

Supplementary Information

***N*-Chlorosuccinimide-promoted synthesis of thiophosphates from thiols and phosphonates under mild conditions**

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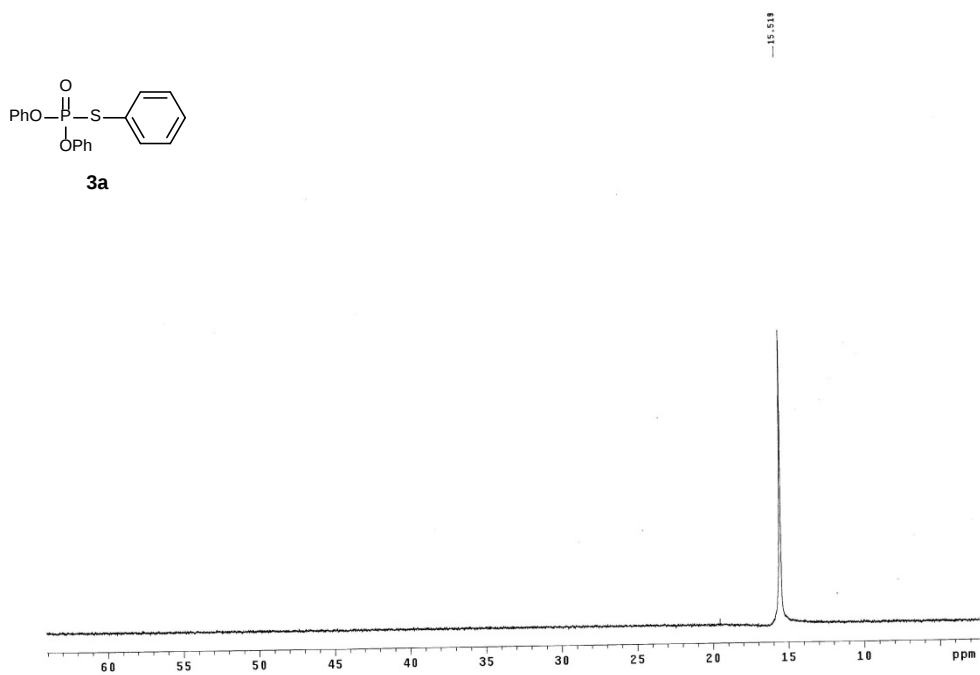
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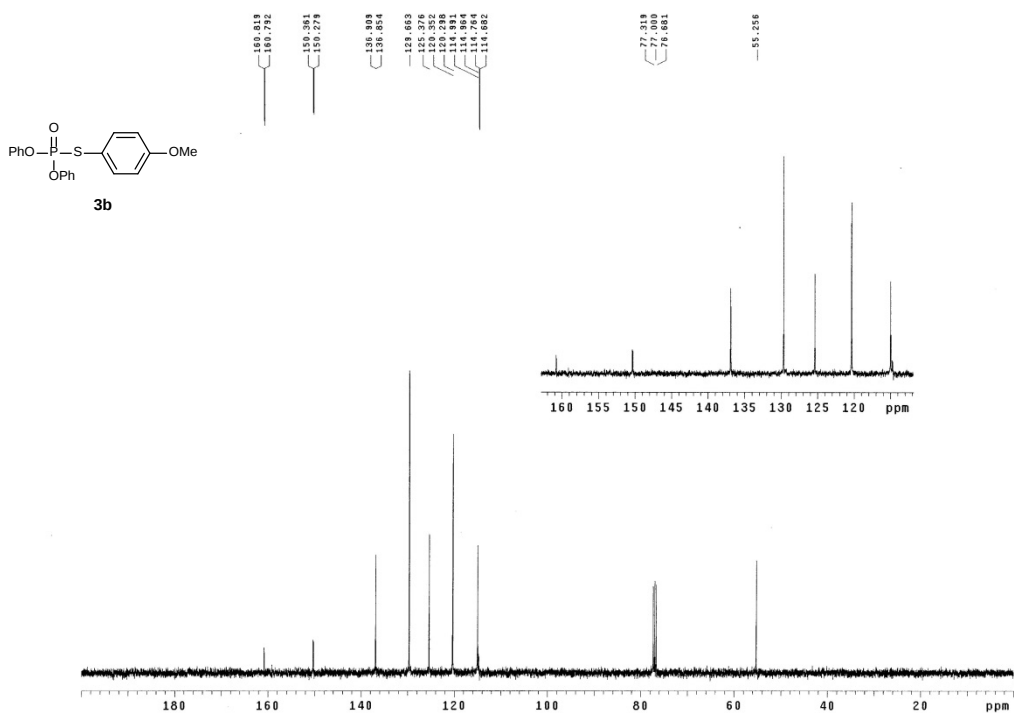
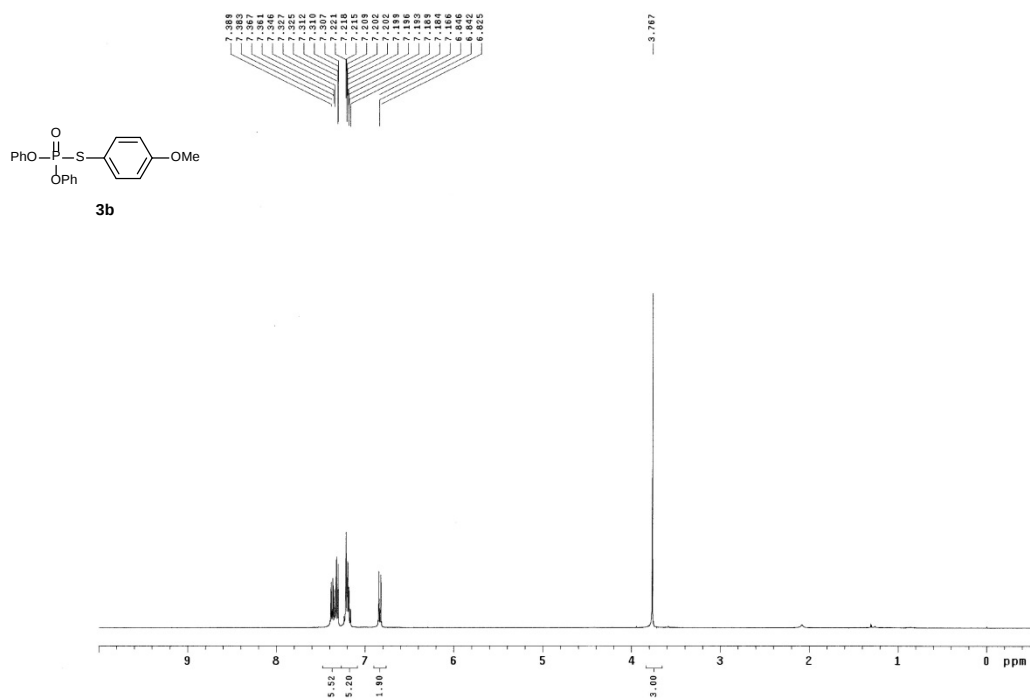
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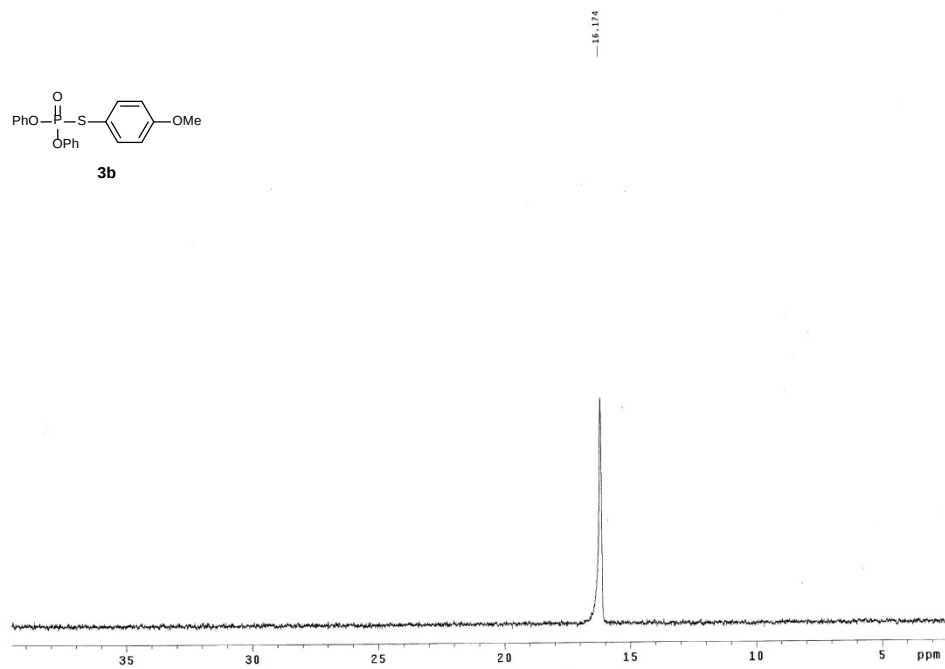
1. General information for NMR measurement

Proton and carbon nuclear magnetic resonance spectra (^1H , ^{13}C , ^{31}P and ^{19}F NMR) were recorded in CDCl_3 . Chemical shifts (δ) are reported in ppm, and coupling constants (J) are given in Hz.

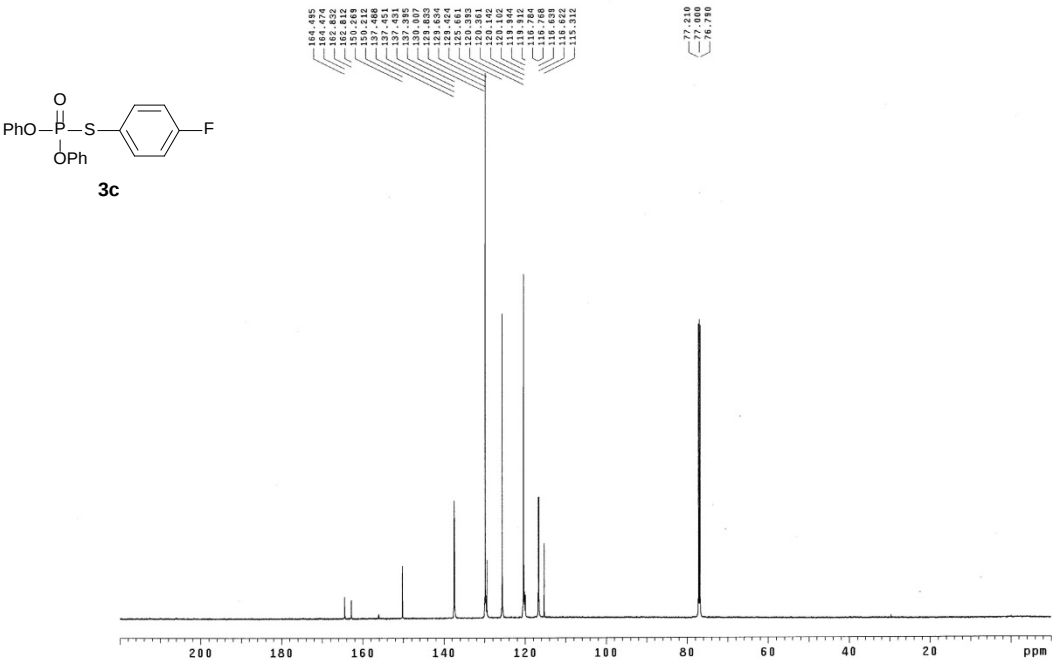
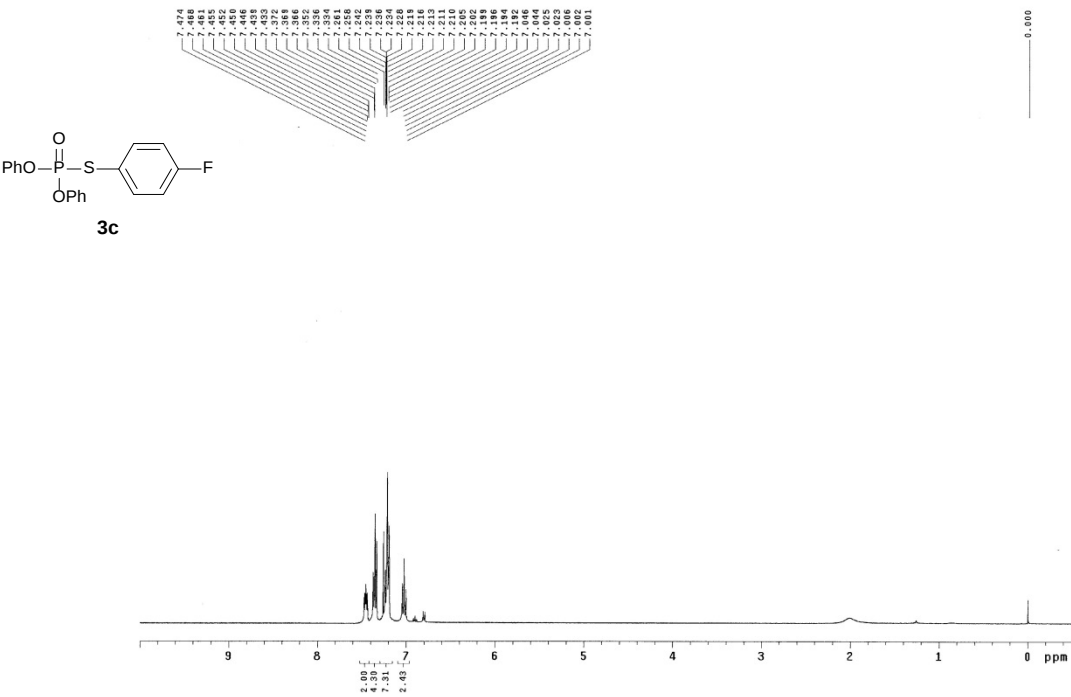


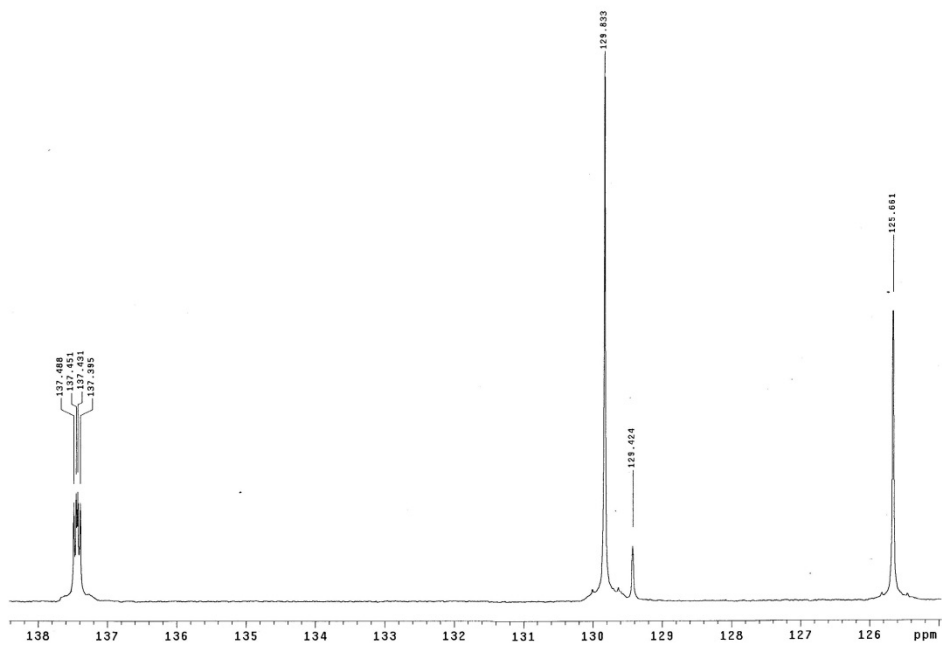
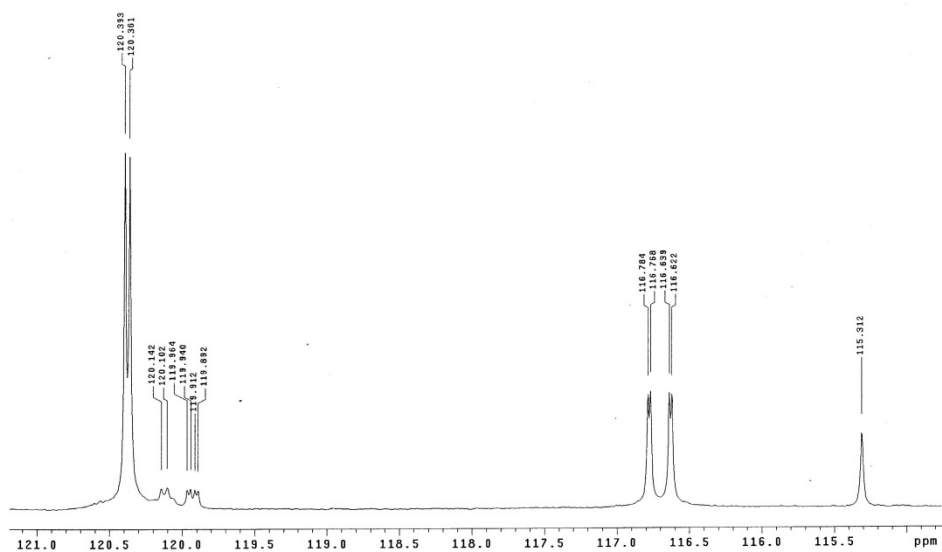
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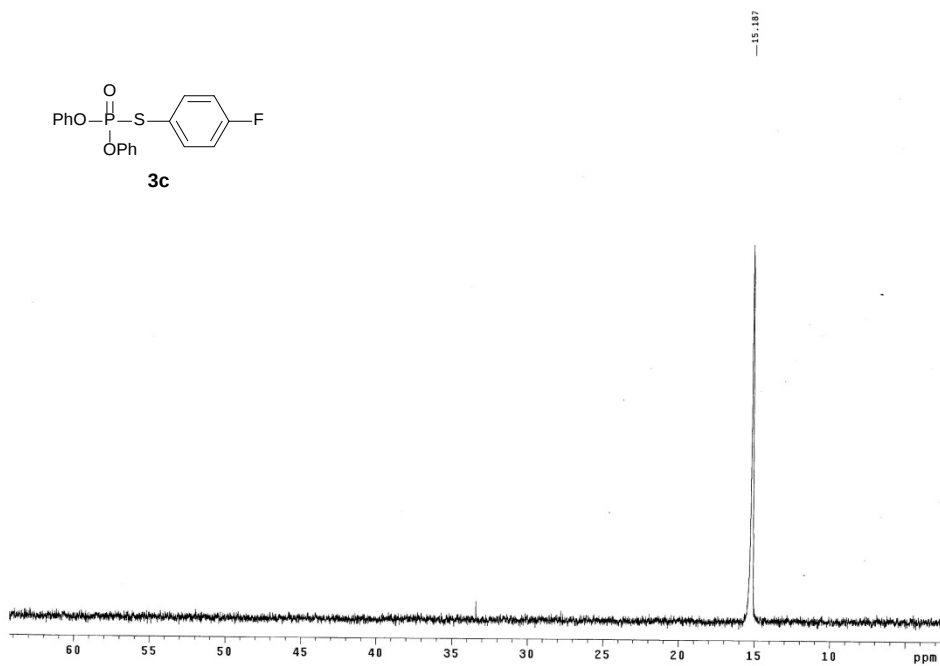
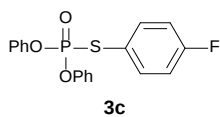
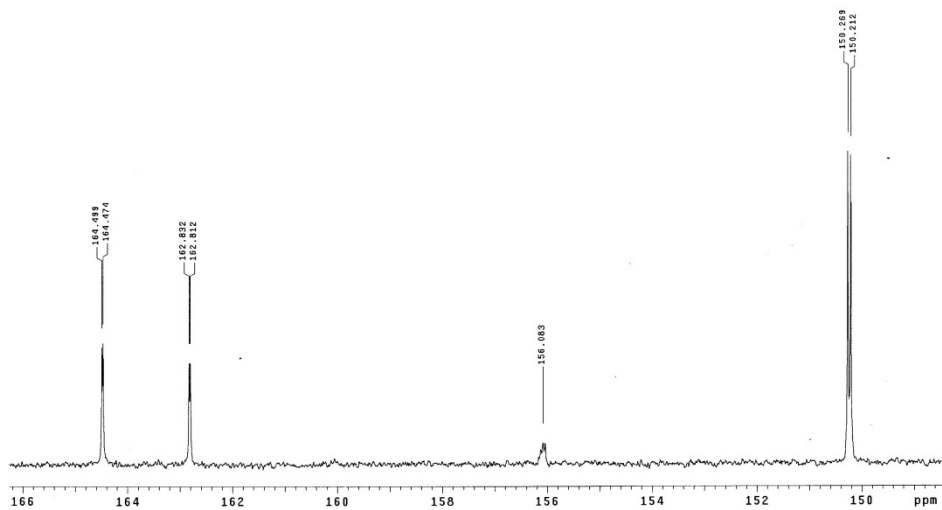


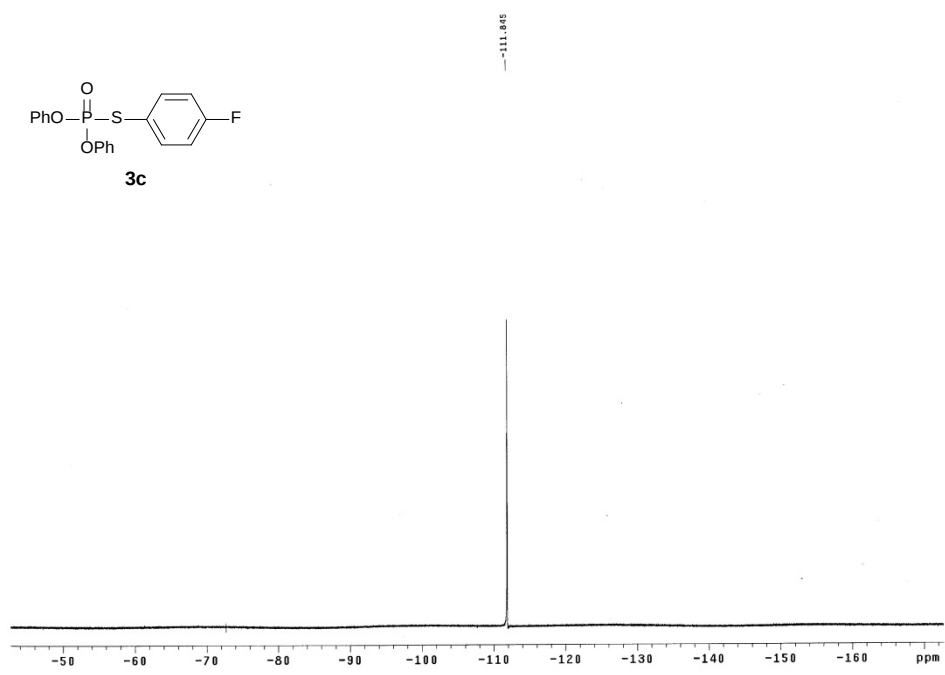


S-(4-Fluorophenyl) O,O-diphenylphosphorothioate (3c)

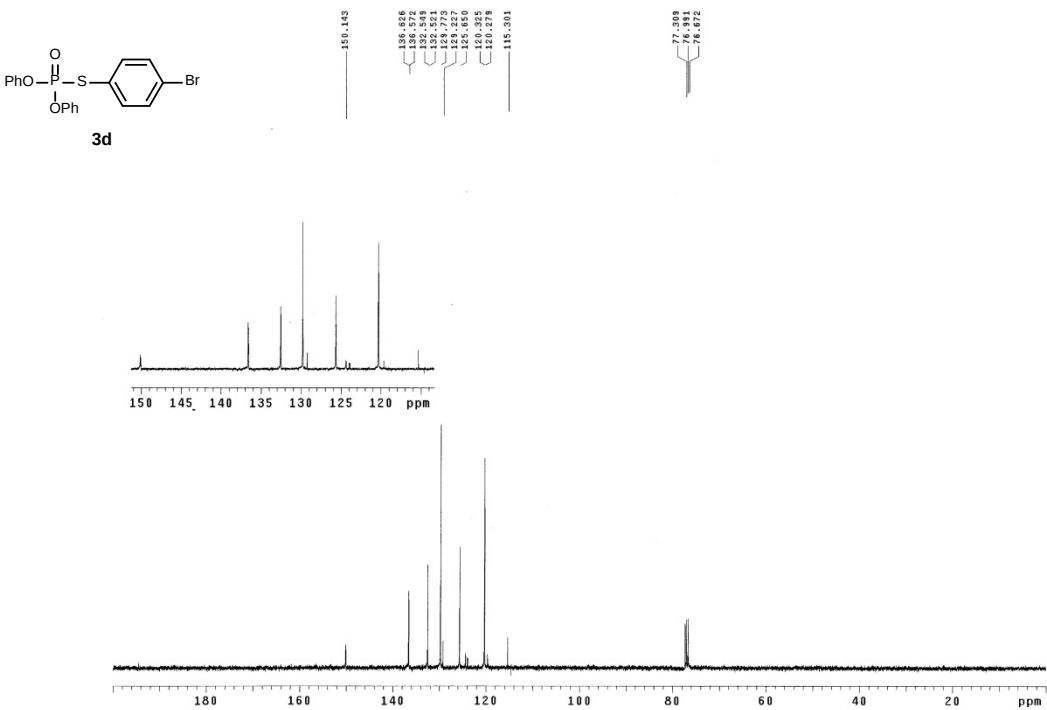
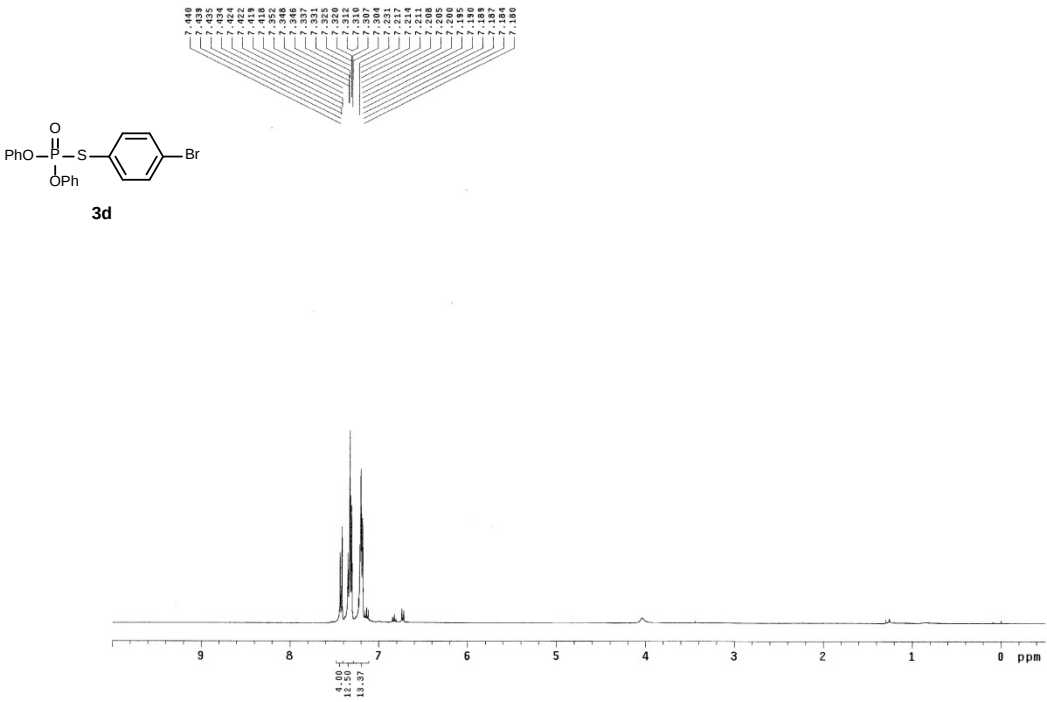


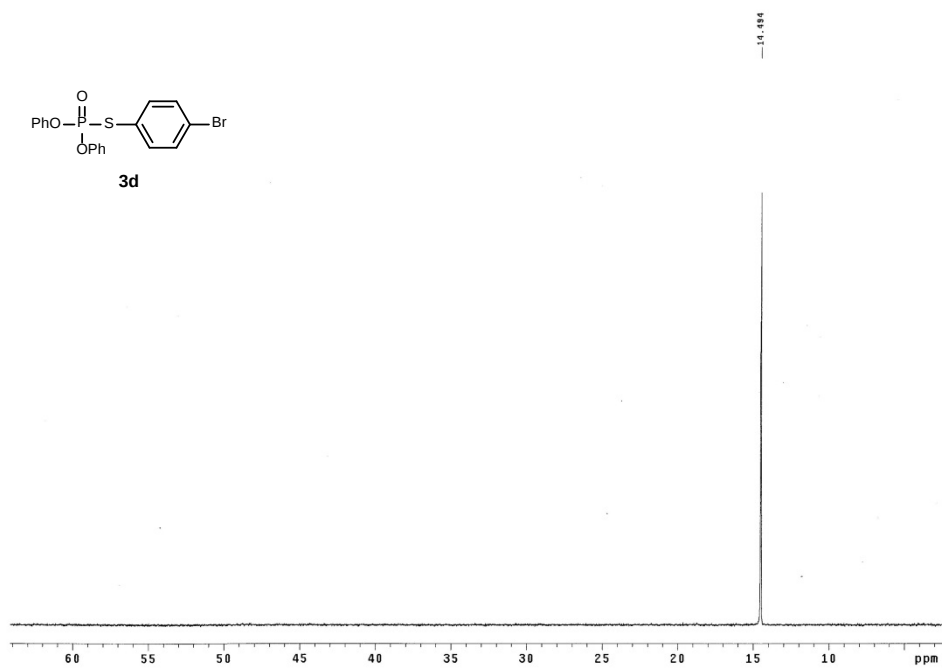


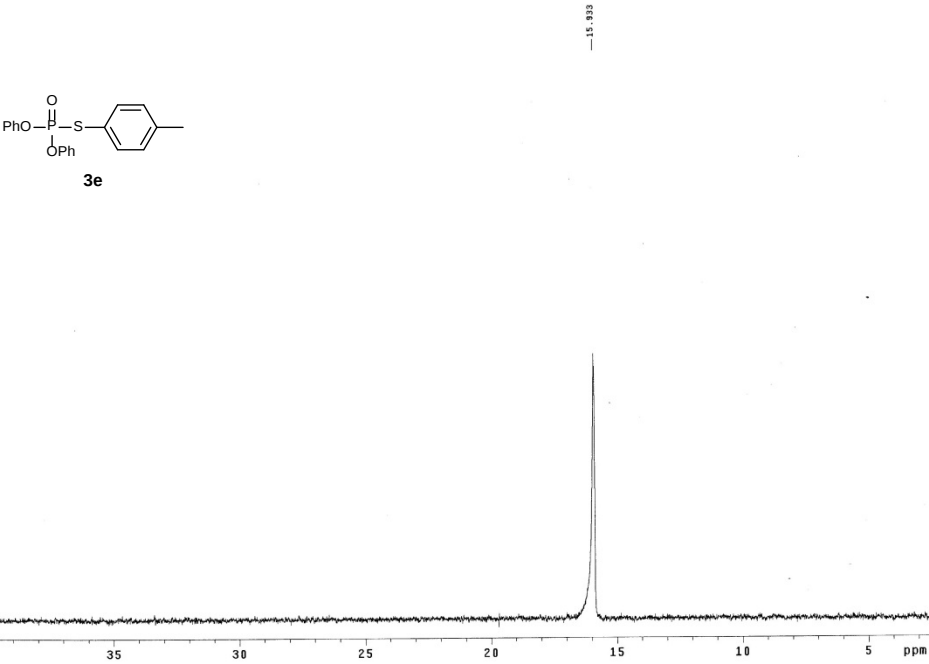




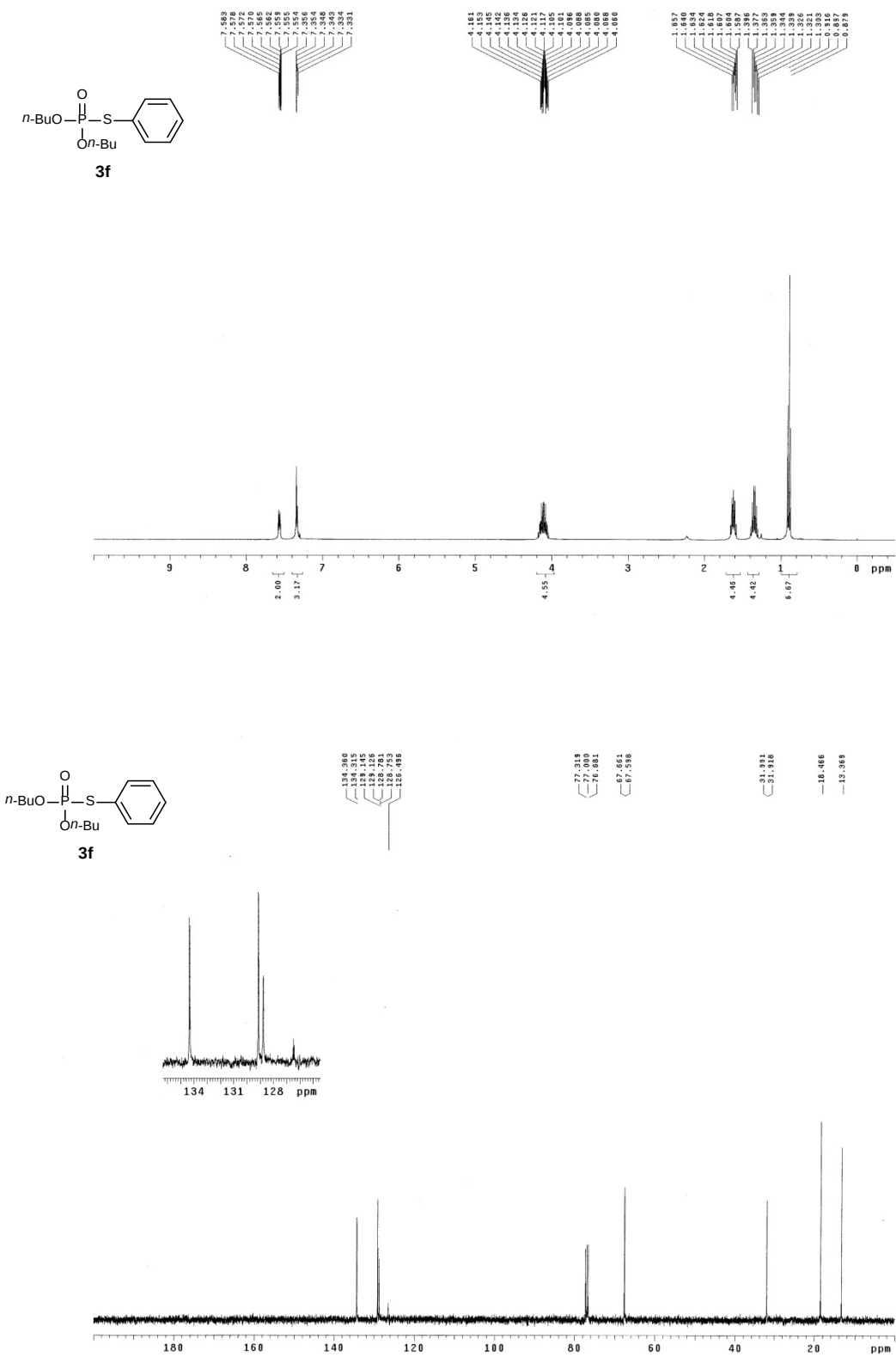
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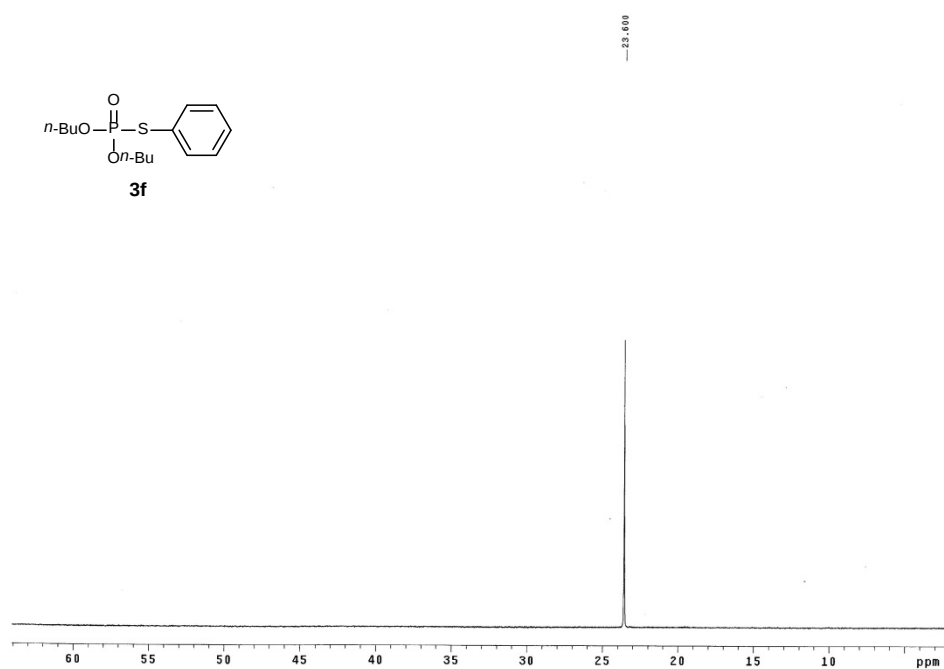




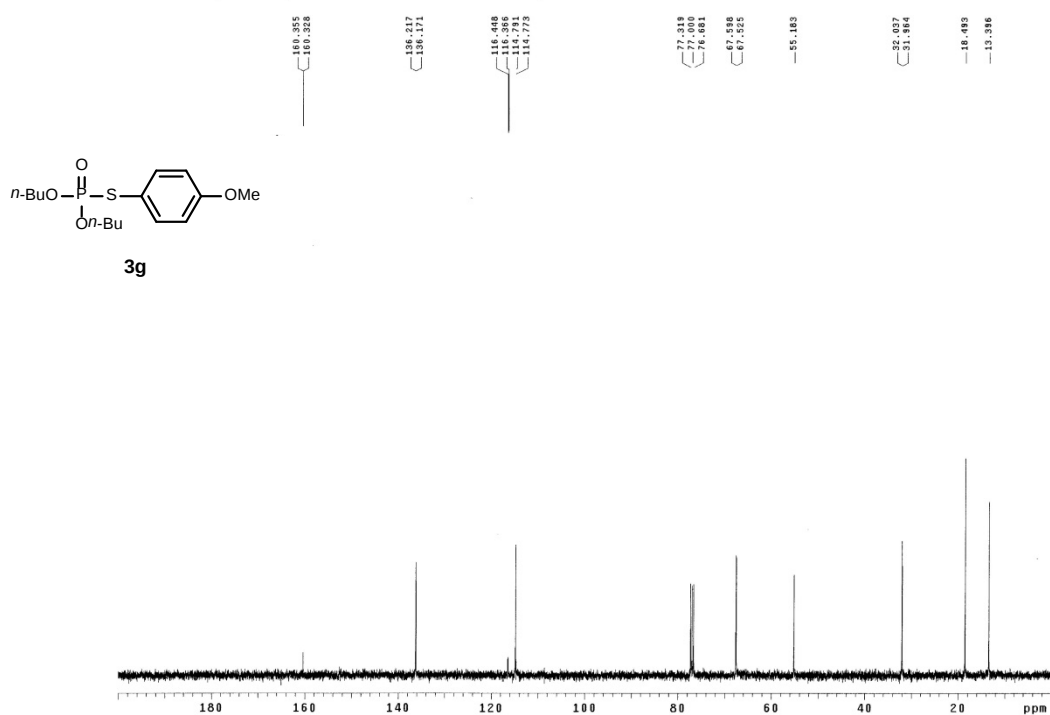
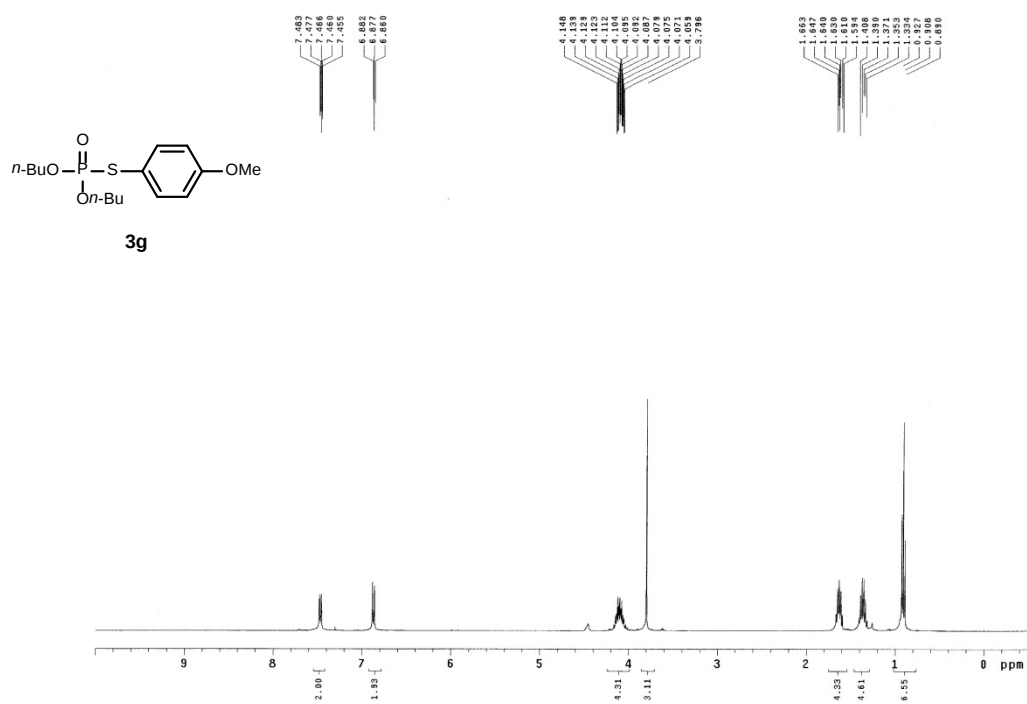


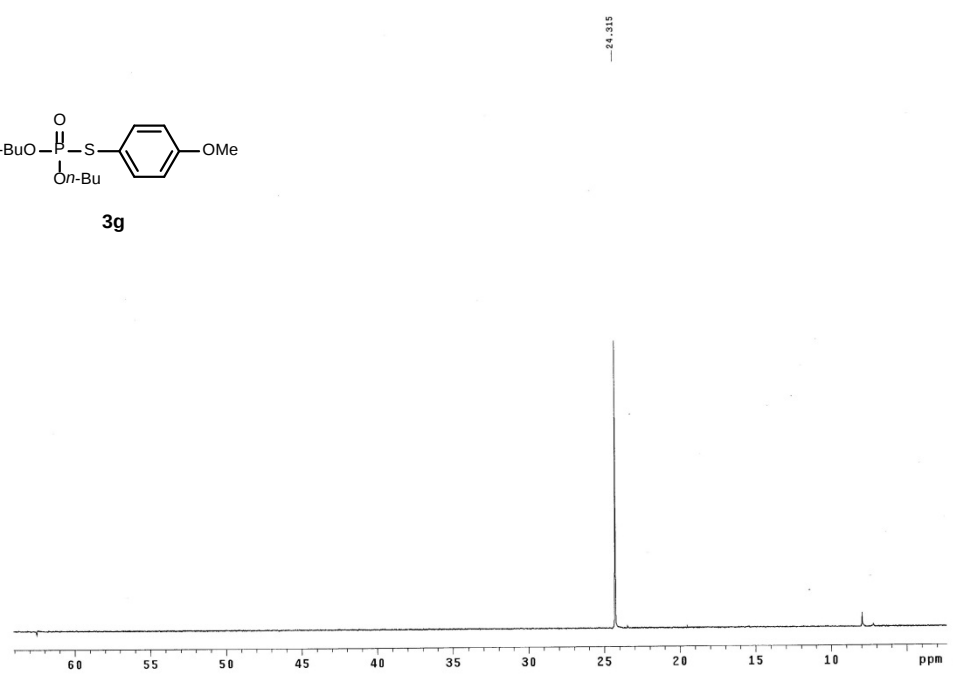
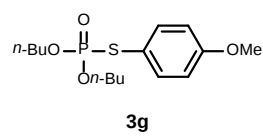
O,O-Dibutyl S-phenyl phosphorothioate (3f)



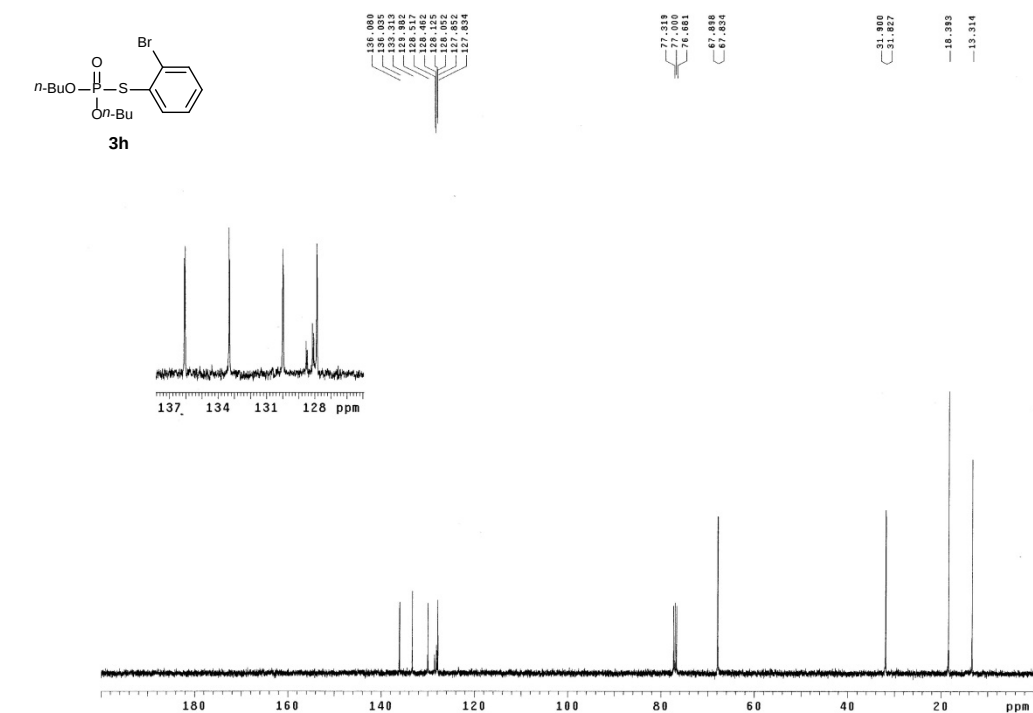
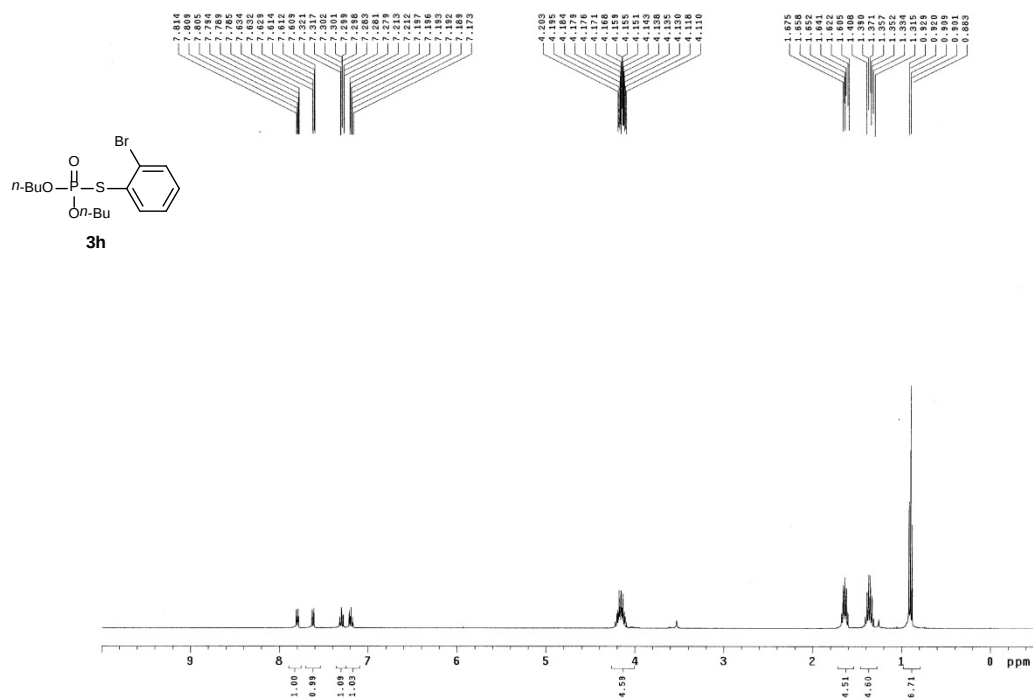


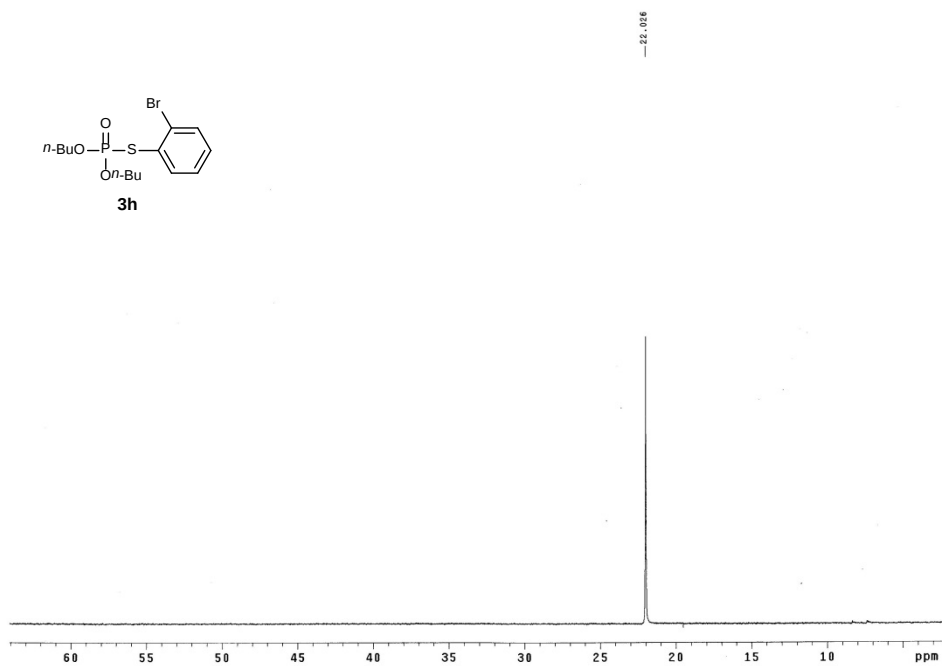
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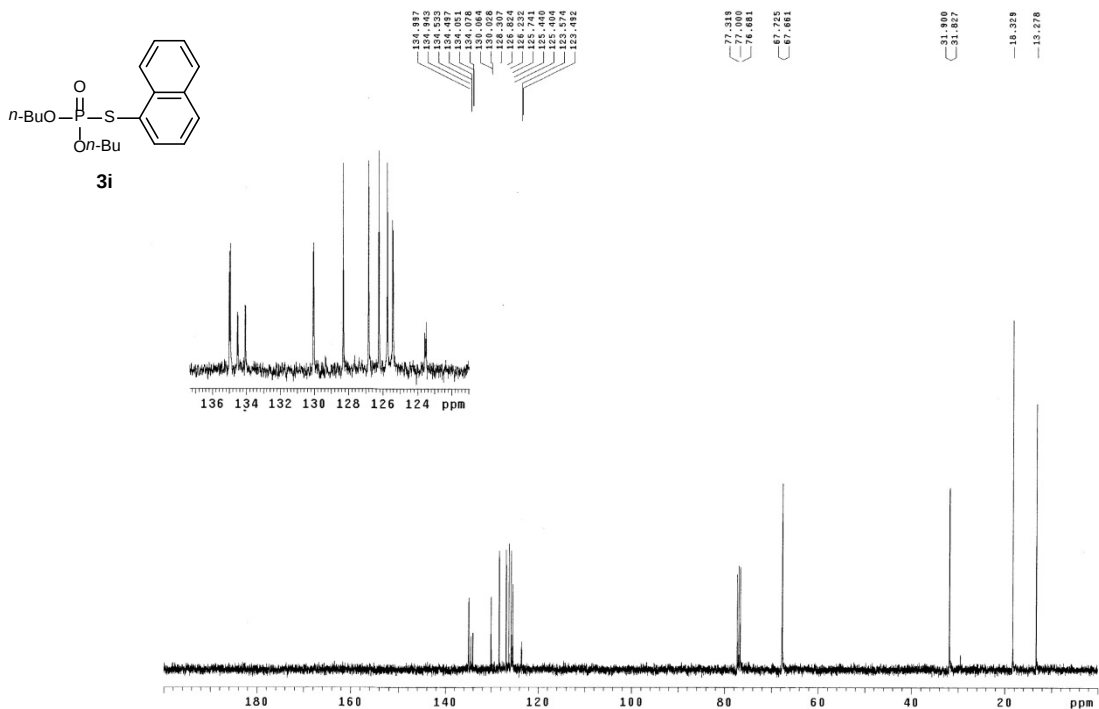
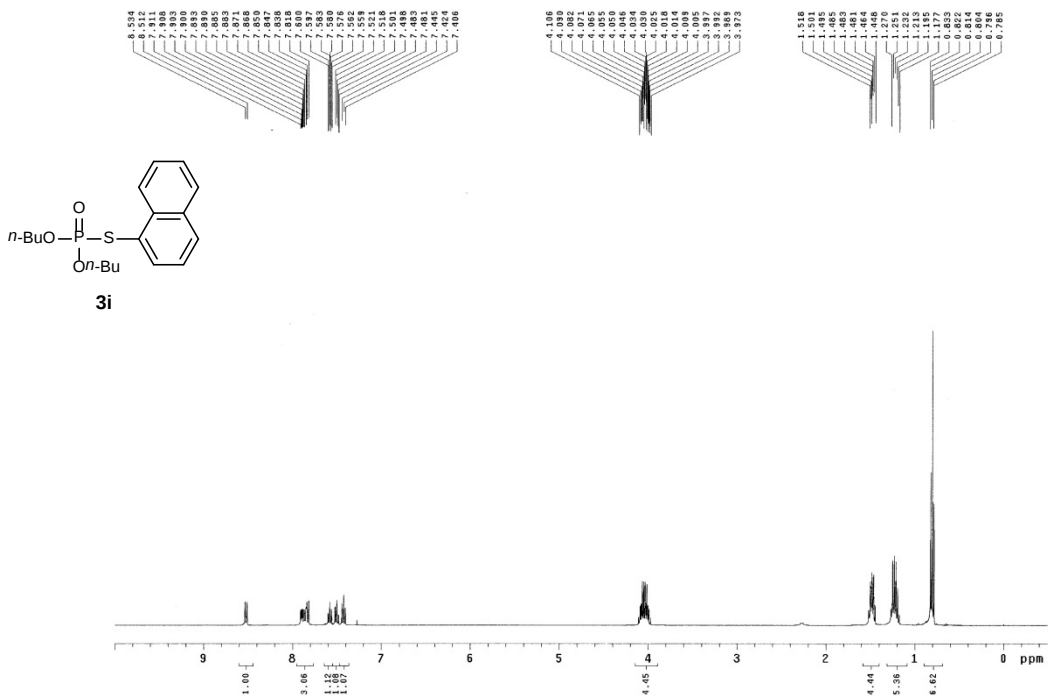


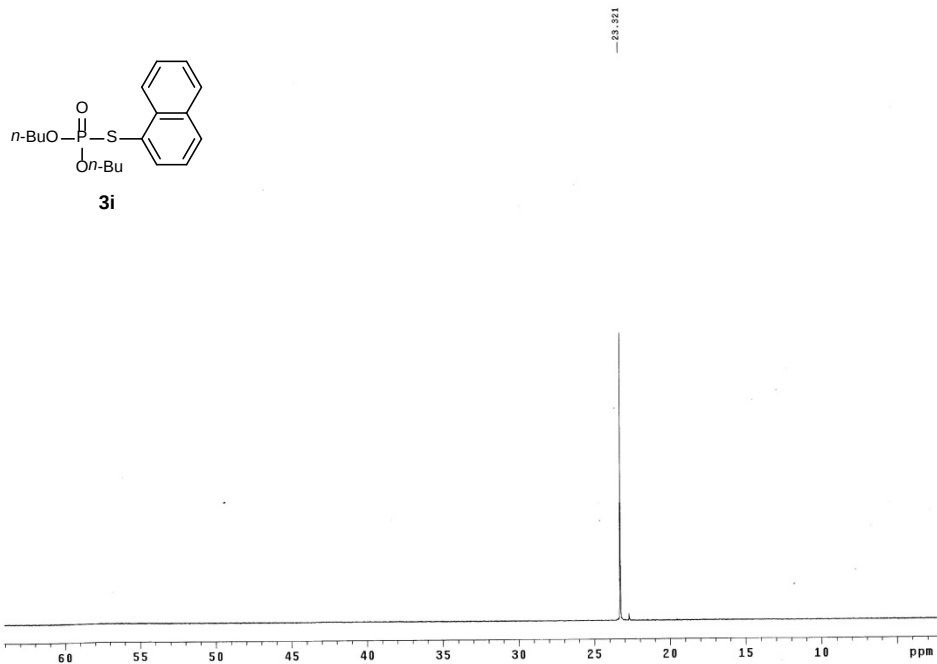
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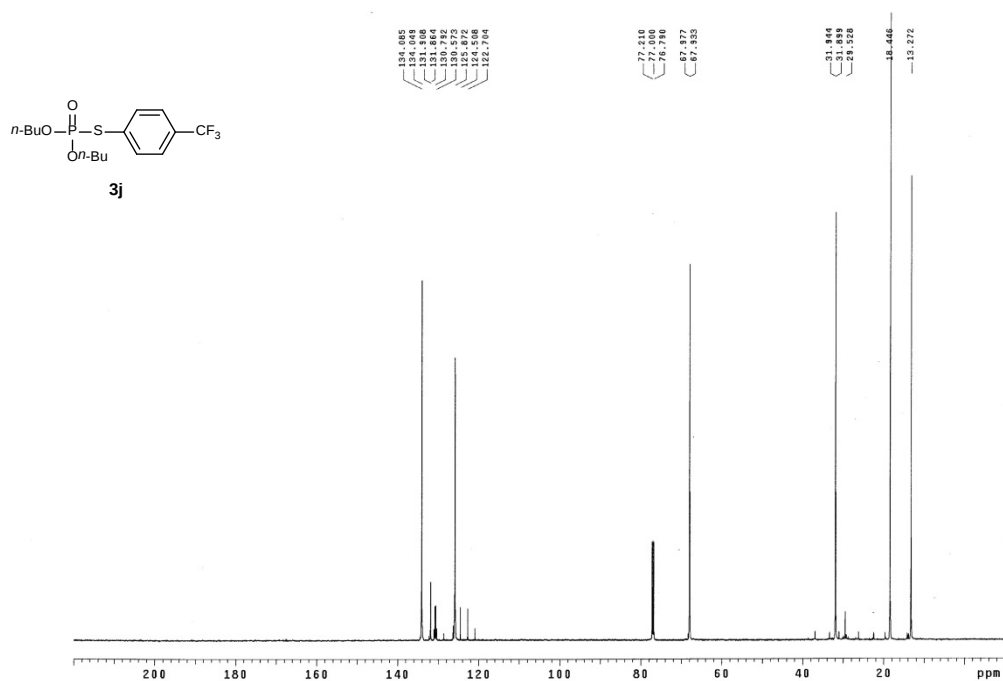
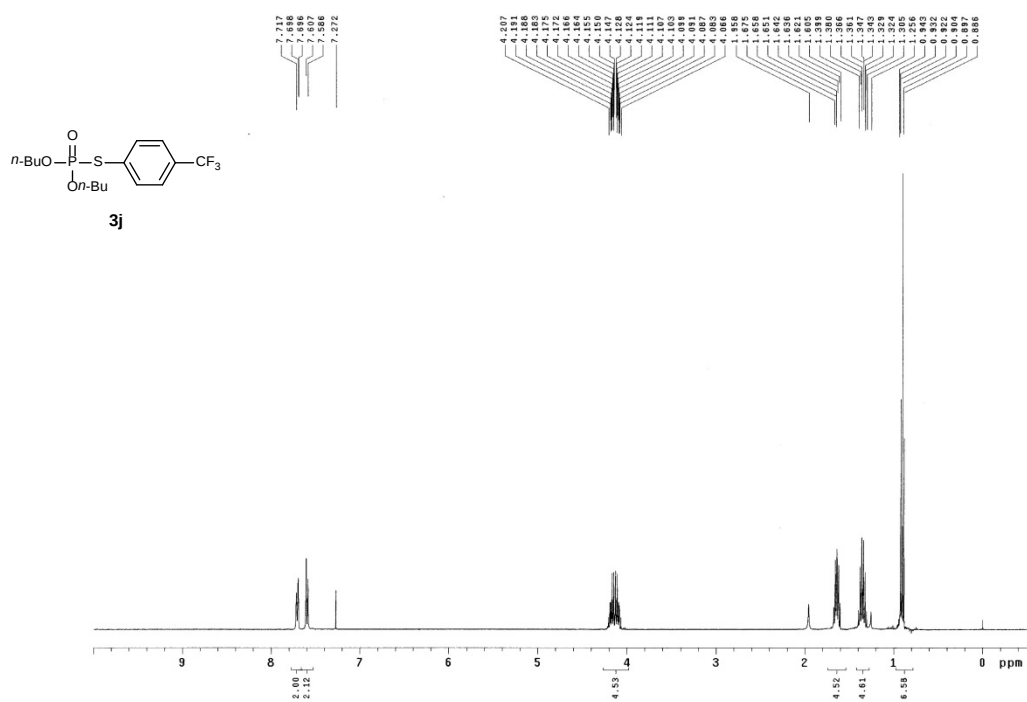


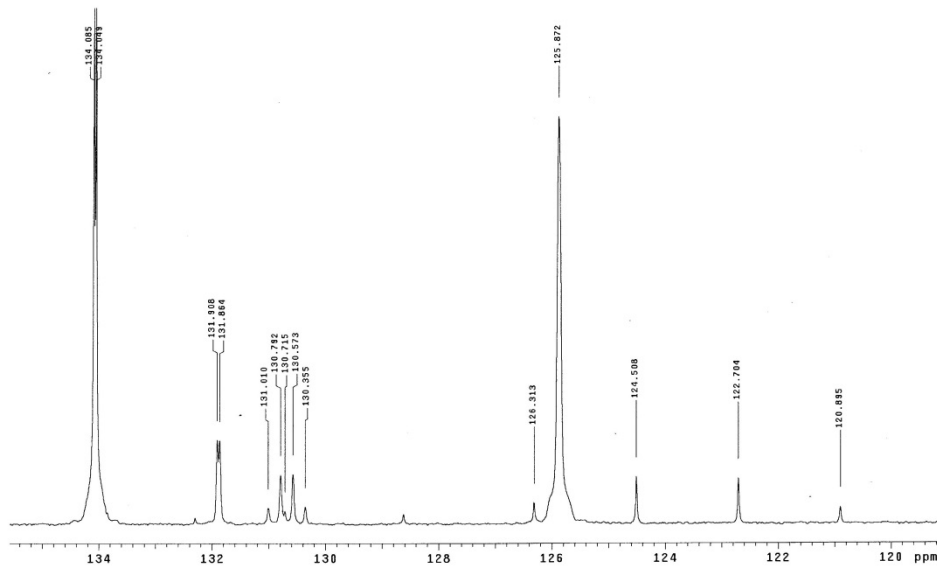
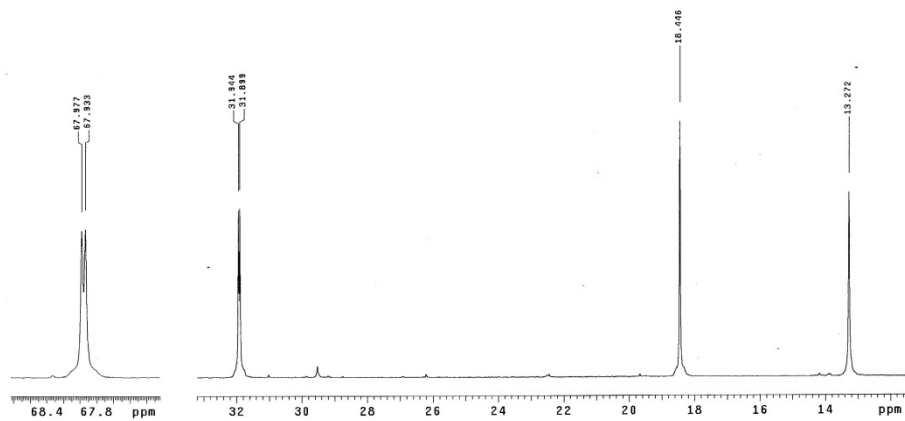
O,O-Dibutyl *S*-naphthalen-1-yl phosphorothioate (**3i**)

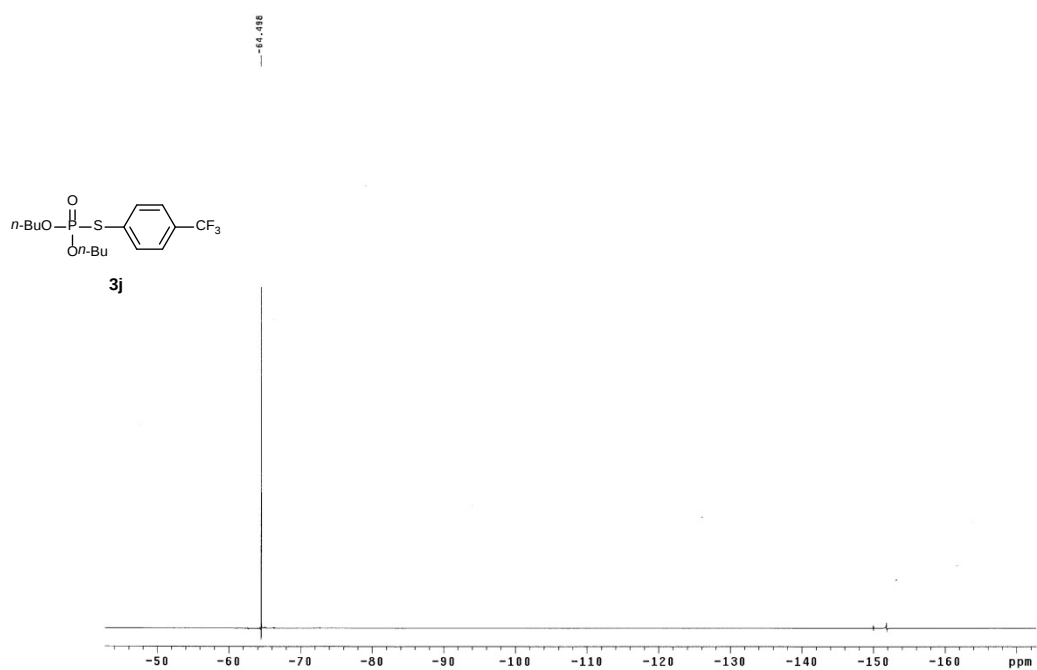
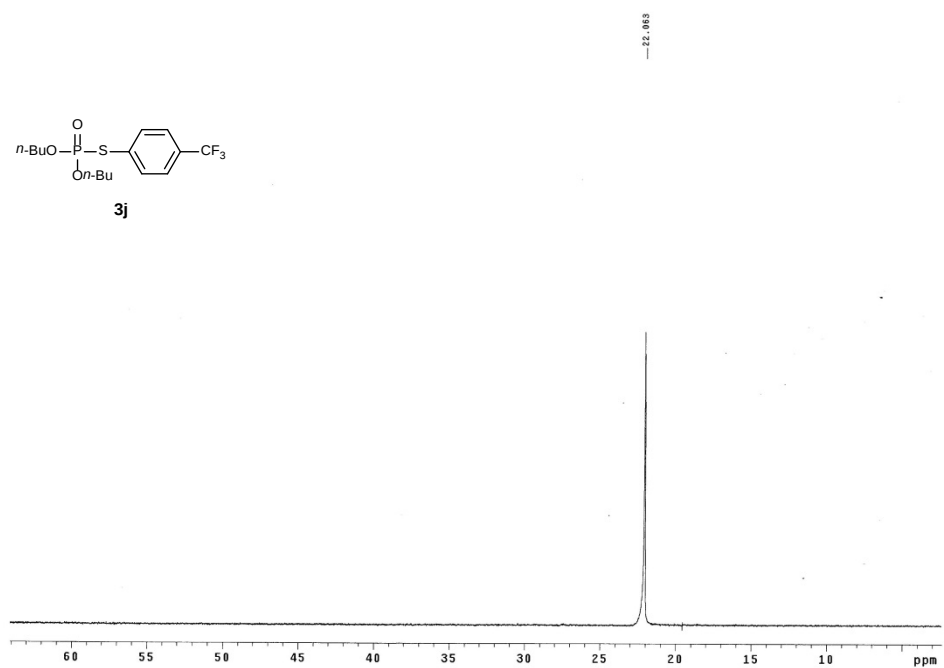




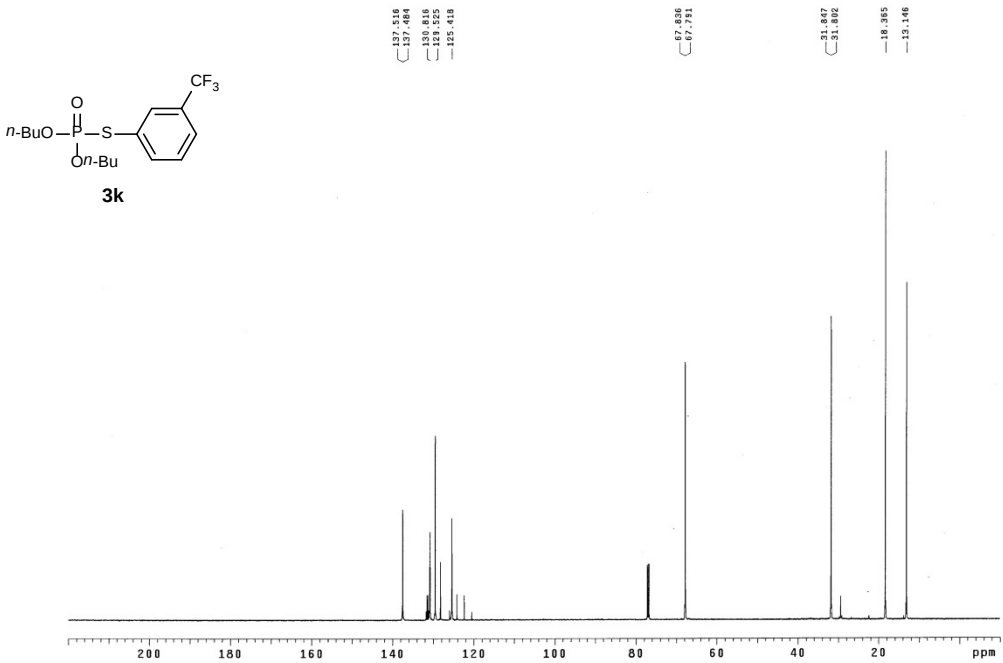
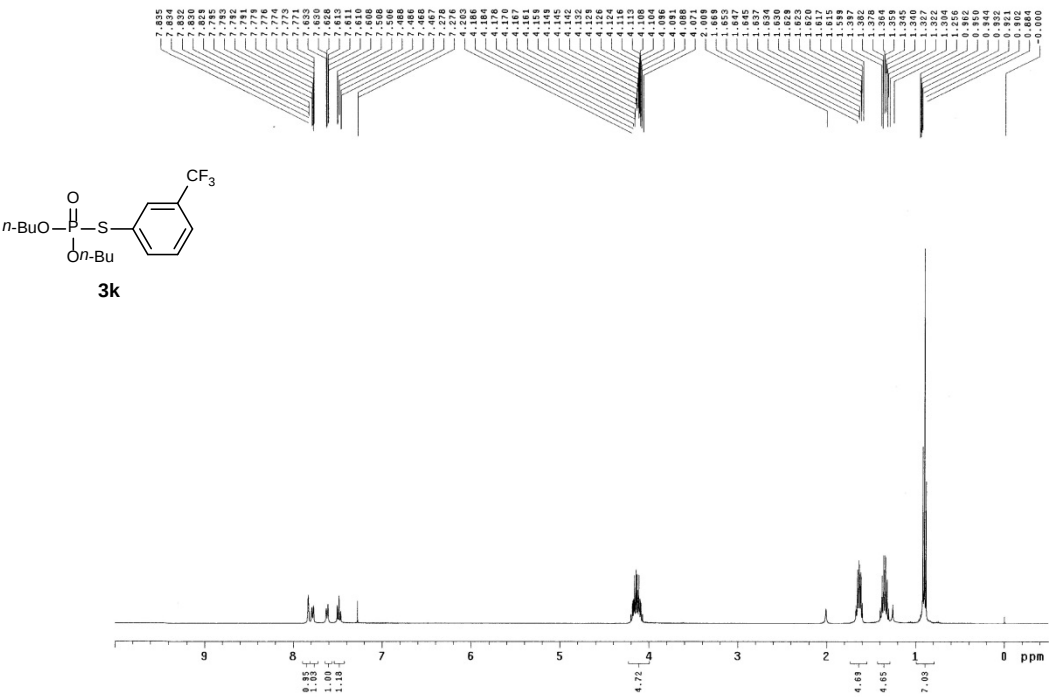
***O,O*-Dibutyl *S*-(4-(trifluoromethyl)phenyl) phosphorothioate (**3j**)**

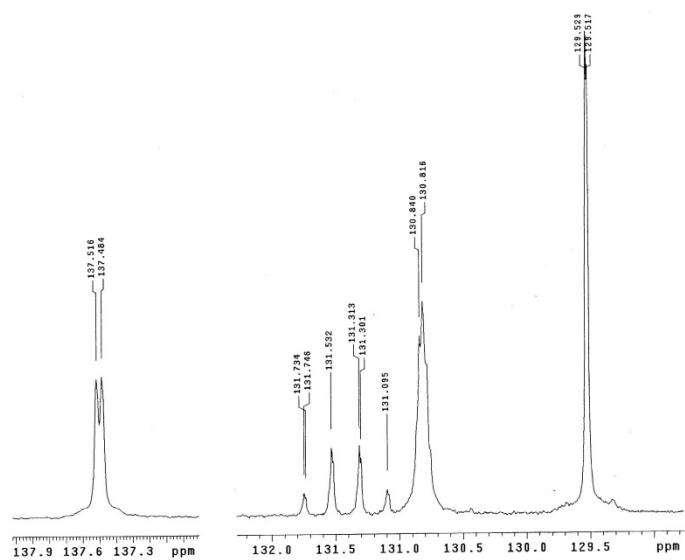
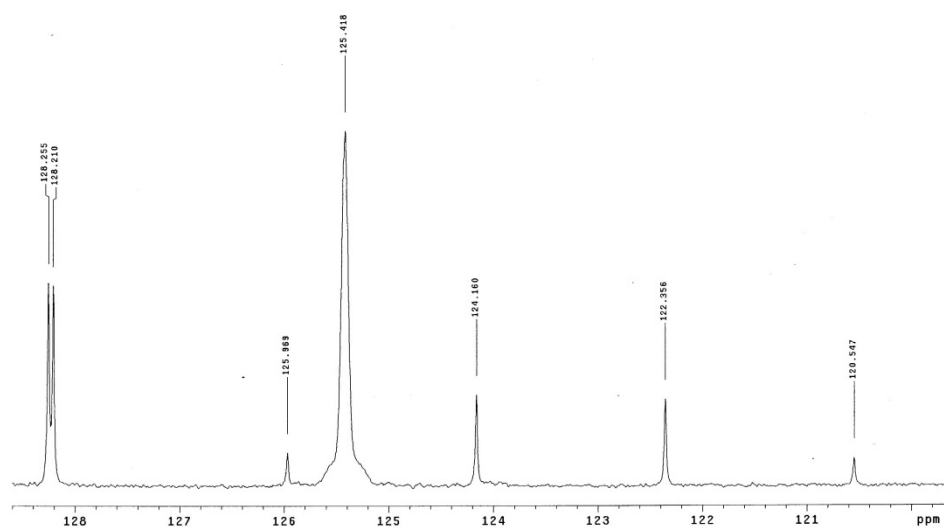


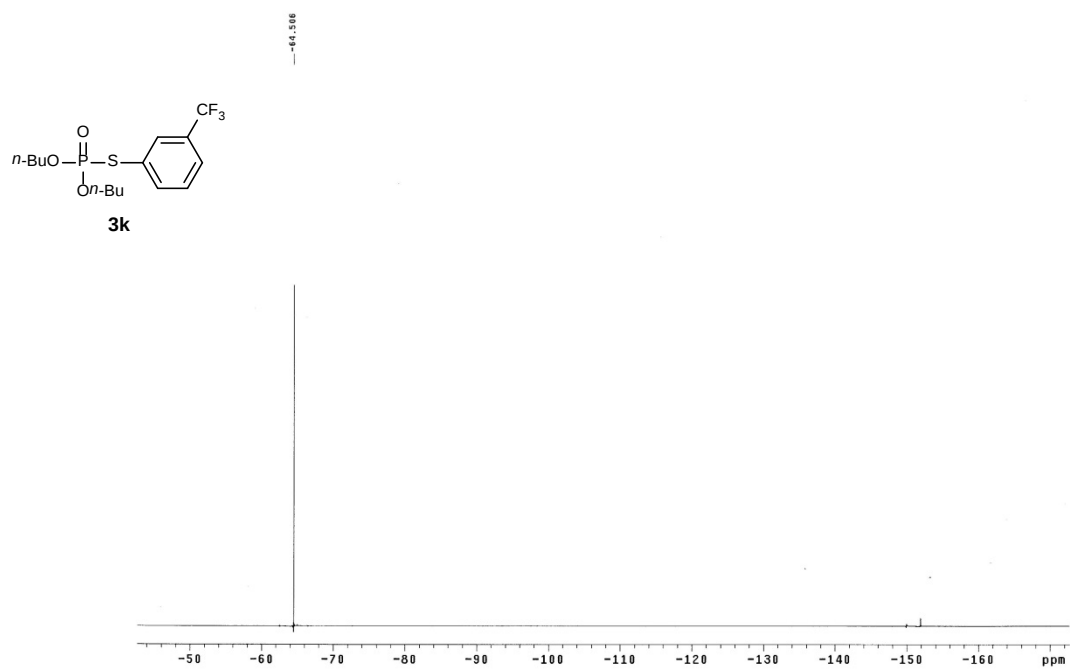
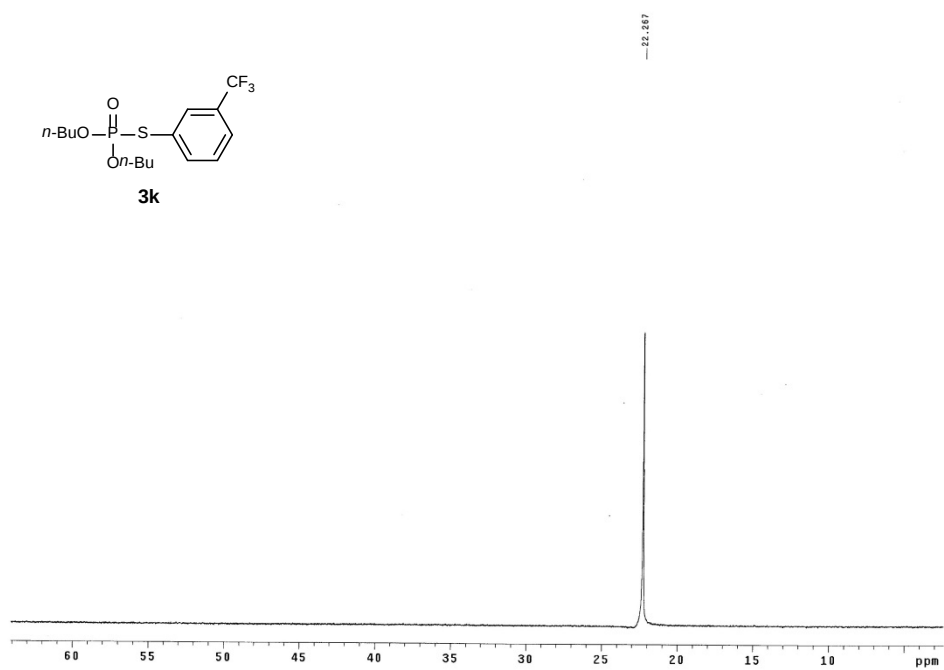




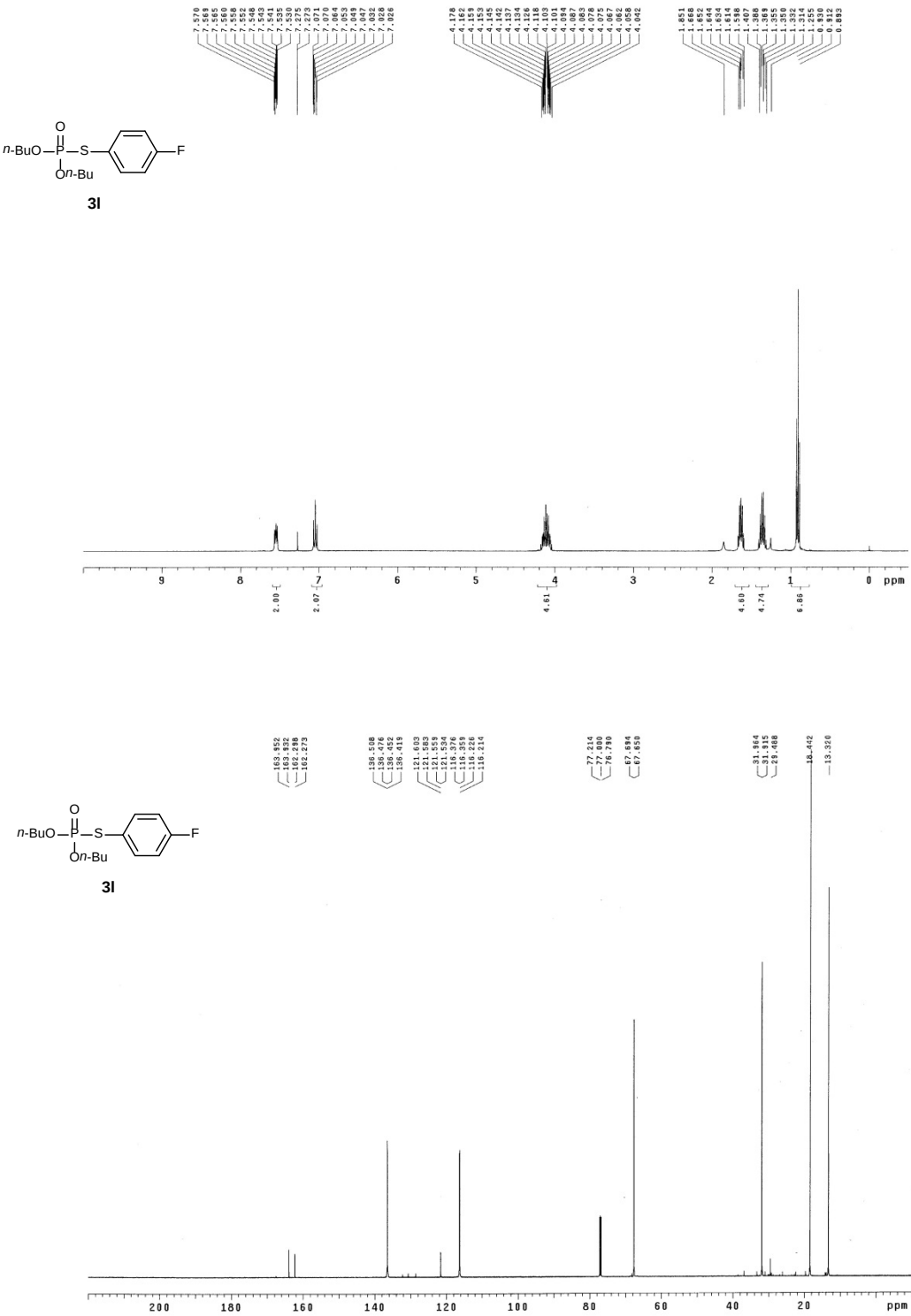
O,O-Dibutyl *S*-(3-(trifluoromethyl)phenyl) phosphorothioate (**3k**)

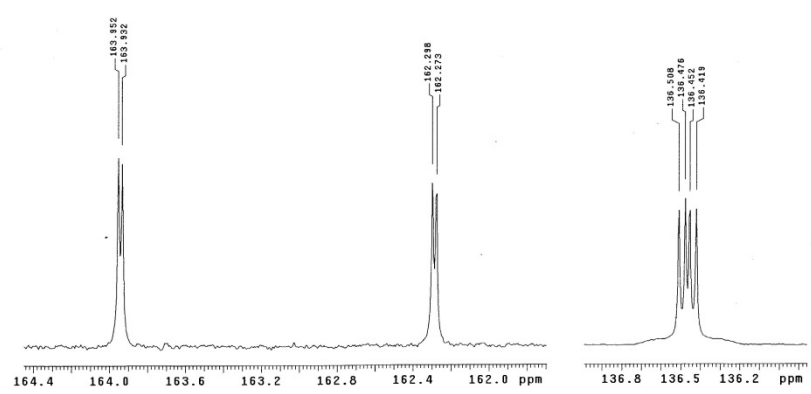
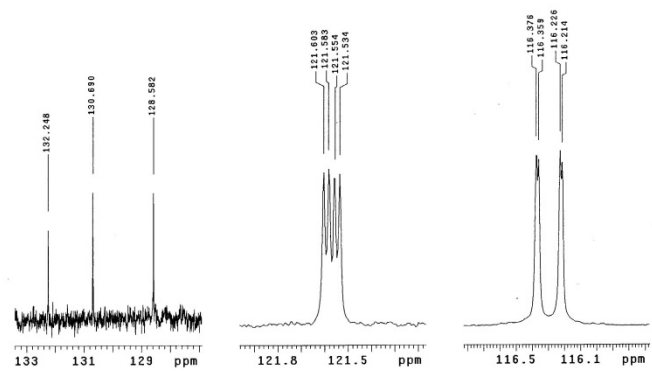


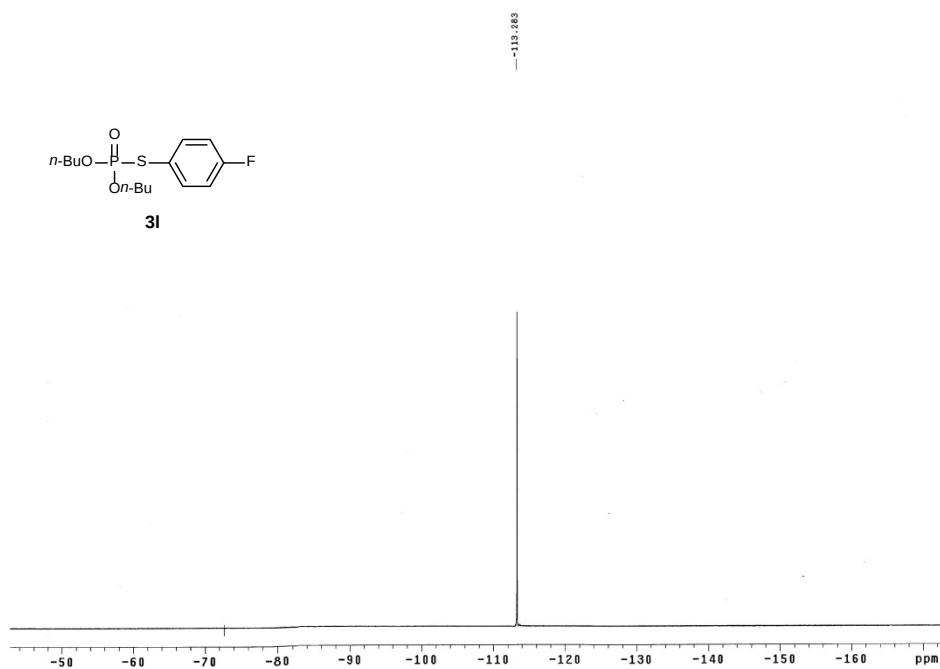
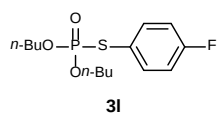
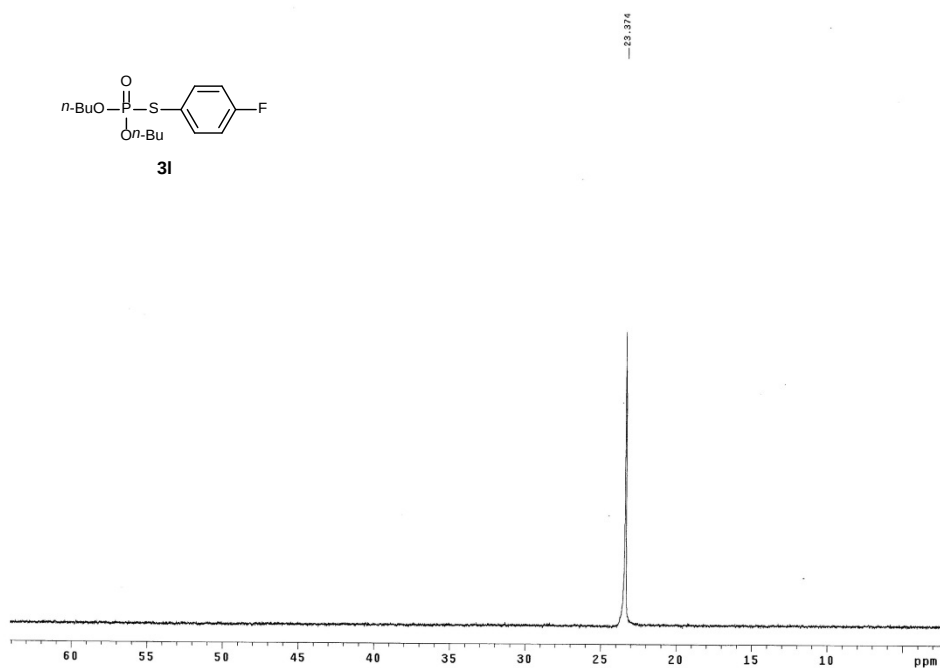
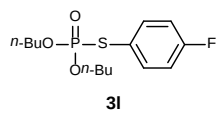




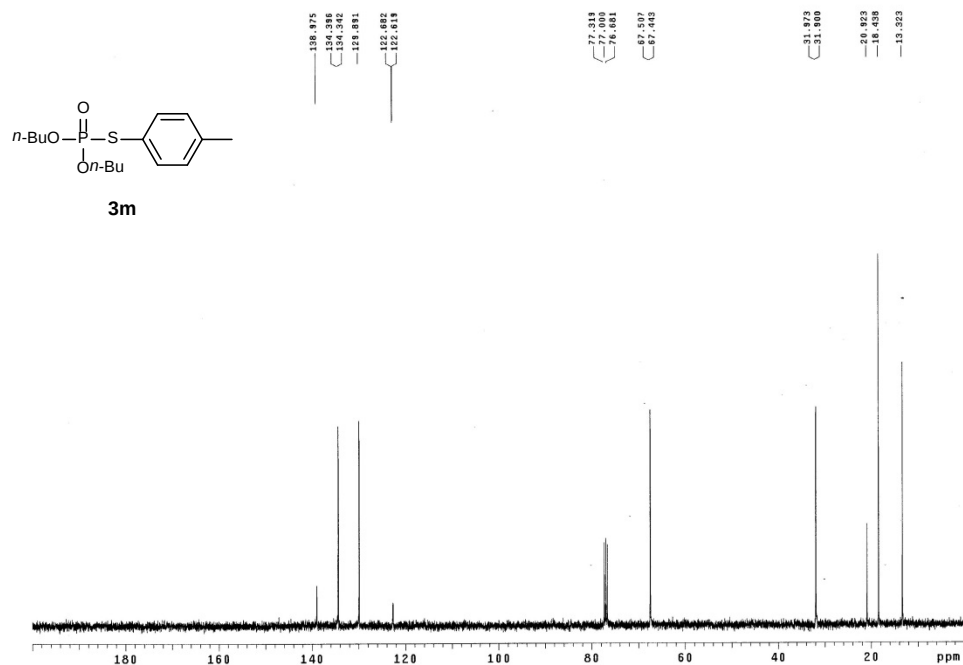
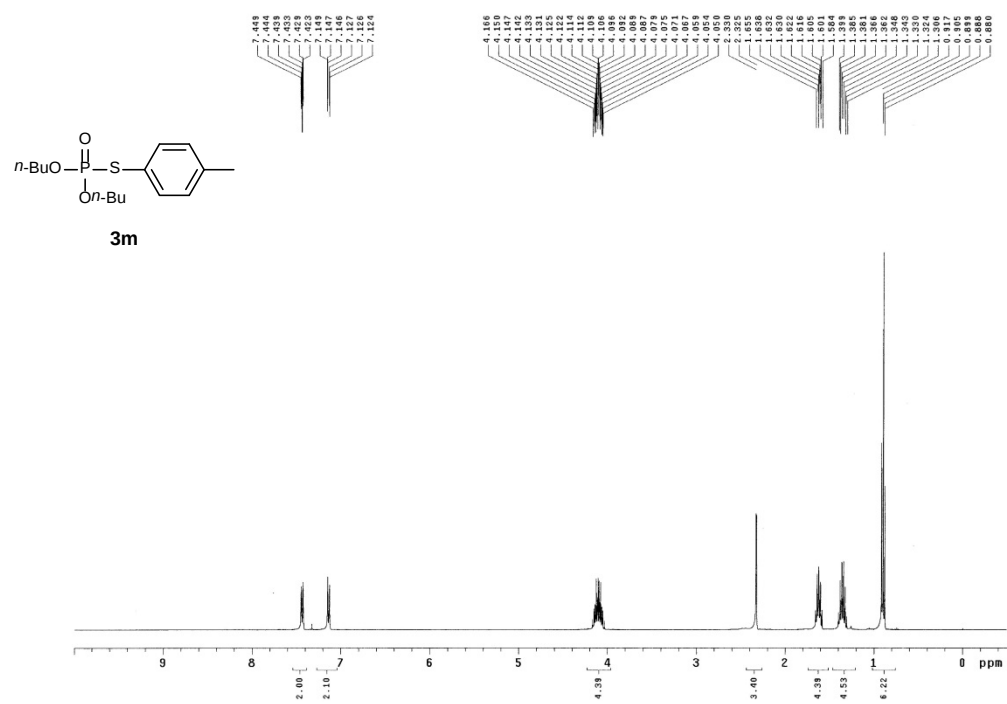
***O,O*-Dibutyl *S*-(4-fluorophenyl) phosphorothioate (31)**

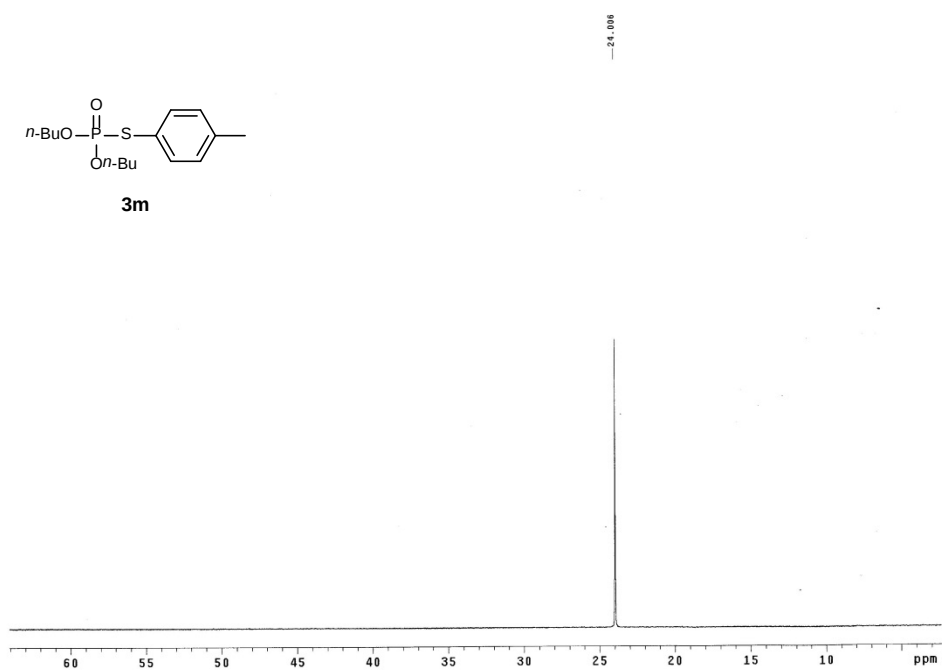




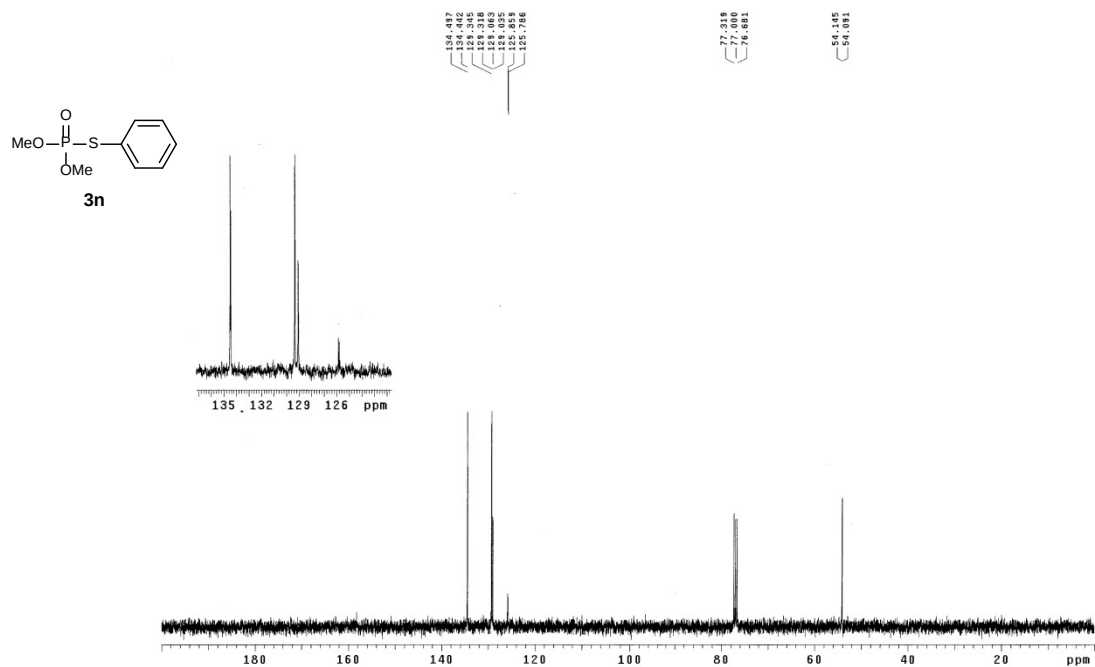
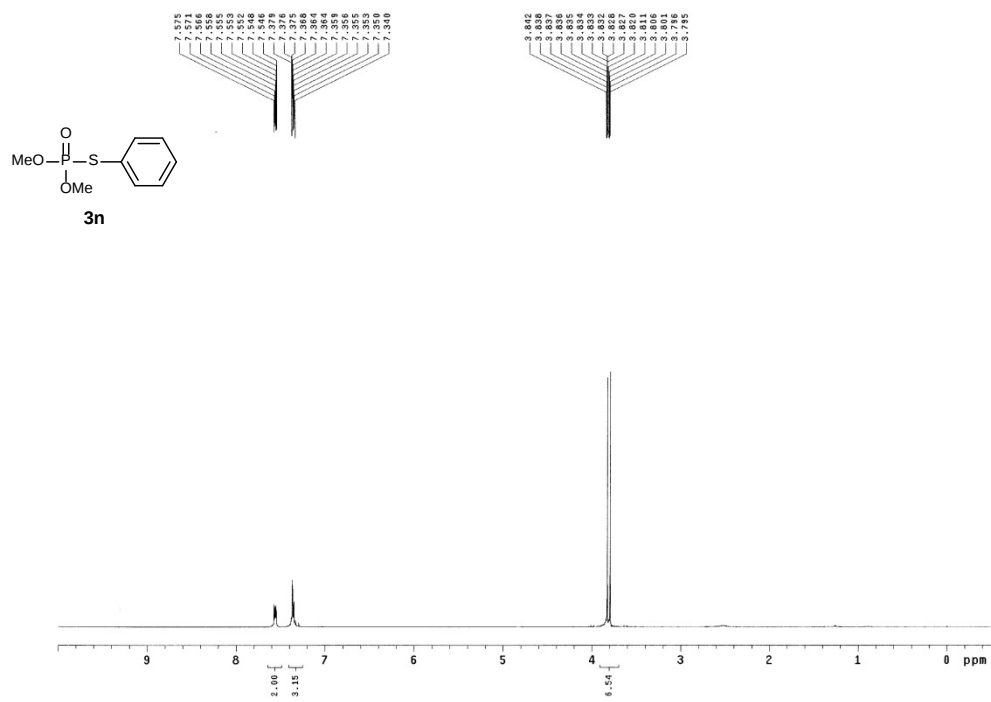


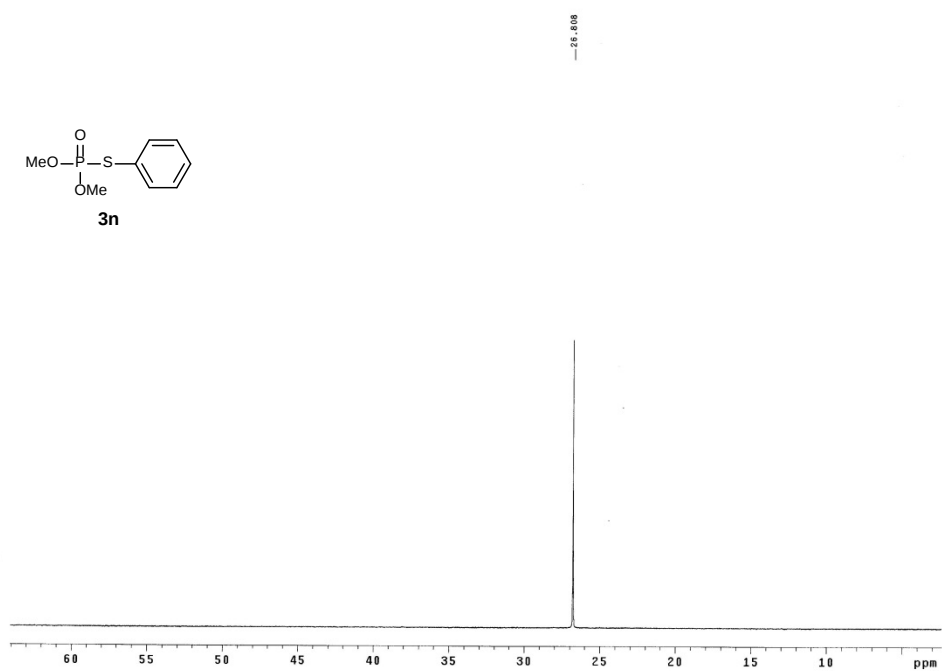
O,O-Dibutyl *S*-*p*-tolylphosphorothioate (**3m**)



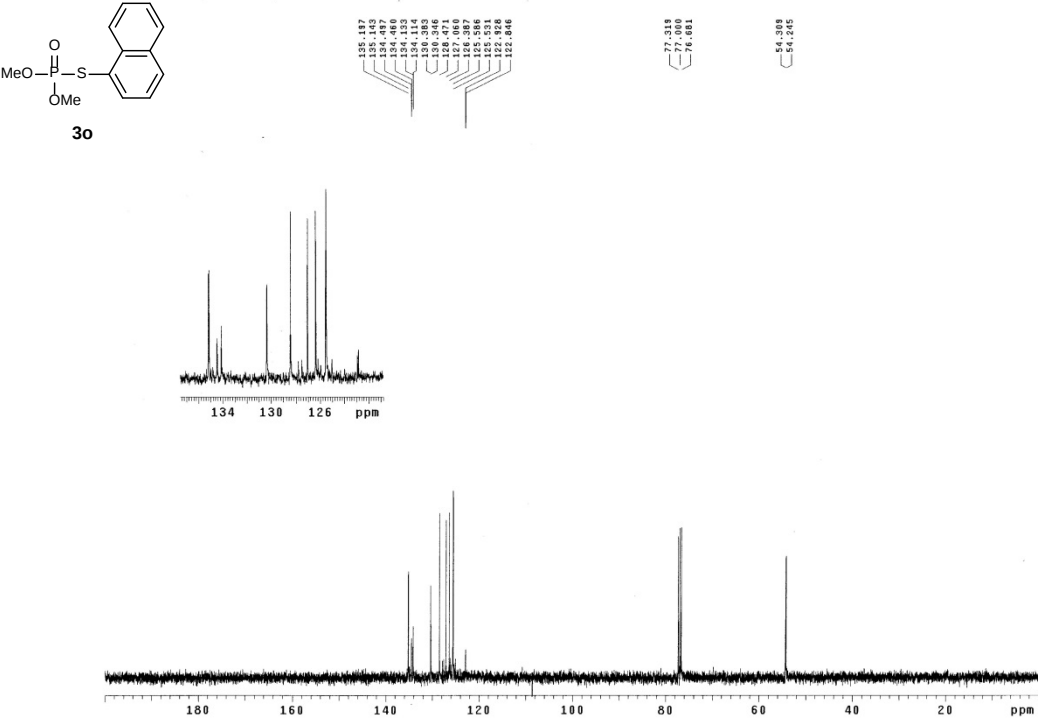
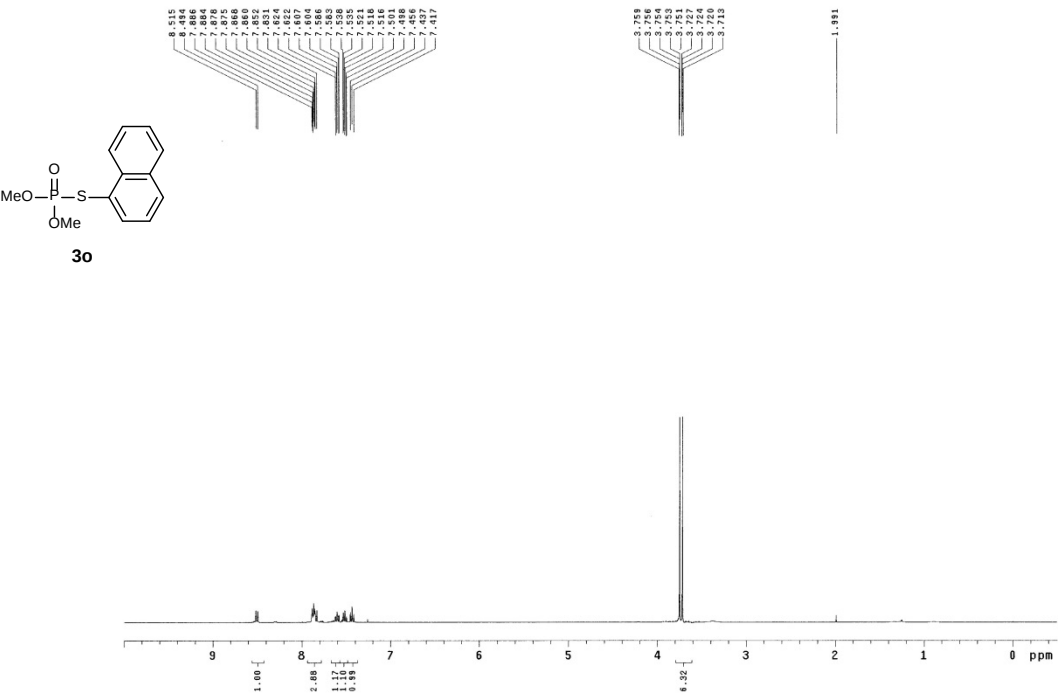


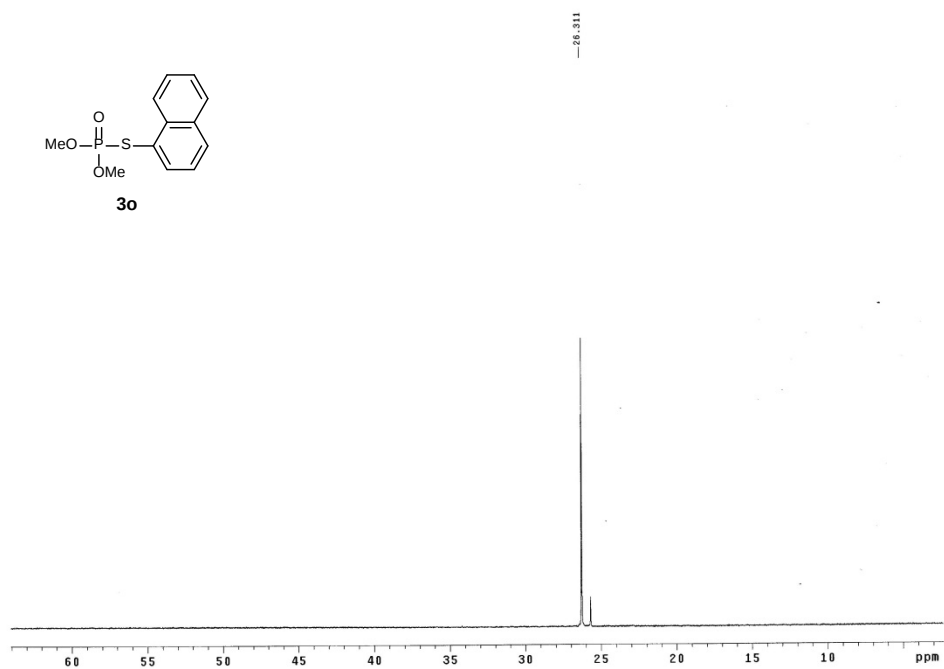
O,O-Dimethyl *S*-phenyl phosphorothioate (**3n**)



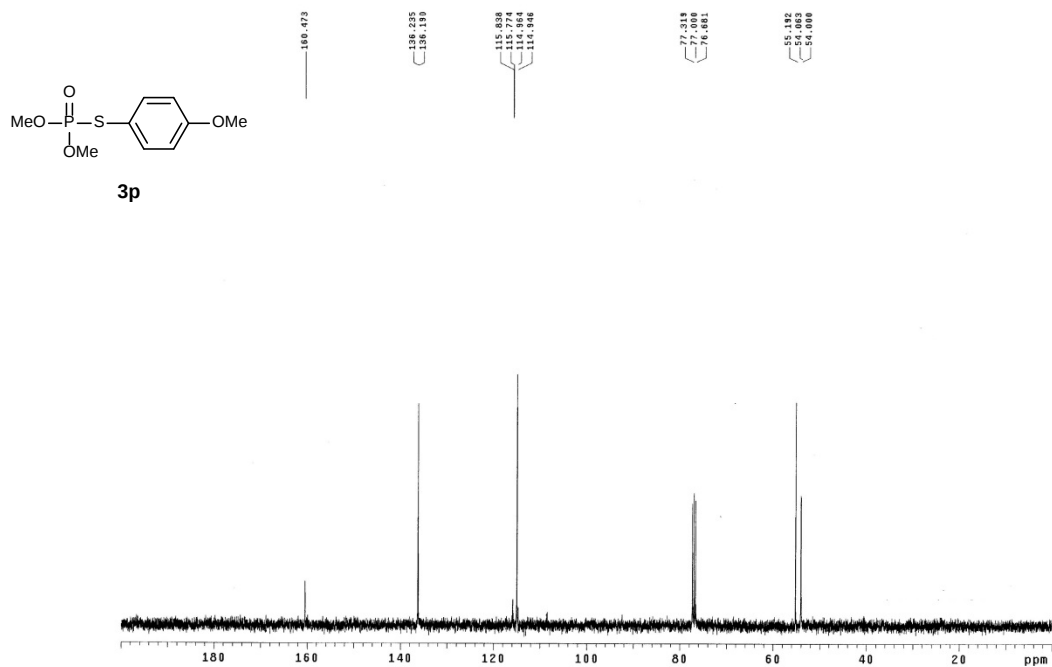
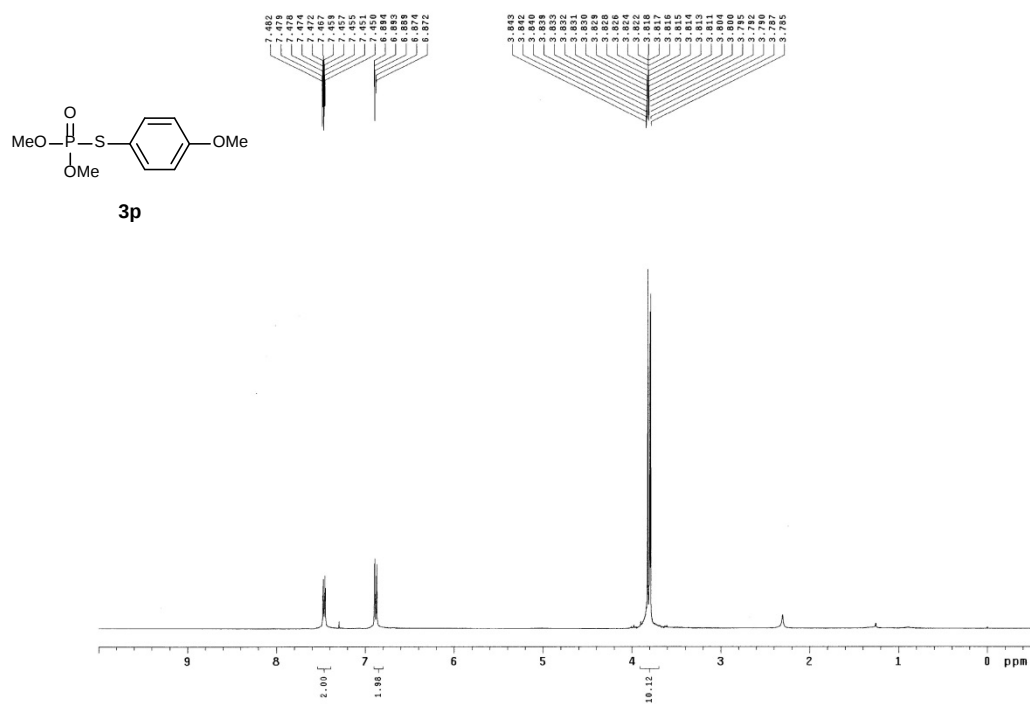


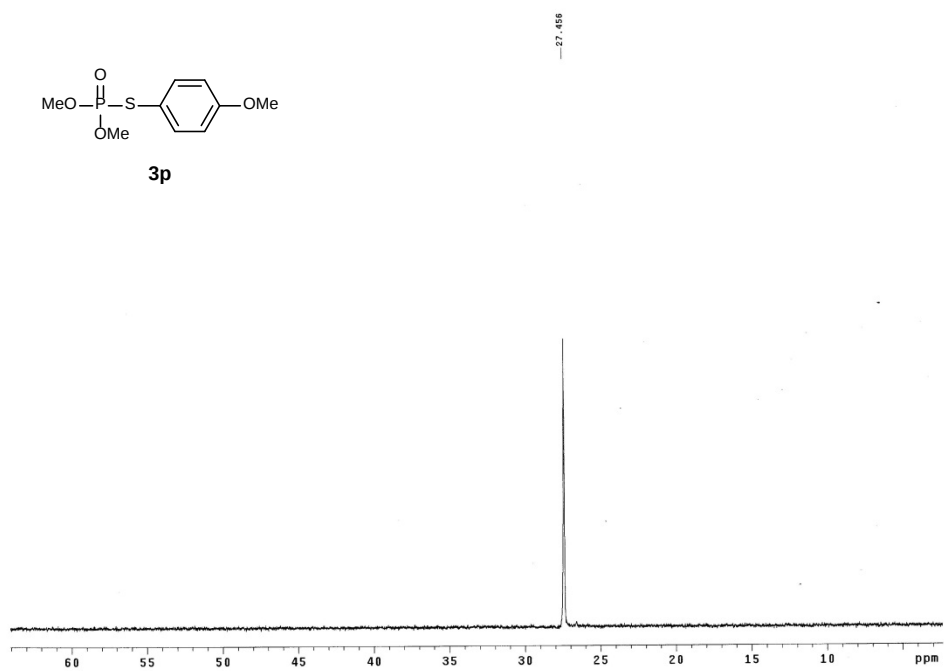
O,O-Dimethyl *S*-naphthalen-1-yl phosphorothioate (**3o**)



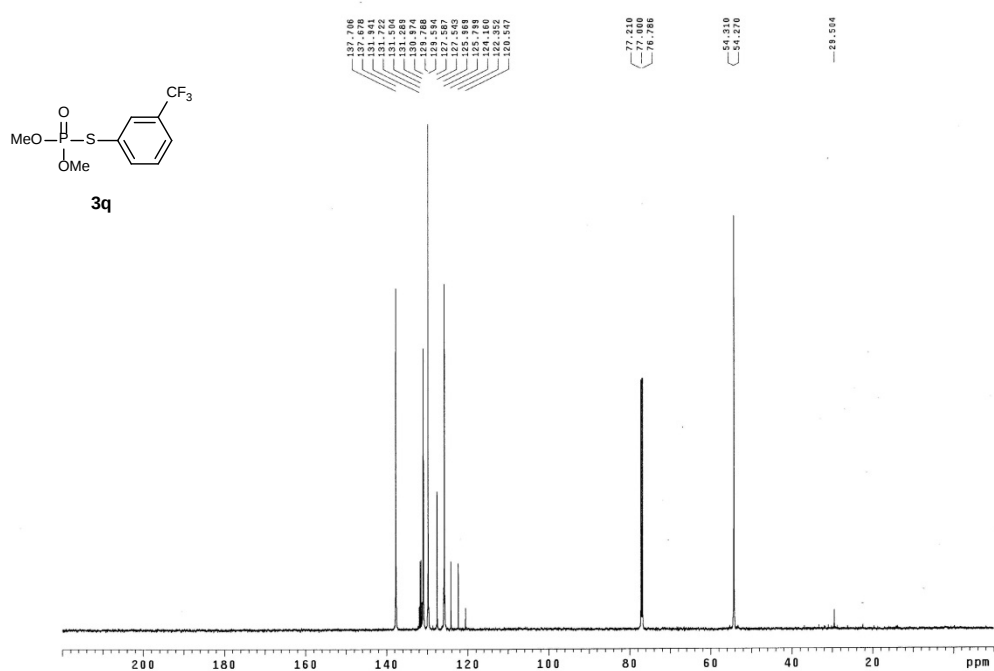
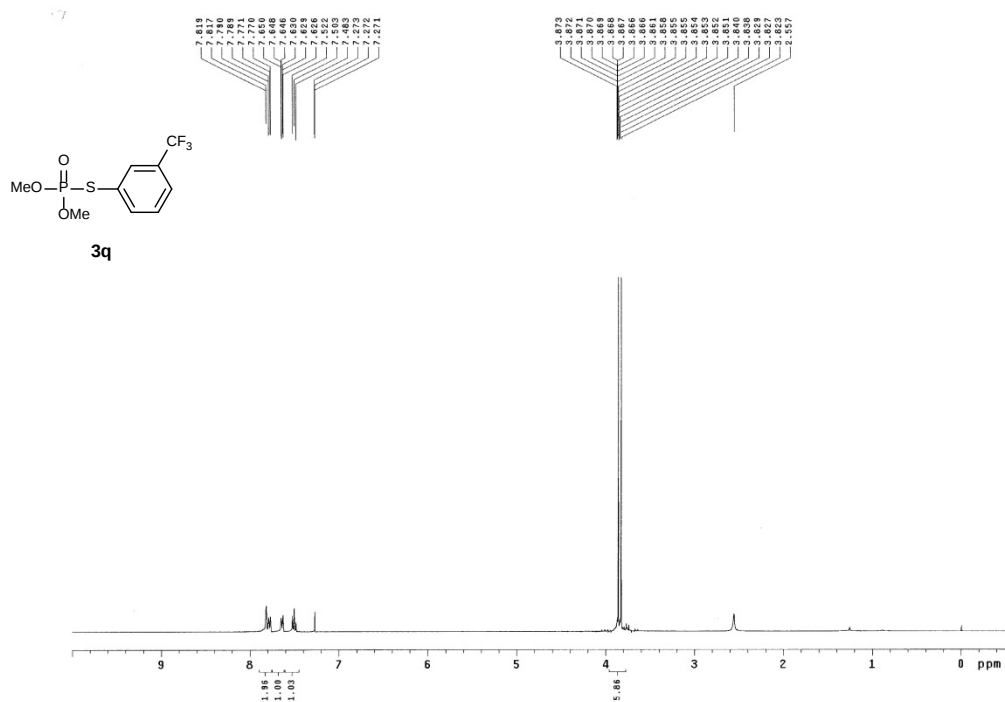


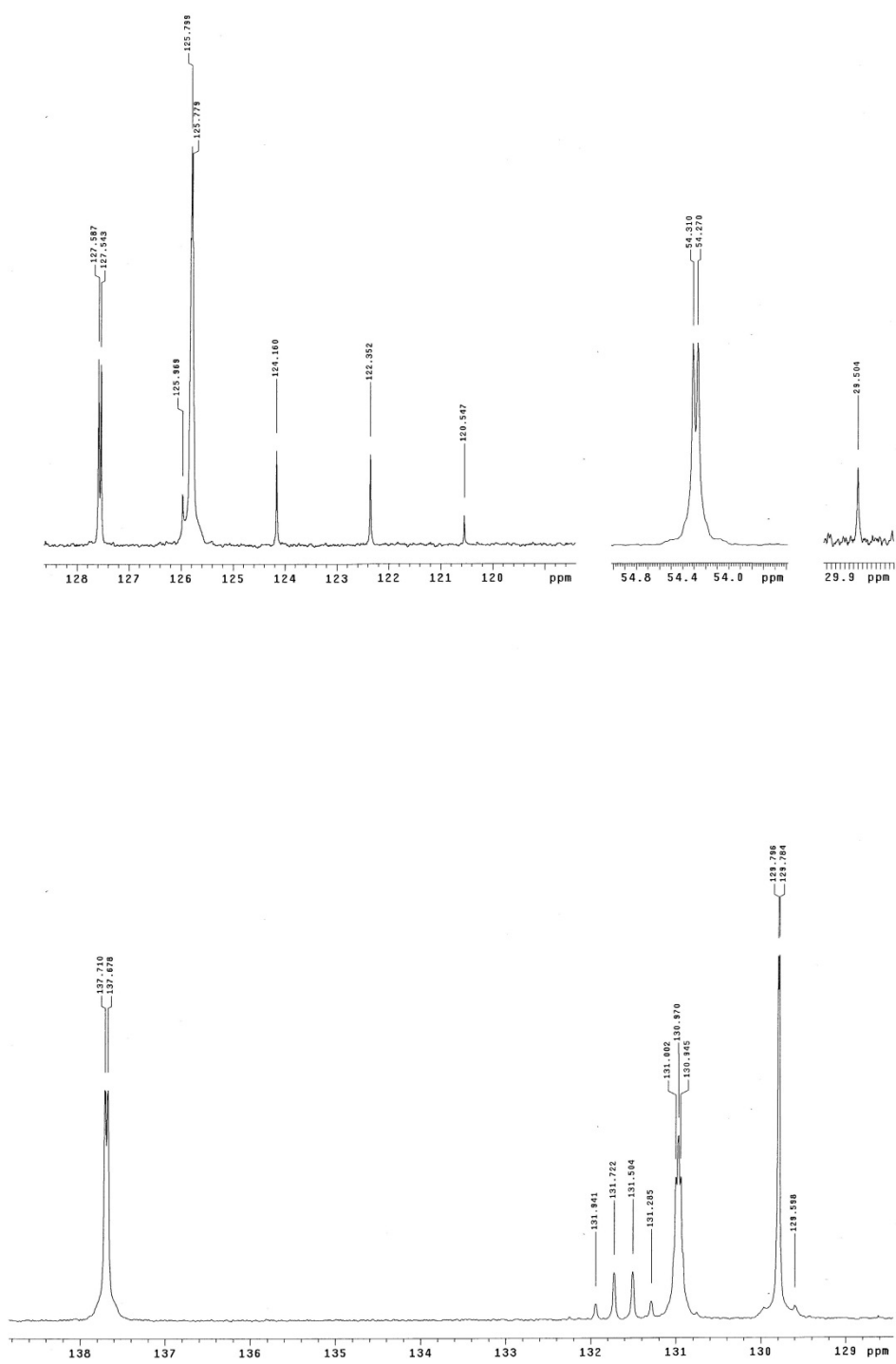
S-(4-Methoxyphenyl) O,O-dimethyl phosphorothioate (3p)

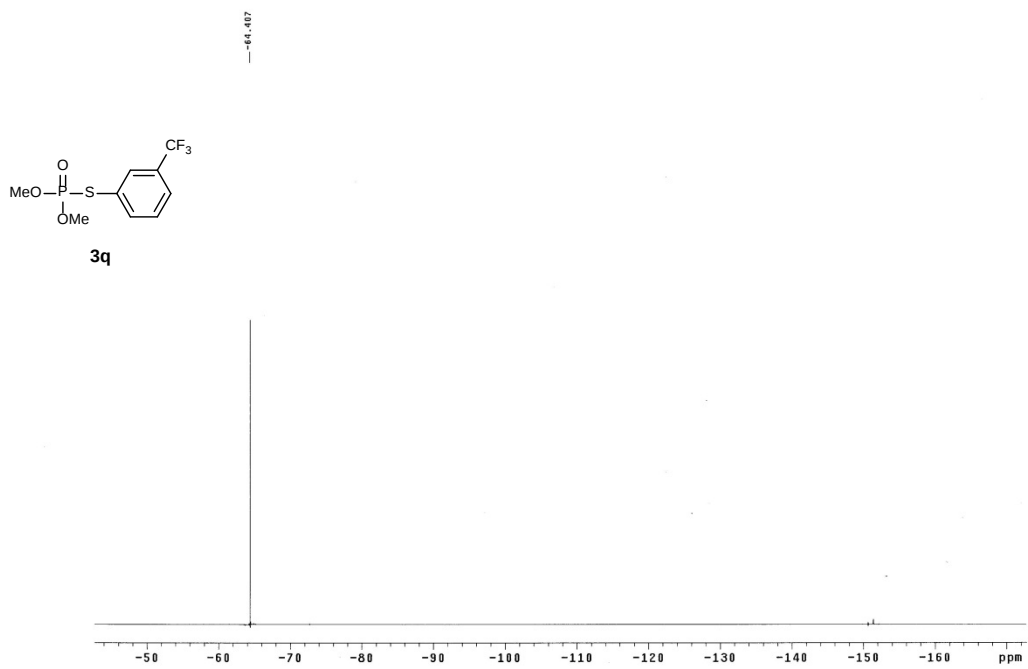
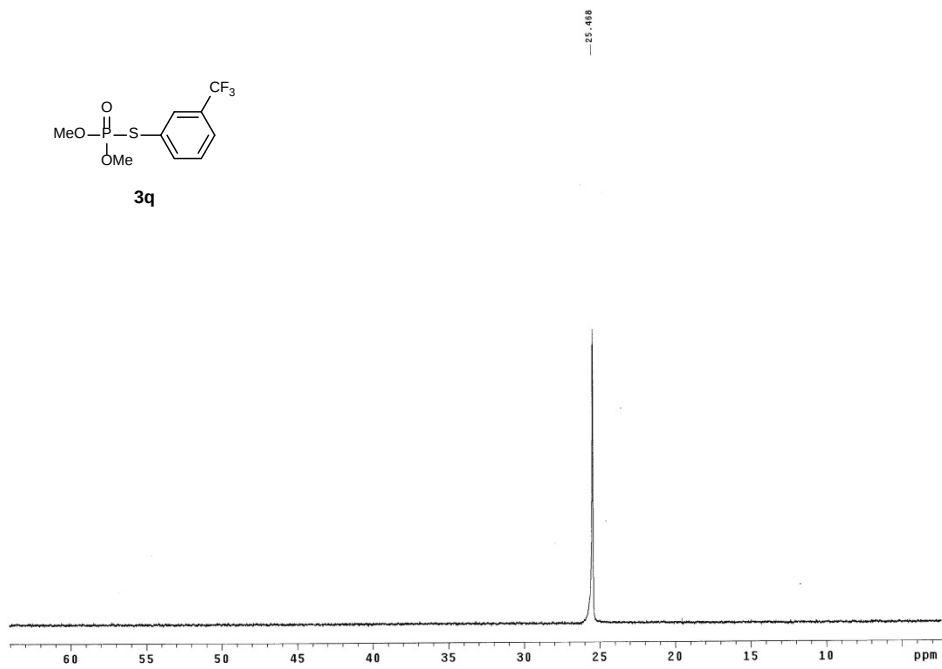




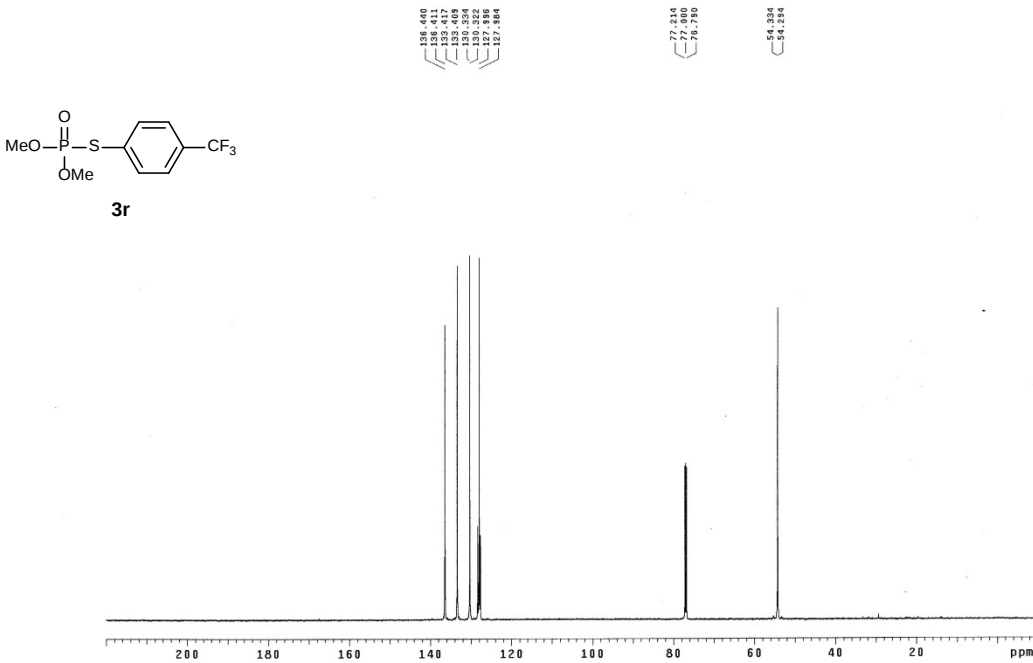
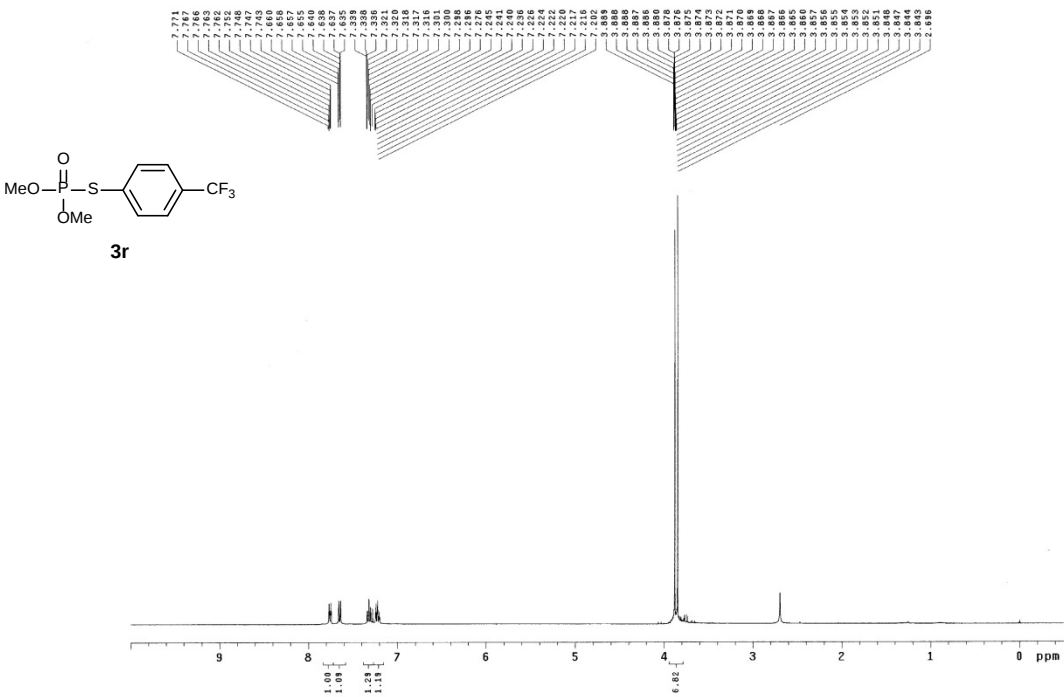
***O,O*-Dimethyl S-(3-(trifluoromethyl)phenyl) phosphorothioate (3q)**

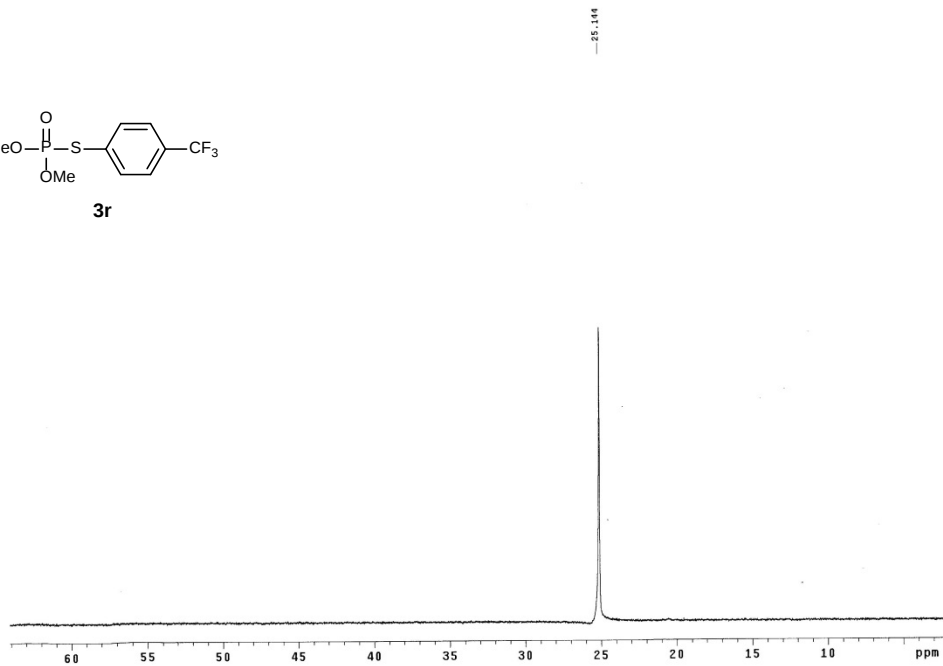
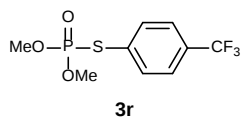
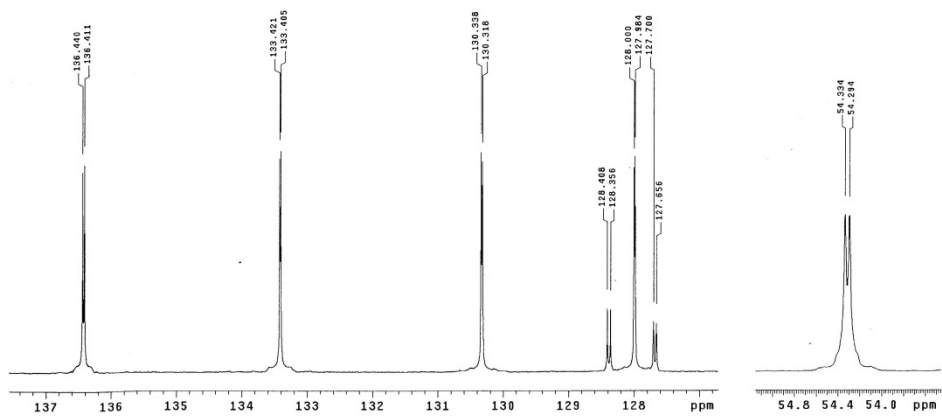


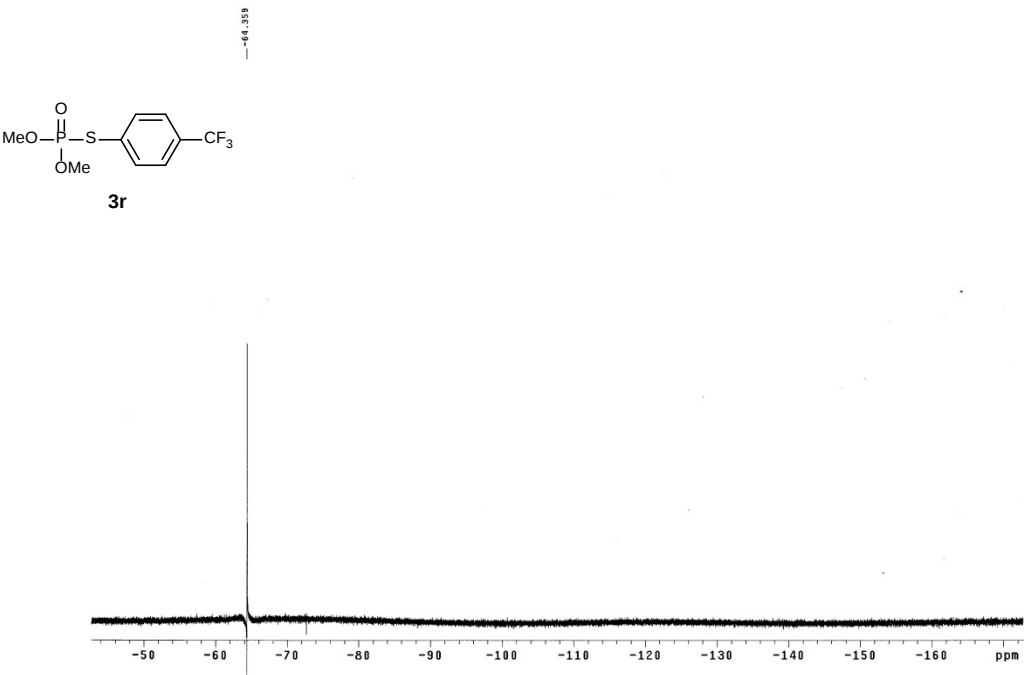




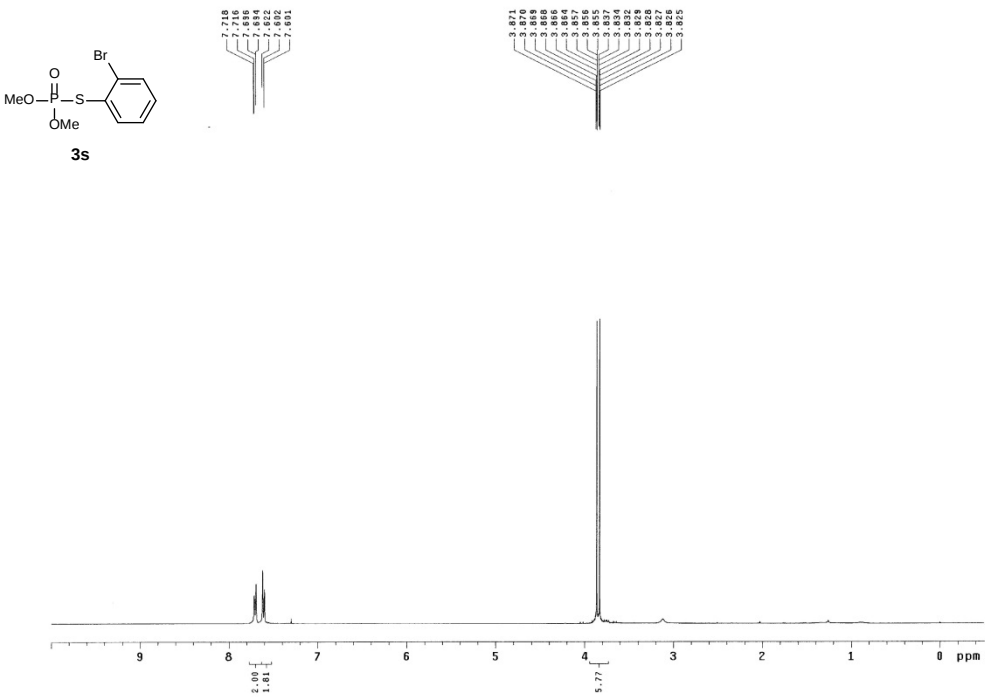
O,O-Dimethyl *S*-(4-(trifluoromethyl)phenyl) phosphorothioate (**3r**)

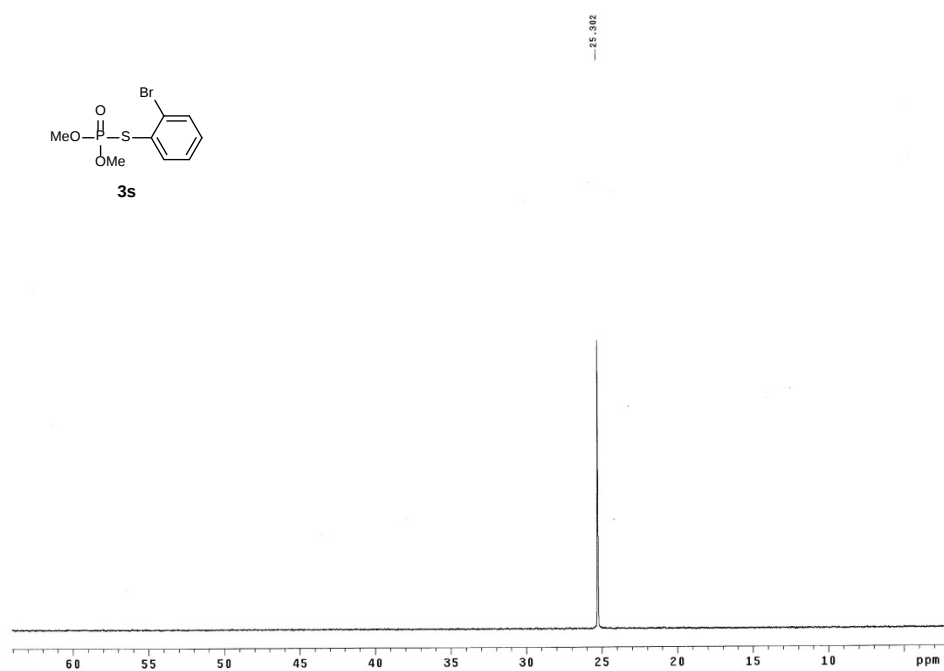




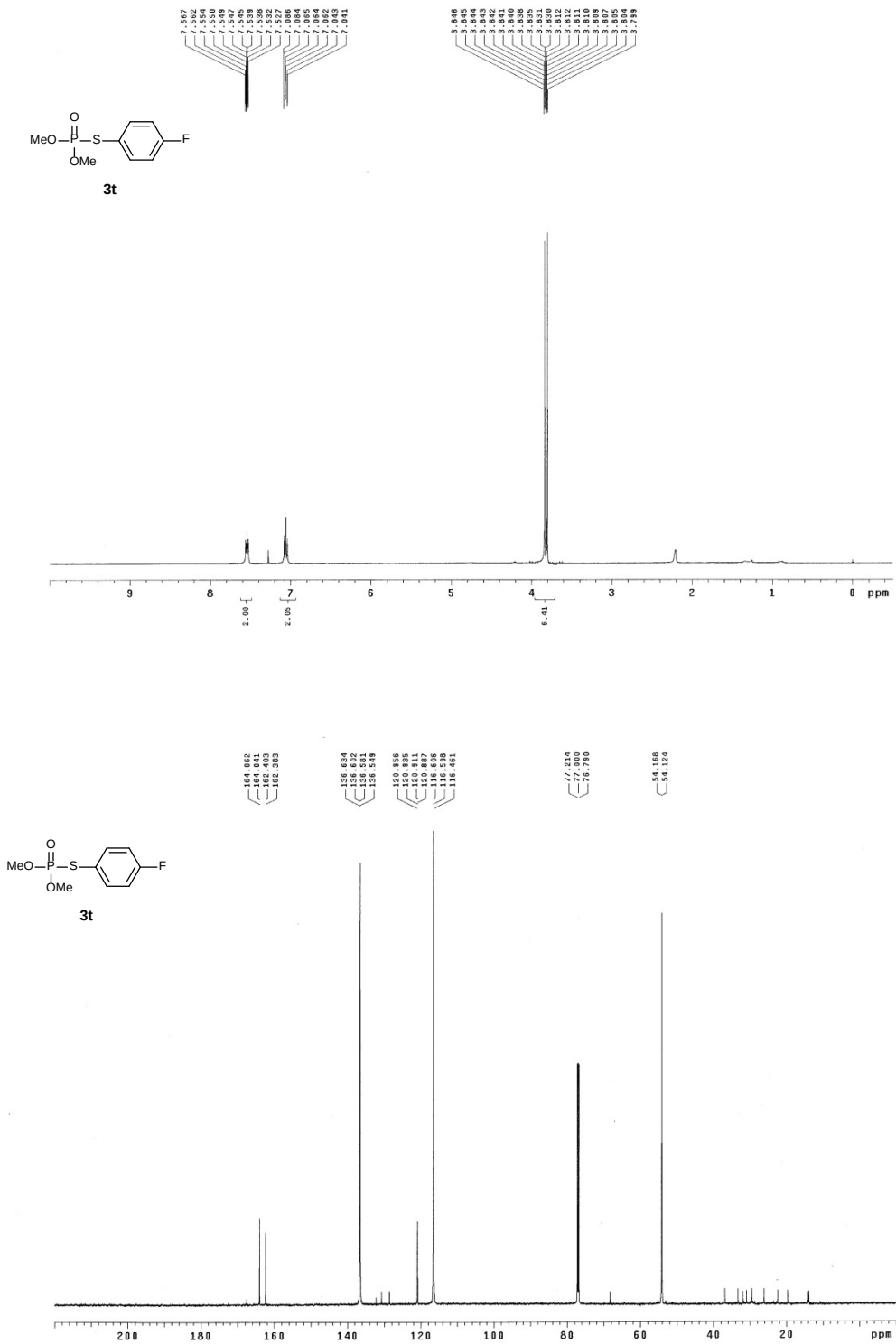


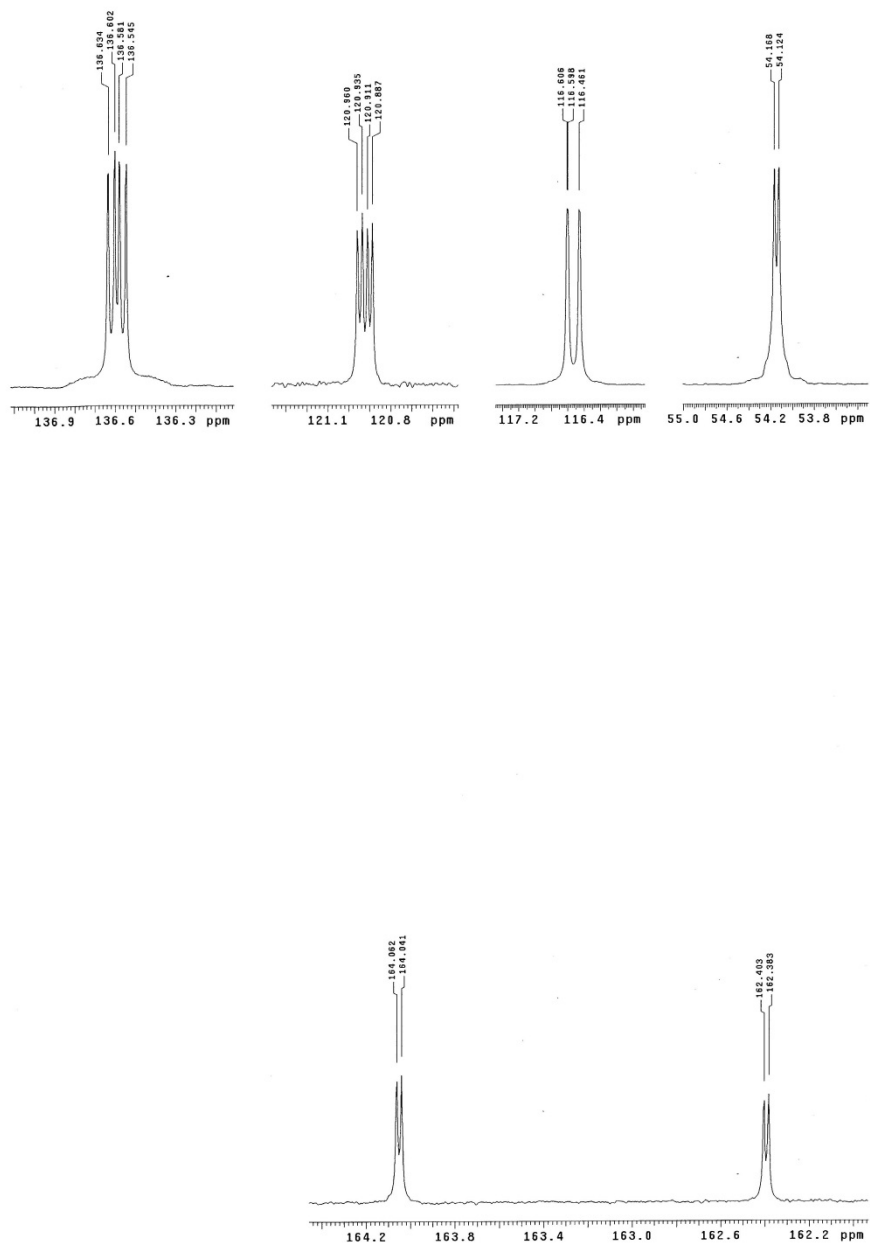
***S*-(2-Bromophenyl) *O,O*-dimethyl phosphorothioate (3s)**

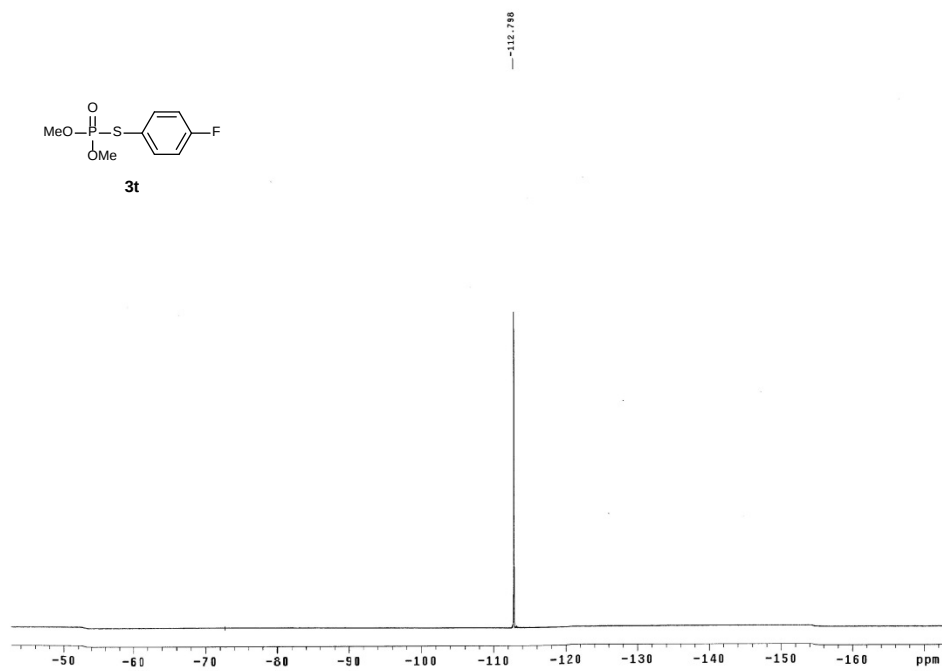
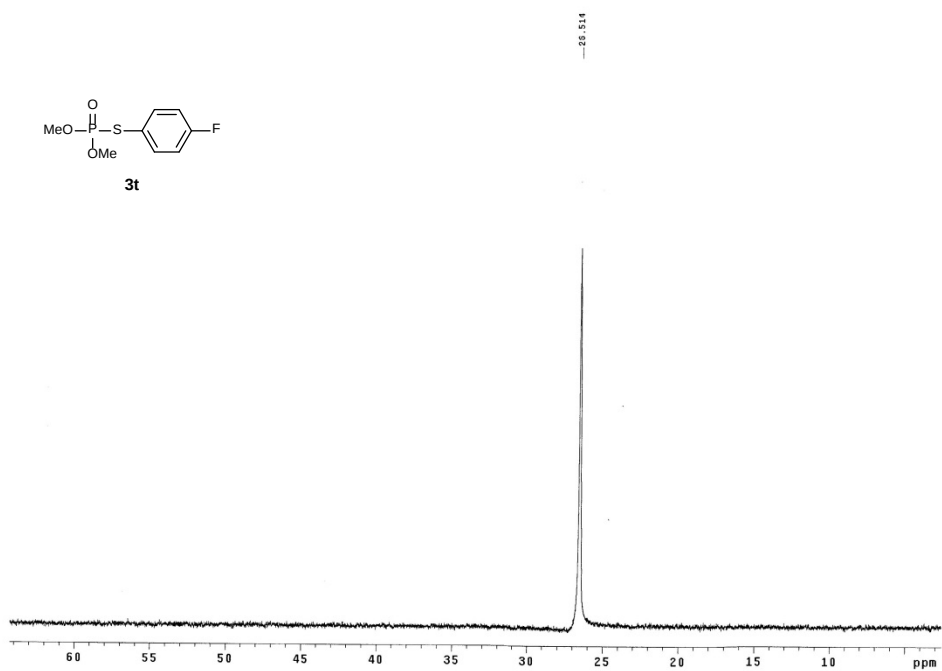




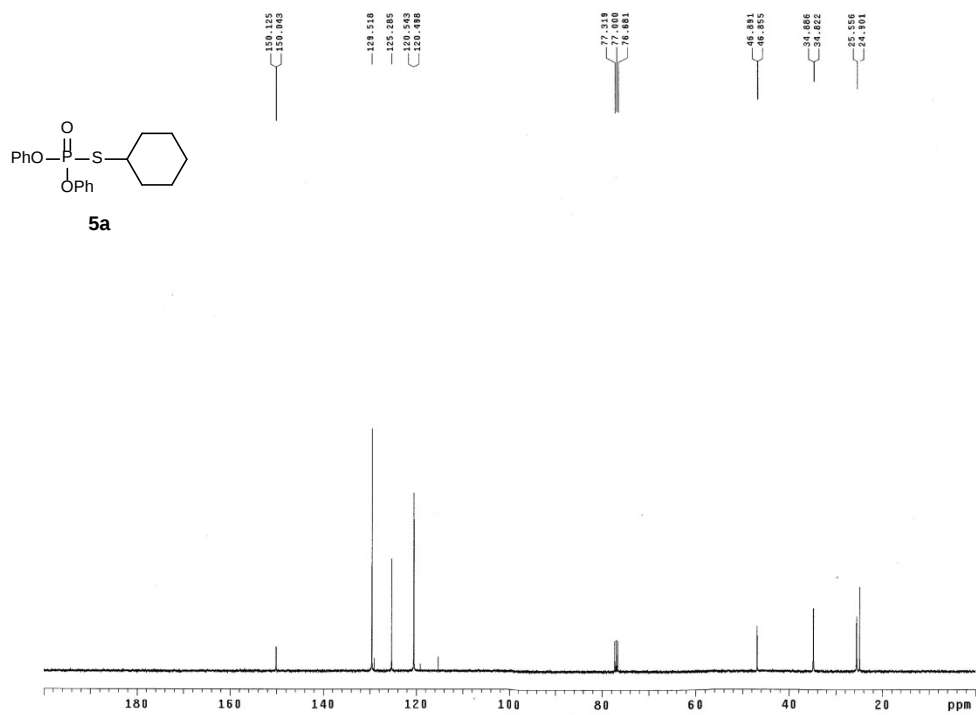
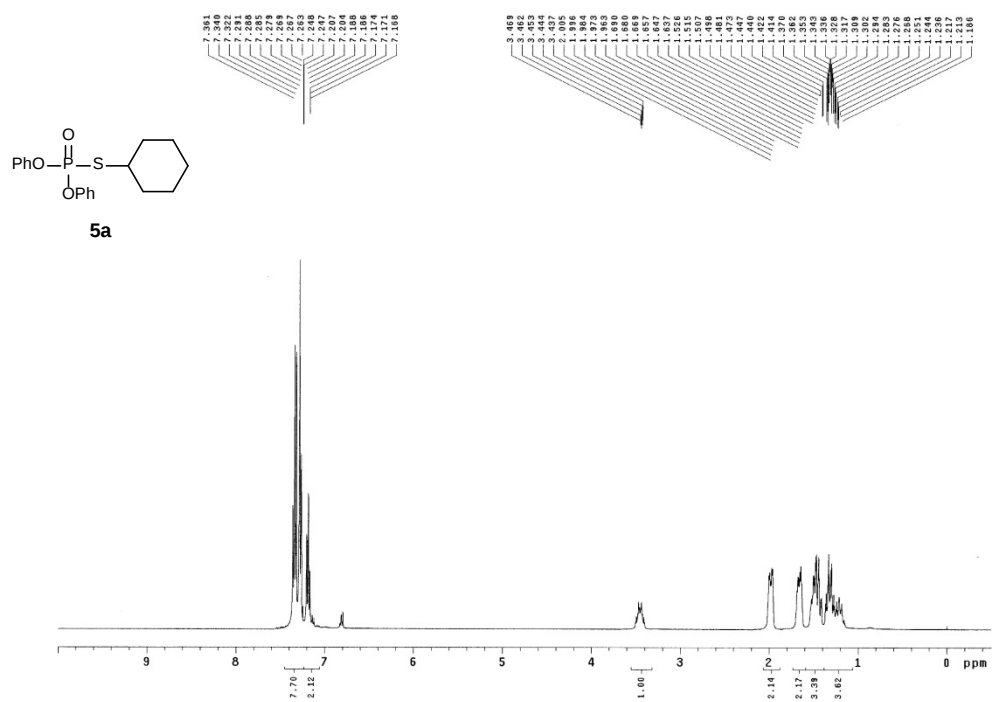
S-(4-Fluorophenyl) O,O-dimethyl phosphorothioate (3t)

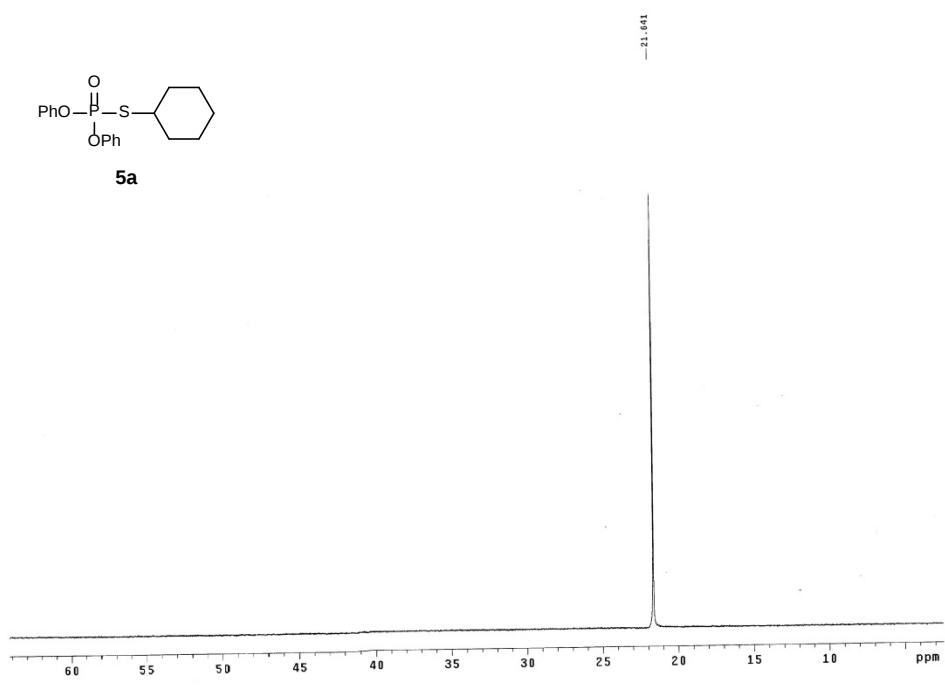




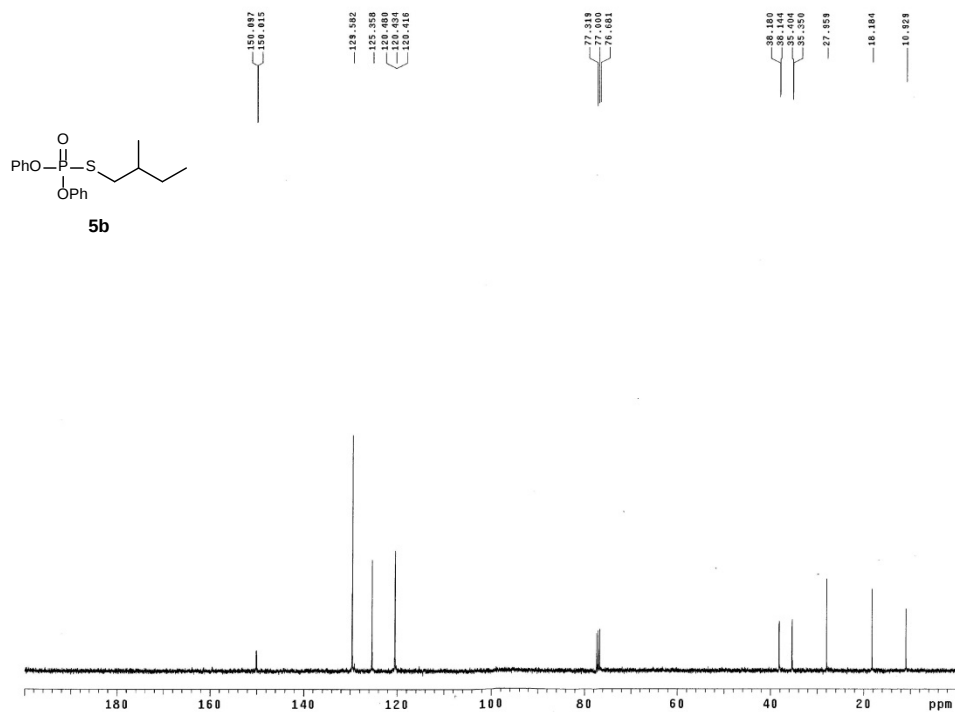
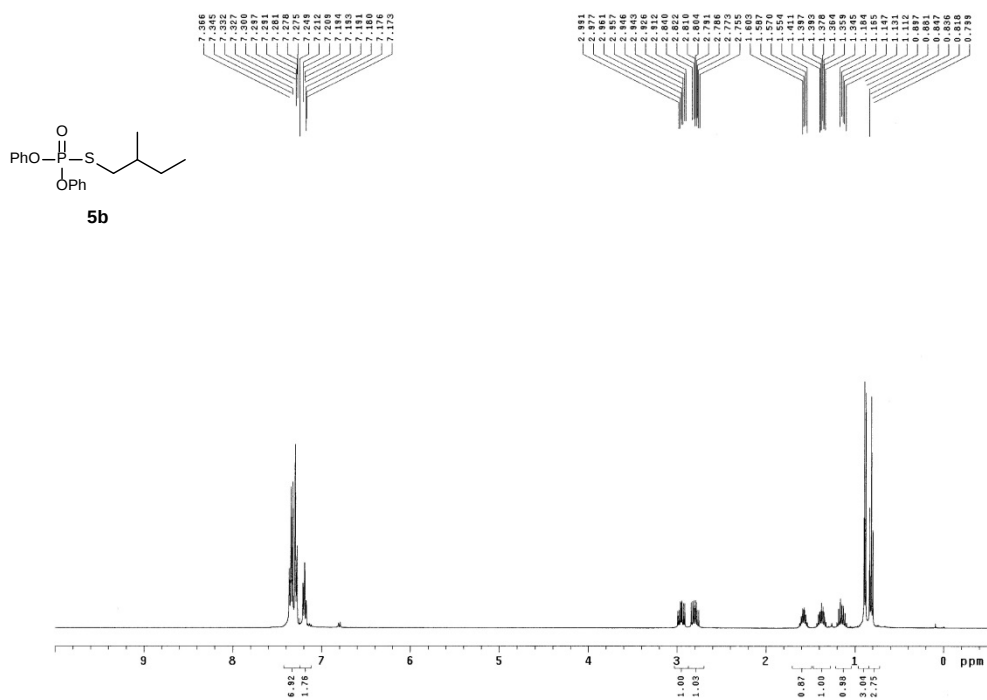


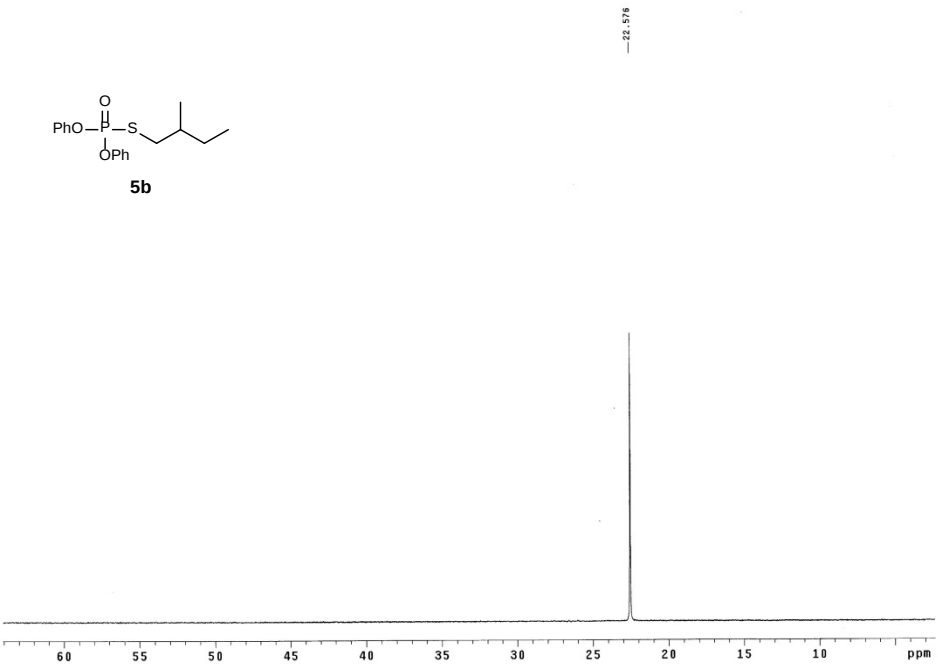
S-Cyclohexyl O,O-diphenylphosphorothioate (5a)

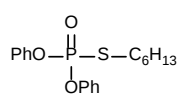




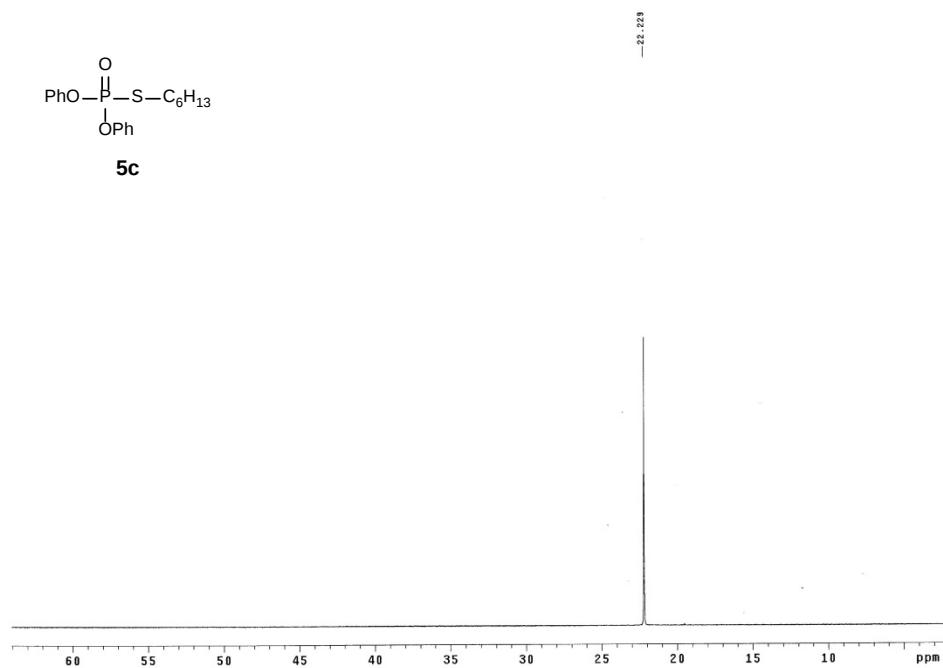
***S*-(2-Methylbutyl) *O,O*-diphenylphosphorothioate (5b)**



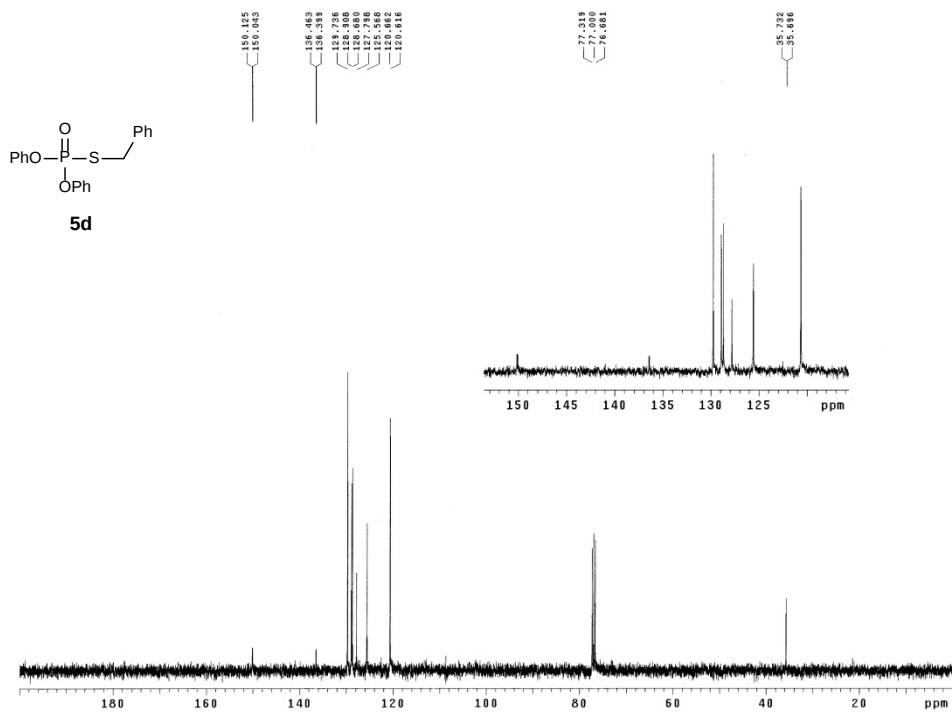
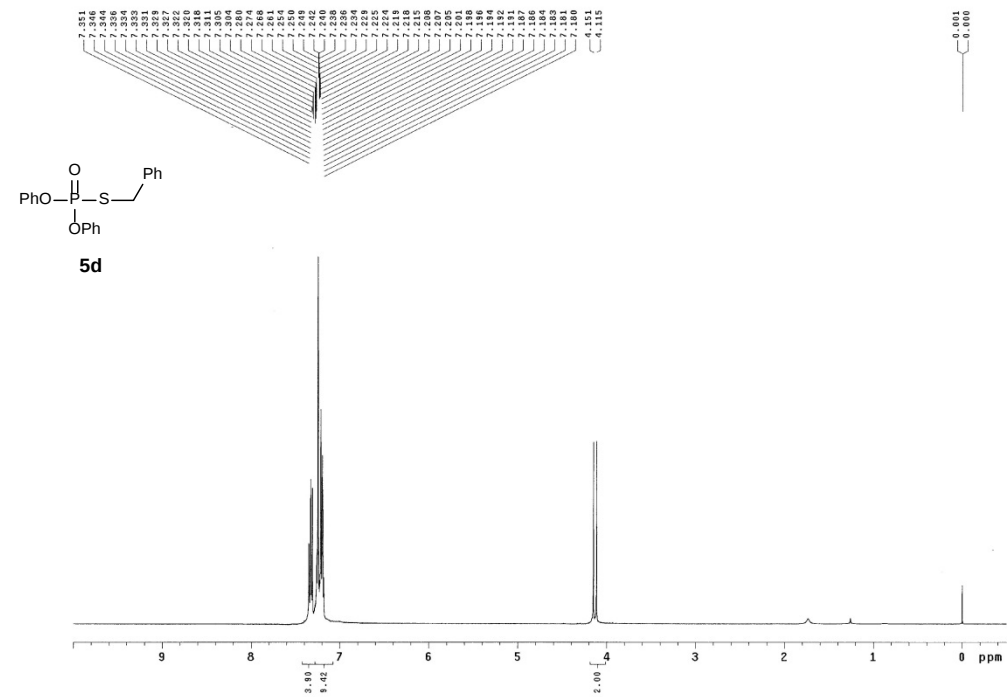


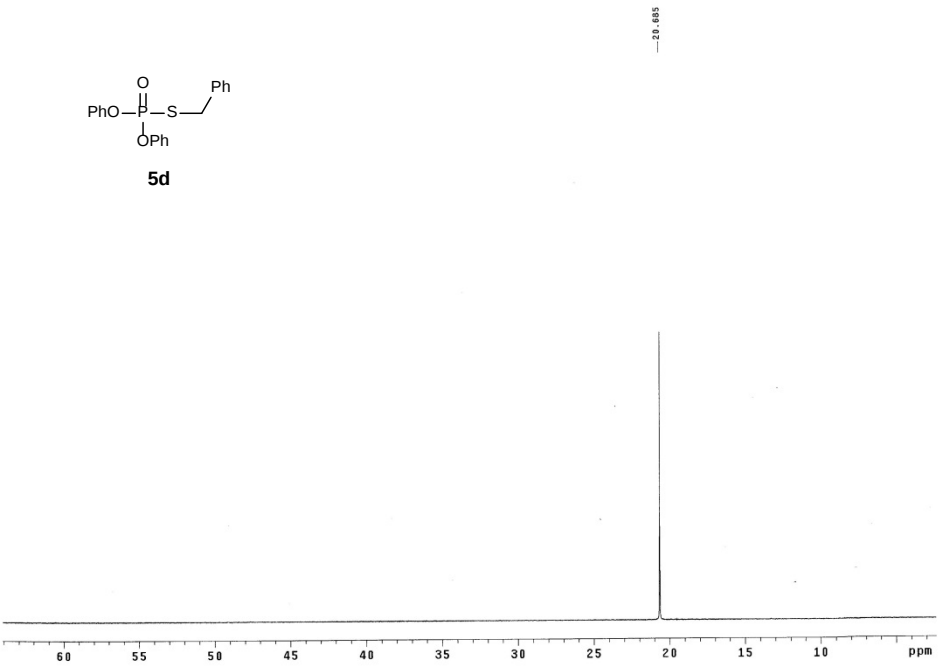


5c

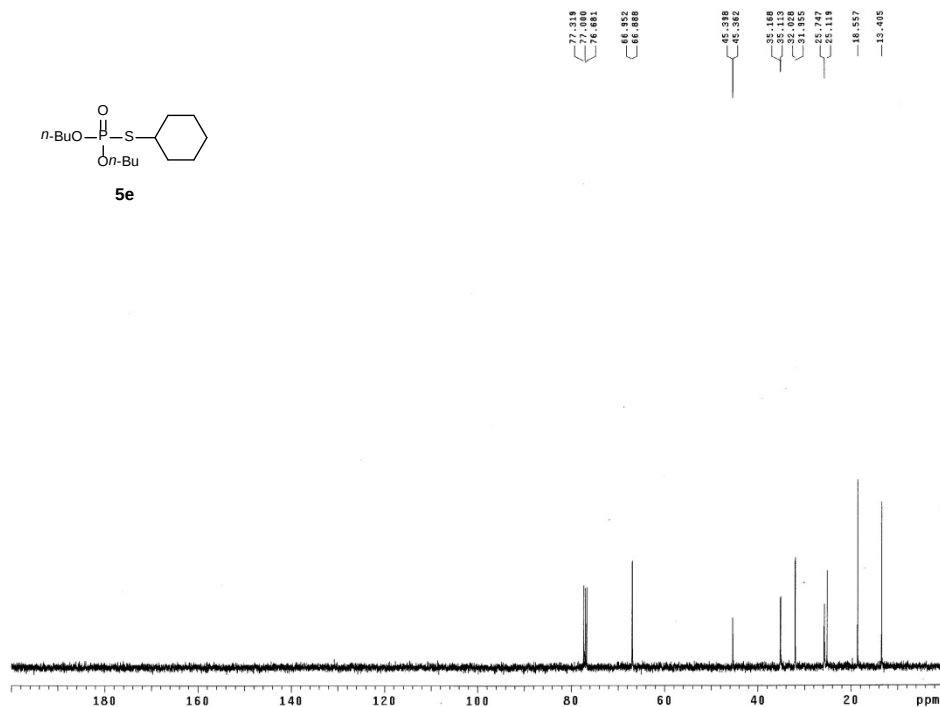
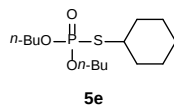
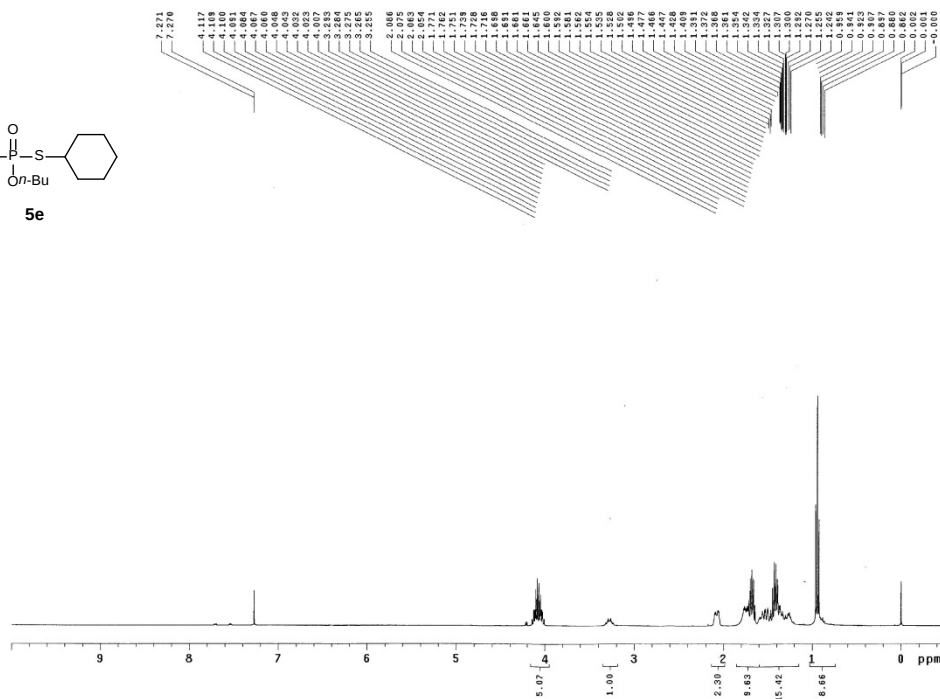
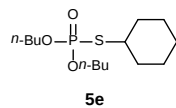


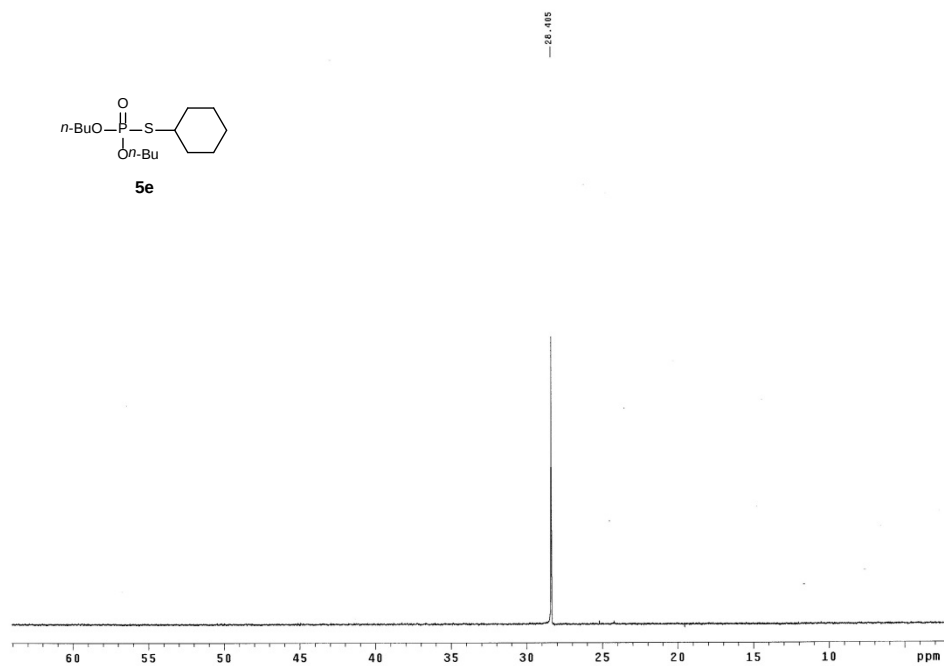
S-Benzyl O,O-diphenylphosphorothioate (5d)



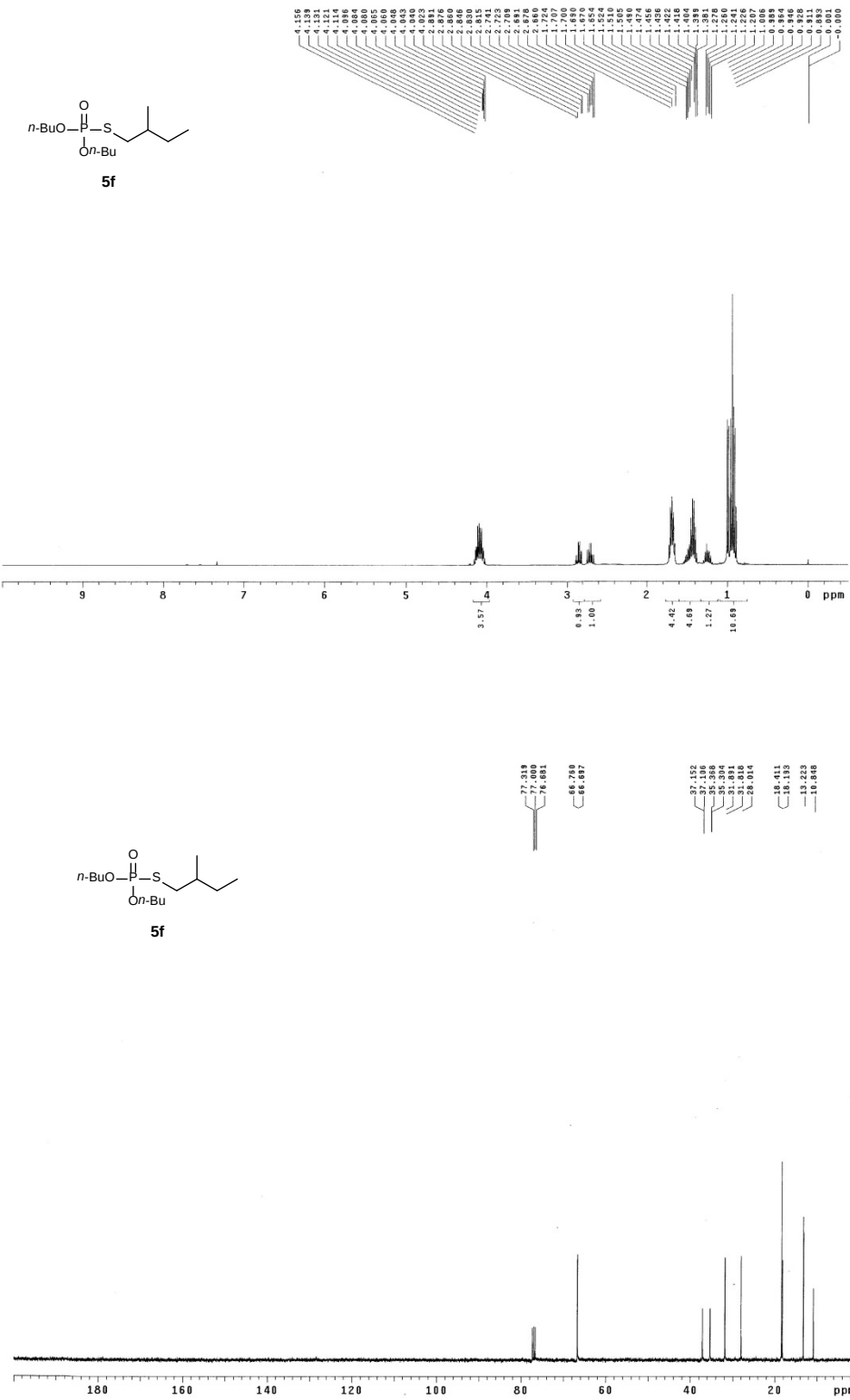


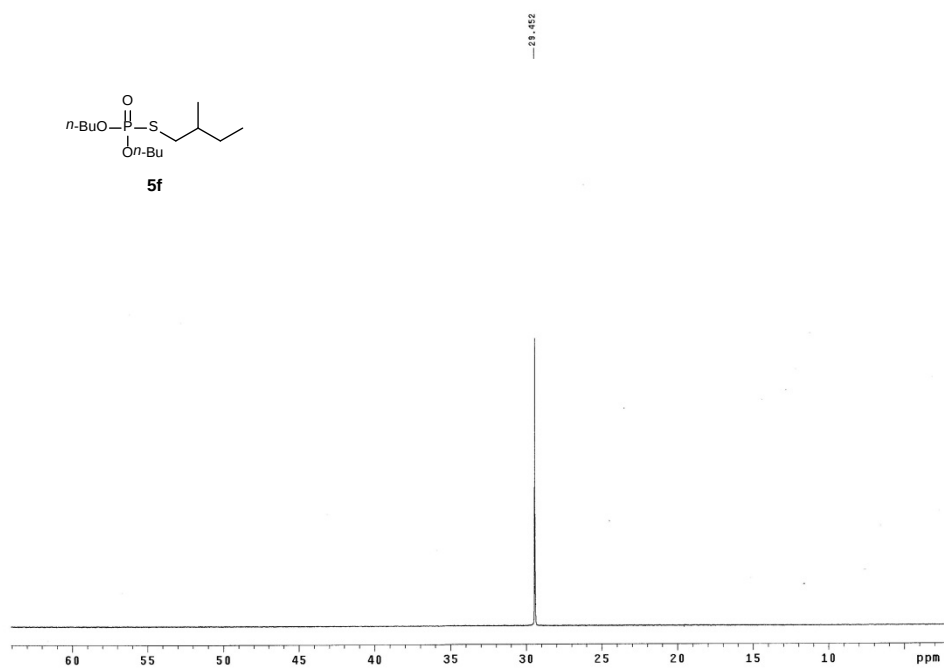
***O,O*-Dibutyl *S*-cyclohexylphosphorothioate (5e)**



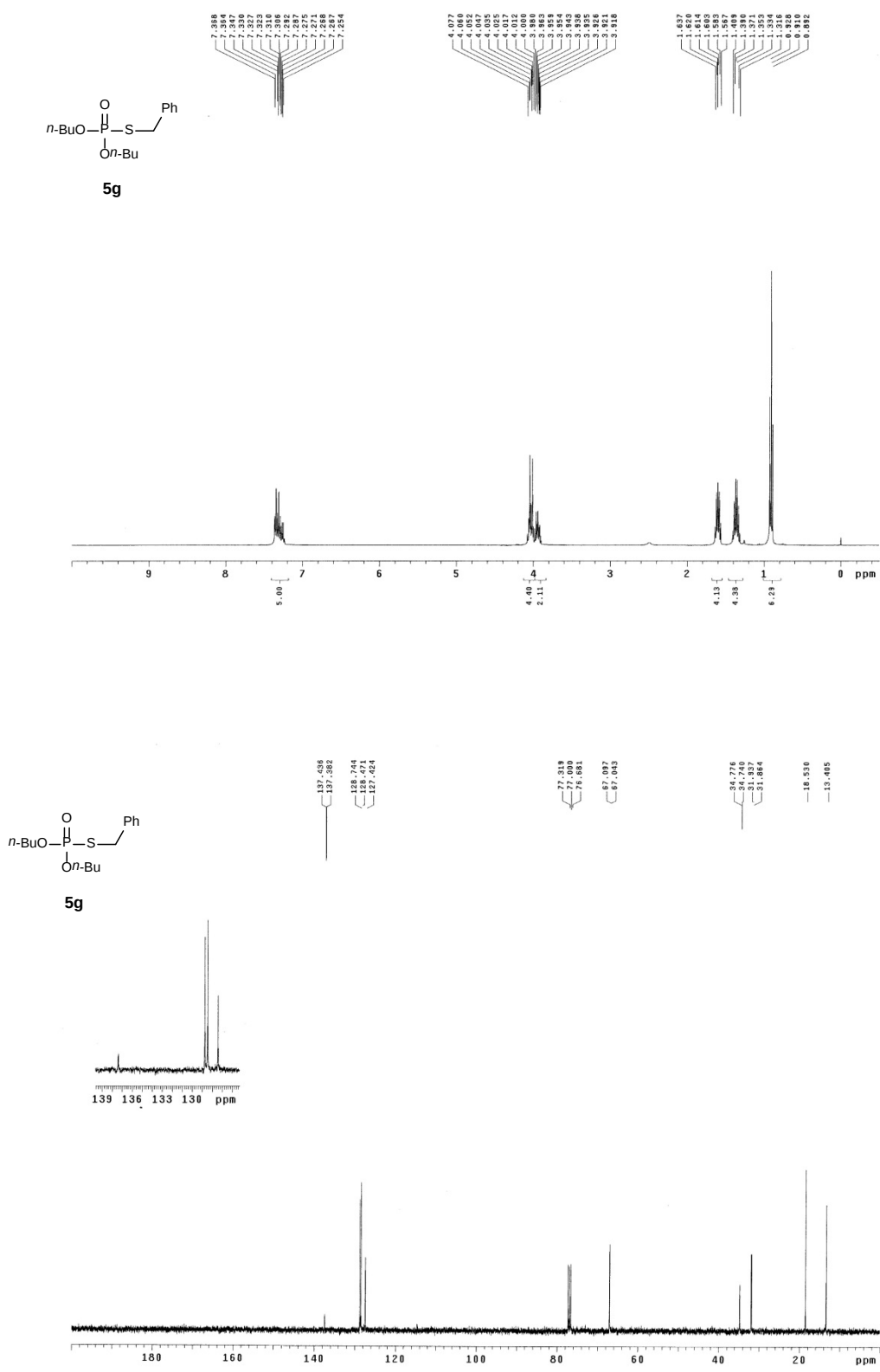


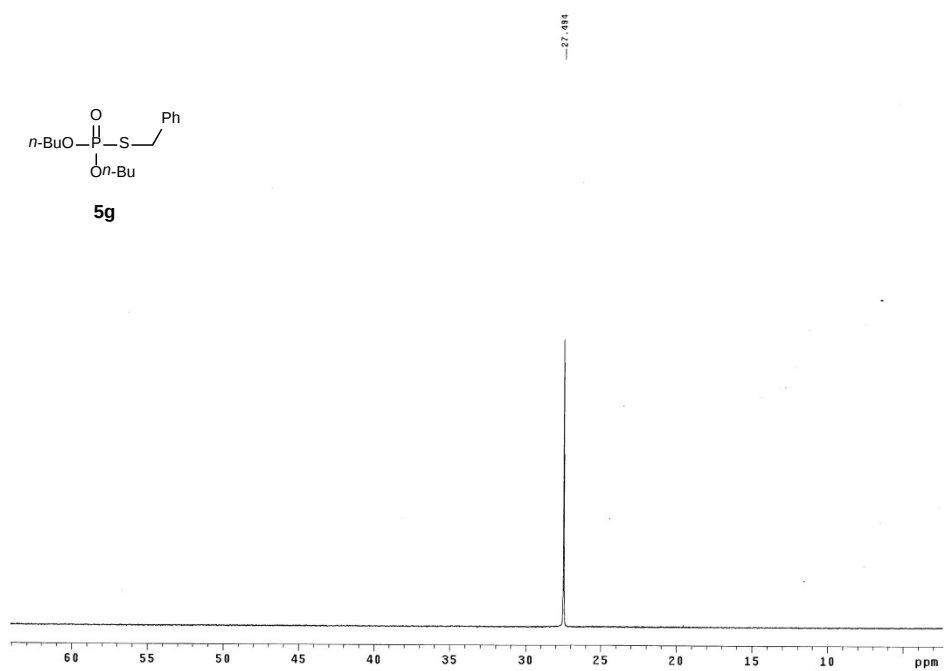
O,O-Dibutyl *S*-(2-methylbutyl) phosphorothioate (**5f**)



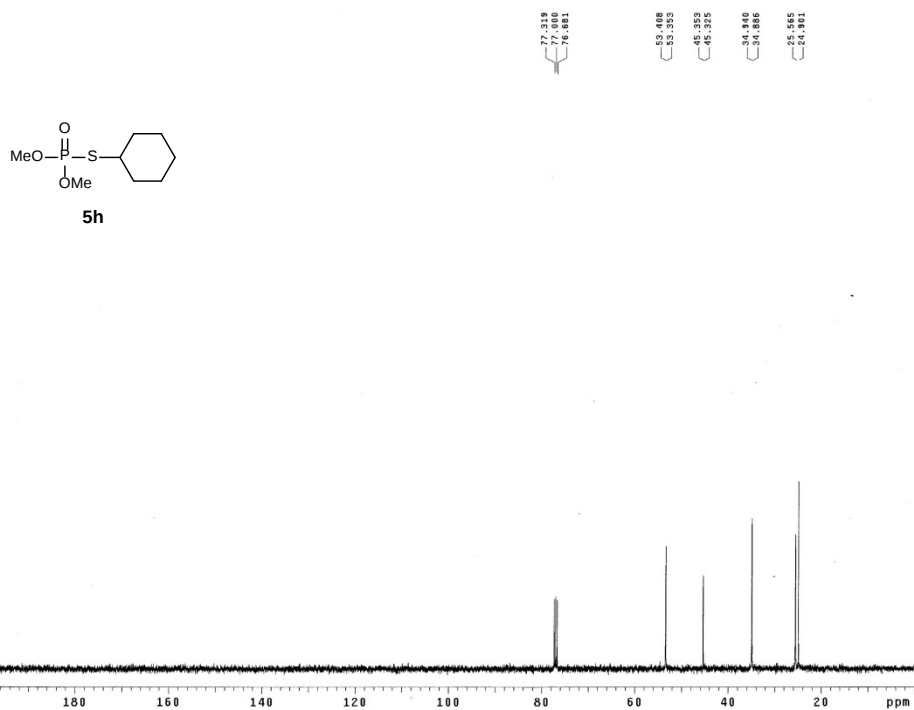
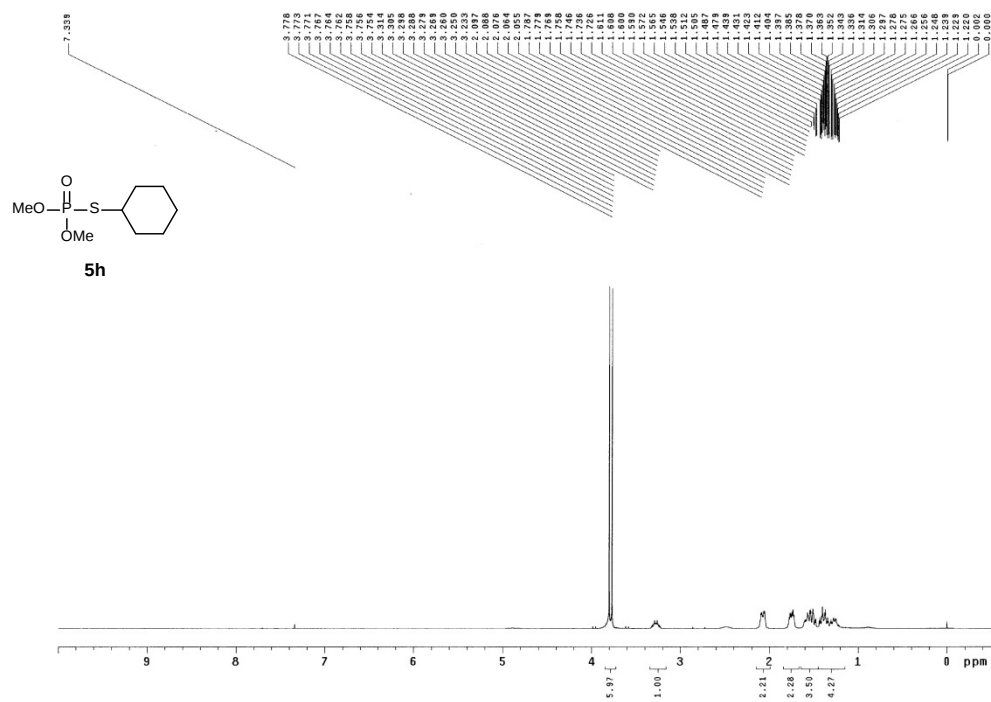


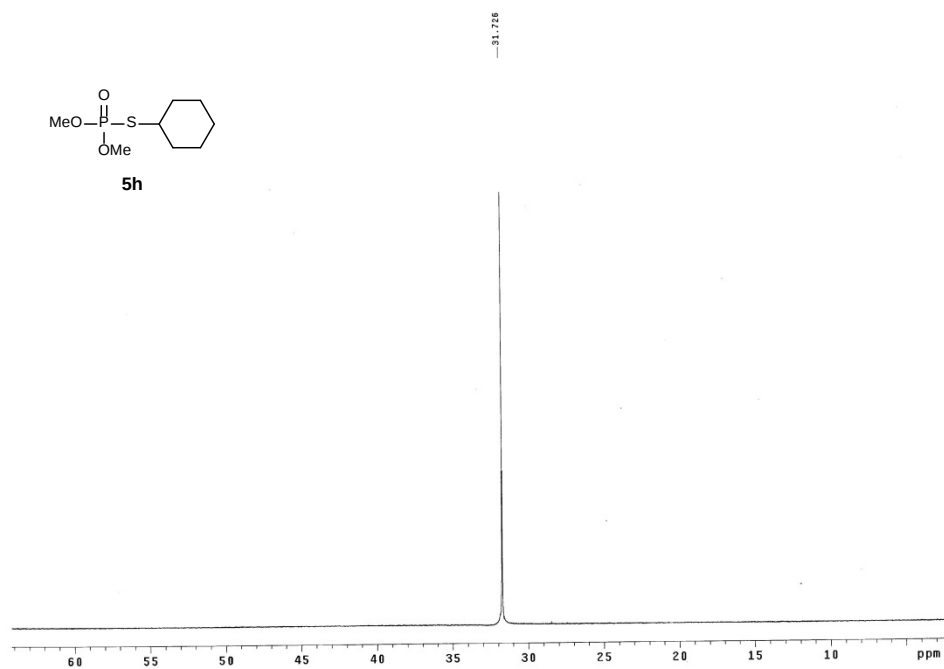
S-Benzyl O,O-dibutylphosphorothioate (5g)



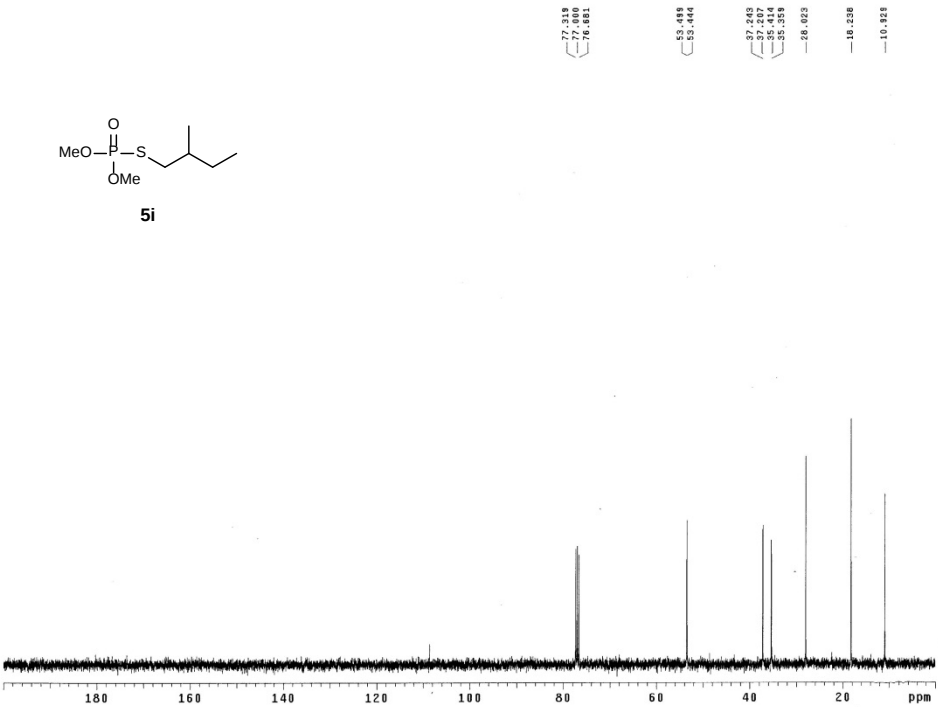
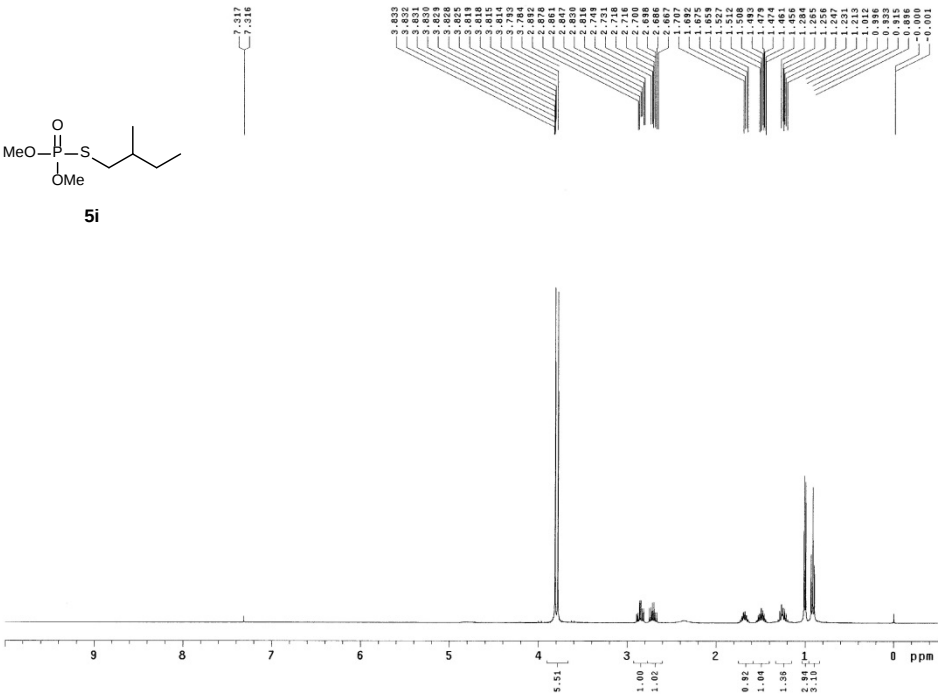


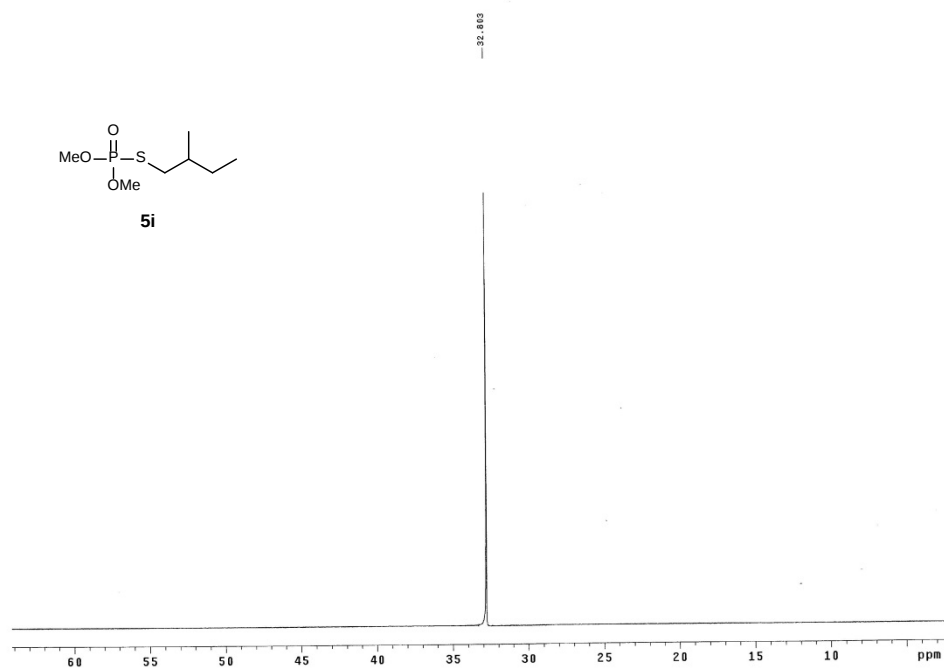
S-Cyclohexyl O,O-dimethyl phosphorothioate (5h)





O,O-Dimethyl *S*-(2-methylbutyl) phosphorothioate (**5i**)





S-Benzyl O,O-dimethyl phosphorothioate (5j)

