

Regioselective Synthesis of Novel Functionalized Dihydro-1,4-thiaselenin-2-ylsufanyl Derivatives Under Phase Transfer Catalysis

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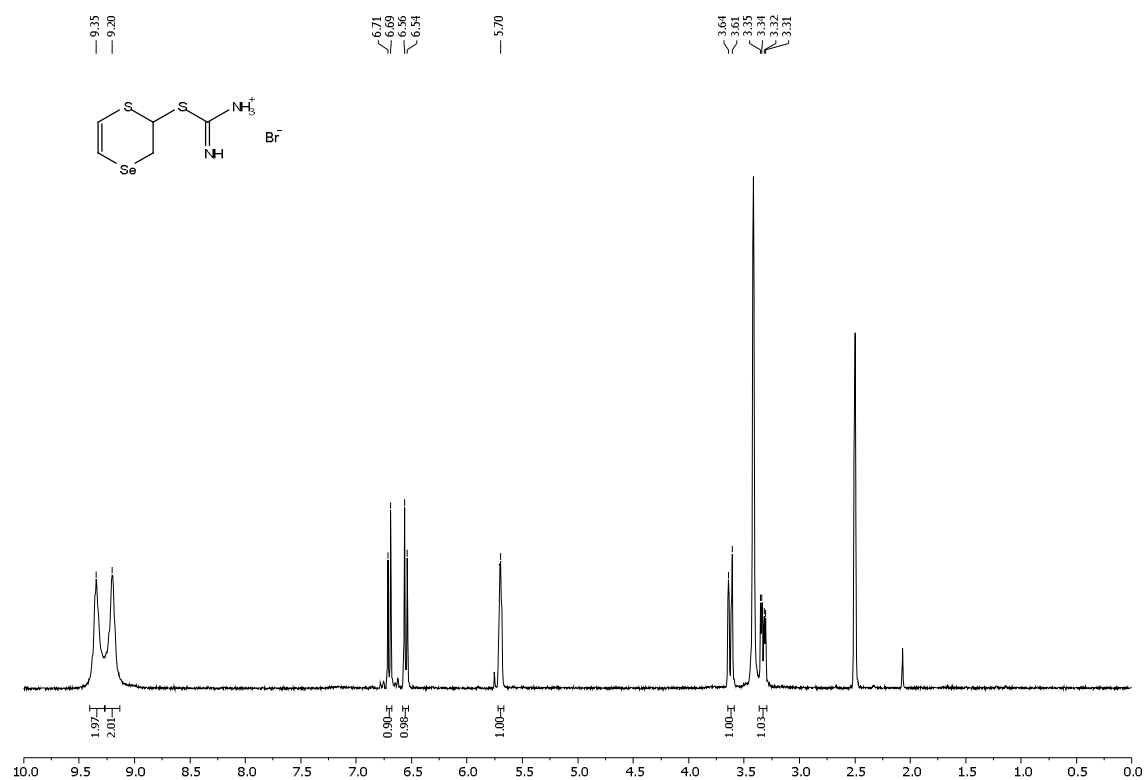
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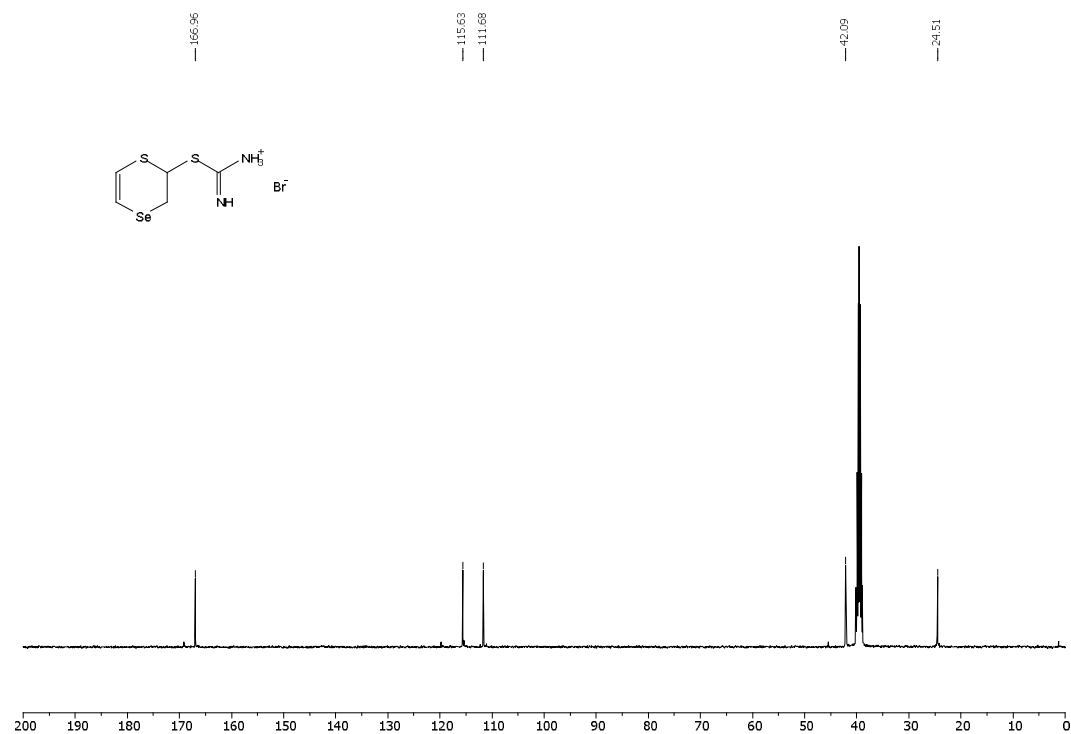
General Information

The ^1H (400.1 MHz), ^{13}C (100.6 MHz), ^{77}Se (76.3 MHz), and ^{15}N (40.6 MHz) NMR spectra (the spectra can be found in Supplementary Materials) were recorded on a Bruker DPX-400 spectrometer (Bruker BioSpin GmbH, Rheinstetten, Germany) in CDCl_3 or $\text{DMSO-}d_6$ solutions and referred to the residual solvent peaks of CDCl_3 ($\delta = 7.27$ and 77.0 ppm), $\text{DMSO-}d_6$ ($\delta = 2.50$ and 39.5 ppm) for ^1H - and ^{13}C -NMR, respectively), and dimethyl selenide (^{77}Se -NMR).

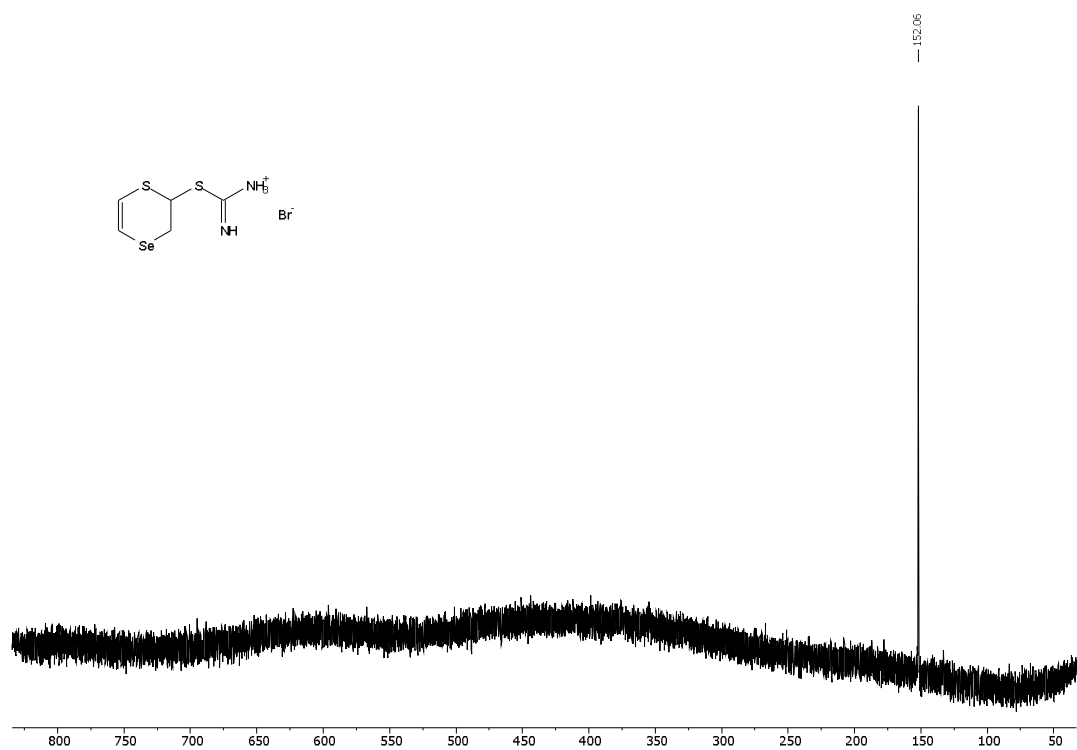
¹H-, ¹³C-, and ⁷⁷Se-NMR spectra of the products



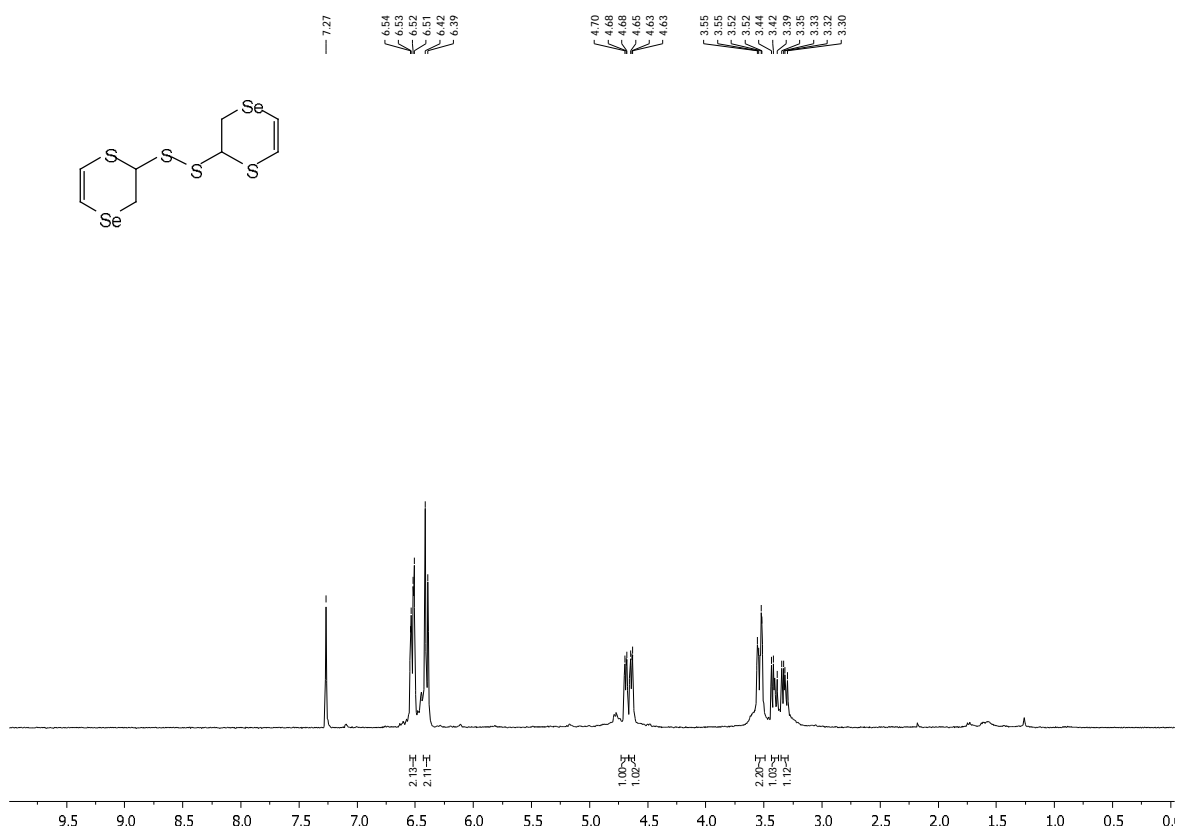
¹H-NMR spectrum (DMSO-*d*₆) of 2-[amino(imino)methyl]sulfanyl-2,3-dihydro-1,4-thiaselenine hydrobromide (2)



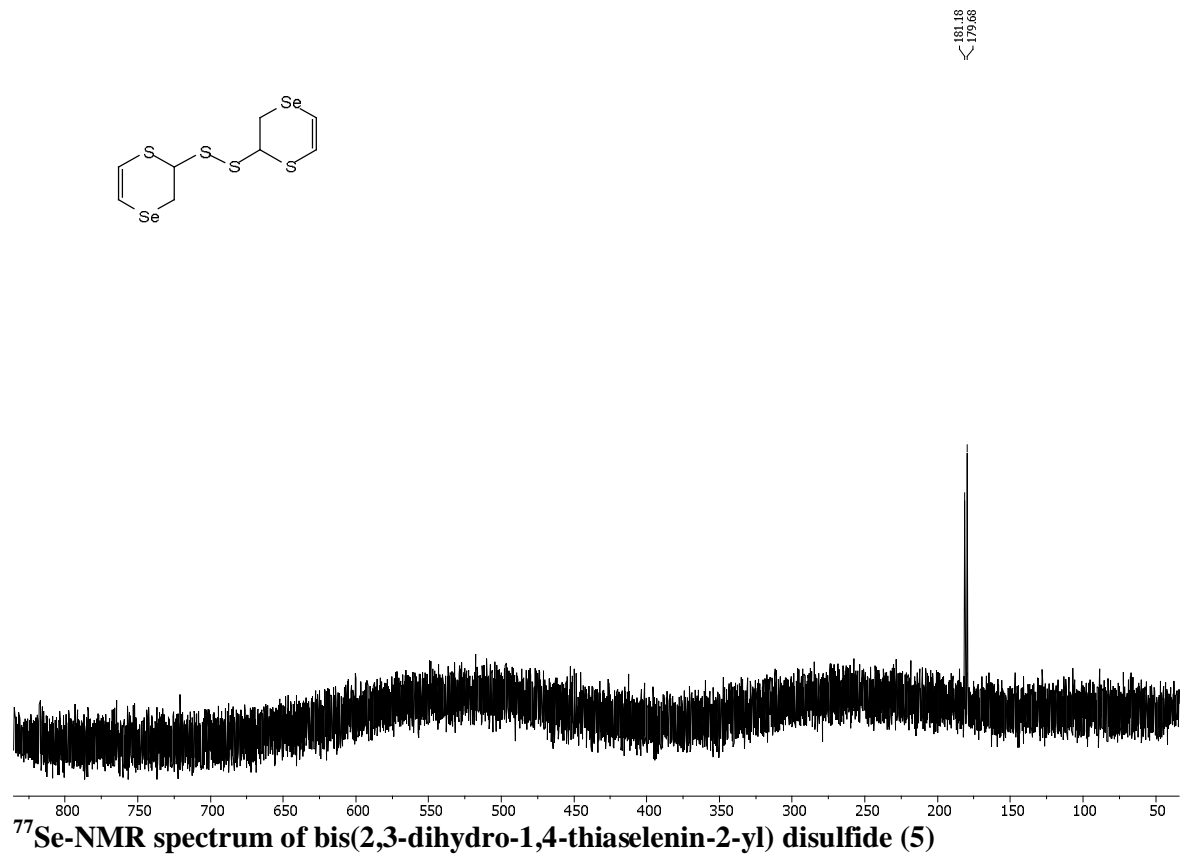
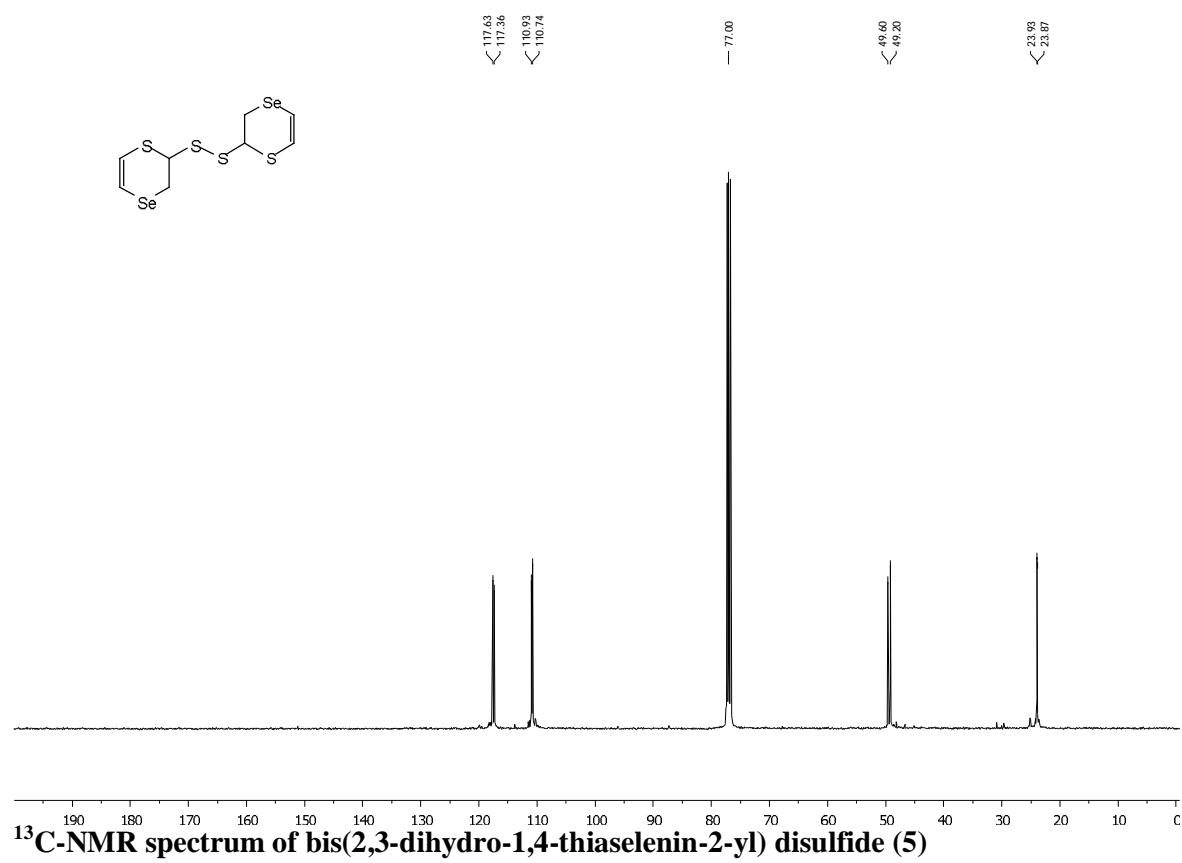
¹³C-NMR spectrum (DMSO-*d*₆) of 2-[amino(imino)methyl]sulfanyl-2,3-dihydro-1,4-thiaselenine hydrobromide (2)

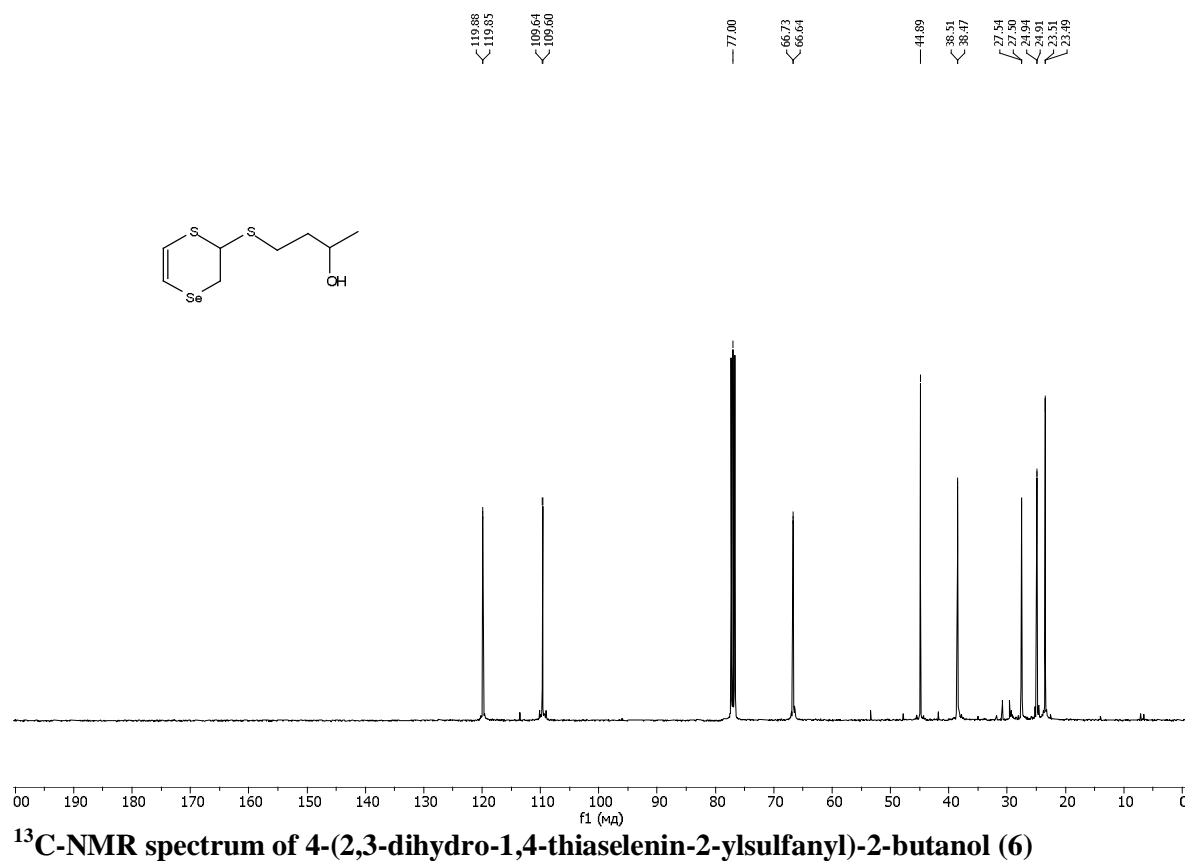
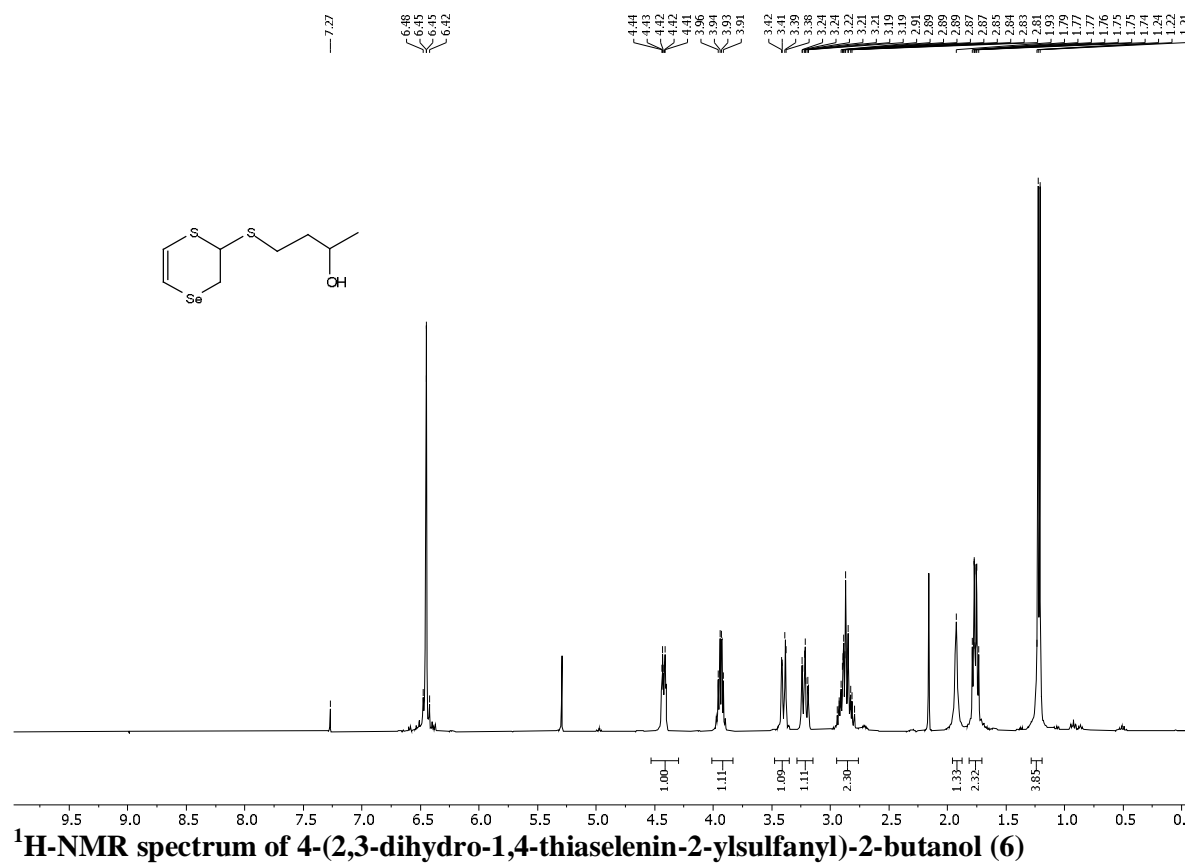


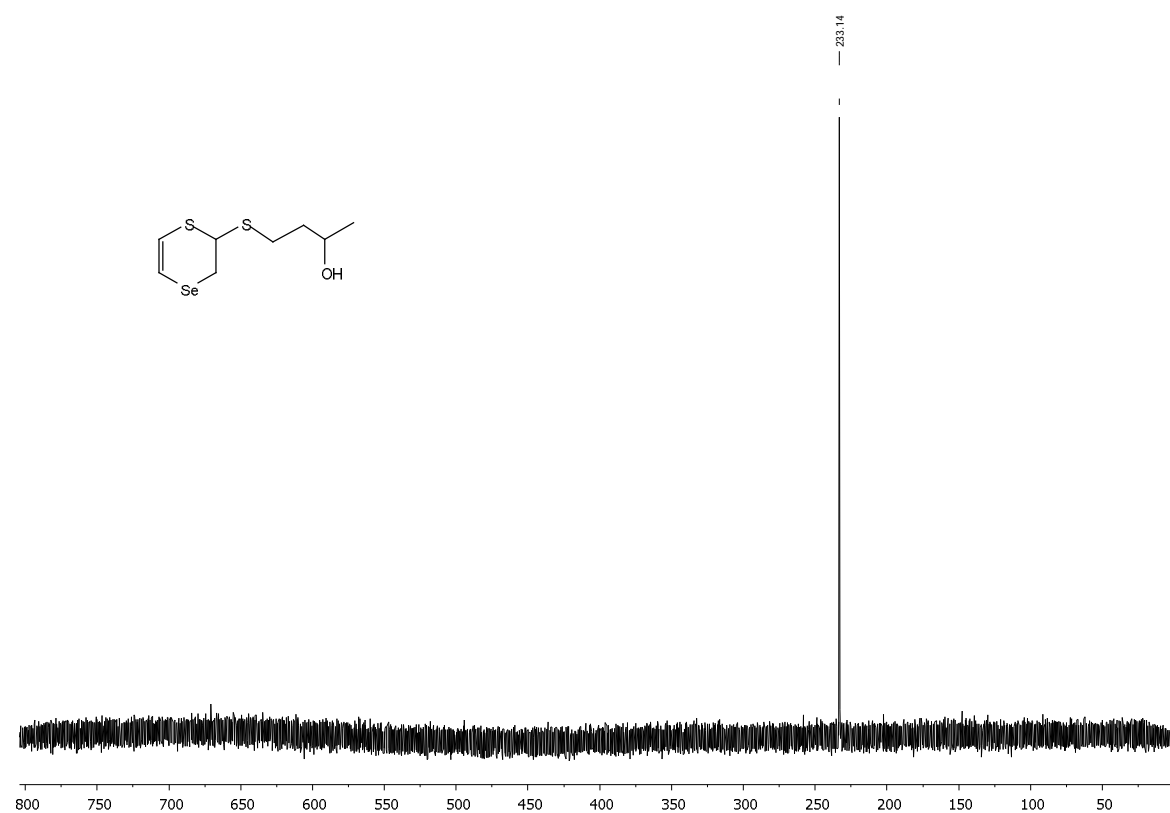
⁷⁷Se-NMR spectrum (DMSO-*d*₆) of 2-[amino(imino)methyl]sulfanyl-2,3-dihydro-1,4-thiaselenine hydrobromide (2)



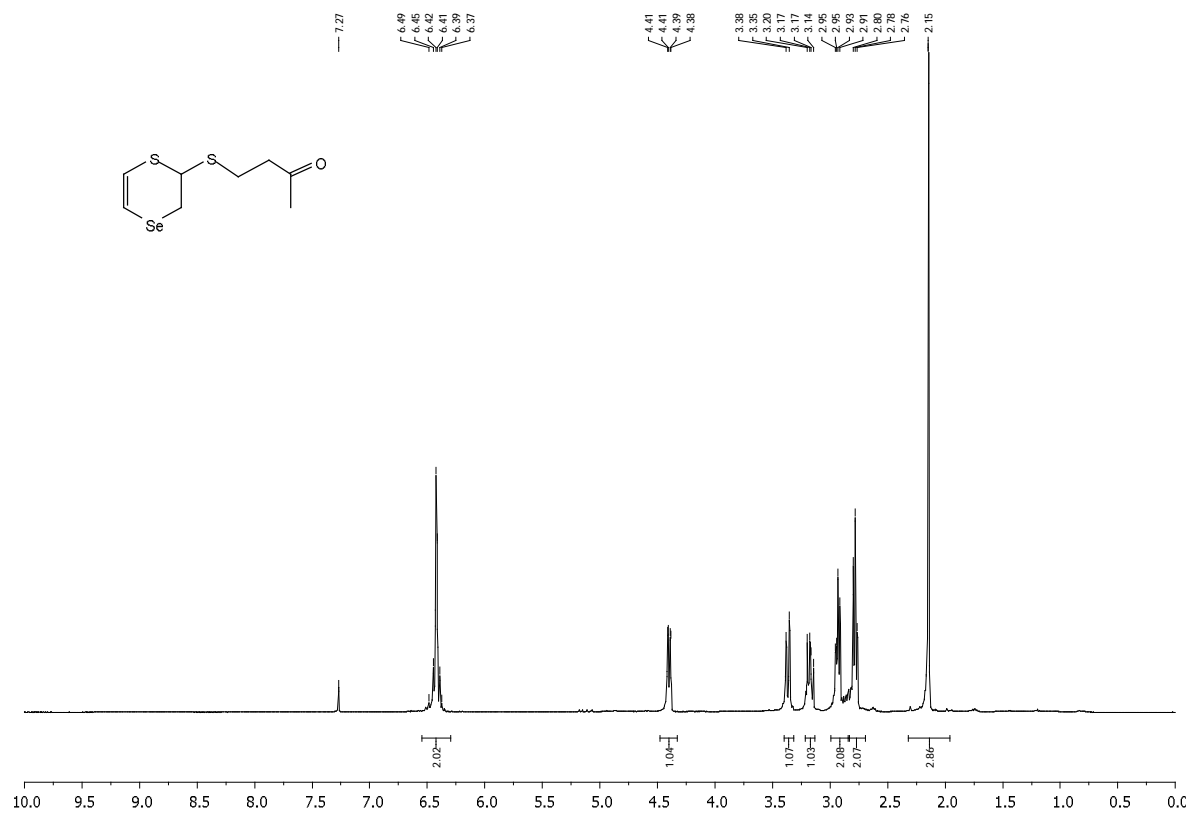
¹H-NMR spectrum of bis(2,3-dihydro-1,4-thiaselenin-2-yl) disulfide (5)



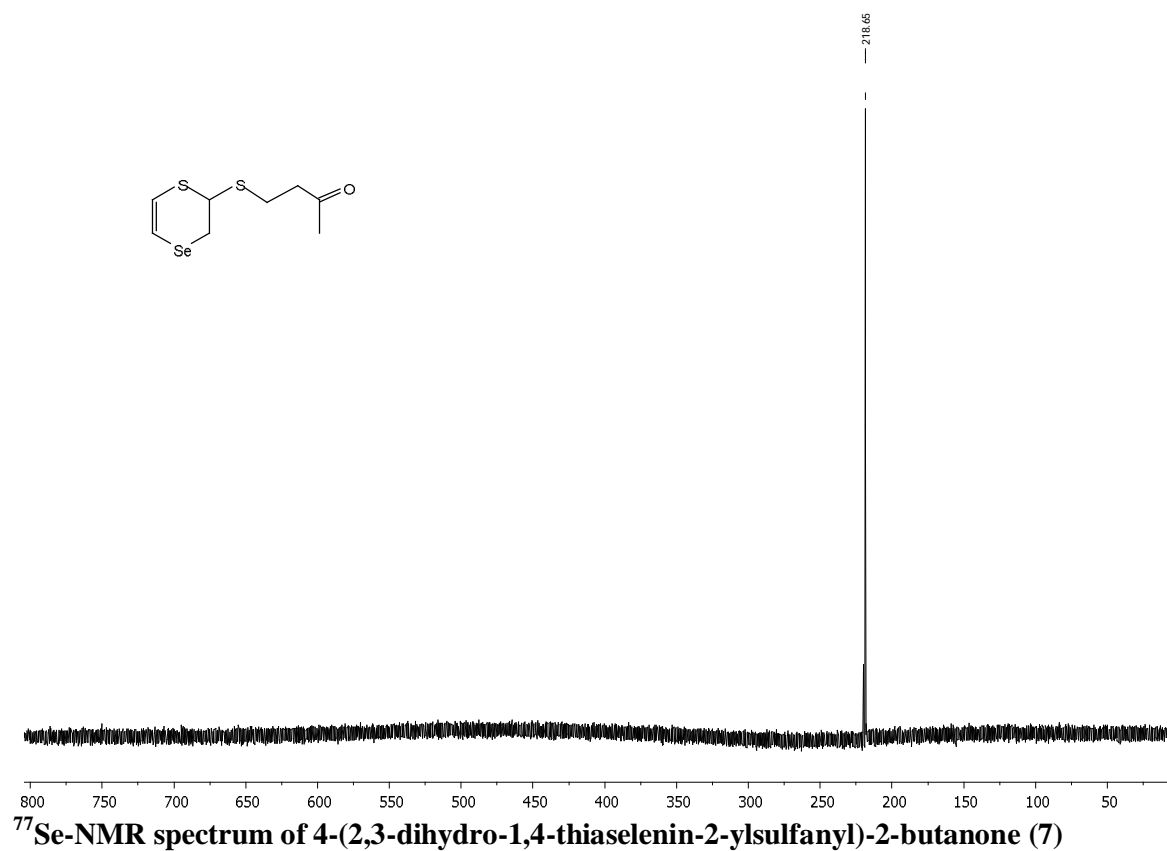
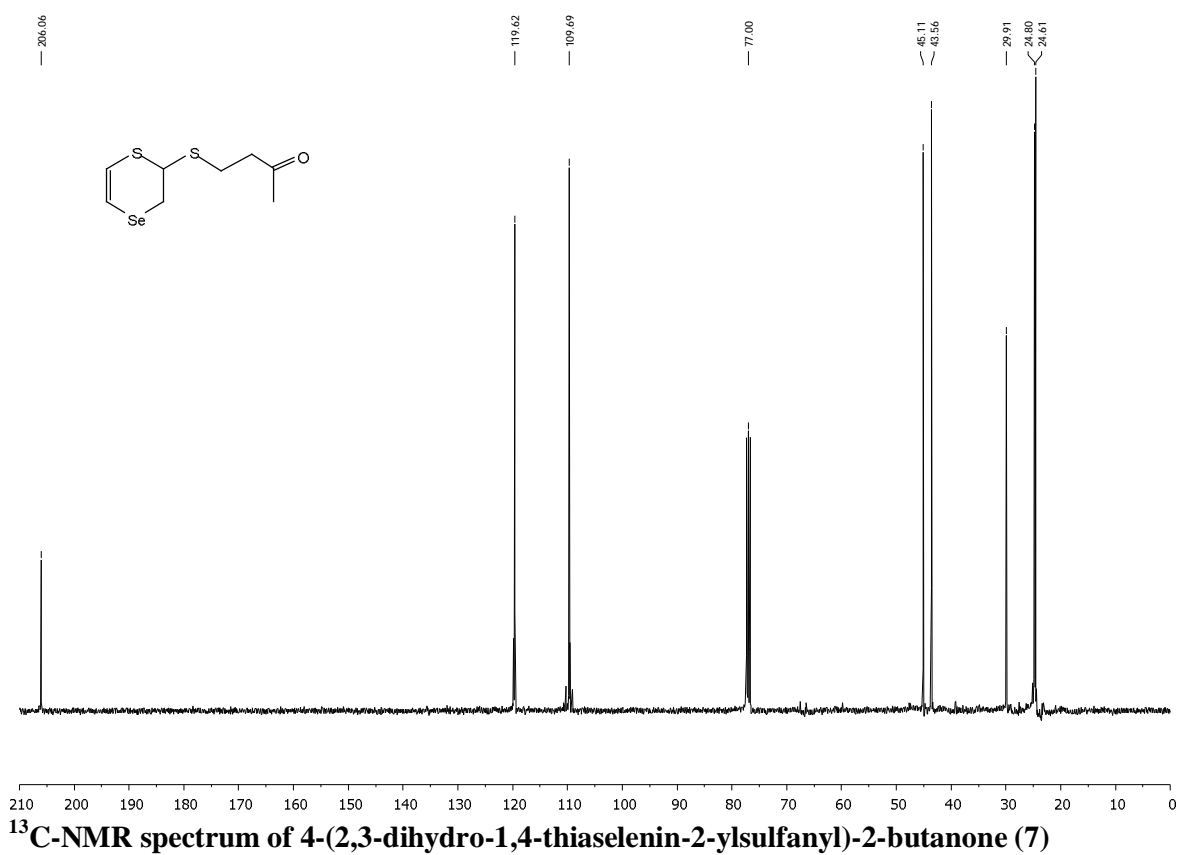


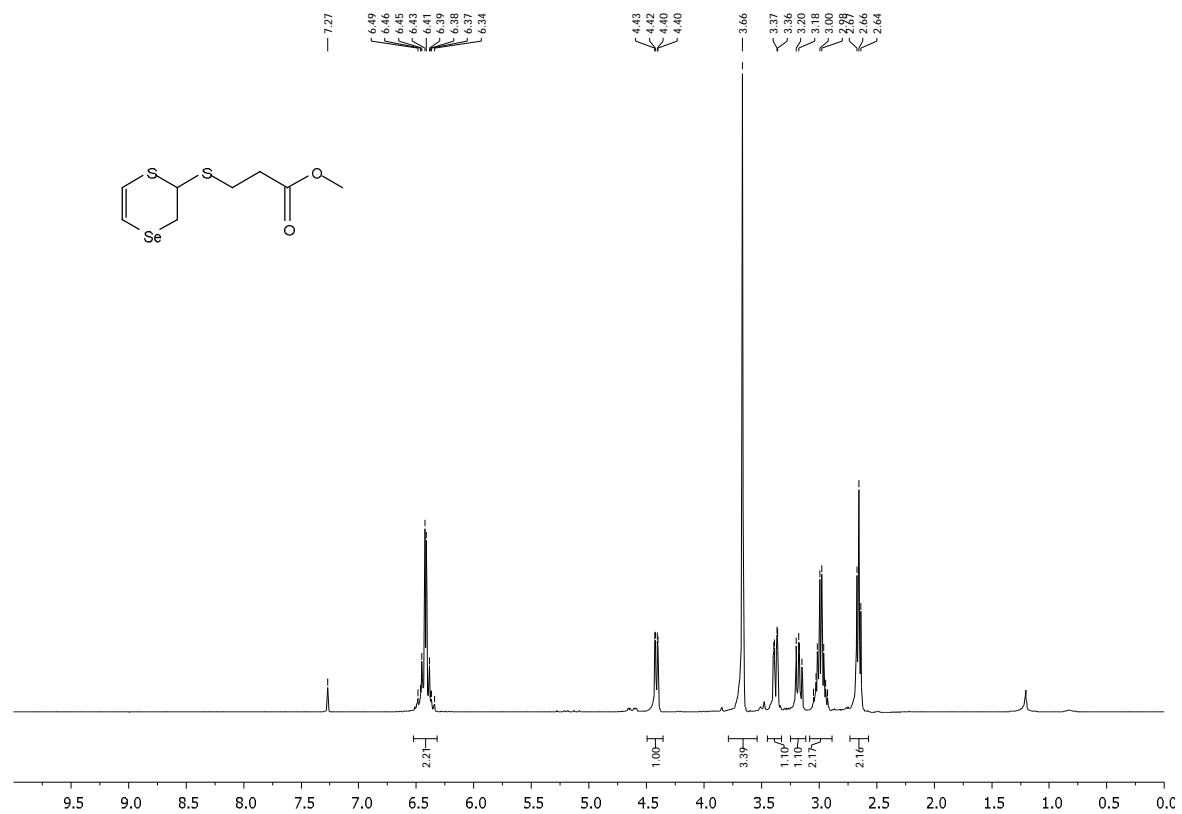


^{77}Se -NMR spectrum of 4-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)-2-butanol (6)

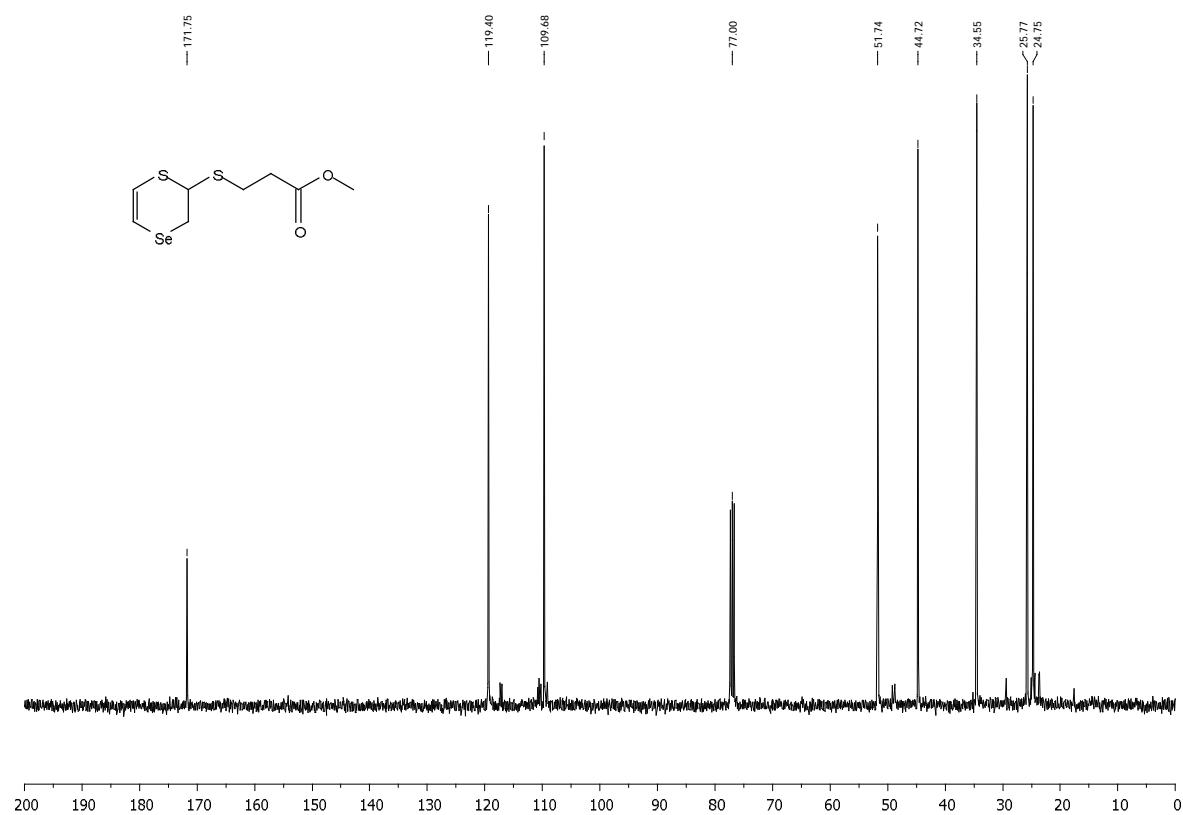


^1H -NMR spectrum of 4-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)-2-butanone (7)

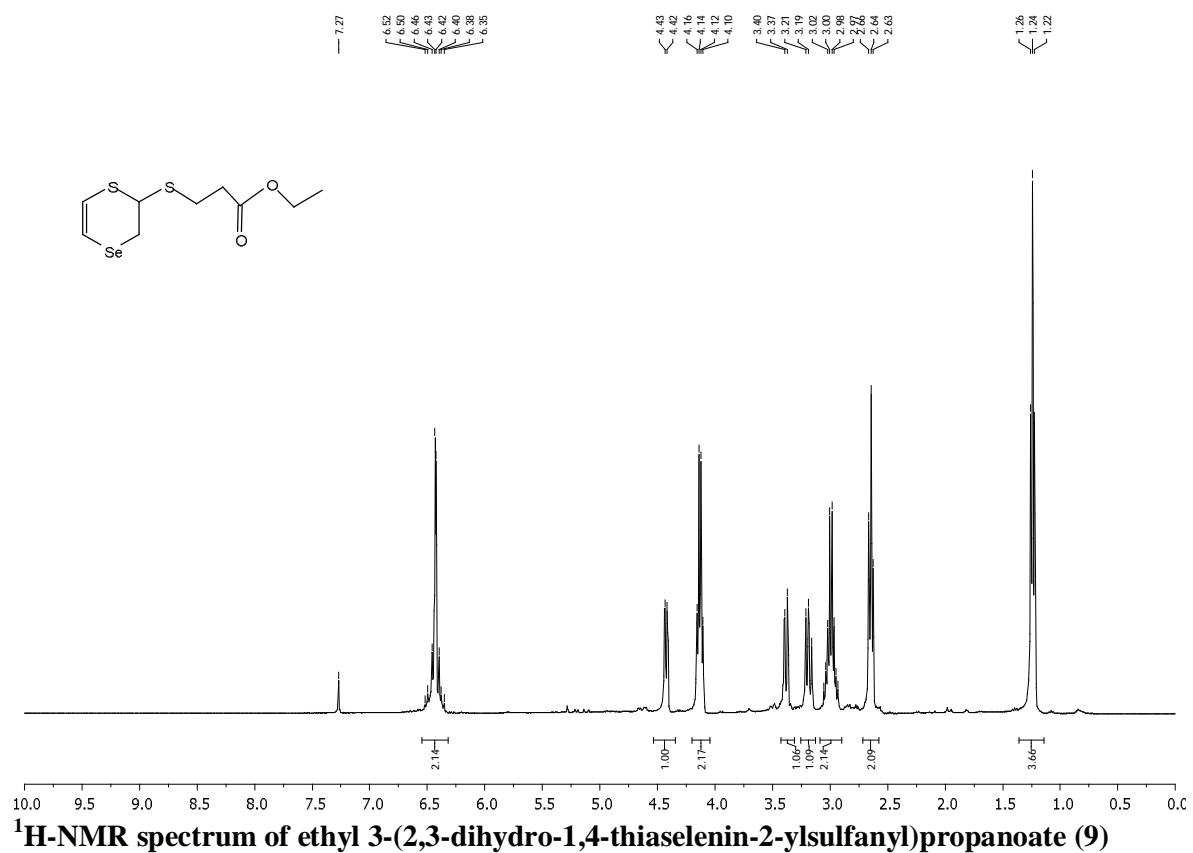
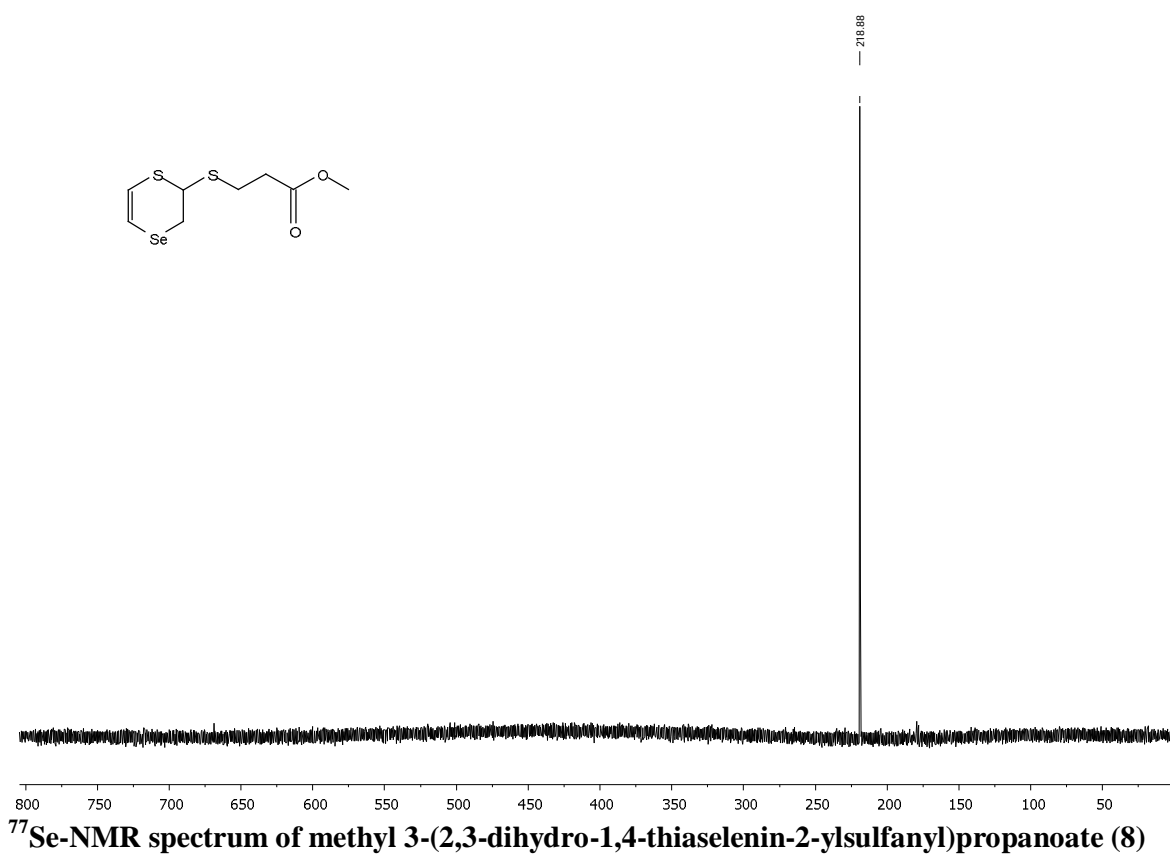


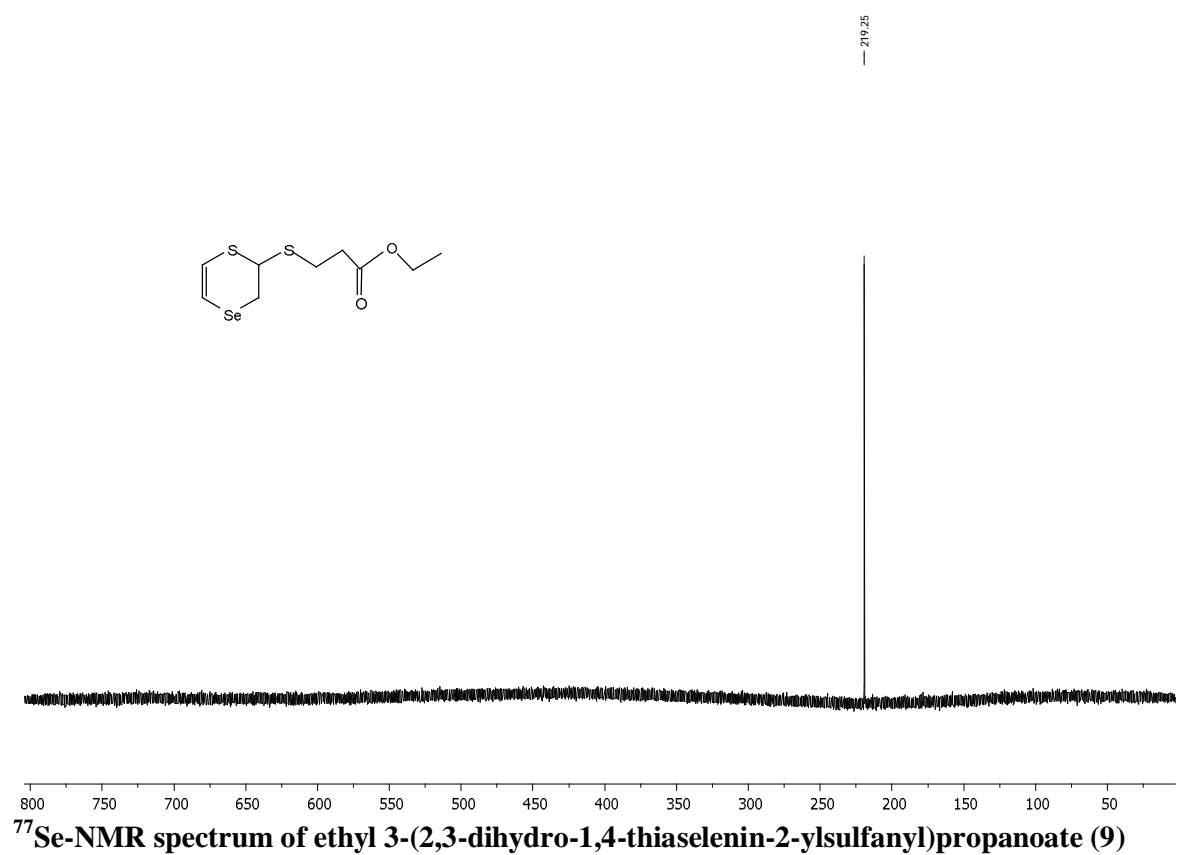
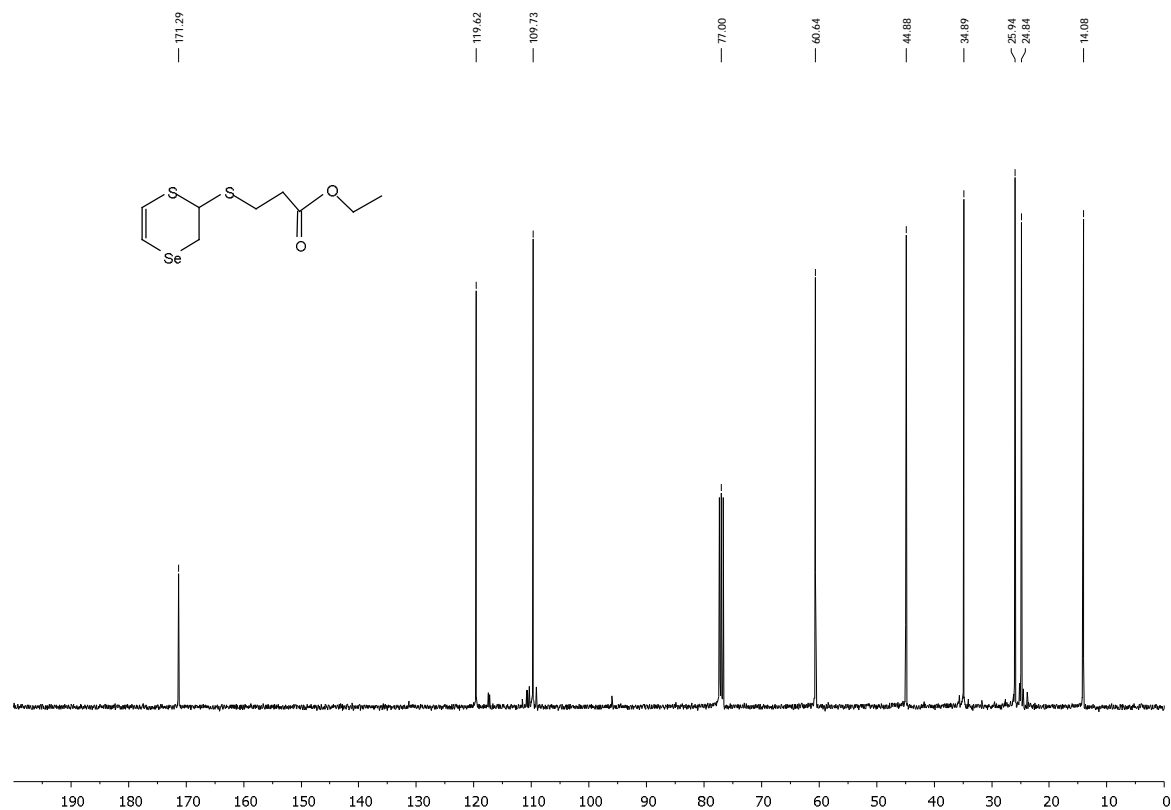


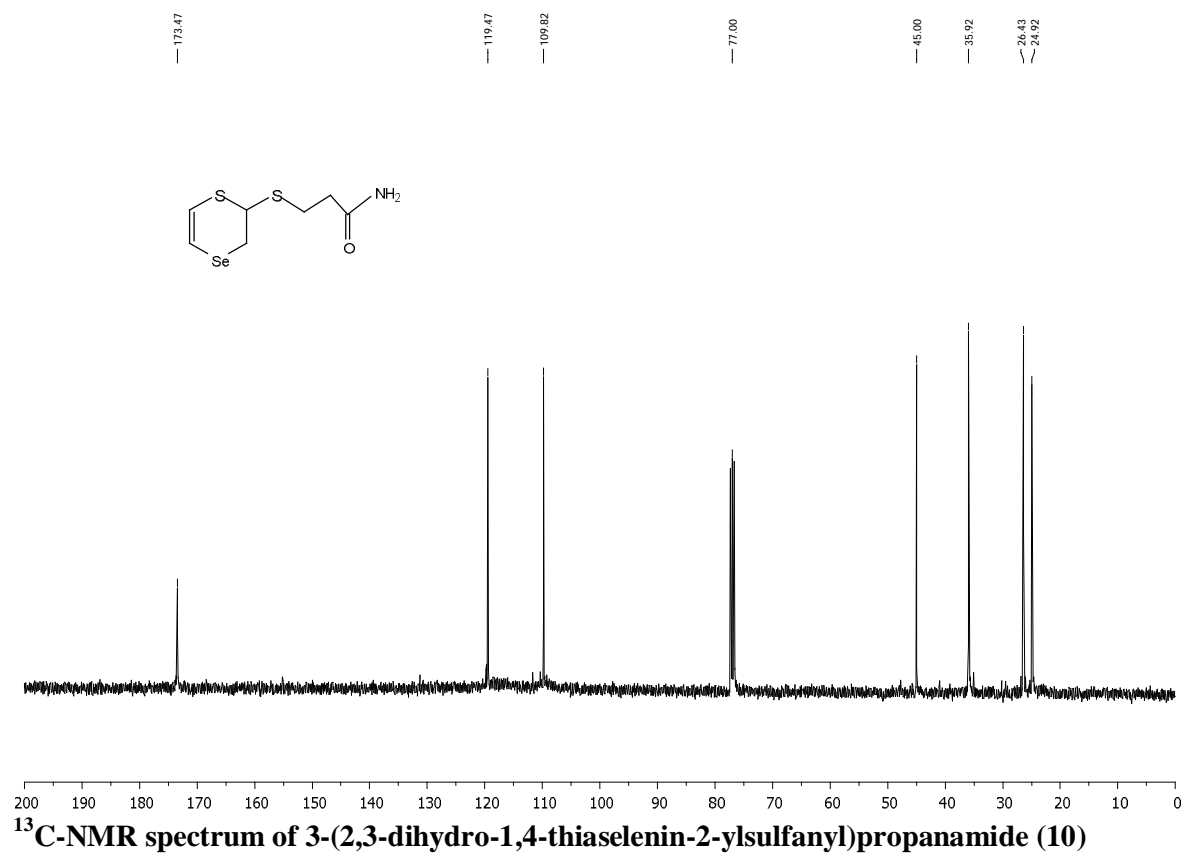
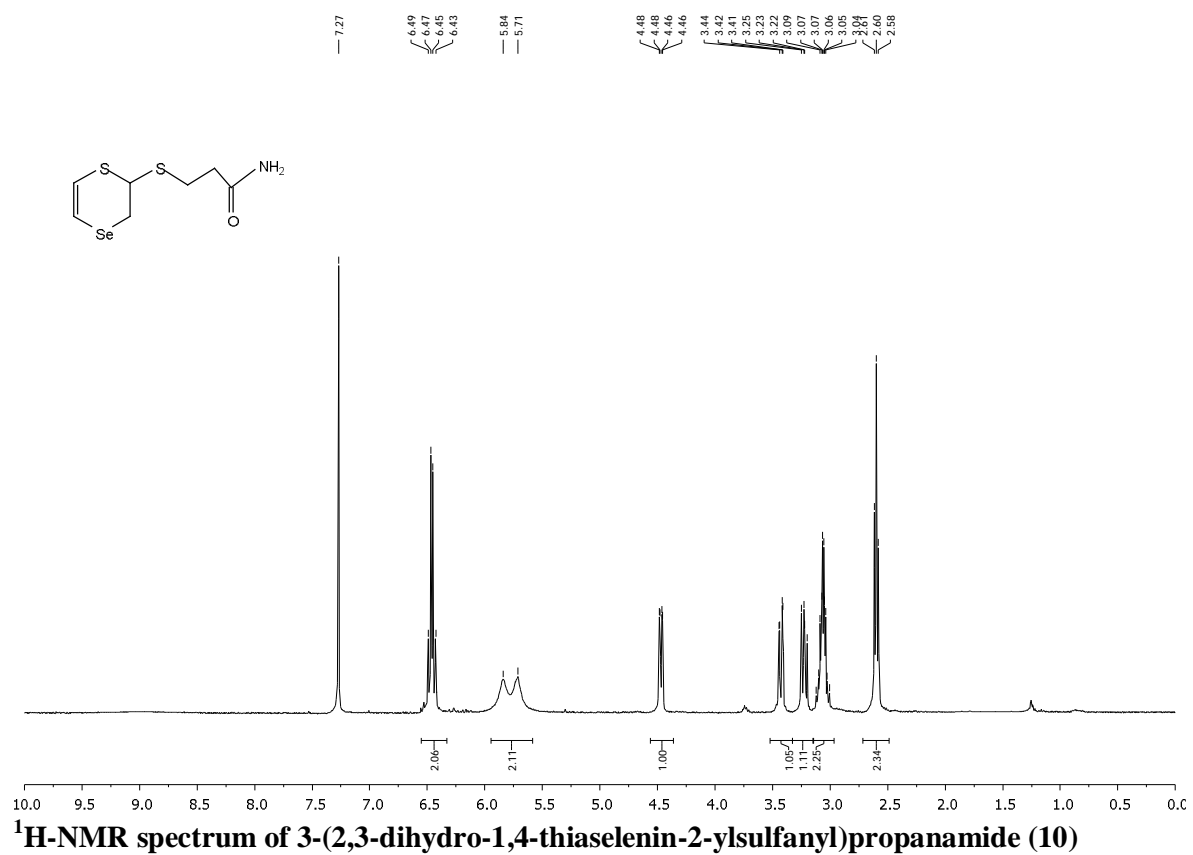
¹H-NMR spectrum of methyl 3-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)propanoate (8)

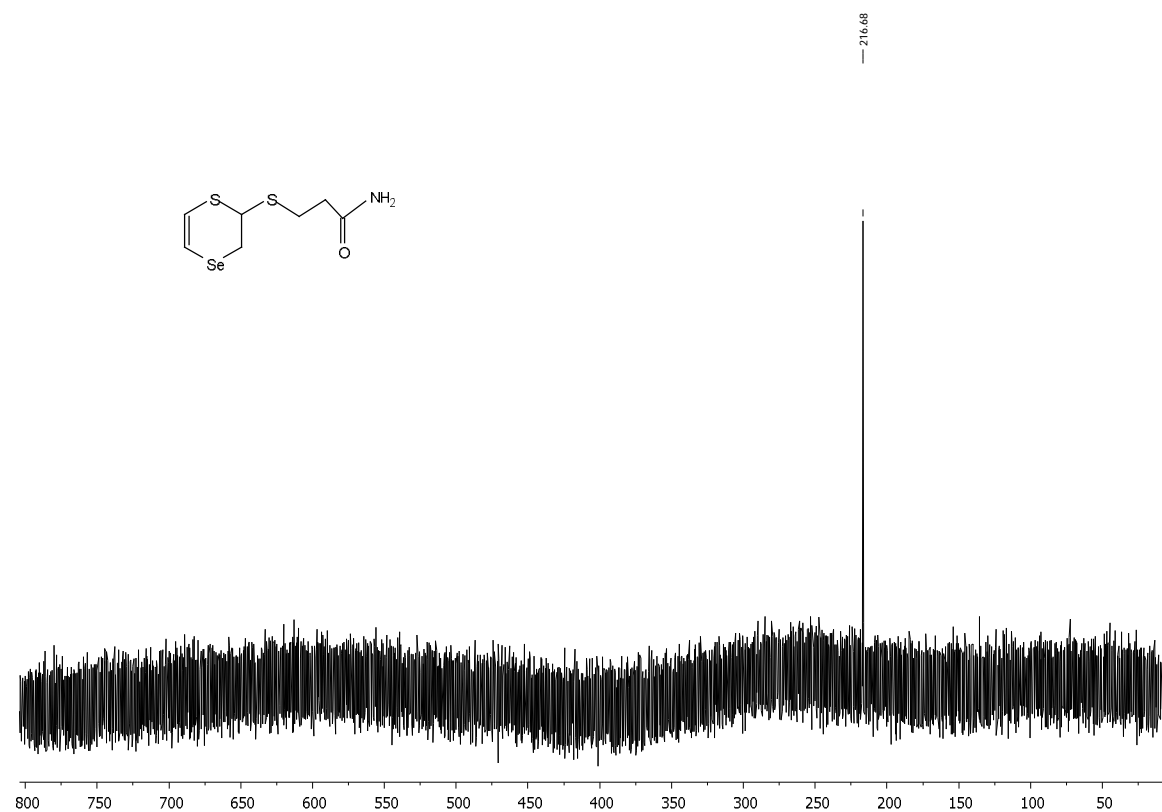


¹³C-NMR spectrum of methyl 3-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)propanoate (8)

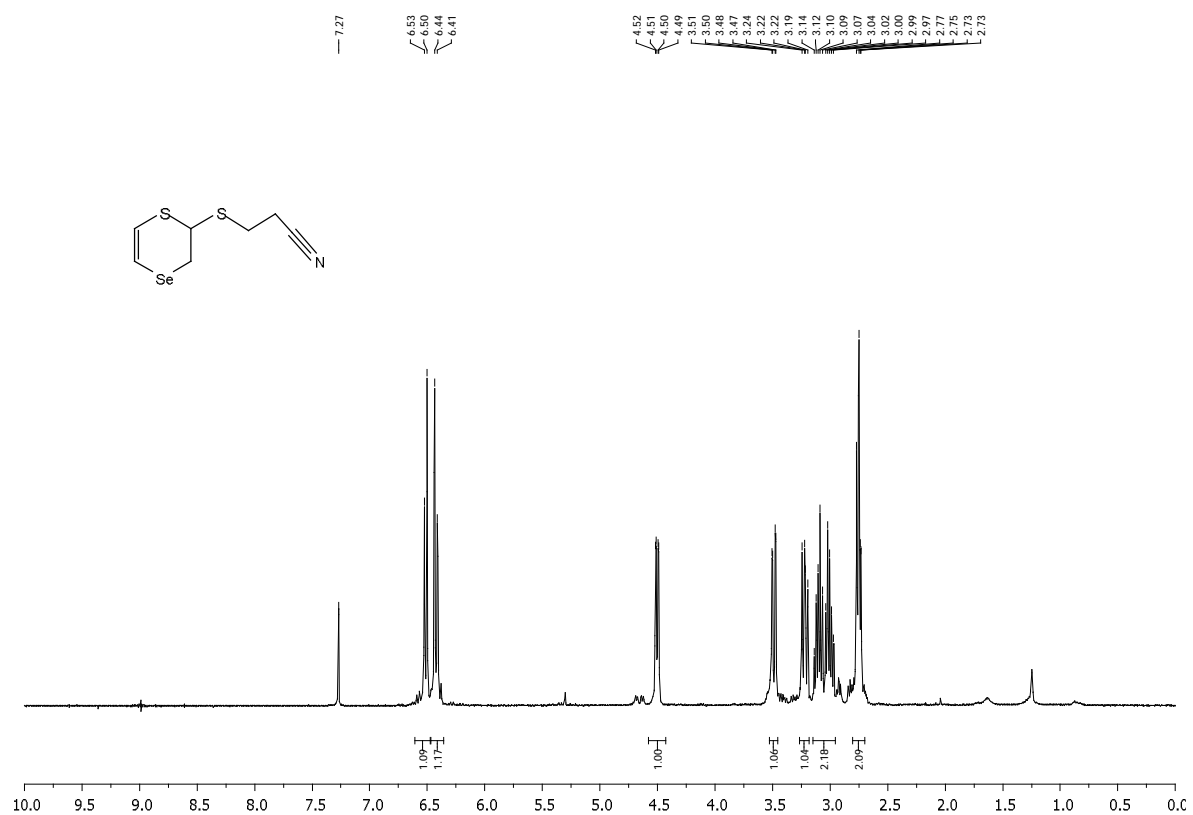




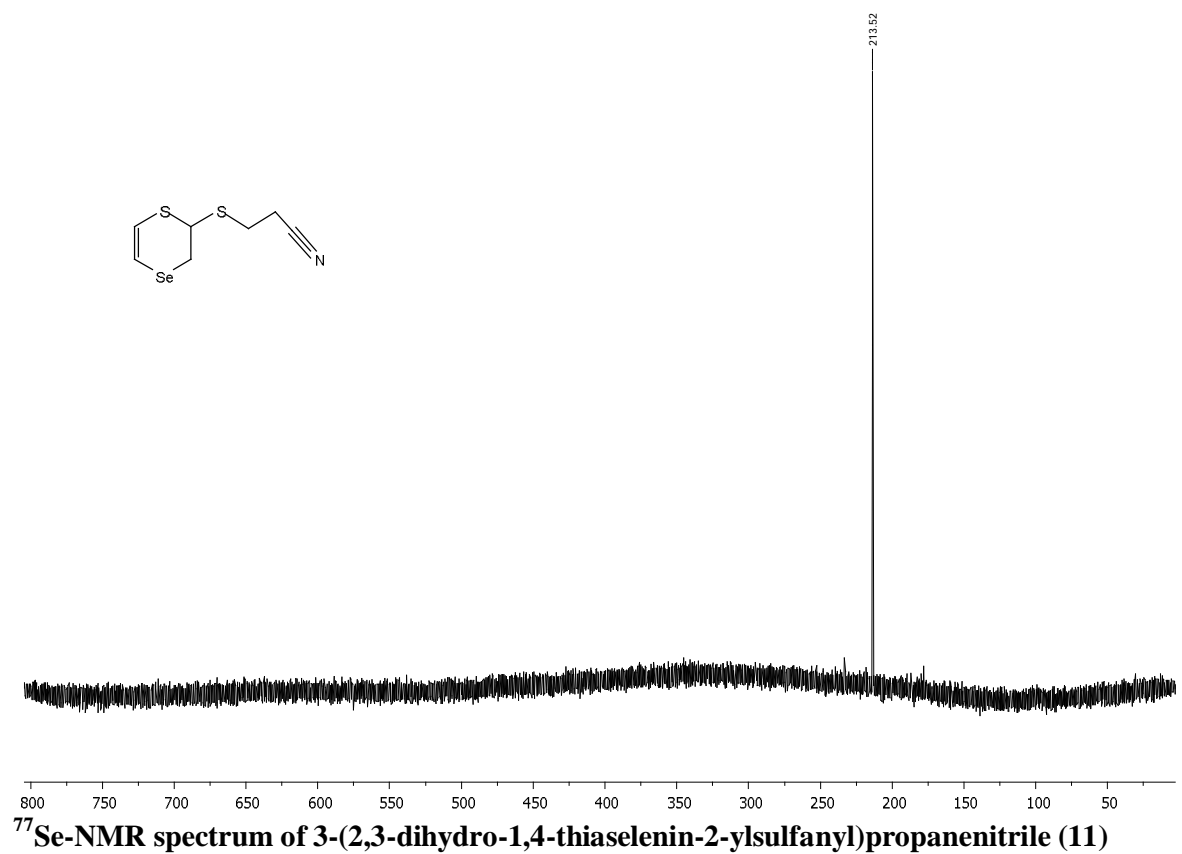
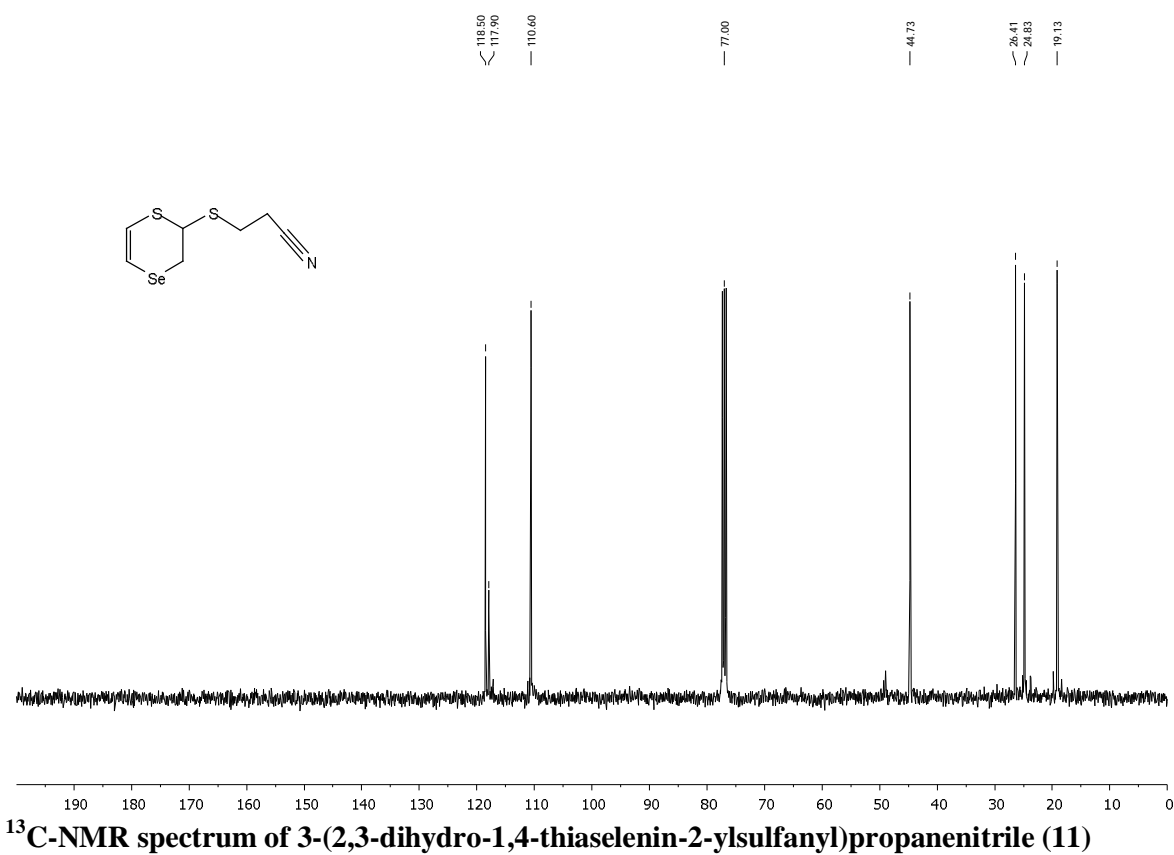


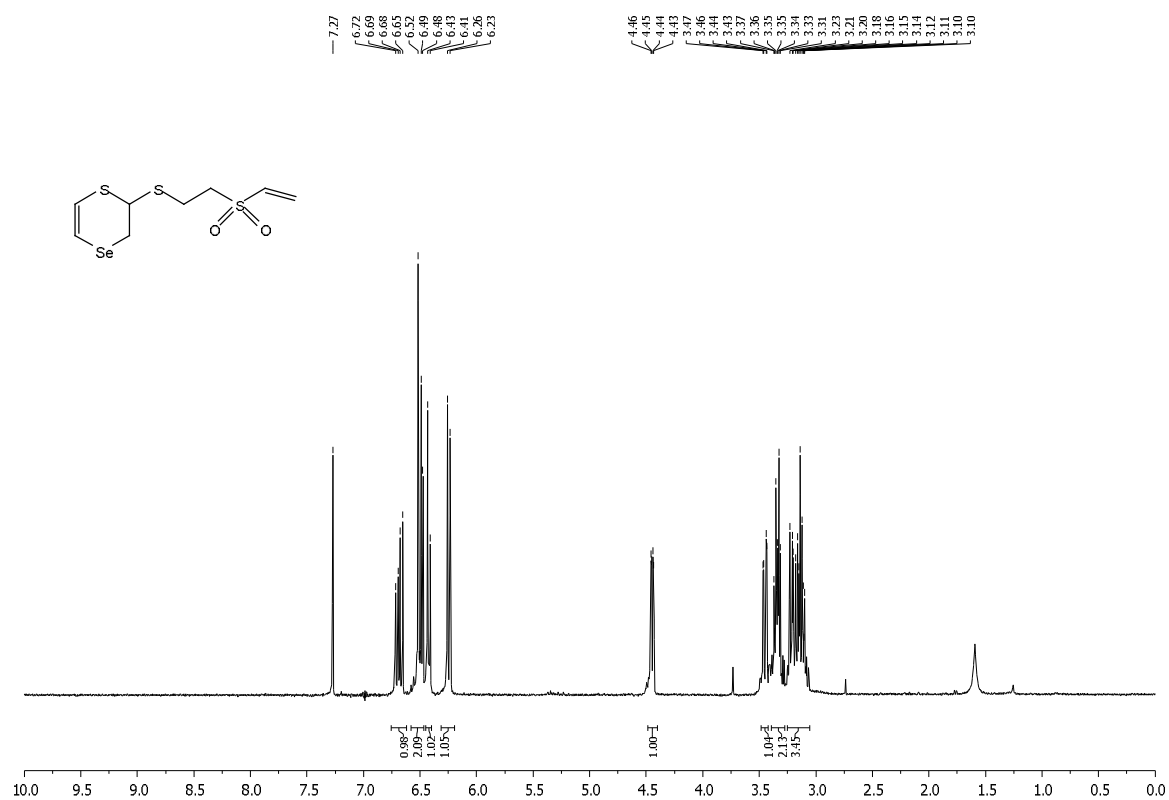


⁷⁷Se-NMR spectrum of 3-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)propanamide (10)

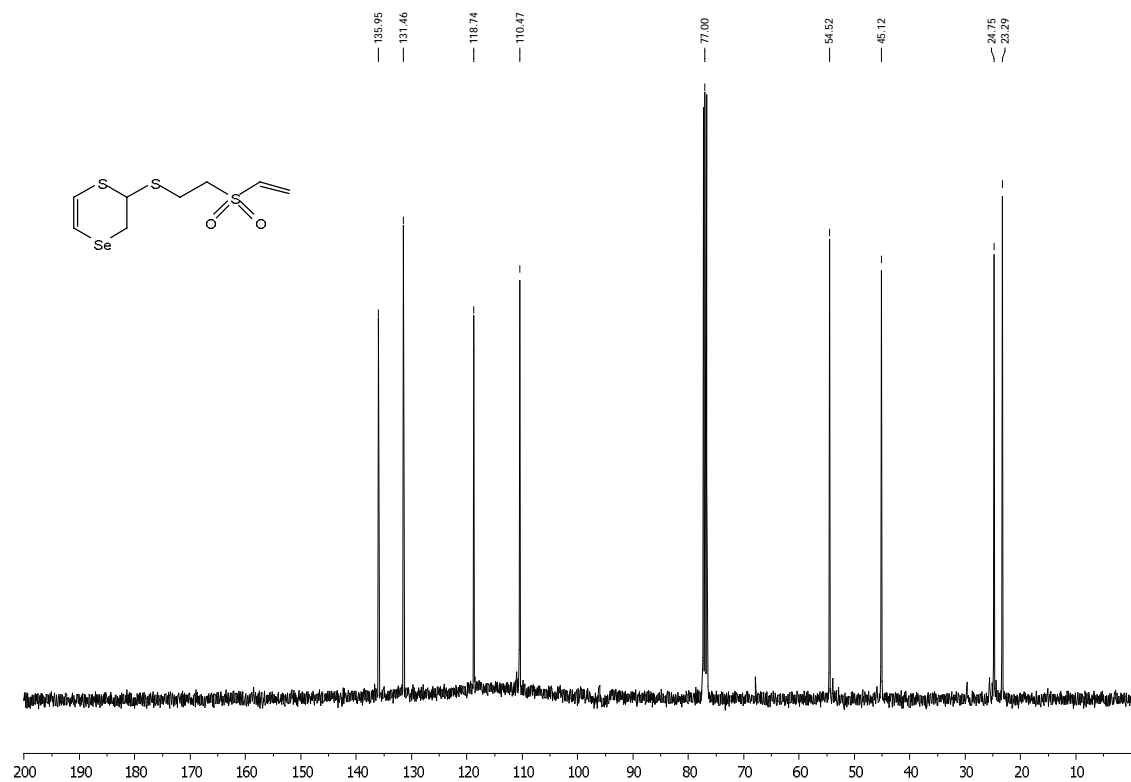


¹H-NMR spectrum of 3-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)propanenitrile (11)

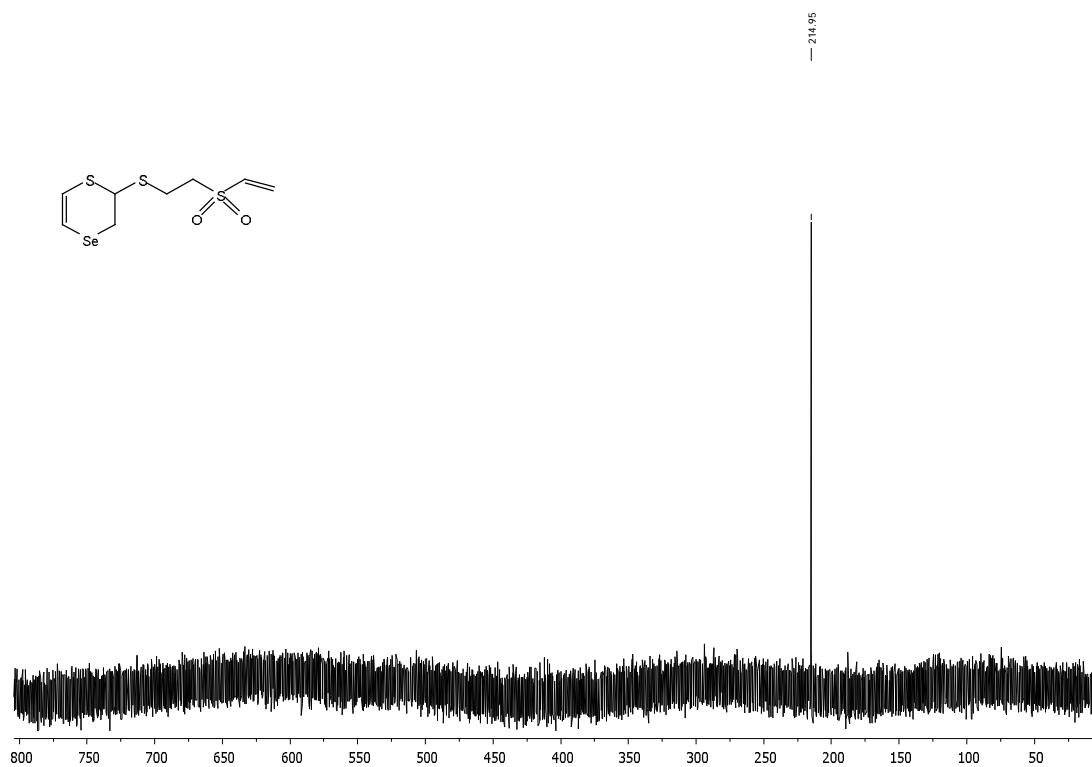




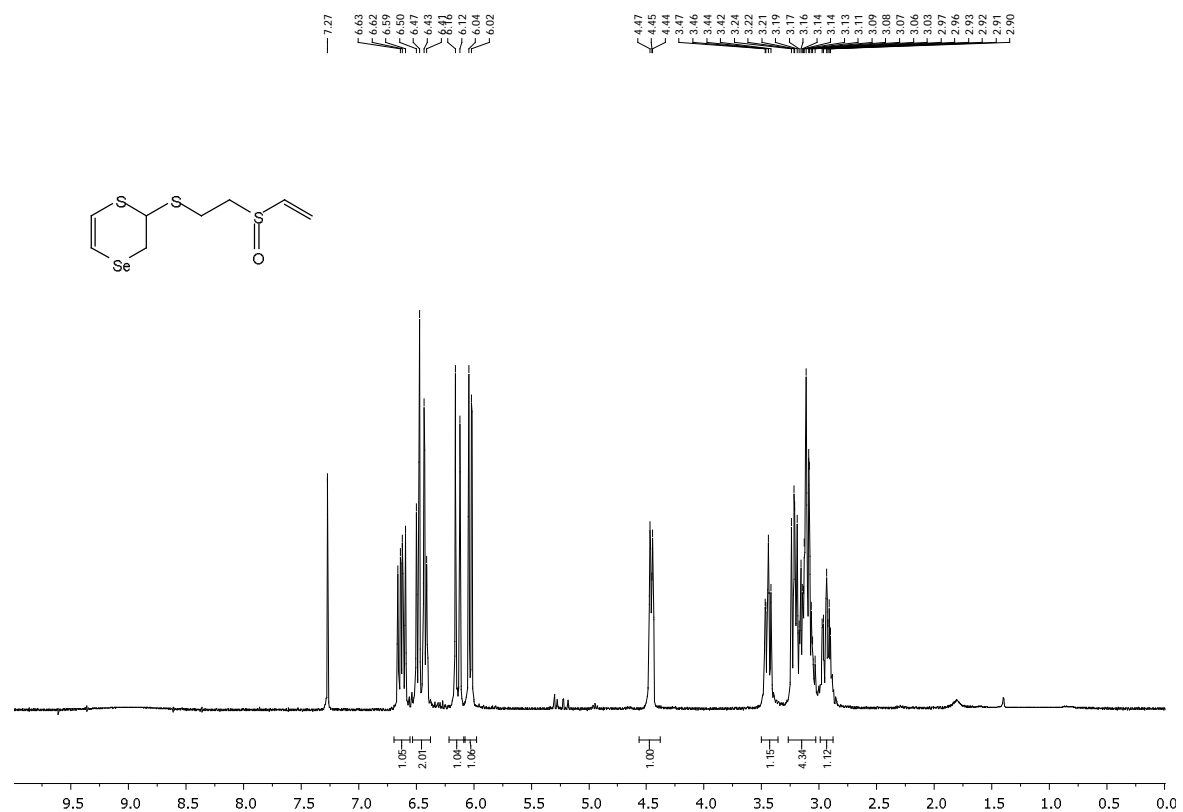
¹H-NMR spectrum of 2-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)ethyl vinyl sulfone (12)



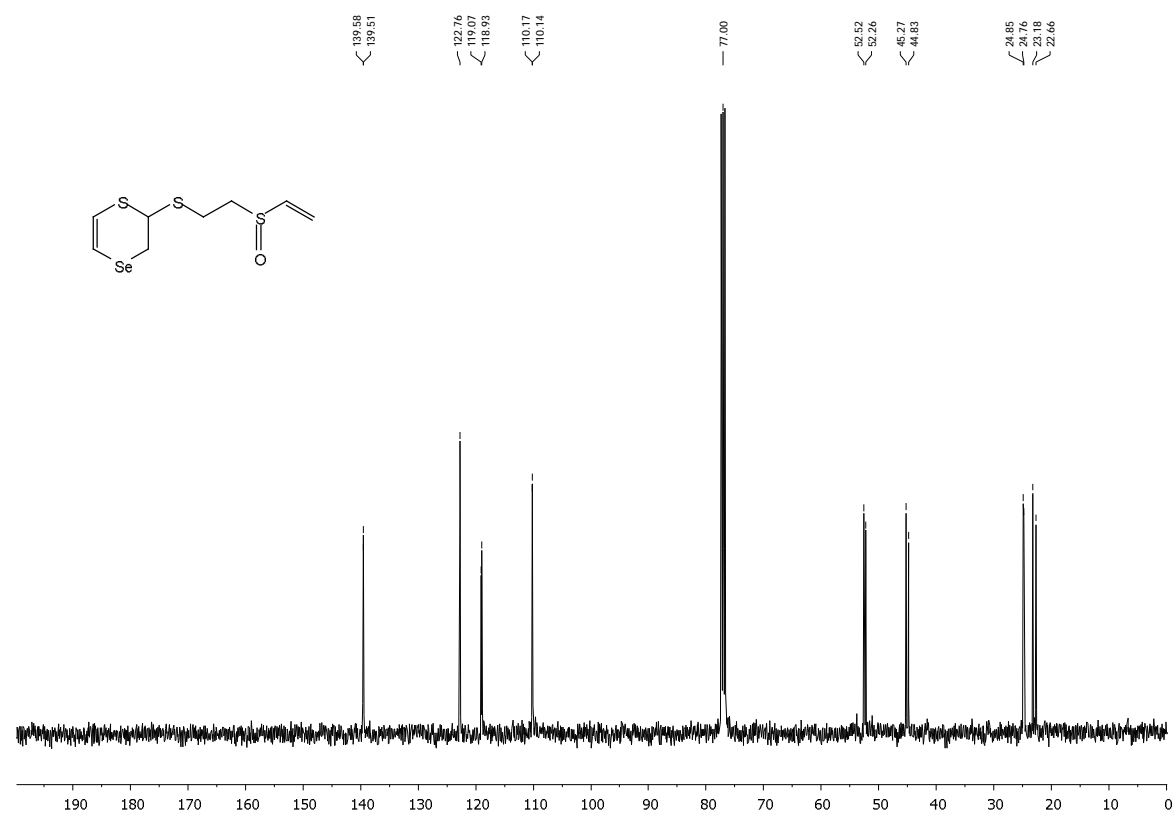
¹³C-NMR spectrum of 2-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)ethyl vinyl sulfone (12)



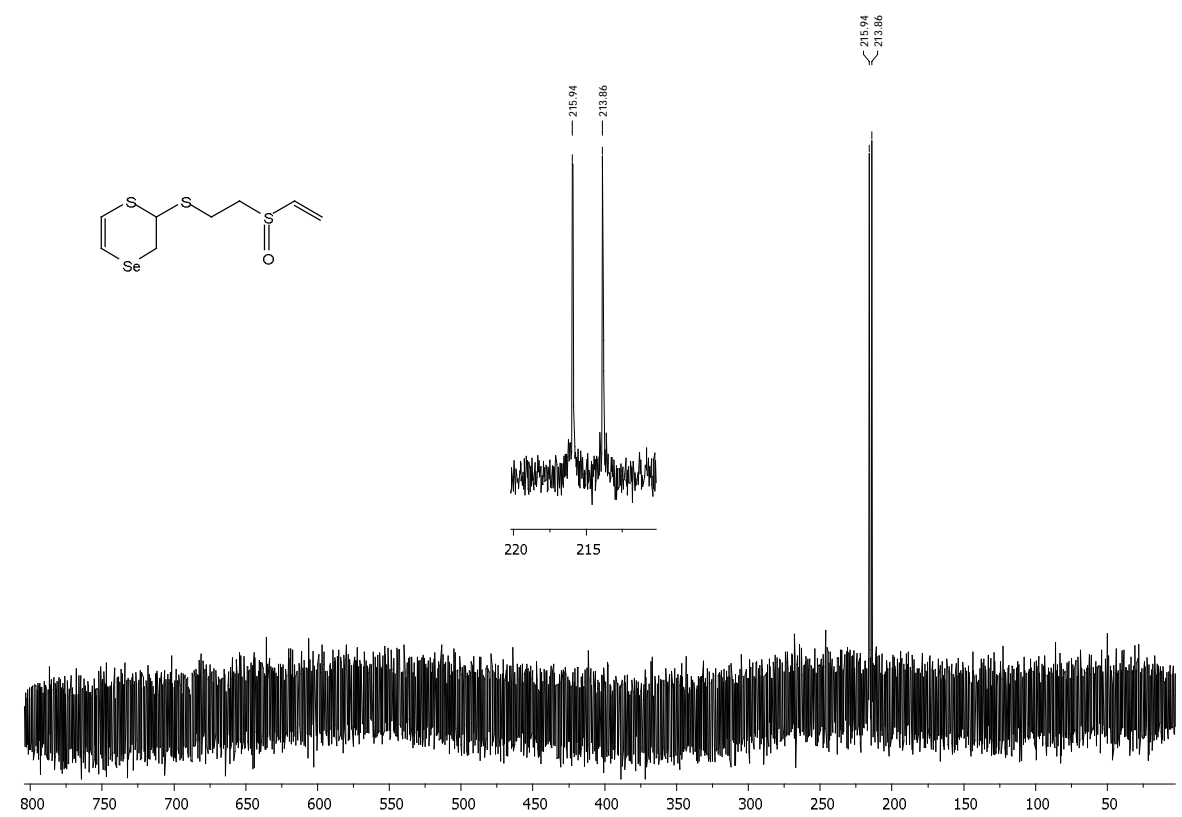
^{77}Se -NMR spectrum of 2-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)ethyl vinyl sulfone (12)



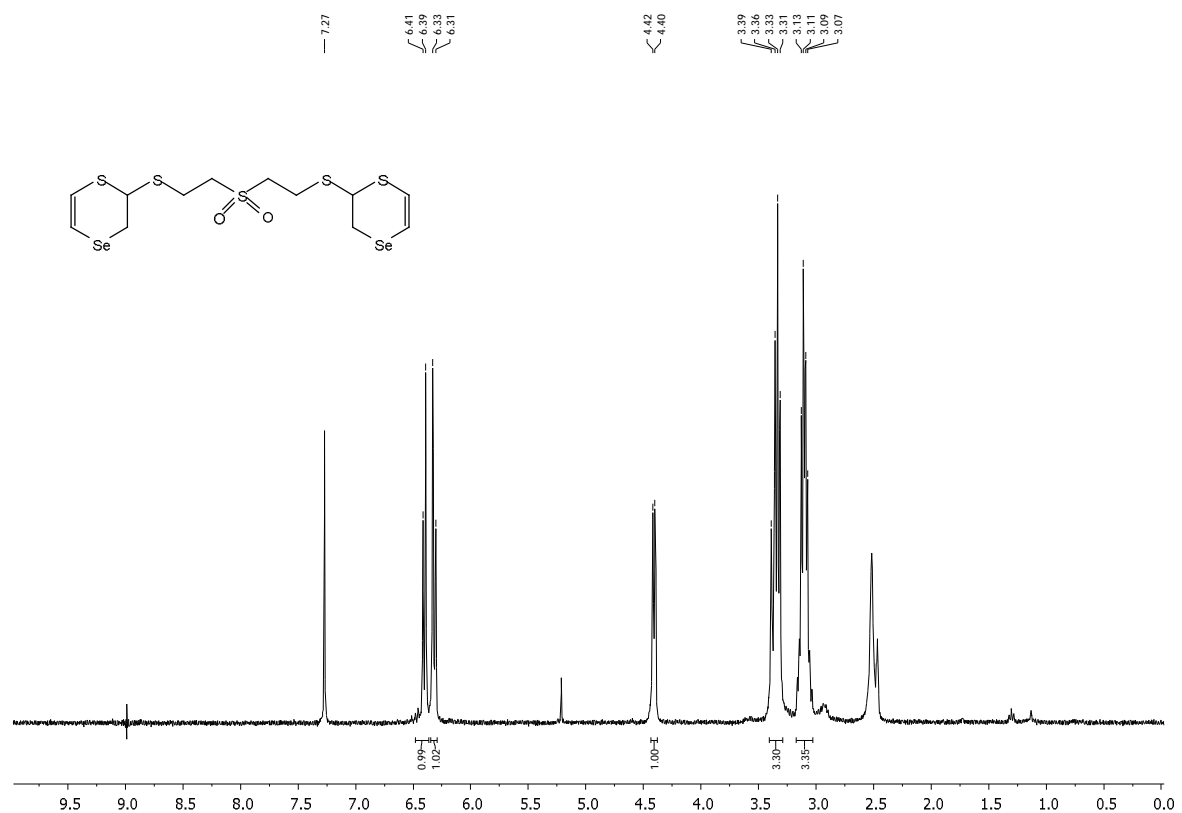
^1H -NMR spectrum of 2-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)ethyl vinyl sulfoxide (13)



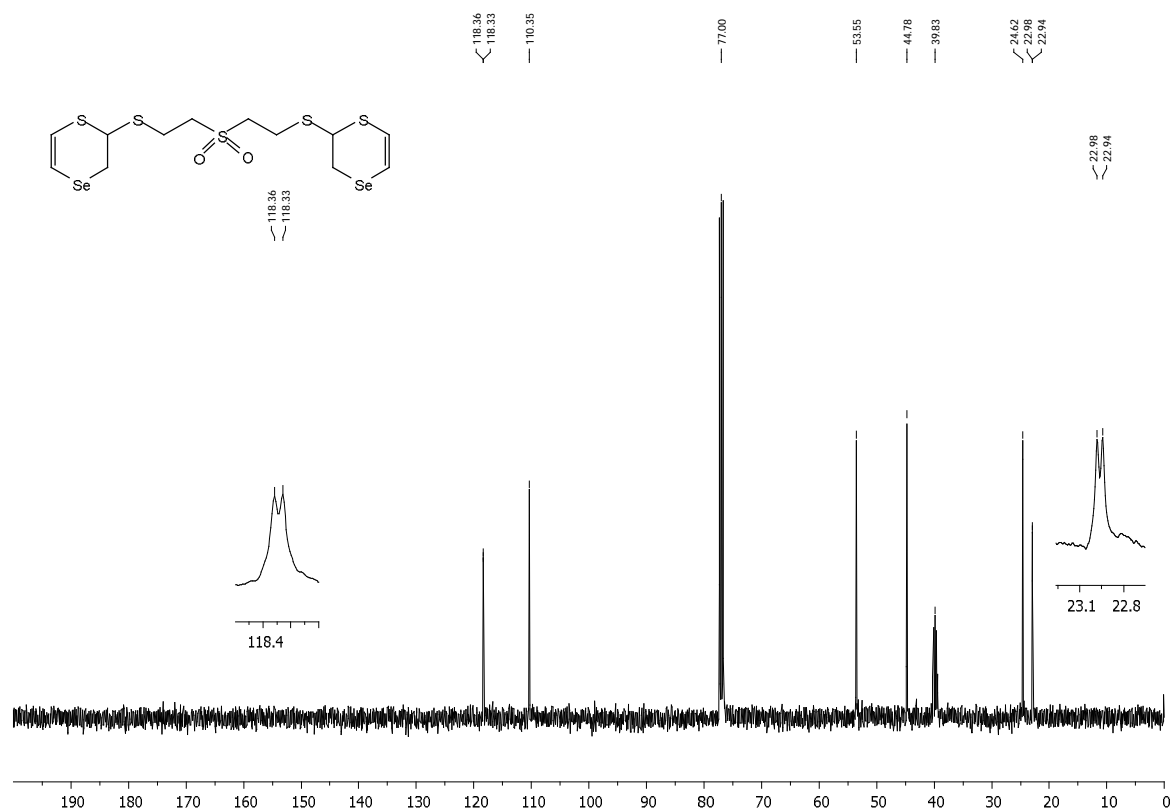
¹³C-NMR spectrum of 2-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)ethyl vinyl sulfoxide (13)



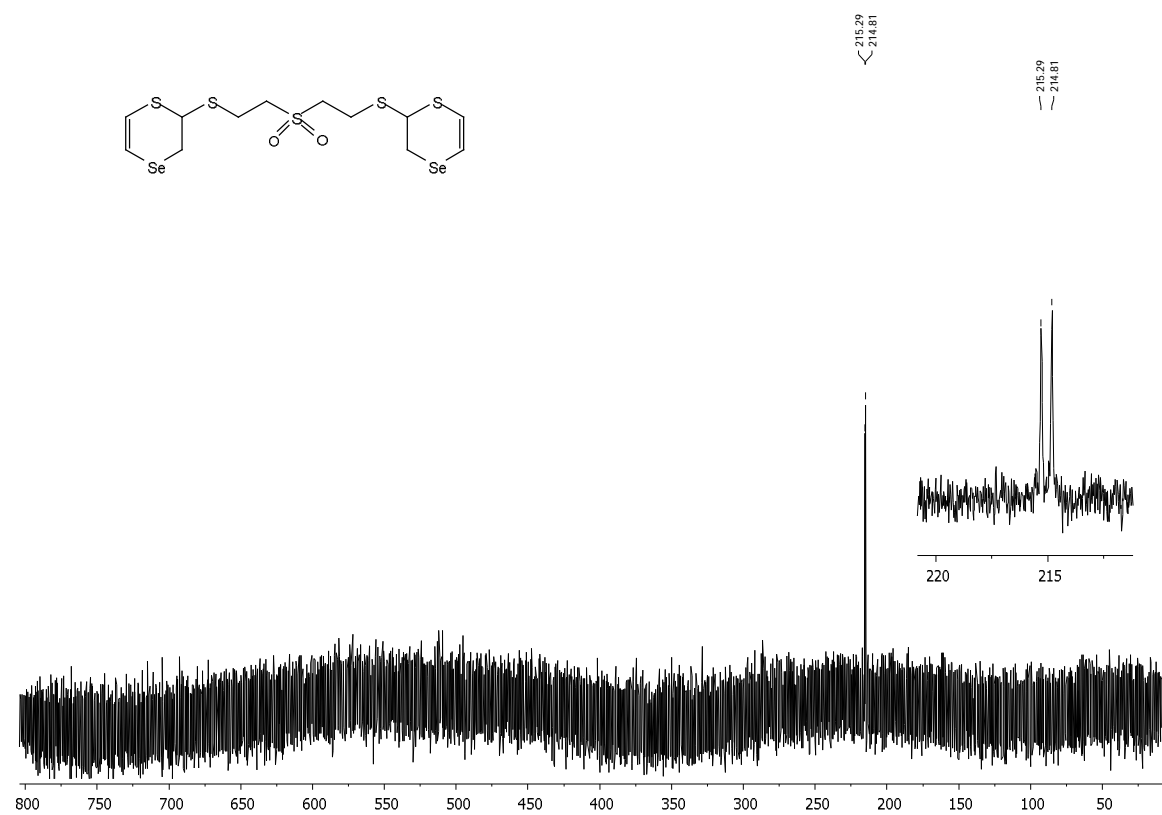
⁷⁷Se-NMR spectrum of 2-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)ethyl vinyl sulfoxide (13)



¹H-NMR spectrum of bis[2-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)ethyl] sulfone (14)



¹³C-NMR spectrum of bis[2-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)ethyl] sulfone (14)



^{77}Se -NMR spectrum of bis[2-(2,3-dihydro-1,4-thiaselenin-2-ylsulfanyl)ethyl] sulfone (14)