Supporting information

Regio- and Stereoselective One-Pot Synthesis of New Heterocyclic Compounds with Two Selenium Atoms Based on 2-Bromomethyl-1,3-thiaselenole Using Phase Transfer Catalysis

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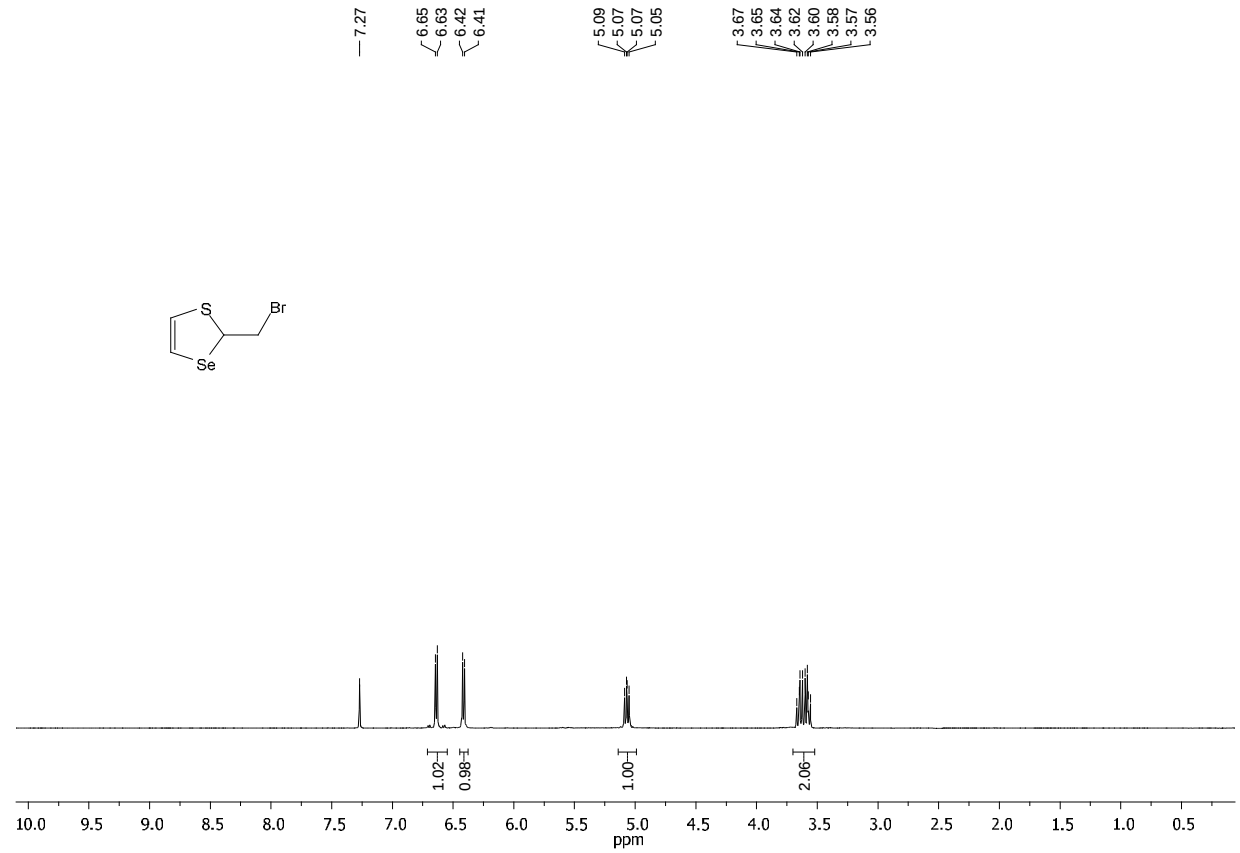
Examples of ^{1}H-, ^{13}C-, and ^{77}Se-NMR Spectra 3-19

General Information

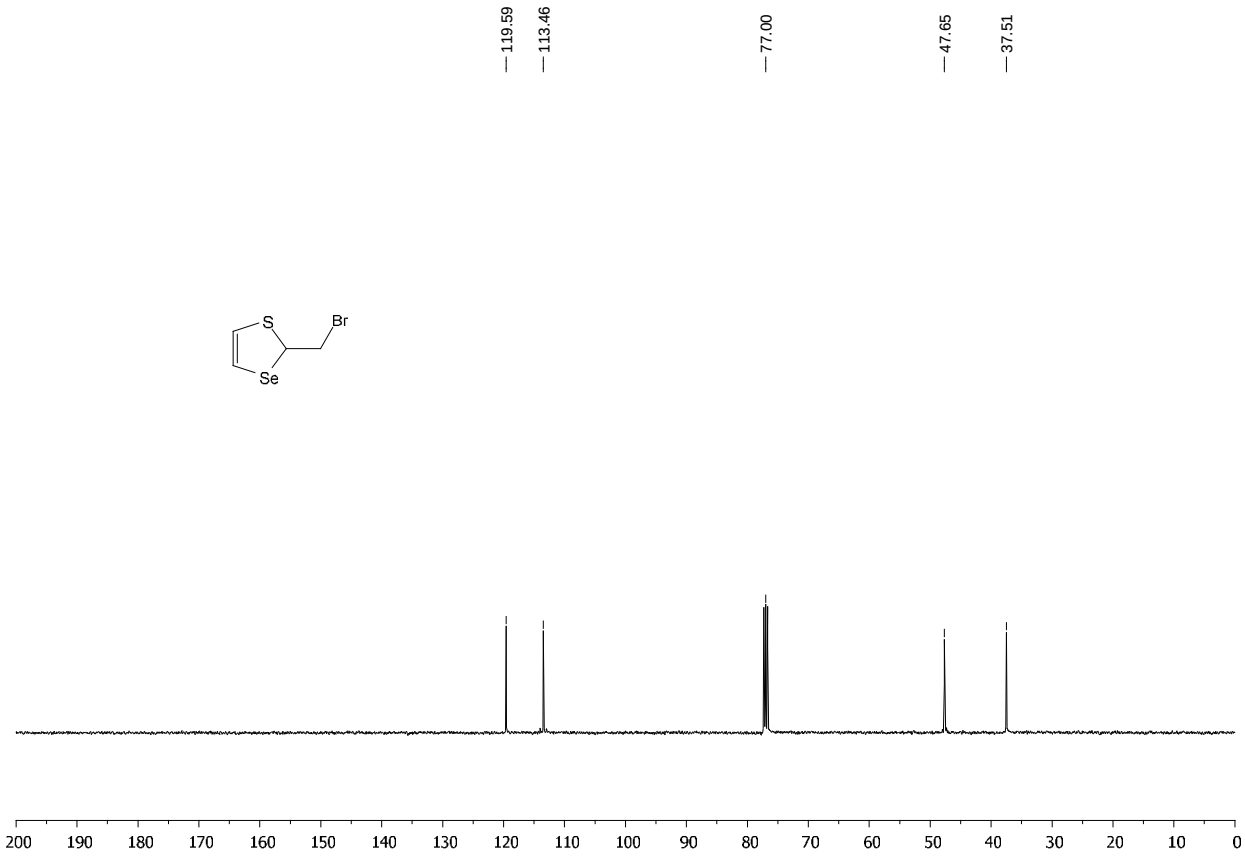
The ^{1}H (400.1 MHz), ^{13}C (100.6 MHz), and ^{77}Se (76.3 MHz) NMR spectra (the spectra can be found in Supplementary Materials) were recorded on a Bruker DPX-400 spectrometer (Bruker BioSpin GmbH, Rheinstetten, Germany) in $CDCl_3$ solutions and referred to the residual solvent peaks ($CDCl_3$, δ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

Mass spectra were recorded on a Shimadzu GCMS-QP5050A (Shimadzu Corporation, Kyoto, Japan) with electron impact (EI) ionization (70 eV). Elemental analysis was performed on a Thermo Scientific Flash 2000 Elemental Analyzer (Thermo Fisher Scientific Inc., Milan, Italy). The distilled organic solvents and degassed water were used in syntheses.

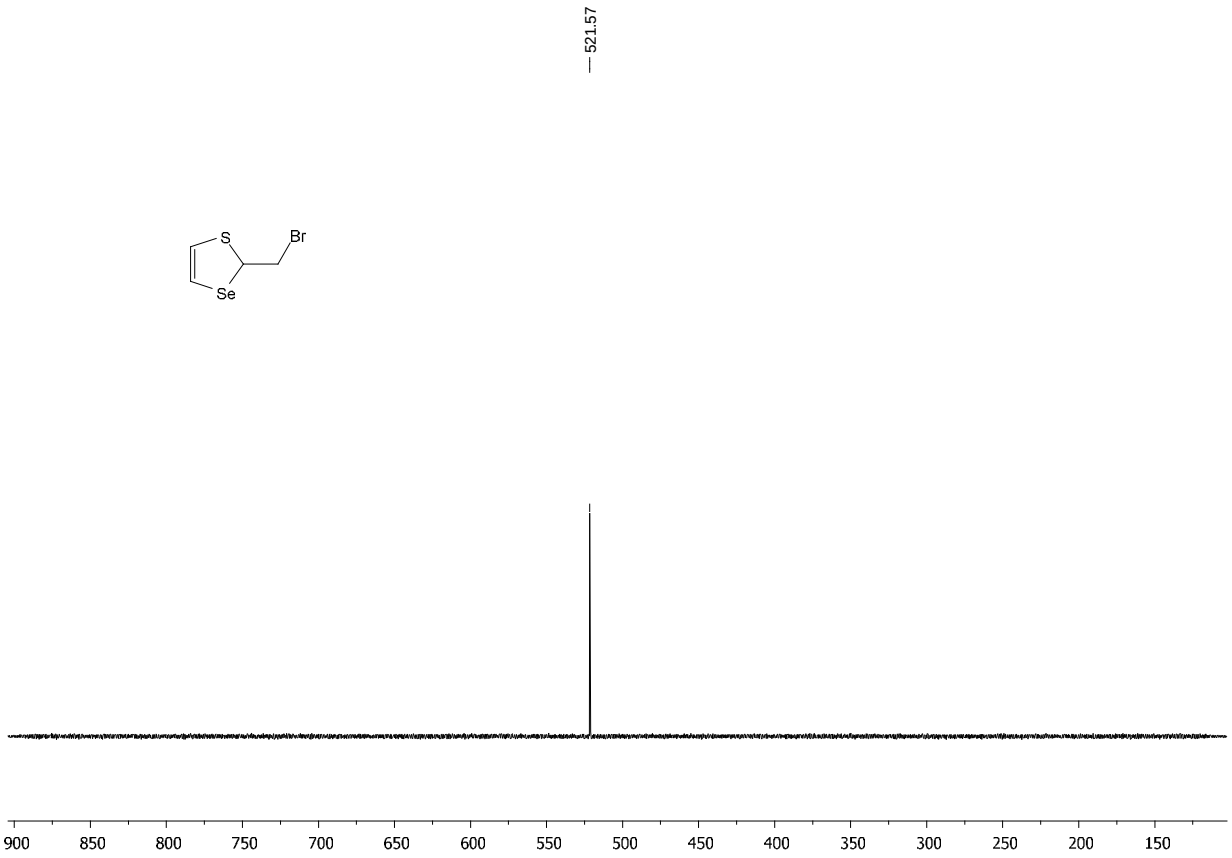
Examples of ^{1}H-, ^{13}C-, and ^{77}Se-NMR Spectra



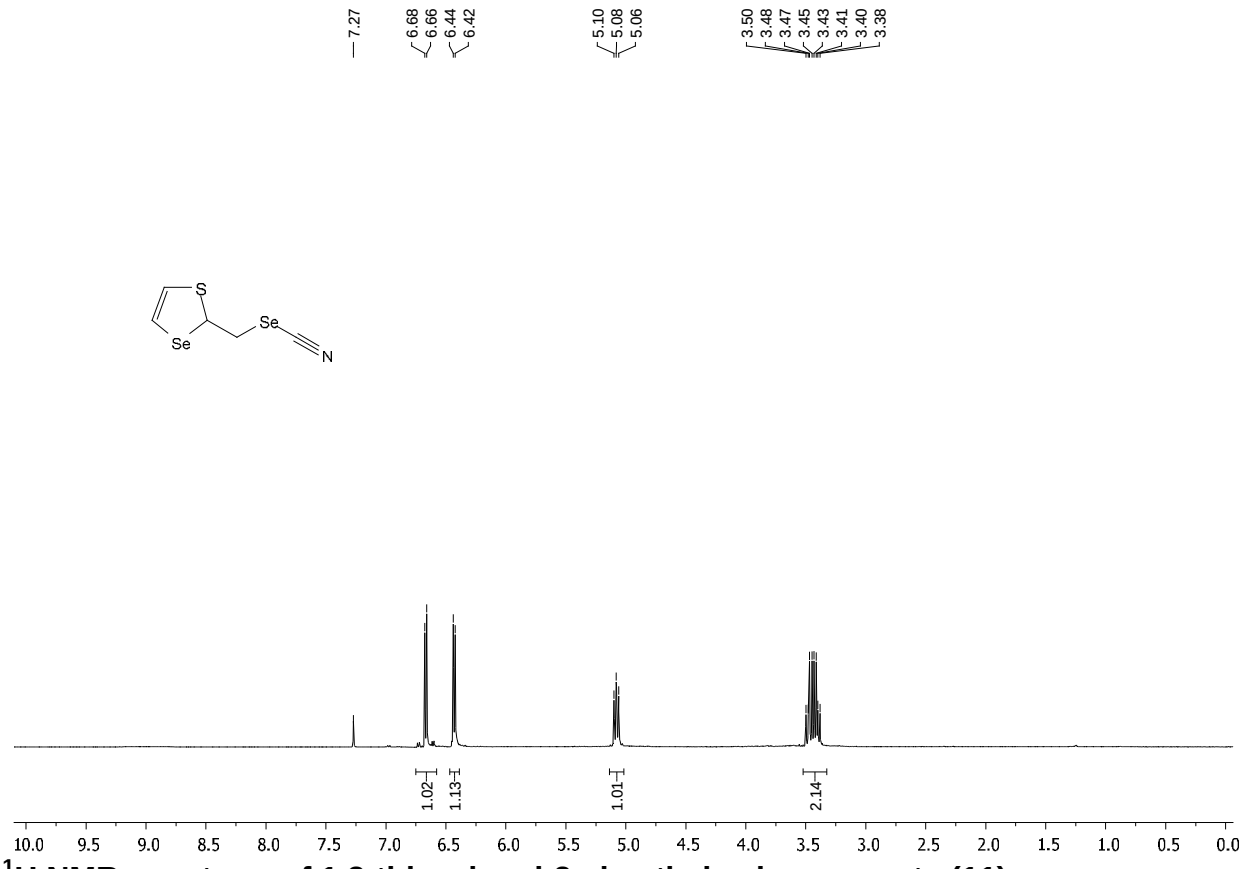
^{1}H NMR spectrum of 2-bromomethyl-1,3-thiaselenole (8)



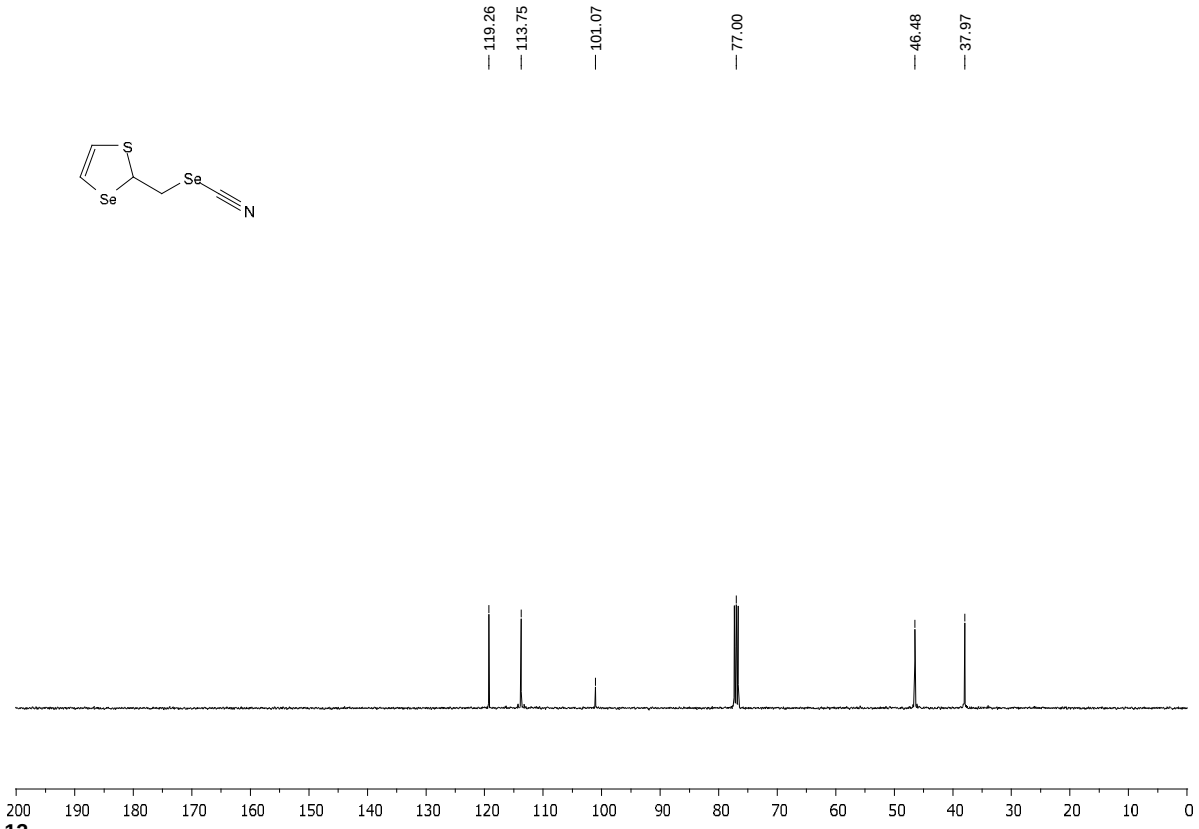
^{13}C NMR spectrum of 2-bromomethyl-1,3-thiaselenole (8)



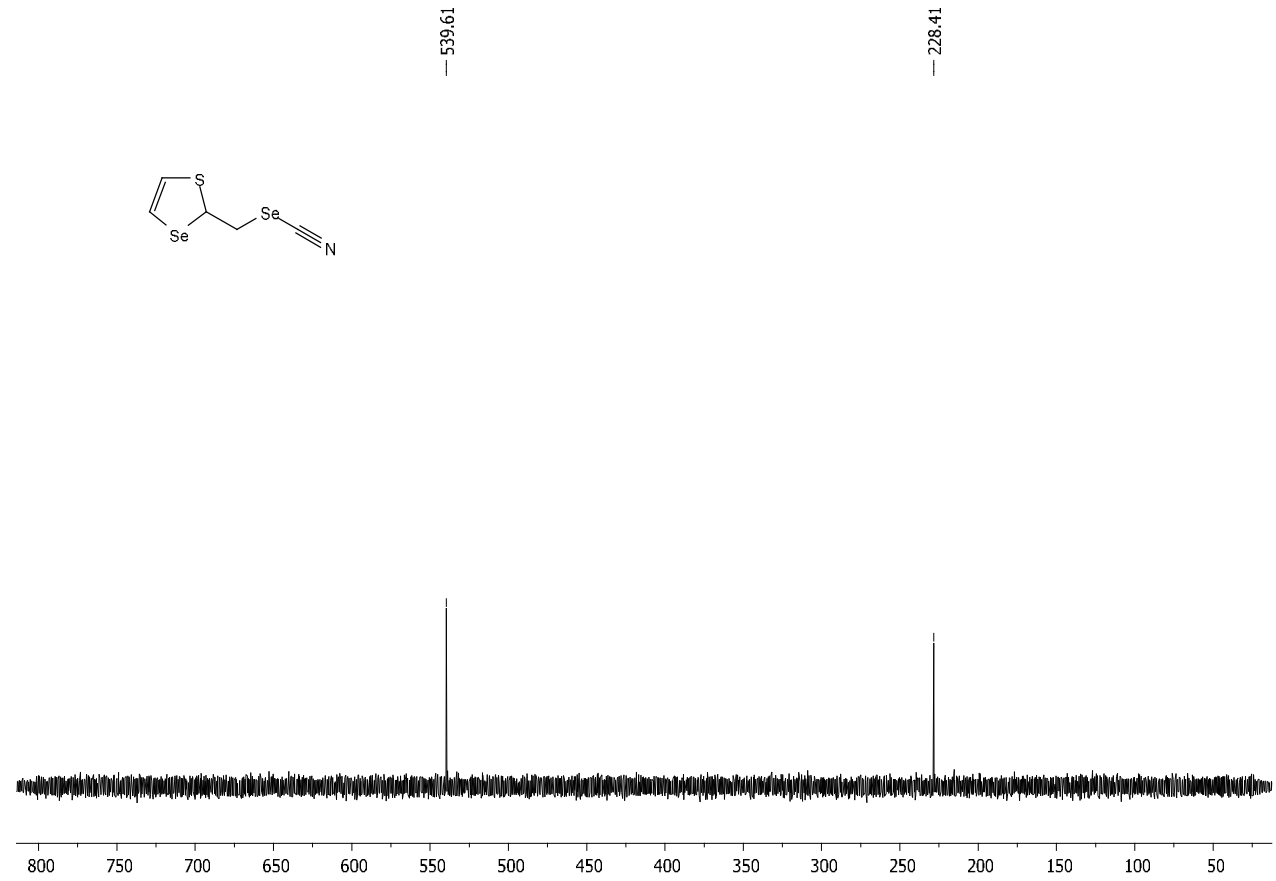
^{77}Se NMR spectrum of 2-bromomethyl-1,3-thiaselenole (8)



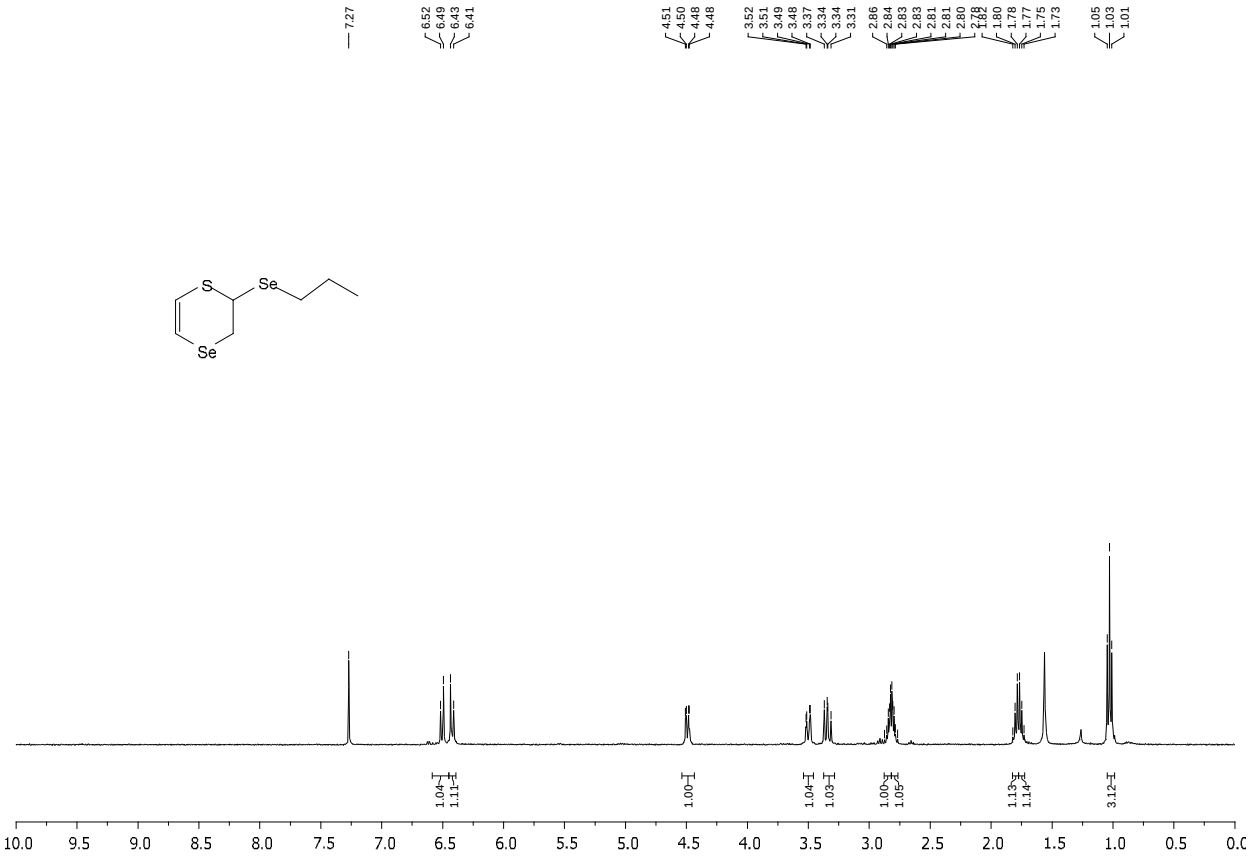
^{1}H NMR spectrum of 1,3-thiaselenol-2-ylmethyl selenocyanate (11)



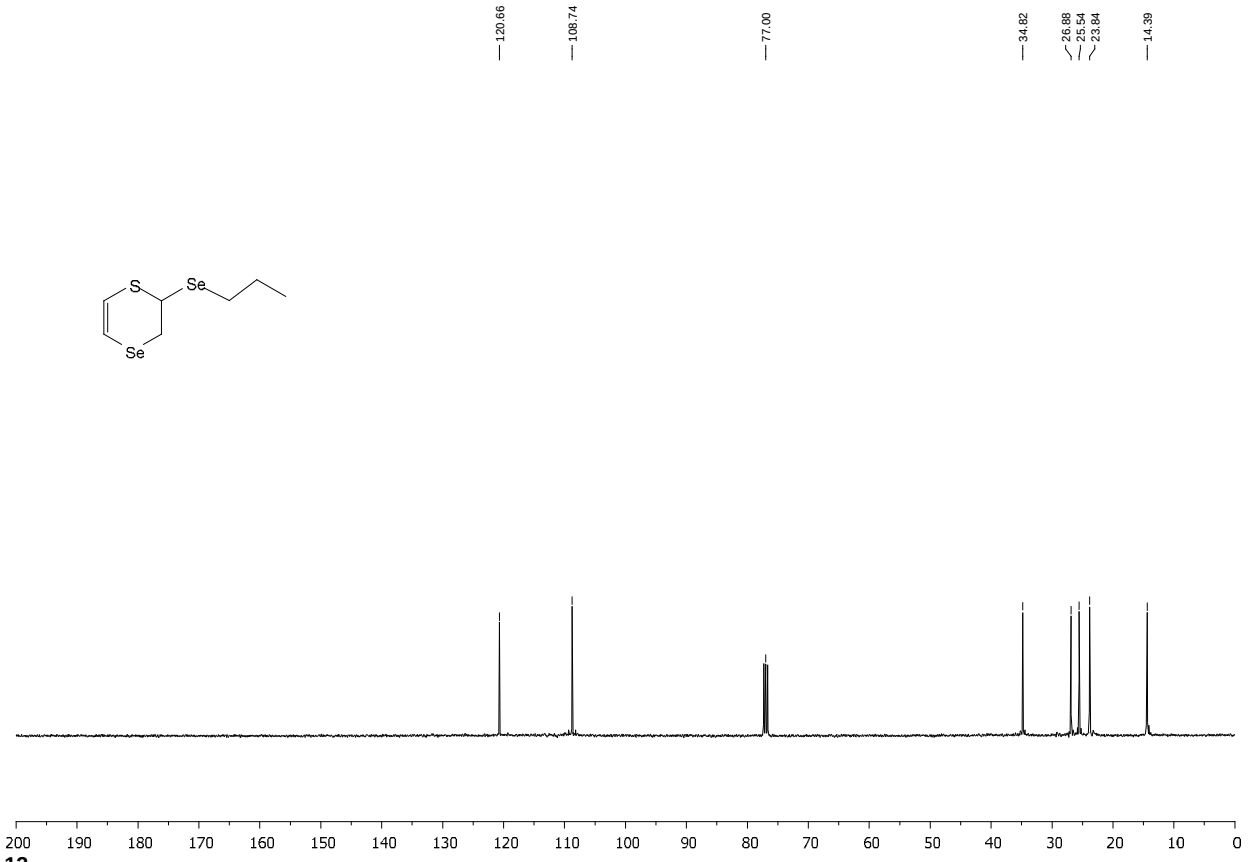
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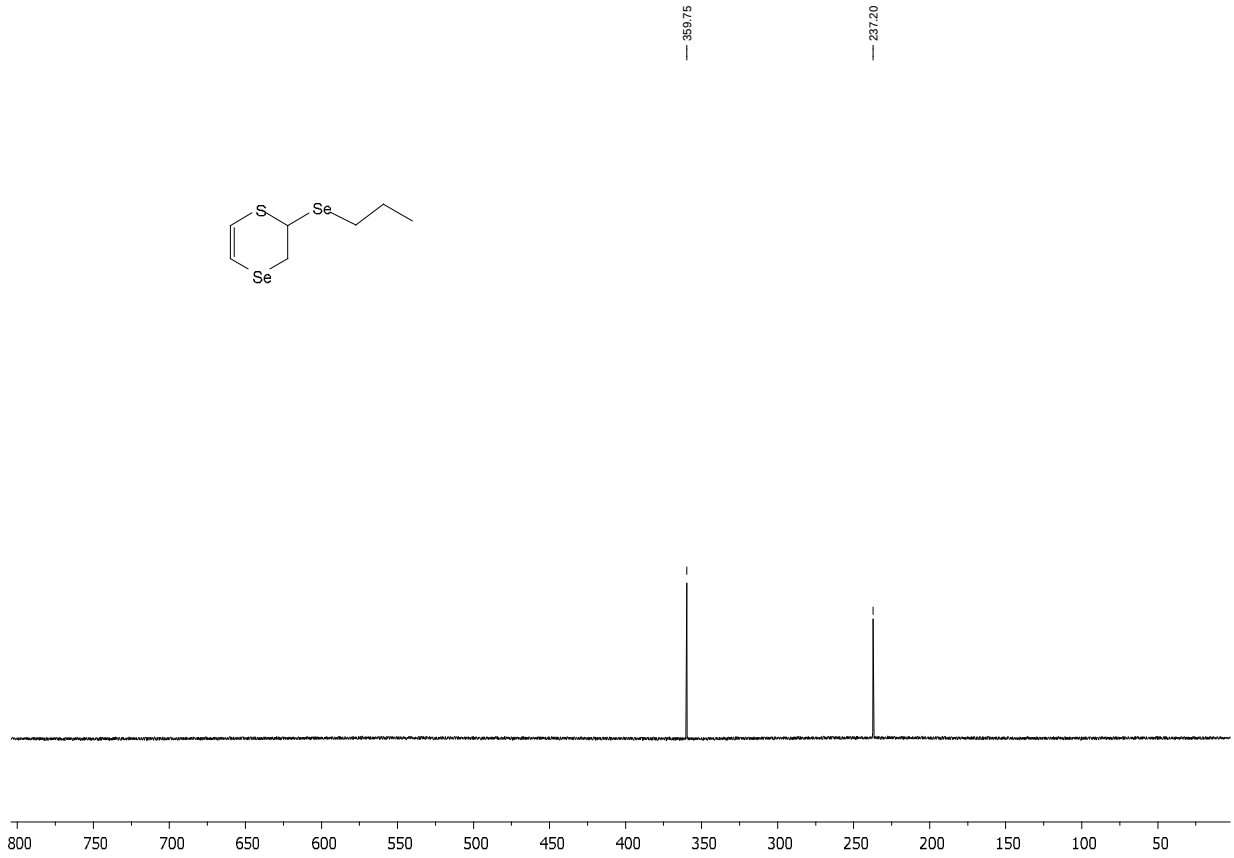
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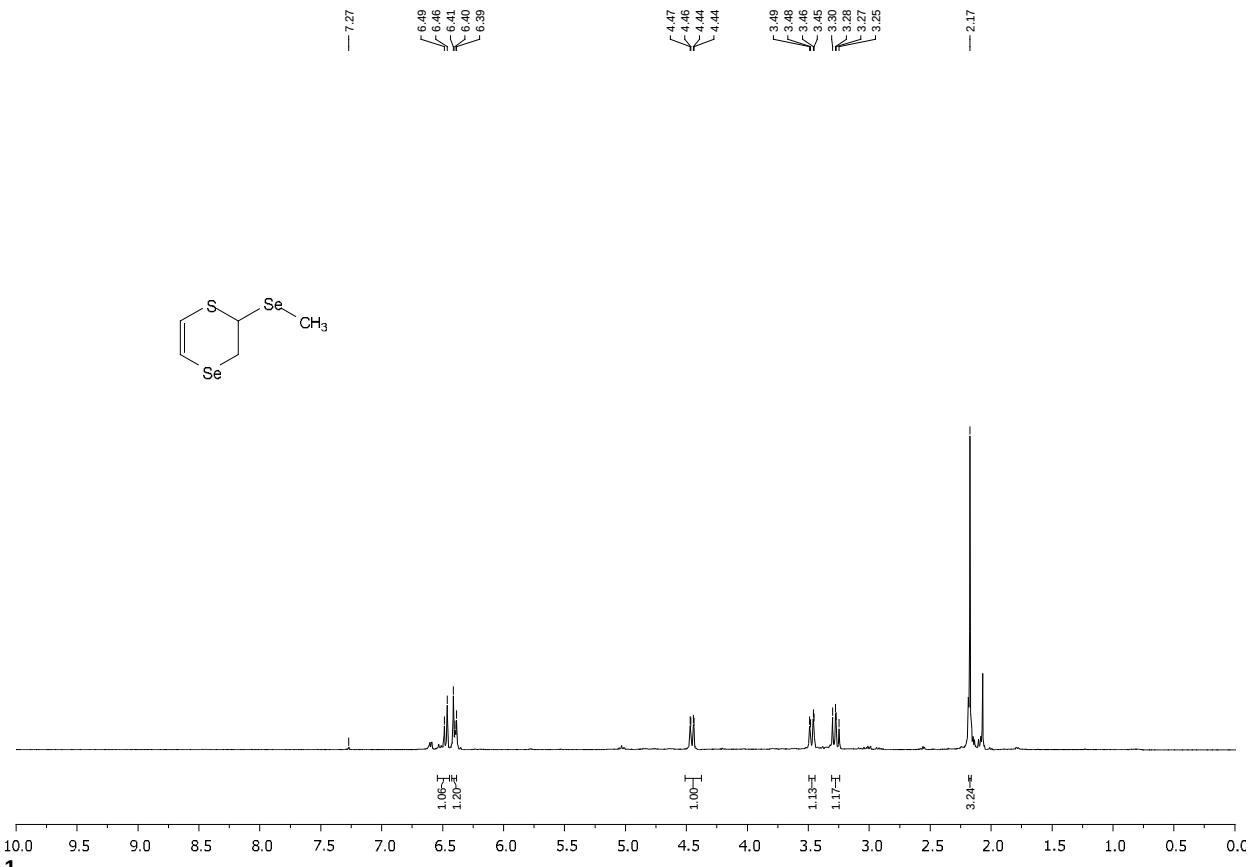
^{1}H NMR spectrum of 2-(propylselanyl)-2,3-dihydro-1,4-thiaselenine (14)



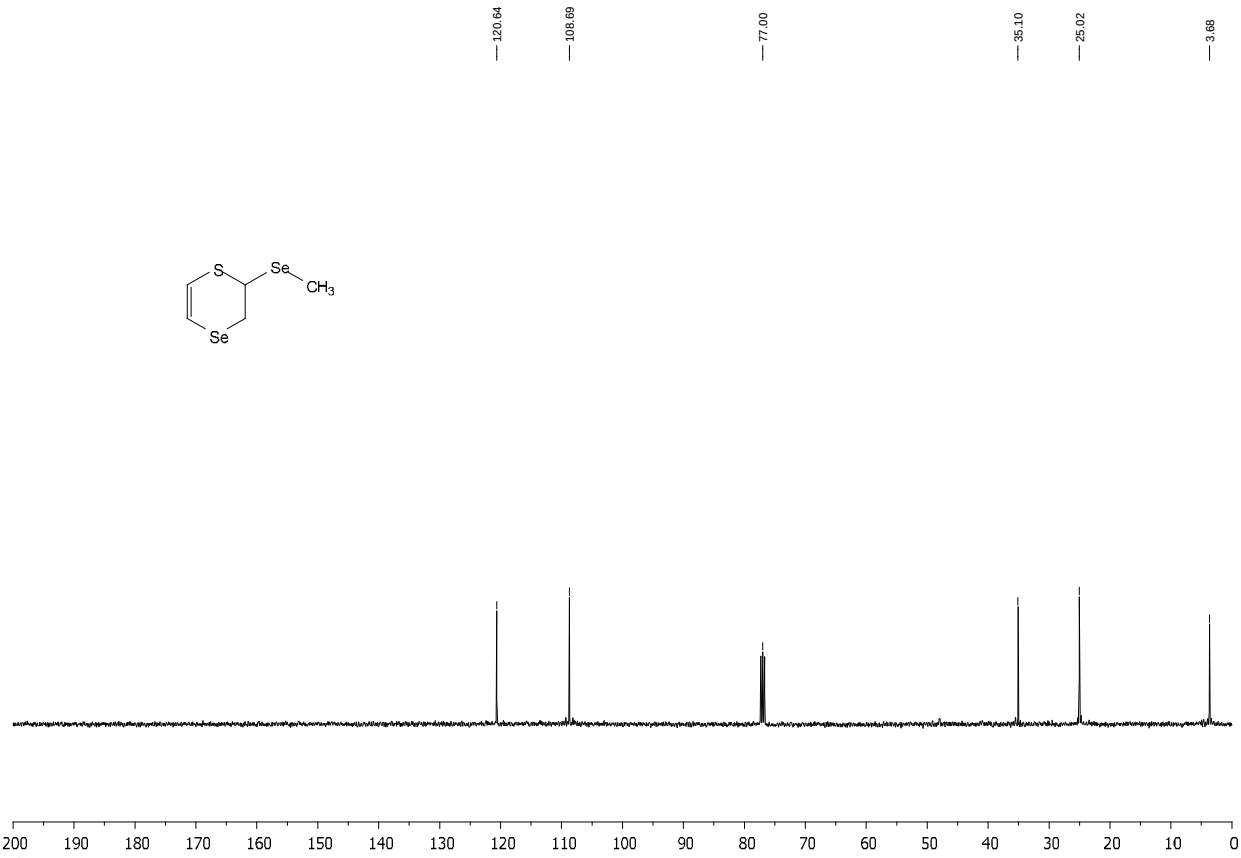
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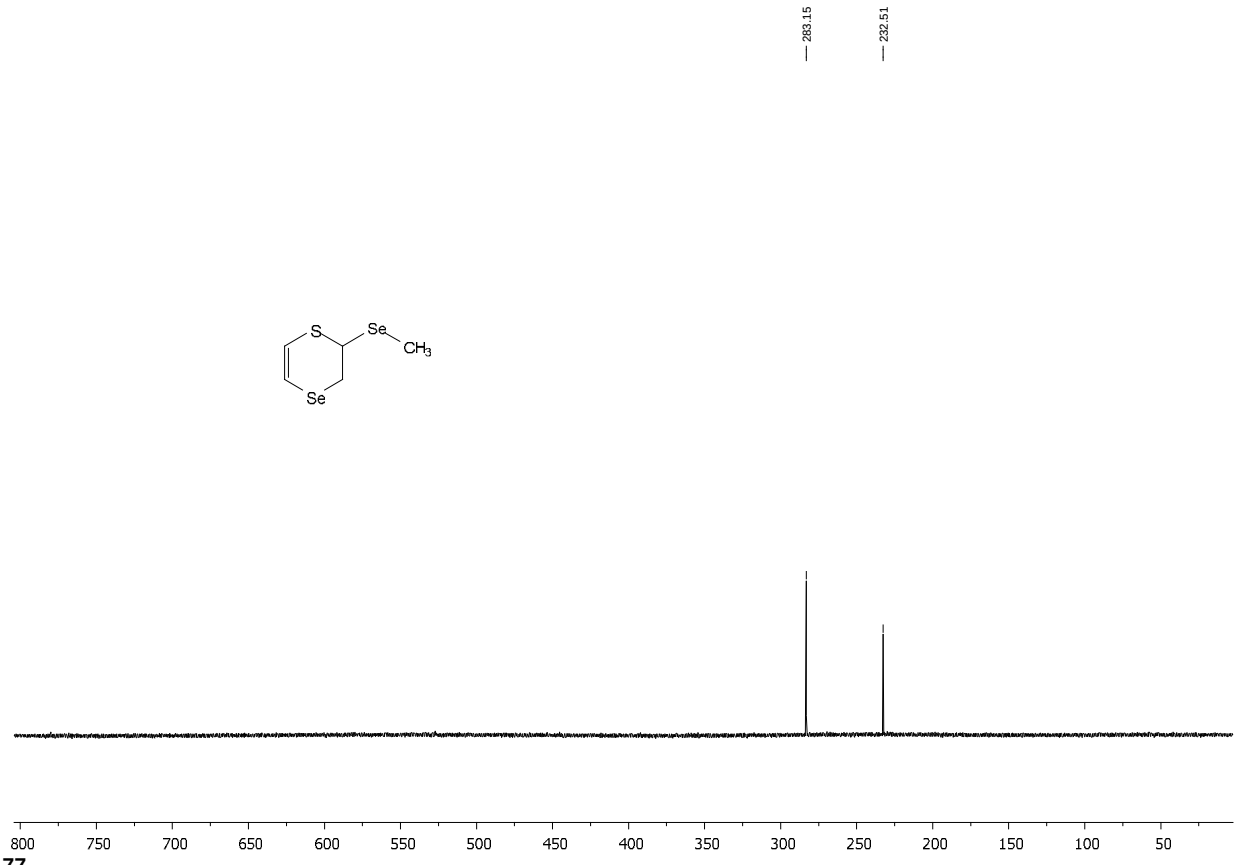
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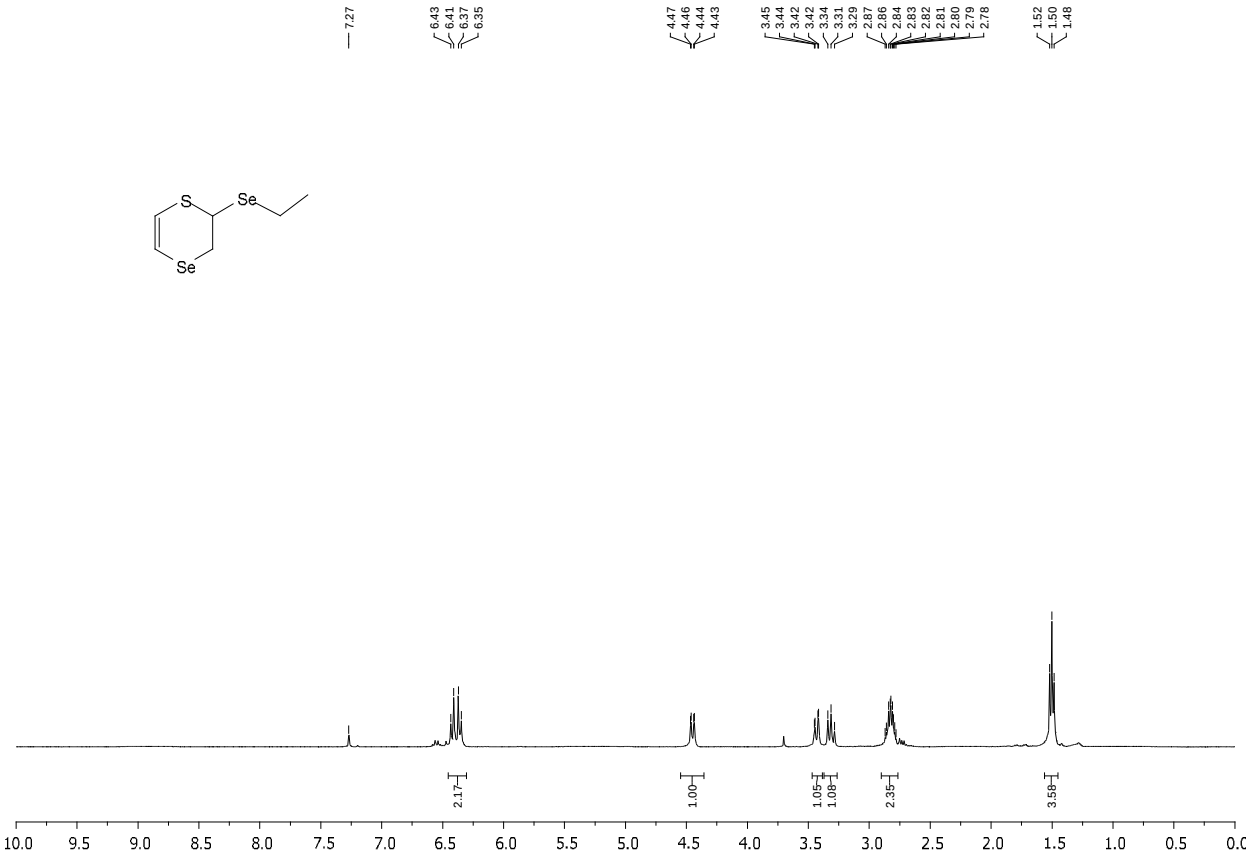
^{1}H NMR spectrum of 2-(methylselanyl)-2,3-dihydro-1,4-thiaselenine (15)



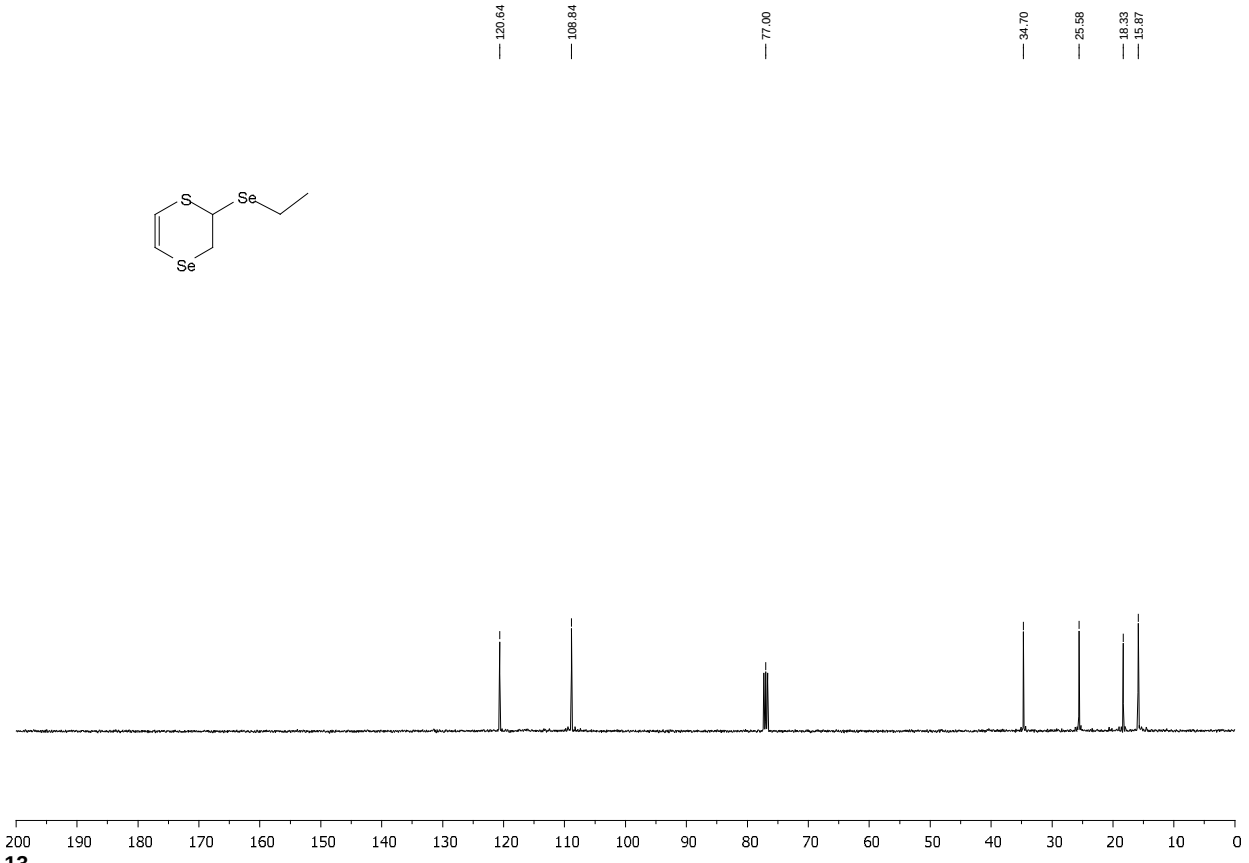
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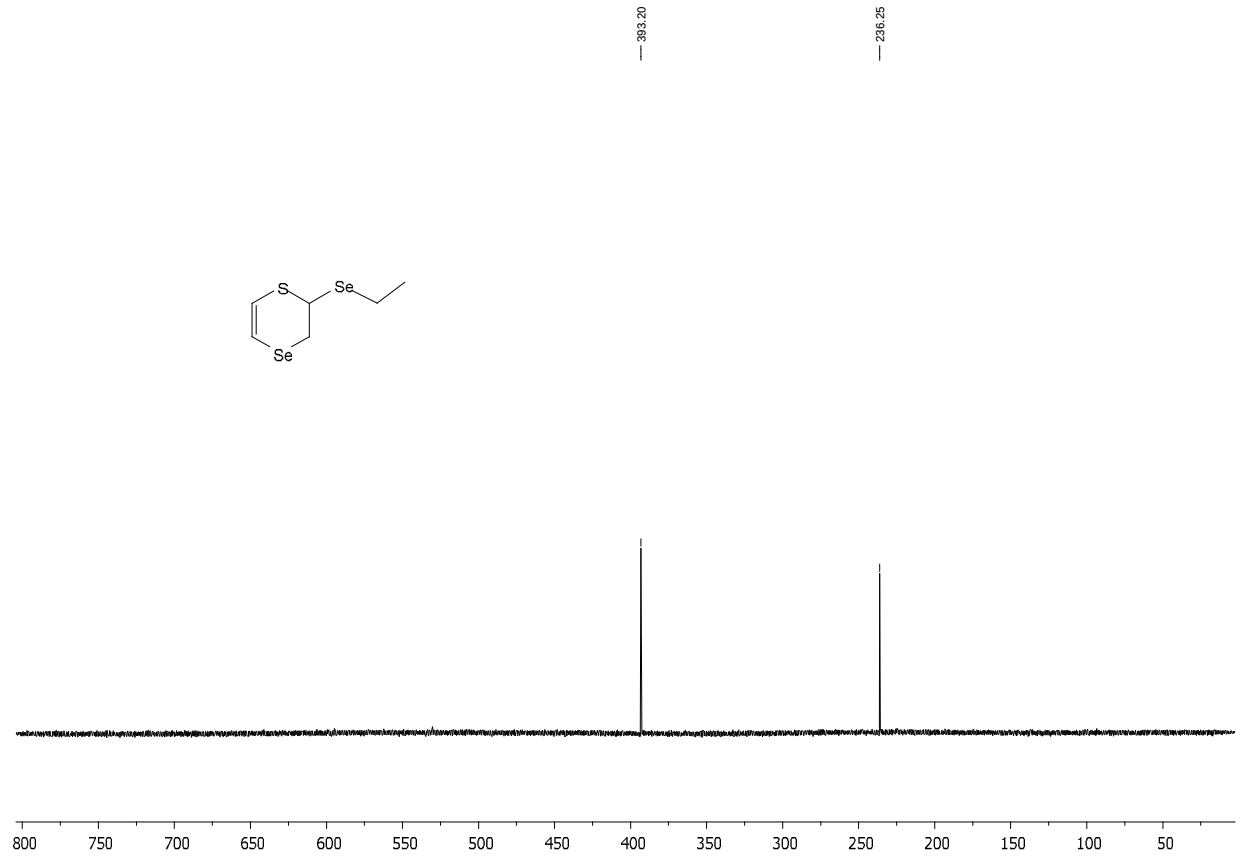
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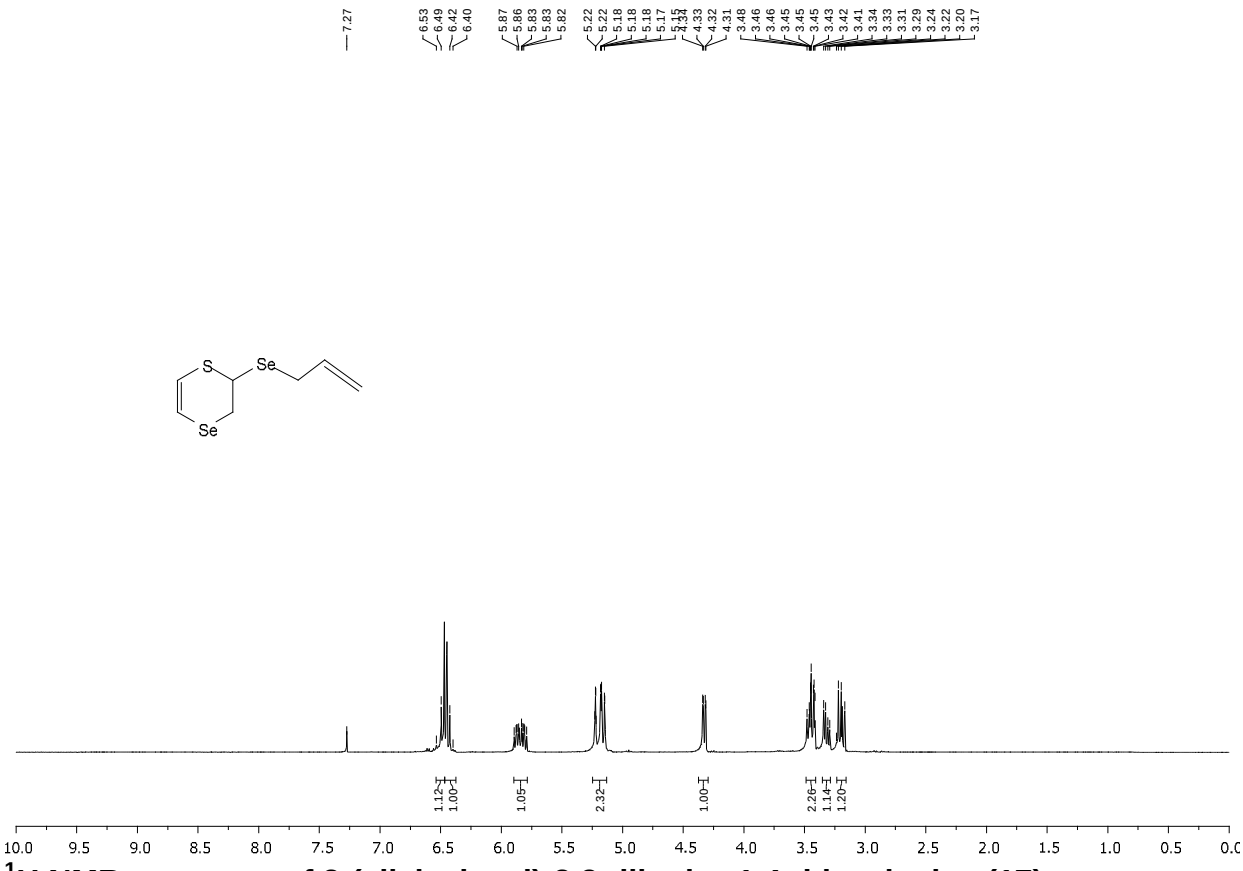
^{1}H NMR spectrum of 2-(ethylselanyl)-2,3-dihydro-1,4-thiaselenine (16)



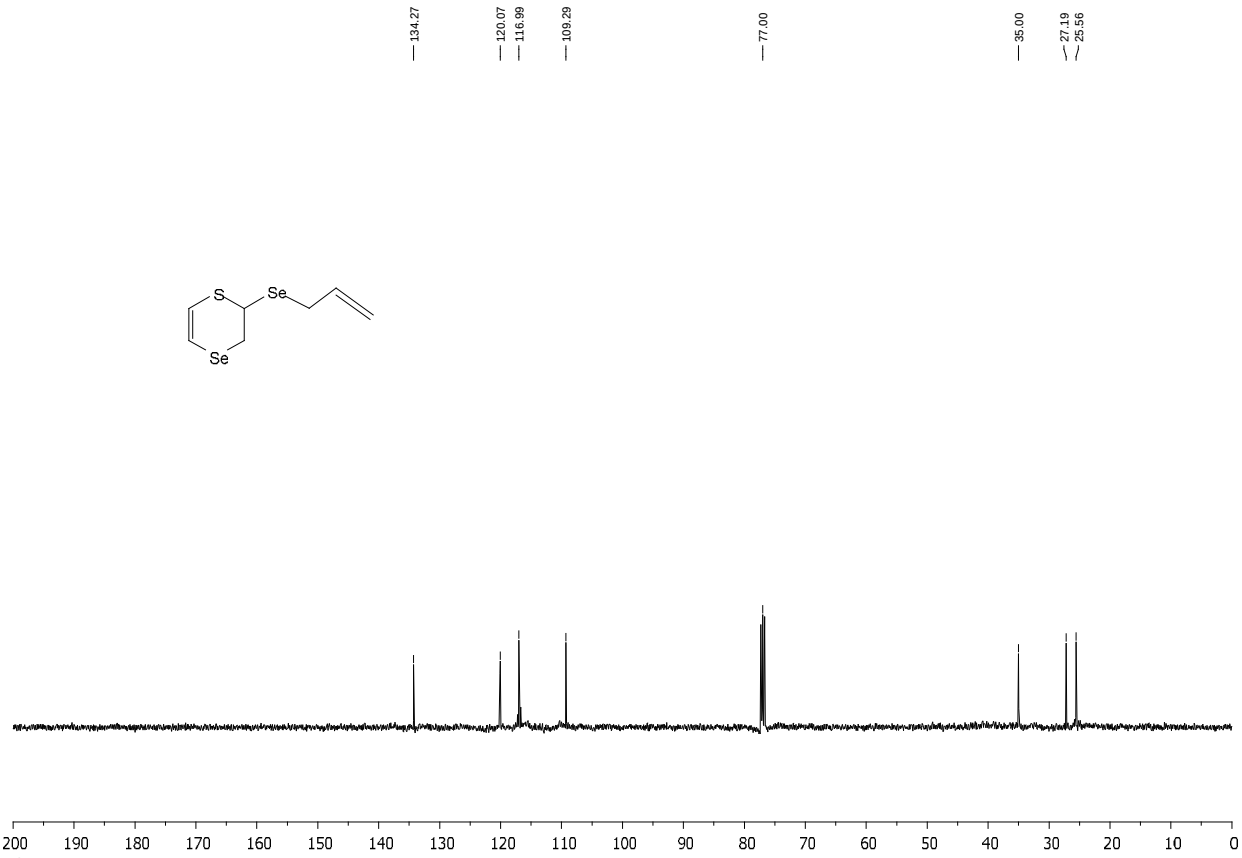
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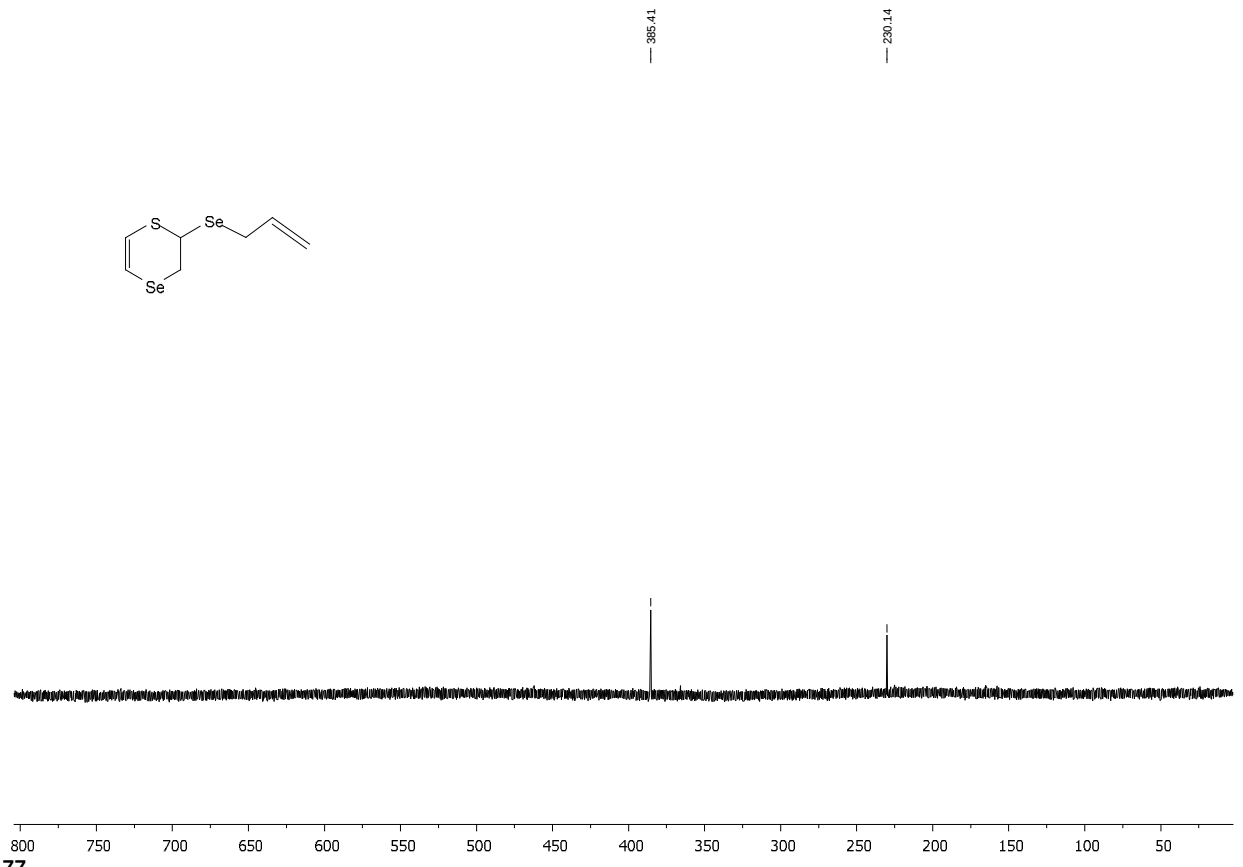
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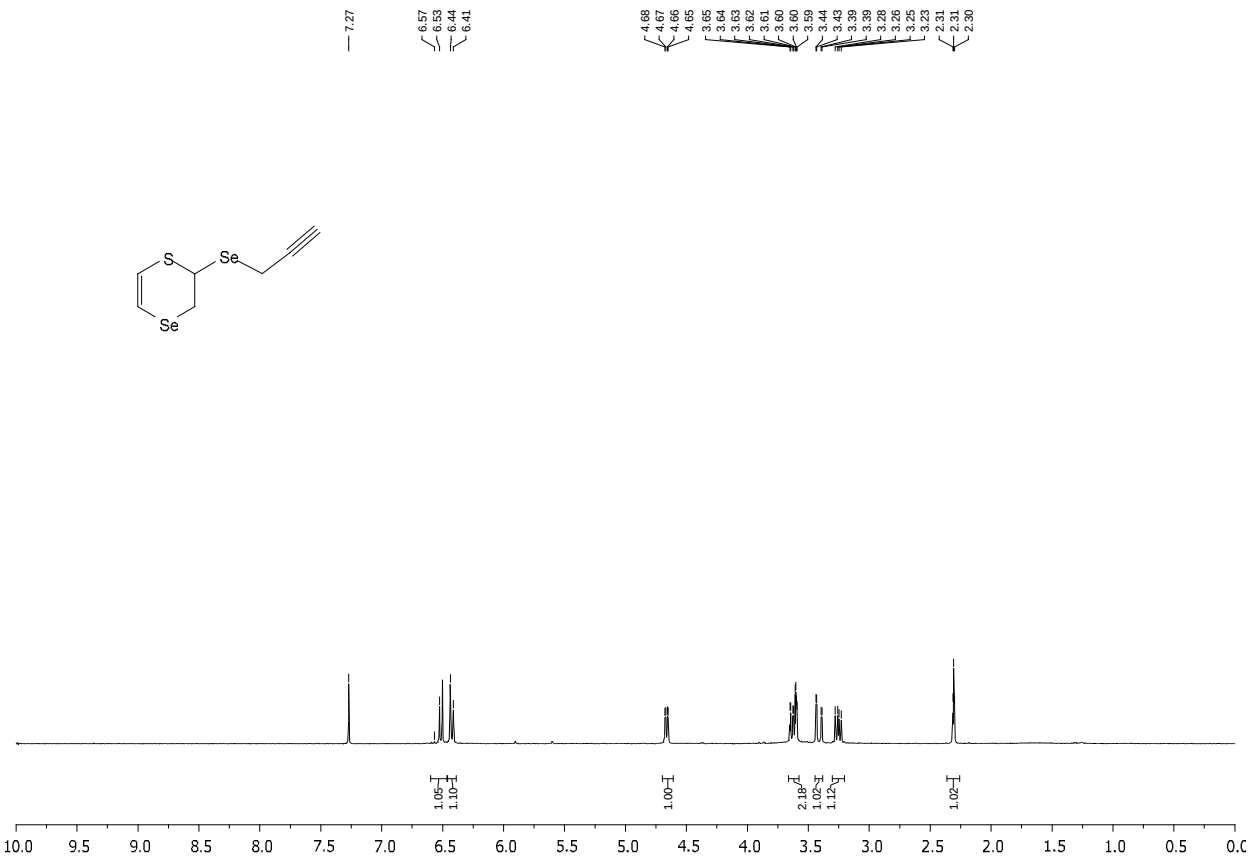
^{1}H NMR spectrum of 2-(allylselanyl)-2,3-dihydro-1,4-thiaselenine (17)



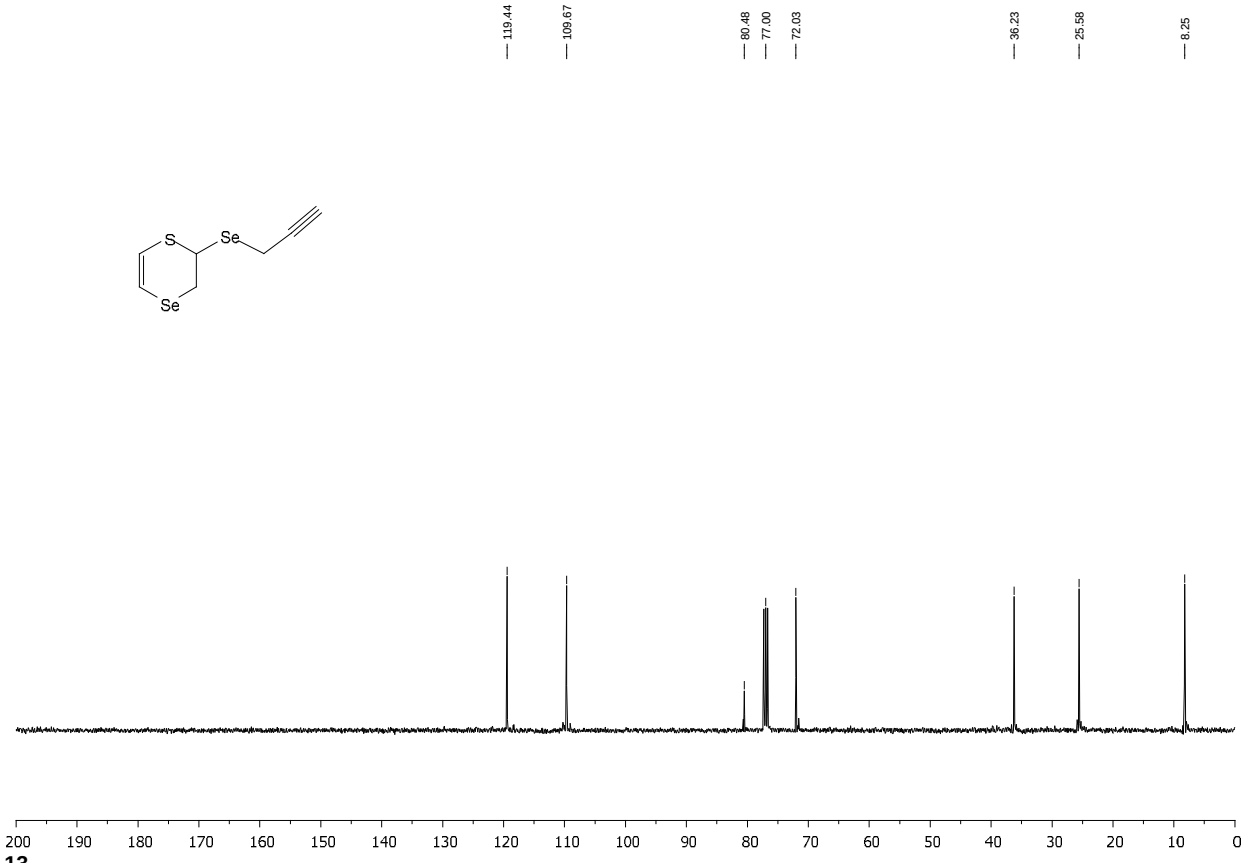
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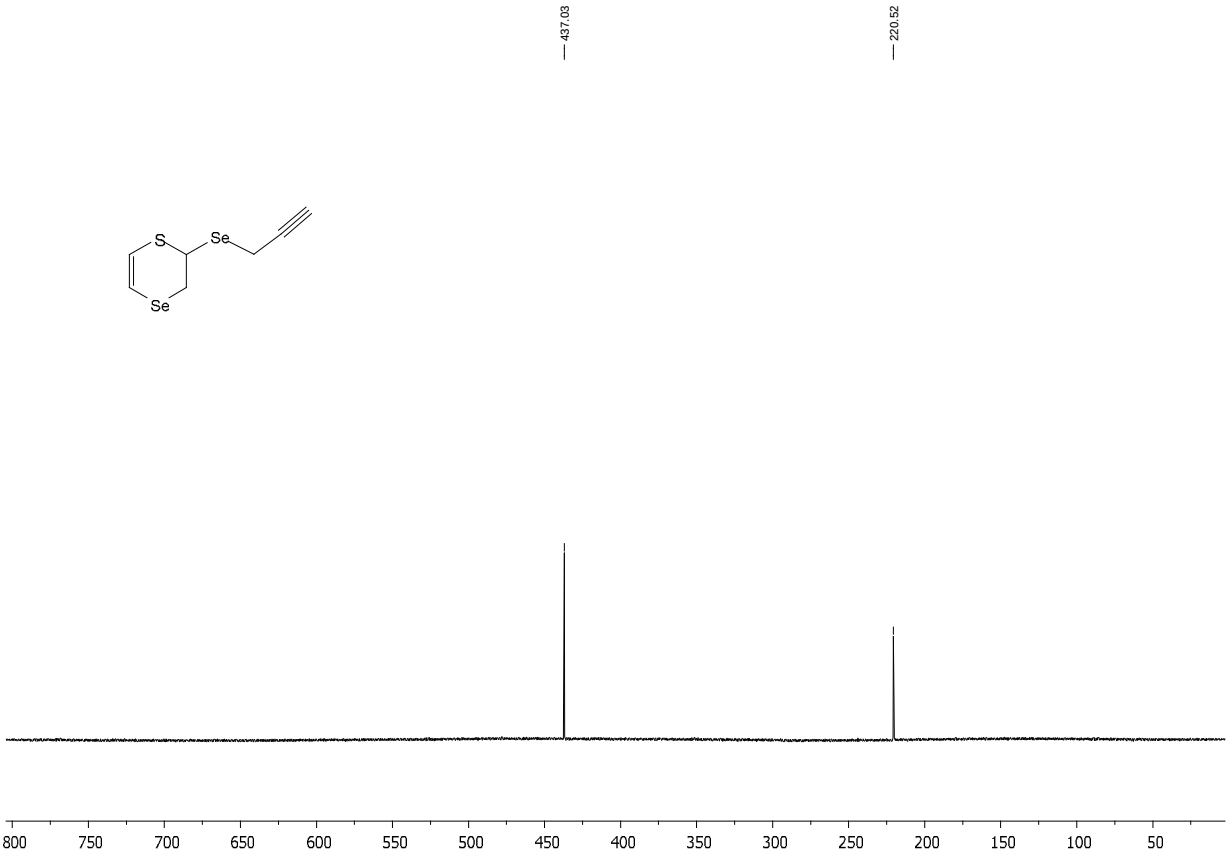
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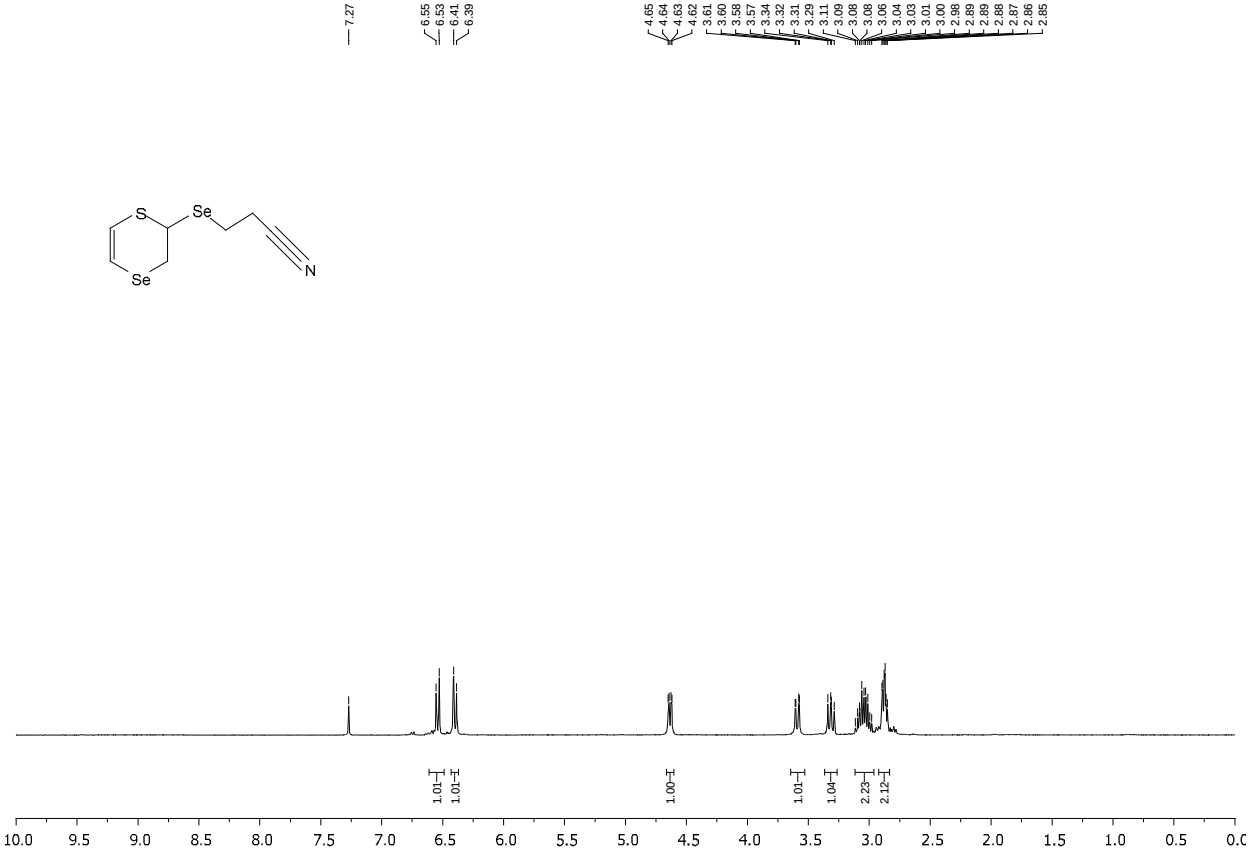
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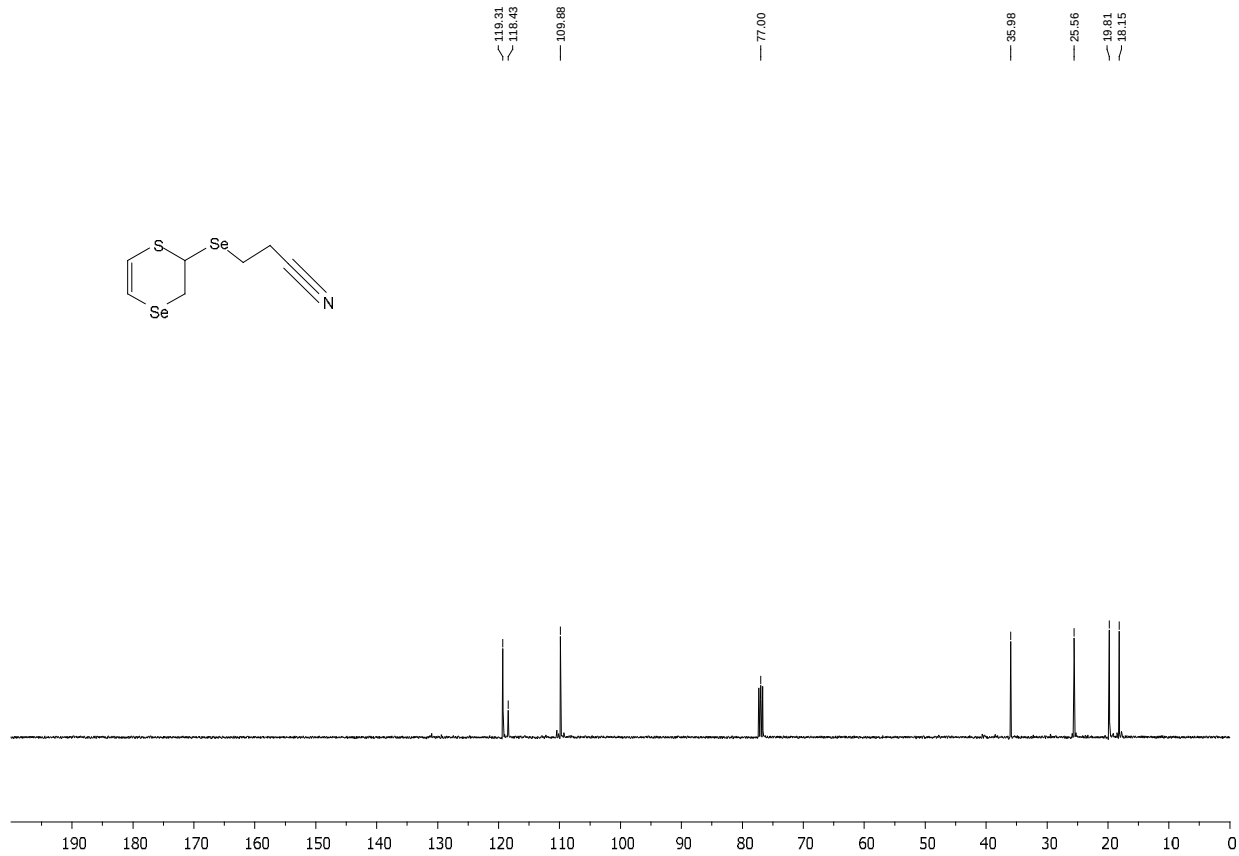
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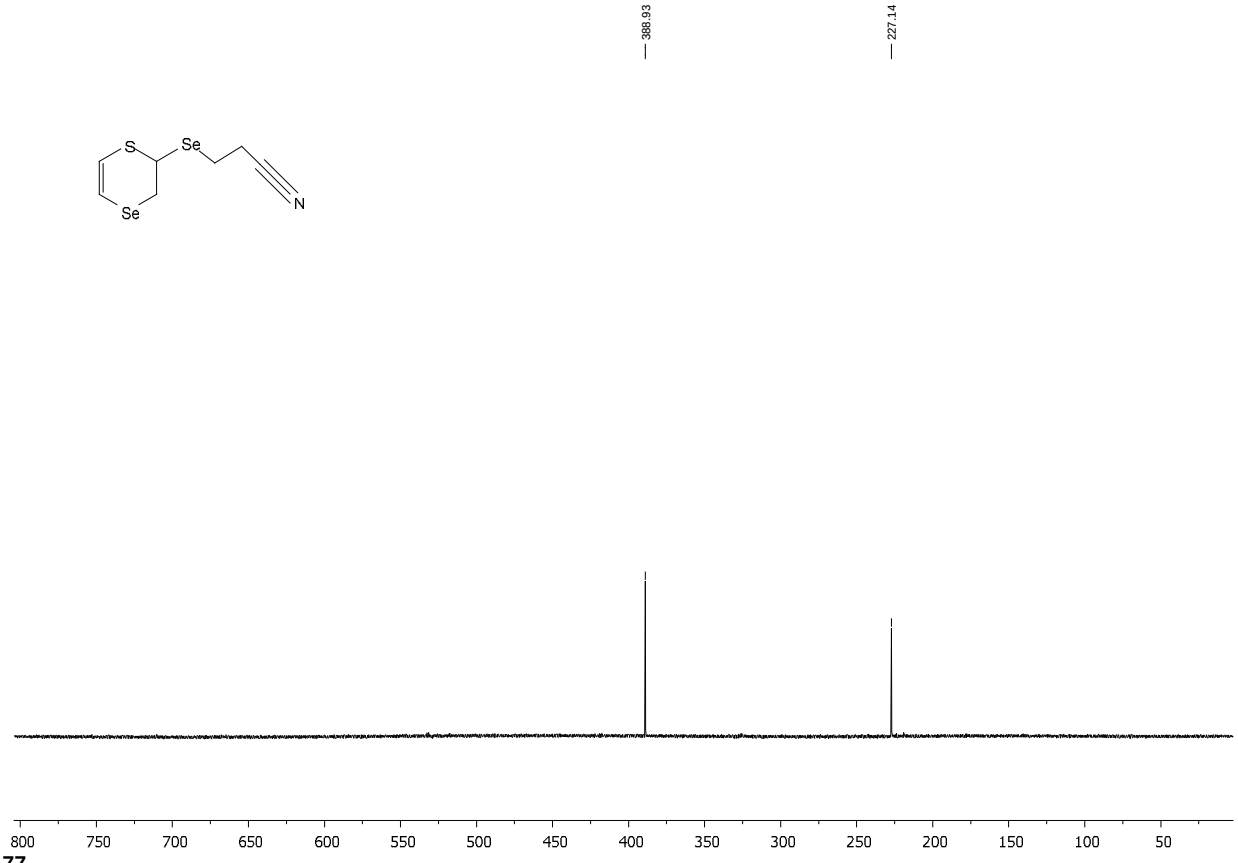
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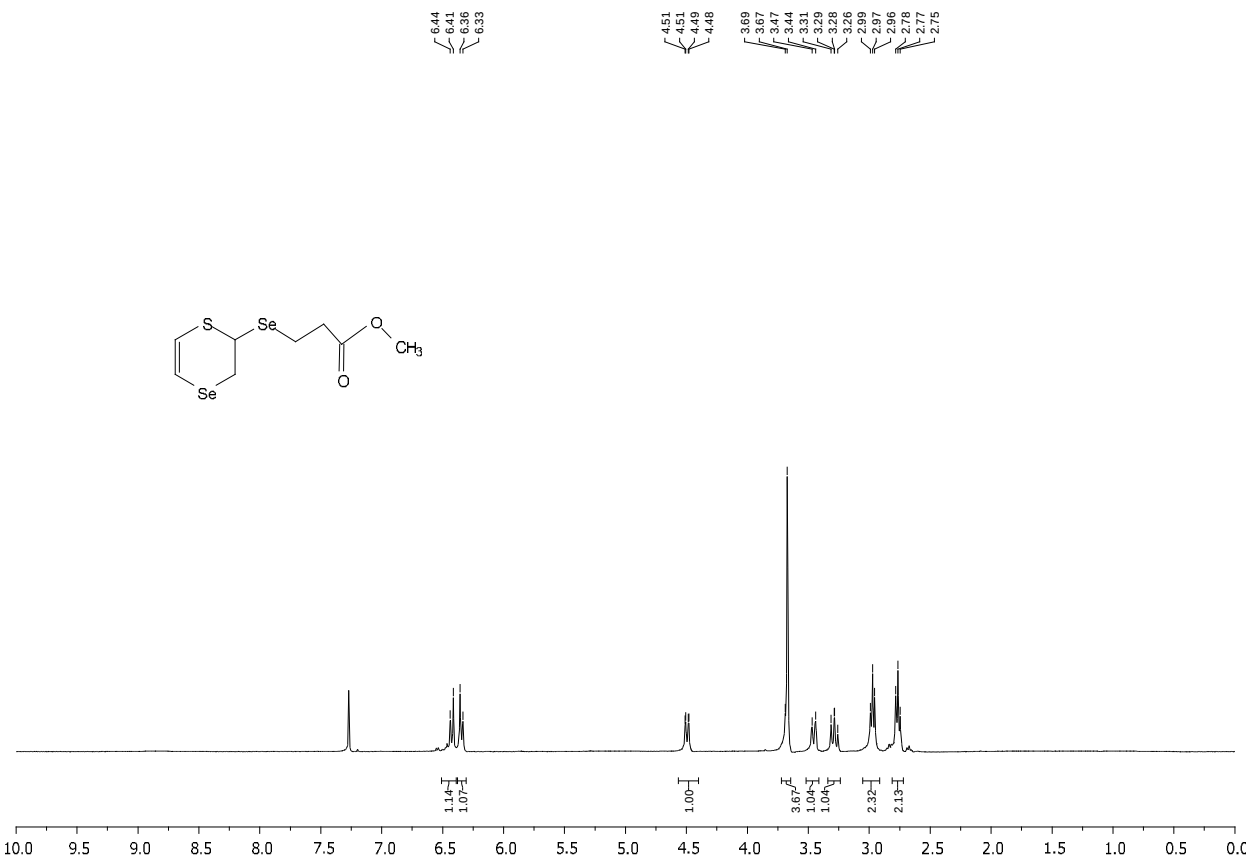
^{1}H NMR spectrum of 3-(2,3-Dihydro-1,4-thiaselenin-2-ylselanyl)propanenitrile (19)



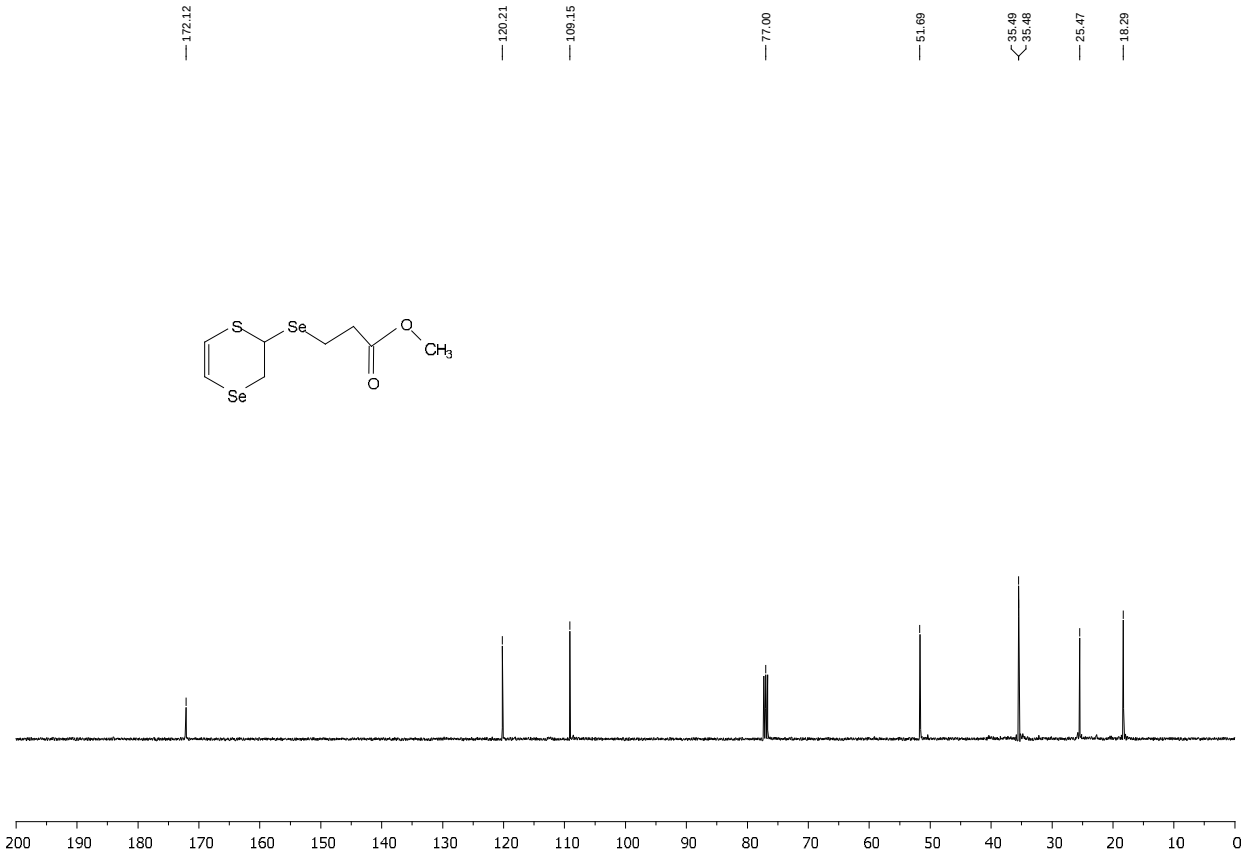
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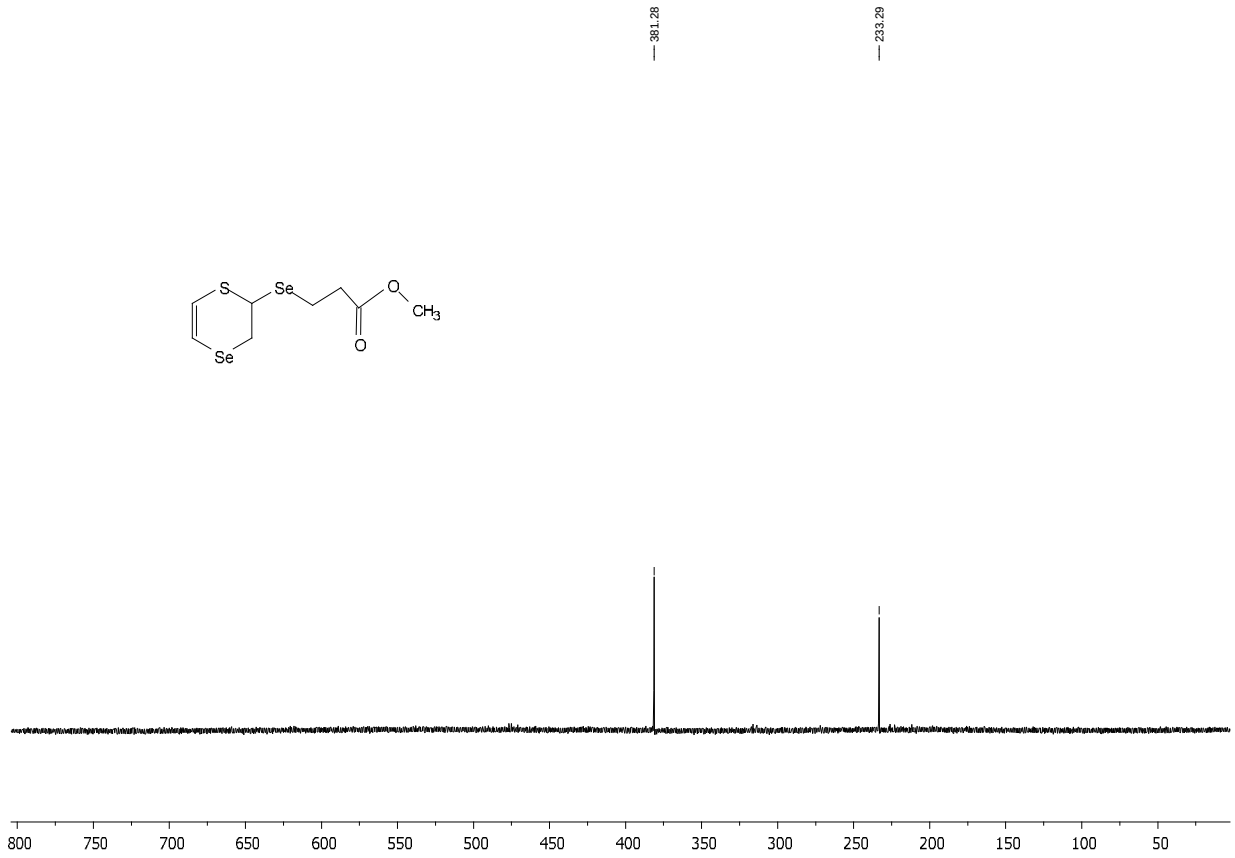
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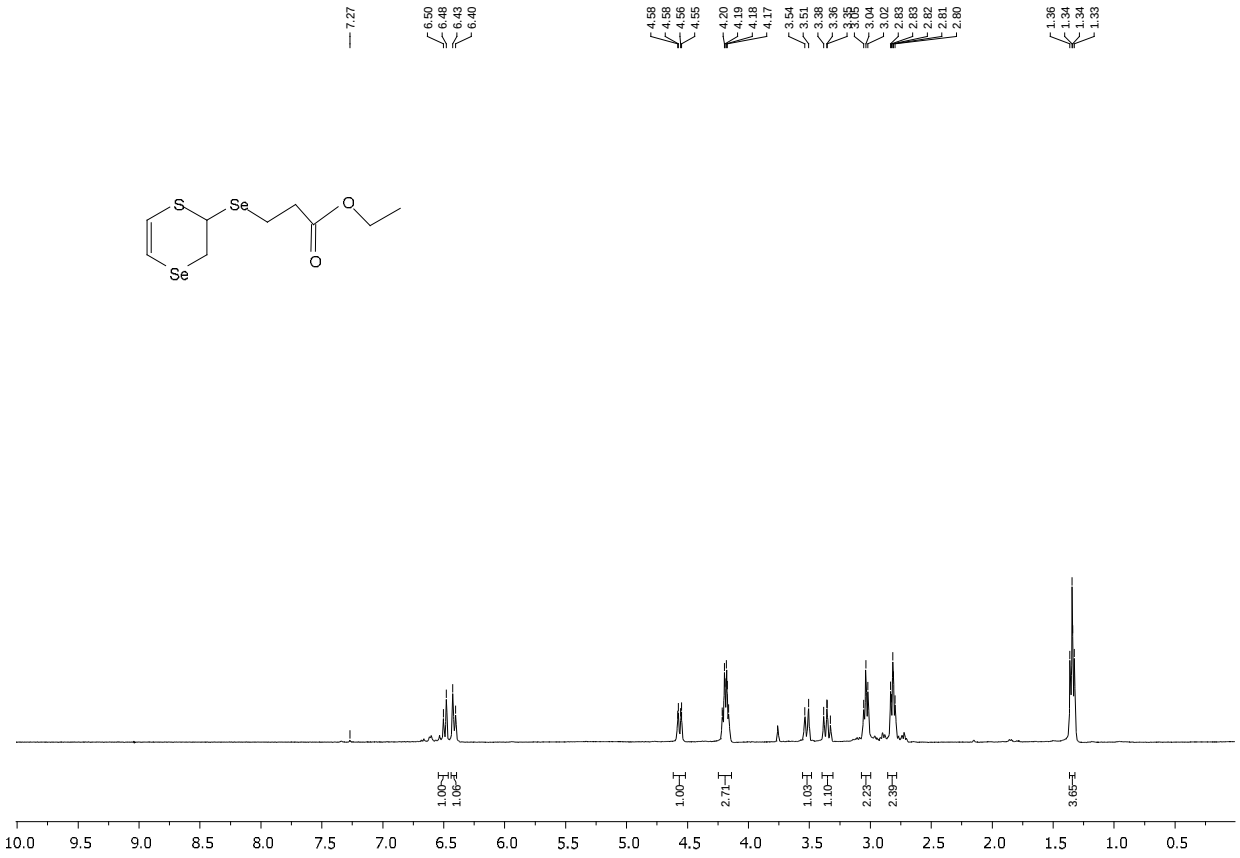
^{1}H NMR spectrum of methyl 3-(2,3-dihydro-1,4-thiaselenin-2-ylselanyl)propanoate (20)



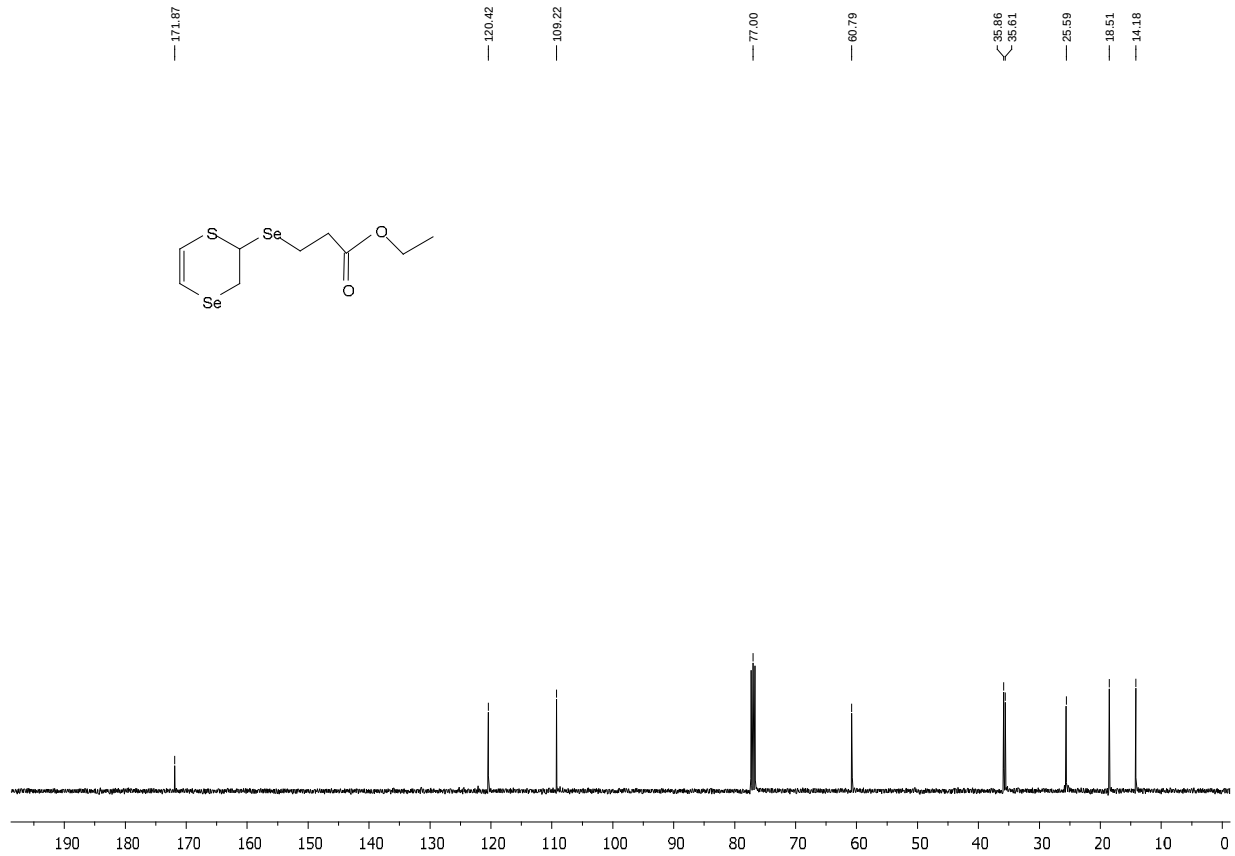
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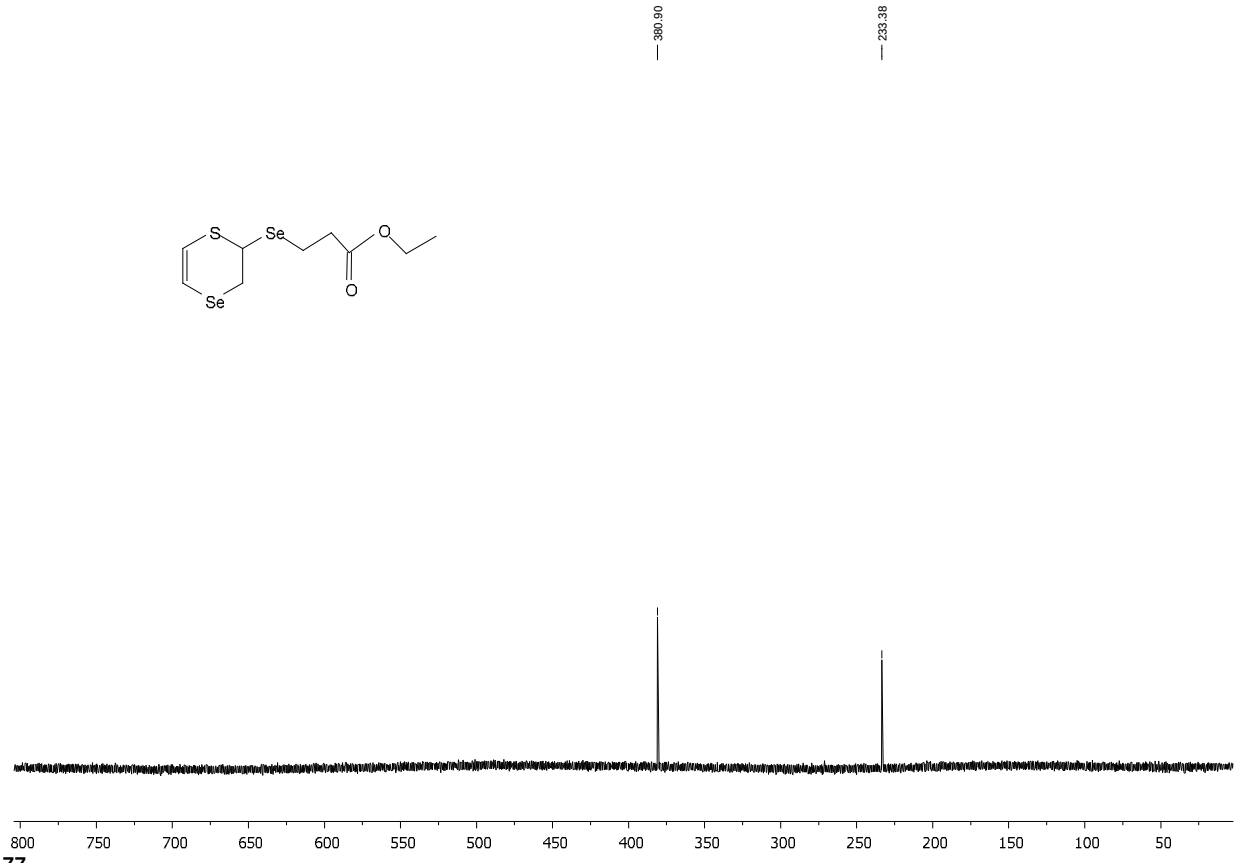
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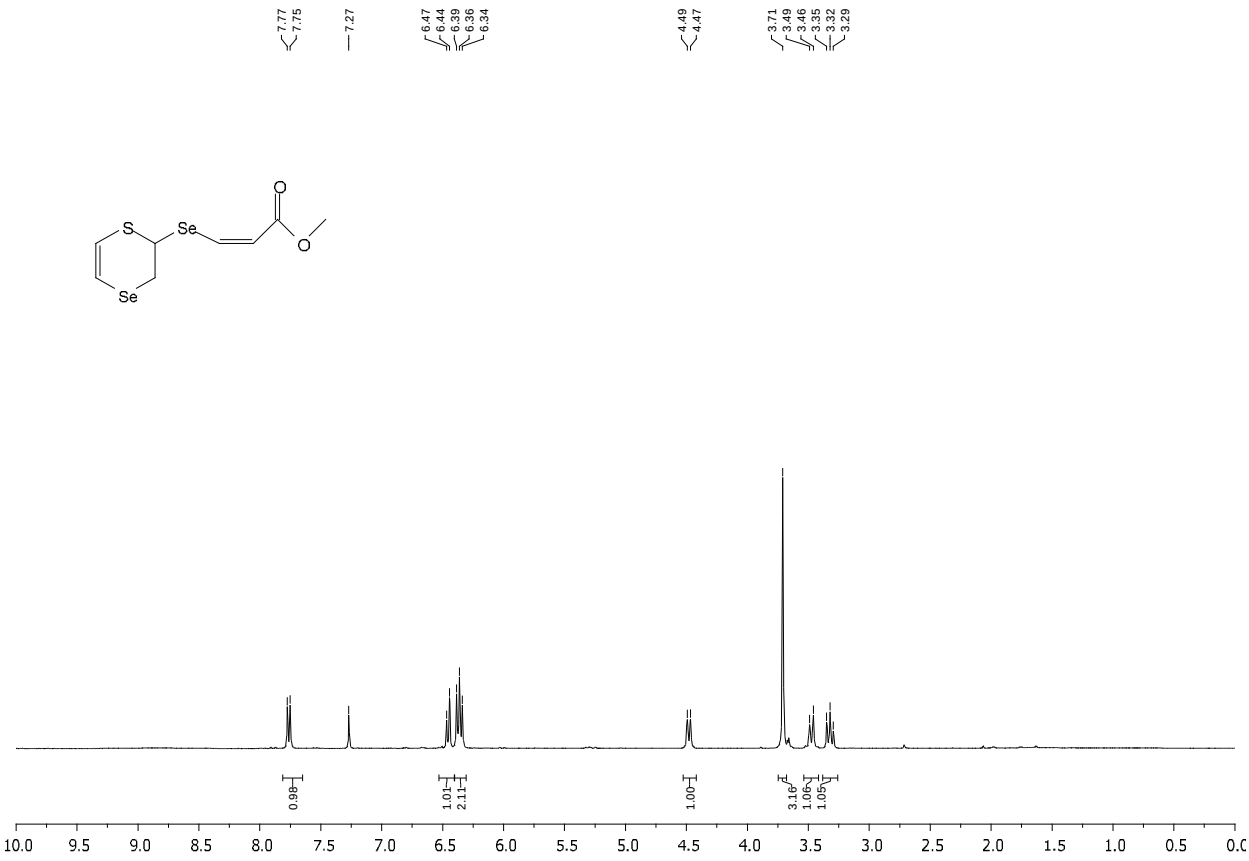
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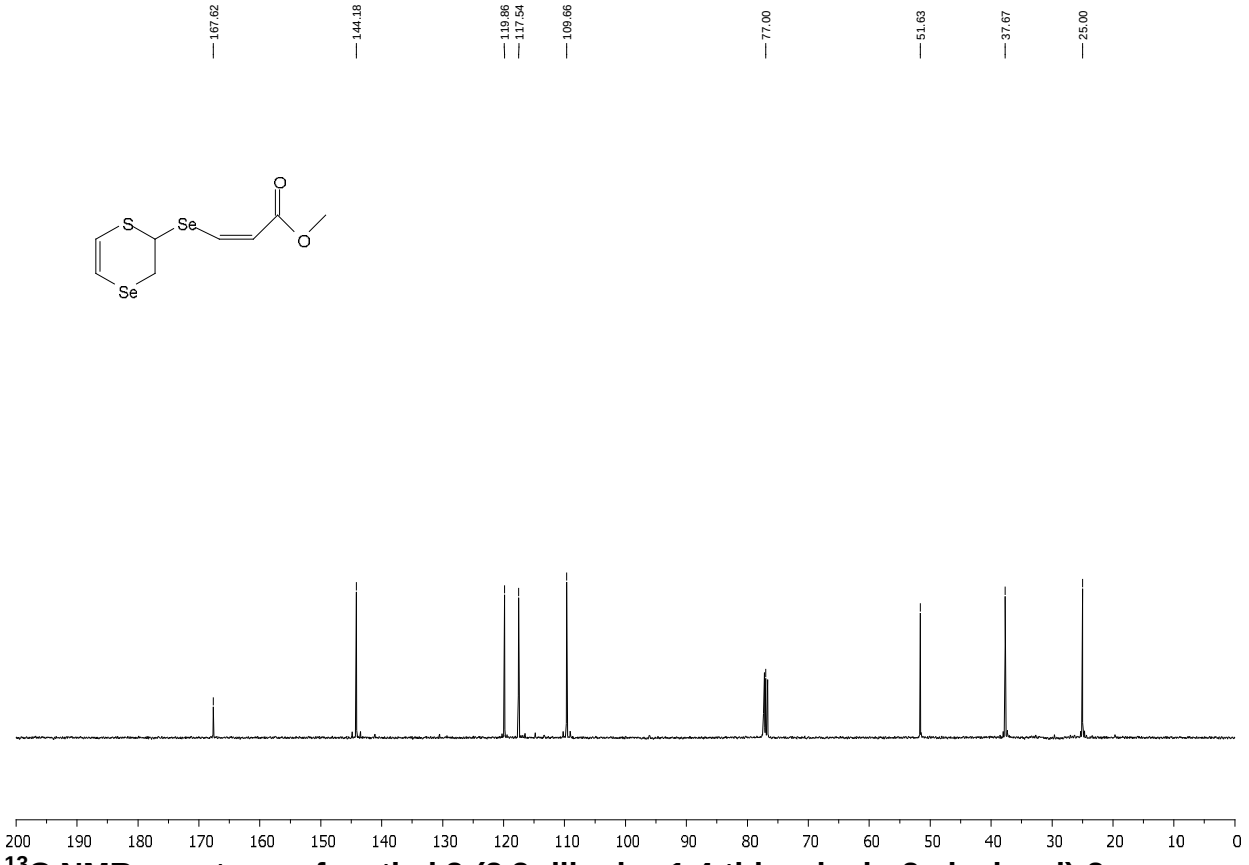
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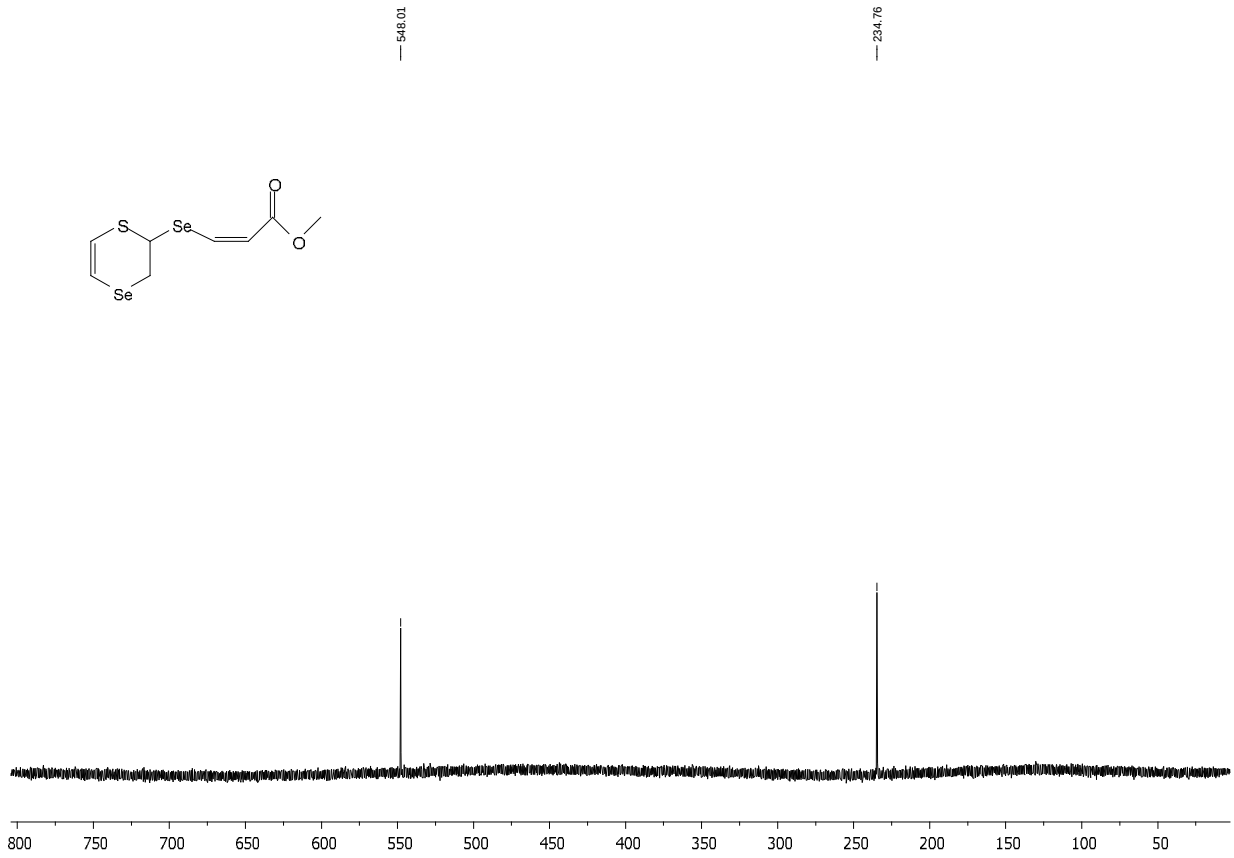
^{77}Se NMR spectrum of ethyl 3-(2,3-dihydro-1,4-thiaselenin-2-ylselanyl)propanoate (21)



^{1}H NMR spectrum of methyl 3-(2,3-dihydro-1,4-thiaselenin-2-ylselanyl)-2-propenoate (22)



^{13}C NMR spectrum of methyl 3-(2,3-dihydro-1,4-thiaselenin-2-ylselanyl)-2-propenoate (22)



^{77}Se NMR spectrum of methyl 3-(2,3-dihydro-1,4-thiaselenin-2-ylselanyl)-2-propenoate (22)