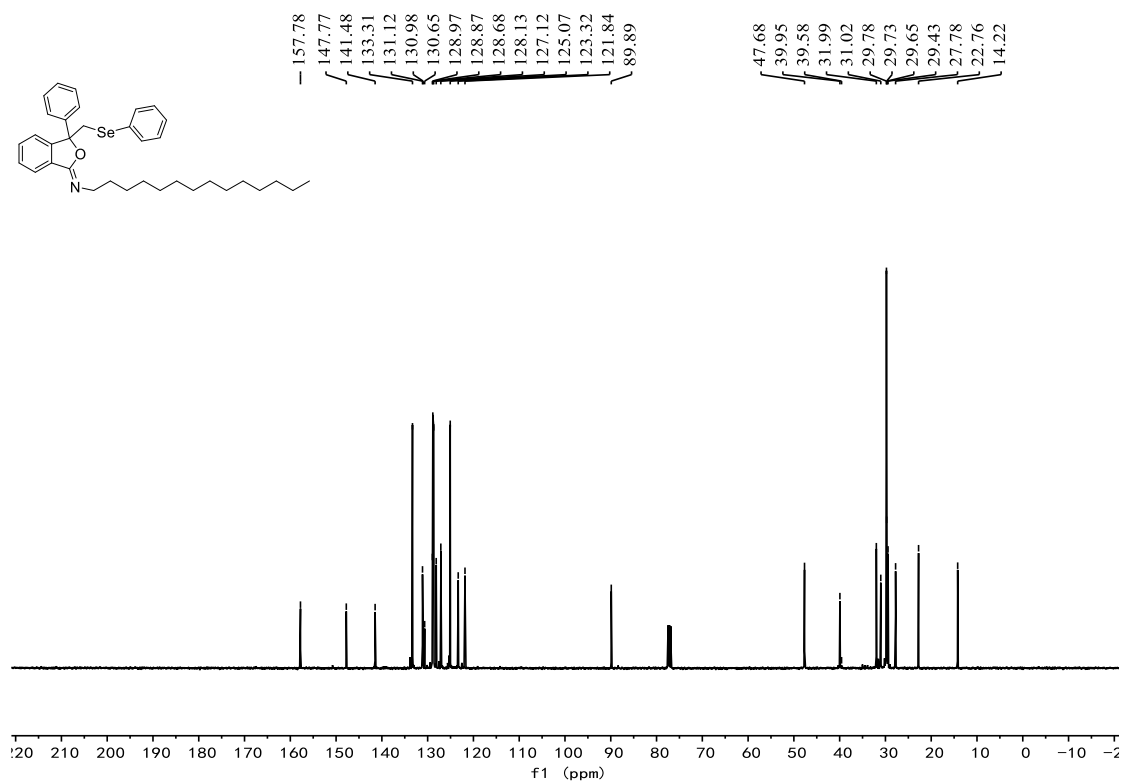
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH-13-53) of compound **3za**



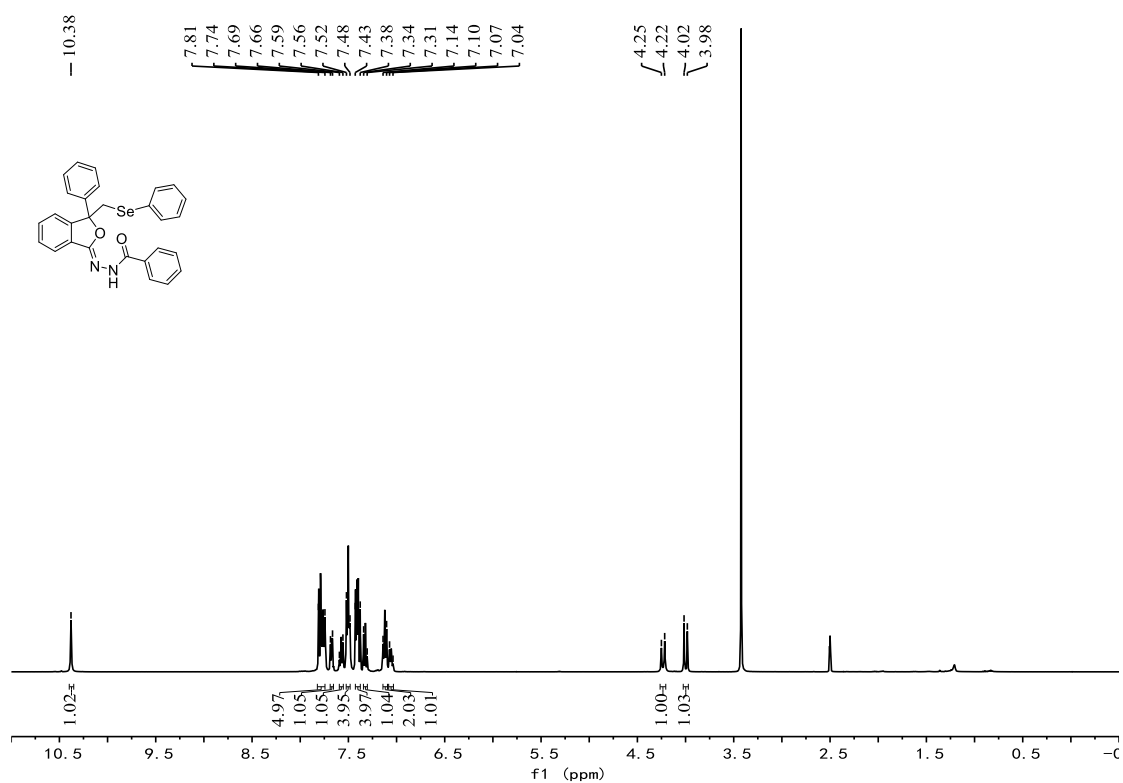
^1H NMR (400 MHz, CDCl_3 , LLH21071701) of compound **3zb**



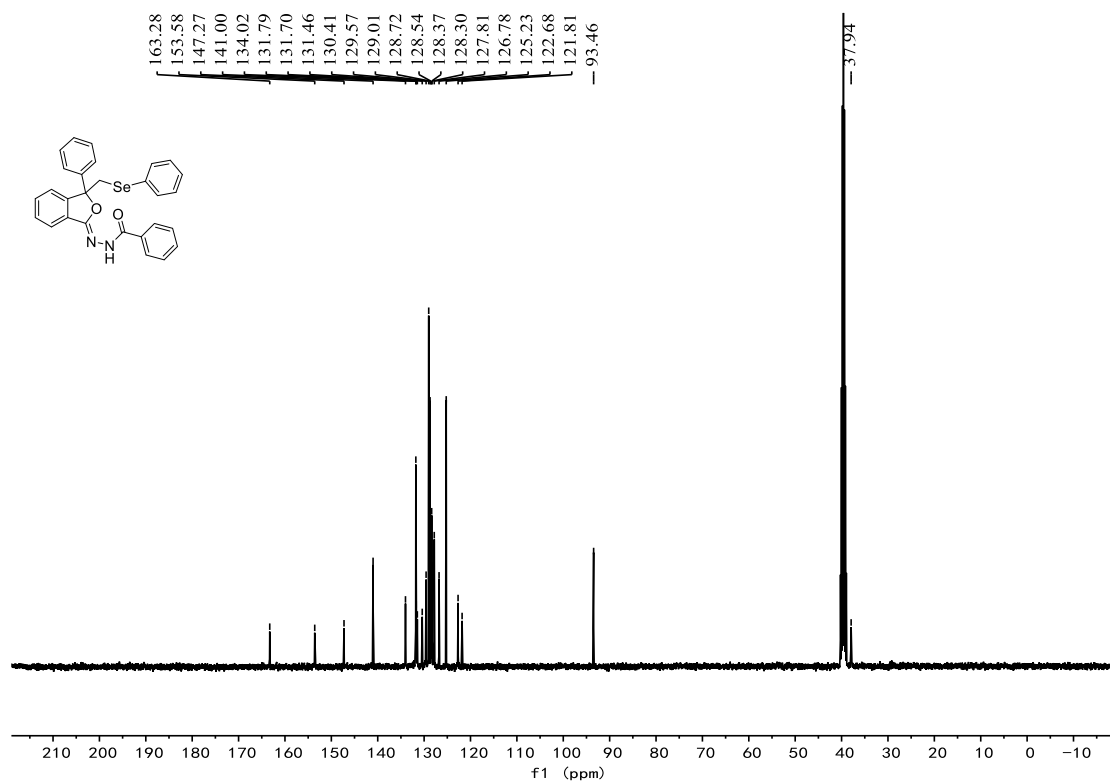
^{13}C NMR (101 MHz, CDCl_3 , LLH21071701) of compound **3zb**



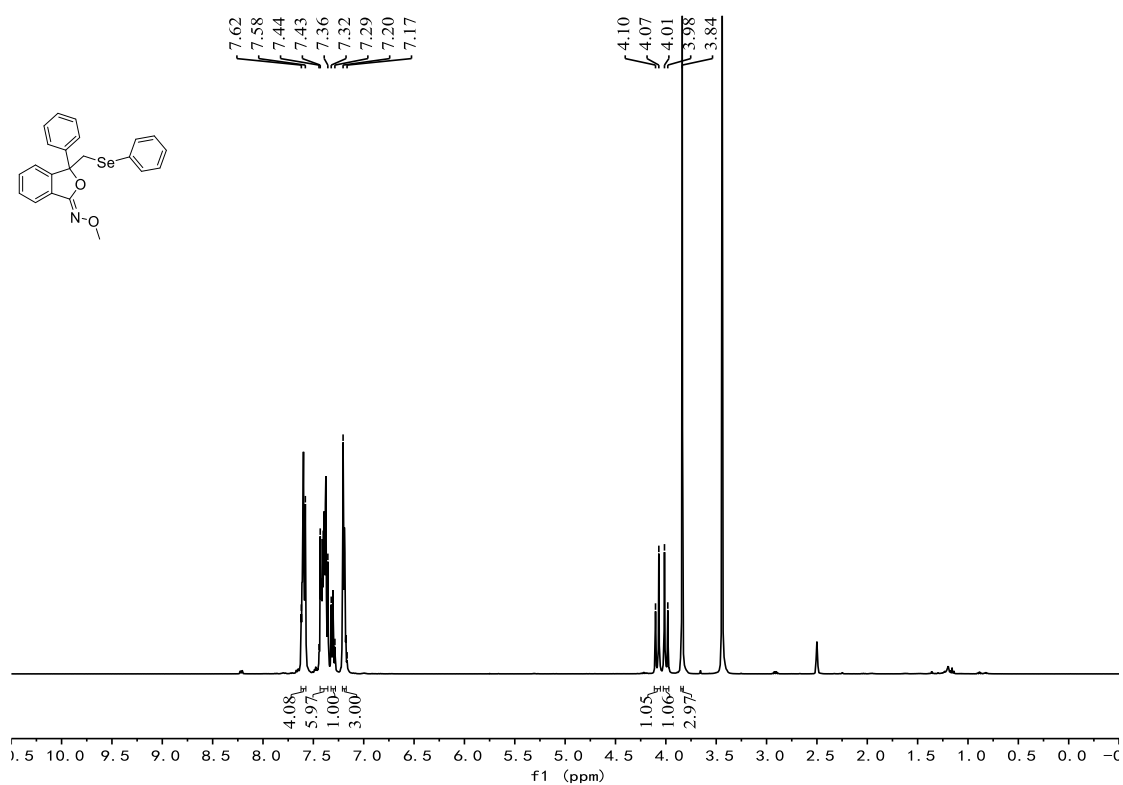
^1H NMR (400 MHz, $\text{DMSO-}d_6$, 59) of compound **3zc**



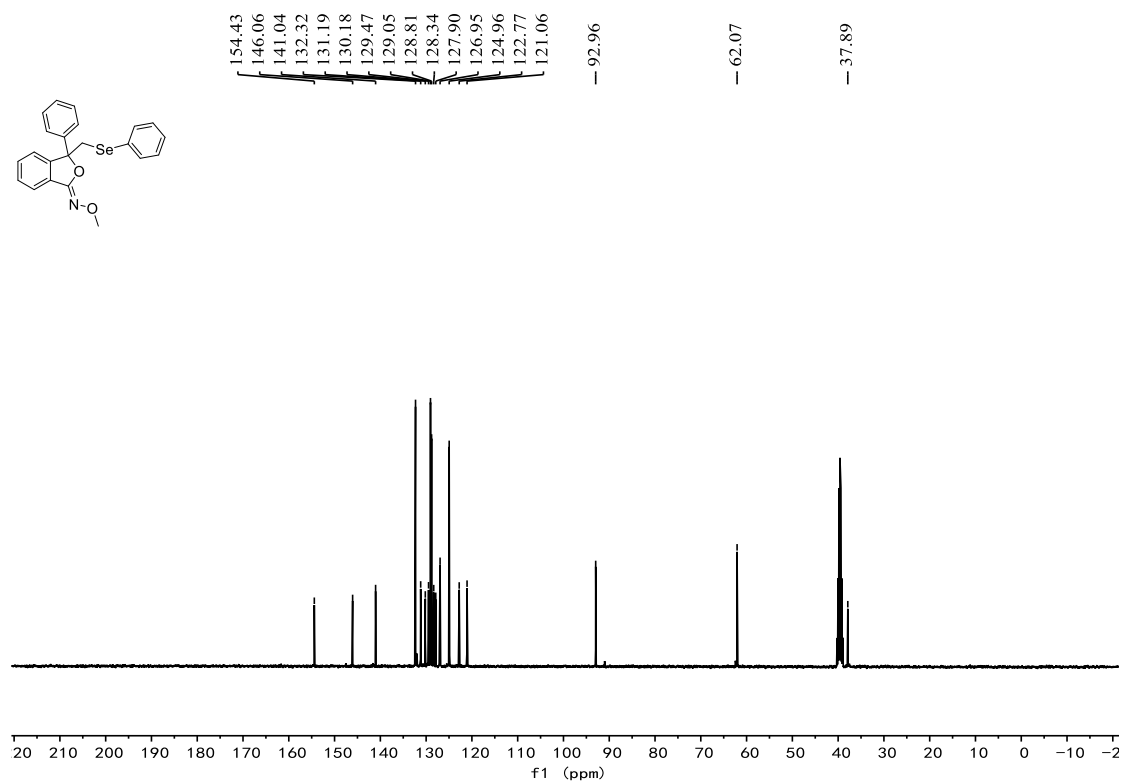
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, 59) of compound **3zc**



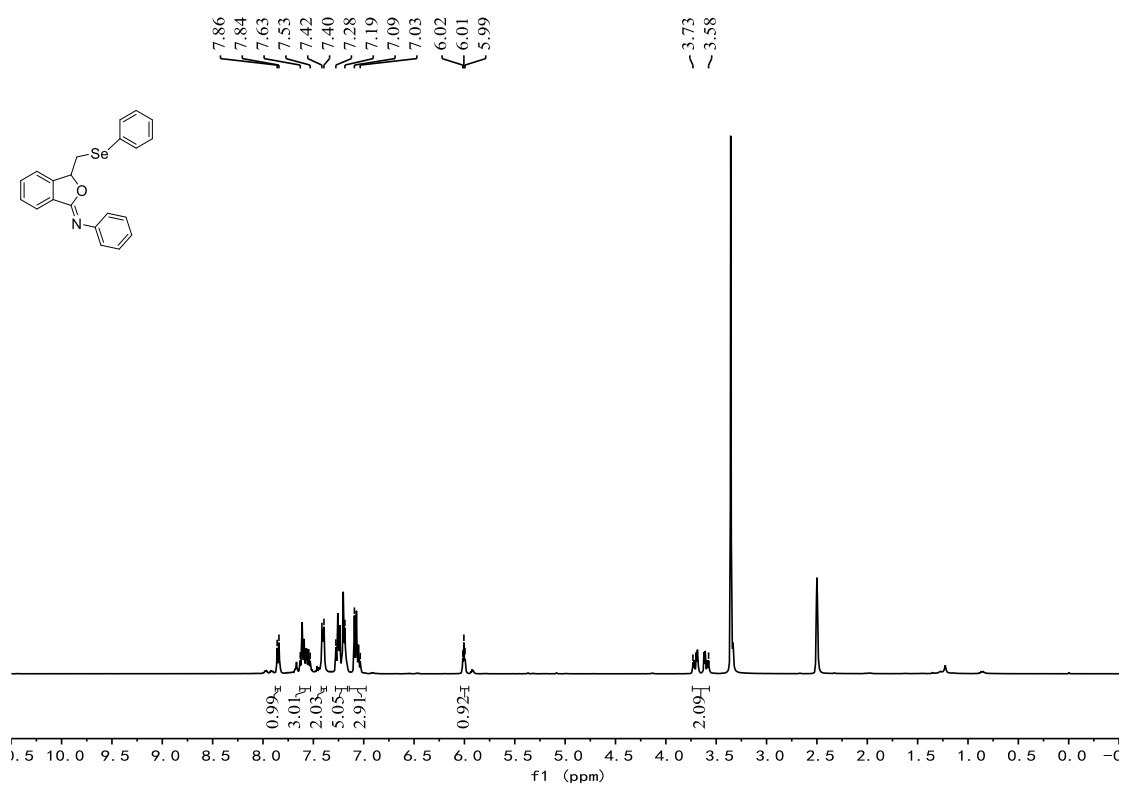
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH21071605) of compound **3zd**



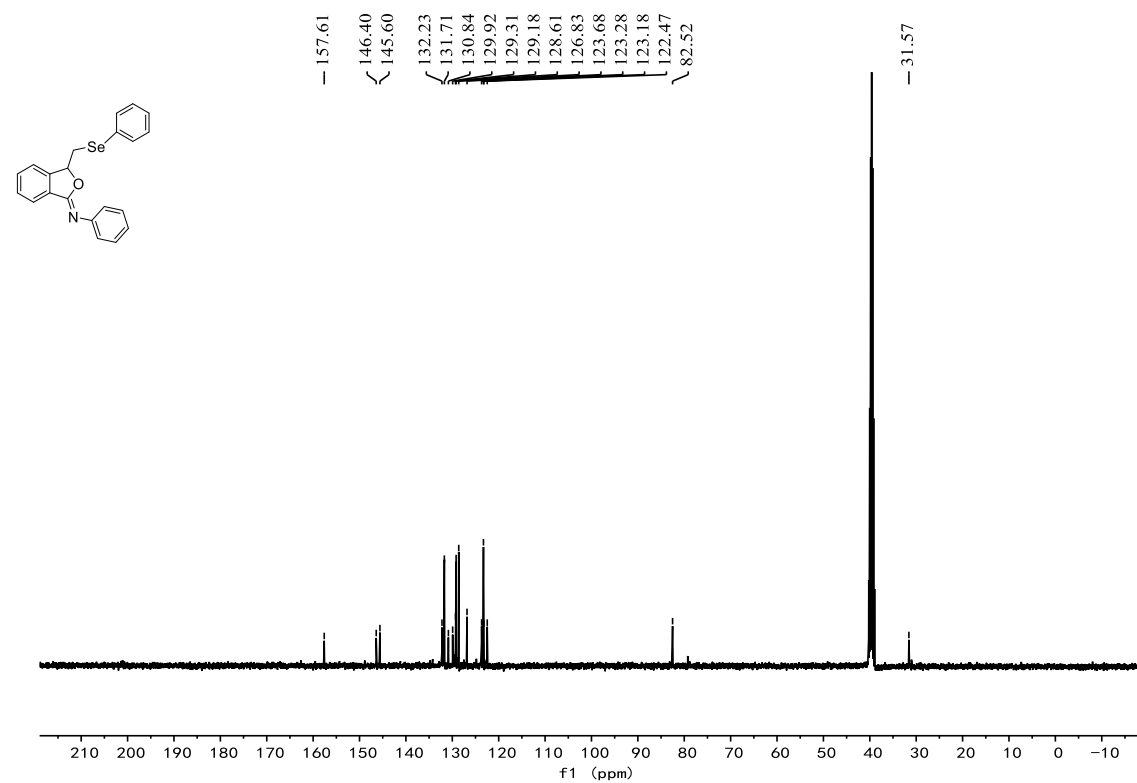
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21071605) of compound **3zd**



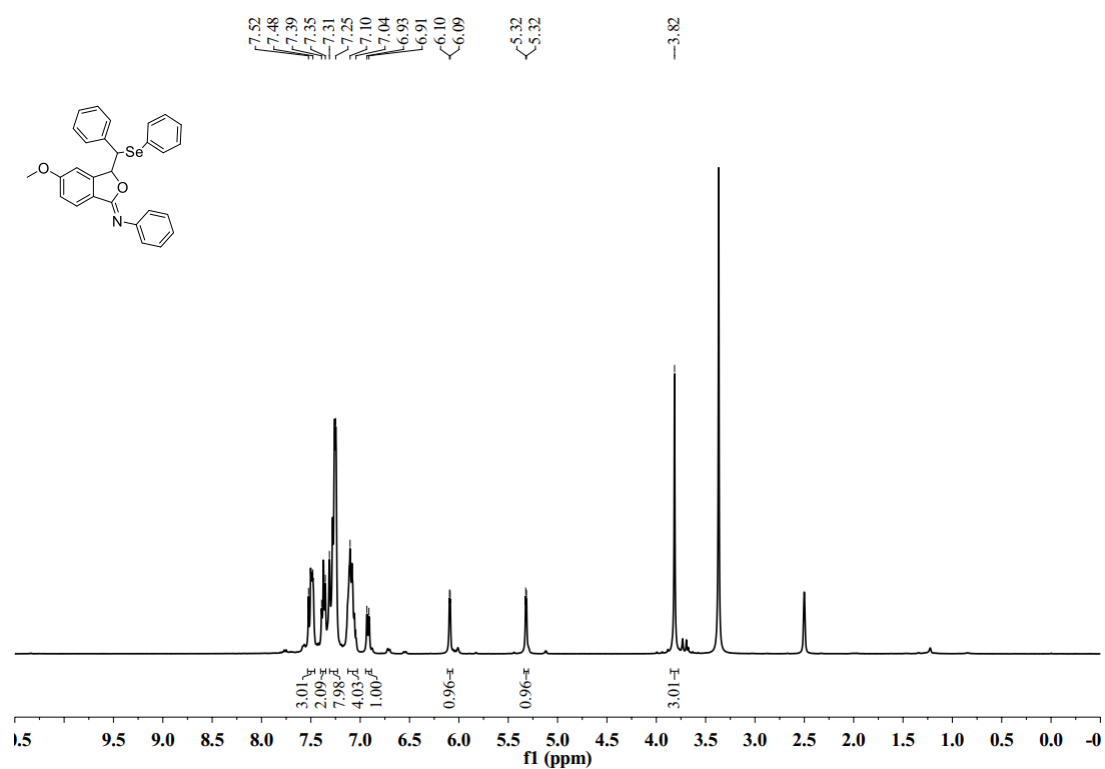
^1H NMR (400 MHz, $\text{DMSO-}d_6$, llh-15-048) of compound **3ze**



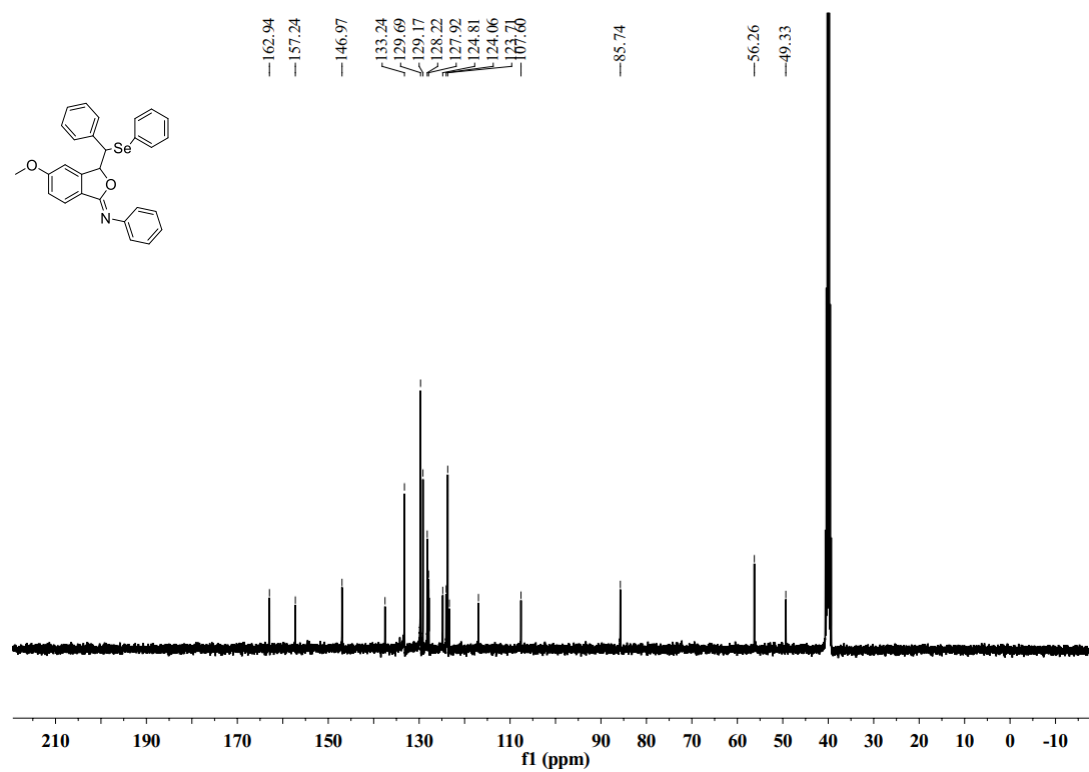
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, llh-15-048) of compound **3ze**



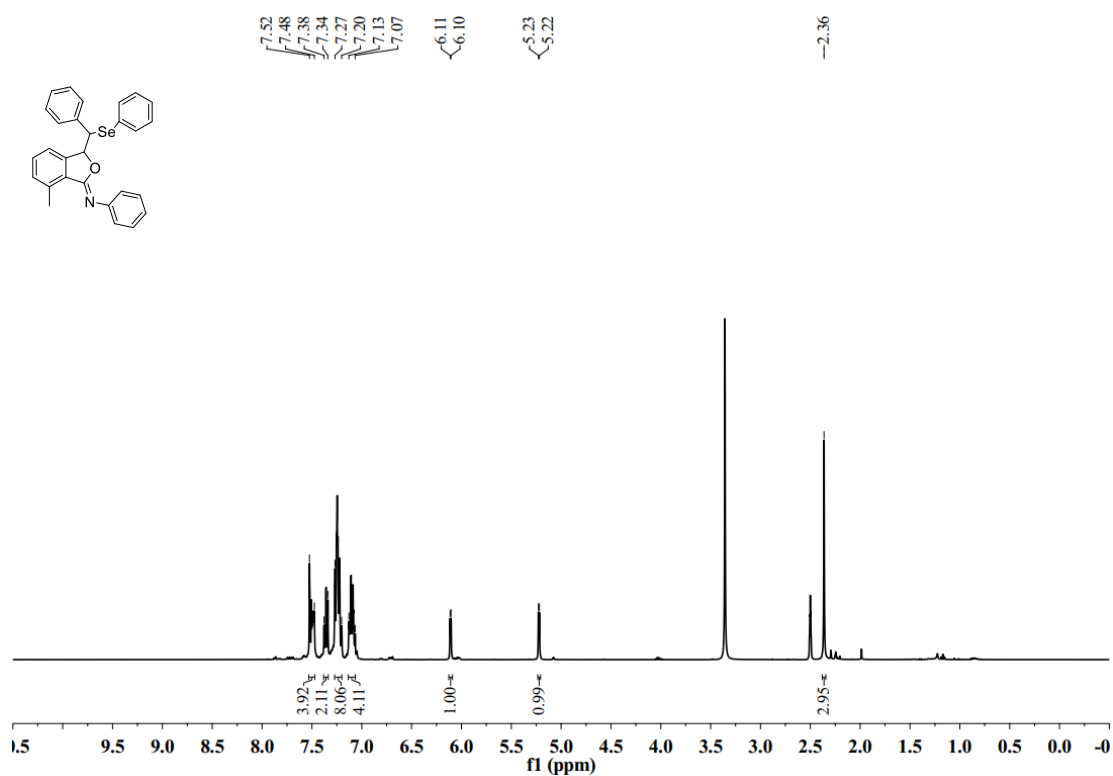
¹H NMR (400 MHz, DMSO-*d*₆, LLH-186-3) of compound **3zf**



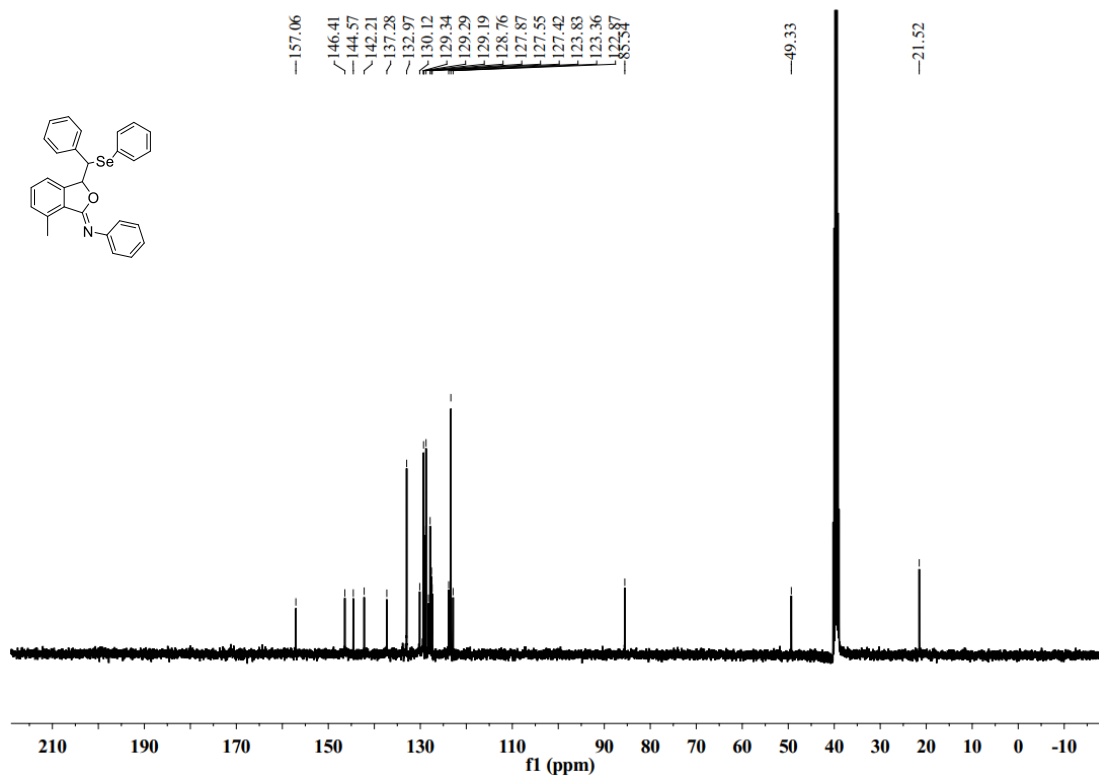
¹³C NMR (101MHz, DMSO-*d*₆, llh-186-3) of compound **3zf**



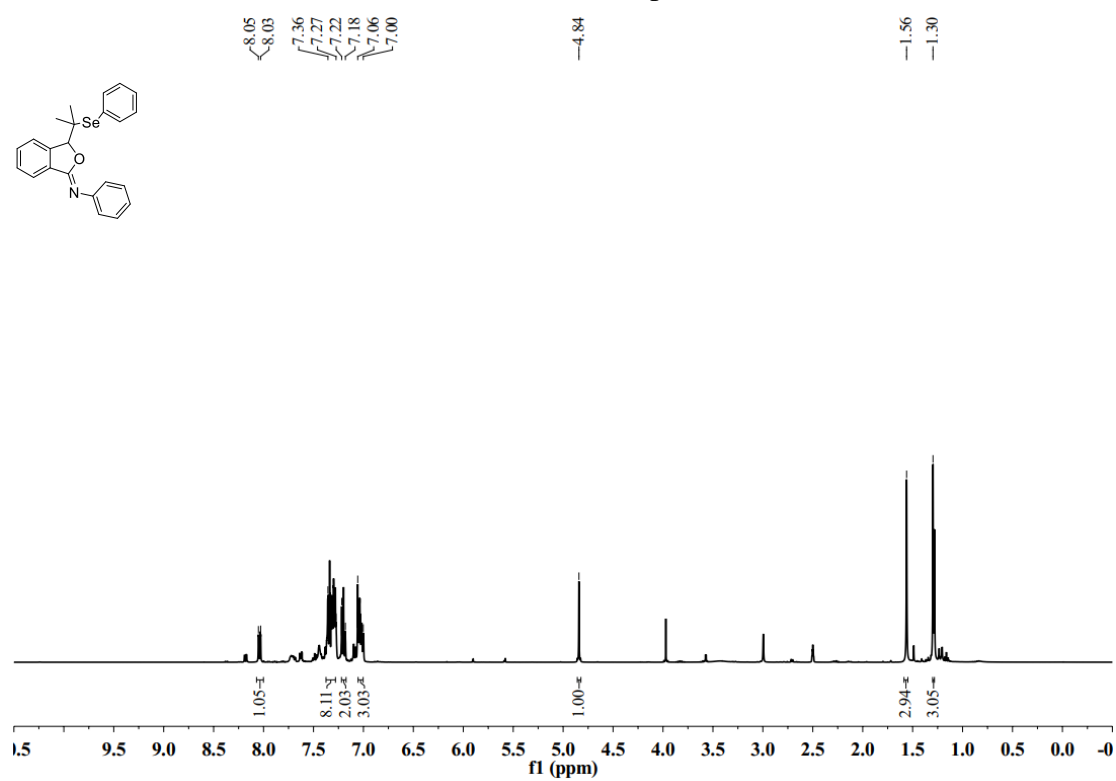
^1H NMR (400 MHz, $\text{DMSO-}d_6$, llh-185-3) of compound **3zg**



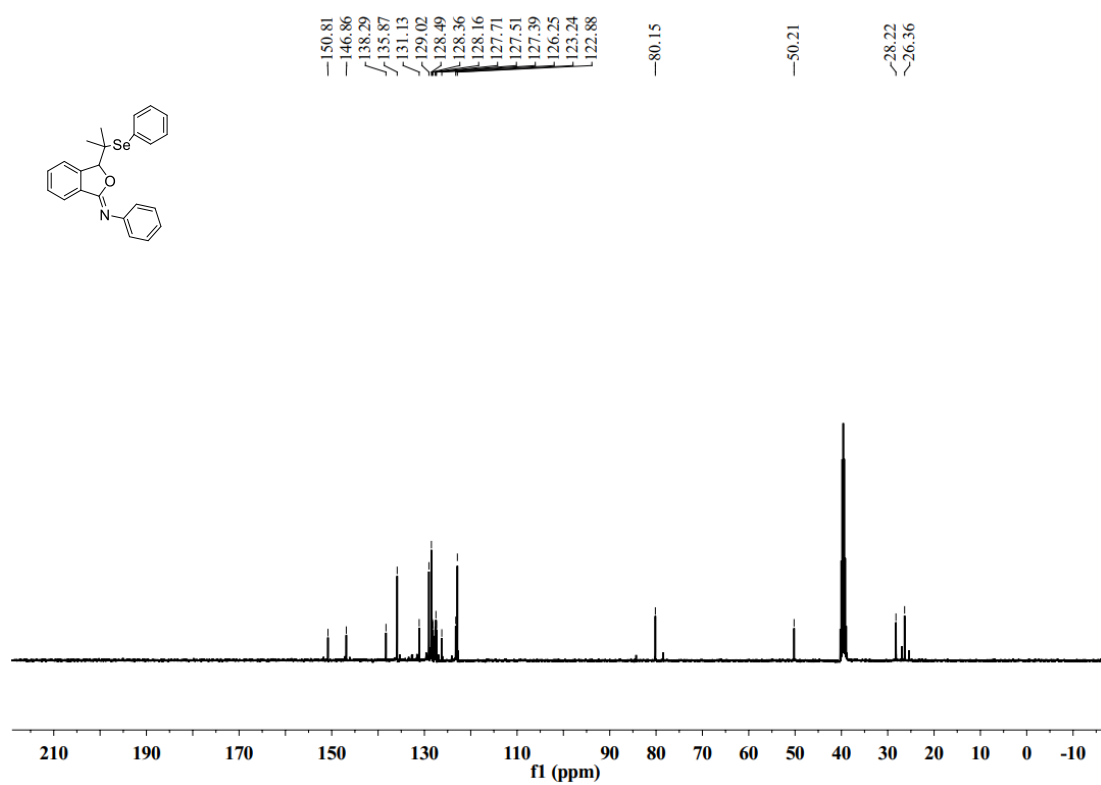
^{13}C NMR (101MHz, $\text{DMSO-}d_6$, llh-185-3) of compound **3zg**



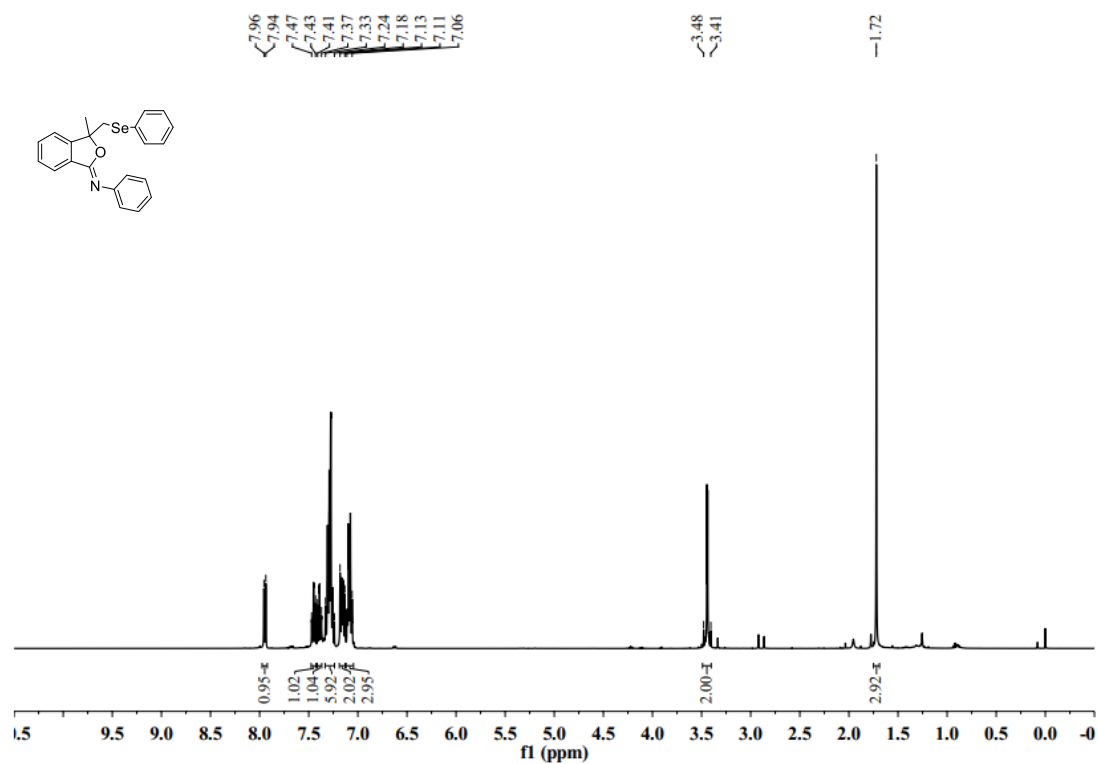
^1H NMR (400 MHz, $\text{DMSO-}d_6$, lh-180-4) of compound **3zh**



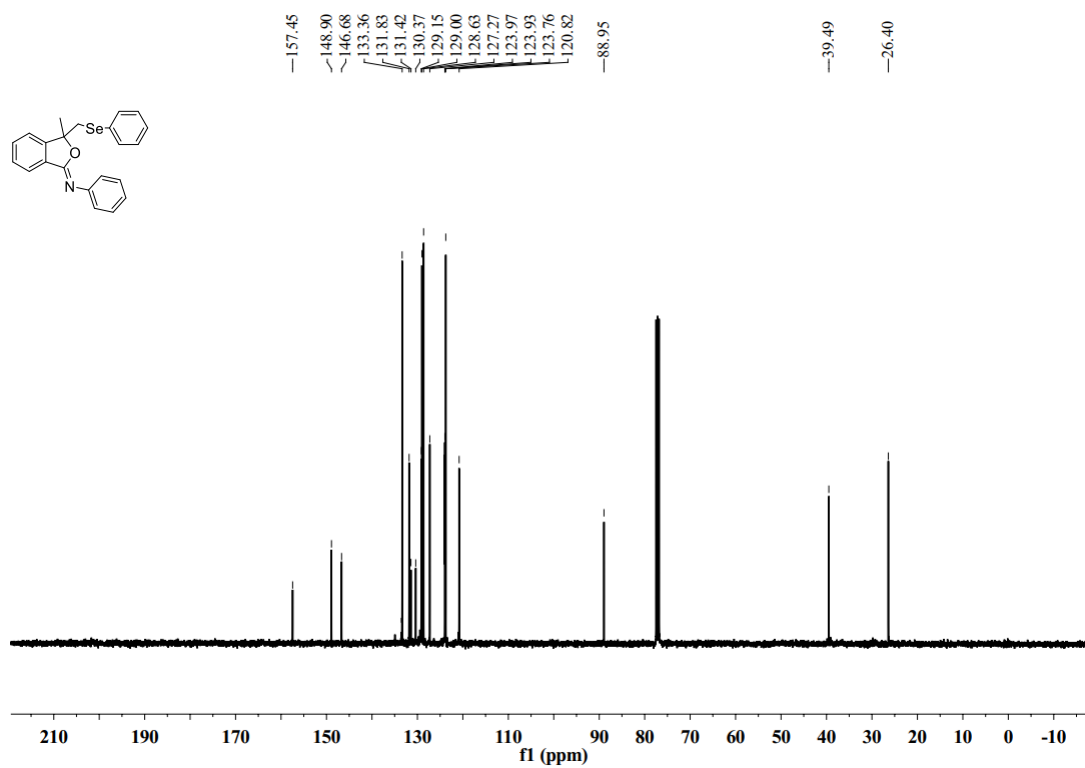
^{13}C NMR (101MHz, $\text{DMSO-}d_6$, lh-180-4) of compound **3zh**



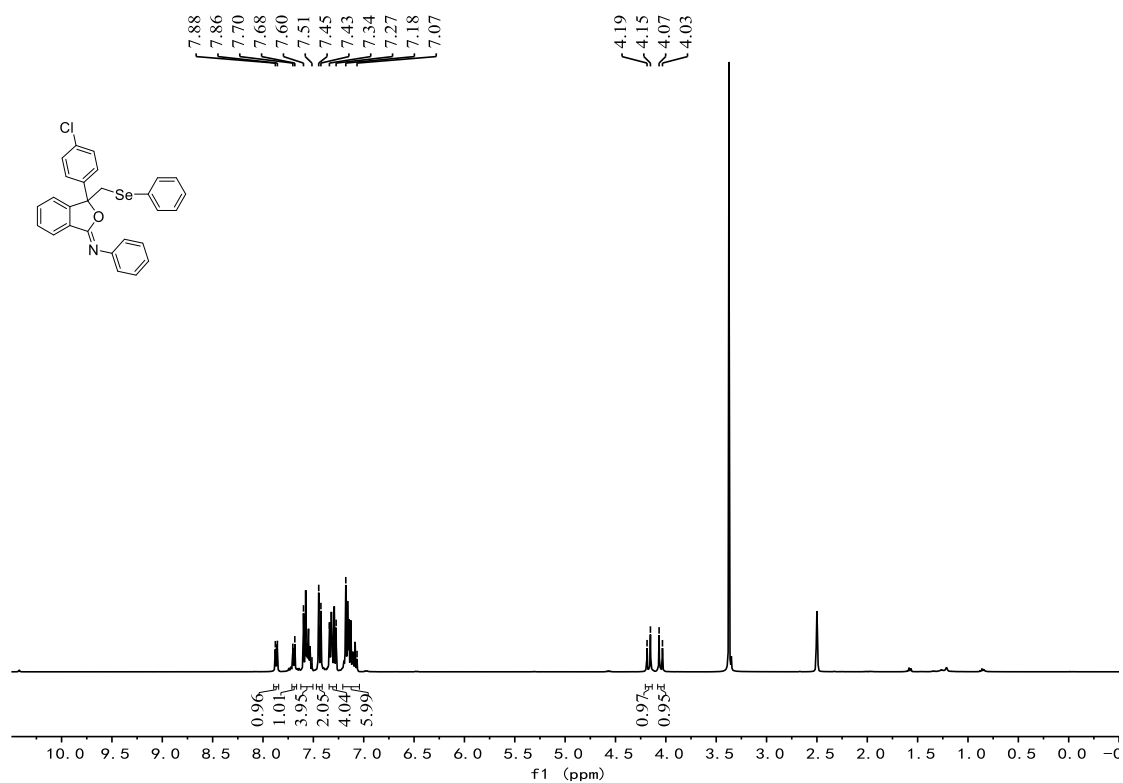
^1H NMR (400 MHz, CDCl_3 , llh-2-31-2) of compound **3zi**



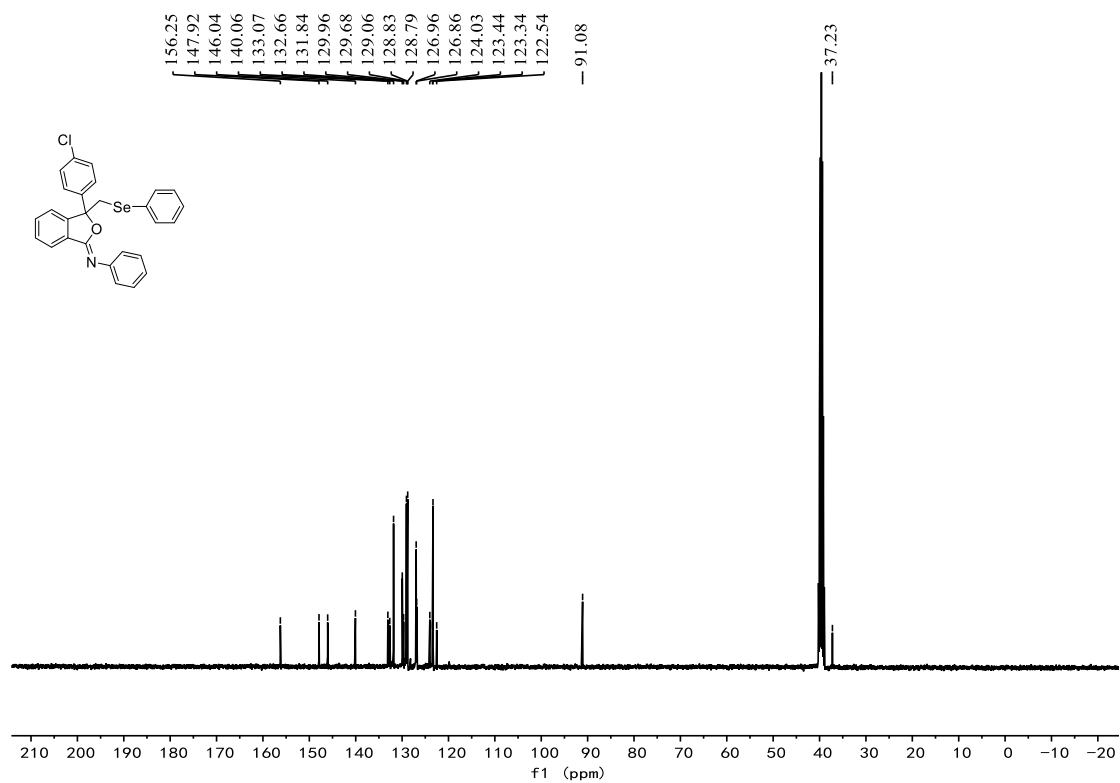
^{13}C NMR (101 MHz, CDCl_3 , llh-2-31-2) of compound **3zi**



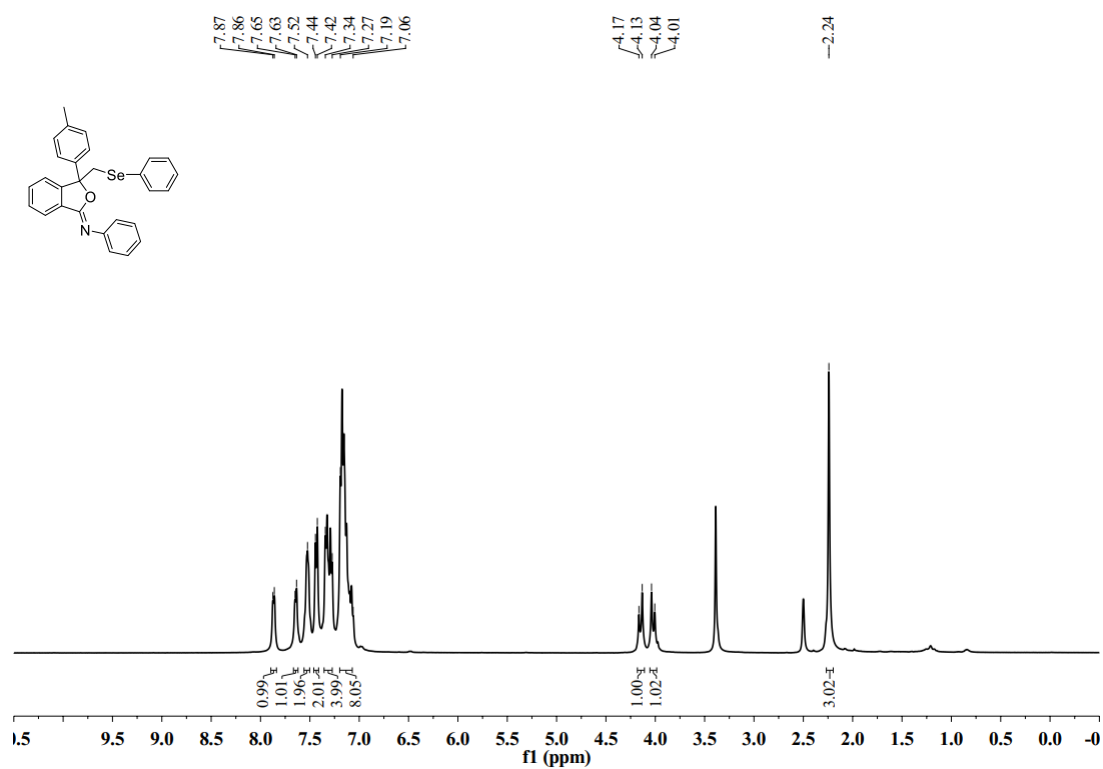
^1H NMR (400 MHz, $\text{DMSO-}d_6$, llh-16-50) of compound **3zj**



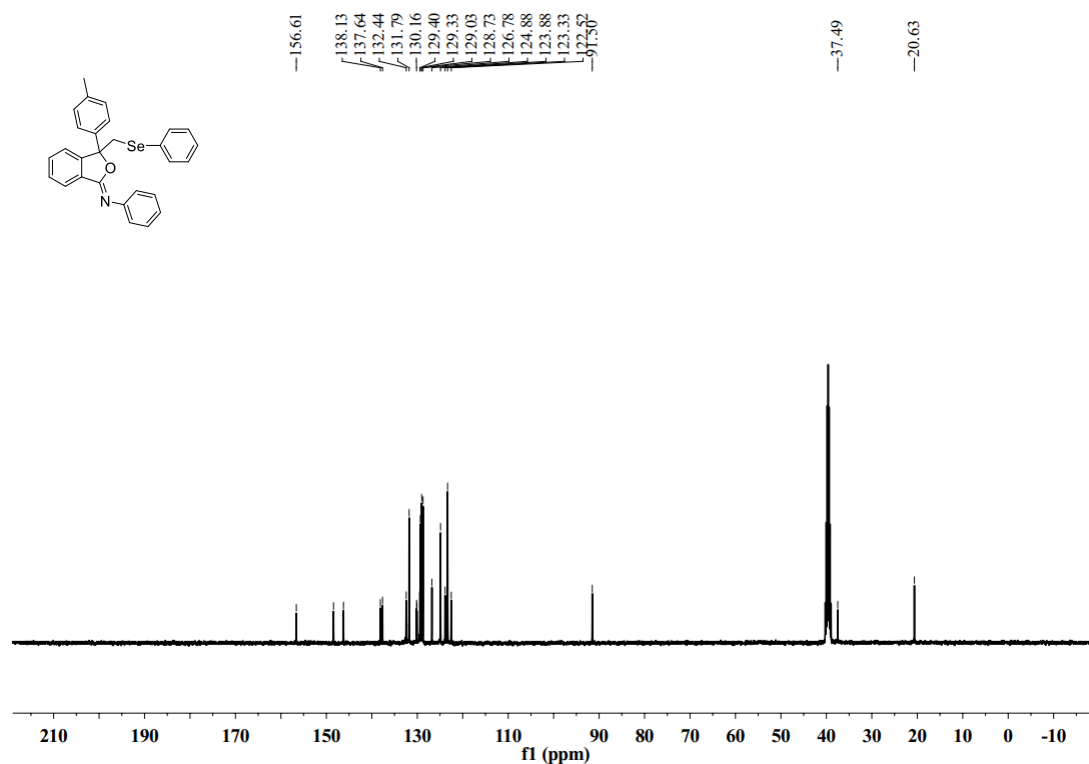
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, llh-16-50) of compound **3zj**



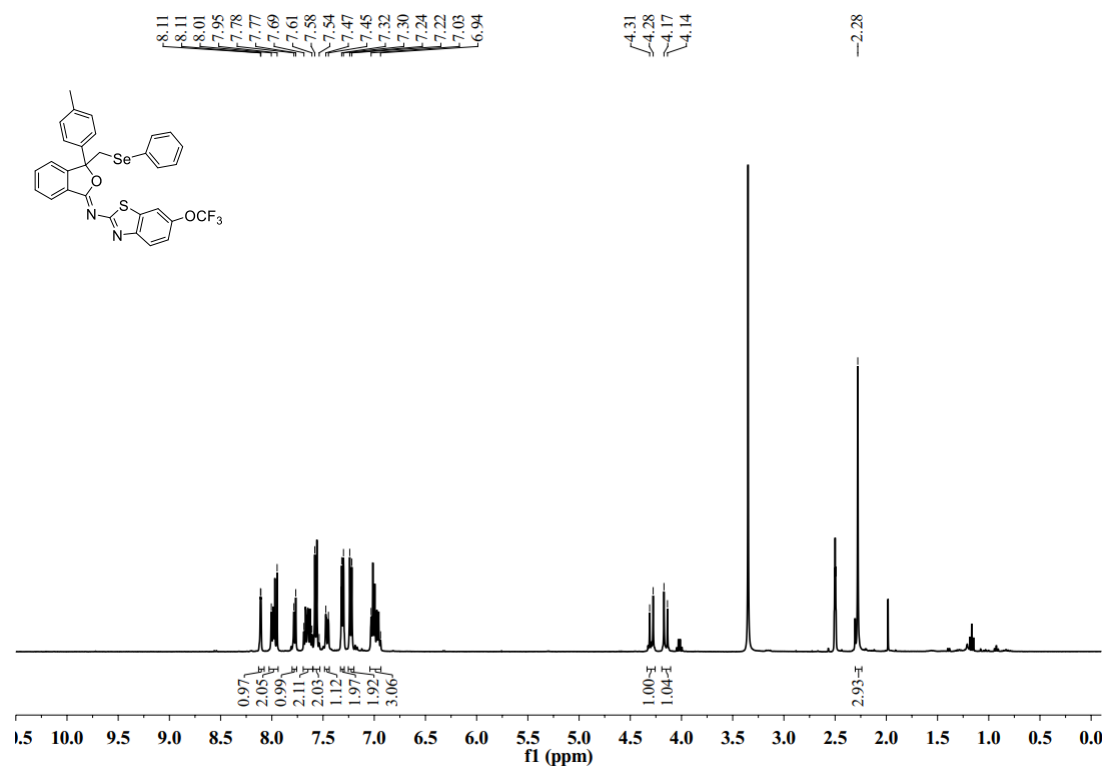
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH-174-4) of compound **3zk**



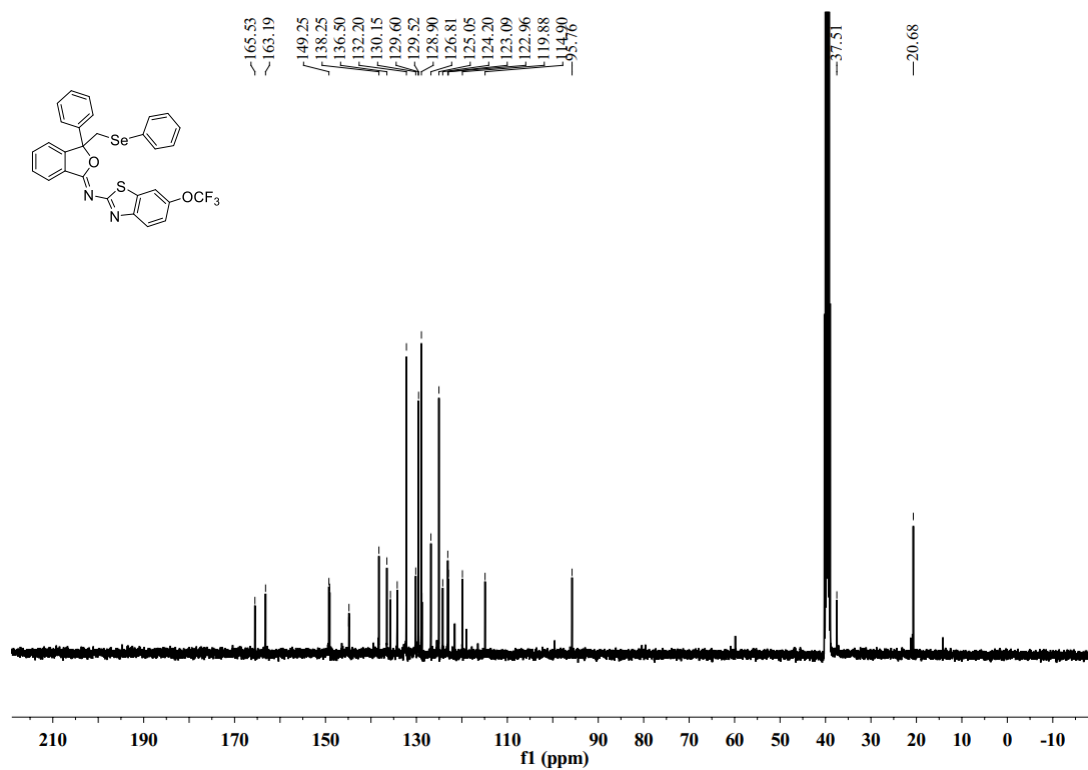
^{13}C NMR (101MHz, $\text{DMSO-}d_6$, LLH-174-4) of compound **3zk**



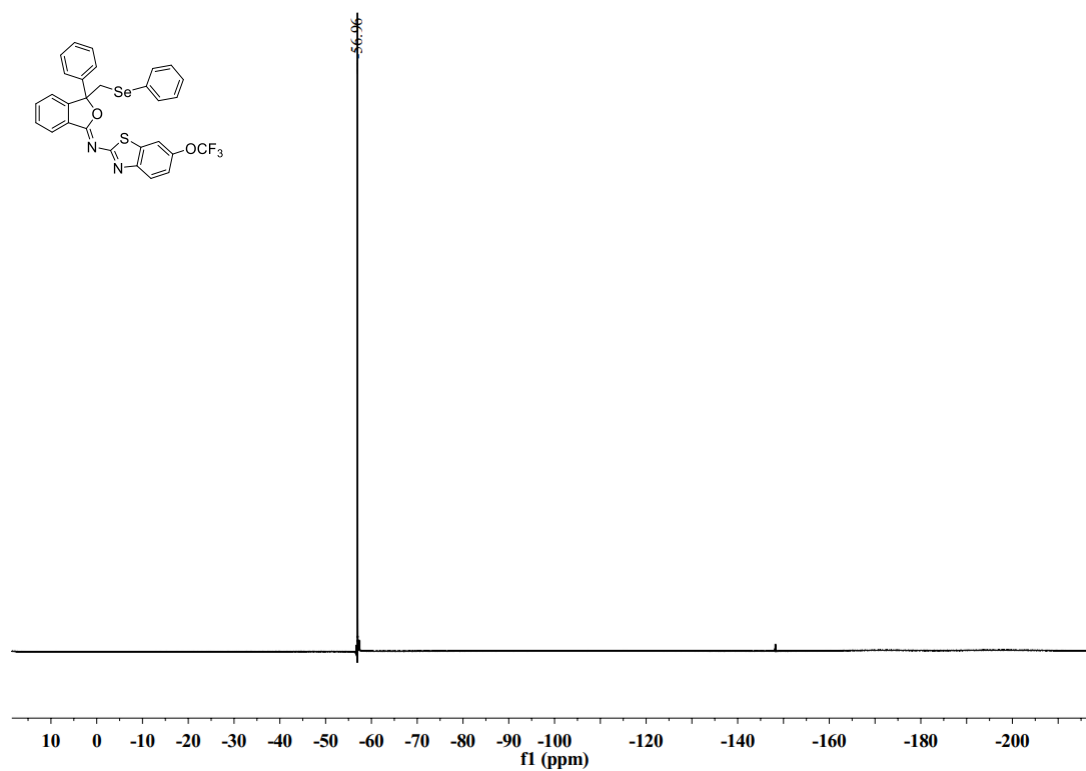
^1H NMR (400 MHz, $\text{DMSO-}d_6$, llh-2-31-4) of compound **3zl**



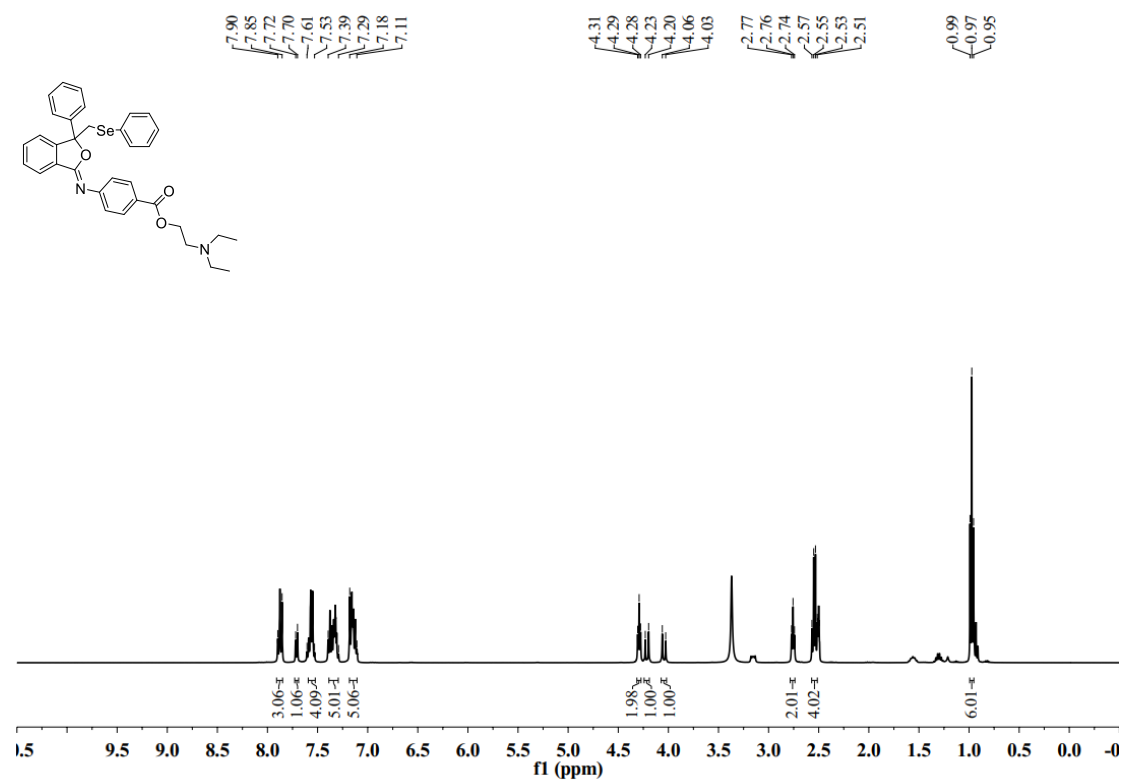
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, llh-2-31-4) of compound **3zl**



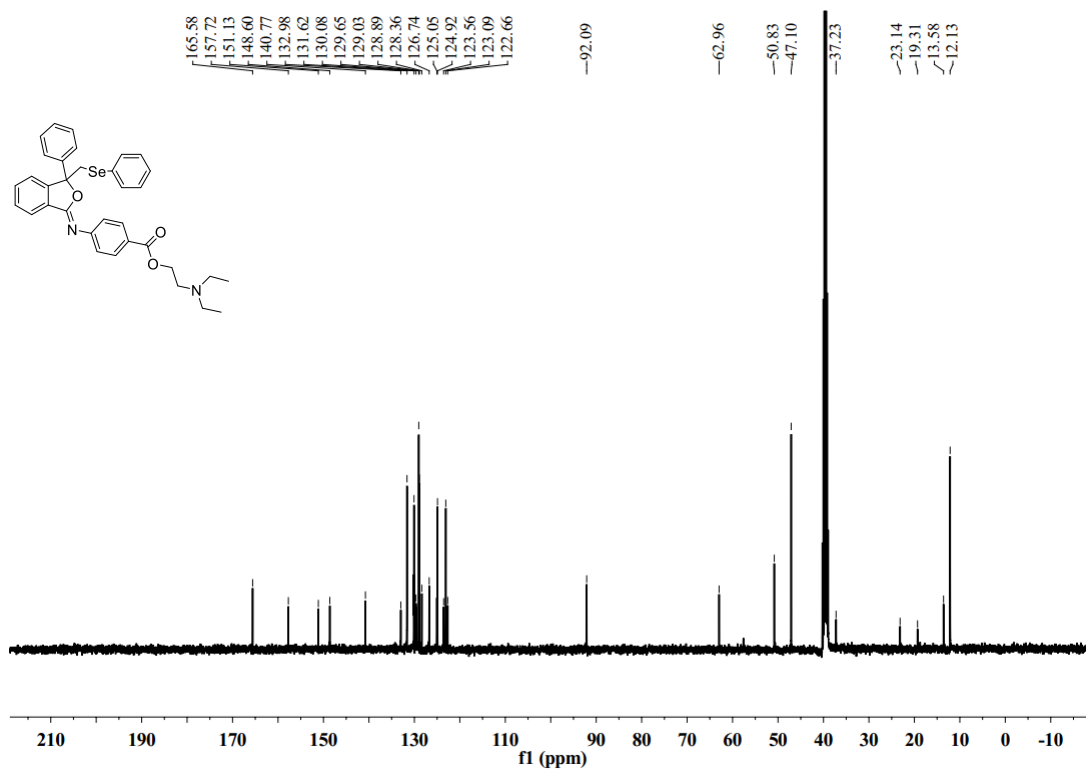
^{19}F NMR (400 MHz, $\text{DMSO-}d_6$, llh-2-31-4) of compound **3zl**



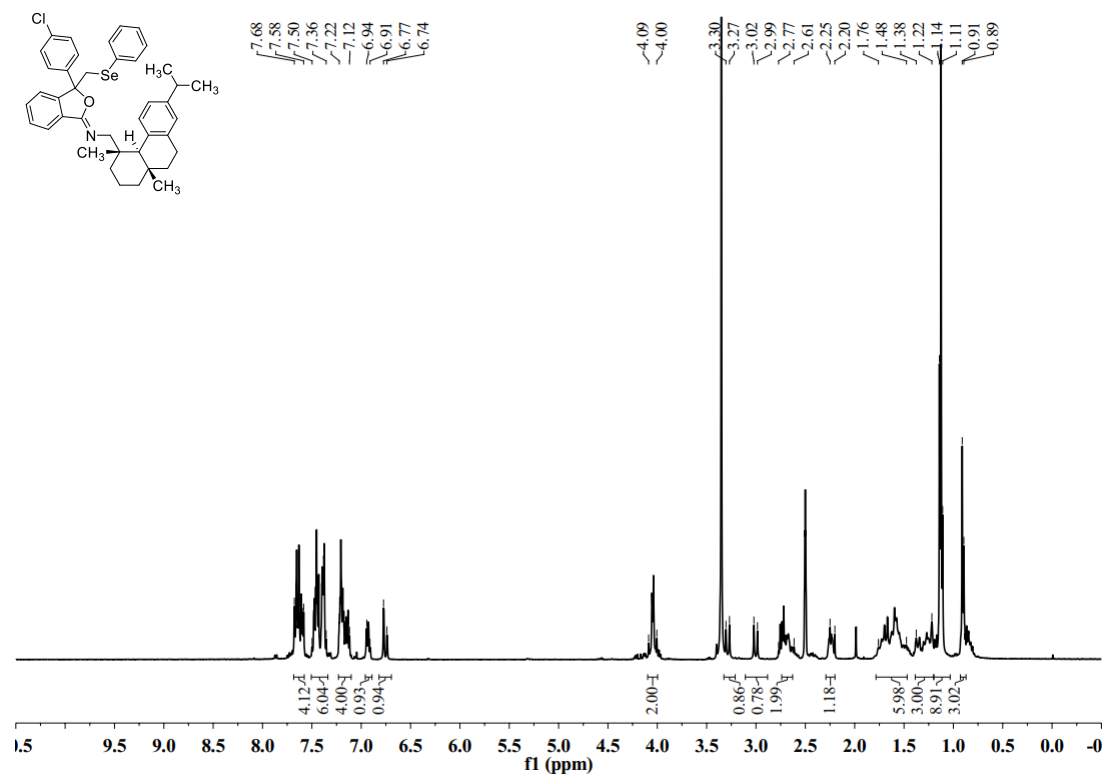
^1H NMR (400 MHz, $\text{DMSO-}d_6$, LLH-175-4) of compound **3zm**



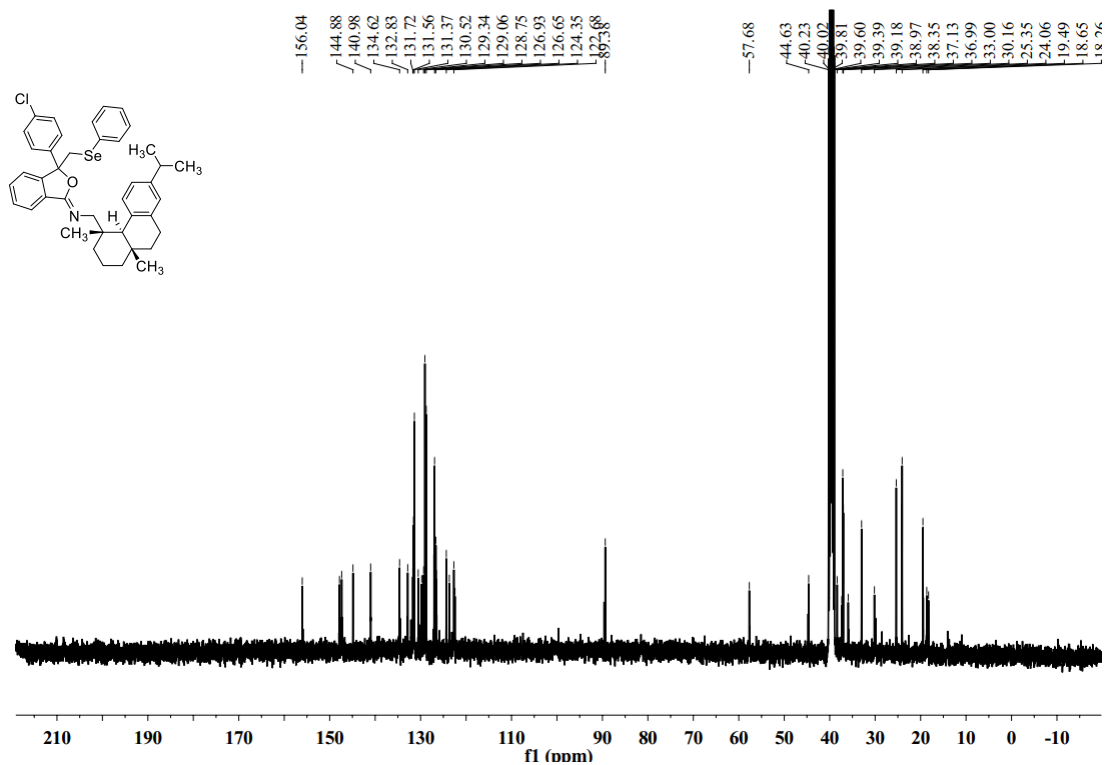
^{13}C NMR (101MHz, DMSO- d_6 , LLH-175-4) of compound **3zm**



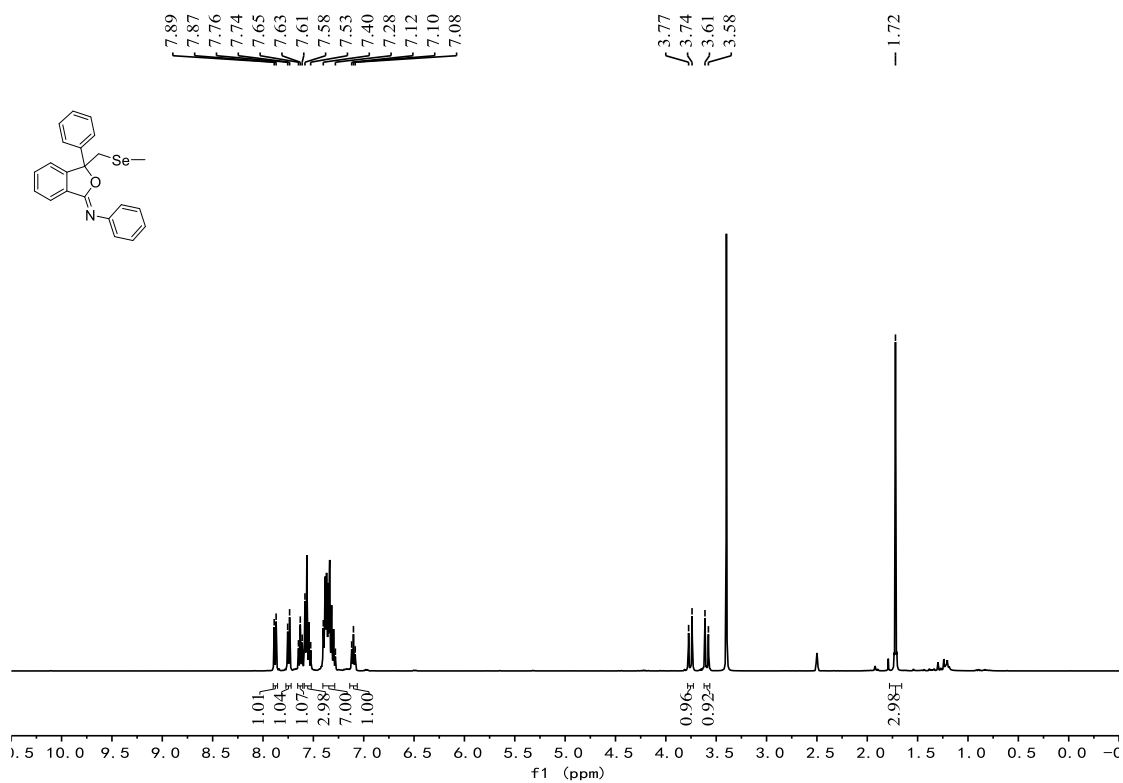
^1H NMR (400 MHz, DMSO- d_6 , LLH-186-1) of compound **3zn**



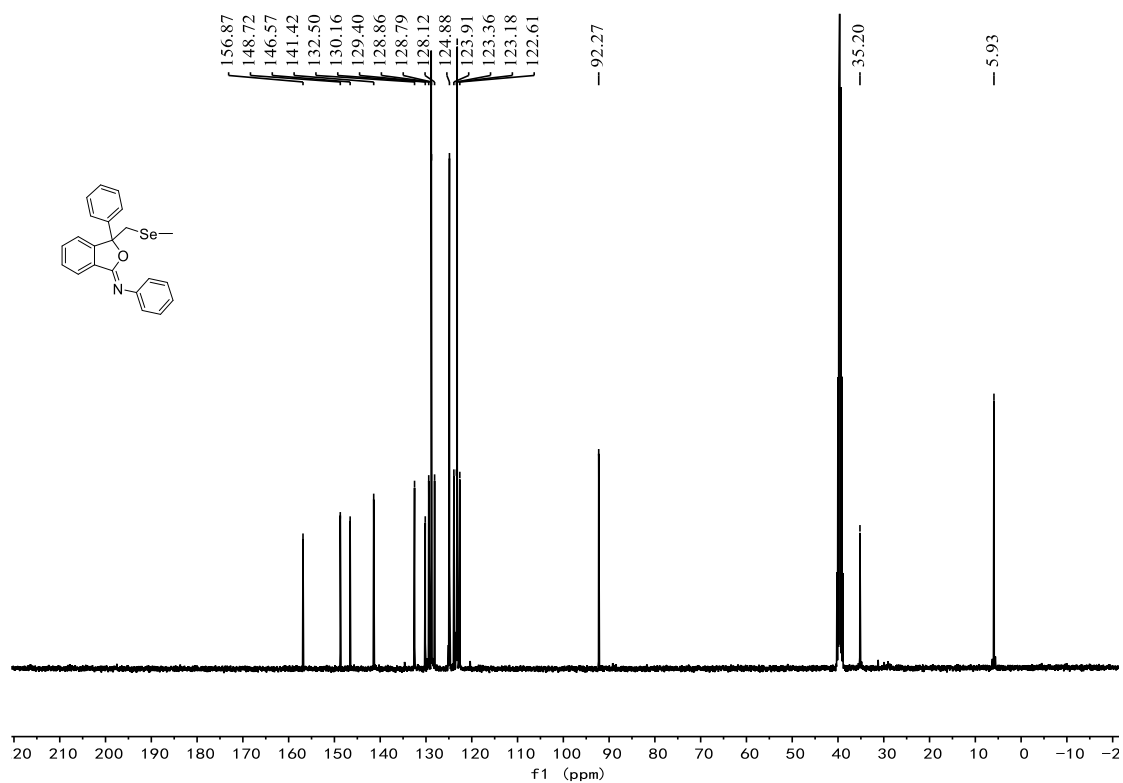
^{13}C NMR (101MHz, DMSO- d_6 , LLH-186-1) of compound **3zn**



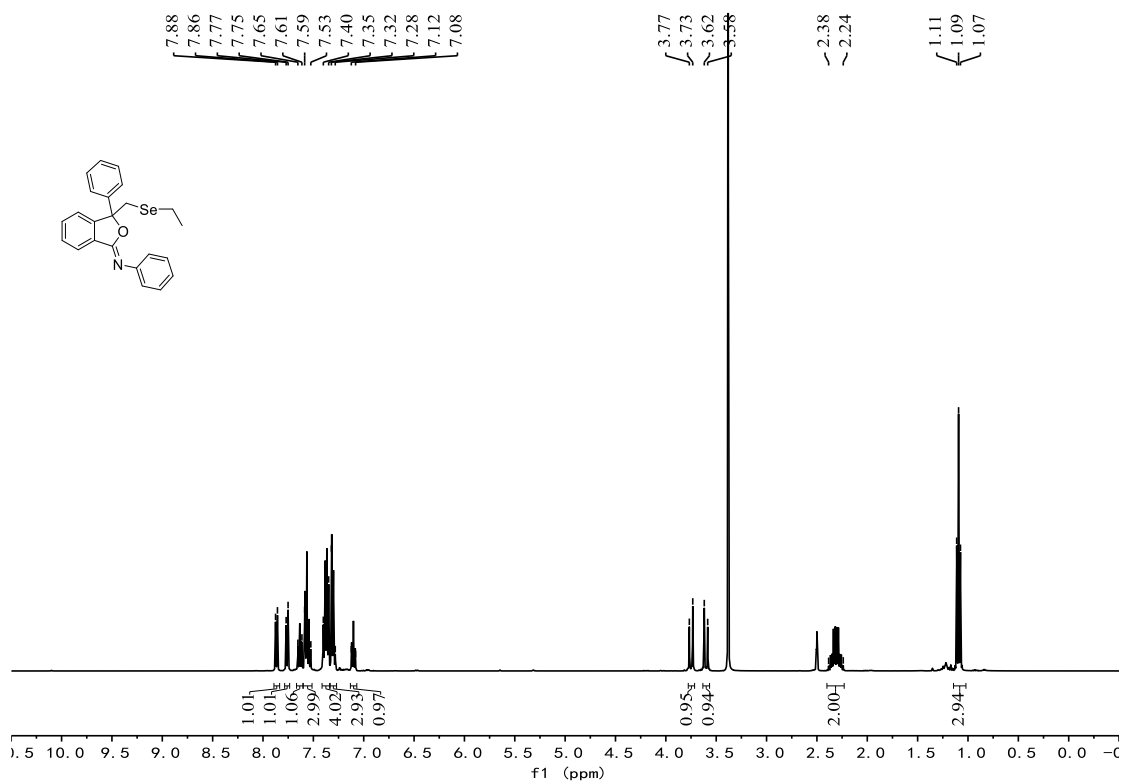
^1H NMR (400 MHz, DMSO- d_6 , LLH21071201) of compound **4a**



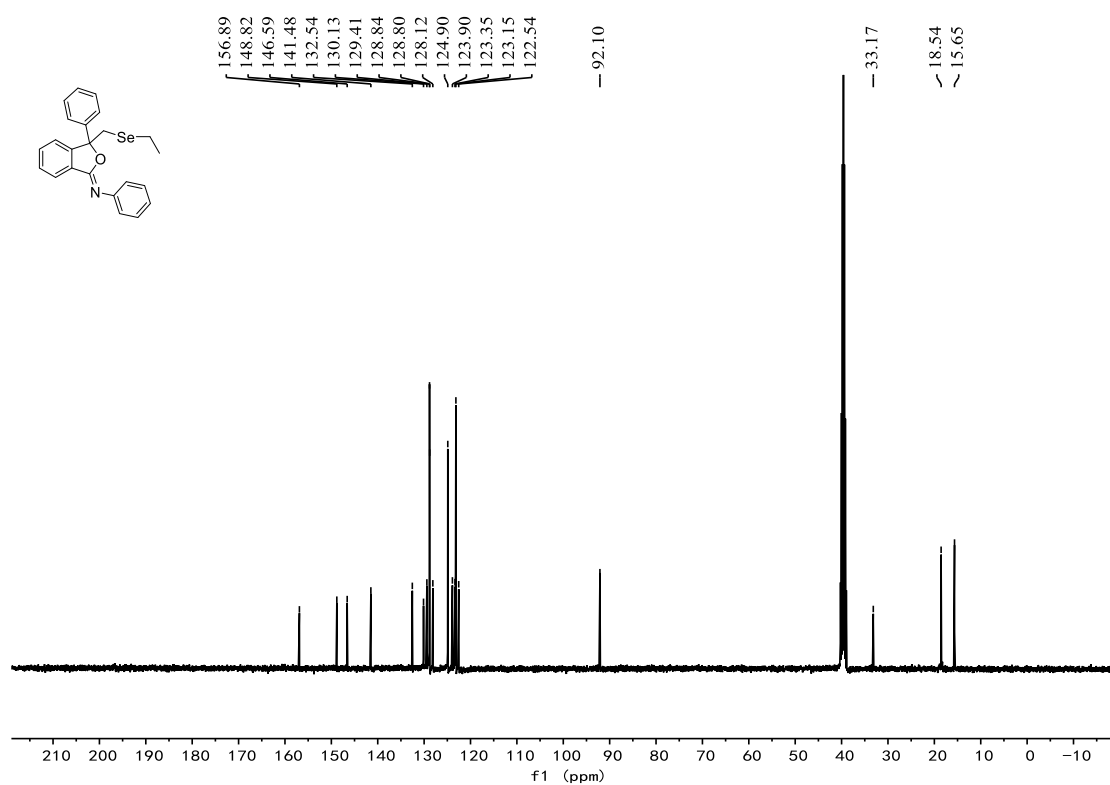
^{13}C NMR (101MHz, $\text{DMSO-}d_6$, LLH21071201) of compound **4a**



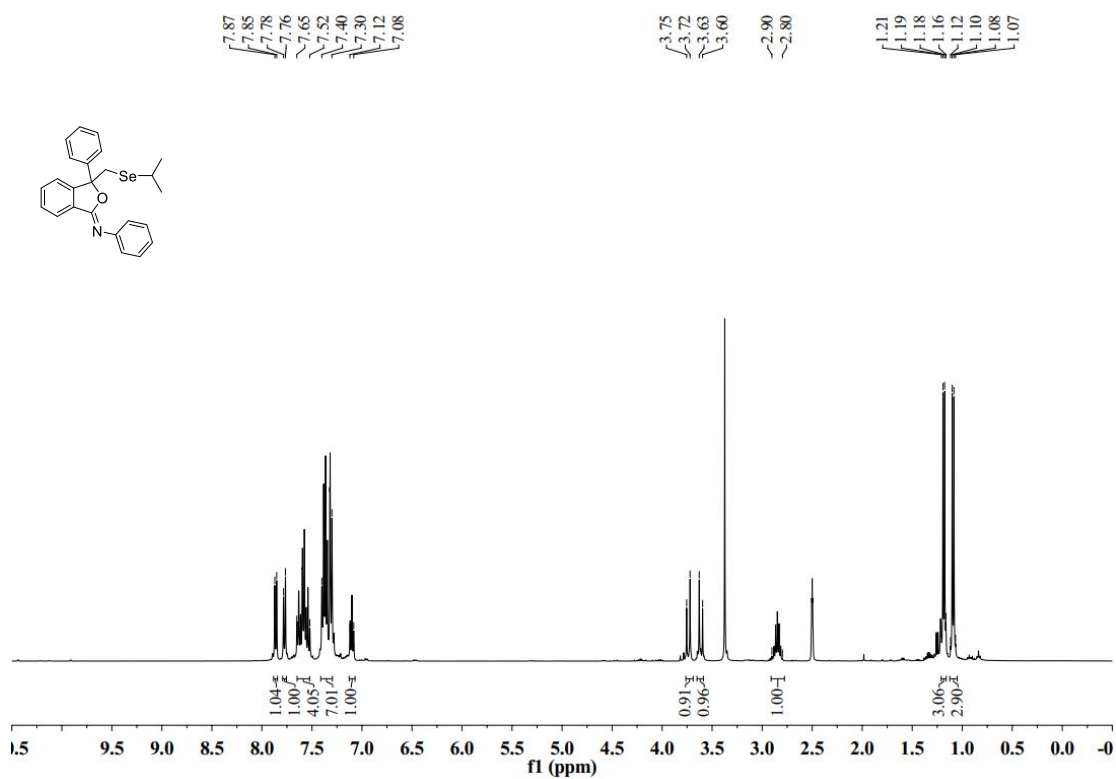
^1H NMR (400 MHz, $\text{DMSO-}d_6$, 41-1) of compound **4b**



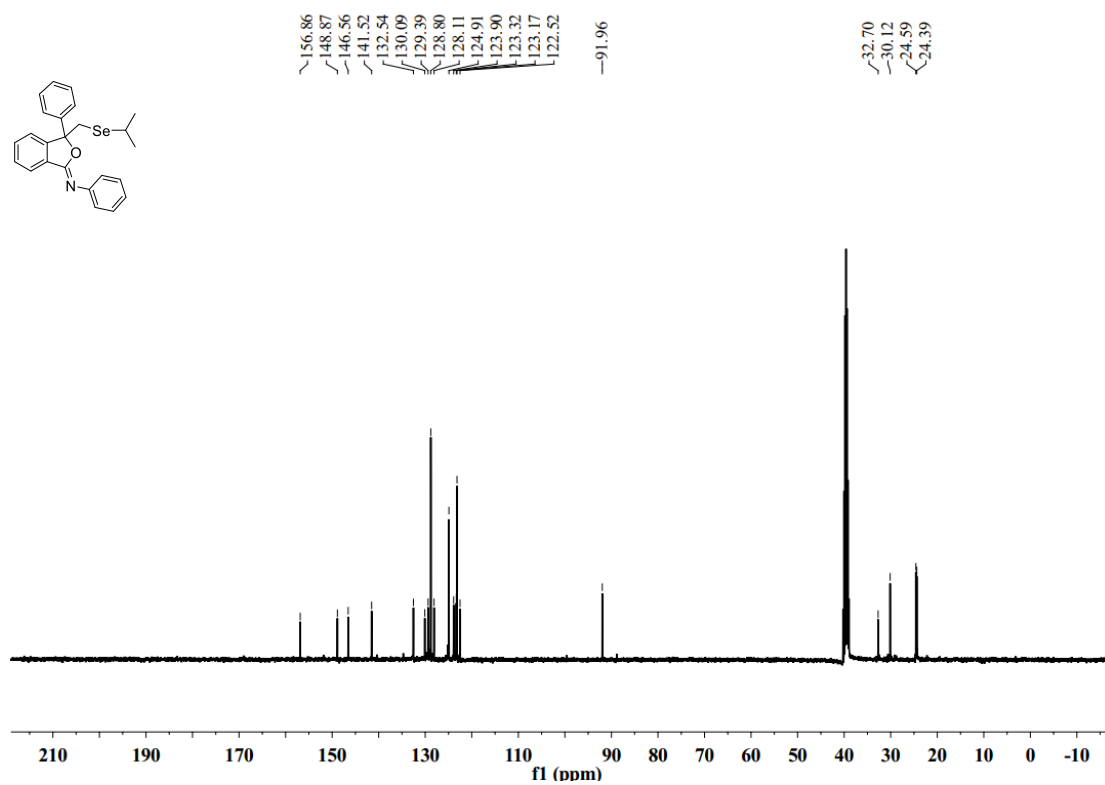
^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, 41-1) of compound **4b**



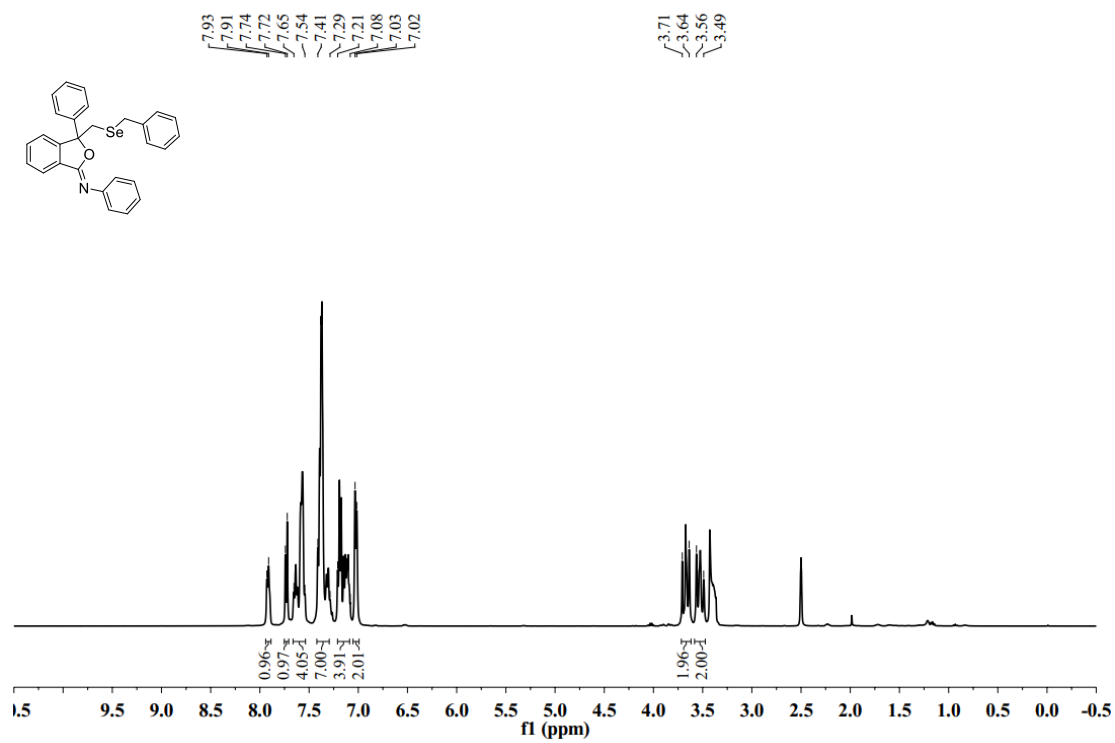
^1H NMR (400 MHz, $\text{DMSO-}d_6$, llh-179-3) of compound **4c**



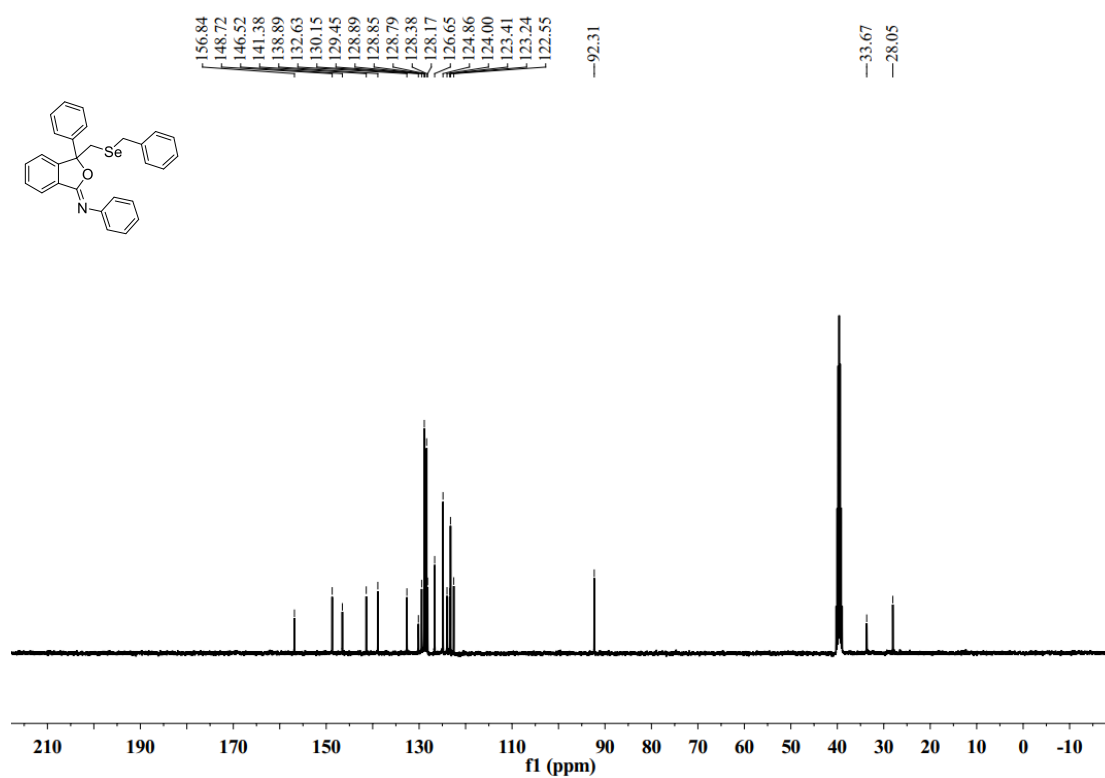
^{13}C NMR (101MHz, $\text{DMSO-}d_6$, llh-179-3) of compound **4c**



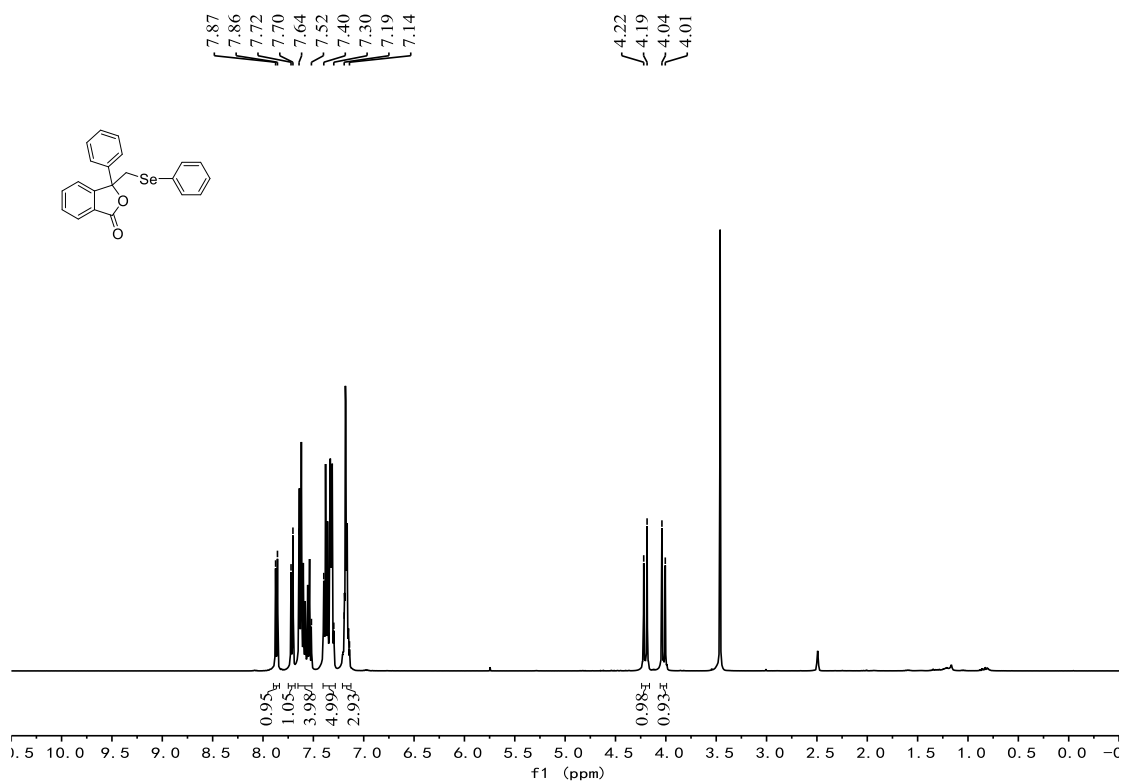
^1H NMR (400 MHz, $\text{DMSO-}d_6$, llh-174-9) of compound **4d**



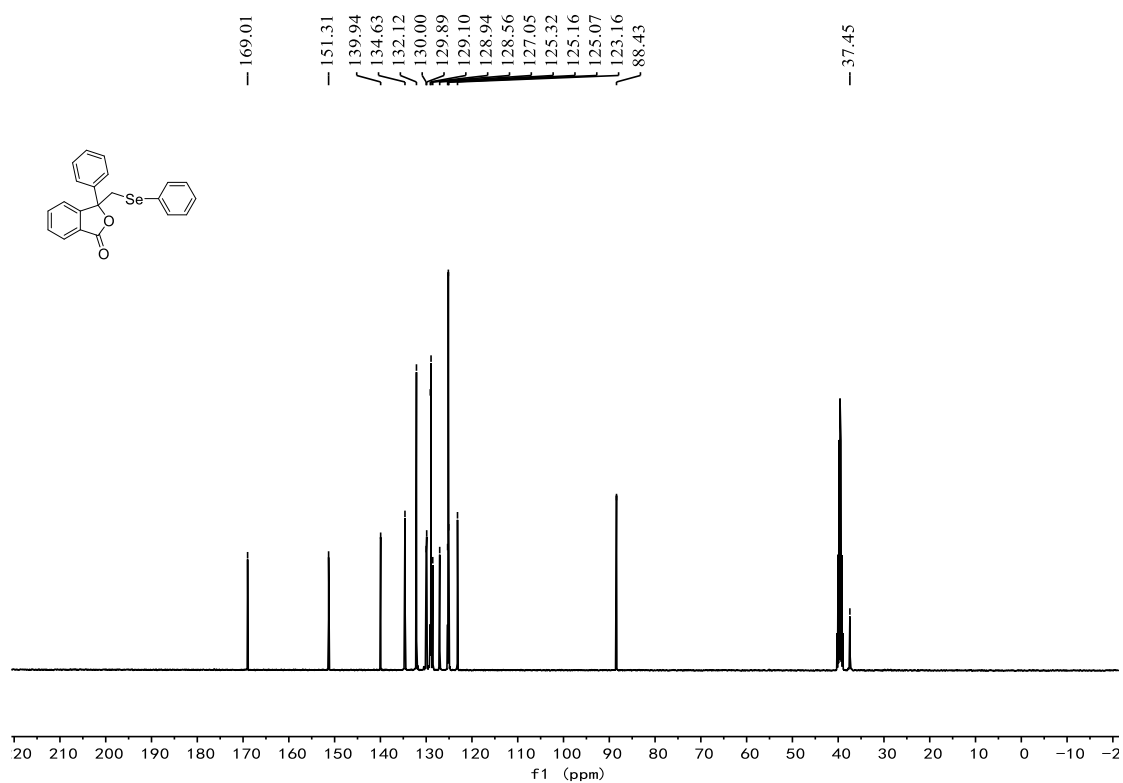
^{13}C NMR (101MHz, DMSO- d_6 , llh-174-9) of compound **4d**



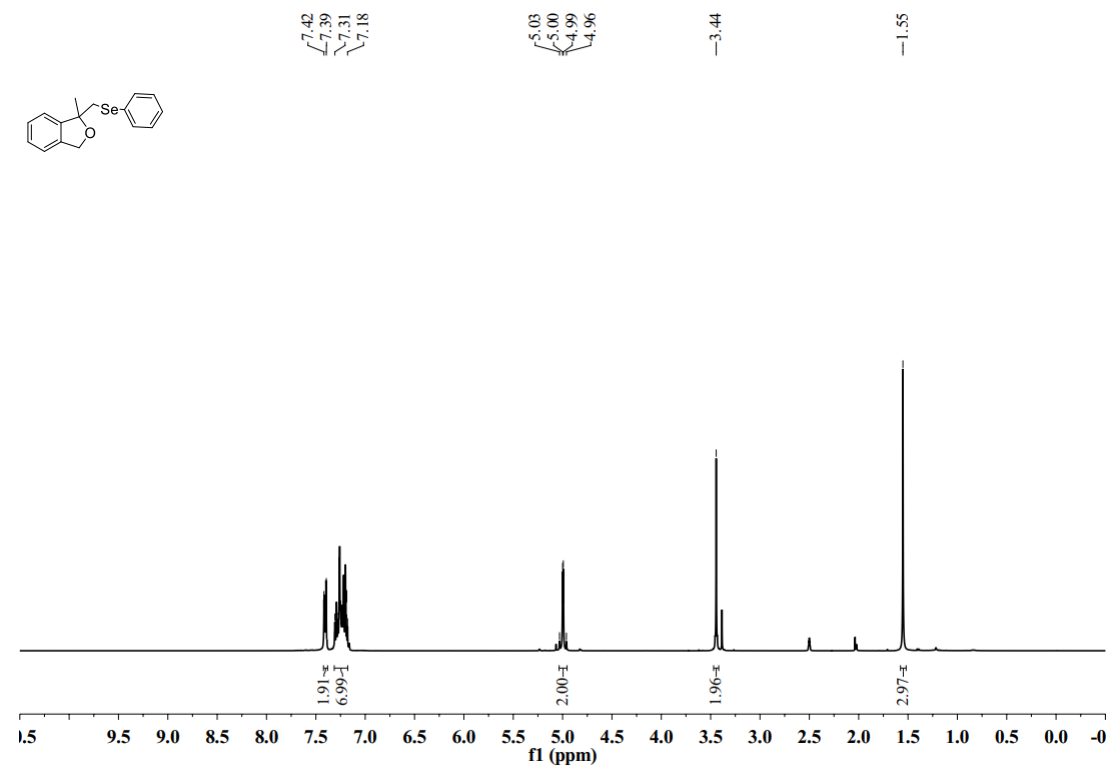
^1H NMR (101 MHz, DMSO- d_6 , LLH21061905) of compound **5a**



^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, LLH21061905) of compound **5a**



^1H NMR (101 MHz, $\text{DMSO-}d_6$, llh-184-5) of compound **8a**



^{13}C NMR (101 MHz, $\text{DMSO-}d_6$, llh-184-5) of compound **8a**

