

Electronic Supplementary Information

Iron-catalyzed Cascade Reaction of C(sp³)-Se Bond Cross-coupling/C-N Bond Formation

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Experimental Section

General Information.

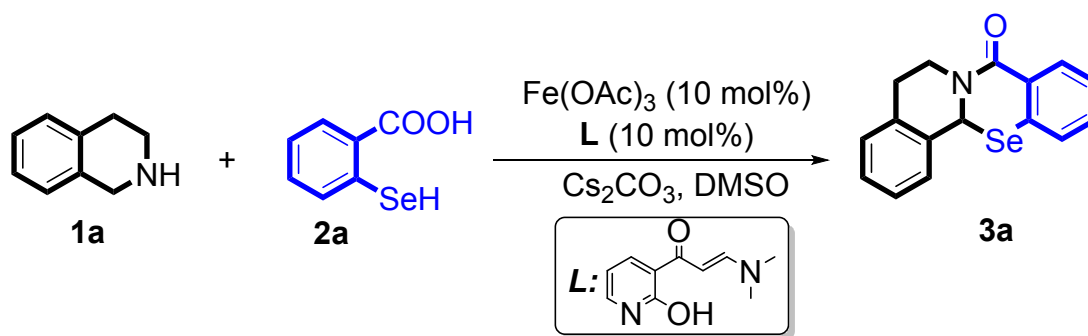
All reagents used in experiment were obtained from commercial sources and used without further purification. Solvents for chromatography were technical grade and distilled prior for using. Solvent mixtures were understood as volume/volume. Chemical yields refer to pure isolated substances. Catalysts were purchased for analytical reagent. Thin layer chromatography employed glass 0.25 mm silica gel plates with F-254 indicator, visualized by irradiation with UV light.

NMR spectra of the products were recorded using 500 MHz NMR spectrometer. The chemical shifts were calibrated to TMS (^1H NMR spectra) and CDCl_3 (^{13}C NMR spectra) as the internal reference (0.00 ppm for ^1H NMR spectra and 77.00 ppm for ^{13}C NMR spectra). The NMR spectra were reported in delta (δ) units, parts per million (ppm) downfield from the internal standard and coupling constants were reported in Hertz (Hz). Multiplicities were indicated s (singlet), d (doublet), t (triplet), q (quartet), m (multiplet). The mass spectra were performed on a Bruker Esquire 3000plus mass spectrometer equipped with ESI interface and ion trap analyzer. HR MS were recorded with an ESI-Obitrap mass spectrometer.

General procedure for preparation of L1-L6:¹⁻³

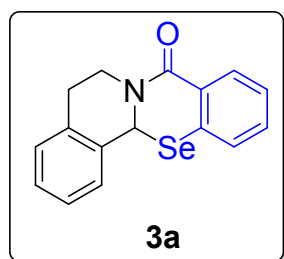
Dimethylformamide dimethylacetal (DMFDMA) (10 mol, 1.2 g) and 1-(2-hydroxypyridin-3-yl)ethan-1-one (10 mol, 1.4 g) were dissolved in *p*-xylene (10 mL). And the mixture was refluxed during a period of 5 to 12 hours, during which time the formation of yellow precipitate. The precipitate was filtered out and washed with petroleum ether three times. The solid was vacuum-dried, and 1.8 g (yield 94 %) of a yellow solid was obtained **L4** ((*E*)-3-(dimethylamino)-1-(2-hydroxyphenyl)prop-2-en-1-one). ^1H NMR (500 MHz, d^6 -DMSO): δ 14.51 (s, 1 H), 7.92-7.90 (t, $J = 7.5$ Hz, 2 H), 7.37-7.34 (t, $J = 7.8$ Hz, 1 H), 6.83 (d, $J = 2.0$ Hz, 2 H), 5.98-5.95 (d, $J = 12$ Hz, 1 H), 3.19 (s, 3 H), 2.98 (s, 3 H); ^{13}C NMR (125 MHz, d^6 -DMSO): δ 191.1, 163.6, 134.9, 129.9, 121.2, 119.1, 118.7, 90.4, 46.1, 38.6.

General procedure for preparation of 3 and 5



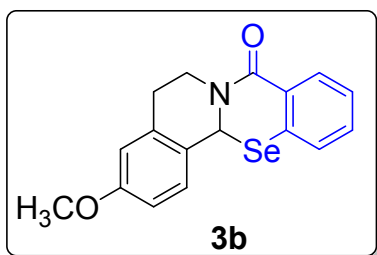
A mixture of 1,2,3,4-tetrahydroisoquinoline **1a** (0.5 mmol, 67 mg), 2-hydro-selenobenzoic acid **2a** (0.75 mmol, 151 mg), $\text{Fe}(\text{OAc})_3$ (10 mol%, 12 mg), **L4** (10 mol%, 9.6 mg) and Cs_2CO_3 (2 equiv, 326 mg), in DMSO (5 mL) was stirred under an O_2 atmosphere. After the reaction mixture was stirred at 80 °C for 12 h, it was allowed to cool to ambient temperature. Then the mixture was quenched with saturated salt water (10 mL), and the solution was extracted with ethyl acetate (3 × 10 mL). The organic layers were combined and dried by sodium sulfate, concentrated in vacuo. Then, the pure product **3** or **5** was obtained by flash column chromatography on silica gel.

Analytical Datas



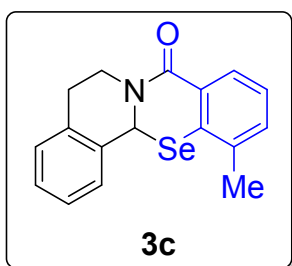
5,13a-Dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3-a]isoquinolin-8-one (**3a**)

White solid (130 mg, 83%); mp: 83-85 °C; ^1H NMR (CDCl_3 , 500 MHz) δ 8.19-8.17 (d, J = 8.0 Hz, 1H), 7.42-7.38 (m, 2H), 7.34-7.29 (m, 4H), 7.26 (m, 1H), 6.22 (s, 1H), 4.81-4.78 (m, 1H), 3.22-3.11 (m, 2H), 2.96-2.92 (m, 1H); ^{13}C NMR (CDCl_3 , 125 MHz) δ 164.8, 137.6, 136.2, 131.7, 131.0, 130.6, 128.9, 128.7, 128.4, 127.5, 127.1, 126.8, 126.1, 60.5, 39.8, 29.4; HRMS (ESI, m/z) calcd for $[\text{C}_{16}\text{H}_{13}\text{NNaOSe}]$ ($\text{M}+\text{Na}$) $^+$ 338.0055, found 338.0057.



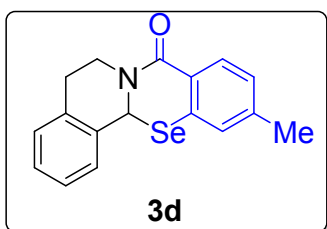
3-Methoxy-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3-a]isoquinolin-8-one (3b)

Yellow oil (131 mg, 76%); ^1H NMR (CDCl_3 , 500 MHz) δ 8.16 (d, $J = 7.5$ Hz, 1H), 7.38 (dd, $J = 7.5$ Hz, 1.5 Hz, 1H), 7.31-7.28 (m, 3H), 6.83 (dd, $J = 8.5$ Hz, 2.5 Hz, 1H), 6.76 (d, $J = 2.0$ Hz, 1H), 6.16 (s, 1H), 4.78 (m, 1H), 3.81 (s, 3H), 3.20-3.07 (m, 2H), 2.90-2.86 (m, 1H); ^{13}C NMR (CDCl_3 , 125 MHz) δ 164.7, 159.3, 137.7, 137.6, 131.5, 130.9, 128.9, 128.7, 126.7, 125.9, 122.5, 113.3, 113.2, 60.3, 55.2, 39.7, 29.6; HRMS (ESI, m/z) calcd for $[\text{C}_{17}\text{H}_{15}\text{NNaO}_2\text{Se}]$ ($\text{M}+\text{Na}$) $^+$ 368.0160, found 368.0162.



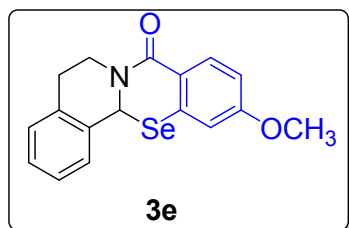
12-Methyl-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3-a]isoquinolin-8-one (3c)

Pale yellow solid (149 mg, 91%); mp: 75-77 °C; ^1H NMR (CDCl_3 , 500 MHz) δ 8.06-8.05 (d, $J = 7.5$ Hz, 1H), 7.41 (t, $J = 5.5$ Hz, 1H), 7.31-7.20 (m, 5H), 6.13 (s, 1H), 4.80-4.77 (m, 1H), 3.22-3.11 (m, 2H), 2.94 (d, $J = 14.5$ Hz, 1H), 2.33 (s, 3H); ^{13}C NMR (CDCl_3 , 125 MHz) δ 165.1, 137.4, 136.3, 134.6, 132.8, 130.8, 128.9, 128.7, 128.6, 128.4, 127.6, 127.0, 125.3, 59.8, 39.7, 29.4, 19.8; HRMS (ESI, m/z) calcd for $[\text{C}_{17}\text{H}_{15}\text{NNaOSe}]$ ($\text{M}+\text{Na}$) $^+$ 352.0211, found 352.0213.



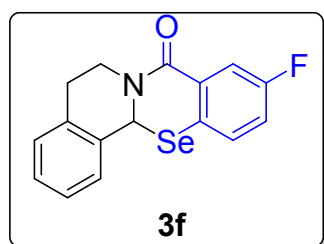
11-Methyl-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3-*a*]isoquinolin-8-one (3d)

Yellow oil (141 mg, 86%); ^1H NMR (CDCl_3 , 500 MHz) δ 8.07 (d, $J = 8.0$ Hz, 1H), 7.38 (m, 1H), 7.28 (t, $J = 4.5$ Hz, 2H), 7.25-7.23 (m, 1H), 7.12 (t, $J = 8.0$ Hz, 2H), 6.20 (s, 1H), 4.79-4.76 (m, 1H), 3.20-3.09 (m, 2H), 2.94-2.90 (m, 1H), 2.37 (s, 3H); ^{13}C NMR (CDCl_3 , 125 MHz) δ 164.8, 142.4, 137.4, 136.2, 130.9, 130.7, 128.6, 128.3, 127.5, 127.2, 127.1, 127.0, 126.3, 60.4, 39.7, 29.4, 21.3; HRMS (ESI, m/z) calcd for $[\text{C}_{17}\text{H}_{15}\text{NNaOSe}]$ ($\text{M}+\text{Na}$) $^+$ 352.0211, found 352.0213.



11-Methoxy-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3-*a*]isoquinolin-8-one (3e)

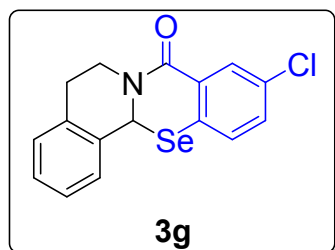
Yellow solid (162 mg, 94%); mp: 140-143 °C; ^1H NMR (CDCl_3 , 500 MHz) δ 8.12 (d, $J = 9.0$ Hz, 1H), 7.36 (m, 1H), 7.29 (t, $J = 4.5$ Hz, 2H), 7.25-7.23 (m, 1H), 6.84-6.79 (m, 2H), 6.23 (s, 1H), 4.77-4.74 (m, 1H), 3.84 (s, 3H), 3.19-3.08 (m, 2H), 2.93-2.90 (m, 1H); ^{13}C NMR (CDCl_3 , 125 MHz) δ 164.7, 161.9, 139.4, 136.2, 132.8, 130.6, 128.6, 128.3, 127.5, 127.0, 121.7, 112.8, 110.8, 60.5, 55.4, 39.6, 29.4; HRMS (ESI, m/z) calcd for $[\text{C}_{17}\text{H}_{15}\text{NNaO}_2\text{Se}]$ ($\text{M}+\text{Na}$) $^+$ 368.0160, found 368.0162.



10-Fluoro-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3-*a*]isoquinolin-8-one (3f)

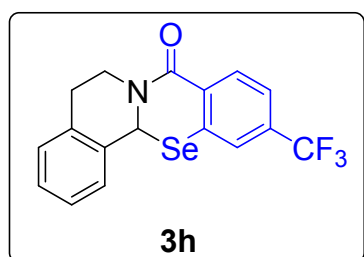
Yellow oil (131 mg, 79%); ^1H NMR (CDCl_3 , 500 MHz) δ 7.89 (dd, $J = 9.5$ Hz, 3.0 Hz, 1H), 7.40 (m, 1H), 7.33-7.29 (m, 3H), 7.27-7.25 (m, 1H), 7.14 (dd, $J = 8.5$ Hz, 2.5 Hz, 1H), 6.20 (s, 1H), 4.80 (m, 1H), 3.24 (m, 2H), 2.96 (m, 1H); ^{13}C NMR (CDCl_3 , 125 MHz) δ

163.8, 161.2, 136.1, 132.7, 130.6, 130.3, 128.8, 128.5, 128.4, 127.6, 127.2, 119.3, 117.6, 60.7, 40.0, 29.4; HRMS (ESI, m/z) calcd for [C₁₆H₁₂FNNaOSe] (M+Na)⁺ 355.9960, found 355.9962.



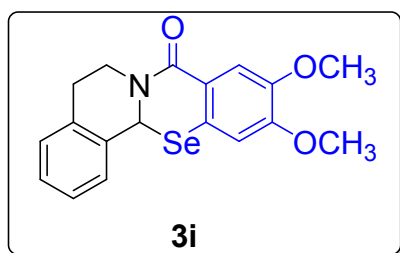
10-Chloro-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3-*a*]isoquinolin-8-one (3g)

Yellow oil (126 mg, 72%); ¹H NMR (CDCl₃, 500 MHz) δ 8.15 (d, *J* = 2.5 Hz, 1H), 7.38-7.35 (m, 2H), 7.31-7.29 (m, 2H), 7.27-7.24 (m, 2H), 6.19 (s, 1H), 4.78-4.74 (m, 1H), 3.22-3.09 (m, 2H), 2.95-2.91 (m, 1H); ¹³C NMR (CDCl₃, 125 MHz) δ 163.6, 136.1, 135.9, 132.1, 131.7, 130.8, 130.2, 130.1, 128.7, 128.5, 128.0, 127.5, 127.2, 60.5, 39.9, 29.3; HRMS (ESI, m/z) calcd for [C₁₆H₁₂ClNNaOSe] (M+Na)⁺ 371.9665, found 371.9667.



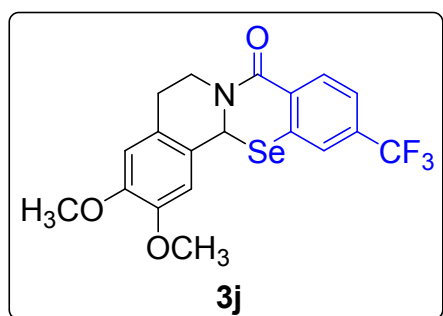
11-(Trifluoromethyl)-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3-*a*]isoquinolin-8-one (3h)

Pale yellow solid (130 mg, 68%); mp: 74-76 °C; ¹H NMR (CDCl₃, 500 MHz) δ 8.29 (d, *J* = 8.5 Hz, 1H), 7.61 (s, 1H), 7.55 (d, *J* = 8.0 Hz, 1H), 7.40-7.38 (m, 1H), 7.32 (t, *J* = 4.0 Hz, 2H), 7.29-7.26 (m, 1H), 6.25 (s, 1H), 4.81-4.77 (m, 1H), 3.25-3.12 (m, 2H), 2.99-2.94 (m, 1H); ¹³C NMR (CDCl₃, 125 MHz) δ 163.7, 138.8, 136.1, 133.5, 131.6, 131.5, 129.9, 128.8, 128.7, 127.5, 127.3, 123.9, 123.2, 122.7, 60.7, 40.0, 29.3; HRMS (ESI, m/z) calcd for [C₁₇H₁₂F₃NNaOSe] (M+Na)⁺ 405.9928, found 405.9930.



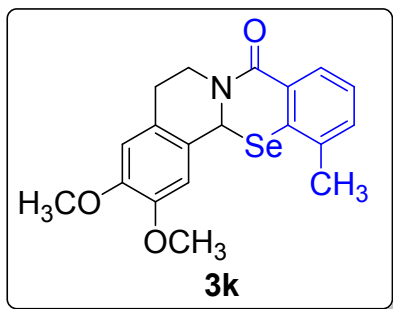
10,11-Dimethoxy-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3- α]isoquinolin-8-one (3i)

Yellow oil (161 mg, 86%); ^1H NMR (CDCl_3 , 500 MHz) δ 7.69 (s, 1H), 7.39 (t, $J = 5.5$ Hz, 1H), 7.30 (t, $J = 5.0$ Hz, 2H), 7.25 (t, $J = 3.5$ Hz, 1H), 6.76 (s, 1H), 6.20 (s, 1H), 4.79-4.75 (m, 1H), 3.95 (s, 3H), 3.91 (s, 3H), 3.10 (m, 2H), 2.97 (m, 1H); ^{13}C NMR (CDCl_3 , 125 MHz) δ 164.8, 151.9, 147.7, 136.2, 130.7, 130.3, 128.7, 128.3, 127.5, 127.0, 121.4, 112.9, 108.7, 60.8, 56.1, 56.0, 39.7, 29.4; HRMS (ESI, m/z) calcd for $[\text{C}_{18}\text{H}_{17}\text{NNaO}_3\text{Se}]$ ($\text{M}+\text{Na}$) $^+$ 398.0266, found 398.0268.



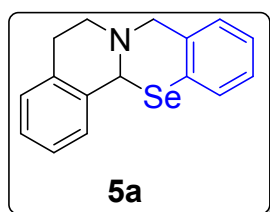
2,3-Dimethoxy-11-(Trifluoromethyl)-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3- α]isoquinolin-8-one (3j)

White solid (144 mg, 65%); ^1H NMR (CDCl_3 , 500 MHz) δ 8.17 (d, $J = 8.0$ Hz, 1H), 7.40 (t, $J = 7.5$ Hz, 1H), 7.33-7.29 (m, 2H), 6.86 (s, 1H), 6.72 (s, 1H), 6.15 (s, 1H), 4.78-4.74 (m, 1H), 3.90 (s, 3H), 3.88 (s, 3H), 3.18-3.15 (m, 1H), 3.10-3.03 (m, 1H), 2.86-2.83 (m, 1H); ^{13}C NMR (CDCl_3 , 125 MHz) δ 164.8, 148.9, 148.1, 137.5, 131.6, 130.9, 128.9, 128.6, 126.7, 126.0, 122.0, 111.1, 109.9, 60.5, 55.9, 55.8, 39.7, 28.7; HRMS (ESI, m/z) calcd for $[\text{C}_{19}\text{H}_{16}\text{F}_3\text{NNaO}_3\text{Se}]$ ($\text{M}+\text{Na}$) $^+$ 466.0140, found 466.0142.



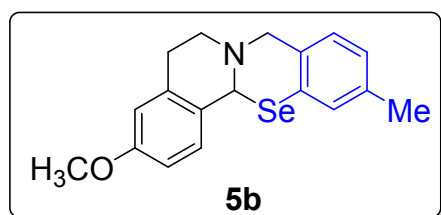
2,3-Dimethoxy-12-methyl-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3- α]isoquinolin-8-one (3k)

Pale yellow solid (153 mg, 79%); mp: 125-127 °C; ^1H NMR (CDCl_3 , 500 MHz) δ 8.04 (d, $J = 7.5$ Hz, 1H), 7.29 (d, $J = 7.0$ Hz, 1H), 7.21 (t, $J = 7.5$ Hz, 1H), 6.88 (s, 1H), 6.73 (s, 1H), 6.06 (s, 1H), 4.77 (m, 1H), 3.89 (s, 3H), 3.91 (s, 3H), 3.21 (m, 1H), 3.10 (m, 1H), 2.87 (m, 1H), 2.34 (s, 3H); ^{13}C NMR (CDCl_3 , 125 MHz) δ 165.2, 149.0, 148.1, 137.4, 134.5, 132.8, 128.9, 128.7, 128.5, 125.3, 122.2, 111.1, 110.1, 59.8, 56.0, 55.9, 39.7, 28.8, 19.9; HRMS (ESI, m/z) calcd for $[\text{C}_{19}\text{H}_{19}\text{NNaO}_3\text{Se}]$ ($\text{M}+\text{Na}$) $^+$ 412.0422, found 412.0424.



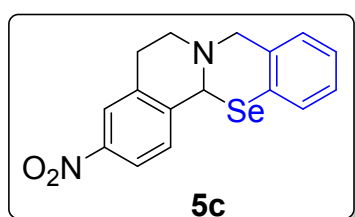
5,13a-Dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3- α]isoquinoline (5a)

White solid (128 mg, 85%); ^1H NMR (CDCl_3 , 500 MHz) δ 7.25 (m, 4H), 7.11 (dd, $J = 8.5$ Hz, 2.0 Hz, 1H), 7.06-7.00 (m, 3H), 6.18 (s, 1H), 4.55 (d, $J = 17.0$ Hz, 1H), 3.96 (d, $J = 16.5$ Hz, 1H), 3.30-3.16 (m, 2H), 2.84 (d, $J = 12.0$ Hz, 2H); ^{13}C NMR (CDCl_3 , 125 MHz) δ 134.8, 134.7, 133.0, 129.2, 128.0, 127.8, 127.0, 126.5, 126.4, 126.2, 126.0, 124.1, 67.0, 57.7, 43.6, 28.7; HRMS (ESI, m/z) calcd for $[\text{C}_{16}\text{H}_{15}\text{NNaSe}]$ ($\text{M}+\text{Na}$) $^+$ 324.0262, found 324.0264.



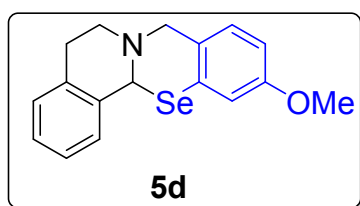
3-Methoxy-11-methyl-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3- α]isoquinoline (5b)

Pale yellow solid (150 mg, 87%); ^1H NMR (CDCl_3 , 500 MHz) δ 7.16-7.06 (m, 4H), 7.02 (d, $J = 8.0$ Hz, 1H), 6.80 (d, $J = 8.5$ Hz, 1H), 6.74 (s, 1H), 6.17 (s, 1H), 4.54 (d, $J = 17.0$ Hz, 1H), 4.00 (d, $J = 17.0$ Hz, 1H), 3.82 (s, 3H), 3.26-3.19 (m, 2H), 2.84 (d, $J = 15.0$ Hz, 2H); ^{13}C NMR (CDCl_3 , 125 MHz) δ 158.9, 134.9, 134.5, 127.8, 127.3, 127.2, 126.8, 126.5, 126.4, 124.0, 113.8, 112.2, 66.8, 57.7, 55.1, 43.5, 28.9; HRMS (ESI, m/z) calcd for $[\text{C}_{18}\text{H}_{19}\text{NNaOSe}]$ ($\text{M}+\text{Na}$) $^+$ 368.0524, found 368.0526.



3-Nitro-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3- α]isoquinoline (5c)

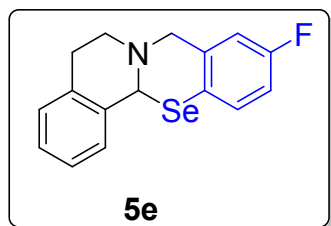
Pale yellow solid (138 mg, 80%); mp: 159-162 $^\circ\text{C}$; ^1H NMR (CDCl_3 , 500 MHz) δ 8.15 (s, 1H), 8.08 (d, $J = 8.0$ Hz, 1H), 7.33 (d, $J = 8.5$ Hz, 1H), 7.13-7.10 (m, 1H), 7.06 (s, 2H), 7.02 (d, $J = 8.0$ Hz, 1H), 6.18 (s, 1H), 4.56 (d, $J = 16.5$ Hz, 1H), 3.96 (d, $J = 16.5$ Hz, 1H), 3.32-3.20 (m, 2H), 2.86-2.96 (m, 2H); ^{13}C NMR (CDCl_3 , 125 MHz) δ 146.2, 141.4, 136.2, 133.6, 130.2, 128.0, 127.2, 126.6, 125.9, 124.7, 122.7, 121.4, 66.0, 57.4, 43.0, 29.1; HRMS (ESI) m/z calcd for $[\text{C}_{16}\text{H}_{14}\text{N}_2\text{NaO}_2\text{Se}]$ ($\text{M}+\text{Na}$) $^+$ 369.0113, found 369.0115.



11-Methoxy-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3- α]isoquinoline (5d)

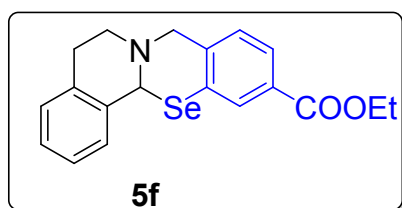
Yellow solid (150 mg, 91%); ^1H NMR (CDCl_3 , 500 MHz) δ 7.14-7.24 (m, 4H), 6.95 (d, $J = 8.5$ Hz, 1H), 6.60 (dd, $J = 8.5$ Hz, 2.5 Hz, 1H), 6.55 (d, $J = 2.0$ Hz, 1H), 6.15 (s, 1H), 4.48 (d, $J = 15.0$ Hz, 1H), 3.90 (d, $J = 13.0$ Hz, 1H), 3.75 (s, 3H), 3.20 (d, $J = 19.5$ Hz, 2H), 2.81 (s, 2H); ^{13}C NMR (CDCl_3 , 125 MHz) δ 158.2, 135.8, 134.7, 133.0, 129.2, 128.8,

127.8, 126.2, 126.0, 118.4, 110.9, 110.8, 67.1, 57.2, 55.2, 43.5, 28.7; HRMS (ESI, m/z) calcd for [C₁₇H₁₇NNaOSe] (M+Na)⁺ 354.0368, found 354.0370.



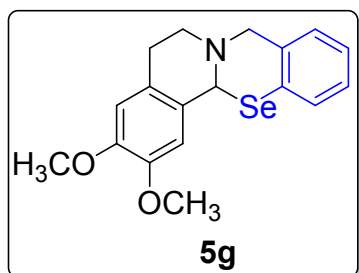
10-Fluoro-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3-a]isoquinoline (5e)

Pale yellow solid (119 mg, 75%); mp: 127-128 °C; ¹H NMR (CDCl₃, 500 MHz) δ 7.23-7.19 (m, 1H), 7.18-7.12 (m, 3H), 6.94-6.91 (m, 1H), 6.84-6.77 (m, 2H), 6.09 (s, 1H), 4.48 (d, *J* = 17.0 Hz, 1H), 3.89 (d, *J* = 16.5 Hz, 1H), 3.23-3.12 (m, 2H), 2.82 (m, 2H); ¹³C NMR (CDCl₃, 125 MHz) δ 159.7, 134.5, 132.9, 129.5, 129.2, 128.0, 127.9, 127.7, 127.6, 126.2, 126.1, 114.5, 66.9, 57.6, 43.6, 28.7; HRMS (ESI, m/z) calcd for [C₁₆H₁₄FNNaSe] (M+Na)⁺ 342.0168, found 342.0170.



Ethyl 5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3-a]isoquinoline-11-carboxylate (5f)

White solid (154 mg, 83%); mp: 126-127 °C; ¹H NMR (CDCl₃, 500 MHz) δ 7.76-7.65 (m, 2H), 7.24-7.13 (m, 4H), 7.09 (d, *J* = 7.5 Hz, 1H), 6.15 (s, 1H), 4.52 (d, *J* = 16.5 Hz, 1H), 4.33 (dd, *J* = 7.0 Hz, 2H), 3.97 (d, *J* = 17.0 Hz, 1H), 3.19-3.16 (m, 2H), 2.81-2.79 (m, 2H), 1.36 (t, 3H); ¹³C NMR (CDCl₃, 125 MHz) δ 166.0, 135.5, 134.4, 132.9, 131.3, 129.2, 129.1, 127.9, 127.8, 127.7, 126.2, 126.1, 124.9, 67.2, 60.9, 57.6, 43.7, 28.7, 14.2, HRMS (ESI, m/z) calcd for [C₁₉H₁₉NNaO₂Se] (M+Na)⁺ 396.0473, found 396.0475.



**2,3-Dimethoxy-5,13a-dihydro-6H,8H-benzo[5,6][1,3]selenazino[2,3-*a*]isoquinoline
(5g)**

Pale yellow solid (122 mg, 68%); ¹H NMR (CDCl₃, 500 MHz) δ 7.13 (t, *J* = 7.0 Hz, 1H), 7.09-7.04 (m, 2H), 6.99 (d, *J* = 8.0 Hz, 1H), 6.65 (d, *J* = 21.5 Hz, 2H), 6.14 (s, 1H), 4.53 (d, *J* = 16.5 Hz, 1H), 3.98 (d, *J* = 16.5 Hz, 1H), 3.89 (s, 3H), 3.88 (s, 3H), 3.20 (m, 2H), 2.86 (m, 1H), 2.76 (d, *J* = 15.5 Hz, 1H); ¹³C NMR (CDCl₃, 125 MHz) δ 148.6, 147.4, 134.9, 127.9, 126.9, 126.7, 126.6, 126.5, 125.2, 124.1, 111.6, 108.9, 67.1, 57.8, 55.9, 55.8, 43.7, 28.4; HRMS (ESI, *m/z*) calcd for [C₁₈H₁₉NNaO₂Se] (M+Na)⁺ 384.0473, found 384.0475.

Reference

1. B. Al-Saleh, M. A. El-Asery, R. S. Abdel-Aziz, M. H. Elnagdi, *J. Heterocyclic Chem.*, **2005**, *42*, 563.
2. S. Kantevari, M. V. Chary, S. V. N. Vup palapati, *Tetrahedron.*, **2007**, *63*, 13024.
3. D. A. Vasselin, A. D. Westwell, C. S. Matthews, T. D. Bradshaw, M. F. G. Stevens, *J. Med. Chem.* **2006**, *49*, 3973.

Spectrums

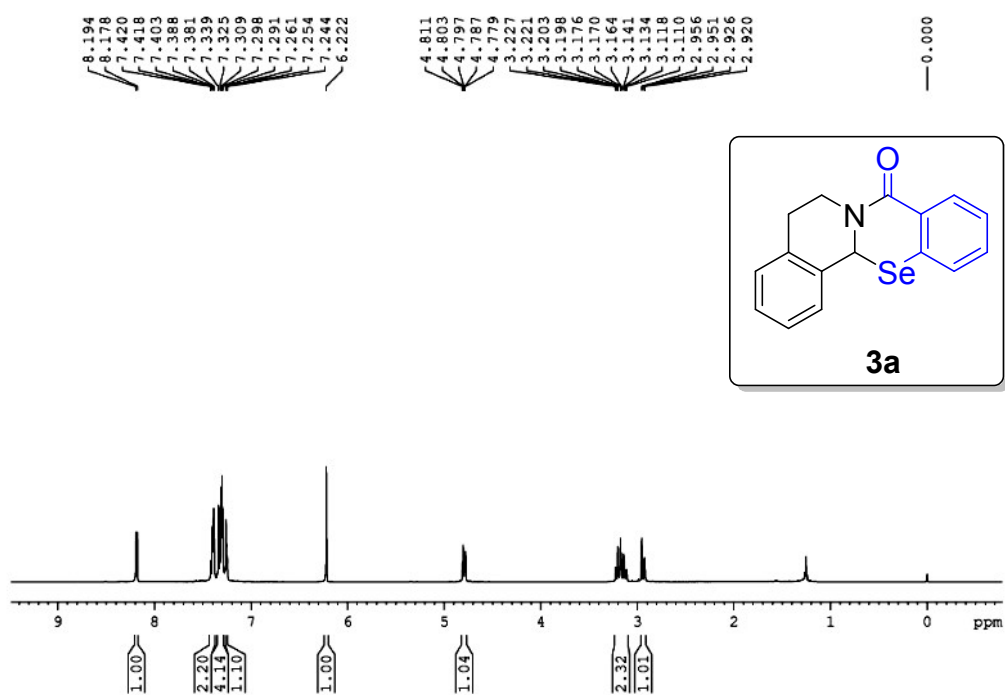


Figure 1. ¹H NMR **3a**

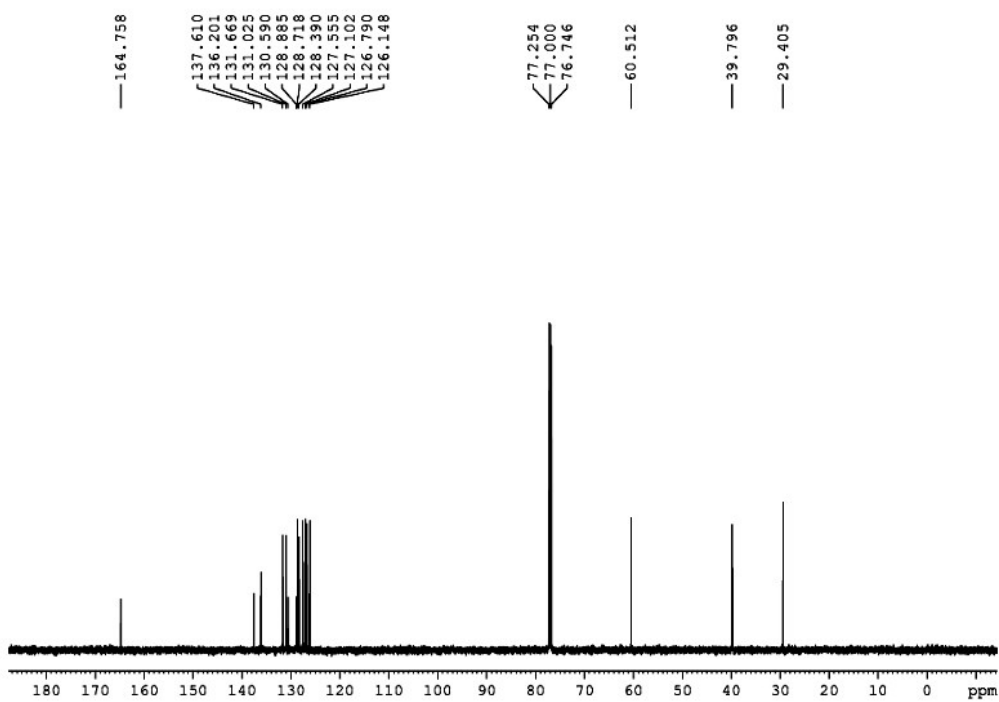


Figure 2. ¹³C NMR **3a**

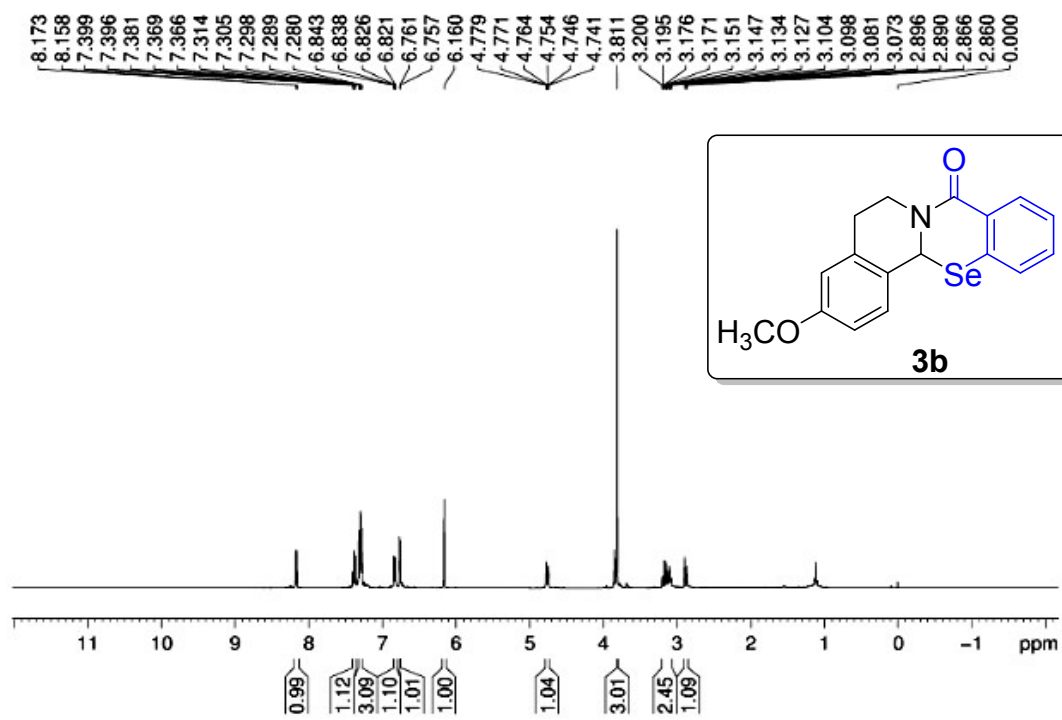


Figure 3. ¹H NMR **3b**

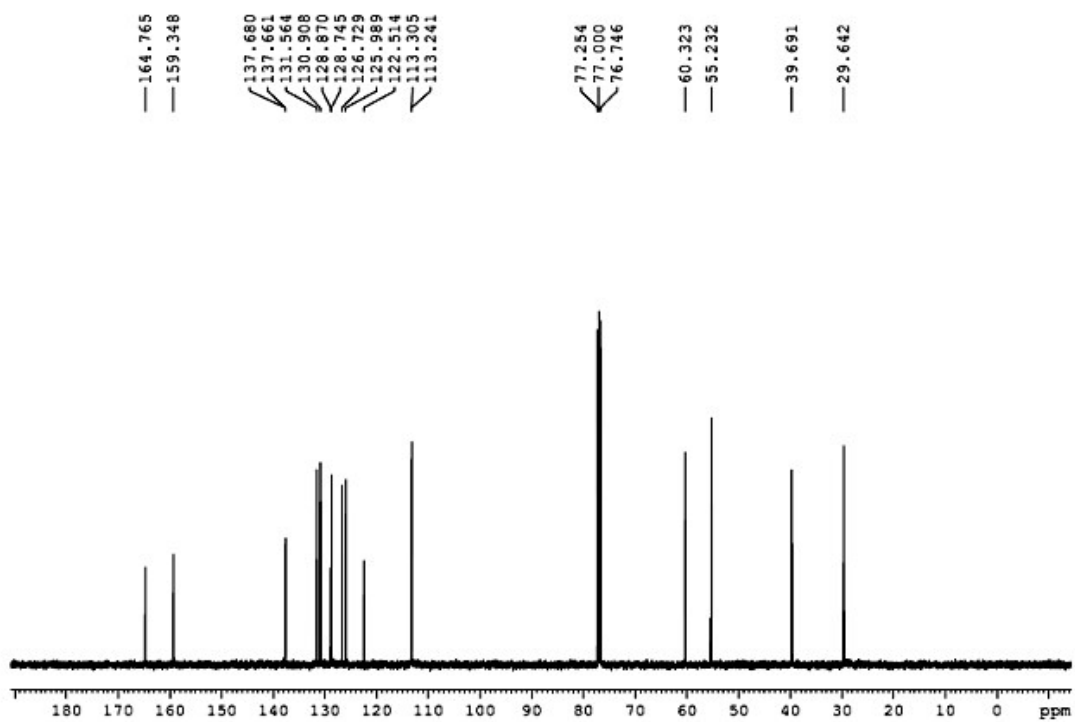


Figure 4. ¹³C NMR **3b**

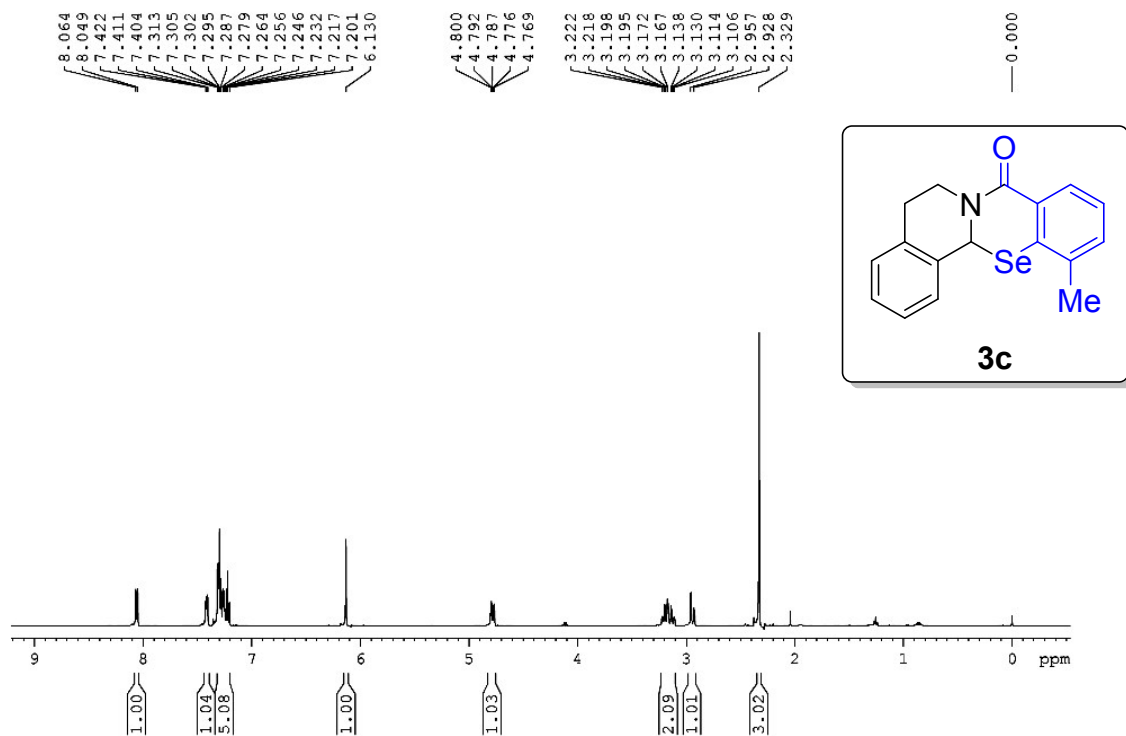


Figure 5. ¹H NMR **3c**

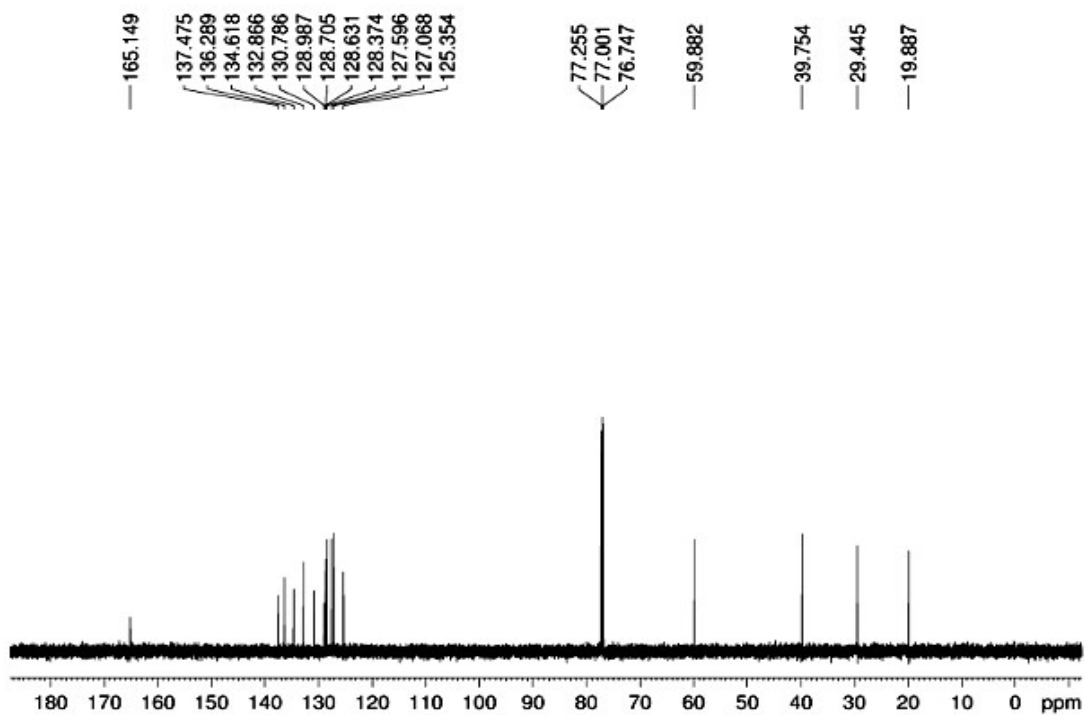


Figure 6. ¹³C NMR **3c**

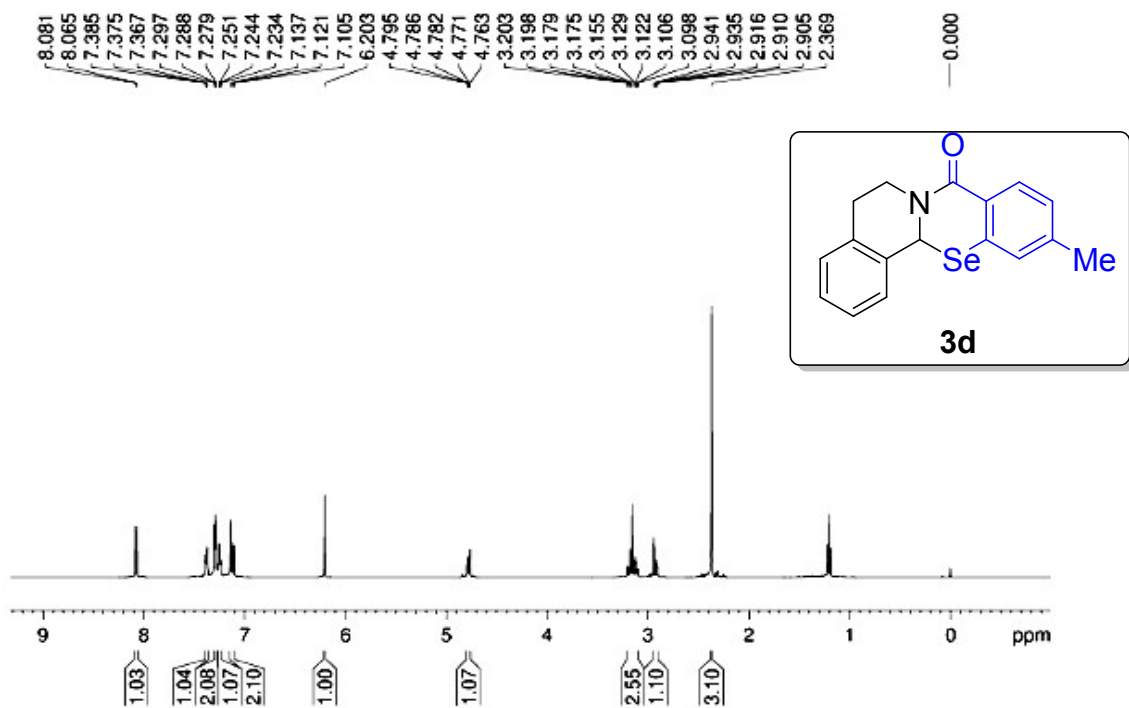


Figure 7. ¹H NMR **3d**

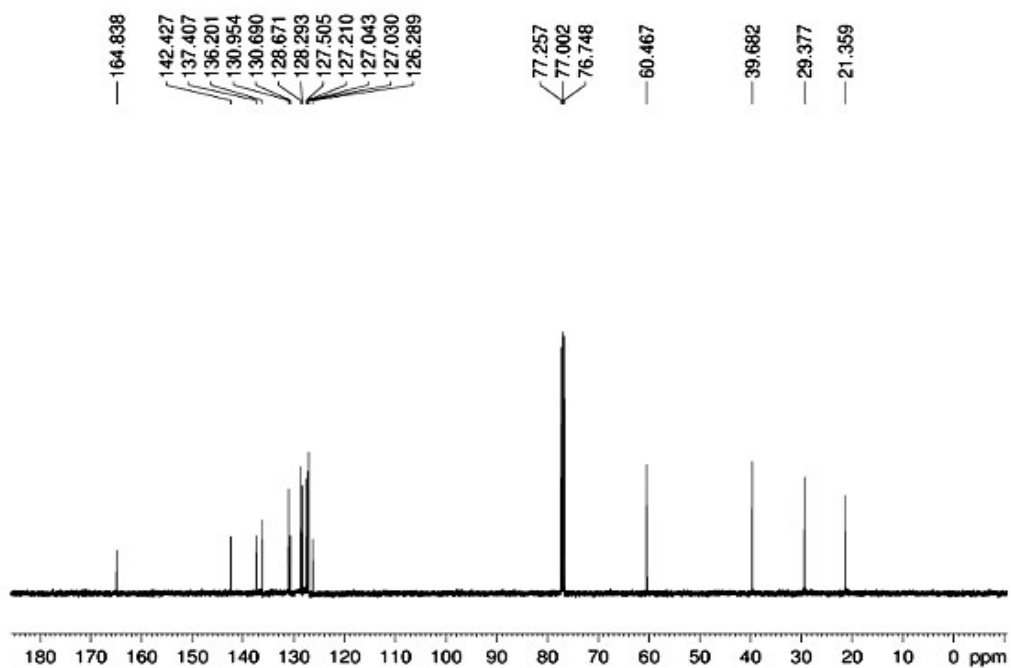


Figure 8. ¹³C NMR **3d**

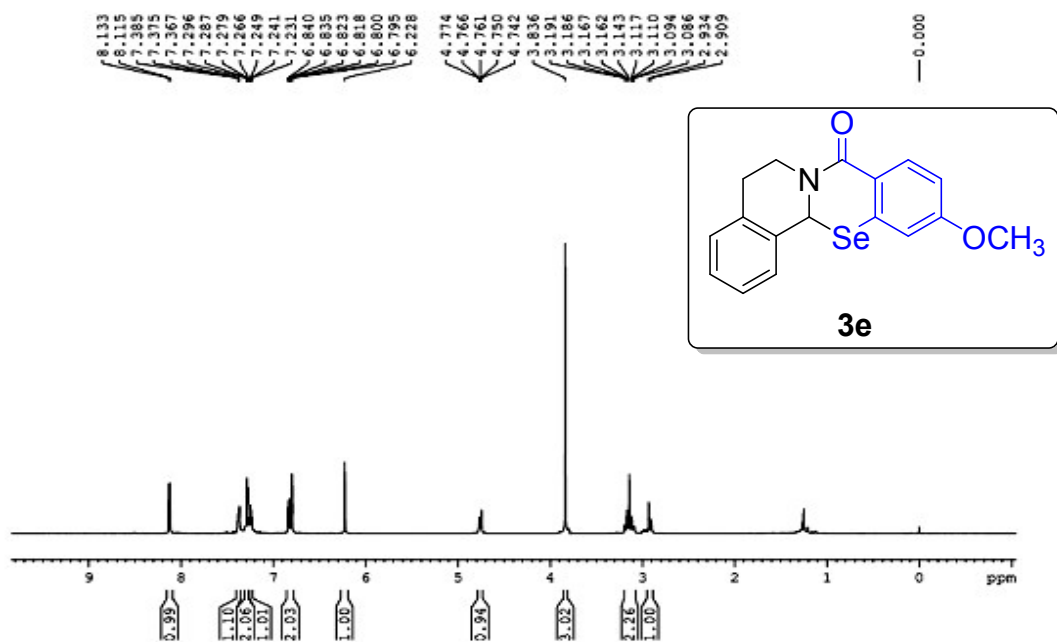


Figure 9. ¹H NMR **3e**

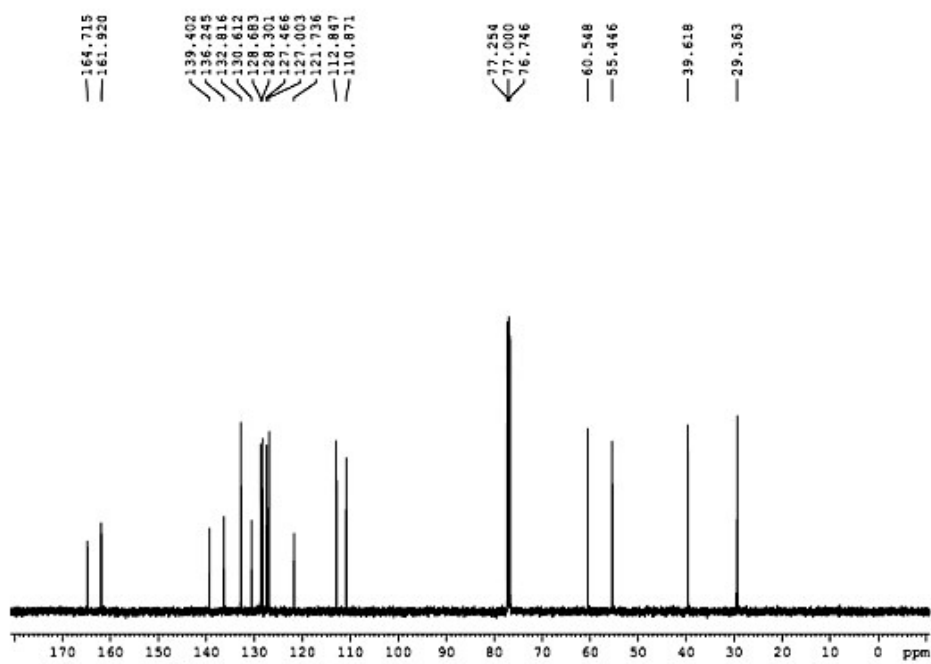


Figure 10. ¹³C NMR **3e**



Figure 11. ¹H NMR **3f**

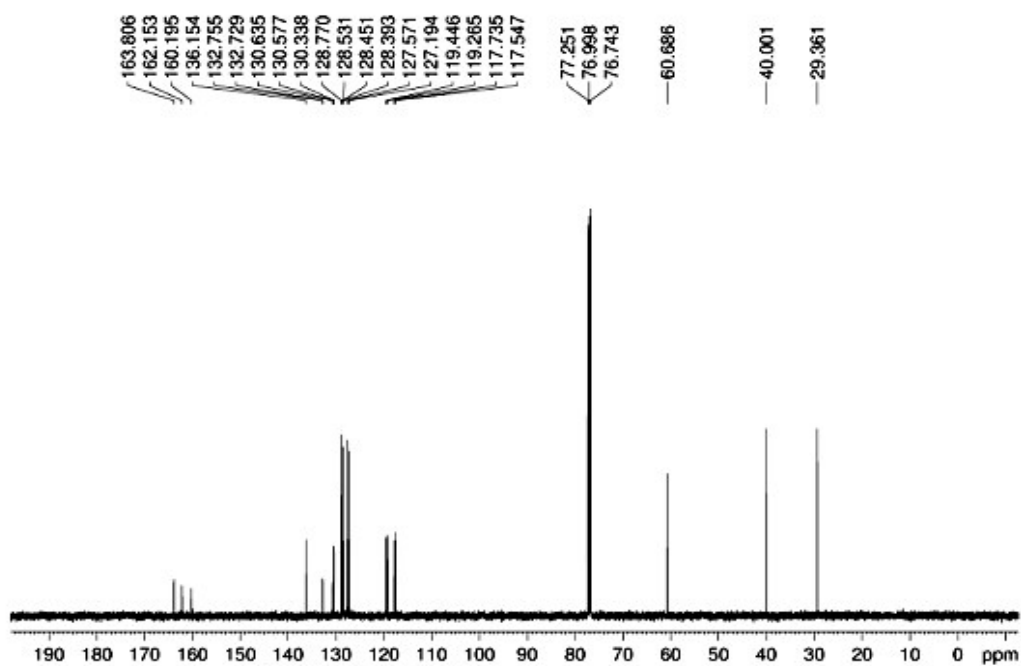


Figure 12. ¹³C NMR **3f**

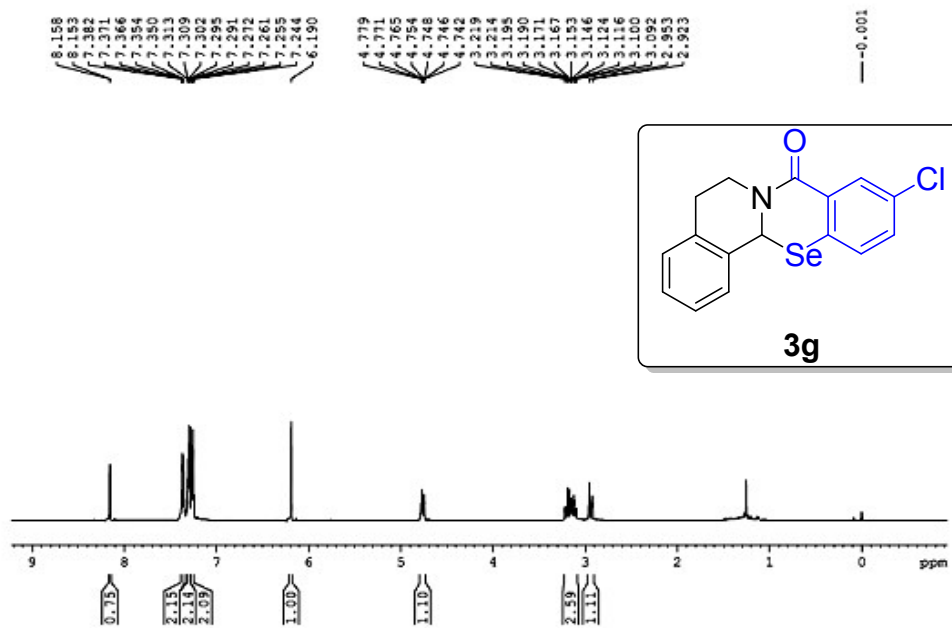


Figure 13. ^1H NMR **3g**

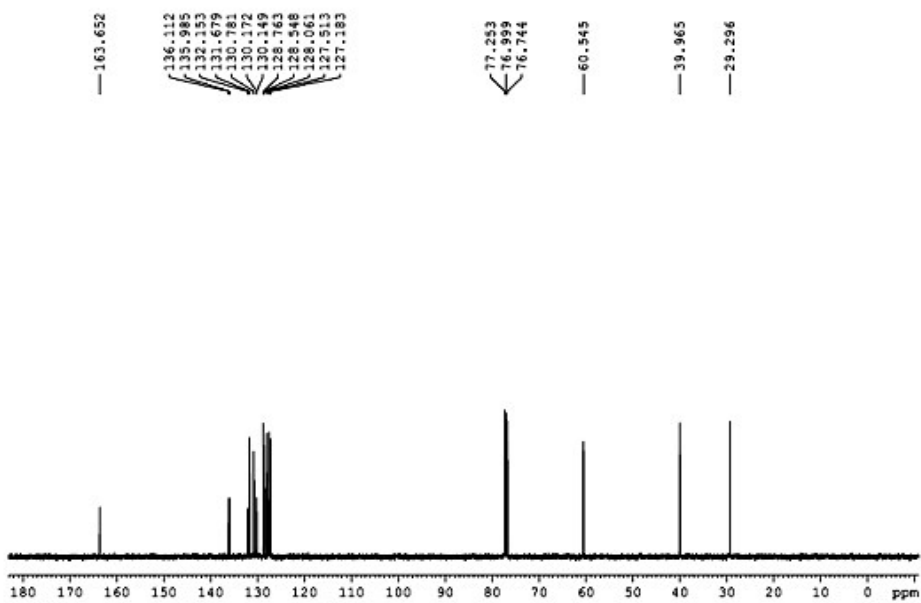


Figure 14. ^{13}C NMR **3g**

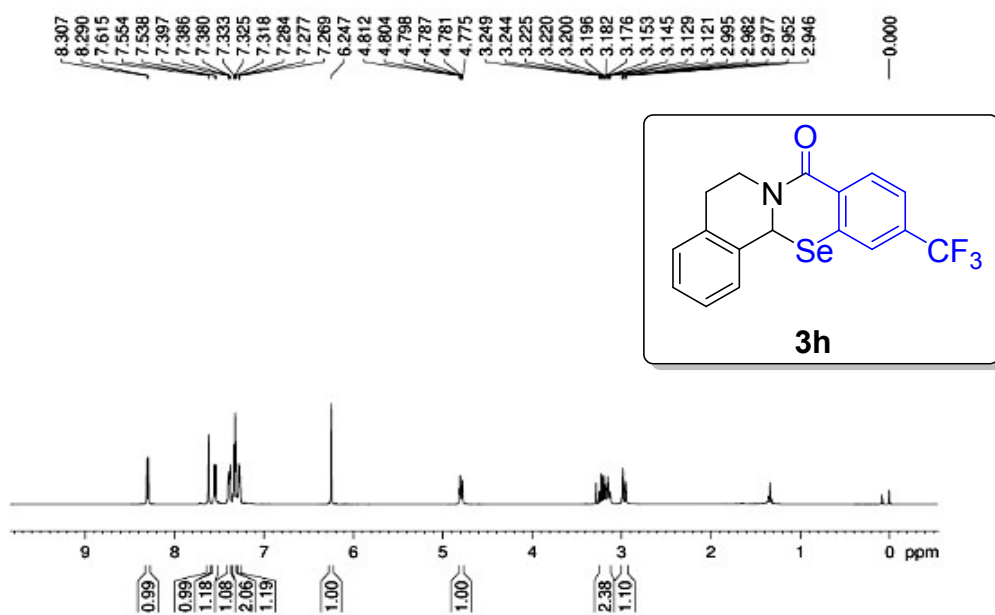


Figure 15. ^1H NMR **3h**

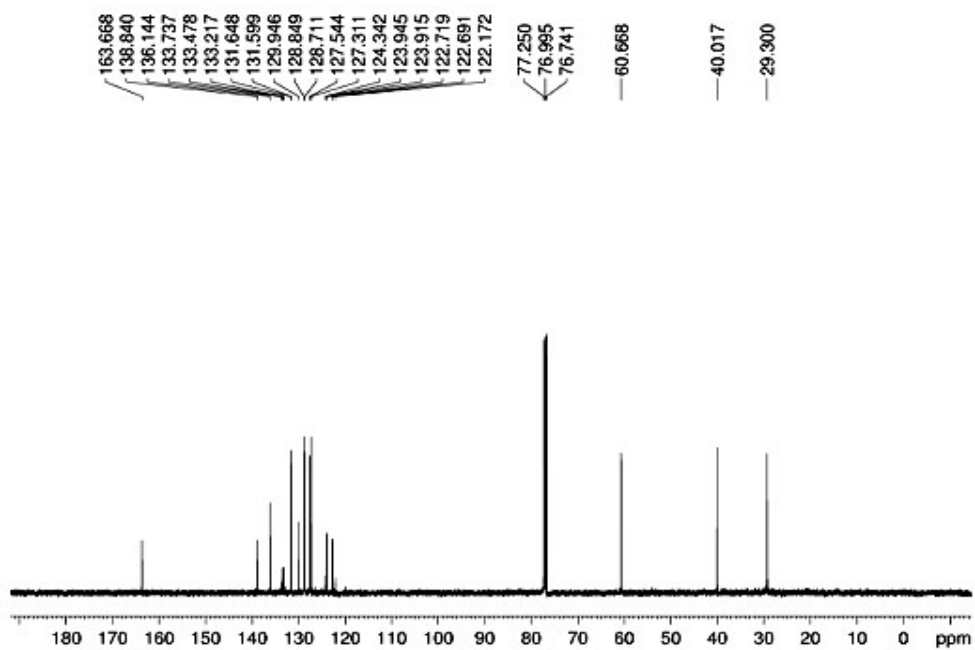


Figure 16. ^{13}C NMR **3h**

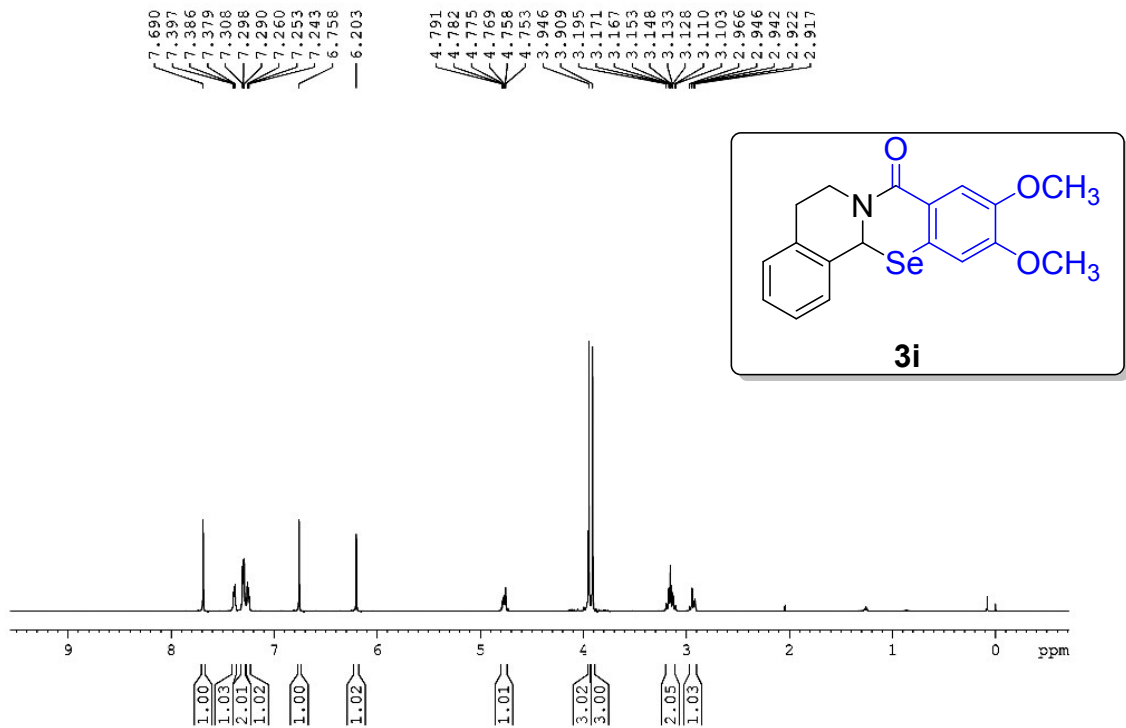


Figure 17. ¹H NMR **3i**

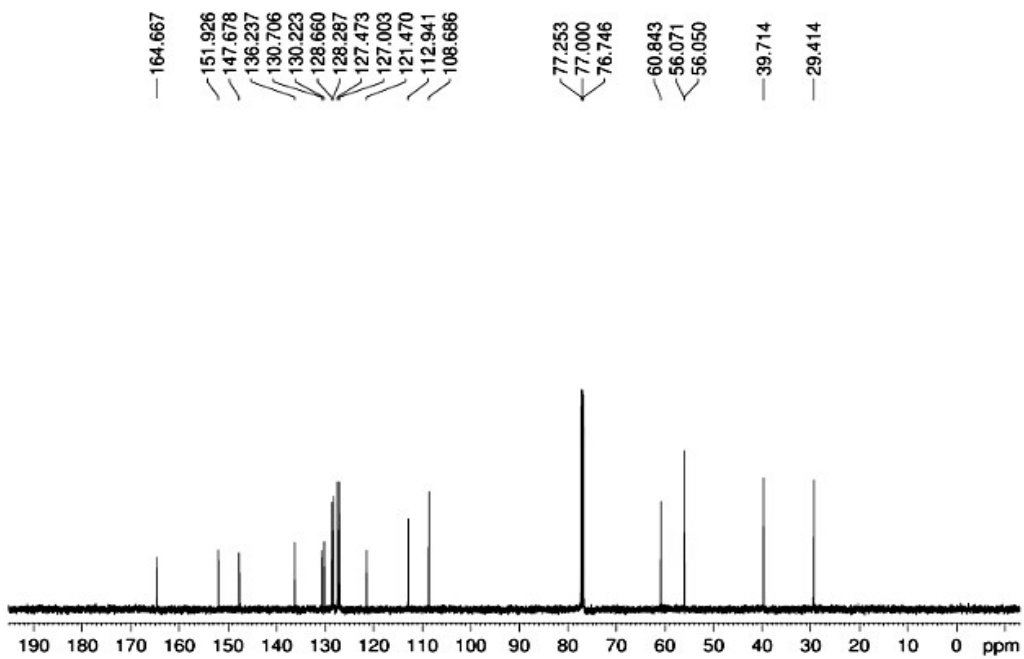


Figure 18. ¹³C NMR **3i**

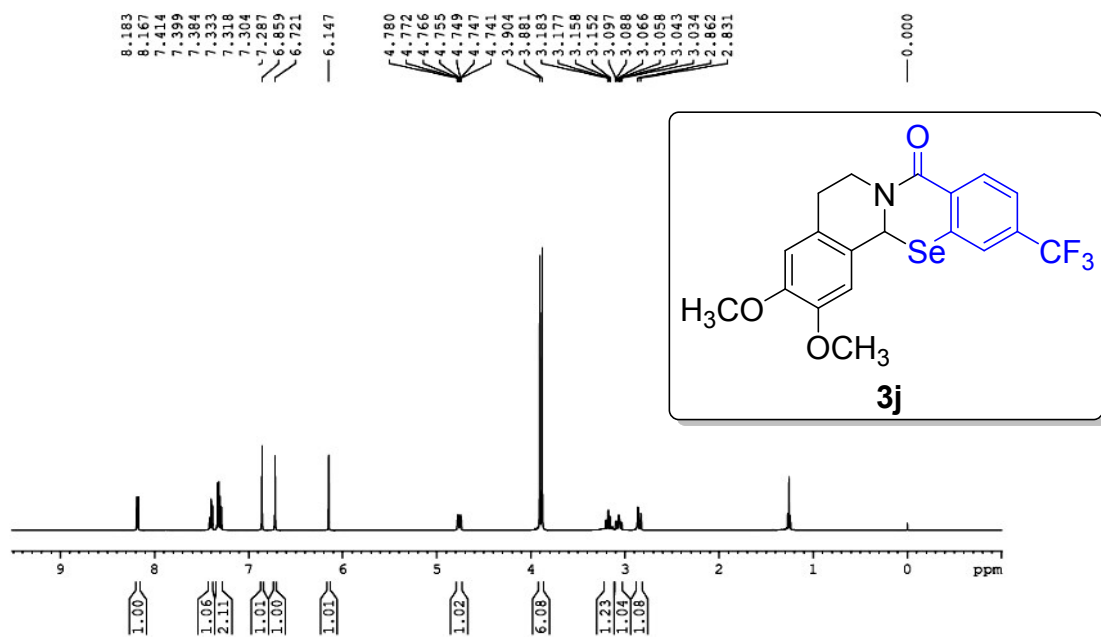


Figure 19. ^1H NMR **3j**

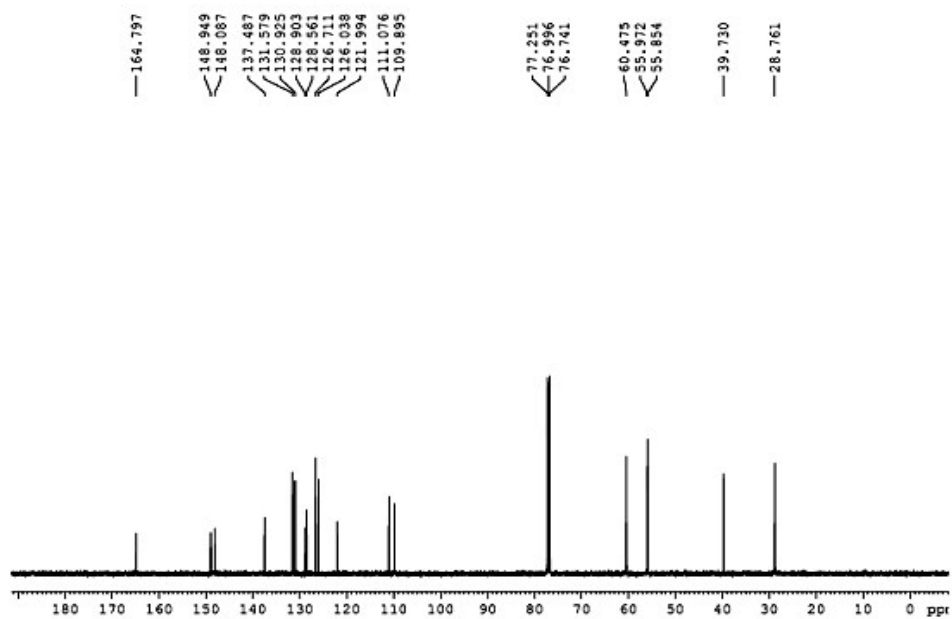


Figure 20. ^{13}C NMR **3j**

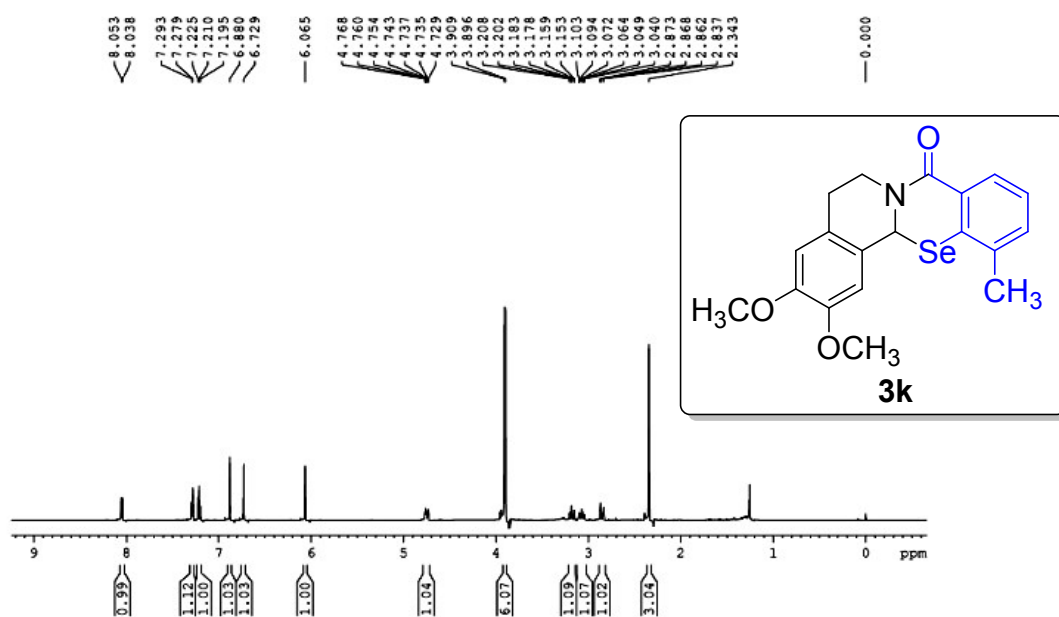


Figure 21. ¹H NMR **3k**

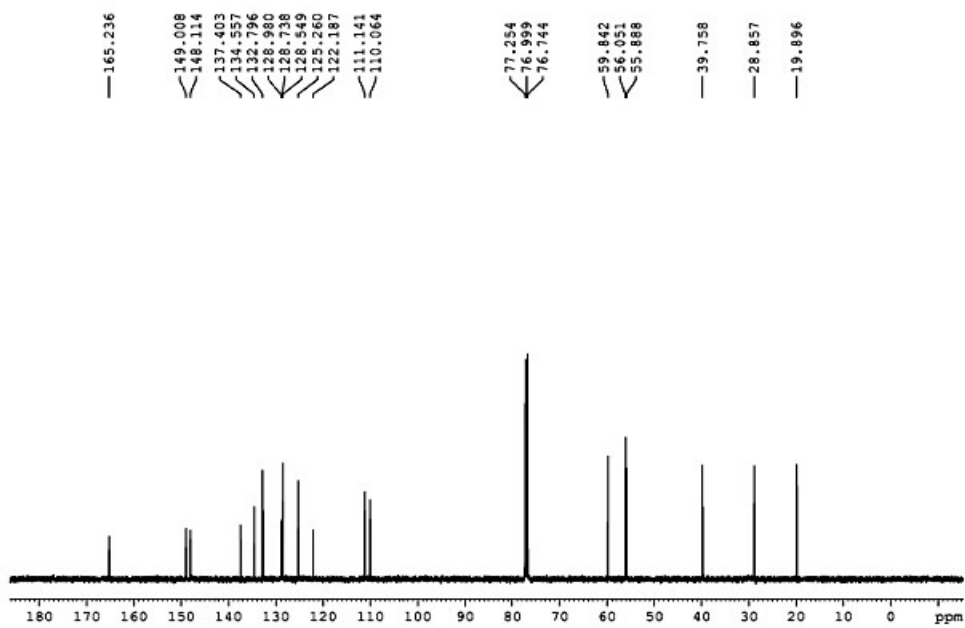


Figure 22. ¹³C NMR **3k**

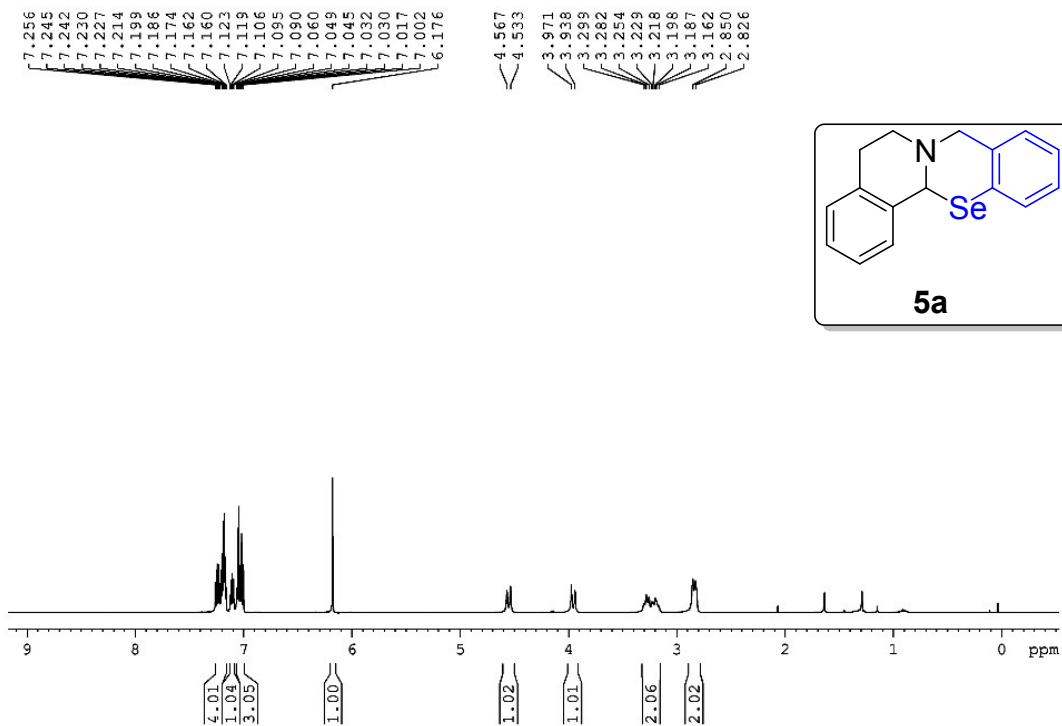


Figure 23. ¹H NMR **5a**

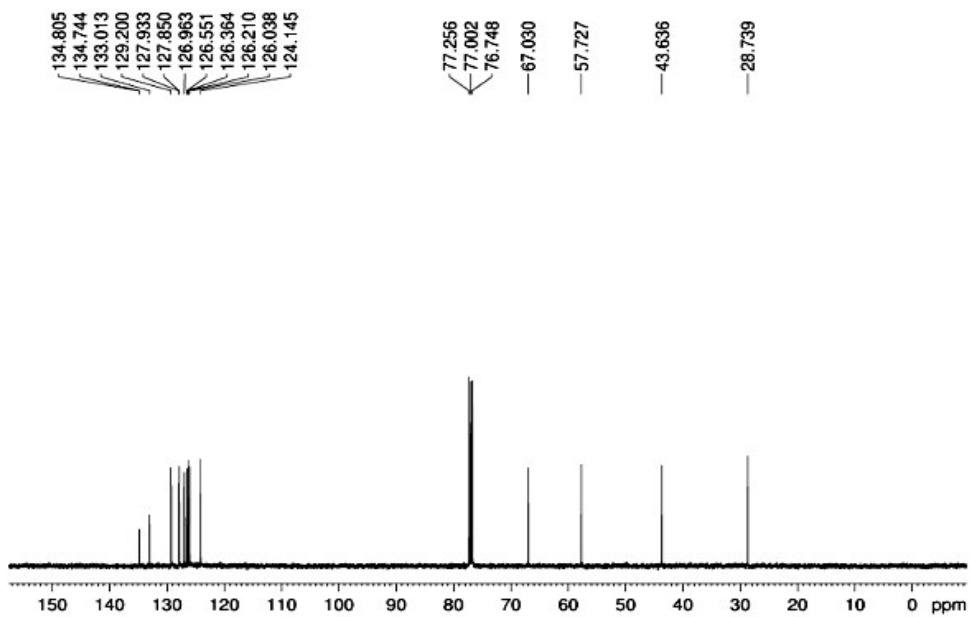


Figure 24. ¹³C NMR **5a**

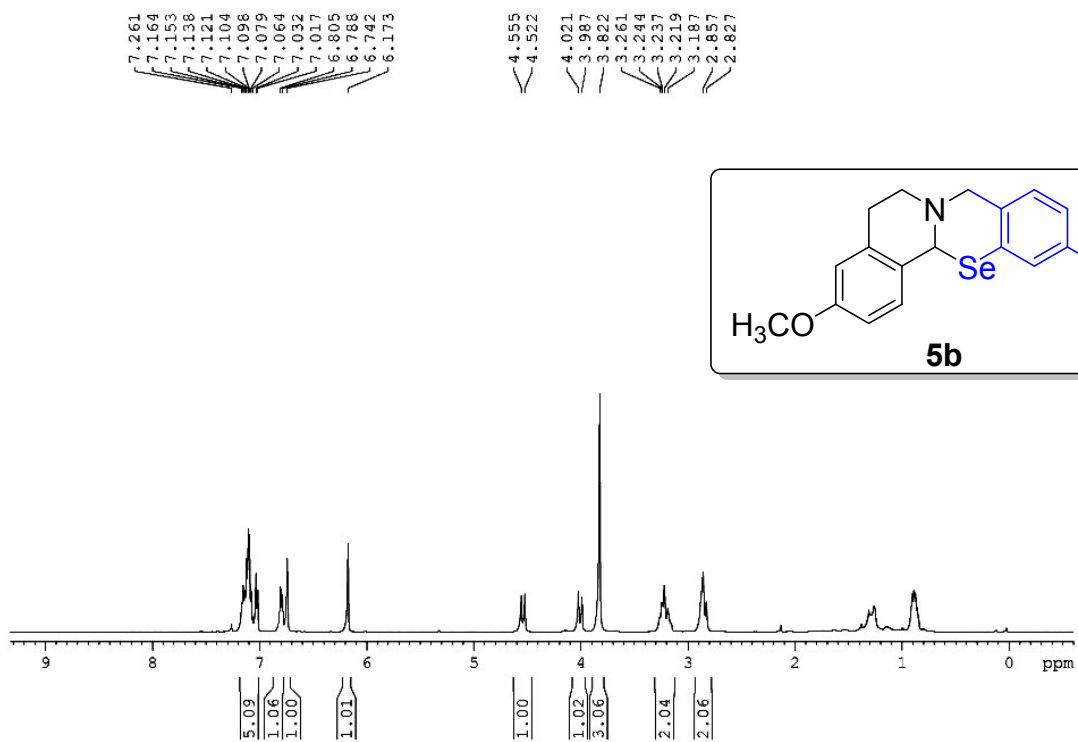


Figure 25. ¹H NMR **5b**

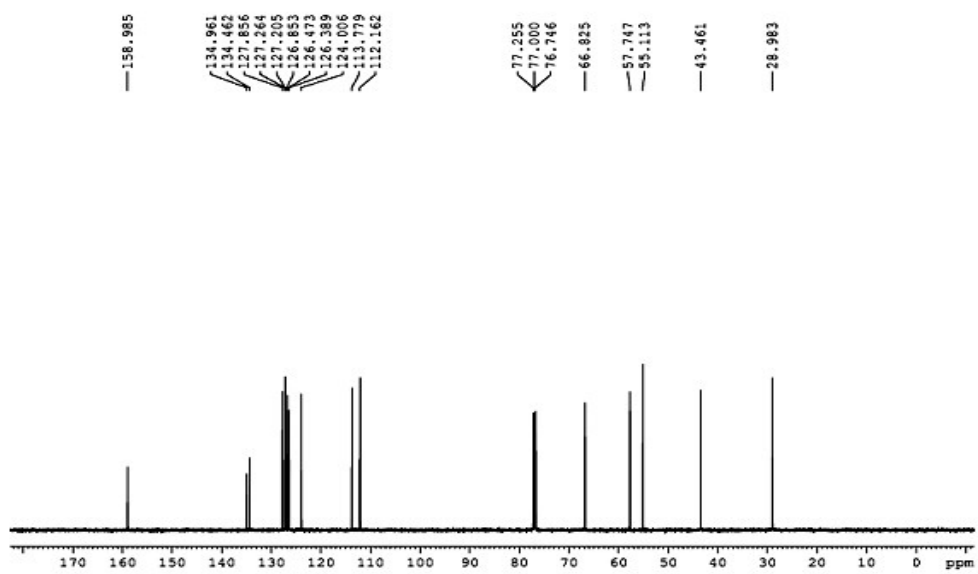


Figure 26. ¹³C NMR **5b**

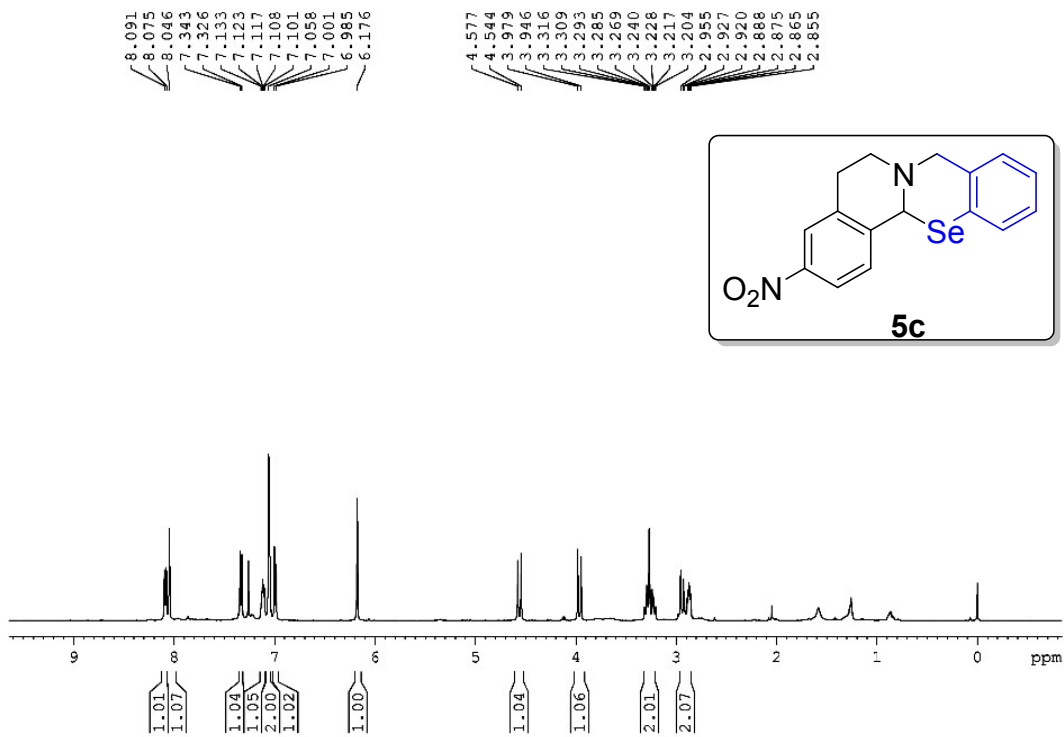


Figure 27. ^1H NMR **5c**

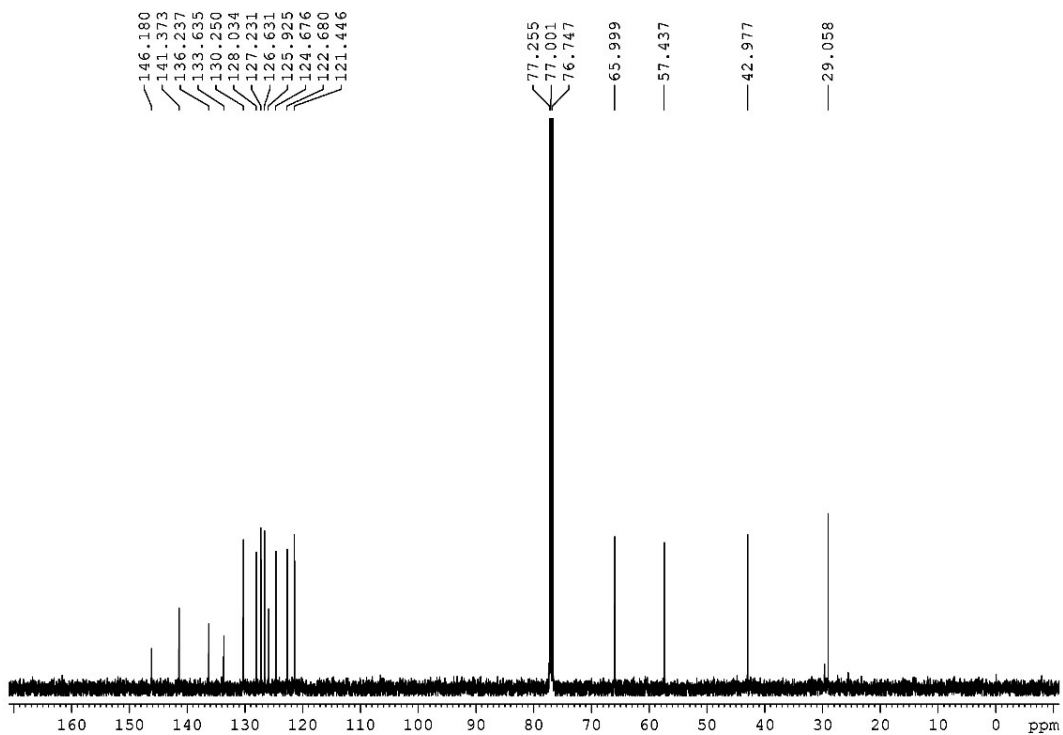


Figure 28. ^{13}C NMR **5c**

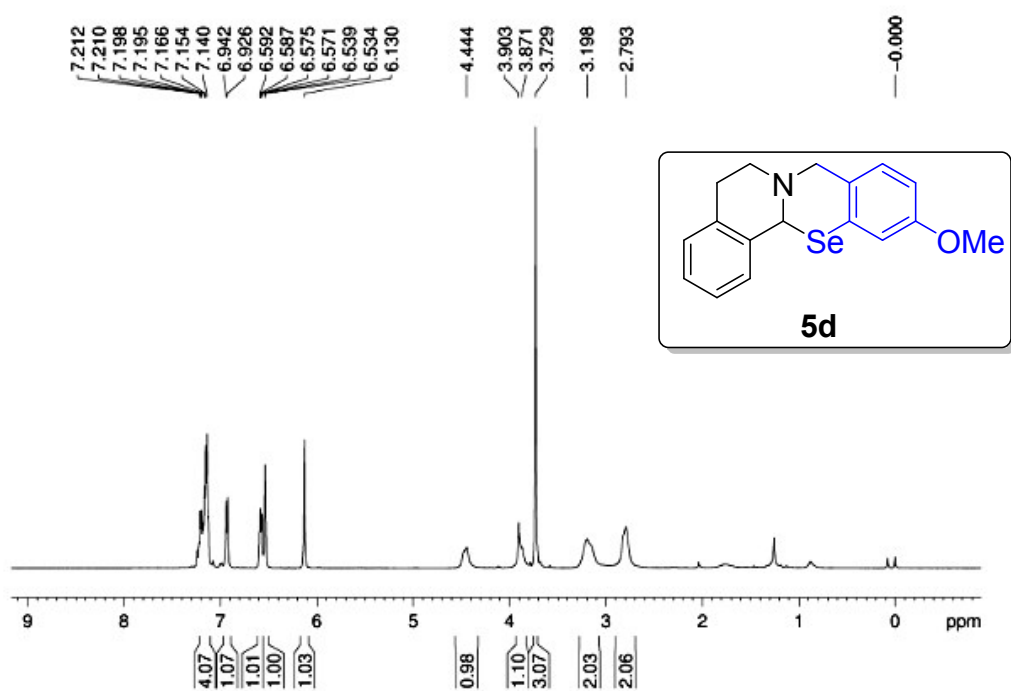


Figure 29. $^1\text{H NMR}$ **5d**

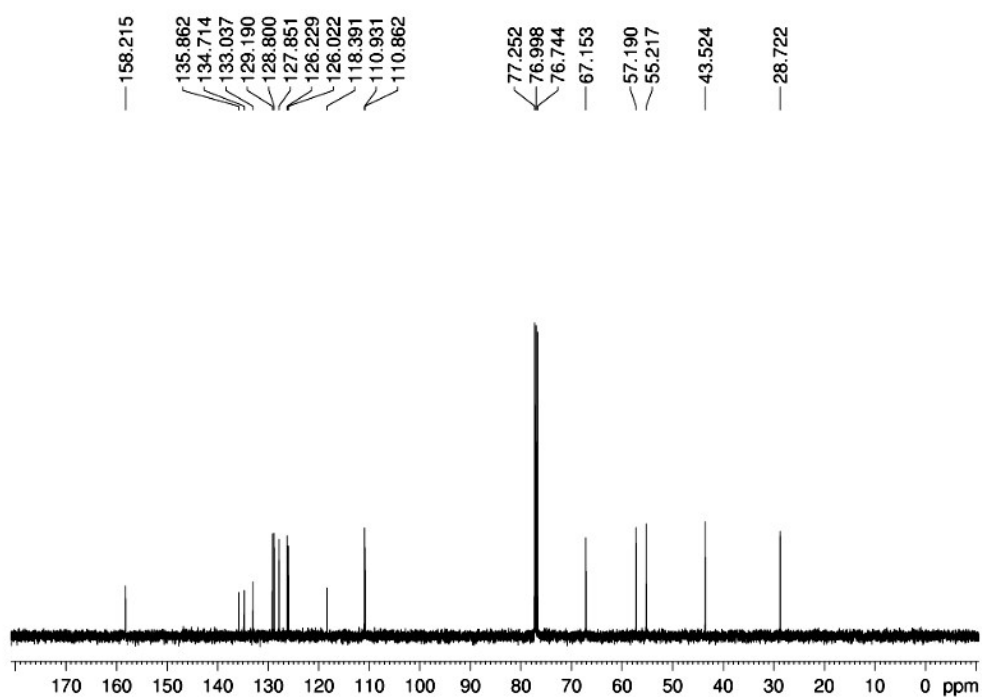


Figure 30. $^{13}\text{C NMR}$ **5d**

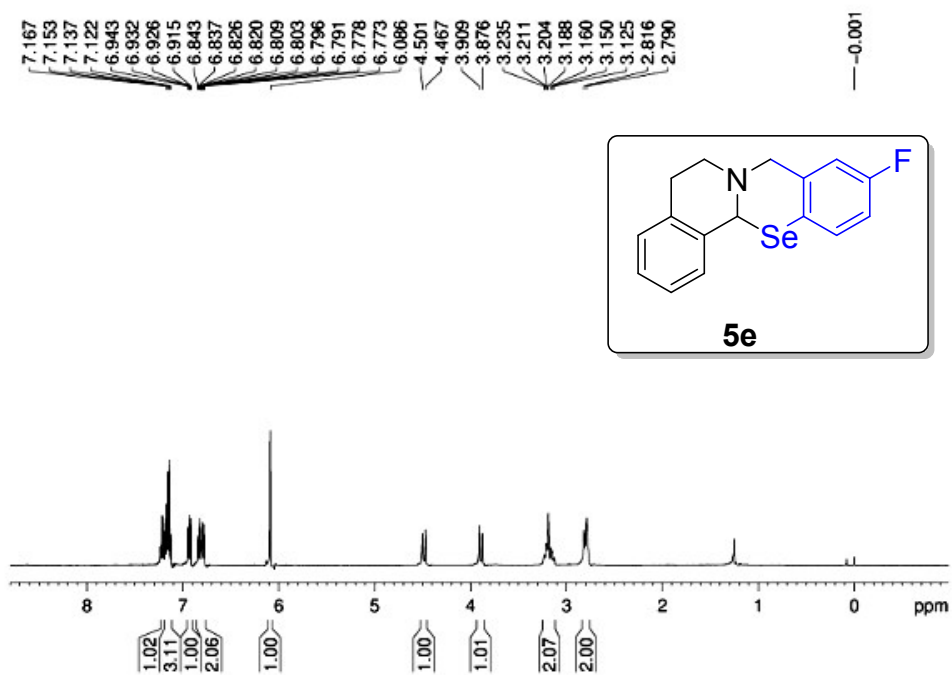


Figure 31. ¹H NMR **5e**

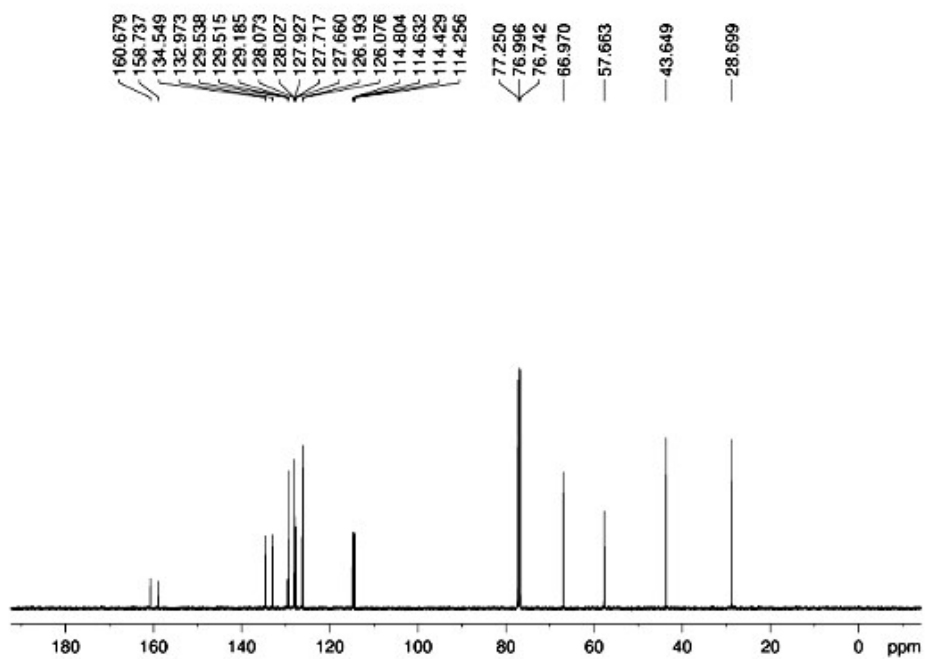


Figure 32. ¹³C NMR **5e**

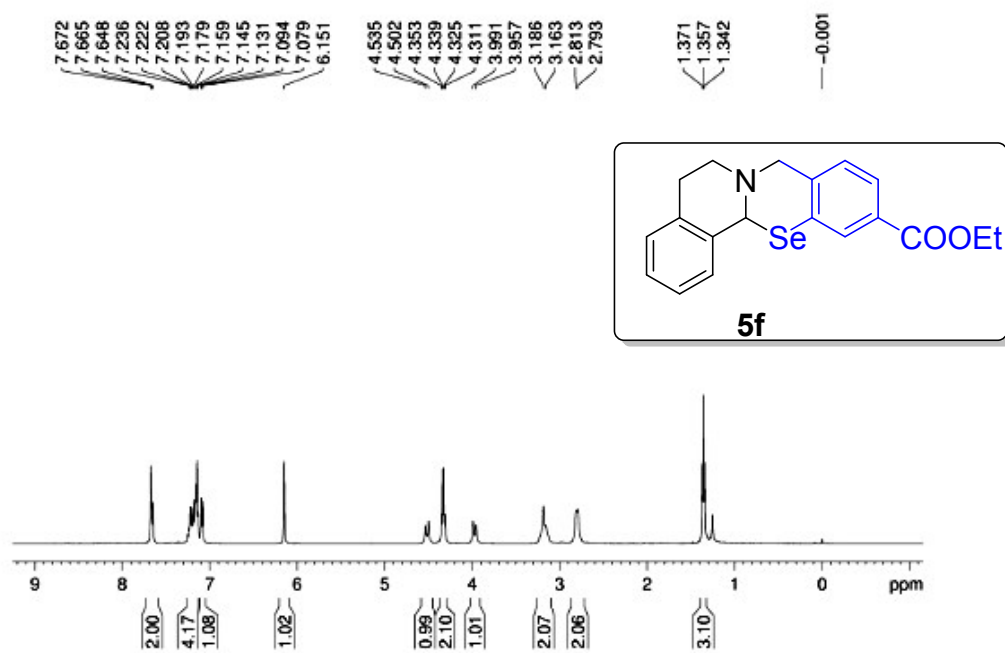


Figure 33. ^1H NMR **5f**

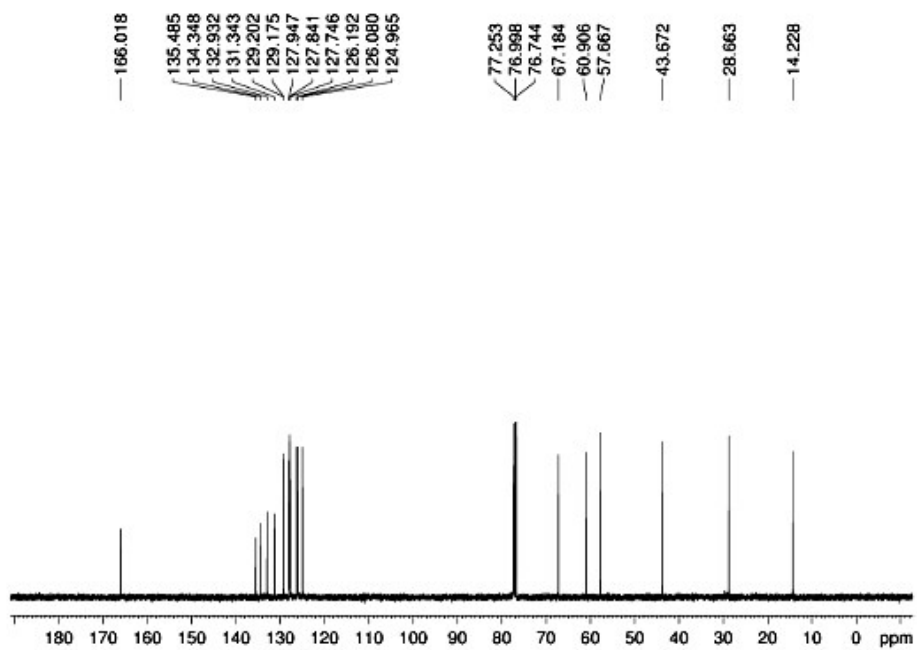


Figure 34. ^{13}C NMR **5f**

