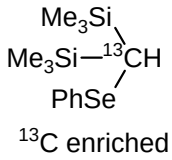
Quiz 601 ($C_{13}H_{24}SeSi_2$)

300 MHz ^{1}H NMR spectrum in $CDCl_3$

Sample is 100% ^{13}C enriched at C-H carbon

Source: Bill Sikorski / Reich 33-11

Identify all signals, estimate coupling constants g



PLT _quiz-all-11.plt

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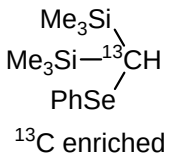


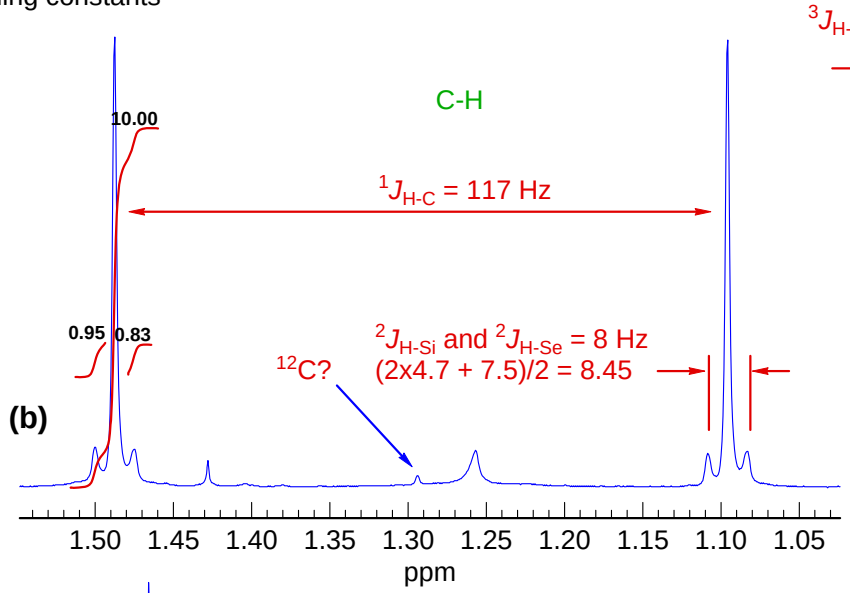
^{13}C enriched

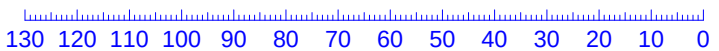
^{29}Si *I* = 1/2, 4.7%, 19.87 MHz

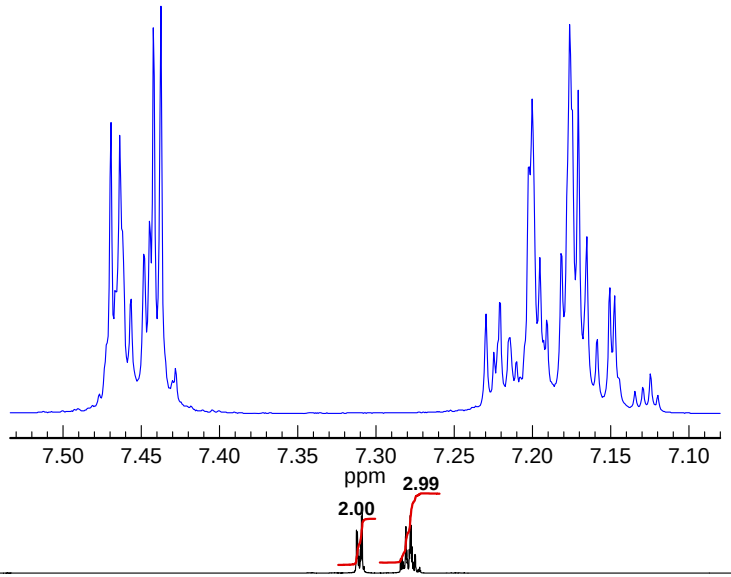
^{77}Se *I* = 1/2, 7.5%, 19.07 MHz

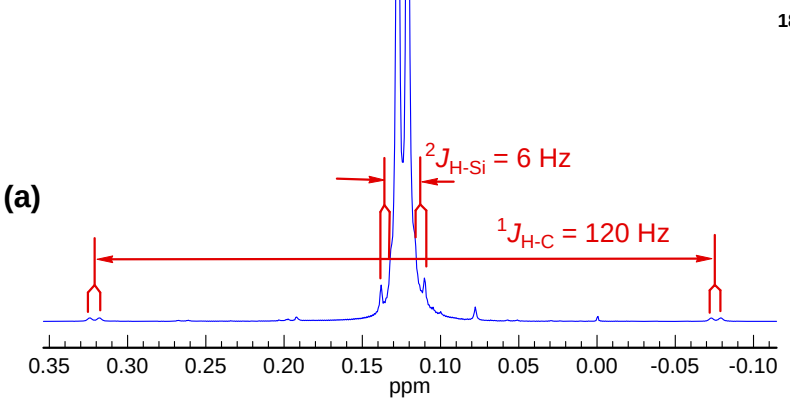
^{13}C *I* = 1/2, 1.1%, 25.14 MHz

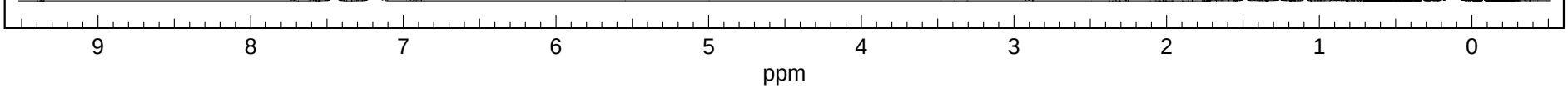
(^{1}H = 100 MHz)











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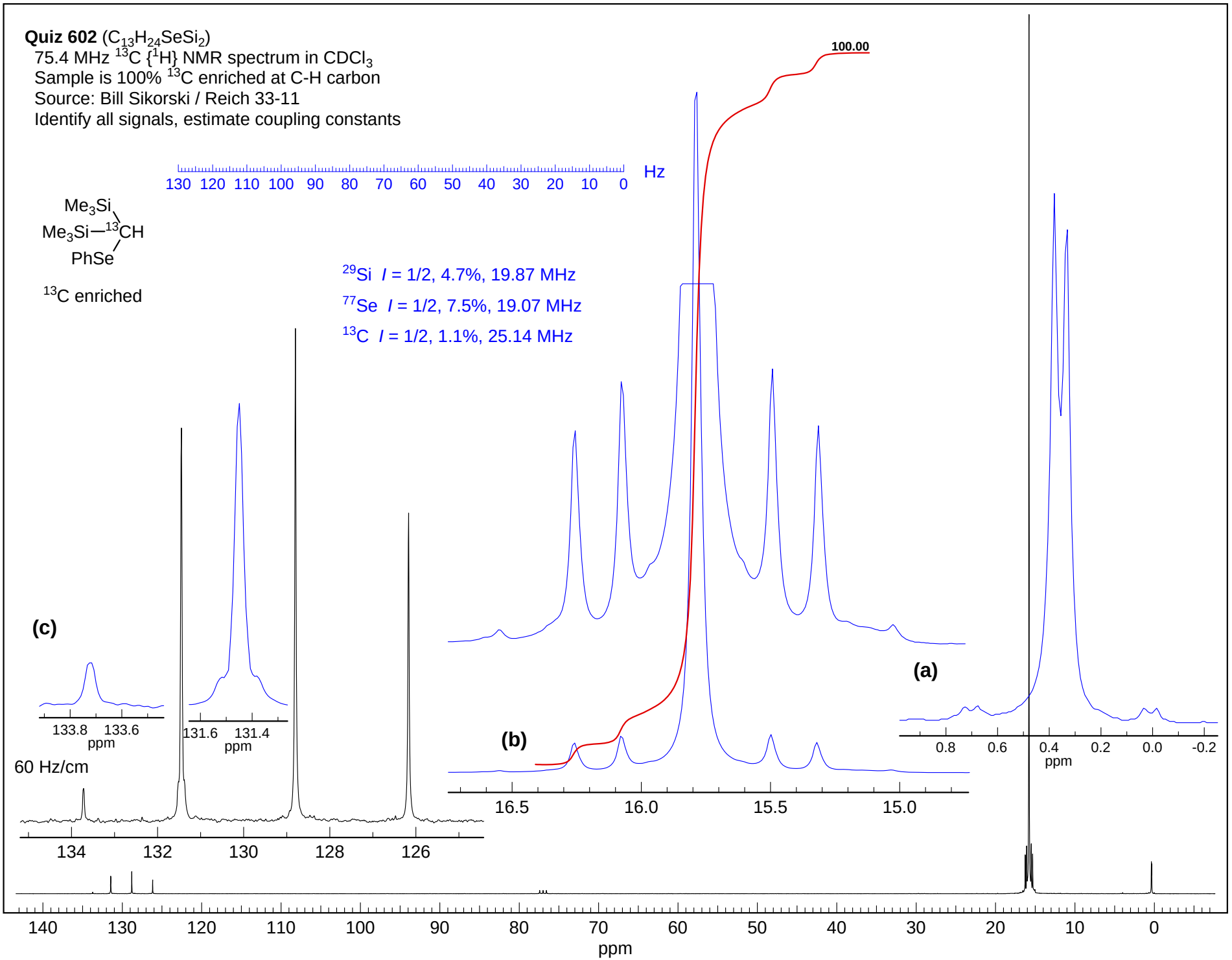


PLT _quiz-all-11.plt

Quiz 602 ($C_{13}H_{24}SeSi_2$)

75.4 MHz ^{13}C {^1H} NMR spectrum in $CDCl_3$

Sample is 100% ^{13}C enriched at C-H carbon

Source: Bill Sikorski / Reich 33-11

Identify all signals, estimate coupling constants

^{29}Si I = 1/2, 4.7%, 19.87 MHz

^{77}Se I = 1/2, 7.5%, 19.07 MHz

^{13}C I = 1/2, 1.1%, 25.14 MHz

Me_3Si
$Me_3Si—^{13}CH$
PhSe

^{13}C enriched

$^1J_{CSe}$ = 70.6 Hz

100.00

$^1J_{CSi}$ = 43.9 Hz

$^2J_{C-C}$ = 3.8 Hz

More on next page ...

$(CH_3)_3Si$

C-H

$^1J_{C-Si}$ = 52.1 Hz

$^2J_{C-Se}$ = 10 Hz

The $^2J_{C-C}$ is not resolved, the $^1J_{C-Se}$ satellites are to small to detect

(a)

(b)

(c)

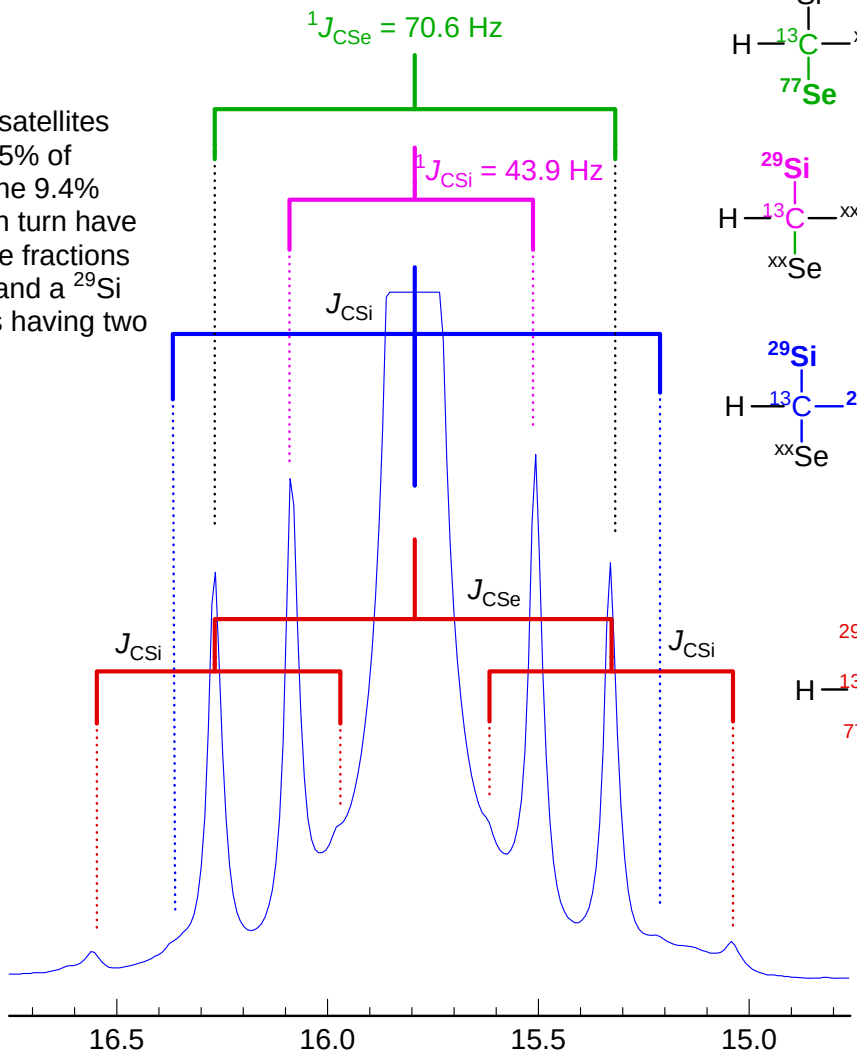
60 Hz/cm

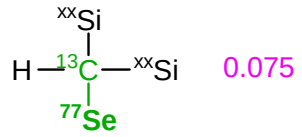
ppm

PLT _quiz-all-11.plt

Quiz 602 ($C_{13}H_{24}SeSi_2$)
75.4 MHz ^{13}C {^{1}H} NMR spectrum in $CDCl_3$
Sample is 100% ^{13}C enriched at C-H carbon
Source: Bill Sikorski / Reich 33-11

Not only does the central peak have satellites due to coupling of the ^{13}C with the 7.5% of molecules having a ^{77}Se (green) or the 9.4% having a ^{29}Si (purple), the satellites in turn have detectable satellites due to the minute fractions of the sample that have both a ^{77}Se and a ^{29}Si in it (red), as well as those molecules having two ^{29}Si atoms (blue), as shown

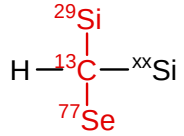




0.075

0.094 (2×0.047)

(0.094)(0.047) = 0.44%



(0.075)(0.094) = 0.71%

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