Supporting information

Trifluoromethylthiolative 1,2-Difunctionalization of Alkenes with Diselenides and $AgSCF_3$

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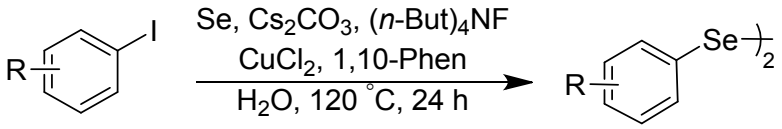
1. General comments

All reactions were carried out in the Schlenk tube under argon atmosphere and few of the styrenes and alkenes were synthesized from corresponding starting materials. DAST (diethylaminosulphurtrifluoride), CF_3TMS, and $BF_3{\cdot}OEt_2$ was procured from Spectrochem, DIPEA (diisopropylethylamine) and all the used solvents were purchased from Avra and dried over either CaH_2 or Na metal followed by stored with 4Å molecular sieves under argon atmosphere, DIPEA stored with KOH under argon atmosphere. All the substituted diaryl diselenides were synthesized from corresponding aryl iodides in presence of catalytic CuI and 1,10-Phenanthrolene.[1] Column chromatography was performed using Rankem silicagel (100-200 mesh) and ethylacetate-hexanes with various percentage of polarity depending on the nature of the substrate as an eluent, unless otherwise specified.

2. Analytical methods

NMR data were recorded on Bruker DPX 400 and AVC 500 MHz spectrometers. ^{13}C, ^{1}H, spectra were referenced to signals of deutero solvents and residual protonated solvents, respectively, in case of ^{19}F NMR, spectra were calibrated to signal of hexafluorobenzene (−164.9 ppm). HRMS were recorded using electron spry ionization (ESI) method on a Q-TOF Micro with lock spray source. Melting points are uncorrected. GCMS were recorded by using Agilent Technologies 7820A GC and 5977E MSD system with DB5-MS (30m × 0.25mm, 0.25 Micron) as following, 60 °C (3min) – 220 °C(1min) – 260 °C(2min) [Ramp-1, 6 °C/min and Ramp-2, 20 °C/min].

3. General procedure for the synthesis of diaryl diselenides (2)



2

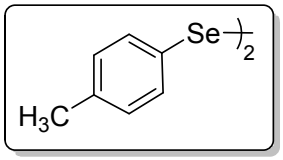
Aryl iodide (1.0 mmol, 1.0 equiv.), Se powder (237 mg, 3.0 mmol, 3.0 equiv.), Cs_2CO_3 (325.8 mg, 1.0 mmol, 1.0 equiv.), $CuCl_2$ (27 mg, 0.2 mmol, 20 mol%), and 1,10-Phen (36 mg, 0.2 mmol, 20 mol%) was mixed together in the pressure tube followed by the addition of 1M solution of $(n\text{-But})_4NF$ (0.2 mL, 0.2 mmol, 20 mol%) in THF. Finally, distilled water was ~~added and the mixture was~~ stirred at 120 ˚C for 24 h. After completion of reaction, the

[1] Z. Li, F. Ke, H. Deng, H. Xu, H. Xiang and X. Zhou, *Org. Biomol. Chem.*, 2013, **11**, 2943-2946.

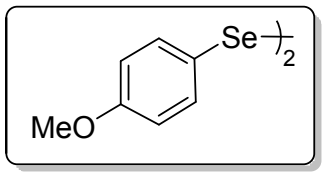
mixture was diluted with EtOAc and filtered *via* celite then the immiscible solution was further diluted with sufficient amount of EtOAC and washed with water followed by NaCl solution. The combined organic layer was dried over Na_2SO_4 and concentrated under reduced pressure. Consiquitly, purified with column chromatography with EtOAOc and Hexane as eluent.

4. Characteristics of isolated diaryl diselenides

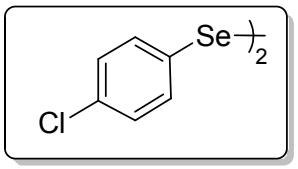
1,2-Bis(4-methylphenyl)diselane[1]: Yellow liquid; yield: 65% (111 mg); ^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7. (d, 2H, J = 8.0 Hz, HAr), 6.08 (d, 2H, J = 8.0 Hz, HAr), 2.33 (s, 3H, CH_3); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 160.1 (C), 135.5 (CH), 122.0 (C), 115.3 (CH), 55.4 (CH_3).



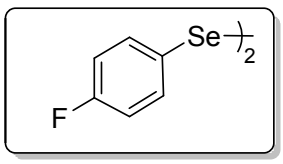
1,2-Bis(4-methoxyphenyl)diselane[1]: Yellow liquid; yield: 74% (138.3 mg); ^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.49 (d, 2H, J = 8.8 Hz, HAr), 6.80 (d, 2H, J = 8.8 Hz, HAr), 3.79 (s, 3H, OCH_3); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 160.1 (C), 135.5 (CH), 122.0 (C), 115.3 (CH), 55.4 (OCH_3).



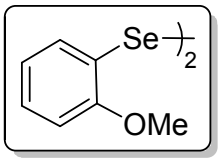
1,2-Bis(4-methylphenyl)diselane[1]: Yellow liquid; yield: 49% (85.7 mg); ^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.53. (d, 2H, J = 8.3 Hz, HAr), 7.22 (d, 2H, J = 8.3 Hz, HAr); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 139.2 (CH), 133.5 (CH), 122.3 (C), 115.3 (C).



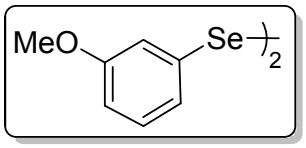
1,2-Bis(4-methylphenyl)diselane[1]: Yellow liquid; yield: 52% (91 mg); ^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.44. (d, 2H, J = 8.6 Hz, HAr), 6.95 (d, 2H, J = 8.8 Hz, HAr); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 139.0 (CH), 133.4 (CH), 122.1 (C), 92.0 (C).



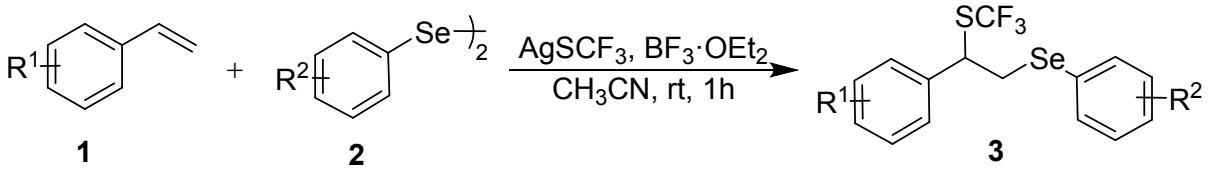
1,2-Bis(2-methoxyphenyl)diselane[1]: Yellow liquid; yield: 54% (100 mg); ^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.54 (dd, 1H, J = 7.7, 1.5 Hz, HAr), 7.20 (td, 1H, J = 7.6, 1.6 Hz, HAr), 6.86 (td, 1H, J = 7.5, 1.5 Hz, HAr), 6.81 (d, 1H, J = 8.1 Hz, HAr), 3.90 (s, 3H, OCH_3); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 156.9 (C), 130.7 (CH), 128.3 (CH), 122.0 (CH), 118.8 (C), 110.2 (CH), 56.0 (OCH_3).



1,2-Bis(3-methoxyphenyl)diselane[1]: Yellow liquid; yield: 59% (110 g); ^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.21-7.14 (m, 3H, HAr), 6.77 (d, 1H, J = 7.4 Hz, HAr), 3.75 (s, 3H, OCH_3); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 159.9 (C), 131.9 (CH), 130.0 (CH), 123.6 (CH), 116.6 (CH), 113.9 (CH), 55.4 (OCH_3).

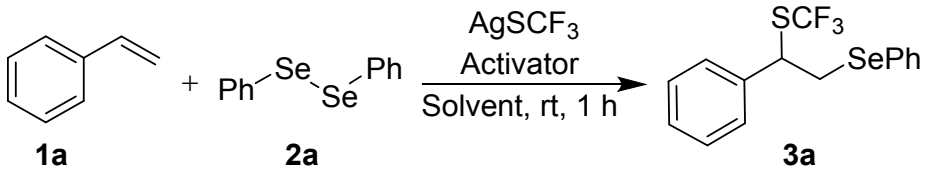


5. General procedure for bifunctionalization of alkenes



Diaryldiselenide (0.24 mmol, 1.0 equiv.) followed by $AgSCF_3$ (50 mg, 0.24 mmol, 1.0 equiv.) was transferred to the oven dried 10 ml Schlenk tube which fitted is with rubber septum, under "Ar" atmosphere. The Schlenk flask was evacuated and refilled with Argon for several times to make complete argon atmosphere in the Schlenk tube. To the mixture acetonitrile (0.24M, 1 mL) followed by styrene (0.48 mmol, 2.0 equiv.) was added to the reaction mixture and stirred for 15 min at room temperature. Then, 0.3 ml of 0.8 M solution of $BF_3{\cdot}OEt_2$ (0.24 mmol, 1.0 equiv.) in acetonitrile was added drop wise to the reaction mixture over the period of 5 min. After 1 hour at room temperature, the mixture was filtered *via* celite then the filtrate was concentrated under reduced pressure and purified on silica gel with pure hexane as elutent (Note: Same reaction procedure was followed for the synthesis of all substrate).

6. Optimization of reaction conditions



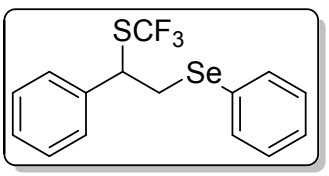
1a **2a** **3a**

Entry	Activator (X equiv)	Solvent	Yield (%)[b]
1	CuI (0.2)	CH_3CN	nr
2	CuBr (0.2)	CH_3CN	nr
3	$PdCl_2$ (0.2)	CH_3CN	nr
4	aq HCl (0.2)	CH_3CN	nr
5	aq H_2SO_4 (0.2)	CH_3CN	nr
6	$BF_3{\cdot}OEt_2$ (1.0)	CH_3CN	44
7	$BF_3{\cdot}OEt_2$ (1.0)	DCE	<5%
8	$BF_3{\cdot}OEt_2$ (1.0)	DCM	20
9[c]	$BF_3{\cdot}OEt_2$ (1.0)	THF	20
10[d]	$BF_3{\cdot}OEt_2$ (1.0)	DMF	<5%
11[e]	$BF_3{\cdot}OEt_2$ (2.0)	CH_3CN	40
12	$BF_3{\cdot}OEt_2$ (0.5)	CH_3CN	26
13	$BF_3{\cdot}OEt_2$ (0.2)	CH_3CN	24
14[c]	$BF_3{\cdot}OEt_2$ (1.0)	CH_3CN	48
15[d]	$BF_3{\cdot}OEt_2$ (1.0)	CH_3CN	20
16[e]	$BF_3{\cdot}OEt_2$ (1.0)	CH_3CN	96

[a]Reaction conditions: Styrene **1** (0.24 mmol, 1.0 equiv.), diselenide **2** (0.24 mmol, 1.0 equiv.), $AgSCF_3$ (0.24 mmol, 1.0 equiv.), $BF_3{\cdot}OEt_2$ (0.24 mmol, 1.0 equiv.), Solvent (0.24M), rt, 1h. [b]Isolated yield, [c]Reaction at 50 C, [d]05 equivalent of styrene, [e]2.0 equivalent of styrene.

7. Characteristics of isolated bifunctionalized compound (3 & 6)

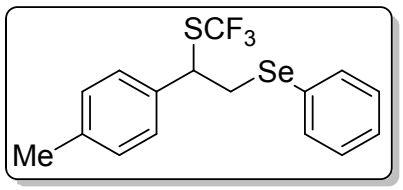
(1-Phenyl-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3a): Yellow liquid; yield: 90%



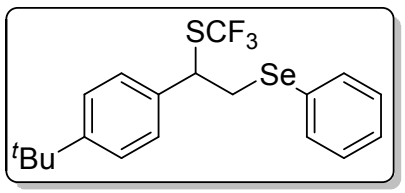
(78.1 mg); IR (CH_3Cl): 2926, 1477, 1110, 1023, 736, 694 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.45-7.39 (m, 2H, HAr), 7.35-7.29 (m, 3H, HAr), 7.29-7.21 (m, 5H, ArH), 4.50 (dd, 1H, J = 10.6, 5.1 Hz, CH), 3.56 (dd, 1H, J = 12.5, 5.1 Hz, CH_2), 3.44 (dd, 1H, J = 12.5, 10.6 Hz, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 138.4 (C), 133.5 (CH), 130.4 (q, J = 308.5 Hz, SCF_3), 129.4 (CH), 129.2 (C), 129.0 (CH), 128.6 (CH),

127.8 (CH), 127.7 (CH), 49.3 (CH), 33.7 (CH_2). ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.9 (s, 3F, SCF_3). ^{77}Se NMR (95.4 MHz, $CDCl_3$, 24 °C): δ –307.14 (Se); GC/MS (m/z): 362.0 (M), 205.0 (M–PhSe), 157.0 (PhSe), 77.0 (Ph); HRMS: calcd. for $C_{15}H_{13}F_3SSe$+H: 362.9928; found: 362.9919.

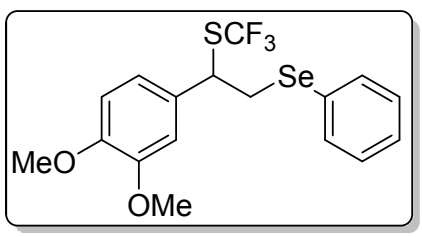
(2-(Phenylselanyl)-1-(p-tolyl)ethyl)(trifluoromethyl)sulfane (3b): Yellow liquid; yield: 92% (82.9 mg); IR (CH_3Cl): 3057, 3026, 2925, 1110, 739, 691 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.46-7.39 (m, 2H, HAr), 7.29-7.21 (m, 3H, HAr), 7.16-7.09 (m, 4H, ArH), 4.48 (dd, 1H, J = 10.8, 5.0 Hz, CH), 3.54 (dd, 1H, J = 12.5, 5.0 Hz, CH_2), 3.44 (dd, 1H, J = 12.5, 10.8 Hz, CH_2), 2.33 (s, 3H, CH_3); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 138.5 (C), 135.2 (C), 133.5 (CH), 130.8 (q, J = 308.4 Hz, SCF_3), 139.7 (CH), 129.3 (CH), 129.2 (C), 127.6 (CH), 127.5 (CH), 49.0 (CH), 33.8 (CH_2), 21.3 (CH_3); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.8 (s, 3F, SCF_3); GC/MS (m/z): 376.0 (M), 275.1 (M–SCF_3), 219.1 (M–PhSe), 157.0 (PhSe), 91.1 (Ph-CH_2-) 77.0 (Ph); HRMS: calcd. for $C_{16}H_{15}F_3SSe$+H: 377.0085; found: 377.0093.



(1-(4-(*tert*-Butyl)phenyl)-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3c): Yellow liquid; yield: 75% (75.2 mg); IR (CH_3Cl): 3064, 2926, 2855, 1242, 1150, 1111, 739, 691 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.40 (dd, 2H, J = 7.3, 1.5 Hz, HAr), 7.31 (d, 2H, J = 8.4 Hz, HAr), 7.25-7.20 (m, 3H, ArH), 7.16 (d, 2H, J = 8.3 Hz, HAr), 4.51 (dd, 1H, J = 10.5, 5.0 Hz, CH), 3.56 (dd, 1H, J = 12.6, 5.0 Hz, CH_2), 3.48 (dd, 1H, J = 12.6, 10.5 Hz, CH_2), 1.30 (s, 9H, CH_3); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 151.6 (C), 135.0 (C), 133.5 (CH), 130.4 (q, J = 308.4 Hz, SCF_3), 129.4 (C), 129.3 (CH), 127.6 (CH), 127.4 (CH), 125.9 (CH), 49.2 (CH), 34.7 (CH_2), 34.0 (C), 31.4 (CH_3); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.9 (s, 3F, SCF_3); HRMS: calcd. for $C_{19}H_{21}F_3SSe$+H: 419.0554; found: 419.0564.

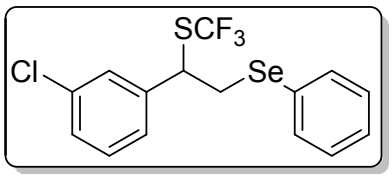


(1-(3,4-Dimethoxyphenyl)-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3d): Yellow liquid; yield: 82% (82.9 mg); IR (CH_3Cl): 2926, 2853, 1264, 1144, 1111, 739 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.44-7.38 (m, 2H, HAr), 7.29-7.19 (m, 3H, HAr), 6.83-6.77 (m, 2H, ArH), 6.72 (s, 1H, ArH), 4.49

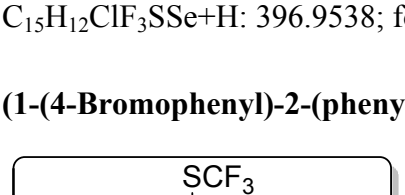


(dd, 1H, J = 10.9, 4.9 Hz, CH), 3.87 (s, 3H, OCH_3), 3.83 (s, 3H, OCH_3), 3.57 (dd, 1H, J = 12.5, 4.9 Hz, CH_2), 3.45 (dd, 1H, J = 12.5, 10.9 Hz, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 149.2 (C), 133.5 (CH), 130.6 (q, J = 308.7 Hz, SCF_3), 130.4 (C), 129.9 (C), 129.2 (CH), 128.8 (C), 127.6 (CH), 120.3 (CH), 111.2 (CH), 110.7 (CH), 56.0 (OCH_3), 49.4 (CH), 33.9 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.8 (s, 3F, SCF_3); GC/MS (m/z): 422.0 (M), 321.1 (M–SCF_3), 265.1 (M–PhSe), 157.0 (PhSe), 77.0 (Ph); HRMS: calcd. for $C_{17}H_{17}F_3O_2SSe$+Na: 444.9959; found: 444.9951.

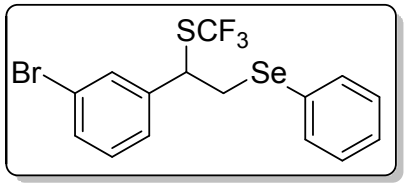
(1-(3-Chlorophenyl)-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3e): Yellow liquid; yield: 76% (72.2 mg); IR (CH_3Cl): 3066, 2925, 1575, 1476, 1431, 737, 689 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.47-7.36 (m, 2H, HAr), 7.28-7.20 (m, 6H, HAr), 7.14-7.1 (m, 1H, ArH), 4.44 (dd, 1H, J = 10.6, 5.2 Hz, CH), 3.53 (dd, 1H, J = 12.7, 5.2 Hz, CH_2), 3.37 (dd, 1H, J = 12.7, 10.6 Hz, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 140.5 (C), 134.8 (C), 133.7 (CH), 131.4 (C), 130.7 (q, J = 308.7 Hz, SCF_3), 130.2 (CH), 129.4 (CH), 128.8 (CH), 128.0 (CH), 127.9 (CH), 126.0 (CH), 48.9 (CH), 33.3 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.8 (s, 3F, SCF_3); GC/MS (m/z): 396.0 (M), 295.0 (M–SCF_3), 239.0 (M–PhSe), 157.0 (PhSe), 77.0 (Ph); HRMS: calcd. for $C_{15}H_{12}ClF_3SSe$+H: 396.9538; found: 396.9529.



(1-(4-Bromophenyl)-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3f): Yellow liquid; yield: 84% (88.6 mg); IR (CH_3Cl): 2926, 2855, 1240, 1150, 1111, 739, 691 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.44-7.36 (m, 4H, HAr), 7.30-7.20 (m, 3H, HAr), 7.10-7.09 (d, 2H, J = 8.5 Hz, ArH), 4.45 (dd, 1H, J = 10.7, 5.0 Hz, CH), 3.53 (dd, 1H, J = 12.7, 5.0 Hz, CH_2), 3.46 (dd, 1H, J = 12.7, 10.7 Hz, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 137.5 (C), 133.6 (CH), 132.0 (CH), 130.8 (q, J = 308.8 Hz, SCF_3), 129.5 (CH), 129.4 (CH), 128.8 (C), 127.8 (CH), 122.6 (C), 48.8 (CH), 33.4 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.8 (s, 3F, SCF_3); GC/MS (m/z): 440.0 (M), 339.0 (M–SCF_3), 283.0 (M–PhSe), 157.0 (PhSe), 155.0 (C_6H_4Br), 77.0 (Ph); HRMS: calcd. for $C_{15}H_{12}BrF_3SSe$+H: 440.9033; found: 440.9026.

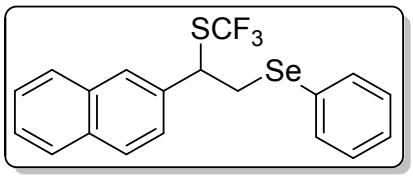


(1-(3-Bromophenyl)-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3g): Yellow liquid; yield: 72% (75.9 mg); IR (CH_3Cl): 3066, 2925, 1575,

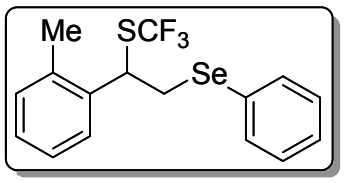


1476, 1431, 737, 689 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.45-7.38 (m, 3H, HAr), 7.36 (s, 1H, ArH), 7.30-7.21 (m, 3H, HAr), 7.21-7.13 (m, 2H, ArH), 4.43 (dd, 1H, J = 10.5, 5.2 Hz, CH), 3.52 (dd, 1H, J = 12.8, 5.2 Hz, CH_2), 3.36 (dd, 1H, J = 12.8, 10.5 Hz, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 140.8 (C), 133.7 (CH), 131.7 (CH), 130.9 (CH), 130.4 (CH), 130.3 (q, J = 308.3 Hz, SCF_3), 129.4 (CH), 128.8 (CH), 127.9 (CH), 126.5 (CH), 122.9 (C), 48.8 (CH), 33.3 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.8 (s, 3F, SCF_3); GC/MS (m/z): 440.0 (M), 339.0 (M–SCF_3), 283.0 (M–PhSe), 157.0 (PhSe), 155.0 (C_6H_4Br), 77.0 (Ph); HRMS: calcd. for $C_{15}H_{12}BrF_3SSe$+H: 440.9033; found: 440.9024.

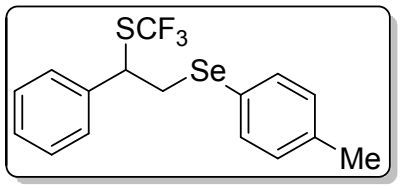
(1-(Naphthalen-2-yl)-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3h): Yellow liquid; yield: 73% (72.1 mg); IR (CH_3Cl): 2962, 2926, 1684, 1284, 709 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.83-7.75 (m, 3H, HAr), 7.67 (d, 1H, J = 1.4 Hz, ArH) 7.52-7.42 (m, 2H, HAr), 7.40-7.37 (m, 2H, ArH), 7.34 (dd, 1H, J = 8.3, 1.9 Hz, ArH), 7.24-7.16 (m, 3H, ArH), 4.68 (dd, 1H, J = 10.6, 5.2 Hz, CH), 3.63 (dd, 1H, J = 12.7, 5.2 Hz, CH_2), 3.55 (dd, 1H, J = 12.7, 10.6 Hz, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 135.5 (C), 133.5 (CH), 133.3 (CH), 133.2 (C), 131.5 (C), 130.6 (q, J = 308.5 Hz, SCF_3), 129.3 (CH), 129.1 (C), 129.0 (CH), 128.1 (CH), 127.8 (CH), 127.7 (CH), 127.2 (CH), 126.6 (CH), 125.1 (CH), 49.6 (CH), 33.5 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.8 (s, 3F, SCF_3); GC/MS (m/z): 412.0 (M), 311.0 (M–SCF_3), 255.0 (M–PhSe), 157.0 (PhSe), 77.0 (Ph); HRMS: calcd. for $C_{19}H_{15}F_3SSe$+H: 413.0085; found: 413.0074.



(2-(Phenylselanyl)-1-(o-tolyl)ethyl)(trifluoromethyl)sulfane (3i): Yellow liquid; yield: 88% (79.4 mg); IR (CH_3Cl): 3069, 2926, 1477, 1438, 1147, 1111, 737, 692 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.44-7.38 (m, 4H, HAr), 7.27-7.20 (m, 4H, HAr), 7.20-7.13 (m, 3H, ArH), 4.47 (dd, 1H, J = 10.5, 5.5 Hz, CH), 3.62 (dd, 1H, J = 12.6, 5.5 Hz, CH_2), 3.47 (dd, 1H, J = 12.6, 10.5 Hz, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 136.5 (C), 135.9 (CH), 133.3 (CH), 131.0 (CH), 130.5 (q, J = 308.2 Hz, SCF_3), 129.3 (CH), 129.1 (C), 128.4 (CH), 127.6 (CH), 126.8 (C), 126.6 (CH), 44.5 (CH), 33.2 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –43.0 (s, 3F, SCF_3); GC/MS (m/z): 376.0 (M), 275.0 (M–SCF_3), 219.1 (M–PhSe), 157.0 (PhSe), 91.1 ($CH_3C_6H_4$), 77.0 (Ph); HRMS: calcd. for $C_{16}H_{15}F_3SSe$+H: 377.0085; found: 377.0077.

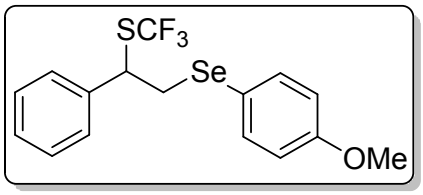


(1-Phenyl-2-(p-tolylselanyl)ethyl)(trifluoromethyl)sulfane (3j): Yellow liquid; yield: 70%



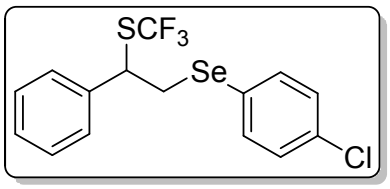
(63.0 mg); IR (CH_3Cl): 2924, 2855, 1110, 758, 699 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.38-7.28 (m, 5H, HAr), 7.25 (dd, 2H, J = 7.5, 1.7 Hz, HAr), 7.06 (d, 2H, J = 7.9 Hz, ArH), 4.48 (dd, 1H, J = 10.2, 5.1 Hz, CH), 3.51 (dd, 1H, J = 12.5, 5.1 Hz, CH_2), 3.40 (dd, 1H, J = 12.5, 10.2 Hz, CH_2), 2.33 (CH_3); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 138.5 (C), 137.9 (C), 133.9 (CH), 130.3 (q, J = 308.8 Hz, SCF_3), 130.1 (CH), 128.9 (CH), 128.6 (CH), 127.8 (CH), 125.3 (C), 49.3 (CH), 33.9 (CH_2), 27.2 (CH_3); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.8 (s, 3F, SCF_3); GC/MS (m/z): 376.0 (M), 205.0 (M–$CH_3C_6H_4Se$), 171.0 ($CH_3C_6H_4Se$), 91.1 (Ph-CH_2-), 77.0 (Ph); HRMS: calcd. for $C_{16}H_{15}F_3SSe$+H: 377.0085; found: 377.0091.

(2-((4-Methoxyphenyl)selanyl)-1-phenylethyl)(trifluoromethyl)sulfane (3k): Yellow



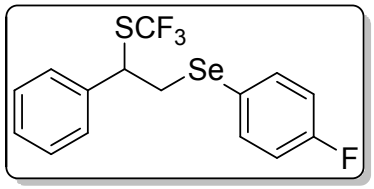
liquid; yield: 81% (76.1 mg); IR (CH_3Cl): 2934, 2843, 1247, 1111, 1031, 825, 700 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.36 (d, 2H, J = 8.8 Hz, ArH), 7.35-7.28 (m, 3H, HAr), 7.27-7.22 (m, 2H, HAr), 6.79 (d, 2H, J = 9.0 Hz, ArH), 4.40 (dd, 1H, J = 10.5, 5.4 Hz, CH), 3.80 (s, 3H, OCH_3), 3.45 (dd, 1H, J = 12.4, 5.4 Hz, CH_2), 3.36 (dd, 1H, J = 12.4, 10.5 Hz, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 159.8 (C), 137.5 (C), 136.2 (CH), 130.8 (q, J = 308.8 Hz, SCF_3), 128.9 (CH), 128.5 (CH), 127.8 (CH), 119.0 (C), 115.0 (CH), 55.4 (OCH_3), 49.3(CH), 34.5 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.8 (s, 3F, SCF_3); GC/MS (m/z): 392.0 (M), 291.0 (M–SCF_3), 205.1, 187 ($CH_3C_6H_4Se$), 107.1 ($CH_3OC_6H_4$), 77.0 (Ph); HRMS: calcd. for $C_{16}H_{15}F_3OSSe$+H: 393.0034; found: 393.0044.

(2-((4-Chlorophenyl)selanyl)-2-phenylethyl)(trifluoromethyl)sulfane (3l): Yellow liquid;

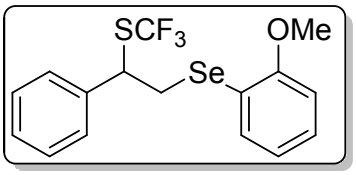


yield: 51% (48.4 mg); IR (CH_3Cl): 3033, 2927, 1474, 1149, 1109, 758, 699 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.35-7.27 (m, 5H, HAr), 7.26-7.15 (m, 4H, HAr), 4.48 (dd, 1H, J = 10.5, 5.1 Hz, CH), 3.54 (dd, 1H, J = 12.6, 5.1 Hz, CH_2), 3.48 (dd, 1H, J = 12.6, 10.5 Hz, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 138.1 (C), 134.9 (CH), 134.1 (C), 130.3 (q, J = 308.4 Hz, SCF_3), 129.4 (CH), 129.0 (CH), 128.7 (CH), 127.7 (CH), 127.3 (C), 49.4 (CH), 34.1 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.9 (s, 3F, SCF_3); GC/MS (m/z): 396.0 (M), 295.0 (M-SCF_3), 205.1 (M-ClPhSe),

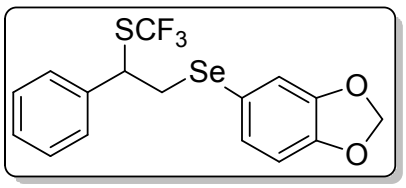
191.0 (ClPhSe), 111.0 (PhCl-), 77.0 (Ph); HRMS: calcd. for $C_{15}H_{12}ClF_3SSe$+H: 396.9538; found: 396.9530.

(2-((4-Fluorophenyl)selanyl)-1-phenylethyl)(trifluoromethyl)sulfane (3m): Yellow liquid; 

yield: 55% (50.1 mg); IR (CH_3Cl): 3033, 2927, 1585, 1487, 1229, 1110, 826, 758, 699 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.43-7.35 (m, 2H, HAr), 7.35-7.28 (m, 3H, HAr),7.28-7.20 (m, 2H,ArH), 6.93 (t, 2H, J = 8.1 Hz, ArH), 4.47 (dd, 1H, J = 10.5, 5.2 Hz, CH), 3.50 (dd, 1H, J = 12.6, 5.2 Hz, CH_2), 3.47 (dd, 1H, J = 12.6, 10.5 Hz, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 138.2 (C), 136.3 (C), 136.2 (CH), 130.3 (q, J = 308.7 Hz, SCF_3), 129.0 (CH), 128.7 (CH), 127.8 (CH), 116.6 (CH), 116.4 (C), 49.4 (CH), 34.5 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.9 (s, 3F, SCF_3), 116.7 (Ar-F)**;** GC/MS (m/z): 380.0 (M), 279.0 (M–SCF_3), 205.1 (M–FPhSe), 175.0 (FPhSe), 95 (PhF-), 77.0 (Ph); HRMS: calcd. for $C_{15}H_{12}F_4SSe$+H: 380.9834; found: 380.9844.

(3-(2-Methoxyphenyl)-1-phenylpropyl)(trifluoromethyl)sulfane (3n): Yellow liquid; 

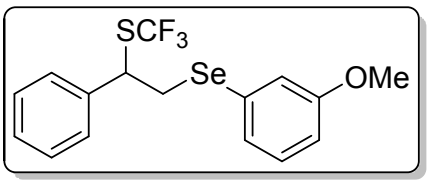
yield: 55% (51.7 mg); IR (CH_3Cl): 2961, 2935, 1240, 1054, 748 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.34-7.29 (m, 3H, ArH), 7.27-7.23 (m, 2H, HAr), 7.16 (t, 1H, J = 8.1 Hz, ArH), 7.00 (dt, 1H, J = 7.6, 1.0 Hz, ArH), 6.95 (dd, 1H, J = 2.5, 1.7 Hz, ArH), 6.8 (m, 1H, ArH), 4.52 (dd, 1H, J = 10.7, 5.2 Hz, CH), 3.78 (s, 3H, OCH_3), 3.58 (dd, 1H, J = 12.6, 5.2 Hz, CH_2), 3.45 (dd, 1H, J = 12.6, 10.7 Hz, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 159.9 (C), 138.4 (C), 130.1 (CH), 130.3 (q, J = 308.9 Hz, SCF_3), 128.9 (CH), 128.6 (CH), 127.9 (C), 127.8 (CH), 125.5 (CH), 120.56 (C), 118.5 (CH), 113.7 (CH), 55.4 (OCH_3), 49.3 (CH), 33.6 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.9 (s, 3F, SCF_3); HRMS: calcd. for $C_{16}H_{15}F_3OSSe$+Na: 414.9853; found: 414.9847.

5-((2-Phenyl-2-((trifluoromethyl)thio)ethyl)selanyl)benzo[d][1,3]dioxole (3o): Yellow 

liquid; yield: 73% (71.1 mg); IR (CH_3Cl): 2926, 1476, 1233, 1109, 1039, 757, 698 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.35-7.28 (m, 3H, HAr), 7.26-7.22 (m, 2H, HAr), 6.93 (dd, 1H, J = 7.8, 1.7 Hz, ArH), 6.88 (d, 1H, J = 1.8 Hz, ArH), 6.69 (d, 1H, J = 10.4 Hz, ArH), 5.06 (s, 2H, -CH_2- 4.48 (dd, 1H, J = 10.5, 5.2 Hz, CH), 3.46 (dd, 1H, J = 12.6, 5.2 Hz, CH_2), 3.37 (dd, 1H, J = 12.6, 10.5 Hz, CH_2);

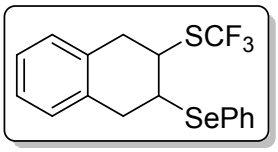
$^{13}C\{^{1}H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 148.1 (C), 148.0 (C), 138.4 (C), 130.3 (q, J = 308.7 Hz, SCF_3), 128.9 (CH), 128.7 (CH), 128.6 (CH), 127.8 (CH), 120.1 (C), 114.9 (CH), 109.2 (CH), 101.4 (CH_2), 49.4 (CH), 34.7 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.8 (s, 3F, SCF_3); GC/MS (m/z): 406.0 (M), 205.0, 201 (Ar-Se), 121, 77.0 (Ph); HRMS: calcd. for $C_{16}H_{14}F_3O_2SSe$+H: 406.9826; found: 406.9820.

(2-((3-Methoxyphenyl)selanyl)-1-phenylethyl)(trifluoromethyl)sulfane (3p): Yellow



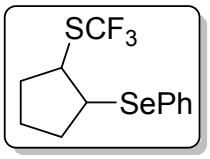
liquid; yield: 79% (74.3 mg); IR (CH_3Cl): 2934, 2835, 1111, 1039, 773, 694 cm^{-1}; ^{1}H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.36-7.27 (m, 3H, ArH), 7.27-7.23 (m, 2H, HAr), 7.16 (t, 1H, J = 8.0 Hz, ArH), 7.00 (dt, 1H, J = 7.6, 1.0 Hz, ArH), 6.95 (dd, 1H, J = 2.5, 1.7 Hz, ArH), 6.8 (ddd, 1H, J = 8.2, 2.5, 0.8 Hz, ArH), 4.52 (dd, 1H, J = 10.7, 5.2 Hz, CH), 3.78 (s, 3H, OCH_3), 3.58 (dd, 1H, J = 12.6, 5.2 Hz, CH_2), 3.45 (dd, 1H, J = 12.6, 10.7 Hz, CH_2); $^{13}C\{^{1}H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 159.9 (C), 138.3 (C), 130.1 (CH), 130.3 (q, J = 308.9 Hz, SCF_3), 128.9 (CH), 128.6 (CH), 127.9 (C), 127.8 (CH), 125.4 (CH), 118.5 (CH), 113.7 (CH), 55.4 (OCH_3), 49.3 (CH), 34.6 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.9 (s, 3F, SCF_3); GC/MS (m/z): 392.1(M), 291.0 (M–MeOPhSe), 187.0 (MeOPhSe), 107.1 (MeOPh-) 77.0 (Ph); HRMS: calcd. for $C_{16}H_{15}F_3OSSe$+H: 393.0034; found: 393.0042.

(3-(Phenylselanyl)-1,2,3,4-tetrahydronaphthalen-2-yl)(trifluoromethyl) sulfane (6a):



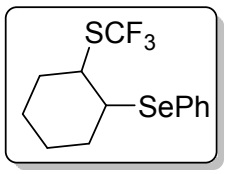
Yellow liquid; yield: 77% (71.7 mg); IR (CH_3Cl): 3064, 2925, 2852, 1260, 1148, 1112, 740, 691cm^{-1}; ^{1}H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.59 (d, 2H, J = 7.7, HAr), 7.30-7.15 (m, 3H, HAr), 7.20-7.13 (m, 2H, ArH), 7.11-7.03 (m, 2H, ArH), 4.0-3.93 (m 1H, CH), 3.8-3.83 (m, 1H, CH) 3.78 (dd, 1H, J = 17.5, 5.3 Hz, CH_2), 3.59 (dd, 1H, J = 18.0, 5.6 Hz, CH_2), 3.05 (dd, 1H, J = 18.0, 3.1 Hz, CH_2), 2.98 (d, 1H, J = 17 Hz, CH_2); $^{13}C\{^{1}H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 134.8 (CH), 132.8 (C), 131.7 (C), 131.6 (C), 130.4 (q, J = 308.5 Hz, SCF_3), 129.5 (CH), 129.3 (CH), 129.2 (CH), 129.1 (CH), 128.3 (CH), 127.8 (CH), 126.9 (CH), 126.7 (CH), 44.1 (CH_2), 41.9 (CH_2), 32.9 (CH_2), 31.9 (CH); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –43.1 (s, 3F, SCF_3); HRMS: calcd. for $C_{17}H_{15}F_3SSe$+H: 389.0085; found: 389.0096.

(2-(Phenylselanyl)cyclopentyl)(trifluoromethyl)sulfane (6b): Yellow liquid; yield: 65%



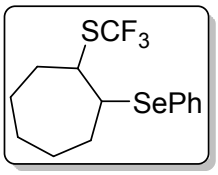
(50.8 mg); IR (CH_3Cl): 2955, 2925, 2854, 1150, 1114, 737, 690 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.58 (dd, 2H, J = 7.1, 1.4 Hz, ArH), 7.36-7.26 (m, 3H, HAr), 3.64-3.54 (m, 2H, CH), 2.46-2.36 (m, 1H, CH_2), 2.31- 2.21 (m, 1H, CH_2), 1.85-1.75 (m, 4H, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 135.2 (CH), 130.6 (q, J = 308.6 Hz, SCF_3), 129.3 (CH), 128.7 (C), 128.2 (CH), 50.1 (CH), 47.5 (CH), 32.7 (CH_2), 31.9 (CH_2), 23.3 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –43.1 (s, 3F, SCF_3); GC/MS (m/z): 325.9 (M), 225.0 (M–SCF_3), 169.0 (M–PhSe), 156.9 (PhSe), 77.0 (Ph), 67.1 (C_5H_7); HRMS: calcd. for $C_{12}H_{13}F_3SSe$+H: 326.9928; found: 326.9935.

(2-(Phenylselanyl)cyclohexyl)(trifluoromethyl)sulfane (6c): Yellow liquid; yield: 75%



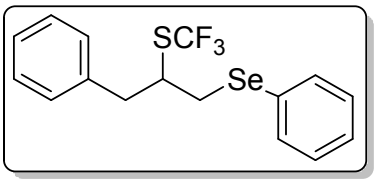
(61.2 mg); IR (CH_3Cl): 2925, 2855, 1149, 1114, 737, 690 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.57 (dd, 2H, J = 6.7, 1.9 Hz, ArH), 7.34-7.24 (m, 3H, HAr), 3.60-3.47 (m, 2H, CH), 2.47-2.35 (m, 1H, CH_2), 2.18- 2.05 (m, 1H, CH_2), 1.88-1.71 (m, 2H, CH_2), 1.67-1.57 (m, 1H, CH_2), 1.55-1.43 (3H, m, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 135.0 (CH), 131.6 (C), 131.0 (q, J = 308.4 Hz, SCF_3), 129.3 (CH), 128.1 (CH), 48.0 (CH), 46.7 (CH), 30.6 (CH_2), 29.8 (CH_2), 23.6 (CH_2), 23.2 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –43.3 (s, 3F, SCF_3); GC/MS (m/z): 340.0 (M), 239.0 (M–SCF_3), 183.0 (M–PhSe), 156.9 (PhSe), 81.1 (C_6H_9), 77.0 (Ph); HRMS: calcd. for $C_{13}H_{15}F_3SSe$+Na: 362.9904; found: 362.9897.

(2-(Phenylselanyl)cycloheptyl)(trifluoromethyl)sulfane (6d): Yellow liquid; yield: 77%

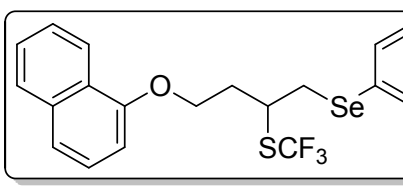


(65.4 mg); IR (CH_3Cl): 2930, 2858, 1146, 1112, 738, 690 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.59-7.54 (m, 2H, ArH), 7.30-7.26 (m, 3H, HAr), 3.80-3.66 (m, 2H, CH), 2.33 (dd, 1H, J = 15.6, 10.8 Hz, CH), 2.17- 2.08 (m, 1H, CH), 2.0-1.9 (m, 2H, CH_2), 1.70-1.56 (m, 6H, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 135.0 (CH), 131.6 (C), 130.8 (q, J = 308.4 Hz, SCF_3), 129.3 (CH), 128.1 (CH), 51.2 (CH), 50.8 (CH), 31.1 (CH_2), 30.9 (CH_2), 27.7 (CH_2), 24.5 (CH_2), 23.3 (CH_2); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –43.1 (s, 3F, SCF_3); GC/MS (m/z): 354.0 (M), 197.1 (M–PhSe), 157.0 (PhSe), 95.1 (C_7H_{11}), 77.0 (Ph); HRMS: calcd. for $C_{14}H_{17}F_3SSe$+H: 355.0241; found: 355.0249.

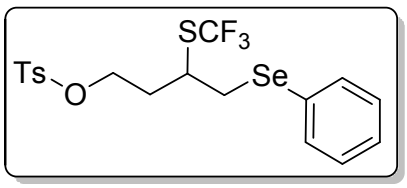
(1-Phenyl-3-(phenylselanyl)propan-2-yl)(trifluoromethyl)sulfane (6e): Yellow liquid; yield: 65% (58.6 mg); IR (CH_3Cl): 2925, 2852, 1111, 741 696 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 7.52 (dd, 2H, J = 7.1, 1.4 Hz, HAr), 7.36-7.18 (m, 8H, HAr), 3.57 (q, 1H, J = 7.7 Hz, CH), 3.22 (dd, 1H, J = 13.5, 5.3 Hz, CH_2), 3.17 (dd, 1H, J = 14.5, 6.2 Hz, CH_2), 3.04 (dd, 1H, J = 13.5, 8.5 Hz, CH_2), 2.97 (dd, 1H, J = 14.3, 7.6 Hz, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 138.2 (C), 135.5 (CH), 130.4 (q, J = 308.5 Hz, SCF_3), 129.4 (CH), 129.2 (C), 128.7 (CH), 128.5 (CH), 127.5 (C), 127.0 (CH), 44.7 (CH_2), 39.7 (CH_2), 35.1 (CH); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.5 (s, 3F, SCF_3); GC/MS (m/z): 376.0 (M), 271.0 (M–SCF_3), 219.1 (M–PhSe), 157.0 (PhSe), 91.1 (Ph-CH_2-), 77.0 (Ph); HRMS: calcd. for $C_{16}H_{15}F_3SSe$+H: 377.0085; found: 377.0095.



(4-(Naphthalen-1-yloxy)-1-(phenylselanyl)butan-2-yl)(trifluoromethyl)sulfane (6f): Yellow liquid; yield: 79% (86.4 mg); IR (CH_3Cl): 3058, 2925, 1107, 771, 739 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.20 (d, 1H, J = 7.6 Hz, HAr), 7.80 (d, 1H, J = 7.2 Hz, HAr), 7.55 (d, 2H, J = 6.8 Hz, ArH), 7.53-7.41 (m, 3H, ArH), 7.37 (t, 1H, J = 7.6 Hz, ArH), 7.31-7.16 (m, 3H, ArH), 6.83 (d, J = 7.3 Hz, ArH), 4.47-4.31 (m 2H, CH_2), 3.77-3.62 (m, 1H, CH_2) 3.43 (dd, 1H, J = 13.1, 5.2 Hz, CH_2), 3.19 (dd, 1H, J = 14.1, 81 Hz, CH_2), 2.63-2.50 (m, 1H, CH_2), 2.19-2.05 (m, 1H, CH_2); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 154.4 (C), 135.7 (CH), 134.6 (C), 129.4 (CH), 128.9 (CH), 127.6 (CH), 127.0 (C), 126.5 (CH), 125.9 (CH), 125.7 (C), 125.4 (CH), 122.0 (CH), 120.6 (CH), 104.8 (CH), ;65.8 (CH), 41.1 (CH), 36.4 (CH), 33.2 (CH); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –43.9 (s, 3F, SCF_3); HRMS: calcd. for $C_{20}H_{19}F_3OSSe$+H: 457.0347; found: 457.0339.

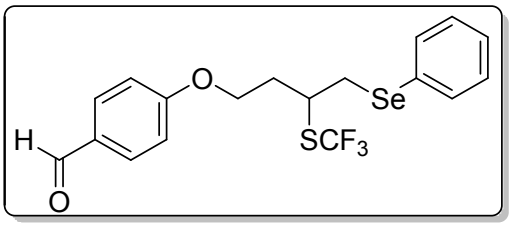


4-(Phenylselanyl)-3-((trifluoromethyl)thio)butyl 4-methylbenzenesulfonate (6g): Yellow liquid; yield: 52% (60.4 mg); IR (CH_3Cl): 2924, 2853, 1363, 1177, 1114, 1020, 756 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.80 (d, 2H, J = 8.1 Hz, HAr), 7.42 (d, 2H, J = 7.0 Hz, HAr), 7.40-7.33 (m, 3H, ArH), 7.29 (t, 2H, J = 7.4 Hz, ArH), 4.36-4.34 (m 2H, CH), 3.31-3.18 (m, 2H, CH) 2.95 (dd, 1H, J = 13.2, 8.1 Hz, CH_2), 2.45 (s, 3H, CH_3), 2.26 (m, 1H, CH_2), 1.85-1.71 (m, 1H, CH_2); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 145.1 (C), 136.1 (CH), 130.4 (q, J = 308.5 Hz, SCF_3), 130.1 (CH),

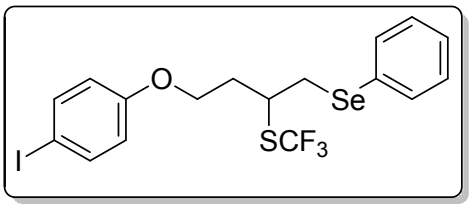


129.5 (CH), 128.9 (CH), 128.1 (CH), 128.0 (CH), 125.9 (CH), 39.4 (CH_2), 35.9 (CH_2), 32.4 (CH_2), 31.9 (CH), 29.8 (CH_3); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –43.9 (s, 3F, SCF_3); HRMS: calcd. for $C_{18}H_{19}F_3O_3S_2Se$+H: 484.9966; found: 484.9973.

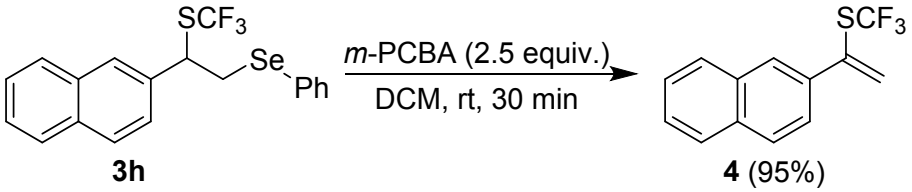
4-(4-(Phenylselanyl)-3-((trifluoromethyl)thio)butoxy)benzaldehyde (6h): Yellow liquid; yield: 64% (66.6 mg); IR (CH_3Cl): 2929, 2733, 1692, 1601, 1256, 1159, 1113, 1030, 742, 693 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 9.89 (s, 1H, CHO), 7.85 (d, 1H, J = 8.7 Hz, HAr), 7.55 (d, 1H, J = 7.2 Hz, HAr), 7.37-721 (m, 3H, ArH), 6.99 (d, 2H, J = 8.9 Hz, ArH), 4.37-4.21 (m 2H, CH_2), 3.61-3.47 (m, 1H, CH_2) 3.78 (dd, 1H, J = 13.7, 5.5 Hz, CH_2), 3.12 (dd, 1H, J = 13.5 & 8.5 Hz, CH_2), 2.49-2.33 (m, 1H, CH_2), 2.09-1.92 (m, 1H, CH_2); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 190.9 (CHO), 163.7 (C), 135.7 (CH), 132.1 (CH), 130.2 (CH), 129.5 (CH), 128.7 (CH), 126.7 (C), 114.9 (CH), 66.0 (CH), 40.6 (CH), 36.2 (CH), 32.8 (CH); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –42.5 (s, 3F, SCF_3); GC/MS (m/z): 434.0 (M), 271.0 (M–SCF_3), 219.1 (M–PhSe), 157.0 (PhSe), 91.1 (Ph-CH_2-), 77.0 (Ph); HRMS: calcd. for $C_{18}H_{17}F_3O_2SSe$+H: 435.0139; found: 435.0129.



(4-(4-Iodophenoxy)-1-(phenylselanyl)butan-2-yl)(trifluoromethyl)sulfane (6i): Yellow liquid; yield: 60% (76.5 mg); IR (CH_3Cl): 1639, 1242, 1146, 1112, 1037, 739, 692 cm^{-1}; ^1H NMR (400 MHz, $CDCl_3$, 24 °C): δ 7.58-7.52 (m, 4H, HAr), 7.36-7.26 (m, 3H, HAr), 7.66 (d, 2H, J = 8.9 Hz, ArH), 4.23-4.20 (m 2H, CH_2), 3.59-3.47 (m, 1H, CH_2), 3.35 (dd, 1H, J = 13.5, 5.6 Hz, CH_2), 3.11 (dd, 1H, J = 13.5, 9.0 Hz, CH_2), 2.24-2.23 (m, 1H, CH_2), 2.05-1.91 (m, 1H, CH_2); $^{13}C\{^1H\}$ NMR (100 MHz, $CDCl_3$, 24 °C): δ 158.5 (C), 138.3 (CH), 135.7 (CH), 129.5 (CH), 128.6 (CH), 126.8 (C), 117.0 (CH), 83.1 (C), 65.7 (CH), 40.7 (CH), 36.2 (CH), 32.9 (CH); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –43.9(s, 3F, SCF_3); GC/MS (m/z): 532.0 (M), 313, 274.0, 257, 219.9, 157; HRMS: calcd. for $C_{17}H_{16}F_3IOSSe$+H: 532.9157; found: 532.9148.



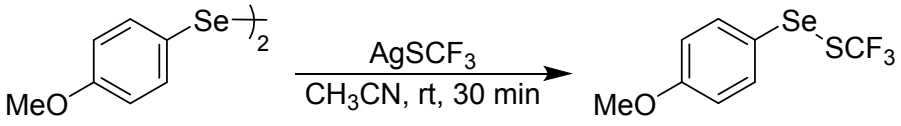
8. Synthesis and characterization of (1-(naphthalen-2-yl)vinyl) (trifluoromethyl)-sulfane (4)



3h **4** (95%)

The bifunctionalized compound **3h** (0.15 mmol) was transferred to the Schlenk tube under argon atmosphere and diluted with DCM followed by the addition solution of *m*-PCBA (0.37 mmol) in DCM over 10 min. Then reaction mixture was stirred for 30 min at room temperature then the mixture was concentrated under reduced pressure and purified by using column chromatography. The compound (1-(naphthalen-2-yl)vinyl)(trifluoromethyl)sulfane **4** was isolated as colorless liquid; yield: 95% (36.1 mg); IR (CH_3Cl): 3059, 2926, 2855, 1688, 1281, 900, 818, 751 cm^{-1}; ^1H NMR (500 MHz, $CDCl_3$, 24 °C): δ 8.11 (d, 1H, J = 1.5 Hz, HAr), 7.91-7.86 (m, 1H, HAr), 7.86-7.80 (m, 2H, HAr), 7.70 (dd, 1H, J = 8.6, 1.9 Hz, HAr), 7.54-7.48 (m, 2H, HAr), 6.21 (d, 1H, J = 0.8 Hz, CH_2), 6.07 (s, 1H, CH_2); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 135.6 (q, J = 10.0 Hz), 133.6, 133.2, 130.8 (q, J = 17.0 Hz), 128.6, 128.3, 128.2 (q, J = 311.9 Hz, SCF_3) 128.0, 127.7, 127.1, 126.9, 126.7, 124.5; ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –45.5 (s, 3F, SCF_3); GC/MS (m/z): 254.0, 153.0, 127.0.

9. Synthesis and characterization of ((4-methoxyphenyl)selanyl)(trifluoro-methyl)sulfane (7)



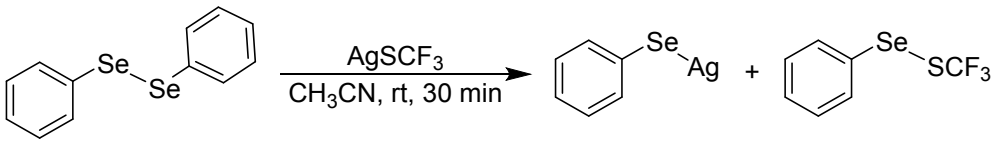
2k **7** (84%)

The flame dried Schlenk tube was evacuated and refilled with argon to create inert atmosphere in the Schlenk tube then filled with 1.0 equiv. of $AgSCF_3$ (1.0 mmol) and 1.0 equiv. bis(4-methoxyphenyl)selenide **2k** (1.0 mmol) followed by the addition of CH_3CN and stirred for 30 min at room temperature. Then the reaction mixture was filtered *via* celite and purified by column chromatography with pure hexanes. The compound ((4-methoxyphenyl)selanyl)-(trifluoromethyl)-sulfane **7** was isolated as yellow liquid; yield: 84% (279 mg); IR (CH_3Cl): 3007, 2947, 2840, 1252, 1141, 1032, 748 cm^{-1}; ^1H NMR (500

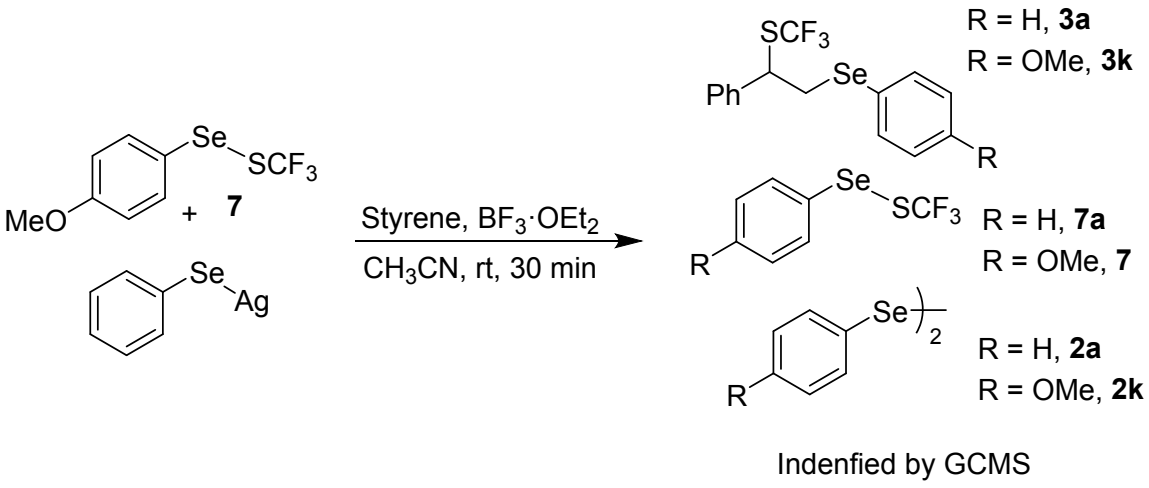
MHz, $CDCl_3$, 24 °C): δ 7.65 (d, 2H, J = 8.5 Hz, HAr), 6.87 (d, 2H, J = 8.3 Hz, HAr); $^{13}C\{^1H\}$ NMR (125 MHz, $CDCl_3$, 24 °C): δ 161.4 (C), 136.7 (CH), 128.8 (q, J = 311.9 Hz, SCF_3), 121.2 (C), 115.3 (C), 55.5 (OCH_3); ^{19}F NMR (470 MHz, $CDCl_3$, 24 °C): δ –45.5 (s, 3F, SCF_3); ^{77}Se NMR (95.38 MHz, $CDCl_3$, 24 °C): δ –470.3 (se); GC/MS (m/z): 287.9 (M), 186.9, 107.0.

10 Control experiment with PhSeAg and 7 under the optimized conditions

Synthesis of PhSeAg



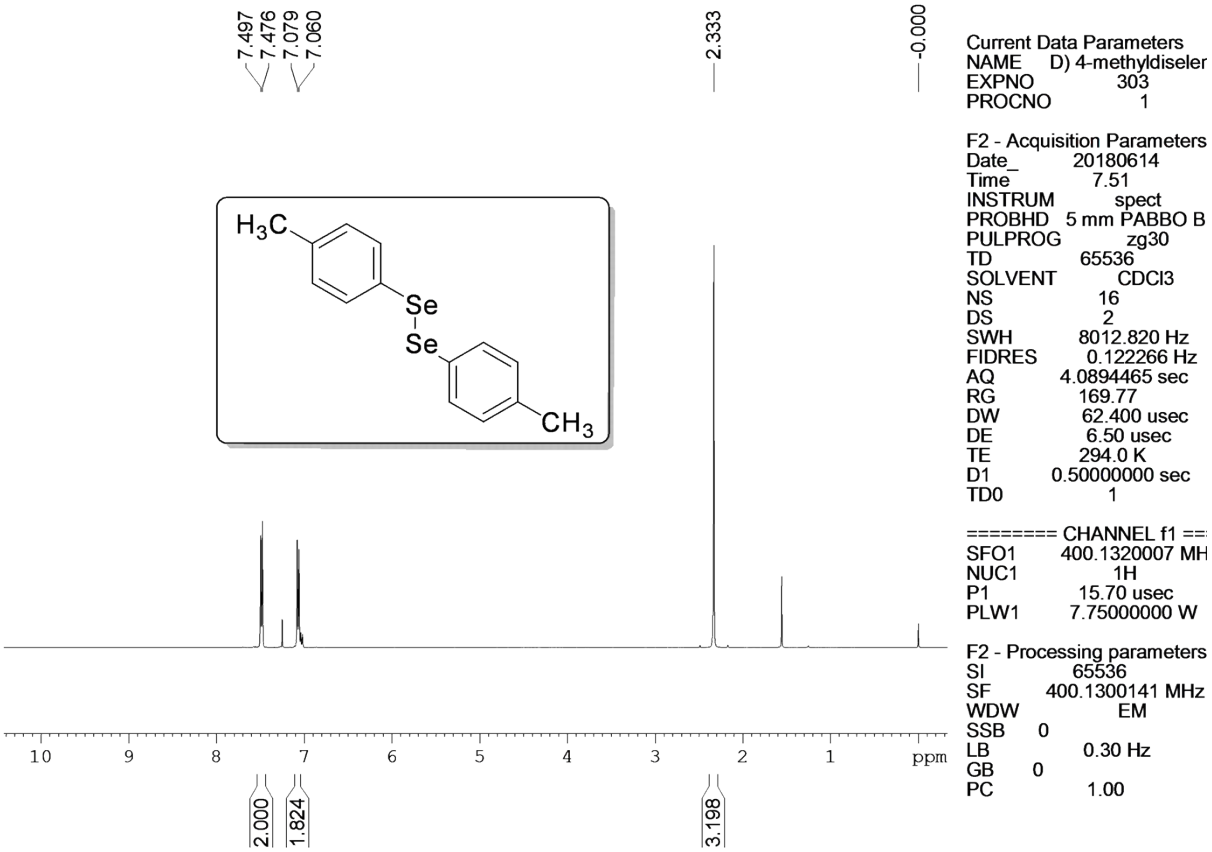
The flame dried Schlenk tube was evacuated and refilled with argon to create inert atmosphere in the Schlenk tube. Then, $AgSCF_3$ (0.24 mmol) and diphenyldiselenide **2a** (0.24 mmol) were added followed by CH_3CN was added and stirred for 30 min at room temperature. After the completion of reaction, the yellow color precipitate (PhSeAg) was isolated from the resulted reaction mixture through filtration under the inert atmosphere.



The isolated yellow color PhSeAg was transferred to the Schlenk tube under the inert atmosphere followed by compund **7** (0.24 mmol), styrene (0.48 mmol) and CH_3CN were added in sequence at room temperature. The $BF_3{\cdot}OEt_2$ was added to the above reaction mixture as drop wise and stirred at room temperature for 30 min. The reaction mixture was further diluted with EtOAc and filtered through Celite followed by the analyzed using GCMS and ^{19}F NMR.

11. ^{1}H, ^{13}C and ^{19}F NMR data for isolated compounds

1,2-Bis(4-methylphenyl)diselane (2j):



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EXPNO 303
PROCNO 1

F2 - Acquisition Parameters
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PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 169.77
DW 62.400 usec
DE 6.50 usec
TE 294.0 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ==
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NUC1 1H
P1 15.70 usec
PLW1 7.75000000 W

F2 - Processing parameters
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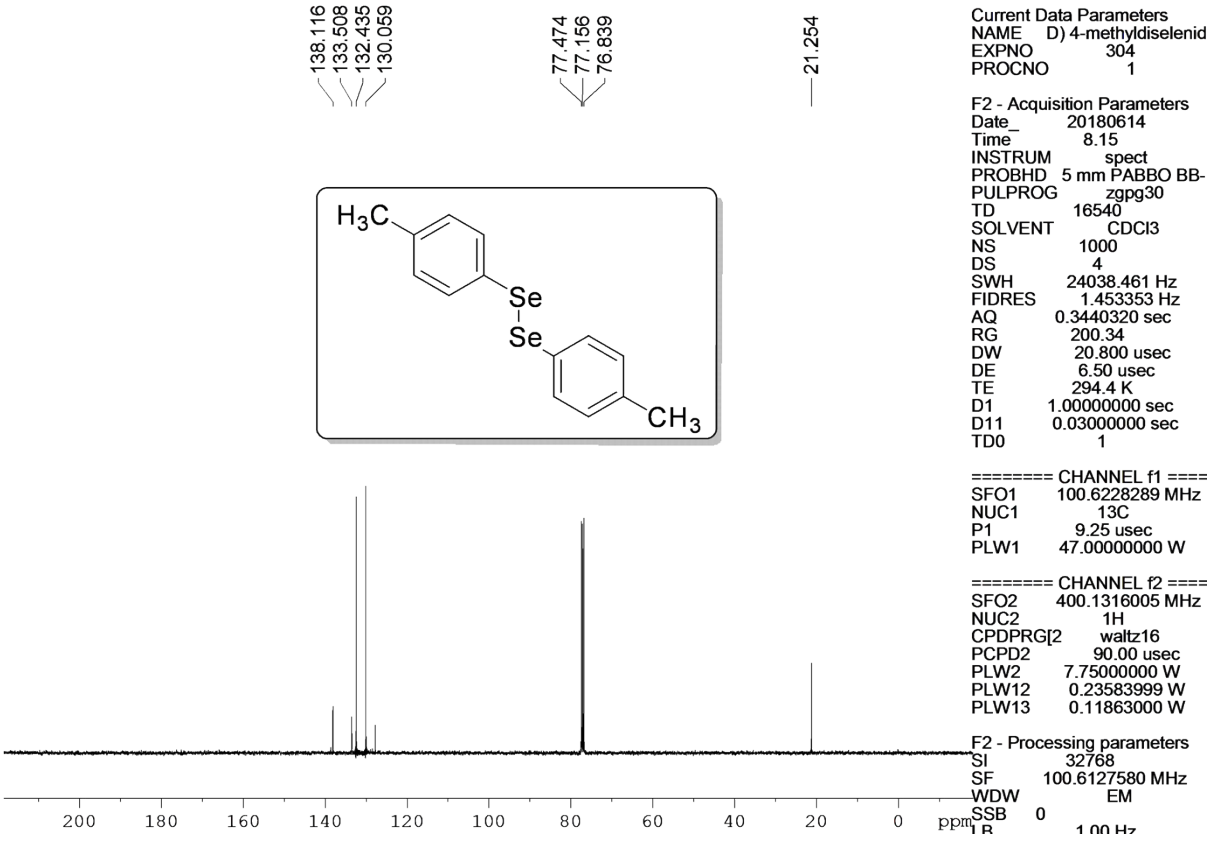
SF 400.1300141 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



Current Data Parameters
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EXPNO 304
PROCNO 1

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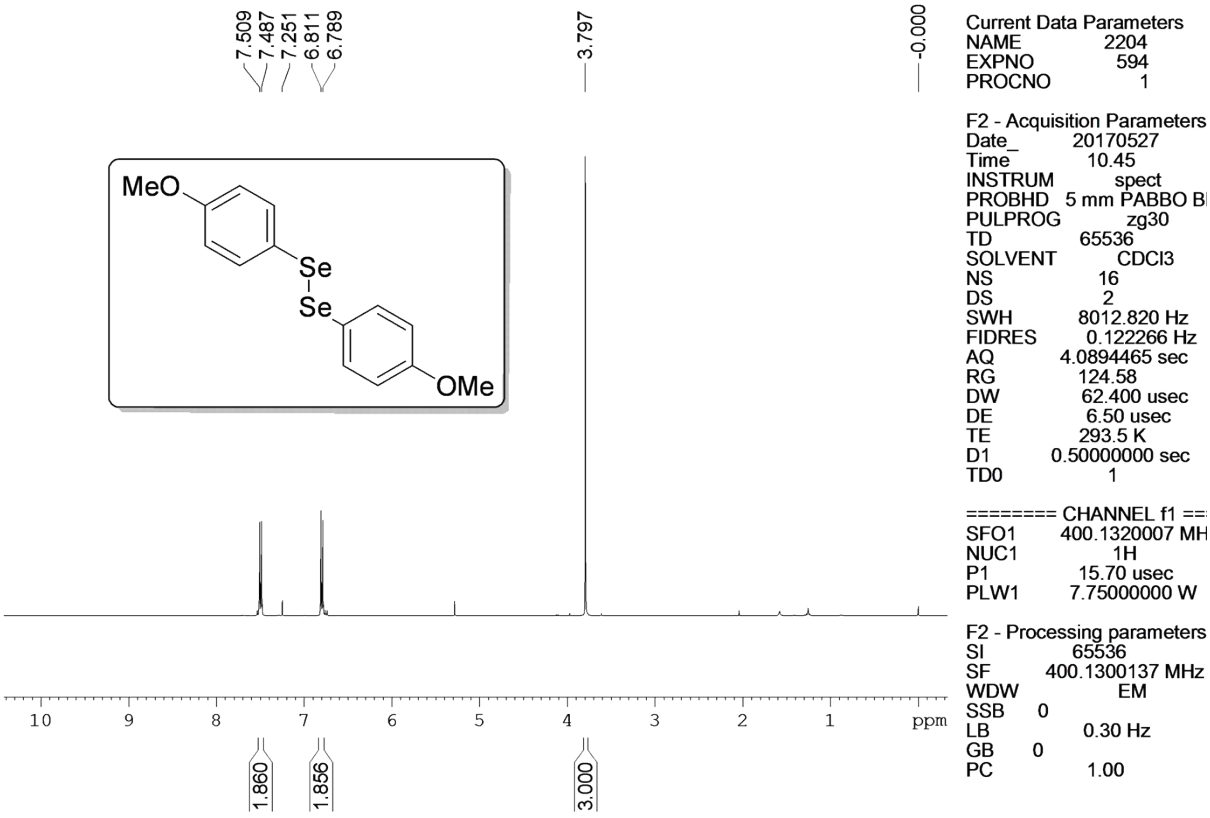
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 1000
DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 294.4 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ====
SFO1 100.6228289 MHz
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

======== CHANNEL f2 ====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

F2 - Processing parameters
SI 32768
SF 100.6127580 MHz
WDW EM
SSB 0
LB 1.00 Hz

1,2-Bis(4-methoxyphenyl)diselane (2k):



Current Data Parameters
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EXPNO 594
PROCNO 1

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INSTRUM spect
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PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 124.58
DW 62.400 usec
DE 6.50 usec
TE 293.5 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ==
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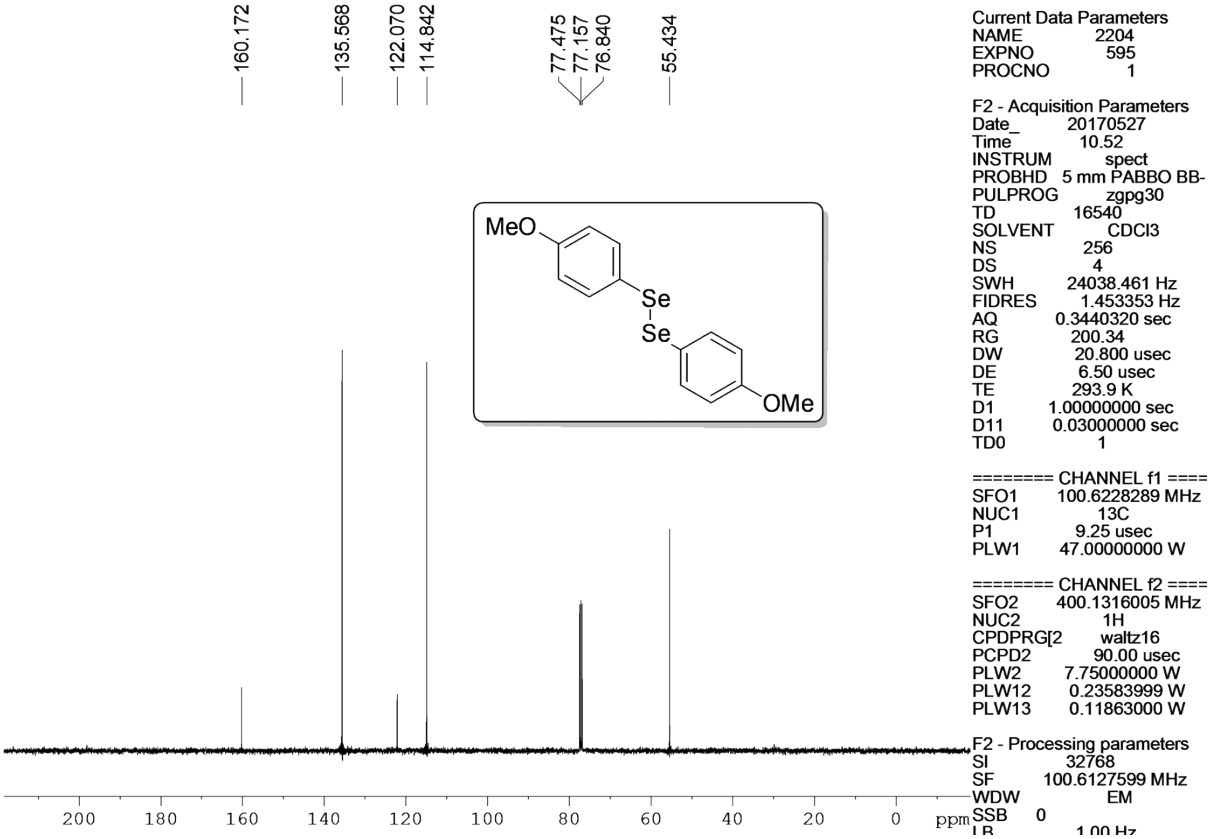
NUC1 1H
P1 15.70 usec
PLW1 7.75000000 W

F2 - Processing parameters
SI 65536
SF 400.1300137 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



Current Data Parameters
NAME 2204
EXPNO 595
PROCNO 1

F2 - Acquisition Parameters
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Time 10.52
INSTRUM spect
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PULPROG zgpg30
TD 16540
SOLVENT CDCl3
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DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 293.9 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ====
SFO1 100.6228289 MHz
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

======== CHANNEL f2 ====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

F2 - Processing parameters
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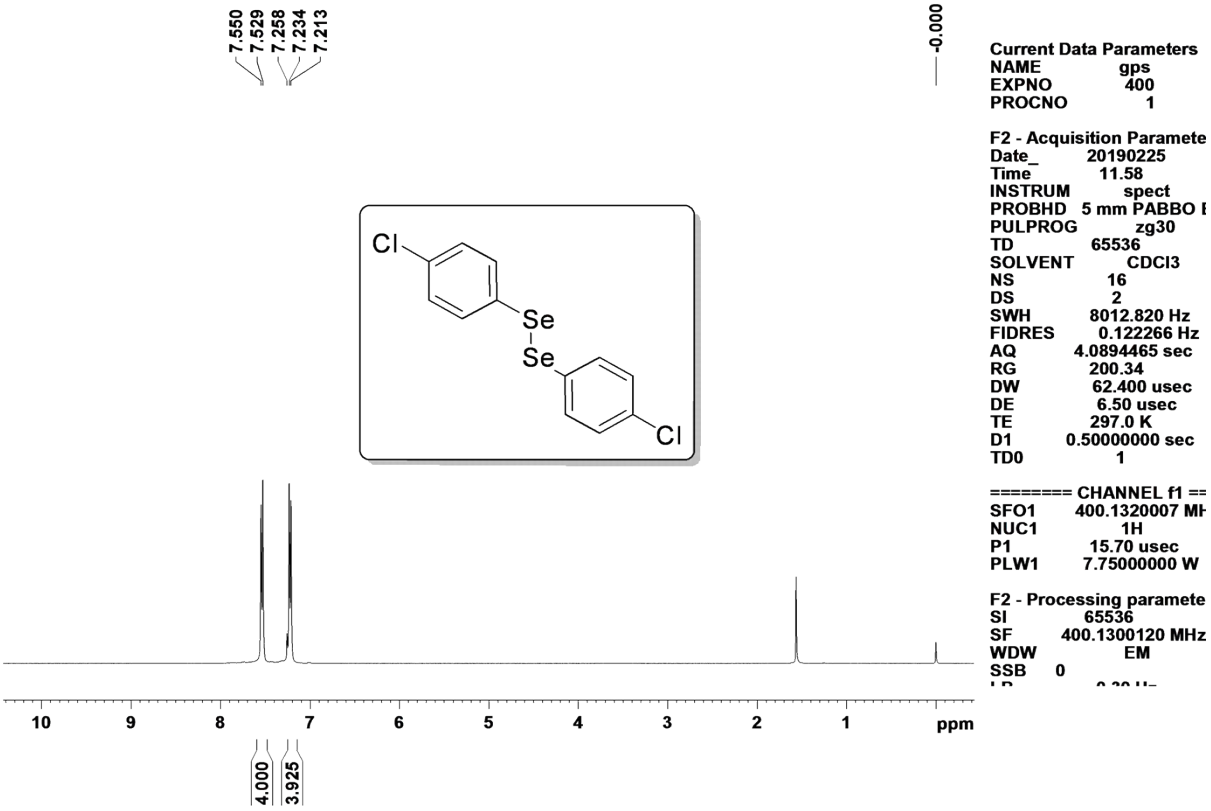
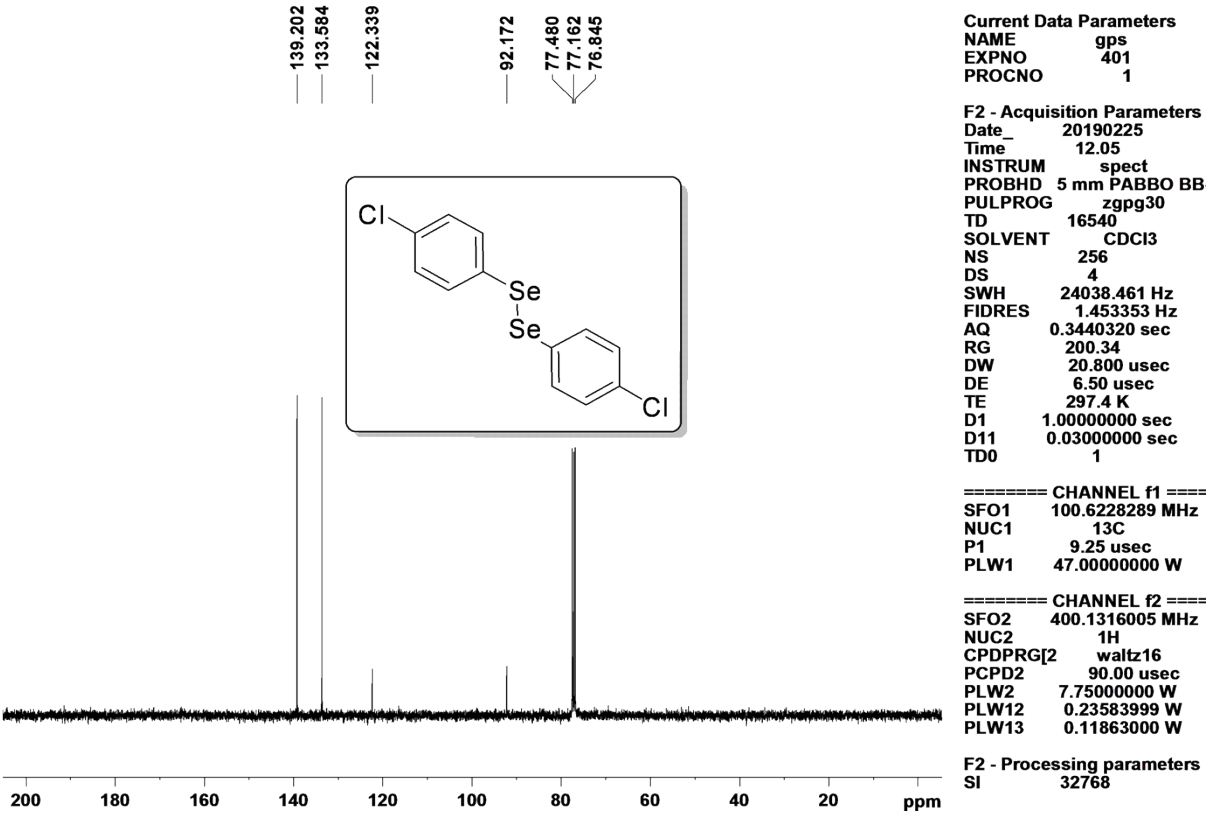
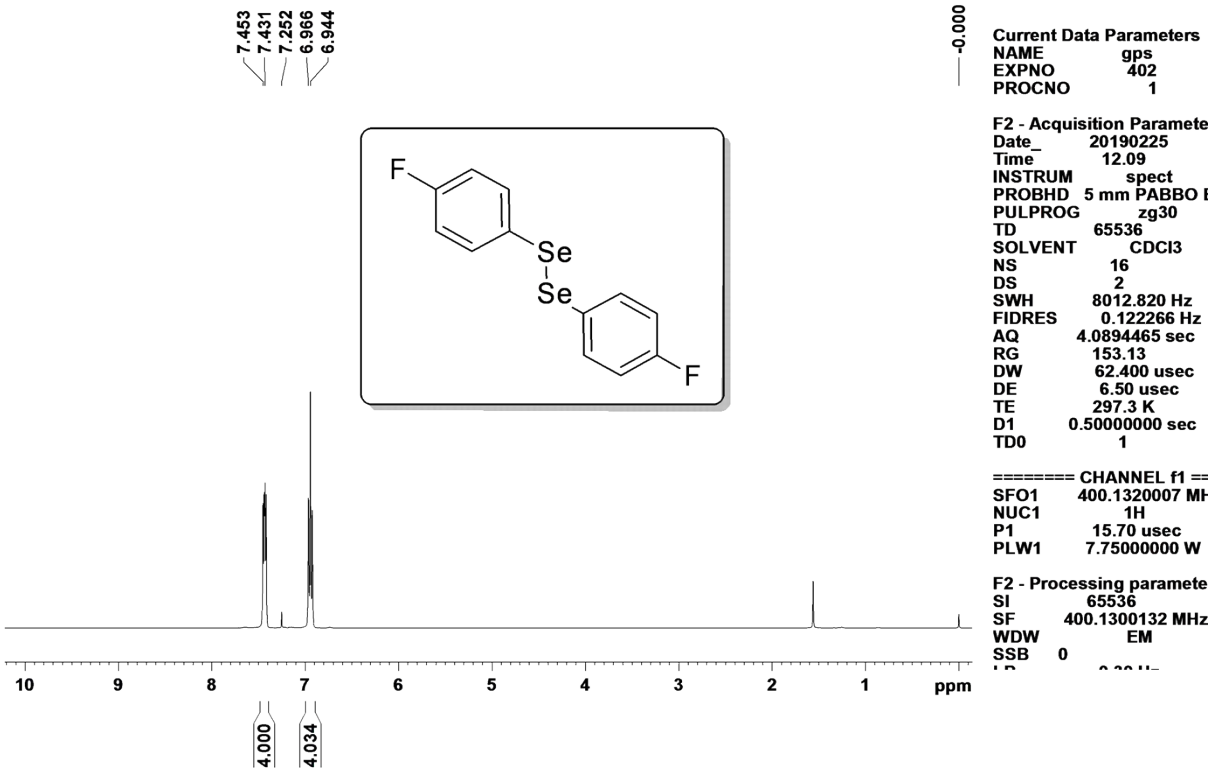
SF 100.6127599 MHz
WDW EM
SSB 0
LB 1.00 Hz

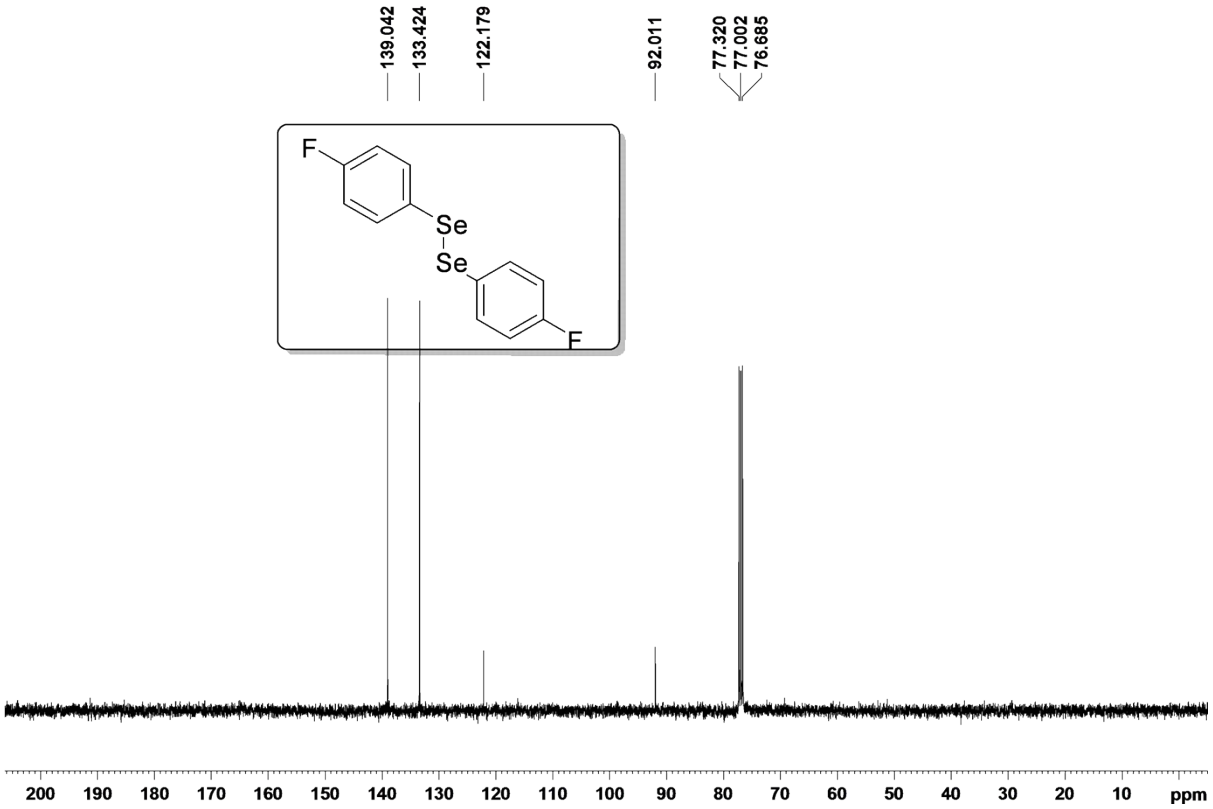
1,2-Bis(4-chloro)diselane (2l):



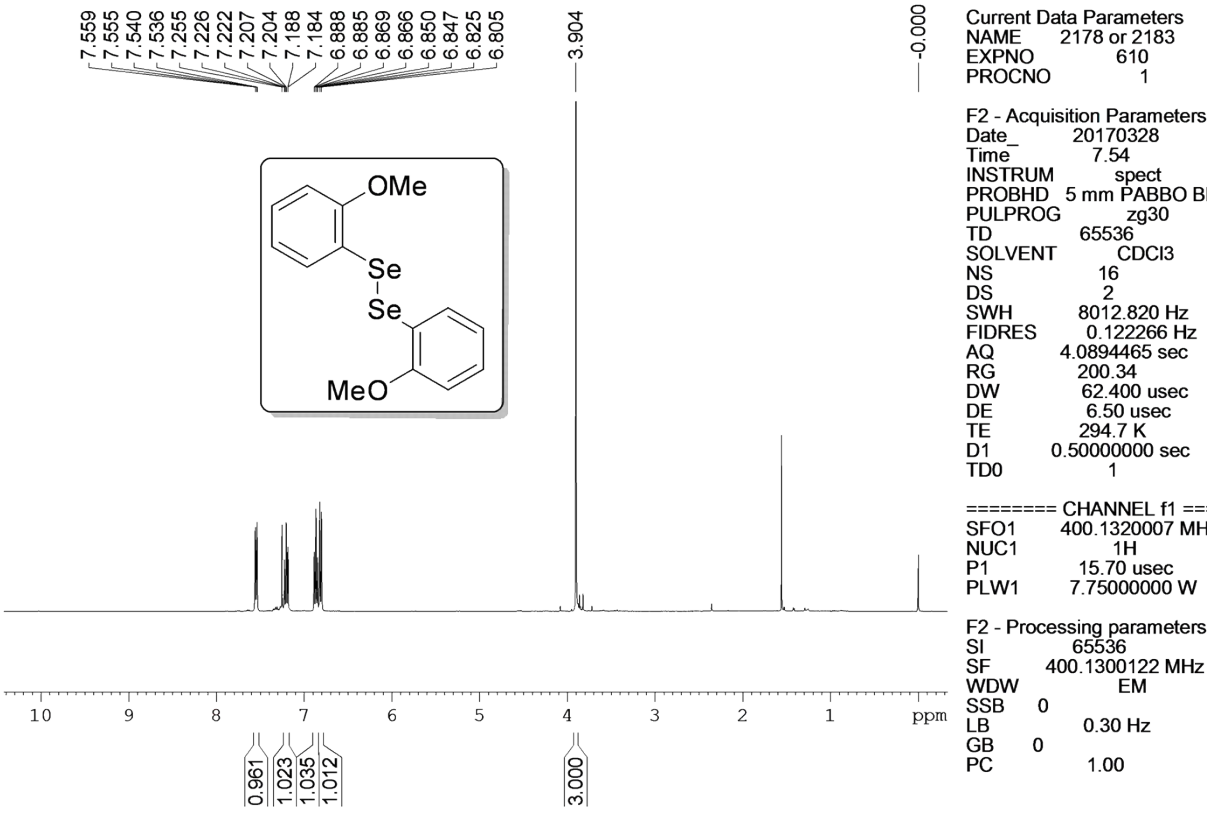


1,2-Bis(4-fluoro)diselane (2m):





1,2-Bis(2-methoxyphenyl)diselane (2n):



Current Data Parameters
NAME 2178 or 2183
EXPNO 610
PROCNO 1

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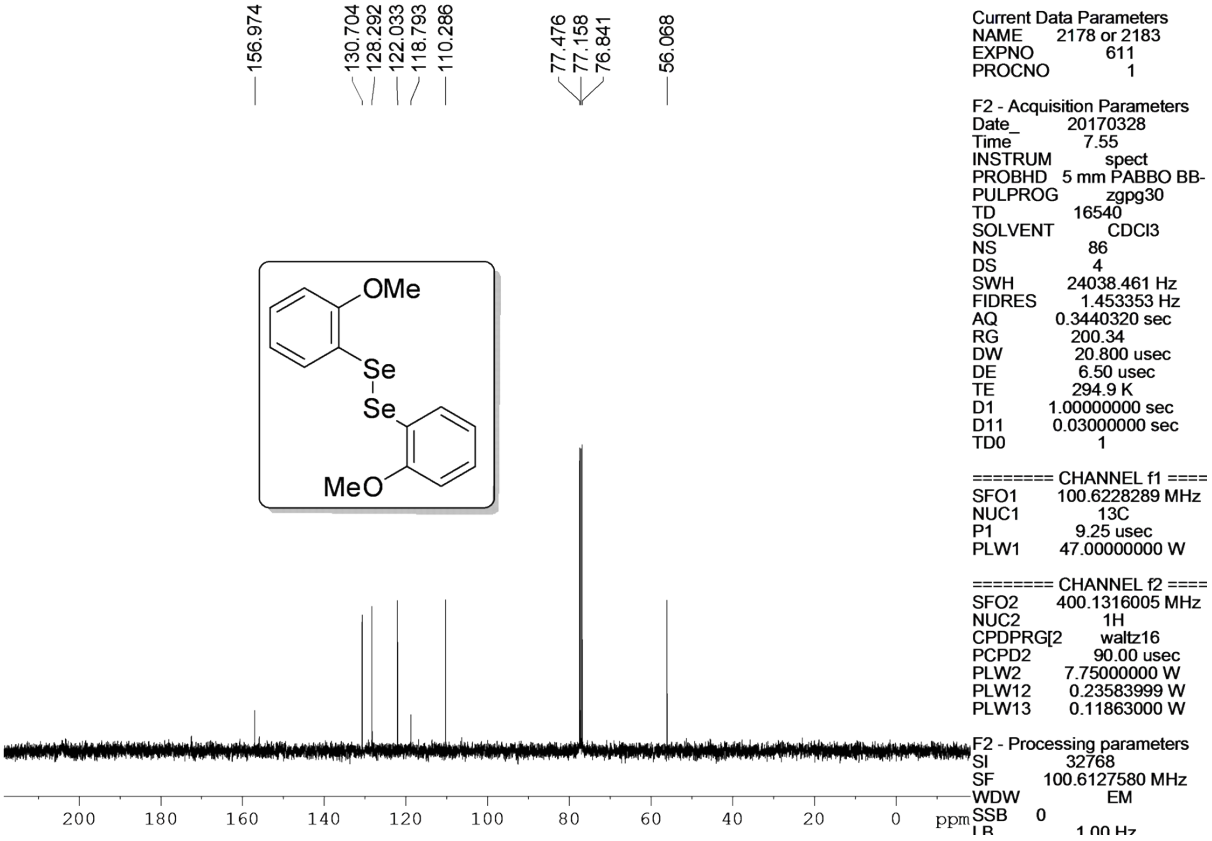
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 200.34
DW 62.400 usec
DE 6.50 usec
TE 294.7 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 400.1320007 MH
NUC1 1H
P1 15.70 usec
PLW1 7.75000000 W

F2 - Processing parameters
SI 65536
SF 400.1300122 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



Current Data Parameters
NAME 2178 or 2183
EXPNO 611
PROCNO 1

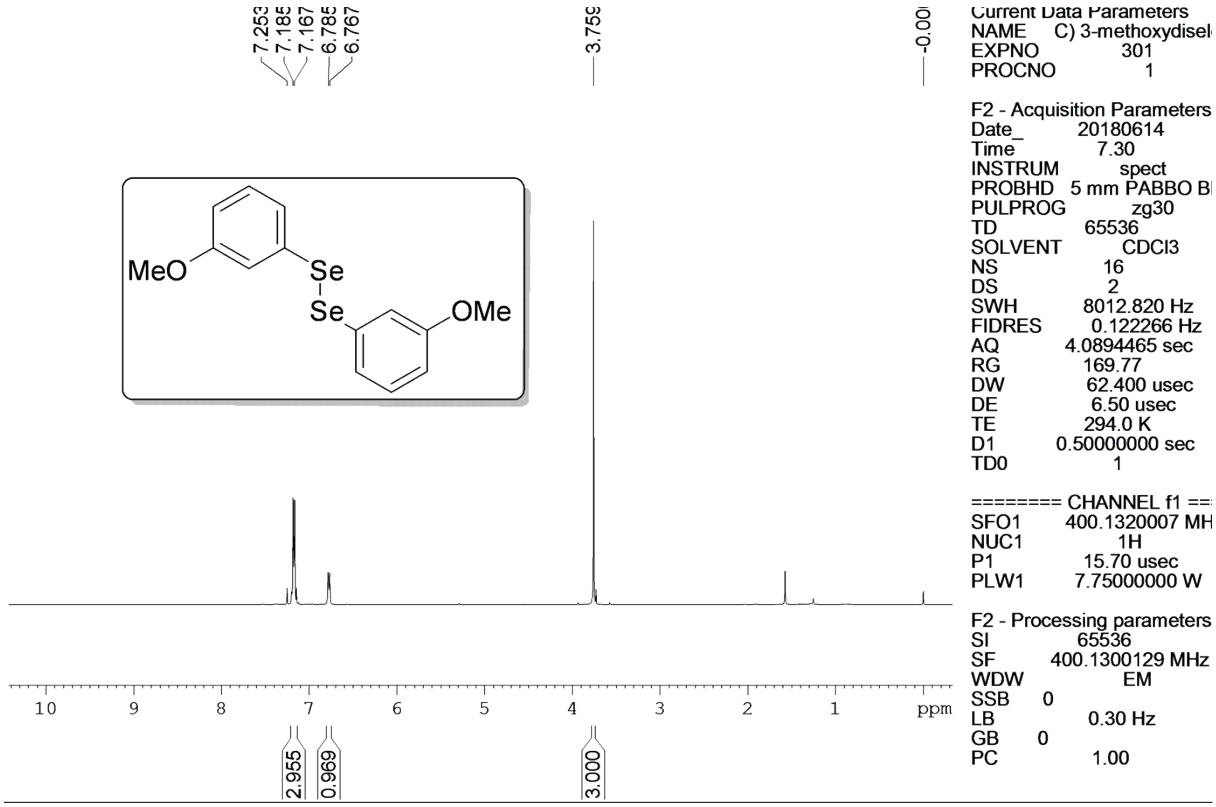
F2 - Acquisition Parameters
Date_ 20170328
Time 7.55
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 86
DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 294.9 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

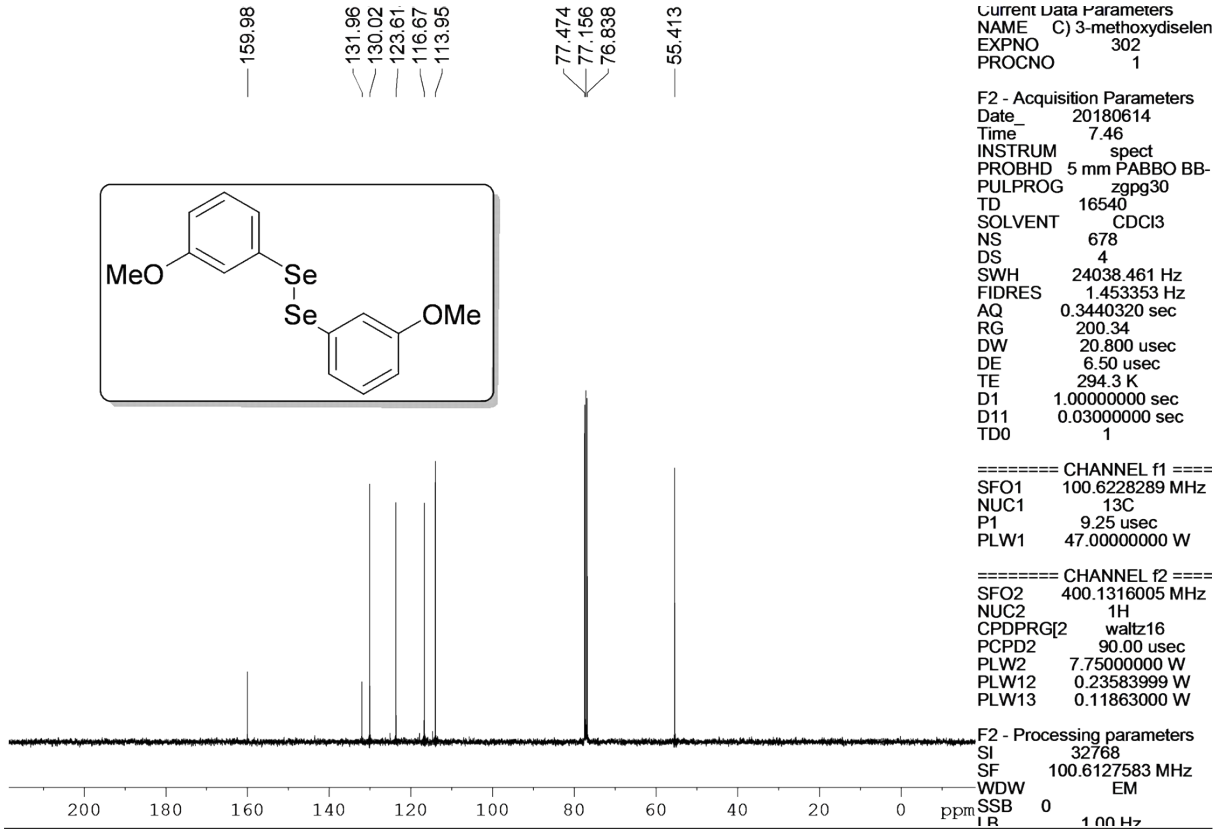
======== CHANNEL f1 ====
SFO1 100.6228289 MHz
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

======== CHANNEL f2 ====
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

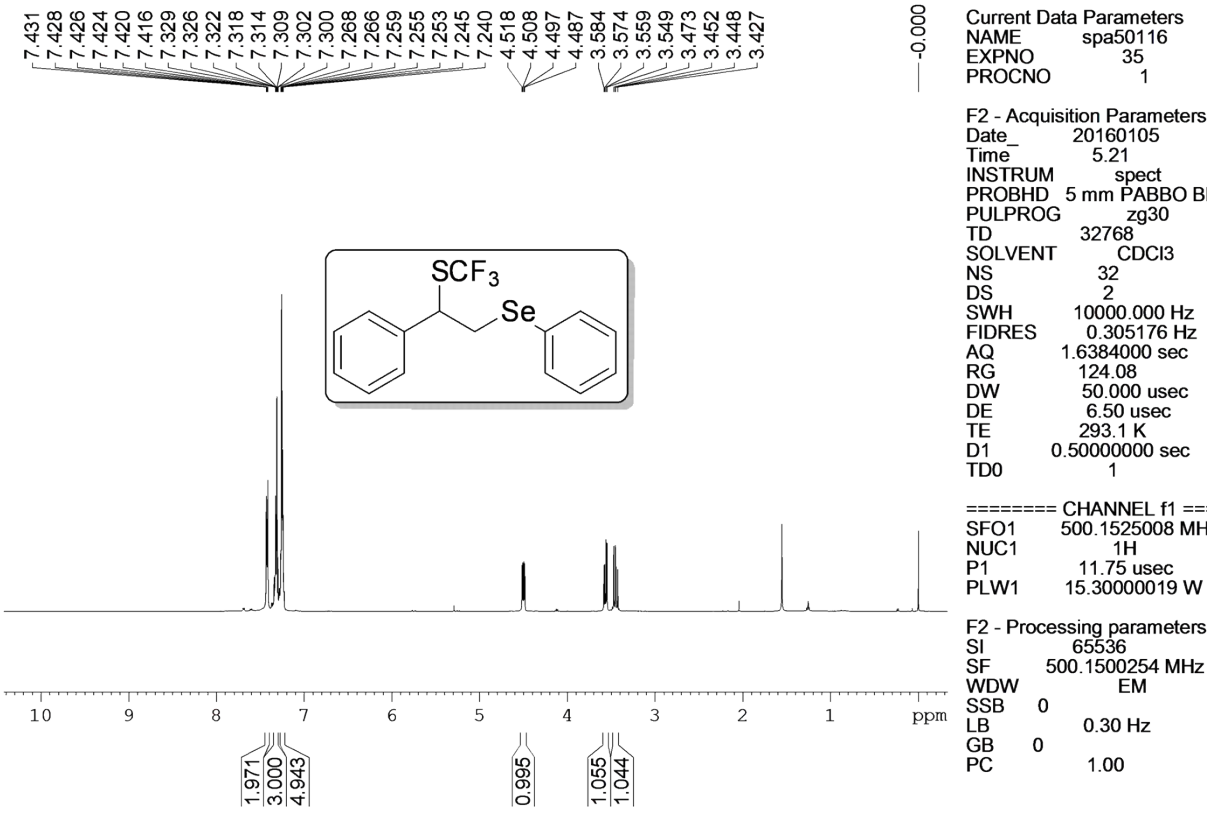
F2 - Processing parameters
SI 32768
SF 100.6127580 MHz
WDW EM
SSB 0
LB 1.00 Hz

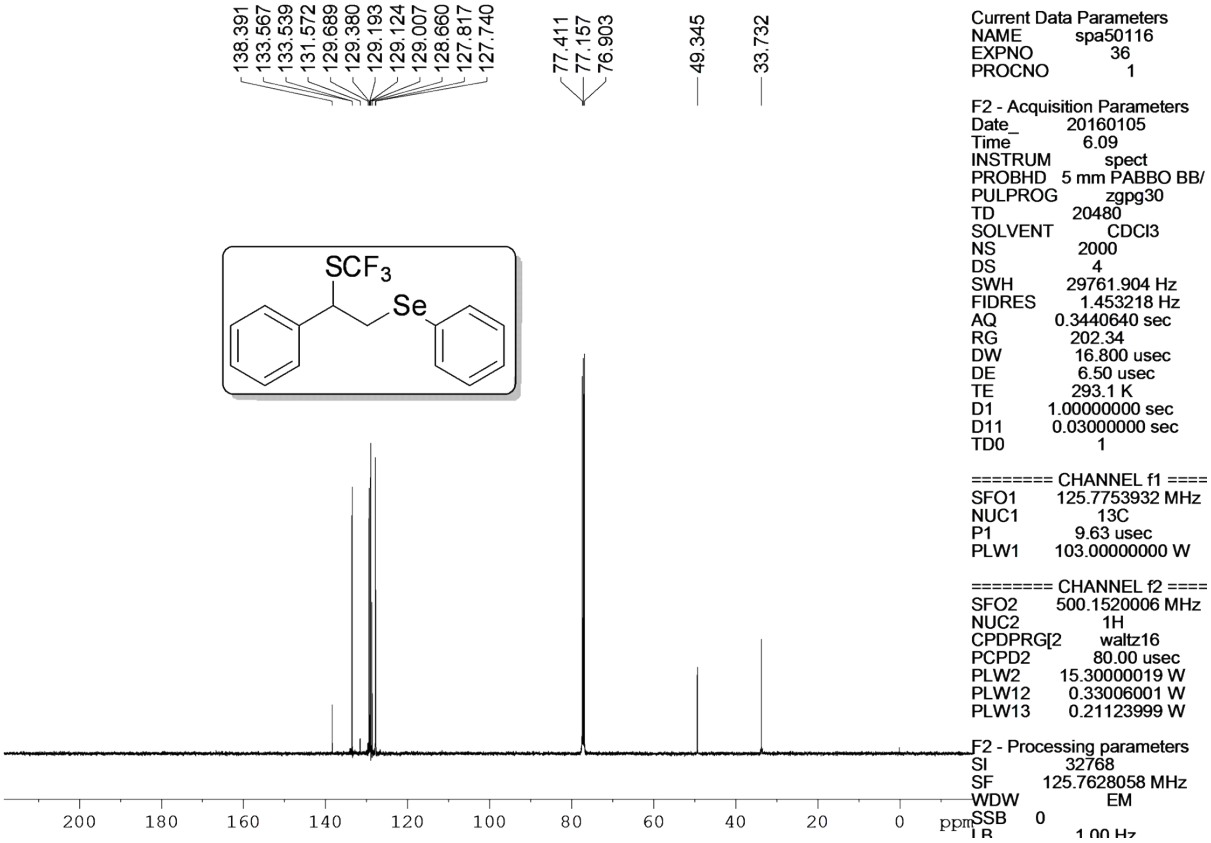
1,2-Bis(3-methoxyphenyl)diselane (2p):

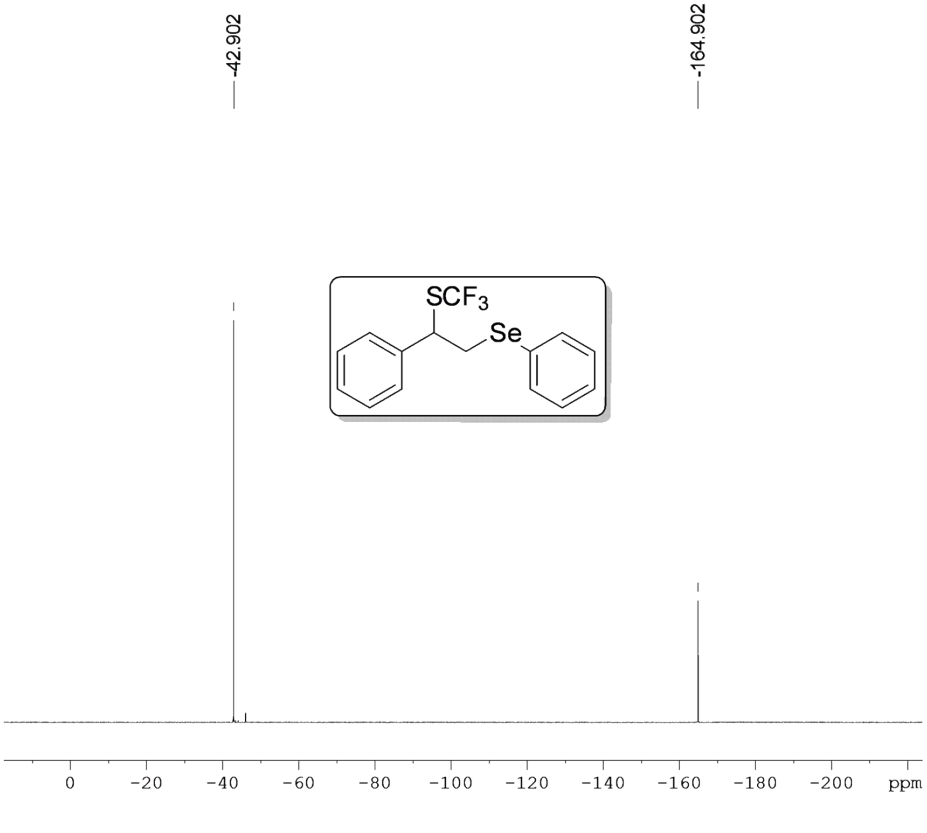




(2-phenyl-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3a):







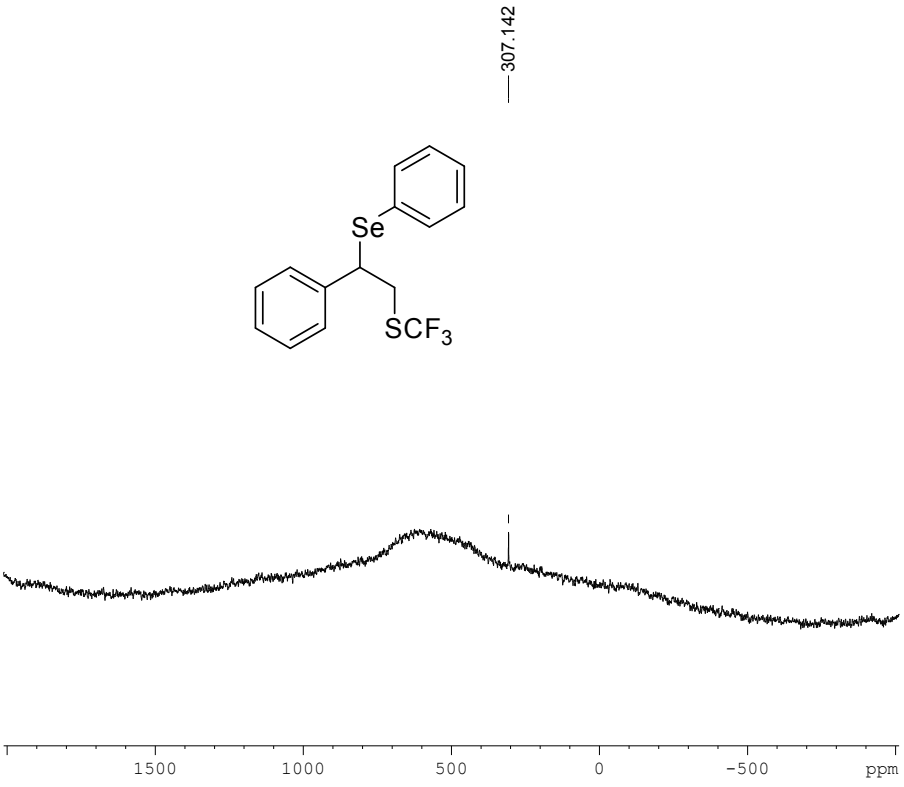
Current Data Parameters
NAME spa50116
EXPNO 49
PROCNO 1

F2 - Acquisition Parameters
Date_ 20160105
Time 14.02
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgfhigqn.2
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 113636.367 Hz
FIDRES 0.866977 Hz
AQ 0.5767168 sec
RG 202.34
DW 4.400 usec
DE 6.50 usec
TE 294.7 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1

======== CHANNEL f1 ======
SFO1 470.5641349 MHz
NUC1 19F
P1 15.00 usec
PLW1 46.00000000 W

======== CHANNEL f2 ======
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.33006001 W

F2 - Processing parameters
SI 65536
SF 470.6127176 MHz
WDW EM



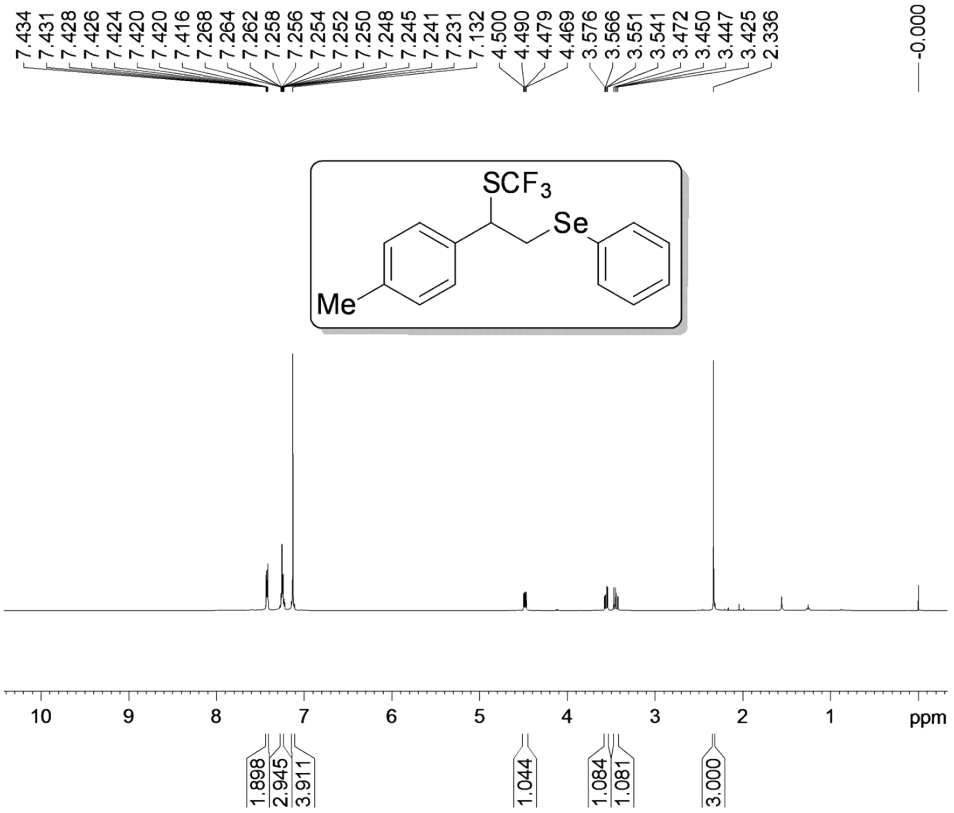
Current Data Parameters
NAME 1) Styrene
EXPNO 21
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170502
Time 9.58
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg
TD 65536
SOLVENT CDCl3
NS 400
DS 0
SWH 288461.531 Hz
FIDRES 4.401574 Hz
AQ 0.1135957 sec
RG 202.34
DW 1.733 usec
DE 6.50 usec
TE 298.1 K
D1 2.00000000 sec
TD0 1

======== CHANNEL f1 ========
SFO1 95.4338651 MHz
NUC1 77Se
P1 13.00 usec
PLW1 40.00000000 W

F2 - Processing parameters
SI 32768
SF 95.3861720 MHz
WDW EM
SSB 0
LB 100.00 Hz
GB 0
PC 1.40

(2-(phenylselanyl)-2-(p-tolyl)ethyl)(trifluoromethyl)sulfane (3b):

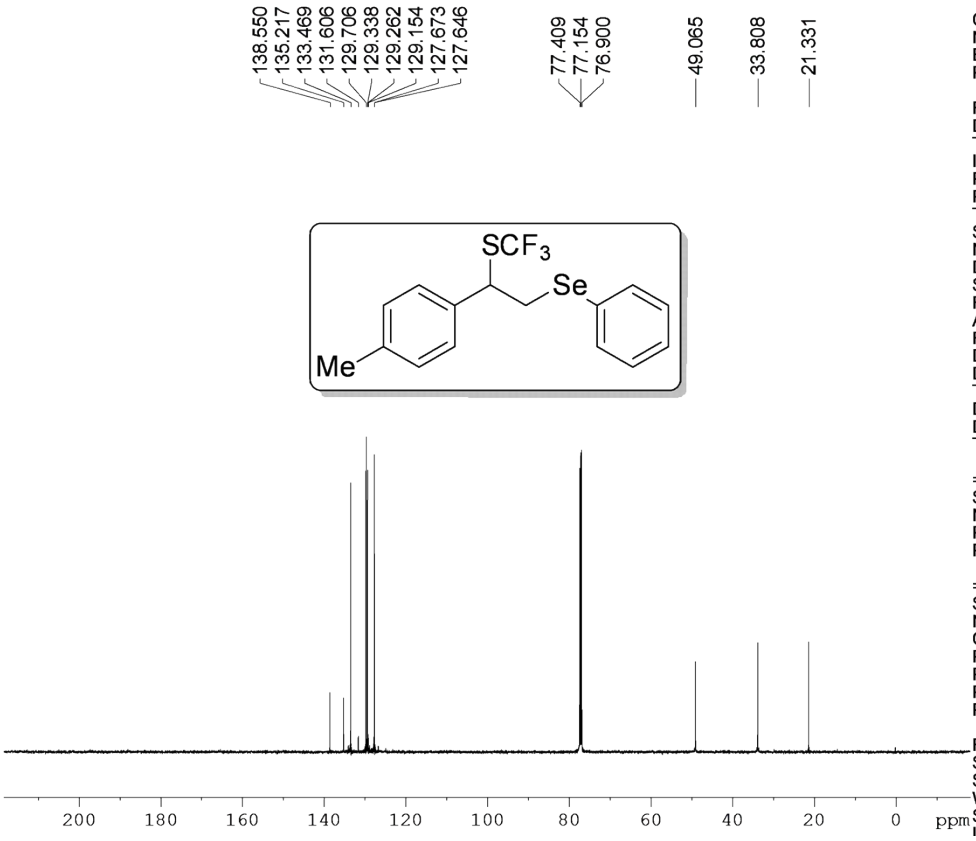


Current Data Parameters
NAME spa50116
EXPNO 33
PROCNO 1

F2 - Acquisition Parameters
Date_ 20160105
Time 4.25
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 2
SWH 10000.000 Hz
FIDRES 0.305176 Hz
AQ 1.6384000 sec
RG 101.5
DW 50.000 usec
DE 6.50 usec
TE 293.2 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 500.1525008 MH
NUC1 1H
P1 11.75 usec
PLW1 15.30000019 W

F2 - Processing parameters
SI 65536
SF 500.1500279 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



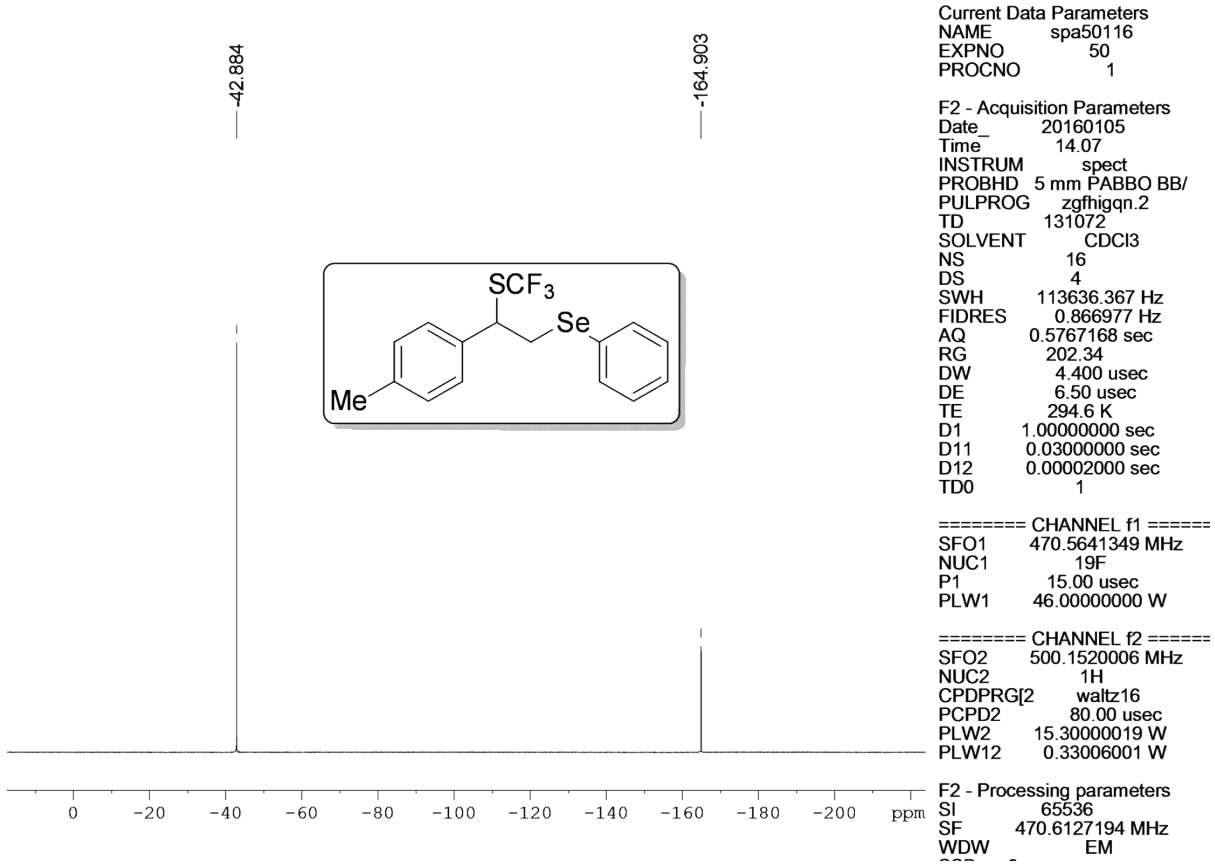
Current Data Parameters
NAME spa50116
EXPNO 34
PROCNO 1

F2 - Acquisition Parameters
Date_ 20160105
Time 5.14
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 20480
SOLVENT CDCl3
NS 2000
DS 4
SWH 29761.904 Hz
FIDRES 1.453218 Hz
AQ 0.3440640 sec
RG 202.34
DW 16.800 usec
DE 6.50 usec
TE 293.2 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

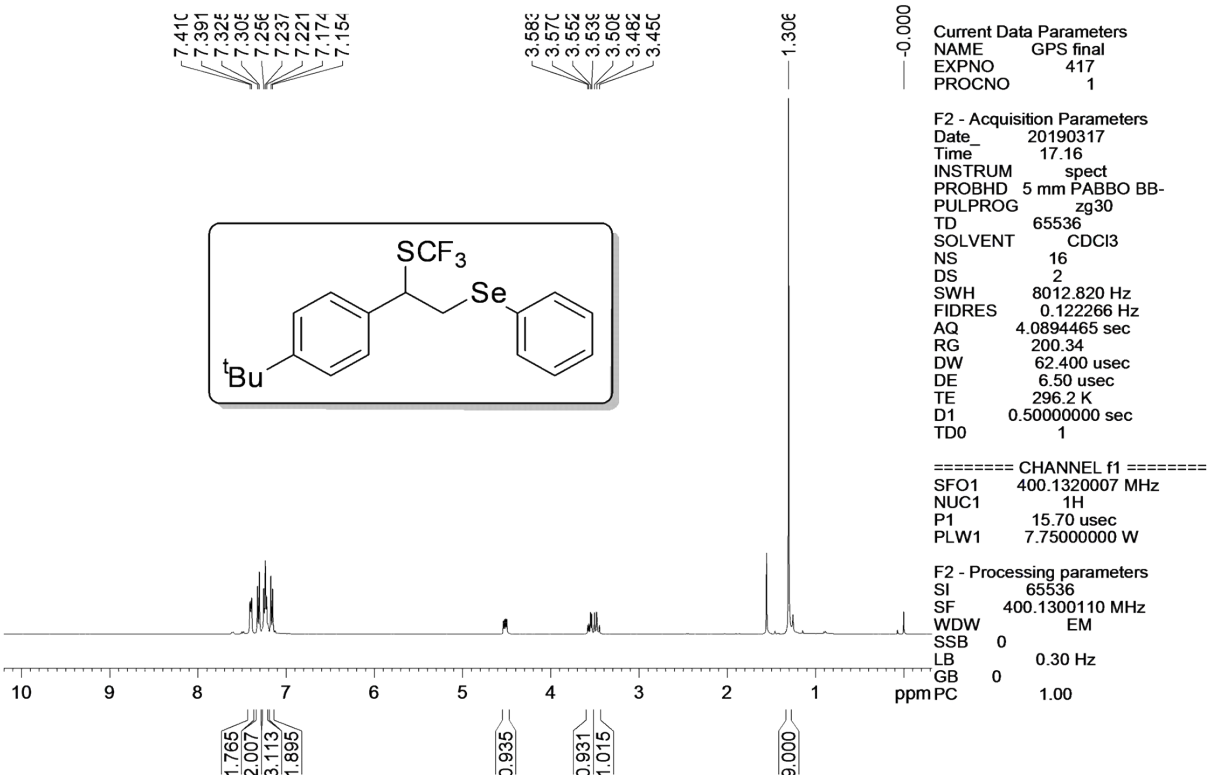
======== CHANNEL f1 ====
SFO1 125.7753932 MHz
NUC1 13C
P1 9.63 usec
PLW1 103.00000000 W

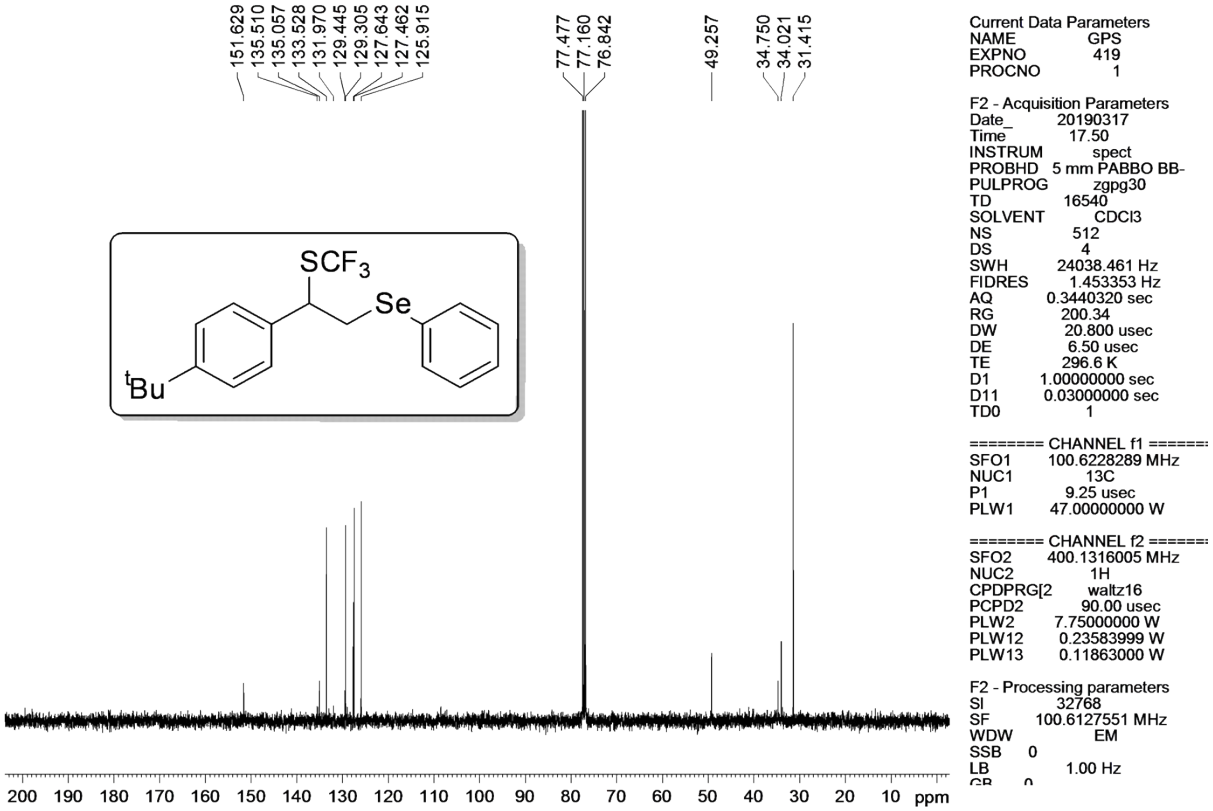
======== CHANNEL f2 ====
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.33006001 W
PLW13 0.21123999 W

F2 - Processing parameters
SI 32768
SF 125.7628071 MHz
WDW EM
SSB 0
LB 1.00 Hz



(1-(4-(tert-butyl)phenyl)-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3c):





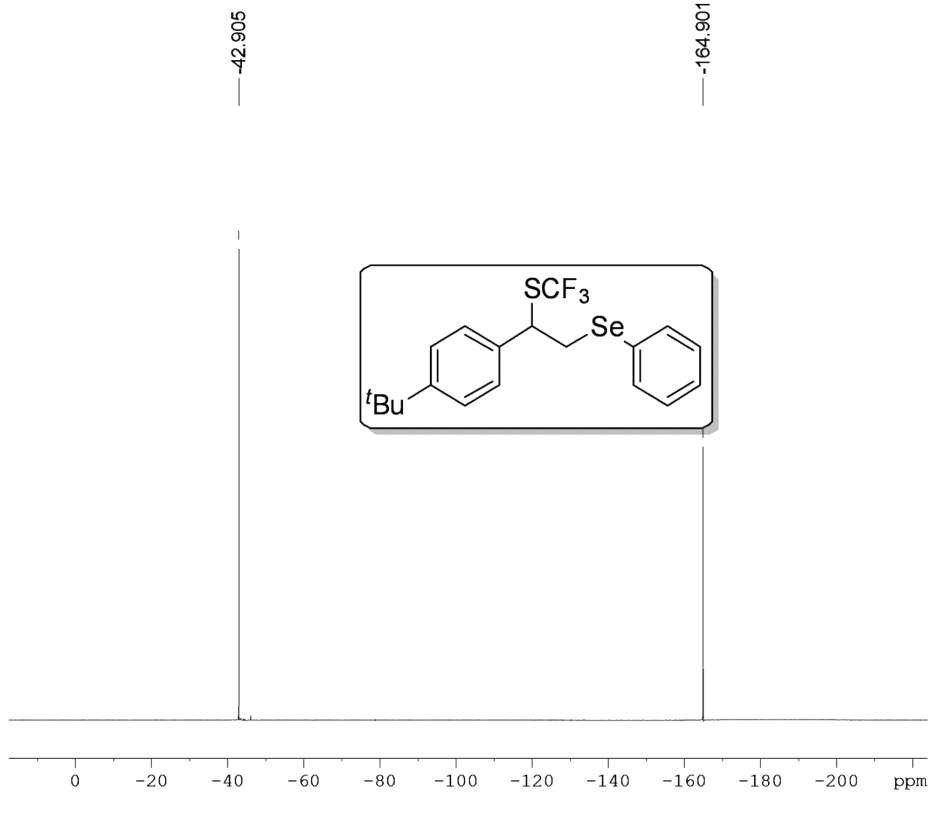
Current Data Parameters
NAME GPS
EXPNO 419
PROCNO 1

F2 - Acquisition Parameters
Date_ 20190317
Time 17.50
INSTRUM spect
PROBHD 5 mm PABBO BB-
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 512
DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 296.6 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ======
SFO1 100.6228289 MHz
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

======== CHANNEL f2 ======
SFO2 400.1316005 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

F2 - Processing parameters
SI 32768
SF 100.6127551 MHz
WDW EM
SSB 0
LB 1.00 Hz



Current Data Parameters
NAME spa51216
EXPNO 170
PROCNO 1

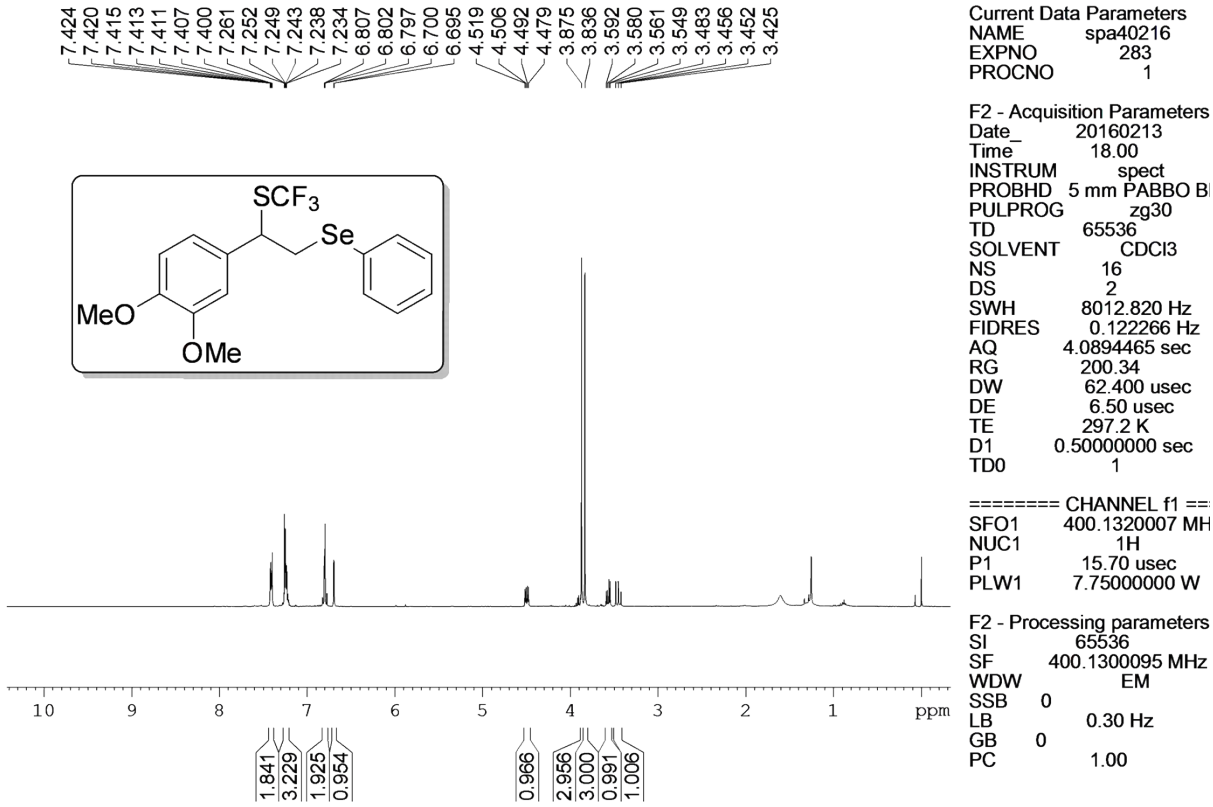
F2 - Acquisition Parameters
Date_ 20161228
Time 17.56
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgfhigqn.2
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 113636.367 Hz
FIDRES 0.866977 Hz
AQ 0.5767168 sec
RG 202.34
DW 4.400 usec
DE 6.50 usec
TE 297.4 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1

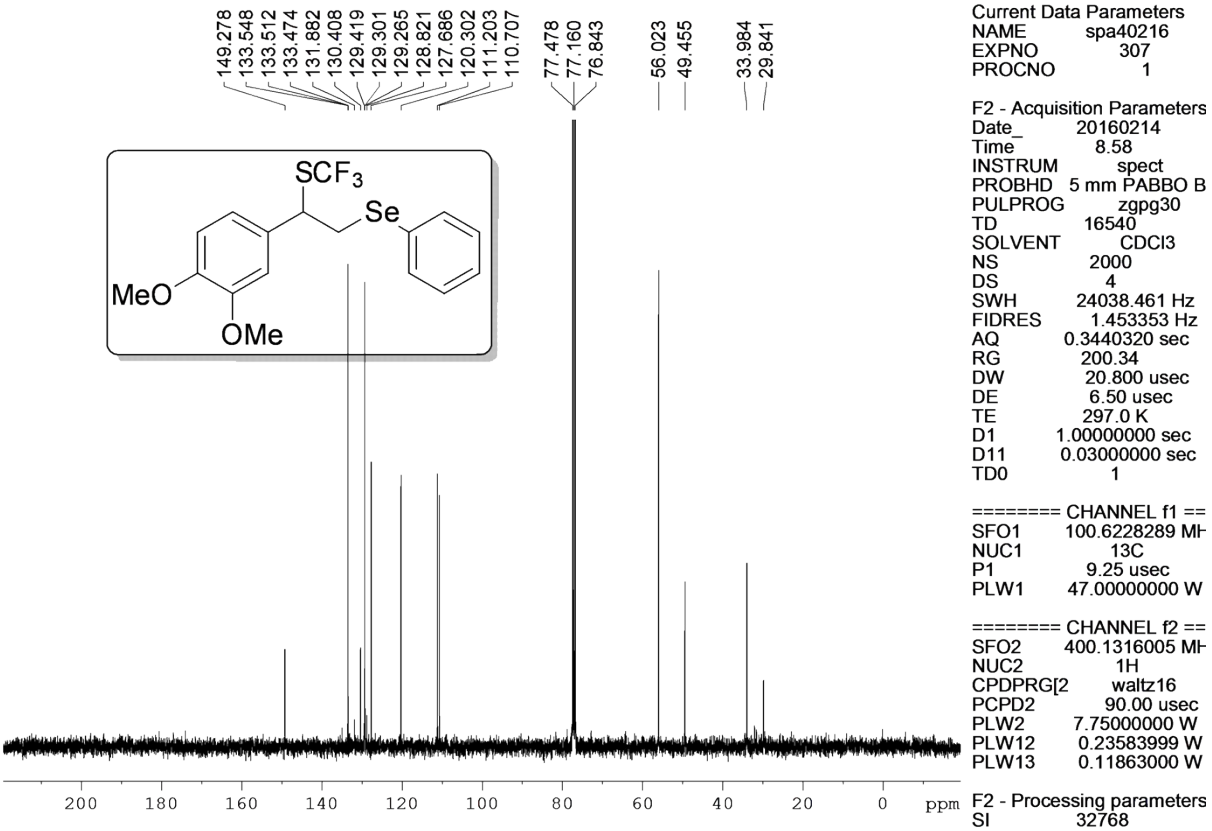
======== CHANNEL f1 ======
SFO1 470.5641349 MHz
NUC1 19F
P1 13.85 usec
PLW1 46.00000000 W

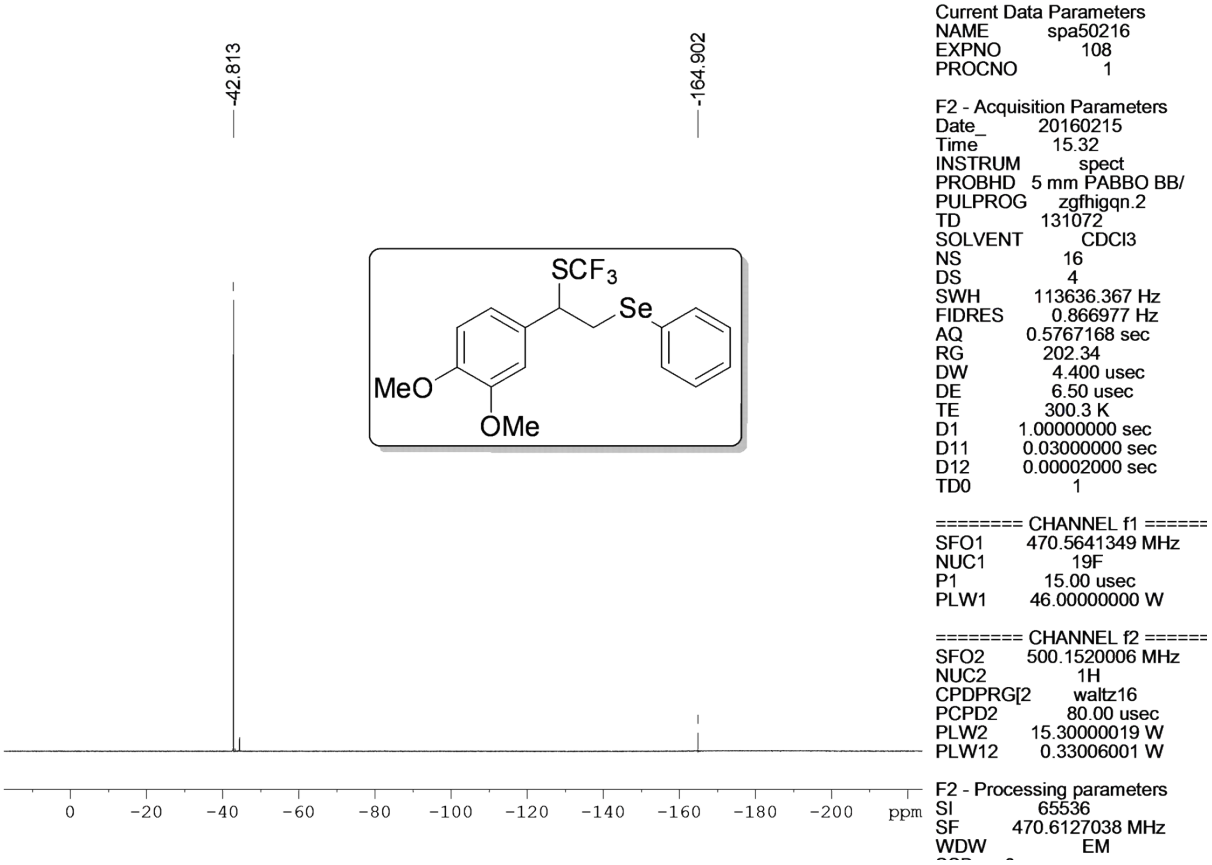
======== CHANNEL f2 ======
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.40402001 W

F2 - Processing parameters
SI 65536
SF 470.6126985 MHz
WDW EM

(2-(3,4-dimethoxyphenyl)-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3d):







Current Data Parameters
NAME spa50216
EXPNO 108
PROCNO 1

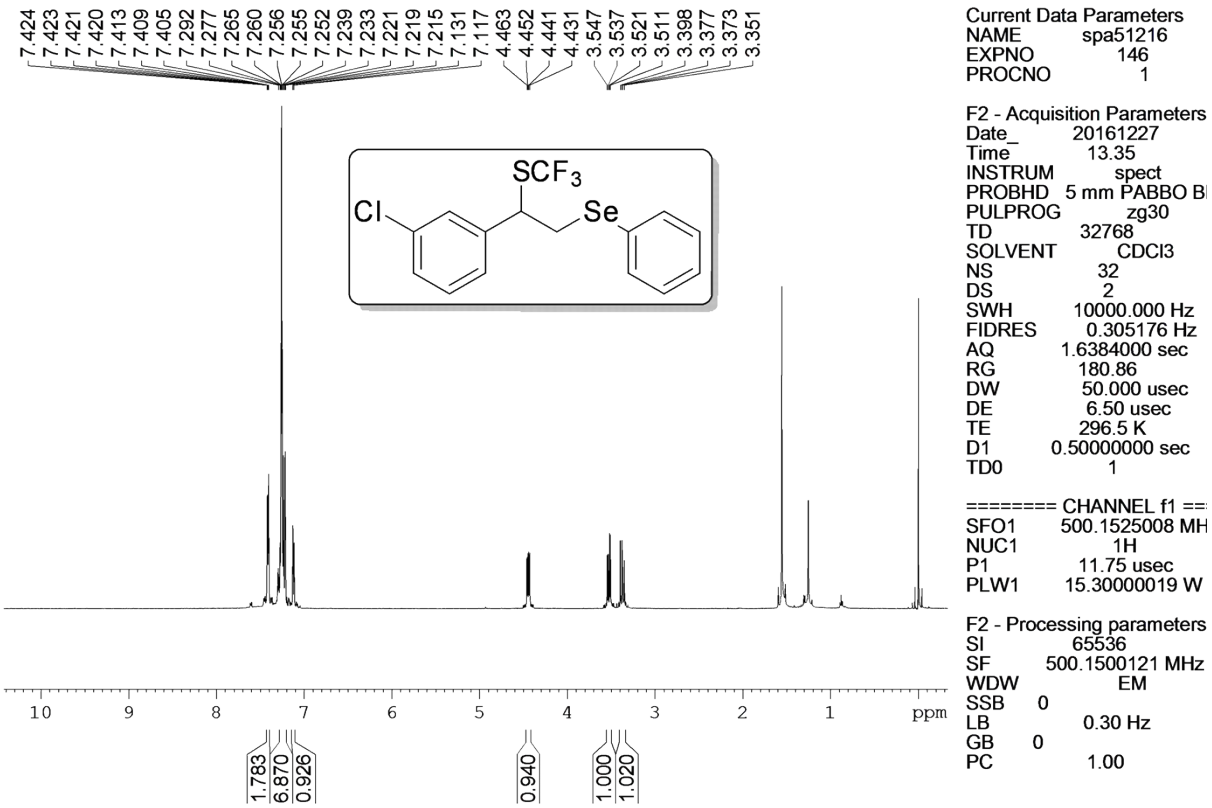
F2 - Acquisition Parameters
Date_ 20160215
Time 15.32
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgfhigqn.2
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 113636.367 Hz
FIDRES 0.866977 Hz
AQ 0.5767168 sec
RG 202.34
DW 4.400 usec
DE 6.50 usec
TE 300.3 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1

======== CHANNEL f1 ======
SFO1 470.5641349 MHz
NUC1 19F
P1 15.00 usec
PLW1 46.00000000 W

======== CHANNEL f2 ======
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.33006001 W

F2 - Processing parameters
SI 65536
SF 470.6127038 MHz
WDW EM

(2-(3-chlorophenyl)-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3e):

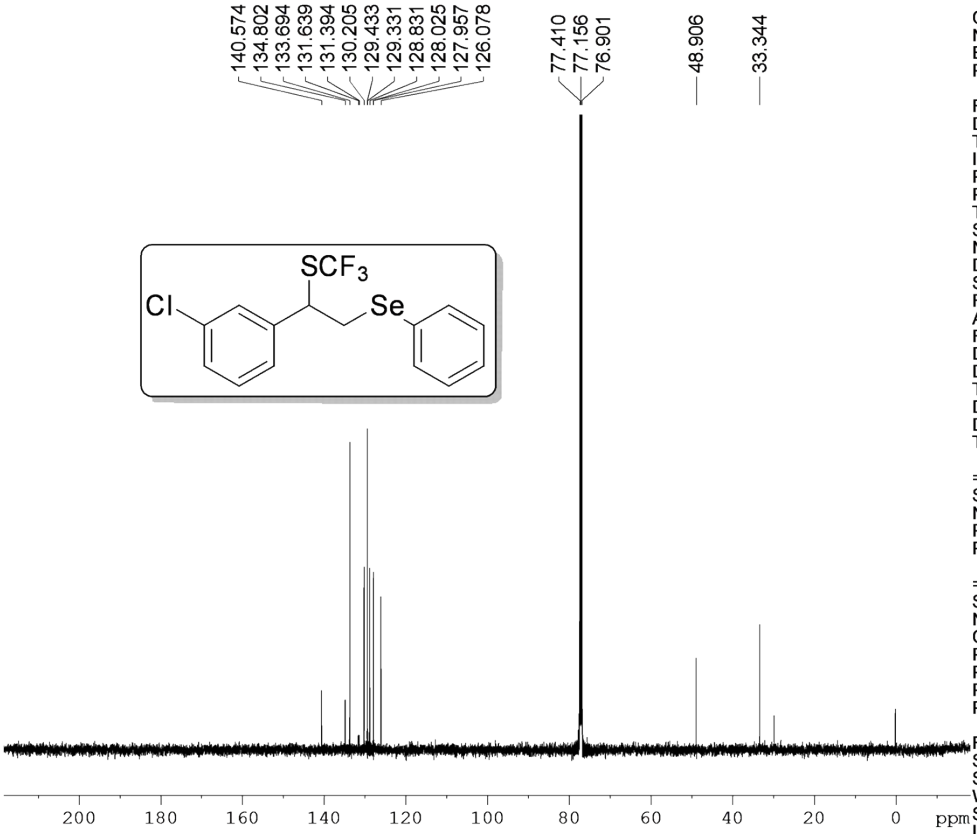


Current Data Parameters
NAME spa51216
EXPNO 146
PROCNO 1

F2 - Acquisition Parameters
Date_ 20161227
Time 13.35
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 2
SWH 10000.000 Hz
FIDRES 0.305176 Hz
AQ 1.6384000 sec
RG 180.86
DW 50.000 usec
DE 6.50 usec
TE 296.5 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 500.1525008 MH
NUC1 1H
P1 11.75 usec
PLW1 15.30000019 W

F2 - Processing parameters
SI 65536
SF 500.1500121 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



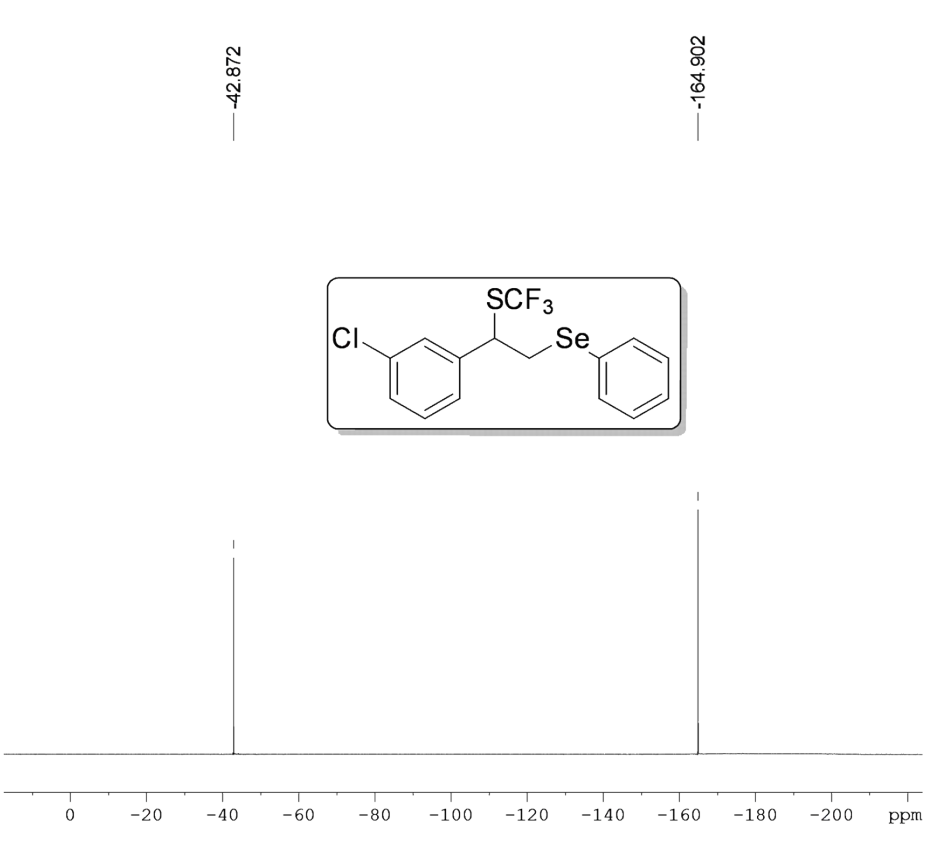
Current Data Parameters
NAME spa51216
EXPNO 210
PROCNO 1

F2 - Acquisition Parameters
Date_ 20161231
Time 5.00
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 20480
SOLVENT CDCl3
NS 5000
DS 4
SWH 29761.904 Hz
FIDRES 1.453218 Hz
AQ 0.3440640 sec
RG 202.34
DW 16.800 usec
DE 6.50 usec
TE 294.8 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ====
SFO1 125.7753932 MHz
NUC1 13C
P1 9.80 usec
PLW1 103.00000000 W

======== CHANNEL f2 ====
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.40402001 W
PLW13 0.20321999 W

F2 - Processing parameters
SI 32768
SF 125.7628016 MHz
WDW EM
SSB 0
LB 1.00 Hz



Current Data Parameters
NAME spa50117
EXPNO 1
PROCNO 1

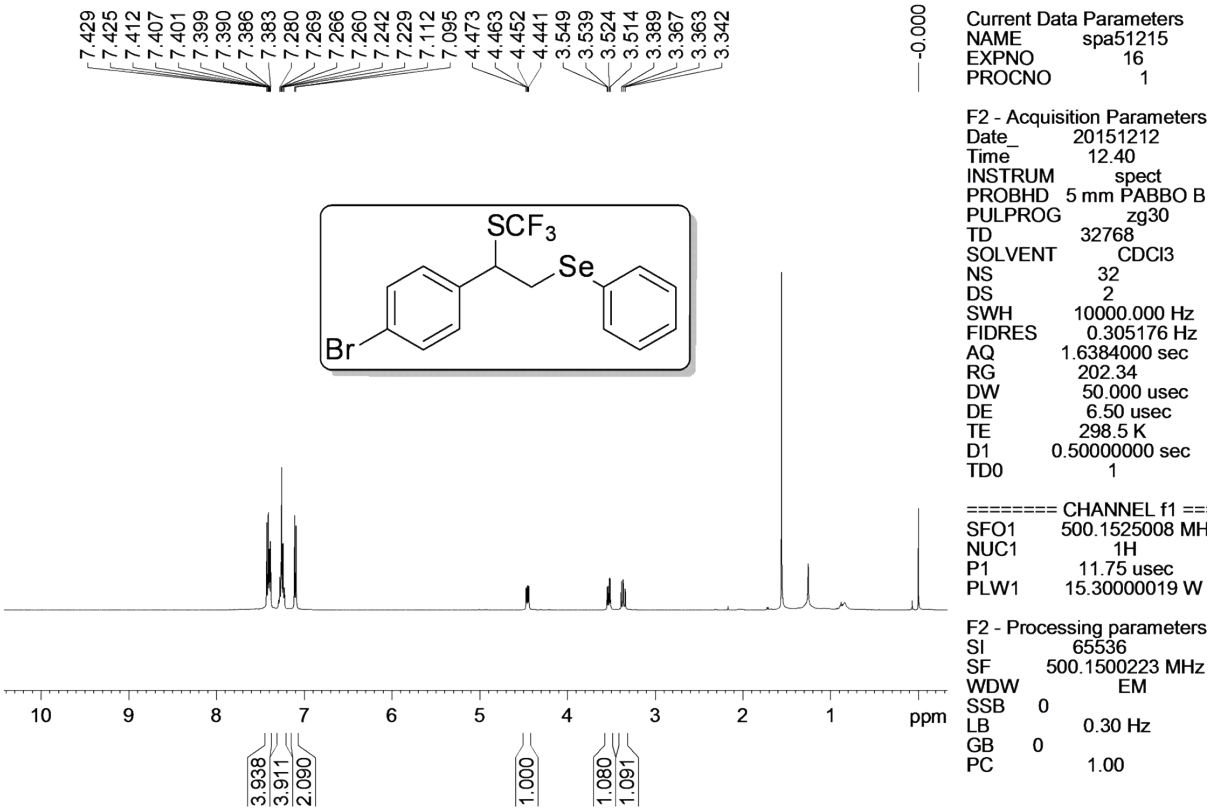
F2 - Acquisition Parameters
Date_ 20170102
Time 14.31
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgfhigqn.2
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 113636.367 Hz
FIDRES 0.866977 Hz
AQ 0.5767168 sec
RG 202.34
DW 4.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1

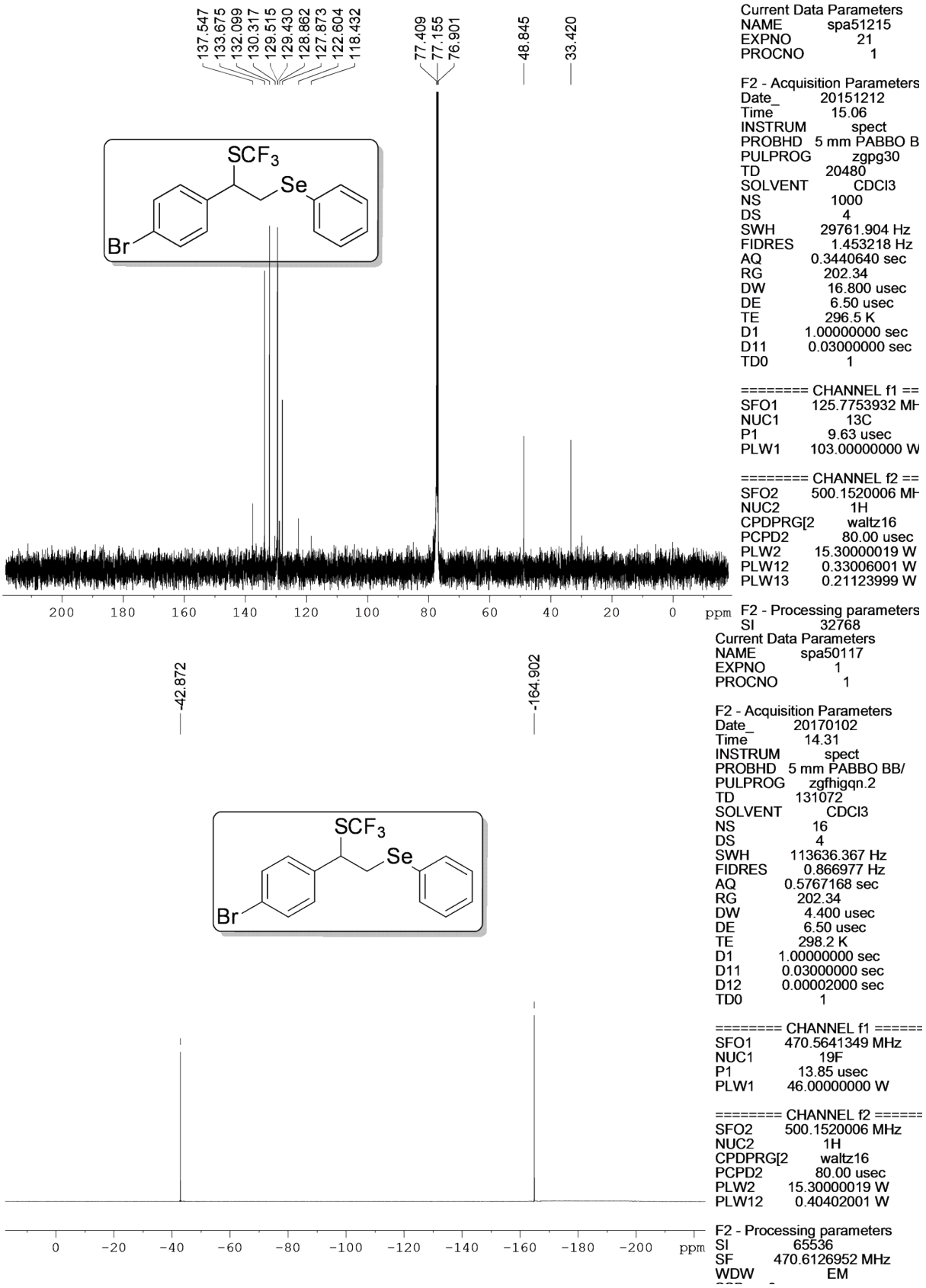
======== CHANNEL f1 ======
SFO1 470.5641349 MHz
NUC1 19F
P1 13.85 usec
PLW1 46.00000000 W

======== CHANNEL f2 ======
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.40402001 W

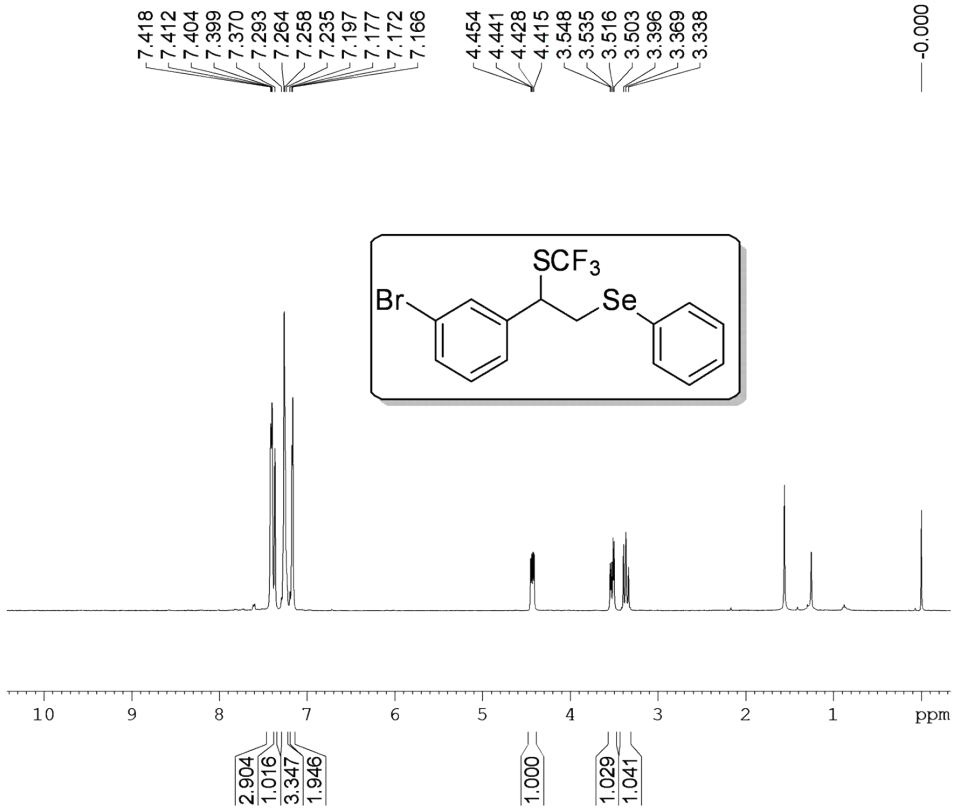
F2 - Processing parameters
SI 65536
SF 470.6126952 MHz
WDW EM

(2-(4-bromophenyl)-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3f):





(2-(3-bromophenyl)-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3g):

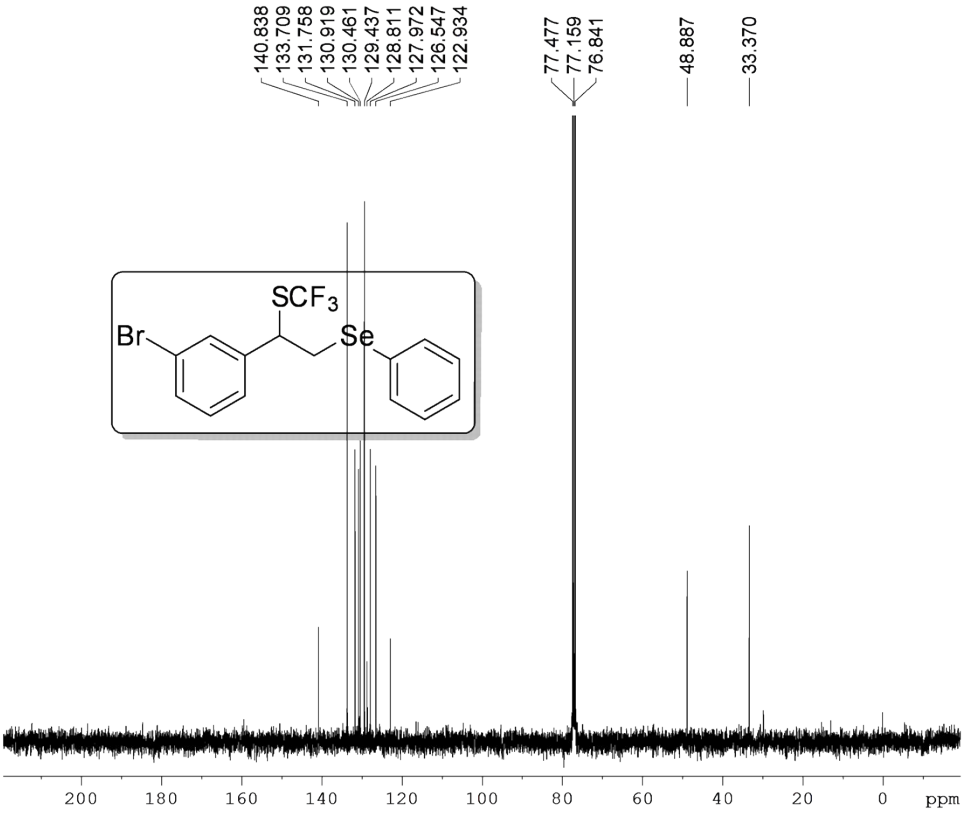


Current Data Parameters
NAME 8) 3-Br styrene
EXPNO 143
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170506
Time 18.04
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 200.34
DW 62.400 usec
DE 6.50 usec
TE 295.6 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 400.1320007 MH
NUC1 1H
P1 15.70 usec
PLW1 7.75000000 W

F2 - Processing parameters
SI 65536
SF 400.1300110 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



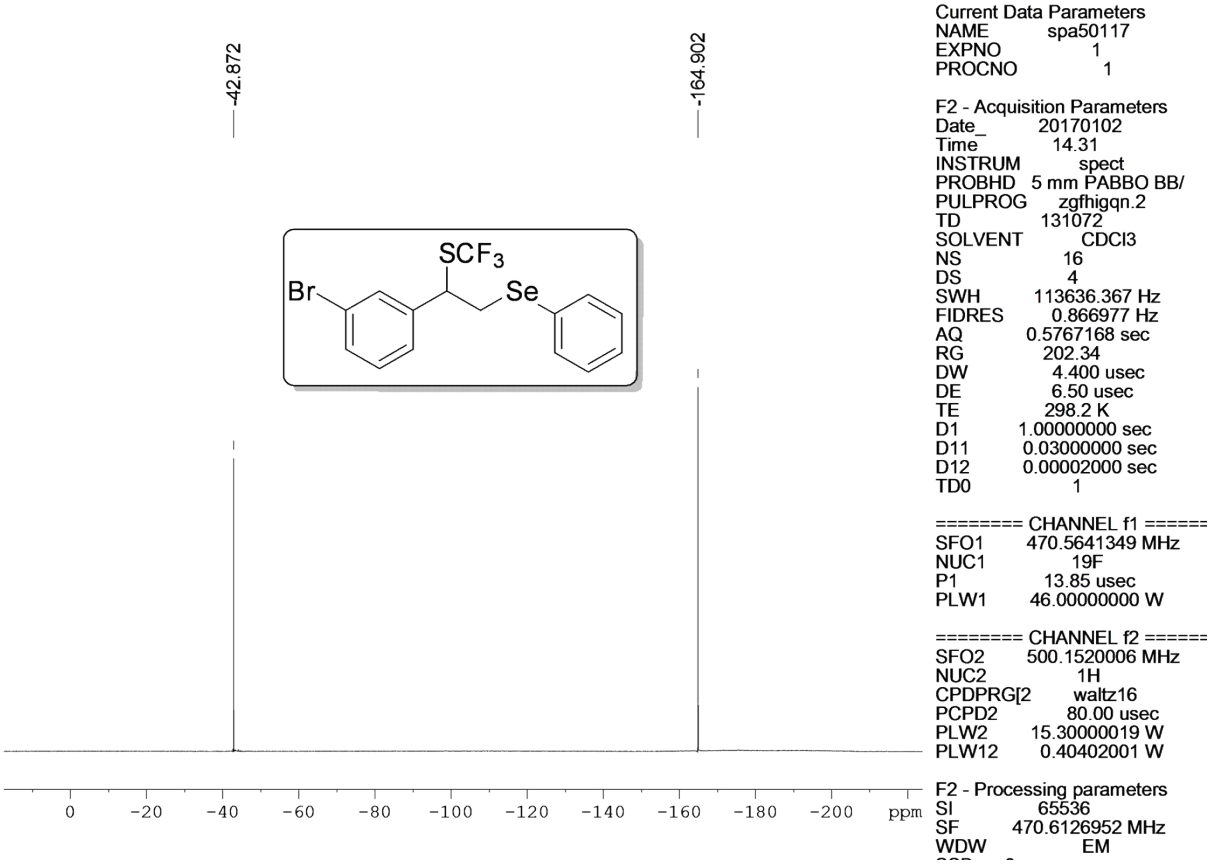
Current Data Parameters
NAME 8) 3-Br styrene
EXPNO 144
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170506
Time 18.11
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 1000
DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 296.1 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 100.6228289 MH
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

======== CHANNEL f2 ==
SFO2 400.1316005 MH
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

F2 - Processing parameters
SI 32768



Current Data Parameters
NAME spa50117
EXPNO 1
PROCNO 1

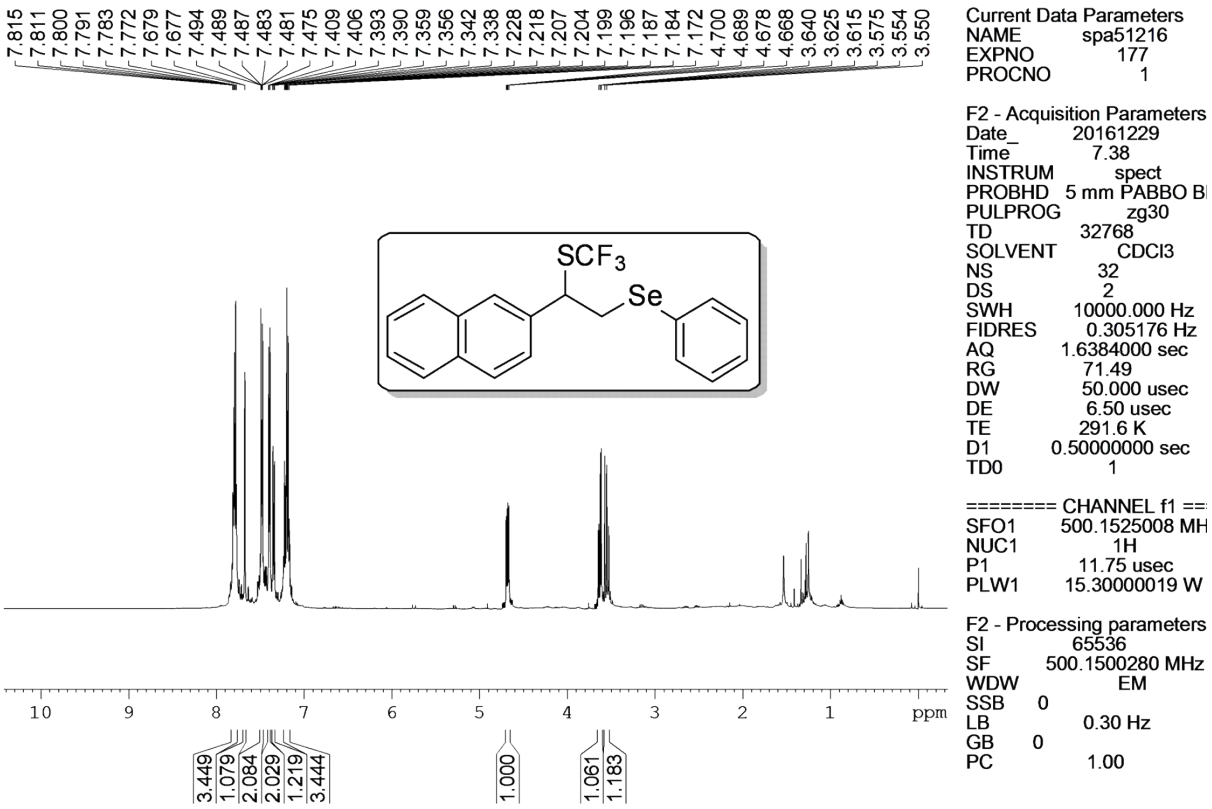
F2 - Acquisition Parameters
Date_ 20170102
Time 14.31
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgfhigqn.2
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 113636.367 Hz
FIDRES 0.866977 Hz
AQ 0.5767168 sec
RG 202.34
DW 4.400 usec
DE 6.50 usec
TE 298.2 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1

======== CHANNEL f1 ======
SFO1 470.5641349 MHz
NUC1 19F
P1 13.85 usec
PLW1 46.00000000 W

======== CHANNEL f2 ======
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.40402001 W

F2 - Processing parameters
SI 65536
SF 470.6126952 MHz
WDW EM

(2-(naphthalen-2-yl)-2-(phenylselanyl)ethyl)(trifluoromethyl)sulfane (3h):

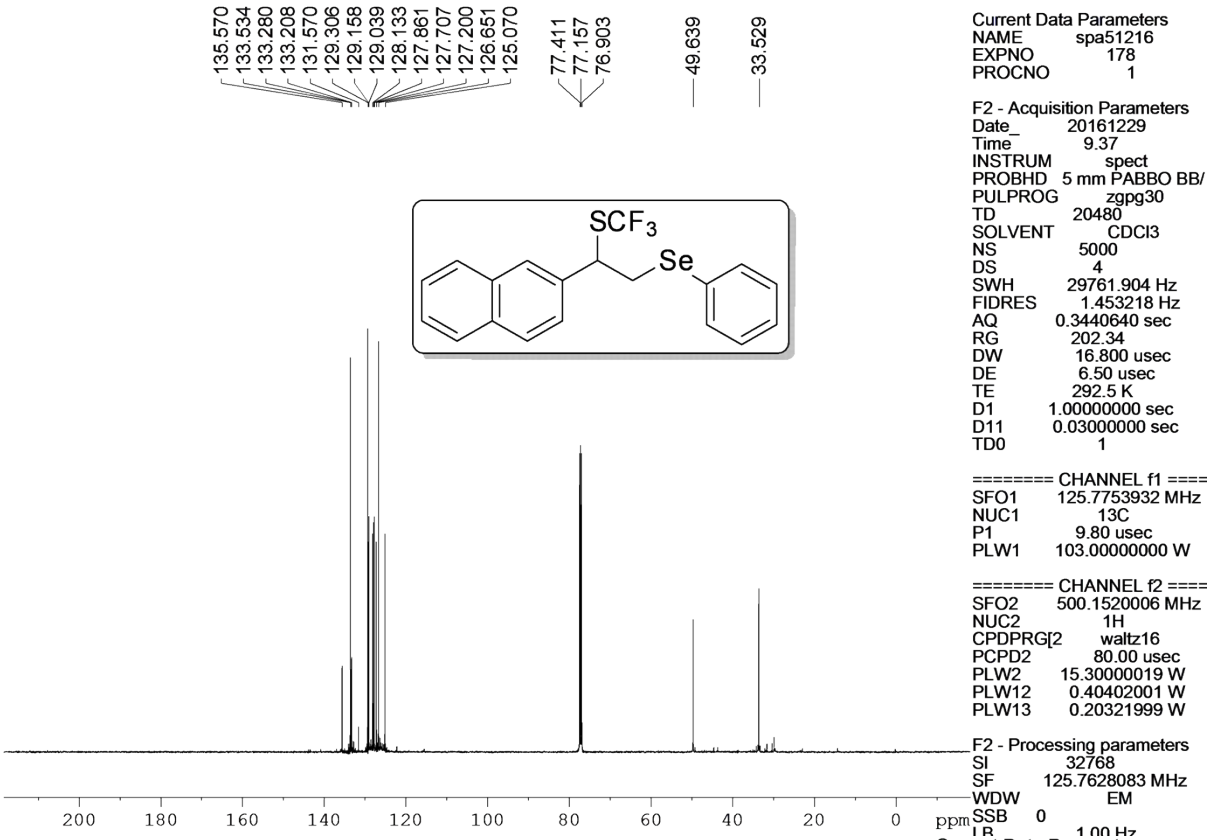


Current Data Parameters
NAME spa51216
EXPNO 177
PROCNO 1

F2 - Acquisition Parameters
Date_ 20161229
Time 7.38
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 2
SWH 10000.000 Hz
FIDRES 0.305176 Hz
AQ 1.6384000 sec
RG 71.49
DW 50.000 usec
DE 6.50 usec
TE 291.6 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 500.1525008 MH
NUC1 1H
P1 11.75 usec
PLW1 15.30000019 W

F2 - Processing parameters
SI 65536
SF 500.1500280 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



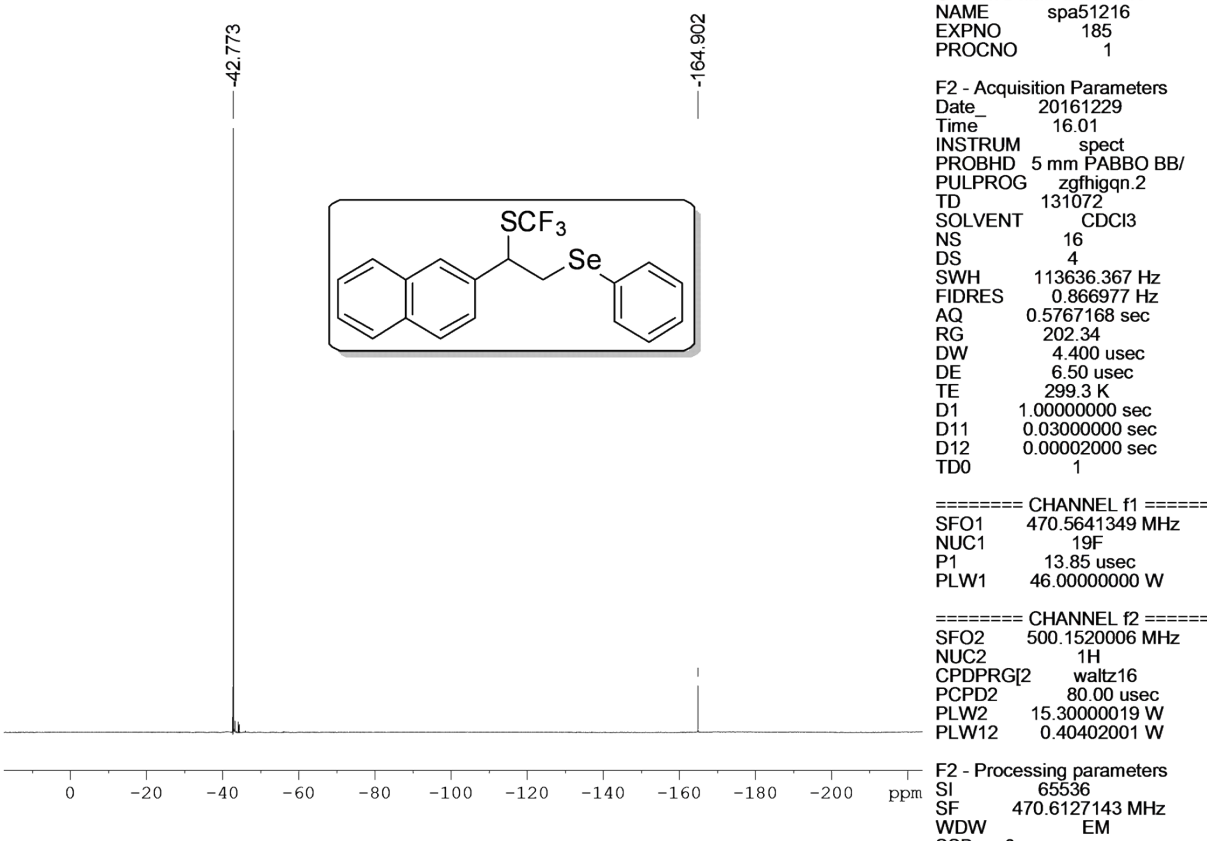
Current Data Parameters
NAME spa51216
EXPNO 178
PROCNO 1

F2 - Acquisition Parameters
Date_ 20161229
Time 9.37
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 20480
SOLVENT CDCl3
NS 5000
DS 4
SWH 29761.904 Hz
FIDRES 1.453218 Hz
AQ 0.3440640 sec
RG 202.34
DW 16.800 usec
DE 6.50 usec
TE 292.5 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ====
SFO1 125.7753932 MHz
NUC1 13C
P1 9.80 usec
PLW1 103.00000000 W

======== CHANNEL f2 ====
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.40402001 W
PLW13 0.20321999 W

F2 - Processing parameters
SI 32768
SF 125.7628083 MHz
WDW EM
SSB 0
LB 1.00 Hz



Current Data Parameters
NAME spa51216
EXPNO 185
PROCNO 1

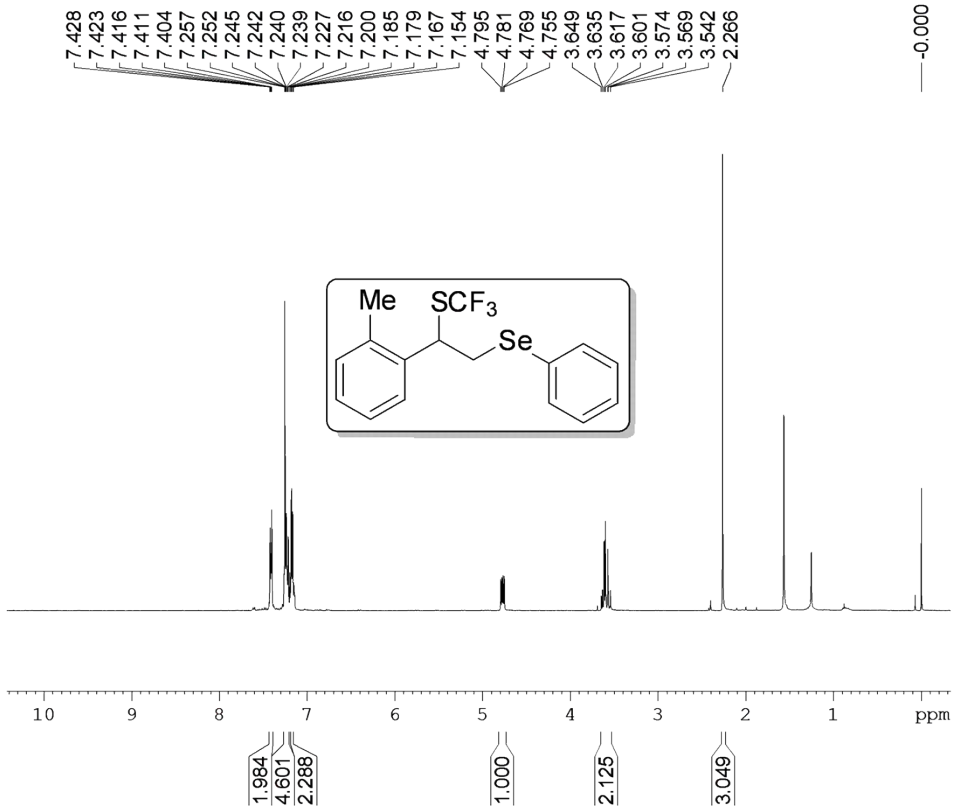
F2 - Acquisition Parameters
Date_ 20161229
Time 16.01
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgfhigqn.2
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 113636.367 Hz
FIDRES 0.866977 Hz
AQ 0.5767168 sec
RG 202.34
DW 4.400 usec
DE 6.50 usec
TE 299.3 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1

======== CHANNEL f1 ======
SFO1 470.5641349 MHz
NUC1 19F
P1 13.85 usec
PLW1 46.00000000 W

======== CHANNEL f2 ======
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.40402001 W

F2 - Processing parameters
SI 65536
SF 470.6127143 MHz
WDW EM

(2-(phenylselanyl)-2-(o-tolyl)ethyl)(trifluoromethyl)sulfane (3i):

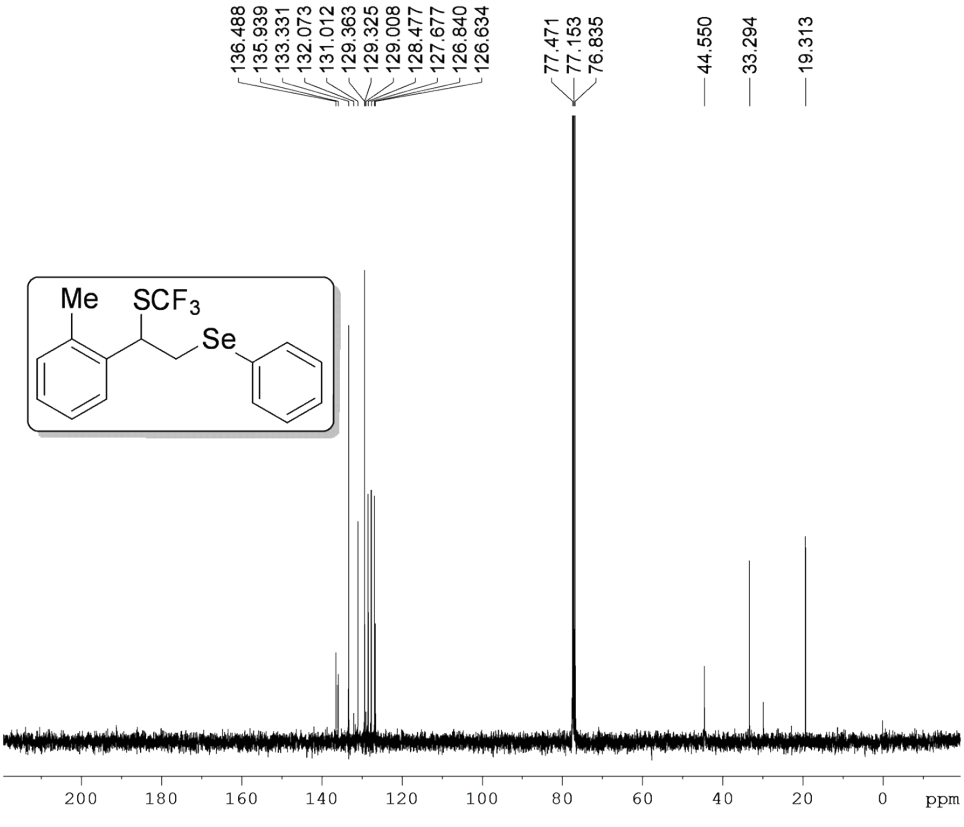


Current Data Parameters
NAME spa40417
EXPNO 612
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170428
Time 18.30
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 200.34
DW 62.400 usec
DE 6.50 usec
TE 294.9 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 400.1320007 MH
NUC1 1H
P1 15.70 usec
PLW1 7.75000000 W

F2 - Processing parameters
SI 65536
SF 400.1300108 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



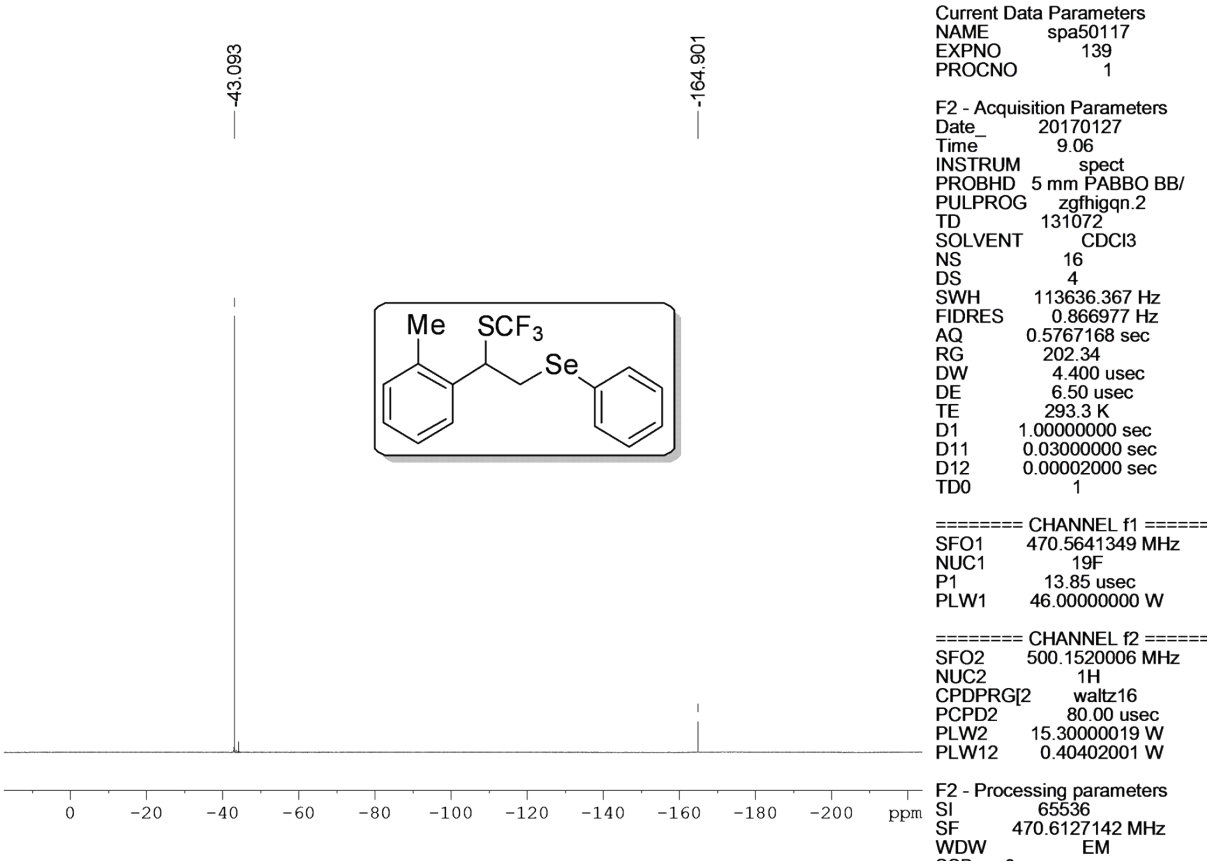
Current Data Parameters
NAME spa40417
EXPNO 613
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170428
Time 19.18
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 2000
DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 295.2 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

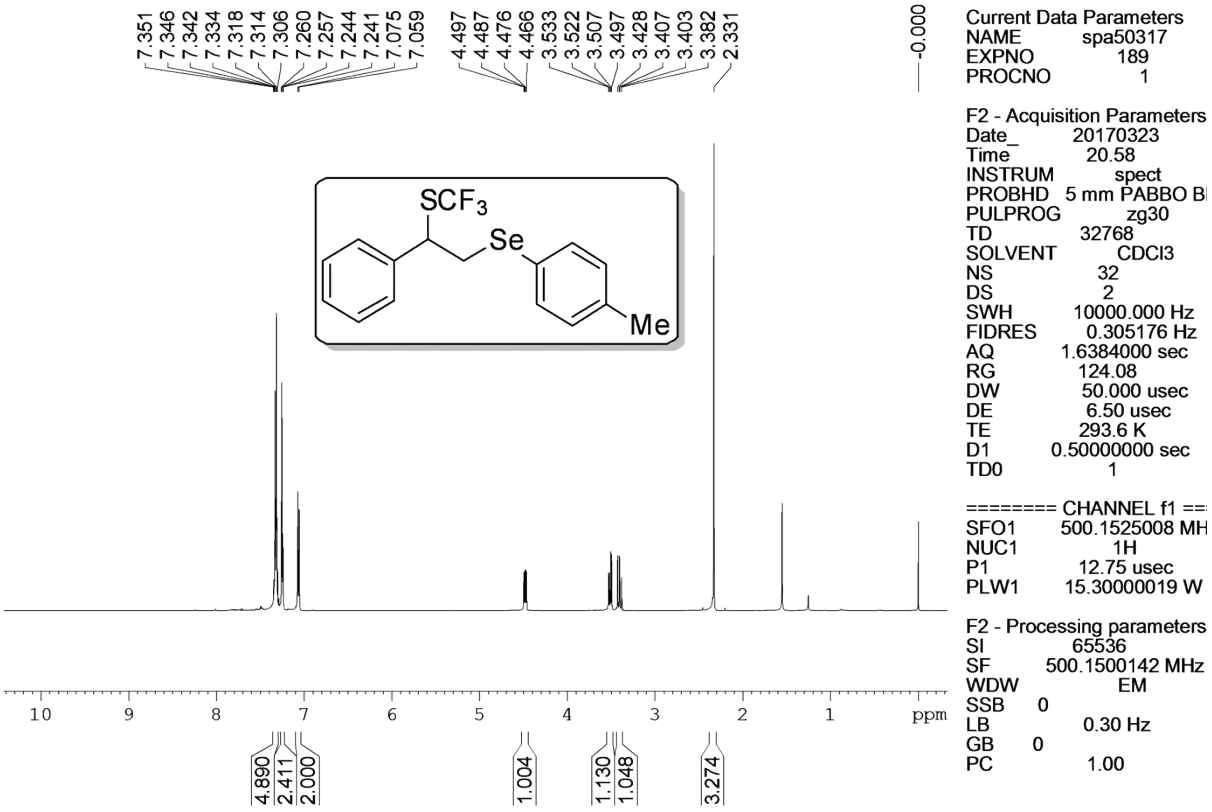
======== CHANNEL f1 ==
SFO1 100.6228289 MH
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

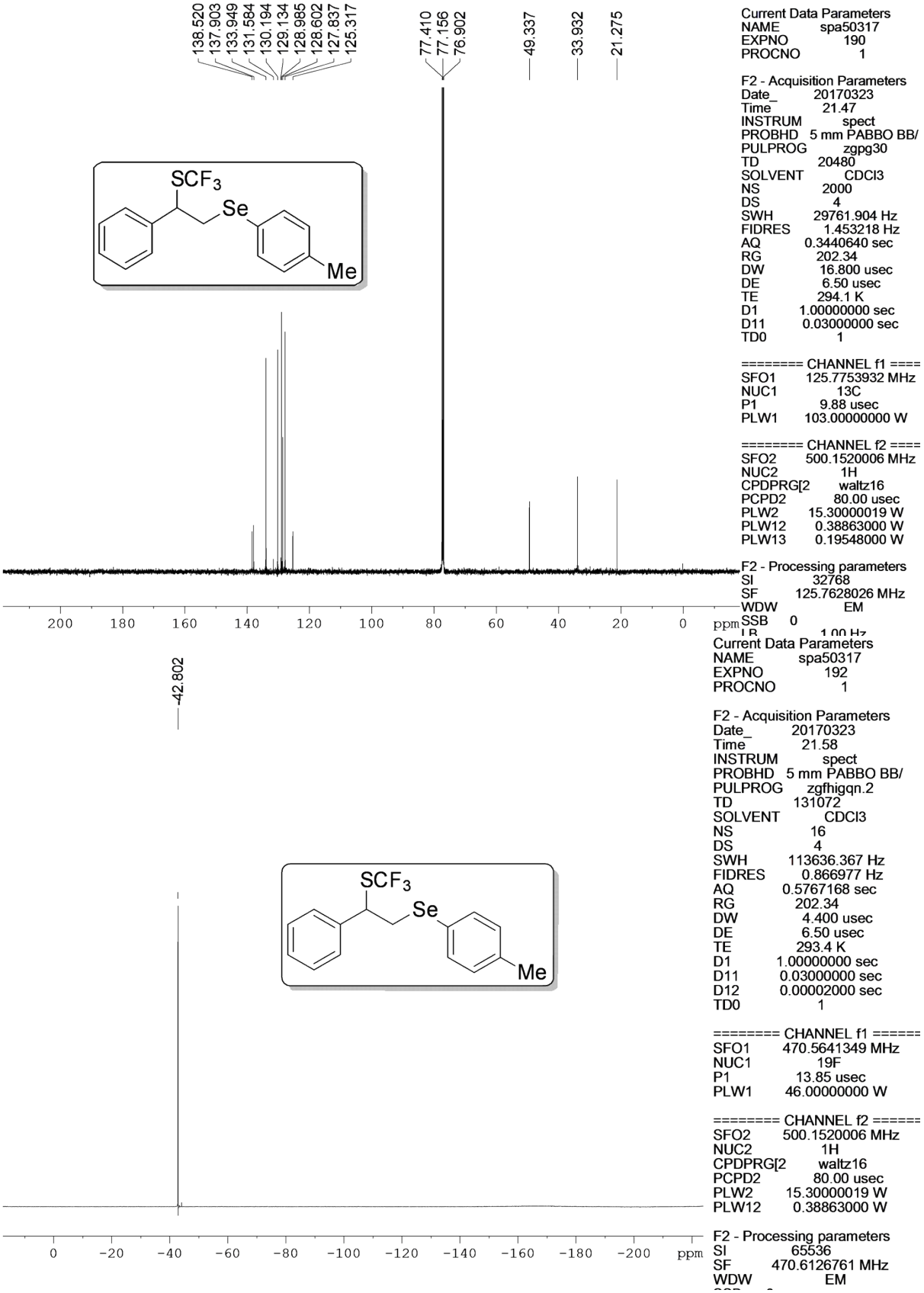
======== CHANNEL f2 ==
SFO2 400.1316005 MH
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

F2 - Processing parameters
SI 32768

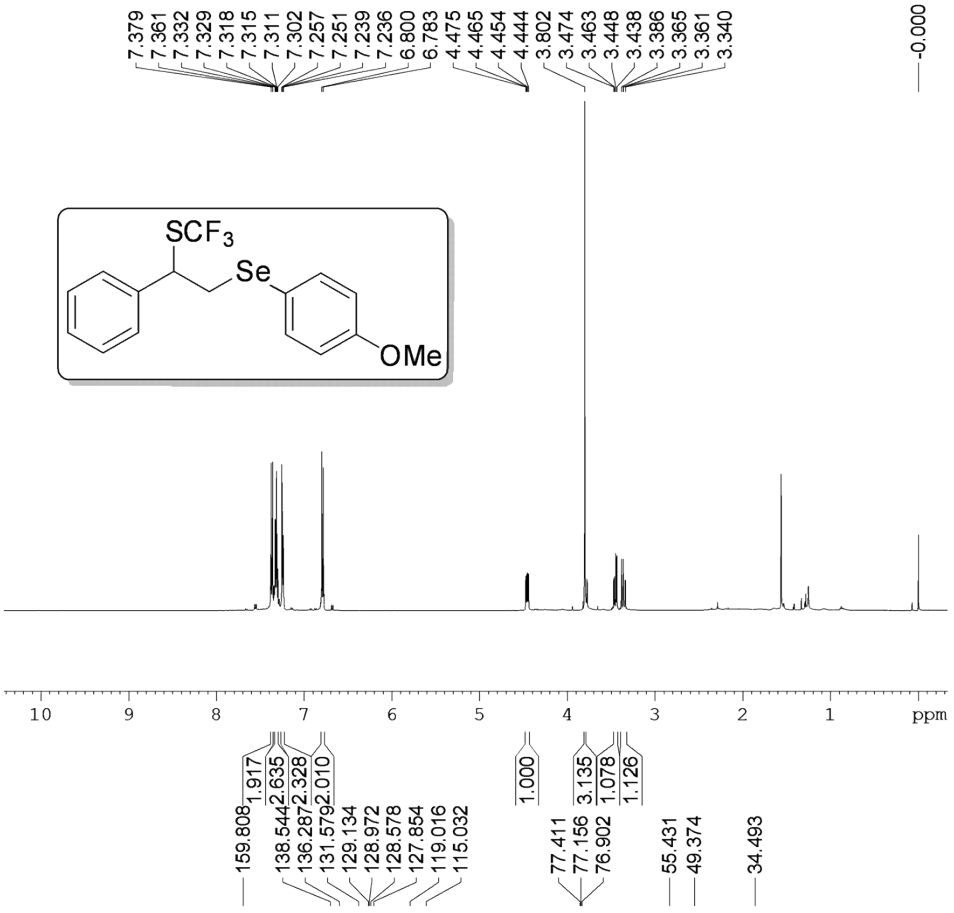


(2-phenyl-2-(p-tolylselanyl)ethyl)(trifluoromethyl)sulfane (3j):





(2-((4-methoxyphenyl)selanyl)-2-phenylethyl)(trifluoromethyl)sulfane (3k):

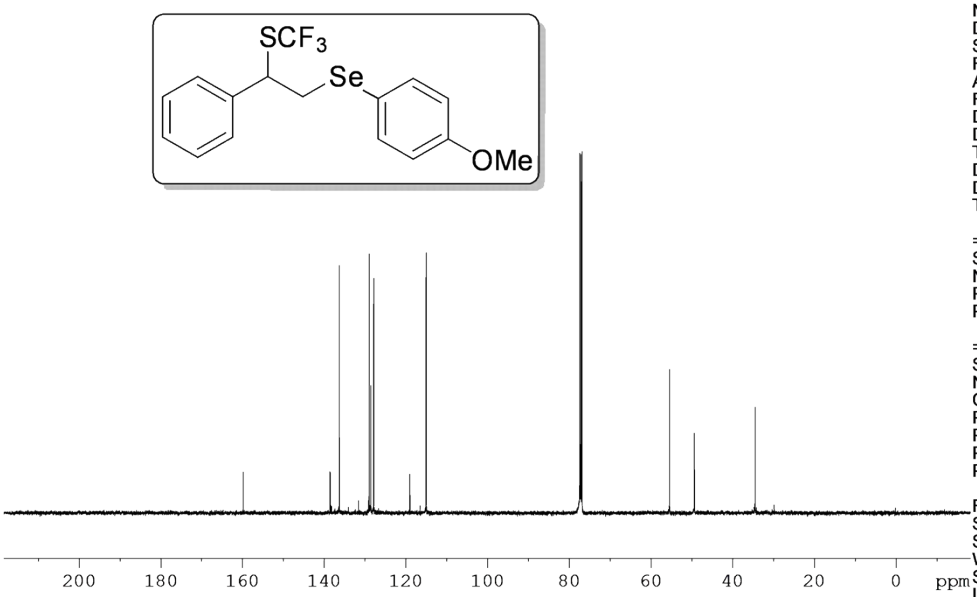


Current Data Parameters
NAME spa50317
EXPNO 150
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170321
Time 13.36
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 2
SWH 10000.000 Hz
FIDRES 0.305176 Hz
AQ 1.6384000 sec
RG 101.5
DW 50.000 usec
DE 6.50 usec
TE 294.3 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 500.1525008 MH
NUC1 1H
P1 12.75 usec
PLW1 15.30000019 W

F2 - Processing parameters
SI 65536
SF 500.1500140 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



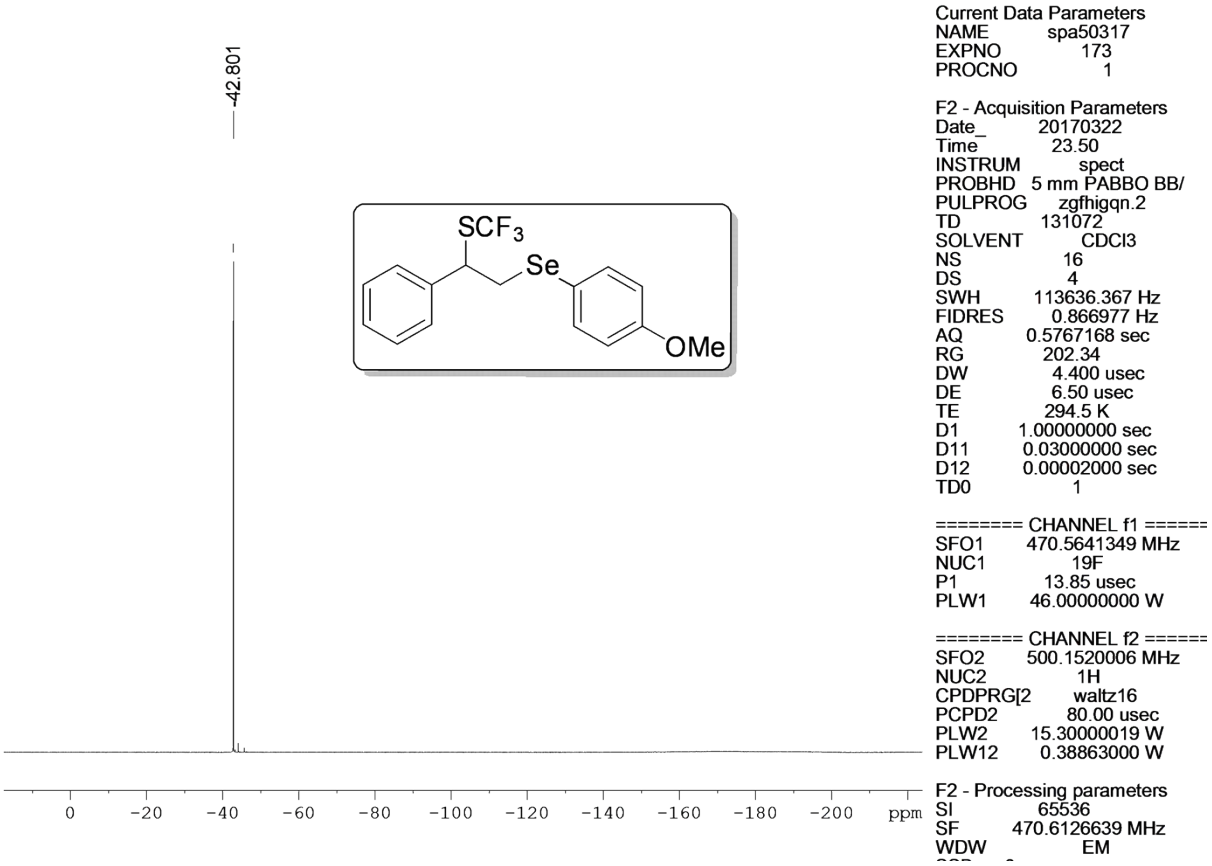
Current Data Parameters
NAME spa50317
EXPNO 172
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170322
Time 23.47
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 20480
SOLVENT CDCl3
NS 2000
DS 4
SWH 29761.904 Hz
FIDRES 1.453218 Hz
AQ 0.3440640 sec
RG 202.34
DW 16.800 usec
DE 6.50 usec
TE 295.0 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

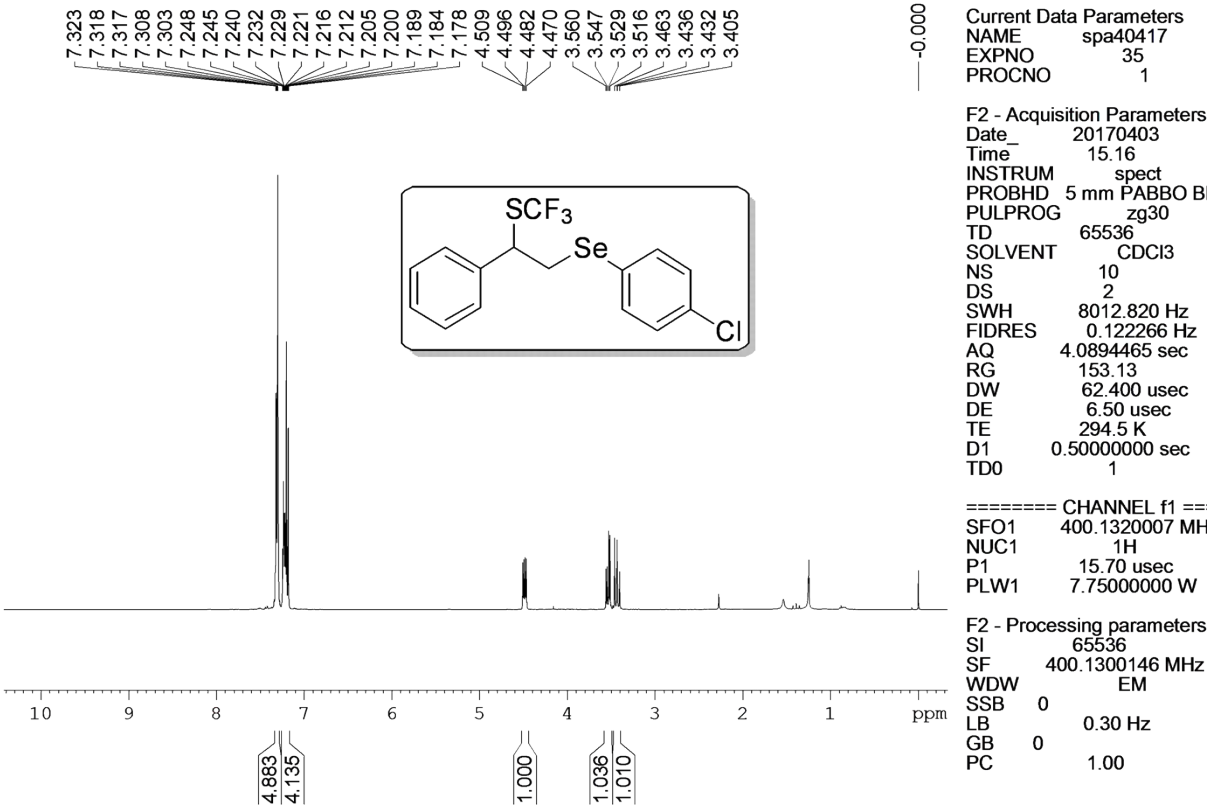
======== CHANNEL f1 ====
SFO1 125.7753932 MHz
NUC1 13C
P1 9.88 usec
PLW1 103.00000000 W

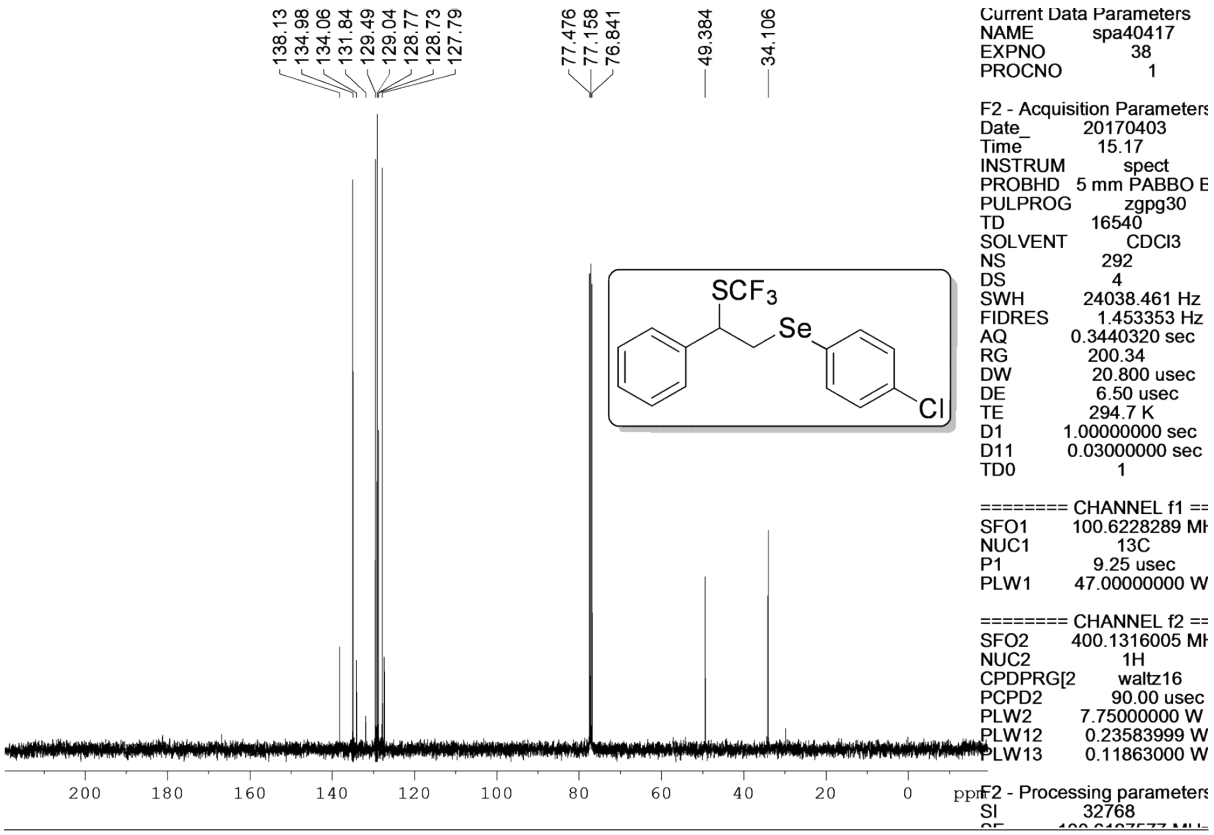
======== CHANNEL f2 ====
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.38863000 W
PLW13 0.19548000 W

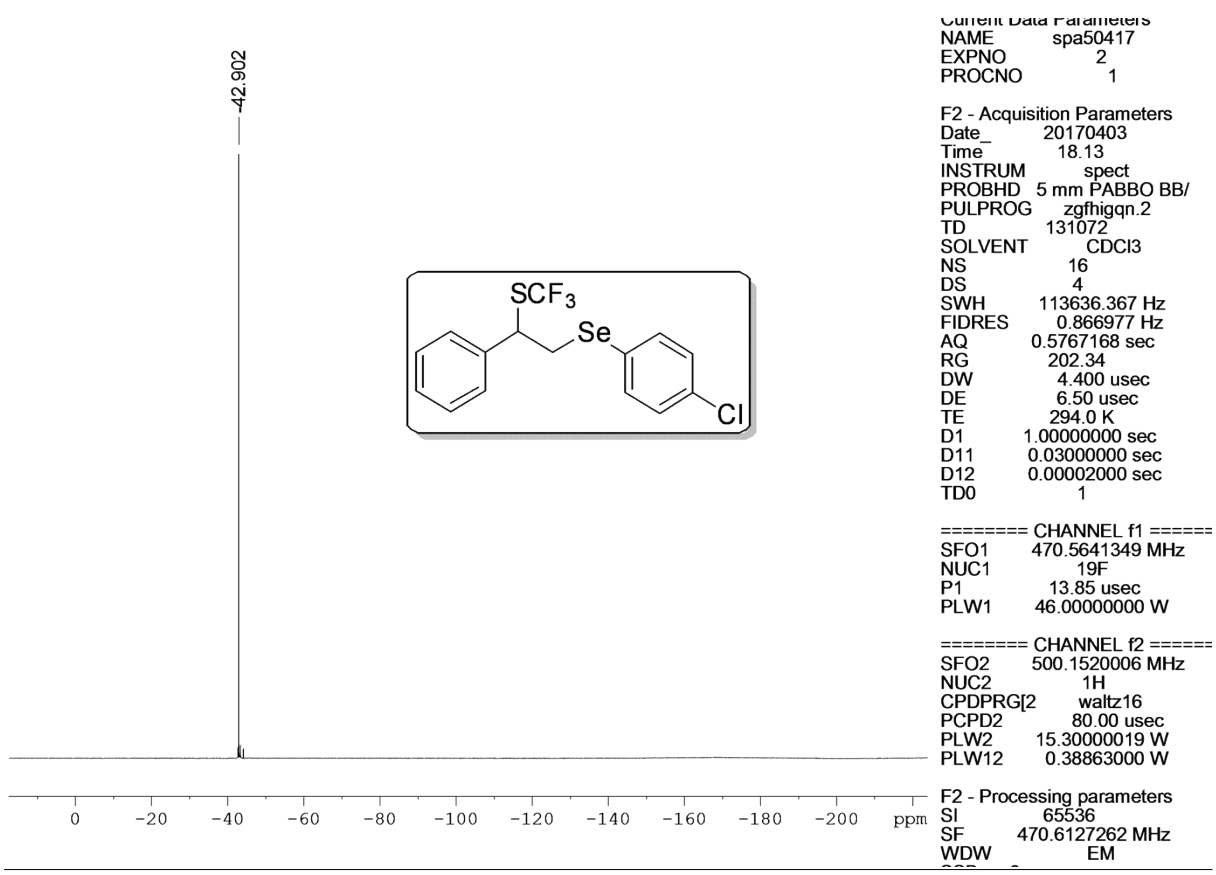
F2 - Processing parameters
SI 32768
SF 125.7628033 MHz
WDW EM
SSB 0
LB 1.00 Hz



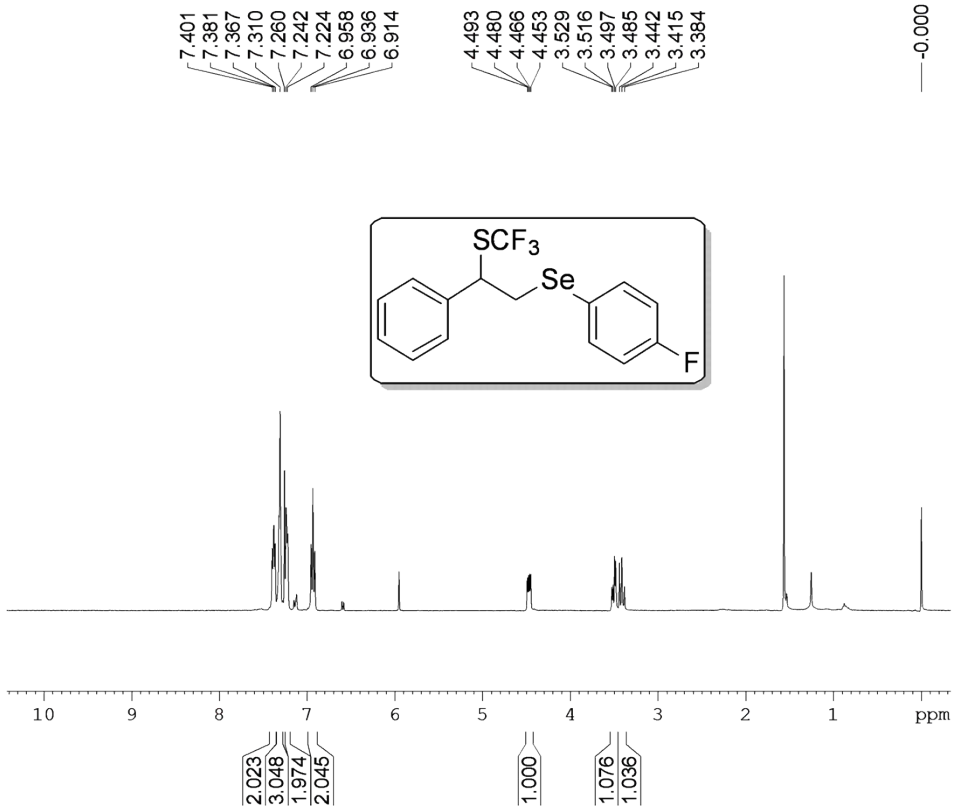
(2-((4-chlorophenyl)selanyl)-2-phenylethyl)(trifluoromethyl)sulfane (3l):







(2-((4-fluorophenyl)selanyl)-2-phenylethyl)(trifluoromethyl)sulfane (3m):

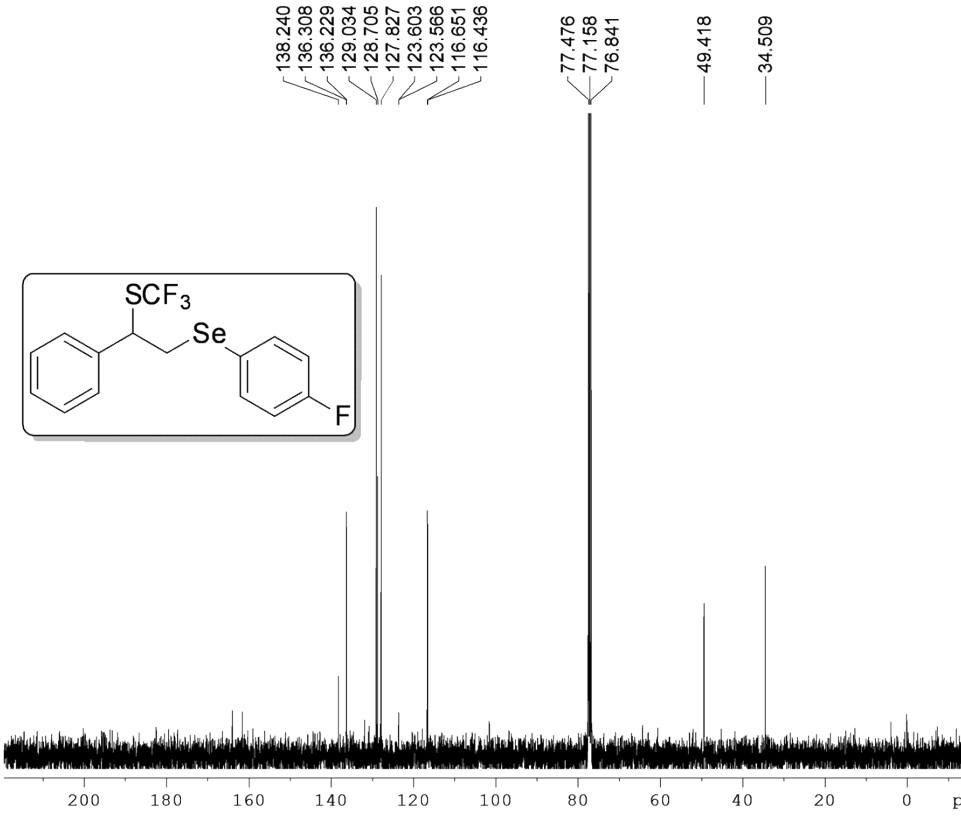


Current Data Parameters
NAME V) 4-fluoro selenid
EXPNO 222
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170407
Time 19.12
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 200.34
DW 62.400 usec
DE 6.50 usec
TE 294.8 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 400.1320007 MH
NUC1 1H
P1 15.70 usec
PLW1 7.75000000 W

F2 - Processing parameters
SI 65536
SF 400.1300103 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



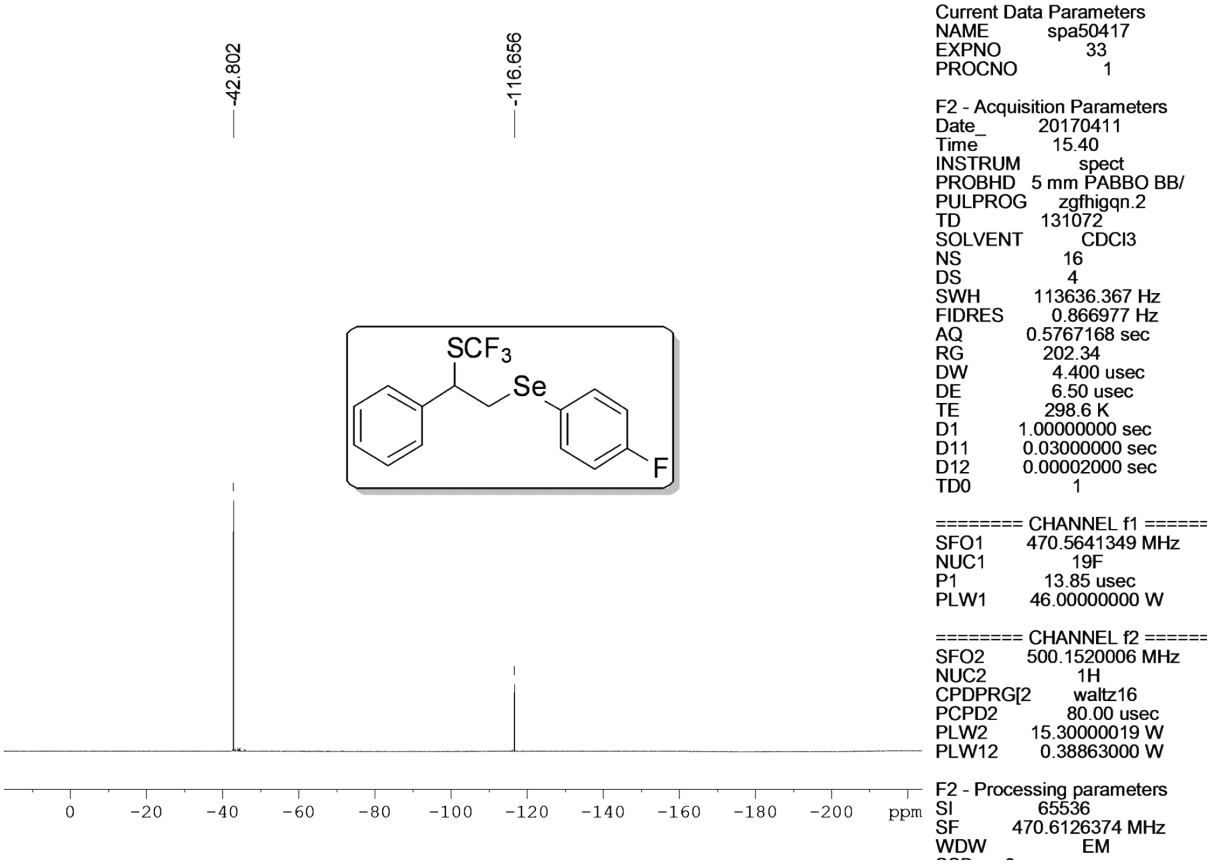
Current Data Parameters
NAME V) 4-fluoro selenic
EXPNO 223
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170407
Time 19.37
INSTRUM spect
PROBHD 5 mm PABBO E
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 1000
DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 295.3 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

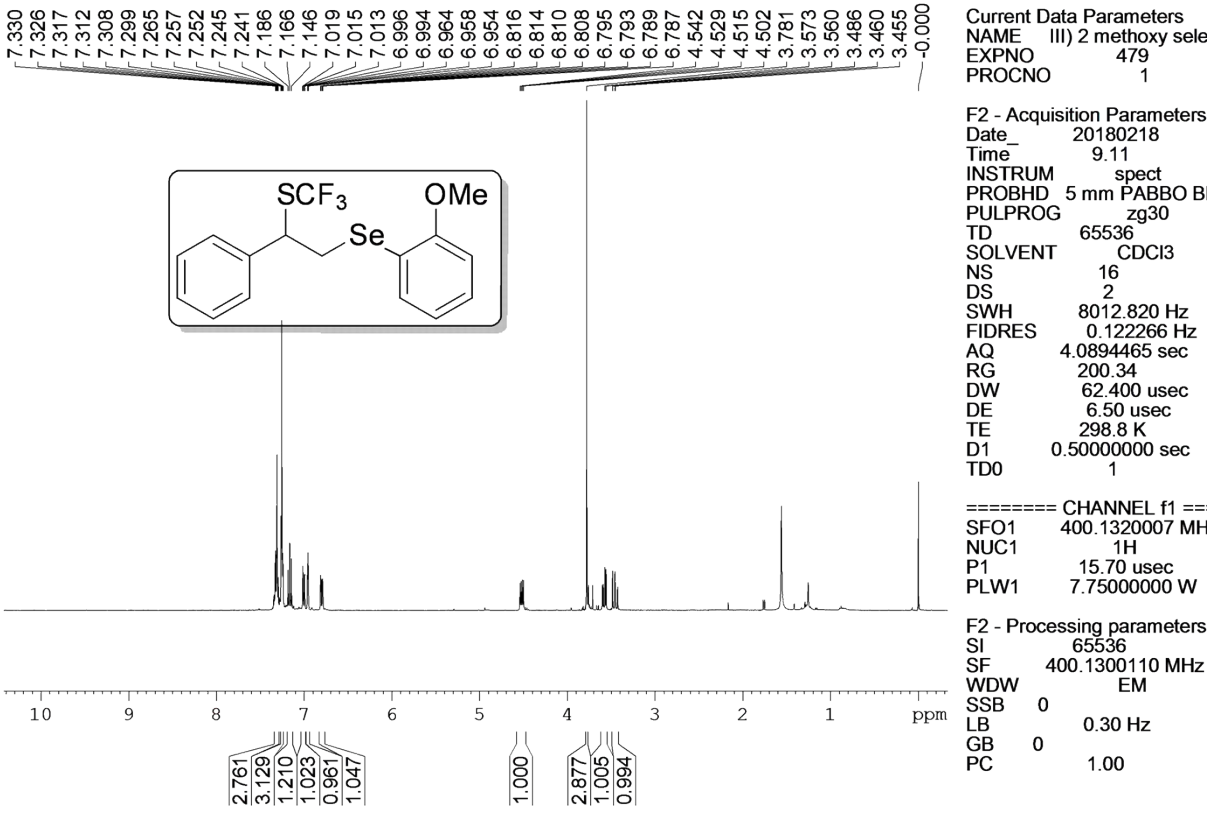
======== CHANNEL f1 ==
SFO1 100.6228289 MH
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

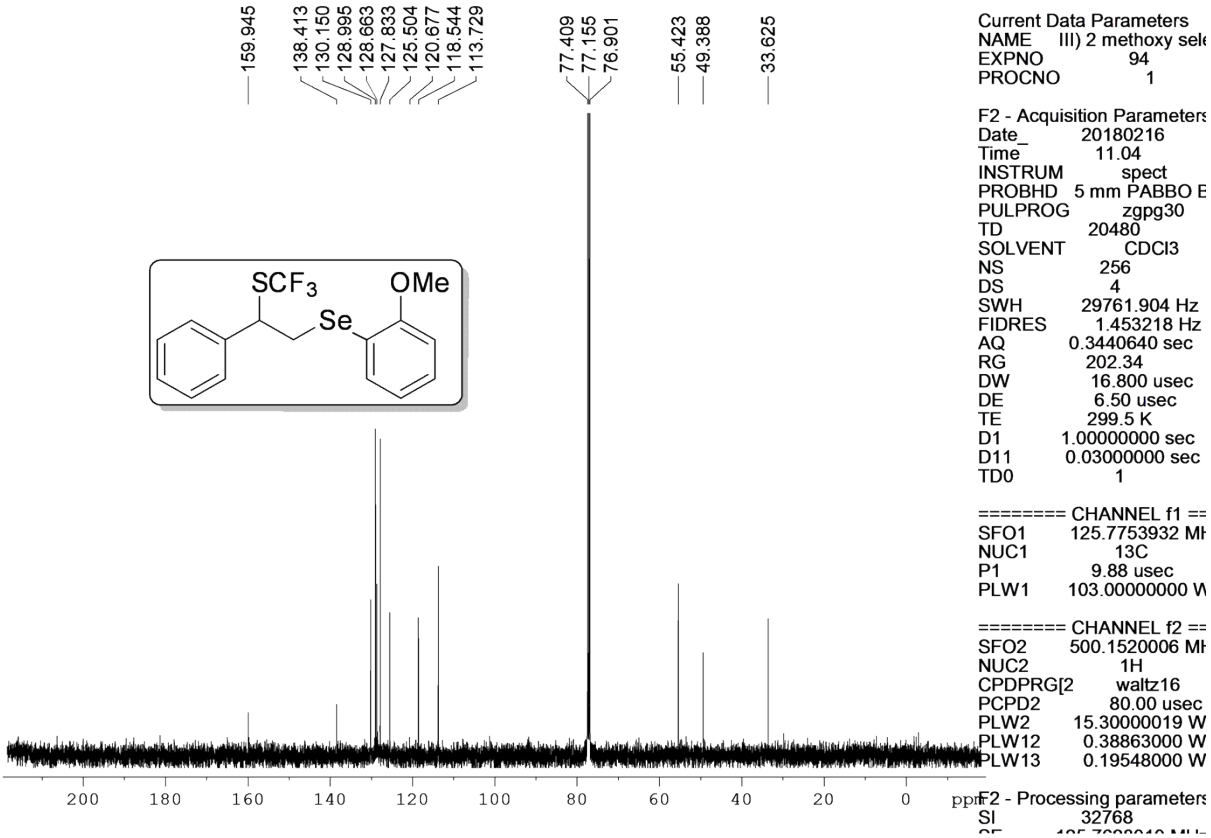
======== CHANNEL f2 ==
SFO2 400.1316005 MH
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

F2 - Processing parameters
SI 32768



(2-((2-methoxyphenyl)selanyl)-2-phenylethyl)(trifluoromethyl)sulfane (3n):





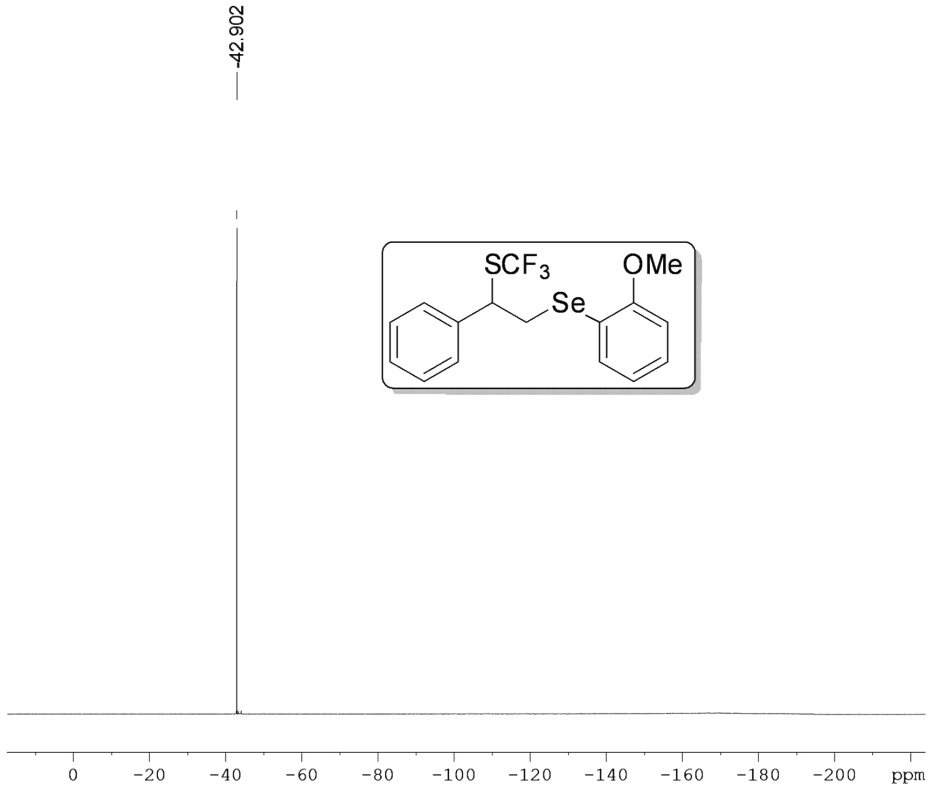
Current Data Parameters
NAME III) 2 methoxy sele
EXPNO 94
PROCNO 1

F2 - Acquisition Parameters
Date_ 20180216
Time 11.04
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zgpg30
TD 20480
SOLVENT CDCl3
NS 256
DS 4
SWH 29761.904 Hz
FIDRES 1.453218 Hz
AQ 0.3440640 sec
RG 202.34
DW 16.800 usec
DE 6.50 usec
TE 299.5 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 125.7753932 MH
NUC1 13C
P1 9.88 usec
PLW1 103.00000000 W

======== CHANNEL f2 ==
SFO2 500.1520006 MH
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.38863000 W
PLW13 0.19548000 W

F2 - Processing parameters
SI 32768



Current Data Parameters
NAME III) 2 methoxy selenide
EXPNO 95
PROCNO 1

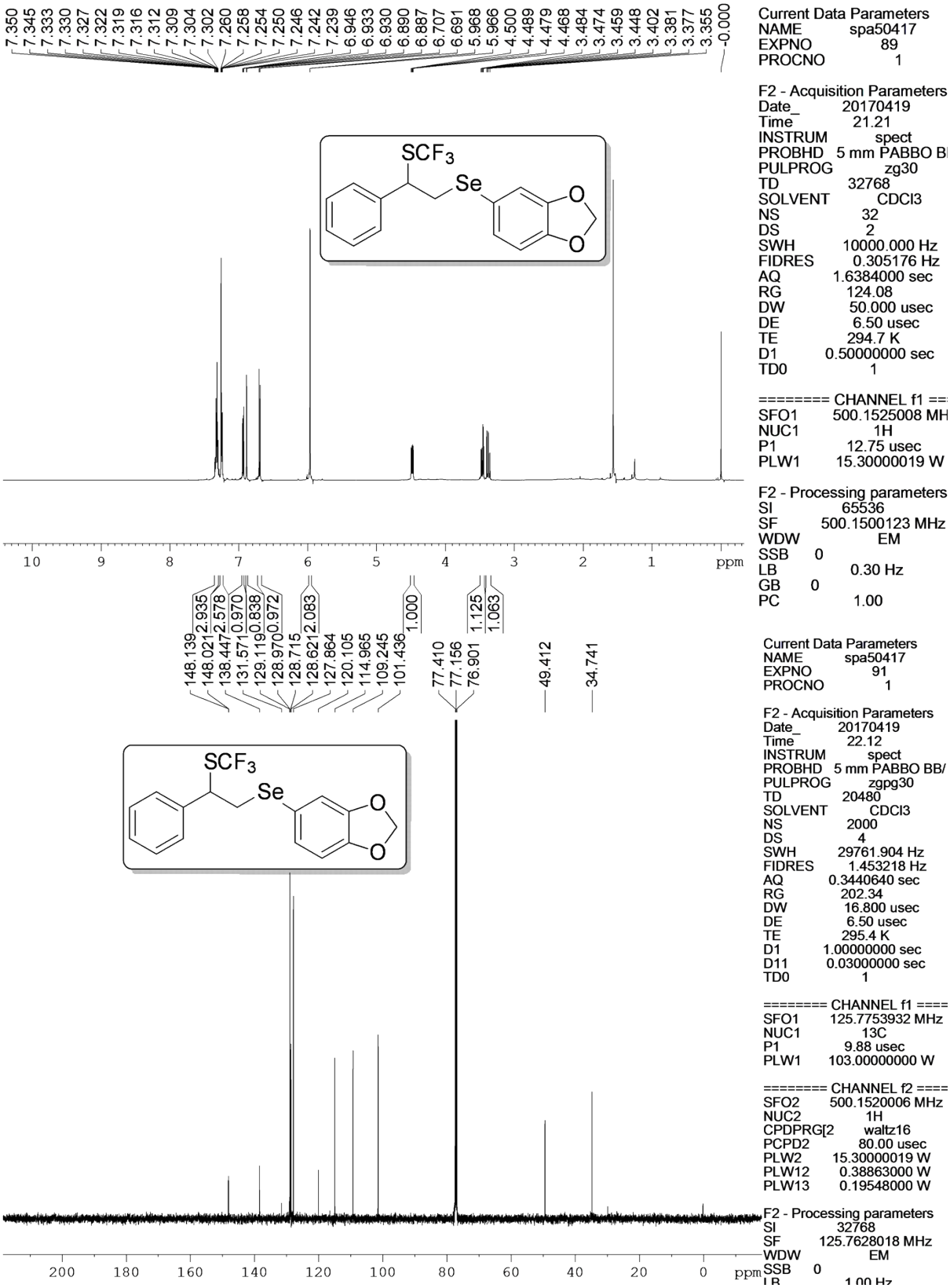
F2 - Acquisition Parameters
Date_ 20180216
Time 11.06
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgfhigqn.2
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 113636.367 Hz
FIDRES 0.866977 Hz
AQ 0.5767168 sec
RG 202.34
DW 4.400 usec
DE 6.50 usec
TE 299.0 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1

======== CHANNEL f1 ======
SFO1 470.5641349 MHz
NUC1 19F
P1 13.85 usec
PLW1 46.00000000 W

======== CHANNEL f2 ======
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.38863000 W

F2 - Processing parameters
SI 65536
SF 470.6127282 MHz
WDW EM

5-((2-phenyl-2-((trifluoromethyl)thio)ethyl)selanyl)benzo[d][1,3]dioxole (3o):



Current Data Parameters
NAME spa50417
EXPNO 89
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170419
Time 21.21
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 2
SWH 10000.000 Hz
FIDRES 0.305176 Hz
AQ 1.6384000 sec
RG 124.08
DW 50.000 usec
DE 6.50 usec
TE 294.7 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 500.1525008 MH
NUC1 1H
P1 12.75 usec
PLW1 15.30000019 W

F2 - Processing parameters
SI 65536
SF 500.1500123 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

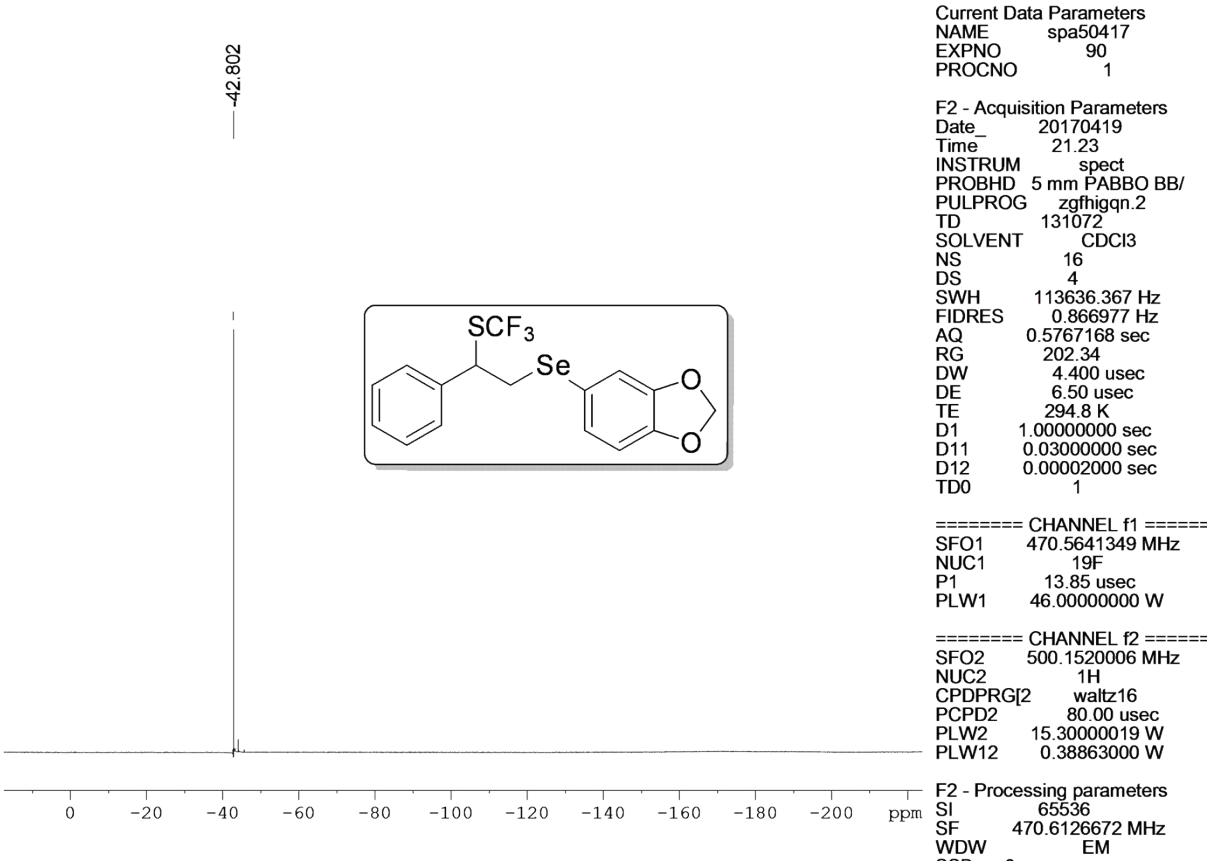
Current Data Parameters
NAME spa50417
EXPNO 91
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170419
Time 22.12
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgpg30
TD 20480
SOLVENT CDCl3
NS 2000
DS 4
SWH 29761.904 Hz
FIDRES 1.453218 Hz
AQ 0.3440640 sec
RG 202.34
DW 16.800 usec
DE 6.50 usec
TE 295.4 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

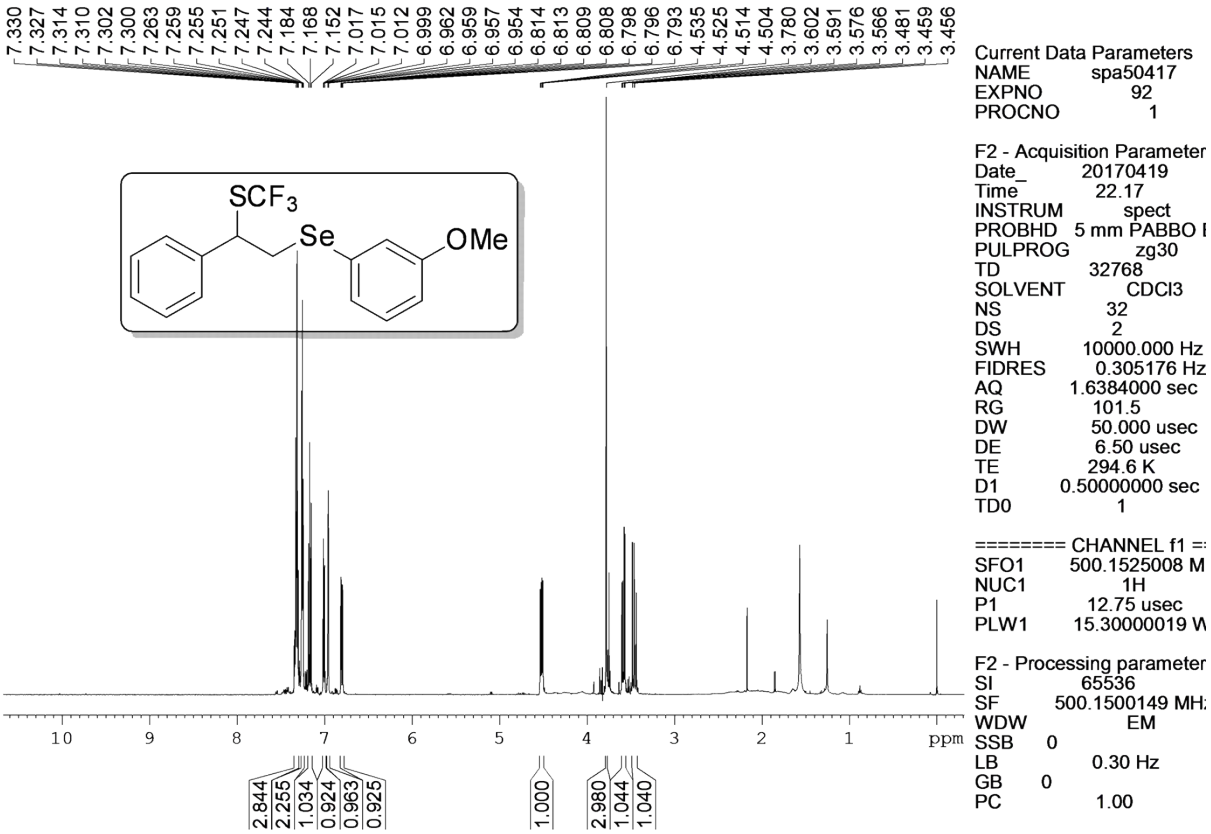
======== CHANNEL f1 ====
SFO1 125.7753932 MHz
NUC1 13C
P1 9.88 usec
PLW1 103.00000000 W

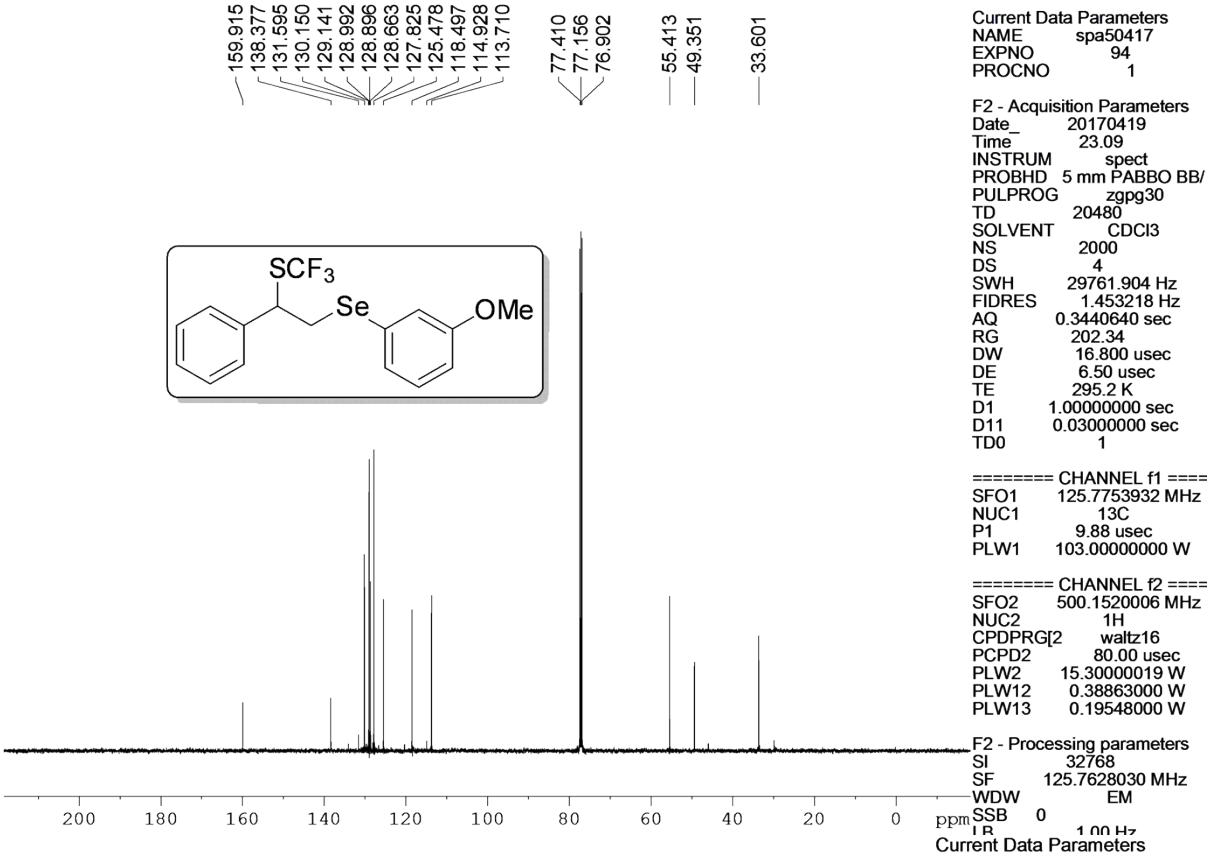
======== CHANNEL f2 ====
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.38863000 W
PLW13 0.19548000 W

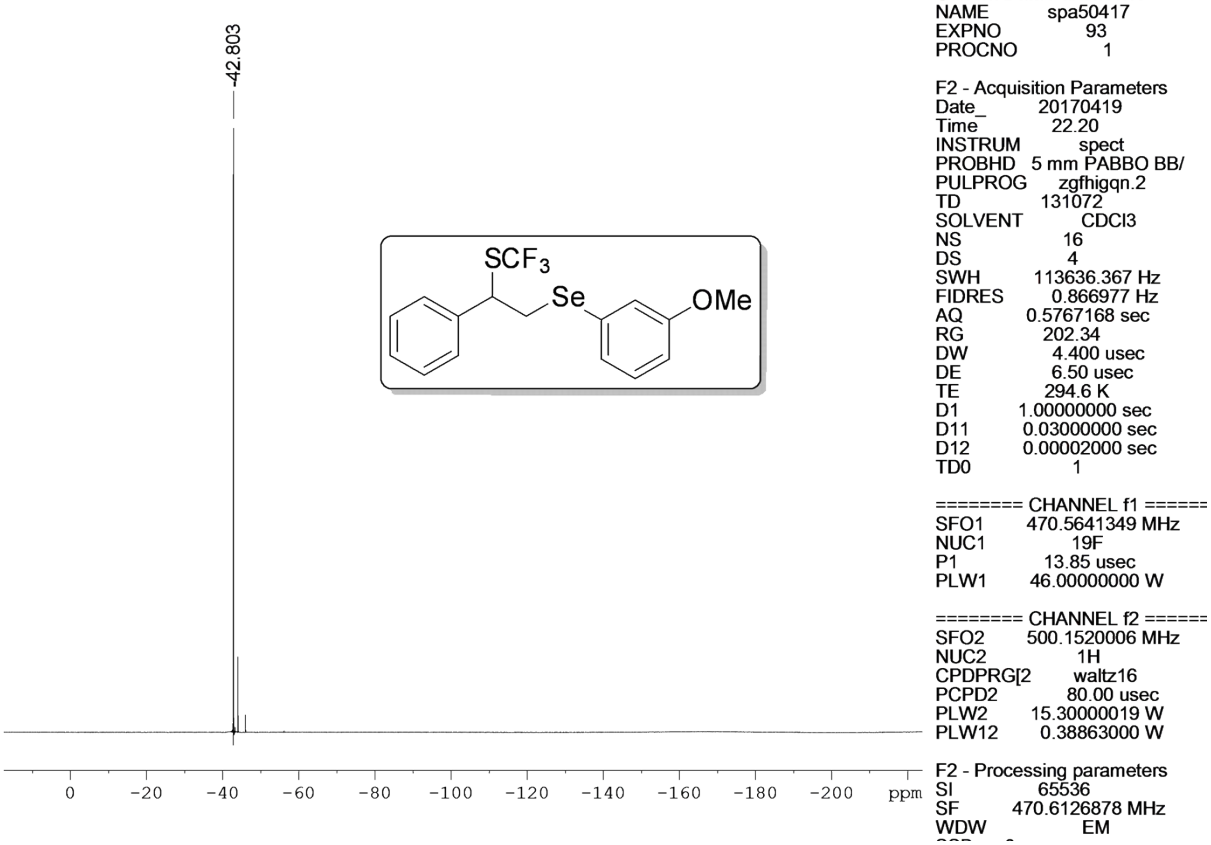
F2 - Processing parameters
SI 32768
SF 125.7628018 MHz
WDW EM
SSB 0
LB 1.00 Hz



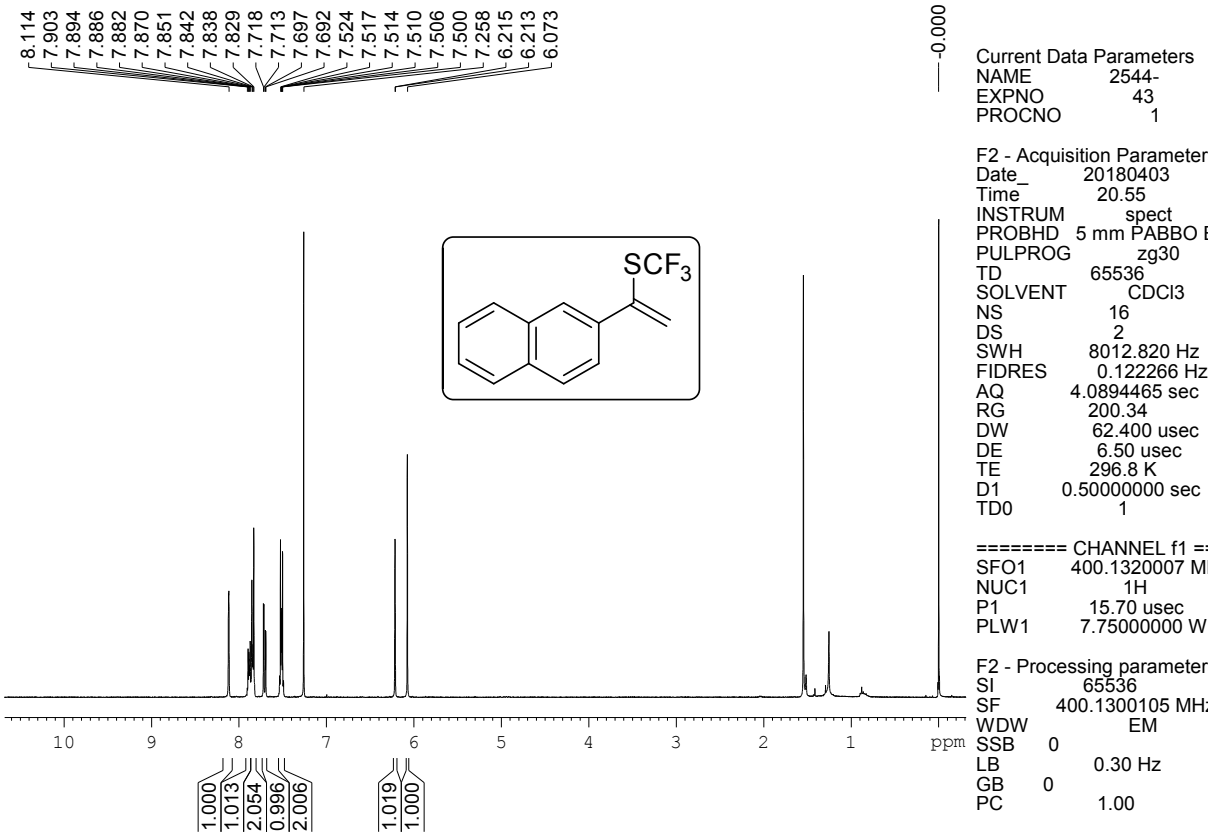
(2-((3-methoxyphenyl)selanyl)-2-phenylethyl)(trifluoromethyl)sulfane (3p):







(1-(naphthalen-2-yl)vinyl)(trifluoromethyl)sulfane (4):

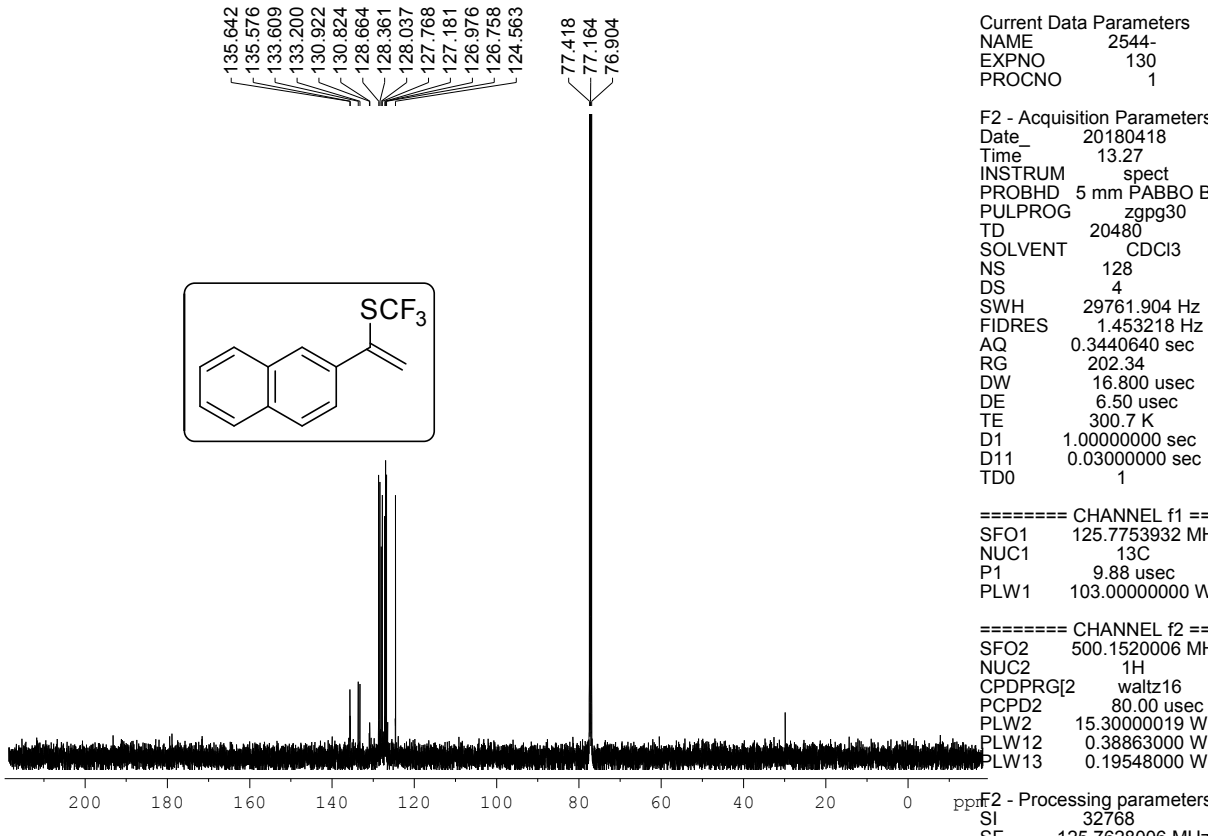


Current Data Parameters
NAME 2544-
EXPNO 43
PROCNO 1

F2 - Acquisition Parameter
Date_ 20180403
Time 20.55
INSTRUM spect
PROBHD 5 mm PABBO I
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894465 sec
RG 200.34
DW 62.400 usec
DE 6.50 usec
TE 296.8 K
D1 0.50000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 400.1320007 M
NUC1 1H
P1 15.70 usec
PLW1 7.75000000 W

F2 - Processing parameter
SI 65536
SF 400.1300105 MH
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00



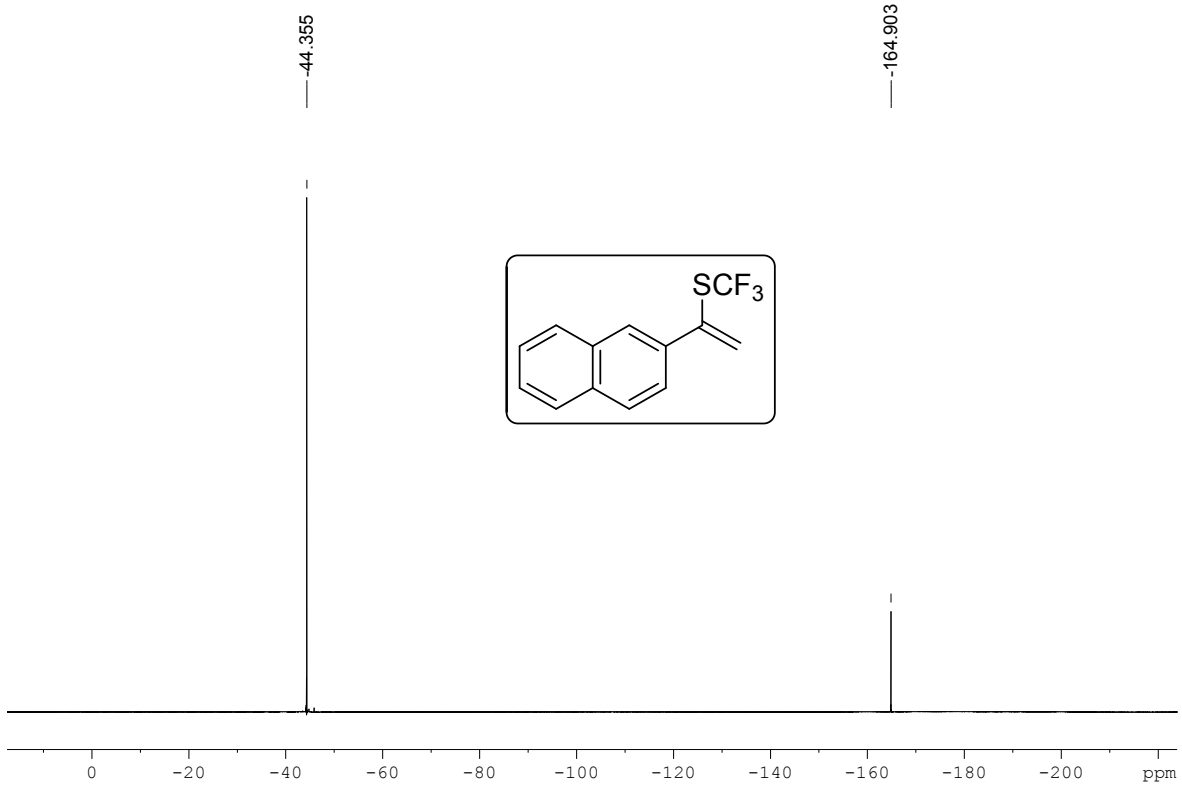
Current Data Parameters
NAME 2544-
EXPNO 130
PROCNO 1

F2 - Acquisition Parameters
Date_ 20180418
Time 13.27
INSTRUM spect
PROBHD 5 mm PABBO I
PULPROG zgpg30
TD 20480
SOLVENT CDCl3
NS 128
DS 4
SWH 29761.904 Hz
FIDRES 1.453218 Hz
AQ 0.3440640 sec
RG 202.34
DW 16.800 usec
DE 6.50 usec
TE 300.7 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

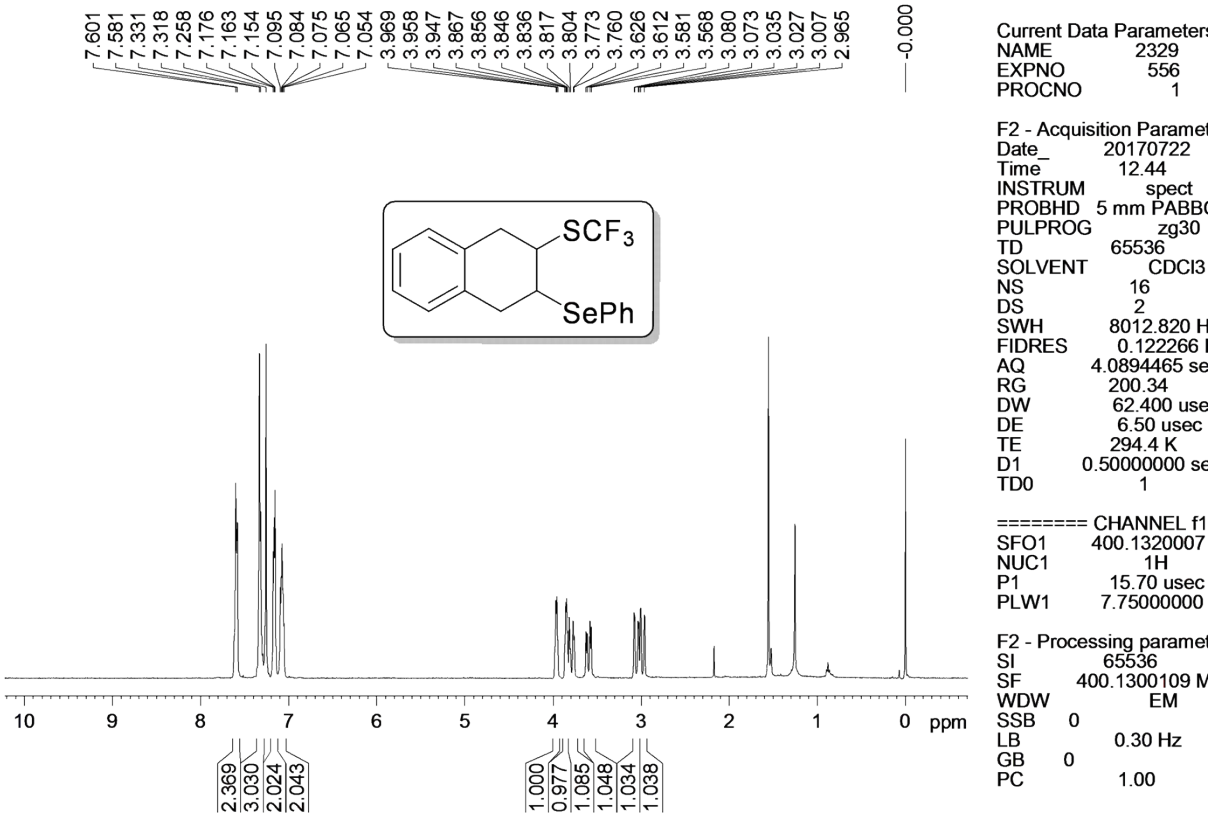
======== CHANNEL f1 ==
SFO1 125.7753932 MH
NUC1 13C
P1 9.88 usec
PLW1 103.00000000 W

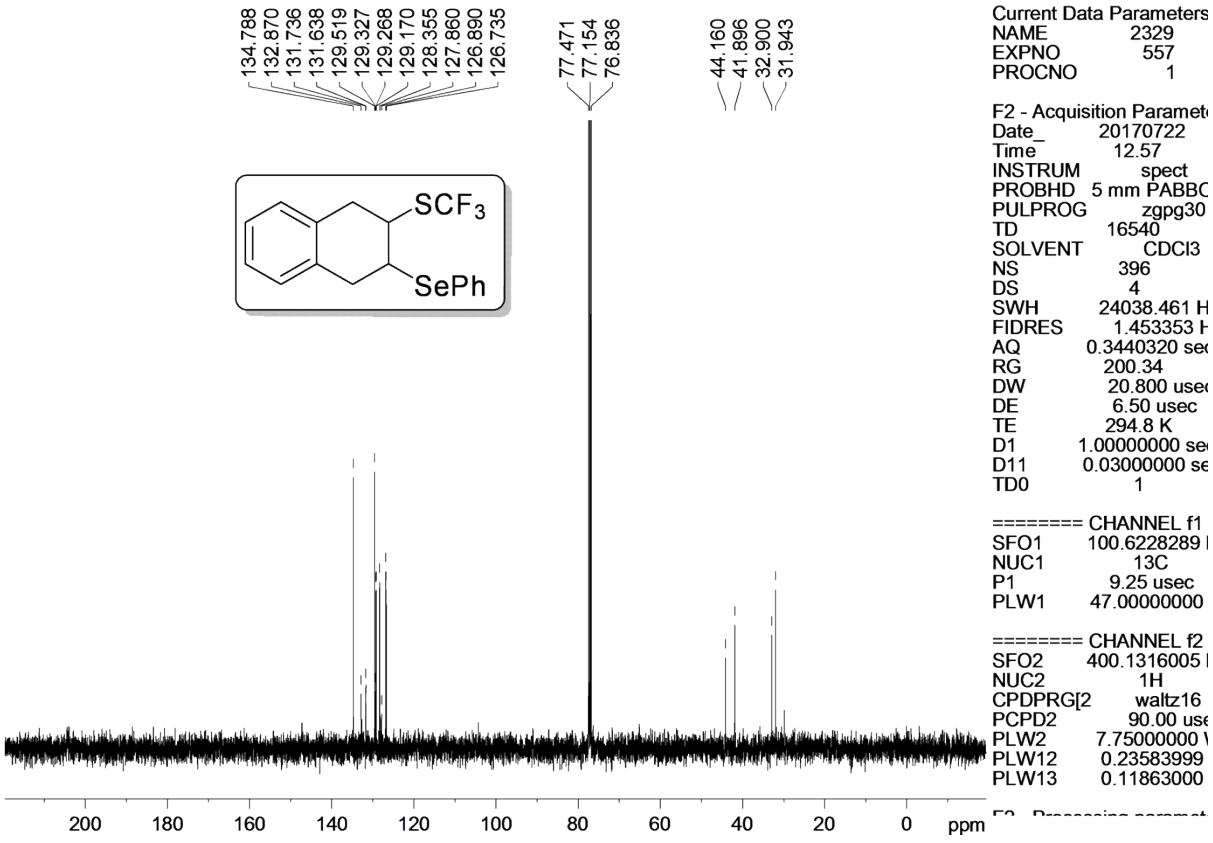
======== CHANNEL f2 ==
SFO2 500.1520006 MH
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.38863000 W
PLW13 0.19548000 W

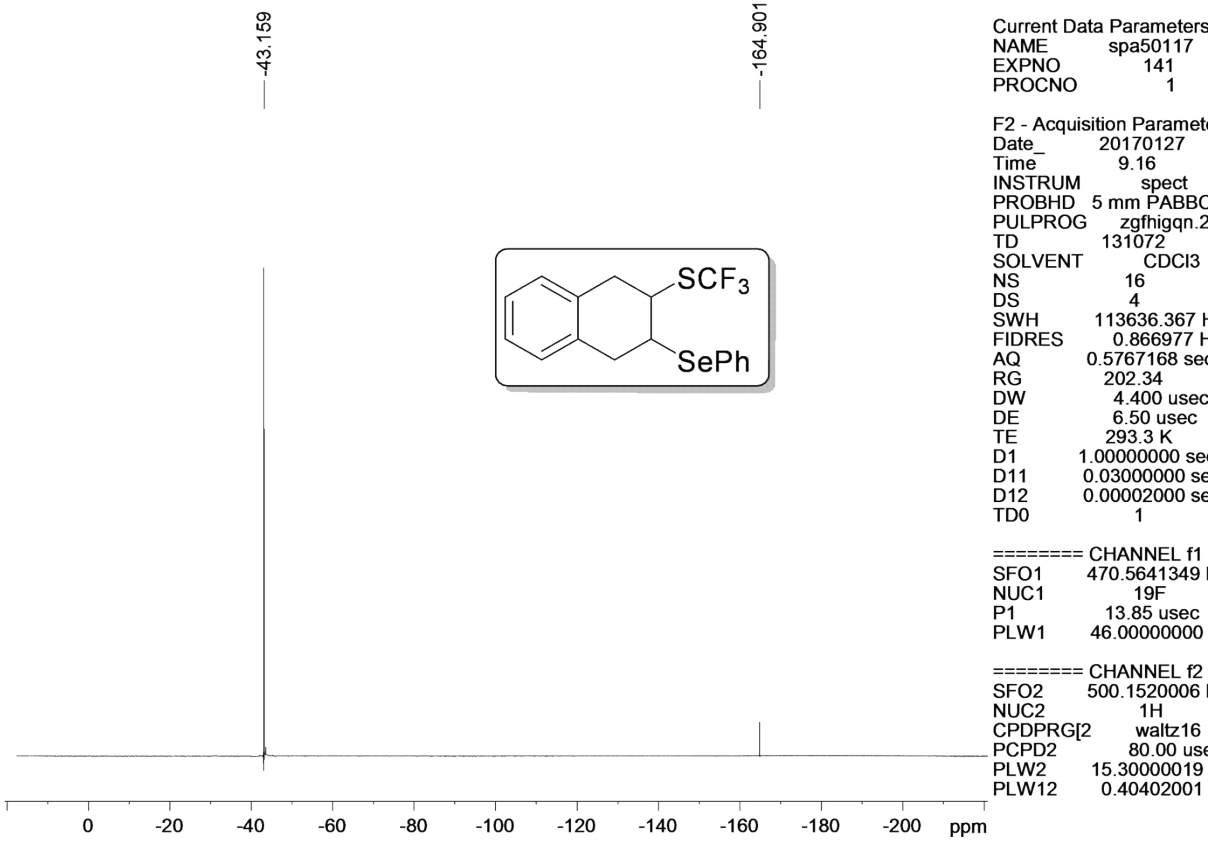
F2 - Processing parameters
SI 32768



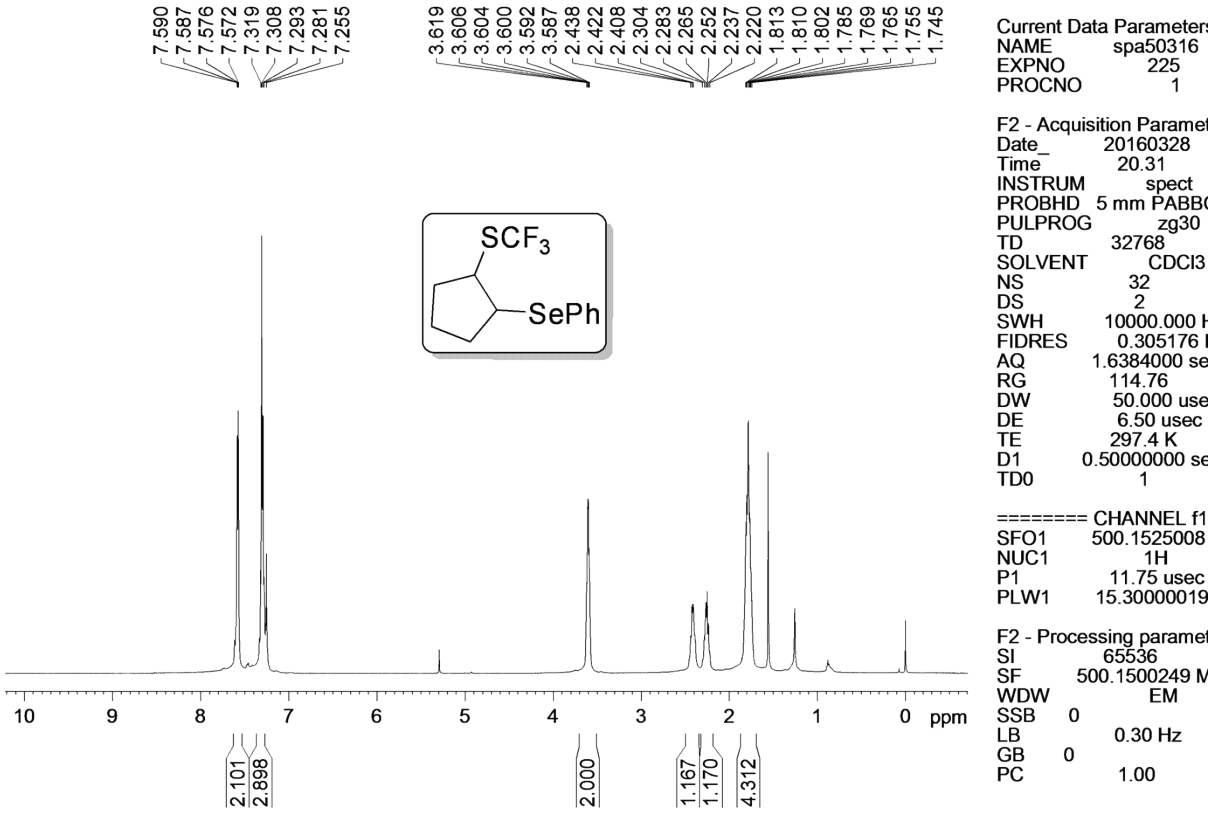
(3-(phenylselanyl)-1,2,3,4-tetrahydronaphthalen-2-yl)(trifluoromethyl)sulfane (6a):







(2-(phenylselanyl)cyclopentyl)(trifluoromethyl)sulfane (6b):

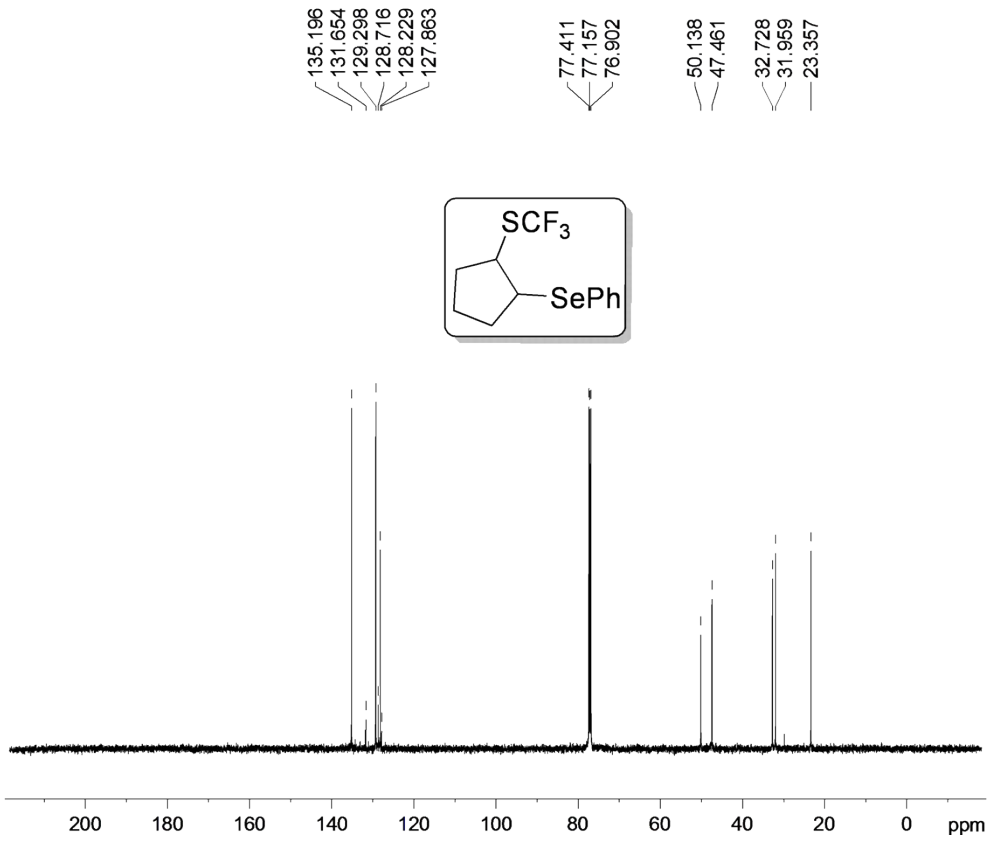


Current Data Parameters
NAME spa50316
EXPNO 225
PROCNO 1

F2 - Acquisition Paramet
Date_ 20160328
Time 20.31
INSTRUM spect
PROBHD 5 mm PABB(
PULPROG zg30
TD 32768
SOLVENT CDCl3
NS 32
DS 2
SWH 10000.000 H
FIDRES 0.305176 I
AQ 1.6384000 se
RG 114.76
DW 50.000 use
DE 6.50 usec
TE 297.4 K
D1 0.50000000 se
TD0 1

======== CHANNEL f1
SFO1 500.1525008
NUC1 1H
P1 11.75 usec
PLW1 15.30000019

F2 - Processing paramet
SI 65536
SF 500.1500249 M
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

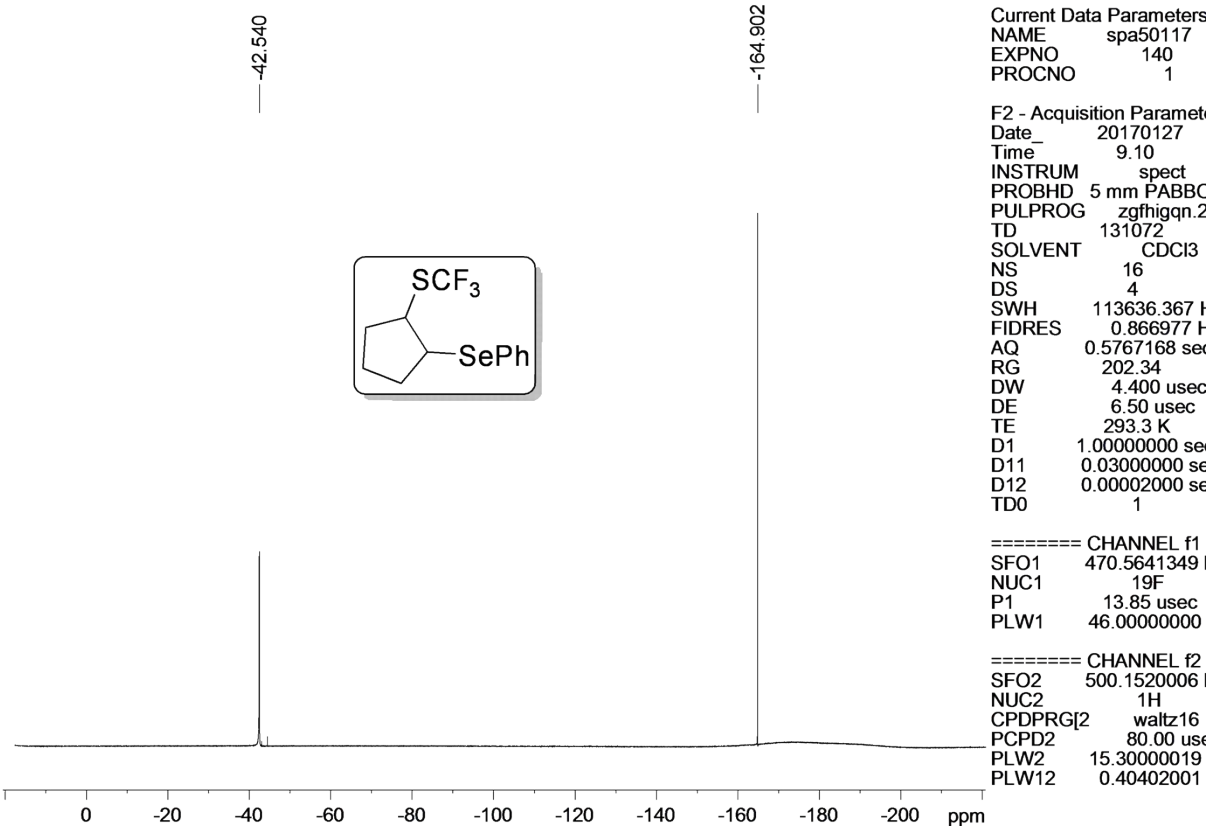


Current Data Parameters
NAME spa50316
EXPNO 226
PROCNO 1

F2 - Acquisition Paramet
Date_ 20160328
Time 20.56
INSTRUM spect
PROBHD 5 mm PABBC
PULPROG zgpg30
TD 20480
SOLVENT CDCl3
NS 1000
DS 4
SWH 29761.904 H
FIDRES 1.453218 H
AQ 0.3440640 sec
RG 202.34
DW 16.800 usec
DE 6.50 usec
TE 298.0 K
D1 1.00000000 se
D11 0.03000000 se
TD0 1

======== CHANNEL f1
SFO1 125.7753932 I
NUC1 13C
P1 9.63 usec
PLW1 103.00000000

======== CHANNEL f2
SFO2 500.1520006 I
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 use
PLW2 15.30000019
PLW12 0.33006001
PLW13 0.21123999



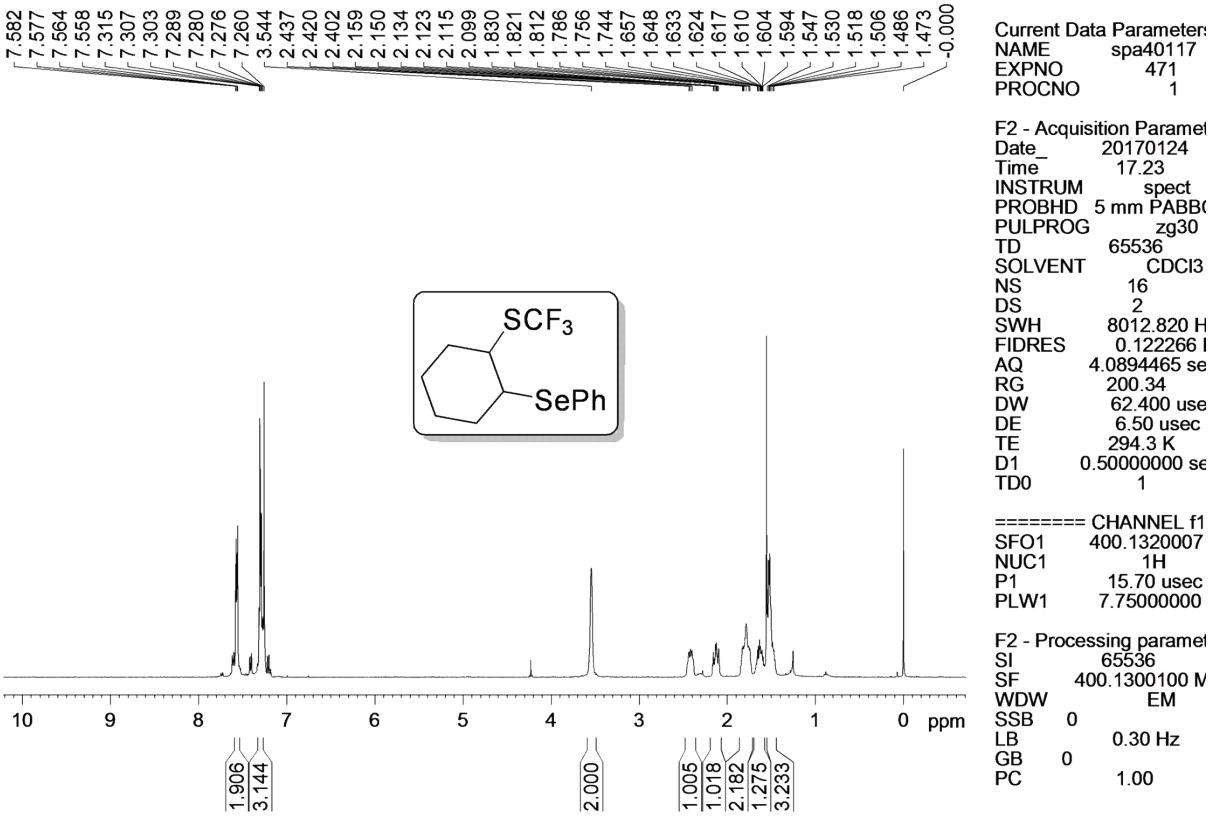
Current Data Parameters
NAME spa50117
EXPNO 140
PROCNO 1

F2 - Acquisition Paramet
Date_ 20170127
Time 9.10
INSTRUM spect
PROBHD 5 mm PABBC
PULPROG zgfhigqn.2
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 113636.367 H
FIDRES 0.866977 H
AQ 0.5767168 sec
RG 202.34
DW 4.400 usec
DE 6.50 usec
TE 293.3 K
D1 1.00000000 se
D11 0.03000000 se
D12 0.00002000 se
TD0 1

======== CHANNEL f1
SFO1 470.5641349 I
NUC1 19F
P1 13.85 usec
PLW1 46.00000000

======== CHANNEL f2
SFO2 500.1520006 I
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 use
PLW2 15.30000019
PLW12 0.40402001

(2-(phenylselanyl)cyclohexyl)(trifluoromethyl)sulfane (6c):

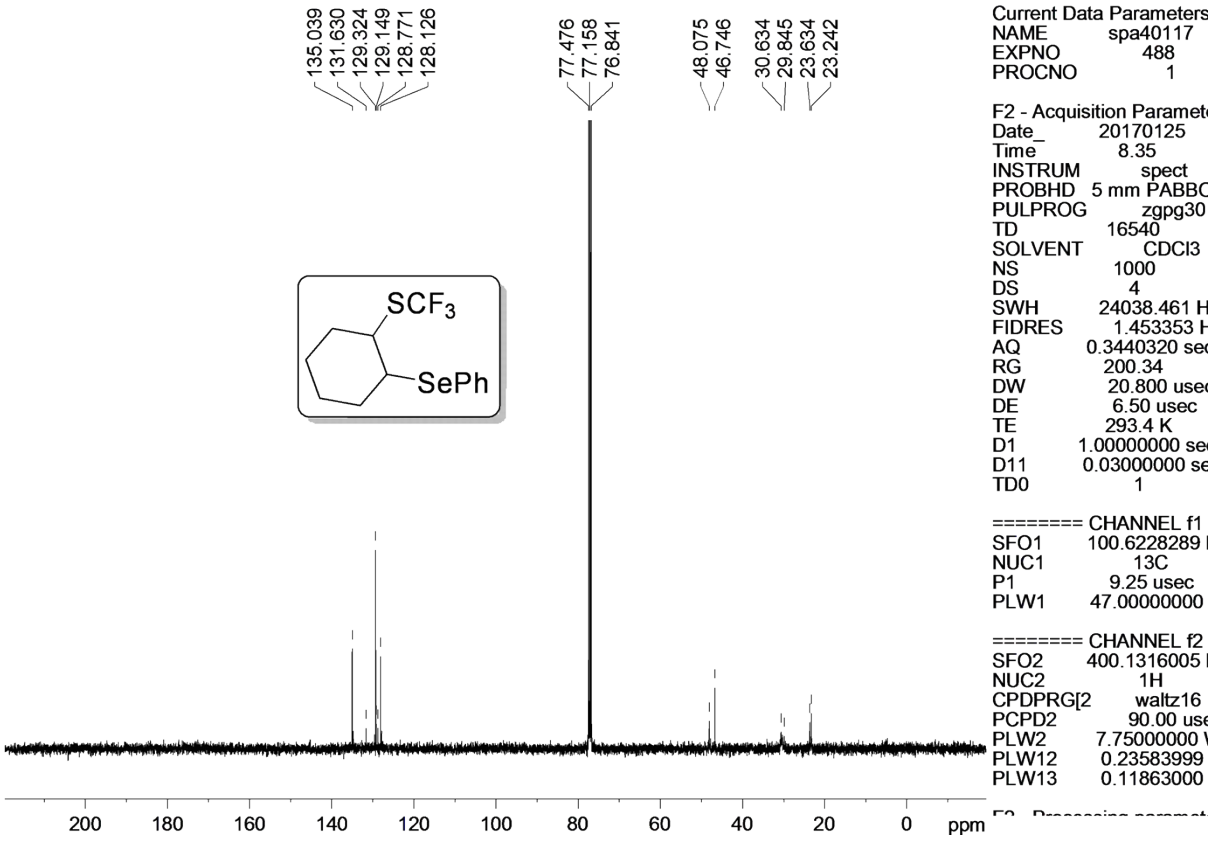


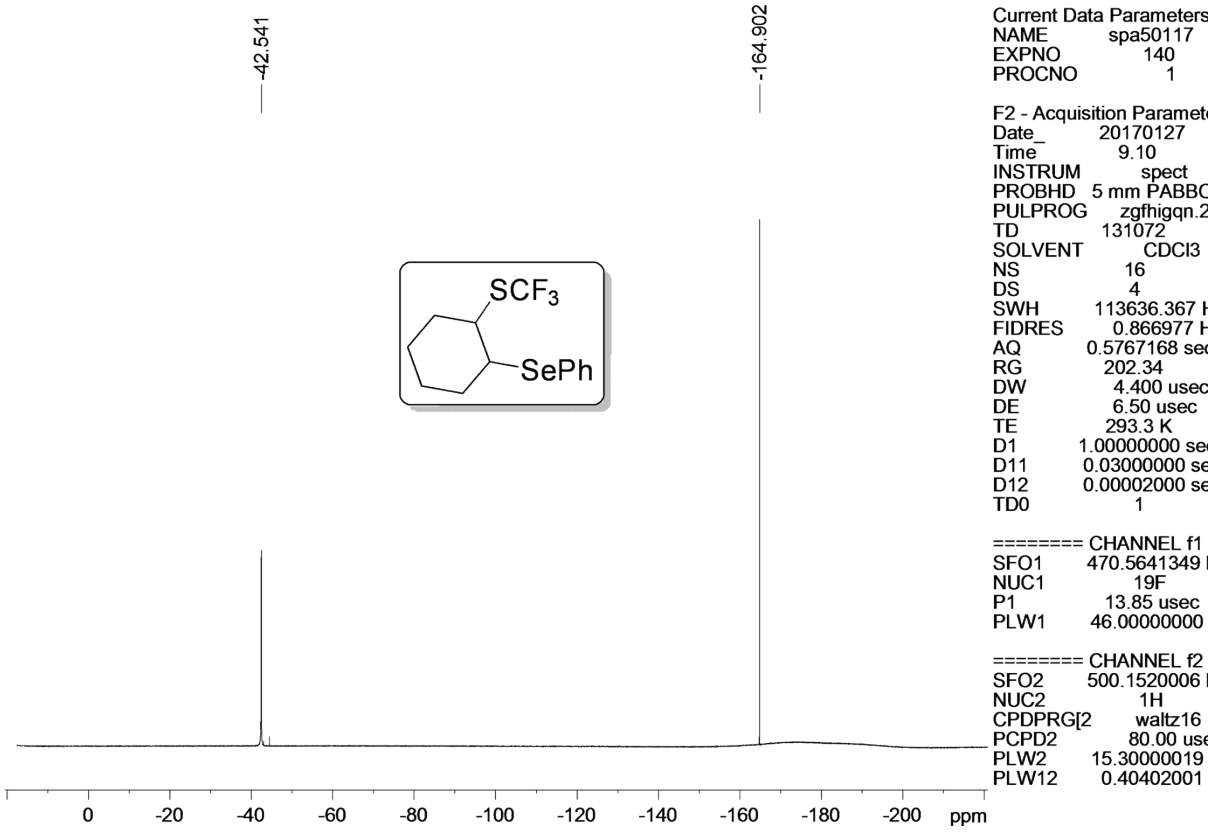
Current Data Parameters
NAME spa40117
EXPNO 471
PROCNO 1

F2 - Acquisition Paramet
Date_ 20170124
Time 17.23
INSTRUM spect
PROBHD 5 mm PABBC
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8012.820 H
FIDRES 0.122266 I
AQ 4.0894465 se
RG 200.34
DW 62.400 use
DE 6.50 usec
TE 294.3 K
D1 0.50000000 se
TD0 1

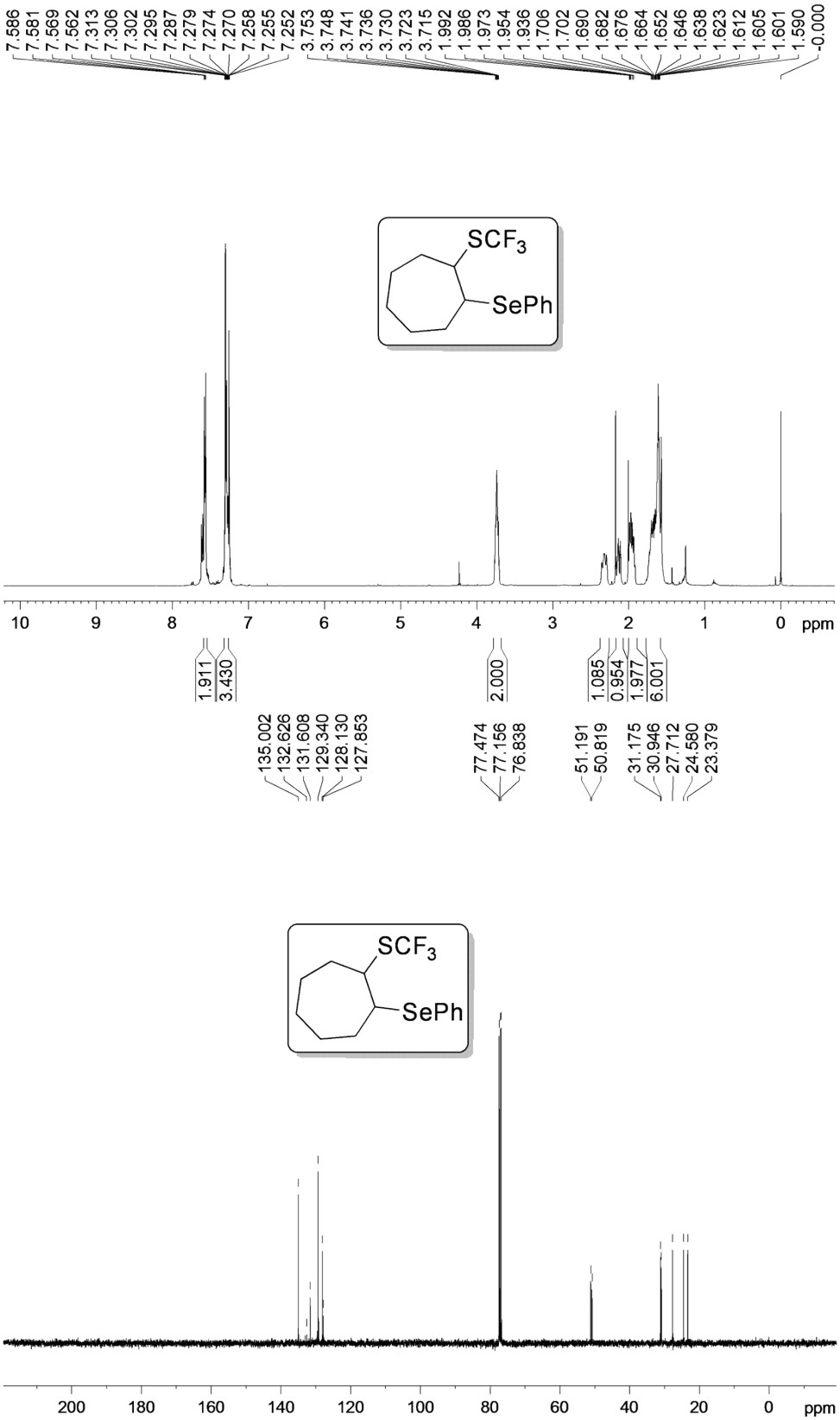
======== CHANNEL f1
SFO1 400.1320007
NUC1 1H
P1 15.70 usec
PLW1 7.75000000

F2 - Processing paramet
SI 65536
SF 400.1300100 M
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00





(2-(phenylselanyl)cycloheptyl)(trifluoromethyl)sulfane (6d):



Current Data Parameters
NAME spa40117
EXPNO 495
PROCNO 1

F2 - Acquisition Paramet
Date_ 20170126
Time 8.08
INSTRUM spect
PROBHD 5 mm PABB
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 100
DS 2
SWH 8012.820 H
FIDRES 0.122266 H
AQ 4.0894465 se
RG 153.13
DW 62.400 use
DE 6.50 usec
TE 291.1 K
D1 0.50000000 se
TD0 1

======== CHANNEL f1
SFO1 400.1320007
NUC1 1H
P1 15.70 usec
PLW1 7.75000000

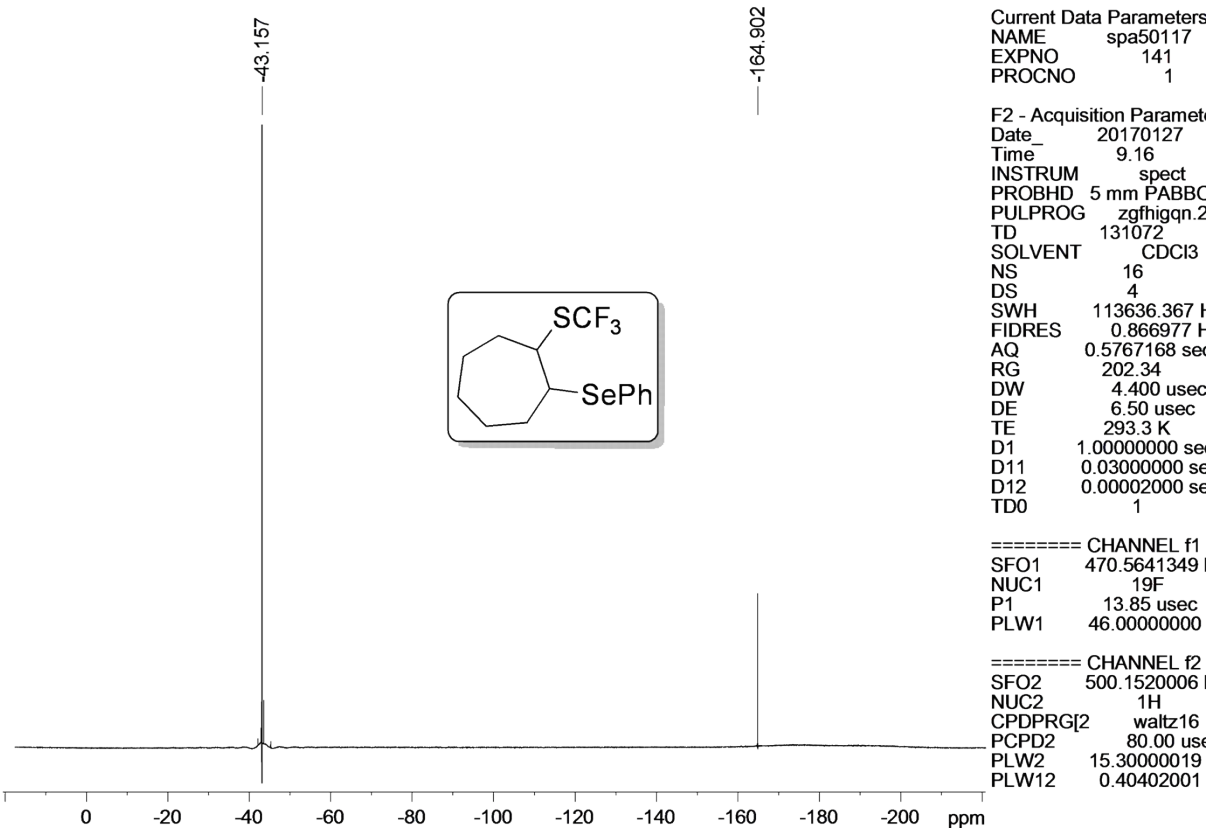
F2 - Processing paramet
SI 65536
SF 400.1300106 M
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00

Current Data Parameters
NAME spa40117
EXPNO 512
PROCNO 1

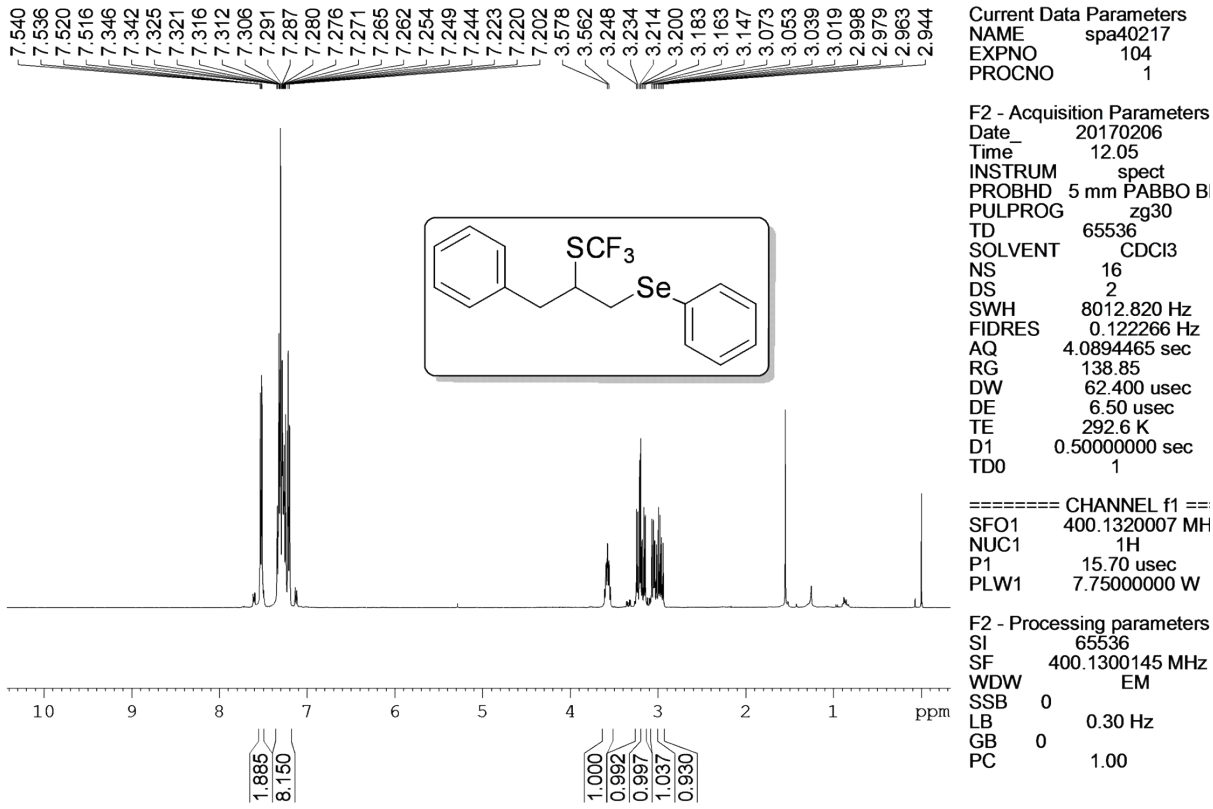
F2 - Acquisition Paramet
Date_ 20170126
Time 8.20
INSTRUM spect
PROBHD 5 mm PABB
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 608
DS 4
SWH 24038.461 H
FIDRES 1.453353 H
AQ 0.3440320 sec
RG 200.34
DW 20.800 use
DE 6.50 usec
TE 291.7 K
D1 1.00000000 se
D11 0.03000000 se
TD0 1

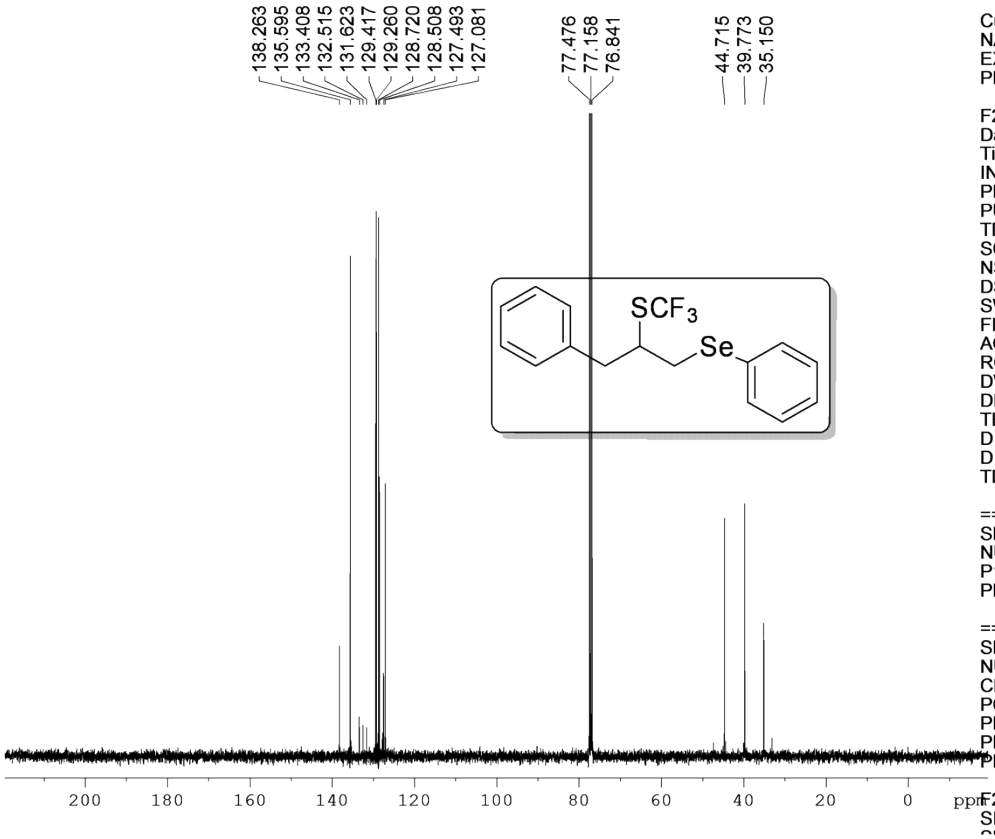
======== CHANNEL f1
SFO1 100.6228289
NUC1 13C
P1 9.25 usec
PLW1 47.00000000

======== CHANNEL f2
SFO2 400.1316005
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 use
PLW2 7.75000000
PLW12 0.23583999
PLW13 0.11863000



(3-phenyl-2-(phenylselanyl)propyl)(trifluoromethyl)sulfane (6e):





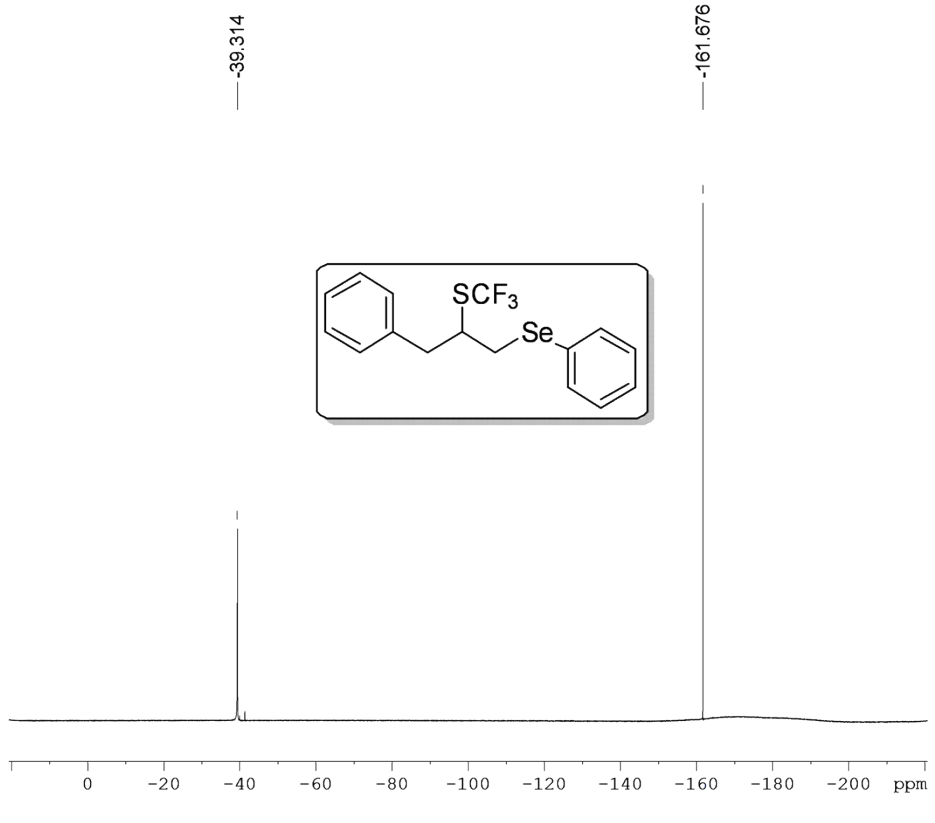
Current Data Parameters
NAME spa40217
EXPNO 105
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170206
Time 12.29
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 1000
DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 293.1 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 100.6228289 MH
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

======== CHANNEL f2 ==
SFO2 400.1316005 MH
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

F2 - Processing parameters
SI 32768



Current Data Parameters
NAME spa50117
EXPNO 140
PROCNO 1

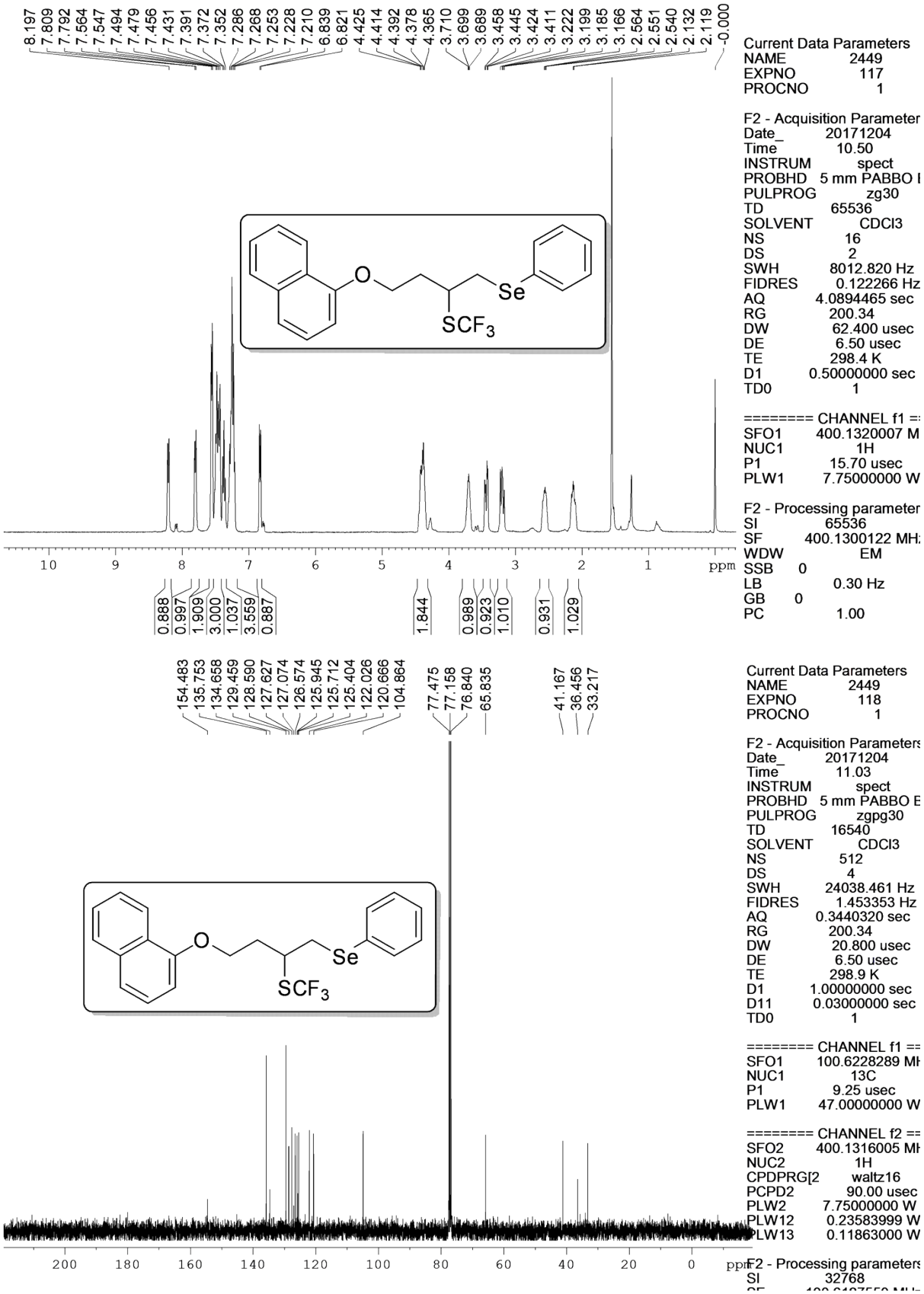
F2 - Acquisition Parameters
Date_ 20170127
Time 9.10
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgfhigqn.2
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 113636.367 Hz
FIDRES 0.866977 Hz
AQ 0.5767168 sec
RG 202.34
DW 4.400 usec
DE 6.50 usec
TE 293.3 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1

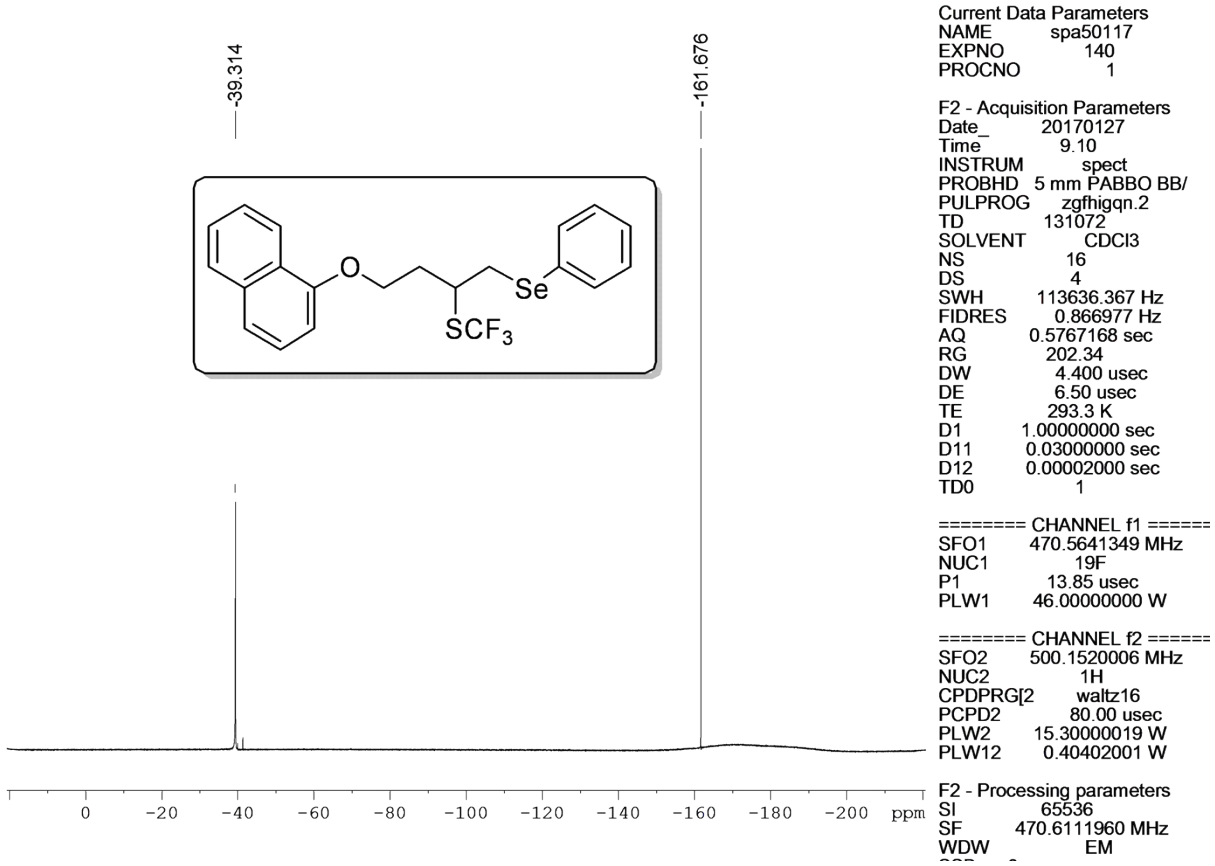
======== CHANNEL f1 ======
SFO1 470.5641349 MHz
NUC1 19F
P1 13.85 usec
PLW1 46.00000000 W

======== CHANNEL f2 ======
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.40402001 W

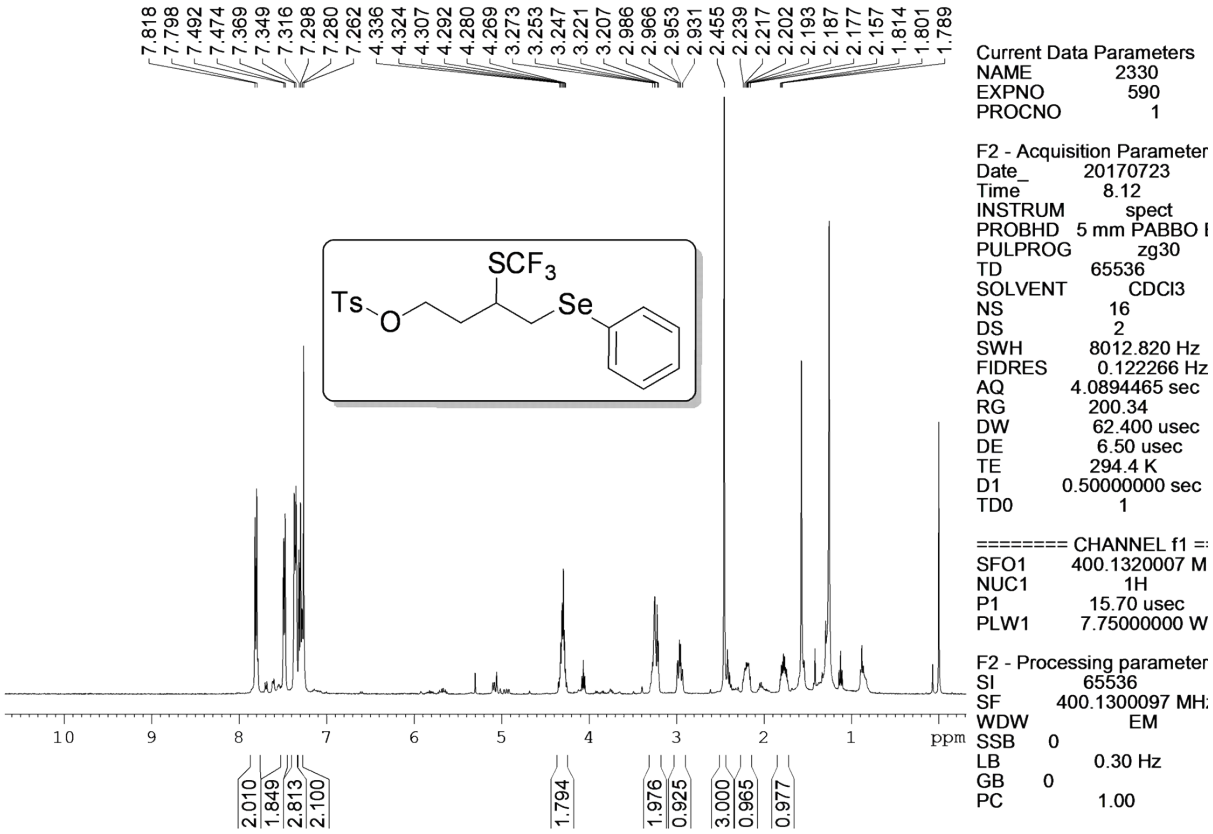
F2 - Processing parameters
SI 65536
SF 470.6111960 MHz
WDW EM

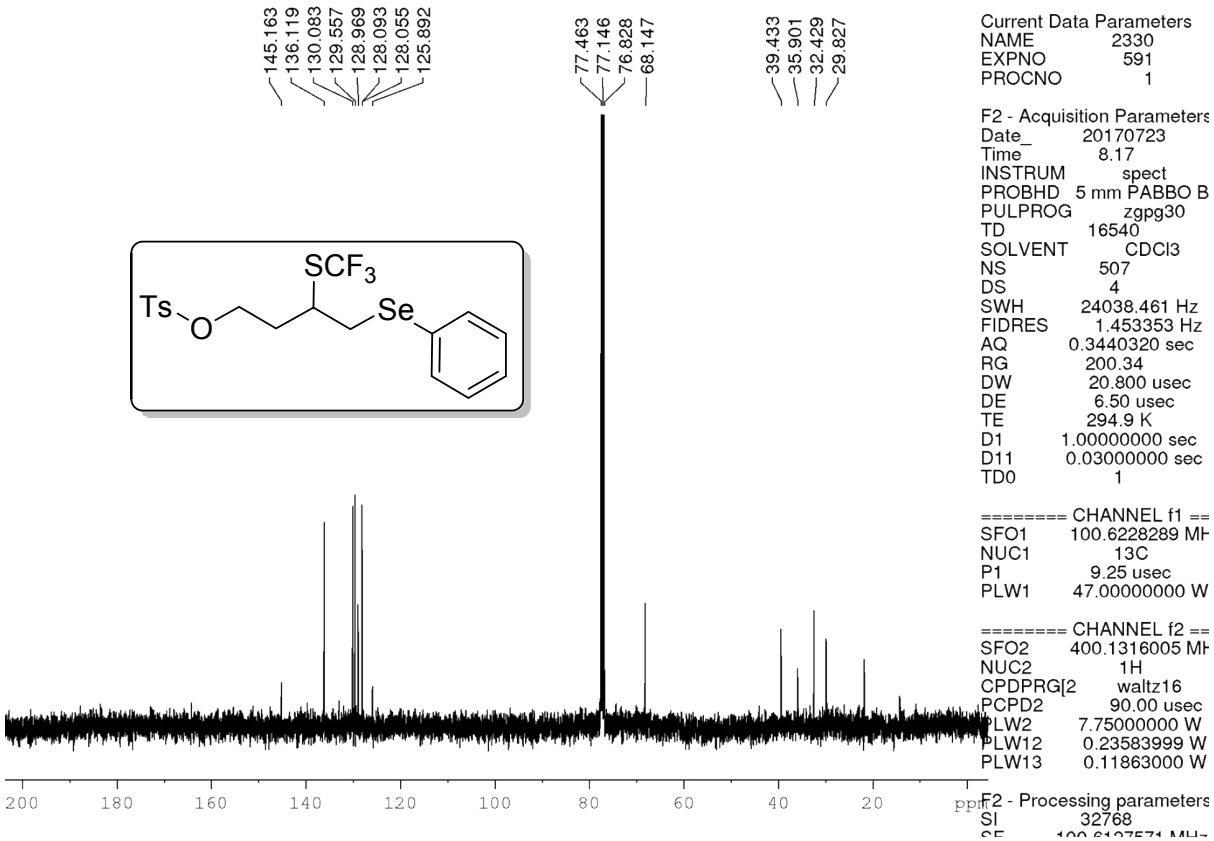
(4-(naphthalen-1-yloxy)-1-(phenylselanyl)butan-2-yl)(trifluoromethyl)sulfane (6f):





3-(phenylselanyl)-4-((trifluoromethyl)thio)butyl 4-methylbenzenesulfonate (6g):





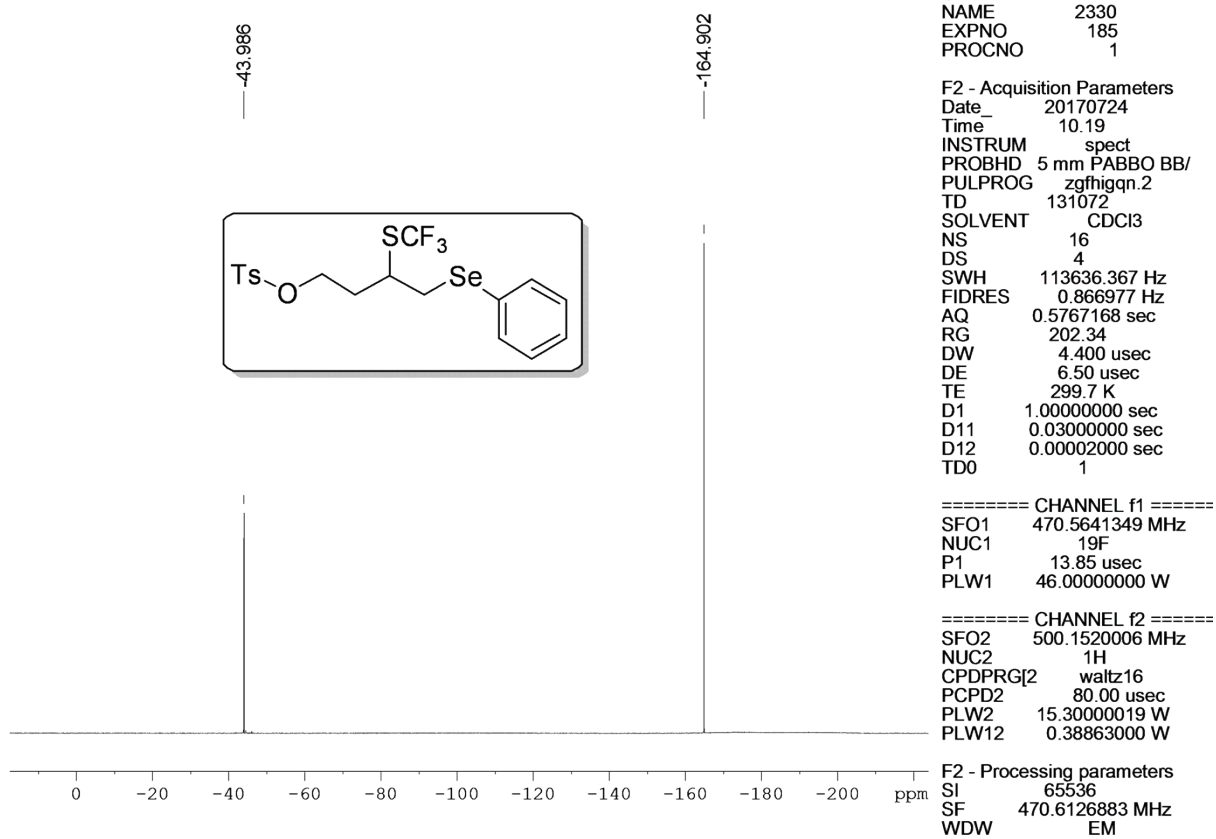
Current Data Parameters
NAME 2330
EXPNO 591
PROCNO 1

F2 - Acquisition Parameters
Date_ 20170723
Time 8.17
INSTRUM spect
PROBHD 5 mm PABBO B
PULPROG zgpg30
TD 16540
SOLVENT CDCl3
NS 507
DS 4
SWH 24038.461 Hz
FIDRES 1.453353 Hz
AQ 0.3440320 sec
RG 200.34
DW 20.800 usec
DE 6.50 usec
TE 294.9 K
D1 1.00000000 sec
D11 0.03000000 sec
TD0 1

======== CHANNEL f1 ==
SFO1 100.6228289 MH
NUC1 13C
P1 9.25 usec
PLW1 47.00000000 W

======== CHANNEL f2 ==
SFO2 400.1316005 MH
NUC2 1H
CPDPRG[2 waltz16
PCPD2 90.00 usec
PLW2 7.75000000 W
PLW12 0.23583999 W
PLW13 0.11863000 W

F2 - Processing parameters
SI 32768



Current Data Parameters
NAME 2330
EXPNO 185
PROCNO 1

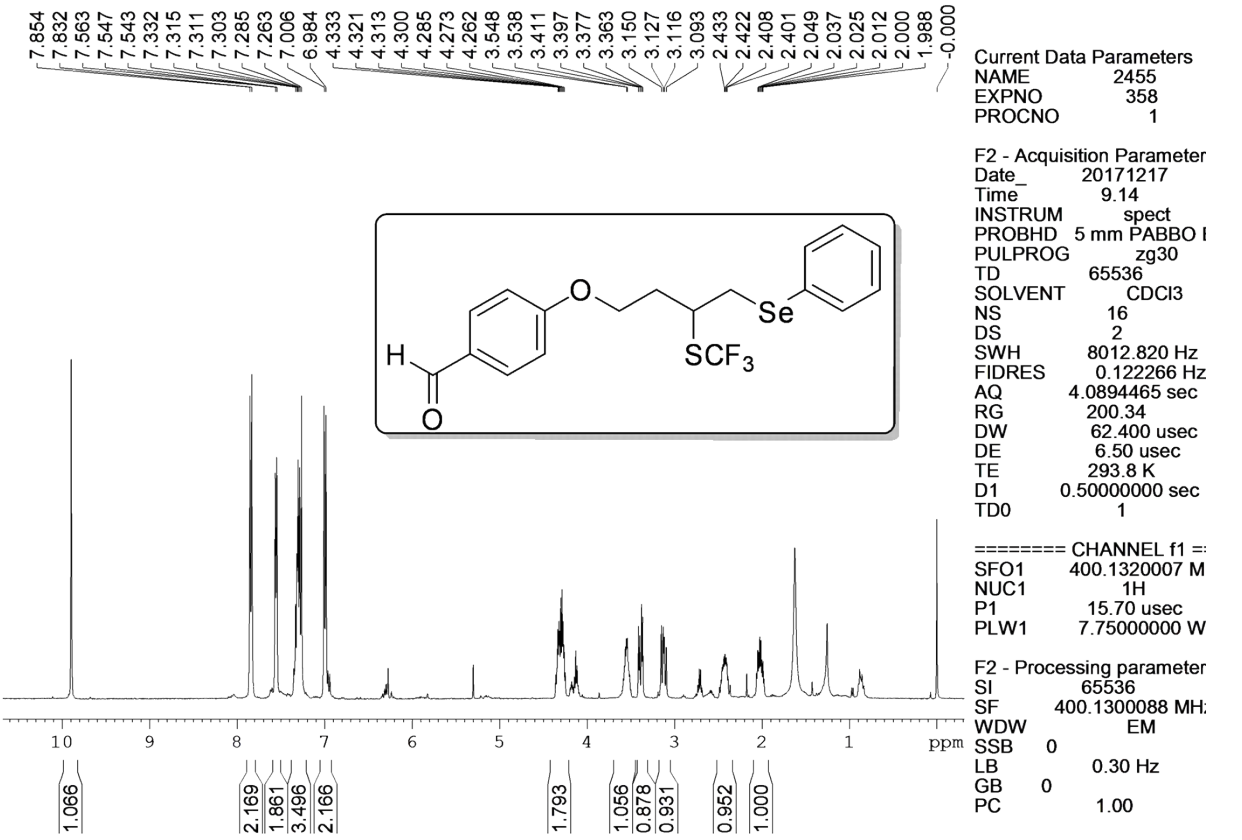
F2 - Acquisition Parameters
Date_ 20170724
Time 10.19
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zgfhigqn.2
TD 131072
SOLVENT CDCl3
NS 16
DS 4
SWH 113636.367 Hz
FIDRES 0.866977 Hz
AQ 0.5767168 sec
RG 202.34
DW 4.400 usec
DE 6.50 usec
TE 299.7 K
D1 1.00000000 sec
D11 0.03000000 sec
D12 0.00002000 sec
TD0 1

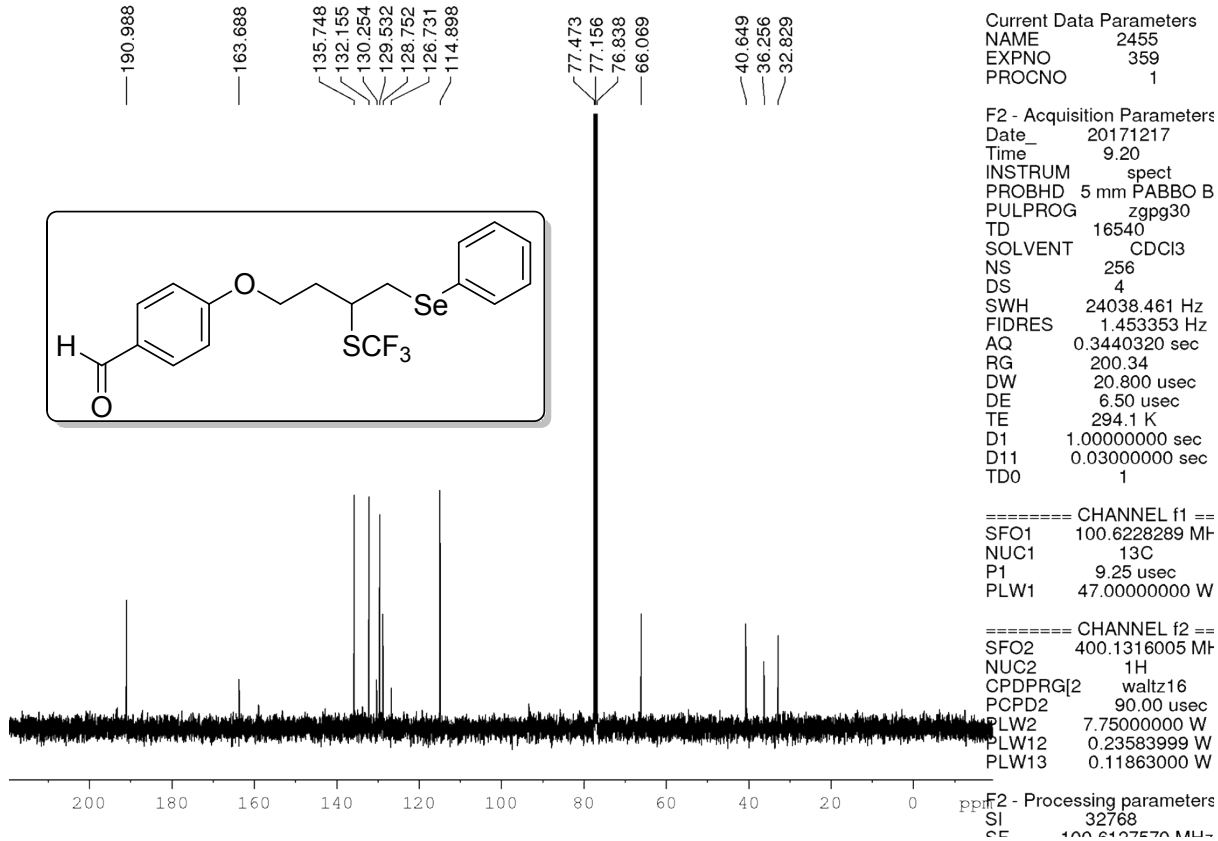
======== CHANNEL f1 ======
SFO1 470.5641349 MHz
NUC1 19F
P1 13.85 usec
PLW1 46.00000000 W

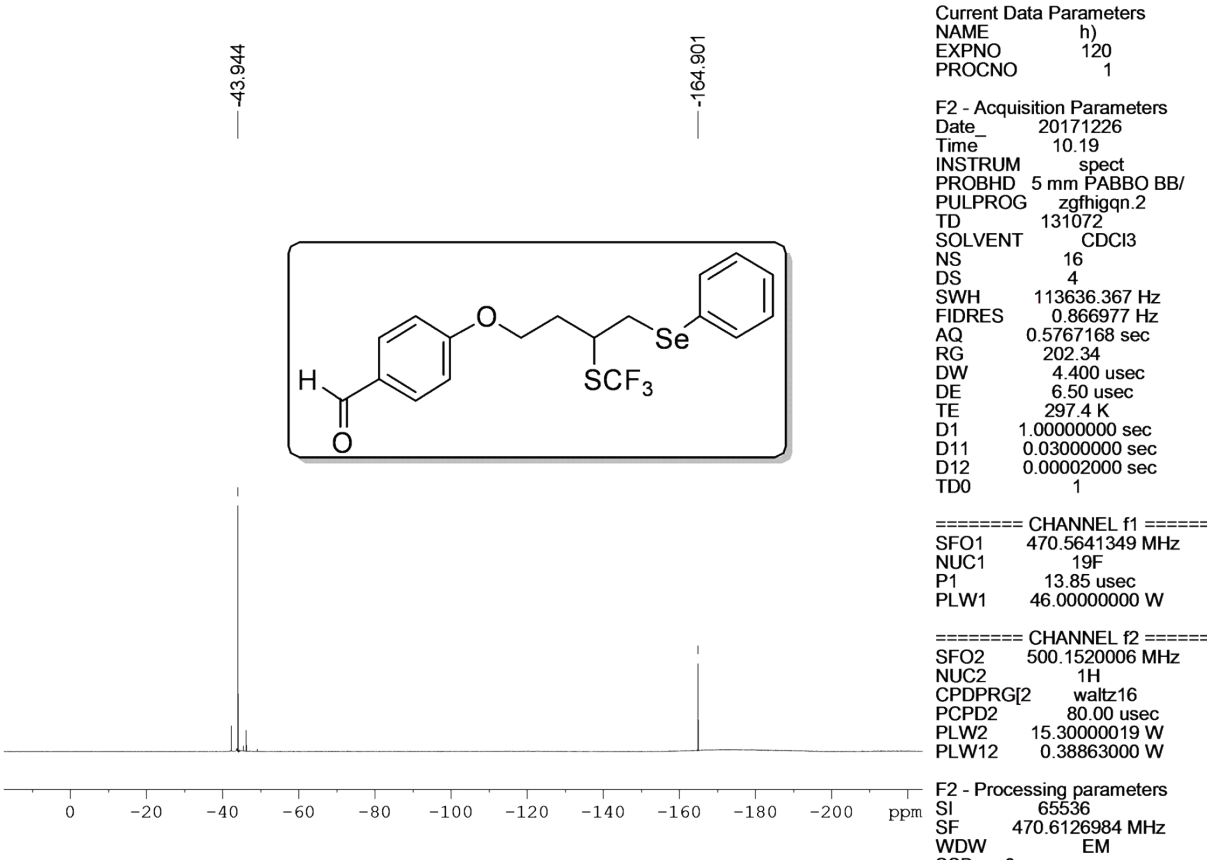
======== CHANNEL f2 ======
SFO2 500.1520006 MHz
NUC2 1H
CPDPRG[2 waltz16
PCPD2 80.00 usec
PLW2 15.30000019 W
PLW12 0.38863000 W

F2 - Processing parameters
SI 65536
SF 470.6126883 MHz
WDW EM

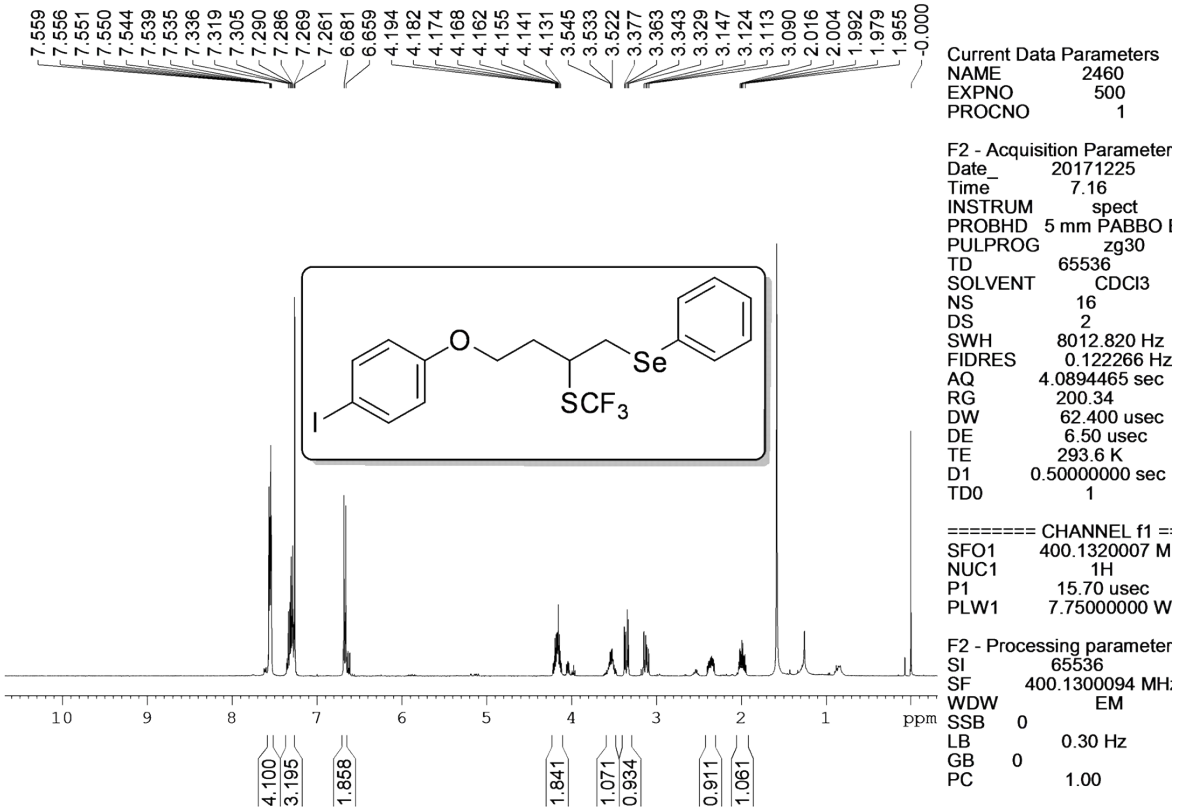
4-(4-(phenylselanyl)-3-((trifluoromethyl)thio)butoxy)benzaldehyde (6h):

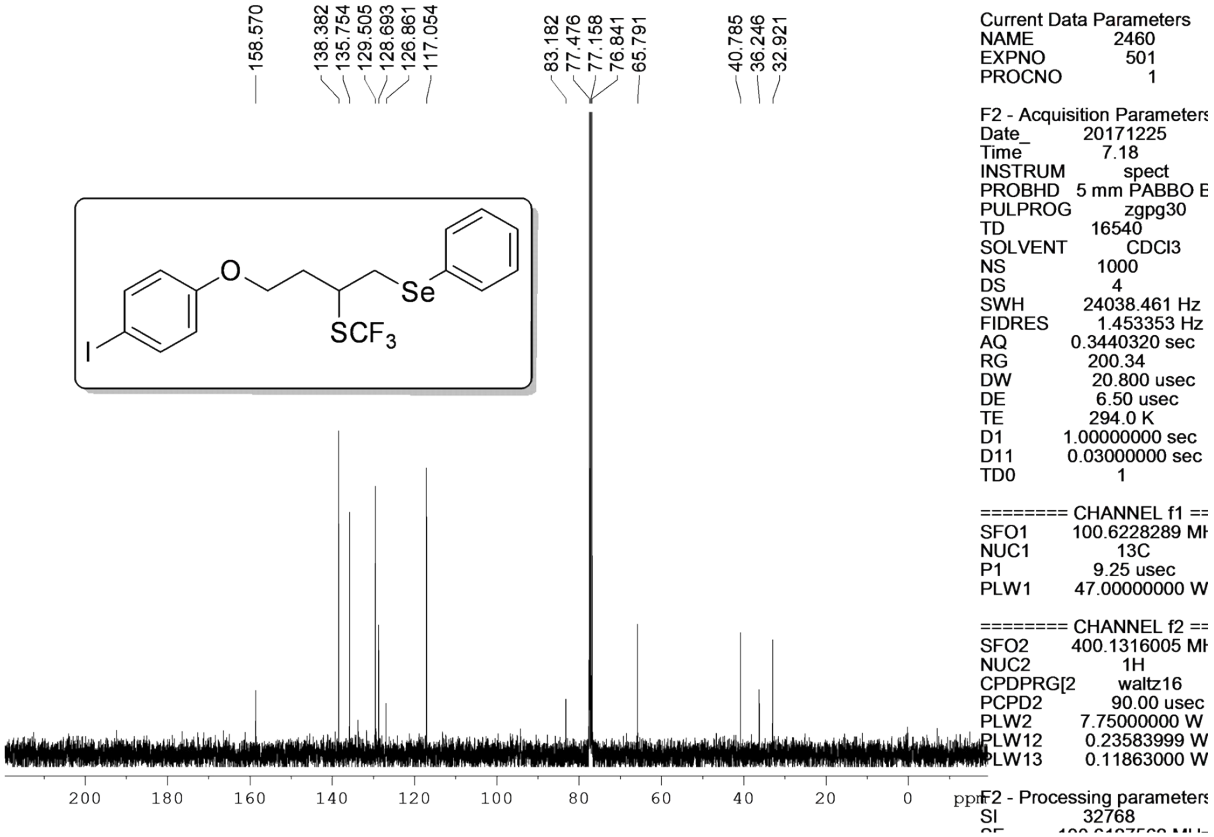


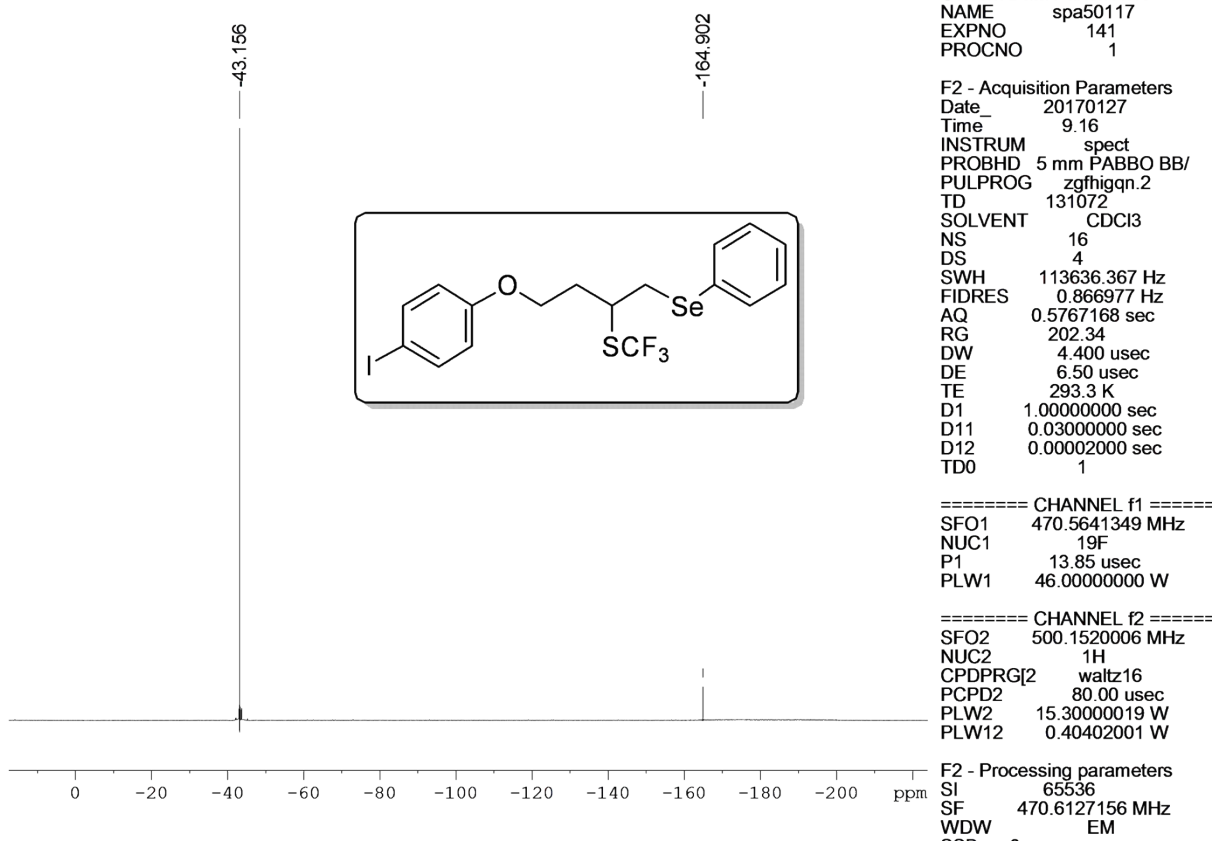




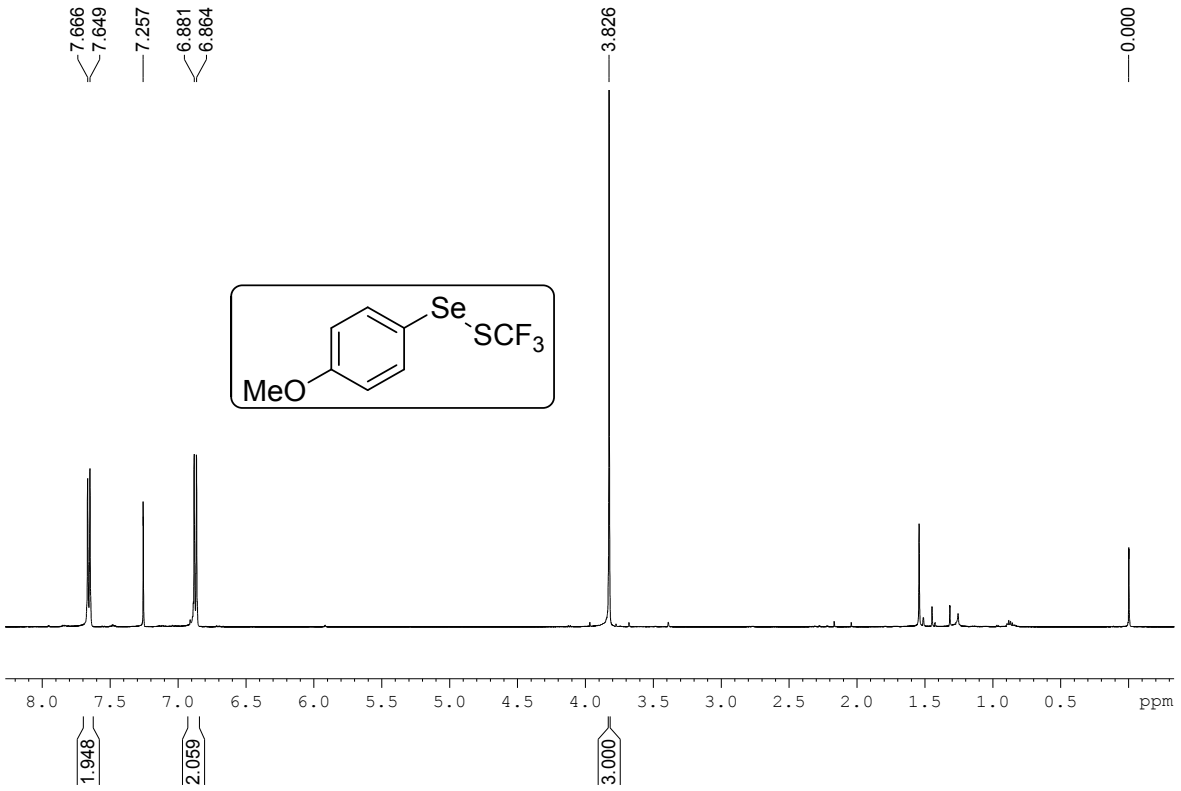
(4-(4-iodophenoxy)-1-(phenylselanyl)butan-2-yl)(trifluoromethyl)sulfane (6i):

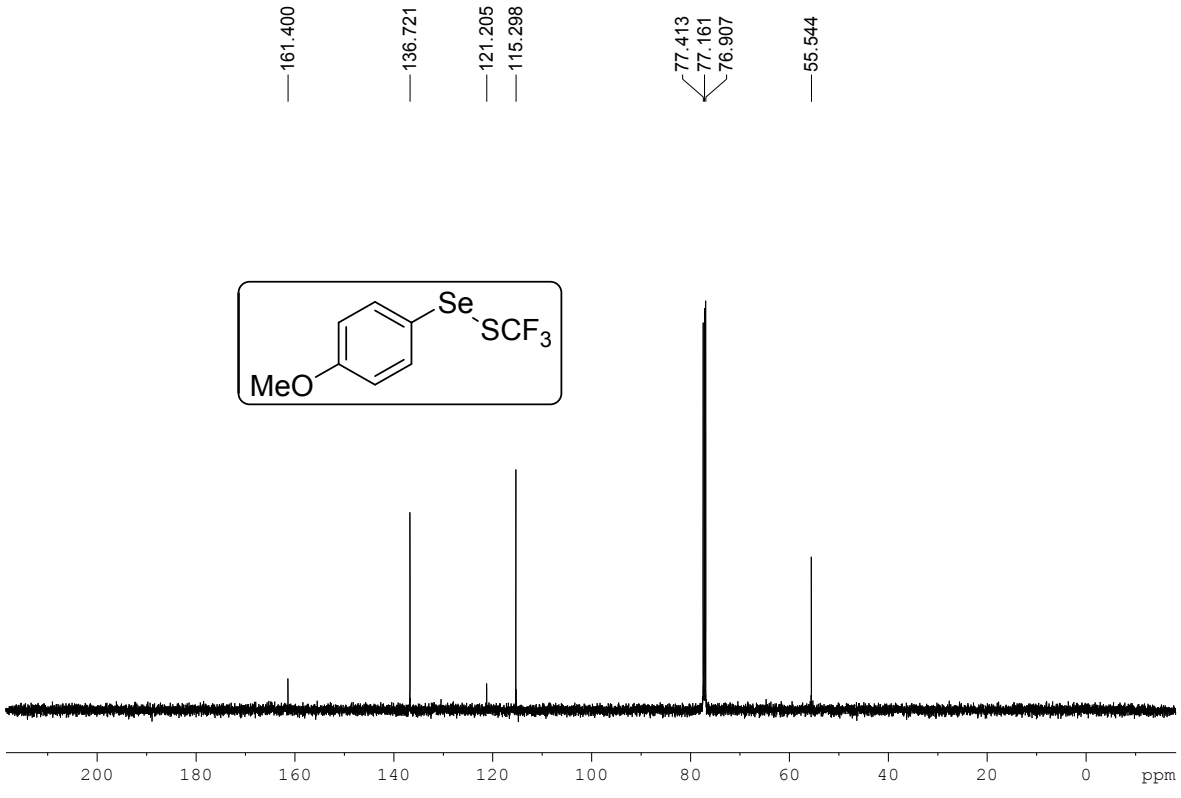


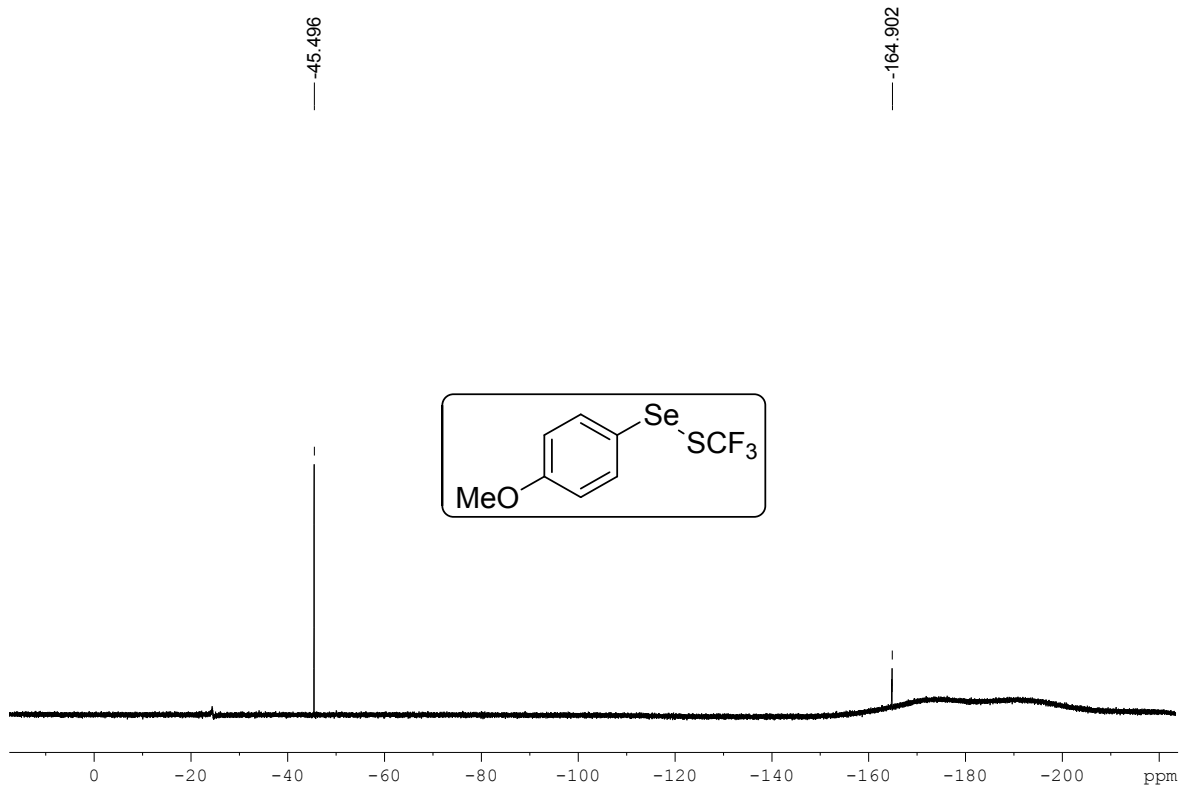


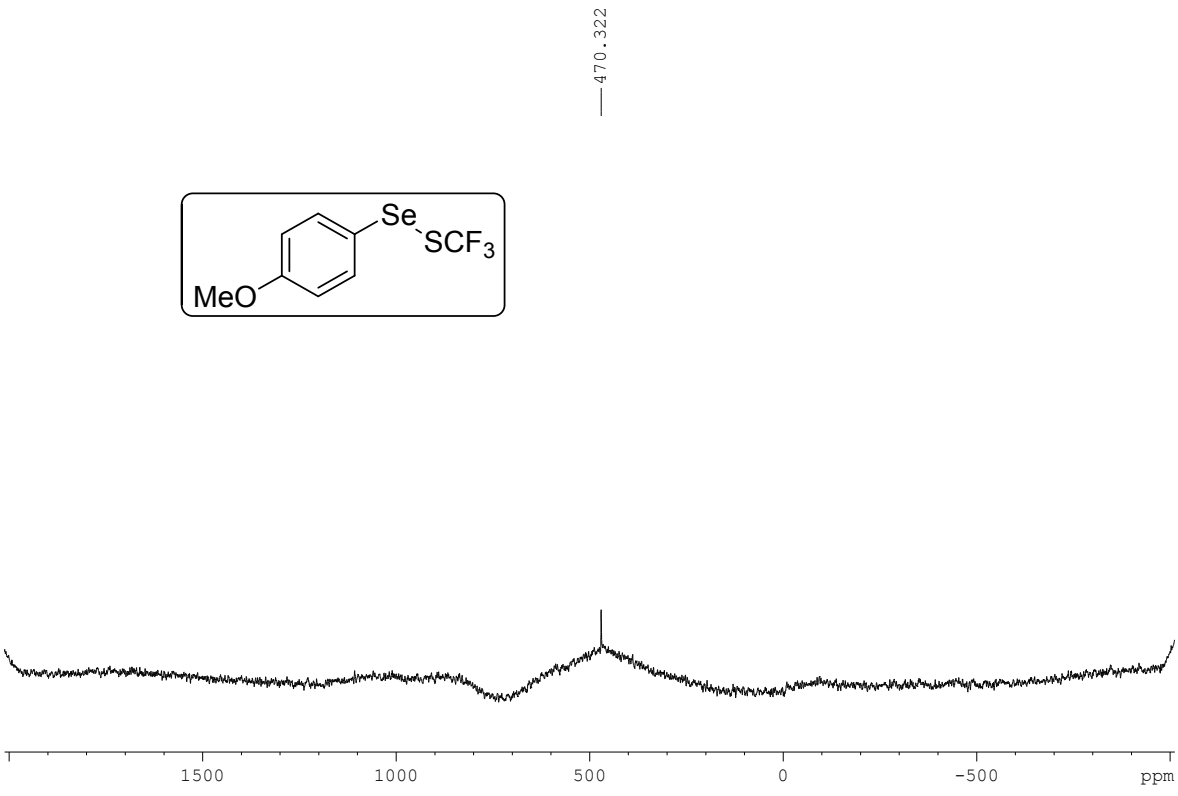


((4-methoxyphenyl)selanyl)(trifluoromethyl)sulfane (7):


7.666
7.649
7.257
6.881
6.864
3.826
0.000
Se
SCF3
MeO
8.0
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
ppm
1.948
2.059
3.000


161.400
136.721
121.205
115.298
77.413
77.161
76.907
55.544
Se
SCF3
MeO
200
180
160
140
120
100
80
60
40
20
0
ppm


-45.496
-164.902
Se
SCF3
MeO
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
ppm


470.322
Se
SCF3
MeO
1500
1000
500
0
-500
ppm