Article

Novel *N,N'*-Disubstituted Acylselenoureas as Potential Antioxidant and Cytotoxic Agents

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Contents:

1. CYTOTOXICITY SCREENING ASSAY

Table S1. Cytotoxic activity of all acylselenourea derivatives synthesized. The data are expressed as percentage of cell growth ± SEM in at least 3 independent experiments performed in quadruplicates.

		MCF-7		HT-29		HTB-54	
Comp.	**Dose (μM)**	**Growth (%)**	**SEM**	**Growth (%)**	**SEM**	**Growth (%)**	**SEM**
1a	10	70.5	7.0	56.9	2.5	67.8	4.7
	50	6.6	1.5	23.4	2.3	57.1	2.8
1b	10	64.2	5.8	60.4	3.5	75.8	4.5
	50	12.6	2.8	28.0	2.1	61.1	4.9
1c	10	67.8	1.7	74.9	6.6	64.4	6.6
	50	13.9	1.8	31.9	0.2	57.2	1.7
1d	10	73.6	7.7	97.3	8.8	84.9	7.3
	50	21.9	1.1	25.1	1.0	38.7	2.7
1e	10	74.0	3.9	77.9	4.2	82.3	5.1
	50	13.9	3.9	33.8	2.5	57.2	0.9
2a	10	93.6	8.4	79.1	9.4	91.3	6.0
	50	30.5	3.1	37.8	3.6	65.6	3.5
2b	10	60.1	14.0	80.2	8.0	87.9	4.1
	50	24.7	1.1	46.1	2.0	66.6	9.7
2c	10	62.6	10.1	76.3	8.3	84.9	7.5
	50	26.4	1.6	44.8	6.6	66.7	2.0
2d	10	94.2	0.7	87.1	10.9	100.4	0.2
	50	10.4	2.2	51.7	6.4	37.6	2.0
2e	10	118.1	9.2	77.8	5.3	96.7	7.0
	50	16.0	9.2	57.9	3.3	18.6	1.8
3a	10	84.1	6.2	71.1	5.1	88.8	5.5
	50	23.1	6.4	42.7	1.7	49.9	10.1
3b	10	64.2	4.9	64.7	4.0	45.1	13.0
	50	24.5	2.5	42.5	2.0	22.2	3.5
3c	10	73.9	6.5	67.9	2.2	79.0	7.6
	50	23.7	1.5	44.4	1.3	27.6	2.8
3e	10	105.1	5.6	76.6	1.4	79.4	10.7
	50	32.4	5.2	73.0	1.7	35.8	15.4
4a	10	68.8	11.5	99.1	5.5	83.1	6.4
	50	29.3	4.9	34.1	1.1	67.6	6.7
4b	10	77.6	5.1	99.2	2.5	87.0	2.2
	50	32.4	5.5	51.7	2.1	64.8	3.9
4c	10	86.6	7.3	99.1	7.2	88.9	5.0
	50	33.0	2.9	51.6	6.4	68.5	2.5
4d	10	67.1	2.9	103.2	11.8	90.5	0.8
	50	48.9	5.8	62.2	5.2	62.2	5.6
4e	10	90.6	6.7	93.4	8.7	92.1	7.8

	50	60.2	5.1	67.0	6.1	63.5	2.3
5a	10	70.3	4.6	73.5	2.2	76.8	4.4
	50	27.4	2.6	39.0	2.7	43.7	11.6
5b	10	64.2	4.4	82.8	7.0	66.8	2.2
	50	17.5	2.1	36.8	2.3	66.7	4.7
5c	10	90.7	4.1	57.5	4.5	85.0	6.0
	50	11.8	2.2	34.6	2.6	60.2	8.5
5d	10	46.7	9.9	60.6	4.7	76.2	1.0
	50	23.5	3.4	29.3	2.0	4.3	0.2
5e	10	77.6	2.4	78.1	1.3	73.2	4.2
	50	20.8	4.4	37.8	3.6	58.1	2.2
6a	10	39.9	1.5	72.6	3.0	72.8	5.6
	50	5.0	0.9	35.5	1.9	0.7	1.3
6b	10	64.9	2.4	87.6	1.1	73.0	8.0
	50	5.8	2.0	48.4	1.7	1.6	1.0
6c	10	70.0	4.7	74.5	2.9	74.2	4.2
	50	13.1	2.8	35.9	4.3	3.8	1.1
6d	10	71.7	3.7	81.5	8.0	59.4	3.7
	50	11.9	0.3	18.7	1.9	4.6	1.9
6e	10	62.7	7.0	75.2	2.6	84.1	2.0
	50	11.2	1.6	31.1	3.1	4.0	1.5
7c	10	91.8	5.3	59.6	4.2	98.4	5.1
	50	24.3	8.7	34.0	3.7	48.3	9.5
7d	10	87.9	8.2	49.5	2.8	92.9	5.3
	50	25.3	9.2	29.6	5.8	79.8	6.6
7e	10	83.9	6.4	53.5	2.8	110.7	7.7
	50	39.0	8.2	45.9	2.1	36.4	5.4
8a	10	75.8	7.2	98.6	12.4	65.2	7.3
	50	15.3	2.1	34.2	2.5	49.7	4.9
8b	10	95.5	1.4	95.3	7.3	85.9	7.3
	50	82.3	3.5	76.9	9.4	72.8	2.8
8c	10	70.2	5.8	73.4	3.9	64.1	3.5
	50	5.7	1.0	42.5	6.6	19.3	2.8
8d	10	91.1	11.1	76.0	5.7	90.0	5.6
	50	18.5	3.4	37.3	8.1	41.1	8.4
8e	10	69.6	9.2	85.2	13.3	76.1	4.0
	50	11.8	2.1	40.6	3.2	31.2	4.8
9a	10	64.9	6.8	62.0	4.1	66.9	6.6
	50	43.4	5.2	28.6	2.3	3.3	1.2
9b	10	76.8	18.1	64.3	6.7	79.0	11.8
	50	62.8	6.2	36.2	1.7	19.0	6.1
9c	10	63.0	11.1	47.9	8.2	64.2	1.3
	50	49.2	7.3	37.3	4.1	7.1	1.3

9d	10	91.1	9.2	61.2	8.2	84.5	6.4
	50	70.2	0.4	36.0	6.2	79.3	7.2
9e	10	54.8	7.8	45.4	7.5	32.9	6.7
	50	44.4	11.6	33.5	5.5	9.0	2.4
10a	10	37.8	7.7	57.3	4.2	44.0	7.9
	50	22.4	5.7	49.5	5.1	13.1	4.5
10b	10	63.0	3.3	63.3	9.1	16.4	3.2
	50	7.4	0.5	43.9	3.9	12.0	2.3
10c	10	52.7	5.4	55.7	6.7	78.2	4.2
	50	15.6	3.1	35.5	4.3	5.1	0.7
10d	10	60.6	1.6	66.5	4.5	79.6	5.1
	50	8.4	1.0	13.9	1.4	5.1	0.7
10e	10	55.6	1.9	54.4	4.0	45.5	8.9
	50	16.9	4.5	21.4	2.0	6.5	1.4

2. SUPPLEMENTARY DATA FOR DPPH AND ABTS ASSAYS

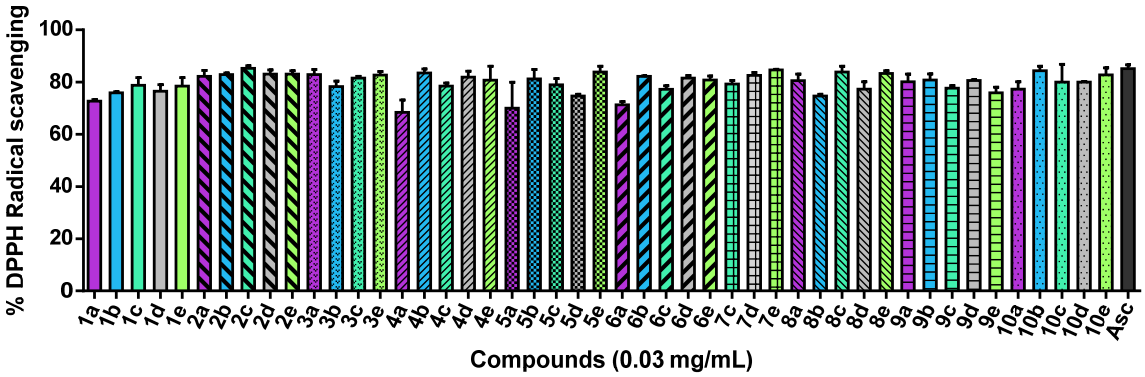

Figure S1. DPPH scavenging activity at a concentration of 0.03 mg/mL and after 60 minutes.

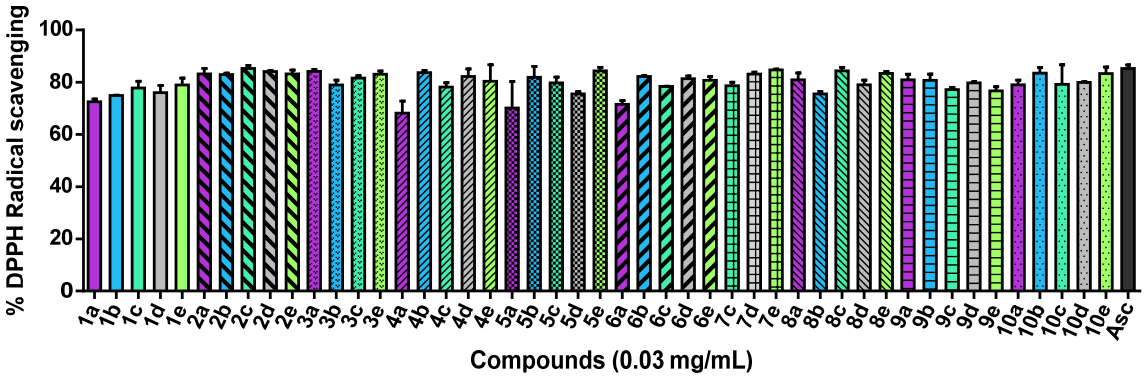

Figure S2. DPPH scavenging activity at a concentration of 0.03 mg/mL and after 90 minutes.

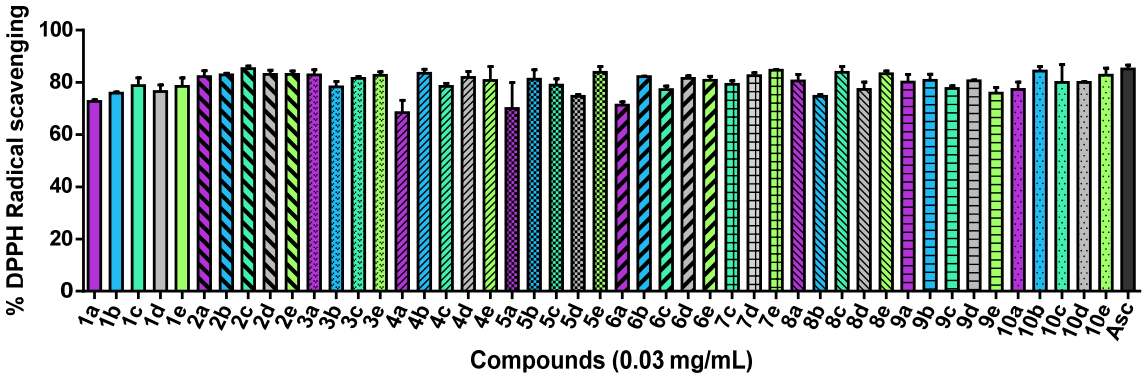

Figure S3. DPPH scavenging activity at a concentration of 0.03 mg/mL and after 120 minutes.

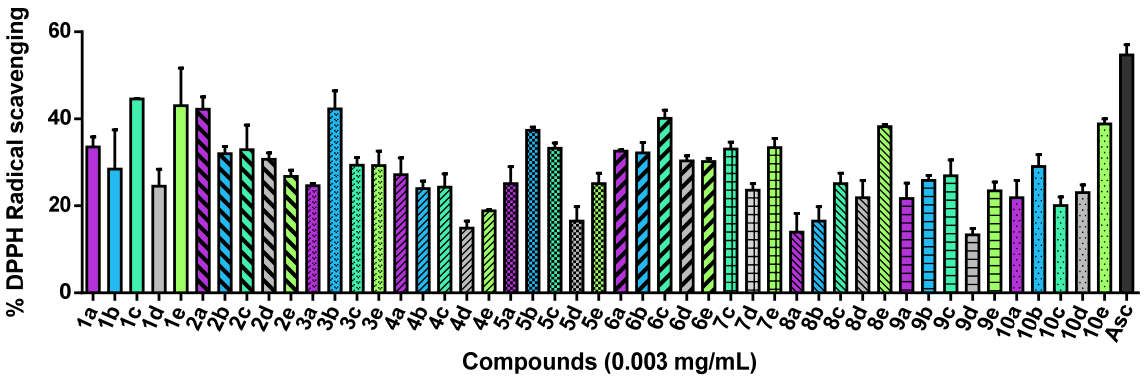

Figure S4. DPPH scavenging activity at a concentration of 0.003 mg/mL and after 30 minutes.

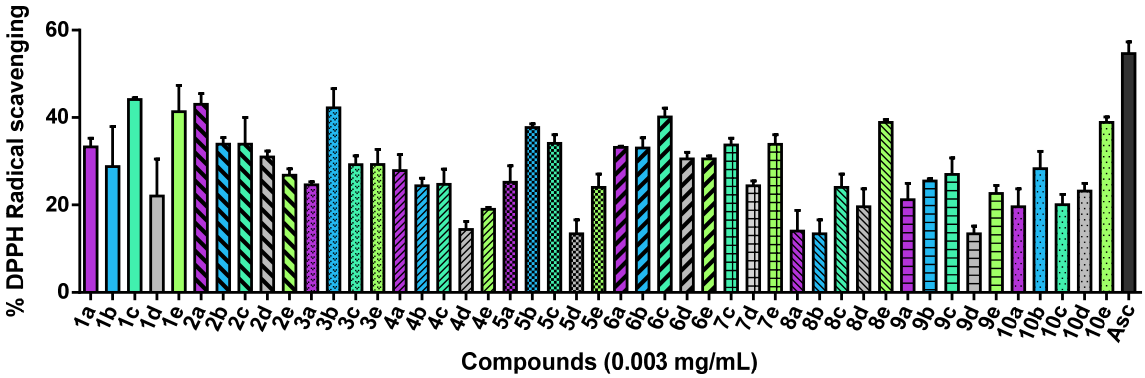

Figure S5. DPPH scavenging activity at a concentration of 0.003 mg/mL and after 60 minutes.

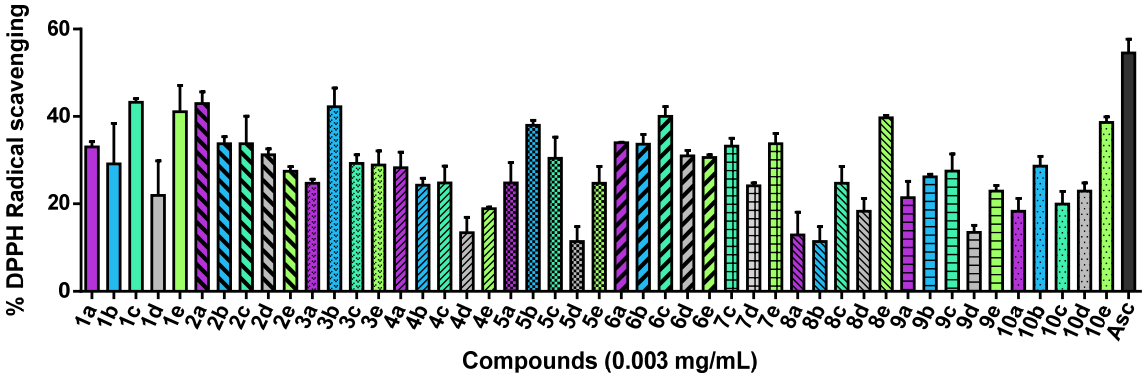

Figure S6. DPPH scavenging activity at a concentration of 0.003 mg/mL and after 90 minutes.

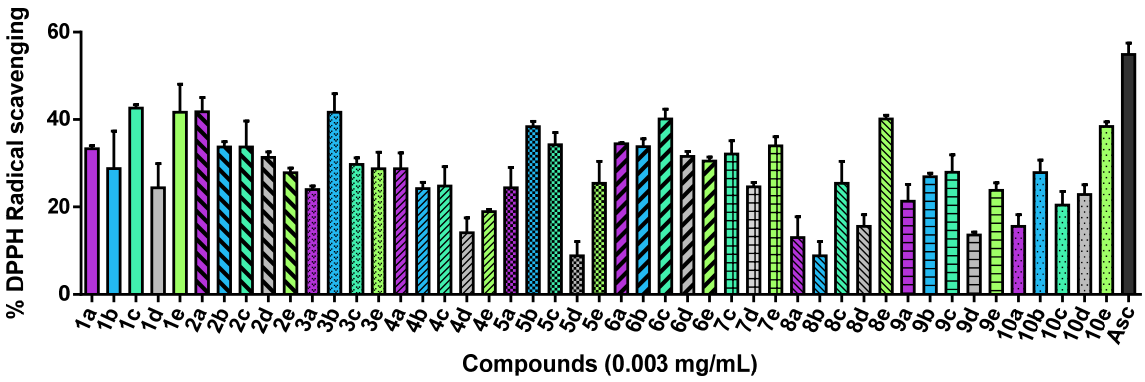

Figure S7. DPPH scavenging activity at a concentration of 0.003 mg/mL and after 120 minutes.

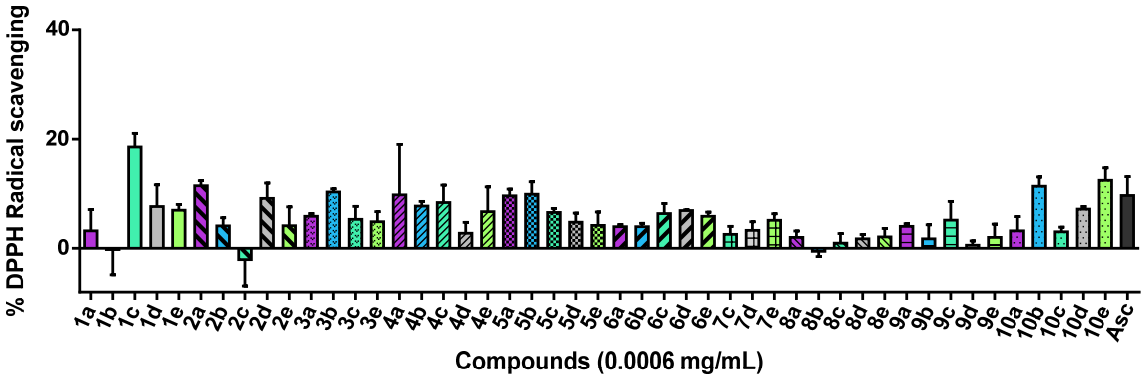

Figure S8. DPPH scavenging activity at a concentration of 0.0006 mg/mL and 0 minutes.

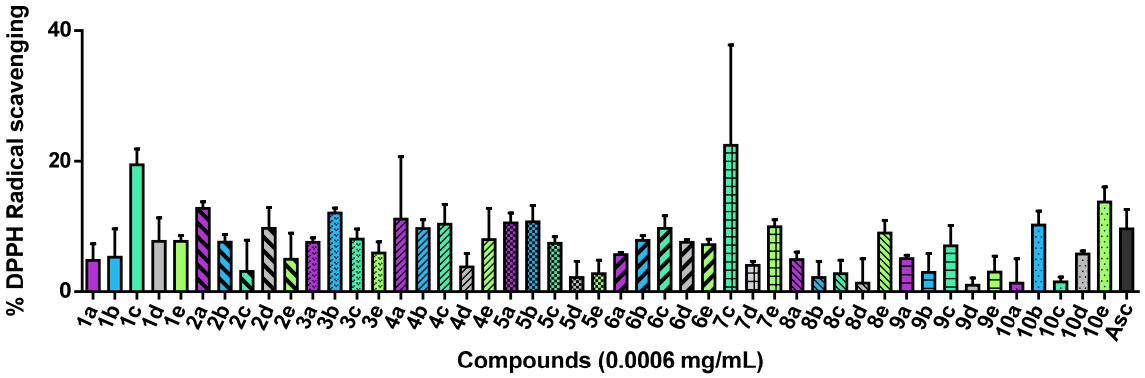

Figure S9. DPPH scavenging activity at a concentration of 0.0006 mg/mL and after 30 minutes.

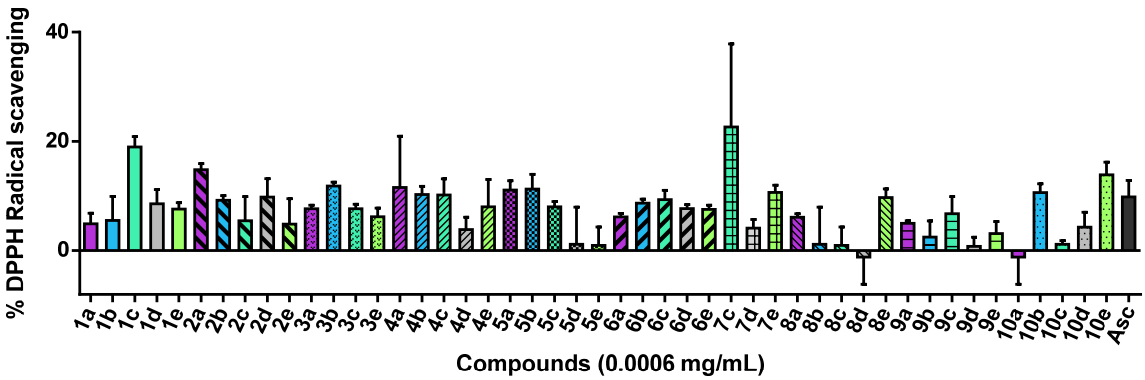

Figure S10. DPPH scavenging activity at a concentration of 0.0006 mg/mL and after 60 minutes.

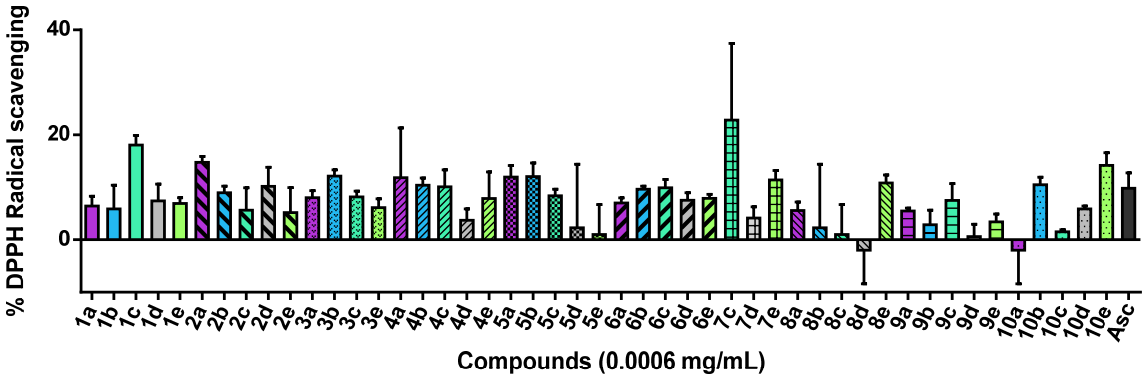

Figure S11. DPPH scavenging activity at a concentration of 0.0006 mg/mL and after 90 minutes.

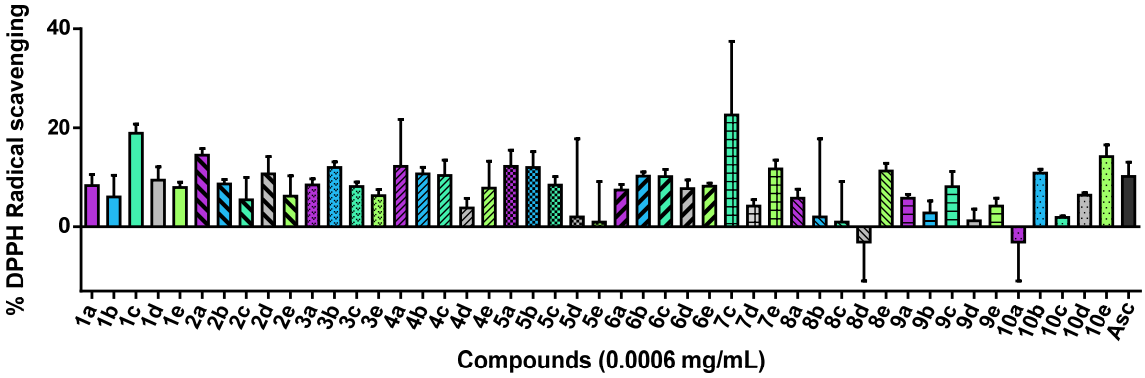

Figure S12. DPPH scavenging activity at a concentration of 0.0006 mg/mL and after 120 minutes.

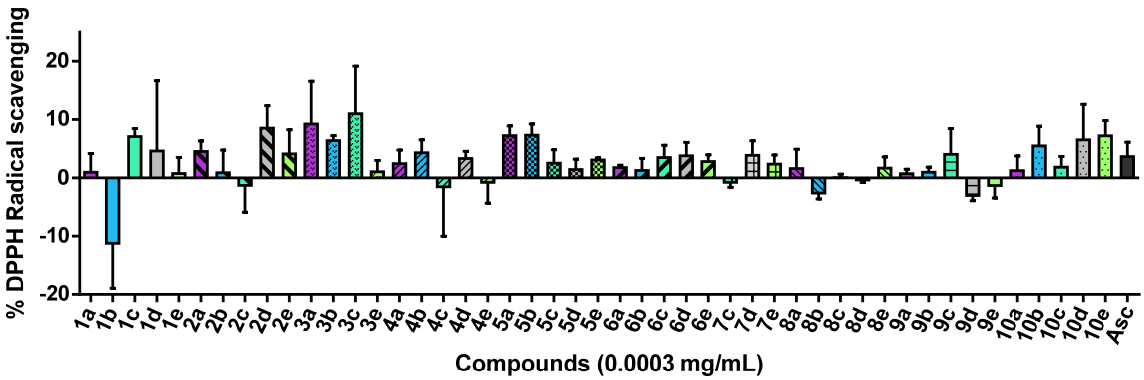

Figure S13. DPPH scavenging activity at a concentration of 0.0003 mg/mL and 0 minutes.

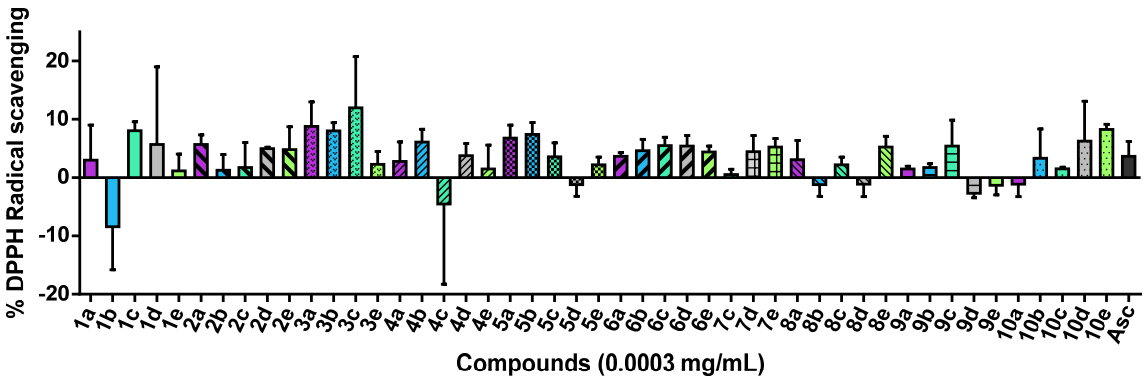

Figure S14. DPPH scavenging activity at a concentration of 0.0003 mg/mL and after 30 minutes.

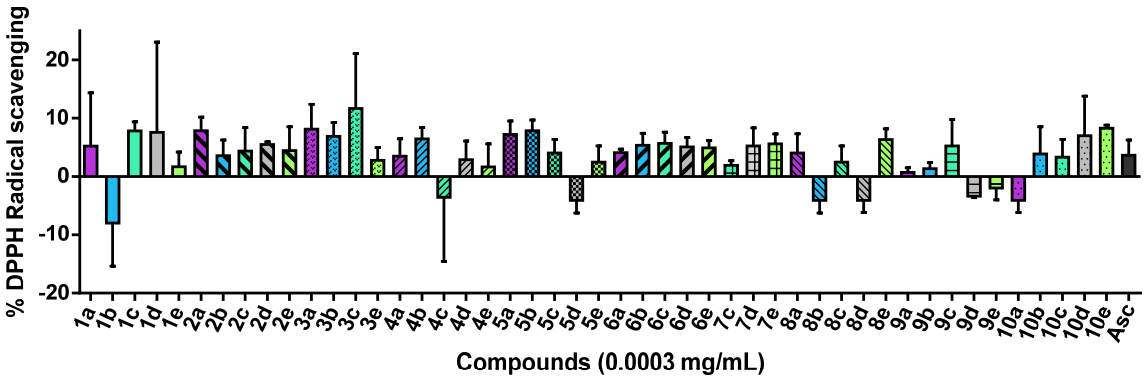

Figure S15. DPPH scavenging activity at a concentration of 0.0003 mg/mL and after 60 minutes.

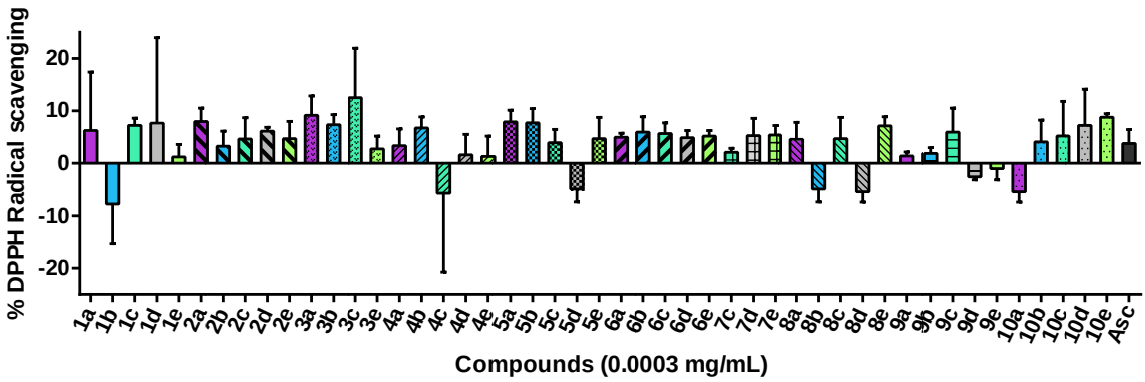

Figure S16. DPPH scavenging activity at a concentration of 0.0003 mg/mL and after 90 minutes.

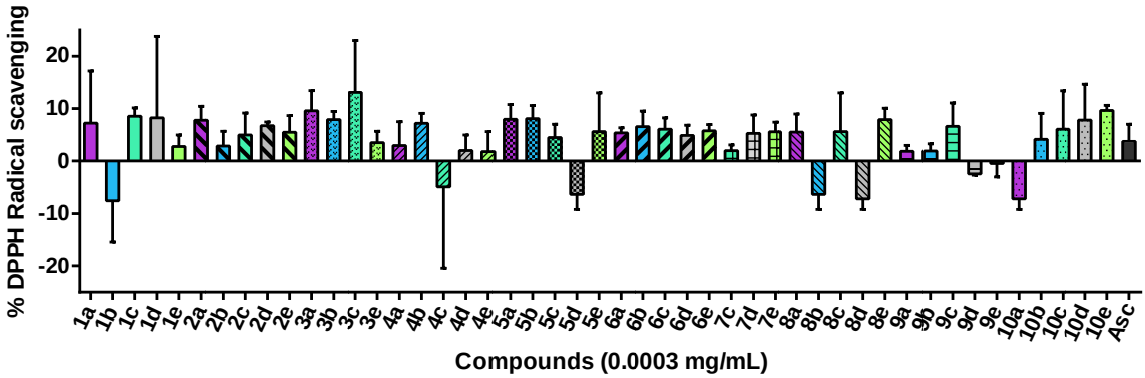

Figure S17. DPPH scavenging activity at a concentration of 0.0003 mg/mL and after 120 minutes.

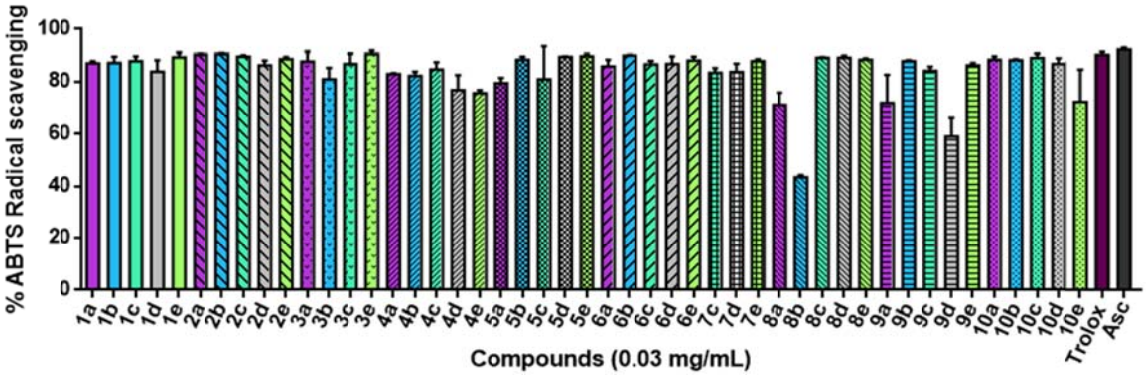

Figure S18. ABTS scavenging activity at a concentration of 0.03 mg/mL and after 30 minutes.

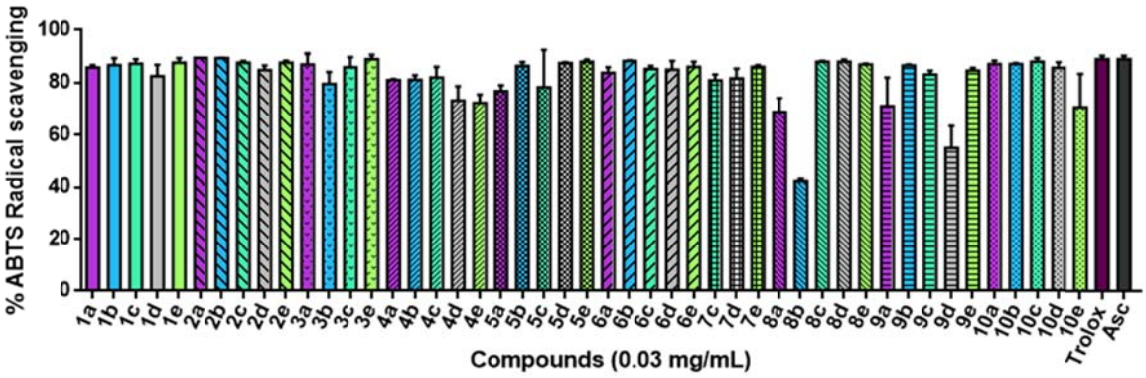

Figure S19. ABTS scavenging activity at a concentration of 0.03 mg/m**L** and after 60 minutes.

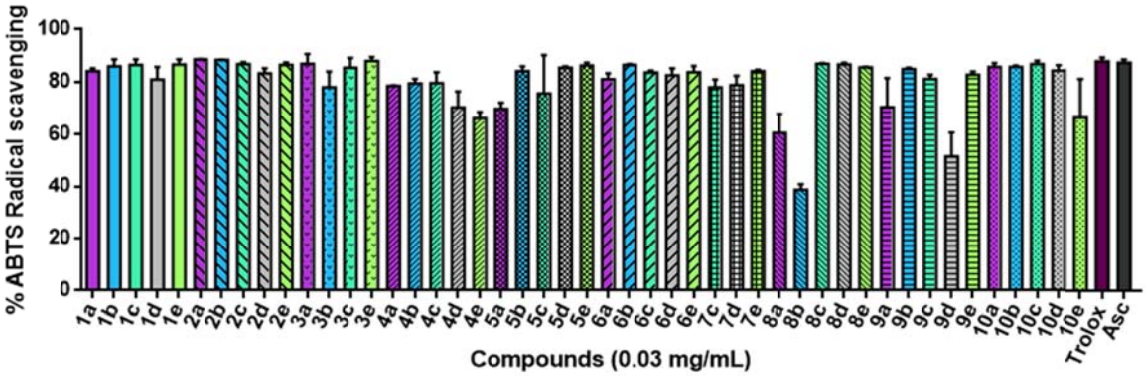

Figure S20. ABTS scavenging activity at a concentration of 0.03 mg/m**L** and after 90 minutes.

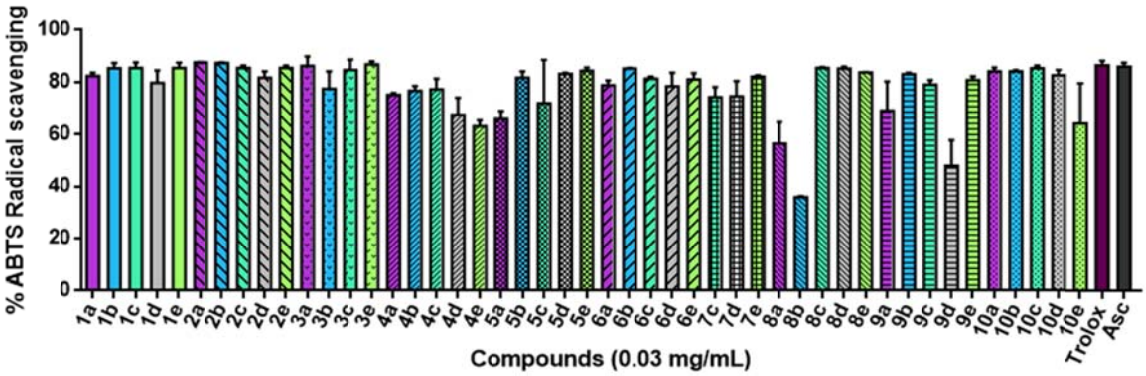

Figure S21. ABTS scavenging activity at a concentration of 0.03 mg/mL and after 120 minutes.

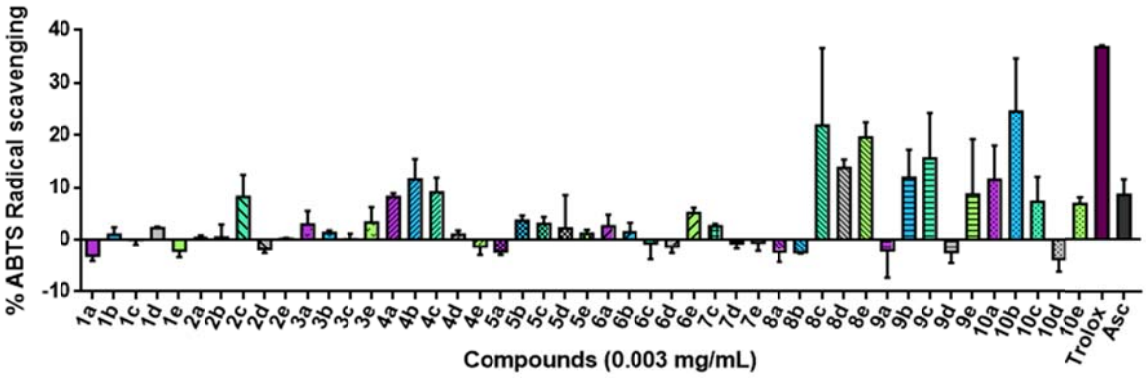

Figure S22. ABTS scavenging activity at a concentration of 0.003 mg/mL and after 6 minutes of incubation.

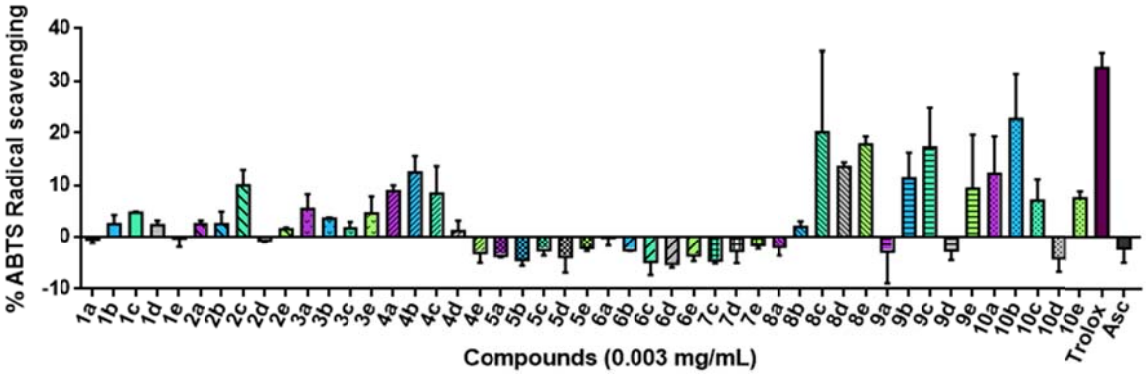

Figure S23. ABTS scavenging activity at a concentration of 0.003 mg/mL and after 30 minutes.

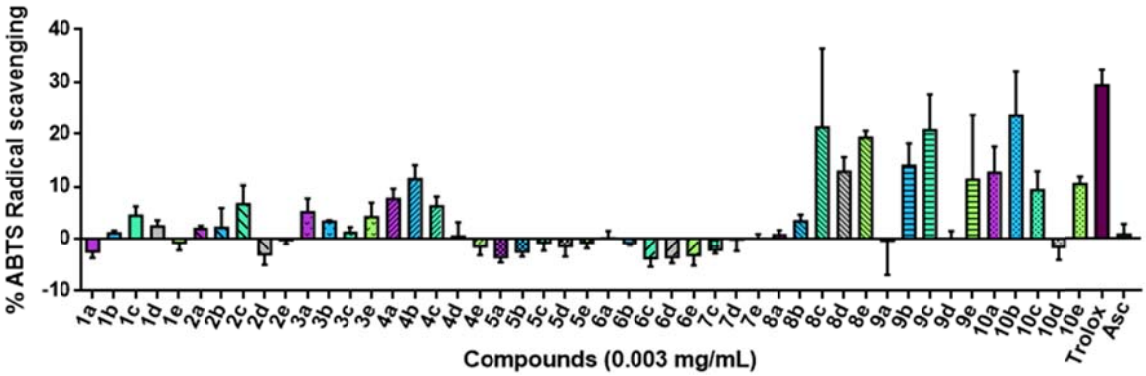

Figure S24. ABTS scavenging activity at a concentration of 0.003 mg/mL and after 60 minutes.

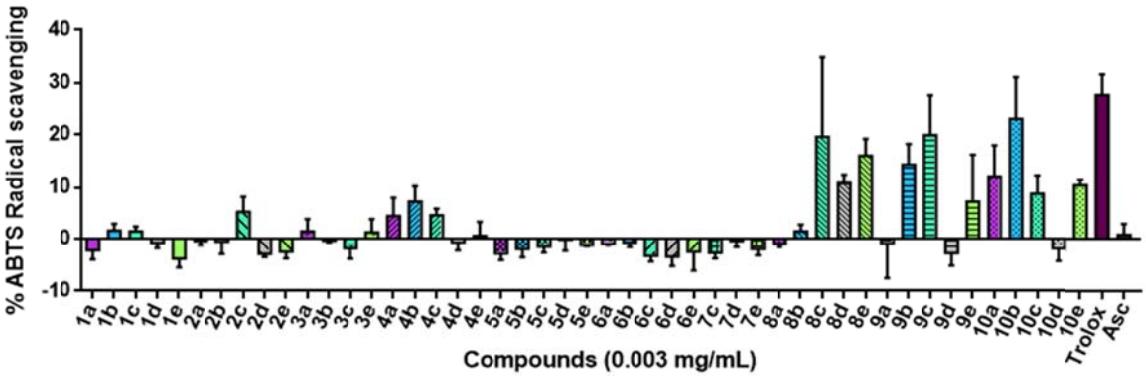

Figure S25. ABTS scavenging activity at a concentration of 0.003 mg/mL and after 90 minutes.

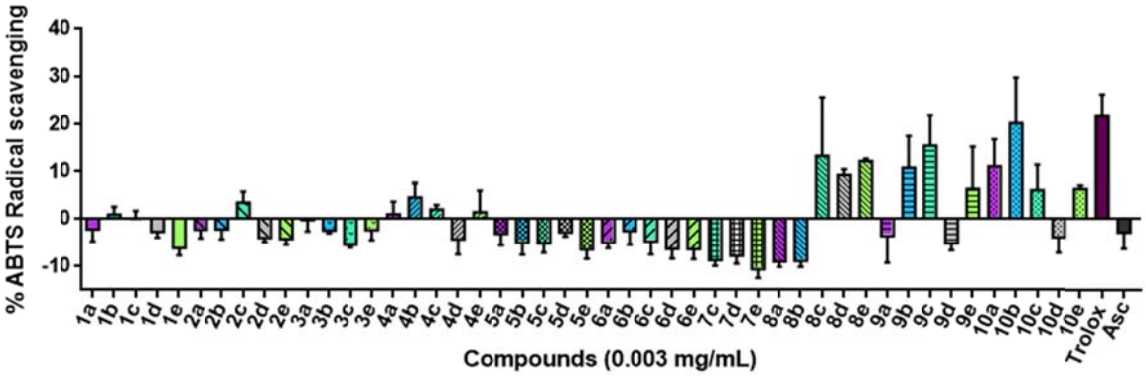

Figure S26. ABTS scavenging activity at a concentration of 0.003 mg/mL and after 120 minutes.

3. CHARACTERIZATION

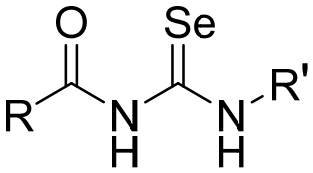

Figure S27. General structure of the new acylselenoureas.

N-(phenylcarbamoselenoyl)benzamide **(1a)**. Brown solid; yield: 45%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.98 (1H, s, CONH), 11.80 (1H, s, Ph-NH), 7.99 (2H, d, *J* = 7.6 Hz, R-H), 7.68 (2H, d, *J* = 7.7 Hz, R'-H), 7.67-7.65 (1H, m, R-H), 7.55 (2H, t, *J* = 7.6 Hz, R-H), 7.45 (2H, t, *J* = 7.7 Hz, R'-H), 7.33 (1H, t, *J* = 7.7 Hz, R'-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 181.0, 168.6, 139.4 133.7, 132.4, 129.2, 129.2, 128.9, 127.4, 125.6. ^{77}Se-NMR (75 MHz, $CDCl_3$) δ: 416.

N-[(4-methylphenyl)carbamoselenoyl]benzamide **(1b)**. Brown solid; yield: 55%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.94 (1H, s, CONH), 11.76 (1H, s, Ph-NH), 7.98 (2H, d, *J* = 7.3 Hz, R-H), 7.68 (1H, t, *J* = 7.3 Hz, R-H), 7.56-7.52 (4H, m, R'-H+R-H), 7.24 (2H, d, *J* = 8.1 Hz, R'-H), 2.33 (3H, s, CH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.8, 168.6, 136.9, 136.8, 133.7, 132.4, 129.6, 129.2, 128.9, 125.4, 21.1. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 412.

N-[(4-methoxyphenyl)carbamoselenoyl]benzamide **(1c)**. Brown solid; yield: 66%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.85 (1H, s, CONH), 11.75 (1H, s, Ph-NH), 7.98 (2H, d, *J* = 7.3 Hz, R-H), 7.68 (1H, t, *J* = 7.3 Hz, R-H), 7.56 (2H, d, *J* = 8.9 Hz, R'-H), 7.55-7.53 (2H, m, R-H), 6.99 (2H, d, *J* = 8.9 Hz, R'-H), 3.79 (3H, s, OCH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.9, 168.6, 158.3, 133.7, 132.4, 132.3, 129.2, 128.9, 127.1, 114.3, 55.8. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 405.

N-[(4-trifluoromethylphenyl)carbamoselenoyl]benzamide **(1d)**. Brown solid; yield: 90%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 13.06 (1H, s, CONH), 11.98 (1H, s, Ph-NH), 7.99 (2H, d, *J* = 7.4 Hz, R-H), 7.95 (2H, d, *J* = 8.3 Hz, R'-H), 7.81 (2H, d, *J* = 8.3 Hz, R'-H), 7.69 (1H, t, *J* = 7.4Hz, R-H), 7.56 (2H, t, *J* = 7.4 Hz, R-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 181.6, 168.4, 143.2, 133.8, 132.3, 129.3, 128.9, 126.3. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 436.

N-[(4-chlorophenyl)carbamoselenoyl]benzamide **(1e)**. Yellow solid; yield: 95%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.92 (1H, s, CONH), 11.87 (1H, s, Ph-NH), 7.98 (2H, d, *J* = 7.5 Hz, R-H), 7.71 (2H, d, *J* = 8.5 Hz, R'-H), 7.69-7.65 (2H, m, R-H), 7.55 (1H, t, *J* = 7.5 Hz, R-H), 7.50 (2H, d, *J* = 8.5 Hz, R'-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 181.4, 168.5, 138.5, 133.7, 132.4, 131.5, 129.3, 129.1, 128.9, 127.7. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 423.

2-chloro-N-(phenylcarbamoselenoyl)benzamide **(2a)**. Orange solid; yield: 11%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.76 (1H, s, CONH), 12.31 (1H, s, Ph-NH), 7.70 (2H, d, *J* = 7.7 Hz, R'-H), 7.65 (1H, d, *J* = 7.5 Hz, R-H), 7.58-7.53 (2H, m, R'-H), 7.49-7.43 (3H, m, R-H), 7.34 (1H, t, *J* = 7.7 Hz, R'-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.6, 168.0, 139.3, 134.6, 132.6, 130.5, 130.0, 129.8, 129.2, 127.6, 127.5, 125.6. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 423.

2-chloro-N-[(4-methylphenyl)carbamoselenoyl]benzamide **(2b)**. Orange solid; yield: 36%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.71 (1H, s, CONH), 12.27 (1H, s, Ph-NH), 7.64 (1H, d, *J* = 7.6 Hz, R-H), 7.57 (2H, d, *J* = 3.2 Hz, R-H), 7.56-7.53 (2H, m, R'-H), 7.46 (1H, t, *J* = 7.6 Hz, R-H), 7.25 (2H, d, *J* = 8.1 Hz, R'-H), 2.33 (3H, s, CH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.4, 168.0, 136.9, 136.8, 134.6, 132.6, 130.5, 130.0, 129.8, 129.6, 127.5, 125.4, 21.2. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 419.

2-chloro-N-[(4-methoxyphenyl)carbamoselenoyl]benzamide **(2c)**. Orange solid; yield: 15%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.63 (1H, s, CONH), 12.25 (1H, s, Ph-NH), 7.64 (1H, d, *J* = 7.5 Hz, R-H), 7.57 (2H, d, *J* = 7.5 Hz, R-H), 7.57-7.53 (2H, m, R′-H), 7.45 (1H, t, *J* = 7.5 Hz, R-H), 6.99 (2H, d, *J* = 8.9 Hz, R′-H), 3.80 (3H, s, OCH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.6, 168.0, 158.4, 134.6, 132.6, 132.2, 130.5, 130.0, 129.8, 127.5, 127.1, 114.3, 55.8. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 411.

2-chloro-N-[(4-trifluoromethylphenyl)carbamoselenoyl]benzamide **(2d)**. Orange solid; yield: 18%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 13.02 (1H, s, CONH), 9.69 (1H, s, Ph-NH), 7.96 (2H, d, *J* = 8.5 Hz, R′-H), 7.80 (1H, dd, *J* = 7.8, 1.6 Hz, R-H), 7.71 (2H, d, *J* = 8.5 Hz, R′-H), 7.56-7.51 (2H, m, R-H), 7.49-7.43 (1H, m, R-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.8, 166.0, 133.8, 131.4, 131.3, 131.2, 130.8, 127.7, 126.3, 126.2, 124.4. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 460.

2-chloro-N-[(4-chlorophenyl)carbamoselenoyl]benzamide **(2e)**. Pink solid; yield: 26%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.69 (1H, s, CONH), 12.37 (1H, s, Ph-NH), 7.71 (2H, d, *J* = 8.3 Hz, R′-H), 7.64 (1H, d, *J* = 7.2 Hz, R-H), 7.59-7.53 (2H, m, R-H), 7.50 (2H, d, *J* = 8.3 Hz, R′-H), 7.50-7.45 (1H, m, R-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 181.0, 167.8, 138.4, 134.5, 132.7, 131.5, 130.5, 130.0, 129.8, 129.1, 127.7, 127.6. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 430.

2-chloro-5-methylthio-N-(phenylcarbamoselenoyl)benzamide **(3a)**. Yellow solid; yield: 12%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.74 (1H, s, CONH), 12.32 (1H, s, Ph-NH), 7.69 (2H, d, *J* = 7.8 Hz, R′-H), 7.53 (1H, d, *J* = 2.1 Hz, R-H), 7.46 (2H, d, *J* = 7.8 Hz, R′-H), 7.44-7.40 (2H, m, R-H), 7.34 (1H, t, *J* = 7.8 Hz, R′-H), 2,54 (3H, s, SCH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.6, 167.5, 139.3, 138.2, 134.8, 130.3, 129.6, 129.2, 127.5, 126.6, 126.6, 125.6, 15.2. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 425.

2-chloro-5-methylthio-N-[(4-methylphenyl)carbamoselenoyl]benzamide **(3b)**. Grey solid; yield: 12%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.69 (1H, s, CONH), 12.28 (1H, s, Ph-NH), 7.56 (2H, d, *J* = 8.3 Hz, R′-H), 7.52 (1H, d, *J* = 2.3 Hz, R-H), 7.48 (1H, d, *J* = 8.5 Hz, R-H), 7.41 (1H, dd, *J* = 8.5, 2.3 Hz, R-H), 7.25 (2H, d, *J* = 8.3 Hz, R′-H), 2,54 (3H, s, SCH_3), 2.33 (3H, s, CH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.4, 167.5, 138.2, 136.9, 136.7, 134.8, 130.3, 129.7, 129.6, 126.6, 126.5, 125.4, 21.2, 15.2. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 421.

2-chloro-5-methylthio-N-[(4-methoxyphenyl)carbamoselenoyl]benzamide **(3c)**. Grey solid; yield: 11%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.61 (1H, s, CONH), 12.26 (1H, s, Ph-NH), 7.56 (2H, d, *J* = 8.9 Hz, R′-H), 7.52 (1H, d, *J* = 2.3 Hz, R-H), 7.48 (1H, d, *J* = 8.5 Hz, R-H), 7.41 (1H, dd, *J* = 8.5, 2.3 Hz, R-H), 7.00 (2H, d, *J* = 8.9 Hz, R′-H), 3.80 (3H, s, OCH_3), 2,54 (3H, s, SCH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.6, 167.5, 158.4, 138.2, 134.9, 130.3, 129.5, 127.1, 126.5, 114.3, 55.8, 15.2. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 413.

2-chloro-5-methylthio-N-[(4-chlorophenyl)carbamoselenoyl]benzamide **(3e)**. Grey solid; yield: 24%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.67 (1H, s, CONH), 12.37 (1H, s, Ph-NH), 7.70 (2H, d, *J* = 8.6 Hz, R′-H), 7.52-7.51 (2H, m, R-H), 7.50-7.47 (2H, m, R′-H), 7.42 (1H, dd, *J* = 8.5, 2.3 Hz, R-H), 2,54 (3H, s, SCH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 181.1, 167.3, 138.4, 138.2, 134.8, 131.6, 130.3, 129.6, 129.1, 127.7, 126.6, 126.5, 15.2. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 431.

2-chloro-N-(phenylcarbamoselenoyl)nicotinamide **(4a)**. Orange solid; yield: 28%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.61 (1H, s, CONH), 9.79 (1H, s, Ph-NH), 8.55 (1H, dd, *J* = 4.7, 1.8 Hz, R-H), 8.12 (1H, dd, *J* = 7.7, 1.8 Hz, R-H), 7.66 (2H, d, *J* = 7.8 Hz, R′-H), 7.42-7.40 (1H, m, R-H), 7.38 (2H, d, *J* = 7.8 Hz, R′-H), 7.30 (1H, t, *J* = 7.8 Hz, R′-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 178.3, 163.2, 151.9, 146.3, 139.1, 137.2, 128.1, 127.4, 126.8, 123.6, 122.0. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 443.

2-chloro-N-[(4-methylphenyl)carbamoselenoyl]nicotinamide **(4b)**. Yellow solid; yield: 43%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.51 (1H, s, CONH), 9.75 (1H, s, Ph-NH), 8.55 (1H, dd, *J* = 4.8, 1.8 Hz, R-H), 8.12 (1H, dd, *J* = 7.7, 1.8 Hz, R-H), 7.51 (2H, d, *J* = 7.3 Hz, R′-H), 7.40 (1H, dd, *J* = 7.7, 4.8 Hz, R-H), 7.18

(2H, d, *J* = 7.3 Hz, R′-H), 2.32 (3H, s, CH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 178.2, 163.1, 151.8, 139.0, 136.9, 134.6, 128.7, 127.4, 123.5, 122.0, 20.2. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 576.

2-chloro-N-[(4-methoxyphenyl)carbamoselenoyl]nicotinamide **(4c)**. Yellow solid; yield: 40%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.46 (1H, s, CONH), 9.84 (1H, s, Ph-NH), 8.54 (1H, d, *J* = 4.8 Hz, R-H), 8.10 (1H, d, *J* = 7.6 Hz, R-H), 7.52 (2H, d, *J* = 8.8 Hz, R′-H), 7.39 (1H, dd, *J* = 7.6, 4.8 Hz, R-H), 6.90 (2H, d, *J* = 8.8 Hz, R′-H), 3.78 (3H, s, OCH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.5, 164.3, 158.9, 152.8, 147.4, 140.0, 131.1, 128.6, 126.2, 123.0, 114.3, 55.51. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 424.

2-chloro-N-[(4-trifluoromethylphenyl)carbamoselenoyl]nicotinamide **(4d)**. Orange solid; yield: 51%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.82 (1H, s, CONH), 9.87 (1H, s, Ph-NH), 8.56 (1H, dd, *J* = 4.8, 2.0 Hz, R-H), 8.14 (1H, dd, *J* = 7.7, 2.0 Hz, R-H), 7.88 (2H, d, *J* = 8.5 Hz, R′-H), 7.64 (2H, d, *J* = 8.5 Hz, R′-H), 7.41 (1H, dd, *J* = 7.7, 4.8 Hz, RH). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 178.6, 163.4, 152.1, 140.1, 139.1, 127.2, 125.3, 123.4, 122.1, 120.1, 118.8. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 478.

2-chloro-N-[(4-chlorophenyl)carbamoselenoyl]nicotinamide **(4e)**. Orange solid; yield: 53%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.62 (1H, s, CONH), 9.86 (1H, s, Ph-NH), 8.56 (1H, dd, *J* = 4.8, 1.6 Hz, R-H), 8.12 (1H, dd, *J* = 7.7, 1.6 Hz, R-H), 7.63 (2H, d, *J* = 8.7 Hz, R′-H), 7.41 (1H, dd, *J* = 7.7, 4.8 Hz, R-H), 7.35 (2H, d, *J* = 8.7 Hz, R′-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.6, 164.4, 153.0, 140.1, 136.7, 133.2, 129.3, 128.4, 128.3, 125.9, 123.1. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 455.

N-(phenylcarbamoselenoyl)-2-thiophencarboxamide **(5a)**. Yellow crystals; yield: 35%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.73 (1H, s, CONH), 9.24 (1H, s, Ph-NH), 7.68 (2H, dd, *J* = 4.6, 3.5 Hz, R-H), 7.62 (2H, d, *J* = 7.8 Hz, R′-H), 7.36 (2H, t, *J* = 7.8 Hz, R′-H), 7.26 (1H, t, *J* = 7.8 Hz, R′-H), 7.13 (1H, dd, *J* = 4.6, 3.5 Hz, R-H).^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.7, 161.1, 138.4, 135.6, 134.7, 131.1, 129.0, 128.7, 127.6, 124.7. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 408.

N-[(4-methylphenyl)carbamoselenoyl]-2-thiophencarboxamide **(5b)**. Yellow solid; yield: 50%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.63 (1H, s, CONH), 9.26 (1H, s, Ph-NH), 7.68 (1H, d, *J* = 4.5 Hz, R-H), 7.67 (1H, d, *J* = 4.5 Hz, R-H), 7.46 (2H, d, *J* = 8.3 Hz, R′-H), 7.15 (2H, d, *J* = 8.3 Hz, R′-H), 7.12 (1H, t, *J* = 4.5 Hz, R-H), 2.29 (3H, s, CH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 178.7, 160.1, 136.6, 134.9, 134.6, 133.6, 130.0, 128.6, 127.6, 123.6, 20.2. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 400.

N-[(4-methoxyphenyl)carbamoselenoyl]-2-thiophencarboxamide **(5c)**. Yellow solid; yield: 46%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.56 (1H, s, CONH), 9.25 (1H, s, Ph-NH), 7.67 (2H, t, *J* = 4.0 Hz, R-H), 7.48 (2H, d, *J* = 8.9 Hz, R′-H), 7.12 (1H, dd, *J* = 5.0, 4.0 Hz, R-H), 6.87 (2H, d, *J* = 8.9 Hz, R′-H), 3.75 (3H, s, OCH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 178.8, 160.1, 157.7, 134.6, 133.6, 130.4, 127.6, 125.2, 113.2, 54.5. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 393.

N-[(4-trifluoromethylphenyl)carbamoselenoyl]-2-thiophencarboxamide **(5d)**. Yellow crystals; yield: 32%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.95 (1H, s, CONH), 9.29 (1H, s, Ph-NH), 7.83 (2H, d, *J* = 7.3 Hz, R-H), 7.72-7.68 (2H, m, R′-H), 7.61 (2H, d, *J* = 7.0 Hz, R′-H), 7.16-7.11 (1H, m, R-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.0, 160.2, 140.3, 134.3, 134.0, 130.2, 127.7, 125.2, 123.4, 118.9. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 438.

N-[(4-chlorophenyl)carbamoselenoyl]-2-thiophencarboxamide **(5e)**. Yellow solid; yield: 53%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.74 (1H, s, CONH), 9.27 (1H, s, Ph-NH), 7.71-7.67 (2H, m, R′H), 7.58 (2H, d, *J* = 8.9 Hz, R′-H), 7.31 (2H, d, *J* = 8.9 Hz, R′-H), 7.12 (1H, dd, *J* = 4.8, 4.0 Hz, R′H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.0, 160.2, 135.9, 134.4, 133.9, 132.0, 130.2, 128.1, 127.7, 124.9. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 419.

N-(phenylcarbamoselenoyl)-2-furancarboxamide **(6a)**. White solid; yield: 39%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.73 (1H, s, CONH), 11.43 (1H, s, Ph-NH), 8.10 (1H, d, *J* = 1.3 Hz, R-H), 7.90 (1H, d,

J = 3.6 Hz, R-H), 7.65 (2H, d, *J* = 7.8 Hz, R′-H), 7.44 (2H, t, *J* = 7.8 Hz, R′-H), 7.33 (1H, t, *J* = 7.8 Hz, R′-H), 6.78 (1H, dd, *J* = 3.6, 1.3 Hz, R-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.4, 157.7, 149.1, 144.9, 139.4, 129.2, 127.4, 125.7, 119.5, 113.3. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 417.

N-[(4-methylphenyl)carbamoselenoyl]-2-furancarboxamide **(6b)**. Yellow solid; yield: 66%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.67 (1H, s, CONH), 11.38 (1H, s, Ph-NH), 8.09 (1H, d, *J* = 1.4 Hz, R-H), 7.88 (1H, d, *J* = 3.6 Hz, R-H), 7.51 (2H, d, *J* = 8.3 Hz, R′-H), 7.23 (2H, d, *J* = 8.3 Hz, R′-H), 6.78 (1H, dd, *J* = 3.6, 1.4 Hz, R-H), 2.32 (3H, s, CH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.2, 157.7, 149.1, 144.9, 136.9, 129.6, 125.5, 119.5, 113.3, 21.1. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 413.

N-((4-methoxyphenyl)carbamoselenoyl)-2-furancarboxamide **(6c)**. Yellow solid; yield: 39%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.59 (1H, s, CONH), 11.37 (1H, s, Ph-NH), 8.09 (1H, s, R-H), 7.88 (1H, d, *J* = 3.6 Hz, R-H), 7.52 (2H, d, *J* = 8.9 Hz, R′-H), 6.98 (2H, d, *J* = 8.9 Hz, R′-H), 6.78 (1H, dd, *J* = 3.6, 1.6 Hz, R-H), 3.79 (3H, s, OCH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.4, 158.4, 157.7, 149.0, 145.0, 132.3, 127.1, 119.4, 114.3, 113.3, 55.8. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 406.

N-[(4-trifluoromethylphenyl)carbamoselenoyl]-2-furancarboxamide **(6d)**. White solid; yield: 42%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.81 (1H, s, CONH), 11.61 (1H, s, Ph-NH), 8.11 (1H, d, *J* = 1.4 Hz, R-H), 7.92 (1H, m, R-H), 7.91 (2H, d, *J* = 8.5 Hz, R′-H), 7.80 (2H, d, *J* = 8.5 Hz, R′-H), 6.79 (1H, dd, *J* = 3.6, 1.4 Hz, R-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 181.1, 156.9, 149.2, 147.5, 146.6, 144.9, 143.1, 142.7, 126.4, 120.6, 119.7, 116.0, 113.3, 112.8. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 437.

N-[(4-chlorophenyl)carbamoselenoyl]-2-furancarboxamide **(6e)**. White solid; yield: 39%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.67 (1H, s, CONH), 11.52 (1H, s, Ph-NH), 8.10 (1H, s, R-H), 7.89 (1H, d, *J* = 3.5 Hz, R-H), 7.67 (2H, d, *J* = 8.6 Hz, R′-H), 7.49 (2H, d, *J* = 8.6 Hz, R′-H), 6.78 (1H, dd, *J* = 3.5, 1.6 Hz, R-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.9, 157.6, 149.1, 144.9, 138.5, 131.5, 129.1, 127.7, 119.6, 113.3. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 424.

(1S,3s)-N-[(4-methoxyphenyl)carbamoselenoyl]adamantane-1-carboxamide **(7c)**. Pink solid; yield: 28%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.83 (1H, s, CONH), 10.65 (1H, s, Ph-NH), 7.48 (2H, d, *J* = 8.9 Hz, R′-H), 6.96 (2H, d, *J* = 8.9 Hz, R′-H), 3.78 (3H, s, OCH_3), 2.05-1.99 (3H, m, R-H), 1.98-1.93 (6H, m, R-H), 1.79-1.64 (6H, m, R-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 181.0, 179.9, 158.3, 132.3, 127.1, 114.2, 55.8, 42.1, 37.3, 36.0, 27.9. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 381.

(1S,3s)-N-[(4-trifluoromethylphenyl)carbamoselenoyl]adamantane-1-carboxamide **(7d)**. Pink solid; yield: 31%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 13.08 (1H, s, CONH), 10.91 (1H, s, Ph-NH), 7.87 (2H, d, *J* = 8.4 Hz, R′-H), 7.77 (2H, d, *J* = 8.4 Hz, R′-H), 2.05-1.99 (3H, m, R-H), 1.99-1.95 (6H, m, R-H), 1.76-1.65 (6H, m, R-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 181.7, 179.9, 143.1, 127.5, 127.2, 126.4, 126.2, 125.9, 123.2, 42.1, 37.2, 36.0, 27.9. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 410.

(1S,3s)-N-((4-chlorophenyl)carbamoselenoyl)adamantane-1-carboxamide **(7e)**. Yellow solid; yield: 37%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.91 (1H, s, CONH), 10.82 (1H, s, Ph-NH), 7.62 (2H, d, *J* = 8.7 Hz, R′-H), 7.46 (2H, d, *J* = 8.7 Hz, R′-H), 2.05-1.99 (3H, m, R-H), 1.98-1.94 (6H, m, R-H), 1.79-1.65 (6H, m, R-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 181.5, 179.9, 138.4, 131.4, 129.0, 127.8, 42.1, 37.2, 36.0, 27.9. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 397.

N-(phenylcarbamoselenoyl)cinnamamide **(8a)**. Yellow solid; yield: 45%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.97 (1H, s, CONH), 9.39 (1H, s, Ph-NH), 7.78 (1H, d, *J* = 15.5 Hz, C=C-H), 7.61 (2H, d, *J* = 7.7 Hz, R′-H), 7.49 (2H, d, *J* = 7.7 Hz, R′-H), 7.41-7.32 (5H, m, R-H), 7.26 (1H, t, *J* = 7.7 Hz, R′-H), 6.51 (1H, d, *J* = 15.5 Hz, C=C-H).^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.0, 164.8, 146.2, 137.4, 132.6, 130.3, 128.1, 128.0, 127.6, 126.5, 123.8, 117.0. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 392.

N-[(4-methylphenyl)carbamoselenoyl]cinnamamide **(8b)**. Brown solid; yield: 42%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.84 (1H, s, CONH), 9.24 (1H, s, Ph-NH), 7.78 (1H, d, *J* = 15.5 Hz, C=C-H), 7.51-7.48 (2H,

m, R-H), 7.47 (2H, d, *J* = 8.3 Hz, R′-H), 7.40-7.32 (3H, m, R-H), 7.15 (2H, d, *J* = 8.3 Hz, R′-H), 6.46 (1H, d, *J* = 15.5 Hz, C=C-H), 2.30 (3H, s, CH_3).^{13}C-NMR (100 MHz, $CDCl_3$) δ: 178.9, 164.6, 146.1, 136.5, 134.9, 132.6, 130.3, 128.6, 128.1, 127.6, 123.7, 117.0, 20.2. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 386.

N-[(4-methoxyphenyl)carbamoselenoyl]cinnamamide **(8c)**. Yellow solid; yield: 48%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.80 (1H, s, CONH), 9.47 (1H, s, Ph-NH), 7.77 (1H, d, *J* = 15.5 Hz, C=C-H), 7.50-7.47 (2H, m, R-H), 7.47 (2H, d, *J* = 8.5 Hz, R′-H), 7.39-7.31 (3H, m, R-H), 6.86 (2H, d, *J* = 8.5 Hz, R′-H), 6.52 (1H, d, *J* = 15.5 Hz, C=C-H), 3.76 (3H, s, OCH_3).^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.1, 164.8, 157.7, 146.0, 132.6, 130.4, 130.3, 128.1, 127.6, 125.3, 117.0, 113.1, 54.4. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 376.

N-[(4-trifluoromethylphenyl)carbamoselenoyl]cinnamamide **(8d)**. Yellow solid; yield: 49%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 13.20 (1H, s, CONH), 9.37 (1H, s, Ph-NH), 7.83 (2H, d, *J* = 8.3 Hz, R′-H), 7.79 (1H, m, C=C-H), 7.60 (2H, d, *J* = 8.3 Hz, R′-H), 7.50 (2H,d, *J* = 6.8 Hz, R-H), 7.41-7.31 (3H, m, R-H), 6.48 (1H, d, *J* = 15.5 Hz, C=C-H).^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.3, 164.9, 146.7, 140.3, 132.5, 130.5, 128.2, 127.6, 125.1, 123.5, 116.6. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 421.

N-((4-chlorophenyl)carbamoselenoyl)cinnamamide **(8e)**. Yellow solid; yield: 46%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.95 (1H, s, CONH), 9.10 (1H, s, Ph-NH), 7.79 (1H, d, *J* = 15.5 Hz, C=C-H), 7.59 (2H, d, *J* = 8.7 Hz, R′-H), 7.52-7.48 (2H, m, R-H), 7.42-7.35 (3H, m, R-H), 7.32 (2H, d, *J* = 8.7 Hz, R′-H), 6.41 (1H, d, *J* = 15.5 Hz, C=C-H).^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.3, 165.6, 147.5, 136.9, 133.5, 132.9, 131.5, 129.2, 128.6, 125.9, 117.7. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 408.

N-(phenylcarbamoselenoyl)benzo[b]thiophene-2-carboxamide **(9a)**. Yellow solid; yield: 44%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.72 (1H, s, CONH), 9.40 (1H, s, Ph-NH), 7.97 (1H, s, CH), 7.85 (2H, t, *J* = 8.7 Hz, R-H), 7.63 (2H, d, *J* = 7.8 Hz, R′-H), 7.46 (1H, t, *J* = 7.8 Hz, R′-H), 7.41-7.27 (4H, m, R-H+R′-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.5, 161.8, 142.4, 138.7, 138.4, 135.1, 129.1, 128.4, 128.0, 127.7, 126.1, 125.7, 124.7, 122.9. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 415.

N-[(4-methylphenyl)carbamoselenoyl]benzo[b]thiophene-2-carboxamide **(9b)**. Yellow solid; yield: 62%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.72 (1H, s, CONH), 9.40 (1H, s, Ph-NH), 7.96 (1H, s, CH), 7.84 (2H, t, *J* = 8.4 Hz, R-H), 7.48 (2H, d, *J* = 7.7 Hz, R′-H), 7.46-7.43 (1H, m, R-H), 7.39 (1H, t, *J* = 7.4 Hz, R-H), 7.16 (2H, d, *J* = 7.7 Hz, R′-H), 2.30 (3H, s, CH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.5, 161.7, 142.4, 138.7, 137.7, 135.9, 135.2, 129.7, 128.3, 127.9, 126.0, 125.6, 124.6, 122.9, 21.2. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 408.

N-[(4-methoxyphenyl)carbamoselenoyl]benzo[b]thiophene-2-carboxamide **(9c)**. Yellow solid; yield: 37%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.56 (1H, s, CONH), 9.44 (1H, s, Ph-NH), 7.95 (1H, s, CH), 7.83 (2H, t, *J* = 7.8 Hz, R-H), 7.48 (2H, d, *J* = 8.4 Hz, R′-H), 7.45-7.36 (2H, m, R-H), 6.86 (2H, d, *J* = 8.4 Hz, R′-H), 3.75 (3H, s, OCH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.6, 161.8, 158.8, 142.4, 138.7, 135.2, 131.4, 128.4, 127.9, 126.2, 126.0, 125.6, 122.9, 114.2, 55.5. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 401.

N-[(4-trifluoromethylphenyl)carbamoselenoyl]benzo[b]thiophene-2-carboxamide **(9d)**. Yellow solid; yield: 51%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.95 (1H, s, CONH), 9.45 (1H, s, Ph-NH), 7.98 (1H, s, CH), 7.86-7.83 (4H, m, R-H+R′-H), 7.61 (2H, d, *J* = 8.5 Hz, R′-H), 7.50-7.37 (2H, m, R-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.8, 161.9, 142.5, 141.3, 138.6, 134.7, 128.6, 128.1, 126.3, 126.2, 126.1, 125.7, 124.4, 122.9. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 448.

N-((4-chlorophenyl)carbamoselenoyl)benzo[b]thiophene-2-carboxamide **(9e)**. Yellow solid; yield: 43%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.73 (1H, s, CONH), 9.40 (1H, s, Ph-NH), 7.97 (1H, s, CH), 7.90-7.82 (2H, m, R-H), 7.61 (2H, d, *J* = 8.7 Hz, R′-H), 7.47 (1H, t, *J*= 7.0 Hz, R-H), 7.41 (1H, t, *J*= 7.0 Hz, R-H), 7.33 (2H, d, *J* = 8.7 Hz, R′-H). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.8, 161.8, 142.5, 138.7, 136.9, 134.9, 133.1, 129.2, 128.5, 128.1, 126.1, 125.9, 125.7, 122.9. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 427.

N-(phenylcarbamoselenoyl)benzo[d][1,3]dioxole-5-carboxamide **(10a)**. Orange solid; yield: 66%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.95 (1H, s, CONH), 9.38 (1H, s, Ph-NH), 7.62 (2H, d, *J* = 7.7 Hz, R′-H), 7.41 (1H, dd, *J* = 8.2, 1.9 Hz, R-H), 7.37 (2H, t, *J* = 7.7Hz, R′-H), 7.31 (1H, d, *J* = 1.9 Hz, R-H), 7.27 (1H, t, *J* = 7.7 Hz, R′-H), 6.85 (1H, d, *J* = 8.2 Hz, R-H), 6.03 (2H, s, CH_2). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.1, 165.1, 151.6, 147.7, 137.4, 128.0, 124.1, 123.7, 122.3, 107.6, 106.9, 101.4. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 394.

N-[(4-methylphenyl)carbamoselenoyl]benzo[d][1,3]dioxole-5-carboxamide **(10b)**. Orange solid; yield: 68%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.82 (1H, s, CONH), 9.29 (1H, s, Ph-NH), 7.47 (2H, d, *J* = 8.3 Hz, R′-H), 7.38 (1H, dd, *J* = 8.2, 1.8 Hz, R-H), 7.28 (1H, d, *J* = 1.8 Hz, R-H), 7.15 (2H, d, *J* = 8.3 Hz, R′-H), 6.83 (1H, d, *J* = 8.2 Hz, R-H), 6.01 (2H, s, CH_2), 2.29 (3H, s, CH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.0, 166.1, 152.6, 148.7, 137.6, 136.0, 129.6, 125.2, 124.7, 123.2, 108.6, 107.9, 102.4, 21.2. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 390.

N-[(4-methoxyphenyl)carbamoselenoyl]benzo[d][1,3]dioxole-5-carboxamide **(10c)**. Orange solid; yield: 62%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.76 (1H, s, CONH), 9.31 (1H, s, Ph-NH), 7.48 (2H, d, *J* = 8.9 Hz, R′-H), 7.38 (1H, dd, *J* = 8.2, 1.6 Hz, R-H), 7.29 (1H, d, *J* = 1.6 Hz, R-H), 6.87 (2H, d, *J* = 8.9 Hz, R′-H), 6.84 (1H, d, *J* = 8.2 Hz, R-H), 6.03 (2H, s, CH_2), 3.76 (3H, s, OCH_3). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 180.2, 166.1, 158.7, 152.6, 148.7, 131.5, 126.3, 125.2, 123.2, 114.2, 108.6, 107.9, 102.4, 55.5. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 383.

N-[(4-trifluoromethylphenyl)carbamoselenoyl]benzo[d][1,3]dioxole-5-carboxamide **(10d)**. Orange solid; yield: 56%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 13.08 (1H, s, CONH), 11.72 (1H, s, Ph-NH), 7.93 (2H, d, *J* = 8.4 Hz, R′-H), 7.79 (2H, d, *J* = 8.4 Hz, R′-H), 7.66 (1H, dd, *J* = 8.2, 1.5 Hz, R-H), 7.55 (1H, d, *J* = 1.5 Hz, R-H), 7.07 (1H, d, *J* = 8.2 Hz, R-H), 6.17 (2H, s, CH_2). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 181.5, 152.2, 147.9, 143.2, 126.2, 125.7, 125.6, 120.5, 109.0, 108.5, 102.7, 102.4. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 432.

N-((4-chlorophenyl)carbamoselenoyl)benzo[d][1,3]dioxole-5-carboxamide **(10e)**. Orange solid; yield: 67%. ^{1}H-NMR (400 MHz, $CDCl_3$) δ: 12.95 (1H, s, CONH), 9.33 (1H, s, Ph-NH), 7.59 (2H, d, *J* = 8.4 Hz, R′-H), 7.38 (1H, dd, *J* = 8.2, 1.9 Hz, R-H), 7.31 (2H, d, *J* = 8.4 Hz, R′-H), 7.28 (1H, d, *J* = 1.9 Hz, R-H), 6.84 (1H, d, *J* = 8.2 Hz, R-H), 6.03 (2H, s, CH_2). ^{13}C-NMR (100 MHz, $CDCl_3$) δ: 179.3, 165.1, 151.7, 147.7, 135.9, 131.9, 128.1, 124.9, 123.9, 122.2, 107.6, 106.8, 101.4. ^{77}Se-NMR (76 MHz, $CDCl_3$) δ: 408.

4. NMR SPECTRA (^{1}H, ^{13}C AND ^{77}Se) OF FINAL PRODUCTS

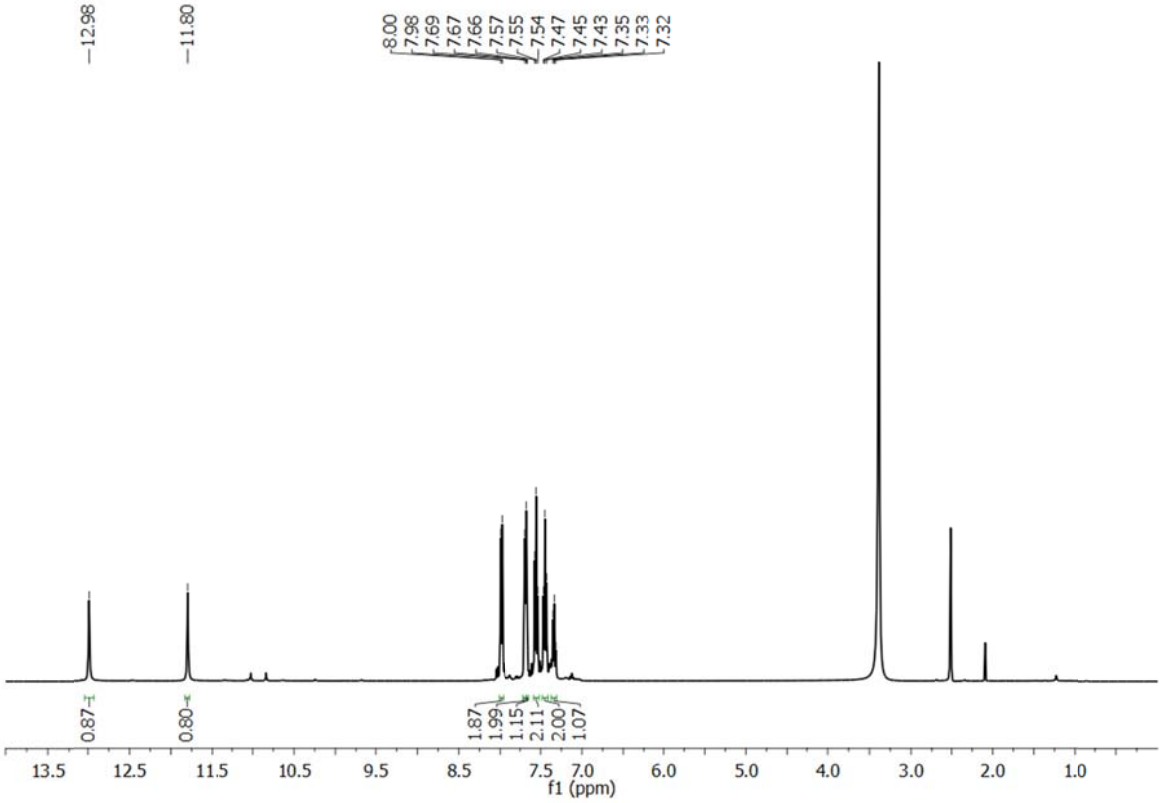

Figure S28. ^{1}H-NMR of compound **1a**.

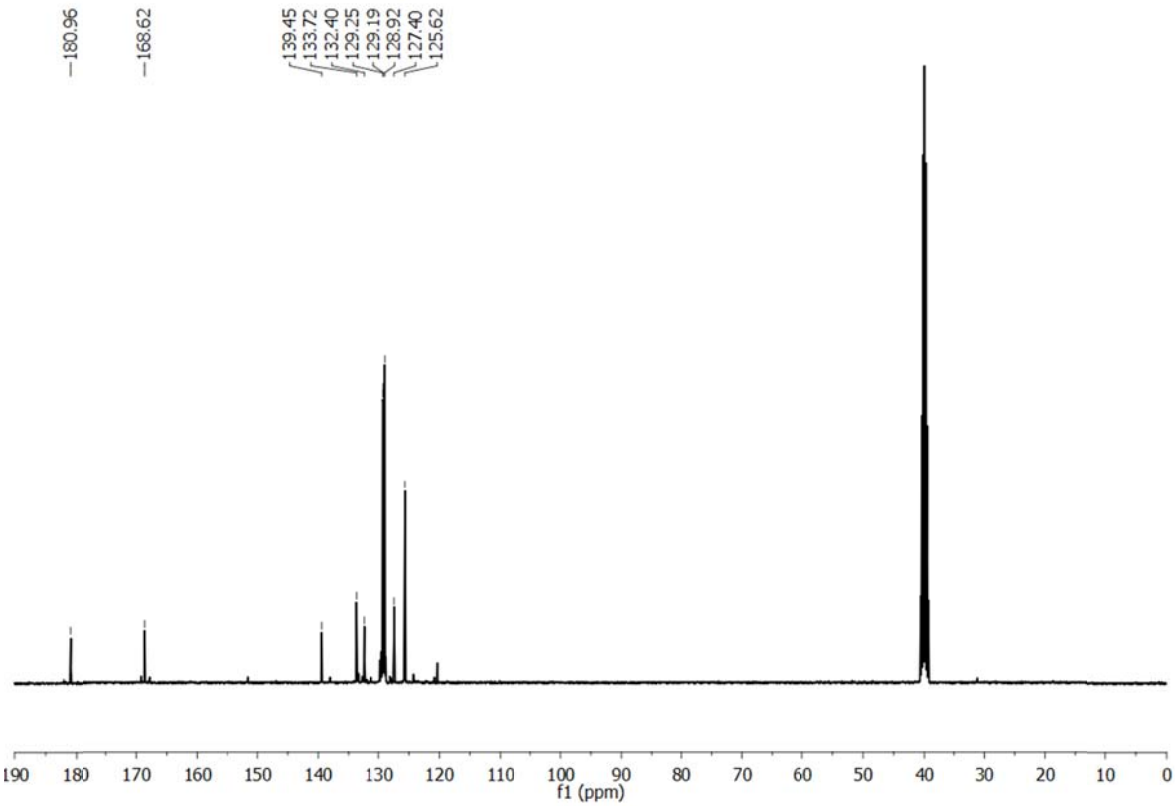

Figure S29. ^{13}C-NMR of compound **1a**.

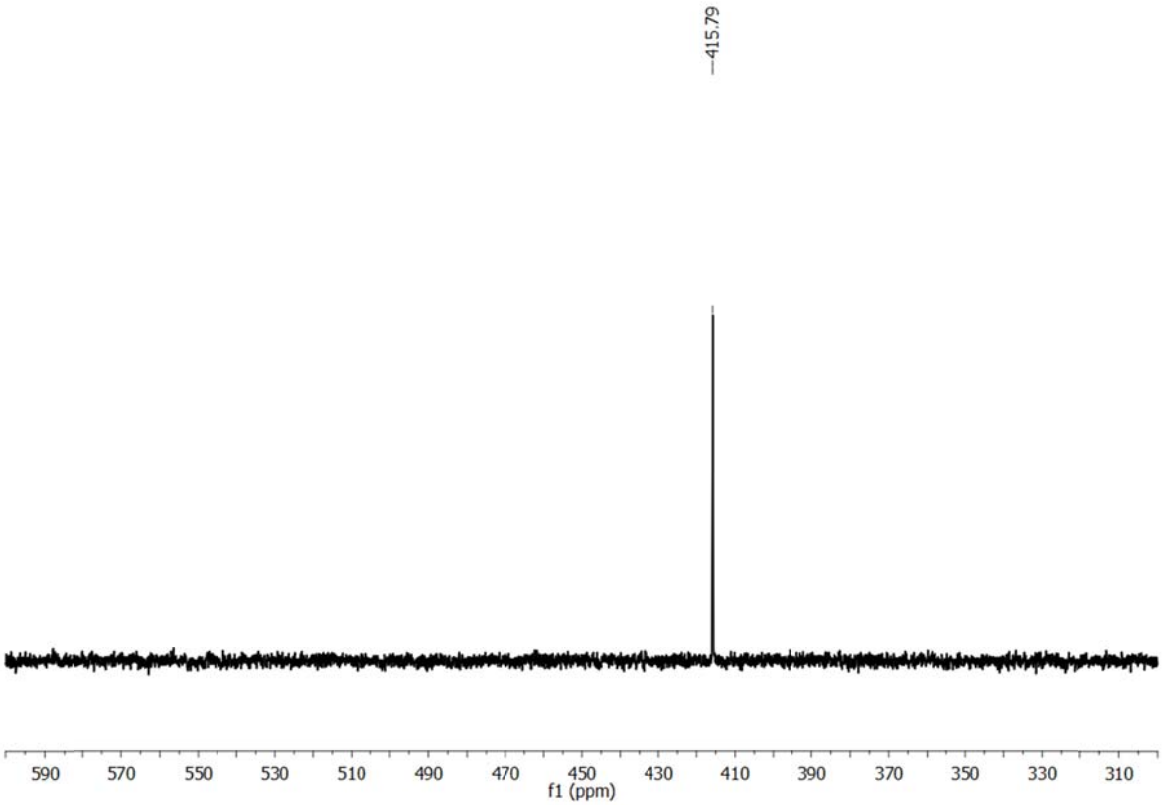

Figure S30. ^{77}Se-NMR of compound **1a**.

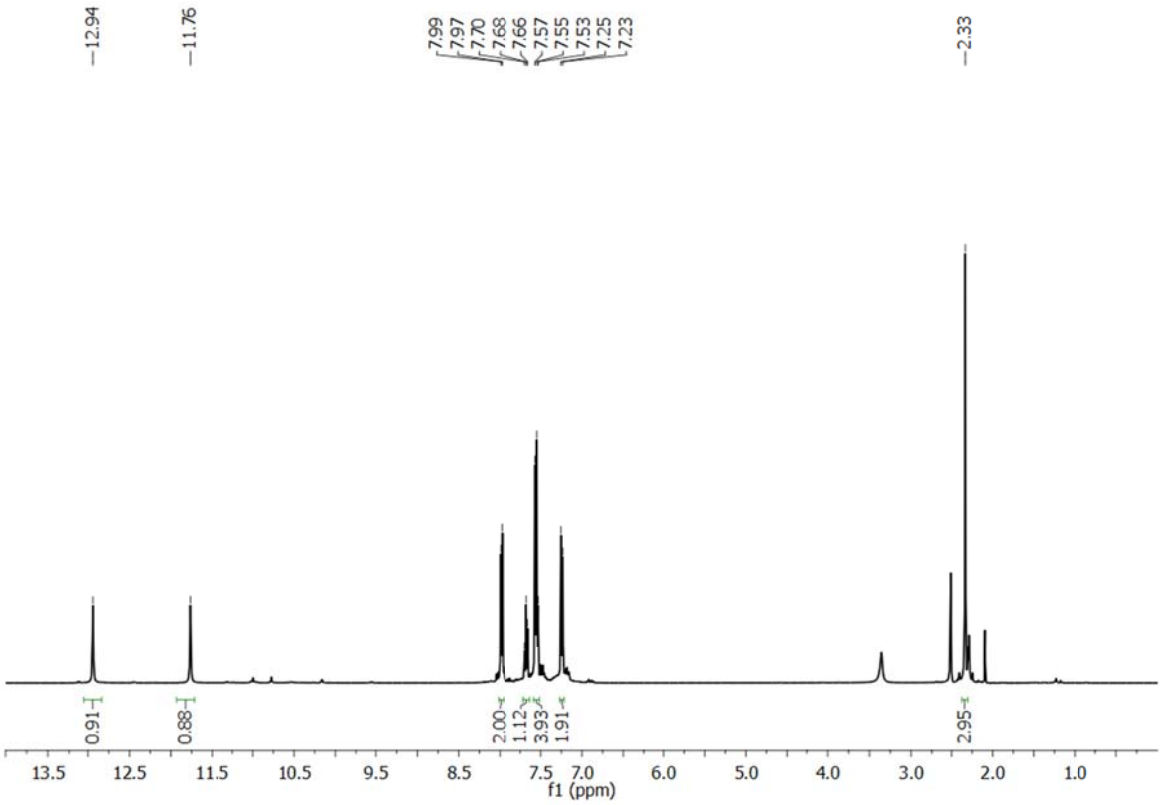

Figure S31. ^{1}H-NMR of compound **1b**.

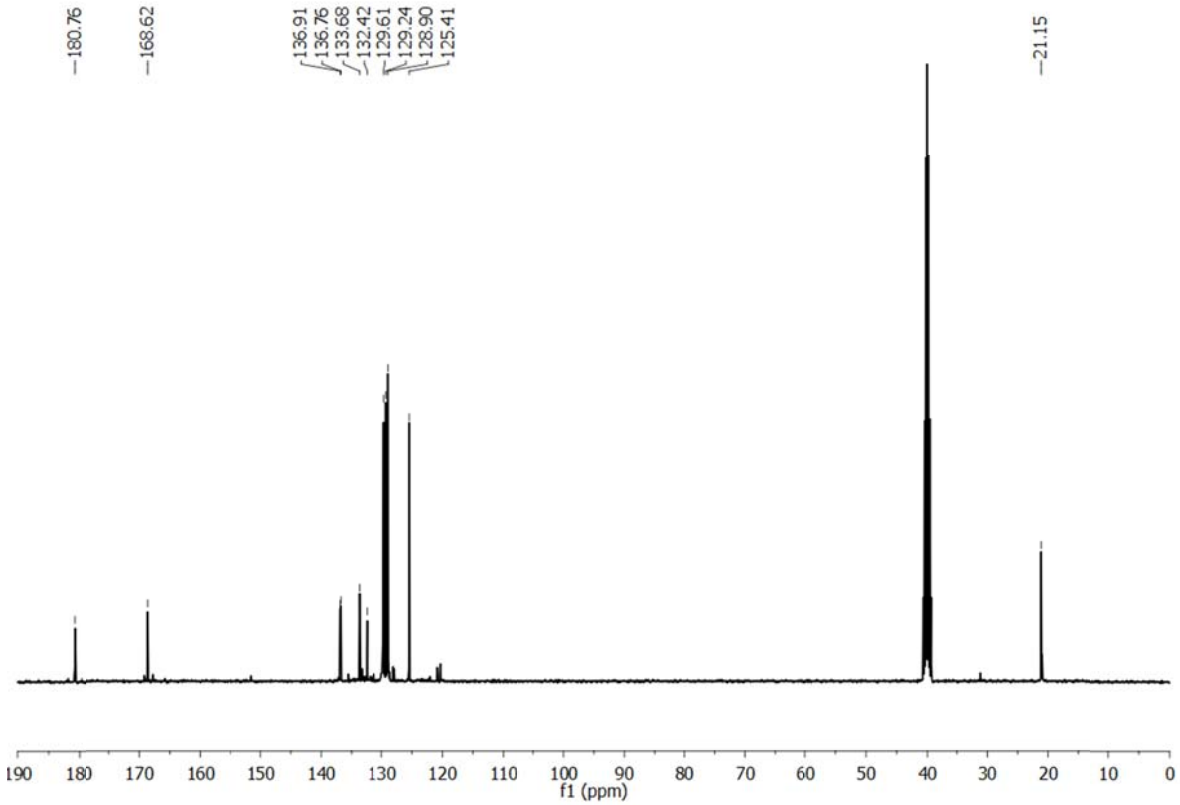

Figure S32. ^{13}C-NMR of compound **1b**.

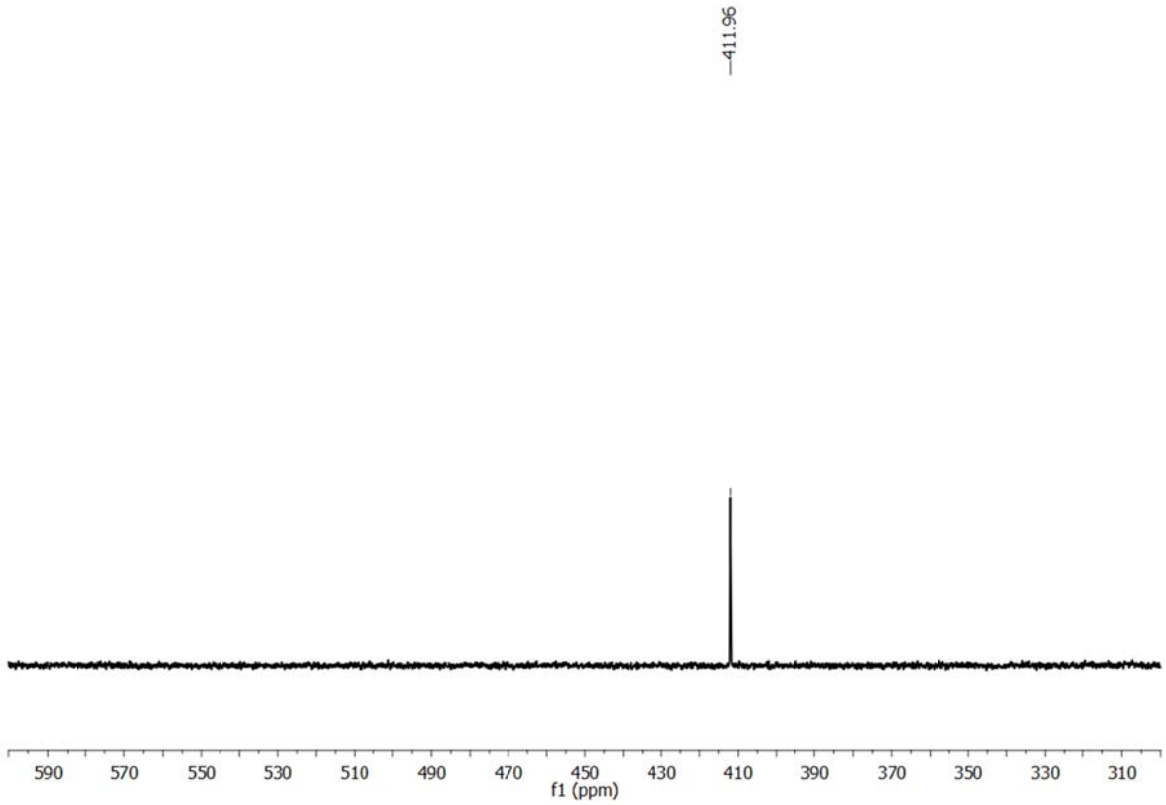

Figure S33. ^{77}Se-NMR of compound **1b**.

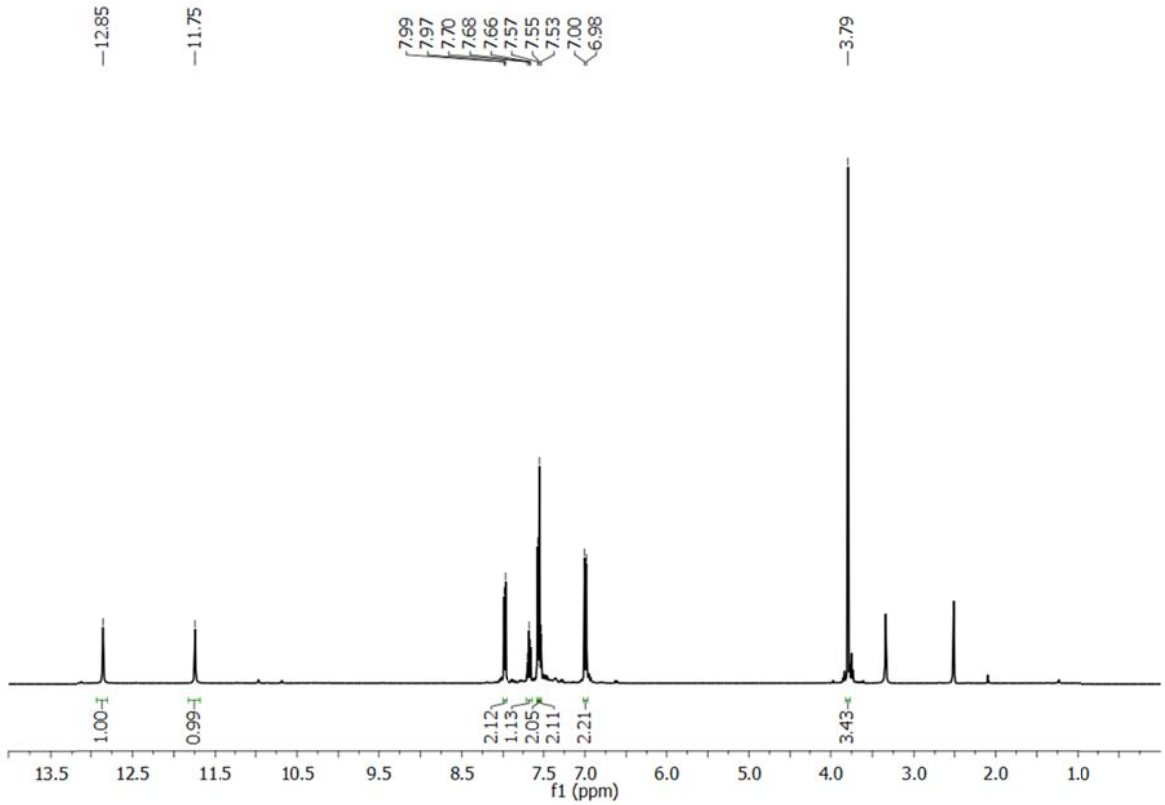

Figure S34. ^{1}H-NMR of compound **1c**.

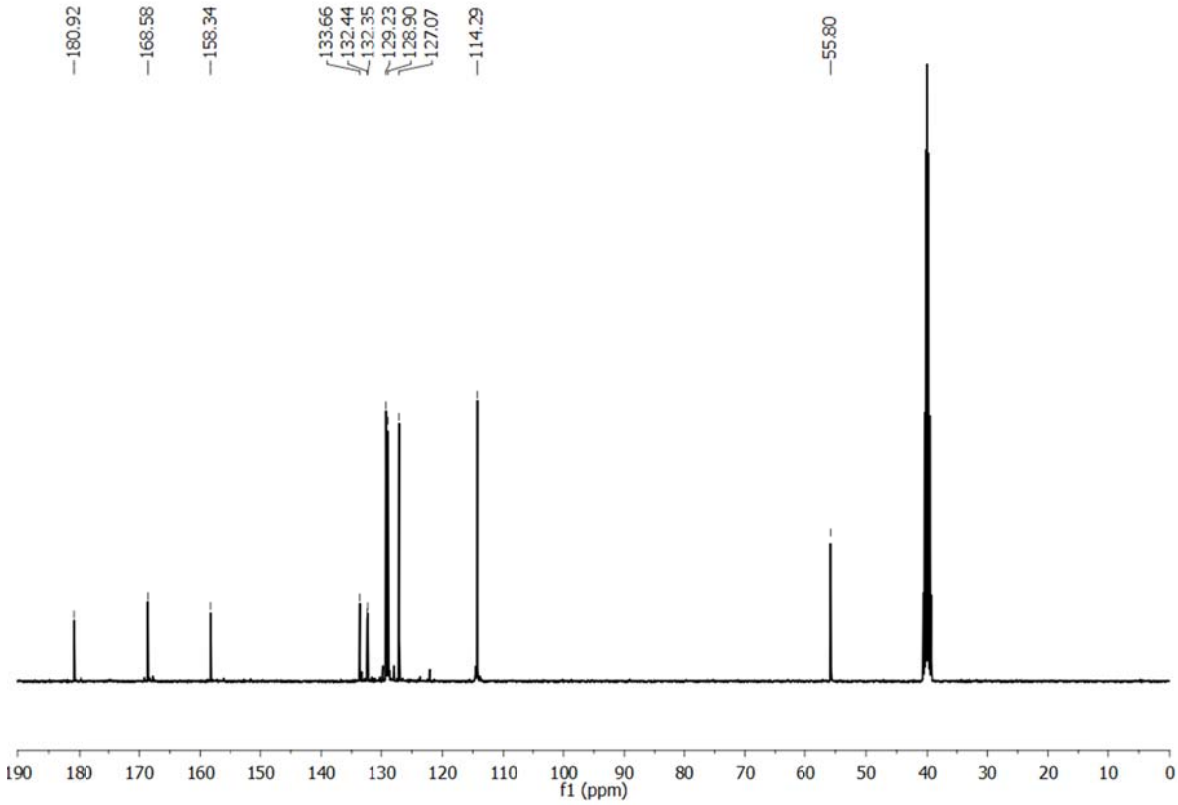

Figure S35. ^{13}C-NMR of compound **1c**.

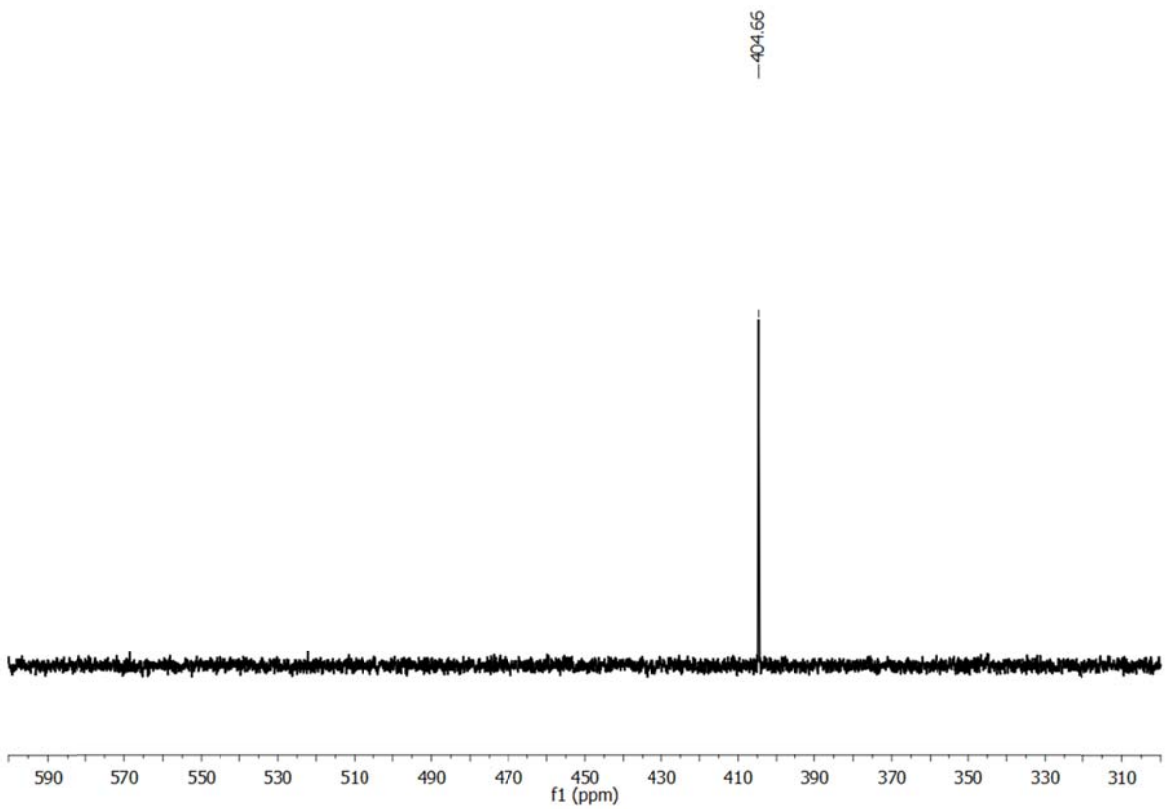

Figure S36. ^{77}Se-NMR of compound **1c**.

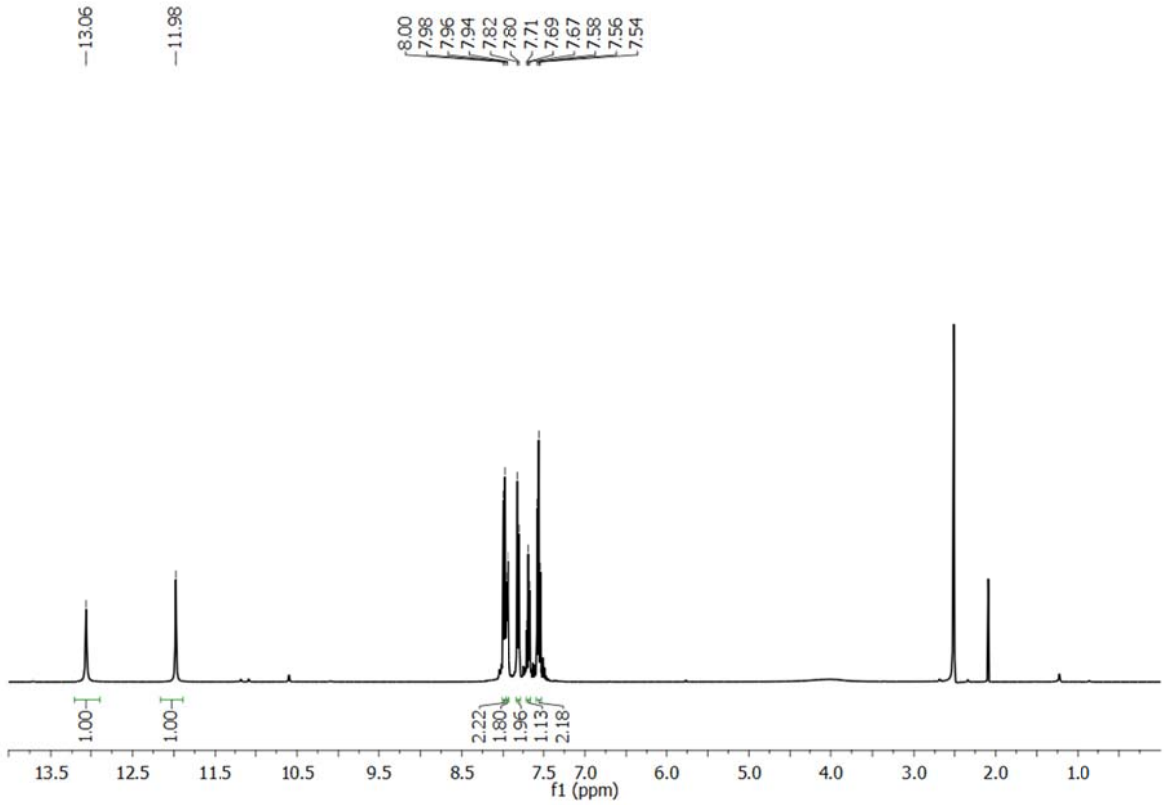

Figure S37. ^{1}H-NMR of compound **1d**.

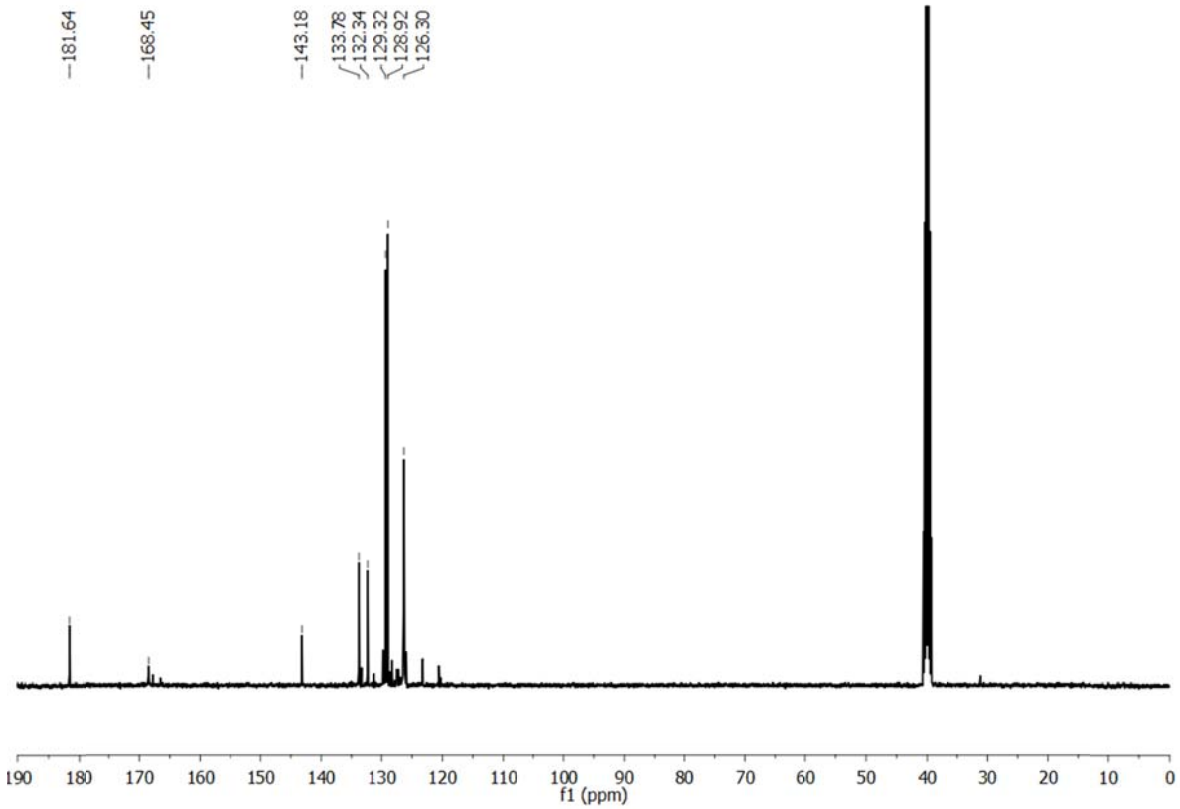

Figure S38. ^{13}C-NMR of compound **1d**.

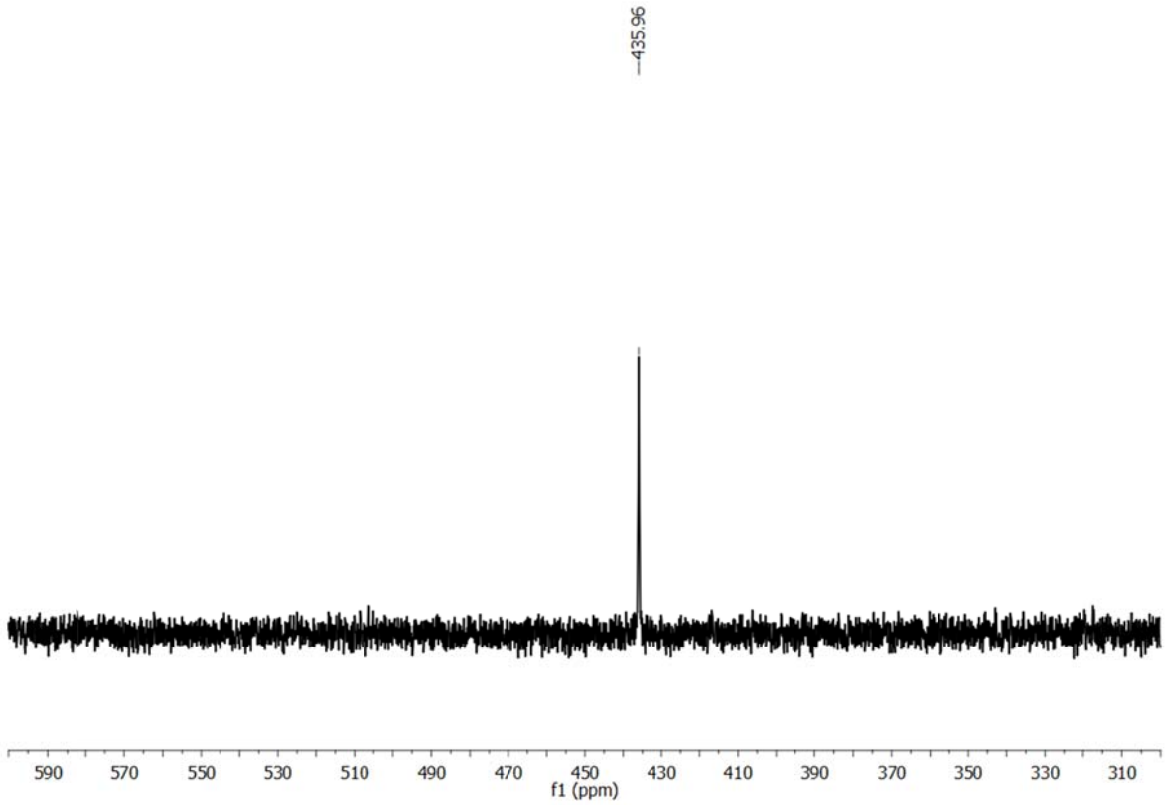

Figure S39. ^{77}Se-NMR of compound **1d**.

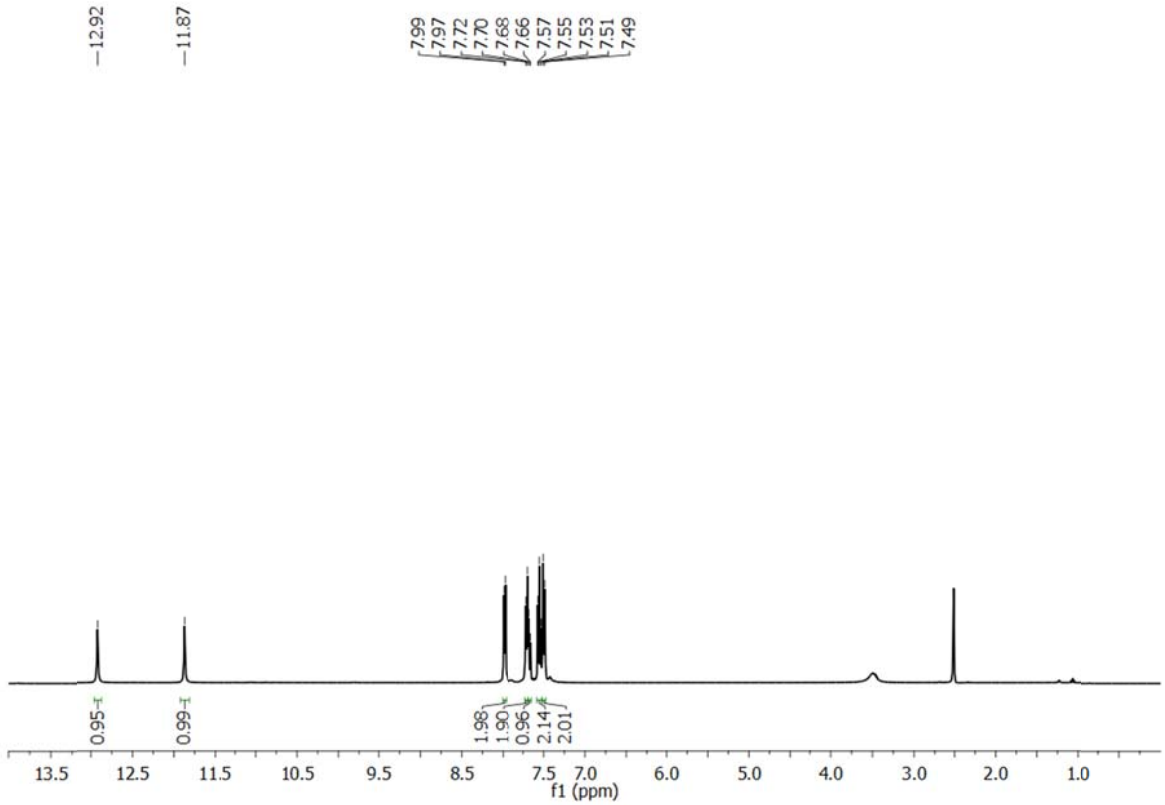

Figure S40. ^{1}H-NMR of compound **1e**.

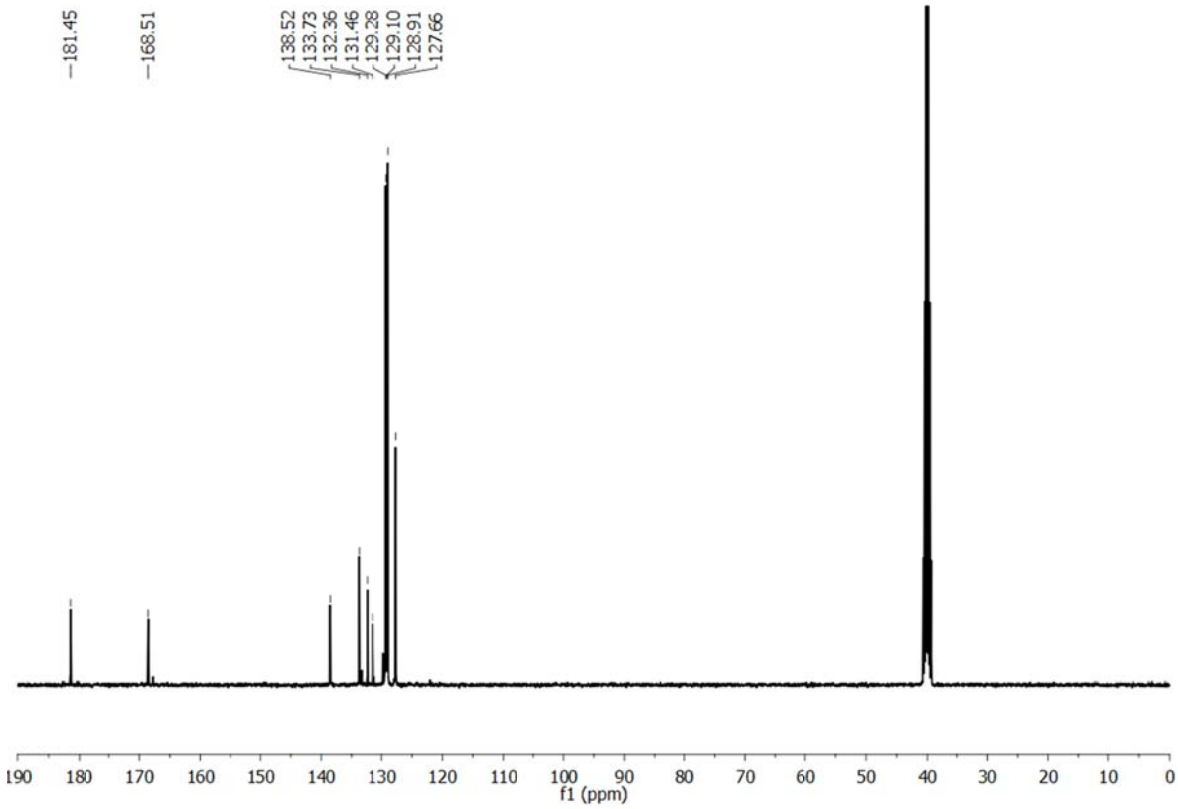

Figure S41. ^{13}C-NMR of compound **1e**.

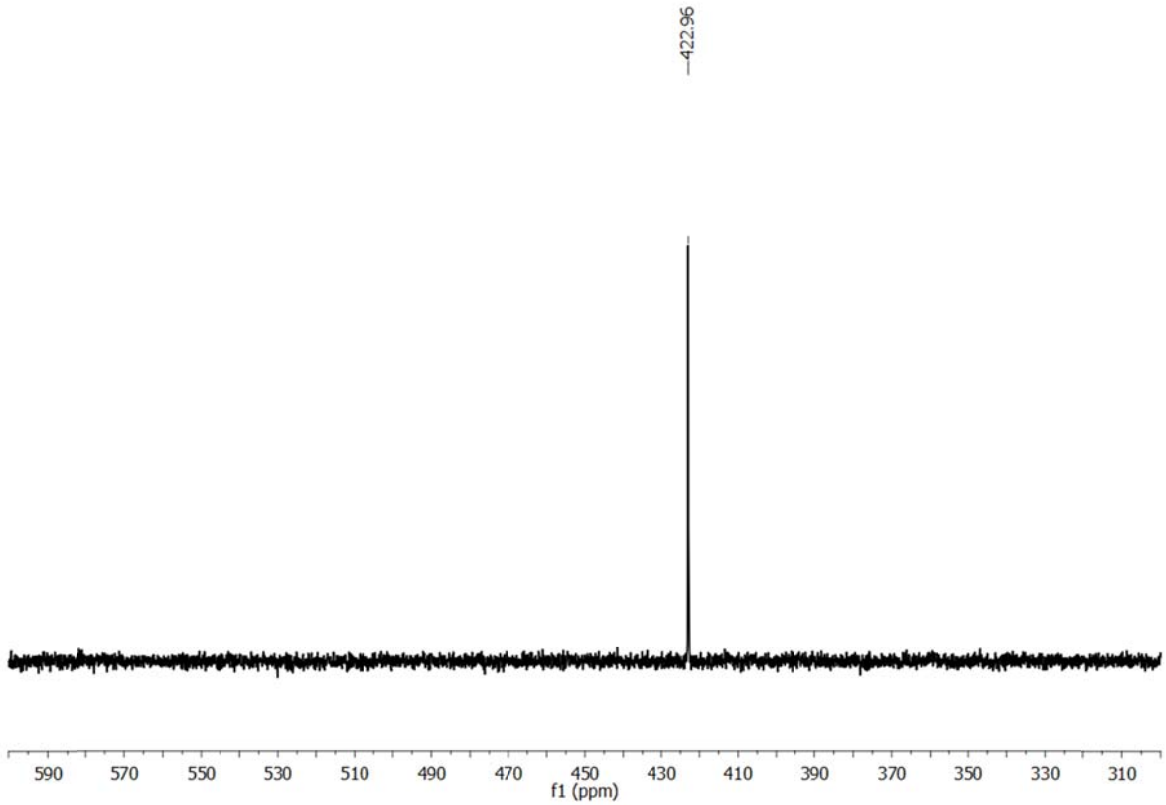

Figure S42. ^{77}Se-NMR of compound **1e**.

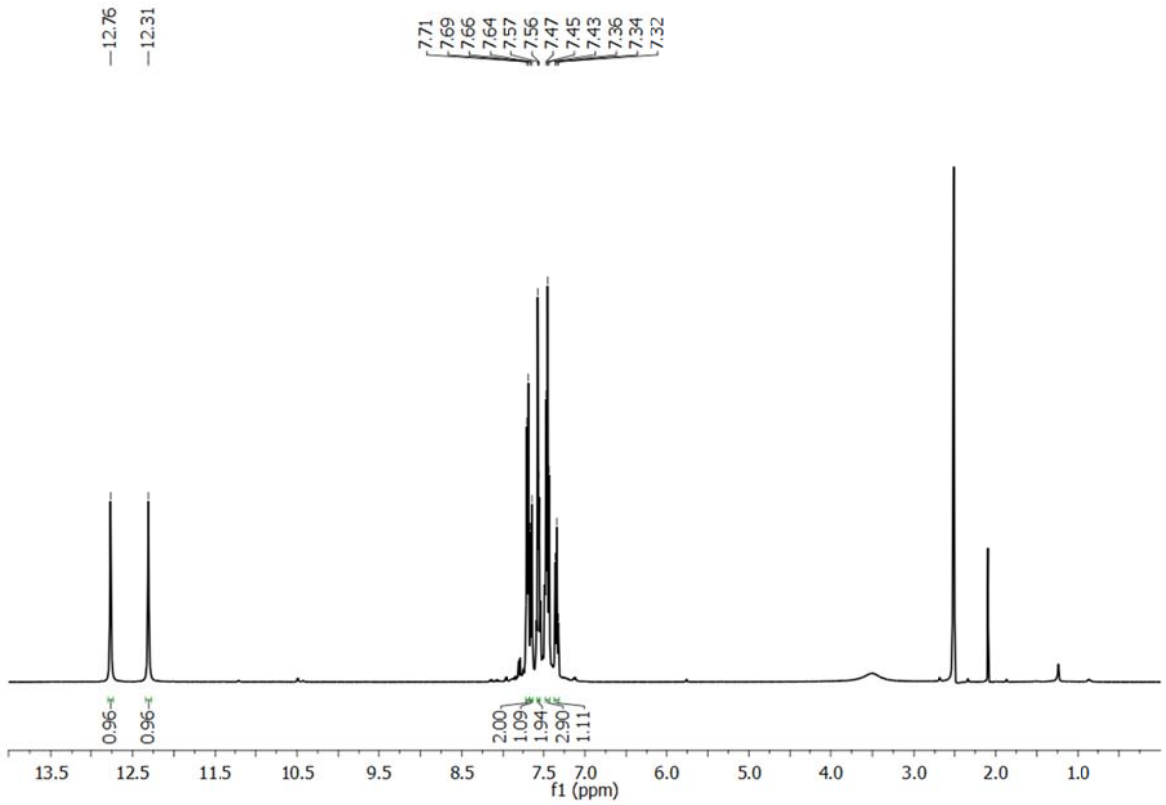

Figure S43. ^{1}H-NMR of compound **2a**.

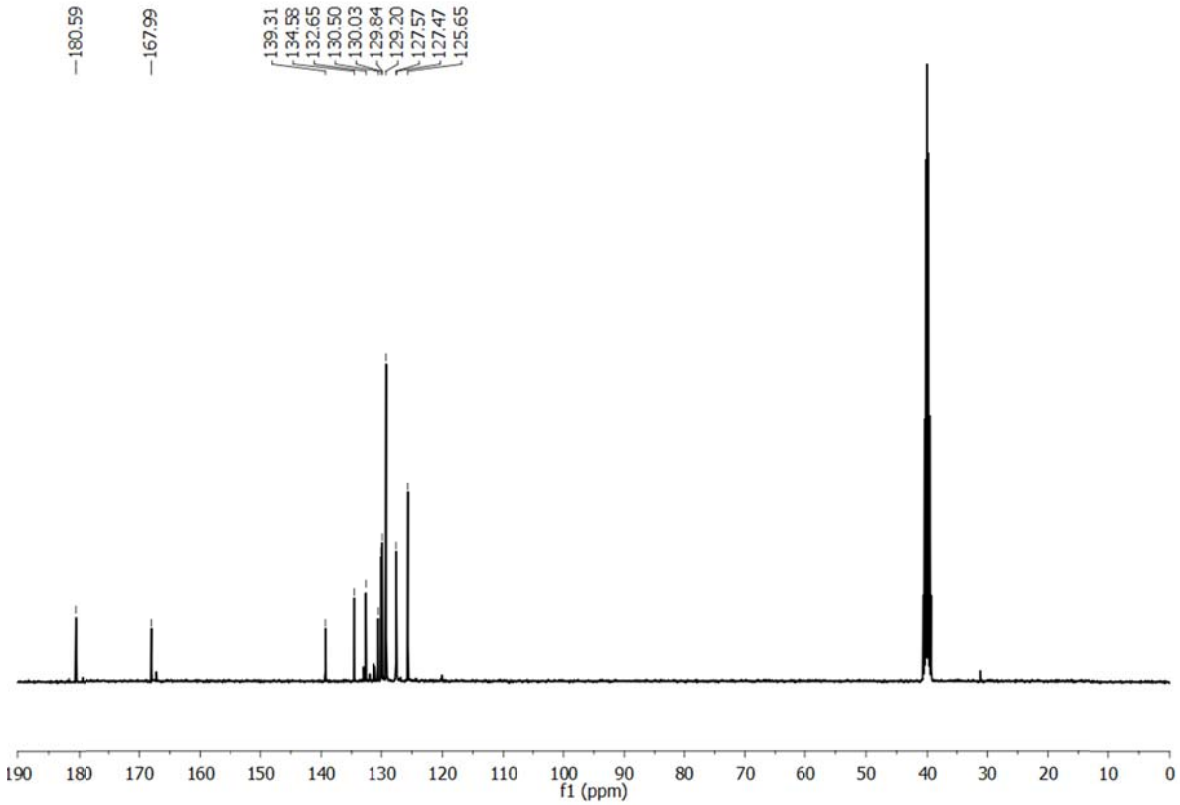

Figure S44. ^{13}C-NMR of compound **2a**.

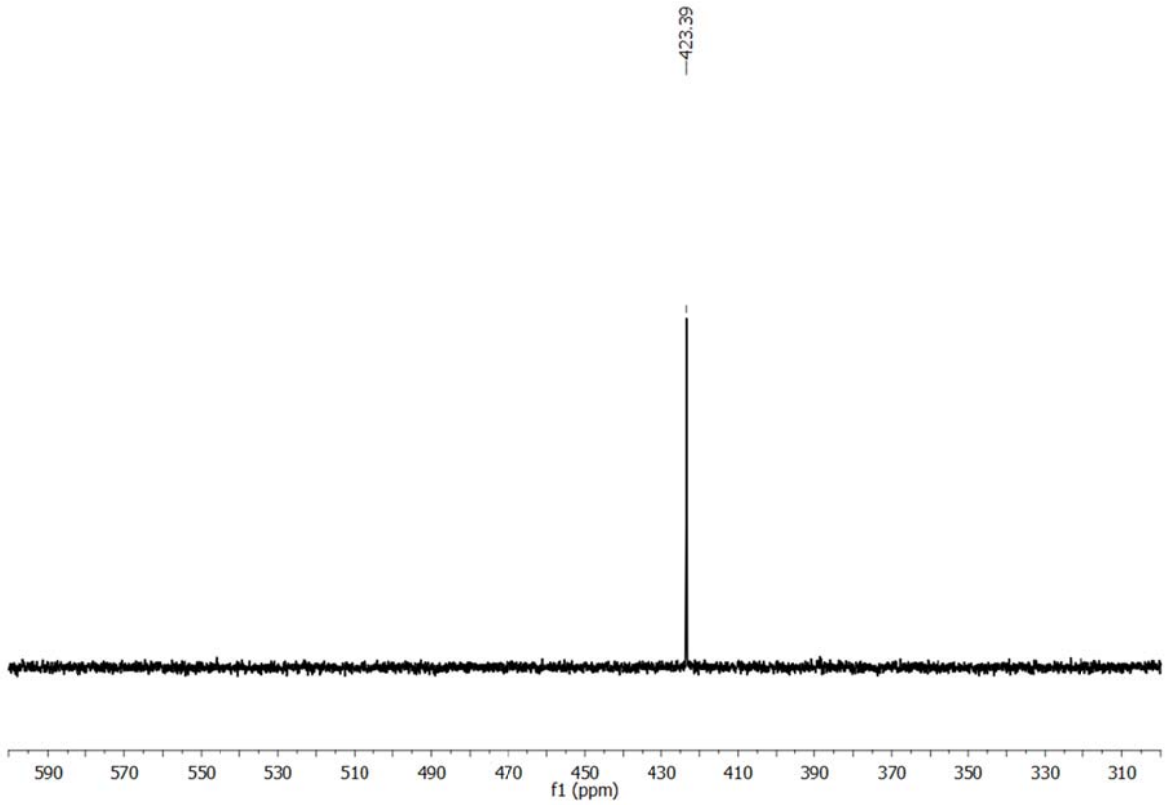

Figure S45. ^{77}Se-NMR of compound **2a**.

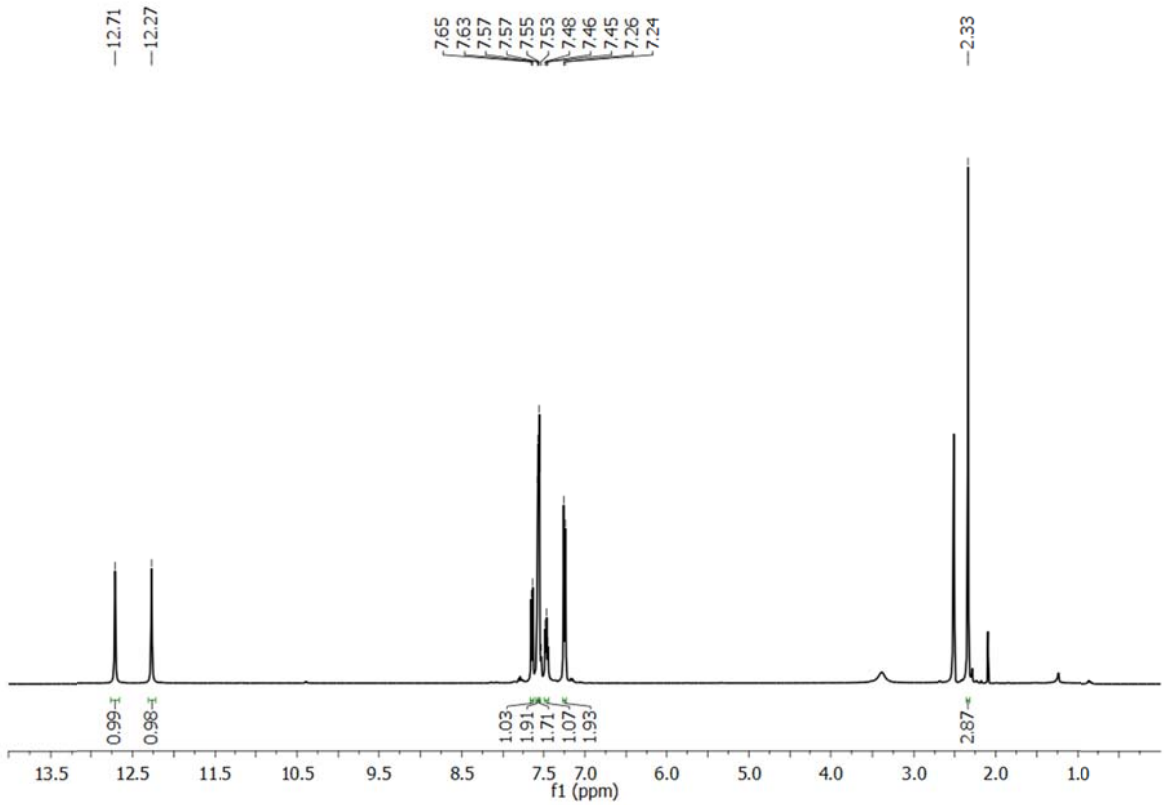

Figure S46. ^{1}H-NMR of compound **2b**.

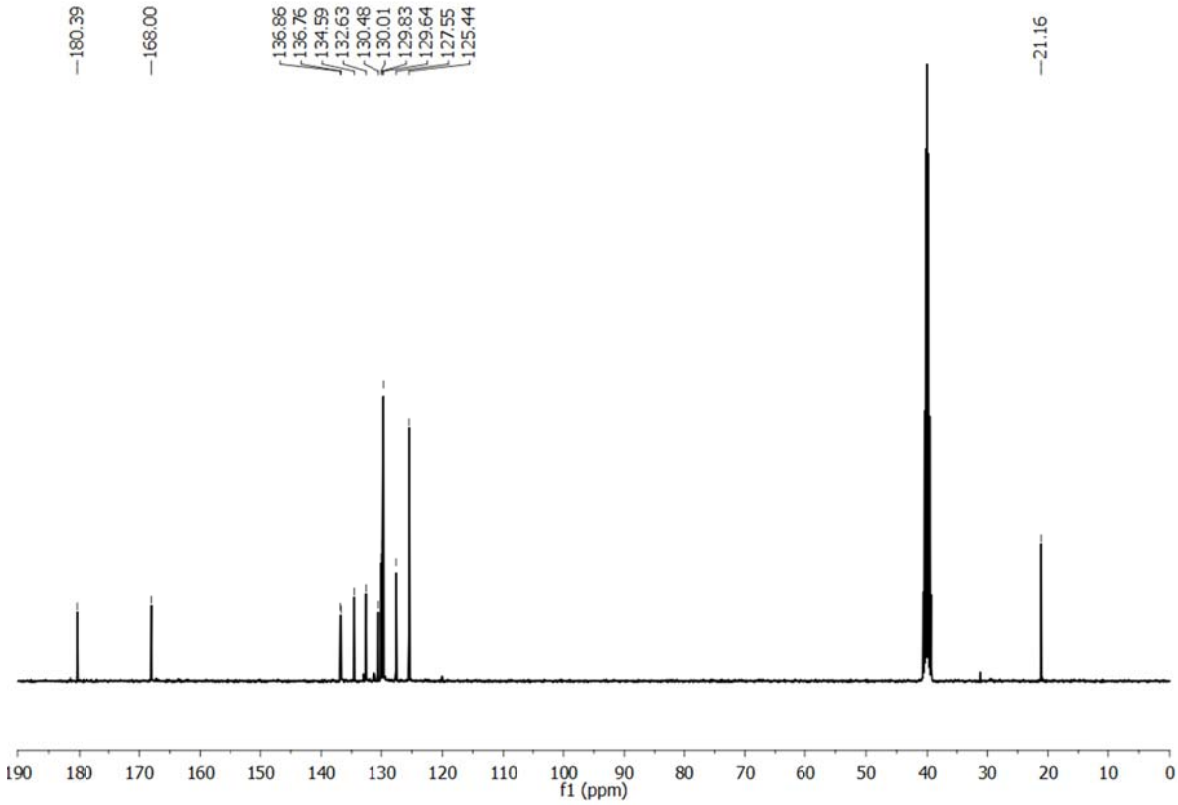

Figure S47. ^{13}C-NMR of compound **2b**.

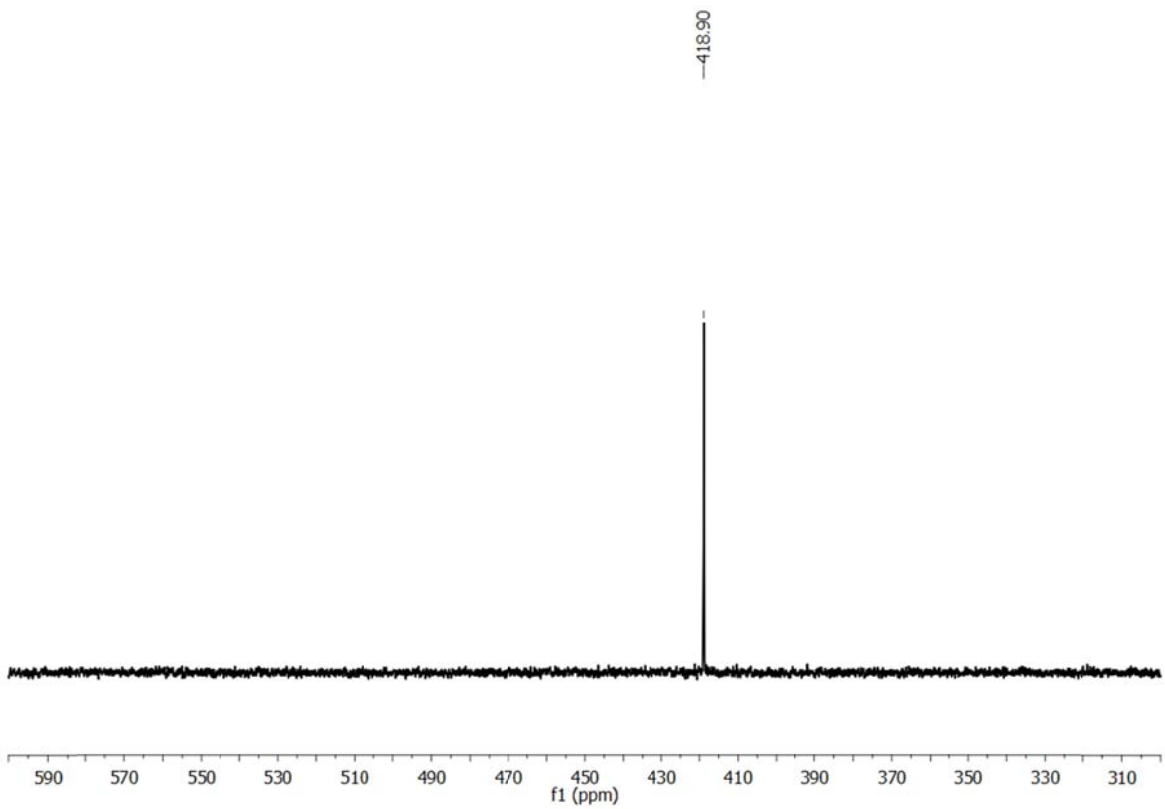

Figure S48. ^{77}Se-NMR of compound **2b**.

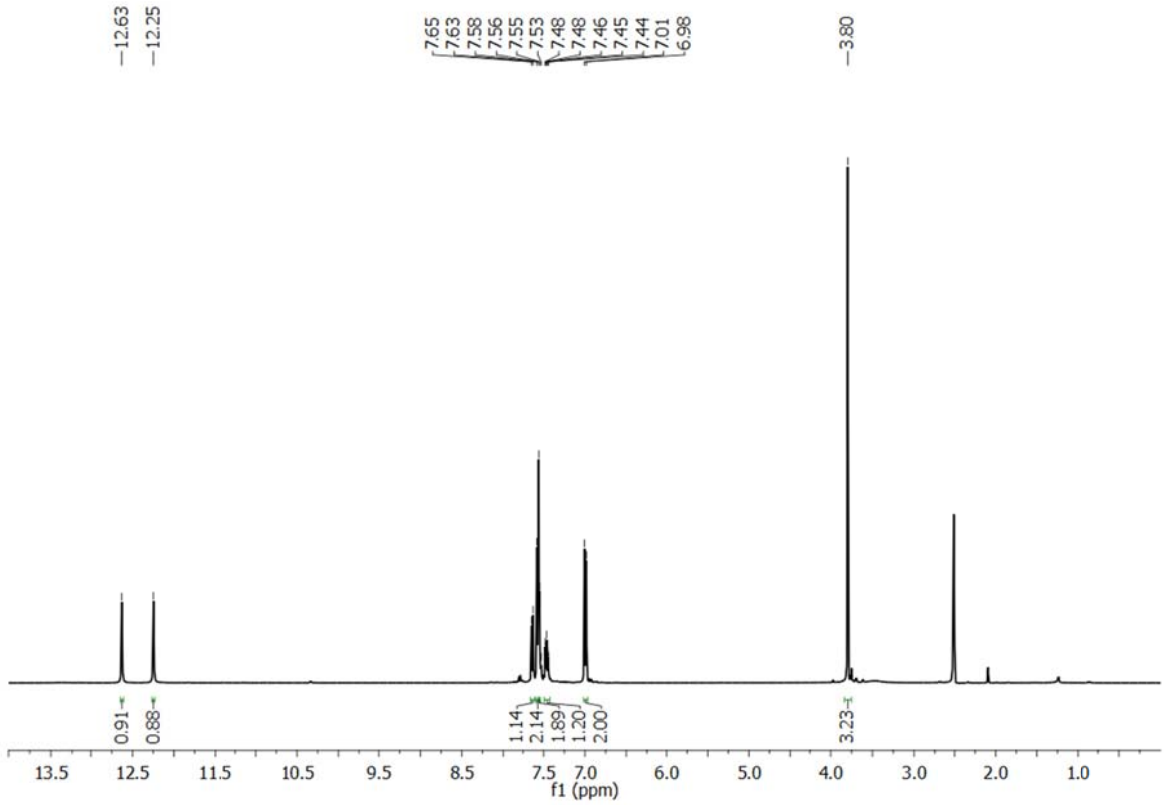

Figure S49. ^{1}H-NMR of compound **2c**.

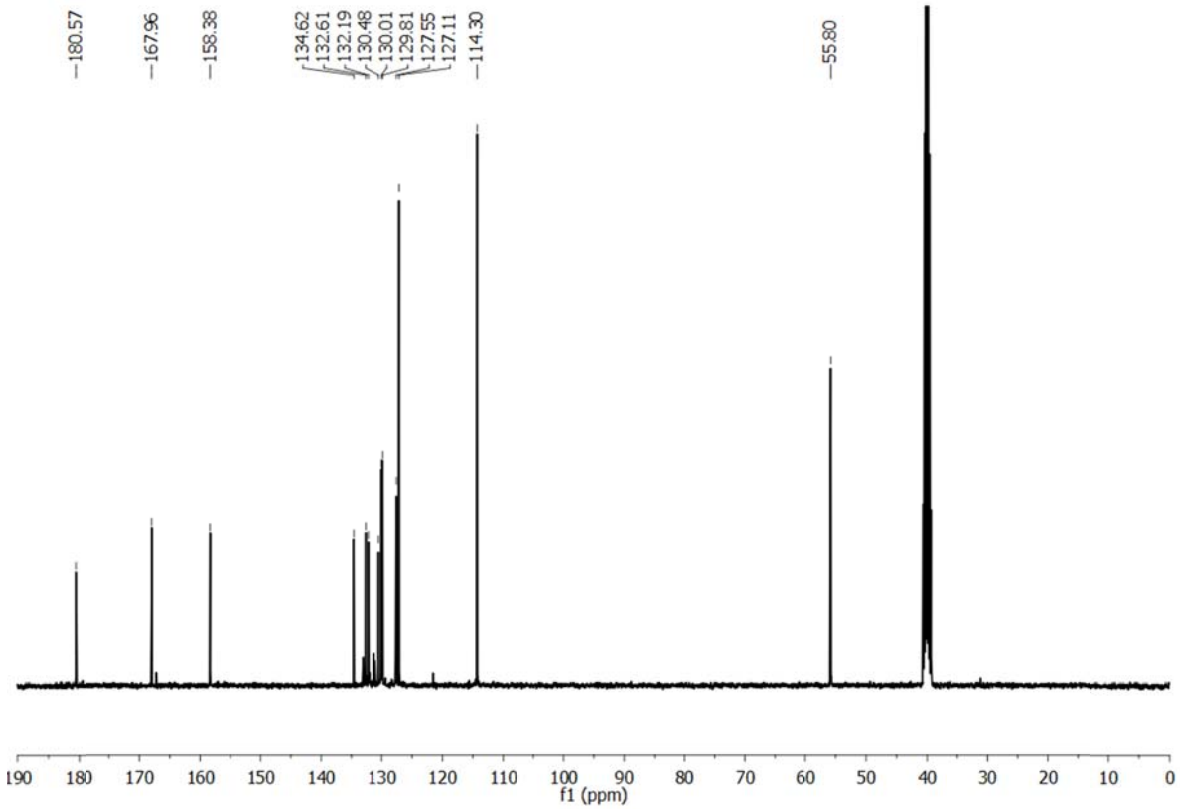

Figure S50. ^{13}C-NMR of compound **2c**.

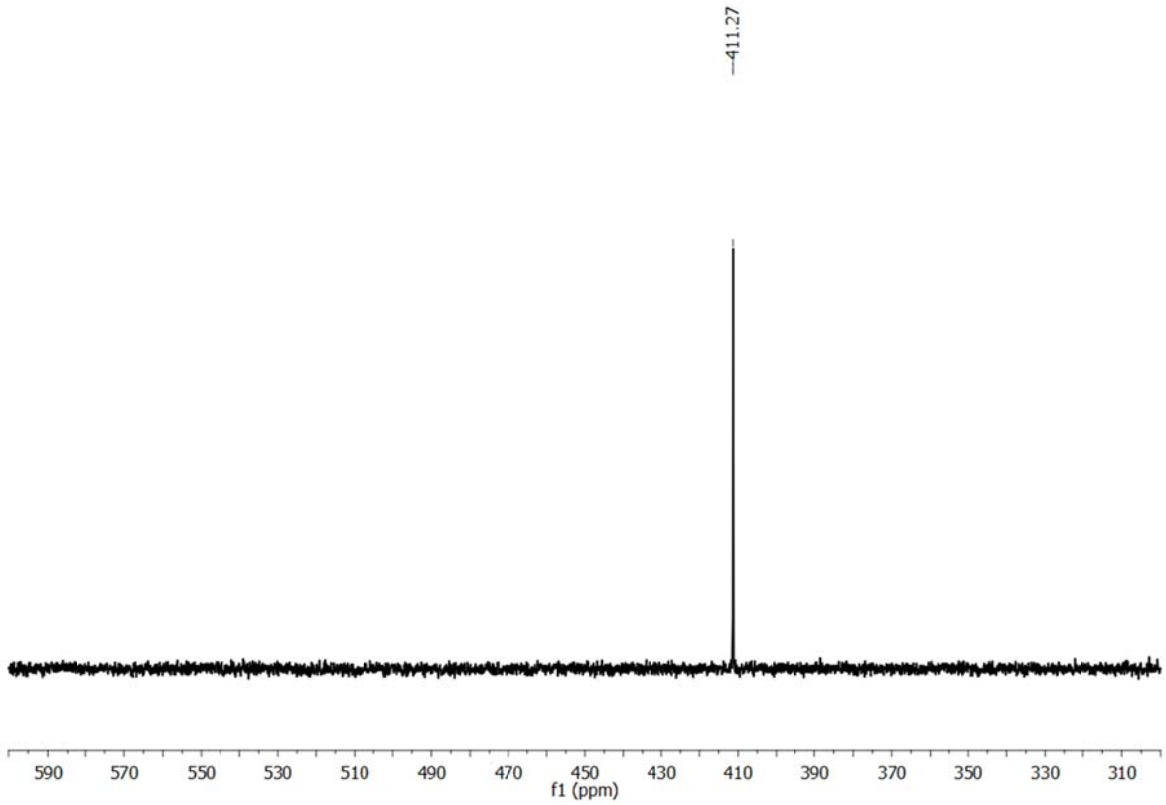

Figure S51. ^{77}Se-NMR of compound **2c**.

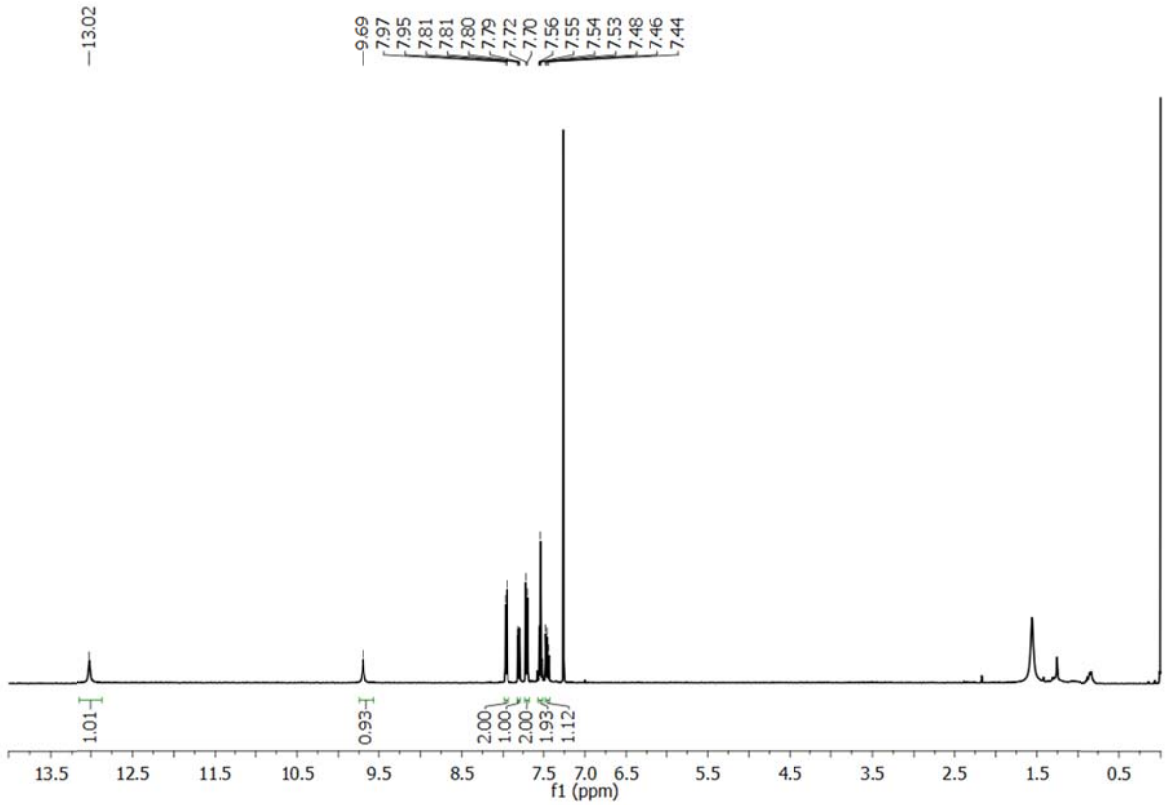

Figure S52. ^{1}H-NMR of compound **2d**.

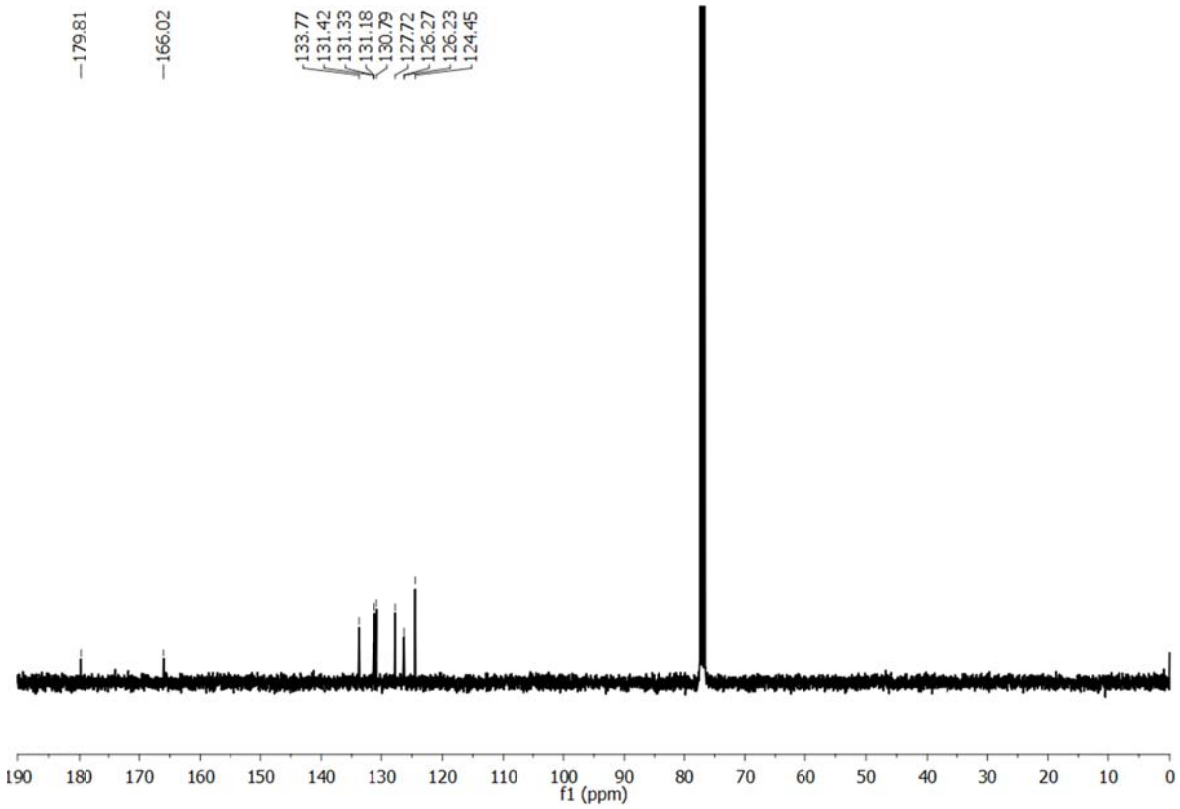

Figure S53. ^{13}C-NMR of compound **2d**.

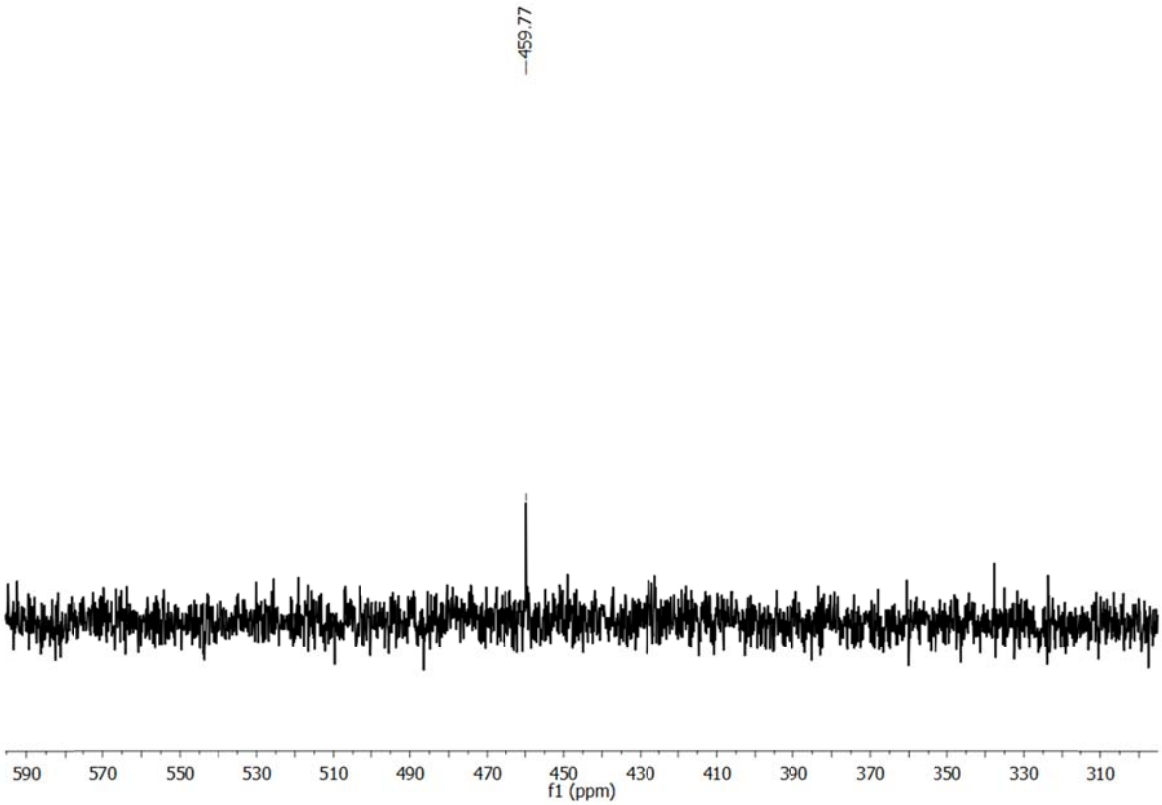

Figure S54. ^{77}Se-NMR of compound **2d**.

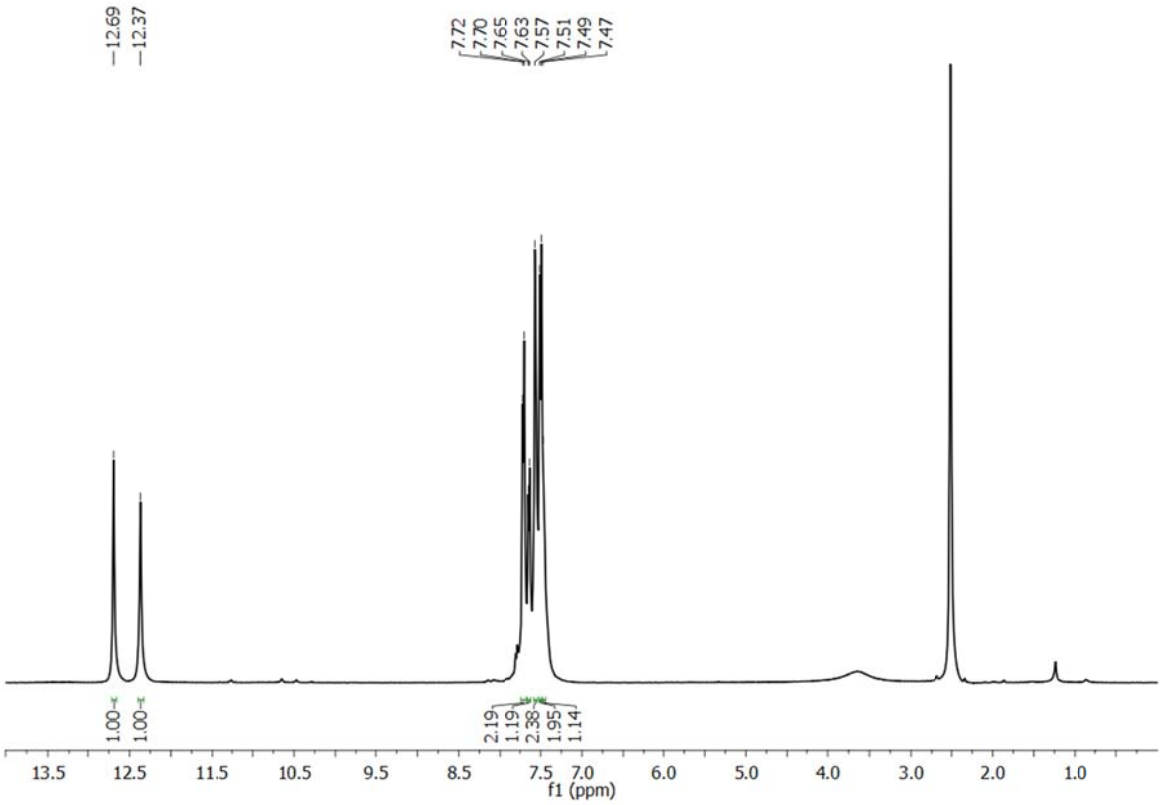

Figure S55. ^{1}H-NMR of compound **2e**.

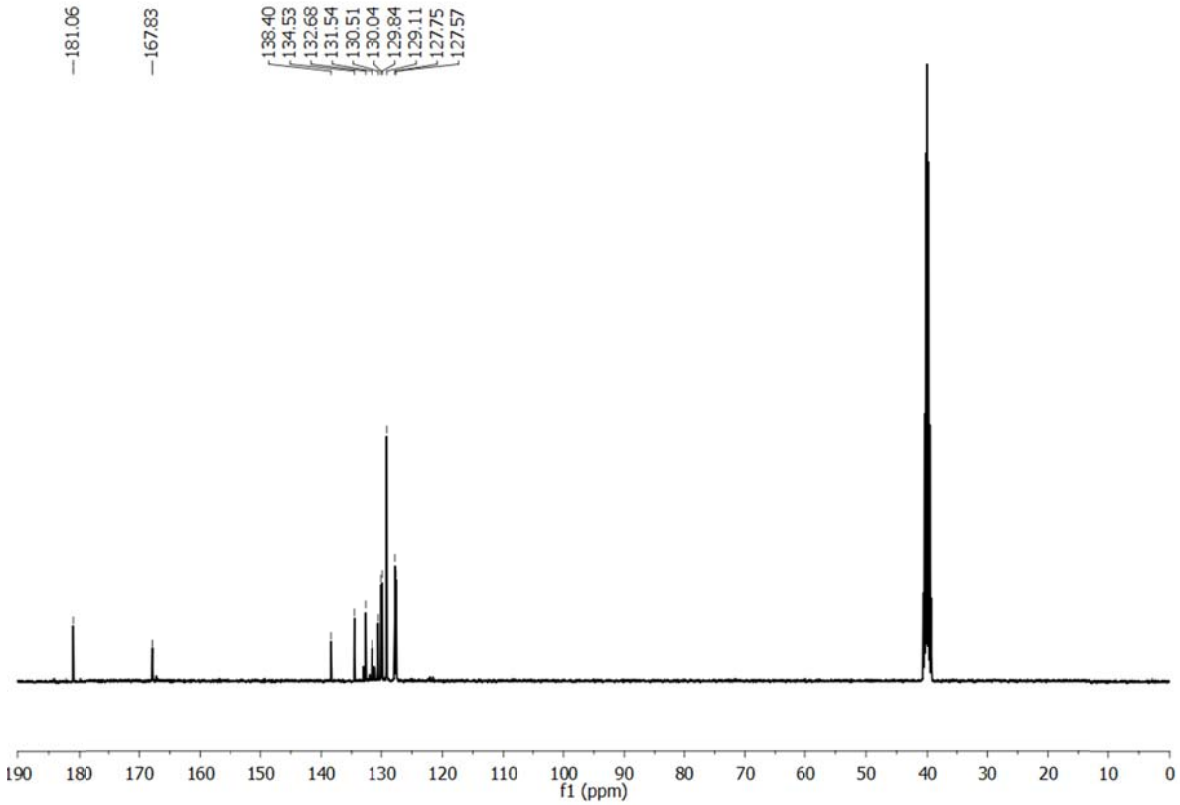

Figure S56. ^{13}C-NMR of compound **2e**.

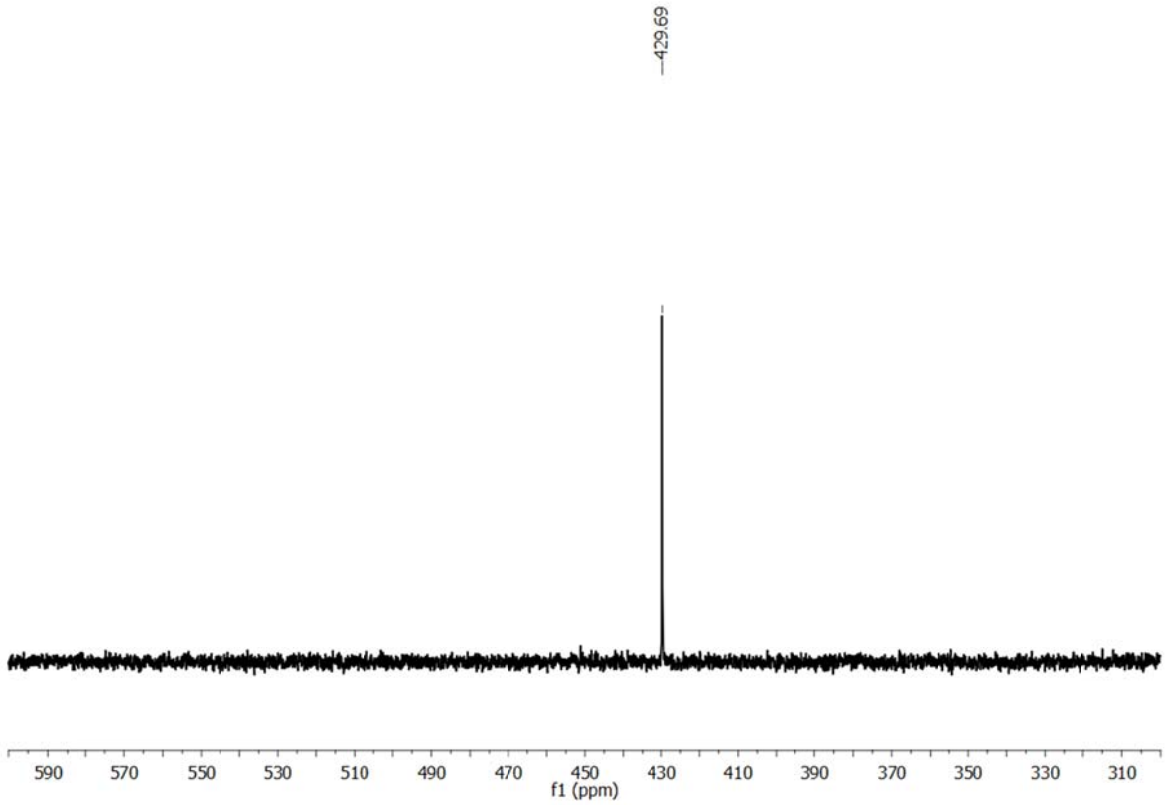

Figure S57. ^{77}Se-NMR of compound **2e**.

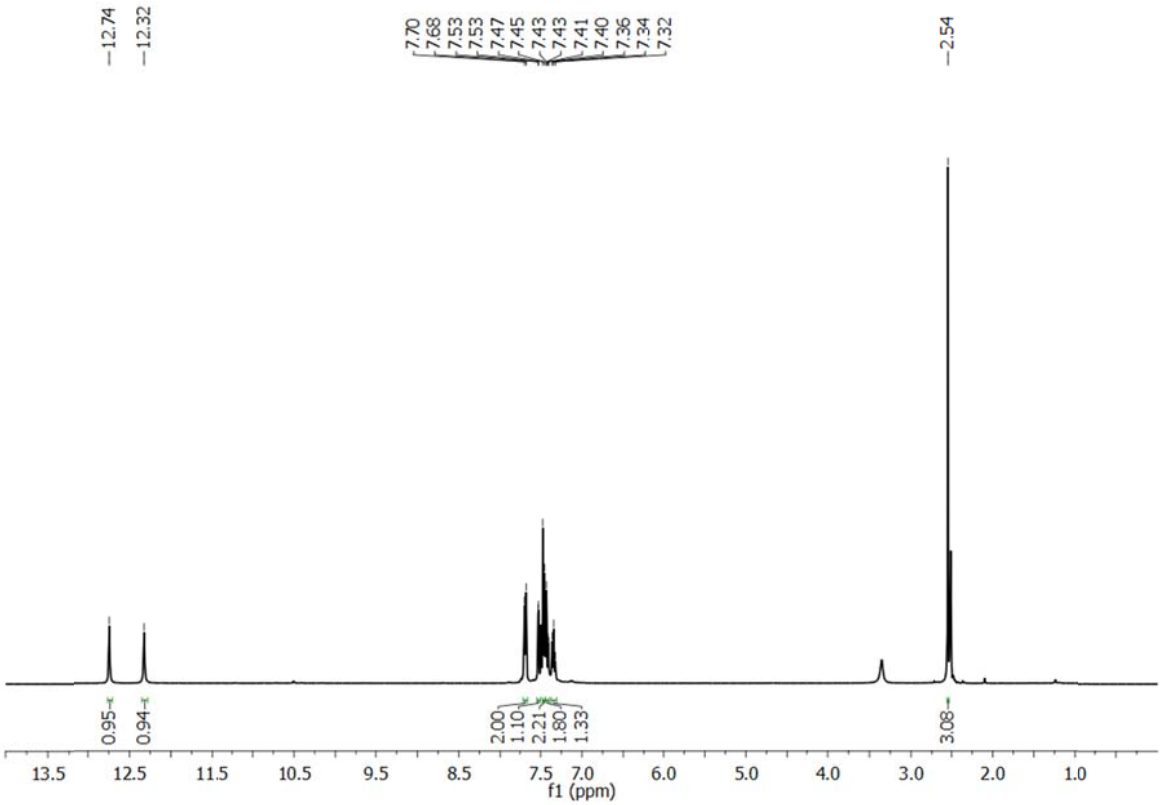

Figure S58. ^{1}H-NMR of compound **3a**.

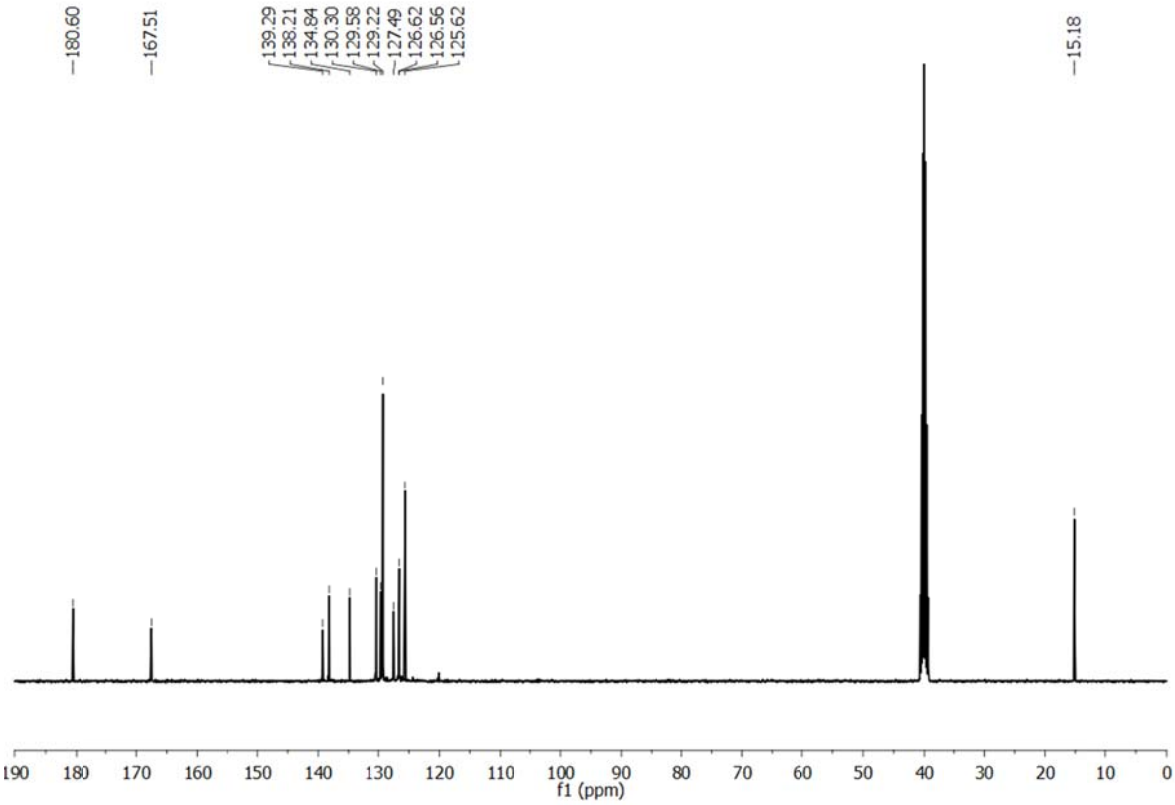

Figure S59. ^{13}C-NMR of compound **3a**.

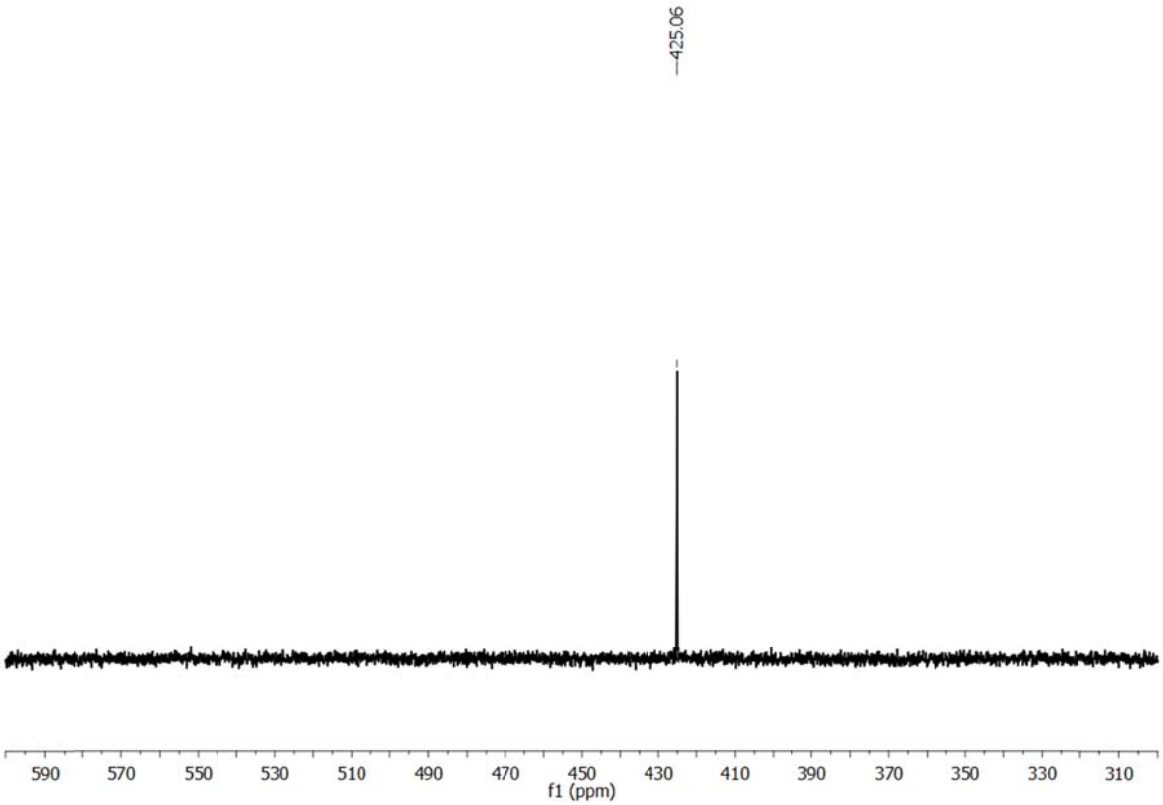

Figure S60. ^{77}Se-NMR of compound **3a**.

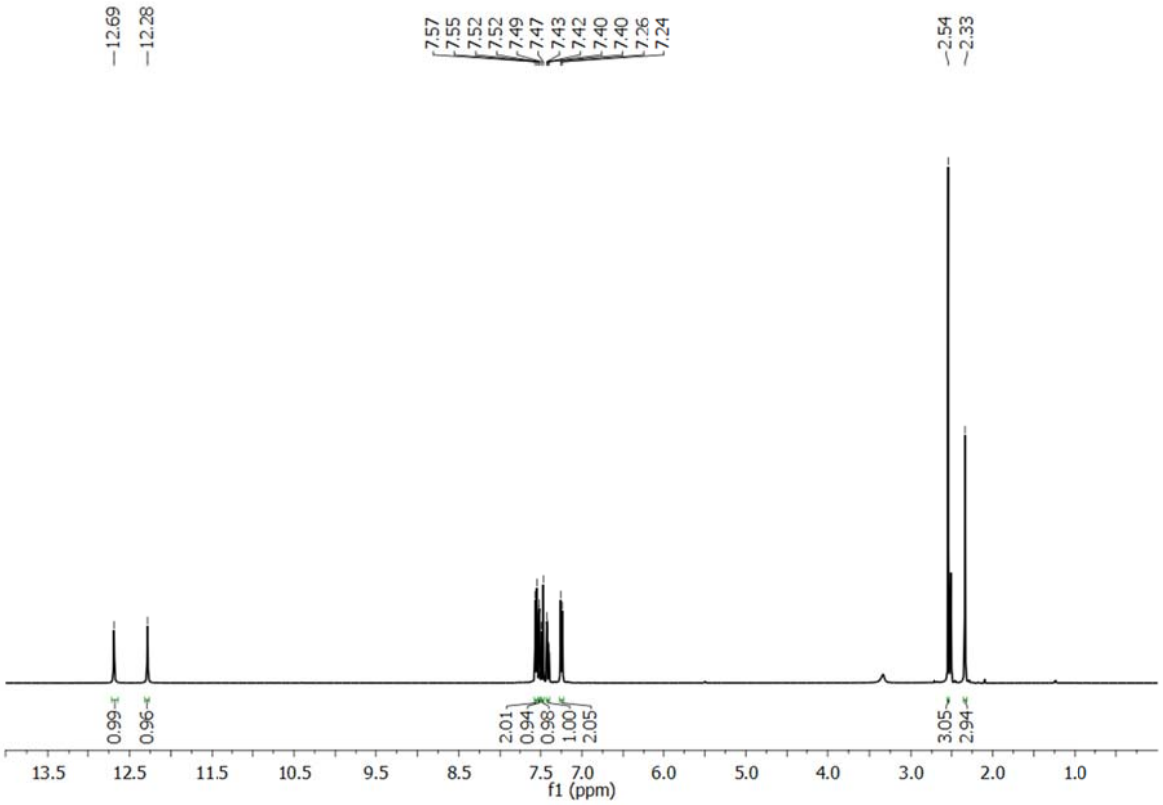

Figure S61. ^{1}H-NMR of compound **3b**.

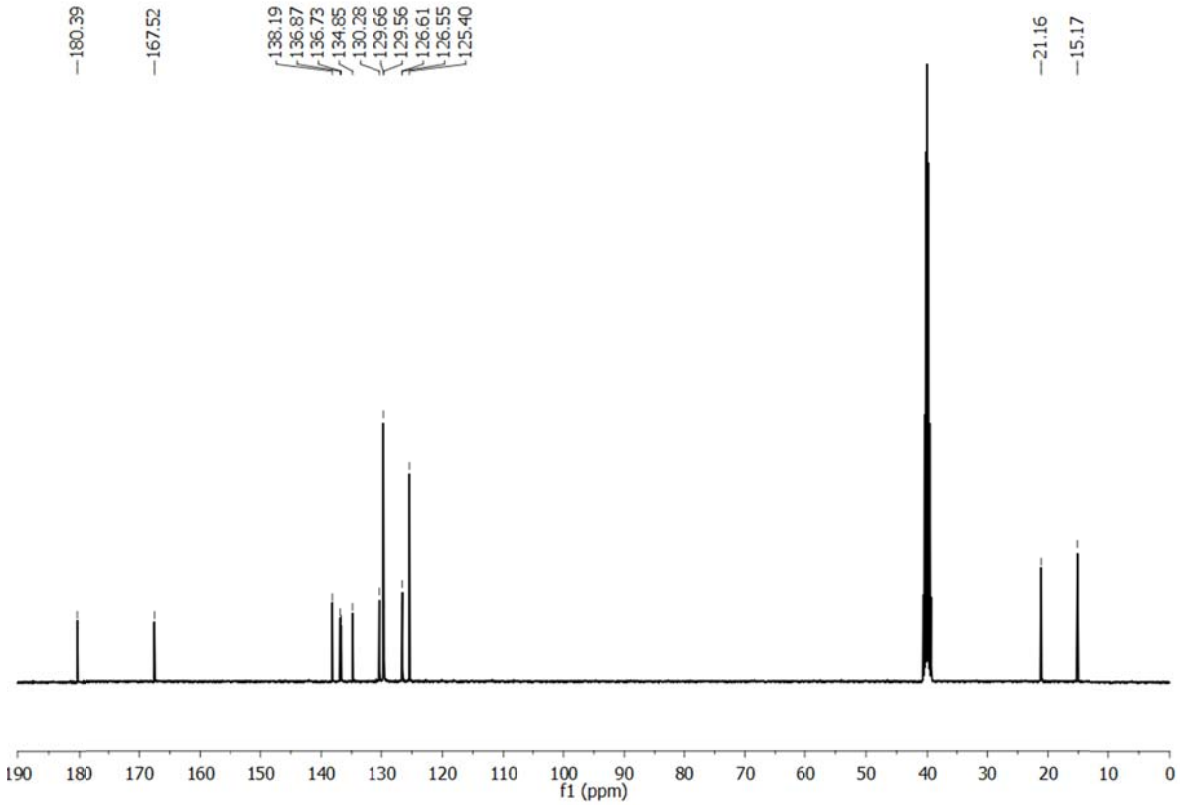

Figure S62. ^{13}C-NMR of compound **3b**.

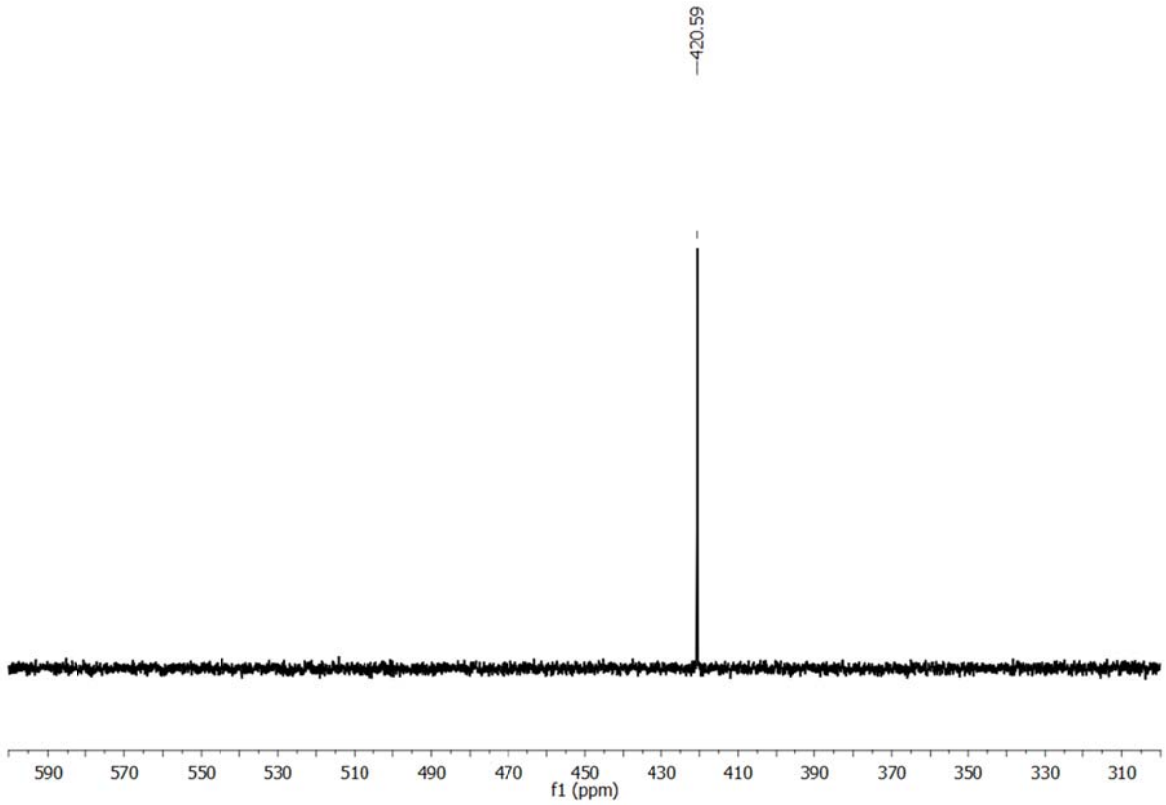

Figure S63. ^{77}Se-NMR of compound **3b**.

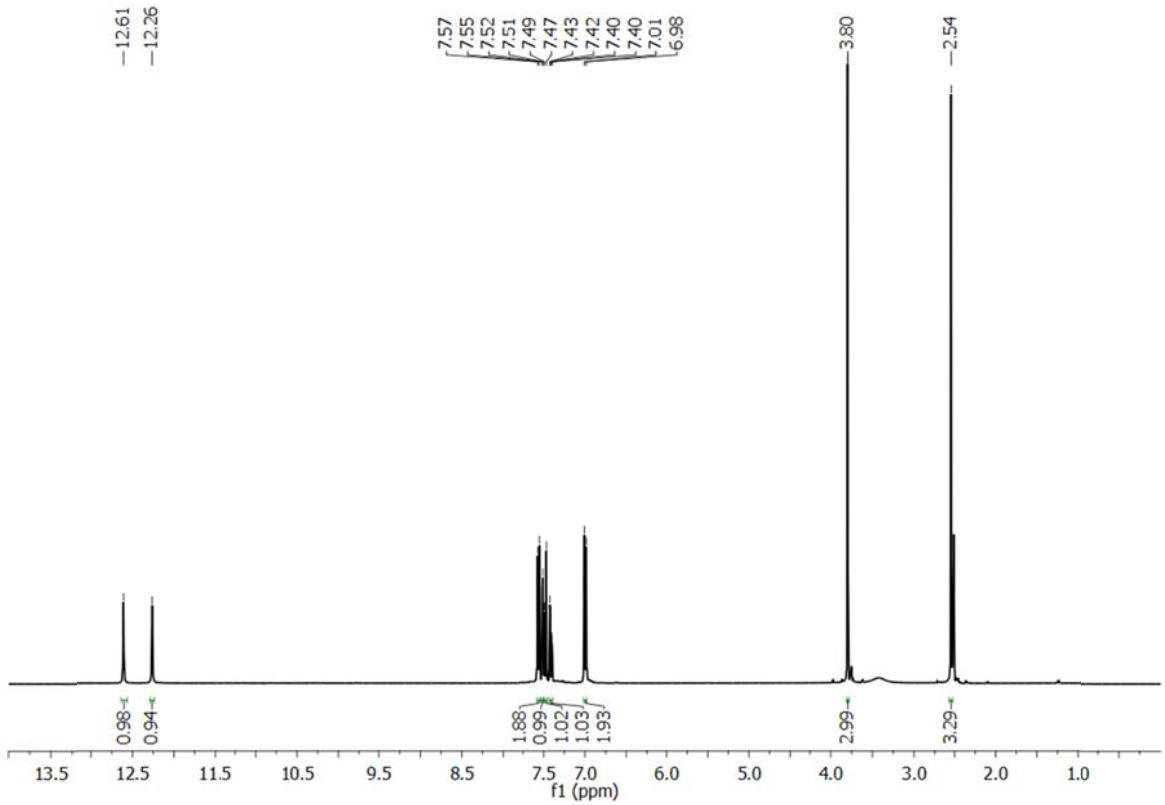

Figure S64. ^{1}H-NMR of compound **3c**.

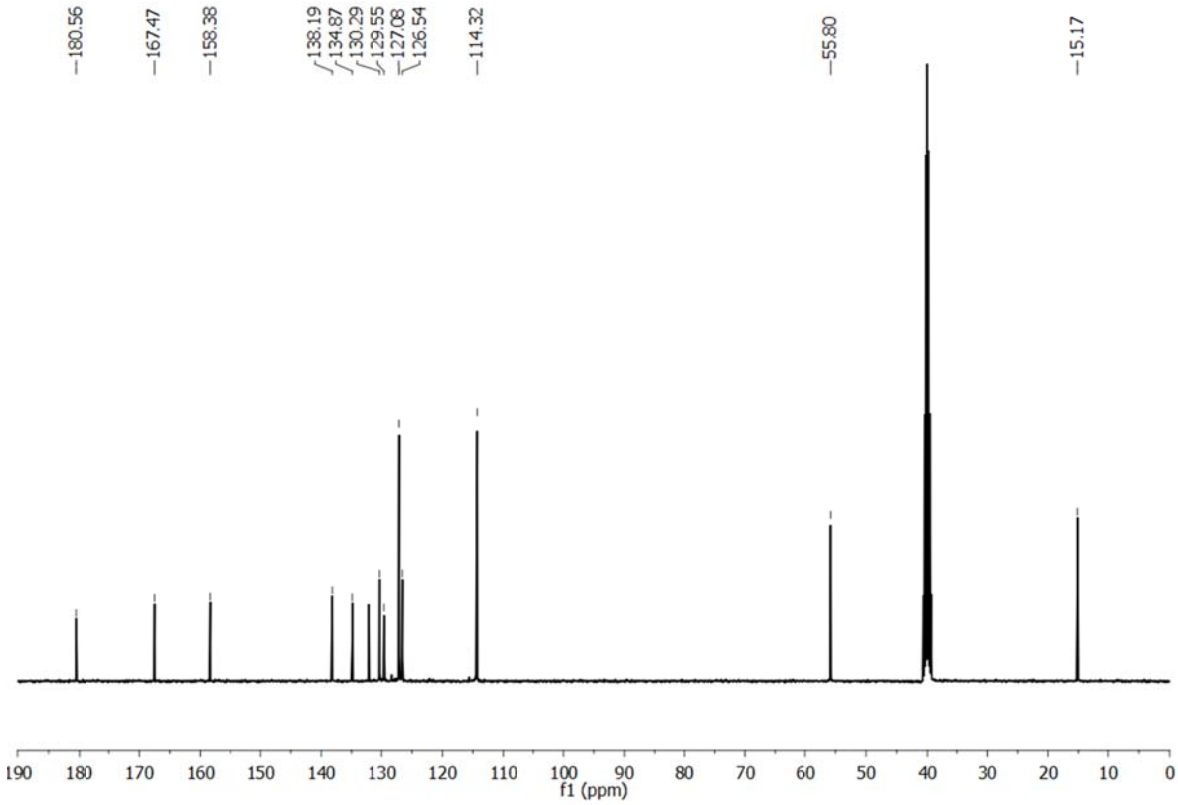

Figure S65. ^{13}C-NMR of compound **3c**.

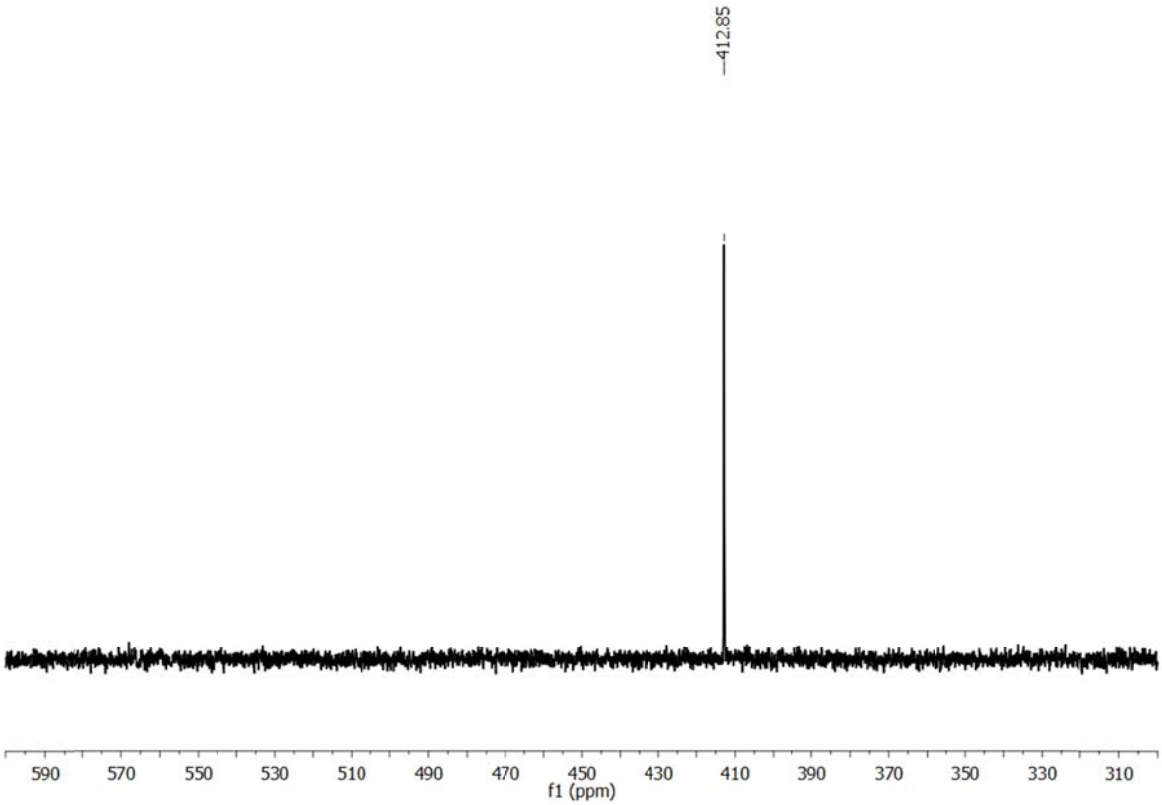

Figure S66. ^{77}Se-NMR of compound **3c**.

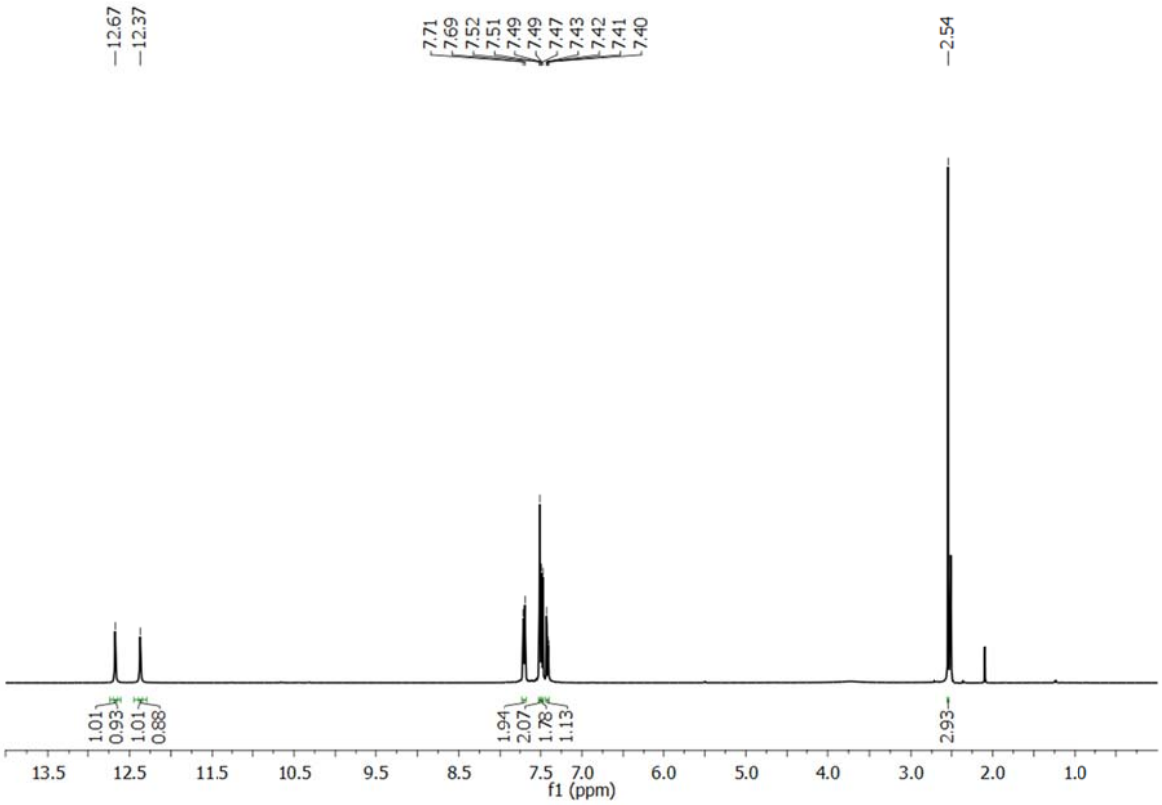

Figure S67. ^{1}H-NMR of compound **3e**.

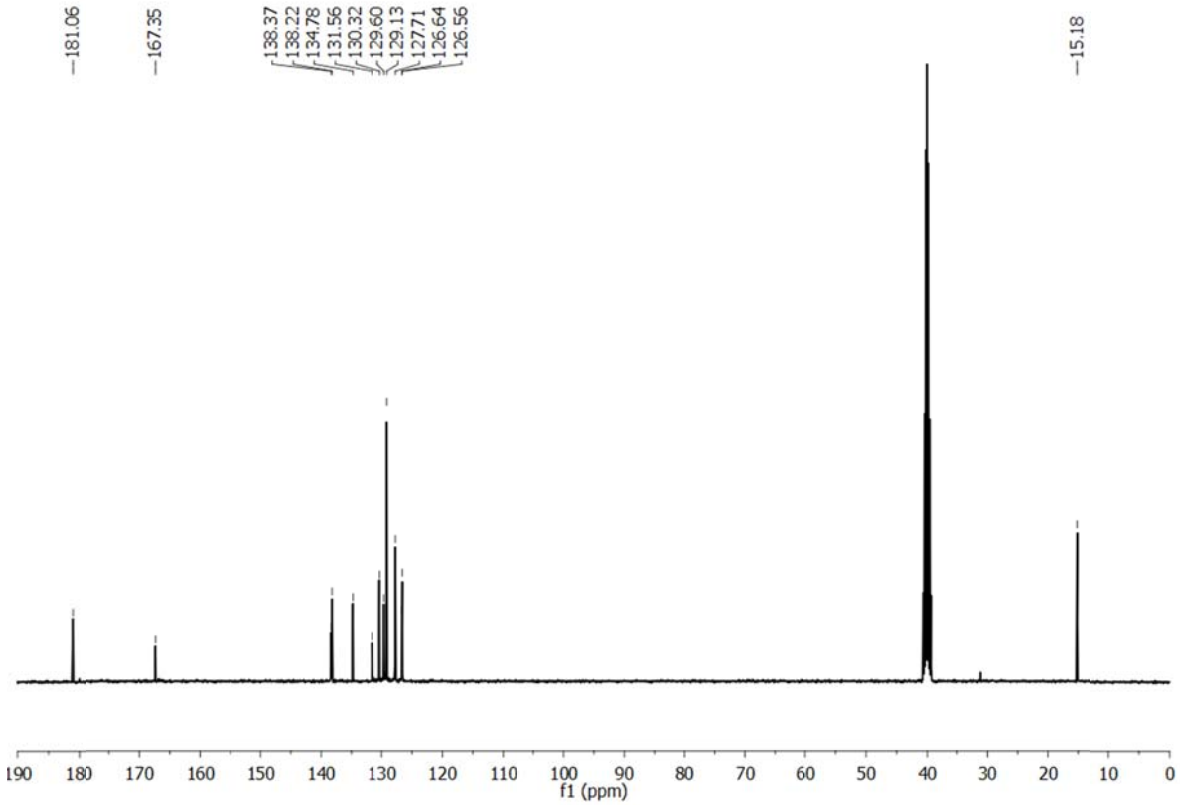

Figure S68. ^{13}C-NMR of compound **3e**.

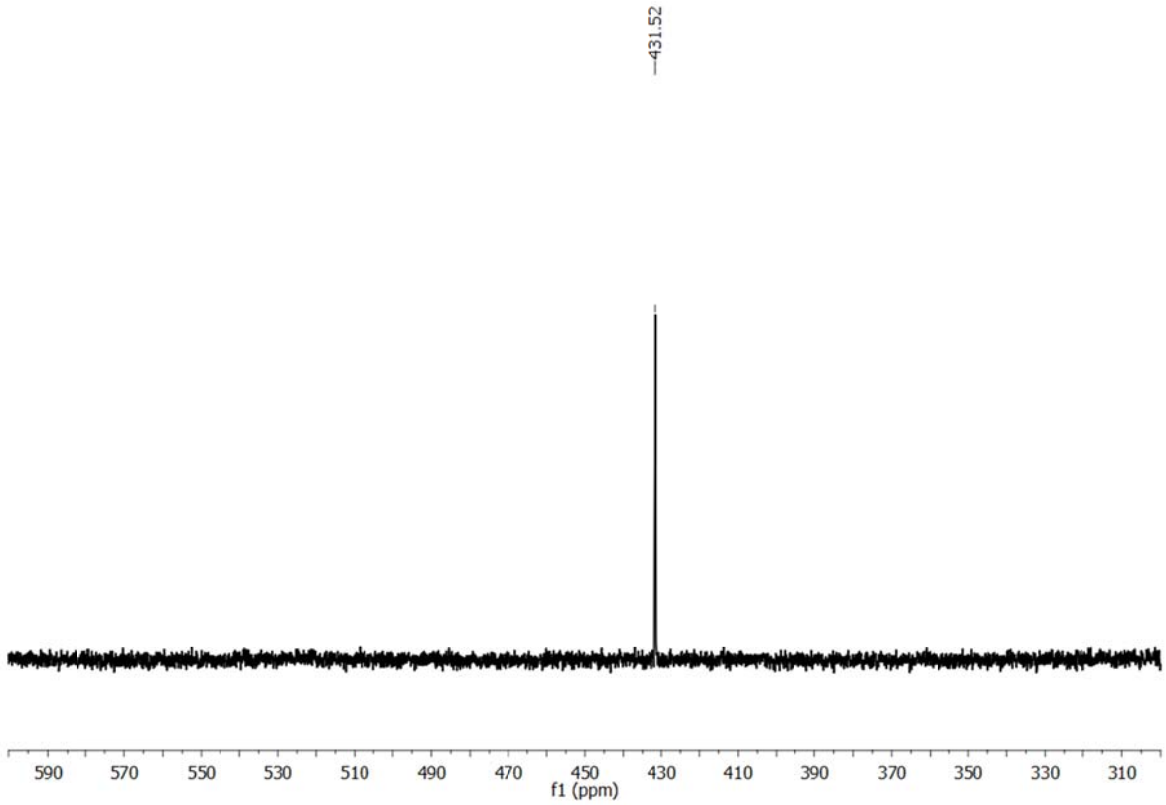

Figure S69. ^{77}Se-NMR of compound **3e**.

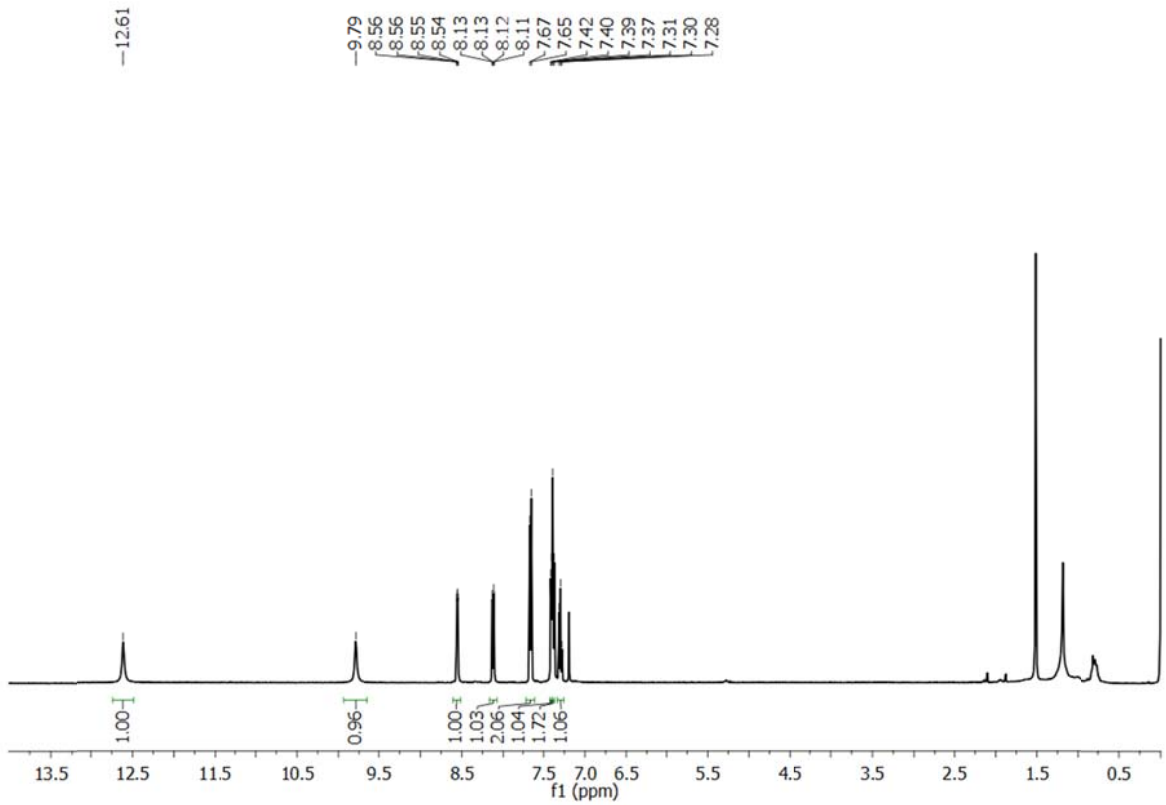

Figure S70. ^{1}H-NMR of compound **4a**.

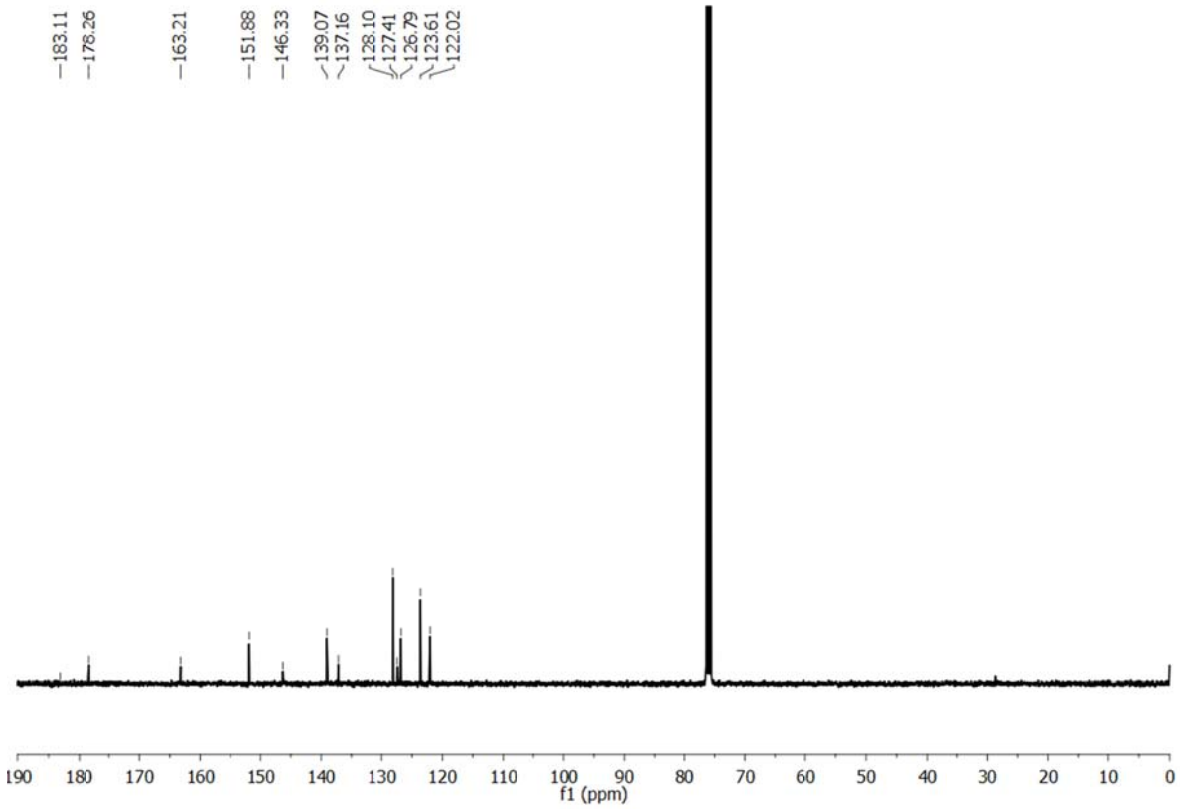

Figure S71. ^{13}C-NMR of compound **4a**.

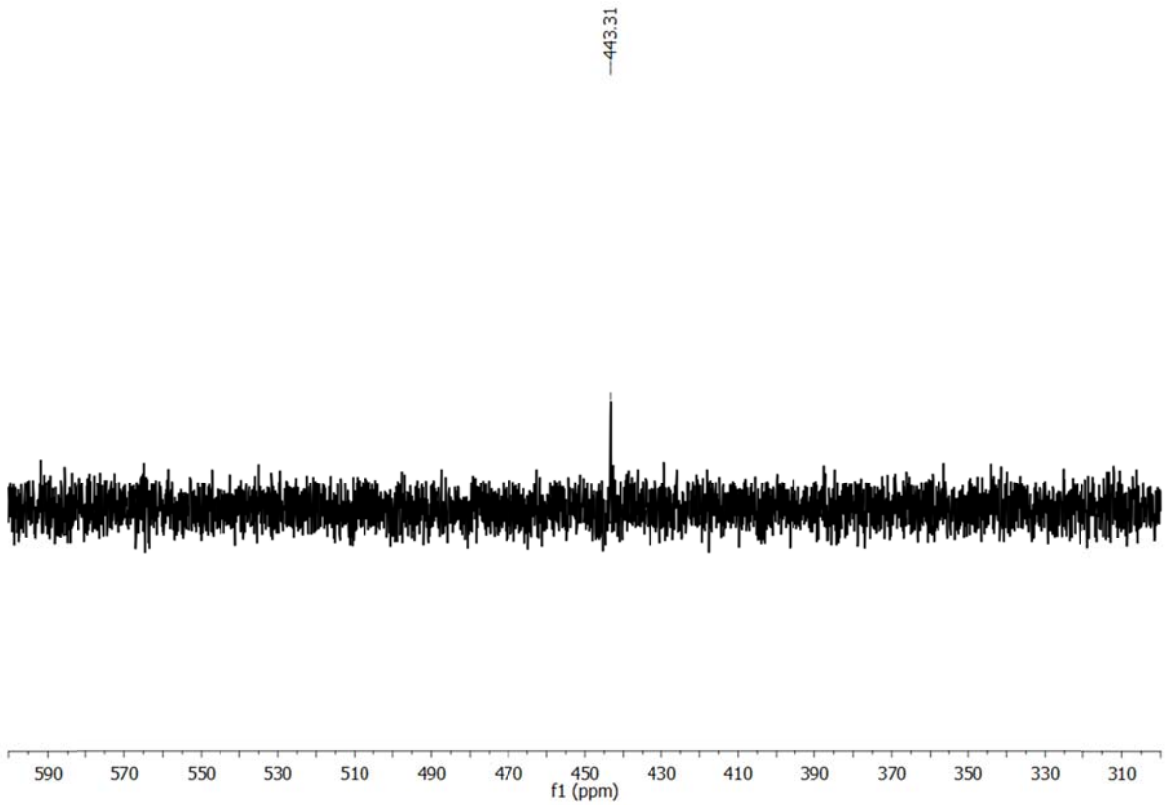

Figure S72. ^{77}Se-NMR of compound **4a**.

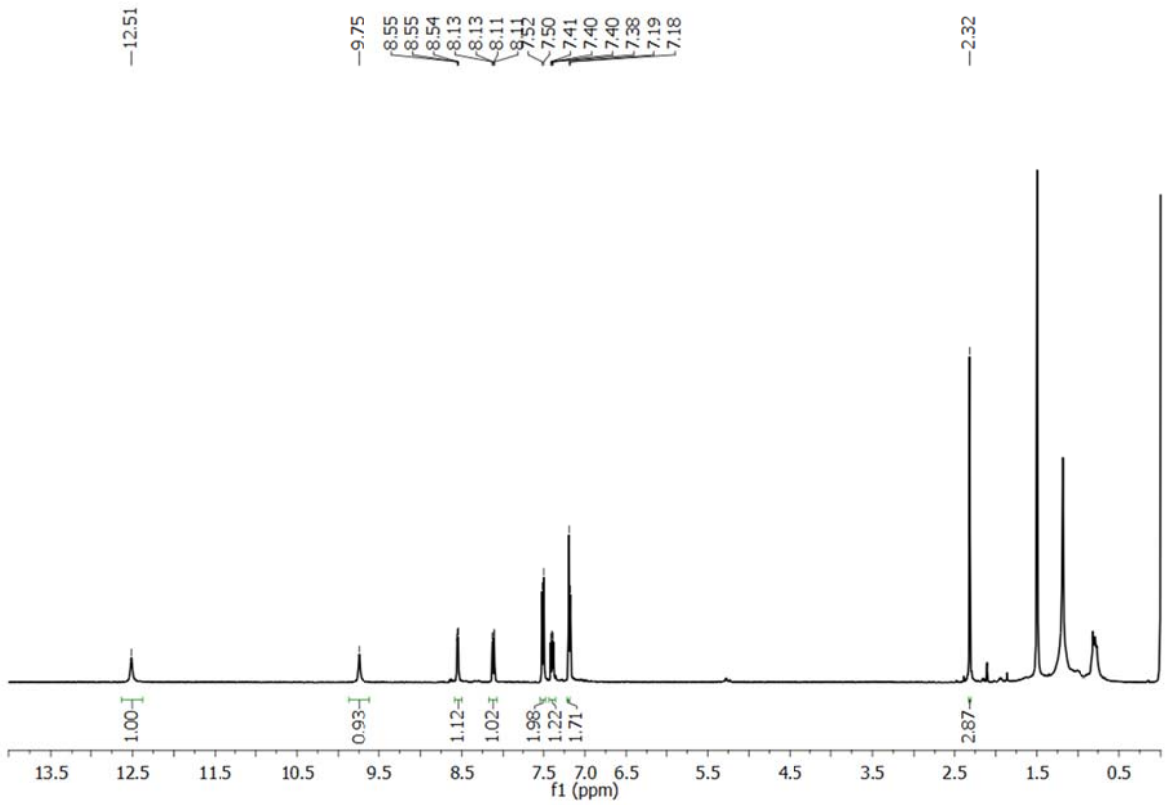

Figure S73. ^{1}H-NMR of compound **4b**.

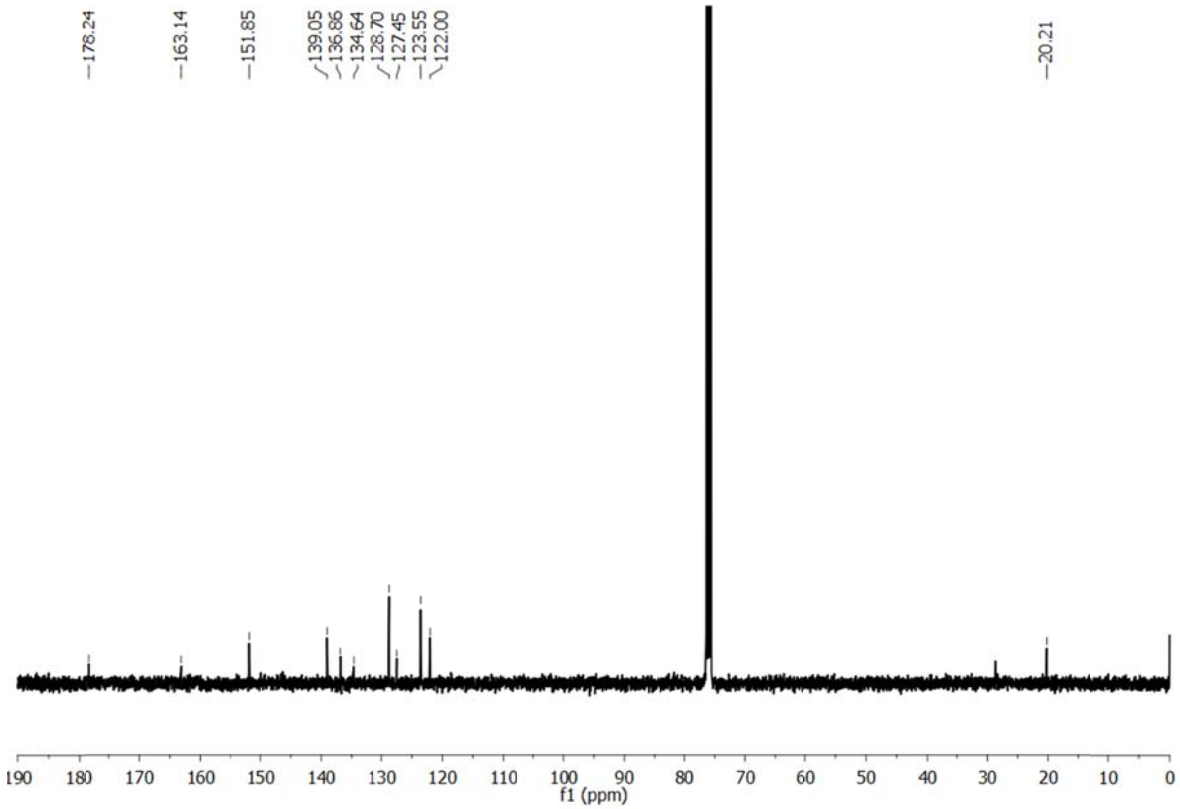

Figure S74. ^{13}C-NMR of compound **4b**.

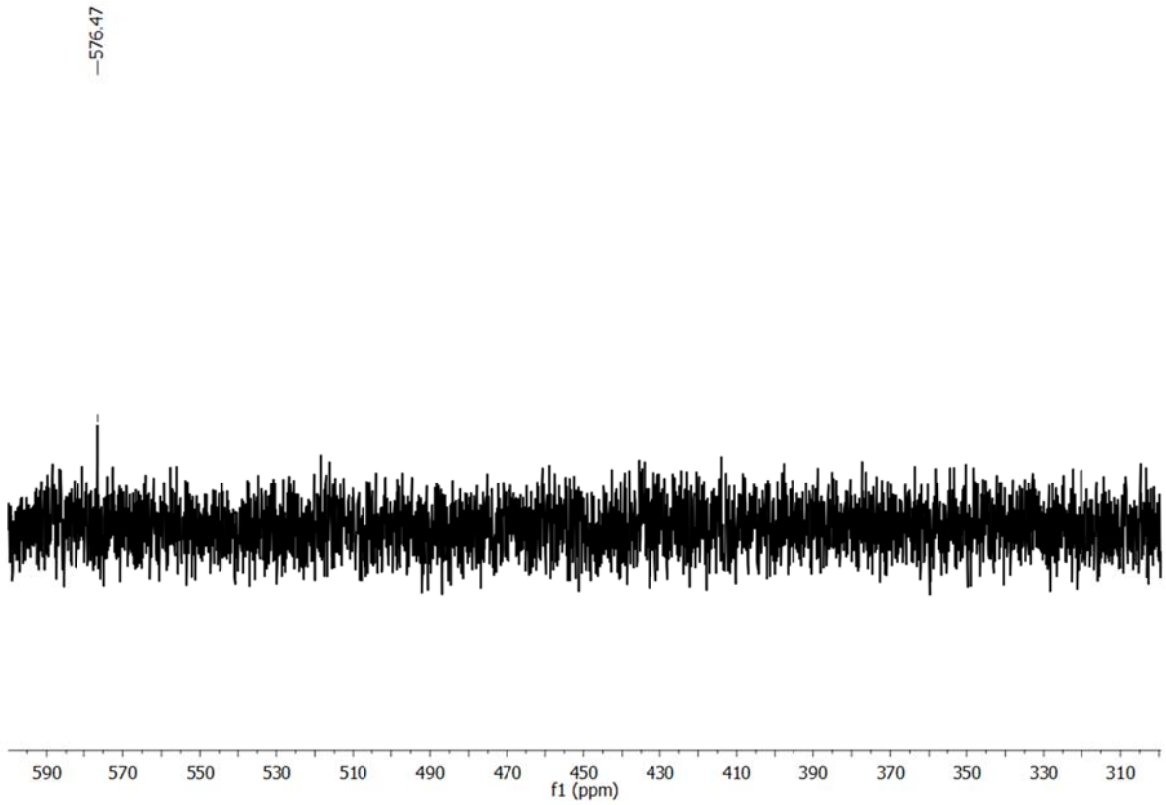

Figure S75. ^{77}Se-NMR of compound **4b**.

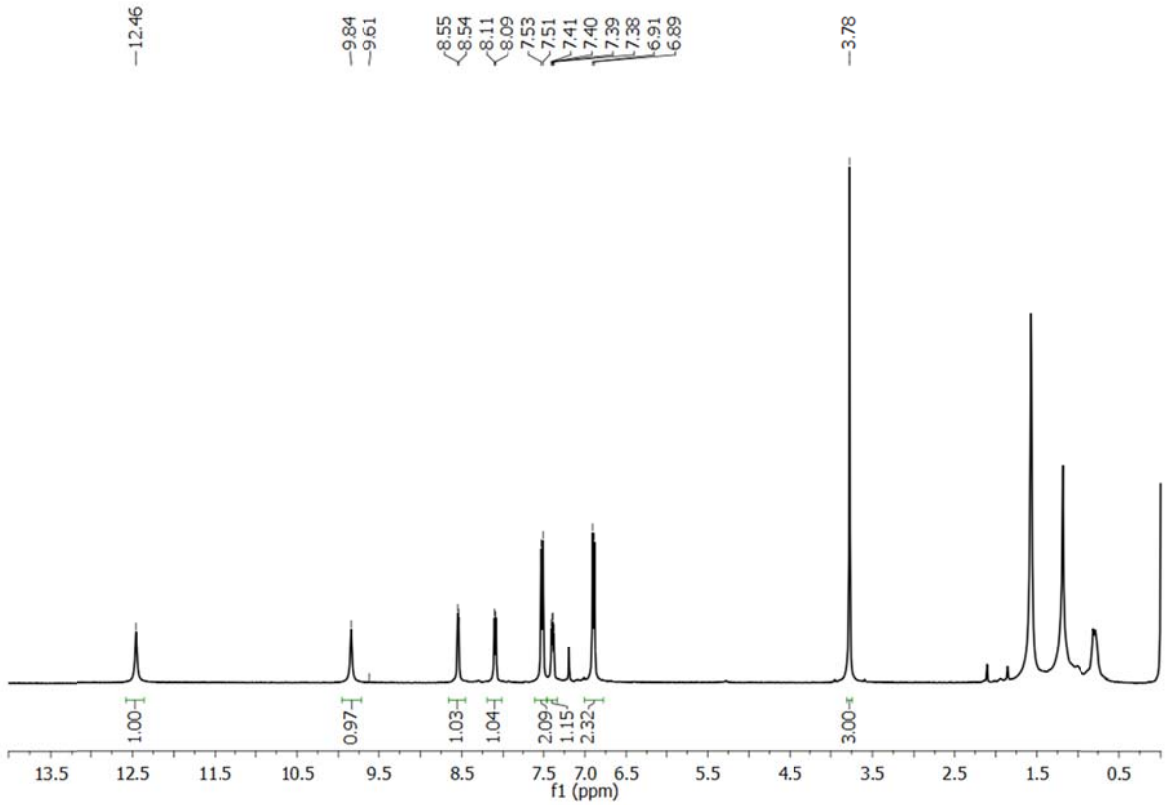

Figure S76. ^{1}H-NMR of compound **4c**.

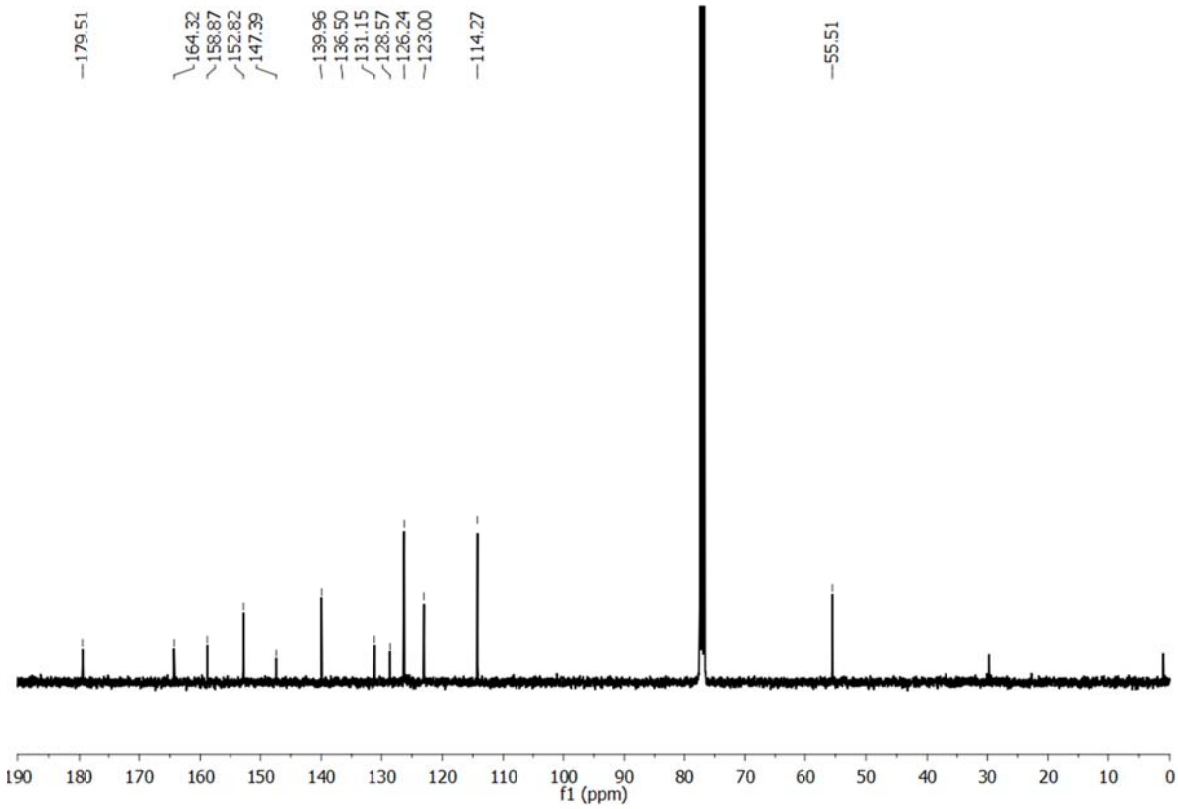

Figure S77. ^{13}C-NMR of compound **4c**.

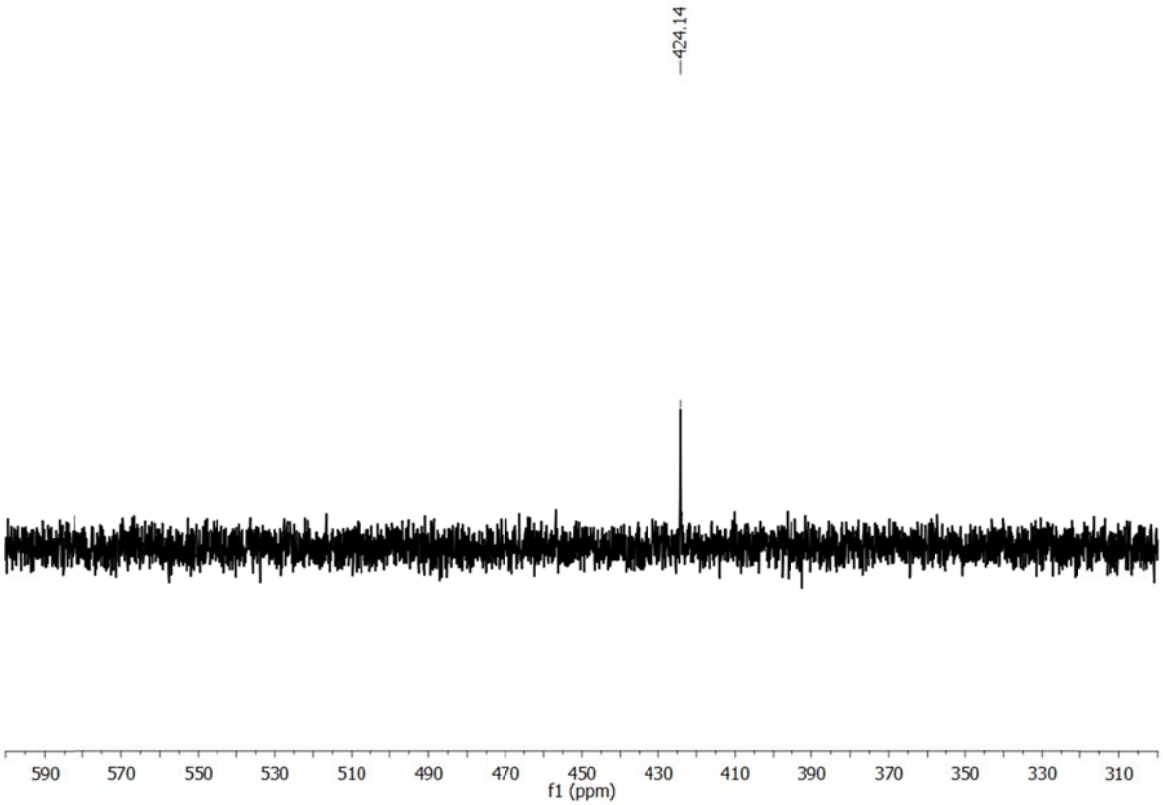

Figure S78. ^{77}Se-NMR of compound **4c**.

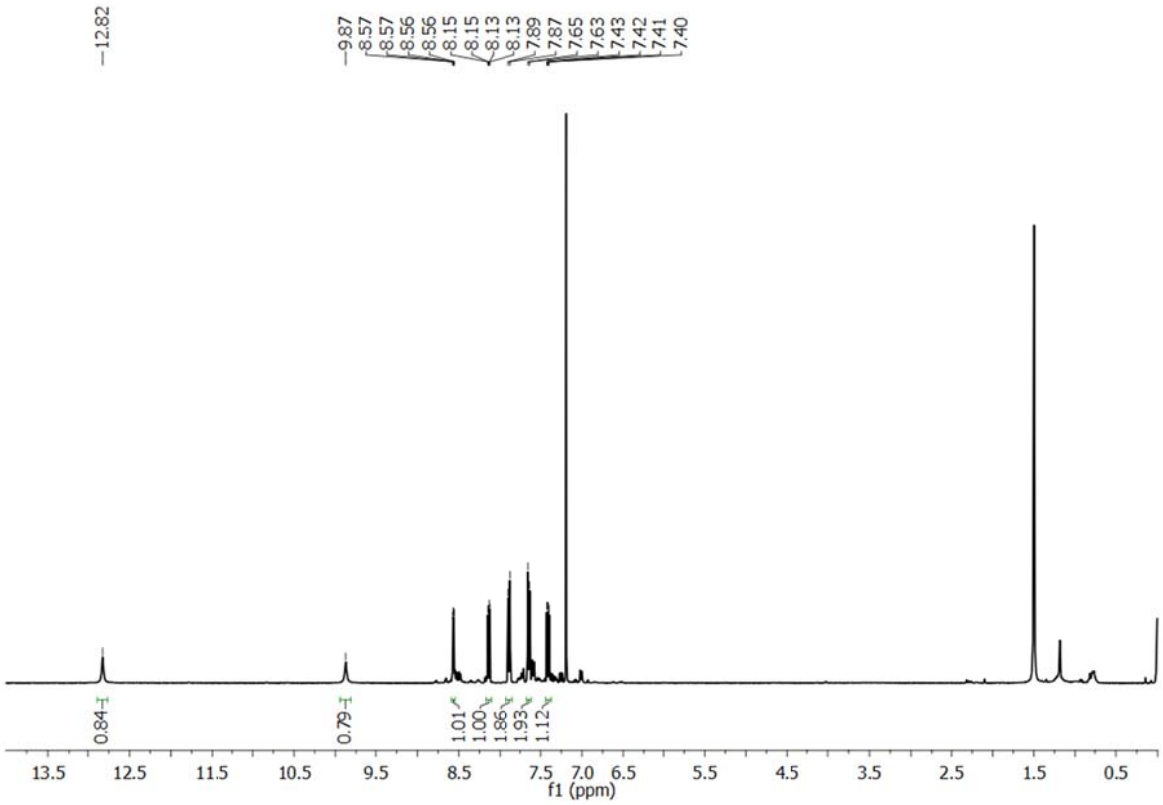

Figure S79. ^{1}H-NMR of compound **4d**.

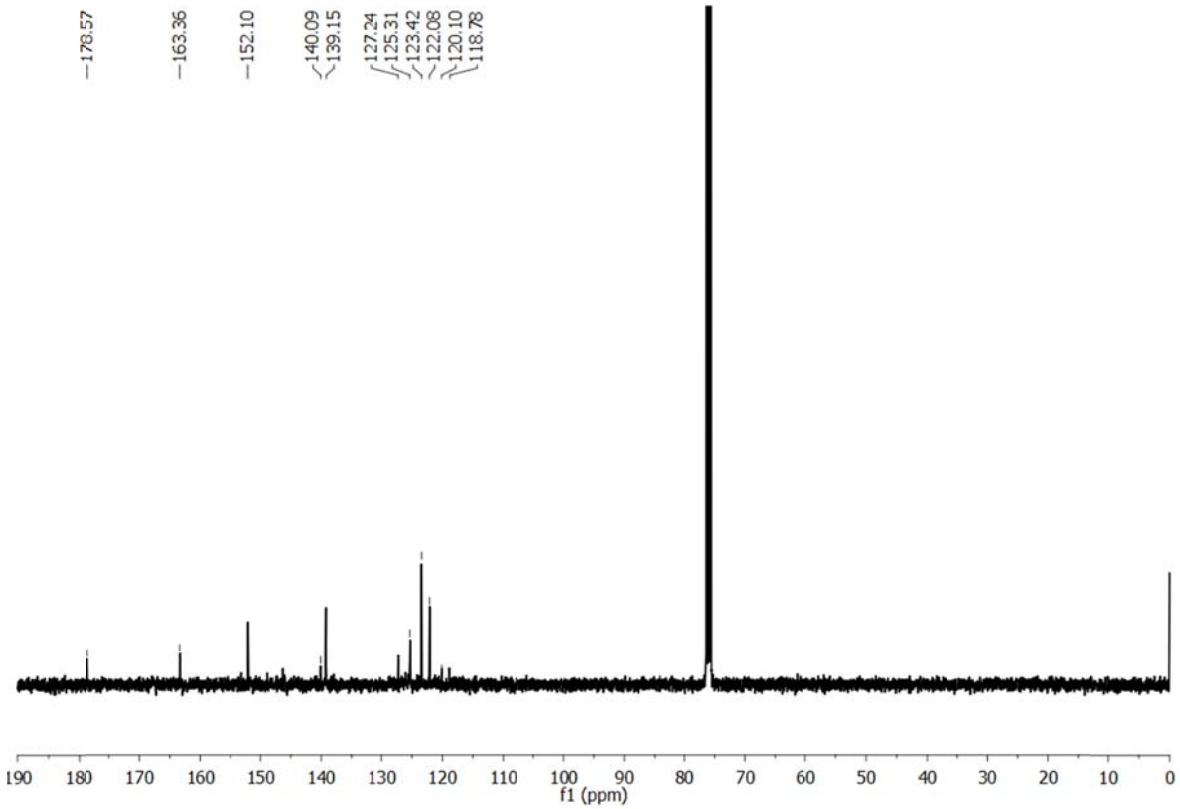

Figure S80. ^{13}C-NMR of compound **4d**.

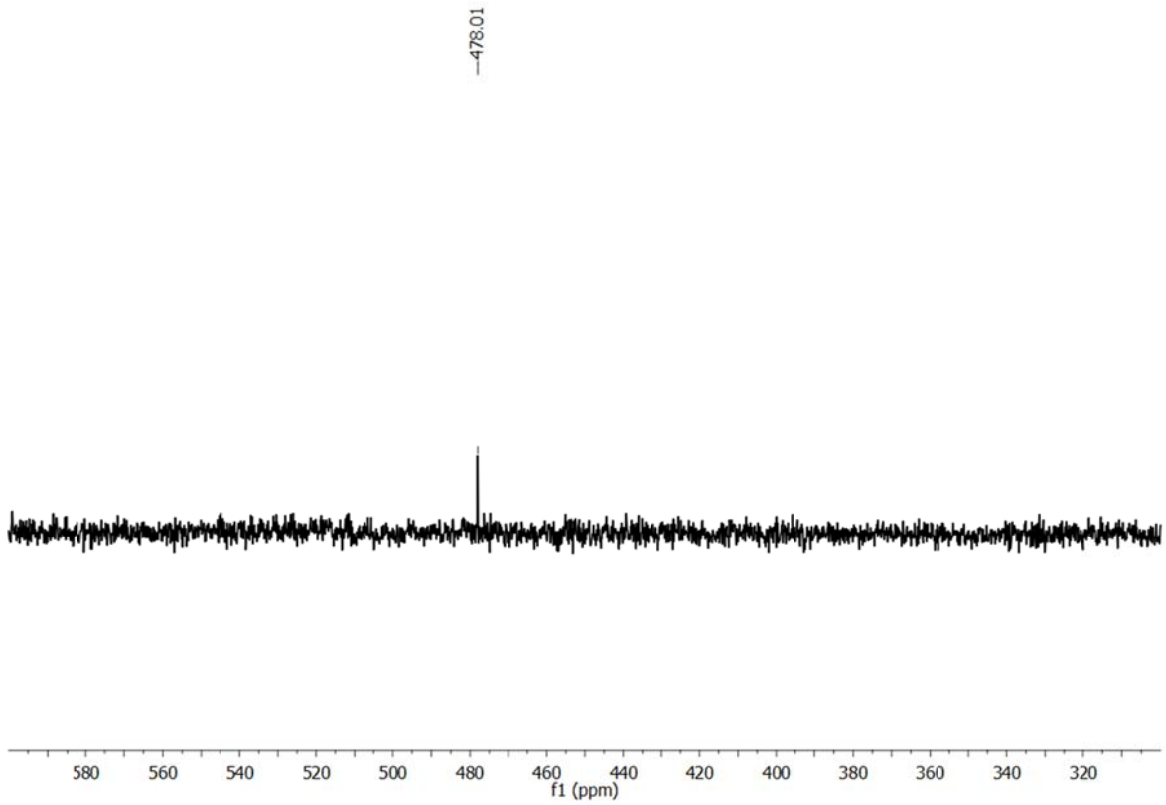

Figure S81. ^{77}Se-NMR of compound **4d**.

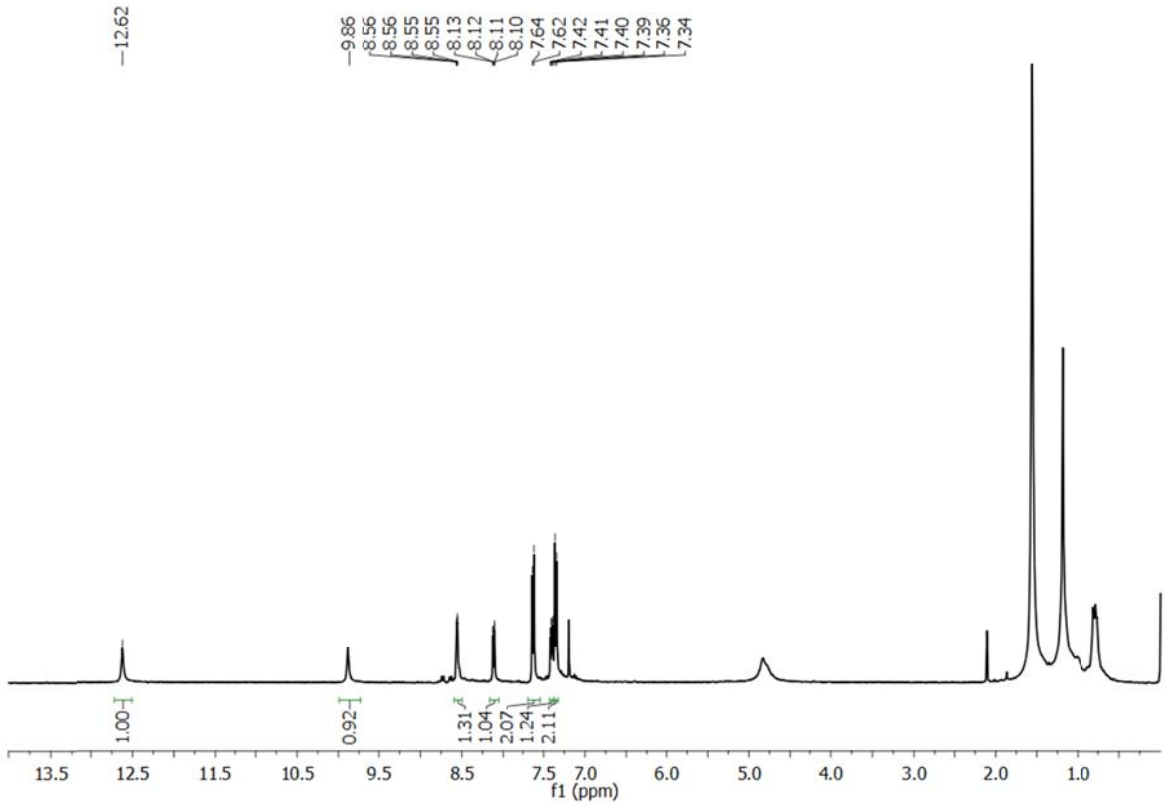

Figure S82. ^{1}H-NMR of compound **4e**.

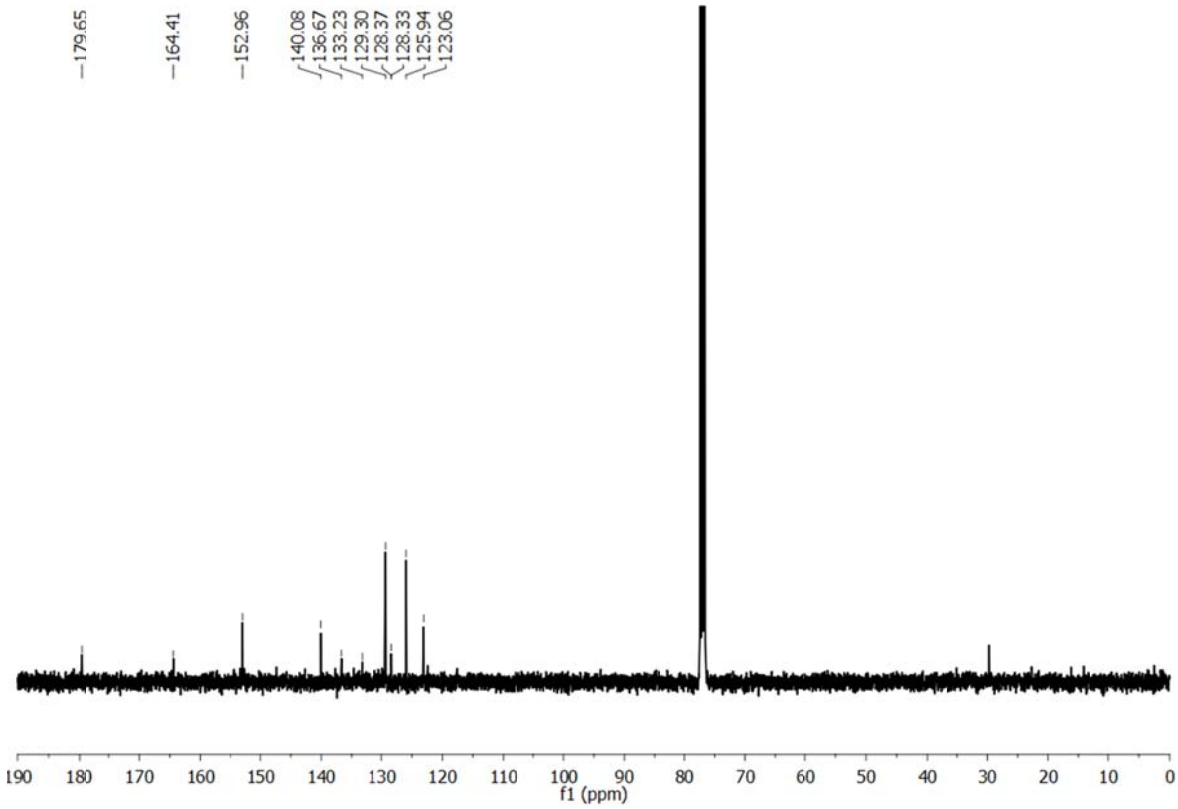

Figure S83. ^{13}C-NMR of compound **4e**.

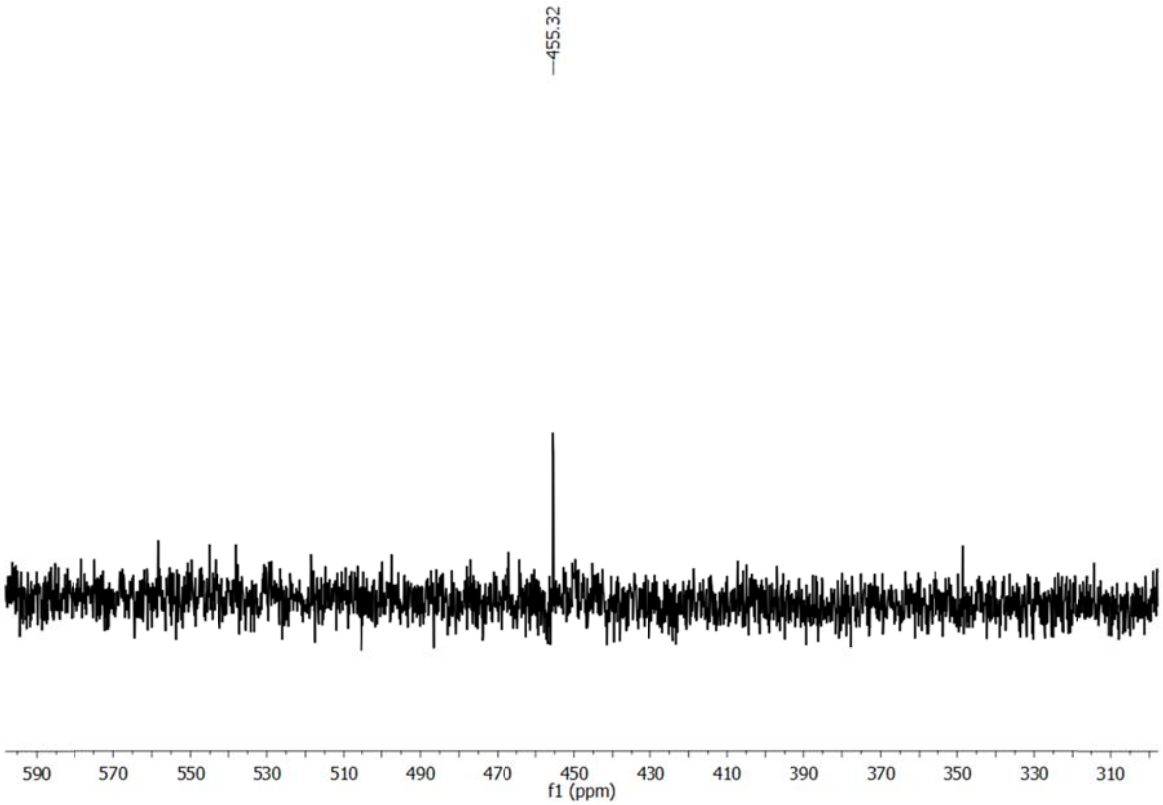

Figure S84. ^{77}Se-NMR of compound **4e**.

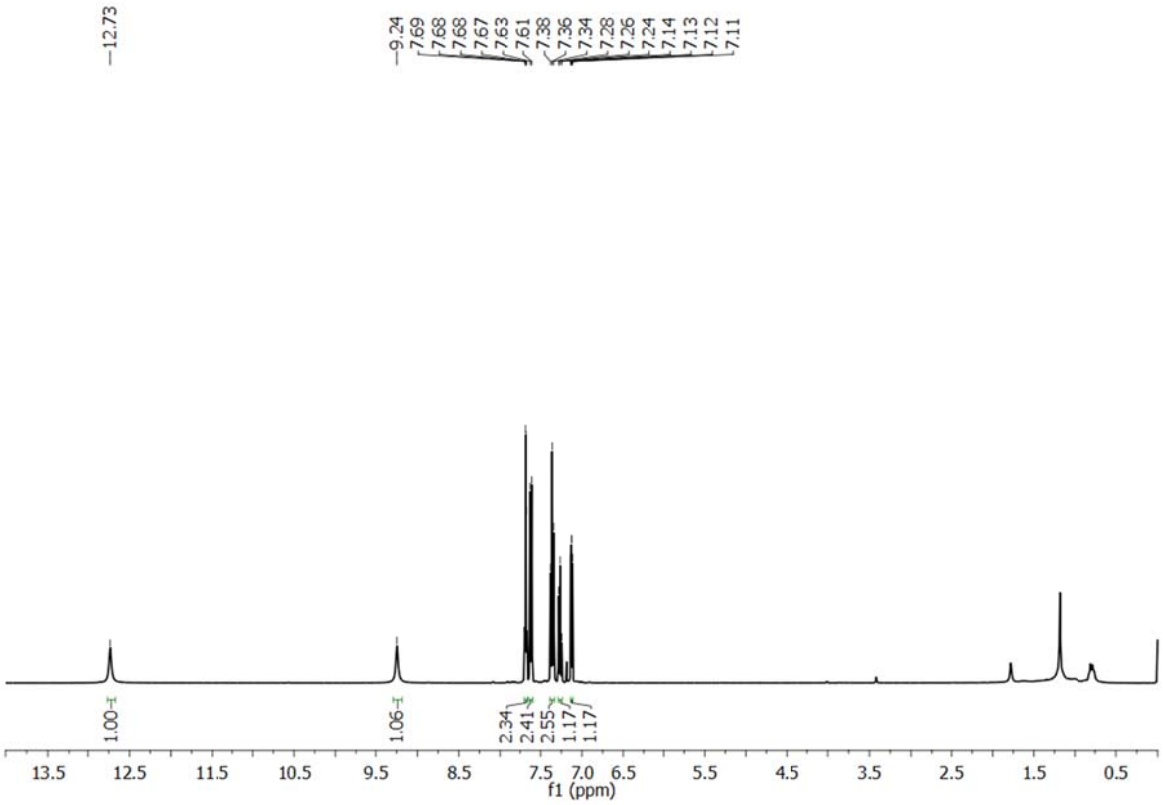

Figure S85. ^{1}H-NMR of compound **5a**.

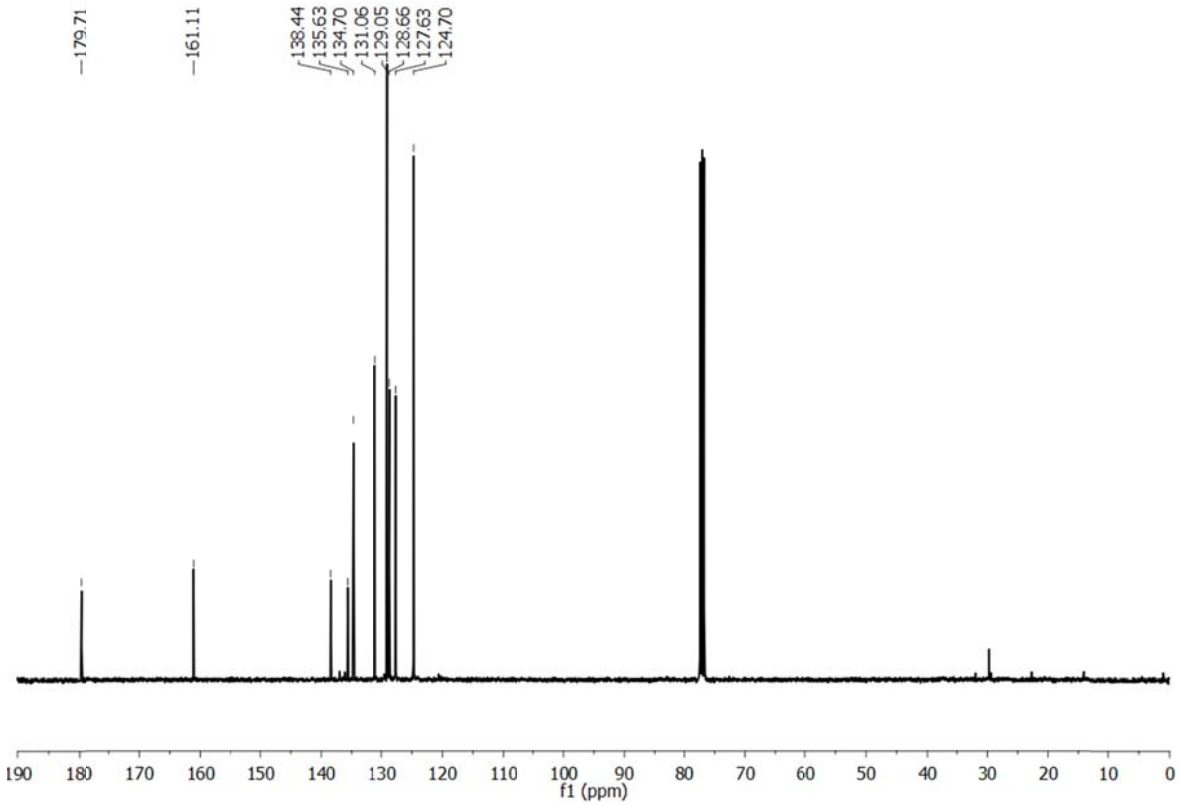

Figure S86. ^{13}C-NMR of compound **5a**.

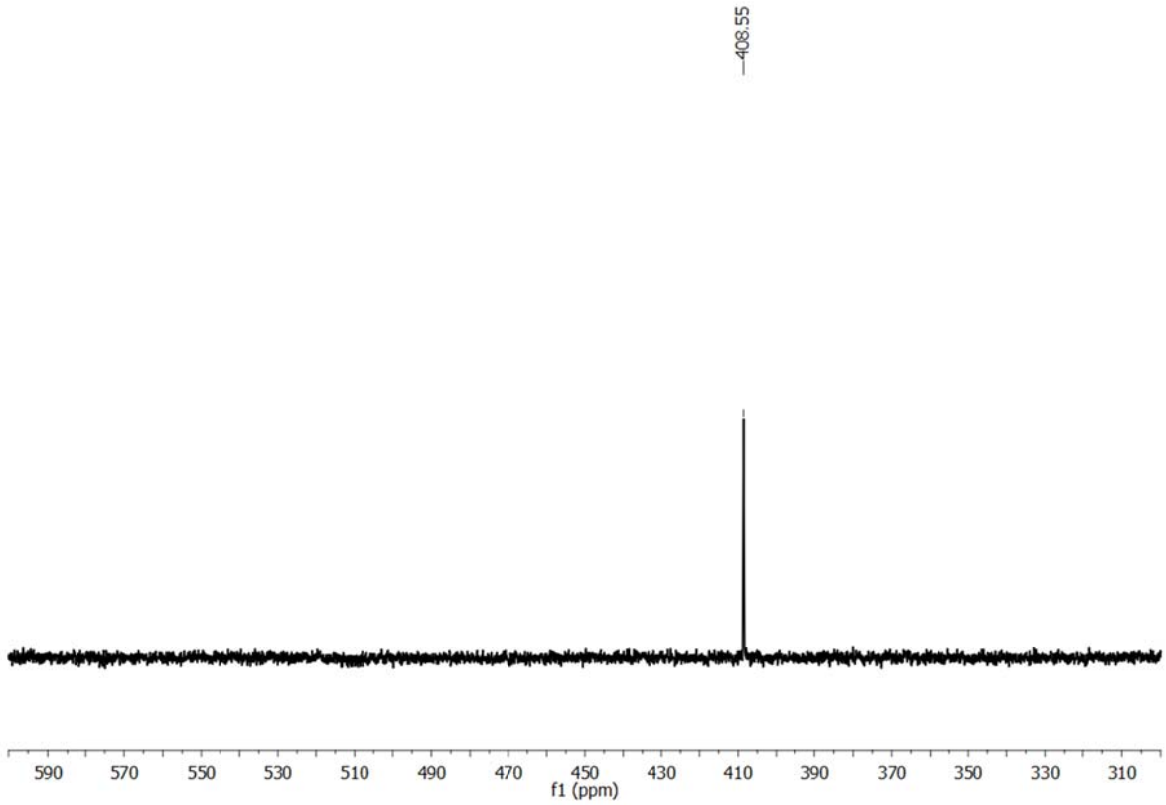

Figure S87. ^{77}Se-NMR of compound **5a**.

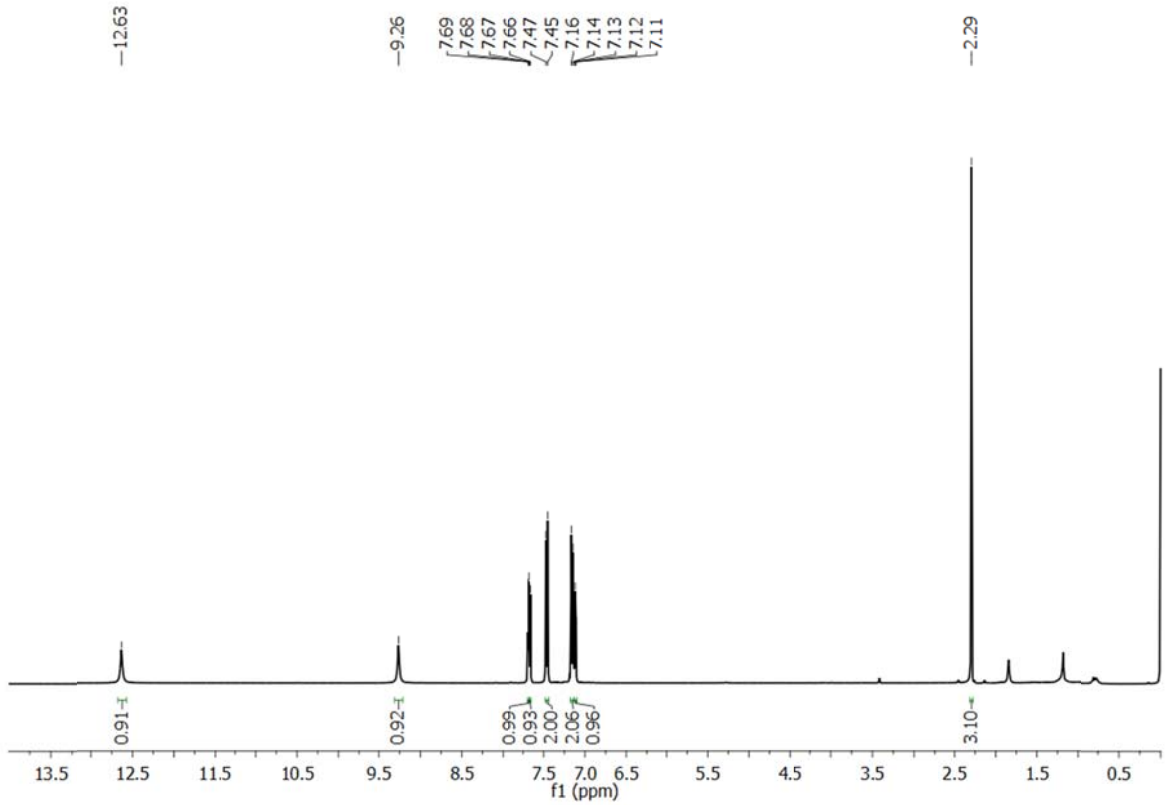

Figure S88. ^{1}H-NMR of compound **5b**.

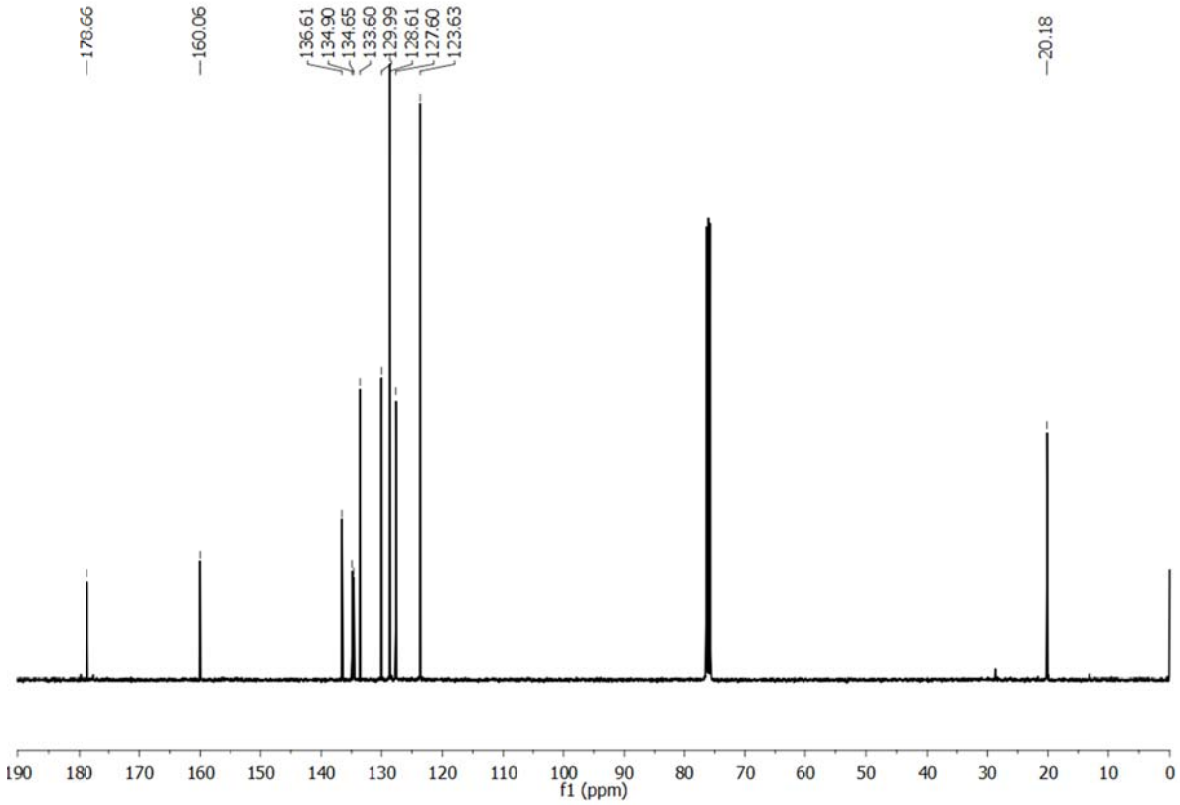

Figure S89. ^{13}C-NMR of compound **5b**.

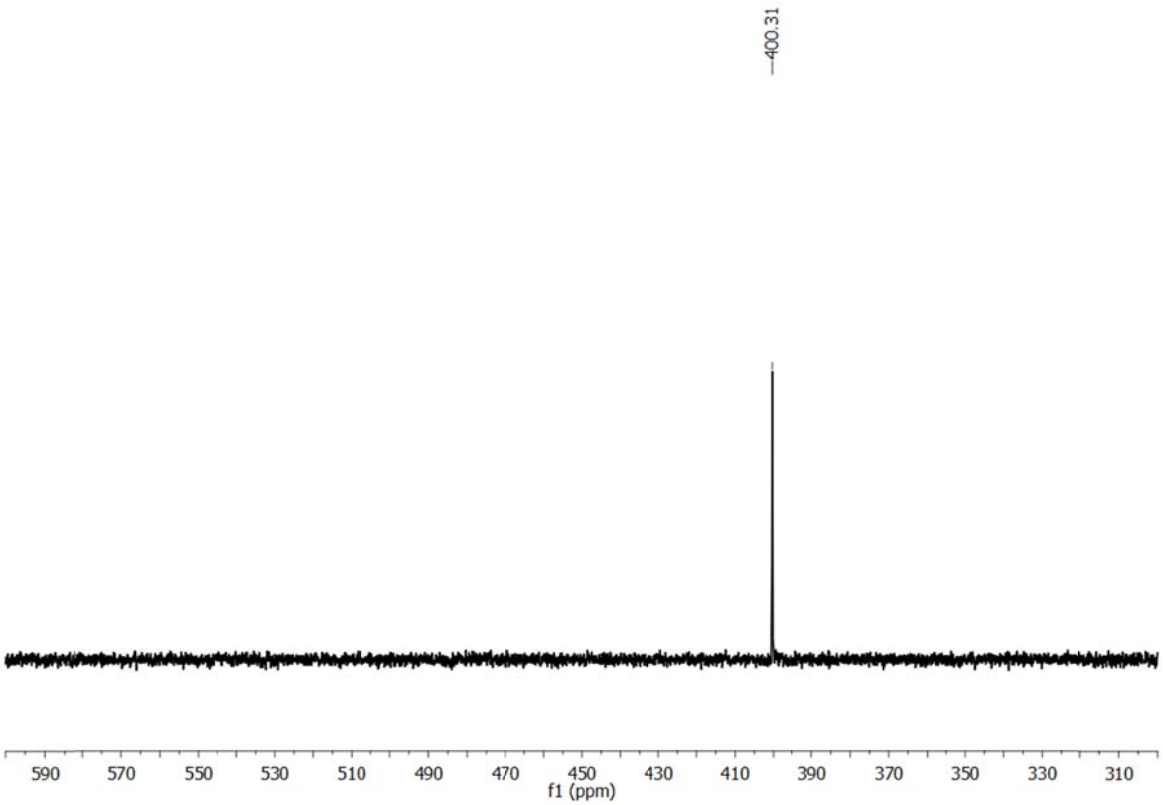

Figure S90. ^{77}Se-NMR of compound **5b**.

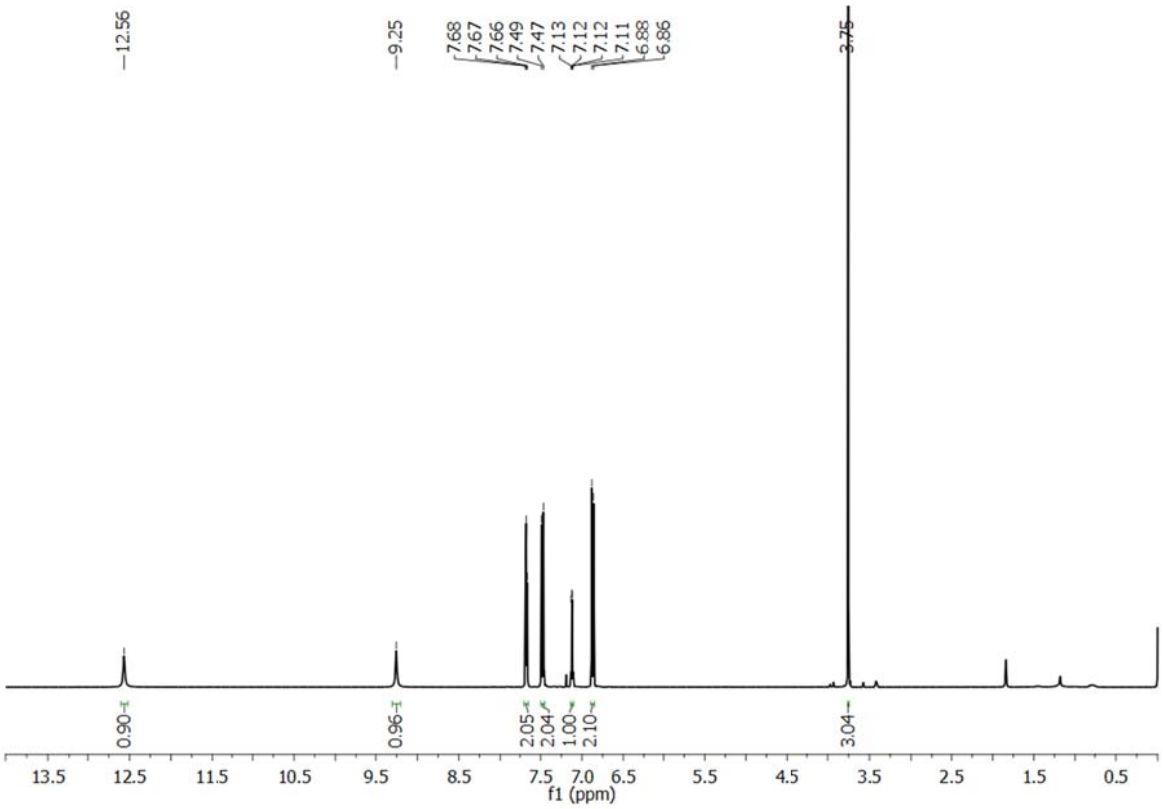

Figure S91. ^{1}H-NMR of compound **5c**.

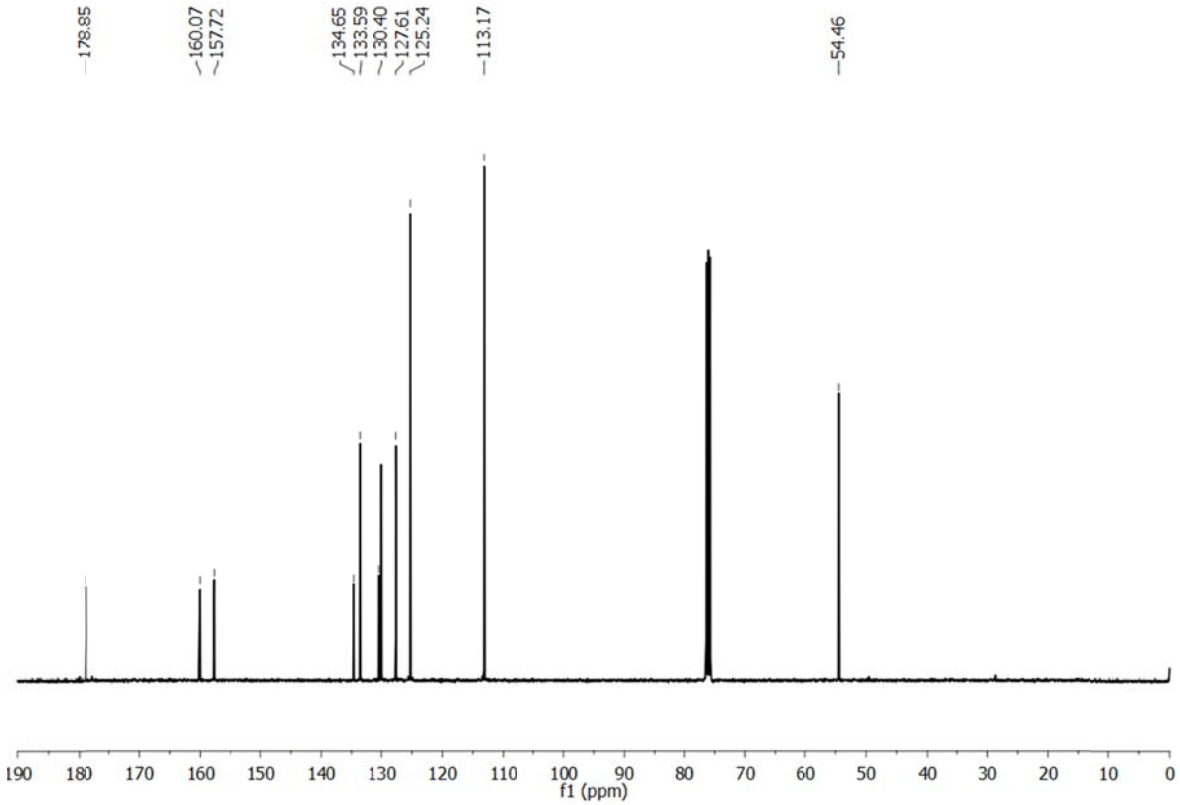

Figure S92. ^{13}C-NMR of compound **5c**.

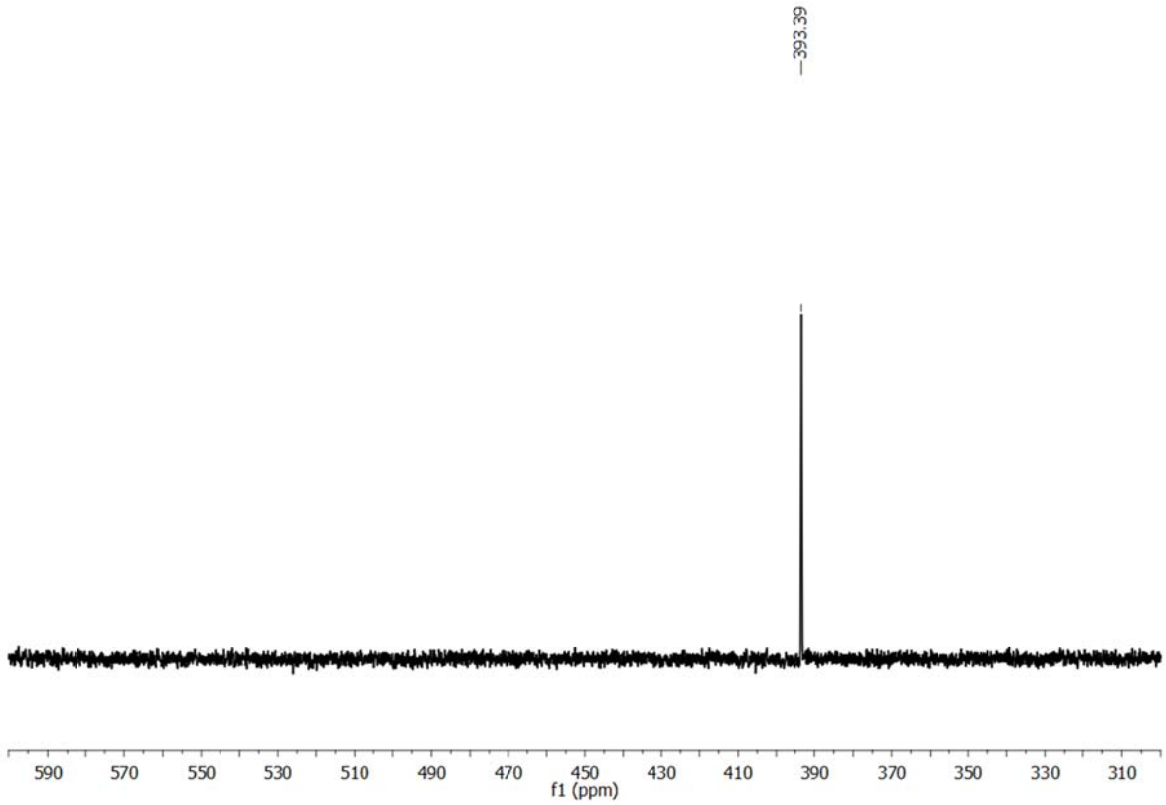

Figure S93. ^{77}Se-NMR of compound **5c**.

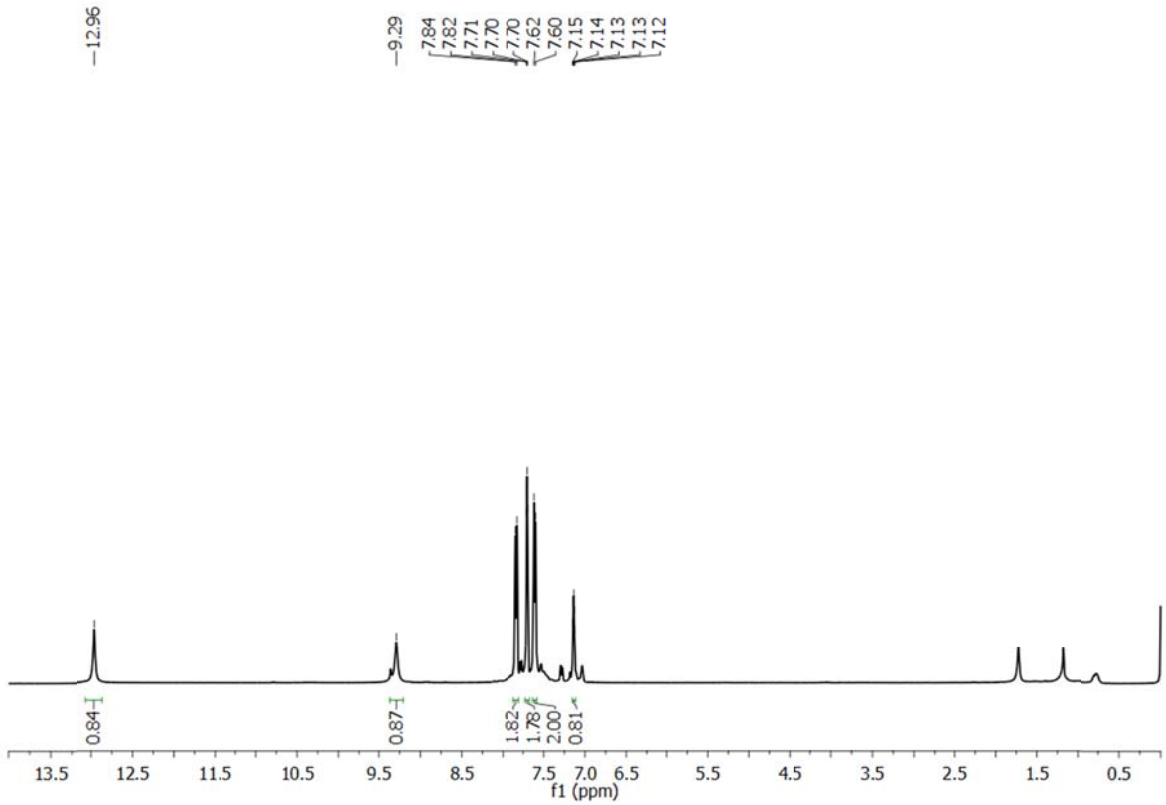

Figure S94. ^{1}H-NMR of compound **5d**.

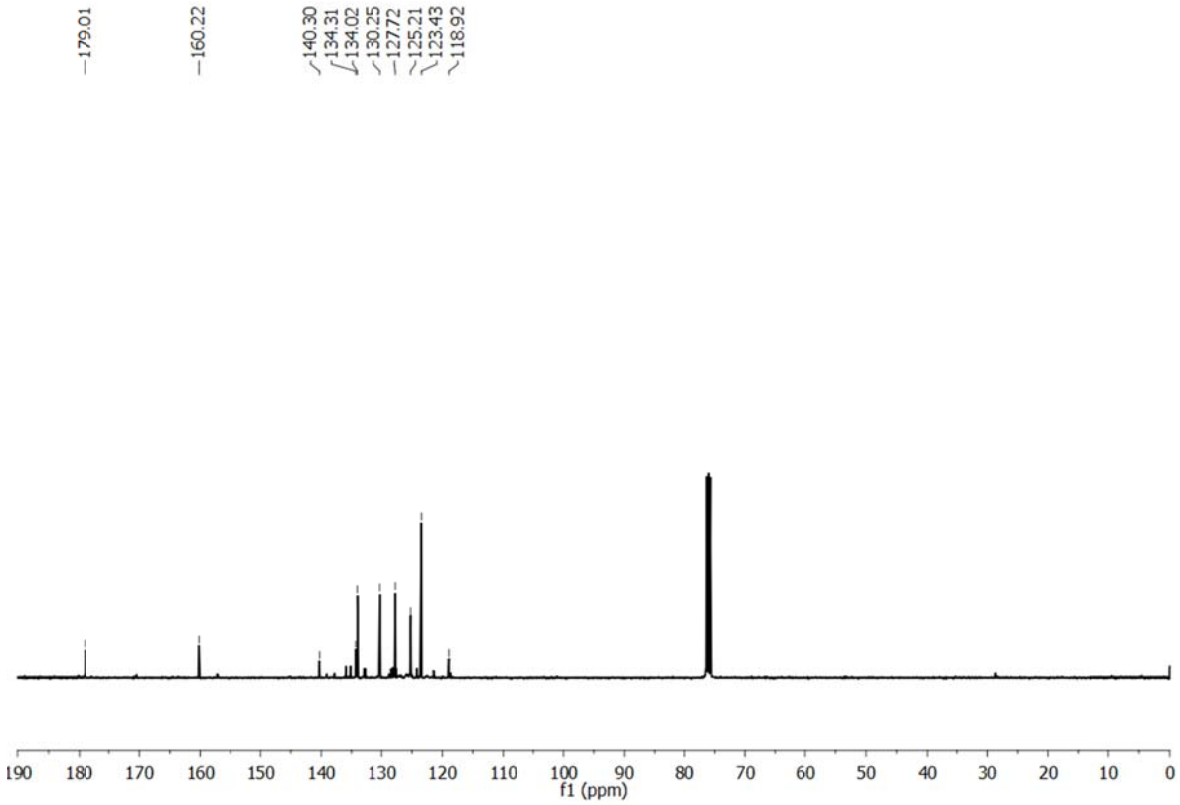

Figure S95. ^{13}C-NMR of compound **5d**.

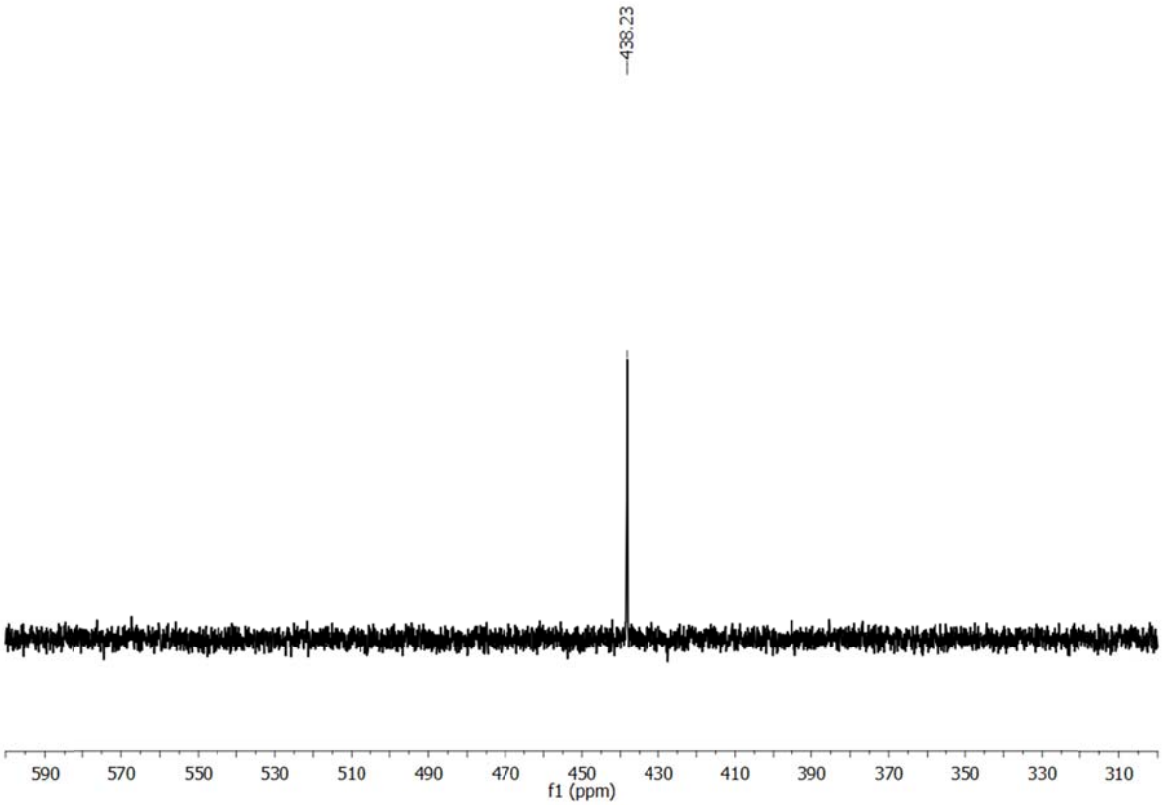

Figure S96. ^{77}Se-NMR of compound **5d**.

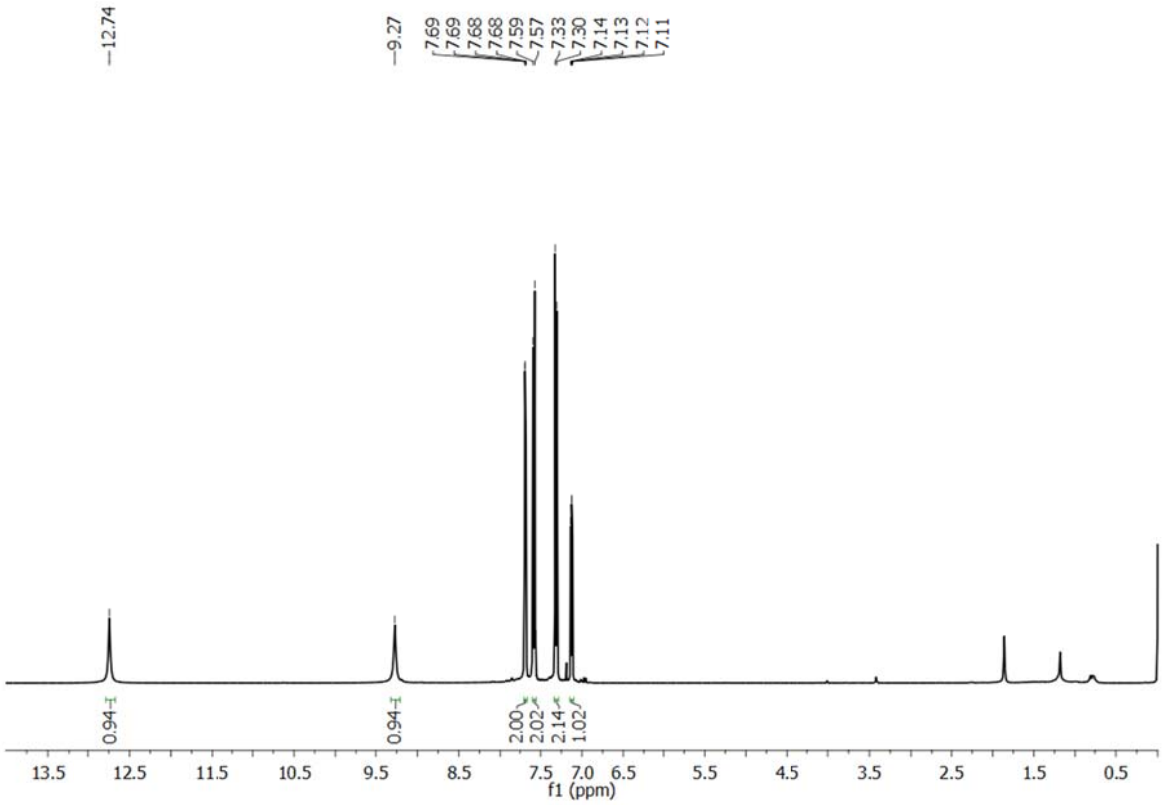

Figure S97. ^{1}H-NMR of compound **5e**.

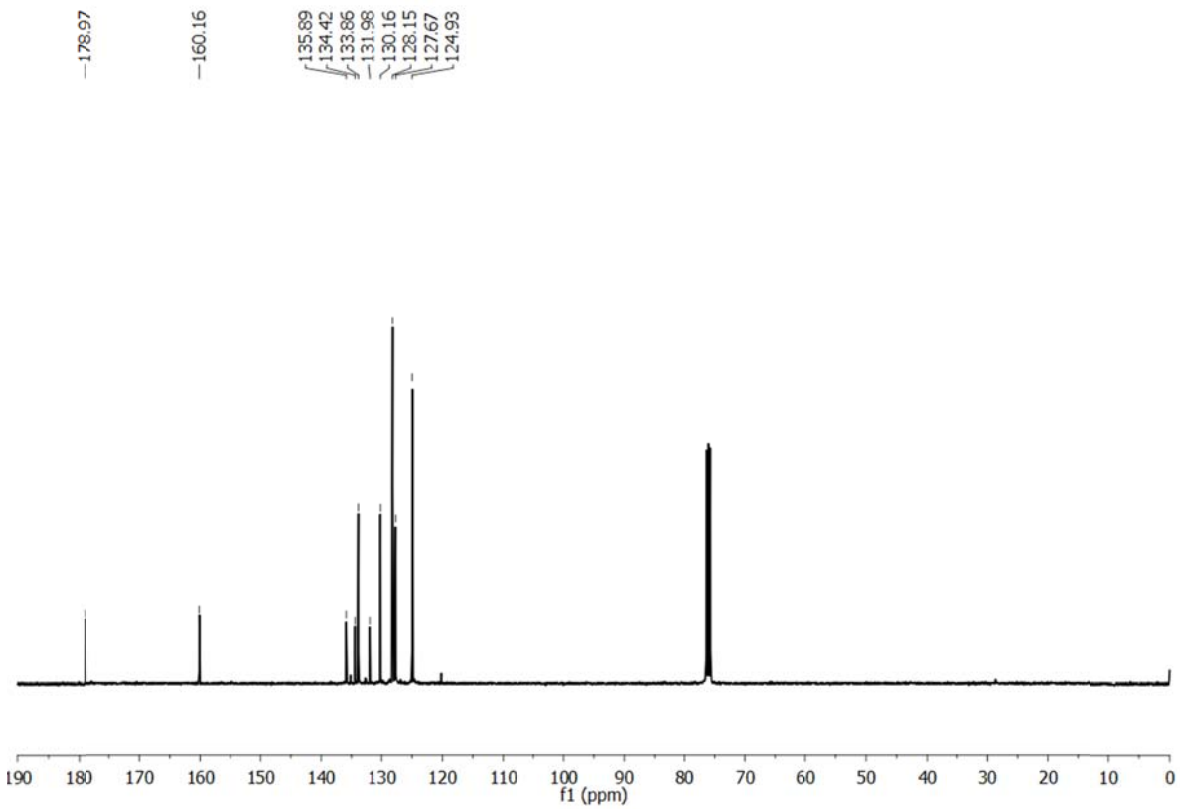

Figure S98. ^{13}C-NMR of compound **5e**.

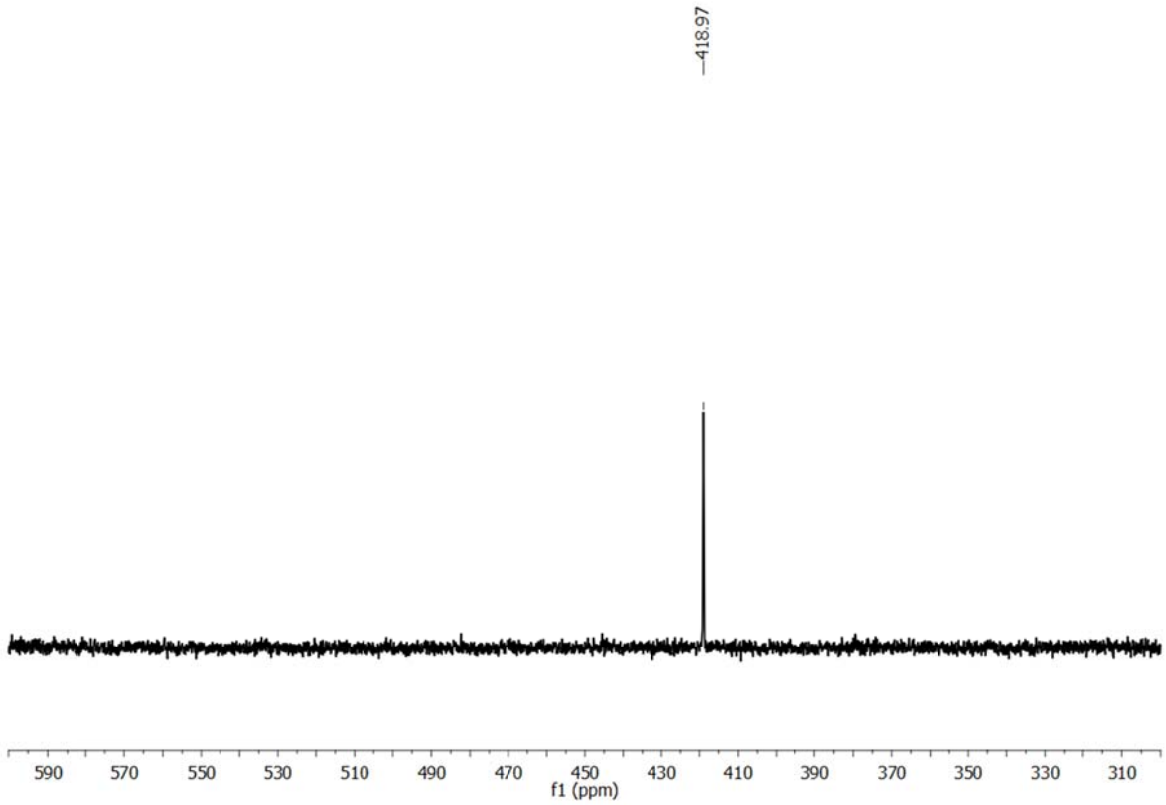

Figure S99. ^{77}Se-NMR of compound **5e**.

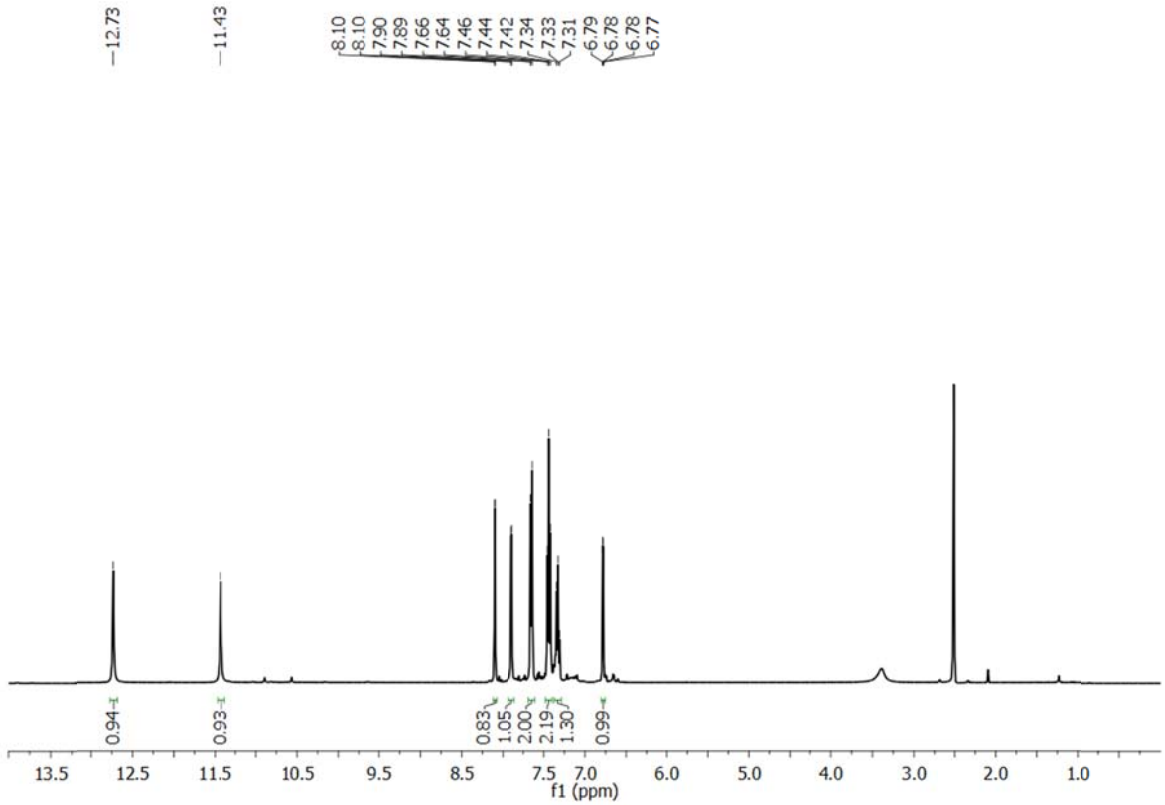

Figure S100. ^{1}H-NMR of compound **6a**.

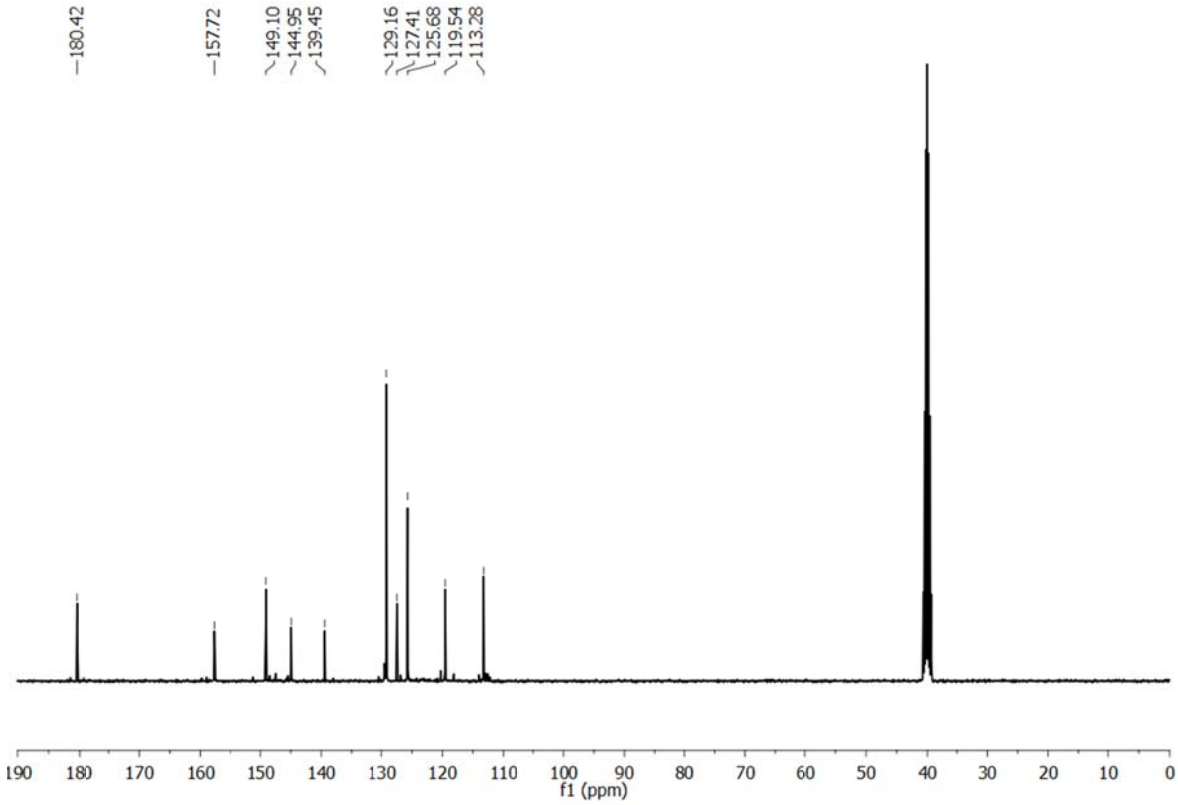

Figure S101. ^{13}C-NMR of compound **6a**.

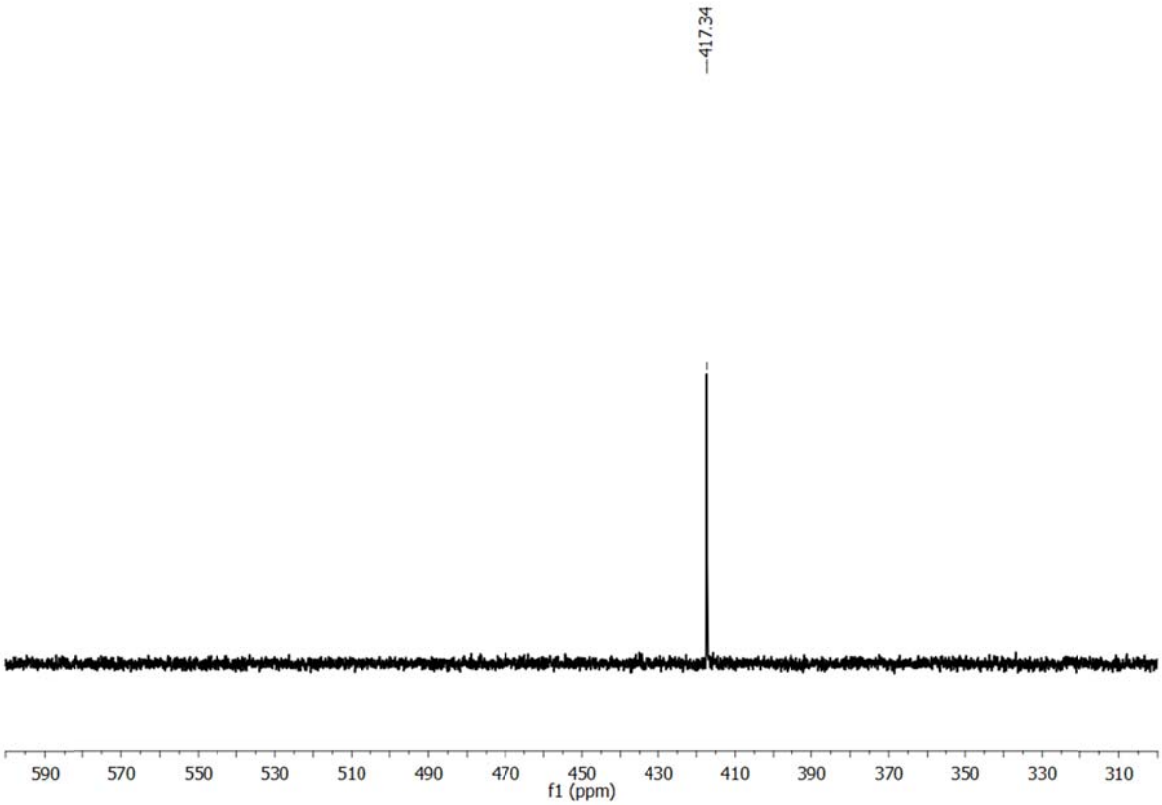

Figure S102. ^{77}Se-NMR of compound **6a**.

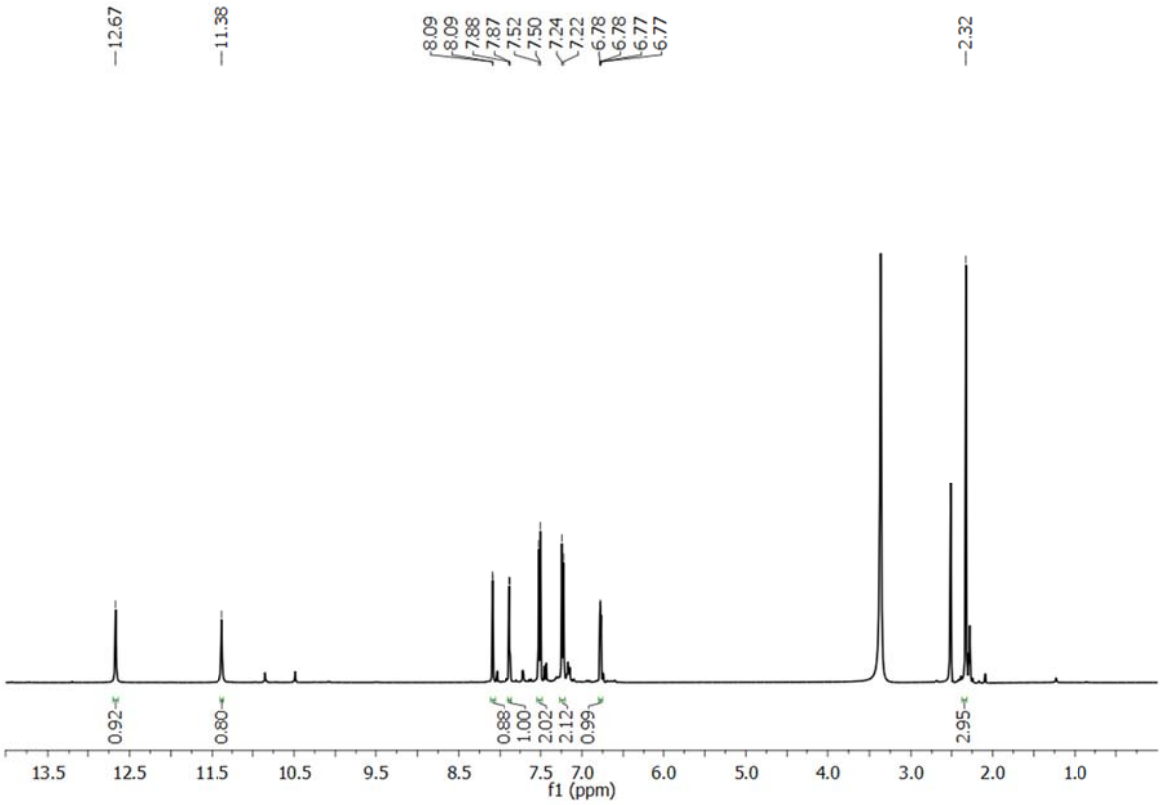

Figure S103. ^{1}H-NMR of compound **6b**.

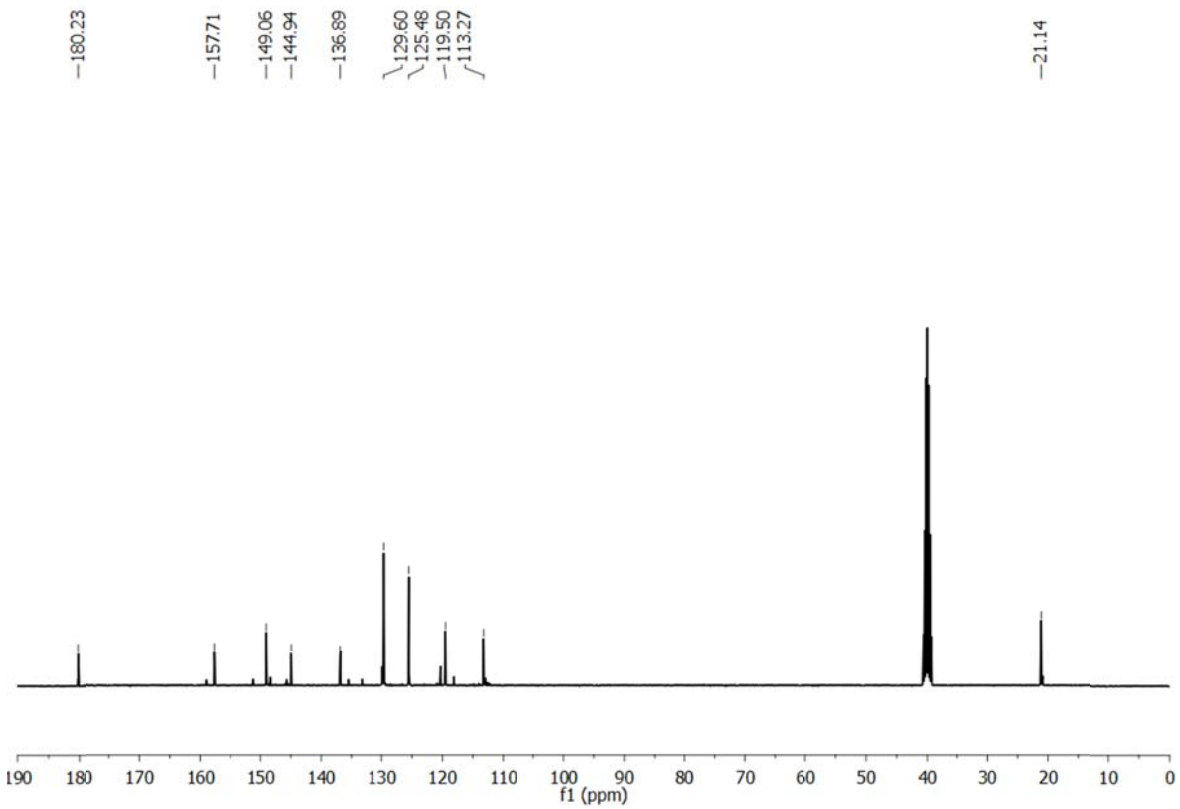

Figure S104. ^{13}C-NMR of compound **6b**.

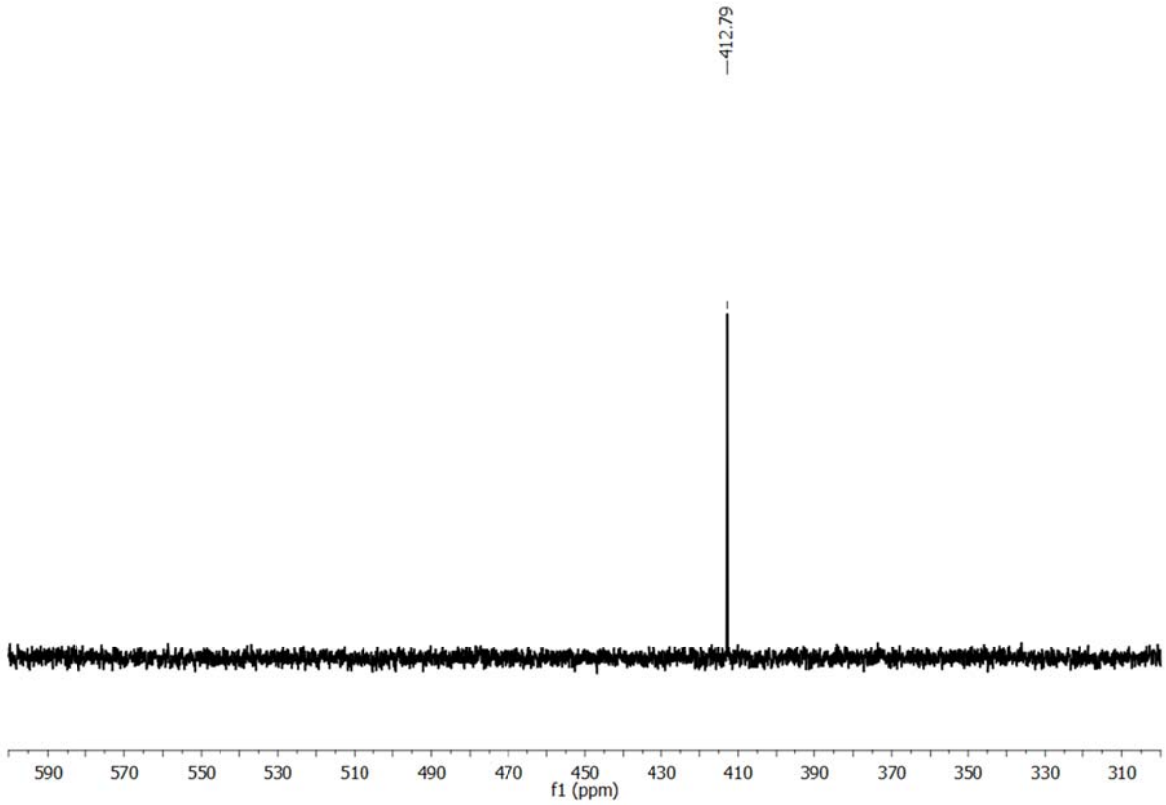

Figure S105. ^{77}Se-NMR of compound **6b**.

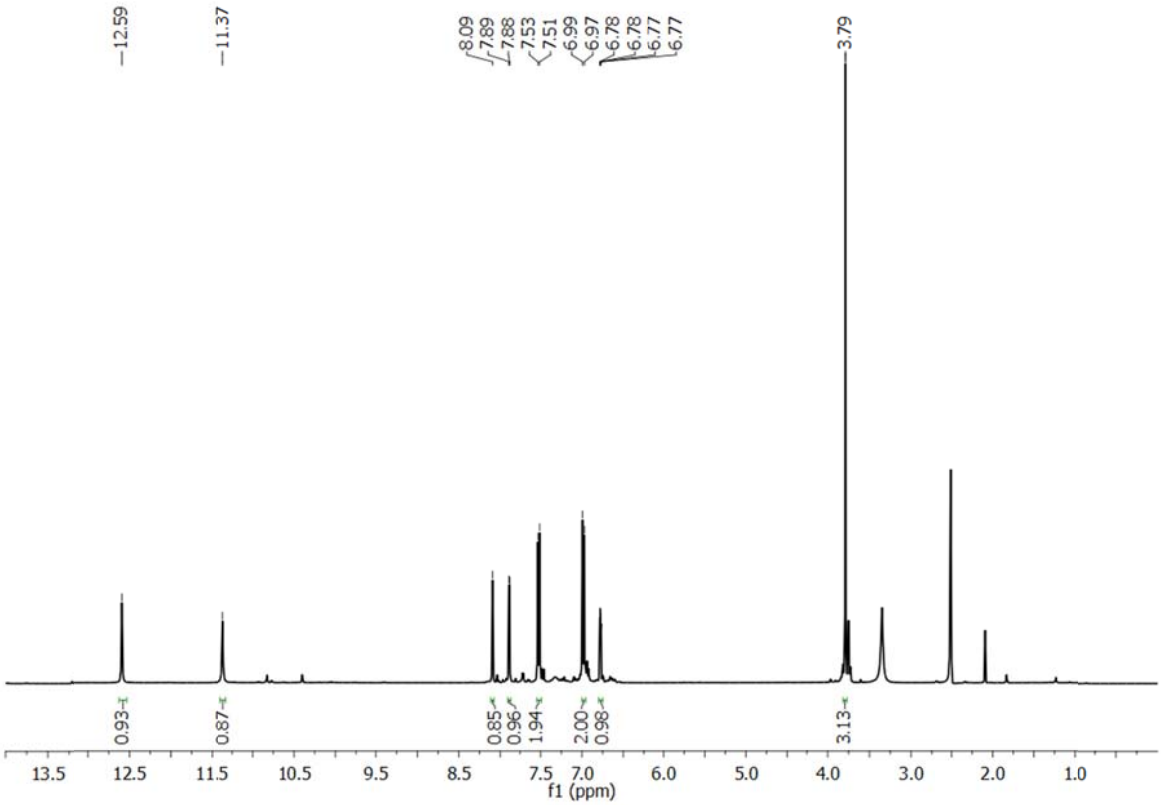

Figure S106. ^{1}H-NMR of compound **6c**.

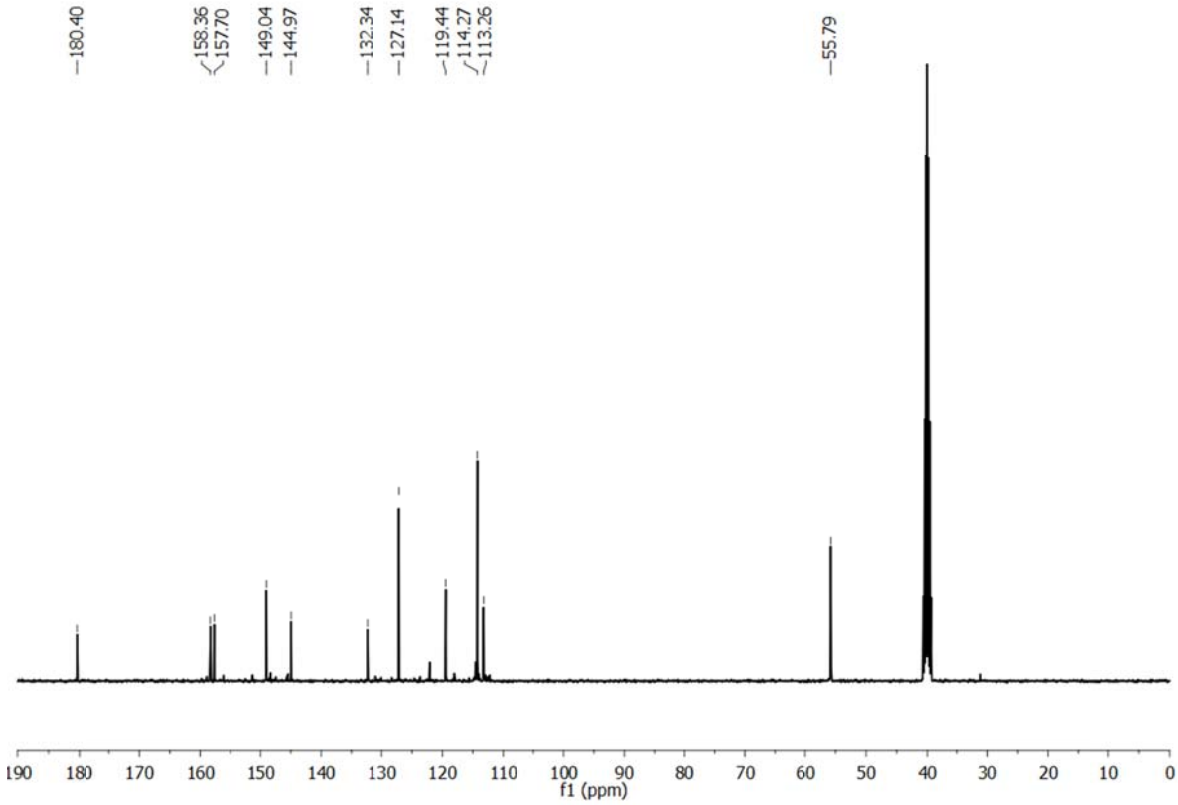

Figure S107. ^{13}C-NMR of compound **6c**.

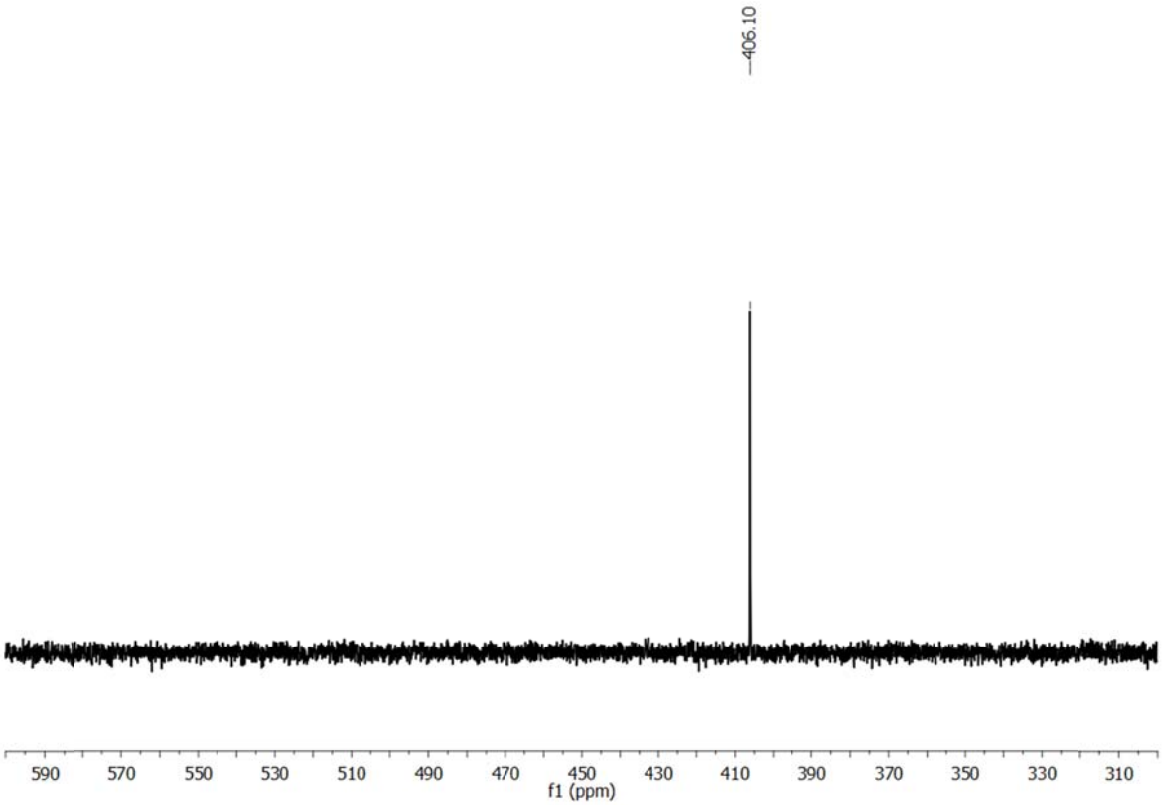

Figure S108. ^{77}Se-NMR of compound **6c**.

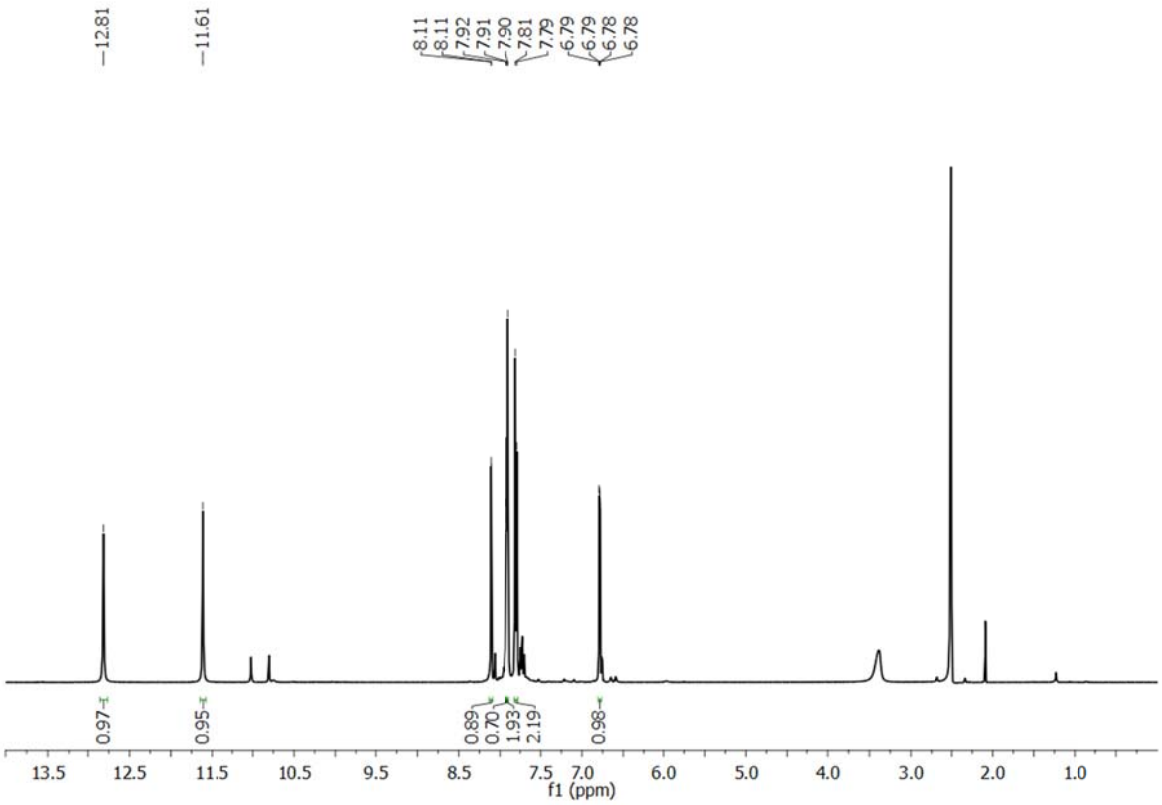

Figure S109. ^{1}H-NMR of compound **6d**.

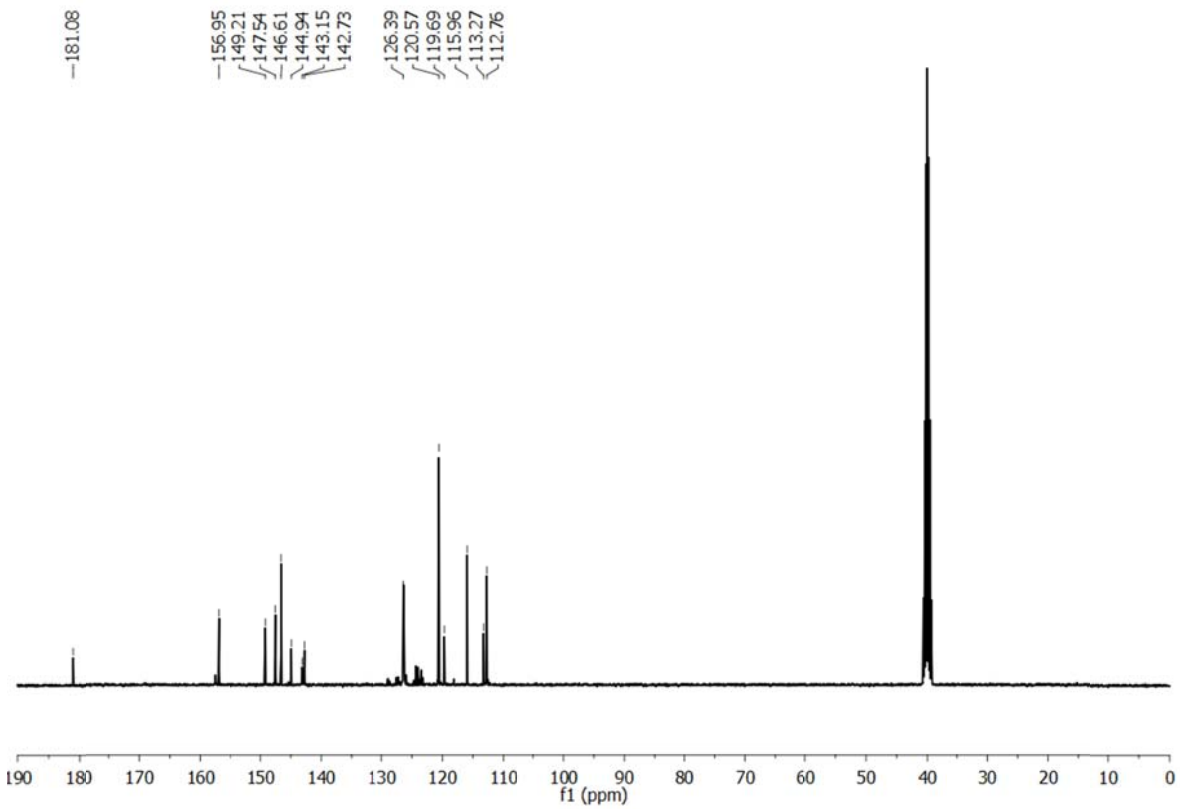

Figure S110. ^{13}C-NMR of compound **6d**.

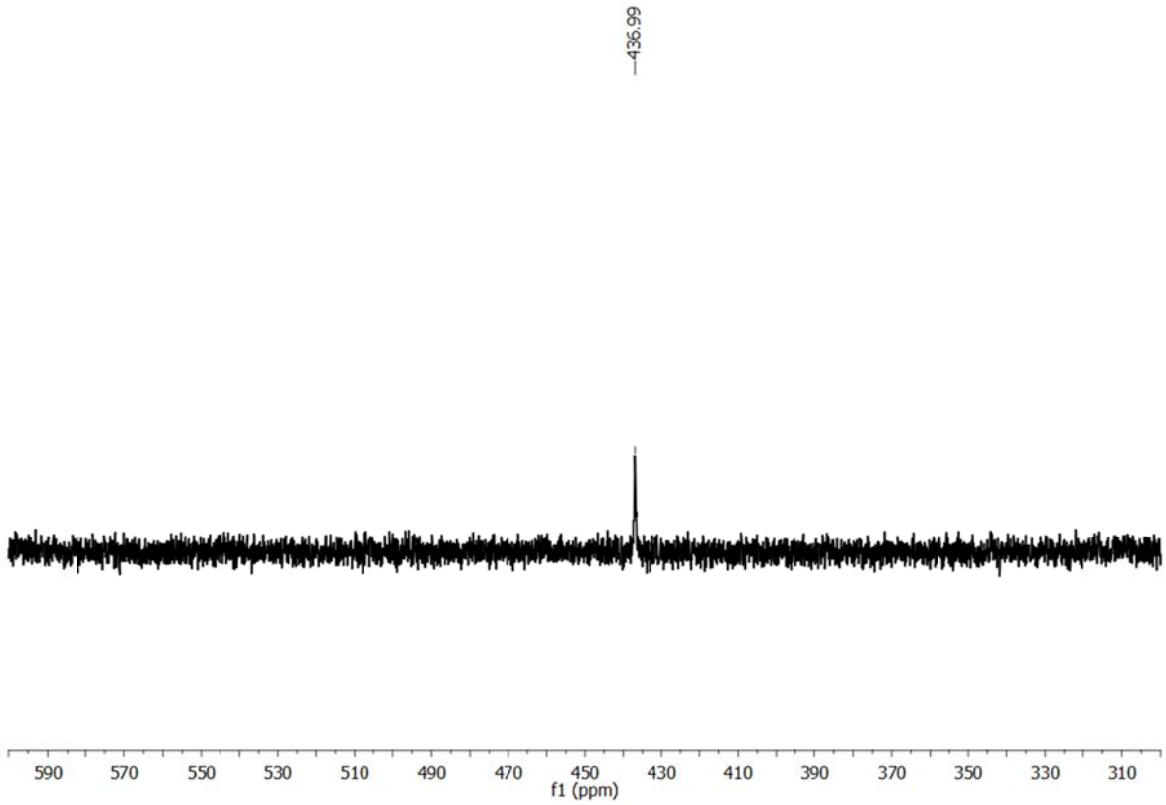

Figure S111. ^{77}Se-NMR of compound **6d**.

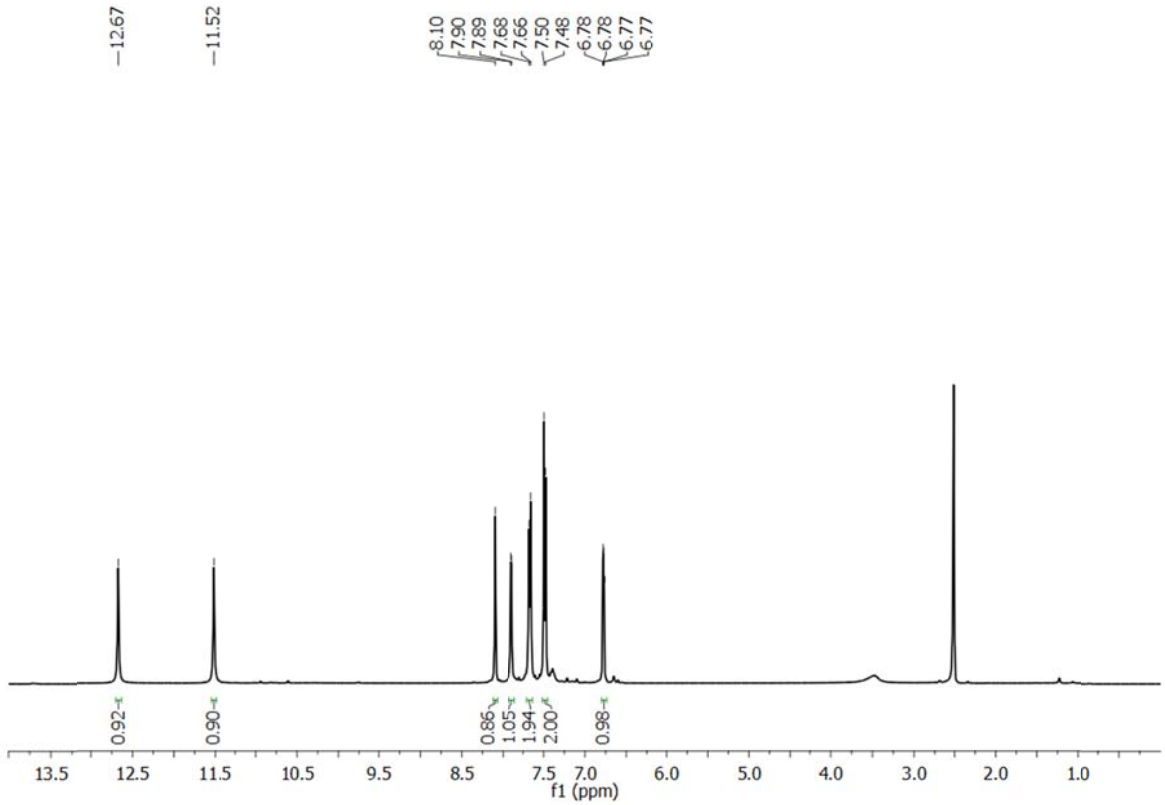

Figure S112. ^{1}H-NMR of compound **6e**.

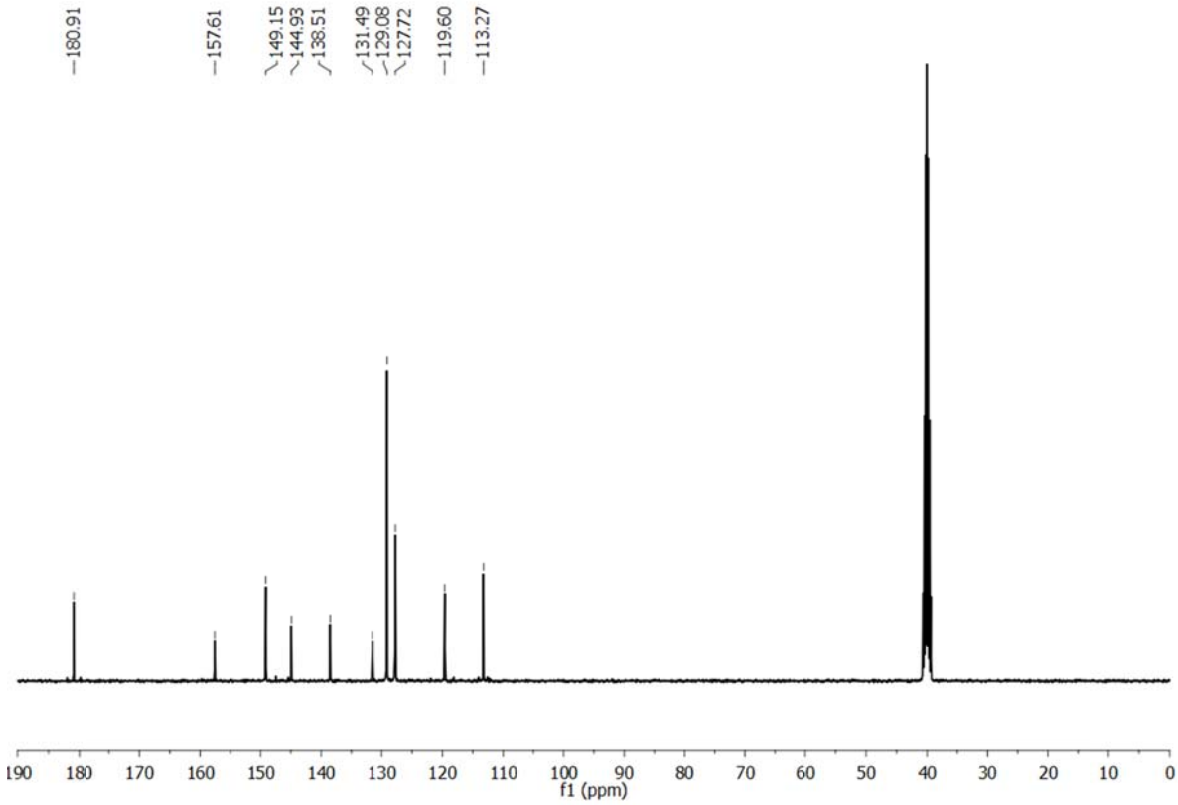

Figure S113. ^{13}C-NMR of compound **6e**.

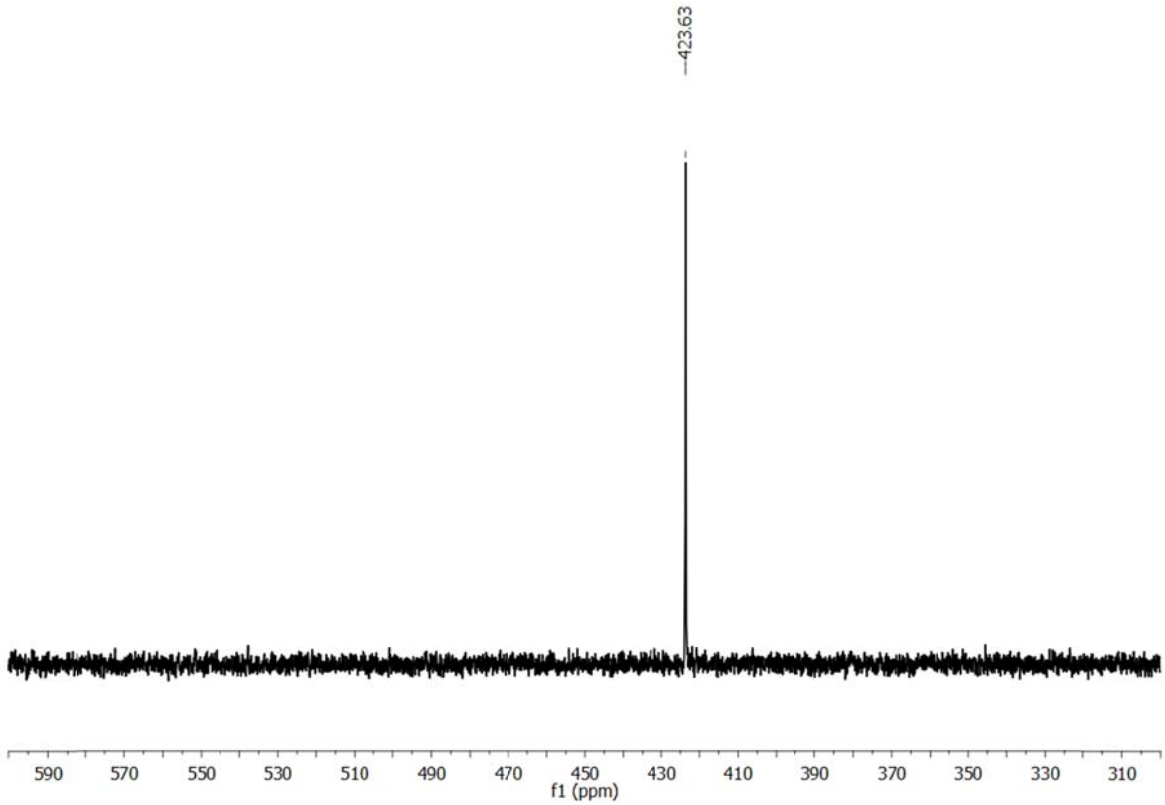

Figure S114. ^{77}Se-NMR of compound **6e**.

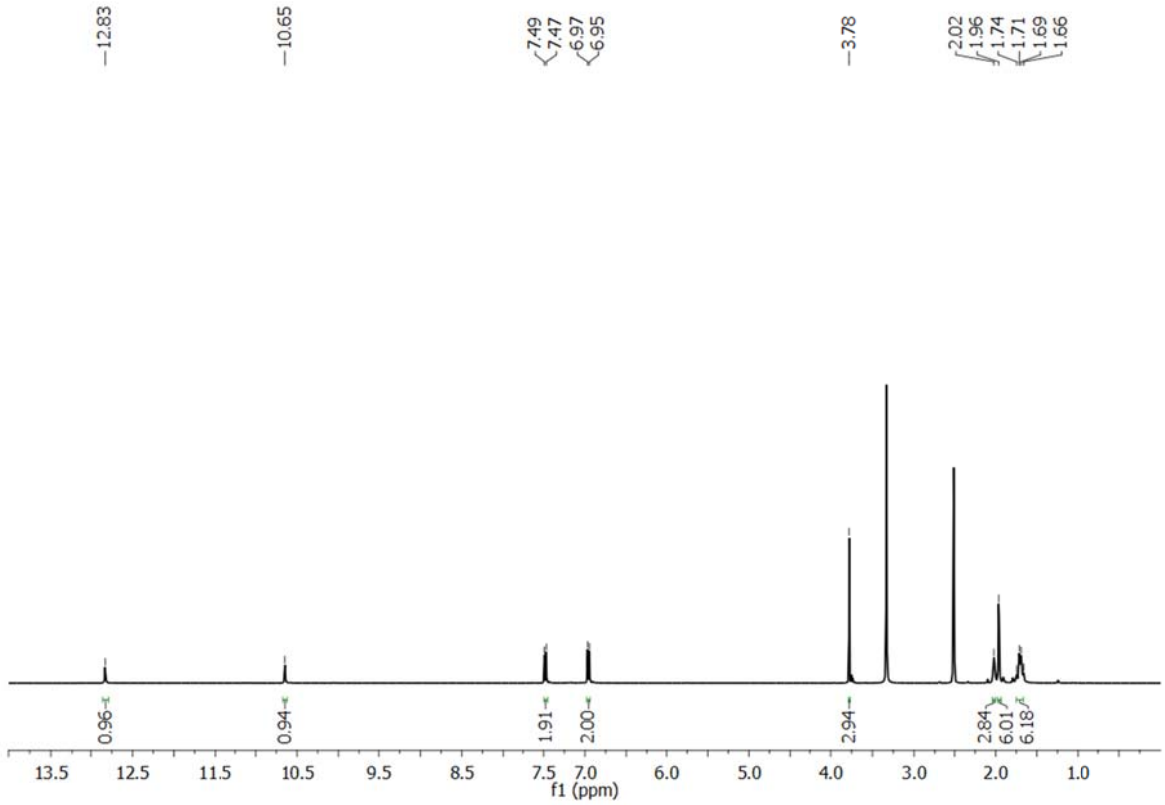

Figure S115. ^{1}H-NMR of compound **7c**.

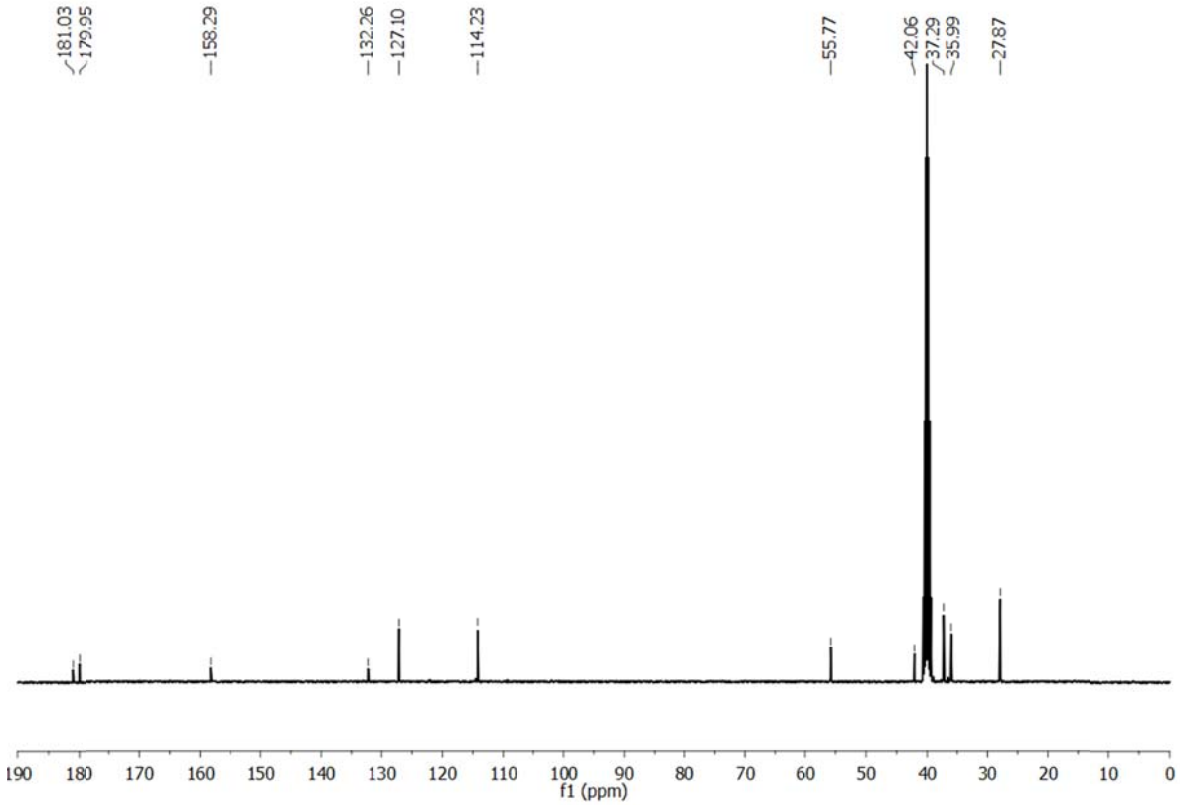

Figure S116. ^{13}C-NMR of compound **7c**.

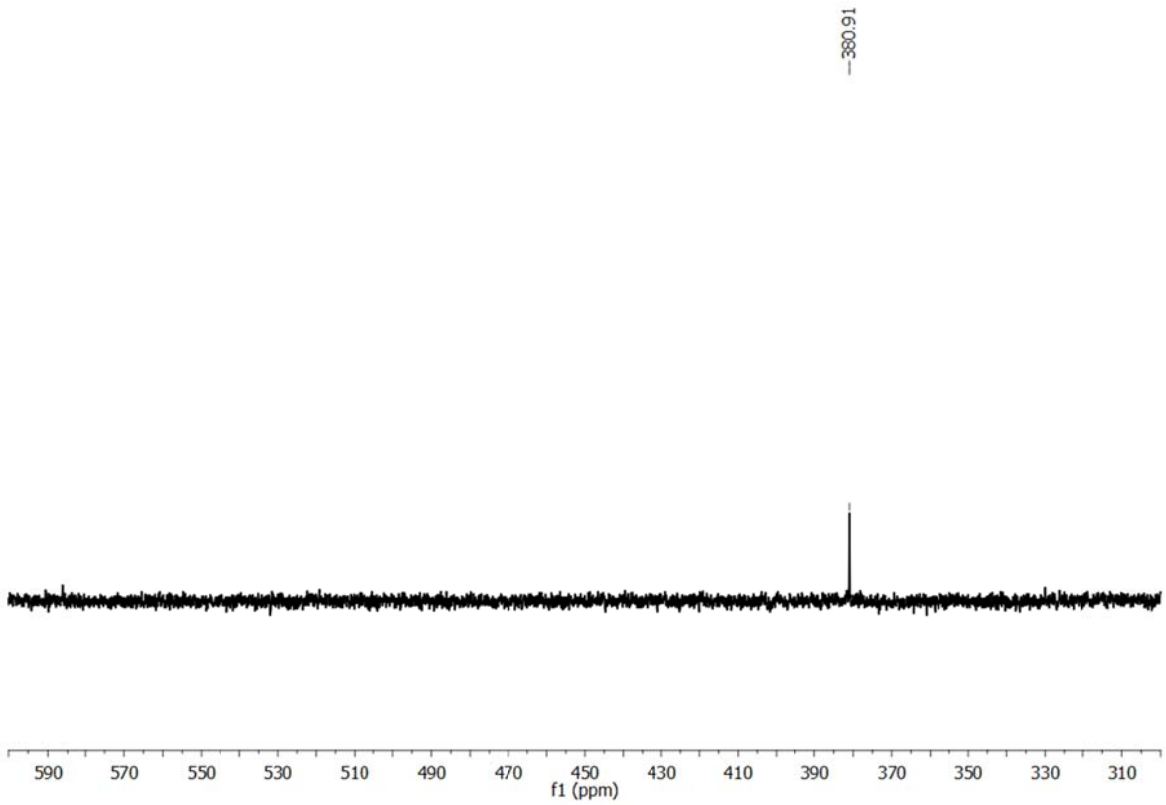

Figure S117. ^{77}Se-NMR of compound **7c**.

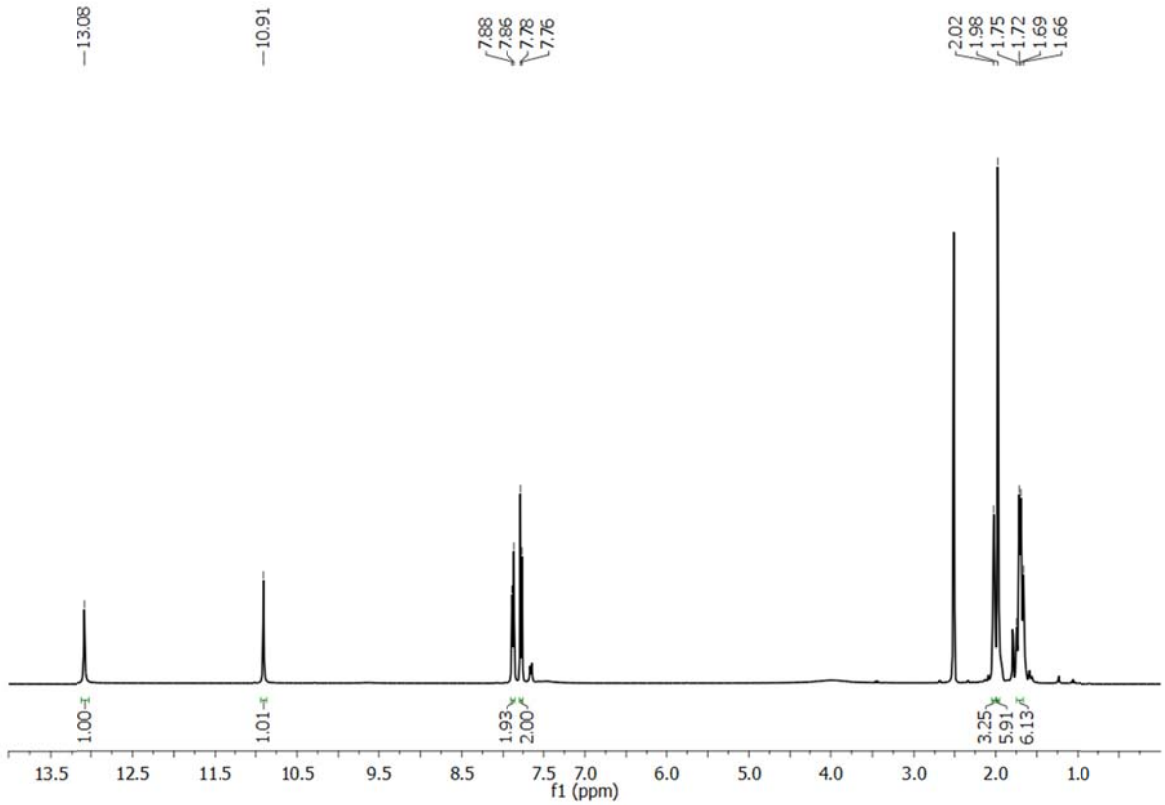

Figure S118. ^{1}H-NMR of compound **7d**.

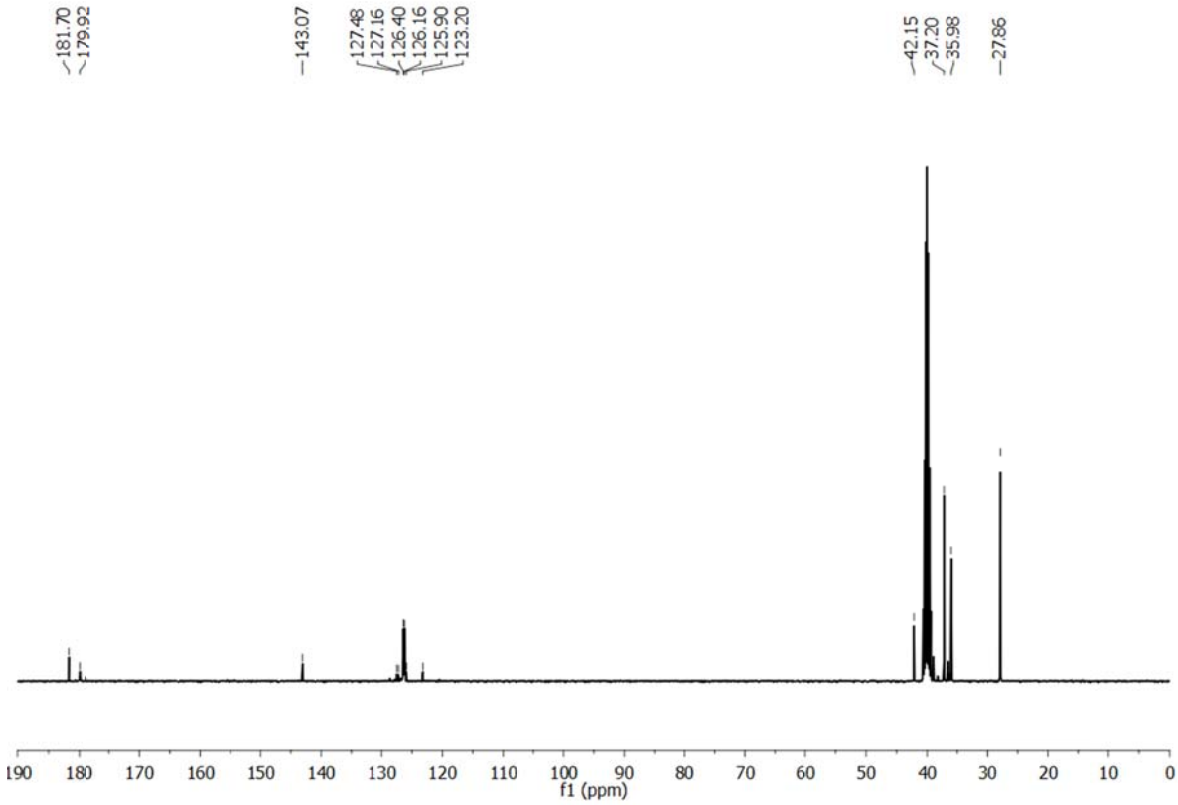

Figure S119. ^{13}C-NMR of compound **7d**.

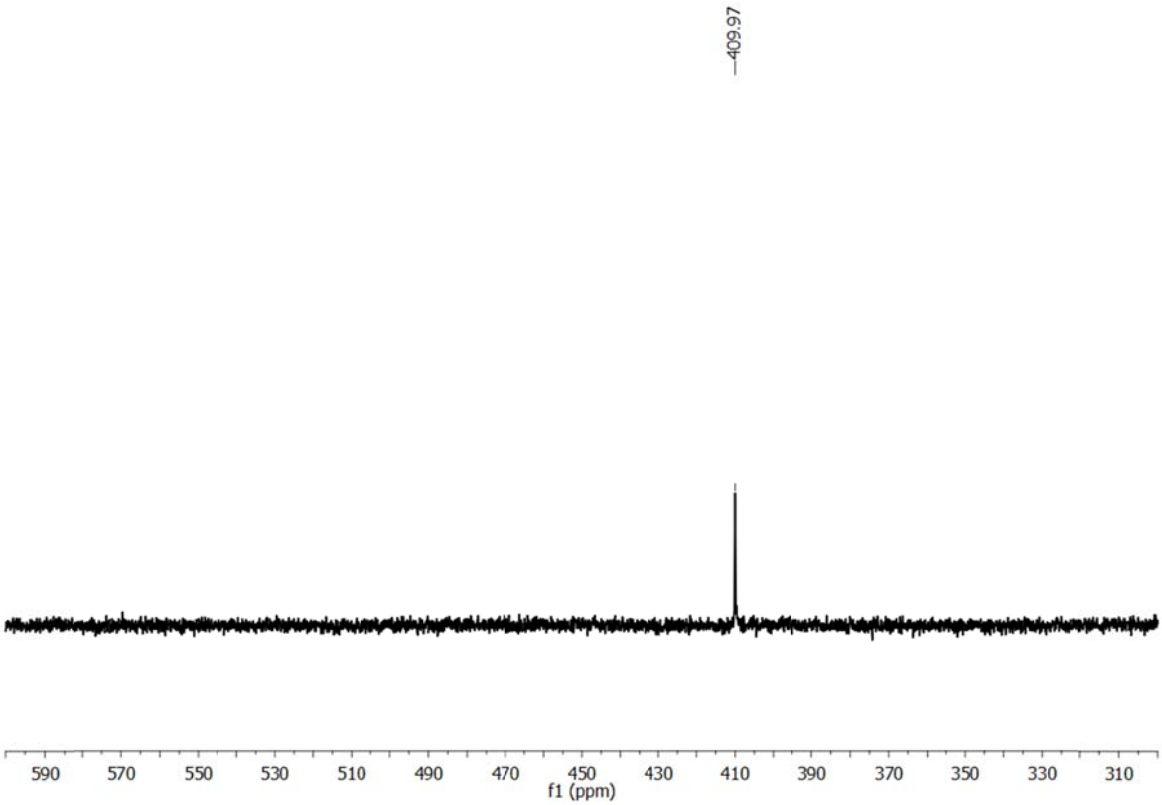

Figure S120. ^{77}Se-NMR of compound **7d**.

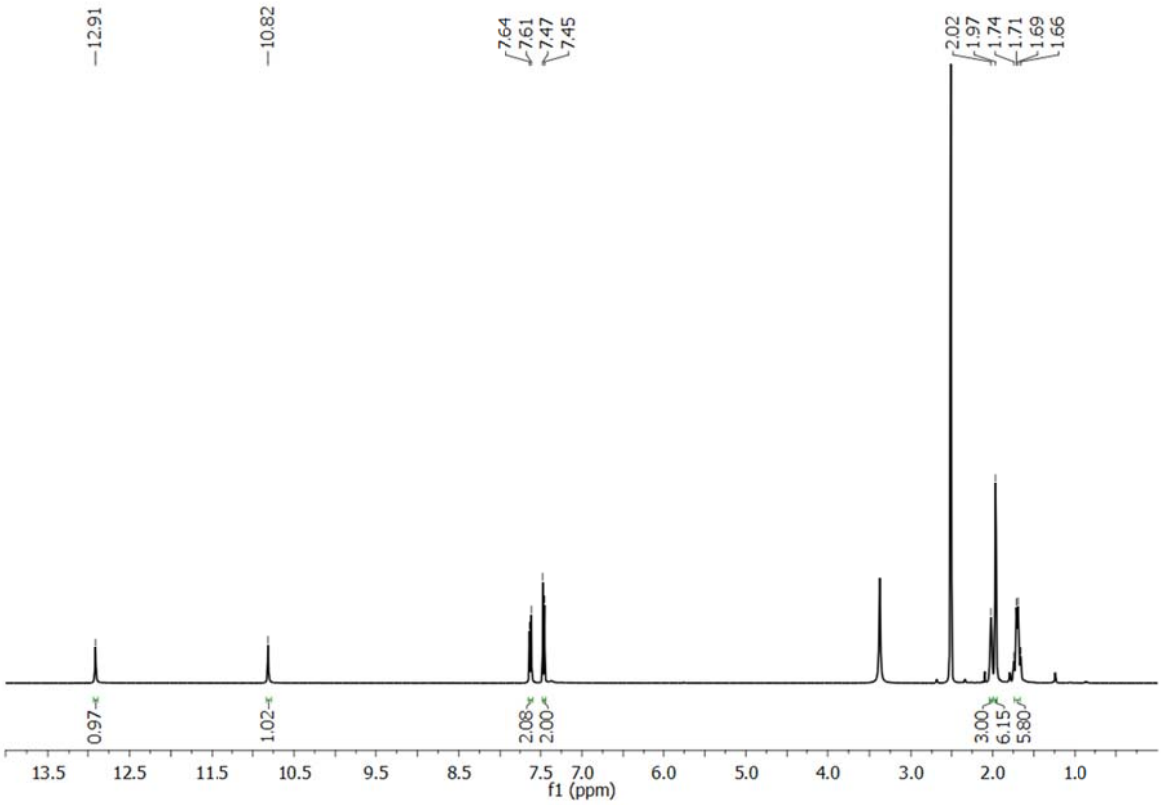

Figure S121. ^{1}H-NMR of compound **7e**.

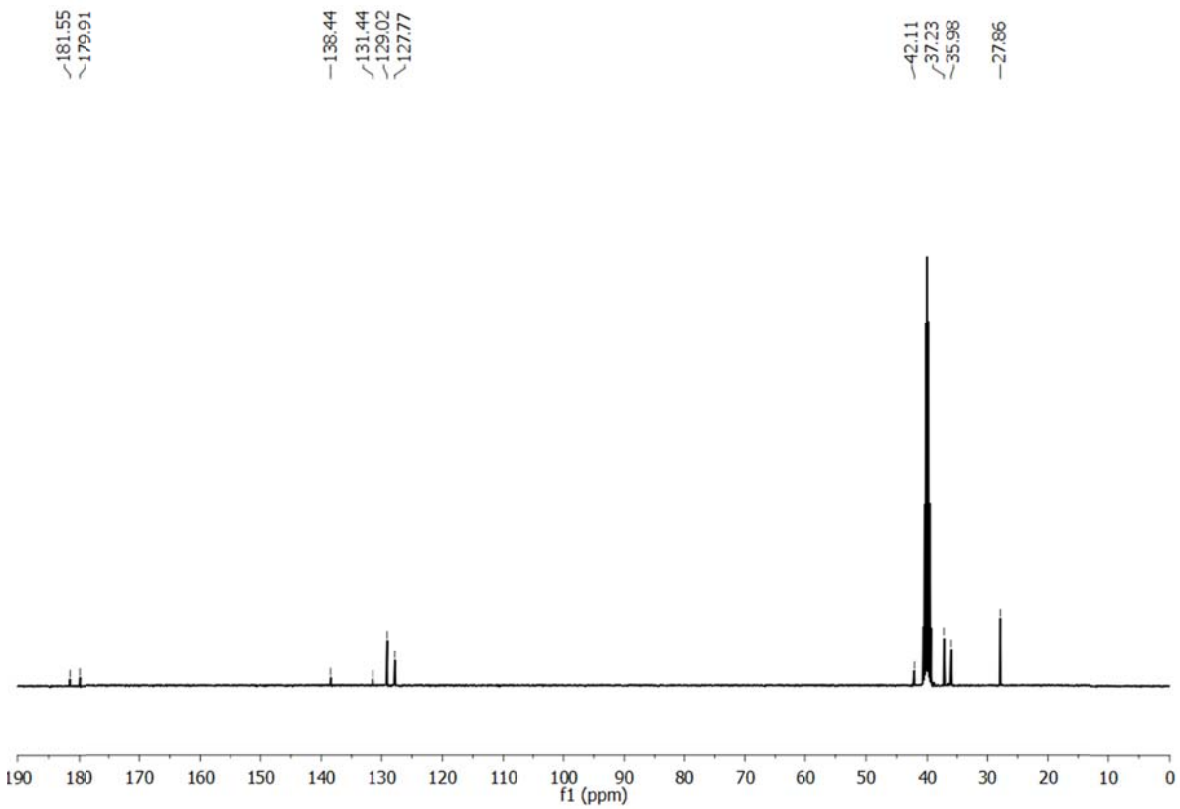

Figure S122. ^{13}C-NMR of compound **7e**.

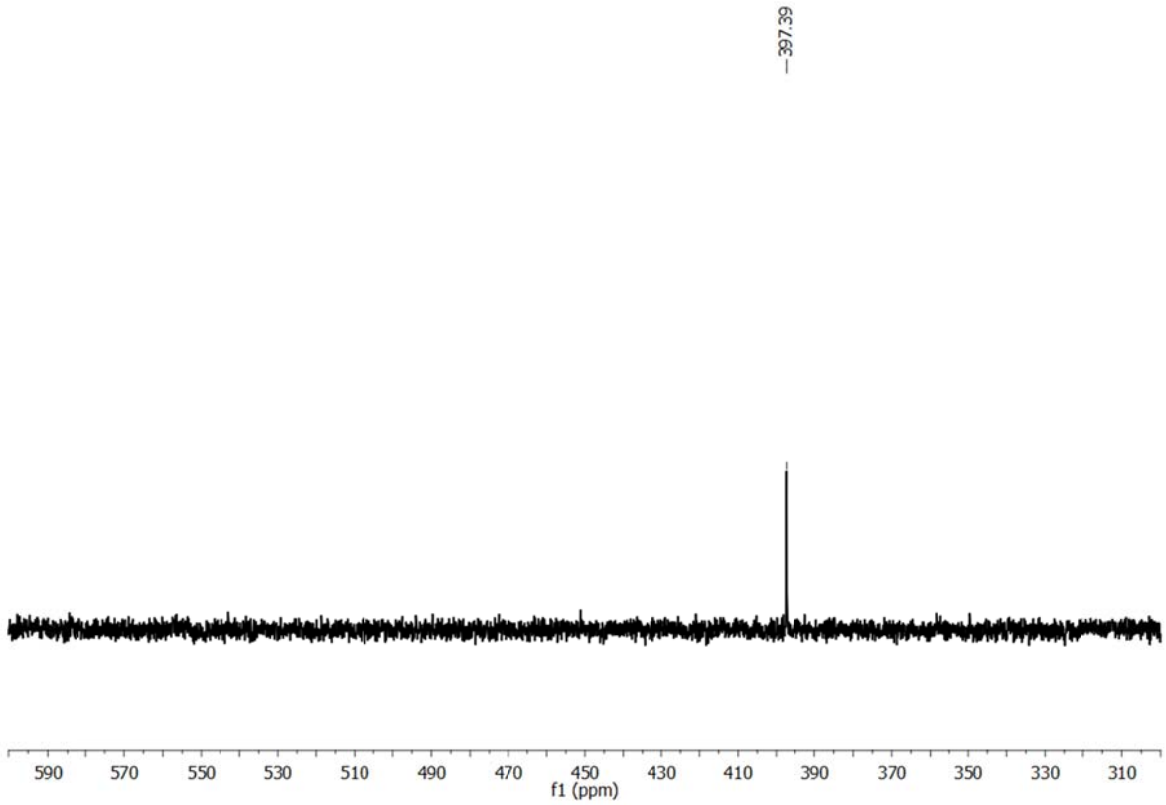

Figure S123. ^{77}Se-NMR of compound **7e**.

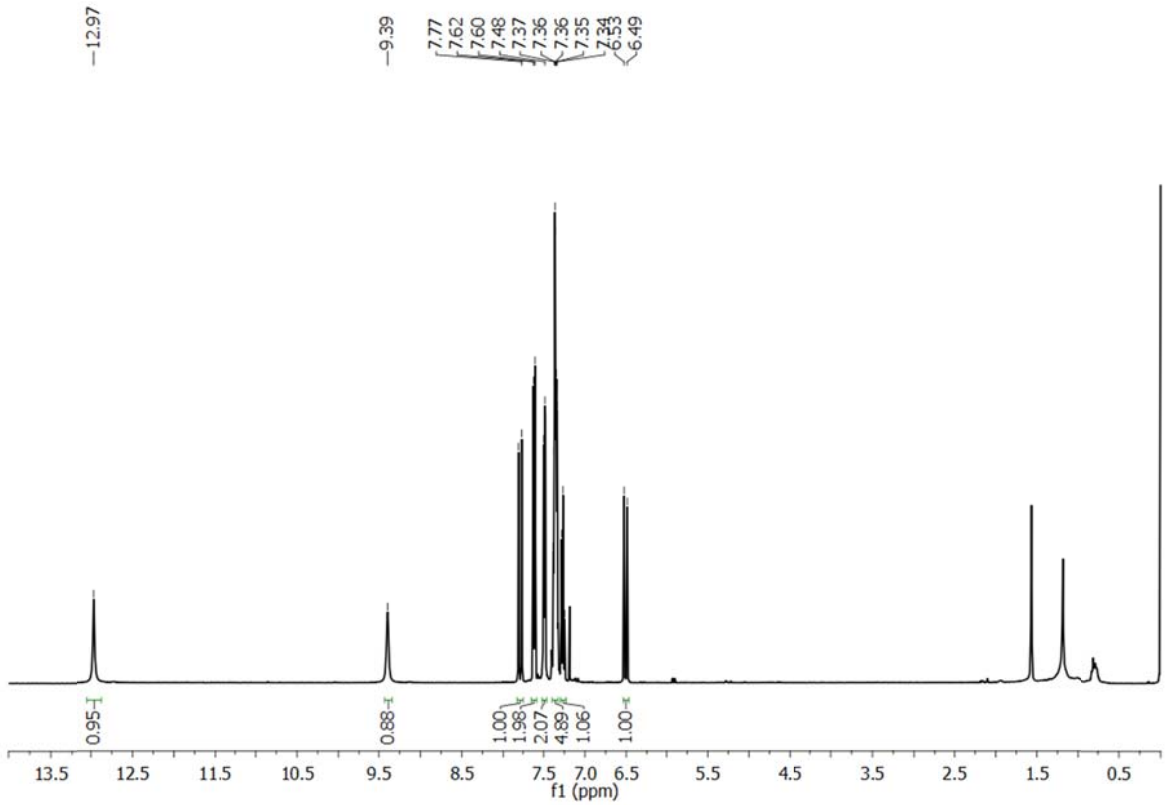

Figure S124. ^{1}H-NMR of compound **8a**.

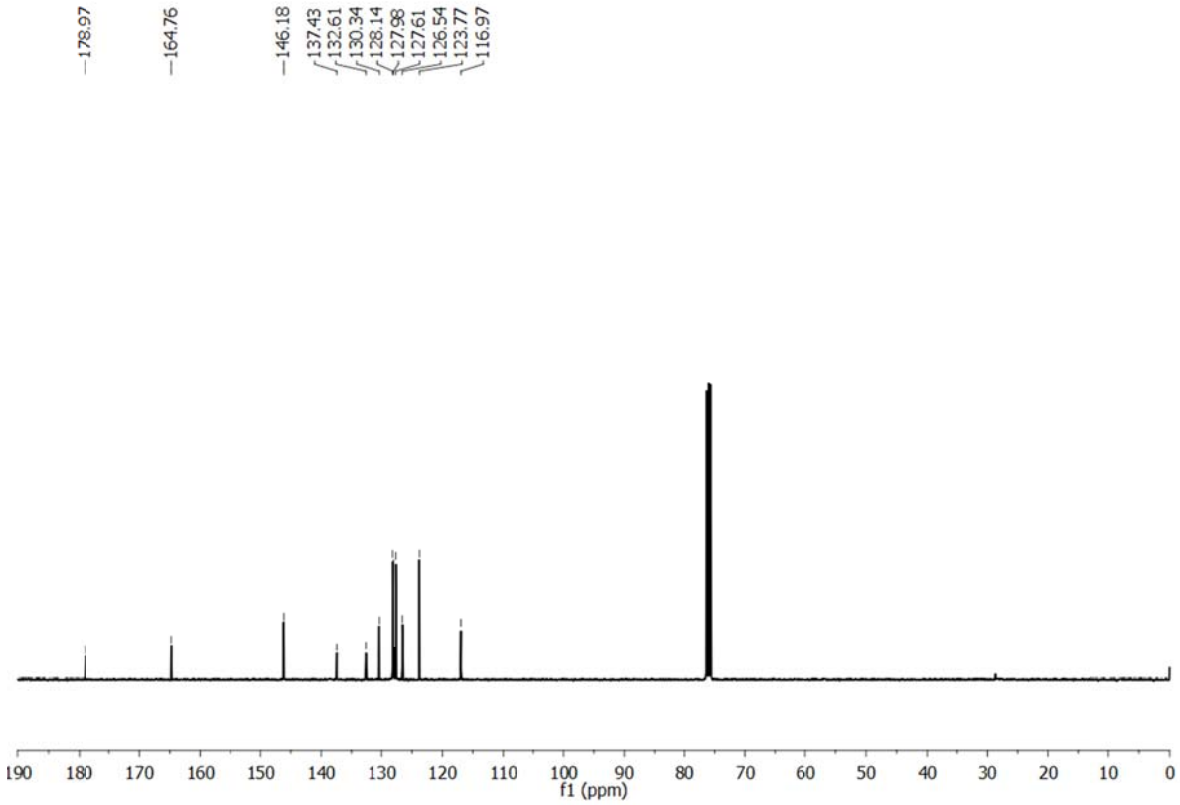

Figure S125. ^{13}C-NMR of compound **8a**.

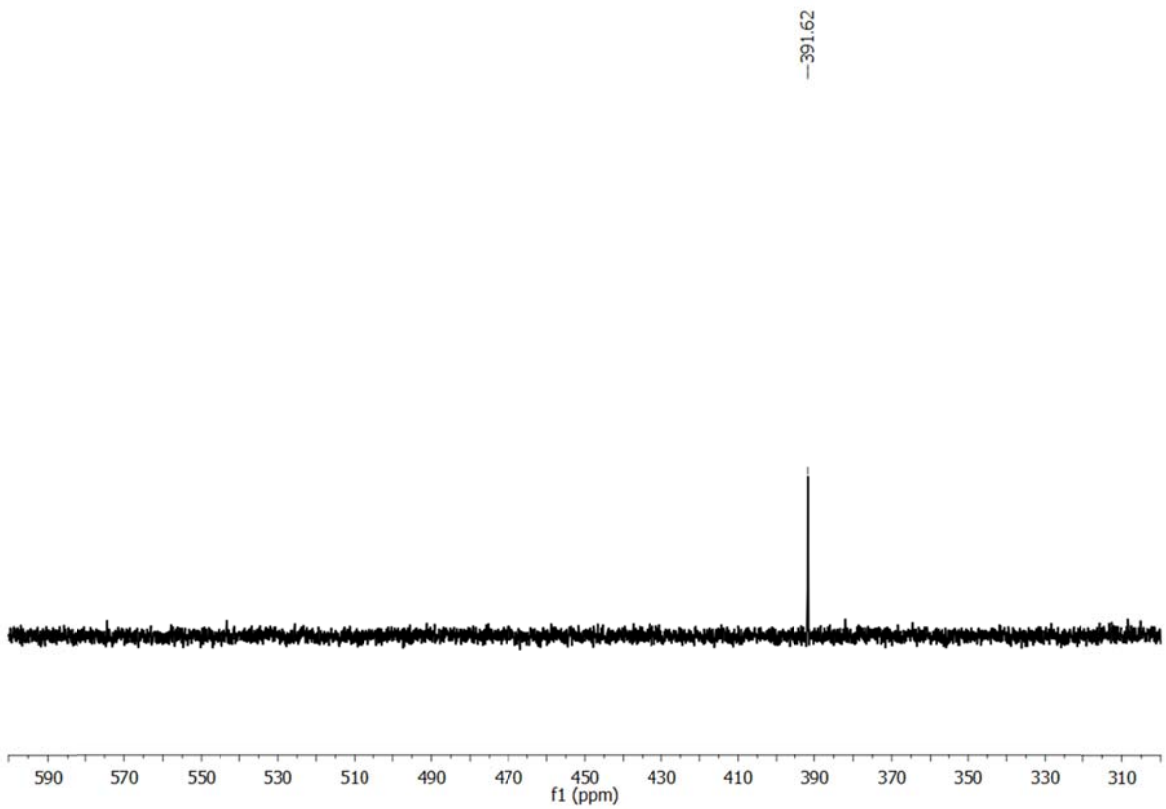

Figure S126. ^{77}Se-NMR of compound **8a**.

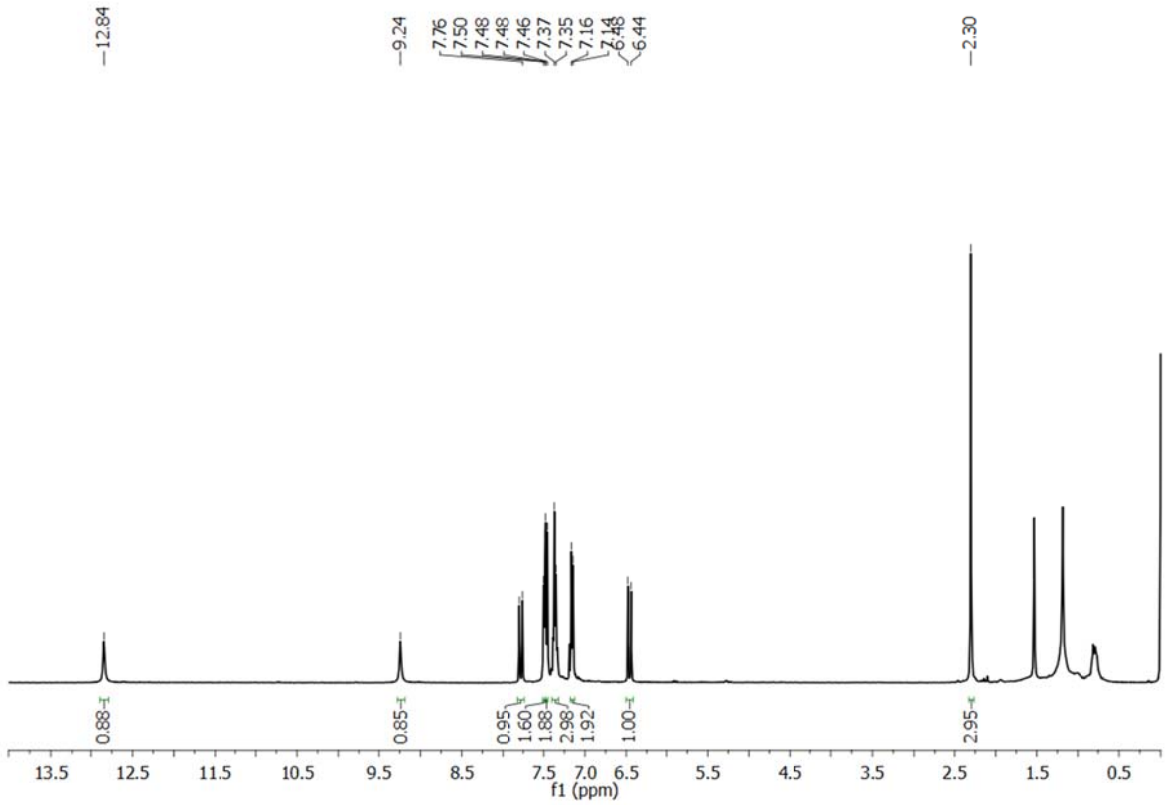

Figure S127. ^{1}H-NMR of compound **8b**.

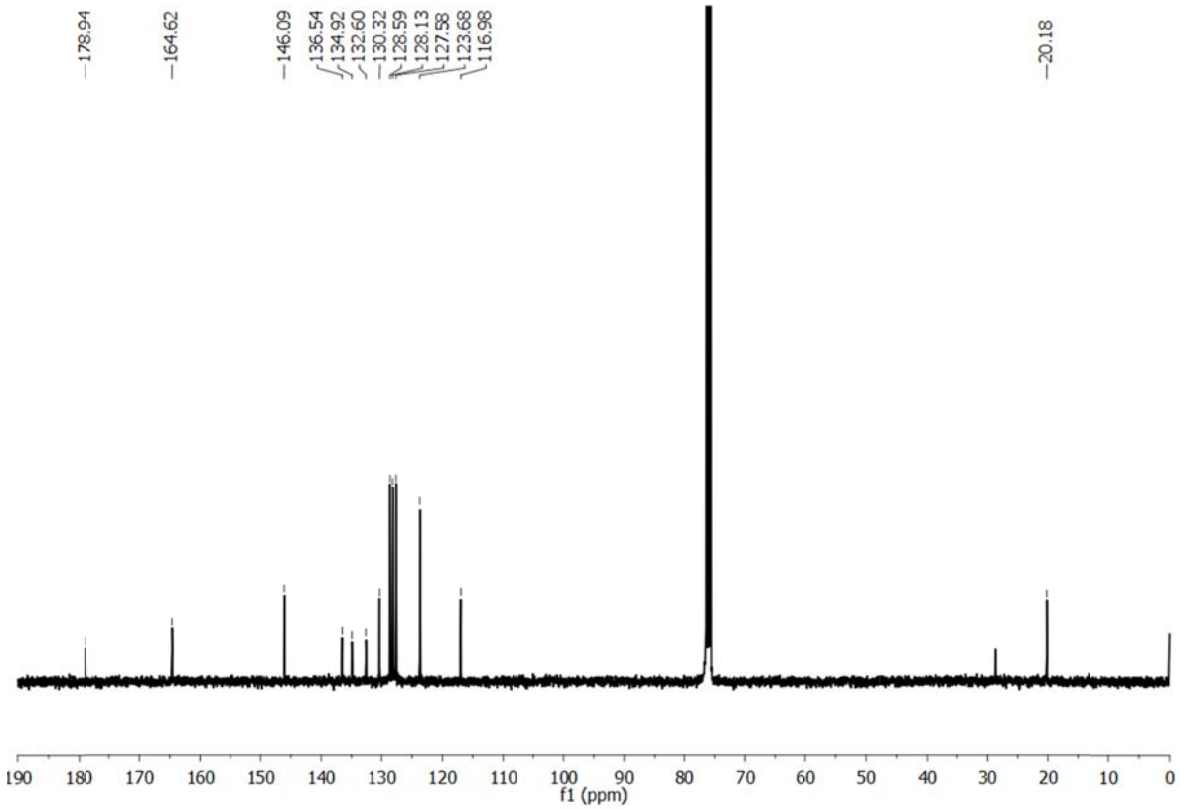

Figure S128. ^{13}C-NMR of compound **8b**.

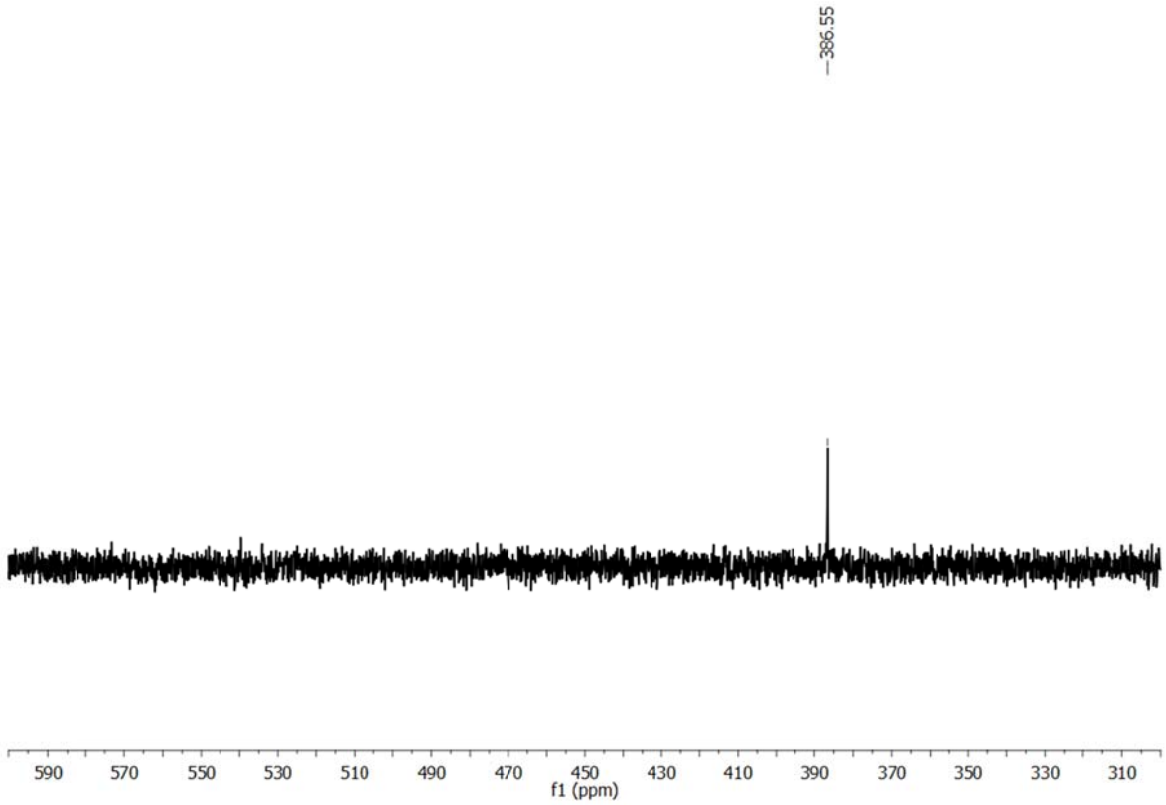

Figure S129. ^{77}Se-NMR of compound **8b**.

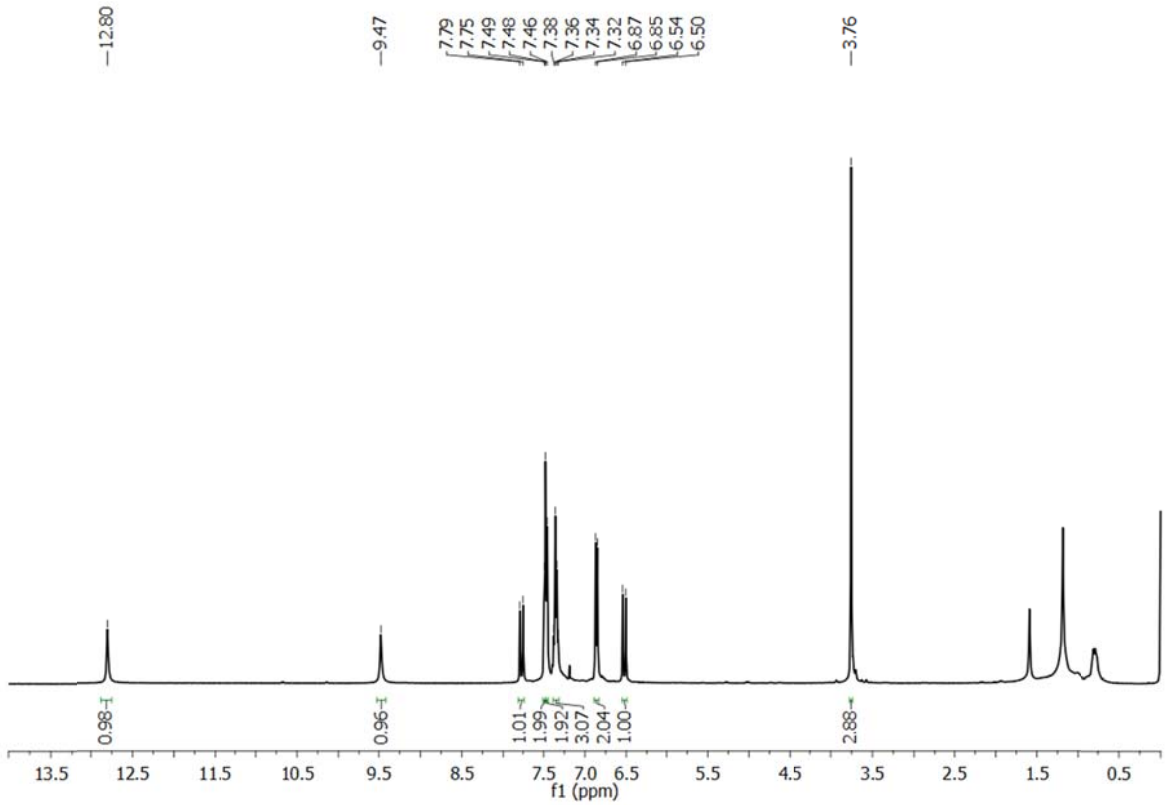

Figure S130. ^{1}H-NMR of compound **8c**.

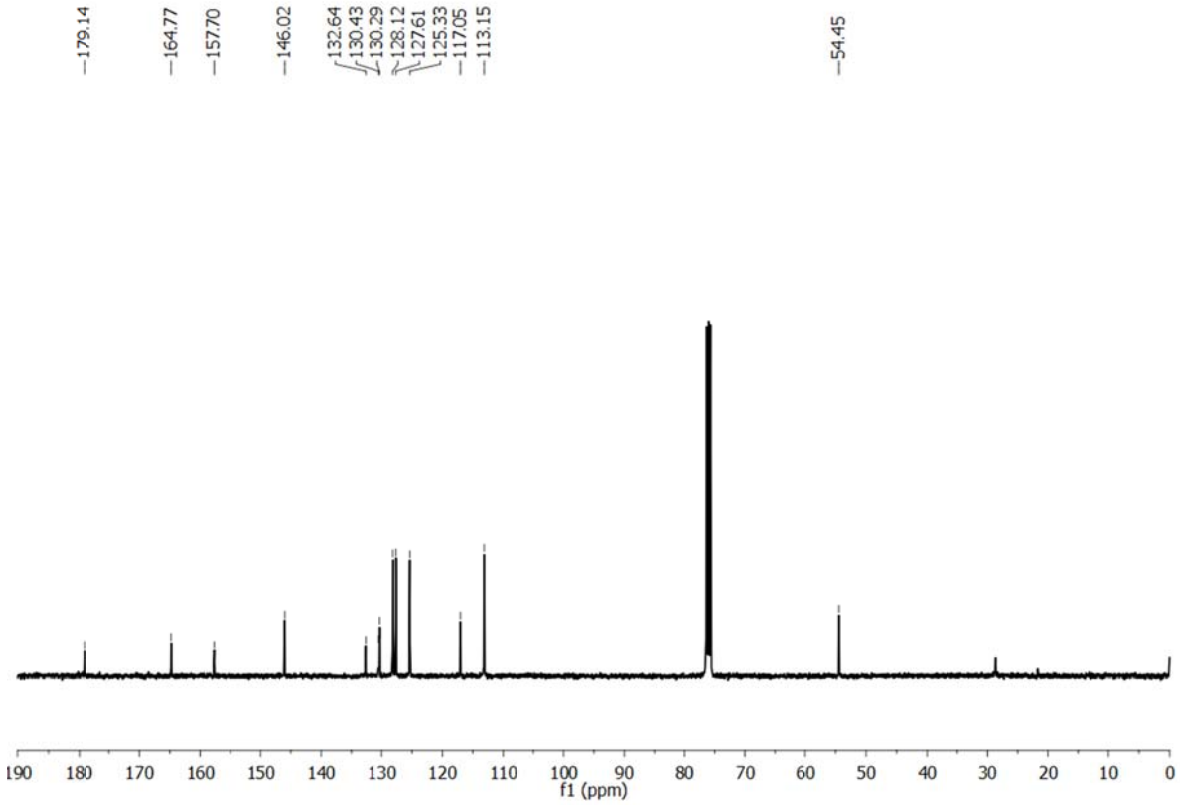

Figure S131. ^{13}C-NMR of compound **8c**.

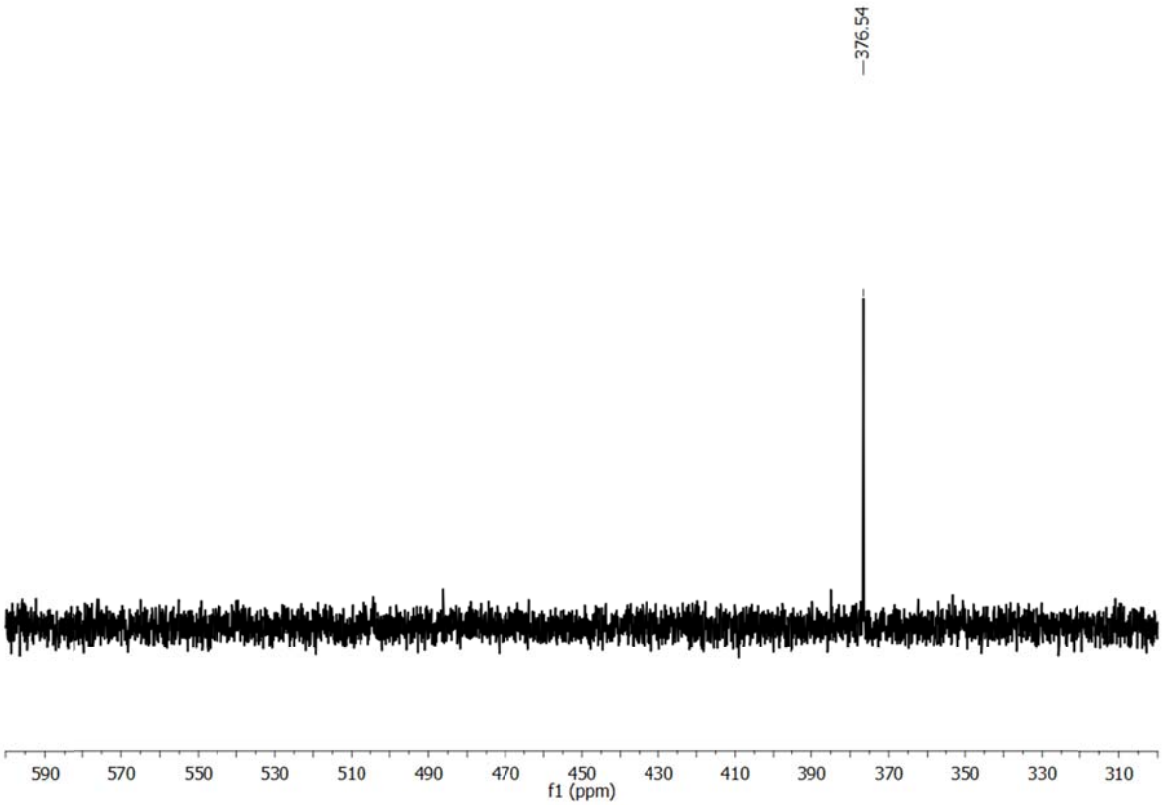

Figure S132. ^{77}Se-NMR of compound **8c**.

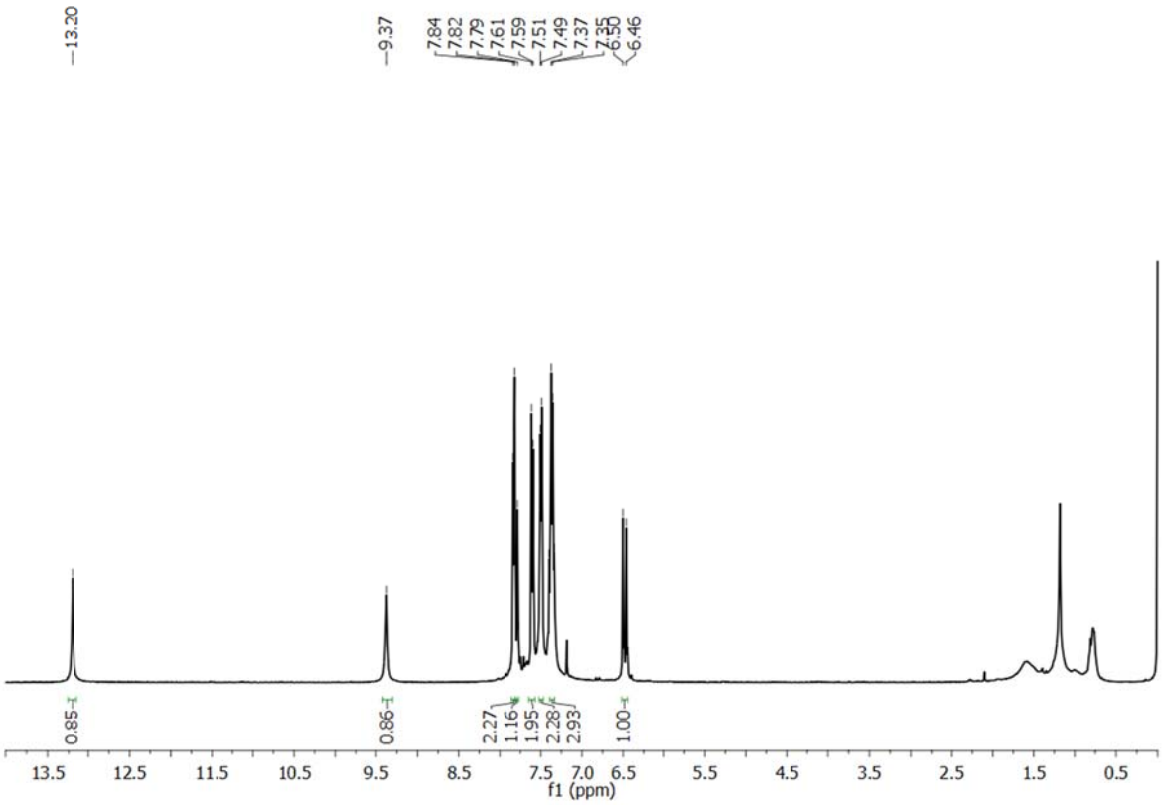

Figure S133. ^{1}H-NMR of compound **8d**.

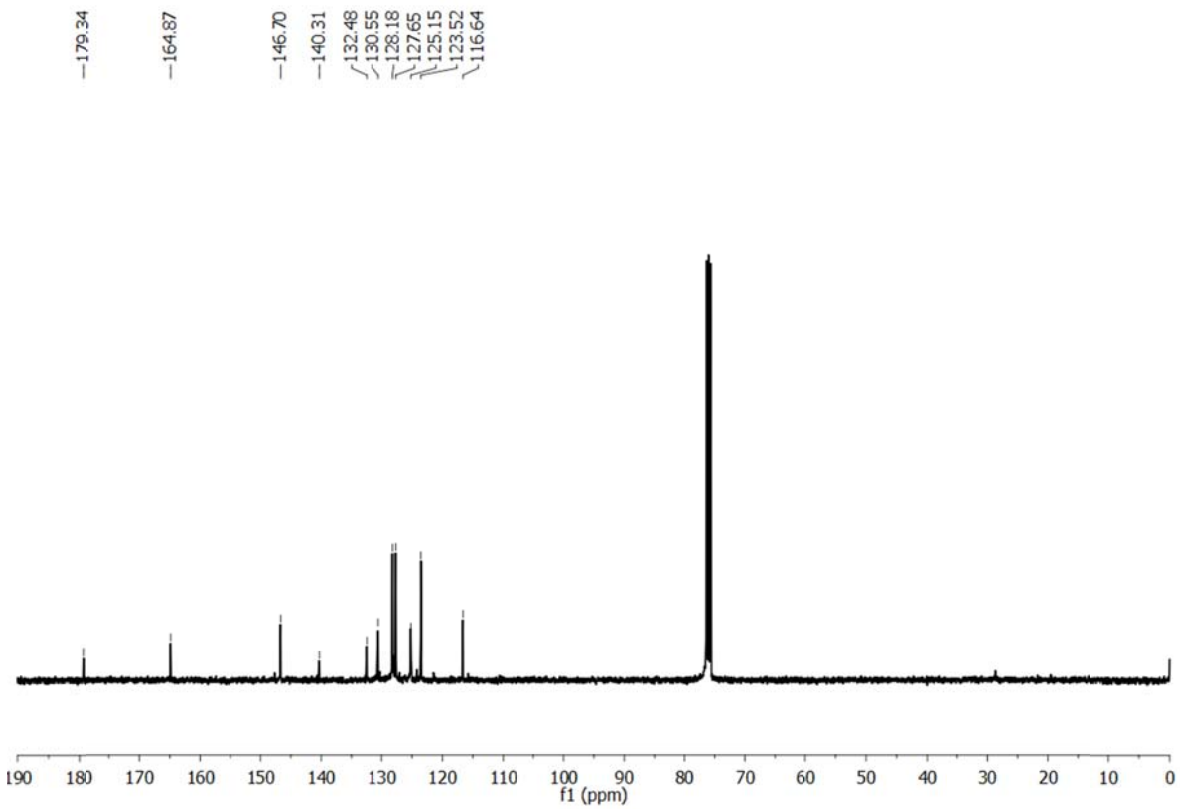

Figure S134. ^{13}C-NMR of compound **8d**.

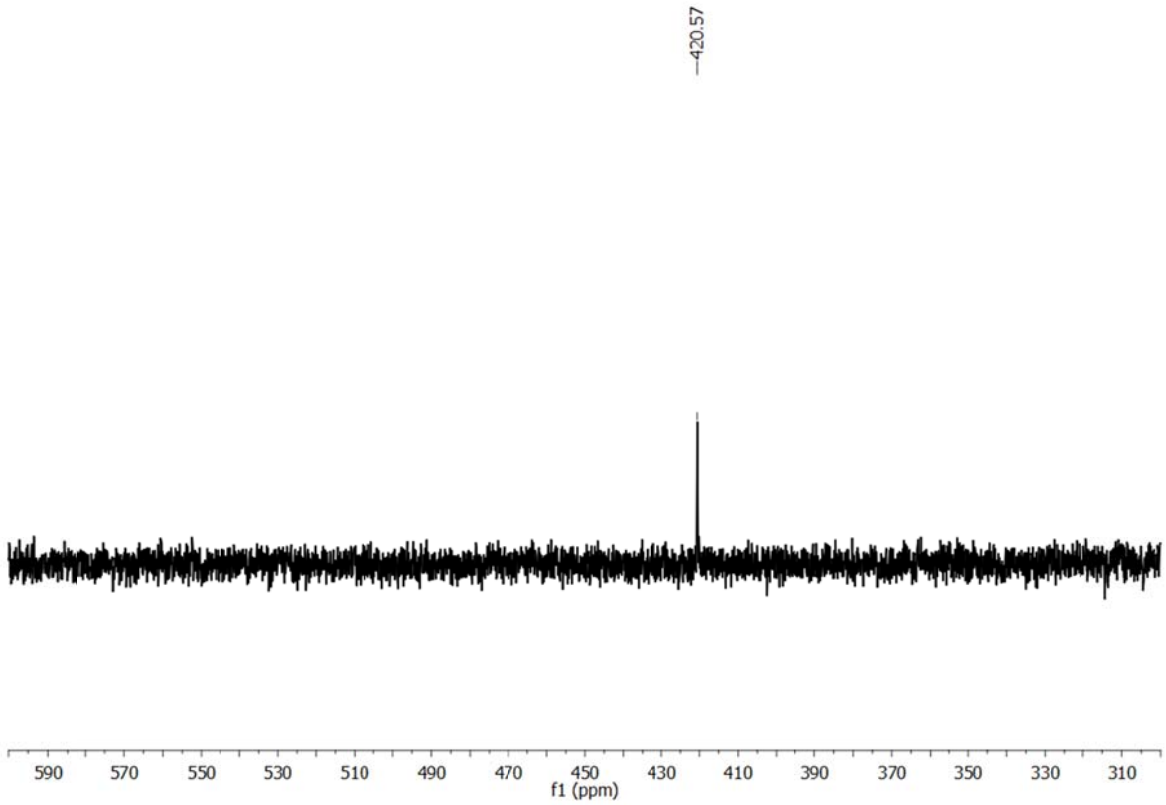

Figure S135. ^{77}Se-NMR of compound **8d**.

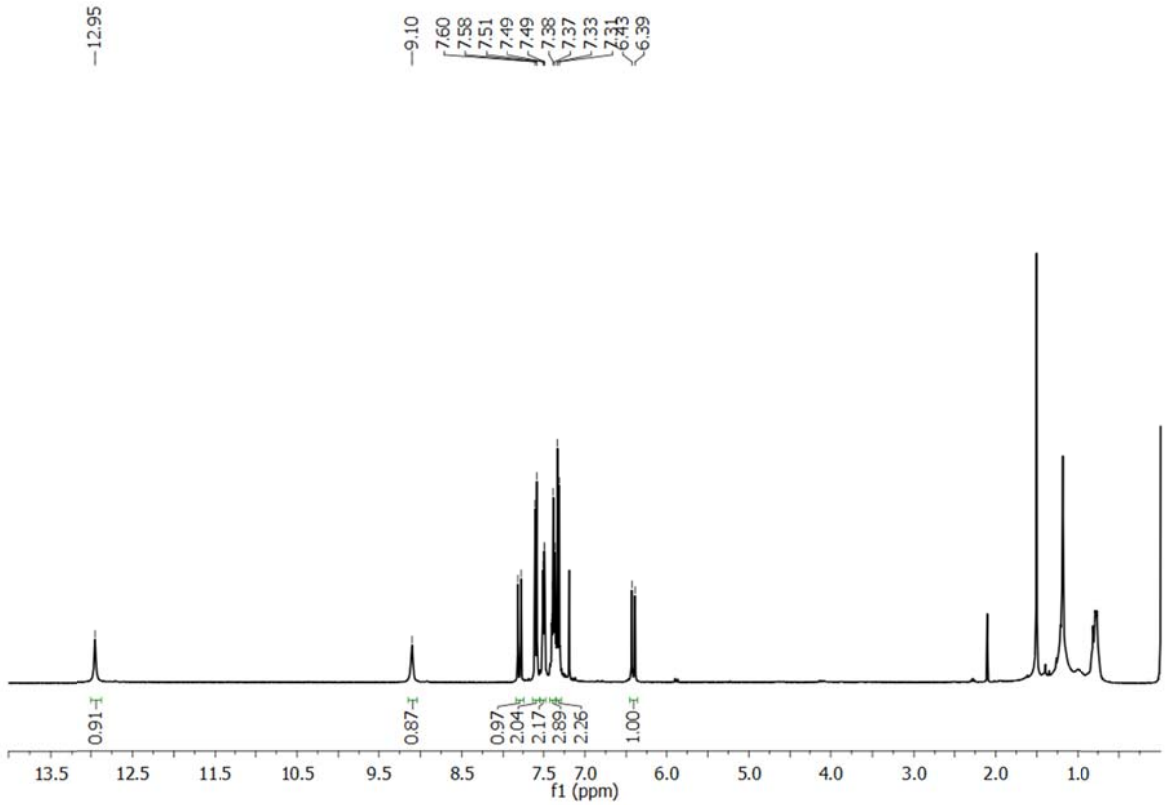

Figure S136. ^{1}H-NMR of compound **8e**.

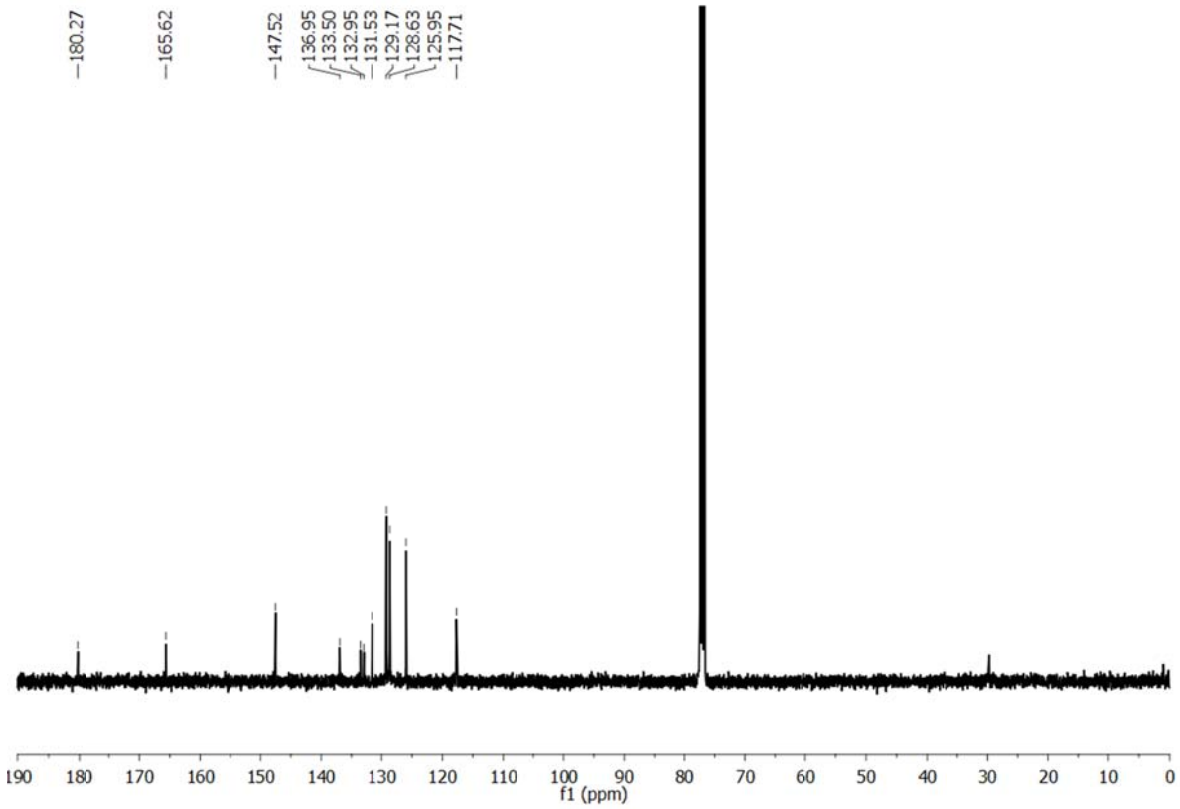

Figure S137. ^{13}C-NMR of compound **8e**.

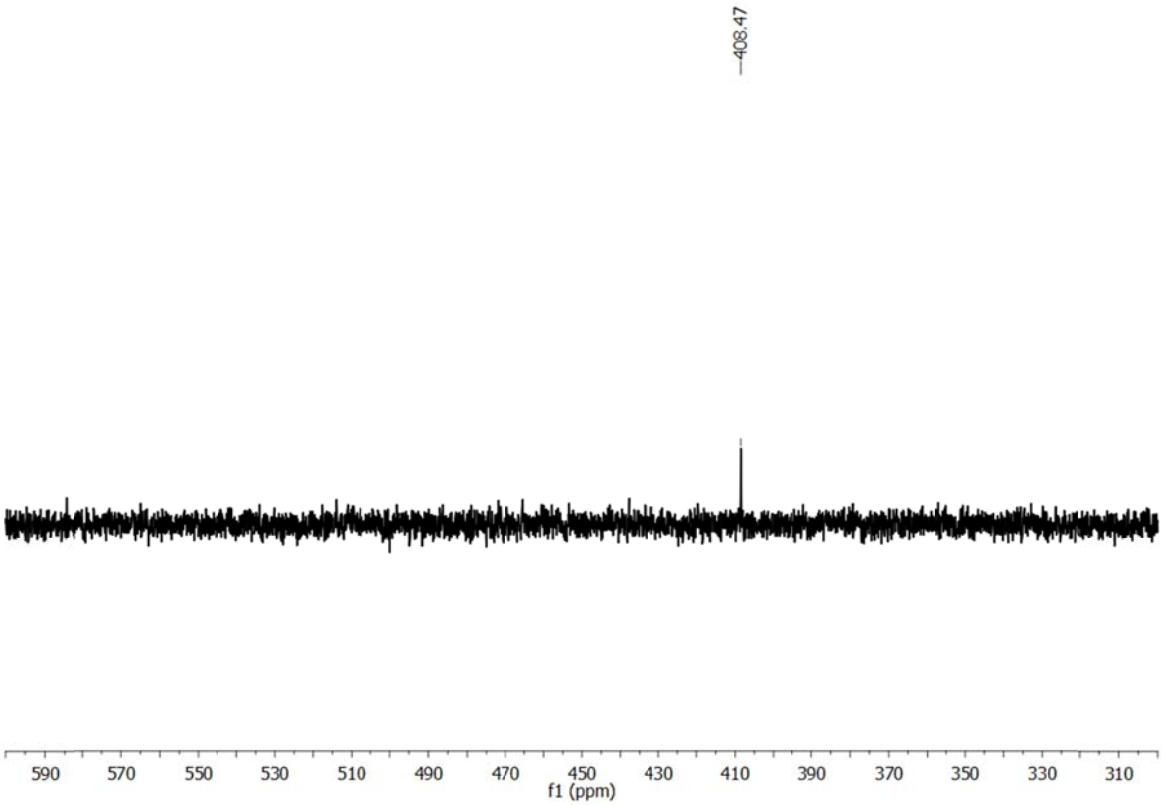

Figure S138. ^{77}Se-NMR of compound **8e**.

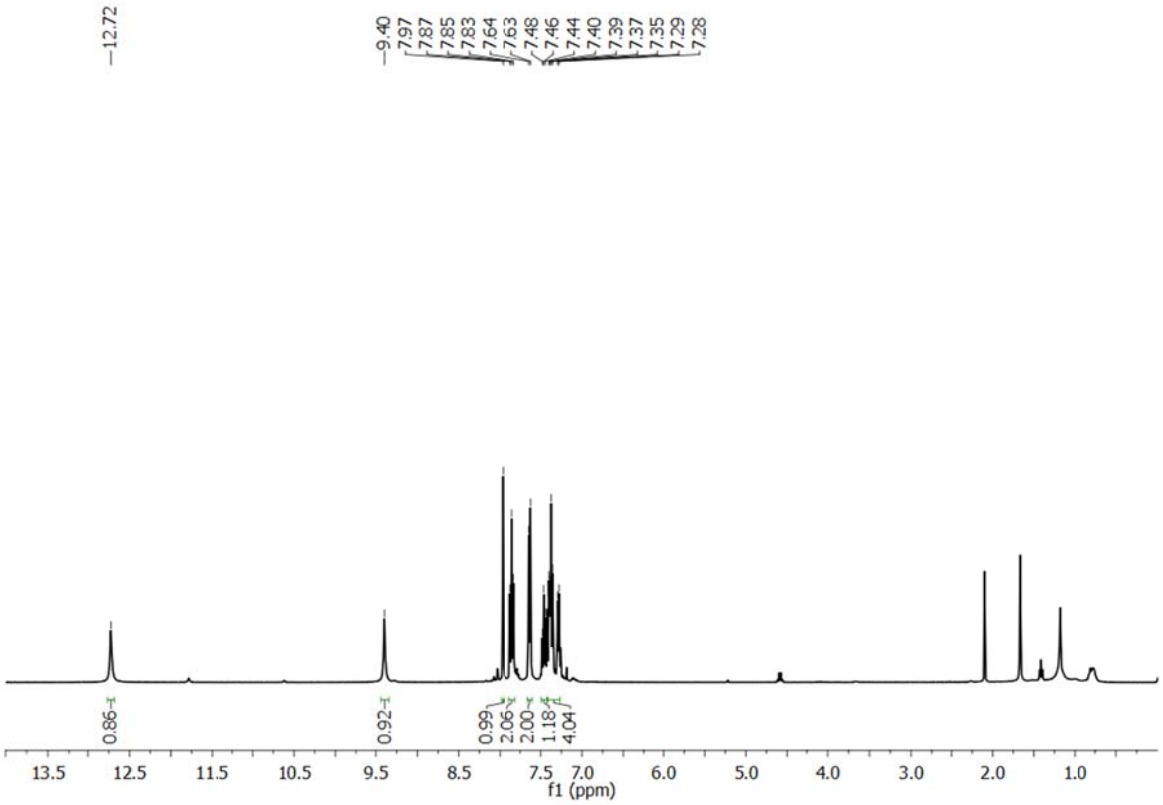

Figure S139. ^{1}H-NMR of compound **9a**.

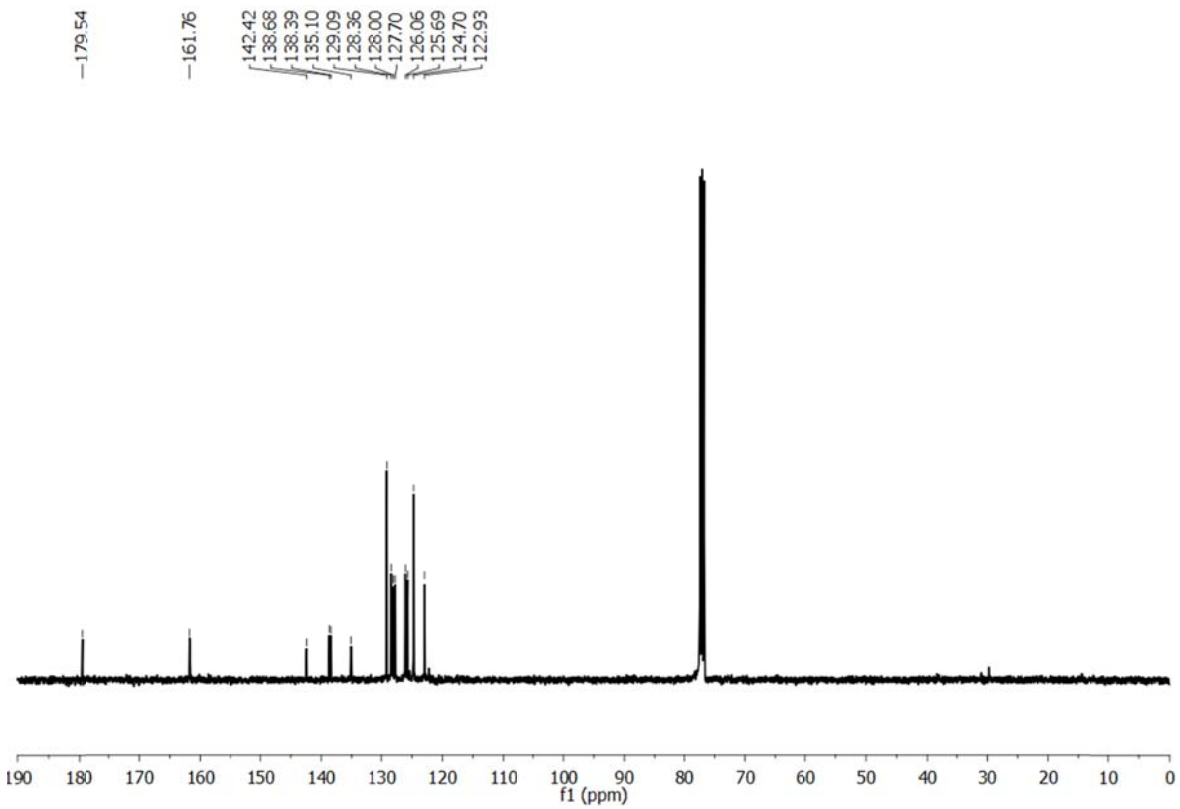

Figure S140. ^{13}C-NMR of compound **9a**.

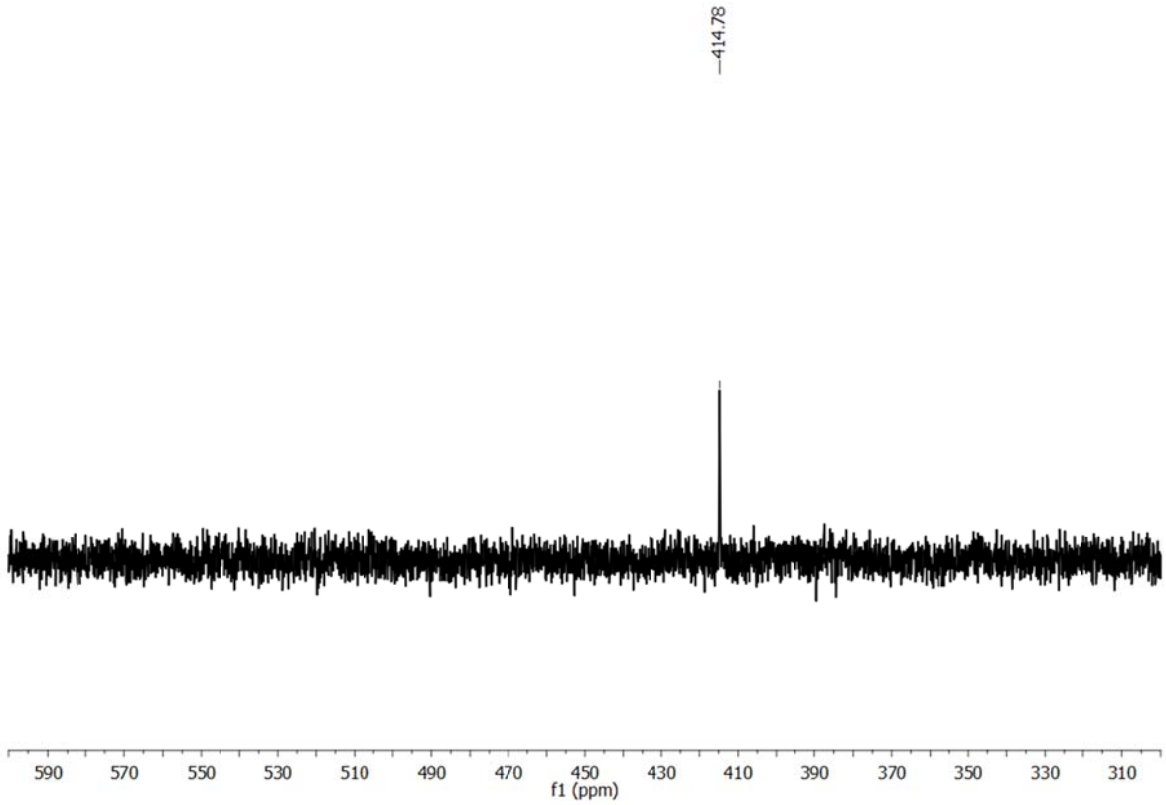

Figure S141. ^{77}Se-NMR of compound **9a**.

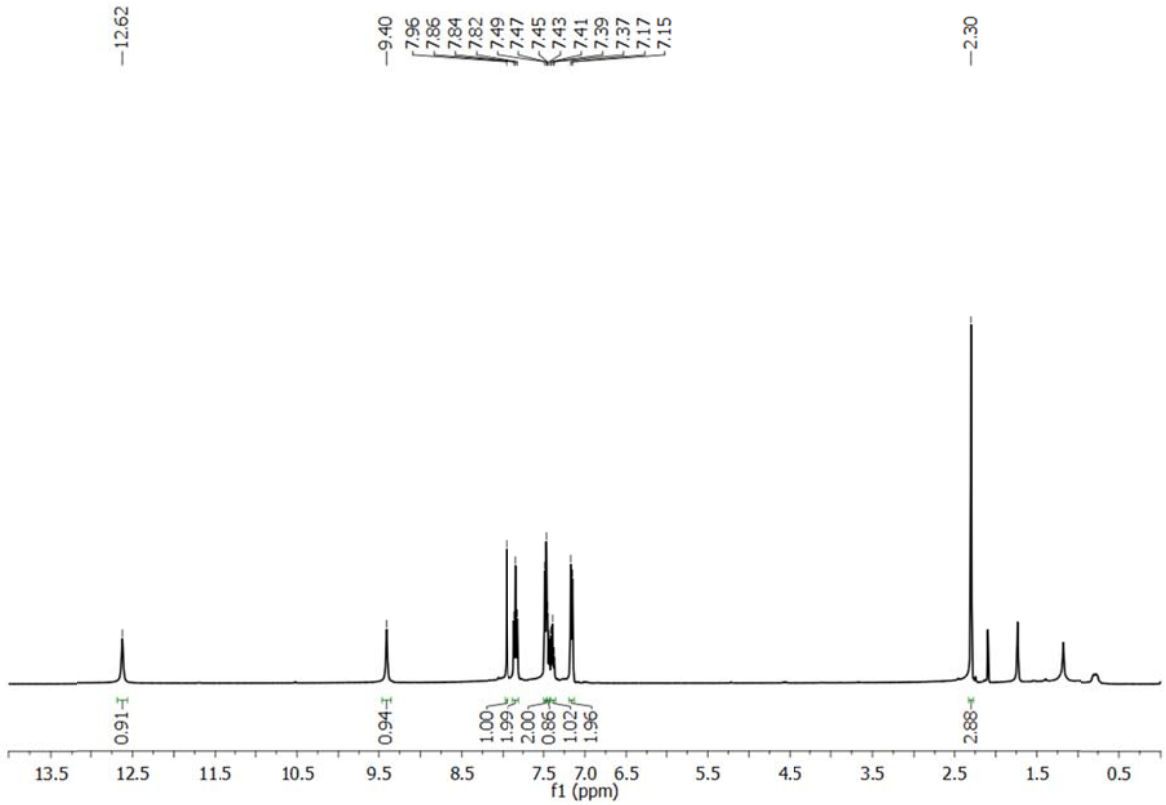

Figure S142. ^{1}H-NMR of compound **9b**.

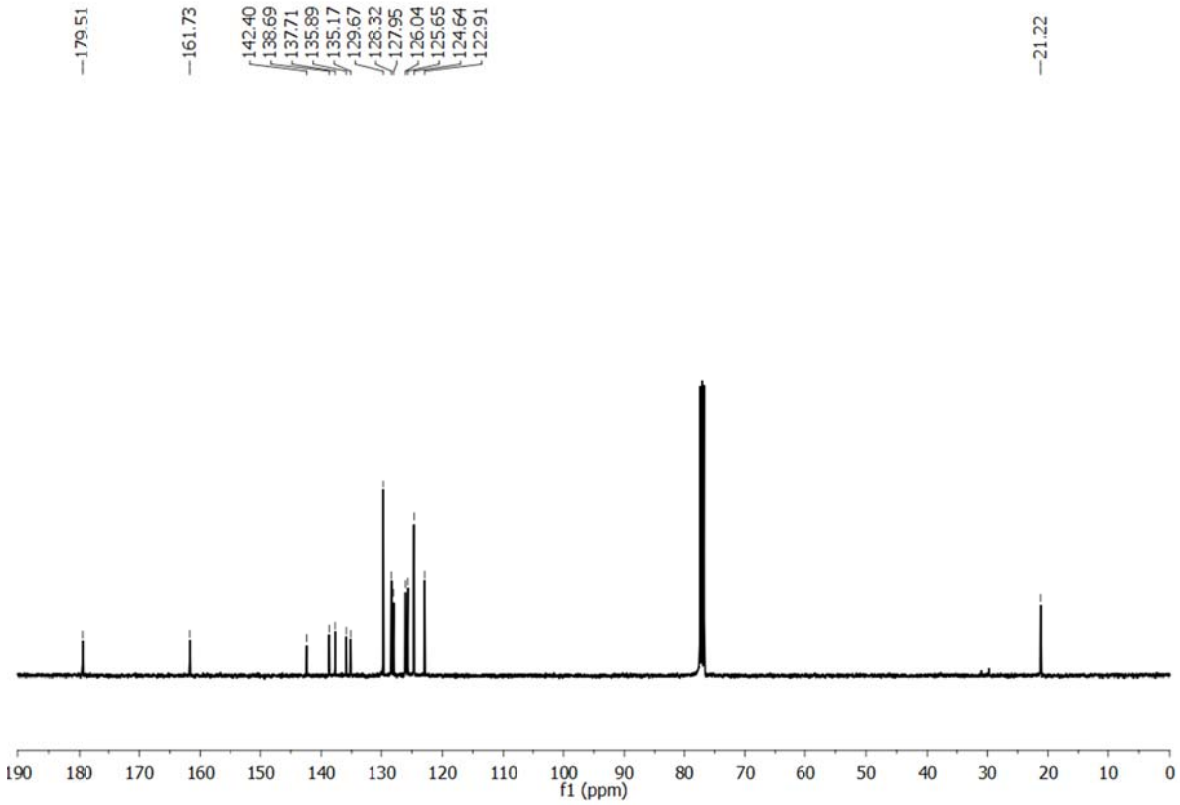

Figure S143. ^{13}C-NMR of compound **9b**.

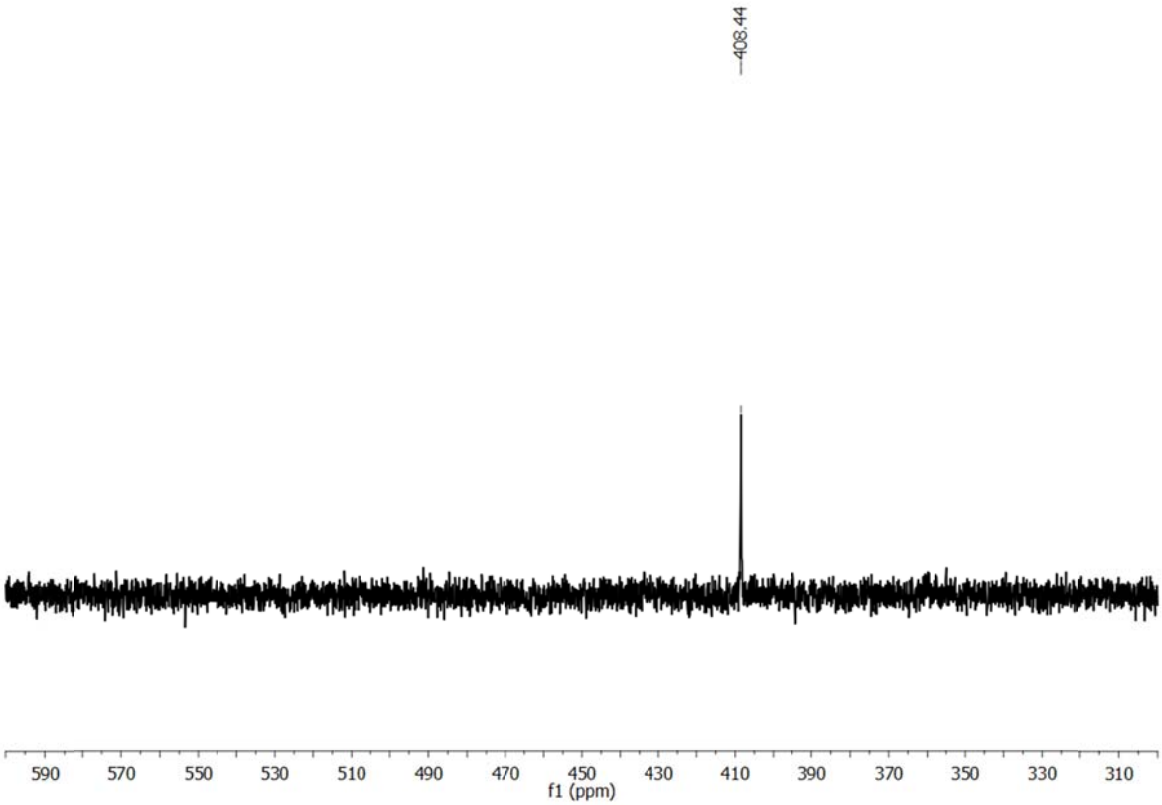

Figure S144. ^{77}Se-NMR of compound **9b**.

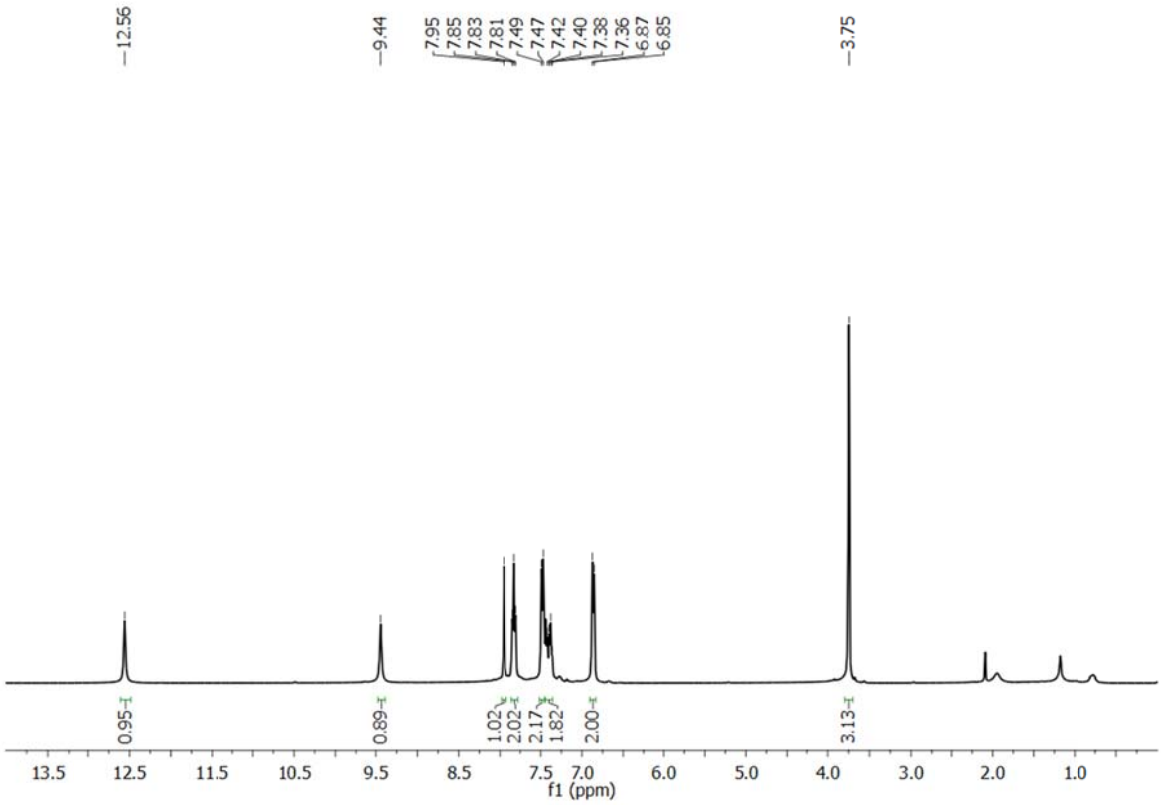

Figure S145. ^{1}H-NMR of compound **9c**.

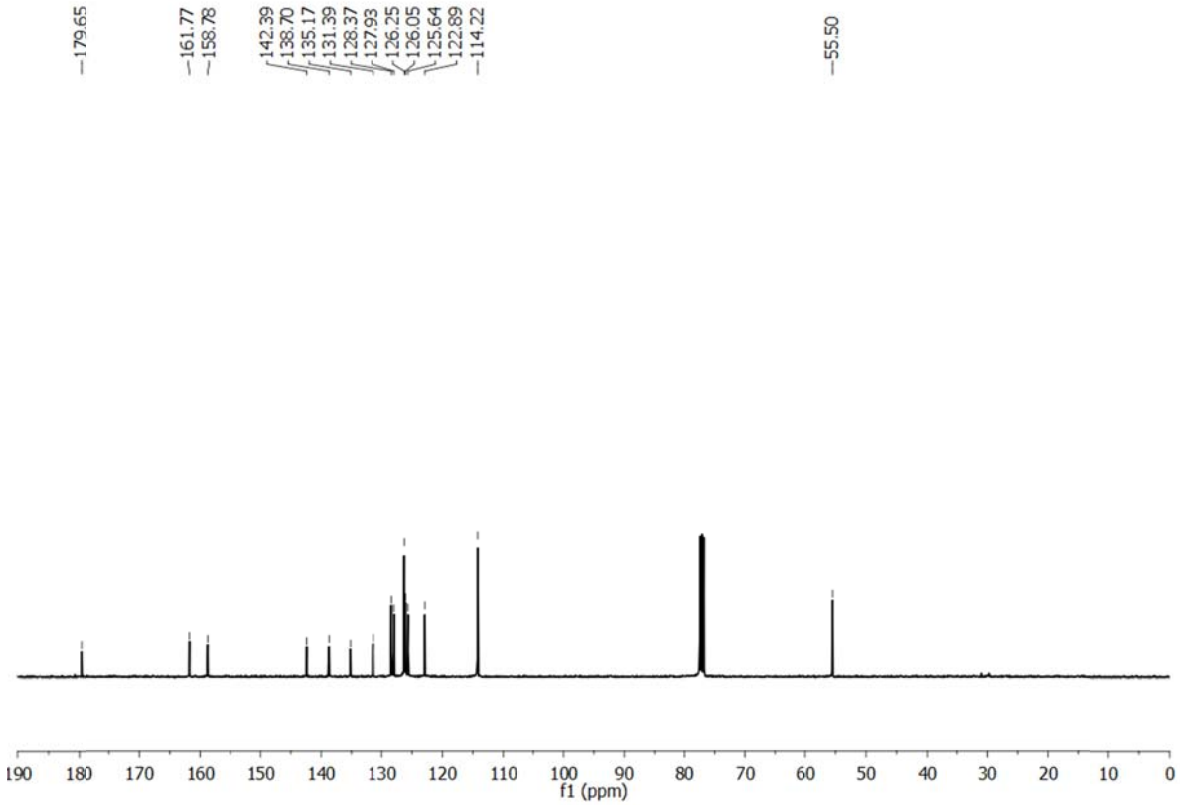

Figure S146. ^{13}C-NMR of compound **9c**.

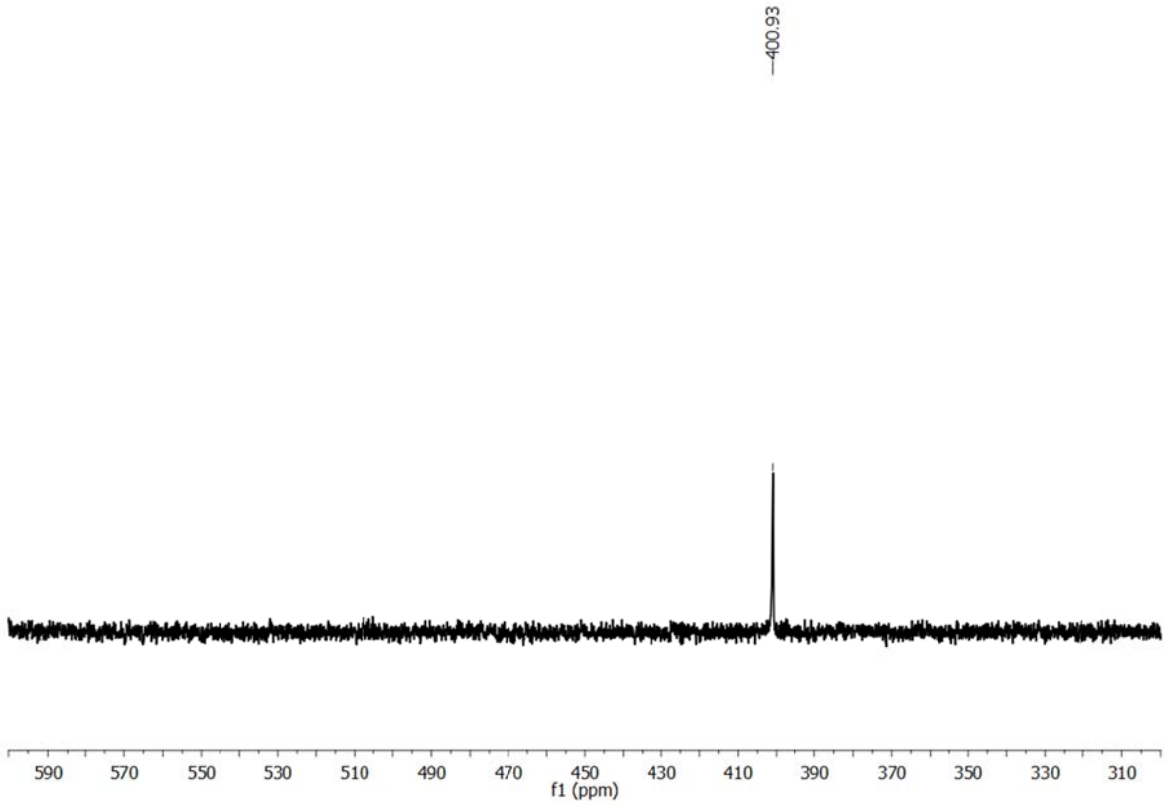

Figure S147. ^{77}Se-NMR of compound **9c**.

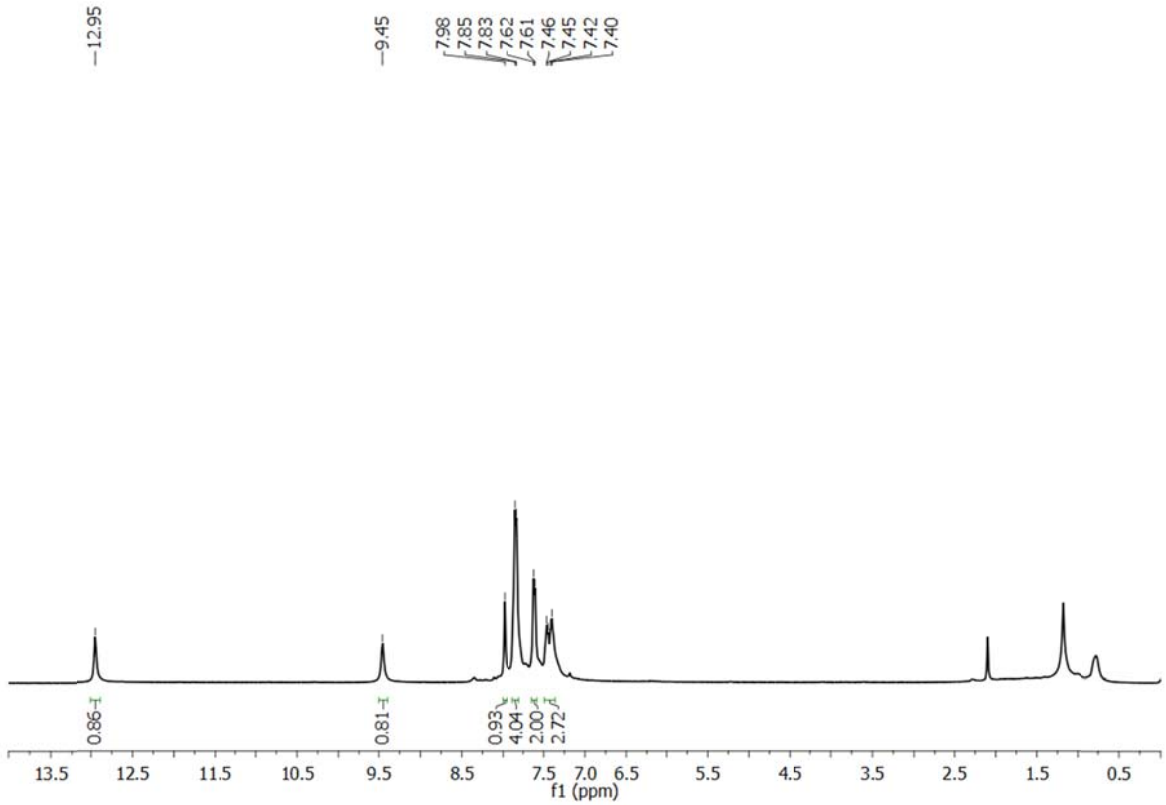

Figure S148. ^{1}H-NMR of compound **9d**.

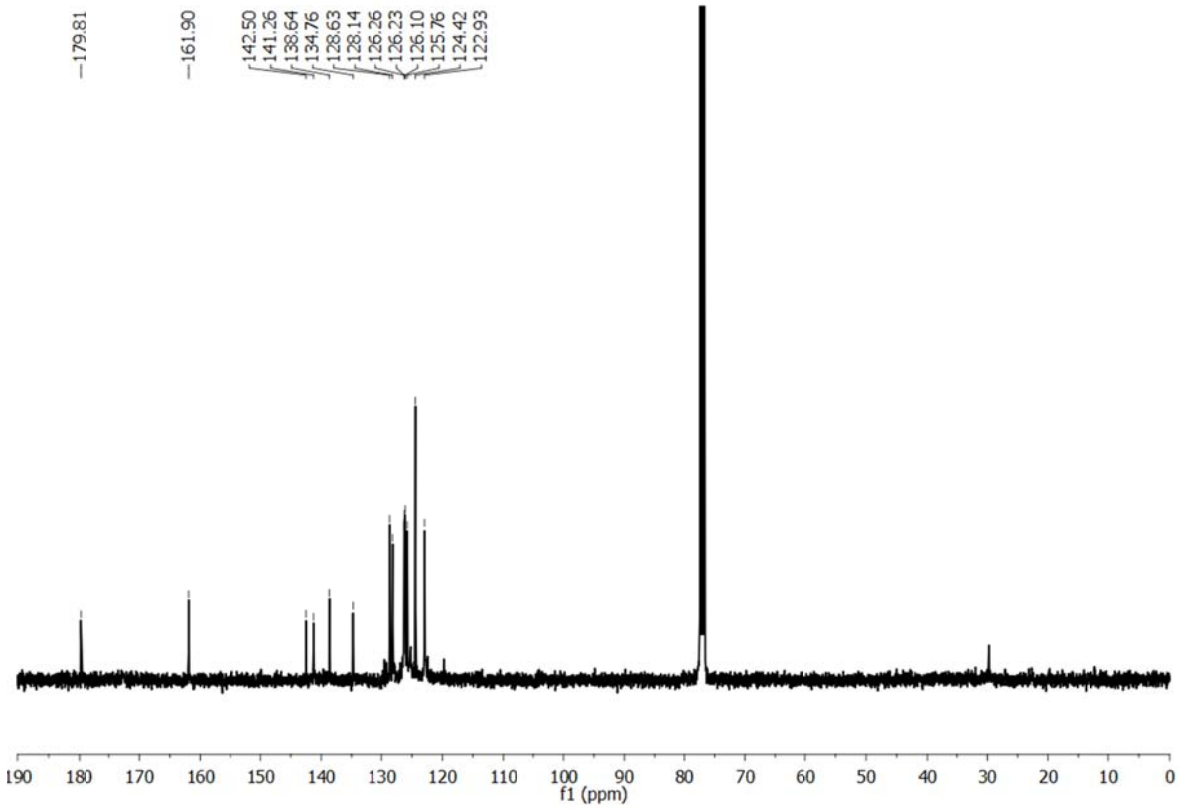

Figure S149. ^{13}C-NMR of compound **9d**.

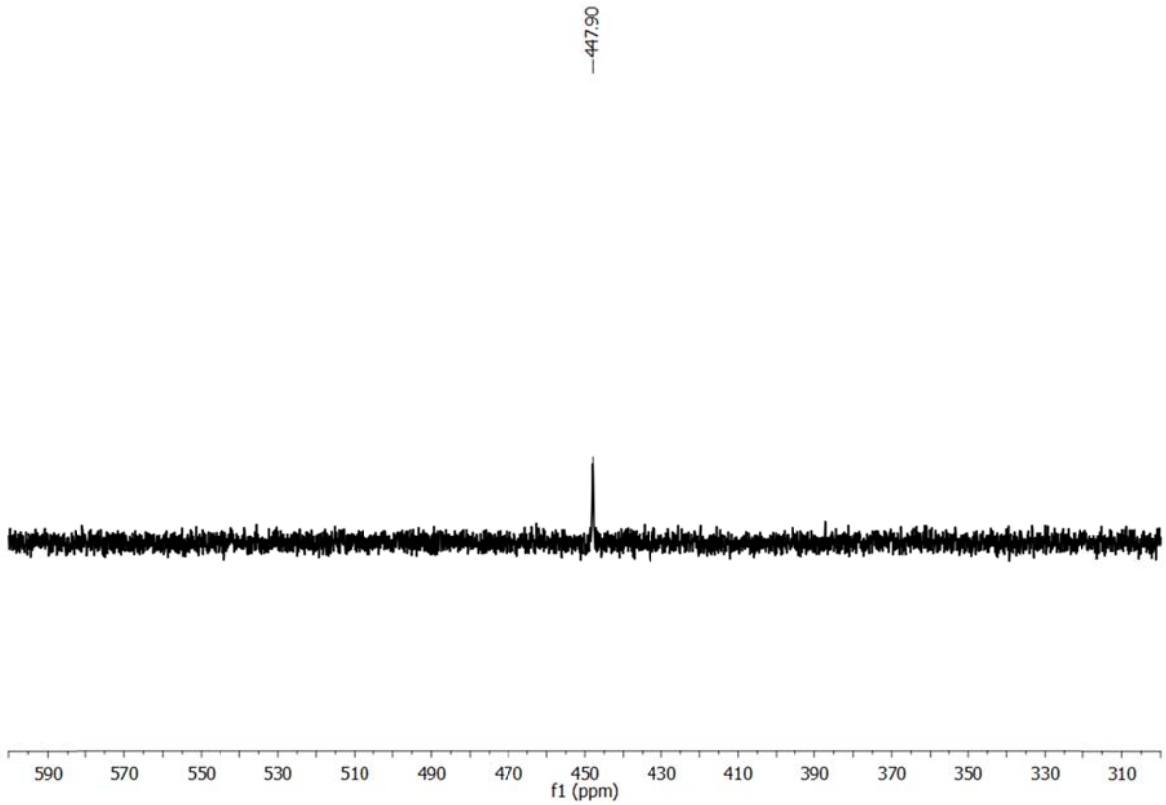

Figure S150. ^{77}Se-NMR of compound **9d**.

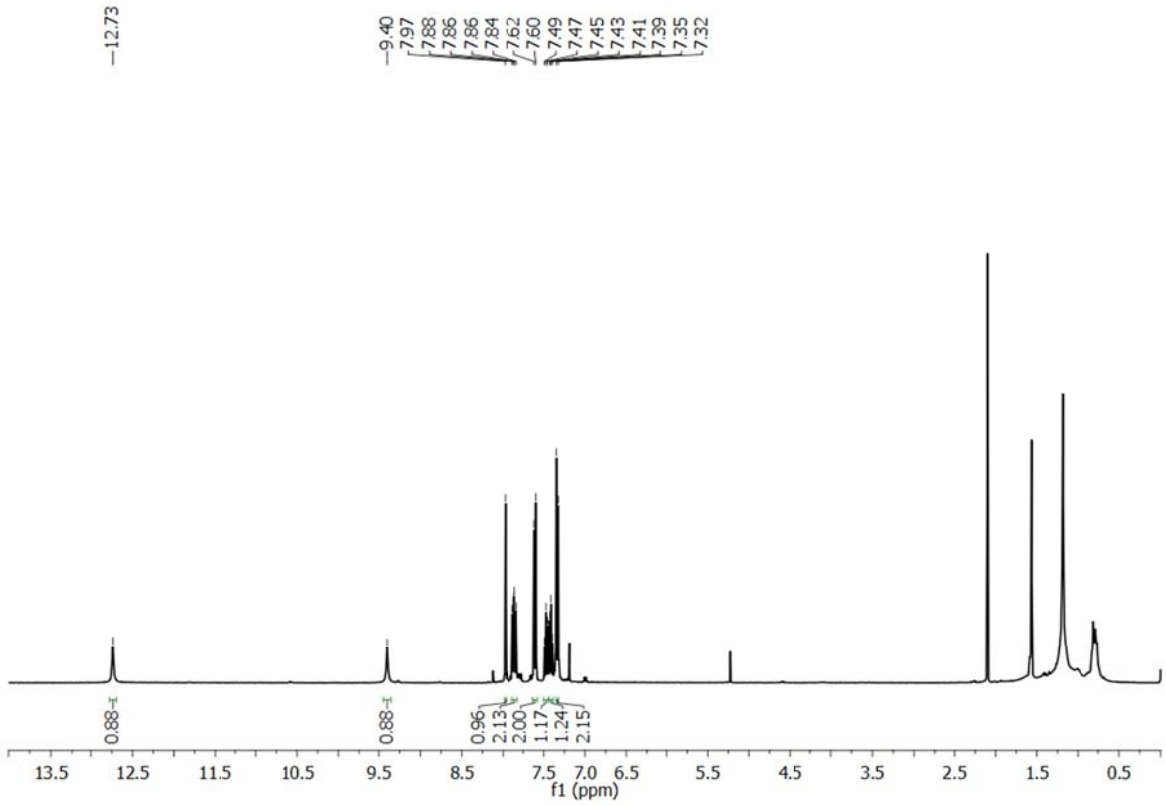

Figure S151. ^{1}H-NMR of compound **9e**.

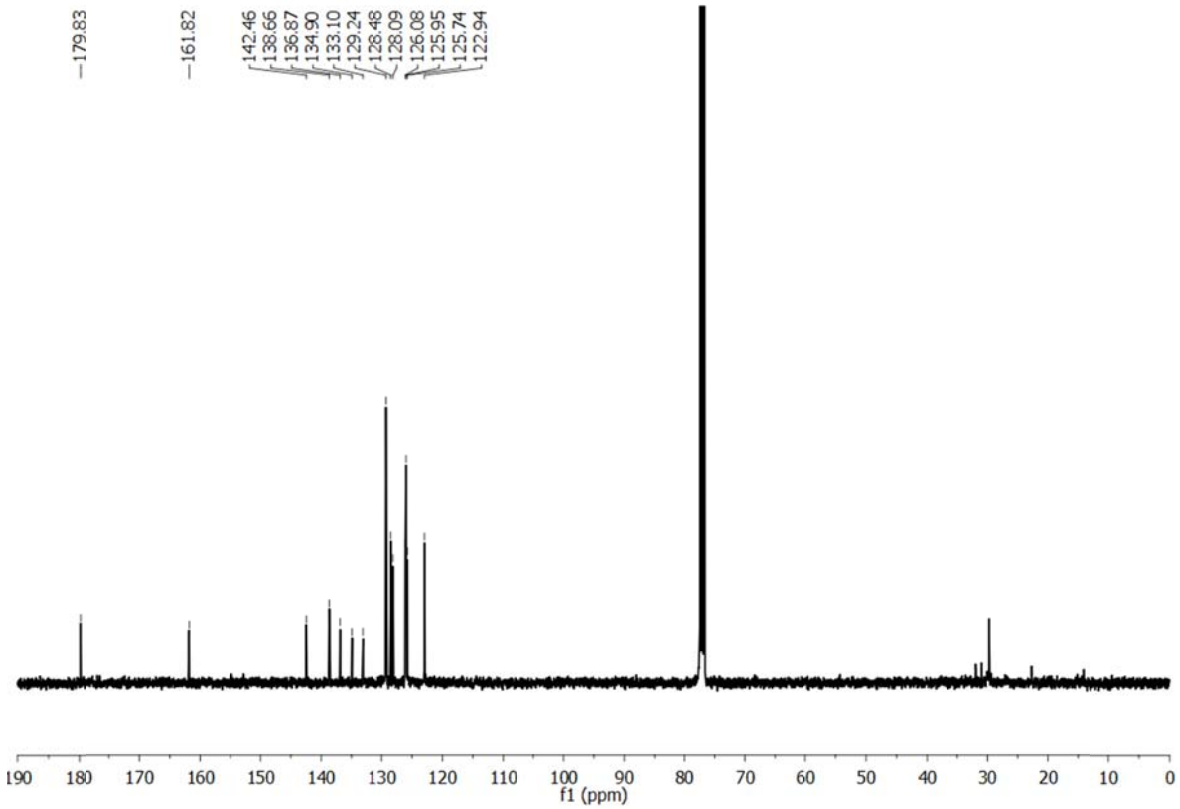

Figure S152. ^{13}C-NMR of compound **9e**.

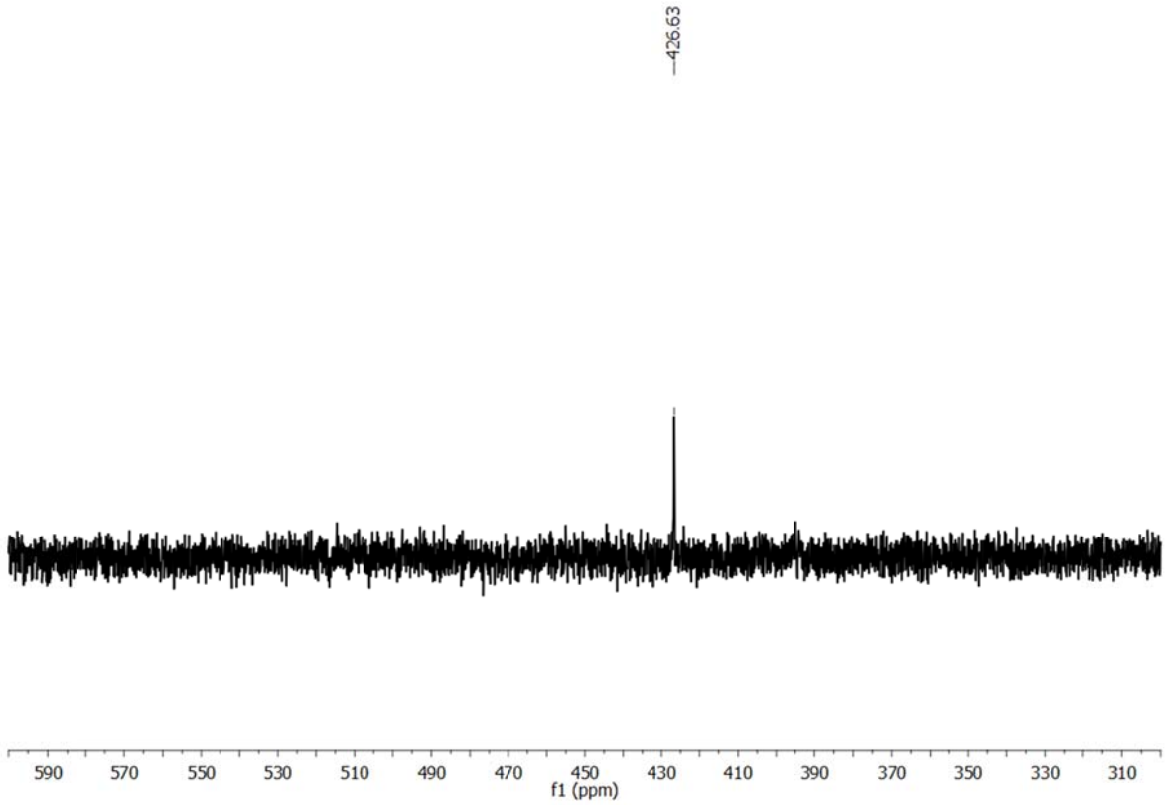

Figure S153. ^{77}Se-NMR of compound **9e**.

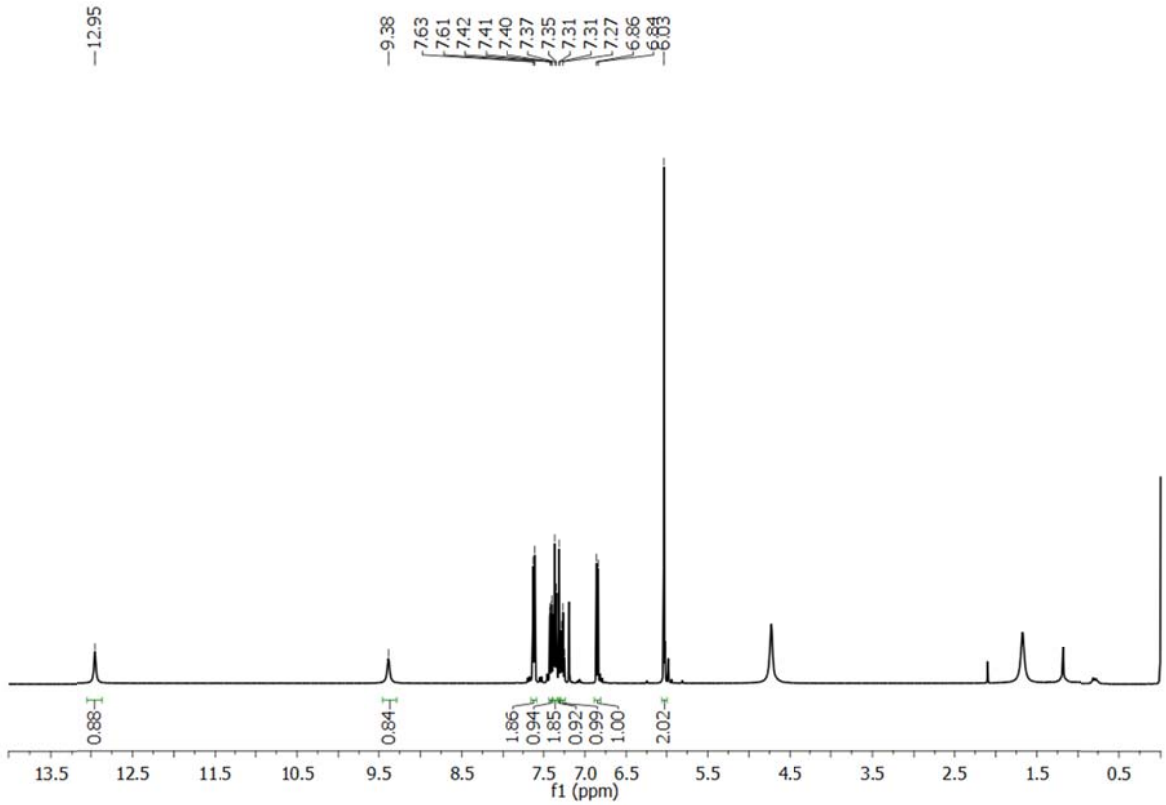

Figure S154. ^{1}H-NMR of compound **10a**.

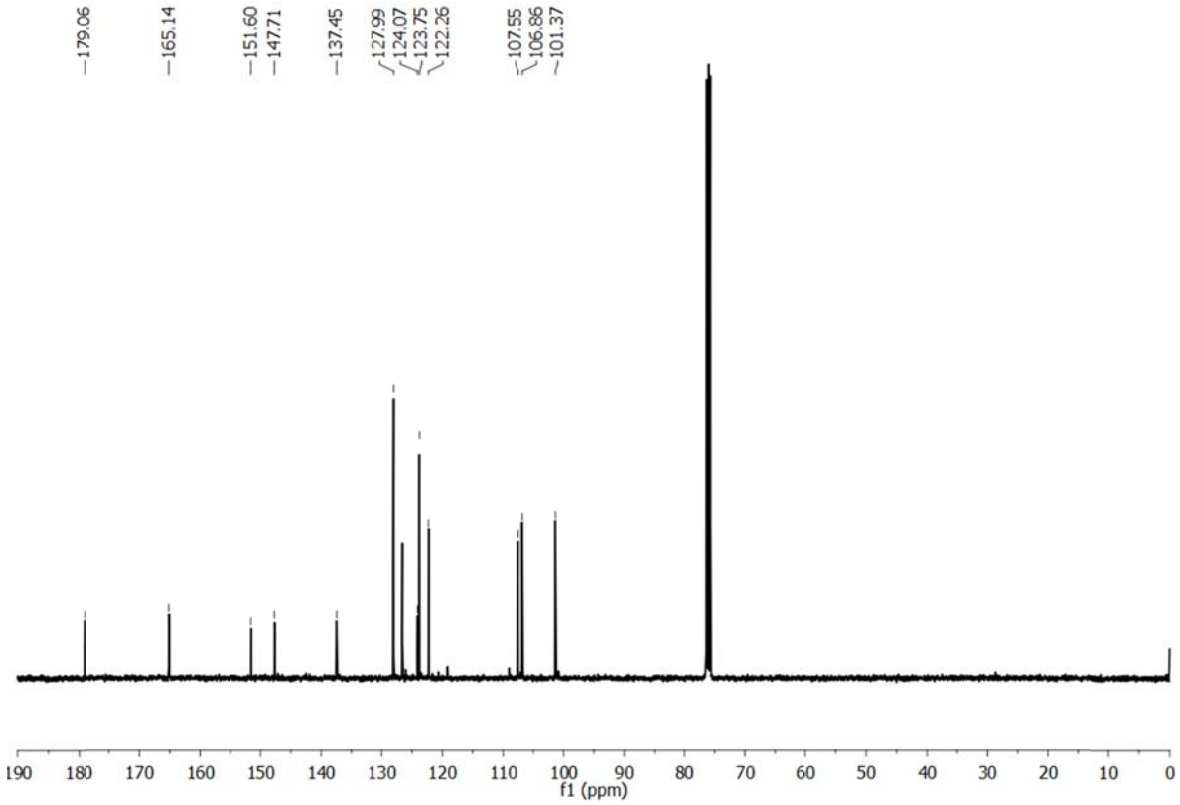

Figure S155. ^{13}C-NMR of compound **10a**.

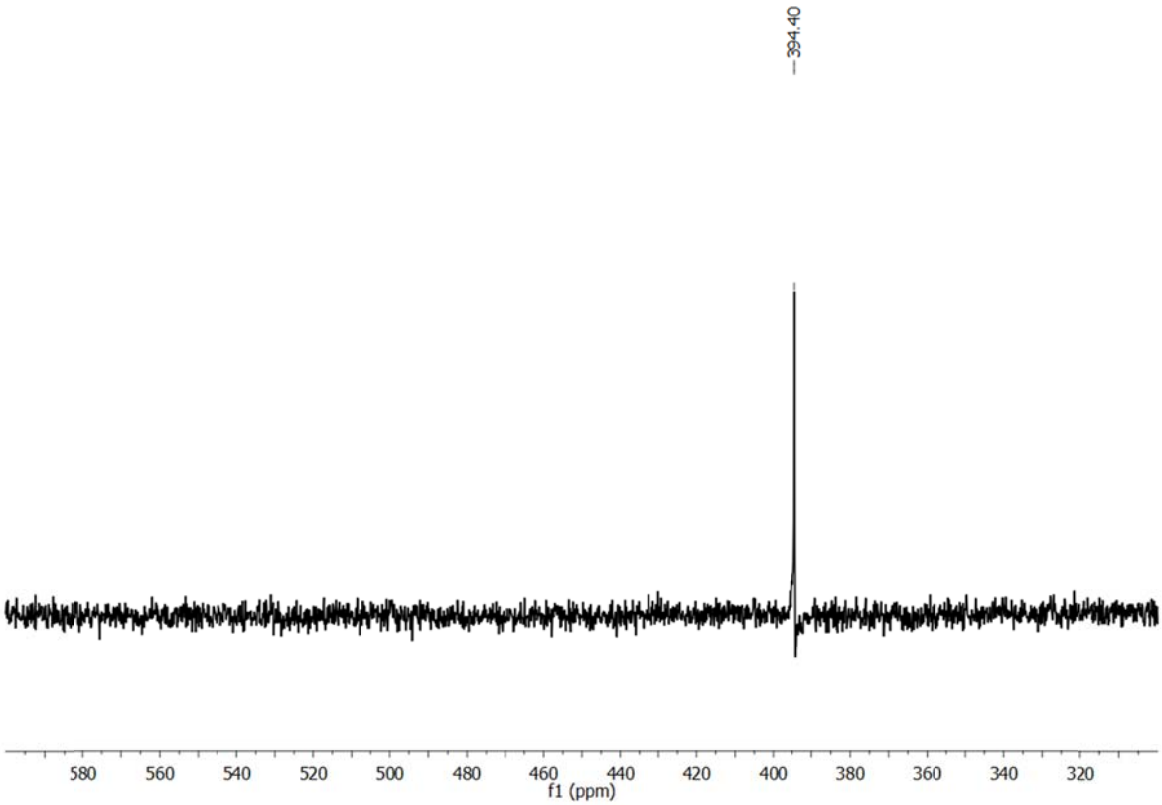

Figure S156. ^{77}Se-NMR of compound **10a**.

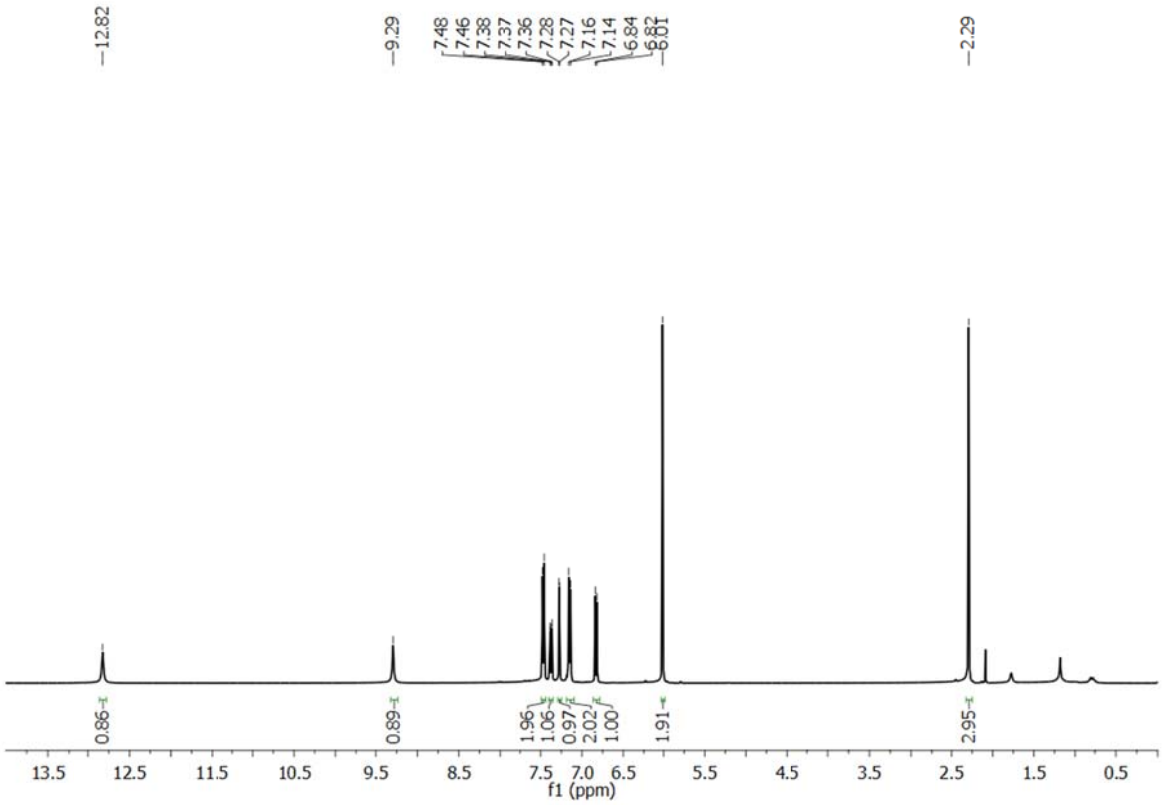

Figure S157. ^{1}H-NMR of compound **10b**.

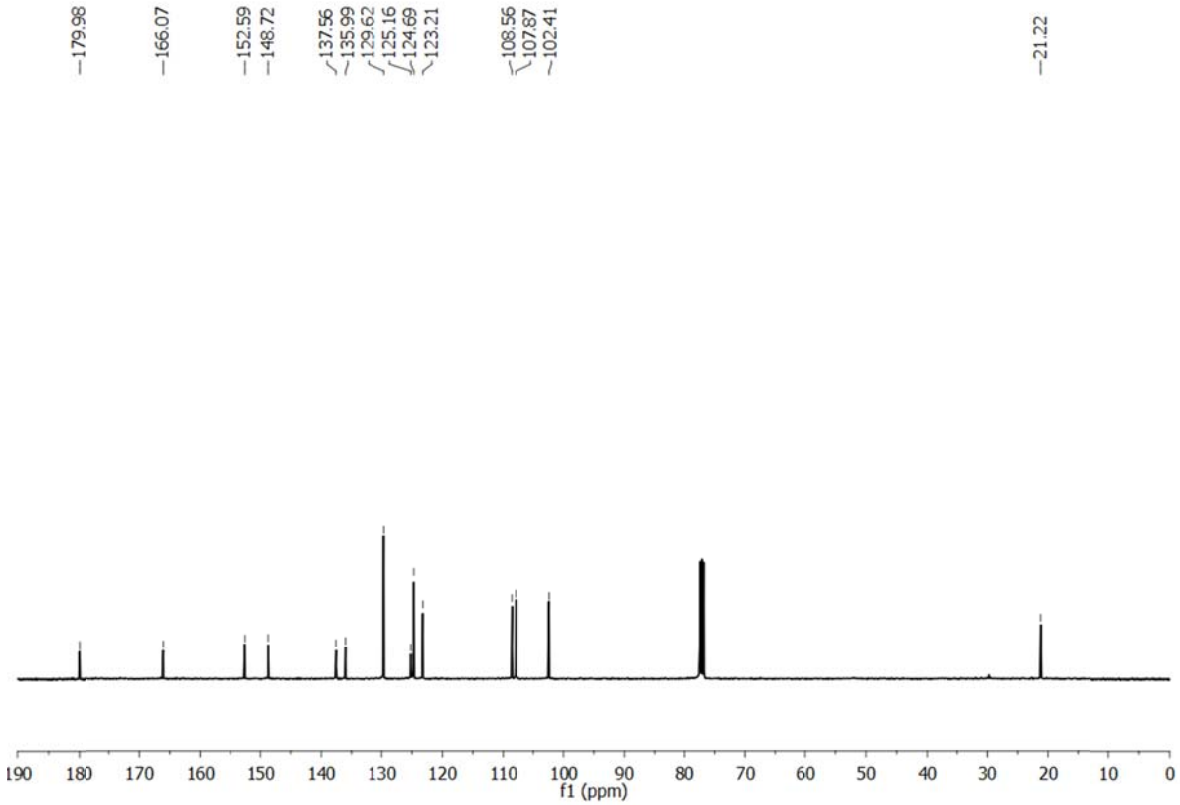

Figure S158. ^{13}C-NMR of compound **10b**.

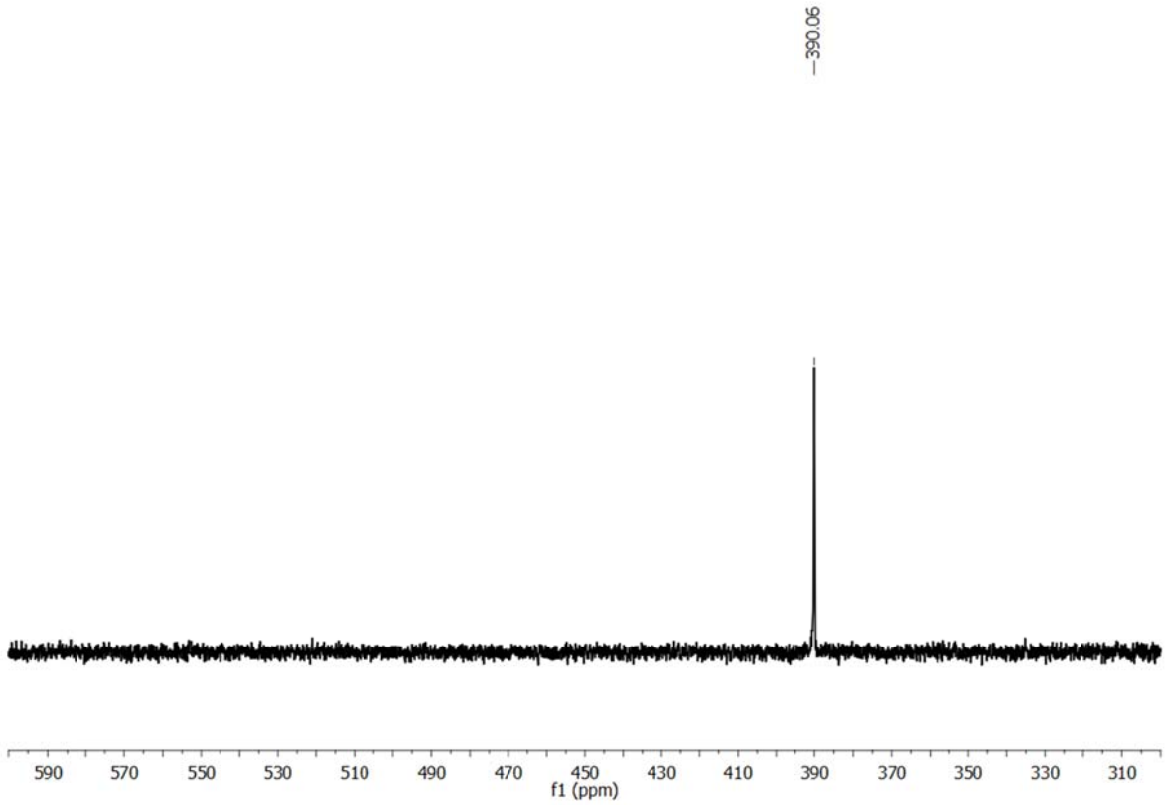

Figure S159. ^{77}Se-NMR of compound **10b**.

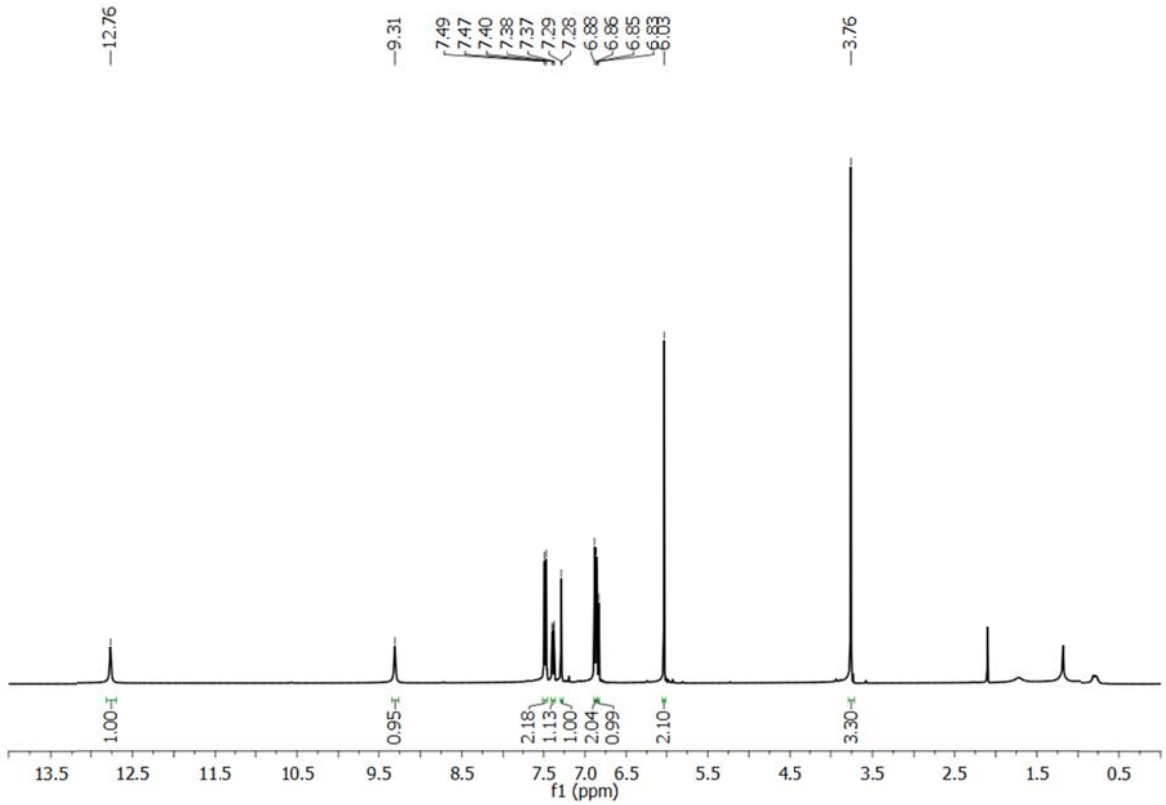

Figure S160. ^{1}H-NMR of compound **10c**.

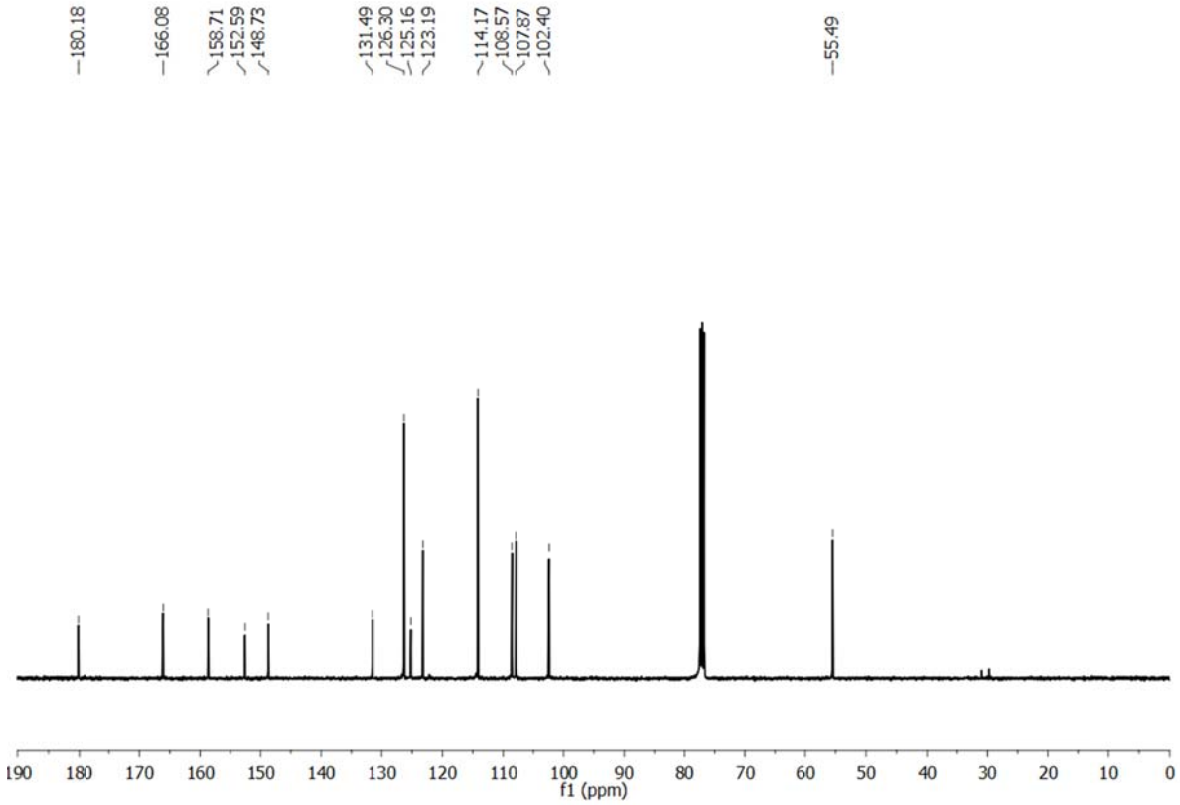

Figure S161. ^{13}C-NMR of compound **10c**.

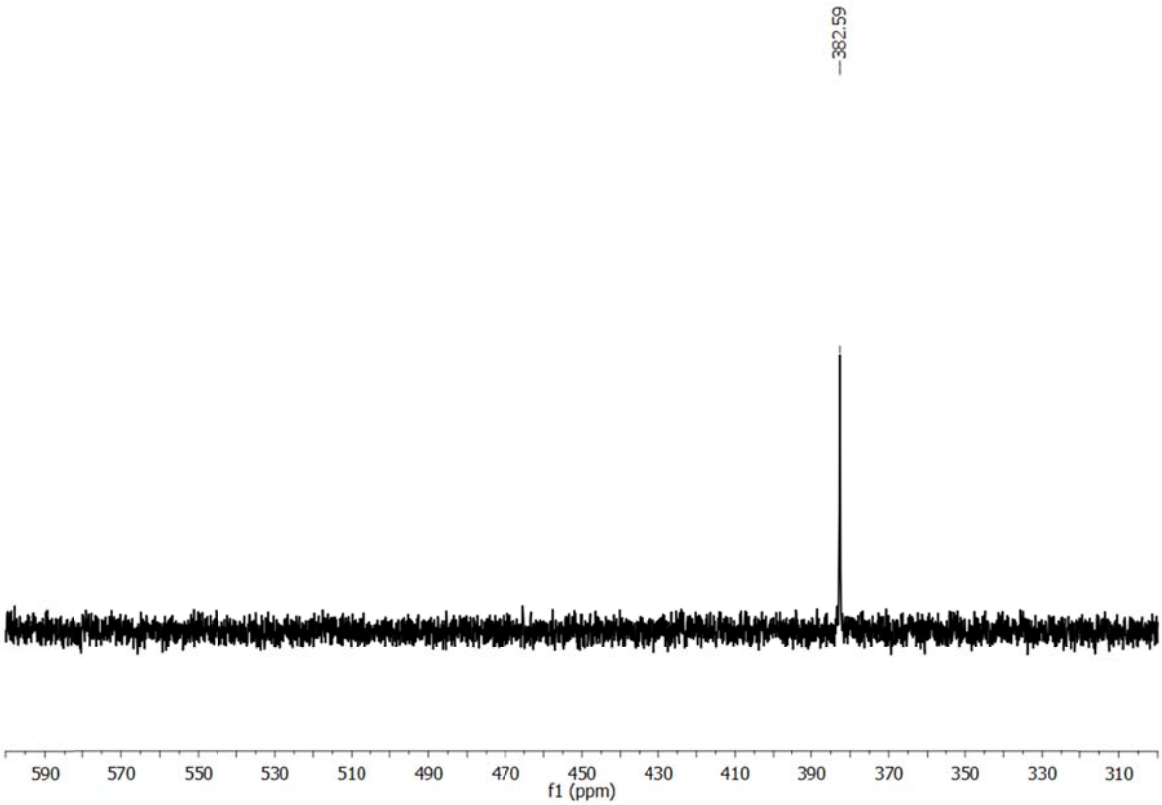

Figure S162. ^{77}Se-NMR of compound **10c**.

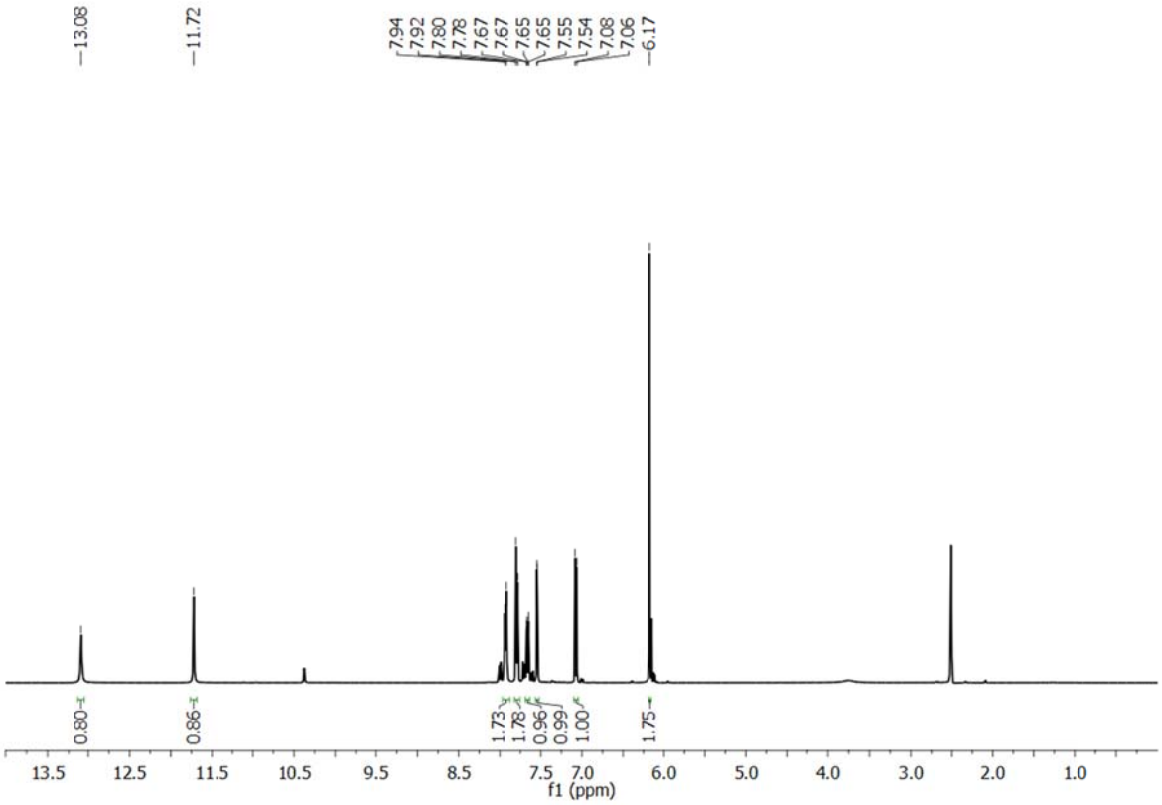

Figure S163. ^{1}H-NMR of compound **10d**.

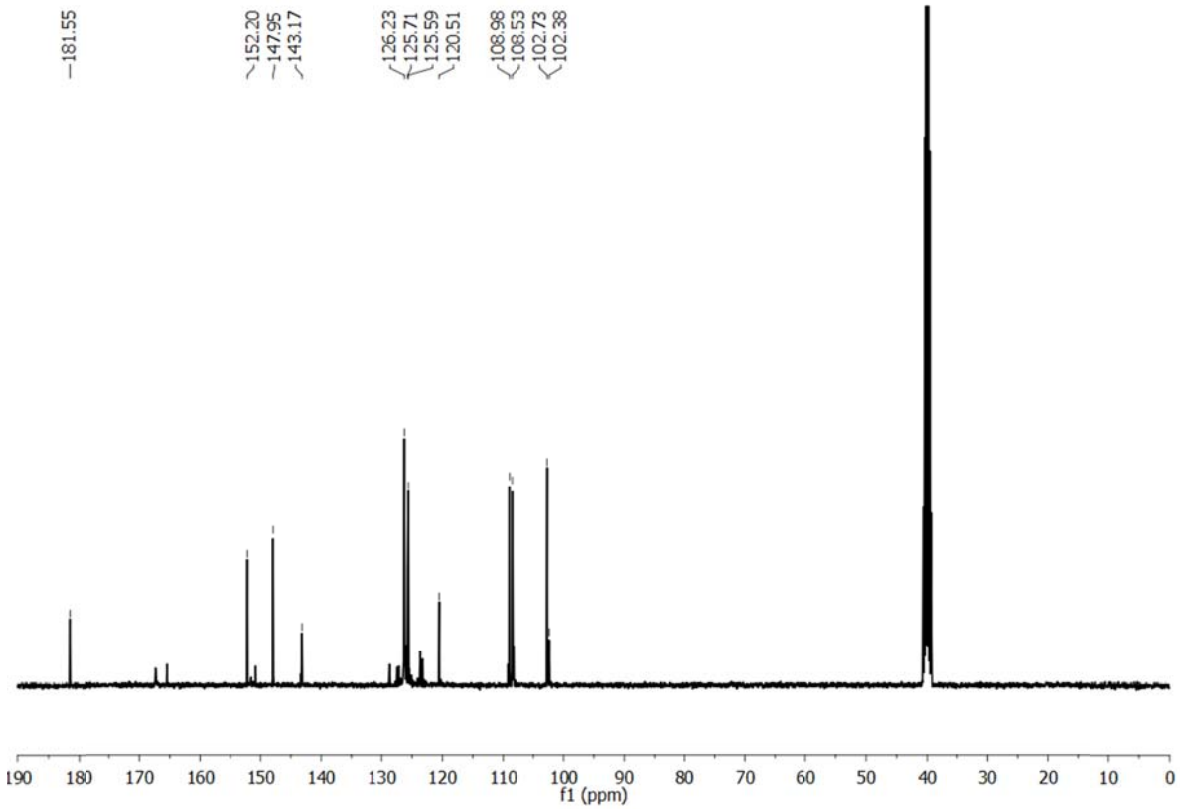

Figure S164. ^{13}C-NMR of compound **10d**.

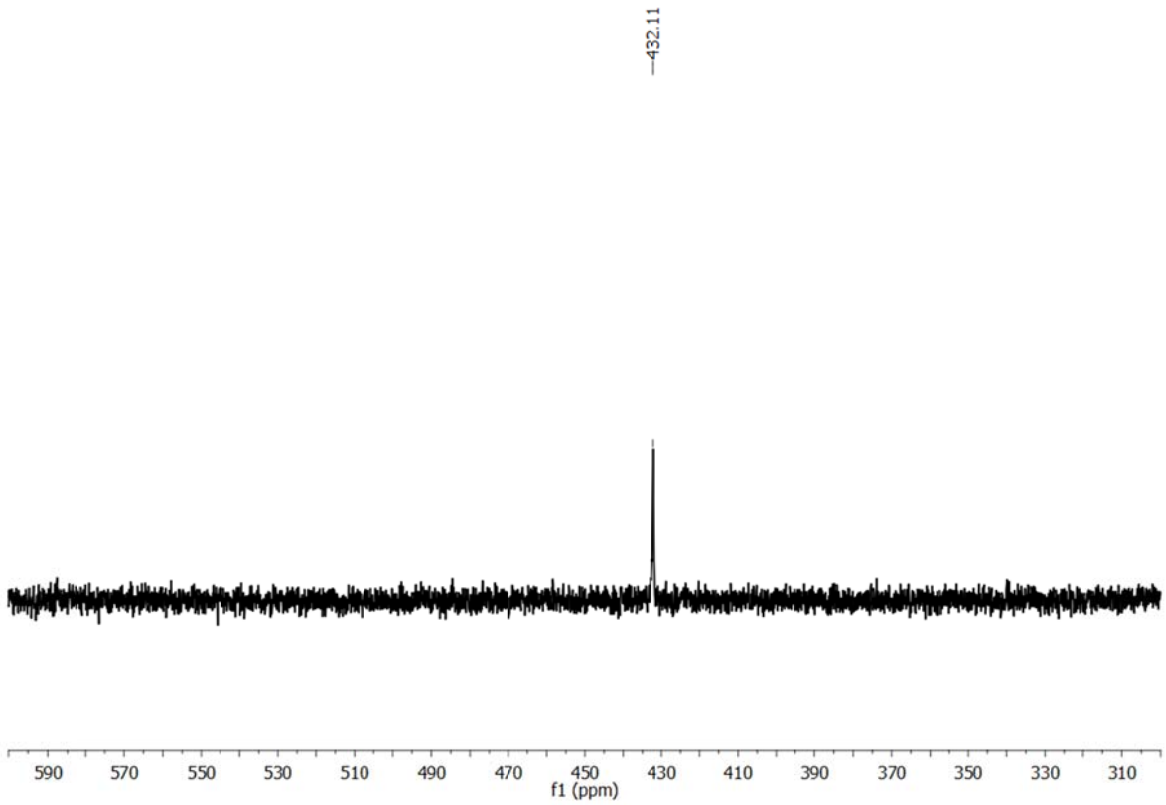

Figure S165. ^{77}Se-NMR of compound **10d**.

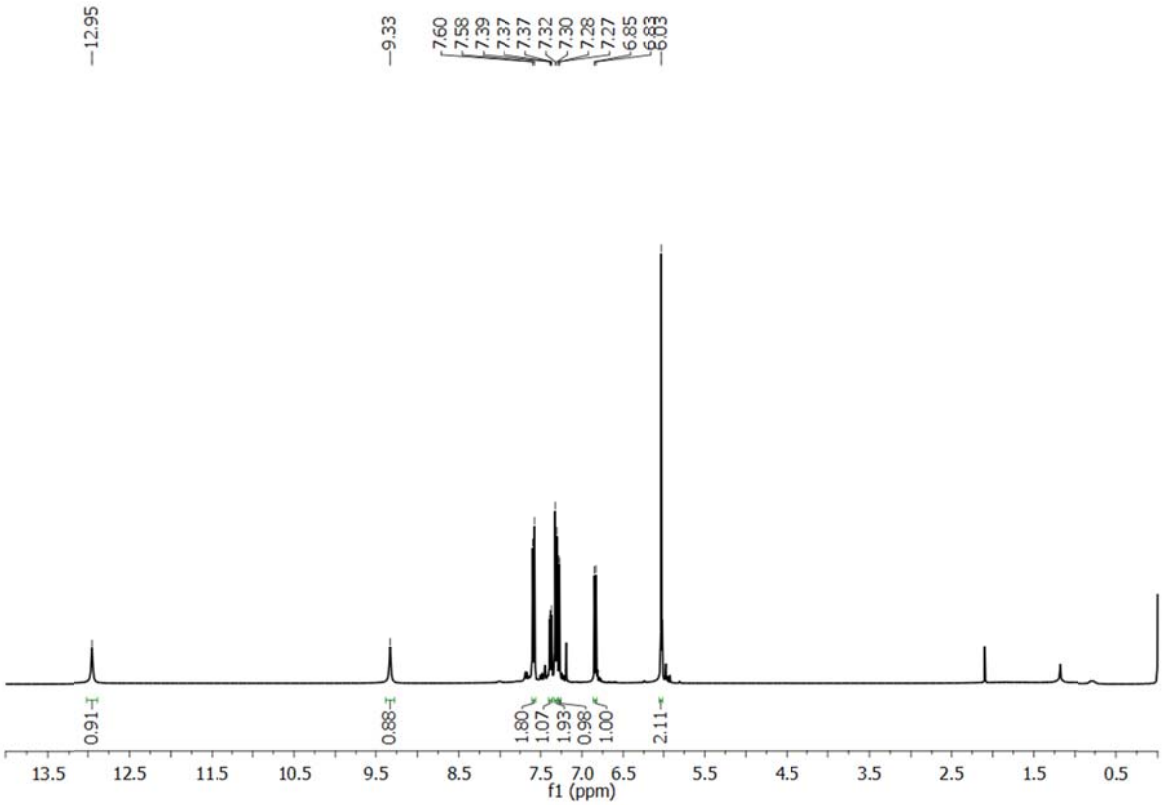

Figure S166. ^{1}H-NMR of compound **10e**.

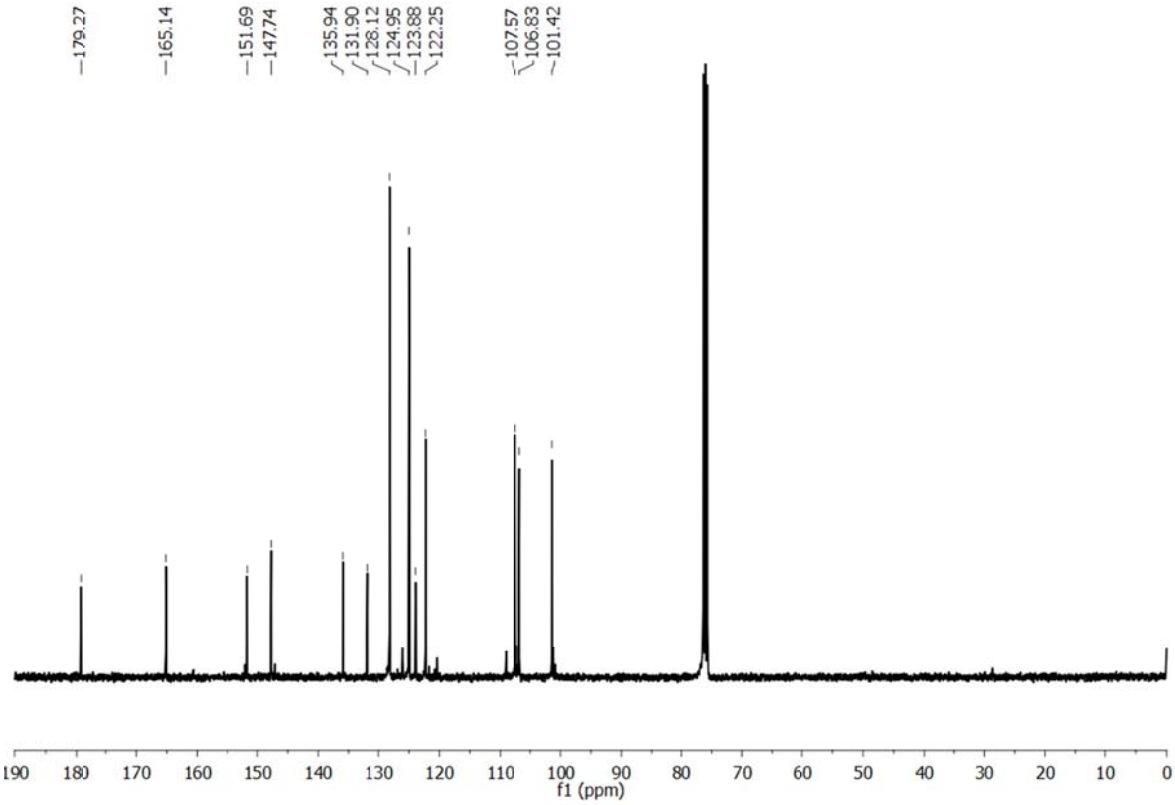

Figure S167. ^{13}C-NMR of compound **10e**.

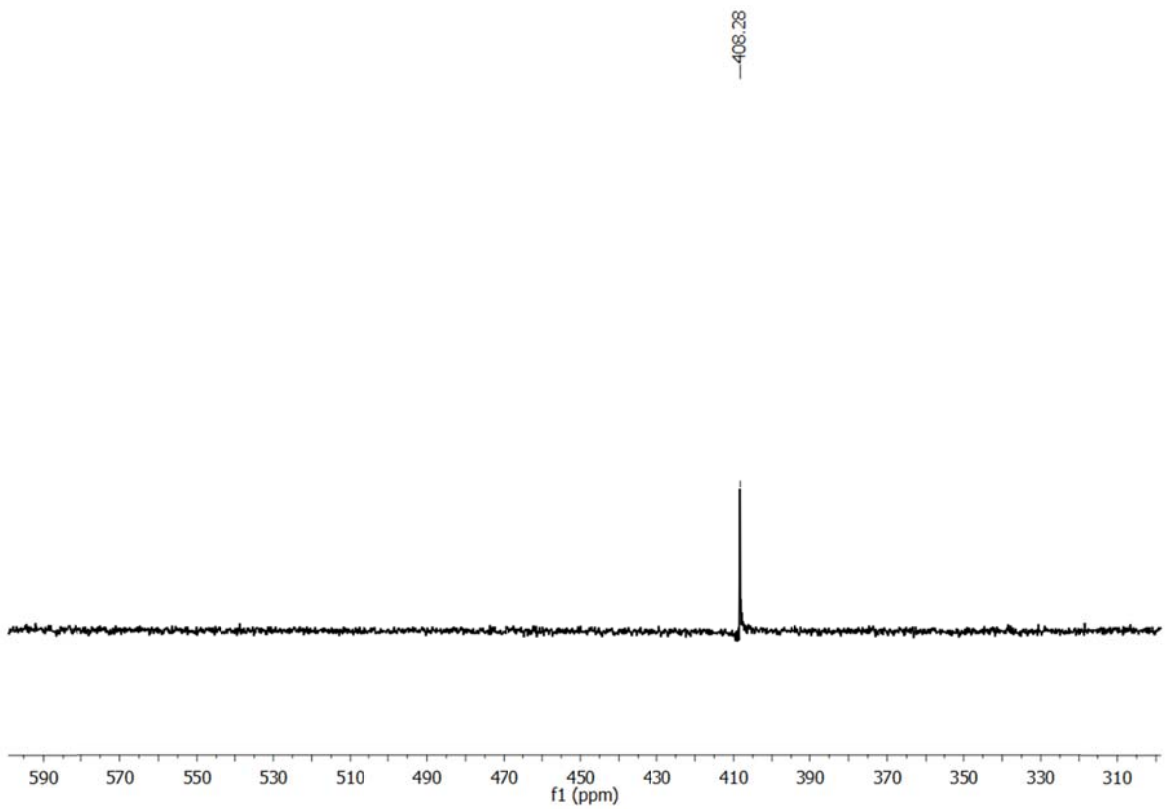

Figure S168. ^{77}Se-NMR of compound **10e**.