Electronic Supplementary Material (ESI) for Organic Chemistry Frontiers.

Supporting Information for

Efficient Preparation of Unsymmetrical Alkyl-Aryl Tellurides by Nickel-catalyzed Reductive Coupling Strategy

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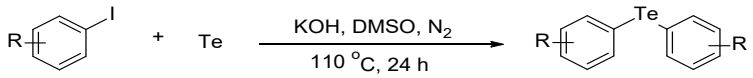
Contents

Ⅰ. General Information

Unless otherwise noted, all commercially available compounds were used as provided without further purification. Solvents for chromatography were analytical grade and used without further purification. Anhydrous DMF, was purchased from Beijing InnoChem Science & Technology Co., Ltd. Analytical thin-layer chromatography (TLC) was performed on silica gel, visualized by irradiation with UV light. For column chromatography, 300-400 mesh silica gel was used. ^{1}H-NMR and ^{13}C-NMR were recorded on a BRUKER 400 MHz spectrometer in $CDCl_3$. Chemical shifts (δ) were reported referenced to an internal tetramethylsilane standard or the $CDCl_3$ residual peak (δ 7.26) for ^{1}H NMR. Chemical shifts of ^{13}C NMR are reported relative to $CDCl_3$ (δ 77.16). Data are reported in the following order: chemical shift (δ) in ppm; multiplicities are indicated s (singlet), bs (broad singlet), d (doublet), t (triplet), m (multiplet); coupling constants (J) are in Hertz (Hz). For the NMR data of the products, these peaks multplets: 2.91 – 2.75 (m, 2H), 2.21 – 2.10 (m, 2H), it is because of Te-Hcoupling. IR spectra were recorded on a BRUKER VERTEX 70 spectrophotometer and are reported in terms of frequency of absorption (cm^{-1}). HRMS spectra were obtained by using BRUKER micrOTOF-Q III instrument with ESI source. The starting materials were isolated by SepaBean machine Flash Chromatography, which purchased from Santai Technologies Inc.

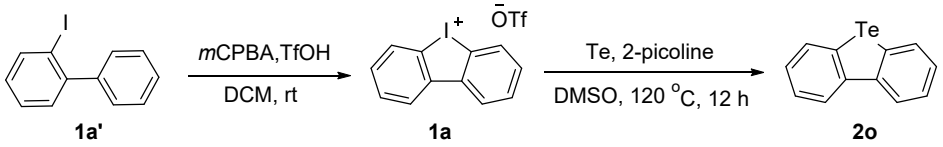
II. Synthesis of Substrates

General procedure for the synthesis of symmetrical aryl-aryl tellurides (2a-2k, 2m, 2n).[1]



A sealed tube containing a magnetic stirring bar was charged with aryl iodide (10.0 mmol), Te^0 (10.0 mmol), KOH (20.0 mmol) and DMSO (15 mL) under nitrogen. The reaction mixture was heated in an oil bath at 110 ºC and stirred at this temperature for 24 h. The progress of the reaction was monitored by TLC via syringe. After the reaction was complete, the reaction mixture was allowed to cool, and treated with CH_2Cl_2 and H_2O. The organic layer was washed with sat. NH_4Cl and brine solution, dried with Na_2SO_4 and concentrated under vacuum. The residue was purified by column chromatography on silica gel with an eluent consisting of hexanes and ethyl acetate to affording the corresponding diaryl tellurides in good yields.

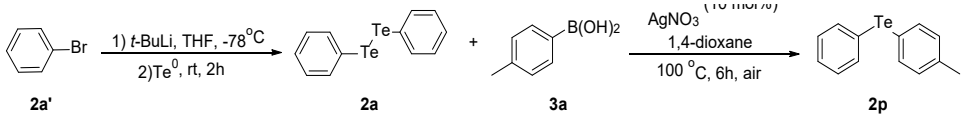
General Procedure for the synthesis of aryl telluride (2o) [2].



A solution of **1a' (**2.4 g, 8.5 mmol) was dissolved in CH_2Cl_2 (35 mL). To the solution was added *m*-CPBA (75%, 2.6 g, 12.75 mmol) in 30 mL CH_2Cl_2, followed by triflic acid (2.3 ml, 25.5 mmol) with stirring, during which a sticky black gum formed on the flask-wall. After stirred for 1 h, the solvent was decanted. Ether (20 mL) was added to the residue and a well-dispersed white solid precipitated, and stirred for 10 min. The solid was filtered and washed with ether (3×15 mL), affording **1a** as a white solid

A 25 mL Schlenk tube was charged with cyclc dirayliodonium salts **1a** (1.5 mmol), tellurium (287 mg, 2.25 mmol), 2-picoline (5 mL) and DMSO (5 mL) under a nitrogen atmosphere. The reaction mixture was stirred at 120 °C for 12 h. After cooled to room temperature, the reaction mixture was diluted with H_2O (15 mL). The mixture extracted with dichloromethane (3×15 mL). The combined organic phase was washed with water and brine (20 mL), dried over anhydrous Na_2SO_4, filtered, and then evaporated under reduced pressure. The residue was purified by column chromatography on silica gel to give the desired product **2o**.

General Procedure for the synthesis of phenyl(*p*-tolyl)tellane (2p) .

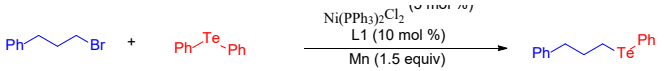


General Procedure for the synthesis of 1,2-diphenylditellane (2a)[3]. To a stirred solution of bromobenzene 2a' (8.5 mmol) in dry tetrahydrofuran (THF) (40 mL) under N_2 at −78°C was added *tert*-butyllithium (7.5 mL, 1.7 M; 12.75 mmol). After 1h, the cooling bath was removed, and freshly crushed finely ground elemental tellurium (8.5 mmol) was added while a brisk stream of nitrogen was passed through the open system. After 1 h, when only trace amounts of tellurium remained, the dark solution was quenched with a saturated solution of NH_4Cl. After extraction with diethyl ether, separation, drying of the organic phase with Na_2SO_4, and evaporation, the pure product was obtained by flash chromatography with an appropriate mixture of hexane/ethyl acetate.

General Procedure for the synthesis of phenyl(*p*-tolyl)tellane (2p)[4]. To a 5 mL Schlenk tube equipped with a small magnetic stirring bar were added the 1,2-diphenylditellane **2a** (1 mmol), the appropriate *p*-tolylboronic acid **3a** (2 mmol), $AgNO_3$ (10 mol %) and 1,4-dioxane (5 mL). The resulting mixture was stirred at 100 °C for 6 h. After that, the reaction mixture was cooled to room temperature, and was quenched using water (5 mL). The mixture was then extracted using ethyl acetate (10 mL) and washed with water (3 x 10 mL). The combined organic layers were dried over anhydrous $MgSO_4$ and concentrated under vacuum to yield the crude product, which

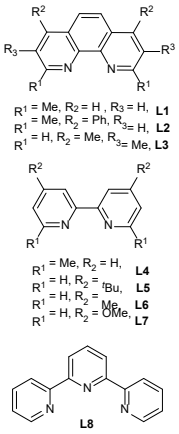
was purified by flash chromatography on silica gel using hexane or a mixture of hexane/ethyl acetate as eluent.

III. Optimization of the reaction conditions[a,b]



1b **2a** **3b**

entry	Devation from standard conditions	3b(%)
1	none	70
2	$NiCl_2$ instead of $Ni(PPh_3)_2Cl_2$	68
3	NiI_2 instead of $Ni(PPh_3)_2Cl_2$	63
4	$NiBr_2$ instead of $Ni(PPh_3)_2Cl_2$	48
5	$Ni(acac)_2$ instead of $Ni(PPh_3)_2Cl_2$	65
6	**L2** instead of **L1**	27
7	**L3** instead of **L1**	52
8	**L4** instead of **L1**	42
9	**L5** instead of **L1**	55
10	**L6** instead of **L1**	35
11	**L7** instead of **L1**	42
12	**L8** instead of **L1**	34
13	DMA instead of DMF	53
14	MeCN, DMSO instead of DMF	n. r
15	without Mn, Zn, $(Bpin)_2/K_3PO_4$ instead of	trace
16	**Mn** (1.0 equiv) instead of Mn (1.5 equiv)	84
17	24h instead of 12h	98[c]
18	without Ligand	55



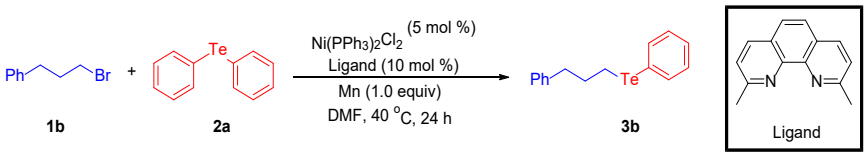
[a]Reaction conditions: **1b** (0.2 mmol, 1.0 equiv.), **2a** (0.34 mmol, 1.7 equiv.), $Ni(PPh_3)_2Cl_2$ (5.0 mol %), **L1** (10 mol %); Mn (0.3 mmol, 1.5 equiv.), DMF (1 mL); N_2 atmosphere; 40 °C; 12 h. [b]Yields were determined by GC with biphenyl as the internal standard. [c]Isolated yield.

We tested the reaction of 1-bromo-3-phenylpropane **1b** with diphenyltellane **2a**, $Ni(PPh_3)_2Cl_2$ (5 mol %), Mn (1.5 equiv), ligand (10 mol %) in DMF at 40 °C for 12 hours. Gratifyingly, the reaction proceeded selectively to give the target product phenyl(3-phenylpropyl)tellane (**3b**). With this promising result in hand, we tried to further optimize the reaction conditions. As briefly illustrated in Table 1, after systematic testing with **L1** as the ligand, $Ni(PPh_3)_2Cl_2$ was chosen as catalyst because of highest yield (Table 1, entries 1-5). Next, we conducted the ligand optimization with a series of bipyridine and phenanthroline ligands. Thus, **L1** provided best result (Table 1, entries 6-12). Then, we probed the reactions in several different solvents, such as DMF, DMA, DMSO, and MeCN. It was found that DMF was crucial for the successful transformation of substrate **1b** (Table 1, entries 13 and 14). When Zn, $(Bpin)_2/K_3PO_4$ was used instead of Mn, the target product **3b** could not be obtained (Table 1, entry 15). Satisfactorily, when 1.0 equiv of Mn was applied to the reaction, the target product **3b** could be obtained in 84% GC-yield (Table 1, entry 16).The reaction time was extended to 24 hours, and the target product could be obtained in excellent yield (Table 1, entry 17). Finally, the target product could be obtained in 55% yield without adding ligand (Table 1, entry 18).

IV. General Procedure and Product Characterization

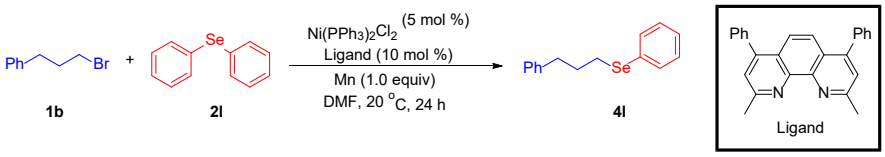
1. General Procedure A

A representative procedure synthesis of phenyl(3-phenylpropyl)tellane (3b) is shown below.



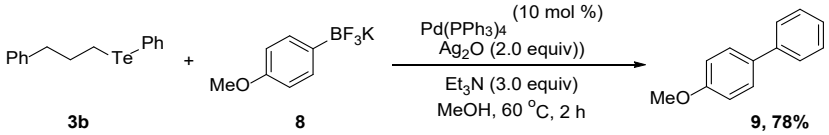
In glovebox, an oven-dried screw-capped 8 mL vial equipped with a magnetic stir bar was charged with (3-bromopropyl)benzene **1b** (99.0 mg, 0.5 mmol) and diphenyltellane **2a** (241.3 mg 0.85 mmol), $Ni(PPh_3)_2Cl_2$ (17.5 mg, 5.0 mol %), Ligand (10 mol %), Mn (1.0 equiv), DMF (1.0 mL) was added via syringe. The reaction mixture was stirred for 24 h at 40 °C. After 24h, the crude reaction mixture was diluted with ethyl acetate (20 mL) and washed with water (20 mL × 3). The organic layer was dried over Na_2SO_4, filtered, and concentrated. The residue was purified by flash chromatography to afford pure product **3b** (98% yield).

General procedure synthesis of phenyl(3-phenylpropyl)selane (4l) is shown below.



In glovebox, an oven-dried screw-capped 8 mL vial equipped with a magnetic stir bar was charged with (3-bromopropyl)benzene **1b** (0.2 mmol) and diphenylselane **2l** (0.34 mmol), $Ni(PPh_3)_2Cl_2$ (5.0 mol %), Ligand (10 mol %), Mn (1.0 equiv), DMF (1.0 mL) was added via syringe. The reaction mixture was stirred for 24 h at 20 °C. After 24h, the crude reaction mixture was diluted with ethyl acetate (20 mL) and washed with water (20 mL × 3). The organic layer was dried over Na_2SO_4, filtered, and concentrated. The residue was purified by flash chromatography to afford pure product **4l** (68% yield).

General procedure synthesis of phenyl(3-phenylpropyl)selane (9) is shown below.[5]



An oven-dried screw-capped 8 mL vial equipped with a magnetic stir bar was charged with phenyl(3-phenylpropyl)tellane **3b** (0.2 mmol) and potassium salt **8** (0.6 mmol), $Pd(PPh_3)_4$ (10 mol %), Ag_2O (2.0 equiv), Et_3N (3.0 equiv) and MeOH was added. The reaction mixture was stirred for 2 h at 60 °C. After 2h, the crude reaction mixture was diluted with ethyl acetate (20 mL) and washed with water (20 mL × 3). The organic layer was dried over Na_2SO_4, filtered, and concentrated. The residue was purified by flash chromatography to afford pure product **9** (78% yield).

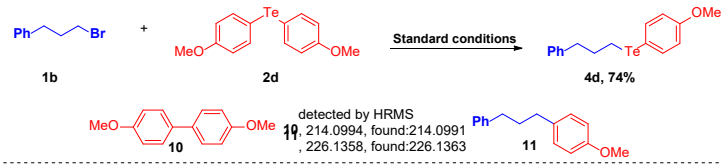
2. General Procedure B

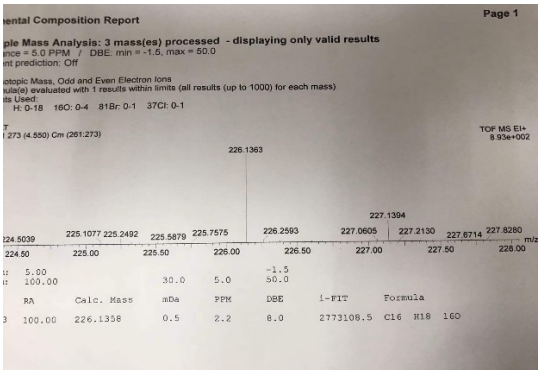
The procedure scale-up synthesis of 3b is shown below.

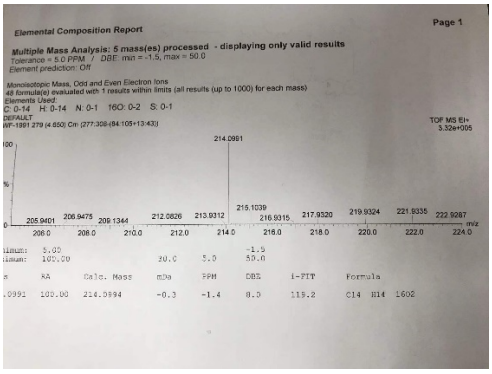
In glovebox, An oven-dried screw-capped 50-mL vial equipped with a magnetic stir bar was charged with (3-bromopropyl)benzene **1b** (5 mmol) and diphenyltellane **2a**

(8.5 mmol), $Ni(PPh_3)_2Cl_2$ (5.0 mol %), Ligand (10 mol %), Mn (1.0 equiv), DMF was added via syringe. The reaction mixture was stirred for 36 h at 40 °C. After 36h, the crude reaction mixture was diluted with ethyl acetate (20 mL) and washed with water (20 mL × 3). The organic layer was dried over Na_2SO_4, filtered, and concentrated. The residue was purified by flash chromatography to afford pure product (60% yield).

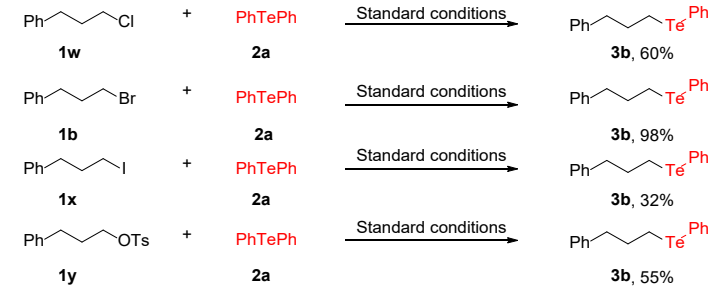
V. Mechanism experiment

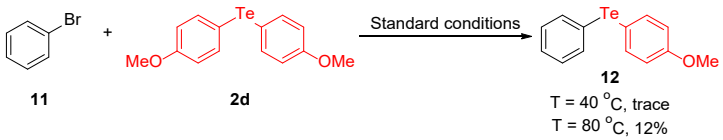






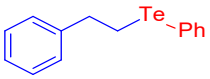
VI. The investigation of other free radical precursors





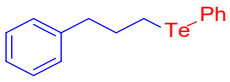
We investigated the activity of other alkyl radical precursors. It was found that under standard conditions, when alkyl chloride and alkyl OTs were applied to the reaction, the target product 3b could be obtained in moderate yield. When alkyl iodide was applied to the reaction, the target product could only be obtained in 32% yield. At the same time, to our delight, the reaction of bromobenzene **11** with **2d** could give the target product **12** in 12% yield at 80 °C, which proves that our strategy has potential application value in the construction of unsymmetrical aryl-aryl tellurides.

VII. Product Characterization



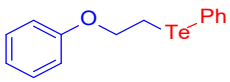
phenethyl(phenyl)tellane (3a)

Yield: 68% (105.3mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 3023, 1573, 1493, 1473, 1432, 1152, 1017, 726, 690. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.74 – 7.67 (m, 2H), 7.31 – 7.23 (m, 3H), 7.23 – 7.12 (m, 5H), 3.16 – 3.06 (m, 4H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 142.8, 138.5, 129.3, 128.6, 128.2, 127.7, 126.4, 111.8, 38.3, 9.2. **^{125}Te** (126 MHz, $CDCl_3$) δ 490.6. **HRMS** (CI) m/z (M^+) calcd for $C_{14}H_{14}Te$: 312.0158, found 312.0157.



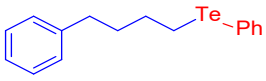
phenyl(3-phenylpropyl)tellane (3b)

Yield: 98% (160.0mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2925, 1573, 1473, 1432, 1017, 726, 690. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.72 – 7.64 (m, 2H), 7.25 (m, J = 7.2, 6.4, 1.1 Hz, 3H), 7.17 (m, J = 6.9, 1.4 Hz, 3H), 7.14 – 7.10 (m, 2H), 2.93 – 2.82 (m, 2H), 2.68 (t, J = 7.5 Hz, 2H), 2.10 (p, J = 7.5 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) ^{13}C NMR (101 MHz, $CDCl_3$) δ 141.3, 138.4, 129.3, 128.6, 128.5, 127.6, 126.0, 111.7, 38.0, 33.4, 8.0. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 470.5. **HRMS** (M^+) m/z calcd for $C_{15}H_{16}Te$: 326.0314, found 326.0306.



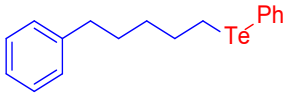
(2-phenoxyethyl)(phenyl)tellane (3c)

Yield: 49% (79.5mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 1728, 1431, 1293, 1242, 1125, 1007, 755, 730, 692. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.82 – 7.74 (m, 2H), 7.32 – 7.19 (m, 5H), 6.93 (m, J = 7.3, 1.1 Hz, 1H), 6.86 – 6.79 (m, 2H), 4.35 – 4.26 (m, 2H), 3.25 – 3.12 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 158.4, 138.8, 129.6, 129.4, 128.1, 121.1, 114.8, 111.1, 69.5, 7.0. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 443.77. **HRMS** (M^+) m/z calcd for $C_{14}H_{14}OTe$: 328.0107, found 328.0113.



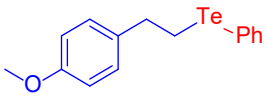
phenyl(4-phenylbutyl)tellane (3d)

Yield: 71% (120.2mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 1709, 1590, 1490, 1358, 1220, 819, 734, 690. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.71 – 7.65 (m, 2H), 7.24 (m, J = 7.7 Hz, 3H), 7.18 – 7.09 (m, 5H), 2.88 (t, J = 7.4 Hz, 2H), 2.58 (t, J = 7.6 Hz, 2H), 1.86 – 1.76 (m, 2H), 1.73 – 1.63 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 142.2, 138.4, 129.2, 128.5, 128.4, 127.6, 125.8, 111.8, 35.2, 33.7, 31.4, 8.5. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 471.3. **HRMS** (CI) m/z (M^+) calcd for $C_{16}H_{18}Te$: 340.0471, found 340.0478.



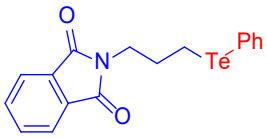
phenyl(5-phenylpentyl)tellane (3e)

Yield: 85% (150.1mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2924, 2852, 1573, 1432, 1018, 728, 691. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.72 – 7.64 (m, 2H), 7.23 (dt, *J* = 7.3, 5.9 Hz, 3H), 7.18 – 7.08 (m, 5H), 2.84 (t, *J* = 7.6 Hz, 2H), 2.58 – 2.50 (m, 2H), 1.79 (p, *J* = 7.5 Hz, 2H), 1.58 (p, *J* = 7.5 Hz, 2H), 1.43 – 1.34 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 142.5, 138.3, 129.1, 128.4, 128.3, 127.5, 125.7, 111.9, 35.8, 31.7, 31.6, 30.8, 8.6. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 472.5. **HRMS** (CI) m/z (M^+) calcd for $C_{17}H_{20}Te$: 354.0627, found 354.0631.



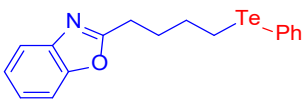
(4-methoxyphenethyl)(phenyl)tellane (3f)

Yield: 98% (173.8mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2930, 1712, 1609, 1573, 1509, 1433, 1299, 1242, 1175, 1033, 814, 729, 690. **^{1}H NMR** (400 MHz, $CDCl_3$) ^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.87 – 7.74 (m, 2H), 7.39 – 7.33 (m, 1H), 7.31 – 7.25 (m, 2H), 7.20 – 7.13 (m, 2H), 6.94 – 6.87 (m, 2H), 3.85 (s, 3H), 3.25 – 3.10 (m, 4H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 158.2, 138.4, 134.9, 129.3, 129.2, 127.6, 114.0, 112.0, 55.3, 37.4, 9.9. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 484.7. **HRMS** (CI) m/z (M^+) calcd for $C_{15}H_{16}OTe$: 342.0263, found 342.0263.



2-(3-(phenyltellanyl)propyl)isoindoline-1,3-dione (3g)

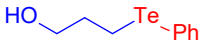
Yield: 56% (110.2mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 1771, 1697, 1432, 1395, 1359, 1189, 1061, 972, 867, 716, 688. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.81 (m, *J* = 5.4, 3.1 Hz, 2H), 7.75 – 7.64 (m, 4H), 7.29 – 7.22 (m, 1H), 7.21 – 7.10 (m, 2H), 3.75 (t, *J* = 6.9 Hz, 2H), 2.91 – 2.75 (m, 2H), 2.21 – 2.10 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 168.3, 138.7, 134.0, 132.0, 129.2, 127.8, 123.2, 111.5, 40.0, 30.8, 4.5. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 492.41. **HRMS** (M^+) m/z calcd for $C_{17}H_{15}NO_2Te$: 395.0165, found 395.0162.



2-(4-(phenyltellanyl)butyl)benzo[d]oxazole (3h)

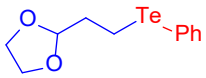
Yield: 91% (173.5mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2329, 1612, 1571, 1455, 1243,

1145, 940, 750, 729, 689. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.72 – 7.61 (m, 3H), 7.47 – 7.40 (m, 1H), 7.29 – 7.19 (m, 3H), 7.16 – 7.09 (m, 2H), 2.89 (td, *J* = 7.4, 2.3 Hz, 4H), 2.00 – 1.93 (m, 2H), 1.93 – 1.86 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.6, 150.7, 141.3, 138.4, 129.1, 127.5, 124.4, 124.0, 119.5, 111.5, 110.2, 31.1, 28.8, 27.8, 7.6. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 477.20. **HRMS** (CI) m/z (M^+) calcd for $C_{17}H_{17}NOTe$: 381.0372, found 381.0375.



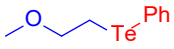
3-(phenyltellanyl)propan-1-ol (3i)

Yield: 56% (74.9mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2925, 1726, 1573, 1473, 1432, 1292, 1017, 727. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.76 – 7.69 (m, 2H), 7.29 – 7.25 (m, 1H), 7.24 – 7.15 (m, 2H), 3.67 (t, *J* = 6.1 Hz, 2H), 2.95 (t, *J* = 7.4 Hz, 2H), 2.03 (tt, *J* = 7.4, 6.2 Hz, 2H), 1.81 (s, 1H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 138.4, 129.3, 127.7, 111.8, 63.9, 34.3, 4.3. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 471.7. **HRMS** (CI) m/z (M^+) calcd for $C_9H_{12}OTe$: 265.9950, found 265.9942.



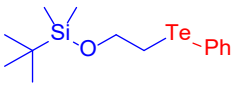
2-(2-(phenyltellanyl)ethyl)-1,3-dioxolane (3j)

Yield: 78% (120.1 mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2880, 1711, 1574, 1433, 1359, 1220, 1123, 1017, 841, 731, 692. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.74 – 7.67 (m, 2H), 7.25 (m, *J* = 8.2, 6.4, 1.4 Hz, 1H), 7.18 (m, *J* = 6.6, 1.7 Hz, 2H), 4.91 (t, *J* = 4.3 Hz, 1H), 3.97 – 3.92 (m, 2H), 3.87 – 3.79 (m, 2H), 3.00 – 2.86 (m, 2H), 2.19 (td, *J* = 7.7, 4.3 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 138.2, 129.2, 127.6, 112.4, 104.7, 65.0, 35.8, 0.2. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 498.7. **HRMS** (CI) m/z (M^+) calcd for $C_{11}H_{14}O_2Te$: 308.0056, found 308.0057.



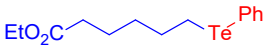
(2-methoxyethyl)(phenyl)tellane (3k)

Yield: 64% (85.3 mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2923, 1574, 1473, 1433, 1101, 1018, 942, 728. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.77 – 7.69 (m, 2H), 7.29 – 7.24 (m, 1H), 7.19 (m, *J* = 8.3, 6.6, 1.3 Hz, 2H), 3.71 (dd, *J* = 7.8, 6.9 Hz, 2H), 3.33 (s, 3H), 3.05 (dd, *J* = 7.8, 6.9 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 138.5, 129.3, 127.8, 111.4, 73.7, 58.3, 7.9. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 437.2. **HRMS** (M^+) m/z calcd for $C_9H_{12}OTe$: 265.9950, found 265.994.



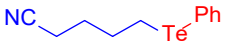
tert-butyldimethyl(2-(phenyltellanyl)ethoxy)silane (3l)

Yield: 50% (88.8 mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2927, 1575, 1472, 1433, 1253, 1067, 833, 774, 728, 690. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.74 – 7.64 (m, 2H), 7.25 – 7.19 (m, 1H), 7.14 (m, *J* = 8.1, 6.6 Hz, 2H), 3.97 – 3.83 (m, 2H), 3.07 – 2.96 (m, 2H), 0.84 (s, 9H), 0.00 (s, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 138.4, 129.2, 127.6, 111.6, 64.7, 26.0, 18.4, 12.3, -5.1. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 422.3. **HRMS** (M^+) m/z calcd for $C_{14}H_{24}ONSiTe$: 366.0659, found 366.0655.



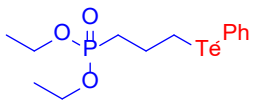
ethyl 6-(phenyltellanyl)hexanoate (3m)

Yield: 84% (146.8mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2929, 1730, 1574, 1433, 1371, 1177, 1115, 1018, 729, 691. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.74 – 7.66 (m, 2H), 7.29 – 7.22 (m, 1H), 7.17 (m, *J* = 8.2, 6.7 Hz, 2H), 4.16 – 4.04 (m, 2H), 2.87 (t, *J* = 7.5 Hz, 2H), 2.25 (t, *J* = 7.5 Hz, 2H), 1.79 (p, *J* = 7.5 Hz, 2H), 1.65 – 1.57 (m, 2H), 1.39 (tt, *J* = 9.7, 6.2 Hz, 2H), 1.26 – 1.20 (m, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 173.5, 138.3, 129.1, 127.5, 111.7, 60.1, 34.1, 31.4, 31.3, 24.2, 14.2, 8.2. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 473.5. **HRMS** (CI) m/z (M^+) calcd for $C_{14}H_{20}O_2Te$: 350.0526, found 350.0527.



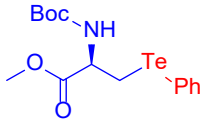
5-(phenyltellanyl)pentanenitrile (3n)

Yield: 84% (121.7mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2929, 2245, 1710, 1573, 1474, 1432, 1359, 1219, 1017, 731. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.75 – 7.67 (m, 2H), 7.31 – 7.24 (m, 1H), 7.24 – 7.16 (m, 2H), 2.86 (t, *J* = 7.4 Hz, 2H), 2.29 (t, *J* = 7.1 Hz, 2H), 1.95 – 1.86 (m, 2H), 1.76 – 1.70 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 138.6, 129.3, 127.8, 119.4, 111.2, 30.6, 27.3, 16.5, 6.8. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 479.6. **HRMS** (CI) m/z (M^+) calcd for $C_{11}H_{13}NTe$: 289.0110, found 289.0109.



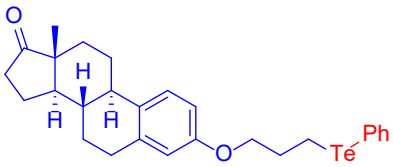
diethyl (3-(phenyltellanyl)propyl)phosphonate (3o)

Yield: 48% (88.8mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2979, 1730, 1434, 1256, 1229, 1052, 1019, 953, 731, 691. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.74 – 7.70 (m, 2H), 7.31 – 7.25 (m, 1H), 7.19 (dd, *J* = 8.2, 6.6 Hz, 2H), 4.05 (ddq, *J* = 14.4, 7.2, 3.4 Hz, 4H), 2.97 – 2.91 (m, 2H), 2.12 – 2.00 (m, 2H), 1.90 – 1.80 (m, 2H), 1.28 (t, *J* = 7.1 Hz, 6H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 138.6, 129.2, 127.8, 111.2, 61.5 (*J* = 6.52), 52.6, 27.9 (*J* = 139.29), 25.92, 24.8 (*J* = 4.68), 16.5 (*J* = 6.22), 9.0 (*J* = 18.06). **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 470.5. **HRMS** (M^+) m/z calcd for $C_{13}H_{21}PO_3Te$: 386.0291, found 386.0294.



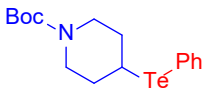
4-(*tert*-butyldisulfanyl)butanenitrile (3p)

Yield: 11% **(**21.4mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2928, 1738, 1712, 1498, 1434, 1248, 1160, 1018, 733, 692. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.80 – 7.73 (m, 2H), 7.32 – 7.27 (m, 1H), 7.20 (dd, *J* = 8.1, 6.7 Hz, 2H), 5.33 (d, *J* = 8.2 Hz, 1H), 4.72 (d, *J* = 7.6 Hz, 1H), 3.53 (s, 3H), 3.29 (t, *J* = 6.5 Hz, 2H), 1.42 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 171.8, 139.3, 129.4, 128.2, 111.0, 80.2, 53.8, 52.5, 28.4, 11.8. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 422.6. **HRMS** (CI) m/z (M^+) calcd for $C_{15}H_{21}NO_4Te$: 409.0533, found 409.0530.



(8*S*,9*R*,13*R*,14*R*)-13-methyl-3-(3-(phenyltellanyl)propoxy)-6,7,8,9,11,12,13,14,15,16-decahydro-17H-cyclopenta[a]phenanthren-17-one (3q)

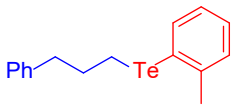
Yield: 68% **(**172.2mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2329, 1728, 1570, 1468, 1247, 1157, 1055, 875, 733, 693. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.75 – 7.66 (m, 2H), 7.28 – 7.21 (m, 1H), 7.19 – 7.13 (m, 3H), 6.67 (m, *J* = 8.5, 2.8 Hz, 1H), 6.59 (d, *J* = 2.7 Hz, 1H), 3.96 (t, *J* = 6.0 Hz, 2H), 3.02 (t, *J* = 7.3 Hz, 2H), 2.90 – 2.81 (m, 2H), 2.48 (dd, *J* = 18.8, 8.6 Hz, 1H), 2.37 (dq, *J* = 11.9, 3.3 Hz, 1H), 2.22 (tq, *J* = 10.0, 4.8, 3.8 Hz, 3H), 2.16 – 1.92 (m, 4H), 1.64 – 1.38 (m, 6H), 0.89 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 220.8, 156.8, 138.3, 137.7, 132.1, 129.2, 127.6, 126.3, 114.6, 112.2, 111.8, 68.6, 50.4, 48.0, 44.0, 38.4, 35.9, 31.6, 31.3, 29.7, 26.6, 25.9, 21.6, 13.9, 4.4. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 473.2. **HRMS** (M^+) m/z calcd for $C_{27}H_{32}O_2Te$: 518.1465, found 518.1464.



1-benzyl-2-(2-phenoxyethyl)disulfane (4a)

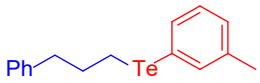
Yield: 68% (132.2mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2928, 1599, 1584, 1493, 1453, 1238, 1171, 1013, 752, 690. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.84 – 7.73 (m, 2H), 7.36 – 7.30 (m, 1H), 7.21 (t, *J* = 7.5 Hz, 2H), 3.80 (d, *J* = 13.4 Hz, 2H), 3.49 (tt, *J* = 10.6, 3.9 Hz, 1H), 2.93 (ddd, *J* = 13.5, 10.3, 3.0 Hz, 2H), 2.03 (dq, *J* = 12.5, 3.9 Hz, 2H), 1.78 (dtd, *J* = 14.1, 10.4, 4.1 Hz, 2H), 1.45 – 1.39 (m, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 154.8, 140.5, 129.2, 128.2, 110.7, 79.5, 49.5, 35.0, 28.5, 23.3. **^{125}Te NMR** (126 MHz,

$CDCl_3$) δ 651.0 **HRMS** (M^+) m/z calcd for $C_{16}H_{23}O_2NTe$: 391.0791, found 391.0793.



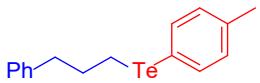
(3-phenylpropyl)(*o*-tolyl)tellane (4a)

Yield: 31% (52.3mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2924, 1583, 1495, 1451, 1377, 1272, 1023, 739. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.56 (m, *J* = 7.6, 1.2 Hz, 1H), 7.26 (m, *J* = 8.1, 6.7 Hz, 2H), 7.22 – 7.10 (m, 5H), 6.97 (m, *J* = 7.4, 1.8 Hz, 1H), 2.85 (t, *J* = 7.5 Hz, 2H), 2.70 (t, *J* = 7.4 Hz, 2H), 2.41 (s, 3H), 2.10 (p, *J* = 7.5 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 142.5, 141.3, 136.9, 129.2, 128.7, 128.5, 127.7, 126.6, 126.1, 116.4, 38.1, 33.2, 26.6, 7.0. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 353.9. **HRMS** (CI) m/z (M^+) calcd for $C_{16}H_{18}Te$: 340.0471, found 340.0469.



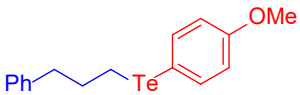
(3-phenylpropyl)(*m*-tolyl)tellane (4b)

Yield: 60% (102.0mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2920, 1586, 1494, 1452, 1209, 769, 746, 687. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.55 – 7.50 (m, 1H), 7.50 – 7.45 (m, 1H), 7.28 – 7.22 (m, 2H), 7.20 – 7.10 (m, 3H), 7.08 – 7.04 (m, 2H), 2.92 – 2.82 (m, 2H), 2.69 (t, *J* = 7.5 Hz, 2H), 2.29 (s, 3H), 2.15 – 2.06 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 141.4, 139.1, 139.0, 135.4, 129.1, 128.7, 128.5, 128.5, 126.0, 111.6, 38.0, 33.5, 21.3, 7.9. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 465.8. **HRMS** (CI) m/z (M^+) calcd for $C_{16}H_{18}Te$: 340.0471, found 340.0477.



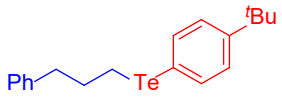
(3-phenylpropyl)(*p*-tolyl)tellane (4c)

Yield: 58% (99.3mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2922, 1602, 1486, 1453, 1209, 1013, 798, 747, 698. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.53 (m, *J* = 8.0 Hz, 2H), 7.18 (m, *J* = 8.0, 6.7 Hz, 2H), 7.13 – 7.03 (m, 3H), 6.93 (m, *J* = 7.7 Hz, 2H), 2.77 (t, *J* = 7.5 Hz, 2H), 2.61 (t, *J* = 7.5 Hz, 2H), 2.26 (s, 3H), 2.01 (p, *J* = 7.5 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 141.4, 139.0, 137.8, 130.2, 128.7, 128.5, 126.0, 107.4, 38.0, 33.4, 21.3, 8.0. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 458.7. **HRMS** (ESI^+, MeCN) m/z calcd for $C_{16}H_{18}Te$: 340.0471, found 340.0473.



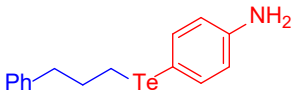
(4-methoxyphenyl)(3-phenylpropyl)tellane (4d)

Yield: 74% (131.7mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2927, 1712, 1585, 1487, 1453, 1281, 1241, 1175, 1028, 820, 747, 698. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.70 – 7.62 (m, 2H), 7.27 – 7.22 (m, 2H), 7.20 – 7.09 (m, 3H), 6.78 – 6.71 (m, 2H), 3.78 (s, 3H), 2.84 – 2.78 (m, 2H), 2.70 – 2.62 (m, 2H), 2.06 (p, *J* = 7.5 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 159.8, 141.4, 141.1, 128.7, 128.4, 126.0, 115.3, 100.5, 55.3, 37.9, 33.4, 8.3. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 455.9. **HRMS** (M^+) m/z calcd for $C_{16}H_{18}OTe$: 356.0420, found 356.0411.



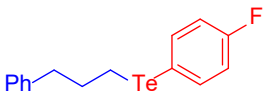
(4-(*tert*-butyl)phenyl)(3-phenylpropyl)tellane (4e)

Yield: 81% (154.4mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2960, 1494, 1453, 1392, 1266, 1112, 1008, 818, 746, 697. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.66 – 7.59 (m, 2H), 7.26 – 7.18 (m, 4H), 7.17 – 7.08 (m, 3H), 2.84 (t, *J* = 7.5 Hz, 2H), 2.67 (dd, *J* = 8.2, 6.8 Hz, 2H), 2.09 (p, *J* = 7.4 Hz, 2H), 1.29 (s, 9H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.9, 141.3, 138.5, 128.6, 128.4, 126.4, 126.0, 107.9, 37.9, 34.6, 33.4, 31.4, 7.8. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 451.5. **HRMS** (CI) m/z (M^+) calcd for $C_{19}H_{24}Te$: 382.0940, found 382.0938.



4-((3-phenylpropyl)tellanyl)aniline (4f)

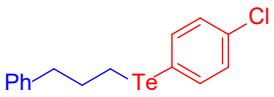
Yield: 90% (162.4mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 1708, 1590, 1490, 1358, 1220, 819, 700. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.58 – 7.49 (m, 2H), 7.29 – 7.20 (m, 2H), 7.17 – 7.09 (m, 3H), 6.49 – 6.41 (m, 2H), 3.62 (s, 2H), 2.80 – 2.69 (m, 2H), 2.66 – 2.60 (m, 2H), 2.07 – 1.98 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 146.5, 141.4, 141.2, 128.5, 128.3, 125.8, 116.1, 97.1, 37.8, 33.2, 8.2. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 448.7. **HRMS** (CI) m/z (M^+) calcd for $C_{15}H_{17}NTe$: 341.0423, found 341.0418.



(4-fluorophenyl)(3-phenylpropyl)tellane (4g)

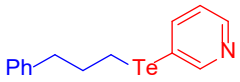
Yield: 78% (134.4mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2926, 1712, 1580, 1483, 1359, 1219, 1160, 1012, 821, 747, 698. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.70 – 7.61 (m, 2H), 7.24 (m, *J* = 8.0, 6.6 Hz, 2H), 7.20 – 7.13 (m, 1H), 7.13 – 7.03 (m, 2H), 6.90 – 6.79 (m, 2H), 2.82 (t, *J* = 7.5 Hz, 2H), 2.66 (t, *J* = 7.4 Hz, 2H), 2.06 (p, *J* = 7.5 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 163.0 (*J* = 246.2), 141.2, 141.0, 140.9, 128.6 (*J* = 13.8),

126.1, 116.6 (J = 20.4), 105.2 (J = 3.7), 37.9, 33.3, 8.5. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 476.0. **HRMS** (CI) m/z (M^+) calcd for $C_{15}H_{15}FTe$: 344.0229, found 344.0217.



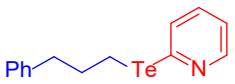
(4-chlorophenyl)(3-phenylpropyl)tellane (4h)

Yield: 76% (137.4mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2925, 1494, 1470, 1380, 1210, 1086, 1007, 805, 721, 696. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.60 – 7.52 (m, 2H), 7.24 (dd, J = 8.1, 6.7 Hz, 2H), 7.20 – 7.15 (m, 1H), 7.15 – 7.07 (m, 4H), 2.84 (t, J = 7.5 Hz, 2H), 2.66 (t, J = 7.4 Hz, 2H), 2.07 (p, J = 7.5 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 141.1, 139.8, 134.2, 129.5, 128.6, 128.5, 126.1, 109.3, 37.9, 33.3, 8.4. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 478.6. **HRMS** (CI) m/z (M^+) calcd for $C_{15}H_{15}ClTe$: 359.9925, found 359.9915.



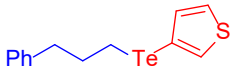
3-((3-phenylpropyl)tellanyl)pyridine (4i)

Yield: 84% (137.2mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 1710, 1358, 1219, 1010, 791, 701, 615. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.87 (m, J = 1.9 Hz, 1H), 8.49 (m, J = 4.9, 1.6 Hz, 1H), 7.95 (m, J = 7.7, 1.9 Hz, 1H), 7.25 (m, J = 8.1, 6.7 Hz, 2H), 7.19 – 7.14 (m, 1H), 7.13 – 7.07 (m, 3H), 2.86 (t, J = 7.5 Hz, 2H), 2.67 (t, J = 7.4 Hz, 2H), 2.08 (p, J = 7.5 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 157.7, 148.4, 145.7, 140.8, 128.5, 128.4, 126.0, 124.4, 109.1, 37.7, 33.2, 8.2. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 435.6. **HRMS** (CI) m/z (M^+) calcd for $C_{14}H_{15}NTe$: 327.0267, found 327.0262.



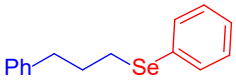
2-((3-phenylpropyl)tellanyl)pyridine (4j)

Yield: 73% (119.9mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2923, 1565, 1552, 1447, 1409, 1273, 1094, 1076, 982, 746, 613. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 8.52 (m, J = 5.1, 1.8 Hz, 1H), 7.48 (m, J = 7.8 Hz, 1H), 7.41 – 7.29 (m, 3H), 7.27 – 7.18 (m, 3H), 7.07 – 7.00 (m, 1H), 3.18 (t, J = 7.4 Hz, 2H), 2.79 (t, J = 7.5 Hz, 2H), 2.30 (p, J = 7.5 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 150.8, 141.3, 141.1, 135.4, 131.6, 128.6, 128.4, 125.9, 121.1, 38.1, 33.5, 8.9. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 517.7. **HRMS** (CI) m/z (M^+) calcd for $C_{14}H_{15}NTe$: 327.0267, found 327.0269.



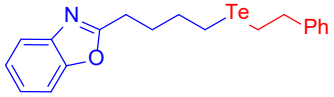
3-((3-phenylpropyl)tellanyl)thiophene (4k)

Yield: 62% (103.3mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2924, 1601, 1494, 1452, 1193, 1150, 841, 766, 747, 696. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.45 (m, *J* = 2.8, 1.3 Hz, 1H), 7.29 – 7.21 (m, 3H), 7.21 – 7.14 (m, 2H), 7.14 – 7.08 (m, 2H), 2.77 (dd, *J* = 8.5, 6.4 Hz, 2H), 2.66 (t, *J* = 7.5 Hz, 2H), 2.10 – 2.00 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 141.3, 137.0, 133.5, 128.6, 128.5, 126.8, 126.0, 101.2, 37.8, 33.4, 8.4, 8.3. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 333.9. **HRMS** (CI) m/z (M^+) calcd for $C_{13}H_{14}STe$: 331.9878, found 331.9882.



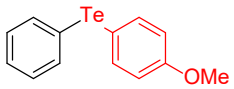
phenyl(3-phenylpropyl)selane (4l)

Yield: 68% (37.5mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2929, 1578, 1476, 1436, 1072, 1022, 732, 689. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.48 – 7.42 (m, 2H), 7.29 – 7.20 (m, 5H), 7.19 – 7.10 (m, 3H), 2.89 (t, *J* = 7.3 Hz, 2H), 2.72 (t, *J* = 7.5 Hz, 2H), 2.00 (p, *J* = 7.4 Hz, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 141.4, 132.6, 130.4, 129.1, 128.6, 128.5, 126.8, 126.0, 35.8, 31.7, 27.2. **^{77}Se NMR** (76 MHz, $CDCl_3$) δ 289.8. **HRMS** (CI) m/z (M^+) calcd for $C_{15}H_{16}Se$: 276.0417, found 276.0419.



2-(4-(phenethyltellanyl)butyl)benzo[*d*]oxazole (4r)

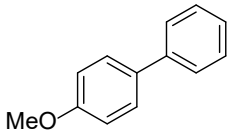
Yield: 75% (91.7mg). Yellow oil. **IR** (neat, ν, cm^{-1}): 2925, 1713, 1614, 1570, 1454, 1240, 1145, 743, 697. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.72 – 7.66 (m, 1H), 7.50 (m, *J* = 8.5, 3.2 Hz, 1H), 7.36 – 7.28 (m, 4H), 7.27 – 7.23 (m, 1H), 7.23 – 7.17 (m, 2H), 3.11 (t, *J* = 7.9 Hz, 2H), 3.01 – 2.86 (m, 4H), 2.65 (t, *J* = 7.5 Hz, 2H), 2.03 – 1.94 (m, 2H), 1.92 – 1.83 (m, 2H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 166.8, 150.8, 142.7, 141.4, 128.5, 128.1, 126.3, 124.5, 124.1, 119.6, 110.3, 38.8, 31.6, 29.0, 27.9, 3.5, 1.9. **^{125}Te NMR** (126 MHz, $CDCl_3$) δ 261.1. **HRMS** (CI) m/z (M^+) calcd for $C_{19}H_{21}NOTe$: 409.0685, found 409.0683.



(4-methoxyphenyl)(phenyl)tellane (12)

Yield: 12% (7.8 mg, 0.2 mmol). White solid. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.70 – 7.62 (m, 2H), 7.52 – 7.47 (m, 2H), 7.11 (m, J = 14.5, 8.5, 6.1, 2.2 Hz, 3H), 6.76 – 6.70 (m, 2H), 3.73 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 160.0, 141.2, 136.4, 129.4, 127.3,

115.9, 115.5, 103.2, 55.2. **HRMS** (CI) m/z (M^+) calcd for $C_{13}H_{12}OTe$: 313.9950, found 313.9948. The values of the NMR spectrum are accordance with reported literature data.[6]



4-methoxy-1,1'-biphenyl (9)

Yield: 78% (28.7 mg). White solid. **^{1}H NMR** (400 MHz, $CDCl_3$) δ 7.53 (m, *J* = 8.7, 7.5, 1.6 Hz, 4H), 7.40 (t, *J* = 7.6 Hz, 2H), 7.32 – 7.25 (m, 1H), 7.02 – 6.91 (m, 2H), 3.83 (s, 3H). **^{13}C NMR** (100 MHz, $CDCl_3$) δ 159.3, 140.9, 133.9, 128.8, 128.3, 126.9, 126.8, 114.3, 55.5.

VIII. References

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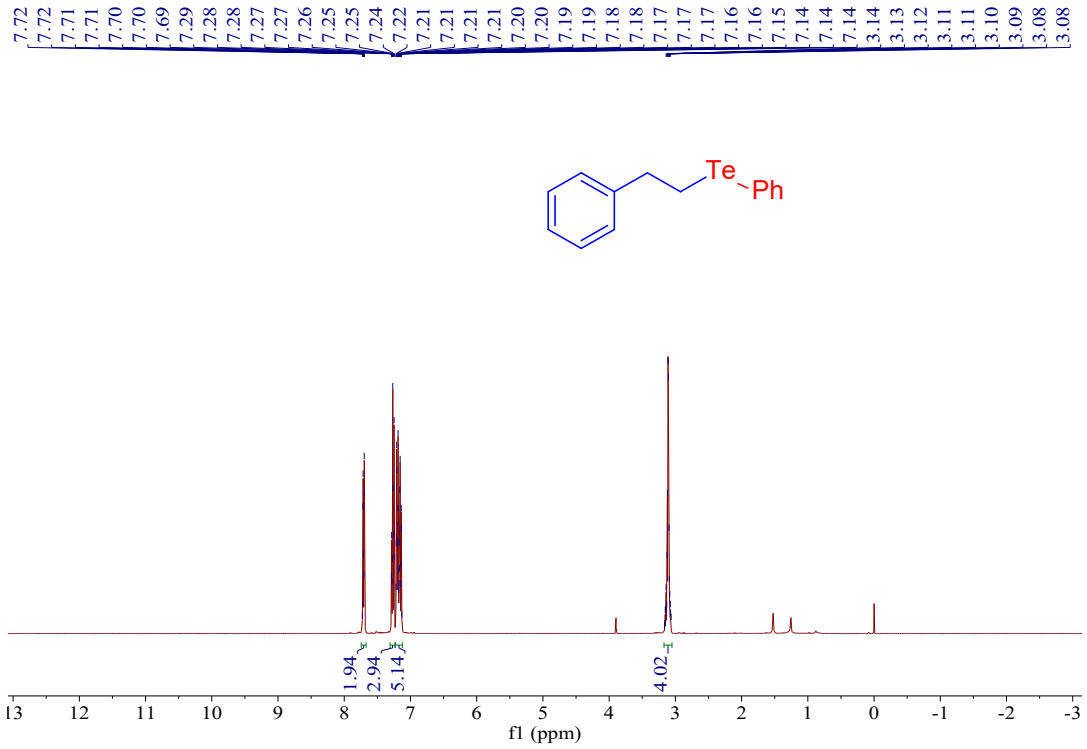
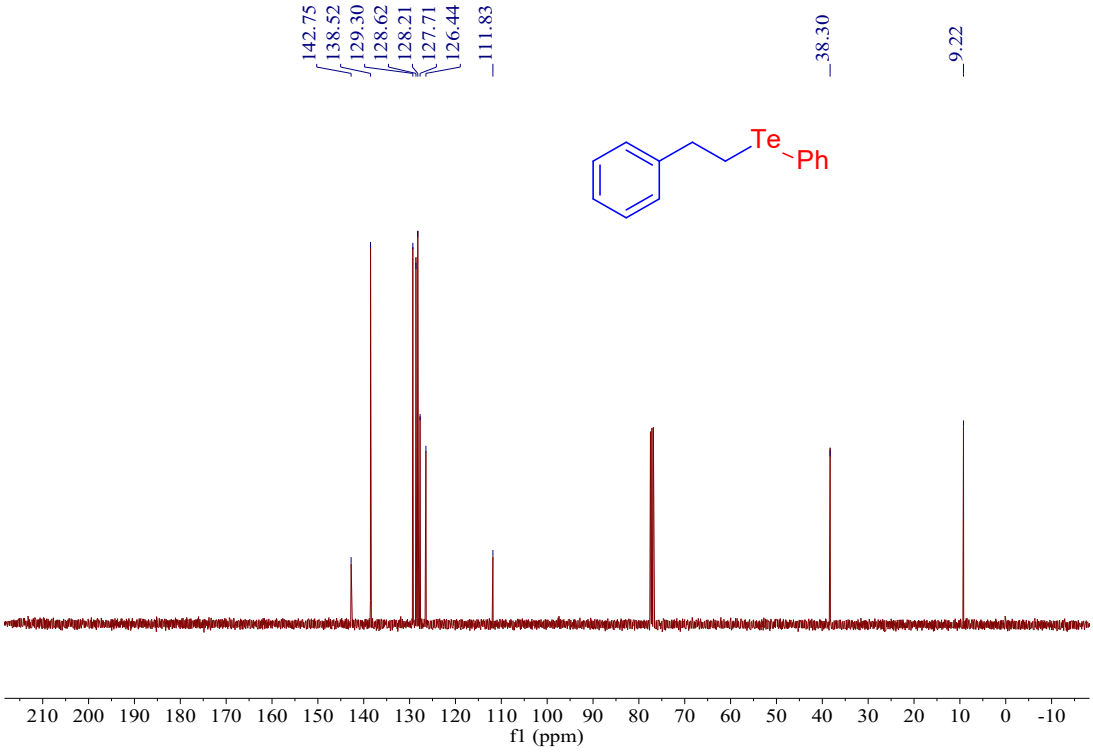
IX. Copies of ^{1}H NMR, ^{13}C NMR and ^{125}Te NMR Spectra

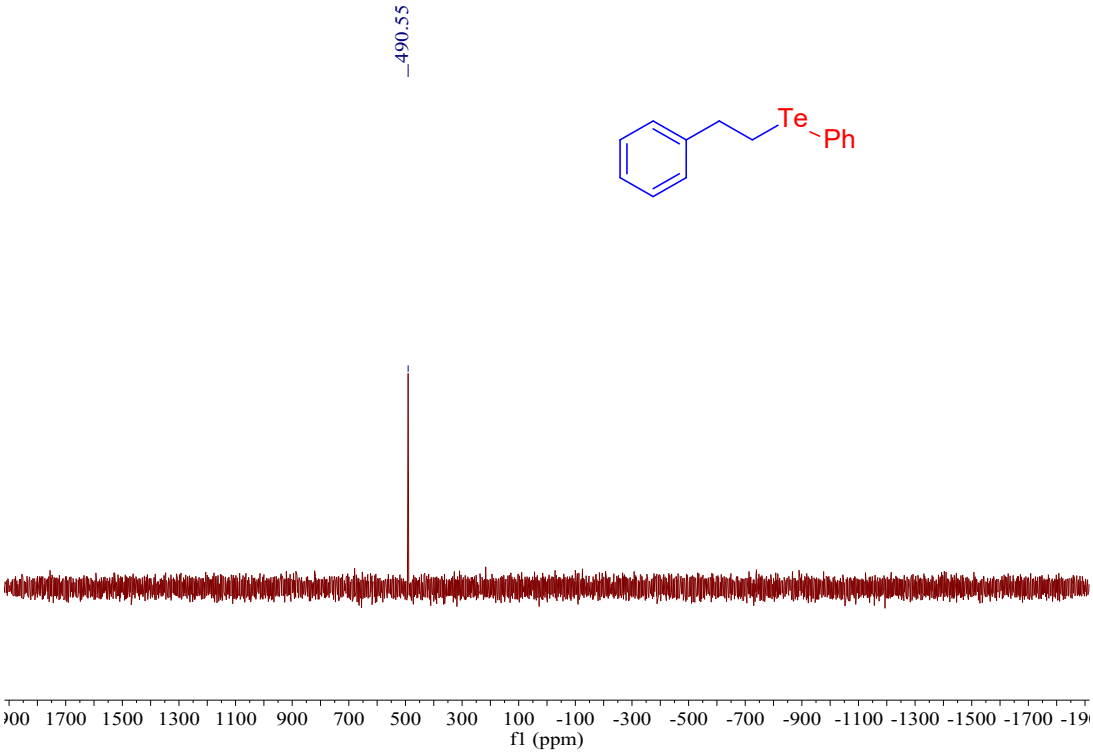
^{1}H NMR Spectra of **3a** (400 MHz, $CDCl_3$)



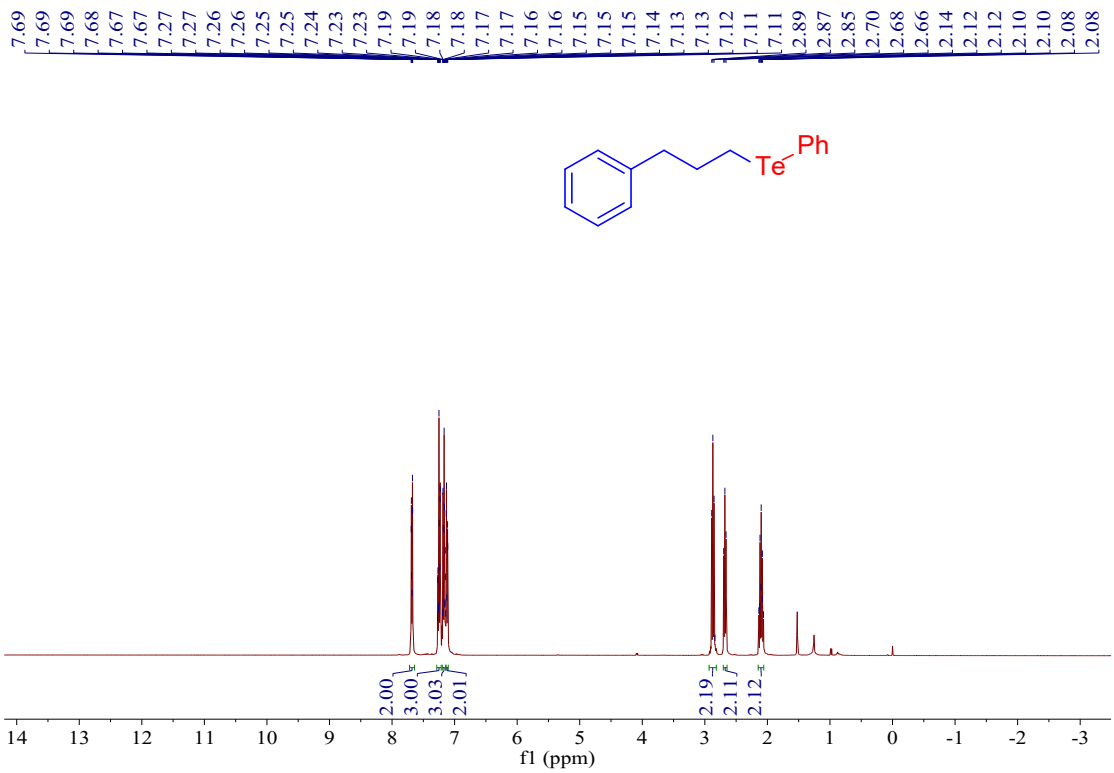
^{13}C NMR Spectra of **3a** (400 MHz, $CDCl_3$)



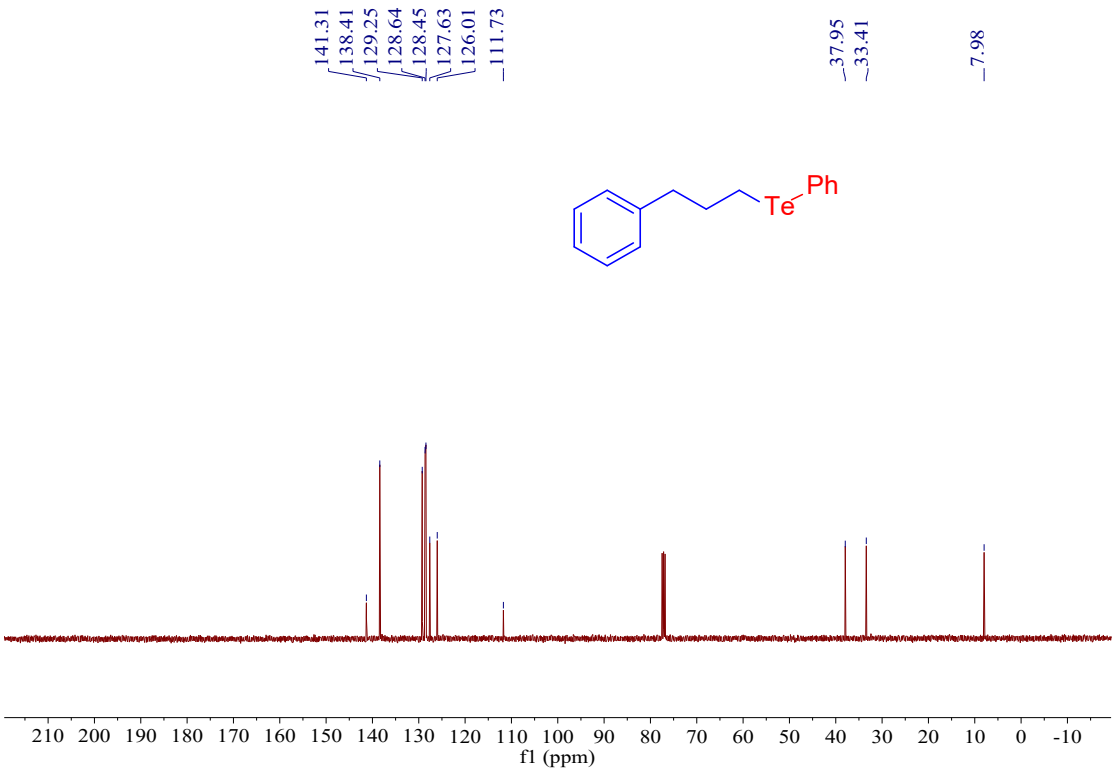
^{125}Te NMR Spectra of **3a** (400 MHz, $CDCl_3$)



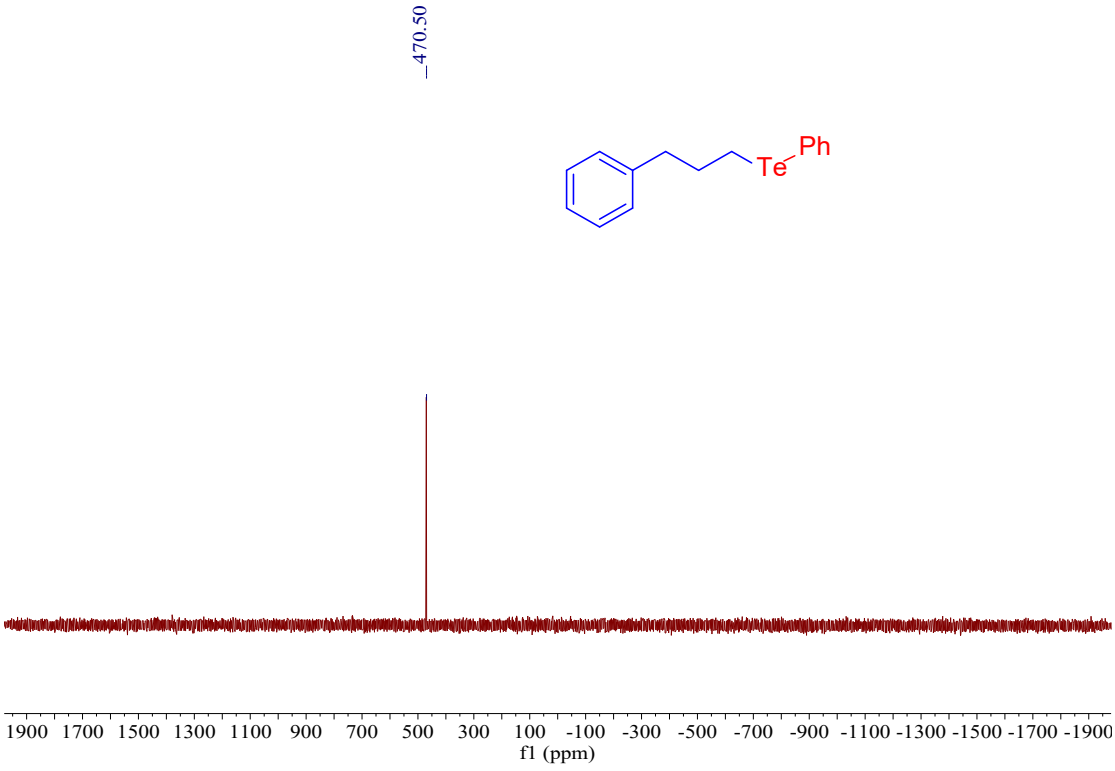
^{1}H NMR Spectra of **3b** (400 MHz, $CDCl_3$)



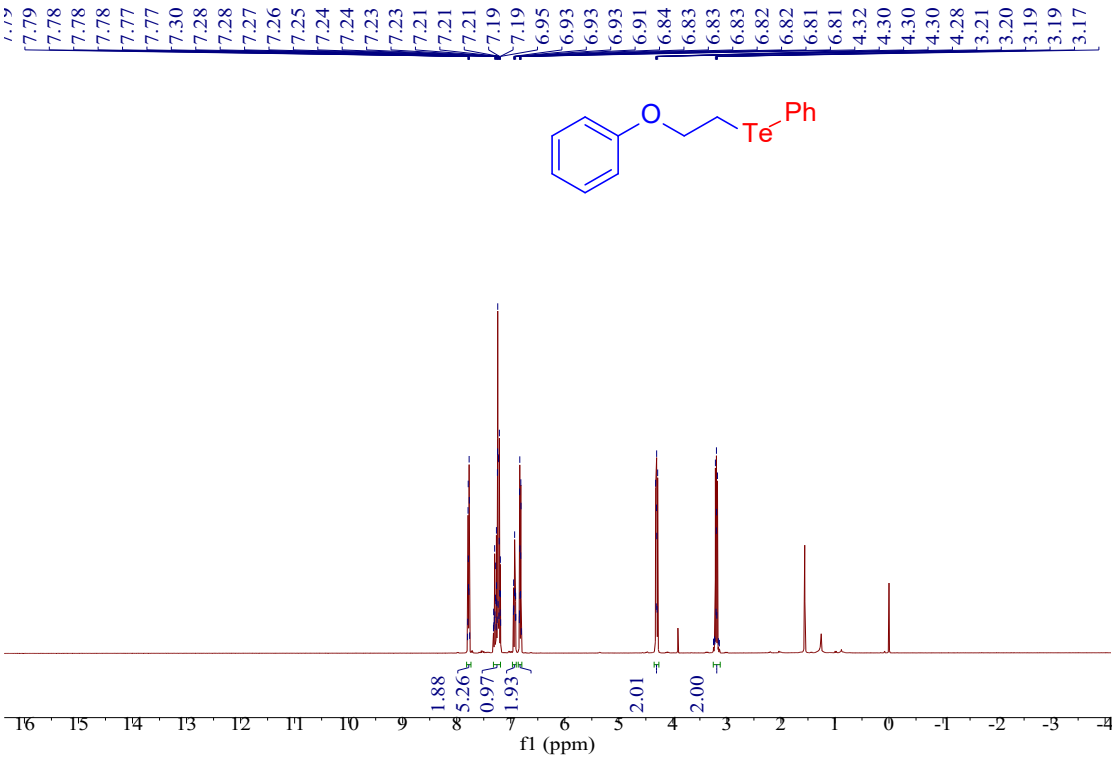
^{13}C NMR Spectra of **3b** (400 MHz, $CDCl_3$)



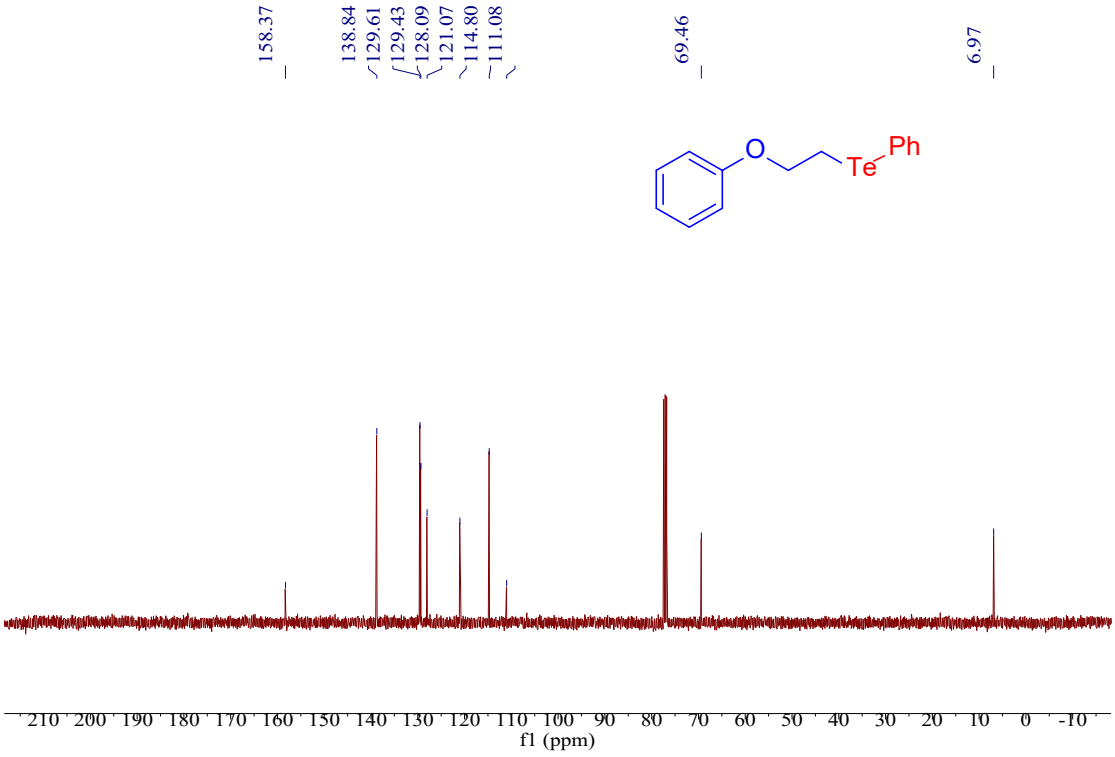
^{125}Te NMR Spectra of **3b** (400 MHz, $CDCl_3$)



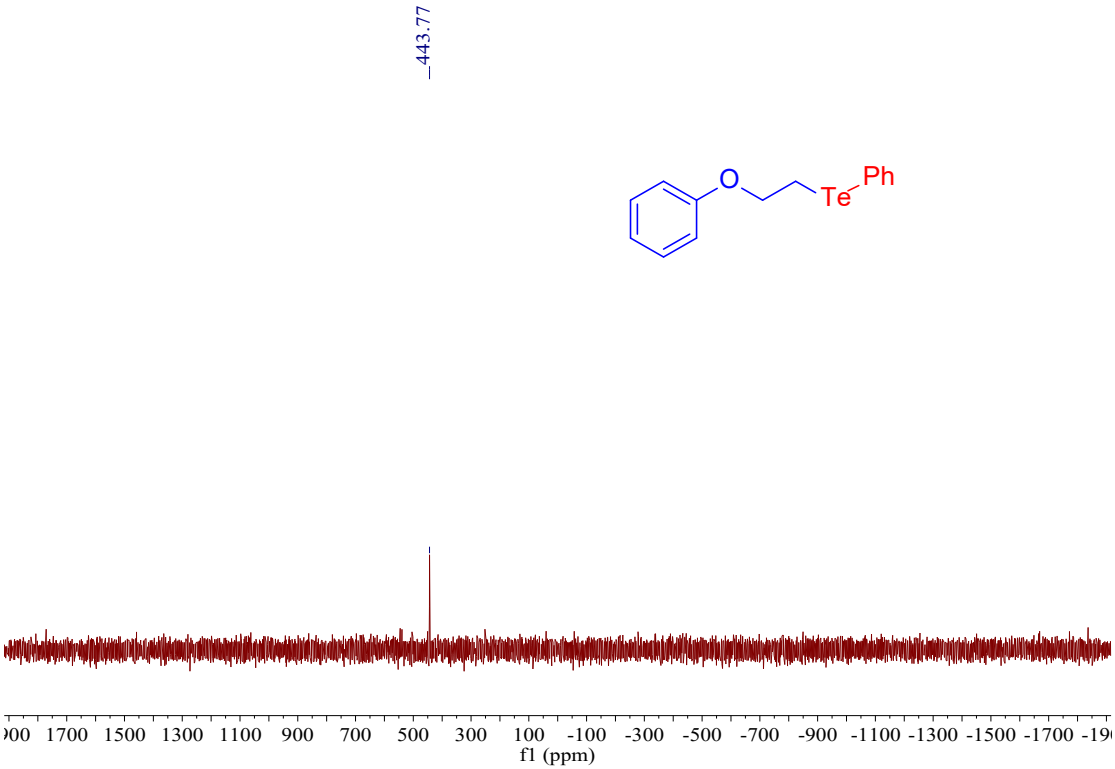
^{1}H NMR Spectra of **3c** (400 MHz, $CDCl_3$)



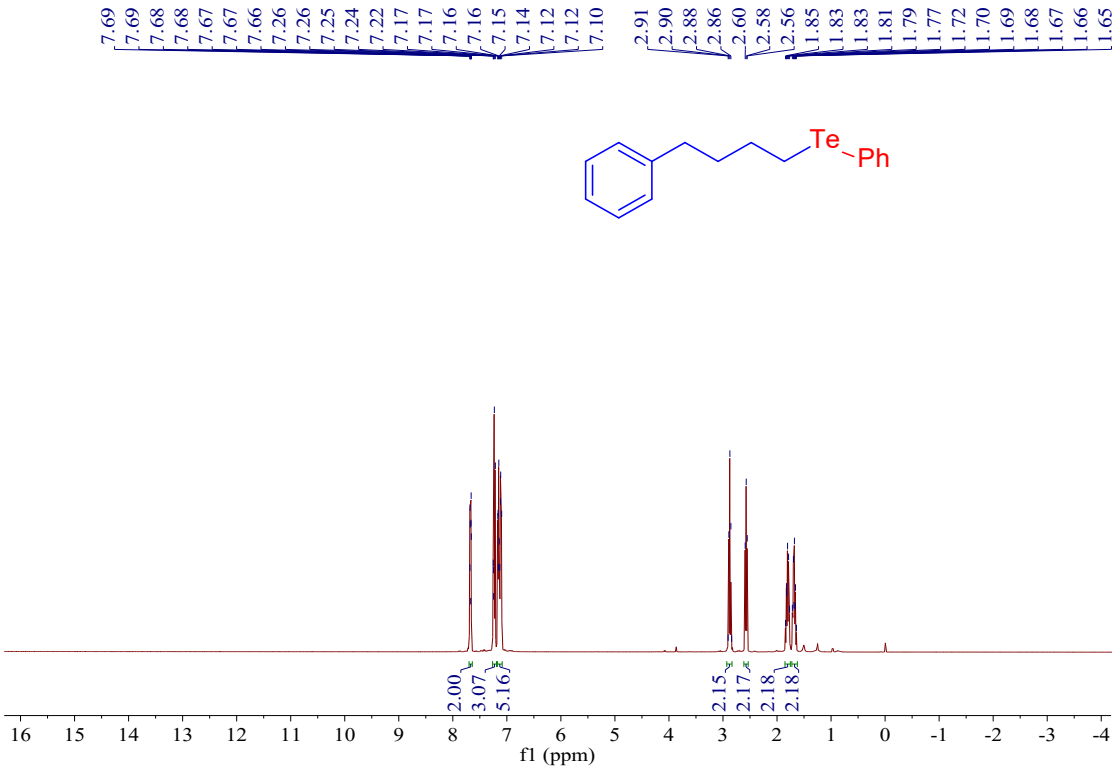
^{13}C NMR Spectra of **3c** (400 MHz, $CDCl_3$)



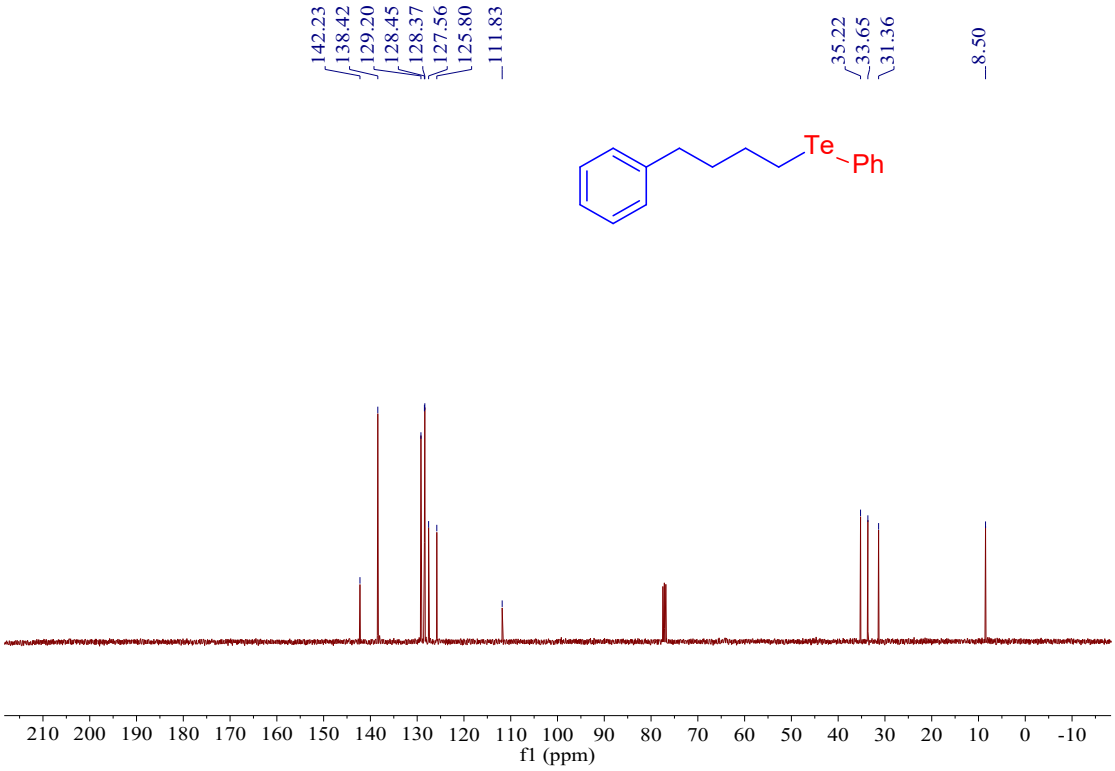
^{125}Te NMR Spectra of **3c** (400 MHz, $CDCl_3$)



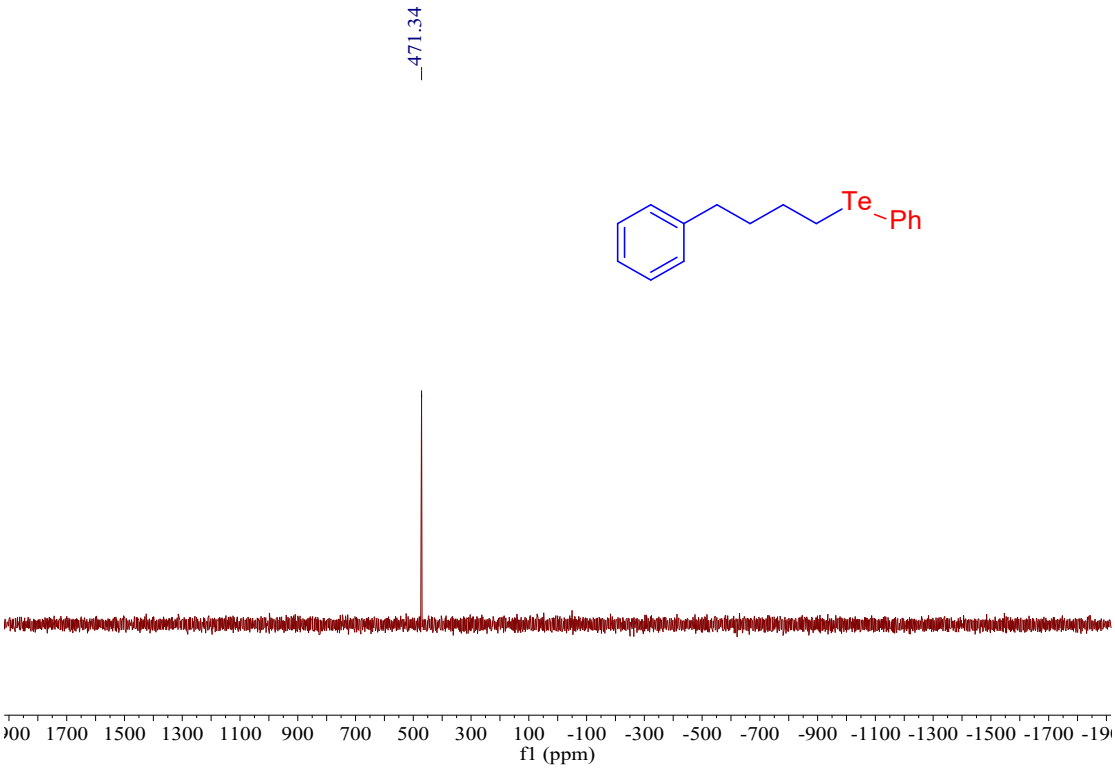
^{1}H NMR Spectra of **3d** (400 MHz, $CDCl_3$)



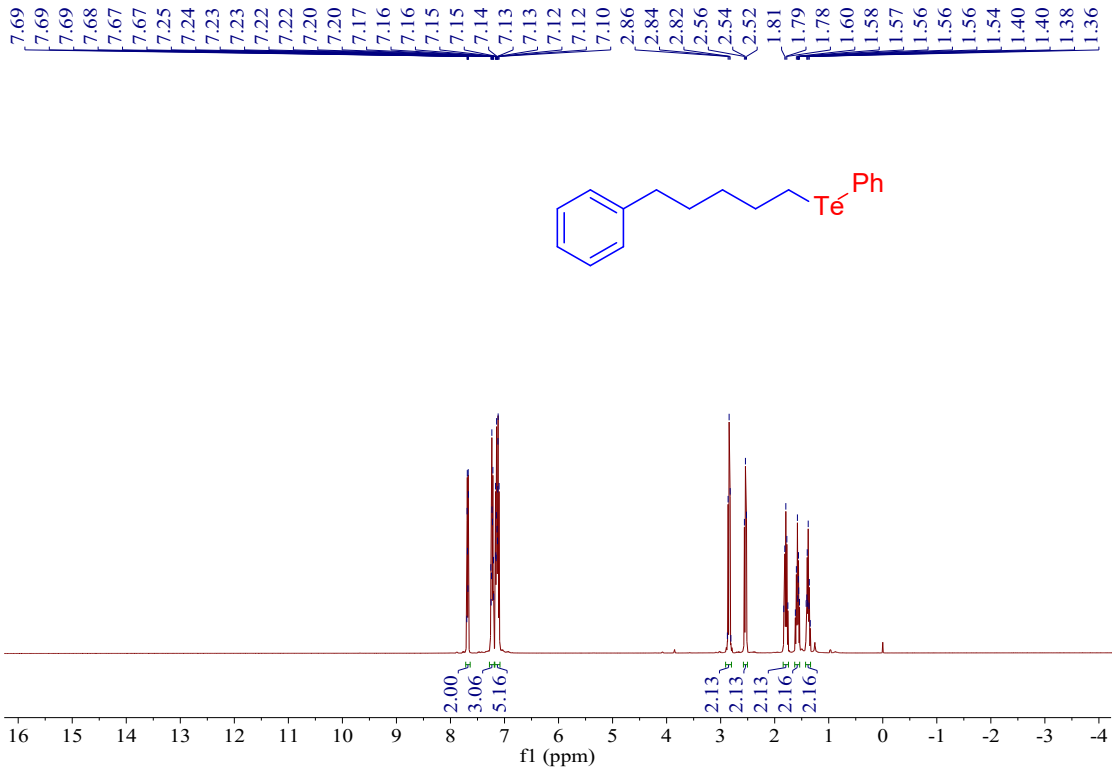
^{13}C NMR Spectra of **3d** (400 MHz, $CDCl_3$)



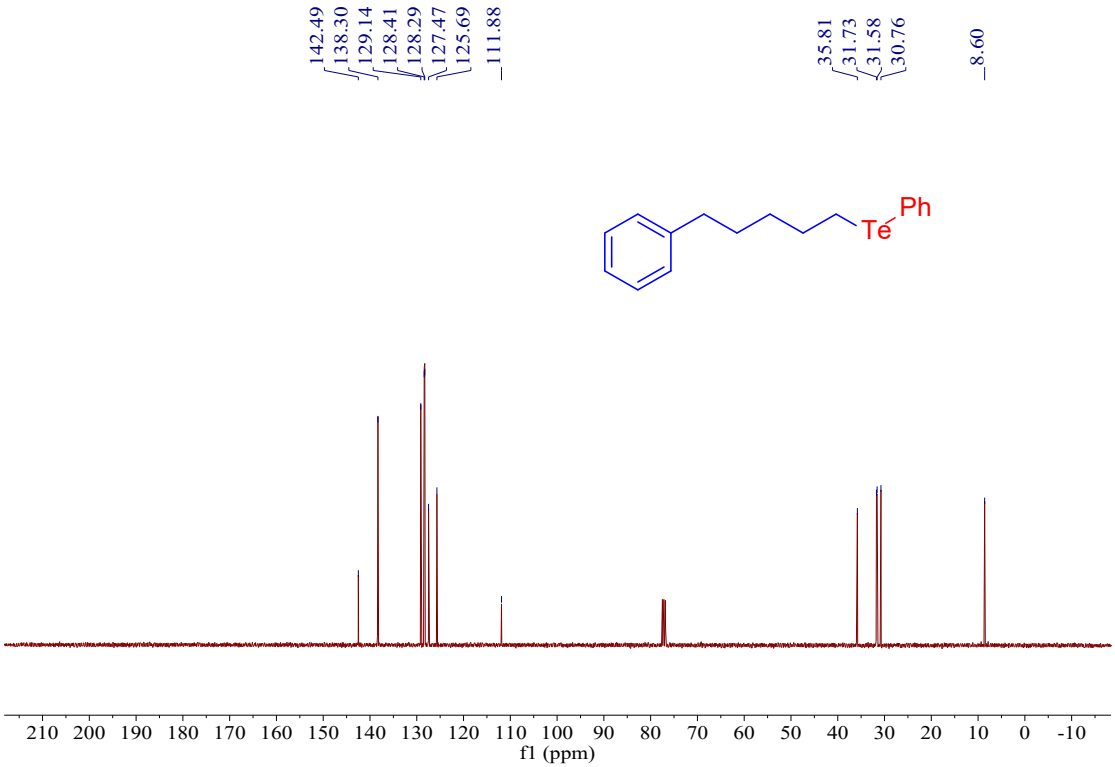
^{125}Te NMR Spectra of **3d** (400 MHz, $CDCl_3$)



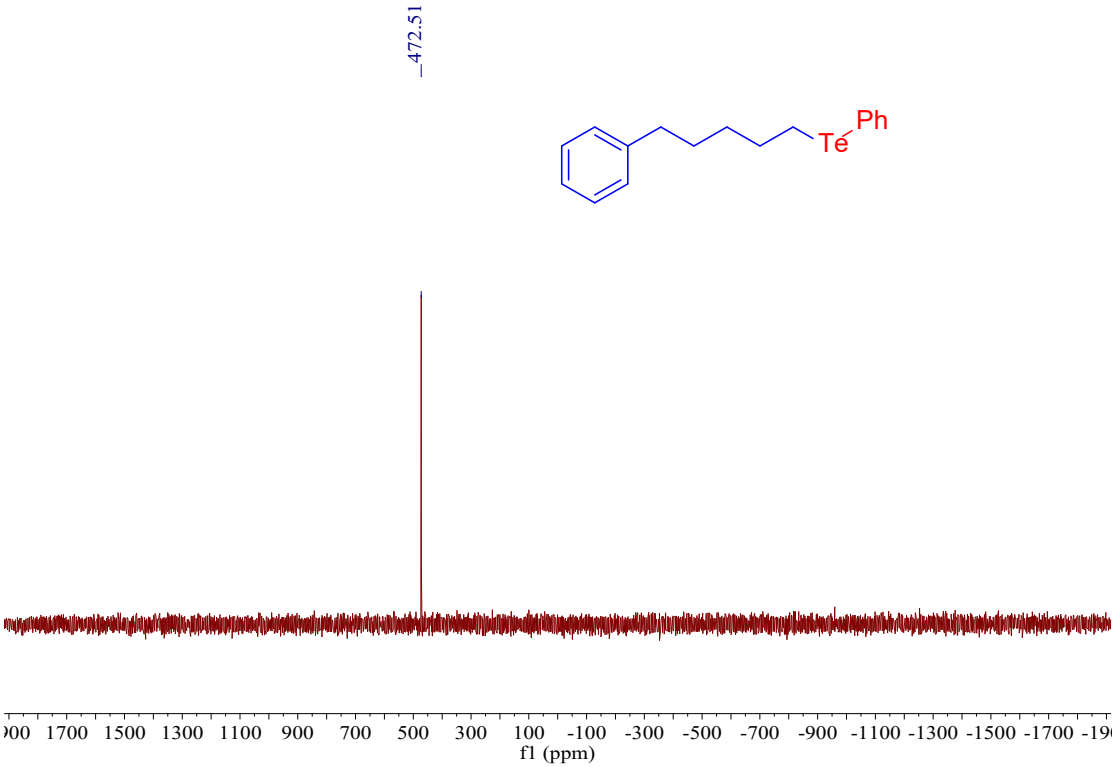
^{1}H NMR Spectra of **3e** (400 MHz, $CDCl_3$)



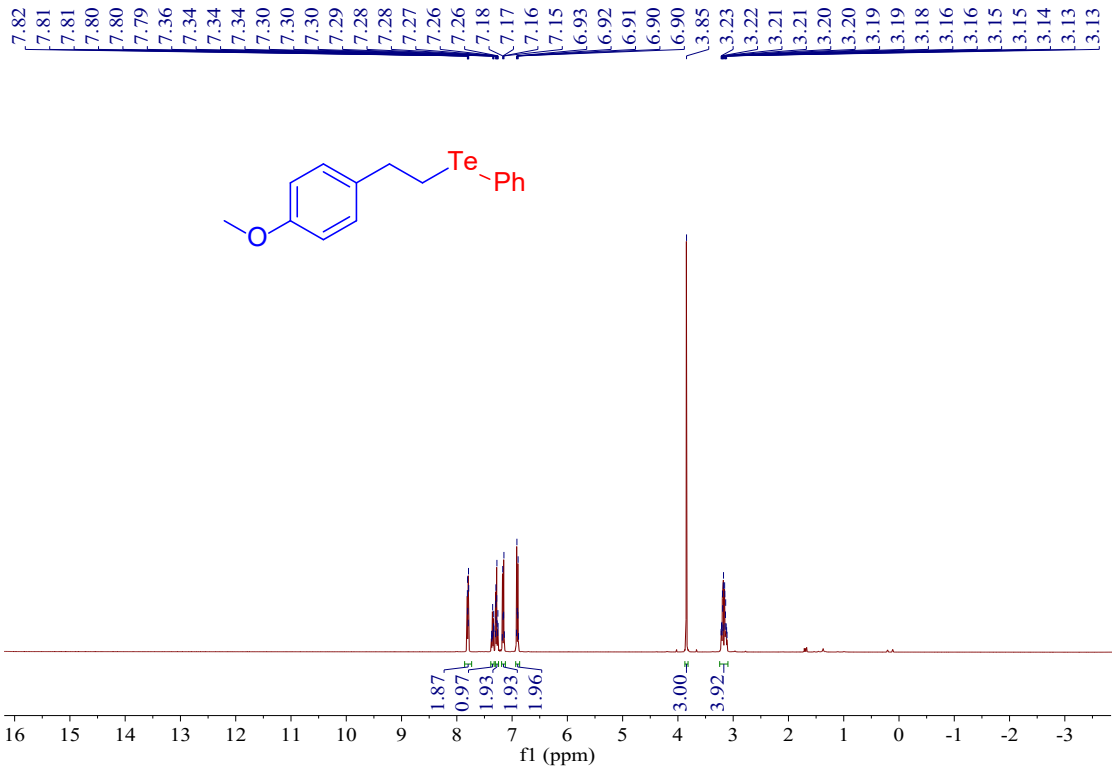
^{13}C NMR Spectra of **3e** (400 MHz, $CDCl_3$)



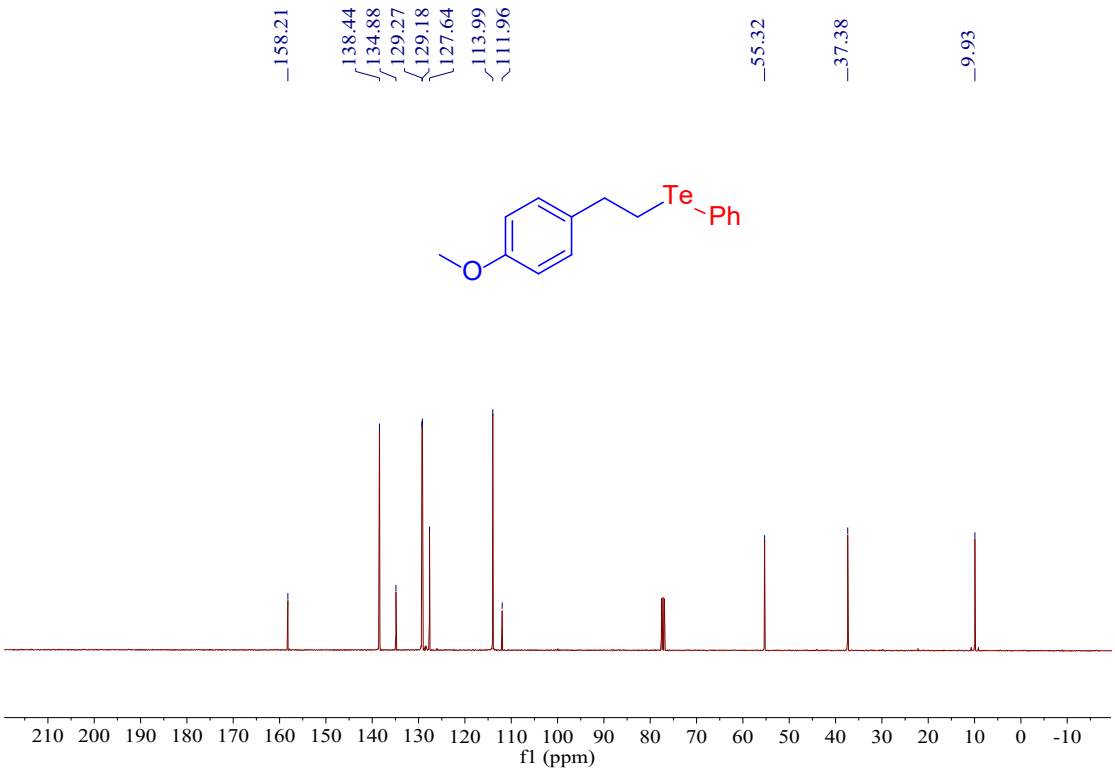
^{125}Te NMR Spectra of **3e** (400 MHz, $CDCl_3$)



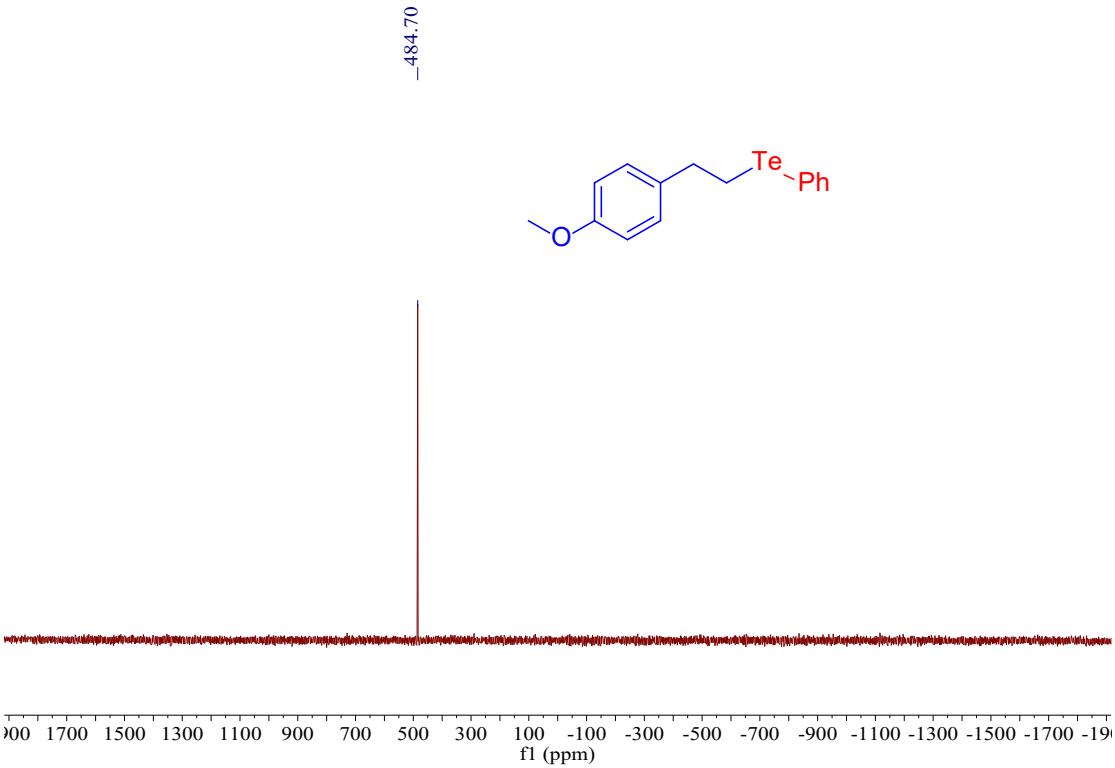
^{1}H NMR Spectra of **3f** (400 MHz, $CDCl_3$)



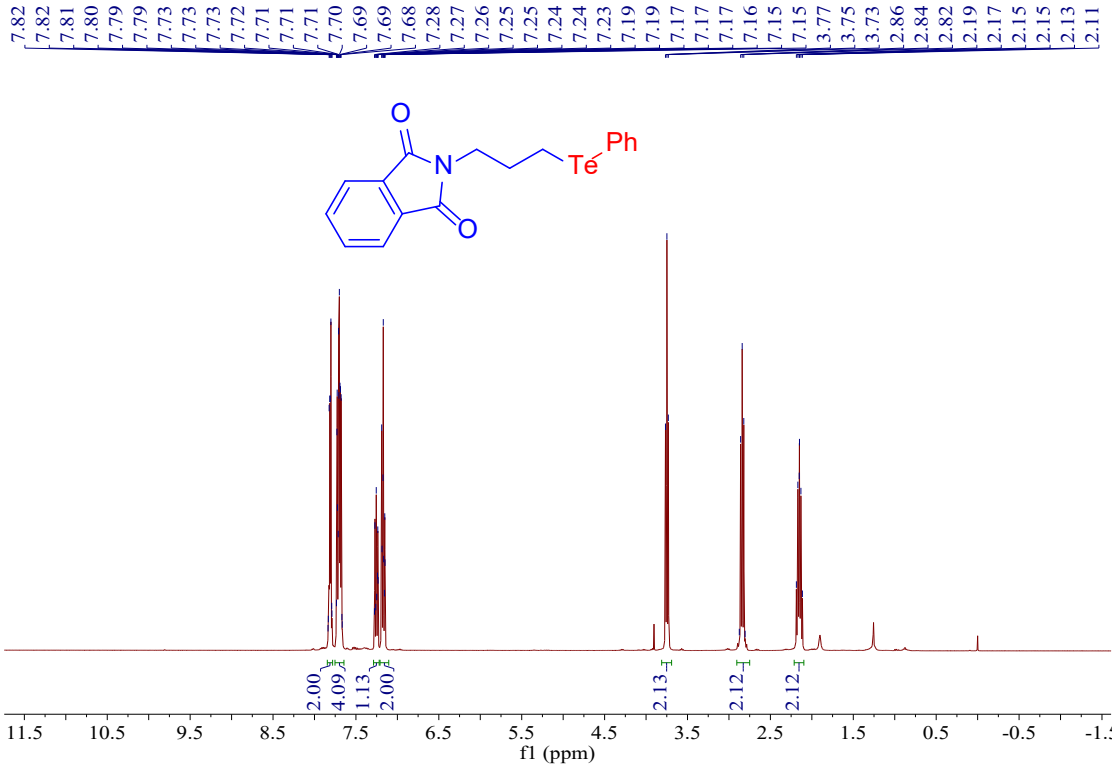
^{13}C NMR Spectra of **3f** (400 MHz, $CDCl_3$)



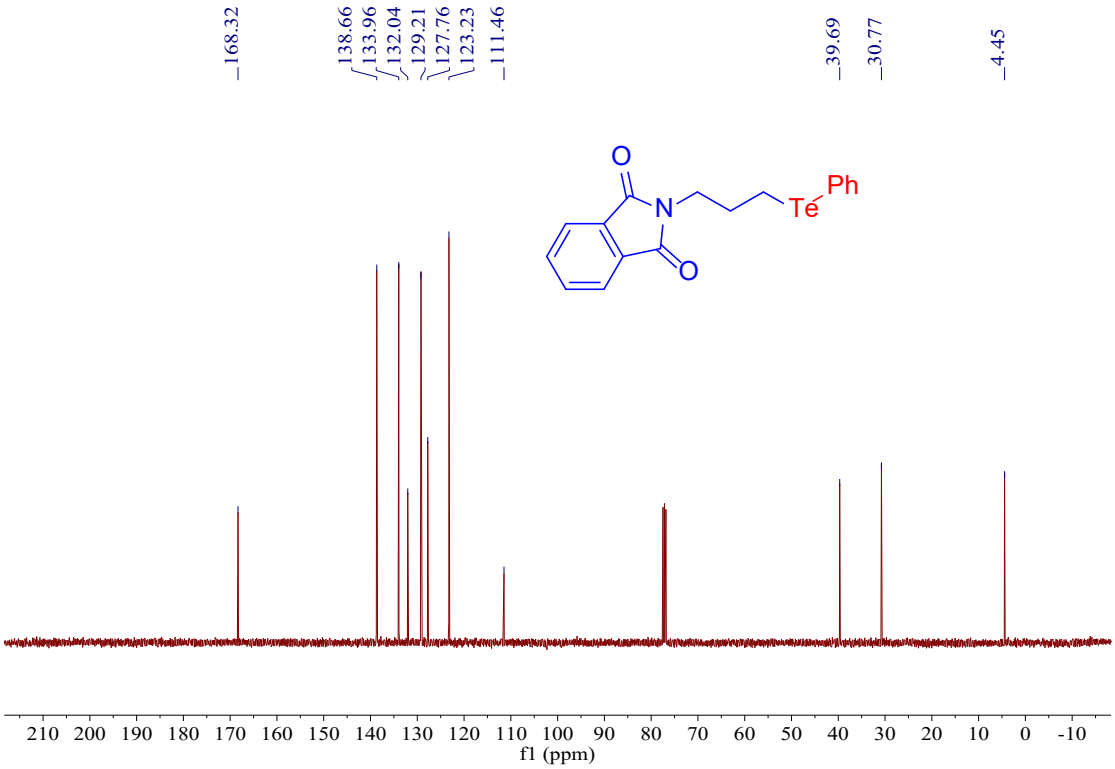
^{125}Te NMR Spectra of **3f** (400 MHz, $CDCl_3$)



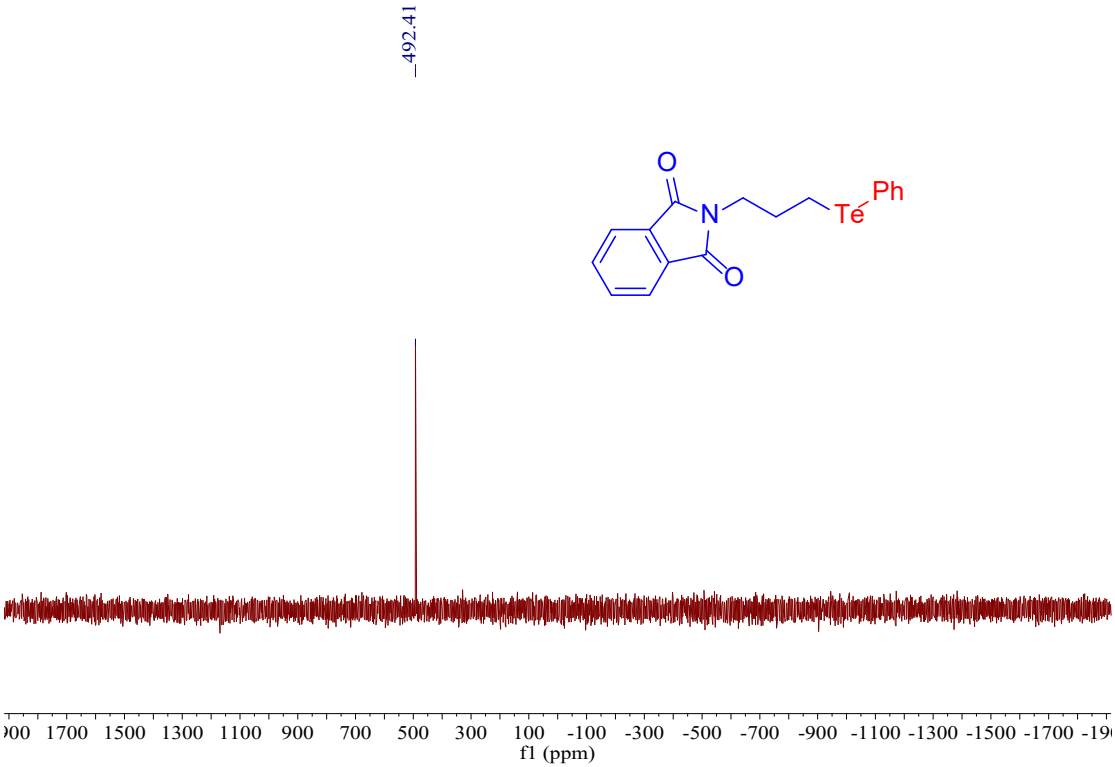
^{1}H NMR Spectra of **3g** (400 MHz, $CDCl_3$)



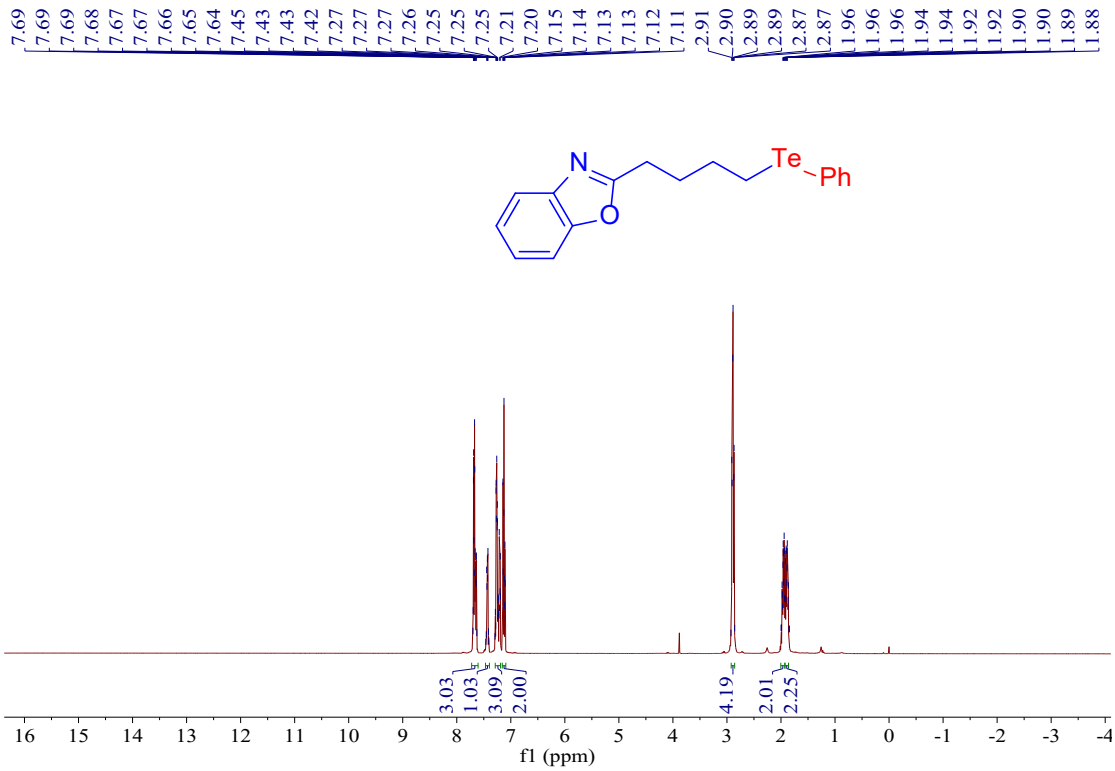
^{13}C NMR Spectra of **3g** (400 MHz, $CDCl_3$)



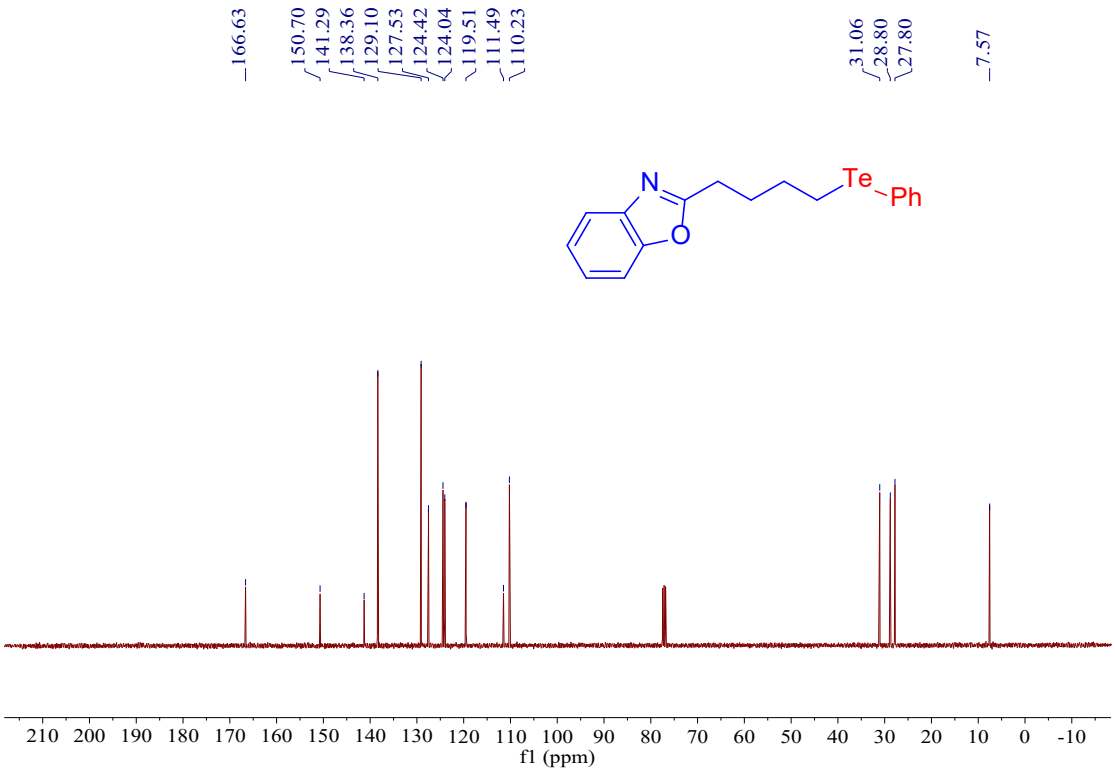
^{125}Te NMR Spectra of **3g** (400 MHz, $CDCl_3$)



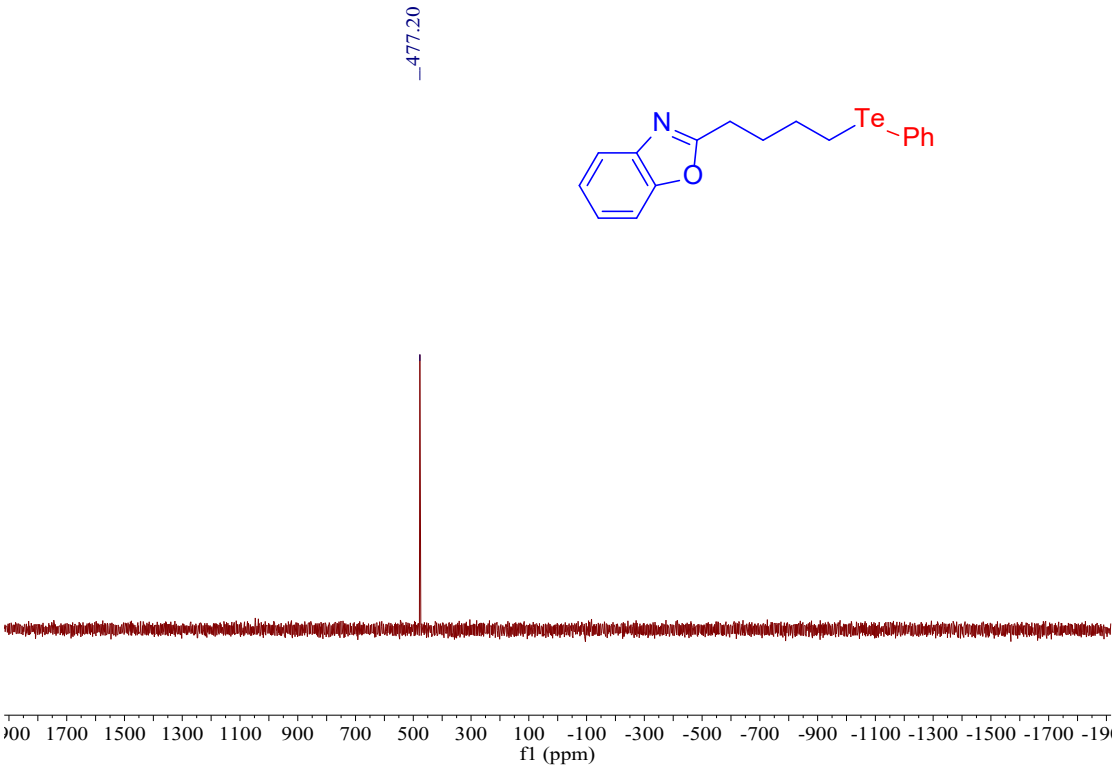
^{1}H NMR Spectra of **3h** (400 MHz, $CDCl_3$)



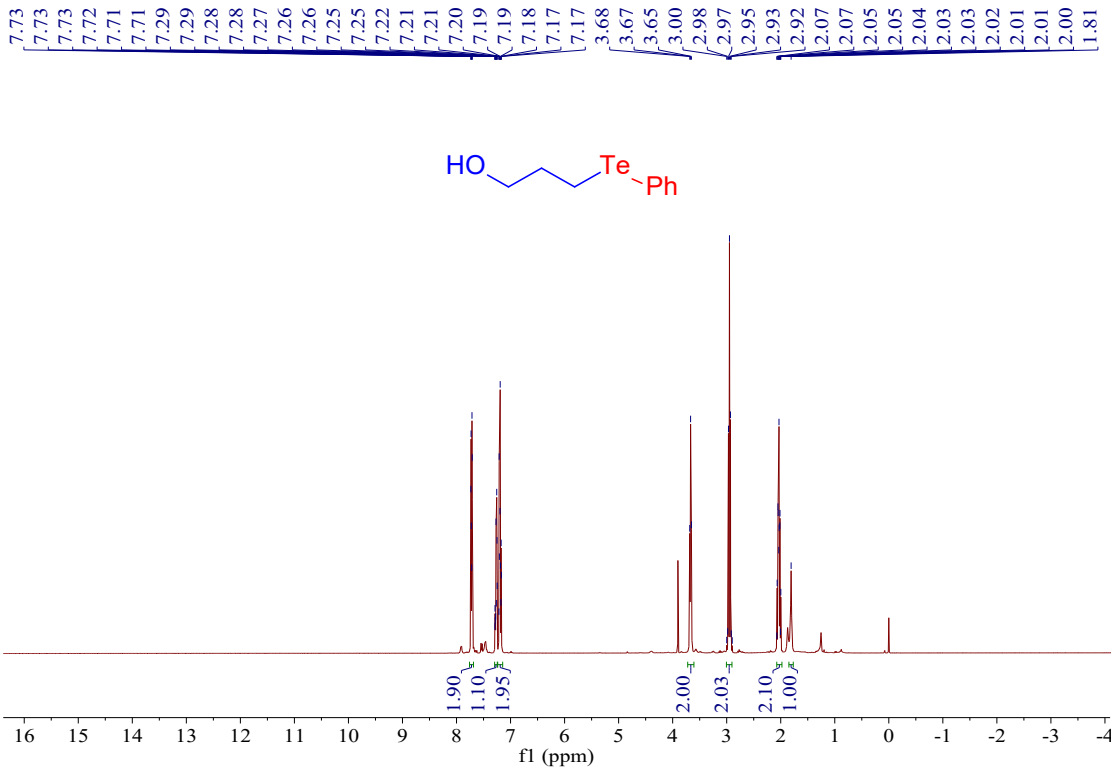
^{13}C NMR Spectra of **3h** (400 MHz, $CDCl_3$)



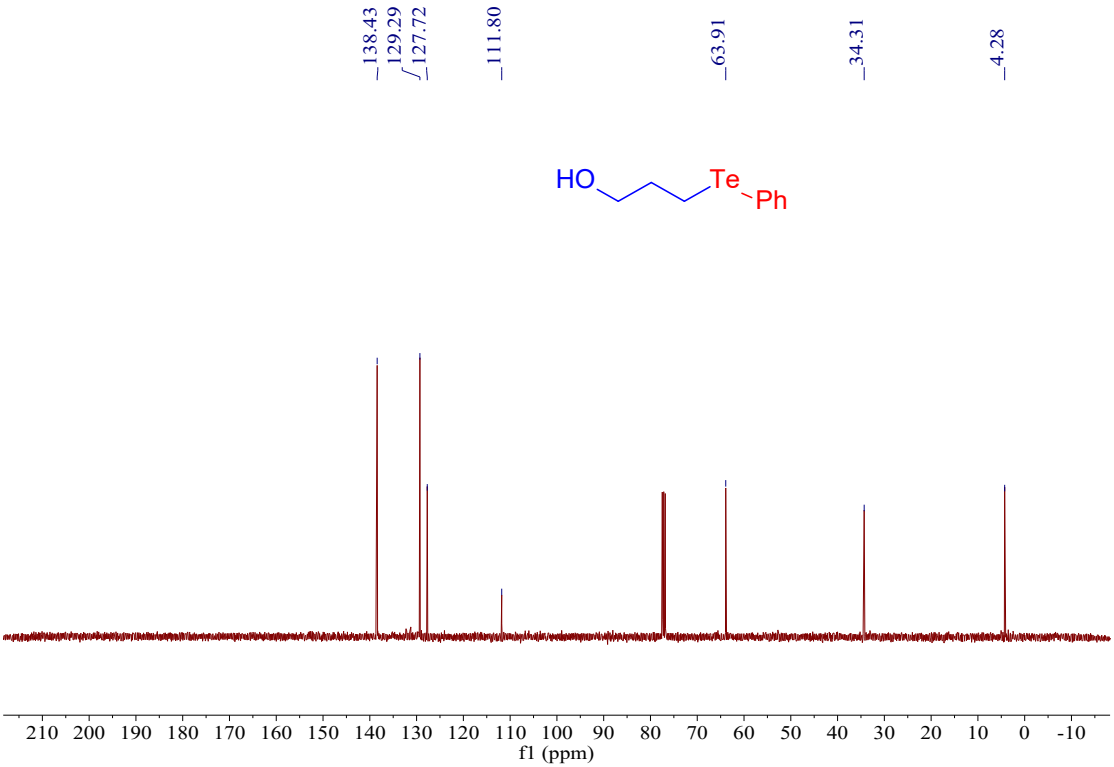
^{125}Te NMR Spectra of **3h** (400 MHz, $CDCl_3$)



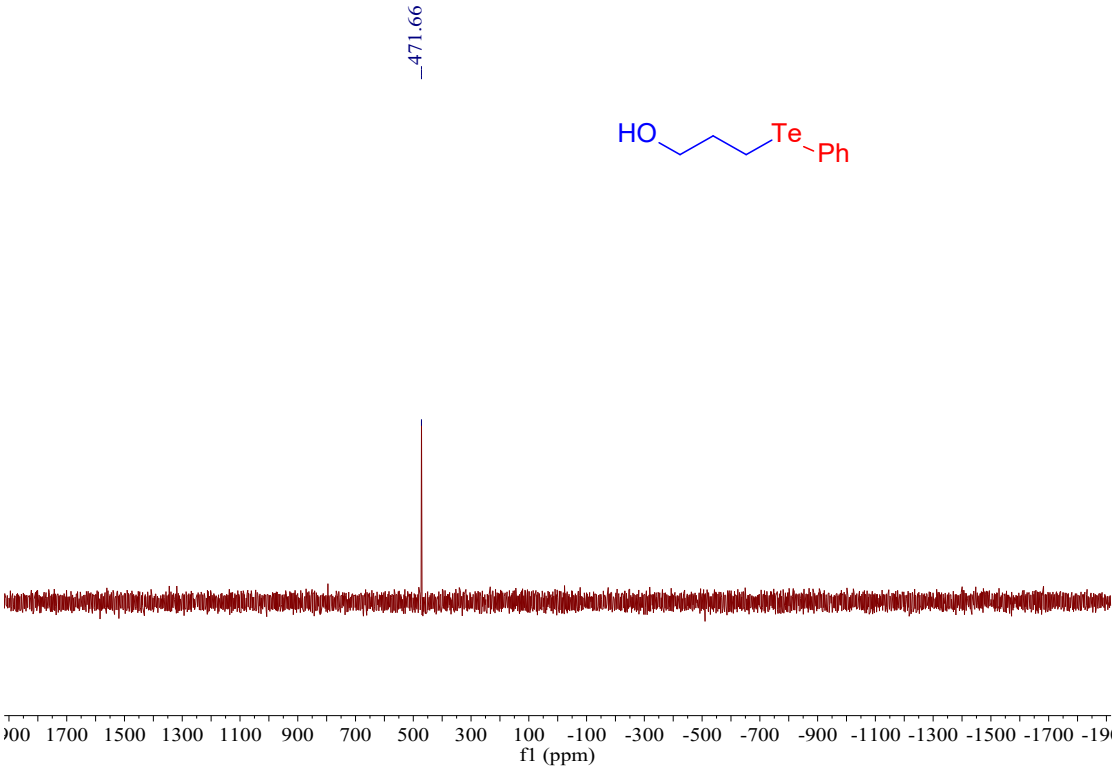
^{1}H NMR Spectra of **3i** (400 MHz, $CDCl_3$)



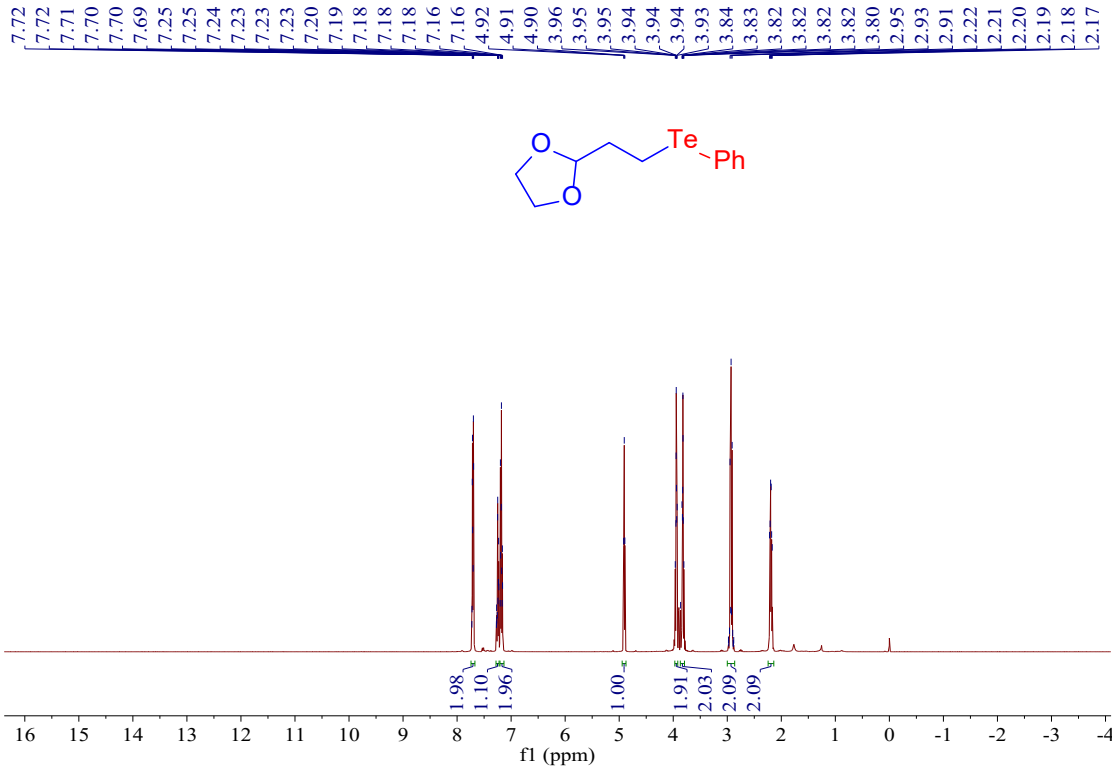
^{13}C NMR Spectra of **3i** (400 MHz, $CDCl_3$)



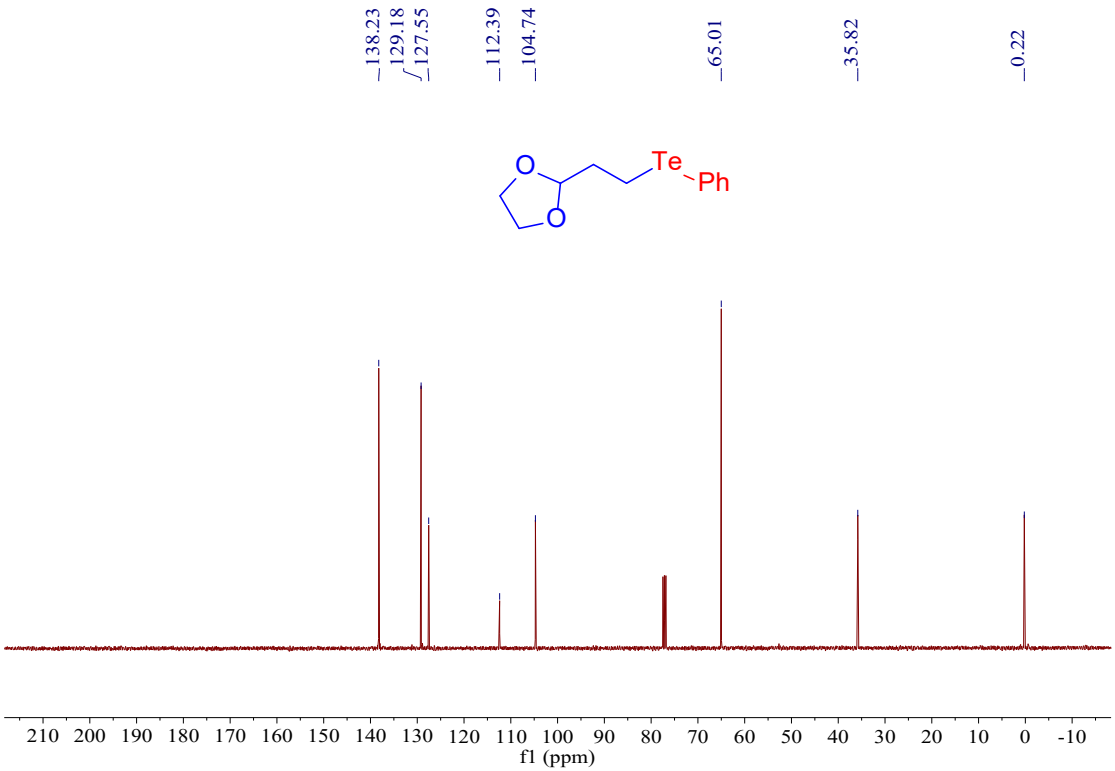
^{125}Te NMR Spectra of **3i** (400 MHz, $CDCl_3$)



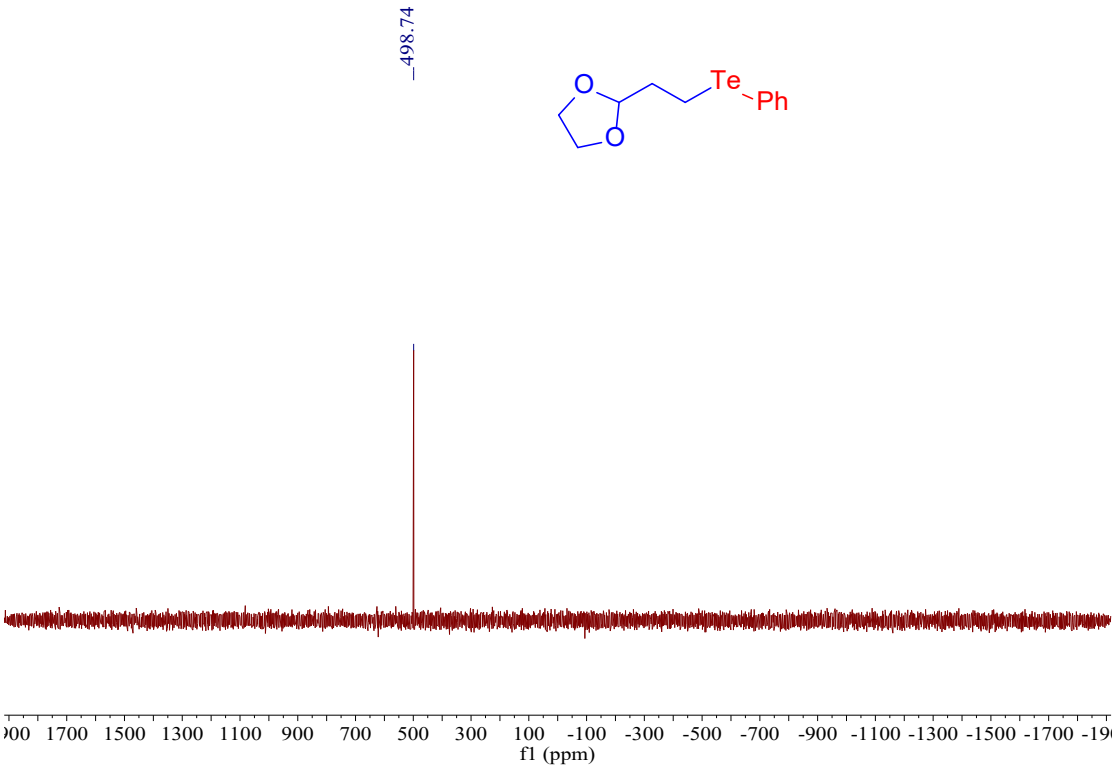
^{1}H NMR Spectra of **3j** (400 MHz, $CDCl_3$)



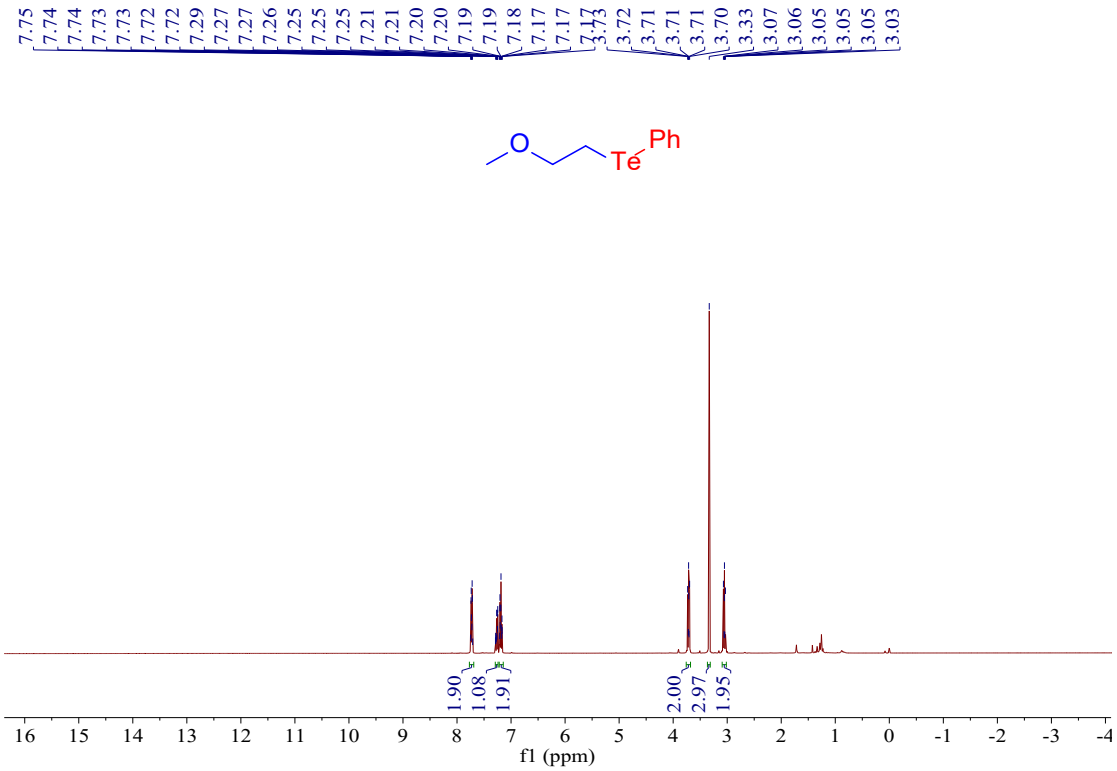
^{13}C NMR Spectra of **3j** (400 MHz, $CDCl_3$)



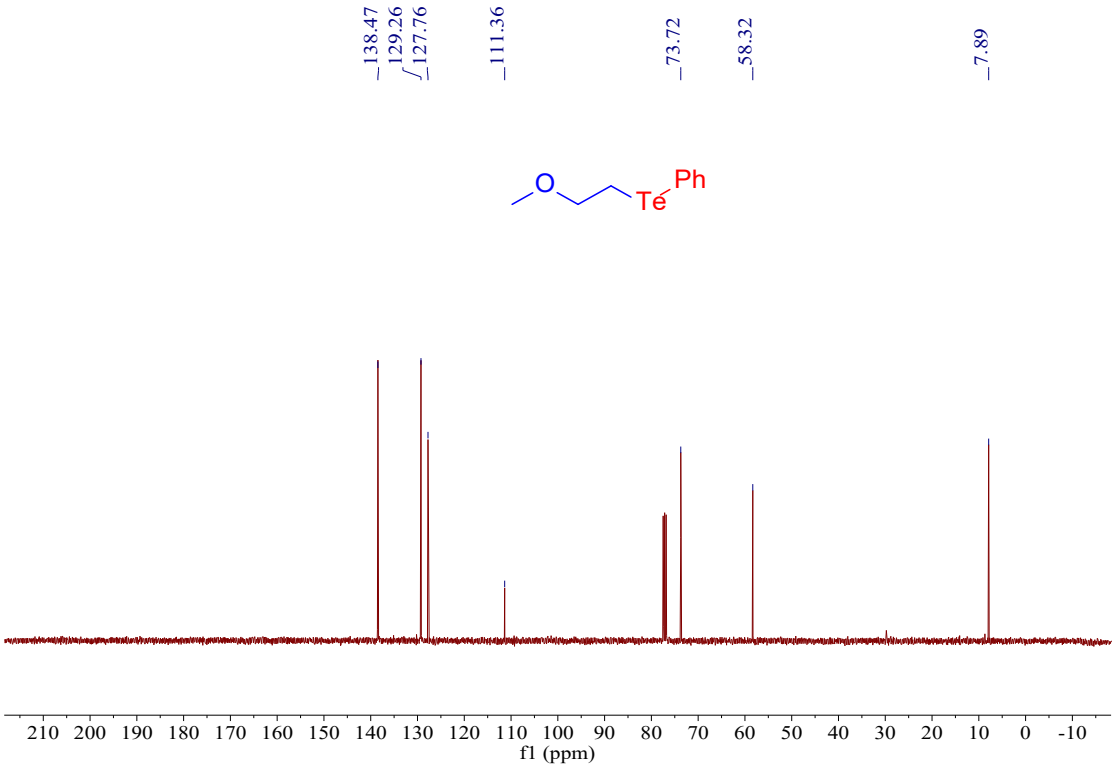
^{125}Te NMR Spectra of **3j** (400 MHz, $CDCl_3$)



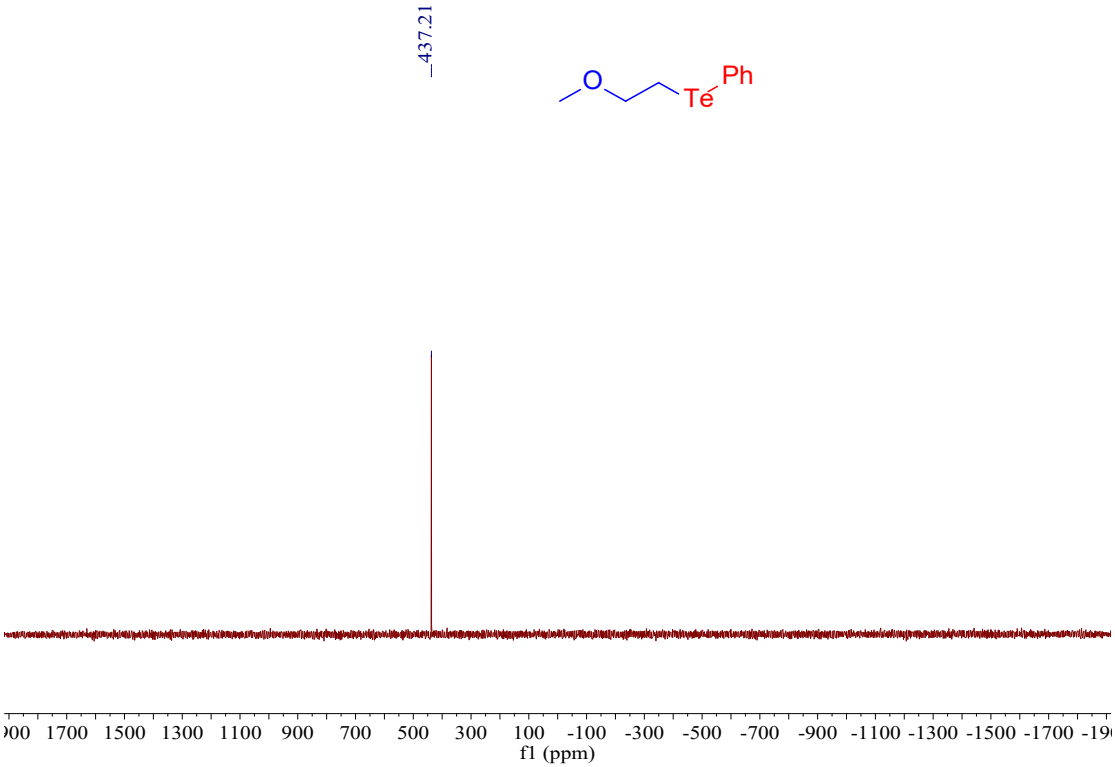
^{1}H NMR Spectra of **3k** (400 MHz, $CDCl_3$)



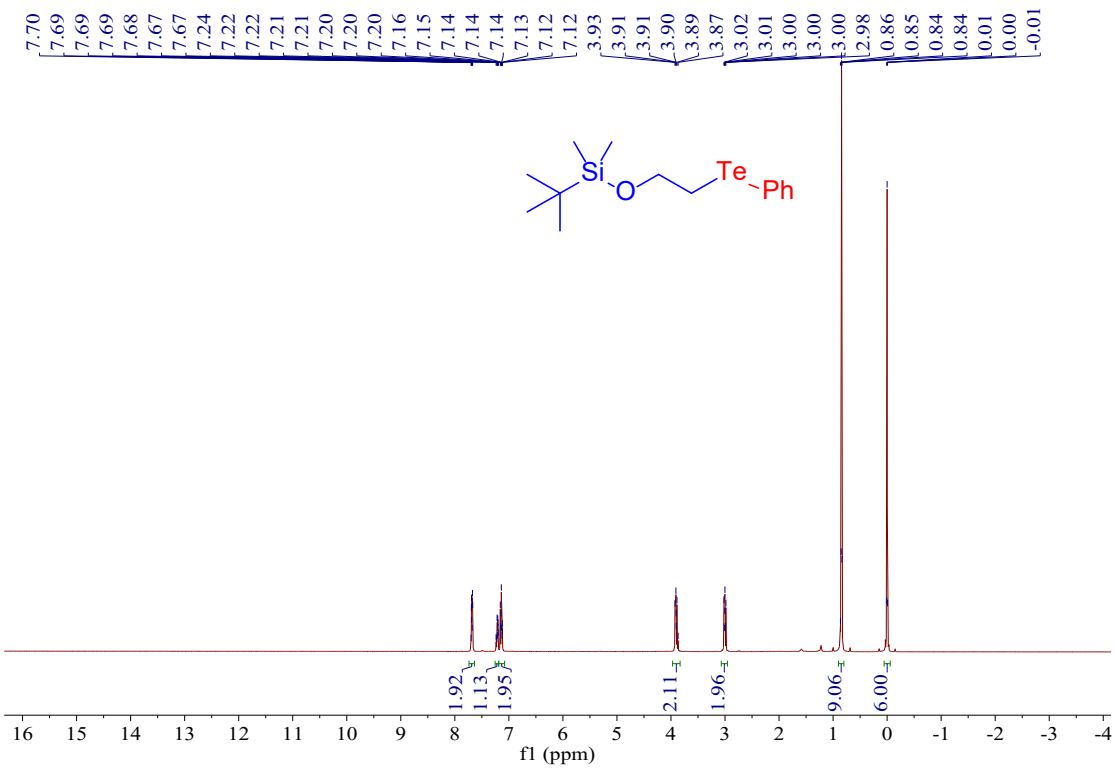
^{13}C NMR Spectra of **3k** (400 MHz, $CDCl_3$)



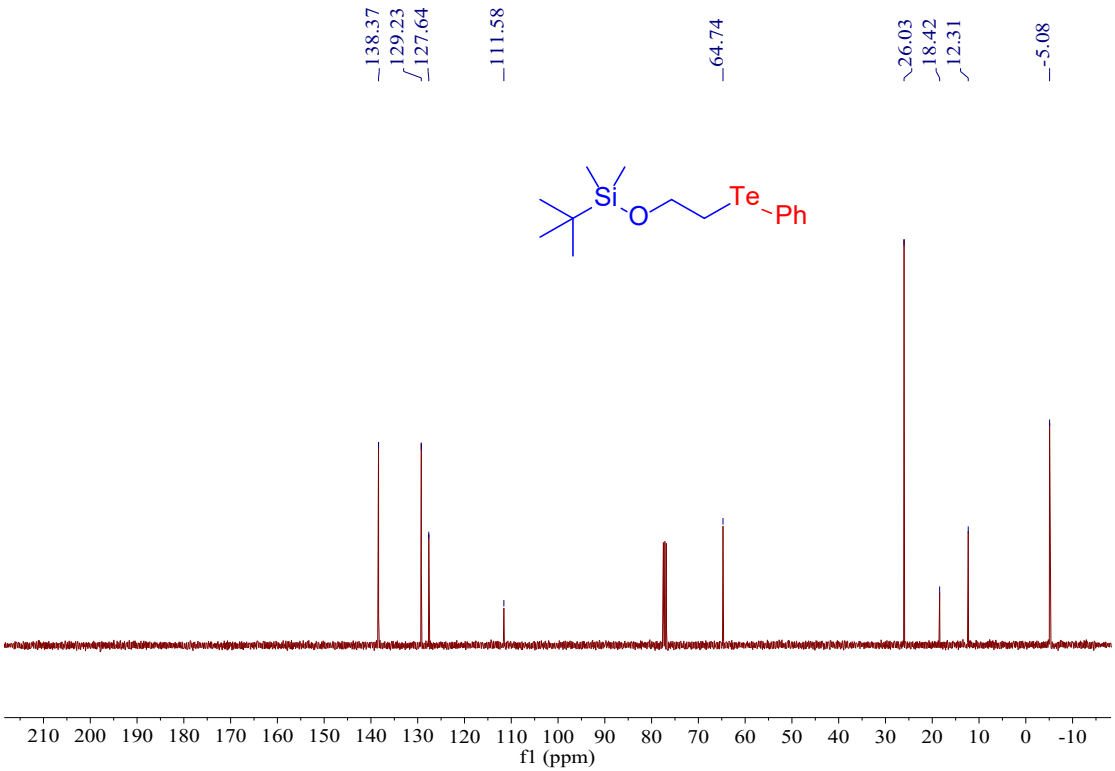
^{125}Te NMR Spectra of **3k** (400 MHz, $CDCl_3$)



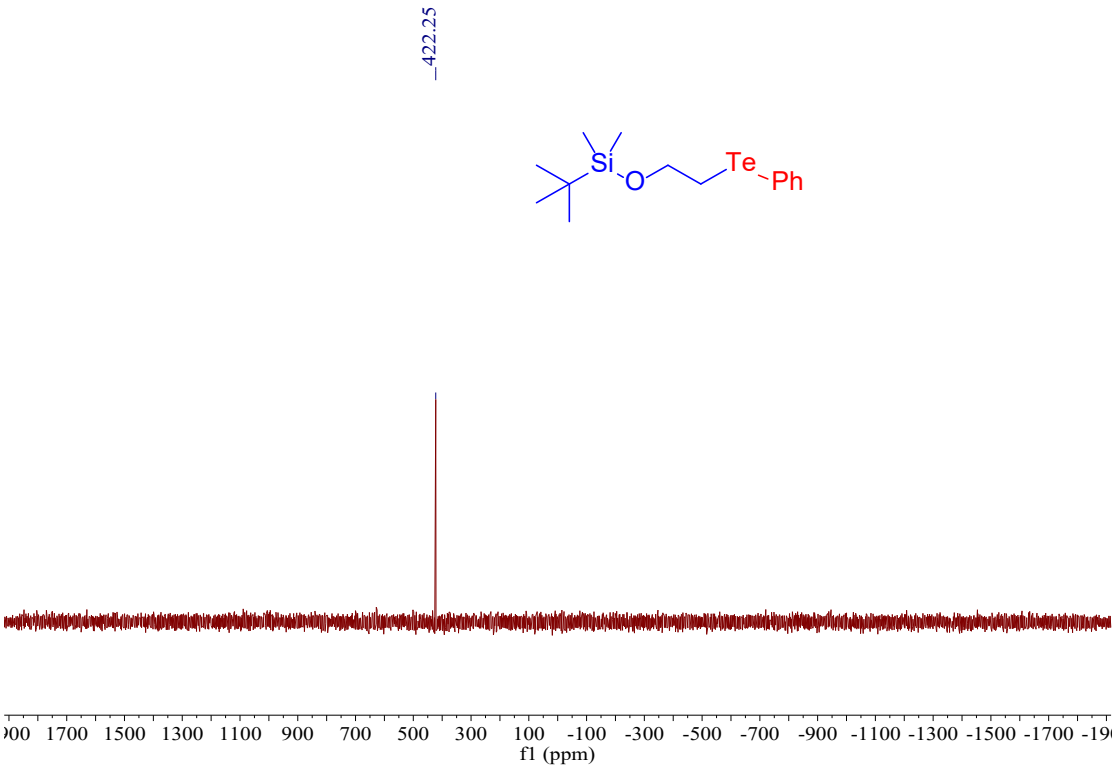
^{1}H NMR Spectra of **3l** (400 MHz, $CDCl_3$)



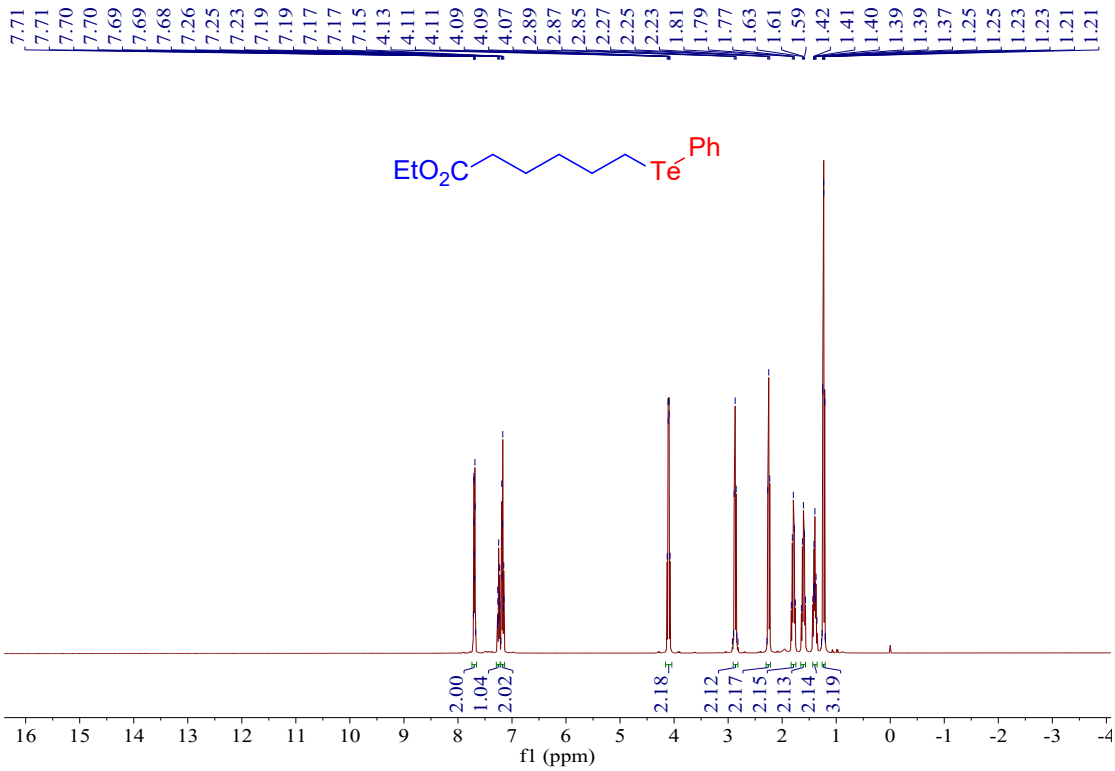
^{13}C NMR Spectra of **3l** (400 MHz, $CDCl_3$)



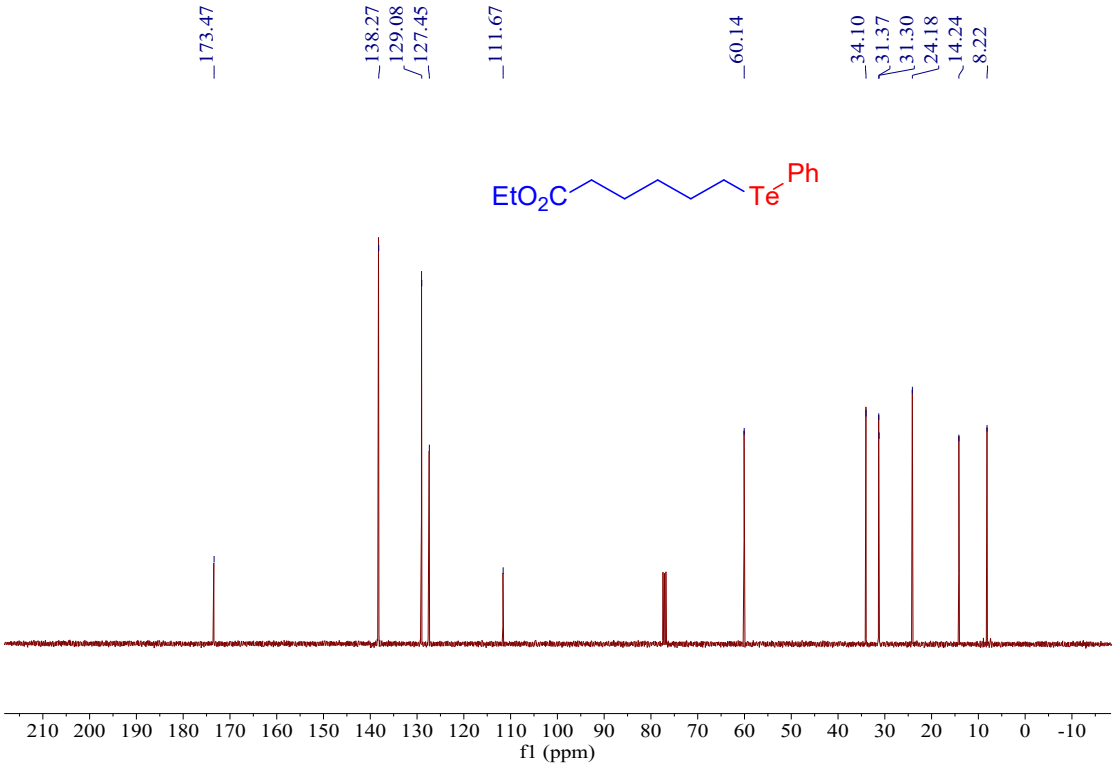
^{13}Te NMR Spectra of **3l** (400 MHz, $CDCl_3$)



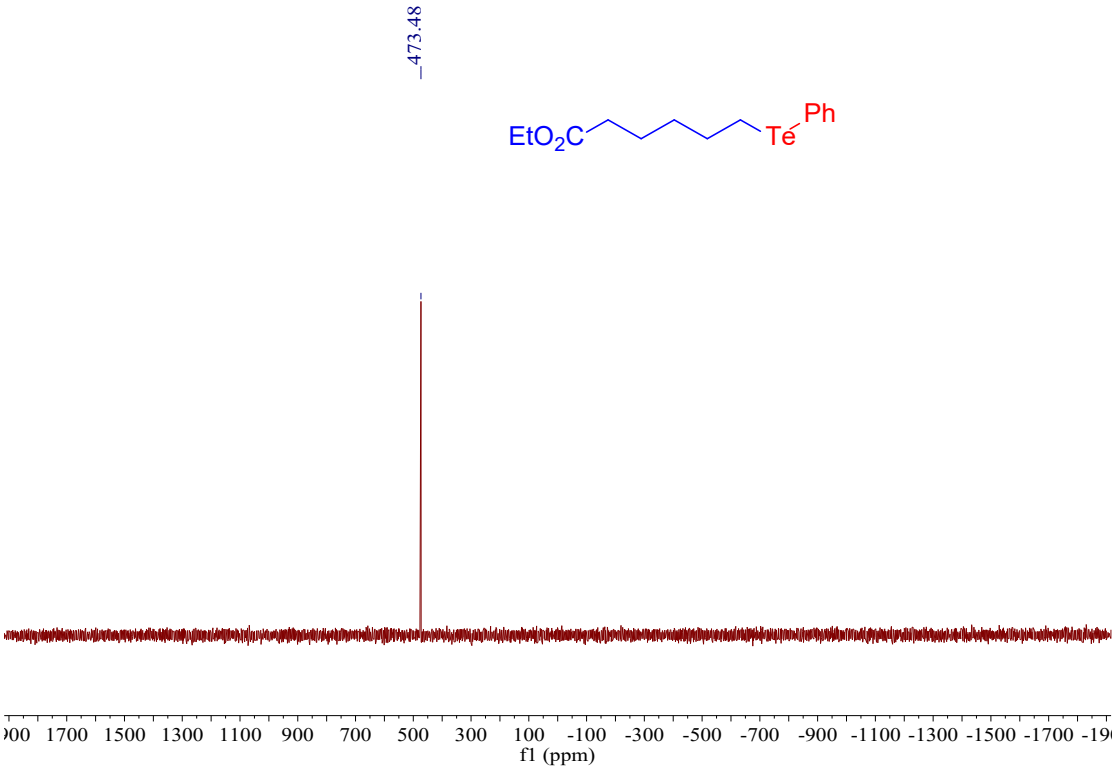
^{1}H NMR Spectra of **3m** (400 MHz, $CDCl_3$)



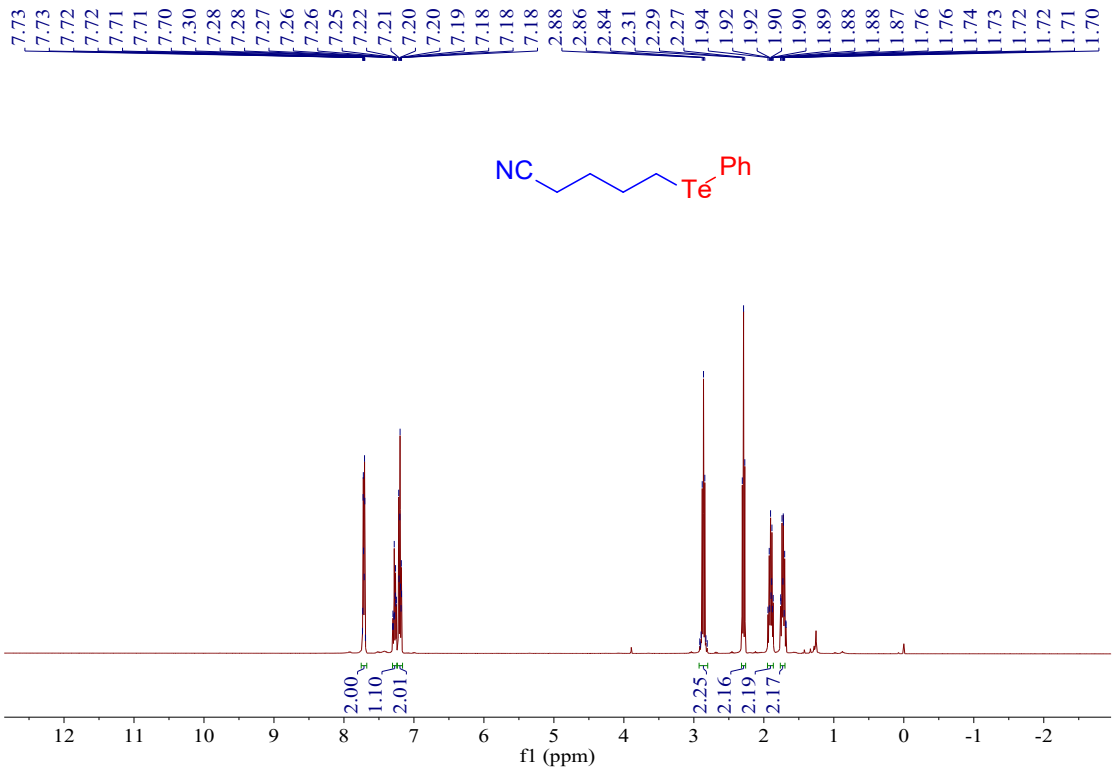
^{13}C NMR Spectra of **3m** (400 MHz, $CDCl_3$)



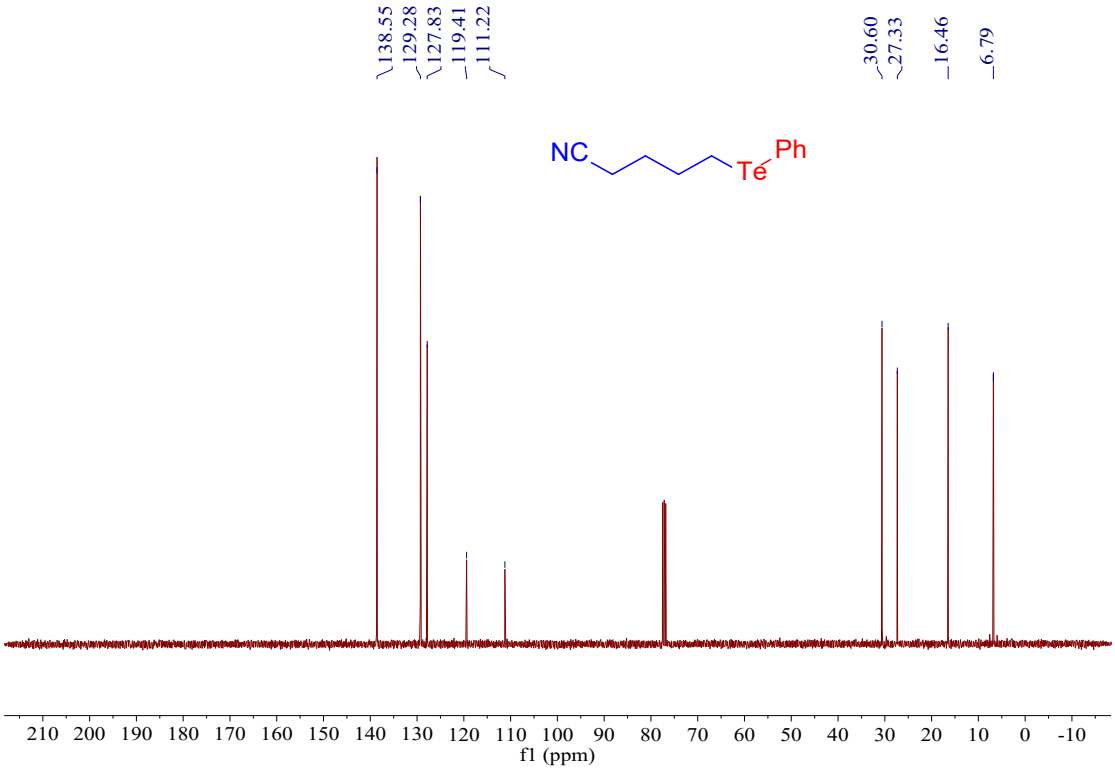
^{125}Te NMR Spectra of **3m** (400 MHz, $CDCl_3$)



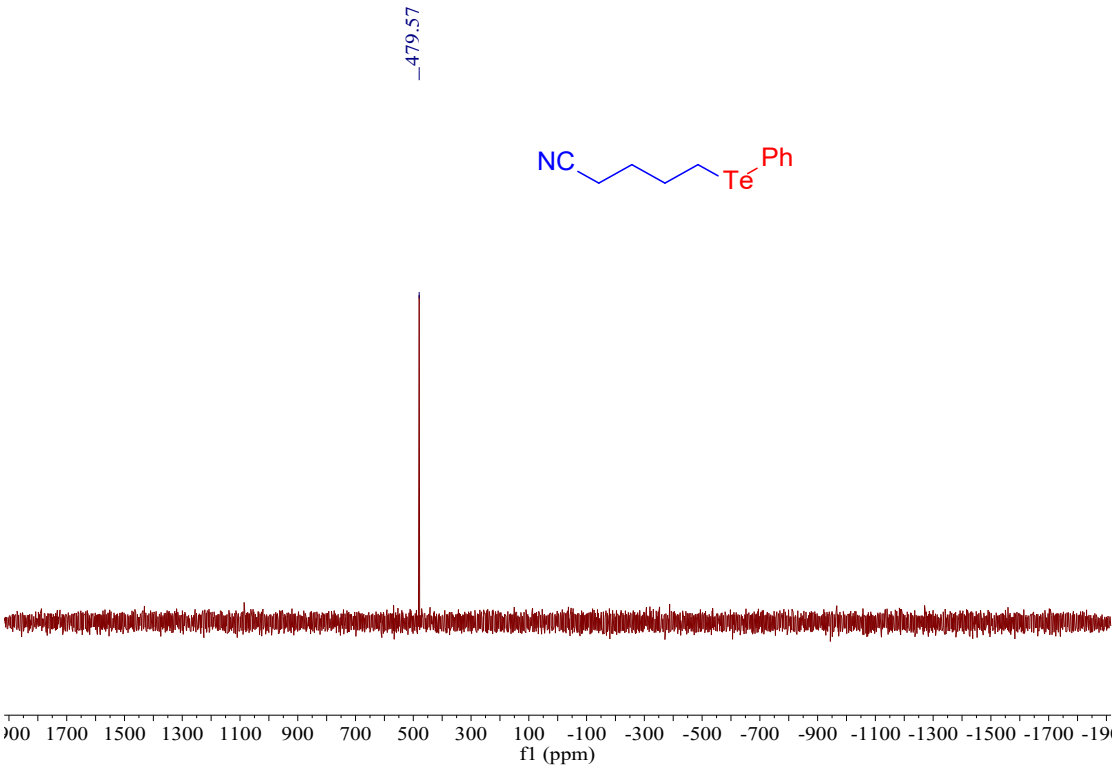
^{1}H NMR Spectra of **3n** (400 MHz, $CDCl_3$)



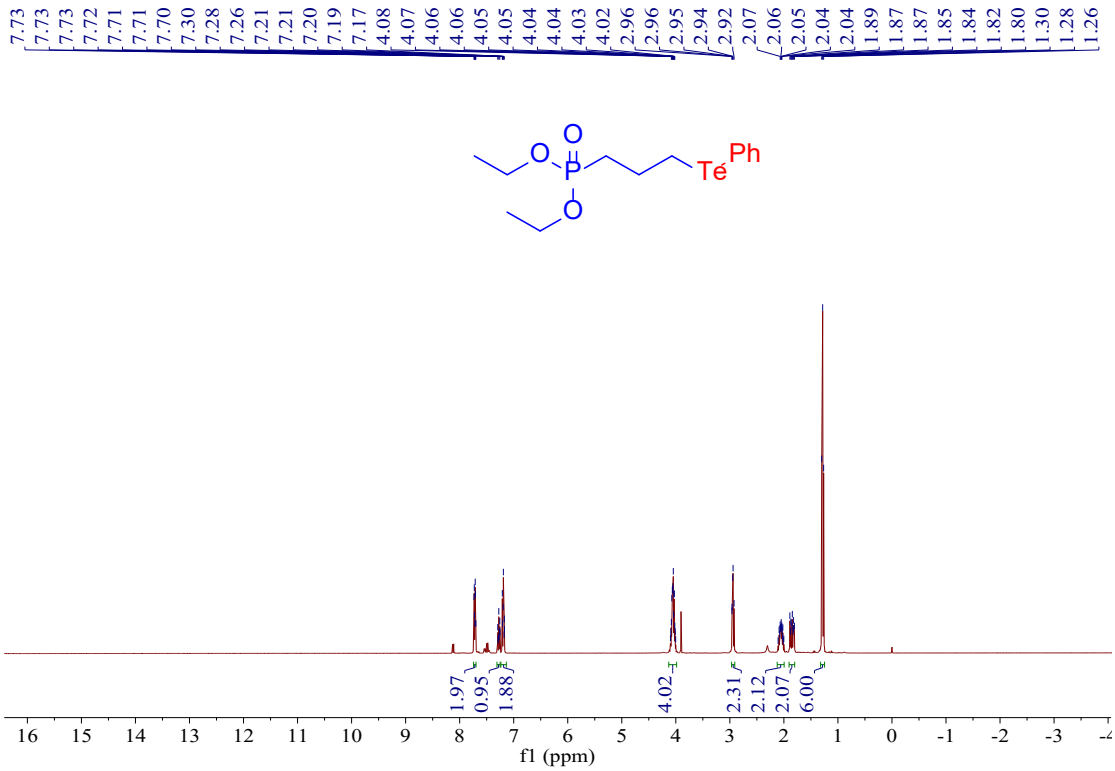
^{13}C NMR Spectra of **3n** (400 MHz, $CDCl_3$)



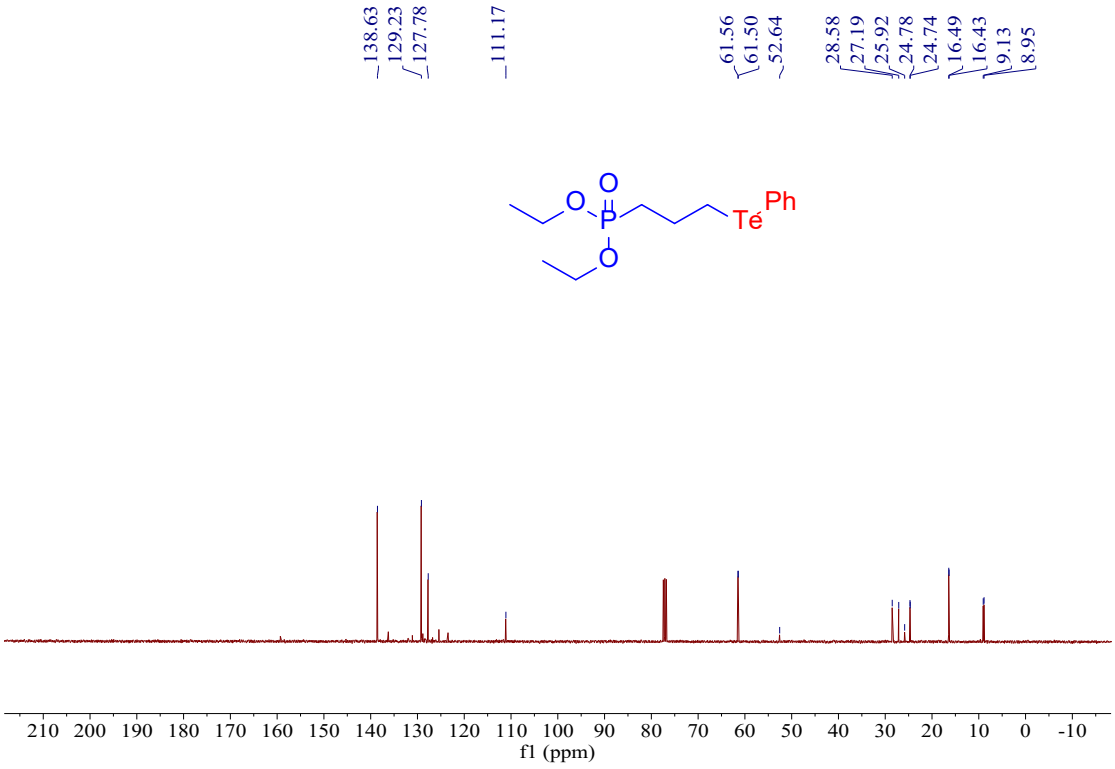
^{125}Te NMR Spectra of **3n** (400 MHz, $CDCl_3$)



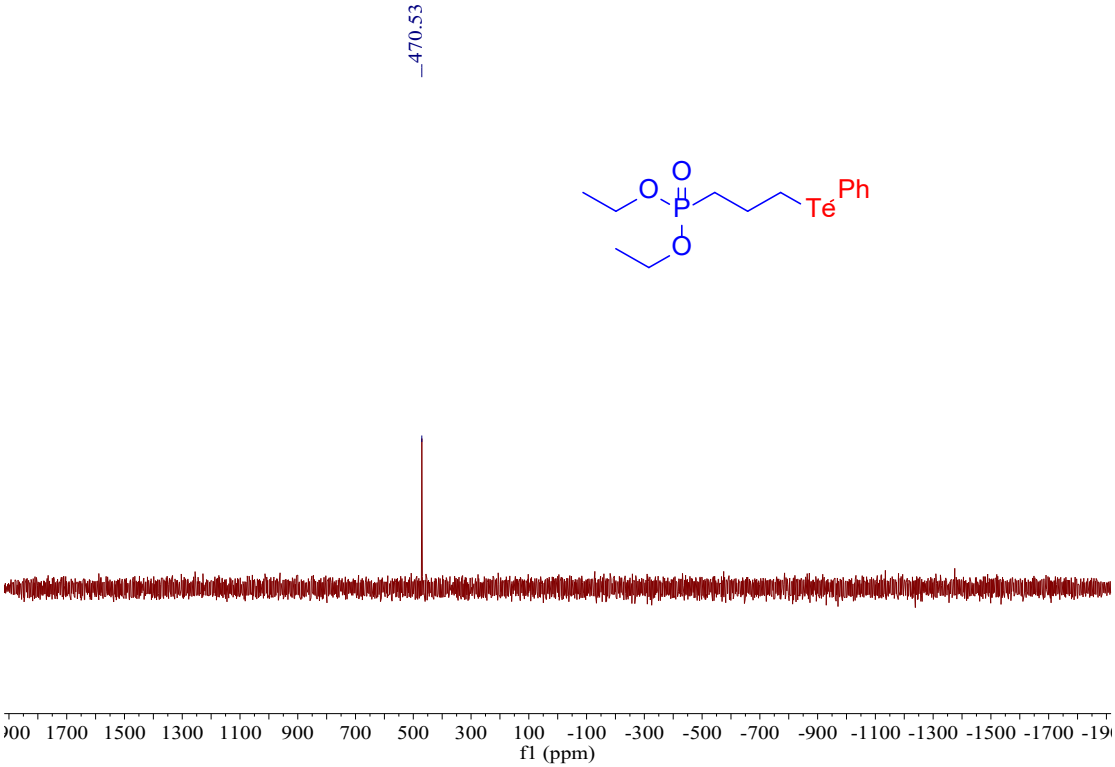
^{1}H NMR Spectra of **3o** (400 MHz, $CDCl_3$)



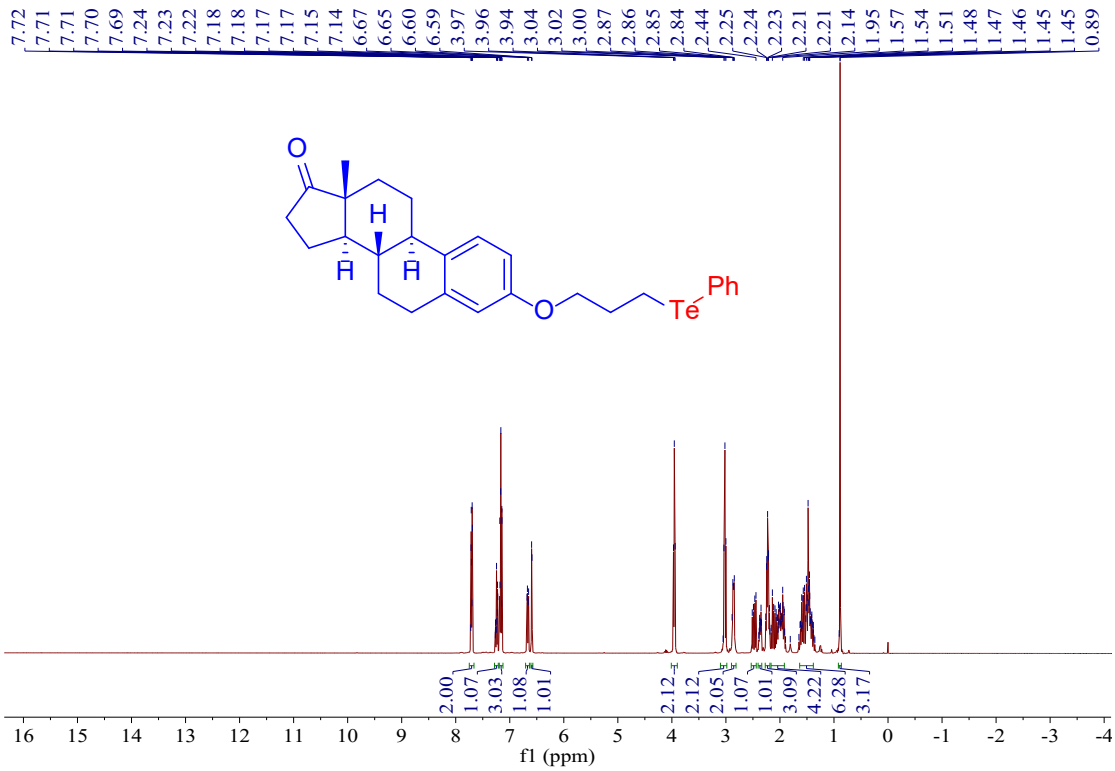
^{13}C NMR Spectra of **3o** (400 MHz, $CDCl_3$)



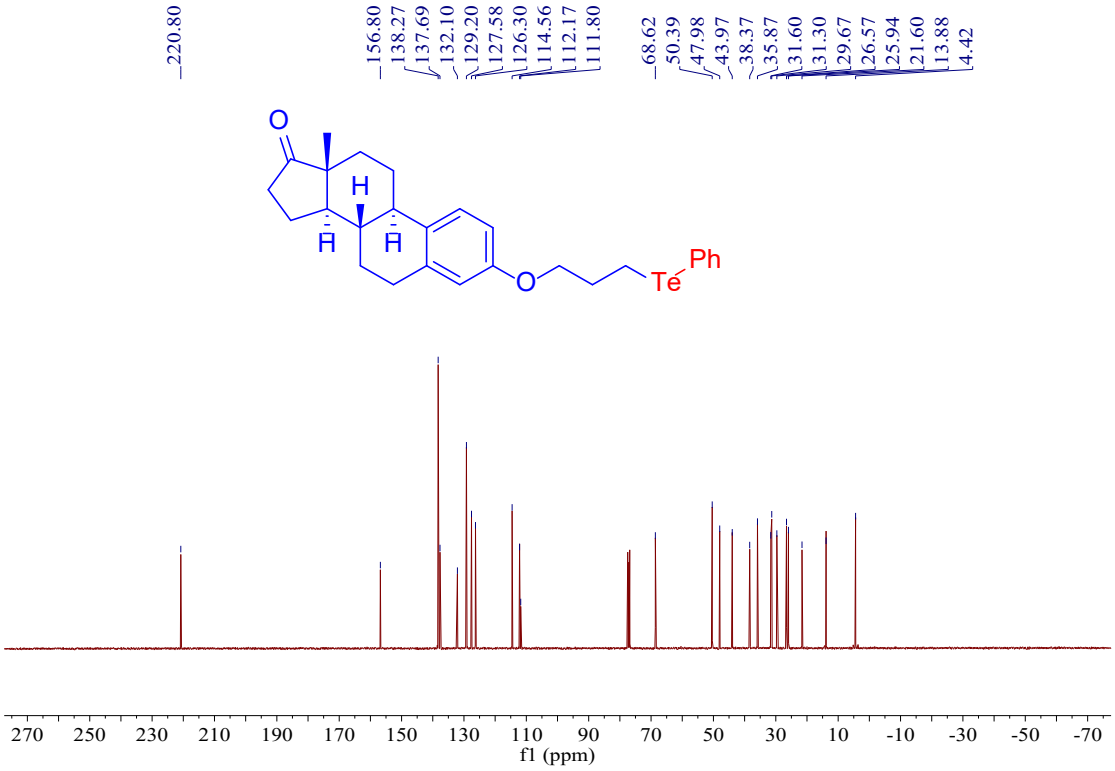
^{125}Te NMR Spectra of **3o** (400 MHz, $CDCl_3$)



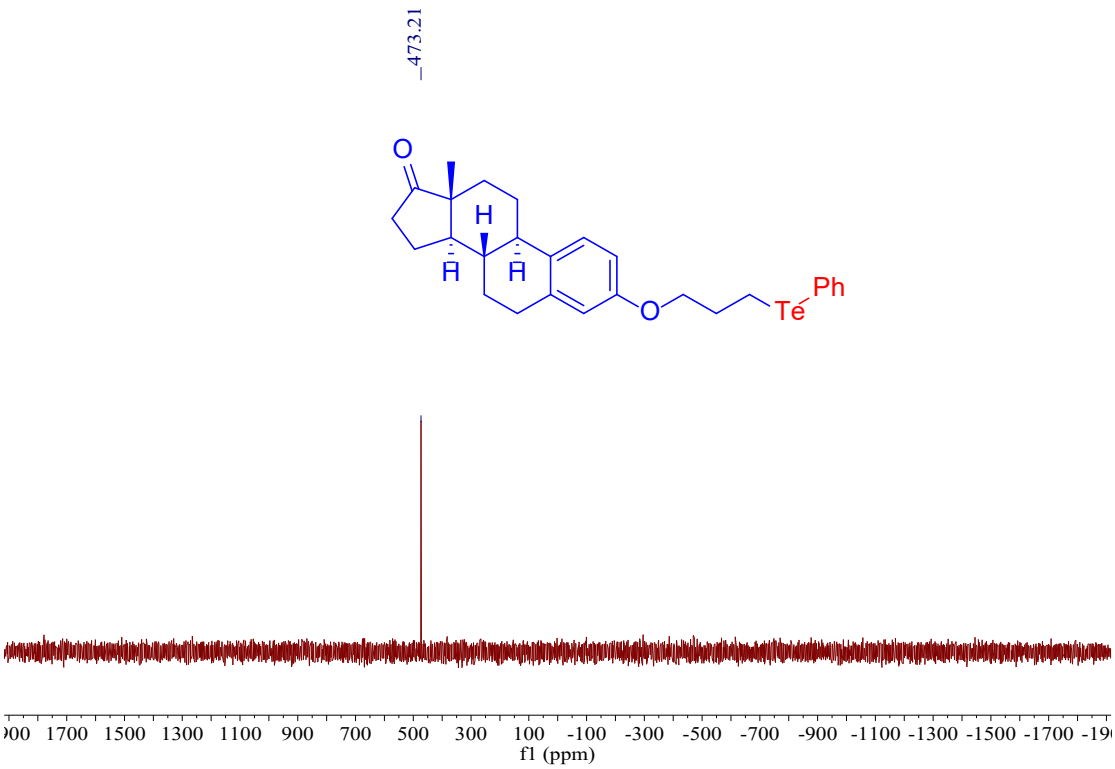
^{1}H NMR Spectra of **3p** (400 MHz, $CDCl_3$)



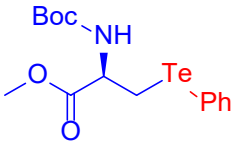
^{13}C NMR Spectra of **3p** (400 MHz, $CDCl_3$)

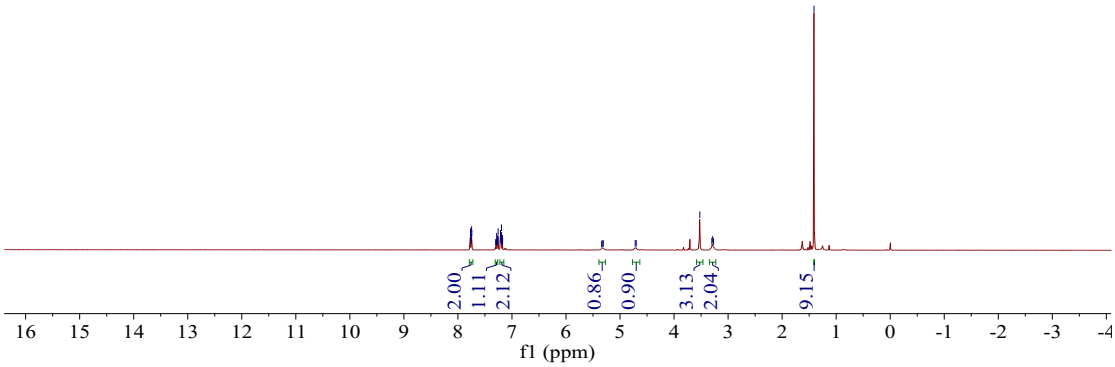


^{125}Te NMR Spectra of **3p** (400 MHz, $CDCl_3$)

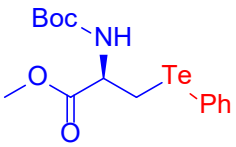


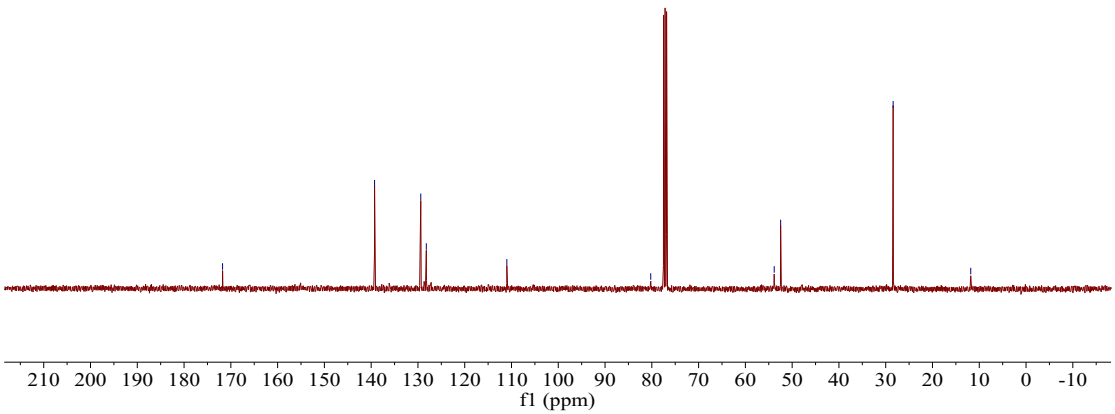
^{1}H NMR Spectra of **3q** (400 MHz, $CDCl_3$)



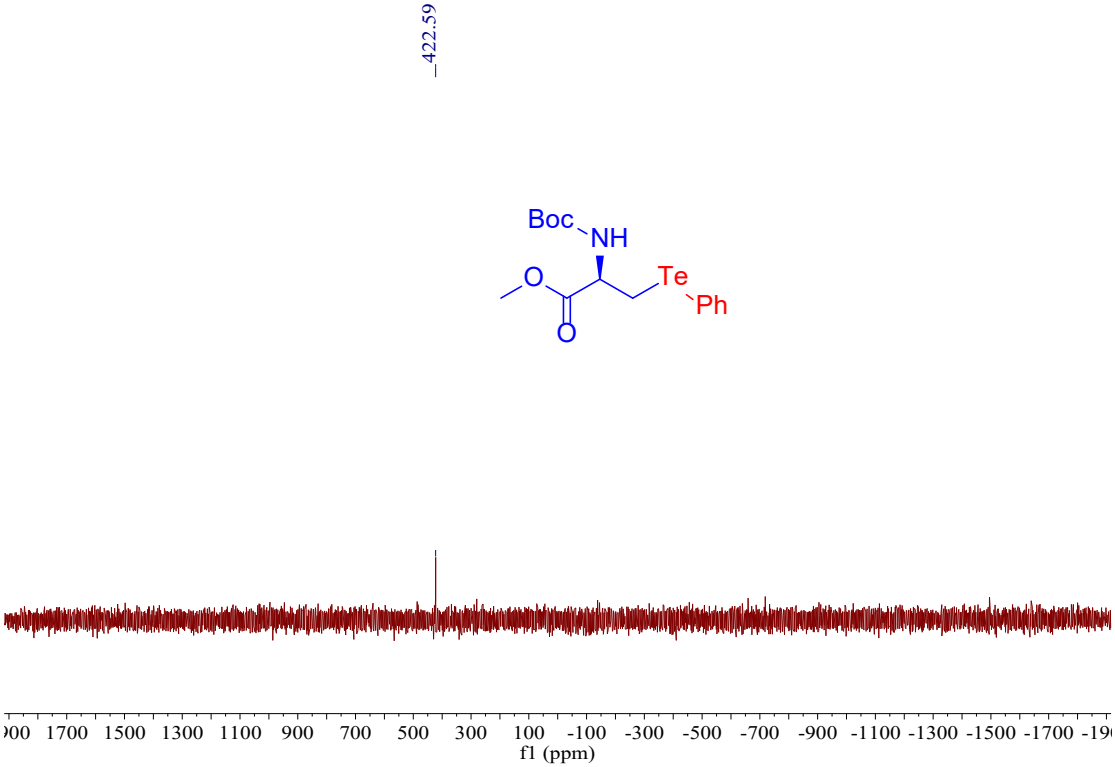


^{13}C NMR Spectra of **3q** (400 MHz, $CDCl_3$)

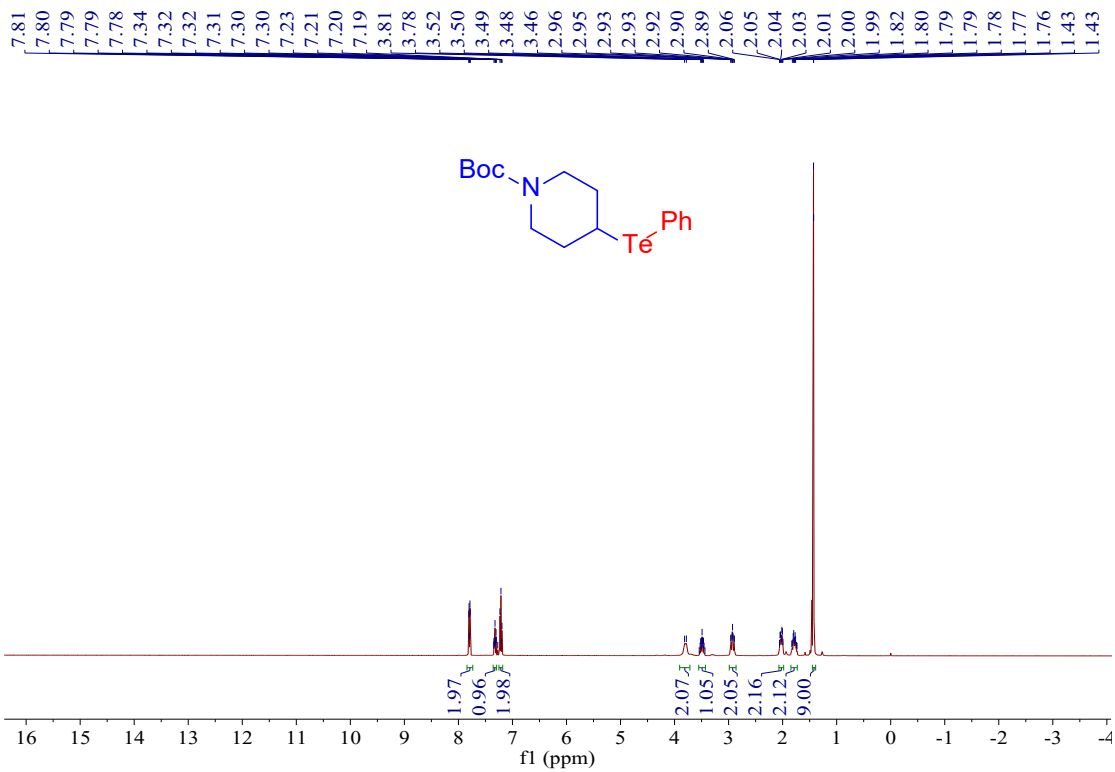




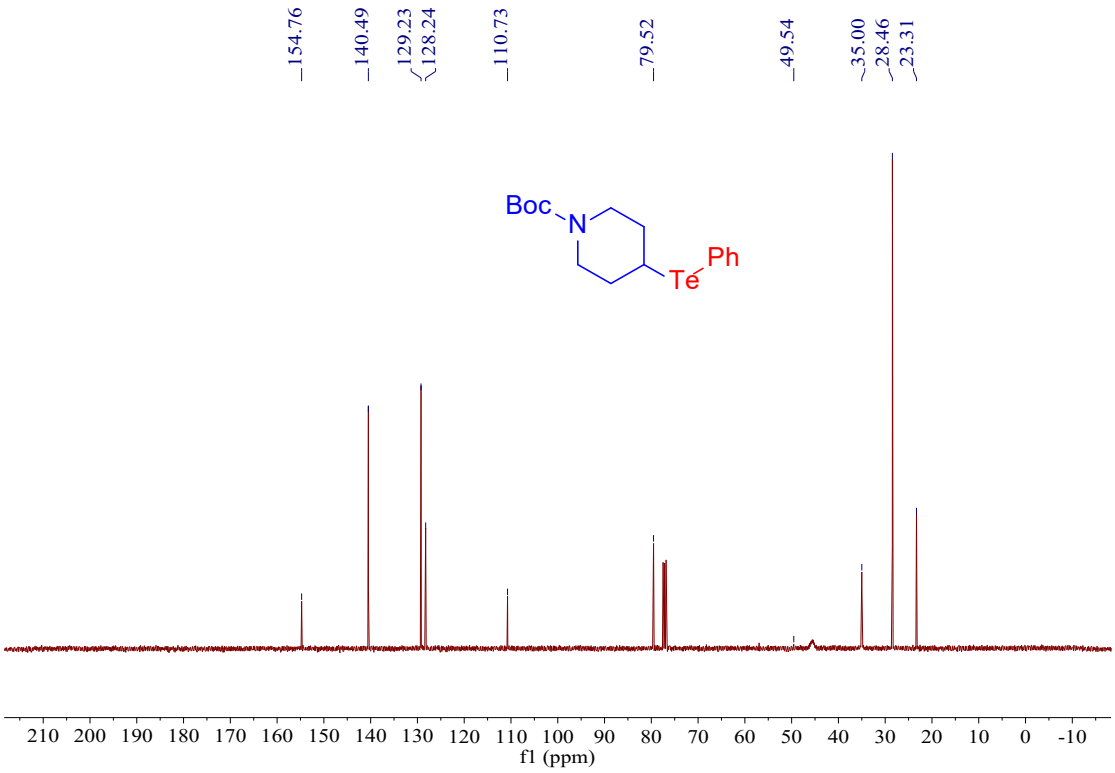
^{125}Te NMR Spectra of **3q** (400 MHz, $CDCl_3$)



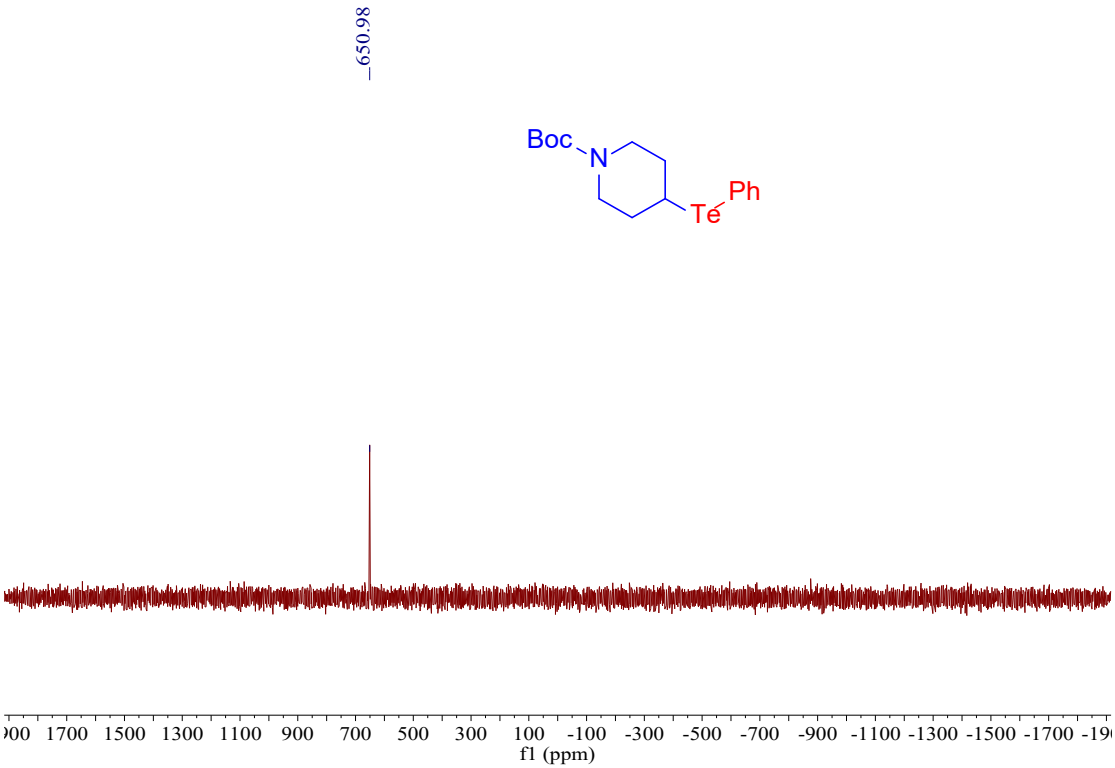
^{1}H NMR Spectra of **3r** (400 MHz, $CDCl_3$)



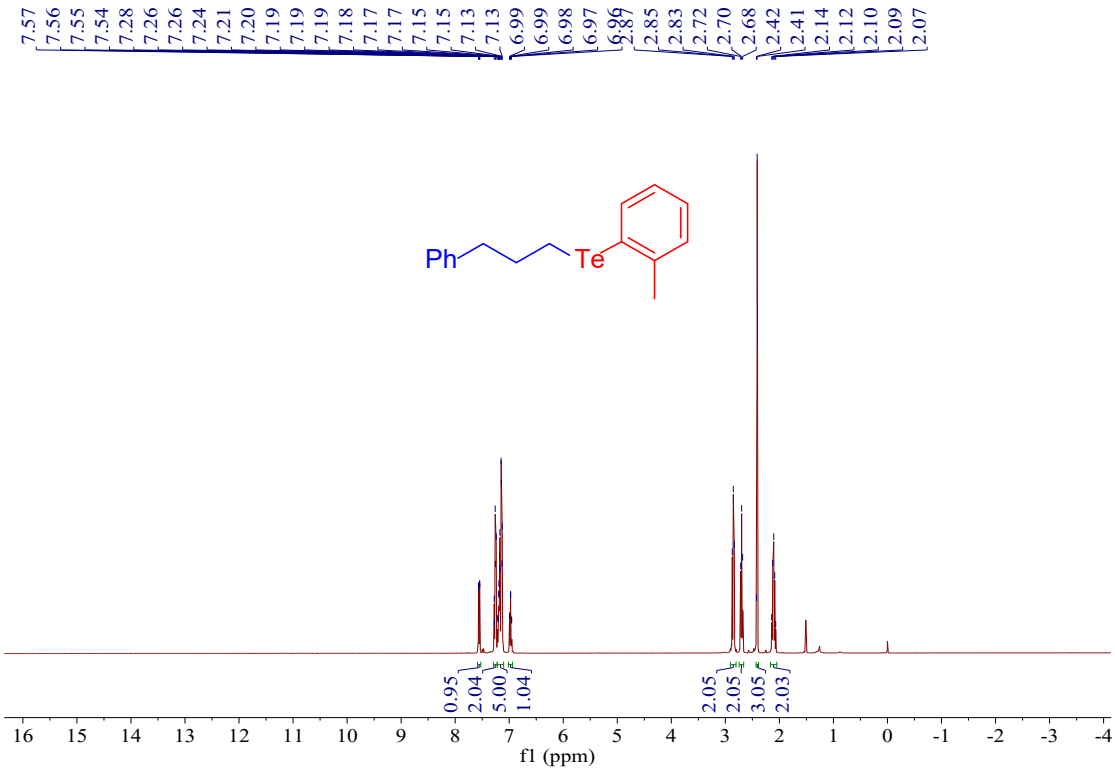
^{13}C NMR Spectra of **3r** (400 MHz, $CDCl_3$)



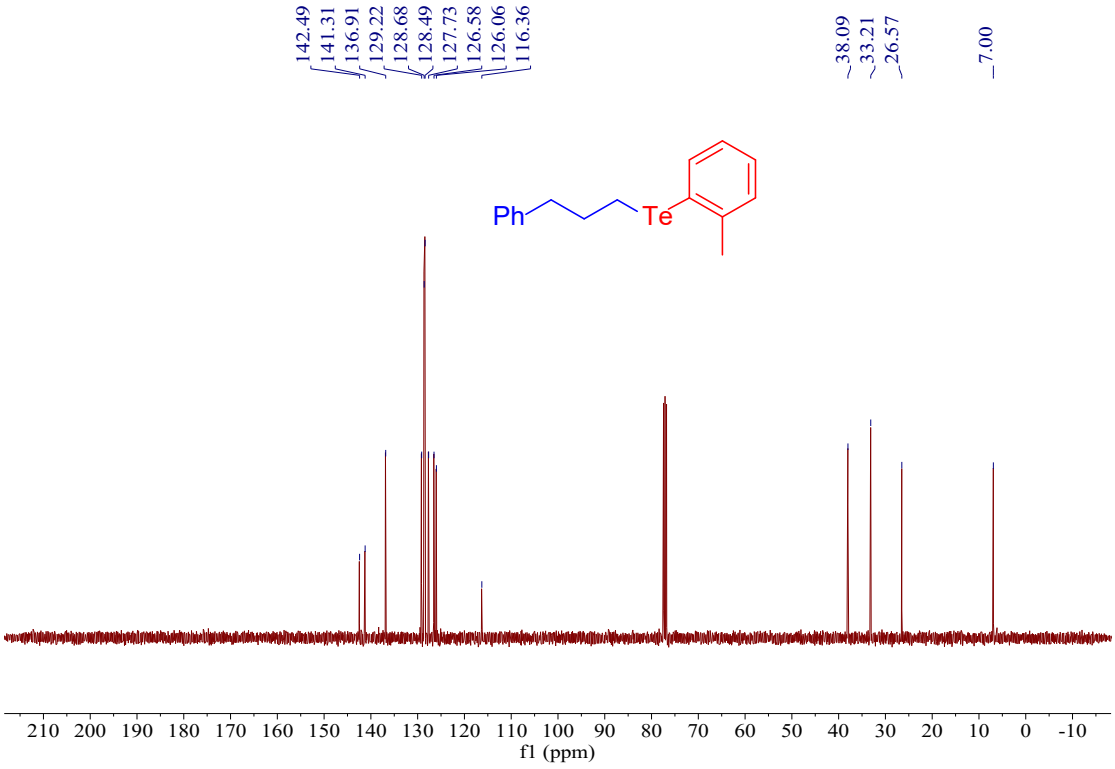
^{125}Te NMR Spectra of **3r** (400 MHz, $CDCl_3$)



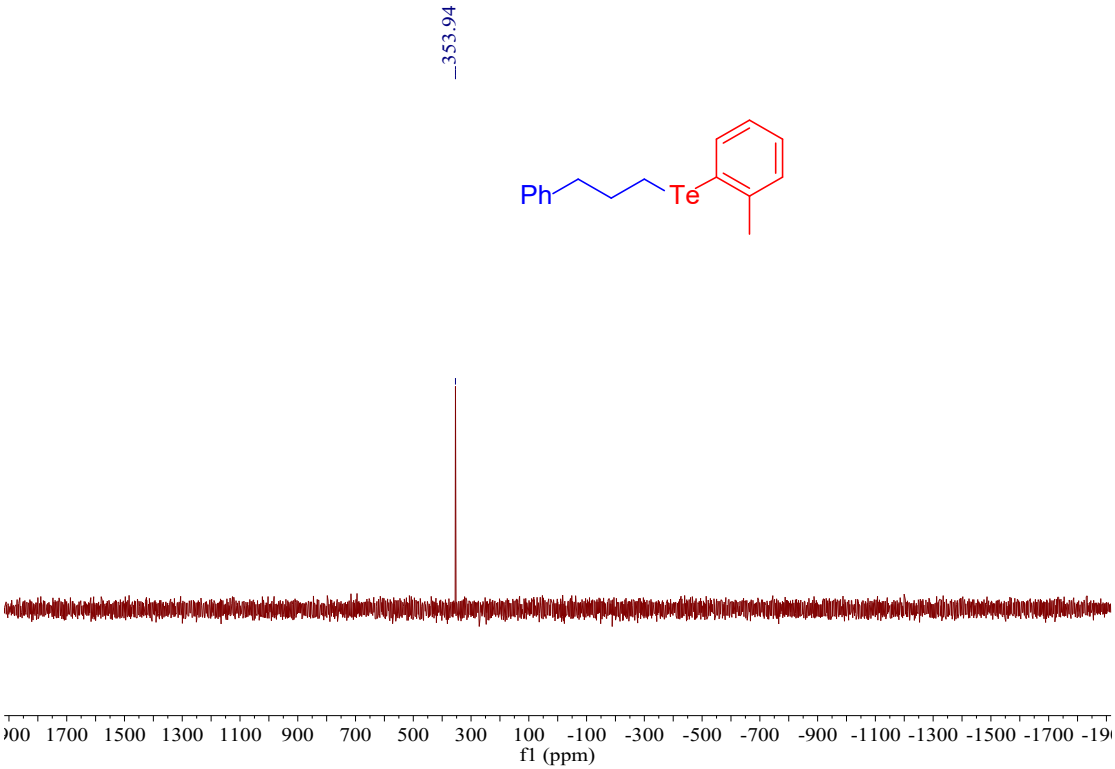
^{1}H NMR Spectra of **4a** (400 MHz, $CDCl_3$)



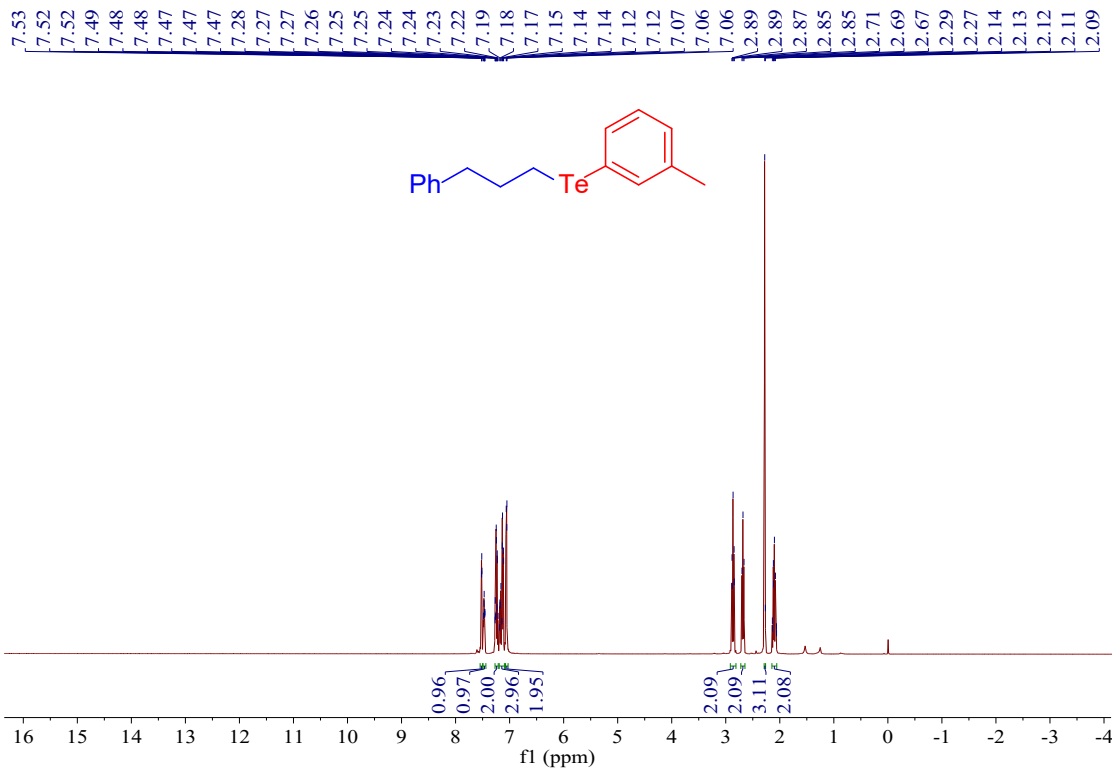
^{13}C NMR Spectra of **4a** (400 MHz, $CDCl_3$)



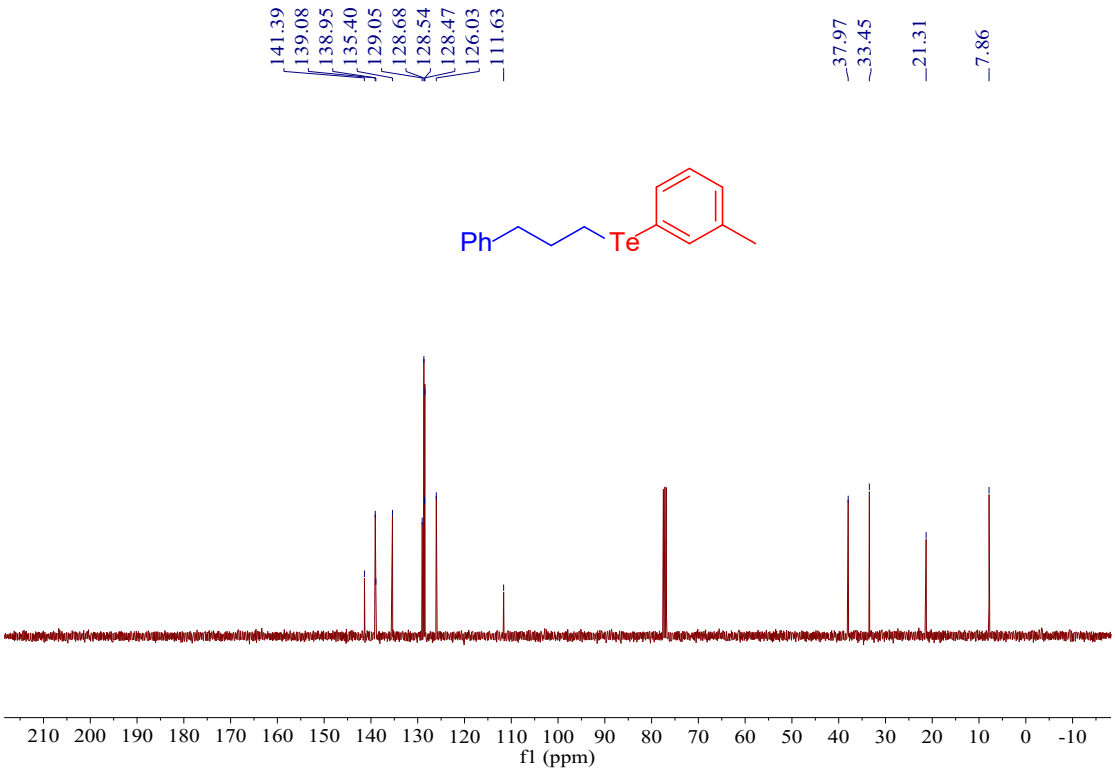
^{125}Te NMR Spectra of **4a** (400 MHz, $CDCl_3$)



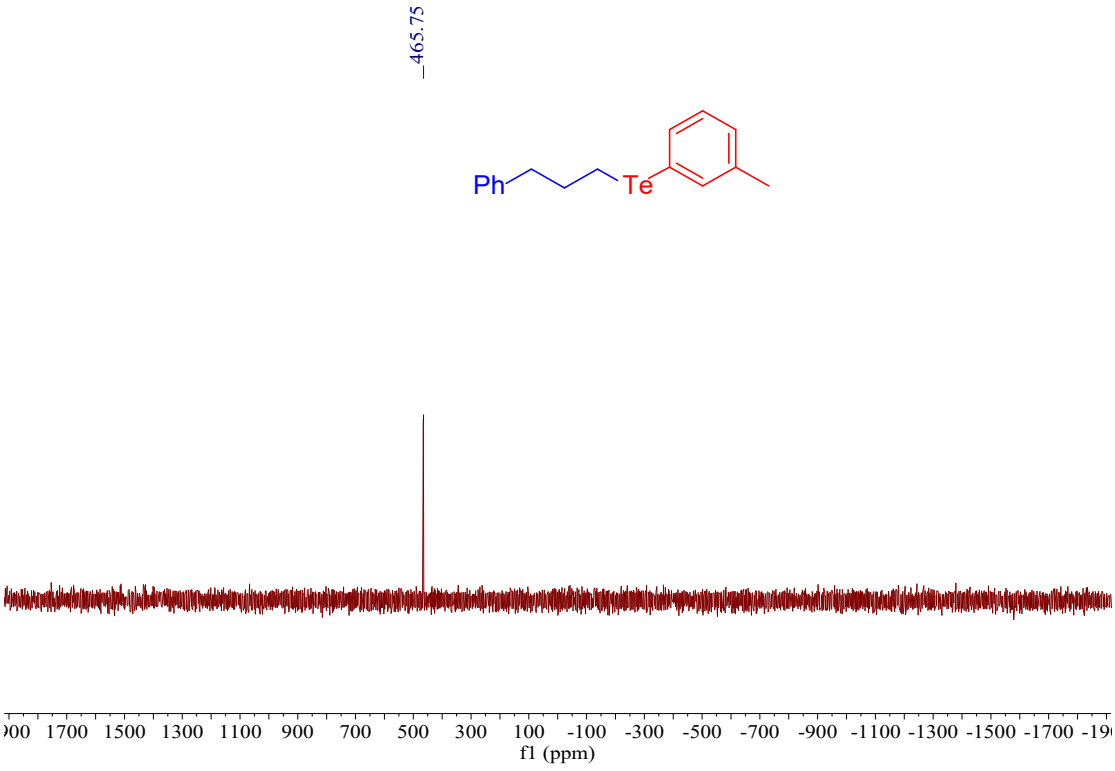
^{1}H NMR Spectra of **4b** (400 MHz, $CDCl_3$)



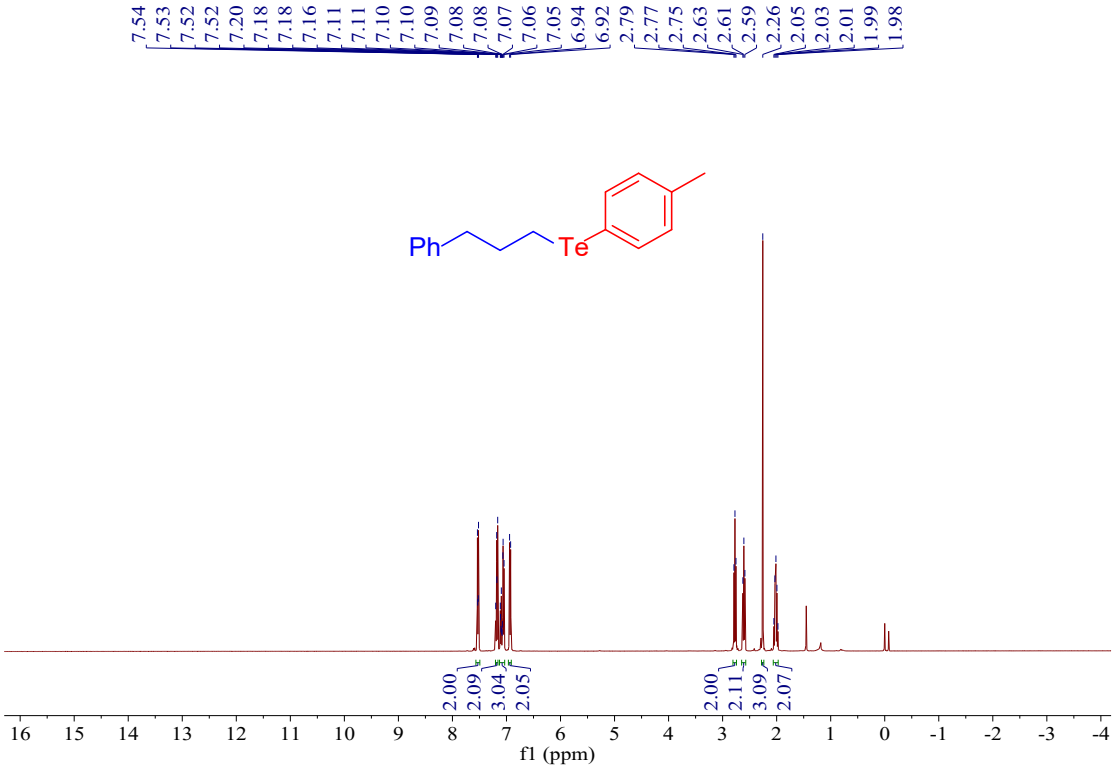
^{13}C NMR Spectra of **4b** (400 MHz, $CDCl_3$)



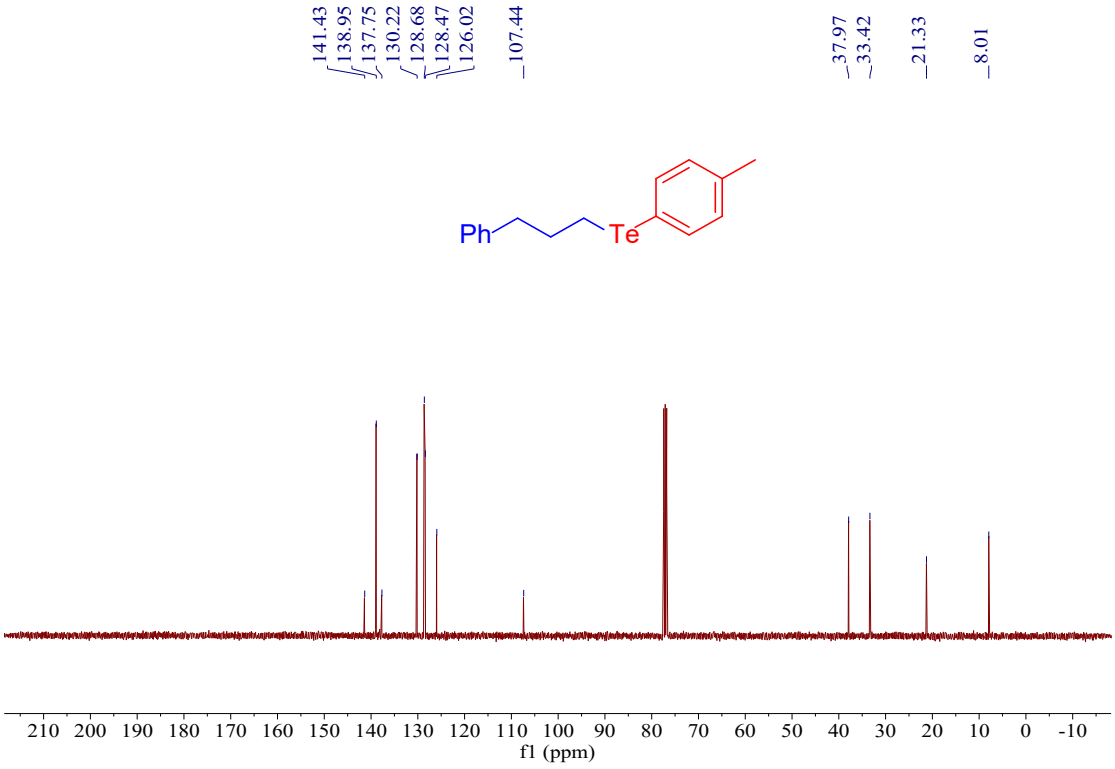
^{125}Te NMR Spectra of **4b** (400 MHz, $CDCl_3$)



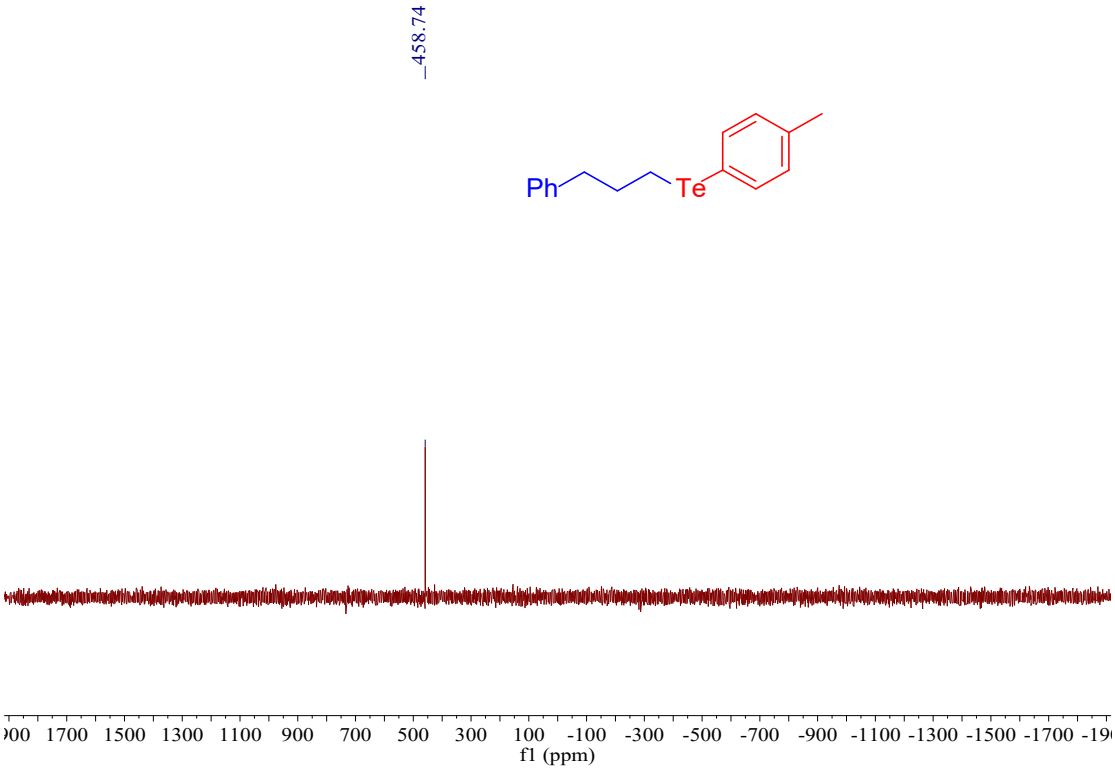
^{1}H NMR Spectra of **4c** (400 MHz, $CDCl_3$)



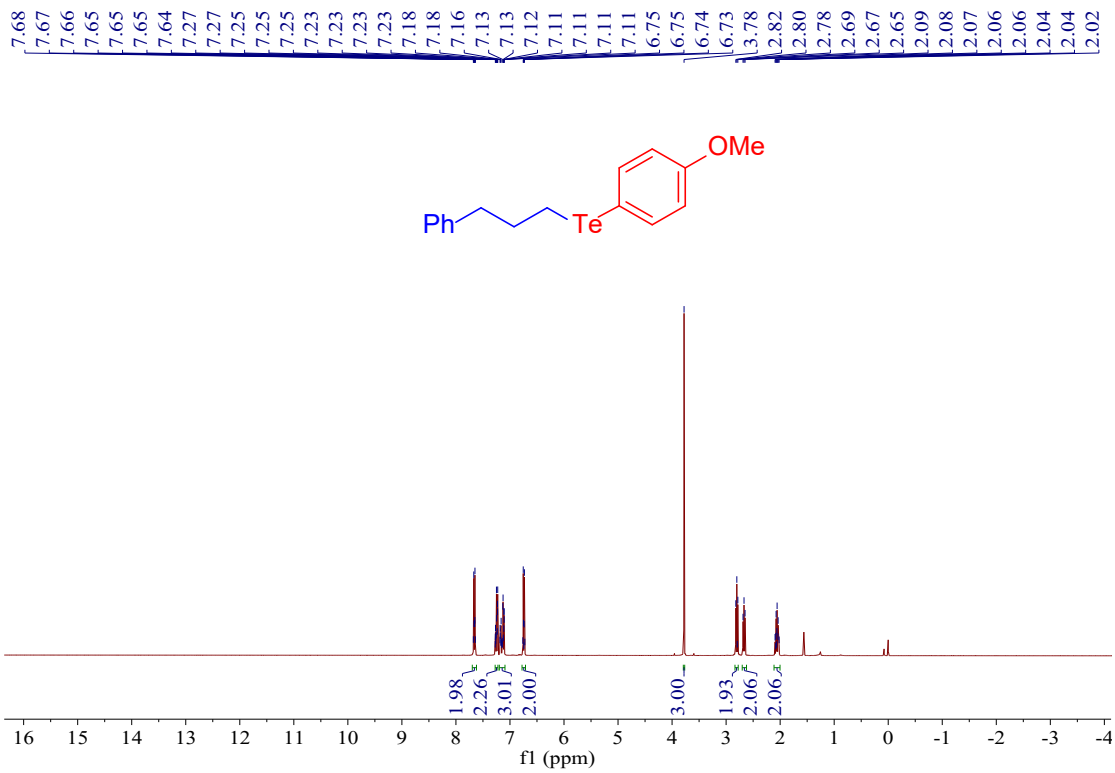
^{13}C NMR Spectra of **4c** (400 MHz, $CDCl_3$)



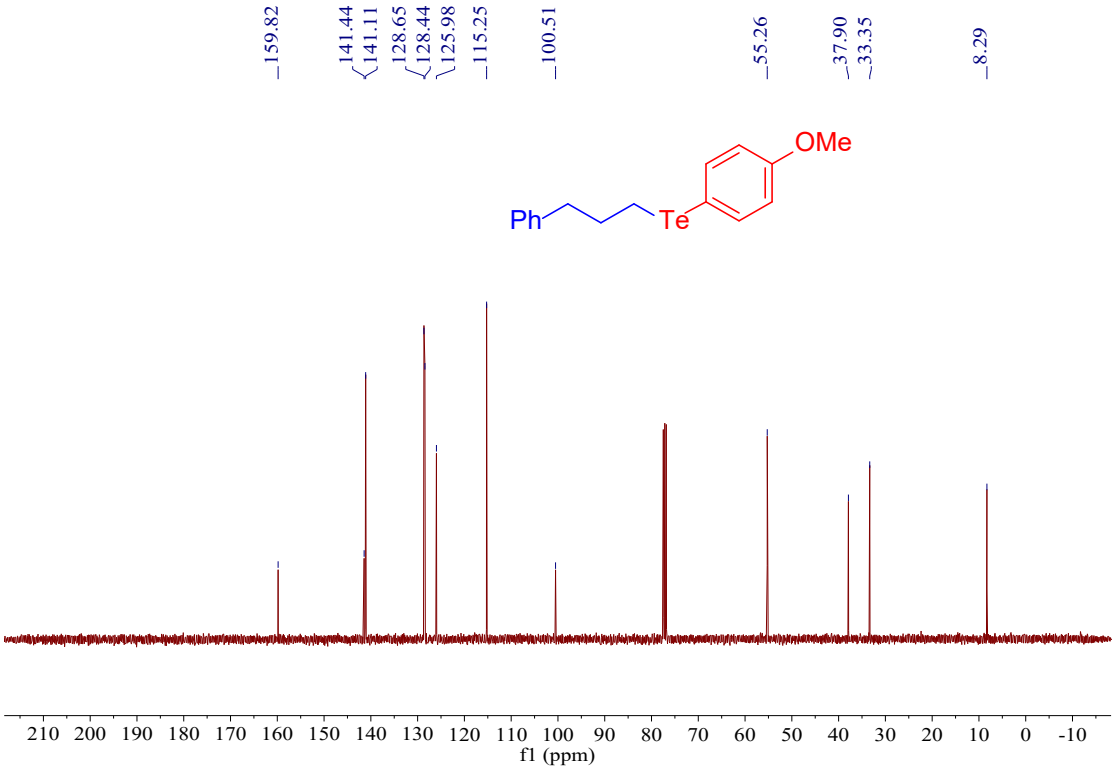
^{125}Te NMR Spectra of **4c** (400 MHz, $CDCl_3$)



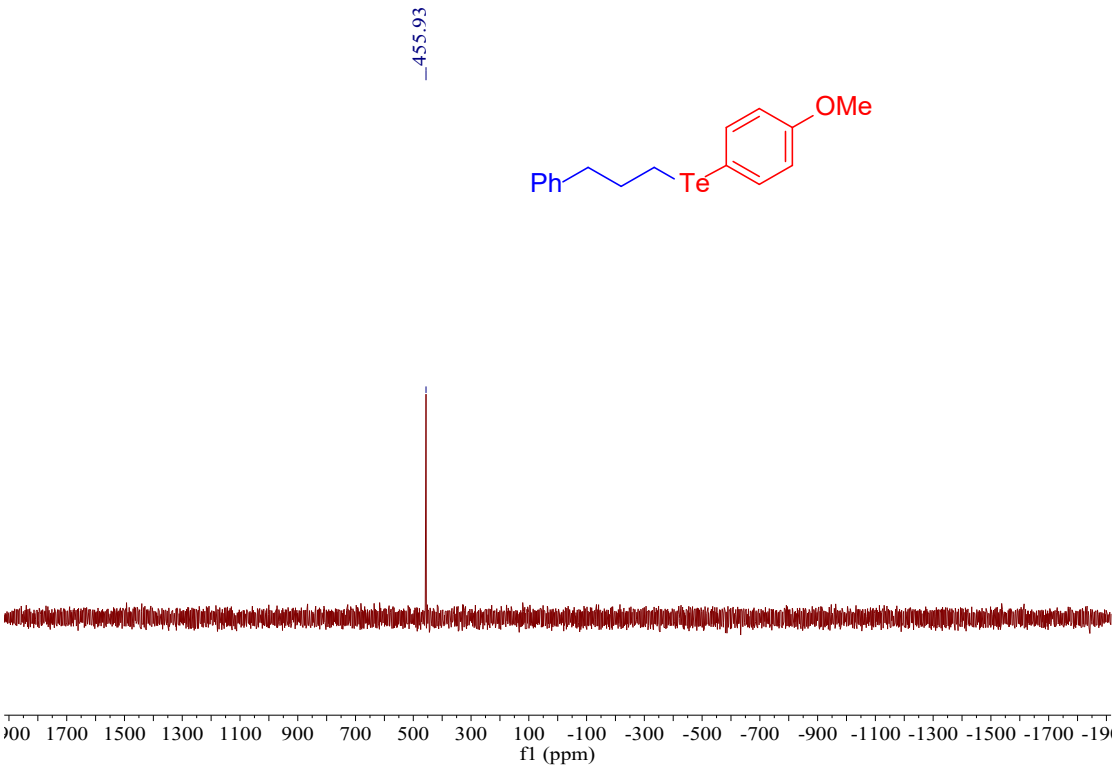
^{1}H NMR Spectra of **4d** (400 MHz, $CDCl_3$)



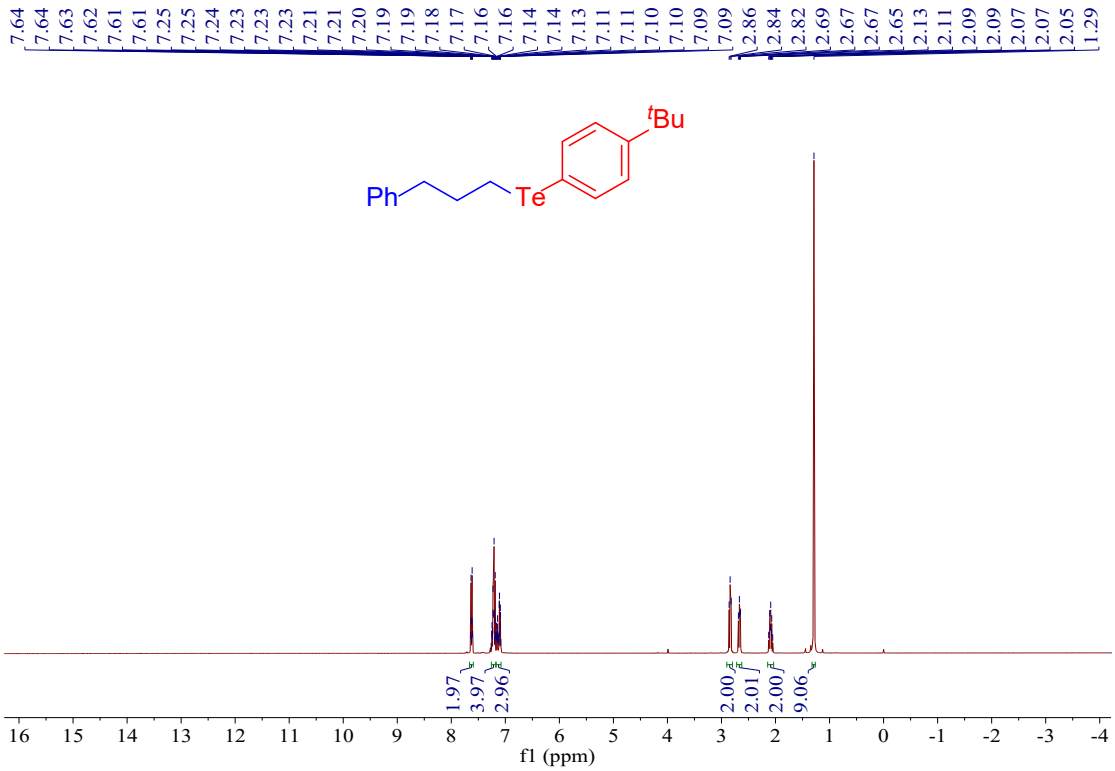
^{13}C NMR Spectra of **4d** (400 MHz, $CDCl_3$)



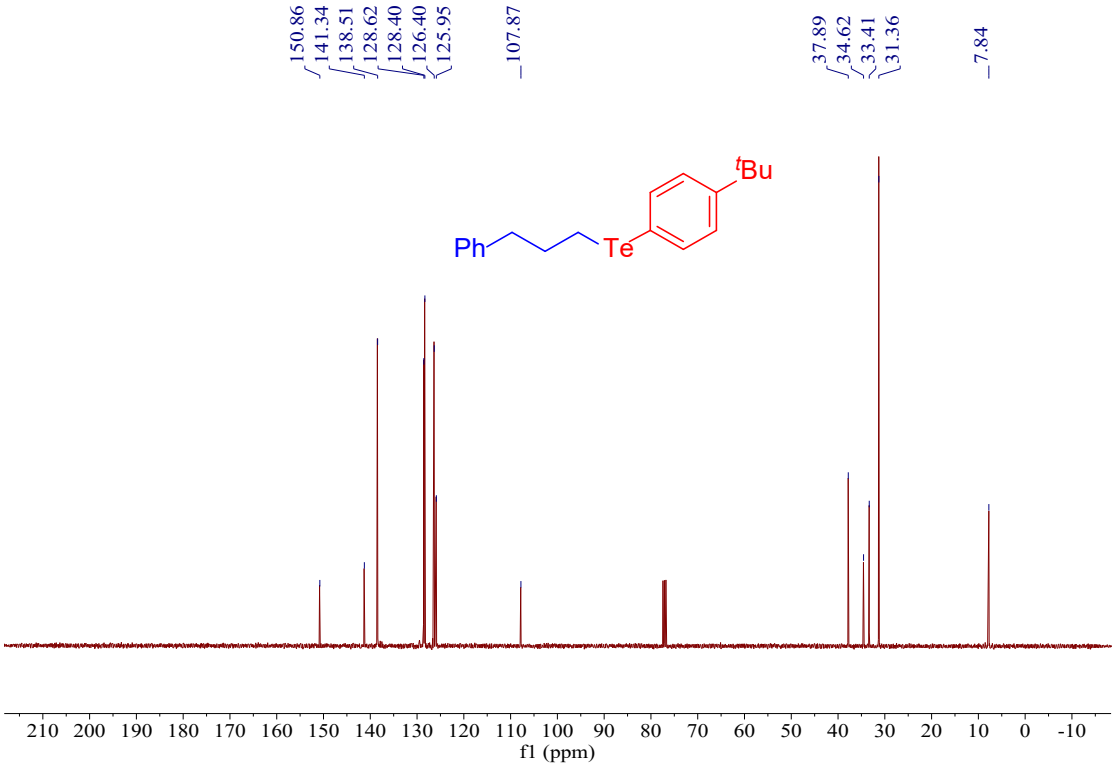
^{125}Te NMR Spectra of **4d** (400 MHz, $CDCl_3$)



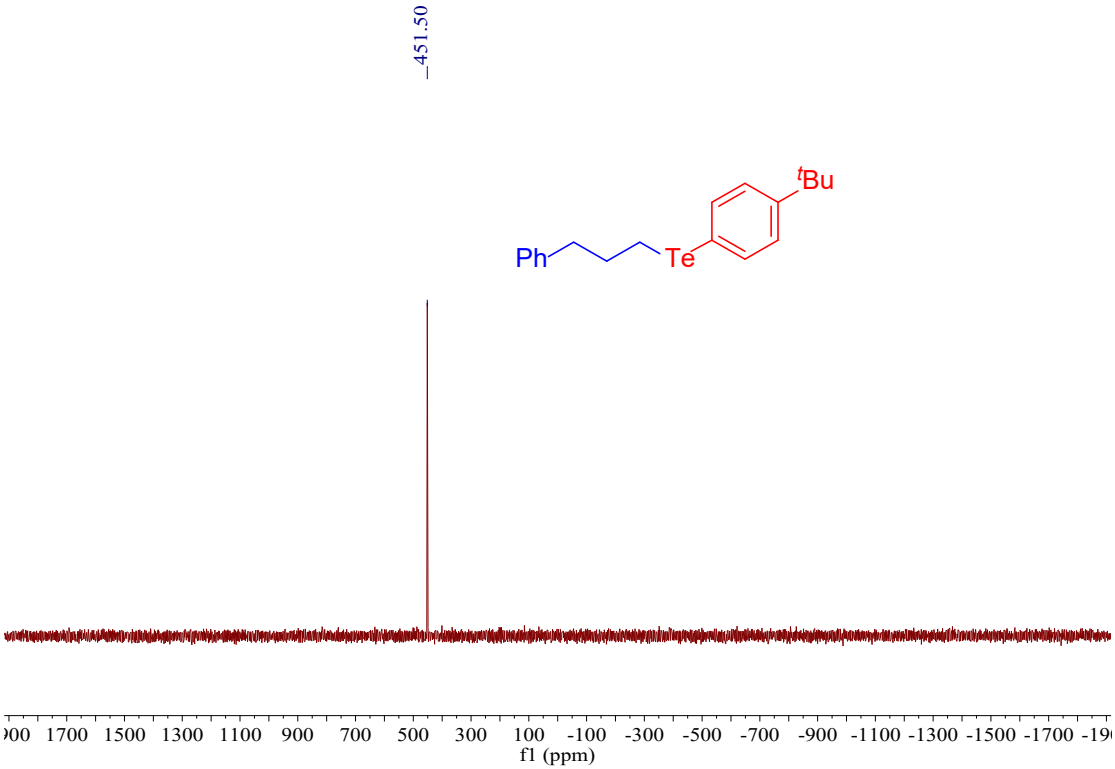
^{1}H NMR Spectra of **4e** (400 MHz, $CDCl_3$)



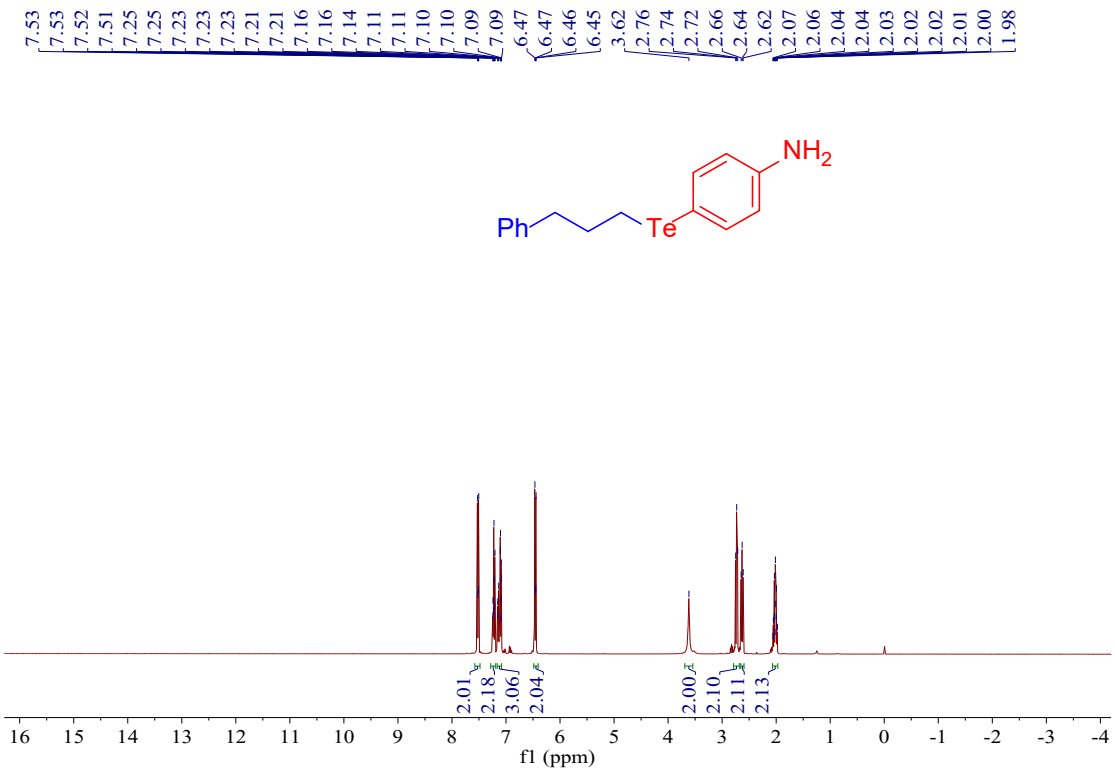
^{13}C NMR Spectra of **4e** (400 MHz, $CDCl_3$)



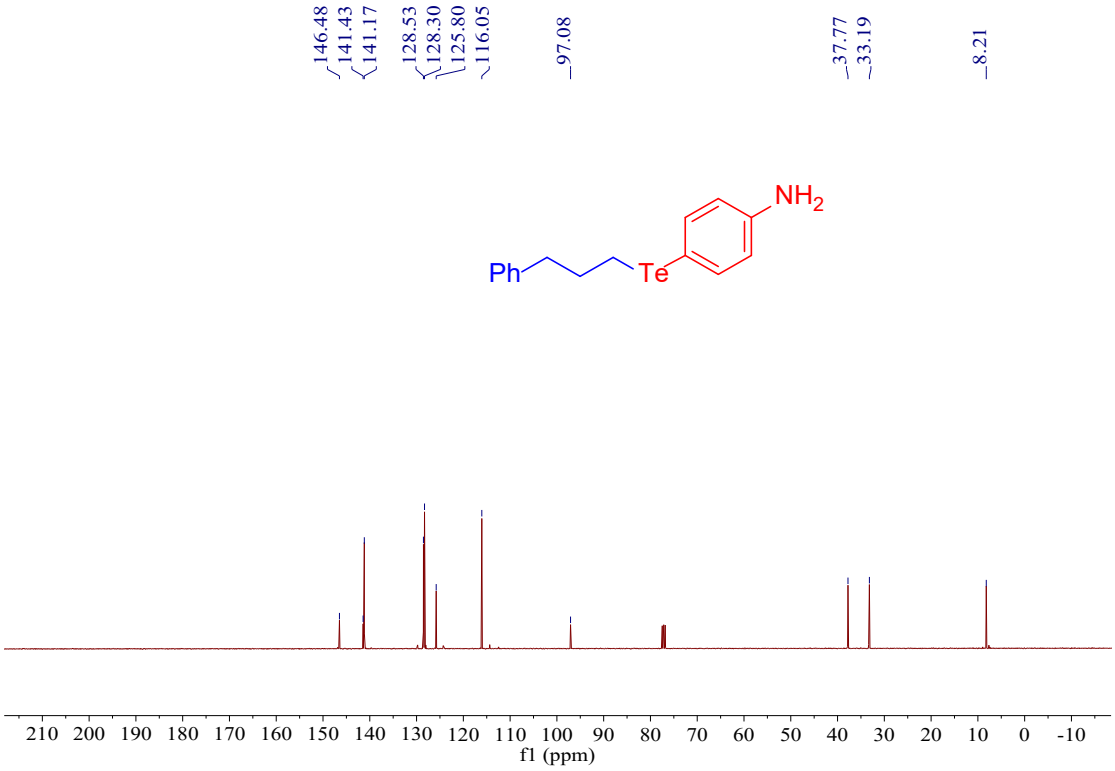
^{125}Te NMR Spectra of **4e** (400 MHz, $CDCl_3$)



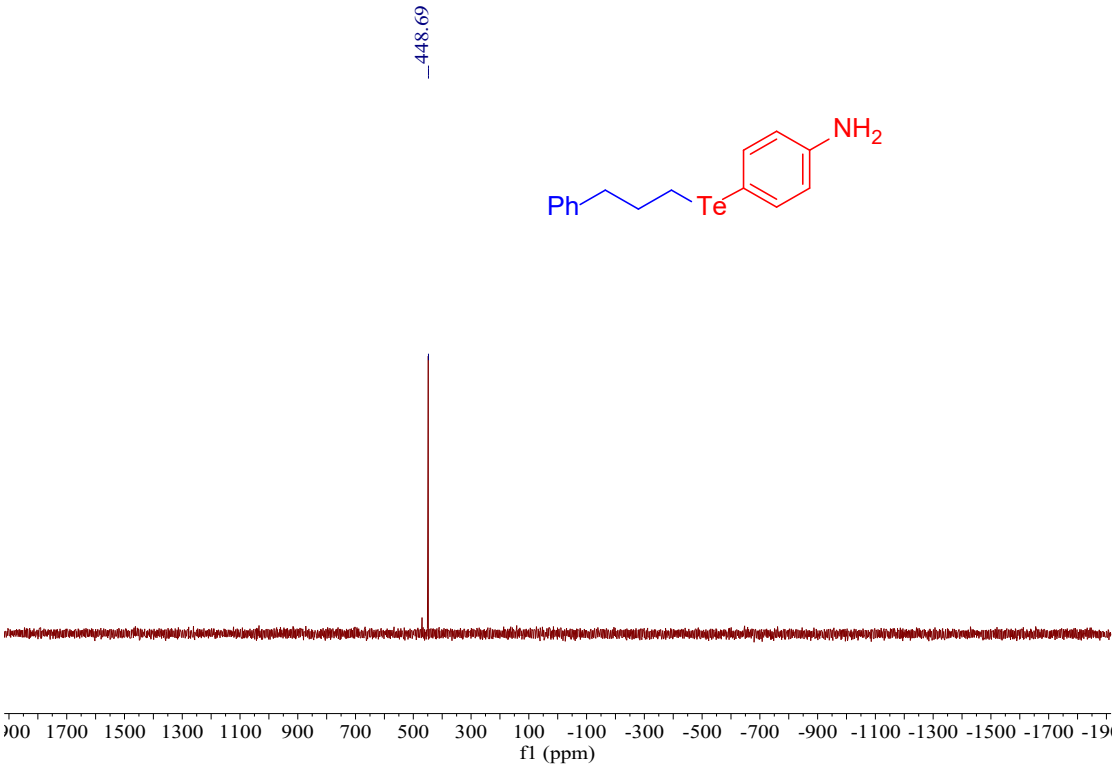
^{1}H NMR Spectra of **4f** (400 MHz, $CDCl_3$)



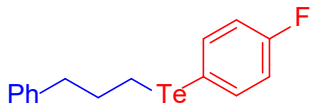
^{13}C NMR Spectra of **4f** (400 MHz, $CDCl_3$)

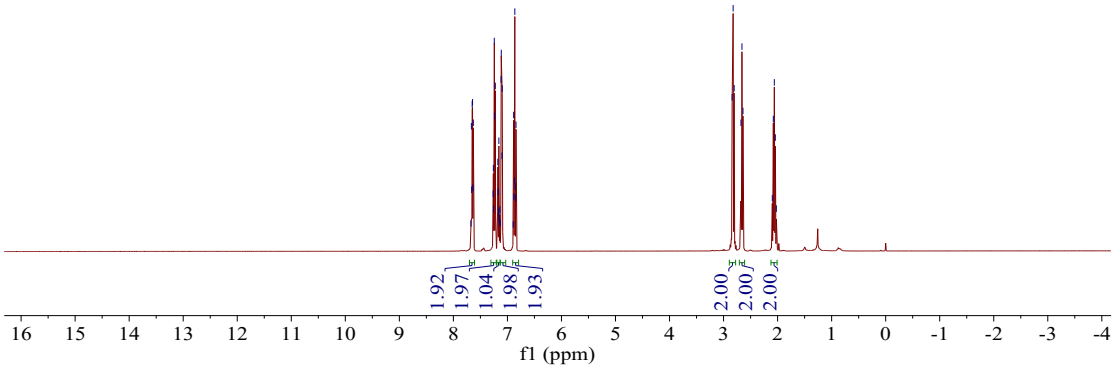


^{125}Te NMR Spectra of **4f** (400 MHz, $CDCl_3$)

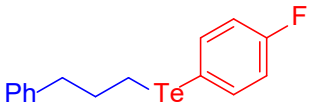


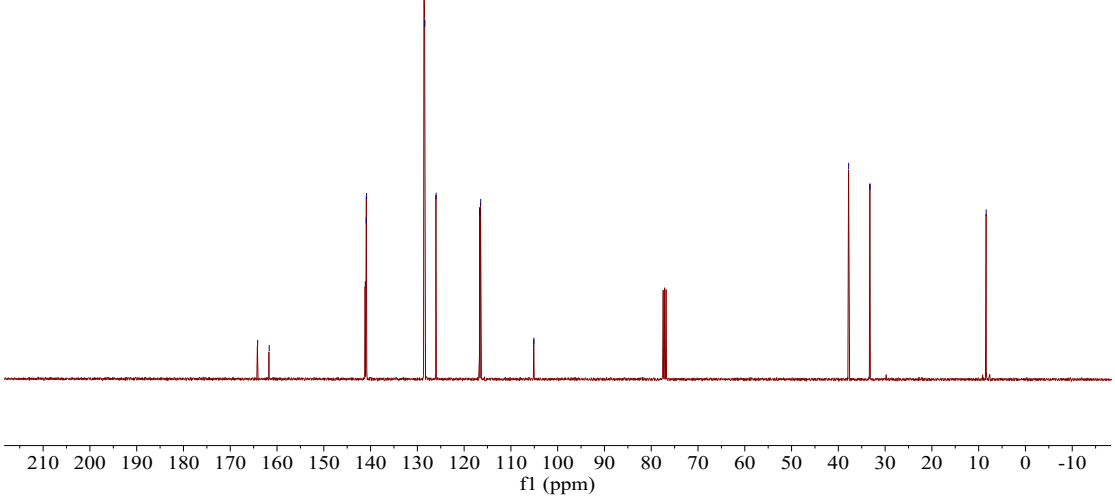
^{1}H NMR Spectra of 4**g** (400 MHz, $CDCl_3$)



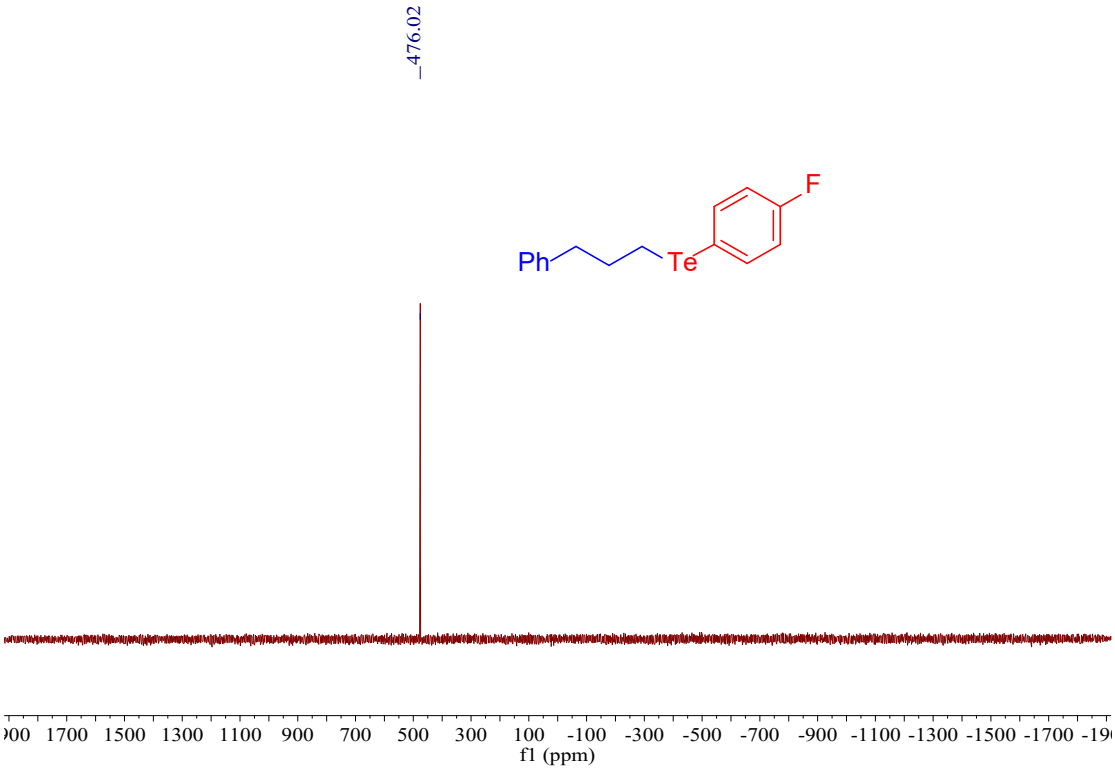


^{13}C NMR Spectra of **4g** (400 MHz, $CDCl_3$)

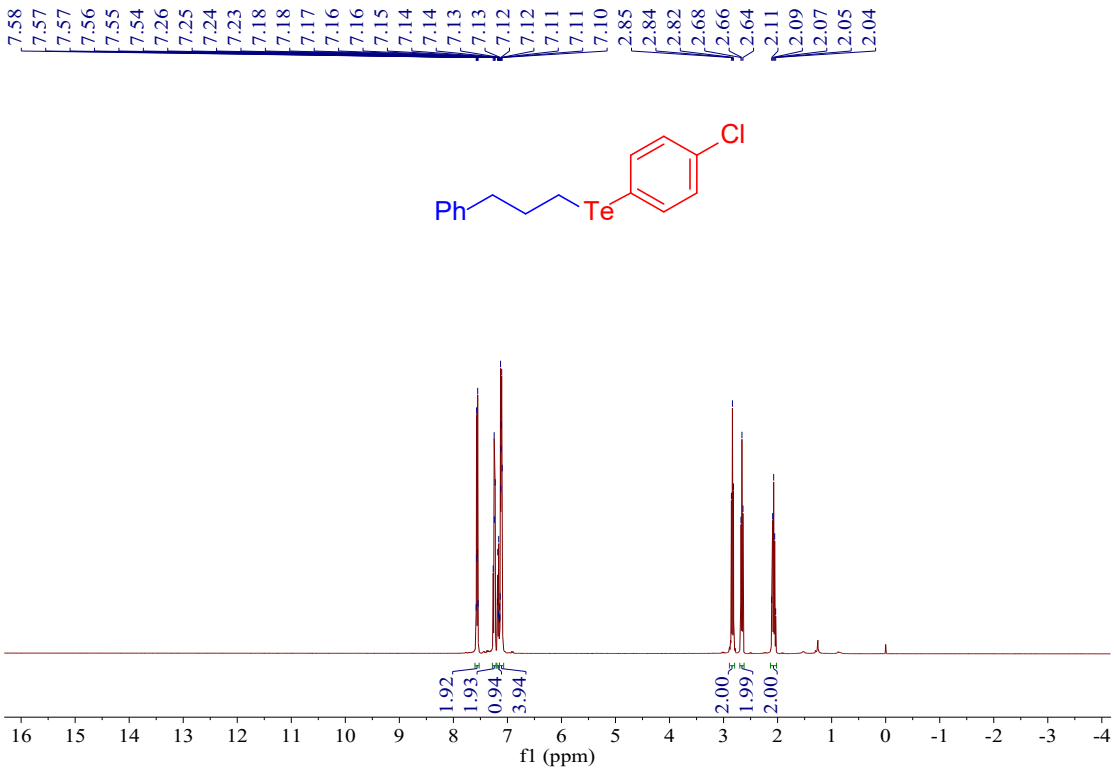




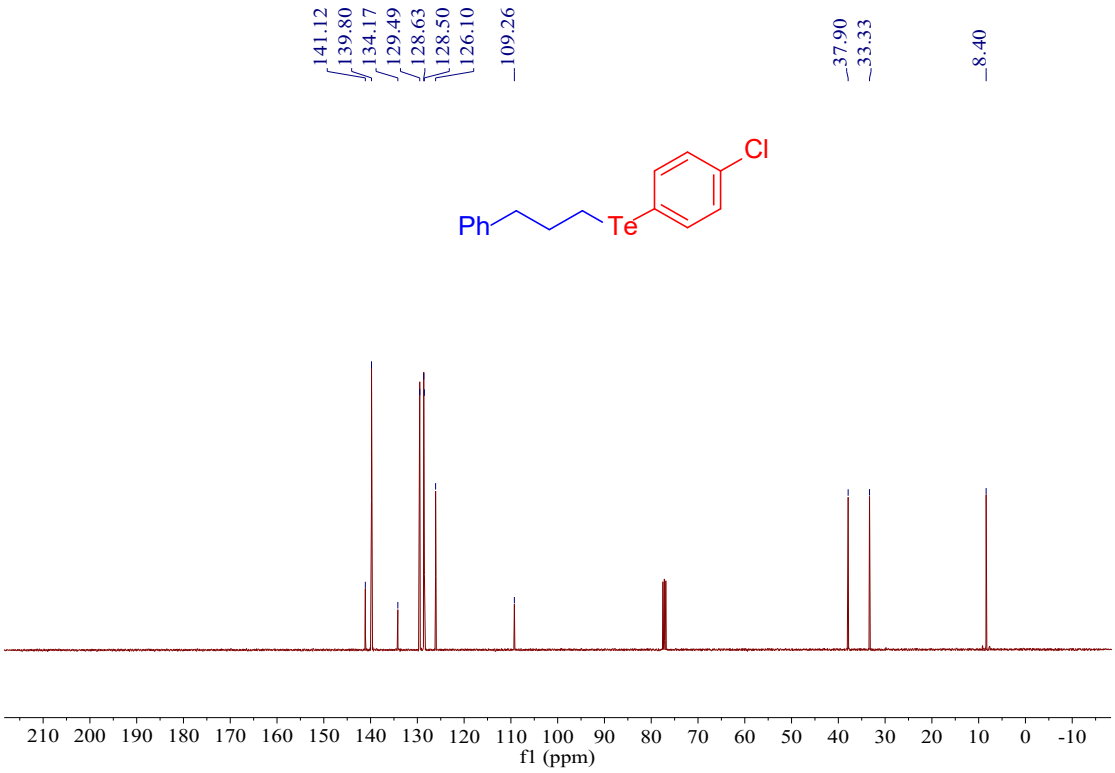
^{125}Te NMR Spectra of **4g** (400 MHz, $CDCl_3$)



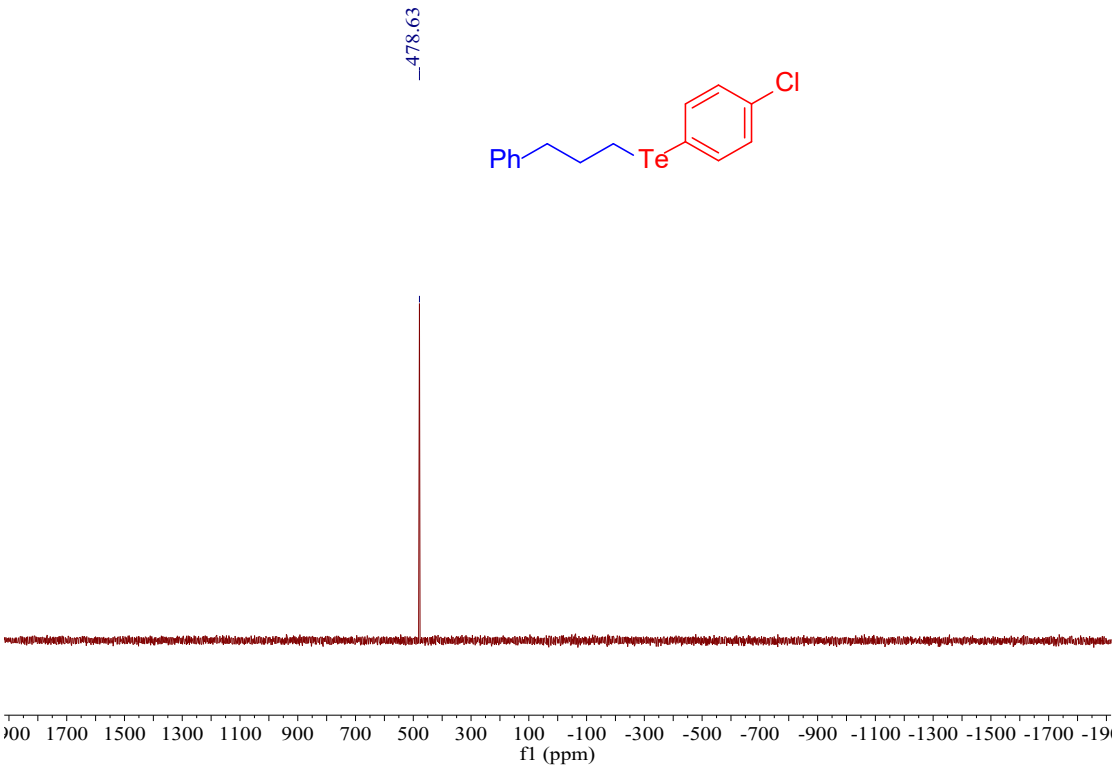
^{1}H NMR Spectra of **4h** (400 MHz, $CDCl_3$)



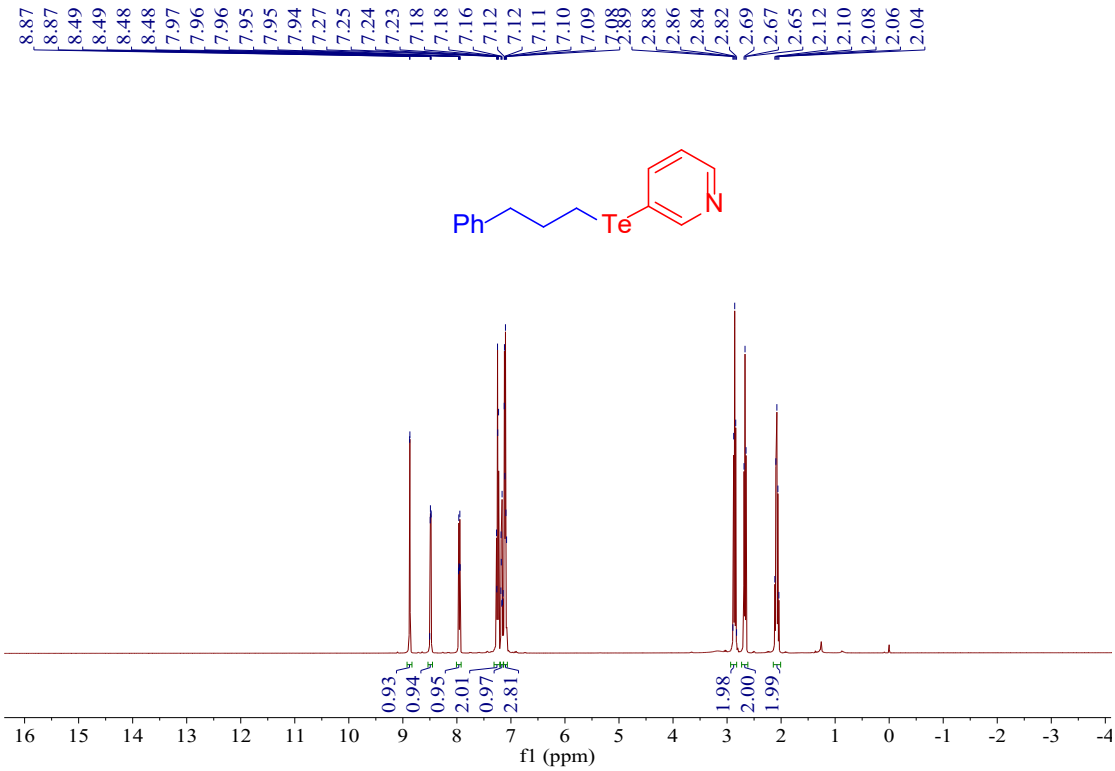
^{13}C NMR Spectra of **4h** (400 MHz, $CDCl_3$)



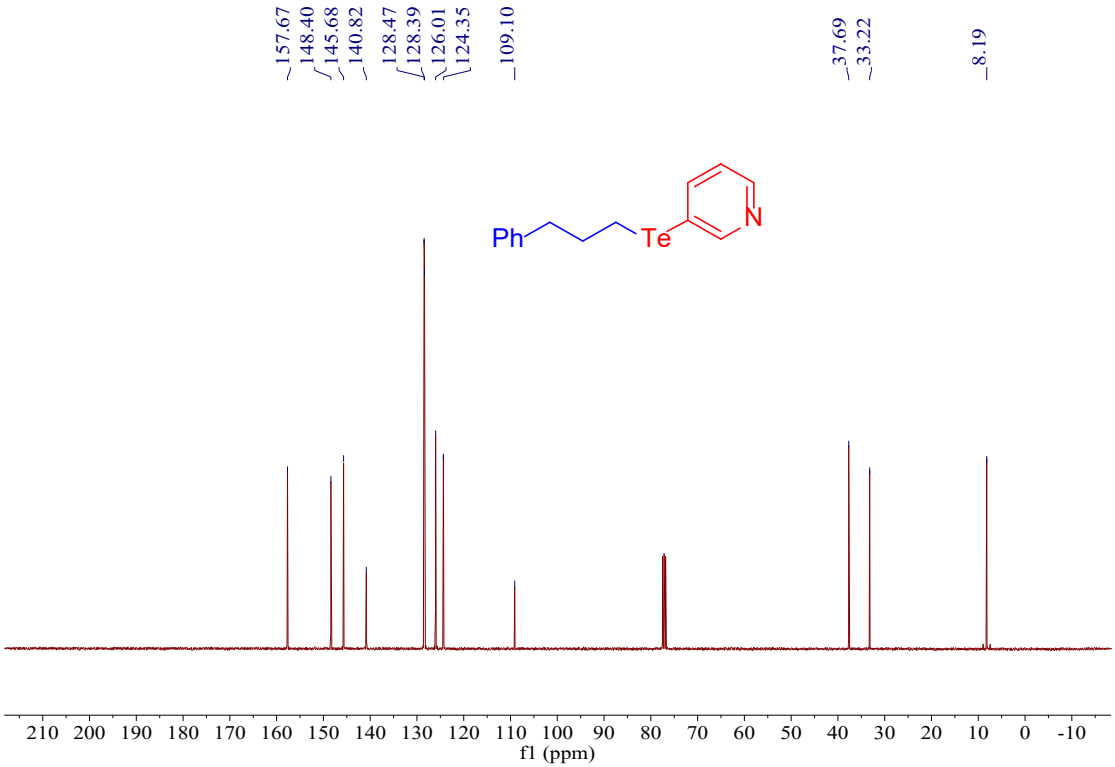
^{125}Te NMR Spectra of **4h** (400 MHz, $CDCl_3$)



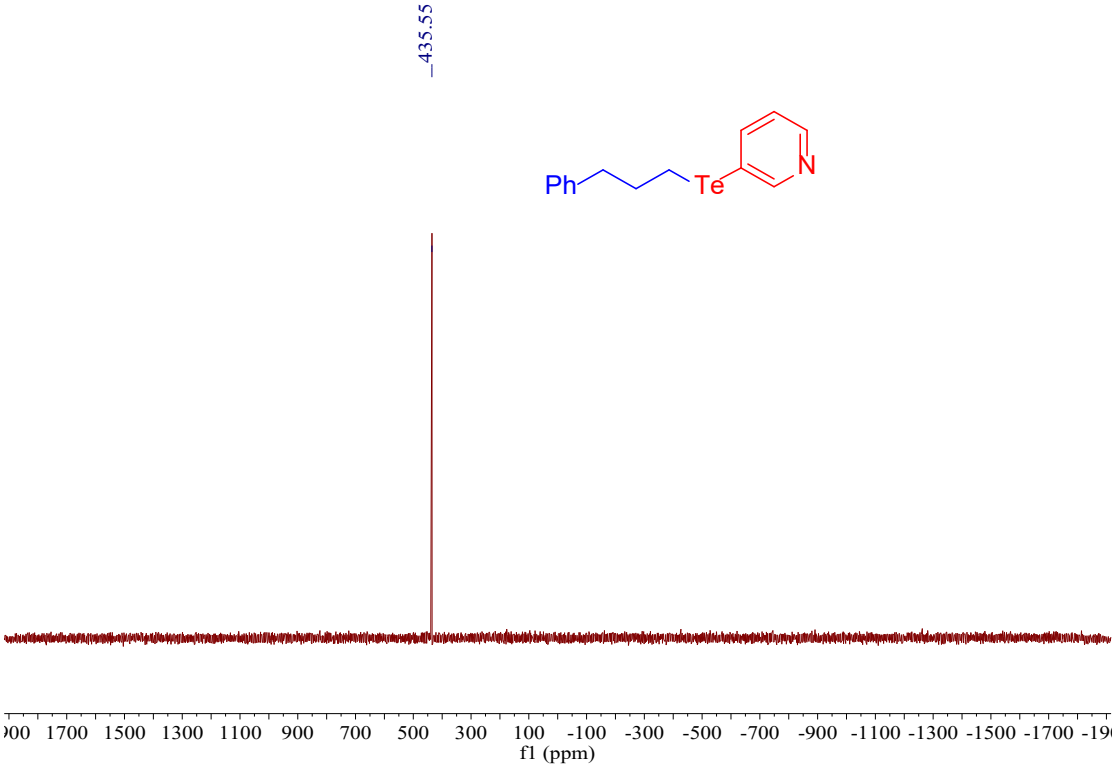
^{1}H NMR Spectra of **4i** (400 MHz, $CDCl_3$)



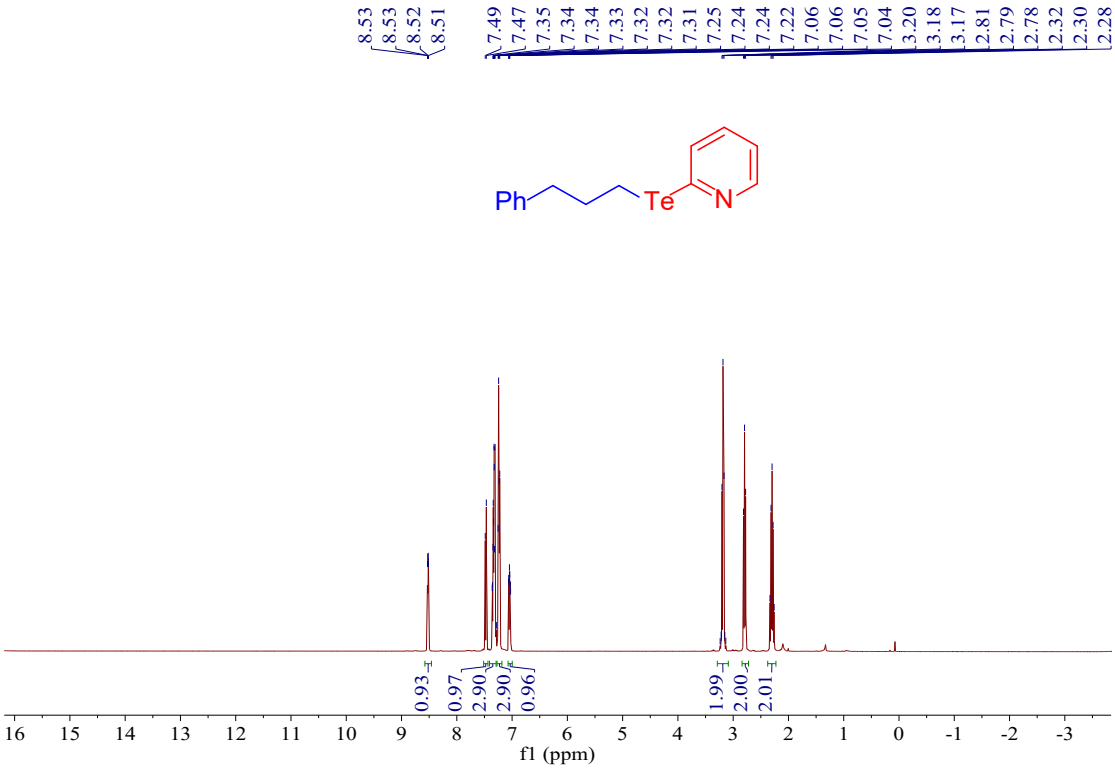
^{13}C NMR Spectra of **4i** (400 MHz, $CDCl_3$)



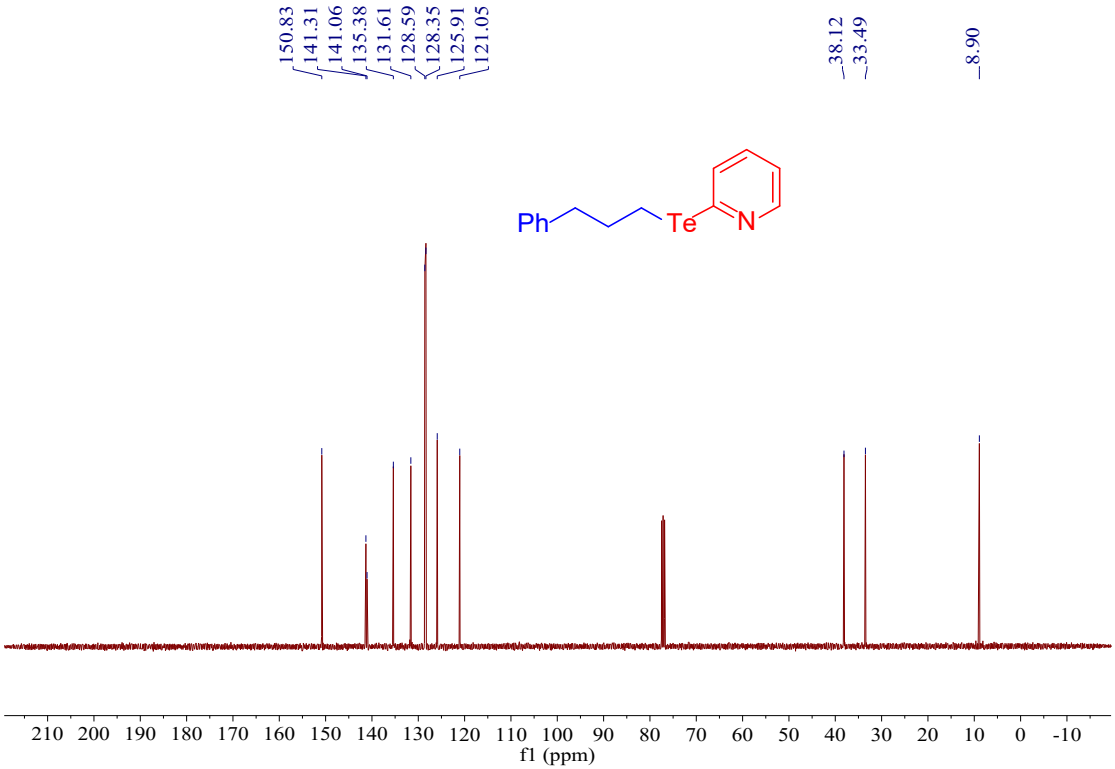
^{125}Te NMR Spectra of **4i** (400 MHz, $CDCl_3$)



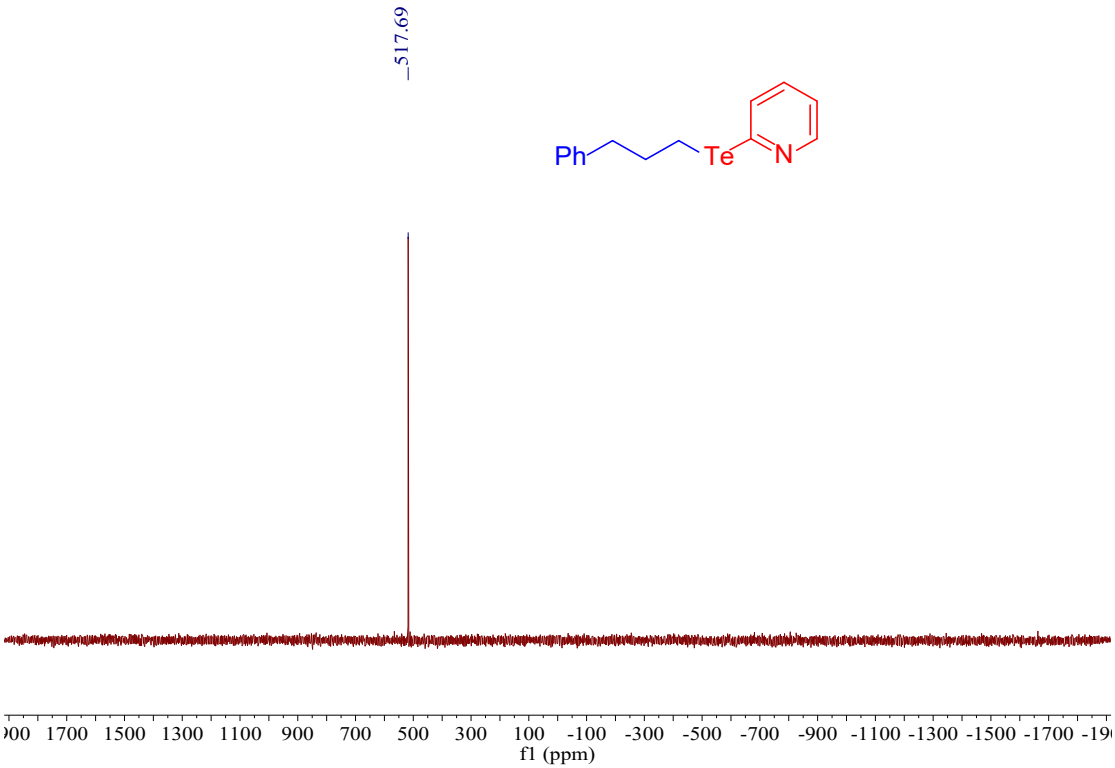
^{1}H NMR Spectra of **4j** (400 MHz, $CDCl_3$)



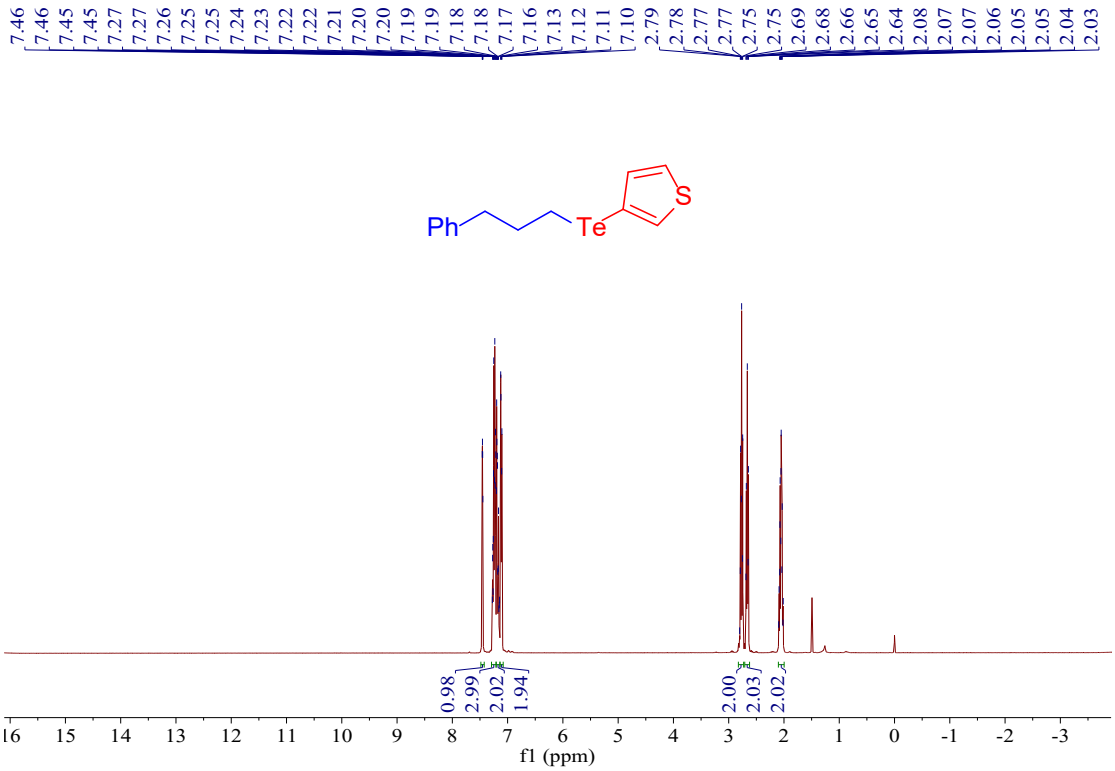
^{13}C NMR Spectra of **4j** (400 MHz, $CDCl_3$)



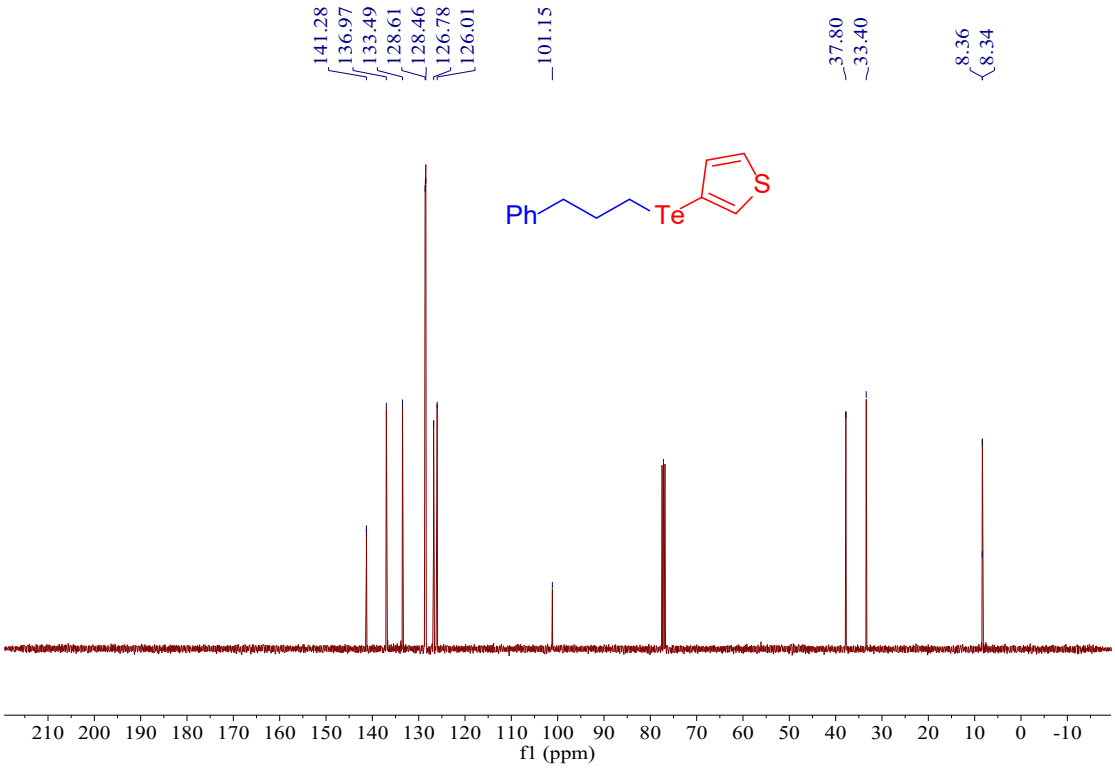
^{125}Te NMR Spectra of **4j** (400 MHz, $CDCl_3$)



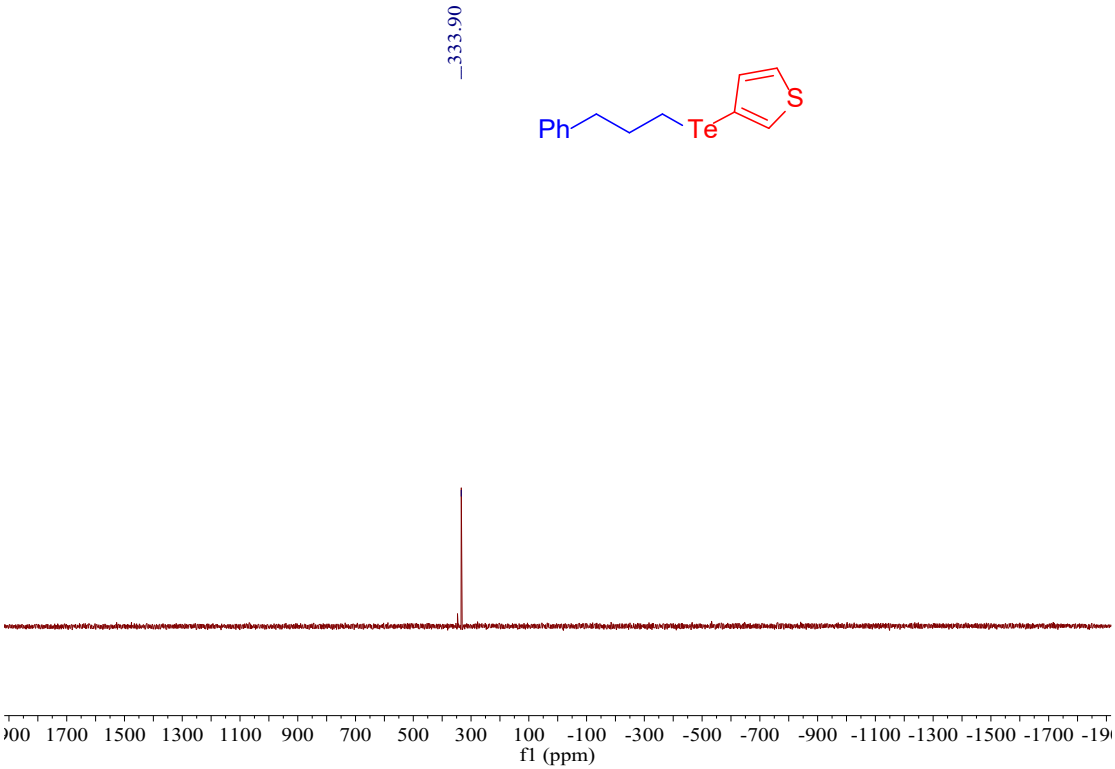
^{1}H NMR Spectra of **4k** (400 MHz, $CDCl_3$)



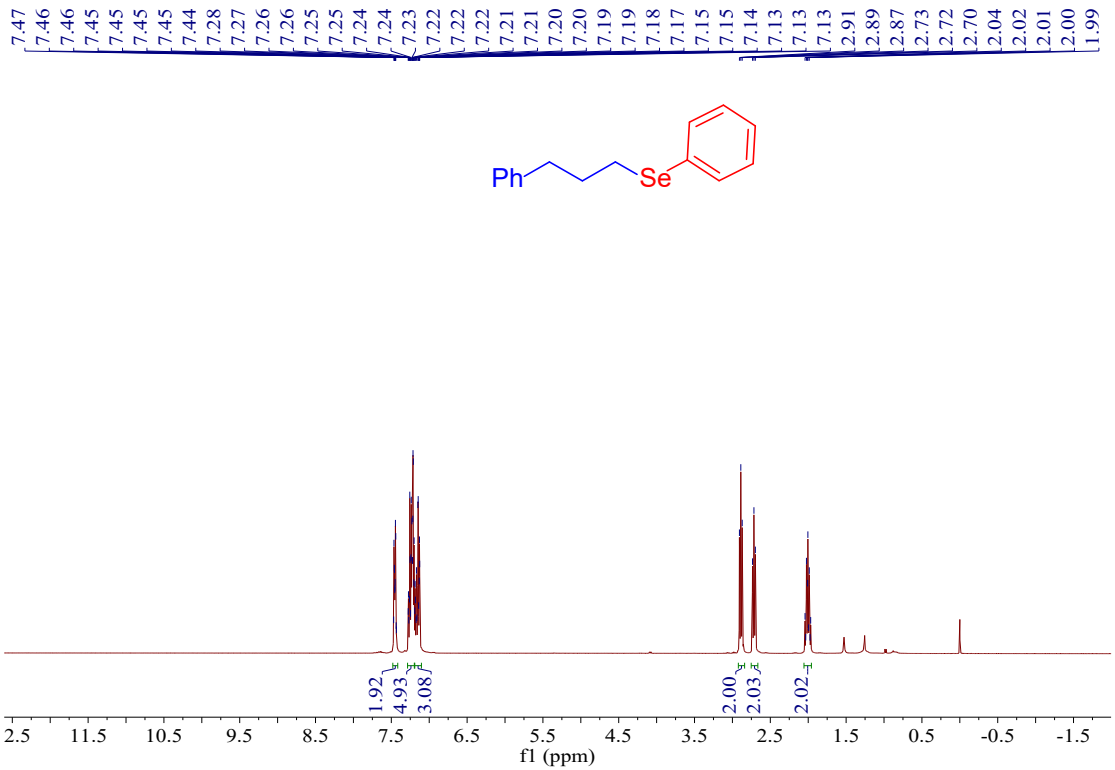
^{13}C NMR Spectra of **4k** (400 MHz, $CDCl_3$)



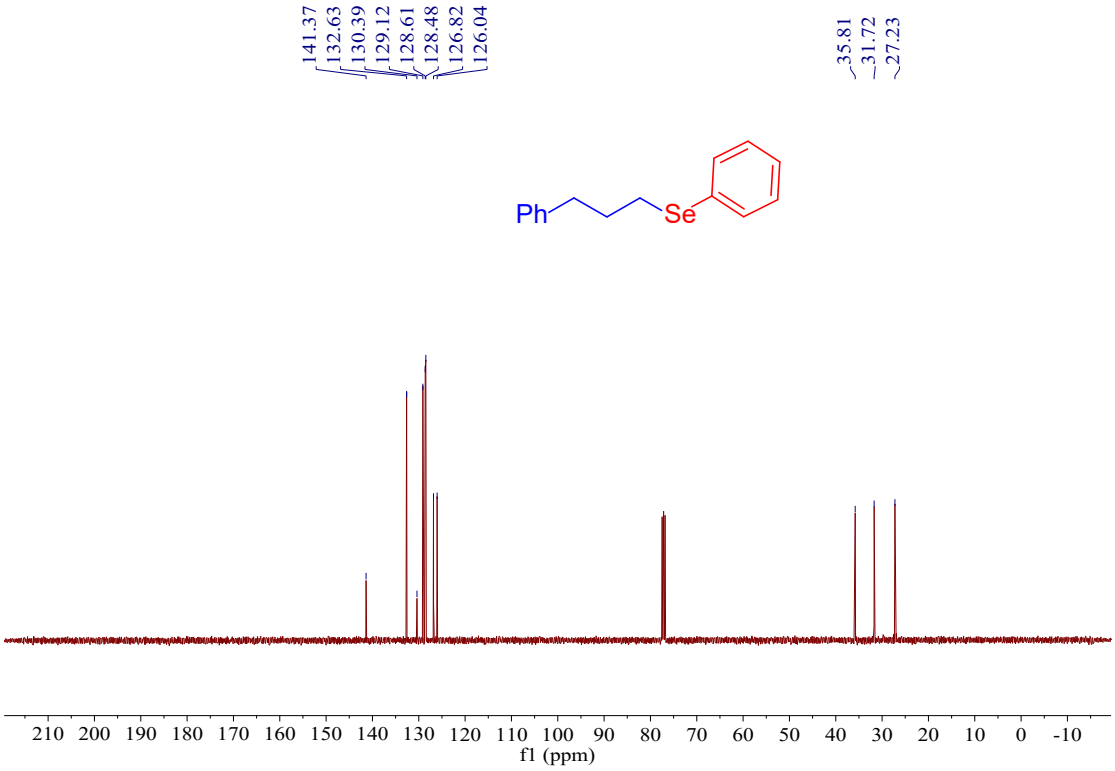
^{125}Te NMR Spectra of **4k** (400 MHz, $CDCl_3$)



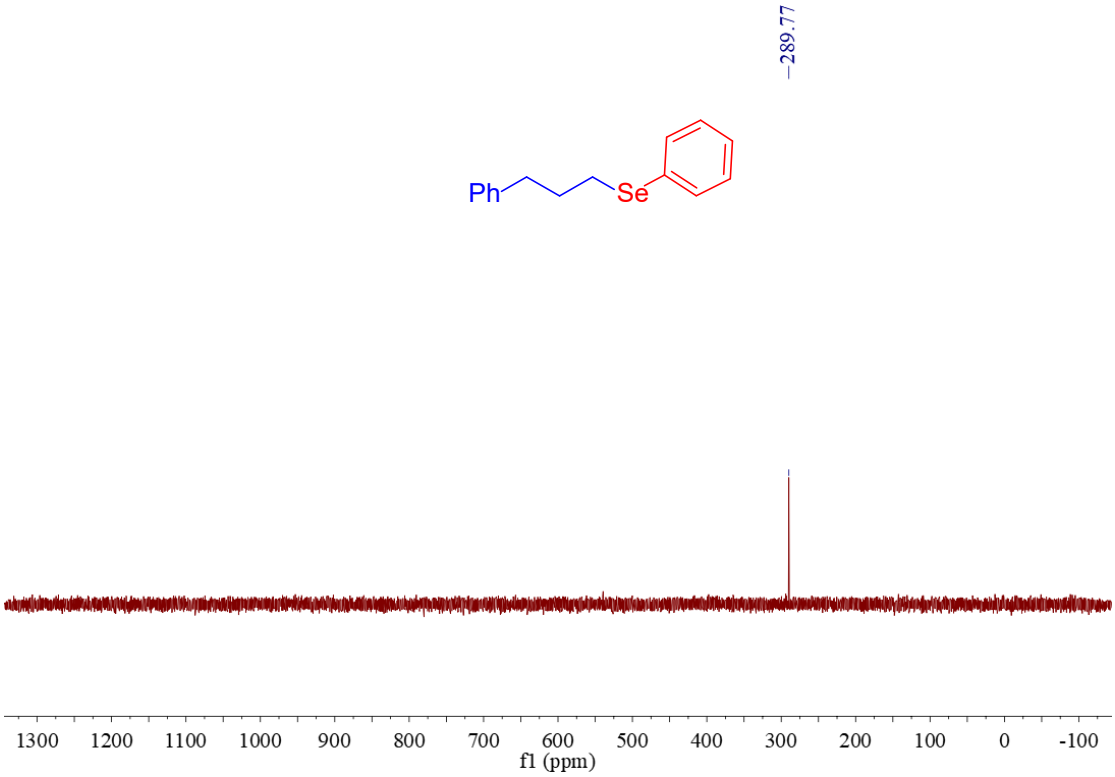
^{1}H NMR Spectra of **4l** (400 MHz, $CDCl_3$)



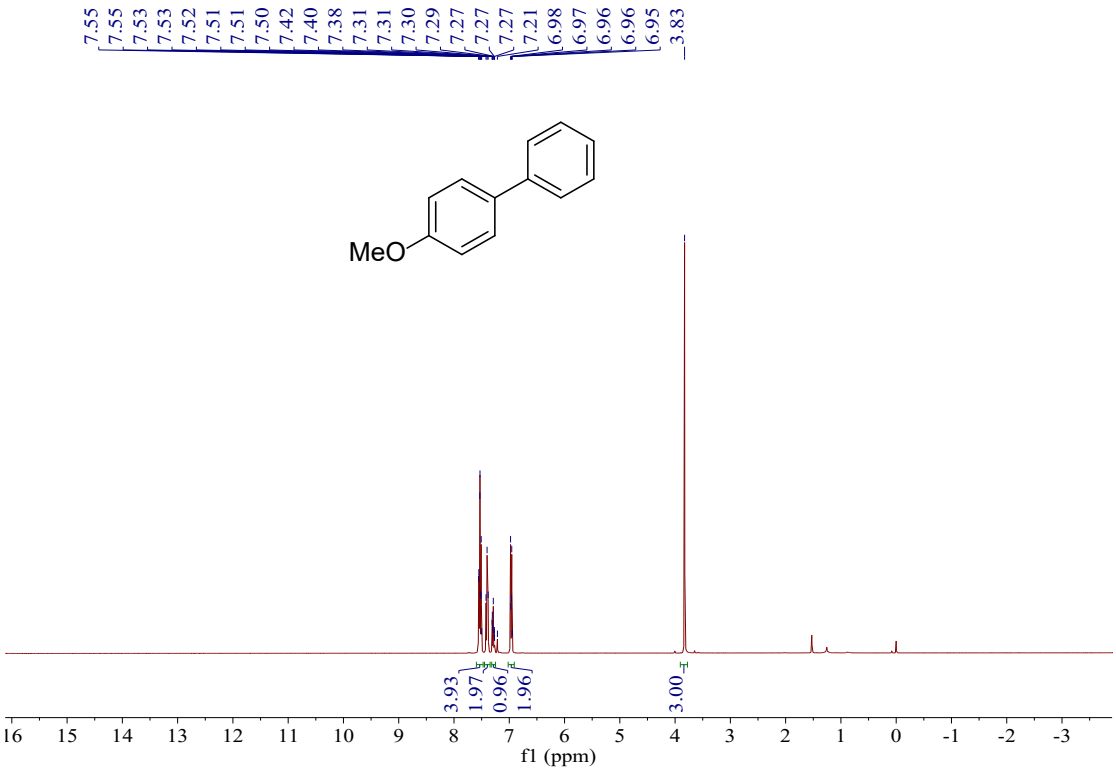
^{13}C NMR Spectra of **4l** (400 MHz, $CDCl_3$)



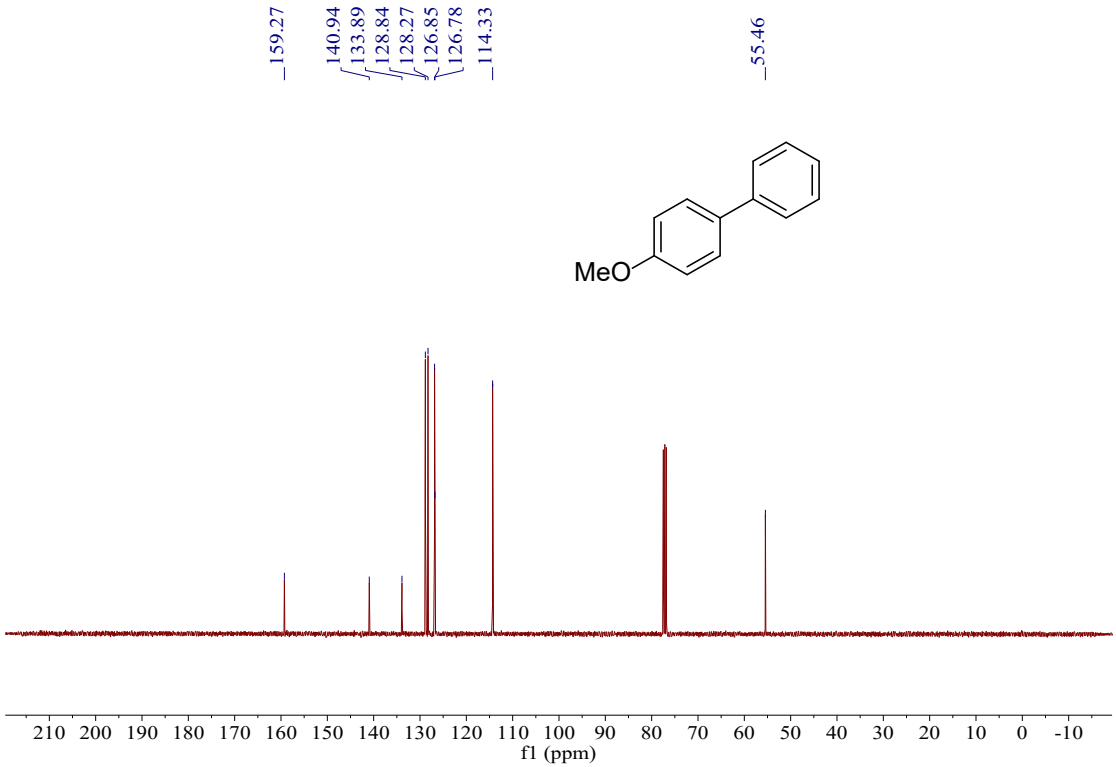
^{125}Te NMR Spectra of **4l** (400 MHz, $CDCl_3$)



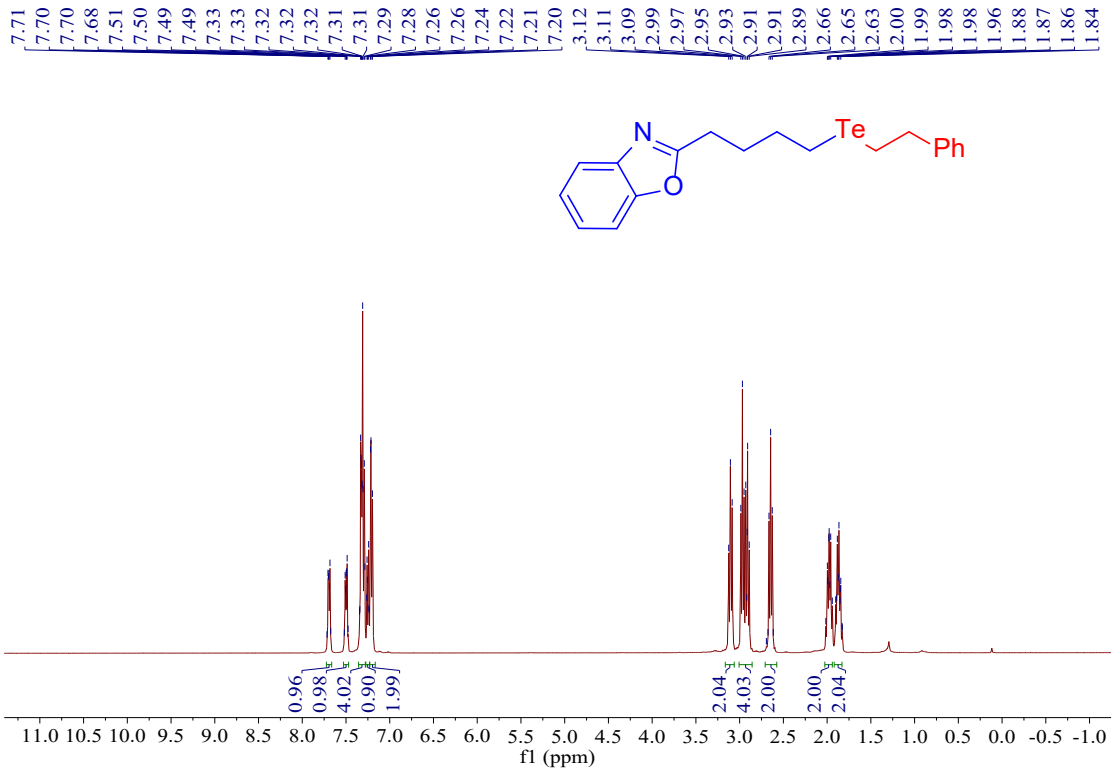
^{1}H NMR Spectra of **9** (400 MHz, $CDCl_3$)



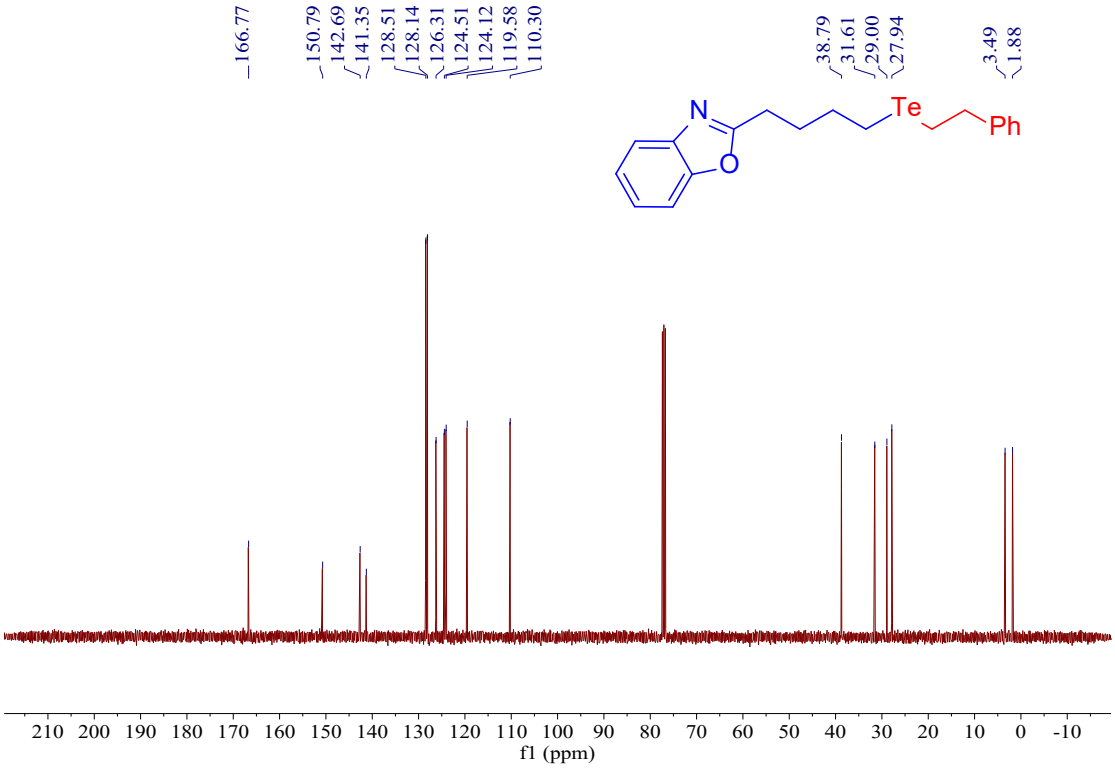
^{13}C NMR Spectra of **9** (400 MHz, $CDCl_3$)



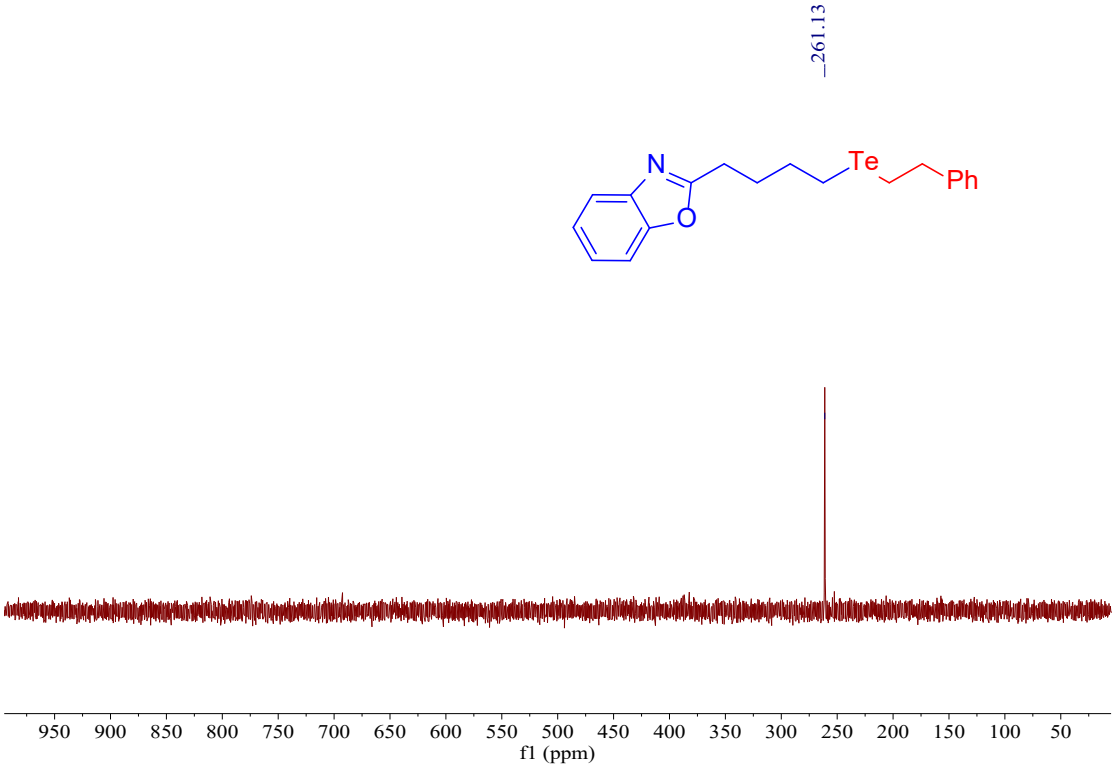
^{1}H NMR Spectra of **4r** (400 MHz, $CDCl_3$)



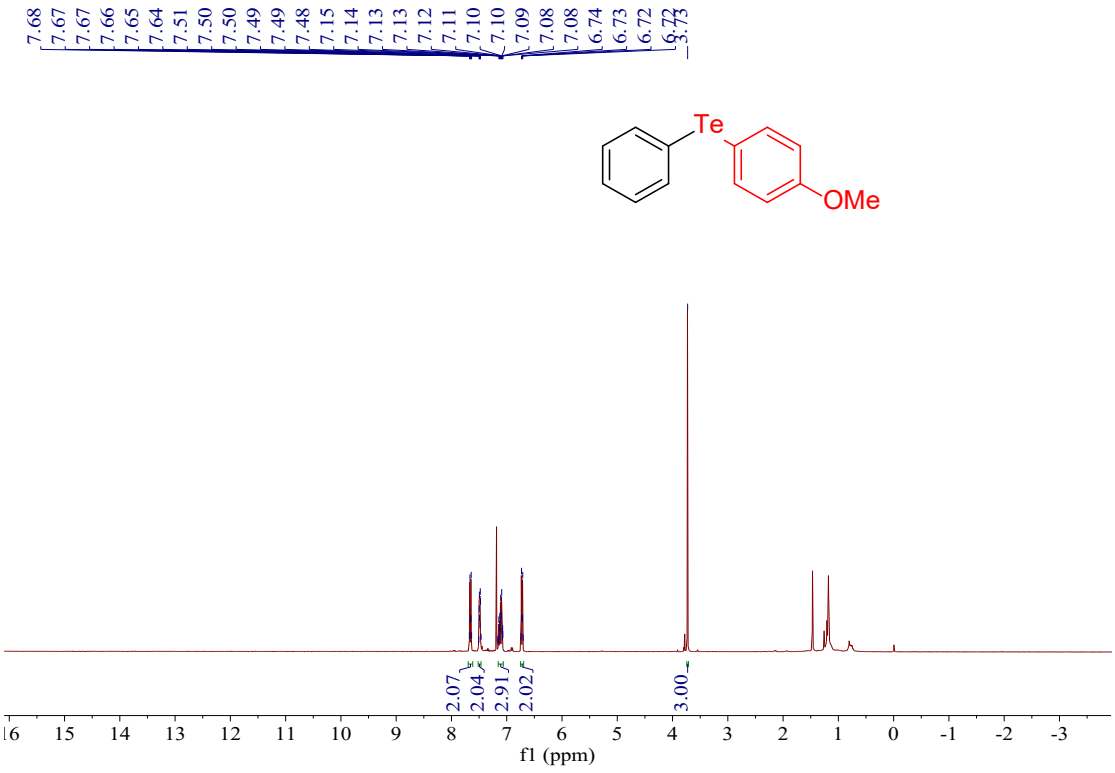
^{13}C NMR Spectra of **4r** (400 MHz, $CDCl_3$)



^{125}Te NMR Spectra of **4r** (400 MHz, $CDCl_3$)



^{1}H NMR Spectra of **12** (400 MHz, $CDCl_3$)



^{13}C NMR Spectra of **12** (400 MHz, $CDCl_3$)