

# Microwave-assisted periselective annulation of triphenylphosphenes with aldehydes and ketones

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## Electronic Supplementary Information

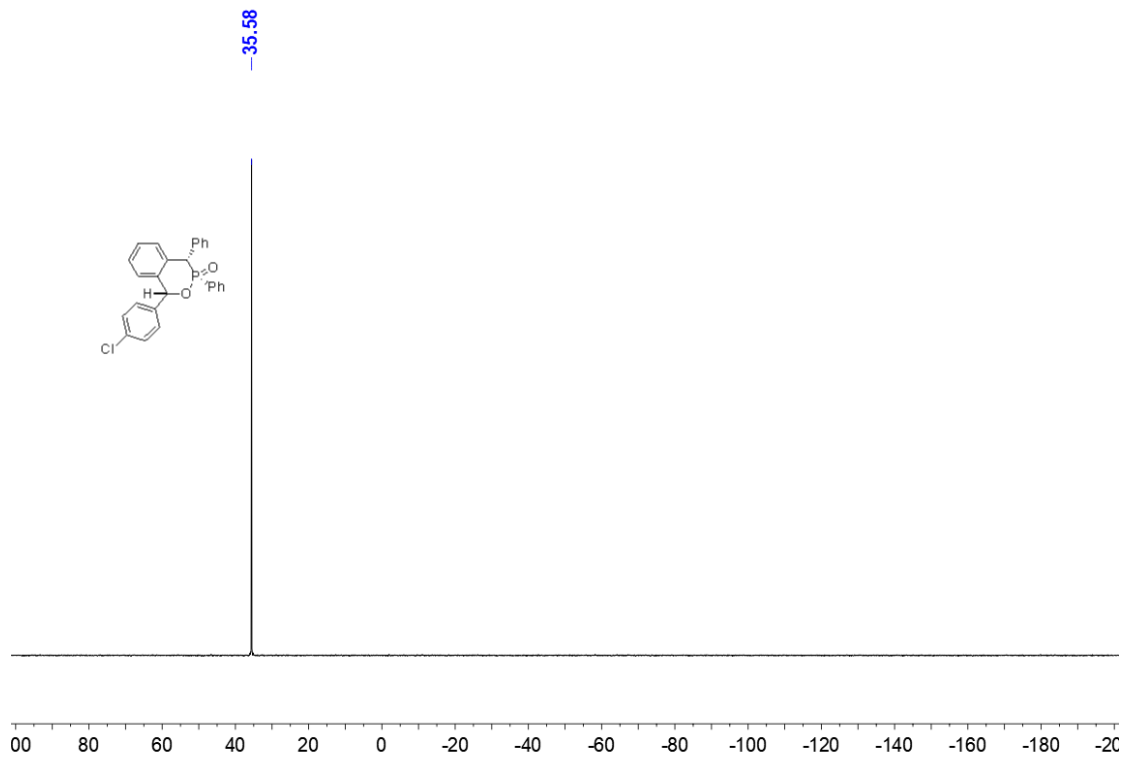
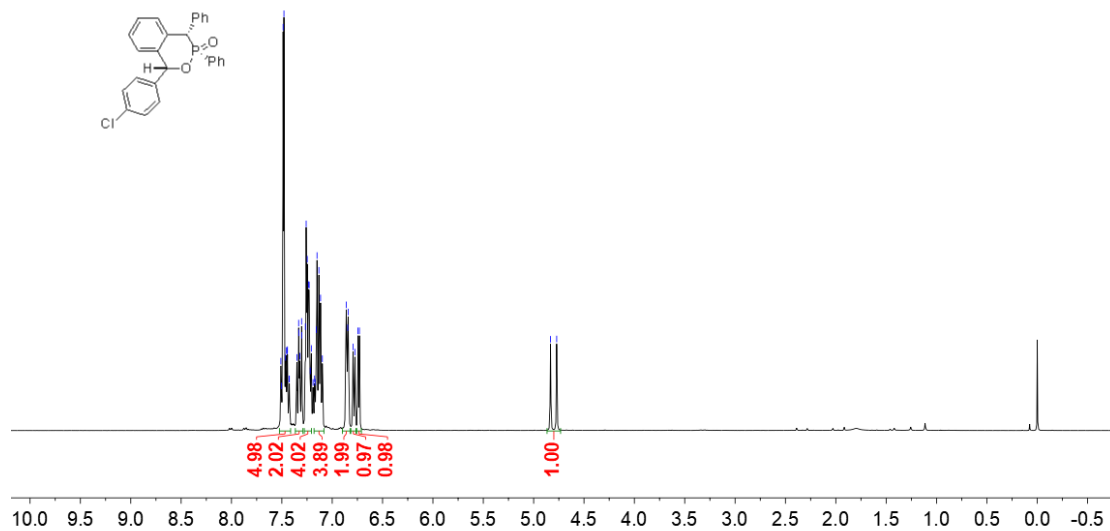
### Contents

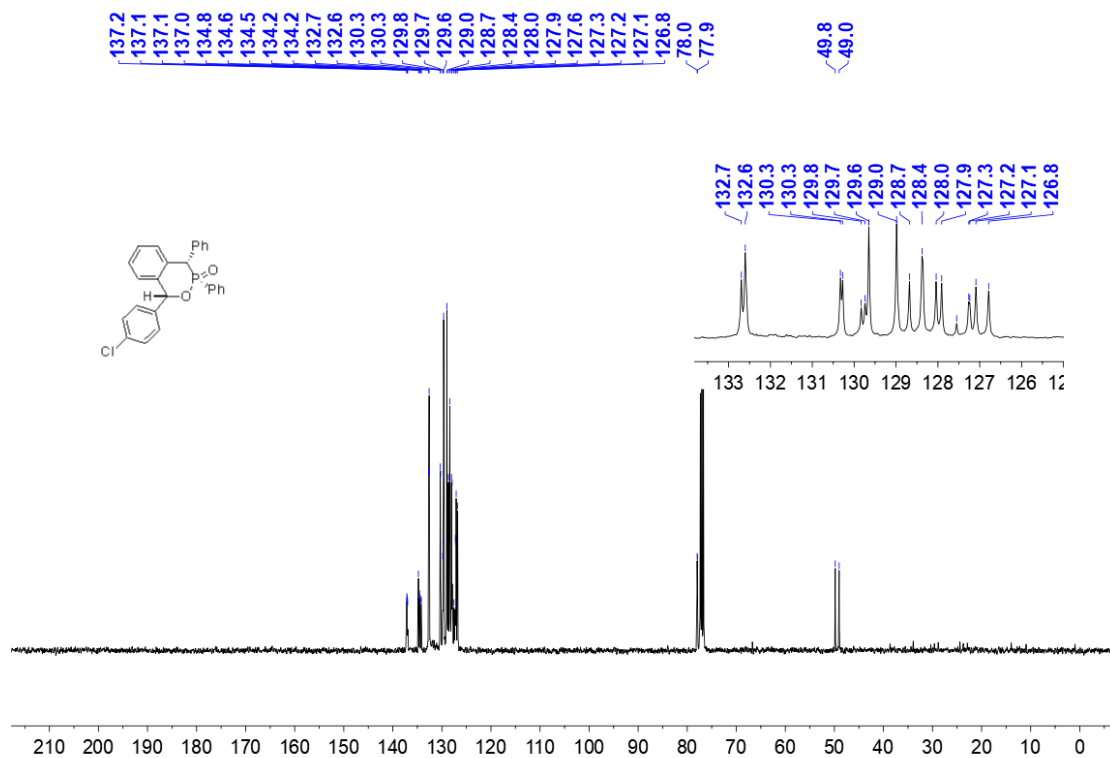
1. Copies of <sup>1</sup>H, <sup>13</sup>C, <sup>31</sup>P and <sup>19</sup>F NMR spectra of compounds 3, 5, and 4. ....S2

# 1. Copies of $^1\text{H}$ , $^{13}\text{C}$ , $^{31}\text{P}$ and $^{19}\text{F}$ NMR spectra of compounds 3 and 4.

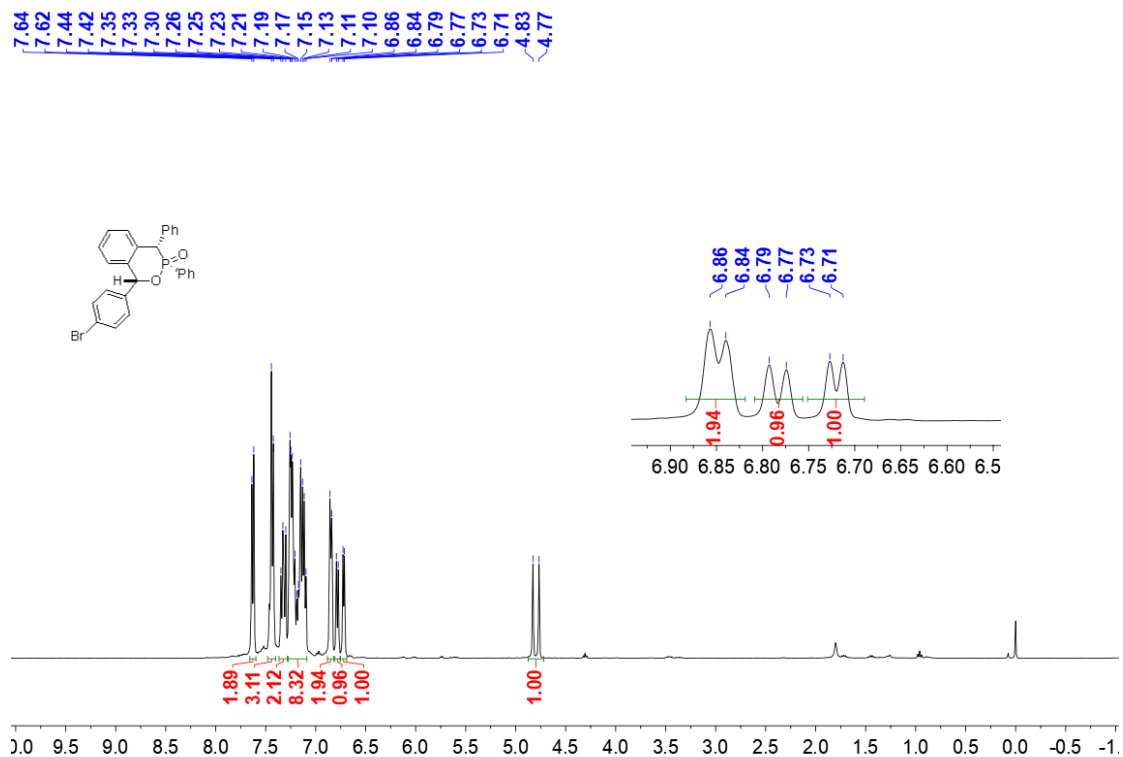
$^1\text{H}$ ,  $^{31}\text{P}$  and  $^{13}\text{C}$  NMR spectra of compound 3a in  $\text{CDCl}_3$  (400 MHz)

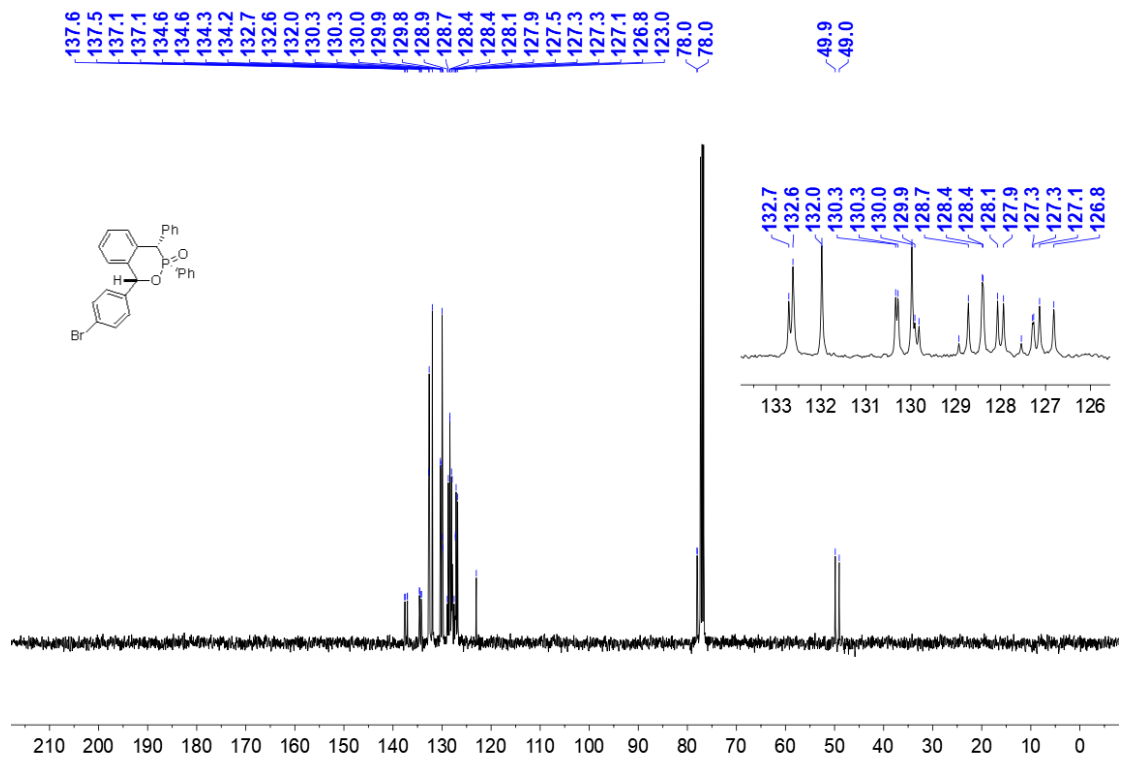
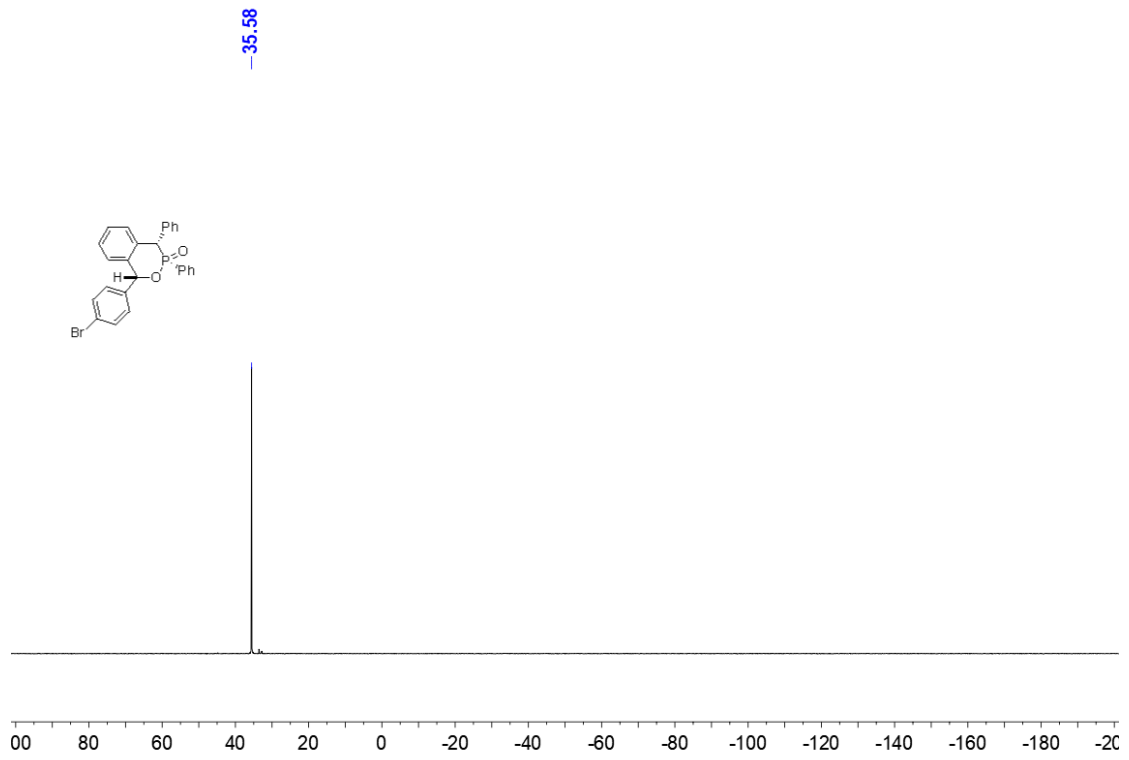
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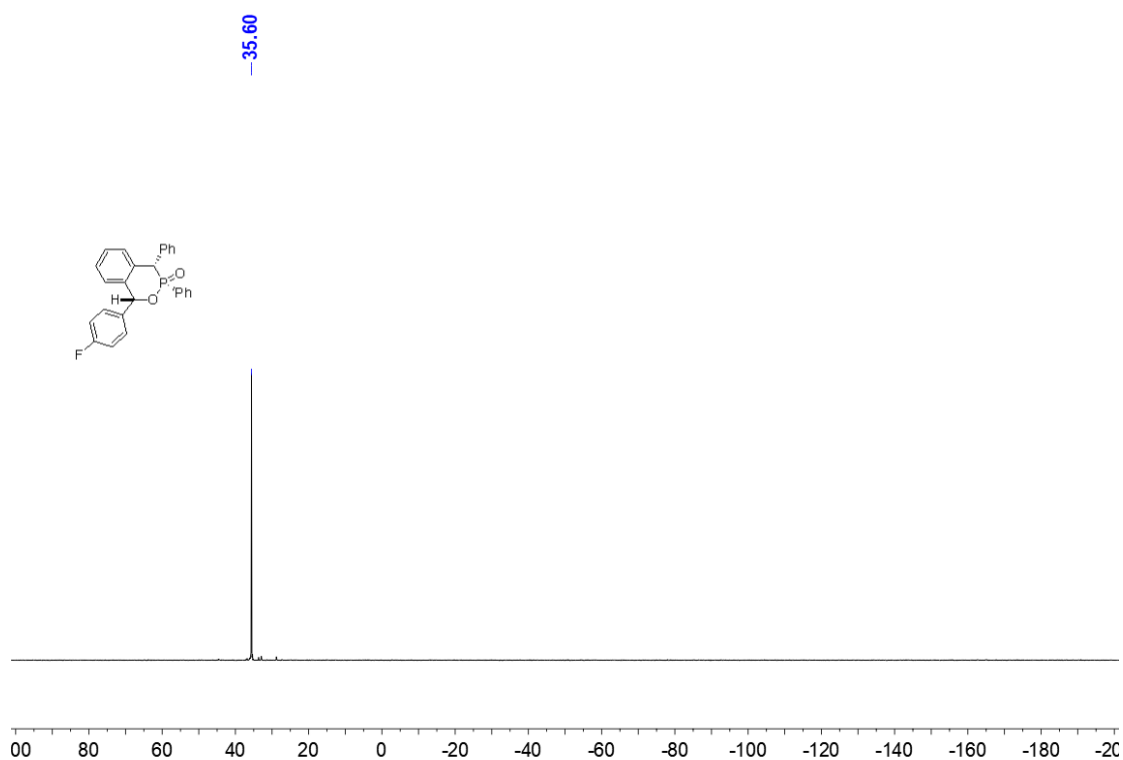
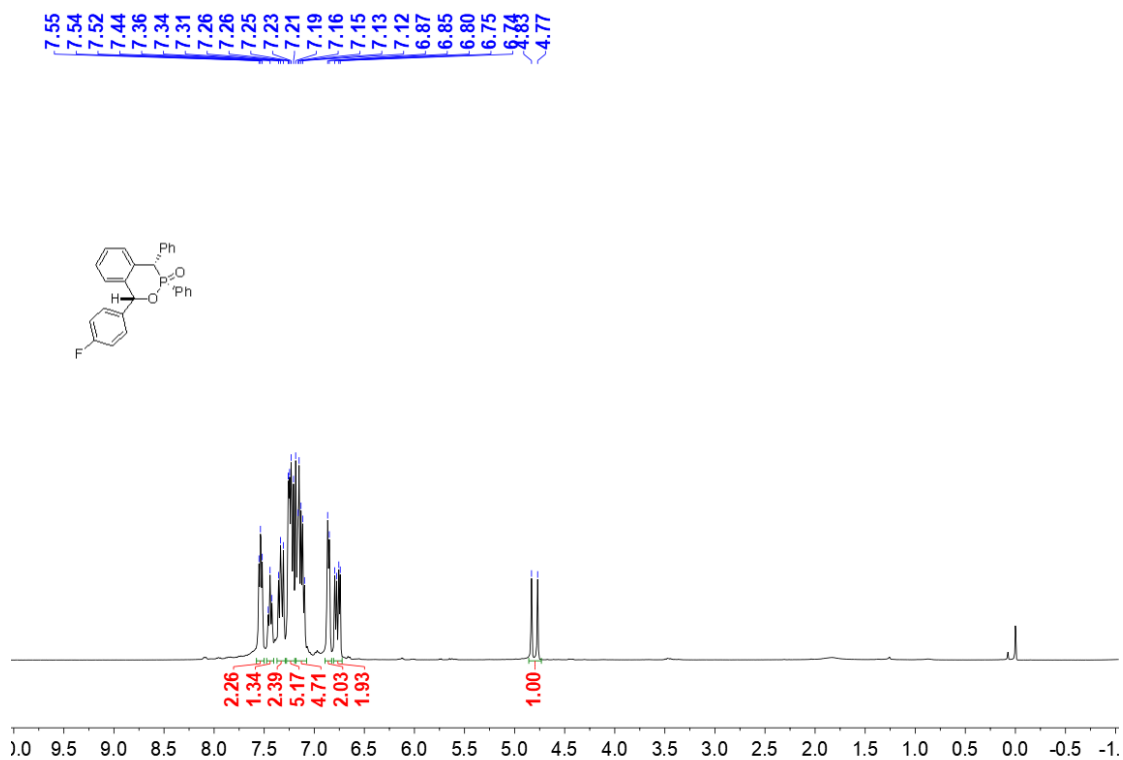


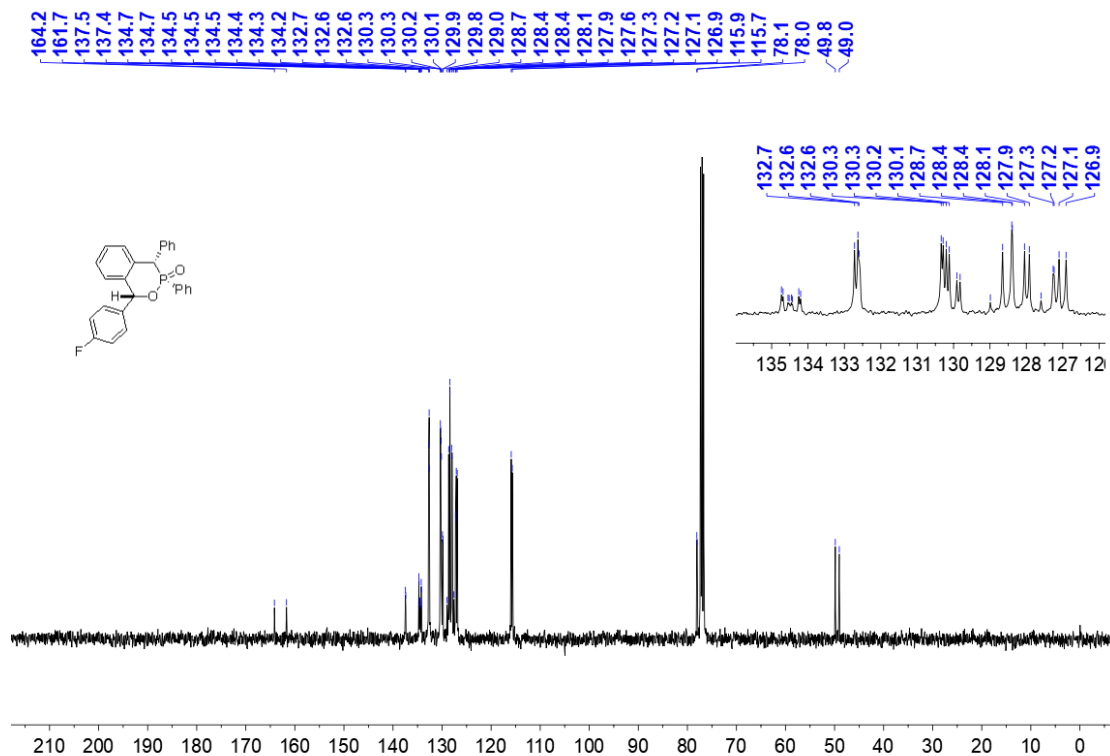
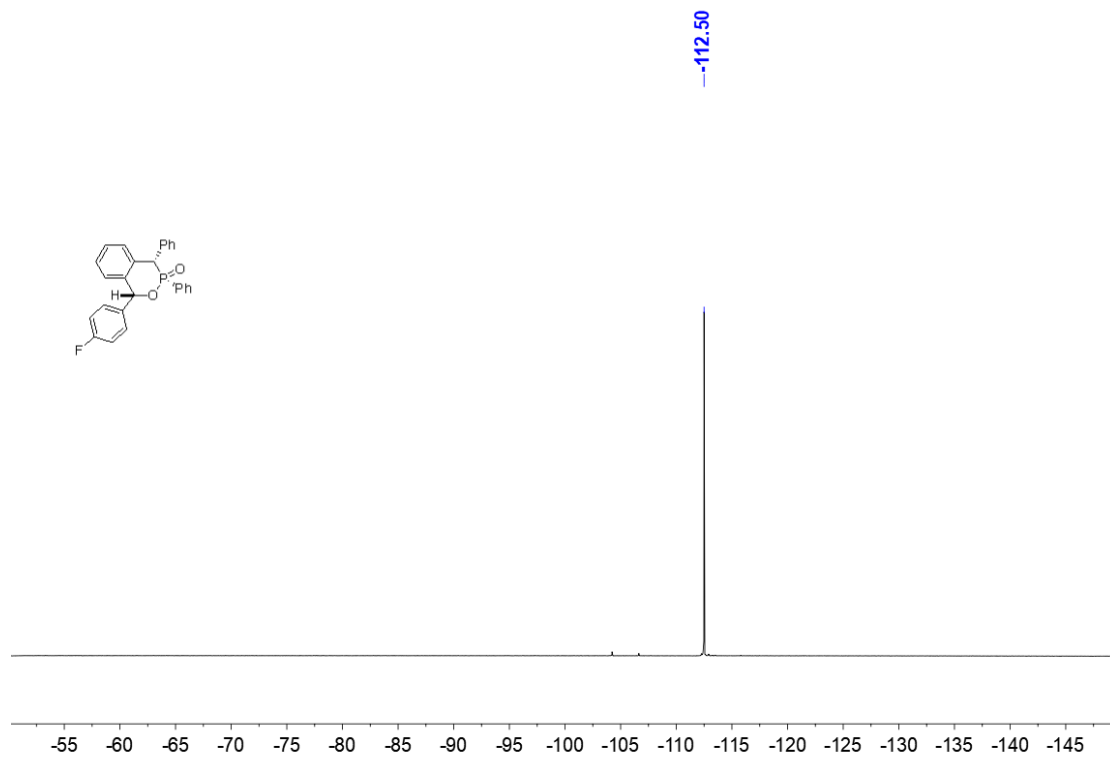
<sup>1</sup>H, <sup>31</sup>P and <sup>13</sup>C NMR spectra of compound **3b** in CDCl<sub>3</sub> (400 MHz)



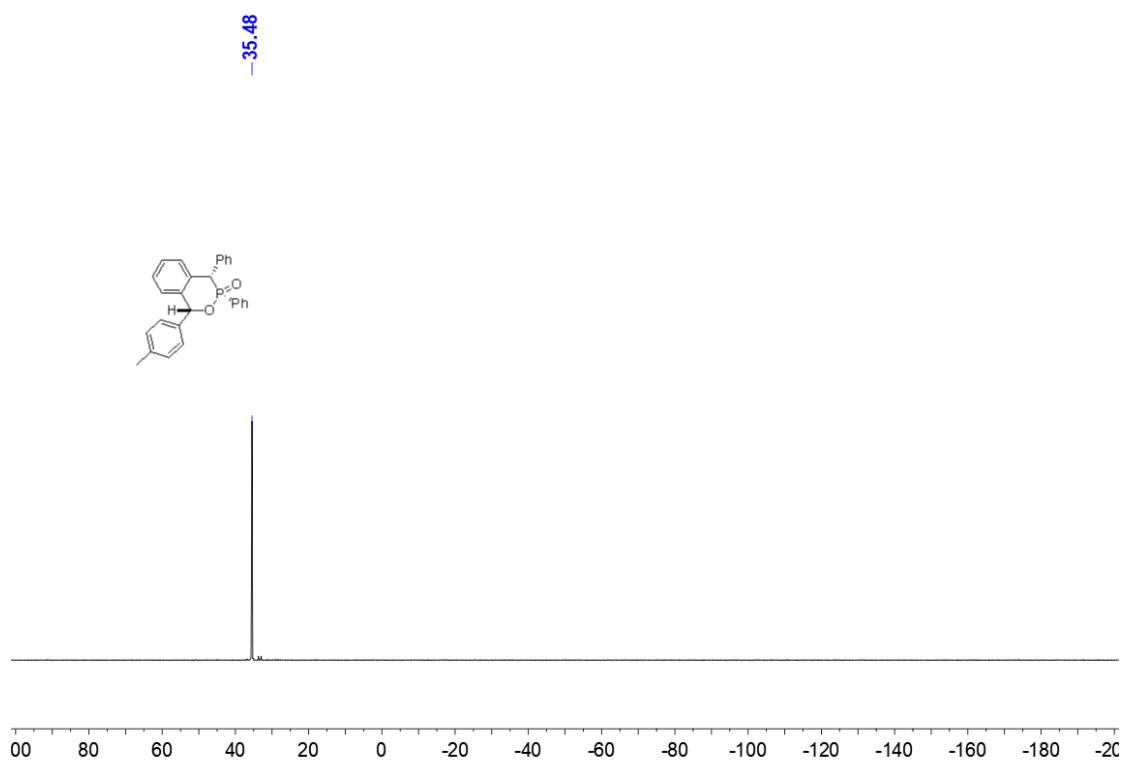
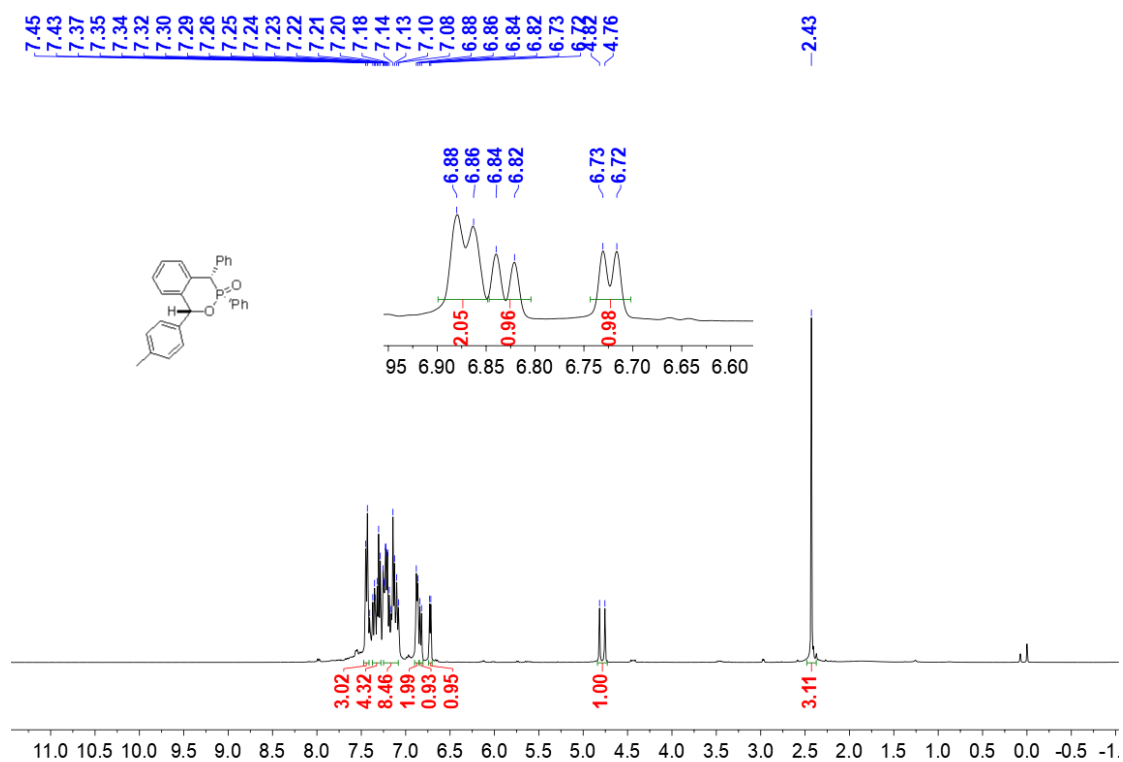


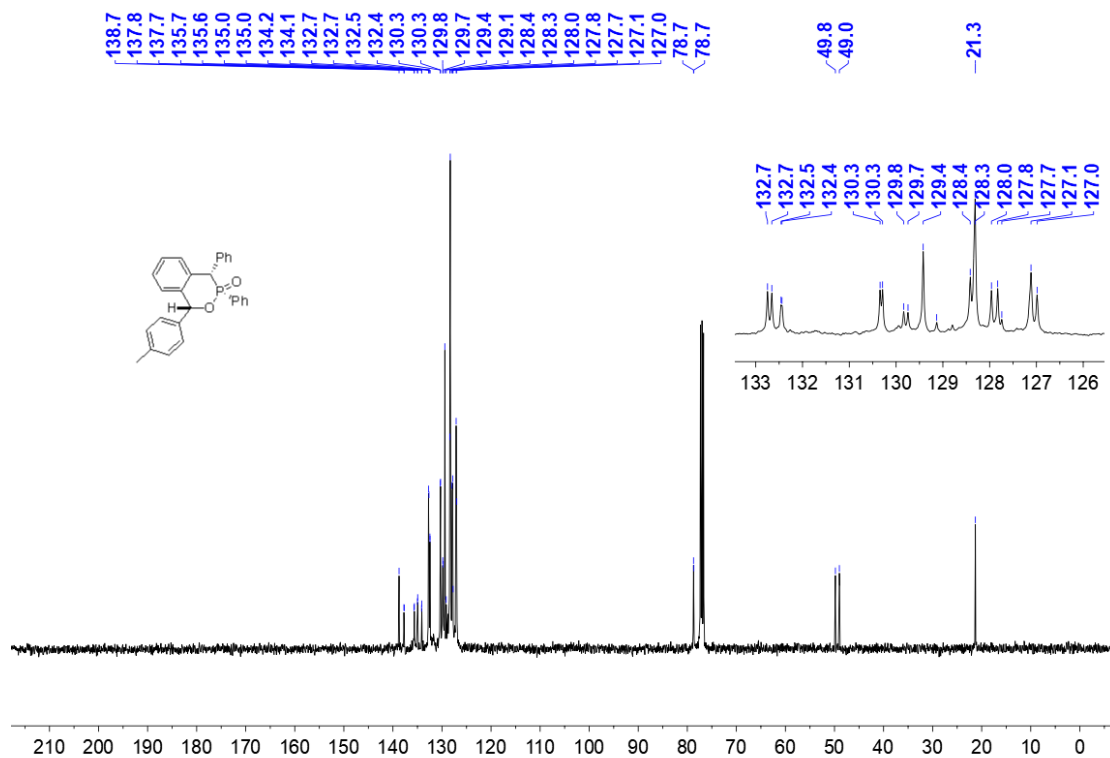
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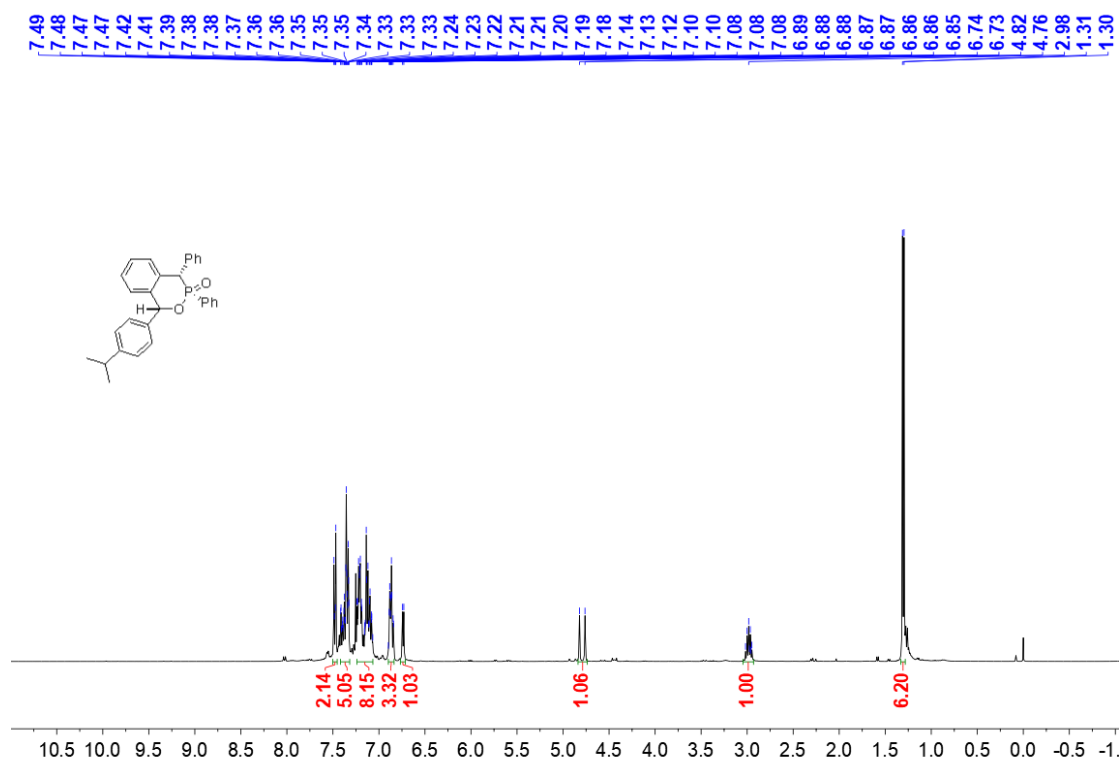


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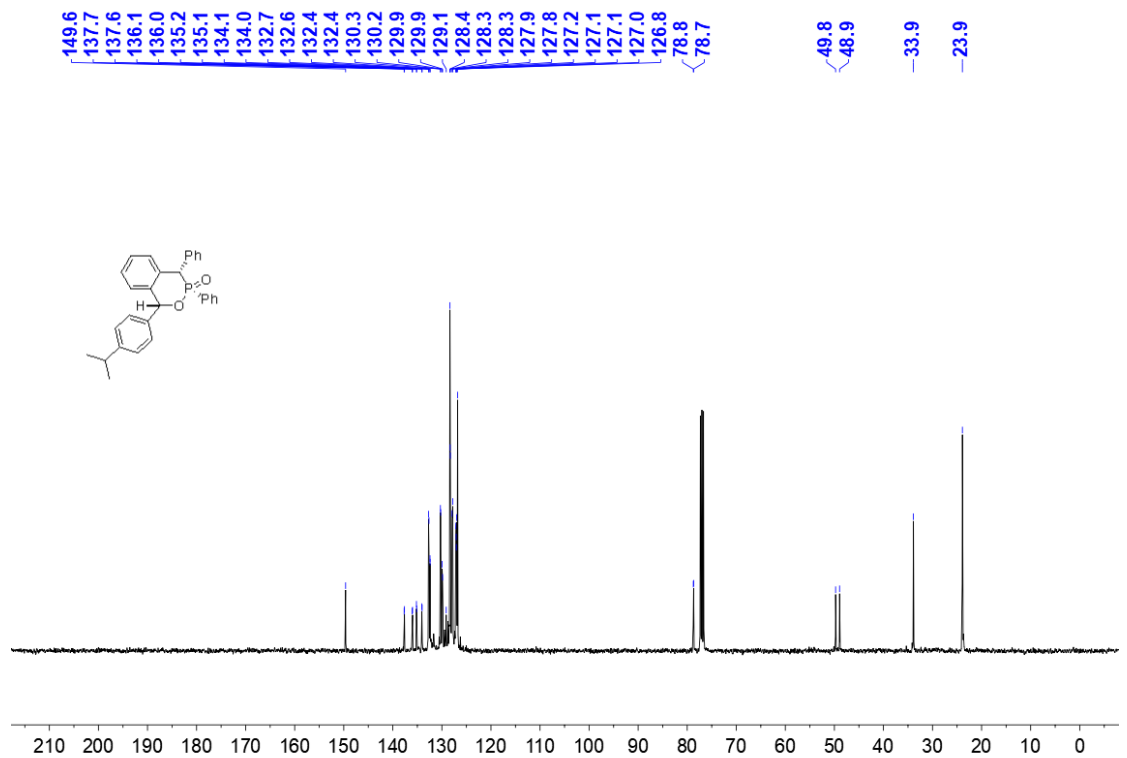
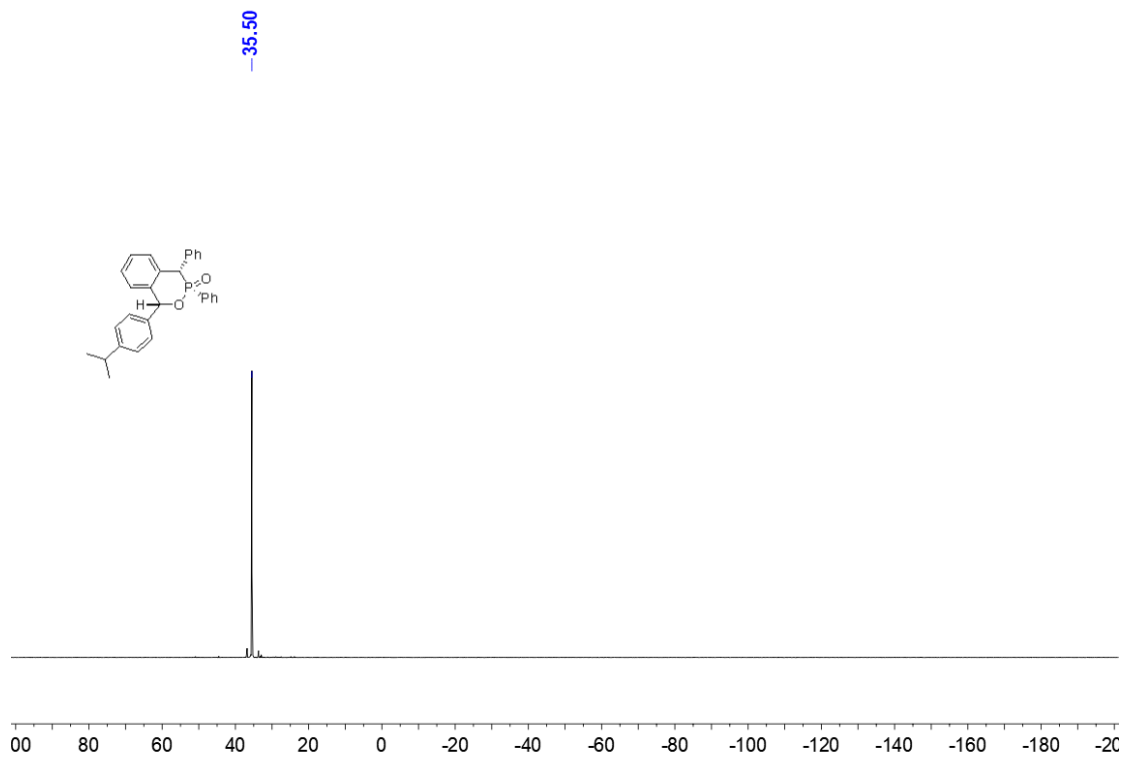




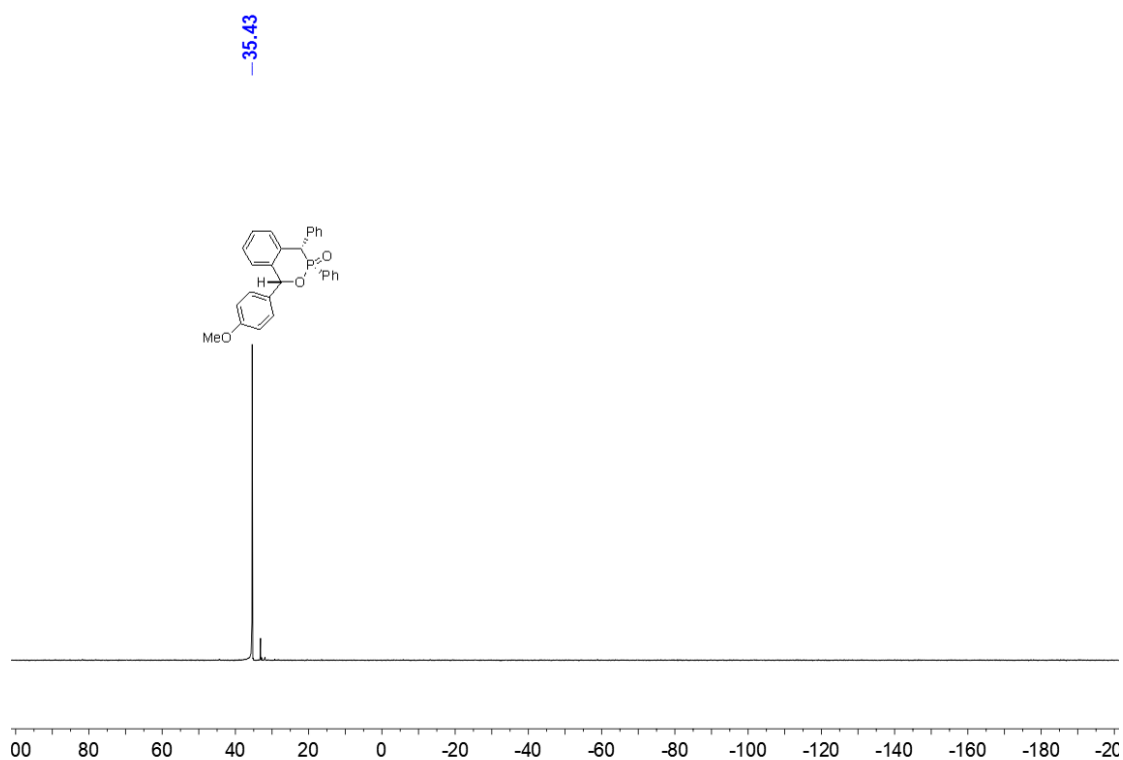
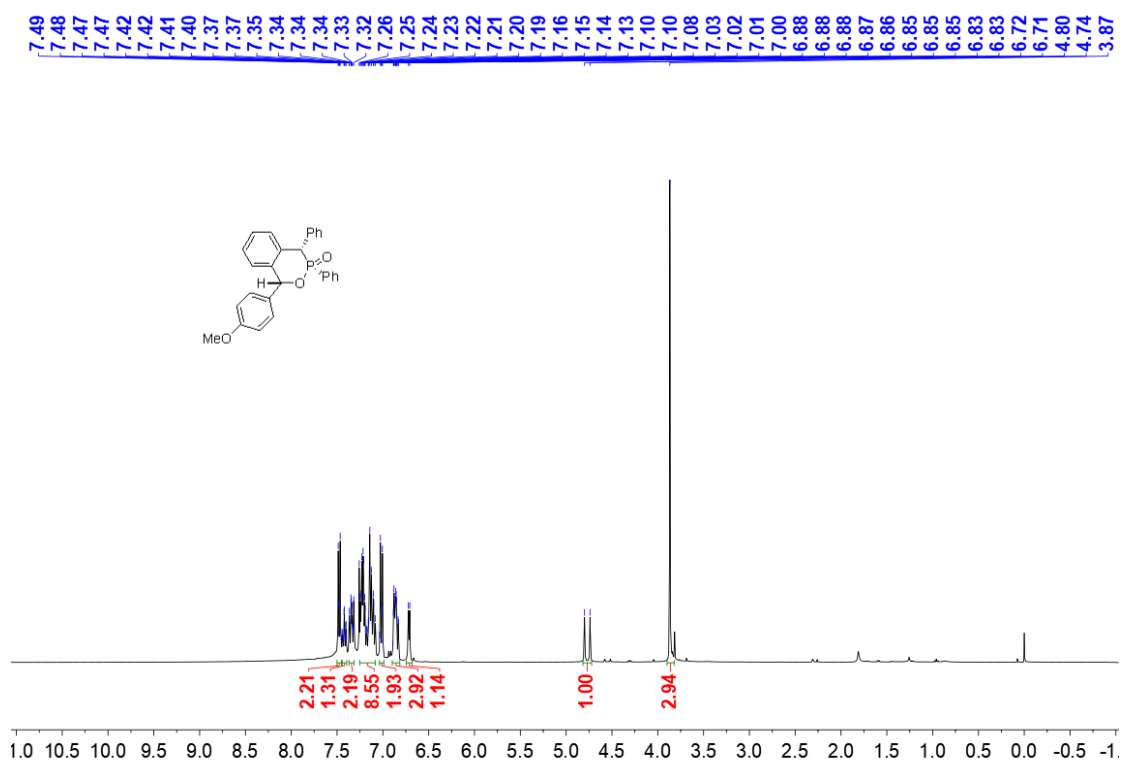
**<sup>1</sup>H, <sup>31</sup>P and <sup>13</sup>C NMR spectra of compound 3e in CDCl<sub>3</sub> (400 MHz)**



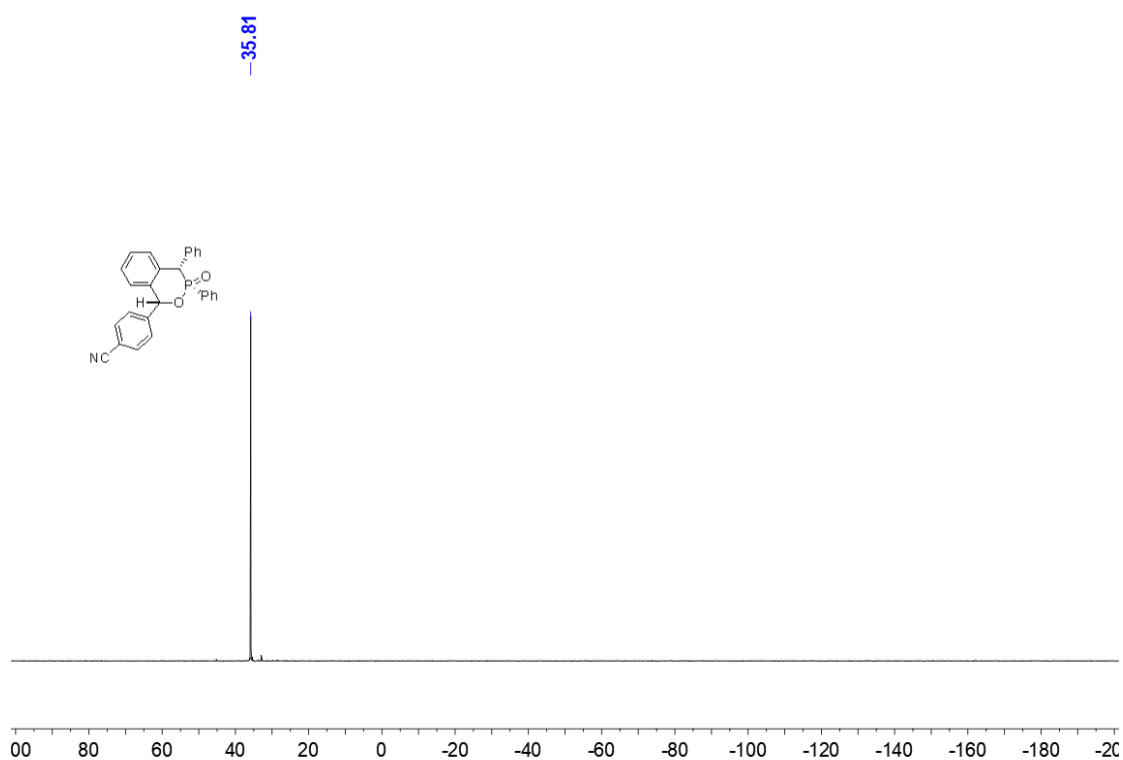
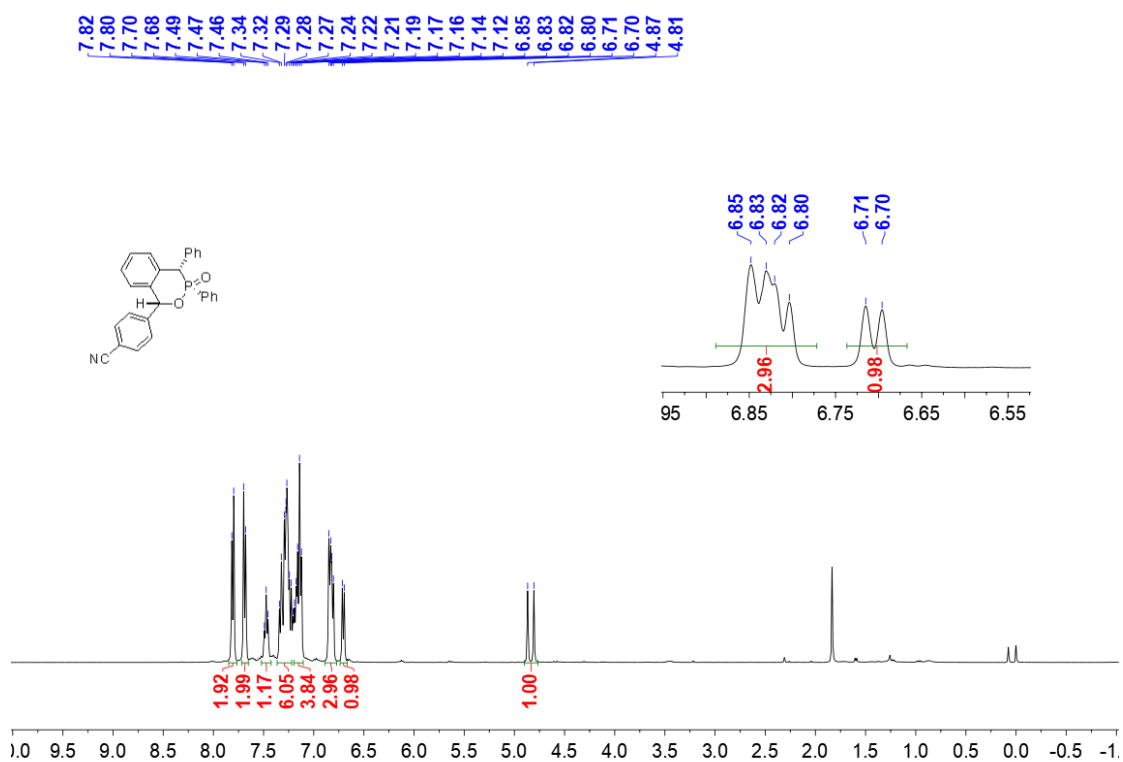


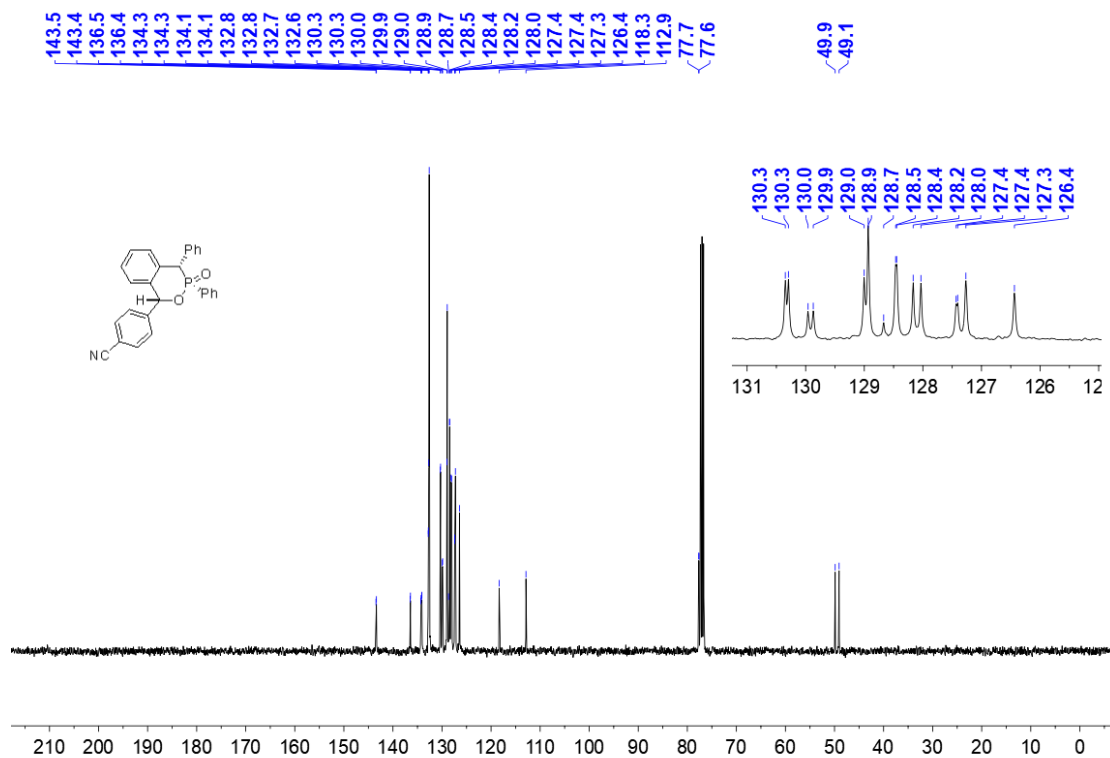


$^1\text{H}$  and  $^{31}\text{P}$  NMR spectra of compound **3f** in  $\text{CDCl}_3$  (400 MHz)

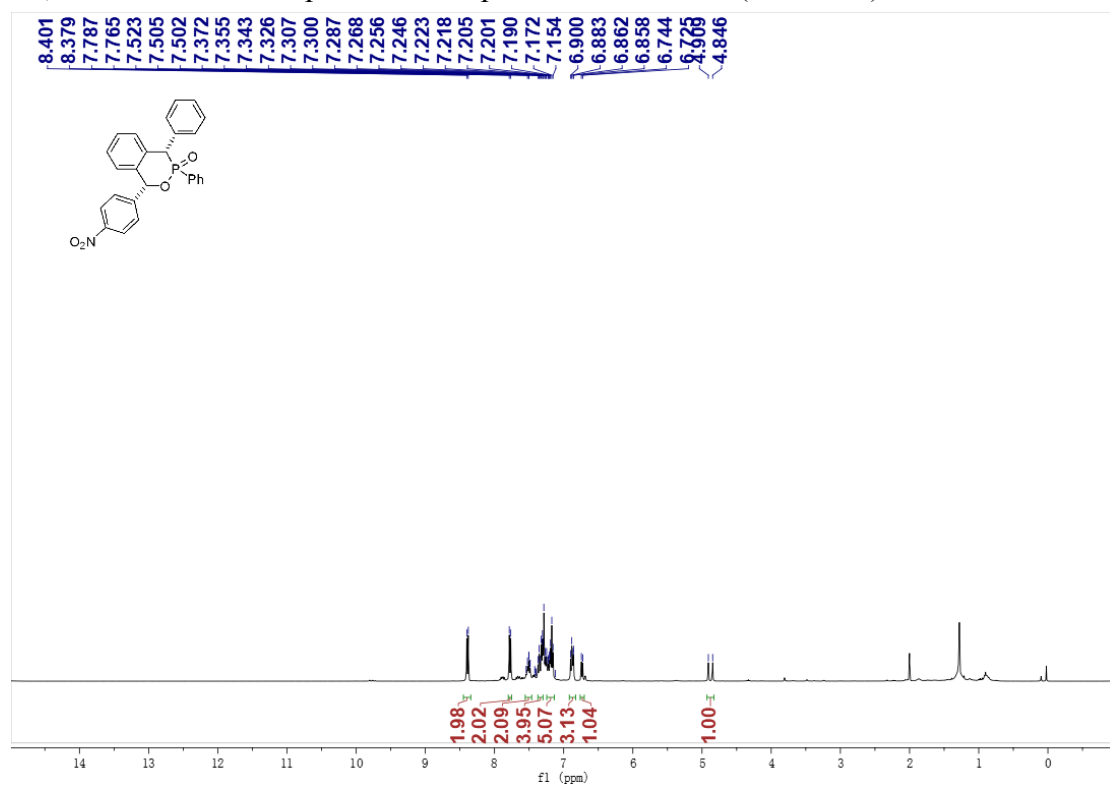


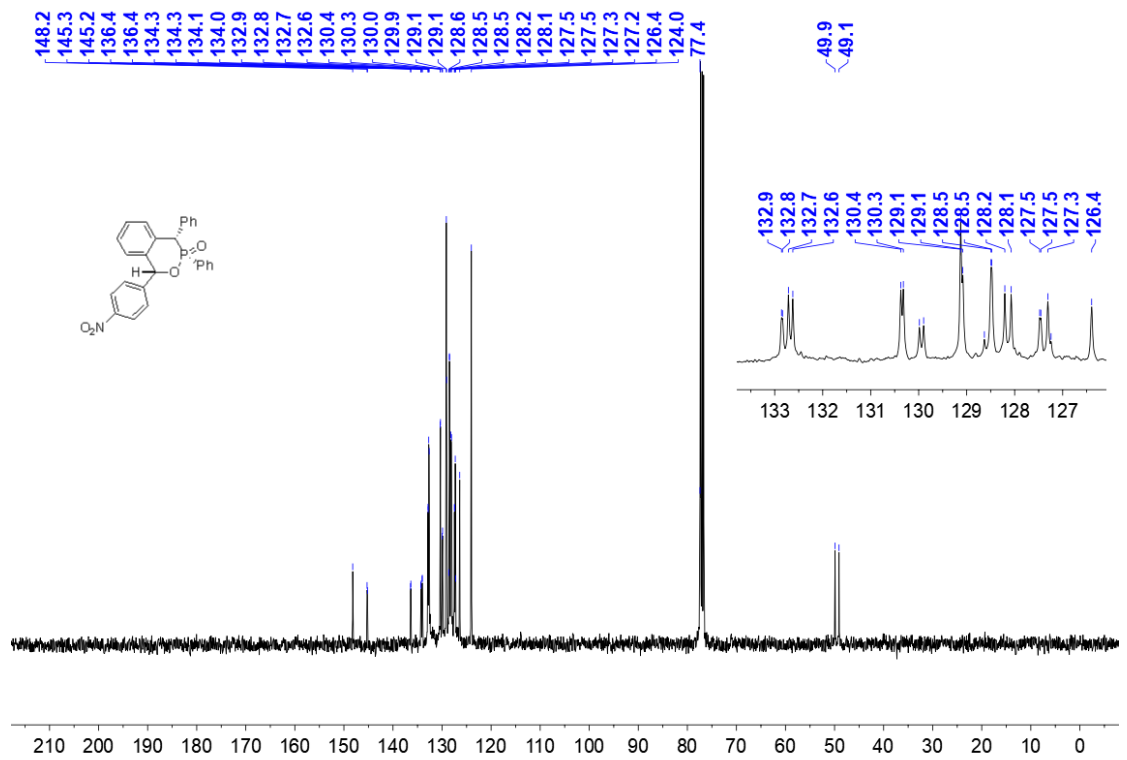
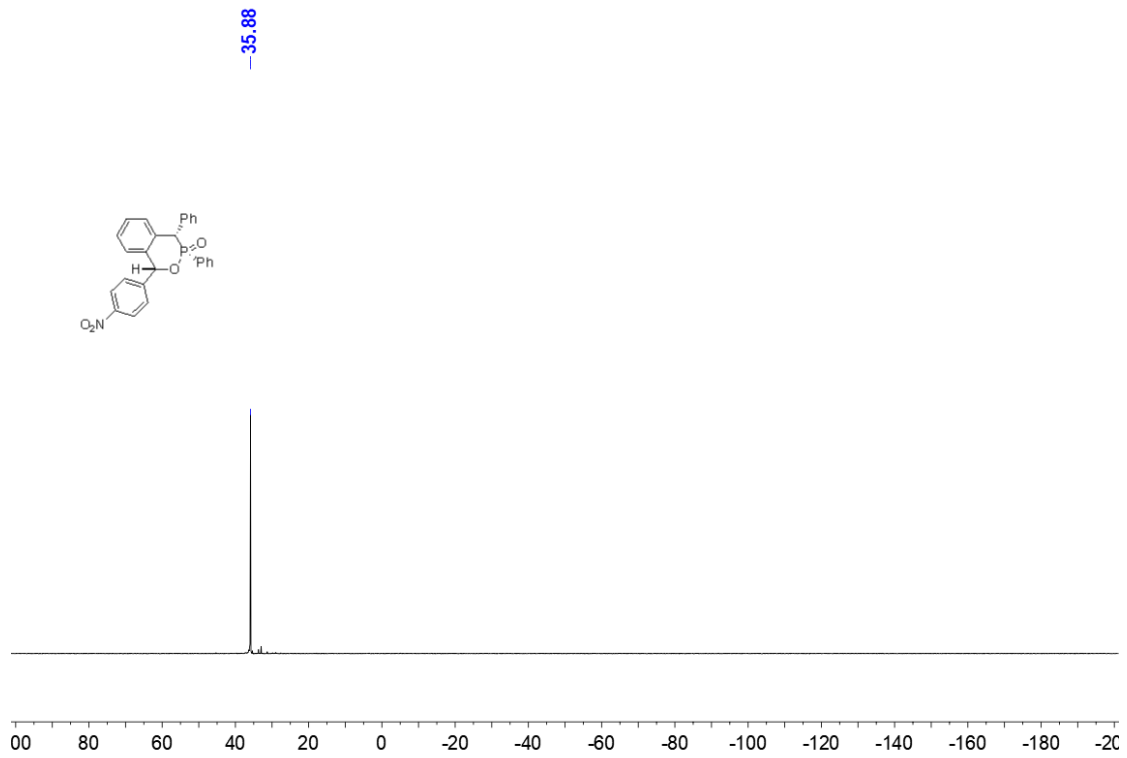
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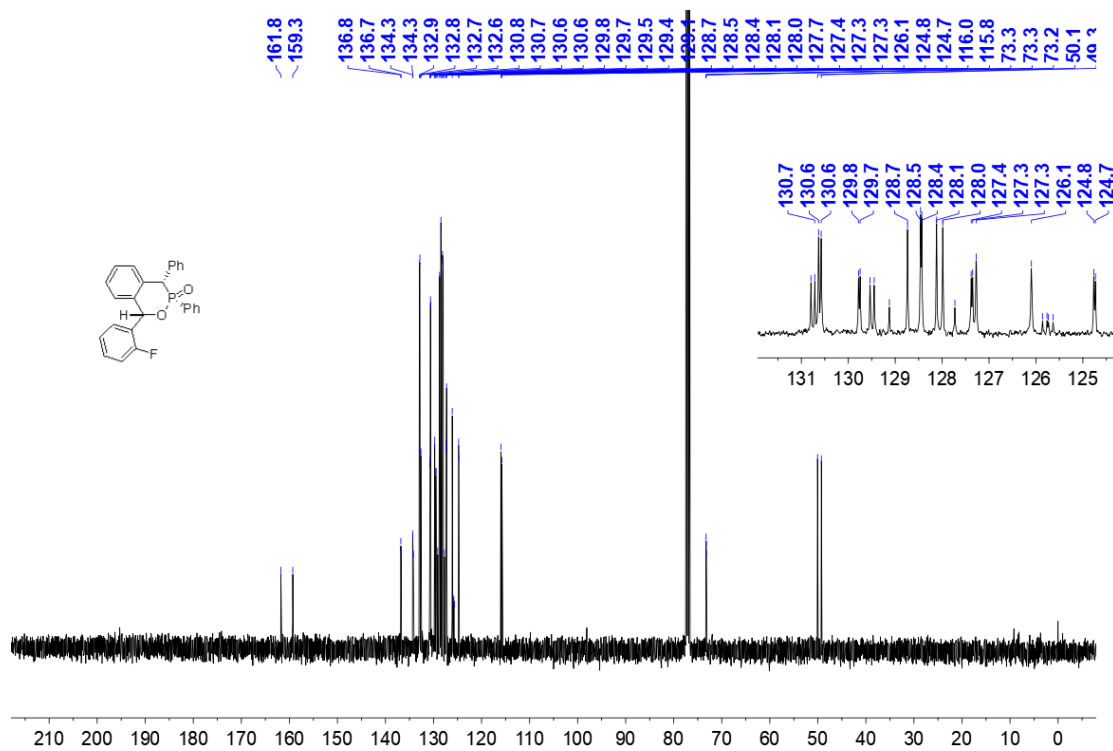
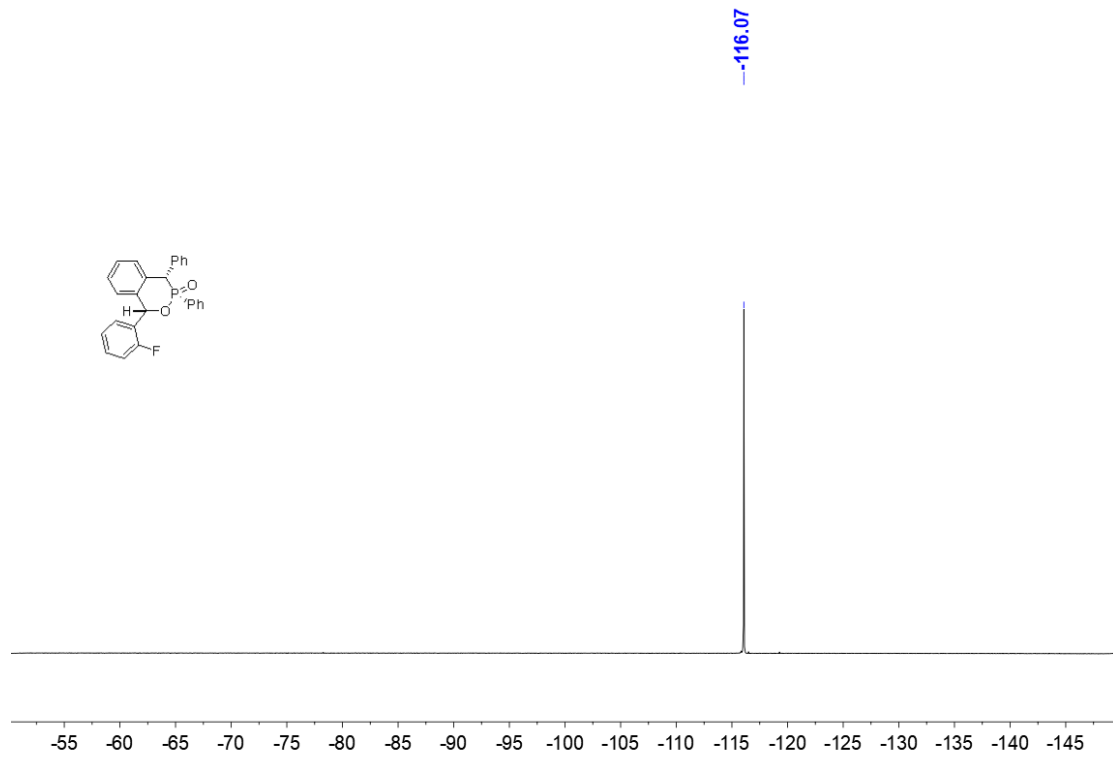


<sup>1</sup>H, <sup>31</sup>P and <sup>13</sup>C NMR spectra of compound **3h** in CDCl<sub>3</sub> (400 MHz)



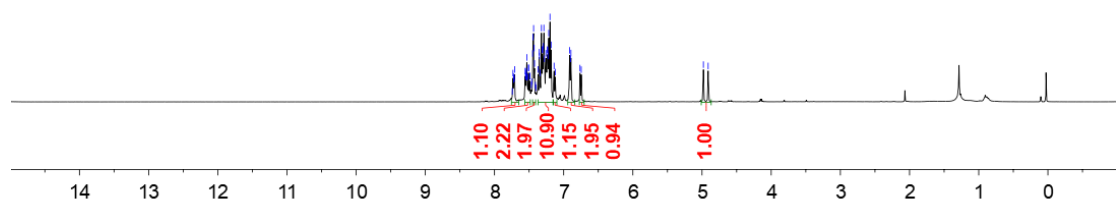
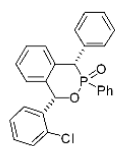




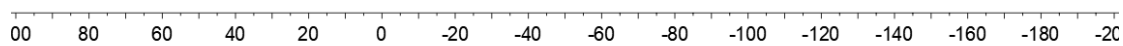
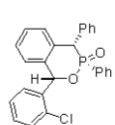


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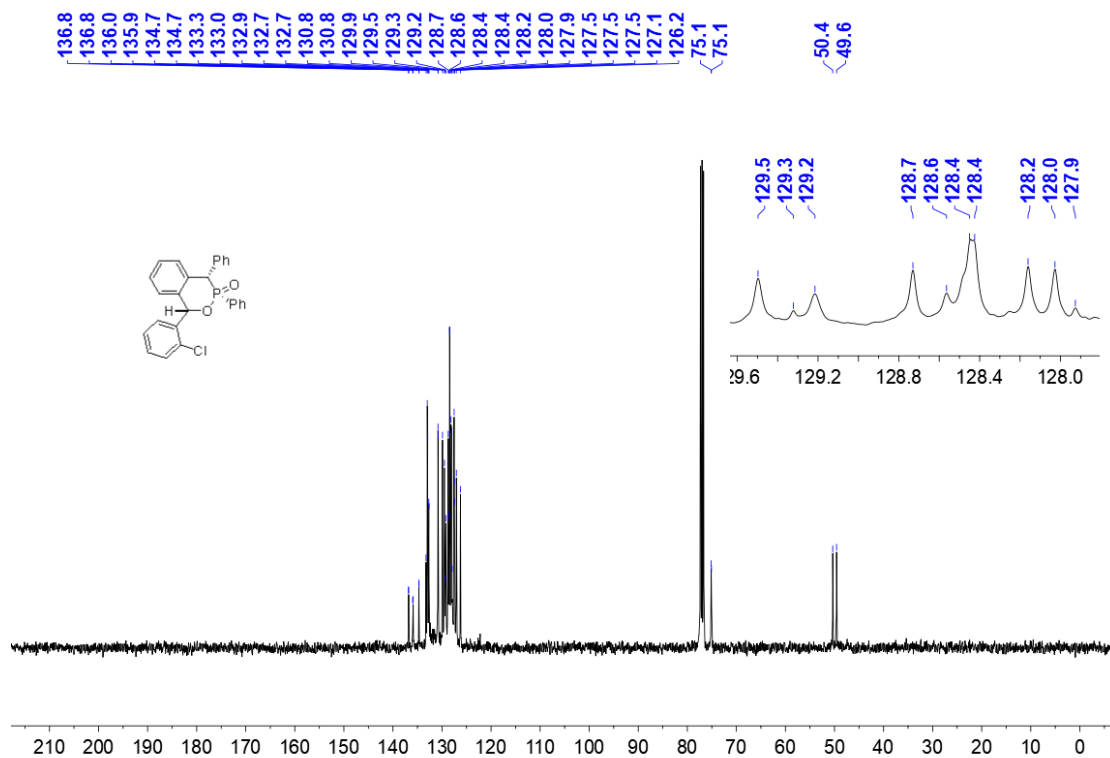
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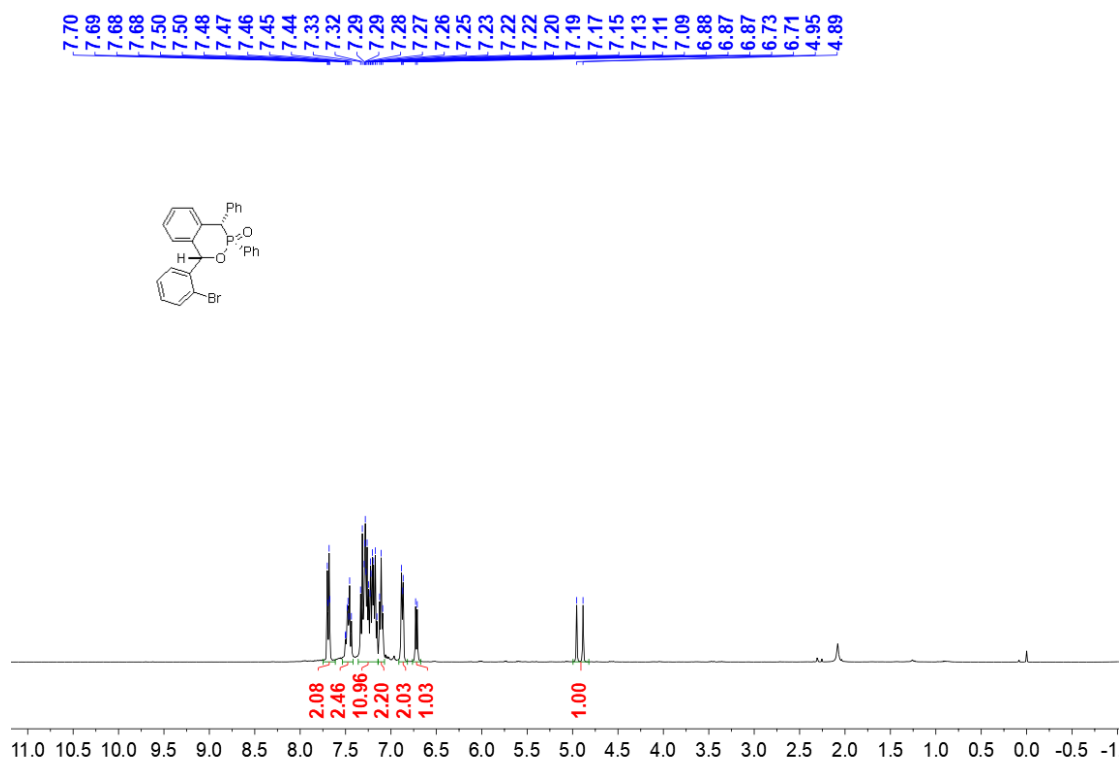
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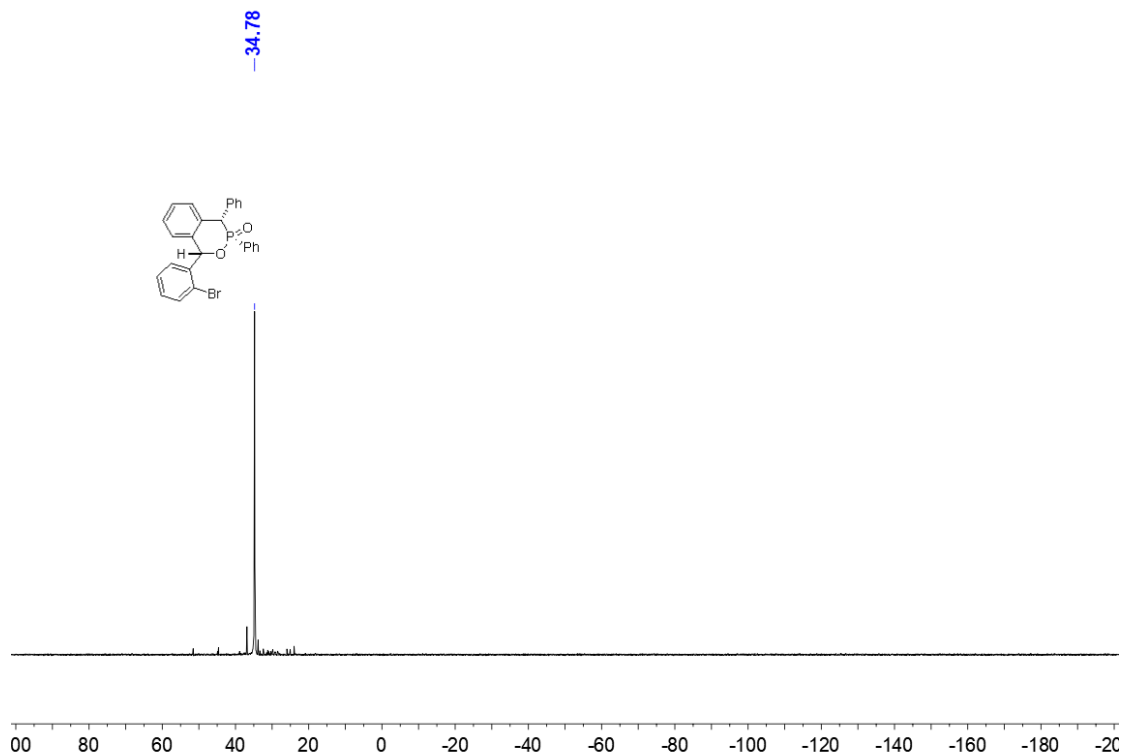




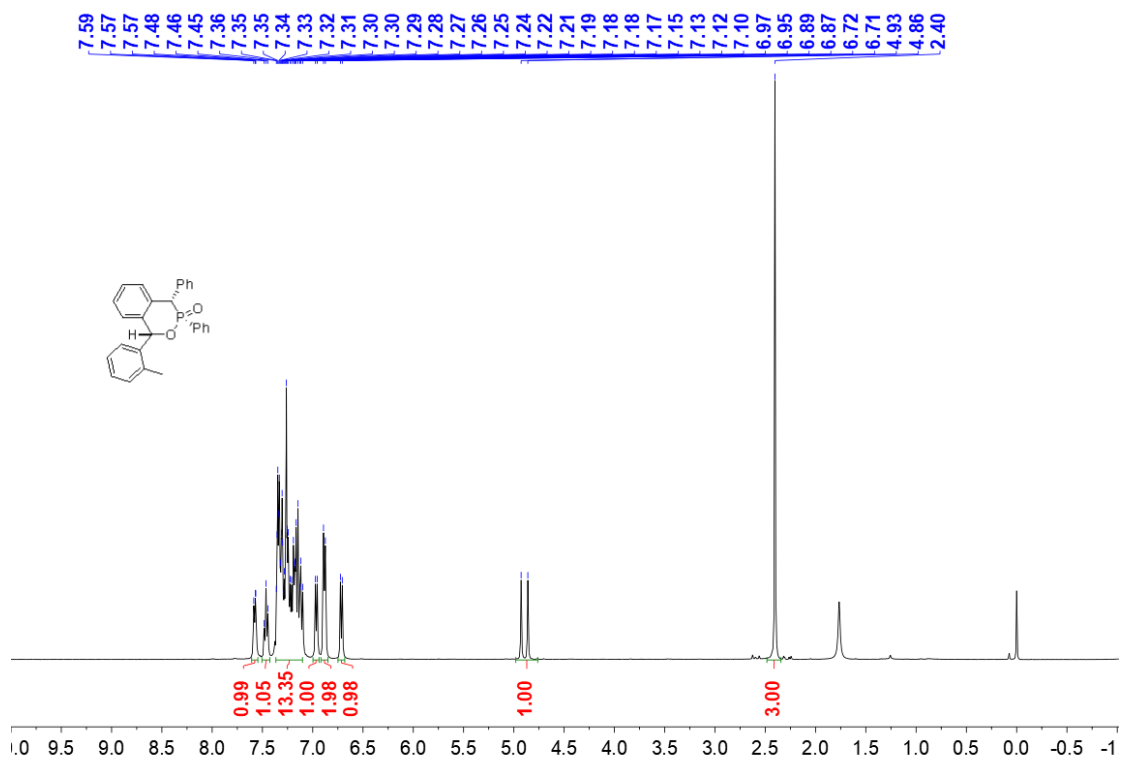


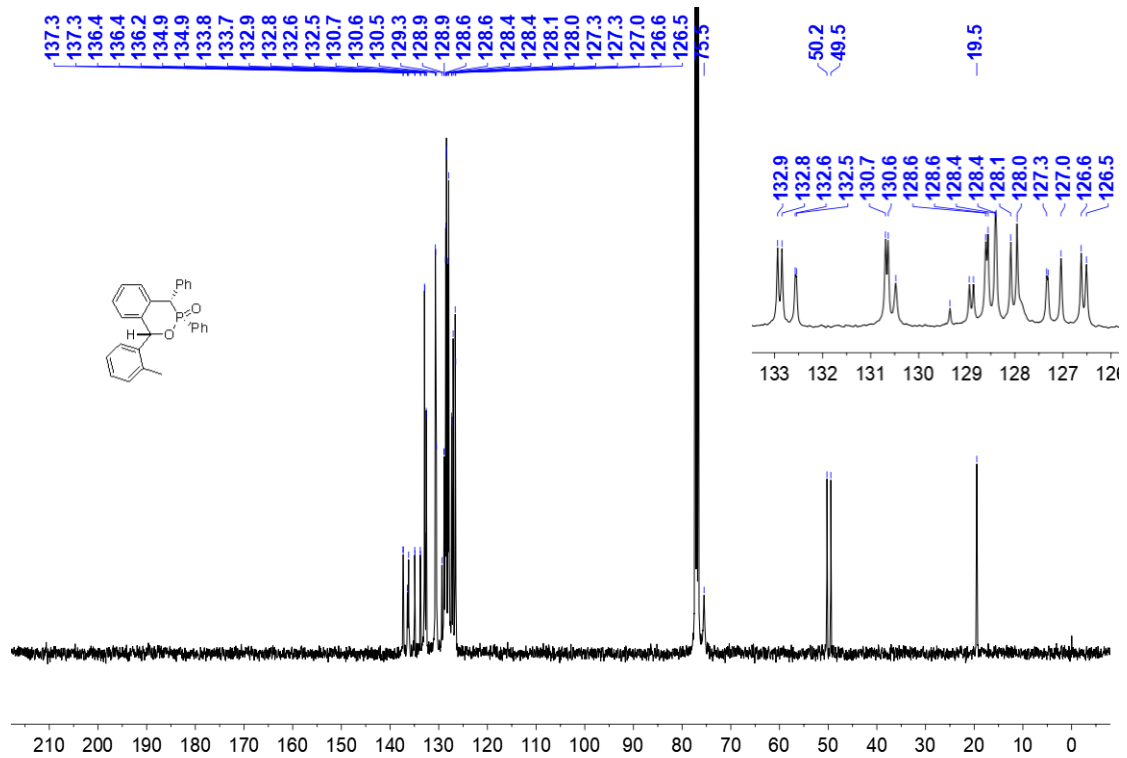
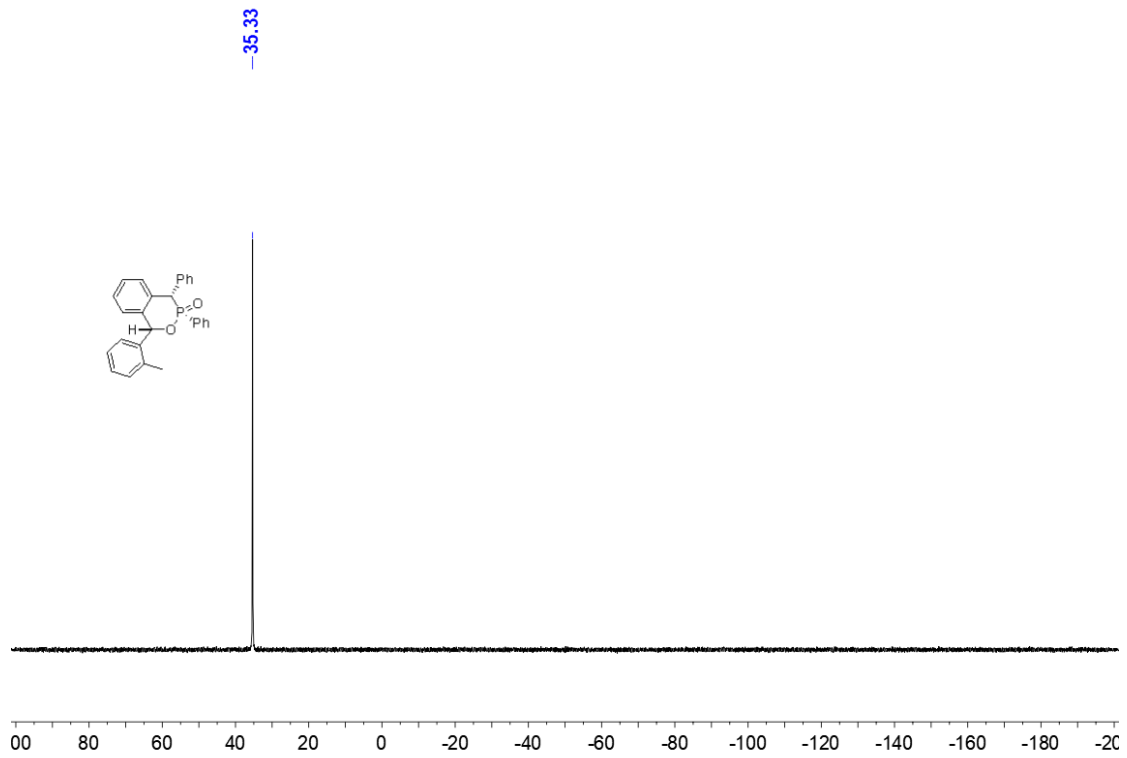
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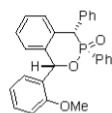
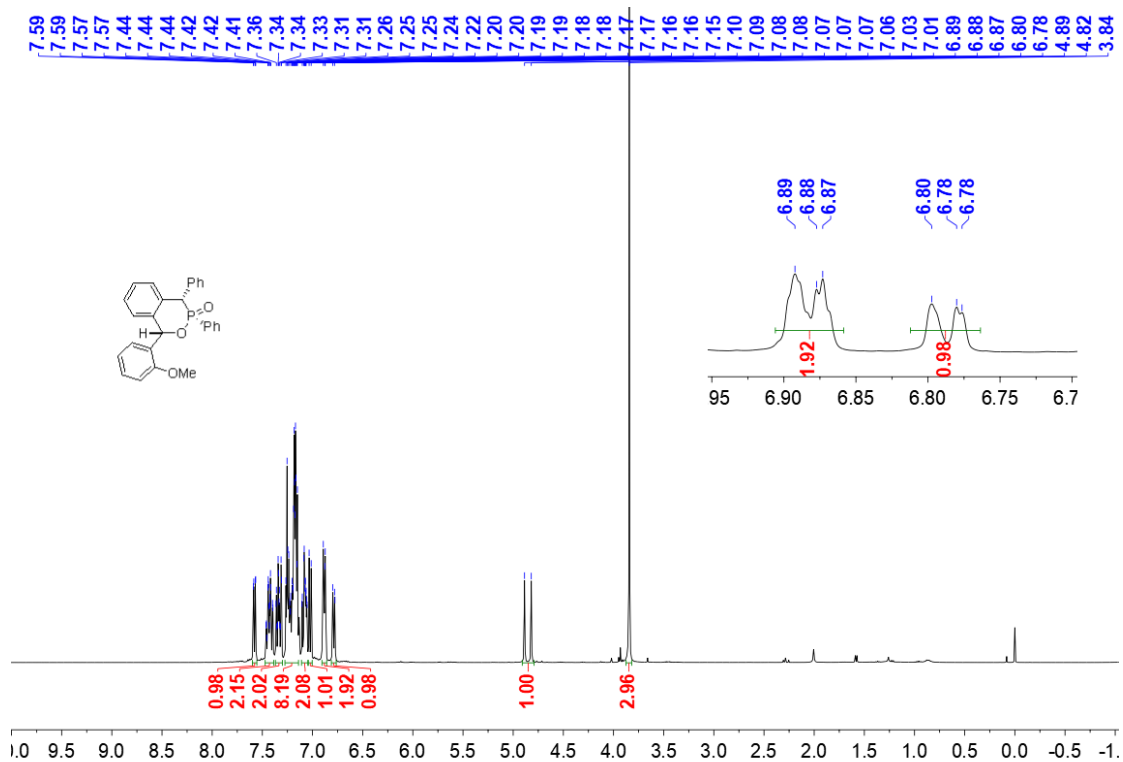


<sup>1</sup>H, <sup>31</sup>P and <sup>13</sup>C NMR spectra of compound **3I** in CDCl<sub>3</sub> (400 MHz)

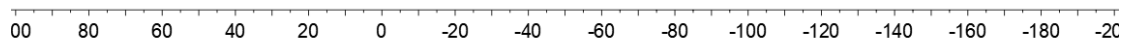
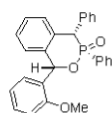


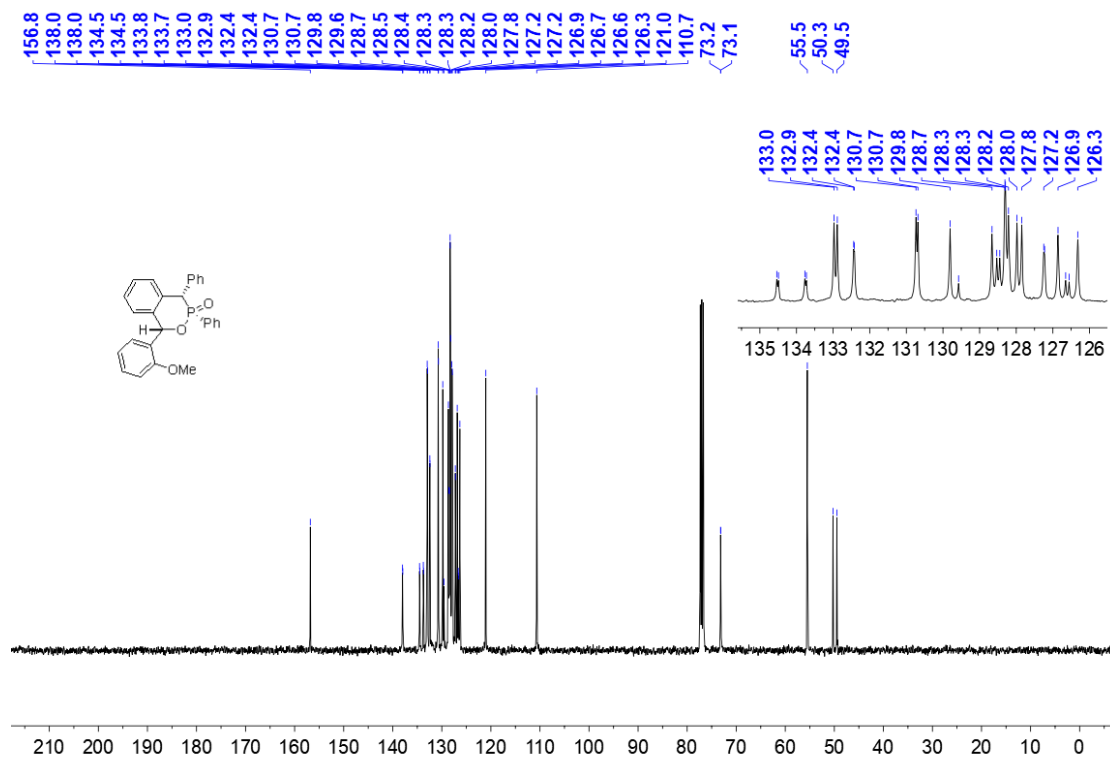


$^1\text{H}$ ,  $^{31}\text{P}$  and  $^{13}\text{C}$  NMR spectra of compound **3m** in  $\text{CDCl}_3$  (400 MHz)

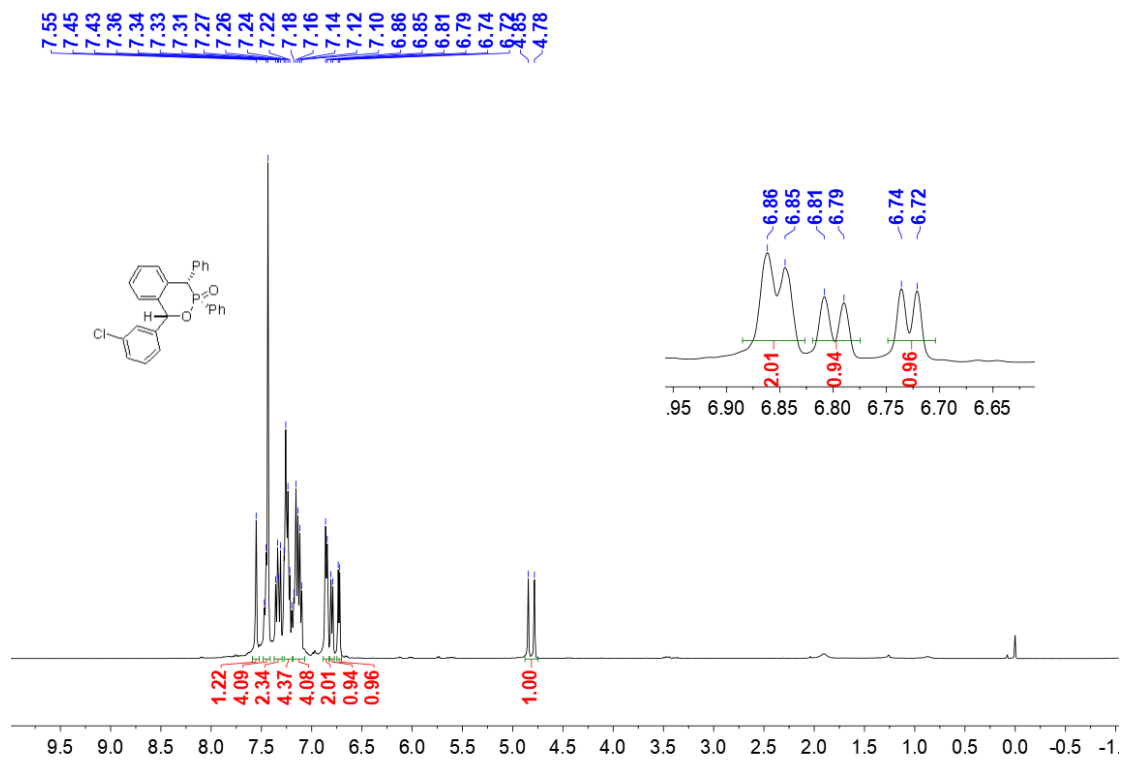


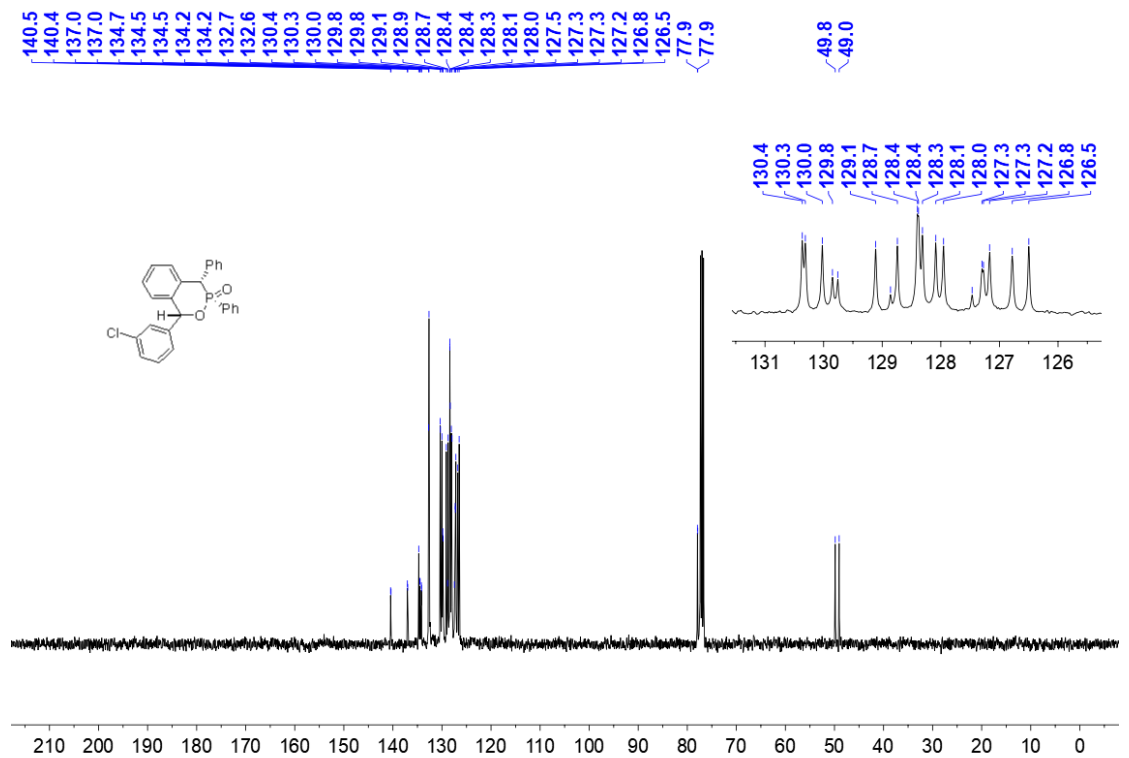
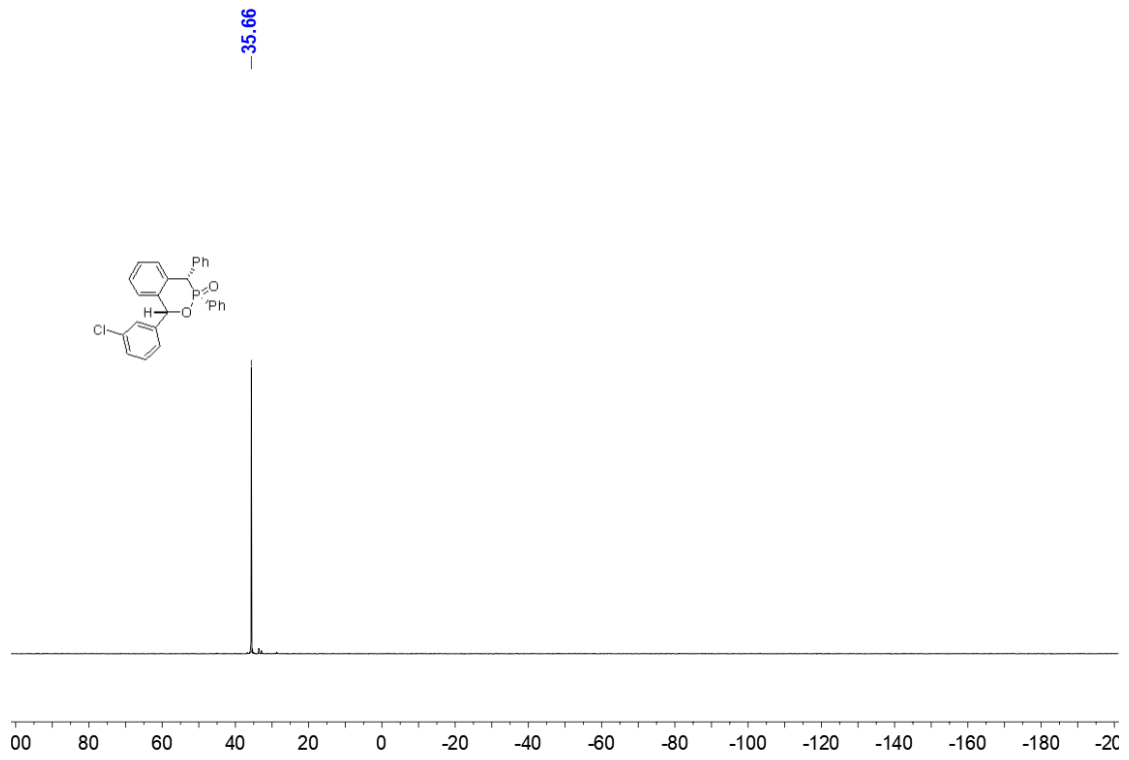
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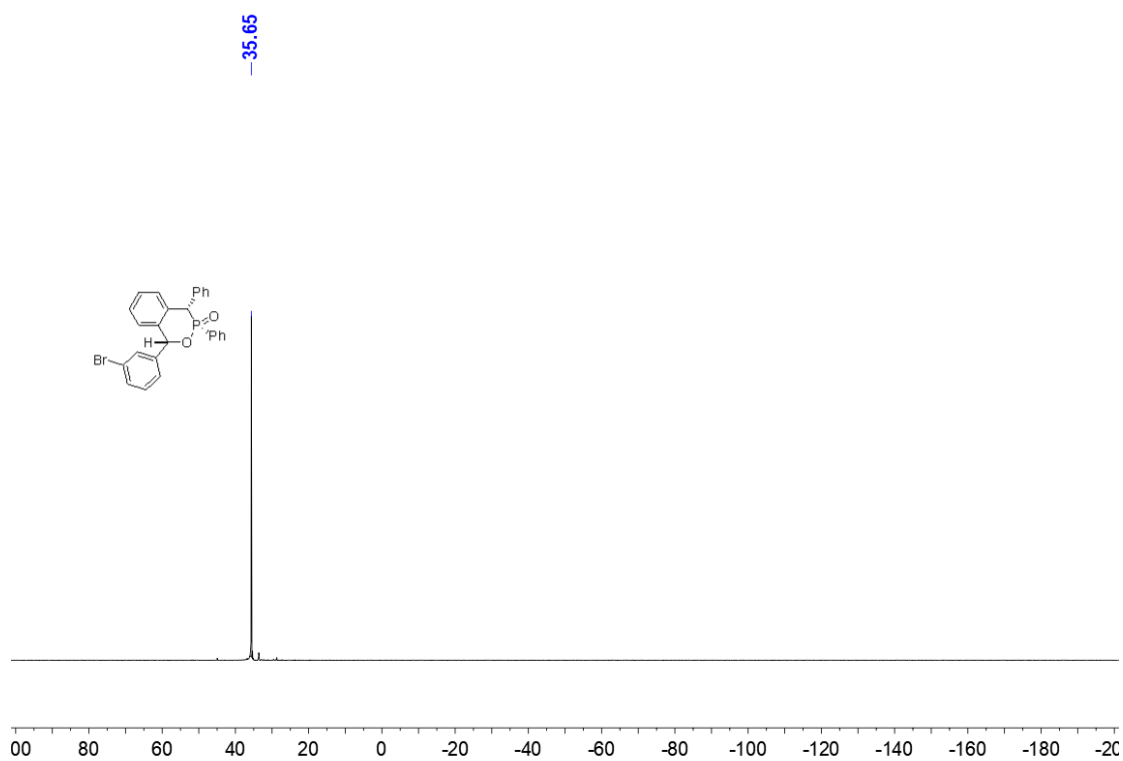
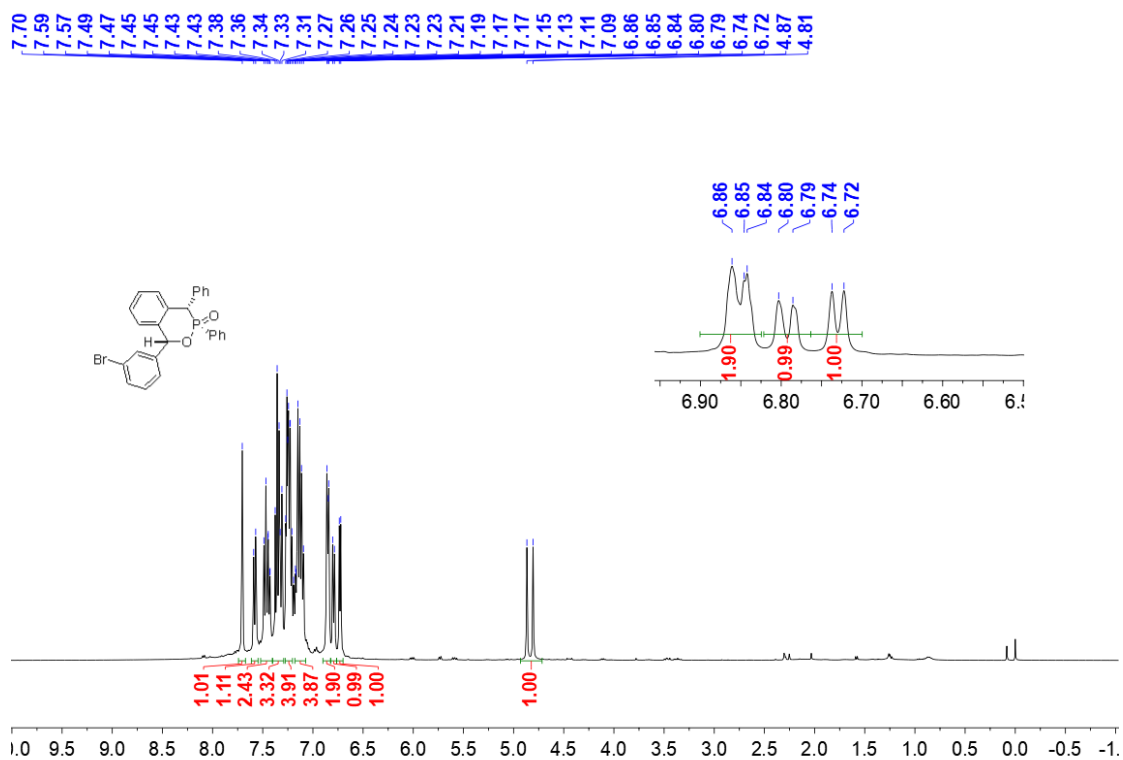


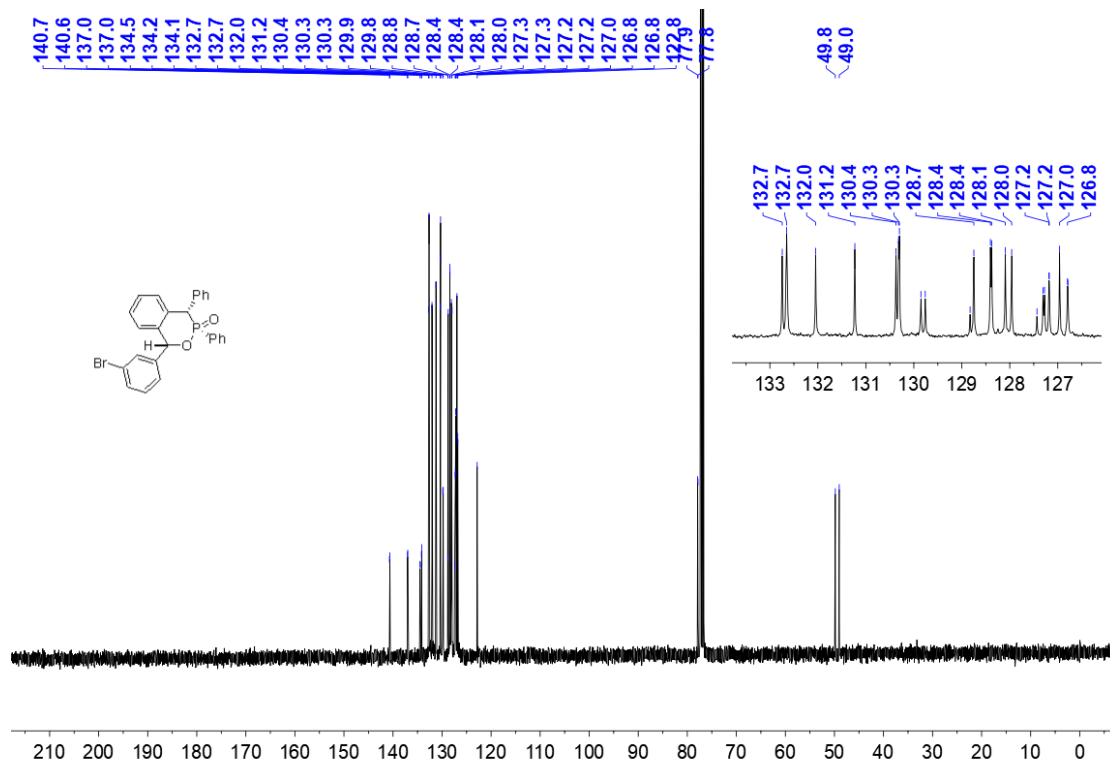
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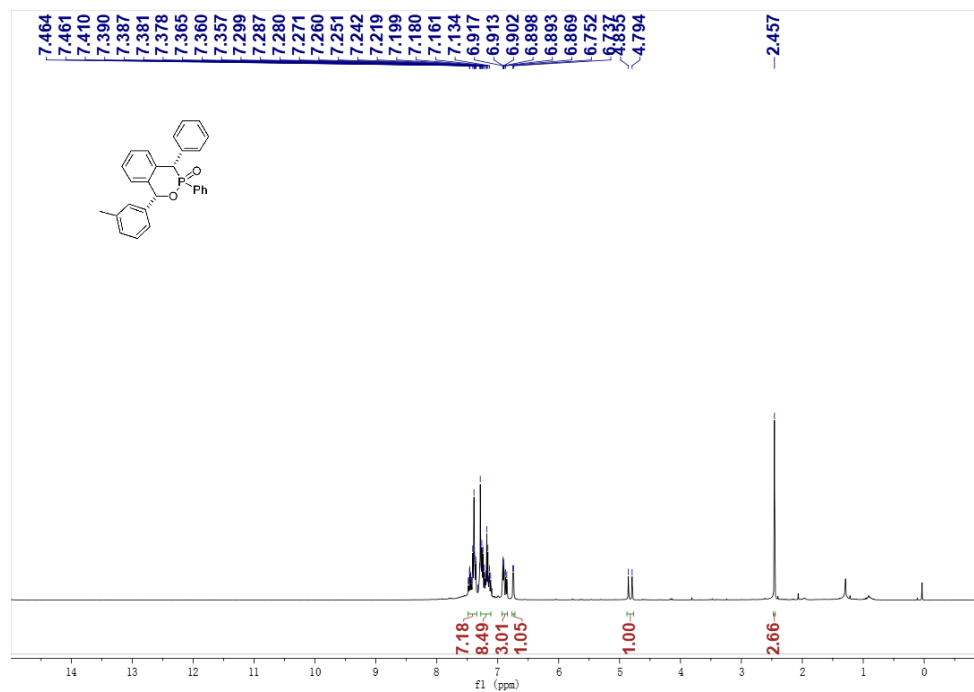


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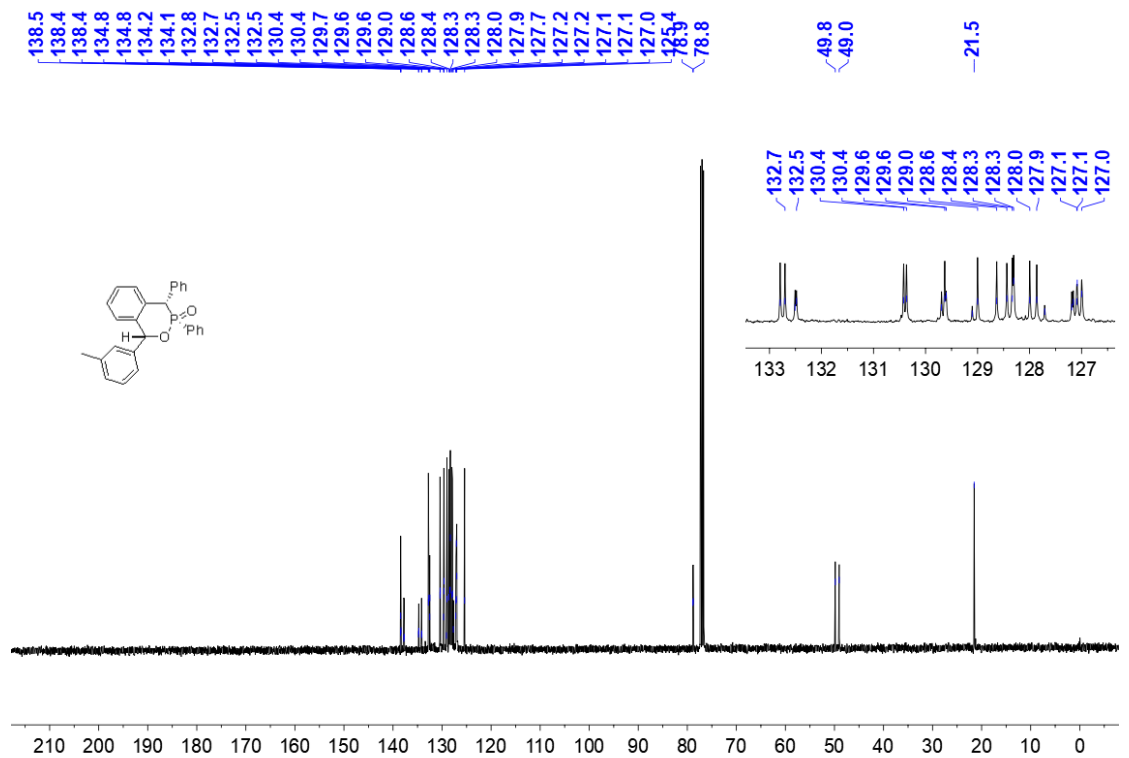
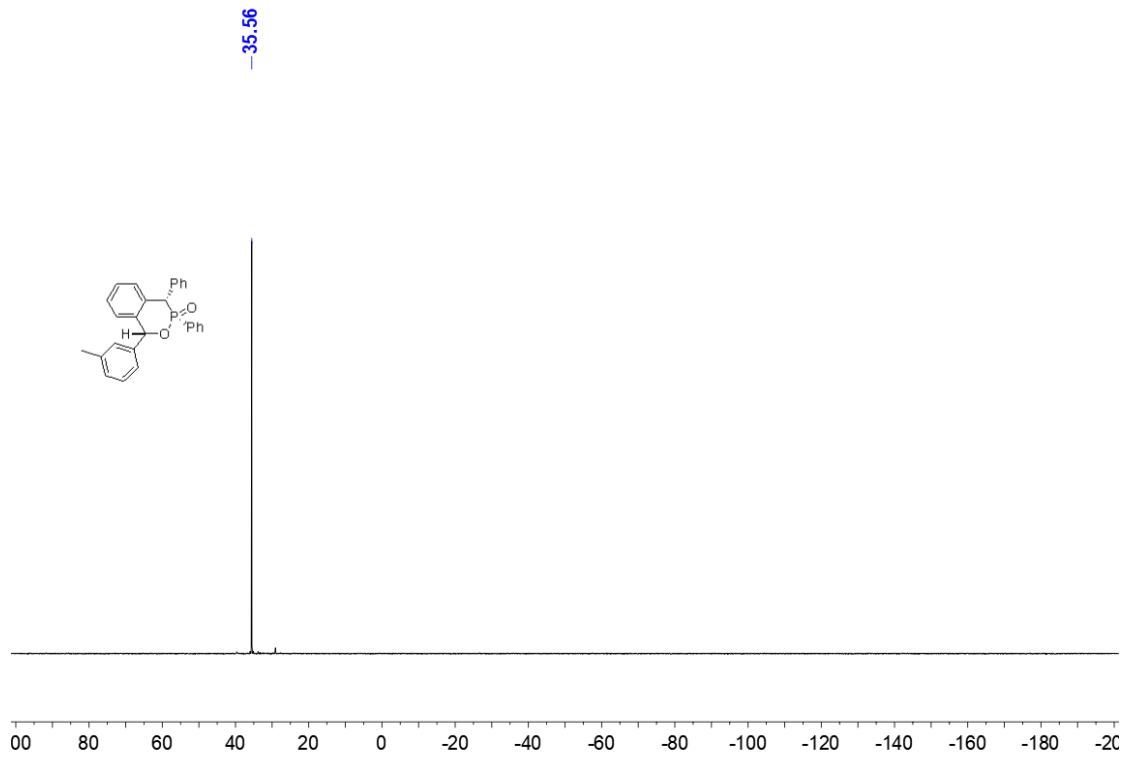




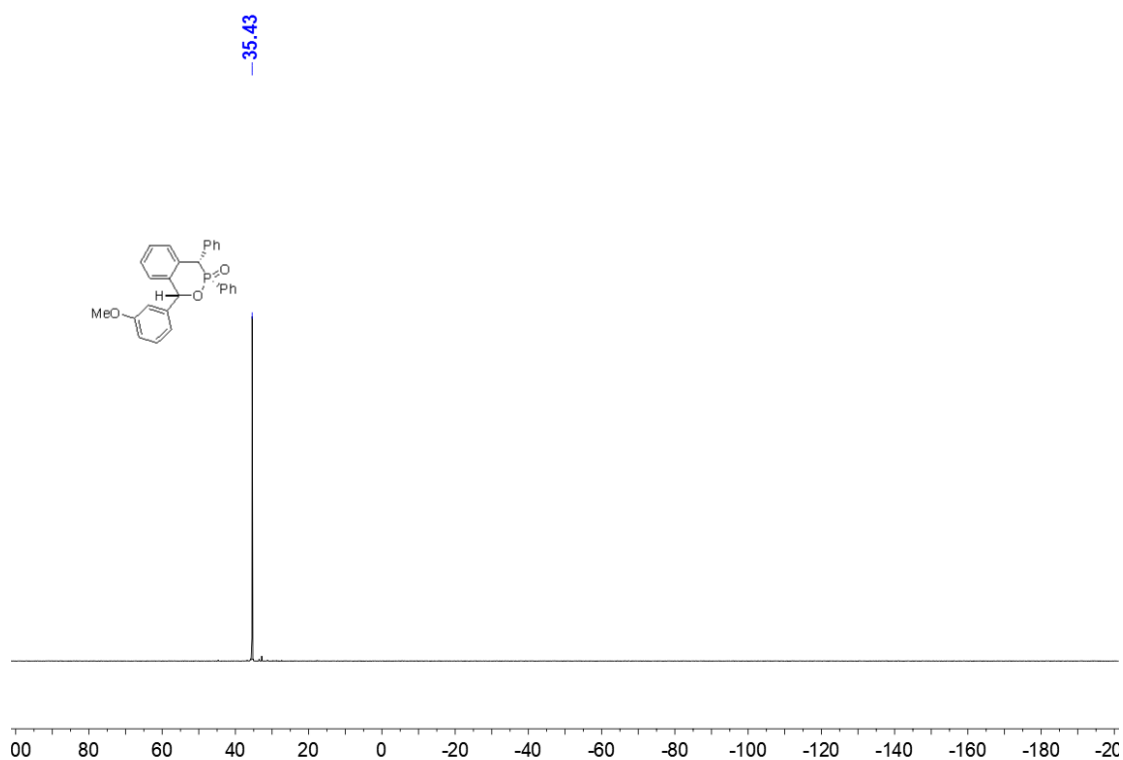
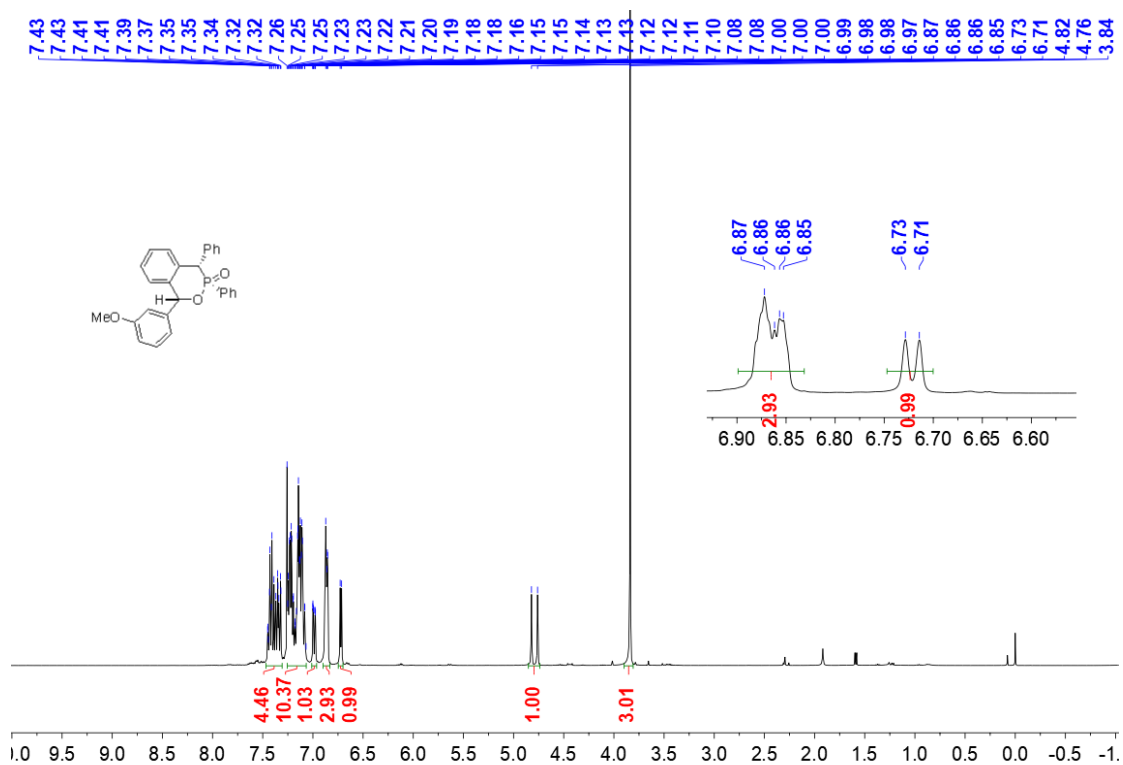
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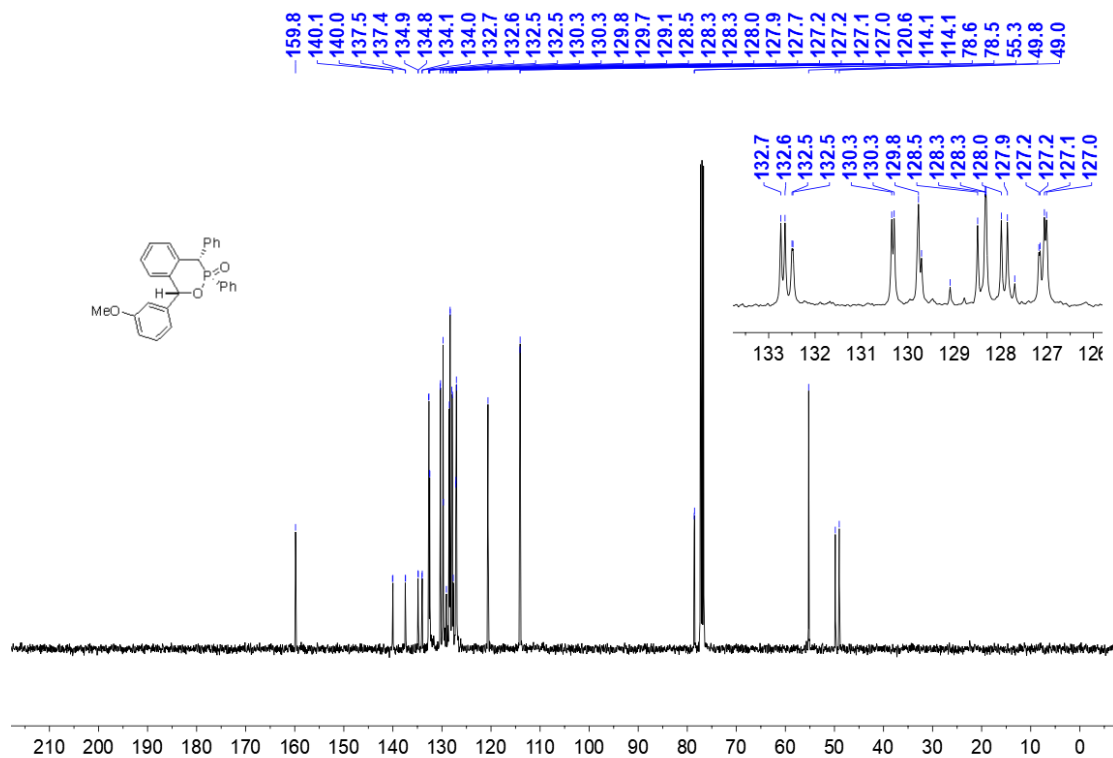




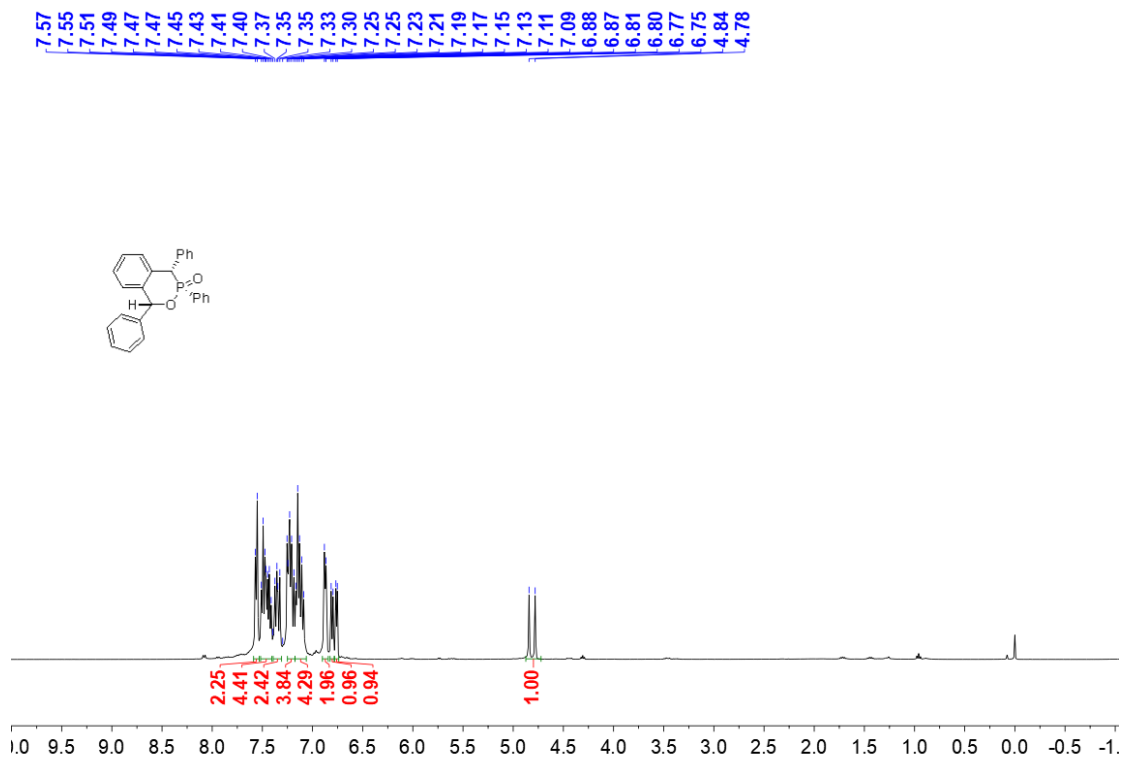


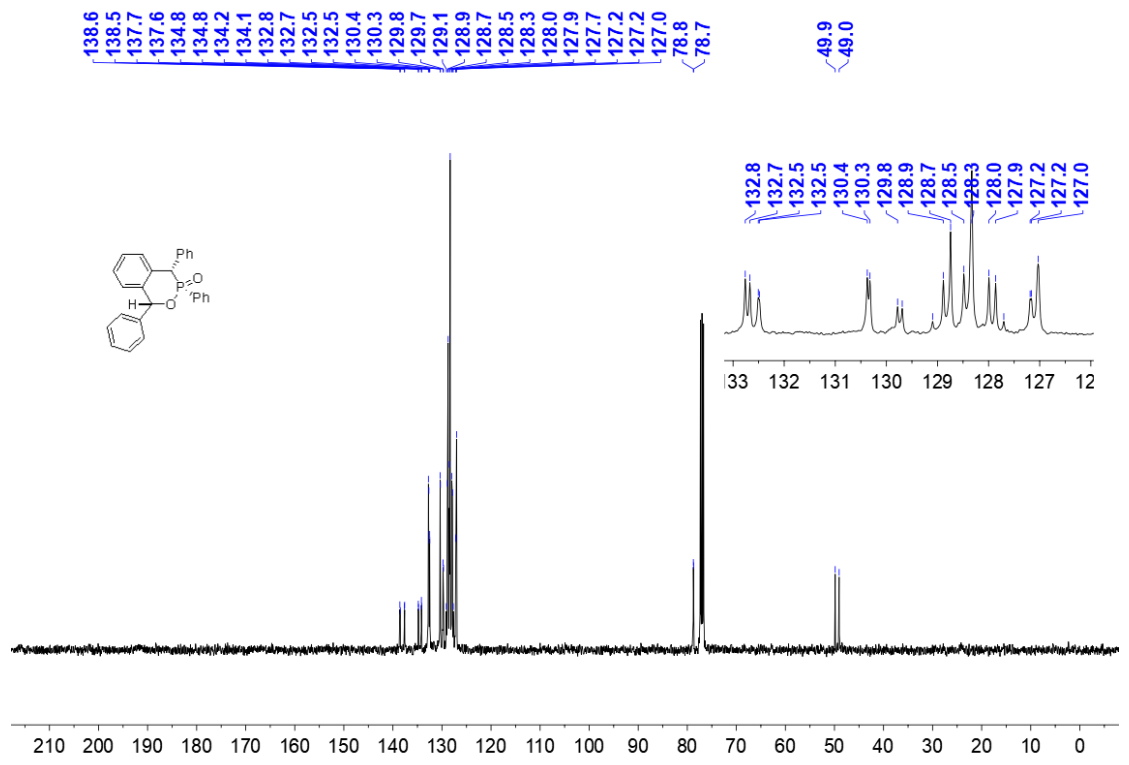
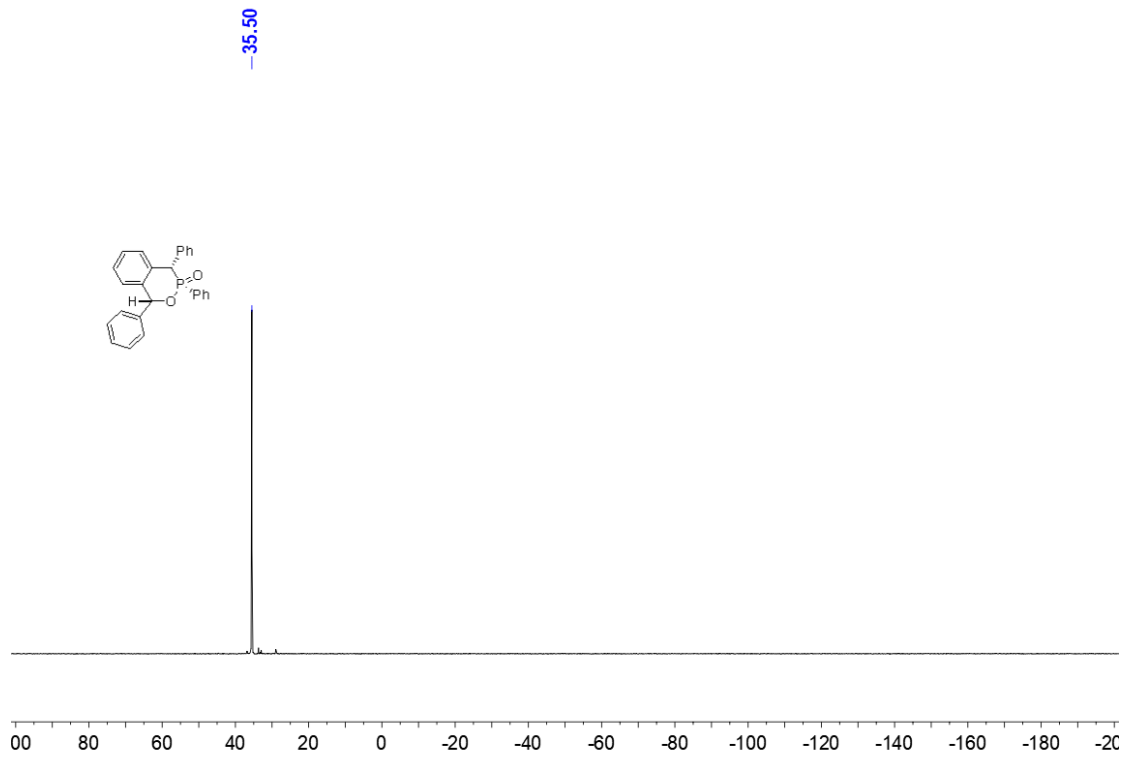
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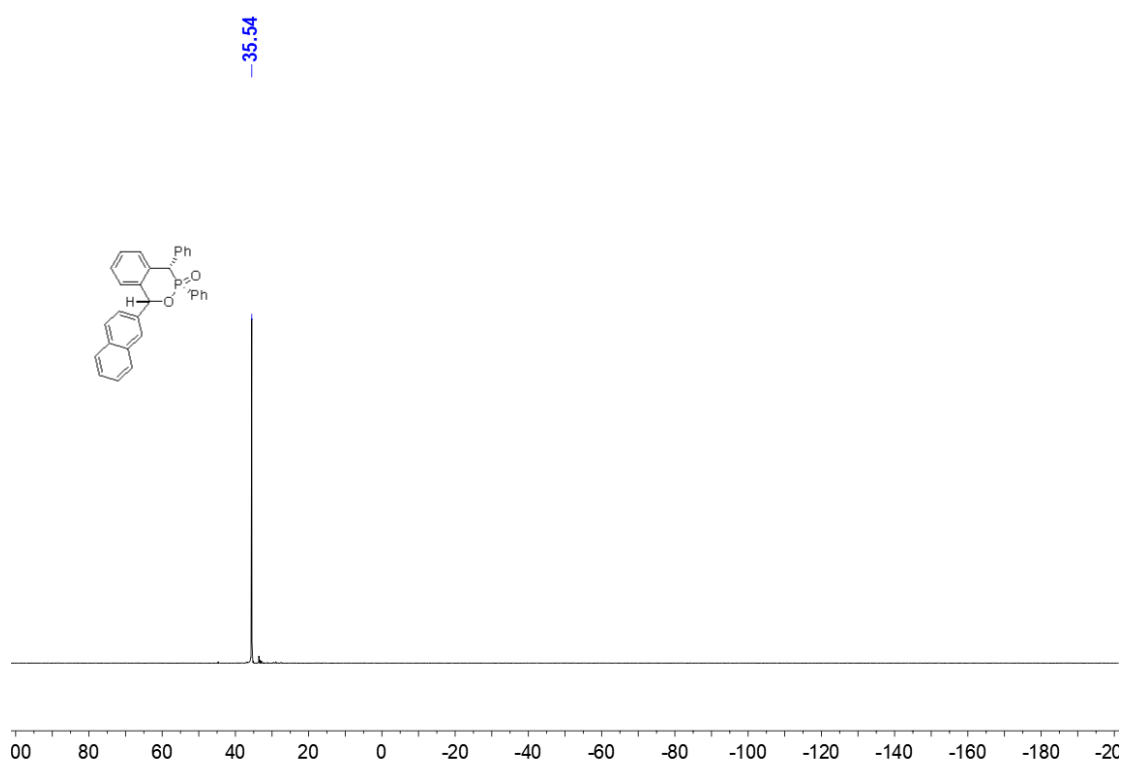
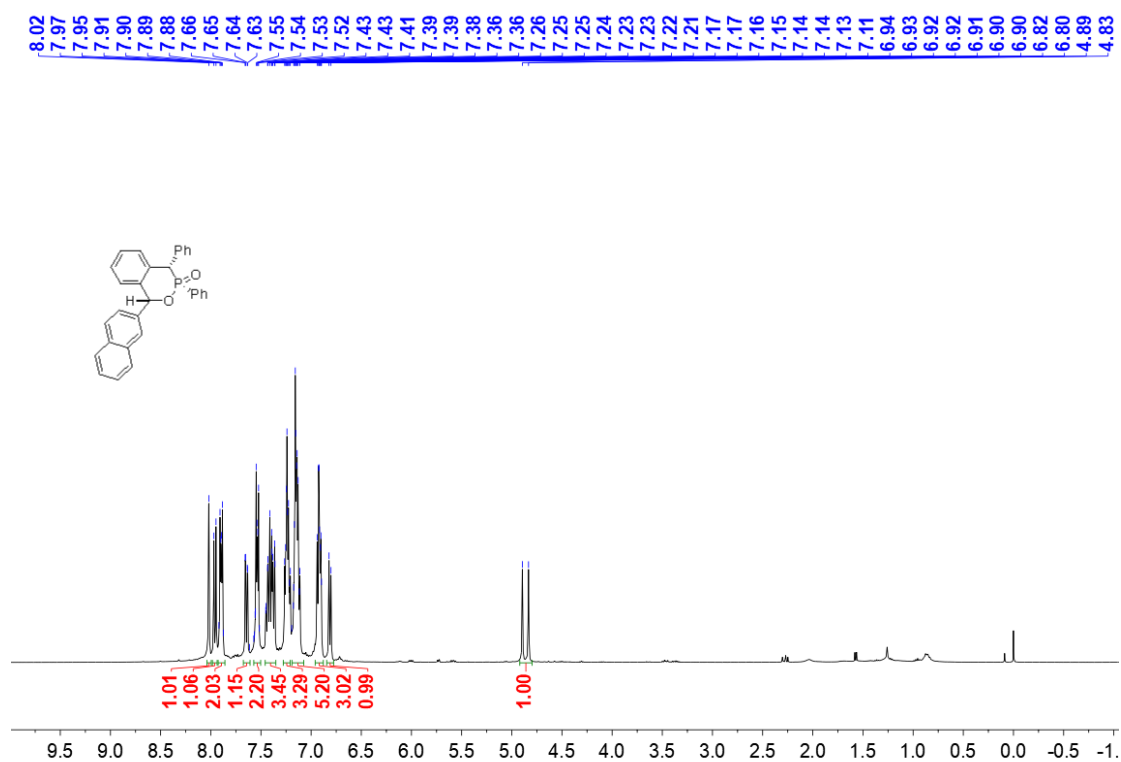


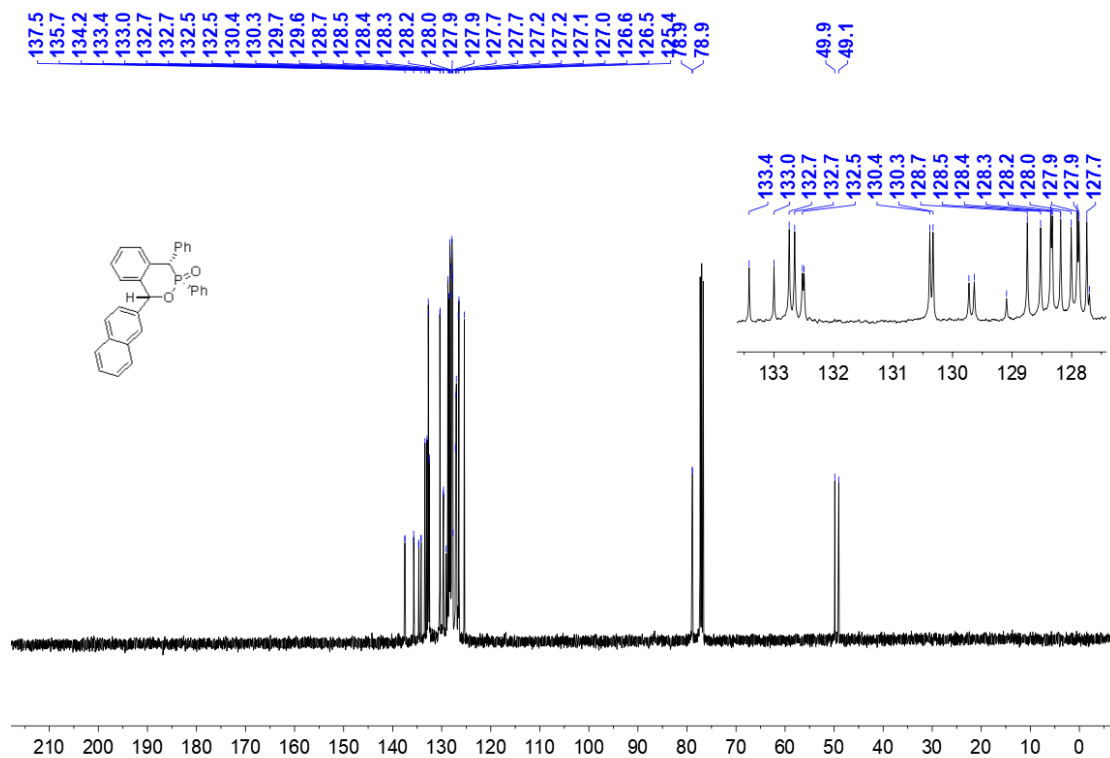
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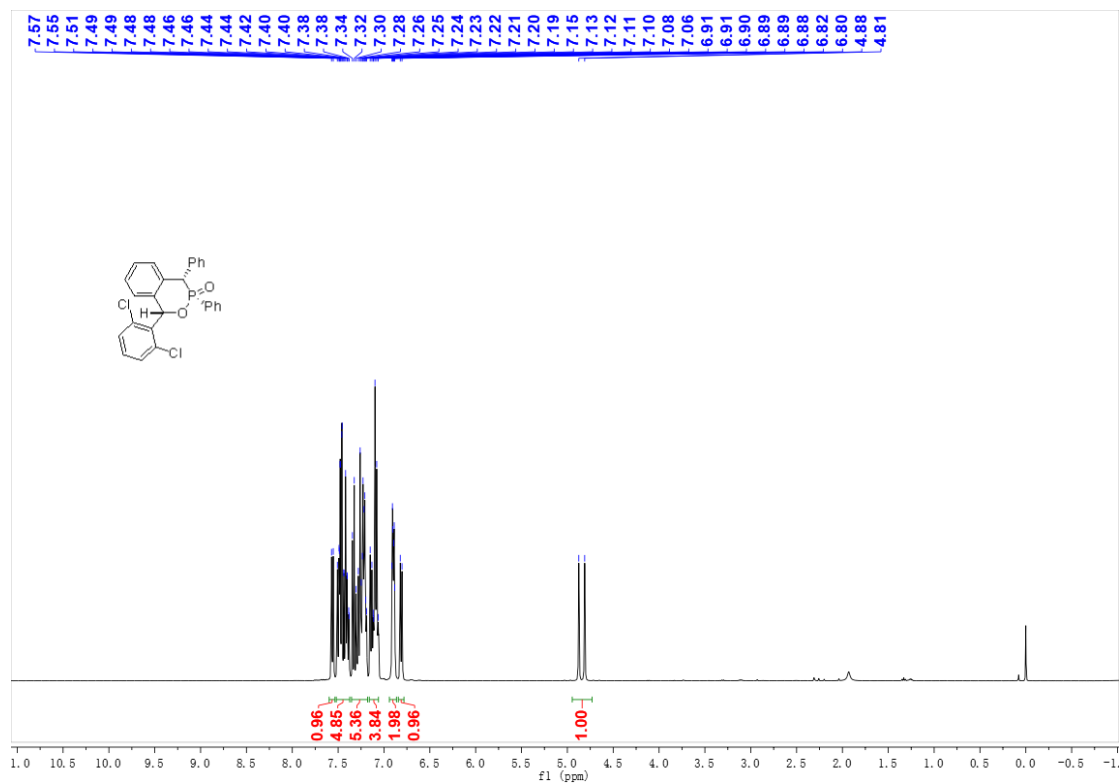


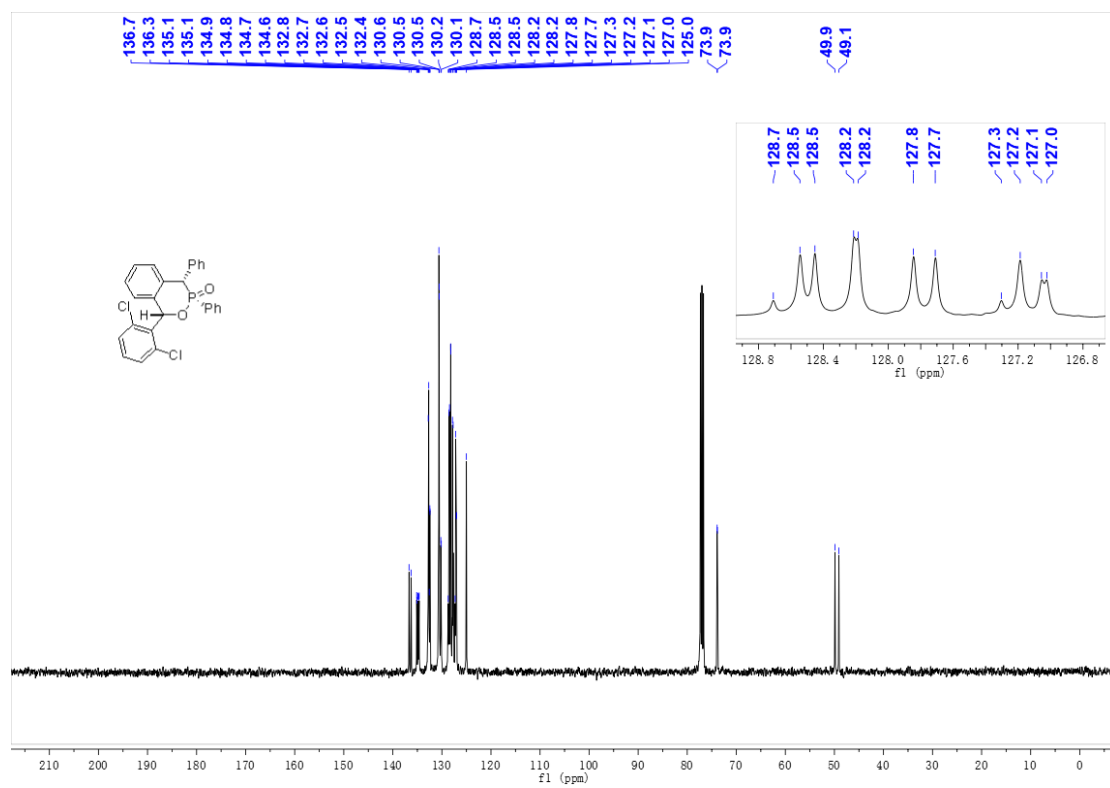
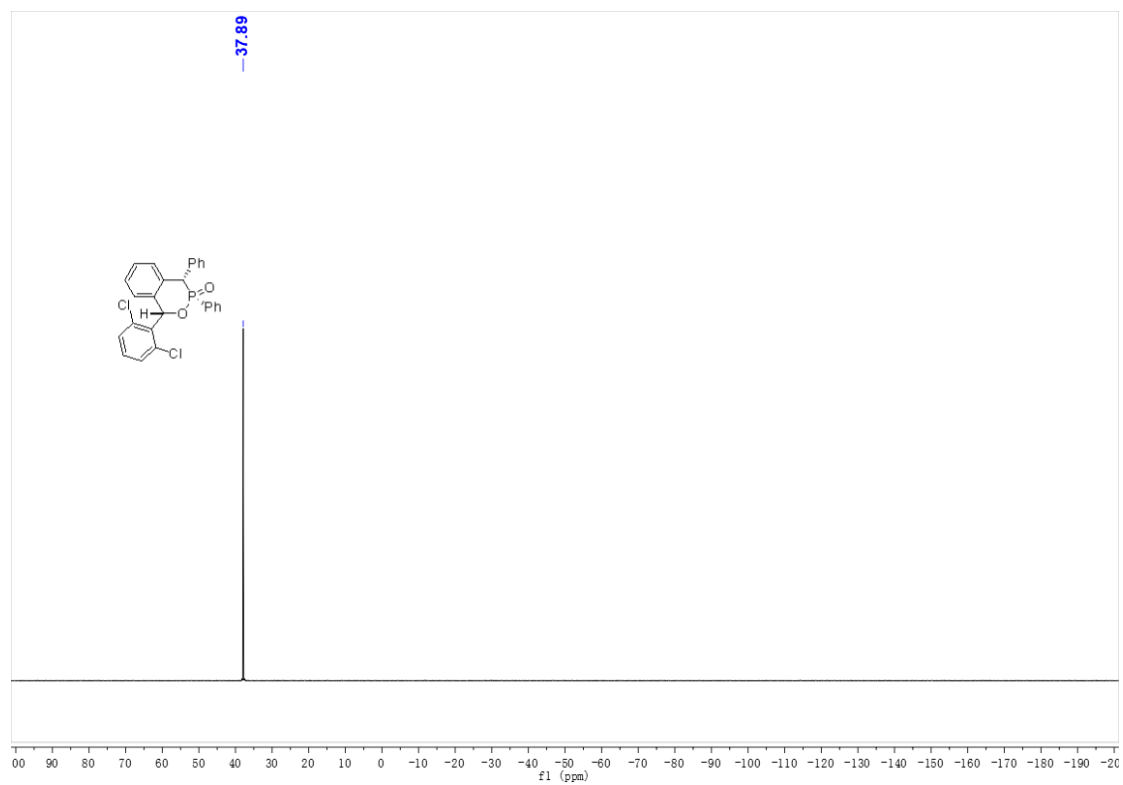
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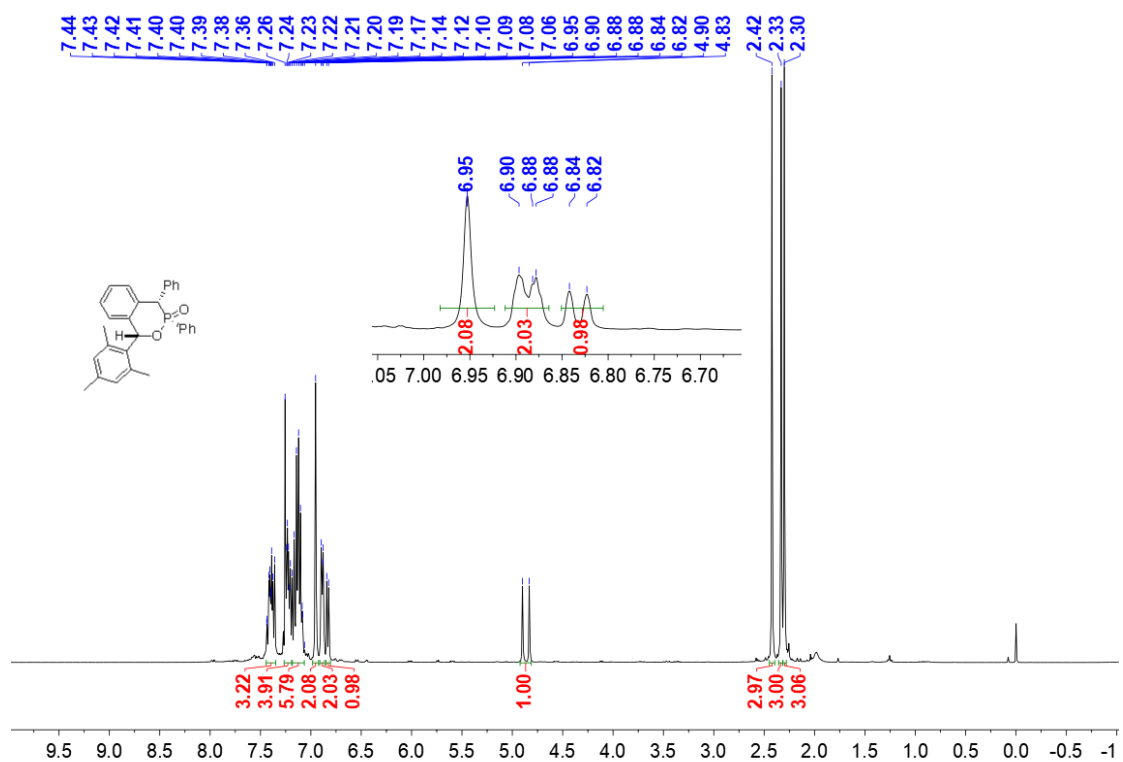


<sup>1</sup>H, <sup>31</sup>P and <sup>13</sup>C NMR spectra of compound **3t** in CDCl<sub>3</sub> (400 MHz)

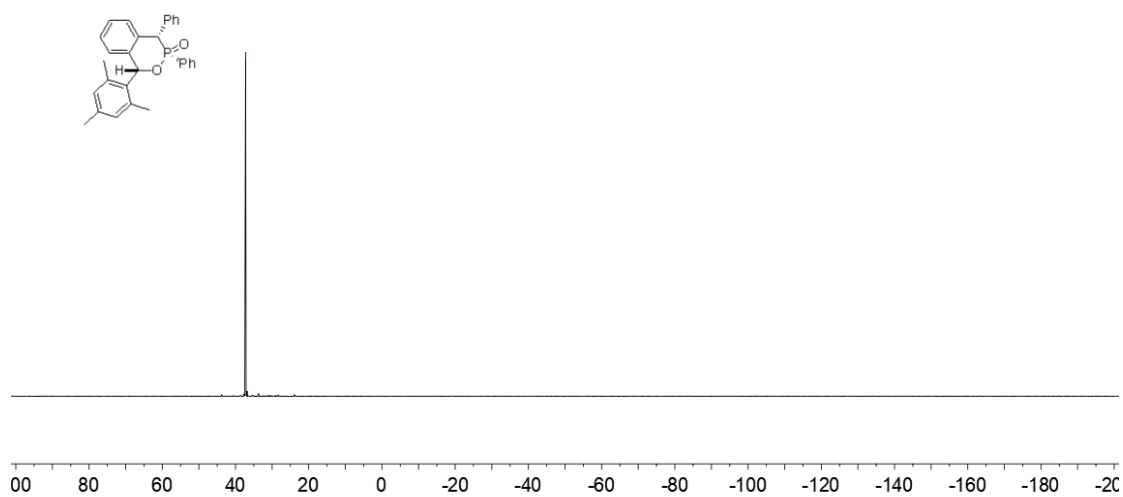




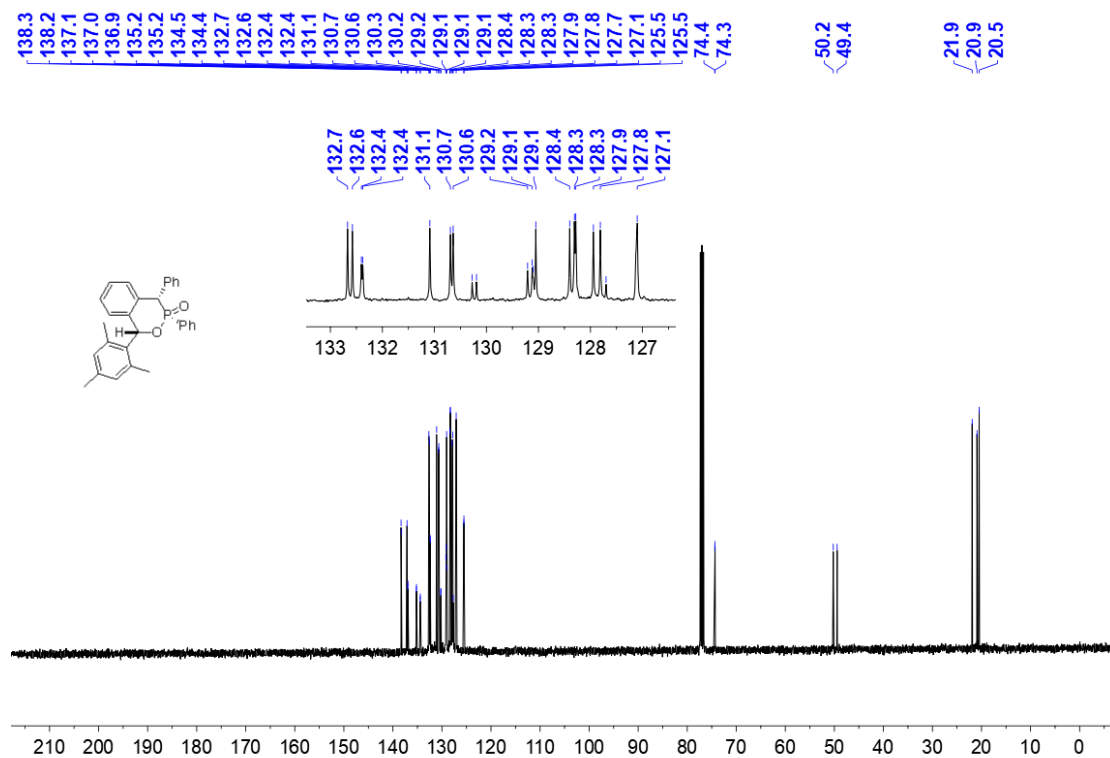
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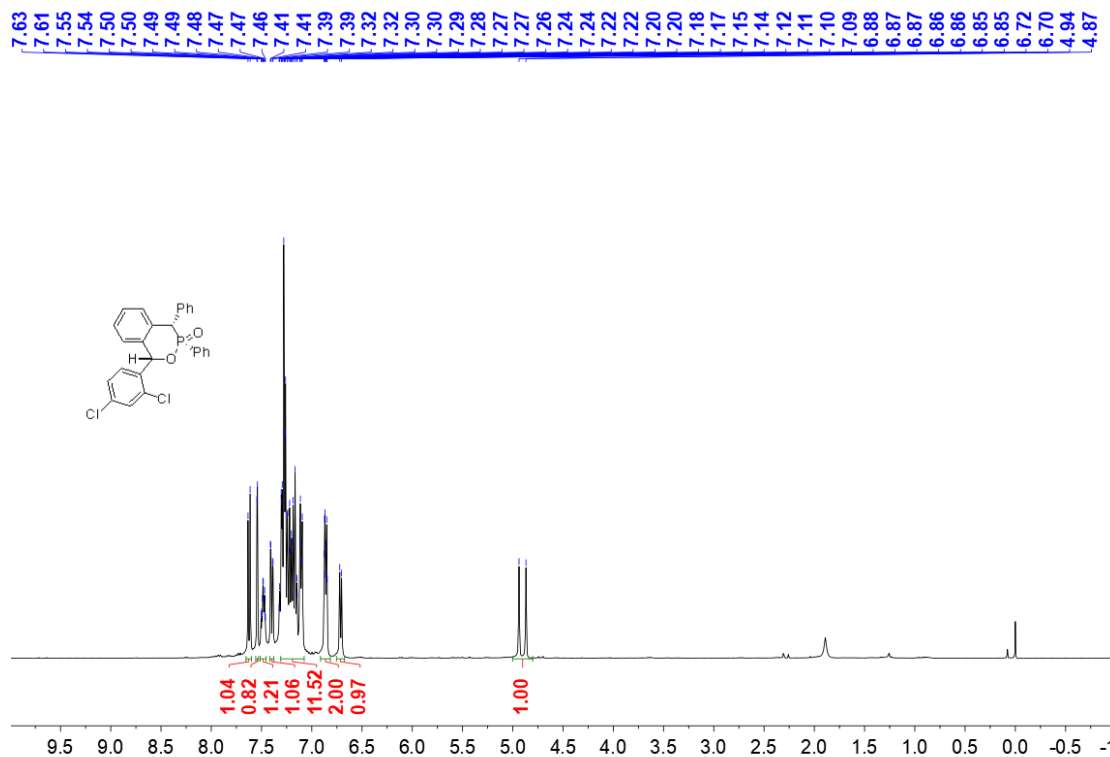
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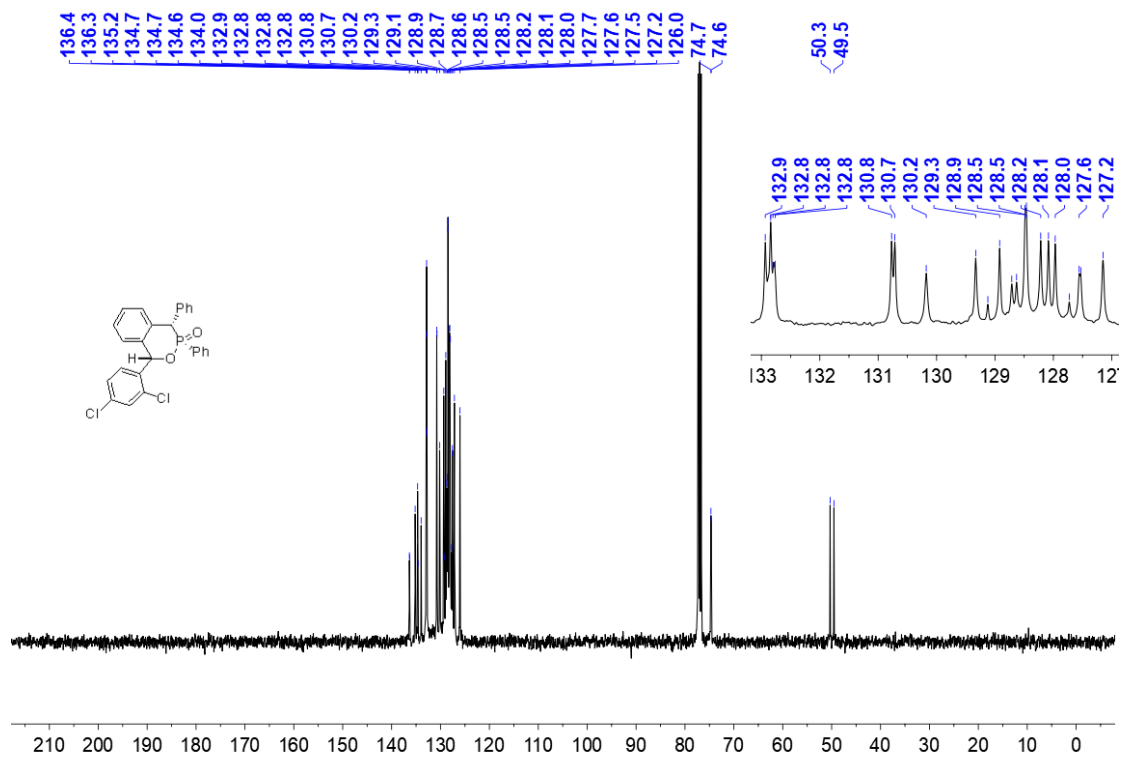
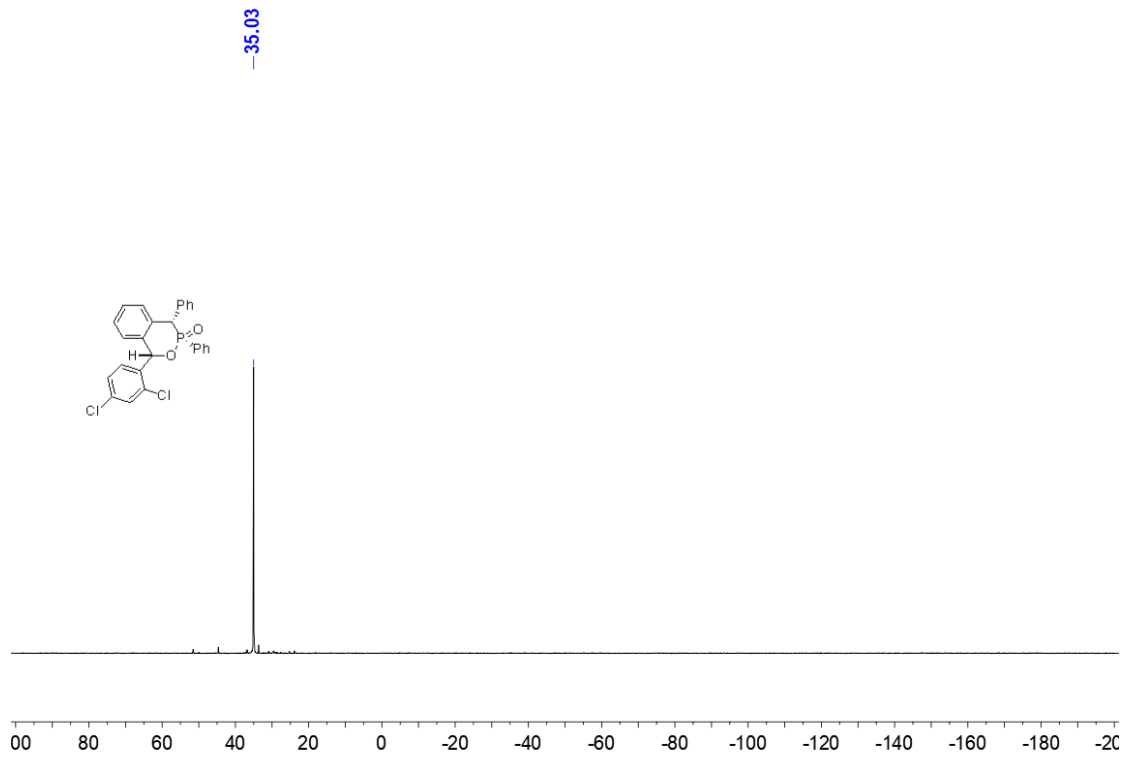




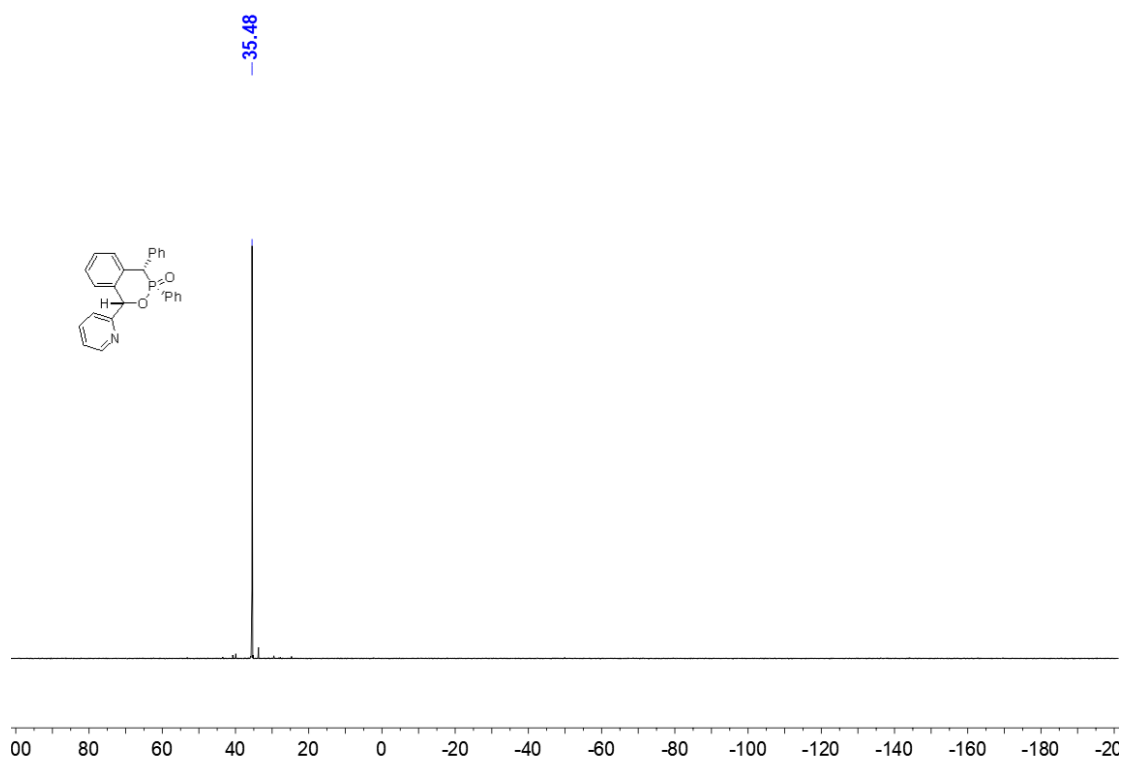
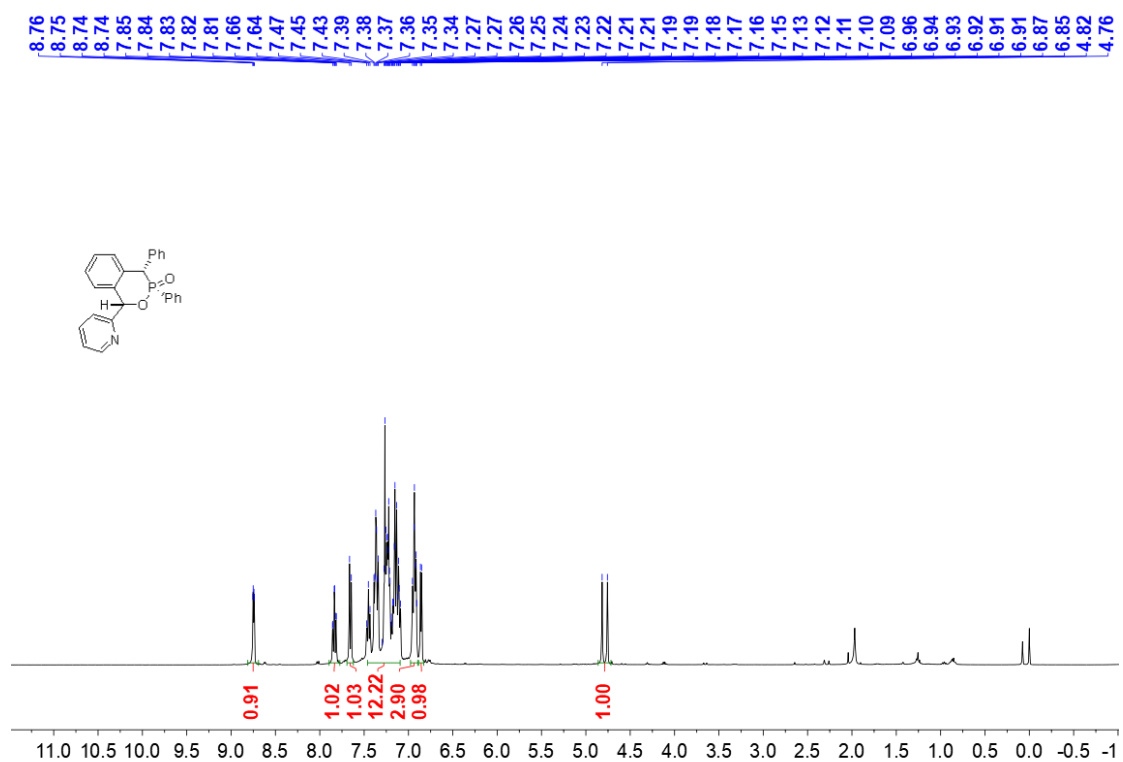


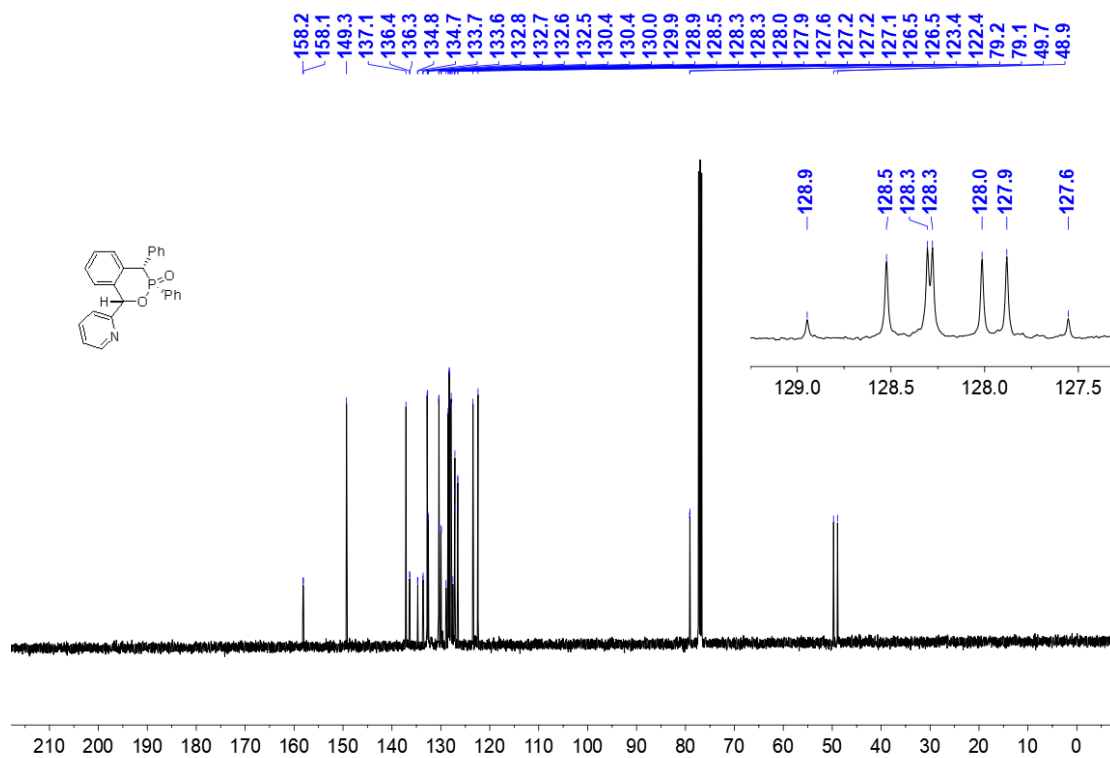
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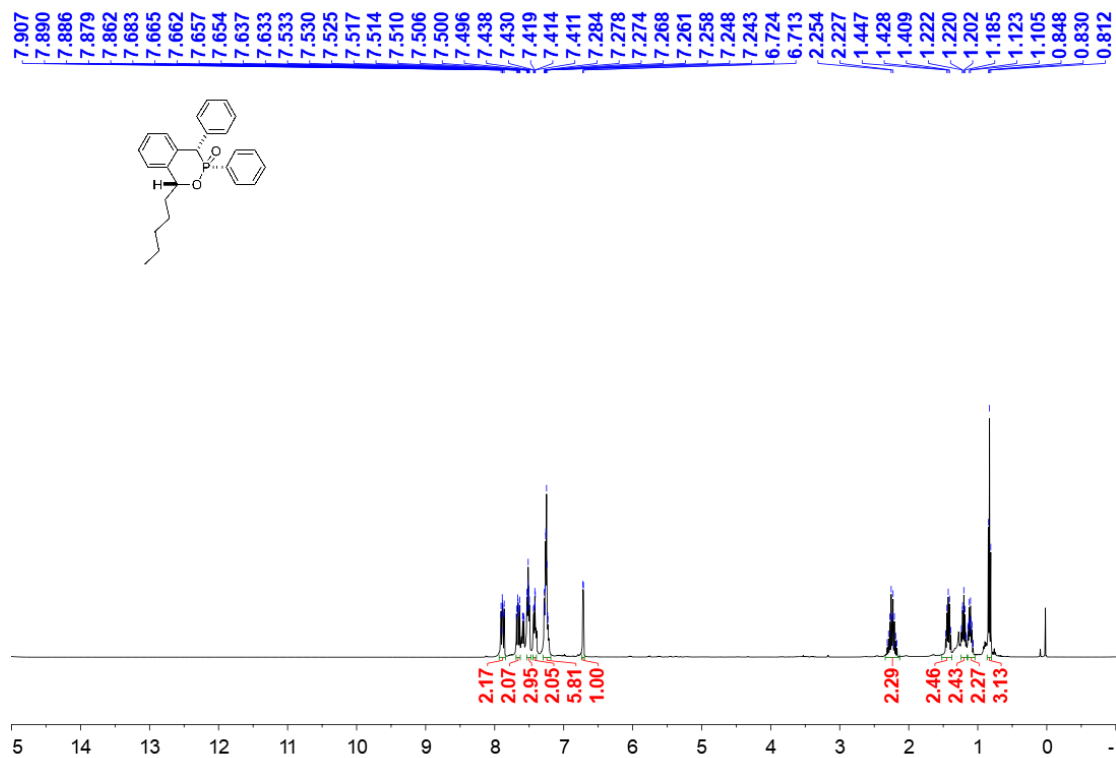


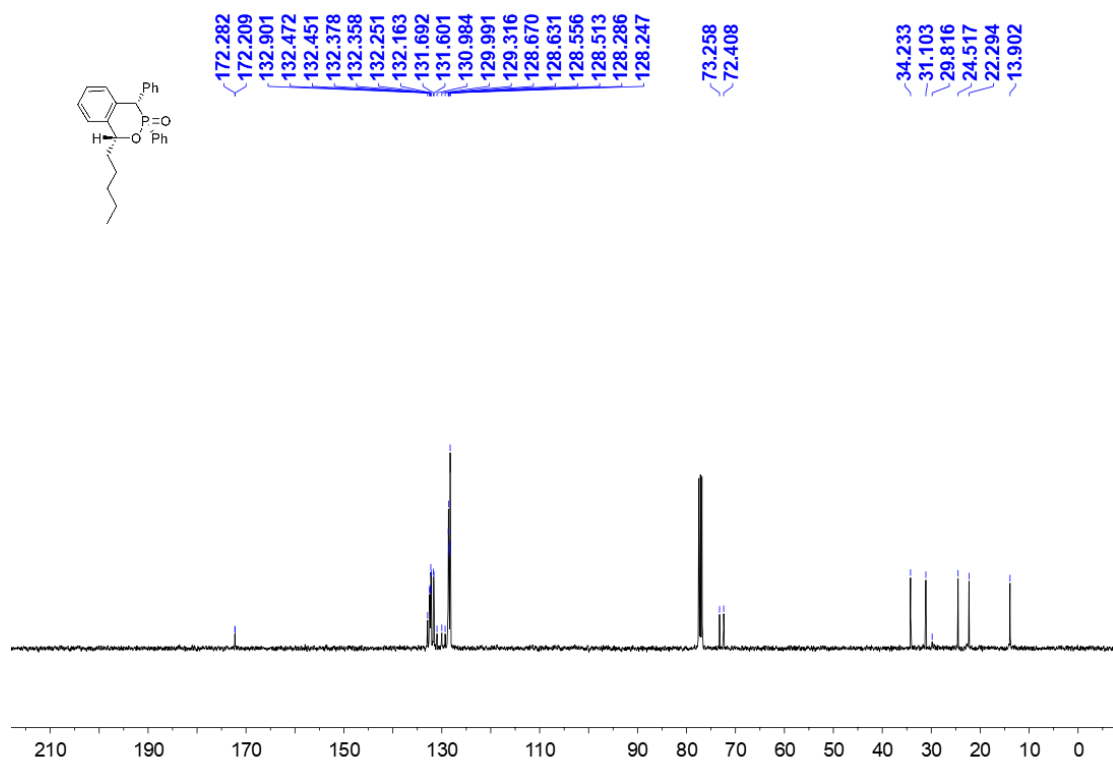
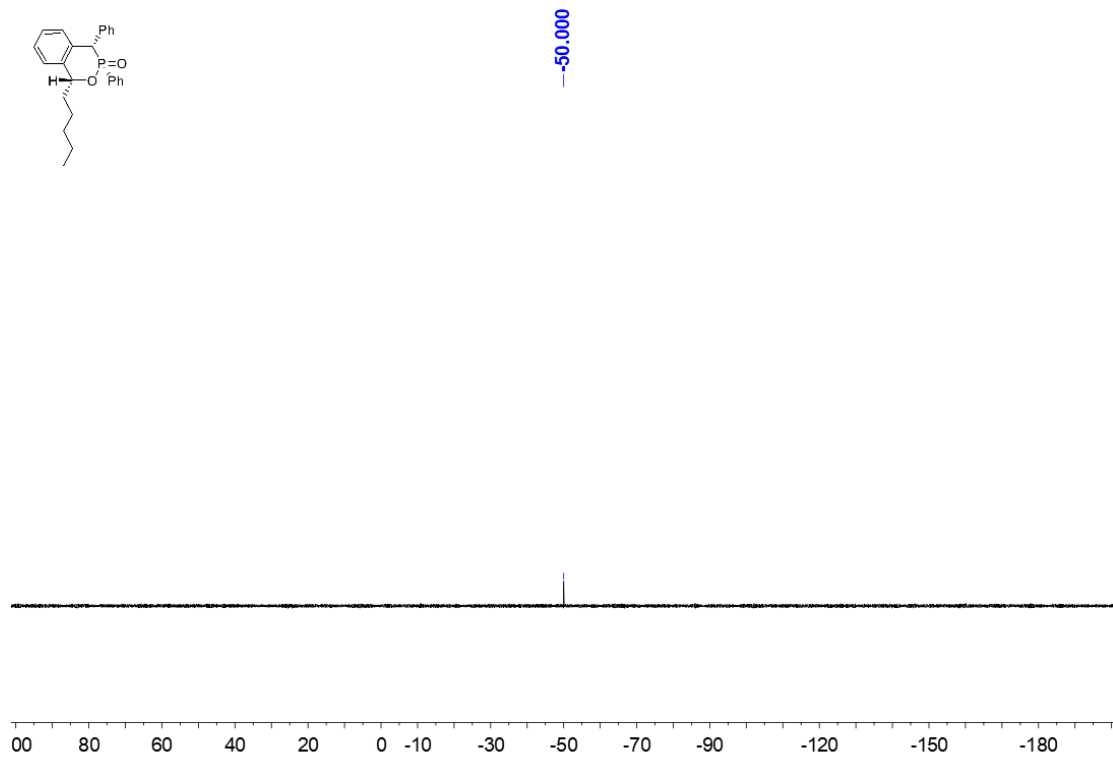
$^1\text{H}$ ,  $^{31}\text{P}$  and  $^{13}\text{C}$  NMR spectra of compound **3w** in  $\text{CDCl}_3$  (400 MHz)



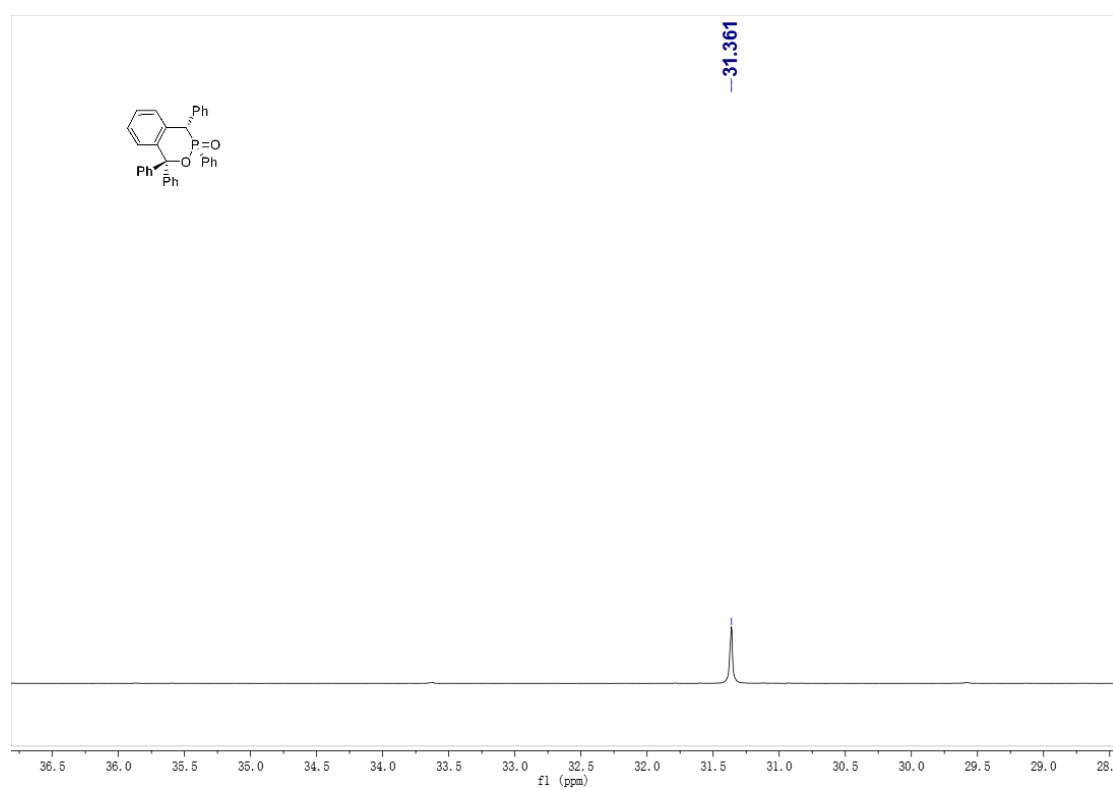
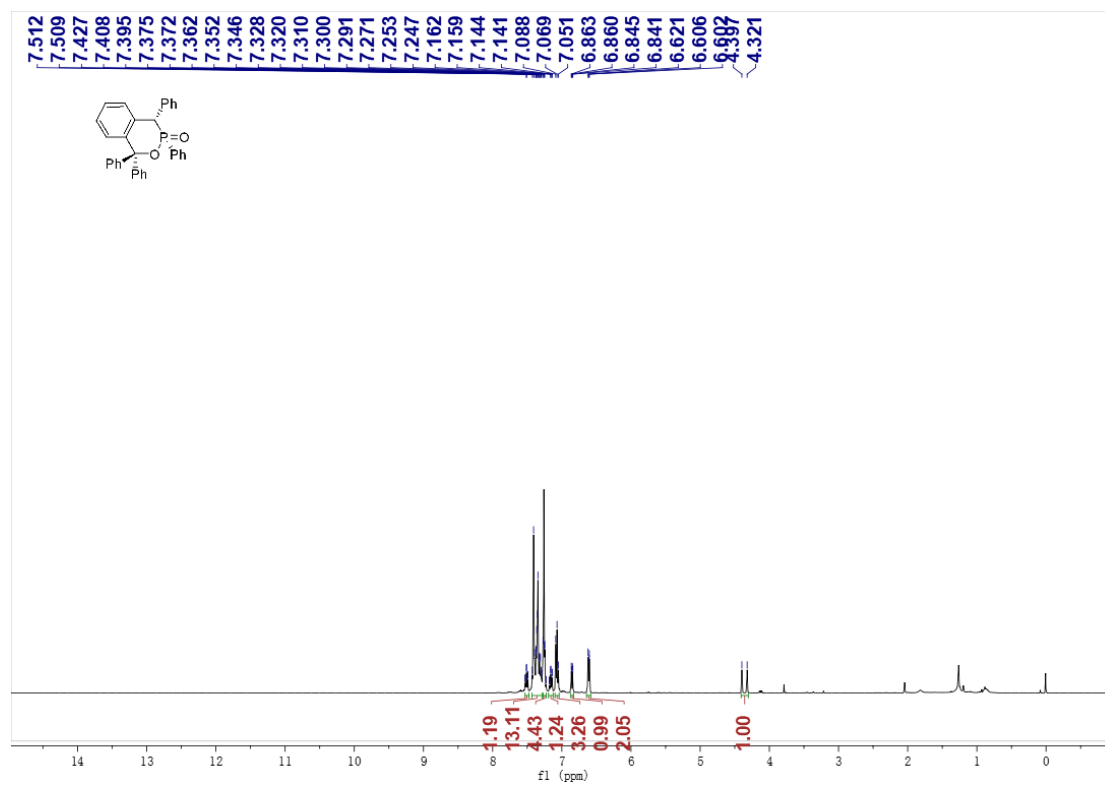


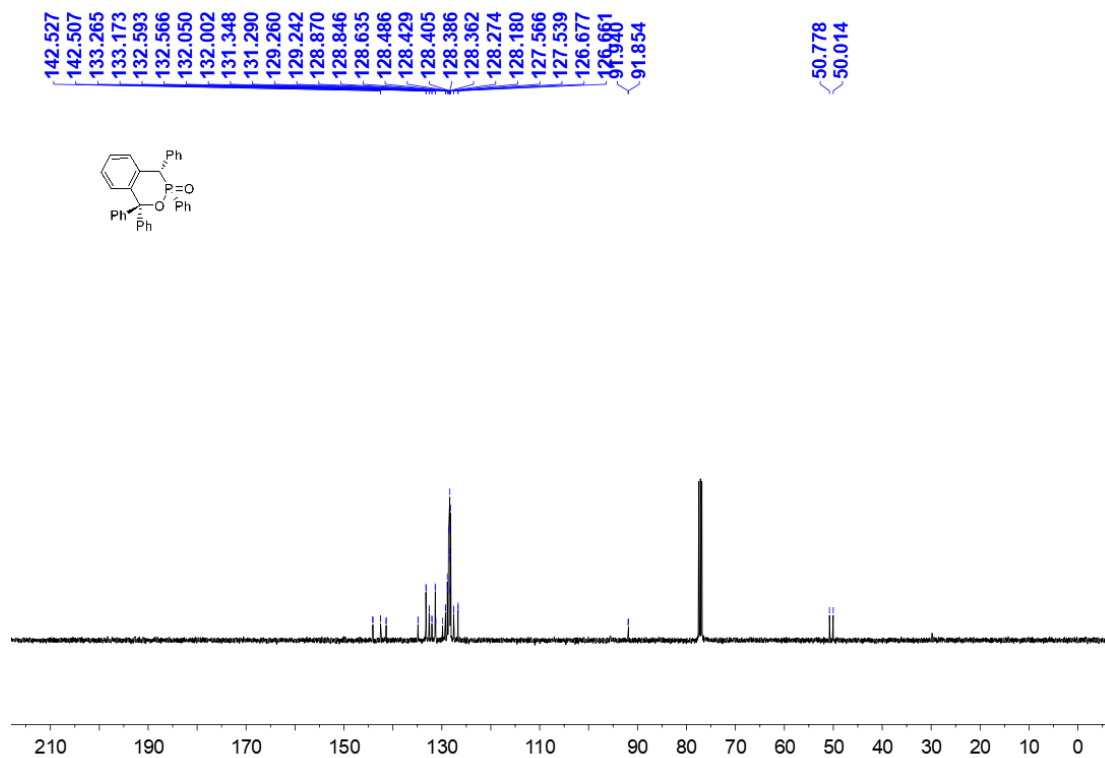
<sup>1</sup>H, <sup>31</sup>P and <sup>13</sup>C NMR spectra of compound **3z** in CDCl<sub>3</sub> (400 MHz)



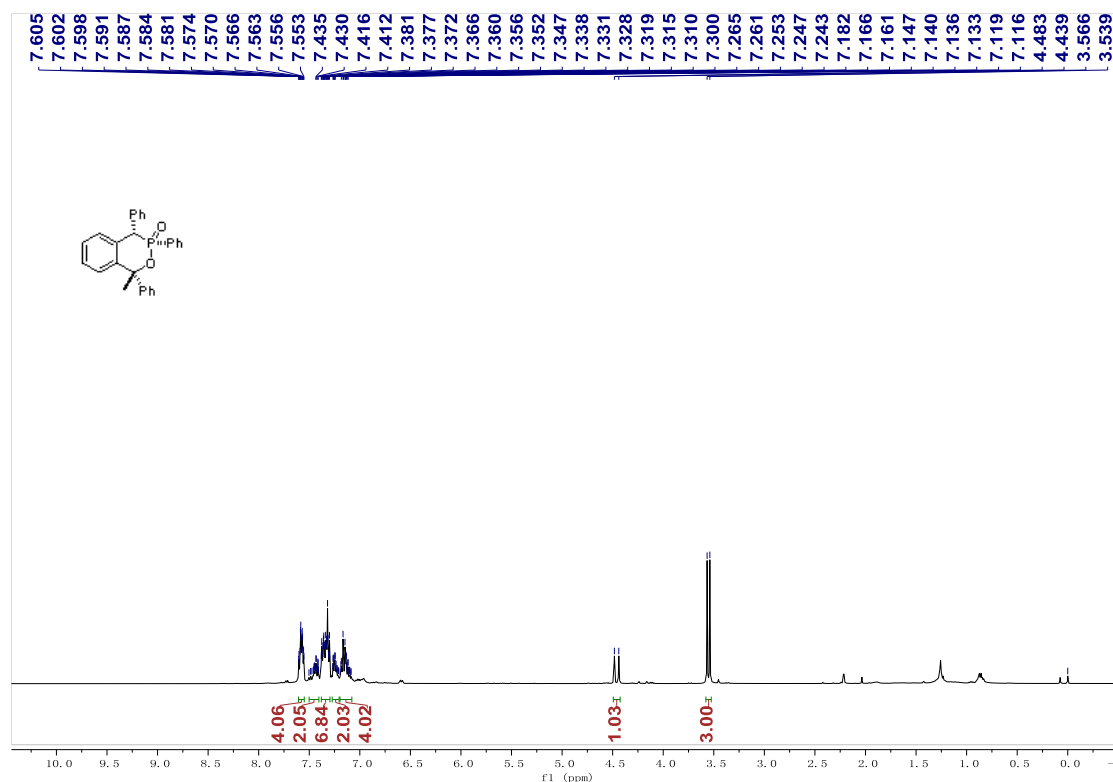


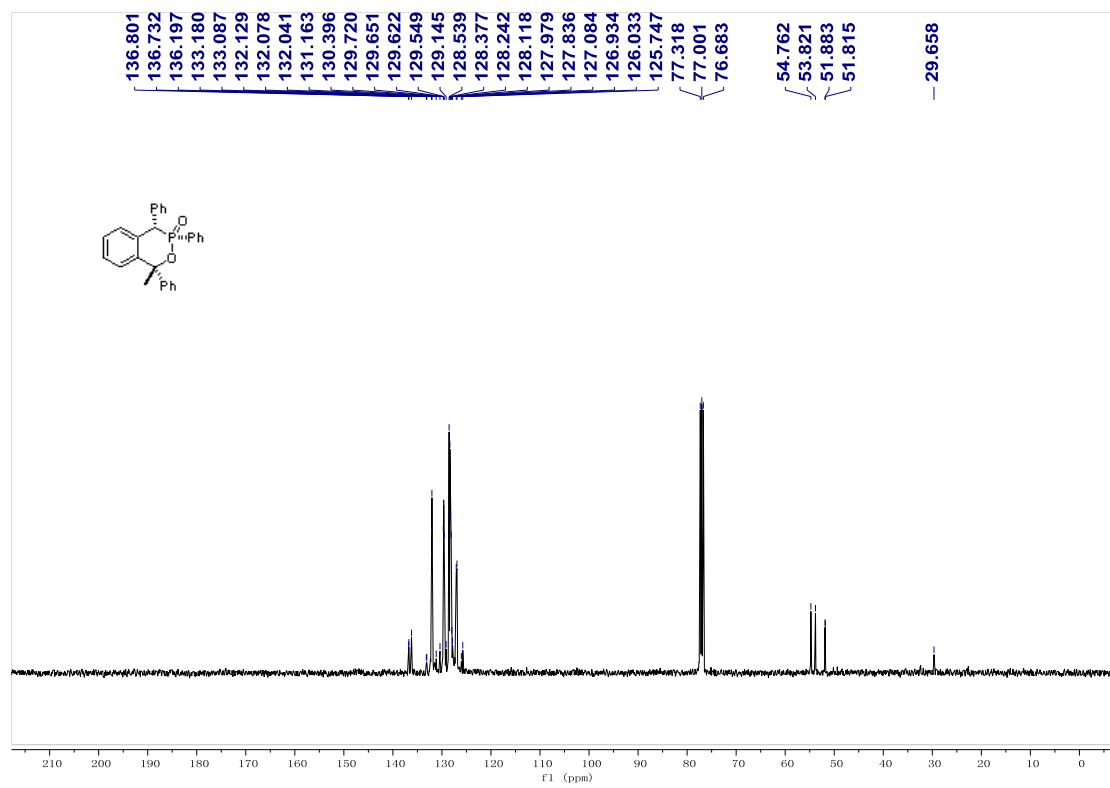
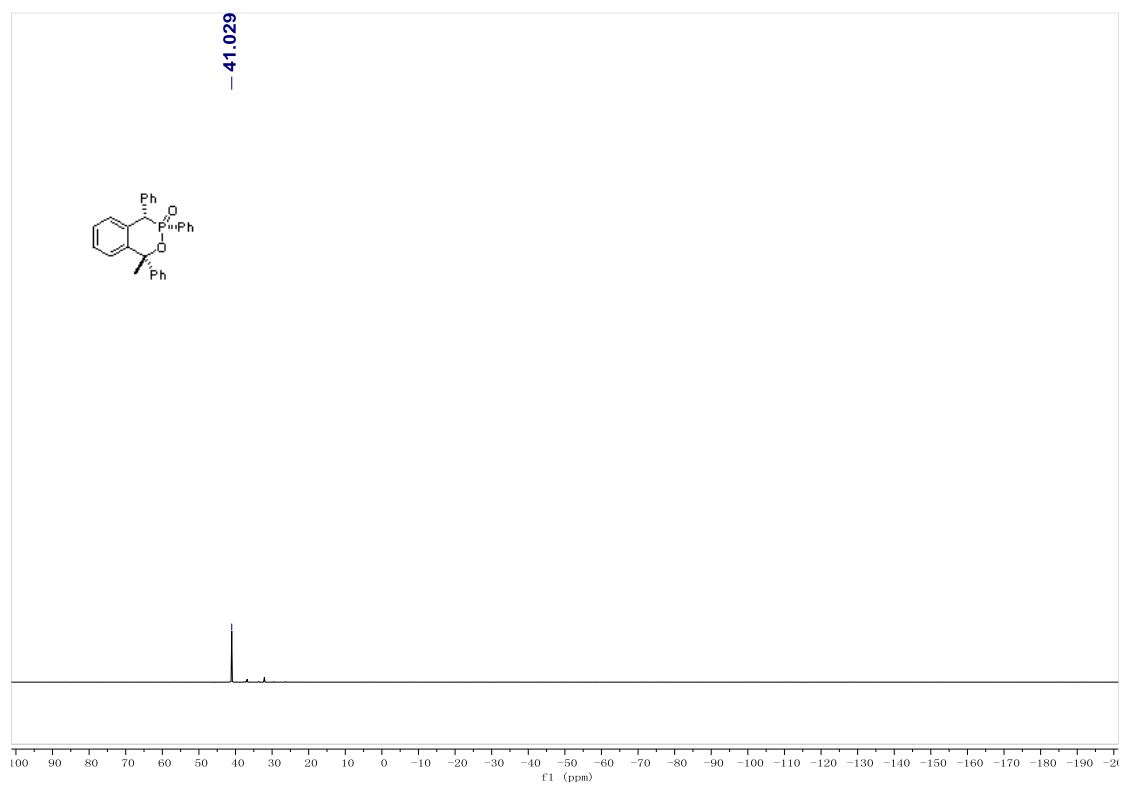
$^1\text{H}$ ,  $^{31}\text{P}$  and  $^{13}\text{C}$  NMR spectra of compound **3aa** in  $\text{CDCl}_3$  (400 MHz)





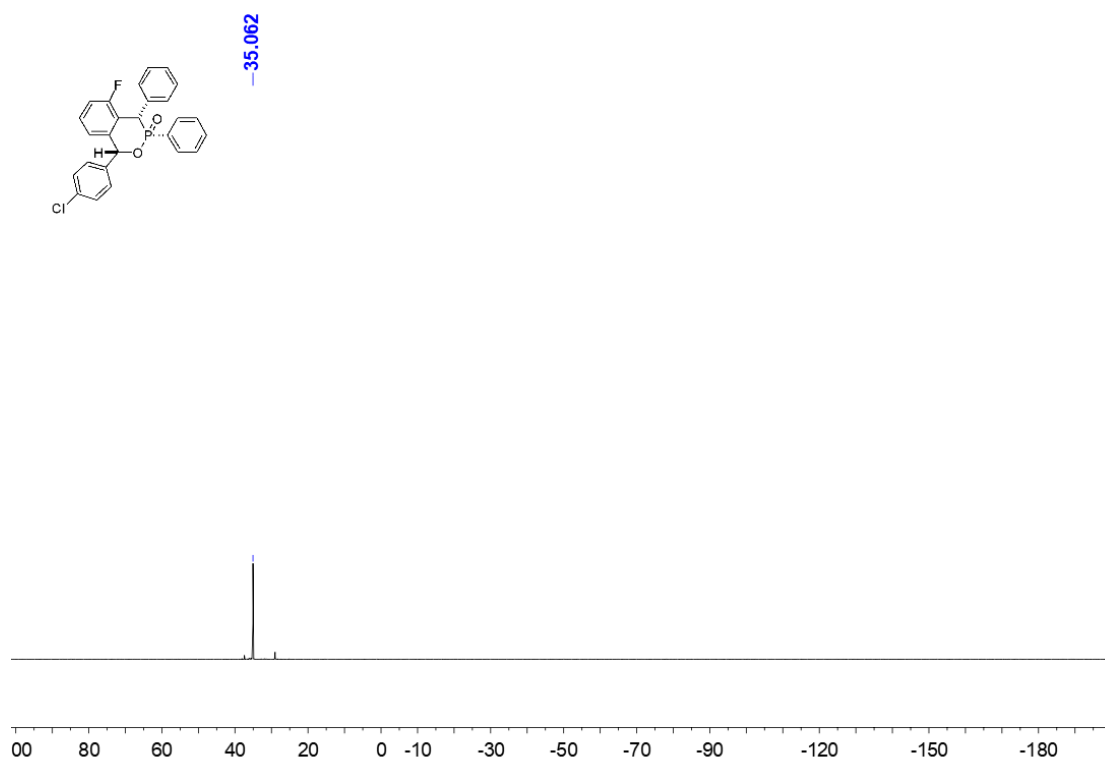
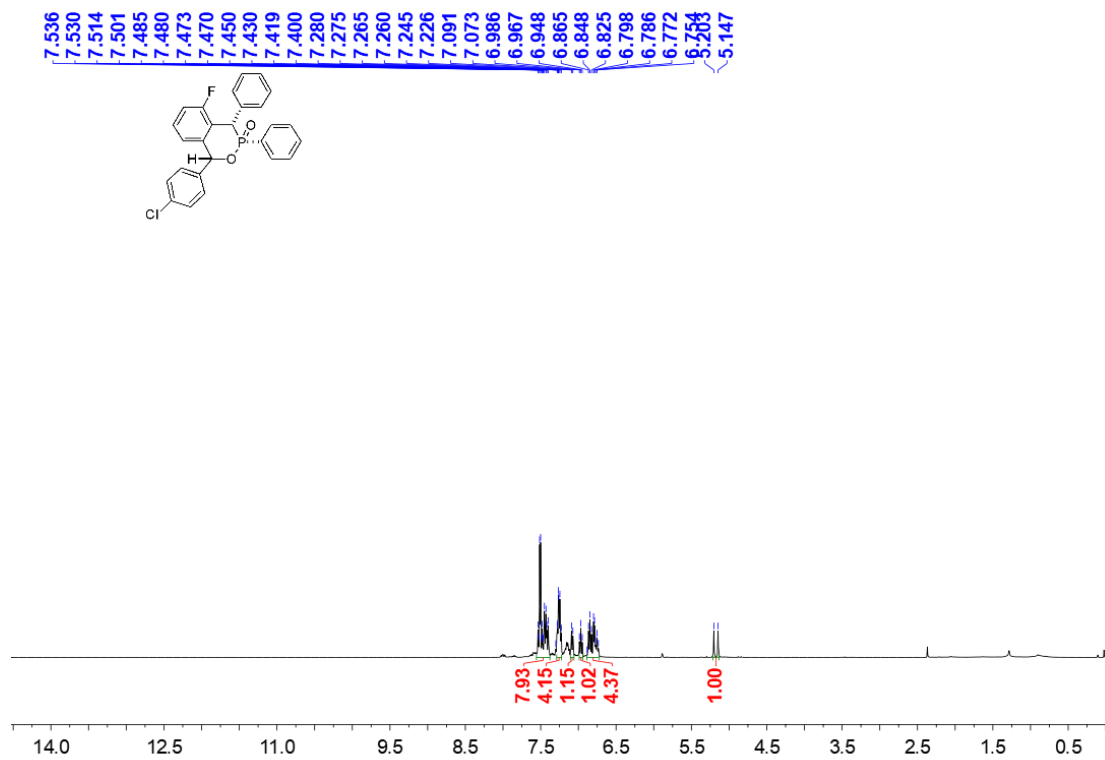
<sup>1</sup>H, <sup>31</sup>P and <sup>13</sup>C NMR spectra of compound **3ab** in CDCl<sub>3</sub> (400 MHz)

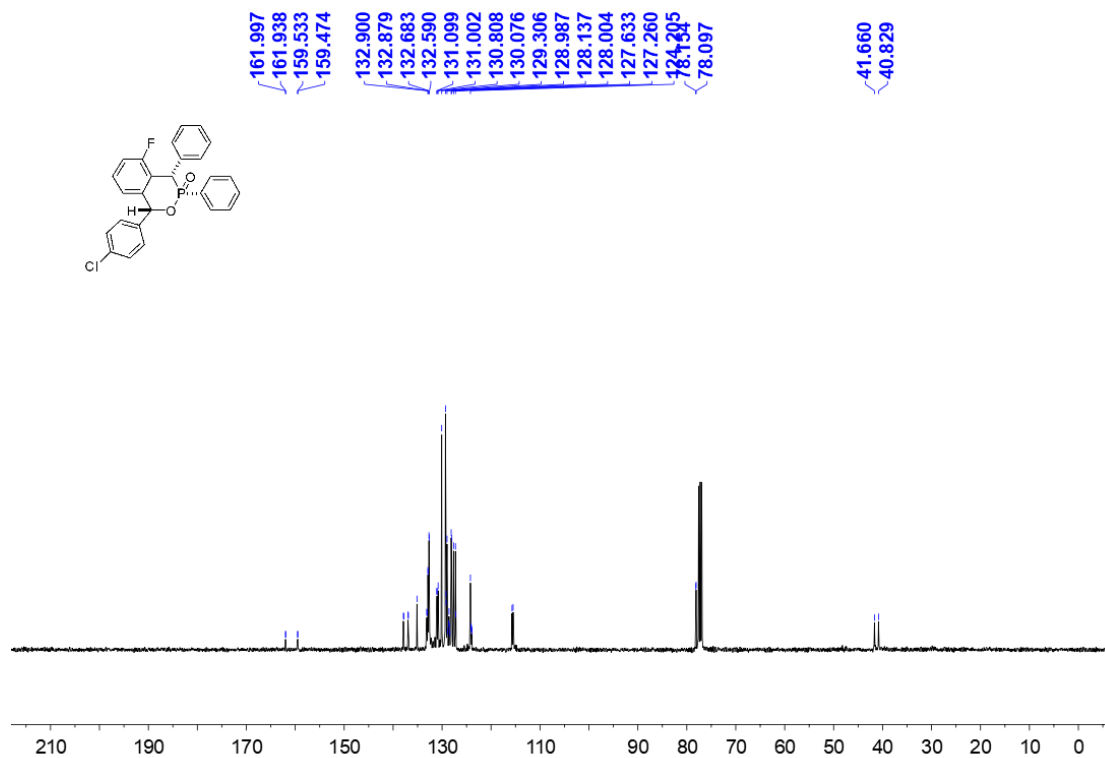




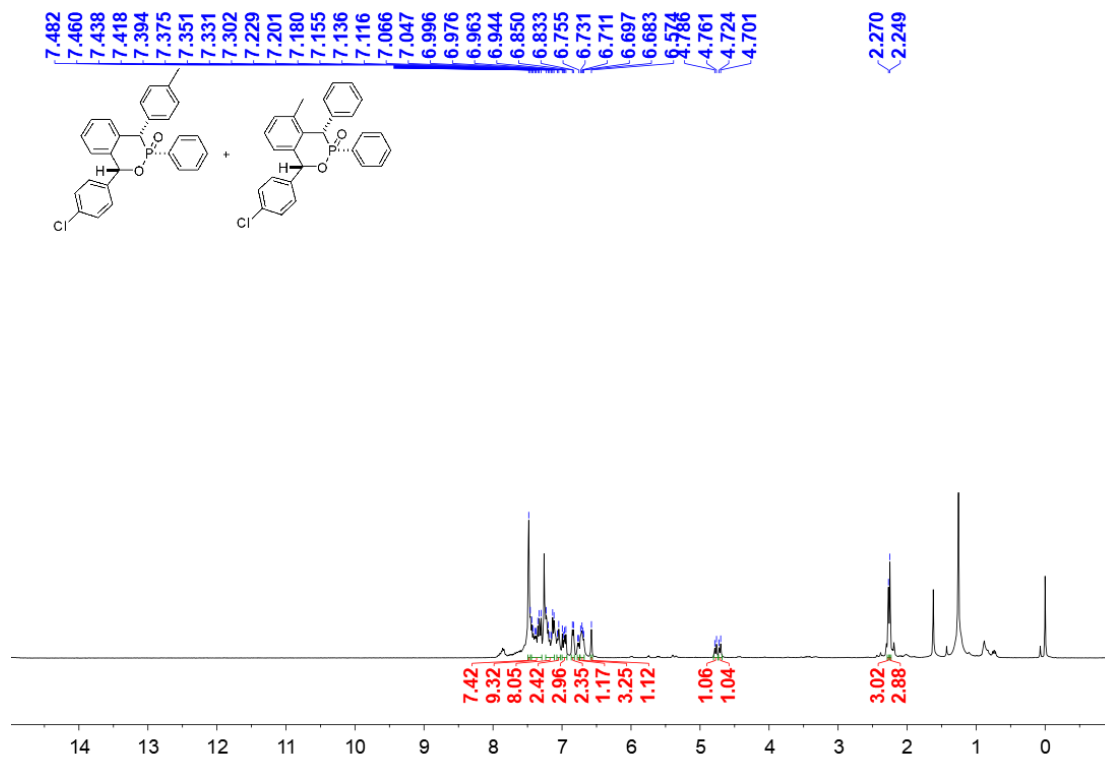


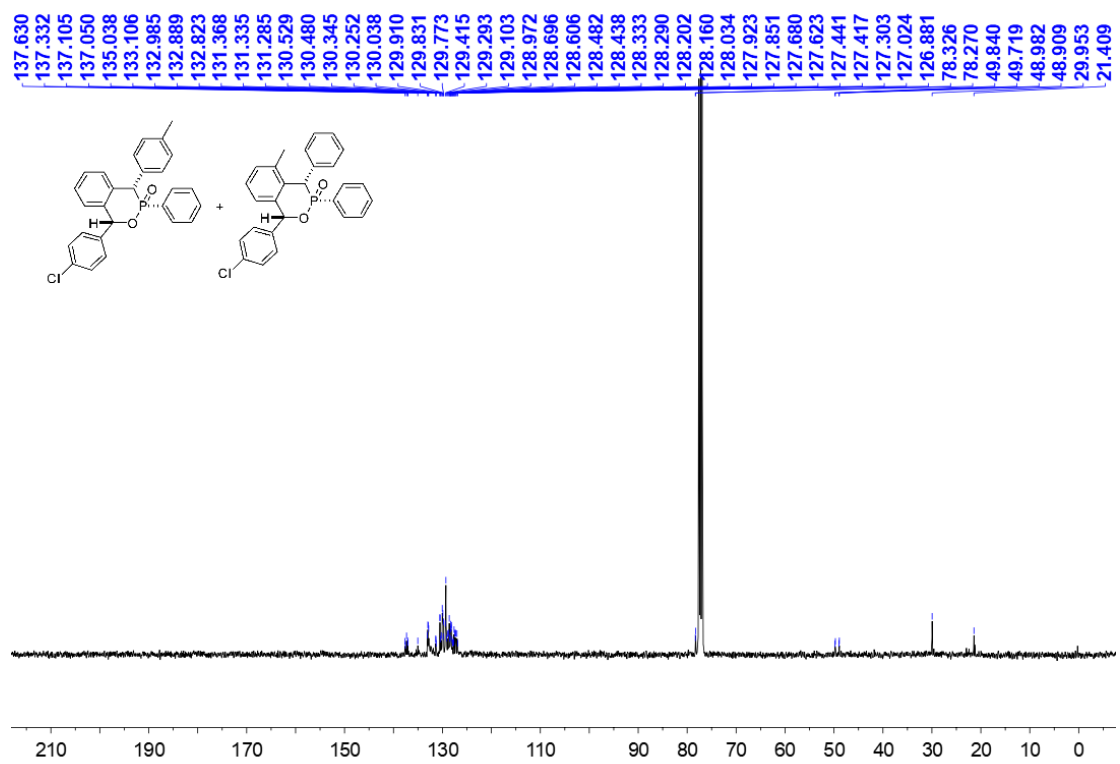
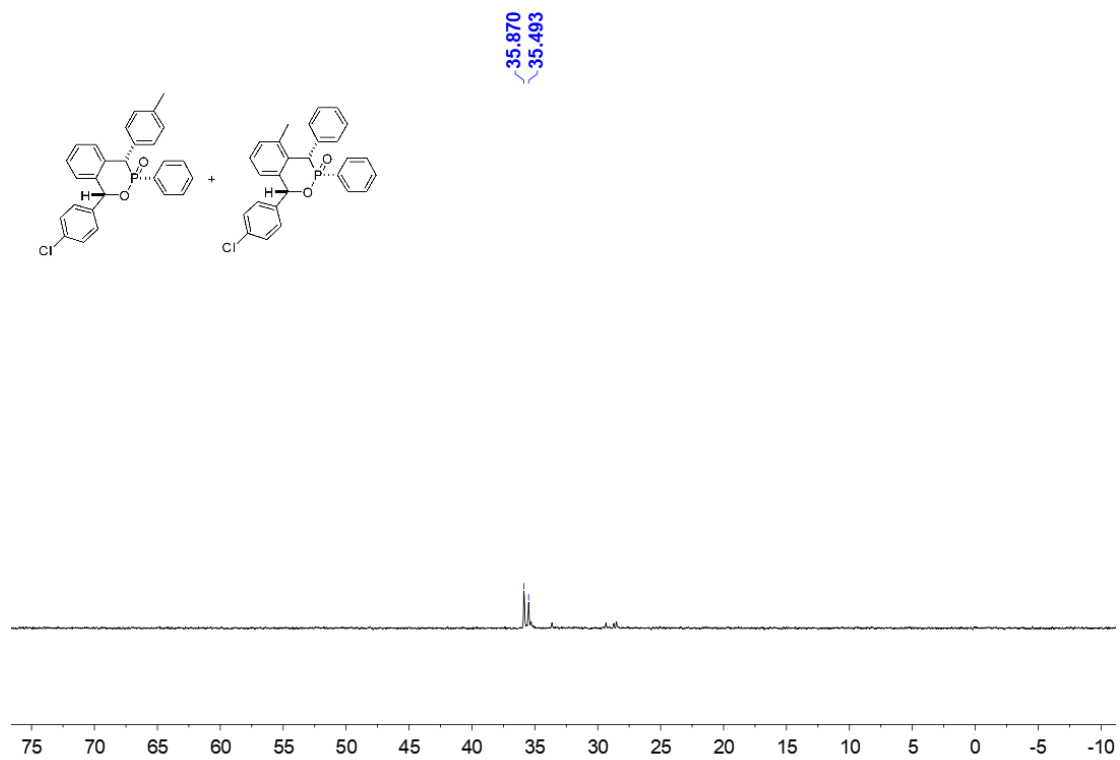
$^1\text{H}$ ,  $^{31}\text{P}$  and  $^{13}\text{C}$  NMR spectra of compound **3ad'** in  $\text{CDCl}_3$  (400 MHz)



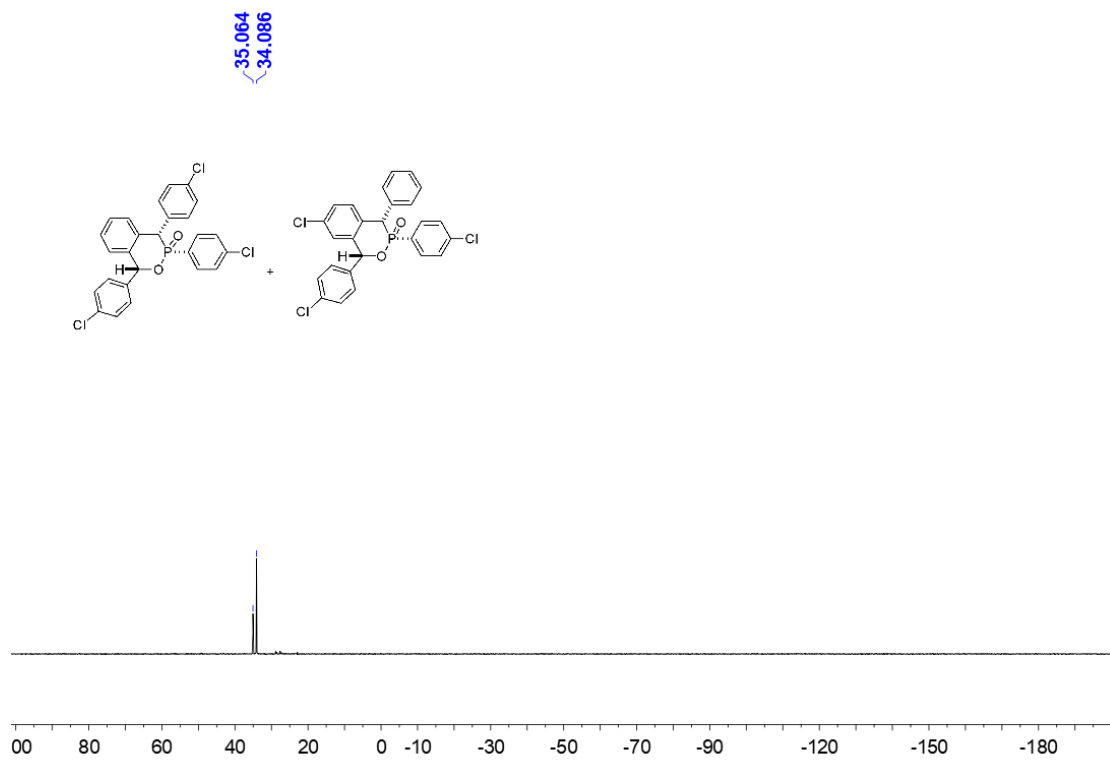
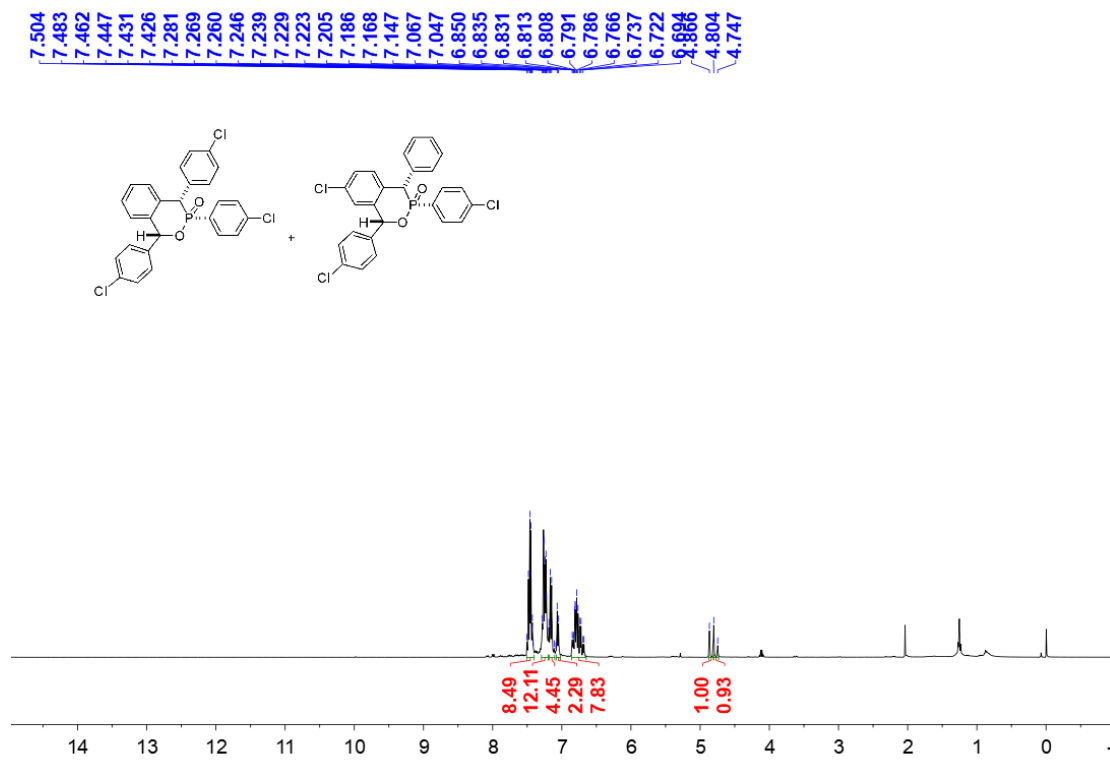


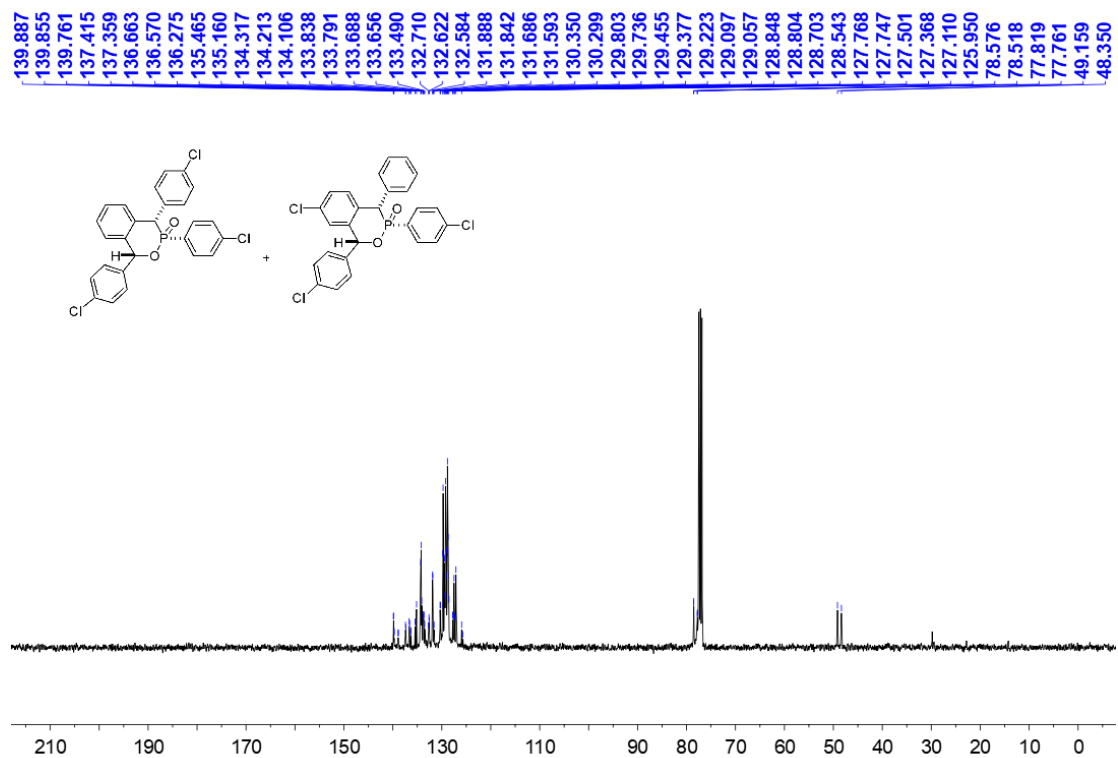
<sup>1</sup>H, <sup>31</sup>P and <sup>13</sup>C NMR spectra of compound **3ae** and **3ae'** in CDCl<sub>3</sub> (400 MHz)



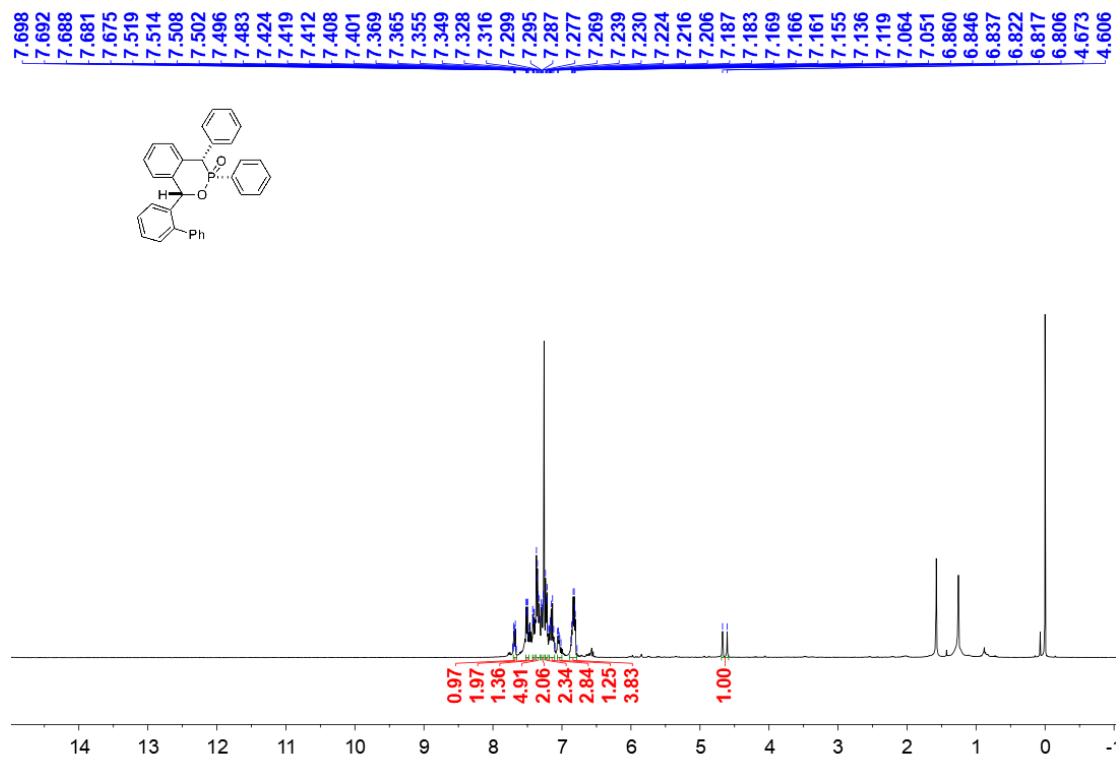


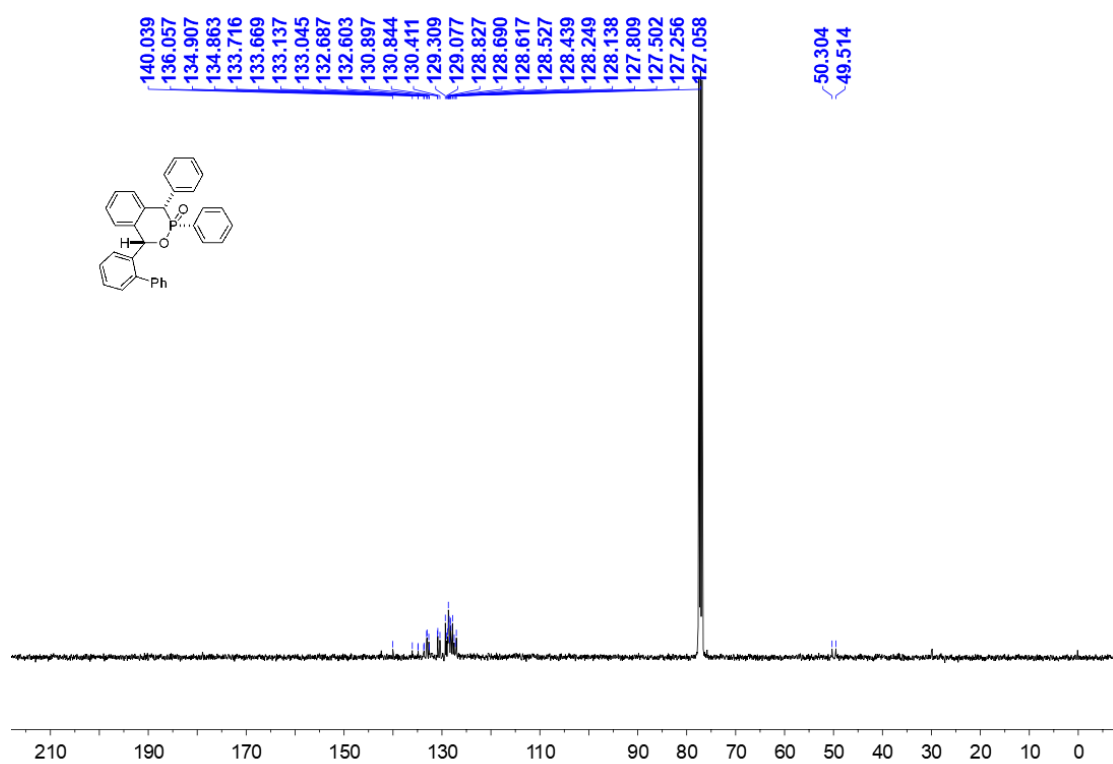
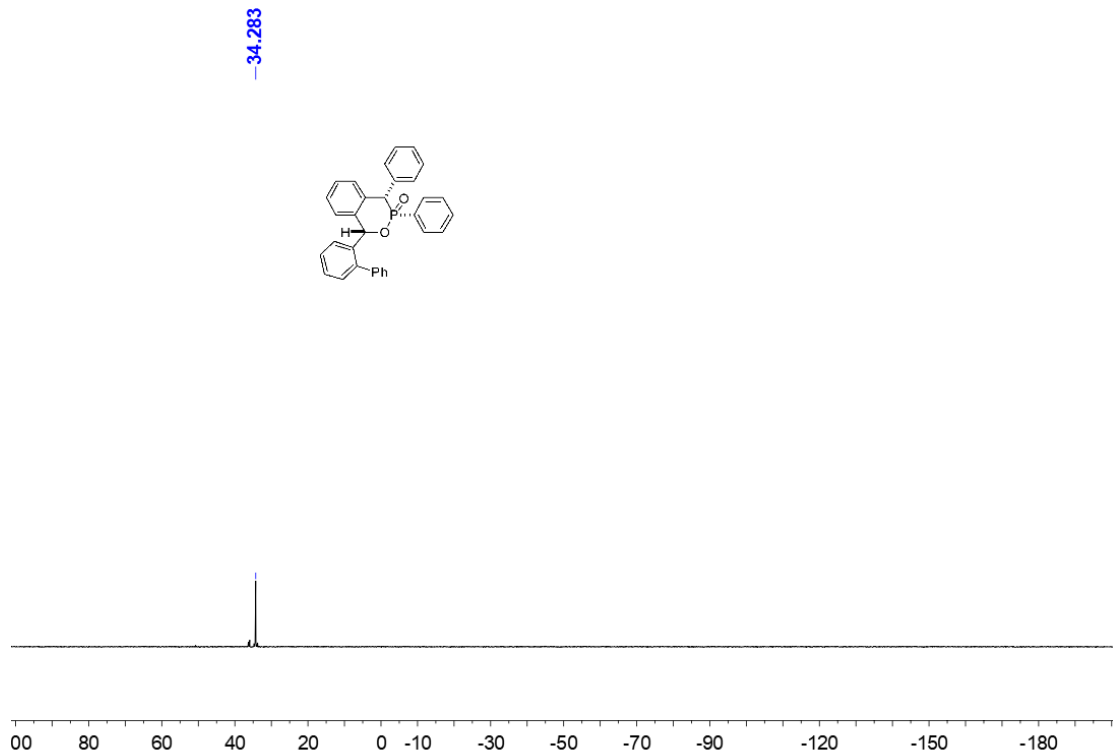
$^1\text{H}$ ,  $^{31}\text{P}$  and  $^{13}\text{C}$  NMR spectra of compound **3ag** and **3ag'** in  $\text{CDCl}_3$  (400 MHz)



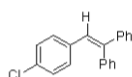
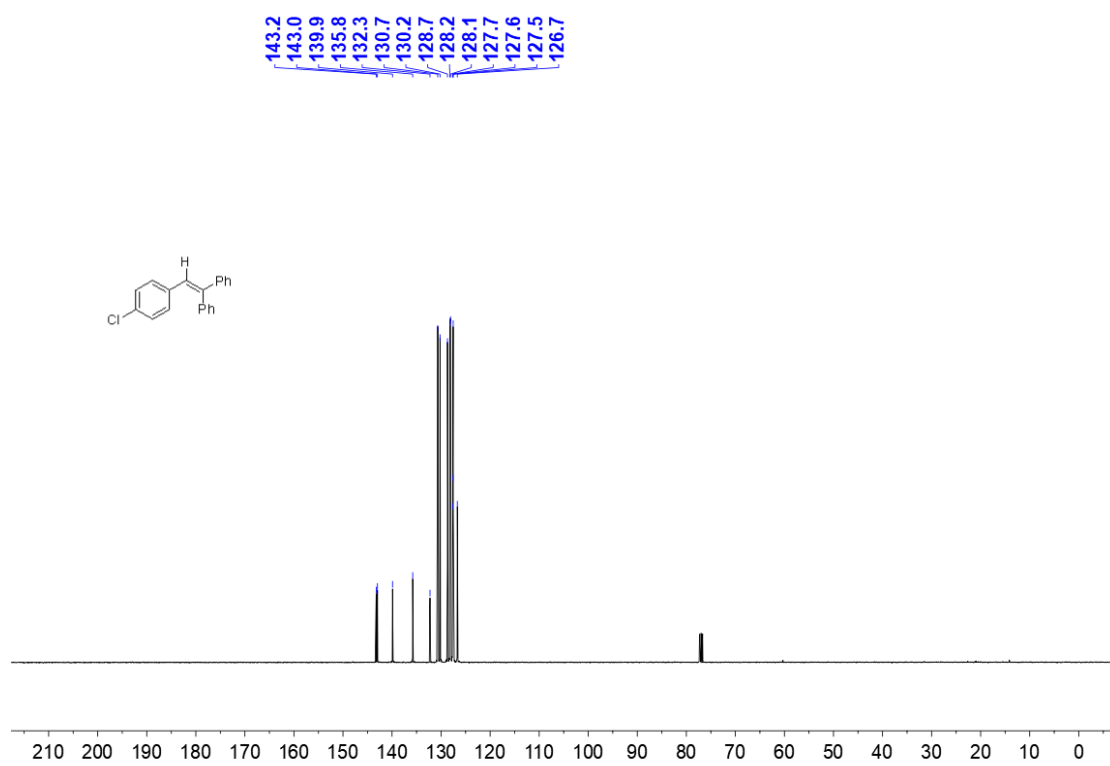
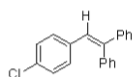
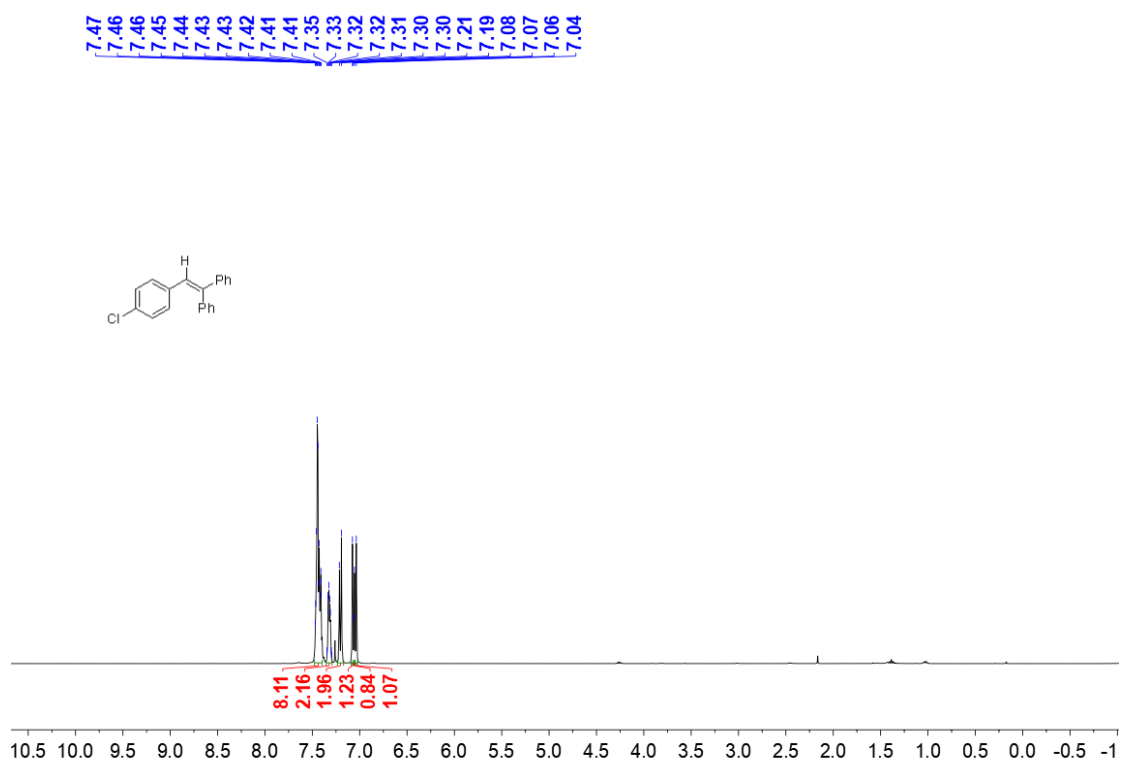


$^1\text{H}$ ,  $^{31}\text{P}$  and  $^{13}\text{C}$  NMR spectra of compound **5** in  $\text{CDCl}_3$  (400 MHz)

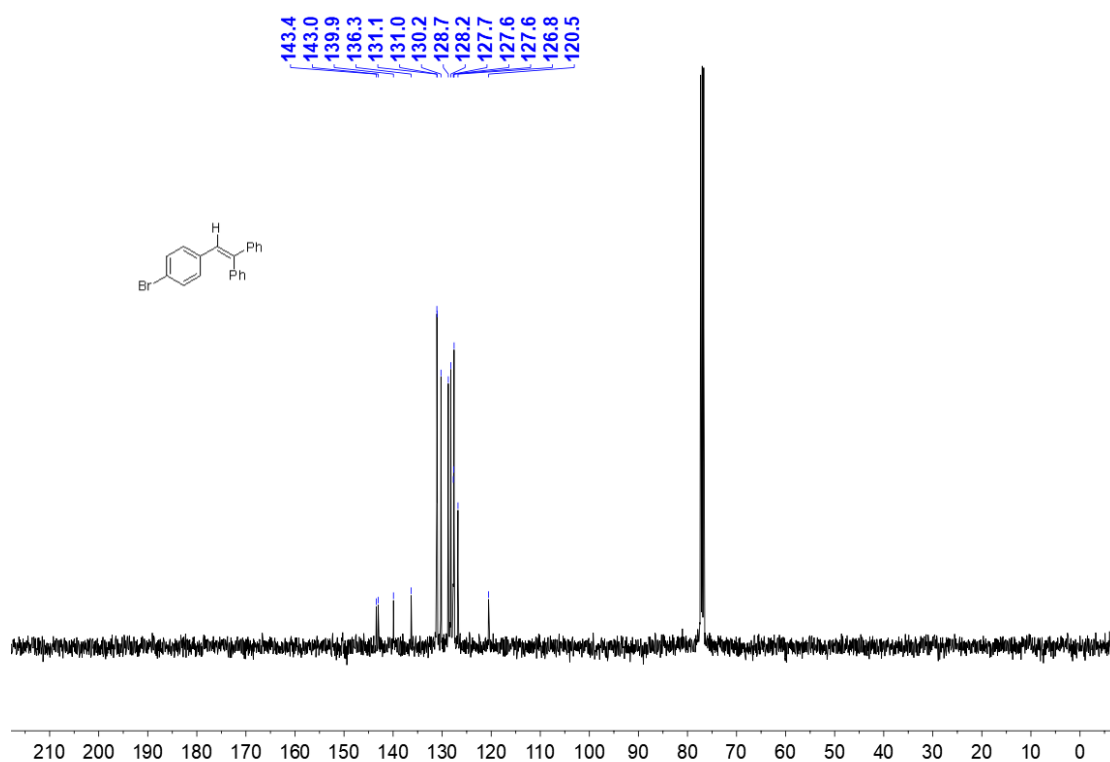
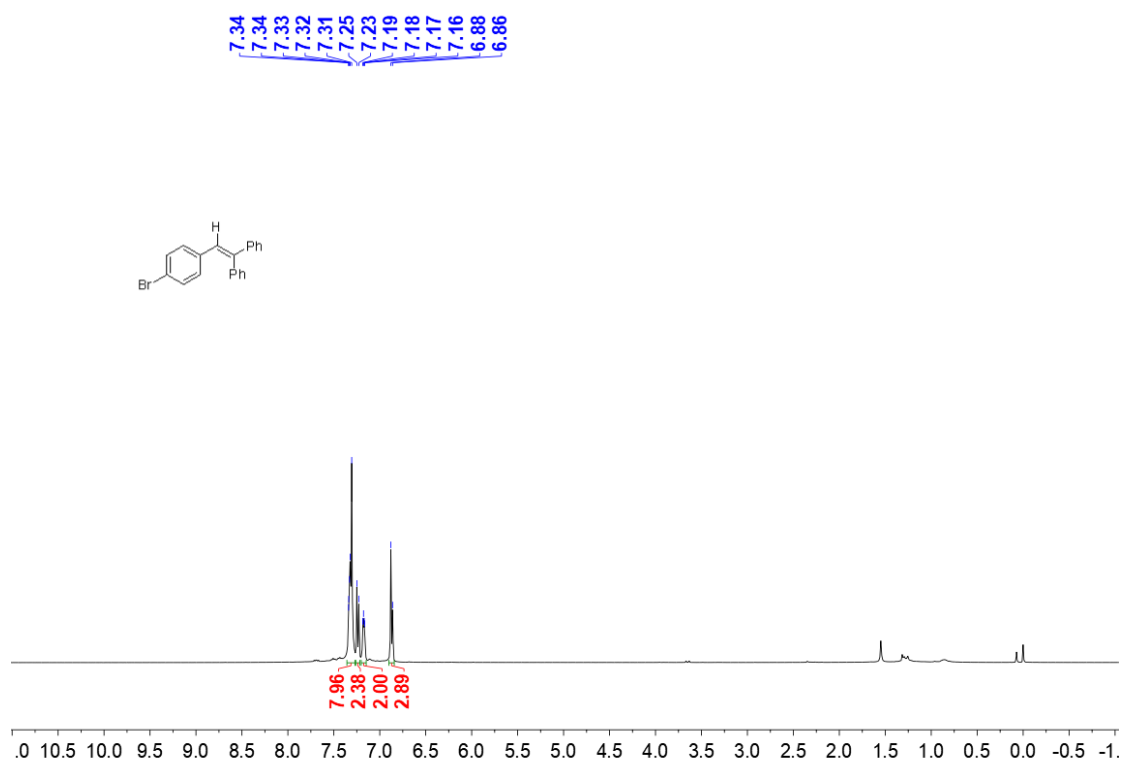




$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4a** in  $\text{CDCl}_3$  (400 MHz)

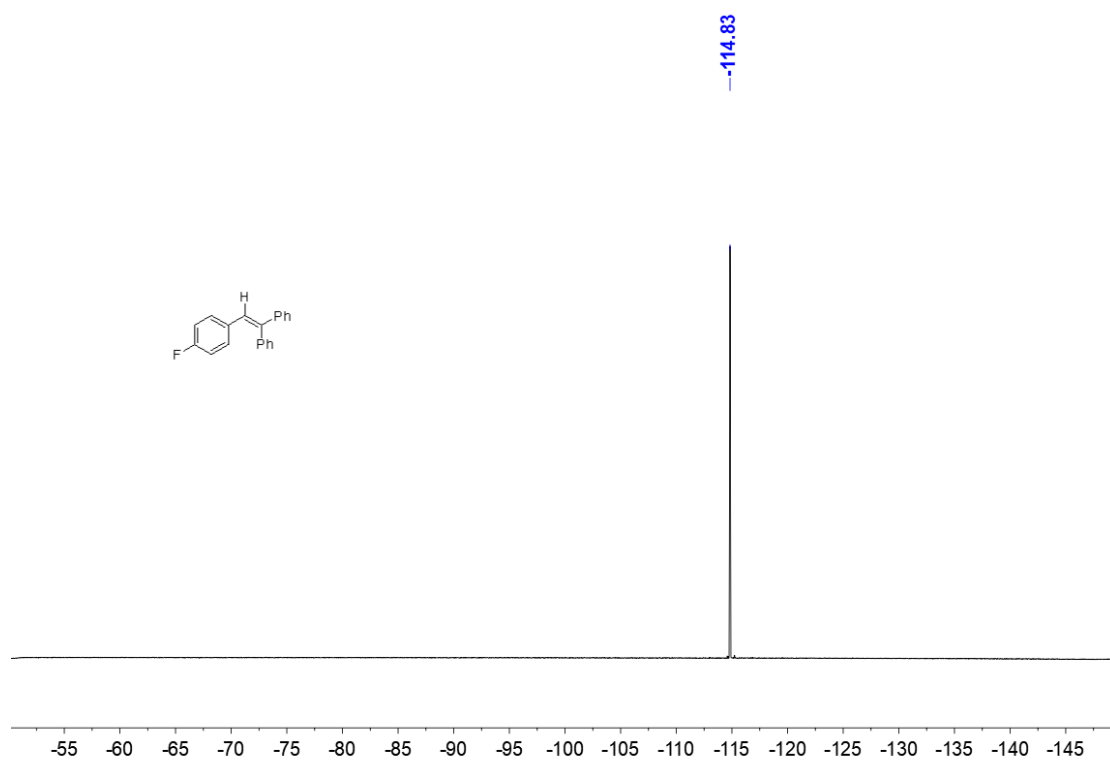
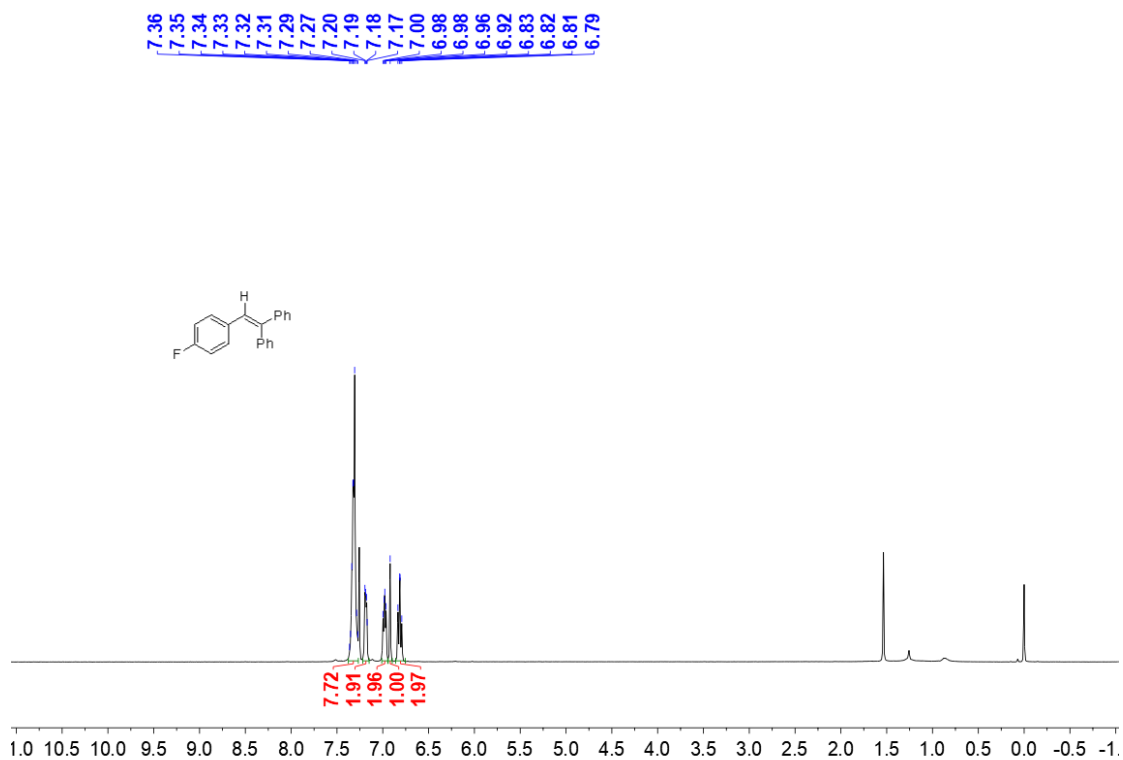


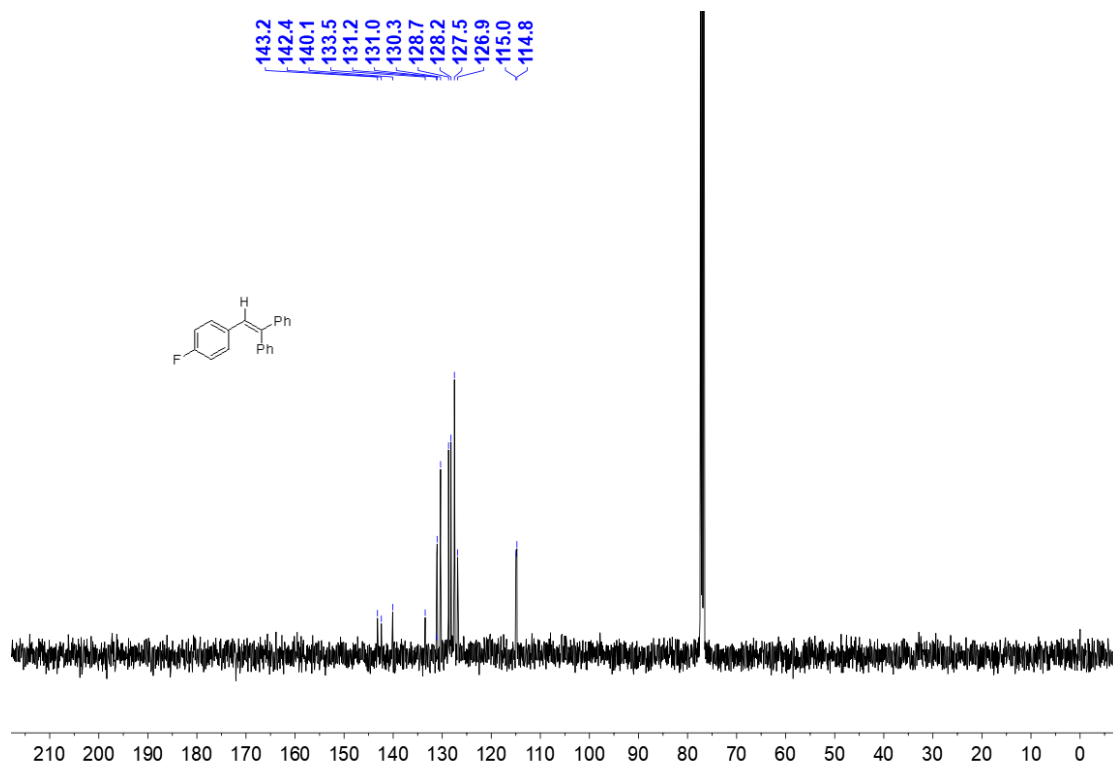
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4b** in  $\text{CDCl}_3$  (400 MHz)



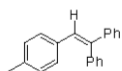
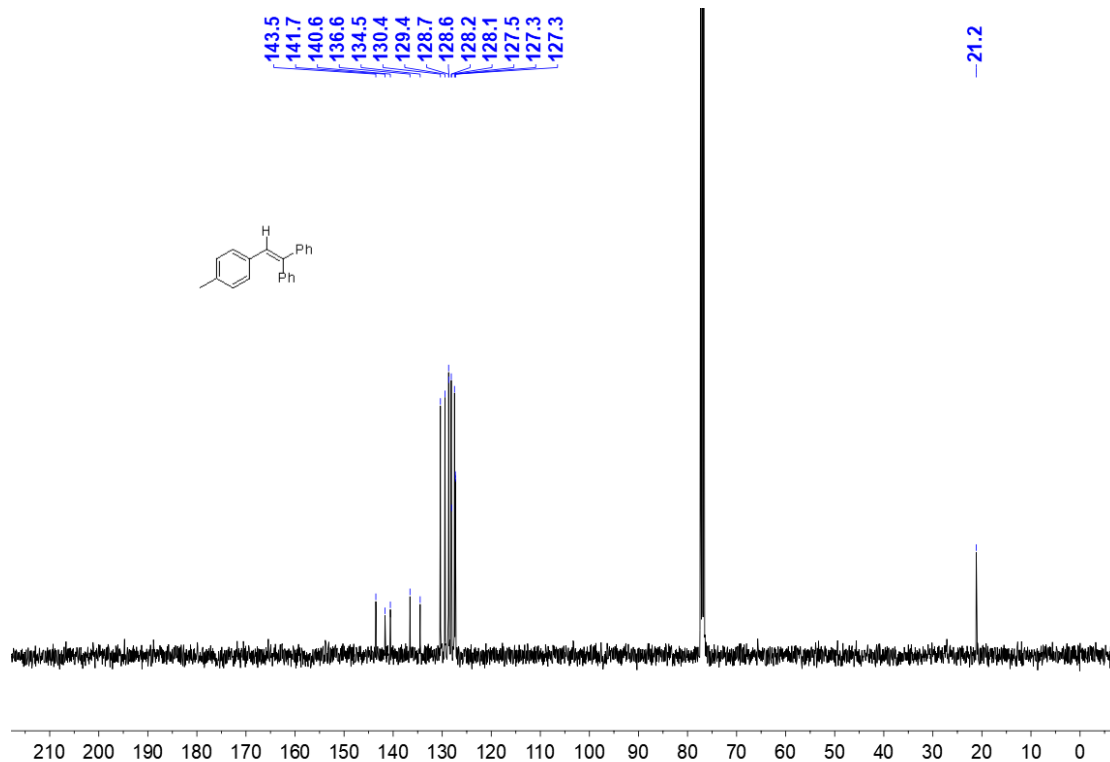
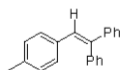
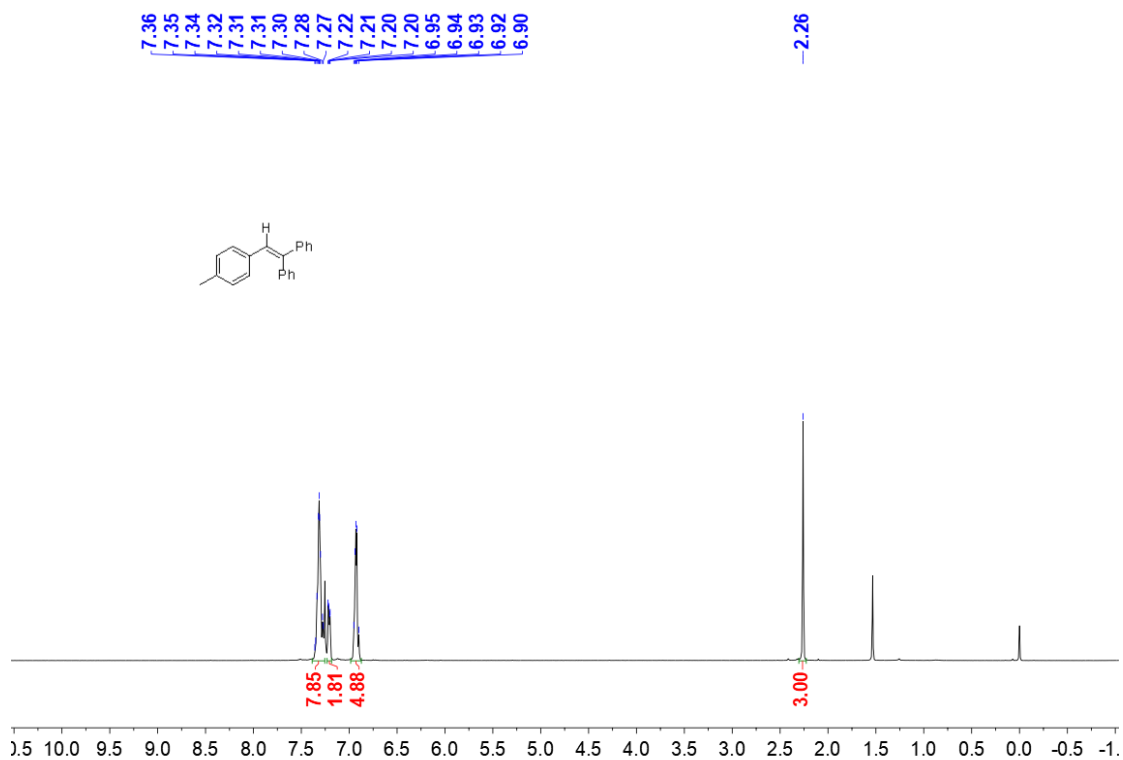


$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4c** in  $\text{CDCl}_3$  (400 MHz)

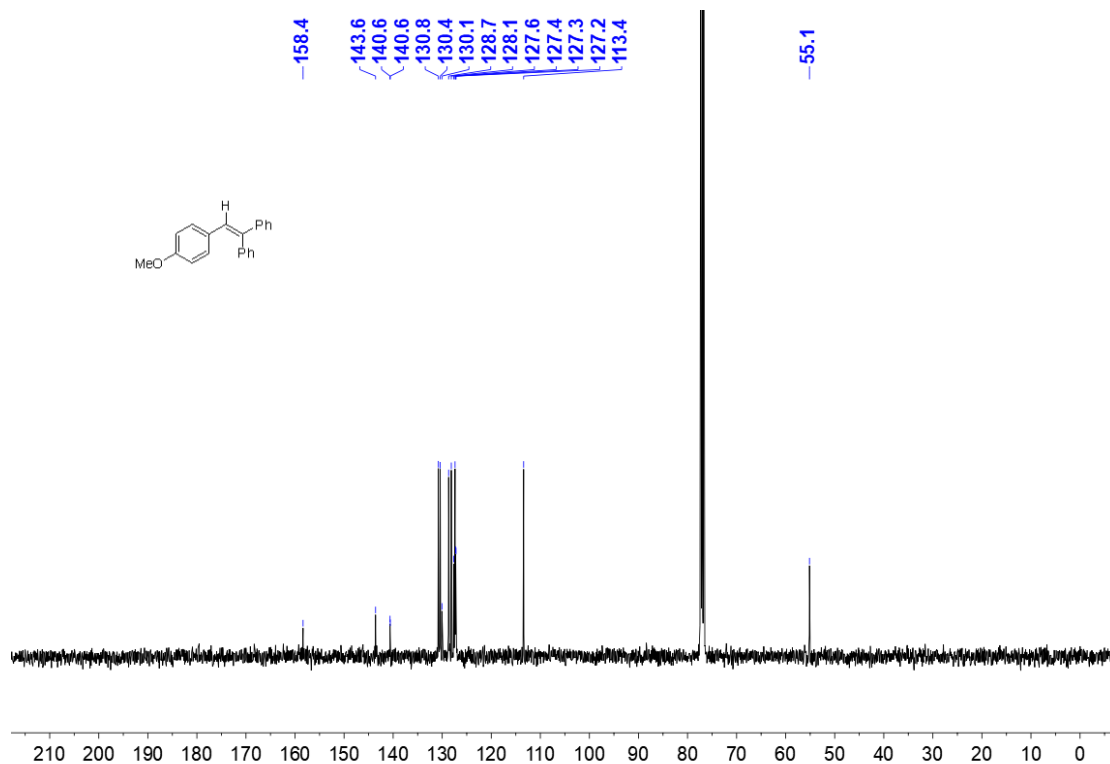
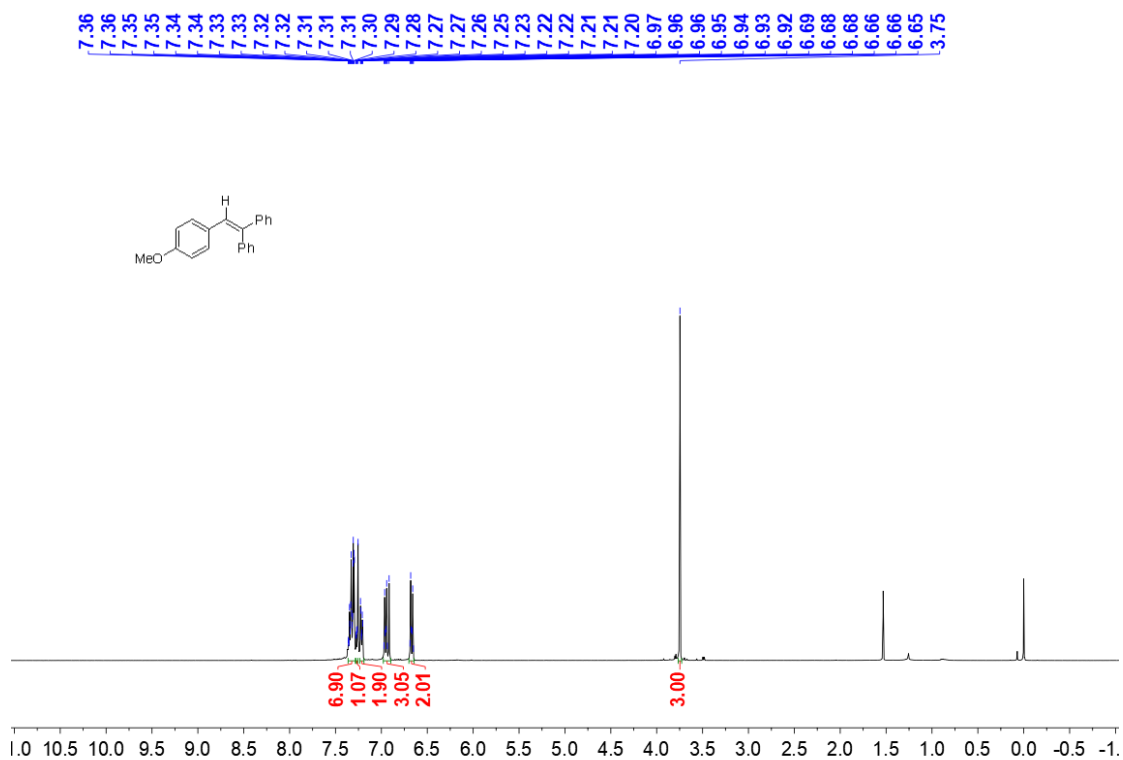




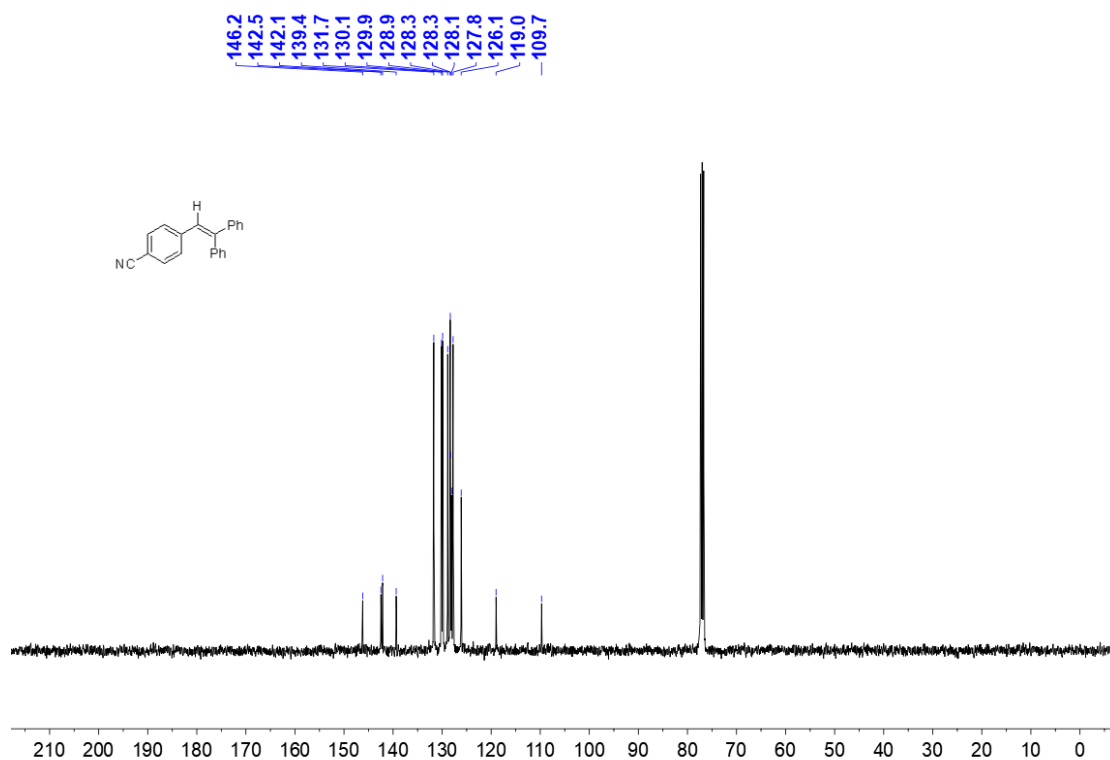
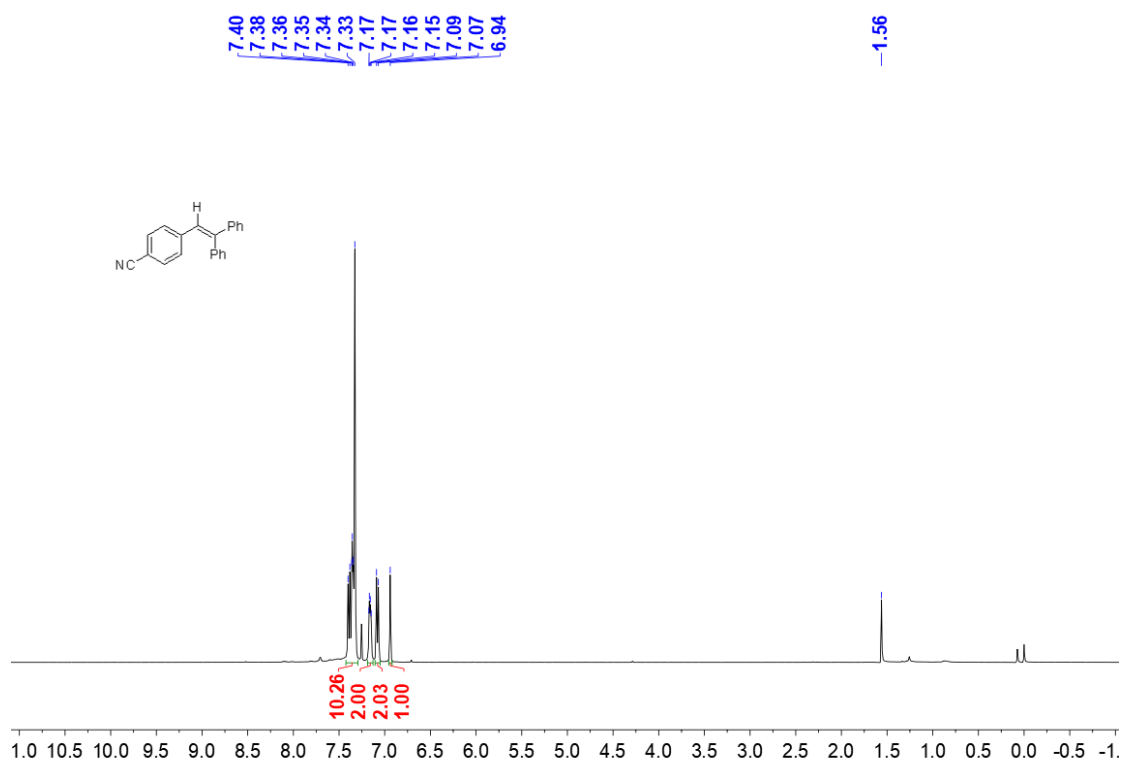
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4d** in  $\text{CDCl}_3$  (400 MHz)



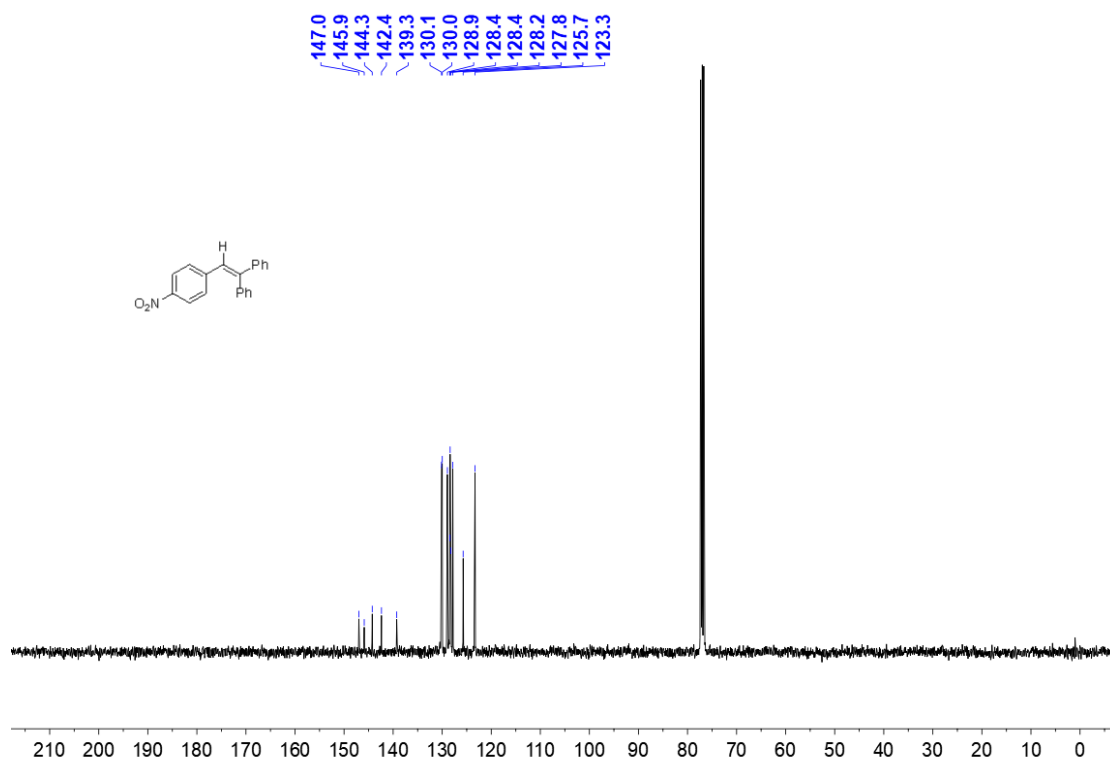
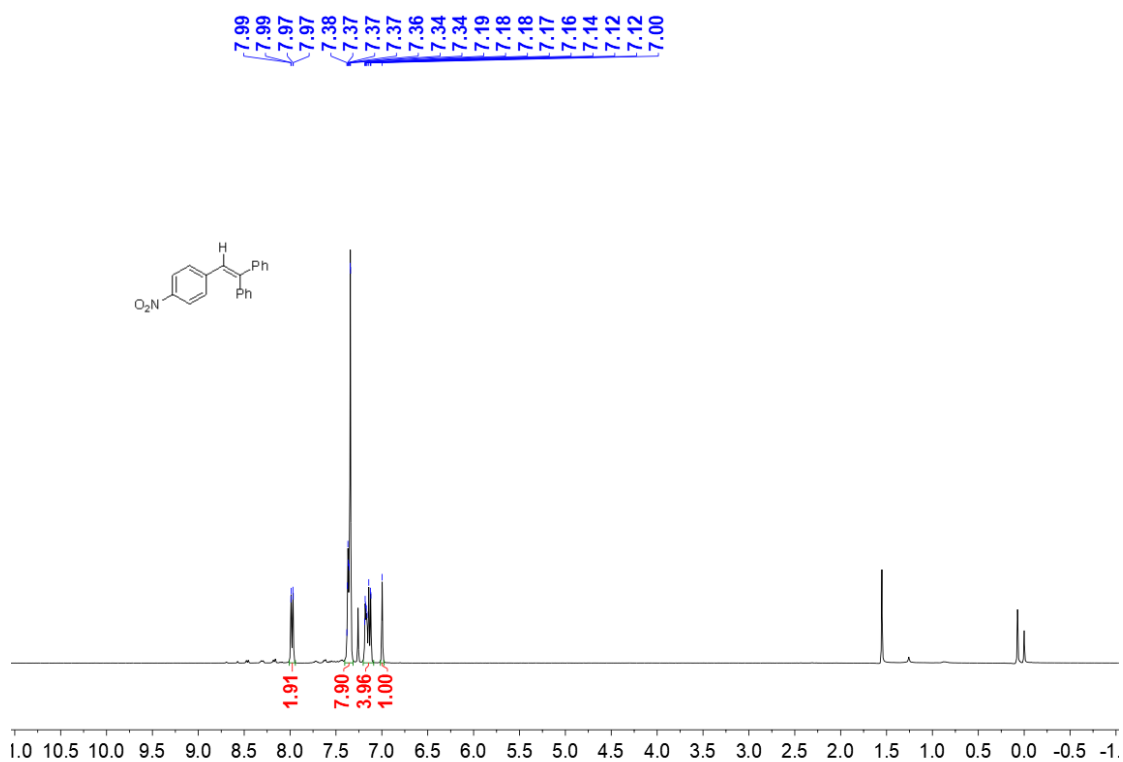
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4f** in  $\text{CDCl}_3$  (400 MHz)



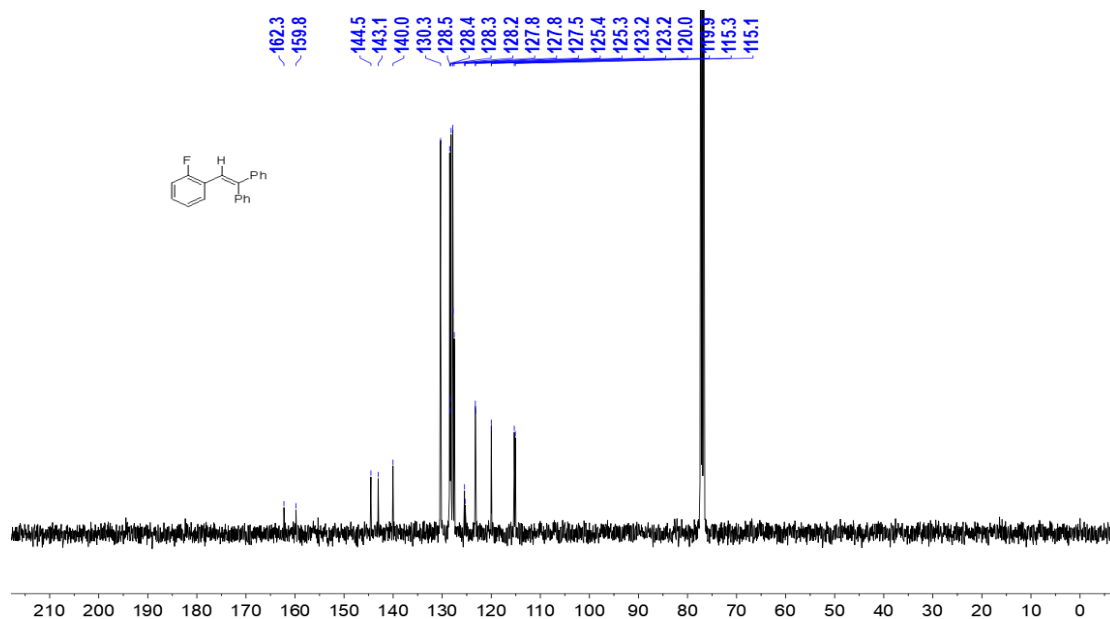
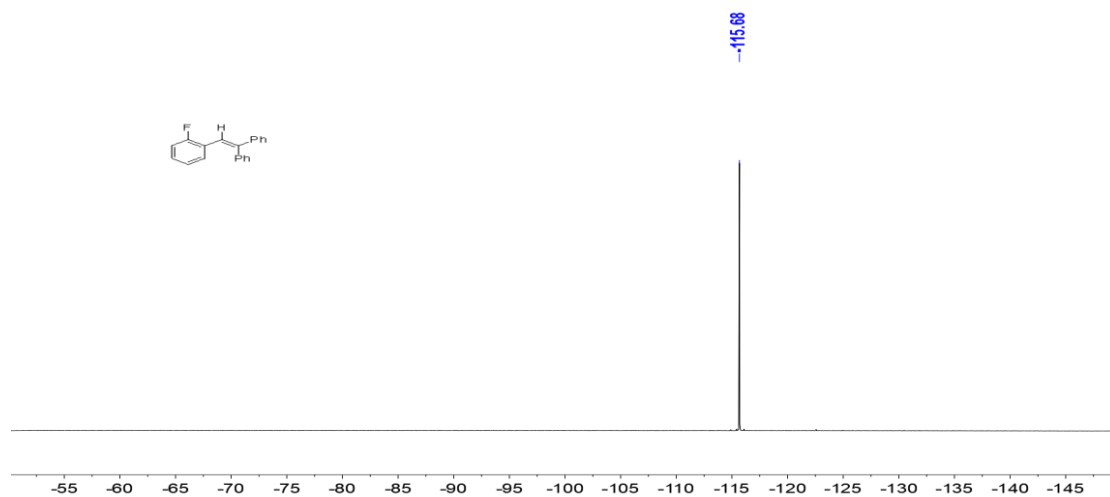
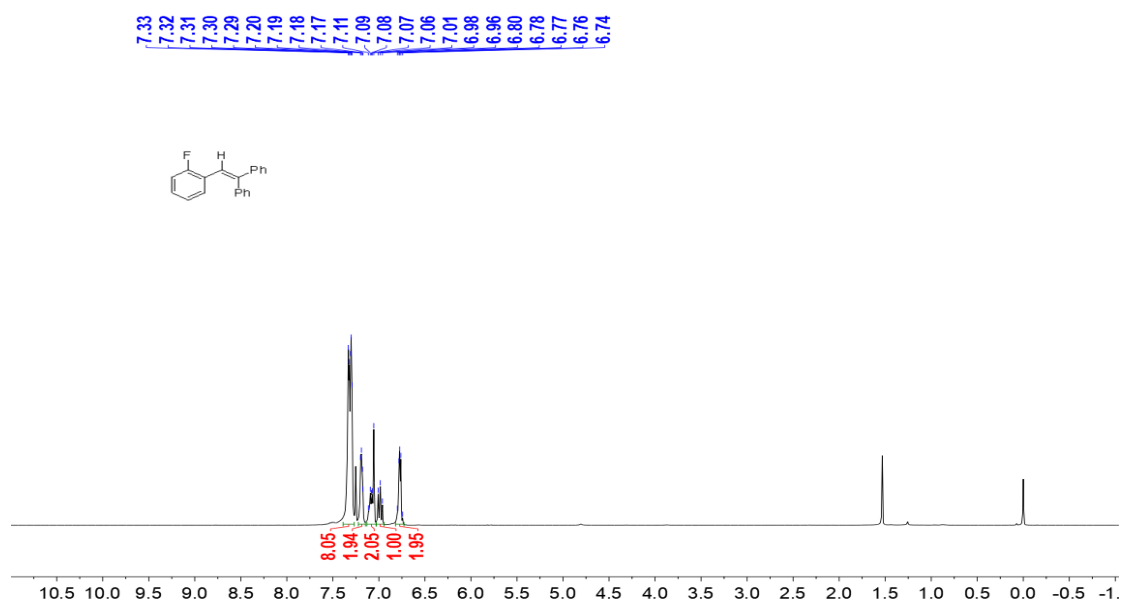
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4g** in  $\text{CDCl}_3$  (400 MHz)



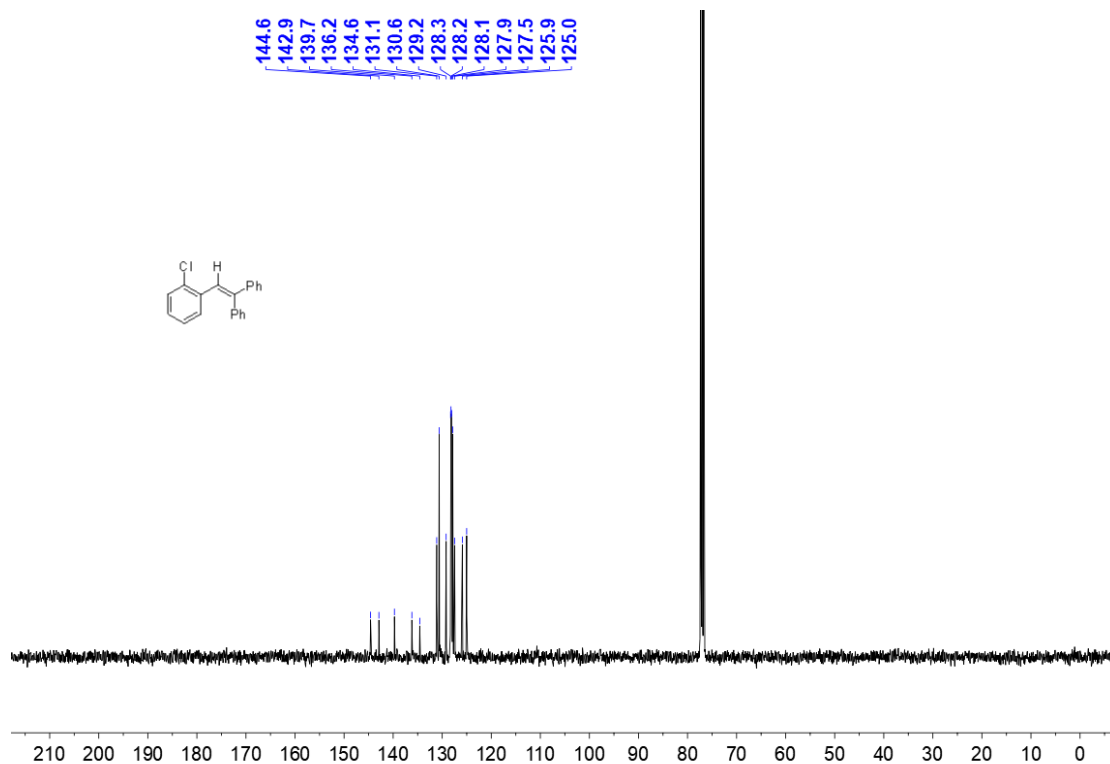
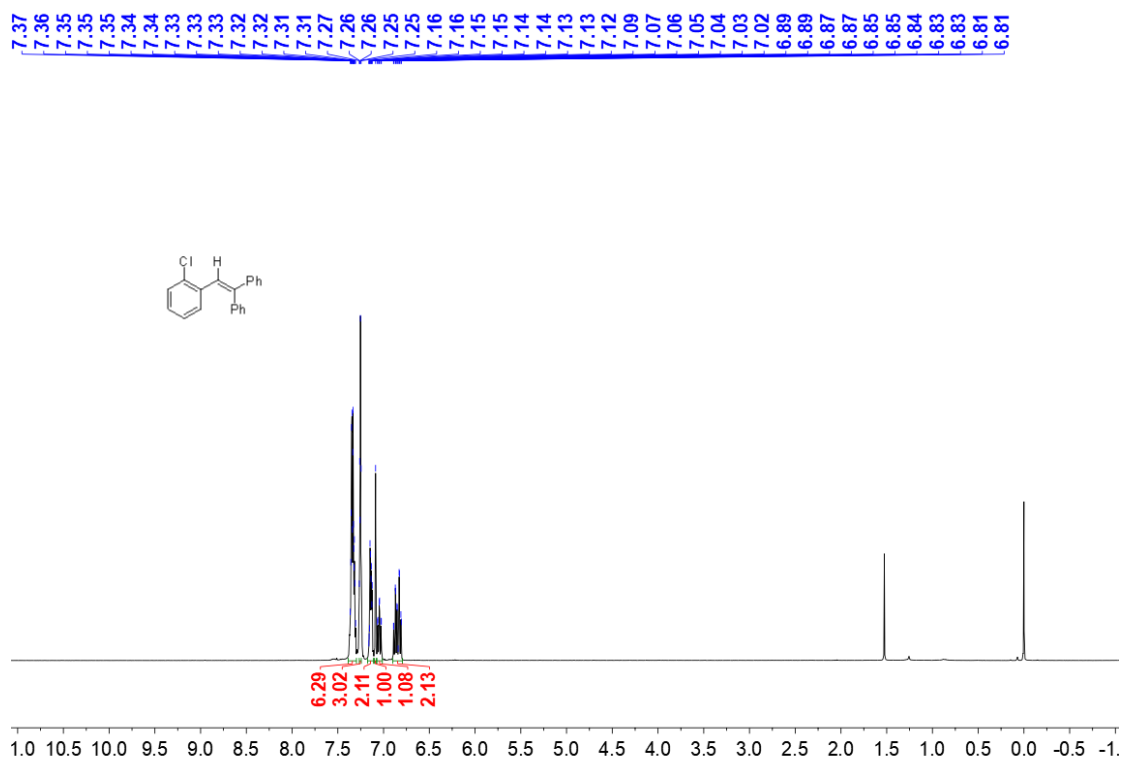
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4h** in  $\text{CDCl}_3$  (400 MHz)



$^1\text{H}$ ,  $^{19}\text{F}$  and  $^{13}\text{C}$  NMR spectra of compound **4i** in  $\text{CDCl}_3$  (400 MHz)

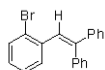
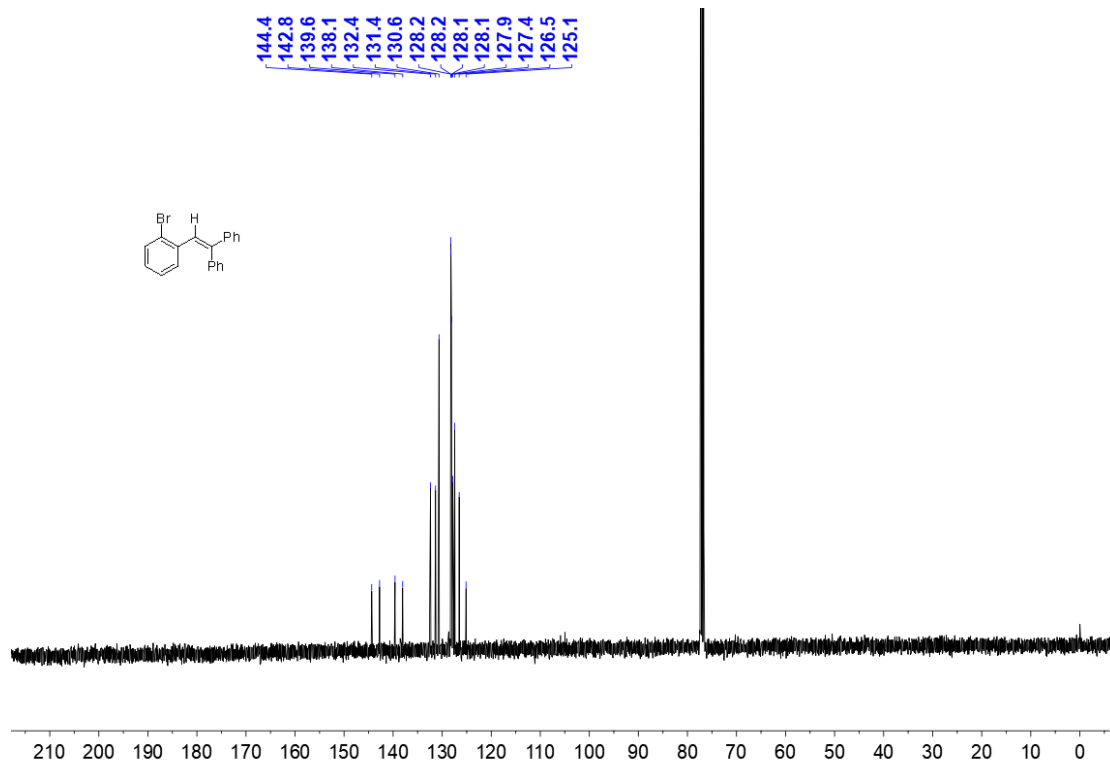
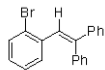
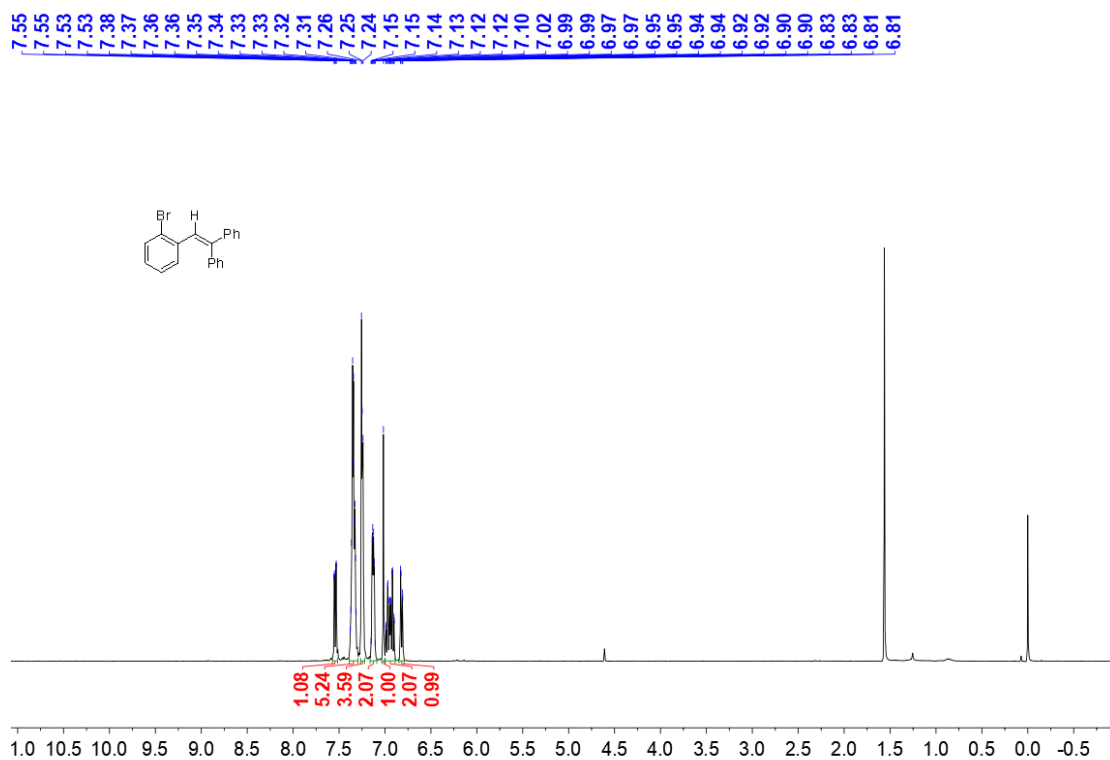


$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4j** in  $\text{CDCl}_3$  (400 MHz)

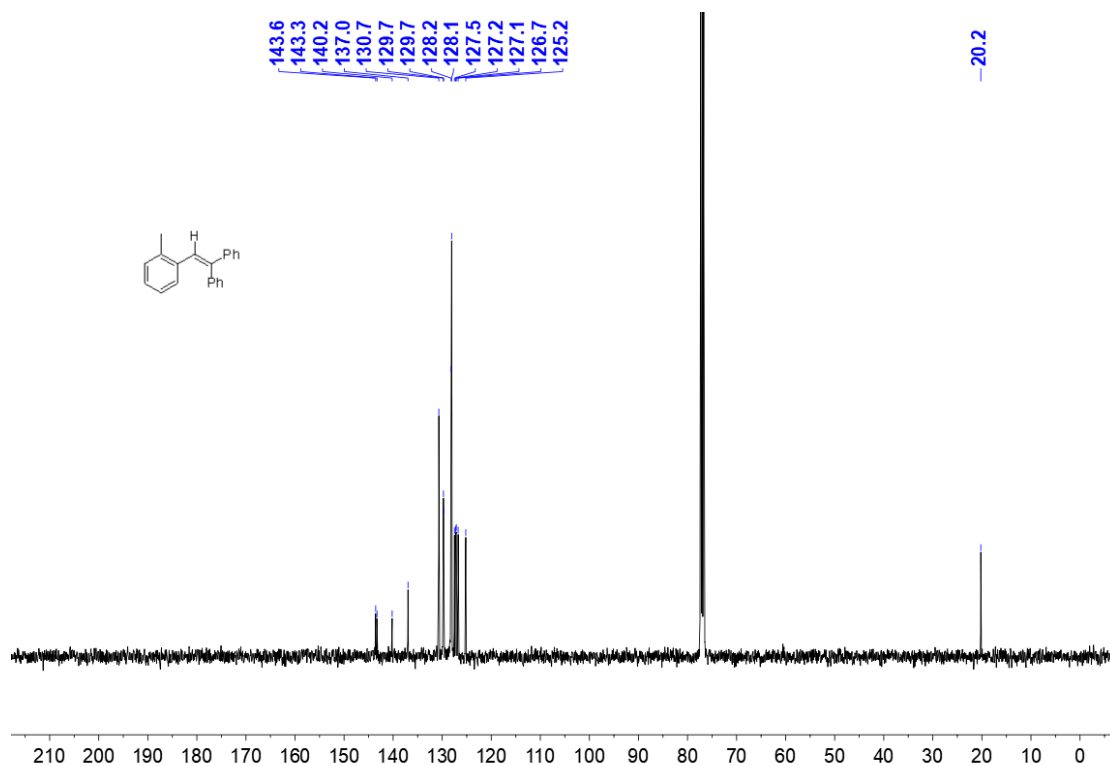
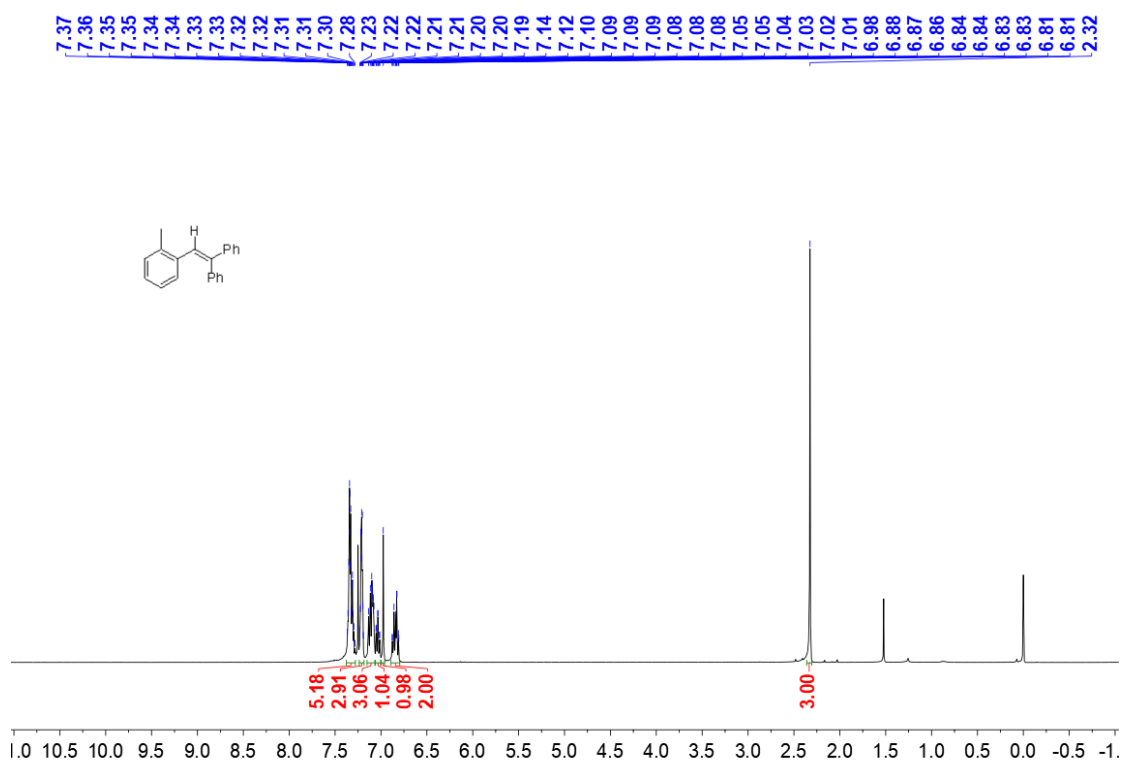




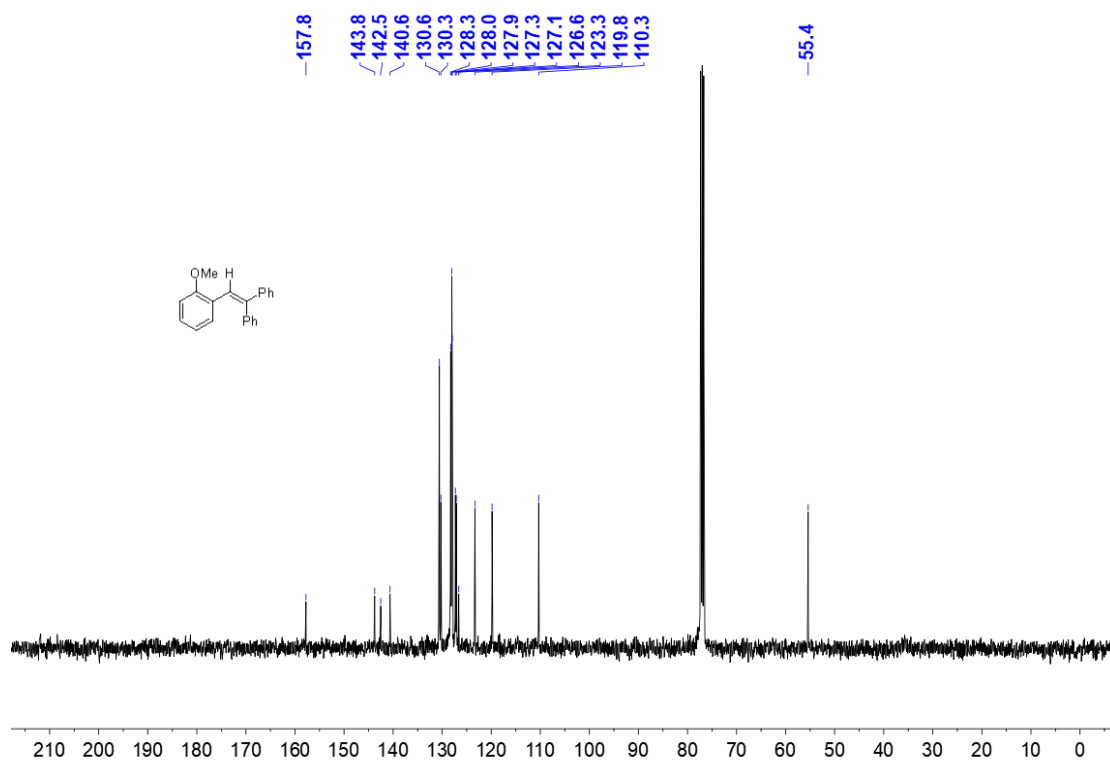
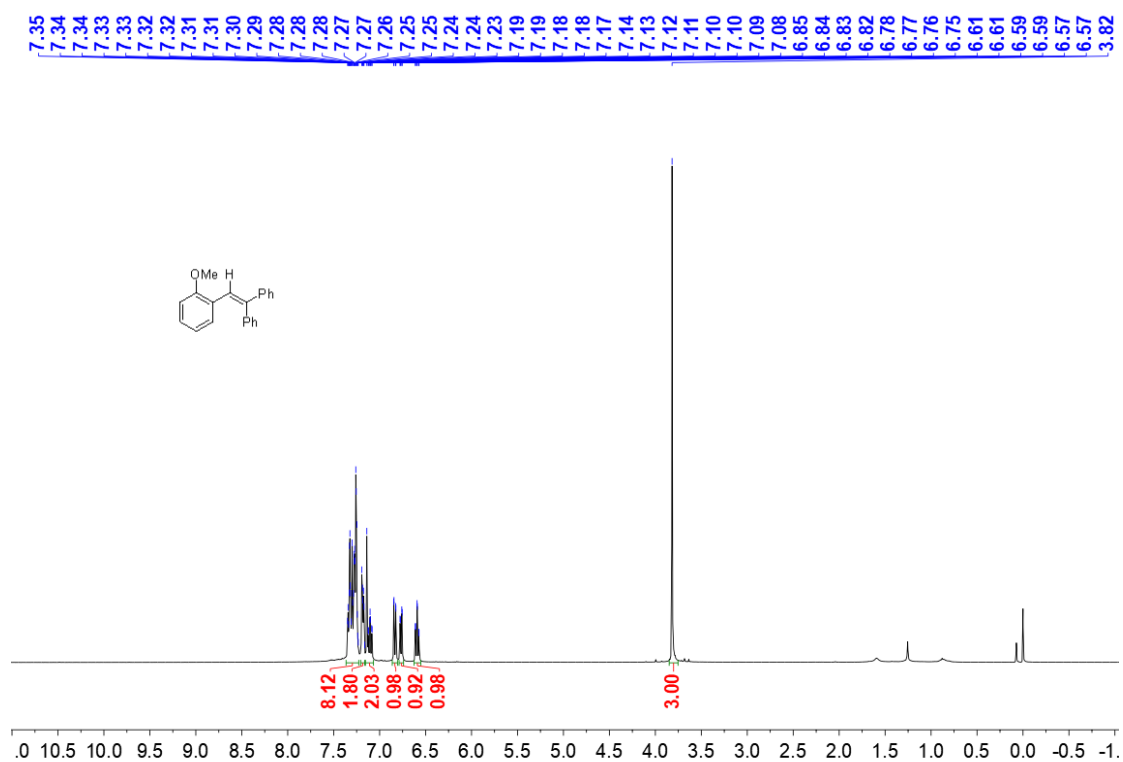
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4k** in  $\text{CDCl}_3$  (400 MHz)



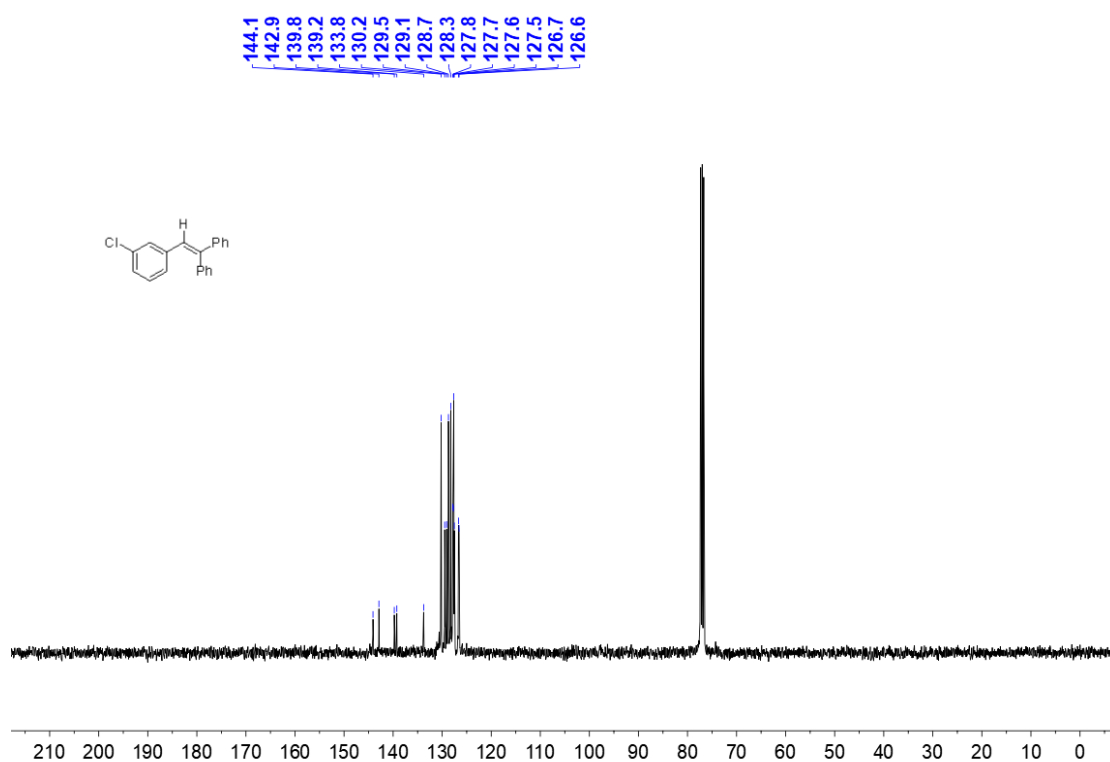
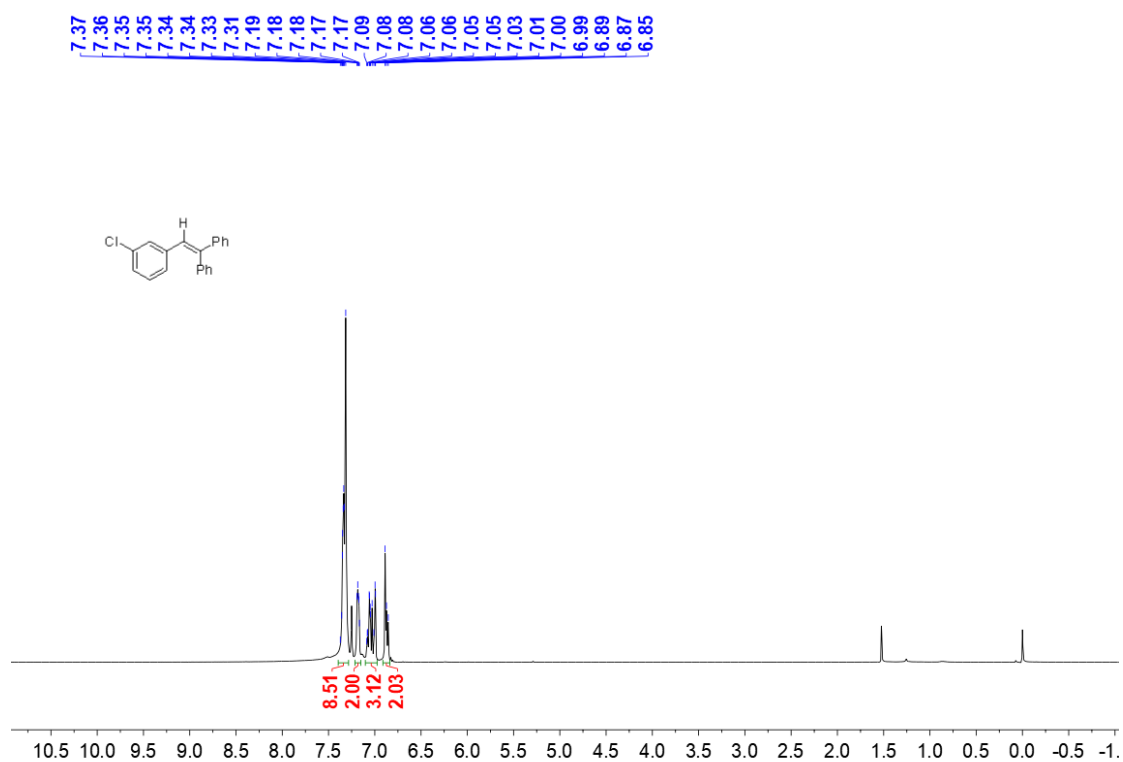
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **41** in  $\text{CDCl}_3$  (400 MHz)



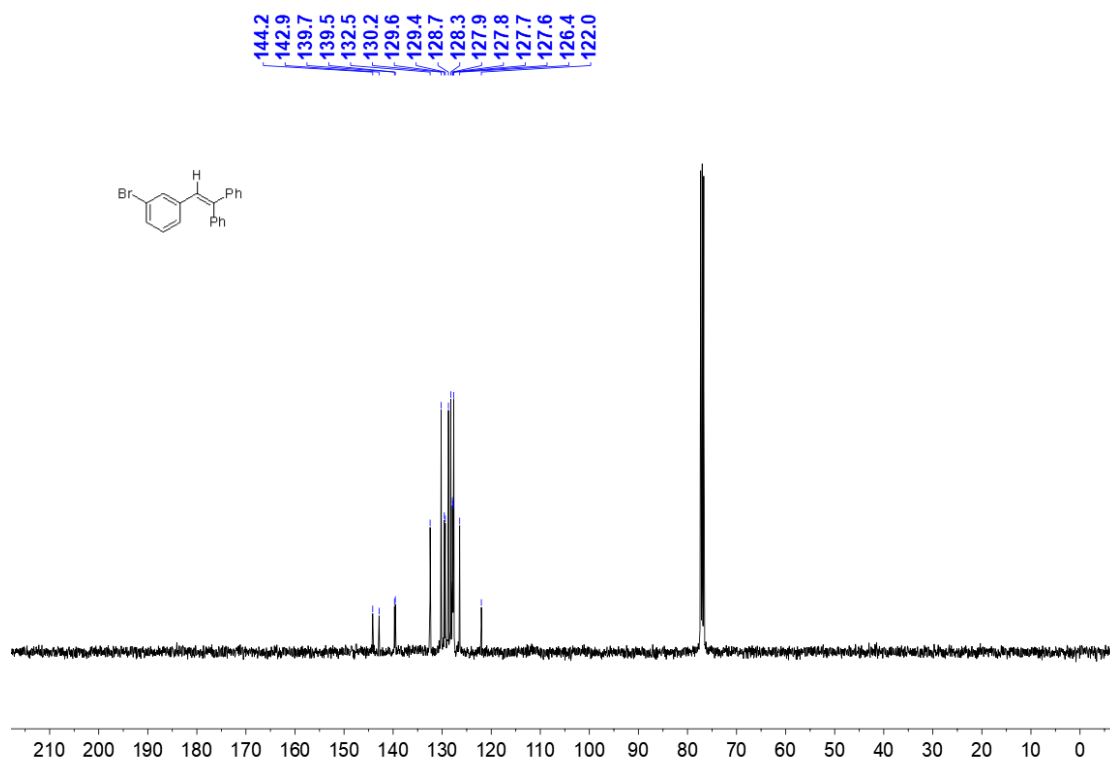
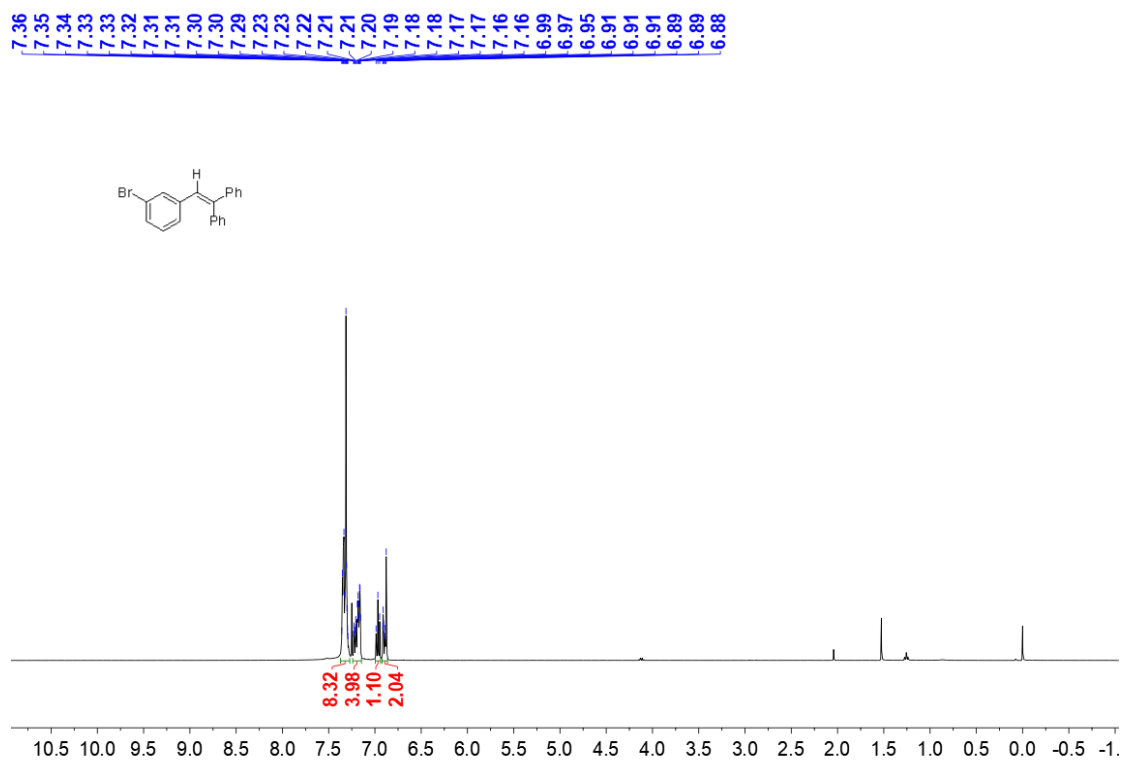
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4m** in  $\text{CDCl}_3$  (400 MHz)



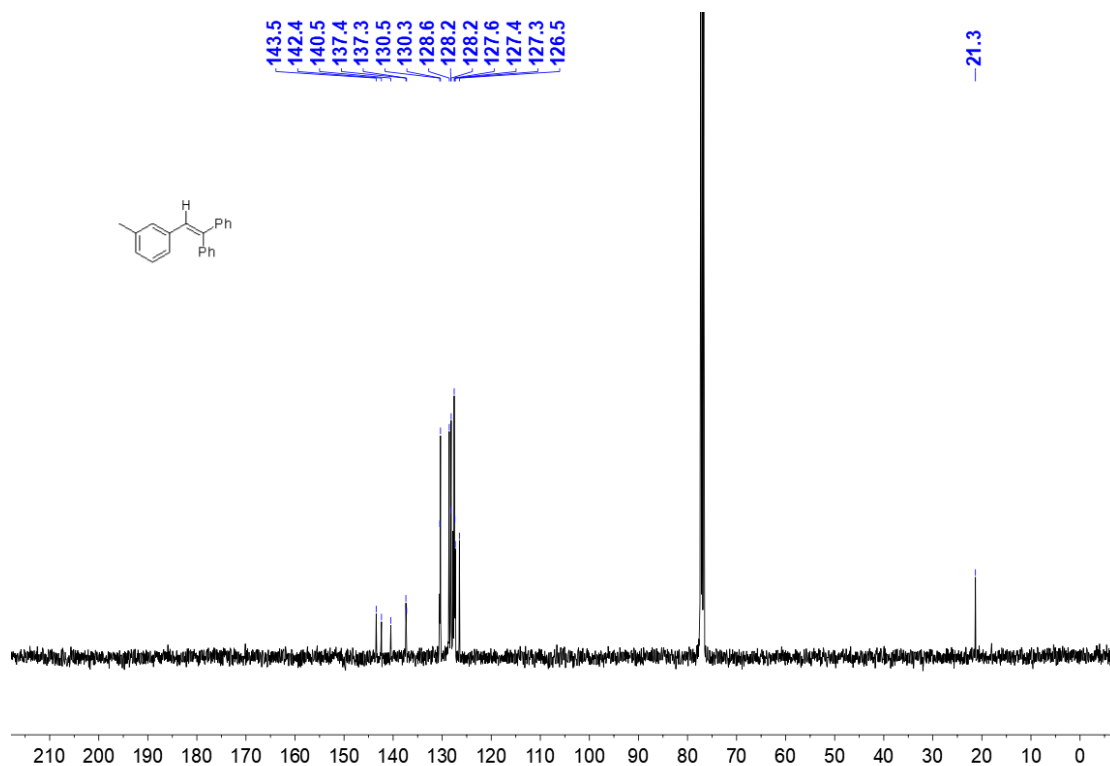
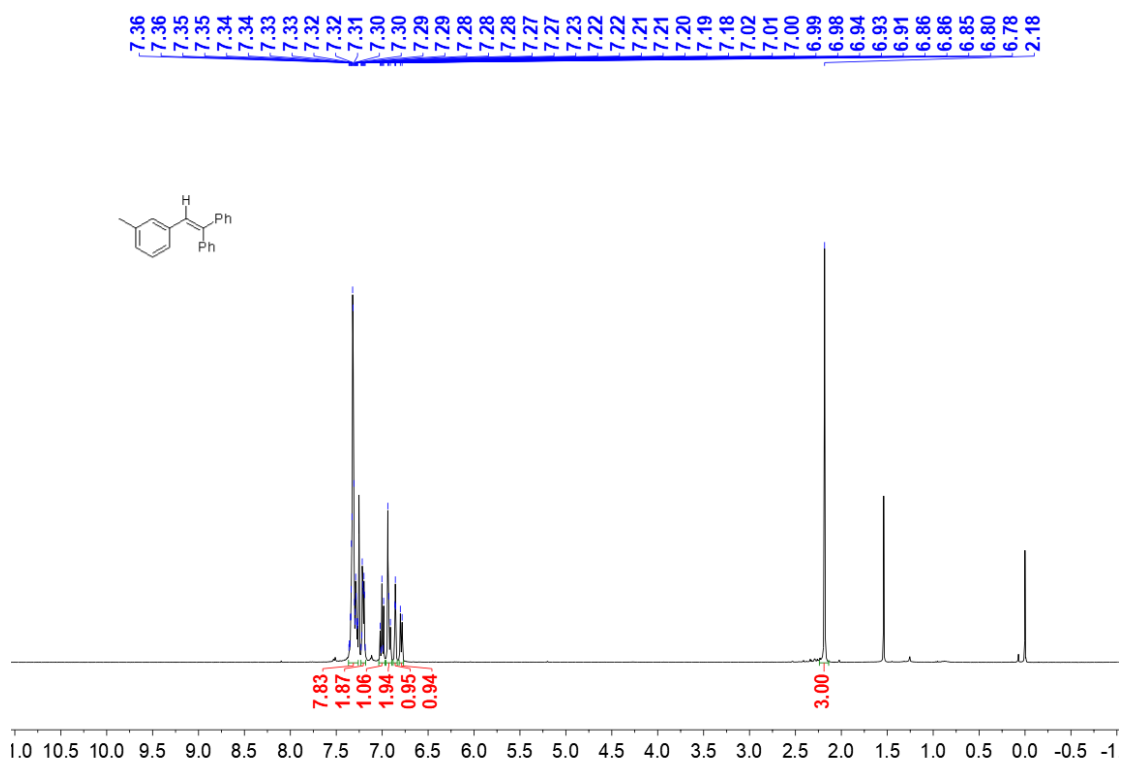
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4n** in  $\text{CDCl}_3$  (400 MHz)



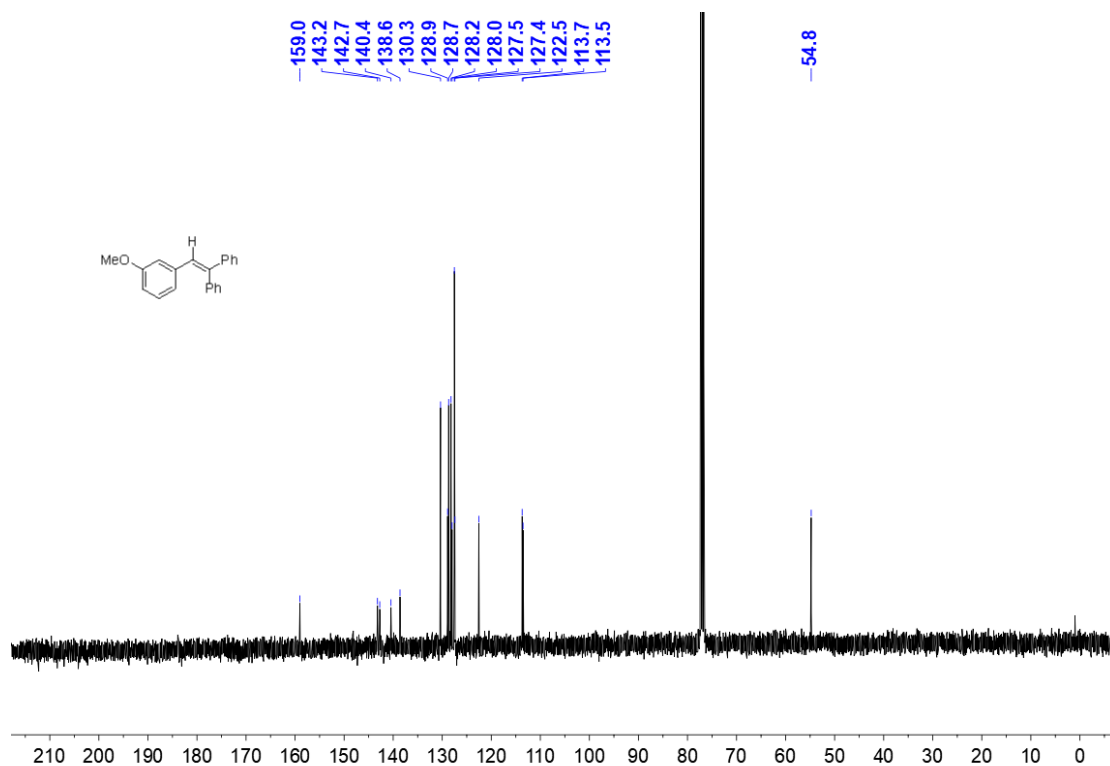
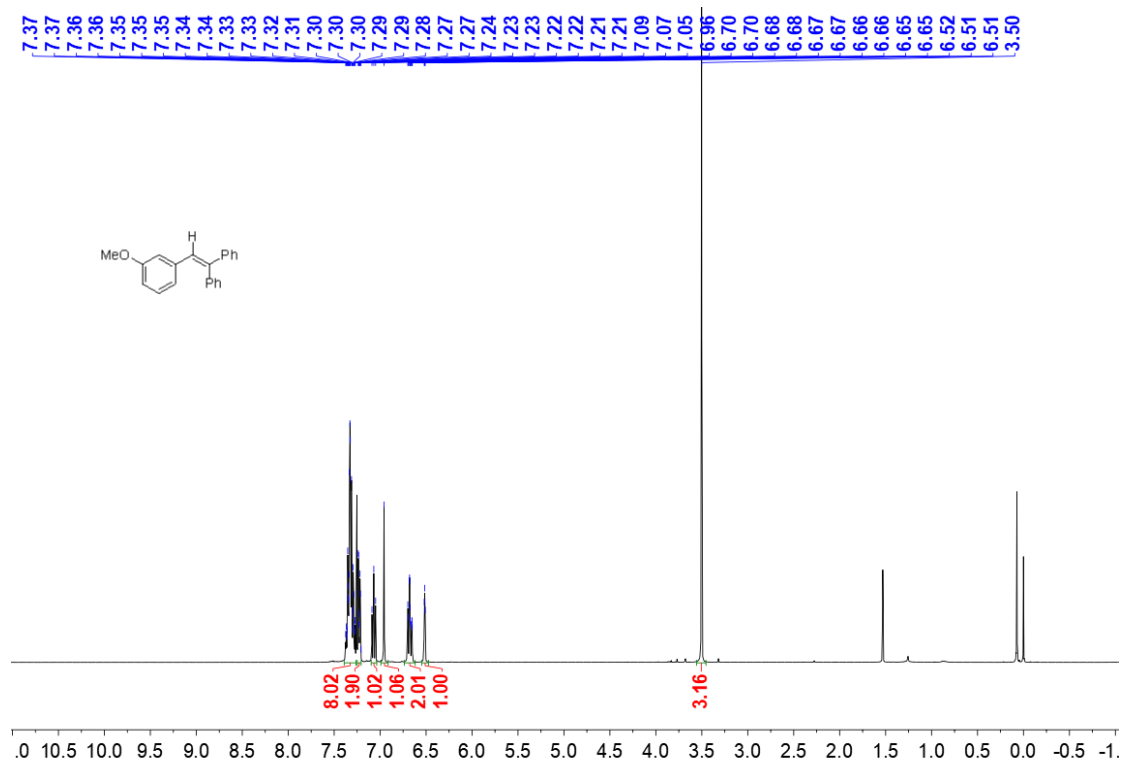
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4o** in  $\text{CDCl}_3$  (400 MHz)



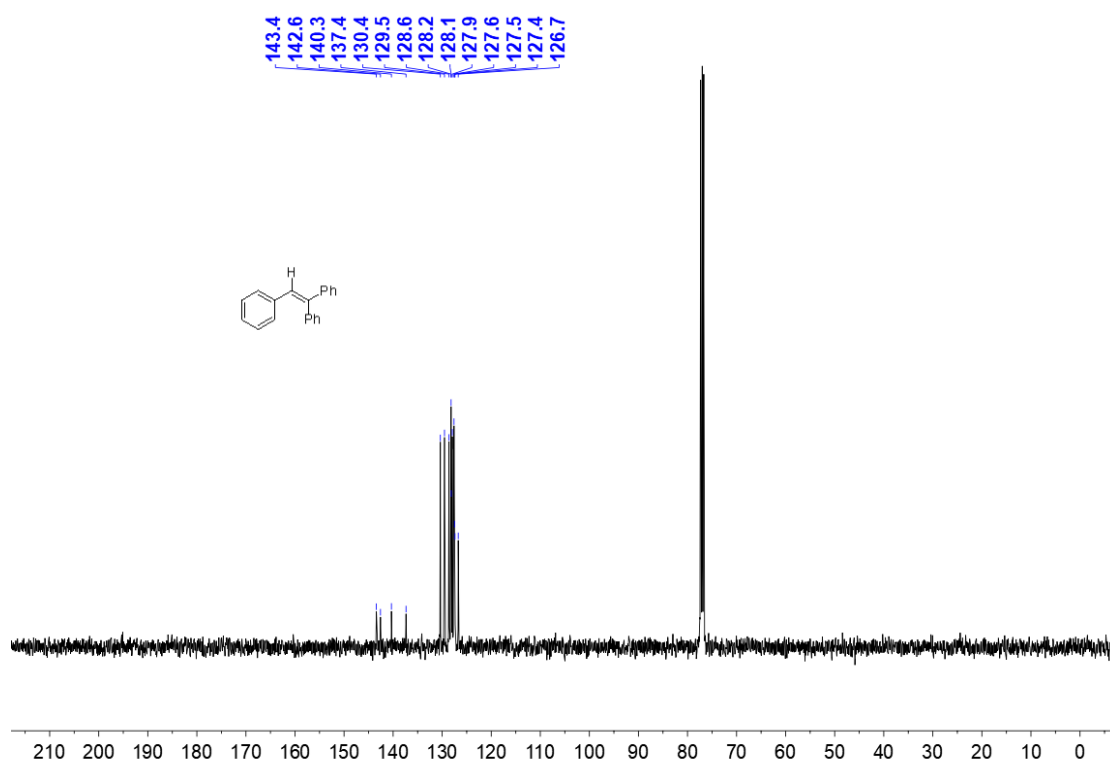
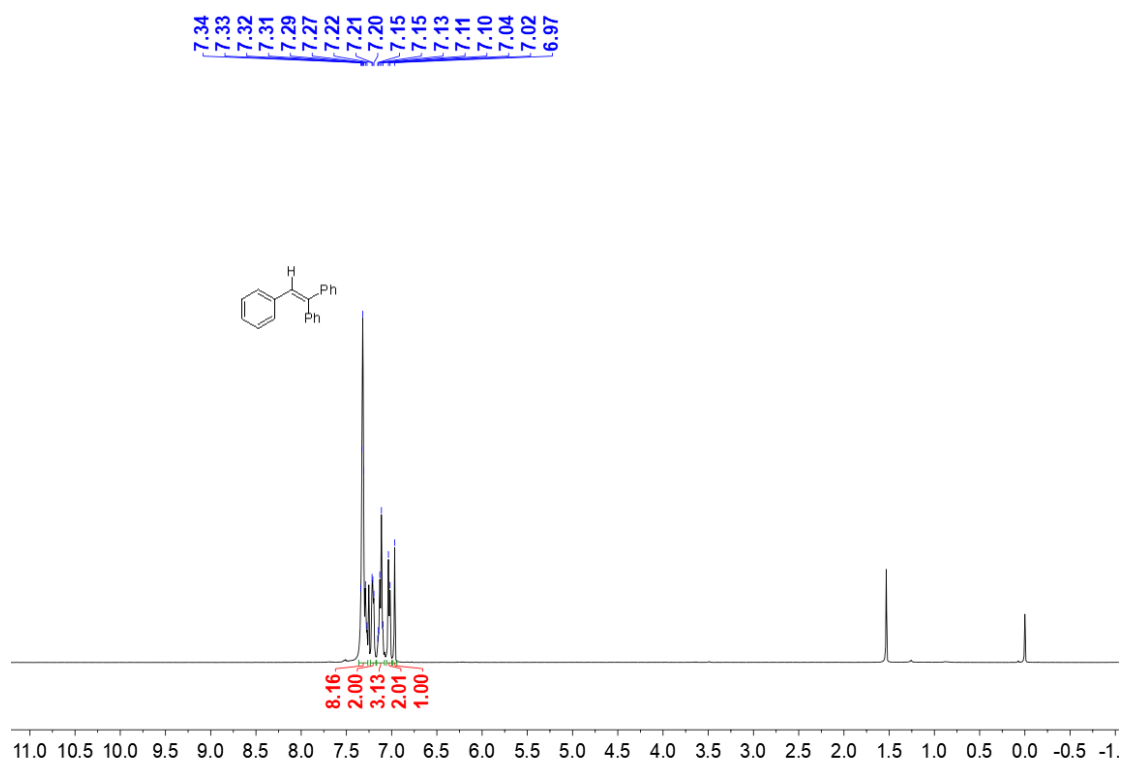
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4p** in  $\text{CDCl}_3$  (400 MHz)



$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4q** in  $\text{CDCl}_3$  (400 MHz)

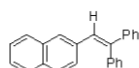
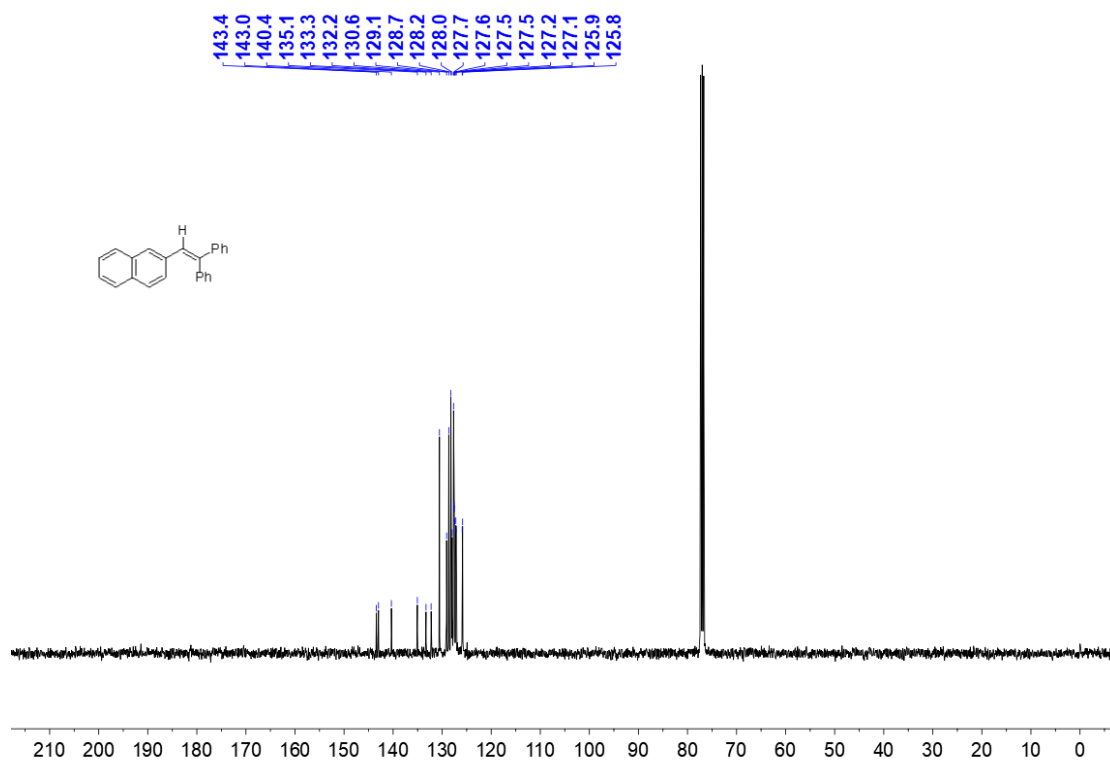
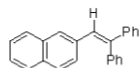
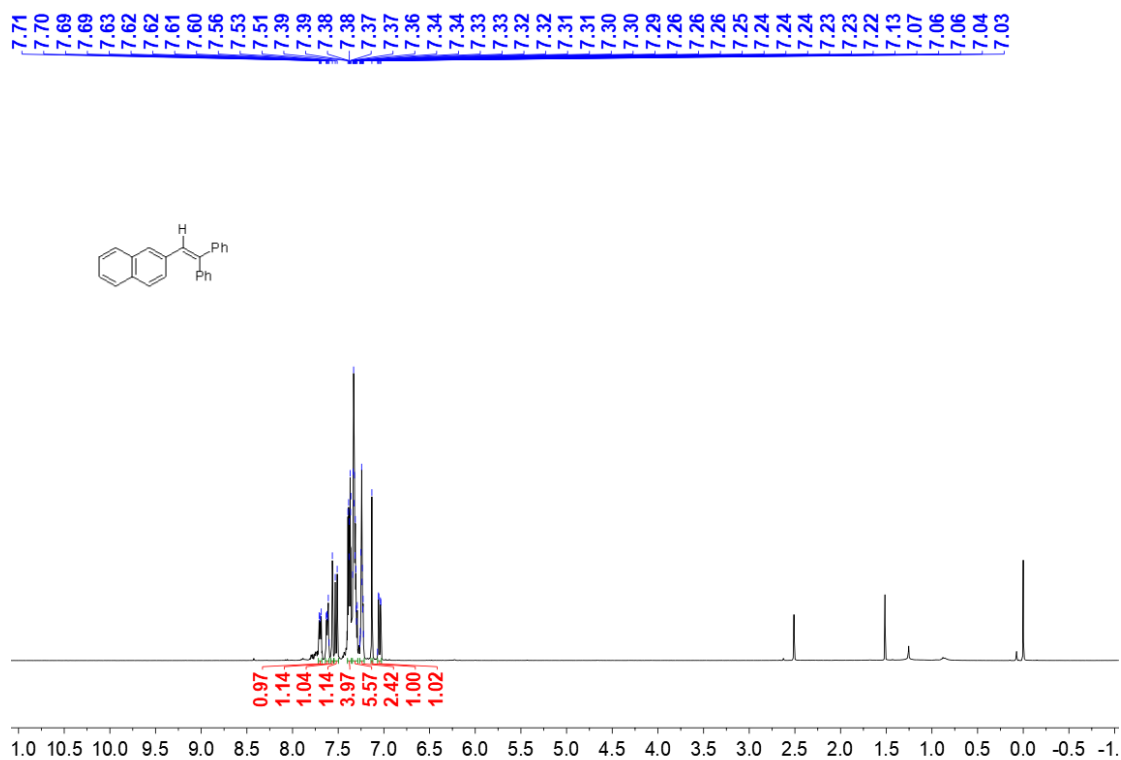


$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4r** in  $\text{CDCl}_3$  (400 MHz)

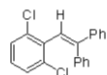
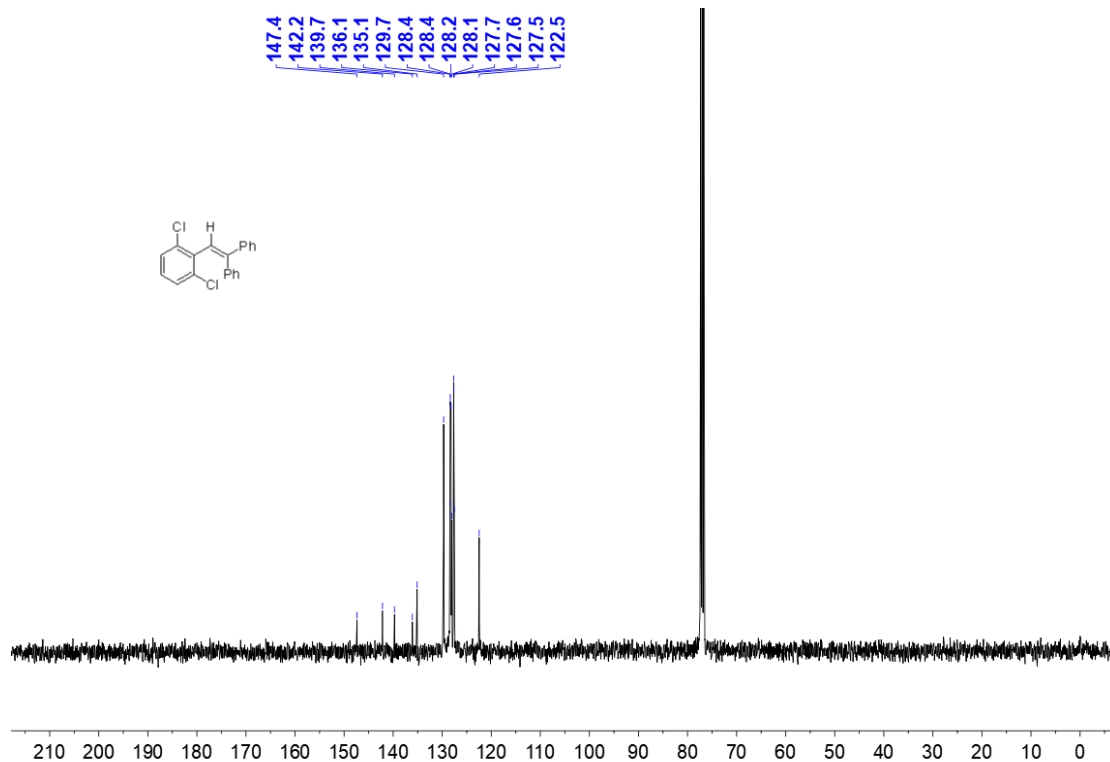
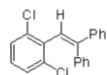
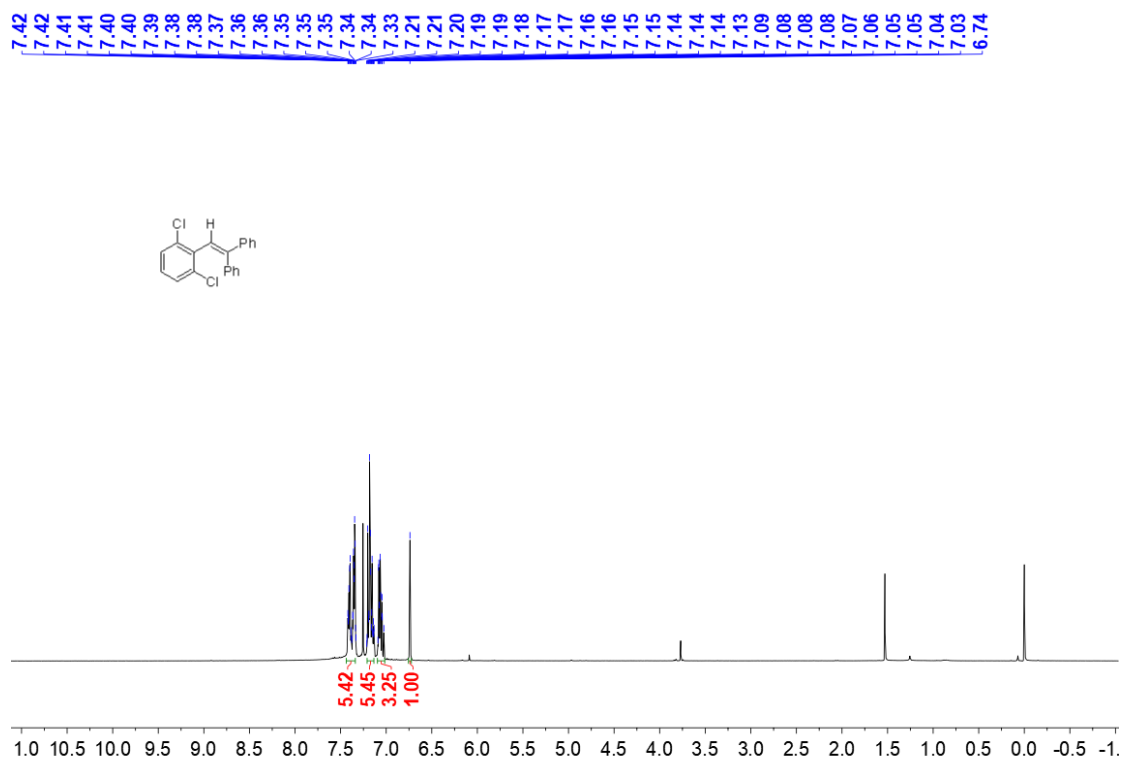




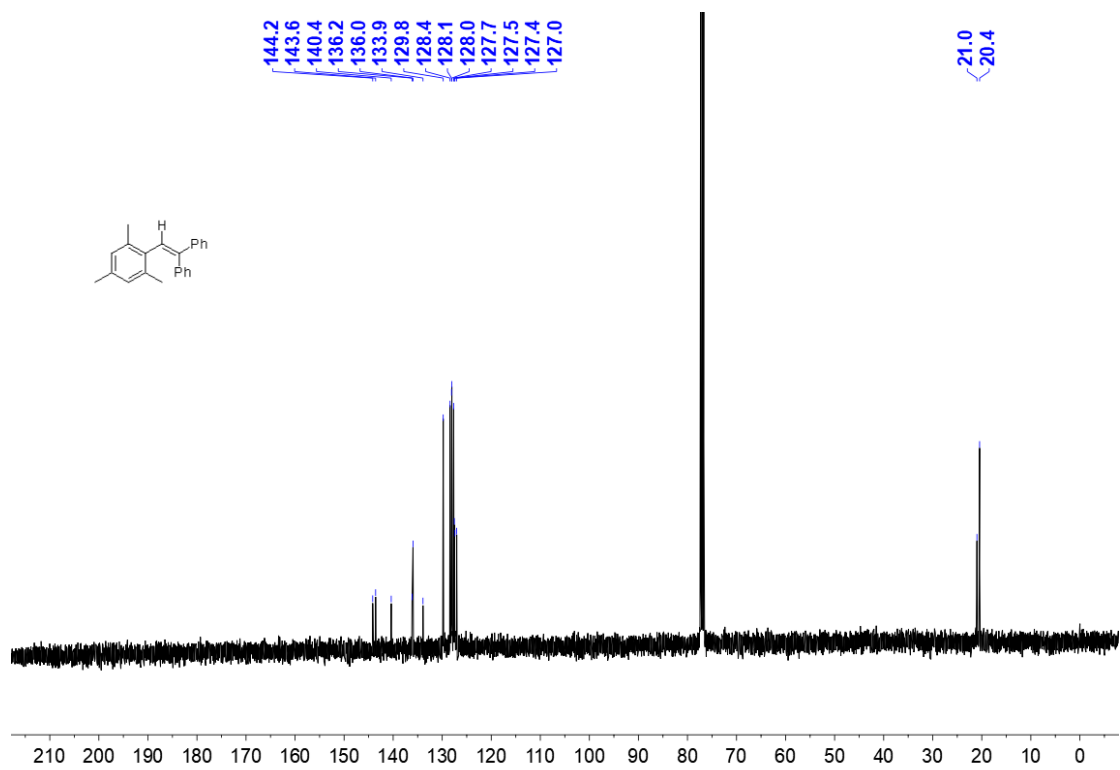
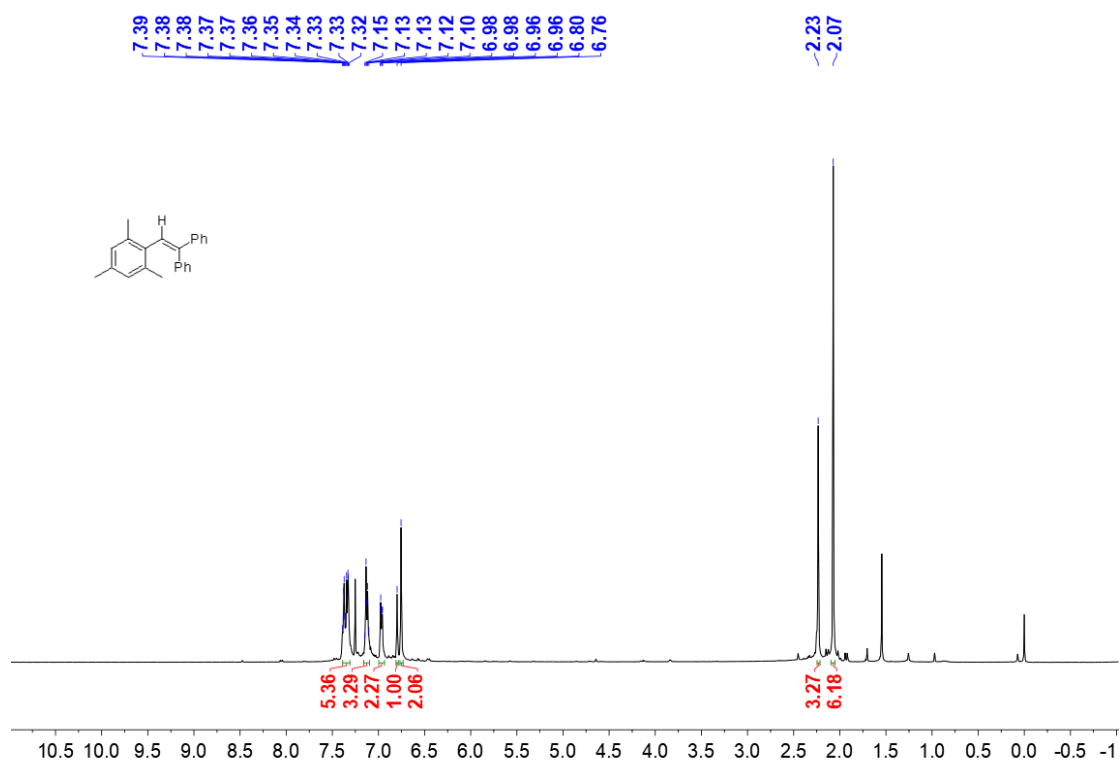
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4s** in  $\text{CDCl}_3$  (400 MHz)



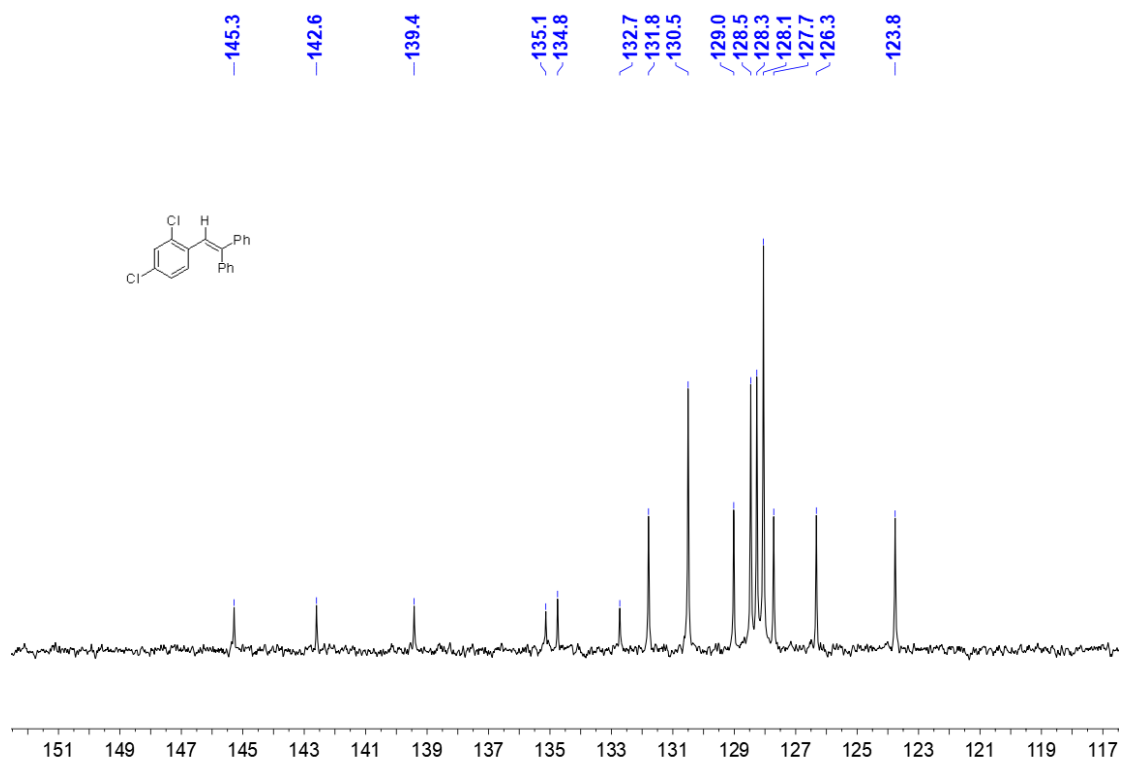
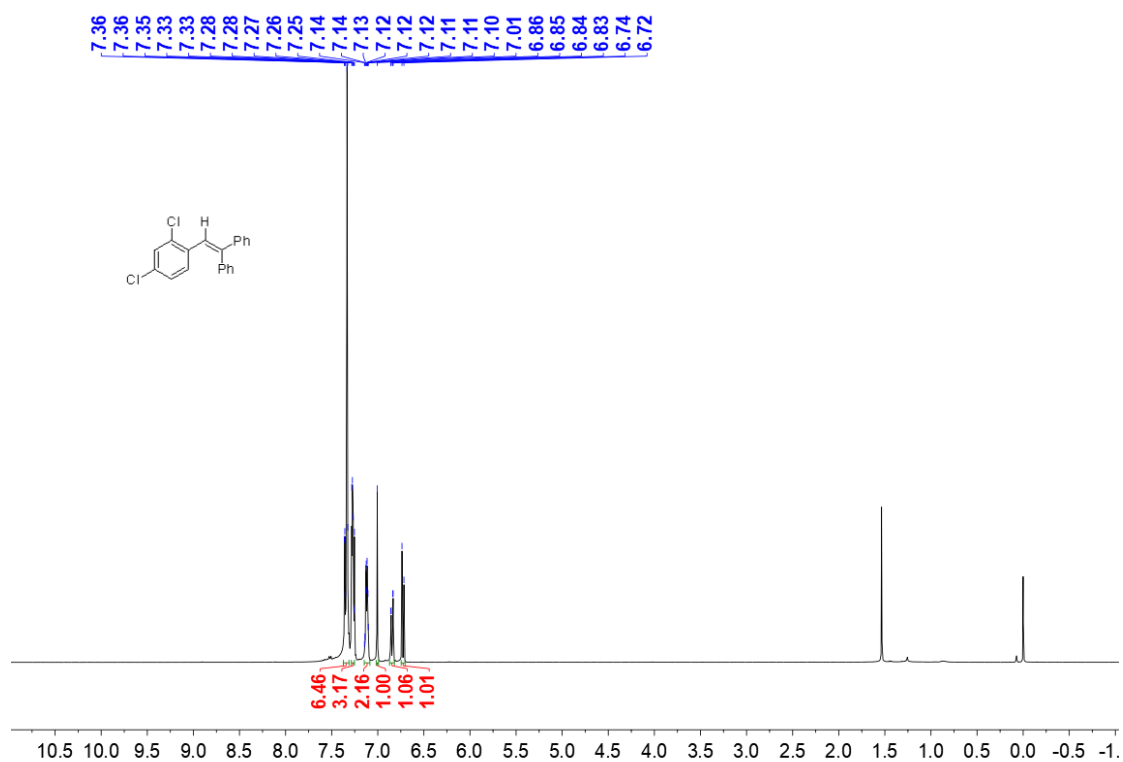
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4t** in  $\text{CDCl}_3$  (400 MHz)



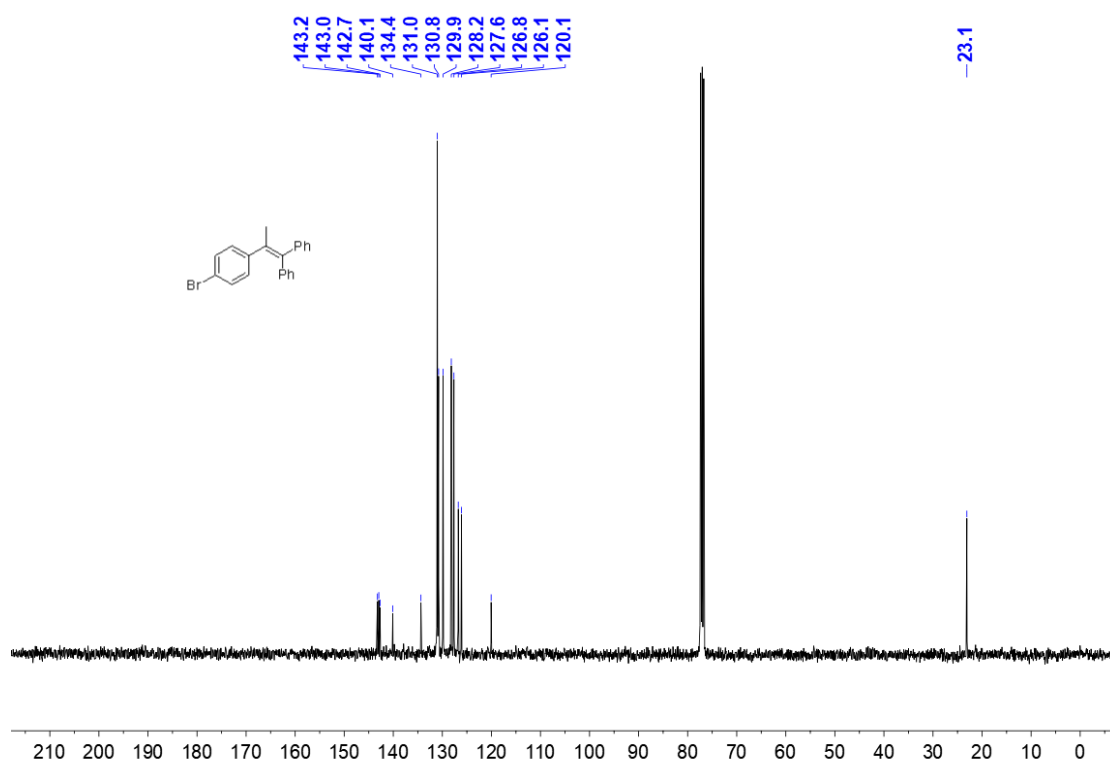
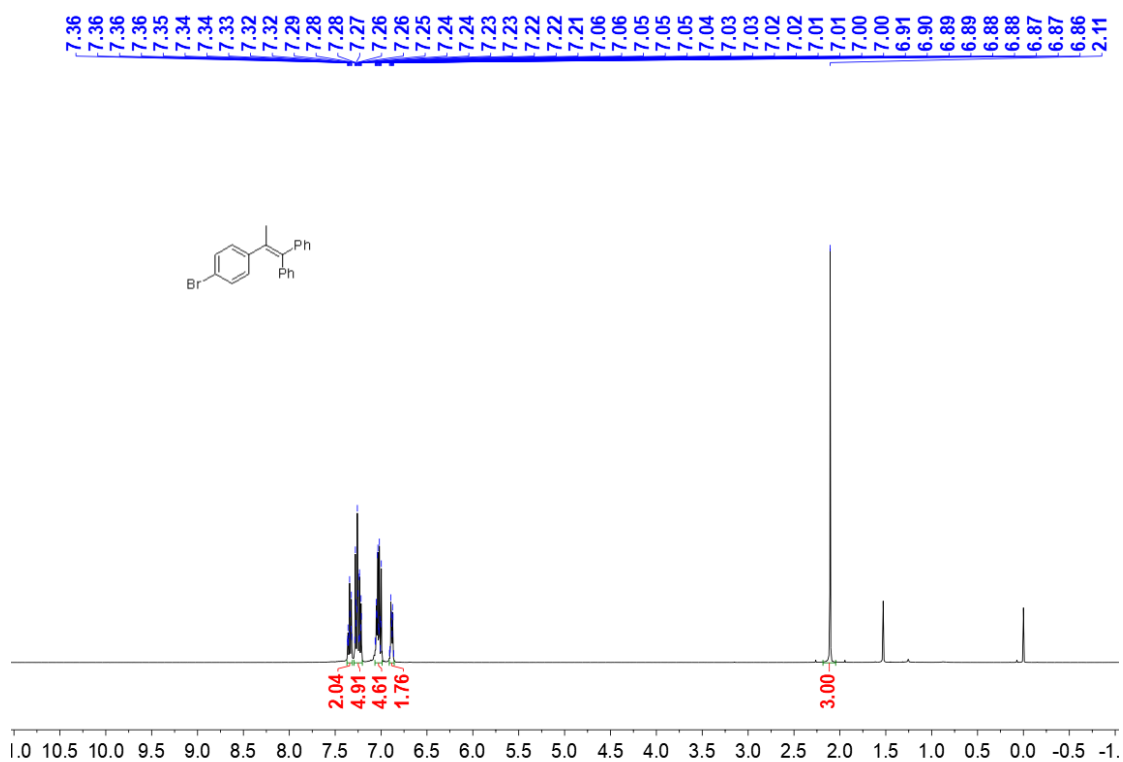
$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4u** in  $\text{CDCl}_3$  (400 MHz)



$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4v** in  $\text{CDCl}_3$  (400 MHz)



$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4x** in  $\text{CDCl}_3$  (400 MHz)



$^1\text{H}$  and  $^{13}\text{C}$  NMR spectra of compound **4aa** in  $\text{CDCl}_3$  (400 MHz)

