

Seleno-Analogs of Scaffolds Resembling Natural Products a

Novel Warhead toward Dual Compounds

Nora Astrain-Redin ¹, Irene Talavera ¹, Esther Moreno ¹, María J. Ramírez ^{2,*}, Nuria Martínez-Sáez ¹, Ignacio Encío ³, Arun K. Sharma ⁴, Carmen Sanmartín ¹, Daniel Plano ^{1,*}

¹ Departamento de Tecnología y Química Farmacéuticas, Facultad de Farmacia y Nutrición, Universidad de Navarra, Irunlarrea 1, E-31008 Pamplona, Spain

² Departamento de Farmacología y Toxicología, Facultad de Farmacia y Nutrición, Universidad de Navarra, Irunlarrea 1, E-31008 Pamplona, Spain

³ Departamento de Ciencias de la Salud, Universidad Pública de Navarra, Avda. Barañain s/n, E-31008 Pamplona, Spain

⁴ Department of Pharmacology, Penn State Cancer Institute, CH72, Penn State College of Medicine, 500 University Drive, Hershey, PA 17033, USA

* Correspondence: mariaja@unav.es (M.J.R.); dplano@unav.es (D.P.)

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Table S1. Cell growth % at 10 μ M for the compounds **1a-19a** and **1b-19b** in HTB-54, DU-145, HT-29, and MDA-MB-231.

Comp. Series a	Cancer cell lines				Comp. Series b	Cancer cell lines			
	HTB-54	MDA-MB-231	DU-145	HT-29		HTB-54	MDA-MB-231	DU-145	HT-29
1a	72.1 \pm 8.1	92.6 \pm 12.7	> 100	91.0 \pm 3.6	1b	86.0 \pm 11.6	71.3 \pm 8.0	62.7 \pm 7.7	87.9 \pm 12.1
2a	43.2 \pm 9.0	37.9 \pm 3.6	65.6 \pm 5.6	85.3 \pm 19.4	2b	78.3 \pm 11.4	79.3 \pm 18.7	72.9 \pm 13.6	78.3 \pm 6.9
3a	37.5 \pm 7.3	29.7 \pm 6.4	39.8 \pm 6.3	63.2 \pm 16.9	3b	> 100	93.2 \pm 10.2	41.6 \pm 3.5	81.8 \pm 15.2
4a	67.6 \pm 15.1	97.3 \pm 10.4	> 100	33.6 \pm 12.6	4b	57.8 \pm 8.1	62.6 \pm 7.4	19.7 \pm 2.2	50.6 \pm 7.8
5a	46.1 \pm 5.6	91.1 \pm 16.8	83.3 \pm 7.8	87.6 \pm 7.9	5b	79.8 \pm 7.7	64.8 \pm 14.7	70.5 \pm 11.5	80.8 \pm 8.5
6a	36.3 \pm 7.0	35.9 \pm 2.6	26.9 \pm 4.4	63.7 \pm 12.3	6b	83.4 \pm 7.7	78.9 \pm 8.4	76.6 \pm 12.0	77.3 \pm 11.6
7a	22.0 \pm 5.1	35.3 \pm 6.4	51.7 \pm 9.8	64.3 \pm 14.1	7b	91.4 \pm 6.6	91.3 \pm 8.3	54.6 \pm 4.5	> 100
8a	25.8 \pm 5.2	37.1 \pm 4.7	49.5 \pm 6.6	62.2 \pm 16.1	8b	99.4 \pm 16.2	92.9 \pm 16.5	77.1 \pm 13.9	87.7 \pm 10.1
9a	64.8 \pm 8.5	89.4 \pm 4.9	48.6 \pm 6.2	99.5 \pm 8.3	9b	58.9 \pm 7.8	70.2 \pm 6.9	22.3 \pm 2.7	76.0 \pm 13.5
10a	27.1 \pm 11.2	41.3 \pm 3.5	33.4 \pm 6.4	61.5 \pm 17.6	10b	81.2 \pm 11.6	62.5 \pm 7.7	66.6 \pm 8.7	80.2 \pm 10.9
11a	30.7 \pm 6.2	34.1 \pm 10.6	35.3 \pm 5.8	79.8 \pm 16.3	11b	75.4 \pm 15.5	99.0 \pm 11.2	70.0 \pm 4.5	> 100
12a	95.5 \pm 5.9	96.8 \pm 15.8	62.7 \pm 4.7	70.7 \pm 10.7	12b	97.6 \pm 7.1	92.5 \pm 15.1	95.1 \pm 12.3	81.3 \pm 11.1
13a	40.9 \pm 4.9	77.1 \pm 12.6	29.5 \pm 4.3	88.8 \pm 8.6	13b	82.1 \pm 7.6	52.3 \pm 7.9	26.8 \pm 5.5	70.2 \pm 13.2
14a	34.2 \pm 6.2	38.8 \pm 3.6	16.9 \pm 8.6	53.9 \pm 5.3	14b	78.9 \pm 9.0	52.3 \pm 7.1	25.5 \pm 6.2	65.6 \pm 7.3
15a	38.0 \pm 7.1	38.0 \pm 5.4	19.1 \pm 7.0	49.0 \pm 7.2	15b	95.6 \pm 5.7	59.7 \pm 15.7	34.7 \pm 6.3	59.3 \pm 4.0
16a	30.9 \pm 6.7	33.8 \pm 5.6	18.8 \pm 6.3	49.9 \pm 5.6	16b	> 100	29.8 \pm 9.6	66.4 \pm 4.4	65.7 \pm 10.0
17a	21.9 \pm 6.5	26.5 \pm 5.6	16.3 \pm 8.4	38.7 \pm 6.0	17b	85.9 \pm 5.1	59.1 \pm 11.5	19.2 \pm 4.0	66.3 \pm 10.2
18a	40.9 \pm 18.5	85.9 \pm 9.5	74.7 \pm 13.7	71.5 \pm 11.7	18b	62.3 \pm 8.3	99.0 \pm 11.2	32.6 \pm 4.6	66.5 \pm 9.5
19a	16.3 \pm 7.6	81.6 \pm 9.7	17.0 \pm 2.9	46.0 \pm 8.7	19b	43.6 \pm 18.4	92.8 \pm 10.2	25.2 \pm 2.2	61.6 \pm 9.8

The cell growth % is presented as the mean \pm SD of three independent experiments performed in triplicates

Table S2. DPPH radical scavenging activity (%) for the compounds **1a-19a** and **1b-19b** at 0.03 mg/mL in the time range of 0, 5, 15, 30, 60, and 90 minutes.

0.03 mg/mL	DPPH scavenging activity (%)					
Compd.	0 min	5 min	15 min	30 min	60 min	90 min
Asc. Acid	96.2 \pm 0.4	96.0 \pm 0.3	96.0 \pm 0.2	96.1 \pm 0.3	96.0 \pm 0.1	96.0 \pm 0.2
Trolox	95.3 \pm 0.2	95.7 \pm 0.1	95.6 \pm 0.2	95.7 \pm 0.2	95.9 \pm 0.2	95.7 \pm 0.2
1a	1.7 \pm 1.3	1.6 \pm 1.1	3.4 \pm 8.8	6.0 \pm 4.9	9.9 \pm 1.1	9.6 \pm 0.4
2a	3.7 \pm 0.7	3.0 \pm 0.6	9.5 \pm 0.3	9.6 \pm 0.1	8.8 \pm 0.9	9.0 \pm 1.2
3a	3.6 \pm 1.6	3.1 \pm 1.2	7.9 \pm 0.8	8.1 \pm 0.8	8.0 \pm 1.3	7.8 \pm 1.7
4a	0.0 \pm 2.4	0.0 \pm 2.3	0.0 \pm 2.8	0.0 \pm 2.4	0.0 \pm 2.4	0.0 \pm 2.3
5a	2.6 \pm 1.5	2.3 \pm 1.1	3.1 \pm 3.9	2.7 \pm 3.6	3.5 \pm 5.2	3.6 \pm 5.3
6a	2.3 \pm 1.1	1.6 \pm 1.0	2.7 \pm 4.2	2.1 \pm 4.4	2.4 \pm 5.6	2.4 \pm 5.6
7a	3.4 \pm 1.5	2.9 \pm 1.1	5.8 \pm 1.7	5.7 \pm 1.9	6.1 \pm 2.9	6.3 \pm 2.9
8a	1.8 \pm 0.2	2.0 \pm 0.1	3.7 \pm 4.8	3.5 \pm 4.7	3.8 \pm 6.2	3.7 \pm 6.6
9a	3.3 \pm 0.9	2.7 \pm 0.7	7.8 \pm 9.6	7.4 \pm 9.3	7.6 \pm 10.0	7.8 \pm 10.4
10a	3.5 \pm 0.2	2.4 \pm 0.2	6.8 \pm 8.5	7.2 \pm 8.4	8.0 \pm 6.2	8.6 \pm 6.8
11a	3.1 \pm 1.1	2.6 \pm 0.8	4.9 \pm 5.9	5.4 \pm 5.7	5.1 \pm 6.6	4.6 \pm 7.5
12a	1.6 \pm 0.9	1.3 \pm 0.6	7.3 \pm 4.7	6.7 \pm 6.0	7.2 \pm 4.5	6.1 \pm 6.7
13a	0.0 \pm 0.4	0.0 \pm 0.4	4.7 \pm 1.5	8.5 \pm 0.7	16.2 \pm 0.7	22.4 \pm 0.8
14a	0.0 \pm 1.4	0.0 \pm 2.2	0.0 \pm 2.3	0.0 \pm 1.9	0.0 \pm 1.5	0.0 \pm 1.4
15a	0.0 \pm 3.5	0.0 \pm 4.2	0.0 \pm 2.9	0.0 \pm 3.8	0.0 \pm 3.5	0.0 \pm 3.5
16a	0.0 \pm 3.9	0.0 \pm 5.0	0.0 \pm 3.6	0.0 \pm 4.7	0.0 \pm 4.2	0.0 \pm 3.9
17a	0.0 \pm 3.5	0.0 \pm 4.4	0.0 \pm 3.3	0.0 \pm 3.2	0.0 \pm 3.8	0.0 \pm 3.1
18a	0.0 \pm 3.0	0.0 \pm 3.8	0.0 \pm 4.0	0.0 \pm 3.7	0.0 \pm 3.5	0.0 \pm 3.5
19a	0.0 \pm 3.7	0.0 \pm 3.8	1.6 \pm 4.6	0.0 \pm 4.5	0.0 \pm 4.4	0.0 \pm 4.2
1b	0.0 \pm 0.1	5.7 \pm 5.2	5.5 \pm 4.9	0.8 \pm 4.7	1.6 \pm 4.3	2.9 \pm 2.2
2b	0.2 \pm 0.2	5.4 \pm 6.2	5.1 \pm 6.5	2.7 \pm 1.0	4.1 \pm 0.9	3.5 \pm 0.9
3b	0.0 \pm 0.6	3.6 \pm 6.7	4.0 \pm 6.5	0.7 \pm 1.7	1.5 \pm 1.5	0.7 \pm 1.6
4b	1.8 \pm 0.8	3.3 \pm 1.6	4.1 \pm 1.5	4.7 \pm 9.8	4.4 \pm 8.1	4.2 \pm 8.0
5b	0.0 \pm 0.5	7.6 \pm 2.1	8.0 \pm 2.4	1.0 \pm 2.1	2.3 \pm 2.1	2.4 \pm 2.0
6b	0.0 \pm 2.0	8.0 \pm 1.1	8.3 \pm 1.1	4.1 \pm 3.6	4.9 \pm 3.9	4.0 \pm 3.3
7b	0.0 \pm 3.4	7.1 \pm 2.2	7.6 \pm 2.2	4.4 \pm 0.8	6.4 \pm 1.0	7.4 \pm 0.7
8b	0.0 \pm 0.3	7.8 \pm 2.7	8.4 \pm 2.9	6.3 \pm 1.5	7.5 \pm 1.6	7.3 \pm 1.7
9b	0.0 \pm 2.1	0.0 \pm 2.1	0.0 \pm 2.2	0.0 \pm 2.2	0.0 \pm 2.3	0.0 \pm 2.1
10b	0.0 \pm 3.4	0.0 \pm 3.5	0.0 \pm 3.6	0.0 \pm 3.5	0.0 \pm 3.3	0.0 \pm 3.2
11b	1.3 \pm 0.3	4.2 \pm 3.1	4.2 \pm 3.3	3.8 \pm 0.6	5.9 \pm 3.0	5.4 \pm 2.3
12b	0.0 \pm 1.1	0.0 \pm 0.7	0.0 \pm 1.6	0.0 \pm 1.3	1.0 \pm 1.6	1.9 \pm 2.0
13b	0.0 \pm 0.9	0.0 \pm 1.2	0.4 \pm 1.2	1.0 \pm 1.3	3.8 \pm 1.2	4.6 \pm 1.1
14b	0.0 \pm 0.6	0.0 \pm 0.6	0.0 \pm 1.2	0.0 \pm 0.6	0.0 \pm 0.6	0.0 \pm 0.5
15b	0.0 \pm 0.4	0.0 \pm 0.7	0.0 \pm 1.5	0.0 \pm 0.4	0.0 \pm 0.5	0.0 \pm 1.0
16b	0.0 \pm 0.9	0.0 \pm 0.4	0.0 \pm 0.6	0.0 \pm 0.5	0.0 \pm 0.4	0.0 \pm 0.6
17b	0.0 \pm 0.9	0.0 \pm 0.8	0.0 \pm 1.3	0.0 \pm 1.1	0.0 \pm 1.1	0.0 \pm 1.5
18b	0.0 \pm 1.4	0.0 \pm 1.5	0.0 \pm 1.7	0.0 \pm 1.1	0.0 \pm 1.3	0.0 \pm 1.6
19b	0.0 \pm 1.0	0.0 \pm 0.9	0.0 \pm 0.8	0.0 \pm 1.0	0.0 \pm 1.0	0.0 \pm 0.9

The percentage of inhibition of DPPH is presented as the mean \pm SD of three independent experiments performed in triplicates.

Table S3. DPPH radical scavenging activity (%) for compound **13a** at five different concentrations (0.3 – 0.0003 mg/mL) in the time range of 0, 5, 15, 30, 60, and 90 minutes.

		DPPH scavenging activity (%)								
Comp.	Concentration	0 min	5 min	15 min	30 min	60 min	90 min	120 min	150 min	180 min
Asc. Acid	0.0003 mg/mL	3.9 ± 0.9	3.3 ± 0.9	3.5 ± 0.8	3.4 ± 0.8	3.3 ± 1.1	3.1 ± 1.3	2.9 ± 1.5	2.2 ± 1.5	2.0 ± 1.9
	0.003 mg/mL	44.8 ± 0.8	43.3 ± 2.4	43.5 ± 2.3	43.4 ± 2.2	43.2 ± 2.3	43.0 ± 2.3	42.8 ± 2.3	42.8 ± 2.3	42.1 ± 2.6
	0.03 mg/mL	96.4 ± 0.1	93.4 ± 5.1	93.6 ± 5.2	93.6 ± 5.4	93.5 ± 5.4	93.5 ± 5.4	93.3 ± 5.3	93.3 ± 5.3	93.2 ± 5.5
	0.09 mg/mL	96.8 ± 0.4	93.7 ± 5.4	94.0 ± 5.6	94.0 ± 5.8	93.7 ± 5.5	93.7 ± 5.5	93.6 ± 5.5	93.6 ± 5.5	93.5 ± 5.6
	0.3 mg/mL	96.9 ± 0.3	93.7 ± 5.4	94.2 ± 5.3	94.0 ± 5.4	93.8 ± 5.4	93.7 ± 5.4	93.6 ± 5.4	93.5 ± 5.4	93.5 ± 5.5
Trolox	0.0003 mg/mL	2.9 ± 0.6	4.2 ± 3.3	3.6 ± 1.3	3.5 ± 1.1	3.3 ± 1.5	3.0 ± 1.7	2.8 ± 1.8	2.1 ± 2.0	1.8 ± 2.2
	0.003 mg/mL	31.6 ± 5.2	32.2 ± 6.1	31.3 ± 6.0	30.8 ± 6.0	31.5 ± 5.6	31.2 ± 5.3	31.0 ± 5.2	30.4 ± 5.4	30.2 ± 5.2
	0.03 mg/mL	91.6 ± 1.2	93.4 ± 5.7	93.5 ± 5.6	93.5 ± 5.5	93.4 ± 5.6	93.4 ± 5.6	93.3 ± 5.6	93.3 ± 5.7	93.2 ± 5.7
	0.09 mg/mL	96.6 ± 0.1	93.6 ± 5.4	93.6 ± 5.3	93.5 ± 5.3	93.5 ± 5.4	93.4 ± 5.4	93.5 ± 5.5	93.4 ± 5.6	93.4 ± 5.6
	0.3 mg/mL	96.6 ± 0.1	93.5 ± 5.3	93.5 ± 5.4	93.4 ± 5.4	93.4 ± 5.5	93.4 ± 5.4	93.4 ± 5.5	93.4 ± 5.7	93.4 ± 5.7
13a	0.0003 mg/mL	0.0 ± 1.2	0.0 ± 1.3	0.0 ± 1.4	0.3 ± 1.5	0.7 ± 1.7	1.0 ± 1.9	1.3 ± 2.1	1.3 ± 2.1	1.1 ± 2.3
	0.003 mg/mL	0.2 ± 0.7	0.7 ± 1.0	2.2 ± 0.8	3.9 ± 0.8	6.5 ± 1.0	8.3 ± 1.2	9.8 ± 1.3	10.7 ± 1.6	11.8 ± 1.8
	0.03 mg/mL	0.4 ± 1.9	4.5 ± 1.6	9.8 ± 1.7	15.5 ± 1.9	23.3 ± 2.5	28.7 ± 2.9	33.0 ± 3.2	36.3 ± 3.5	39.4 ± 3.8
	0.09 mg/mL	1.6 ± 1.4	9.5 ± 1.3	18.0 ± 1.4	26.5 ± 1.8	37.5 ± 2.5	44.7 ± 2.9	50.3 ± 3.4	54.4 ± 3.8	58.0 ± 3.9
	0.3 mg/mL	5.7 ± 0.7	19.8 ± 1.9	32.7 ± 2.1	44.2 ± 2.7	57.4 ± 3.4	65.0 ± 3.7	70.1 ± 3.9	73.7 ± 4.3	76.4 ± 4.3

The percentage of inhibition of DPPH is presented as the mean ± SD of three independent experiments performed in triplicates.

Figure S1. NCI-60 results at one dose (10 μ M) of compound **14a** after 48 h of treatment.

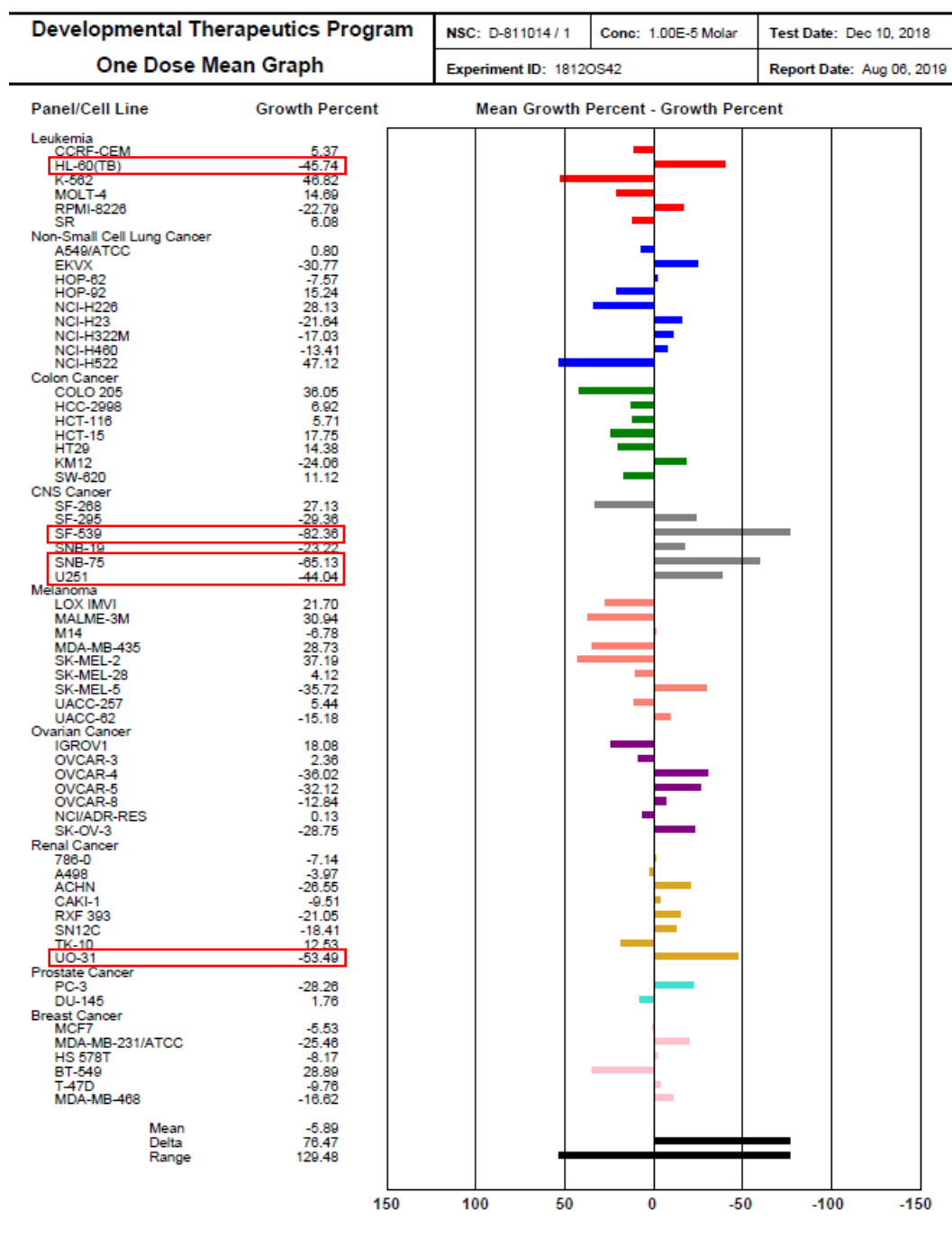


Figure S2. NCI-60 results at one dose (10 μ M) of compound **17a** after 48 h of treatment.

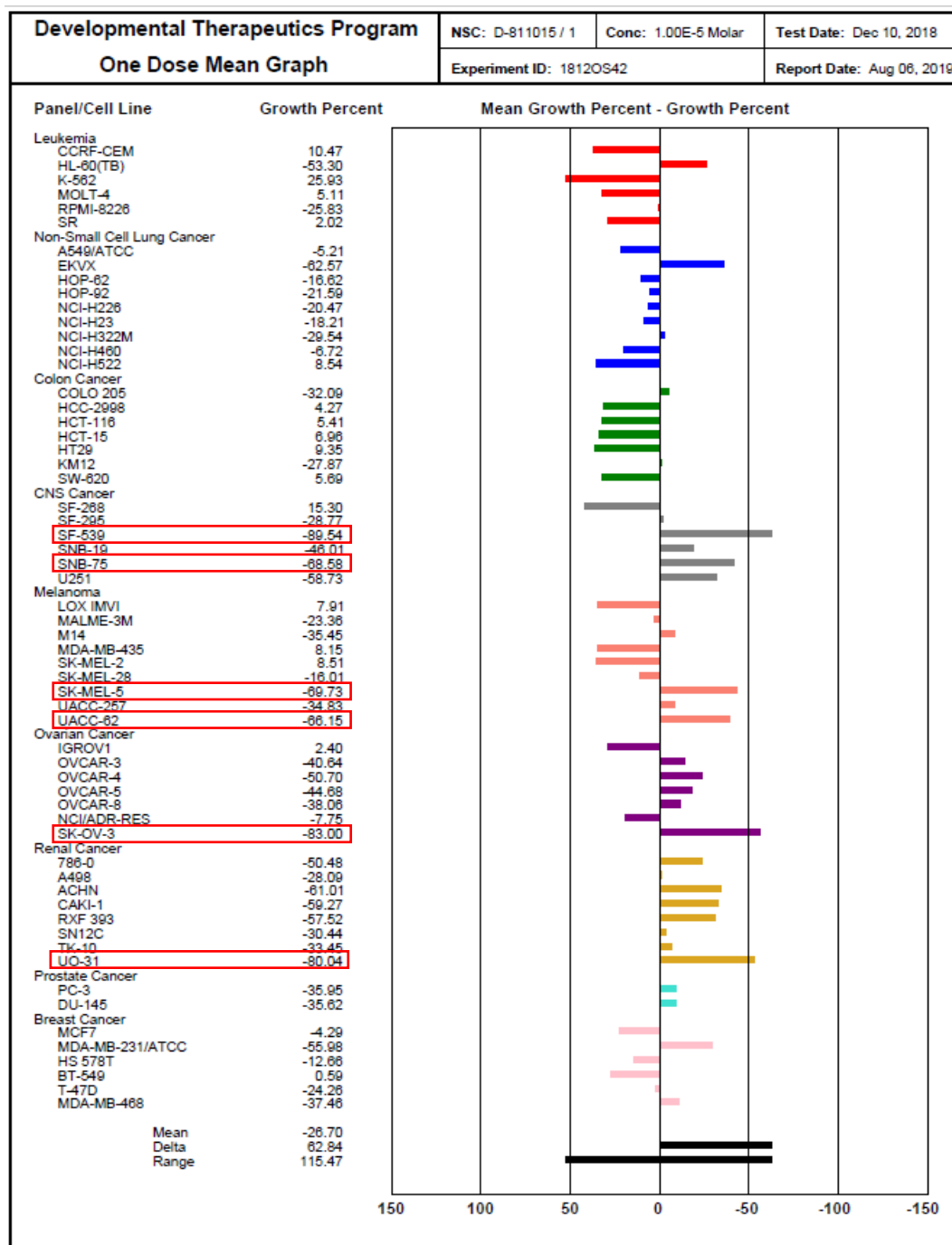


Figure S3. NCI-60 results of GI₅₀, TGI, and LD₅₀ values for compound **14a**.

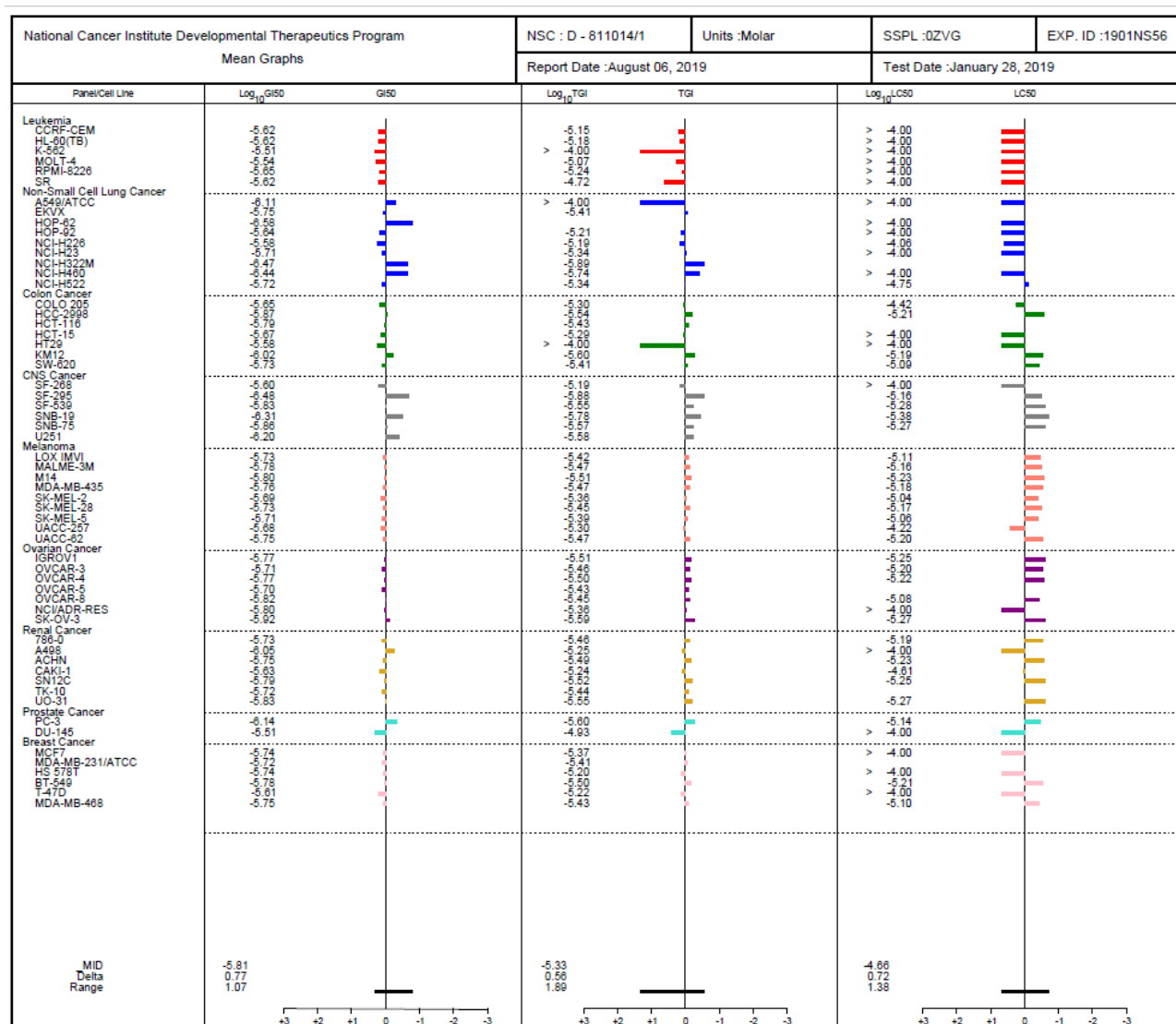
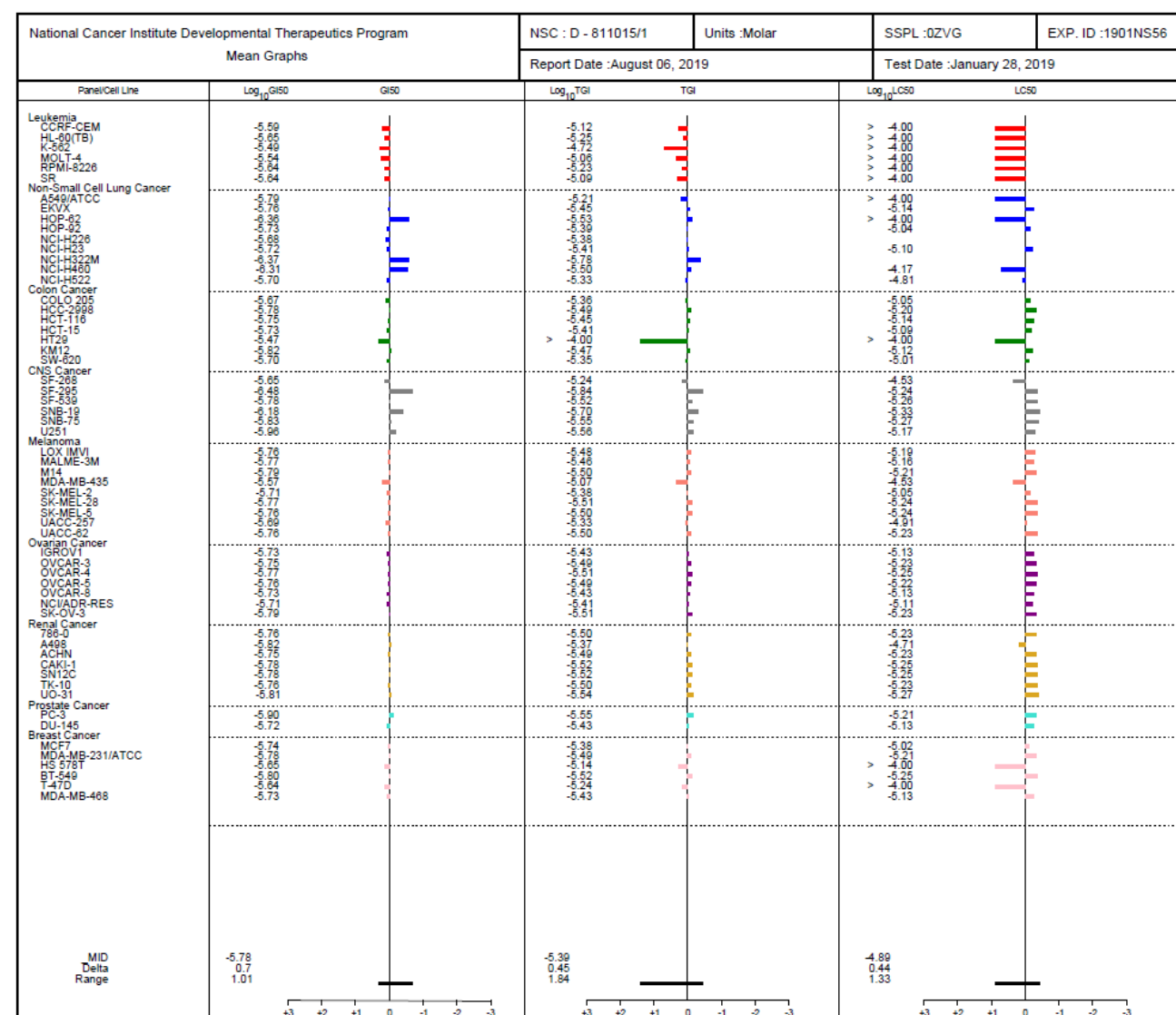


Figure S4. NCI-60 results of GI₅₀, TGI, and LD₅₀ values for compound **17a**.



Spectroscopic characterization-NMR spectra

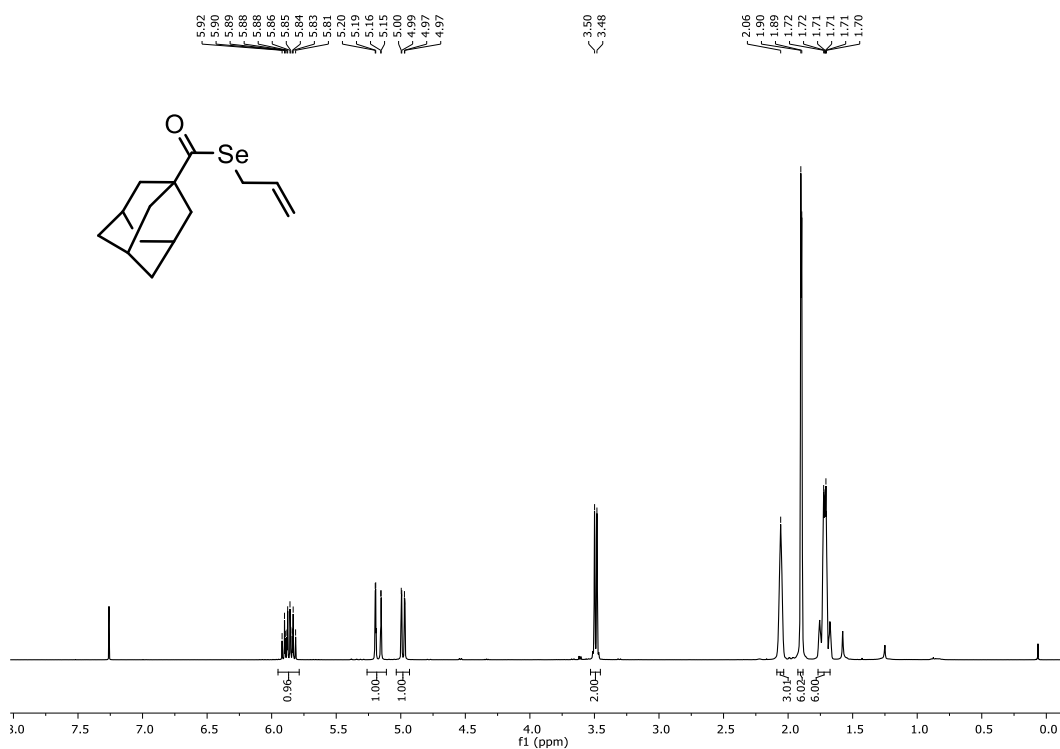


Figure S5. ¹H-NMR spectrum of compound **1a**.

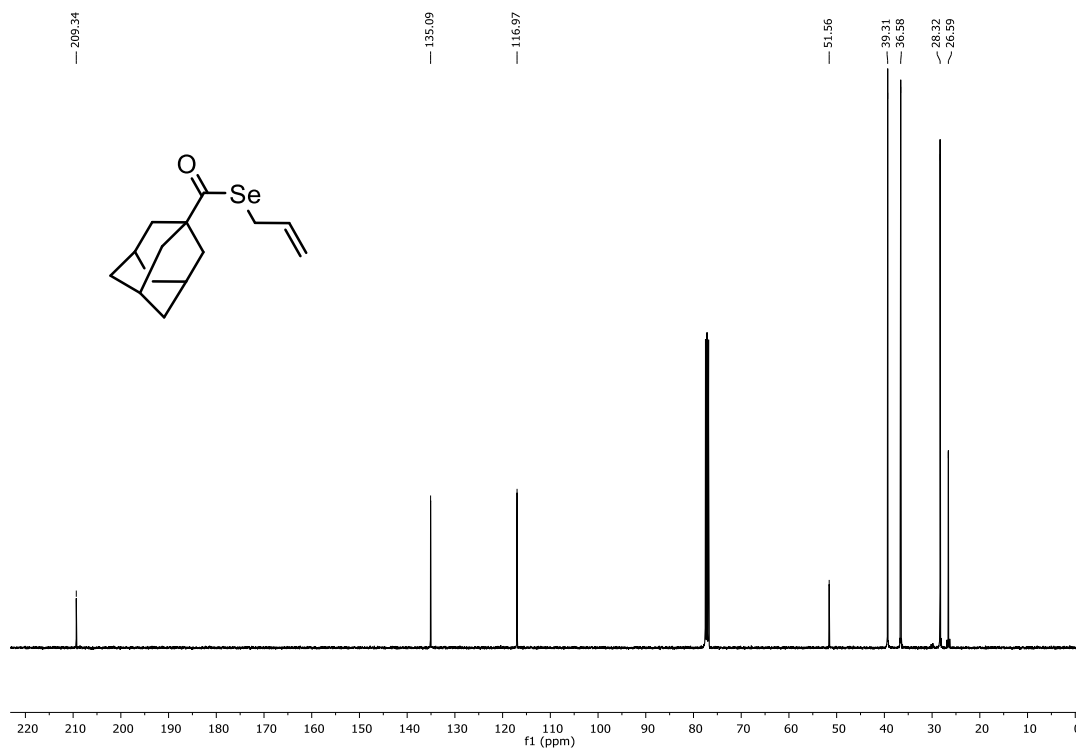


Figure S6. ¹³C-NMR spectrum of compound **1a**.

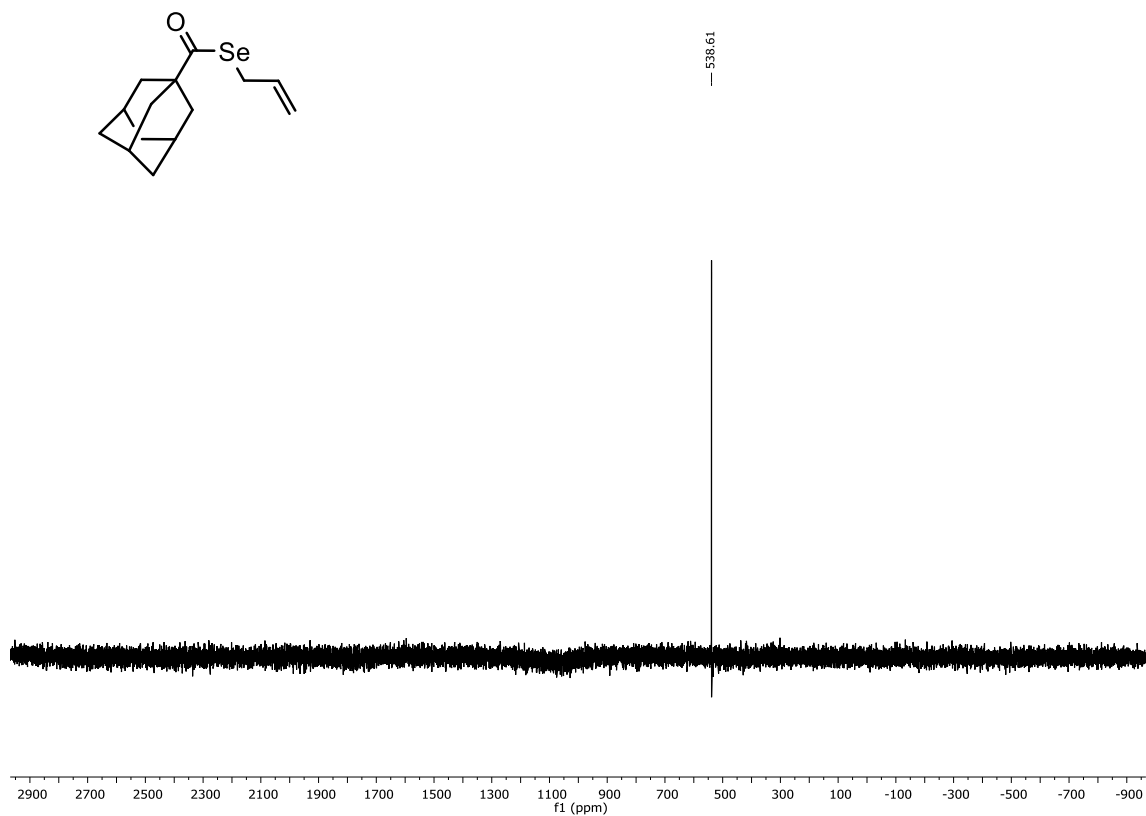


Figure S7. ^{77}Se -NMR spectrum of compound **1a**.

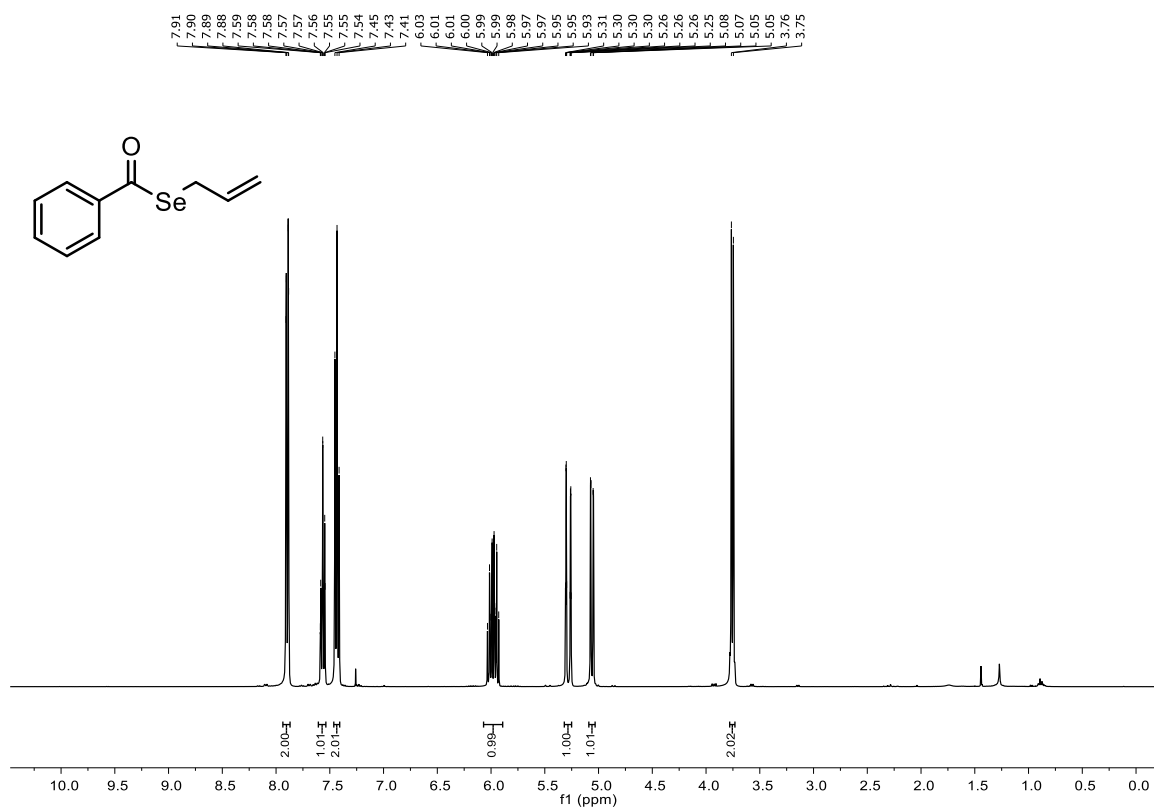


Figure S8. ^1H -NMR spectrum of compound **2a**.

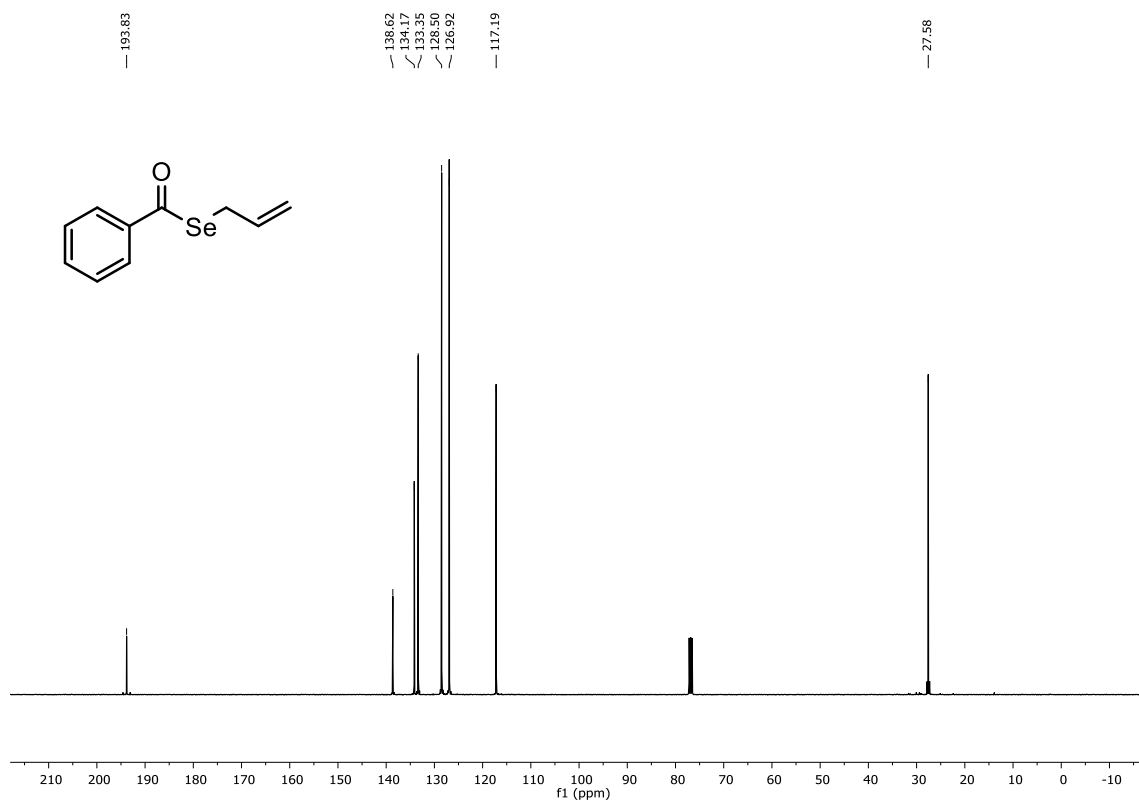


Figure S9. ¹³C-NMR spectrum of compound 2a.

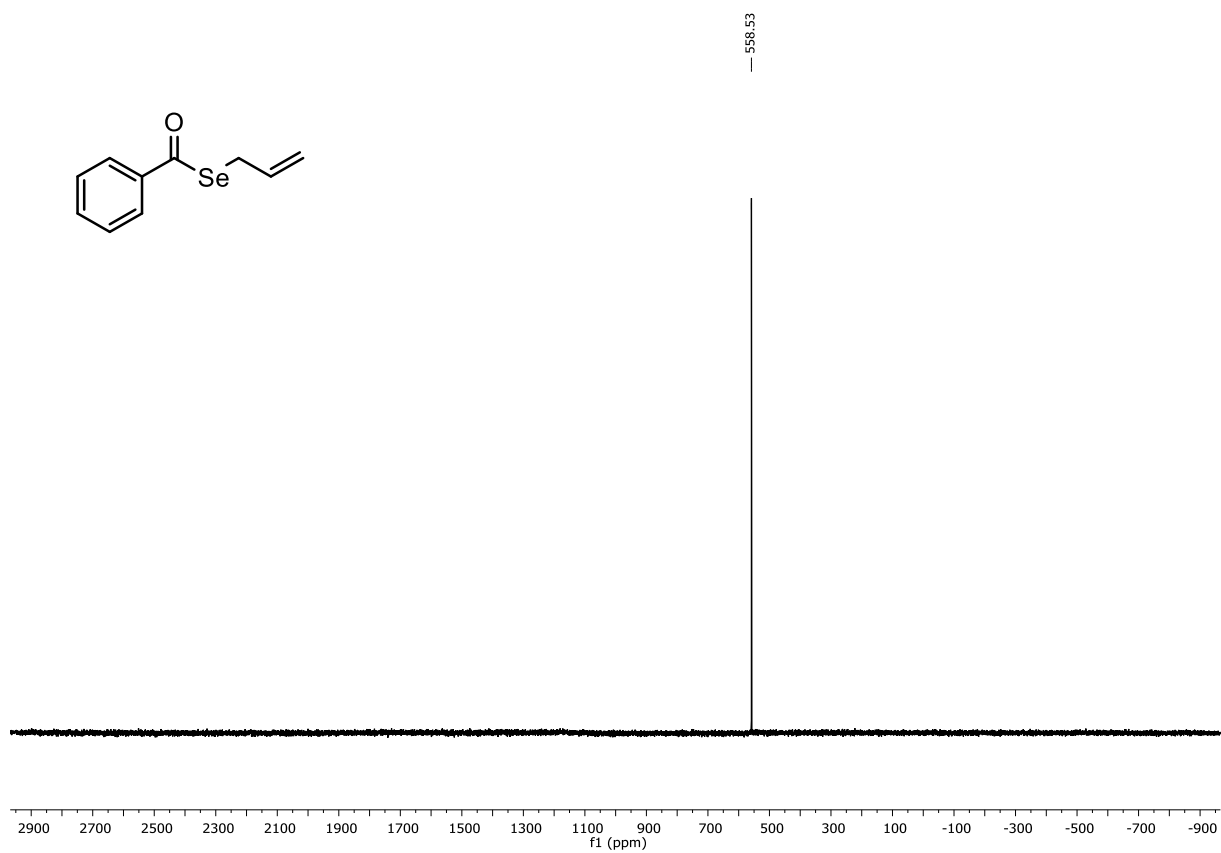


Figure S10. ⁷⁷Se-NMR spectrum of compound 2a.

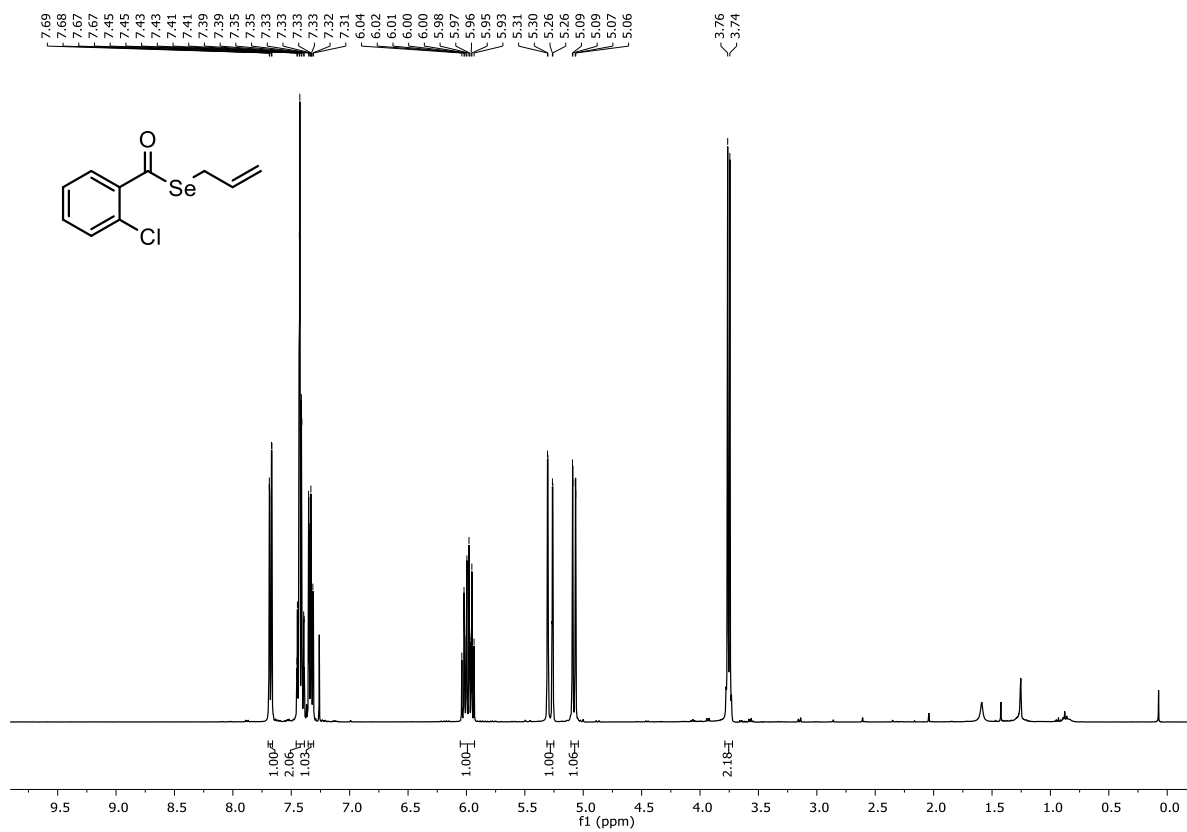


Figure S11. ¹H-NMR spectrum of compound 3a.

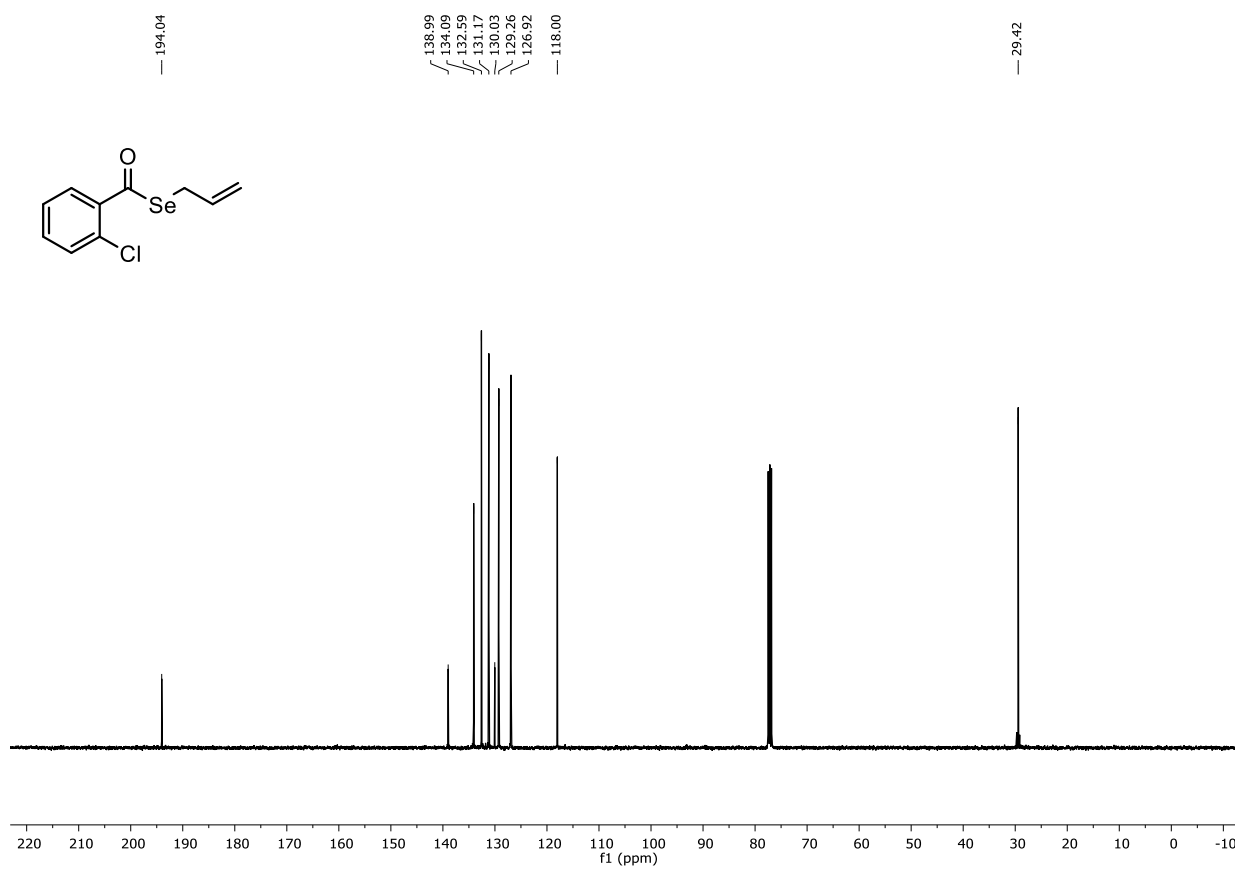


Figure S12. ¹³C-NMR spectrum of compound 3a.

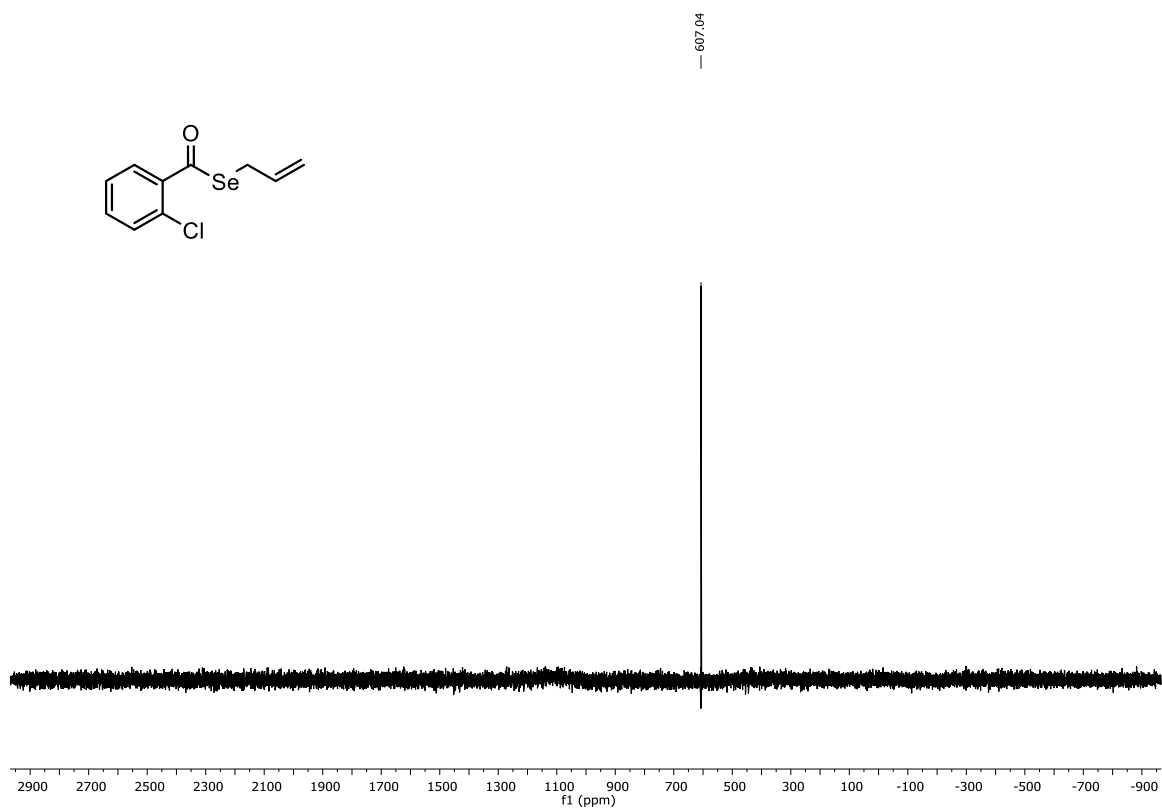


Figure S13. ^{77}Se -NMR spectrum of compound **3a**.

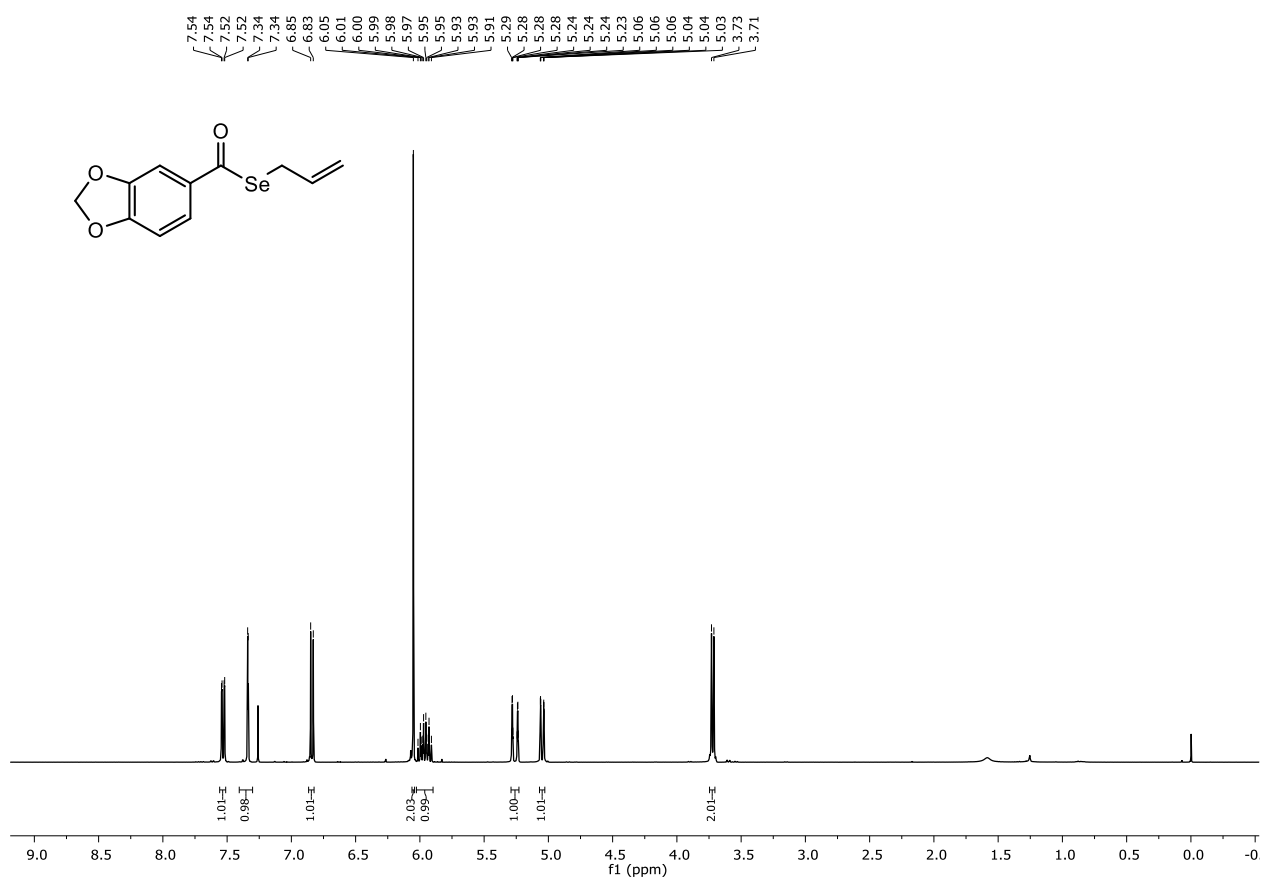


Figure S14. ^1H -NMR spectrum of compound **4a**.

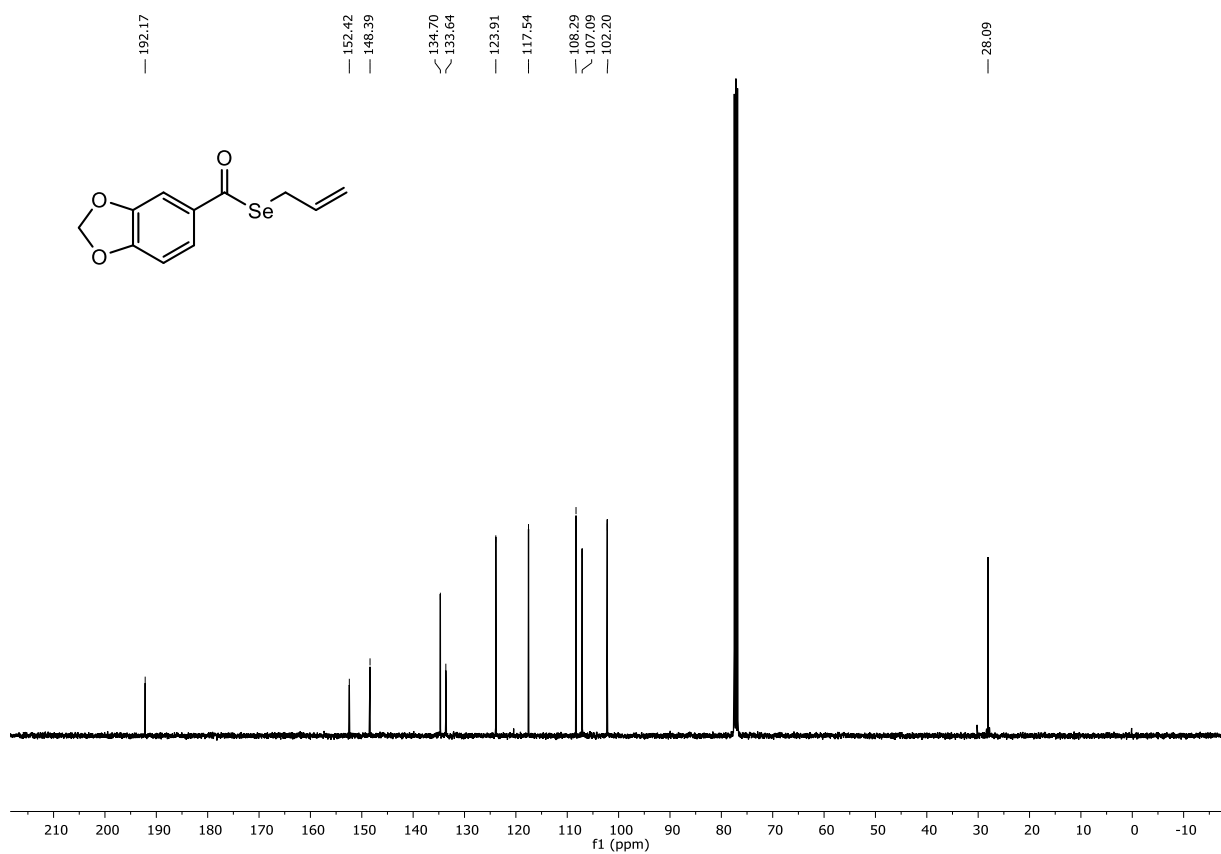


Figure S15. ^{13}C -NMR spectrum of compound **4a**.

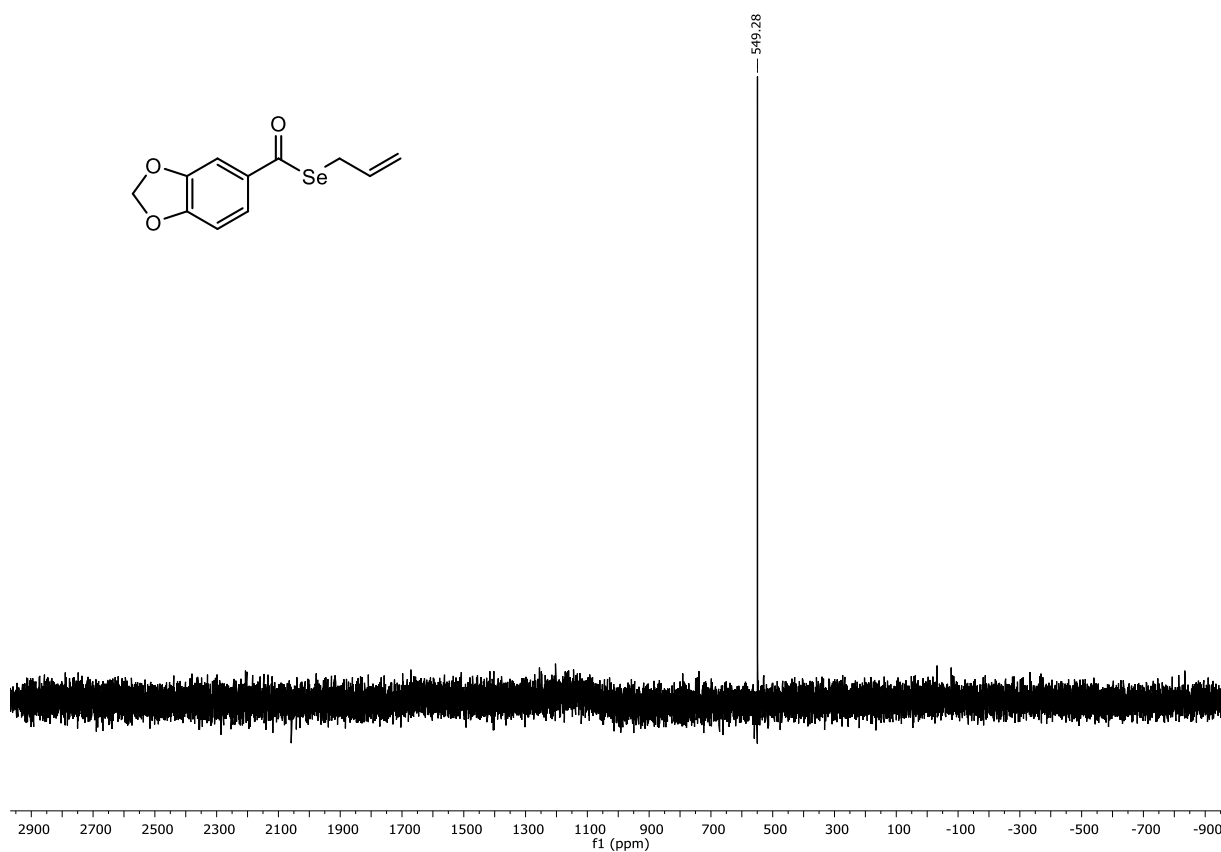


Figure S16. ^{77}Se -NMR spectrum of compound **4a**.

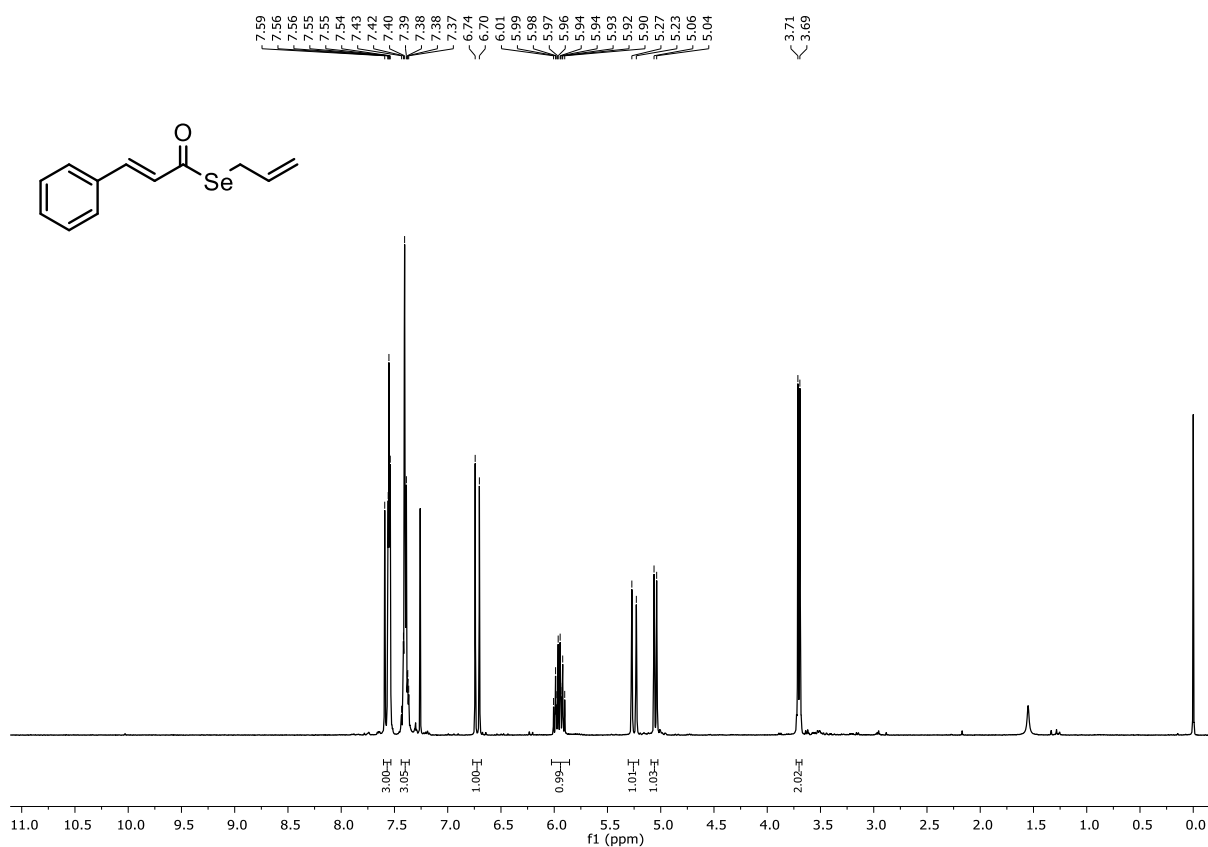


Figure S17. ¹H-NMR spectrum of compound **5a**.

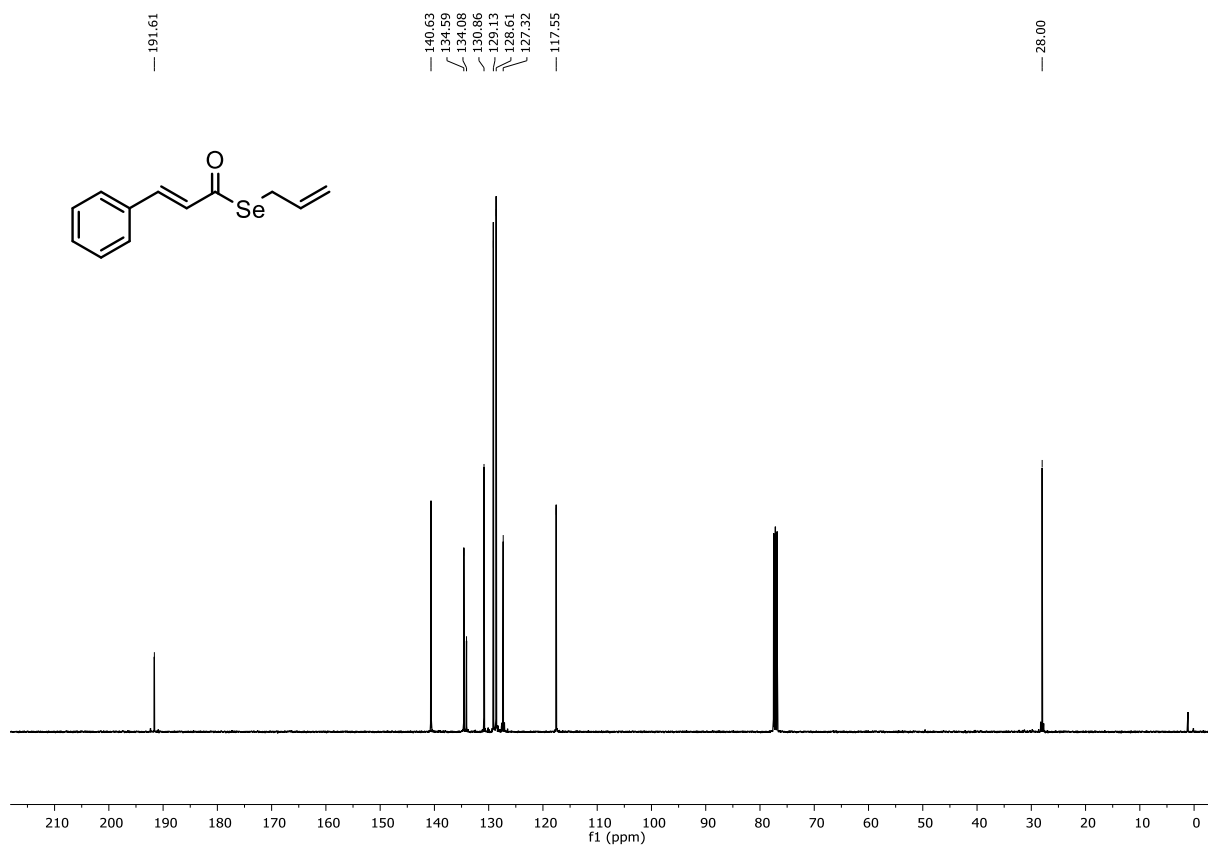


Figure S18. ¹³C-NMR spectrum of compound **5a**.

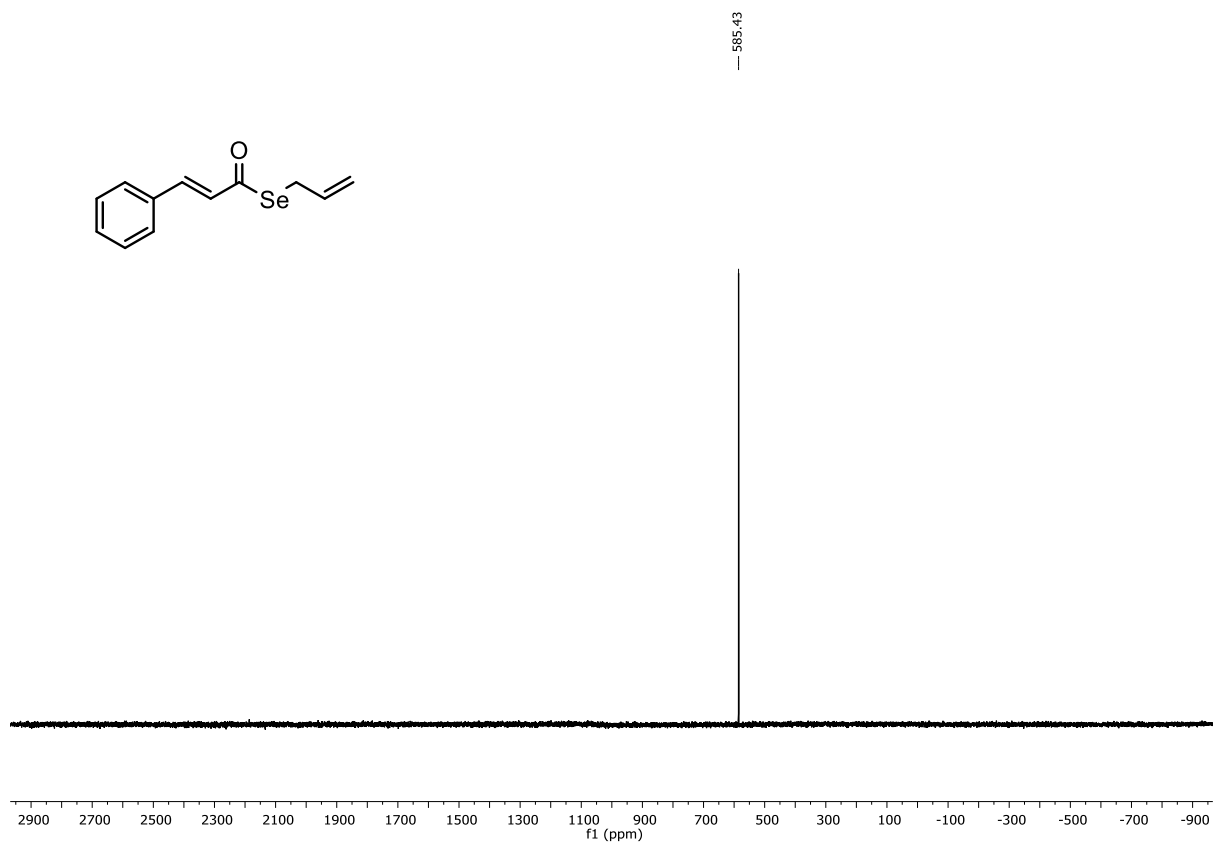


Figure S19. ^{77}Se -NMR spectrum of compound 5a.

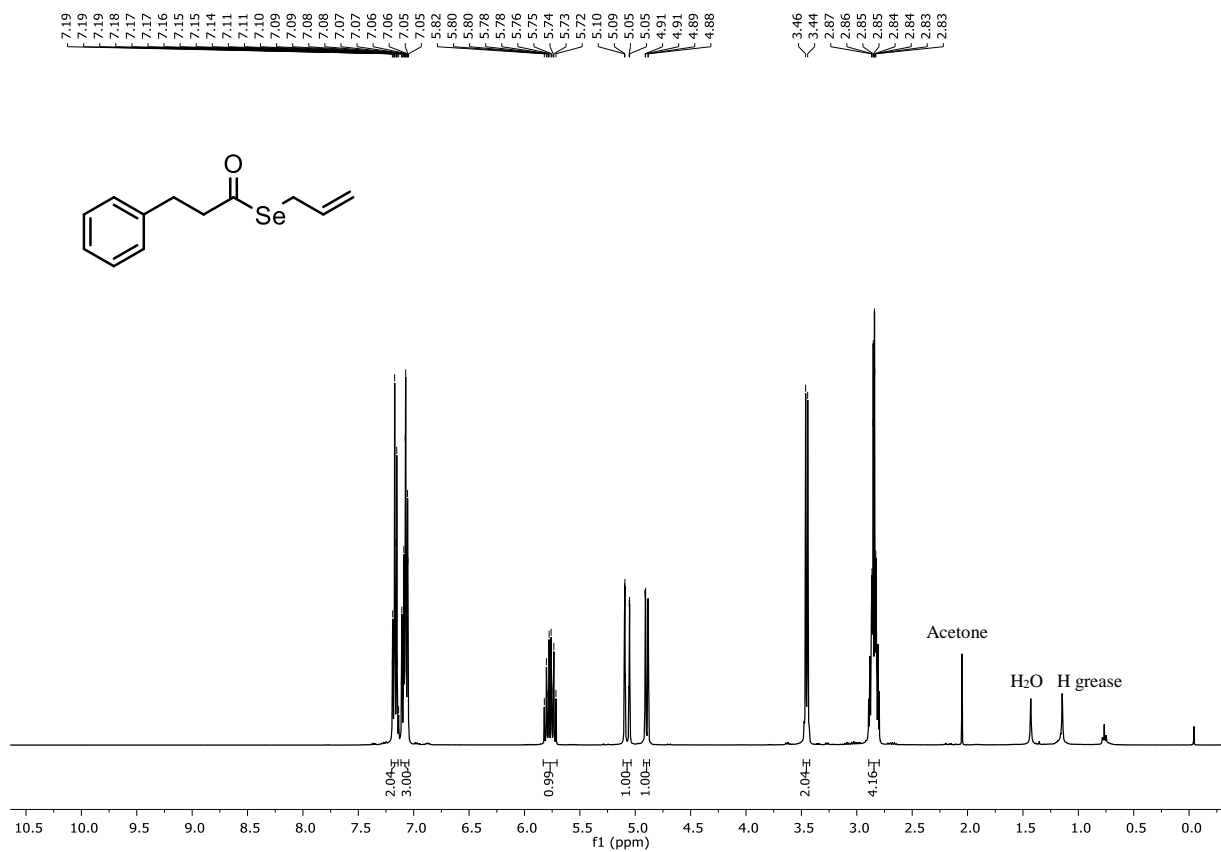


Figure S20. ^1H -NMR spectrum of compound 6a.

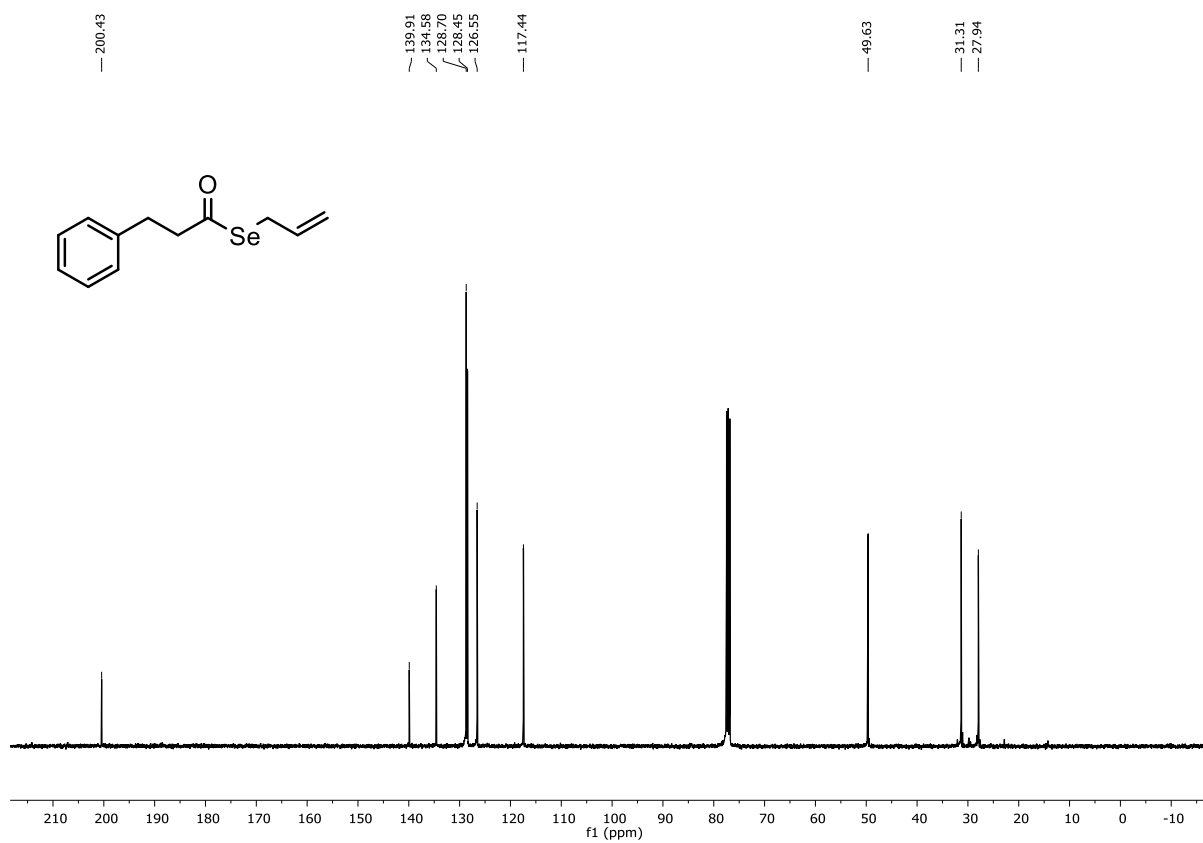


Figure S21. ^{13}C -NMR spectrum of compound **6a**.

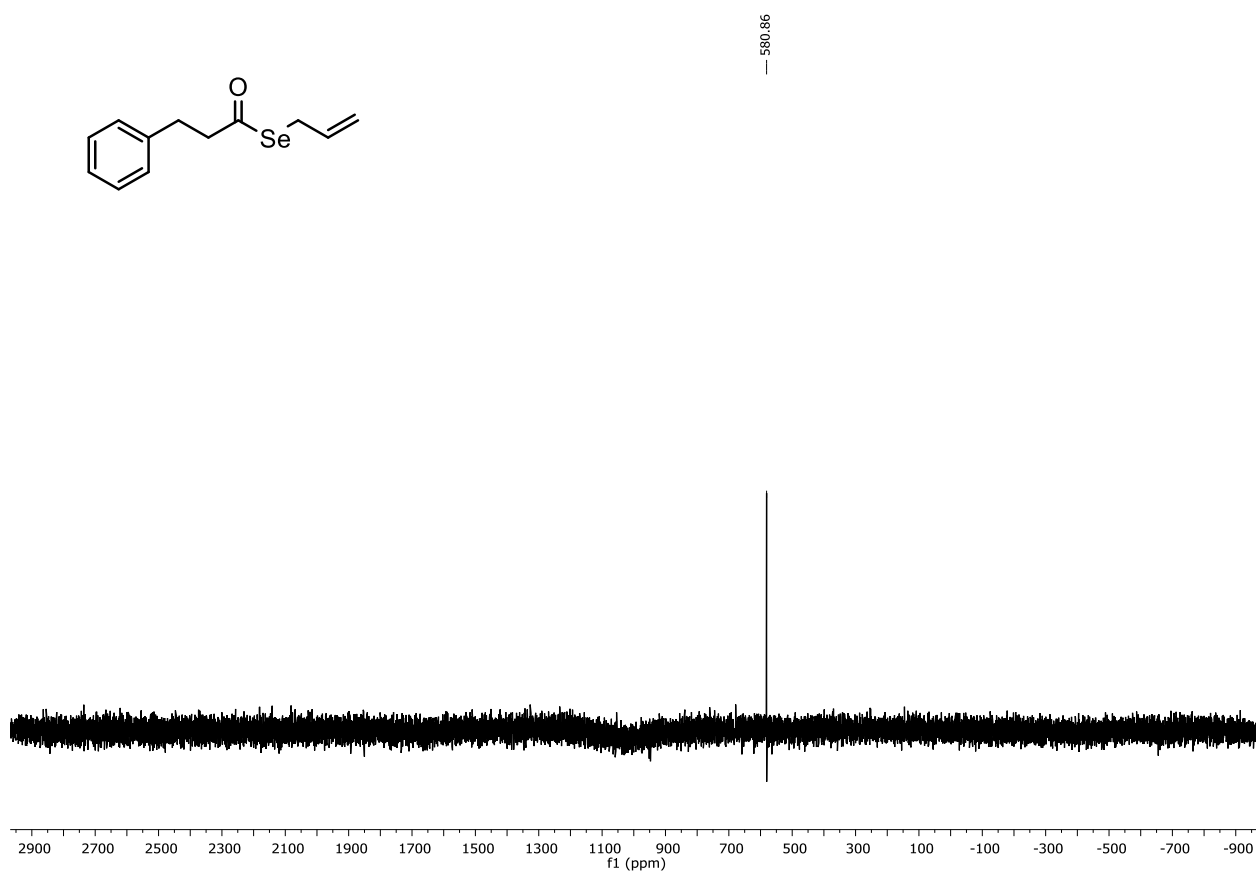


Figure S22. ^{77}Se -NMR spectrum of compound **6a**.

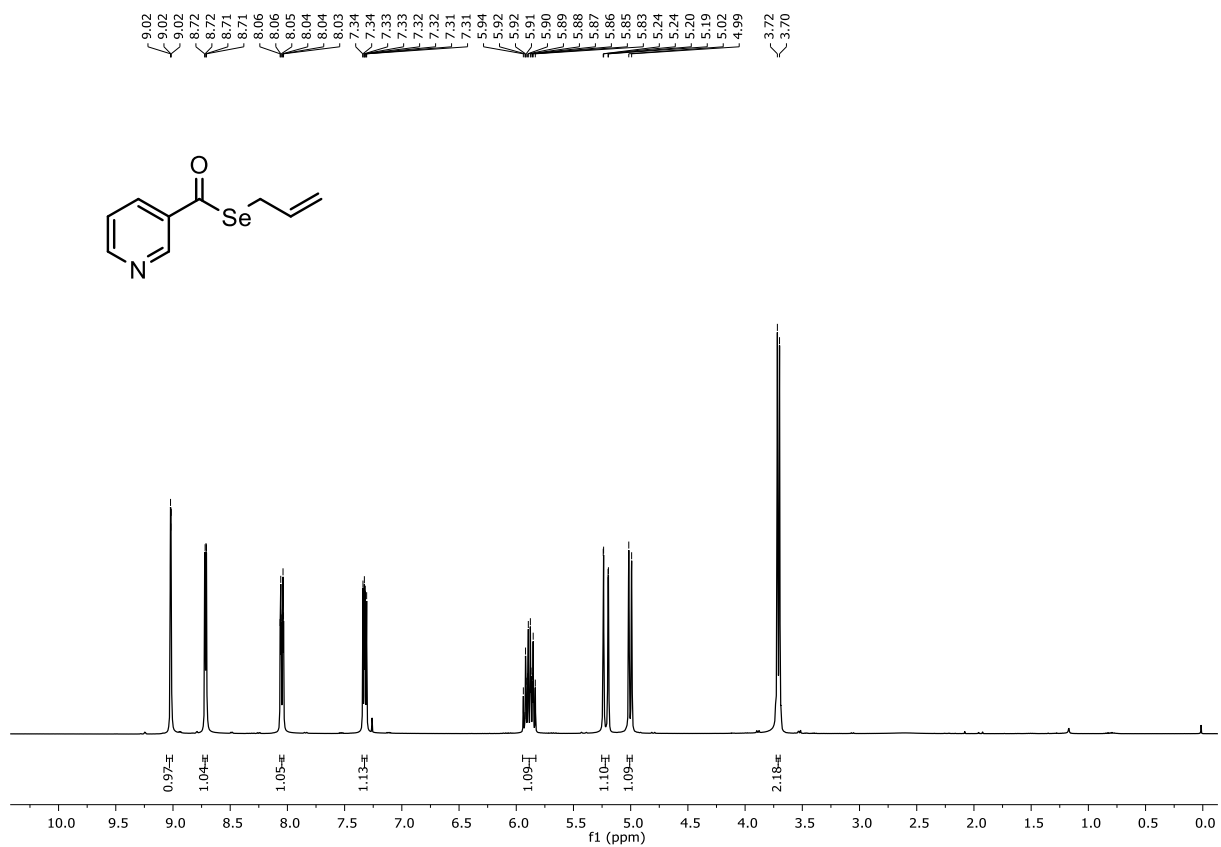


Figure S23. ¹H-NMR spectrum of compound **7a**.

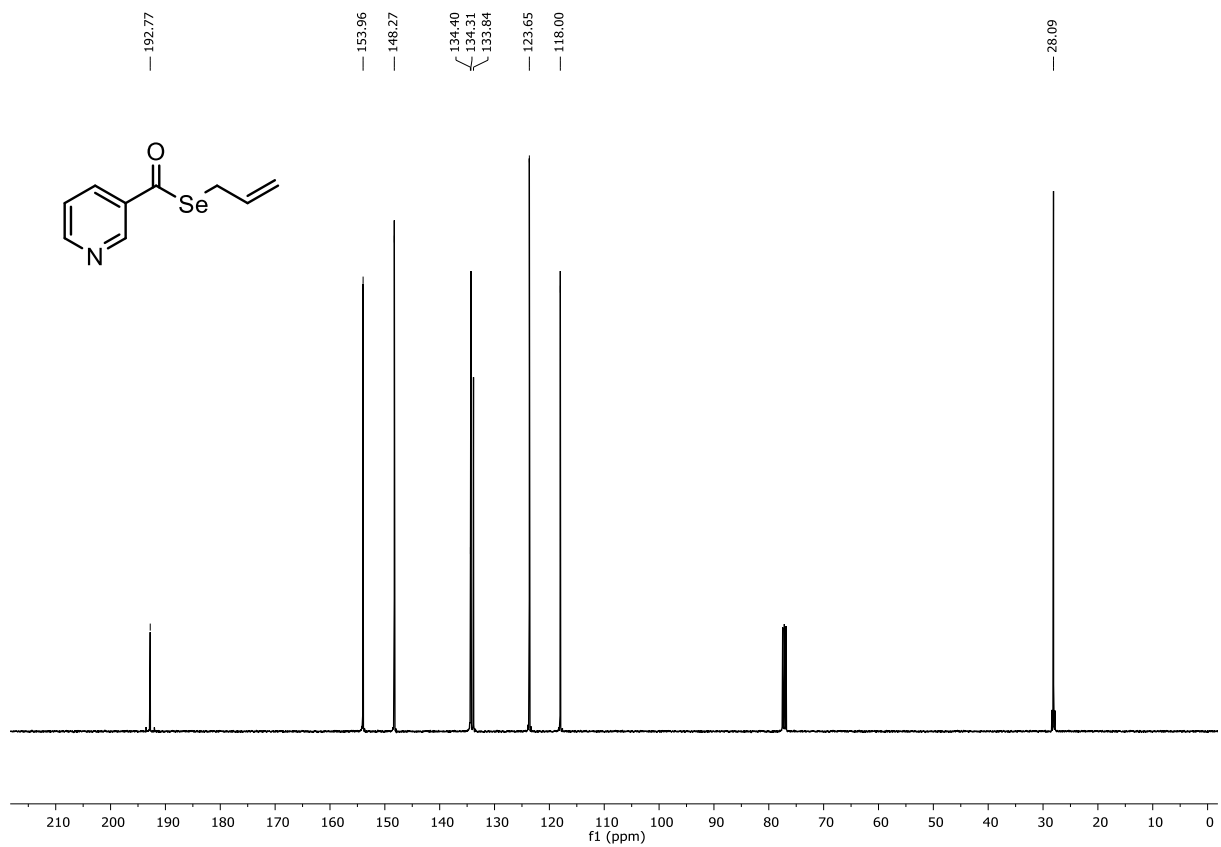


Figure S24. ¹³C-NMR spectrum of compound **7a**.

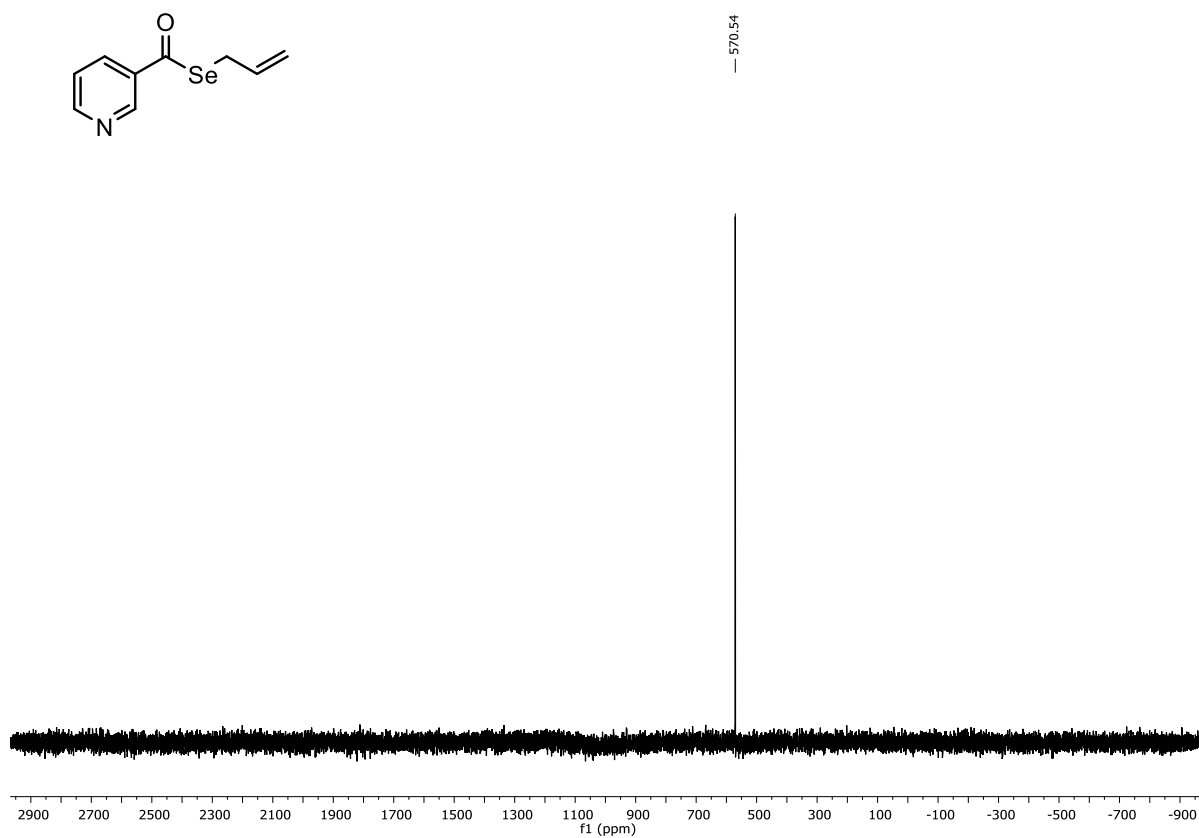


Figure S25. ⁷⁷Se-NMR spectrum of compound 7a.

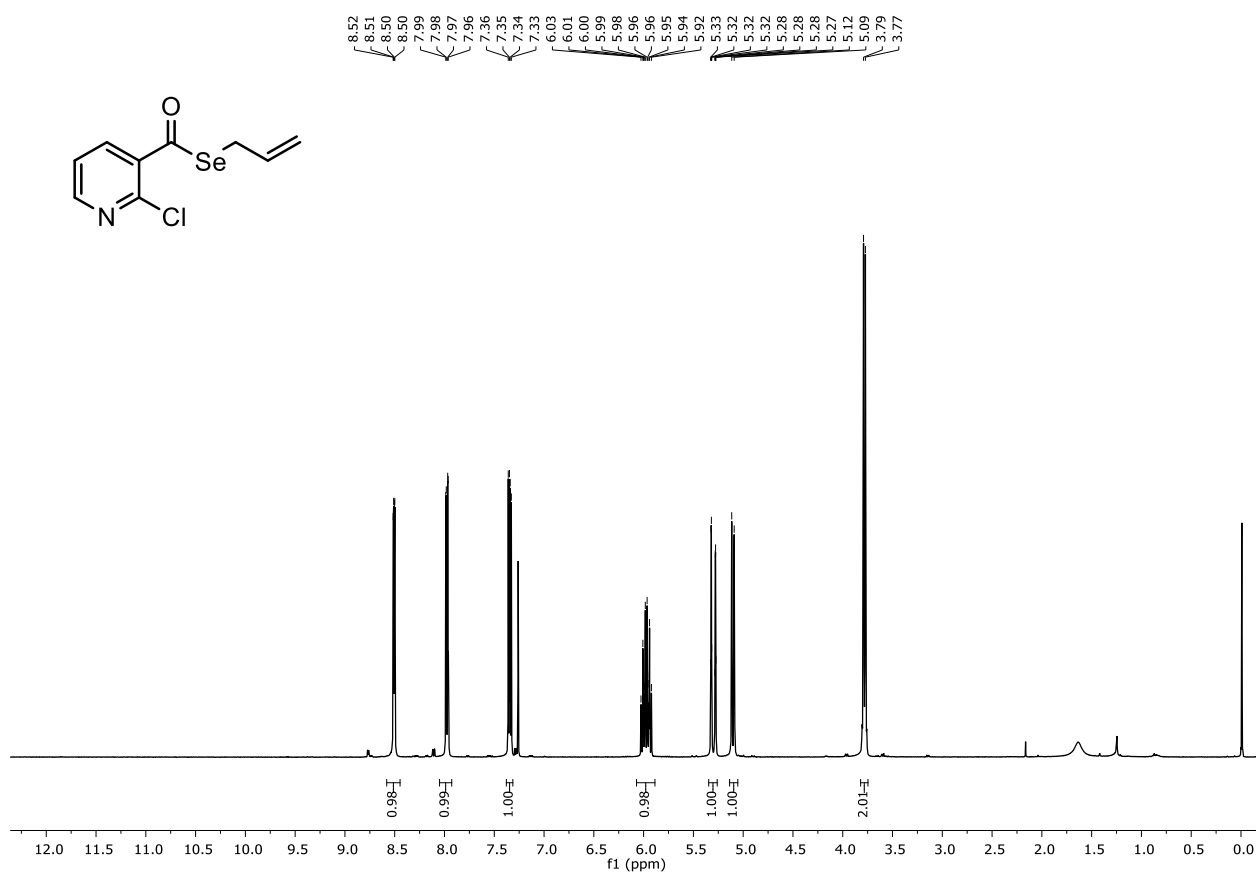


Figure S26. ¹H-NMR spectrum of compound 8a.

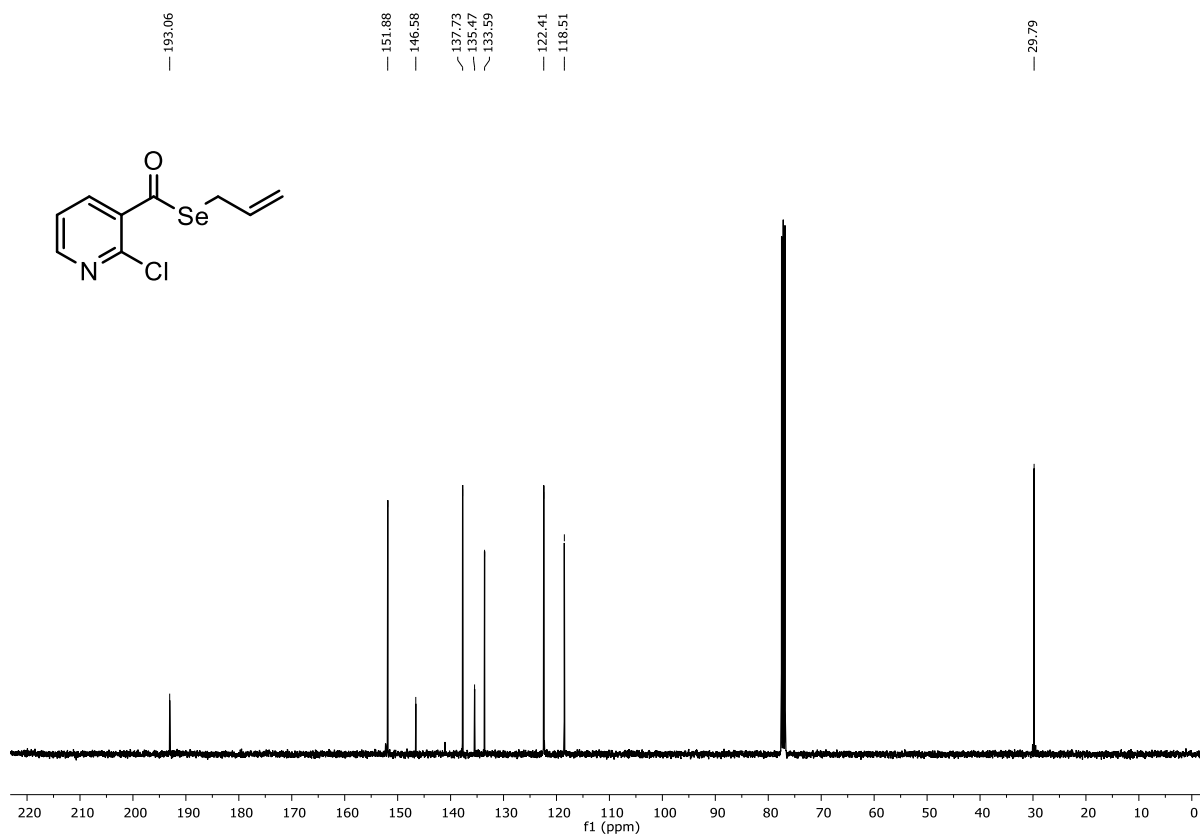


Figure S27. ^{13}C -NMR spectrum of compound **8a**.

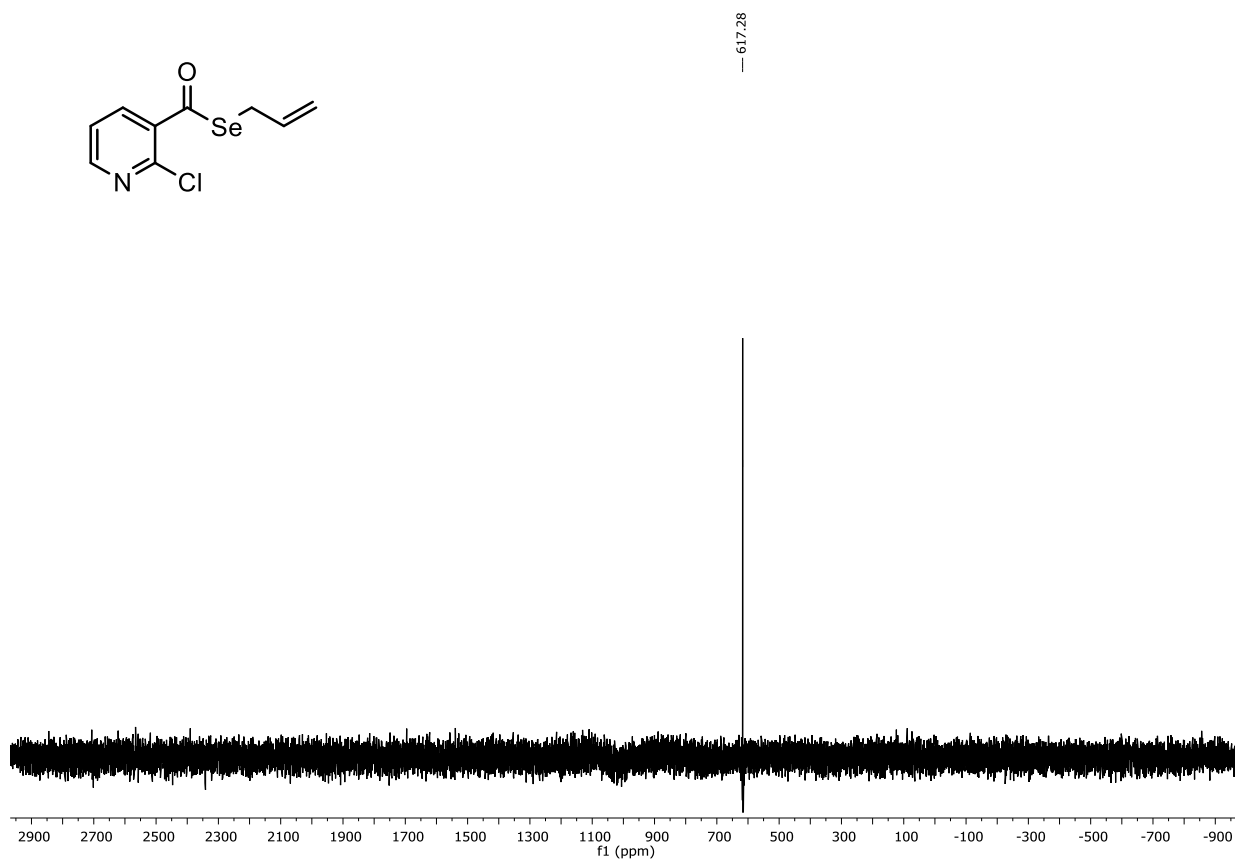


Figure S28. ^{77}Se -NMR spectrum of compound **8a**.

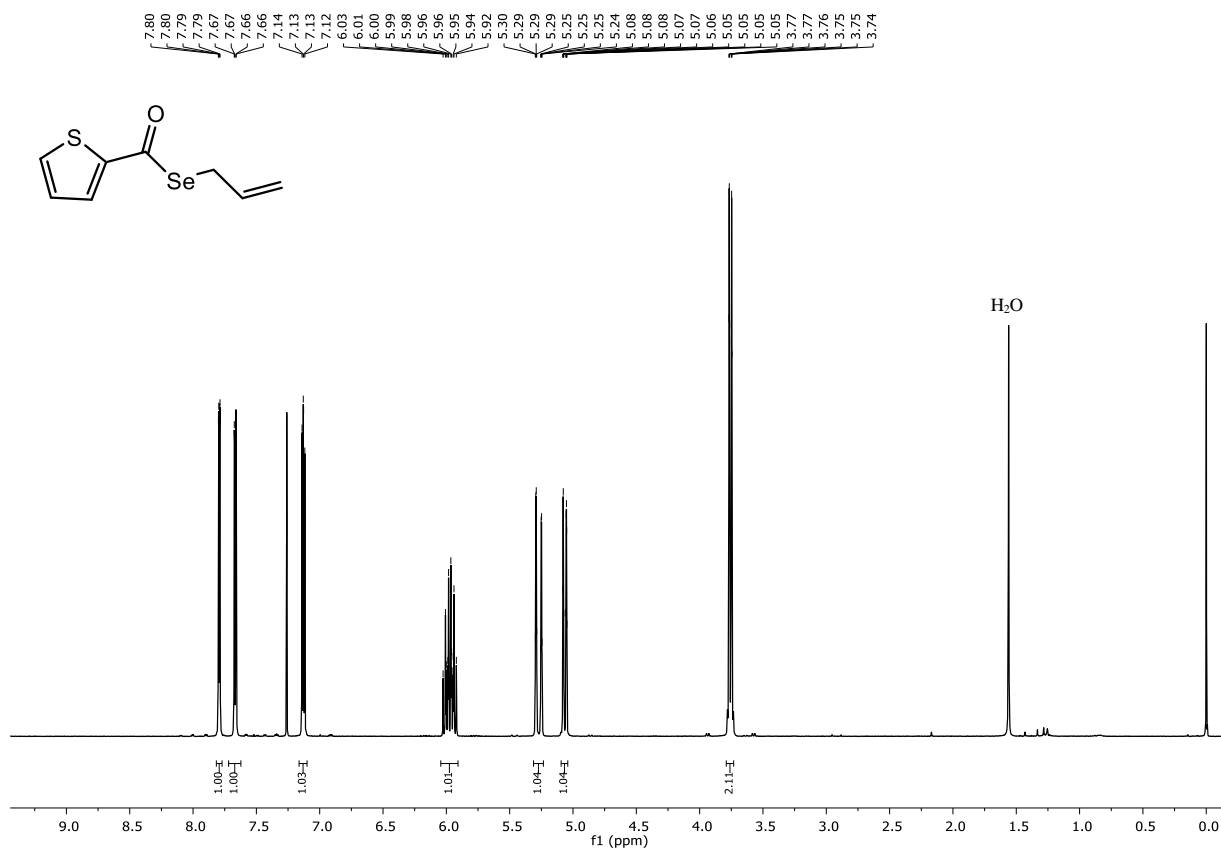


Figure S29. ¹H-NMR spectrum of compound **9a**.

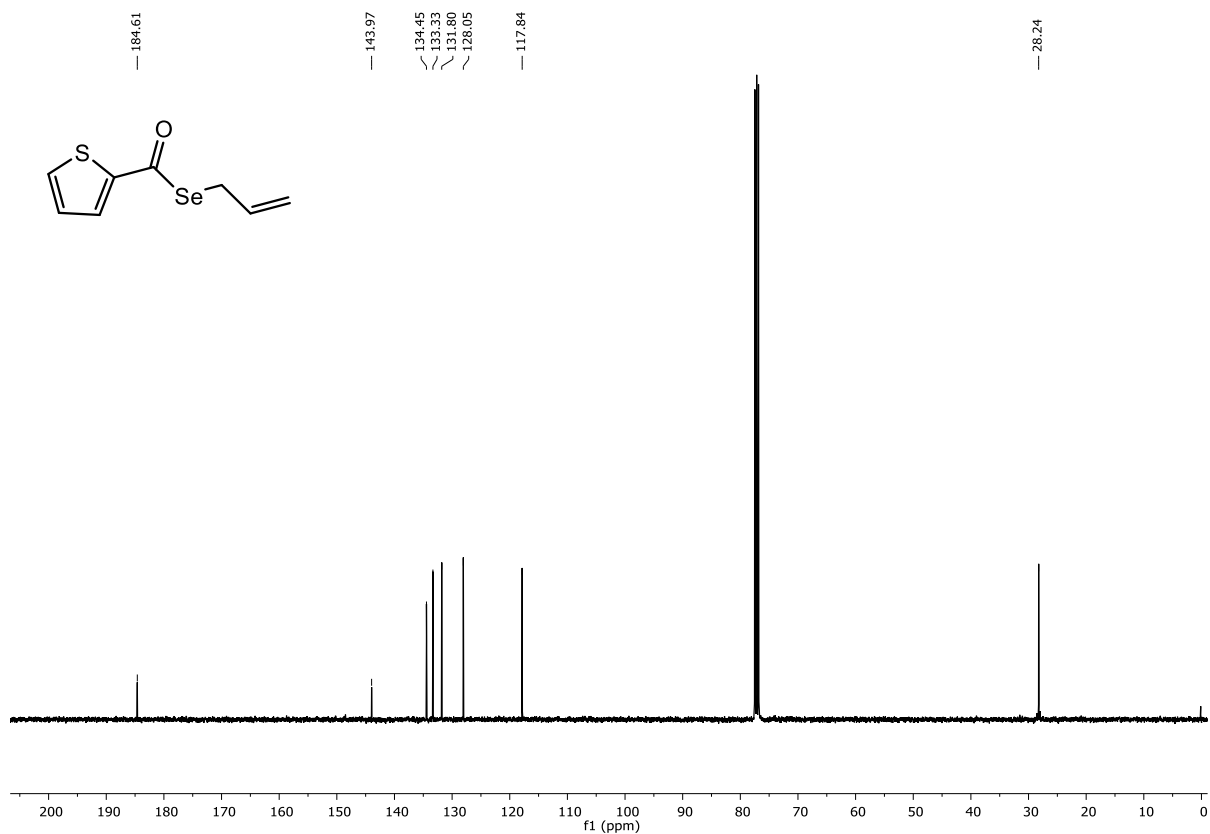


Figure S30. ¹³C-NMR spectrum of compound **9a**.

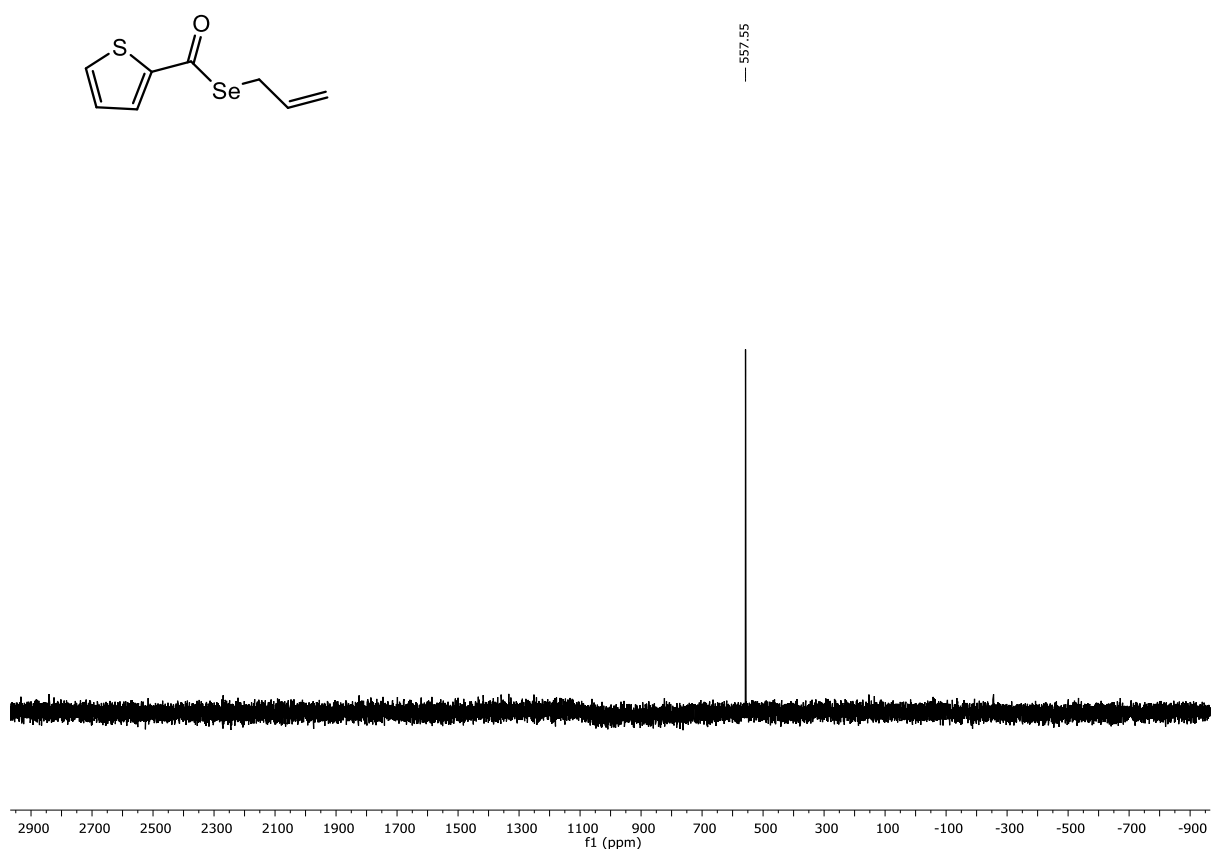


Figure S31. ^{77}Se -NMR spectrum of compound 9a.

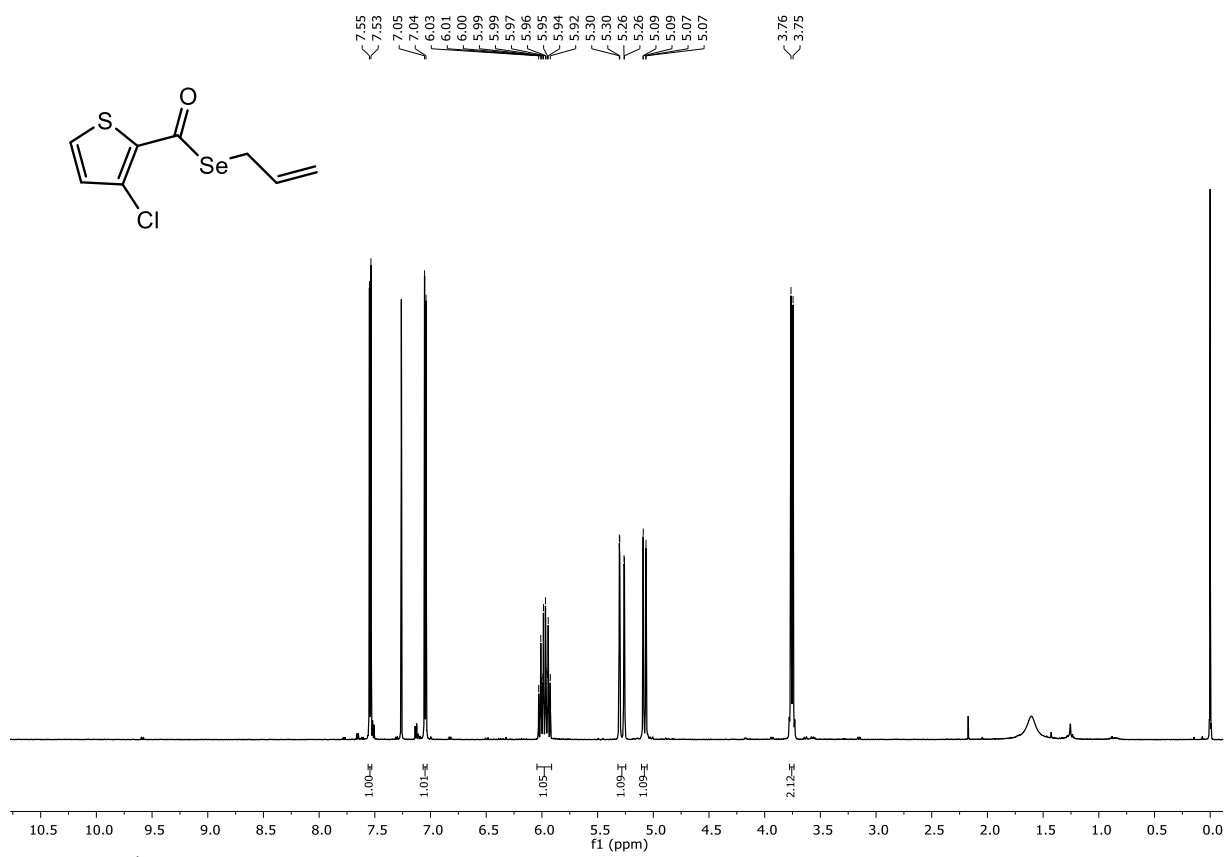


Figure S32. ^1H -NMR spectrum of compound 10a.

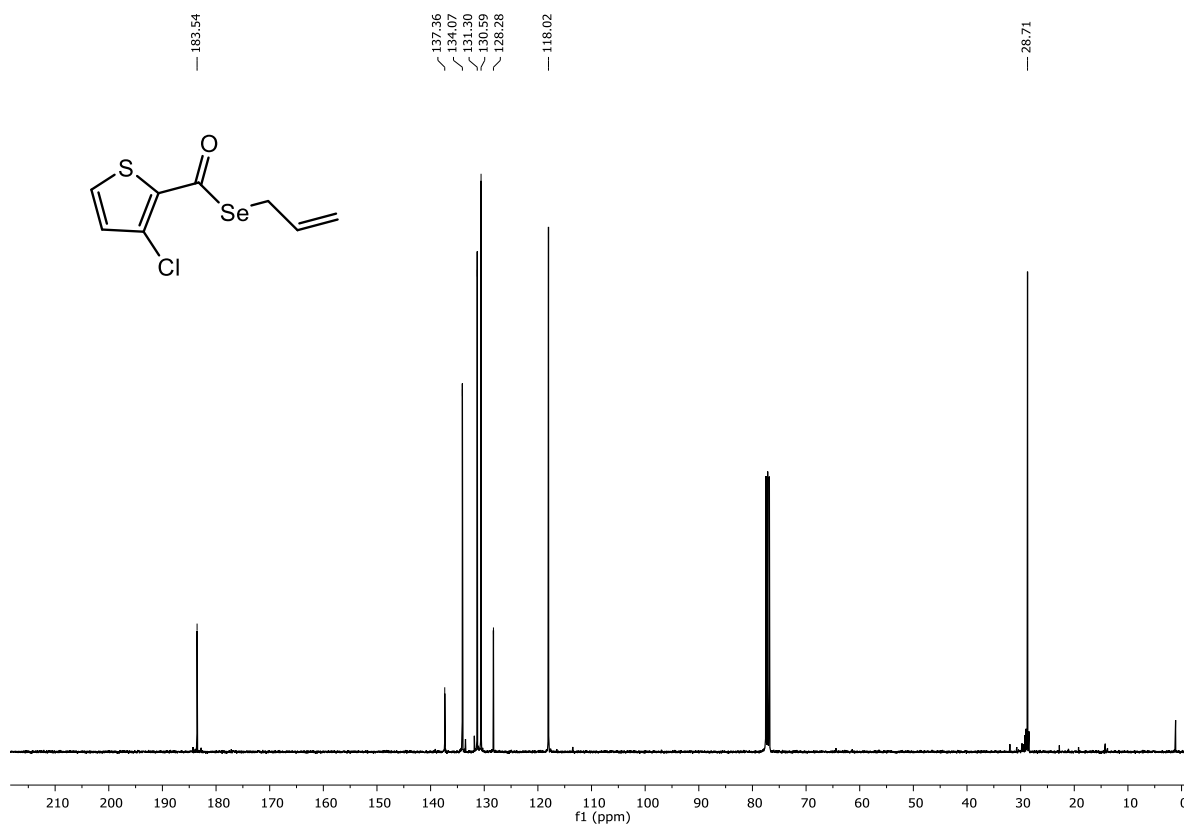


Figure S33. ^{13}C -NMR spectrum of compound **10a**.

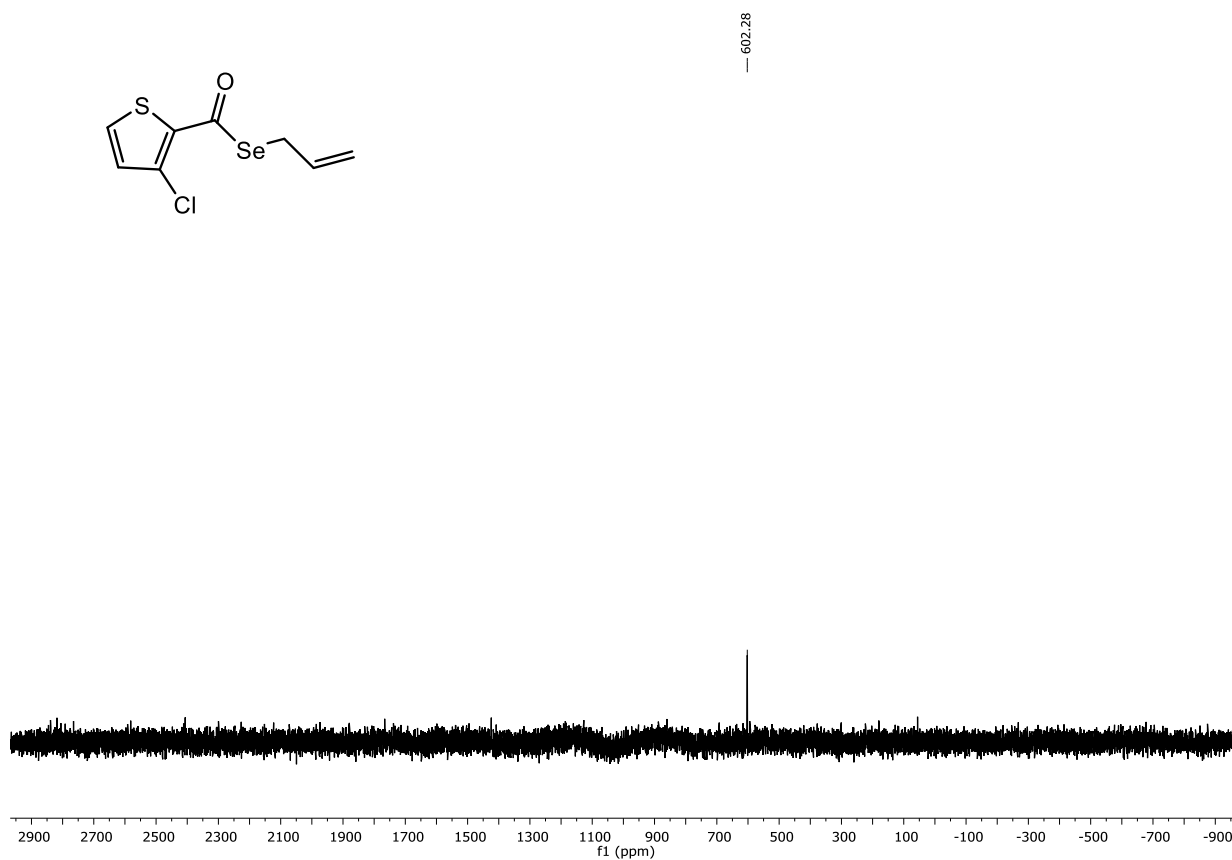


Figure S34. ^{77}Se -NMR spectrum of compound **10a**.

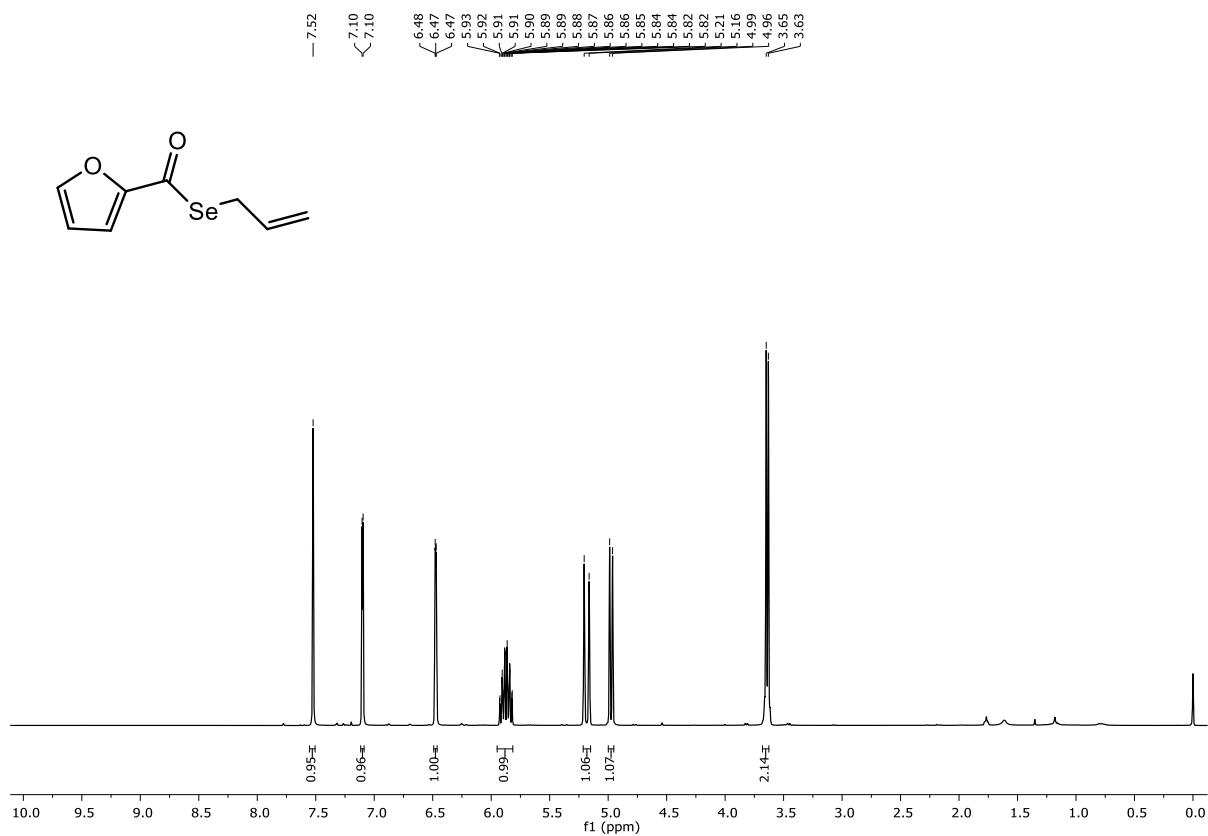


Figure S35. ^1H -NMR spectrum of compound **11a**.

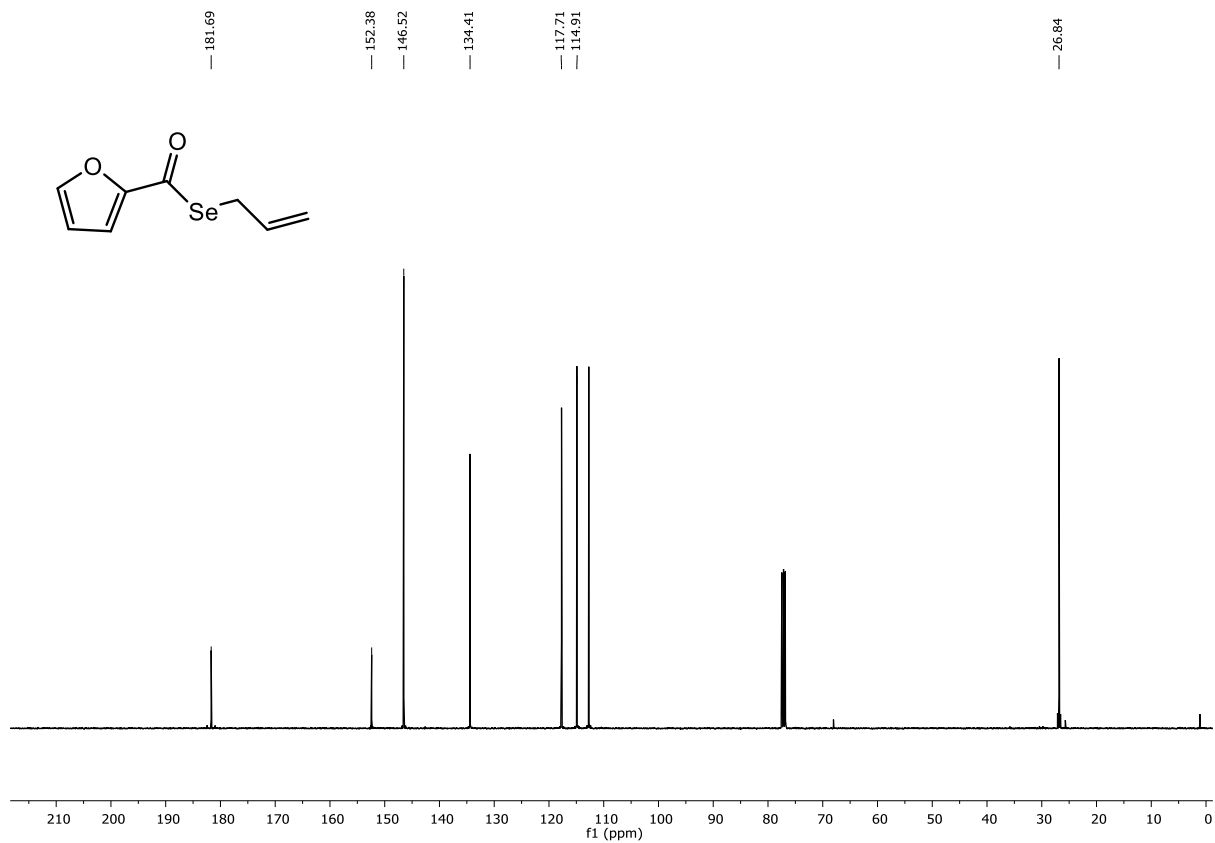


Figure S36. ^{13}C -NMR spectrum of compound **11a**.

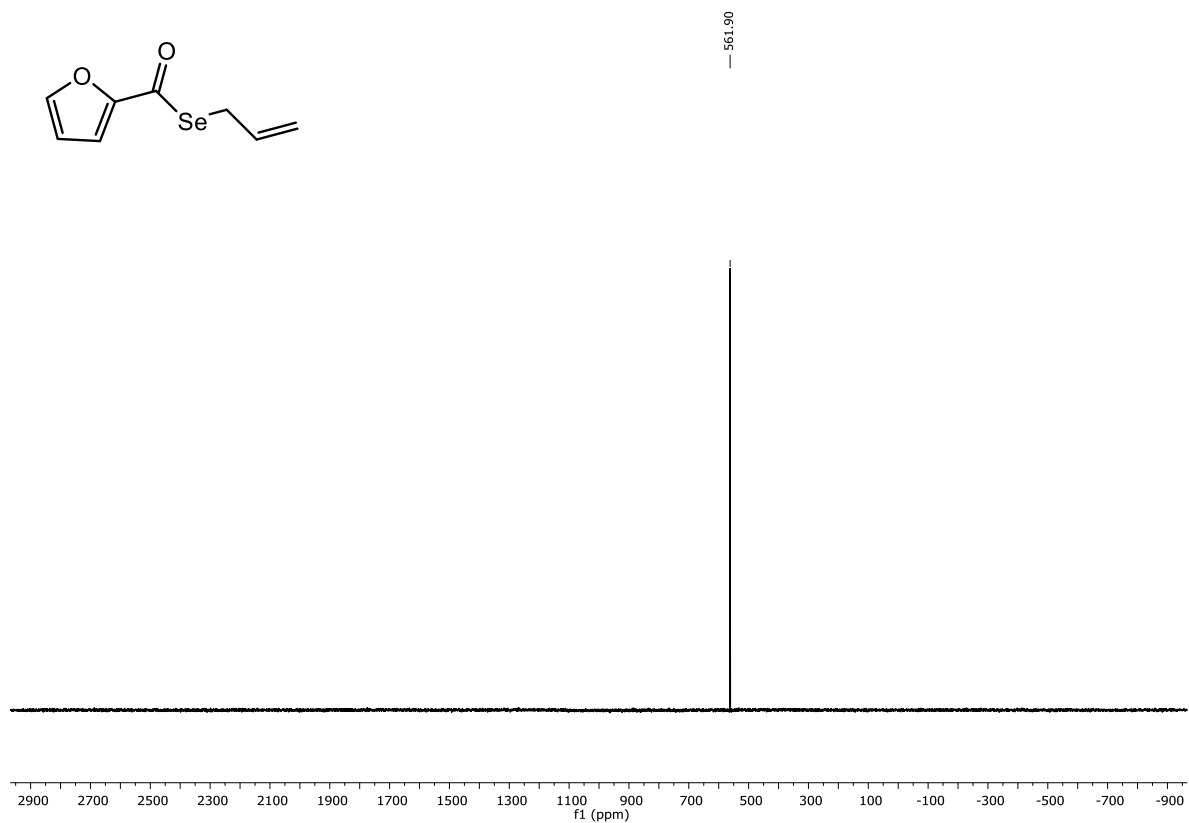


Figure S37. ⁷⁷Se-NMR spectrum of compound 11a.

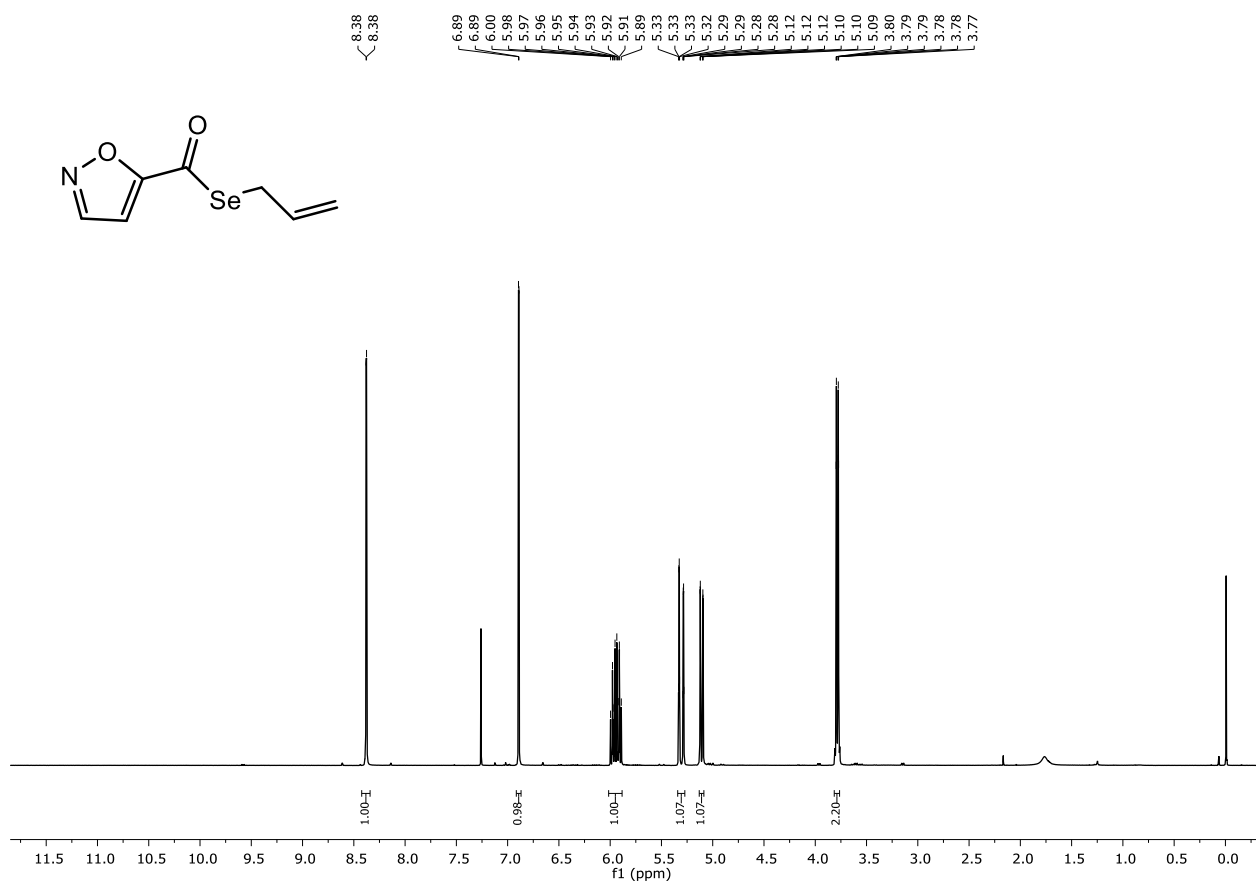


Figure S38. ¹H-NMR spectrum of compound 12a.

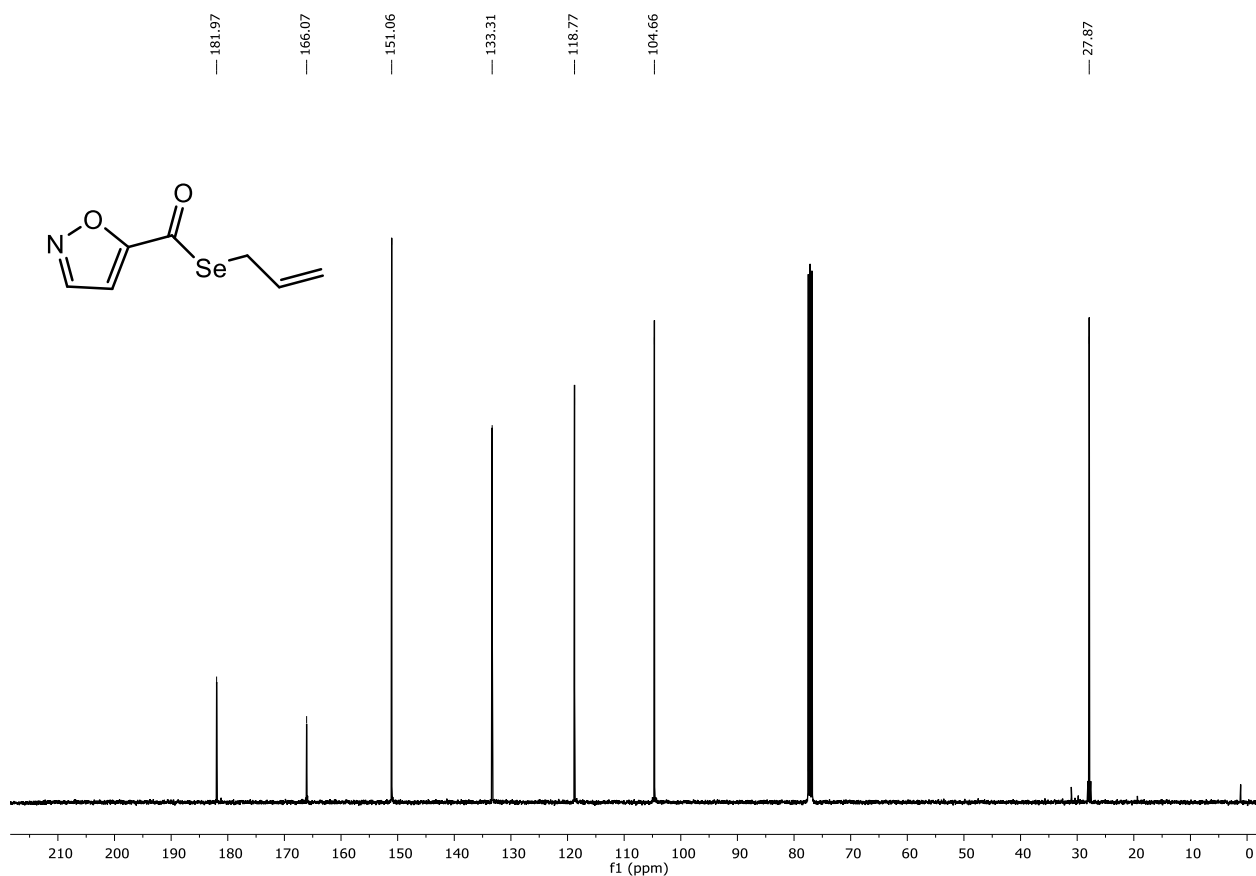


Figure S39. ¹³C-NMR spectrum of compound **12a**.

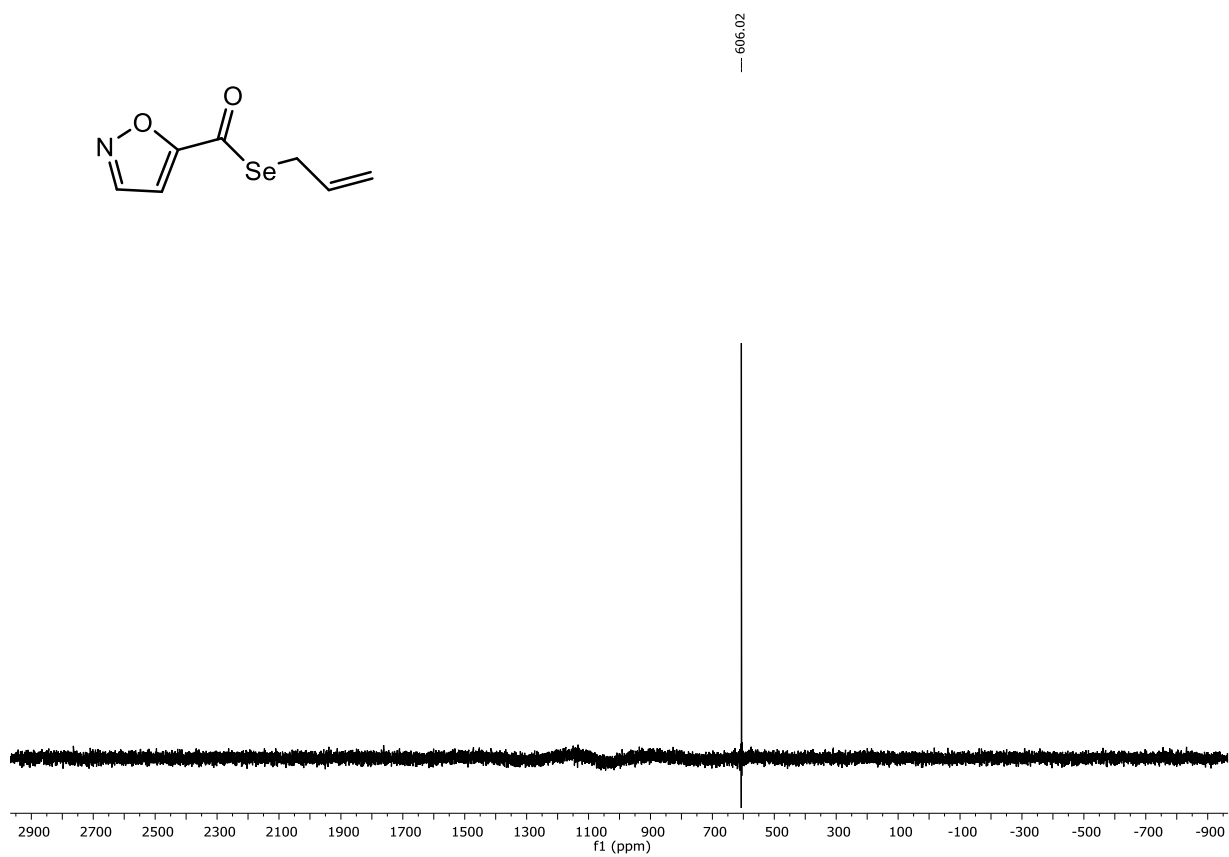


Figure S40. ⁷⁷Se-NMR spectrum of compound **12a**.

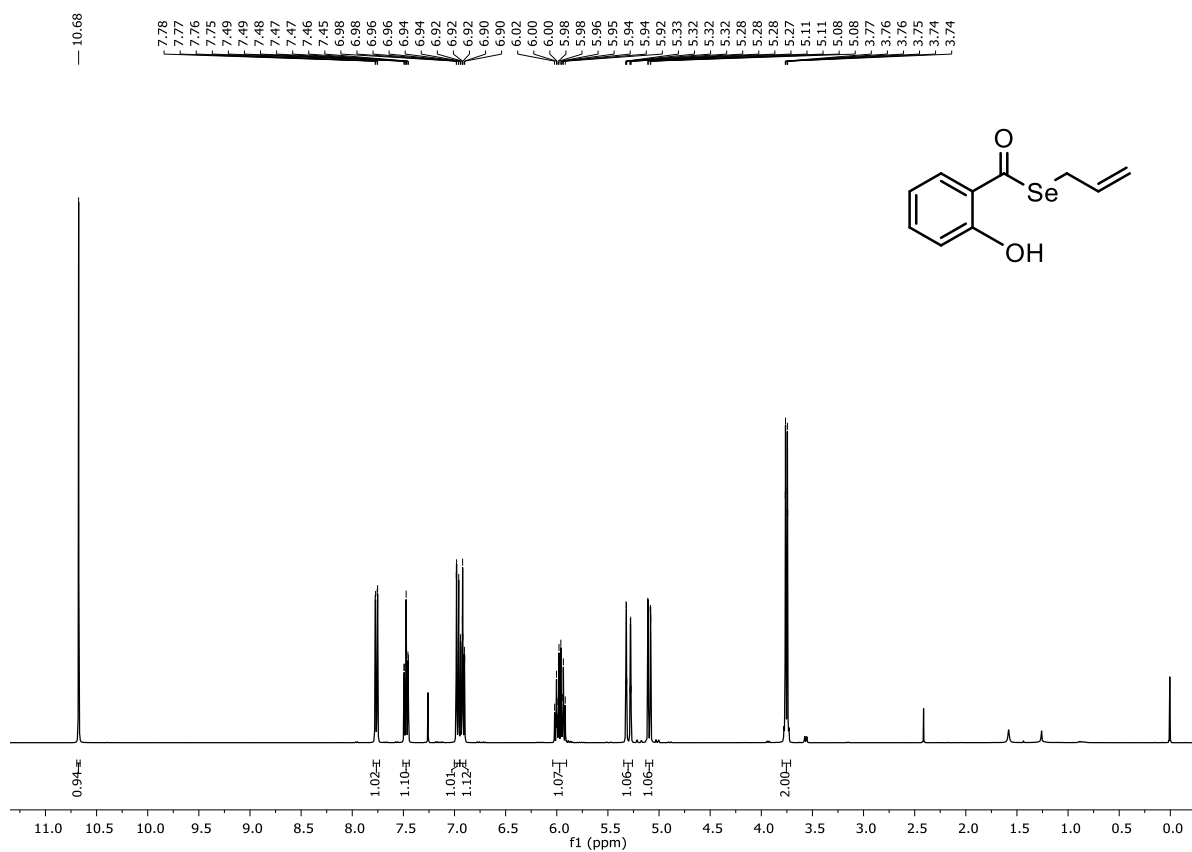


Figure S41. ¹H-NMR spectrum of compound 13a.

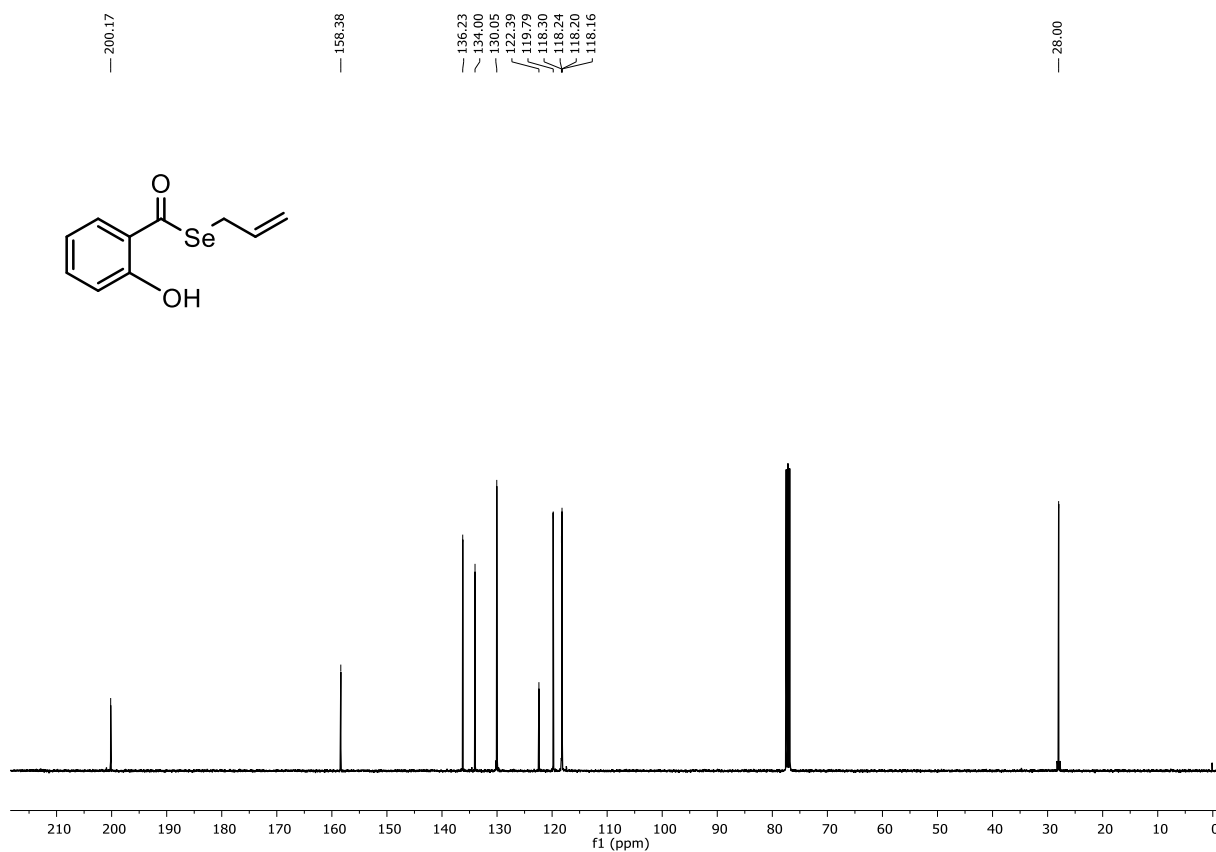


Figure S42. ¹³C-NMR spectrum of compound 13a.

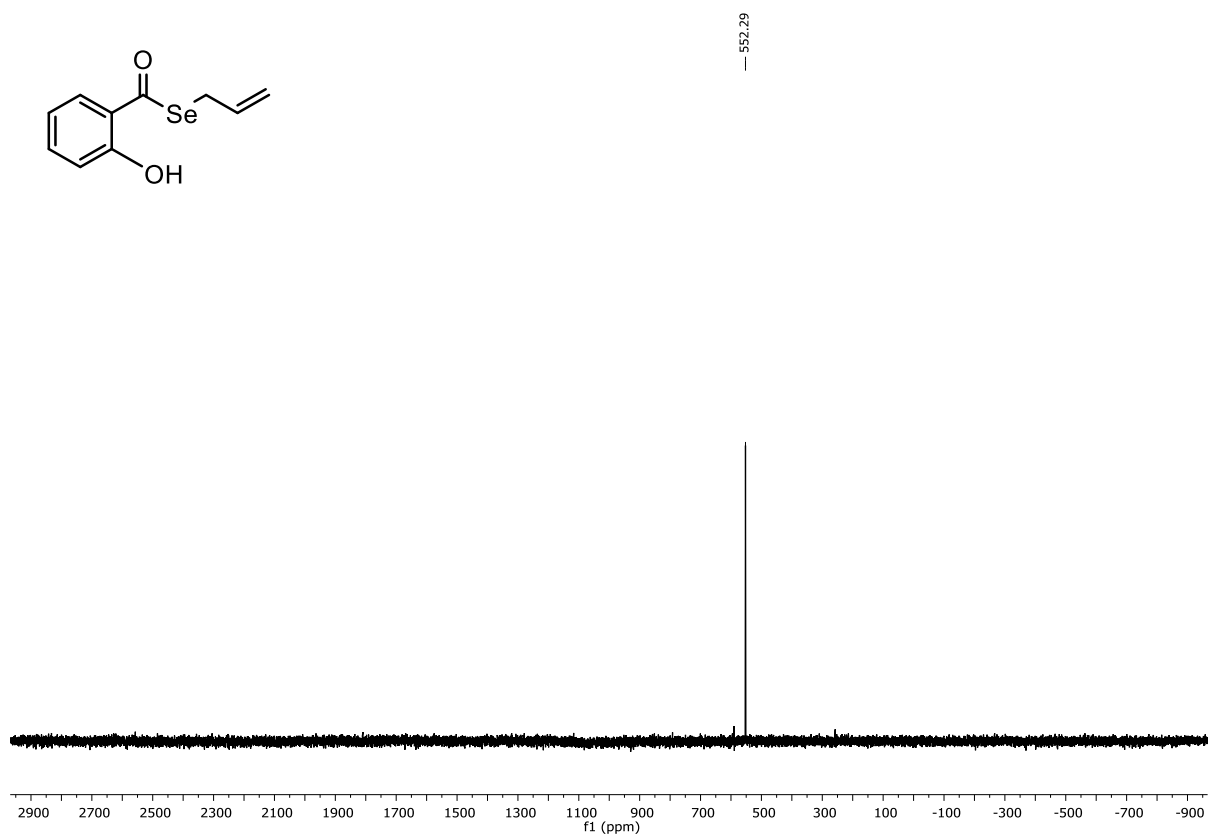


Figure S43. ^{77}Se -NMR spectrum of compound 13a.

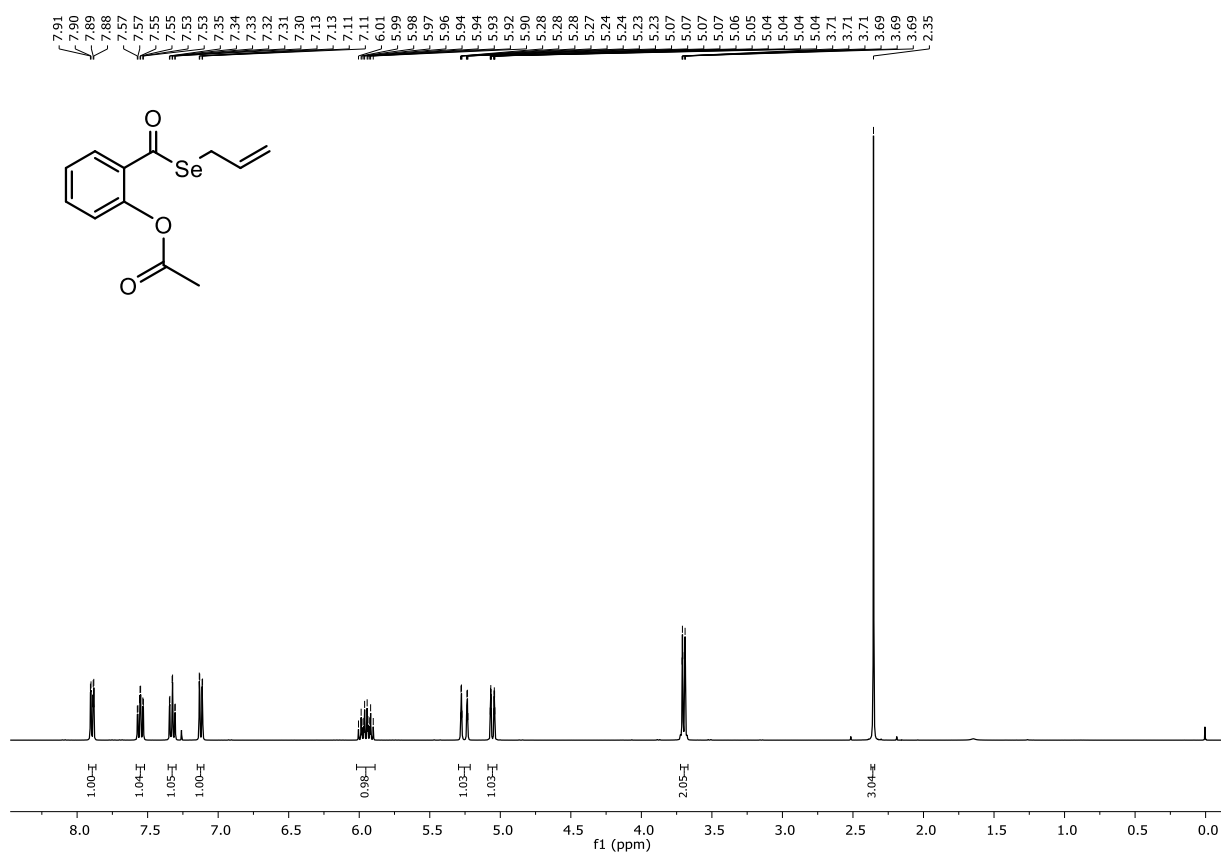


Figure S44. ^1H -NMR spectrum of compound 14a.

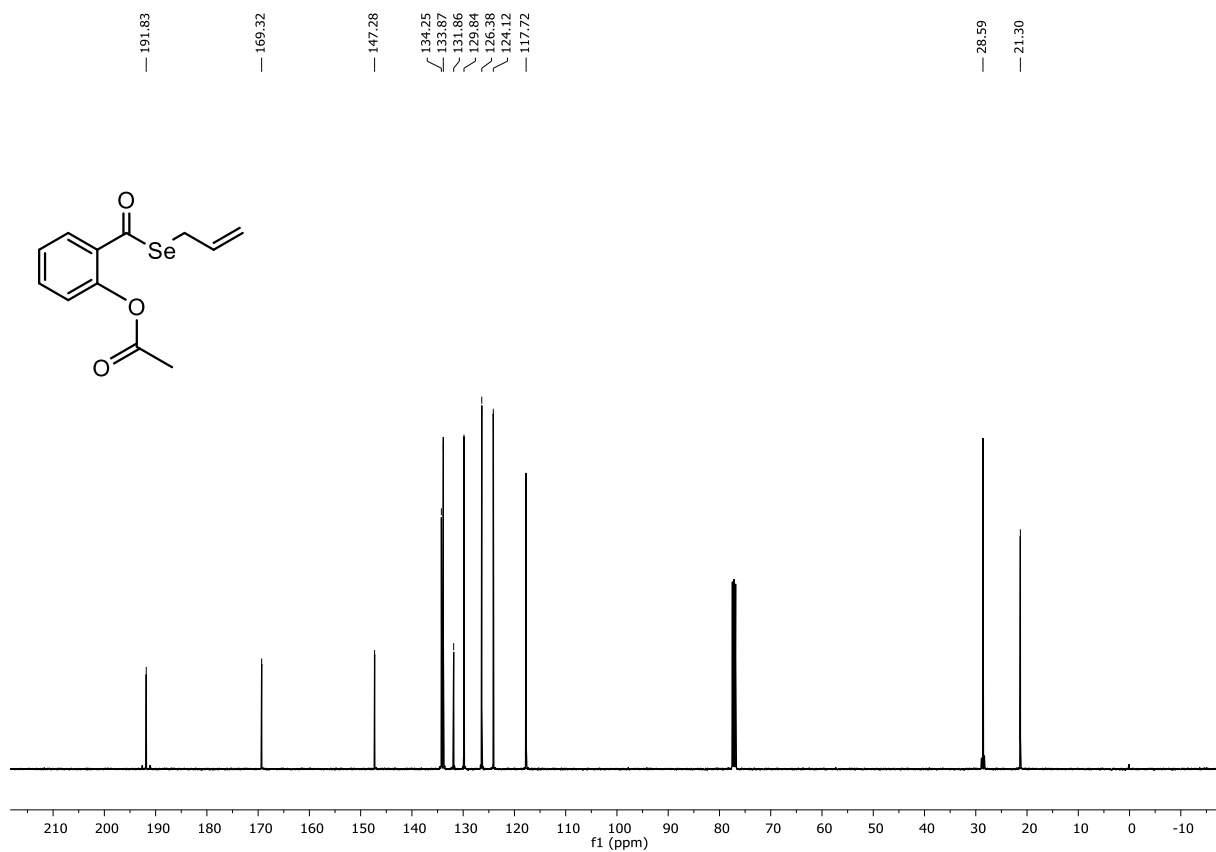


Figure S45. ¹³C-NMR spectrum of compound **14a**.

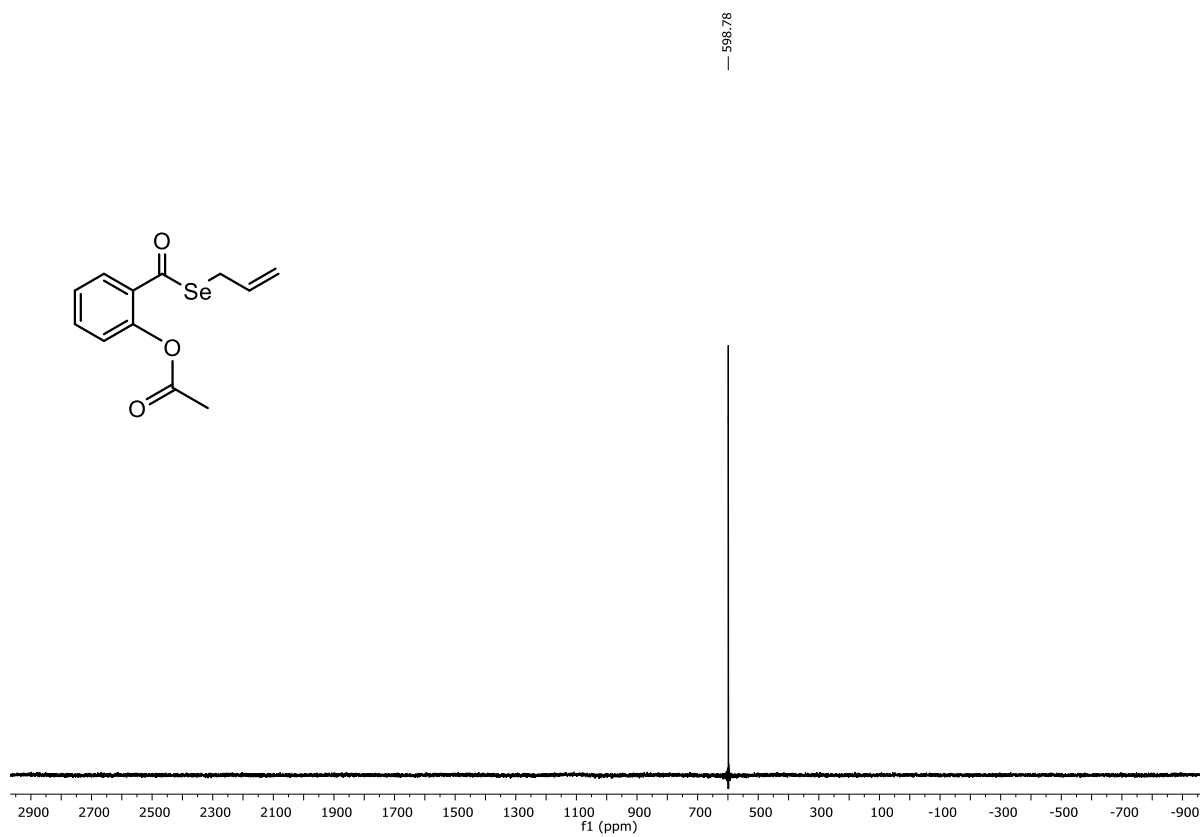


Figure S46. ⁷⁷Se-NMR spectrum of compound **14a**.

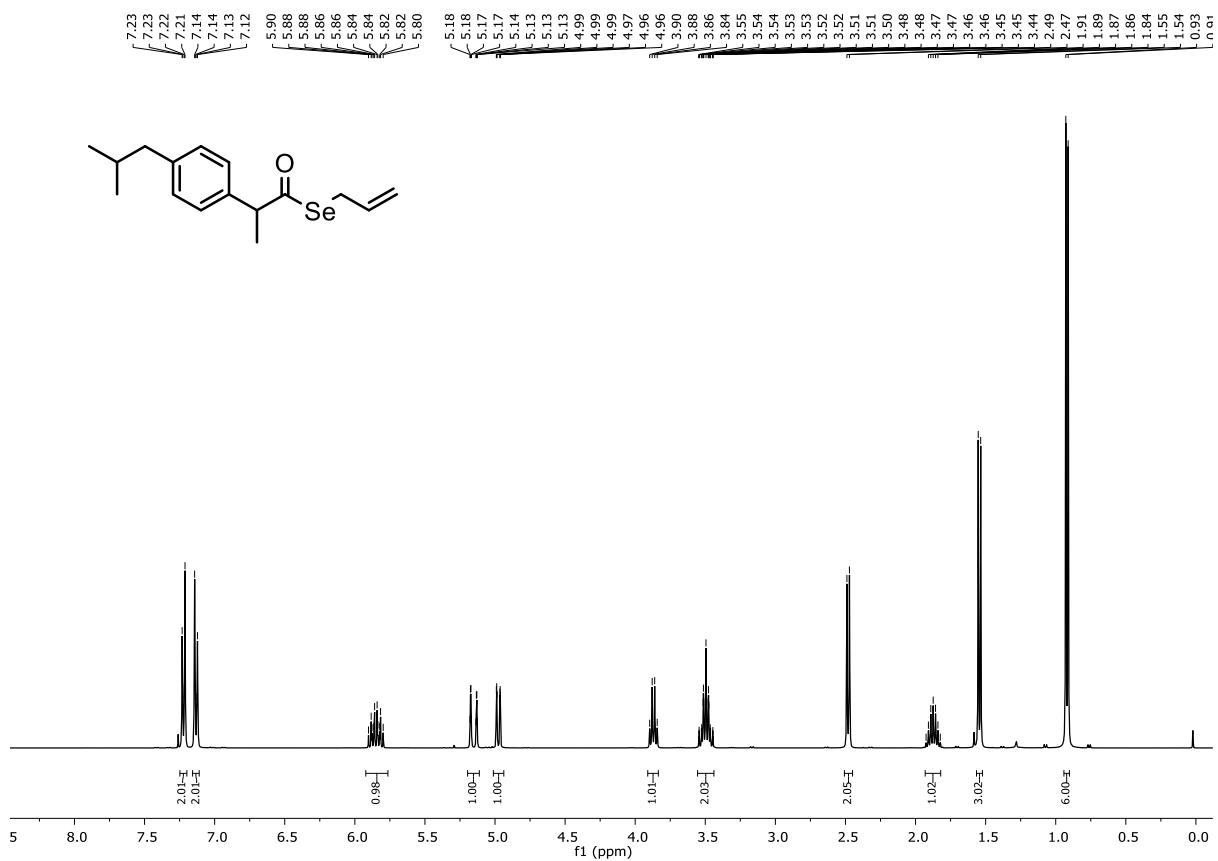


Figure S47. ¹H-NMR spectrum of compound **15a**.

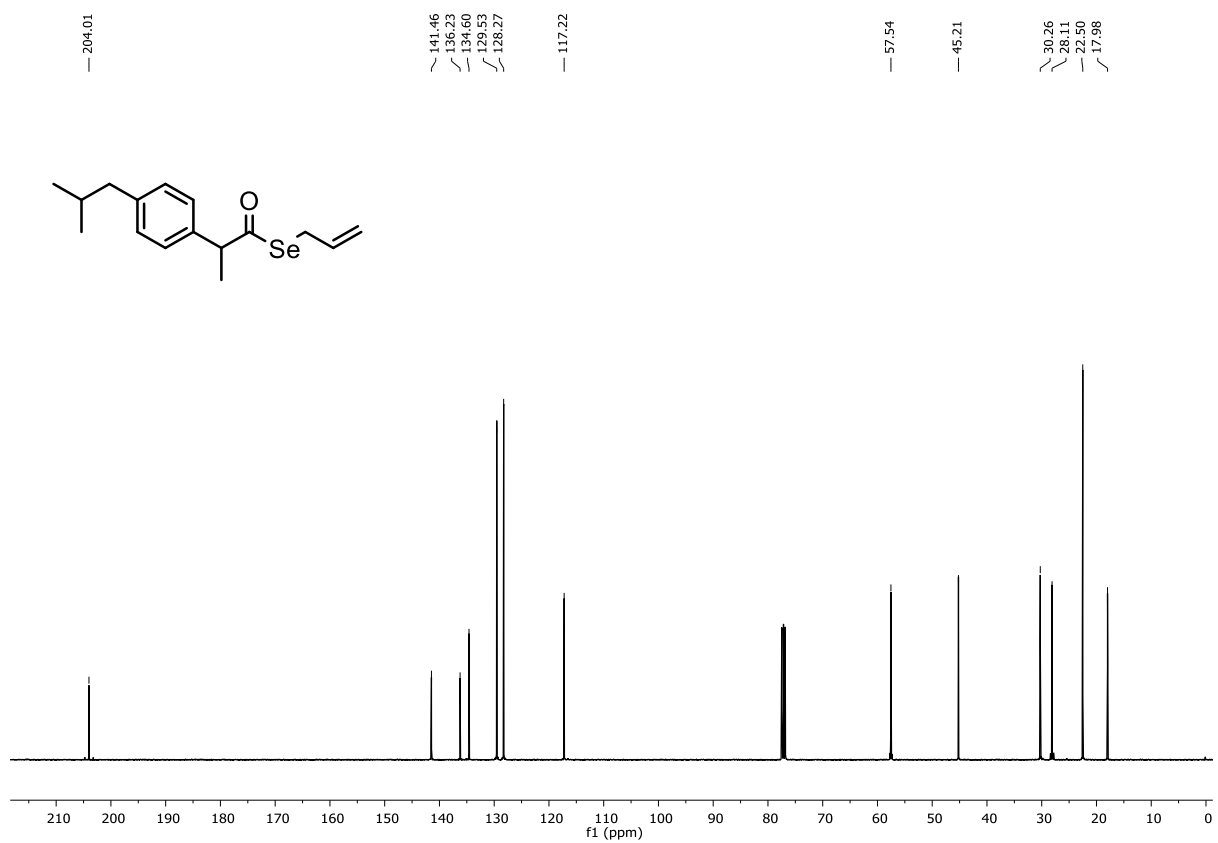


Figure S48. ¹³C-NMR spectrum of compound **15a**.

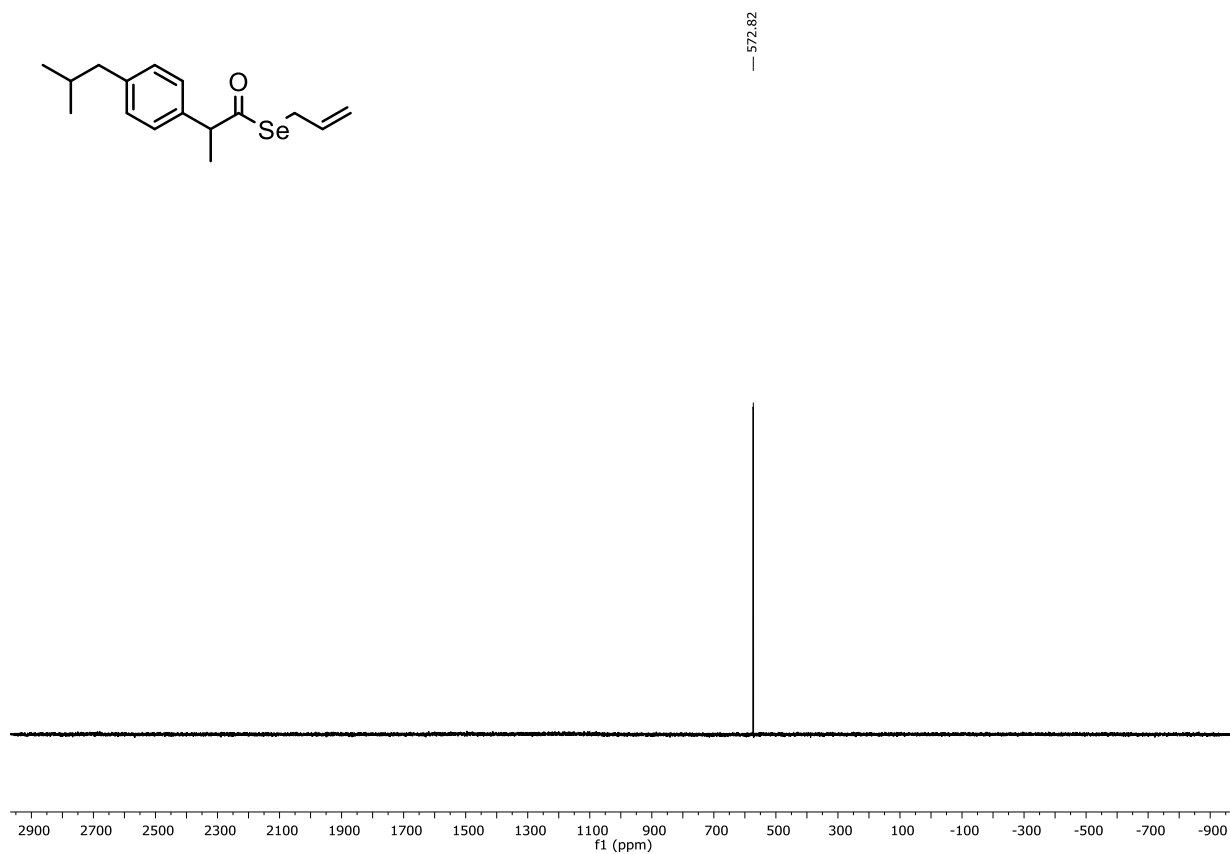


Figure S49. ⁷⁷Se-NMR spectrum of compound **15a**.

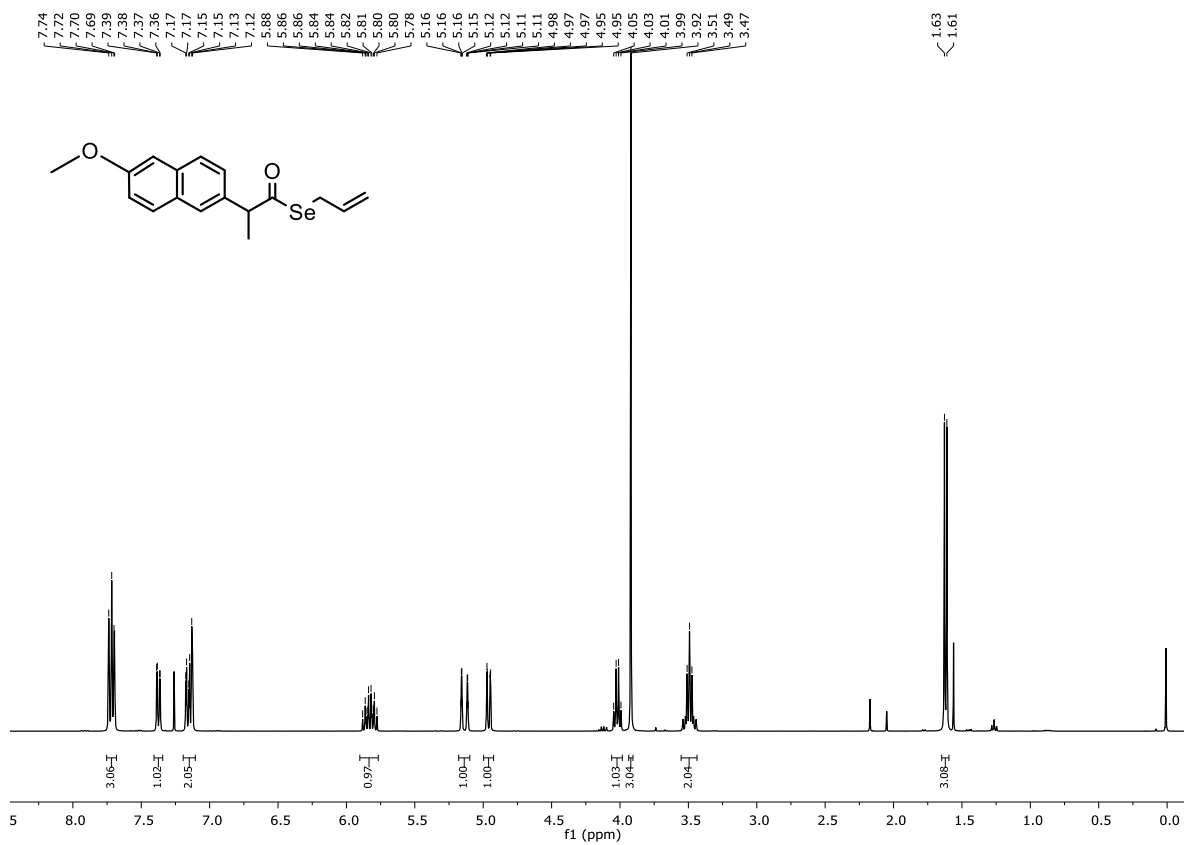


Figure S50. ¹H-NMR spectrum of compound **16a**.

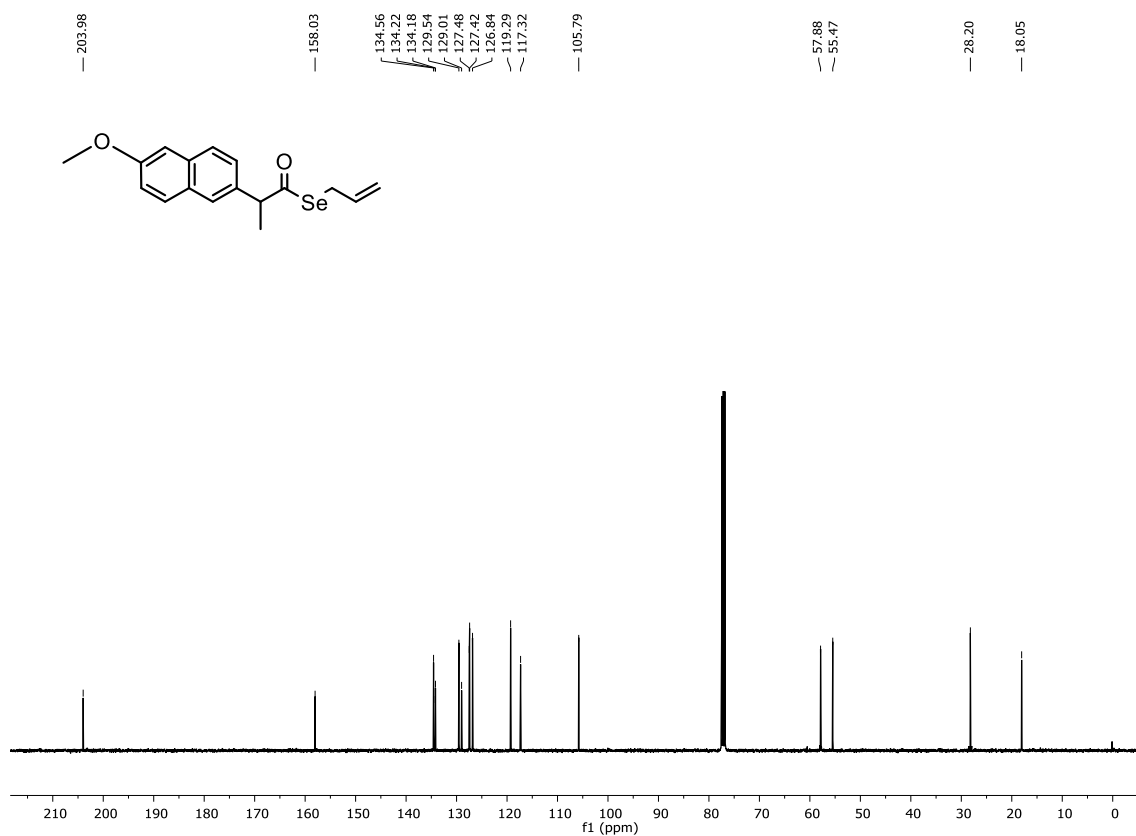


Figure S51. ^{13}C -NMR spectrum of compound **16a**.

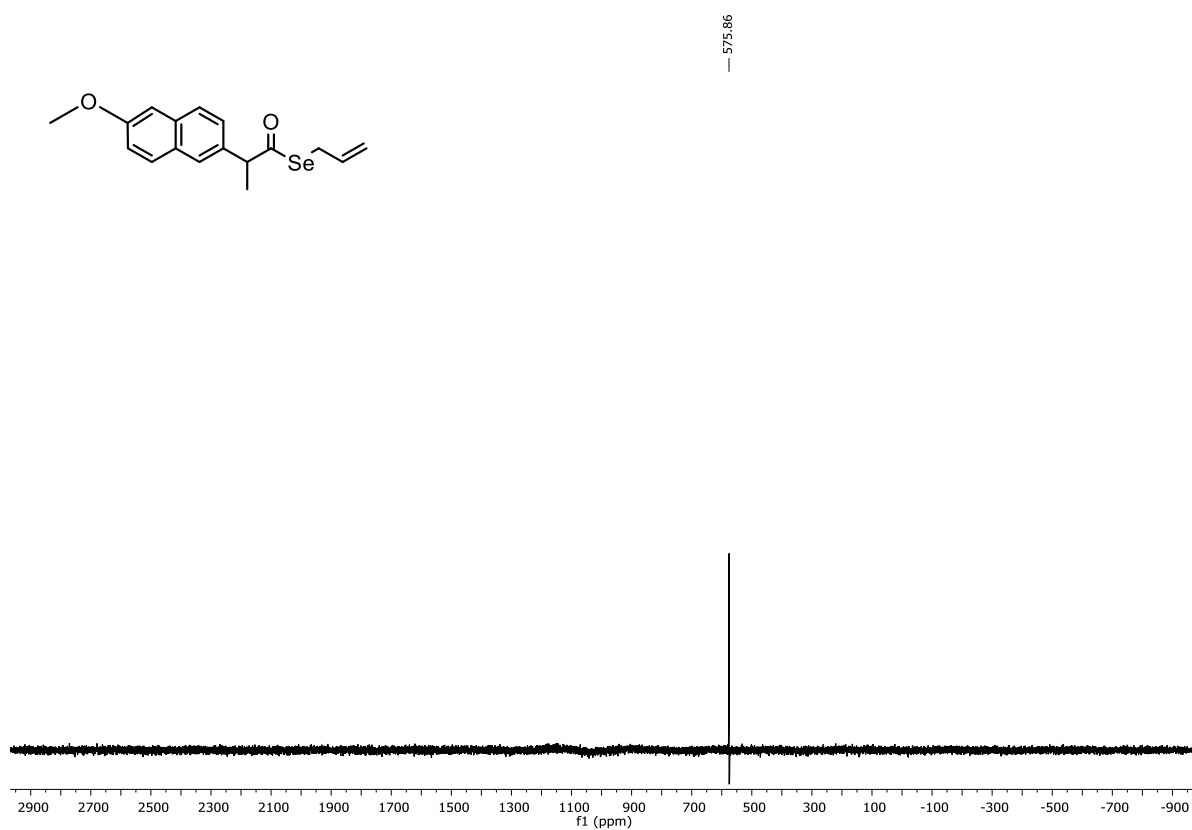


Figure S52. ^{77}Se -NMR spectrum of compound **16a**.

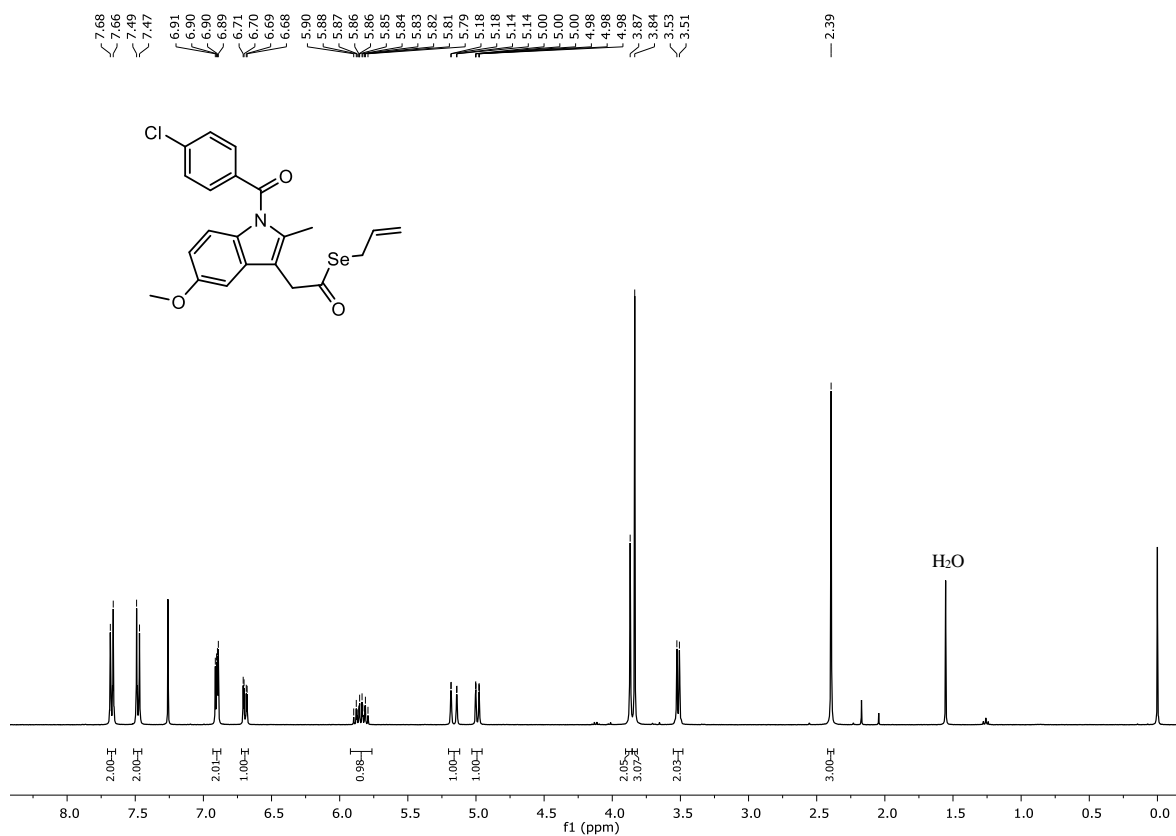


Figure S53. ¹H-NMR spectrum of compound **17a**.

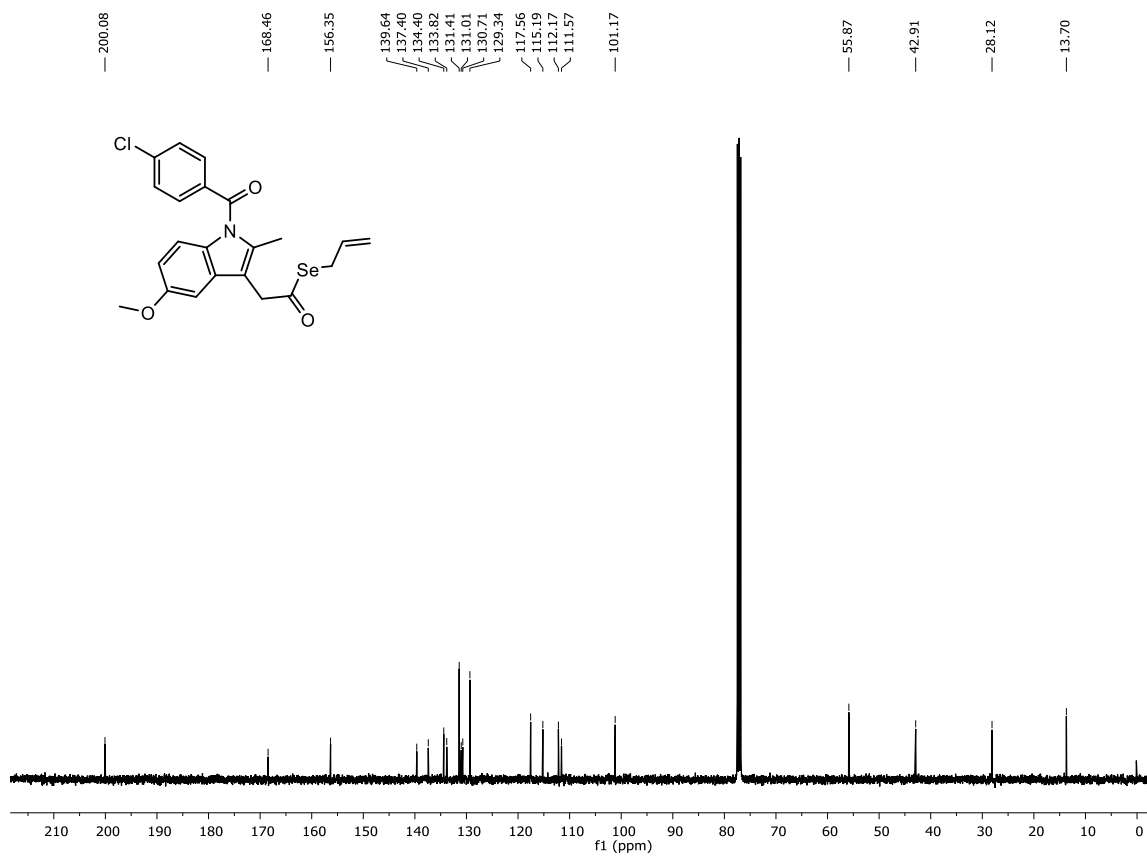


Figure S54. ¹³C-NMR spectrum of compound **17a**.

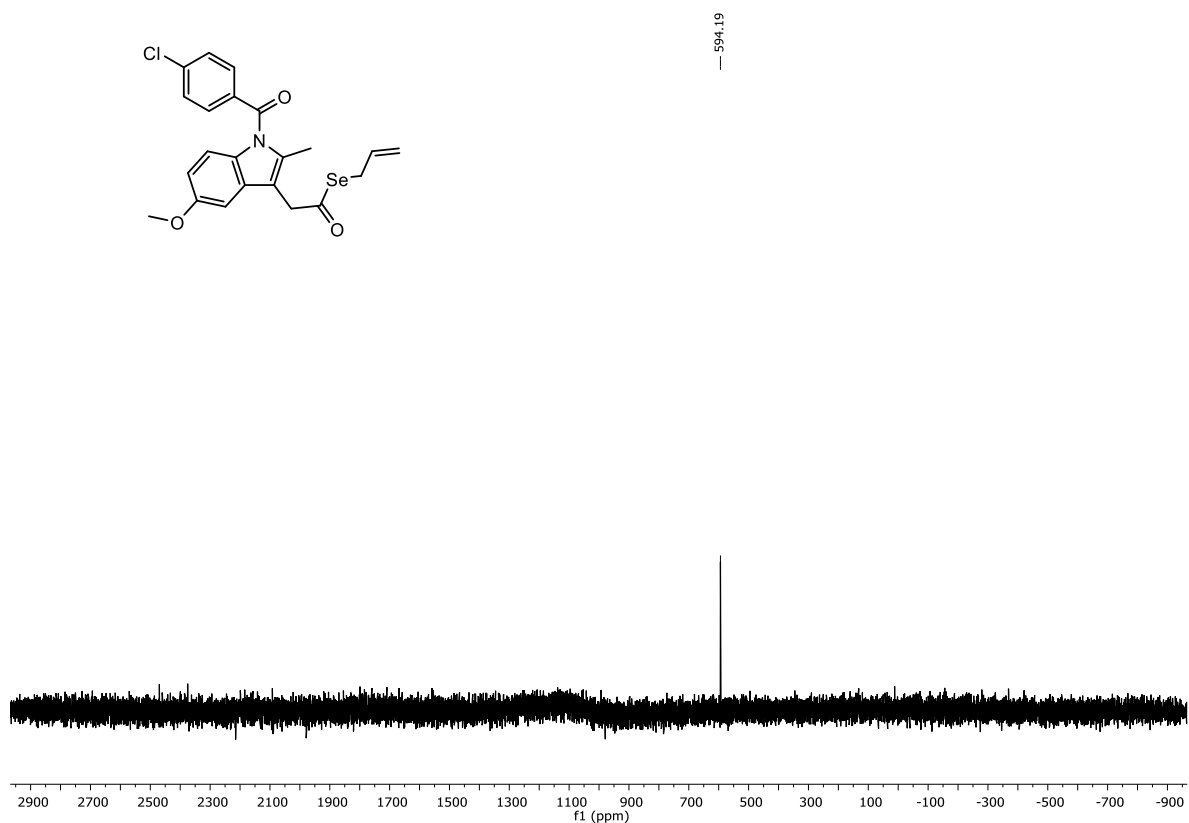


Figure S55. ^{77}Se -NMR spectrum of compound **17a**.

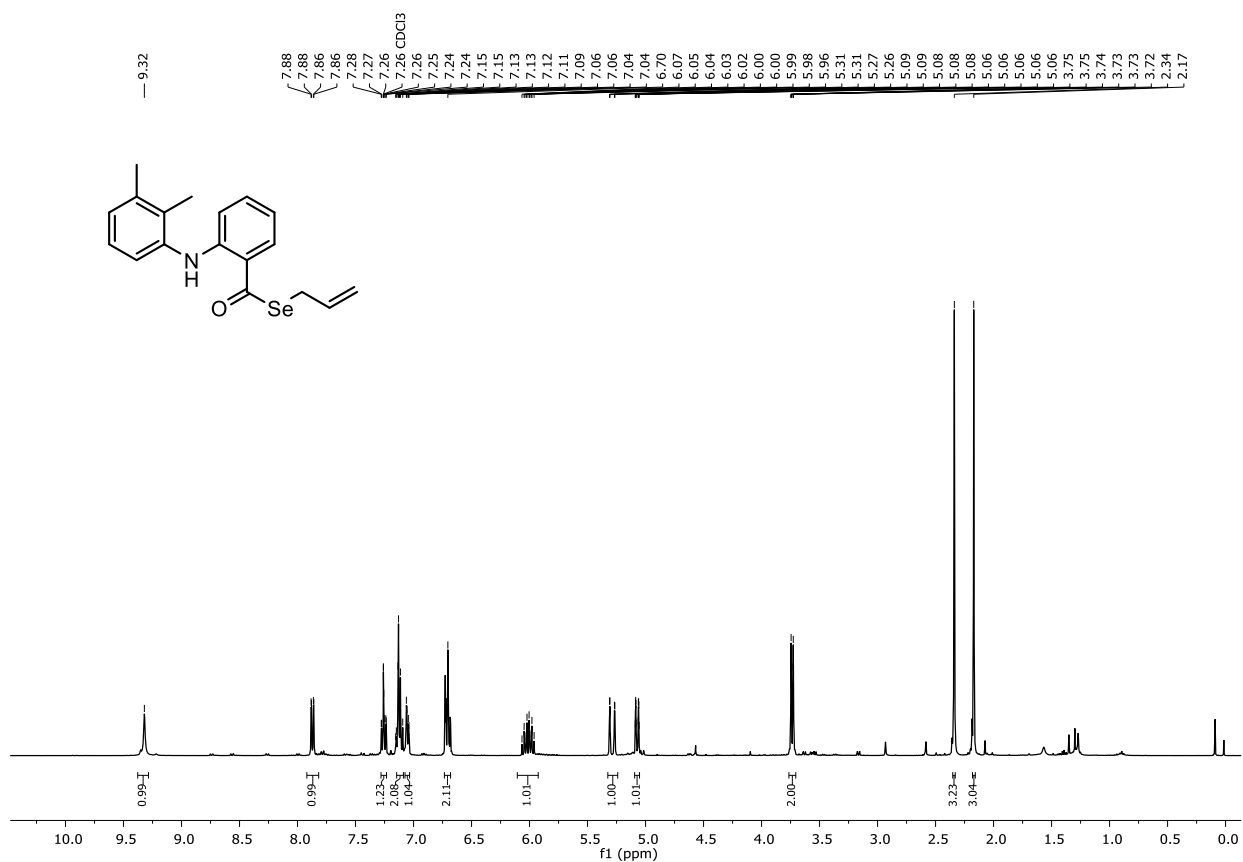


Figure S56. ^1H -NMR spectrum of compound **18a**.

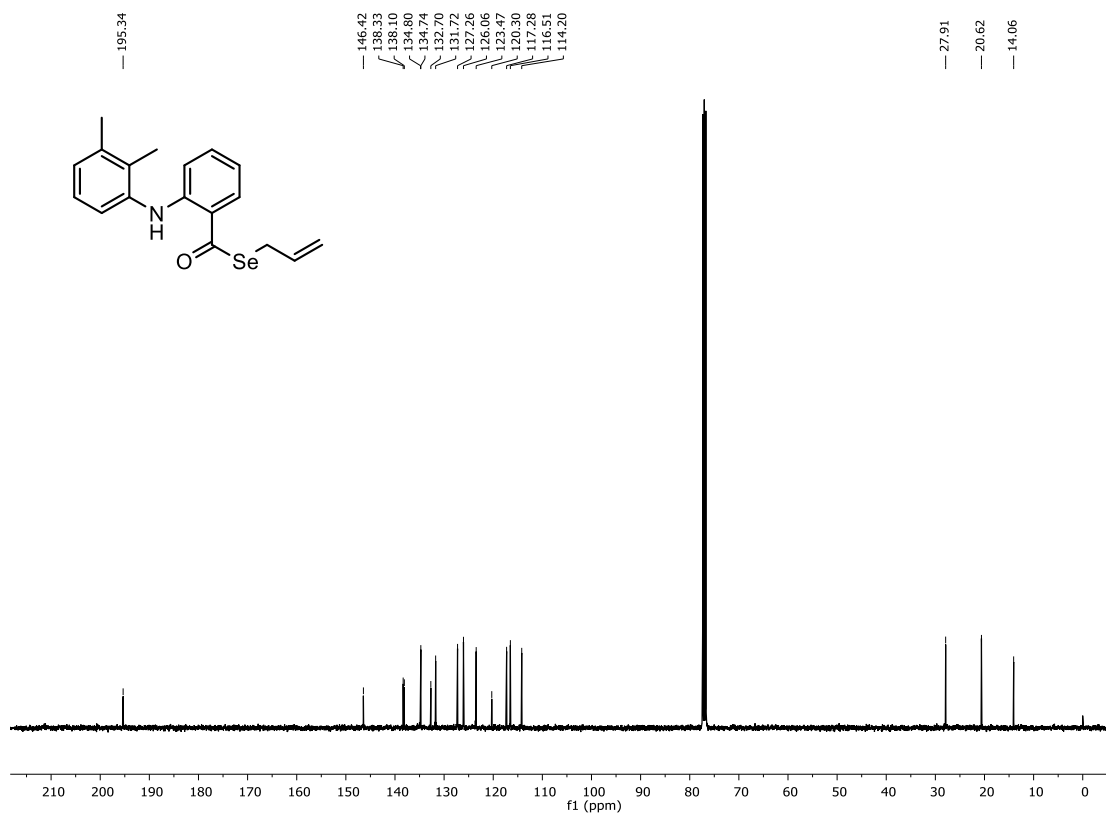


Figure S57. ¹³C-NMR spectrum of compound **18a**.

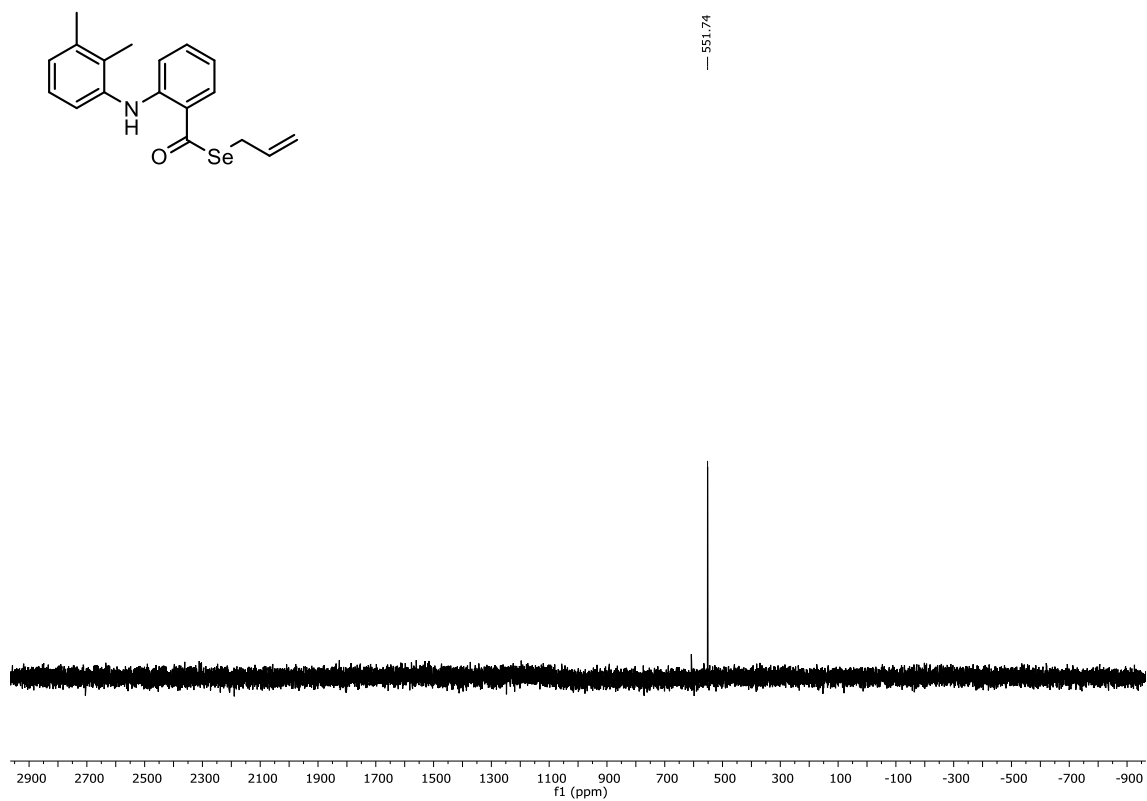


Figure S58. ⁷⁷Se-NMR spectrum of compound **18a**.

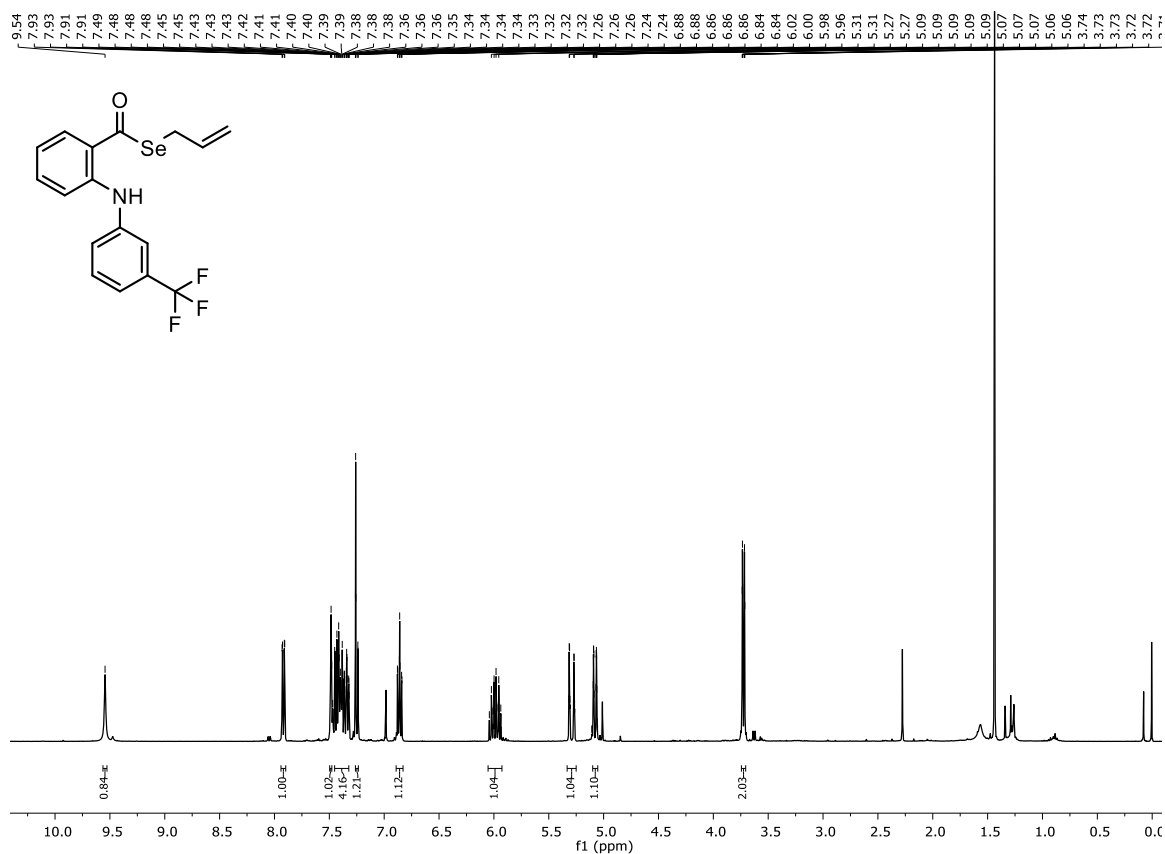


Figure S59. ¹H-NMR spectrum of compound 19a.

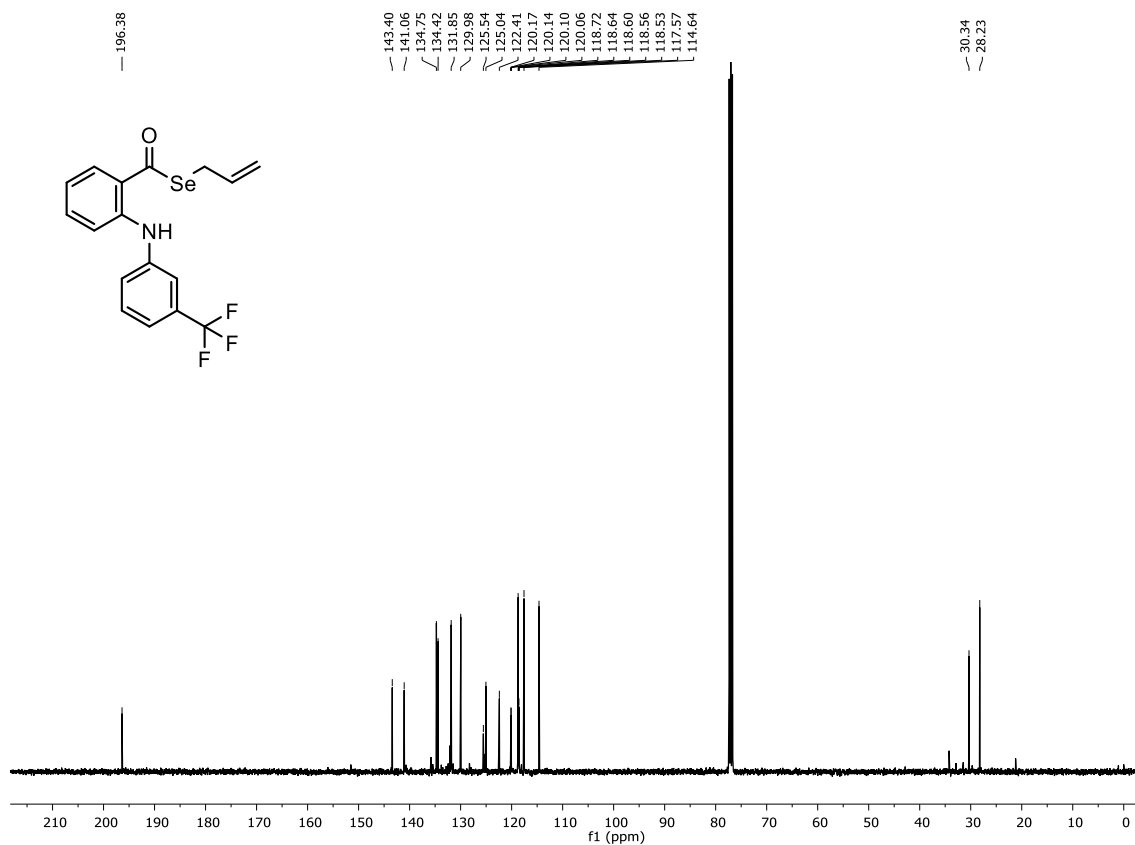


Figure S60. ¹³C-NMR spectrum of compound 19a.

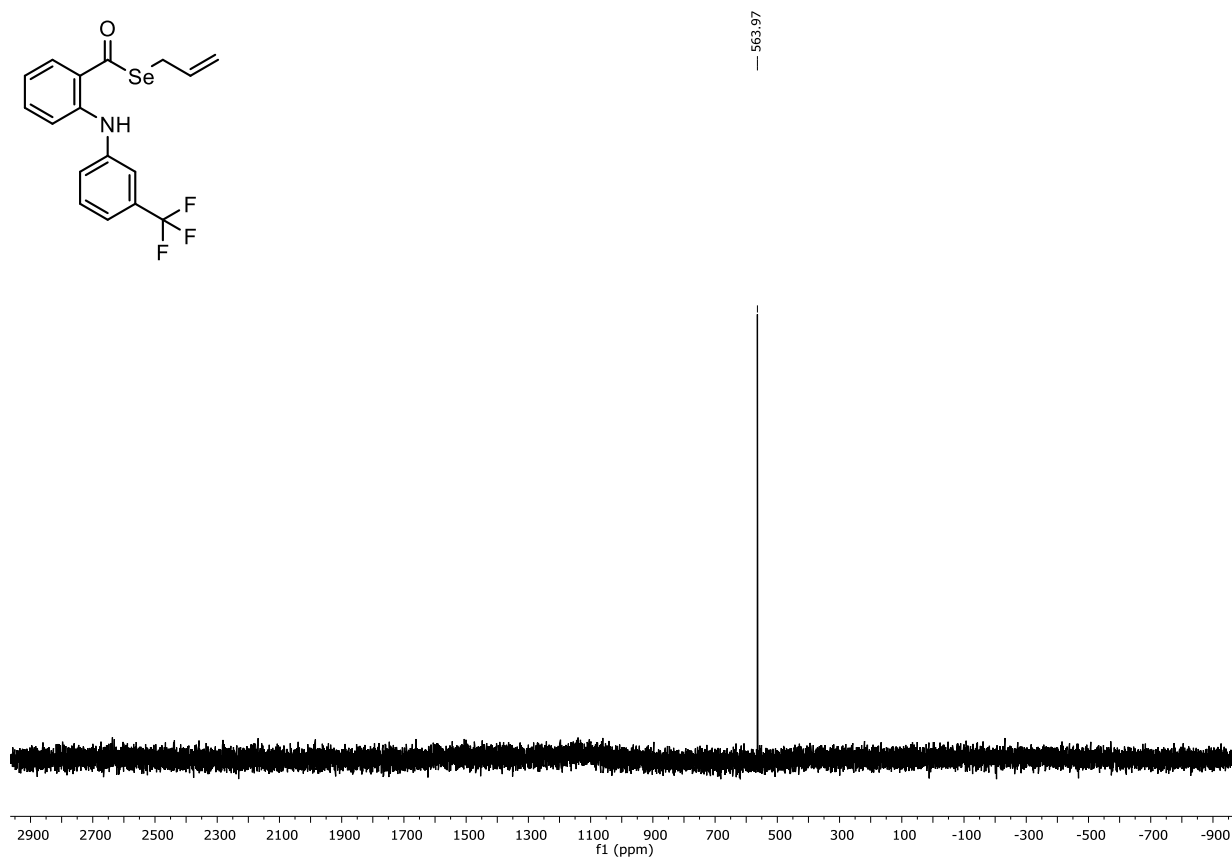


Figure S61. ⁷⁷Se-NMR spectrum of compound **19a**.

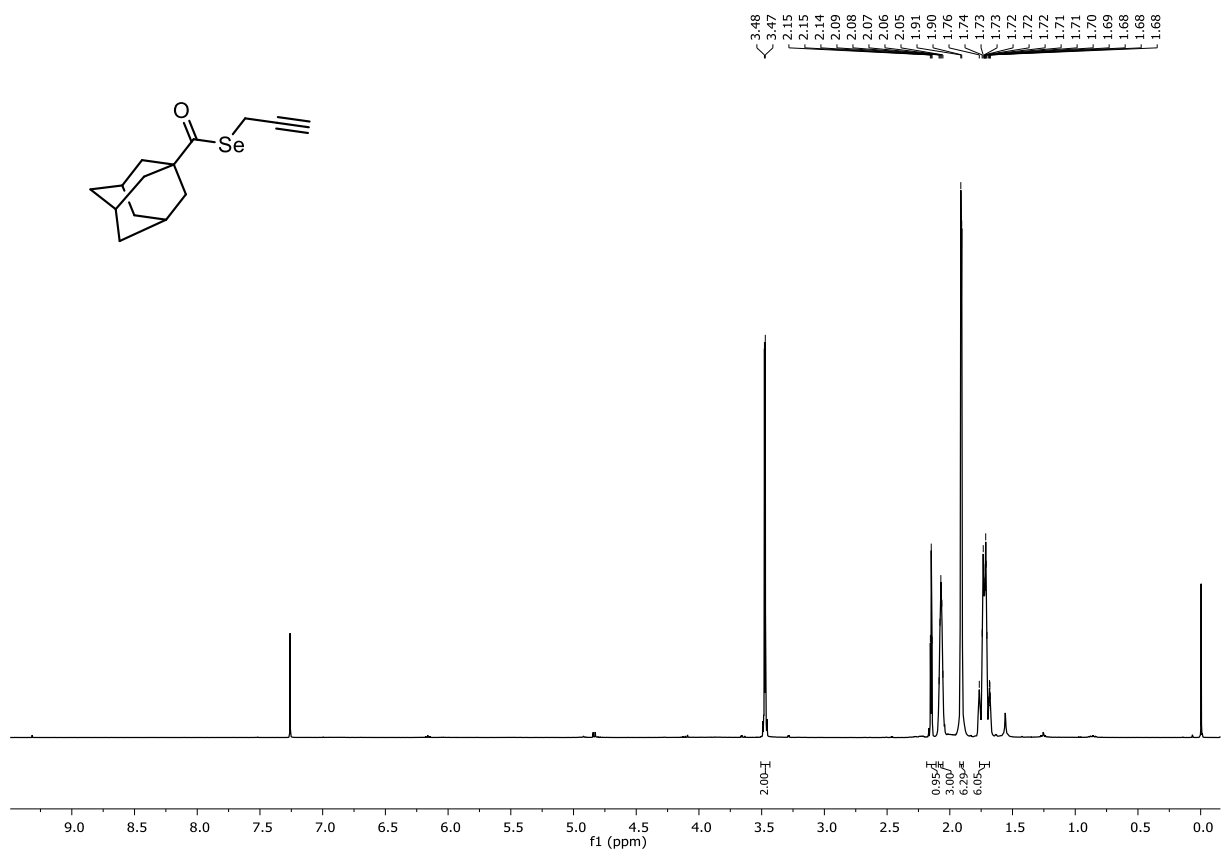


Figure S62. ¹H-NMR spectrum of compound **1b**.

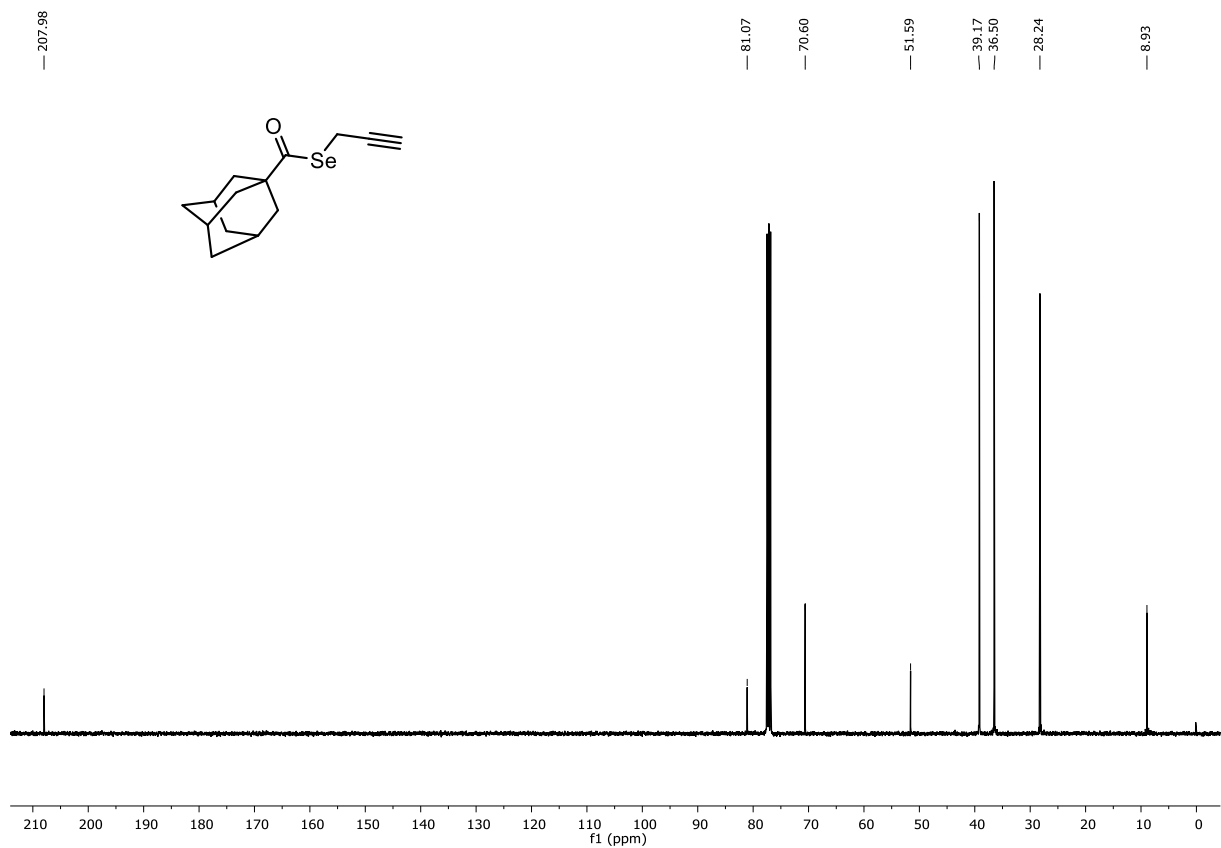


Figure S63. ^{13}C -NMR spectrum of compound **1b**.

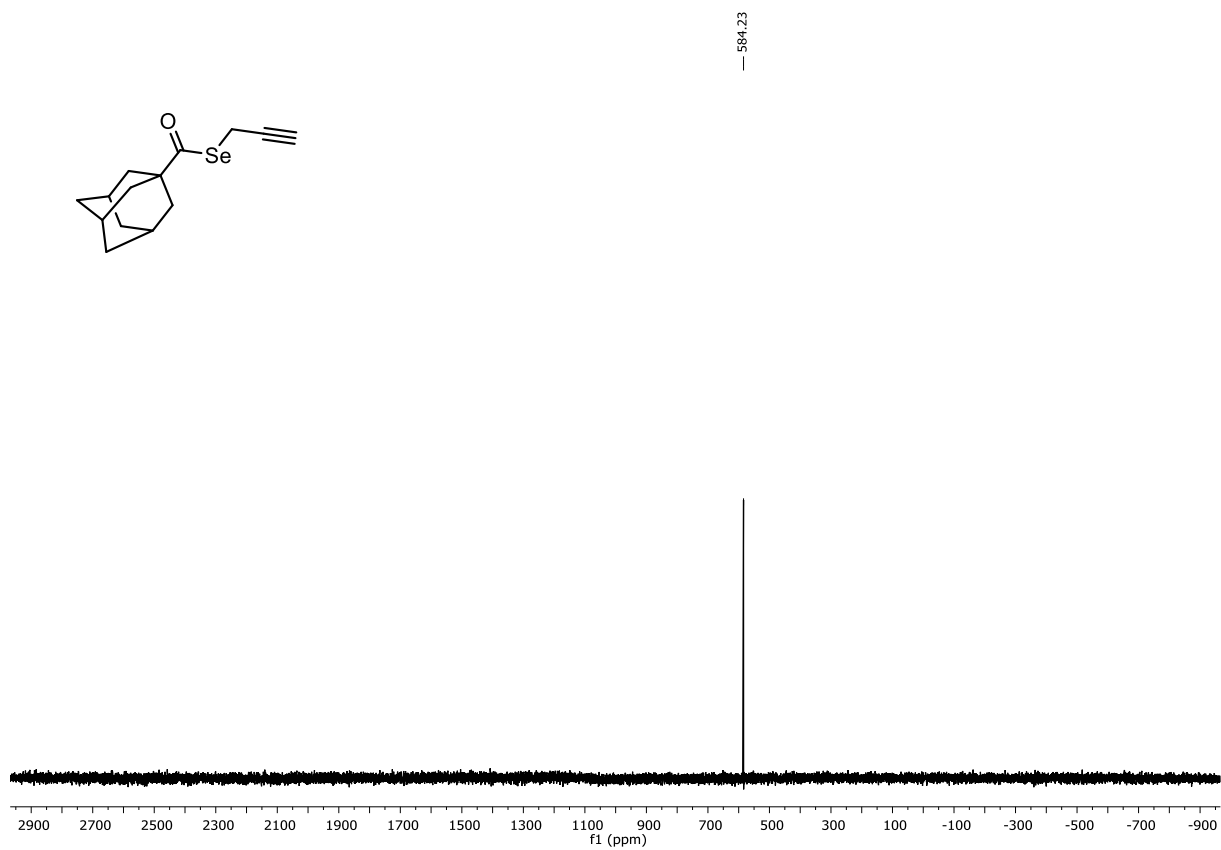
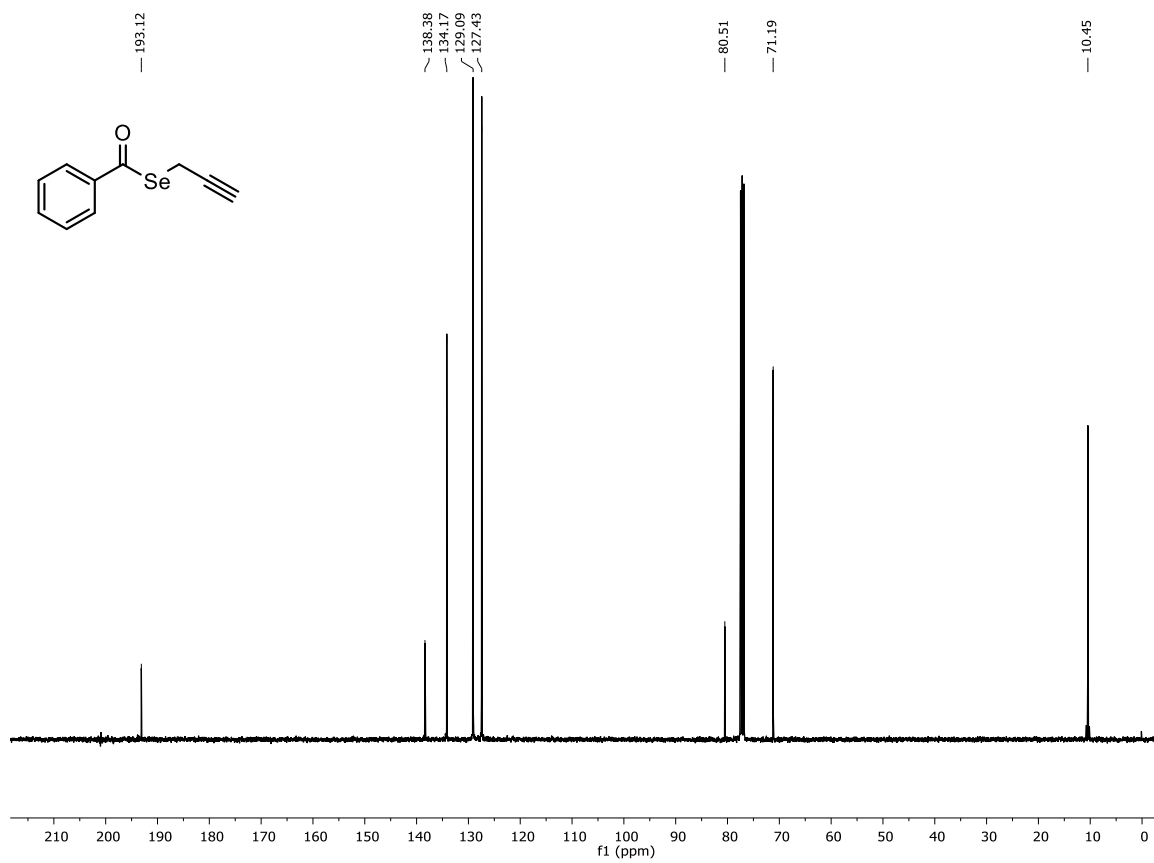
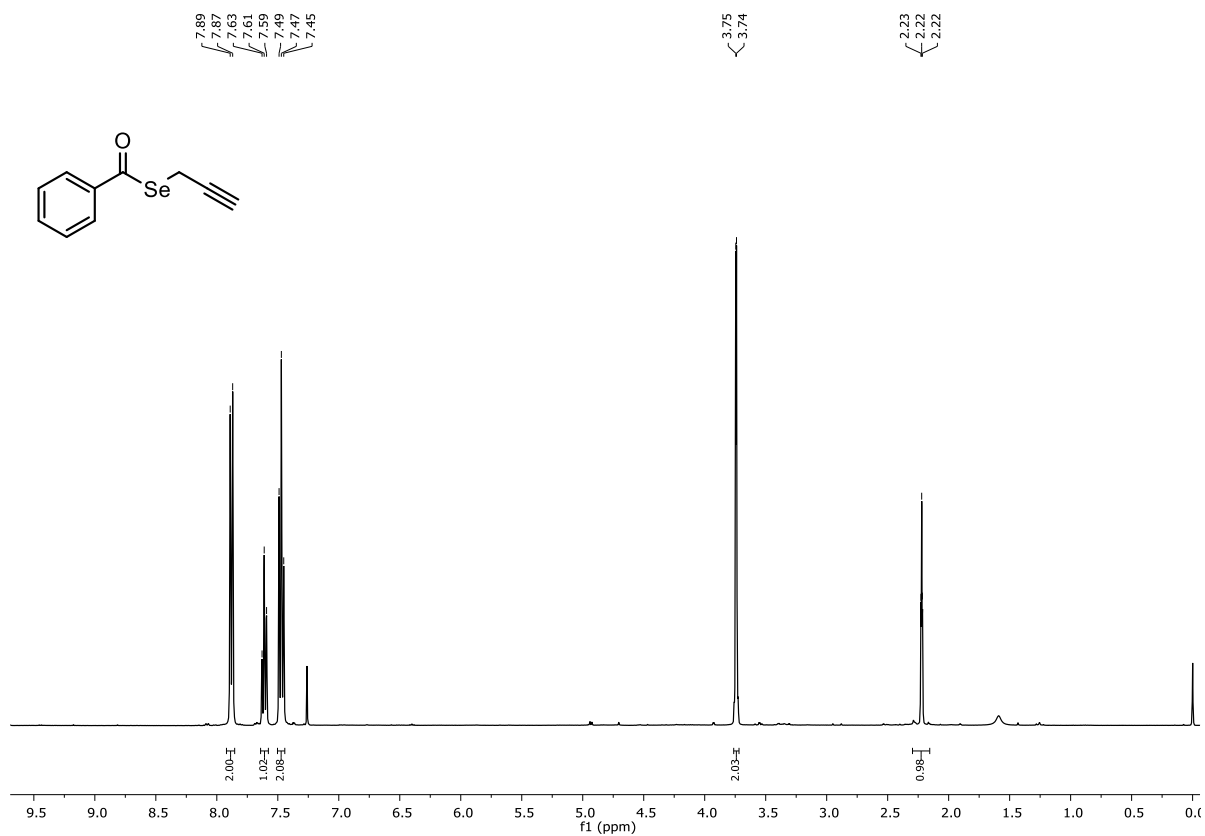


Figure S64. ^{77}Se -NMR spectrum of compound **1b**.



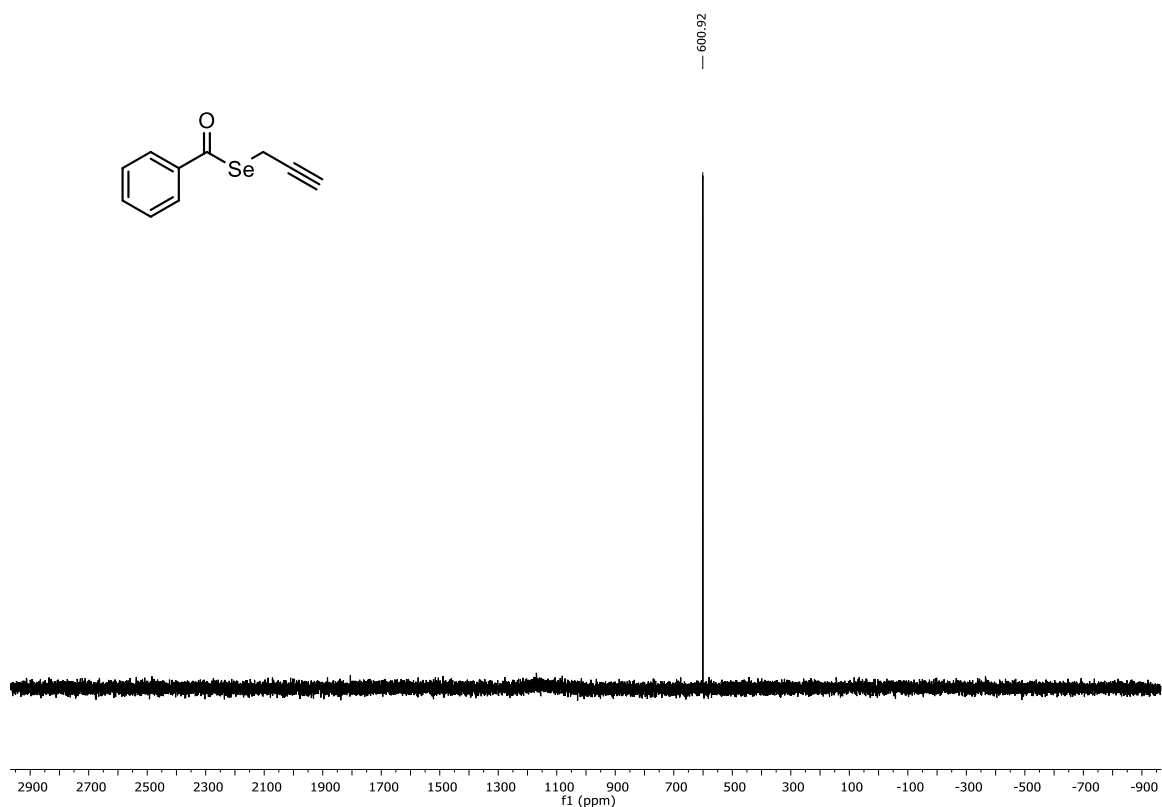


Figure S67. ⁷⁷Se-NMR spectrum of compound 2b.

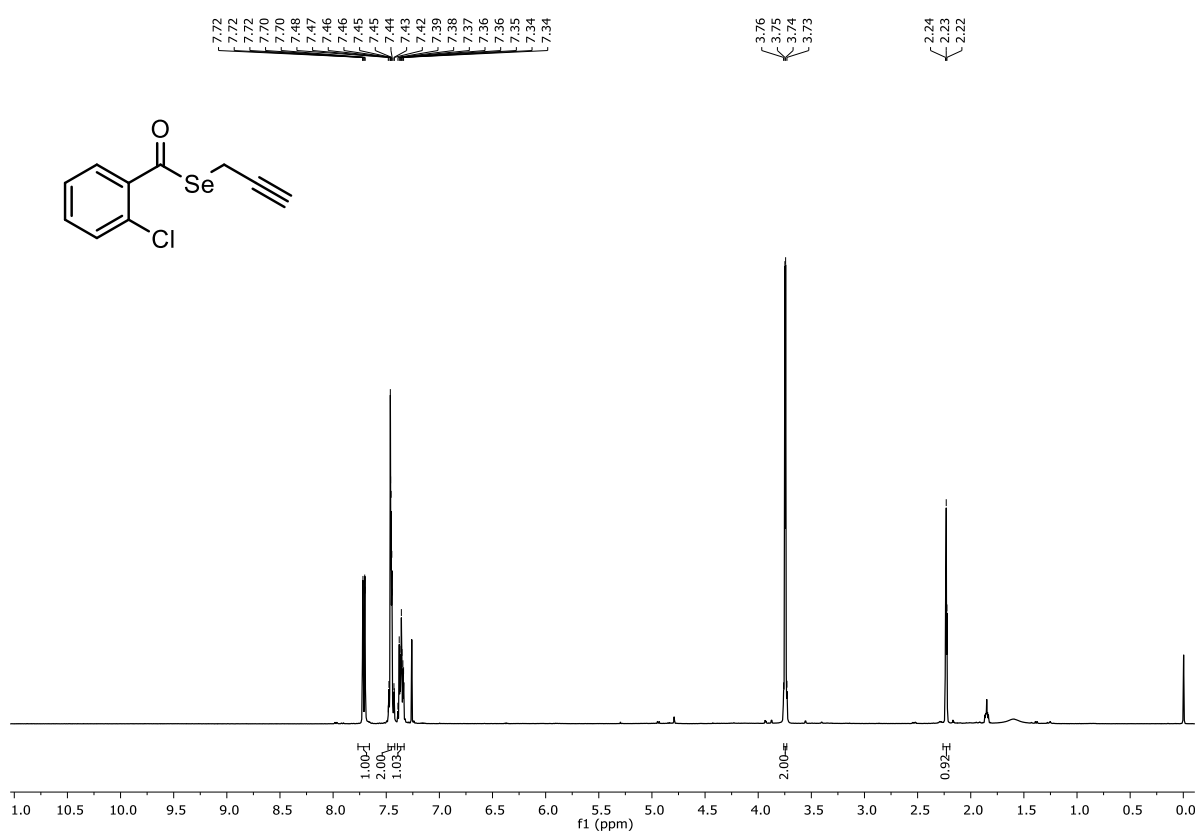


Figure S68. ¹H-NMR spectrum of compound 3b.

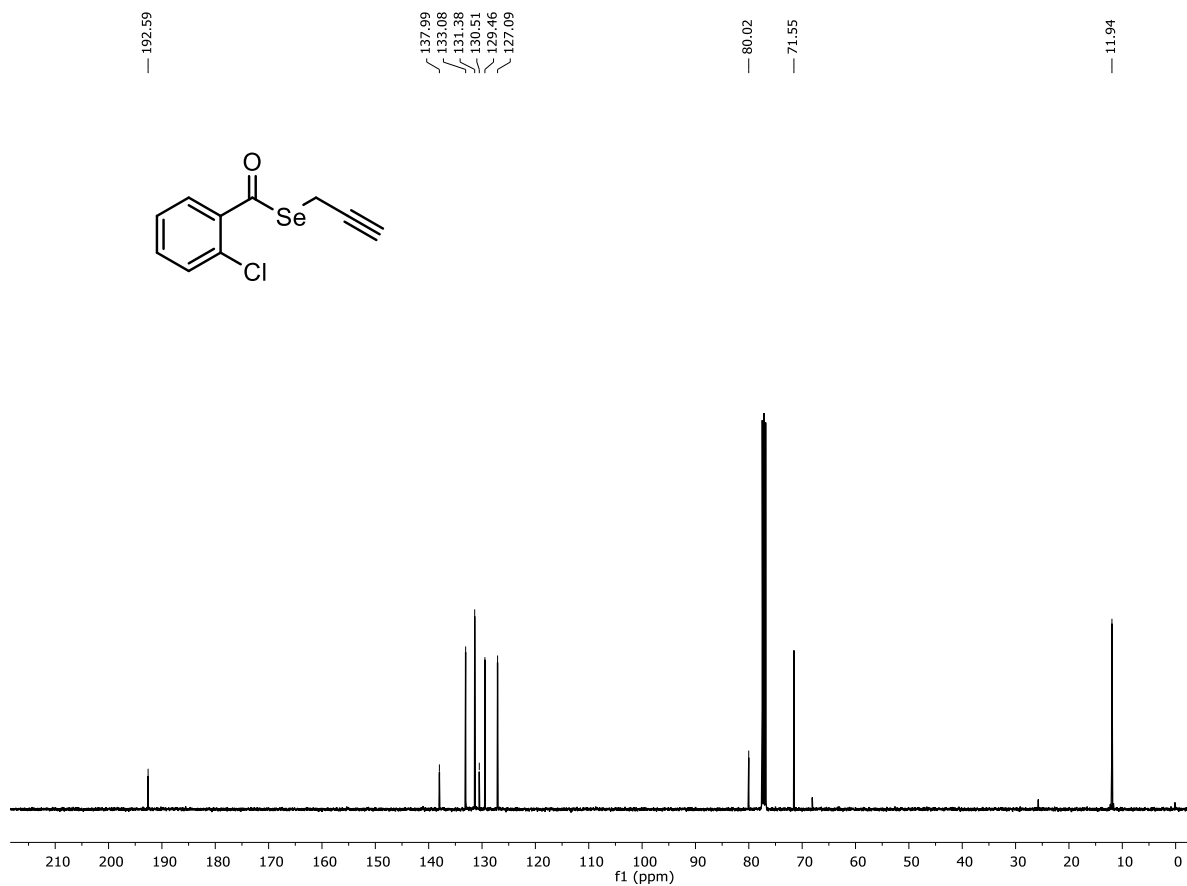


Figure S69. ¹³C-NMR spectrum of compound **3b**.

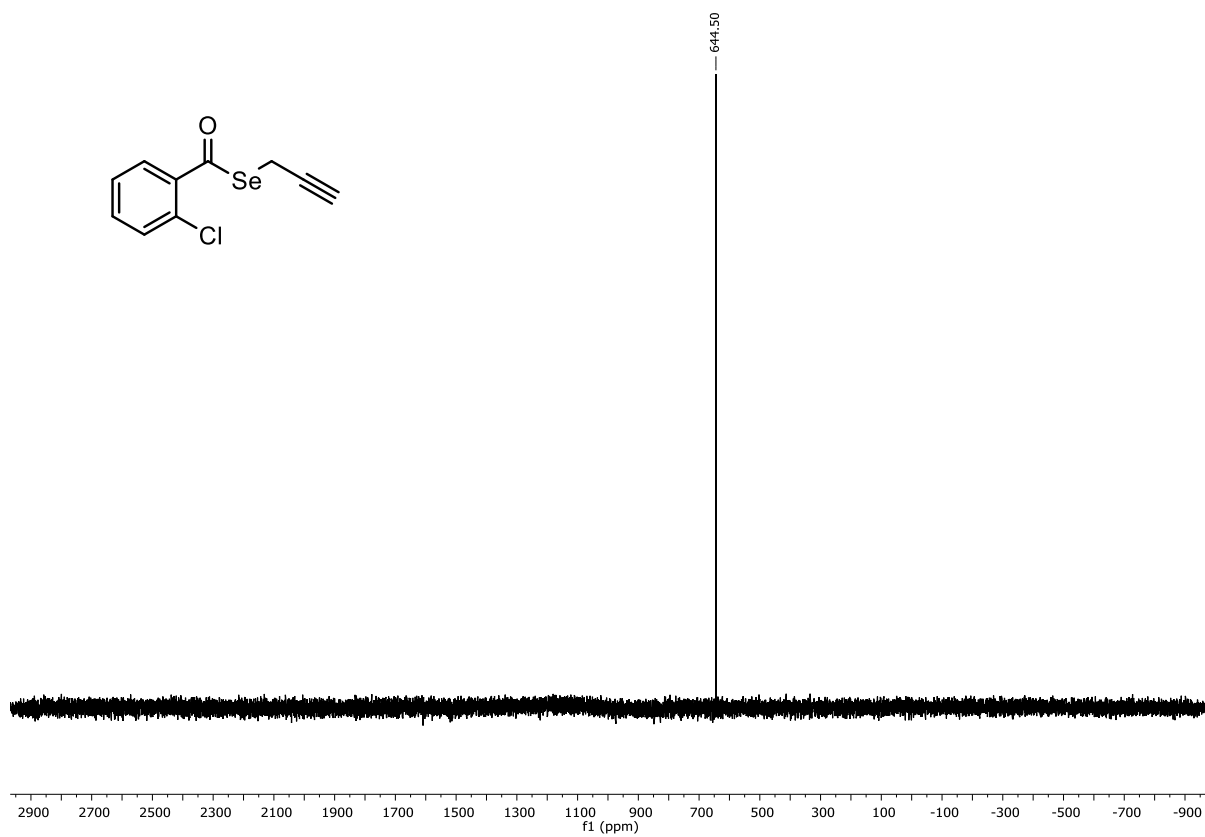


Figure S70. ⁷⁷Se-NMR spectrum of compound **3b**.

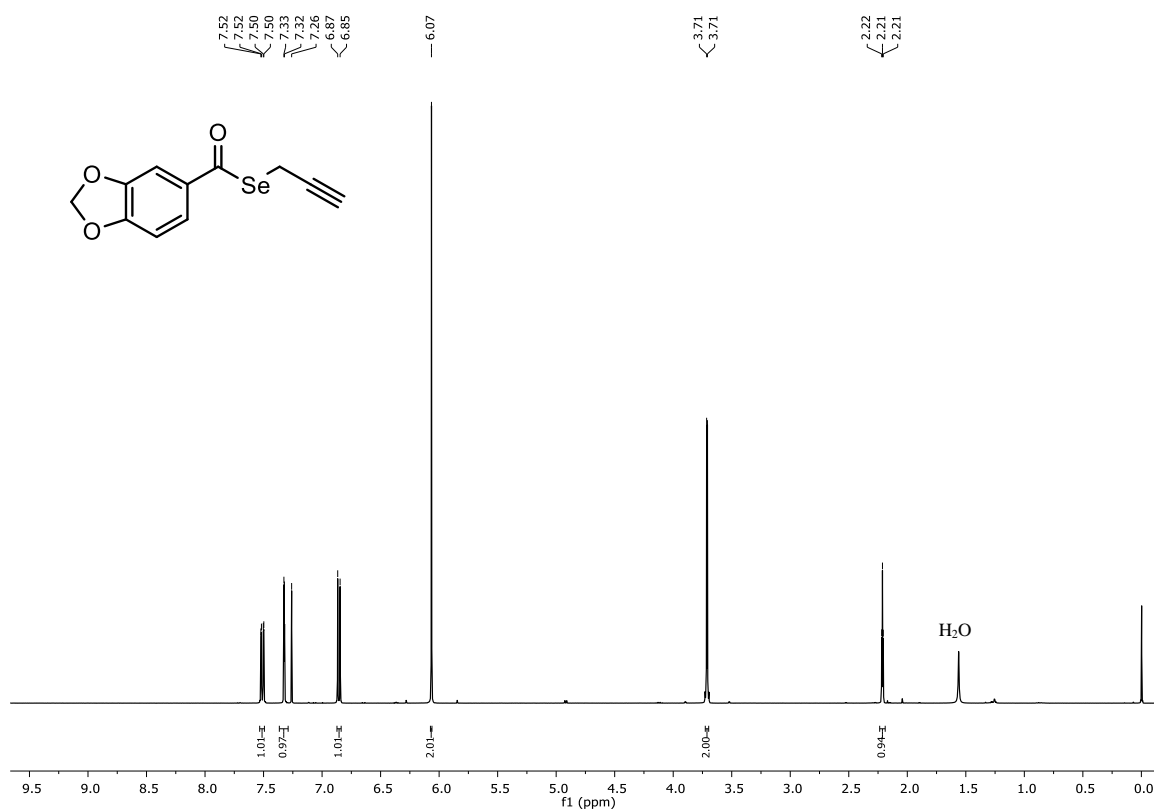


Figure S71. ¹H-NMR spectrum of compound **4b**.

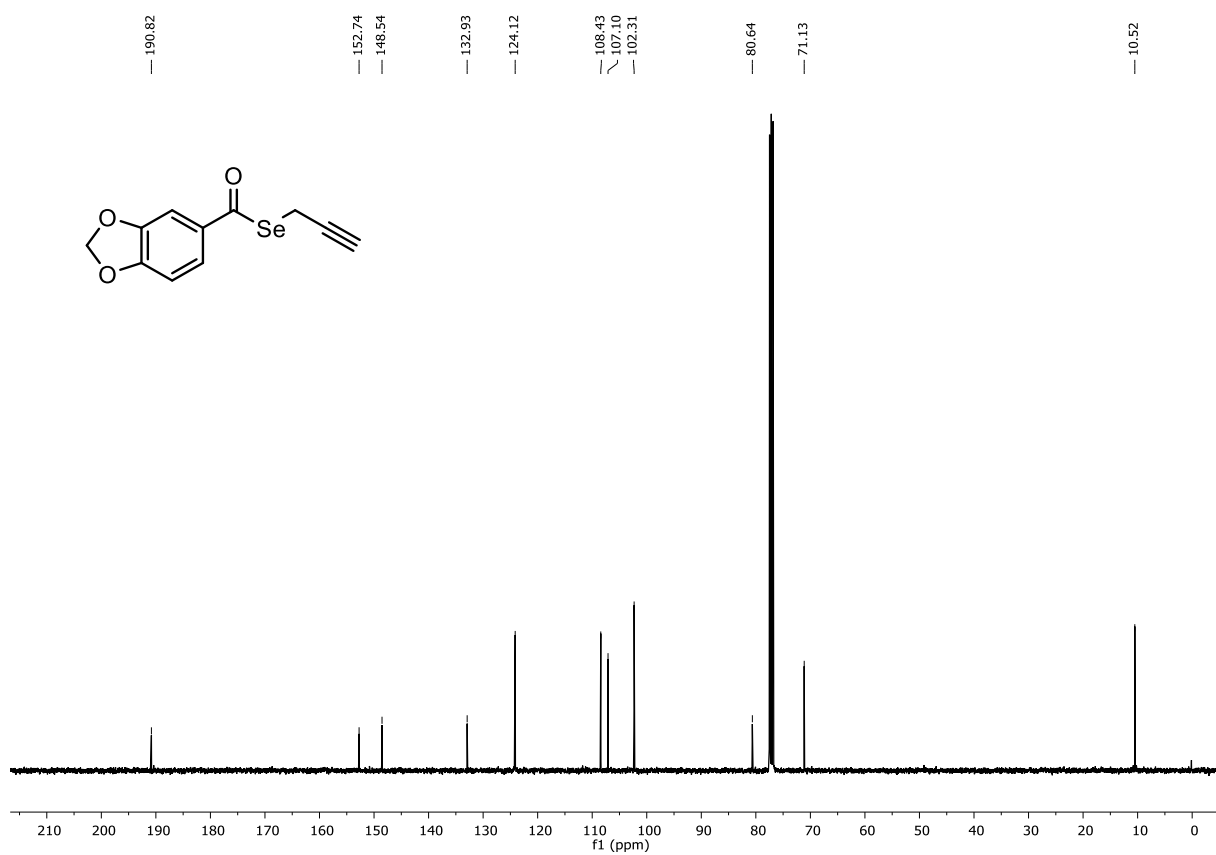


Figure S72. ¹³C-NMR spectrum of compound **4b**.

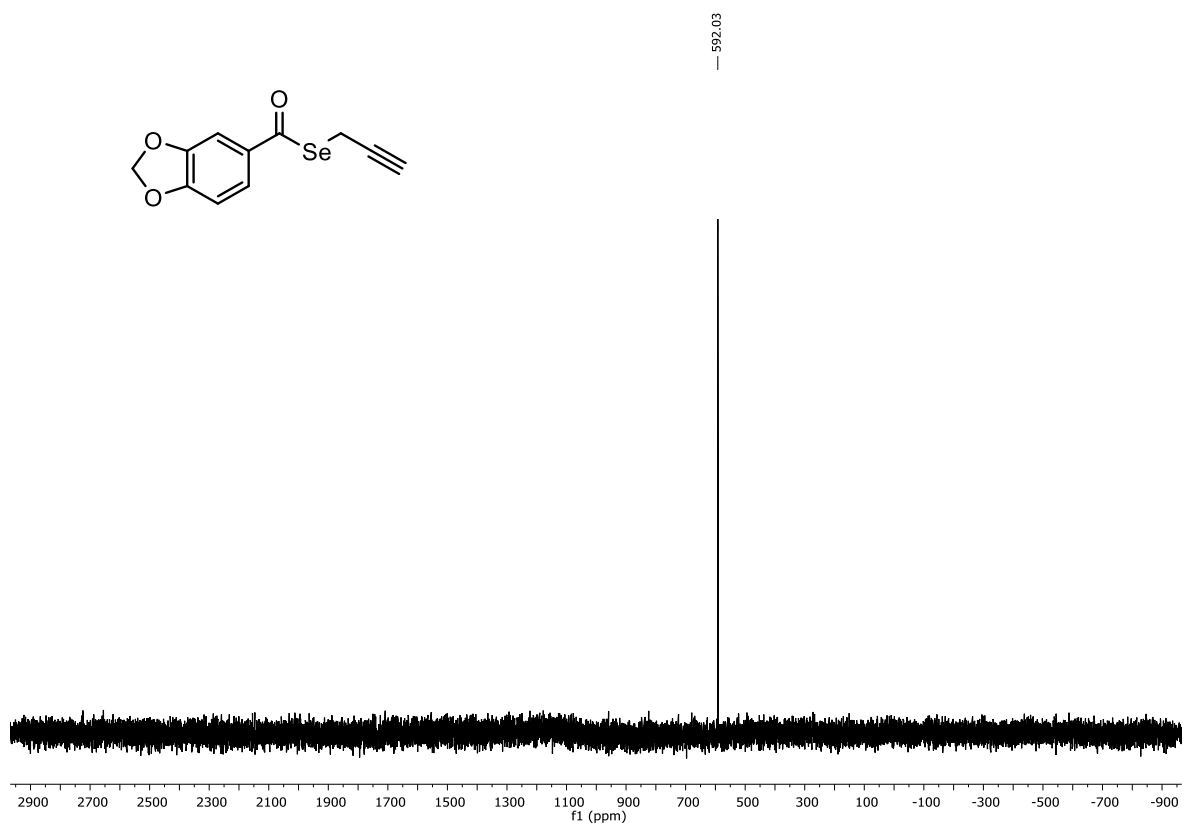


Figure S73. ⁷⁷Se-NMR spectrum of compound 4b.

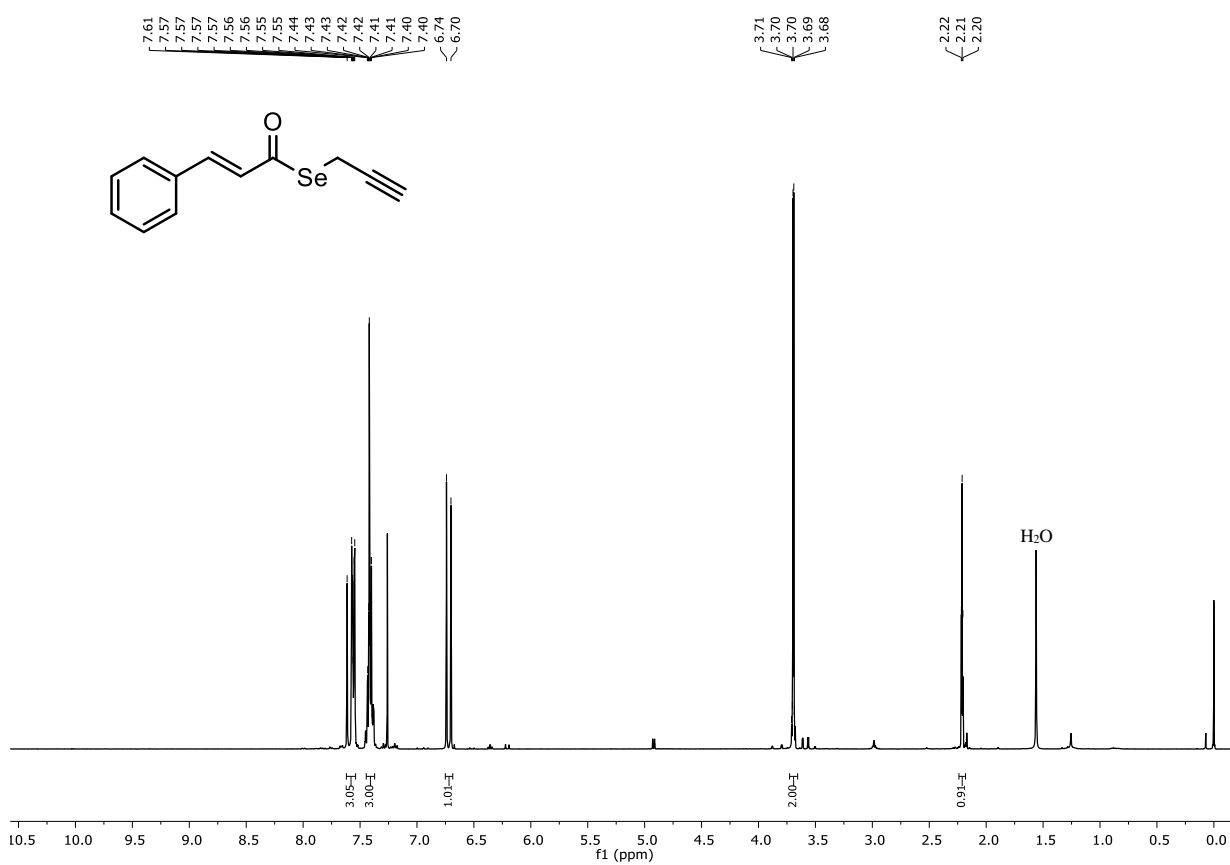


Figure S74. ¹H-NMR spectrum of compound 5b.

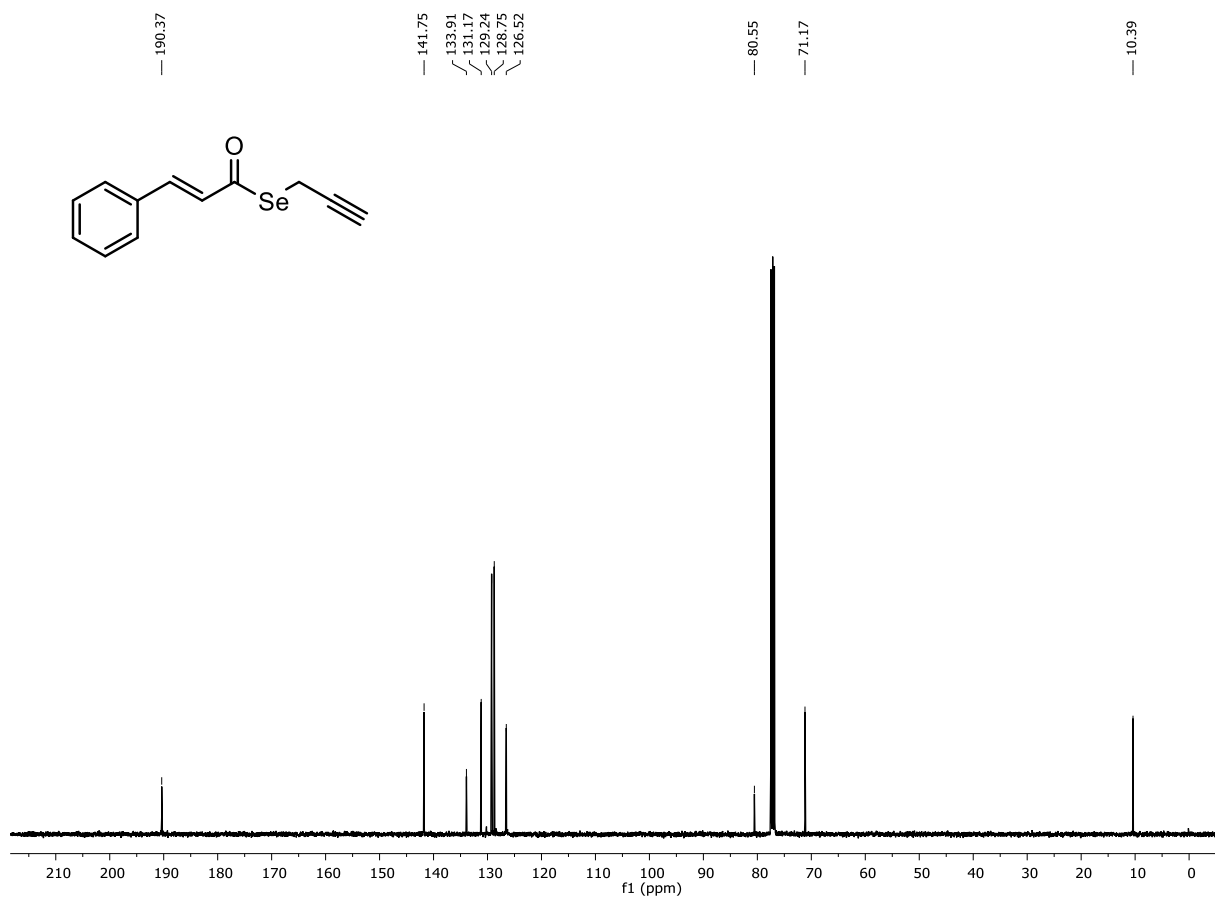


Figure S75. ¹³C-NMR spectrum of compound **5b**.

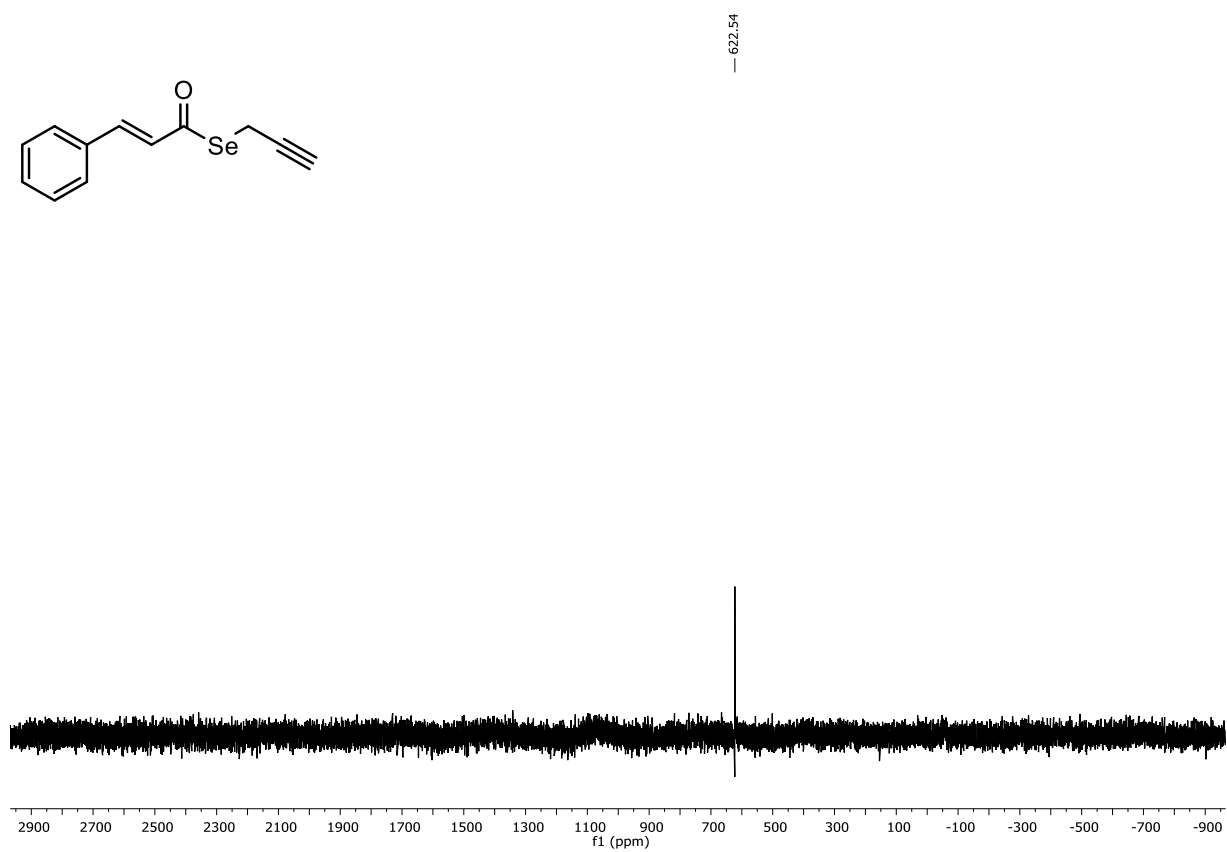


Figure S76. ⁷⁷Se-NMR spectrum of compound **5b**.

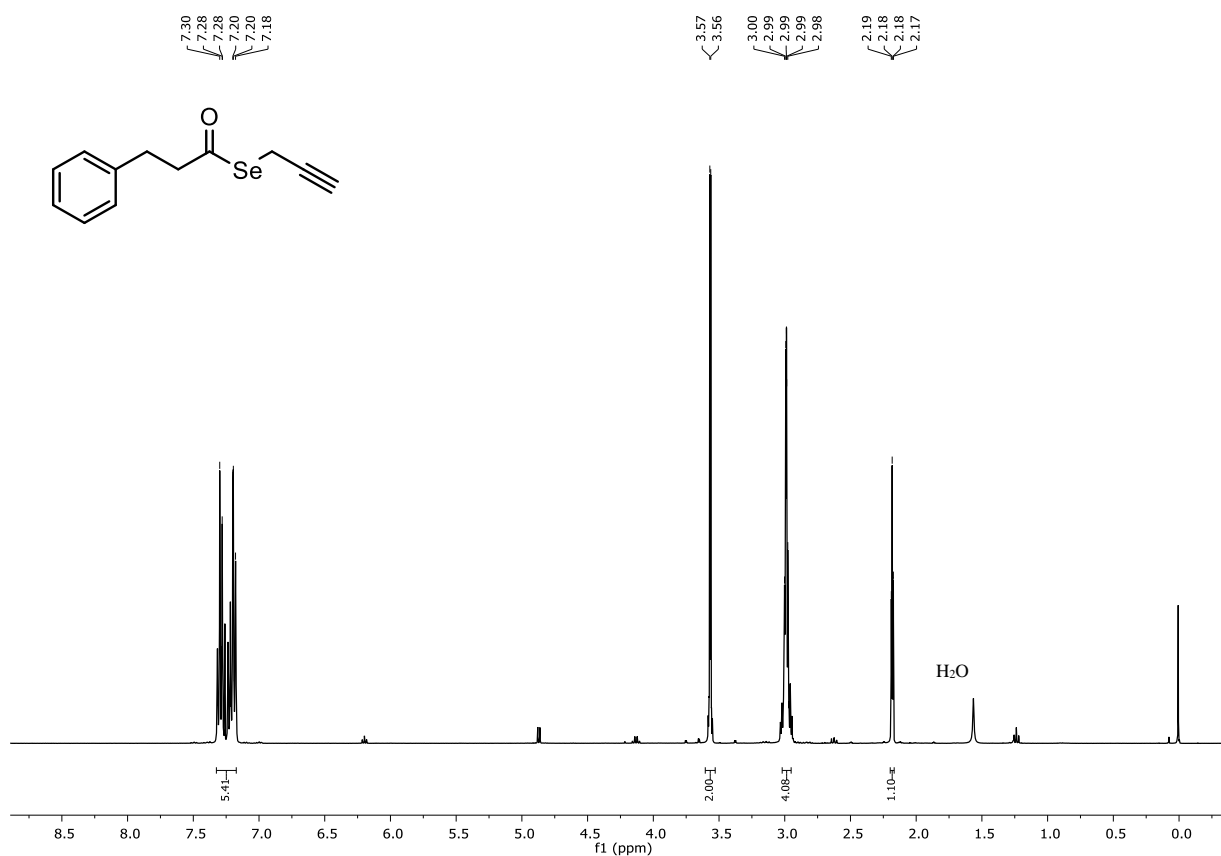


Figure S77. ¹H-NMR spectrum of compound **6b**.

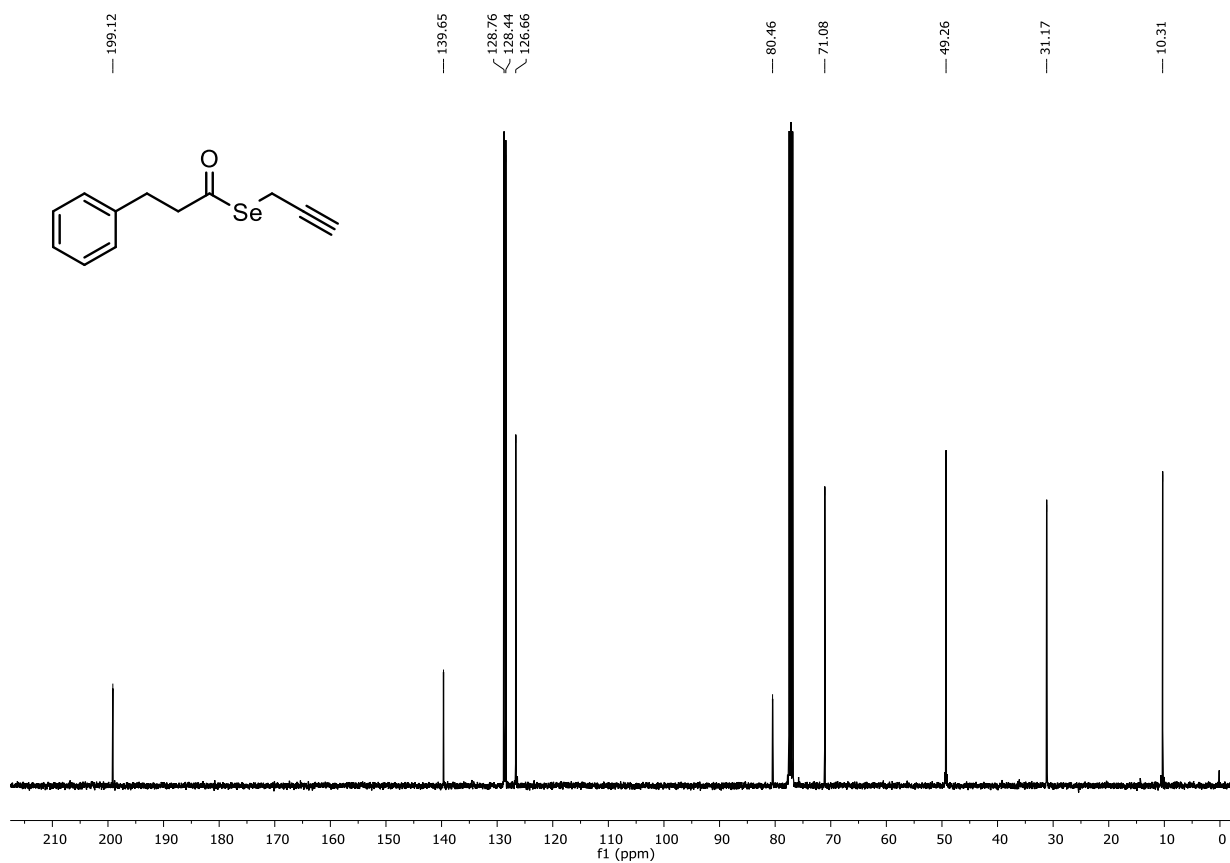


Figure S78. ¹³C-NMR spectrum of compound **6b**.

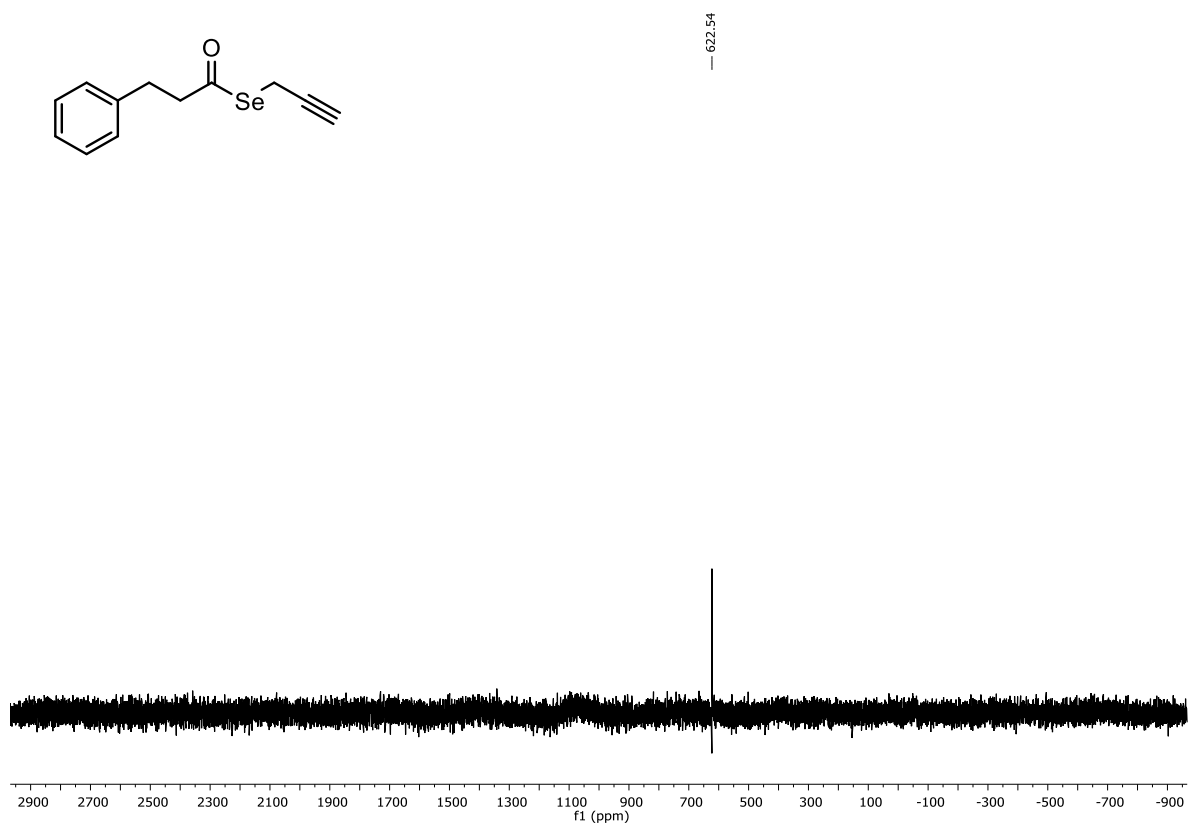


Figure S79. ⁷⁷Se-NMR spectrum of compound **6b**.

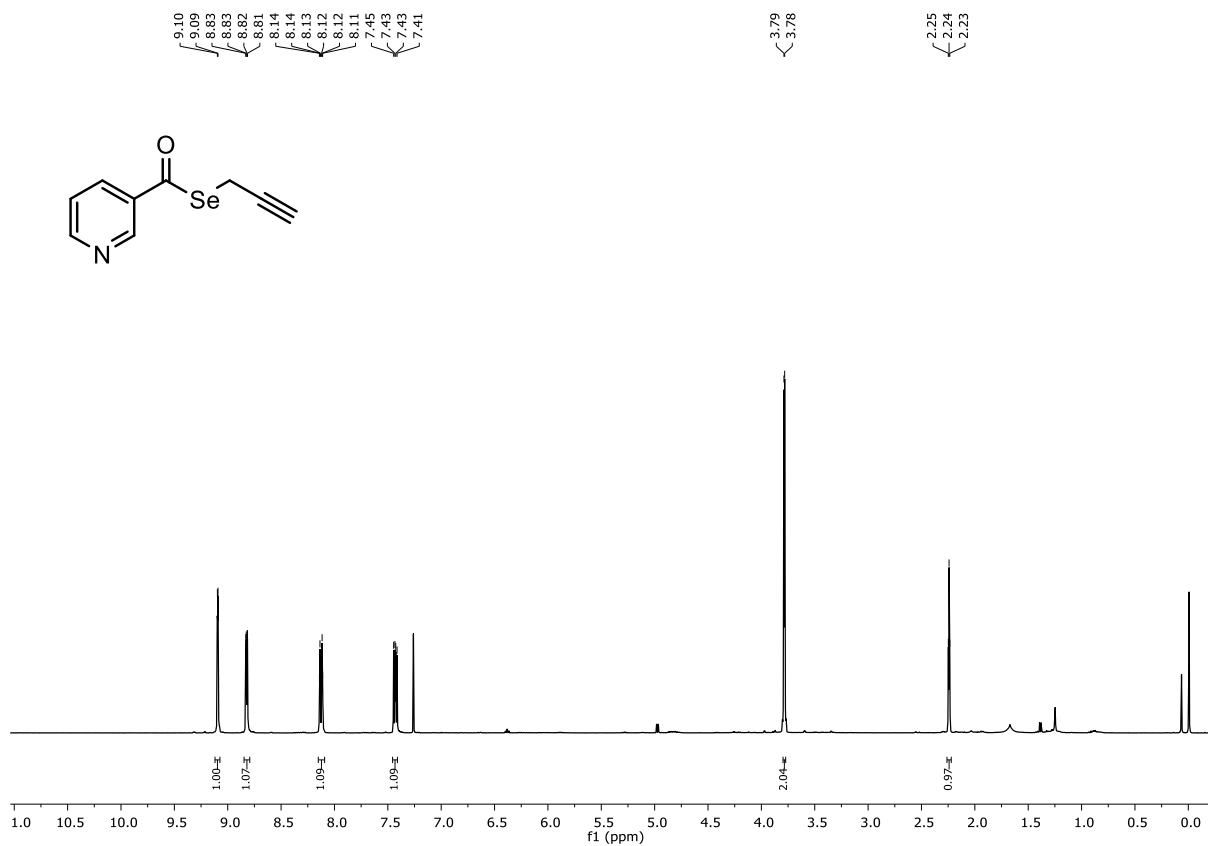


Figure S80. ¹H-NMR spectrum of compound **7b**.

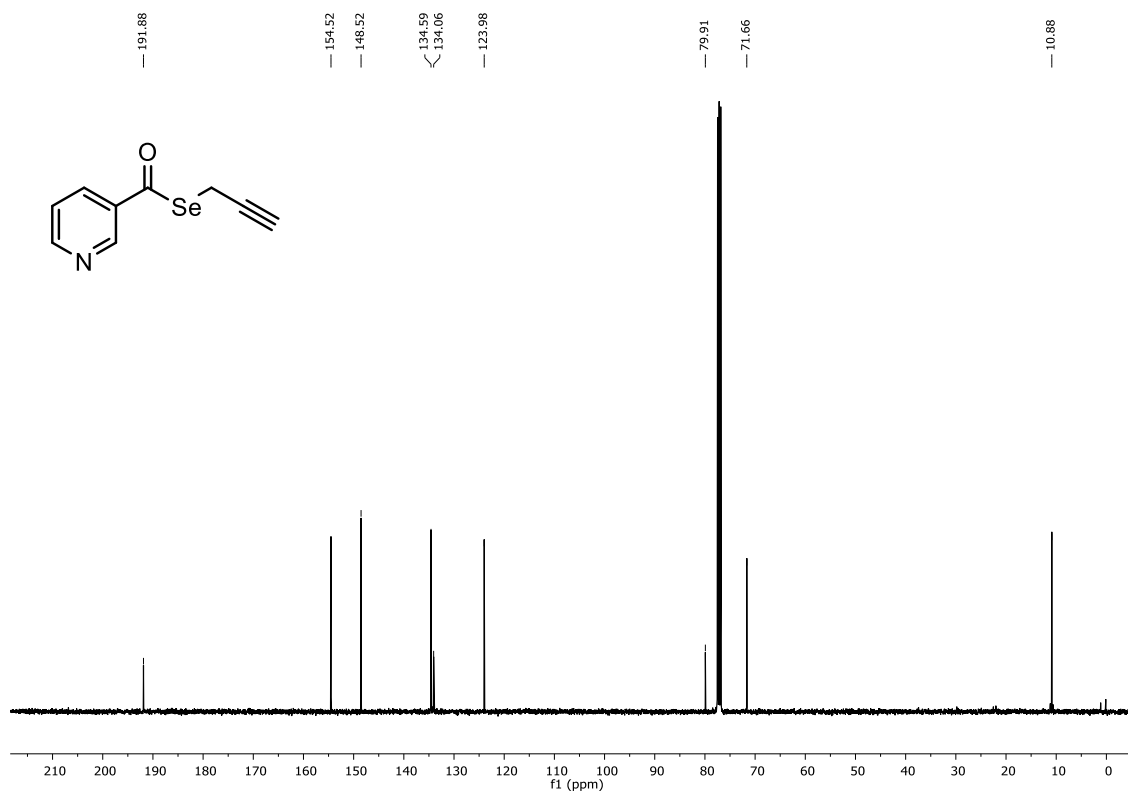


Figure S81. ¹³C-NMR spectrum of compound **7b**.

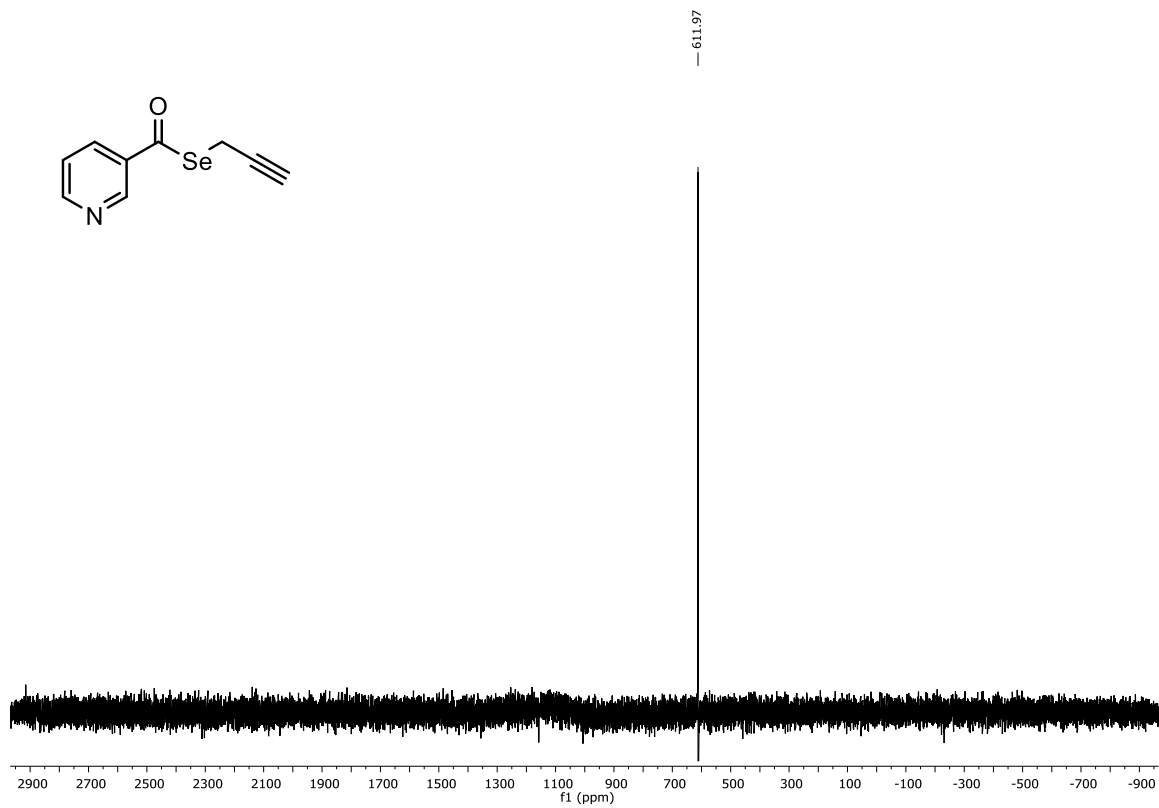


Figure S82. ⁷⁷Se-NMR spectrum of compound **7b**.

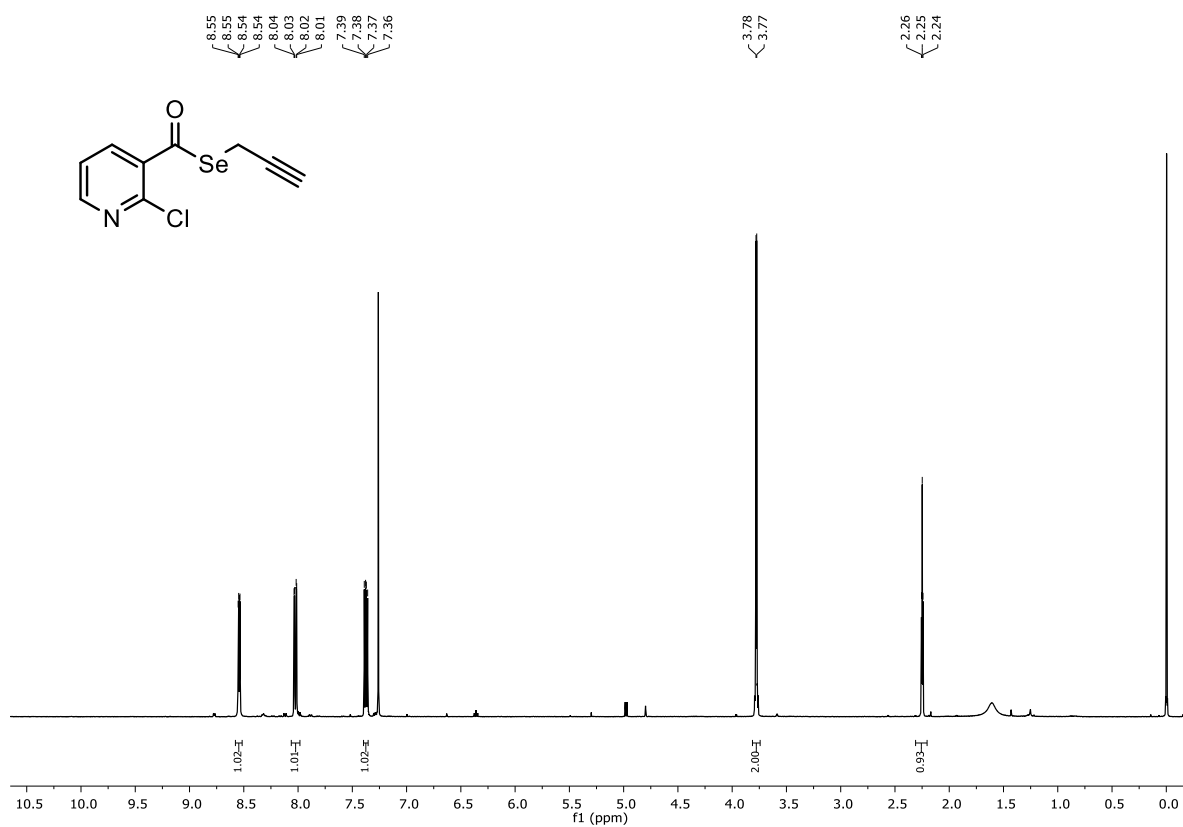


Figure S83. ¹H-NMR spectrum of compound **8b**.

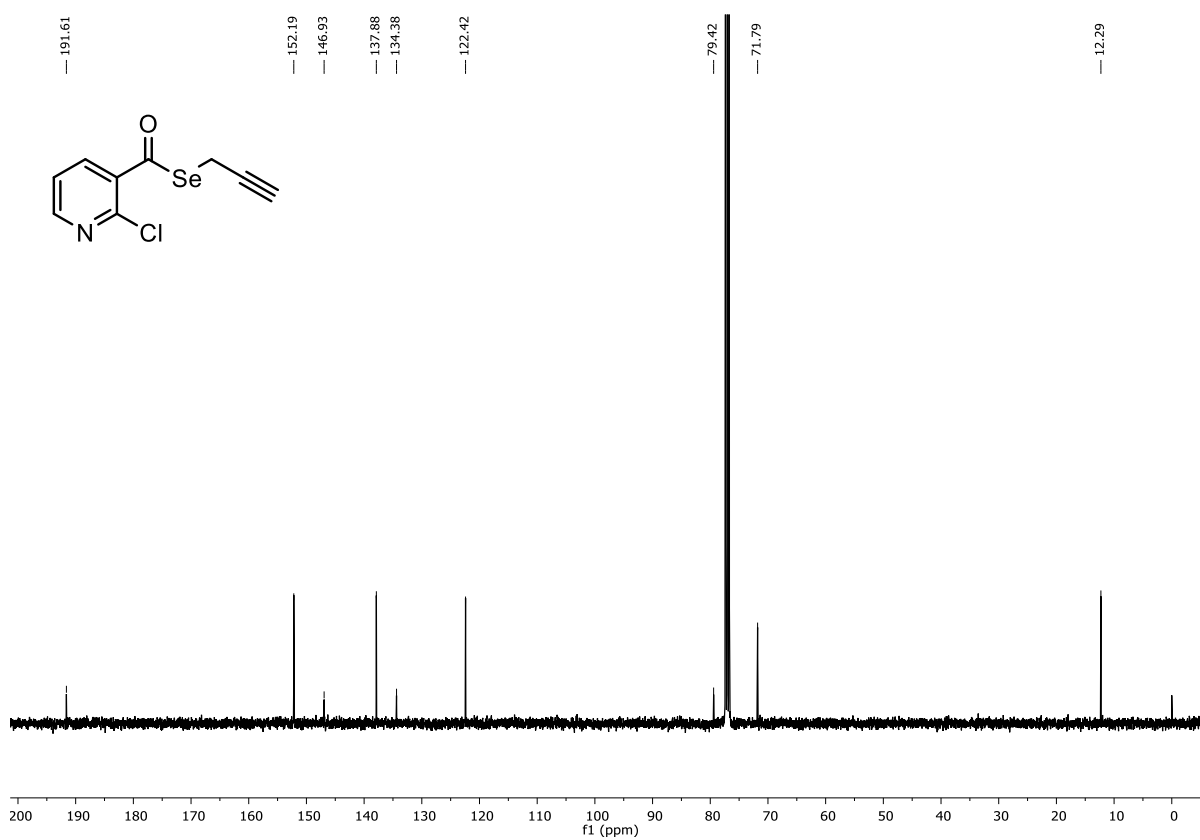


Figure S84. ¹³C-NMR spectrum of compound **8b**.

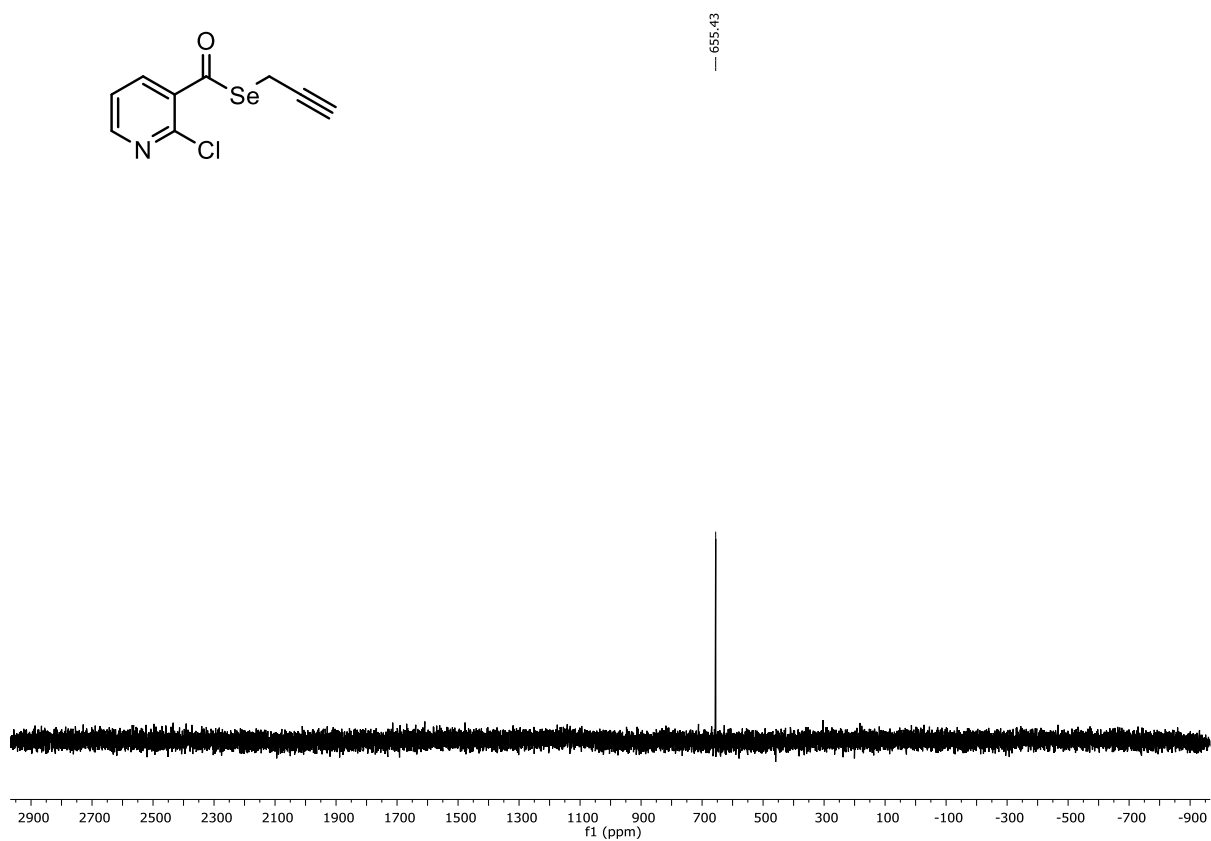


Figure S85. ^{77}Se -NMR spectrum of compound **8b**.

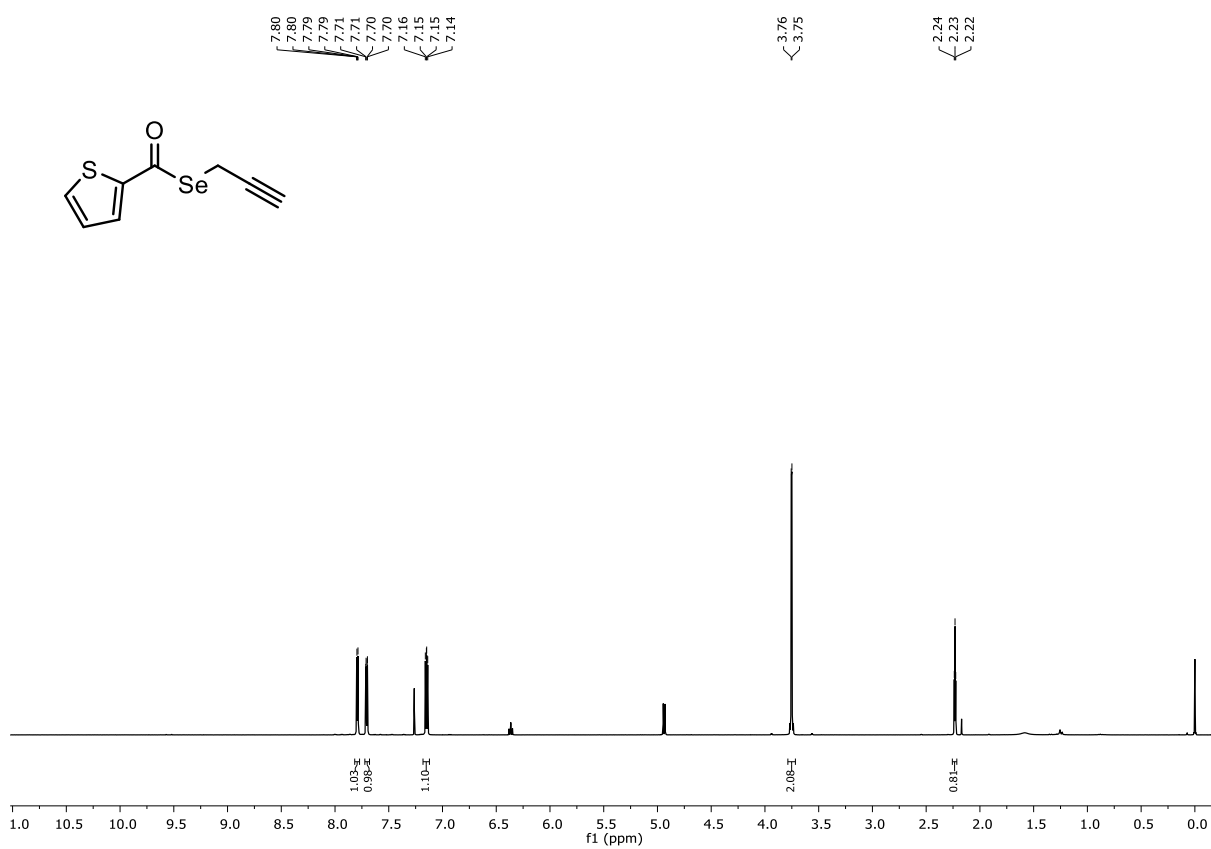


Figure S86. ^1H -NMR spectrum of compound **9b**.

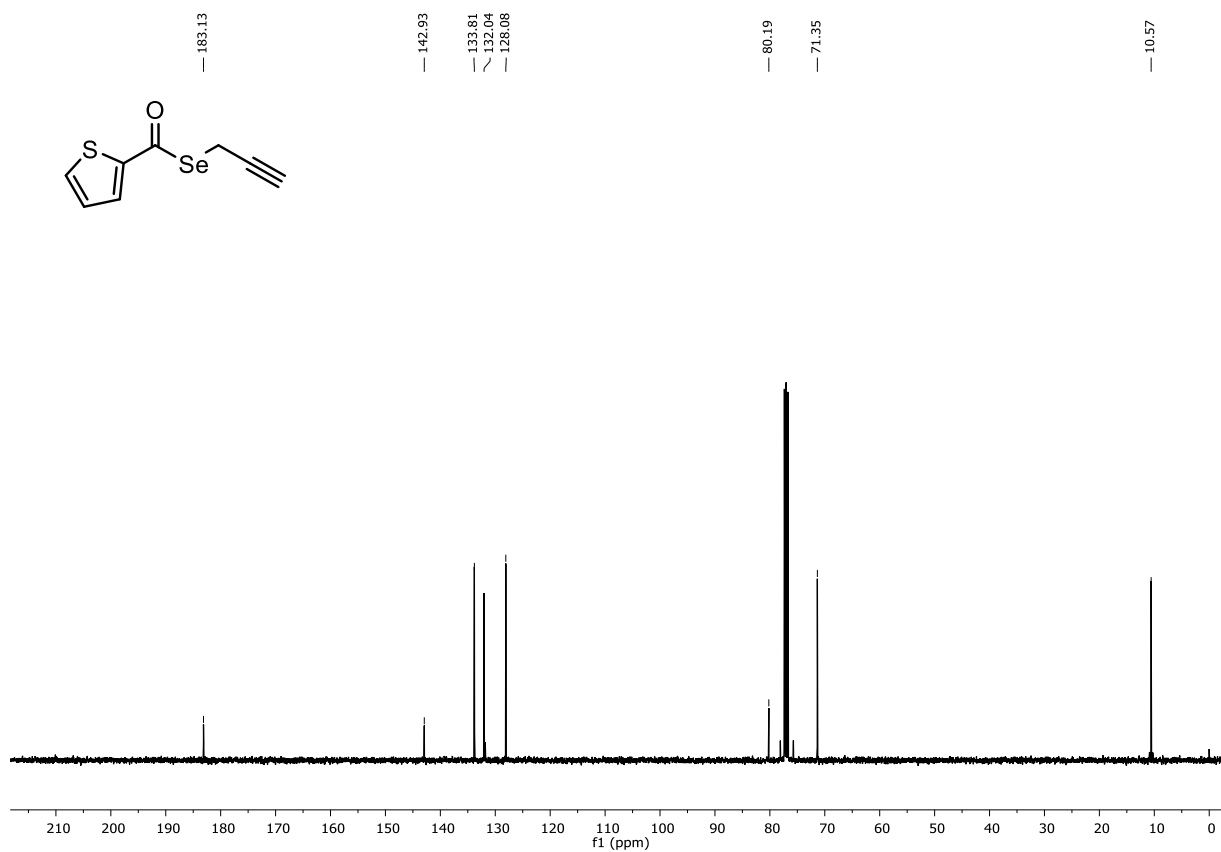


Figure S87. ¹³C-NMR spectrum of compound **9b**.

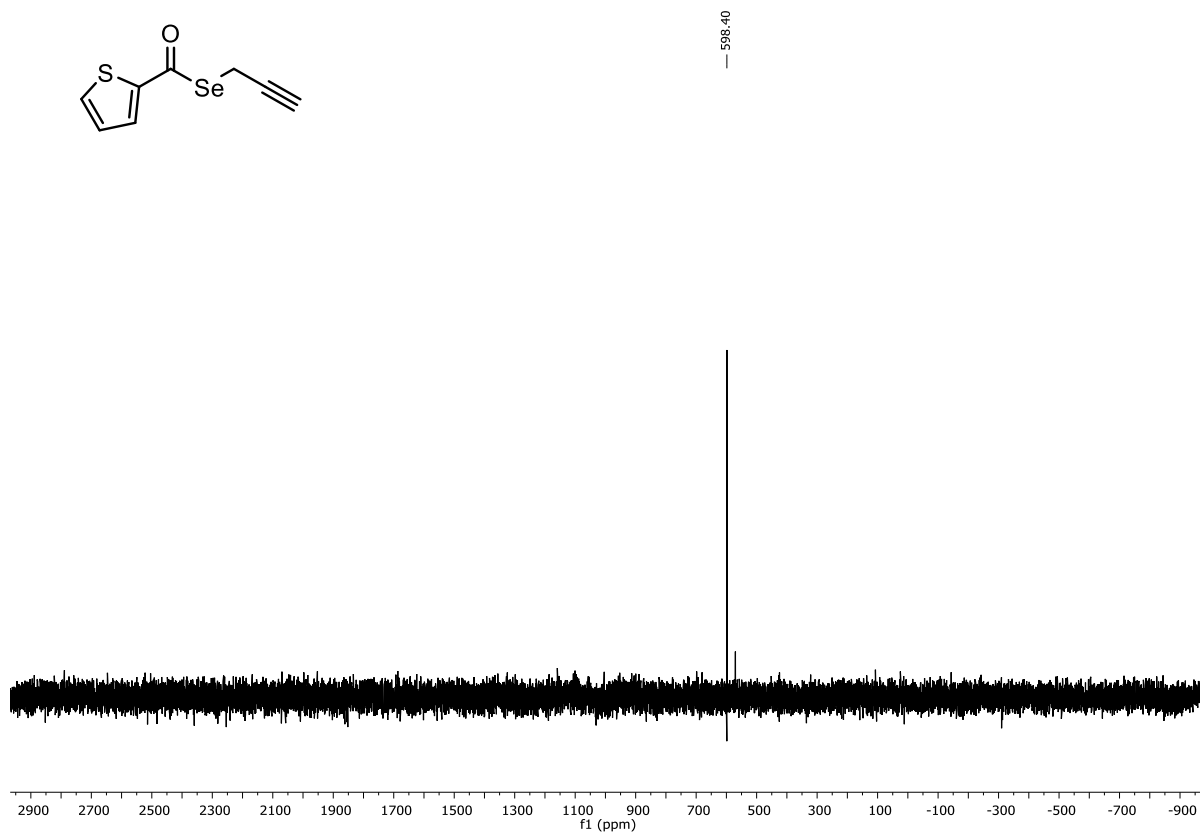


Figure S88. ⁷⁷Se-NMR spectrum of compound **9b**.

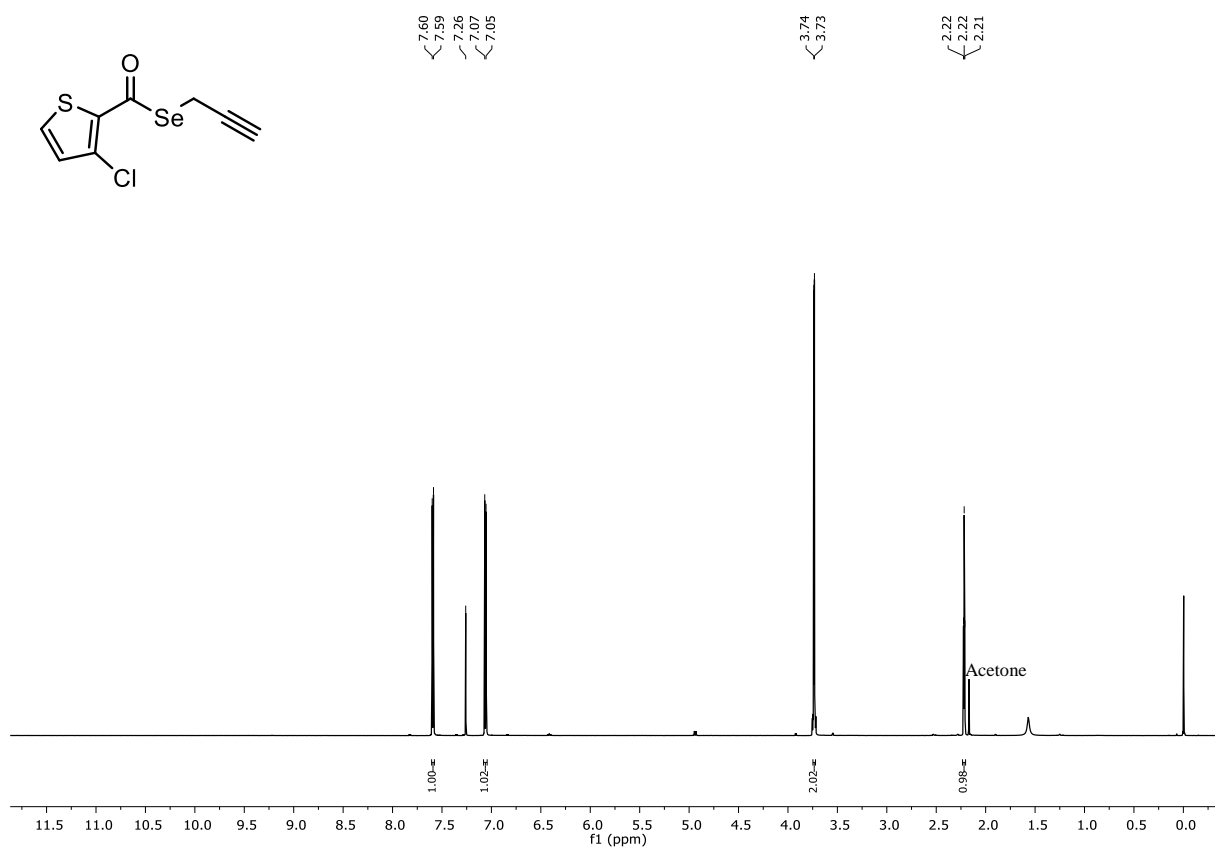


Figure S89. ¹H-NMR spectrum of compound **10b**.

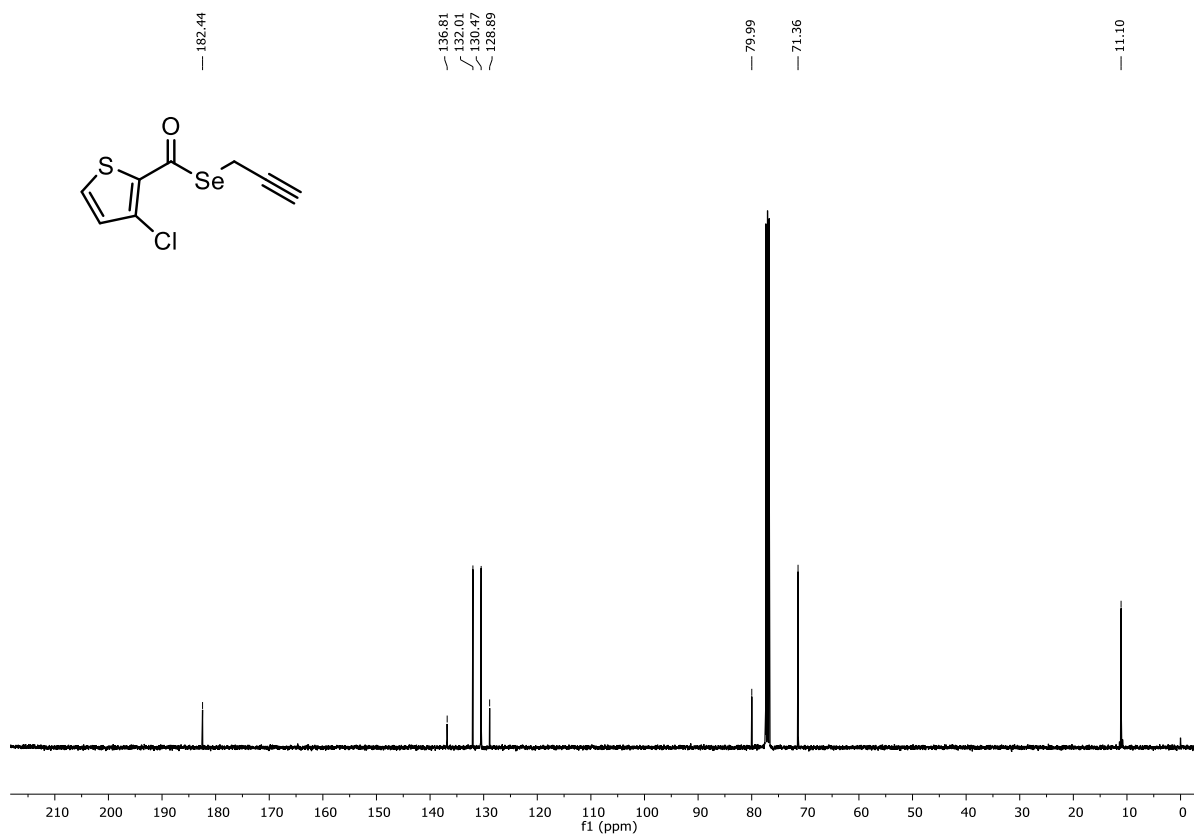


Figure S90. ¹³C-NMR spectrum of compound **10b**.

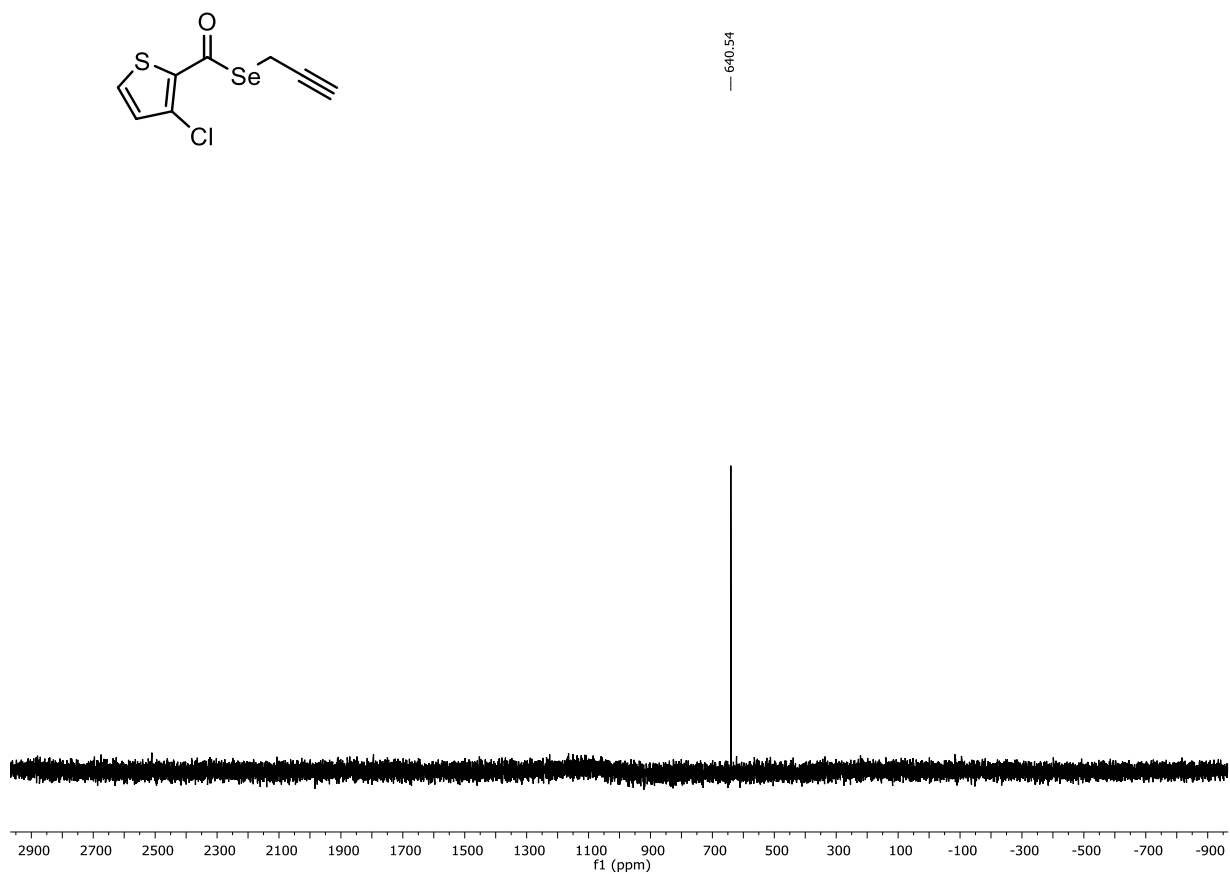


Figure S91. ^{77}Se -NMR spectrum of compound **10b**.

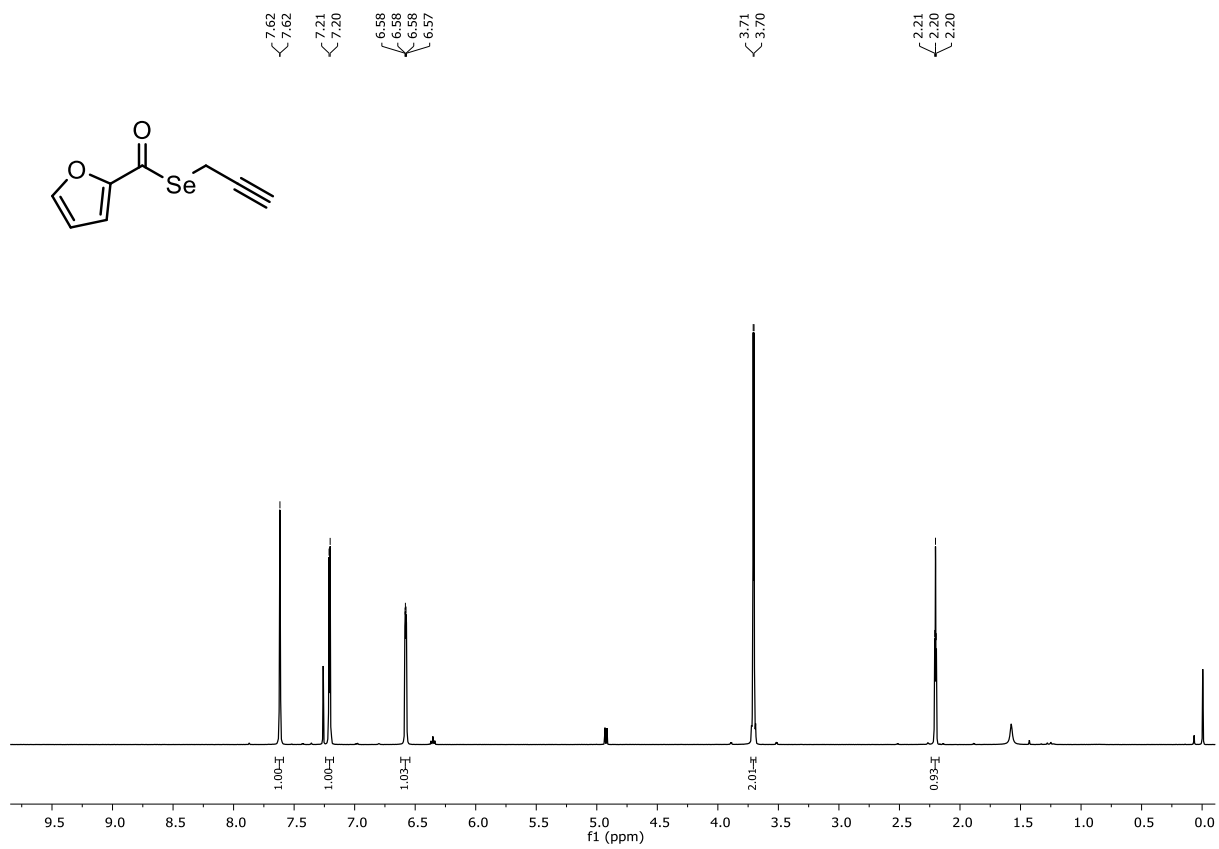


Figure S92. ^1H -NMR spectrum of compound **11b**.

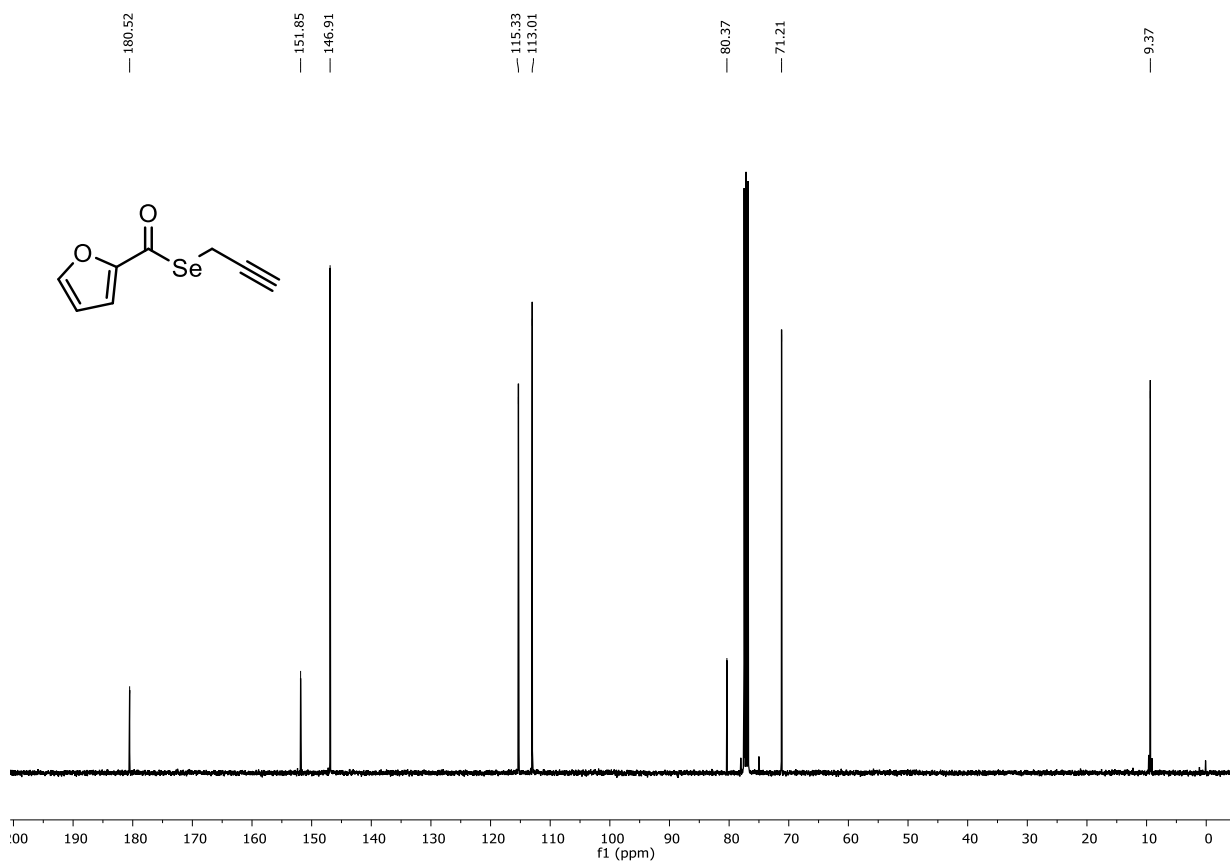


Figure S93. ¹³C-NMR spectrum of compound **11b**.

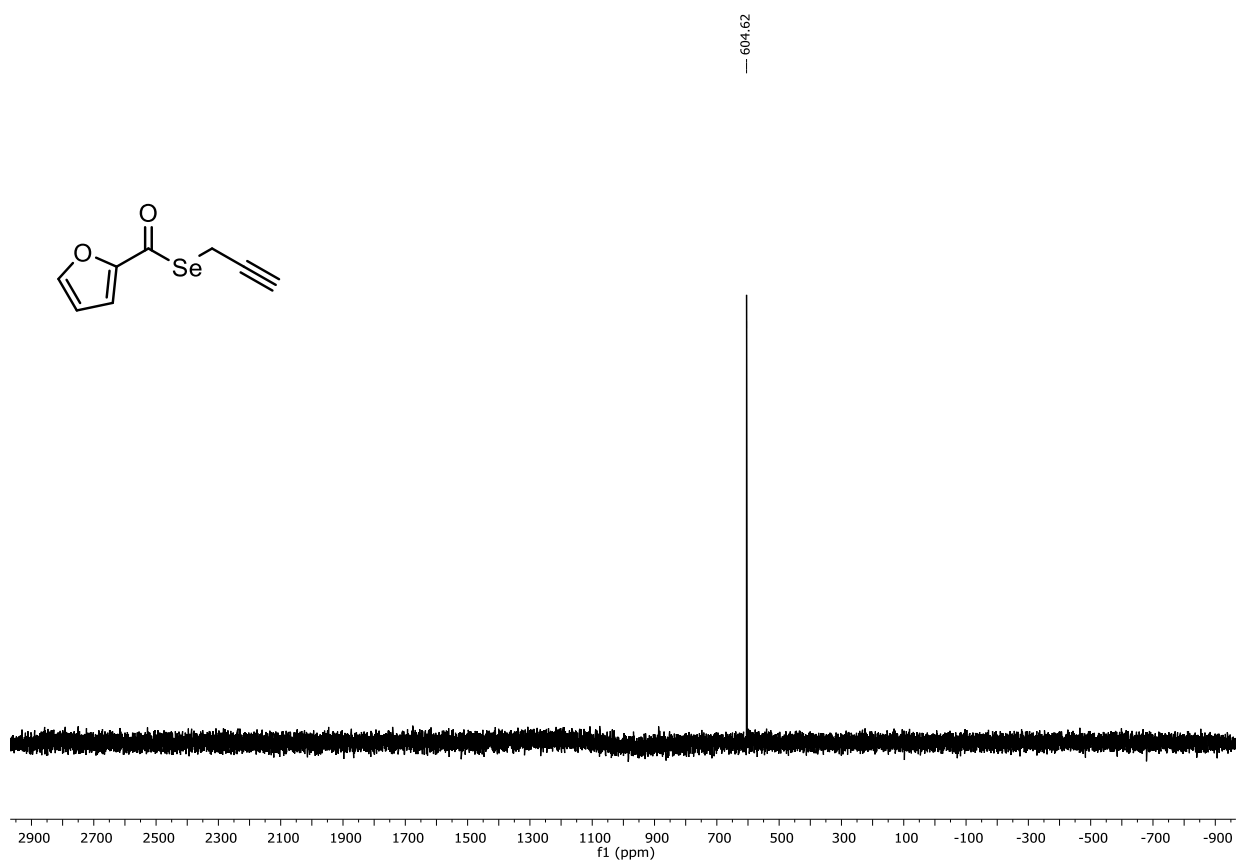


Figure S94. ⁷⁷Se-NMR spectrum of compound **11b**.

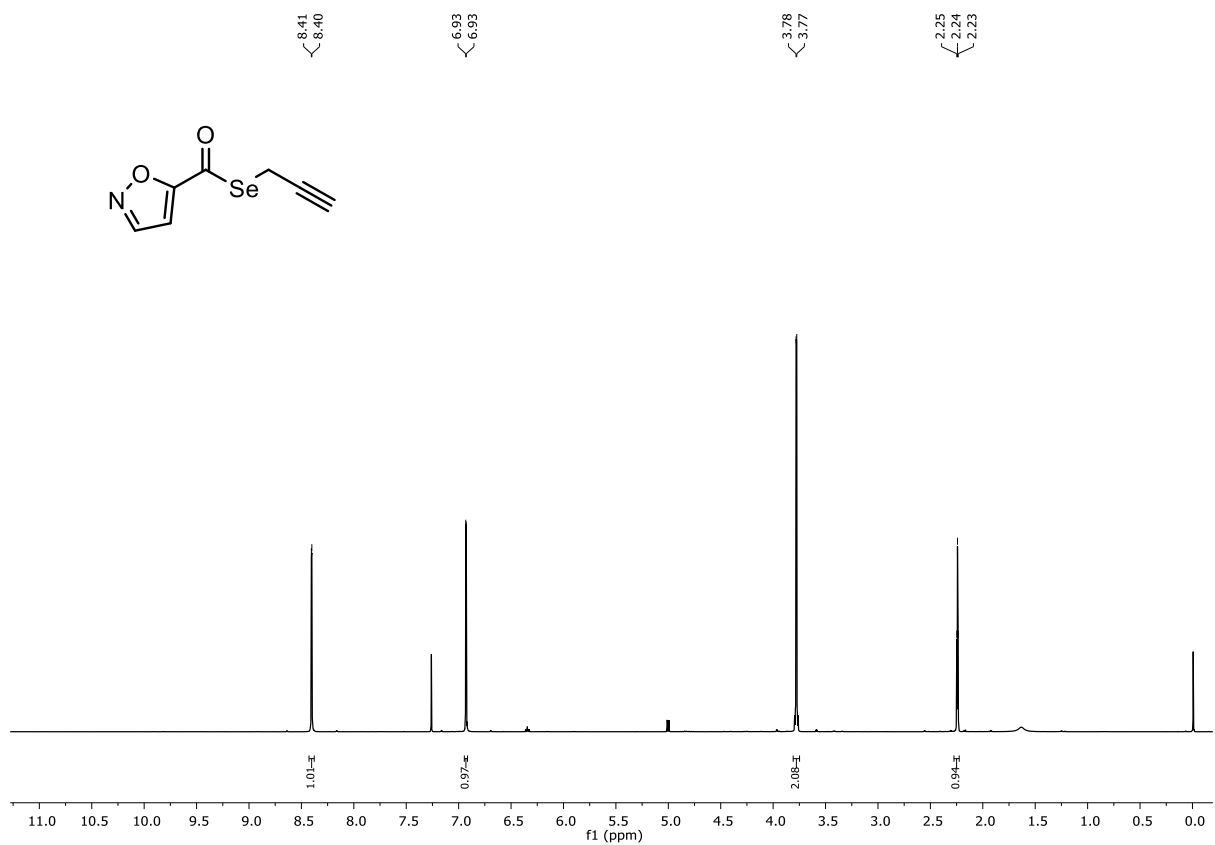


Figure S95. ¹H-NMR spectrum of compound **12b**.

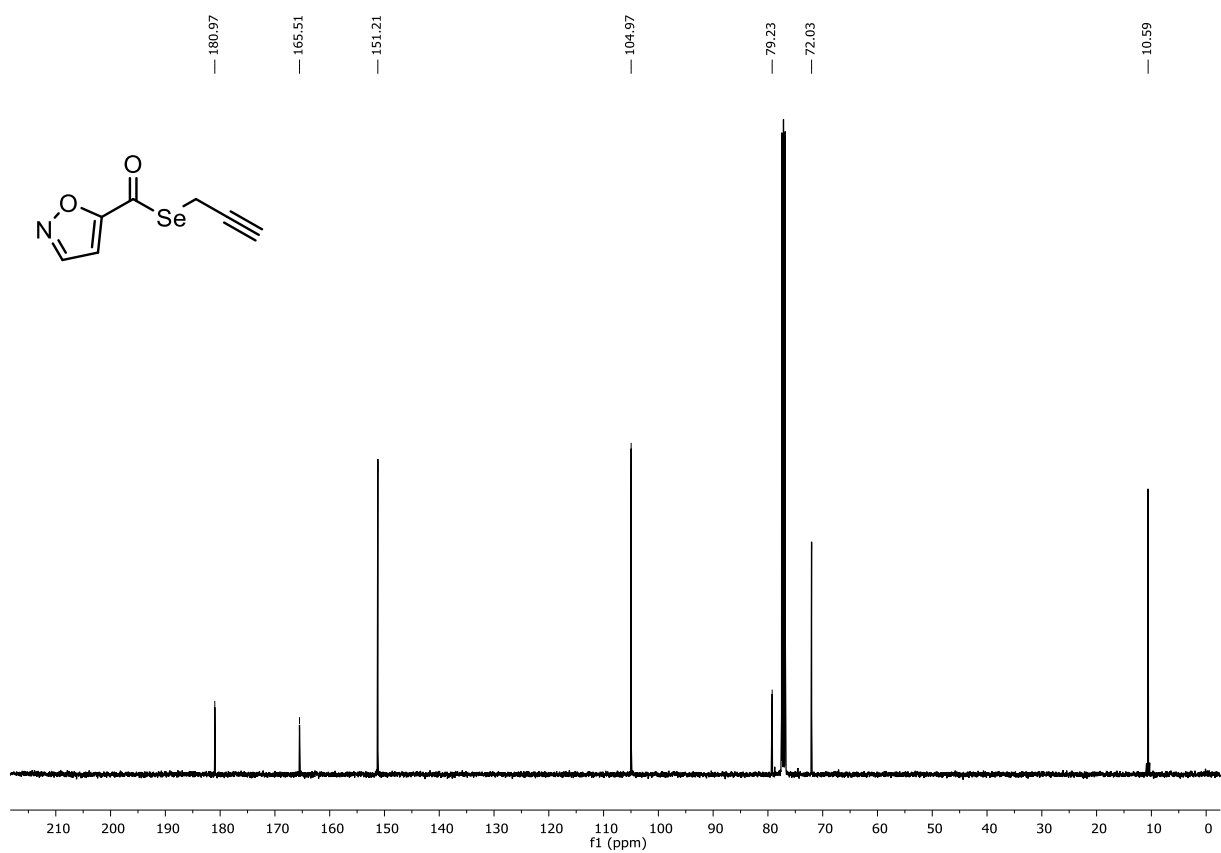


Figure S96. ¹³C-NMR spectrum of compound **12b**.

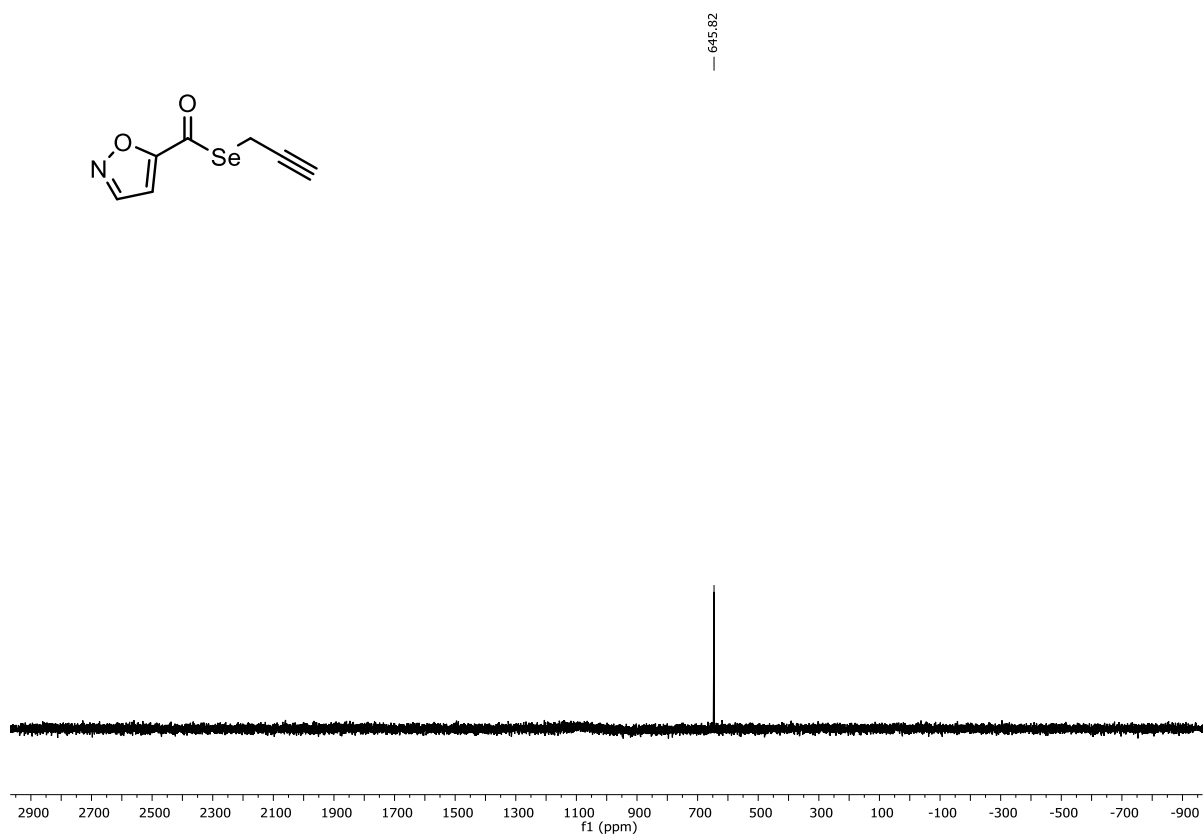


Figure S97. ^{77}Se -NMR spectrum of compound **12b**.

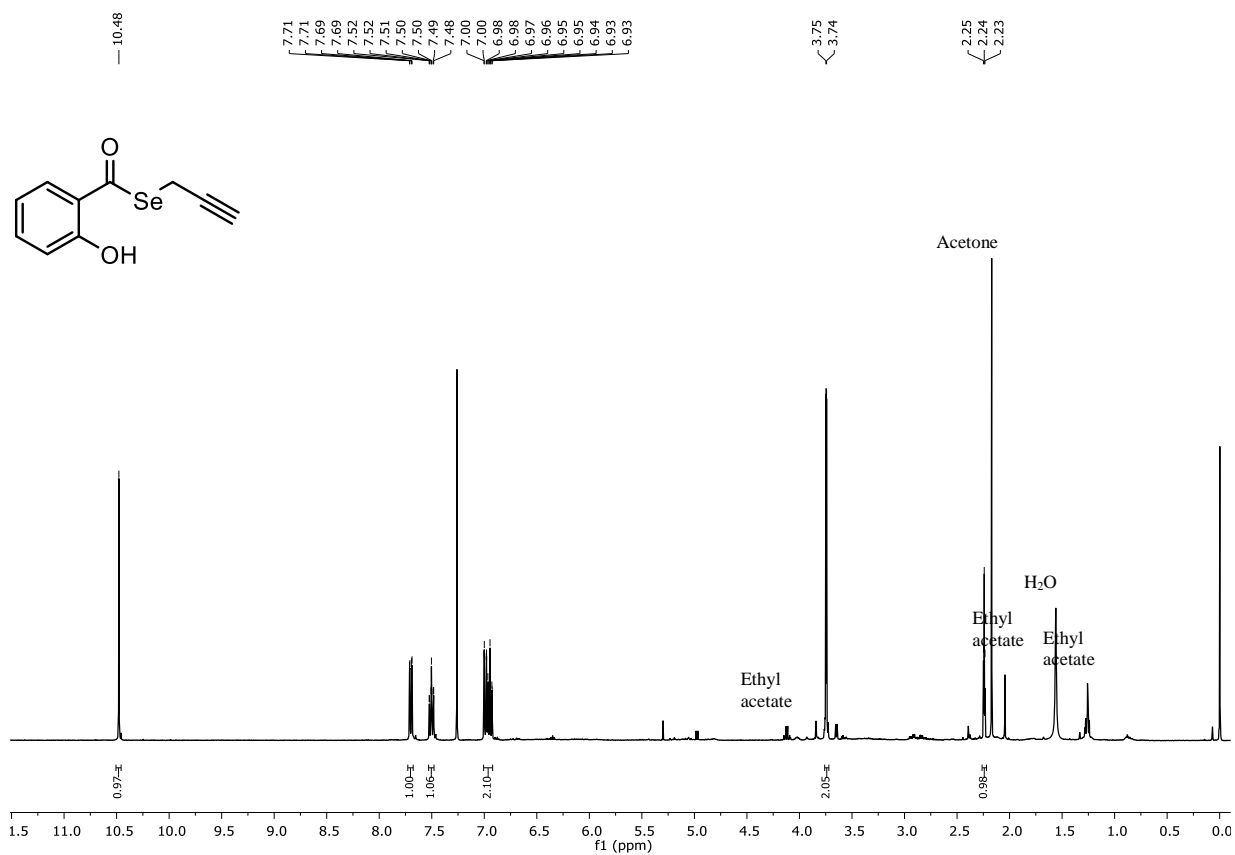


Figure S98. ^1H -NMR spectrum of compound **13b**.

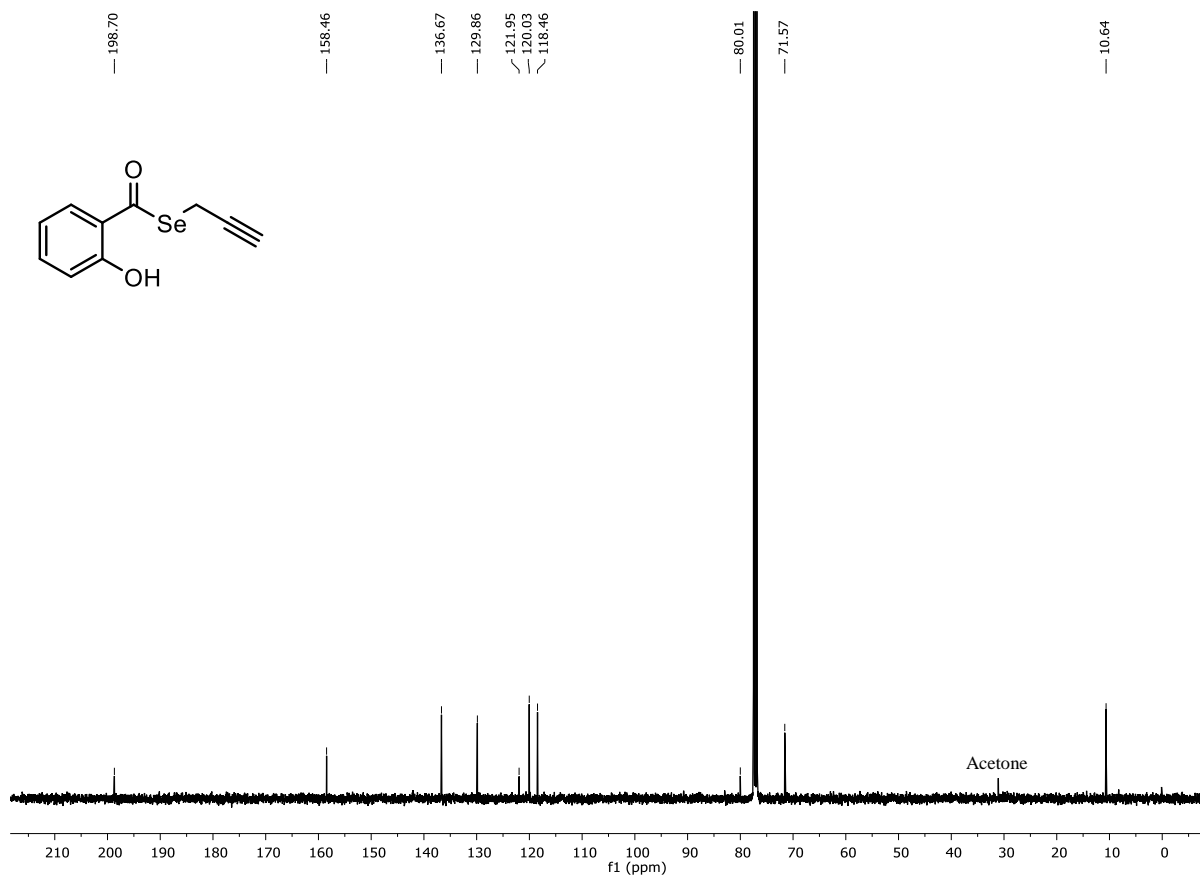


Figure S99. ¹³C-NMR spectrum of compound **13b**.

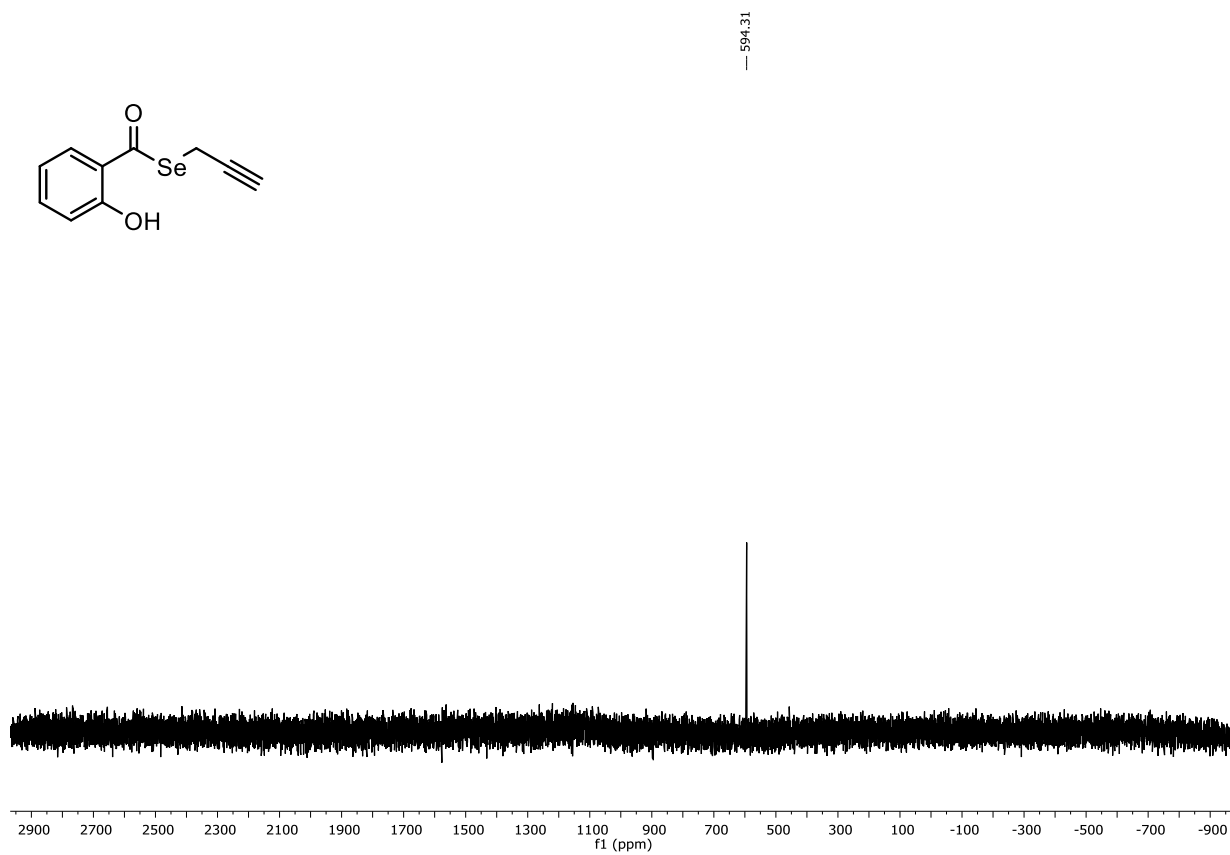


Figure S100. ⁷⁷Se-NMR spectrum of compound **13b**.

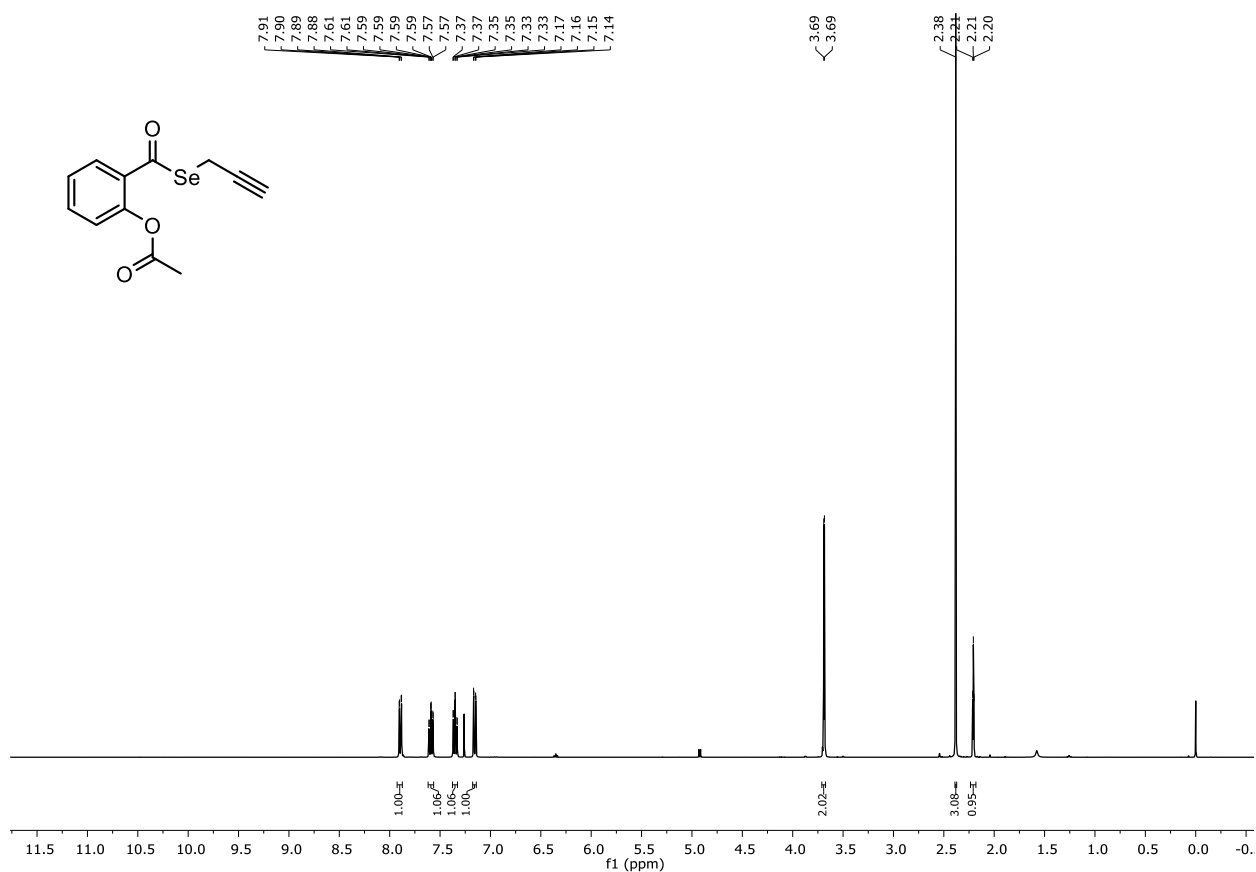


Figure S101. ¹H-NMR spectrum of compound **14b**.

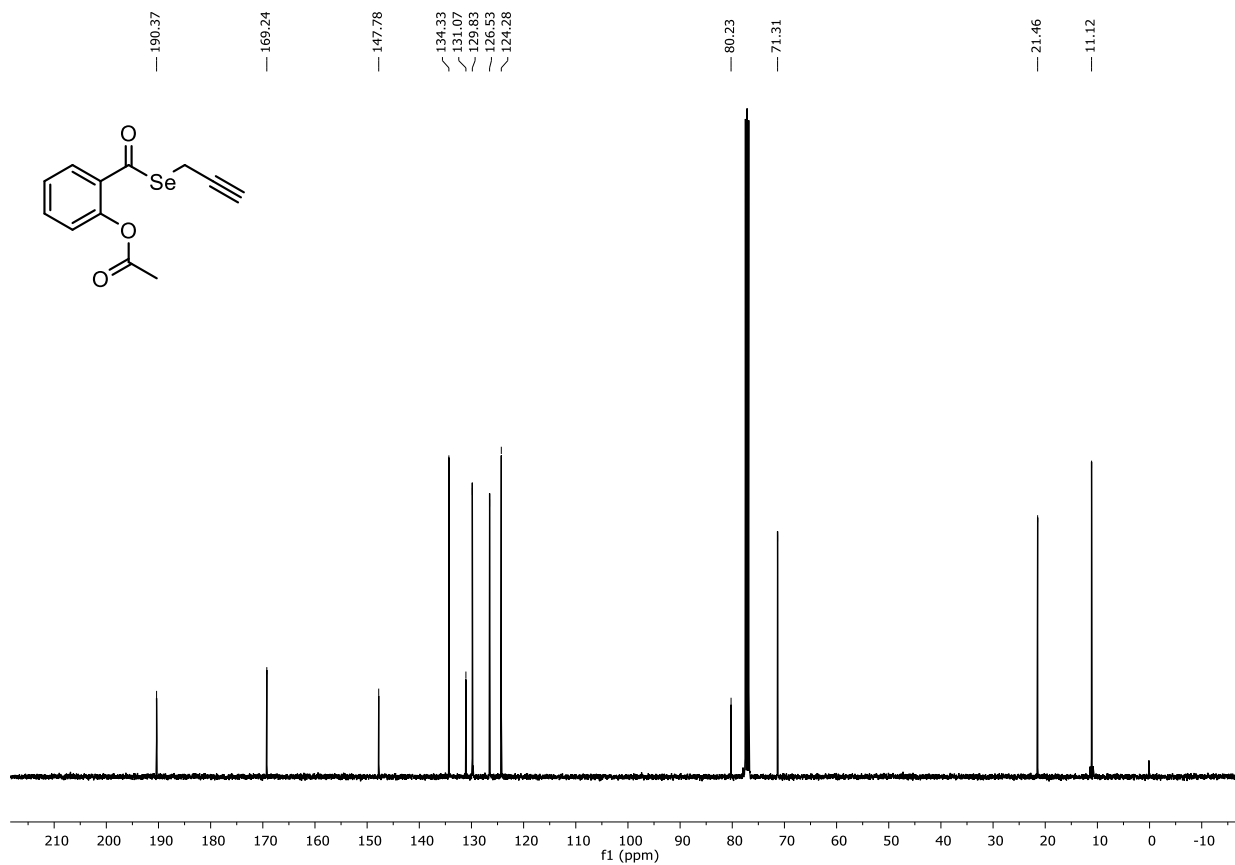


Figure S102. ¹³C-NMR spectrum of compound **14b**.

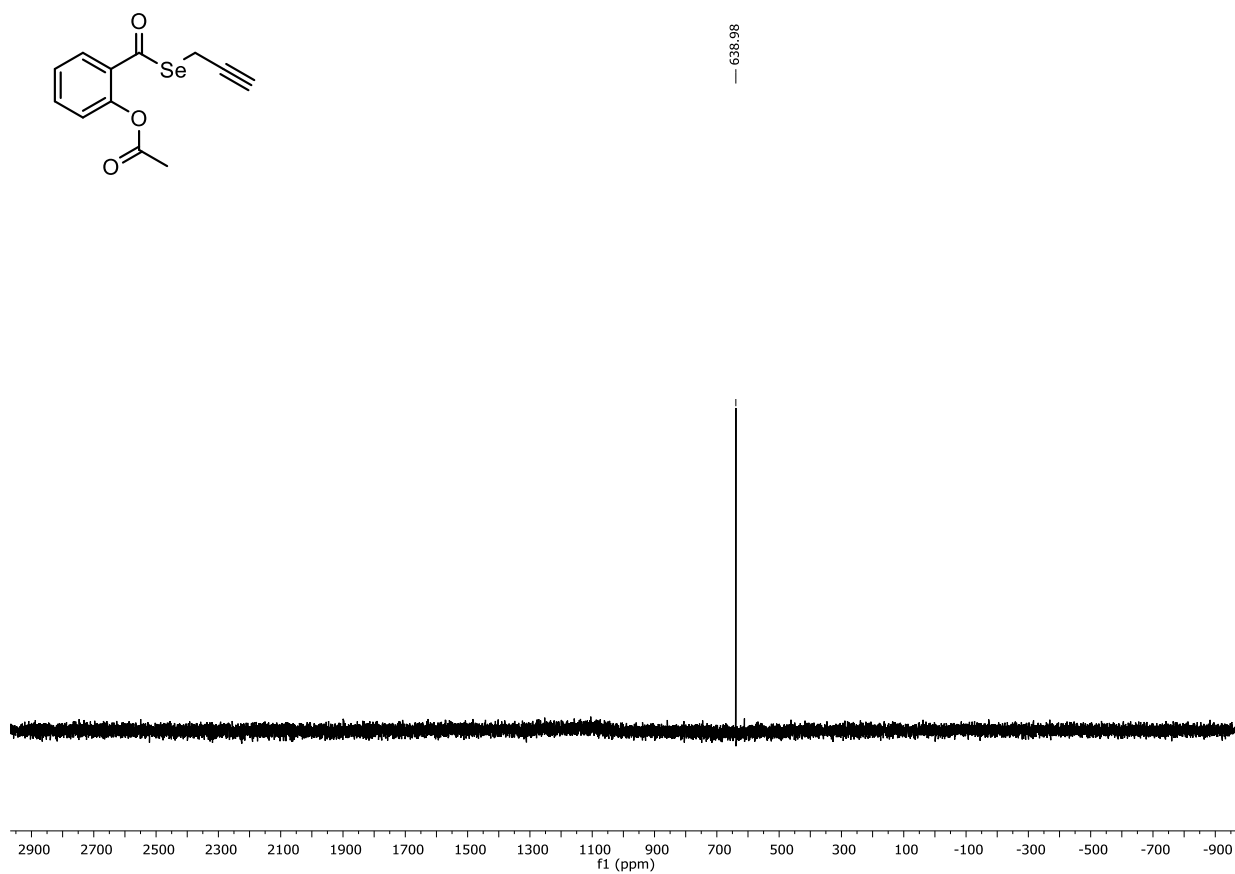


Figure S103. ⁷⁷Se-NMR spectrum of compound 14b.



Figure S104. ¹H-NMR spectrum of compound 15b.

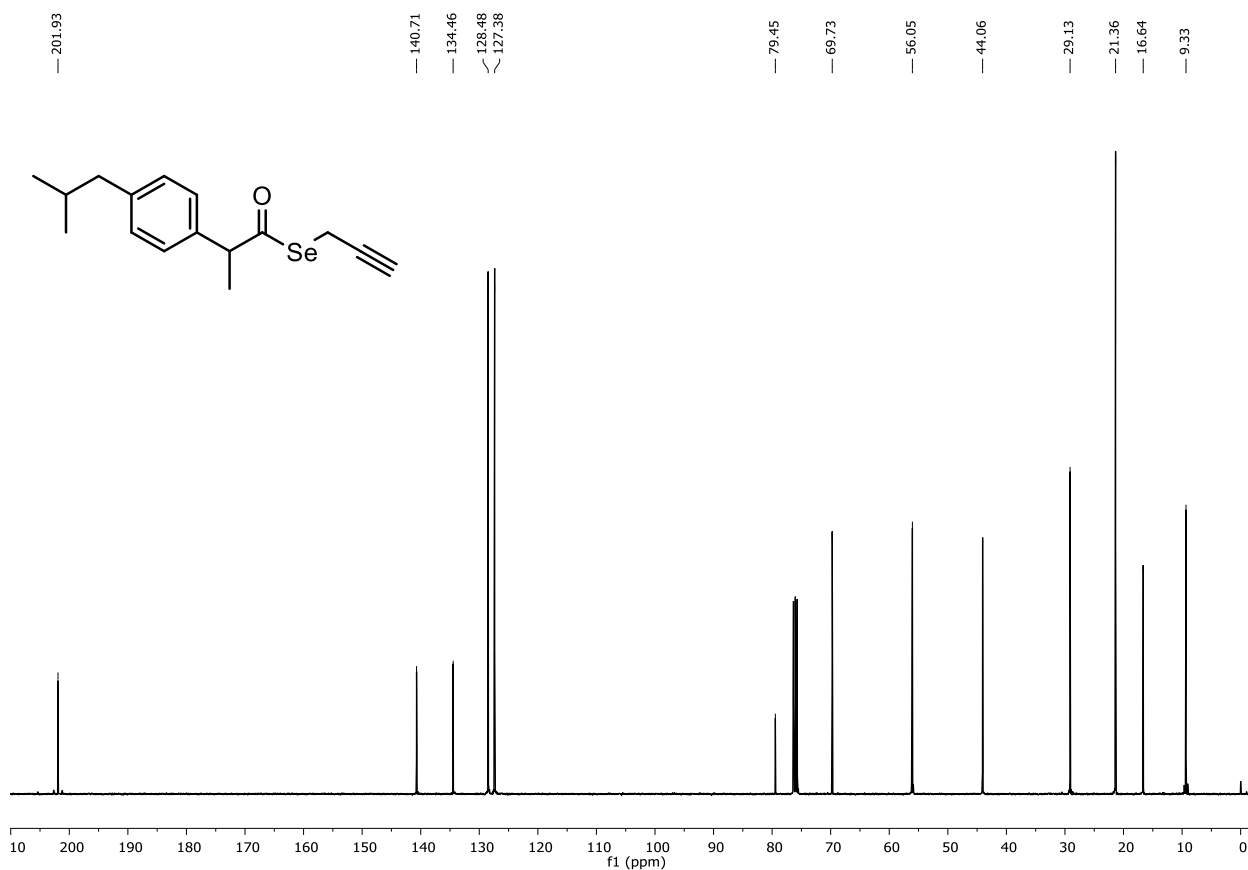


Figure S105. ¹³C-NMR spectrum of compound **15b**.

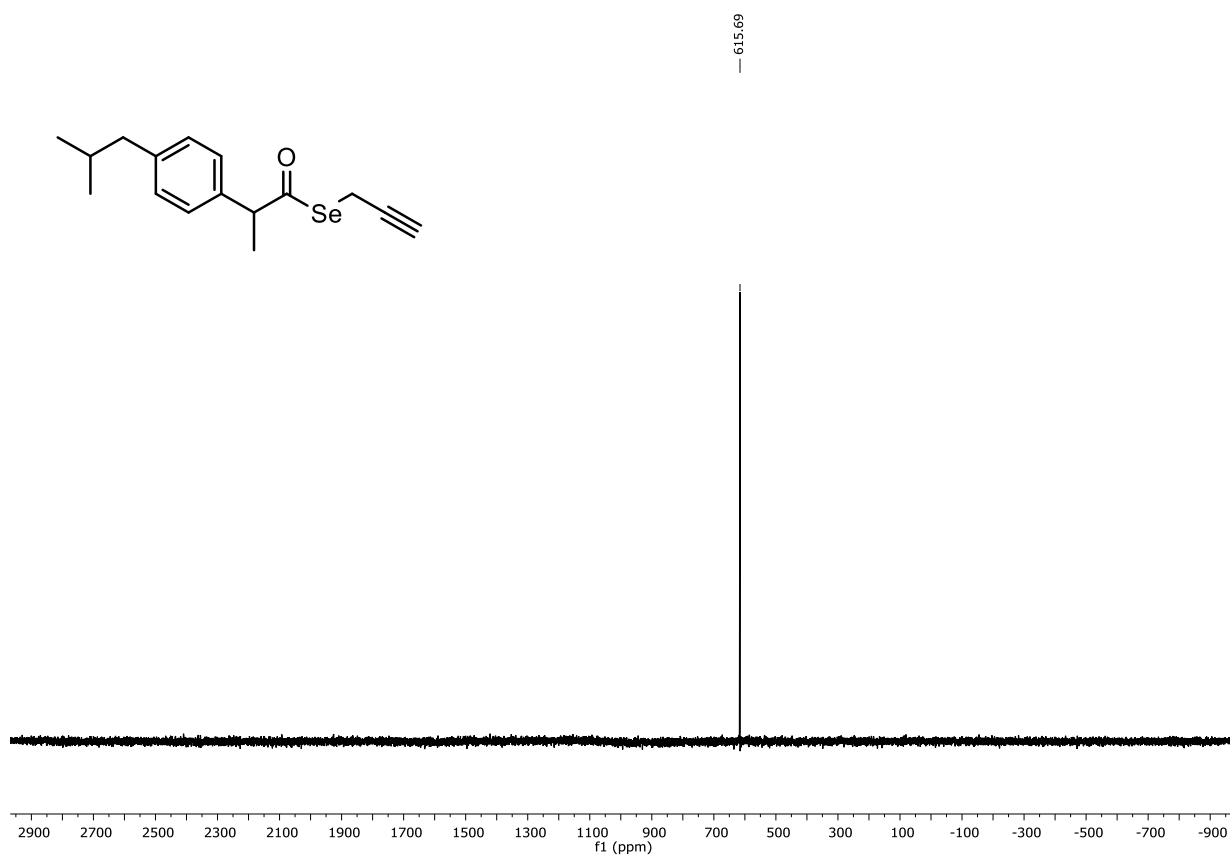


Figure S106. ⁷⁷Se-NMR spectrum of compound **15b**.

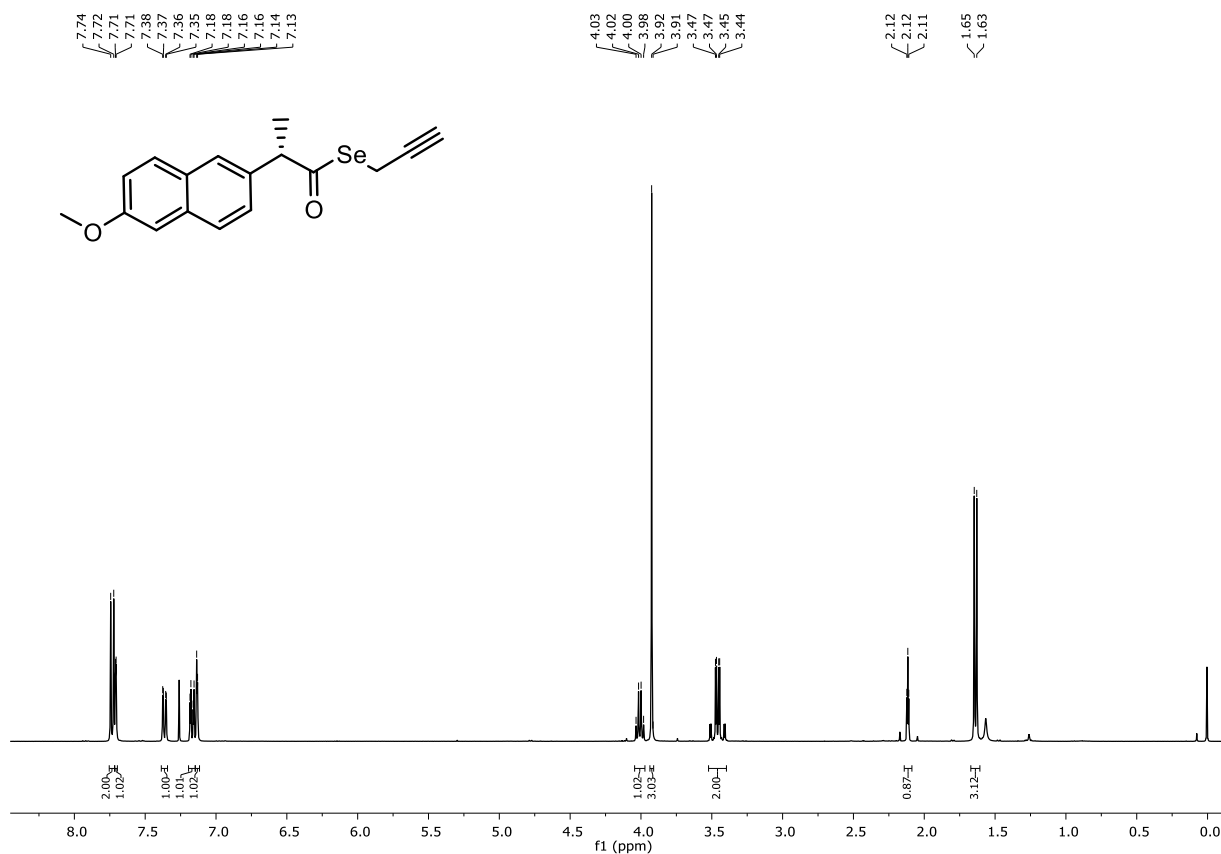


Figure S107. ¹H-NMR spectrum of compound **16b**.

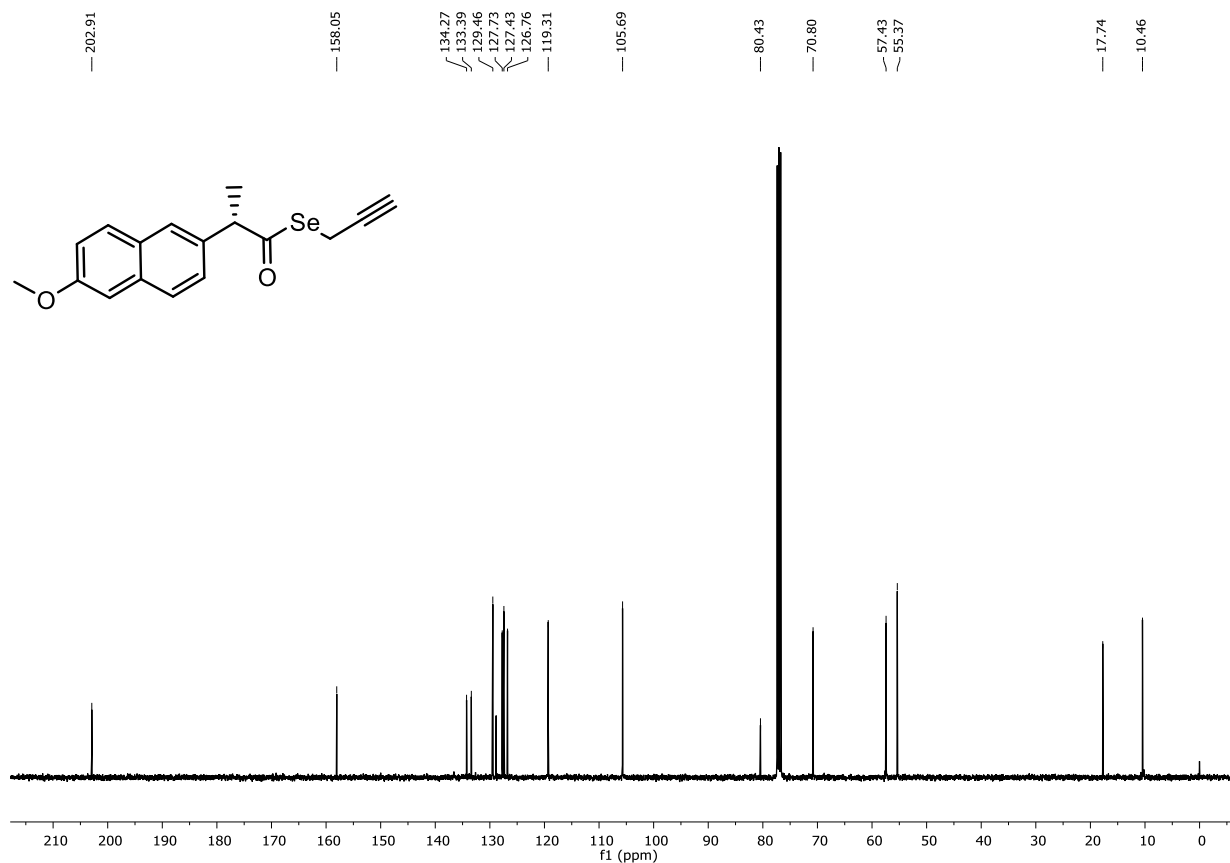


Figure S108. ¹³C-NMR spectrum of compound **16b**.

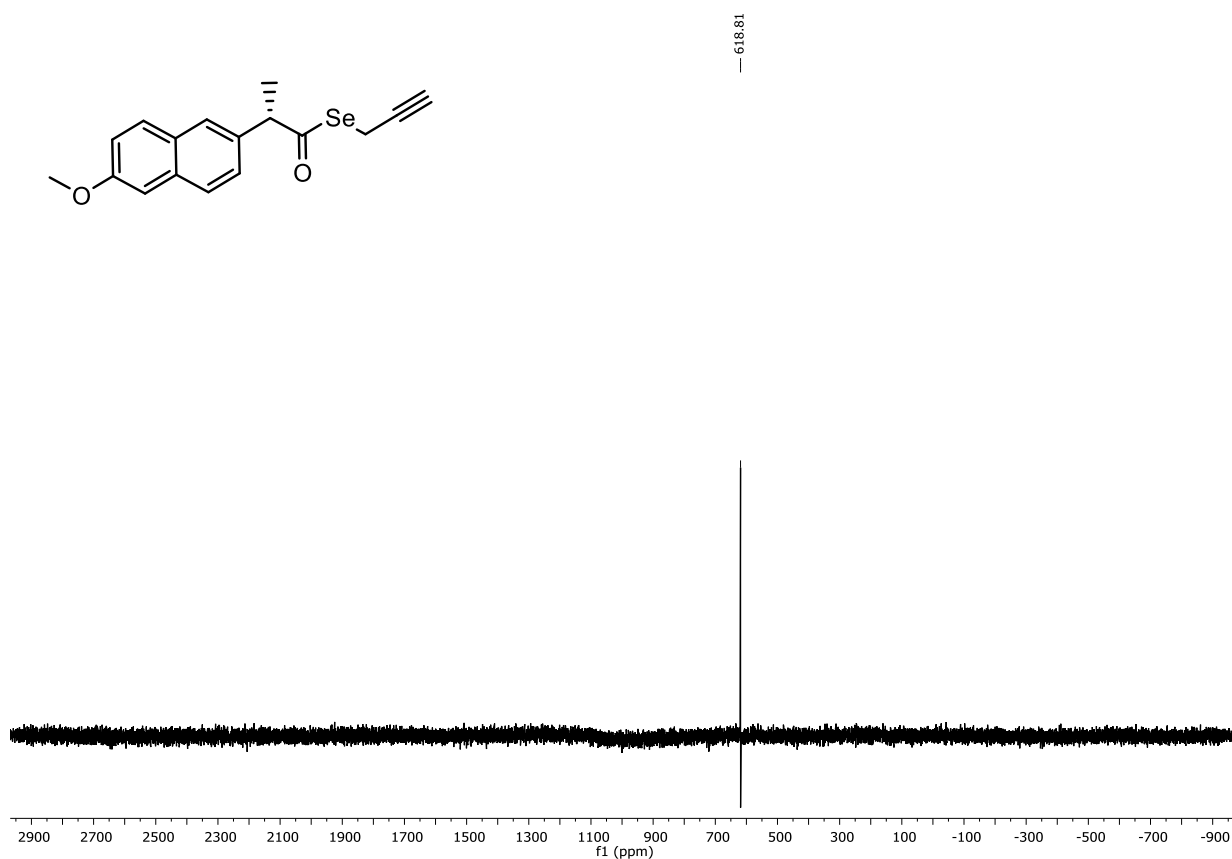


Figure S110. ^{77}Se -NMR spectrum of compound 16b.

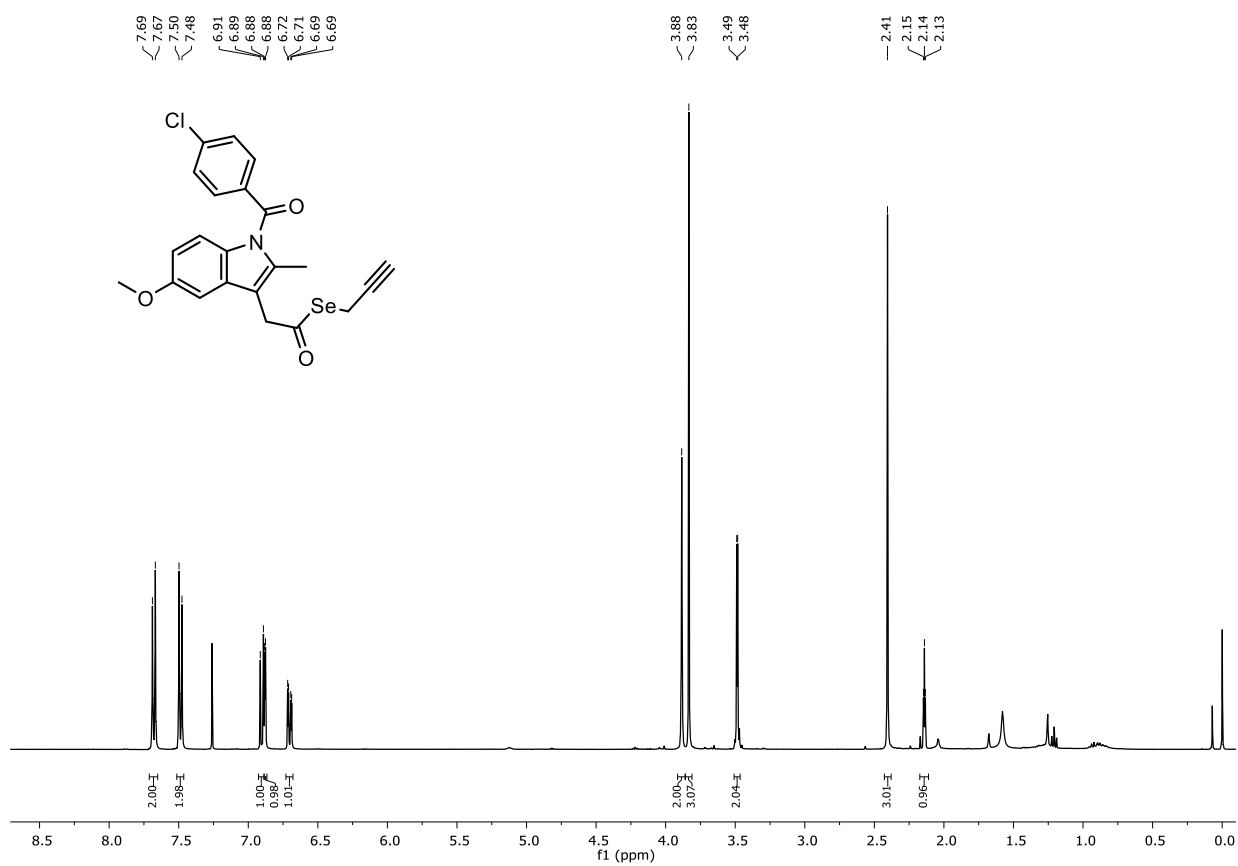


Figure S111. ^1H -NMR spectrum of compound 17b.

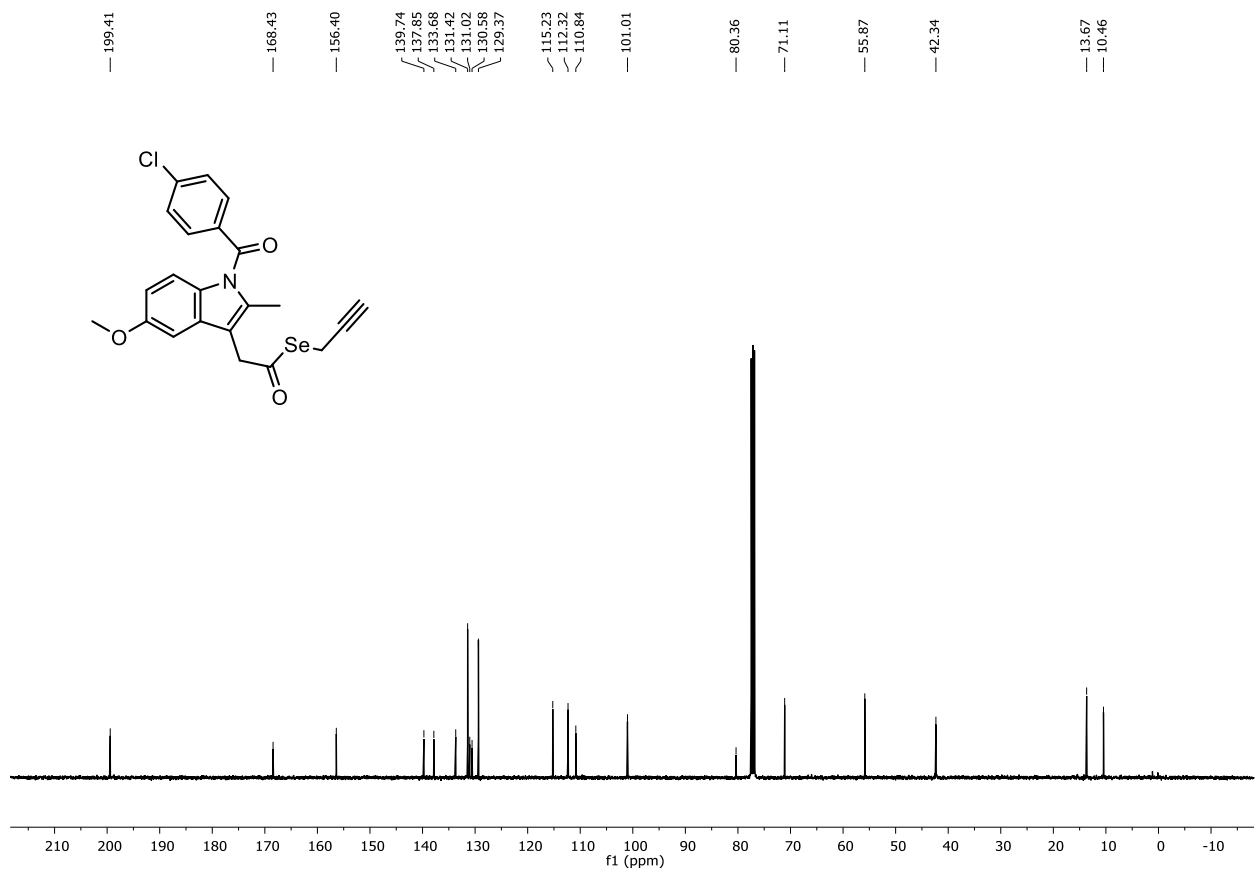


Figure S112. ¹³C-NMR spectrum of compound **17b**.

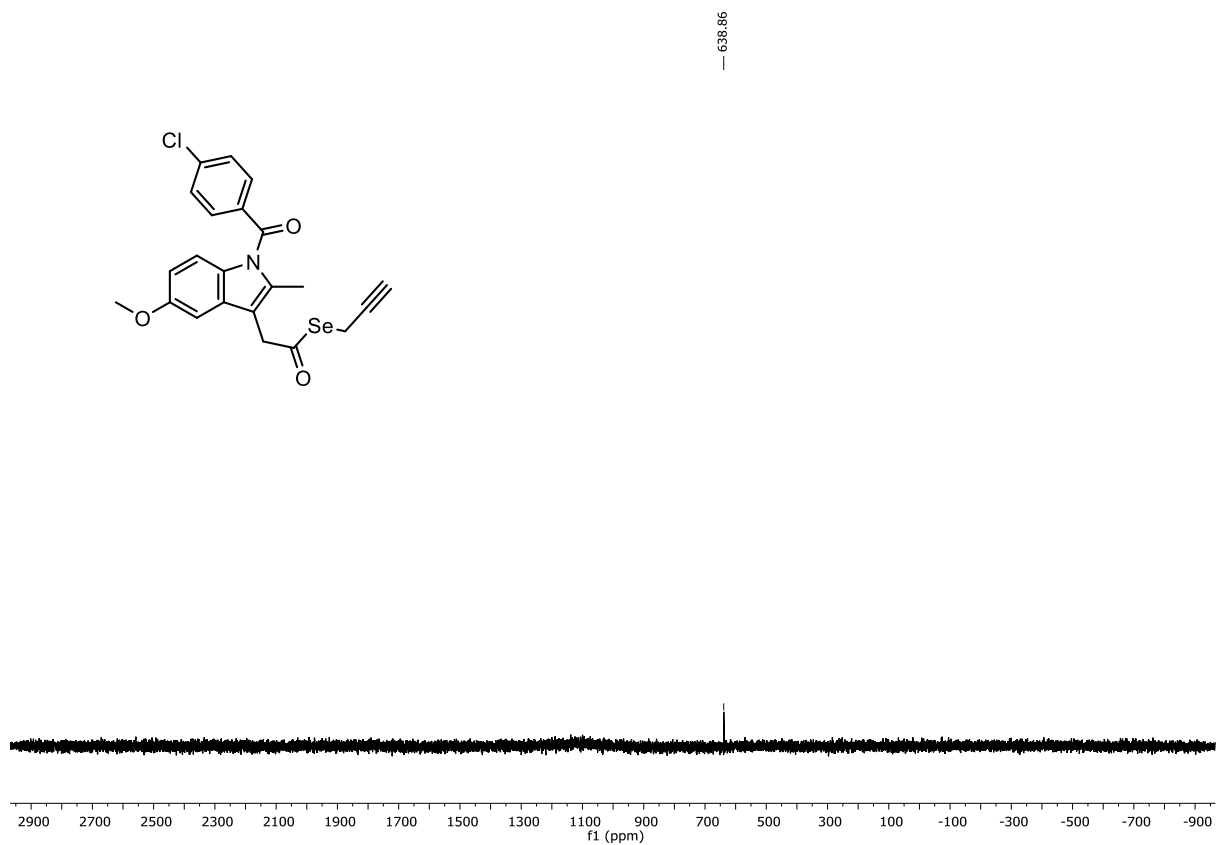


Figure S113. ⁷⁷Se-NMR spectrum of compound **17b**.

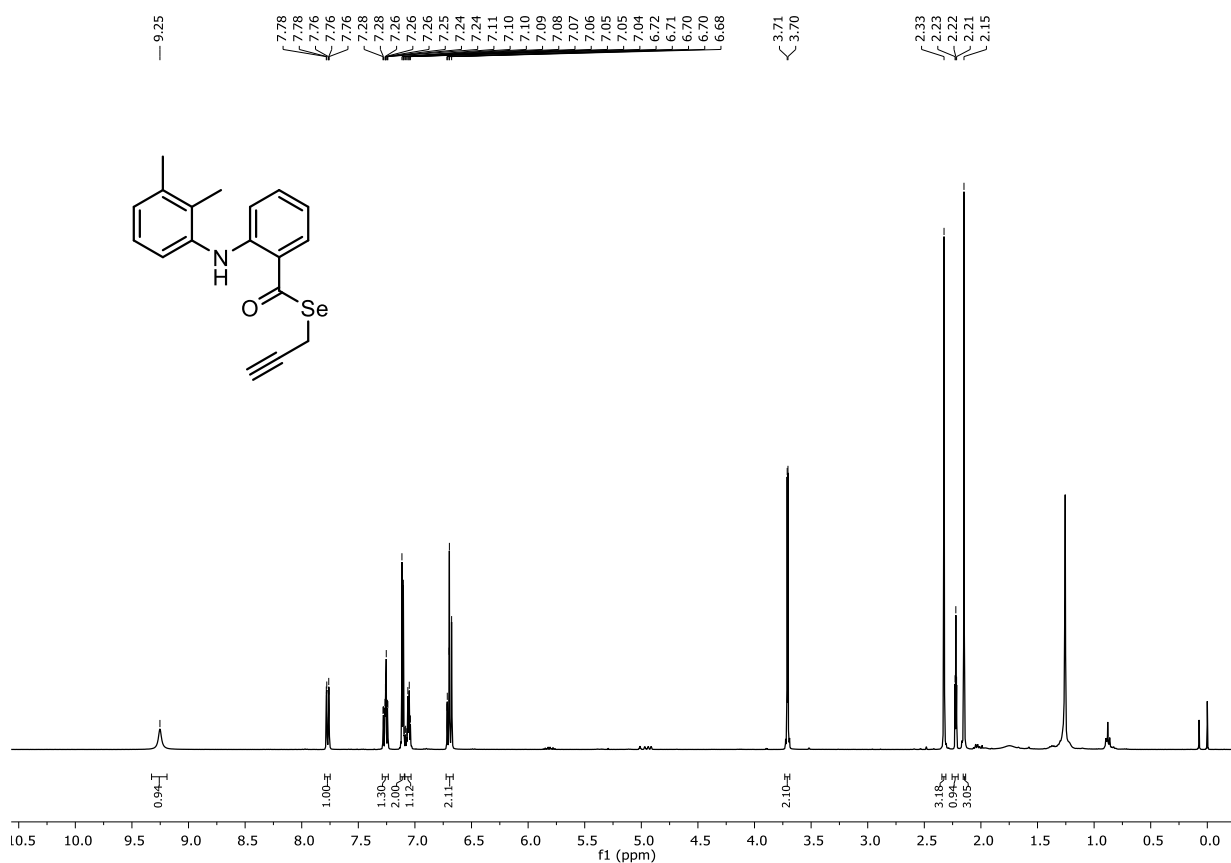


Figure S114. ¹H-NMR spectrum of compound **18b**.

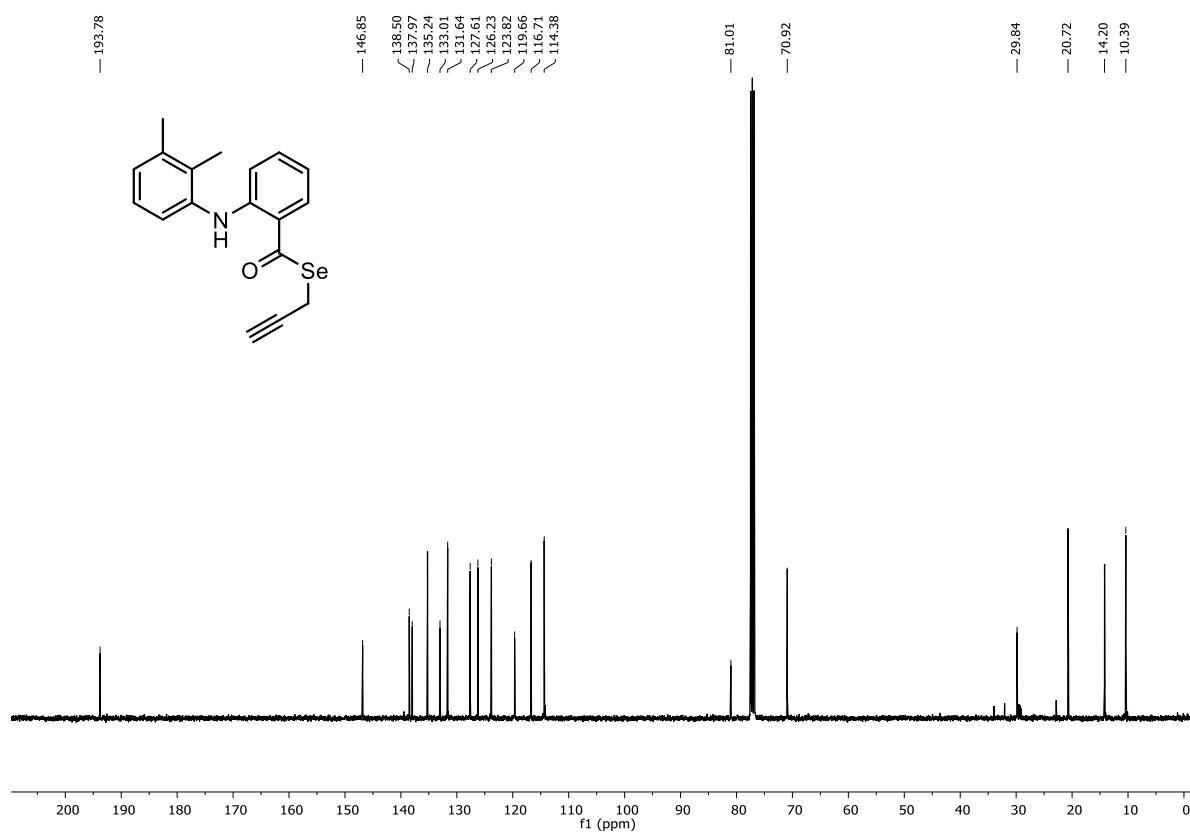


Figure S115. ¹³C-NMR spectrum of compound **18b**.

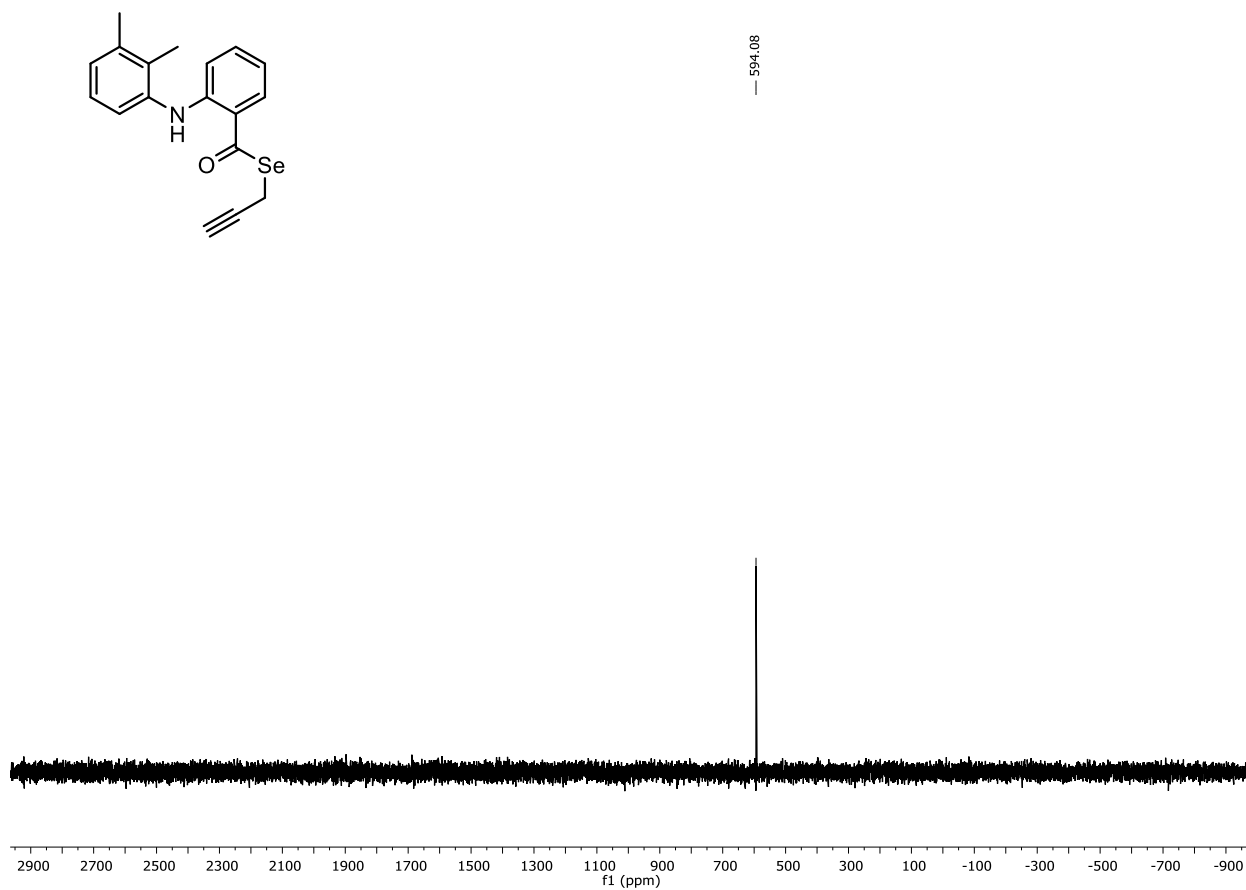


Figure S116. ^{77}Se -NMR spectrum of compound **18b**.

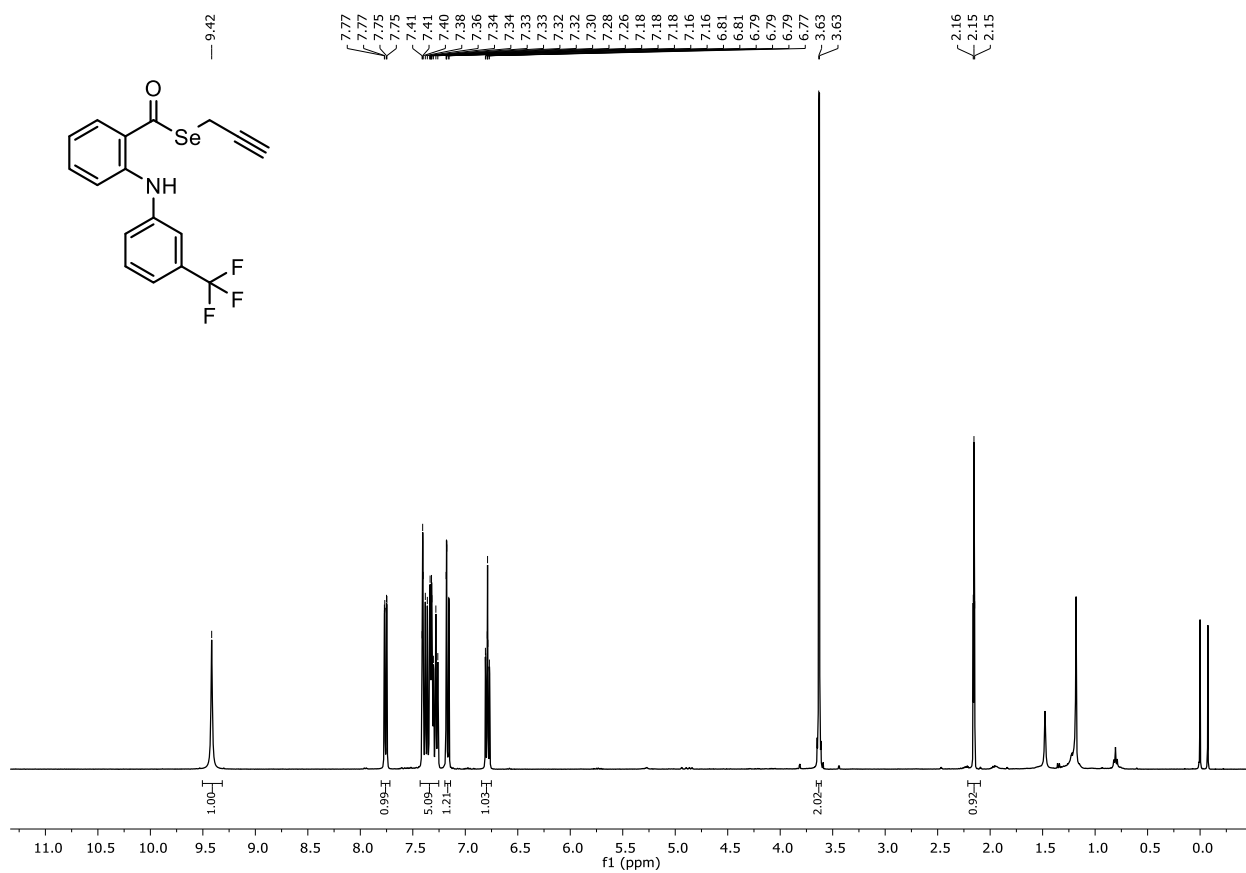


Figure S117. ^1H -NMR spectrum of compound **19b**.

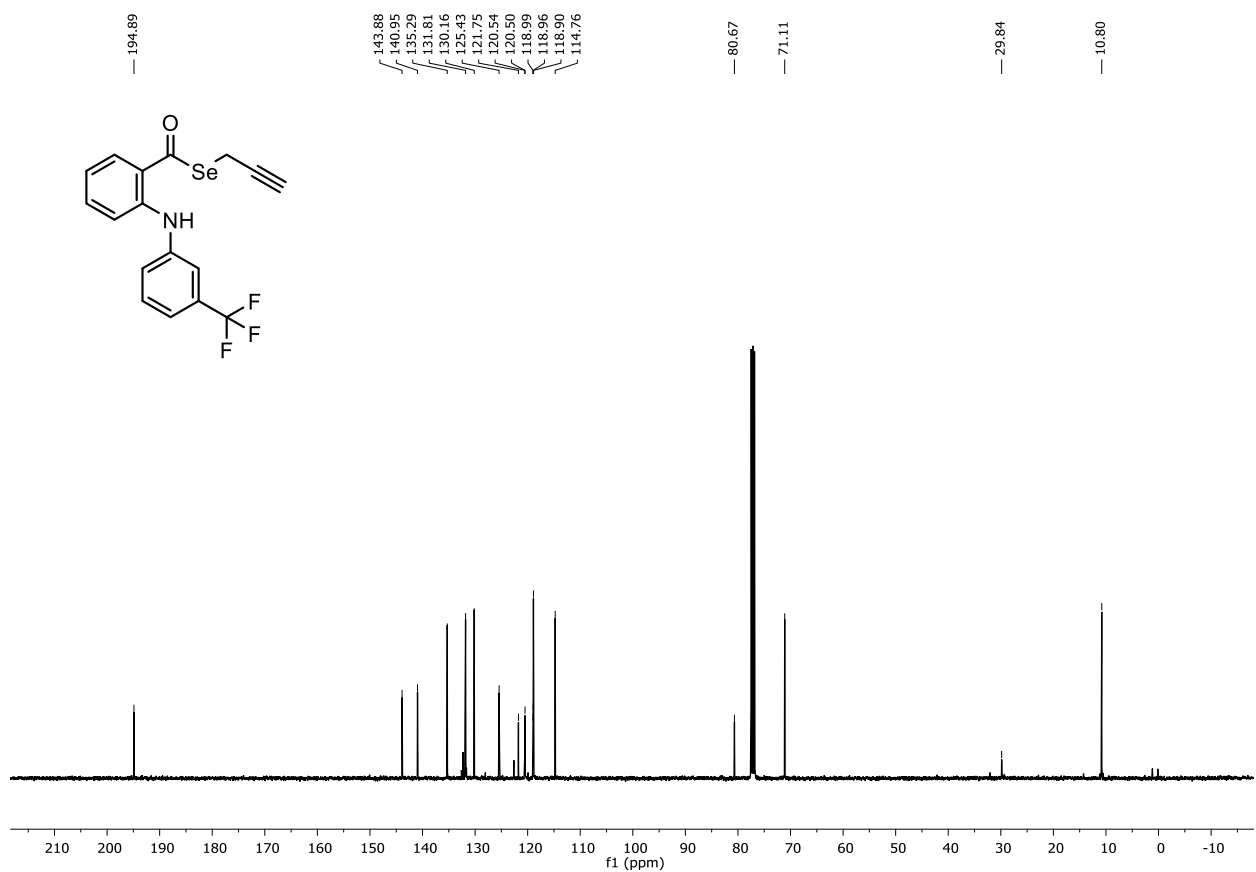


Figure S118. ¹³C-NMR spectrum of compound **19b**.

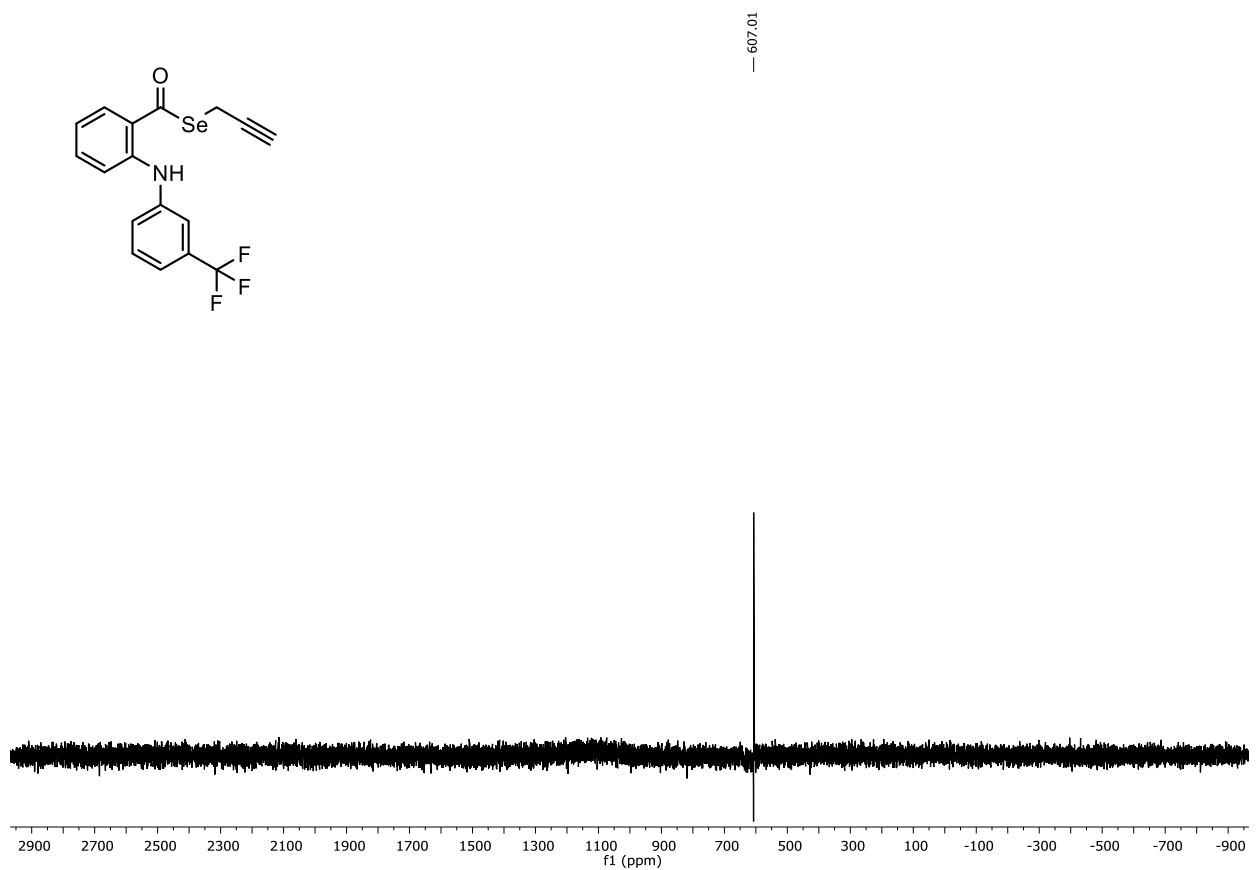


Figure S119. ⁷⁷Se-NMR spectrum of compound **19b**.