5 Other Spin-½ Nuclei
5.1 ^{15}N

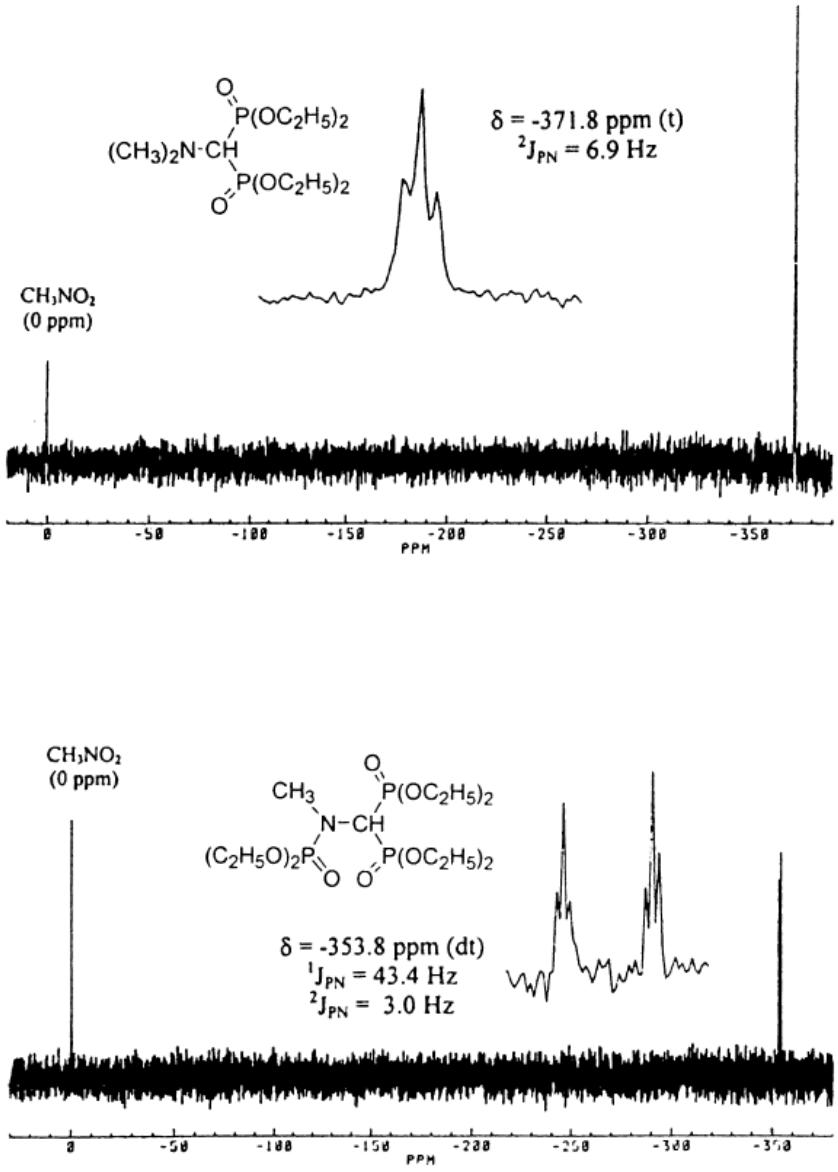


Fig. 37 Nitrogen-15 spectra of two aminophosphonates (structures as shown). 10-mm NMR tube, concentration 25% in $CDCl_3$, proton decoupling, relaxation delay 15 sec, measurement time 12 hours

5.2 ^{19}F

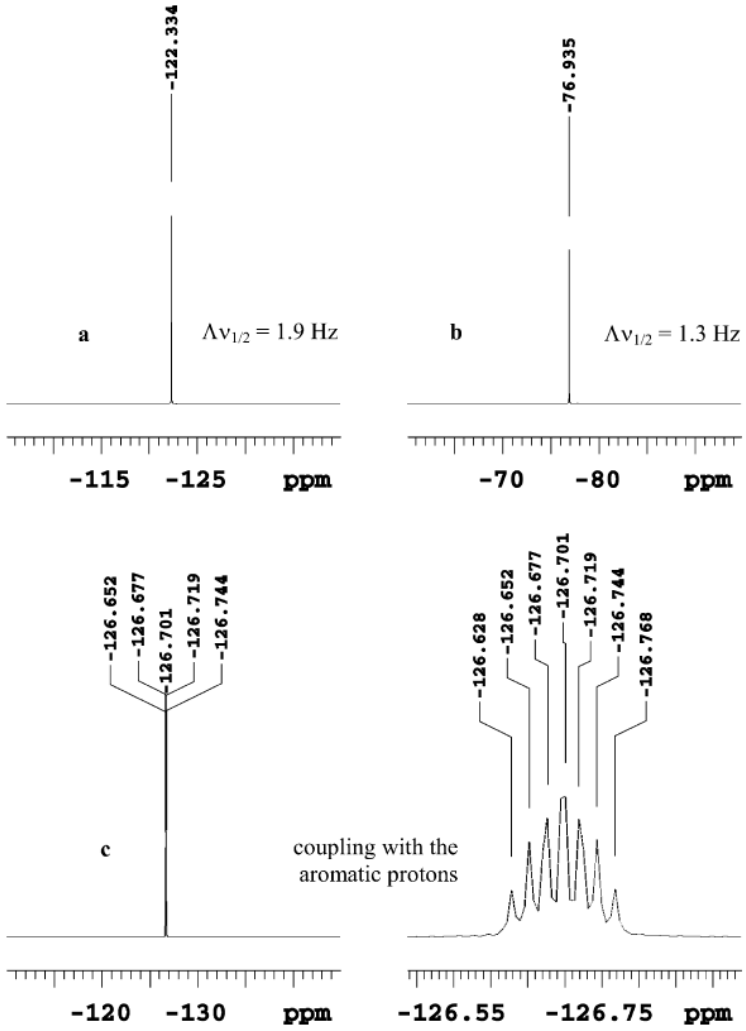


Fig. 38a–c Fluorine-19 spectra: a potassium fluoride in D_2O; b trifluoroacetic acid; and c p-fluorophenol in $CDCl_3$ (with expansion)

5.3 ^{29}Si

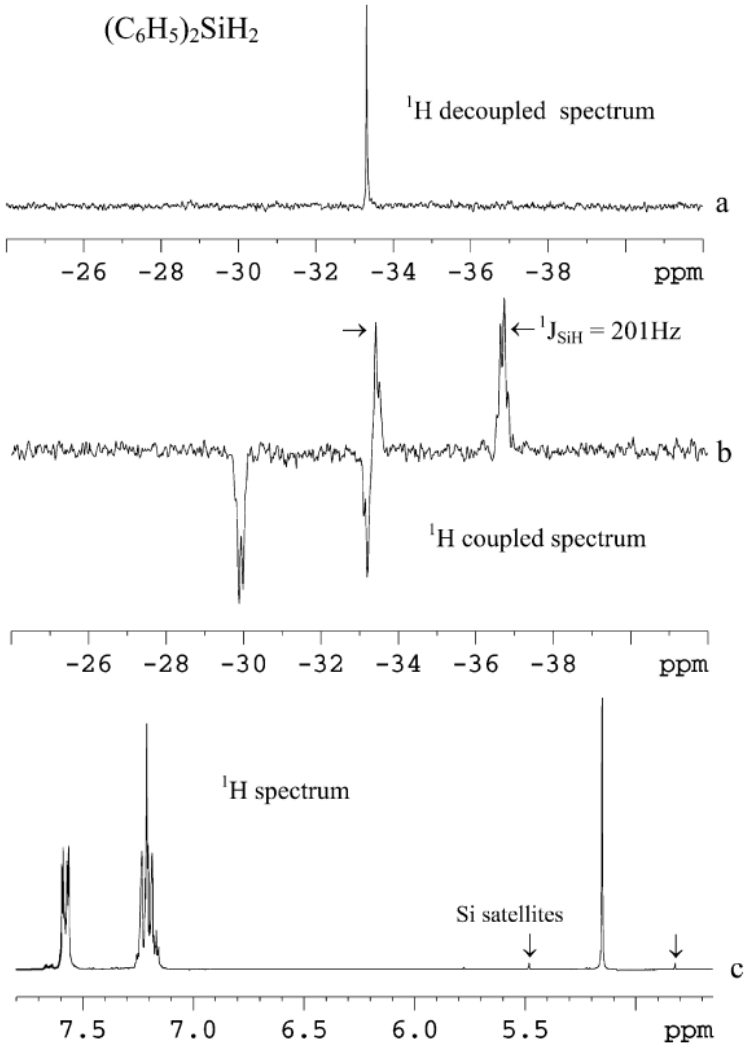


Fig. 39a–c Silicon-29 and proton spectra of diphenylsilane in C_6D_6. a INEPT spectrum with complete proton decoupling, b proton-coupled INEPT spectrum ($^1J_{SiH}$ 201 Hz); the fine structure is due to coupling with thearomatic protons, c proton spectrum showing ^{29}Si satellites for the SiH protons)

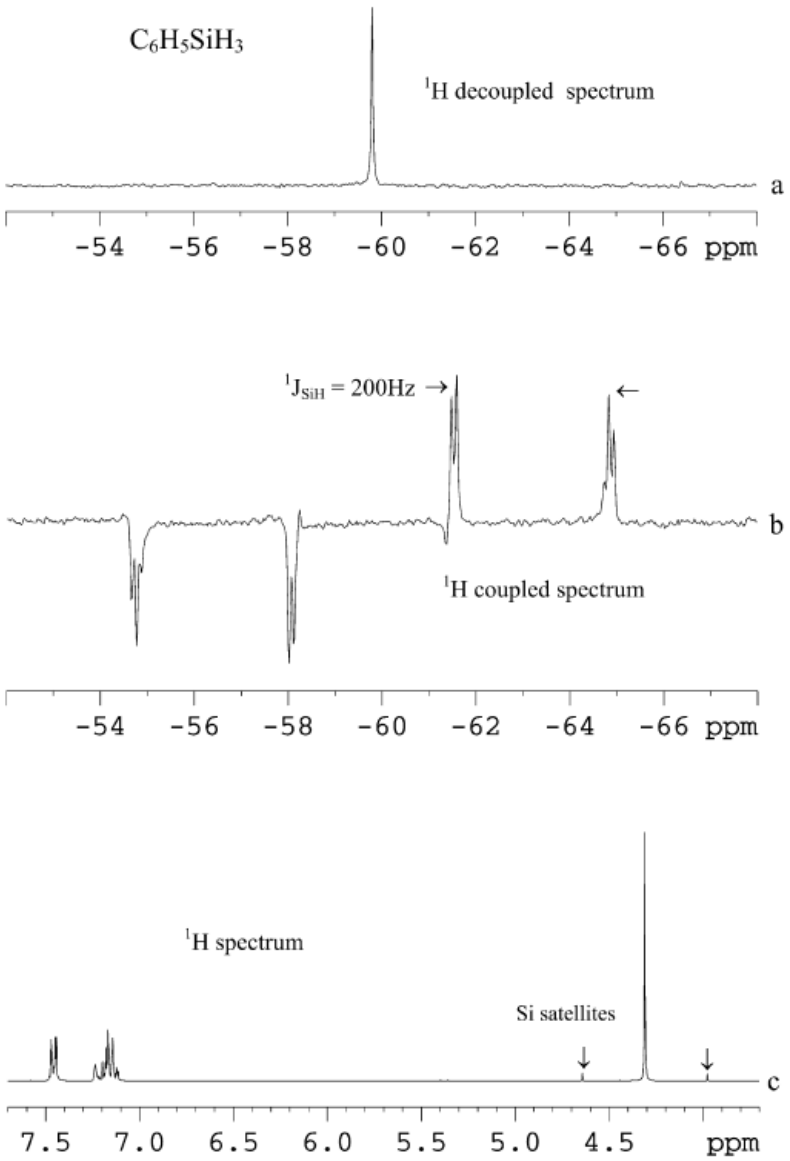


Fig. 40a–c Silicon-29 and proton spectra of phenylsilane $PhSiH_3$ in C_6D_6. **a** INEPT spectrum with complete proton decoupling, **b** proton-coupled INEPT spectrum ($^1J_{SiH}$ 200 Hz); the fine structure is due to coupling with the aromatic protons, **c** proton spectrum showing ^{29}Si satellites for the SiH protons)

5.4 ^{77}Se

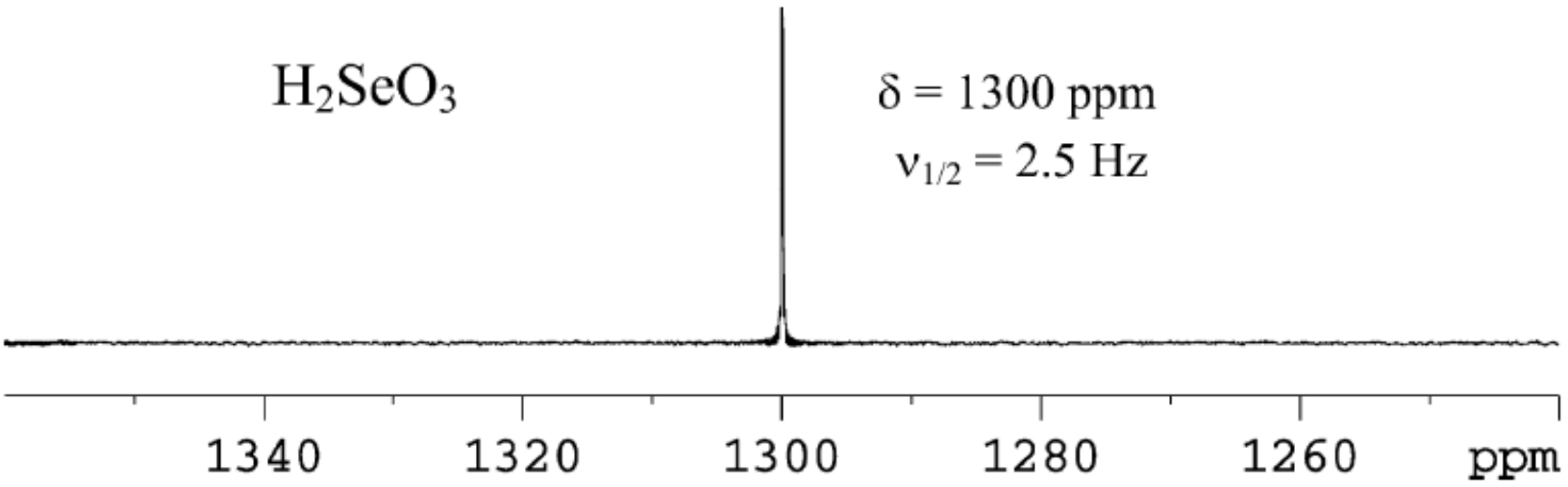


Fig. 41 Spectrum of H_2SeO_3 in D_2O

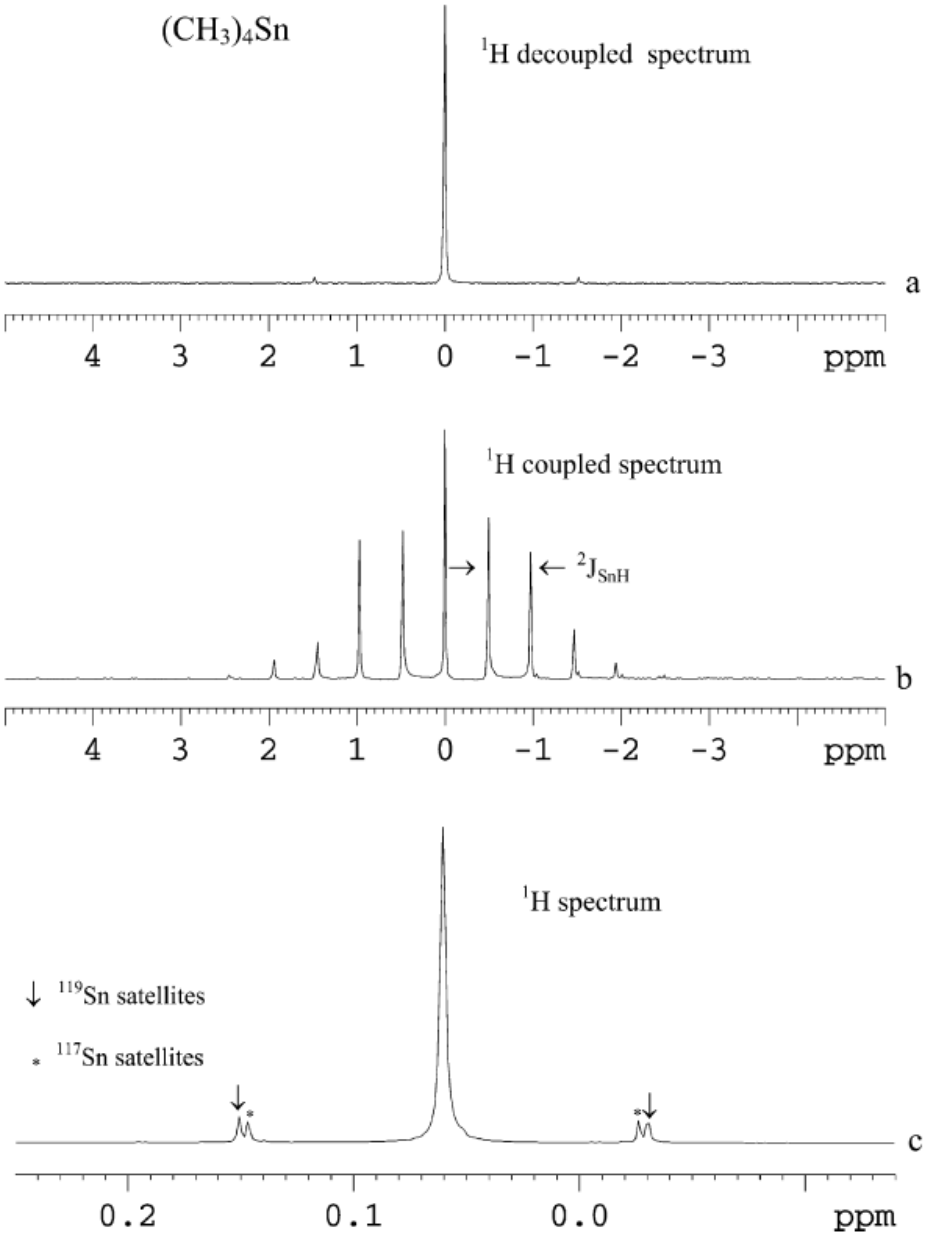


Fig. 42a–c Spectra of tetramethyltin in $CDCl_3$. a Proton decoupled, b proton coupled ($^2J_{SnCH}$ 54.3 Hz), c proton spectrum. The satellite signals are due to coupling to tin-117 (*inner lines*) and tin-119 (*outer lines*). The ratio of the coupling with tin-119 to that with tin-117 is 1.046:1 (the ratio of the magnetogyric ratios of the two nuclei)

5.5 ^{117}Sn, ^{119}Sn

7.68 and 8.59%

Main isotopes of tin

Isotope	Abundance	Half-life ($t_{1/2}$)	Decay mode	Product
^{112}Sn	0.97%	stable		
^{114}Sn	0.66%	stable		
^{115}Sn	0.34%	stable		
^{116}Sn	14.54%	stable		
^{117}Sn	7.68%	stable		
^{118}Sn	24.22%	stable		
^{119}Sn	8.59%	stable		
^{120}Sn	32.58%	stable		
^{122}Sn	4.63%	stable		
^{124}Sn	5.79%	stable		
^{126}Sn	trace	2.3×10^5 y	β^-	^{126}Sb

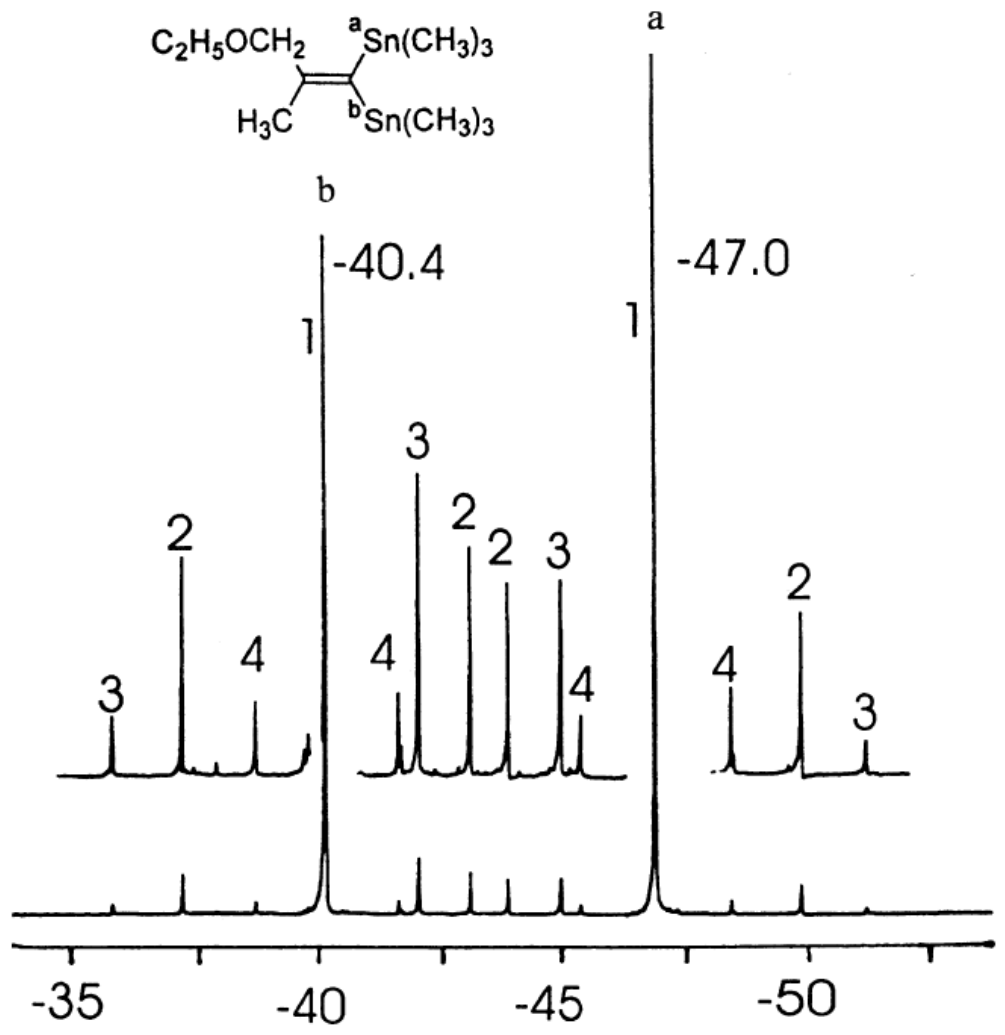
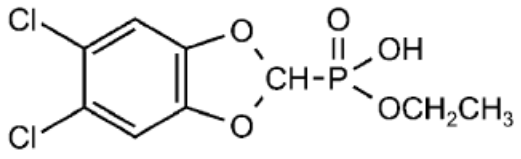


Fig. 43 Tin-119 spectrum of a 1,1-distannyl-1-alkene (structure shown). Signals result from various isotopomers: 1 from molecules containing one tin-119 nucleus, 2 from molecules containing one tin-119 and one tin-117 nucleus, 3 from molecules containing two tin-119 nuclei and 4 from molecules containing tin-119 and carbon-13 nuclei

3 Quadrupolar Nucleus Experiments
3.1 General Principles: Quadrupole Moment, Relaxation, Linewidth

spin I = ½ (^{1}H, ^{13}C, ^{31}P)

Τετραπολικοί πυρήνες
spin I = 5/2 ^{17}O (0.037%)
spin I = 3/2 ^{35}Cl, ^{37}Cl (75.53%, 24.47%)



1

• Πολύ μικροί χρόνοι T_1, T_2
(γρήγορη αποδιέγερση με το τετράπολο του πυρήνα)
• Ευρείες κορυφές στα φάσματα NMR.

3.2 ^{17}O

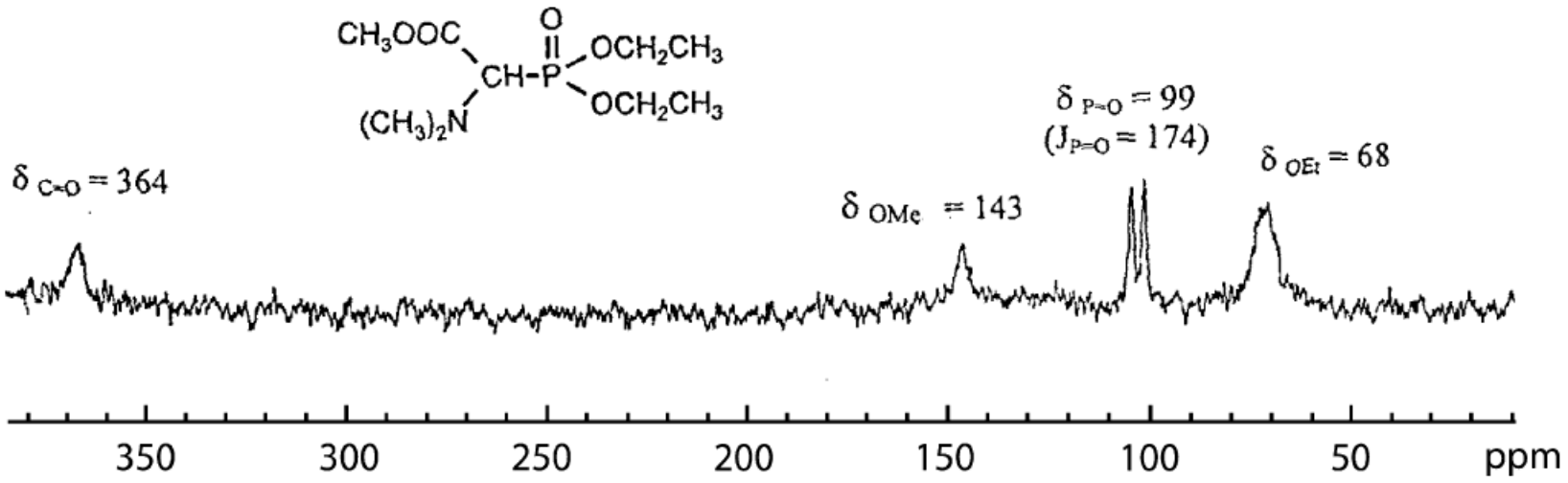


Fig. 31 Oxygen-17 spectrum for compound **7** (40% in CD_3CN, temperature 55°C)

Chlorine NMR

^{35}Cl and ^{37}Cl NMR spectra showing increasing linewidth with increasing environmental asymmetry