

Supporting Information

**Zn(OTf)₂-Catalyzed Intra- and Intermolecular
Selenofunctionalization of Alkenes under Mild Conditions**

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1. General information

Solvents and reagents

Reagents were used as received without further purification unless otherwise indicated. Solvents were dried and distilled prior to use. Petroleum ether used had a boiling point range of 60–90°C.

Chromatography

Chromatographic purification of products was performed as flash column chromatography on silica gel (200–300 meshes). Thin-layer chromatography (TLC) was carried out on silica plates (TLC Silica GF₂₅₄). Visualization of the compounds was accomplished by projecting UV-light onto the developed plates.

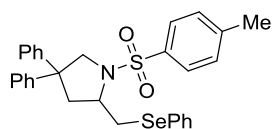
Instrumentations

- NMR spectra were recorded on a Bruker Avance- III HD (¹H NMR: 400 MHz, ¹³C NMR: 100 MHz) spectrometer. Chemical shifts are referenced to residual solvent signals (CDCl₃: 7.26 ppm and 77.16 ppm for ¹H NMR and ¹³C NMR respectively) and reported in parts per million (ppm) relative to tetramethylsilane (TMS). Spin–spin coupling constants (*J*) were given in Hz. Multiplicities of NMR signals are abbreviated as follows: br = broad, s = singlet, d = doublet, t = triplet, q = quartet, m = multiplet.
- High resolution mass spectrometry (HRMS) analyses were carried out on a Thermo Fisher Q Exactive Mass Spectrometer.
- Melting points were determined on glass slides using a WRX-4 digital display microscopic melting point apparatus and were presented uncorrected.

2. General procedure for the selenofunctionalization

The reaction was carried out in an open air system. To a 20 mL test tube with magnetic stir bar were added 0.2 mmol alkene, 0.2 mmol nucleophile, 0.01 mmol Zn(OTf)₂ and 2 mL of CH₂Cl₂. The reaction mixture was stirred at room temperature for 5 hours. Then, the solvent was removed with a rotary evaporator. The pure product was obtained by flash chromatography on silica gel using petroleum ether and ethyl acetate as the eluent.

3. Characterization data

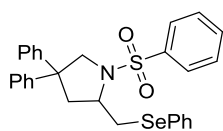


4,4-Diphenyl-2-((phenylselenanyl)methyl)-1-tosylpyrrolidine (3a). Compound **3a** was prepared according to the general procedure and isolated as an oil (93 mg, 85% yield) after flash chromatography (petroleum ether/ethyl acetate=15/1).

¹H NMR (400 MHz, CDCl₃): δ 7.49 – 7.42 (m, 2H), 7.28 – 7.20 (m, 5H), 7.19 – 7.12 (m, 4H), 7.09 – 6.91 (m, 8H), 4.40 (d, *J* = 10.1 Hz, 1H), 3.65 – 3.57 (m, 1H), 3.54 (dd, *J* = 12.5, 2.9 Hz, 1H), 3.41 (d, *J* = 10.2 Hz, 1H), 2.64 – 2.50 (m, 2H), 2.24 (s, 3H), 2.23 – 2.19 (m, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 143.9, 143.8, 142.3, 132.0, 128.5, 128.2, 127.8, 127.6, 127.5, 127.4, 126.4, 126.1, 125.7, 125.5, 125.35, 125.30, 58.4, 57.8, 51.0, 41.5, 31.4, 20.4.

Spectral data are in agreement with literature values^[1].



4,4-Diphenyl-2-((phenylselanyl)methyl)-1-(phenylsulfonyl)pyrrolidine (3b). Compound **3b** was prepared according to the general procedure and isolated as a white solid (85 mg, 80% yield) after flash chromatography (petroleum ether/ethyl acetate=20/1).

mp=127-129 °C.

^1H NMR (400 MHz, CDCl_3): δ 7.49 – 7.43 (m, 2H), 7.42 – 7.35 (m, 3H), 7.28 – 7.22 (m, 5H), 7.20 – 7.15 (m, 4H), 7.12 – 7.00 (m, 4H), 6.98 – 6.93 (m, 2H), 4.41 (d, J = 10.2 Hz, 1H), 3.67 – 3.58 (m, 1H), 3.54 (dd, J = 12.5, 2.9 Hz, 1H), 3.45 (d, J = 10.2 Hz, 1H), 2.64 – 2.54 (m, 2H), 2.29 – 2.19 (m, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 143.8, 143.7, 135.2, 132.1, 131.6, 128.2, 127.9, 127.6, 127.5, 126.4, 126.1, 125.7, 125.6, 125.56, 125.50, 125.3, 58.5, 57.7, 51.0, 41.5, 31.4.

Spectral data are in agreement with literature values^[1].



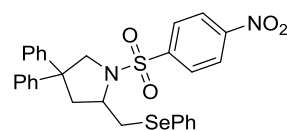
1-((4-Methoxyphenyl)sulfonyl)-4,4-diphenyl-2-((phenylselanyl)methyl)pyrrolidine (3c). Compound **3c** was prepared according to the general procedure and isolated as a white solid (88 mg, 78% yield) after flash chromatography

(petroleum ether/ethyl acetate=10/1). mp=115-116 °C.

^1H NMR (400 MHz, CDCl_3): 7.52 – 7.43 (m, 2H), 7.31 (d, J = 8.9 Hz, 2H), 7.23 (dd, J = 5.0, 1.8 Hz, 3H), 7.20 – 7.14 (m, 4H), 7.12 – 6.89 (m, 6H), 6.66 (d, J = 8.9 Hz, 2H), 4.41 (d, J = 10.1 Hz, 1H), 3.72 (s, 3H), 3.65 – 3.49 (m, 2H), 3.40 (d, J = 10.1 Hz, 1H), 2.74 – 2.47 (m, 2H), 2.23 (dd, J = 12.5, 11.1 Hz, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 161.7, 143.9, 143.8, 132.0, 128.5, 128.2, 127.8, 127.6, 127.5, 126.7, 126.1, 125.7, 125.5, 125.4, 125.3, 113.1, 58.4, 57.8, 54.5, 51.08, 41.5, 31.5.

Spectral data are in agreement with literature values^[1].



1-((4-Nitrophenyl)sulfonyl)-4,4-diphenyl-2-((phenylselanyl)methyl)pyrrolidine (3d). Compound **3d** was prepared according to the general procedure and isolated as a yellow solid (76mg, 66% yield) after flash chromatography

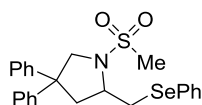
(petroleum ether/ethyl acetate=15/1). mp=166-168 °C.

^1H NMR (400 MHz, CDCl_3): δ 7.50 – 7.43 (m, 2H), 7.43 – 7.34 (m, 3H), 7.30 – 7.15 (m, 9H), 7.12 – 6.99 (m, 4H), 6.99 – 6.89 (m, 2H), 4.41 (d, J = 10.1 Hz, 1H), 3.71 – 3.57 (m, 1H), 3.54 (dd, J = 12.6, 3.0 Hz, 1H), 3.45 (d, J = 10.2 Hz, 1H), 2.71 – 2.50 (m, 2H), 2.24 (dd, J = 12.6, 11.2 Hz, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 143.8, 143.7, 135.2, 132.1, 131.6, 128.2, 127.9, 127.6, 127.5, 127.4, 126.4, 126.1, 125.7, 125.6, 125.5, 125.3, 58.5, 57.7, 51.0, 41.5,

31.4.

Spectral data are in agreement with literature values^[1].

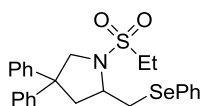


1-(Methylsulfonyl)-4,4-diphenyl-2-((phenylselanyl)methyl)pyrrolidine (3e). Compound **3e** was prepared according to the general procedure and isolated as an oil (78 mg, 83% yield) after flash chromatography (petroleum ether/ethyl acetate=10/1).

¹H NMR (400 MHz, CDCl₃): δ 7.44 (dd, *J* = 7.6, 1.9 Hz, 2H), 7.27 – 7.15 (m, 9H), 7.14 – 7.07 (m, 4H), 4.28 – 4.06 (m, 2H), 3.89 (dtd, *J* = 10.3, 7.5, 3.0 Hz, 1H), 3.51 (dd, *J* = 12.4, 3.1 Hz, 1H), 3.18 (ddd, *J* = 13.4, 7.1, 1.7 Hz, 1H), 2.78 (dd, *J* = 12.3, 9.9 Hz, 1H), 2.36 (dd, *J* = 13.4, 7.9 Hz, 1H), 2.13 (s, 3H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 143.8, 143.2, 131.3, 128.3, 128.2, 127.9, 127.7, 126.0, 126.0, 125.8, 125.7, 125.4, 59.0, 58.6, 52.1, 42.4, 34.7, 32.1.

Spectral data are in agreement with literature values^[1].

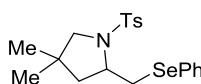


1-(Ethylsulfonyl)-4,4-diphenyl-2-((phenylselanyl)methyl)pyrrolidine (3f). Compound **3f** was prepared according to the general procedure and isolated as an oil (79 mg, 81% yield) after flash chromatography (petroleum ether/ethyl acetate=10/1).

¹H NMR (400 MHz, CDCl₃): δ 7.45 – 7.38 (m, 2H), 7.31 – 7.22 (m, 2H), 7.23 – 7.14 (m, 7H), 7.13 – 7.05 (m, 4H), 4.20 (dd, *J* = 10.7, 1.6 Hz, 1H), 4.09 – 3.91 (m, 2H), 3.43 (dd, *J* = 12.3, 3.0 Hz, 1H), 3.03 (ddd, *J* = 13.0, 7.0, 1.6 Hz, 1H), 2.79 (dd, *J* = 12.3, 9.6 Hz, 1H), 2.63 – 2.39 (m, 3H), 1.11 (t, *J* = 7.4 Hz, 3H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 144.0, 143.2, 131.2, 128.5, 128.2, 127.7, 127.6, 125.9, 125.8, 125.7, 125.6, 125.5, 58.4, 58.2, 52.1, 44.6, 42.5, 31.9, 6.9.

Spectral data are in agreement with literature values^[1].



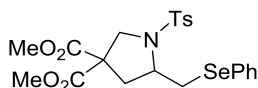
4,4-Dimethyl-2-((phenylselanyl)methyl)-1-tosylpyrrolidine (3g). Compound **3g** was prepared according to the general procedure and isolated as a yellow solid (70 mg, 83% yield) after flash chromatography (petroleum ether/ethyl acetate=20/1). mp=103-104 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.57 – 7.47 (m, 2H), 7.42 (d, *J* = 8.3 Hz, 2H), 7.27 – 7.22 (m, 3H), 7.13 (d, *J* = 8.3 Hz, 2H), 3.76 (dd, *J* = 12.2, 2.9 Hz, 1H), 3.59 (dtd, *J* = 10.6, 7.7, 2.9 Hz, 1H), 3.14 (d, *J* = 10.5 Hz, 1H), 2.97 (dd, *J* = 10.5, 1.2 Hz, 1H), 2.89 (dd, *J* = 12.3, 10.4 Hz, 1H), 2.31 (s, 3H), 1.79 (ddd, *J* = 12.8, 7.4, 1.2 Hz, 1H), 1.51 (dd, *J* = 12.8, 8.0 Hz, 1H), 0.95 (s, 3H), 0.36 (s, 3H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 142.3, 133.1, 131.7, 128.5, 128.4, 128.2, 126.5, 125.96, 61.0, 58.9, 45.7, 36.2, 33.0, 25.4, 24.8, 20.5.

Spectral data are in agreement with literature values^[1].

Dimethyl 5-((phenylselanyl)methyl)-1-tosylpyrrolidine-3,3-dicarboxylate (3h).

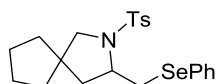


Compound **3h** was prepared according to the general procedure and isolated as an oil (73 mg, 72% yield) after flash chromatography (petroleum ether/ethyl acetate=4/1).

¹H NMR (400 MHz, CDCl₃): δ 7.56 – 7.50 (m, 2H), 7.36 (d, *J* = 8.3 Hz, 2H), 7.29 – 7.21 (m, 3H), 7.18 – 7.12 (m, 2H), 4.00 (d, *J* = 11.4 Hz, 1H), 3.75 – 3.62 (m, 6H), 3.38 (s, 3H), 2.86 (dd, *J* = 12.4, 10.3 Hz, 1H), 2.53 (dd, *J* = 13.3, 8.2 Hz, 1H), 2.41 – 2.28 (m, 4H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 168.3, 168.1, 142.7, 132.2, 128.6, 128.2, 127.8, 126.7, 126.3, 126.0, 58.4, 56.9, 53.7, 52.3, 52.1, 37.5, 32.0, 20.5.

Spectral data are in agreement with literature values^[1].



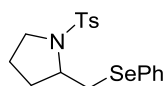
3-((Phenylselanyl)methyl)-2-tosyl-2-azaspiro[4.4]nonane (3i).

Compound **3i** was prepared according to the general procedure and isolated as an oil (73 mg, 81% yield) after flash chromatography (petroleum ether/ethyl acetate=20/1).

¹H NMR (400 MHz, CDCl₃): δ 7.52 (dd, *J* = 7.6, 1.9 Hz, 2H), 7.41 (d, *J* = 8.3 Hz, 2H), 7.30 – 7.21 (m, 3H), 7.13 (d, *J* = 8.0 Hz, 2H), 3.75 (dd, *J* = 12.3, 3.0 Hz, 1H), 3.53 (dtd, *J* = 10.5, 7.2, 3.0 Hz, 1H), 3.24 (d, *J* = 10.2 Hz, 1H), 2.94 (d, *J* = 10.2 Hz, 1H), 2.88 (dd, *J* = 12.3, 10.7 Hz, 1H), 2.32 (s, 3H), 1.84 (dd, *J* = 12.9, 7.4 Hz, 1H), 1.64 (dd, *J* = 12.8, 6.8 Hz, 1H), 1.56 – 1.31 (m, 6H), 0.87 (ddd, *J* = 12.6, 8.2, 6.9 Hz, 1H), 0.73 (ddd, *J* = 13.2, 7.8, 6.0 Hz, 1H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 142.4, 132.9, 131.7, 128.5, 128.3, 128.2, 126.5, 126.0, 59.4, 59.0, 47.3, 43.2, 35.6, 35.4, 32.7, 23.5, 23.2, 20.5.

Spectral data are in agreement with literature values^[1].



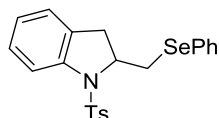
2-((Phenylselanyl)methyl)-1-tosylpyrrolidine (3j).

Compound **3j** was prepared according to the general procedure and isolated as a white solid (57 mg, 72% yield) after flash chromatography (petroleum ether/ethyl acetate=10/1). mp=90-92° C.

¹H NMR (400 MHz, CDCl₃): δ 7.51 (d, *J* = 8.0 Hz, 2H), 7.43 (d, *J* = 8.2 Hz, 2H), 7.31 – 7.20 (m, 3H), 7.14 (d, *J* = 8.0 Hz, 2H), 3.62 – 3.47 (m, 2H), 3.47 – 3.31 (m, 1H), 3.04 (dt, *J* = 9.9, 7.1 Hz, 1H), 2.75 (dd, *J* = 13.1, 11.4 Hz, 1H), 2.32 (s, 3H), 1.81 – 1.65 (m, 2H), 1.60 (ddd, *J* = 15.3, 7.6, 3.6 Hz, 1H), 1.49 – 1.32 (m, 1H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 142.7, 132.8, 131.3, 128.6, 128.2, 128.1, 126.4, 125.9, 58.8, 48.9, 31.9, 30.0, 22.8, 20.5.

Spectral data are in agreement with literature values^[1].



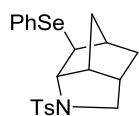
2-((Phenylselanyl)methyl)-1-tosylindoline (3k).

Compound **3k** was prepared according to the general procedure and isolated as an oil (66 mg, 75% yield) after flash chromatography (petroleum ether/ethyl acetate=20/1).

¹H NMR (400 MHz, CDCl₃): δ 7.57 (d, *J* = 8.1 Hz, 1H), 7.55 – 7.44 (m, 2H), 7.34 – 7.22 (m, 5H), 7.17 – 7.09 (m, 1H), 7.05 – 6.99 (m, 2H), 6.98 – 6.88 (m, 2H), 4.20 – 4.10 (m, 1H), 3.58 (dd, *J* = 12.5, 3.5 Hz, 1H), 2.85 (dd, *J* = 12.5, 10.8 Hz, 1H), 2.80 – 2.76 (m, 2H), 2.24 (s, 3H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 142.9, 140.3, 133.5, 131.4, 129.9, 128.5, 128.2, 127.8, 126.8, 126.1, 125.9, 124.2, 123.7, 116.0, 60.5, 33.0, 32.0, 20.5.

Spectral data are in agreement with literature values^[1].

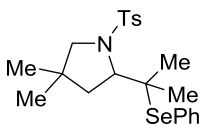


6-(Phenylselanyl)-1-tosyloctahydro-3,5-methanocyclopenta[b]pyrrole (3l). Compound **3l** was prepared according to the general procedure and isolated as a white solid (67 mg, 77% yield) after flash chromatography (petroleum ether/ethyl acetate = 12/1). mp=88-90° C.

¹H NMR (400 MHz, CDCl₃): δ 7.59 (d, *J* = 8.2 Hz, 2H), 7.49 (dd, *J* = 6.4, 3.0 Hz, 2H), 7.23 – 7.15 (m, 5H), 3.92 (d, *J* = 5.0 Hz, 1H), 3.20 (d, *J* = 3.6 Hz, 2H), 2.98 (d, *J* = 1.6 Hz, 1H), 2.33 (s, 3H), 2.24 (t, *J* = 8.3 Hz, 2H), 2.14 (d, *J* = 3.4 Hz, 1H), 1.92 (ddd, *J* = 14.8, 10.6, 4.4 Hz, 1H), 1.83 (d, *J* = 10.8 Hz, 1H), 1.37 (d, *J* = 11.0 Hz, 1H), 0.97 (d, *J* = 13.0 Hz, 1H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 142.1, 135.0, 133.2, 128.8, 128.6, 128.0, 126.4, 126.1, 66.4, 53.0, 52.4, 45.0, 40.2, 36.5, 36.3, 35.1, 20.5.

Spectral data are in agreement with literature values^[1].

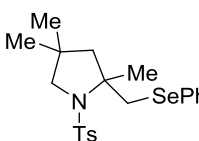


4,4-Dimethyl-2-(2-(phenylselanyl)propan-2-yl)-1-tosylpyrrolidine (3m). Compound **3m** was prepared according to the general procedure and isolated as a yellow solid (65 mg, 72% yield) after flash chromatography (petroleum ether/ethyl acetate=30/1). mp=78-80° C.

¹H NMR (400 MHz, CDCl₃): 7.62 (d, *J* = 8.4 Hz, 2H), 7.47 (d, *J* = 8.2 Hz, 2H), 7.23 – 7.13 (m, 5H), 4.34 (t, *J* = 8.1 Hz, 1H), 3.63 (d, *J* = 11.5 Hz, 1H), 3.06 (d, *J* = 11.5 Hz, 1H), 2.34 (s, 3H), 2.01 – 1.86 (m, 2H), 1.21 (s, 3H), 1.15 (s, 3H), 1.06 (s, 3H), 0.86 (s, 3H).

¹³C{¹H} NMR (100 MHz, CDCl₃): 142.6, 139.7, 138.3, 129.4, 128.7, 128.7, 127.0, 126.6, 69.5, 62.6, 53.8, 44.7, 39.4, 29.5, 27.2, 26.7, 25.9, 21.5.

Spectral data are in agreement with literature values^[1].

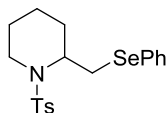


2,4,4-Trimethyl-2-((phenylselanyl)methyl)-1-tosylpyrrolidine (3n). Compound **3n** was prepared according to the general procedure and isolated as an oil (70 mg, 80% yield) after flash chromatography (petroleum ether/ethyl acetate=35/1).

¹H NMR (400 MHz, CDCl₃): δ 7.67 (d, *J* = 8.3 Hz, 2H), 7.52 – 7.32 (m, 2H), 7.32 – 7.12 (m, 5H), 3.56 (d, *J* = 11.8 Hz, 1H), 3.41 (d, *J* = 11.8 Hz, 1H), 3.08 (d, *J* = 9.4 Hz, 1H), 3.01 (d, *J* = 9.4 Hz, 1H), 2.34 (s, 3H), 2.03 (d, *J* = 13.2 Hz, 1H), 1.56 (d, *J* = 8.7 Hz, 1H), 1.53 (s, 3H), 0.92 (s, 3H), 0.87 (s, 3H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 141.9, 136.8, 131.5, 130.1, 128.4, 128.1, 126.3, 125.8, 68.1, 60.7, 52.7, 40.5, 35.2, 26.5, 26.2, 26.0, 20.5.

Spectral data are in agreement with literature values^[1].



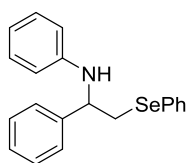
2-((Phenylselanyl)methyl)-1-tosylpiperidine (3o). Compound **3o** was prepared according to the general procedure and isolated as an

oil (49 mg, 60% yield) after flash chromatography (petroleum ether/ethyl acetate=15/1).

$^1\text{H NMR}$ (400 MHz, CDCl_3): δ 7.53 (d, $J = 8.3$ Hz, 2H), 7.46 – 7.38 (m, 2H), 7.25 – 7.17 (m, 3H), 7.15 (d, $J = 8.1$ Hz, 2H), 4.14 – 4.07 (m, 1H), 3.82 – 3.54 (m, 1H), 3.02 (dd, $J = 12.3, 10.5$ Hz, 1H), 2.96 – 2.81 (m, 2H), 2.33 (s, 3H), 1.95 – 1.81 (m, 1H), 1.44 – 1.18 (m, 5H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 142.0, 137.1, 131.9, 128.6, 128.4, 128.1, 126.2, 125.9, 51.6, 39.8, 26.2, 25.1, 23.6, 20.5, 17.0.

Spectral data are in agreement with literature values^[1].

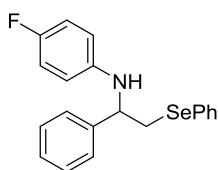


N-(1-Phenyl-2-(phenylselanyl)ethyl)aniline (4a). Compound **4a** was prepared according to the general procedure and isolated as an oil (53 mg, 75% yield) after flash chromatography (petroleum ether/ethyl acetate = 50/1).

$^1\text{H NMR}$ (400 MHz, CDCl_3): δ 7.52 – 7.40 (m, 2H), 7.34 – 7.10 (m, 8H), 7.04 – 6.89 (m, 2H), 6.58 (t, $J = 7.3$ Hz, 1H), 6.36 (d, $J = 8.5$ Hz, 2H), 4.56 – 4.25 (m, 2H), 3.27 (dd, $J = 12.6, 4.5$ Hz, 1H), 3.11 (dd, $J = 12.6, 8.8$ Hz, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 147.0, 142.7, 133.6, 129.3, 129.2, 129.1, 128.9, 127.6, 127.6, 126.4, 117.9, 113.8, 57.9, 36.5.

Spectral data are in agreement with literature values^[2].



4-Fluoro-N-(1-phenyl-2-(phenylselanyl)ethyl)aniline (4b).

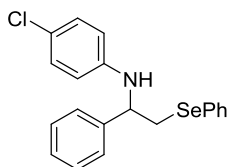
Compound **4b** was prepared according to the general procedure and isolated as an oil (58 mg, 79% yield) after flash chromatography (petroleum ether/ethyl acetate = 20/1).

$^1\text{H NMR}$ (400 MHz, CDCl_3): δ 7.43 (dd, $J = 7.2, 2.2$ Hz, 2H), 7.33 – 7.02 (m, 8H), 6.69 (t, $J = 8.6$ Hz, 2H), 6.31 (dd, $J = 8.8, 4.4$ Hz, 2H), 4.48 (brs, 1H), 4.27 (dd, $J = 9.0, 4.6$ Hz, 1H), 3.29 (dd, $J = 12.6, 4.6$ Hz, 1H), 3.11 (dd, $J = 12.6, 9.0$ Hz, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 156.1 (d, $J_{\text{C-F}} = 236.5$ Hz), 142.3, 133.6, 129.3, 129.1, 128.9, 127.7, 127.6, 126.4, 115.5 (d, $J_{\text{C-F}} = 22.3$ Hz), 114.9, 58.6, 36.4.

$^{19}\text{F NMR}$ (376 MHz, CDCl_3): δ -127.5.

Spectral data are in agreement with literature values^[2].



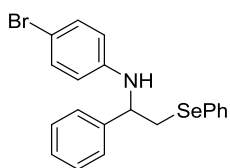
4-Chloro-N-(1-phenyl-2-(phenylselanyl)ethyl)aniline (4c).

Compound **4c** was prepared according to the general procedure and isolated as an oil (64 mg, 83% yield) after flash chromatography (petroleum ether/ethyl acetate = 30/1).

$^1\text{H NMR}$ (400 MHz, CDCl_3): δ 7.54 – 7.33 (m, 2H), 7.29 – 7.10 (m, 8H), 6.90 (d, $J = 8.8$ Hz, 2H), 6.25 (d, $J = 8.8$ Hz, 2H), 4.39 (d, $J = 3.8$ Hz, 1H), 4.27 (dt, $J = 8.6, 4.2$ Hz, 1H), 3.25 (dd, $J = 12.7, 4.4$ Hz, 1H), 3.06 (dd, $J = 12.7, 9.1$ Hz, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 144.5, 141.1, 132.6, 128.3, 127.9, 127.83, 127.82, 126.26, 126.60, 125.2, 121.3, 113.7, 56.8, 35.3.

Spectral data are in agreement with literature values^[2].



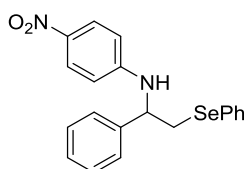
4-Bromo-N-(1-phenyl-2-(phenylselanyl)ethyl)aniline (4d).

Compound **4d** was prepared according to the general procedure and isolated as an oil (69 mg, 80% yield) after flash chromatography (petroleum ether/ethyl acetate = 20/1).

¹H NMR (400 MHz, CDCl₃): δ 7.43 (d, *J* = 7.7 Hz, 2H), 7.31 – 7.10 (m, 8H), 7.06 (d, *J* = 8.5 Hz, 2H), 6.24 (d, *J* = 8.4 Hz, 2H), 4.49 (brs, 1H), 4.28 (dd, *J* = 9.0, 4.5 Hz, 1H), 3.28 (dd, *J* = 12.7, 4.5 Hz, 1H), 3.10 (dd, *J* = 12.7, 9.0 Hz, 1H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 145.9, 142.0, 133.7, 131.8, 129.4, 129.0, 128.9, 127.8, 127.7, 126.3, 115.4, 109.7, 57.9, 36.3.

Spectral data are in agreement with literature values^[2].



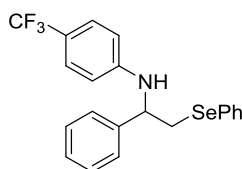
4-Nitro-N-(1-phenyl-2-(phenylselanyl)ethyl)aniline (4e).

Compound **4e** was prepared according to the general procedure and isolated as an oil (49 mg, 62% yield) after flash chromatography (petroleum ether/ethyl acetate = 10/1).

¹H NMR (400 MHz, CDCl₃): δ 7.88 (d, *J* = 8.9 Hz, 2H), 7.52 – 7.36 (m, 2H), 7.27 – 7.17 (m, 8H), 6.27 (d, *J* = 9.1 Hz, 2H), 5.14 (brs, 1H), 4.43 (dd, *J* = 9.1, 4.4 Hz, 1H), 3.31 (dd, *J* = 12.8, 4.5 Hz, 1H), 3.12 (dd, *J* = 12.9, 9.0 Hz, 1H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 152.2, 140.9, 138.5, 133.9, 129.5, 129.2, 128.5, 128.2, 128.1, 126.2, 126.1, 112.2, 57.6, 35.7.

Spectral data are in agreement with literature values^[2].



N-(1-Phenyl-2-(phenylselanyl)ethyl)-4-(trifluoromethyl)aniline (4f).

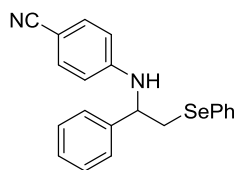
Compound **4f** was prepared according to the general procedure and isolated as an oil (61 mg, 73% yield) after flash chromatography (petroleum ether/ethyl acetate = 10/1).

¹H NMR (400 MHz, CDCl₃): δ 7.44 (d, *J* = 7.9 Hz, 2H), 7.30 – 7.11 (m, 10H), 6.34 (d, *J* = 8.4 Hz, 2H), 4.70 (brs, 1H), 4.37 (dd, *J* = 9.1, 4.4 Hz, 1H), 3.29 (dd, *J* = 12.8, 4.4 Hz, 1H), 3.10 (dd, *J* = 12.8, 9.1 Hz, 1H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 149.5, 141.6, 133.8, 129.4, 129.2, 128.8, 127.9, 127.8, 126.5 (q, *J*_{C-F} = 3.8 Hz), 126.2, 125.1 (q, *J*_{C-F} = 270.0 Hz), 119.3 (q, *J*_{C-F} = 30.0 Hz), 112.9, 57.6, 36.2.

¹⁹F NMR (376 MHz, CDCl₃): δ -61.0.

Spectral data are in agreement with literature values^[2].



4-((1-Phenyl-2-(phenylselanyl)ethyl)amino)benzonitrile (4g).

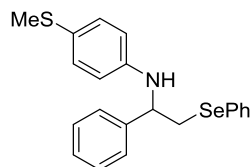
Compound **4g** was prepared according to the general procedure and isolated as an oil (57 mg, 75% yield) after flash chromatography (petroleum ether/ethyl acetate = 30/1).

¹H NMR (400 MHz, CDCl₃): δ 7.40 (d, *J* = 8.6 Hz, 2H), 7.21 – 7.15 (m, 10H), 6.26 (d, *J* = 8.6 Hz, 2H), 4.93 (brs, 1H), 4.52 –

4.07 (m, 1H), 3.24 (dd, $J = 12.8, 4.5$ Hz, 1H), 3.07 (dd, $J = 12.8, 9.0$ Hz, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 150.3, 141.3, 133.8, 133.6, 129.5, 129.1, 128.8, 128.0, 127.9, 126.2, 120.5, 113.3, 99.3, 57.4, 35.9.

Spectral data are in agreement with literature values^[3].

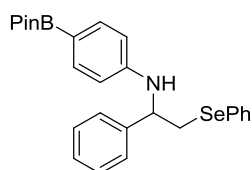


4-(Methylthio)-N-(1-phenyl-2-(phenylselanyl)ethyl)aniline (4h). Compound **4h** was prepared according to the general procedure and isolated as a yellow solid (56 mg, 70% yield) after flash chromatography (petroleum ether/ethyl acetate = 50/1). mp=55-56° C.

^1H NMR (400 MHz, CDCl_3): δ 7.52 – 7.38 (m, 2H), 7.33 – 7.11 (m, 8H), 7.01 (d, $J = 8.4$ Hz, 2H), 6.31 (d, $J = 8.2$ Hz, 2H), 4.43 (brs, 1H), 4.33 (dd, $J = 9.0, 4.5$ Hz, 1H), 3.28 (dd, $J = 12.6, 4.5$ Hz, 1H), 3.10 (dd, $J = 12.6, 8.9$ Hz, 1H), 2.28 (s, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 145.8, 142.4, 133.6, 131.0, 129.3, 129.1, 128.9, 127.7, 127.6, 126.3, 114.4, 57.9, 36.4, 18.9.

HRMS: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{21}\text{H}_{22}\text{NSSe}$, 400.0633; found, 400.0629.

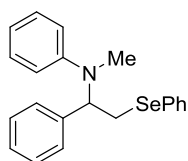


N-(1-Phenyl-2-(phenylselanyl)ethyl)-4-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)aniline (4i). Compound **4i** was prepared according to the general procedure and isolated as a yellow solid (72 mg, 75% yield) after flash chromatography (petroleum ether/ethyl acetate = 40/1). mp=122-123° C.

^1H NMR (400 MHz, CDCl_3): δ 7.54 – 7.36 (m, 4H), 7.32 – 6.93 (m, 8H), 6.33 (d, $J = 8.1$ Hz, 2H), 4.55 (brs, 1H), 4.42 (dd, $J = 8.6, 4.8$ Hz, 1H), 3.26 (dd, $J = 12.6, 4.8$ Hz, 1H), 3.12 (dd, $J = 12.6, 8.5$ Hz, 1H), 1.20 (s, 12H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 149.5, 142.2, 136.2, 133.7, 129.3, 129.2, 128.9, 127.7, 127.6, 126.3, 112.8, 83.2, 57.3, 36.2, 24.9, 24.8.

HRMS: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{26}\text{H}_{31}\text{BNO}_2\text{Se}$, 480.1608; found, 480.1613.



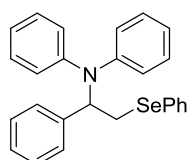
N-Methyl-N-(1-phenyl-2-(phenylselanyl)ethyl)aniline (4j).

Compound **4j** was prepared according to the general procedure and isolated as an oil (60 mg, 82% yield) after flash chromatography (petroleum ether/ethyl acetate = 30/1).

^1H NMR (400 MHz, CDCl_3): δ 7.51 – 7.26 (m, 2H), 7.32 – 6.90 (m, 10H), 6.69 – 6.67 (m, 3H), 5.14 – 5.10 (m, 1H), 3.51 – 3.44 (m, 2H), 2.61 (s, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 150.1, 139.8, 133.3, 130.1, 129.2, 129.1, 128.5, 127.5, 127.4, 127.2, 117.4, 113.7, 61.9, 31.9, 30.2.

Spectral data are in agreement with literature values^[3].



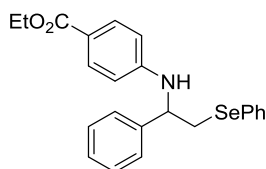
N-Phenyl-N-(1-phenyl-2-(phenylselanyl)ethyl)aniline (4k).

Compound **4k** was prepared according to the general procedure and isolated as an oil (58 mg, 68% yield) after flash chromatography (petroleum ether/ethyl acetate = 80/1).

¹H NMR (400 MHz, CDCl₃): δ 7.44 – 7.41 (m, 2H), 7.25 – 7.08 (m, 6H), 7.08 – 7.04 (m, 4H), 7.00 – 6.94 (m, 2H), 6.89 – 6.77 (m, 3H), 6.71 – 6.59 (m, 3H), 5.73 – 5.22 (m, 1H), 3.49 – 3.38 (m, 2H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 145.1, 142.0, 138.9, 132.6, 128.9, 128.3, 128.1, 128.0, 127.2, 127.1, 126.5, 126.3, 121.9, 120.9, 119.9, 116.7, 60.8, 28.9.

Spectral data are in agreement with literature values^[2].

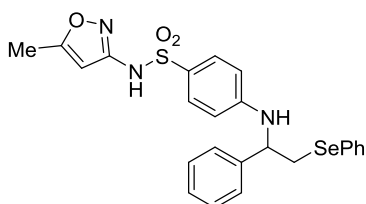


Ethyl 4-((1-phenyl-2-(phenylselanyl)ethyl)amino)benzoate (4l). Compound **4l** was prepared according to the general procedure and isolated as an oil (55 mg, 65% yield) after flash chromatography (petroleum ether/ethyl acetate = 40/1).

¹H NMR (400 MHz, CDCl₃): δ 7.68 (d, *J* = 8.4 Hz, 2H), 7.57 – 7.36 (m, 2H), 7.33 – 7.06 (m, 8H), 6.30 (d, *J* = 8.5 Hz, 2H), 4.78 (brs, 1H), 4.42 (dd, *J* = 8.8, 4.6 Hz, 1H), 4.19 (q, *J* = 7.1 Hz, 2H), 3.28 (dd, *J* = 12.7, 4.6 Hz, 1H), 3.11 (dd, *J* = 12.8, 8.8 Hz, 1H), 1.23 (t, *J* = 7.1 Hz, 3H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 166.8, 150.7, 141.7, 133.8, 131.3, 129.4, 129.0, 128.9, 127.9, 127.8, 126.2, 119.3, 112.5, 60.2, 57.4, 36.1, 14.5.

Spectral data are in agreement with literature values^[2].



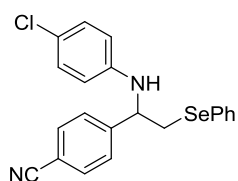
N-(5-Methylisoxazol-3-yl)-4-((1-phenyl-2-(phenylselanyl)ethyl)amino)benzenesulfonamide (4m).

Compound **4m** was prepared according to the general procedure and isolated as an oil (59 mg, 58% yield) after flash chromatography (petroleum ether/ethyl acetate = 3/1).

¹H NMR (400 MHz, CDCl₃): δ 8.22 (s, 1H), 8.09 (s, 1H), 7.81 (dd, *J* = 5.4, 3.1 Hz, 2H), 7.69 (dd, *J* = 5.5, 3.1 Hz, 2H), 7.49 – 7.40 (m, 3H), 7.31 – 7.11 (m, 5H), 6.28 (d, *J* = 8.5 Hz, 2H), 6.11 (s, 1H), 4.36 (dd, *J* = 9.0, 4.5 Hz, 1H), 3.28 (dd, *J* = 12.8, 4.5 Hz, 1H), 3.09 (dd, *J* = 12.9, 9.0 Hz, 1H), 2.26 (s, 3H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 170.7, 151.0, 141.1, 134.4, 133.8, 132.6, 129.5, 129.1, 129.0, 128.6, 128.0, 127.9, 126.1, 123.7, 112.8, 95.5, 57.4, 35.9, 12.8.

Spectral data are in agreement with literature values^[2].

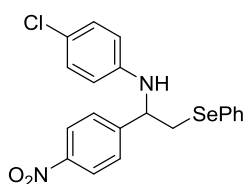


4-(1-((4-chlorophenyl)amino)-2-(phenylselanyl)ethyl)benzotrile (5a). Compound **5a** was prepared according to the general procedure and isolated as an oil (63 mg, 76% yield) after flash chromatography (petroleum ether/ethyl acetate = 60/1).

¹H NMR (400 MHz, CDCl₃): δ 7.48 (d, *J* = 8.3 Hz, 2H), 7.40 (d, *J* = 6.5 Hz, 2H), 7.32 (d, *J* = 8.3 Hz, 2H), 7.27 – 7.12 (m, 3H), 6.92 (d, *J* = 8.8 Hz, 2H), 6.20 (d, *J* = 8.9 Hz, 2H), 4.29 (dd, *J* = 8.9, 4.3 Hz, 1H), 3.38 (brs, 1H), 3.23 (dd, *J* = 12.9, 4.3 Hz, 1H), 3.02 (dd, *J* = 12.9, 8.9 Hz, 1H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 147.8, 145.0, 134.0, 133.9, 132.8, 129.5, 129.1, 129.0, 128.3, 128.1, 127.2, 123.1, 118.7, 116.3, 114.8, 111.5, 57.6, 35.8.

HRMS: *m/z* [M + H]⁺ calcd for C₂₁H₁₈ClN₂Se, 413.0318; found, 413.0320.



4-Chloro-N-(1-(4-nitrophenyl)-2-(phenylselanyl)ethyl)aniline (5b). Compound **5b** was prepared according to the general procedure and isolated as an oil (59 mg, 68% yield) after flash chromatography (petroleum ether/ethyl acetate = 50/1).

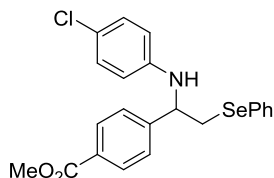
$^1\text{H NMR}$ (400 MHz, CDCl_3): δ 8.03 (d, $J = 8.3$ Hz, 2H), 7.51 – 7.32 (m, 4H), 7.21 – 7.14 (m, 3H), 6.92 (d, $J = 8.4$ Hz, 2H),

6.20 (d, $J = 8.5$ Hz, 2H), 4.49 (s, 1H), 4.35 (dd, $J = 8.8, 4.3$ Hz, 1H), 3.24 (dd, $J = 12.9, 4.4$ Hz, 1H), 3.04 (dd, $J = 12.9, 8.7$ Hz, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 149.9, 147.4, 144.9, 134.0, 129.5, 129.1, 128.1, 127.3, 124.2, 123.1, 116.3, 114.8, 57.4, 35.8.

HRMS: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{20}\text{H}_{18}\text{ClN}_2\text{O}_2\text{Se}$, 433.0217; found, 433.0221.

Methyl

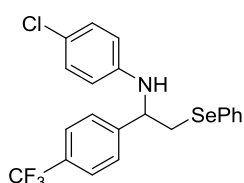


4-(1-((4-chlorophenyl)amino)-2-(phenylselanyl)ethyl)benzoate (5c). Compound **5c** was prepared according to the general procedure and isolated as an oil (65 mg, 73% yield) after flash chromatography (petroleum ether/ethyl acetate = 50/1).

$^1\text{H NMR}$ (400 MHz, CDCl_3): δ 7.89 (d, $J = 8.4$ Hz, 2H), 7.41 (d, $J = 8.1$ Hz, 2H), 7.28 (d, $J = 8.4$ Hz, 2H), 7.22 – 7.15 (m, 3H), 6.90 (d, $J = 8.8$ Hz, 2H), 6.22 (d, $J = 9.0$ Hz, 2H), 4.43 (brs, 1H), 4.30 (dd, $J = 9.2, 4.3$ Hz, 1H), 3.80 (s, 3H), 3.24 (dd, $J = 12.7, 4.3$ Hz, 1H), 3.03 (dd, $J = 12.7, 9.0$ Hz, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 166.8, 147.6, 145.3, 133.9, 130.3, 129.4, 129.1, 129.0, 127.9, 126.4, 122.8, 116.3, 114.8, 57.7, 52.2, 36.0.

HRMS: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{22}\text{H}_{21}\text{ClNO}_2\text{Se}$, 446.0421; found, 446.0411.



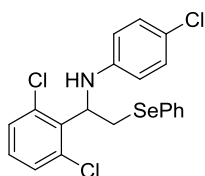
4-Chloro-N-(2-(phenylselanyl)-1-(4-(trifluoromethyl)phenyl)ethyl)aniline (5d). Compound **5d** was prepared according to the general procedure and isolated as a yellow solid (68 mg, 75% yield) after flash chromatography (petroleum ether/ethyl acetate = 40/1). mp=97-98 $^\circ$ C.

$^1\text{H NMR}$ (400 MHz, CDCl_3): δ 7.46 (d, $J = 8.1$ Hz, 2H), 7.40 (d, $J = 6.3$ Hz, 2H), 7.33 (d, $J = 8.1$ Hz, 2H), 7.24 – 7.13 (m, 3H), 6.93 (d, $J = 8.8$ Hz, 2H), 6.23 (d, $J = 8.8$ Hz, 2H), 4.48 (s, 1H), 4.33 (dd, $J = 8.9, 4.4$ Hz, 1H), 3.50 – 3.23 (m, 1H), 3.05 (dd, $J = 12.8, 8.8$ Hz, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 146.3, 145.1, 133.9, 129.9 (q, $J_{\text{C-F}} = 32.0$ Hz), 129.2 (d, $J_{\text{C-F}} = 39.3$ Hz), 128.5, 128.0, 126.7, 125.9 (q, $J_{\text{C-F}} = 3.8$ Hz), 124.1 (q, $J_{\text{C-F}} = 270.0$ Hz), 123.0, 114.9, 57.6, 36.1.

$^{19}\text{F NMR}$ (376 MHz, CDCl_3): δ -62.4.

HRMS: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{21}\text{H}_{18}\text{ClF}_3\text{NSe}$, 456.0240; found, 456.0239.



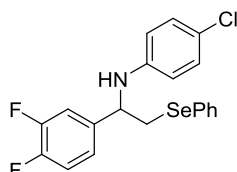
4-Chloro-N-(1-(2,6-dichlorophenyl)-2-(phenylselanyl)ethyl)aniline (5e). Compound **5e** was prepared according to the general procedure and isolated as a yellow solid (77 mg, 84% yield) after

flash chromatography (petroleum ether/ethyl acetate = 60/1). mp=79-80° C.

¹H NMR (400 MHz, CDCl₃): δ 7.58 – 7.28 (m, 2H), 7.25 – 6.98 (m, 4H), 7.06 – 7.03 (m, 1H), 6.97 – 6.93 (m, 3H), 6.38 (d, *J* = 8.7 Hz, 2H), 5.32 (dd, *J* = 9.6, 6.0 Hz, 1H), 4.70 (s, 1H), 3.51 (dd, *J* = 12.5, 9.5 Hz, 1H), 3.27 (dd, *J* = 12.6, 6.0 Hz, 1H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 145.0, 135.6, 133.7, 130.5, 129.3, 129.2, 129.1, 129.0, 128.7, 127.5, 122.7, 114.6, 55.2, 30.5.

HRMS: *m/z* [M + H]⁺ calcd for C₂₀H₁₇Cl₃NSe, 455.9586; found, 455.9579.



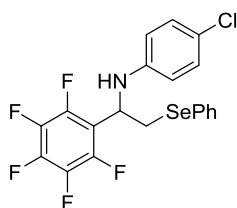
4-Chloro-N-(1-(3,4-difluorophenyl)-2-(phenylselanyl)ethyl)aniline (5f). Compound **5f** was prepared according to the general procedure and isolated as an oil (68 mg, 80% yield) after flash chromatography (petroleum ether/ethyl acetate = 50/1).

¹H NMR (400 MHz, CDCl₃): δ 7.40 (d, *J* = 6.0 Hz, 2H), 7.25 – 7.12 (m, 3H), 7.10 – 6.80 (m, 5H), 6.22 (d, *J* = 8.7 Hz, 2H), 4.40 (brs, 1H), 4.20 (dd, *J* = 8.9, 4.3 Hz, 1H), 3.20 (dd, *J* = 12.8, 4.4 Hz, 1H), 3.00 (dd, *J* = 12.8, 8.8 Hz, 1H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 151.9 (d, *J*_{C-F} = 12.8 Hz), 150.9 (d, *J*_{C-F} = 12.8 Hz), 149.4 (d, *J*_{C-F} = 12.8 Hz), 148.4 (d, *J*_{C-F} = 12.7 Hz), 145.2, 139.5 (t, *J*_{C-F} = 4.0 Hz), 133.9, 129.24 (d, *J*_{C-F} = 42.1 Hz), 128.5, 128.0, 123.0, 122.2 (dd, *J*_{C-F} = 6.4, 3.5 Hz), 117.7 (d, *J*_{C-F} = 17.4 Hz), 115.2 (d, *J*_{C-F} = 17.8 Hz), 114.9, 57.1, 36.2.

¹⁹F NMR (376 MHz, CDCl₃): δ -136.51 (d, *J* = 21.4 Hz), -138.94 (d, *J* = 21.4 Hz).

HRMS: *m/z* [M + H]⁺ calcd for C₂₀H₁₇ClF₂NSe, 424.0177; found, 424.0183.



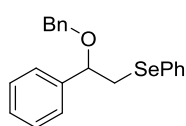
4-Chloro-N-(1-(perfluorophenyl)-2-(phenylselanyl)ethyl)aniline (5g). Compound **5g** was prepared according to the general procedure and isolated as an oil (69 mg, 72% yield) after flash chromatography (petroleum ether/ethyl acetate = 50/1).

¹H NMR (400 MHz, CDCl₃): δ 7.45 – 7.33 (m, 2H), 7.26 – 7.08 (m, 3H), 7.00 (d, *J* = 8.8 Hz, 2H), 6.36 (d, *J* = 8.8 Hz, 2H), 4.92 (dd, *J* = 8.5, 6.6 Hz, 1H), 4.15 (brs, 1H), 3.38 (dd, *J* = 12.8, 6.5 Hz, 1H), 3.23 (dd, *J* = 12.9, 8.4 Hz, 1H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 144.1, 133.6, 129.4, 129.2, 128.4, 127.9, 123.8, 114.5, 50.3, 31.4.

¹⁹F NMR (376 MHz, CDCl₃): δ -143.67 (dd, *J* = 23.1, 8.0 Hz), -154.42 (t, *J* = 21.0 Hz), -161.33 (td, *J* = 22.6, 8.2 Hz).

HRMS: *m/z* [M + H]⁺ calcd for C₂₀H₁₄ClF₅NSe, 477.9895; found, 477.9884.



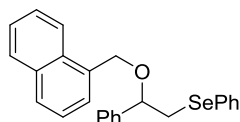
(2-(Benzyloxy)-2-phenylethyl)(phenyl)selane (6a). Compound **6a** was prepared according to the general procedure and isolated as an oil (63 mg, 85% yield) after flash chromatography (petroleum ether/ethyl acetate = 80/1).

¹H NMR (400 MHz, CDCl₃): δ 7.46 – 7.40 (m, 2H), 7.38 – 7.33 (m, 4H), 7.33 – 7.24 (m, 6H), 7.22 – 7.15 (m, 3H), 4.56 (dd, *J* = 8.5, 5.0 Hz, 1H), 4.48 (d, *J* = 11.8 Hz, 1H), 4.29 (d, *J* = 11.7 Hz, 1H), 3.39 (dd, *J* = 12.3, 8.5 Hz, 1H), 3.12 (dd, *J* = 12.3, 5.0 Hz,

1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 141.1, 138.1, 132.5, 130.9, 129.1, 128.7, 128.4, 128.2, 127.9, 127.7, 126.9, 126.8, 80.8, 70.9, 35.6.

Spectral data are in agreement with literature values^[4].

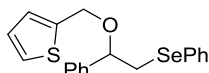


(2-(Naphthalen-1-ylmethoxy)-2-phenylethyl)(phenyl)selane (6b). Compound **6b** was prepared according to the general procedure and isolated as an oil (75 mg, 90% yield) after flash chromatography (petroleum ether/ethyl acetate = 60/1).

^1H NMR (400 MHz, CDCl_3): δ 8.00 (d, $J = 7.4$ Hz, 1H), 7.76 (d, $J = 7.7$ Hz, 1H), 7.74 – 7.61 (m, 1H), 7.44 – 7.37 (m, 2H), 7.36 – 7.20 (m, 9H), 7.15 – 7.05 (m, 3H), 4.84 (d, $J = 11.7$ Hz, 1H), 4.64 (d, $J = 11.7$ Hz, 1H), 4.54 (dd, $J = 8.4, 5.2$ Hz, 1H), 3.29 (dd, $J = 12.4, 8.3$ Hz, 1H), 3.04 (dd, $J = 12.3, 5.2$ Hz, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 141.1, 133.8, 133.5, 132.5, 131.8, 130.8, 129.0, 128.7, 128.6, 128.5, 128.3, 127.0, 126.7, 126.6, 126.2, 125.8, 125.2, 124.4, 80.9, 69.3, 35.5.

HRMS: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{25}\text{H}_{23}\text{OSe}$, 419.0909; found, 419.0912.



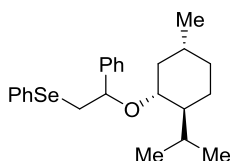
2-((1-Phenyl-2-(phenylselanyl)ethoxy)methyl)thiophene (6c).

Compound **6c** was prepared according to the general procedure and isolated as an oil (63 mg, 84% yield) after flash chromatography (petroleum ether/ethyl acetate = 90/1).

^1H NMR (400 MHz, CDCl_3): δ 7.37 – 7.34 (m, 2H), 7.32 – 7.26 (m, 5H), 7.21 – 7.07 (m, 5H), 6.76 (d, $J = 3.5$ Hz, 1H), 4.59 – 4.43 (m, 2H), 4.36 (d, $J = 12.5$ Hz, 1H), 3.29 (dd, $J = 12.3, 8.3$ Hz, 1H), 3.03 (dd, $J = 12.3, 5.2$ Hz, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 147.5, 140.5, 136.6, 132.5, 130.6, 129.2, 129.0, 128.7, 128.3, 127.3, 126.9, 126.8, 80.6, 65.4, 35.2.

HRMS: m/z $[\text{M} + \text{H}]^+$ calcd for $\text{C}_{19}\text{H}_{19}\text{OSSe}$, 375.0316; found, 375.0312.



(2-(((1R,2S,5R)-2-Isopropyl-5-methylcyclohexyl)oxy))-2-phenylethyl(phenyl)selane (6d). Compound **6d** was prepared according to the general procedure and isolated as a white solid (71 mg, 86% yield) after flash chromatography (petroleum ether/ethyl acetate = 50/1).

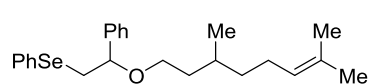
The crude NMR indicated the presence of mixture of diastereomers (dr = 1.8:1).

^1H NMR (400 MHz, CDCl_3): δ 7.43 – 7.31 (m, 4H, both diastereomers), 7.31 – 7.02 (m, 16H, both diastereomers), 4.56 (dd, $J = 8.3, 5.4$ Hz, 1H, major diastereomer), 4.44 (t, $J = 6.6$ Hz, 1H, minor diastereomer), 3.30 (dd, $J = 12.1, 8.4$ Hz, 2H, both diastereomers), 3.12 – 2.99 (m, 3H, both diastereomers), 2.83 (td, $J = 10.5, 4.2$ Hz, 1H, major diastereomer), 2.39 – 2.31 (m, 1H, minor diastereomer), 2.19 – 2.12 (m, 1H, major diastereomer), 2.11 – 2.00 (m, 1H, major diastereomer), 1.58 – 1.46 (m, 6H, both diastereomers), 1.27 – 1.07 (m, 5H, both diastereomers), 0.93 – 0.57 (m, 19H, both diastereomers), 0.16 (d, $J = 6.9$ Hz, 3H, major diastereomer).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 143.0, 141.7, 132.3, 132.3, 131.2, 131.0, 129.0,

128.9, 128.3, 128.2, 128.0, 127.8, 127.4, 126.9, 126.7, 126.5, 80.9, 79.3, 77.6, 75.4, 49.2, 48.3, 42.3, 40.0, 35.5, 35.4, 34.5, 34.3, 31.6, 31.4, 25.2, 24.8, 23.0, 22.7, 22.4, 22.2, 21.4, 21.3, 16.2, 15.3.

Spectral data are in agreement with literature values^[4].



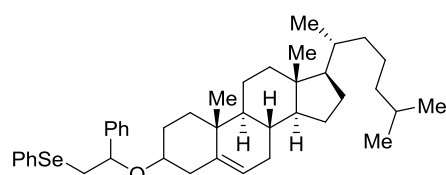
(2-((3,7-Dimethyloct-6-en-1-yl)oxy)-2-phenylethyl)phenylselane (6e). Compound **6e** was prepared according to the general procedure and isolated as an

oil (66 mg, 80% yield) after flash chromatography (petroleum ether/ethyl acetate = 80/1).

¹H NMR (400 MHz, CDCl₃): δ 7.40 (d, *J* = 7.0 Hz, 2H), 7.32 – 7.20 (m, 5H), 7.20 – 7.06 (m, 3H), 5.01 (q, *J* = 7.6 Hz, 1H), 4.37 (ddd, *J* = 8.8, 4.9, 2.0 Hz, 1H), 3.45 – 3.18 (m, 3H), 3.00 (dd, *J* = 12.2, 4.8 Hz, 1H), 1.87 (tt, *J* = 14.4, 8.2 Hz, 2H), 1.61 (s, 3H), 1.55 – 1.48 (m, 5H), 1.36 – 1.14 (m, 2H), 1.09 – 0.96 (m, 1H), 0.78 (d, *J* = 6.3 Hz, 3H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 140.7, 131.4, 130.1, 130.0, 127.9, 127.4, 126.9, 125.6, 125.6, 123.8, 80.8, 66.6, 36.1, 35.8, 34.6, 28.4, 24.7, 24.5, 18.5, 16.6.

HRMS: *m/z* [M + H]⁺ calcd for C₂₄H₃₃OSe, 417.1691; found, 417.1683.



(2-(((8S,9S,10R,13R,14S,17R)-10,13-Dimethyl-17-((R)-6-methylheptan-2-yl)-2,3,4,7,8,9,10,11,12,13,14,15,16,17-tetradecahydro-1H-cyclopenta[a]phenanthren-3-yl)oxy)-2-phenylethyl)phenylselane (6f). Compound **6f** was prepared according to the general procedure and isolated as an oil (106 mg, 82% yield) after

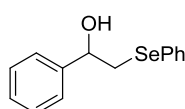
flash chromatography (petroleum ether/ethyl acetate = 70/1).

The crude NMR indicated the presence of mixture of diastereomers (dr = 1.07:1).

¹H NMR (400 MHz, CDCl₃): δ 7.45 – 7.37 (m, 4H, both diastereomers), 7.36 – 7.11 (m, 16H, both diastereomers), 5.23 (d, *J* = 5.0 Hz, 1H, major diastereomer), 5.12 (d, *J* = 4.9 Hz, 1H, minor diastereomer), 4.58 (dt, *J* = 8.9, 4.4 Hz, 2H, both diastereomers), 3.24 (dd, *J* = 12.1, 9.0 Hz, 2H, major diastereomer), 3.06 – 2.97 (m, 4H, both diastereomers), 2.34 (dd, *J* = 13.2, 4.8 Hz, 1H, major diastereomer), 2.19 (t, *J* = 12.3 Hz, 2H, major diastereomer), 2.03 (dd, *J* = 13.4, 5.0, 1H, major diastereomer), 1.94 – 1.80 (m, 5H, both diastereomers), 1.78 – 1.63 (m, 4H, both diastereomers), 1.59 – 1.15 (m, 26H, both diastereomers), 1.11 – 0.67 (m, 41H, both diastereomers), 0.58 (m, 6H, both diastereomers),

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 141.5, 141.4, 139.9, 139.8, 131.3, 131.3, 130.1, 130.0, 127.9, 127.4, 127.4, 126.8, 126.7, 125.6, 125.5, 125.4, 120.5, 120.4, 77.8, 77.6, 55.7, 55.1, 49.1, 49.0, 41.3, 39.0, 38.7, 38.5, 37.6, 36.2, 36.0, 35.8, 35.2, 35.1, 35.0, 34.7, 30.9, 30.8, 30.8, 28.4, 27.2, 27.0, 26.8, 23.2, 22.8, 21.8, 21.5, 20.0, 20.0, 18.4, 18.4, 17.7, 10.8.

Spectral data are in agreement with literature values^[4].



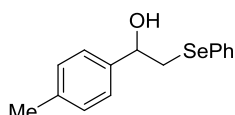
1-Phenyl-2-(phenylselanyl)ethan-1-ol (7a). Compound **7a** was

prepared according to the general procedure and isolated as an oil (45 mg, 82% yield) after flash chromatography (petroleum ether/ethyl acetate = 15/1).

$^1\text{H NMR}$ (400 MHz, CDCl_3): δ 7.8 – 7.45 (m, 2H), 7.26 – 7.23 (m, 4H), 7.23 – 7.16 (m, 4H), 4.66 (dd, $J = 9.4, 3.7$ Hz, 1H), 3.22 (dd, $J = 12.8, 3.7$ Hz, 1H), 3.06 (dd, $J = 12.8, 9.4$ Hz, 1H), 2.75 (brs, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 141.4, 132.1, 128.2, 128.1, 127.5, 126.9, 126.4, 124.76, 71.2, 37.4.

Spectral data are in agreement with literature values^[5].

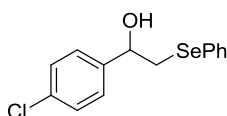


2-(Phenylselanyl)-1-(p-tolyl)ethan-1-ol (7b). Compound **7b** was prepared according to the general procedure and isolated as an oil (42 mg, 72% yield) after flash chromatography (petroleum ether/ethyl acetate = 18/1).

$^1\text{H NMR}$ (400 MHz, CDCl_3): δ 7.46 – 7.44 (m, 2H), 7.23 – 7.17 (m, 3H), 7.16 – 7.10 (m, 2H), 7.05 (d, $J = 7.7$ Hz, 2H), 4.63 (dt, $J = 8.9, 3.0$ Hz, 1H), 3.19 (dd, $J = 12.7, 3.9$ Hz, 1H), 3.05 (dd, $J = 12.7, 9.2$ Hz, 1H), 2.76 (d, $J = 2.6$ Hz, 1H), 2.25 (s, 3H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 138.5, 136.6, 132.0, 128.2, 128.15, 128.13, 126.3, 124.7, 71.0, 37.3, 20.1.

Spectral data are in agreement with literature values^[5].



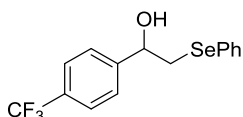
1-(4-Chlorophenyl)-2-(phenylselanyl)ethan-1-ol (7c).

Compound **7c** was prepared according to the general procedure and isolated as an oil (47 mg, 76% yield) after flash chromatography (petroleum ether/ethyl acetate = 20/1).

$^1\text{H NMR}$ (400 MHz, CDCl_3): δ 7.65 – 7.29 (m, 2H), 7.30 – 7.00 (m, 7H), 4.60 (dt, $J = 9.2, 3.1$ Hz, 1H), 3.16 (dd, $J = 12.8, 3.8$ Hz, 1H), 2.98 (dd, $J = 12.8, 9.3$ Hz, 1H), 2.88 (d, $J = 2.7$ Hz, 1H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 139.9, 132.5, 132.2, 128.3, 127.8, 127.6, 126.5, 126.2, 70.4, 37.3.

Spectral data are in agreement with literature values^[5].



2-(Phenylselanyl)-1-(4-(trifluoromethyl)phenyl)ethan-1-ol (7d).

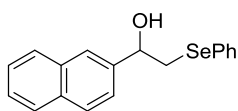
Compound **7d** was prepared according to the general procedure and isolated as an oil (48 mg, 70% yield) after flash chromatography (petroleum ether/ethyl acetate = 15/1).

$^1\text{H NMR}$ (400 MHz, CDCl_3): δ 7.46 (d, $J = 8.1$ Hz, 2H), 7.44 – 7.39 (m, 2H), 7.32 (d, $J = 8.1$ Hz, 2H), 7.21 – 7.17 (m, 3H), 4.67 (dt, $J = 9.2, 3.1$ Hz, 1H), 3.18 (dd, $J = 12.9, 3.8$ Hz, 1H), 3.05 – 2.91 (m, 2H).

$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3): δ 145.3, 132.2, 128.9 (q, C-F, $^2J_{\text{C-F}} = 32.4$ Hz), 128.3, 127.6, 126.6, 125.1, 124.4 (q, $^3J_{\text{C-F}} = 3.8$ Hz), 121.7 (q, C-F, $^1J_{\text{C-F}} = 270.4$ Hz), 70.5, 37.3.

$^{19}\text{F NMR}$ (376 MHz, CDCl_3): δ -62.4.

Spectral data are in agreement with literature values^[5].



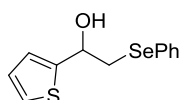
1-(Naphthalen-2-yl)-2-(phenylselanyl)ethan-1-ol (7e).

Compound **7e** was prepared according to the general procedure and isolated as a white solid (55 mg, 84% yield) after flash chromatography (petroleum ether/ethyl acetate = 17/1). mp = 52-53 °C.

¹H NMR (400 MHz, CDCl₃): δ 7.77 – 7.57 (m, 4H), 7.51 – 7.39 (m, 2H), 7.38 – 7.31 (m, 2H), 7.29 (dd, *J* = 8.5, 1.8 Hz, 1H), 7.20 – 7.09 (m, 3H), 4.77 (dt, *J* = 9.2, 3.1 Hz, 1H), 3.23 (dd, *J* = 12.8, 3.8 Hz, 1H), 3.08 (dd, *J* = 12.8, 9.3 Hz, 1H), 2.96 (d, *J* = 2.6 Hz, 1H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 138.8, 132.1, 132.1, 132.0, 128.2, 128.1, 127.3, 126.9, 126.6, 126.3, 125.1, 124.9, 123.6, 122.7, 71.3 37.2.

Spectral data are in agreement with literature values^[5].



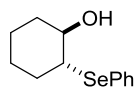
2-(Phenylselanyl)-1-(thiophen-2-yl)ethan-1-ol (7t).

Compound **7t** was prepared according to the general procedure and isolated as an oil (42 mg, 74% yield) after flash chromatography (petroleum ether/ethyl acetate = 15/1).

¹H NMR (400 MHz, CDCl₃): δ 7.48 – 7.40 (m, 2H), 7.26 – 7.06 (m, 4H), 6.92 – 6.81 (m, 2H), 4.91 (dt, *J* = 7.9, 3.6 Hz, 1H), 3.26 (dd, *J* = 12.8, 4.3 Hz, 1H), 3.16 (dd, *J* = 12.8, 8.6 Hz, 1H), 2.99 (d, *J* = 3.4 Hz, 1H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 145.2, 132.1, 128.2, 128.0, 126.4, 125.7, 123.8, 123.0, 67.5, 37.1.

Spectral data are in agreement with literature values^[5].



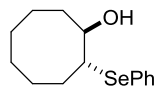
anti-2-(Phenylselanyl)cyclohexan-1-ol (7g).

Compound **7g** was prepared according to the general procedure and isolated as an oil (37 mg, 72% yield) after flash chromatography (petroleum ether/ethyl acetate = 20/1).

¹H NMR (400 MHz, CDCl₃): δ 7.60 – 7.43 (m, 2H), 7.31 – 7.12 (m, 3H), 3.25 (tdd, *J* = 10.3, 4.3, 1.4 Hz, 1H), 2.90 (s, 1H), 2.82 (ddd, *J* = 12.3, 10.0, 4.0 Hz, 1H), 2.23 – 1.96 (m, 1H), 1.67 – 1.62 (m, 1H), 1.58– 1.52 (m, 1H), 1.44 – 1.02 (m, 5H).

¹³C{¹H} NMR (100 MHz, CDCl₃): δ 135.1, 128.0, 127.1, 125.5, 71.2, 52.5, 32.8, 32.3, 25.8, 23.4.

Spectral data are in agreement with literature values^[5].



anti-2-(Phenylselanyl)cyclooctan-1-ol (7h).

Compound **7h** was prepared according to the general procedure and isolated as an oil (38 mg, 68% yield) after flash chromatography (petroleum ether/ethyl acetate = 30/1).

¹H NMR (400 MHz, CDCl₃): δ 7.60 – 7.41 (m, 2H), 7.27 – 7.12 (m, 3H), 3.61 (dd, *J* = 10.1, 4.6 Hz, 1H), 3.24 (ddd, *J* = 10.4, 8.5, 2.7 Hz, 1H), 2.87 (s, 1H), 2.22 – 2.14 (m, 1H), 1.95 – 1.71 (m, 2H), 1.70 – 1.58 (m, 3H), 1.54 – 1.38 (m, 6H).

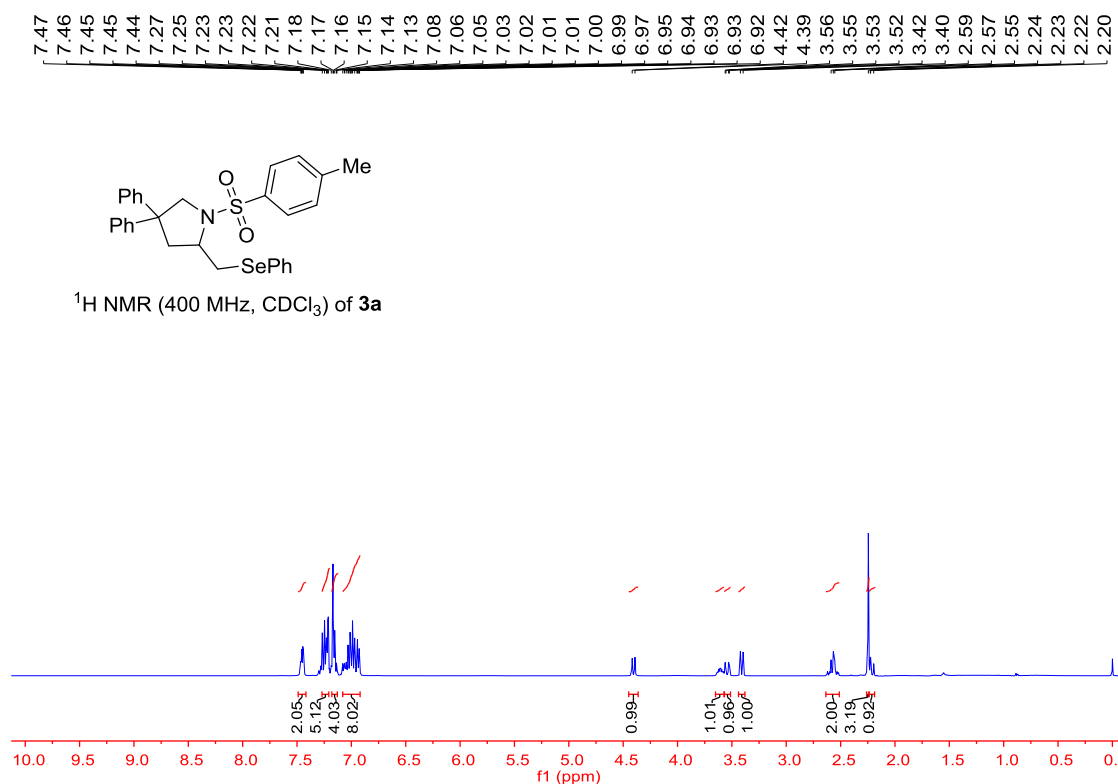
¹³C{¹H} NMR (100 MHz, CDCl₃): δ 134.4, 128.0, 126.9, 126.8, 72.6, 54.2, 30.9, 30.6, 25.8, 25.7, 24.2, 22.6.

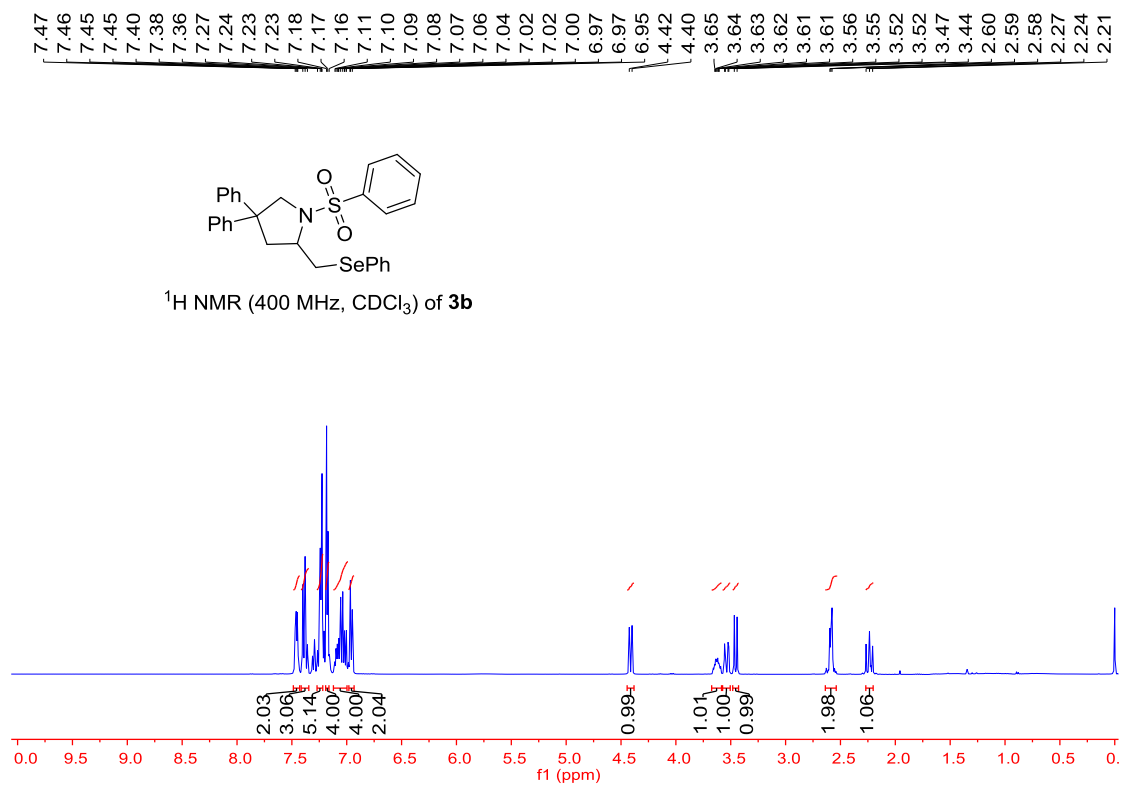
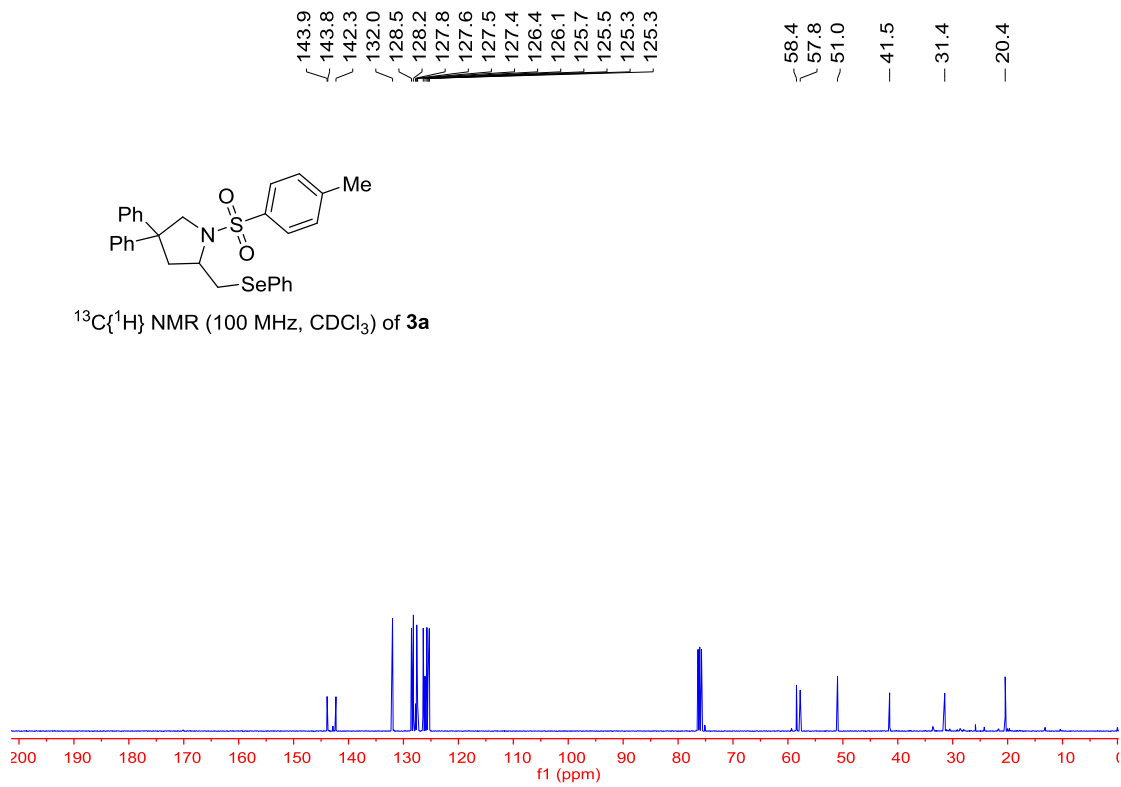
Spectral data are in agreement with literature values^[5].

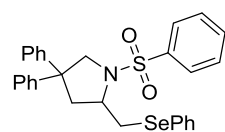
4. References

- [1] Wang, P.-F.; Yi, W.; Ling, Y.; Ming, L.; Liu, G.-Q.; Zhao, Y. Preparation of selenofunctionalized heterocycles via iodosobenzene-mediated intramolecular selenocyclizations of olefins with diselenides; *Chin. Chem. Lett.* **2021**, *32*, 2587-2591.
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- [4] Zhang, Y.-Q.; Jiang, Y.-Q.; Wang, Y.-H.; Qi, C.; Ling, Y.; Zhang, Y.; Liu, G.-Q. Oxidative Three-Component Selenofunctionalization of Alkenes: Convenient Access to Vicinally Functionalized Selenides; *J. Org. Chem.* **2023**, *88*, 7431-7447.
- [5] Liang, Z.-P.; Yi, W.; Wang, P.-F.; Liu, G.-Q.; Ling, Y. Iodosobenzene-mediated three-component selenofunctionalization of olefins; *J. Org. Chem.* **2021**, *86*, 5292-5304.

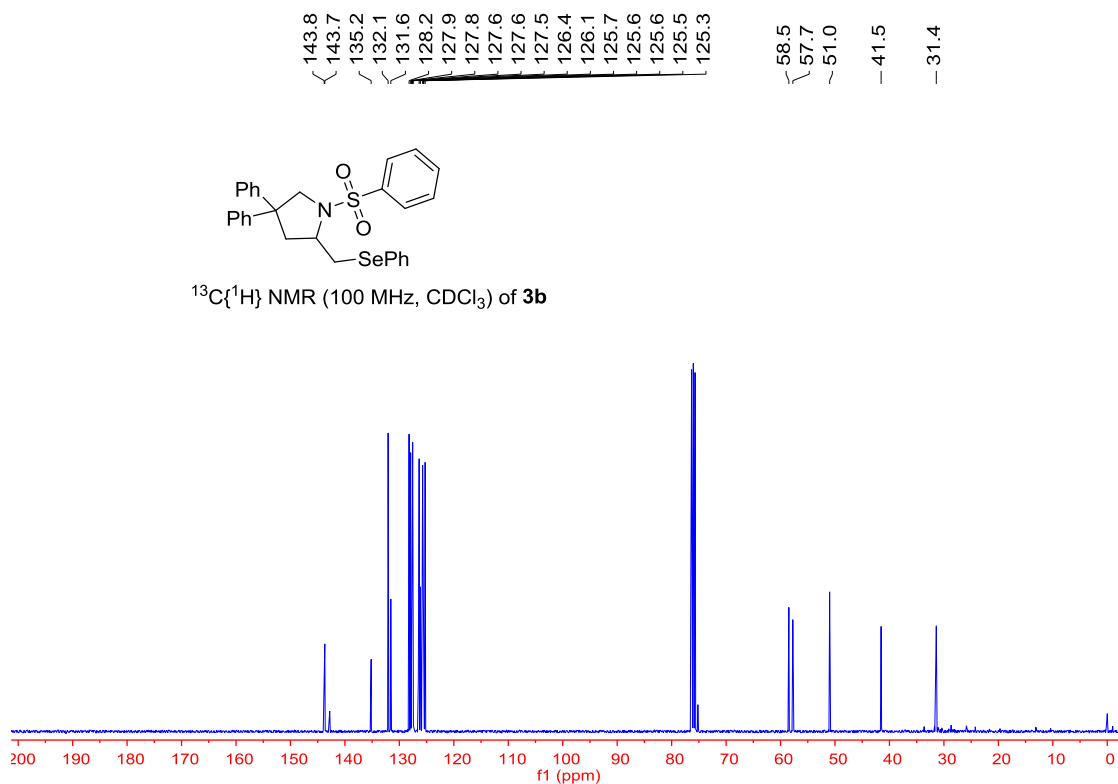
5. Copies of NMR spectra



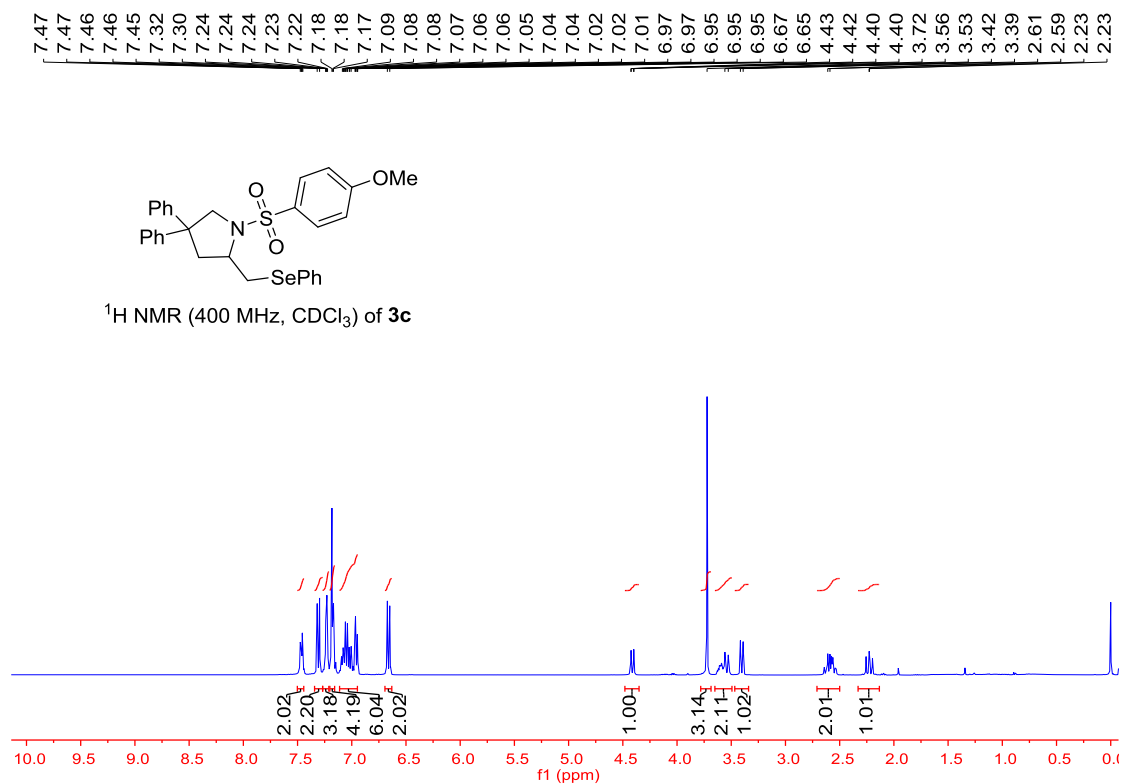




$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **3b**



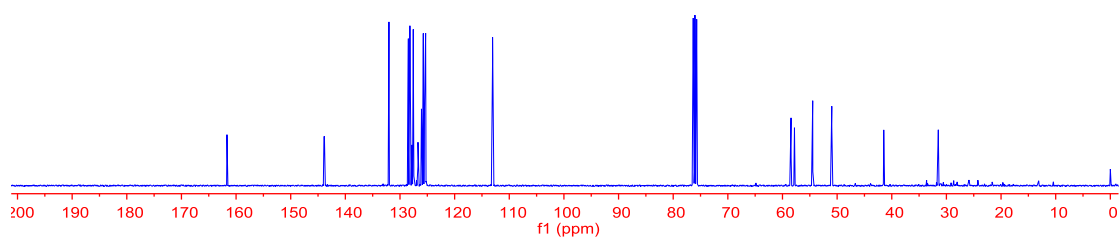
^1H NMR (400 MHz, CDCl_3) of **3c**



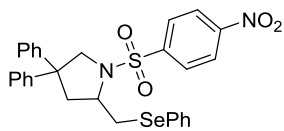
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 127.6
 127.5
 126.7
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 113.1
 58.4
 57.8
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 51.0
 41.5
 31.5



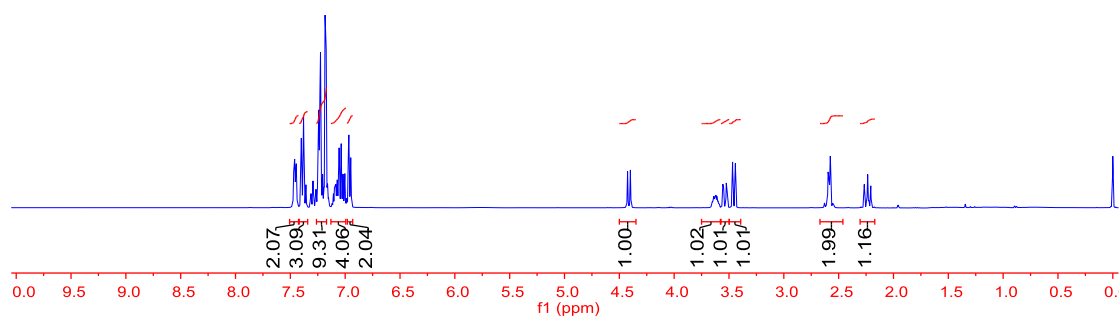
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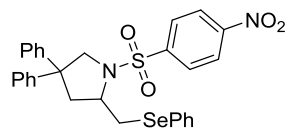


7.47
 7.46
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 7.45
 7.40
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 7.40
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 7.22
 7.18
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 7.08
 7.07
 7.06
 7.05
 7.04
 7.04
 7.02
 7.02
 7.00
 6.97
 6.97
 6.95
 6.95
 6.95
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 2.23

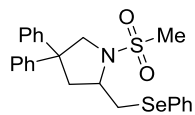
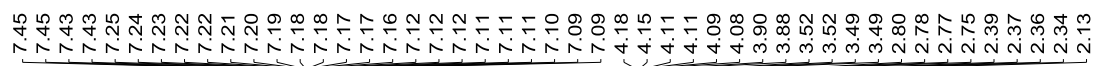
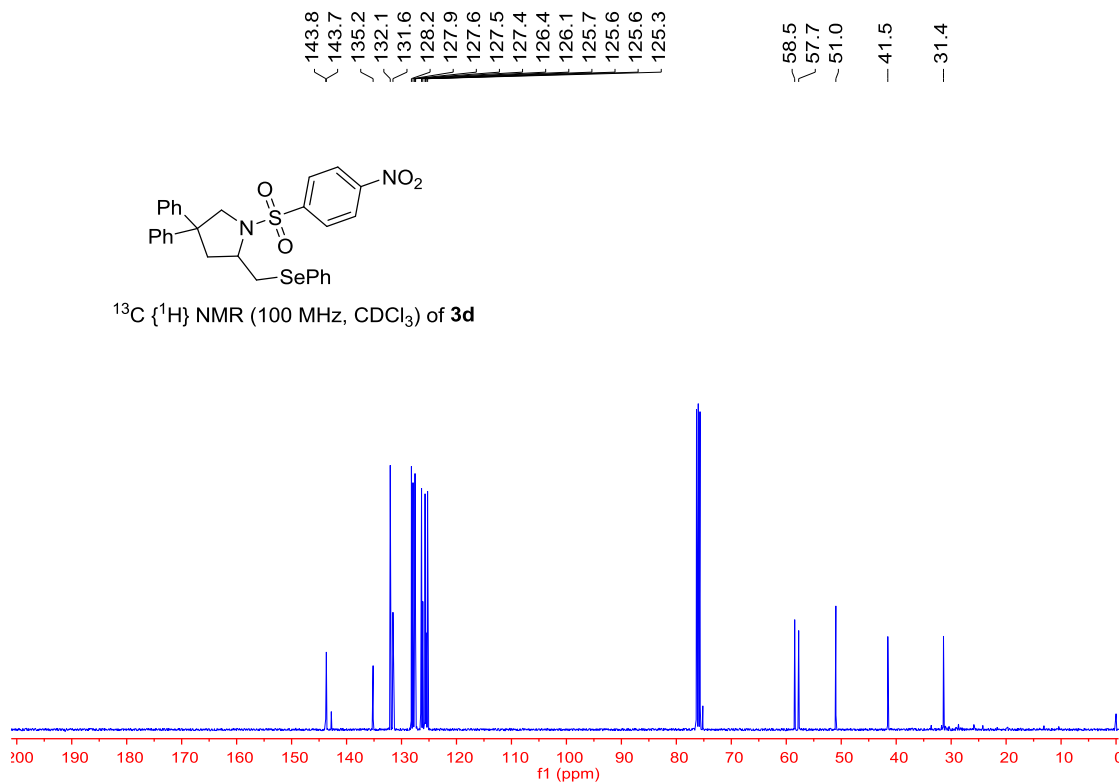


^1H NMR (400 MHz, CDCl_3) of **3d**

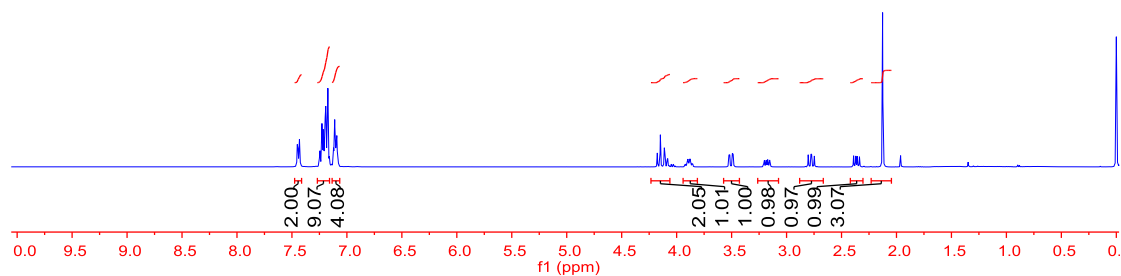




$^{13}\text{C} \{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **3d**

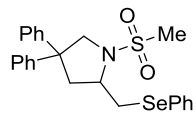


^1H NMR (400 MHz, CDCl_3) of **3e**

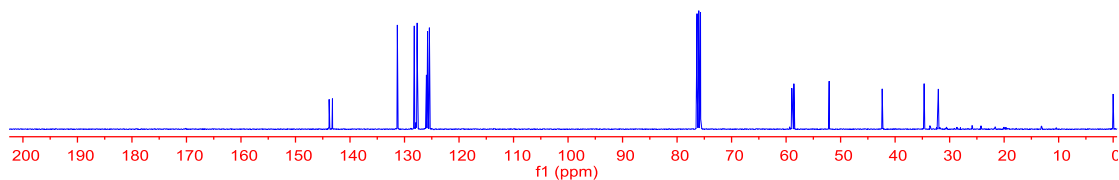


143.8
143.2
131.3
128.3
128.2
127.9
127.7
126.0
126.0
125.8
125.7
125.4

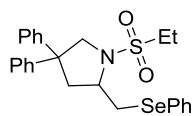
59.0
58.6
52.1
42.4
34.7
32.1



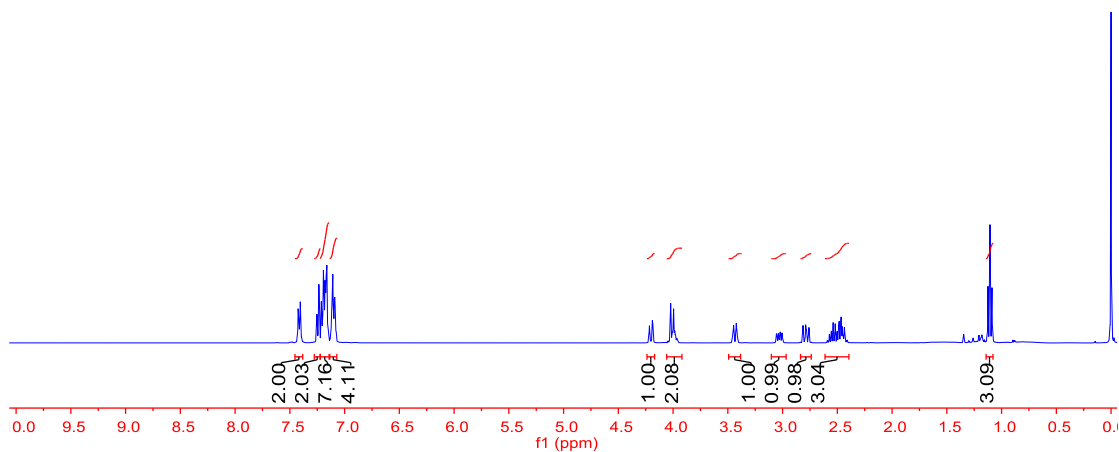
^{13}C $\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **3e**

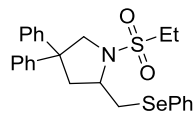


7.42
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7.12
7.11
7.11
7.11
7.10
7.09
7.09
7.09
4.19
4.19
4.02
4.00
4.00
3.45
3.42
3.42
2.79
2.54
2.52
2.49
2.48
2.47
2.46
1.12
1.11
1.09



^1H NMR (400 MHz, CDCl_3) of **3f**

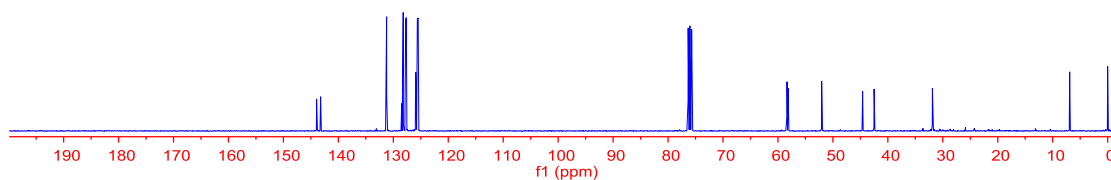




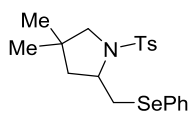
^{13}C $\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **3f**

144.0
143.2
131.2
128.5
128.2
127.7
127.6
125.9
125.8
125.7
125.6
125.5

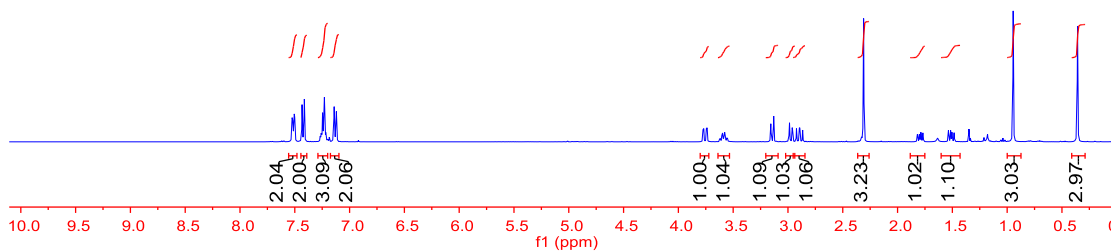
58.4
58.1
52.0
44.6
42.5
-31.9
-6.9



7.52
7.52
7.51
7.50
7.50
7.43
7.41
7.26
7.26
7.25
7.24
7.24
7.23
7.23
7.22
7.14
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3.78
3.77
3.74
3.74
3.60
3.58
3.16
3.13
2.99
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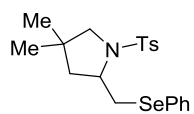


^1H NMR (400 MHz, CDCl_3) of **3g**

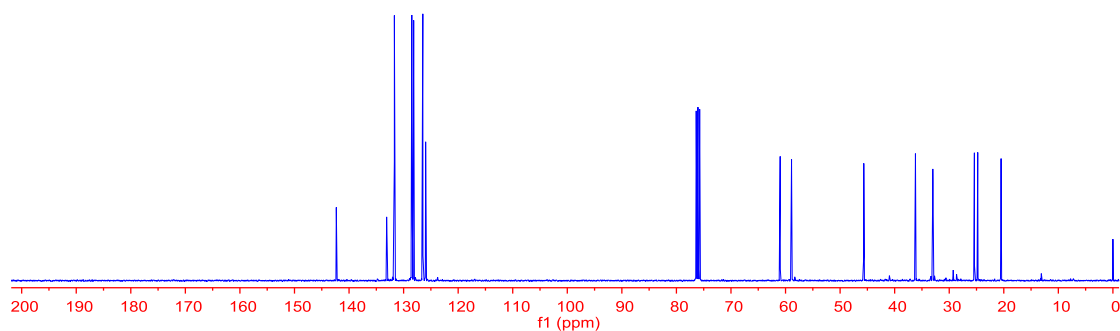


142.3
133.1
131.7
128.5
128.4
128.2
126.5

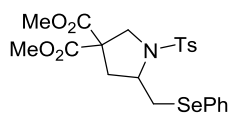
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25.4
24.8
20.5



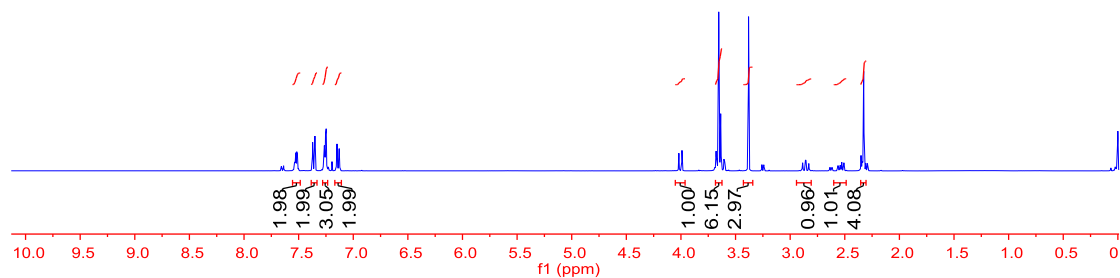
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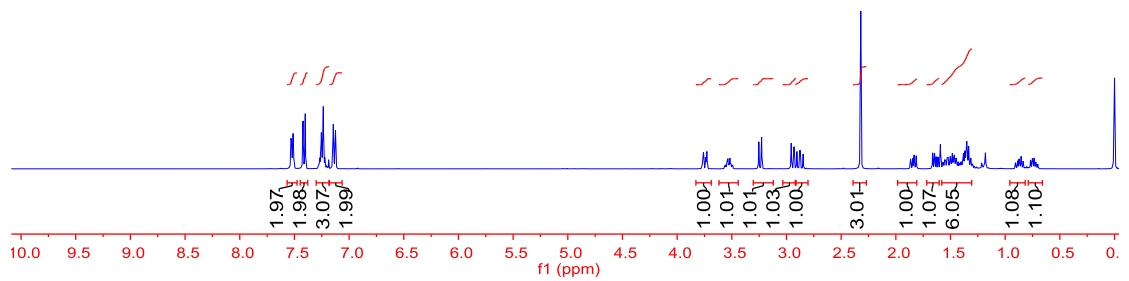
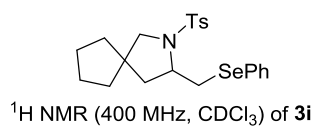
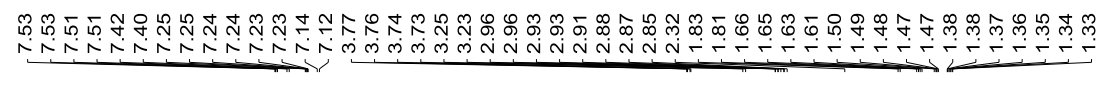
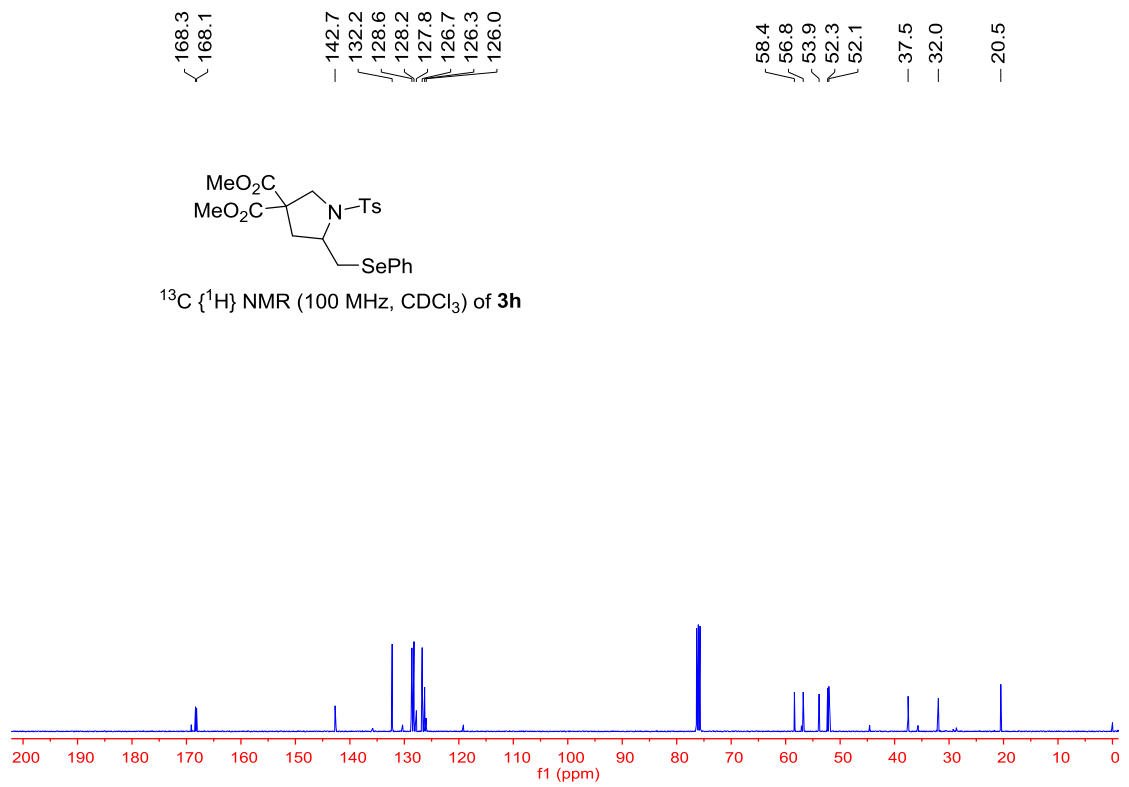
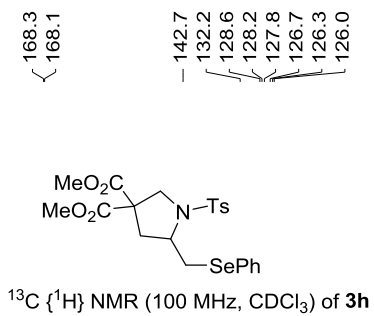


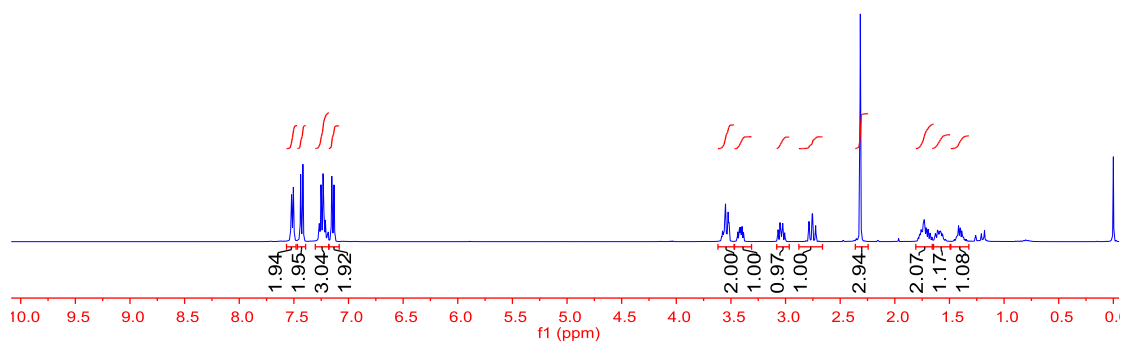
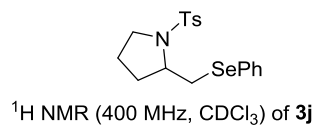
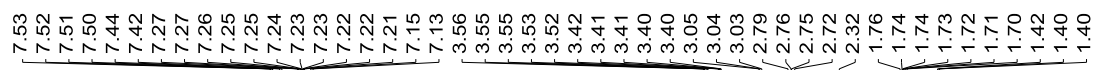
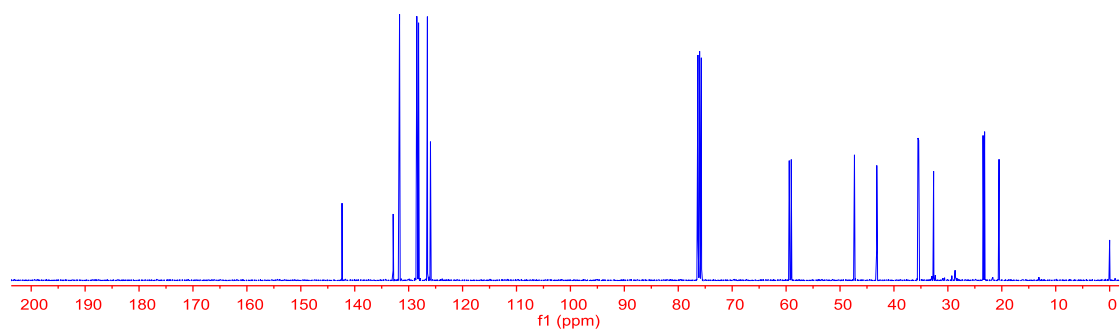
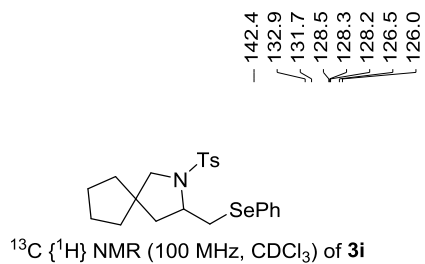
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7.13
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3.99
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3.67
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3.63
3.38
2.89
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2.31
2.29

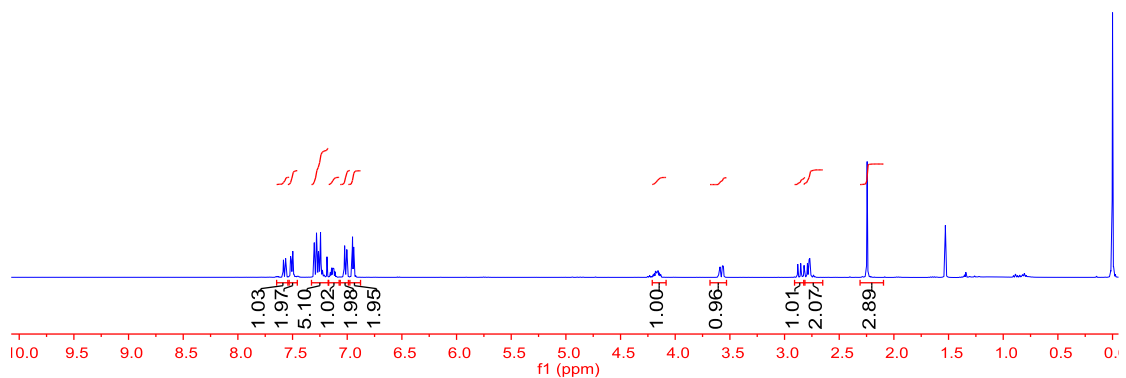
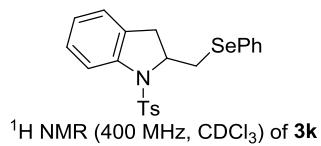
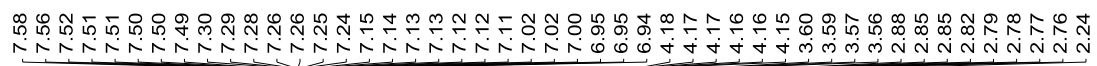
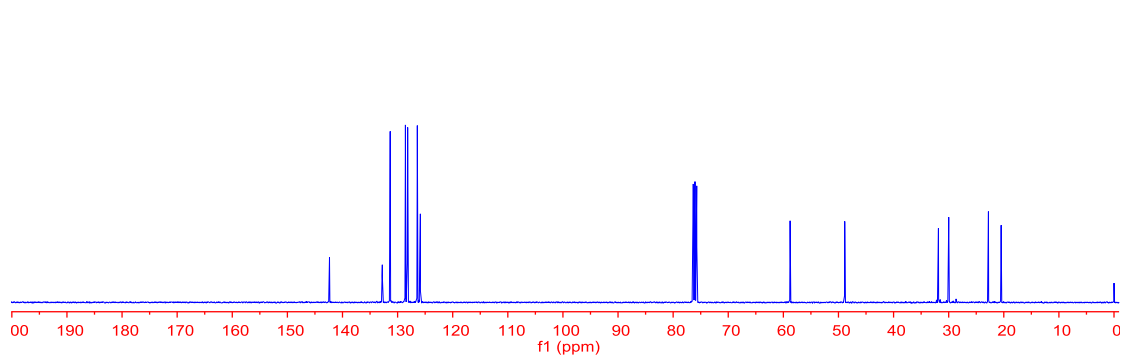
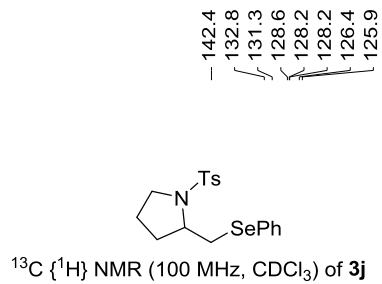


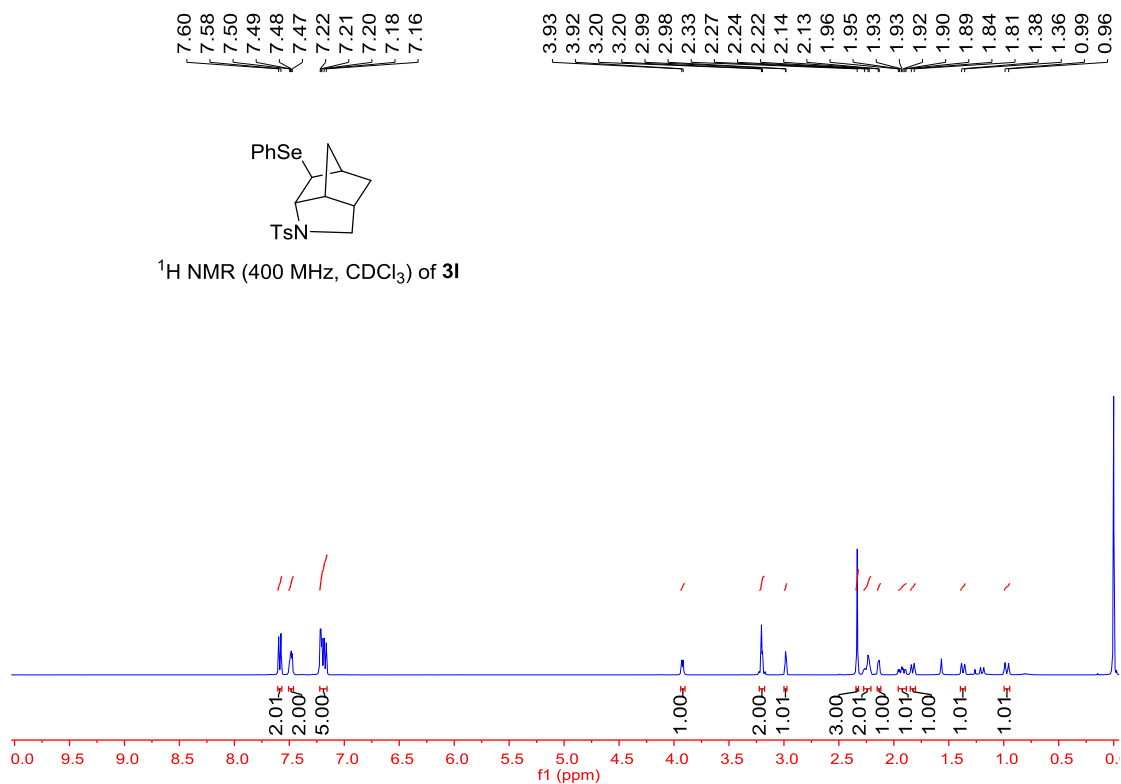
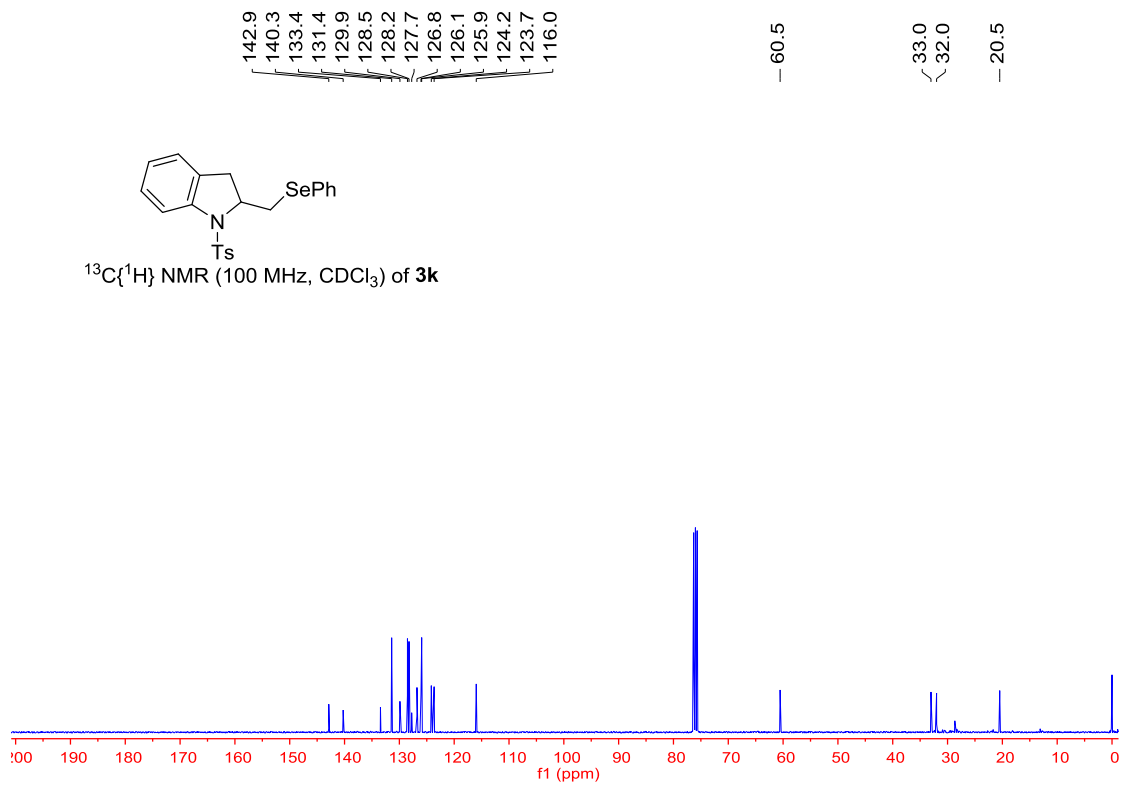
^1H NMR (400 MHz, CDCl_3) of **3h**





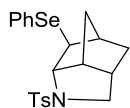




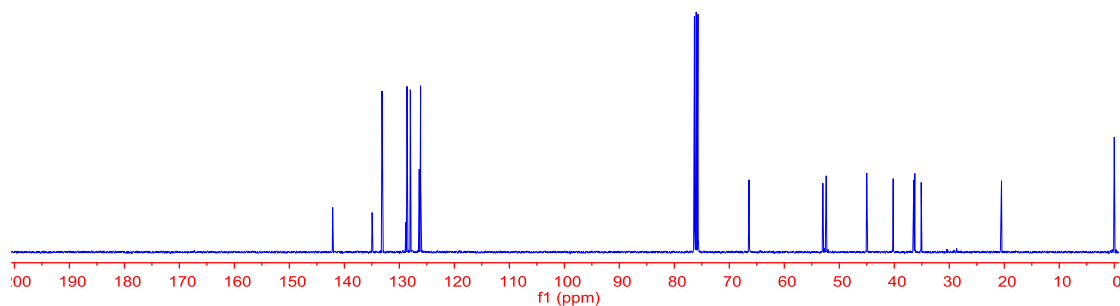


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135.0
133.2
128.8
128.6
128.0
126.4
126.1

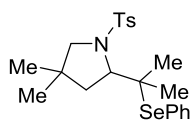
- 66.4
53.0
52.4
45.0
40.2
36.5
36.3
35.1
-20.5



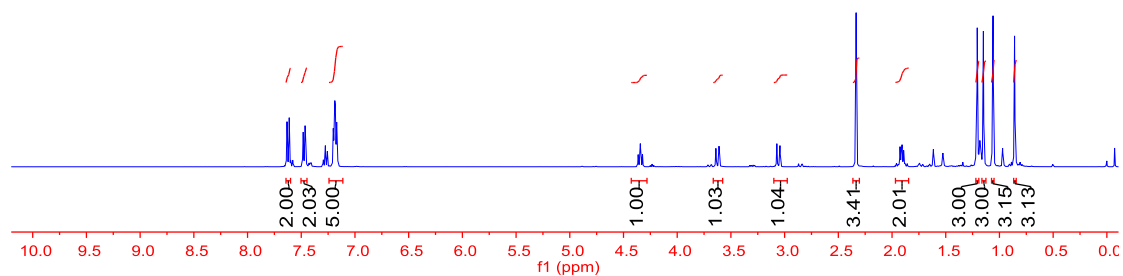
$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **3l**

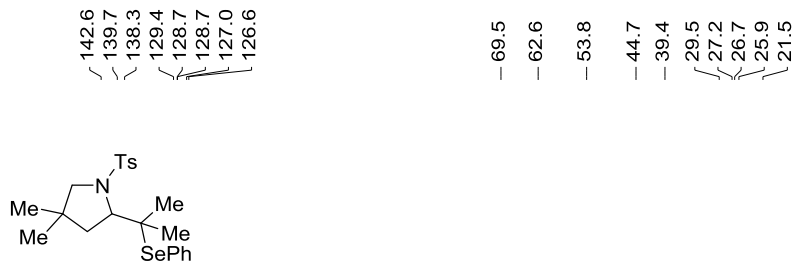


7.63
7.63
7.62
7.61
7.48
7.48
7.47
7.46
7.29
7.28
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7.26
7.26
7.25
7.20
7.19
7.18
7.17
7.16
4.36
4.34
4.32
3.64
3.61
3.61
3.07
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1.15
1.06
0.86

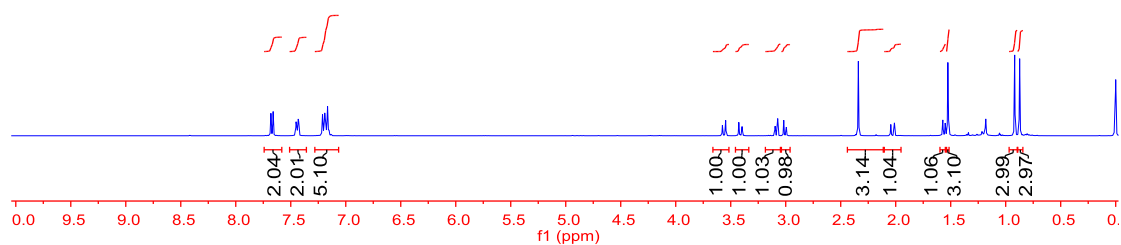
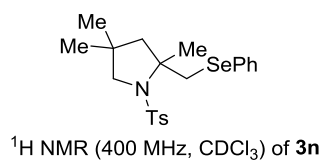
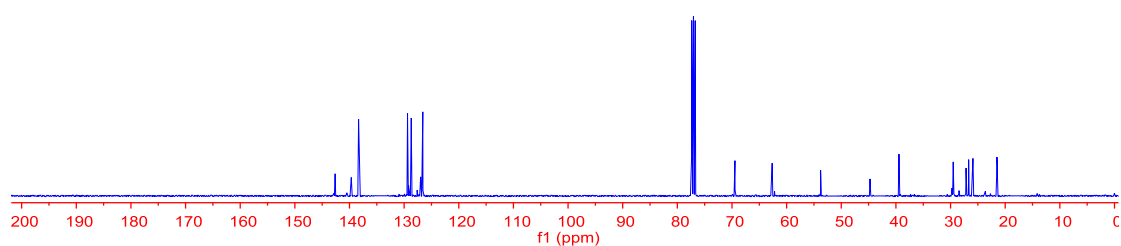


^1H NMR (400 MHz, CDCl_3) of **3m**





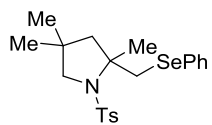
^{13}C { ^1H } NMR (100 MHz, CDCl_3) of **3m**



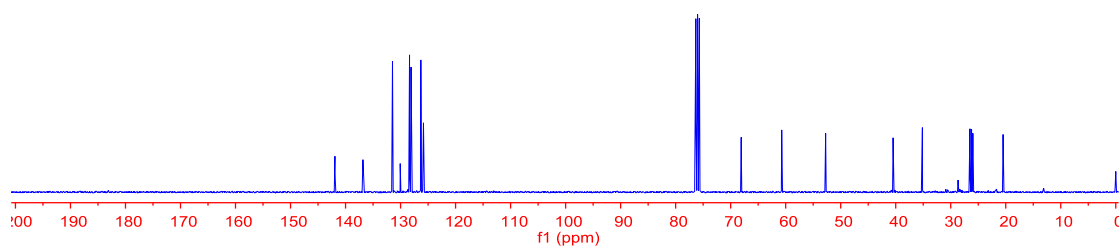
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136.8
131.5
130.1
128.4
128.1
126.3
125.8

68.1
60.7
52.7

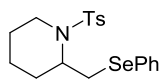
40.5
35.2
26.5
26.2
26.0
20.5



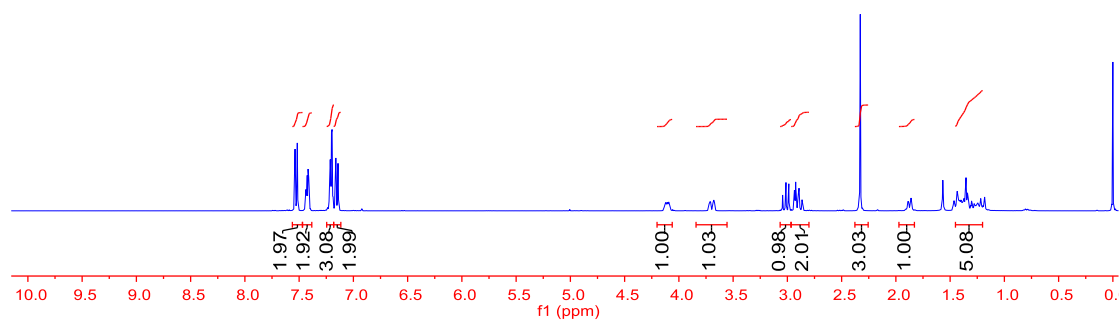
^{13}C $\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **3n**



7.54
7.52
7.44
7.43
7.43
7.43
7.42
7.41
7.21
7.21
7.20
7.20
7.19
7.16
7.15
7.14
3.68
3.04
3.02
3.01
2.99
2.94
2.93
2.93
2.92
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1.33
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1.18

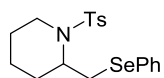


^1H NMR (400 MHz, CDCl_3) of **3o**

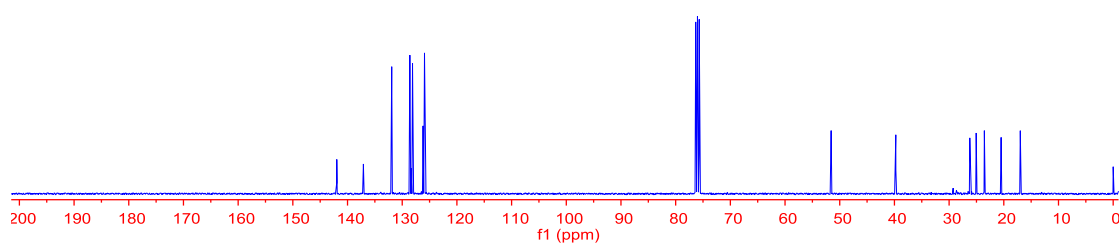


142.0
137.1
131.9
128.6
128.4
128.1
126.2
125.9

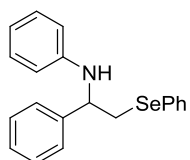
- 51.6
- 39.7
26.2
25.1
23.6
20.5
17.0



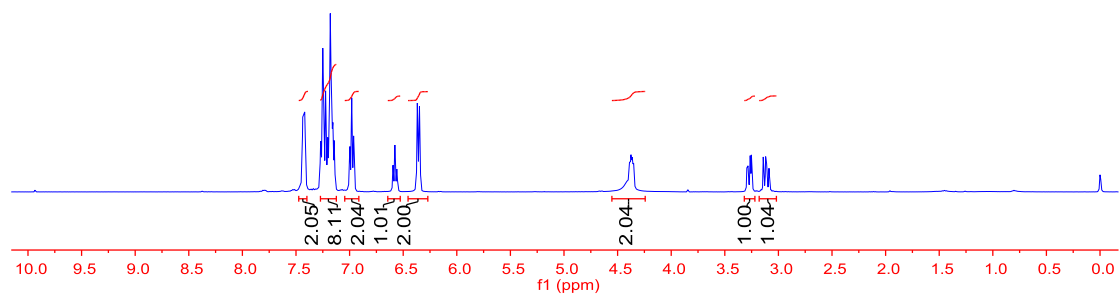
^{13}C $\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **3o**

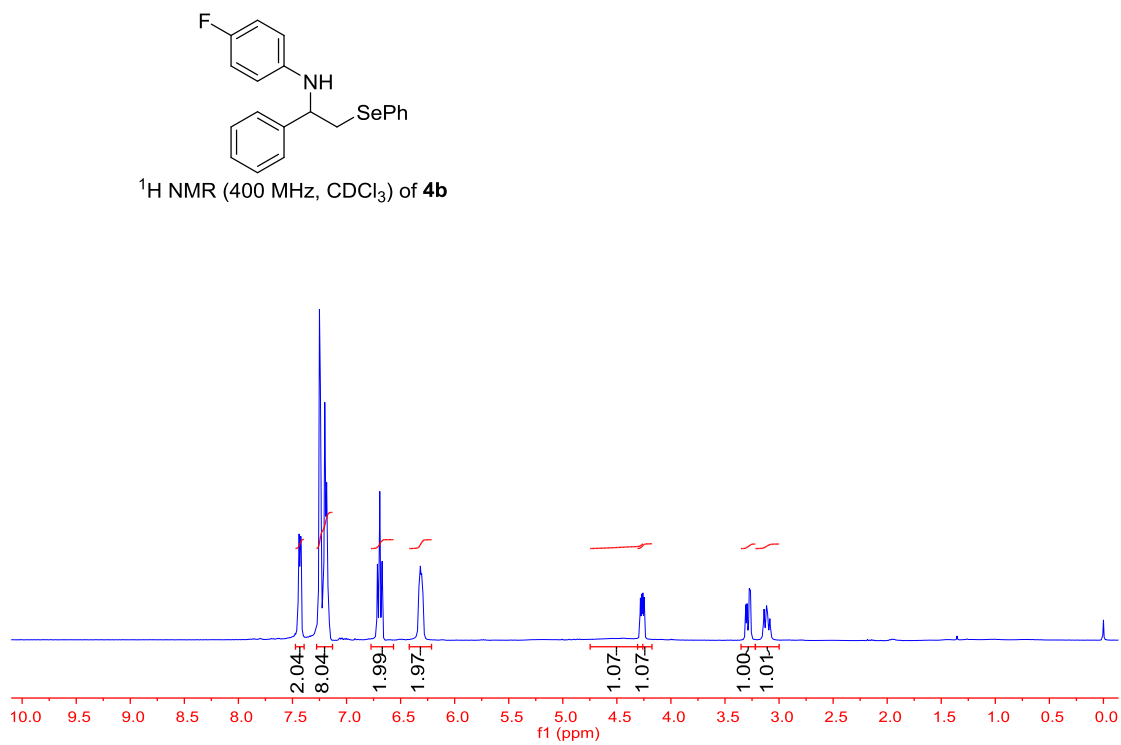
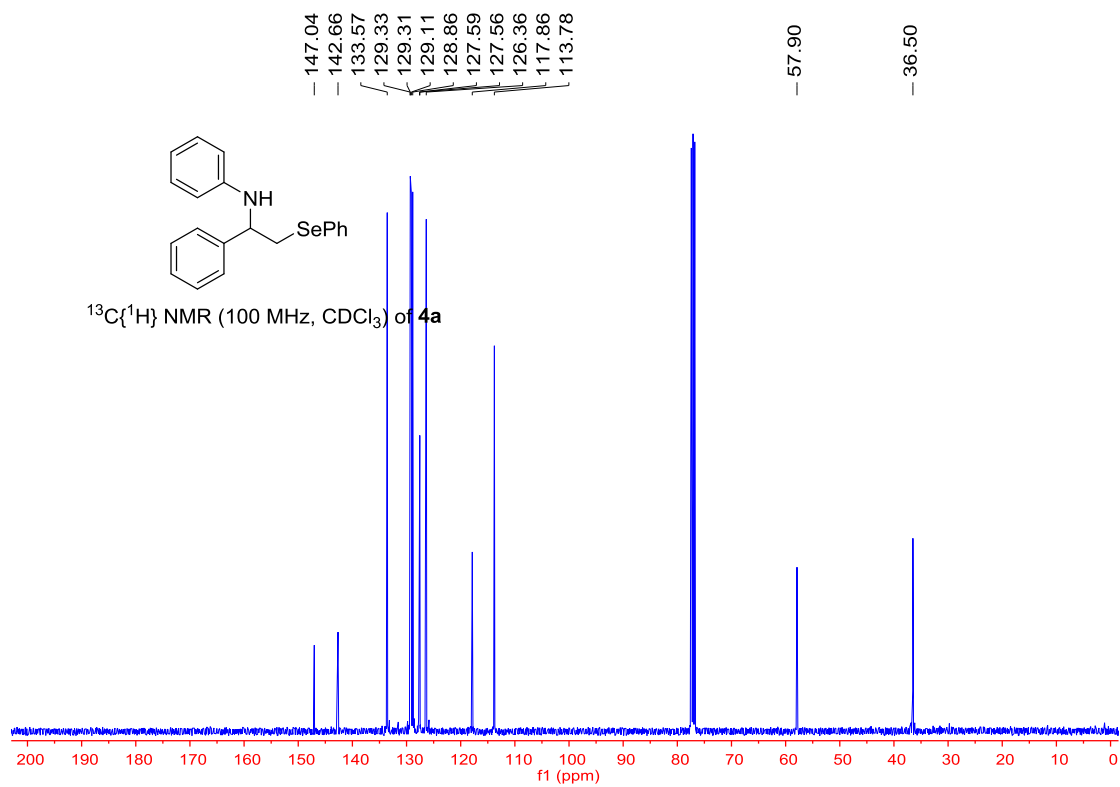


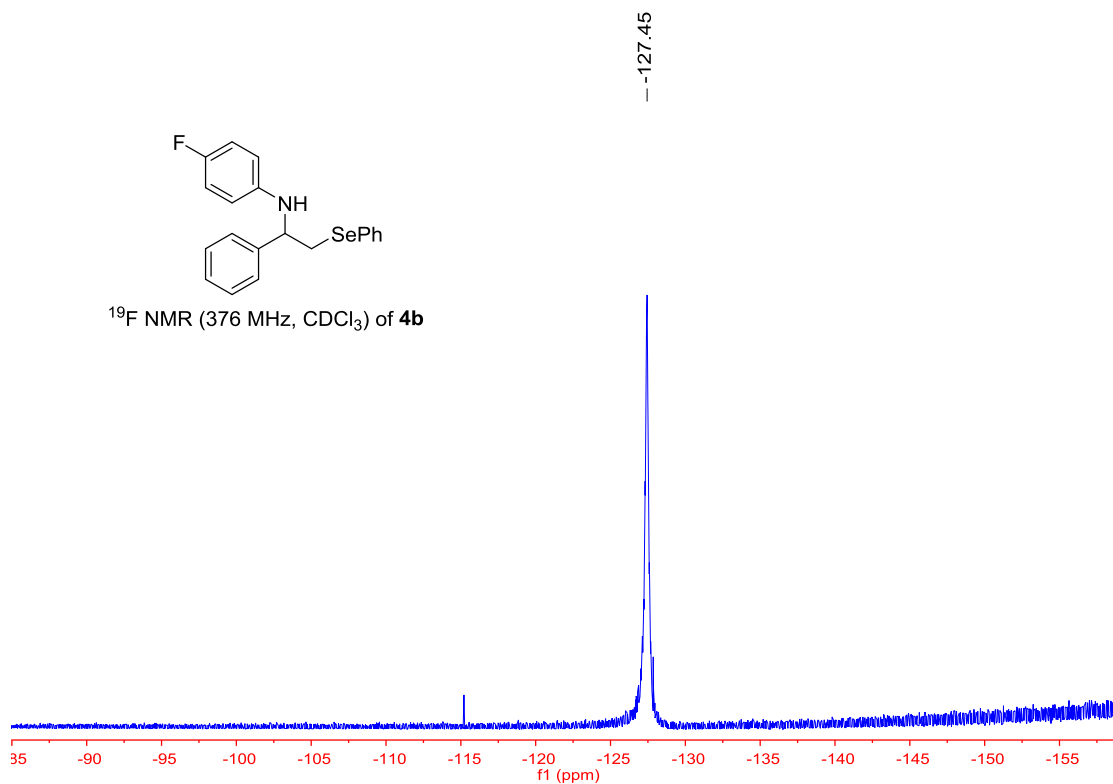
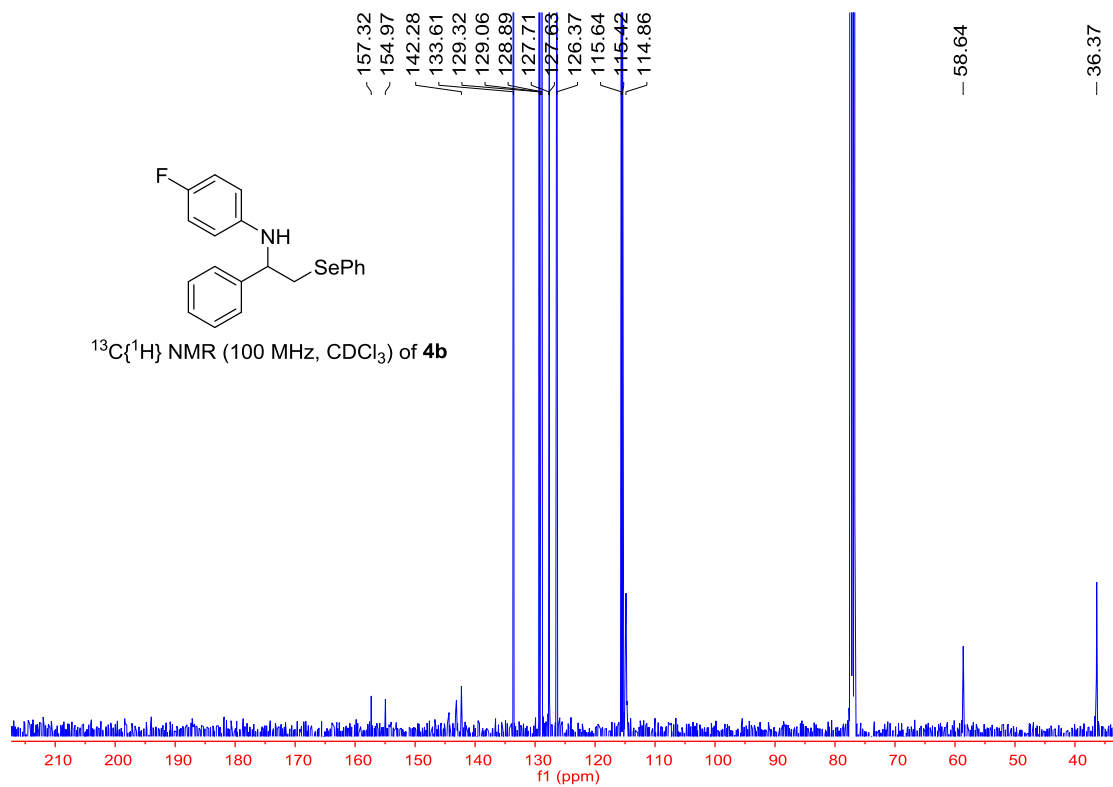
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7.00
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6.37
6.35
4.38
4.37
4.37
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3.11
3.09



^1H NMR (400 MHz, CDCl_3) of **4a**

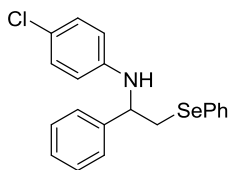




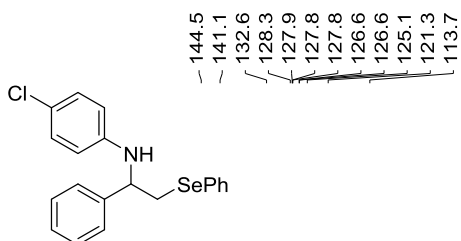
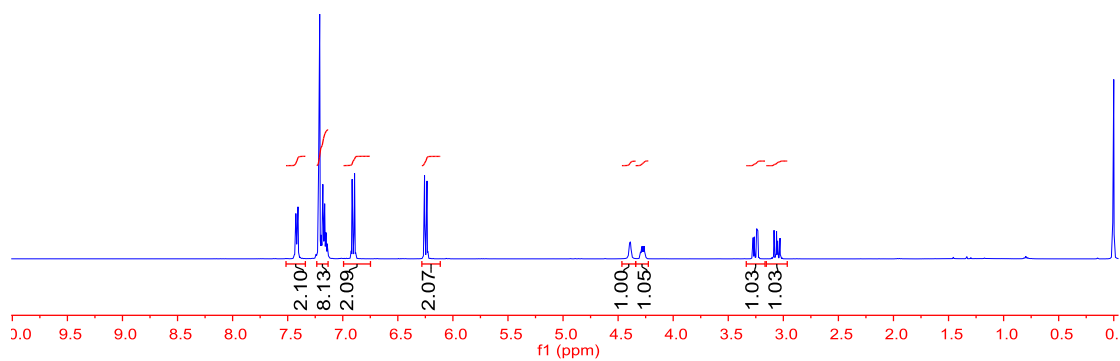


7.43
7.43
7.41
7.41
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7.16
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6.26
6.24

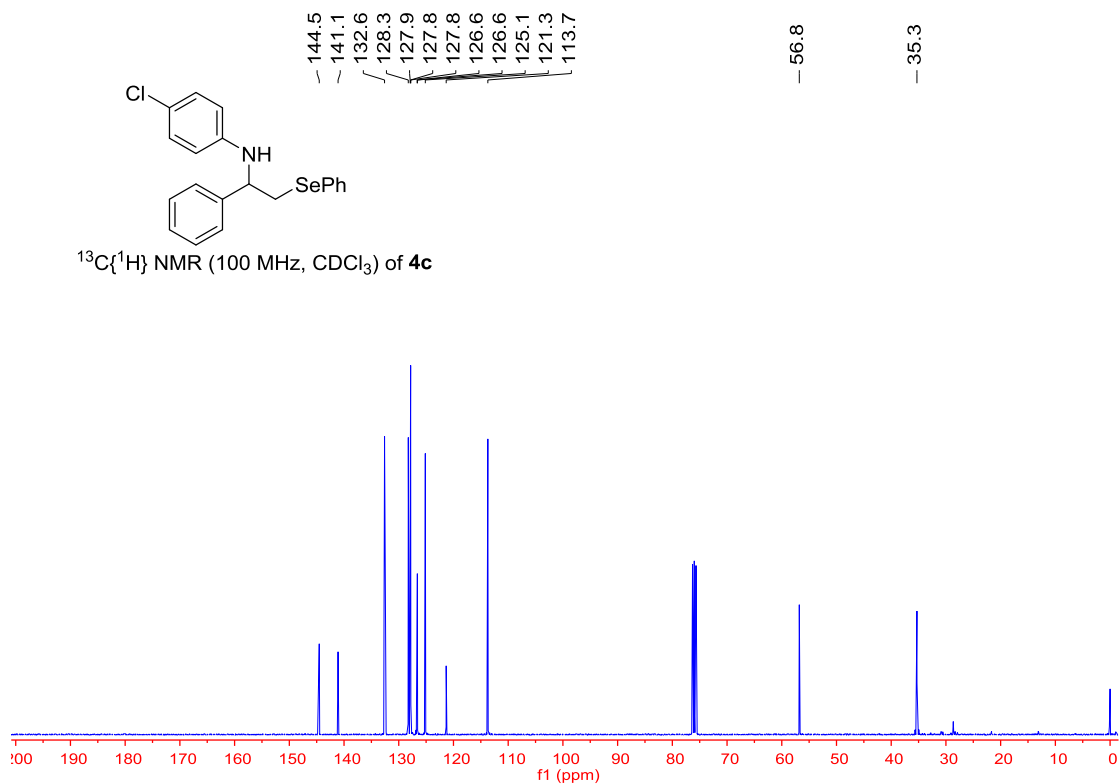
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3.05
3.03

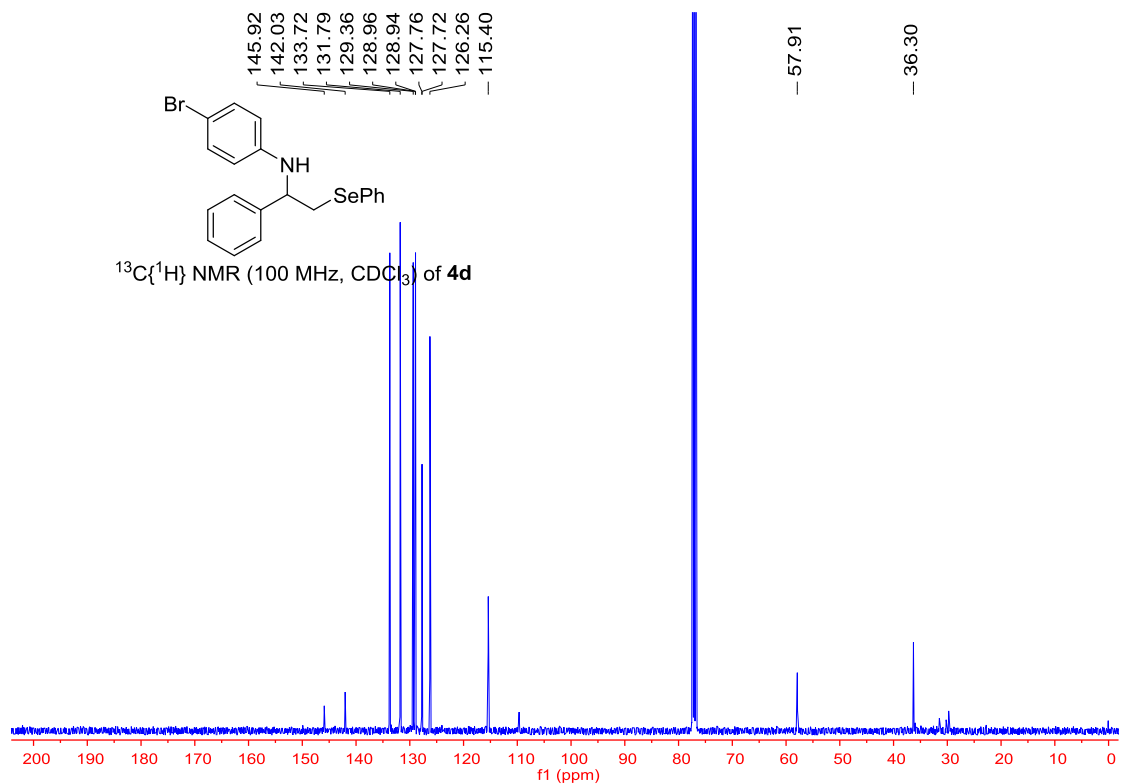
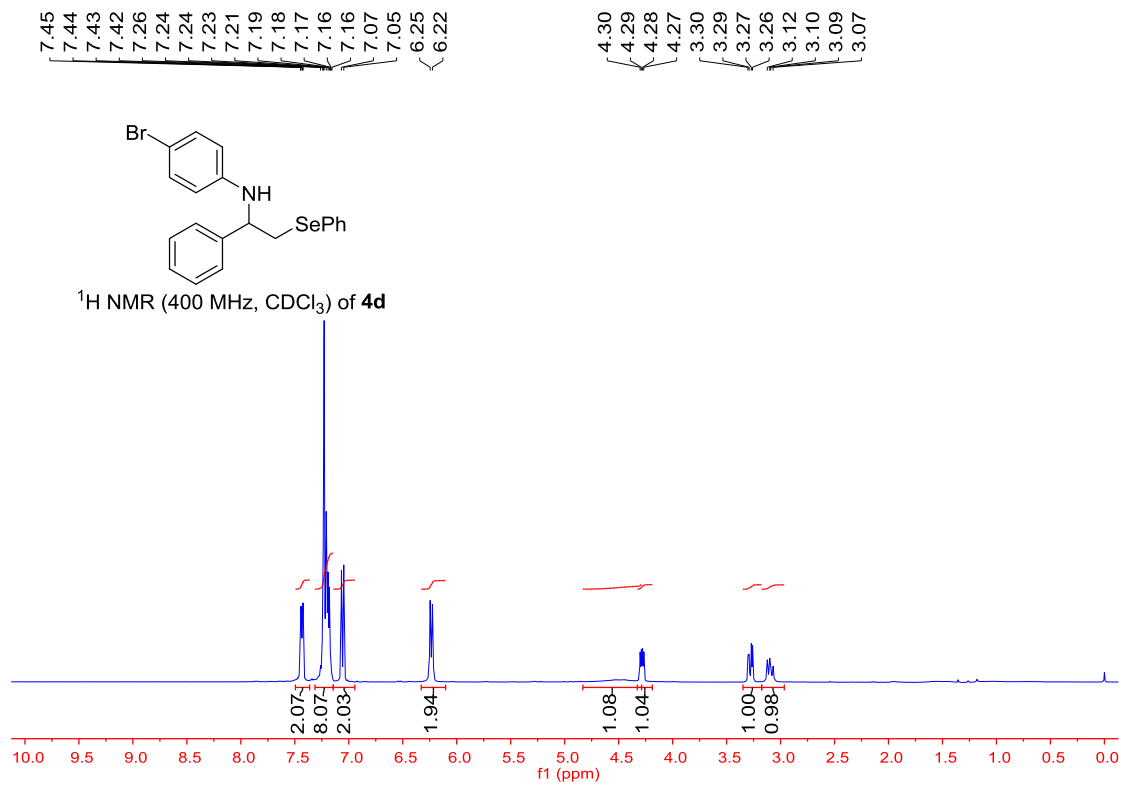


^1H NMR (400 MHz, CDCl_3) of **4c**



$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **4c**



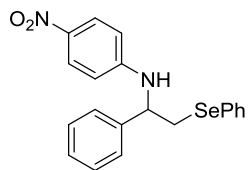


7.90
7.89
7.87
7.46
7.45
7.44
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7.24
7.22
7.21
7.19
7.17
6.28
6.26
6.25

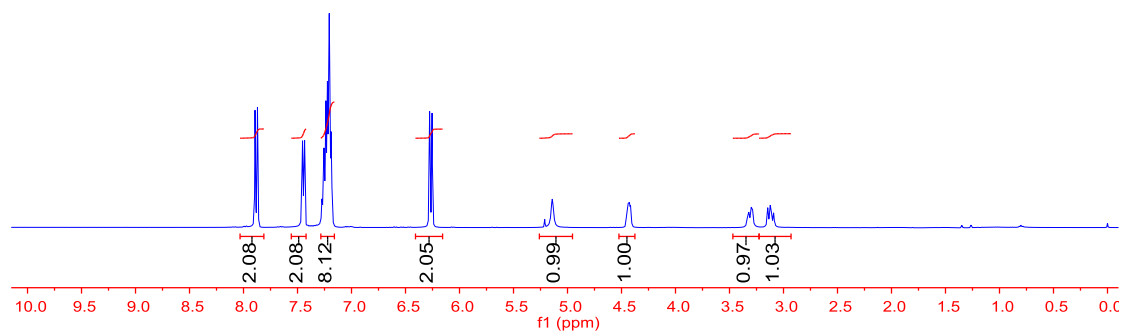
— 5.14

4.45
4.44
4.43
4.42

3.33
3.32
3.30
3.29
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3.12
3.11
3.09



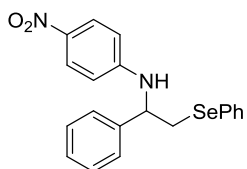
^1H NMR (400 MHz, CDCl_3) of **4e**



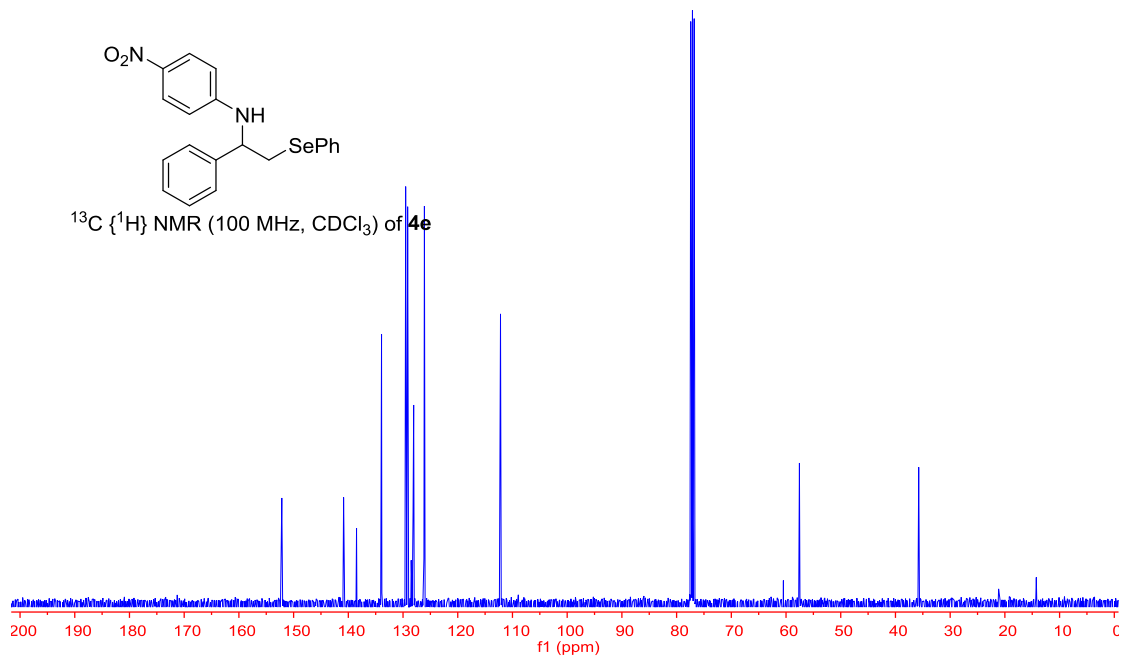
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138.50
133.93
129.52
129.16
128.51
128.16
128.05
126.16
126.09
— 112.19

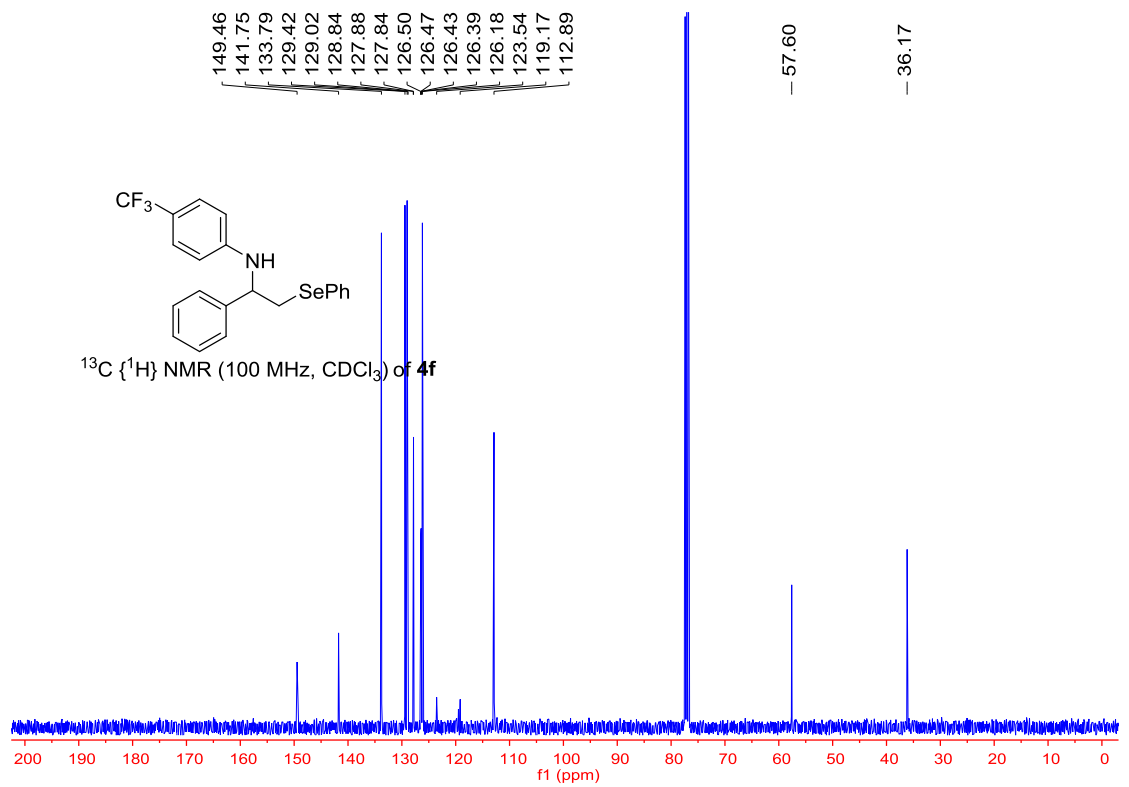
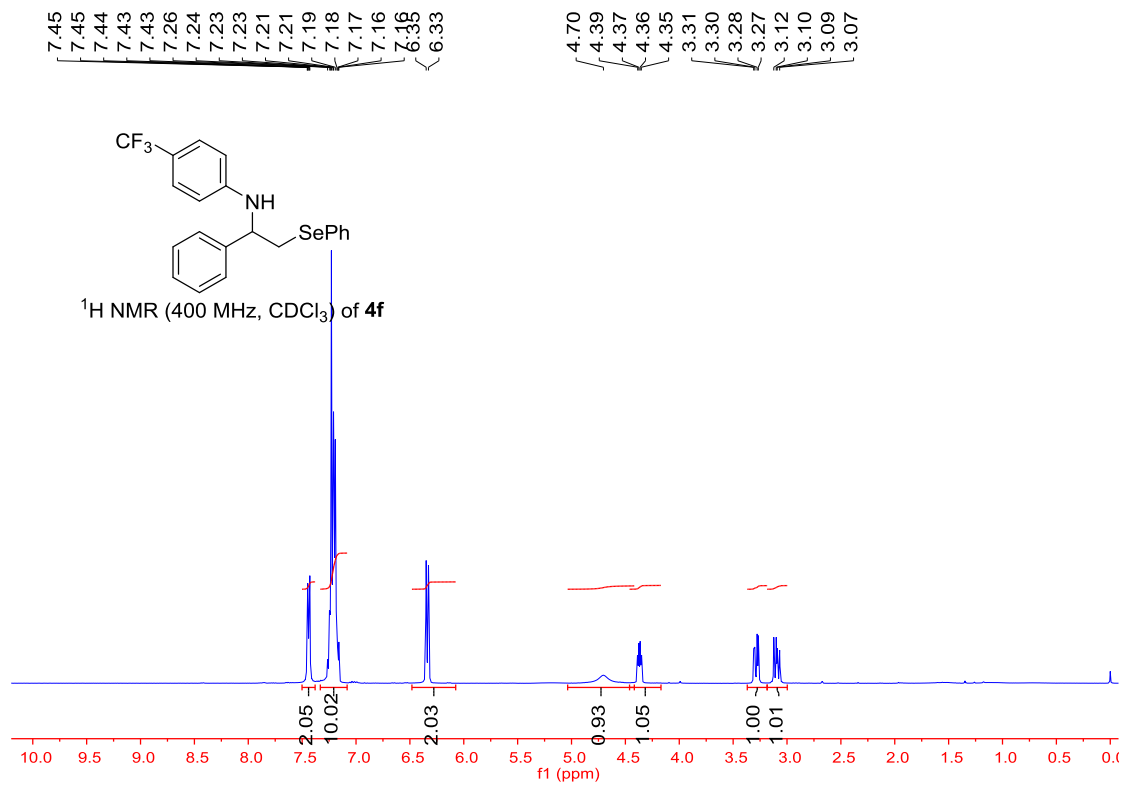
— 57.55

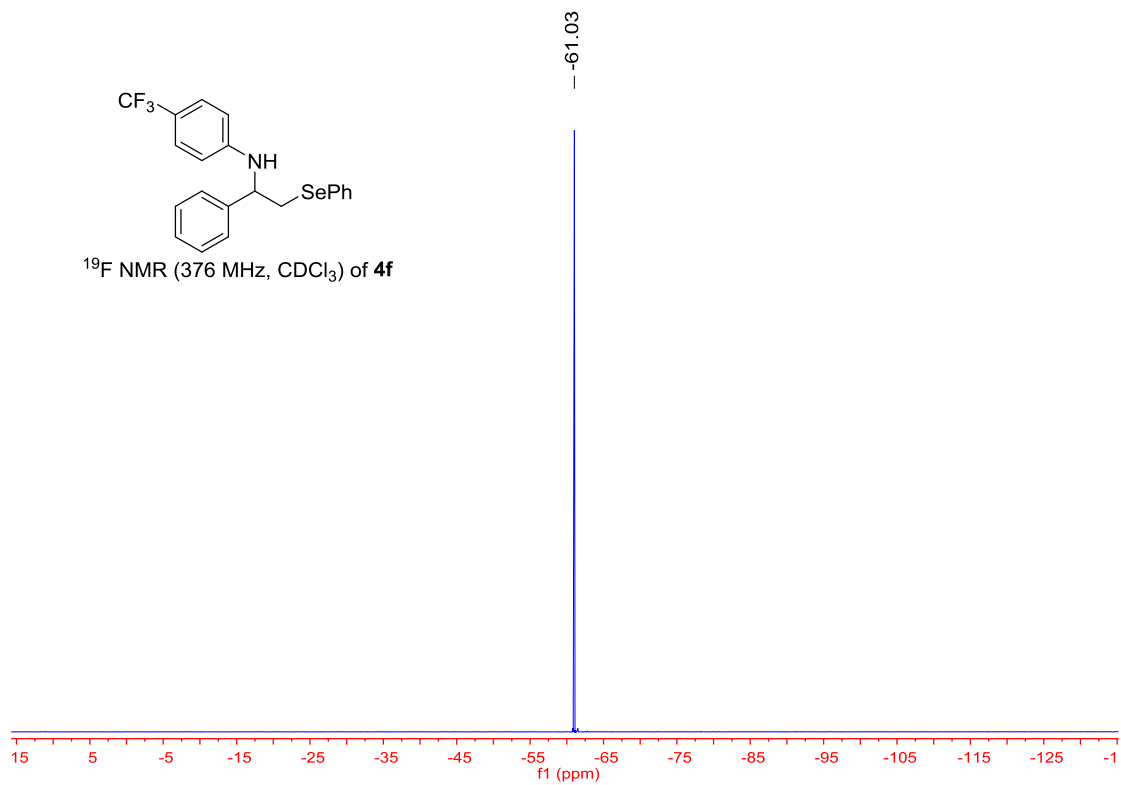
— 35.75



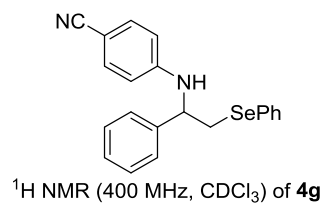
^{13}C $\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **4e**

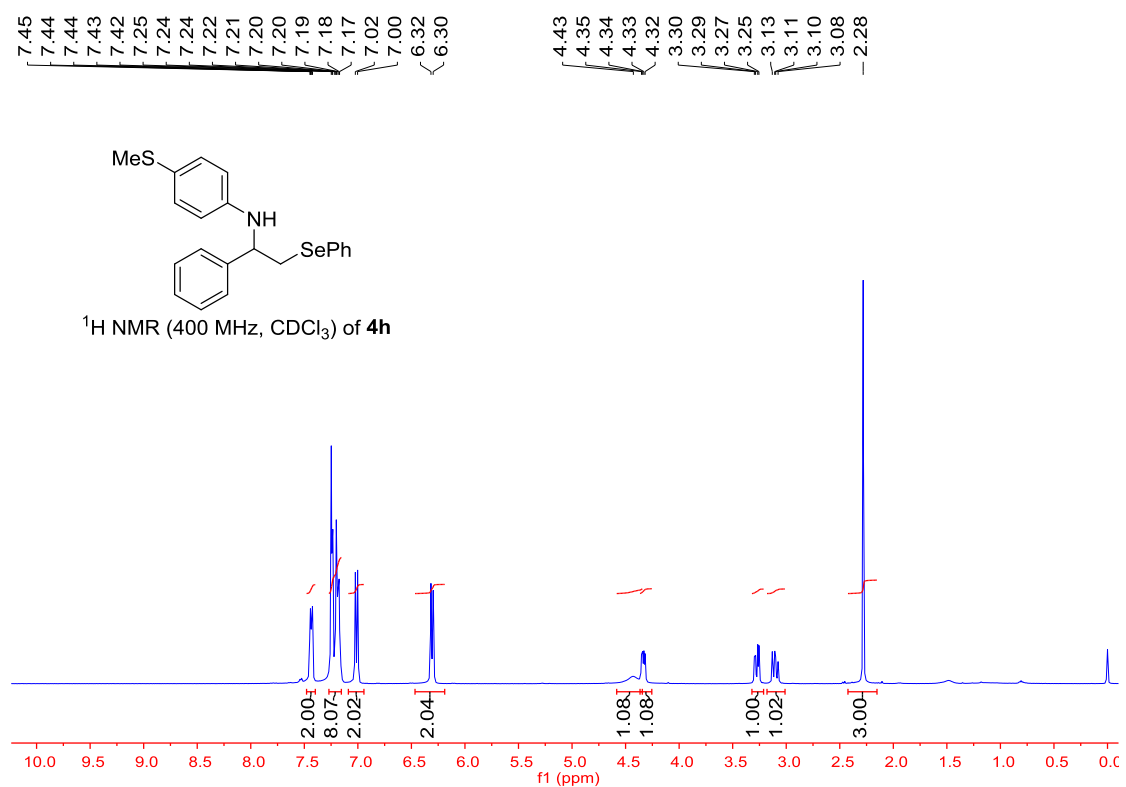
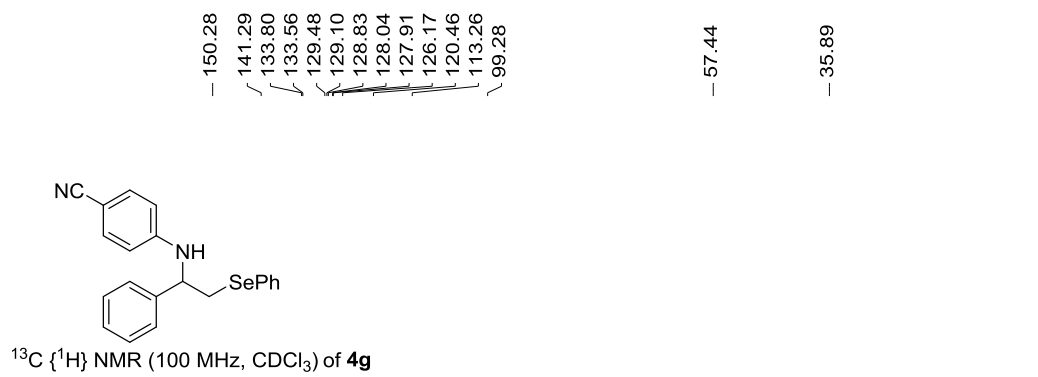


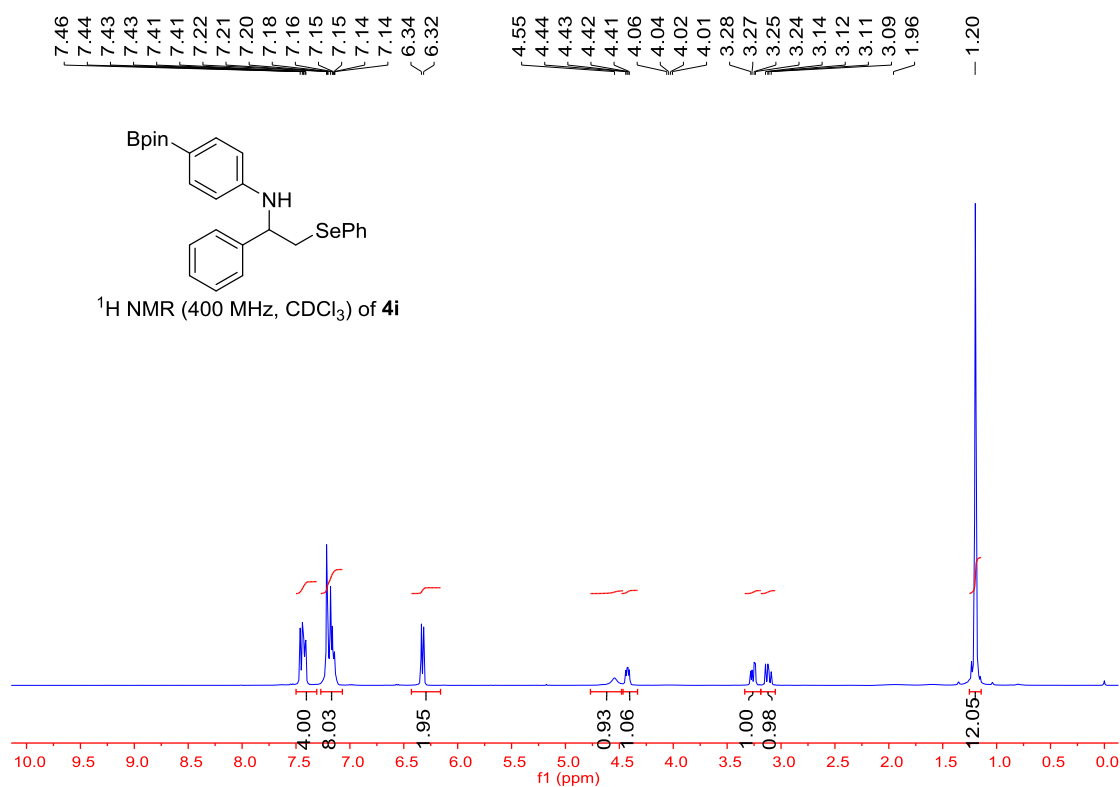
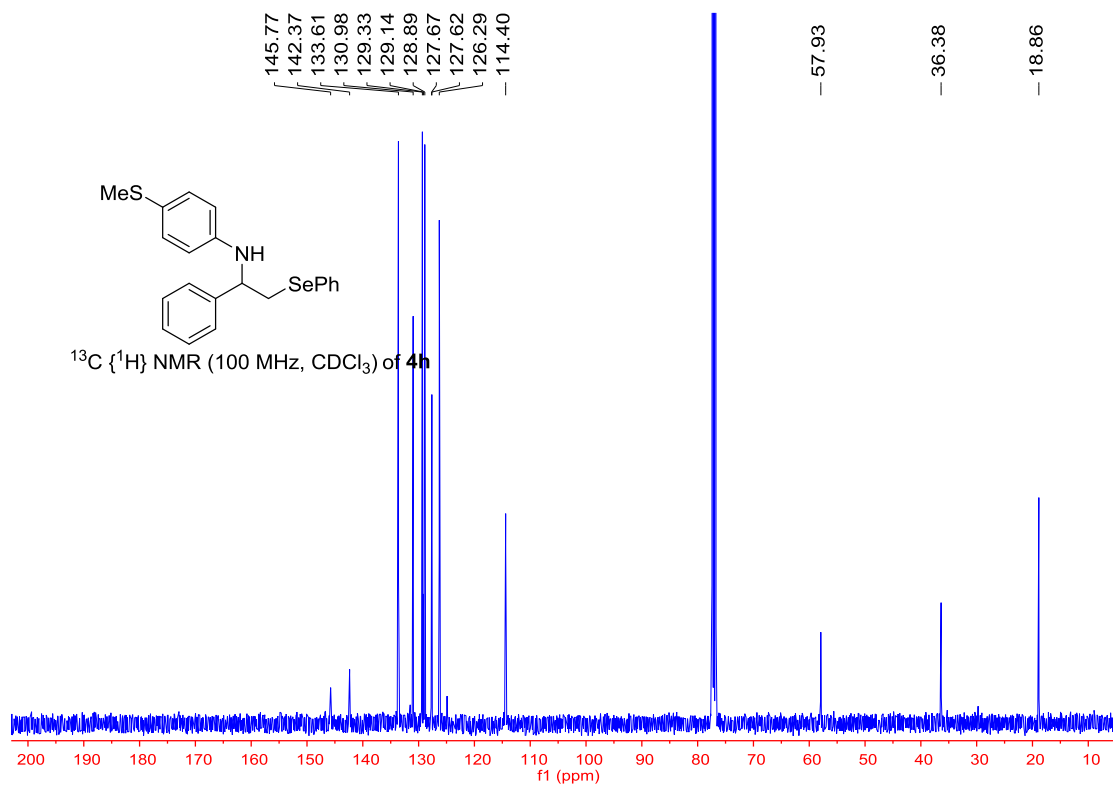


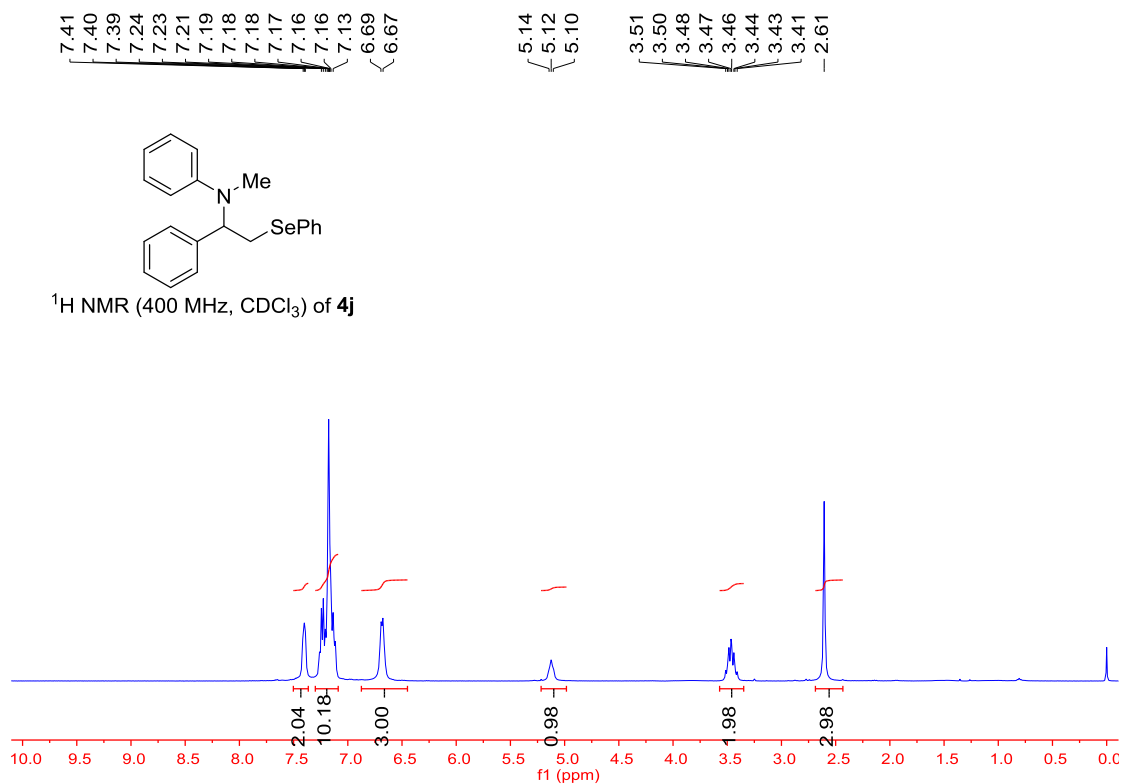
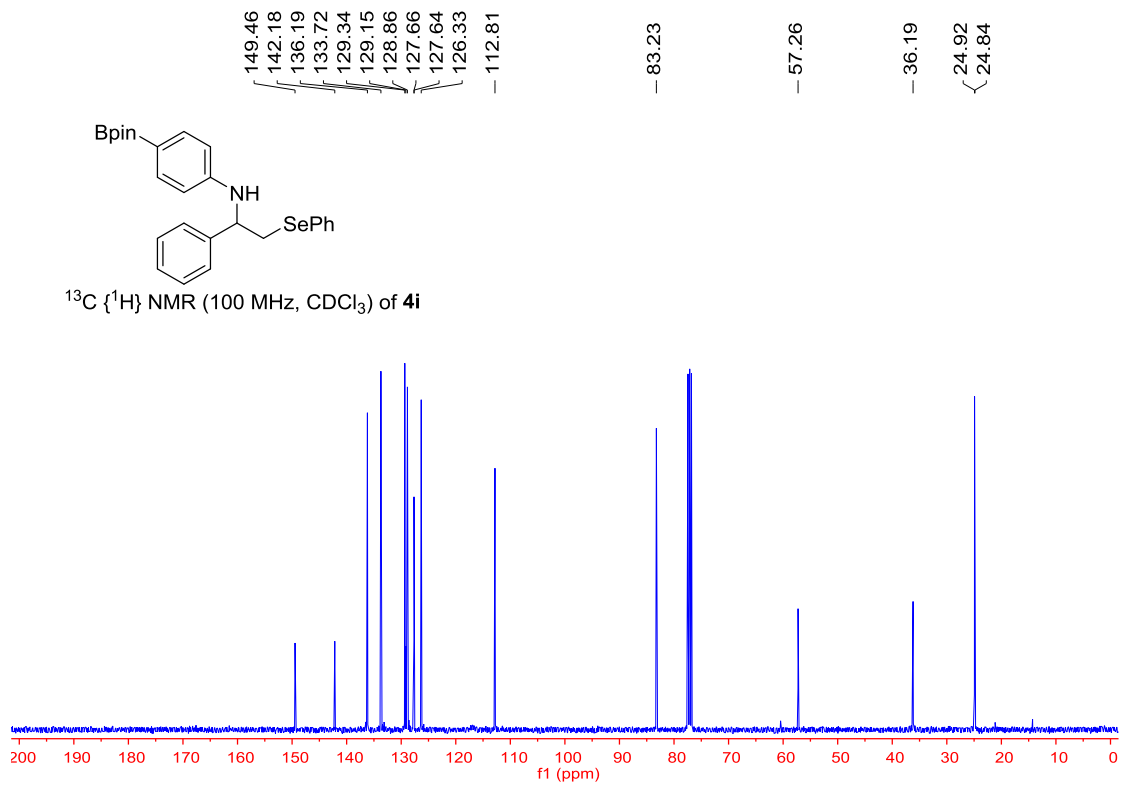


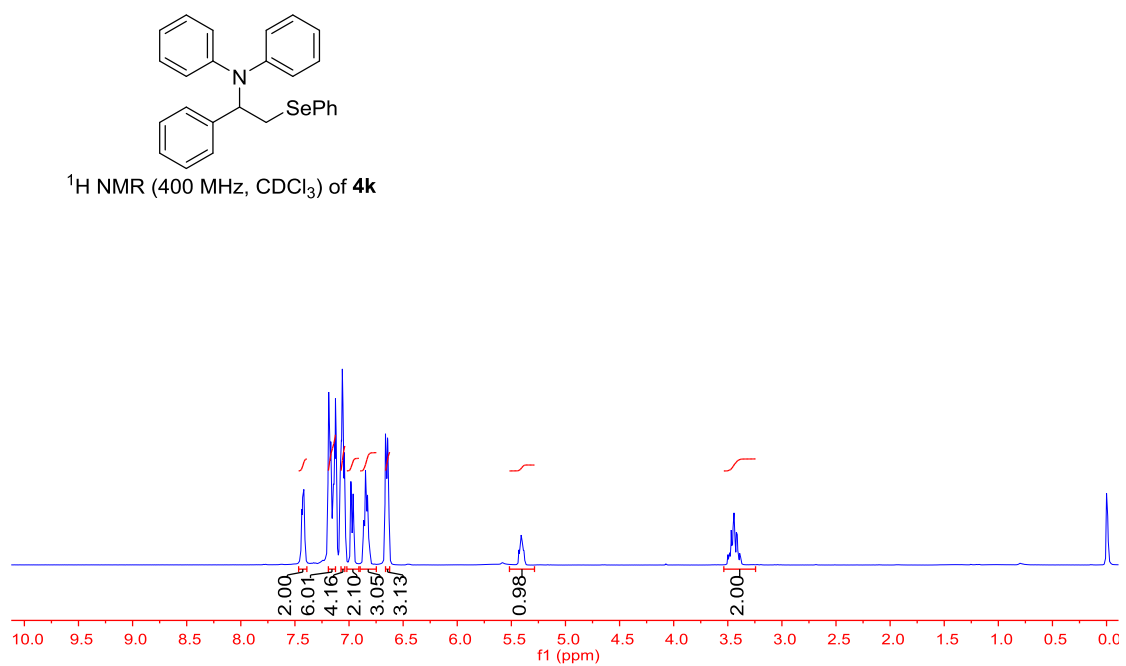
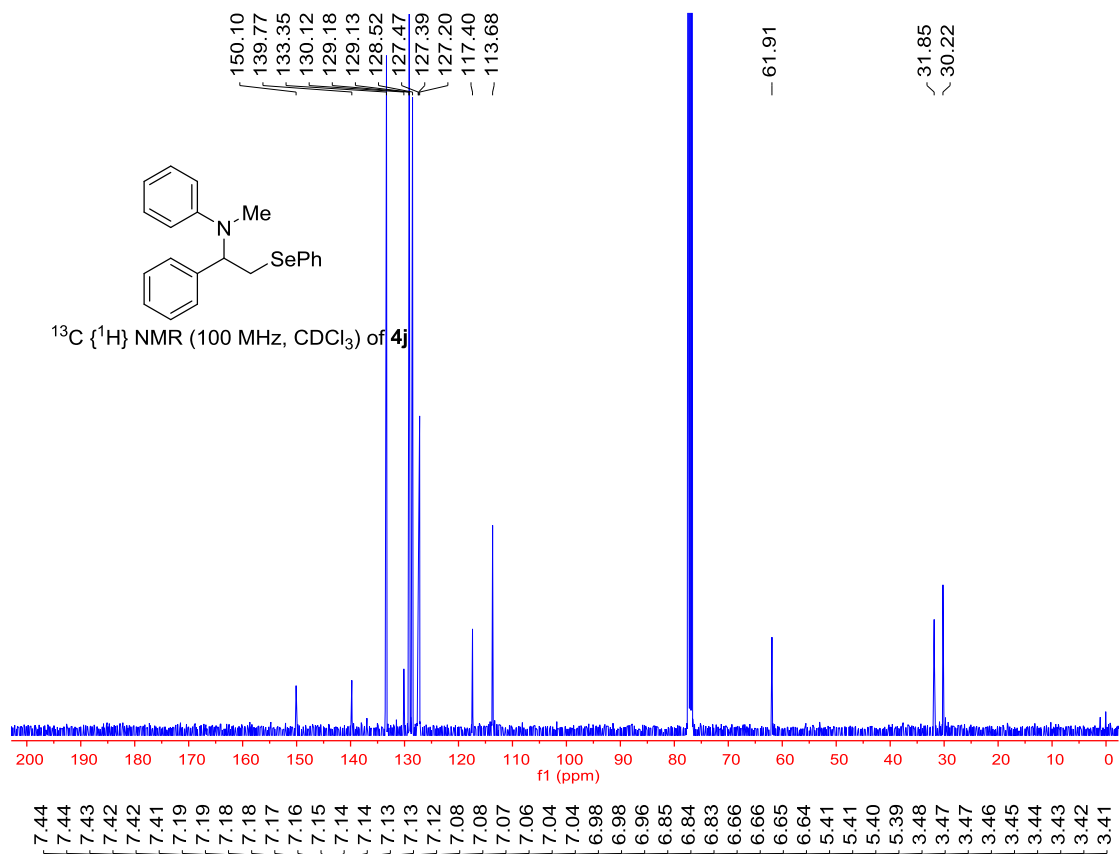
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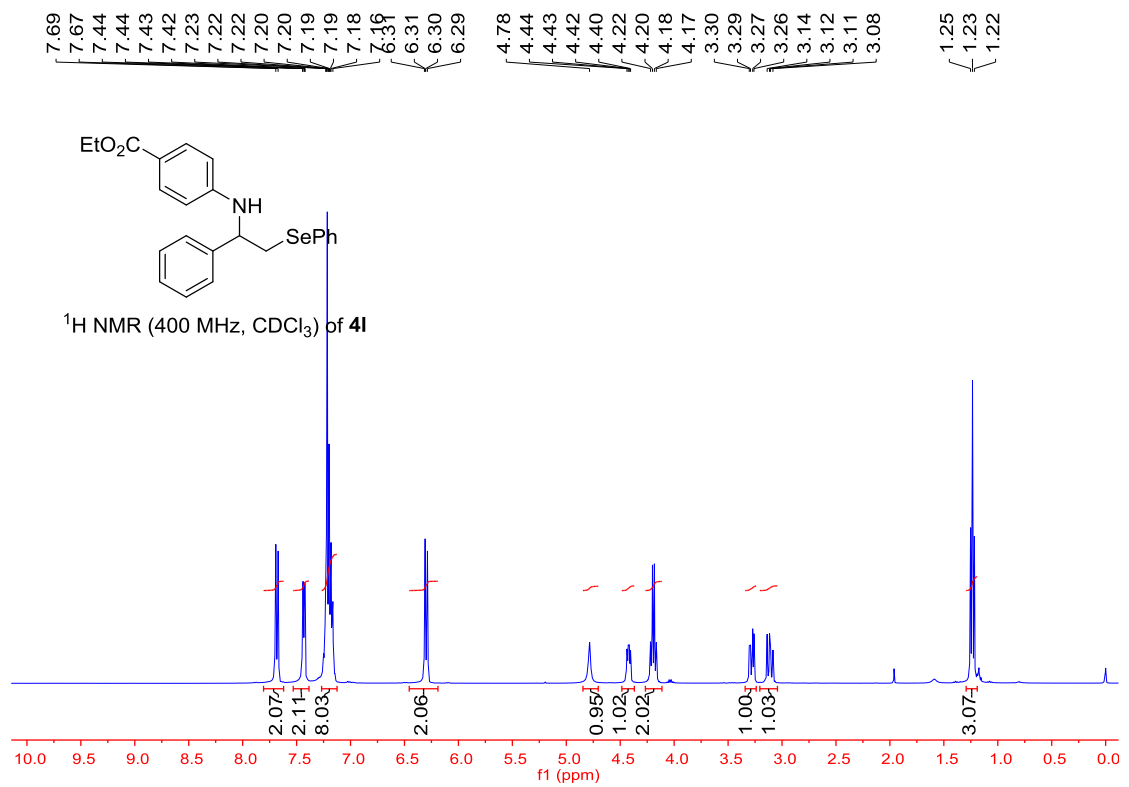
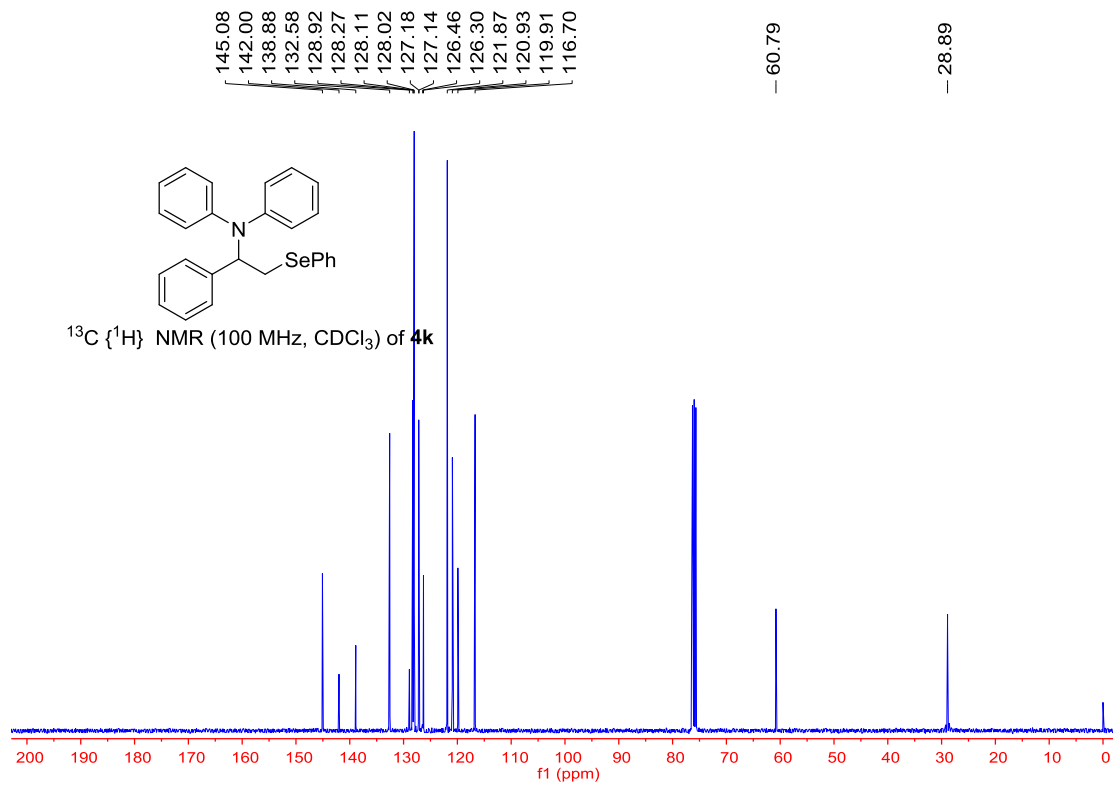


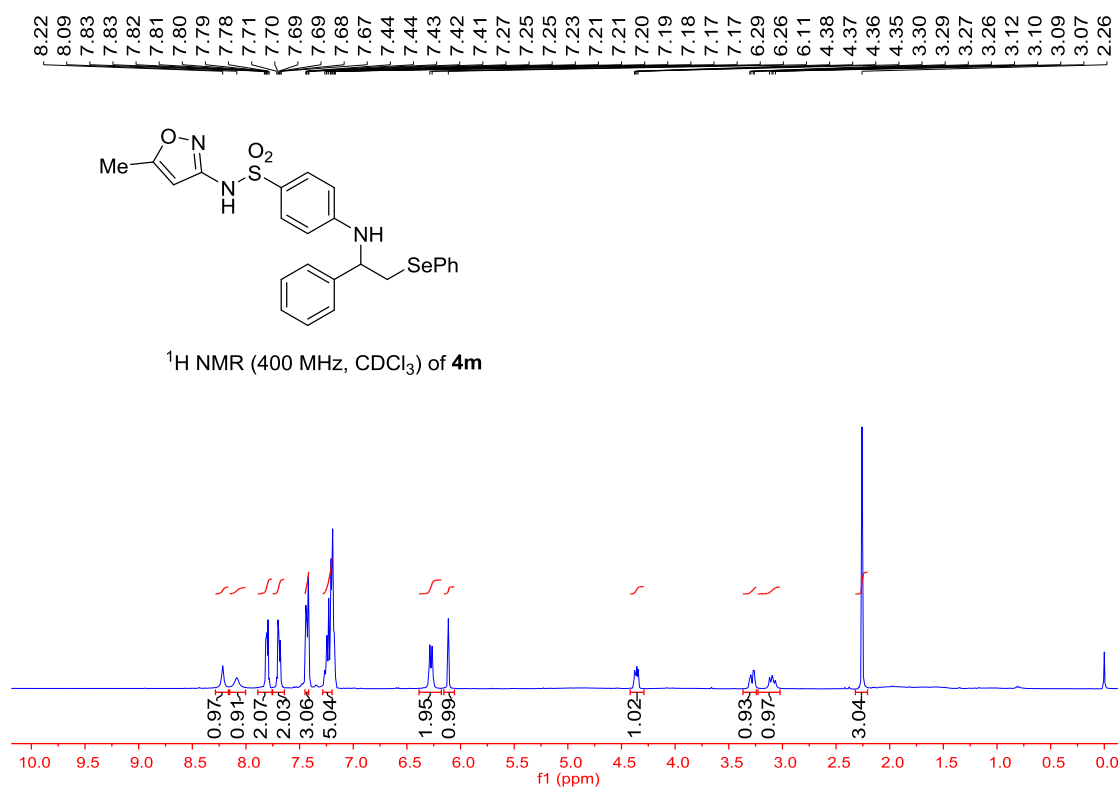
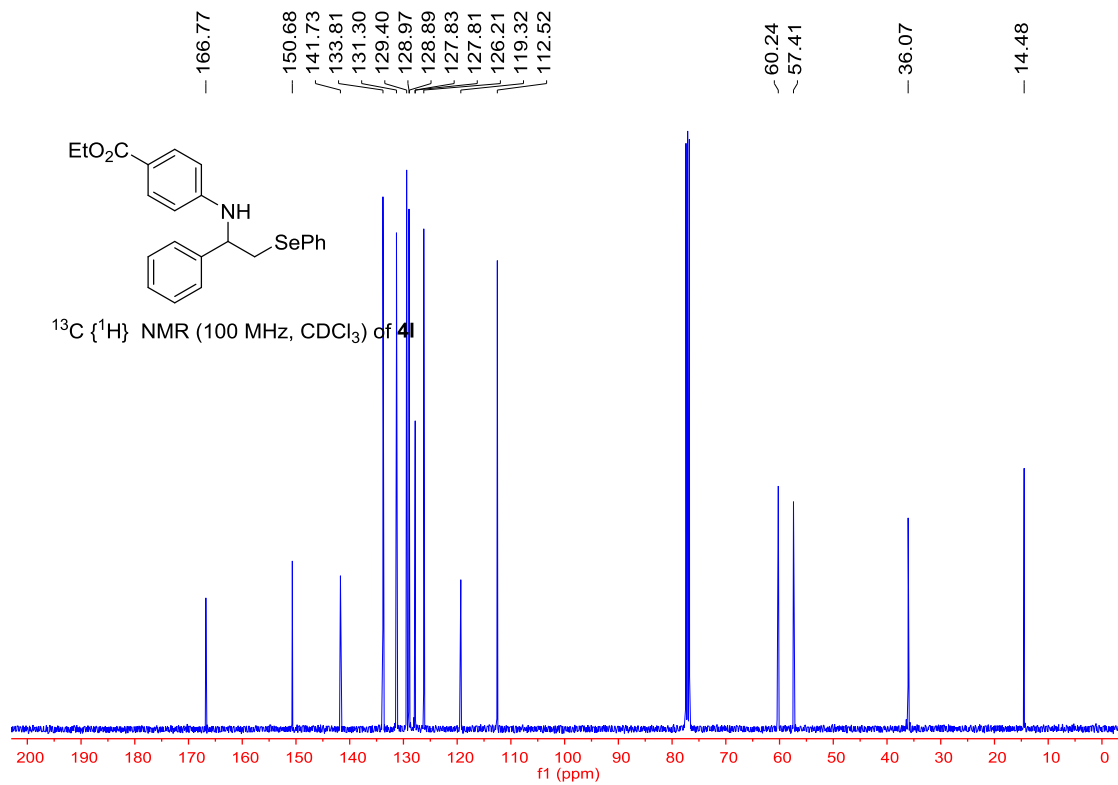


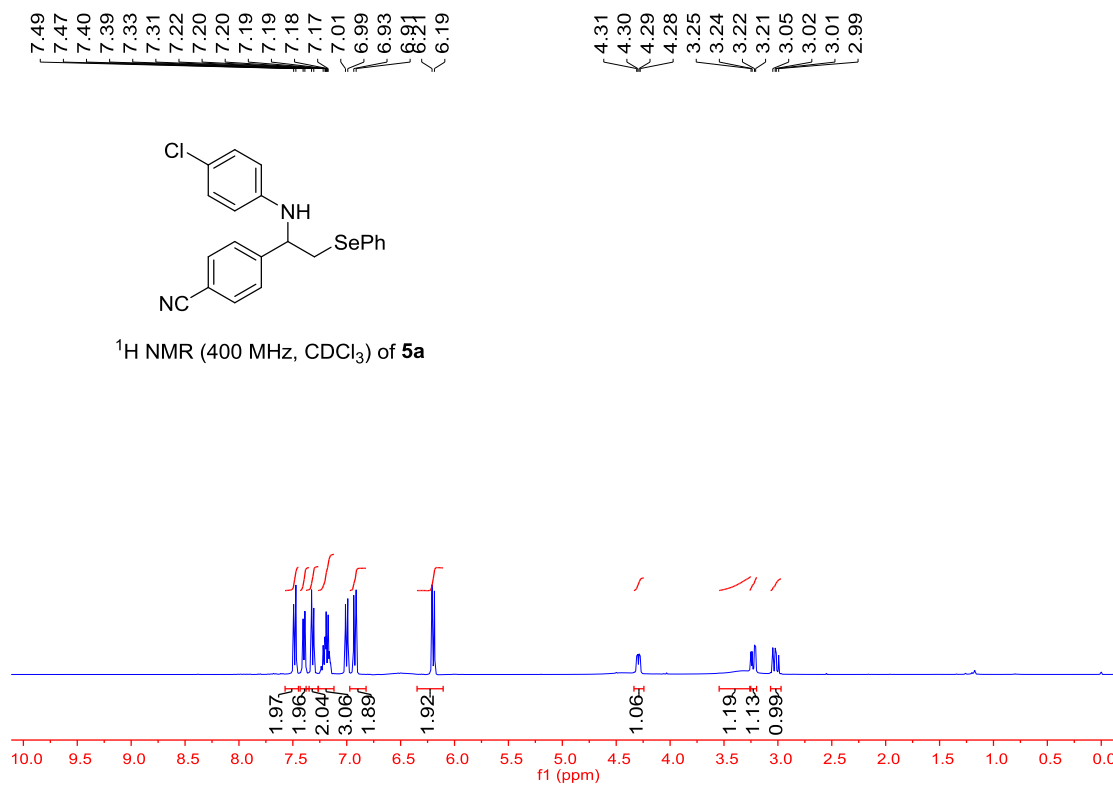
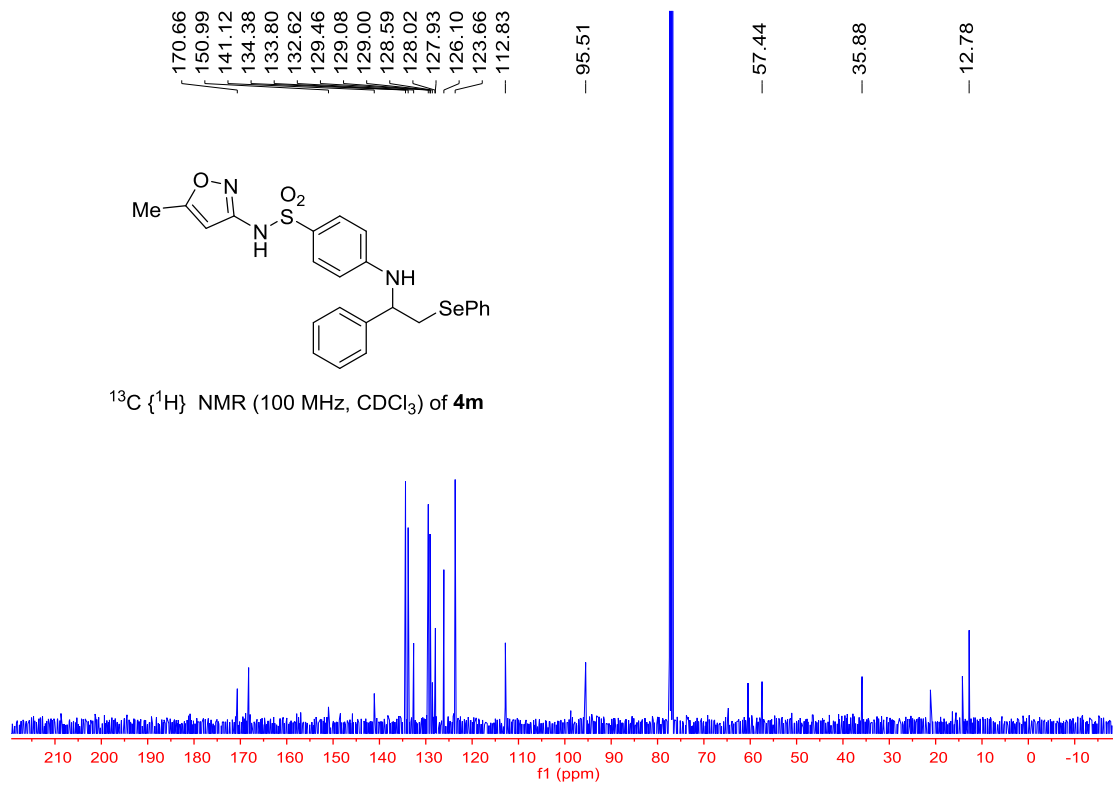


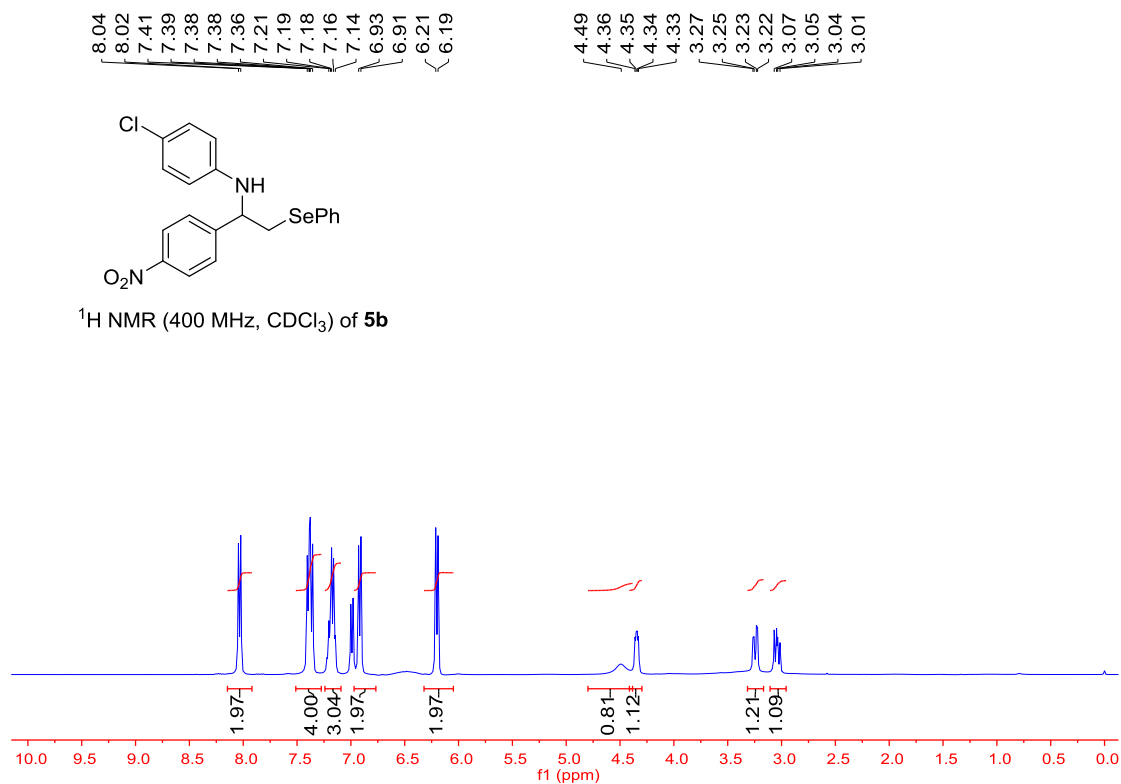
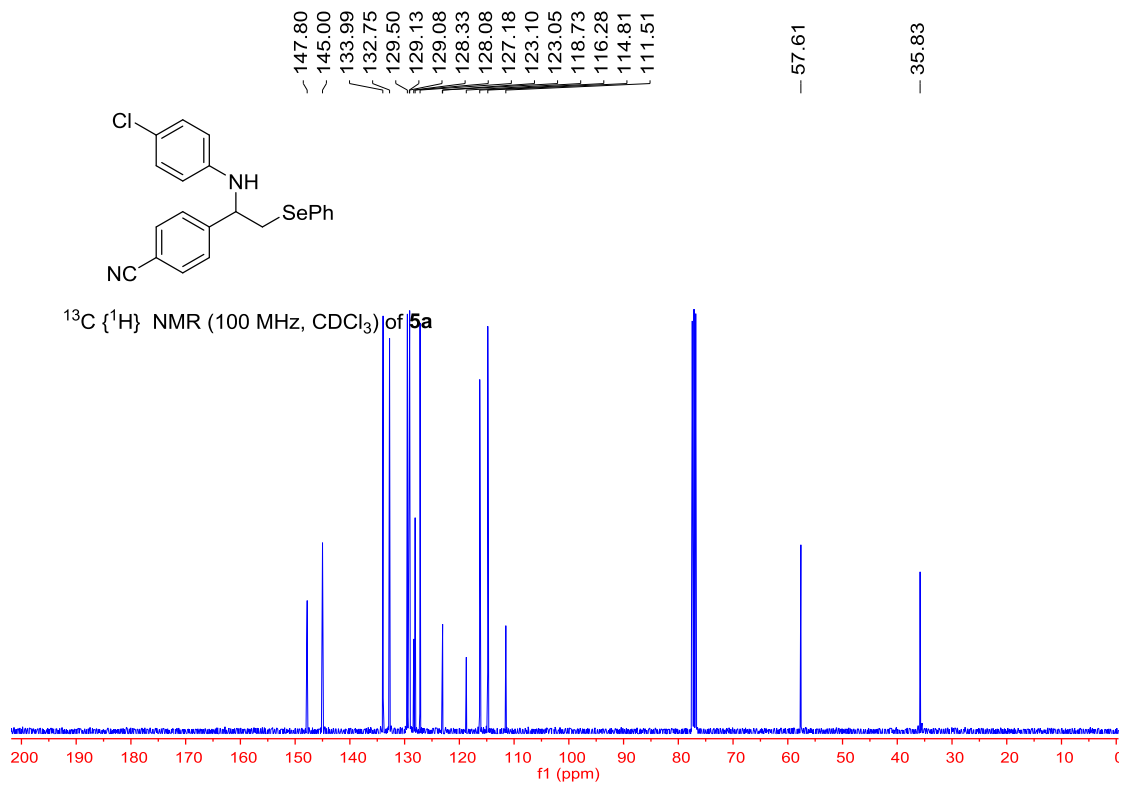


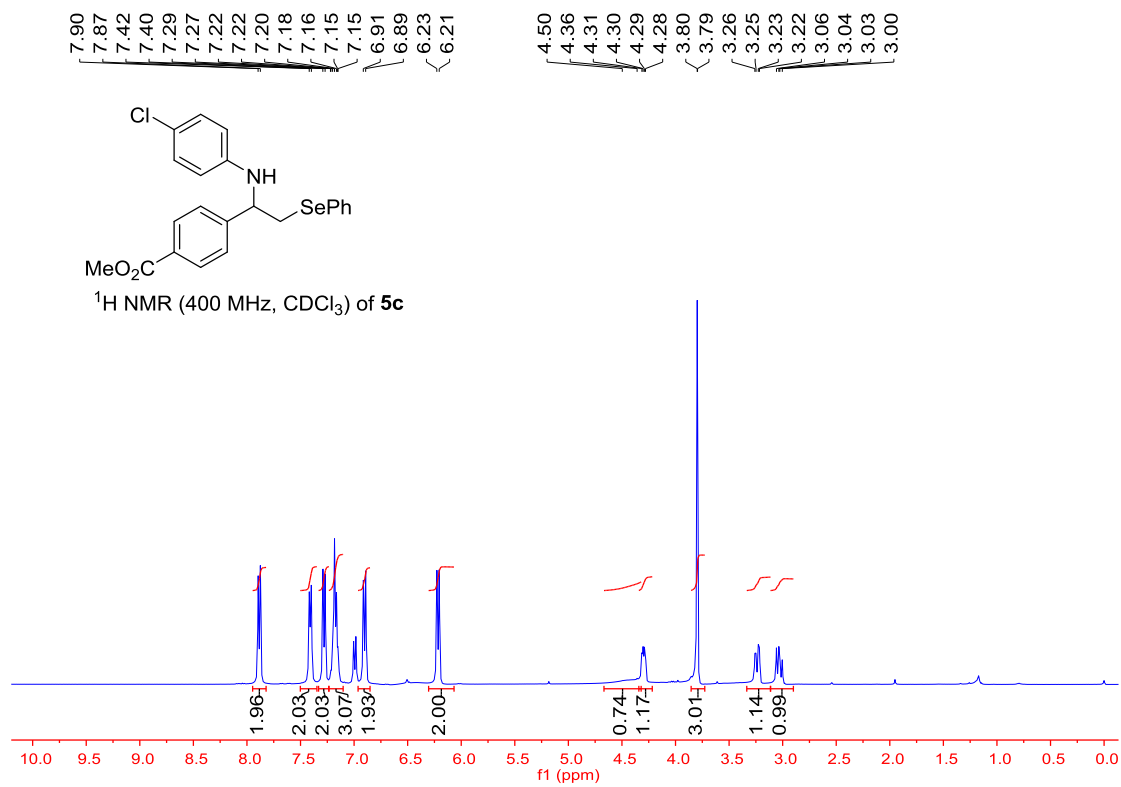
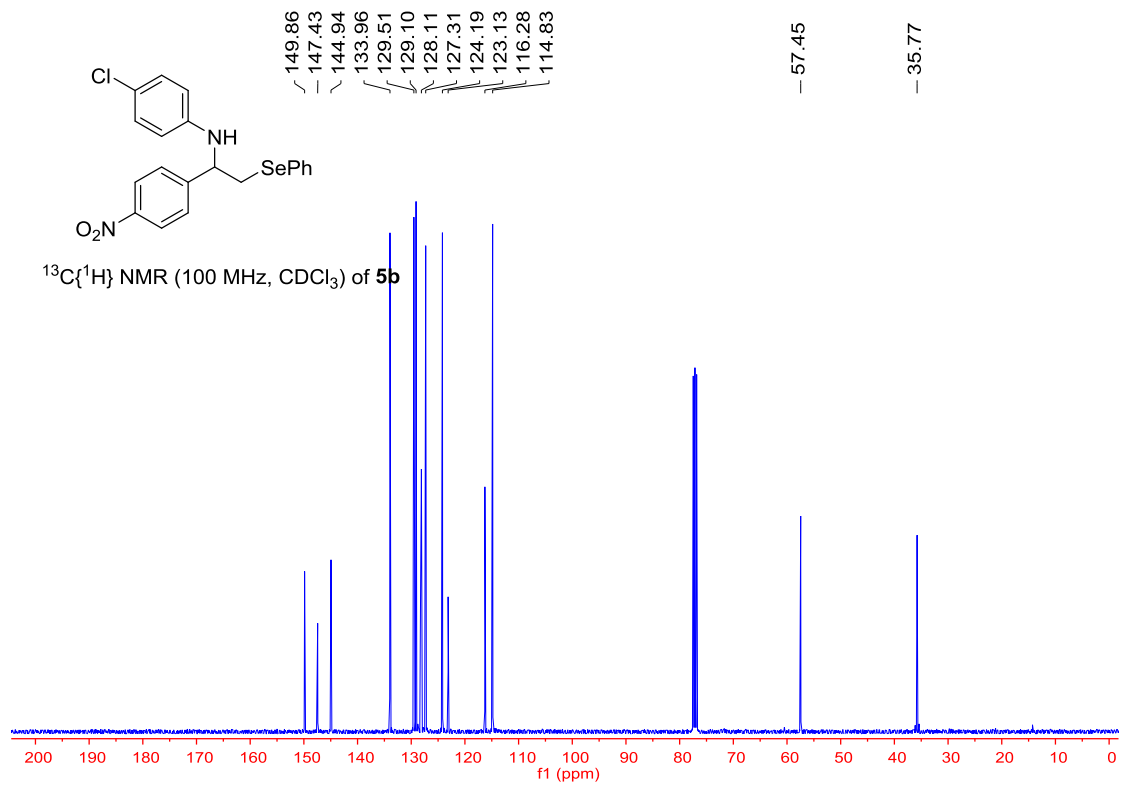


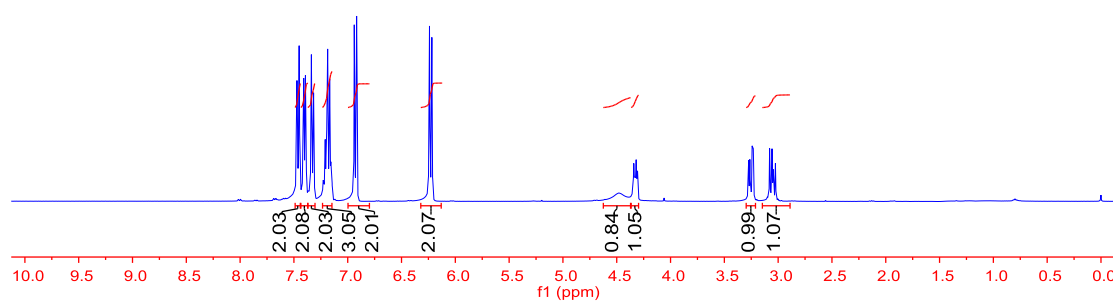
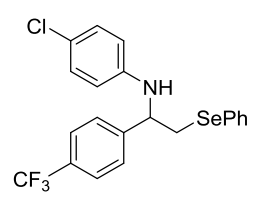
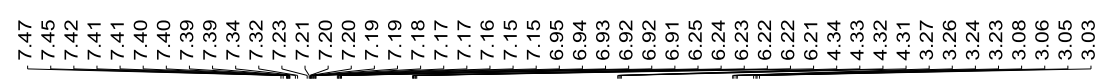
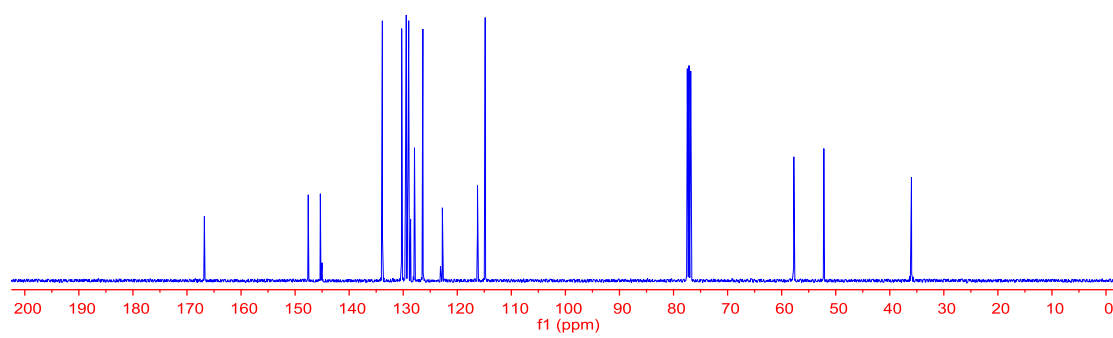
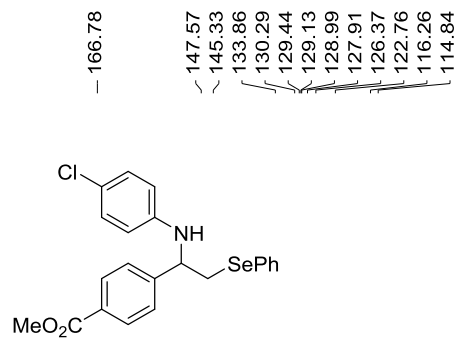


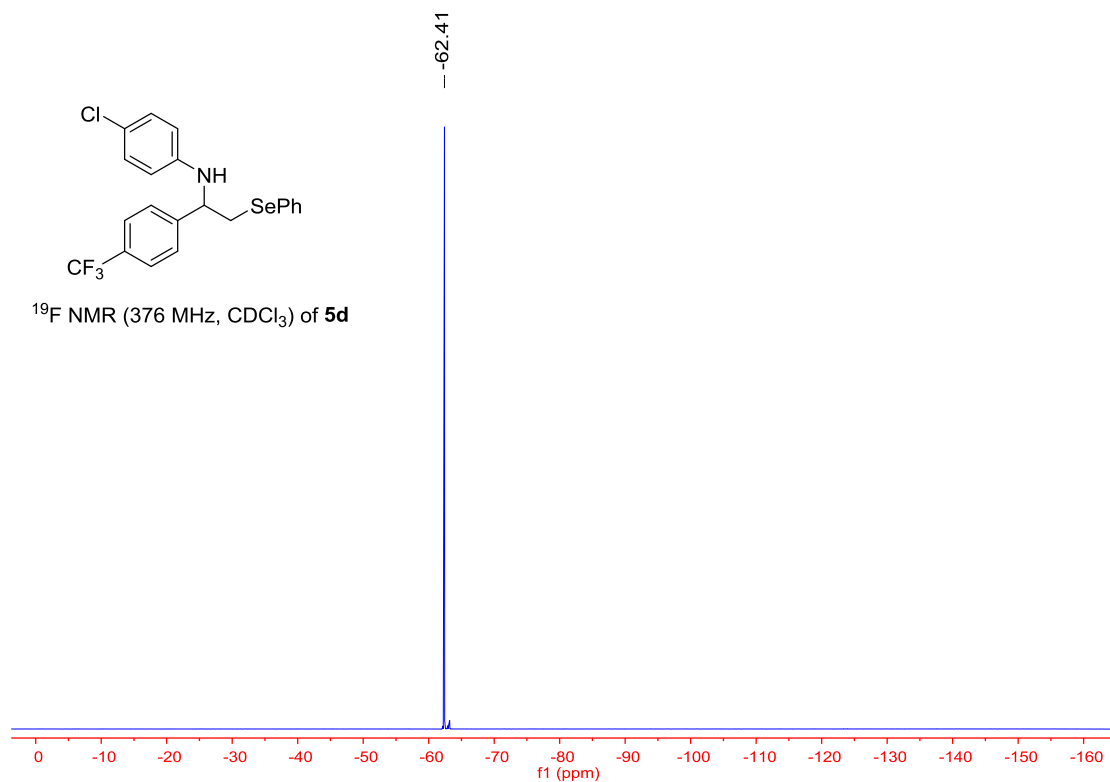
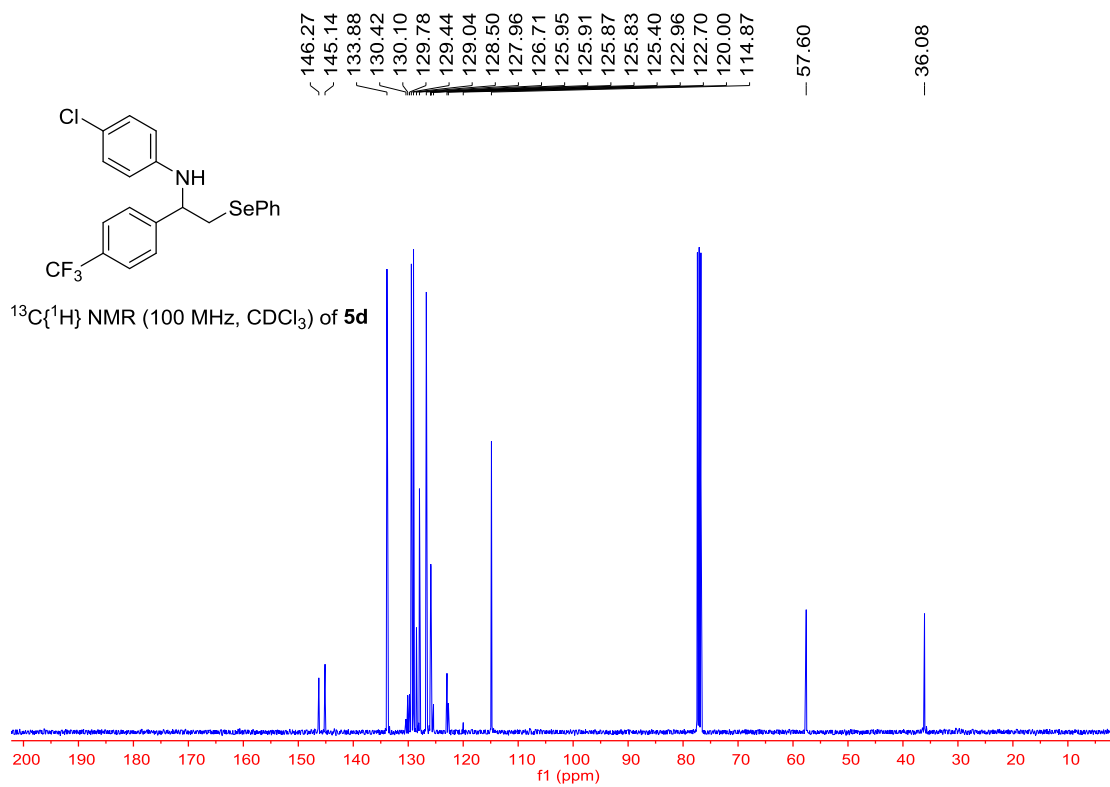




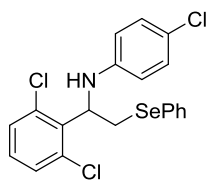




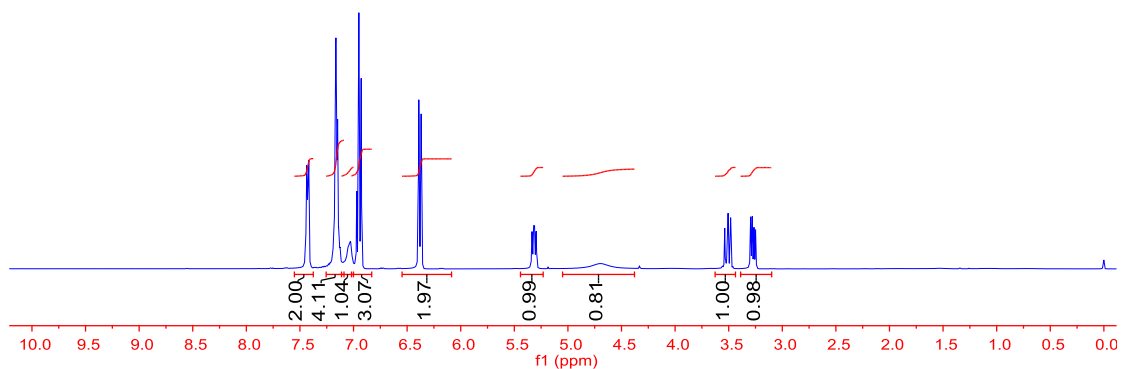




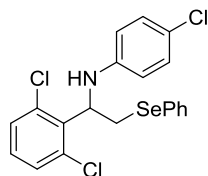
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7.16
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7.13
7.13
7.05
7.03
6.97
6.95
6.93
6.37
5.33
5.32
5.31
5.30
- 4.70
3.54
3.51
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3.48
3.30
3.28
3.26
3.25



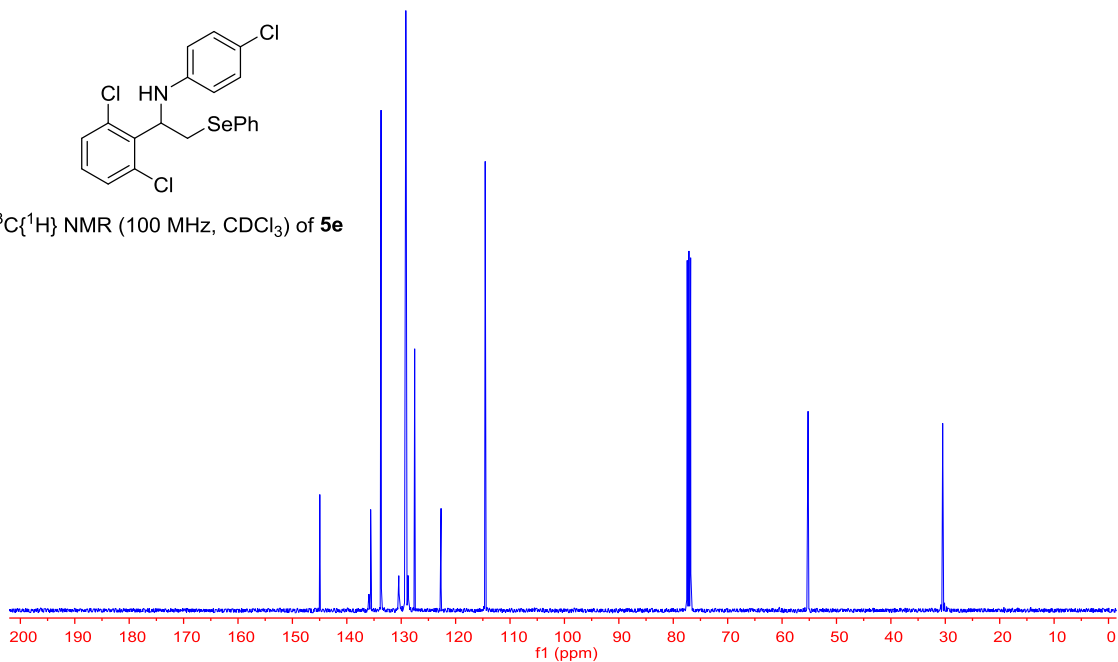
^1H NMR (400 MHz, CDCl_3) of **5e**

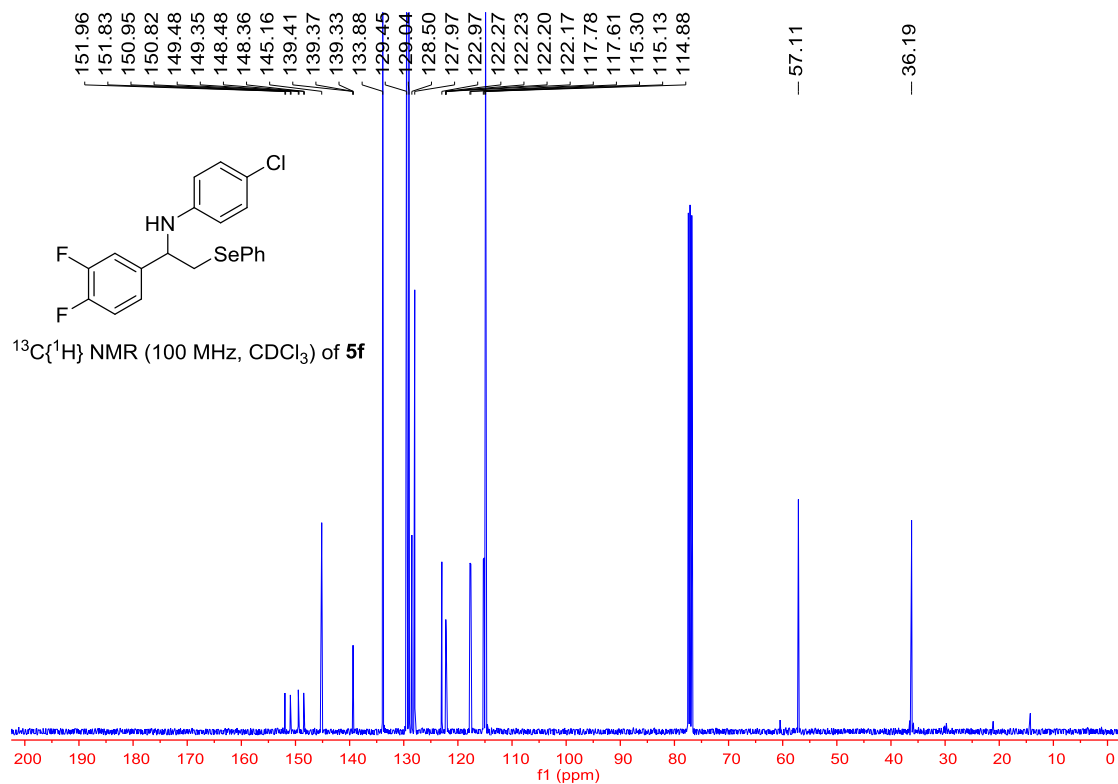
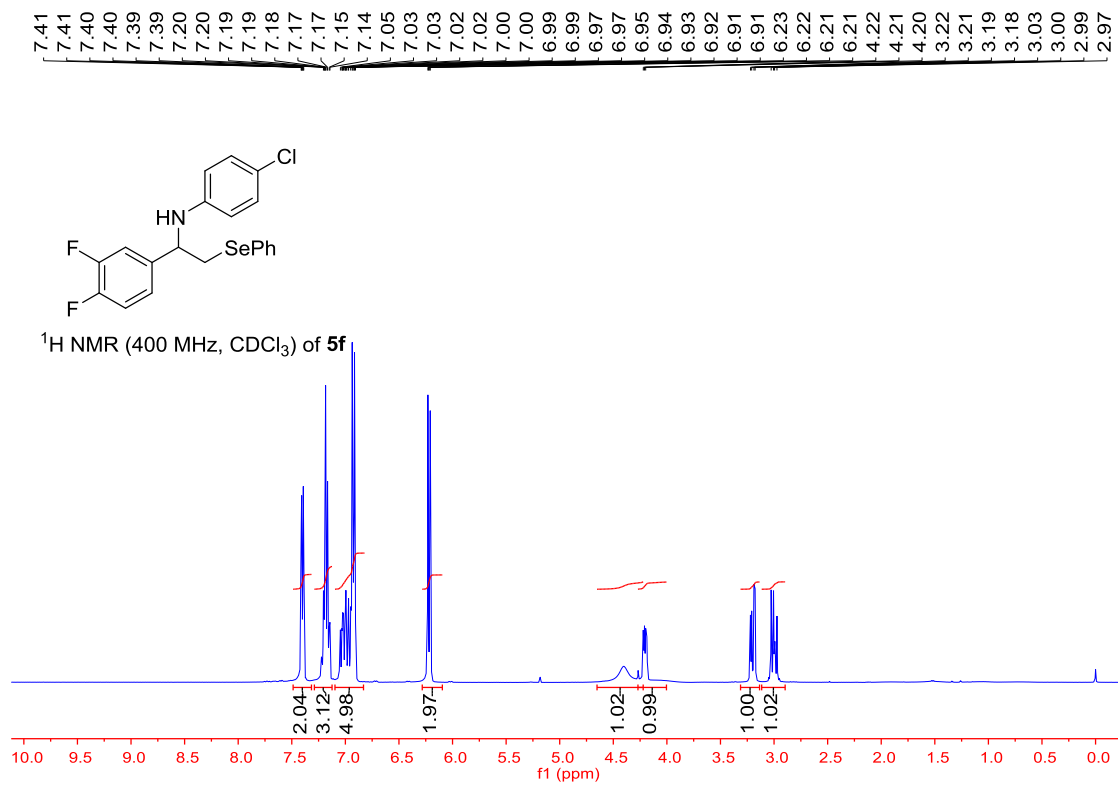


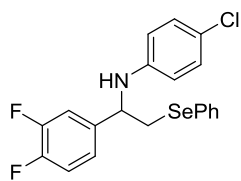
144.96
135.62
133.71
130.45
129.33
129.17
129.15
129.09
128.74
127.53
122.68
114.57
- 55.22
- 30.48



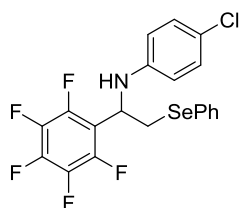
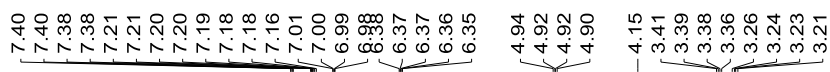
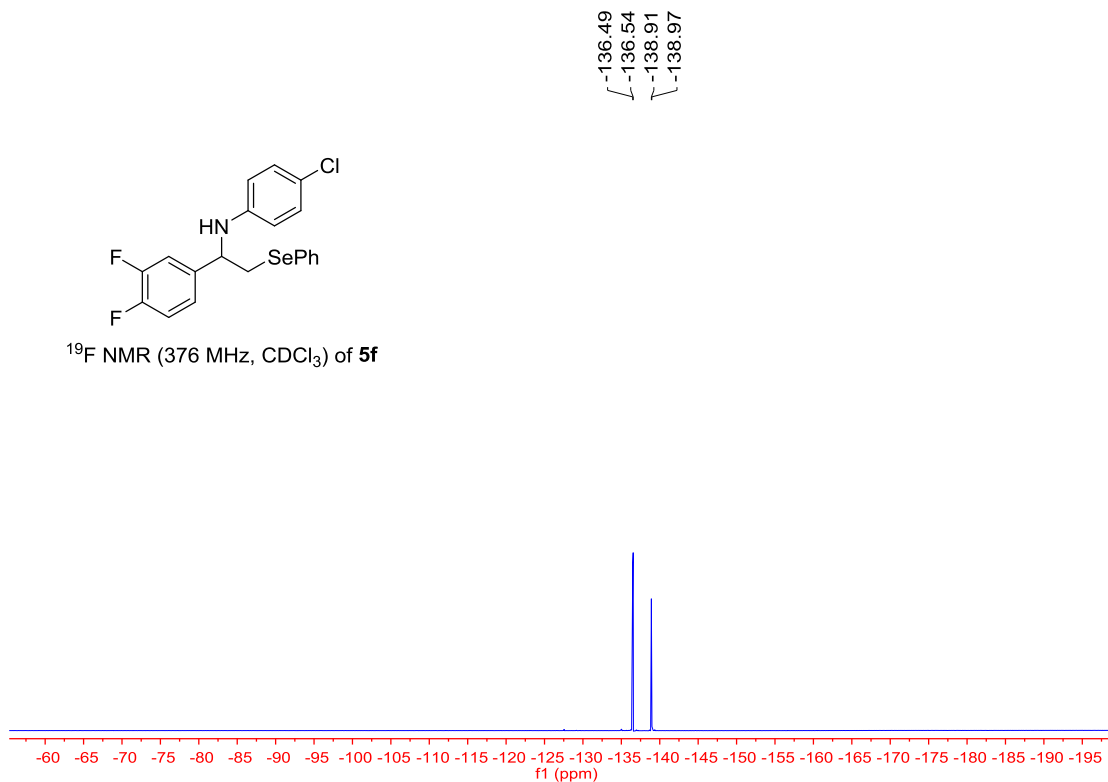
$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **5e**



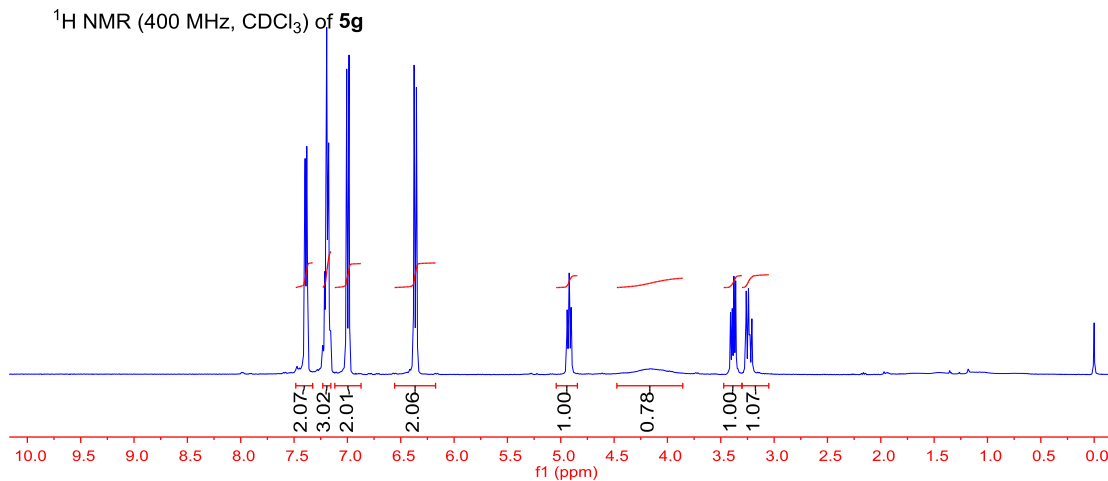


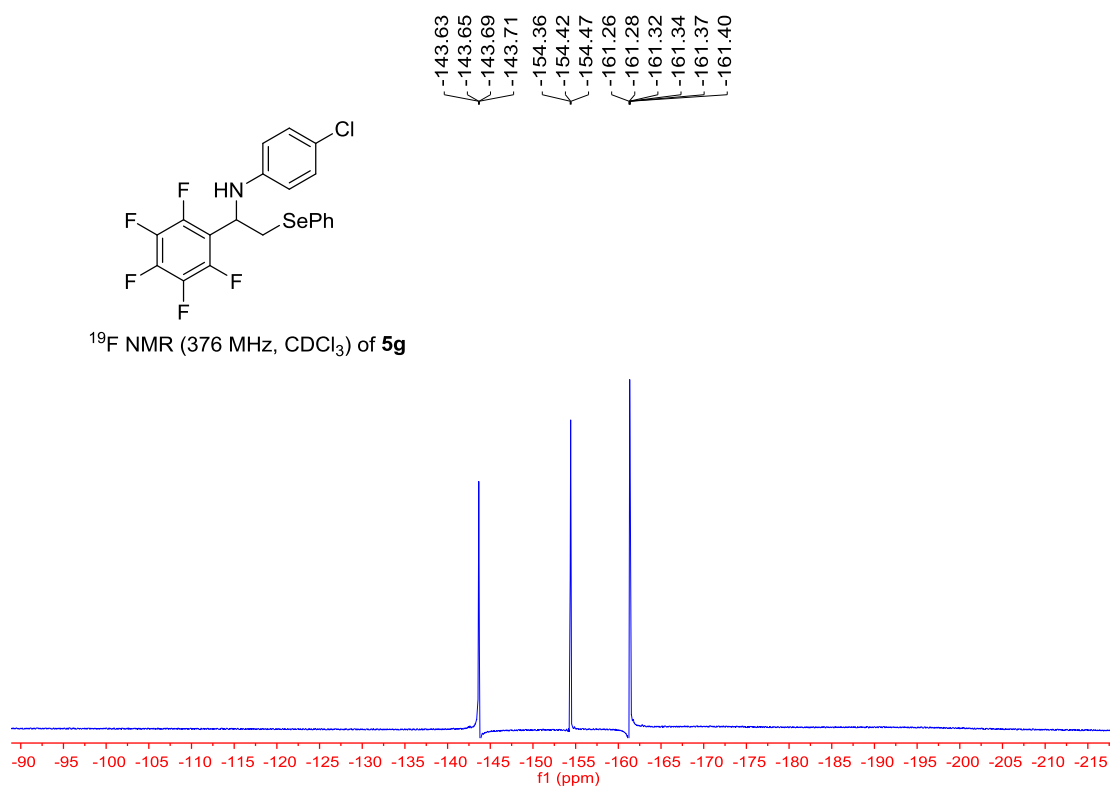
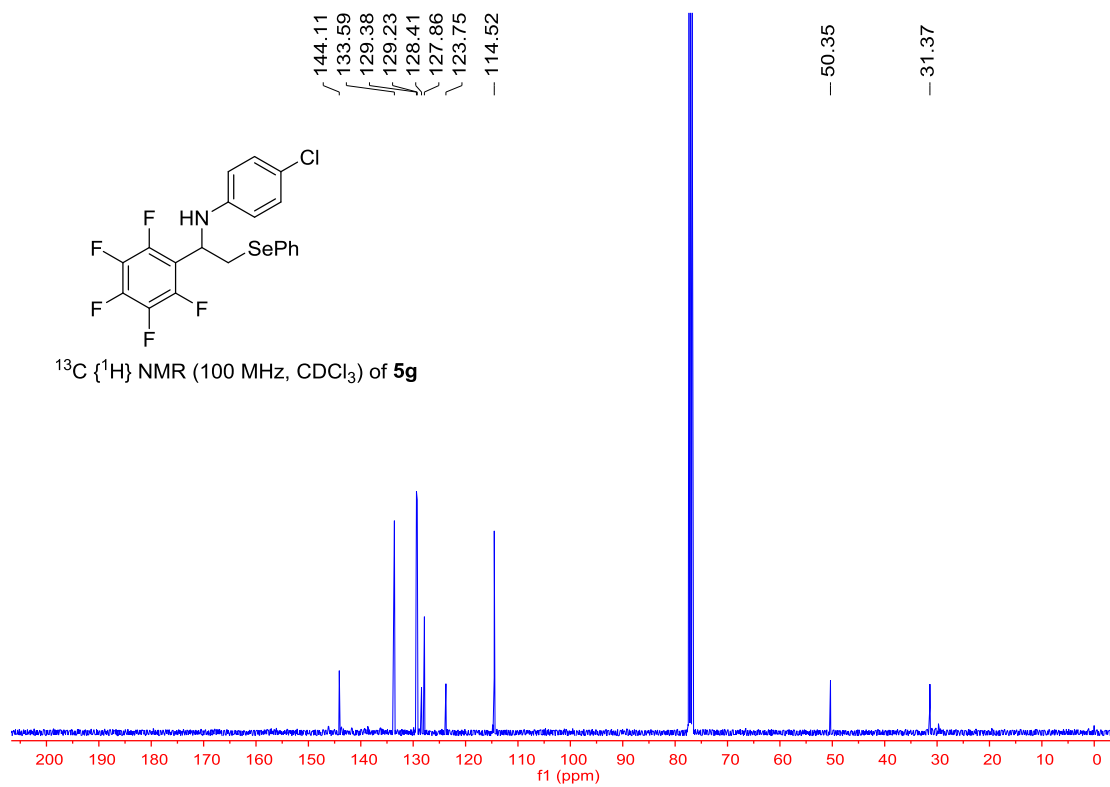


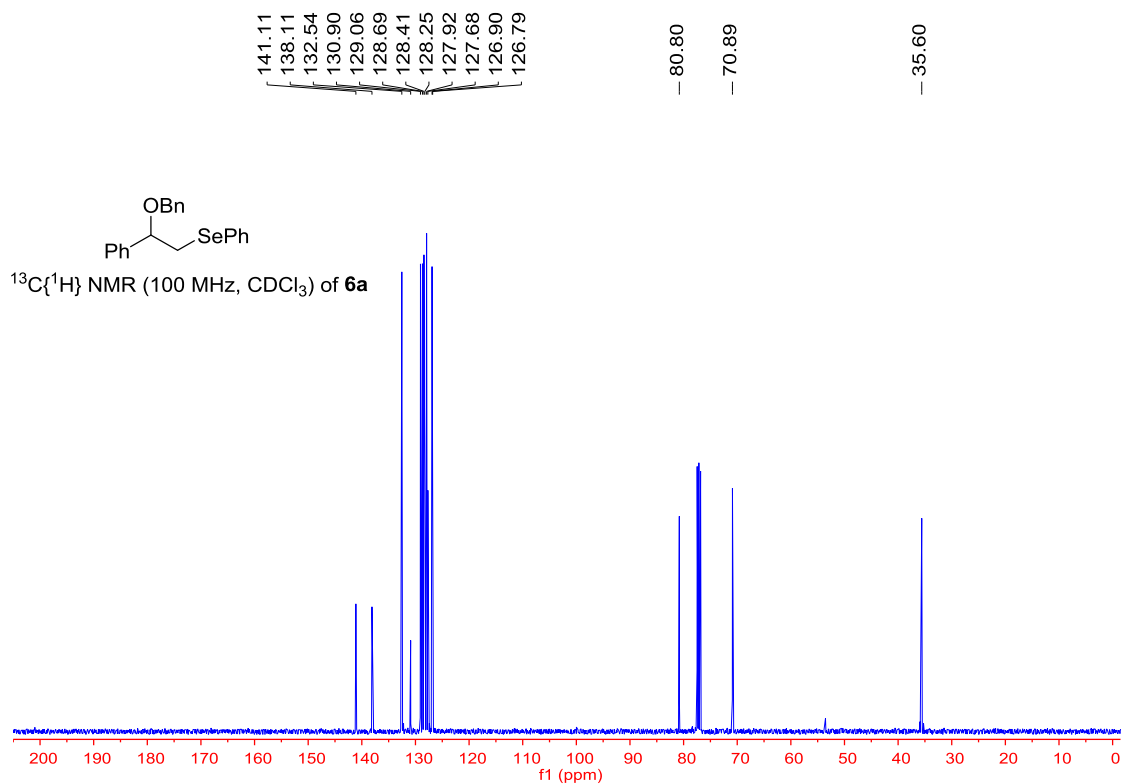
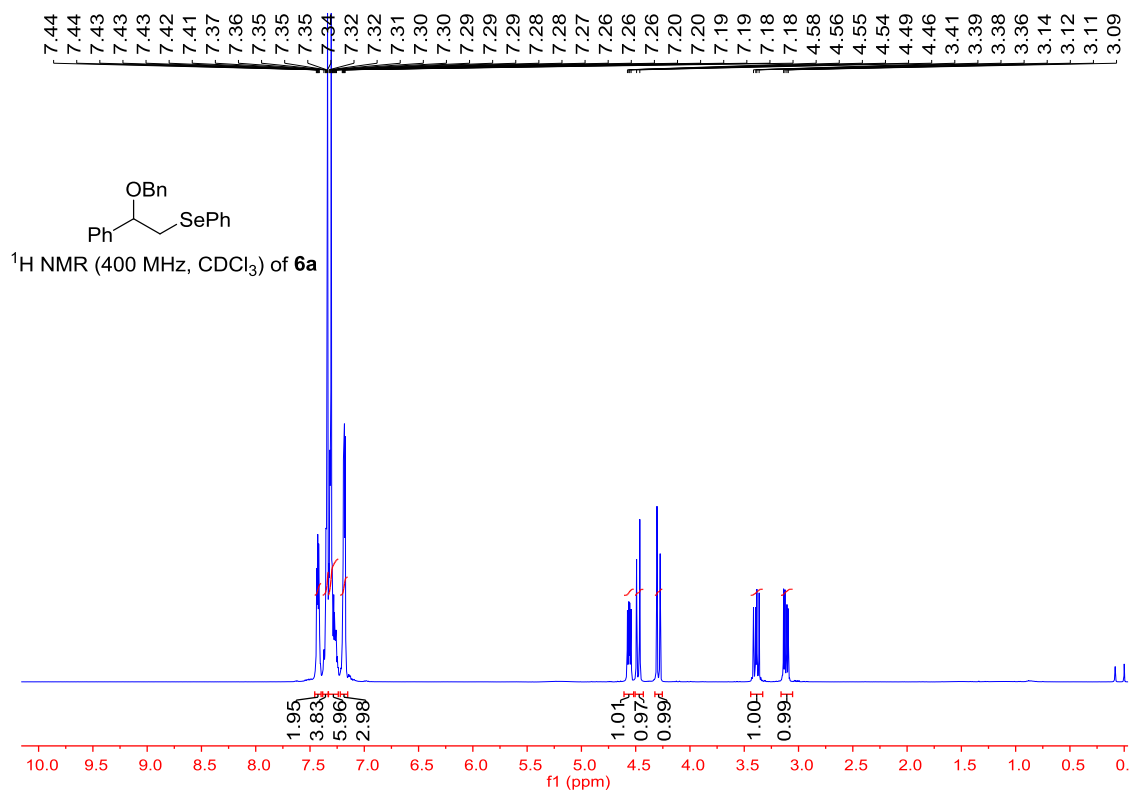
^{19}F NMR (376 MHz, CDCl_3) of **5f**

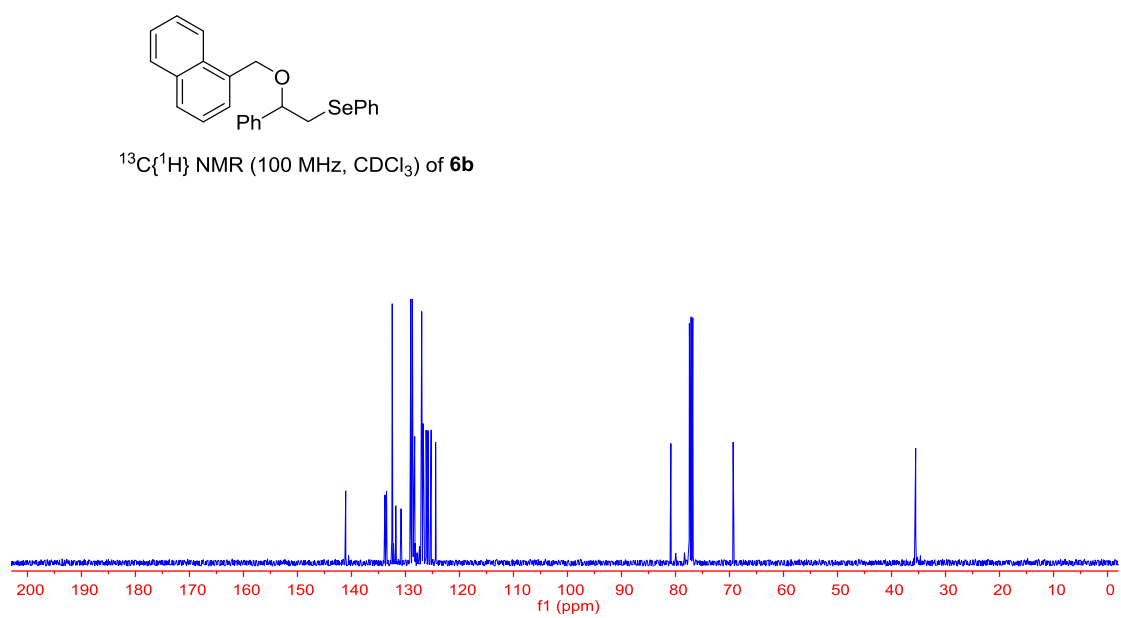
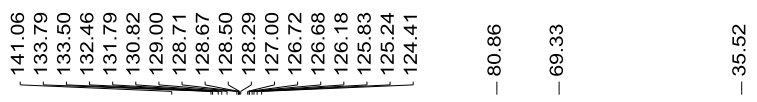
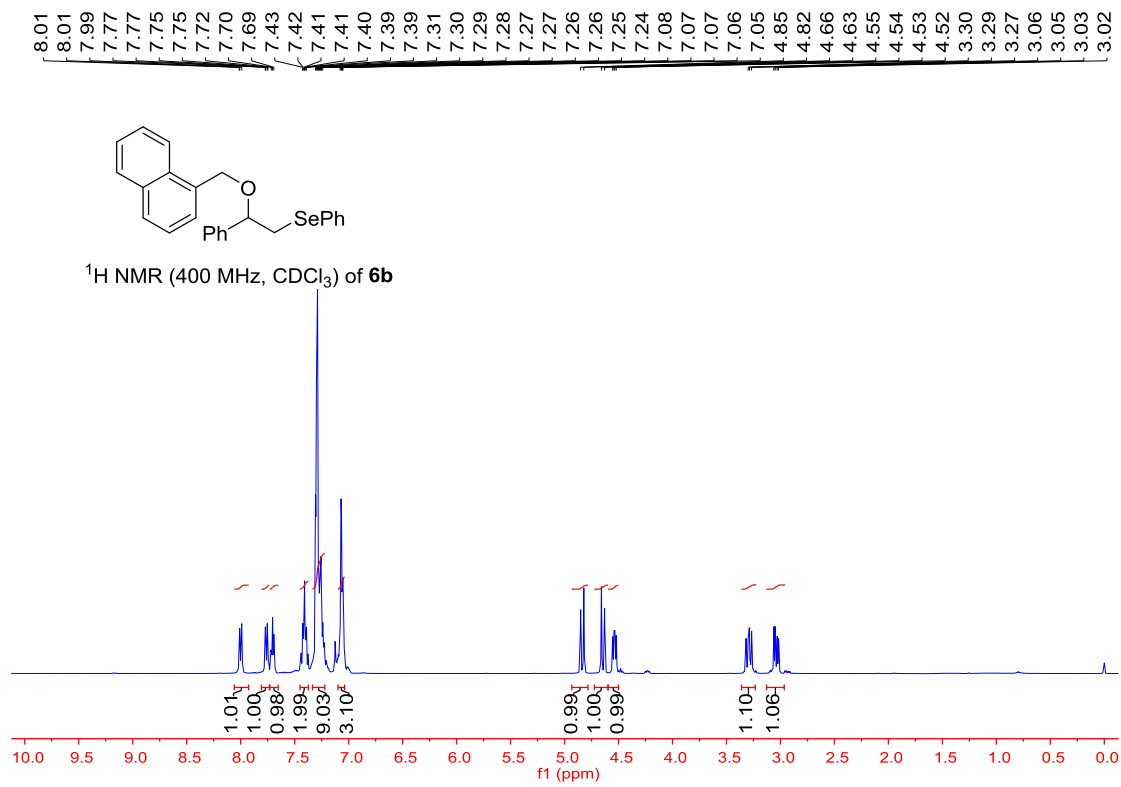


^1H NMR (400 MHz, CDCl_3) of **5g**

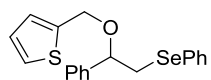




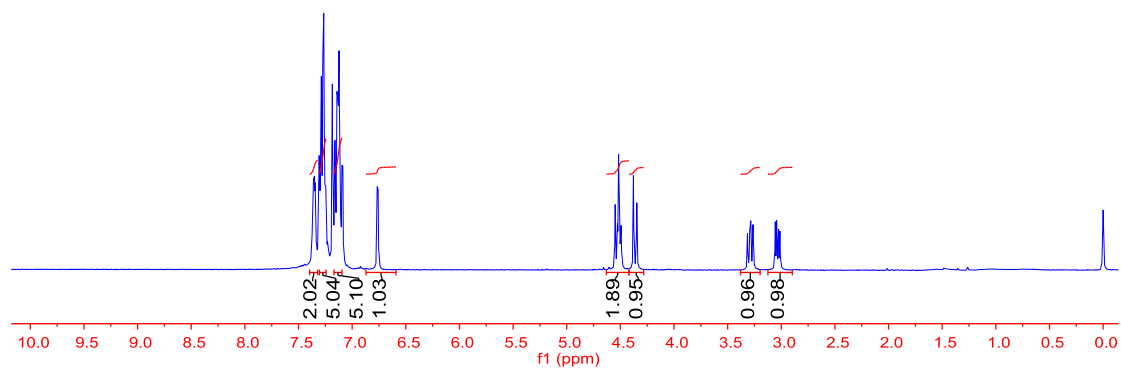




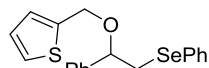
7.37
7.36
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7.27
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7.19
7.16
7.14
7.13
7.12
7.11
7.10
7.09
6.77
6.76
4.55
4.53
4.52
4.51
4.49
4.38
4.35
3.32
3.29
3.28
3.26
3.06
3.04
3.03
3.01



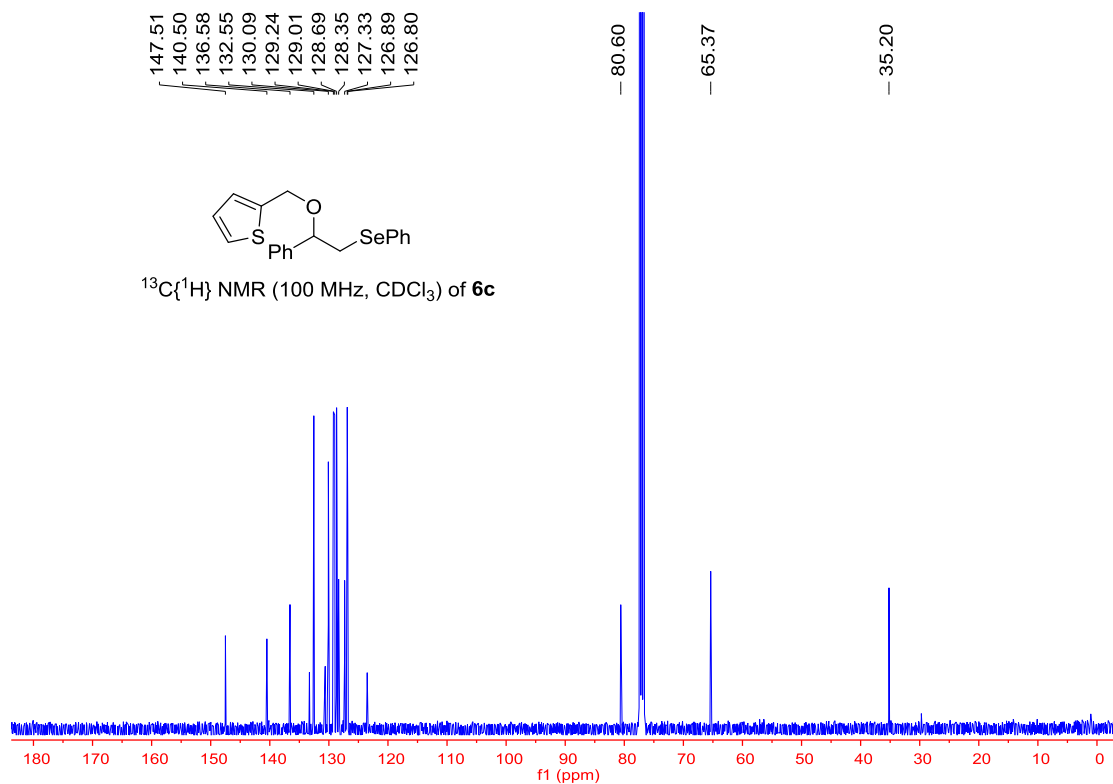
^1H NMR (400 MHz, CDCl_3) of **6c**

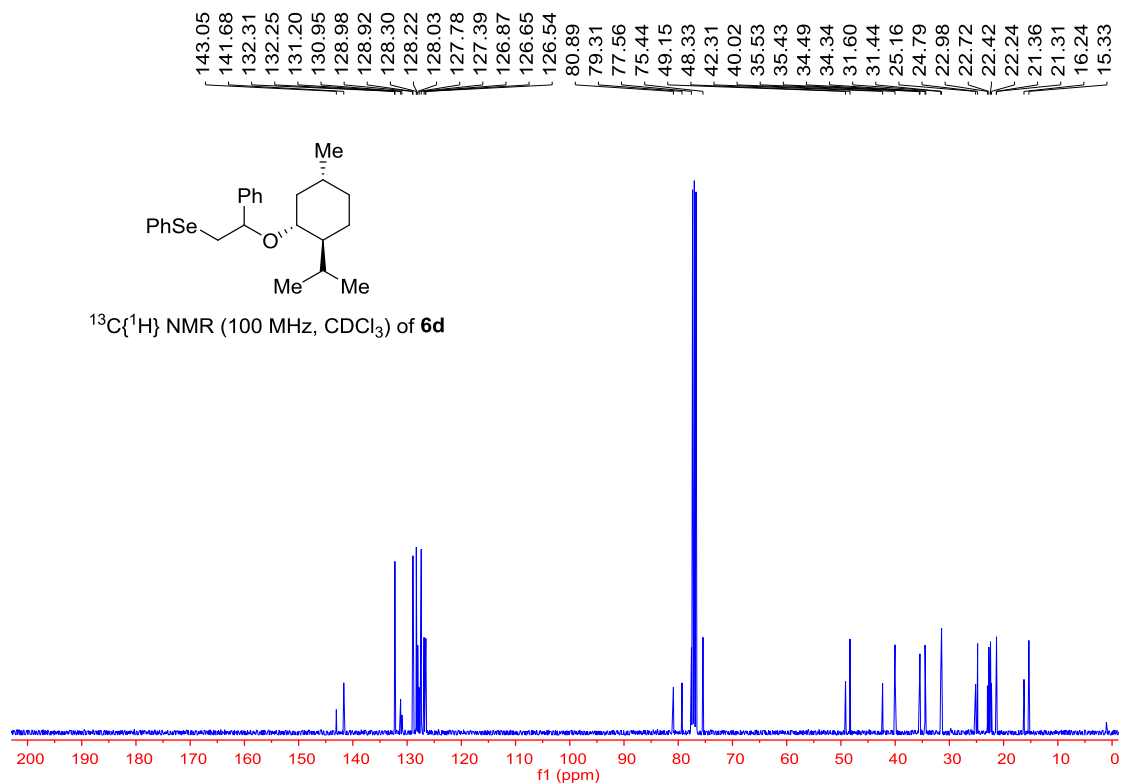
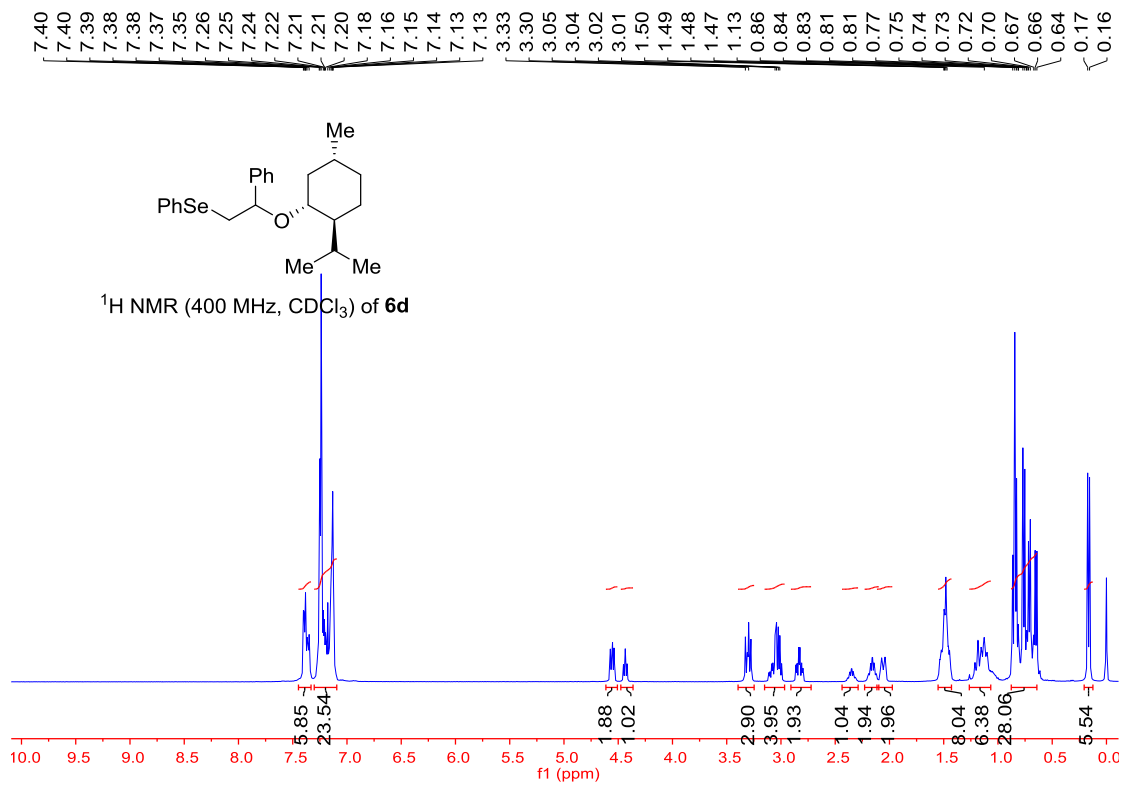


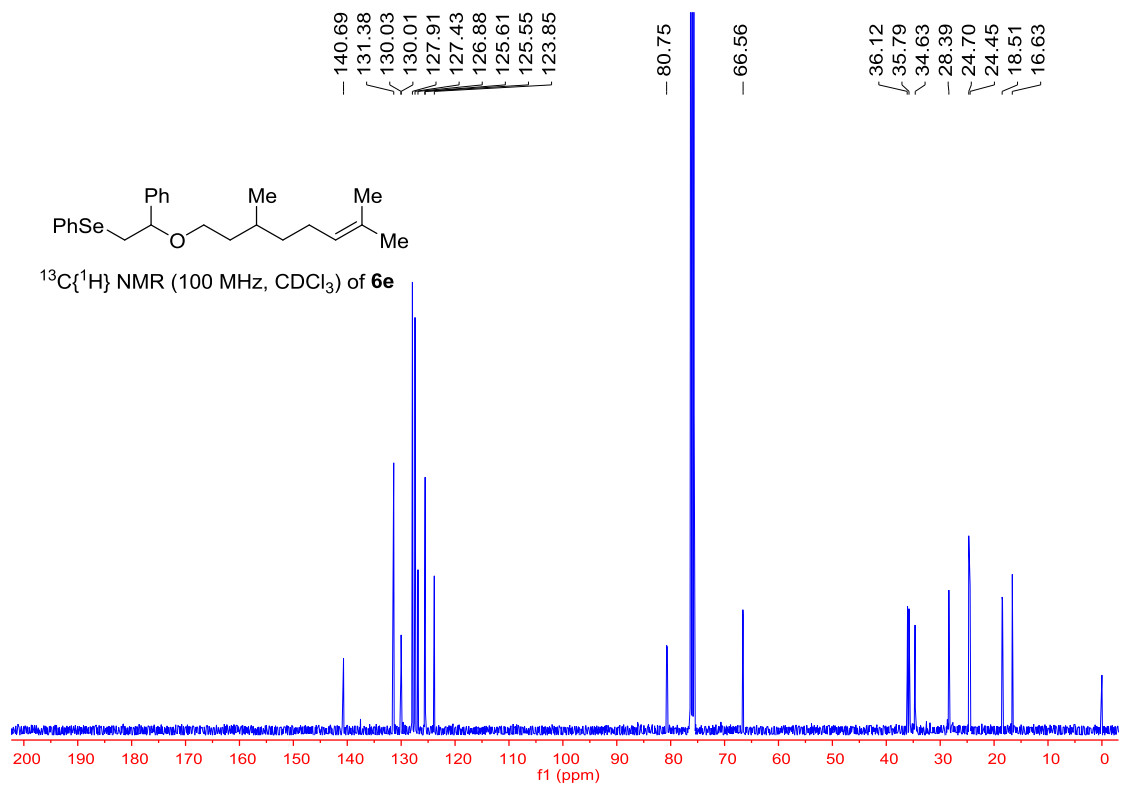
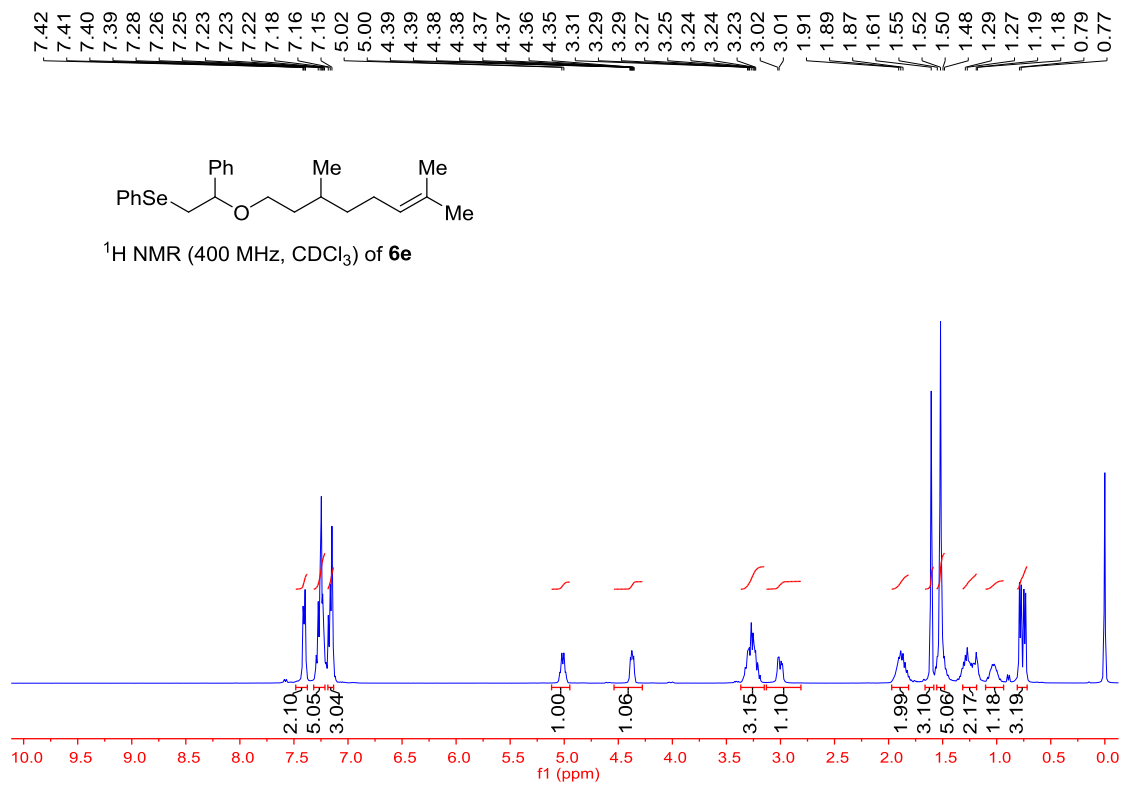
147.51
140.50
136.58
132.55
130.09
129.24
129.01
128.69
128.35
127.33
126.89
126.80

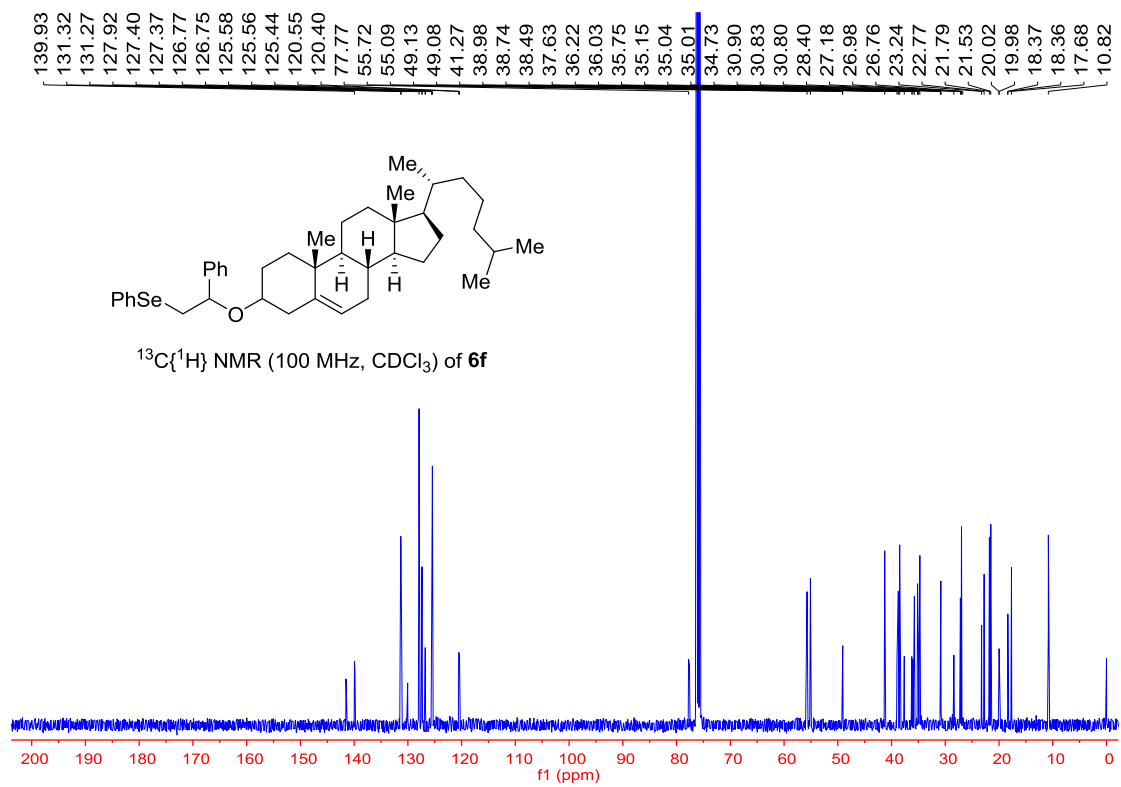
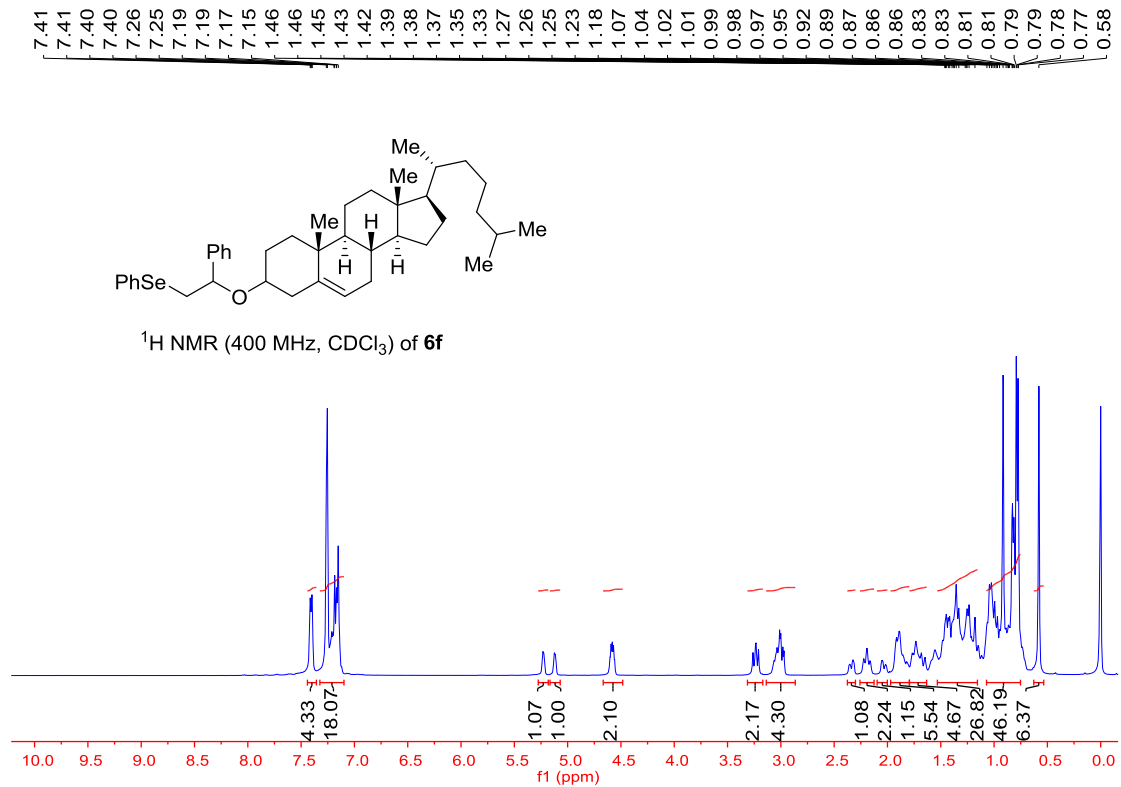


$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **6c**





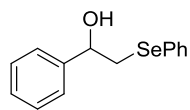




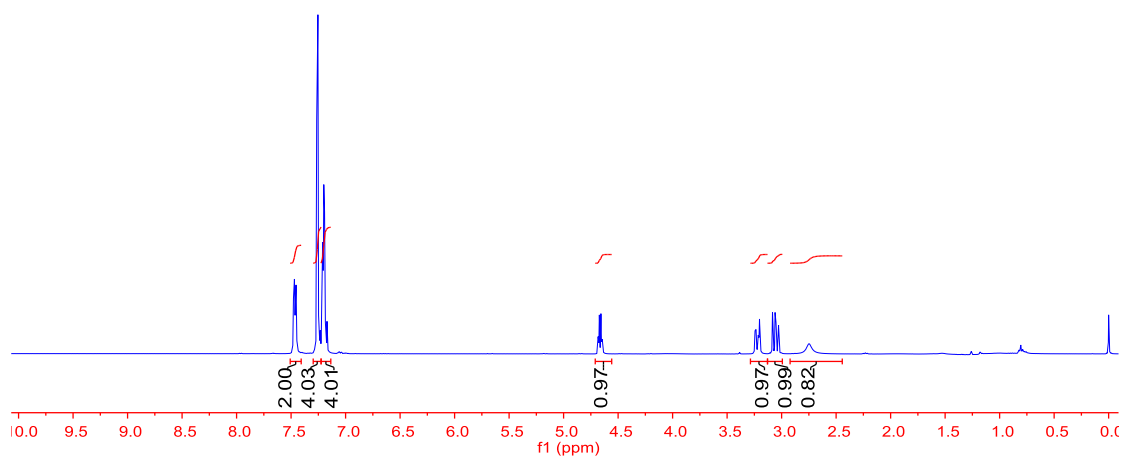
7.48
7.47
7.47
7.46
7.45
7.26
7.25
7.23
7.22
7.22
7.21
7.20
7.19
7.19
7.18
7.17

4.68
4.67
4.66
4.65

3.24
3.23
3.21
3.20
3.08
3.06
3.05
3.03
2.75



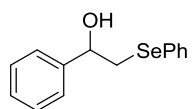
^1H NMR (400 MHz, CDCl_3) of **7a**



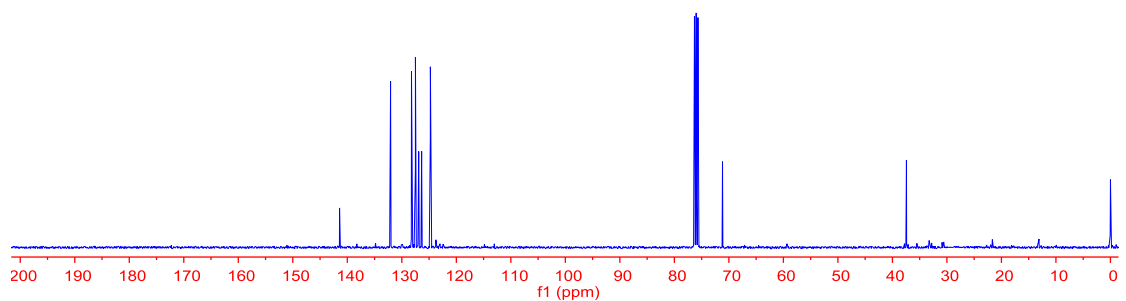
141.4
132.1
128.2
128.1
127.5
126.9
126.4
124.8

71.2

37.4



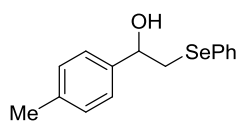
$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **7a**



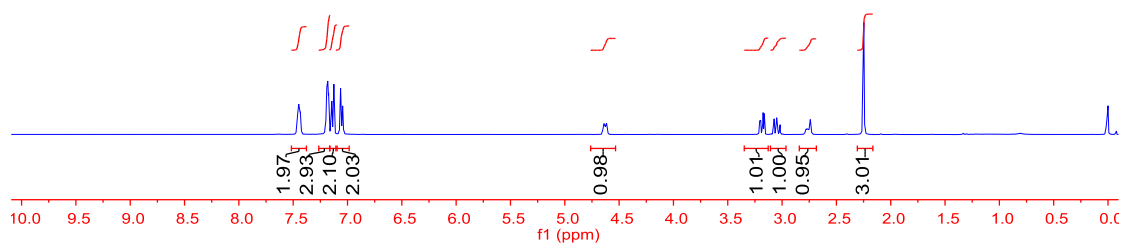
7.46
7.45
7.45
7.45
7.44
7.44
7.19
7.18
7.18
7.17
7.15
7.13
7.12
7.06
7.04

4.65
4.64
4.63
4.62
4.62
4.61

3.21
3.20
3.17
3.17
3.08
3.07
3.05
3.05
3.04
3.04
3.02
3.02
2.78
2.77
2.75
2.74
2.73
2.25
2.25



^1H NMR (400 MHz, CDCl_3) of **7b**

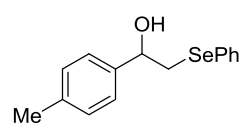


138.5
136.6
132.0
128.2
128.2
128.1
126.2
124.7

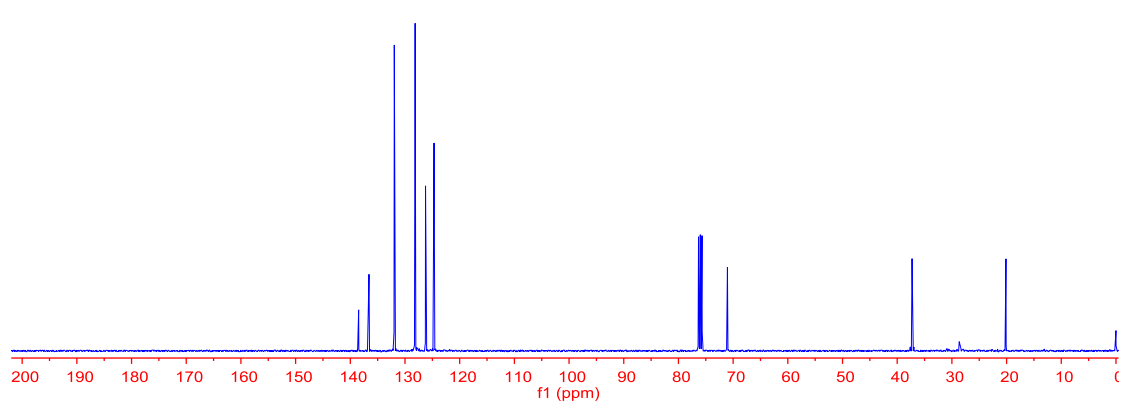
-71.0

-37.3

-20.1

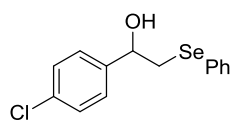


$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **7b**

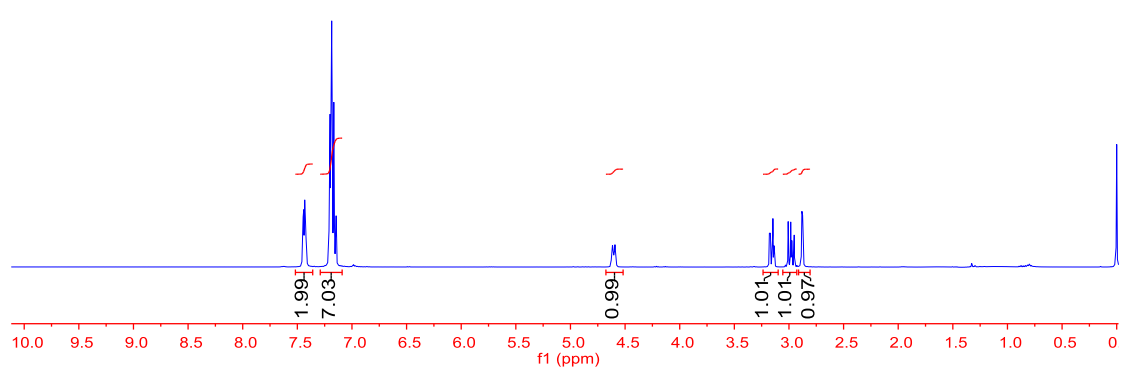


7.45
7.44
7.44
7.43
7.43
7.42
7.21
7.20
7.19
7.19
7.17
7.16
7.14

4.62
4.62
4.61
4.60
4.59
4.58
3.18
3.17
3.15
3.14
3.01
2.98
2.98
2.95
2.88
2.87



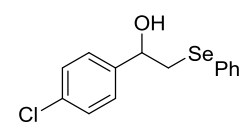
^1H NMR (400 MHz, CDCl_3) of **7c**



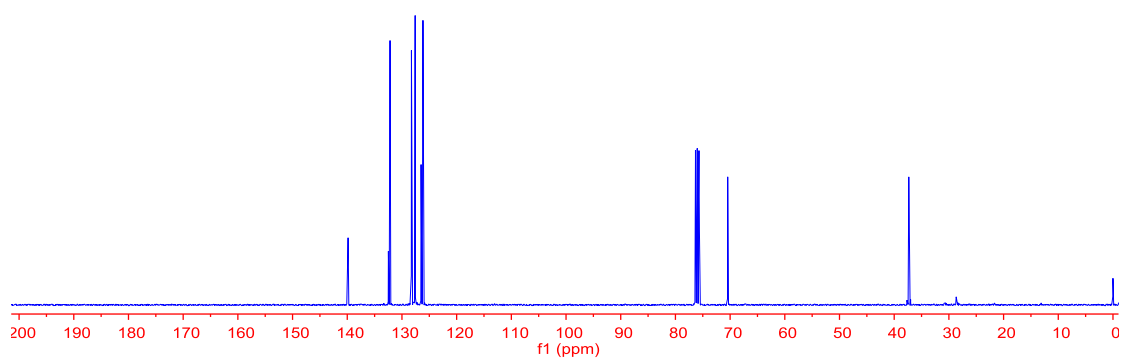
139.8
132.5
132.2
128.3
127.8
127.6
126.5
126.2

-70.4

-37.3



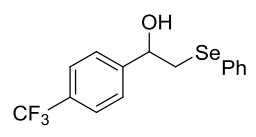
$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **7c**



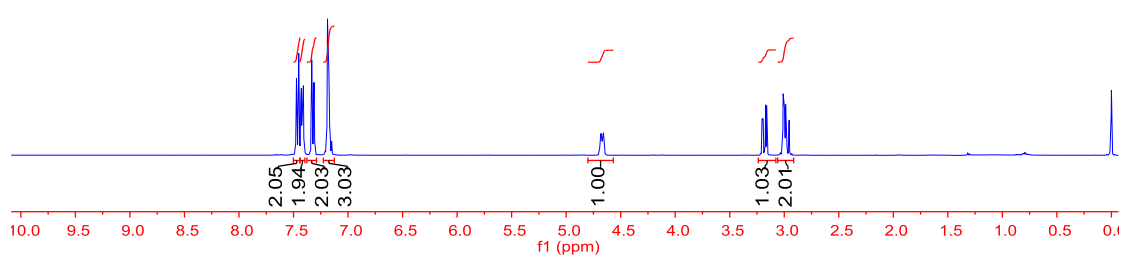
7.47
7.45
7.43
7.43
7.42
7.42
7.41
7.33
7.31
7.19
7.18
7.17

4.69
4.68
4.67
4.67
4.66
4.65

3.20
3.19
3.17
3.16
3.01
3.00
3.00
2.99
2.98
2.96



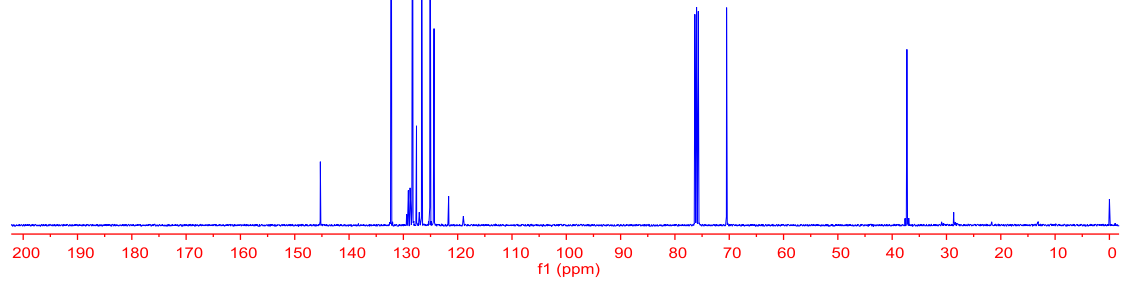
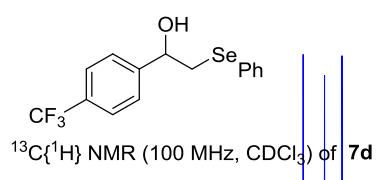
¹H NMR (400 MHz, CDCl₃) of **7d**

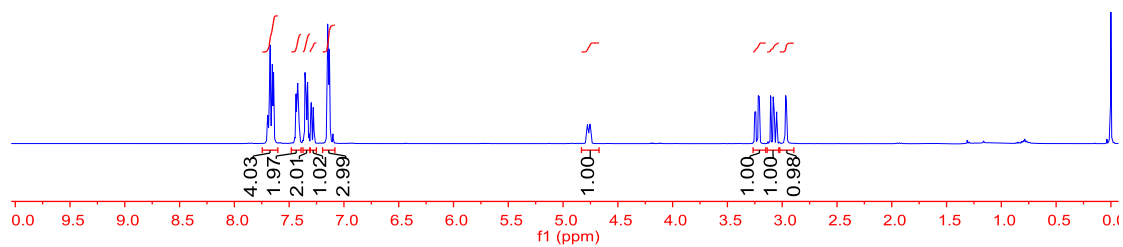
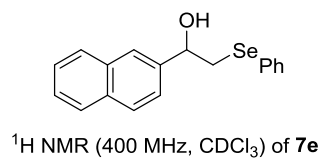
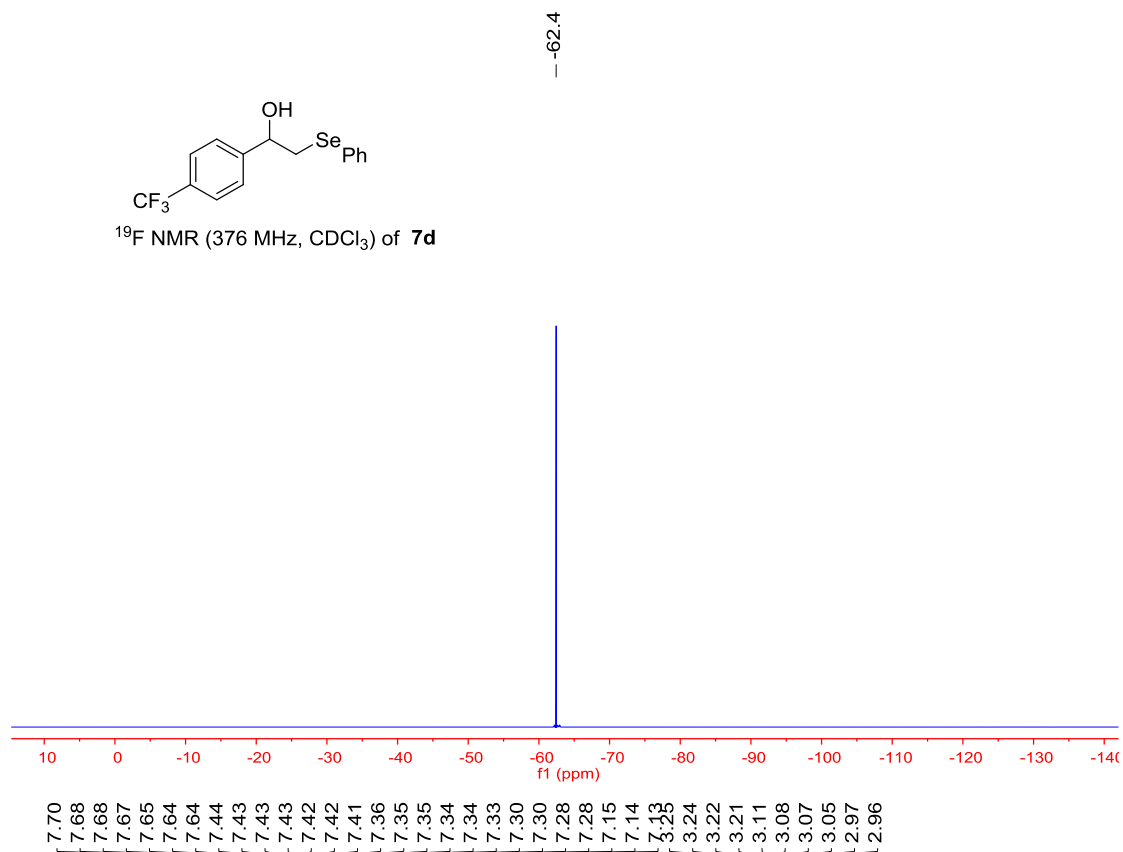
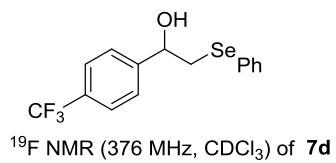


145.3
132.3
129.4
129.1
128.8
128.4
128.3
127.6
126.6
125.1
124.4
124.4
124.4
124.3
121.7
119.0

-70.5

-37.3

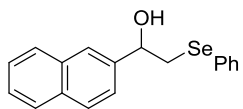




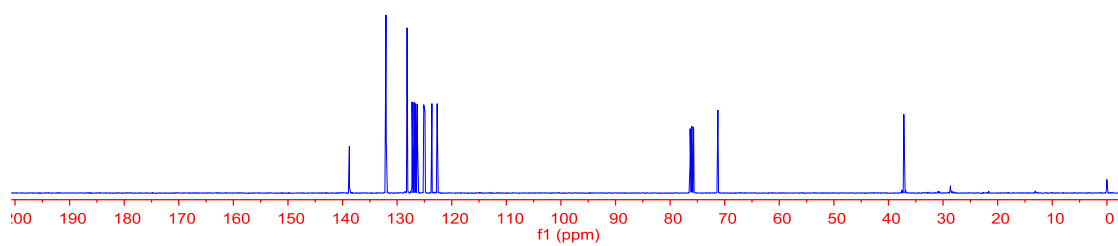
138.8
132.1
132.0
132.0
128.2
128.1
127.3
126.9
126.6
126.3
125.1
124.9
123.6
122.7

- 71.2

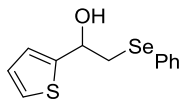
- 37.2



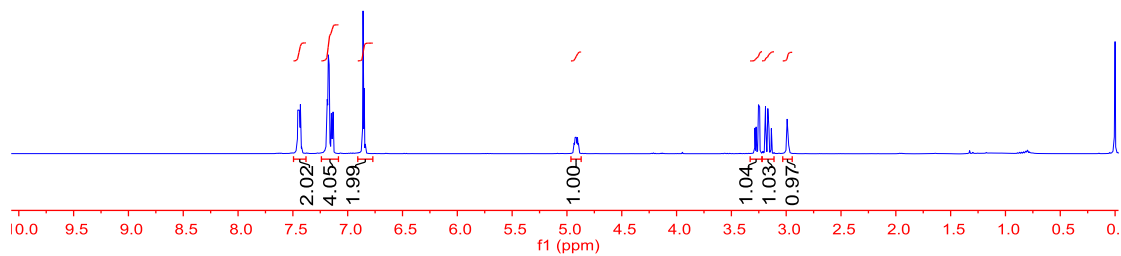
$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **7e**

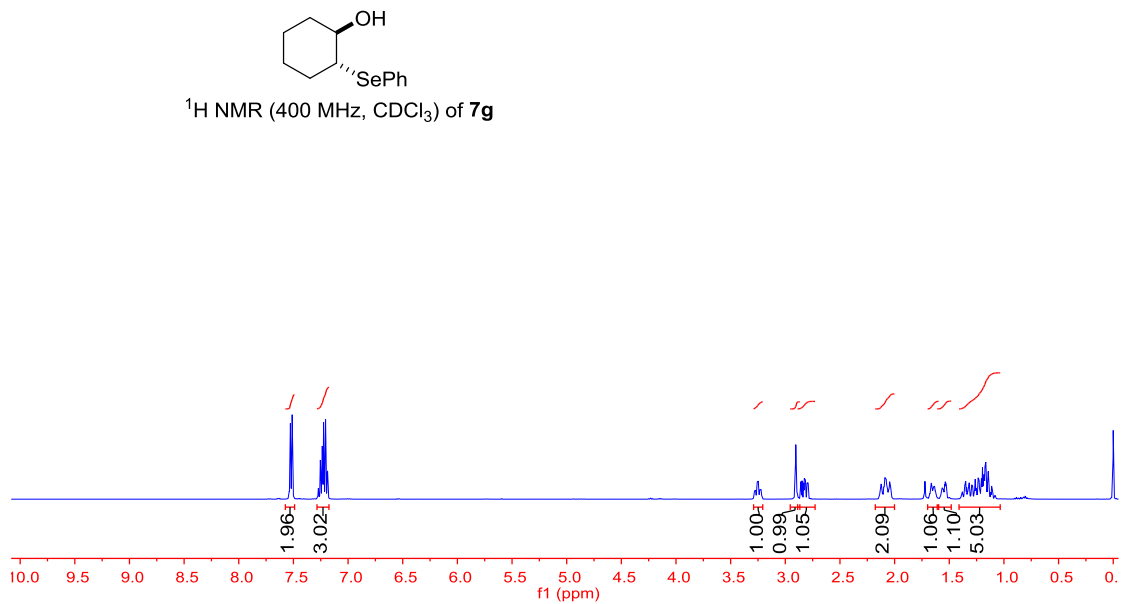
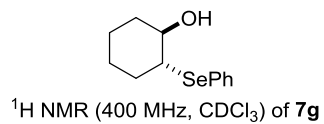
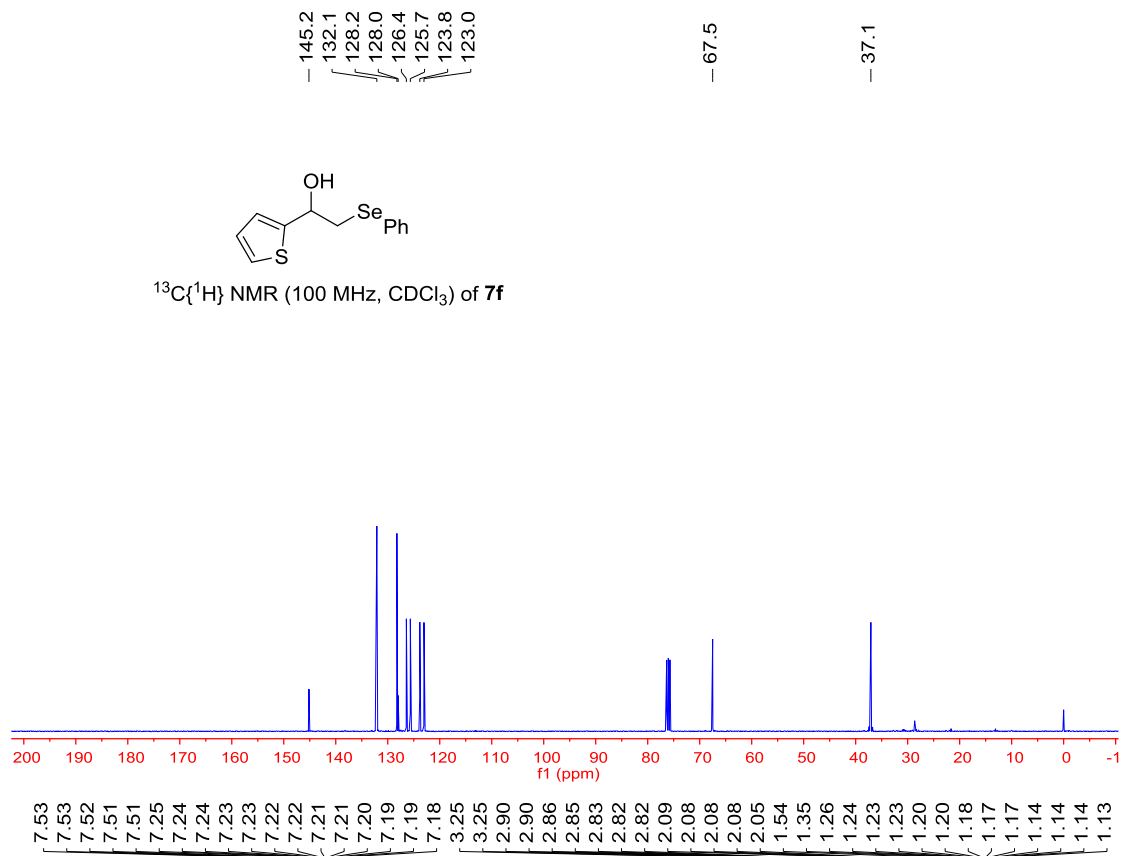
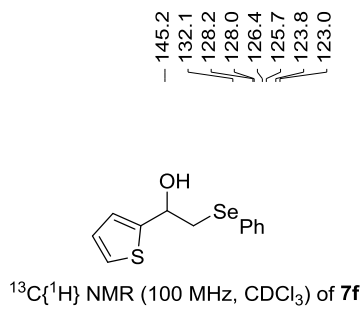


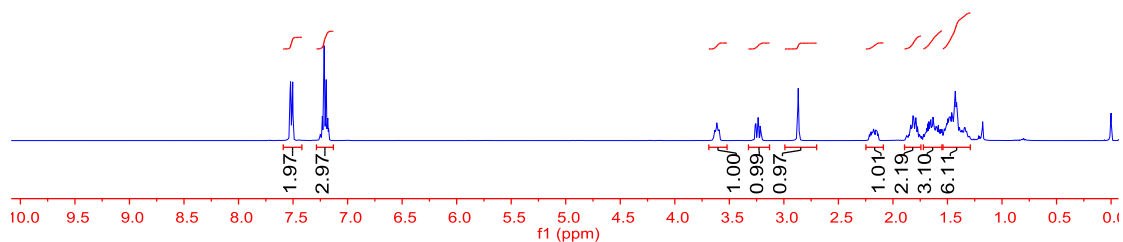
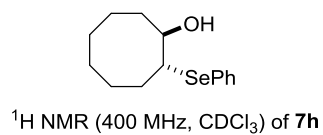
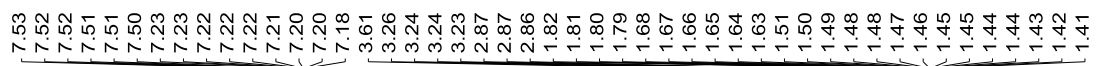
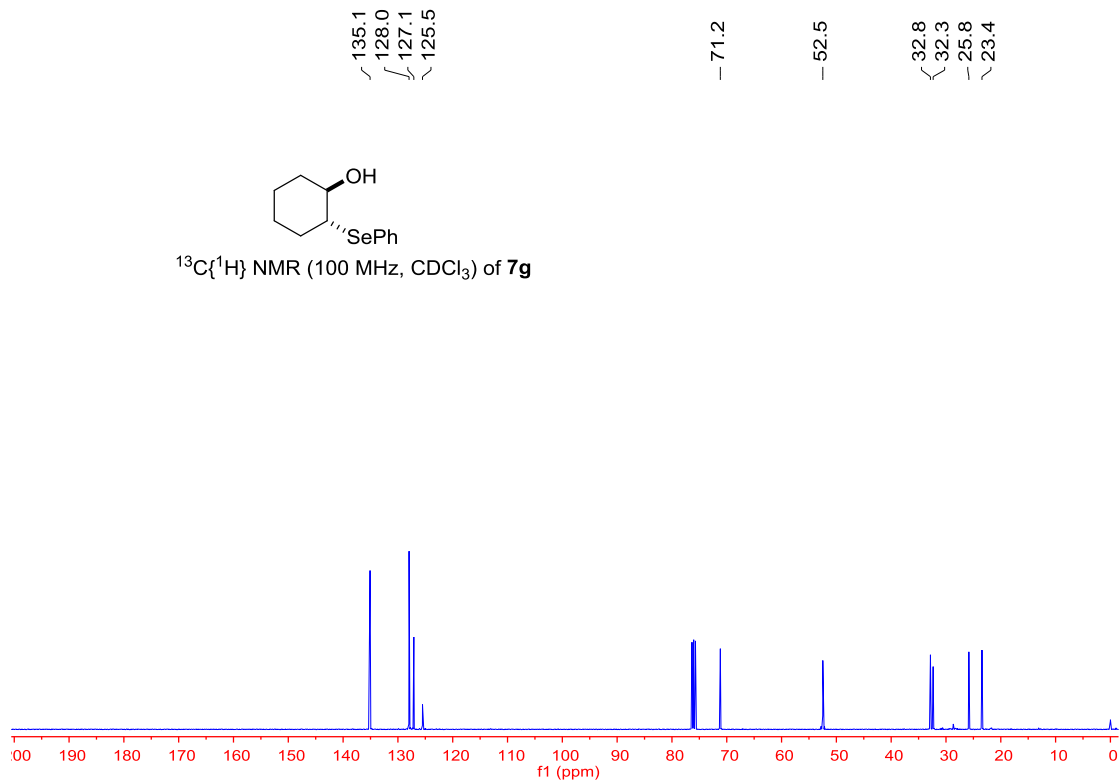
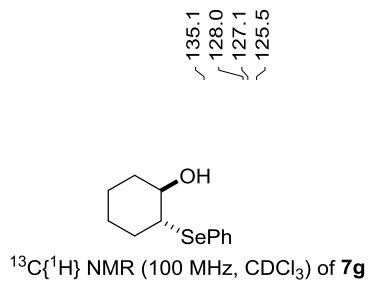
7.46
7.45
7.45
7.45
7.44
7.44
7.44
7.43
7.43
7.19
7.18
7.18
7.18
7.17
7.17
7.16
7.15
7.14
7.14
7.13
6.86
6.86
6.85
6.85
4.91
3.28
3.27
3.25
3.24
3.19
3.17
3.16
3.14
2.99
2.98



^1H NMR (400 MHz, CDCl_3) of **7f**







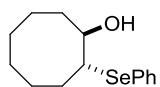
- 182.3

134.4
134.4
128.0
126.9
126.8

- 72.5

- 54.2

30.9
30.6
25.8
25.7
24.2
22.6



$^{13}\text{C}\{^1\text{H}\}$ NMR (100 MHz, CDCl_3) of **7h**

