

Electronic supplementary information

## **Nickel-Catalyzed Coupling of $R_2P(O)Me$ ( $R = \text{Aryl or Alkoxy}$ ) with (Hetero)arylmethyl Alcohols**

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<sup>b</sup> Collaborative Innovation Center of Chemical Science and Engineering (Tianjin), Tianjin 300072, P. R. China

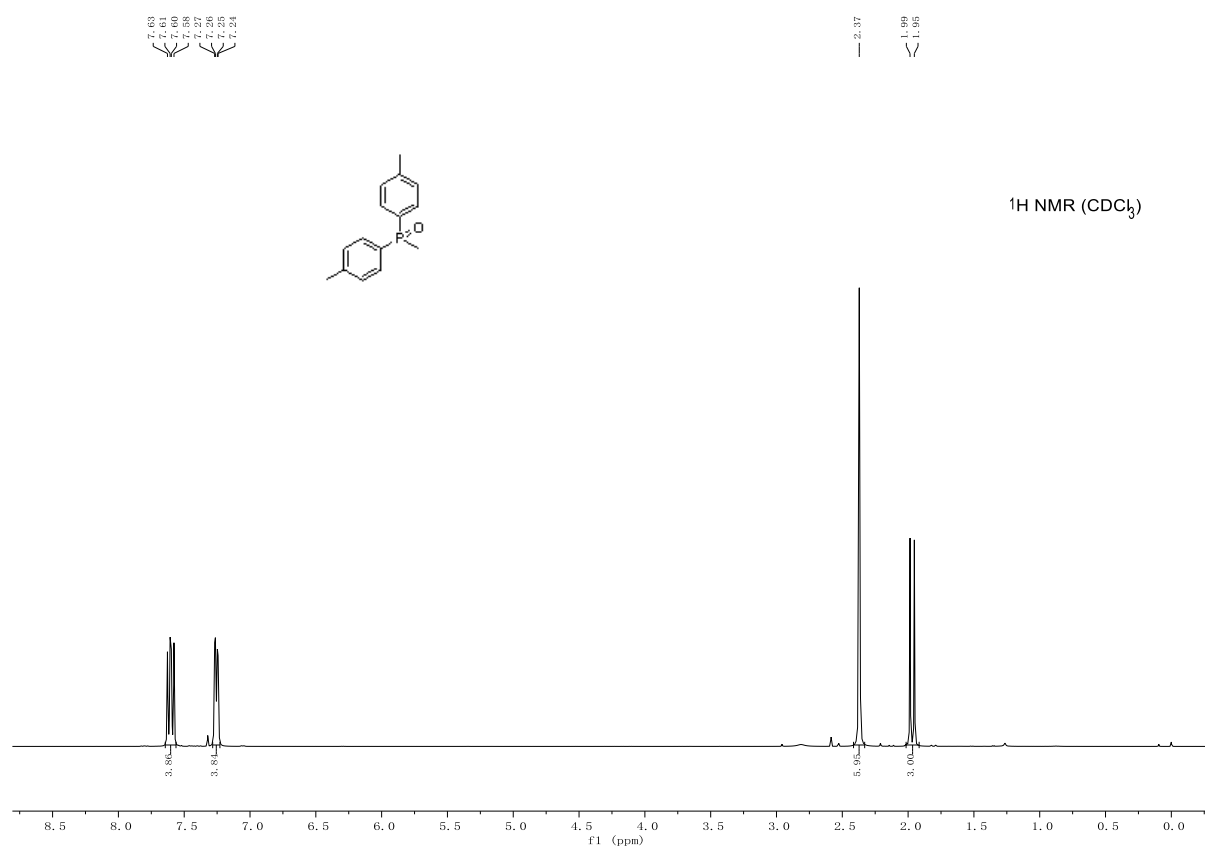
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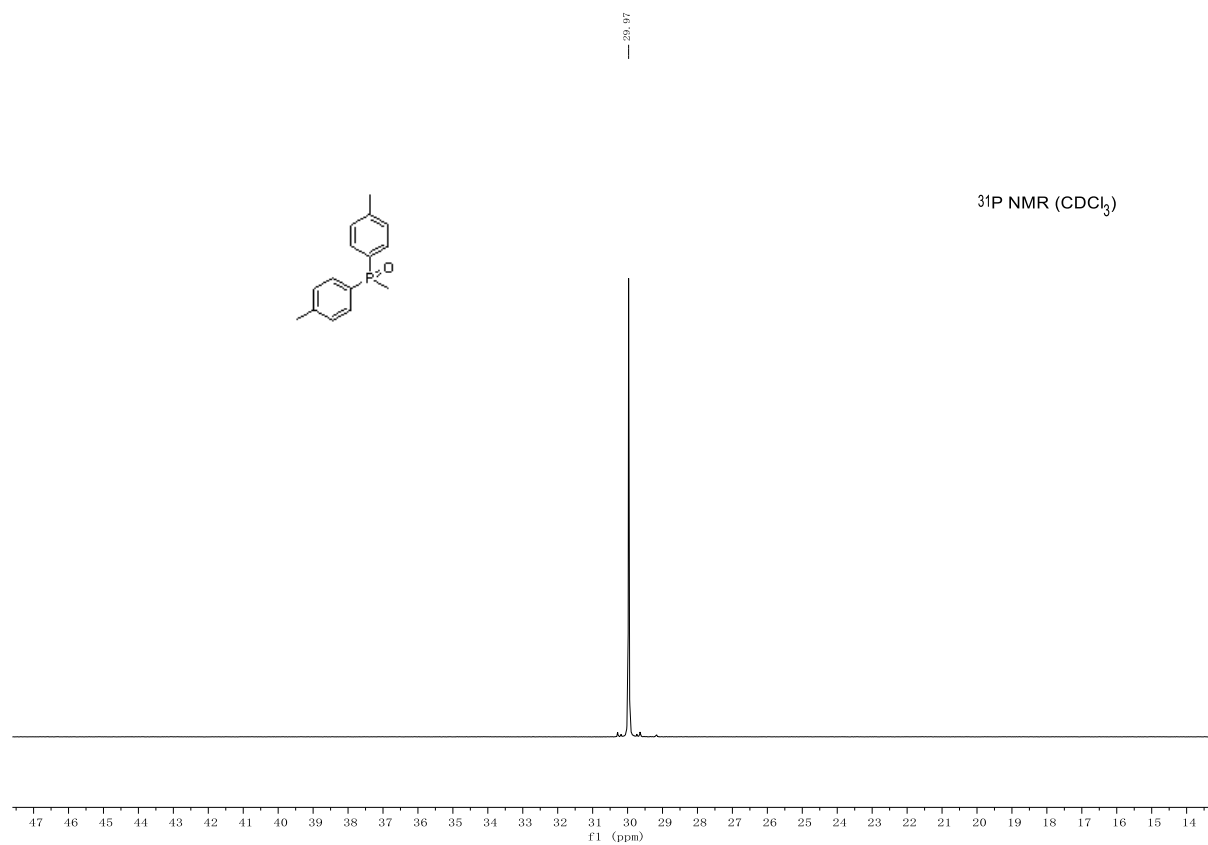
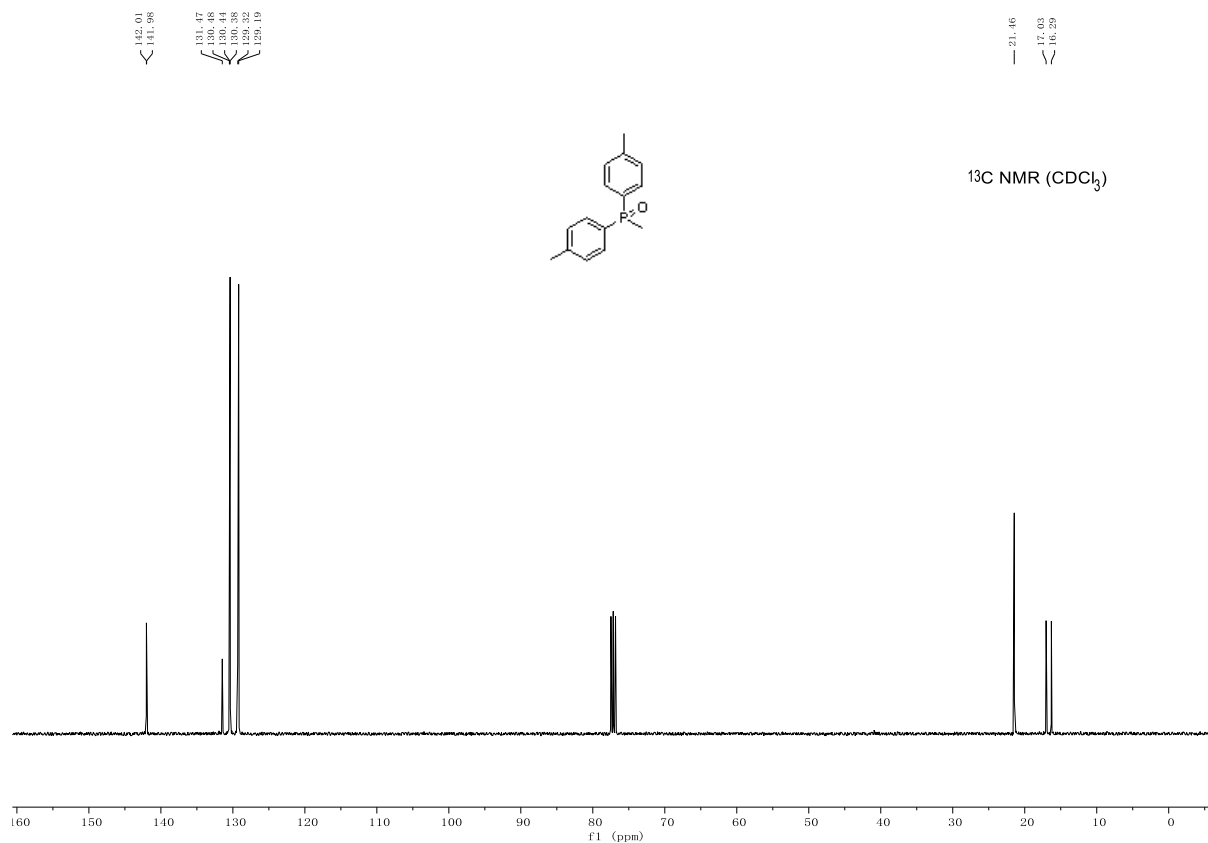
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3	NMR spectrum of reduction product of $Ph_2P(O)CH_2CH_2Ph$ ( <b>3a</b> ) with $HSiCl_3$	S62-S63
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## Copies of NMR spectra

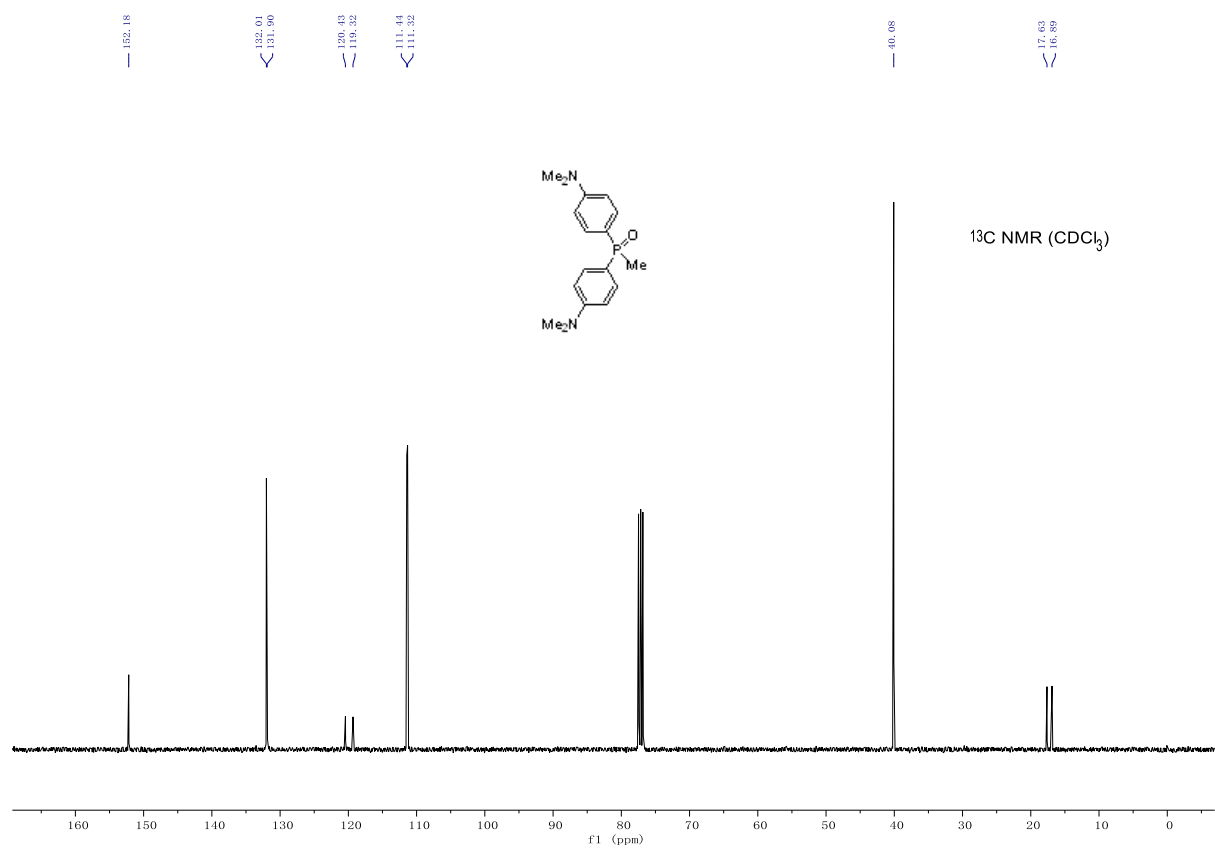
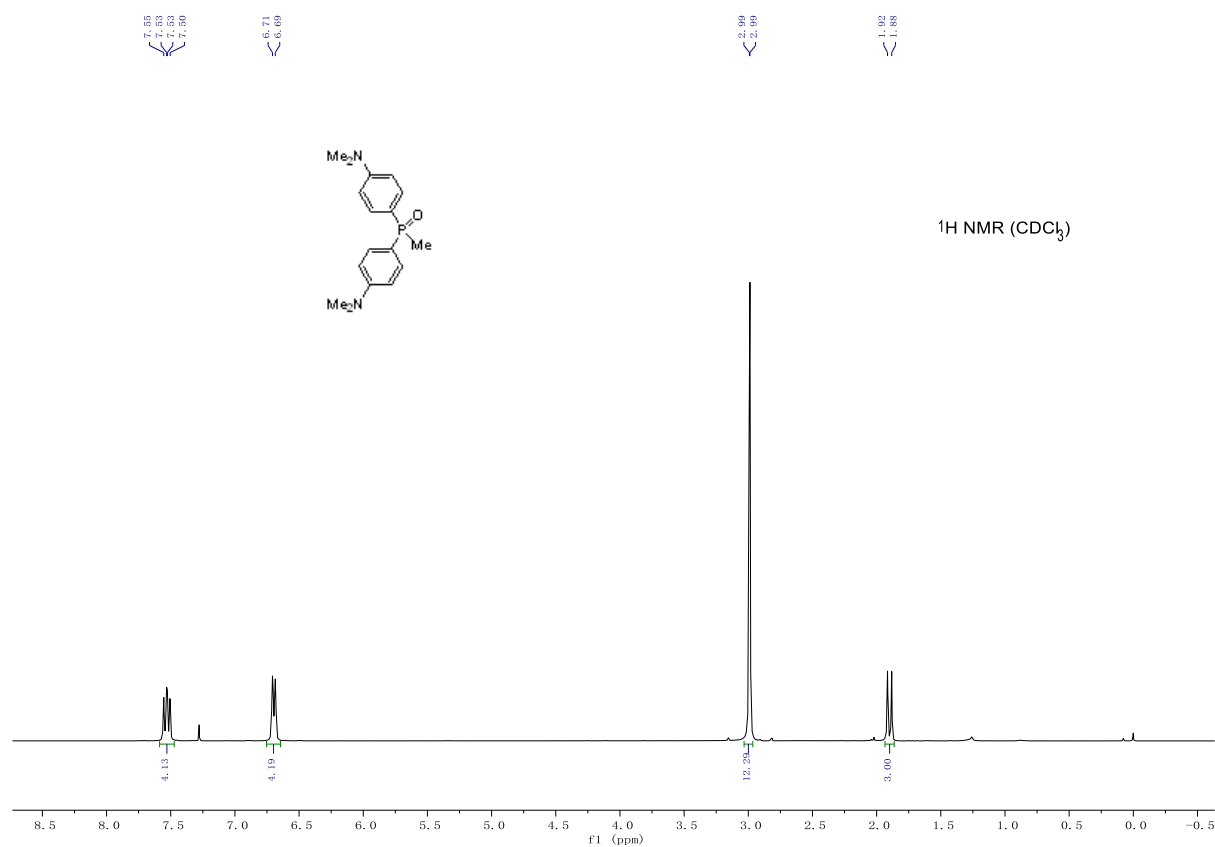
### 1. NMR spectra of methyldiarylphosphine oxides

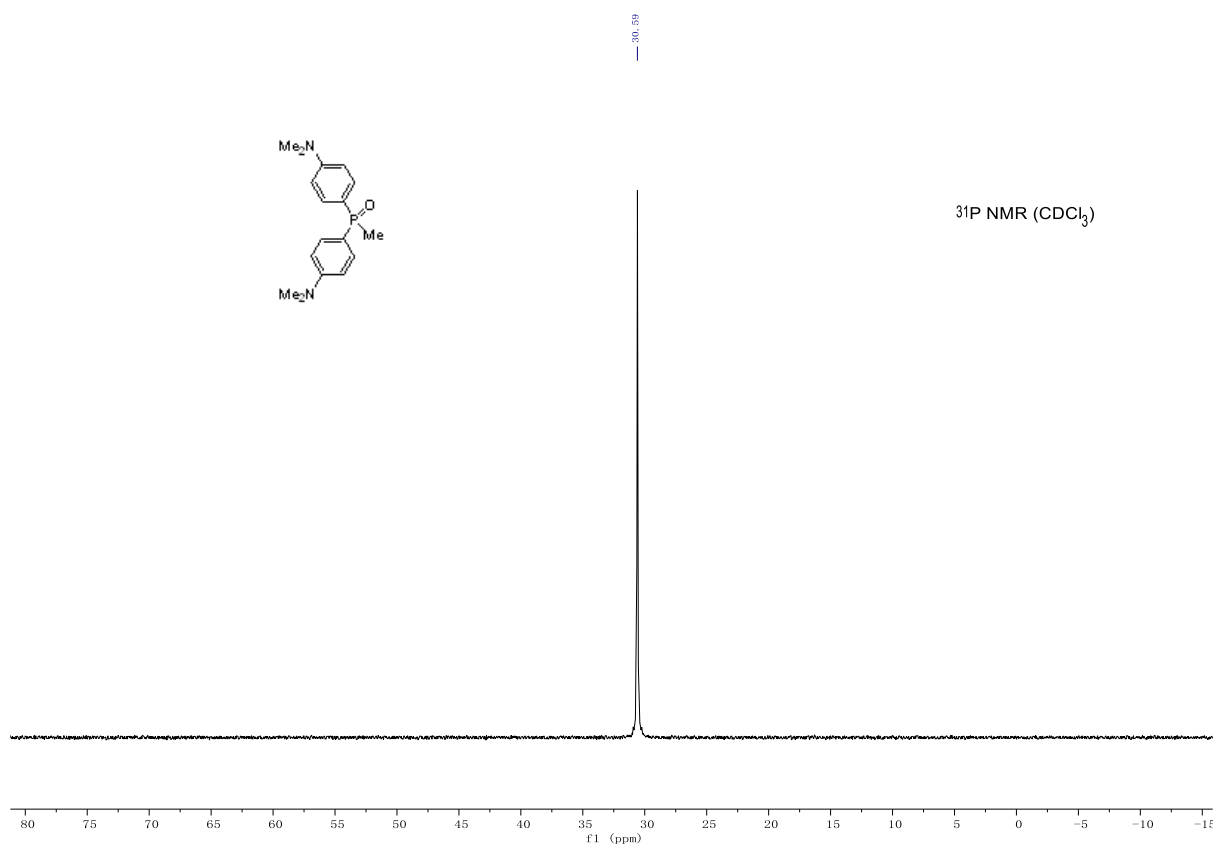
#### (1) Methyldi-*p*-tolylphosphine oxide



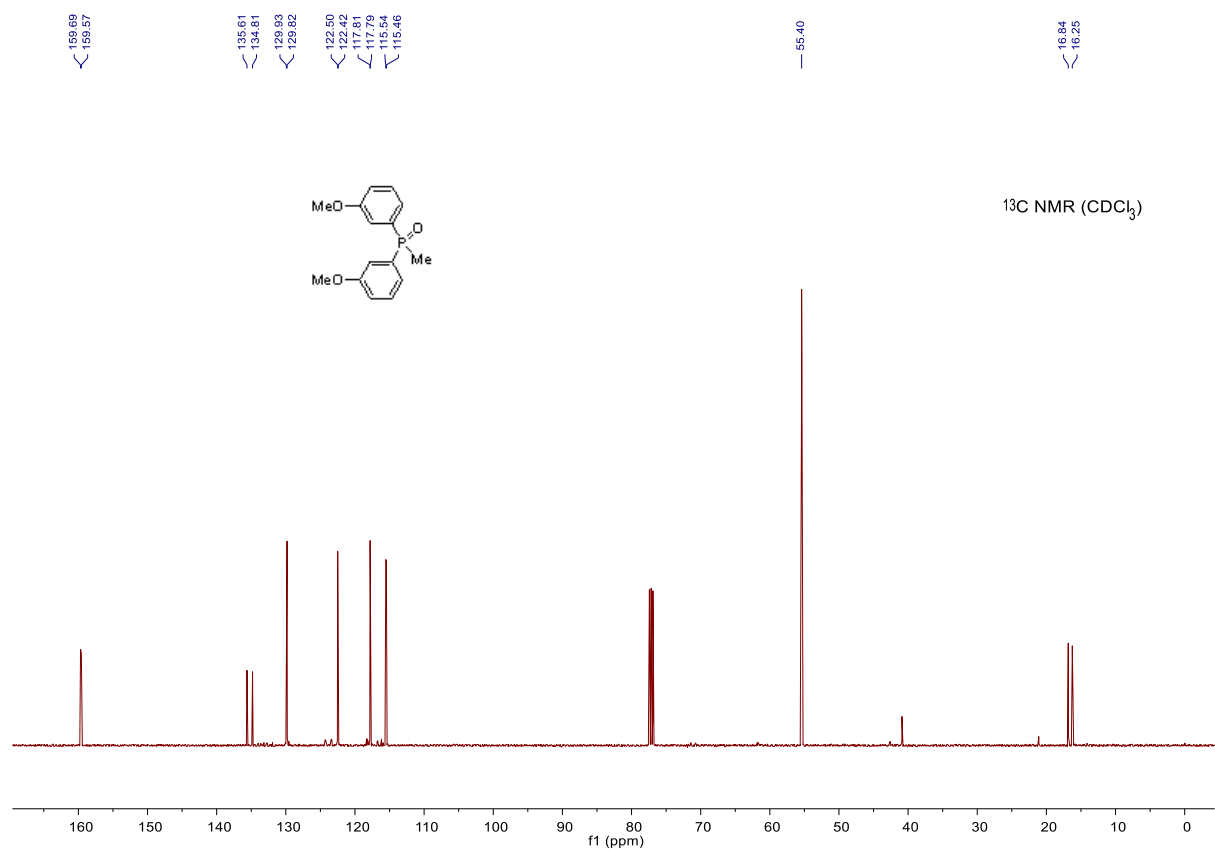
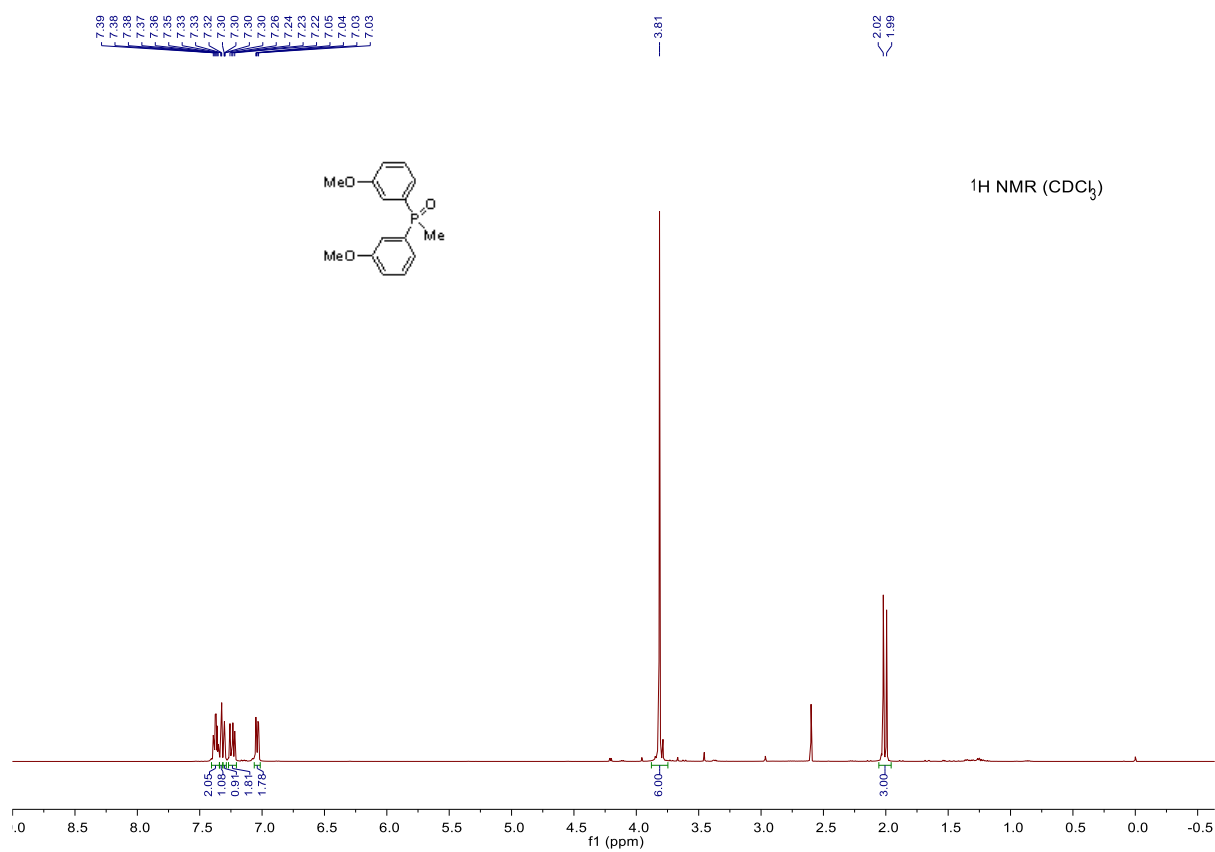


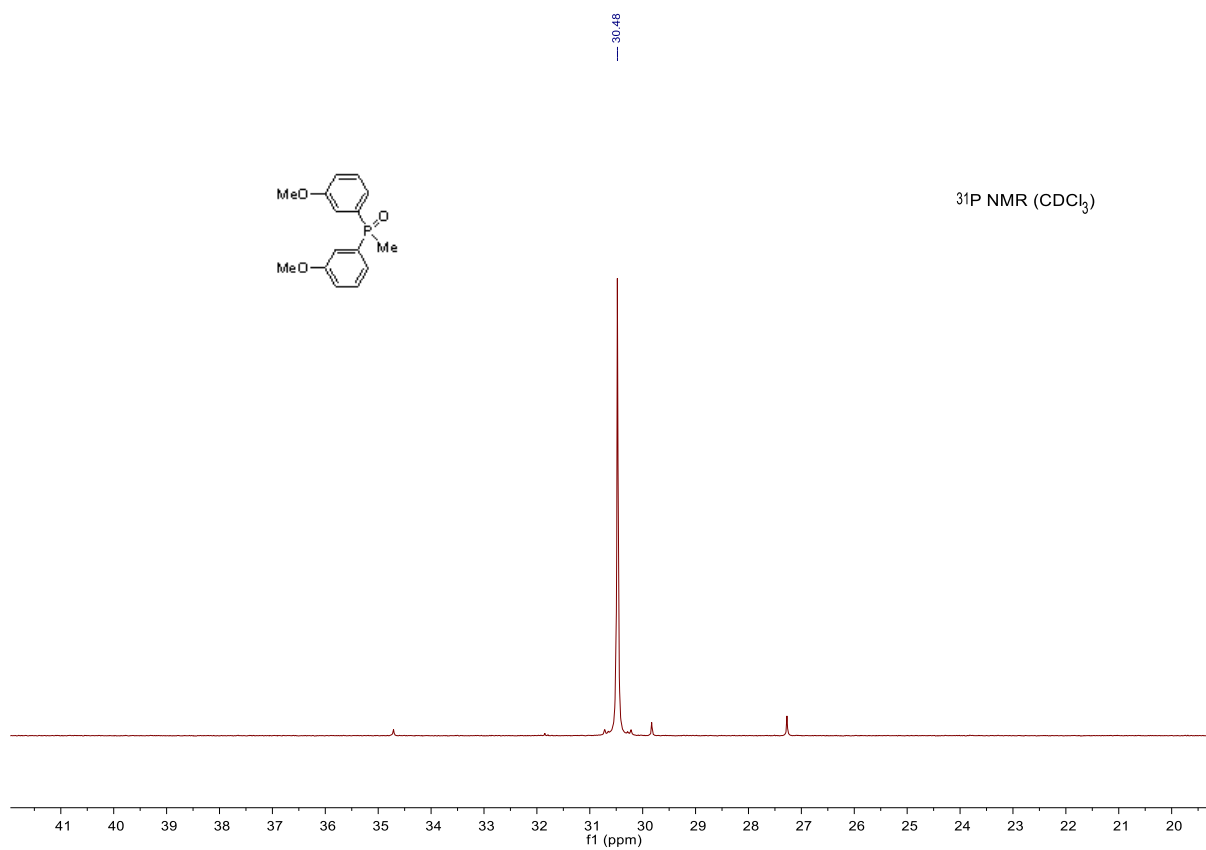
## (2) Bis(4-(dimethylamino)phenyl)(methyl)phosphine oxide





### (3) Bis(3-methoxyphenyl)(methyl)phosphine oxide



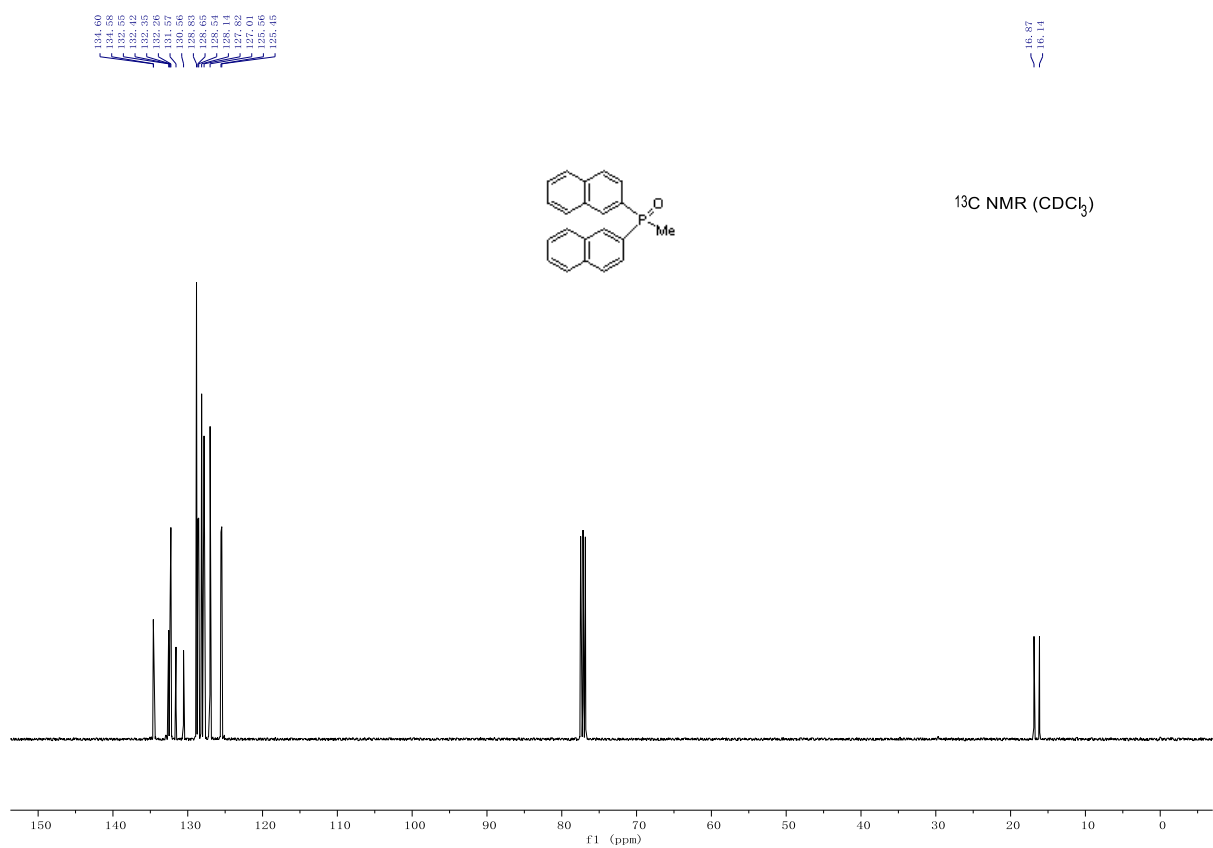


Chemical structure of the compound is shown above the spectrum:

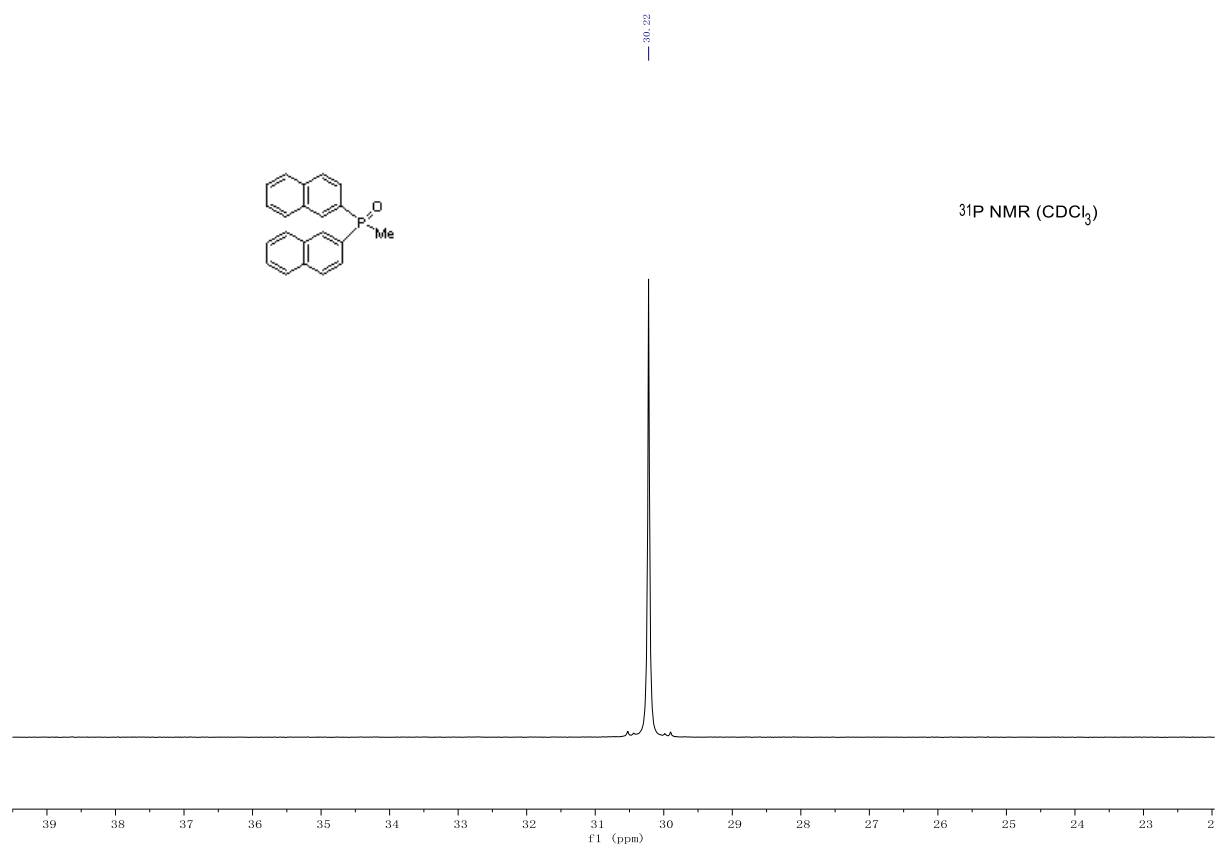
COP(=O)(c1ccc2ccccc2cc1)c3ccc4ccccc43

<sup>1</sup>H NMR (CDCl<sub>3</sub>) spectrum showing peaks in the aromatic region (7.5-8.5 ppm) and a methoxy singlet (~3.8 ppm). Integration values are provided below the baseline.

Chemical Shift (ppm)	Integration
~8.45	2.07
~7.95	4.23
~7.85	2.02
~7.75	4.15
~3.85	3.00

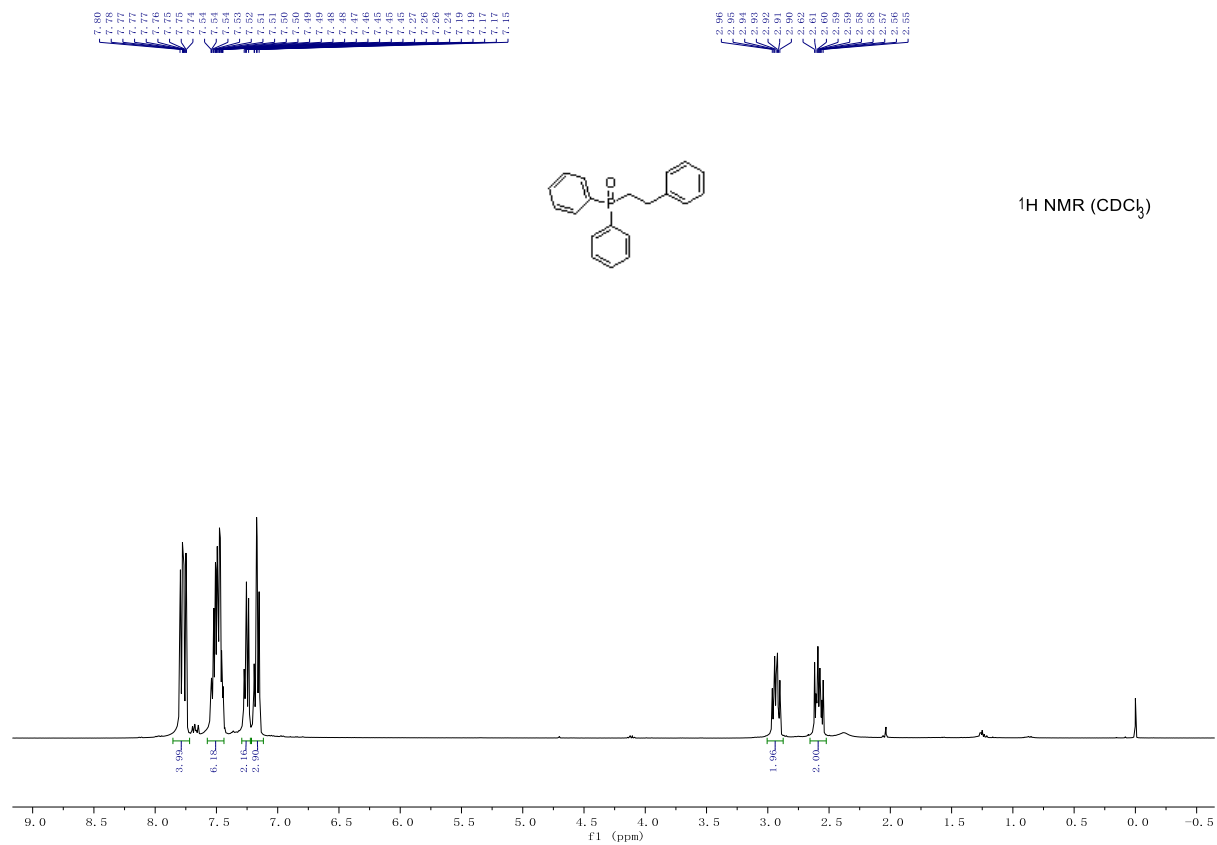


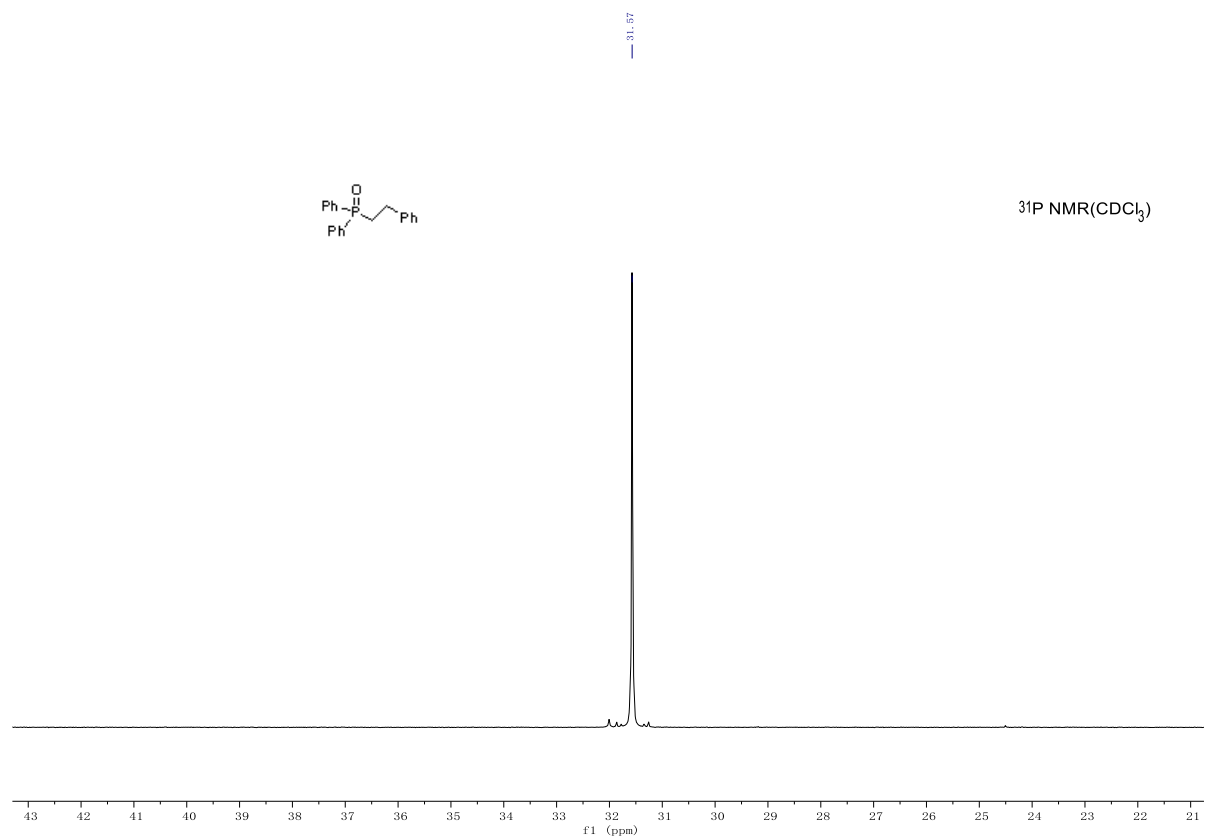
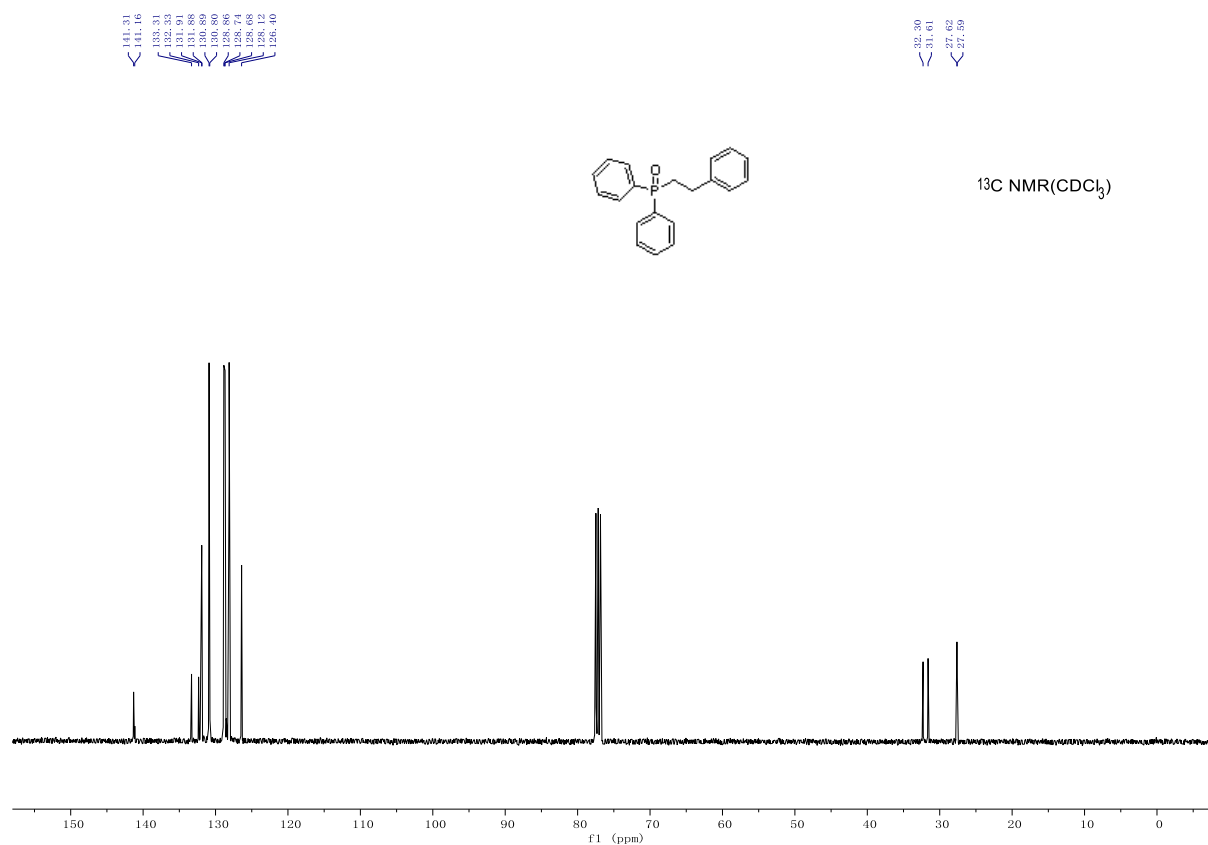




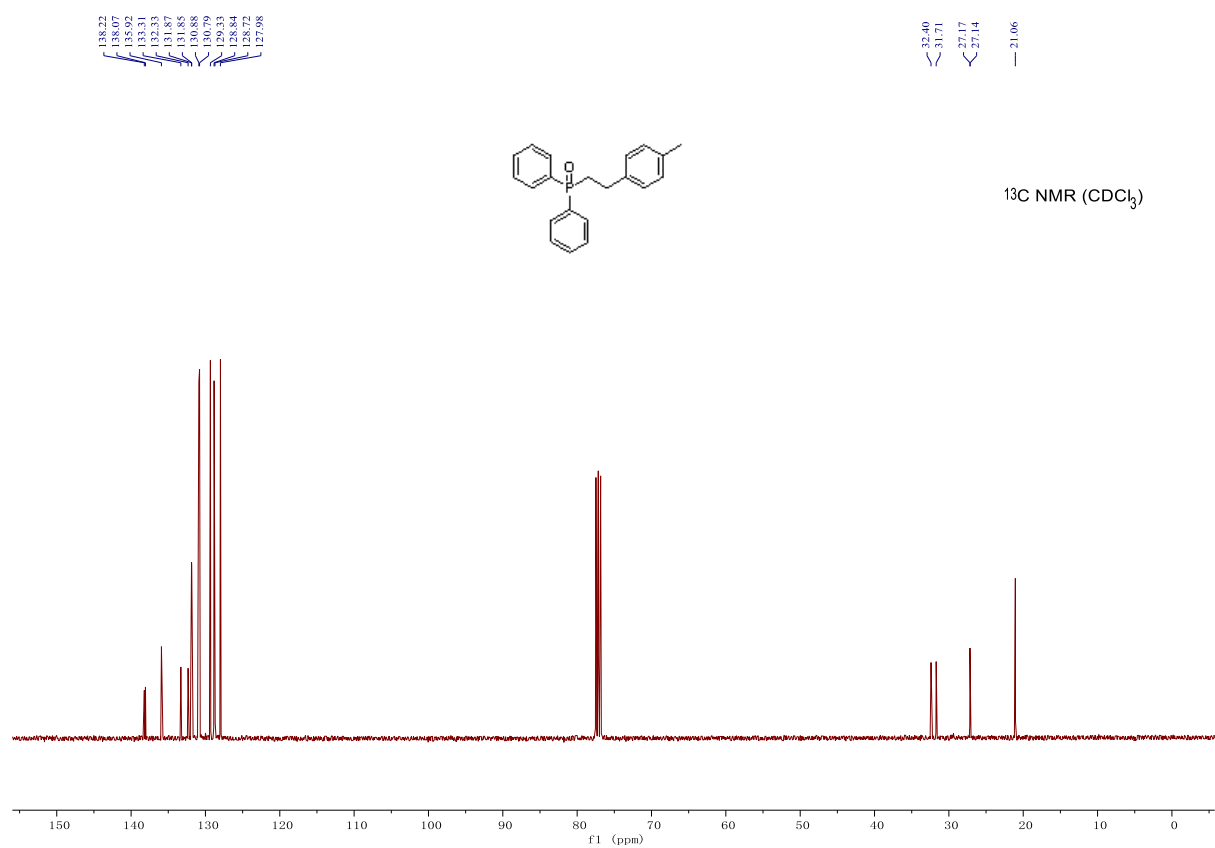
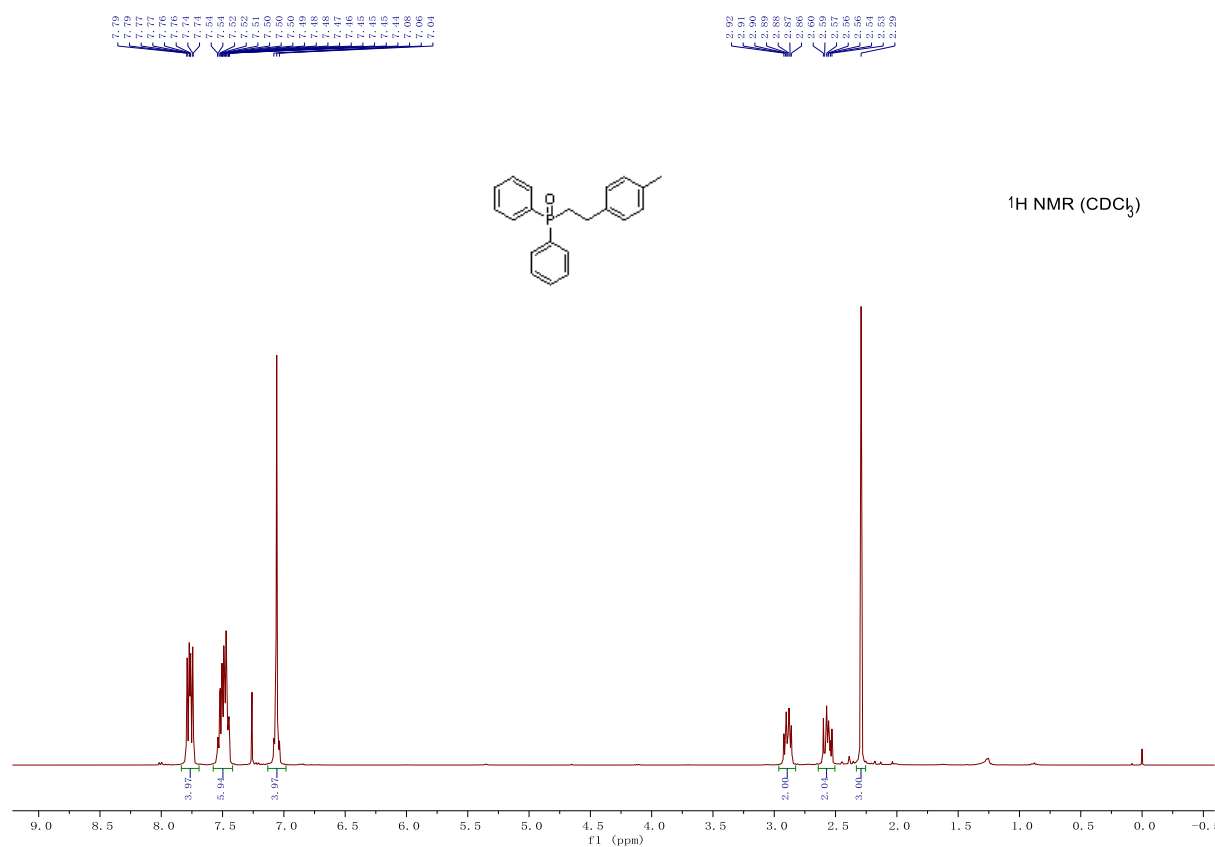
## 2 NMR spectra of cross-coupling products

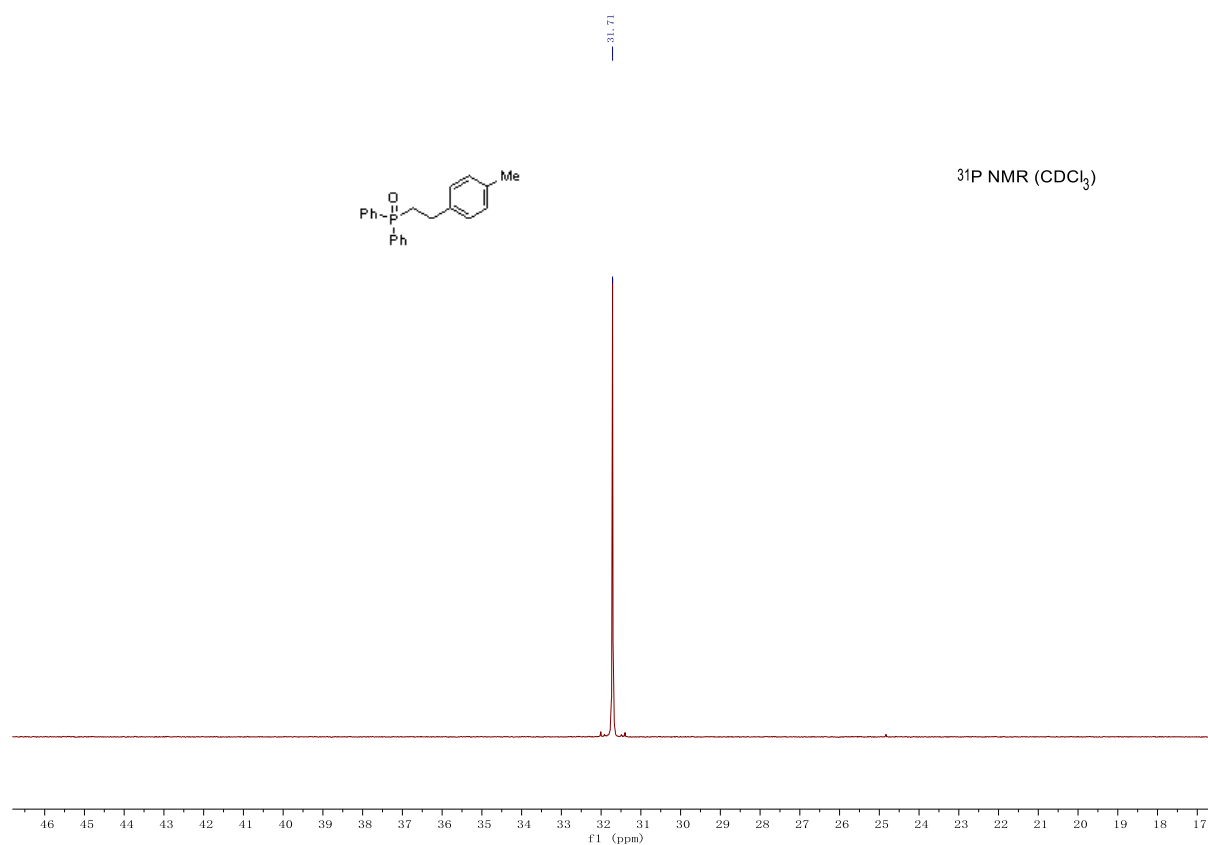
### (1) Phenethyldiphenylphosphine oxide (**3a**)



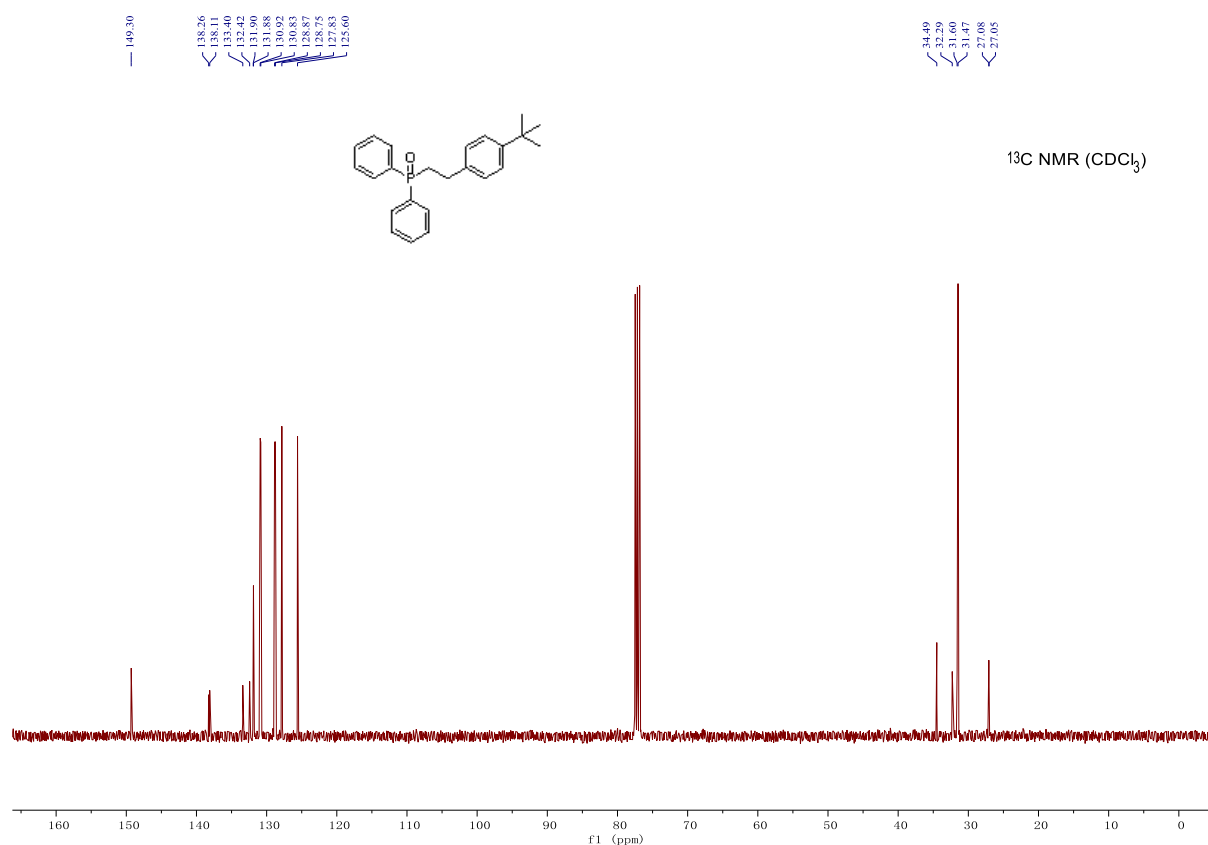
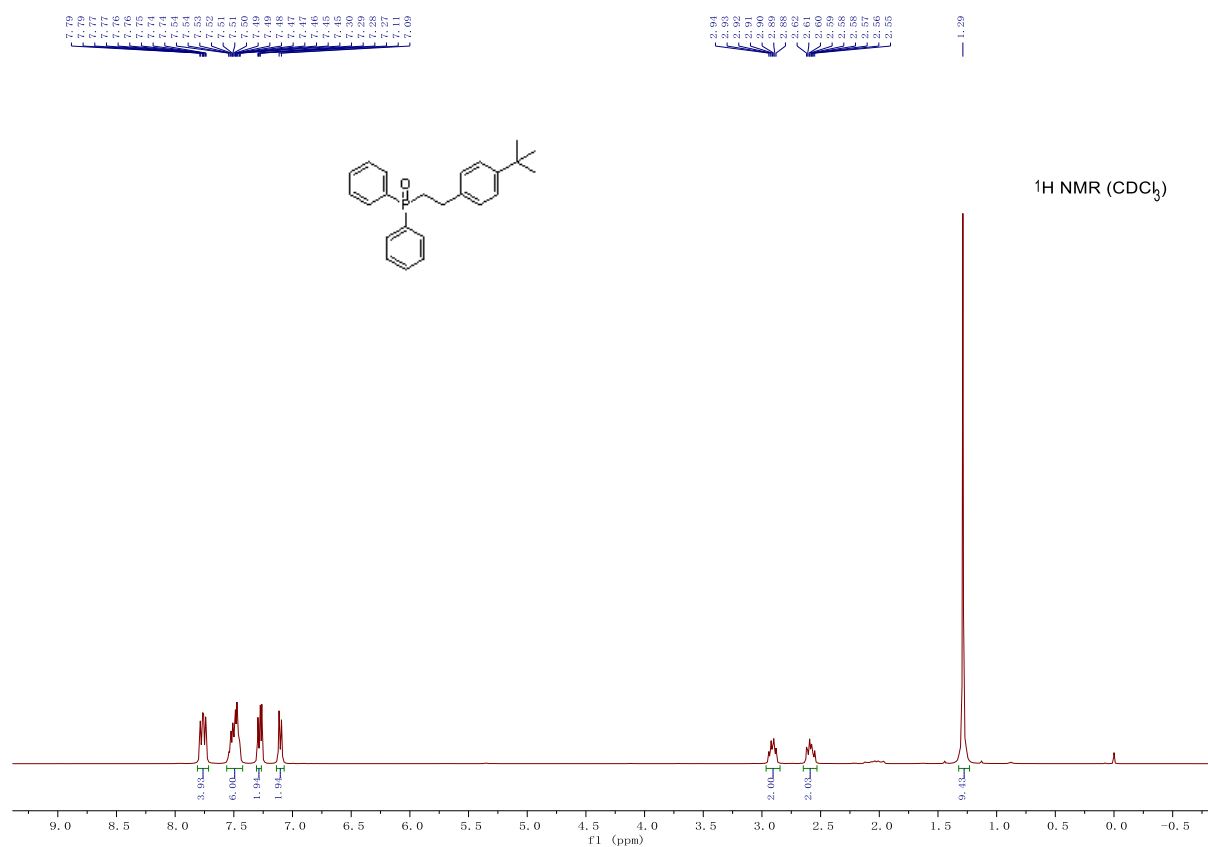


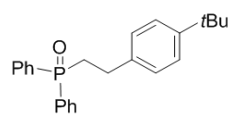
(2) (4-Methylphenethyl)diphenylphosphine oxide (**3b**)





(3) (4-(*tert*-Butyl)phenethyl)diphenylphosphine oxide (**3c**)

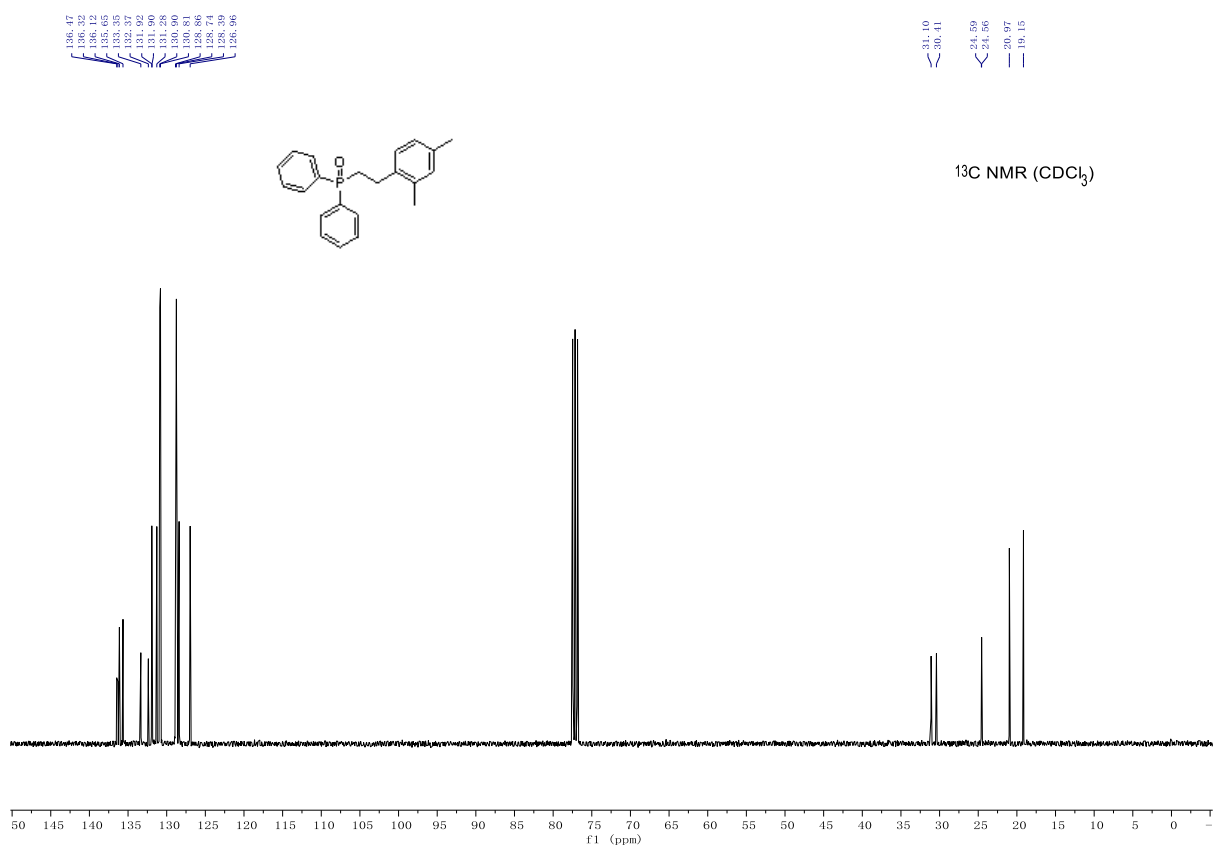
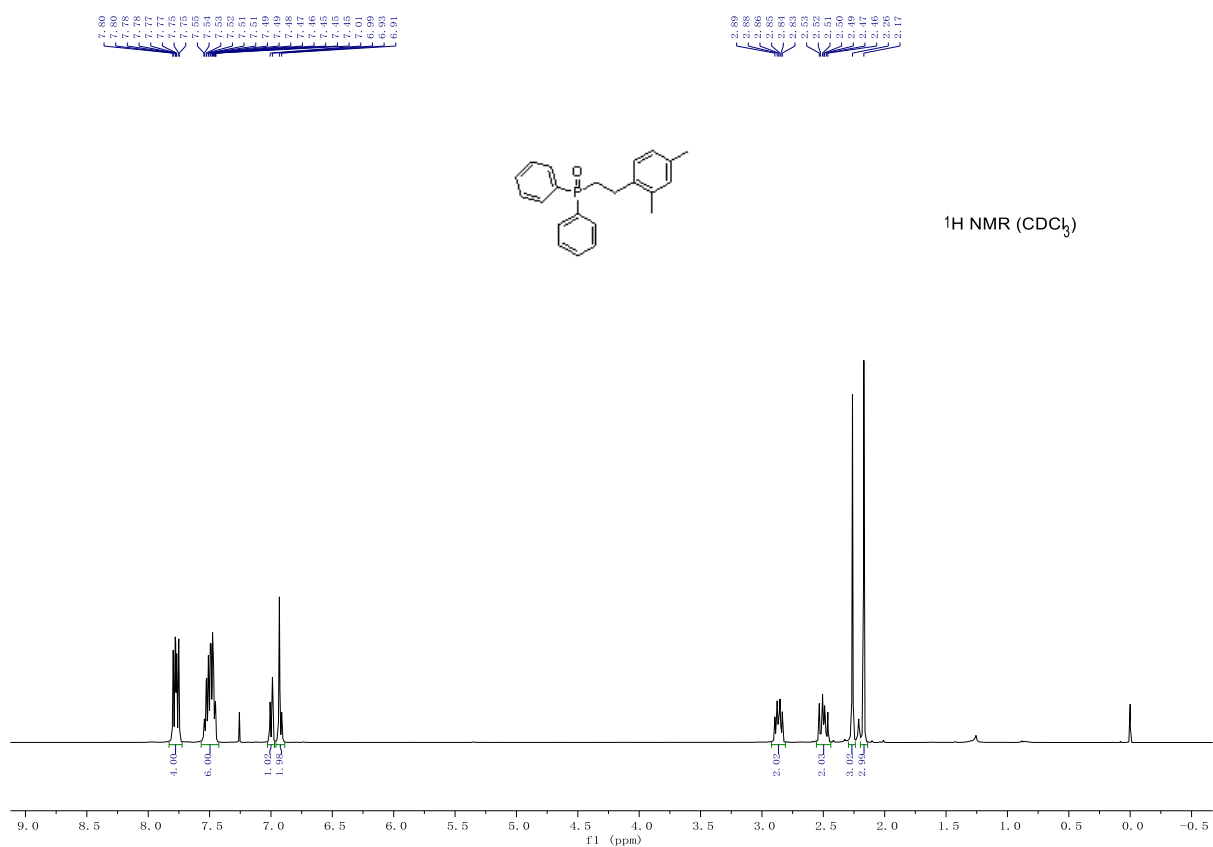




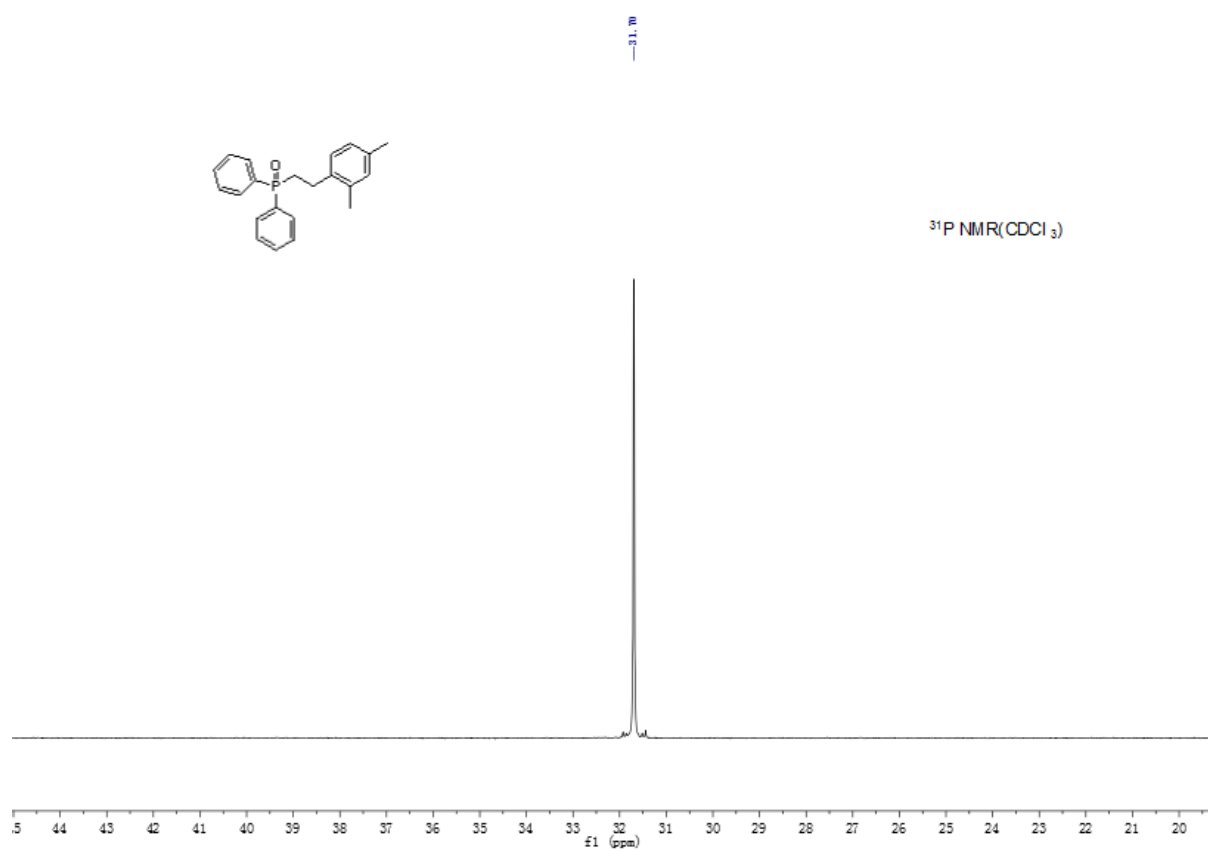
<sup>1</sup>H NMR (CDCl<sub>3</sub>)



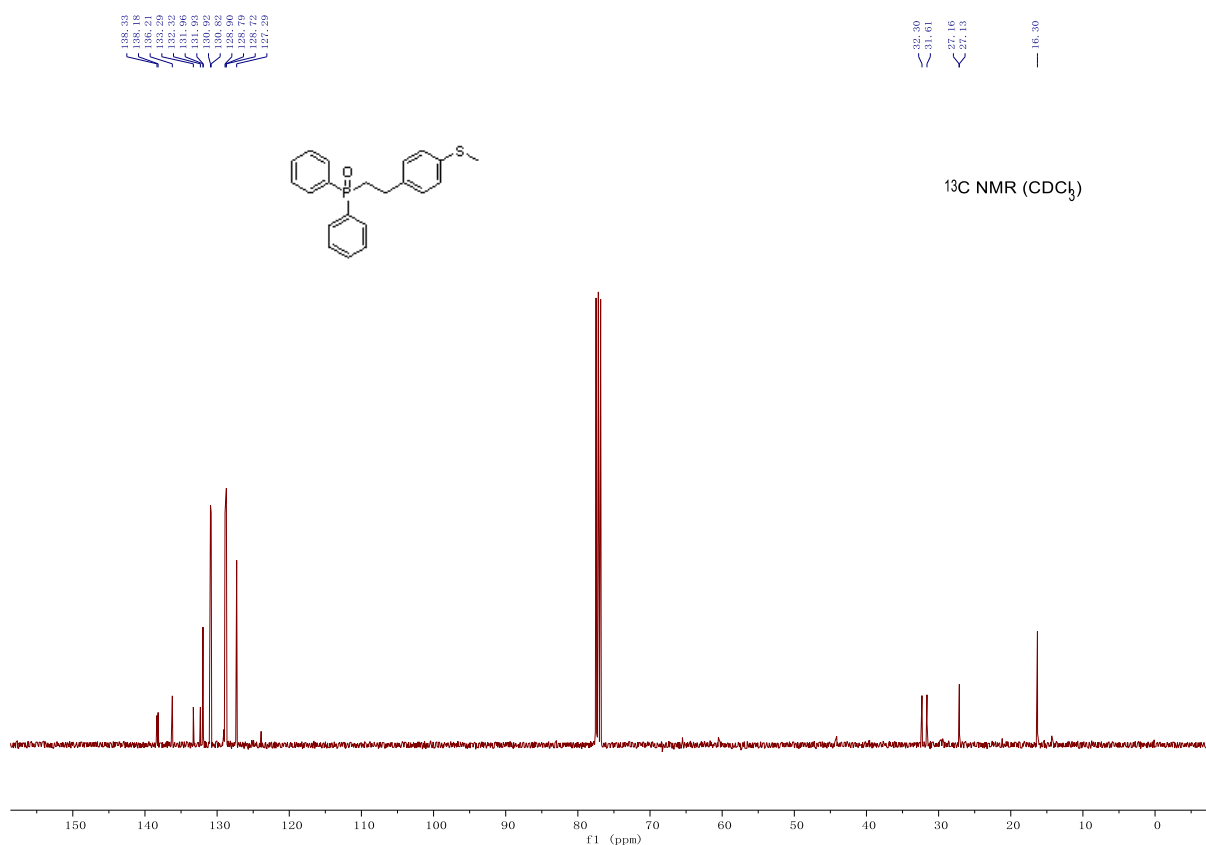
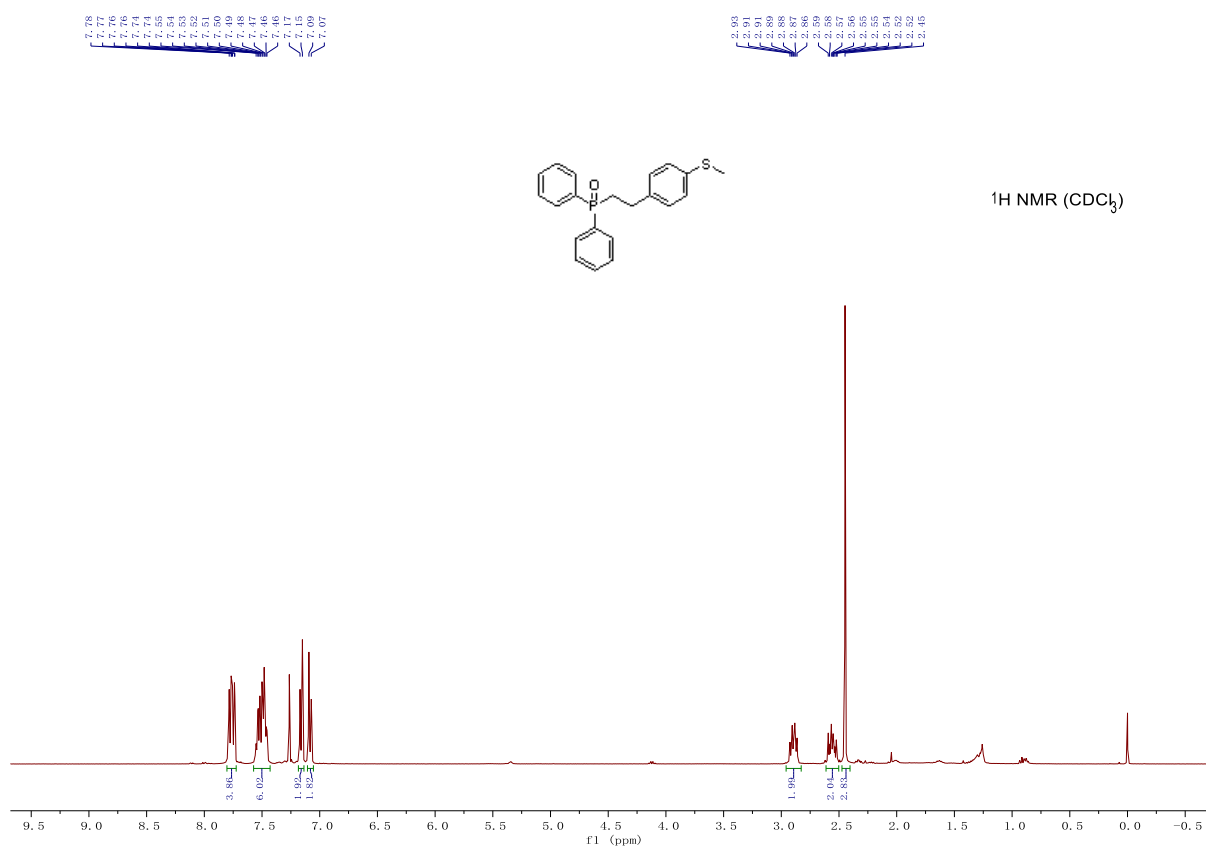
(4) (2,4-Dimethylphenethyl)diphenylphosphine oxide (**3d**)

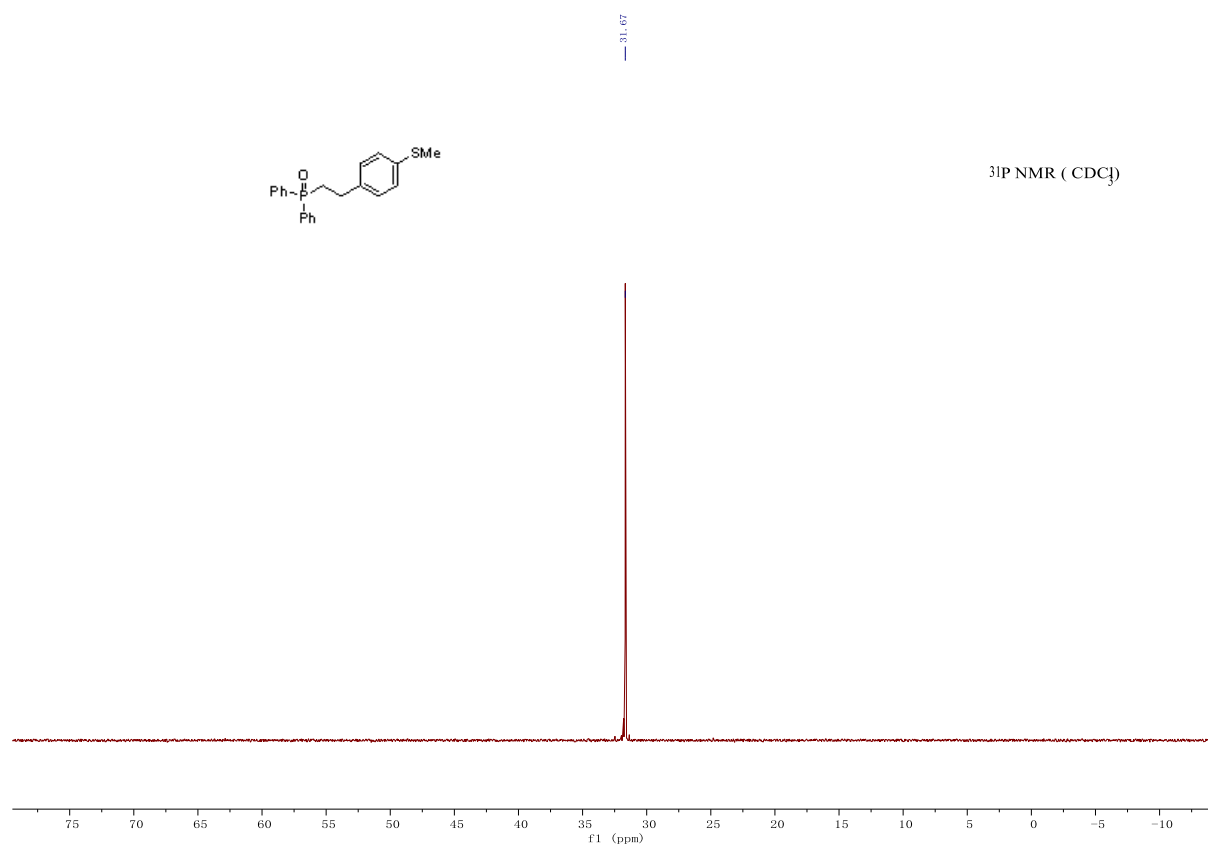




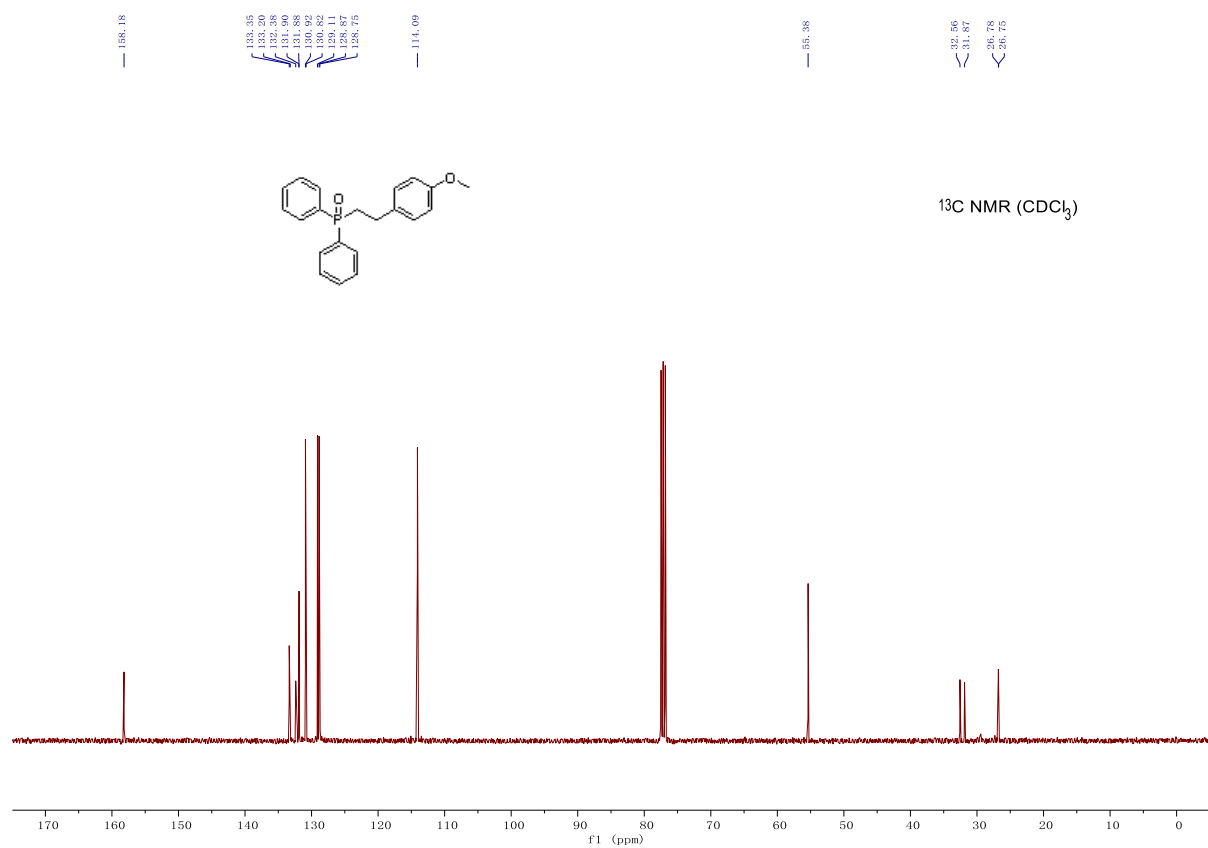
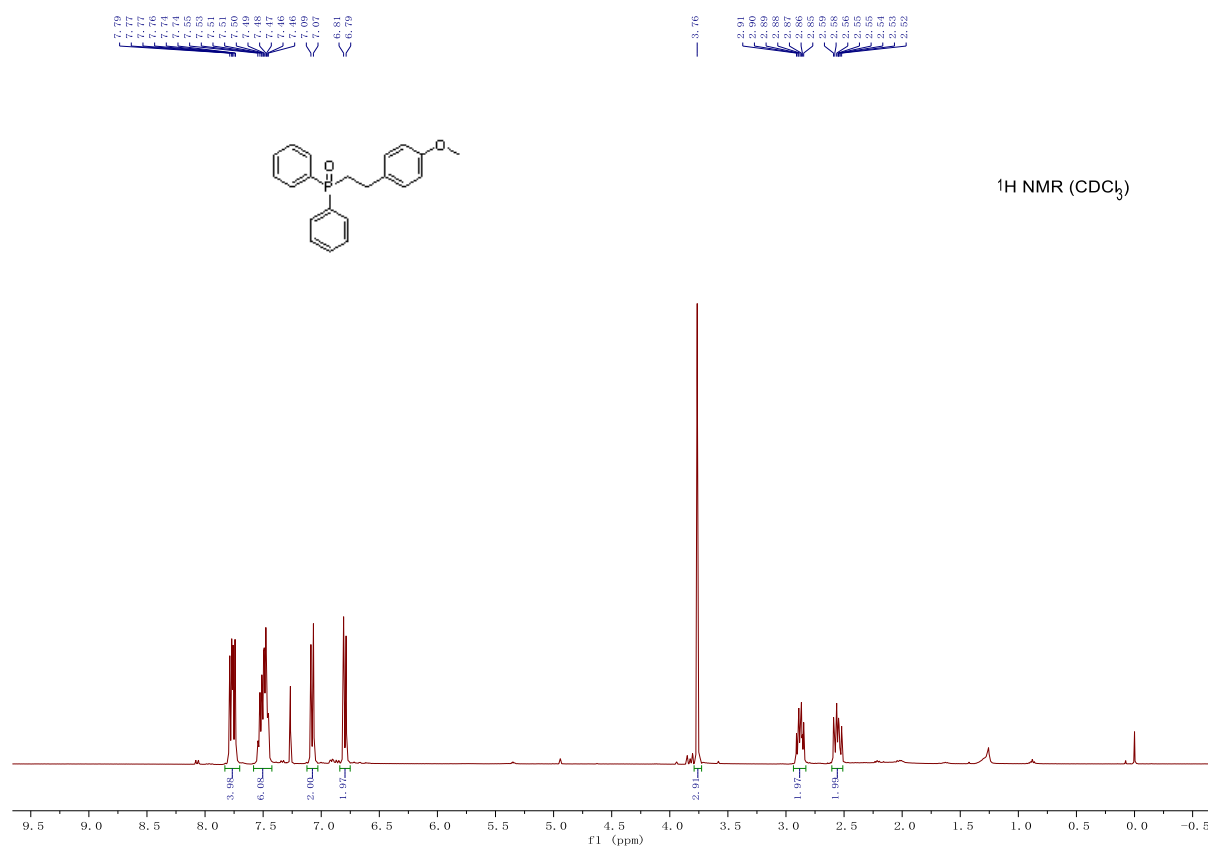


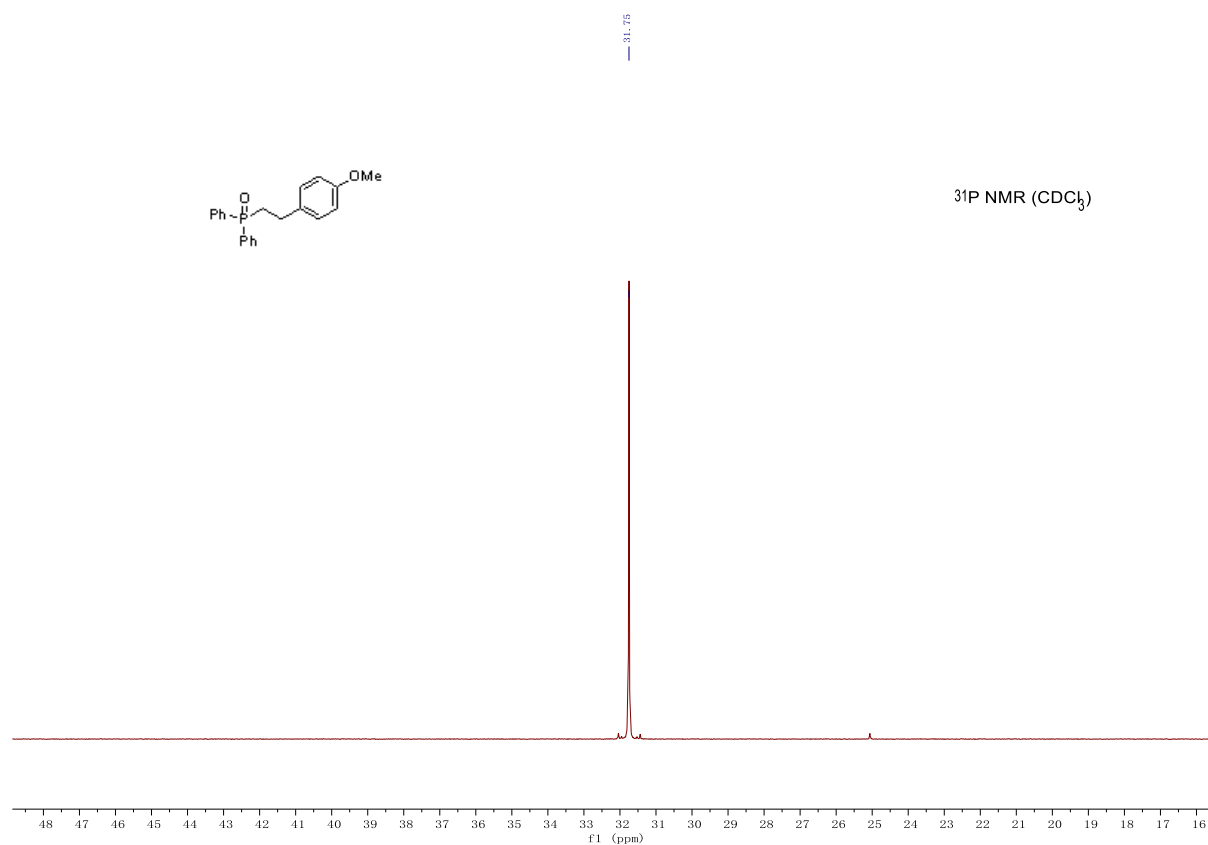
(5) (4-(Methylthio)phenethyl)diphenylphosphine oxide (**3e**)



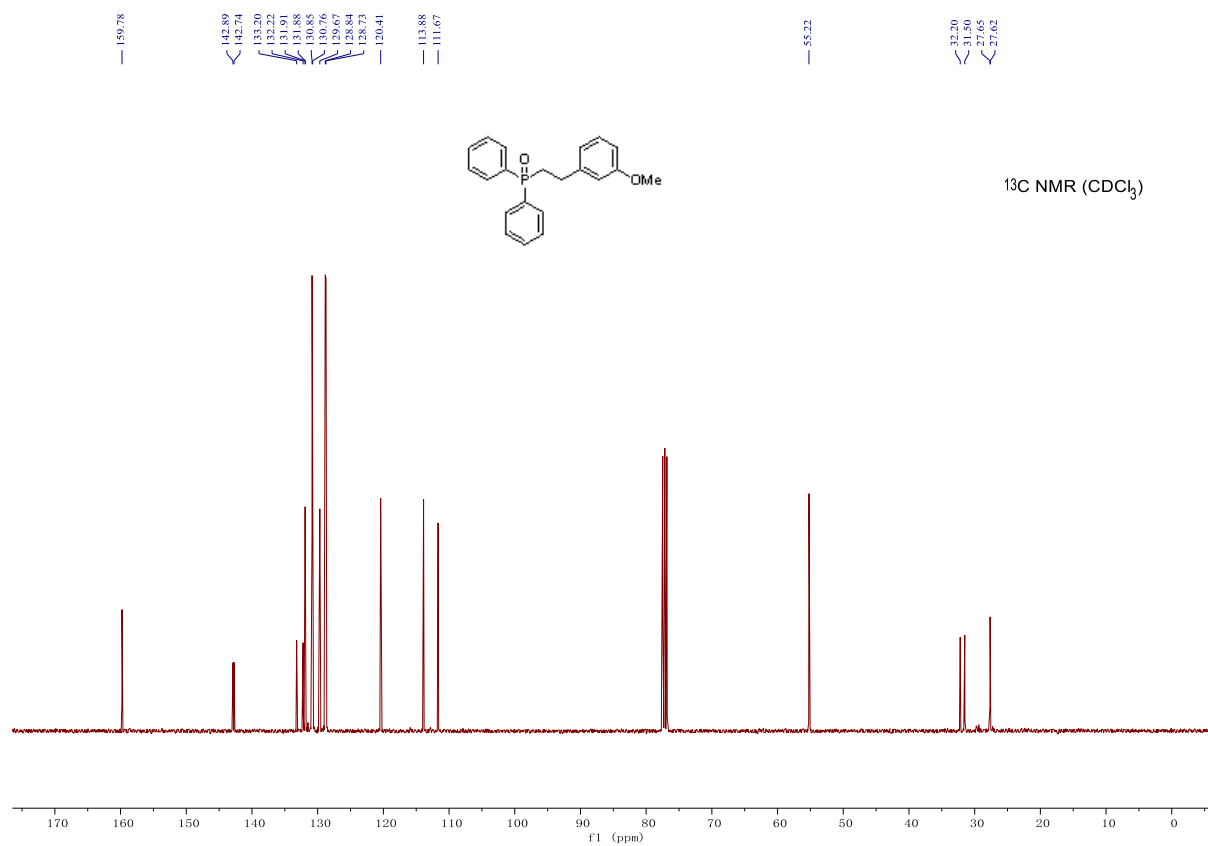
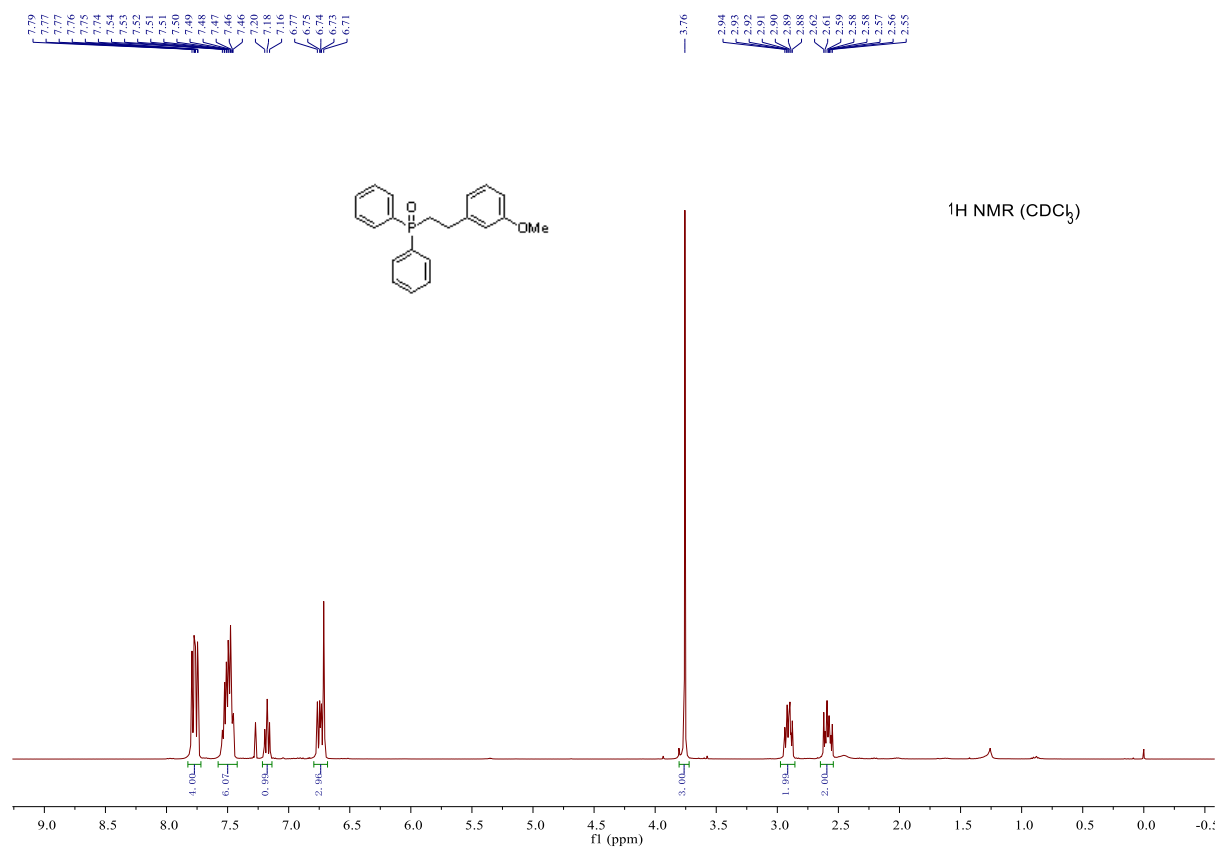


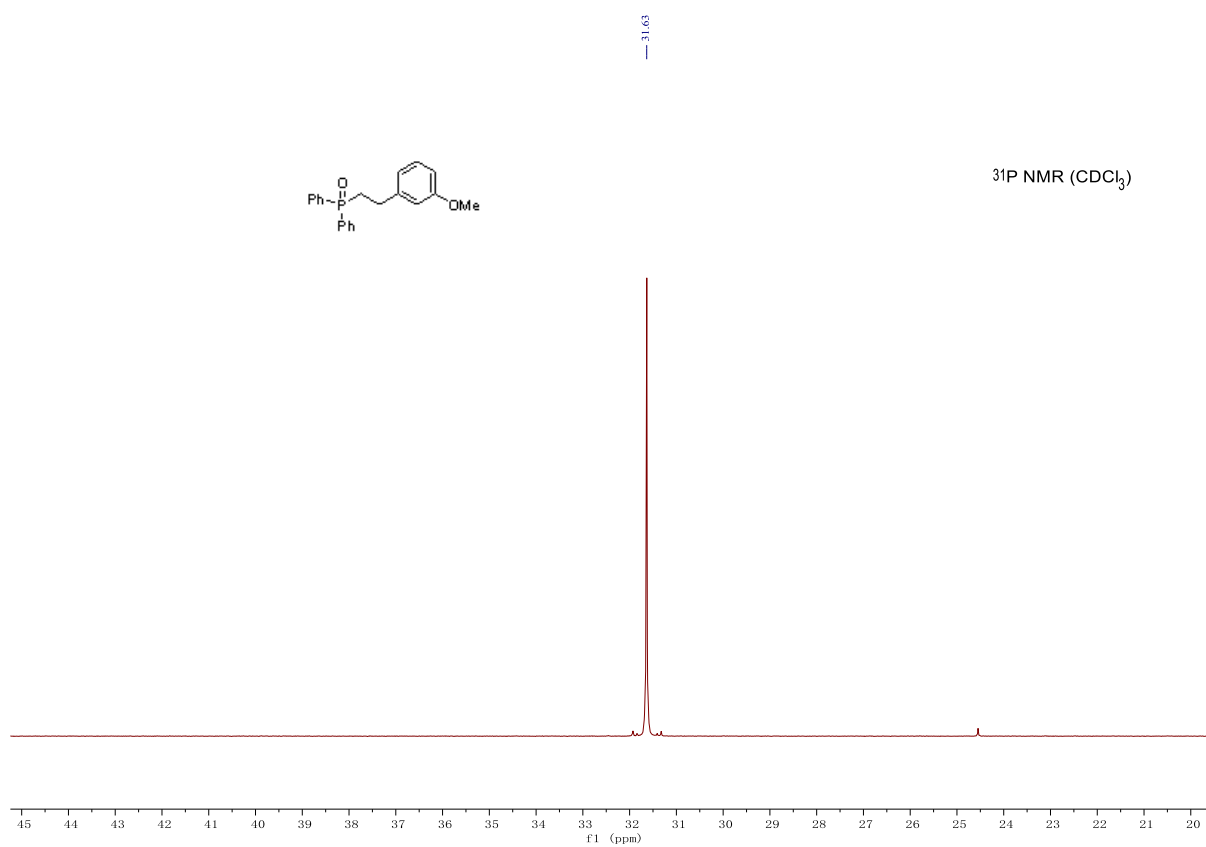
(6) (4-Methoxyphenethyl)diphenylphosphine oxide (**3f**)



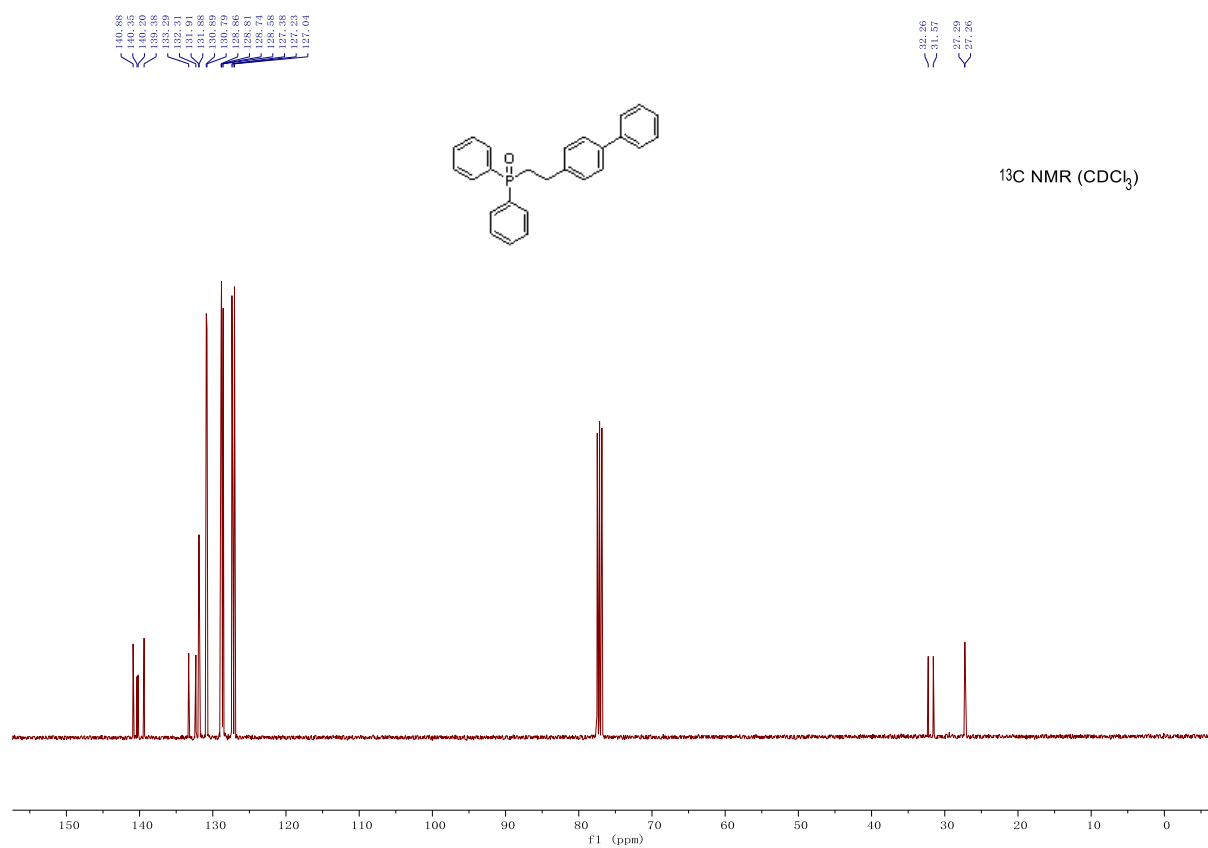
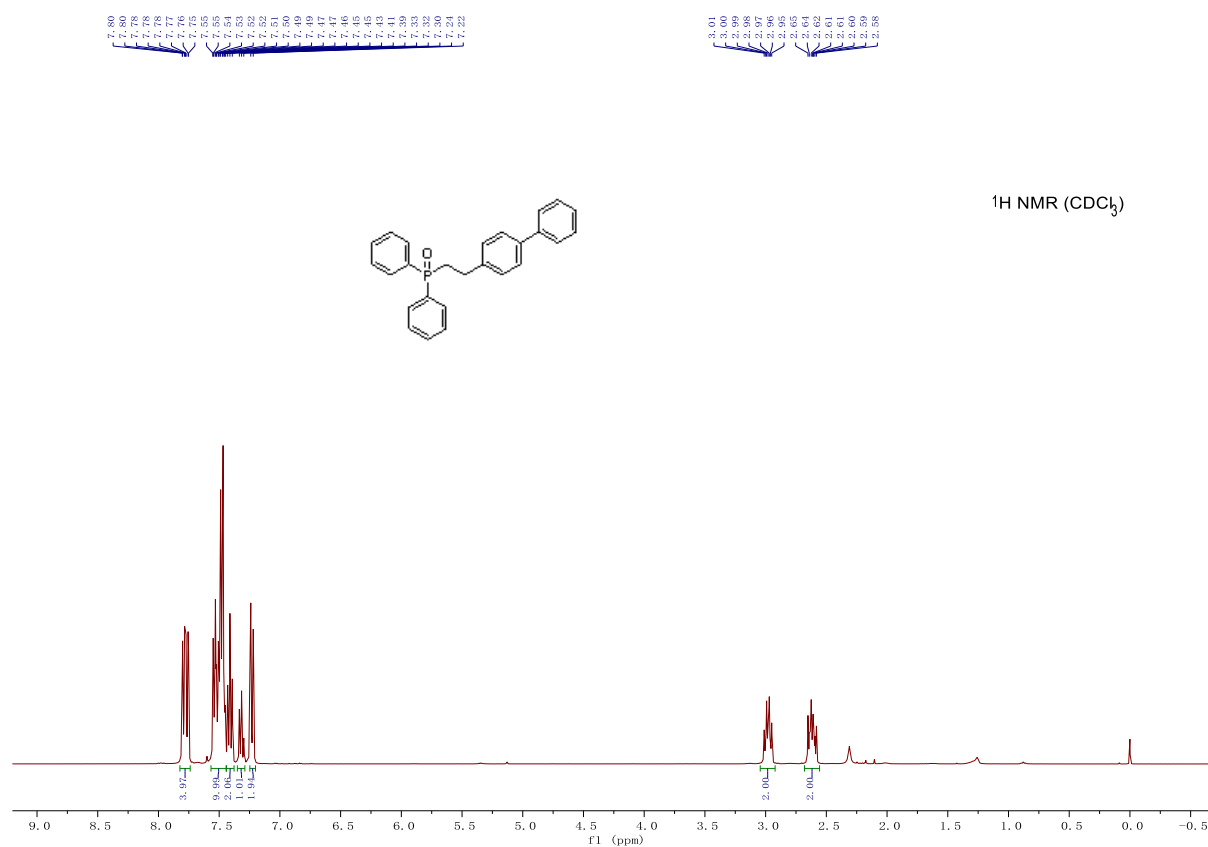


(7) (3-Methoxyphenethyl)diphenylphosphine oxide (**3g**)

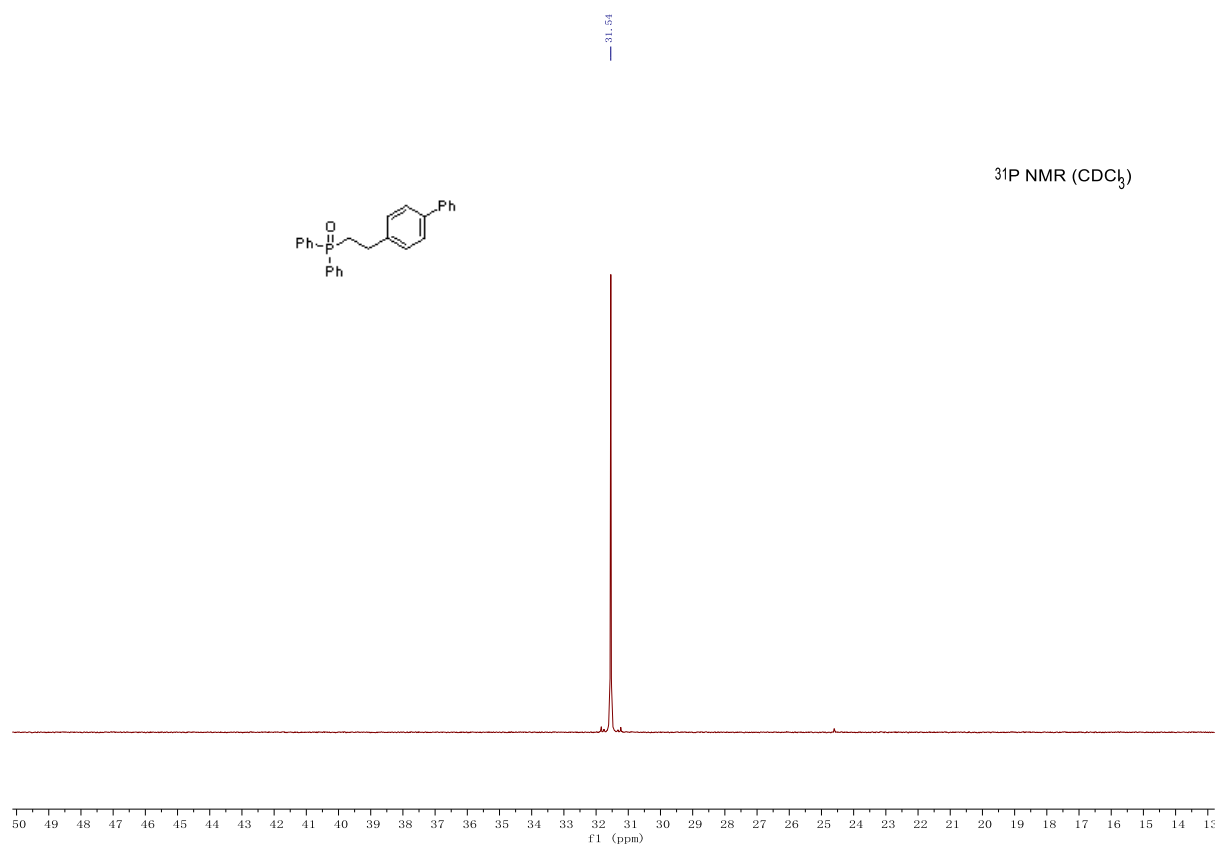




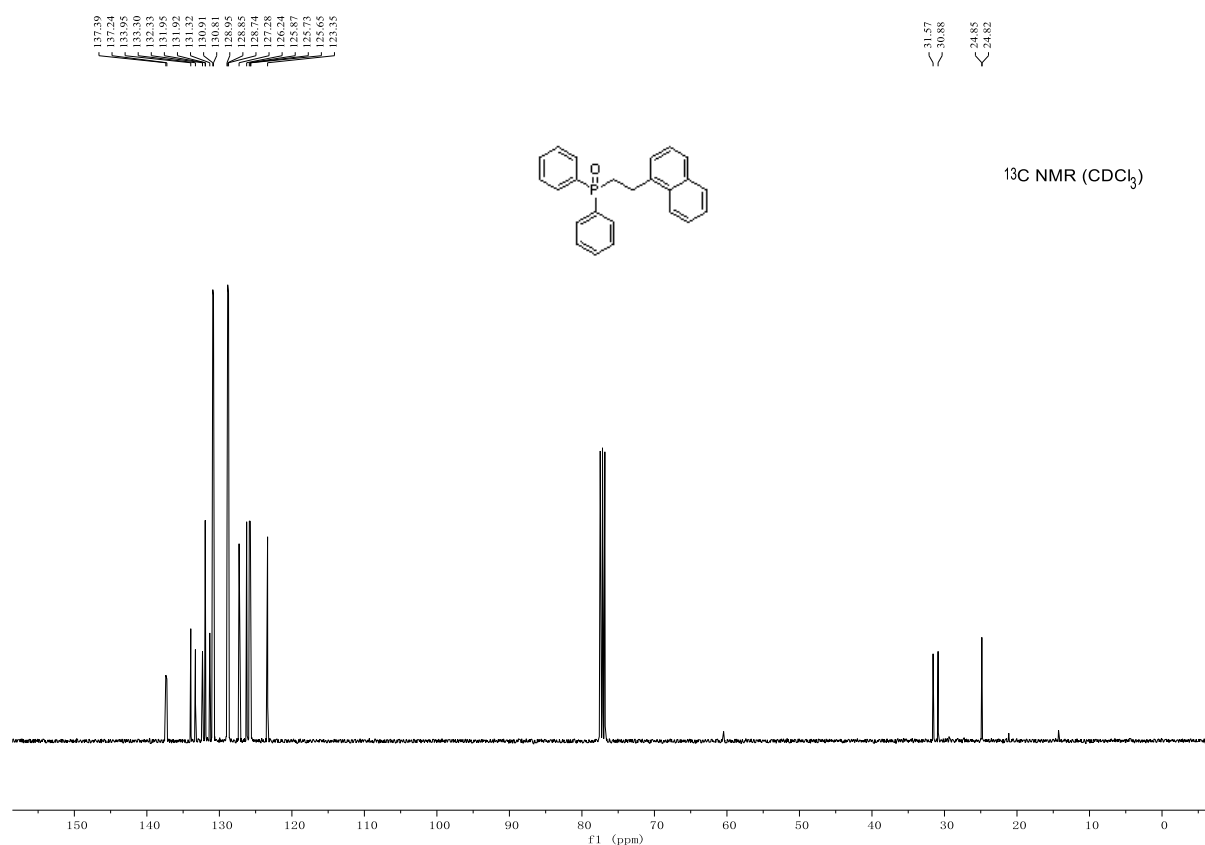
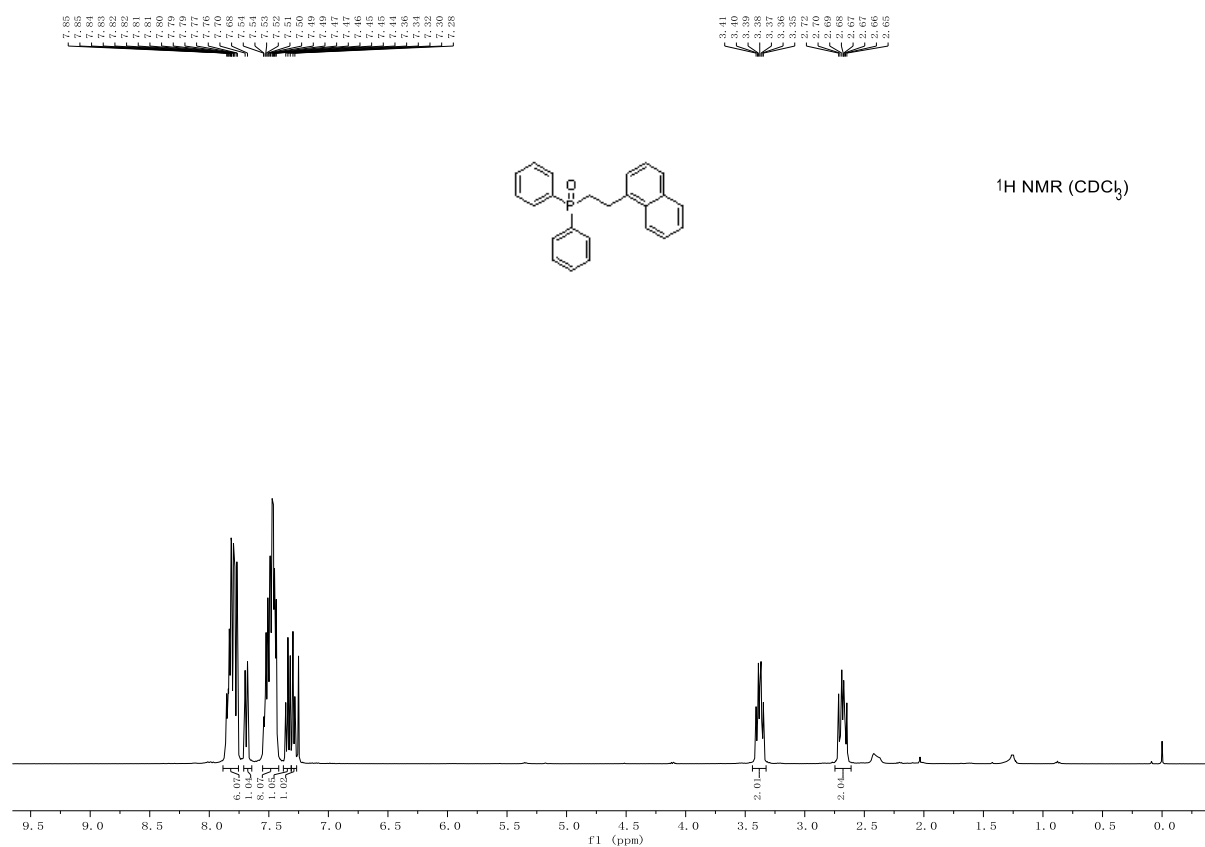
(8) (2-([1,1'-Biphenyl]-4-yl)ethyl)diphenylphosphine oxide (**3h**)

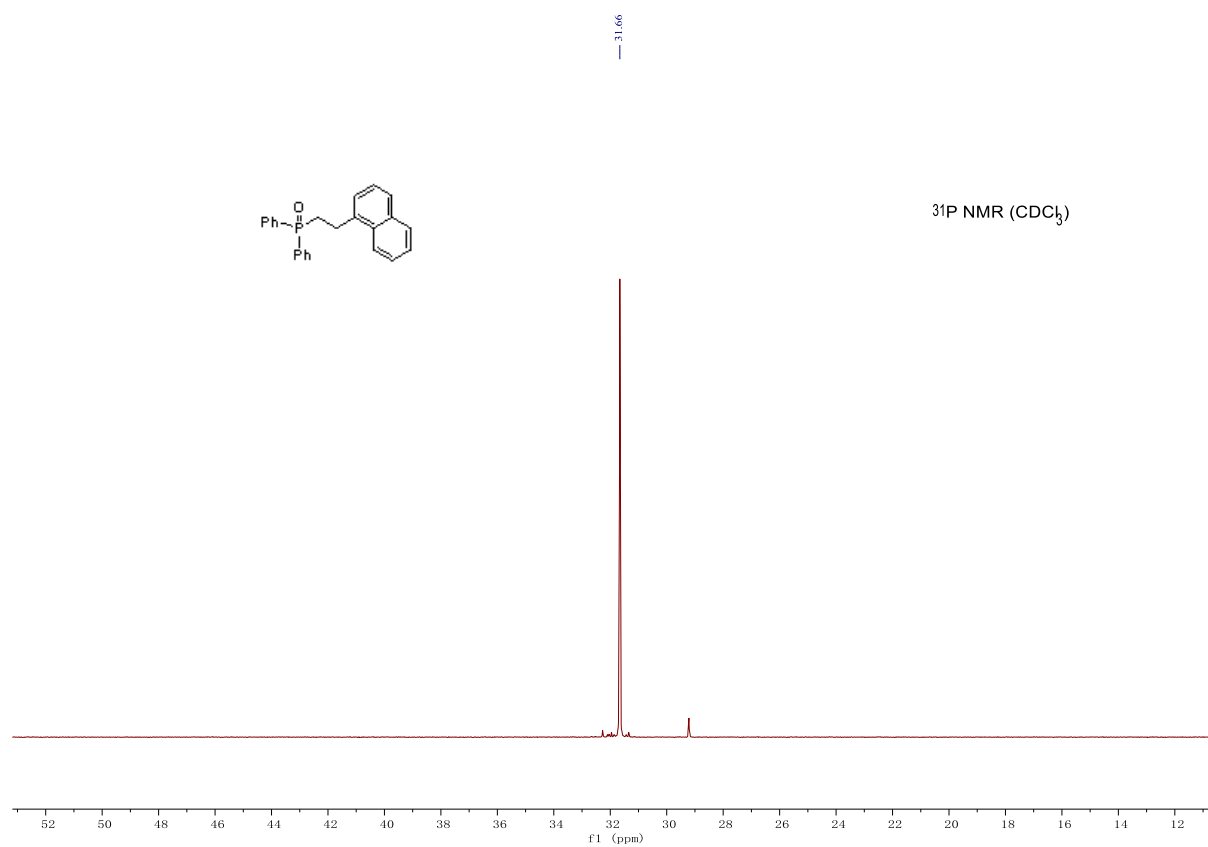




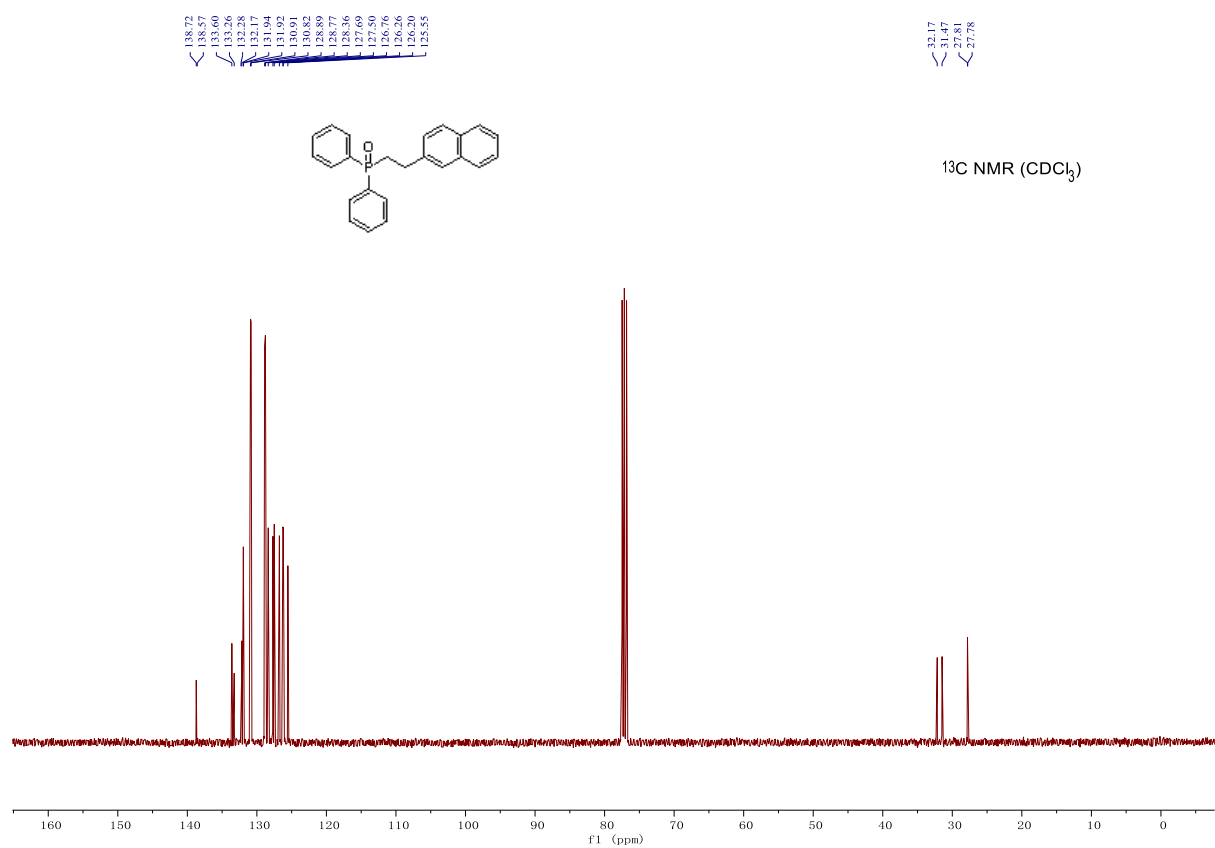
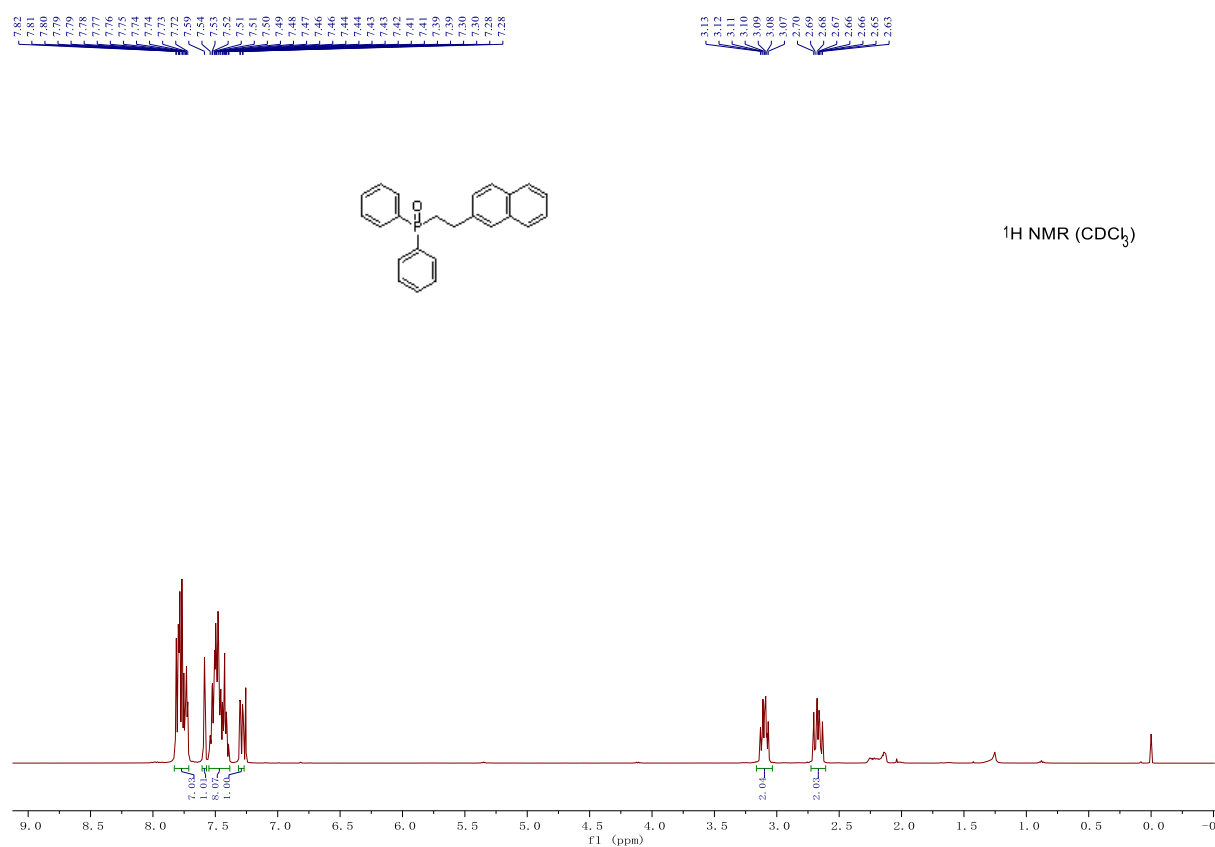


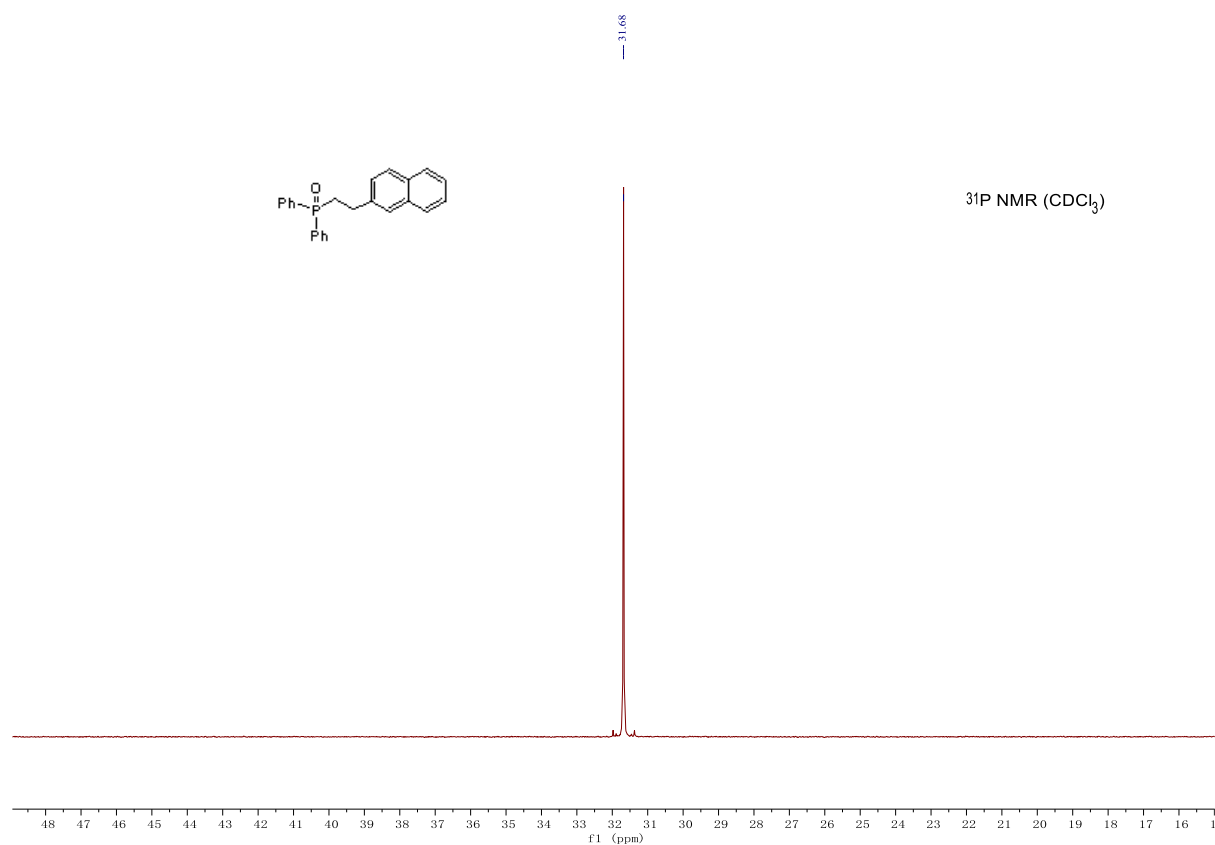
(9) (2-(Naphthalen-1-yl)ethyl)diphenylphosphine oxide (**3i**)



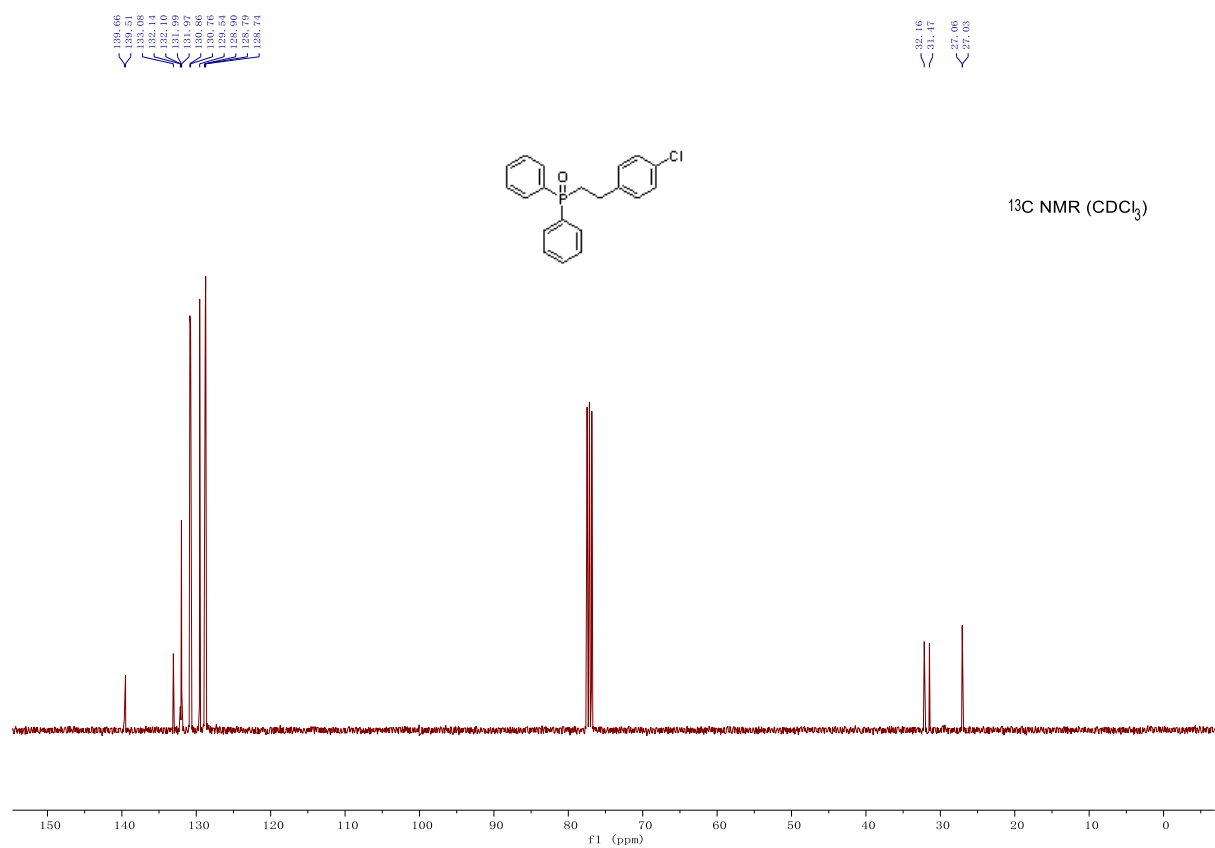
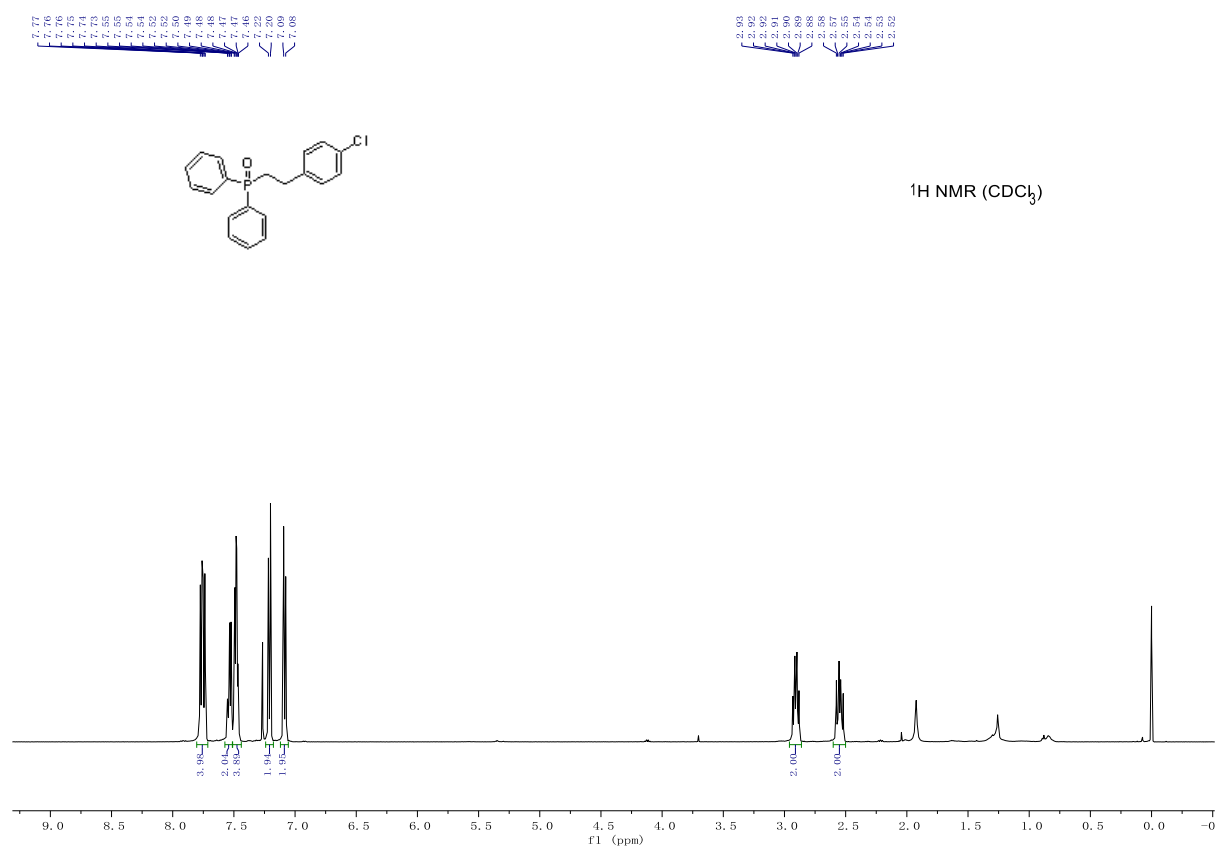


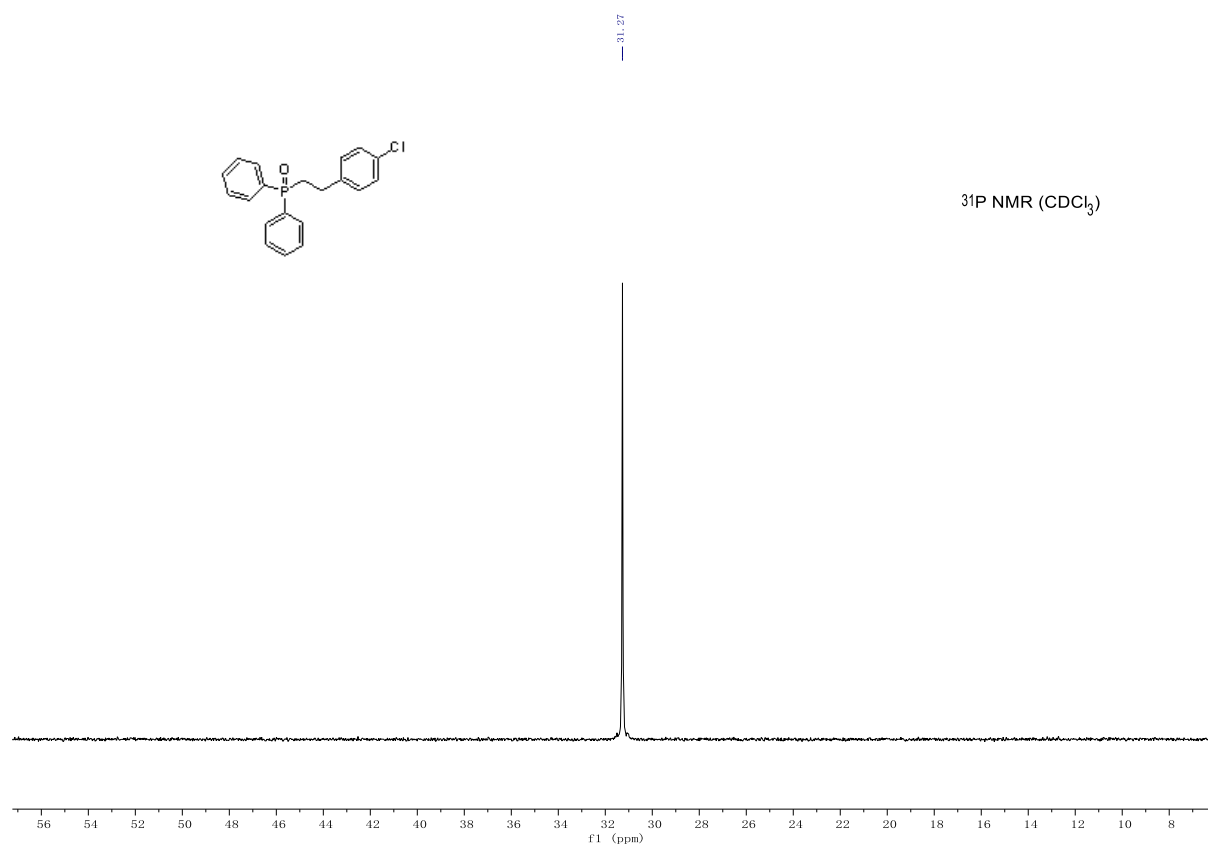
(10) (2-(Naphthalen-2-yl)ethyl)diphenylphosphine oxide (**3j**)



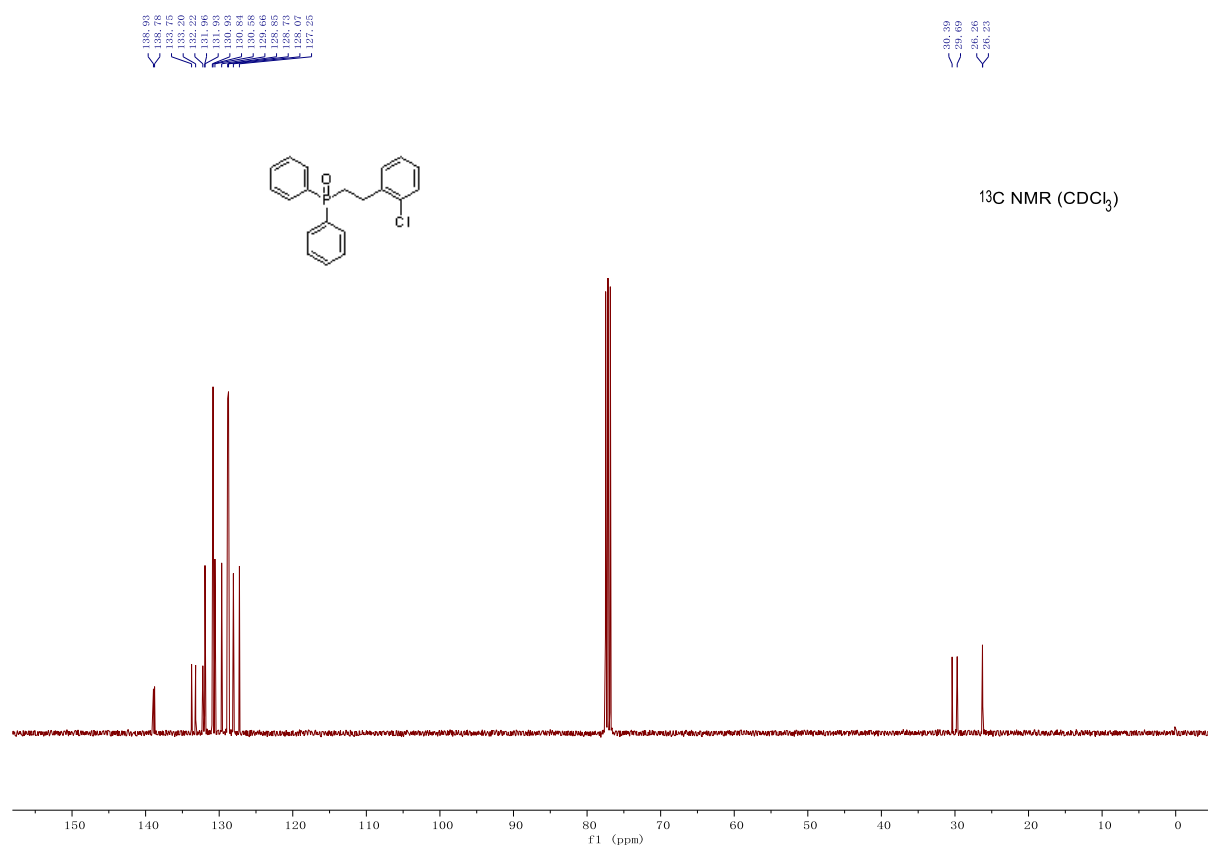
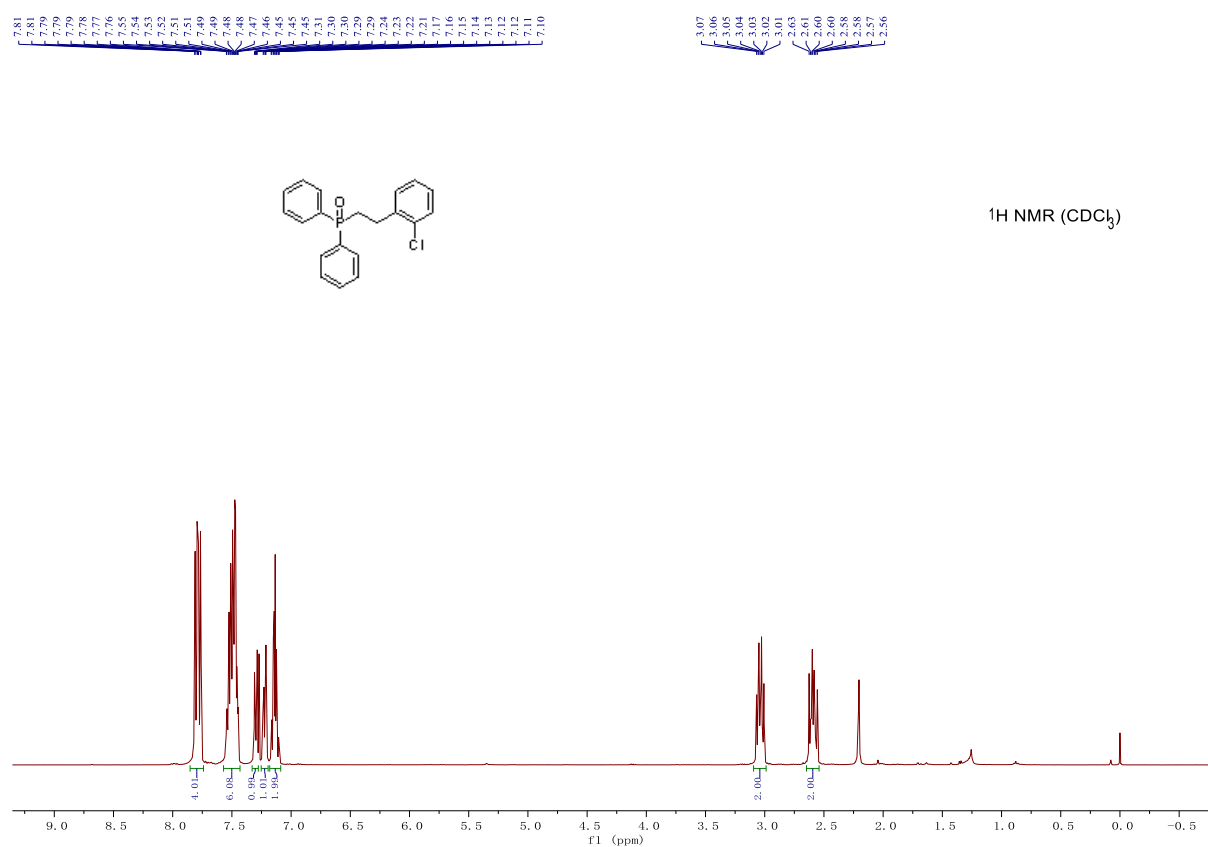


(11) (4-Chlorophenethyl)diphenylphosphine oxide (**3k**)

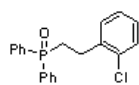




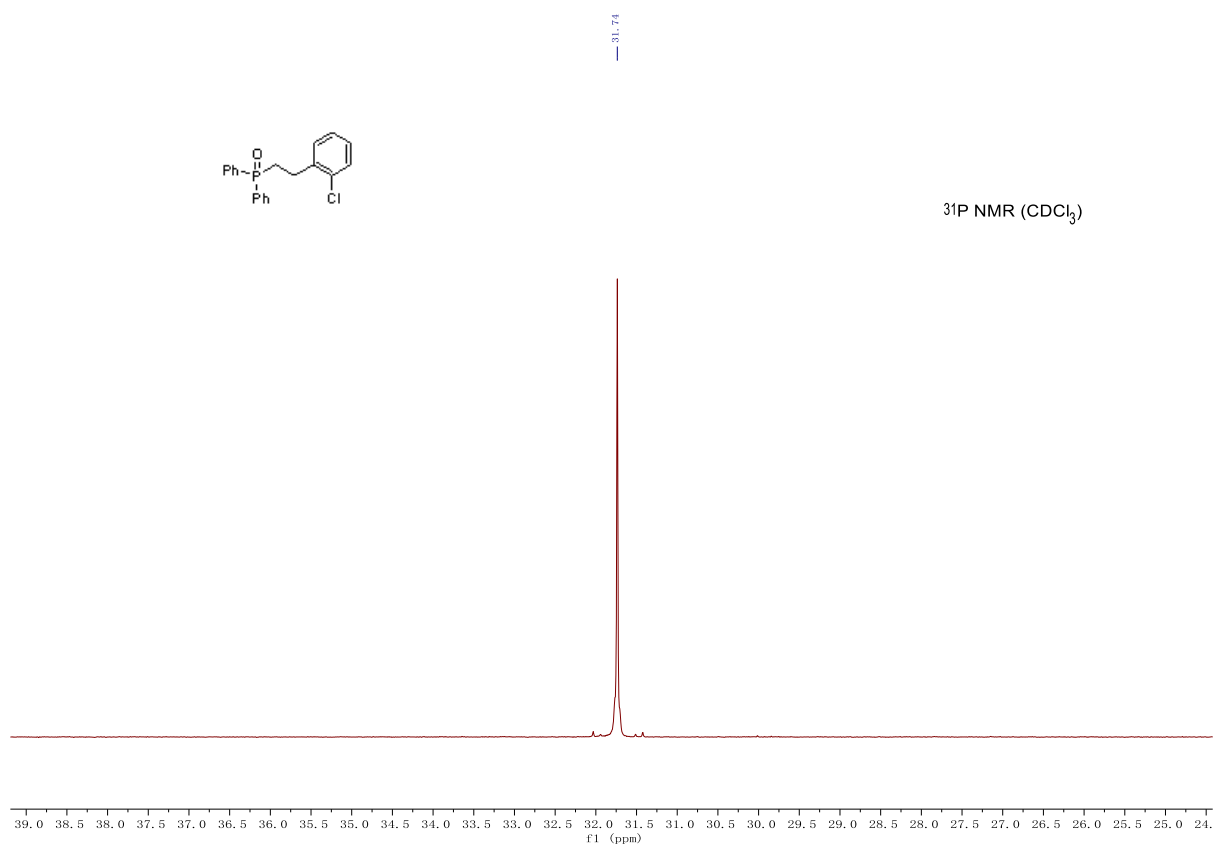
(12) (2-Chlorophenethyl)diphenylphosphine oxide (**3I**)



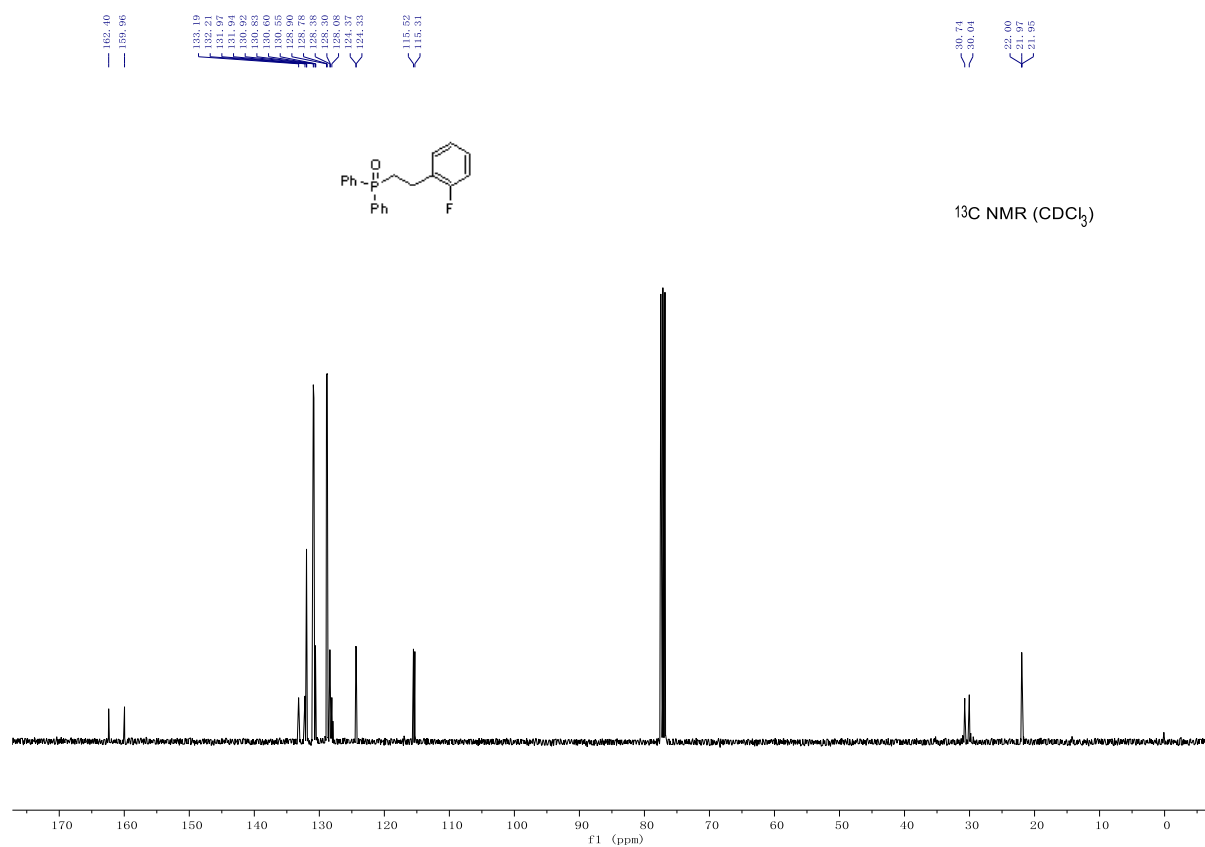
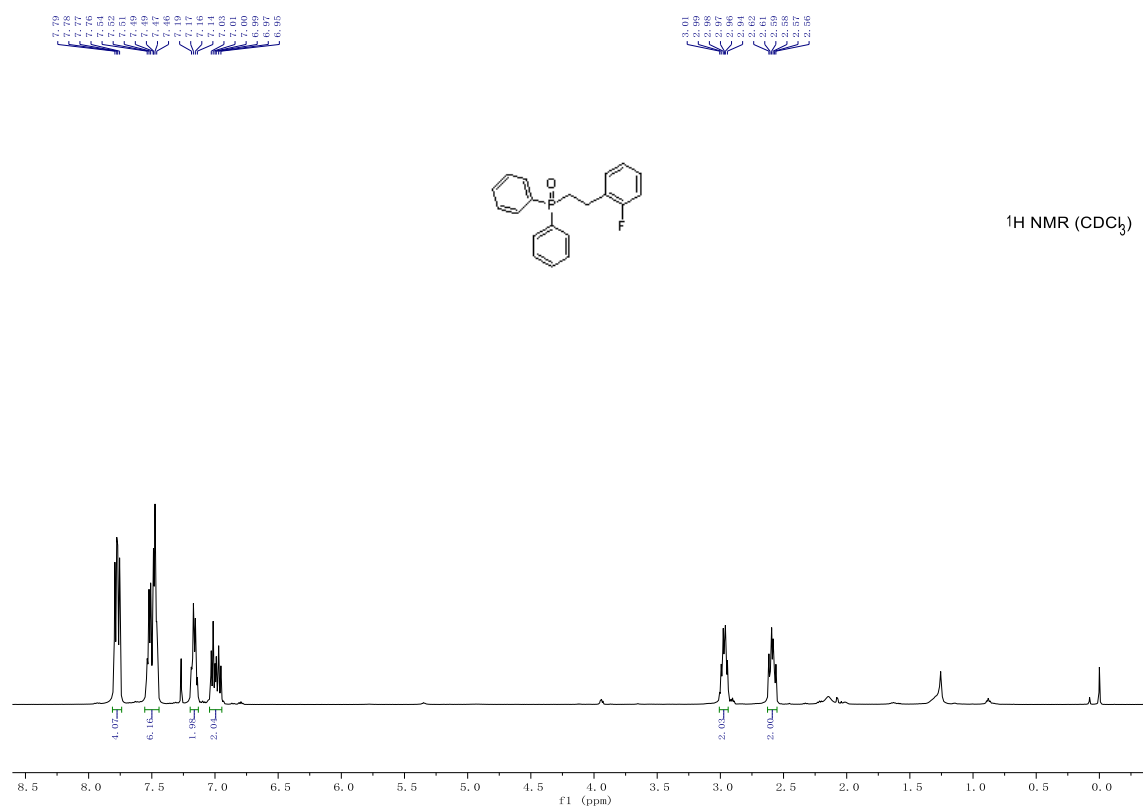


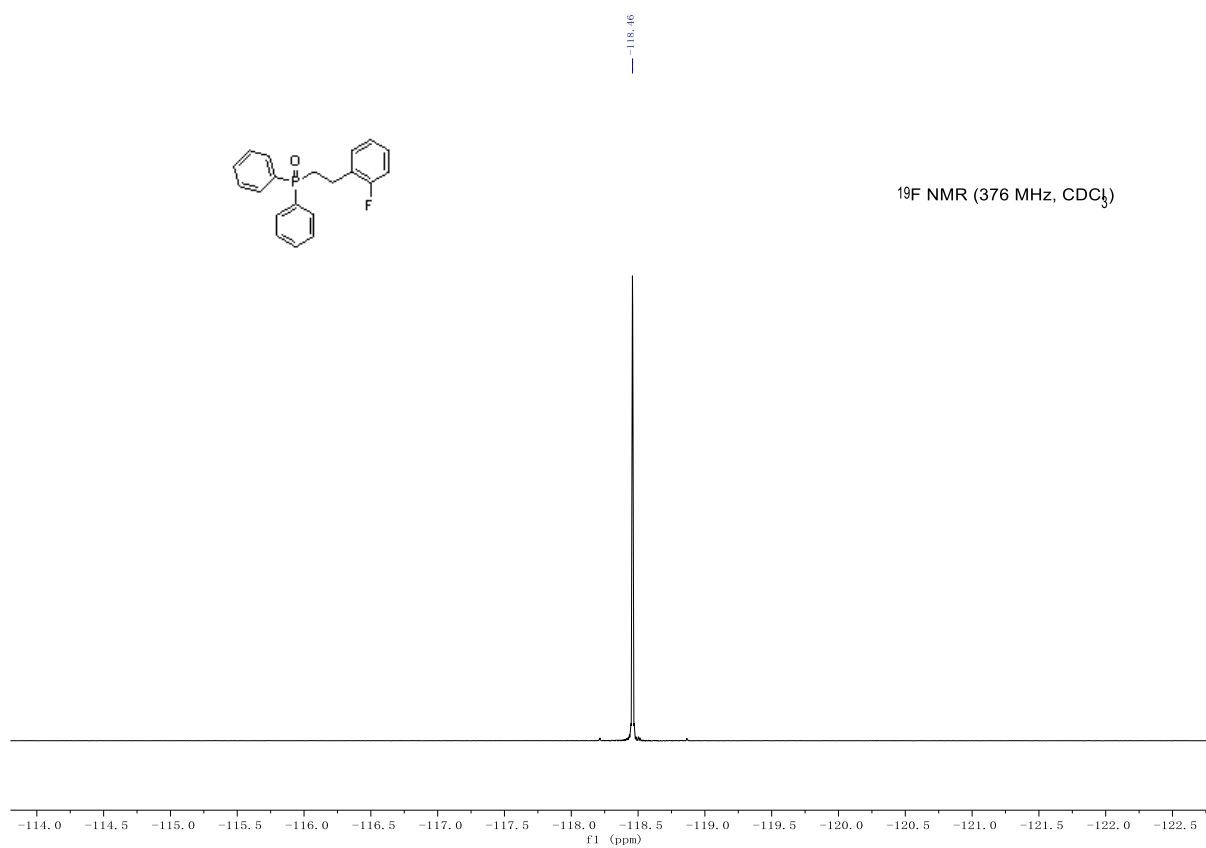
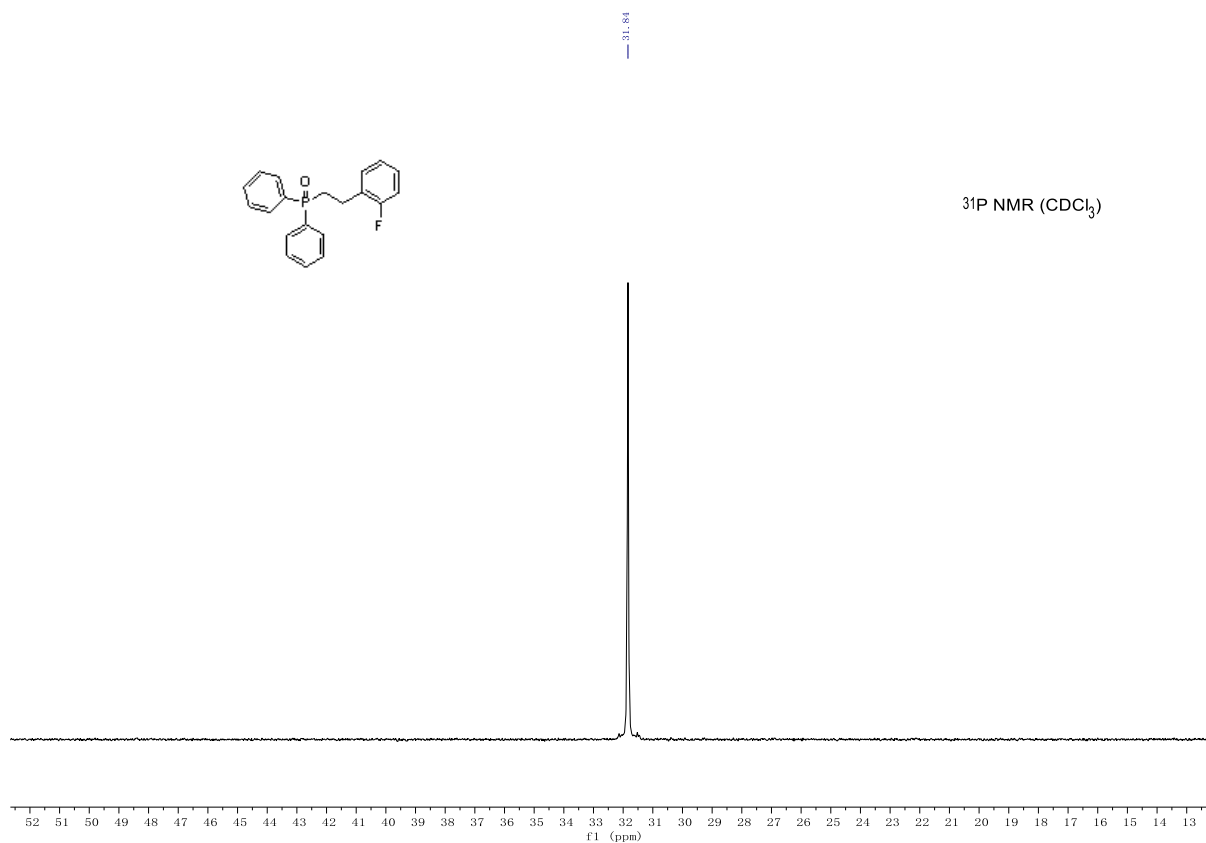


$^{31}\text{P}$  NMR ( $\text{CDCl}_3$ )

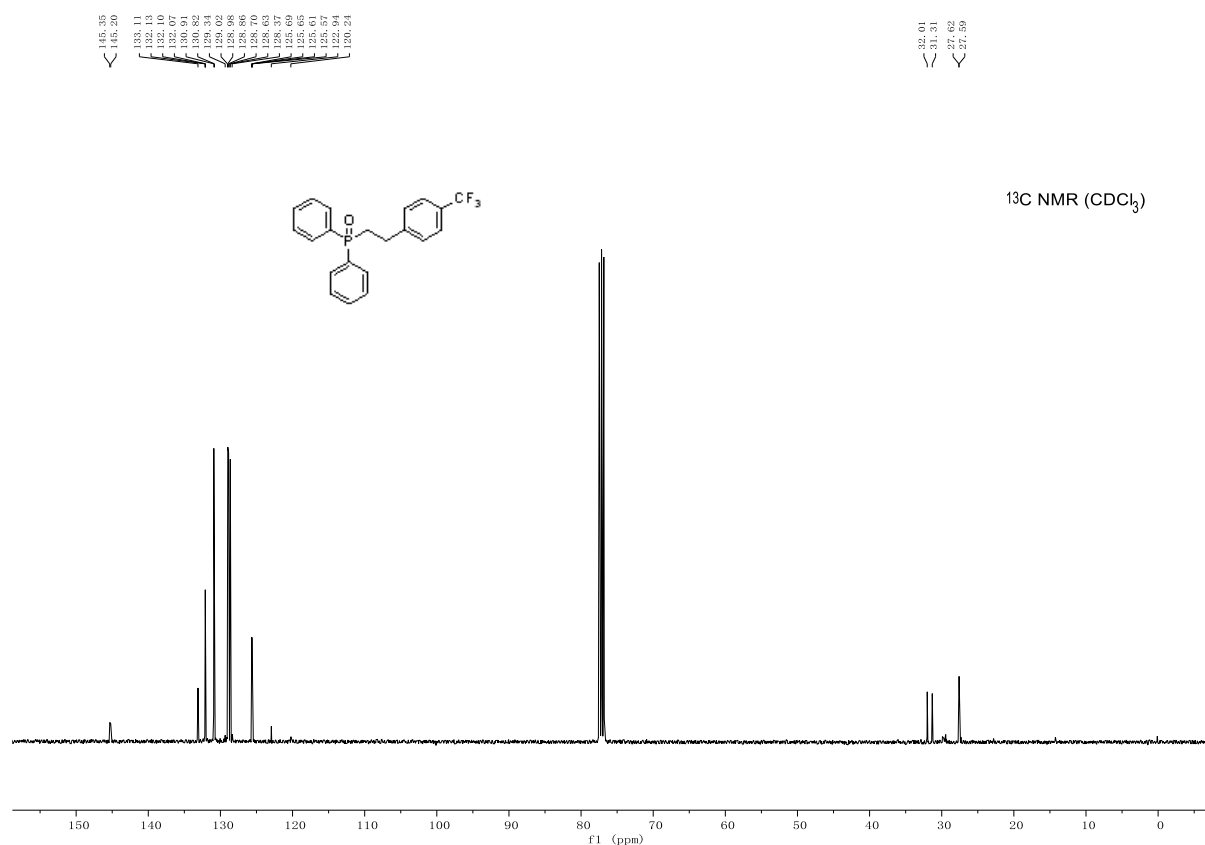
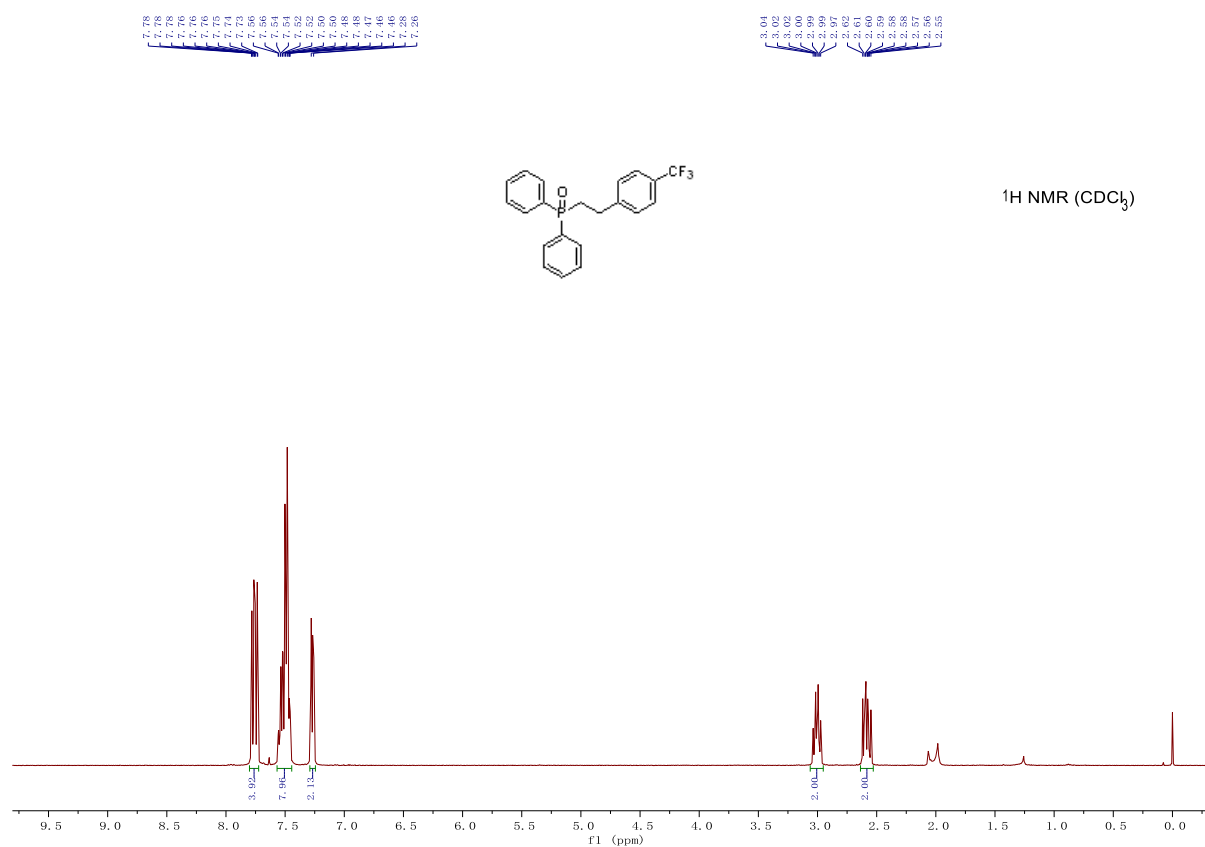


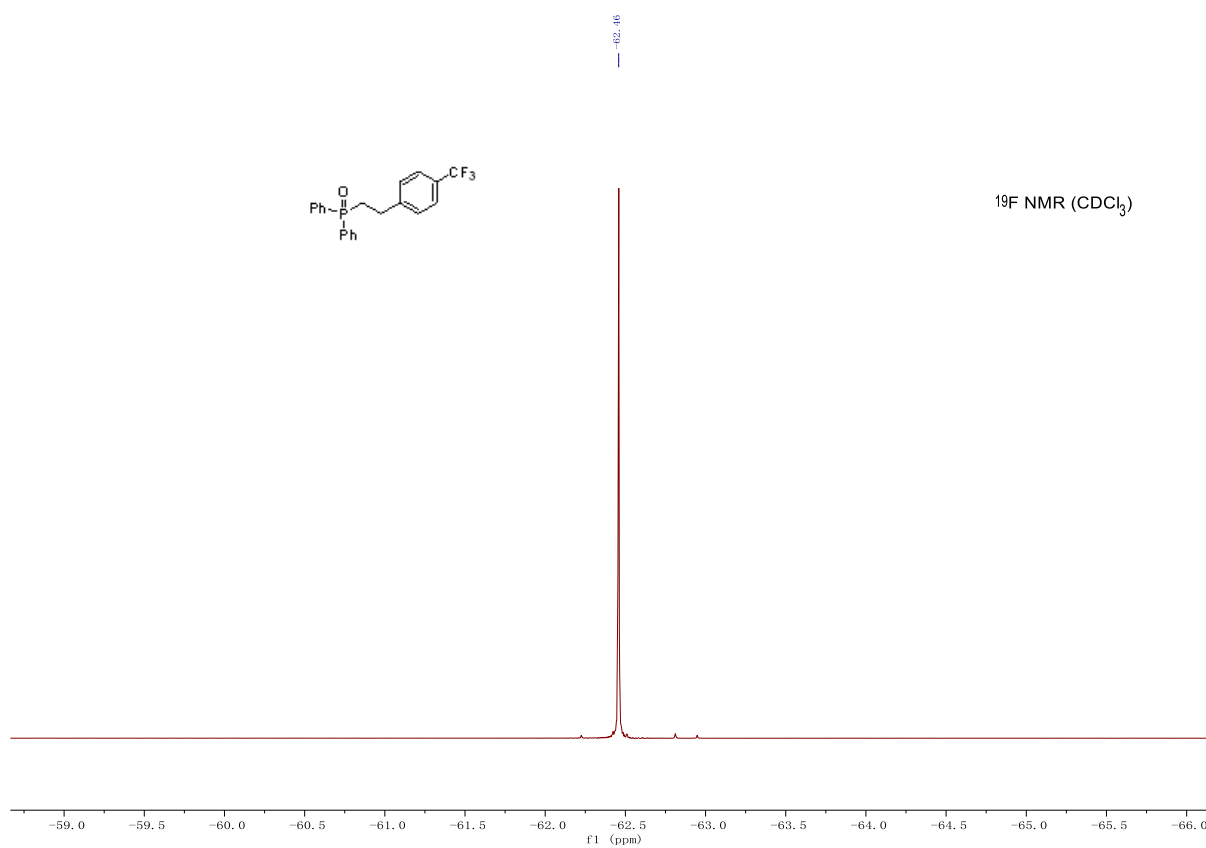
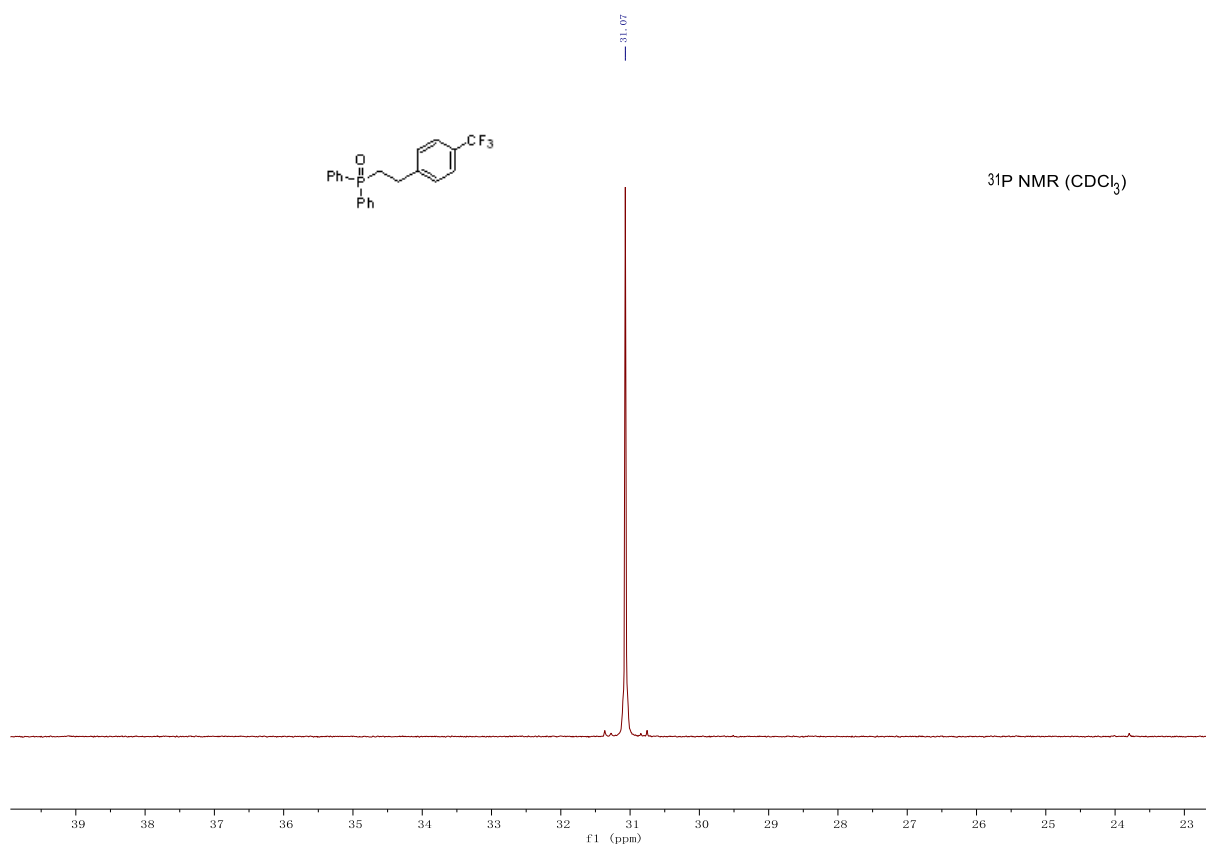
(13) (2-Fluorophenethyl)diphenylphosphine oxide (**3m**)



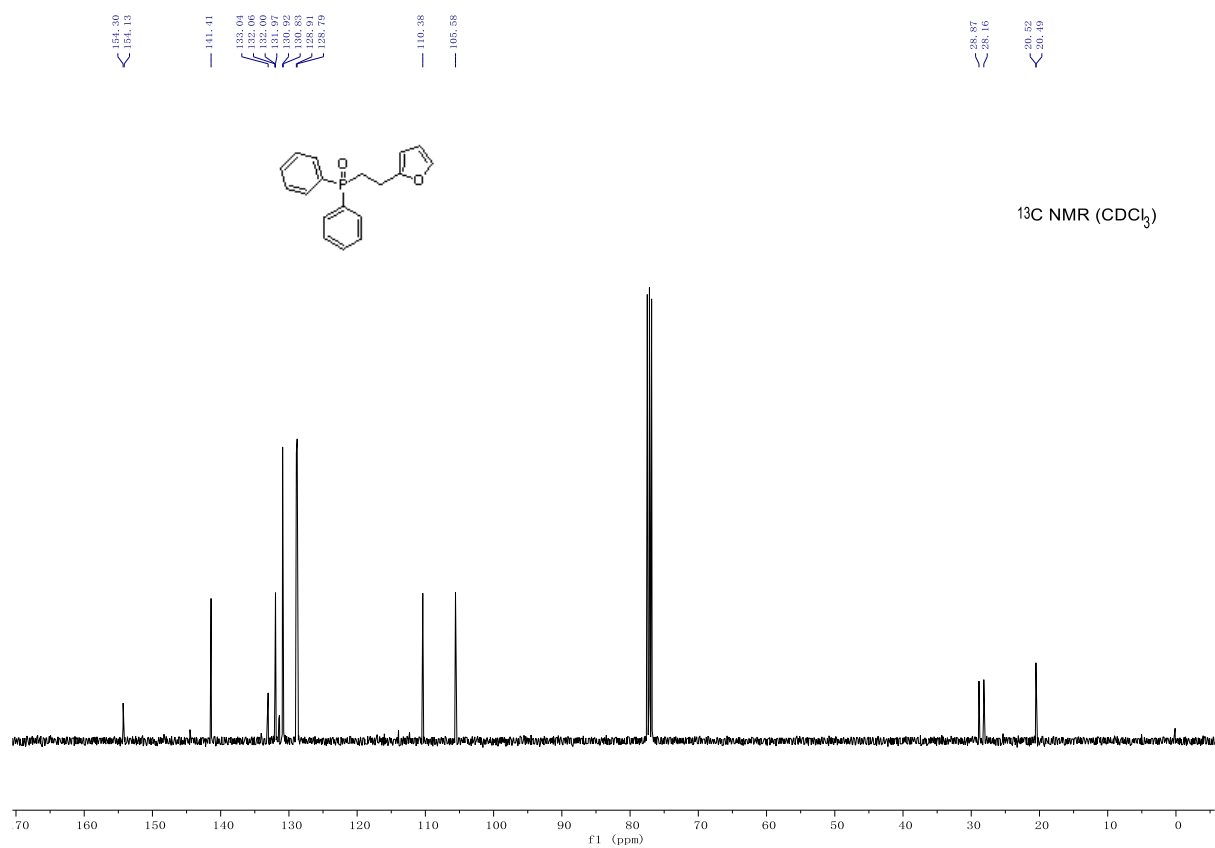
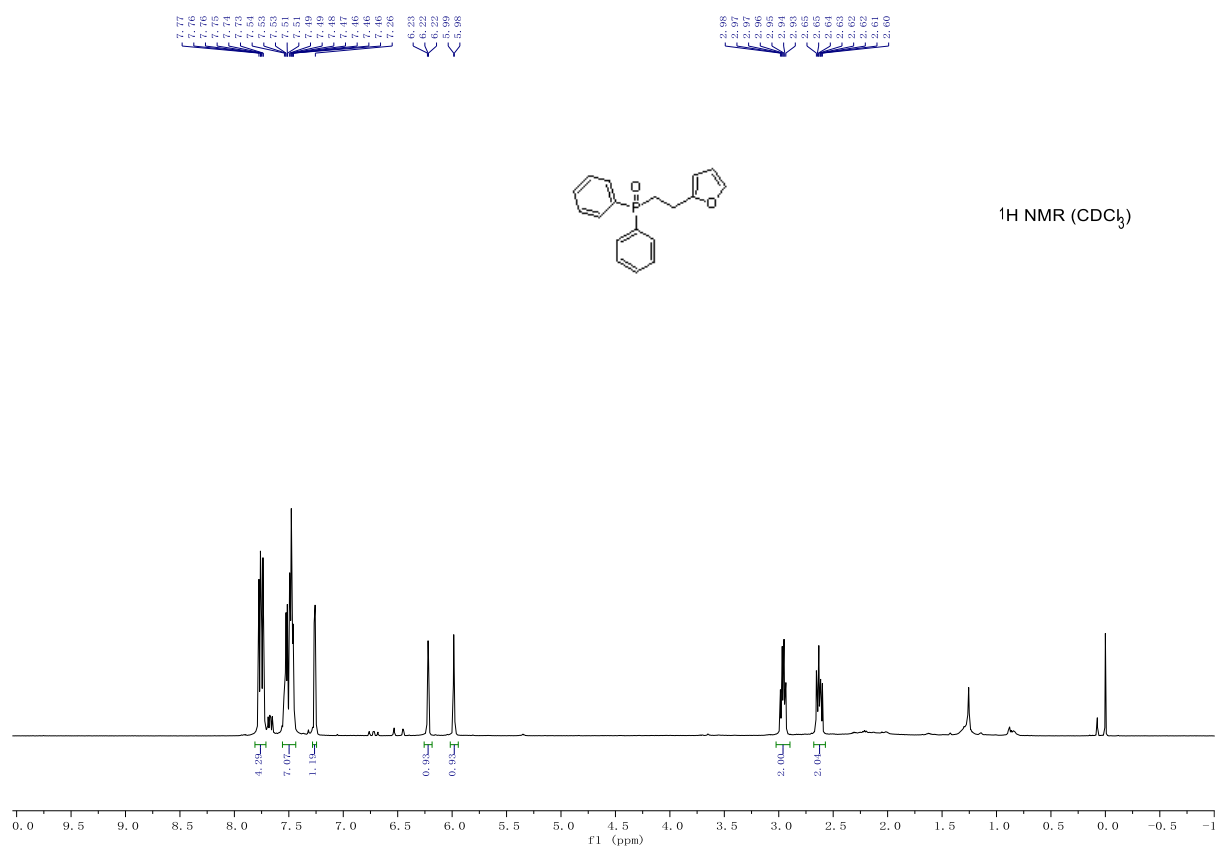


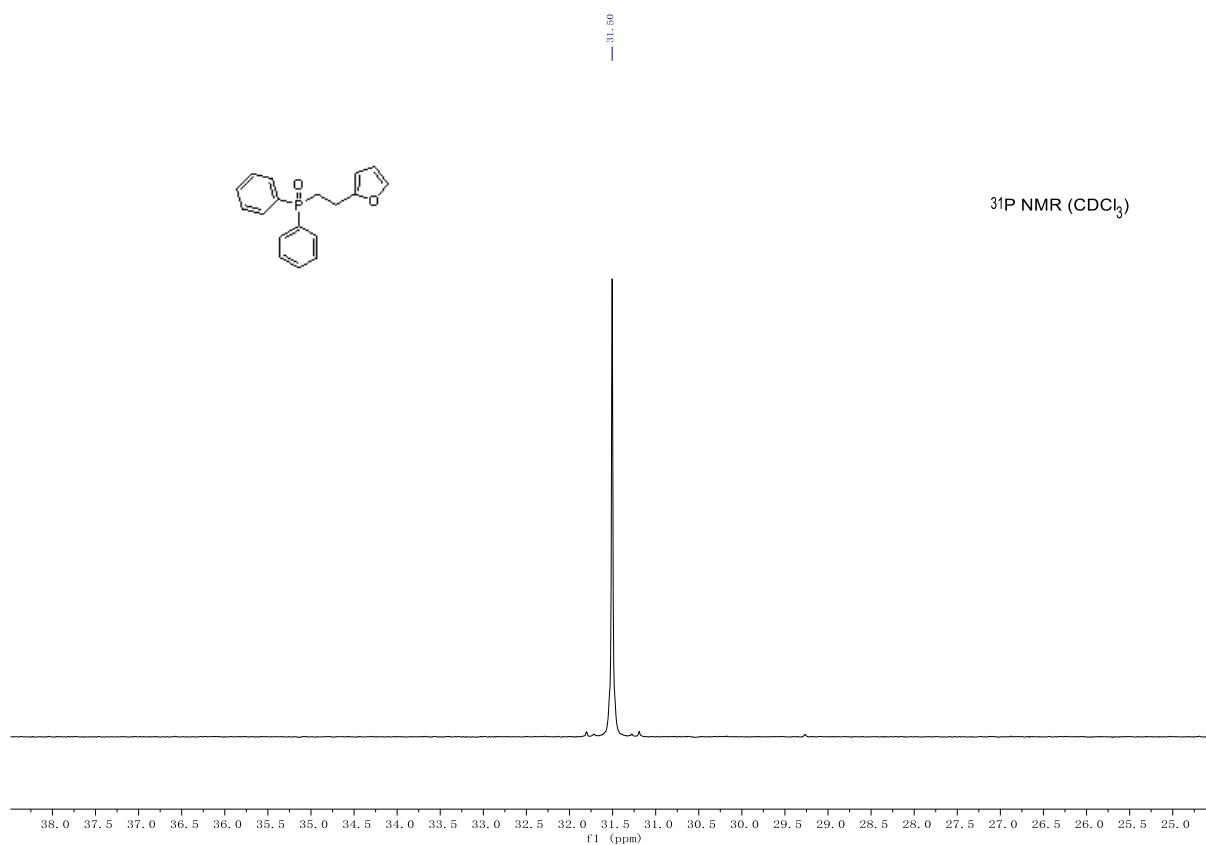
(14) Diphenyl(4-(trifluoromethyl)phenethyl)phosphine oxide (**3n**)



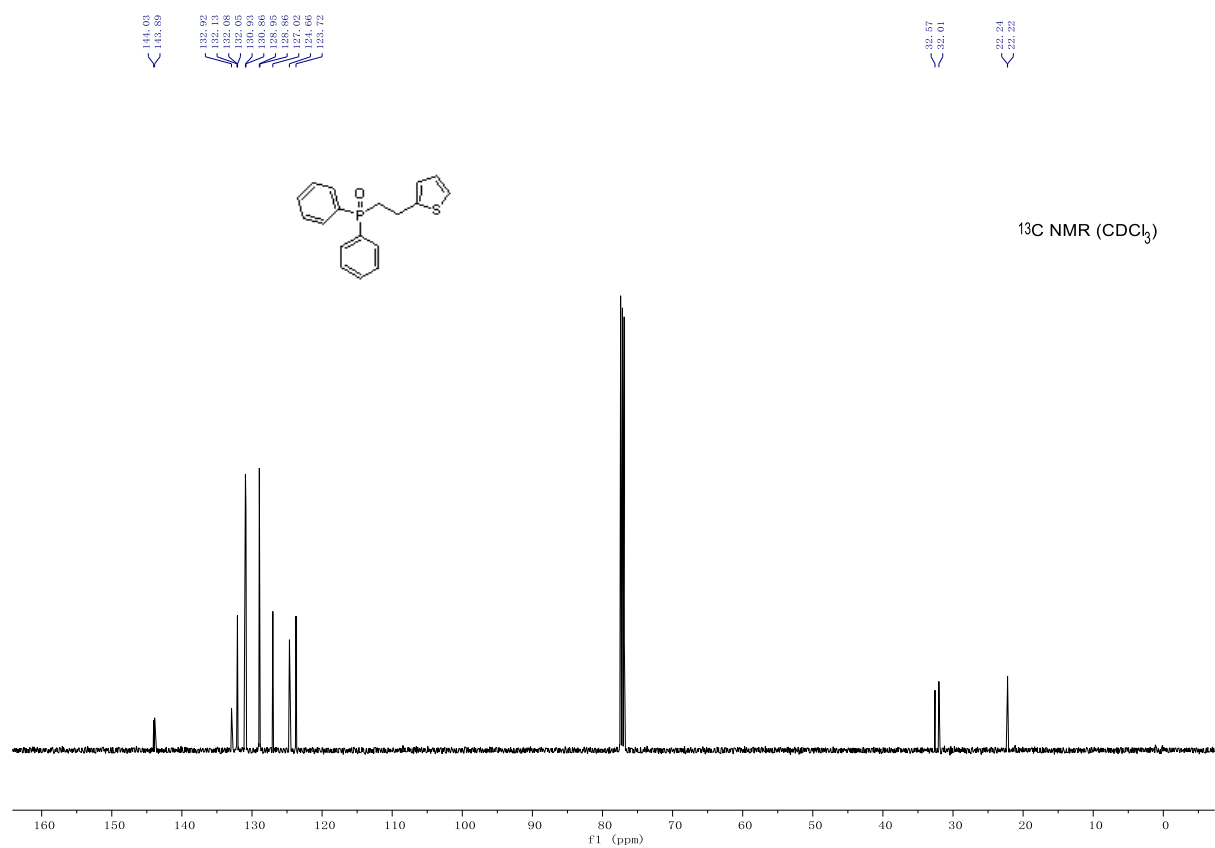
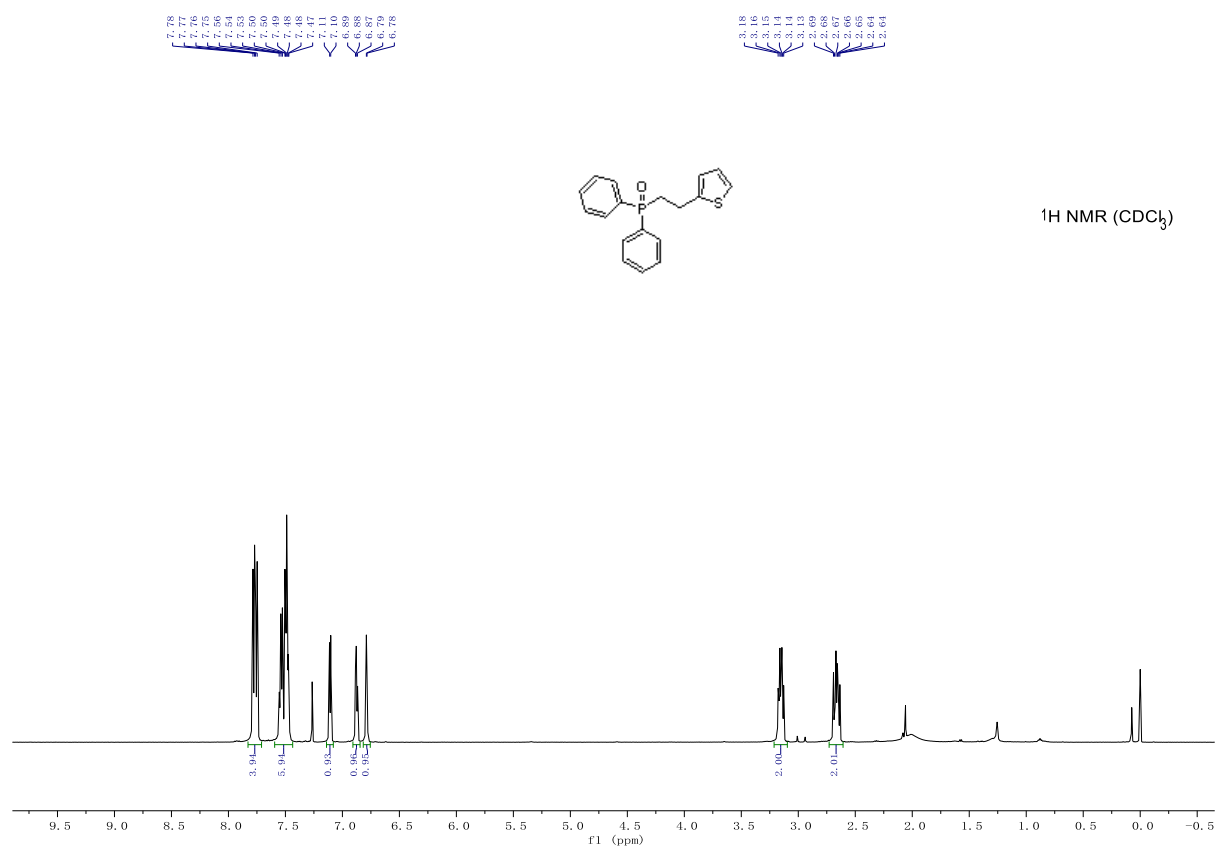


(15) (2-(Furan-2-yl)ethyl)diphenylphosphine oxide (**30**)

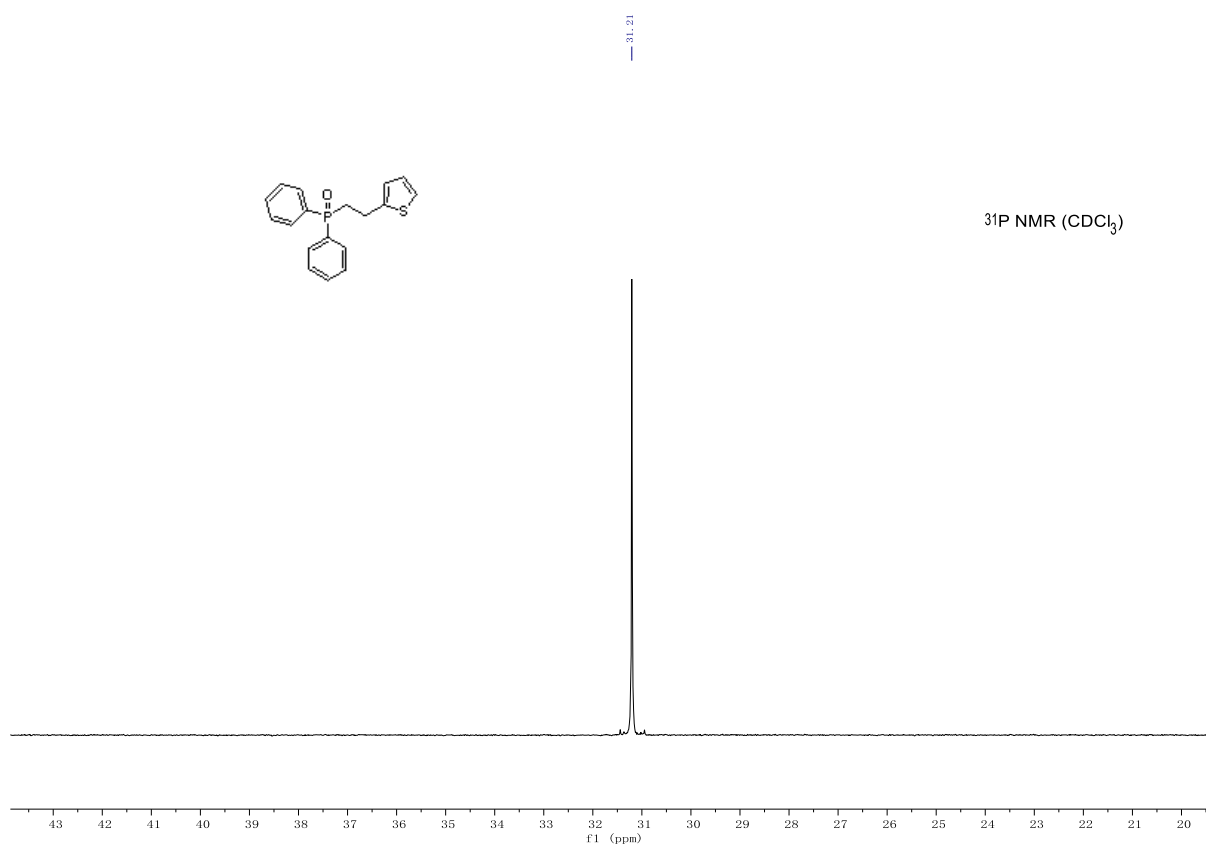




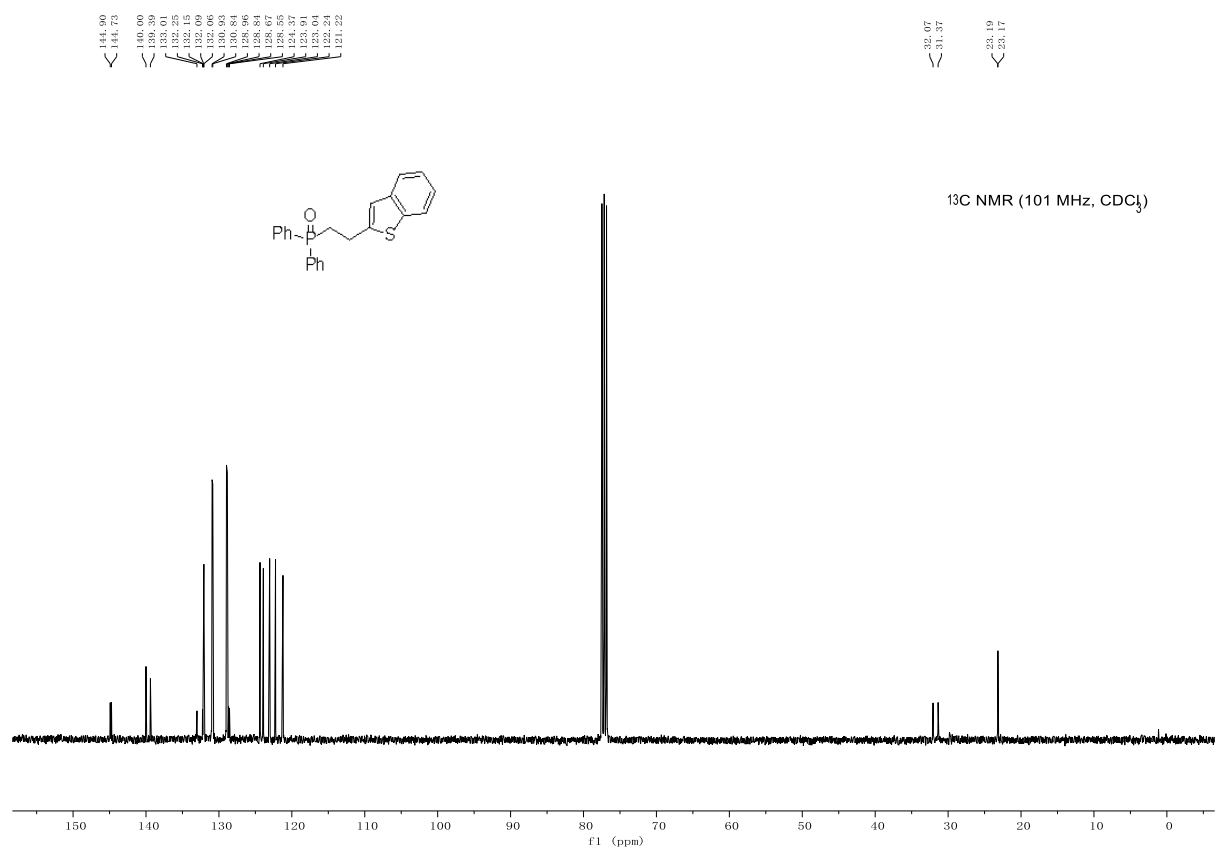
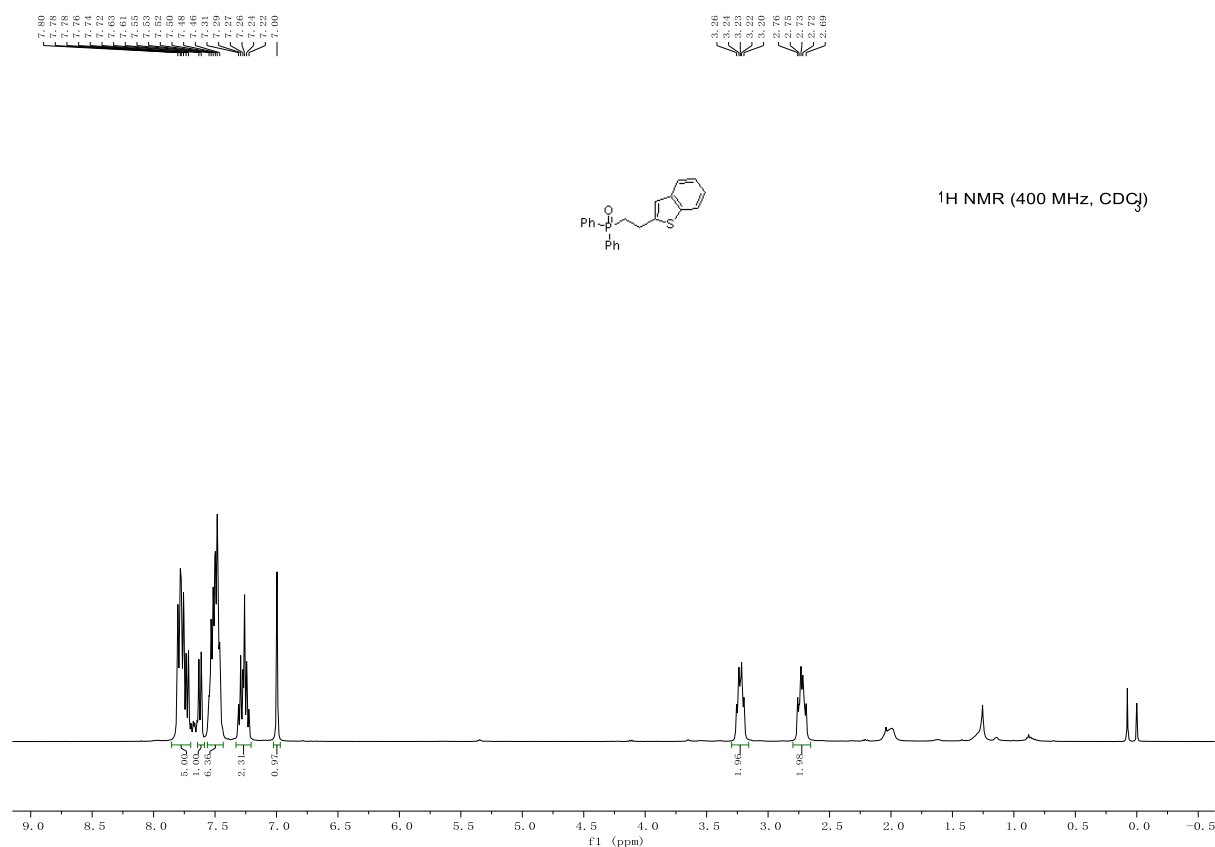
(16) Diphenyl(2-(thiophen-2-yl)ethyl)phosphine oxide (**3p**)

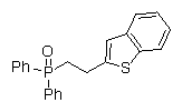




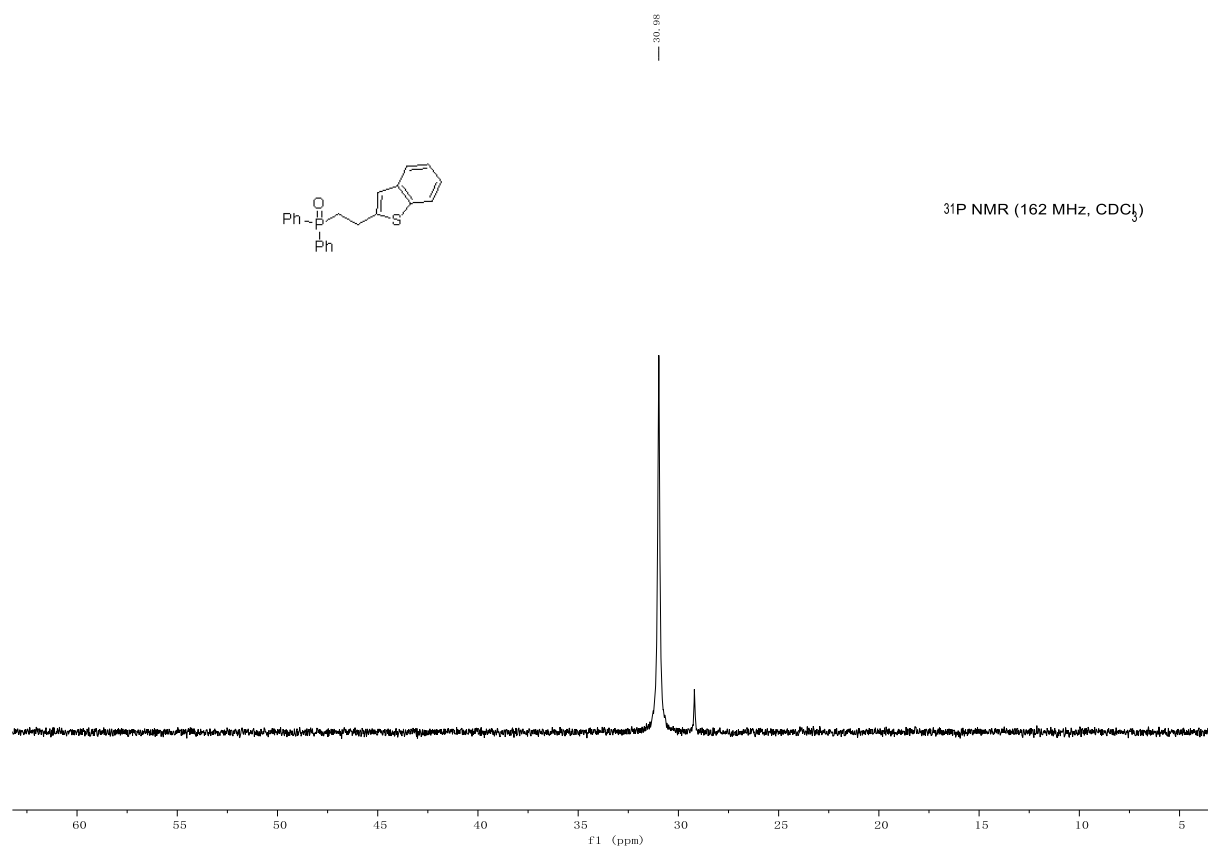


(17) 2-(2-Diphenylphosphorylethyl)benzothiophene (**3q**)

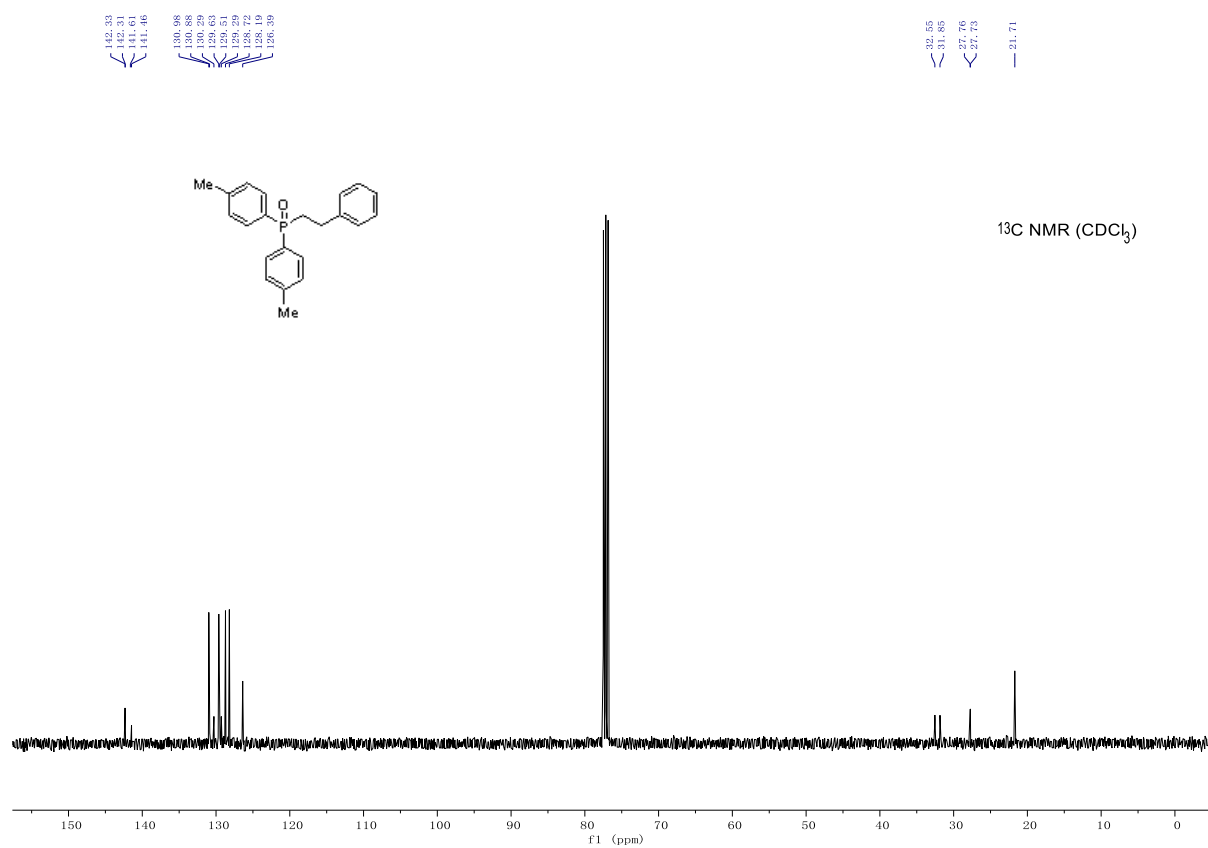
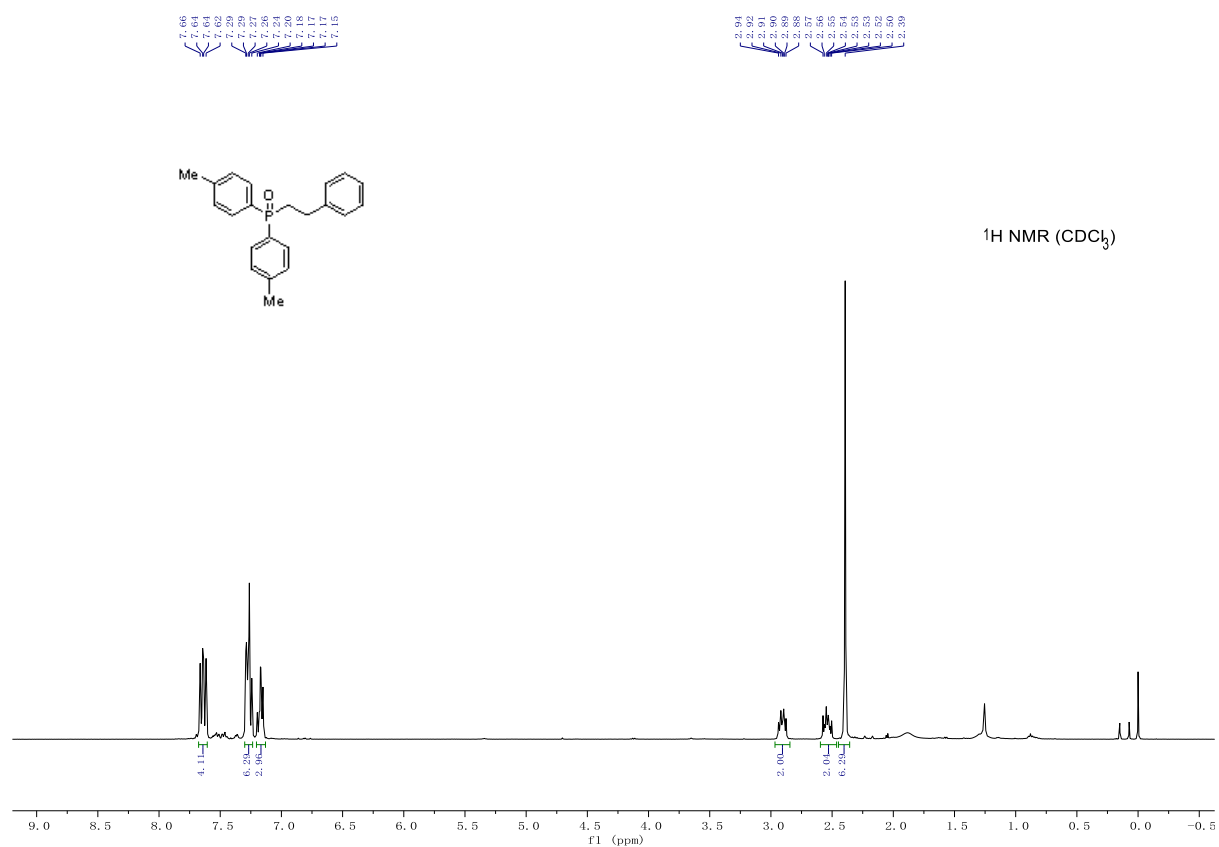


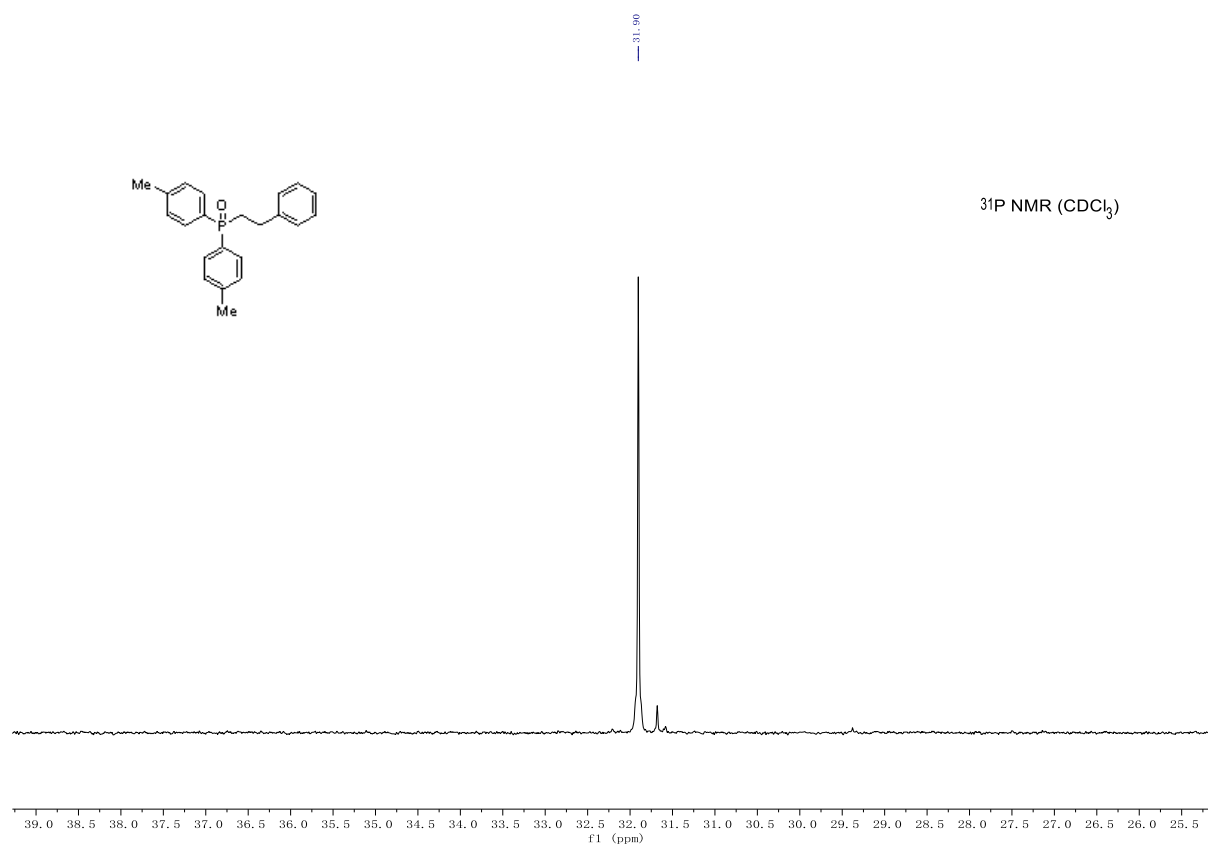


$^{31}\text{P}$  NMR (162 MHz,  $\text{CDCl}_3$ )

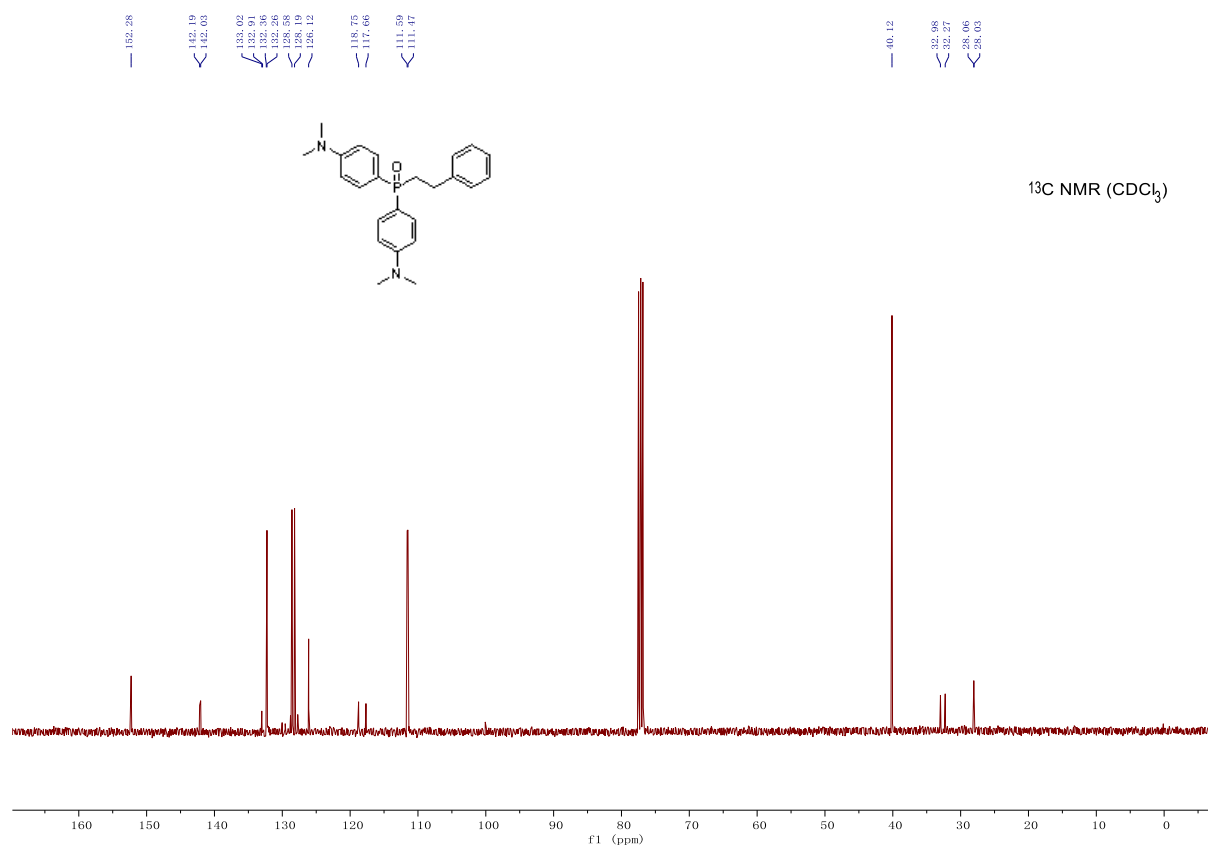
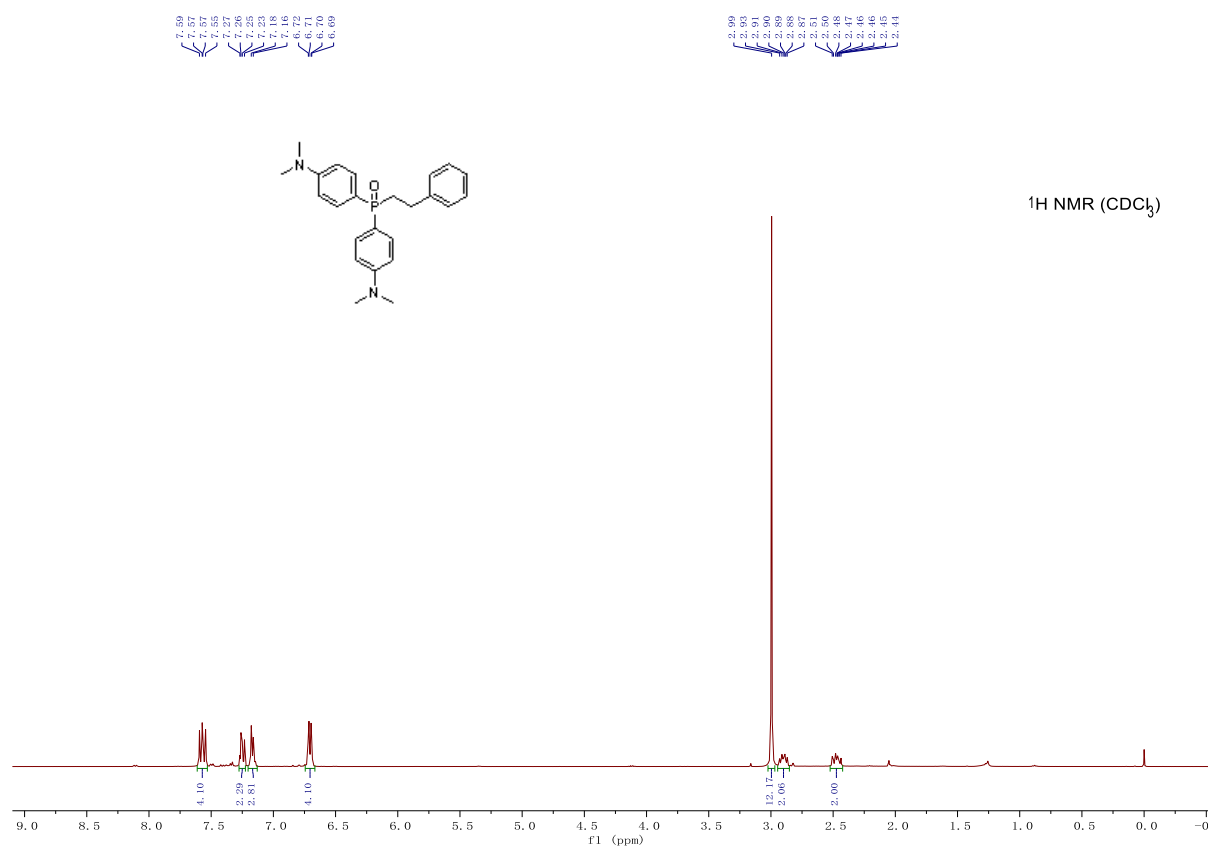


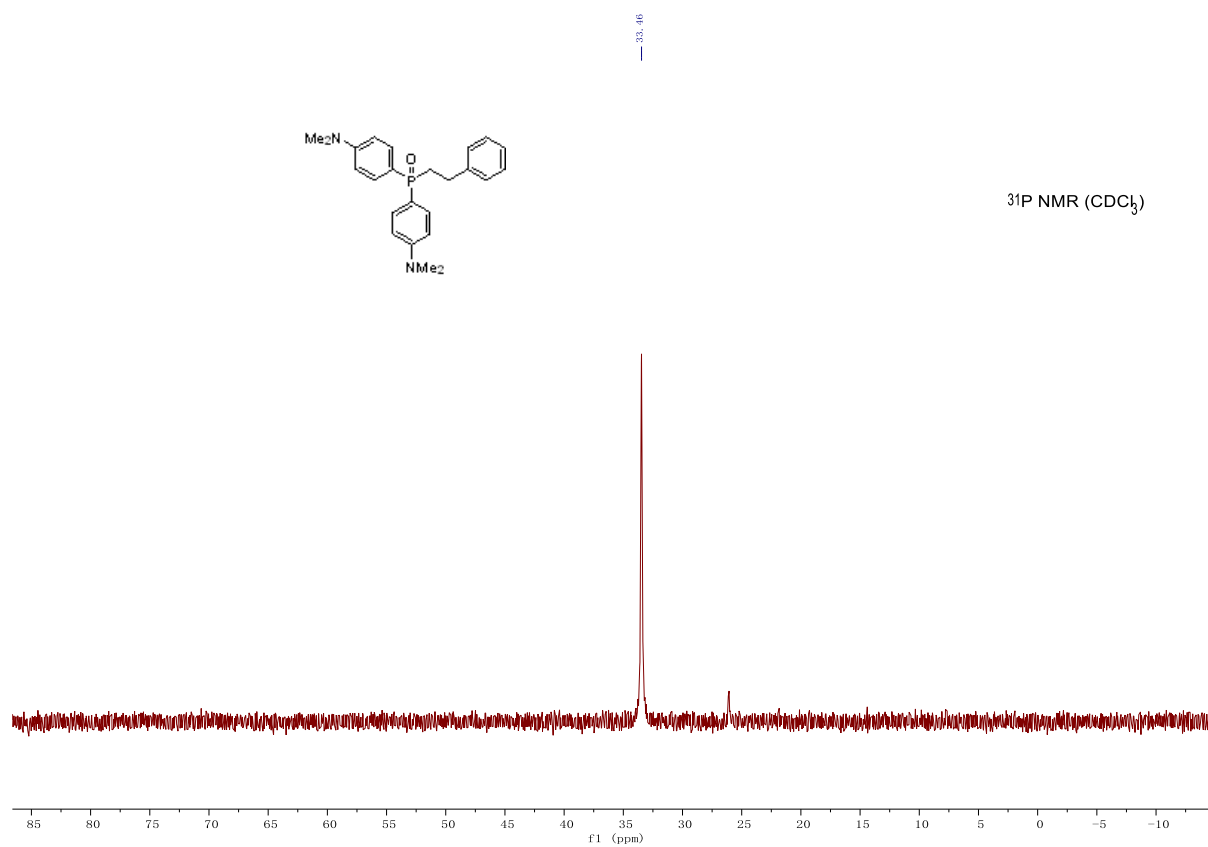
(18) Phenethyldi-*p*-tolylphosphine oxide (**3r**)



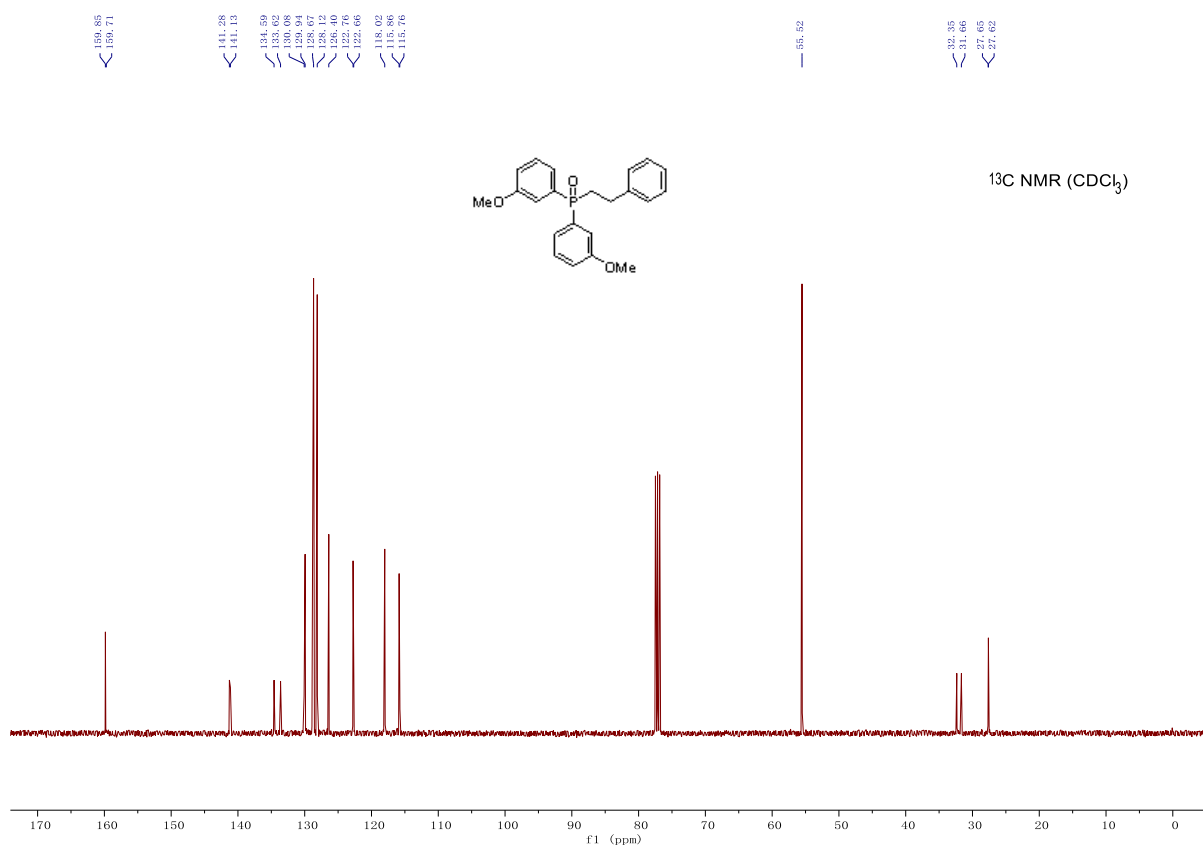
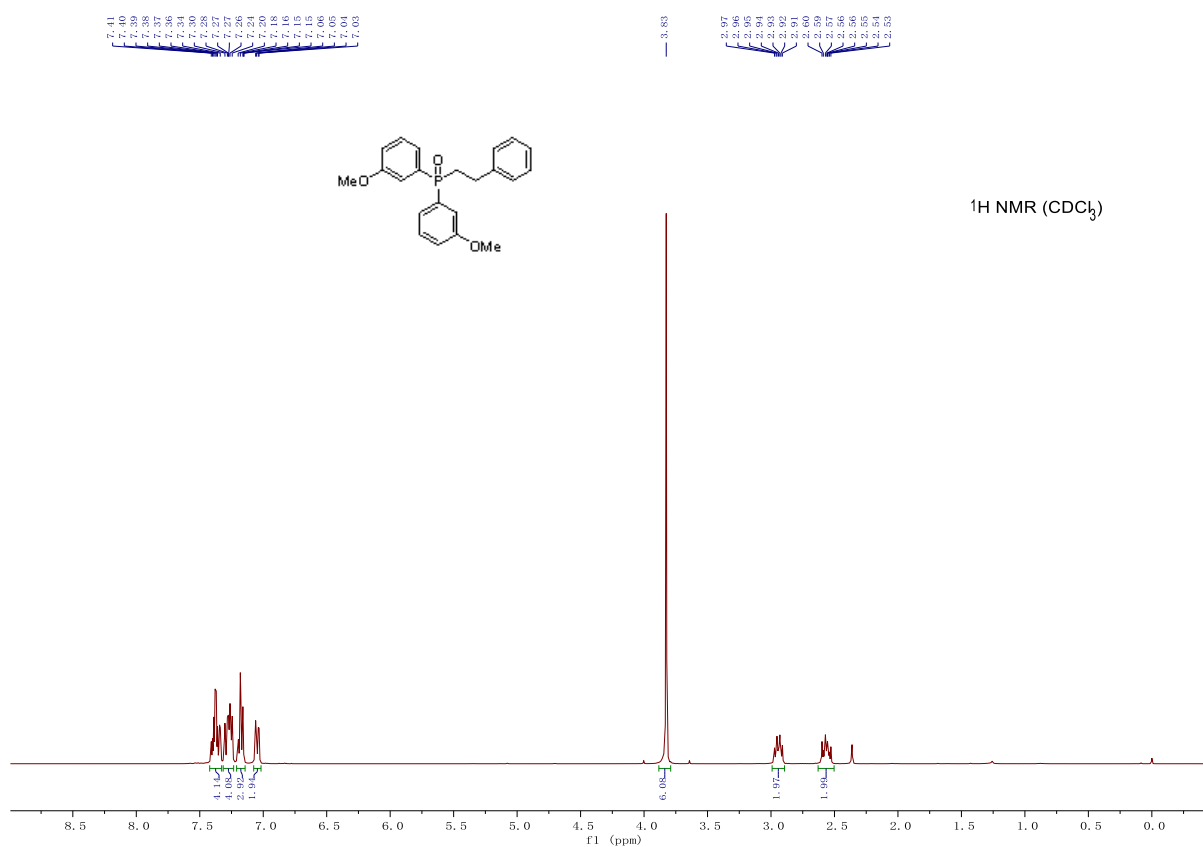


(19) Bis(4-(dimethylamino)phenyl)(phenethyl)phosphine oxide (**3s**)

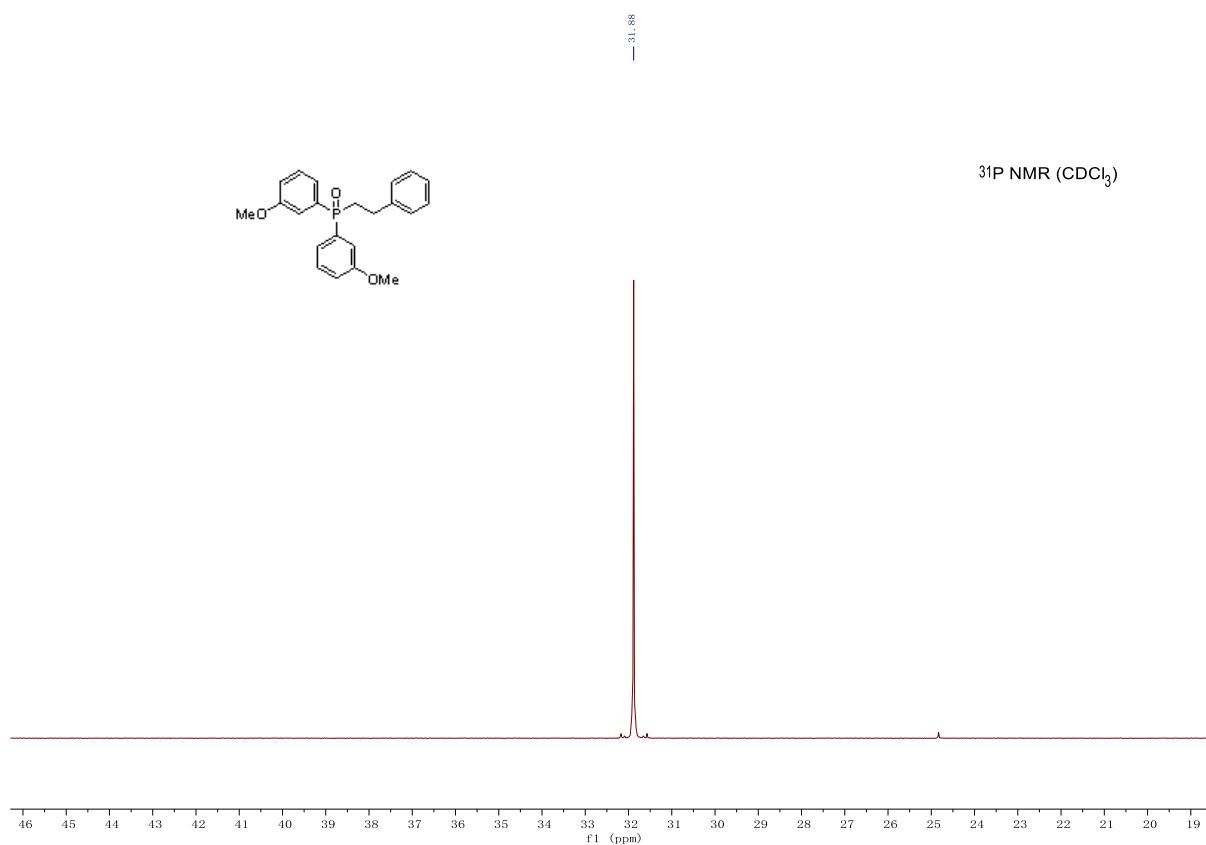




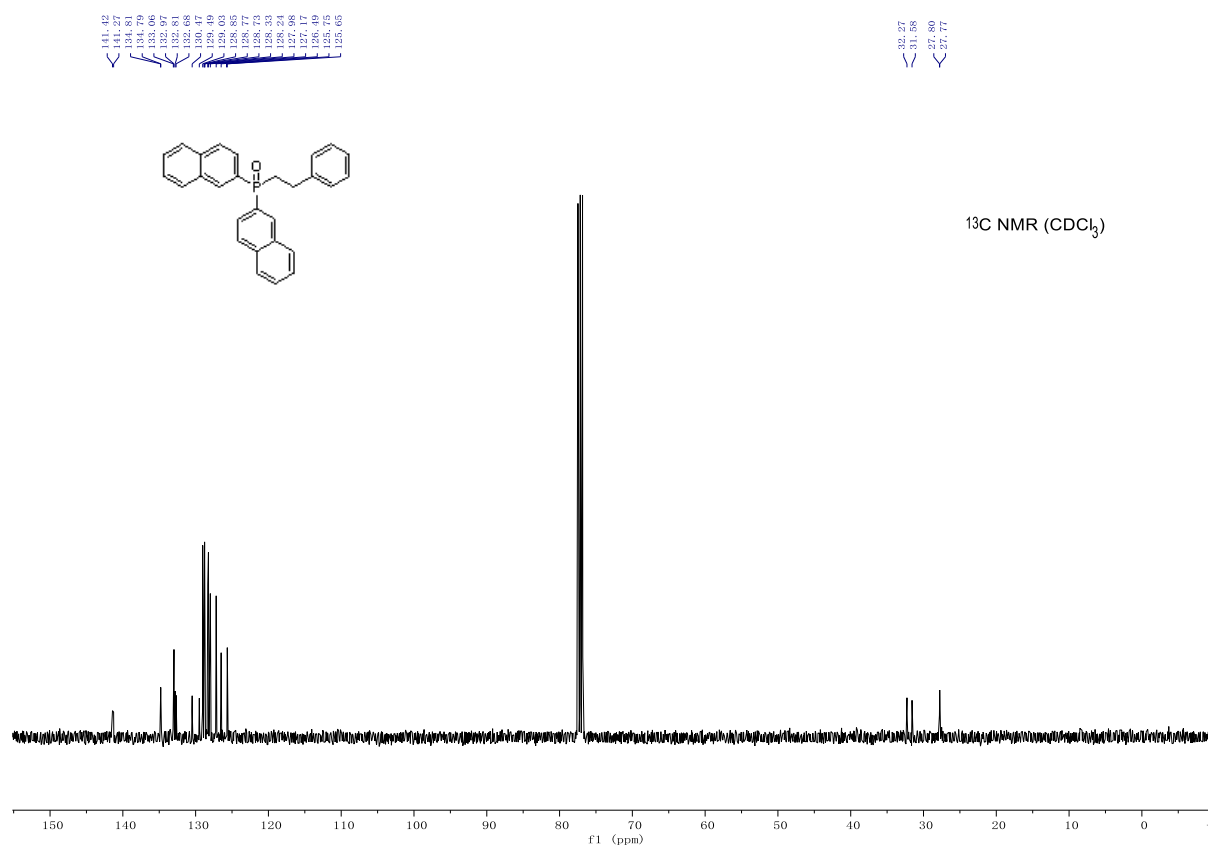
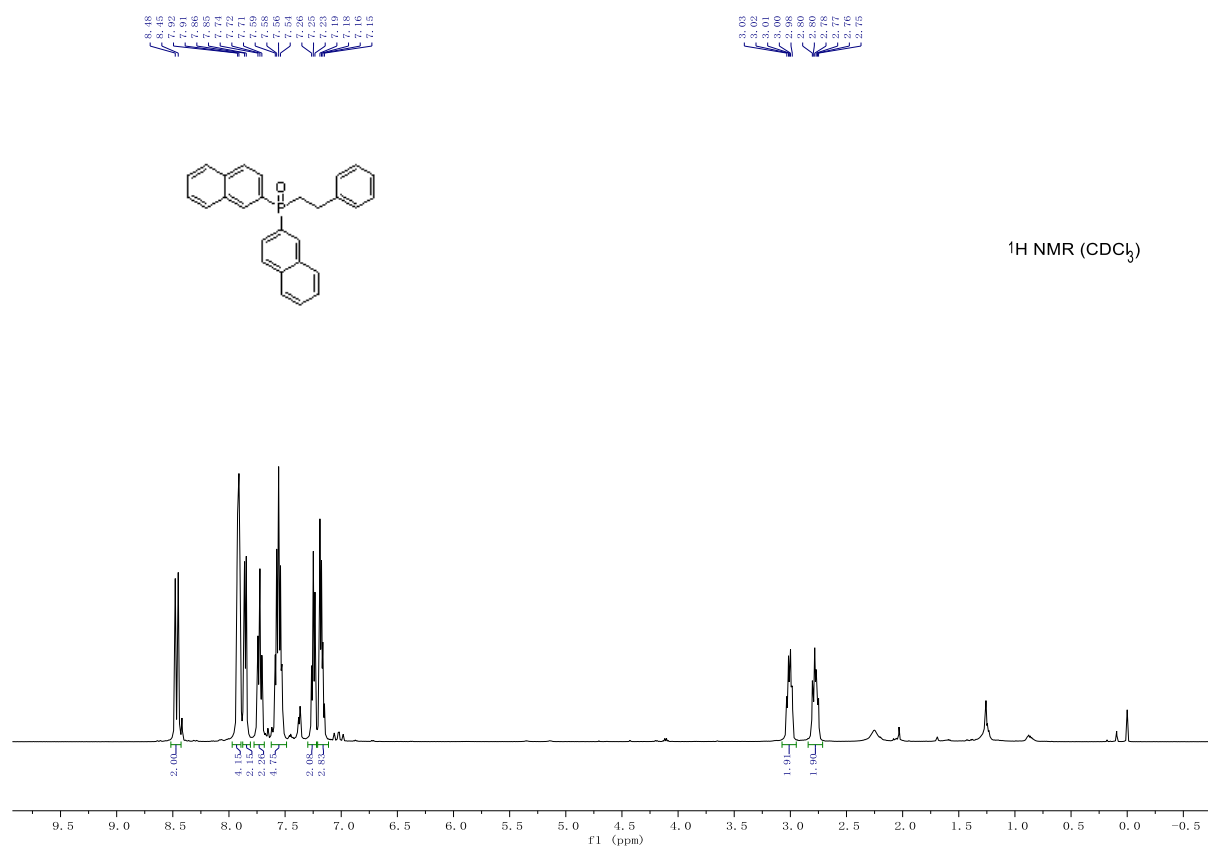
(20) Bis(3-methoxyphenyl)(phenethyl)phosphine oxide (**3t**)

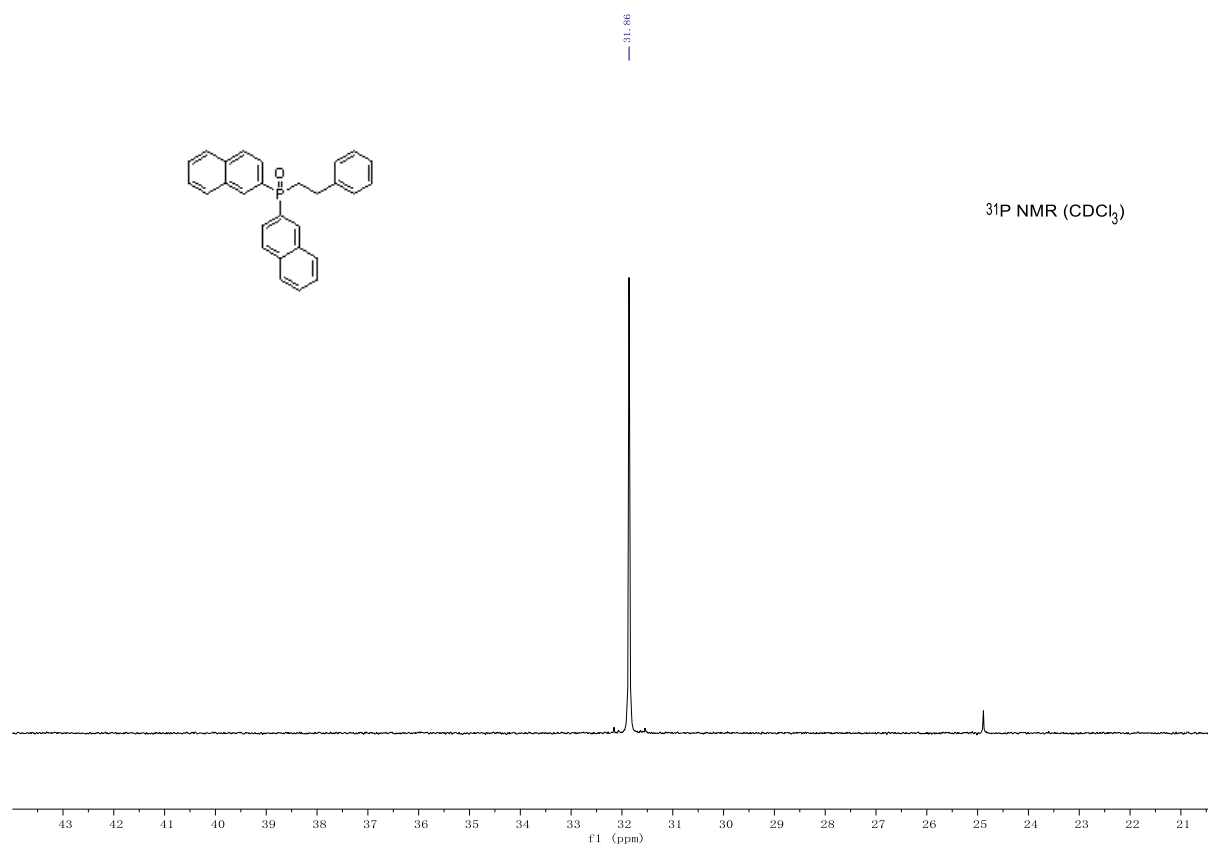




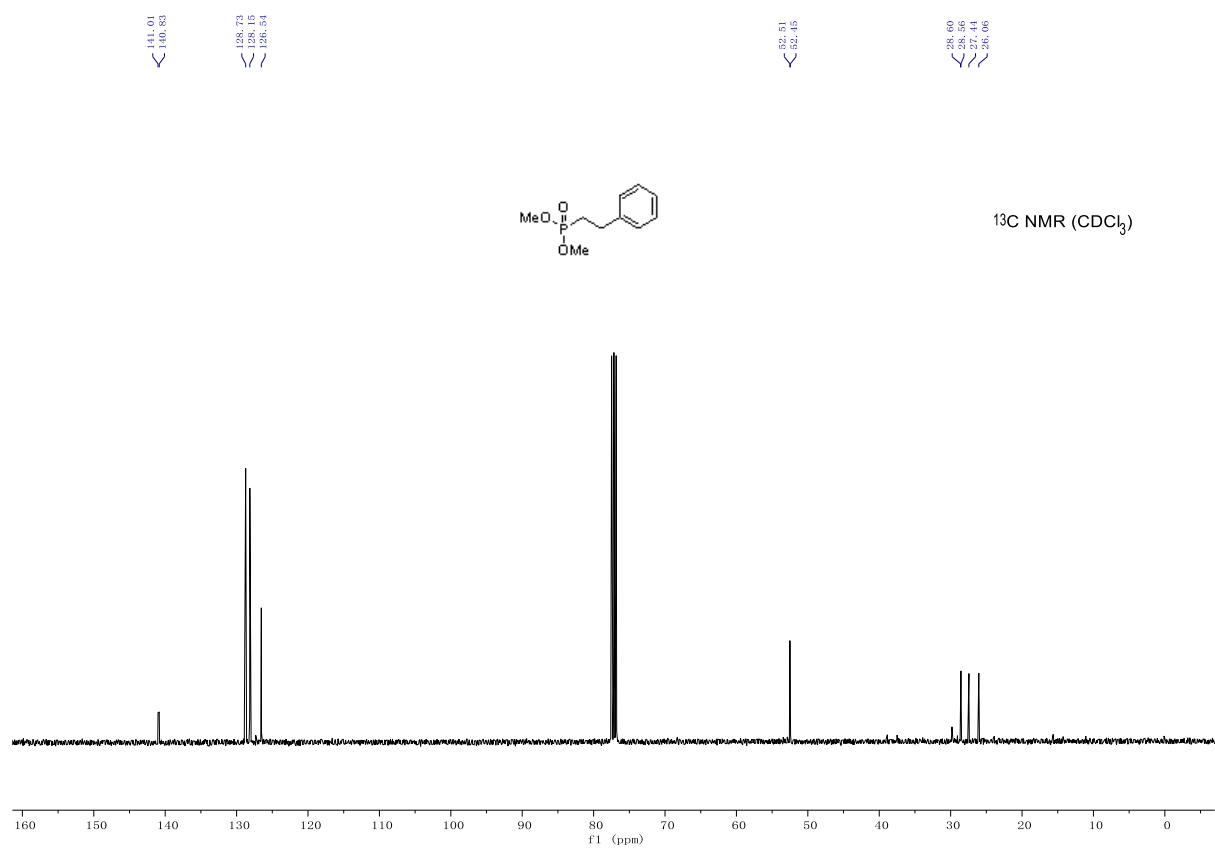
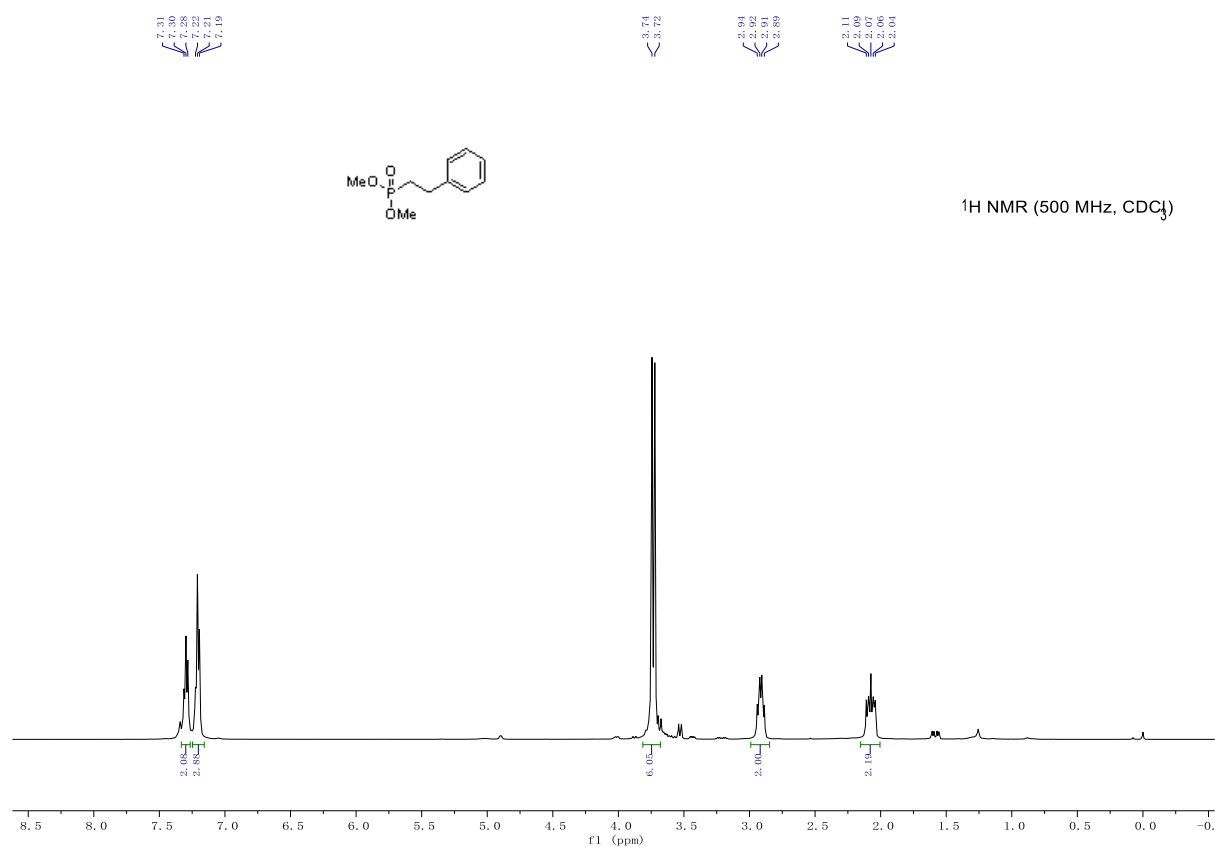


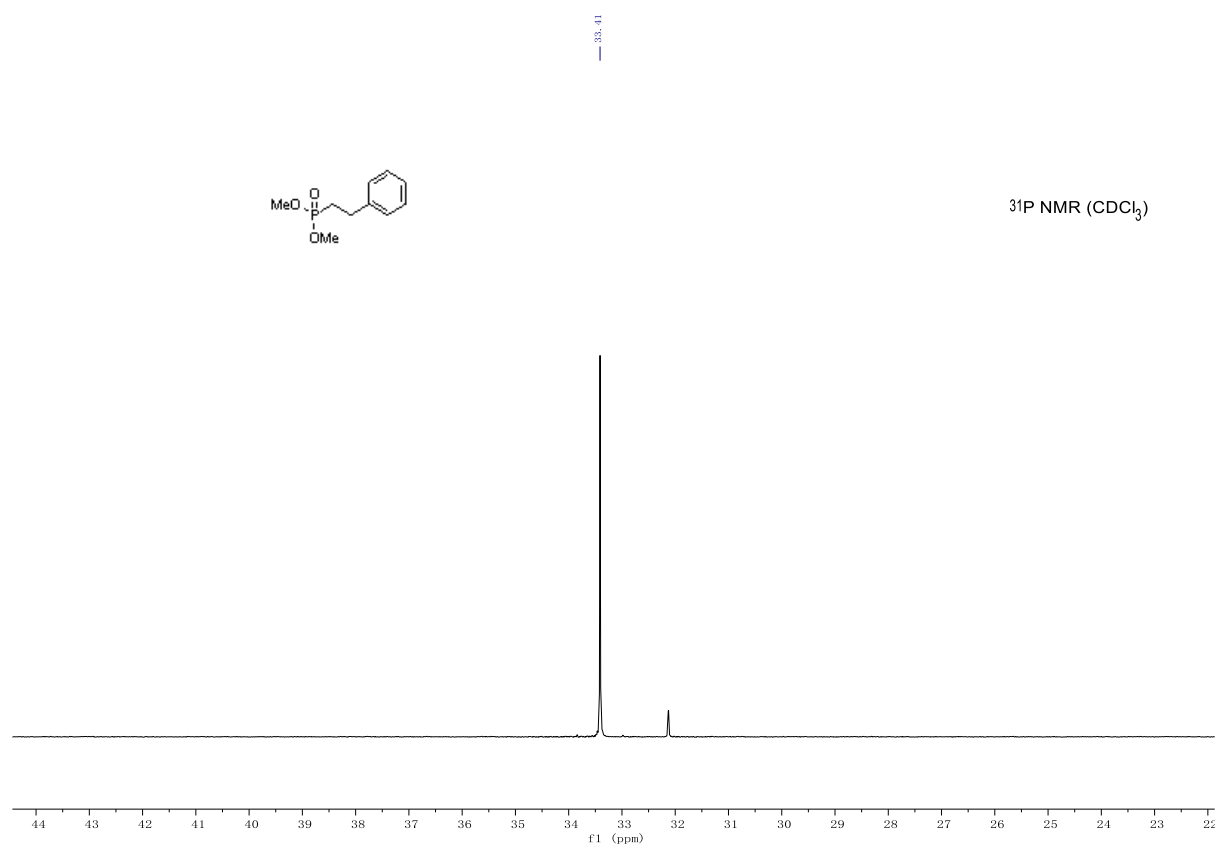
(21) Di(naphthalen-2-yl)(phenethyl)phosphine oxide (**3u**)



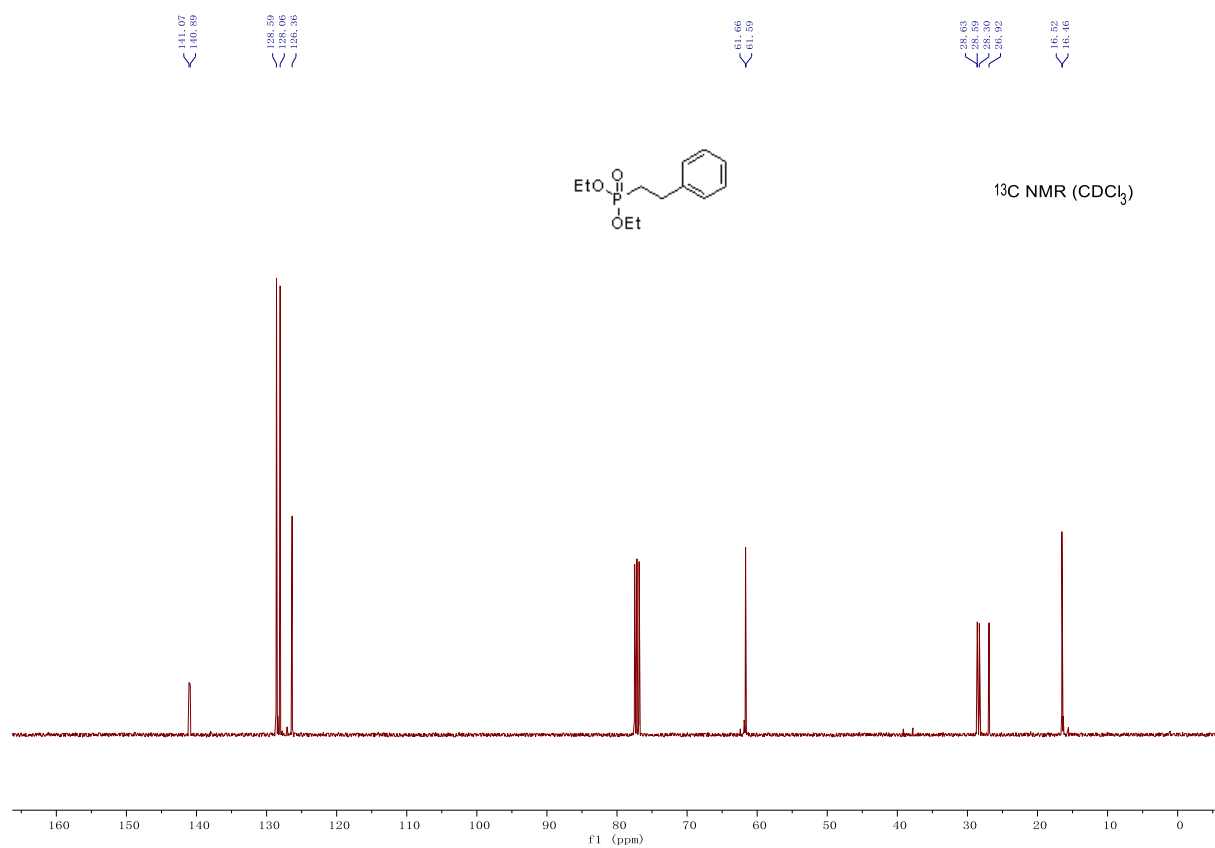
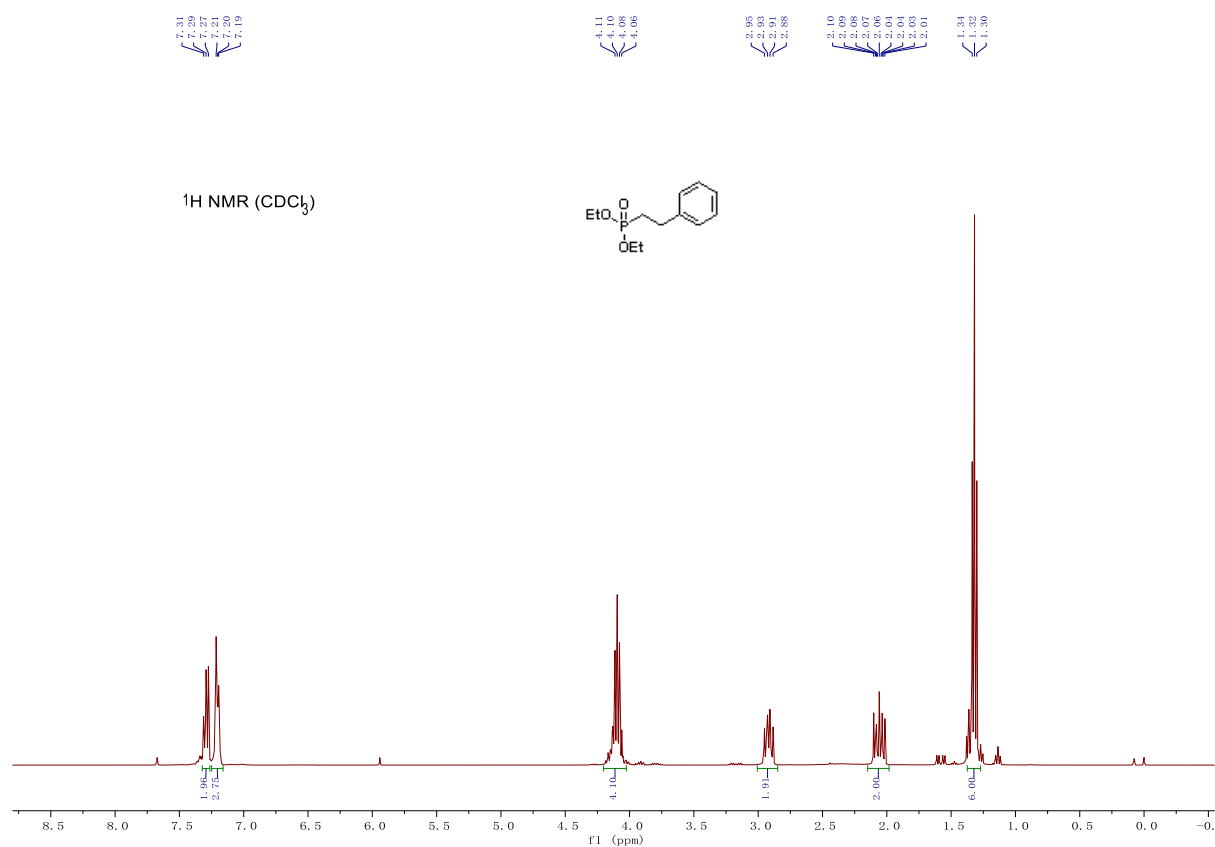


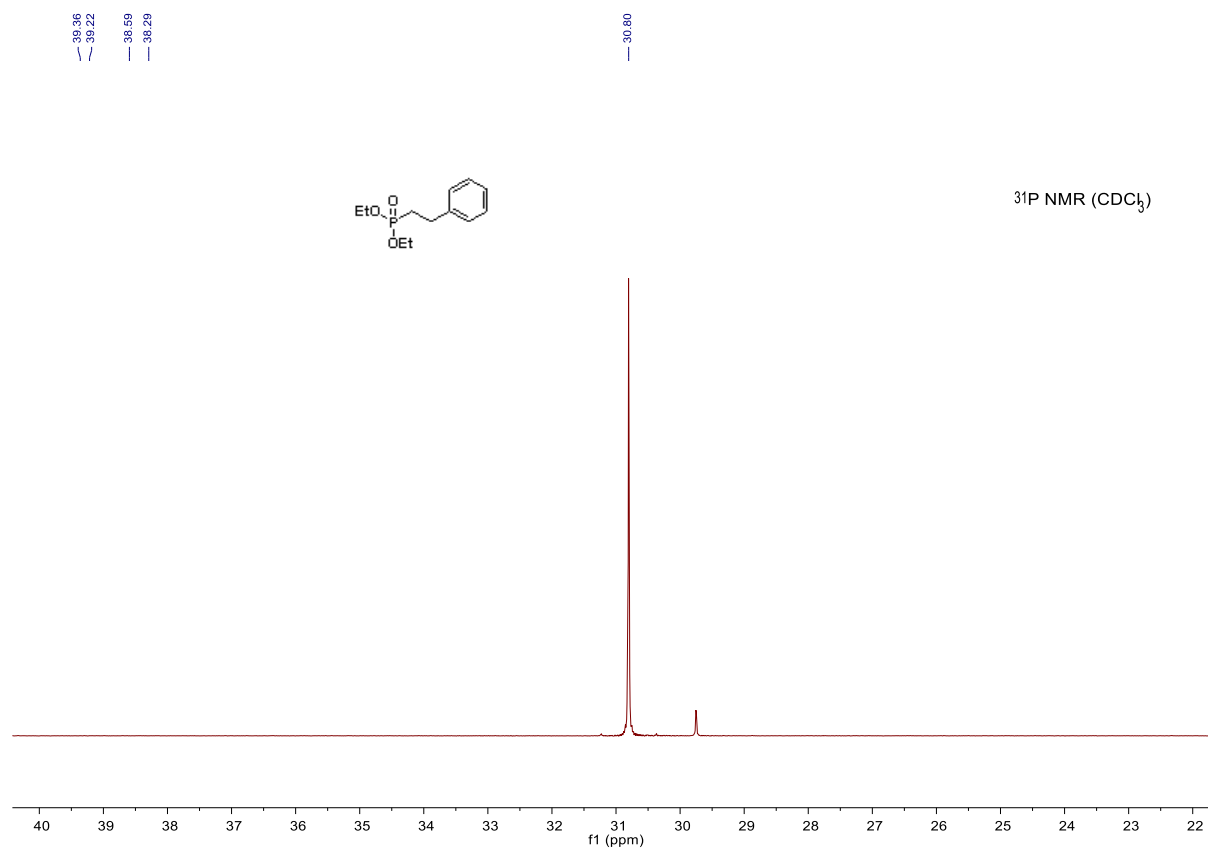
(22) Dimethyl phenethylphosphonate (**4a**)



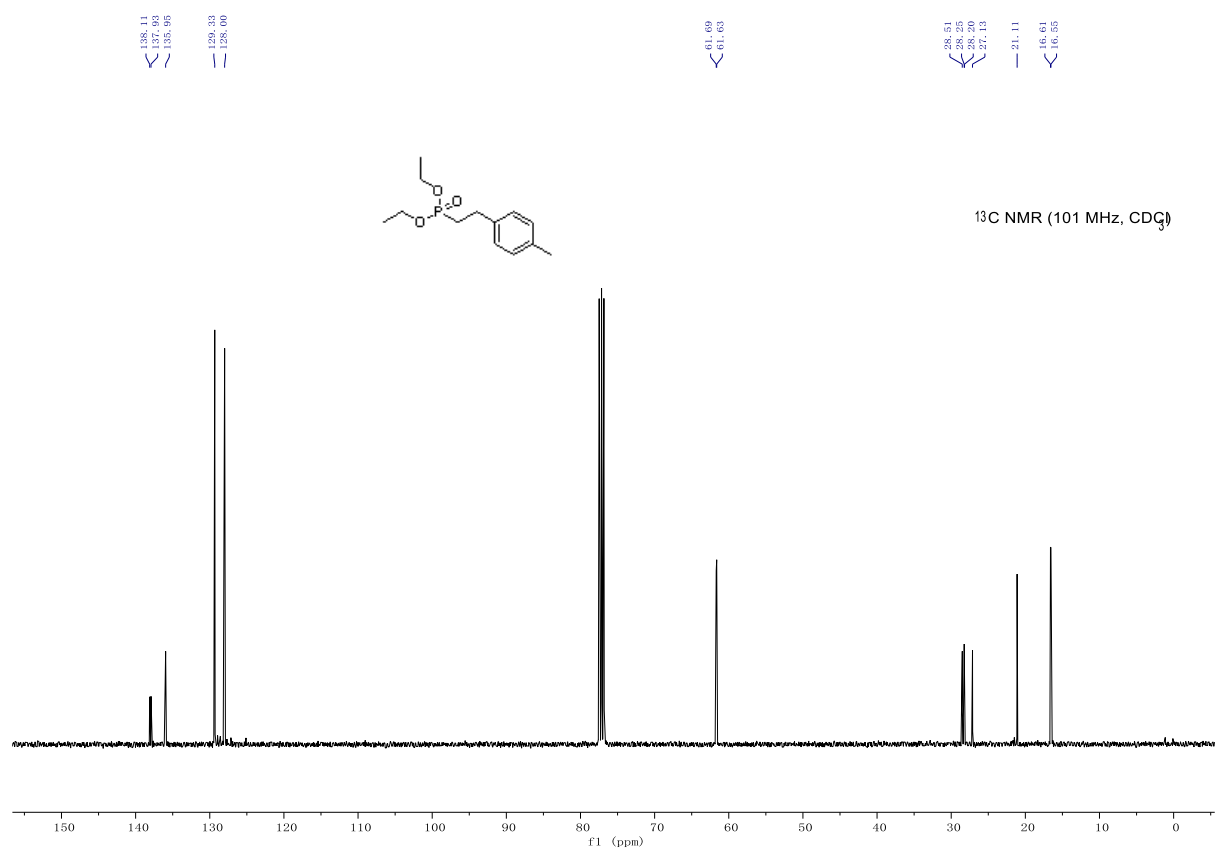
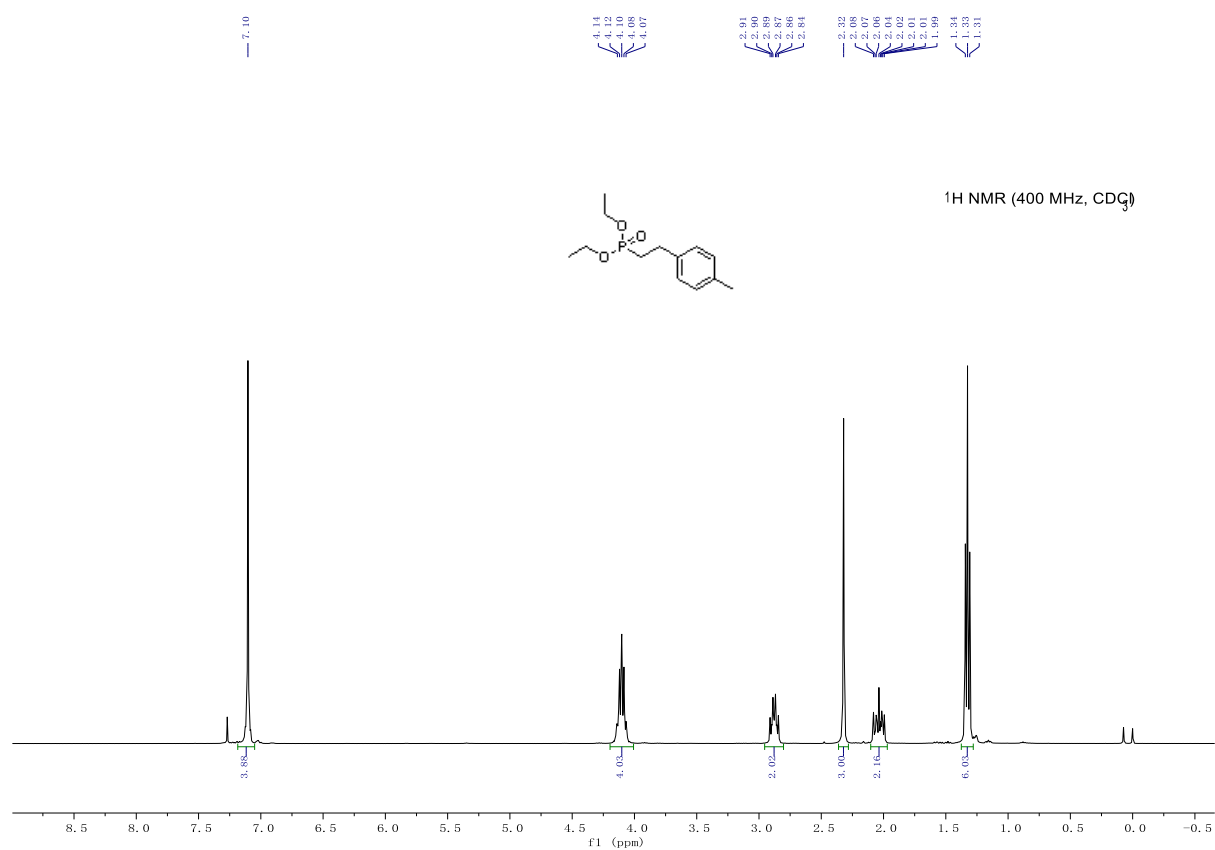


(23) Diethyl phenethylphosphonate (**4b**)

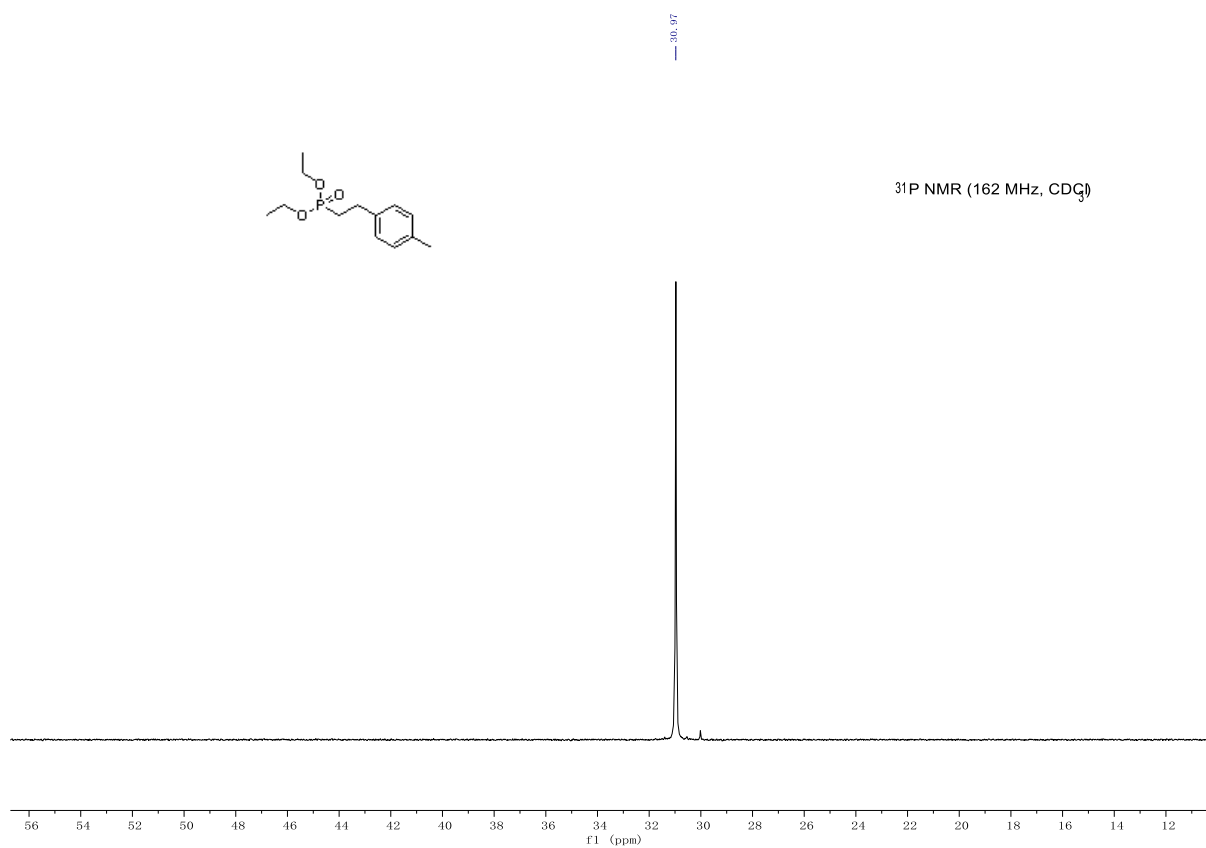




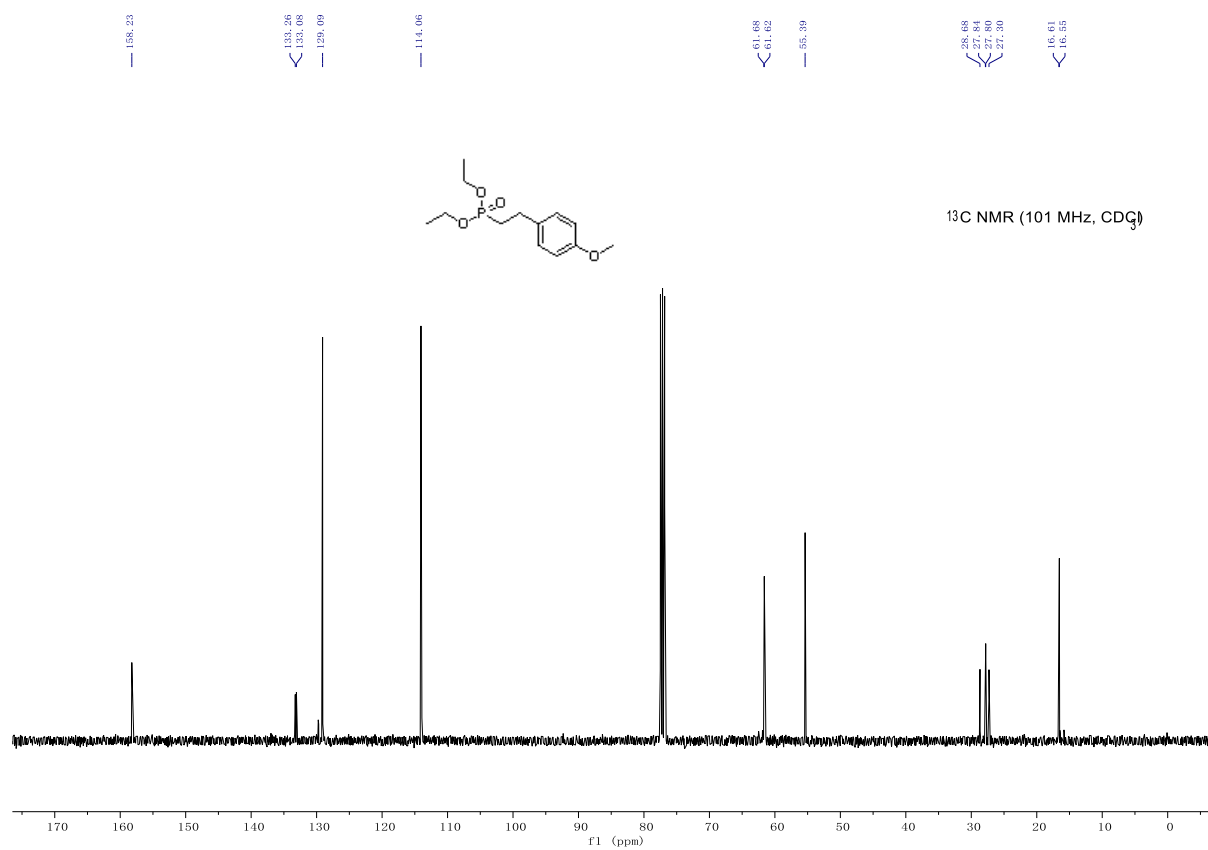
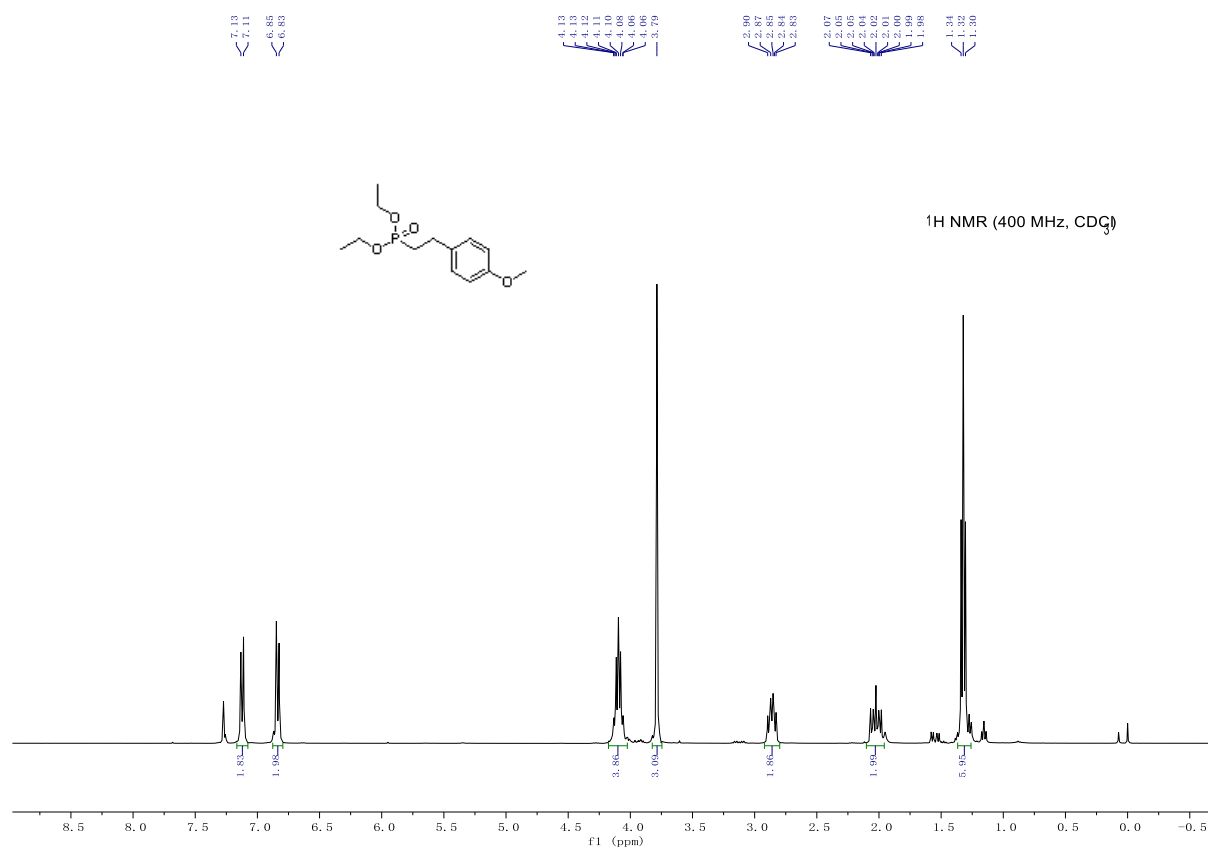
(24) Diethyl (4-methylphenethyl)phosphonate (**4c**)

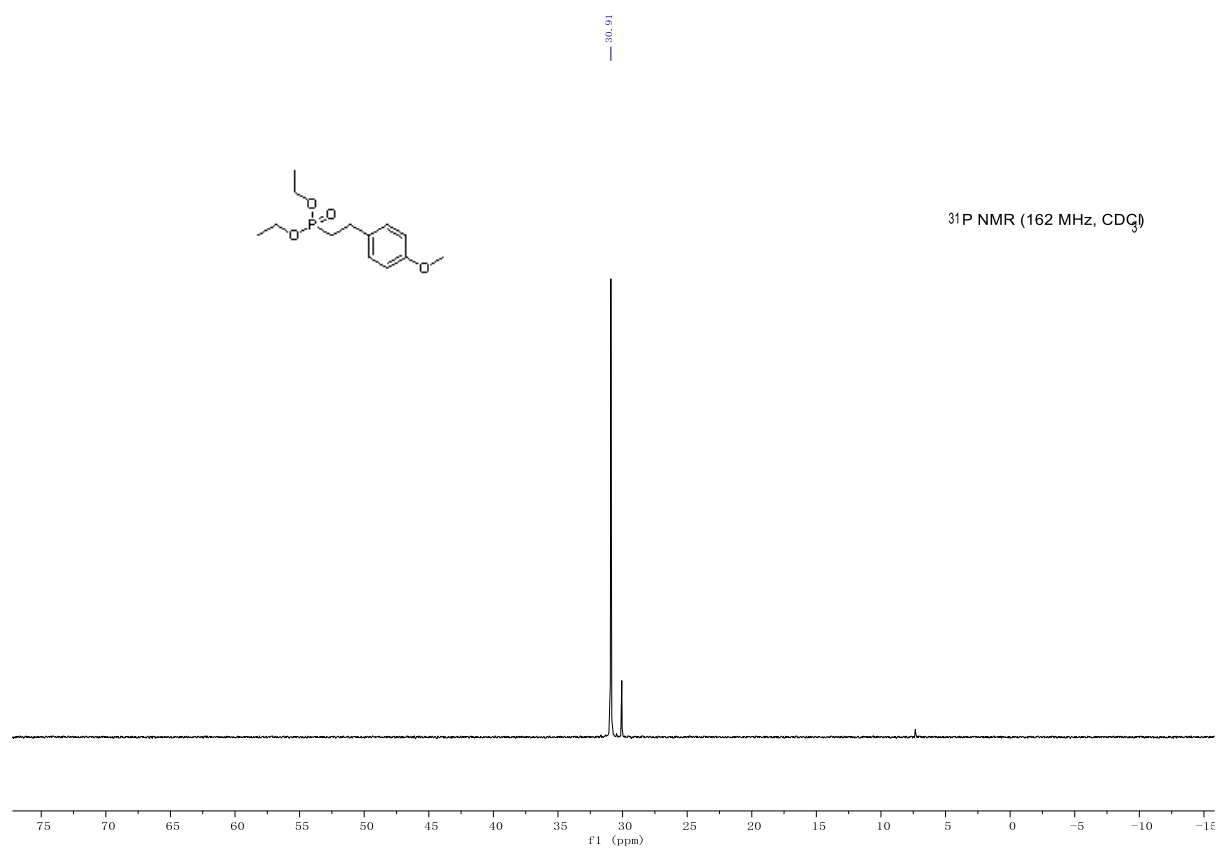




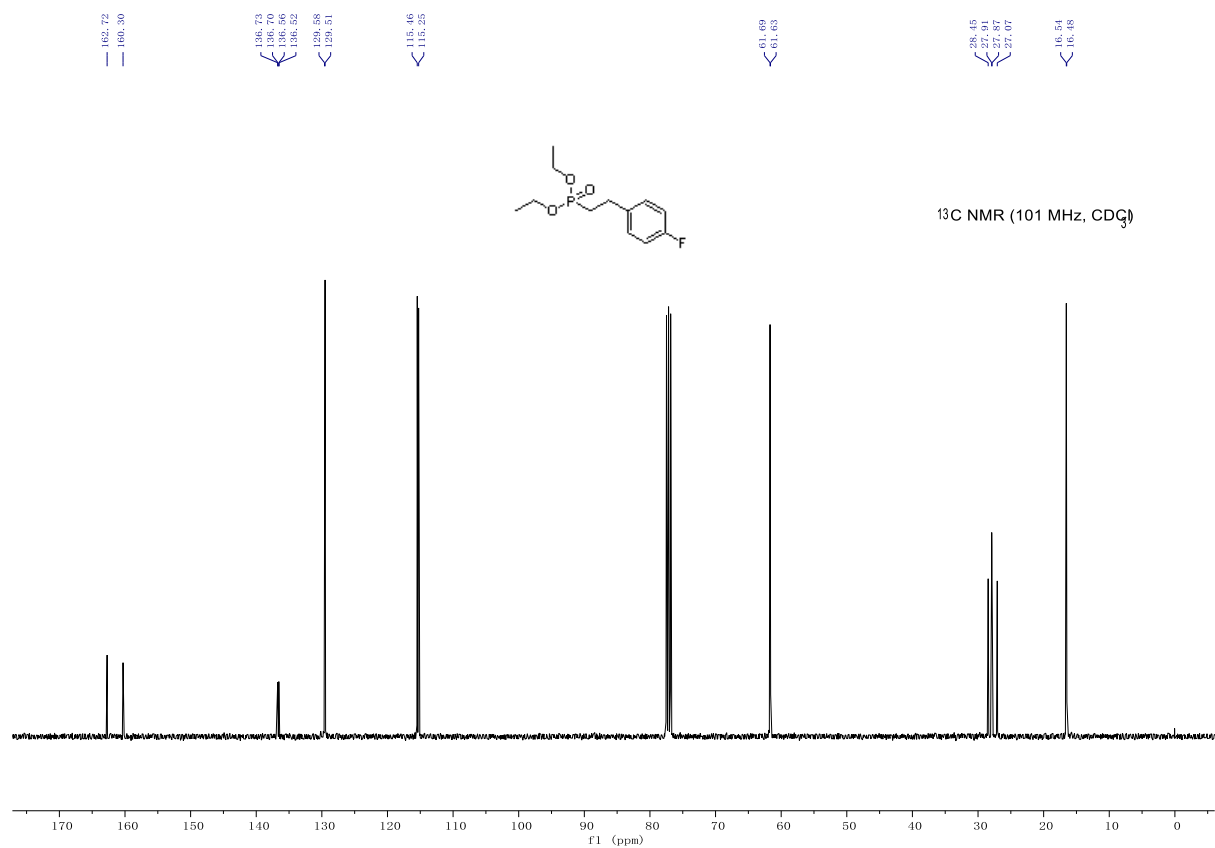
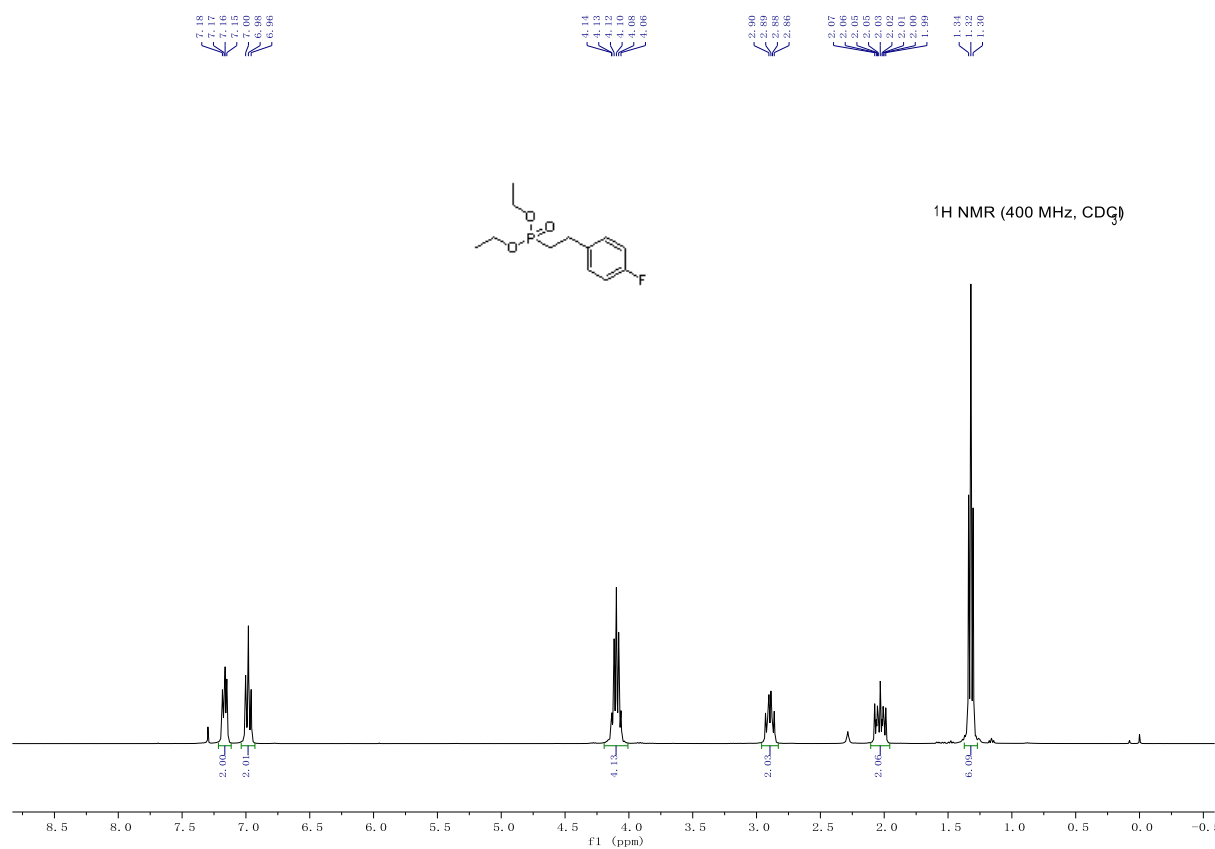


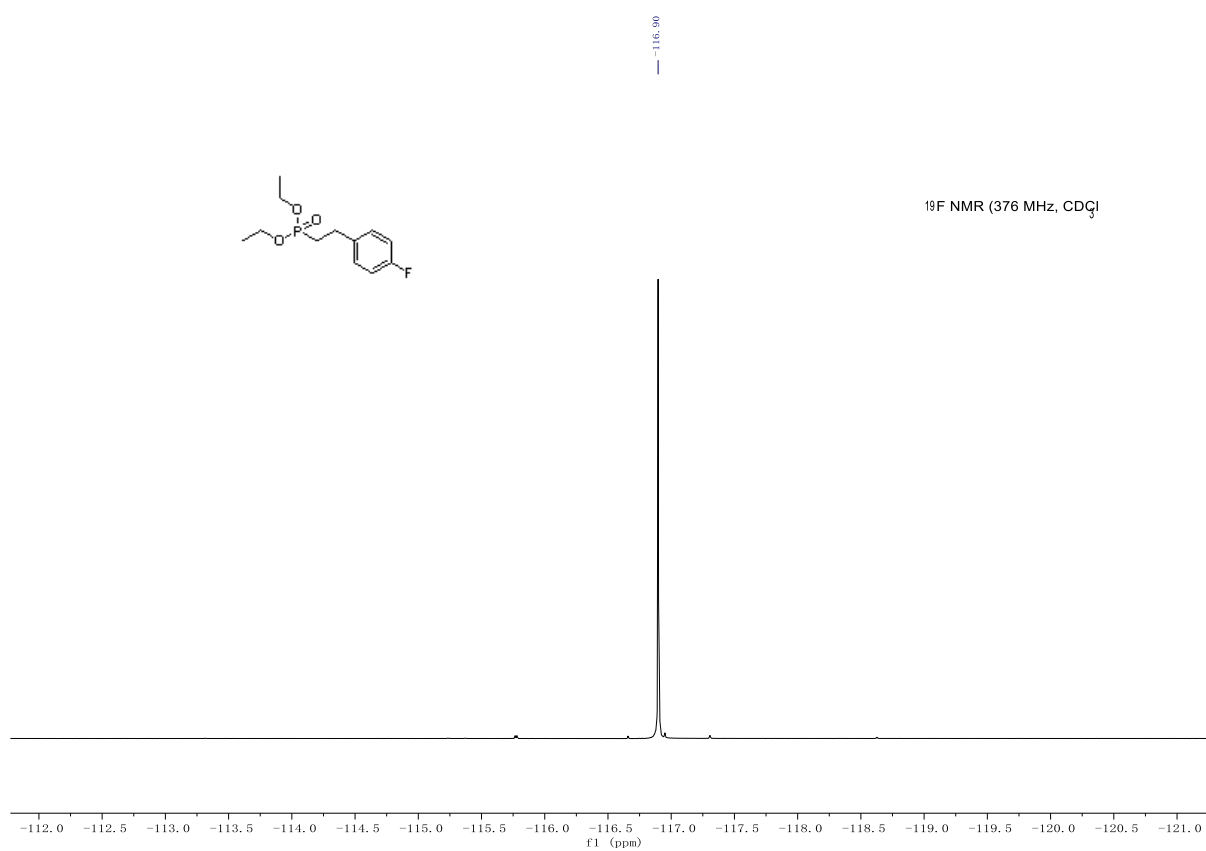
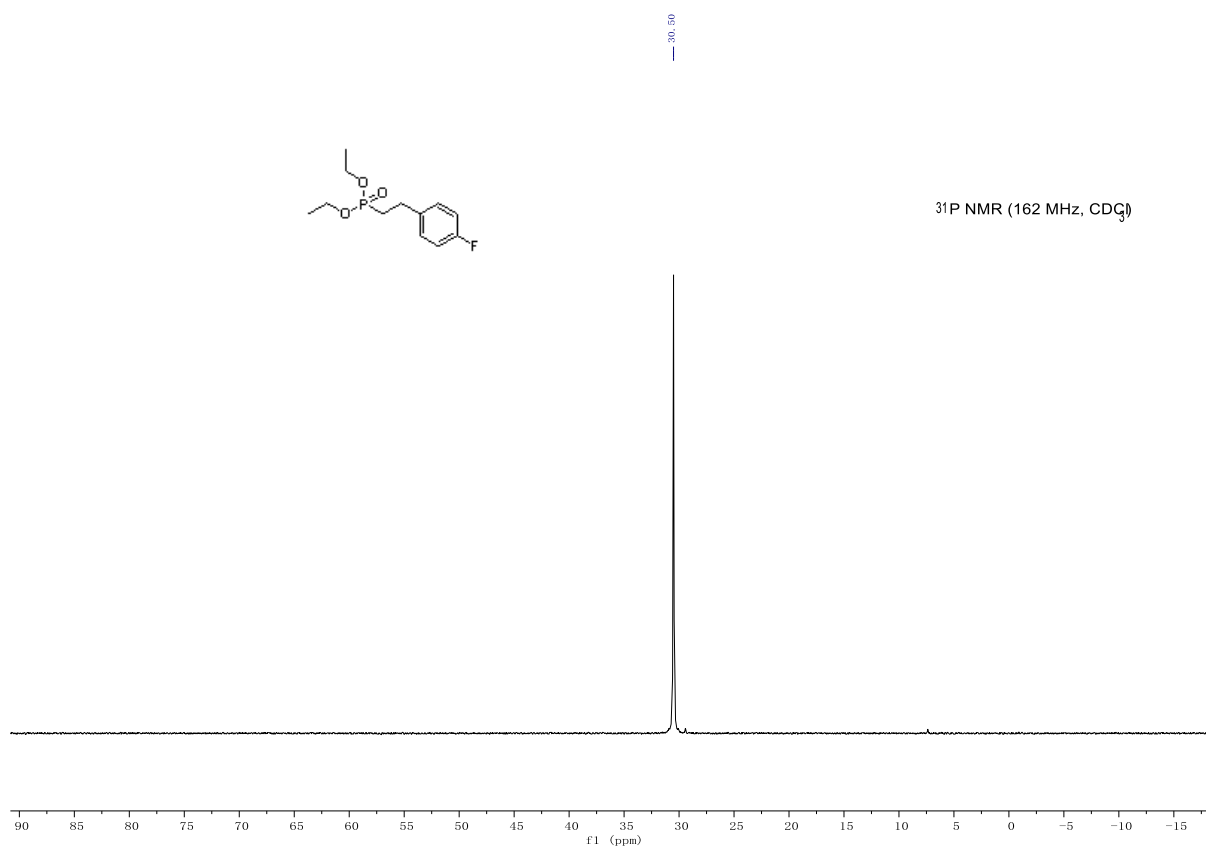
(25) Diethyl (4-methoxyphenethyl)phosphonate (**4d**)



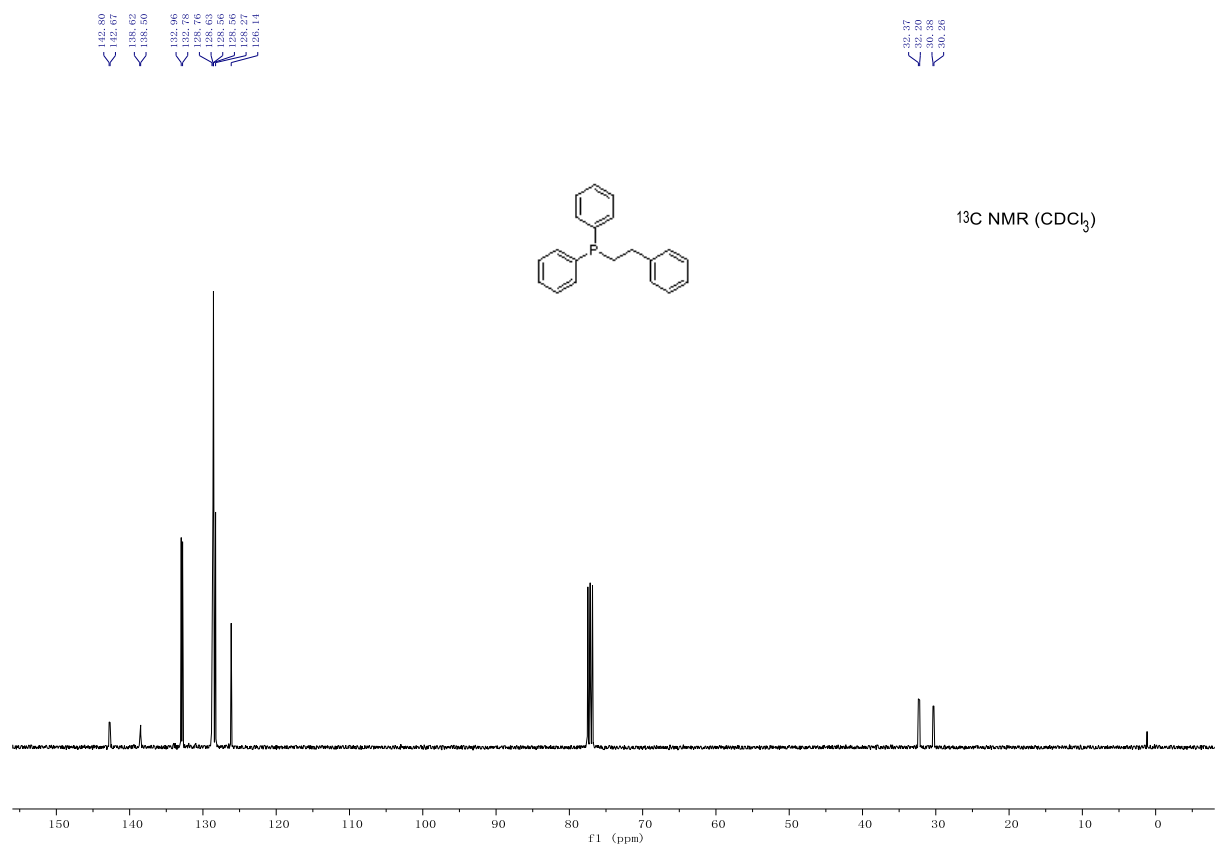
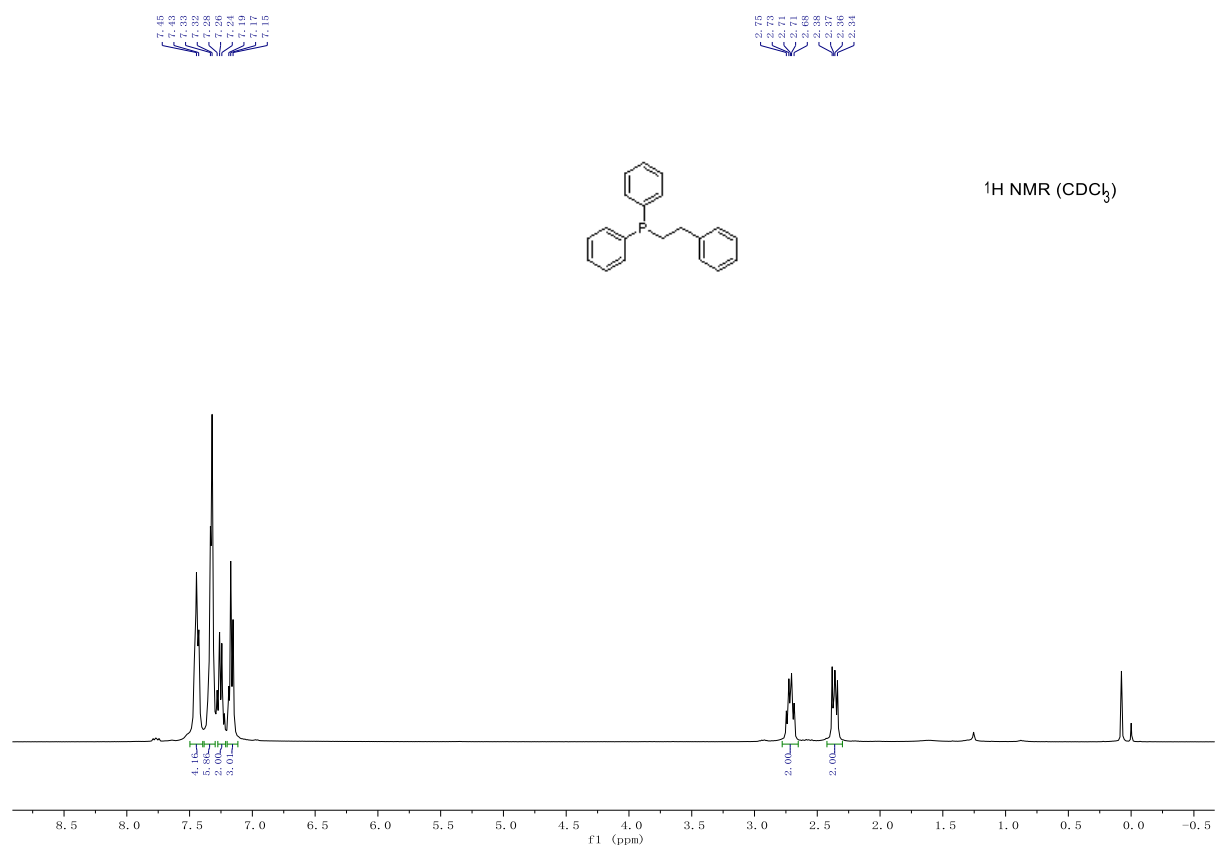


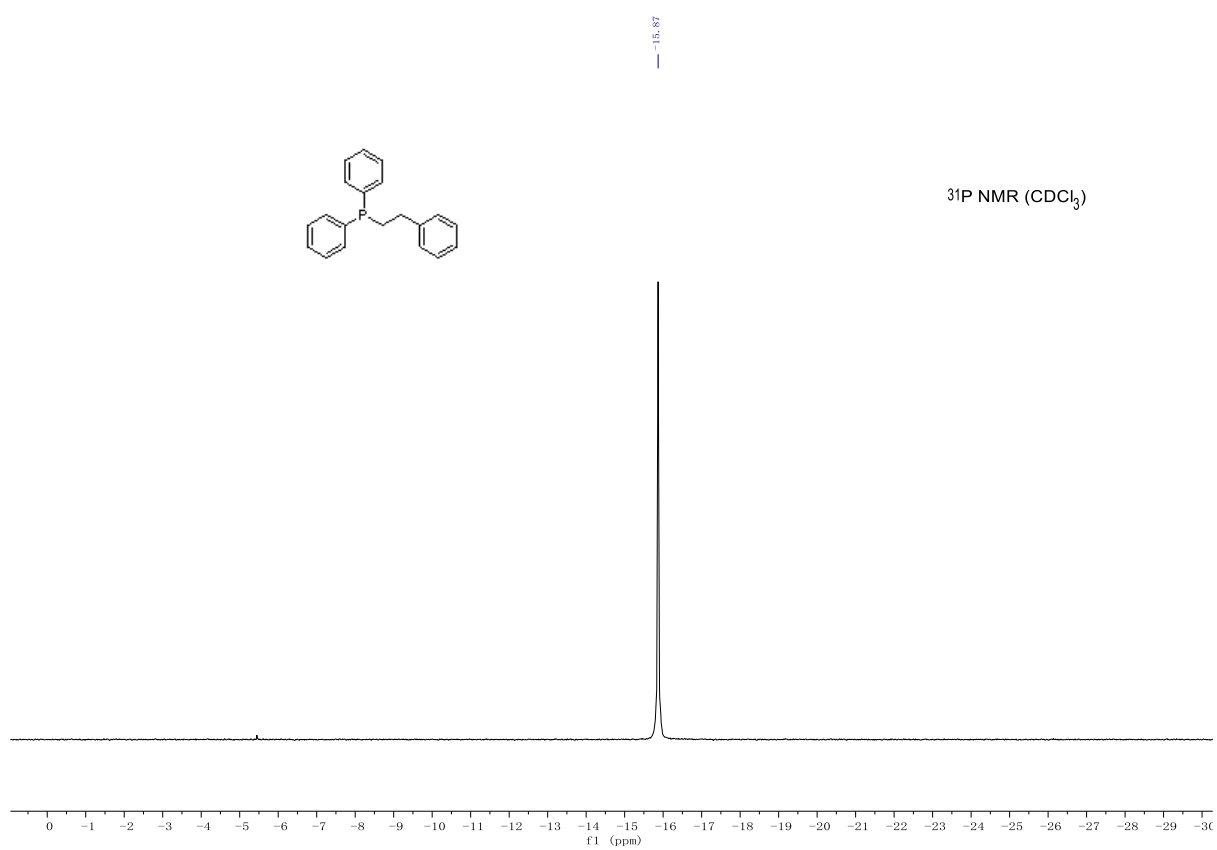
(26) Diethyl (4-fluorophenethyl)phosphonate (**4e**)





### 3. NMR spectrum of reduction product of Ph<sub>2</sub>P(O)CH<sub>2</sub>CH<sub>2</sub>Ph (3a) with HSiCl<sub>3</sub>





#### 4. $^1\text{H}$ NMR spectrum of reaction product of $\text{Ph}_2\text{P}(\text{O})\text{Me}$ with $\text{PhCD}_2\text{OH}$

