

Electronic supplementary information

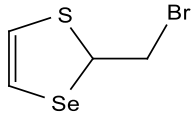
Polyunsaturated sulfur/selenium-containing products based on regio- and stereoselective nucleophilic addition and substitution reactions of 1,2-bis[(Z)-2-(vinylsulfanyl)ethenyl] diselanet†

Svetlana V. Amosova,* Andrey S. Filippov, Nataliya A. Makhaeva, Alexander I. Albanov and Vladimir A. Potapov

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¹H

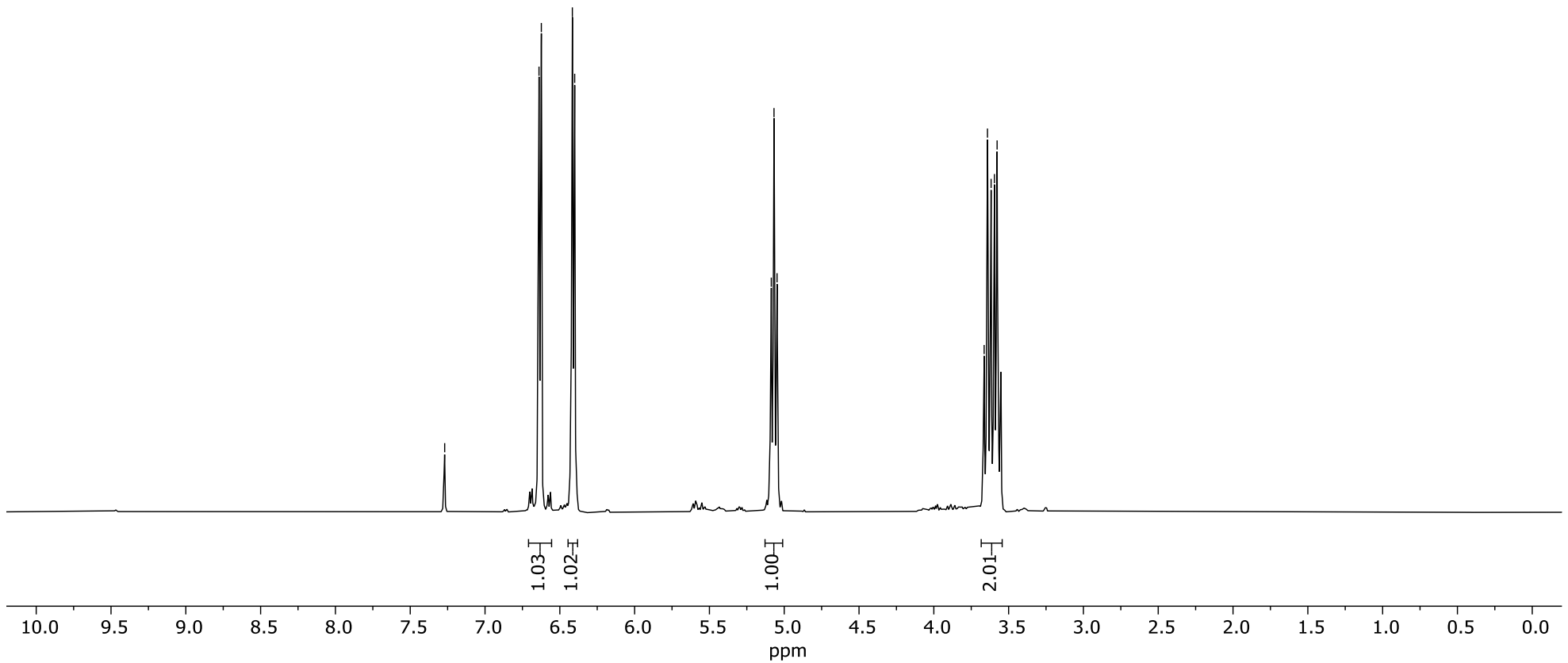


— 7.27

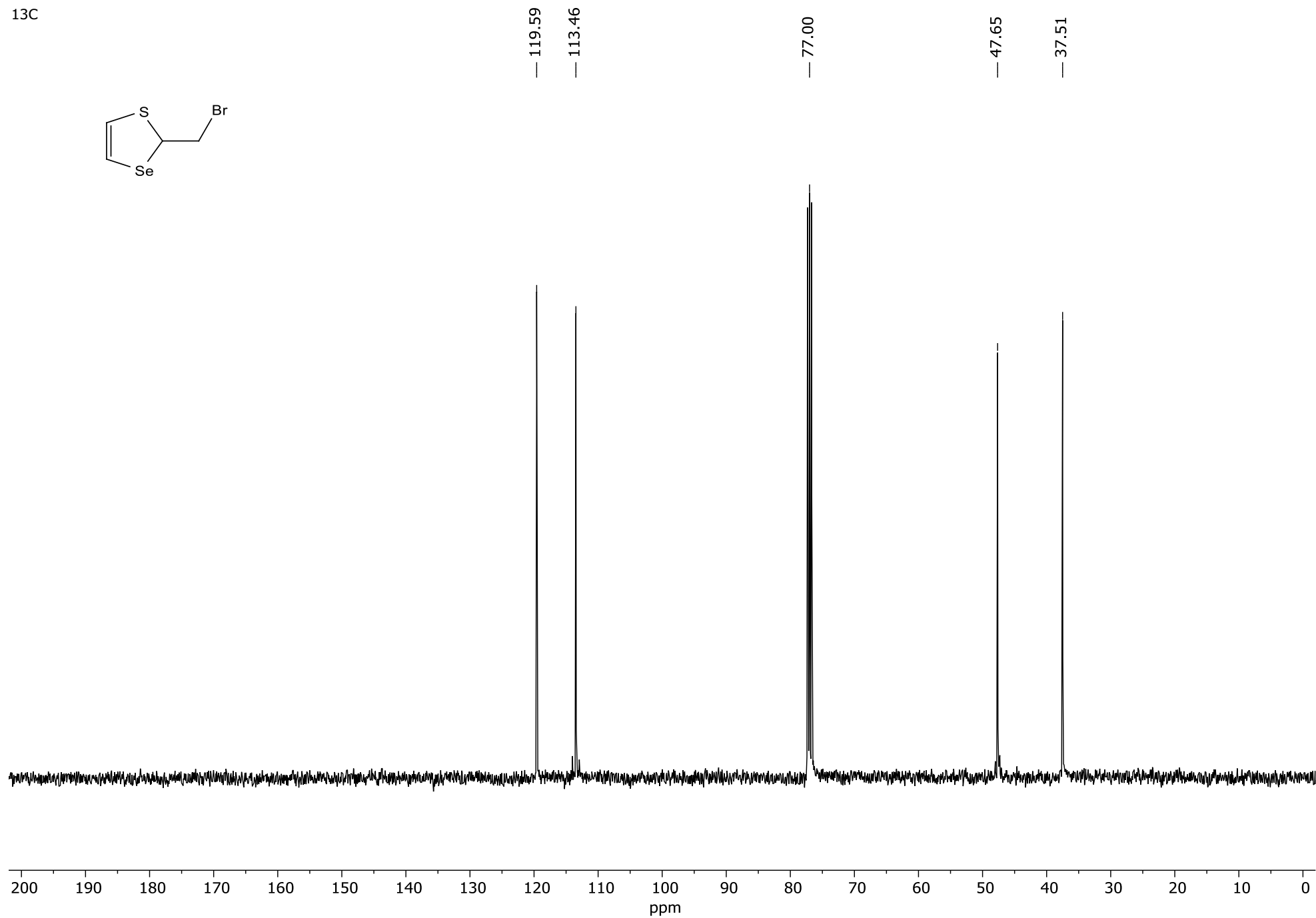
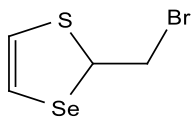
6.64
6.62
6.42
6.40

5.09
5.07
5.05

3.66
3.64
3.62
3.59
3.58

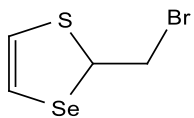


¹H NMR spectrum of 2-(bromomethyl)-1,3-thiaselenole

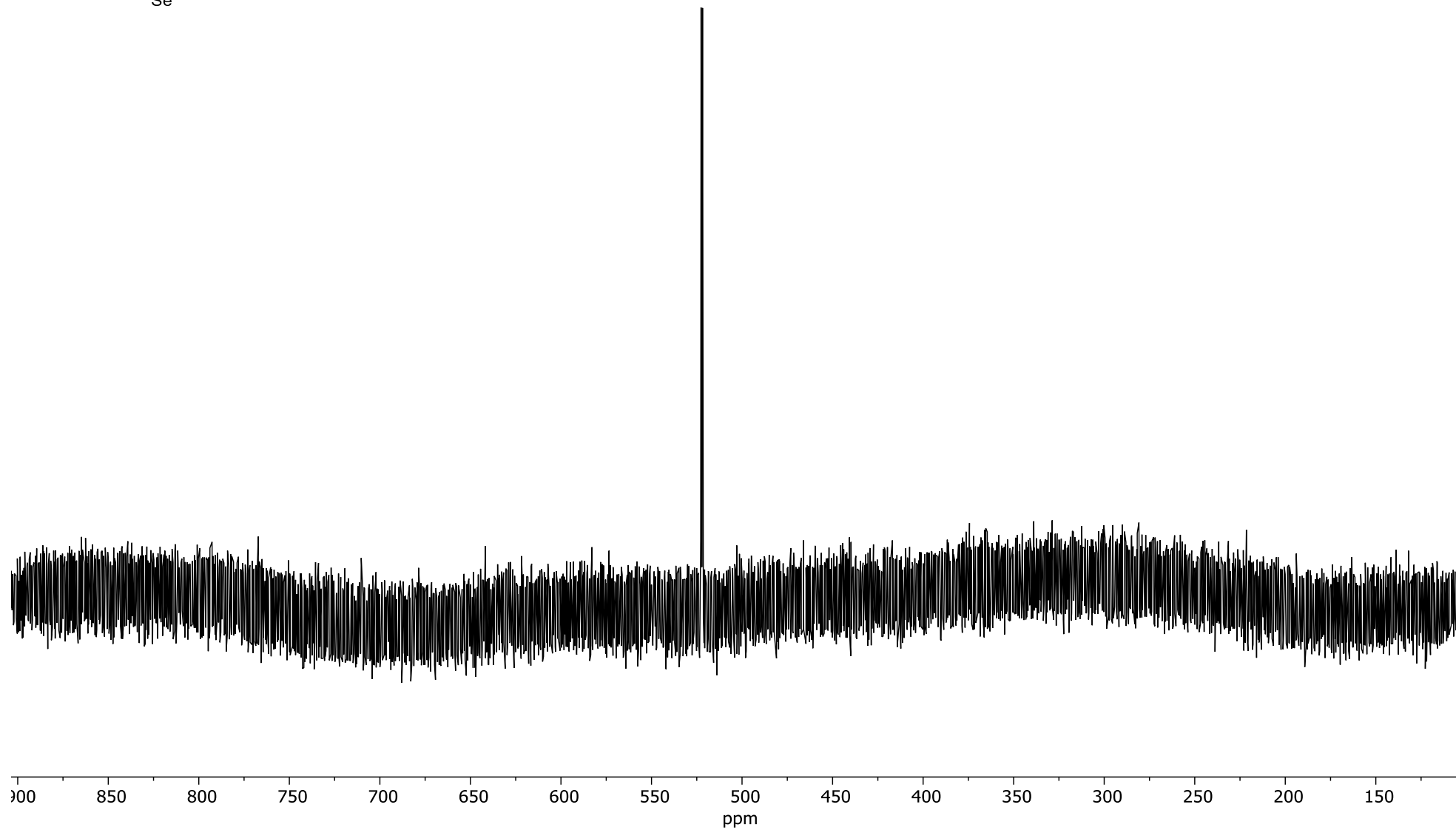


¹³C NMR spectrum of 2-(bromomethyl)-1,3-thiaselenole

^{77}Se

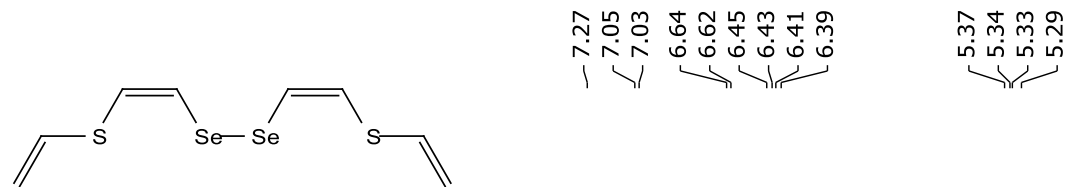


— 522.26

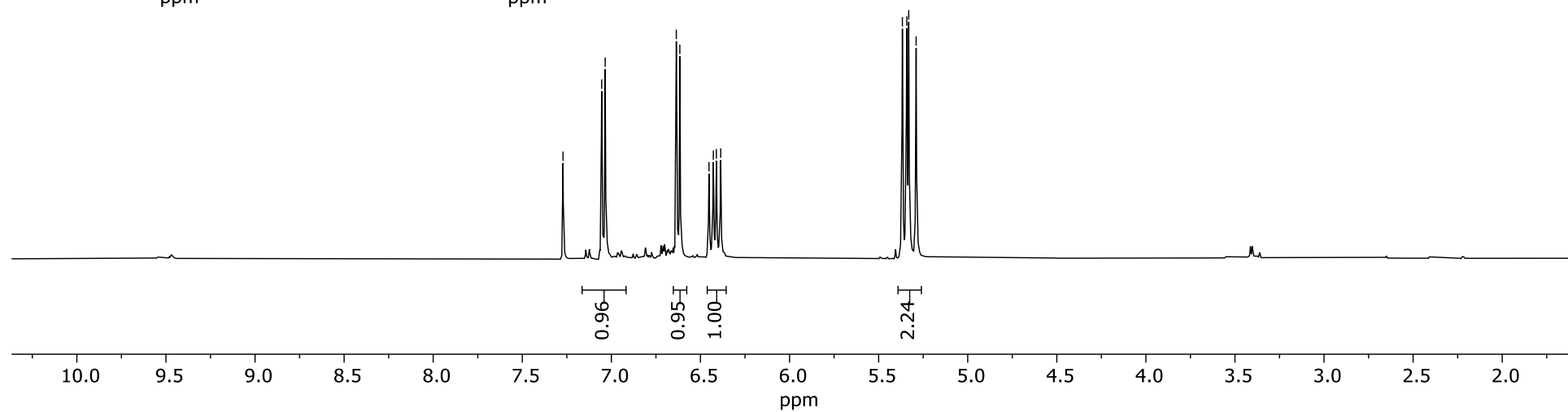
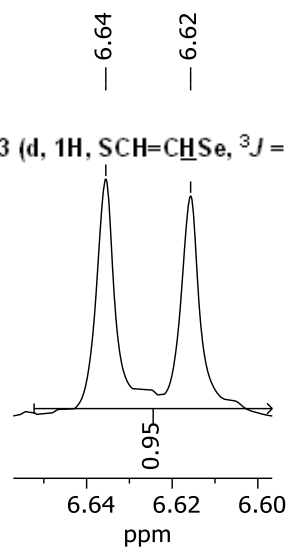
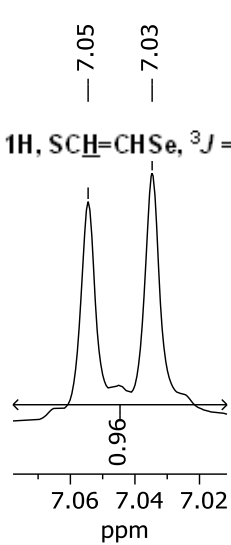


^{77}Se NMR spectrum of 2-(bromomethyl)-1,3-thiaselenole

¹H



7.04 (d, 1H, SCH=CHSe, ³J = 7.9 Hz) 6.63 (d, 1H, SCH=CHSe, ³J = 7.9 Hz)



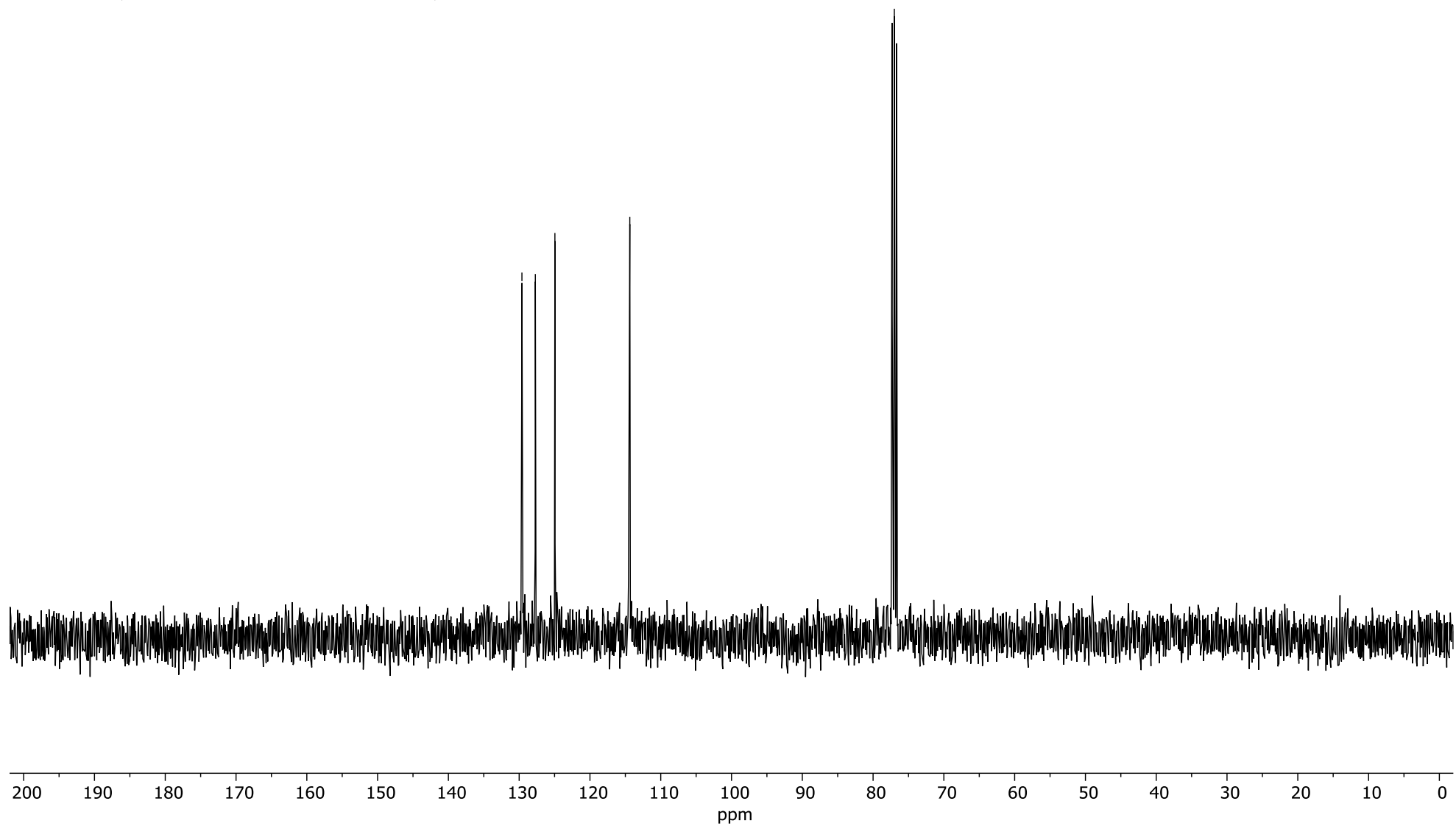
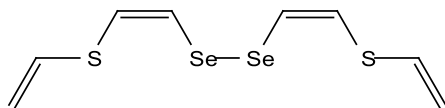
¹H NMR spectrum of 1,2-bis[(Z)-2-(vinylsulfanyl)ethenyl]diselane (1)

13C

~ 129.61
~ 127.72
~ 124.95

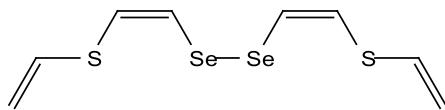
— 114.37

— 77.00

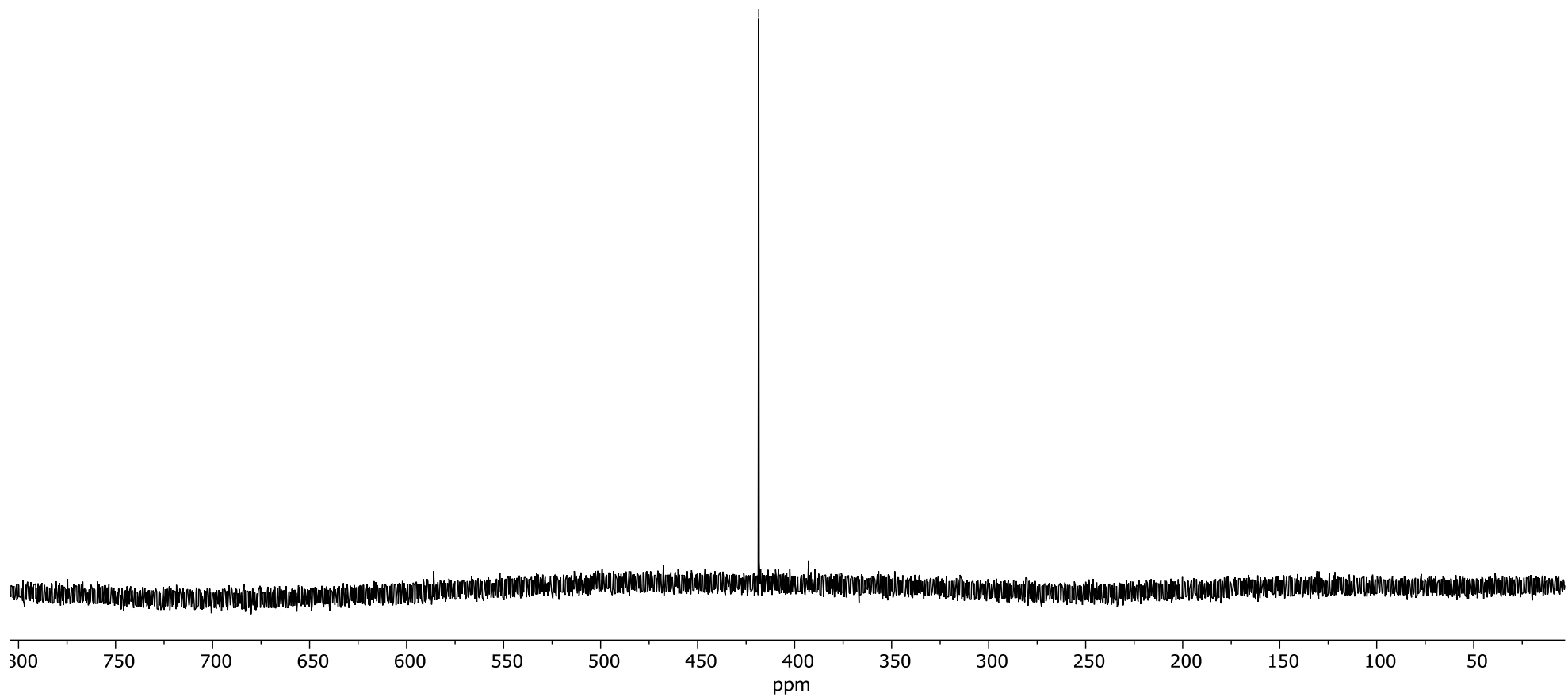


¹³C NMR spectrum of 1,2-bis[(Z)-2-(vinylsulfanyl)ethenyl]diselane (1)

⁷⁷Se

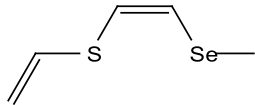


— 418.48



⁷⁷Se NMR spectrum of 1,2-bis[(Z)-2-(vinylsulfanyl)ethenyl]diselane (1)

¹H



7.27
6.66
6.64
6.58
6.56
6.47
6.44
6.43
6.40
5.34
5.32
5.32
5.28

6.66

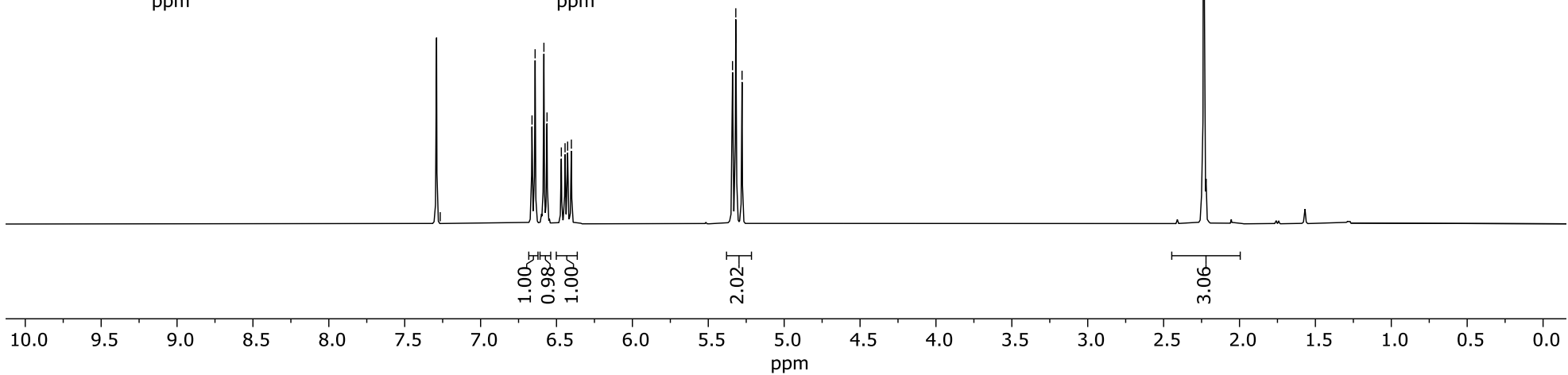
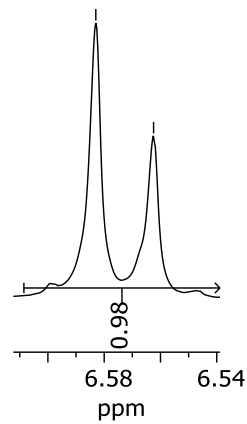
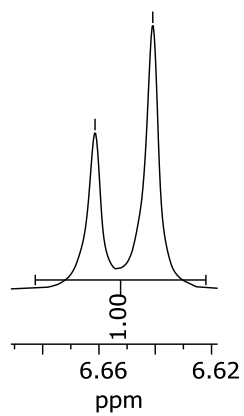
6.64

6.58

6.56

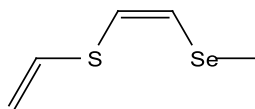
6.65 (d, 1H, SCH=CHSe, ³J = 8.3 Hz)

6.57 (d, 1H, SCH=CHSe, ³J = 8.3 Hz)



¹H NMR spectrum of (Z)-2-(methylselanyl)ethenyl vinyl sulfide (2a)

13C

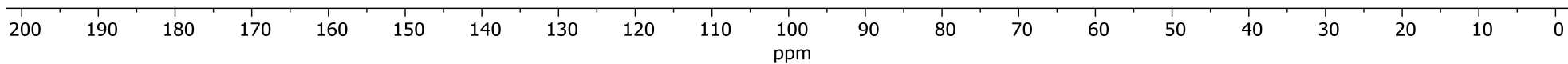


~ 129.93
/ 124.65
/ 122.38
— 113.27

— 7.18

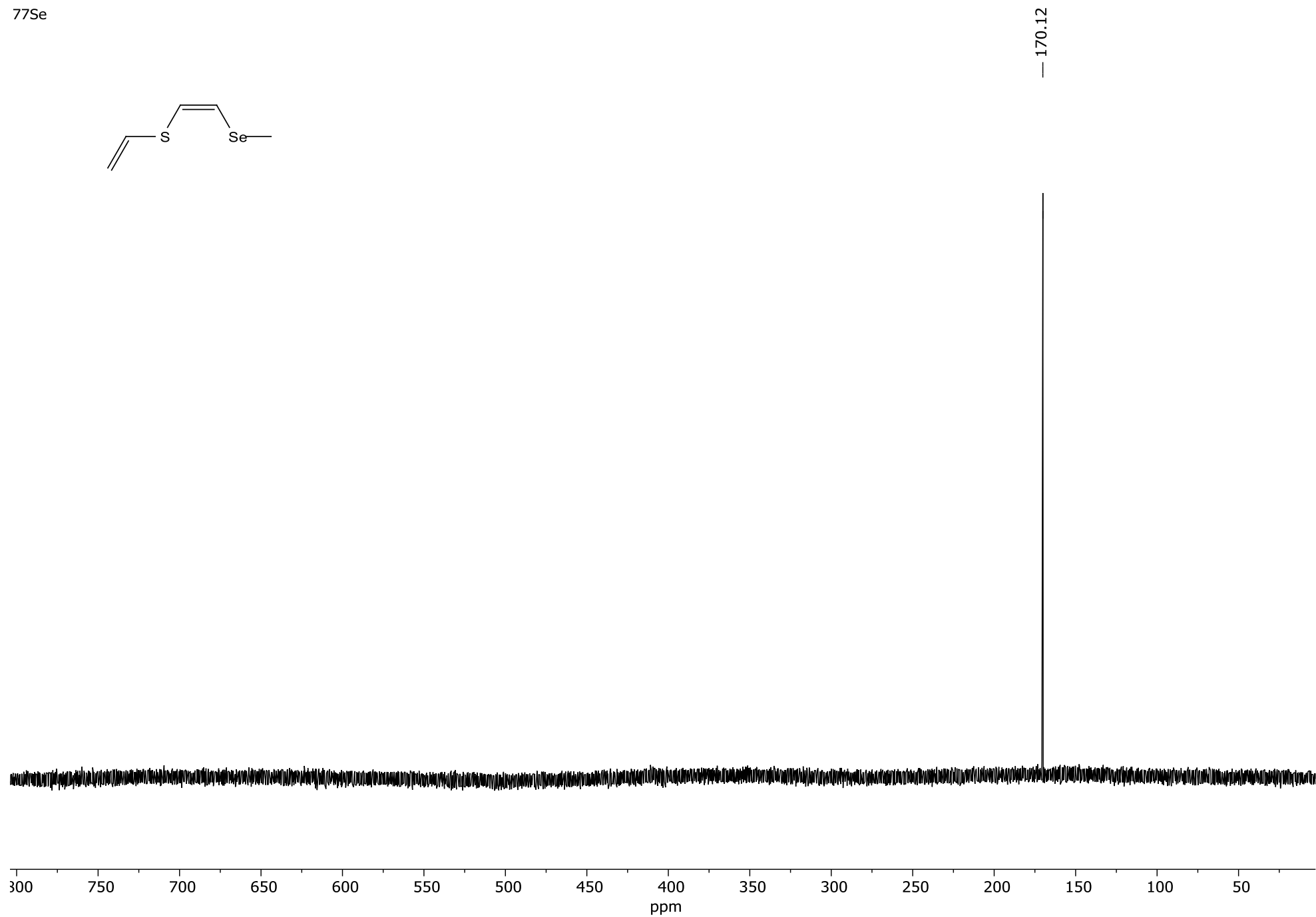
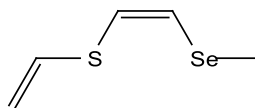
— 125.18
— 124.65
— 124.11

125.0
124.5
ppm

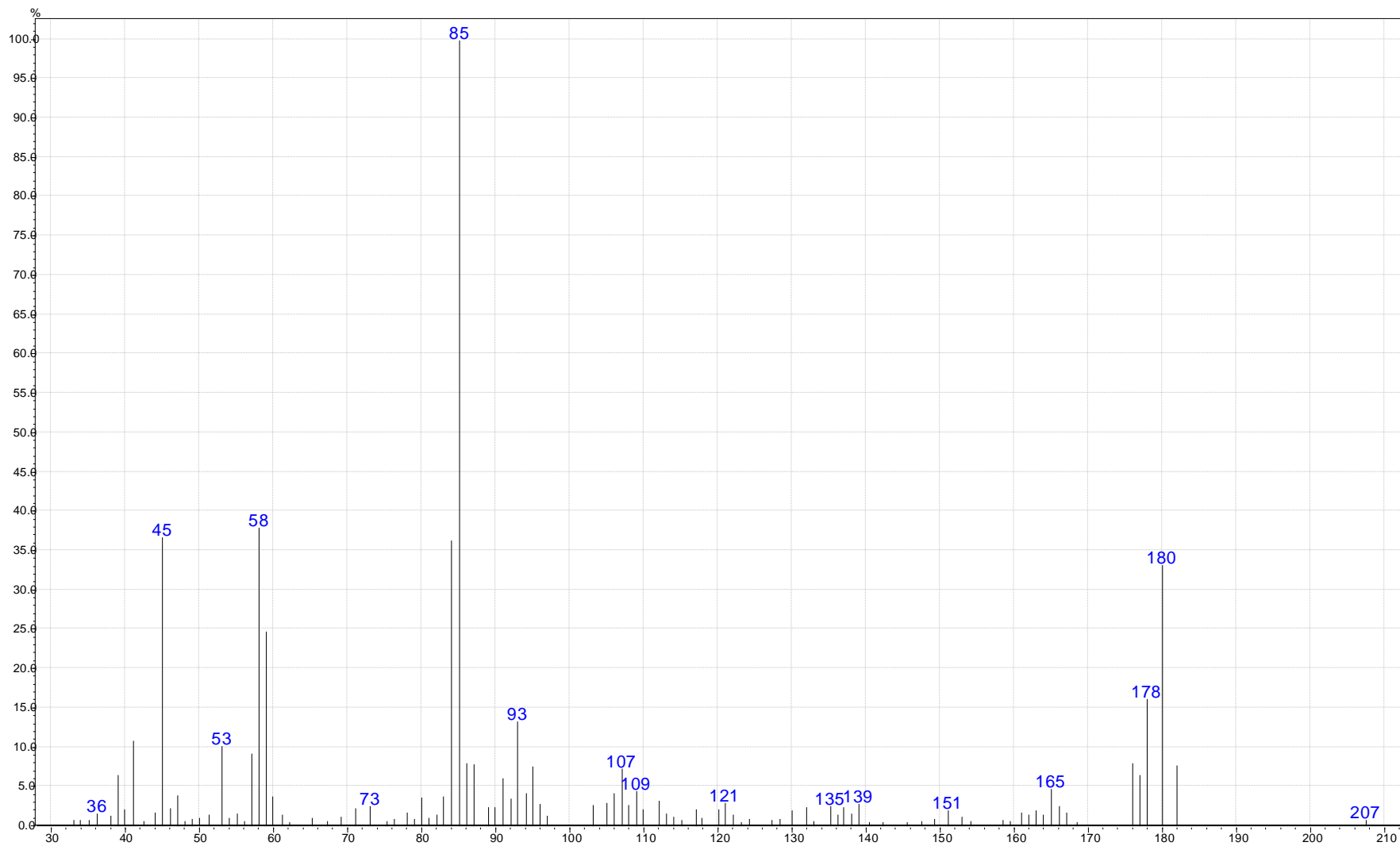
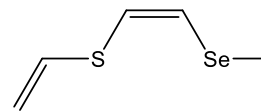


¹³C NMR spectrum of (Z)-2-(methylselanyl)ethenyl vinyl sulfide (2a)

⁷⁷Se

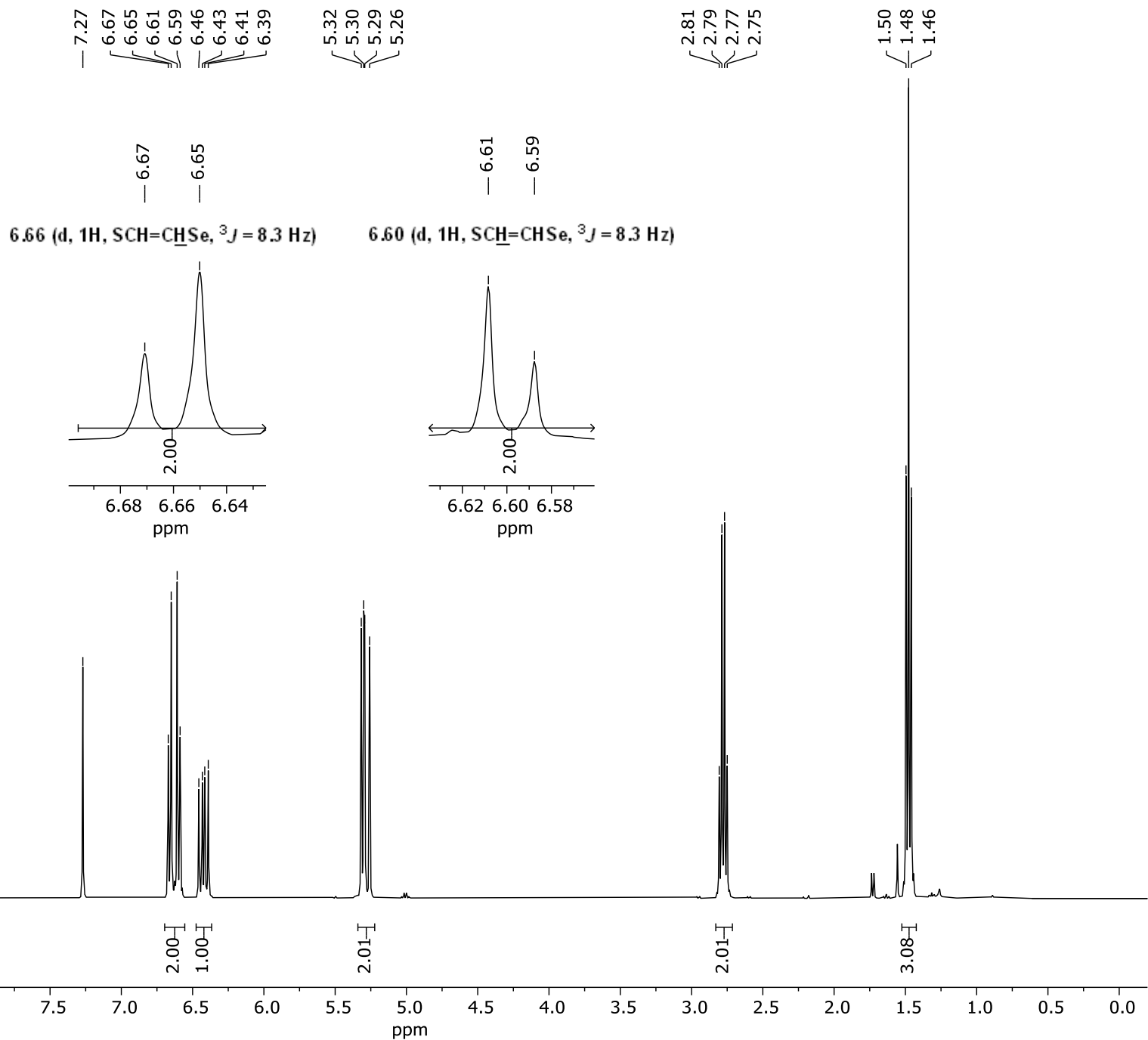
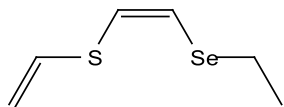


⁷⁷Se NMR spectrum of (Z)-2-(methylselanyl)ethenyl vinyl sulfide (2a)



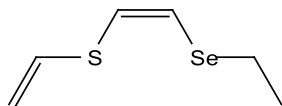
Mass-spectrum of (Z)-2-(methylselanyl)ethenyl vinyl sulfide (2a)

¹H



¹H NMR spectrum of (Z)-2-(ethylselanyl)ethenyl vinyl sulfide (2b)

13C



— 130.06

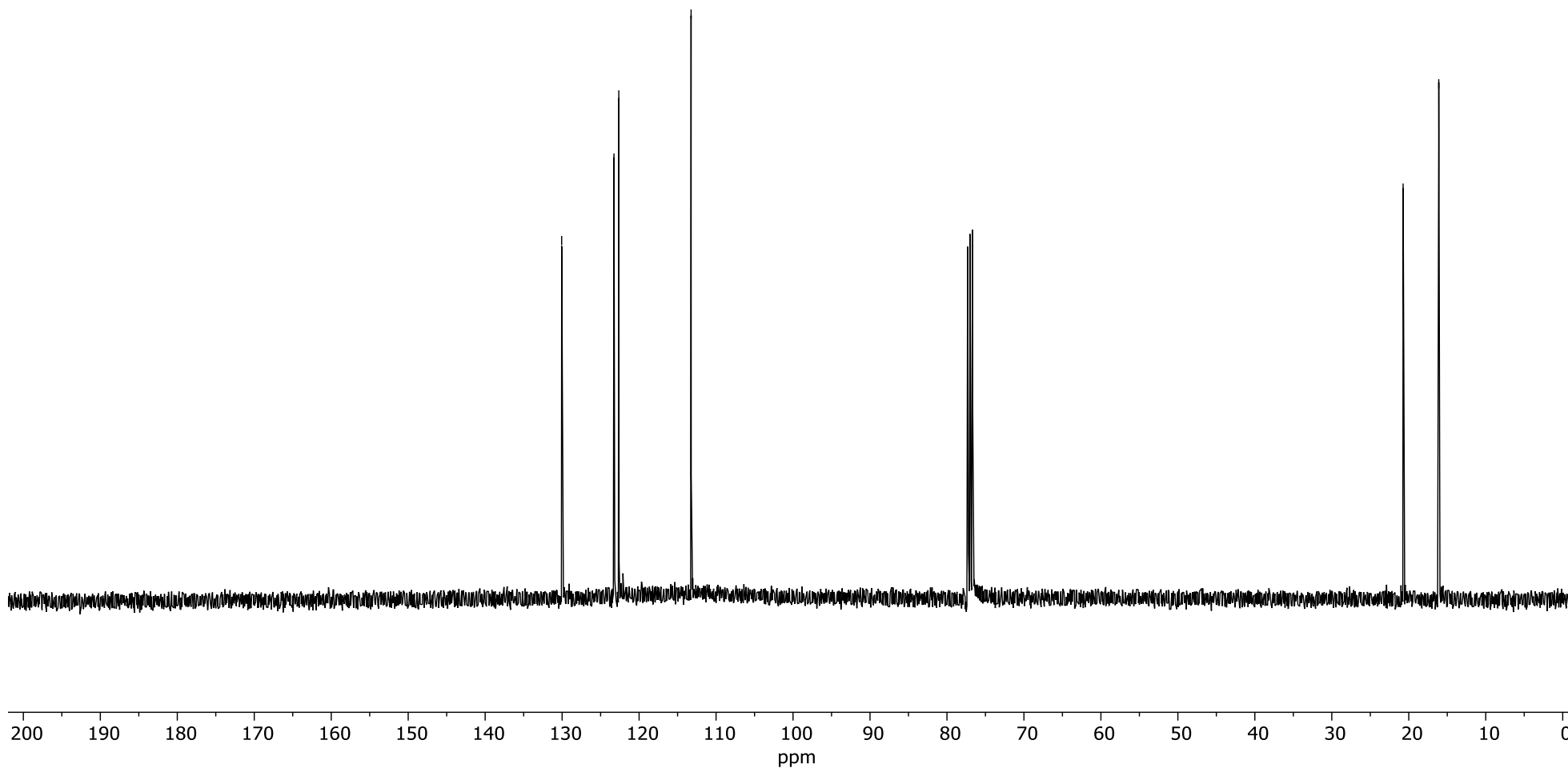
— 123.26

— 122.64

— 113.25

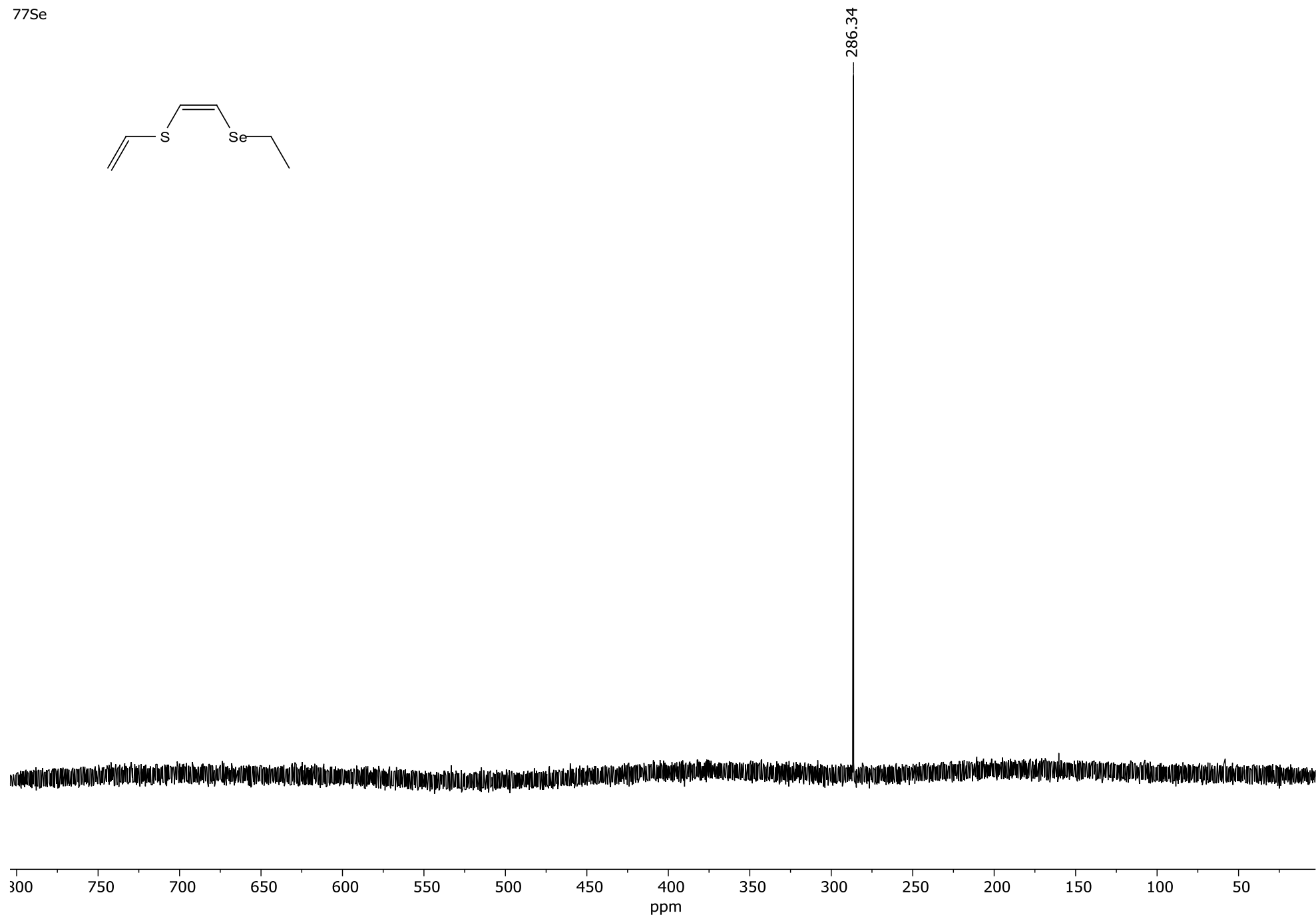
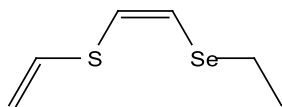
— 20.73

— 16.10

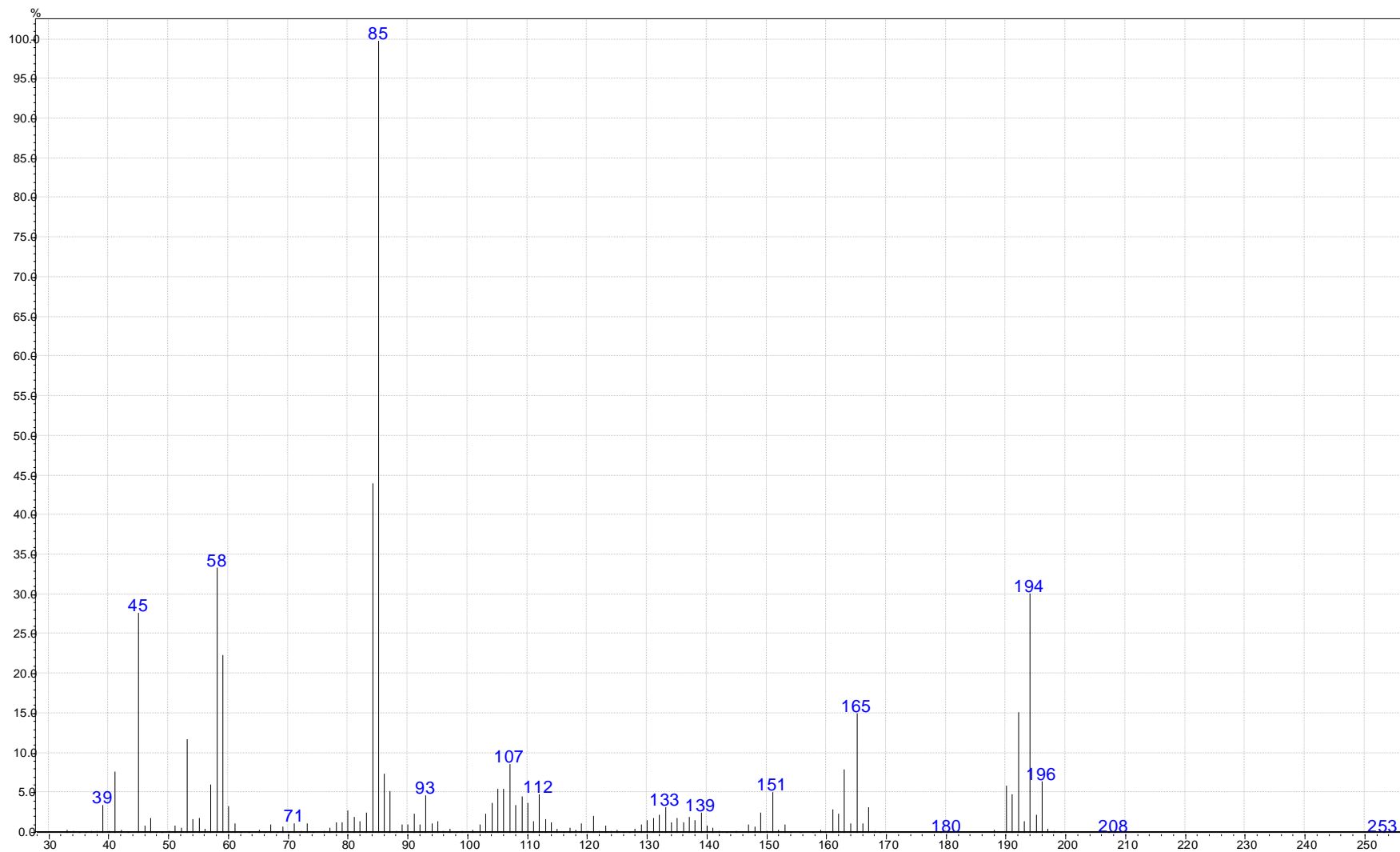
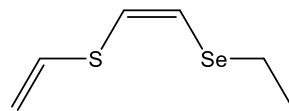


¹³C NMR spectrum of (Z)-2-(ethylselanyl)ethenyl vinyl sulfide (2b)

⁷⁷Se

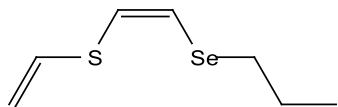


⁷⁷Se NMR spectrum of (*Z*)-2-(ethylselanyl)ethenyl vinyl sulfide (**2b**)



Mass spectrum of (Z)-2-(ethylselanyl)ethenyl vinyl sulfide (2b)

¹H



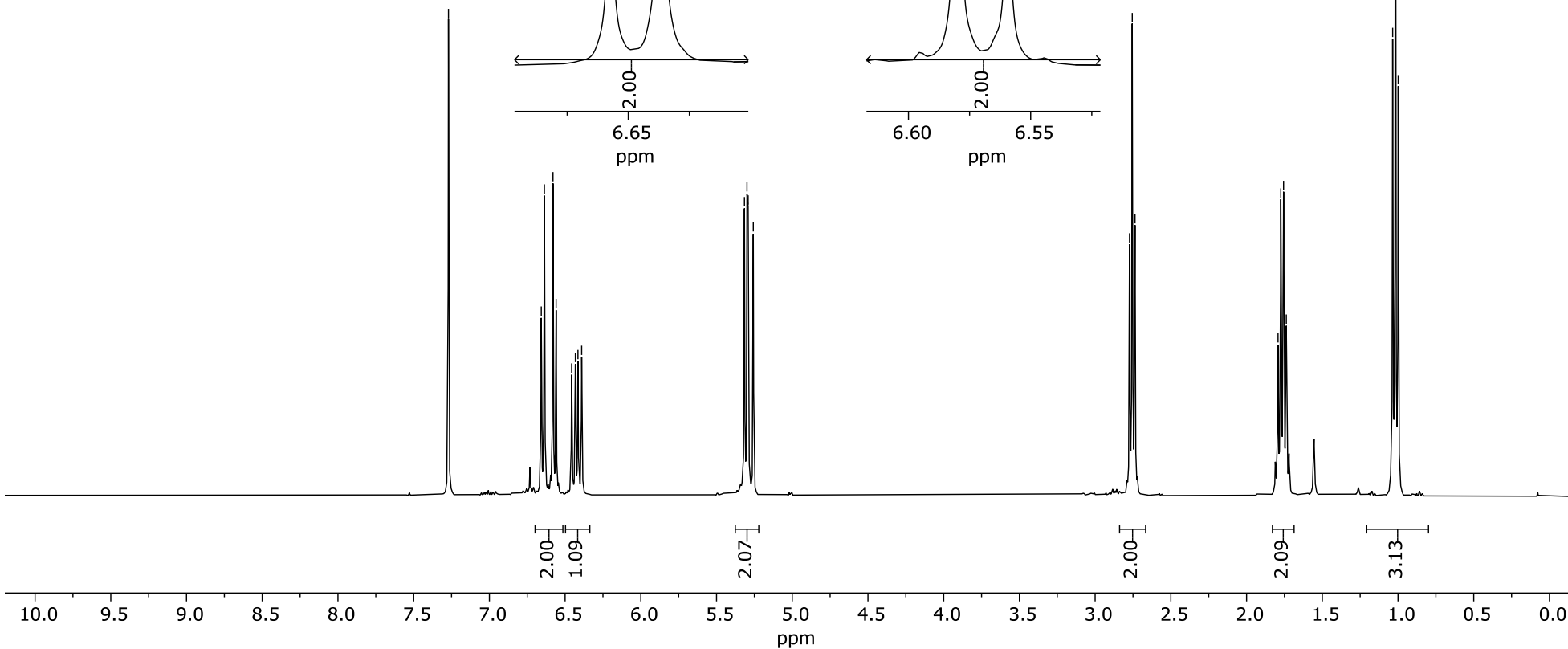
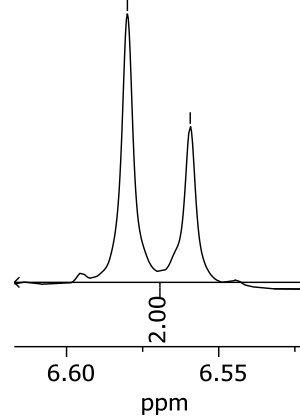
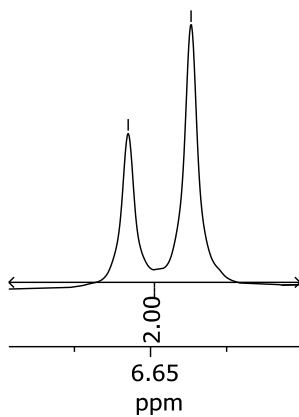
7.27
6.66
6.64
6.58
6.56
6.46
6.43
6.42
6.39
5.32
5.30
5.29
5.26
2.77
2.75
2.74
1.79
1.77
1.76
1.74
1.04
1.02
1.00

6.66
6.64

6.58
6.56

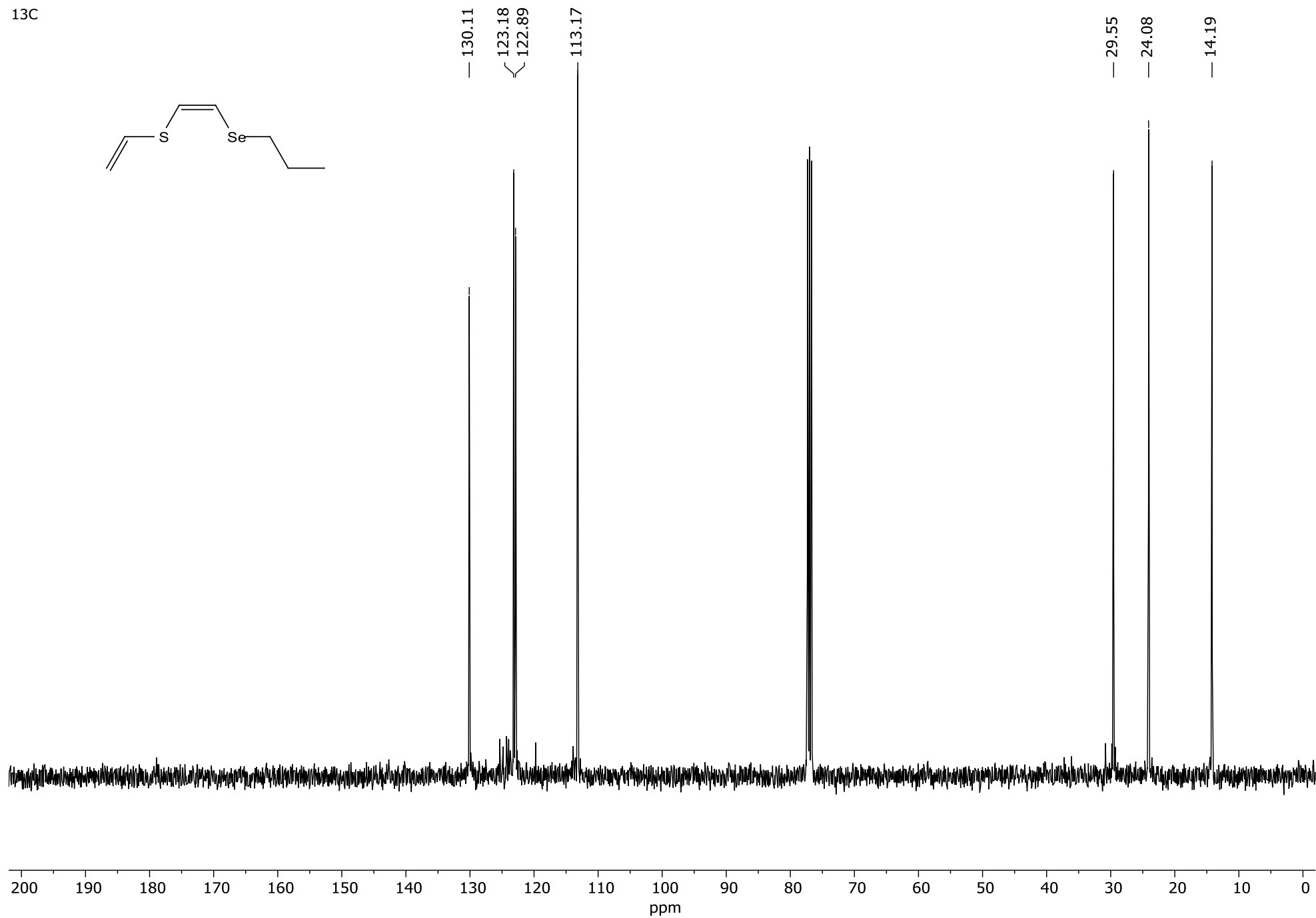
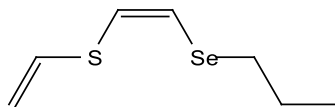
6.65 (d, 1H, SCH=CHSe, ³J = 8.3 Hz)

6.57 (d, 1H, SCH=CHSe, ³J = 8.3 Hz)



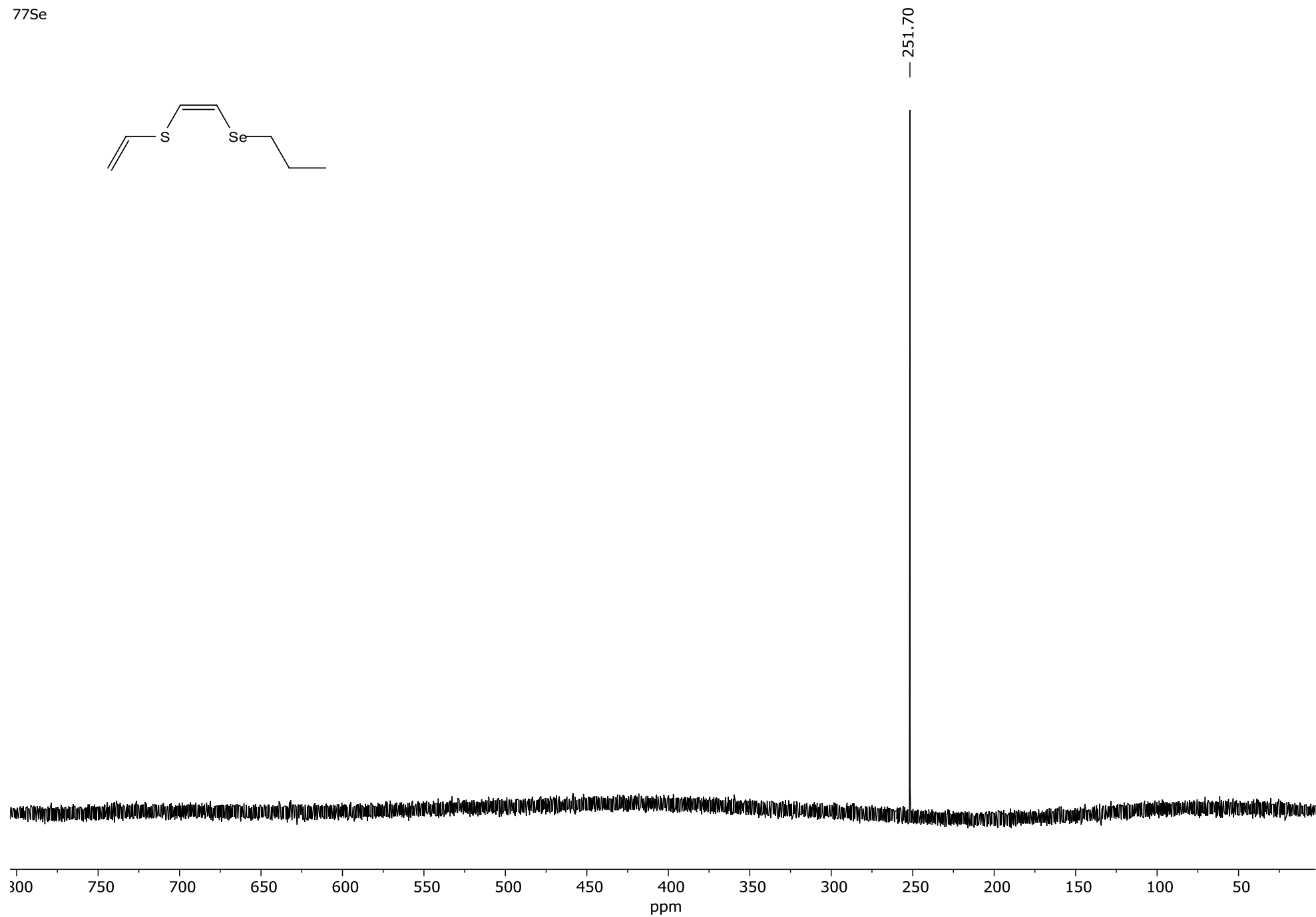
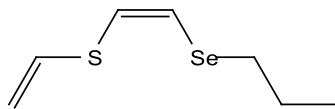
¹H NMR spectrum of (Z)-2-(propylselanyl)ethenyl vinyl sulfide (2c)

13C

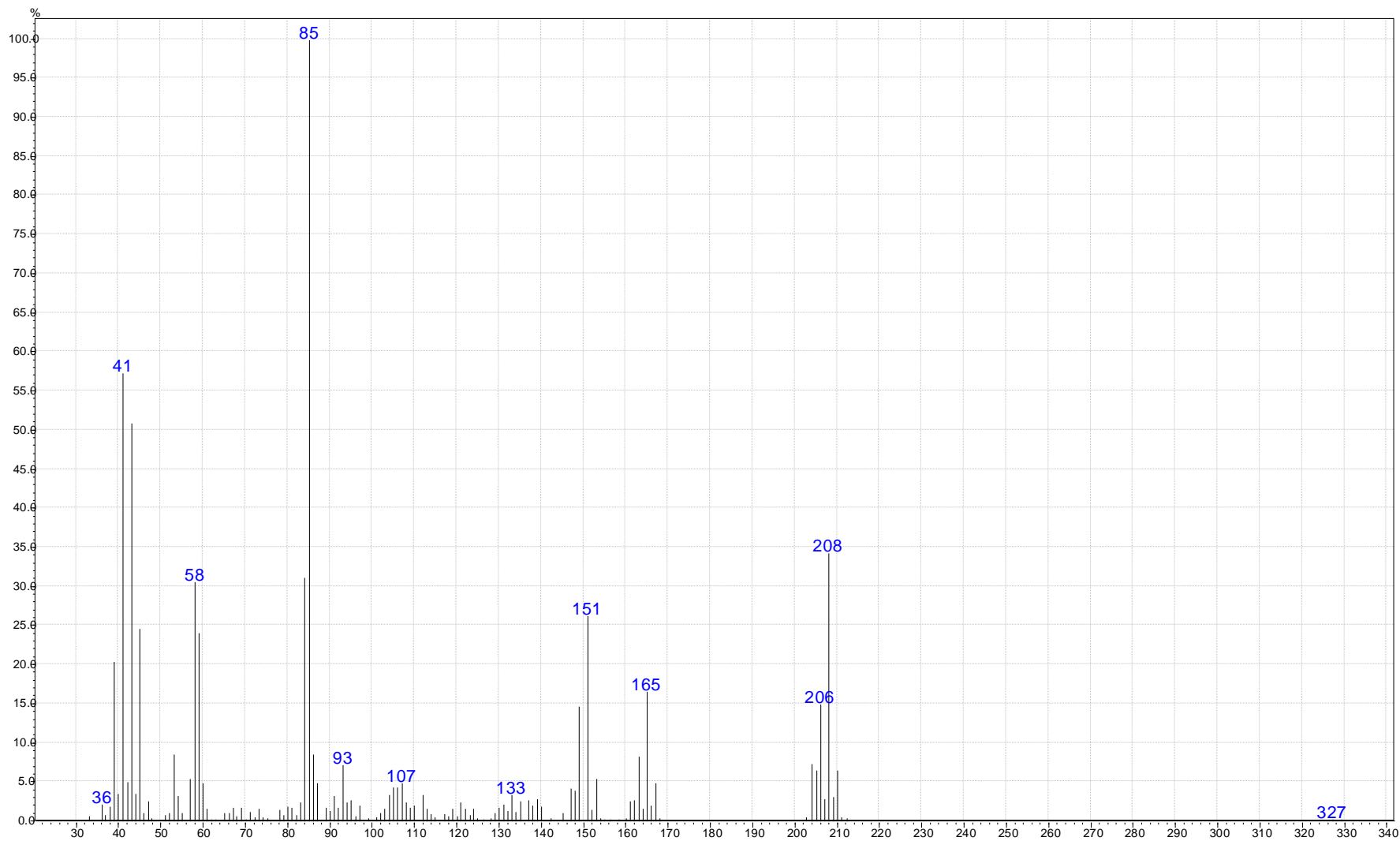
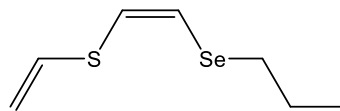


¹³C NMR spectrum of (Z)-2-(propylselanyl)ethenyl vinyl sulfide (2c)

⁷⁷Se

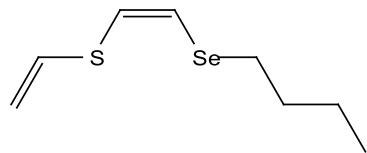


⁷⁷Se NMR spectrum of (Z)-2-(propylselanyl)ethenyl vinyl sulfide (2c)



Mass-spectrum of (Z)-2-(propylselanyl)ethenyl vinyl sulfide (2c)

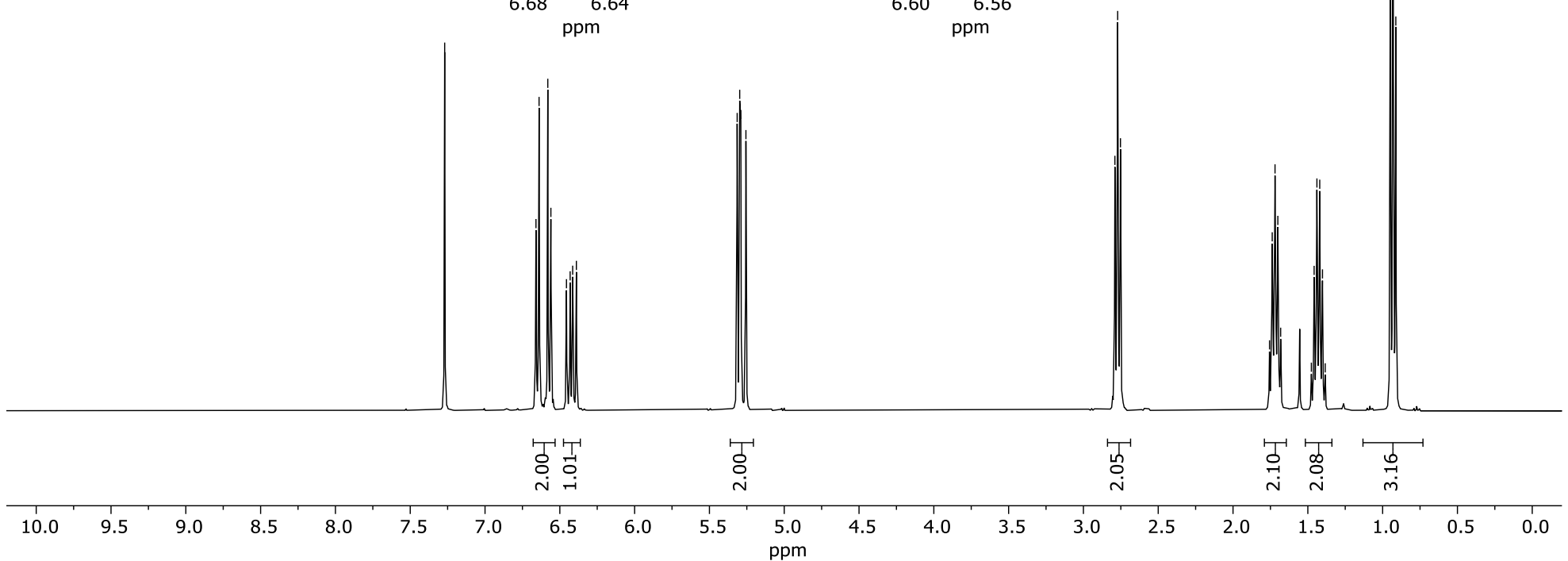
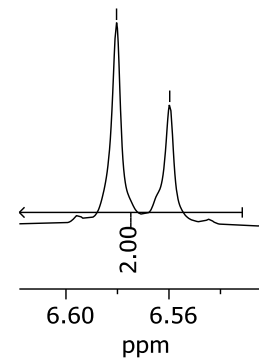
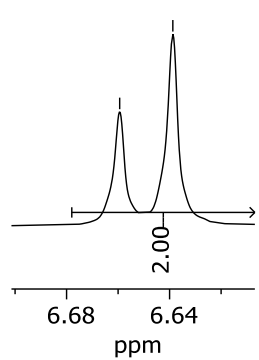
¹H



7.27, 6.66, 6.64, 6.58, 6.56, 6.46, 6.43, 6.41, 6.39, 5.31, 5.30, 5.29, 5.26, 2.79, 2.77, 2.75, 1.76, 1.74, 1.72, 1.70, 1.68, 1.48, 1.46, 1.44, 1.42, 1.40, 1.38, 0.95, 0.93, 0.91

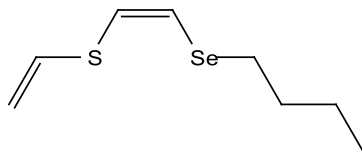
6.66, 6.64, 6.58, 6.56

6.65 (d, 1H, SCH=CHSe, ³J = 8.3 Hz) 6.57 (d, 1H, SCH=CHSe, ³J = 8.3 Hz)



¹H NMR spectrum of (Z)-2-(butylselanyl)ethenyl vinyl sulfide (2d)

13C



— 130.11

— 123.23

— 122.85

— 113.21

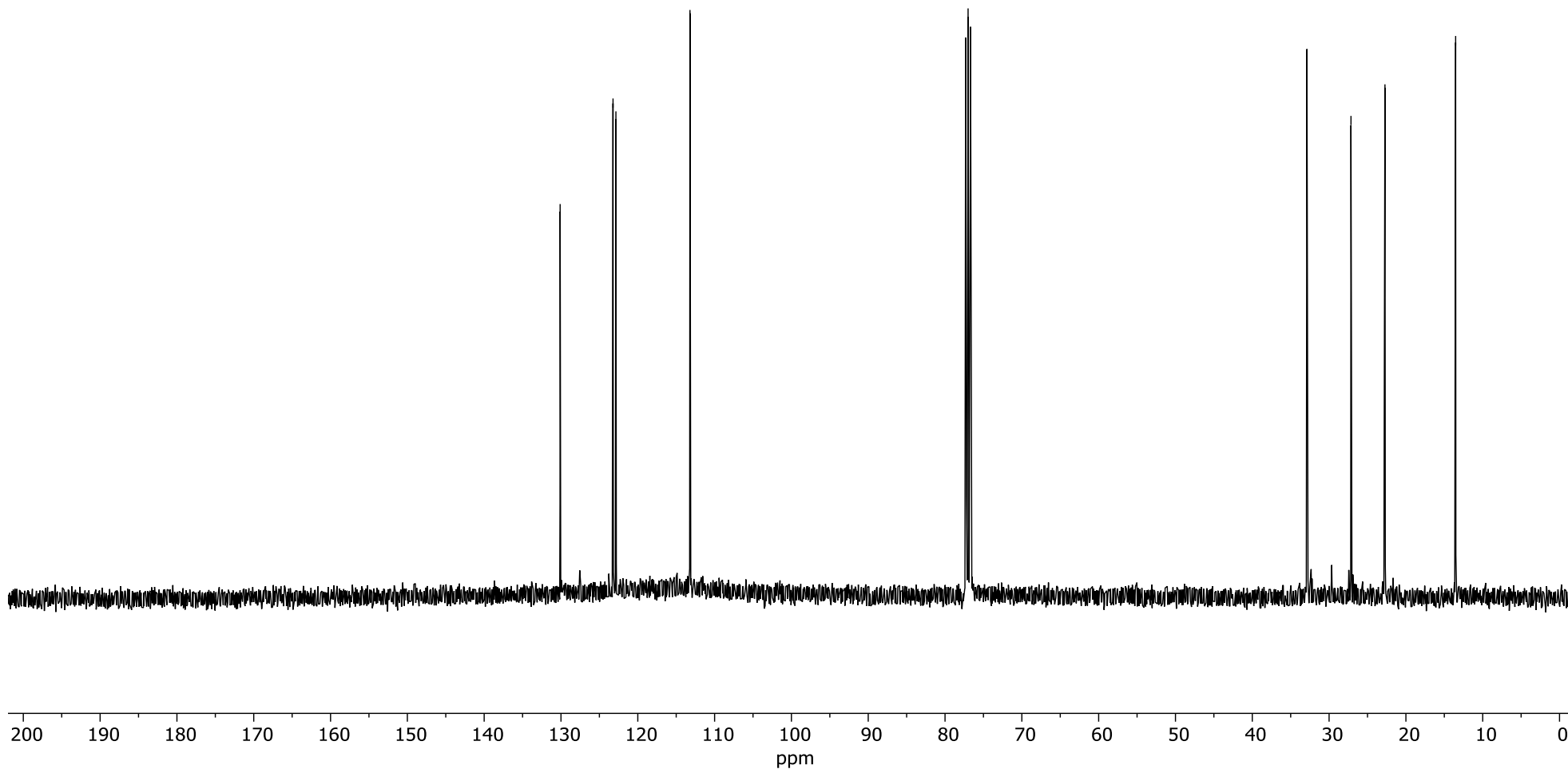
— 77.00

— 32.89

— 27.15

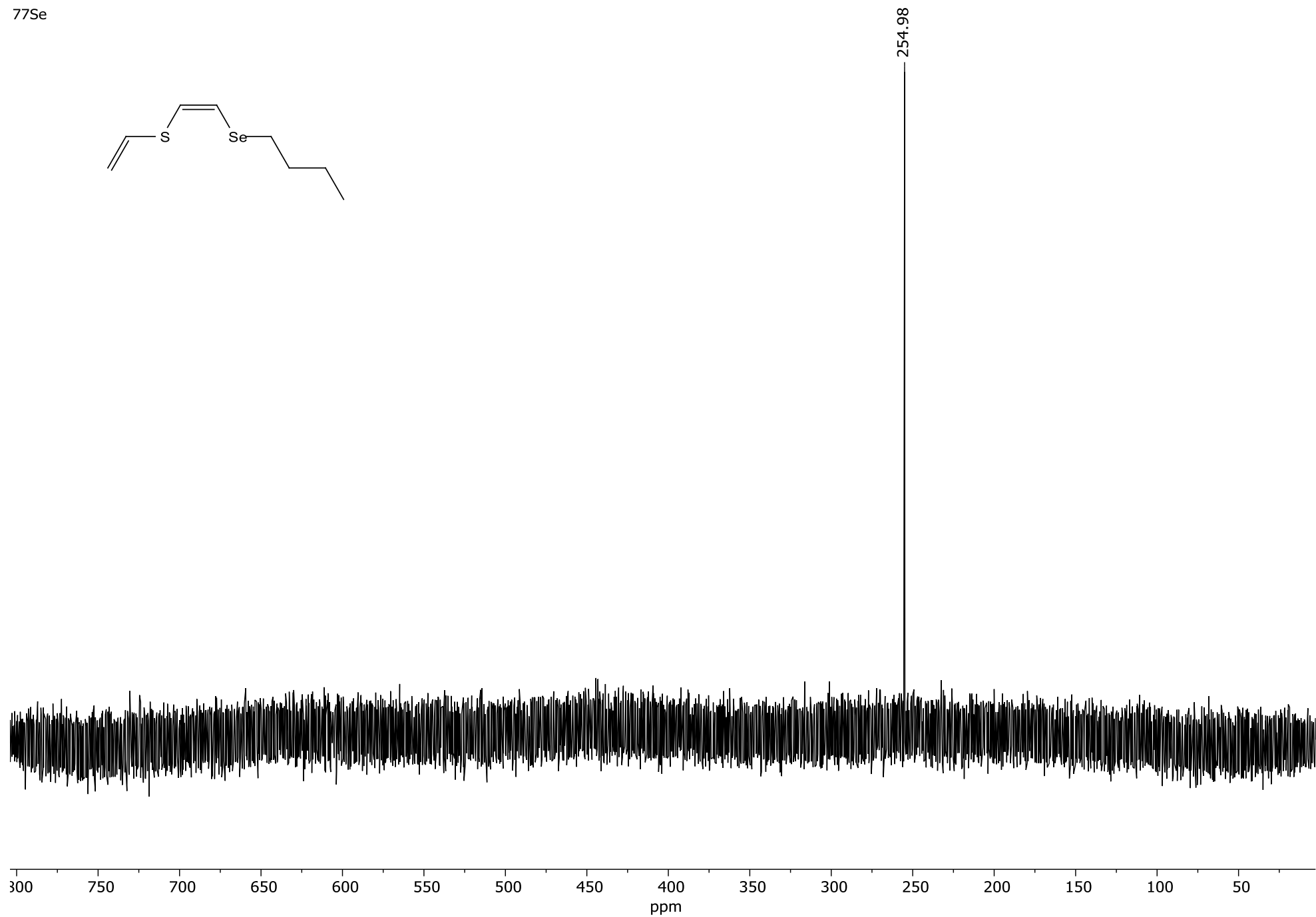
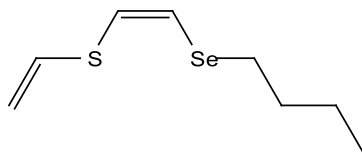
— 22.73

— 13.53

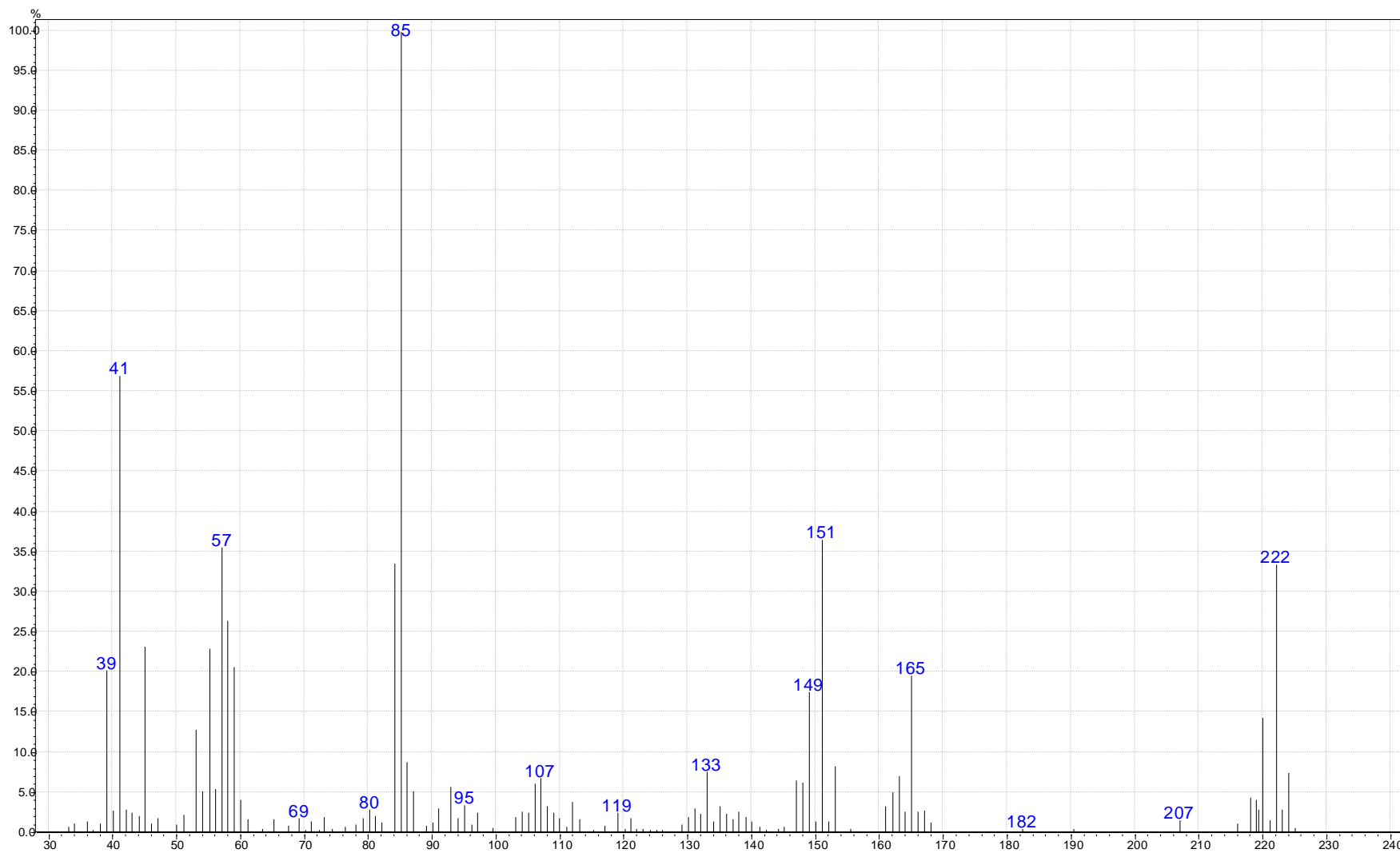
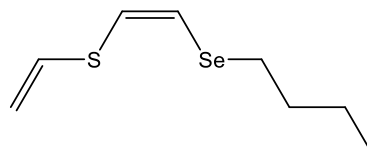


¹³C NMR spectrum of (Z)-2-(butylselanyl)ethenyl vinyl sulfide (2d)

⁷⁷Se

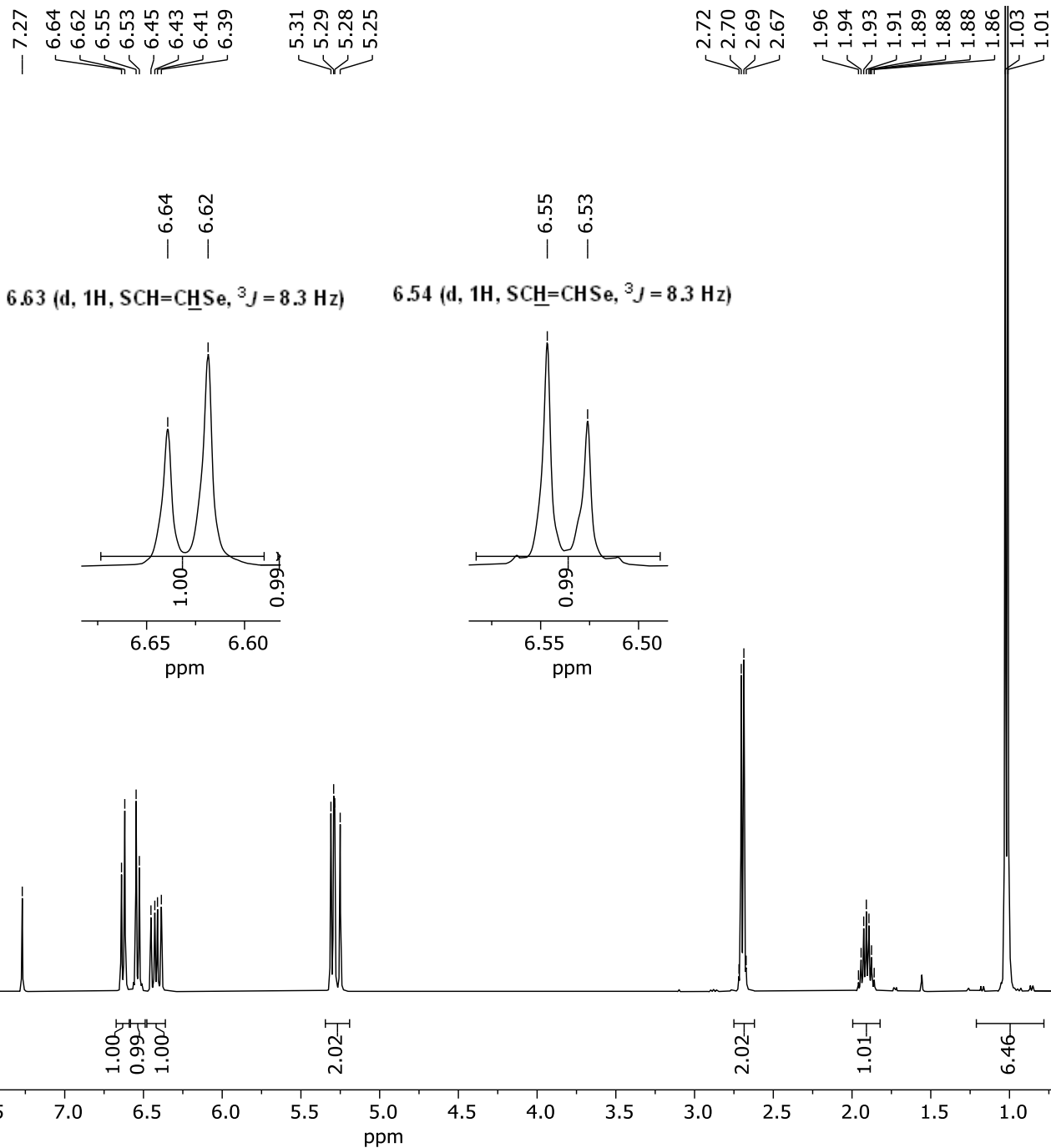
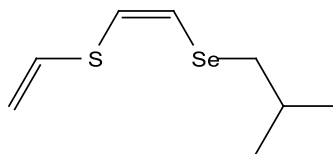


⁷⁷Se NMR spectrum of (Z)-2-(butylselanyl)ethenyl vinyl sulfide (2d)



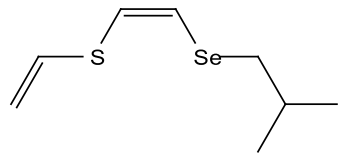
Mass-spectrum of (Z)-2-(butylselanyl)ethenyl vinyl sulfide (2d)

¹H



¹H NMR spectrum of (Z)-2-(isobutylselanyl)ethenyl vinyl sulfide (2e)

¹³C



— 124.58
— 124.03
— 123.48

~ 130.13
/ 124.03
\ 122.33

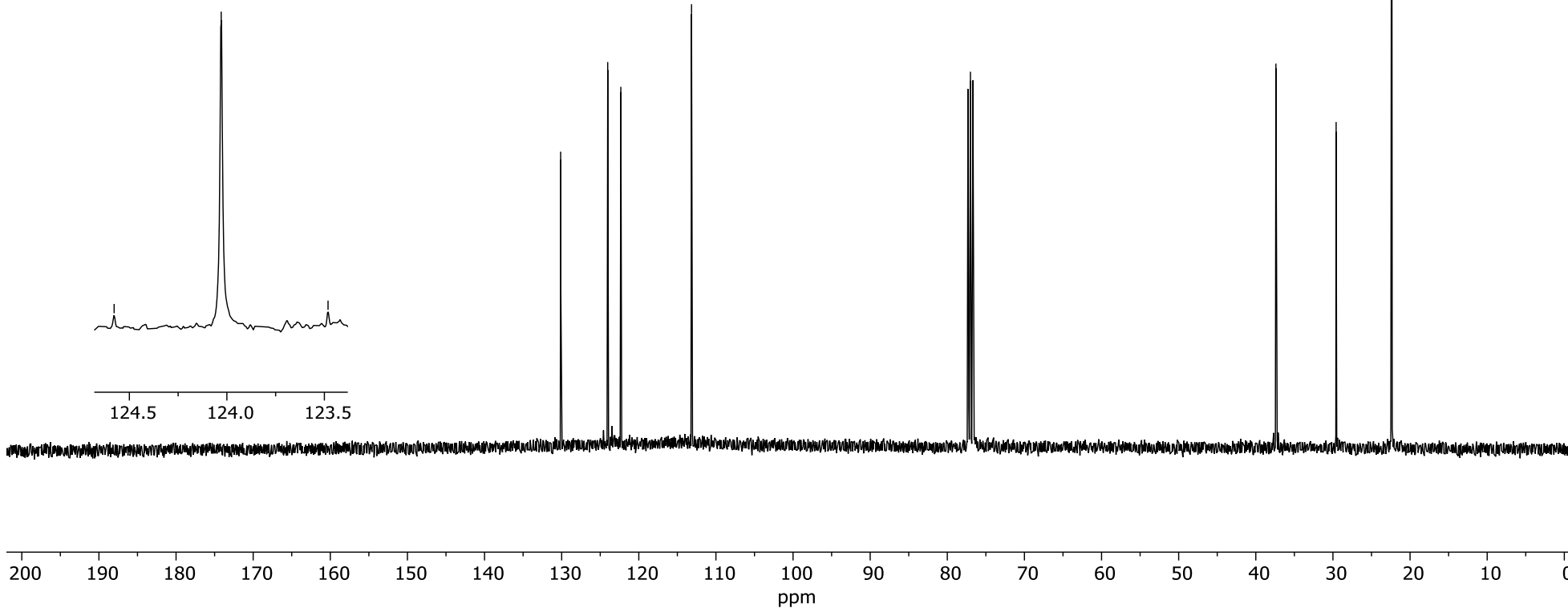
— 113.16

— 77.00

— 37.39

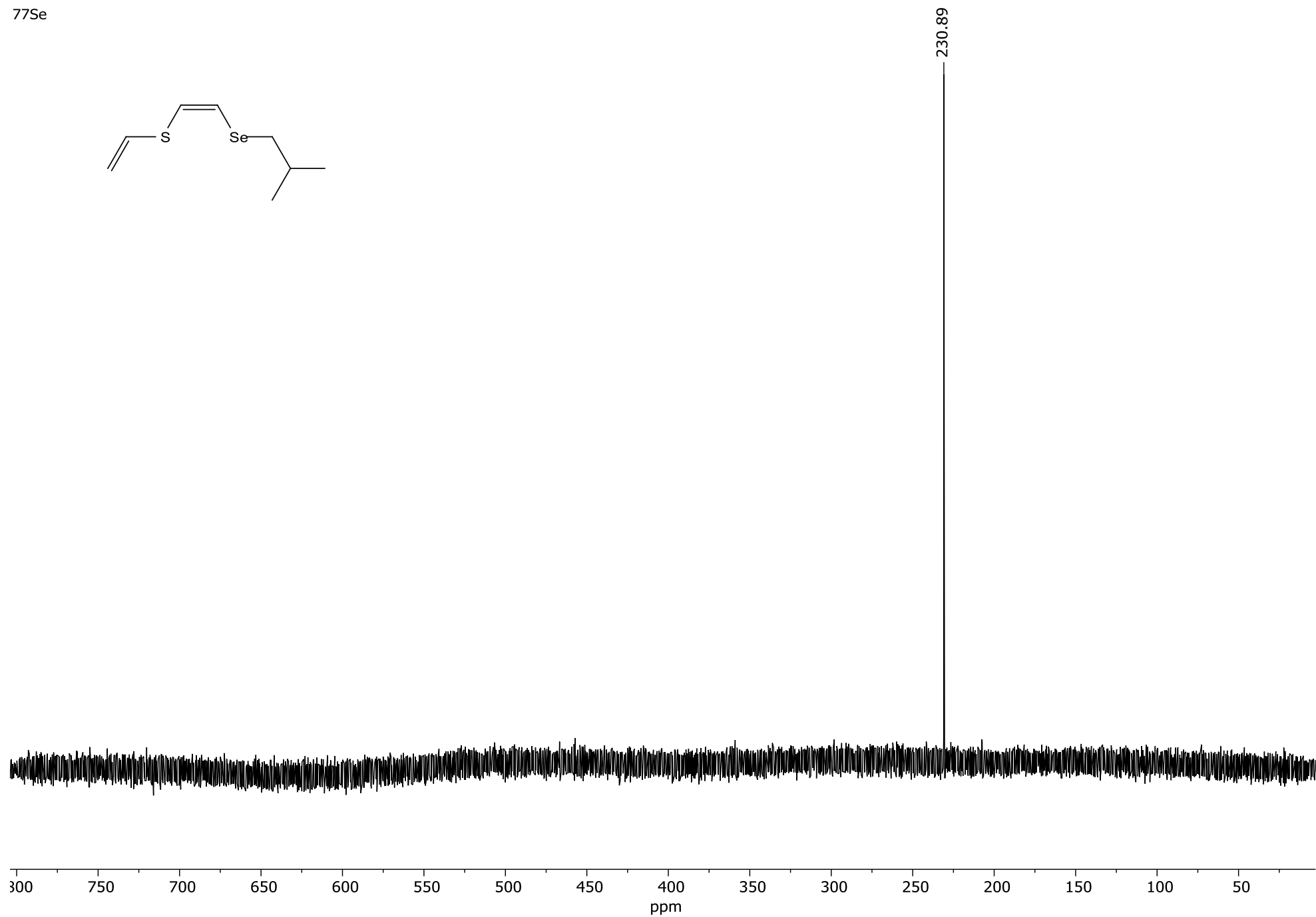
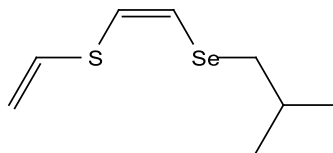
— 29.59

— 22.38

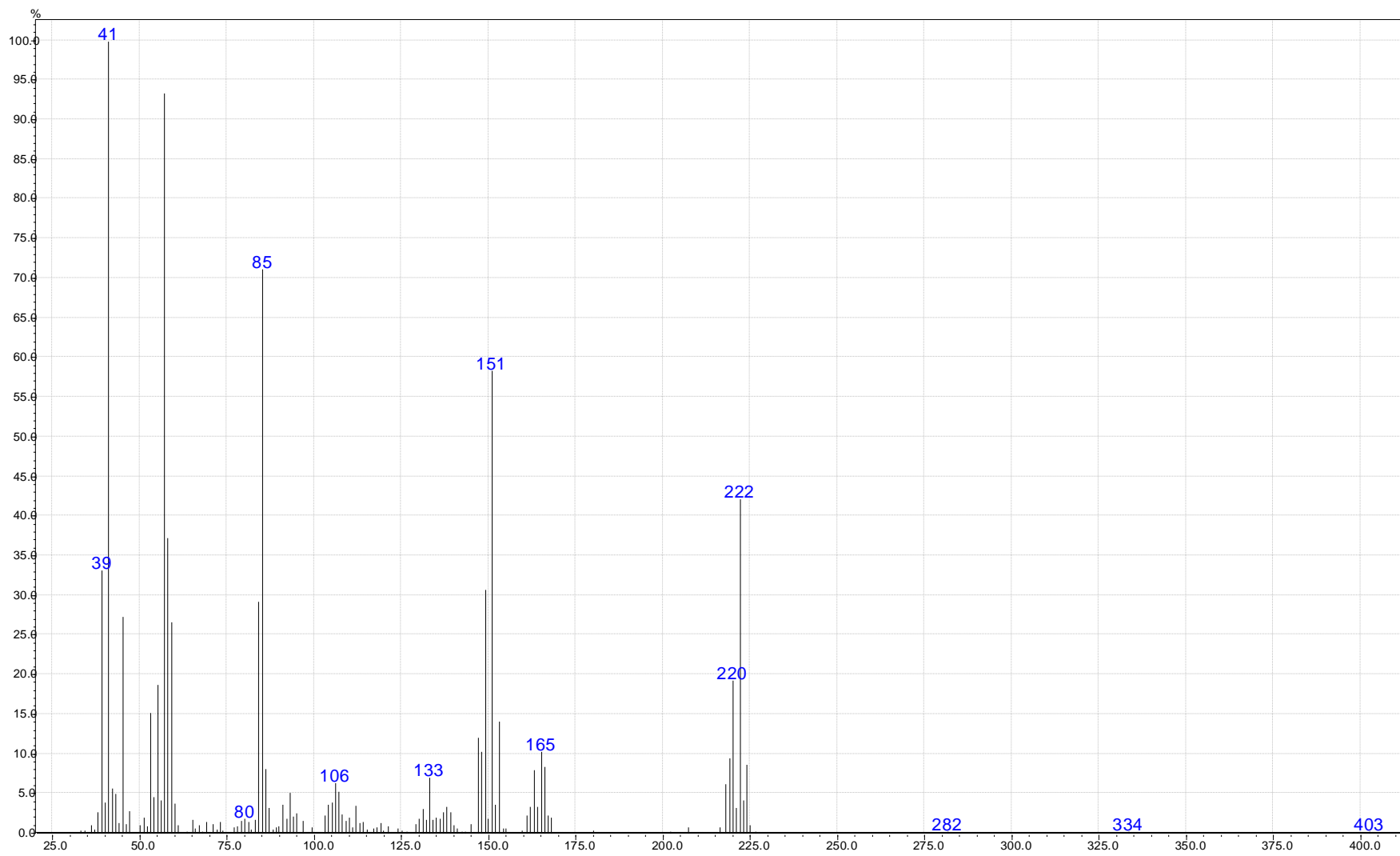
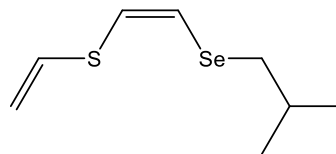


¹³C NMR spectrum of (Z)-2-(isobutylselanyl)ethenyl vinyl sulfide (2e)

⁷⁷Se

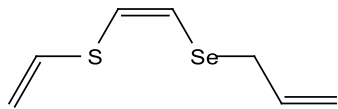


⁷⁷Se NMR spectrum of (Z)-2-(isobutylselanyl)ethenyl vinyl sulfide (2e)



Mass-spectrum of (Z)-2-(isobutylselanyl)ethenyl vinyl sulfide (2e)

¹H

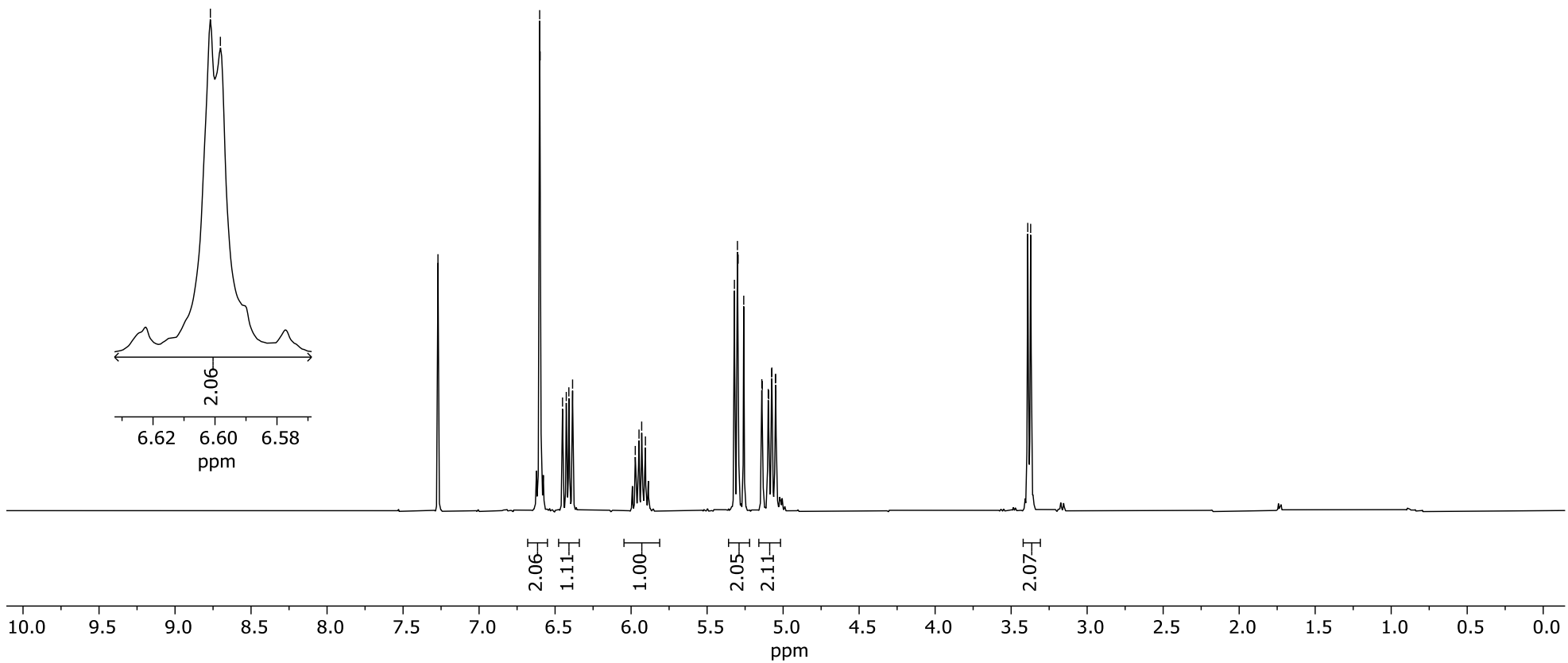


6.60
6.60

6.60 (d, 1H, SCH=CHSe, ³J = 8.3 Hz)

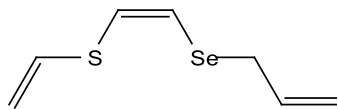
6.60 (d, 1H, SCH=CHSe, ³J = 8.3 Hz)

7.27
6.60
6.60
6.45
6.43
6.41
6.38
5.97
5.95
5.93
5.91
5.32
5.30
5.30
5.26
5.14
5.14
5.10
5.09
5.08
5.07
5.05
5.05
3.39
3.37



¹H NMR spectrum of (Z)-2-(allylselanyl)ethenyl vinyl sulfide (2f)

13C



— 134.45
— 130.05
~ 123.51
~ 122.38
— 117.09
~ 113.39

— 122.93
— 122.38
— 121.84

77.00

— 29.05

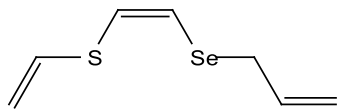
123.0 122.5 122.0
ppm

190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10

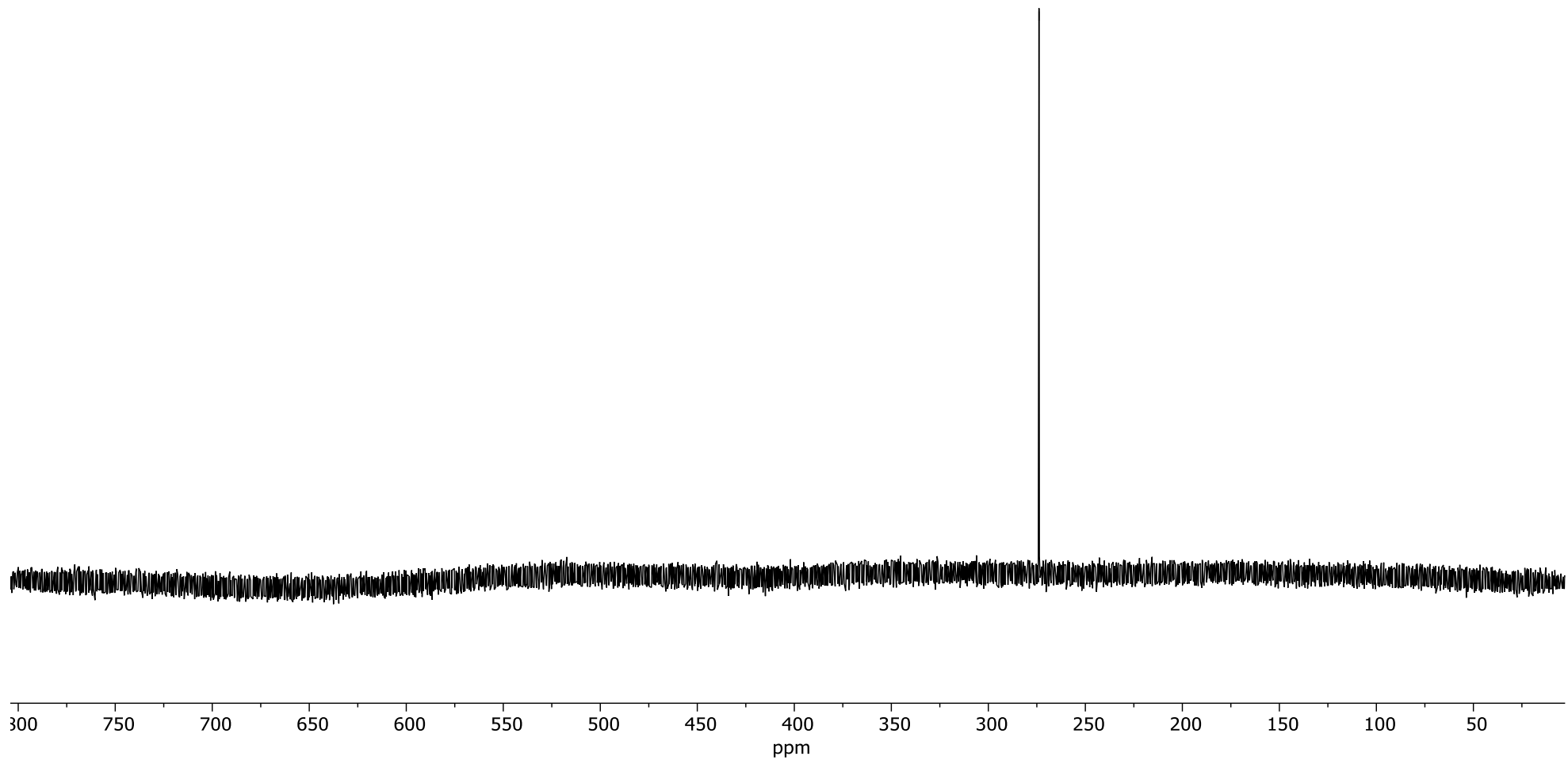
ppm

¹³C NMR spectrum of (Z)-2-(allylselanyl)ethenyl vinyl sulfide (2f)

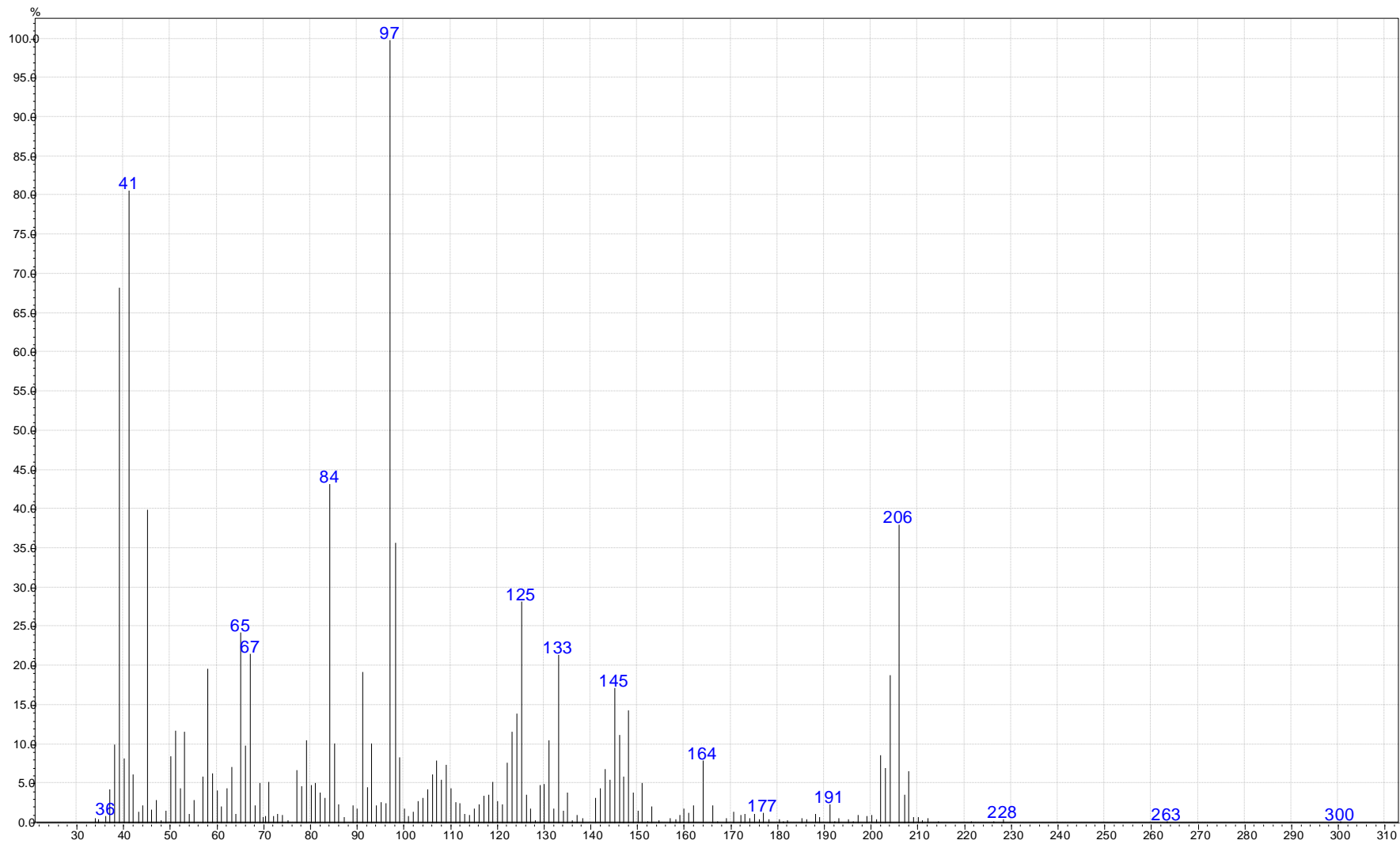
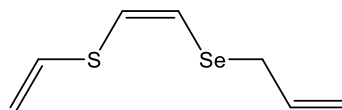
^{77}Se



— 273.90

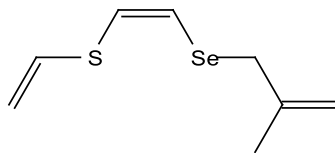


^{77}Se NMR spectrum of (Z)-2-(allylselanyl)ethenyl vinyl sulfide (2f)



Mass-spectrum of (Z)-2-(allylselanyl)ethenyl vinyl sulfide (2f)

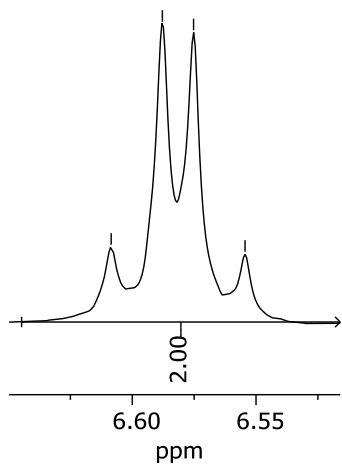
¹H



6.61
6.59
6.58
6.55

6.60 (d, 1H, SCH=CHSe, ³J = 8.3 Hz)

6.57 (d, 1H, SCH=CHSe, ³J = 8.3 Hz)

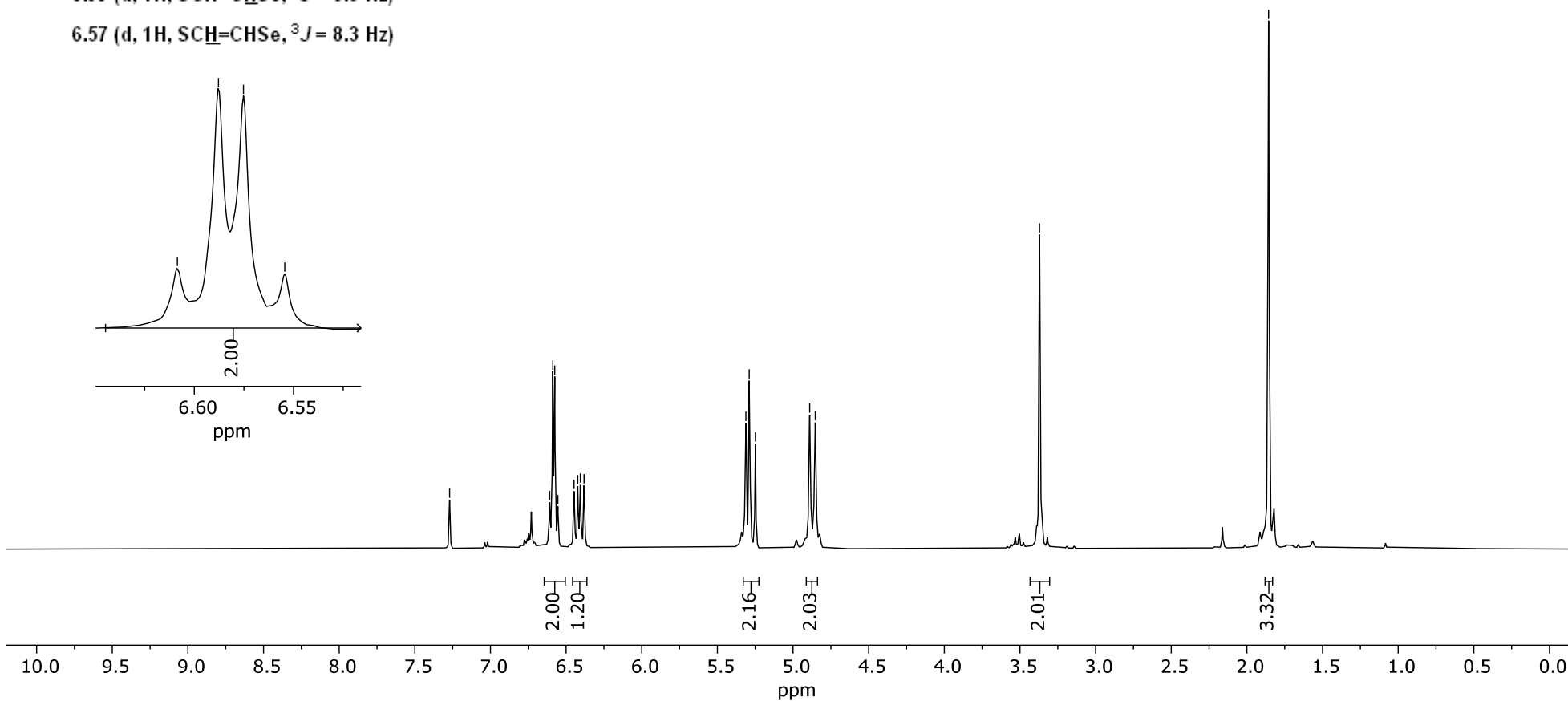


7.27
6.61
6.59
6.58
6.55
6.45
6.42
6.41
6.38

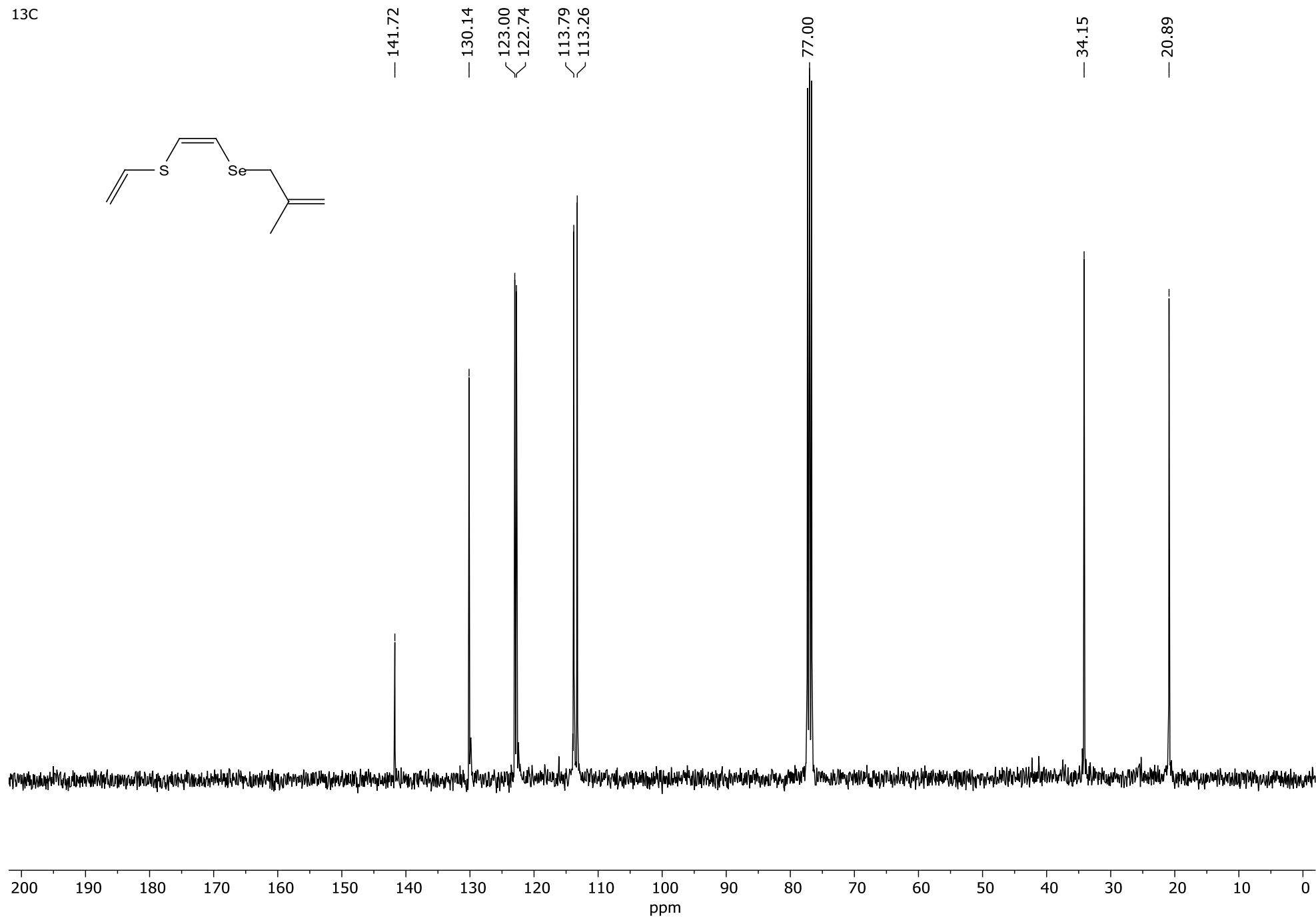
5.31
5.29
5.25
4.89
4.85

3.37

1.86

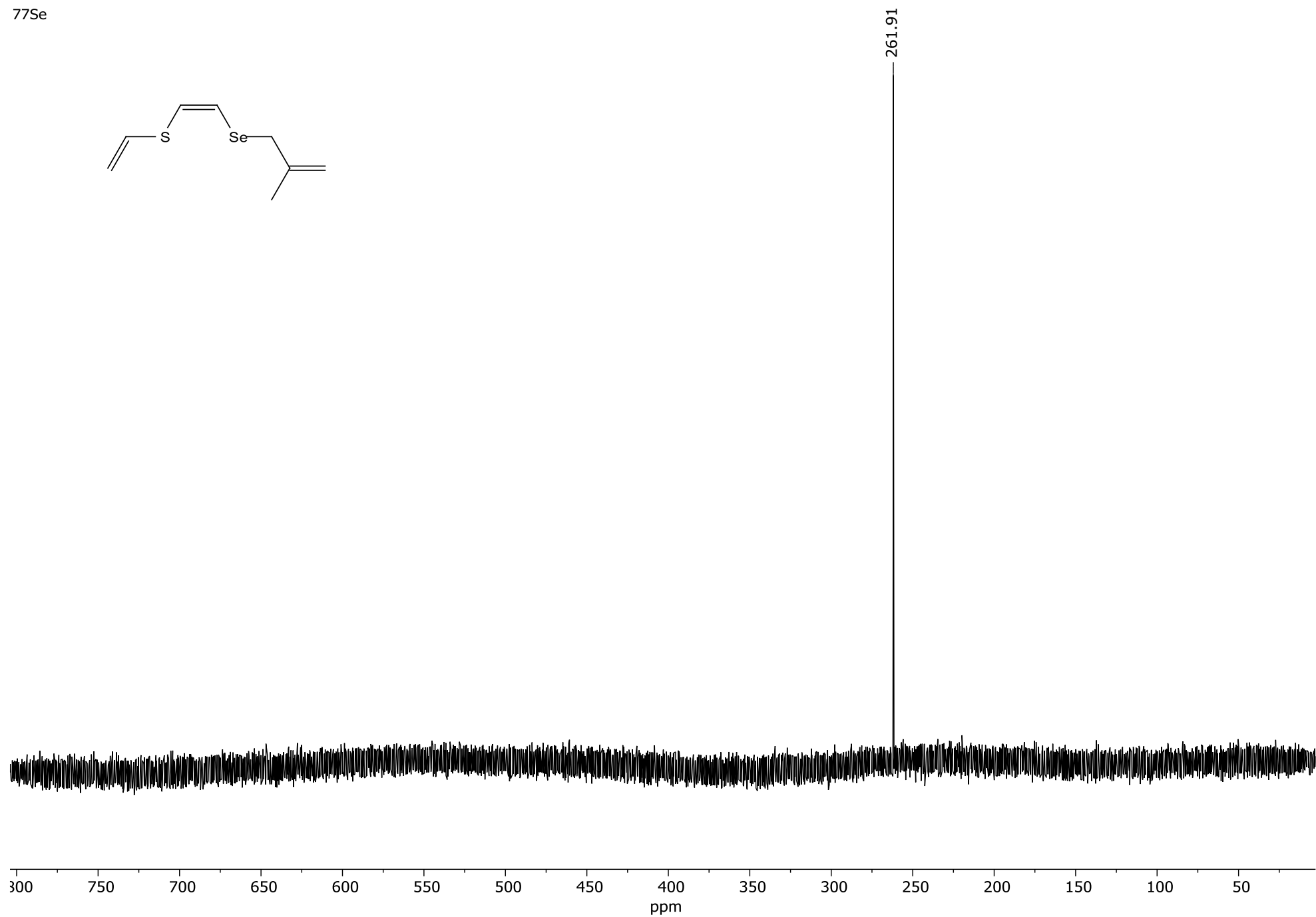
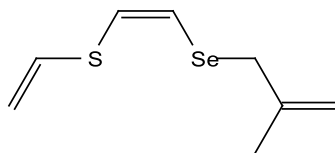


¹H NMR spectrum of (Z)-2-[(2-methyl-2-propenyl)selanyl]ethenyl vinyl sulfide (2g)

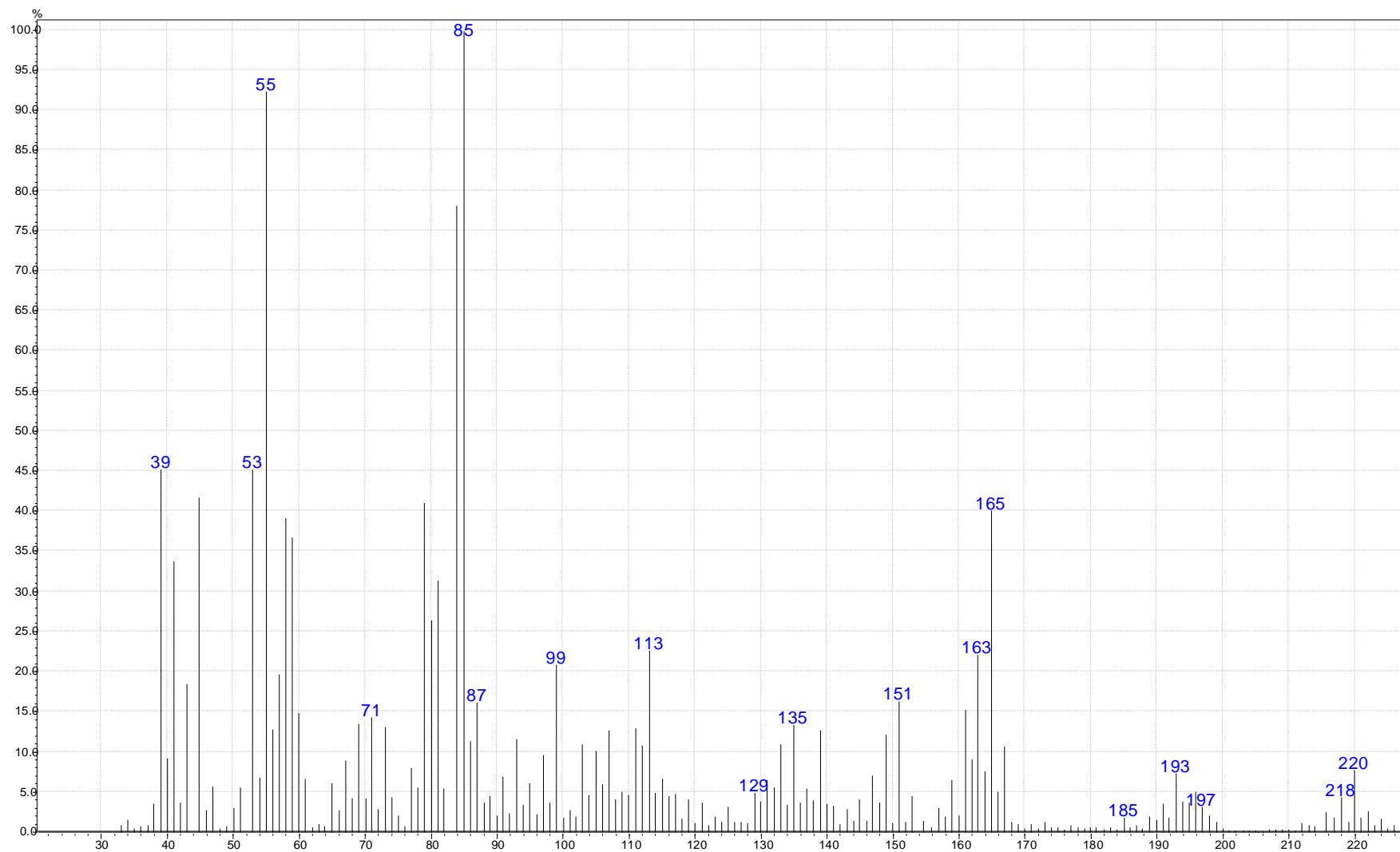
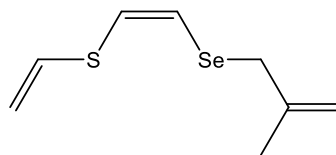


^{13}C NMR spectrum of (Z)-2-[(2-methyl-2-propenyl)selanyl]ethenyl vinyl sulfide (2g)

⁷⁷Se

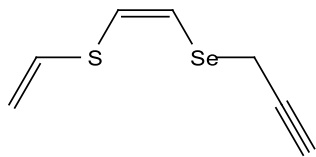


⁷⁷Se NMR spectrum of (Z)-2-[(2-methyl-2-propenyl)selenyl]ethenyl vinyl sulfide (2g)



Mass-spectrum of (Z)-2-[(2-methyl-2-propenyl)selenyl]ethenyl vinyl sulfide (2g)

¹H



6.86
6.84

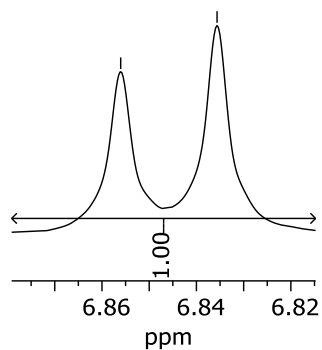
7.27
6.86
6.84
6.70
6.67
6.45
6.42
6.41
6.38
5.34
5.31
5.27

6.70
6.67

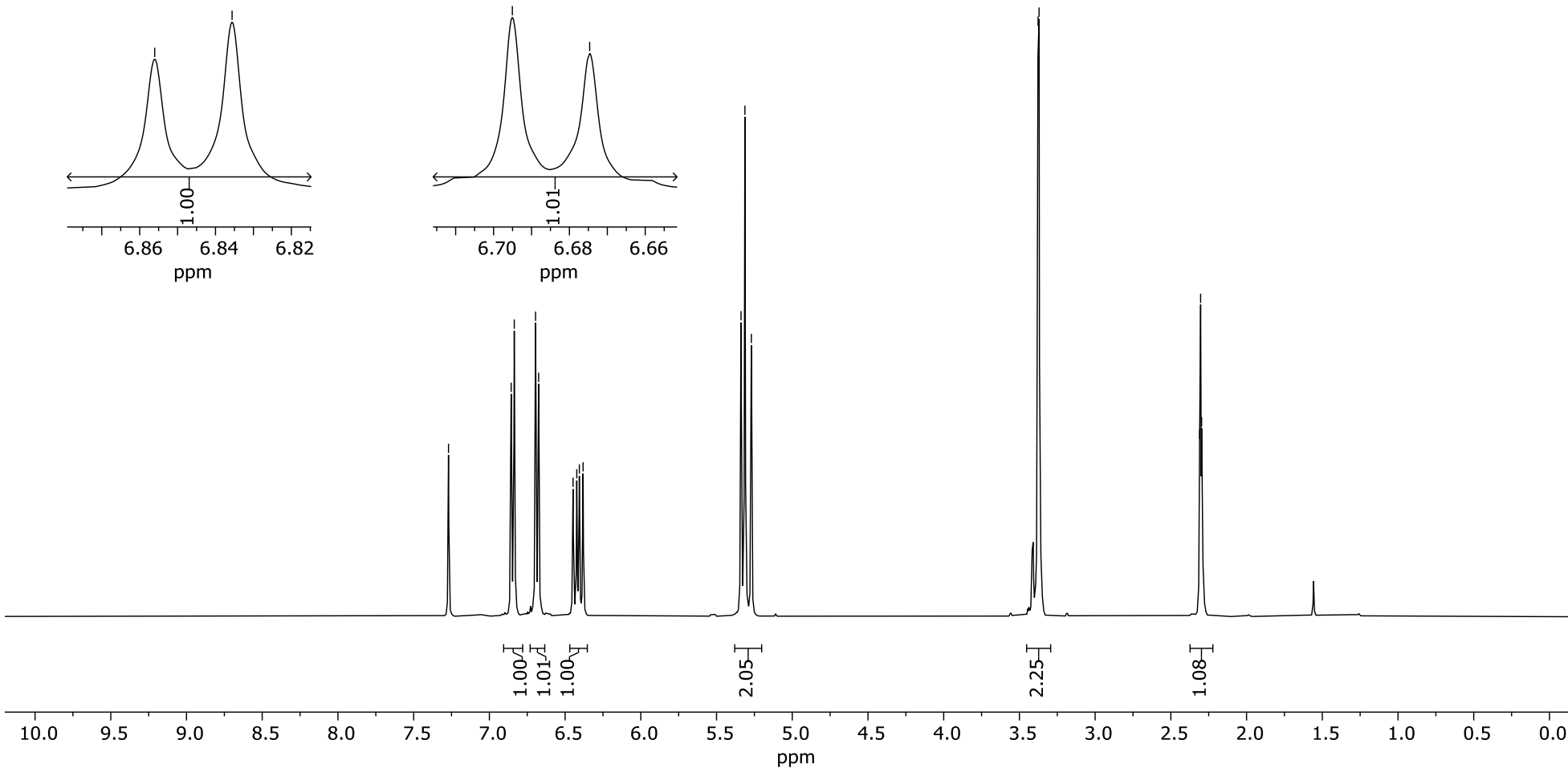
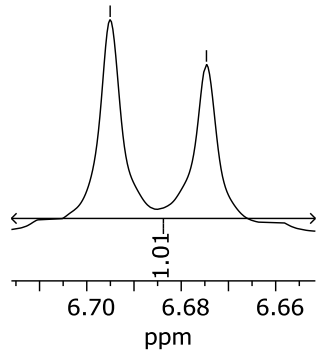
3.38
3.37

2.31
2.30
2.30

6.85 (d, 1H, SCH=CHSe, ³J = 8.1 Hz)

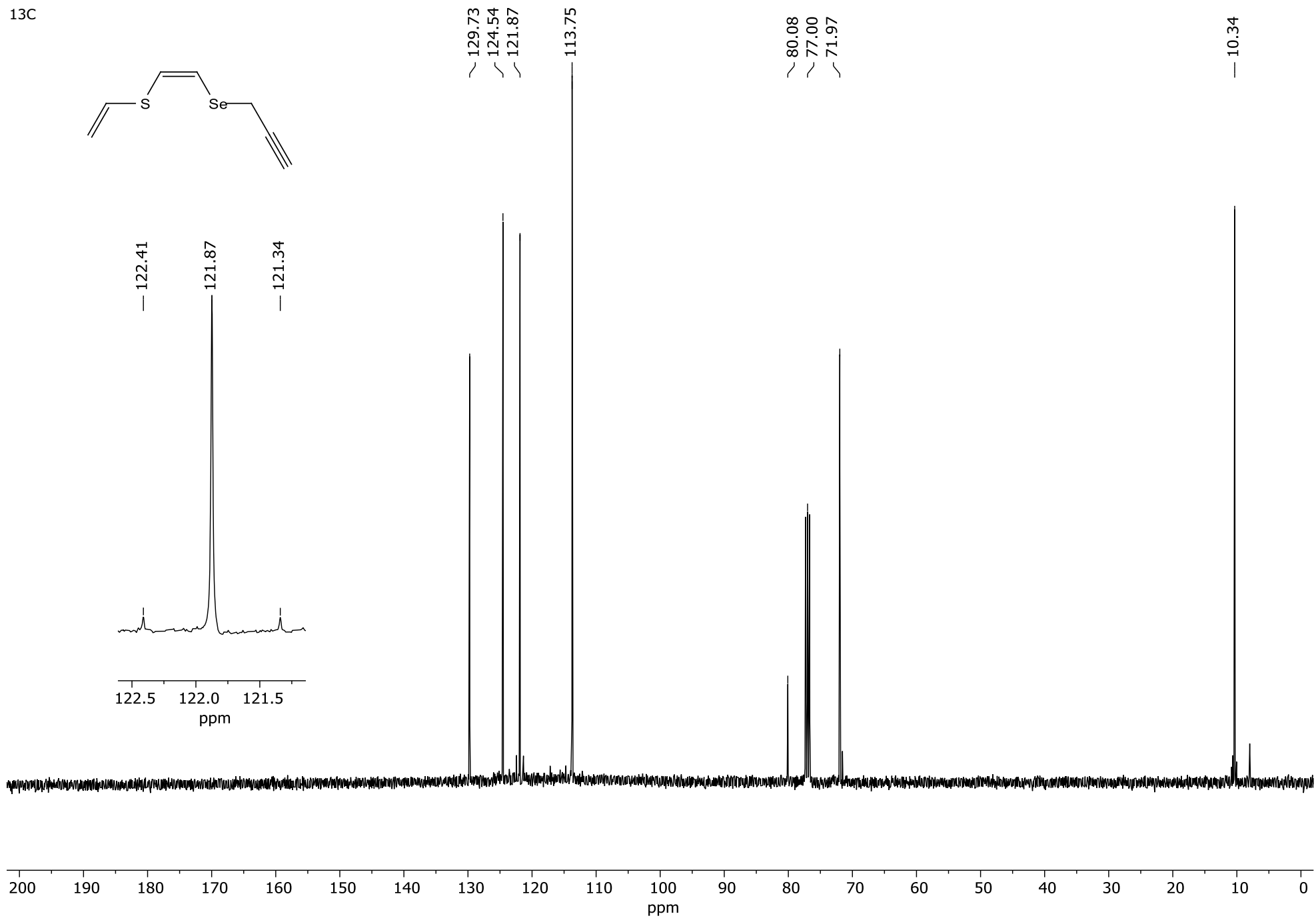
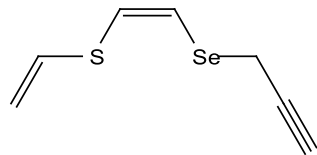


6.69 (d, 1H, SCH=CHSe, ³J = 8.1 Hz)



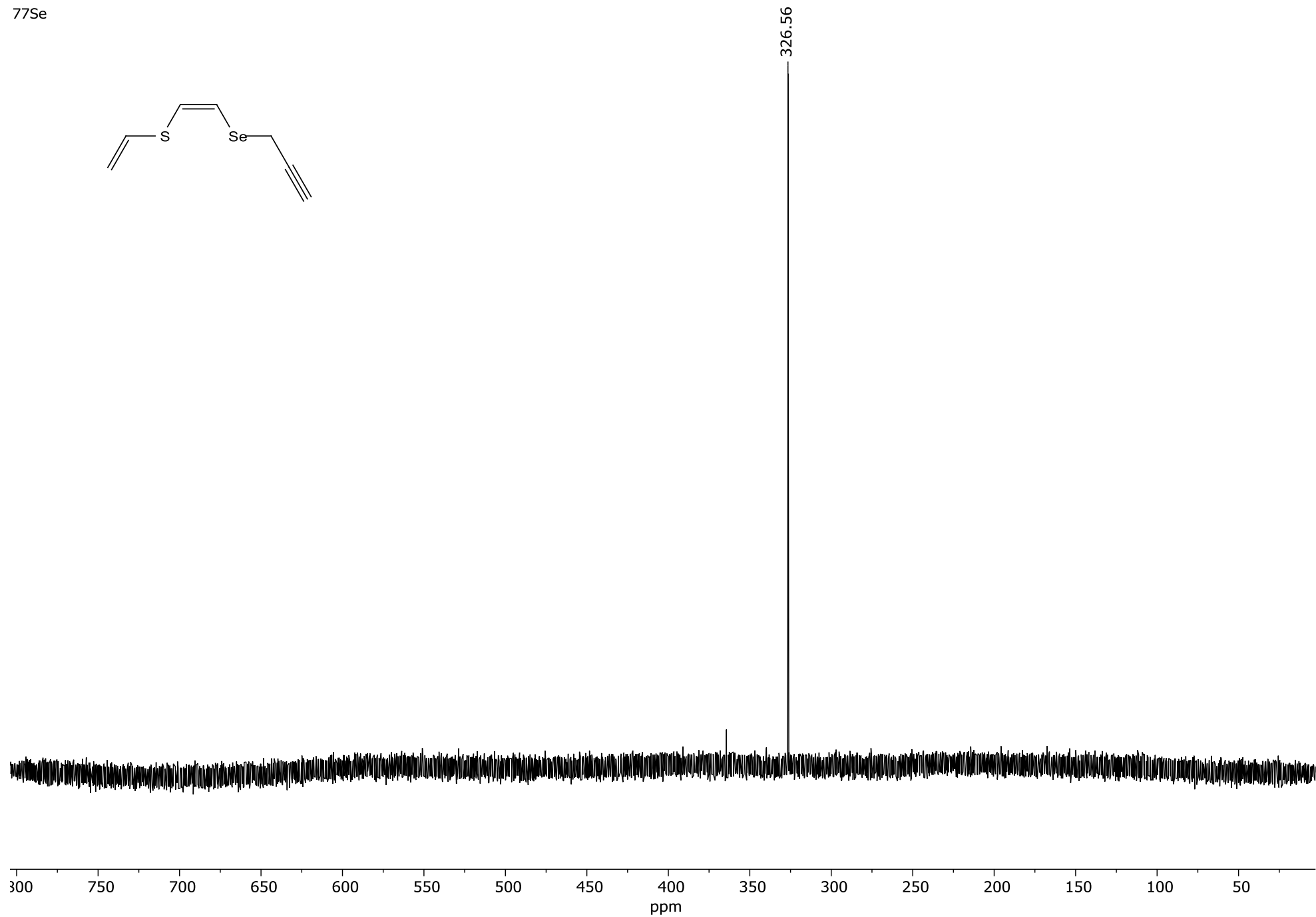
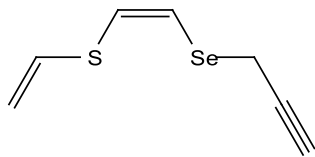
¹H NMR spectrum of (Z)-2-(propynylselanyl)ethenyl vinyl sulfide (2h)

13C

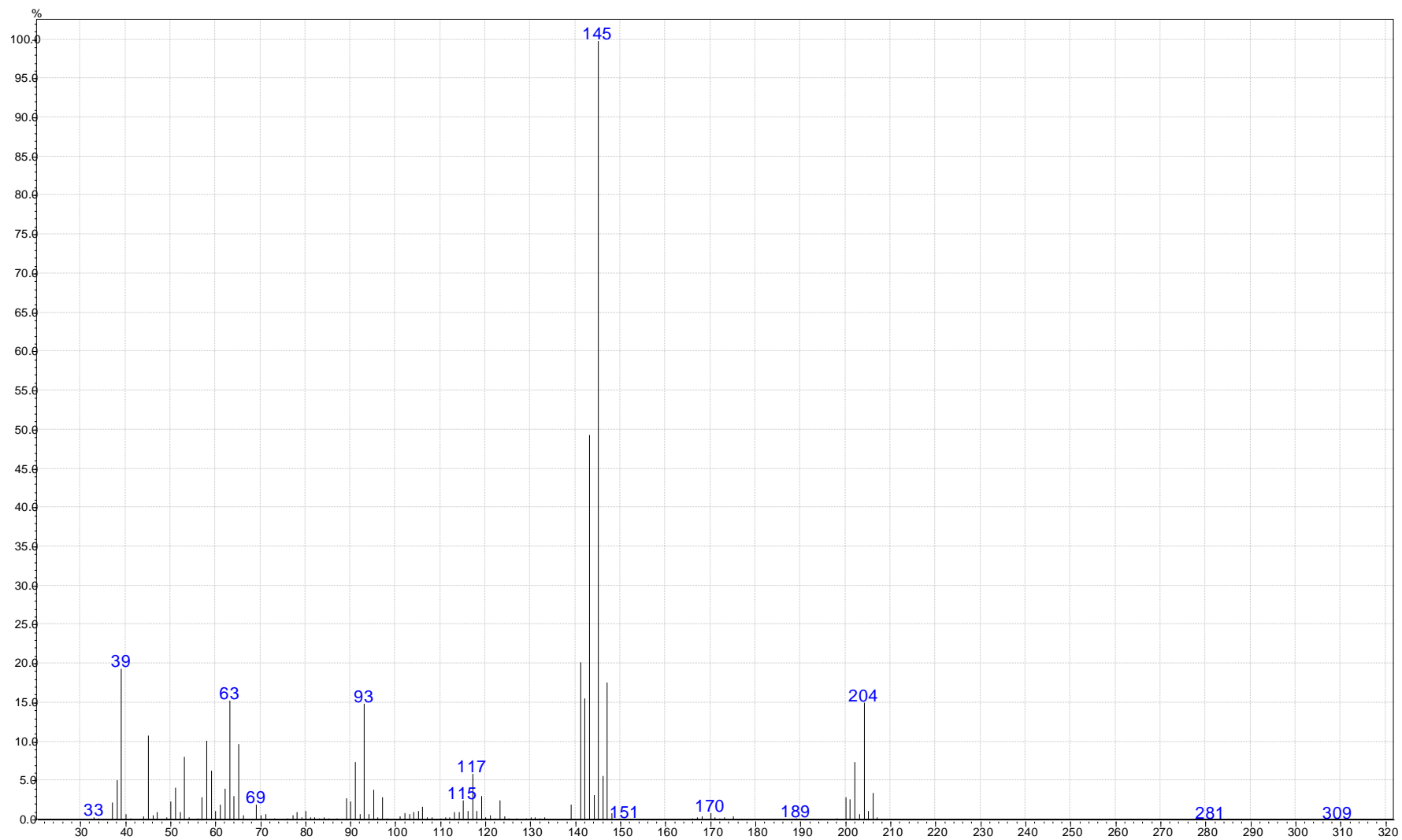
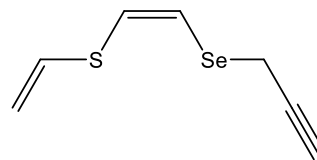


¹³C NMR spectrum of (Z)-2-(propynylselanyl)ethenyl vinyl sulfide (2h)

⁷⁷Se

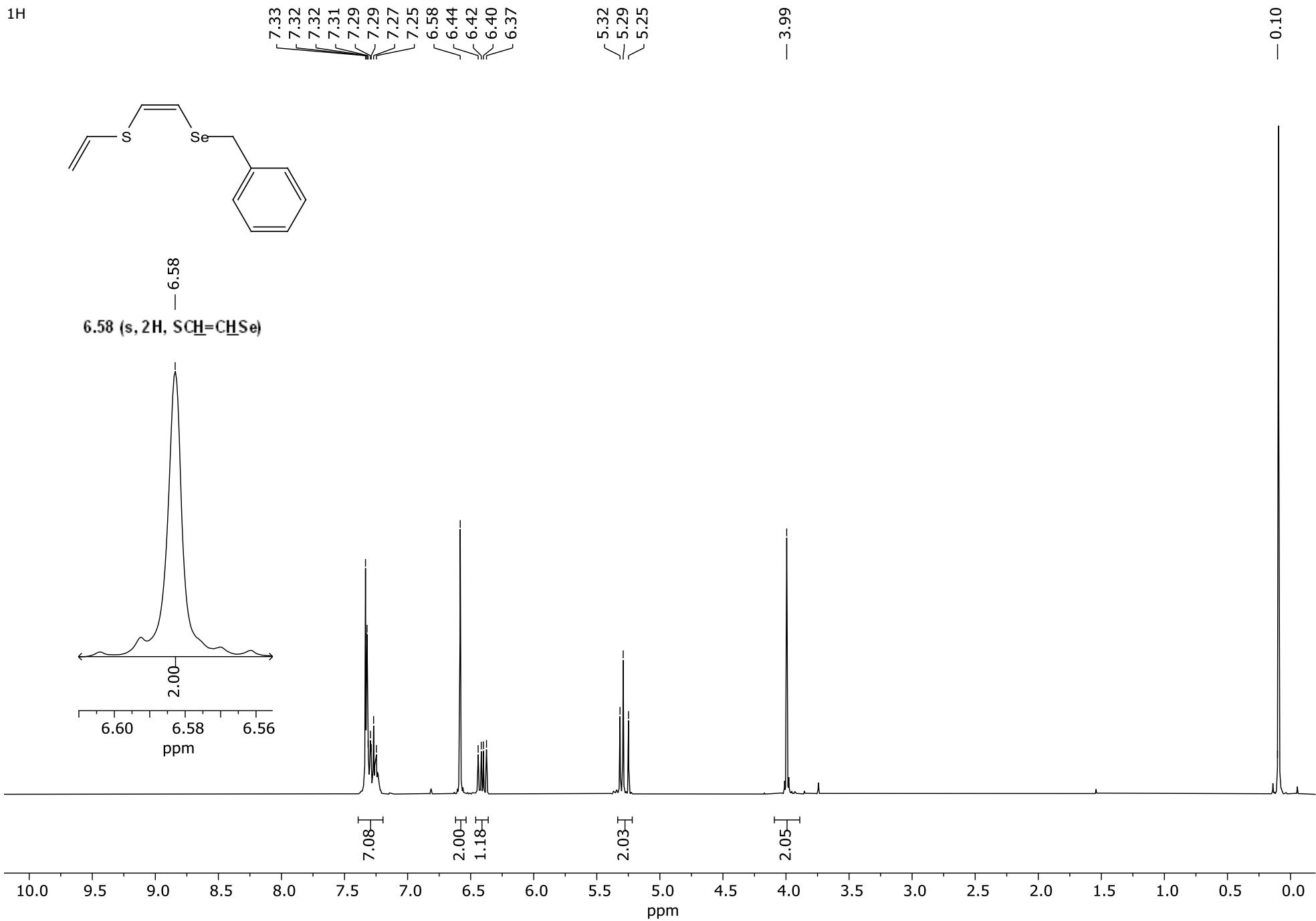


⁷⁷Se NMR spectrum of (Z)-2-(propynylselanyl)ethenyl vinyl sulfide (2h)



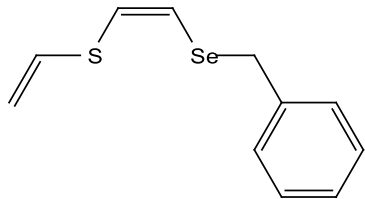
Mass-spectrum of (Z)-2-(propynylselanyl)ethenyl vinyl sulfide (2h)

¹H



¹H NMR spectrum of (Z)-2-(benzylselanyl)ethenyl vinyl sulfide (2i)

13C



— 138.28
— 130.02
— 128.91
— 128.58
— 127.03
— 123.99
— 122.05
— 113.46

— 77.00

— 30.14

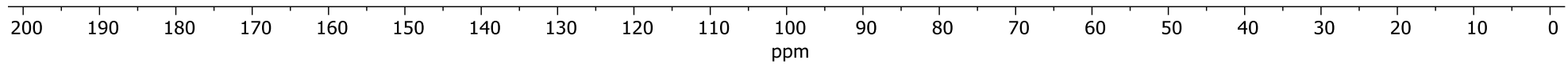
— 130.02

— 128.91

— 128.58

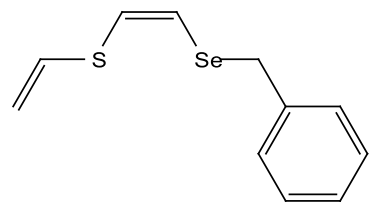
— 127.03

131 130 129 128 127 126
ppm

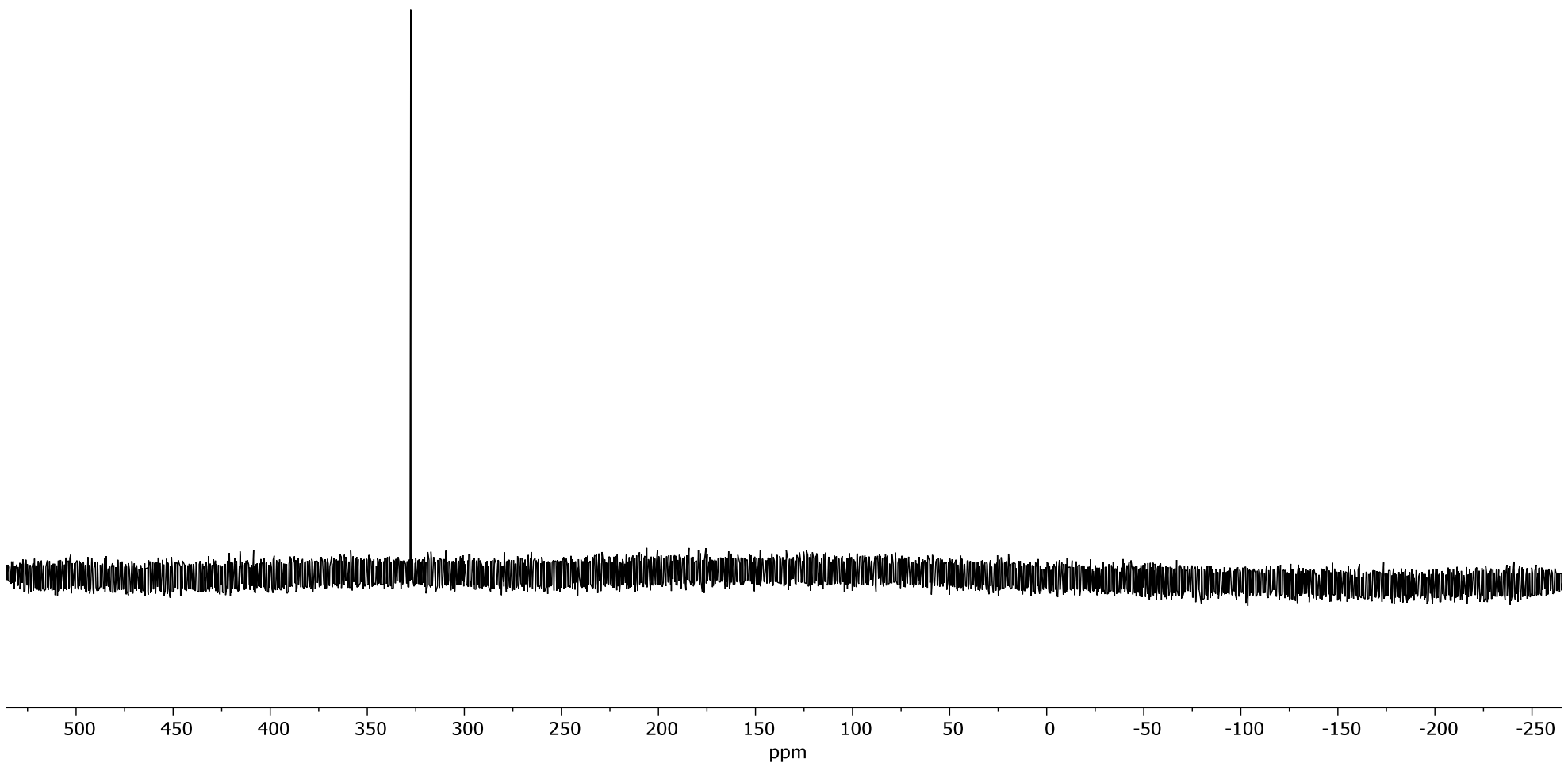


¹³C NMR spectrum of (Z)-2-(benzylselanyl)ethenyl vinyl sulfide (2i)

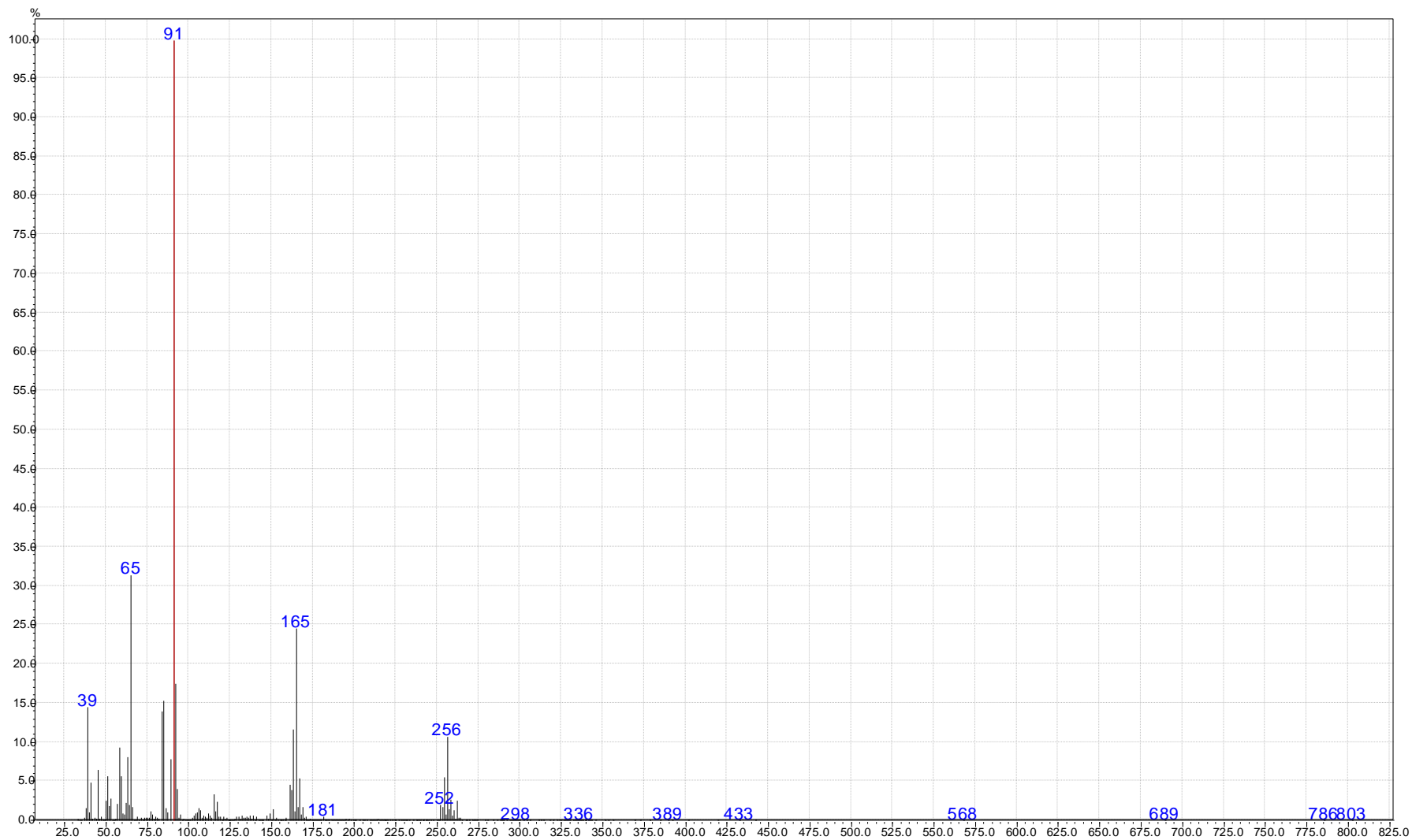
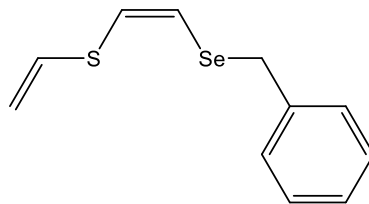
⁷⁷Se



— 327.63

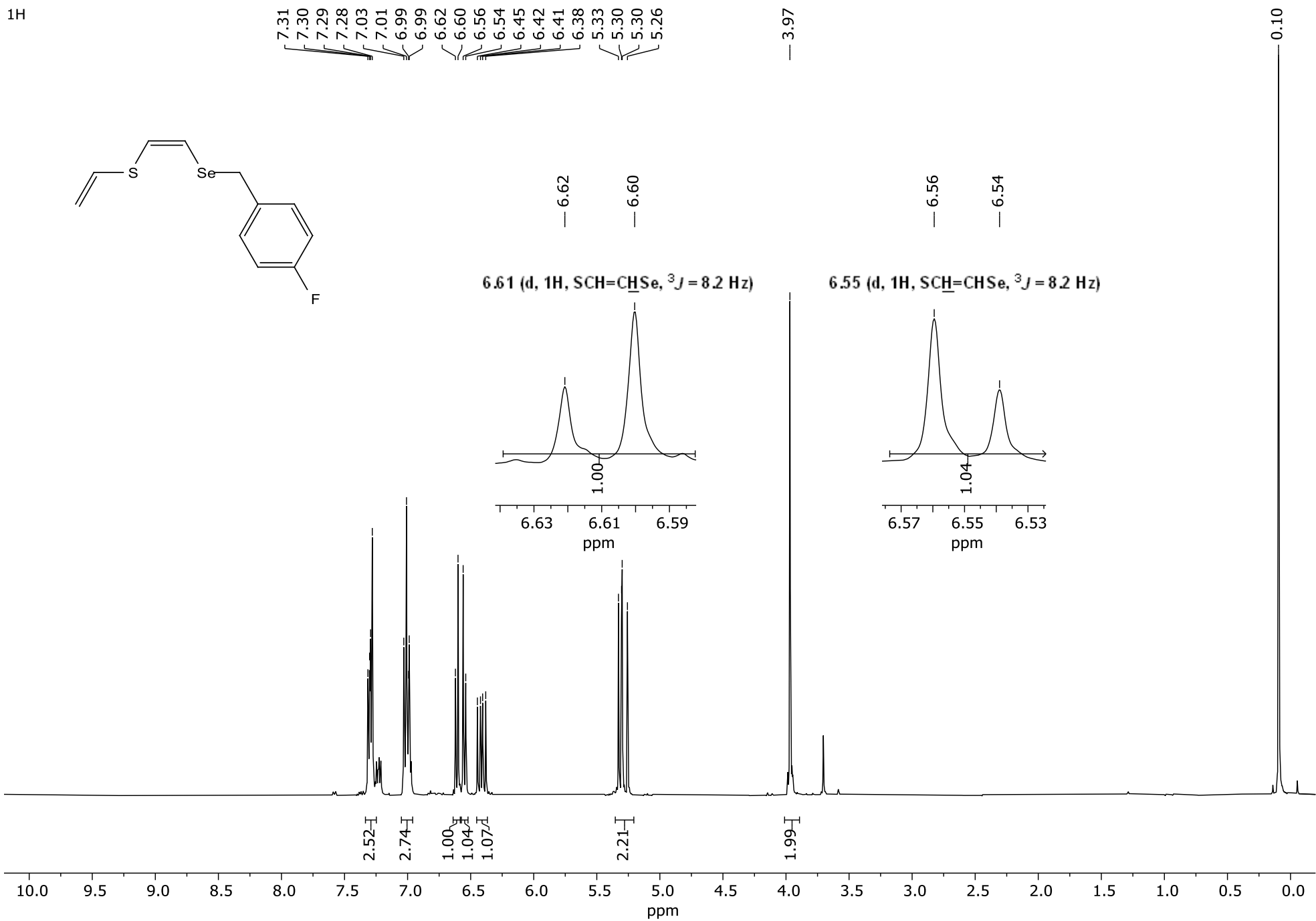


⁷⁷Se NMR spectrum of (Z)-2-(benzylselanyl)ethenyl vinyl sulfide (2i)



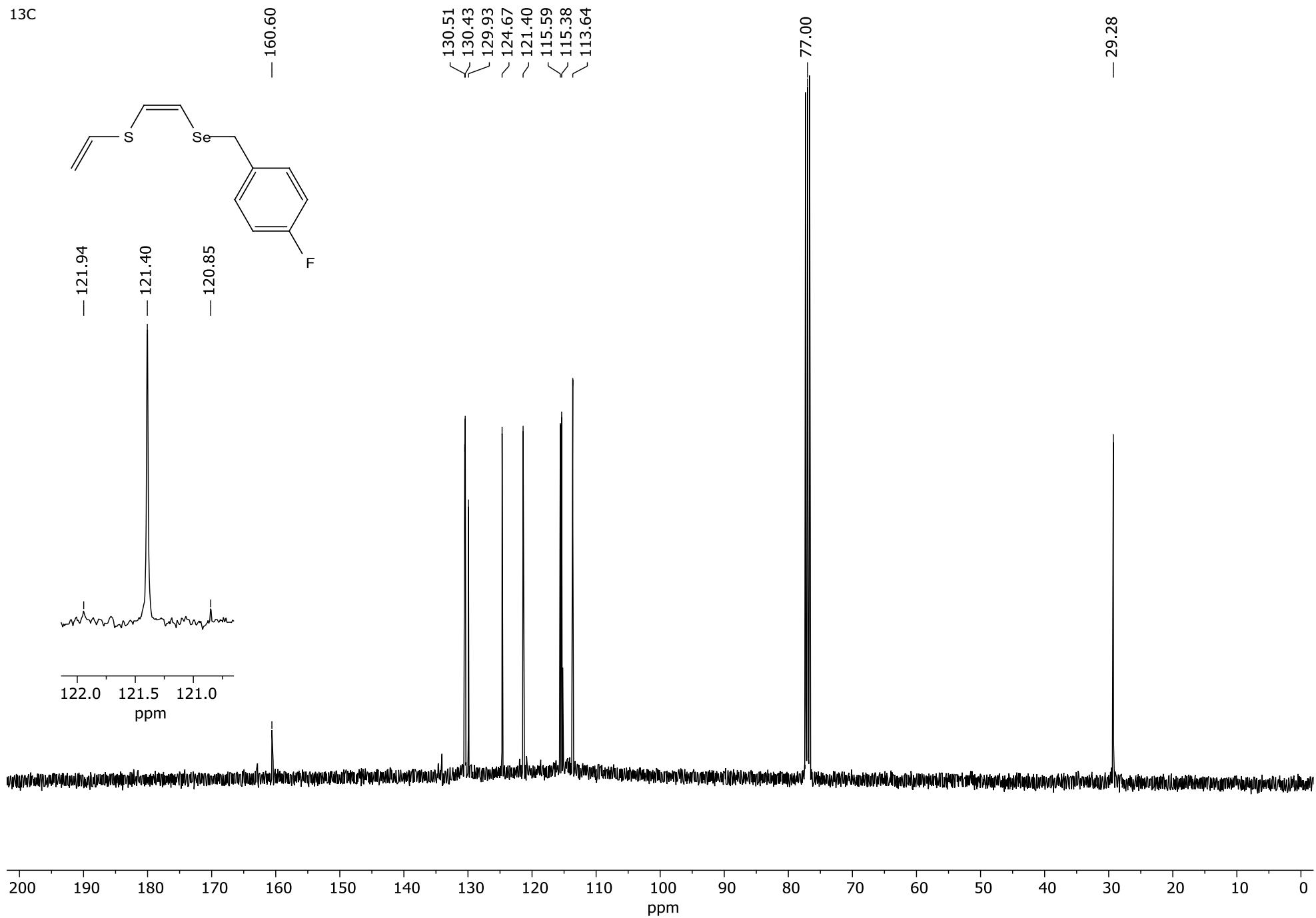
Mass-spectrum of (Z)-2-(benzylselanyl)ethenyl vinyl sulfide (2i)

¹H



¹H NMR spectrum of (Z)-2-[(4-fluorobenzylselanyl)ethenyl vinyl sulfide (2j)

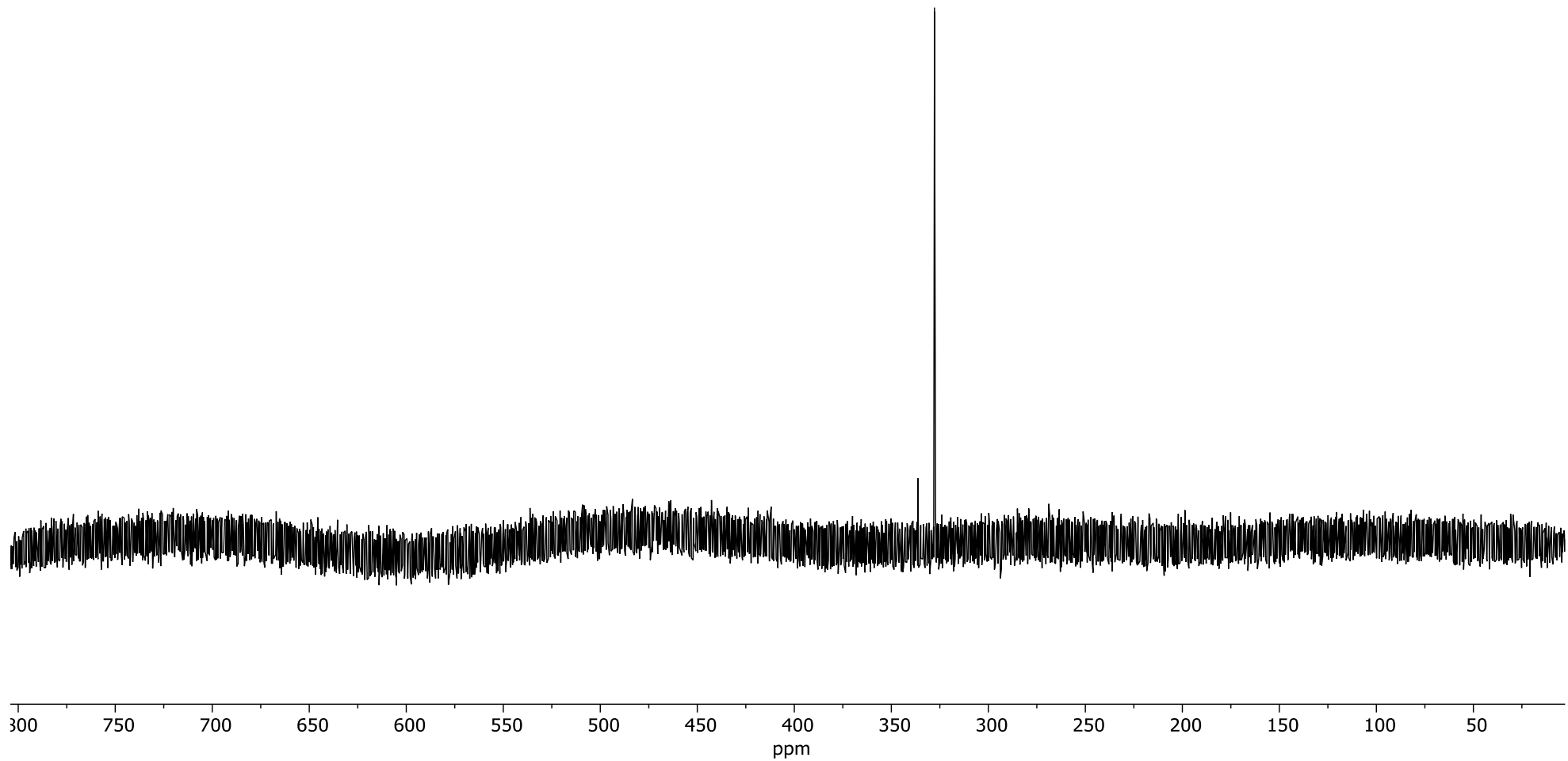
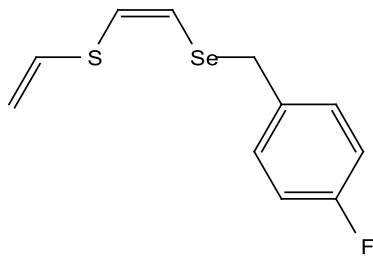
13C



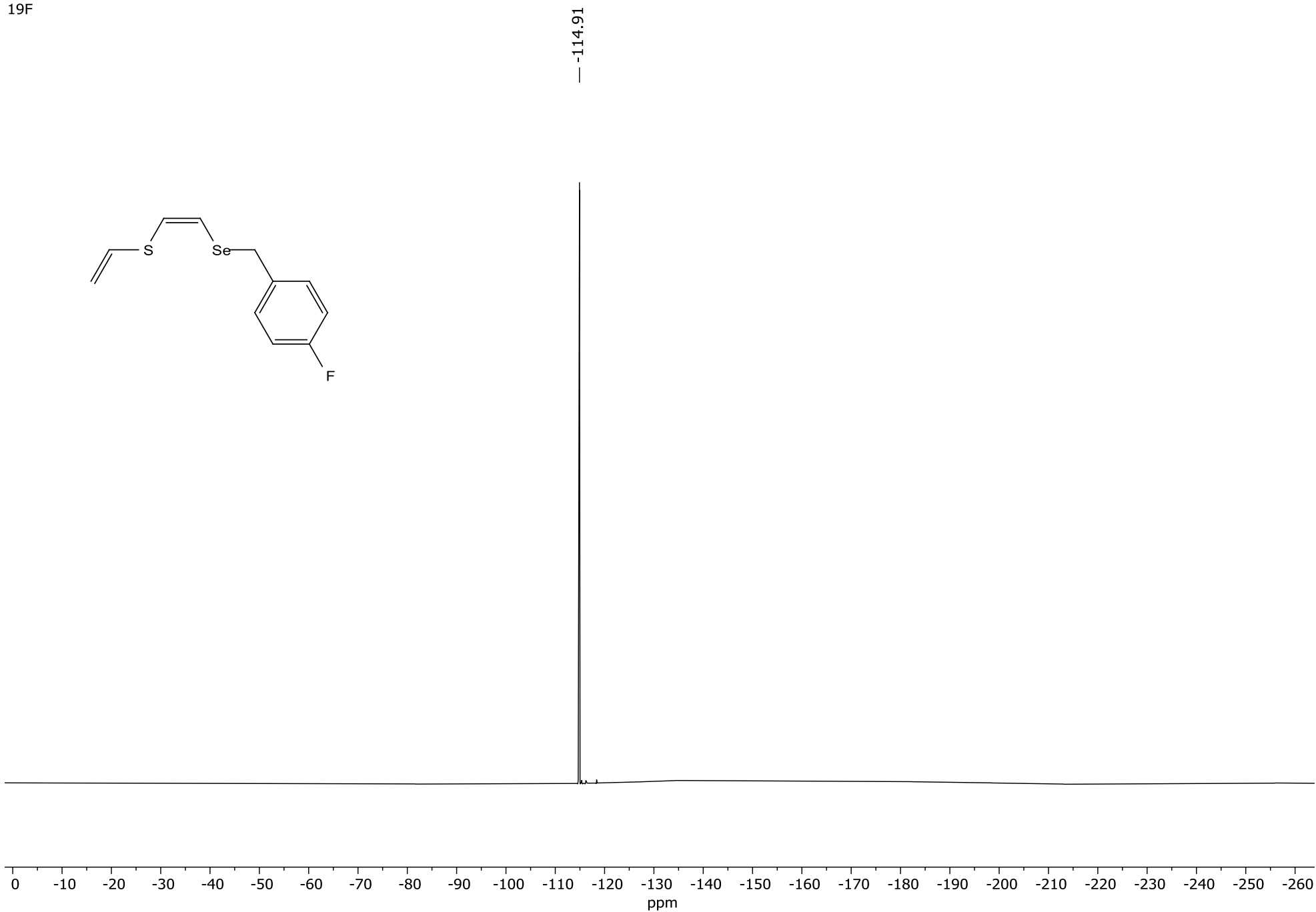
^{13}C NMR spectrum of (Z)-2-[(4-fluorobenzylselanyl)ethenyl vinyl sulfide (2j)

⁷⁷Se

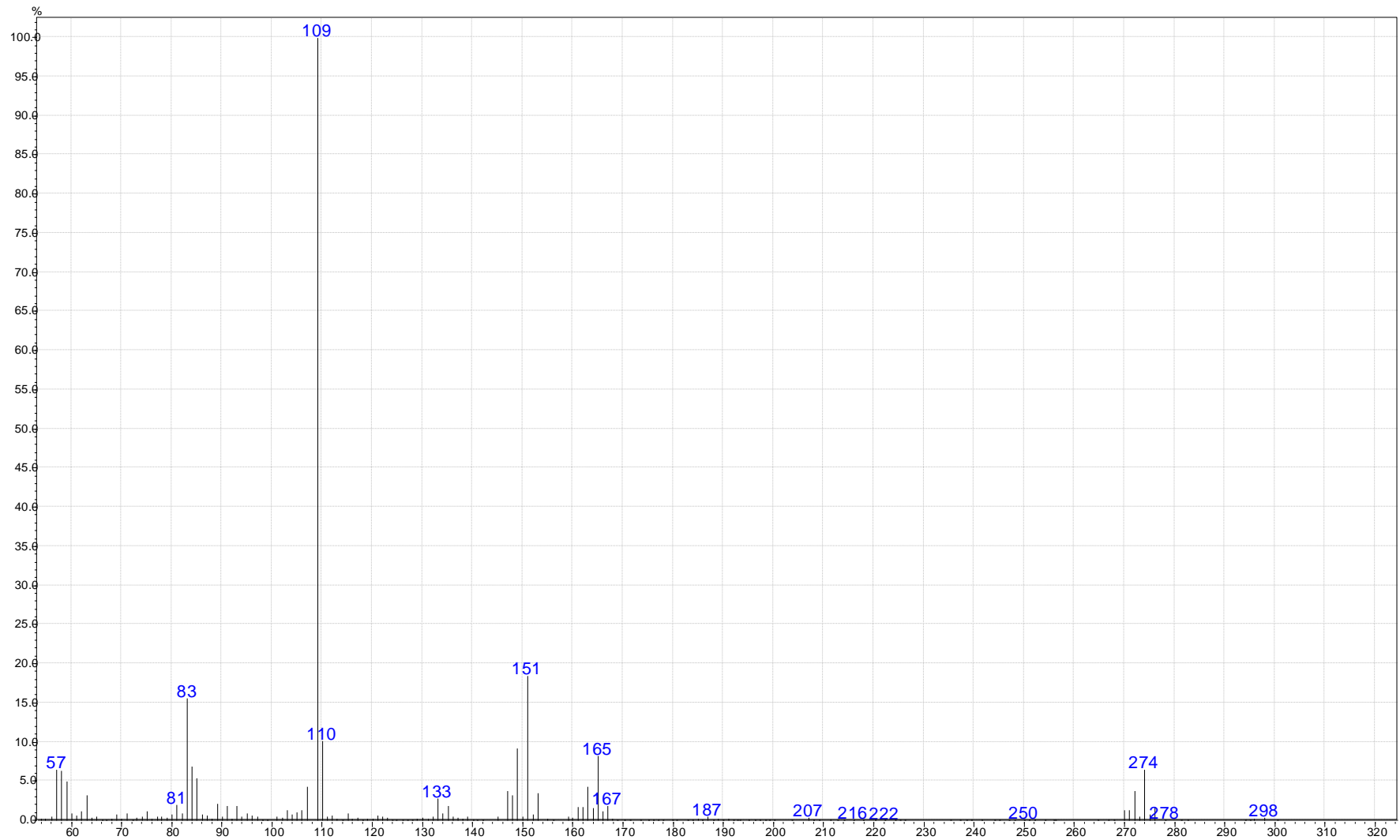
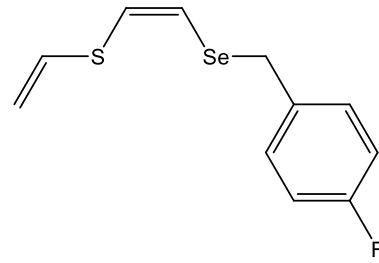
327.79
327.75



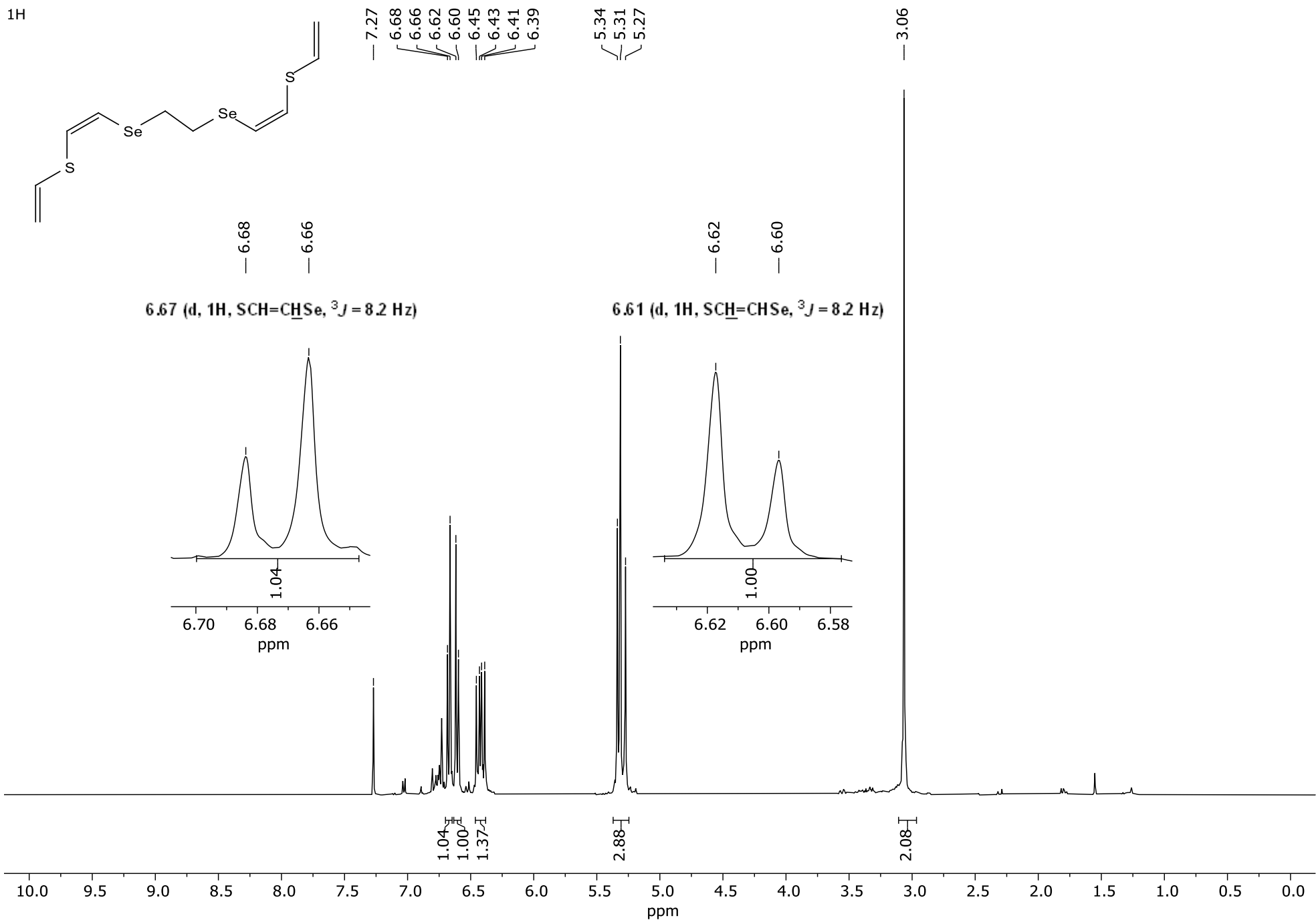
⁷⁷Se NMR spectrum of (Z)-2-[(4-fluorobenzylselanyl)ethenyl]vinyl sulfide (2j)



^{19}F NMR spectrum of (Z)-2-[(4-fluorobenzylselanyl)ethenyl vinyl sulfide (2j)



Mass-spectrum of (Z)-2-[(4-fluorobenzylselanyl)ethenyl vinyl sulfide (2j)



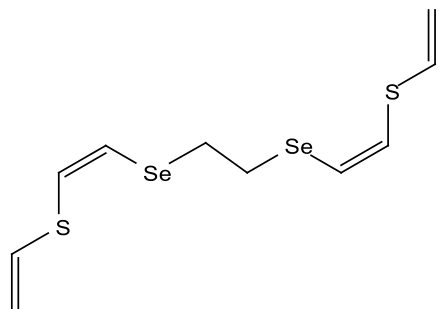
¹H NMR spectrum of vinyl (Z)-2-[(2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl)ethyl]selanyl]ethenyl sulfide (3a)

¹³C

129.82
125.55
120.91
113.73

77.00

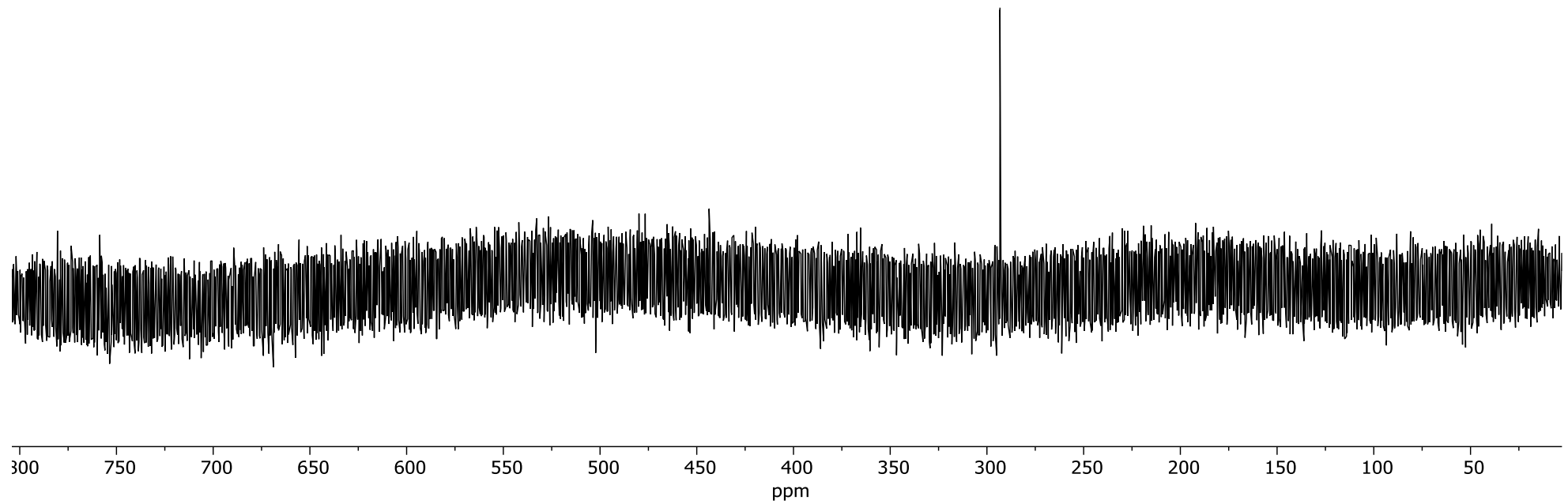
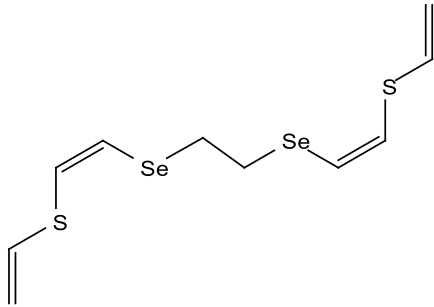
27.10



200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

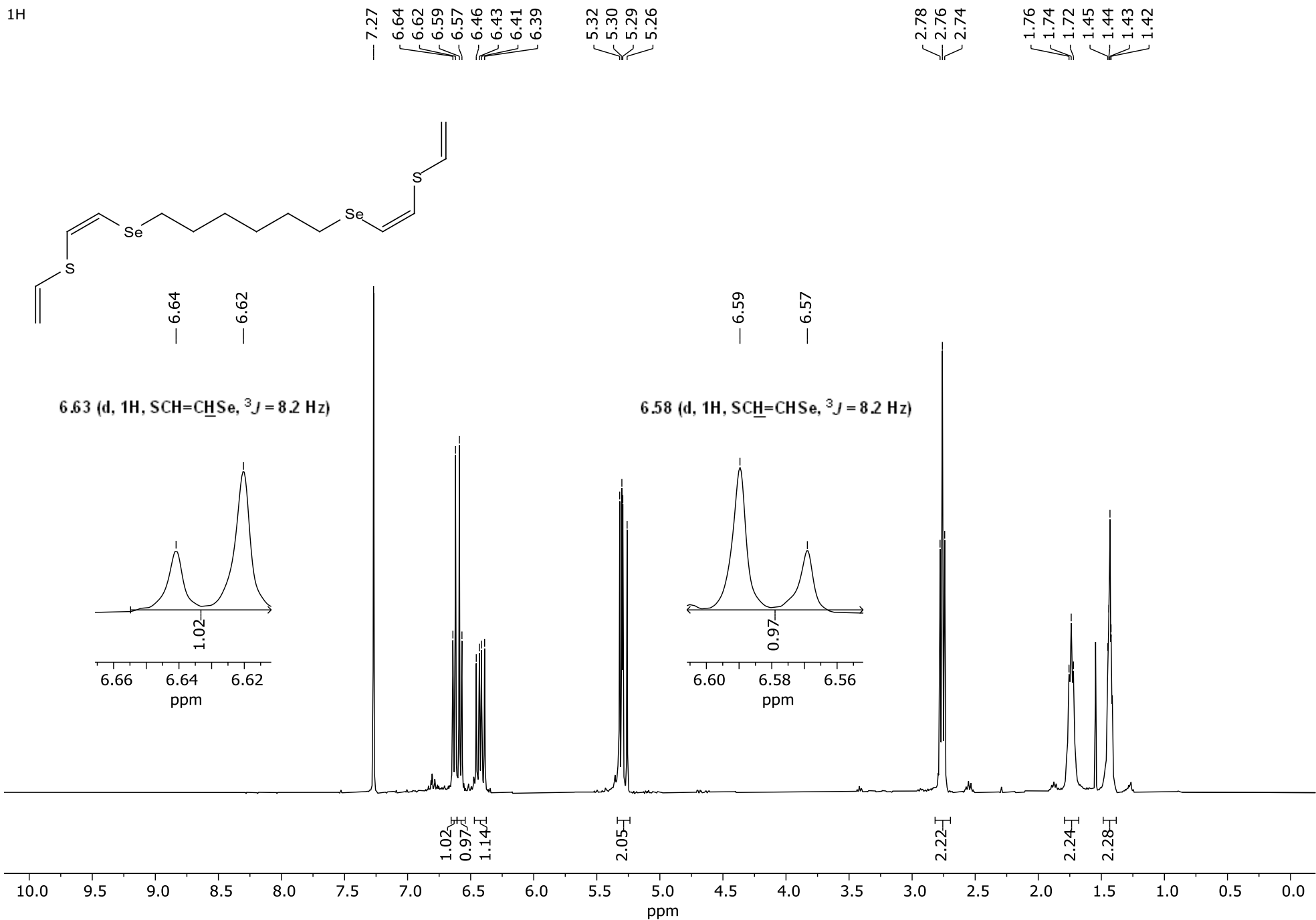
¹³C NMR

spectrum of vinyl (Z)-2-[(2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl)ethyl]selanyl]ethenyl sulfide (3a)



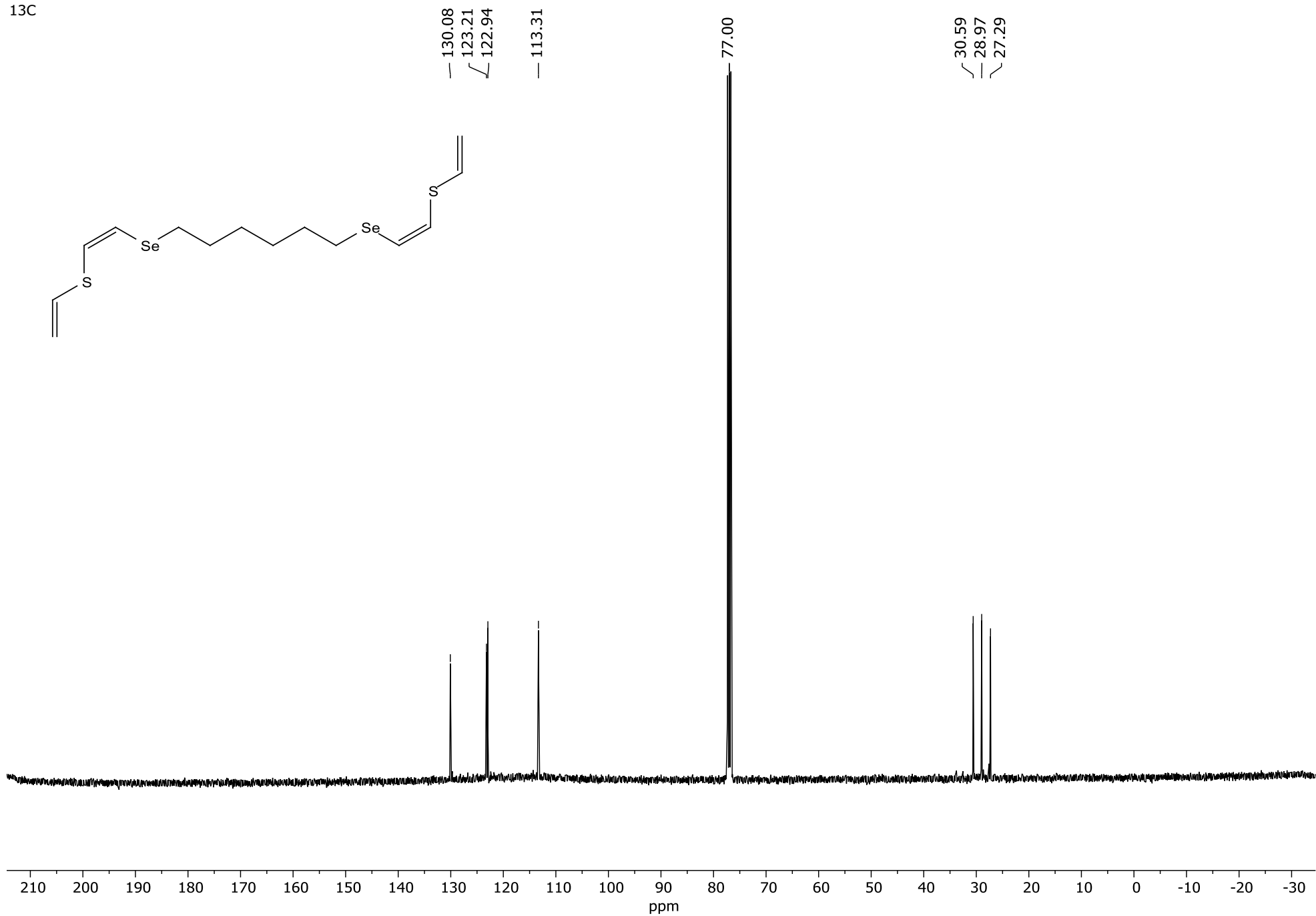
^{77}Se NMR spectrum of vinyl (Z)-2-[(2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl)ethyl]selanyl ethenyl sulfide (3a)

¹H



¹H NMR spectrum of vinyl (Z)-2-[(6-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl)hexyl]selanyl]ethenyl sulfide (3b)

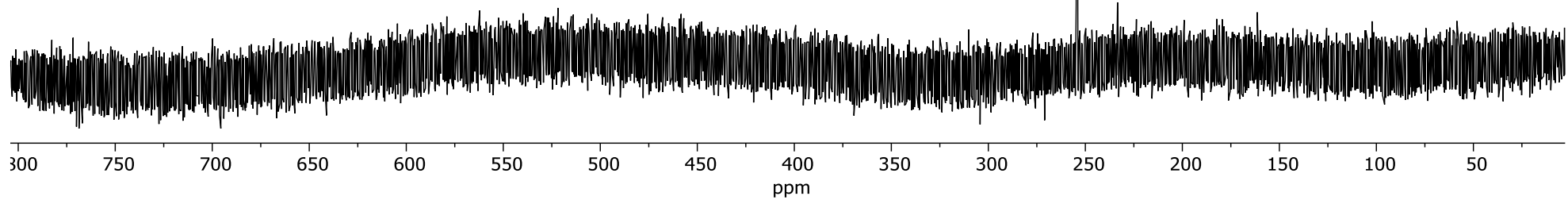
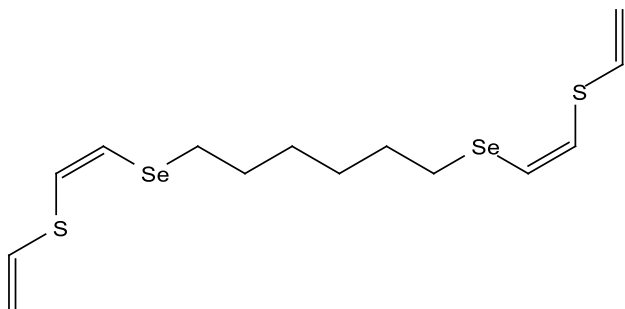
13C



¹³C NMR spectrum of vinyl (Z)-2-[(6-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl}hexyl)selanyl]ethenyl sulfide (3b)

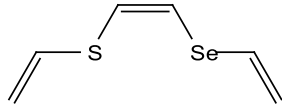
⁷⁷Se

— 254.29



⁷⁷Se NMR spectrum of vinyl (Z)-2-[(6-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl)hexyl]selanyl ethenyl sulfide (3b)

¹H

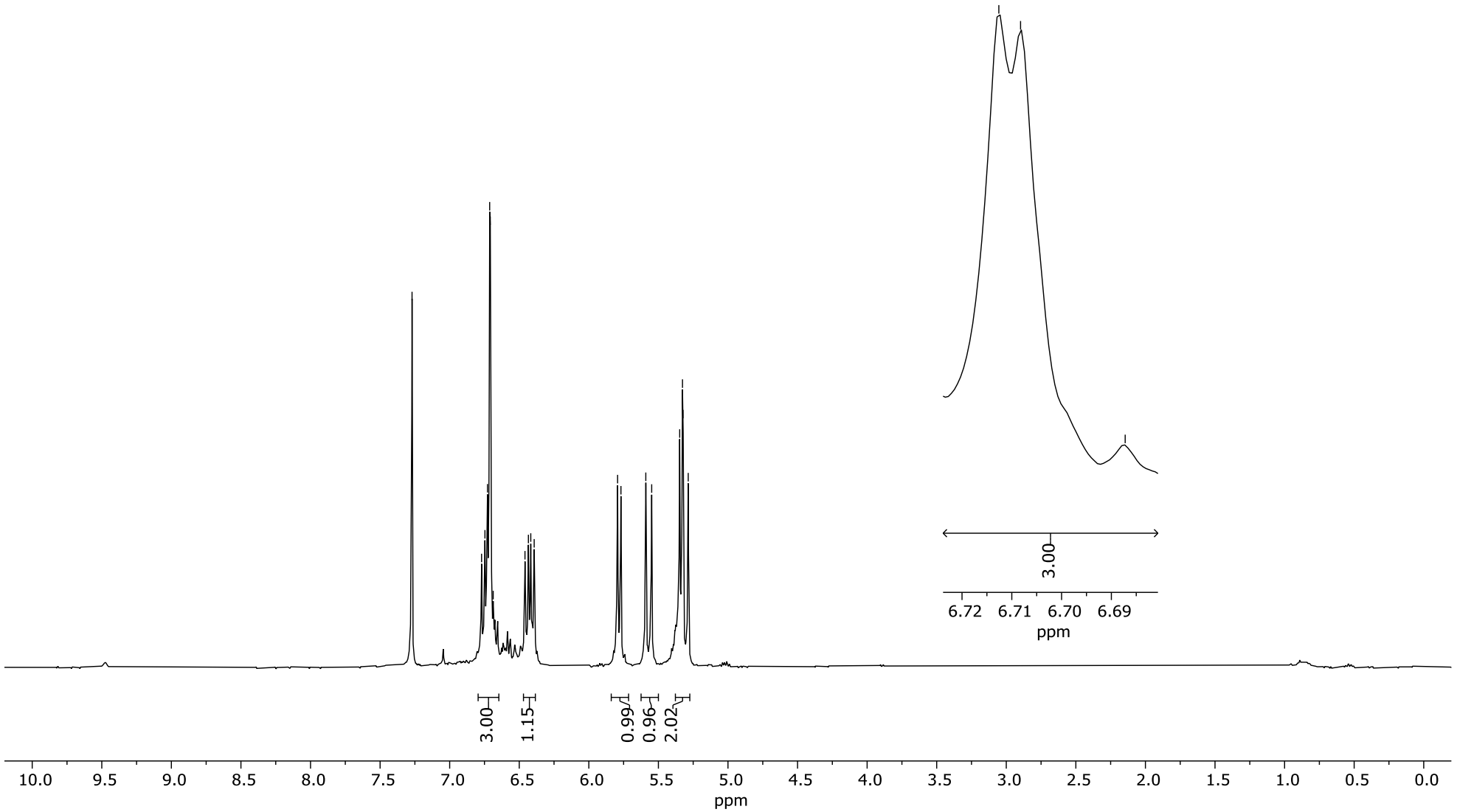


7.27
6.77
6.75
6.73
6.71
6.71
6.69
6.46
6.43
6.42
6.39
5.79
5.77
5.59
5.55
5.35
5.33
5.32
5.29

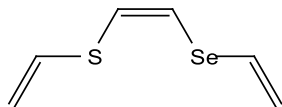
6.71
6.71

6.69

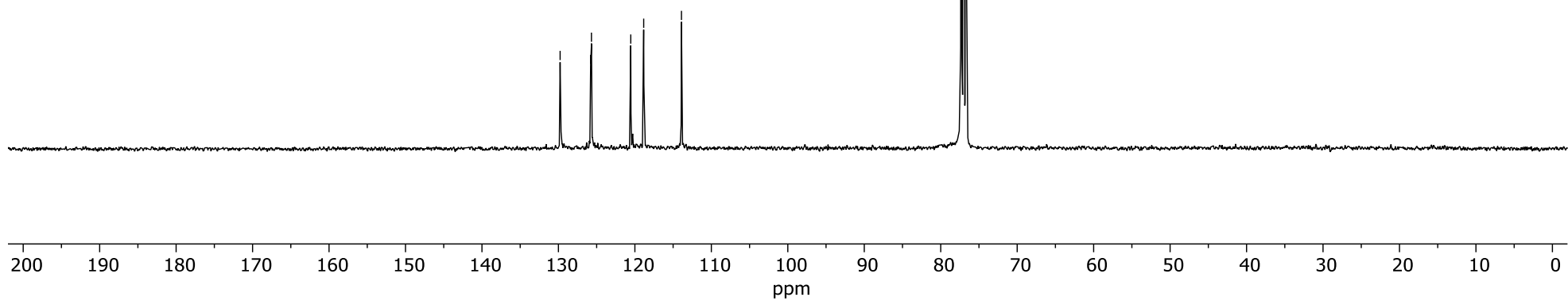
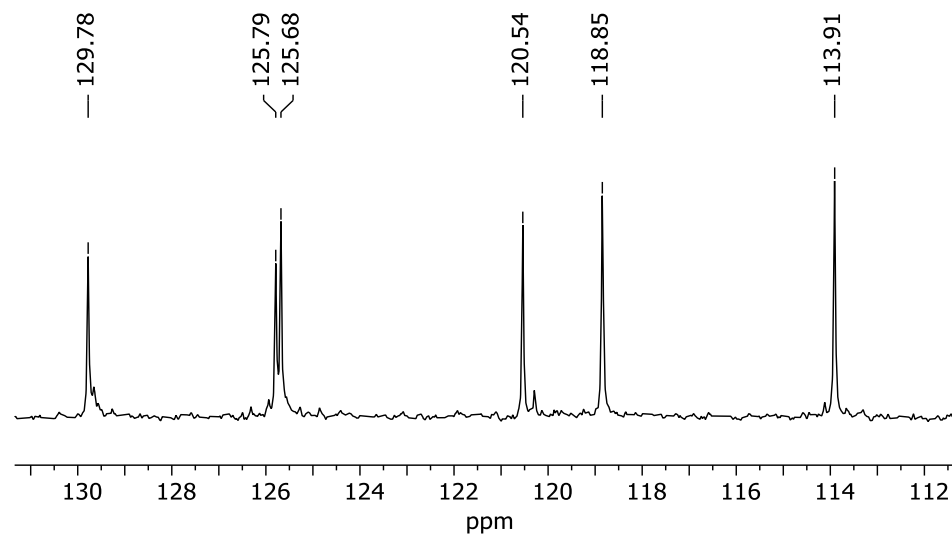
6.70 (d, 1H, SCH=CHSe, ³J = 8.2 Hz)



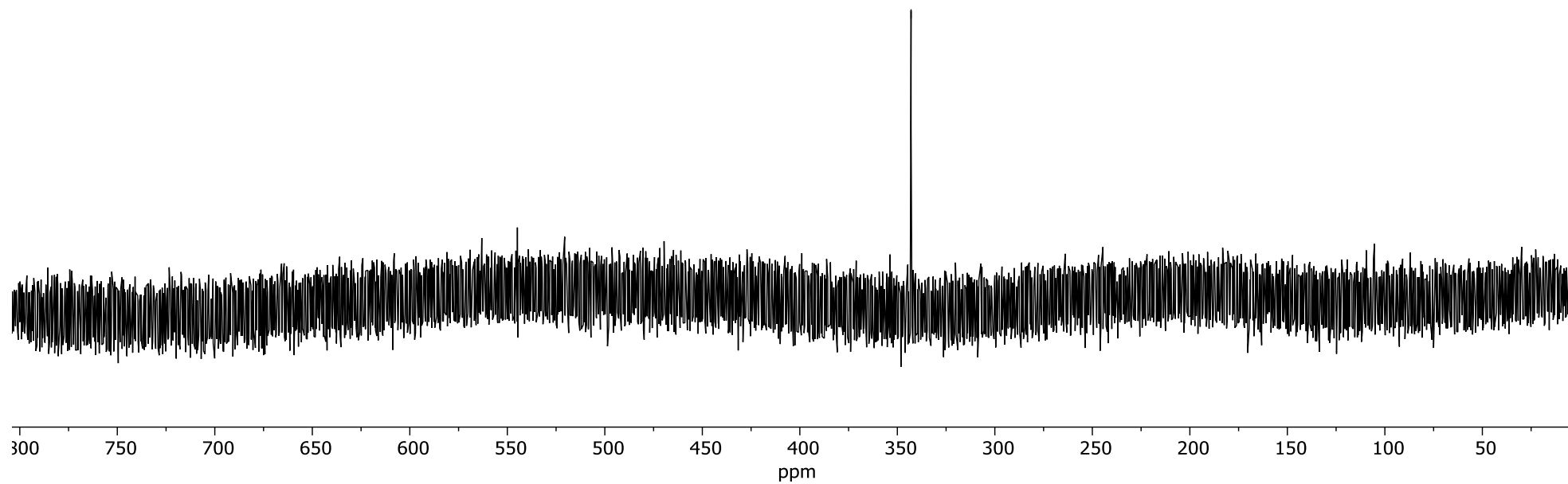
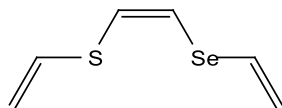
¹H NMR spectrum of vinyl (Z)-2-(vinylselanyl)ethenyl sulfide (4a)



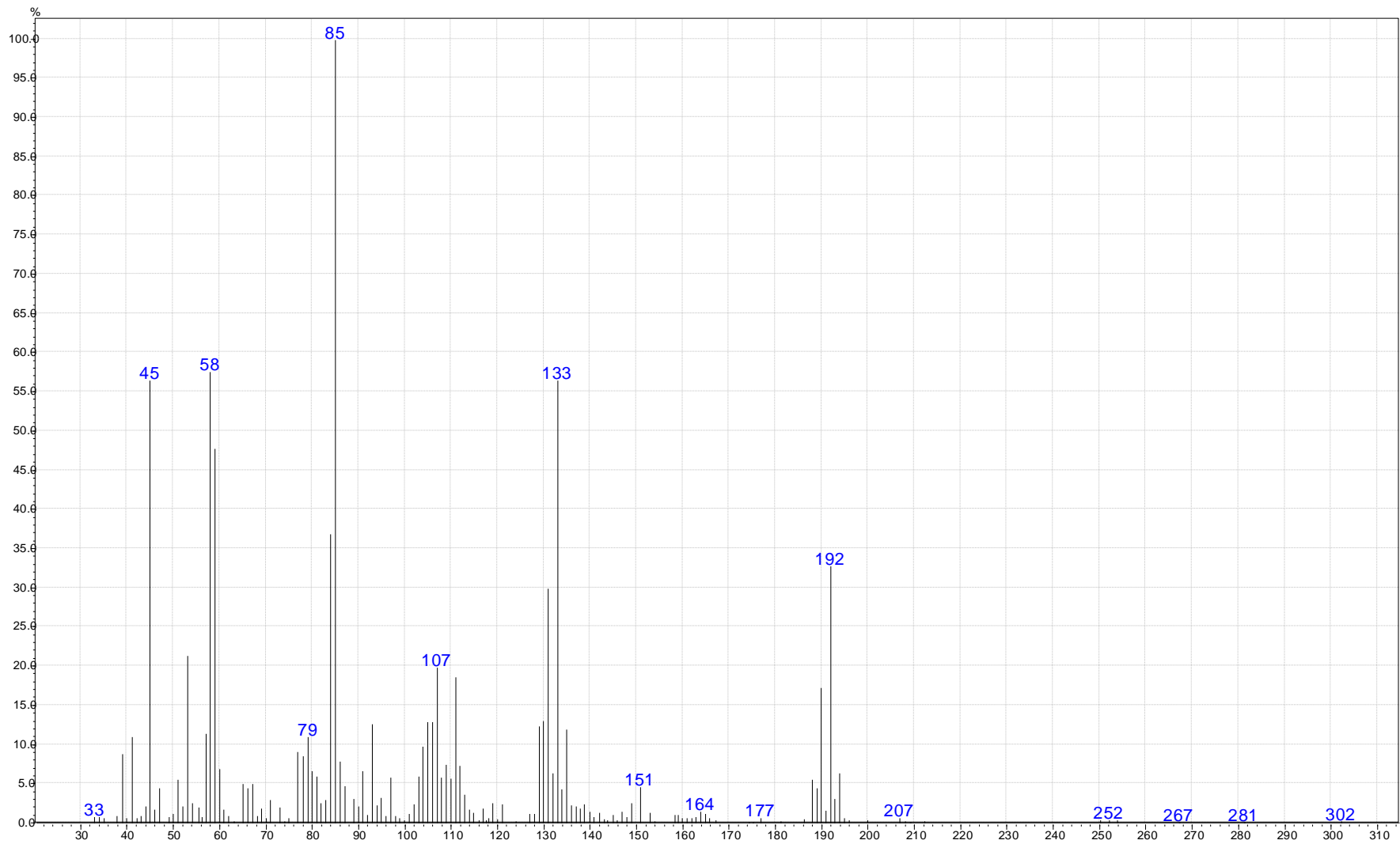
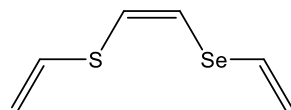
— 129.78
— 125.79
— 125.68
— 120.54
— 118.85
— 113.91



¹³C NMR spectrum of vinyl (Z)-2-(vinylselanyl)ethenyl sulfide (4a)

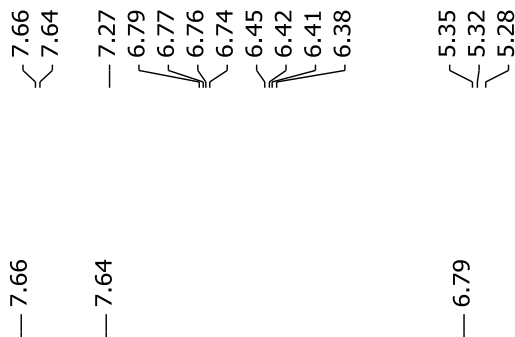
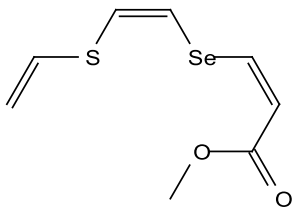


^{77}Se NMR spectrum of vinyl (Z)-2-(vinylselanyl)ethenyl sulfide (4a)



Mass-spectrum of vinyl (Z)-2-(vinylselanyl)ethenyl sulfide (4a)

¹H

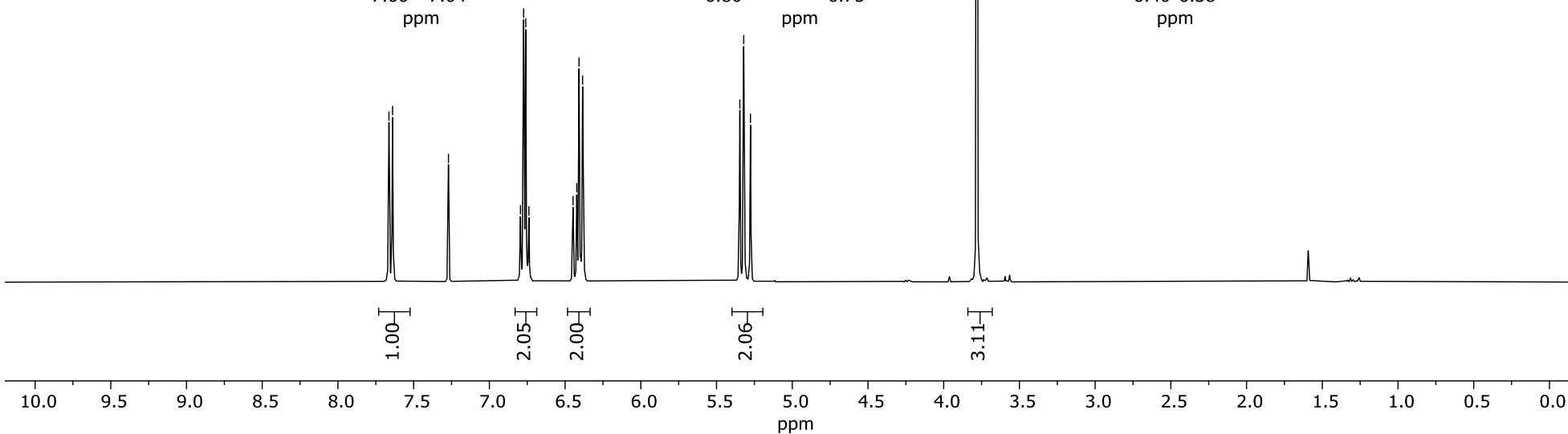
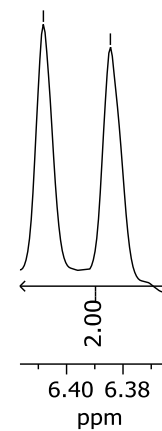
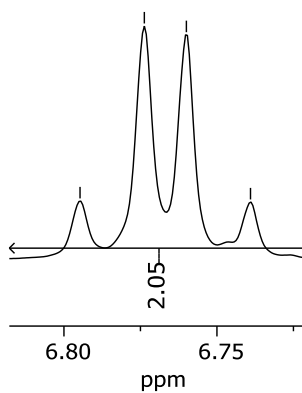
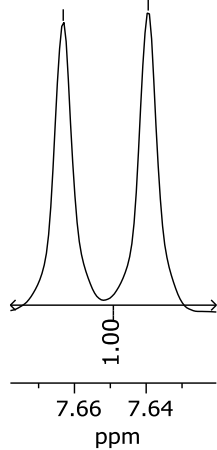


7.65 (d, 1H, C(O)CH=CHSe, ³J = 9.4 Hz)

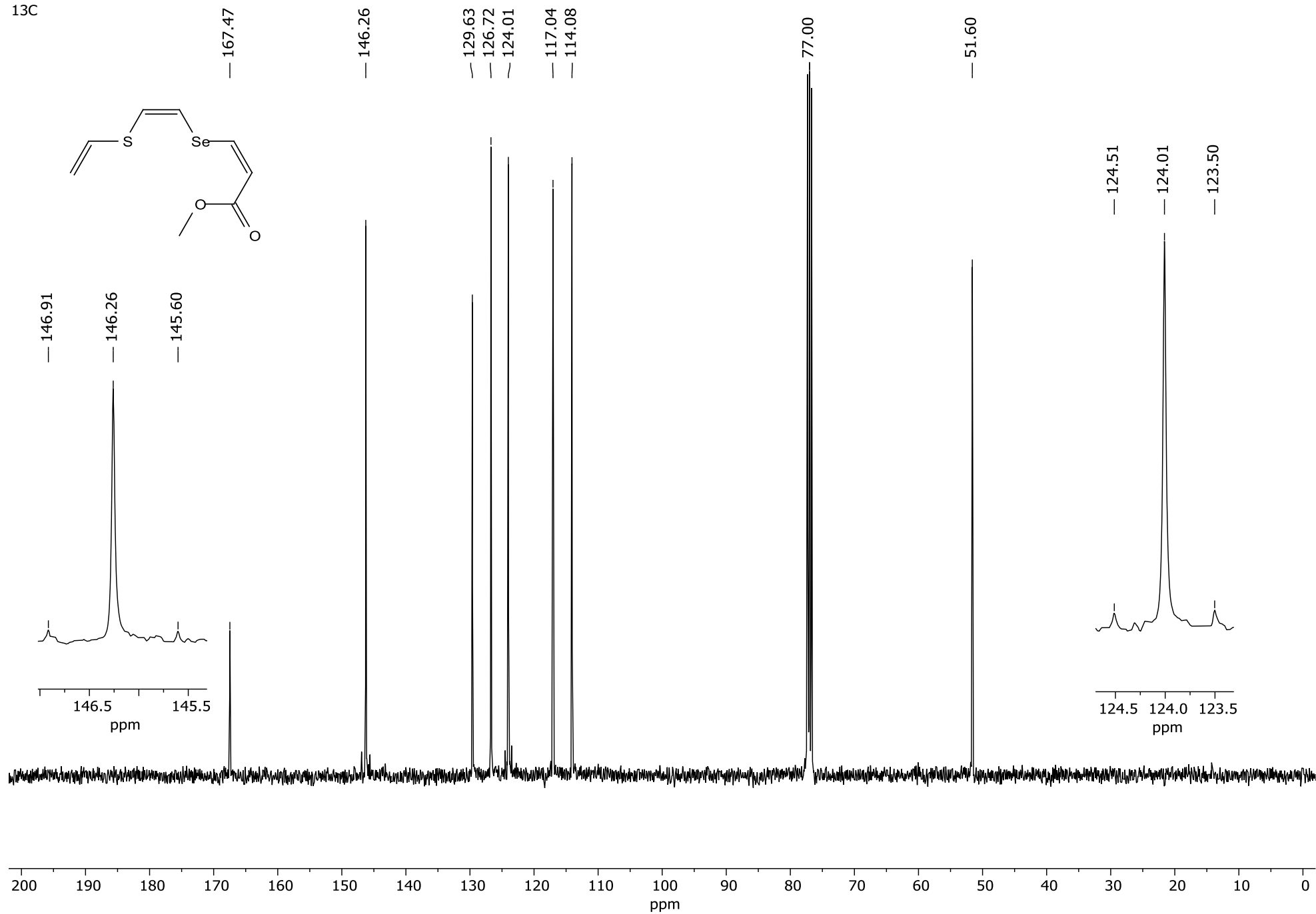
6.78 (d, 1H, SCH=CHSe, ³J = 8.5 Hz)

6.40 (d, 1H, C(O)CH=CHSe, ³J = 9.4 Hz)

6.75 (d, 1H, SCH=CHSe, ³J = 8.5 Hz)



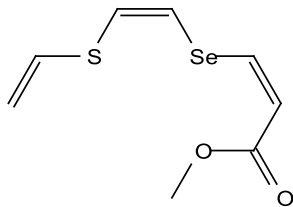
¹H NMR spectrum of methyl (Z)-3-[(Z)-2-(vinylsulfanyl)ethenyl]selenyl-2-propenoate (4b)



¹³C NMR spectrum of methyl (Z)-3-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-propenoate (4b)

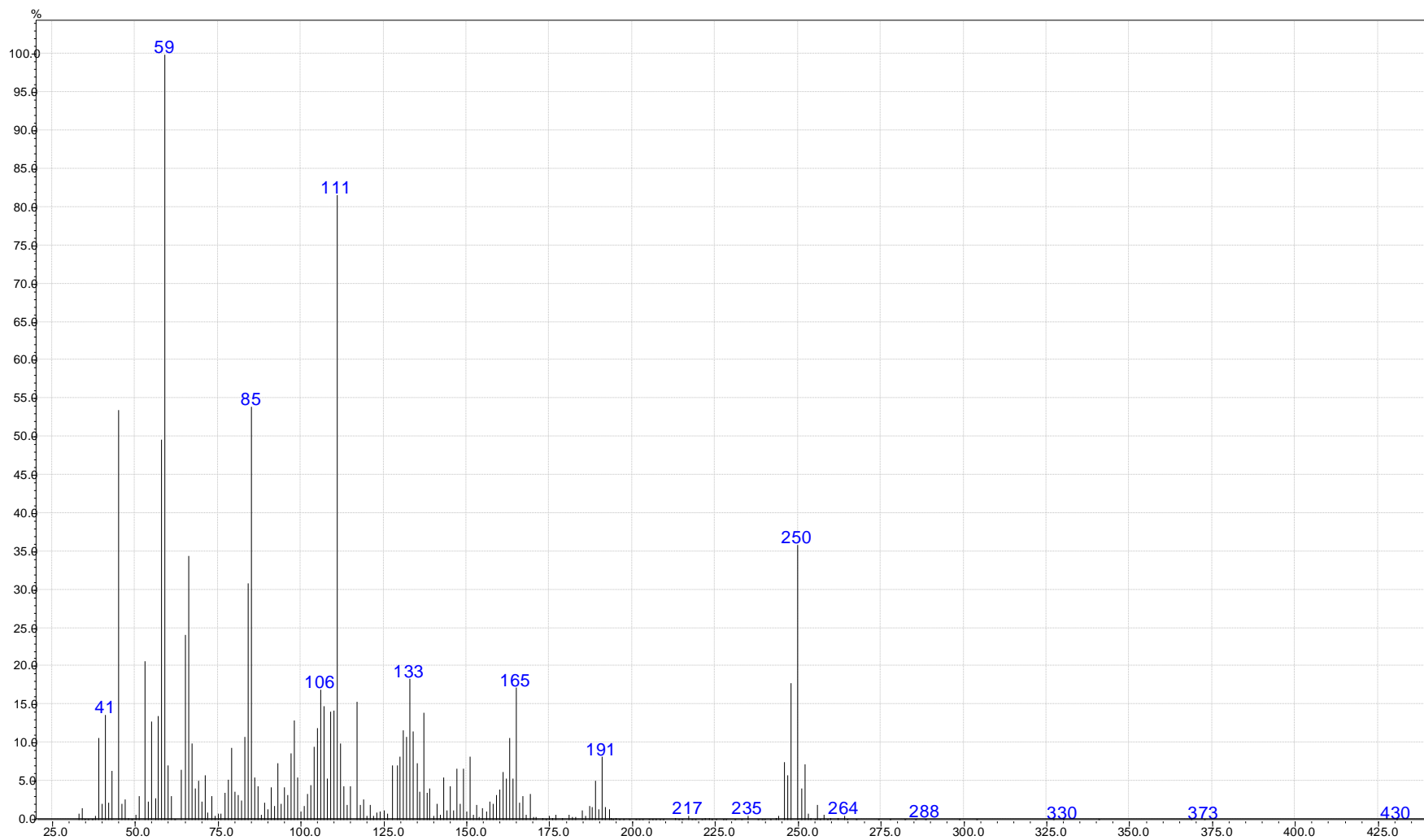
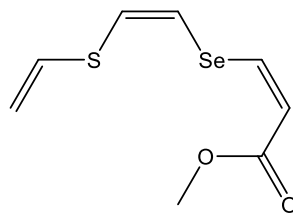
⁷⁷Se

434.94



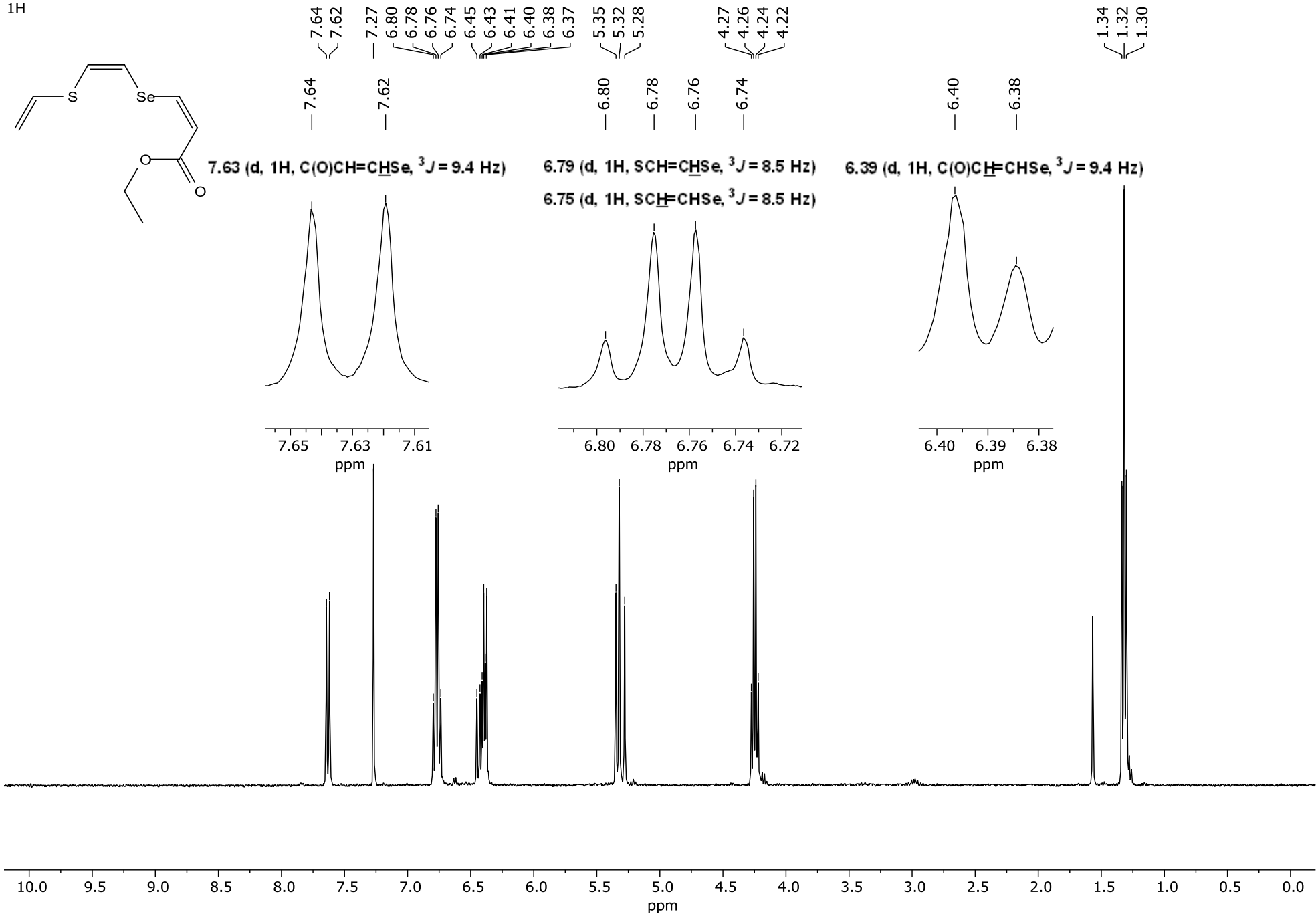
500 450 400 350 300 250 200 150 100 50 0 -50 -100 -150 -200 -250
ppm

⁷⁷Se NMR spectrum of methyl (Z)-3-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-propenoate (4b)

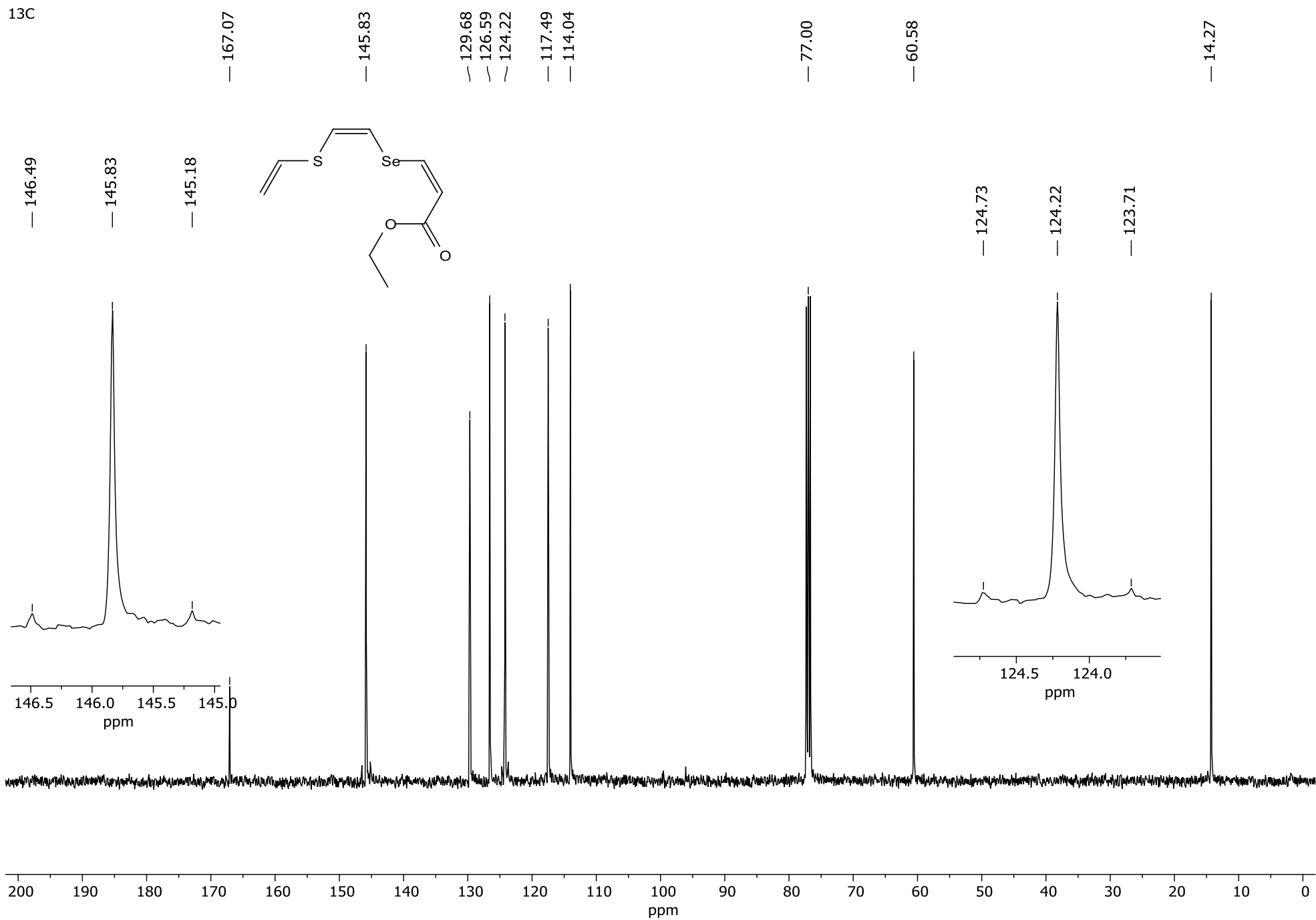


Mass-spectrum of methyl (Z)-3-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-propenoate (4b)

¹H

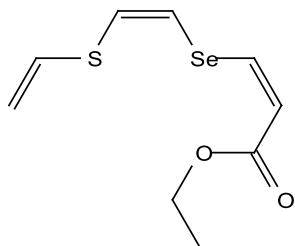


¹H NMR spectrum of ethyl (Z)-3-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-propenoate (4c)

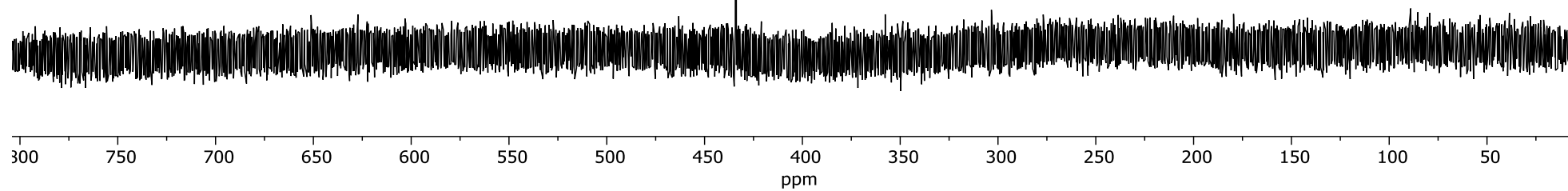


¹³C NMR spectrum of ethyl (Z)-3-[[*Z*]-2-(vinylsulfanyl)ethenyl]selanyl]-2-propenoate (**4c**)

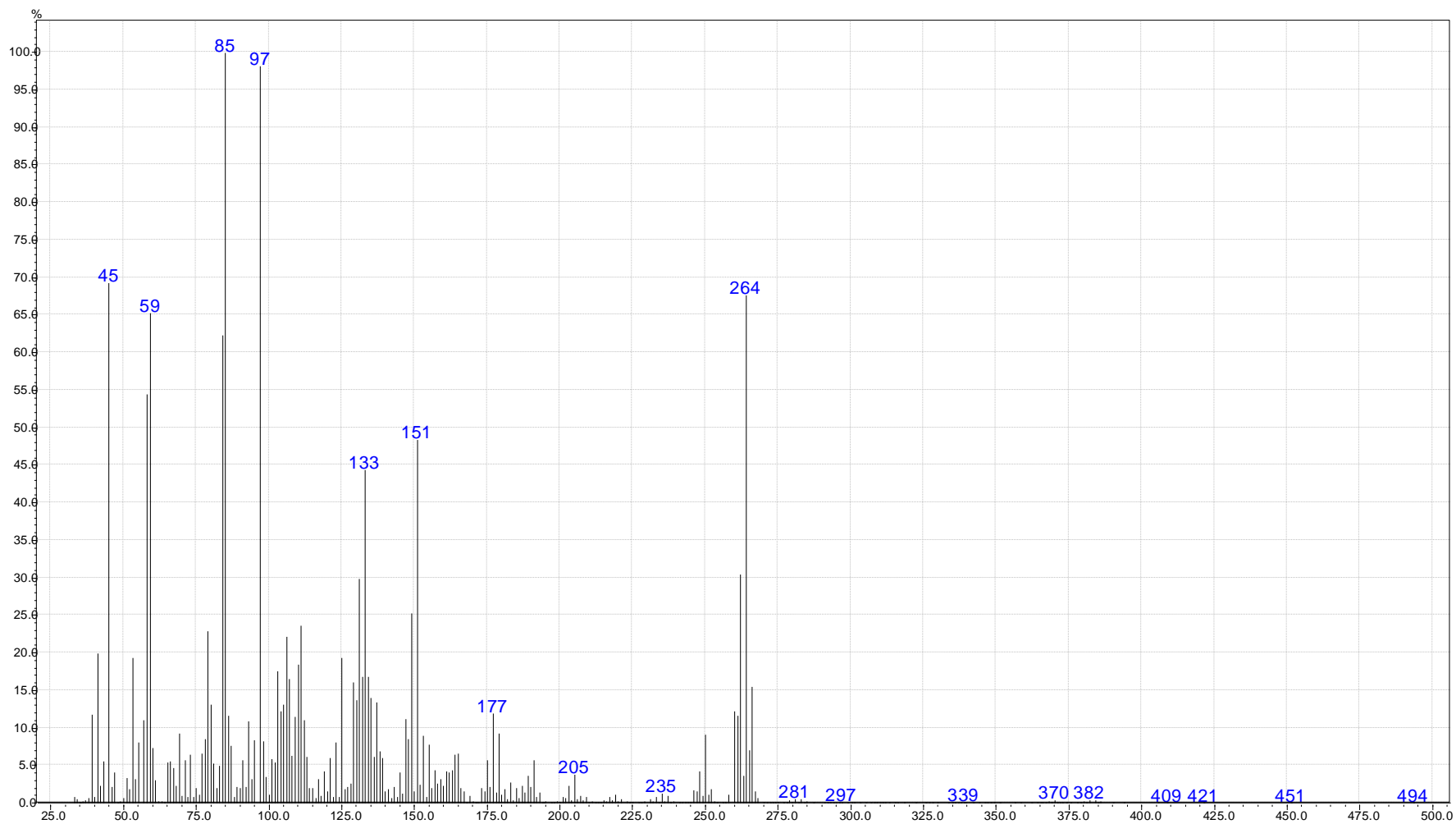
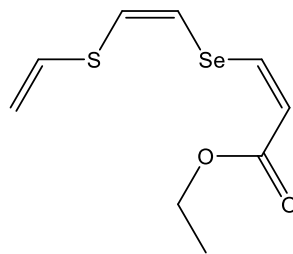
⁷⁷Se



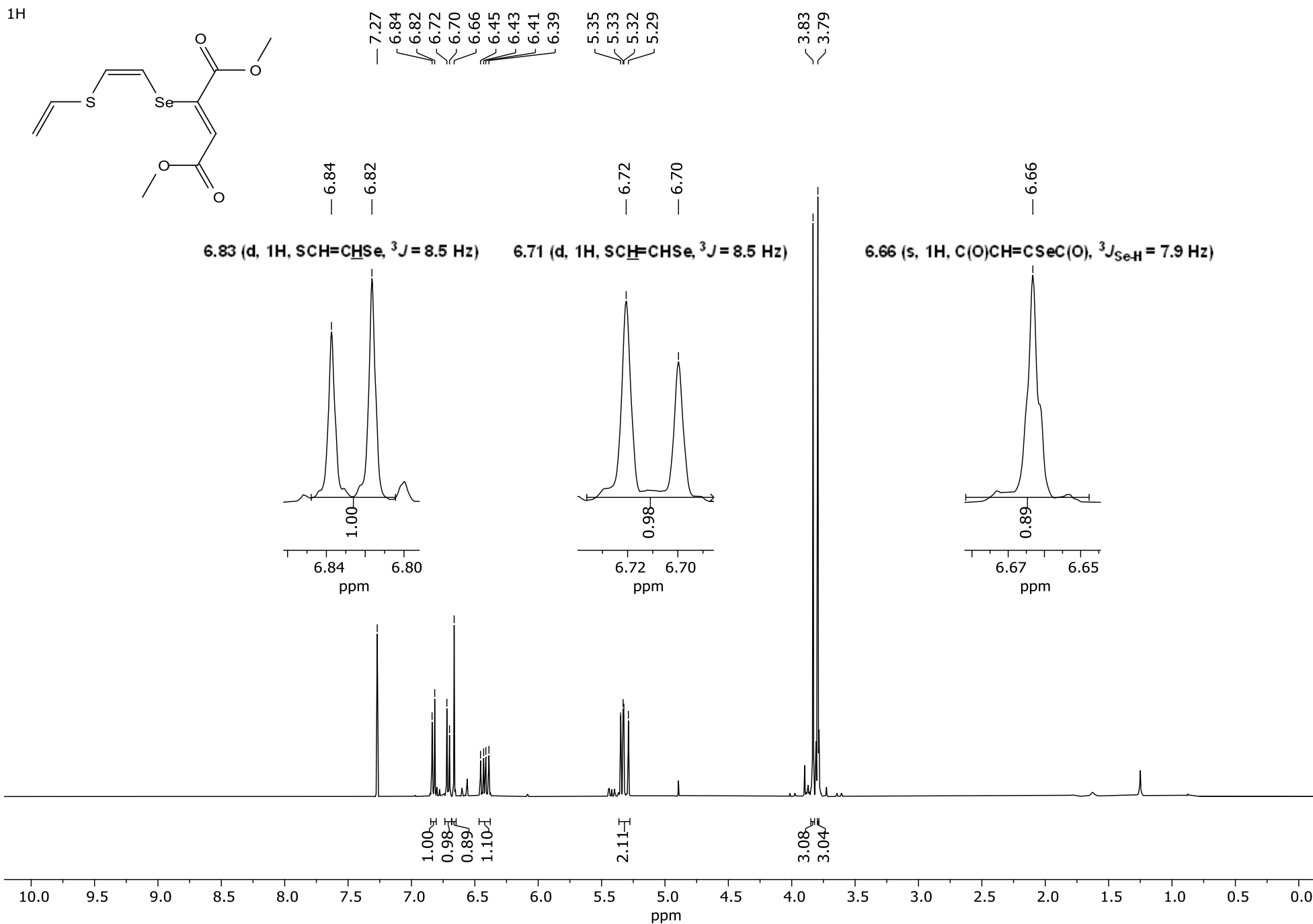
— 434.08



⁷⁷Se NMR spectrum of ethyl (Z)-3-([(Z)-2-(vinylsulfanyl)ethenyl]selanyl)-2-propenoate (4c)



Mass-spectrum of ethyl (Z)-3-[[Z]-2-(vinylsulfanyl)ethenyl]selanyl-2-propenoate (4c)



¹H NMR spectrum of dimethyl (Z,Z)-2-[[2-(vinylsulfanyl)ethenyl]selanyl]-2-butenedioate (5a) (Z,Z)

13C

166.21
165.55

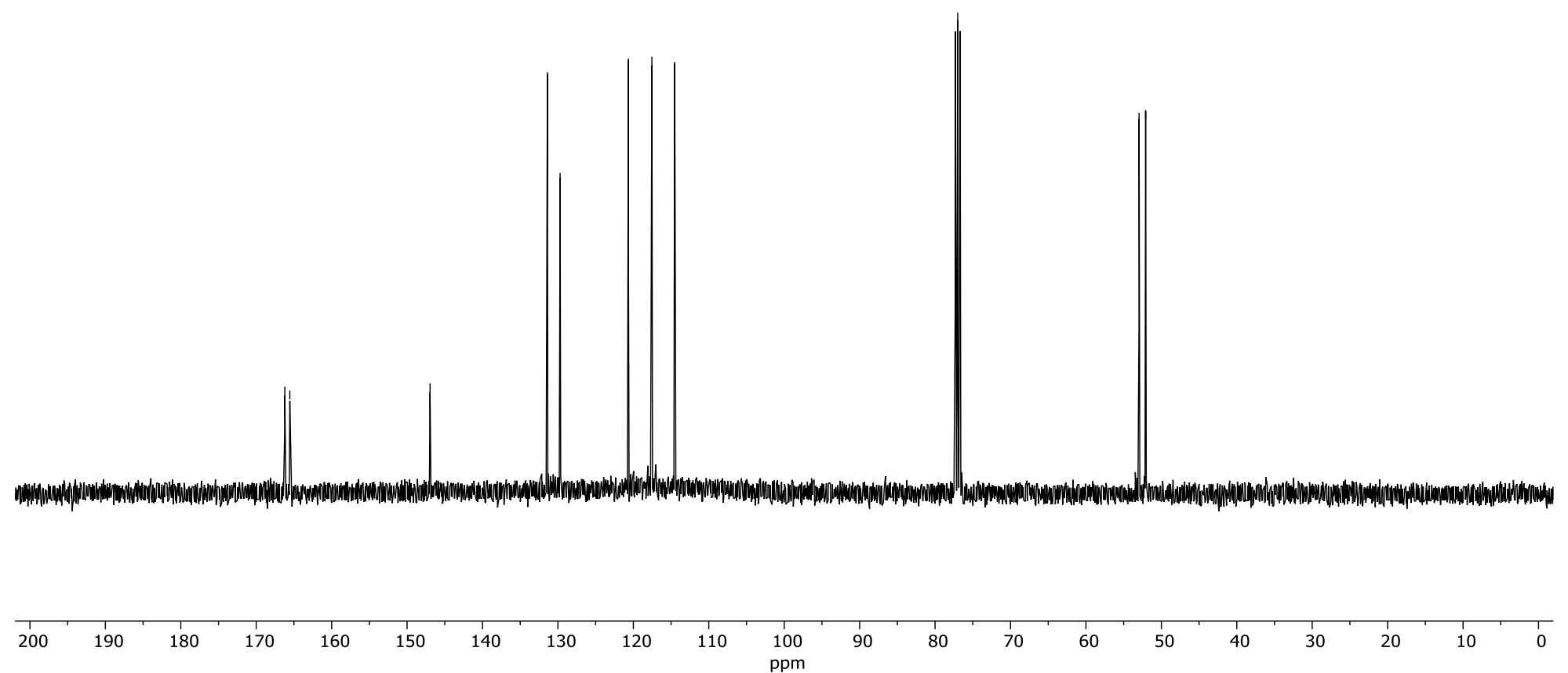
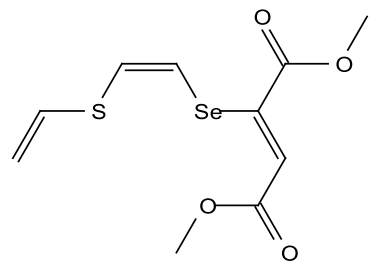
146.96

131.39
129.71

120.65
117.54
114.52

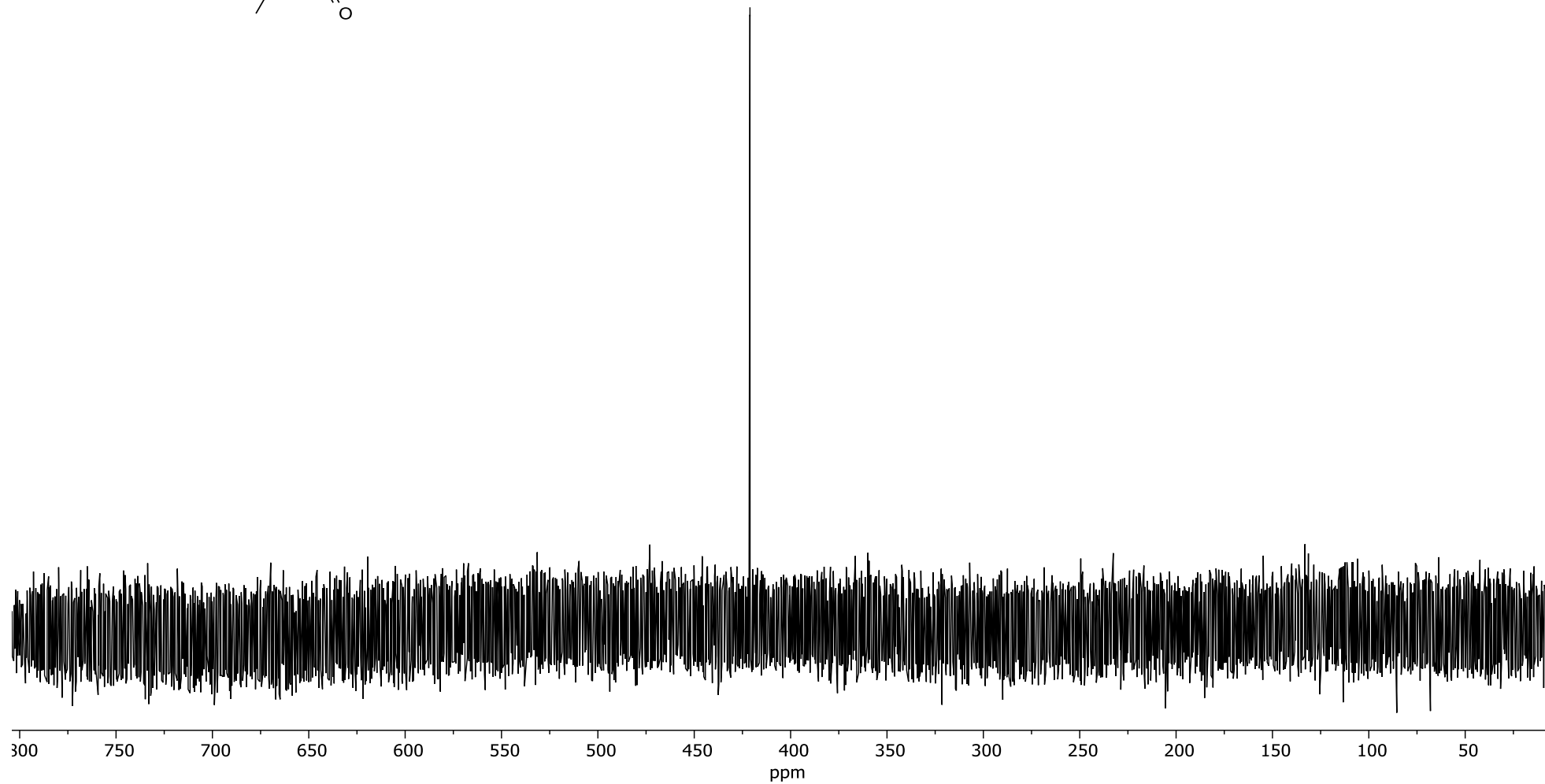
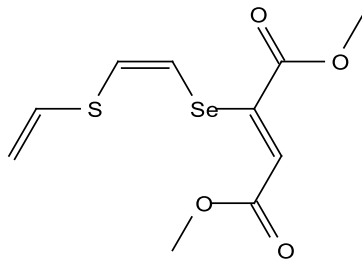
77.00

52.96
52.09

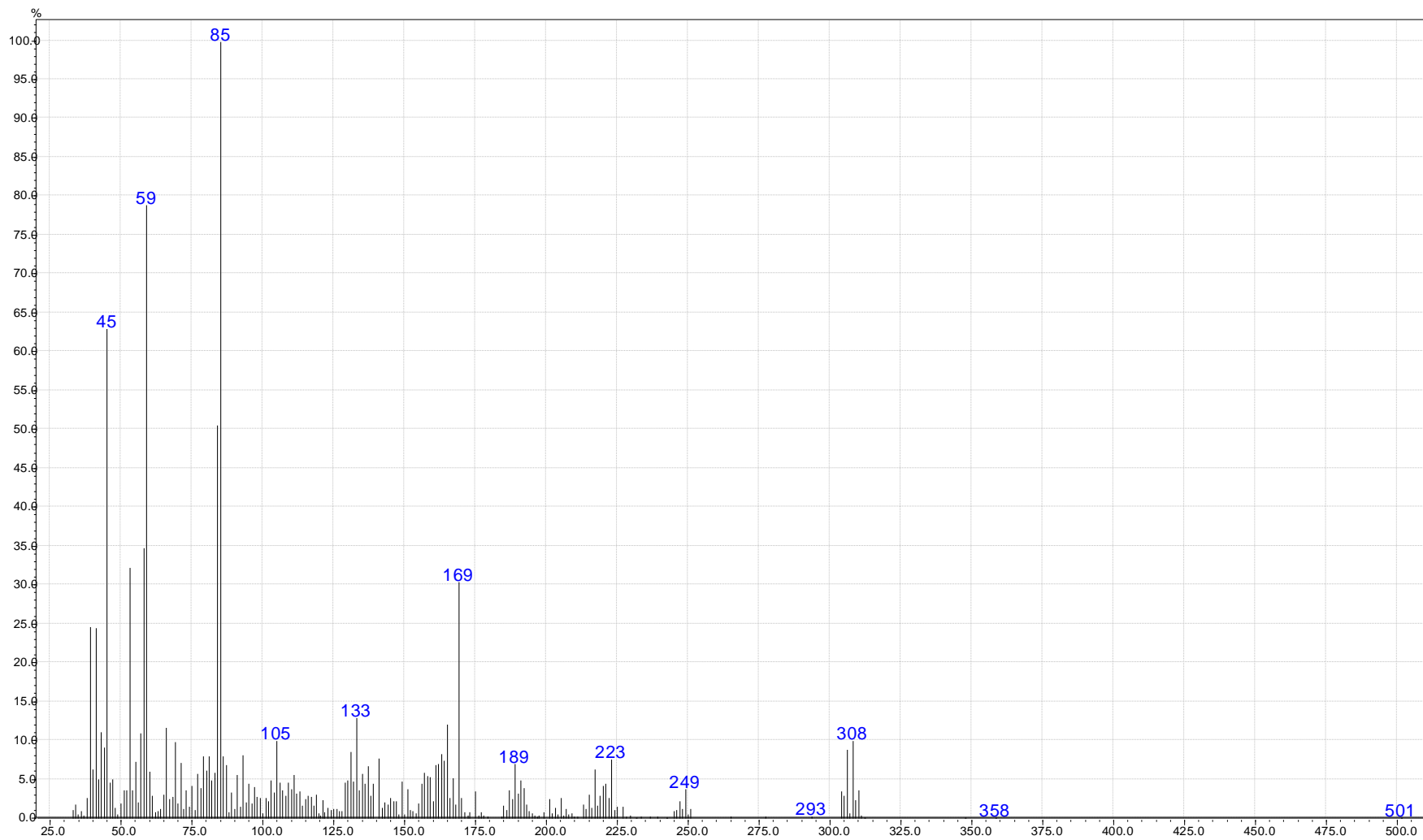
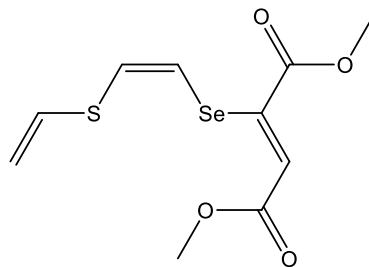


¹³C NMR spectrum of dimethyl (Z)-2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-butenedioate (5a) (Z,Z)

— 421.10

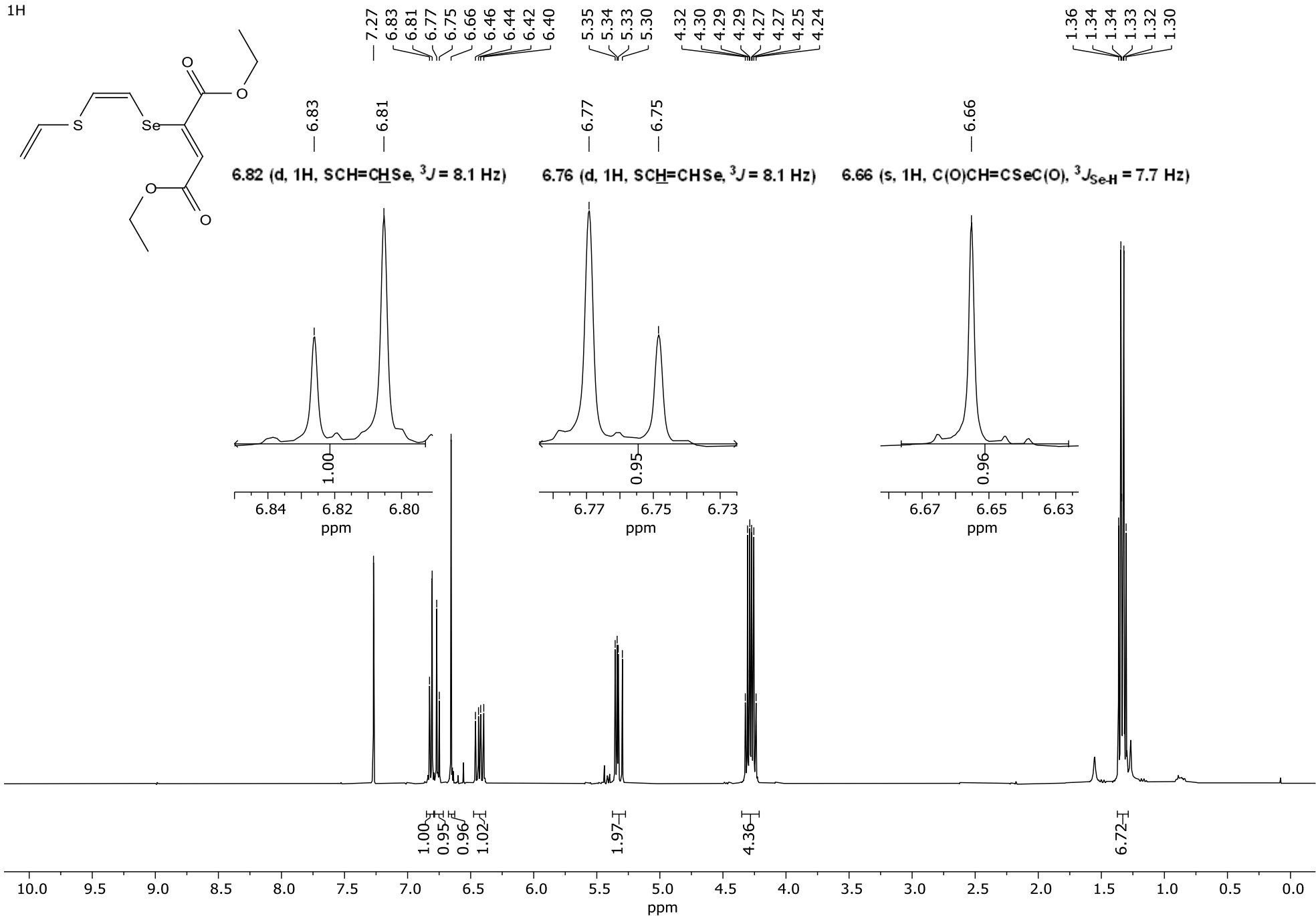


⁷⁷Se NMR spectrum of dimethyl (Z)-2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-butenedioate (5a) (Z,Z)



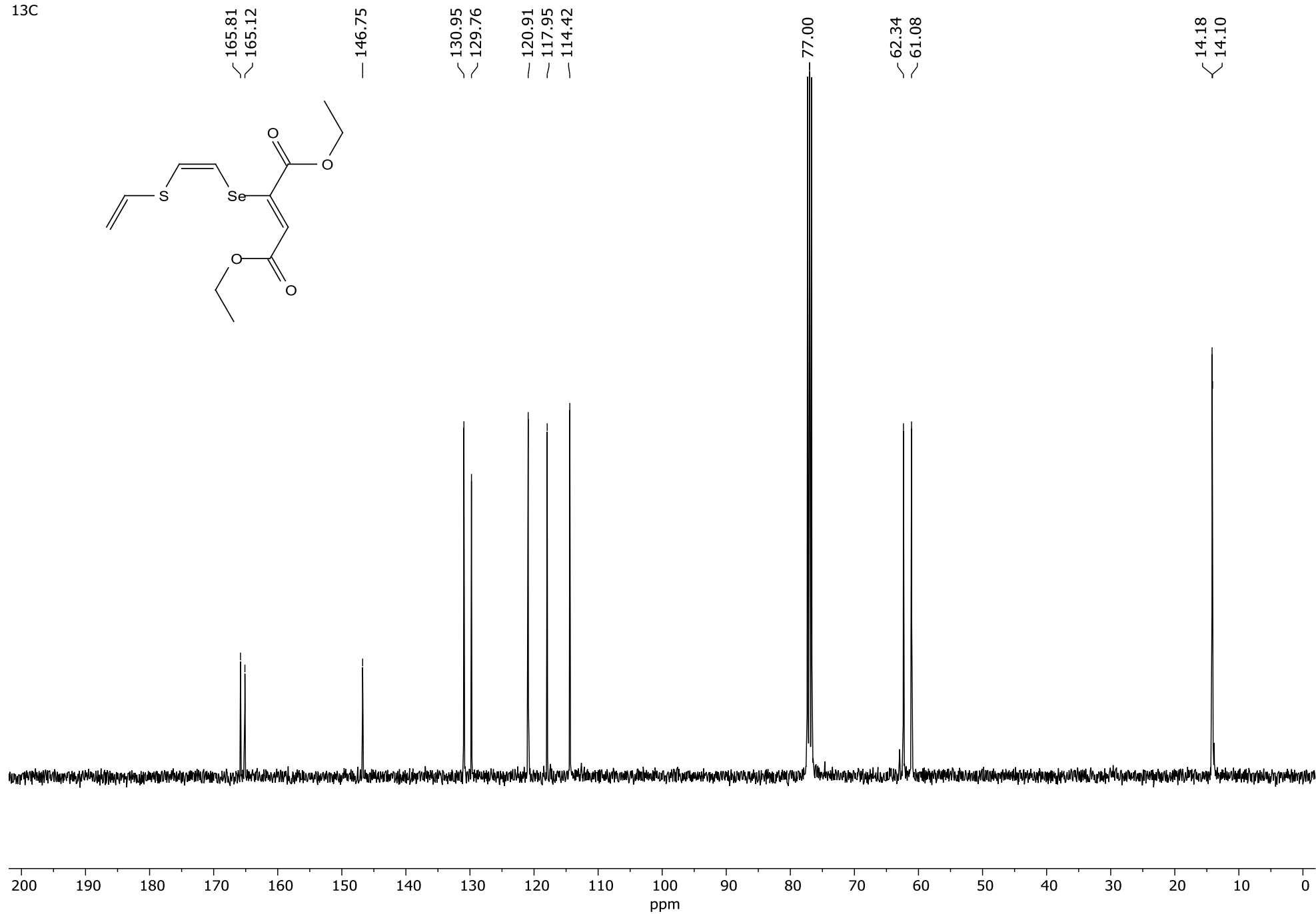
Mass-spectrum of dimethyl (Z)-2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-butenedioate (5a)

¹H

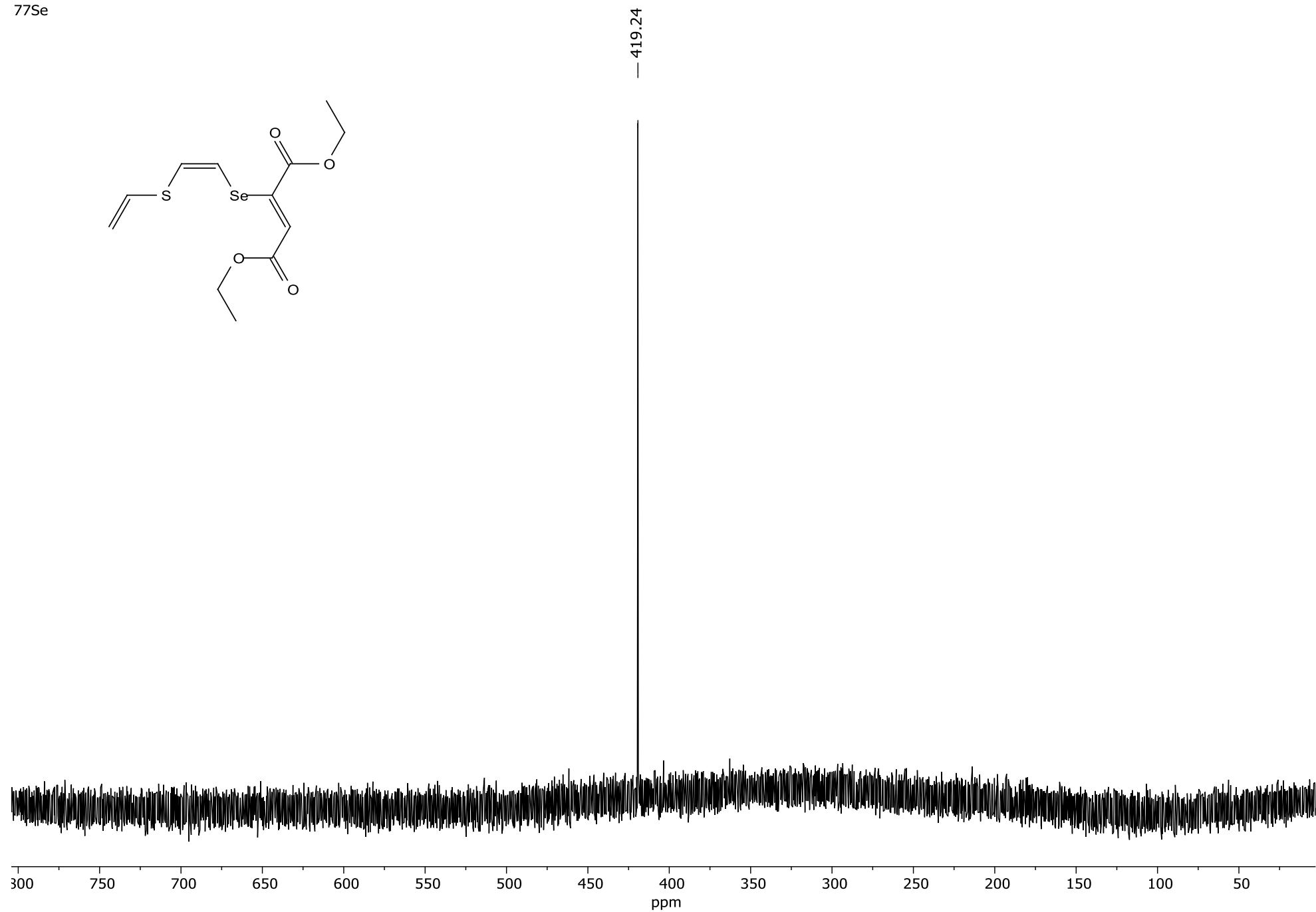


¹H NMR spectrum of diethyl (Z)-2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-butenedioate (5b)

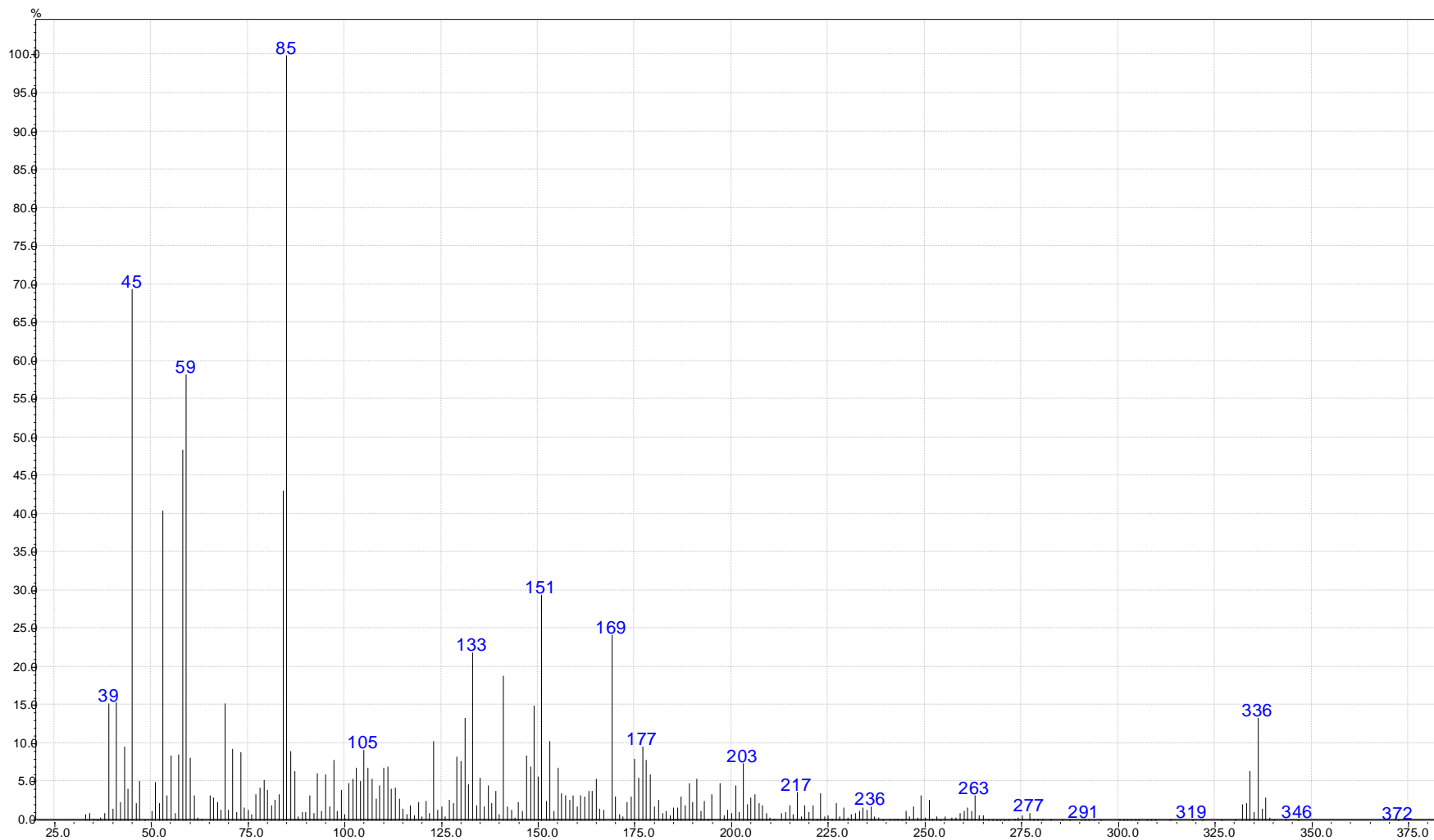
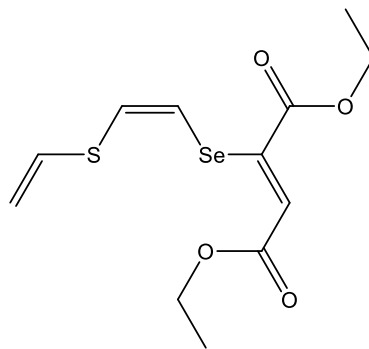
13C



¹³C NMR spectrum of diethyl (Z)-2-[[Z]-2-(vinylsulfanyl)ethenyl]selanyl]-2-butenedioate (5b)

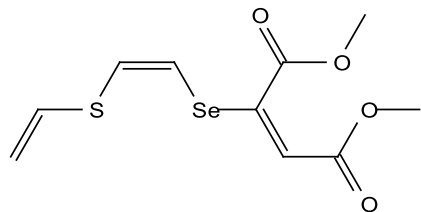


^{77}Se NMR spectrum of diethyl (Z)-2-[[Z]-2-(vinylsulfanyl)ethenyl]selanyl-2-butenedioate (5b)



Mass-spectrum of diethyl (Z)-2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-butenedioate (5b)

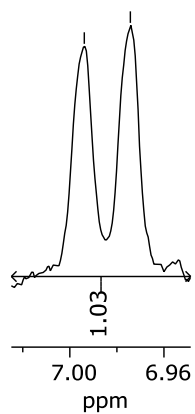
¹H



6.99
6.97
6.59
6.57
6.47
6.44
6.43
6.40
6.10
5.40
5.38
5.34
3.88
3.74

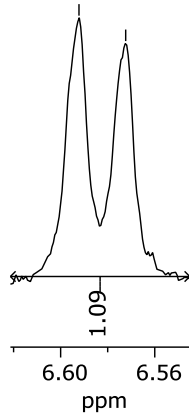
6.99
6.97

6.98 (d, 1H, SCH=CHSe, ³J = 7.9 Hz)

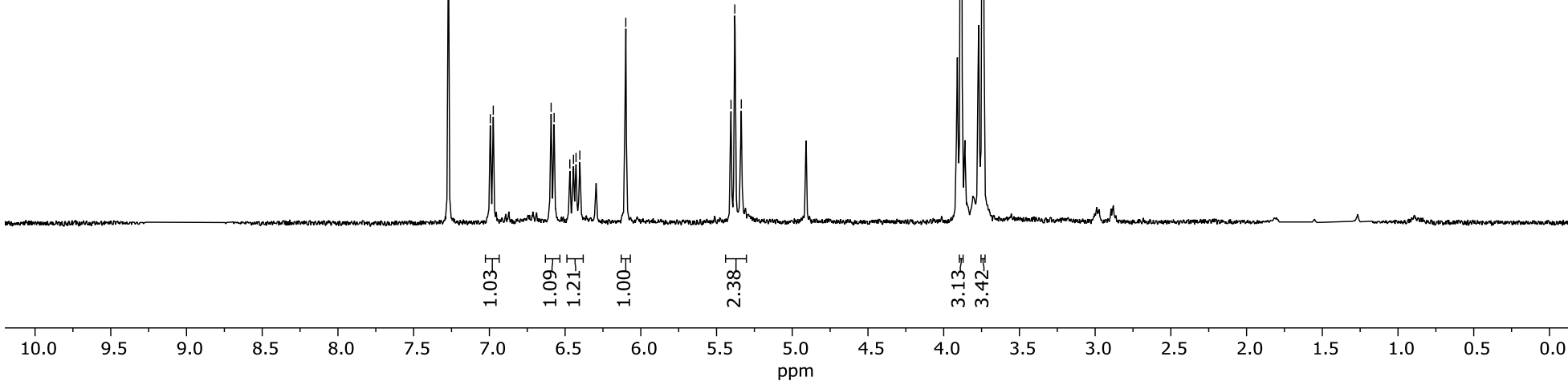
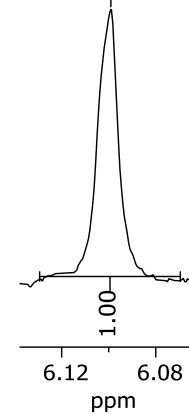


6.59
6.57

6.58 (d, 1H, SCH=CHSe, ³J = 7.9 Hz)



6.10 (s, 1H, C(O)CH=CSeC(O), ³J_{Se-H} = 5.4 Hz)



¹H NMR spectrum of dimethyl (E)-2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-butenedioate (5c) (E,Z)

13C

— 166.36
— 163.71

— 142.85

— 133.95

— 129.14

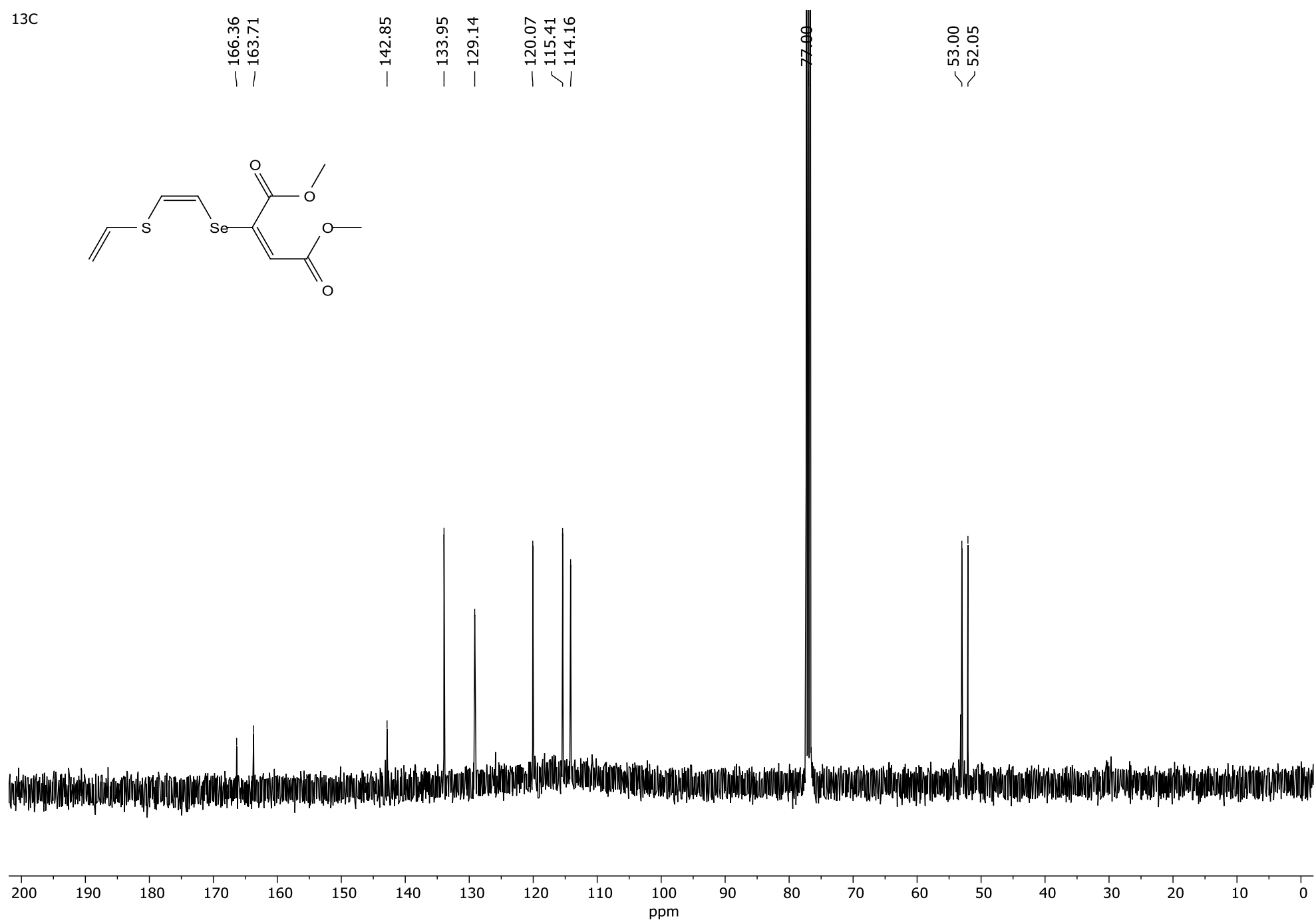
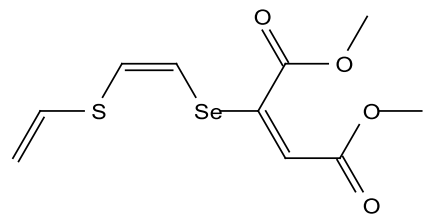
— 120.07

— 115.41

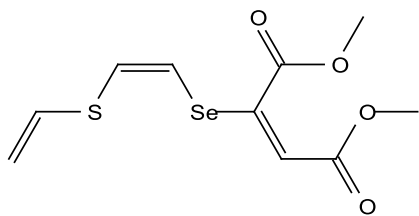
— 114.16

77.00

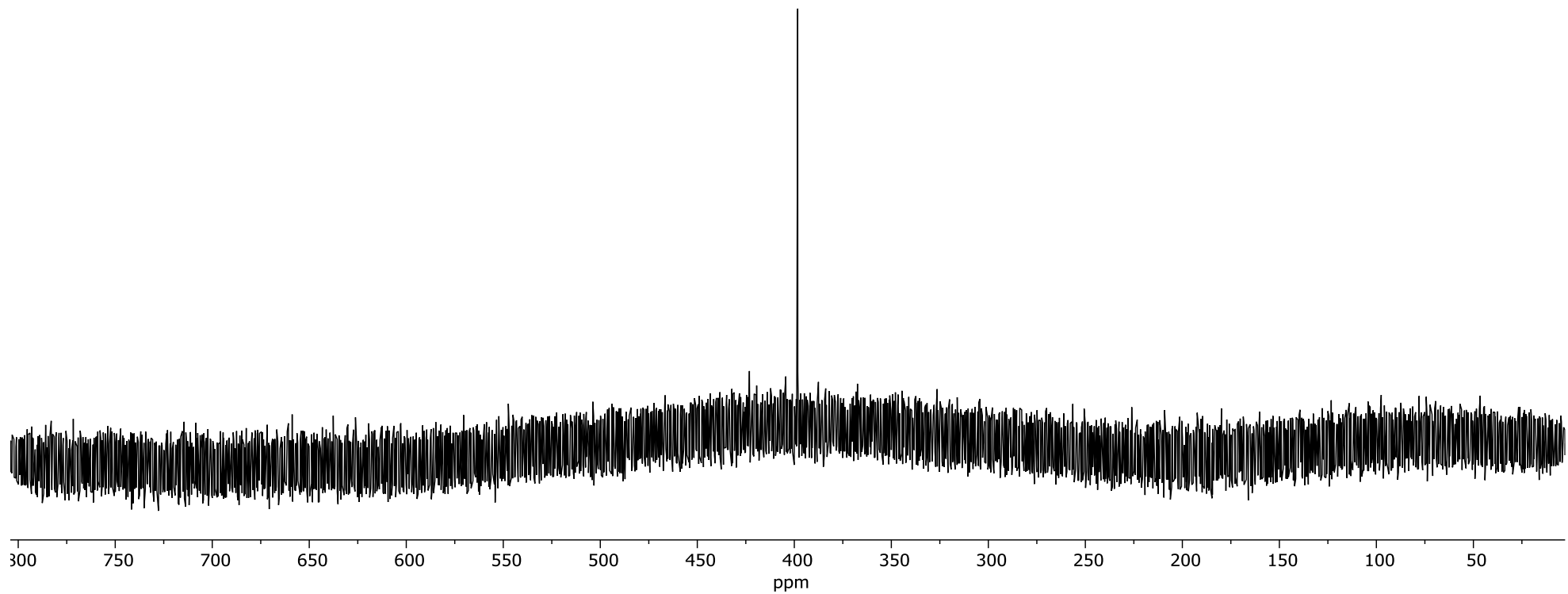
— 53.00
— 52.05



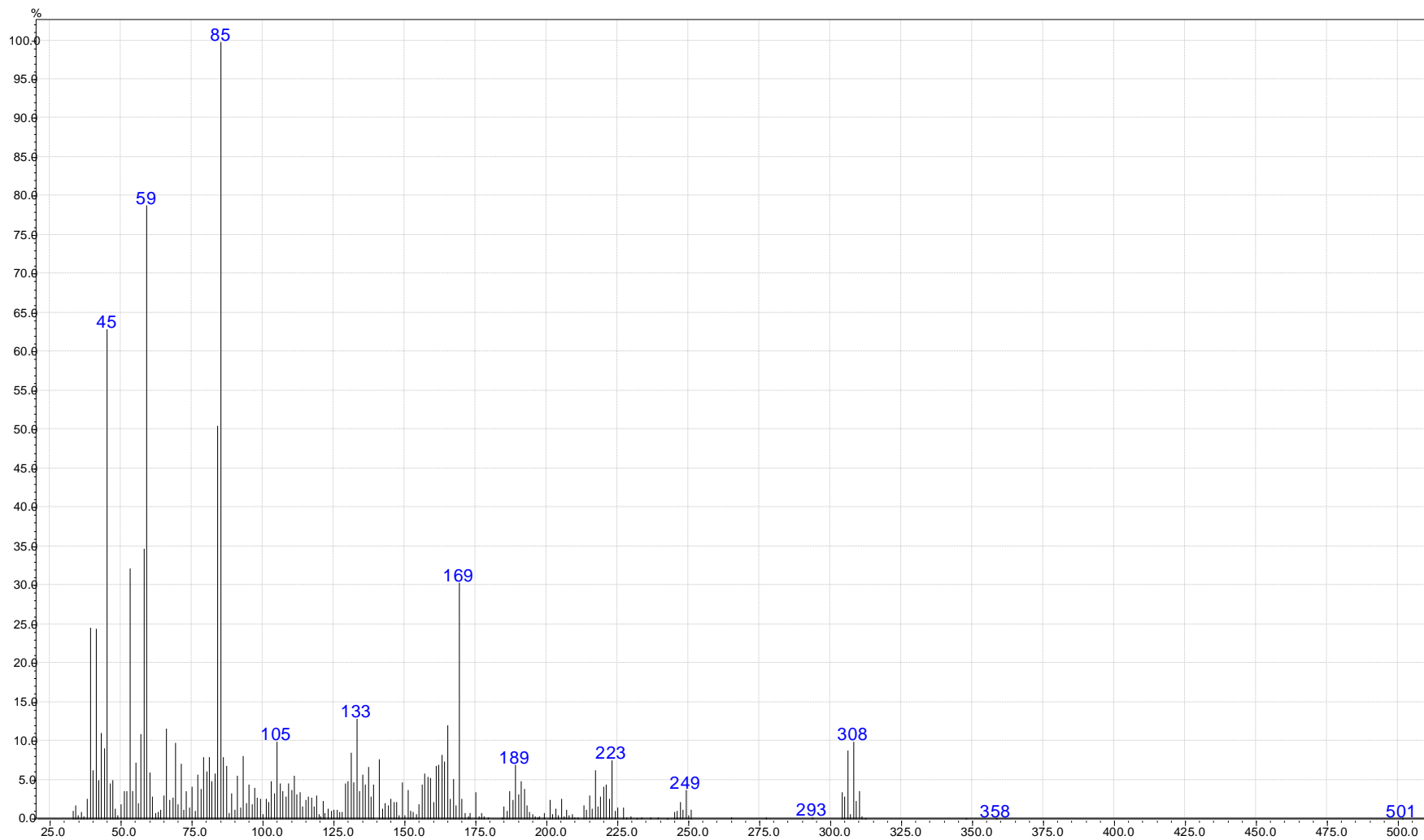
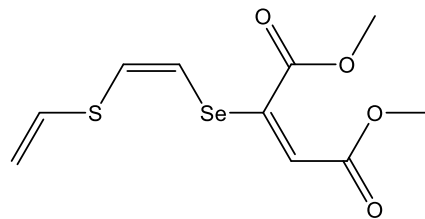
¹³C NMR spectrum of dimethyl (E)-2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-butenedioate (5c) (E,Z)



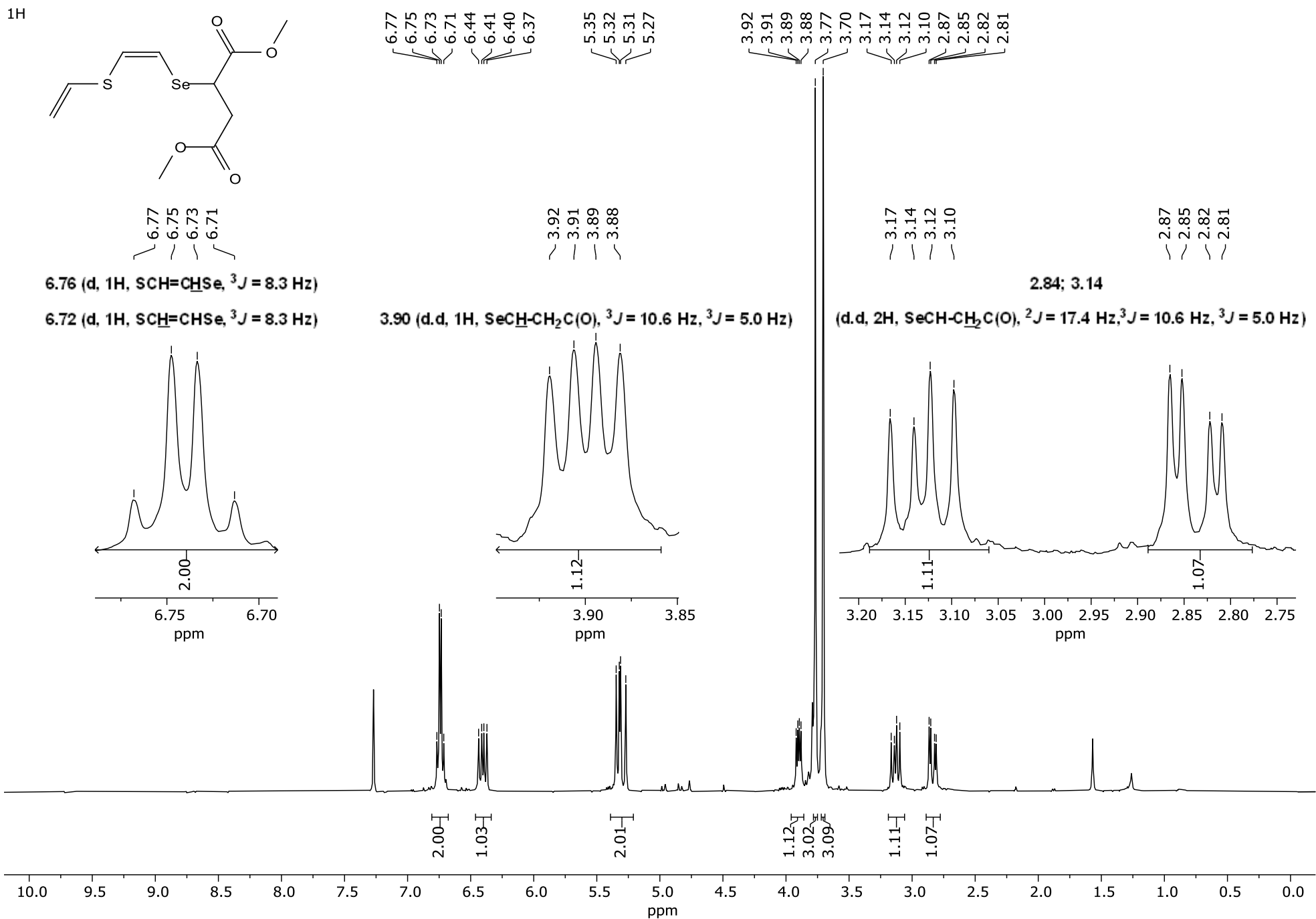
— 398.24



⁷⁷Se NMR spectrum of dimethyl (E)-2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-butenedioate (5c) (E,Z)

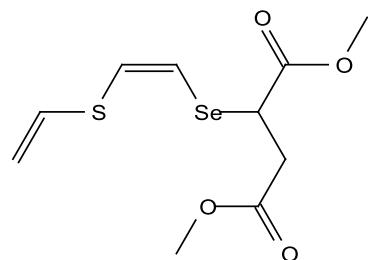


Mass-spectrum of dimethyl (E)-2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl-2-butenedioate (5c) (E,Z)



¹H NMR spectrum of dimethyl 2-[(Z)-2-(vinylsulfonyl)ethenyl]selanyl succinate (6a)

13C



172.12
171.13

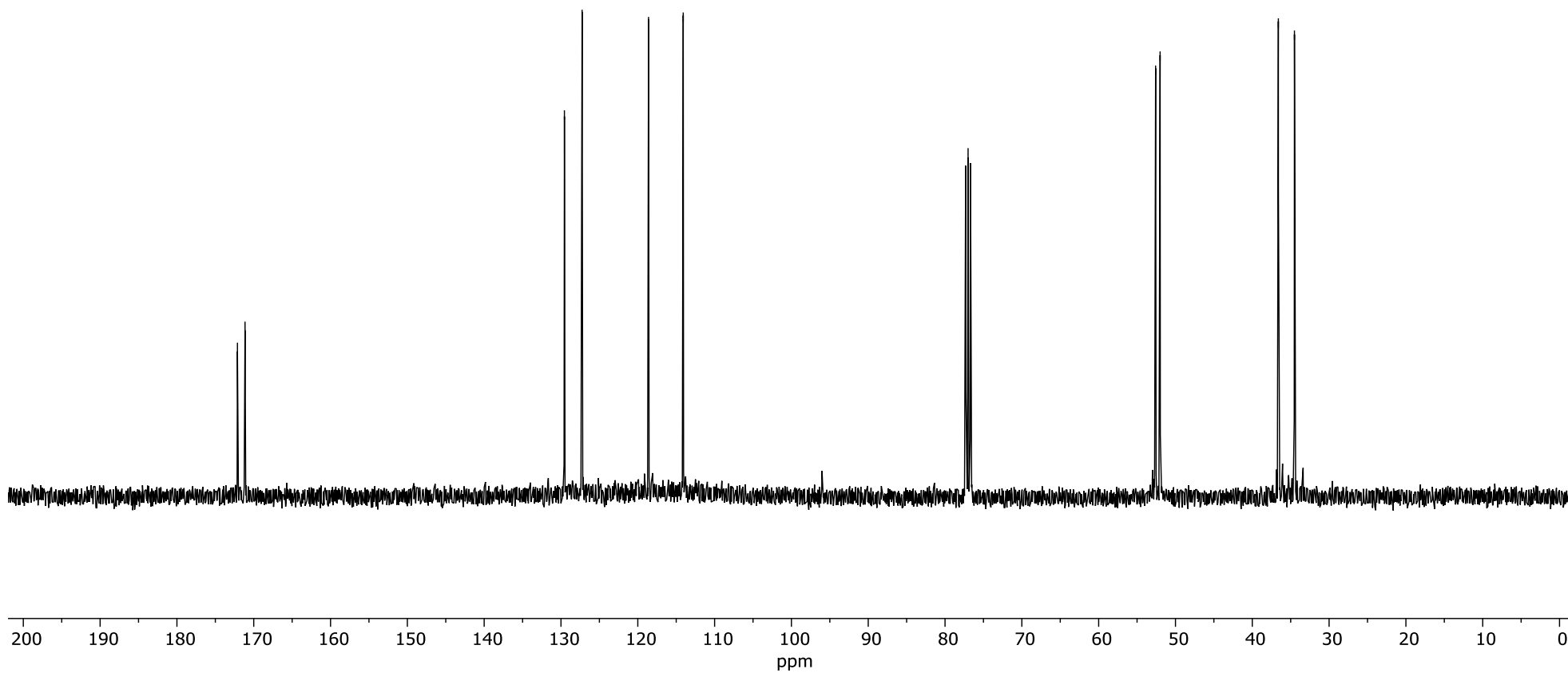
129.55
127.25

118.60
114.08

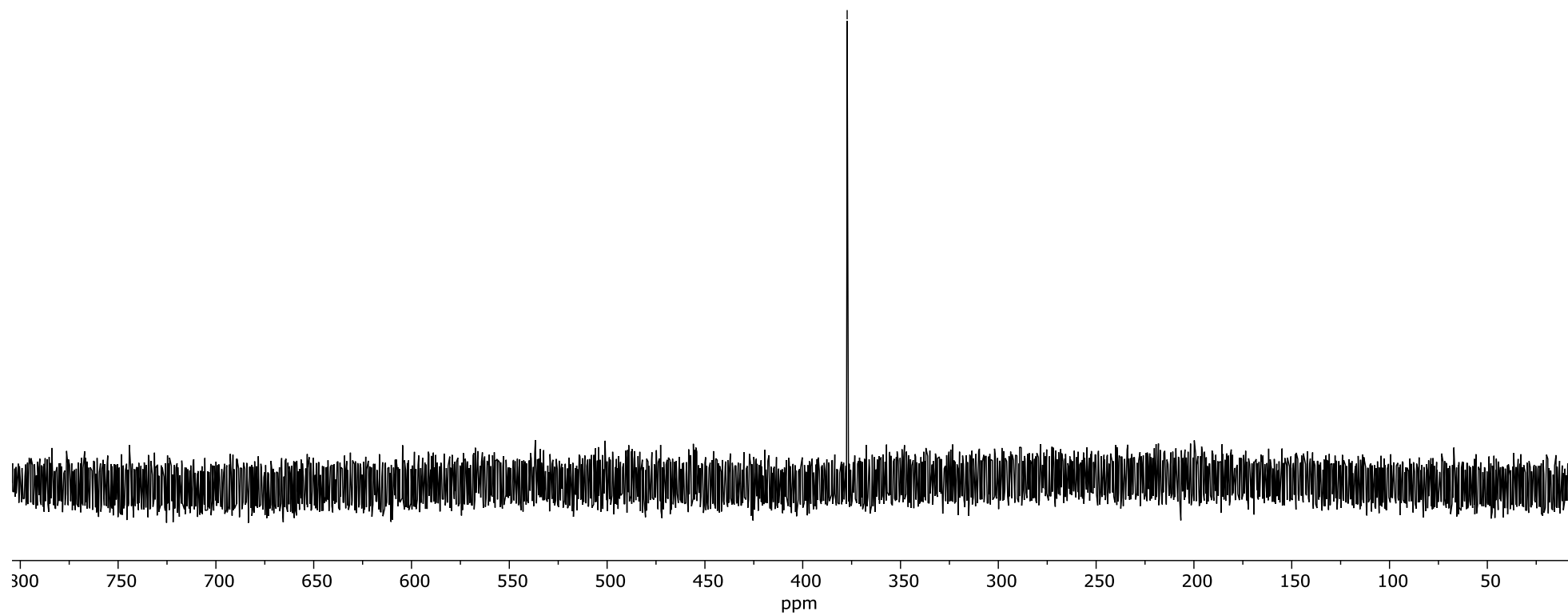
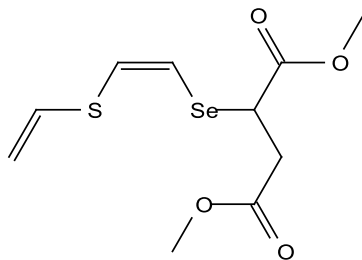
77.00

52.59
52.00

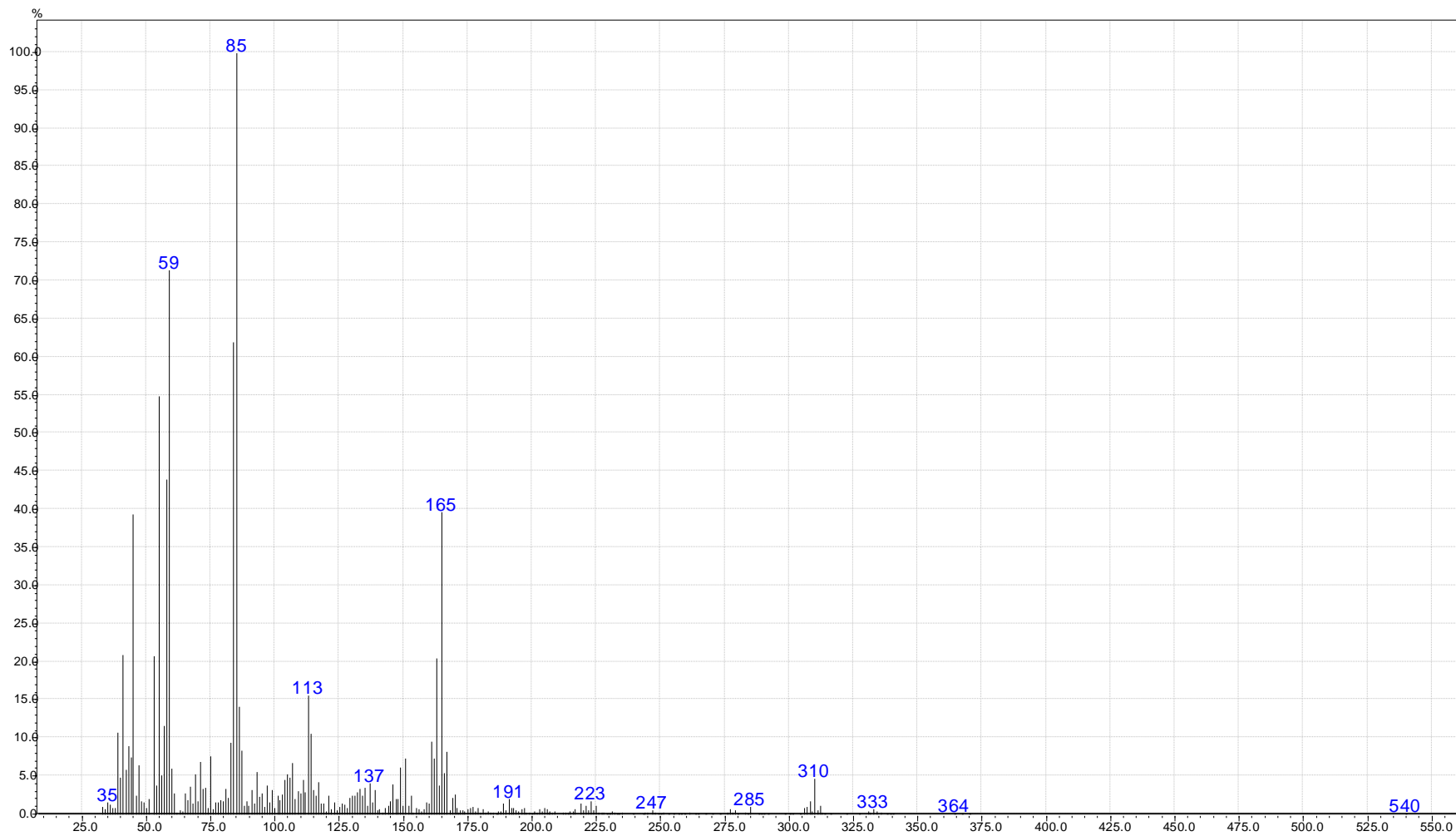
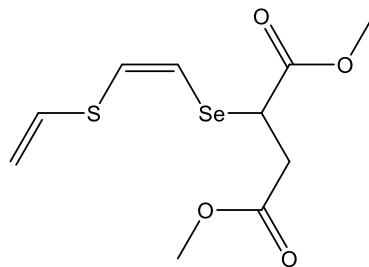
36.60
34.51



¹³C NMR spectrum of dimethyl 2-[(Z)-2-(vinylsulfanyl)ethenyl]selanylsuccinate (6a)

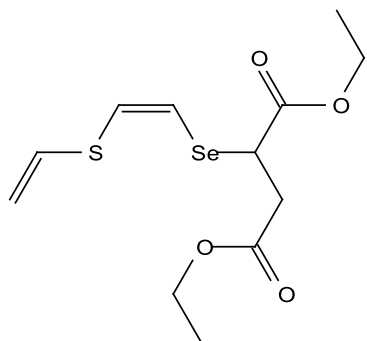


⁷⁷Se NMR spectrum of dimethyl 2-([(Z)-2-(vinylsulfanyl)ethenyl]selanyl)succinate (6a)



Mass-spectrum of dimethyl 2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl succinate (6a)

¹H

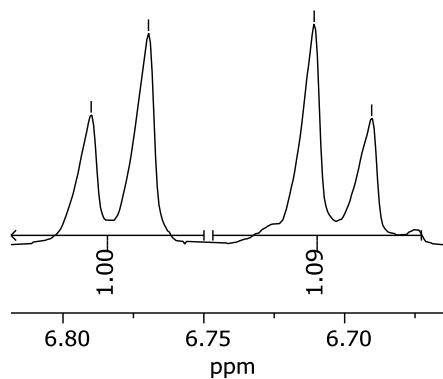


7.27
6.79
6.77
6.71
6.69
6.43
6.40
6.39
6.36
5.33
5.31
5.30
5.25
4.24
4.23
4.22
4.22
4.20
4.20
4.19
4.18
4.18
4.16
4.14
4.12
3.89
3.87
3.86
3.85
3.13
3.11
3.11
3.09
3.07
2.83
2.82
2.79
2.78
1.29
1.28
1.27
1.26
1.25
1.23

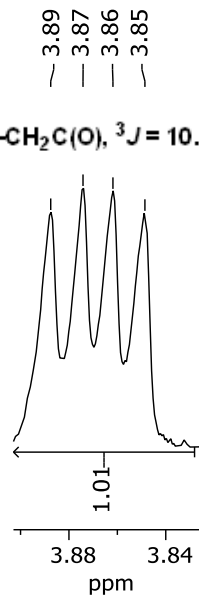
6.79
6.77
6.71
6.69

6.78 (d, 1H, SCH=CHSe, ³J = 8.2 Hz)

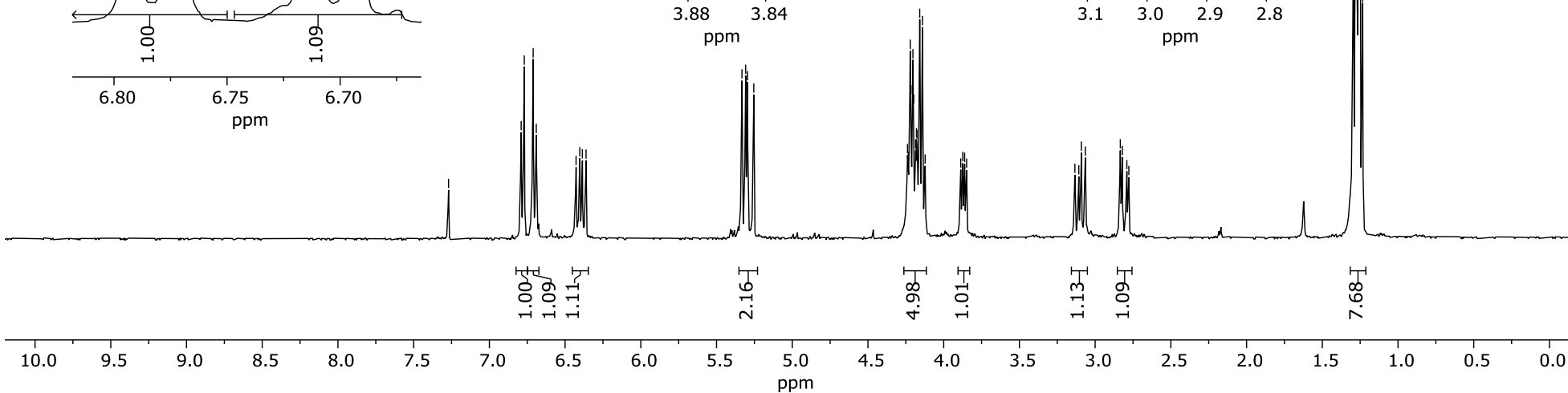
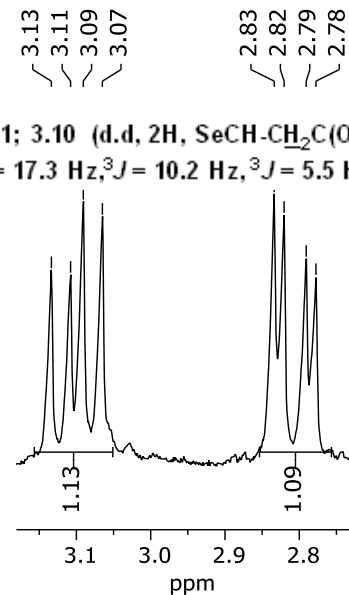
6.70 (d, 1H, SCH=CHSe, ³J = 8.2 Hz)



3.87 (d.d, 1H, SeCH-CH₂C(O), ³J = 10.2 Hz, ³J = 5.5 Hz)

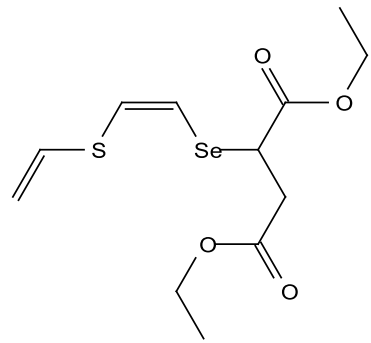


2.81; 3.10 (d.d, 2H, SeCH-CH₂C(O), ²J = 17.3 Hz, ³J = 10.2 Hz, ³J = 5.5 Hz)



¹H NMR spectrum of diethyl 2-[(Z)-2-(vinylsulfanyl)ethenyl]selanylsuccinate (6b)

13C



171.36
170.36

129.55
126.55

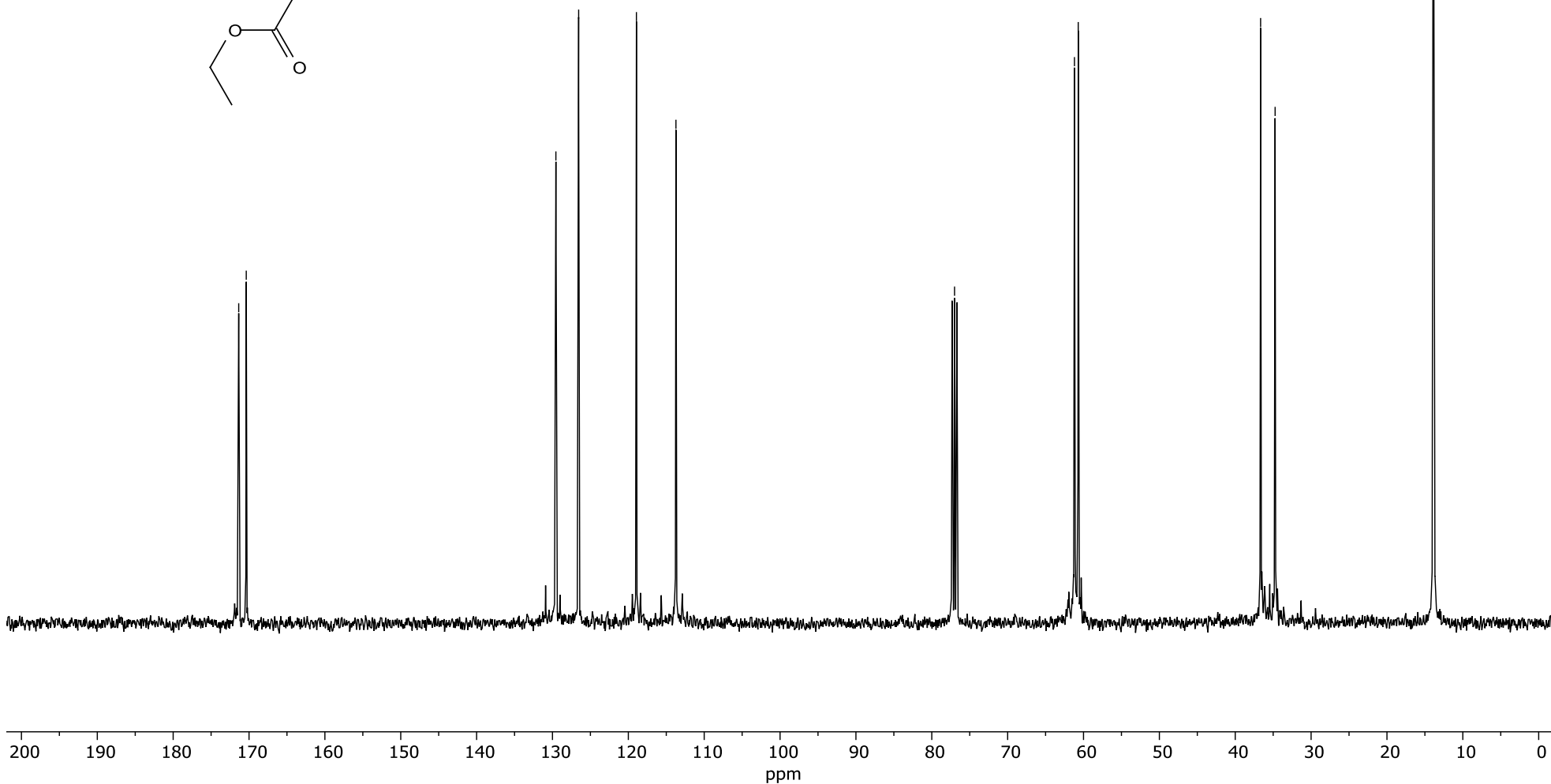
118.94
113.73

77.00

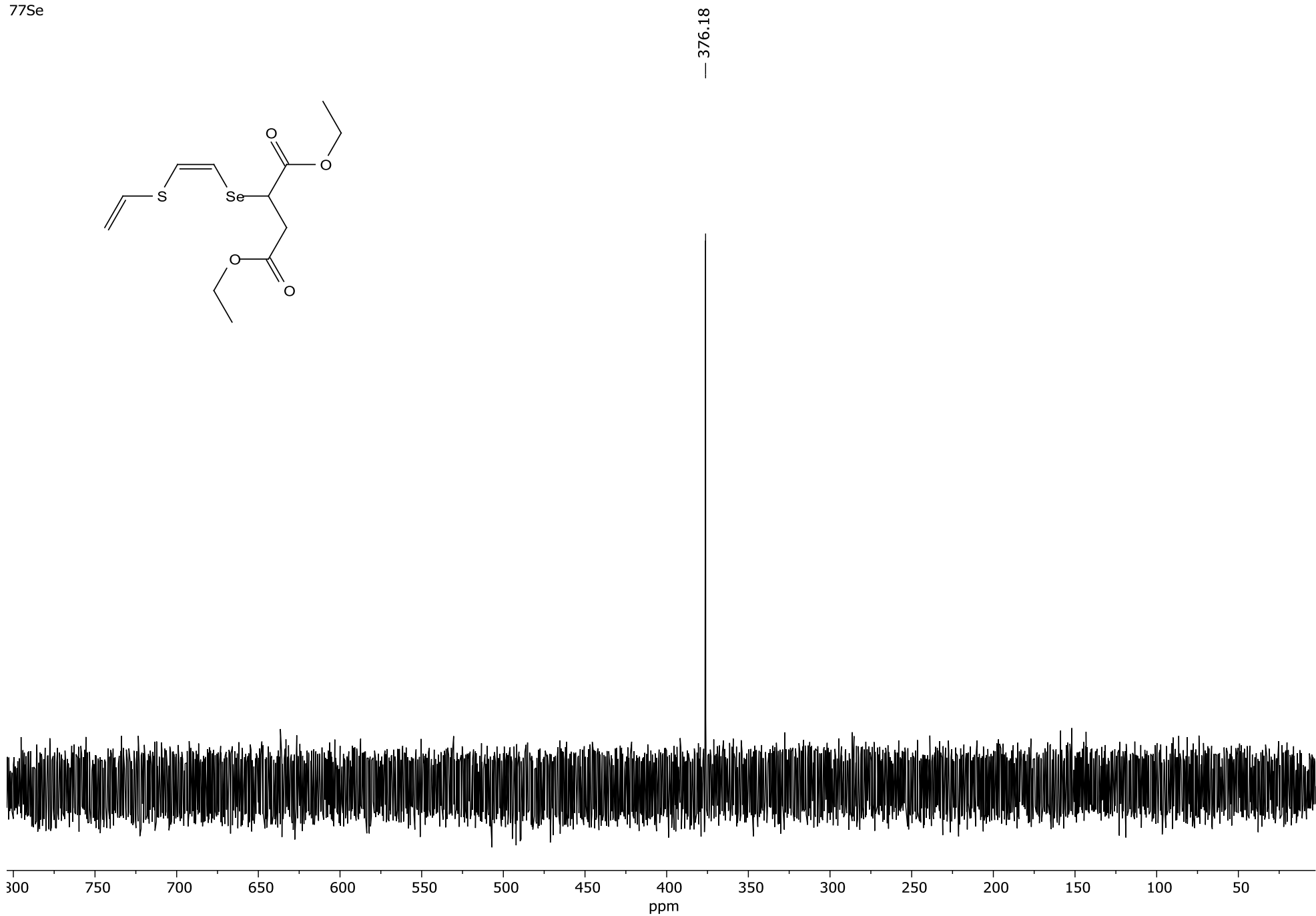
61.19
60.70

36.65
34.74

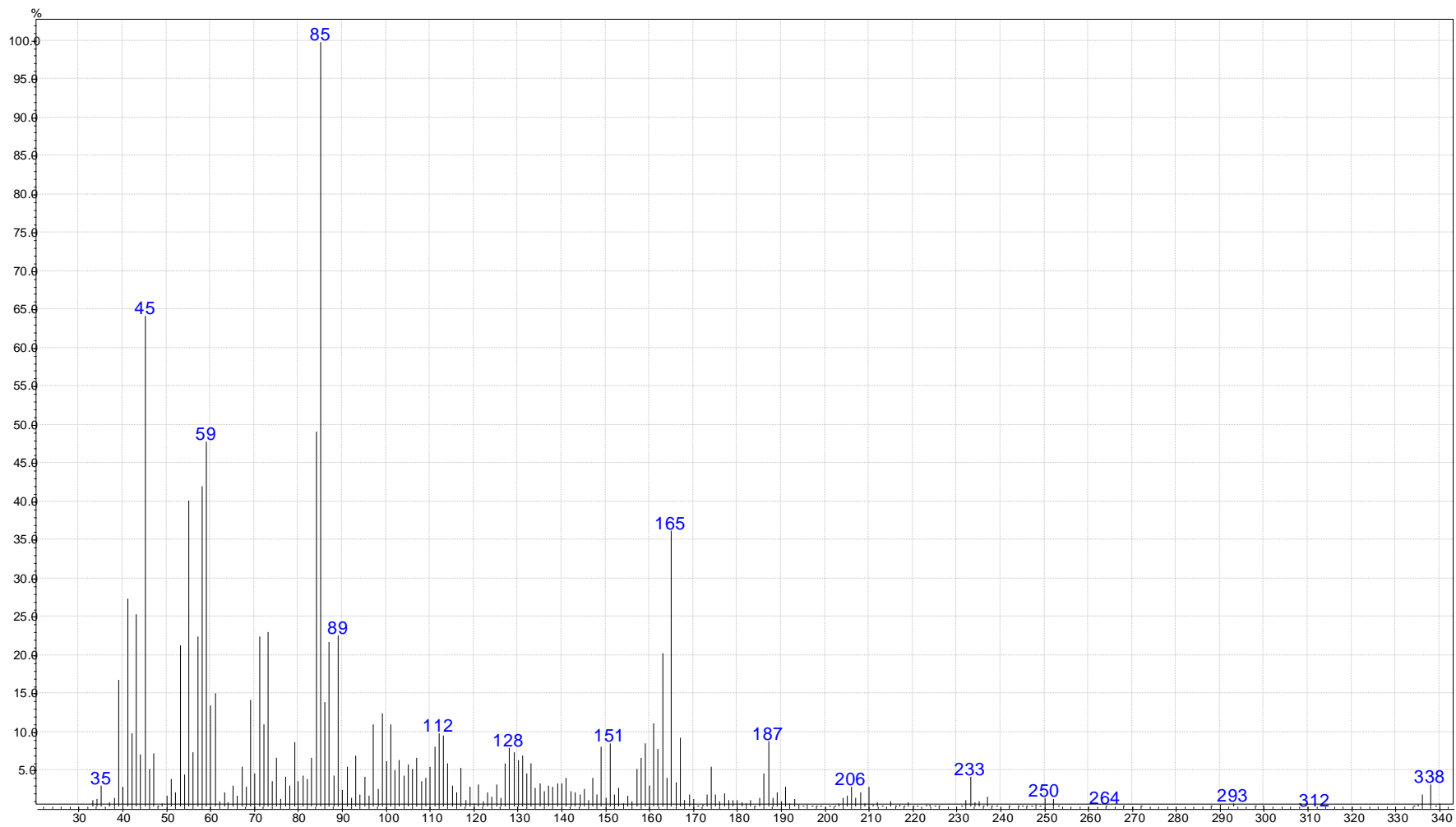
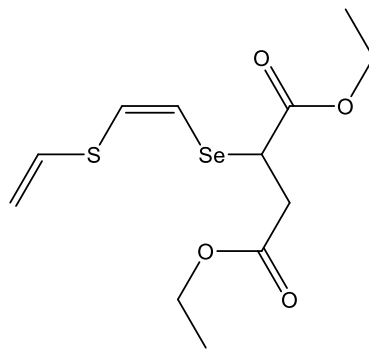
13.91
13.83



¹³C NMR spectrum of diethyl 2-[[*Z*]-2-(vinylsulfanyl)ethenyl]selanyl]succinate (6b)



^{77}Se NMR spectrum of diethyl 2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl succinate (6b)



Mass-spectrum of diethyl 2-[(Z)-2-(vinylsulfanyl)ethenyl]selanyl succinate (6b)