

Supplementary Materials (SM)

The First Example of the Friedel–Crafts Cyclization Leading to (10-Hydroxy-9,10-dihydroanthr-9-yl)phosphonium Salts without the Expected Bradsher Dehydration

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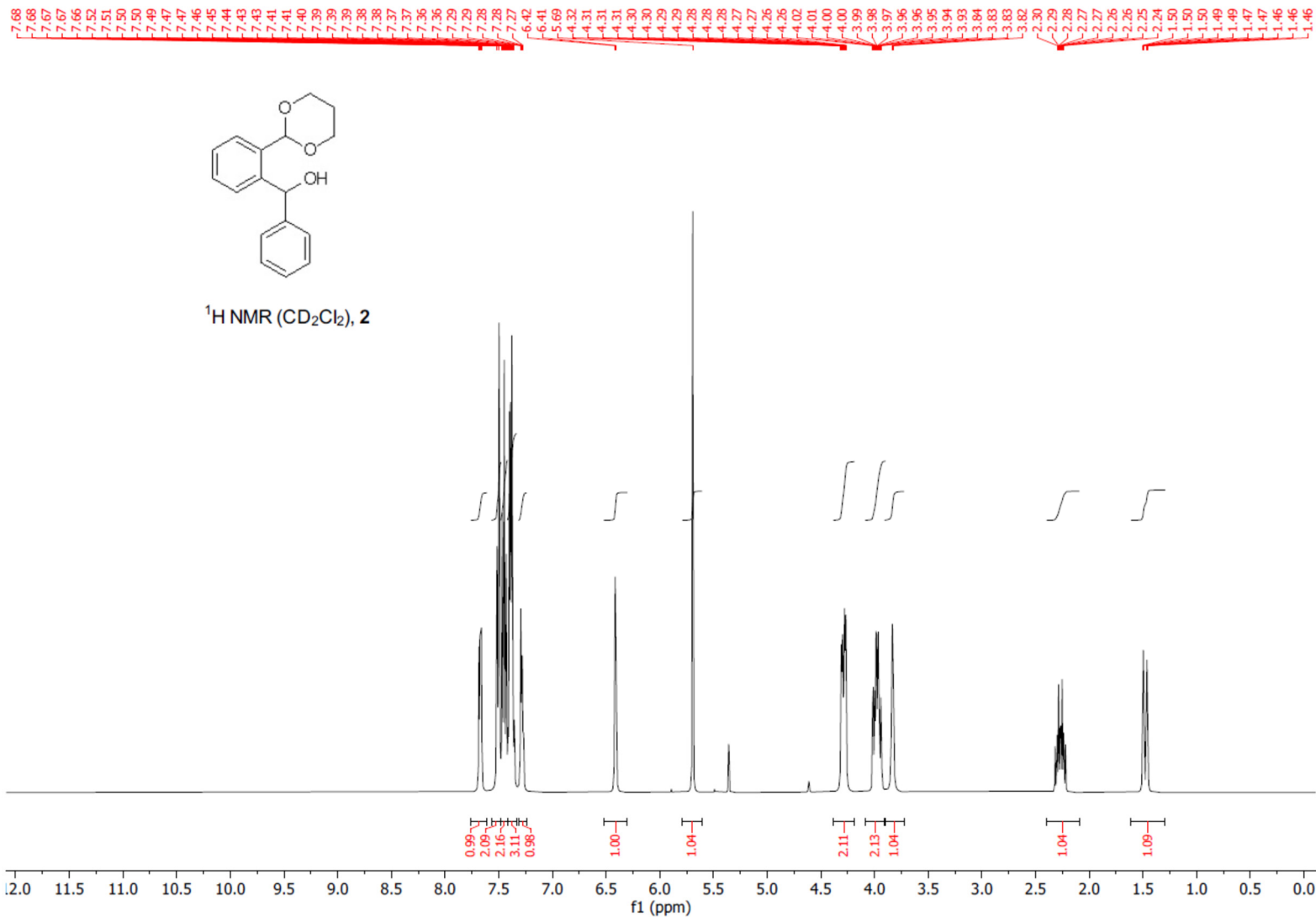
³ The Bio-Med-Chem Doctoral School of the University of Łódź and Łódź Institutes of the Polish Academy of Sciences, University of Łódź, Matejki 21/23, 90-237 Łódź, Poland

* Correspondence: krzysztof.owsianik@cbmm.lodz.pl (K.O.);
piotr.balczewski@cbmm.lodz.pl (P.B.)

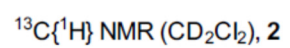
Table of contents

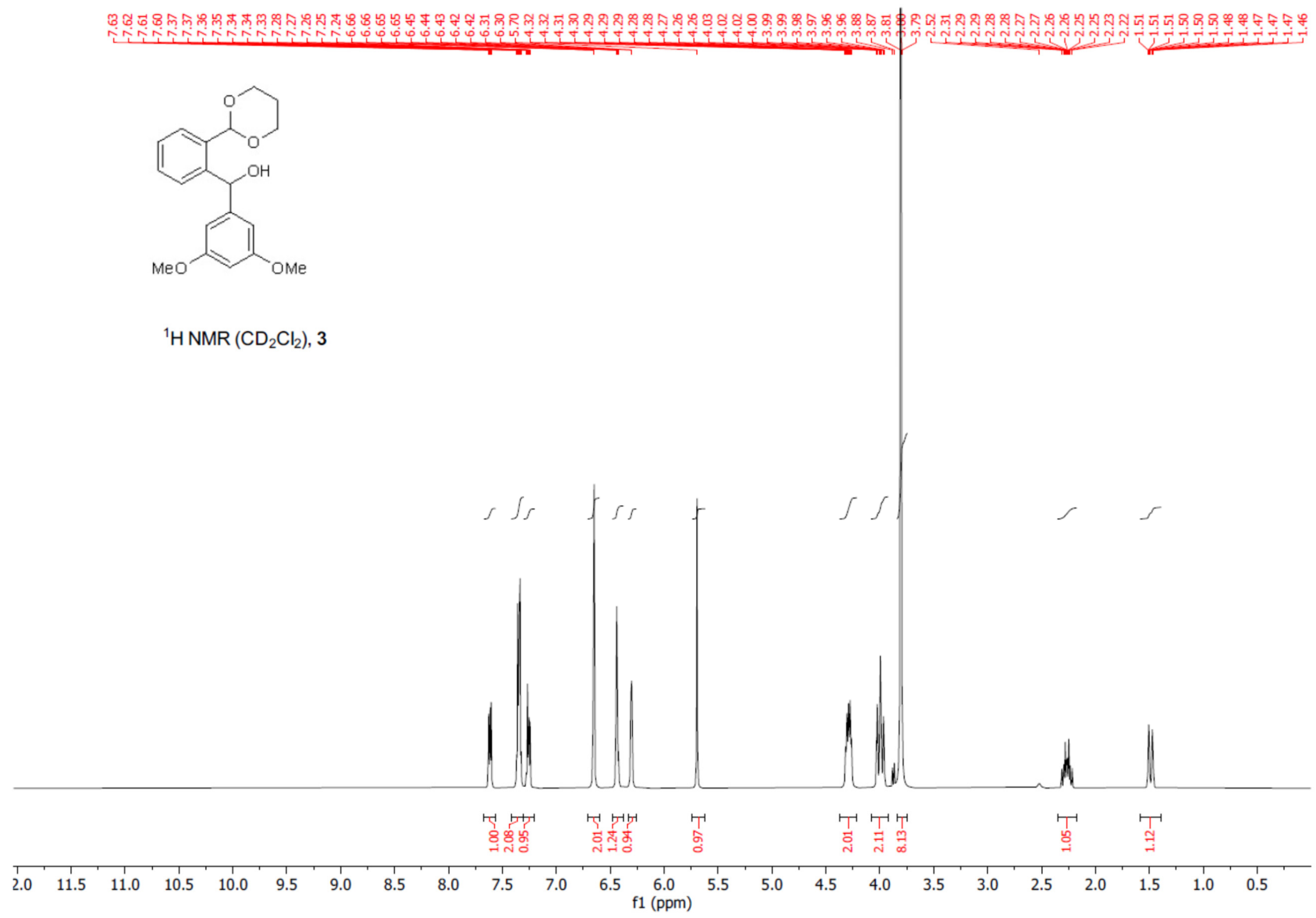
| | |
|---------------|---------|
| NMR spectra | S2-S66 |
| FT IR spectra | S67-S69 |

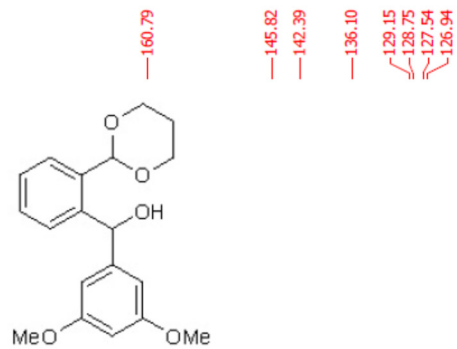
NMR Spectra



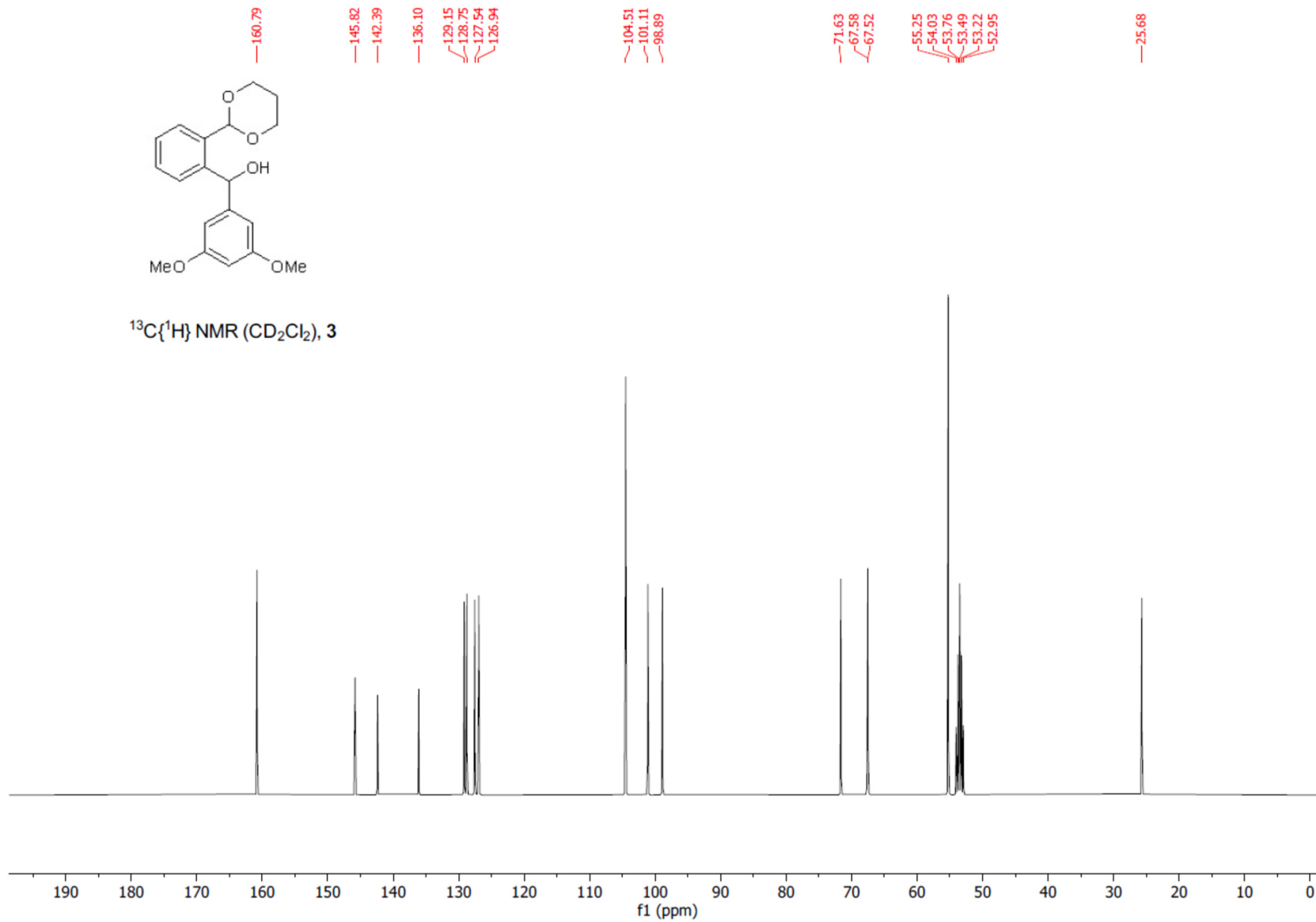
S2

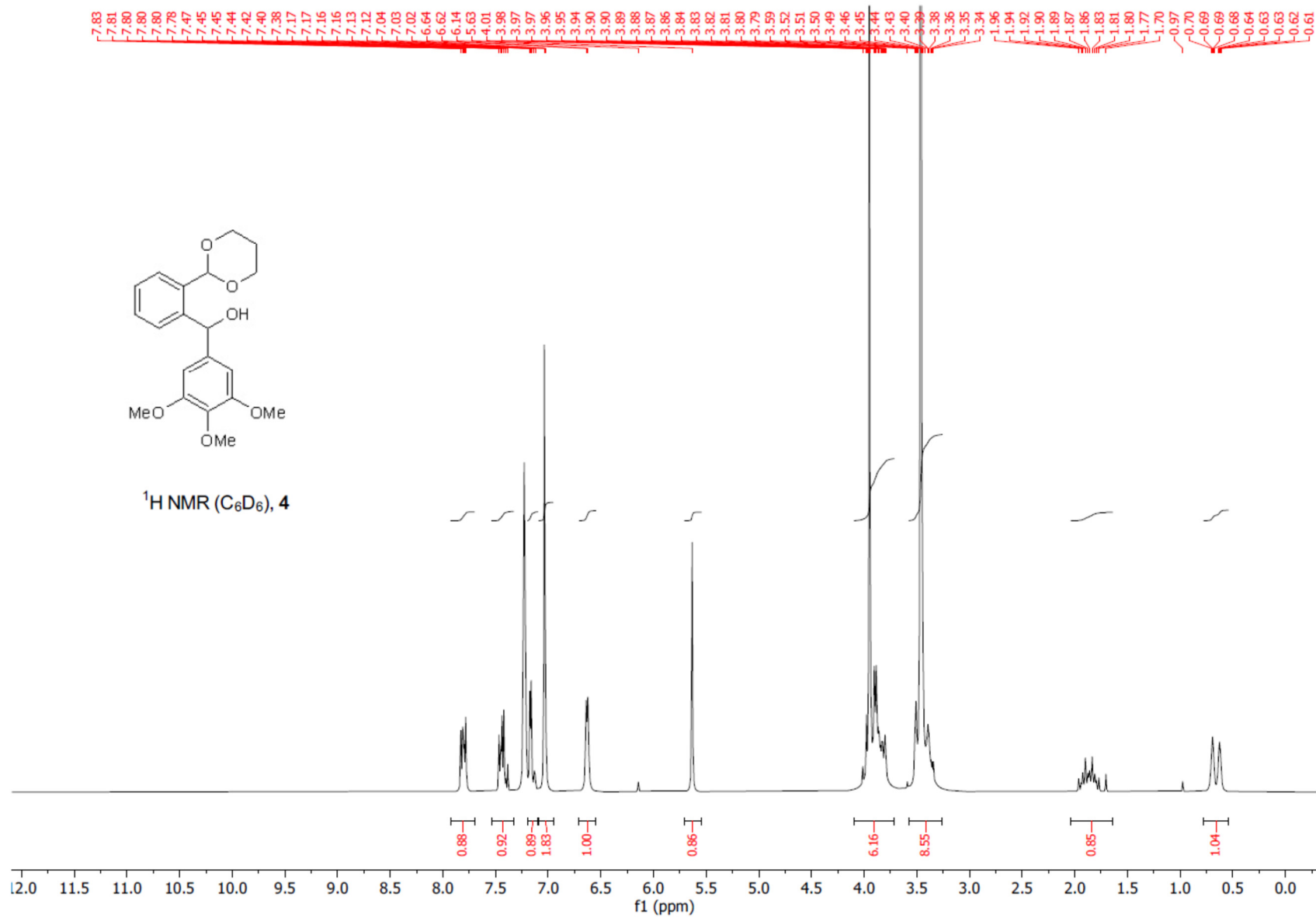


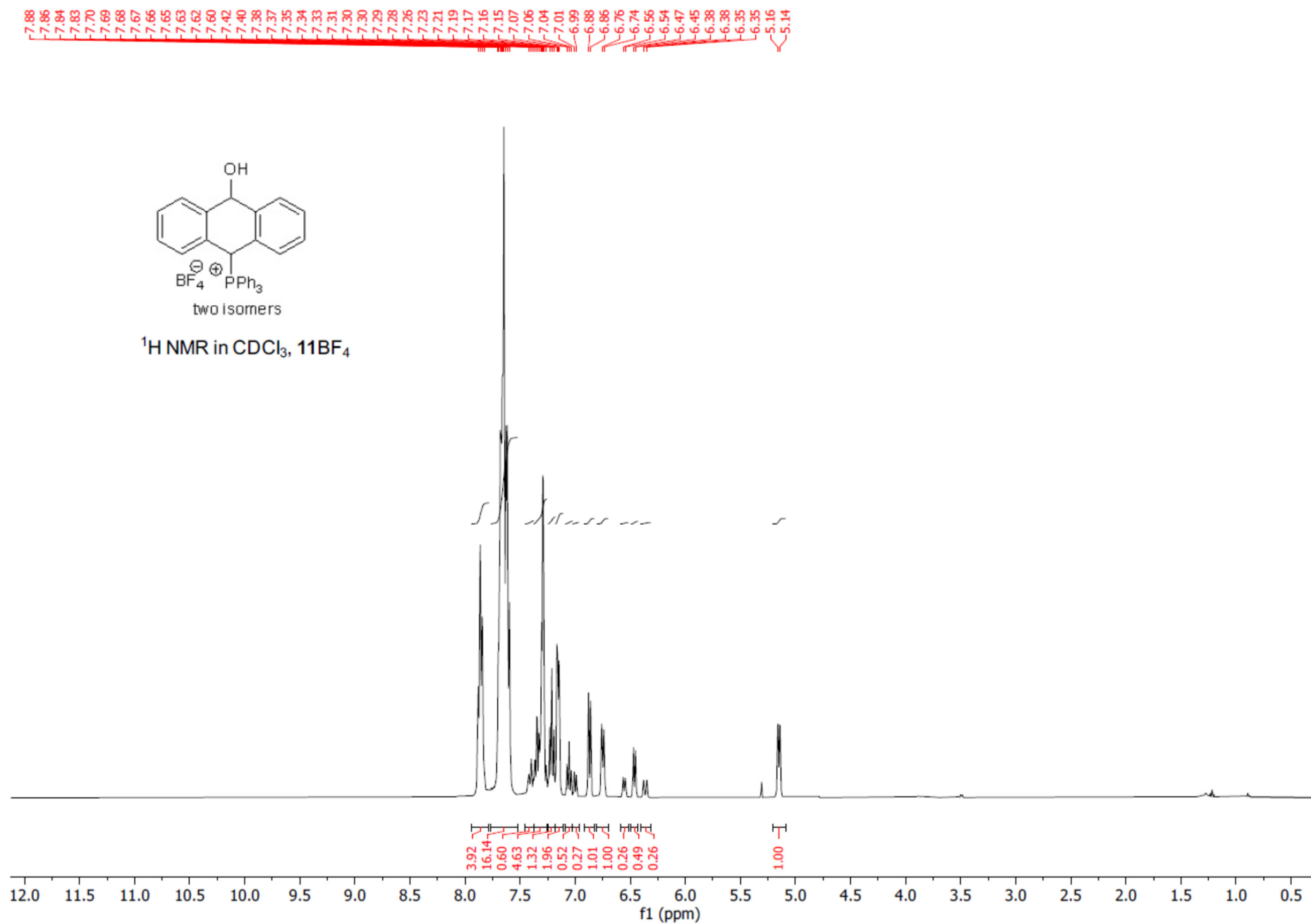


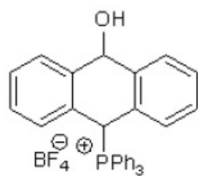


$^{13}\text{C}\{^1\text{H}\}$ NMR (CD_2Cl_2), 3



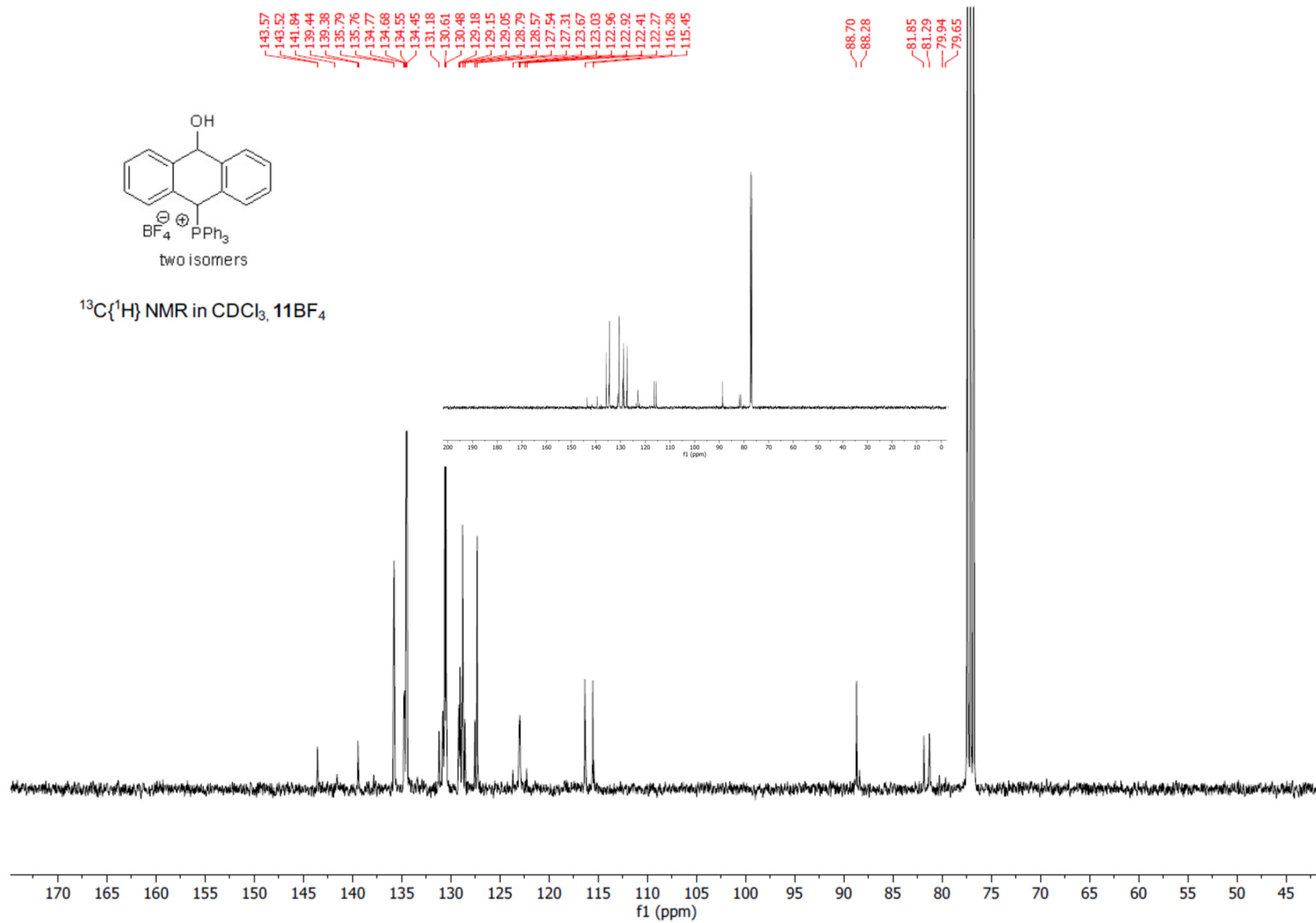


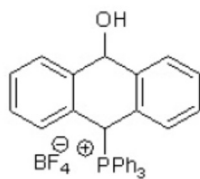




two isomers

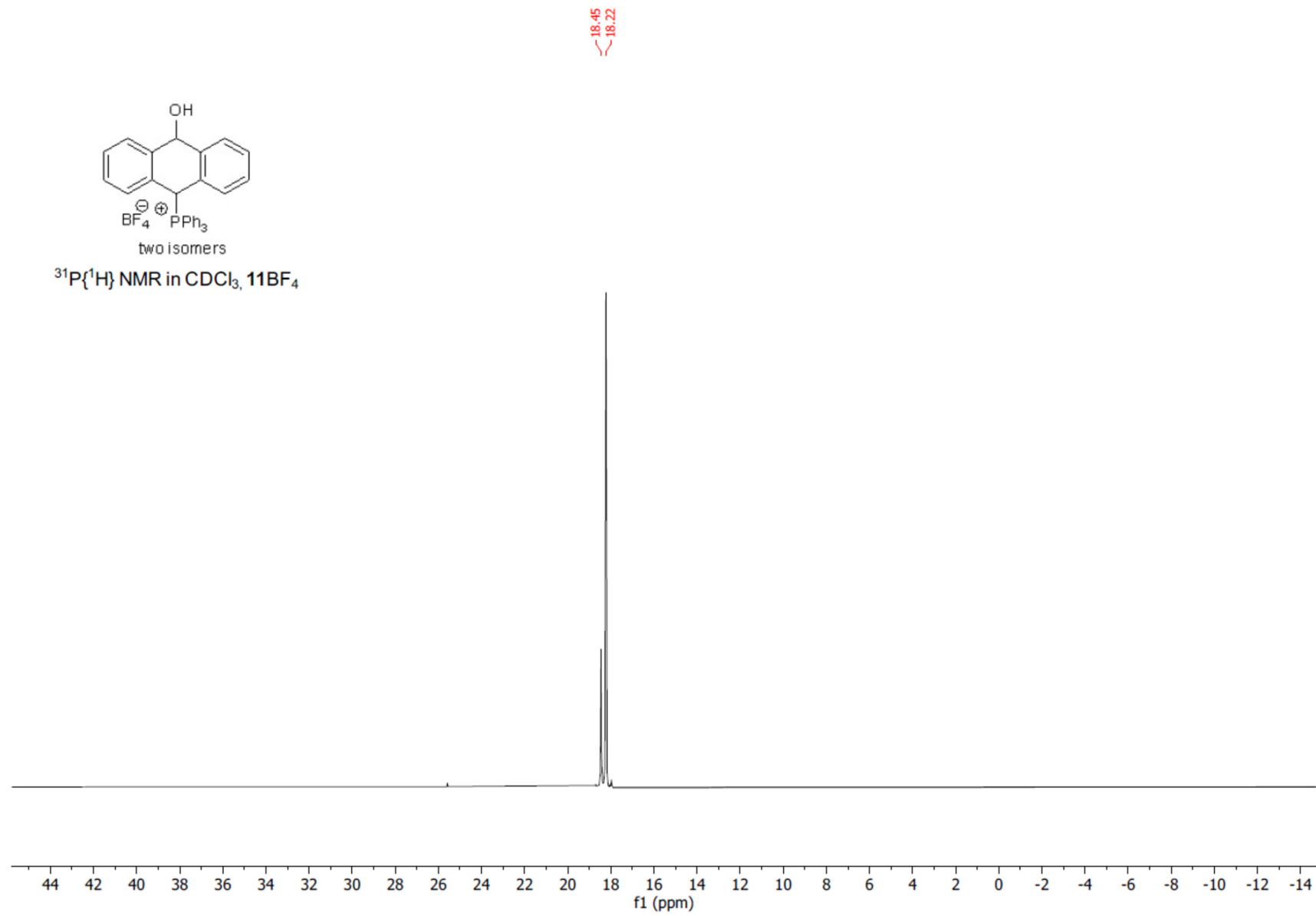
$^{13}\text{C}\{^1\text{H}\}$ NMR in CDCl_3 , 11BF_4

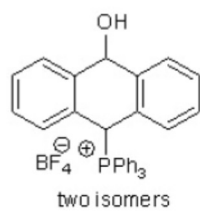




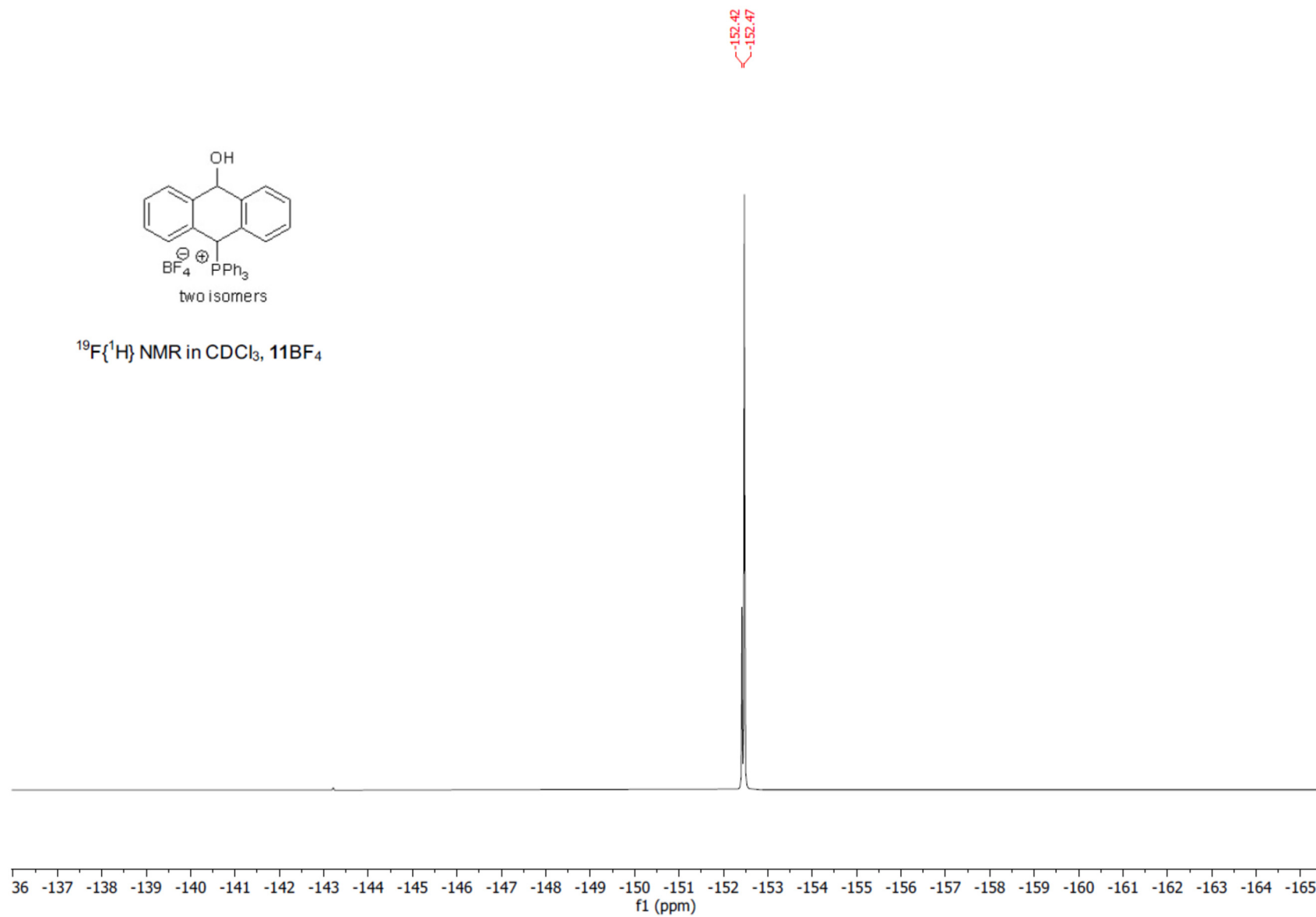
two isomers

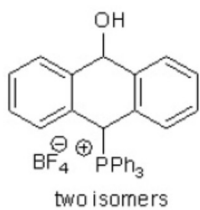
³¹P{¹H} NMR in CDCl₃, 11BF₄



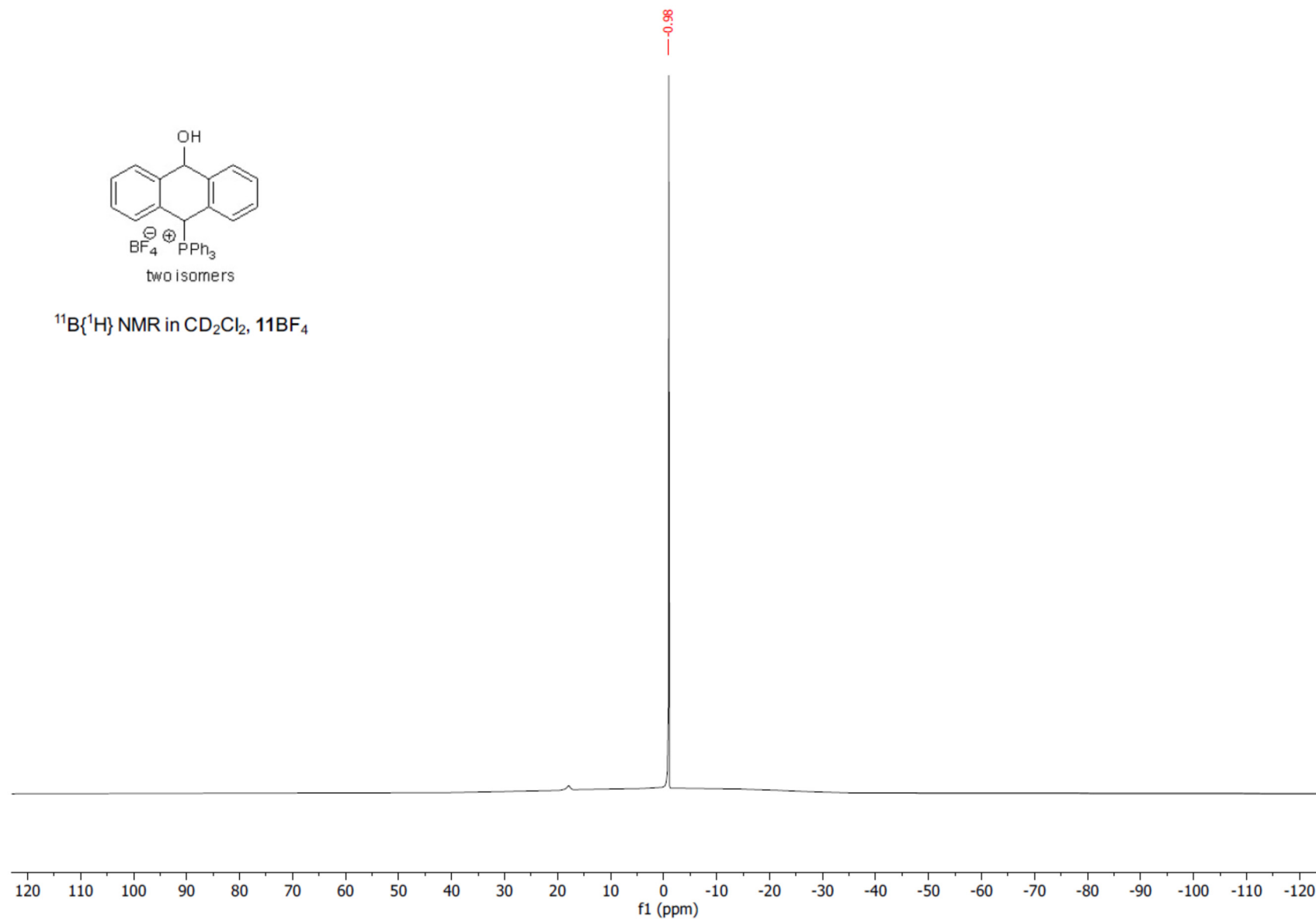


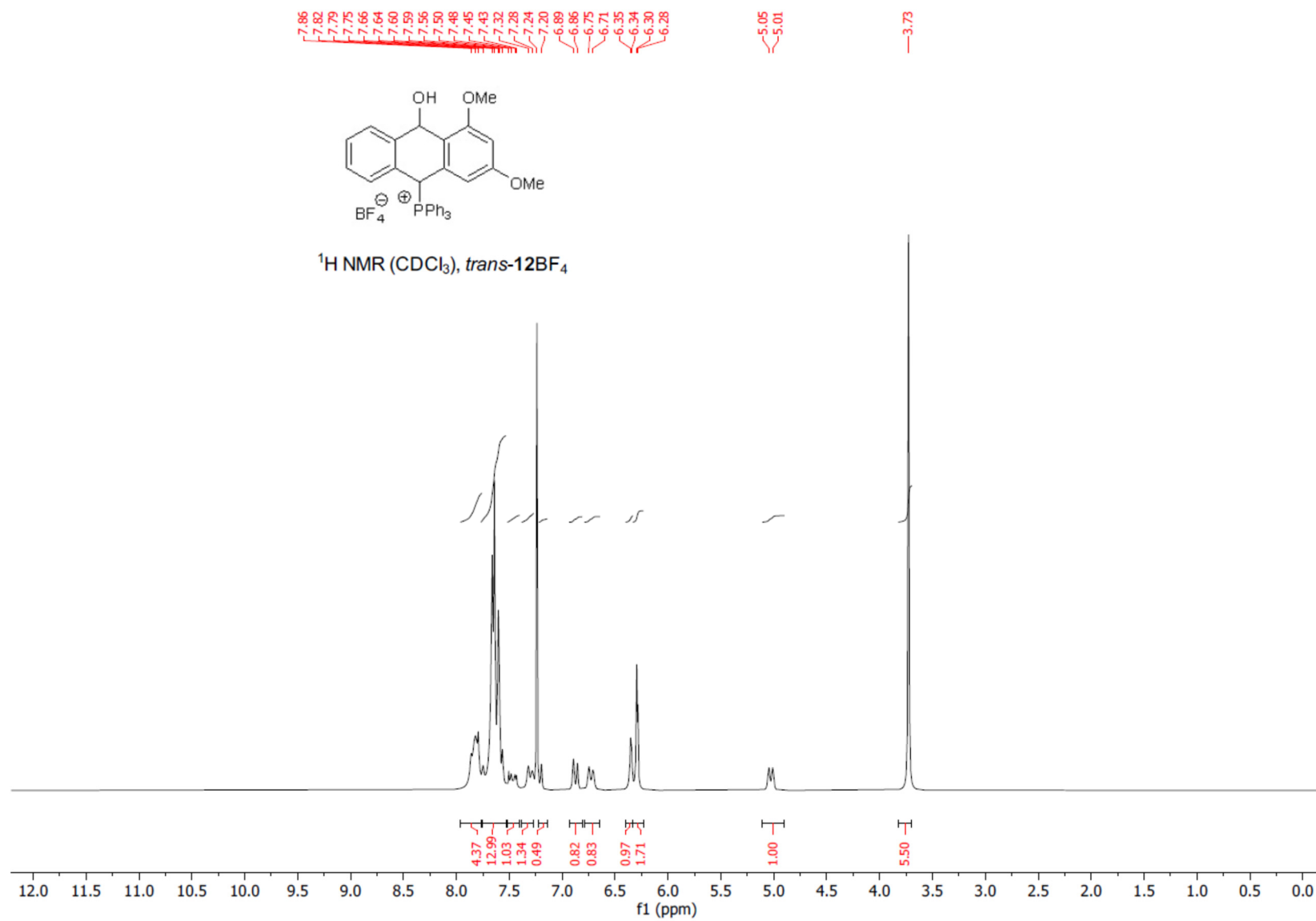
$^{19}\text{F}\{^1\text{H}\}$ NMR in CDCl_3 , 11BF_4

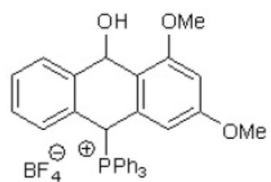




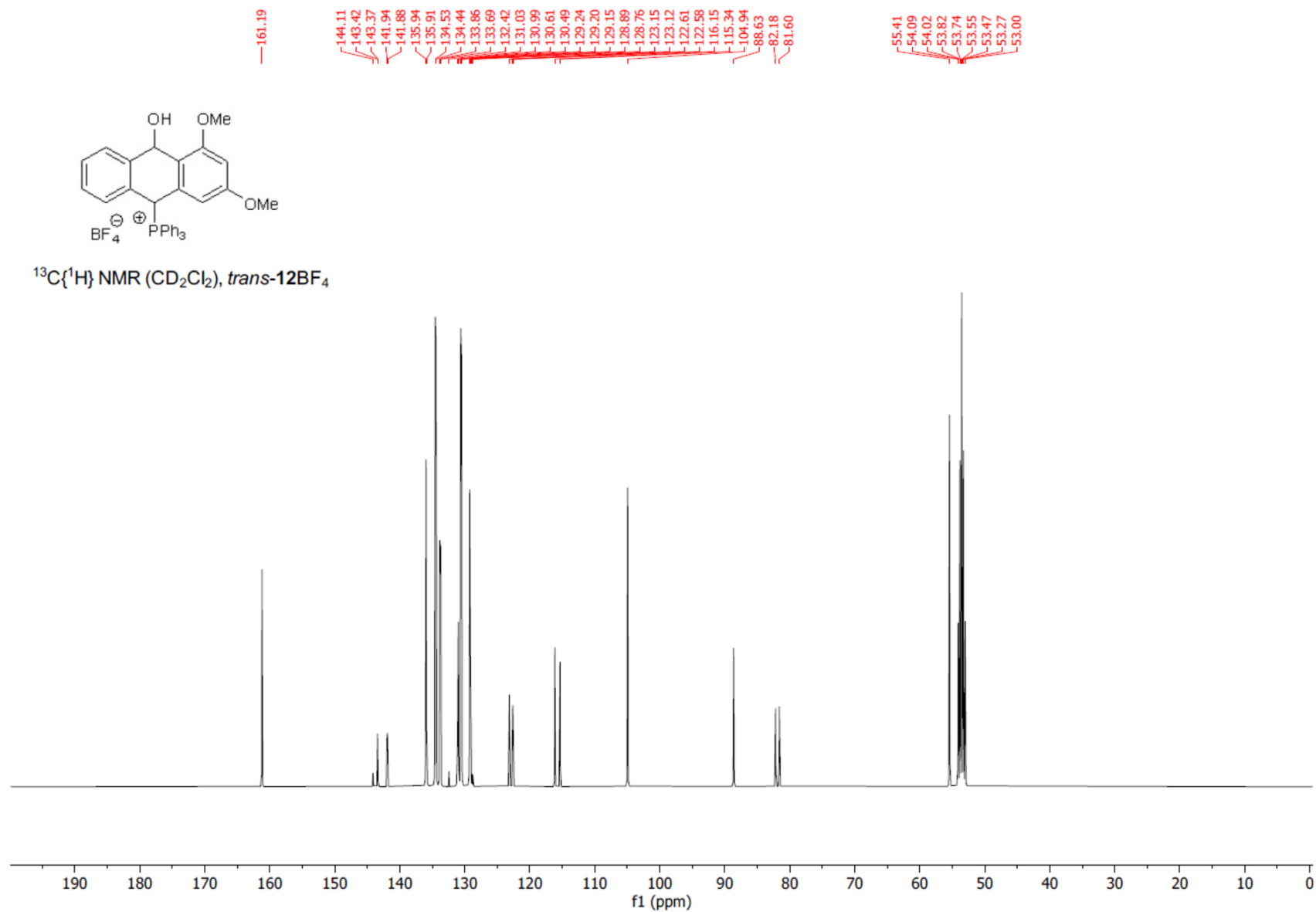
$^{11}\text{B}\{^1\text{H}\}$ NMR in CD_2Cl_2 , 11BF_4

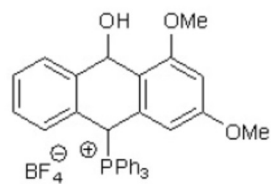




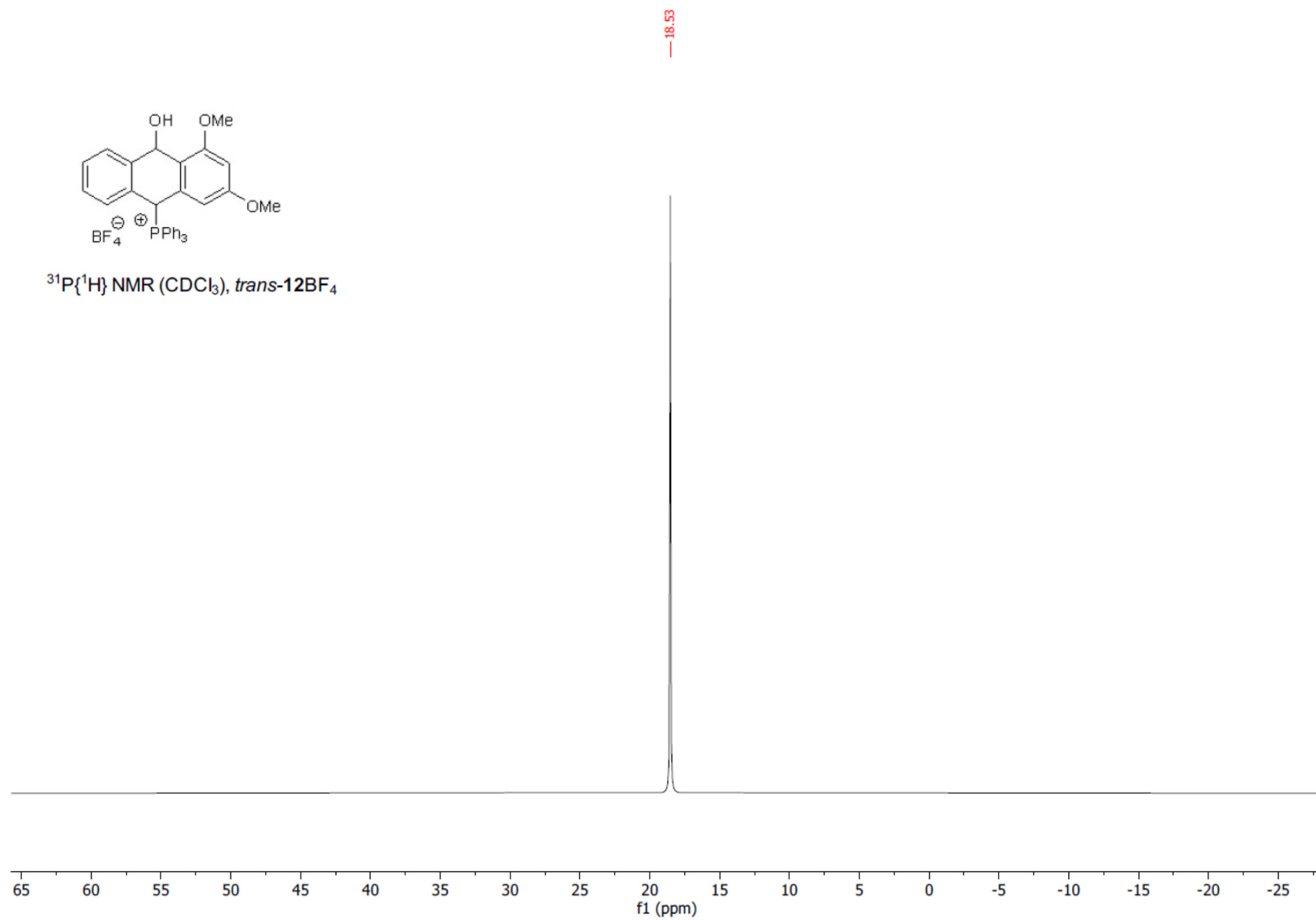


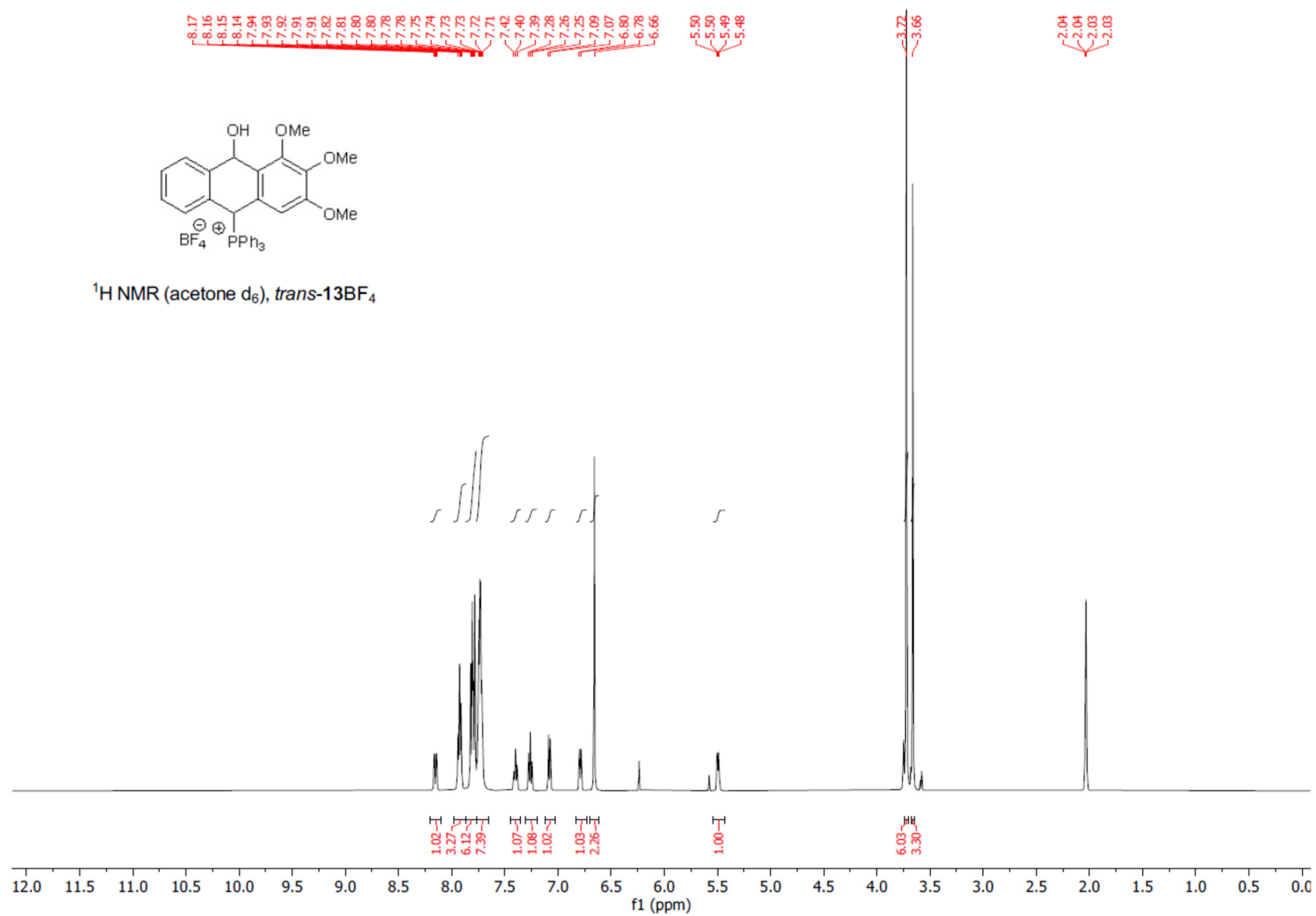
$^{13}\text{C}\{^1\text{H}\}$ NMR (CD_2Cl_2), *trans*-12BF₄

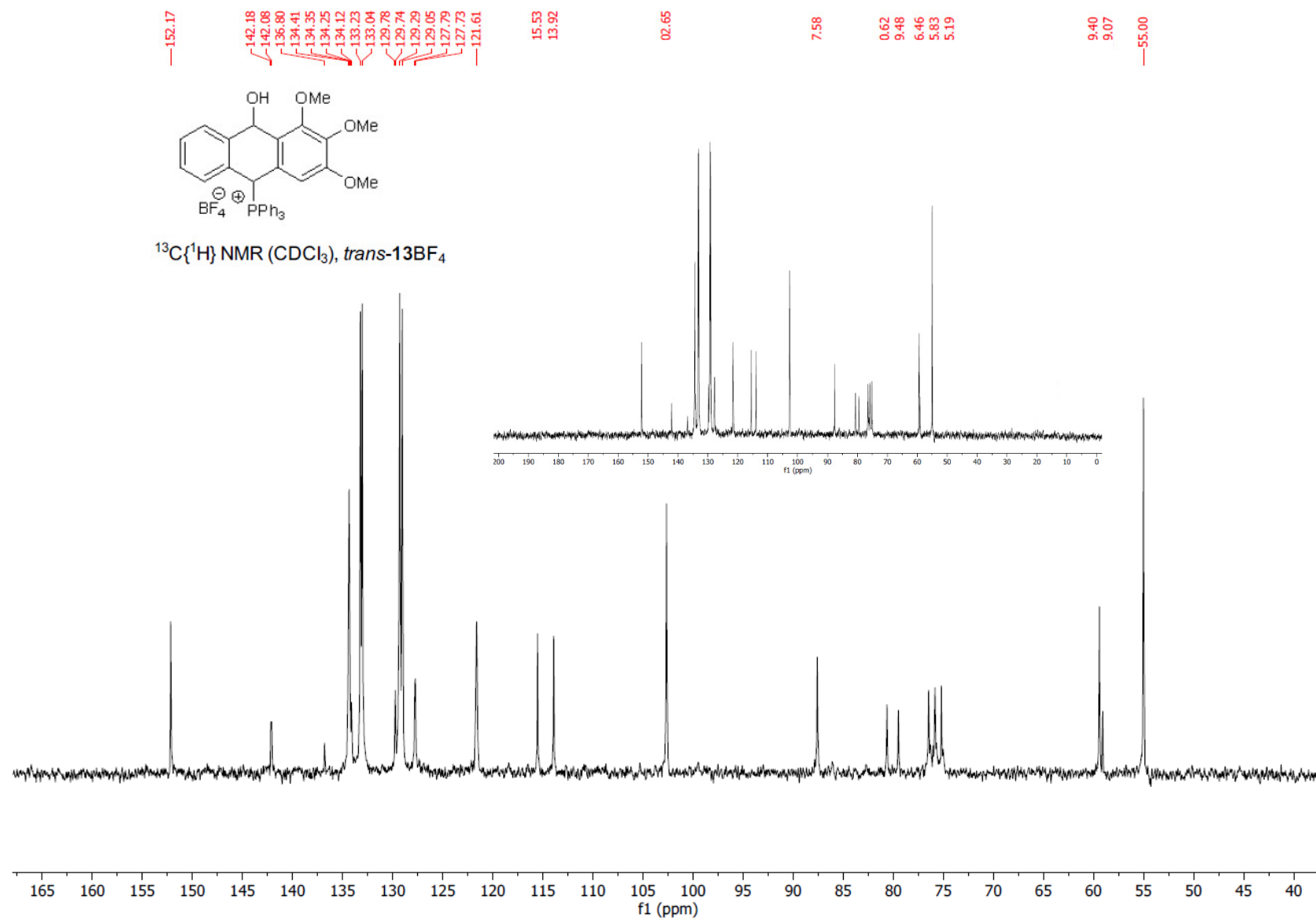


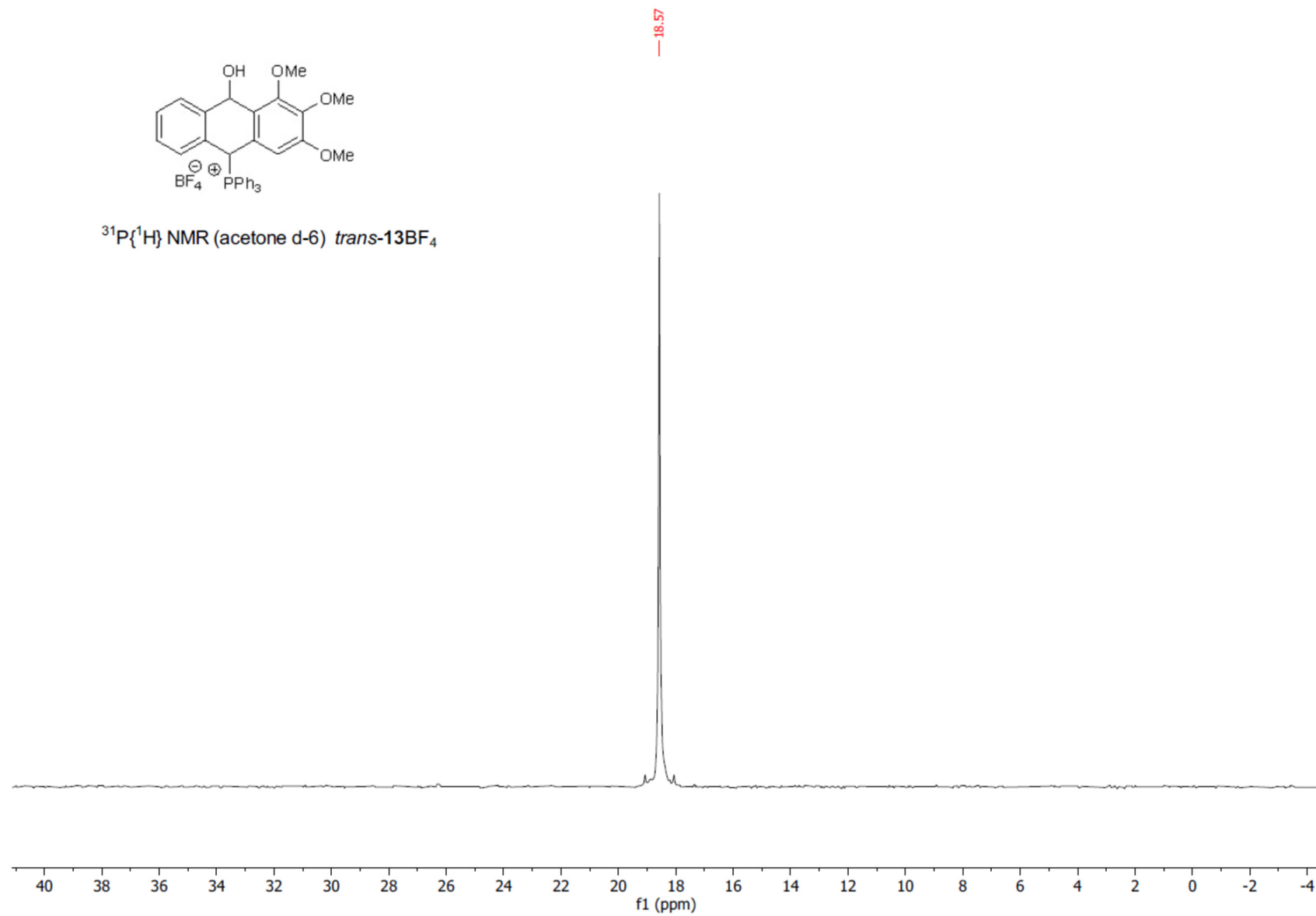


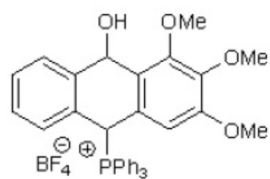
$^{31}\text{P}\{^1\text{H}\}$ NMR (CDCl_3), *trans*-12 BF_4



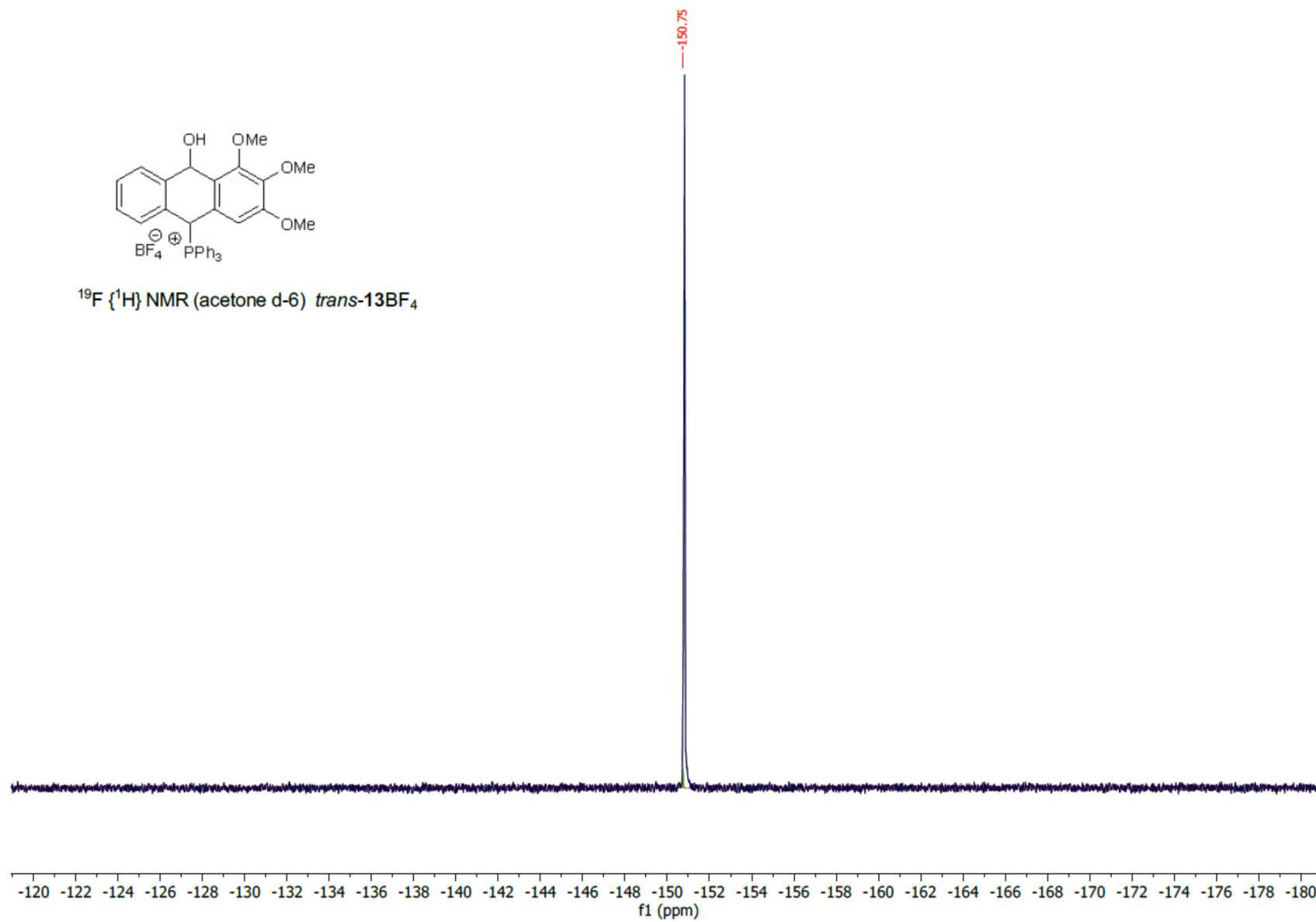


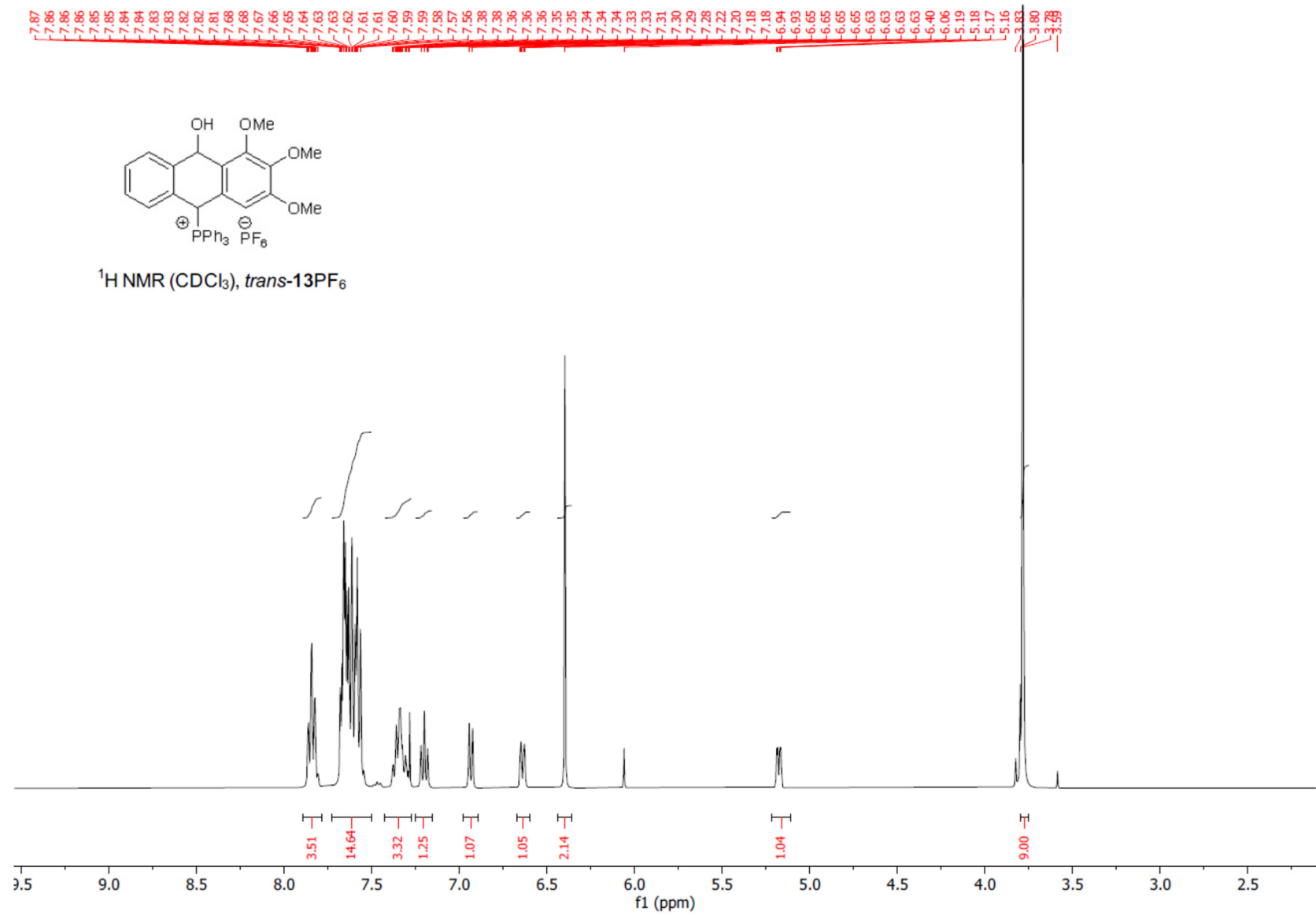


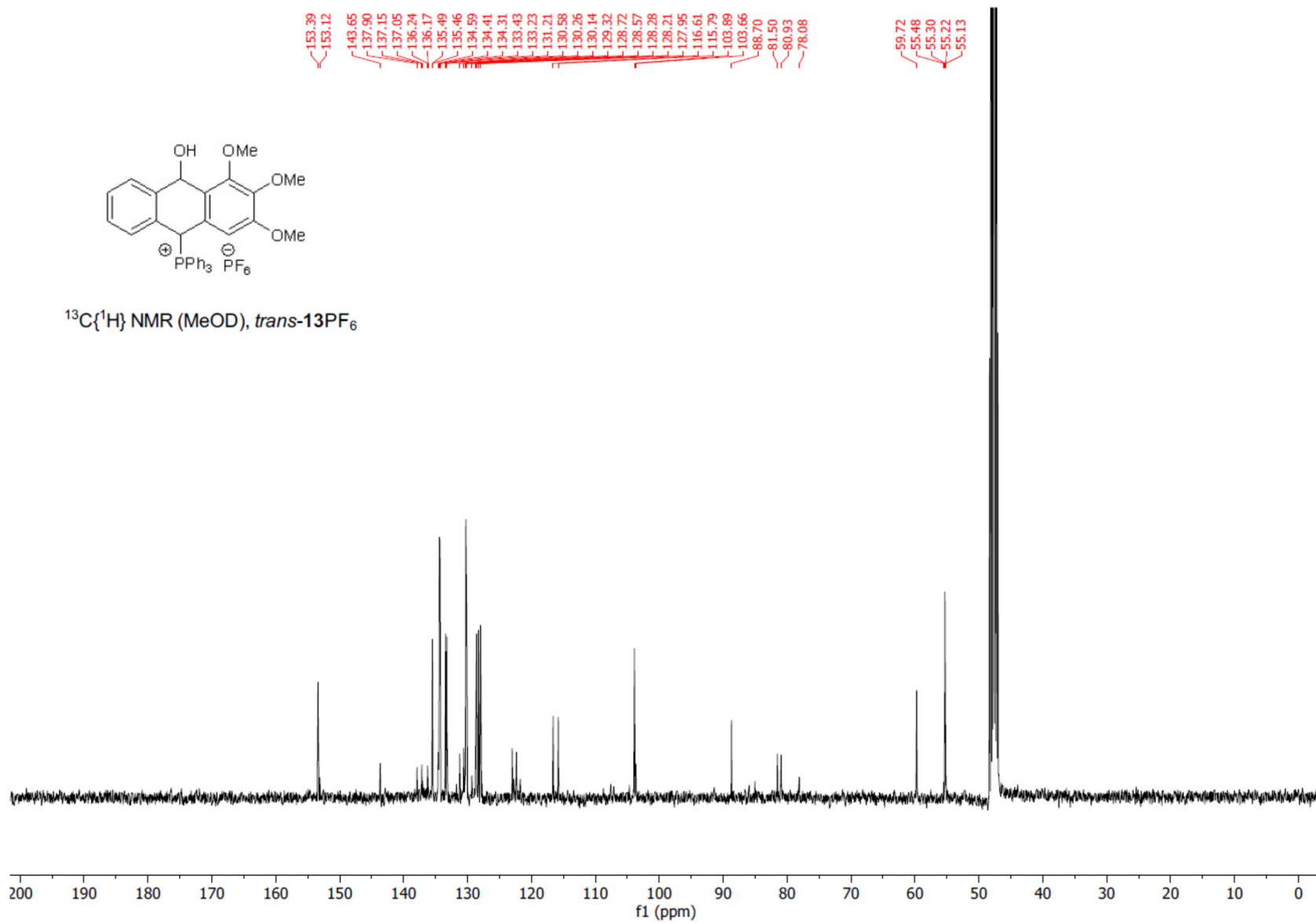


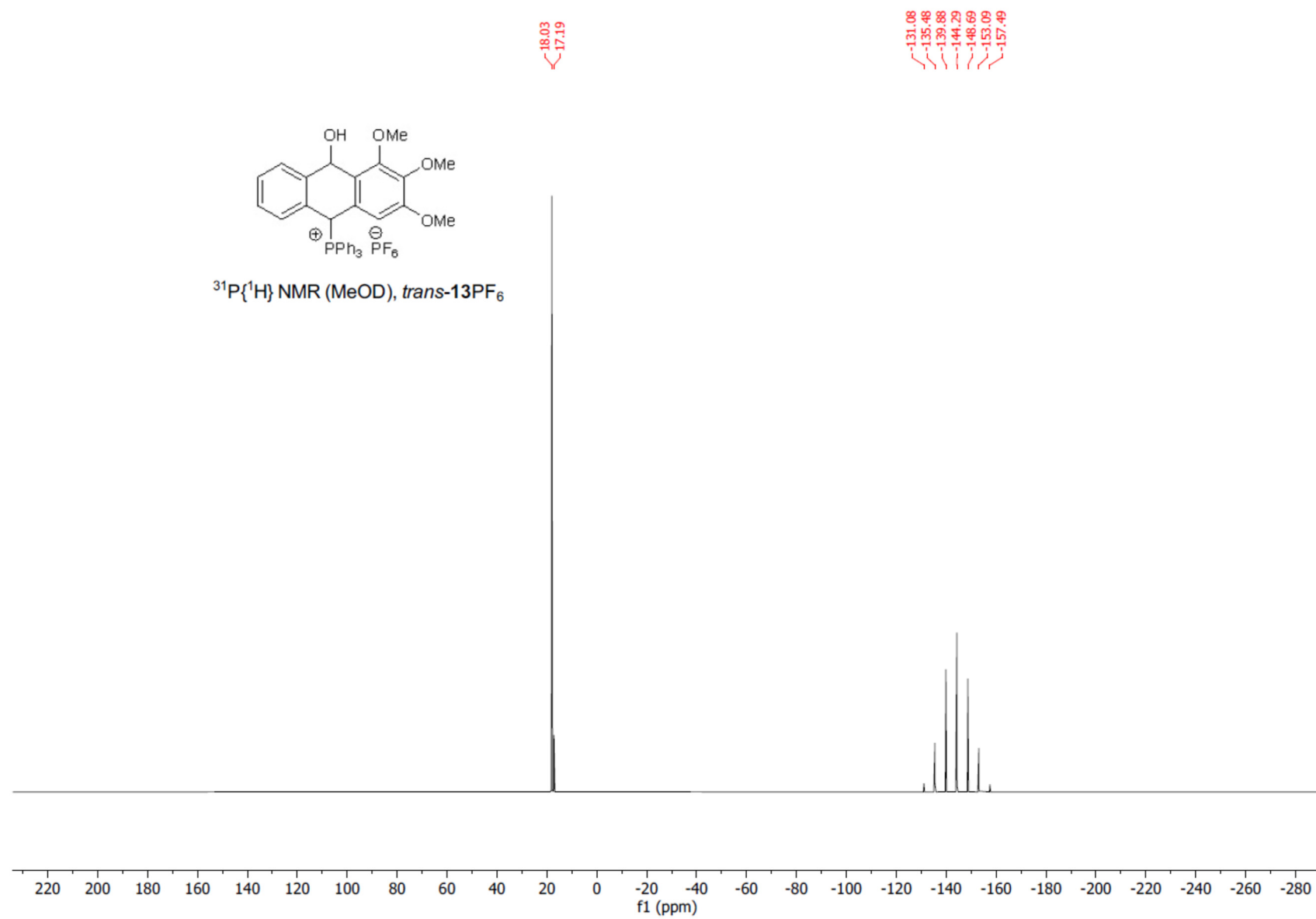


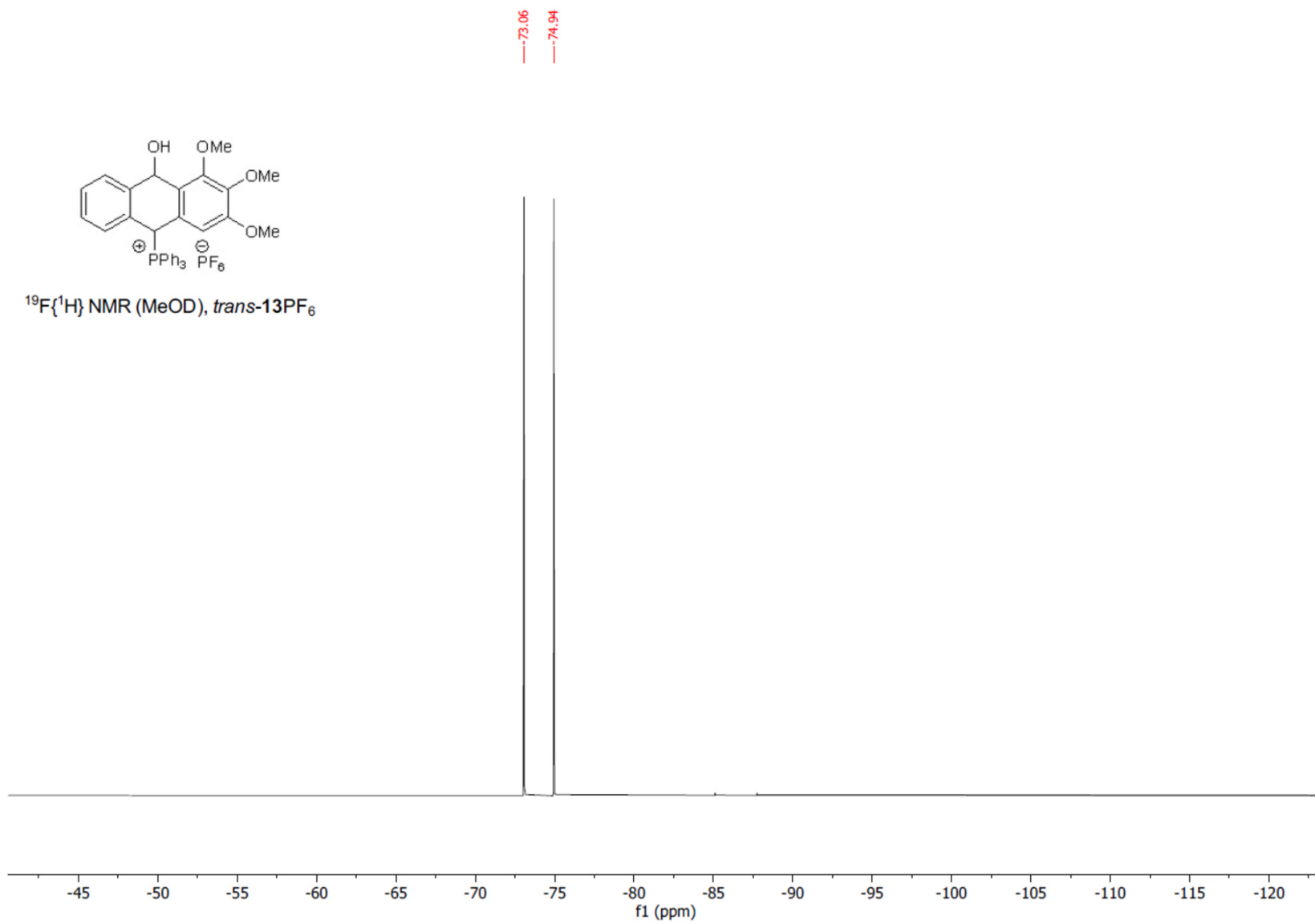
^{19}F $\{^1\text{H}\}$ NMR (acetone d-6) *trans*-13BF₄

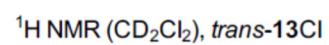


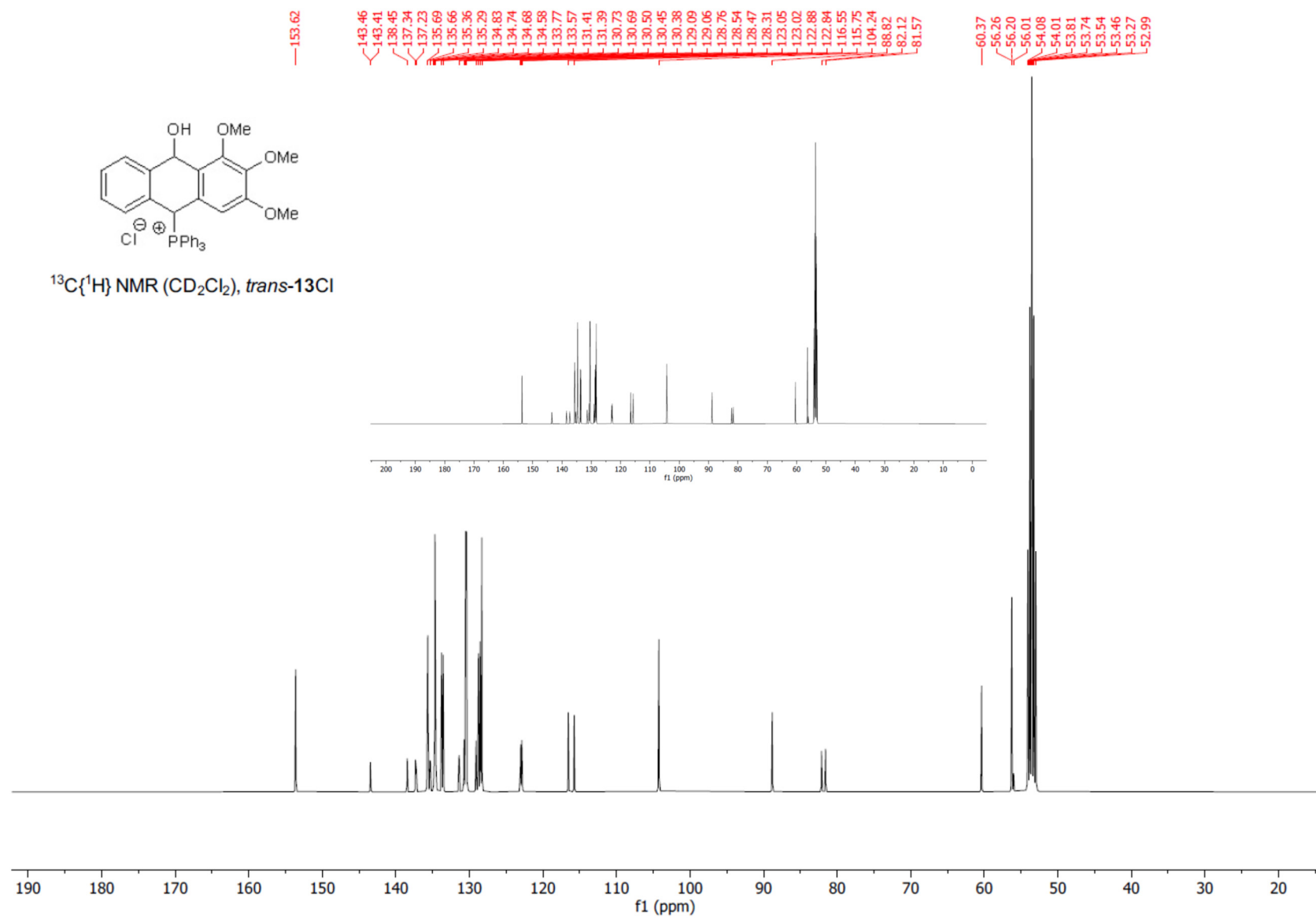


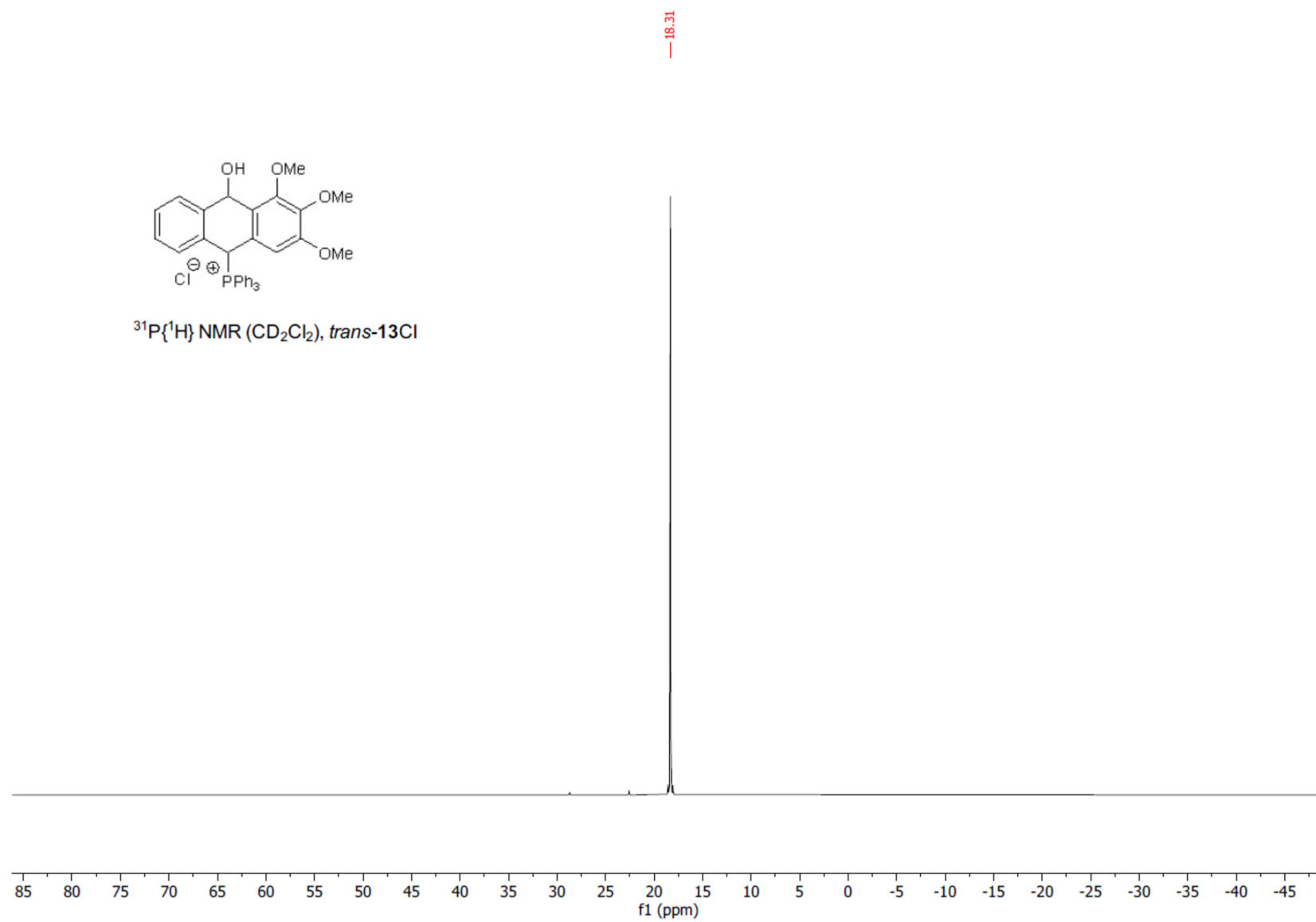


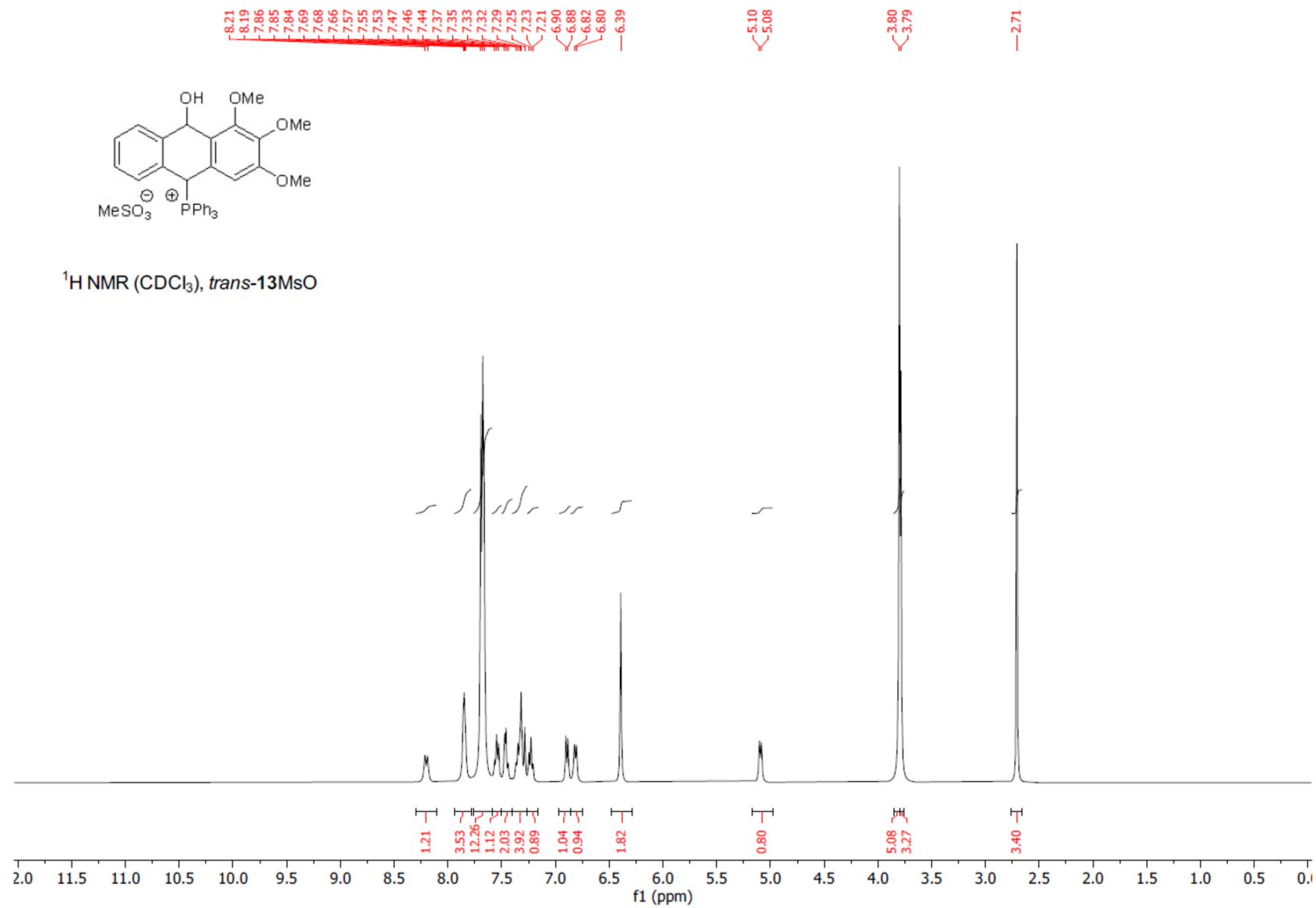


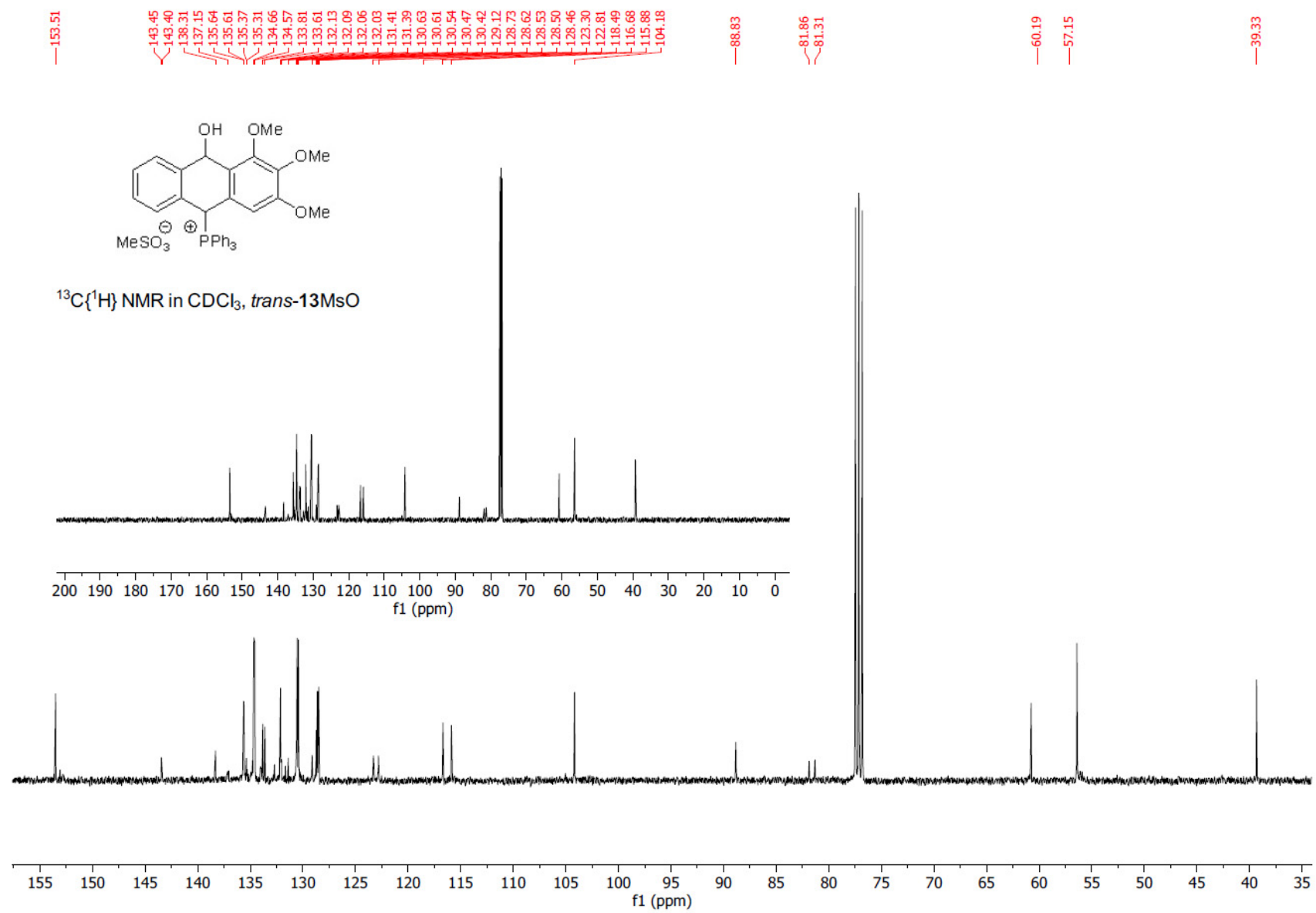


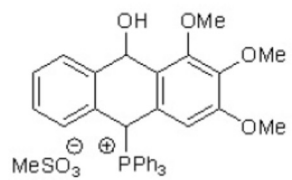




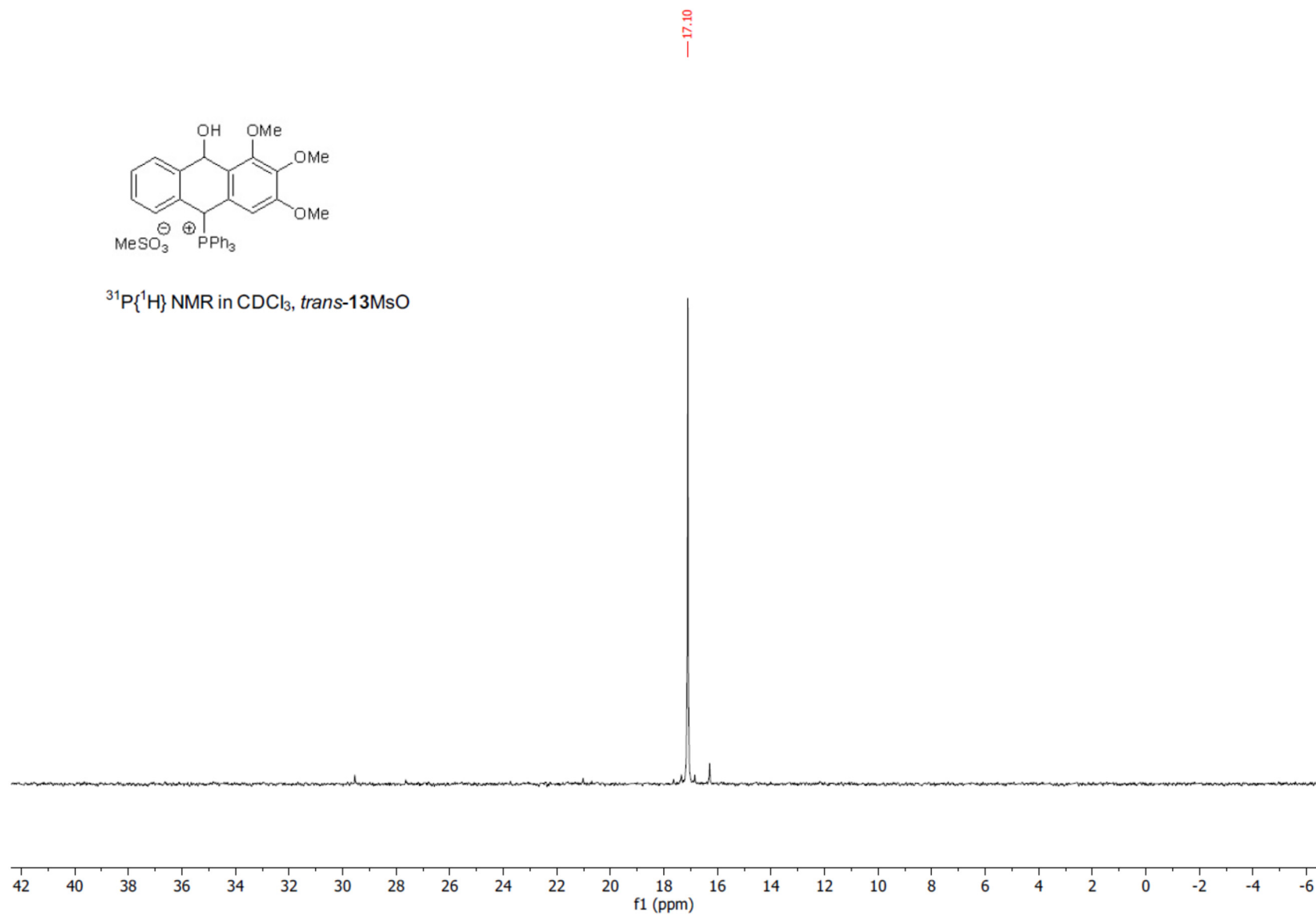


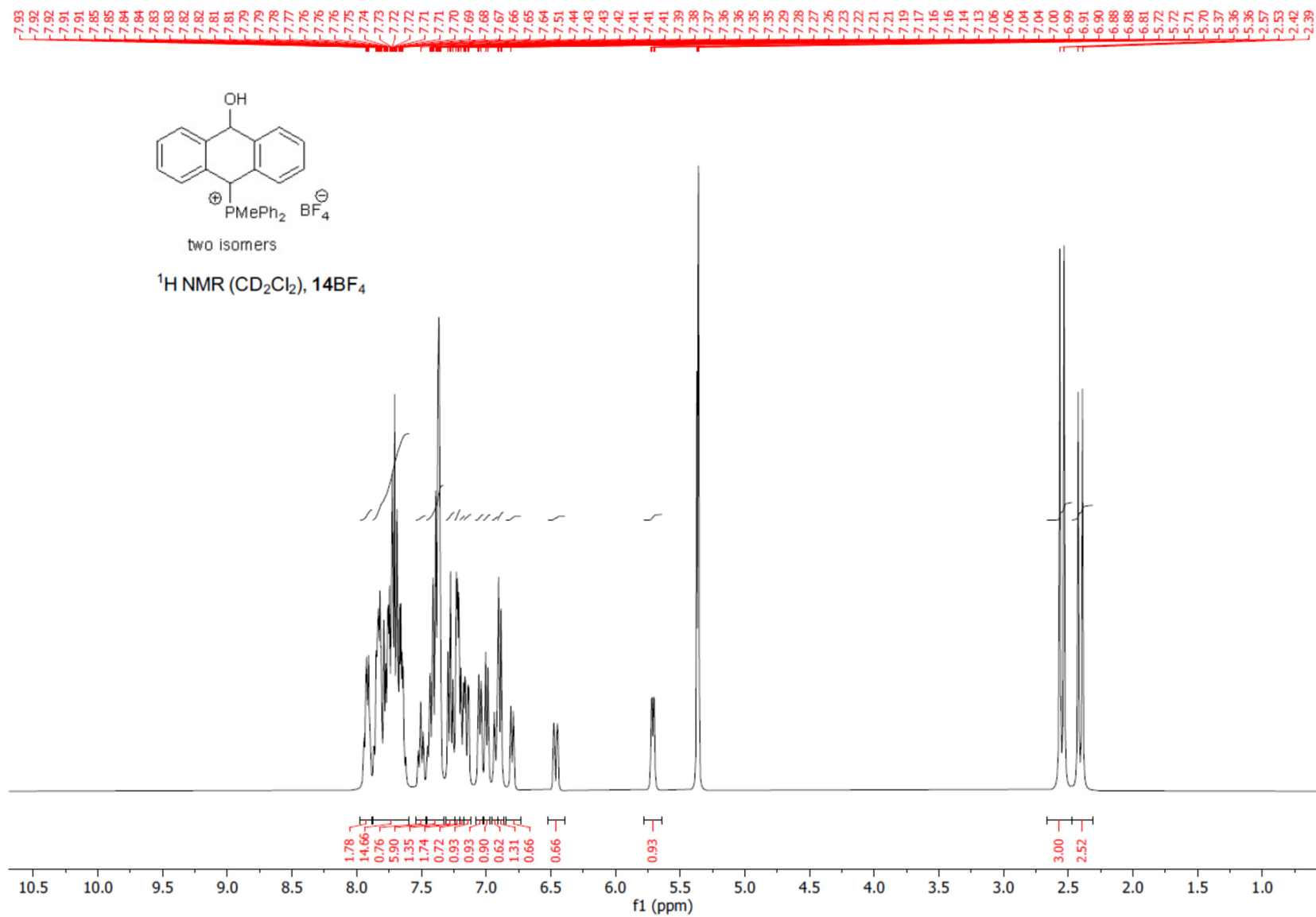


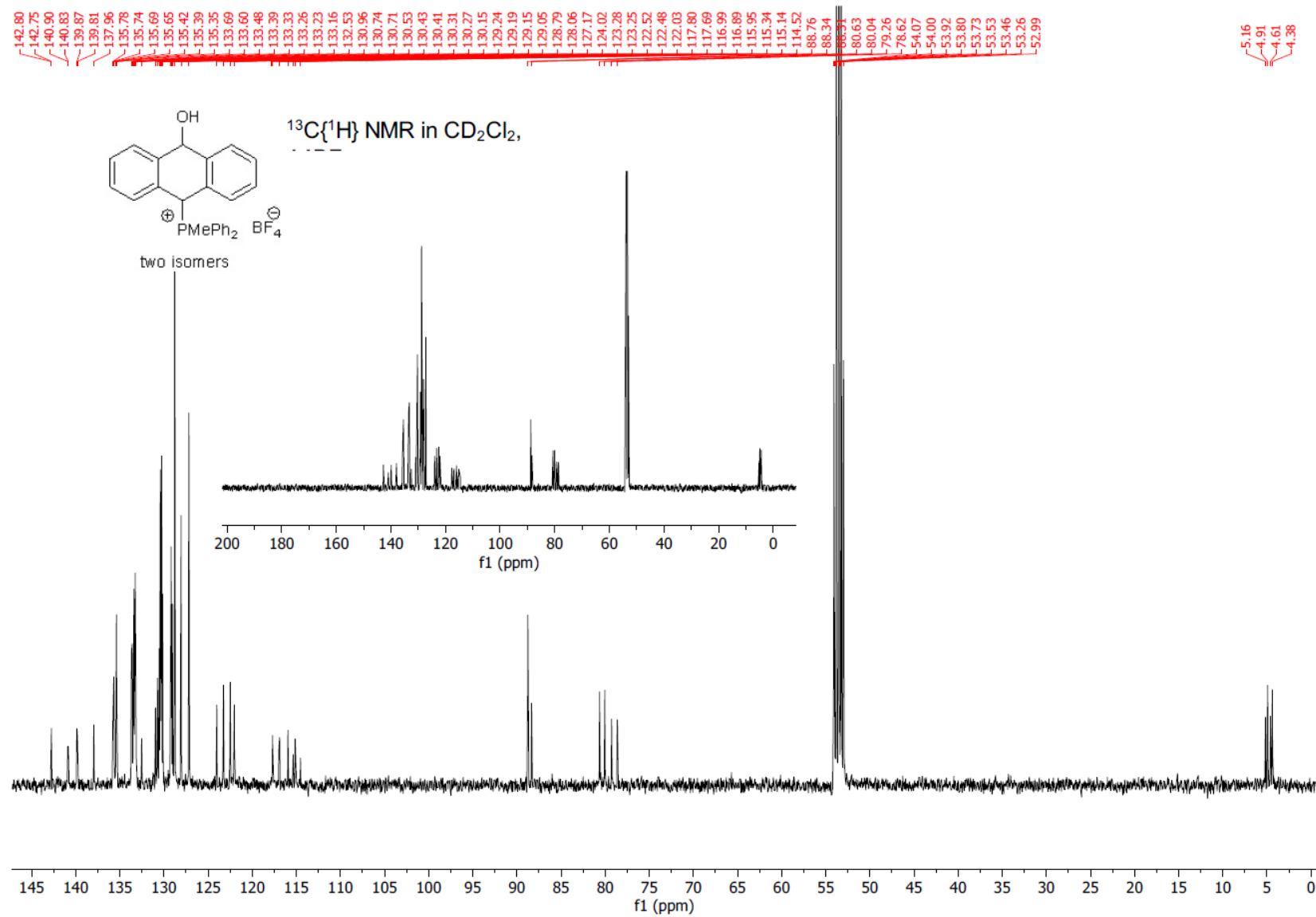


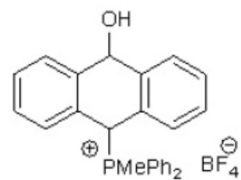


$^{31}\text{P}\{^1\text{H}\}$ NMR in CDCl_3 , *trans*-13MsO



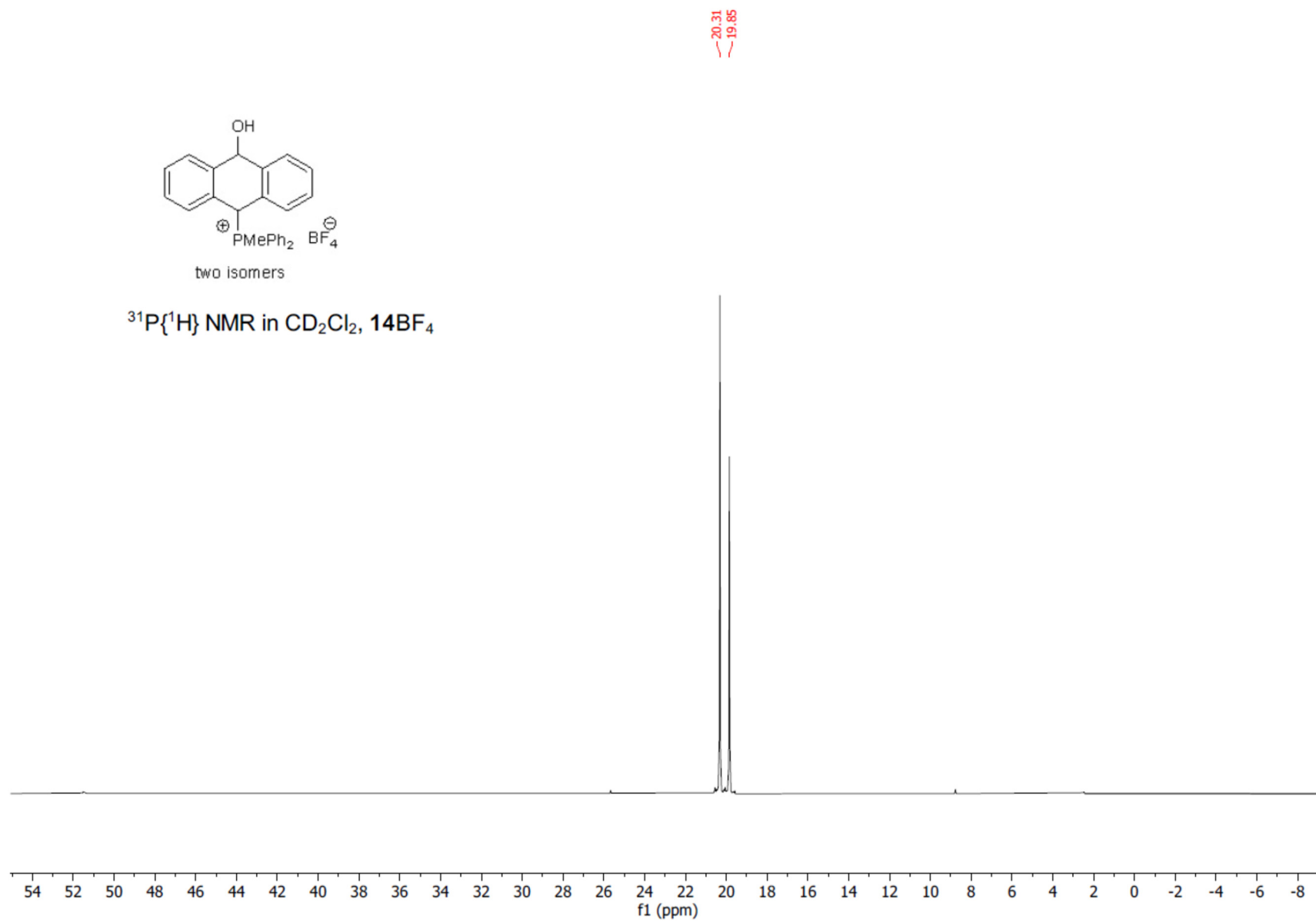


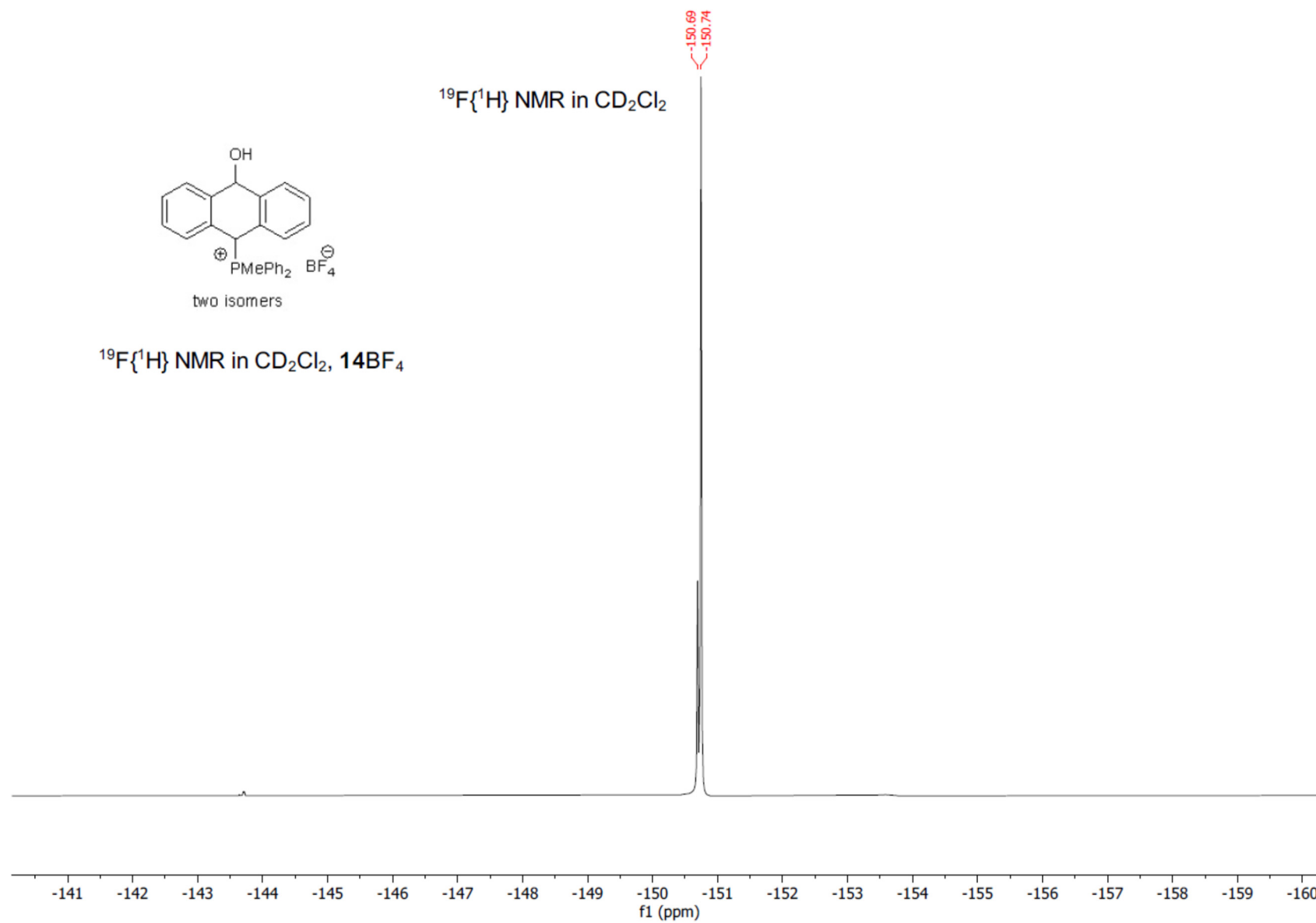


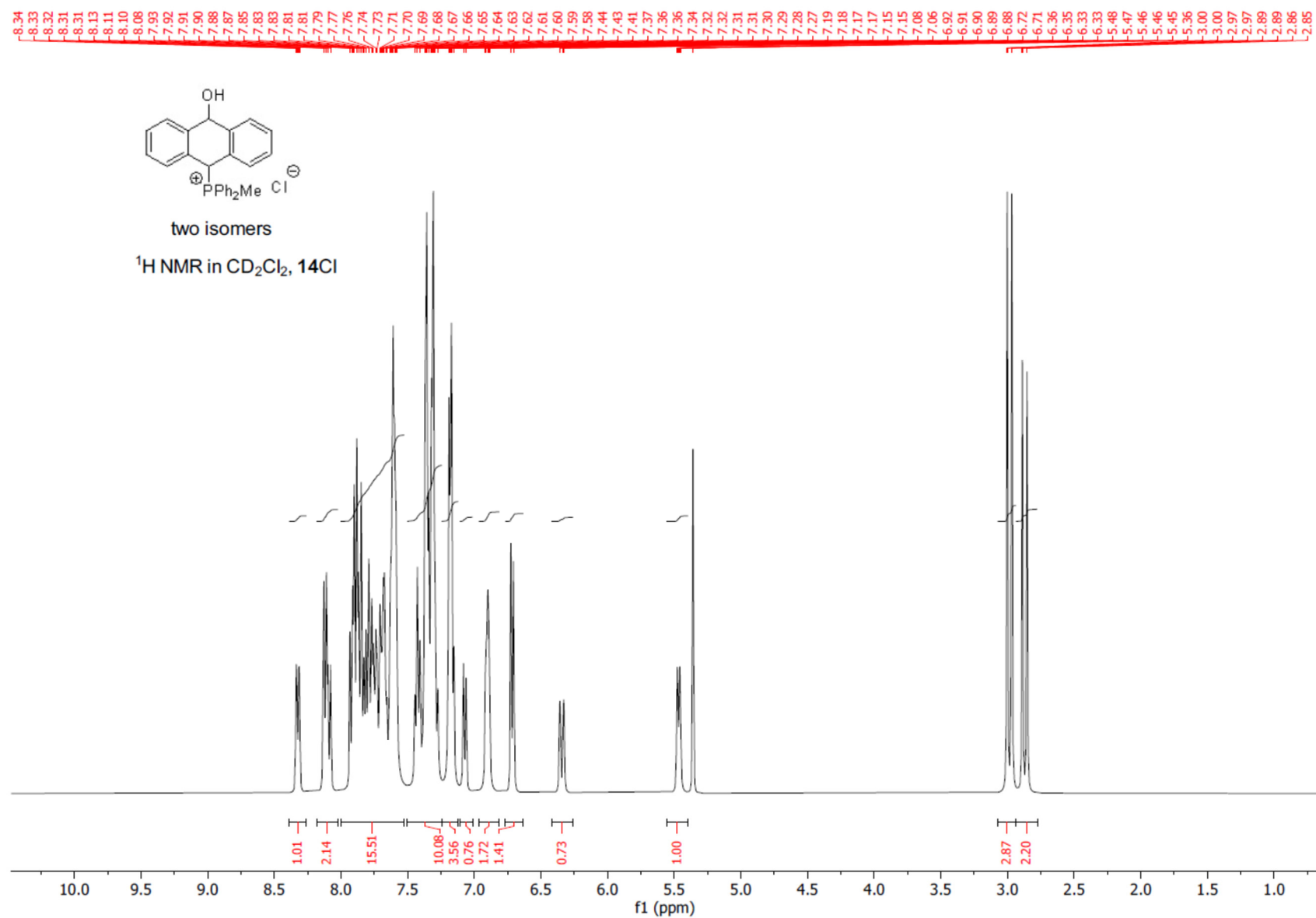


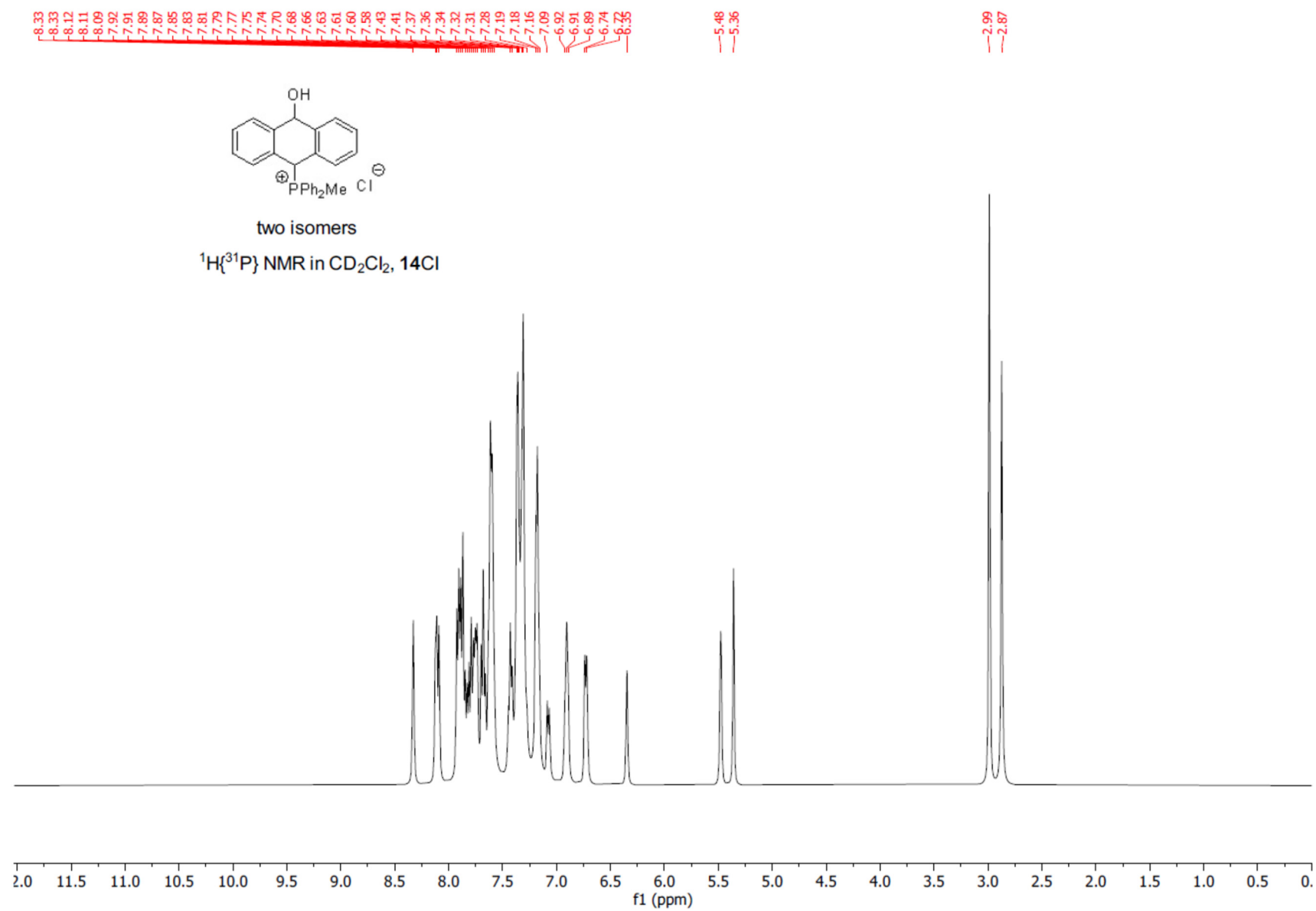
two isomers

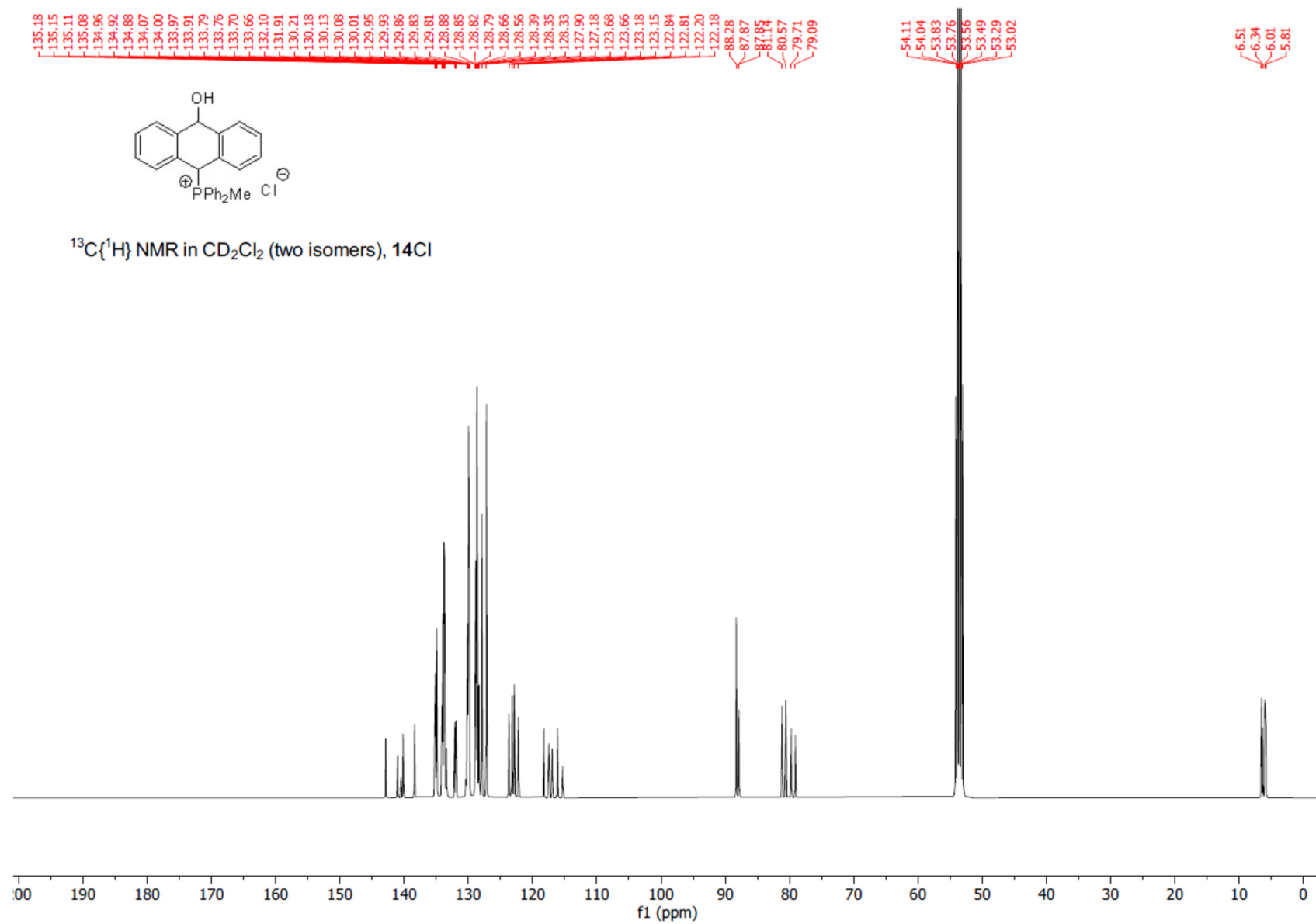
$^{31}\text{P}\{^1\text{H}\}$ NMR in CD_2Cl_2 , 14BF_4

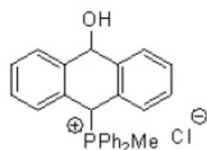




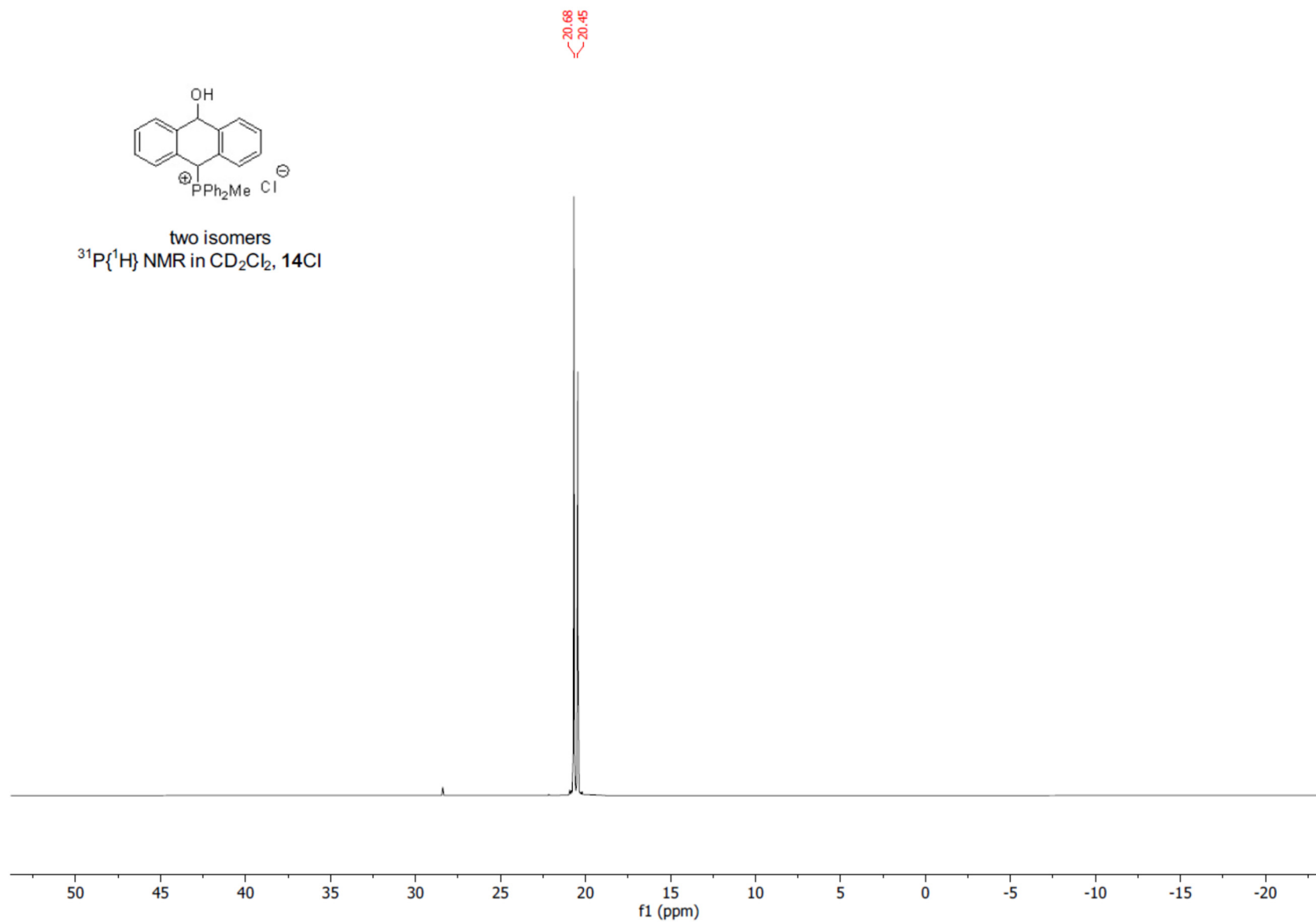


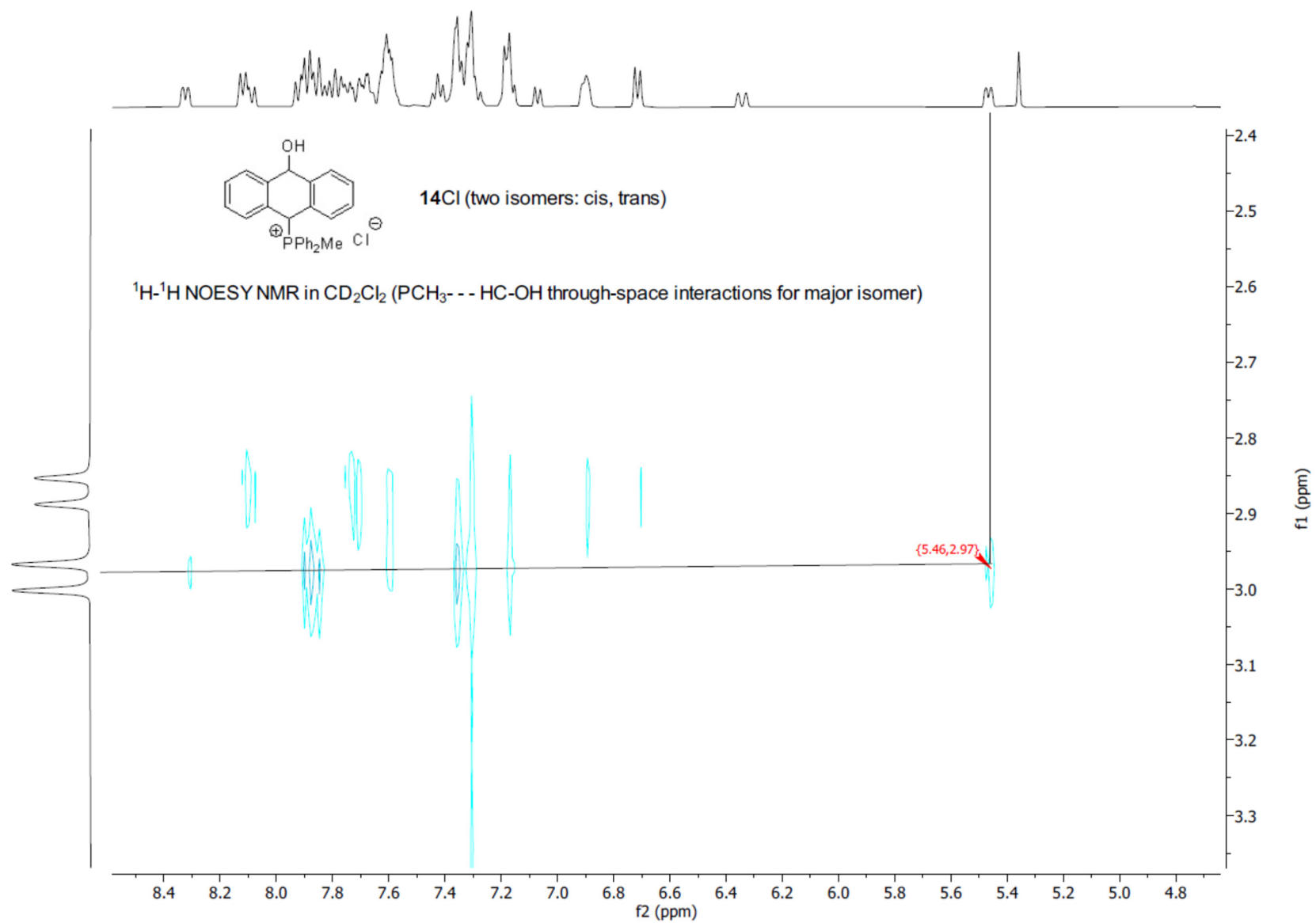


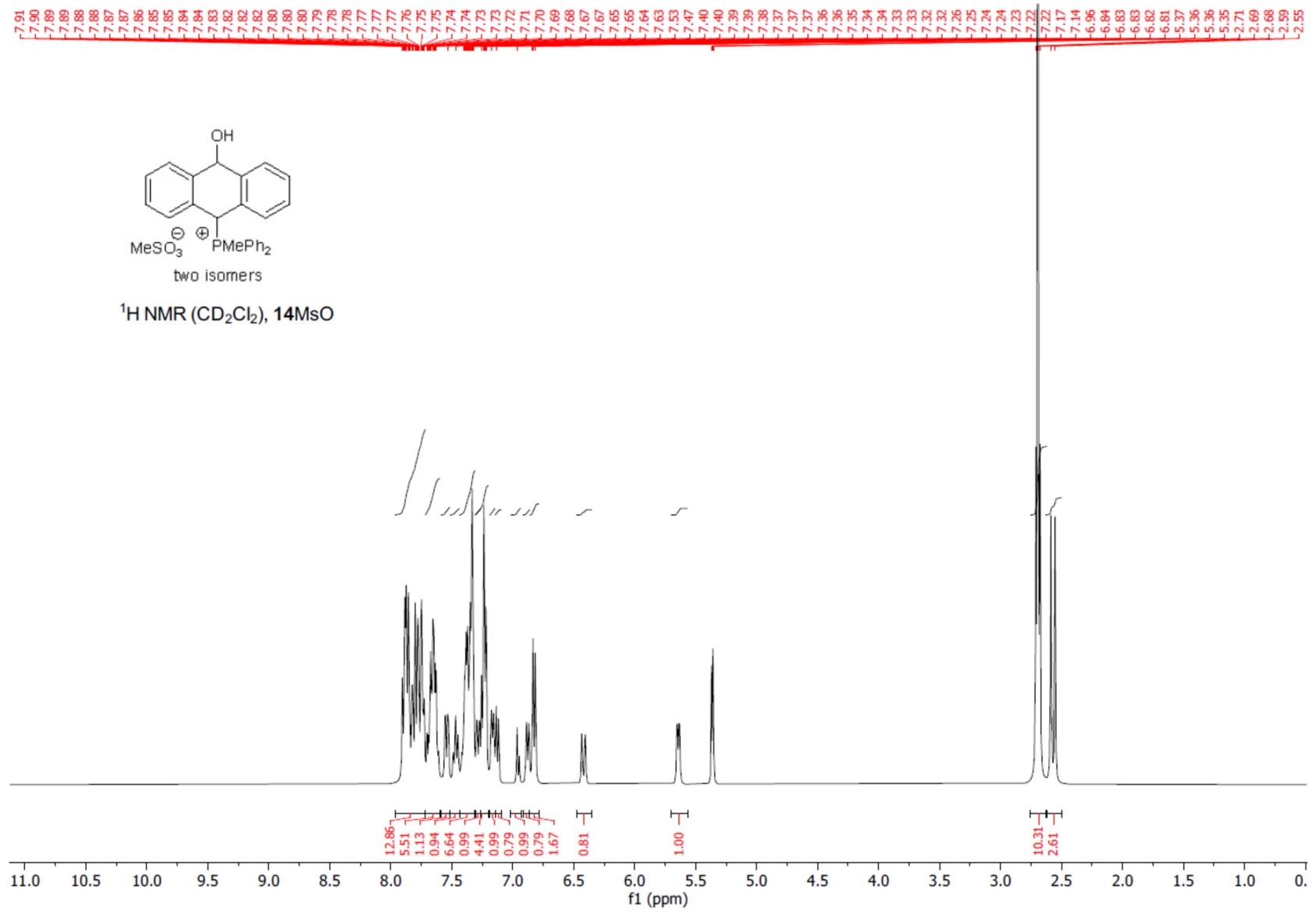


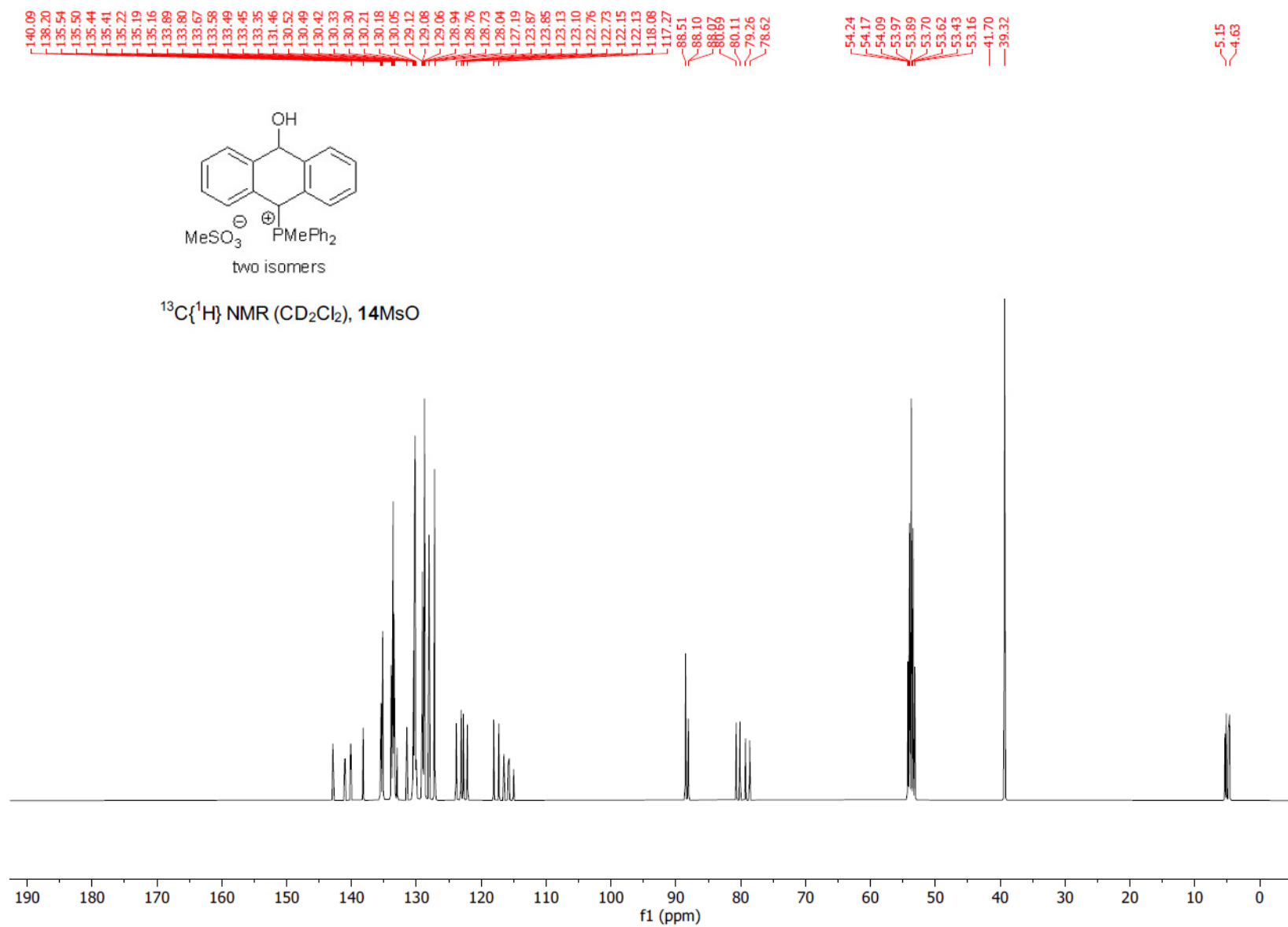


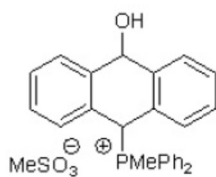
two isomers
 $^{31}\text{P}\{^1\text{H}\}$ NMR in CD_2Cl_2 , 14Cl





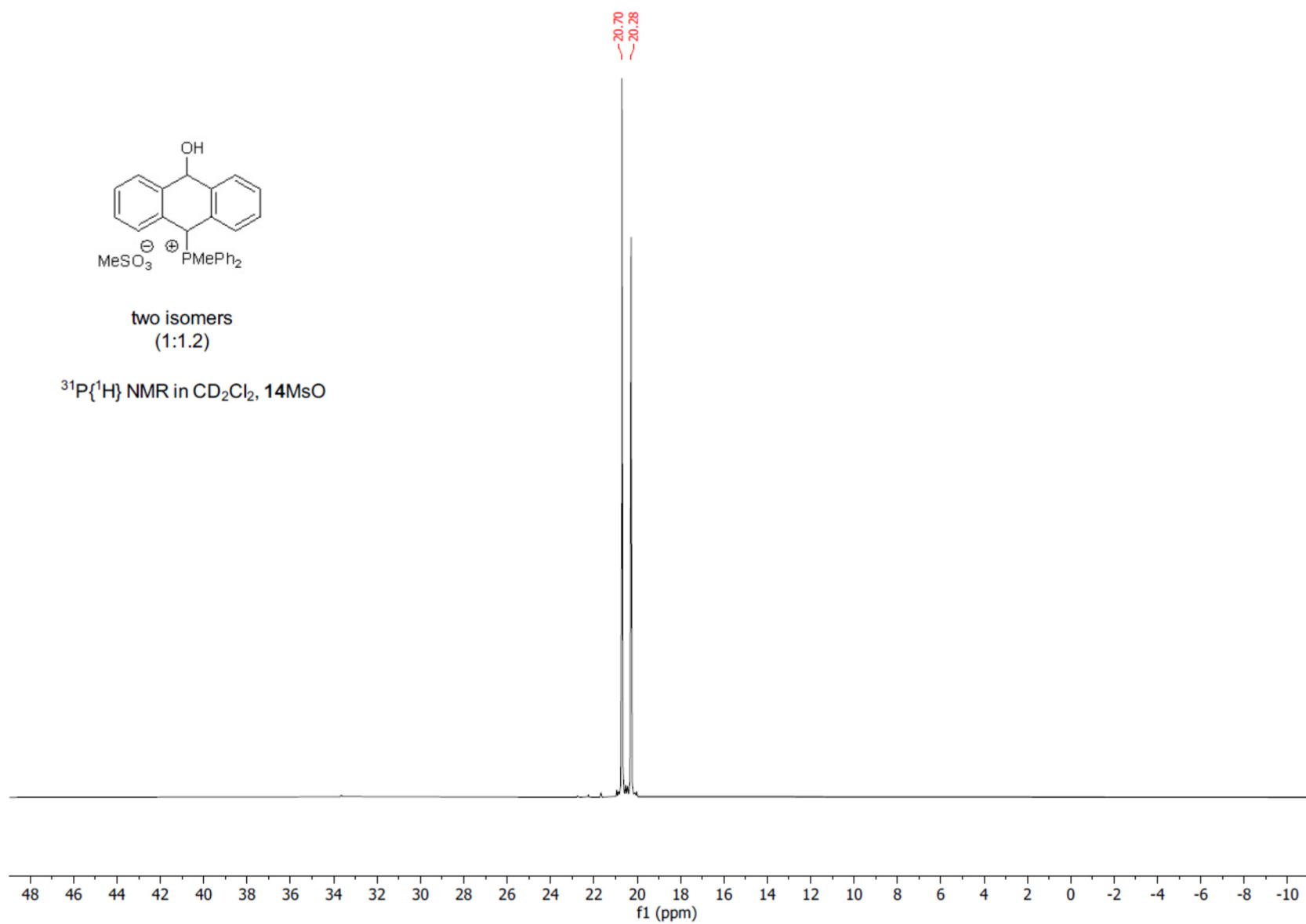


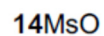




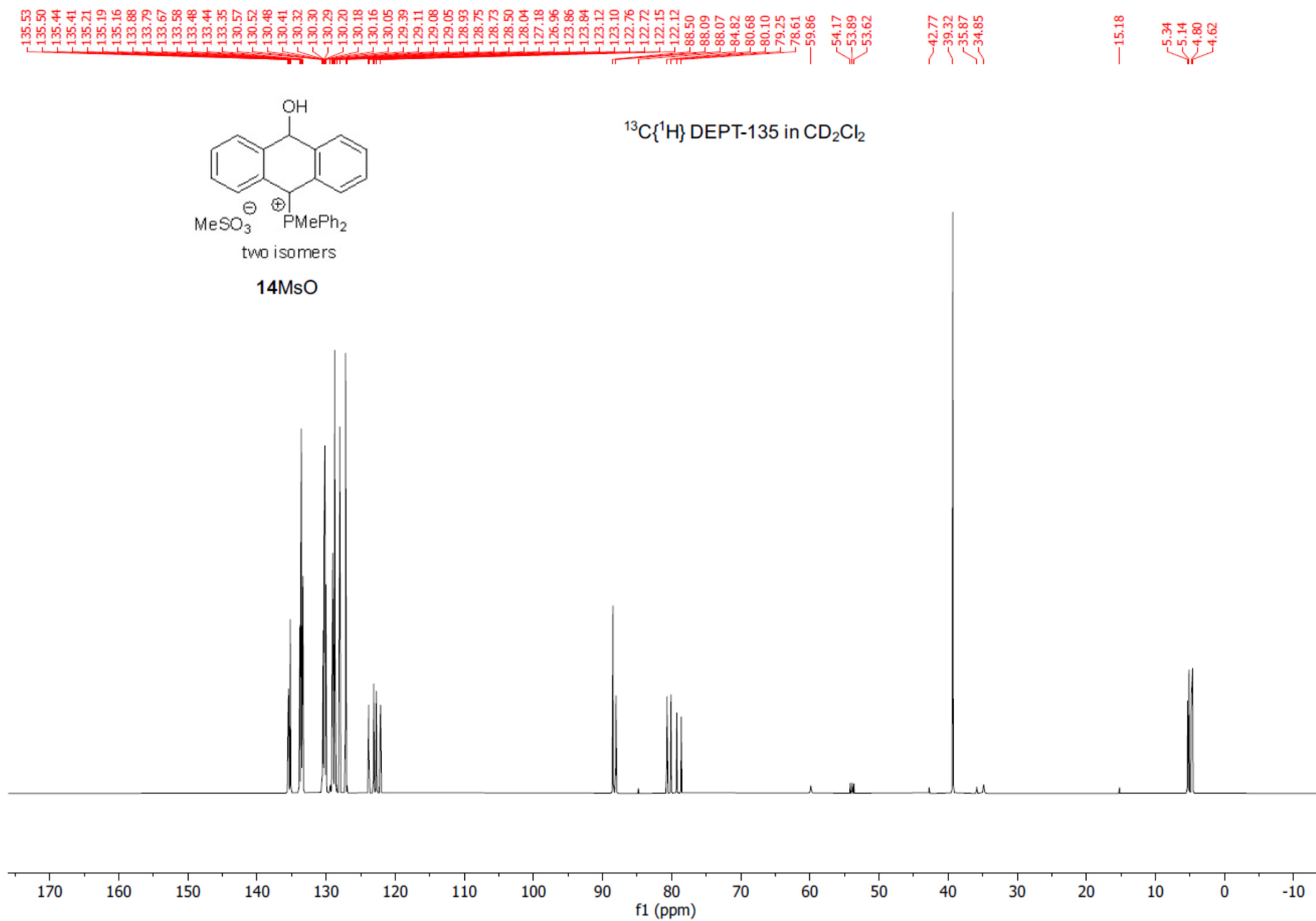
two isomers
(1:1.2)

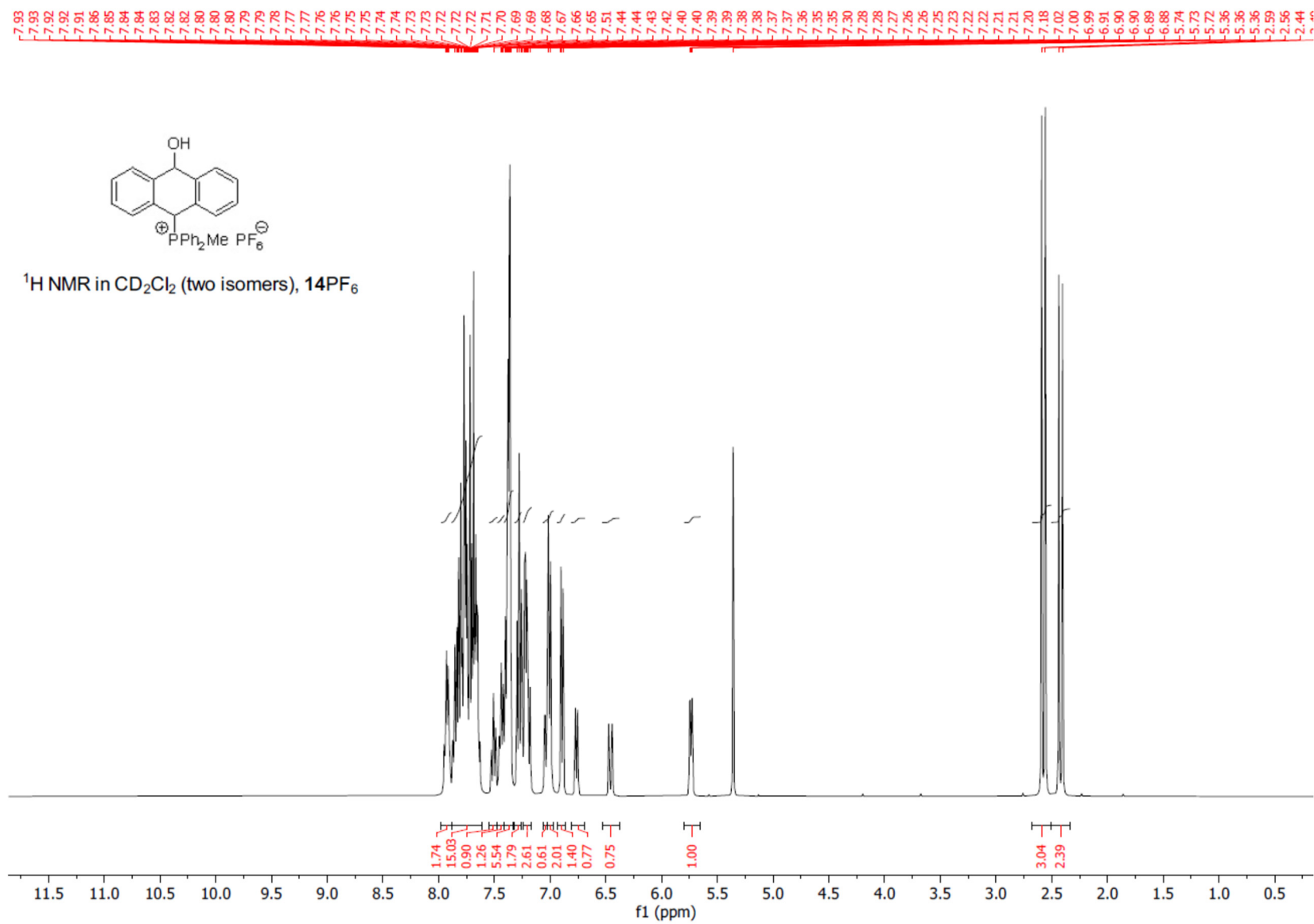
$^{31}\text{P}\{^1\text{H}\}$ NMR in CD_2Cl_2 , 14MsO

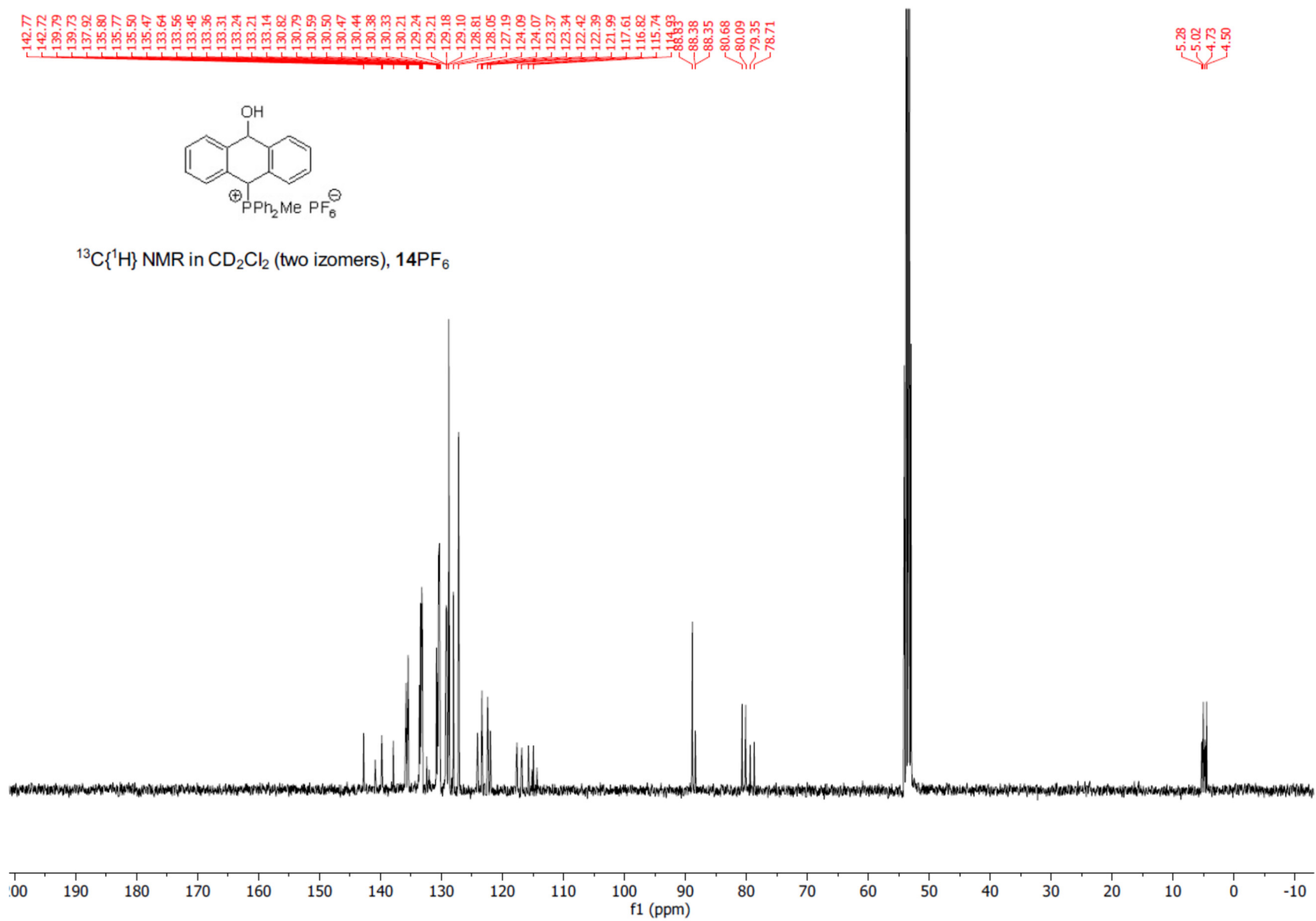


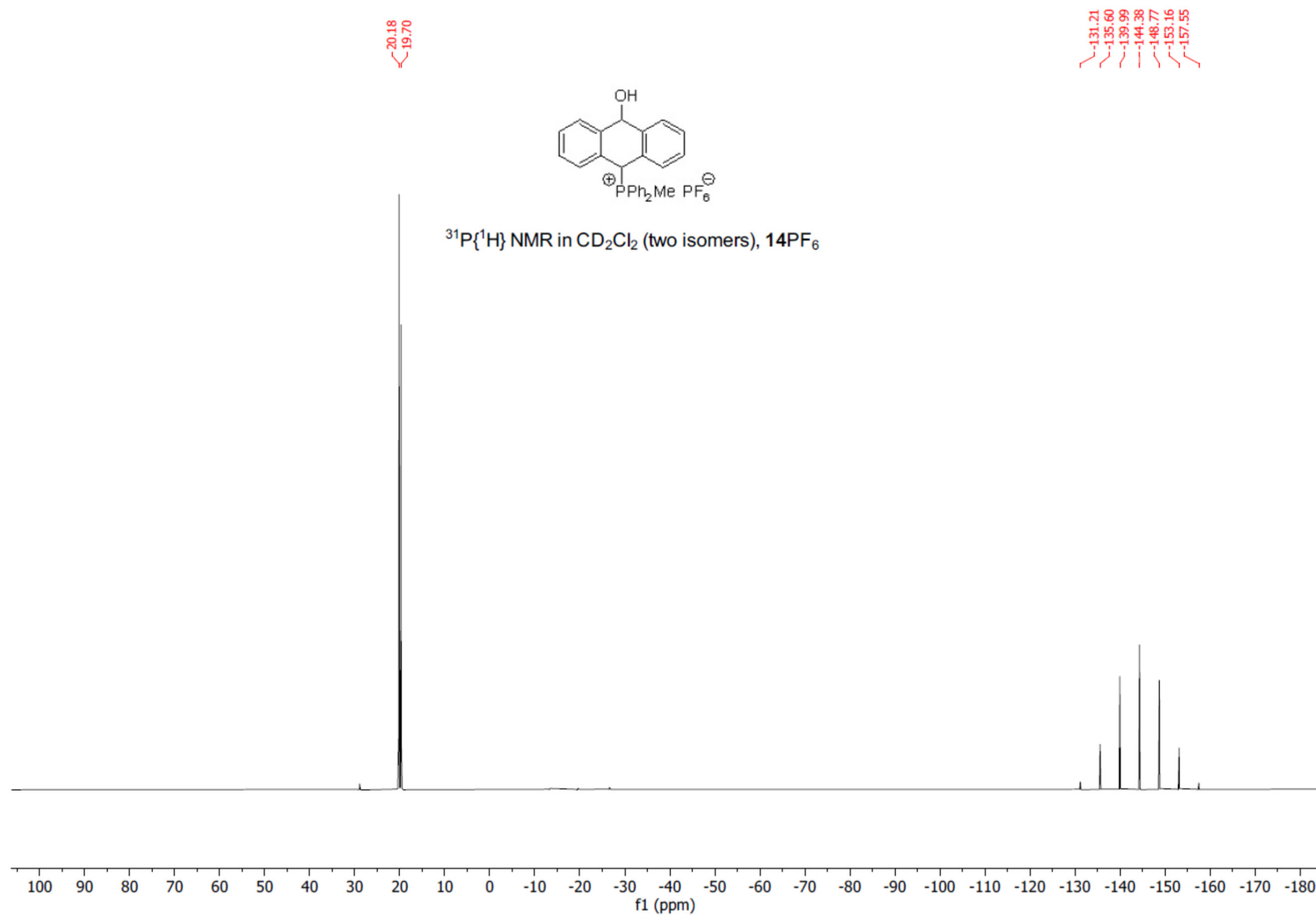


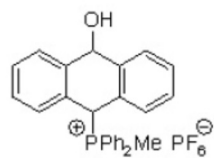
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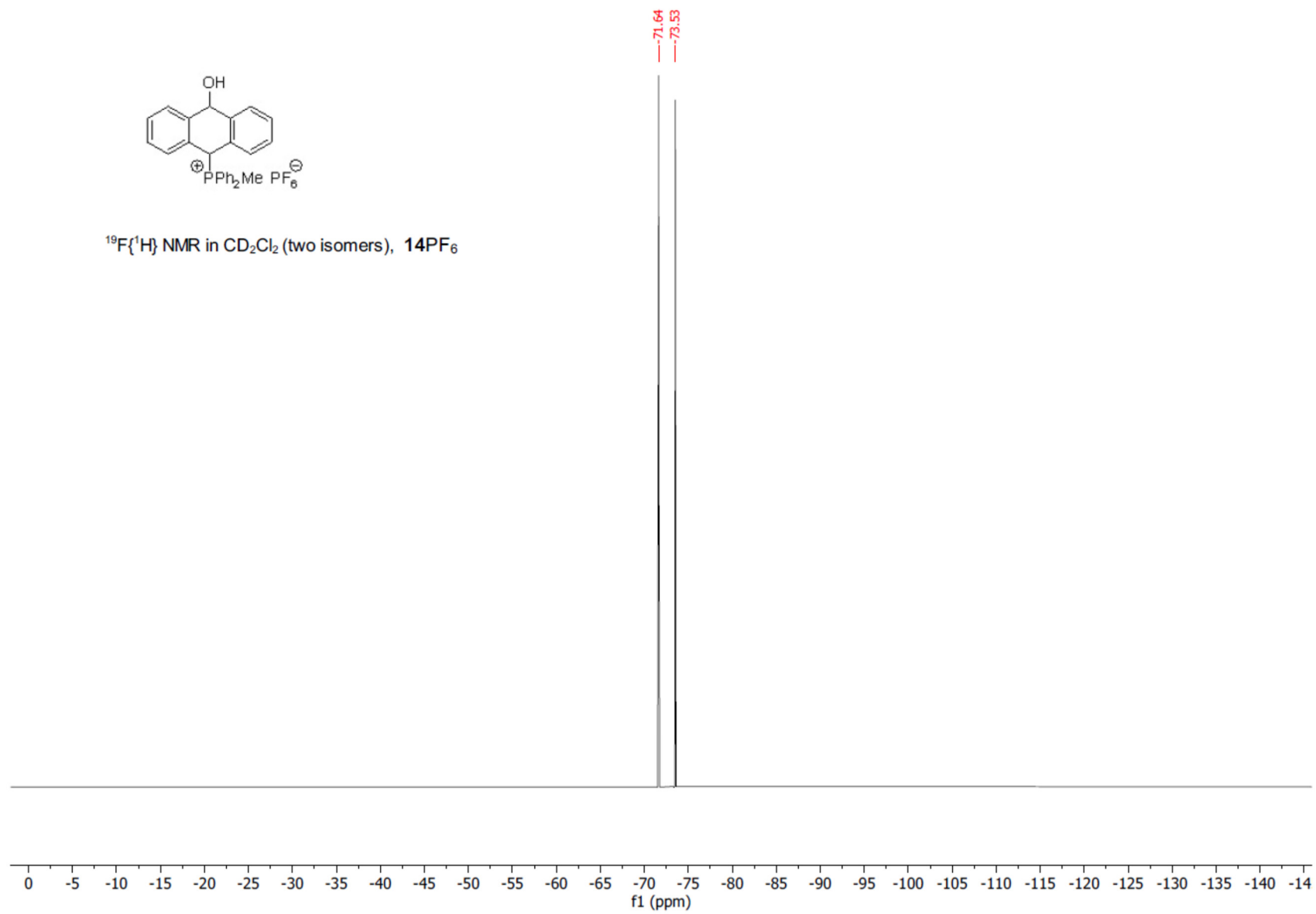


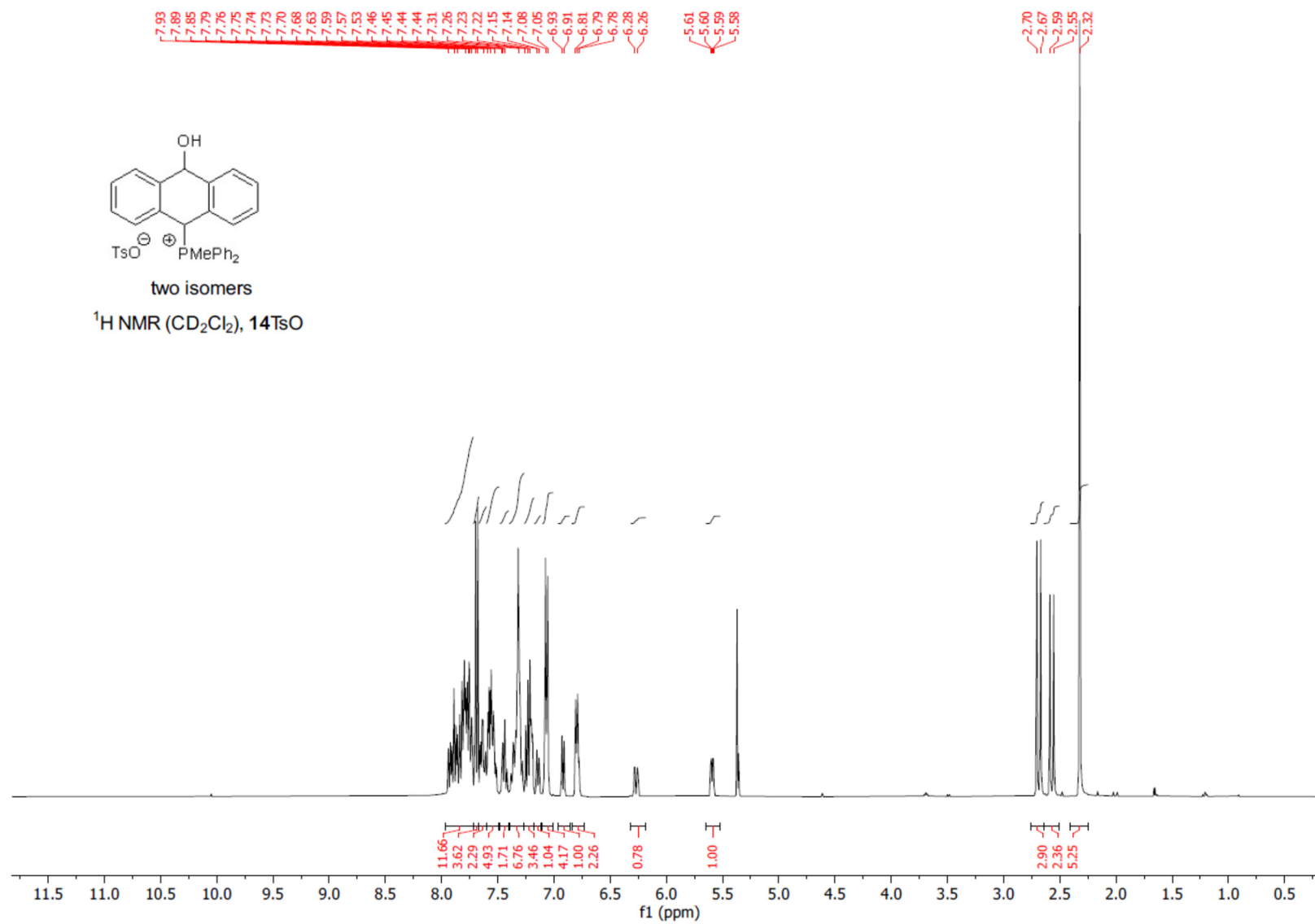


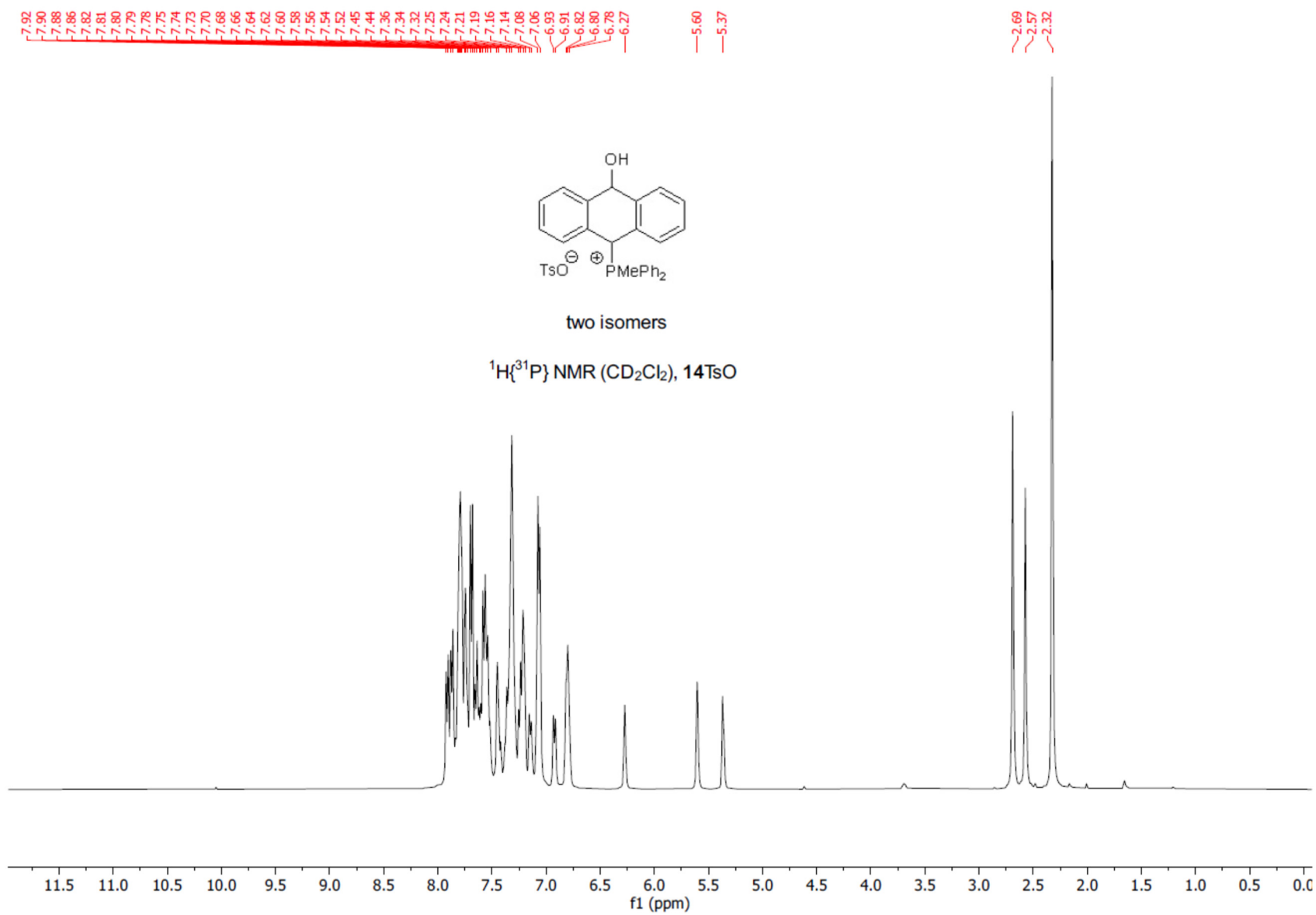


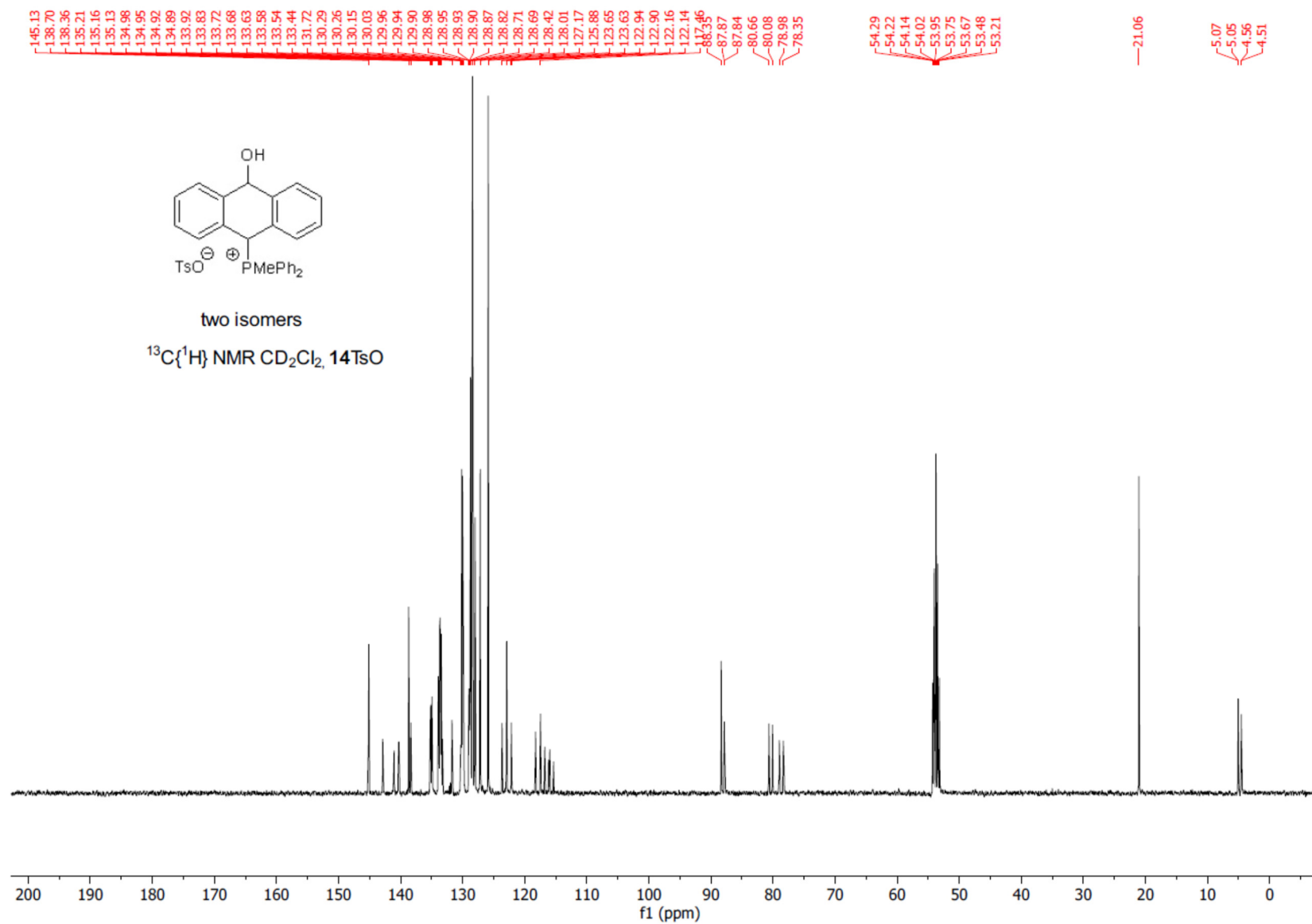


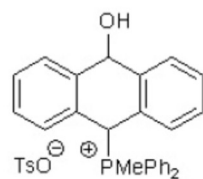
¹⁹F{¹H} NMR in CD₂Cl₂ (two isomers), **14**PF₆





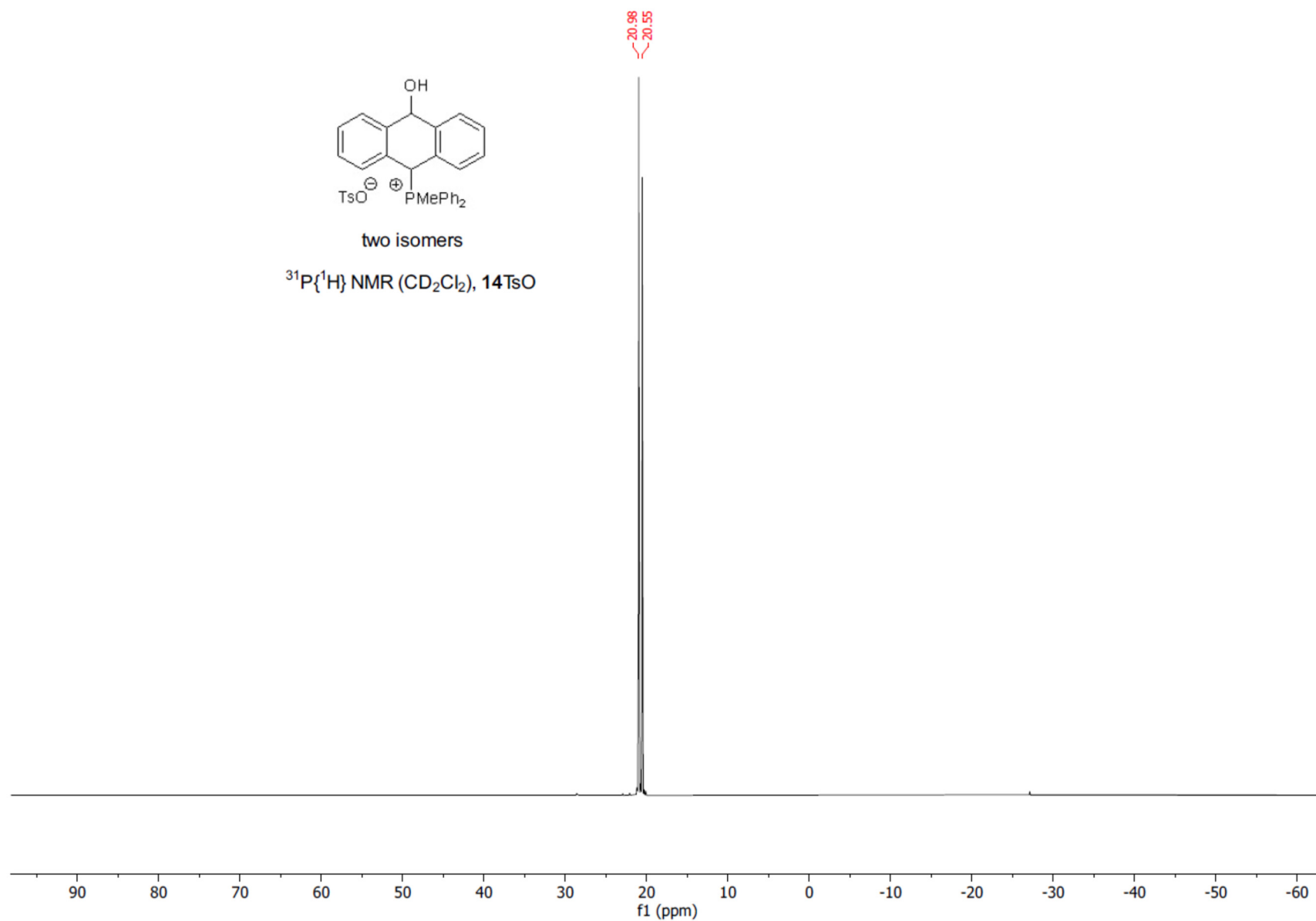




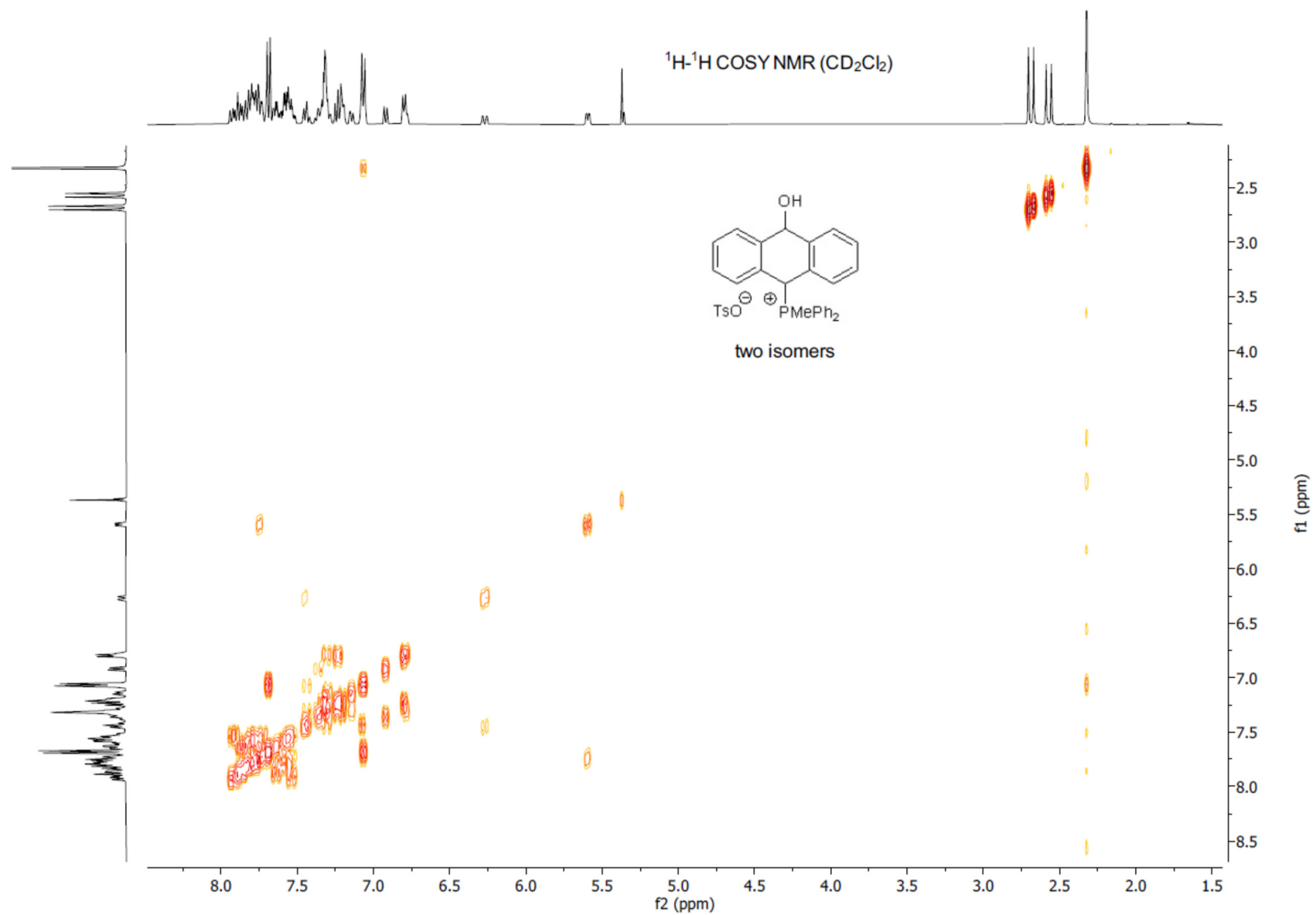


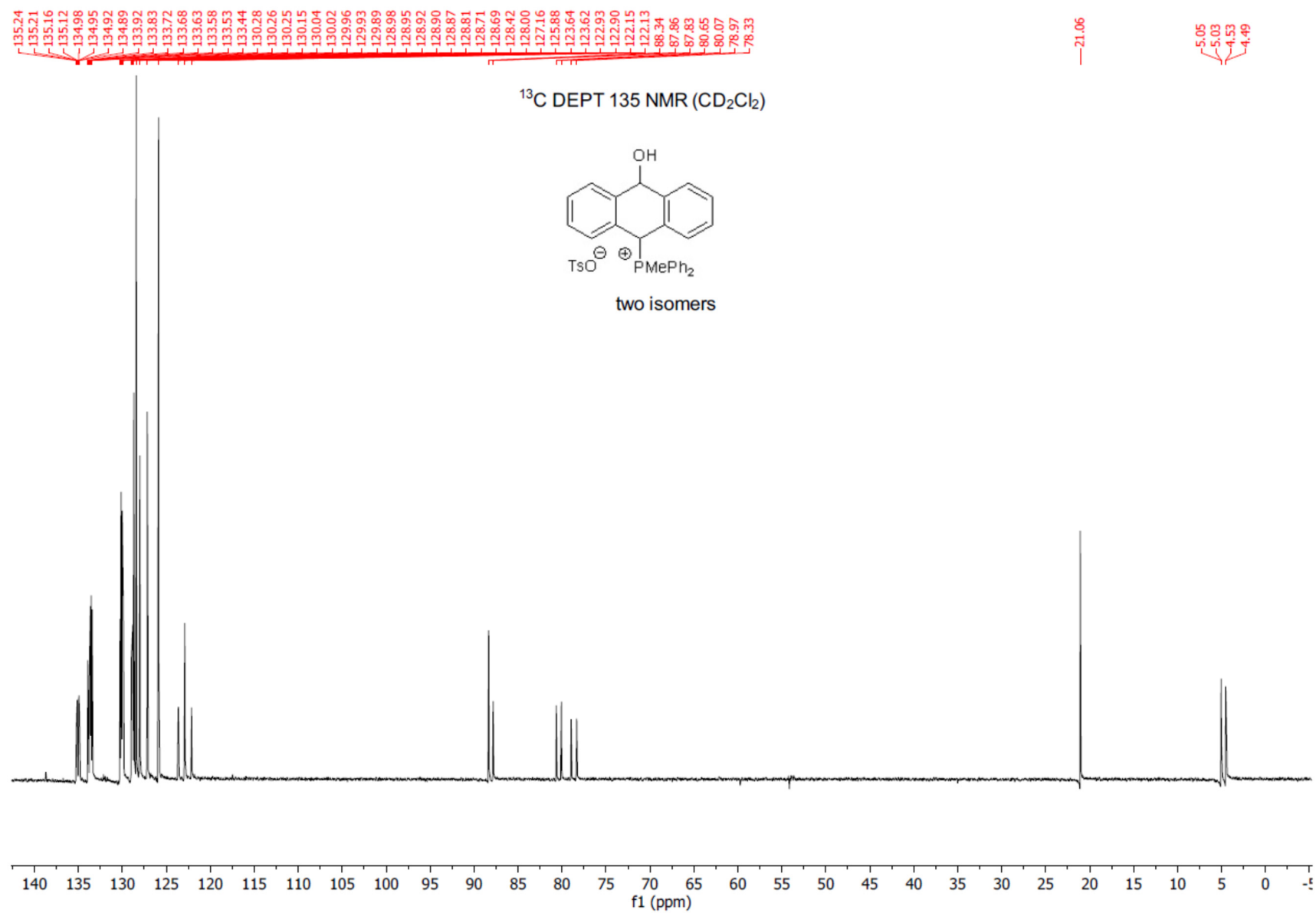
two isomers

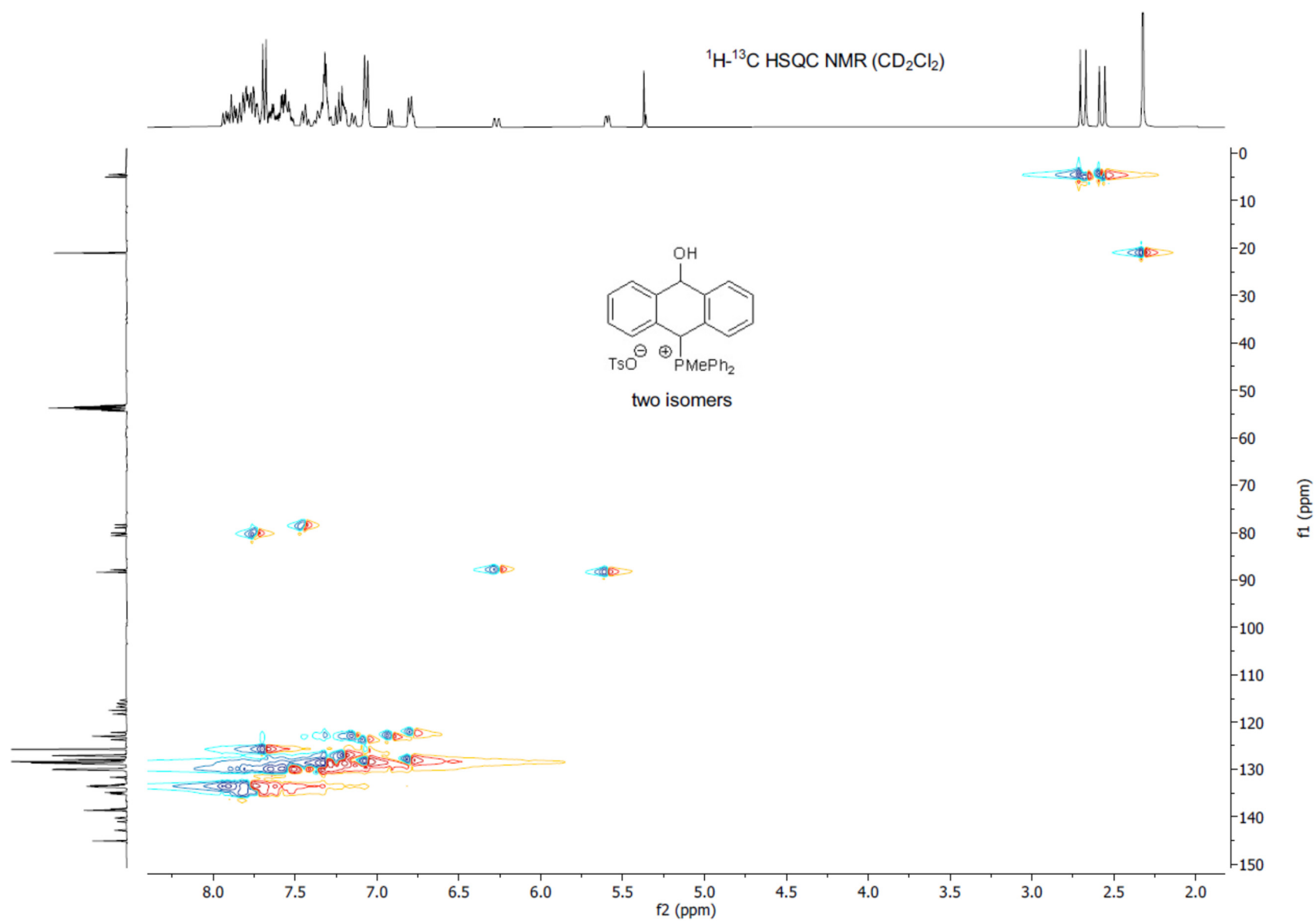
$^{31}\text{P}\{^1\text{H}\}$ NMR (CD_2Cl_2), 14TsO

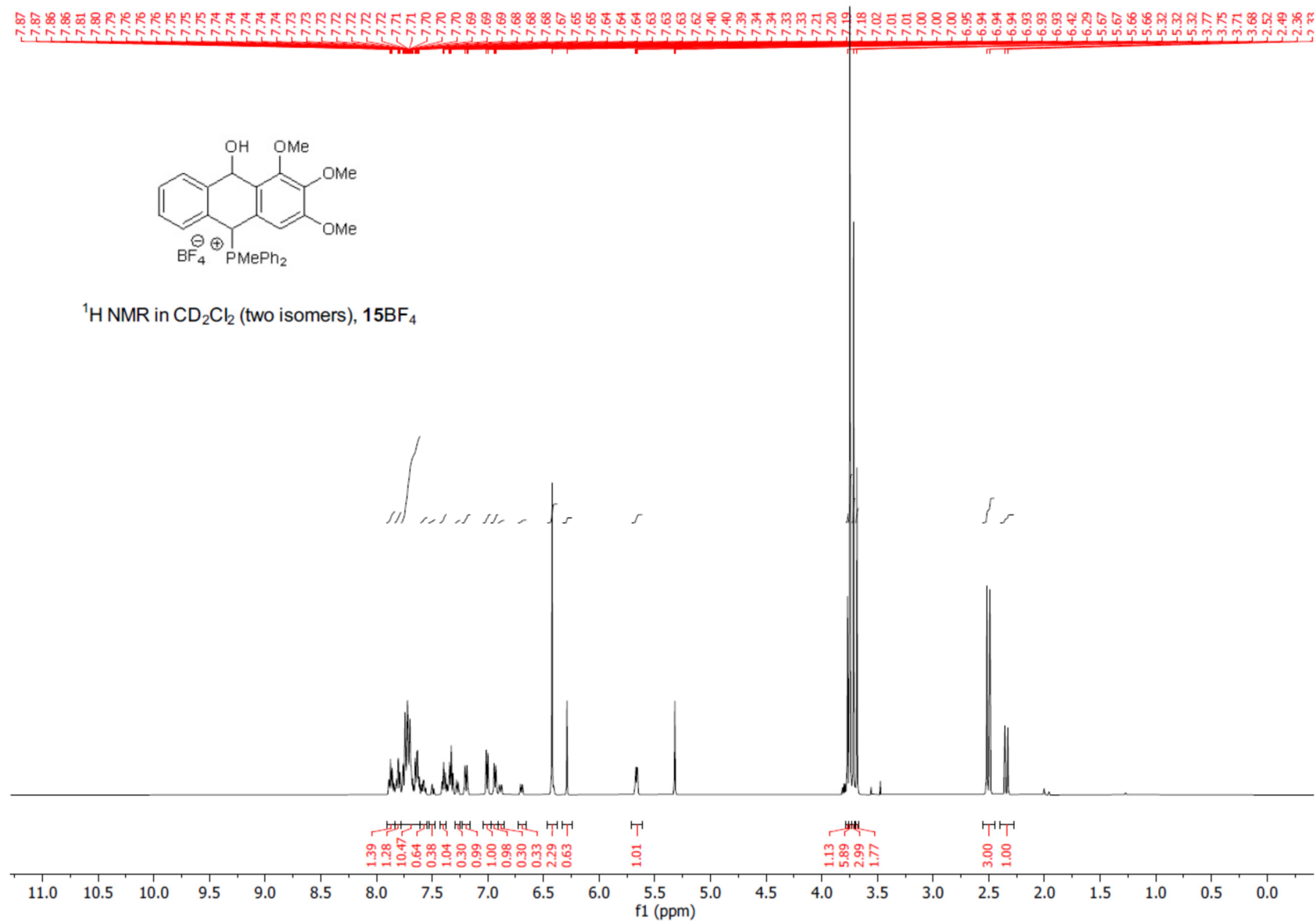


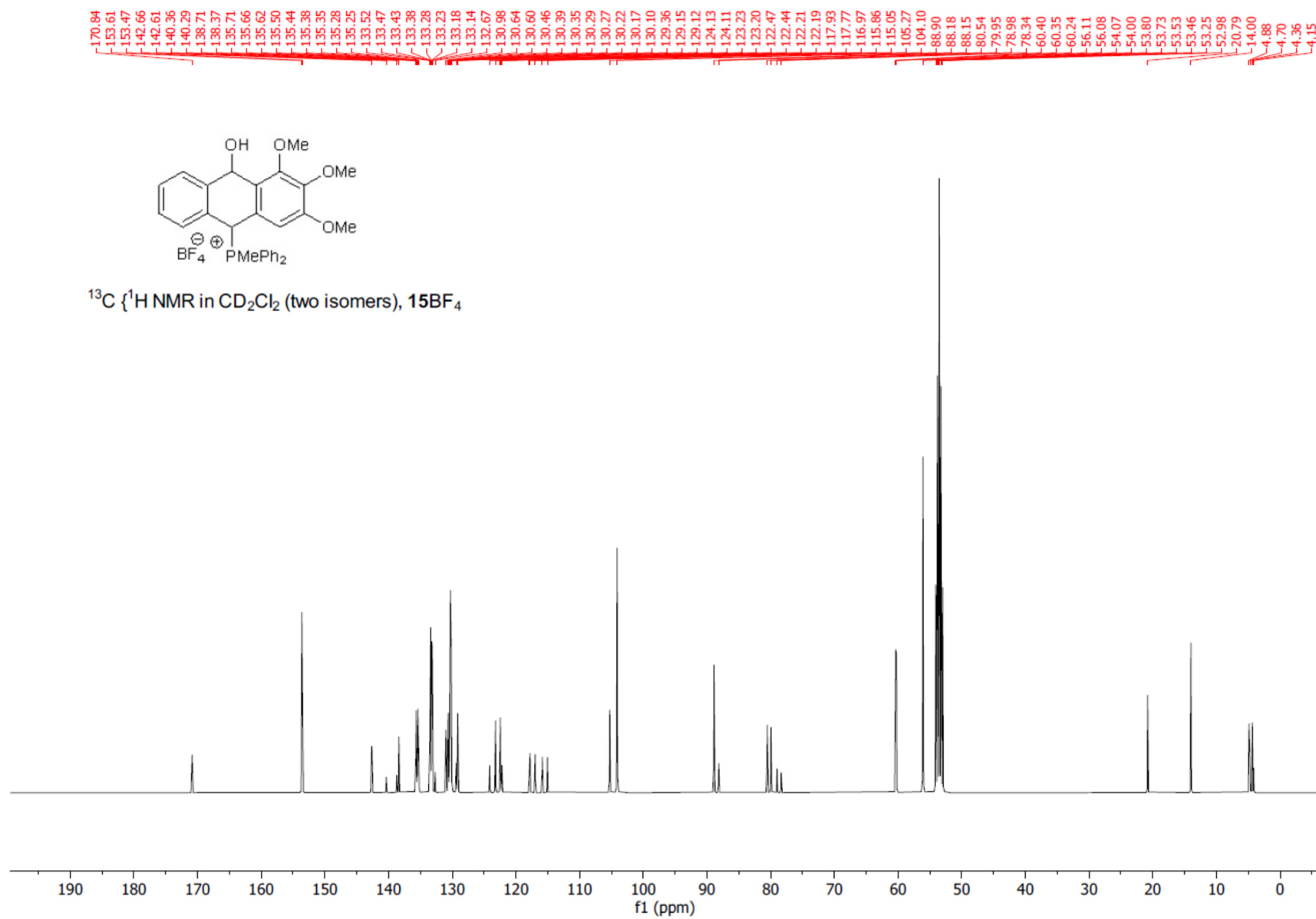
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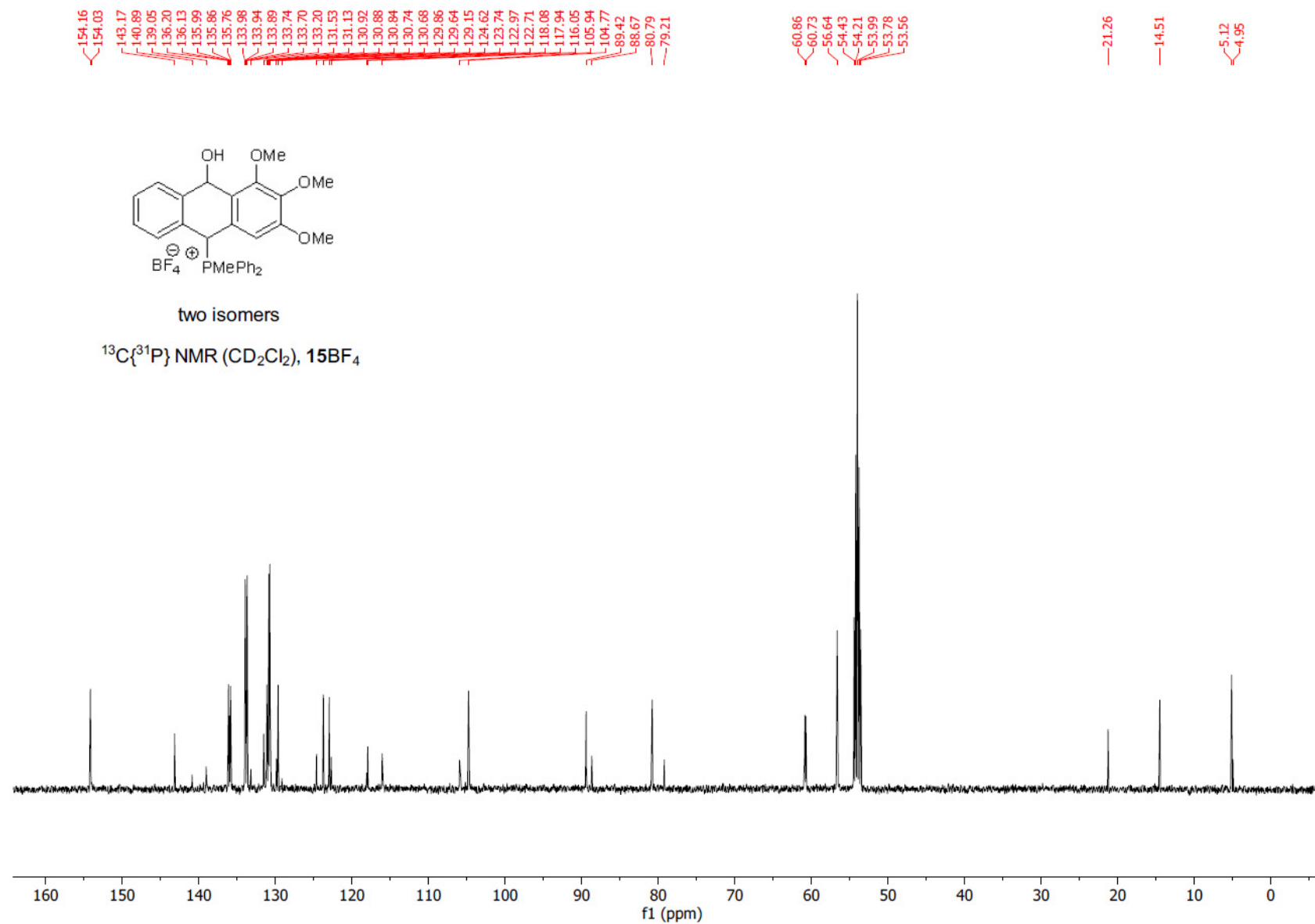


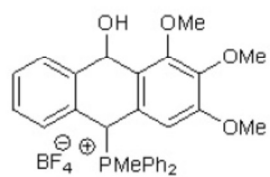






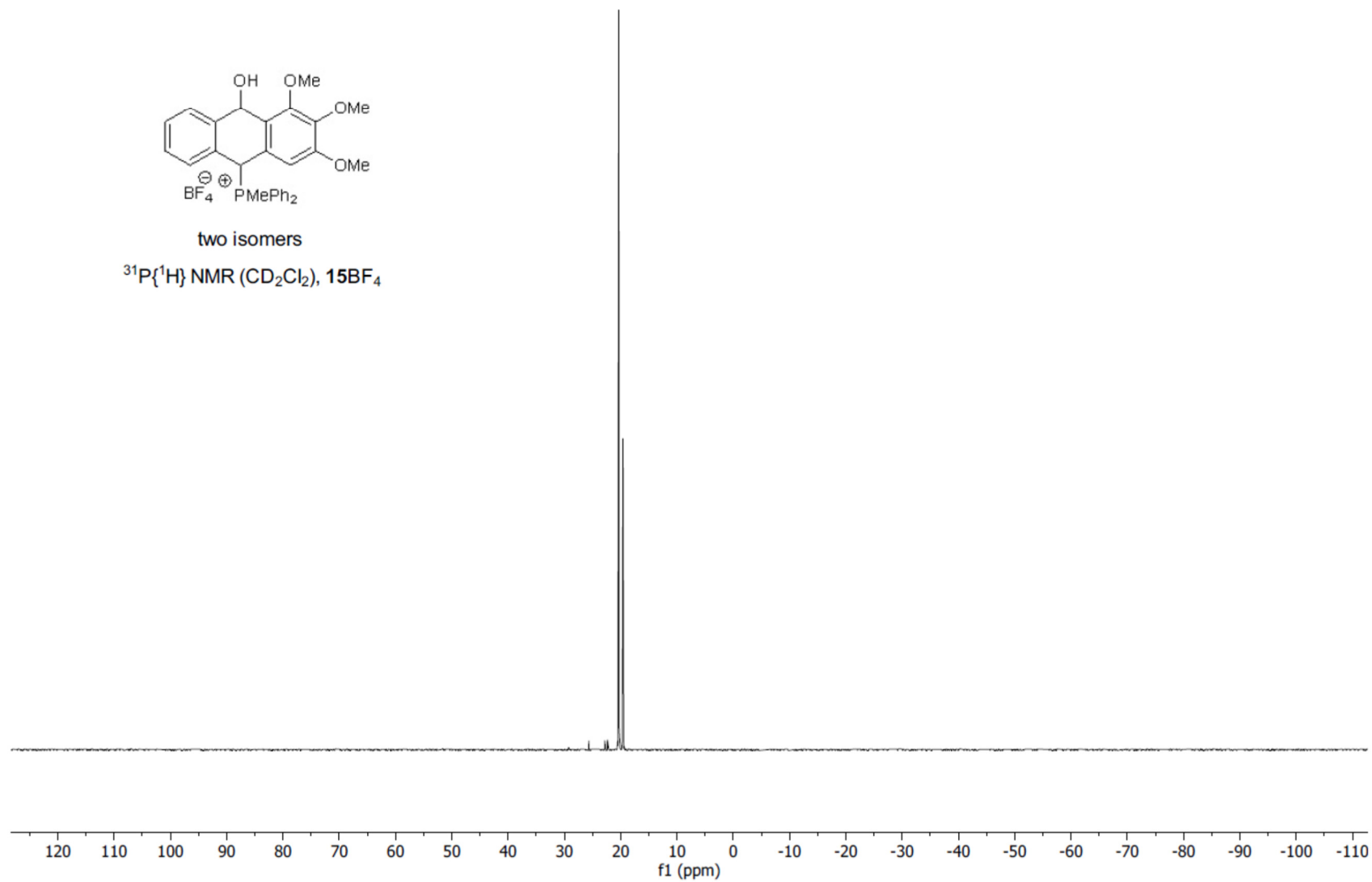


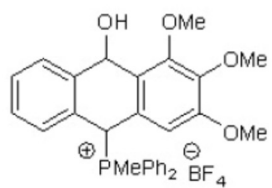




two isomers

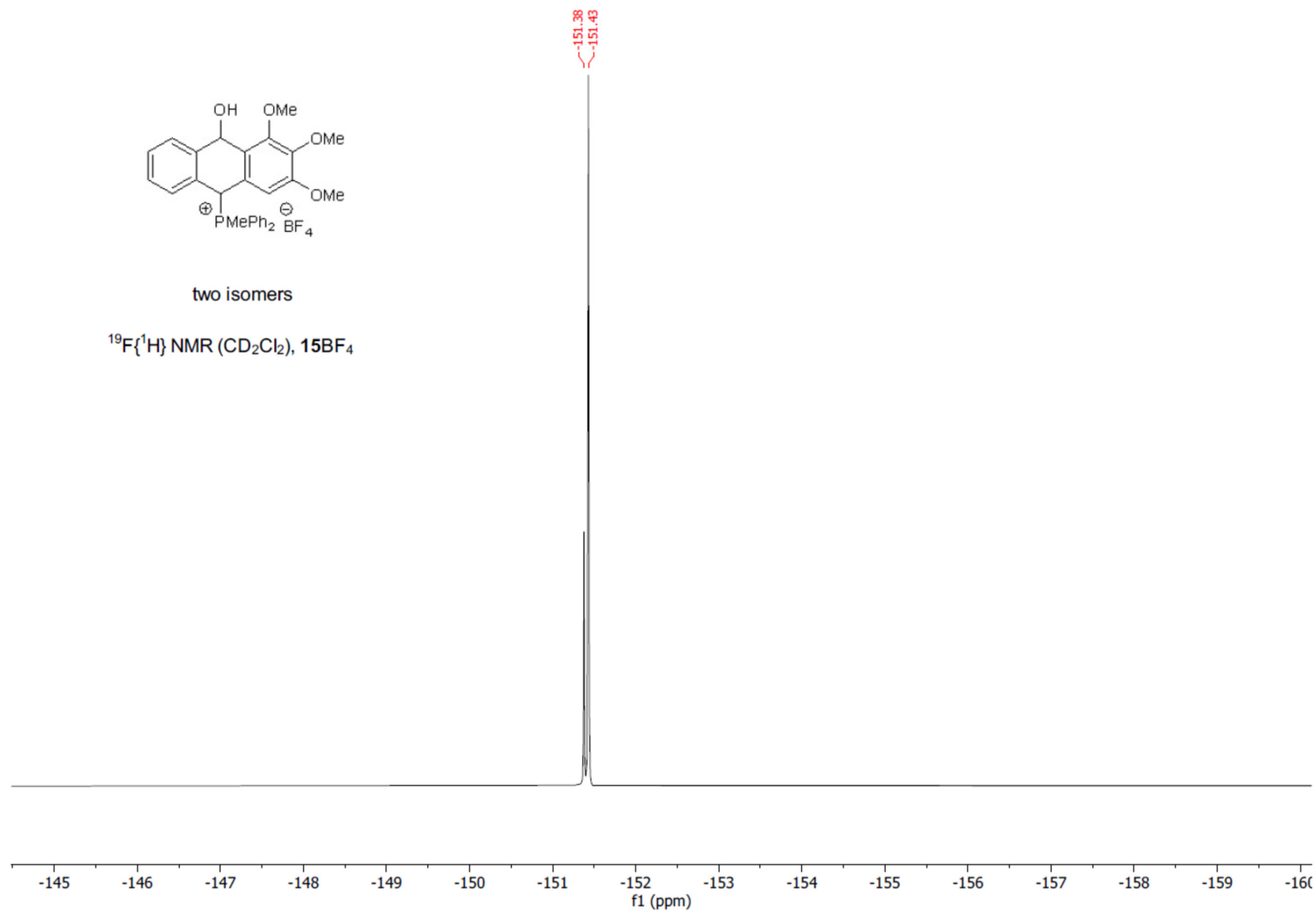
$^{31}\text{P}\{^1\text{H}\}$ NMR (CD_2Cl_2), 15BF_4

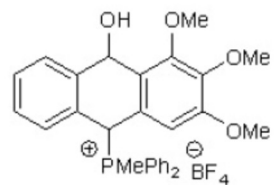




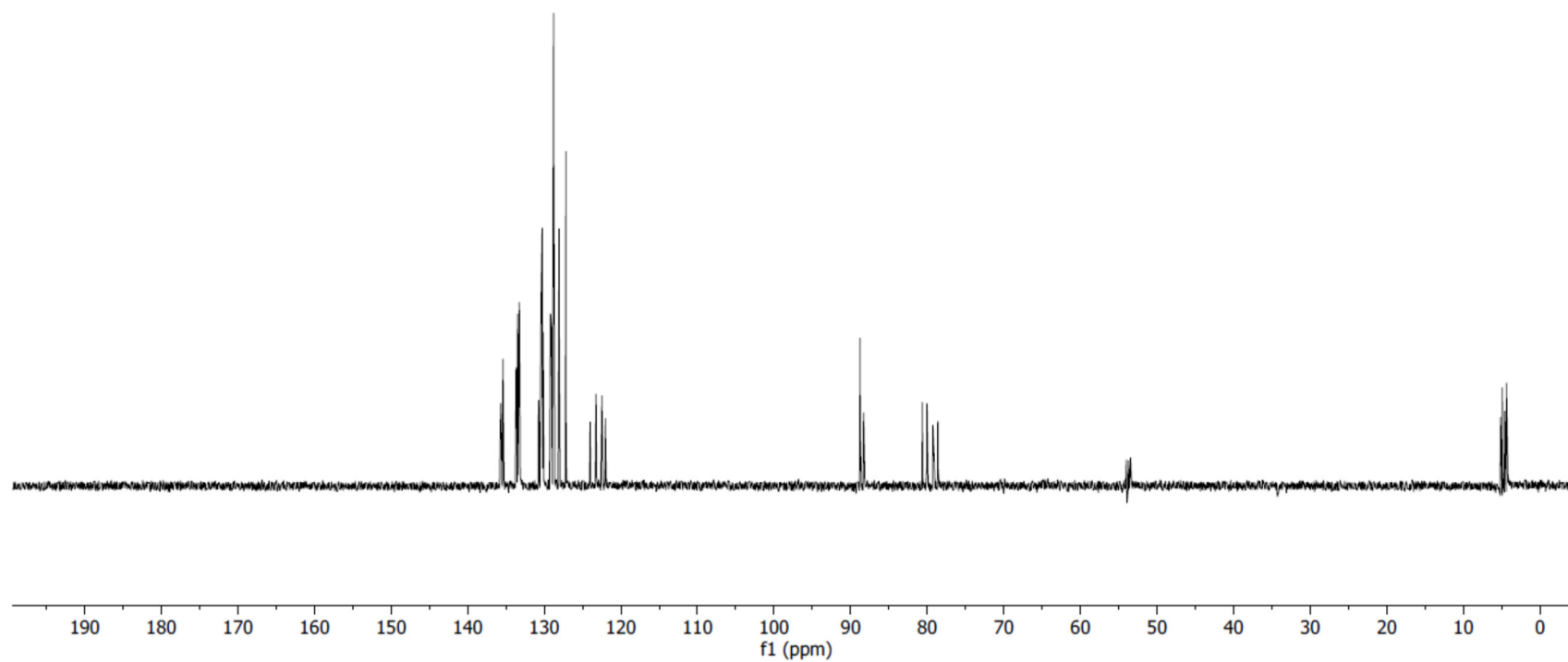
two isomers

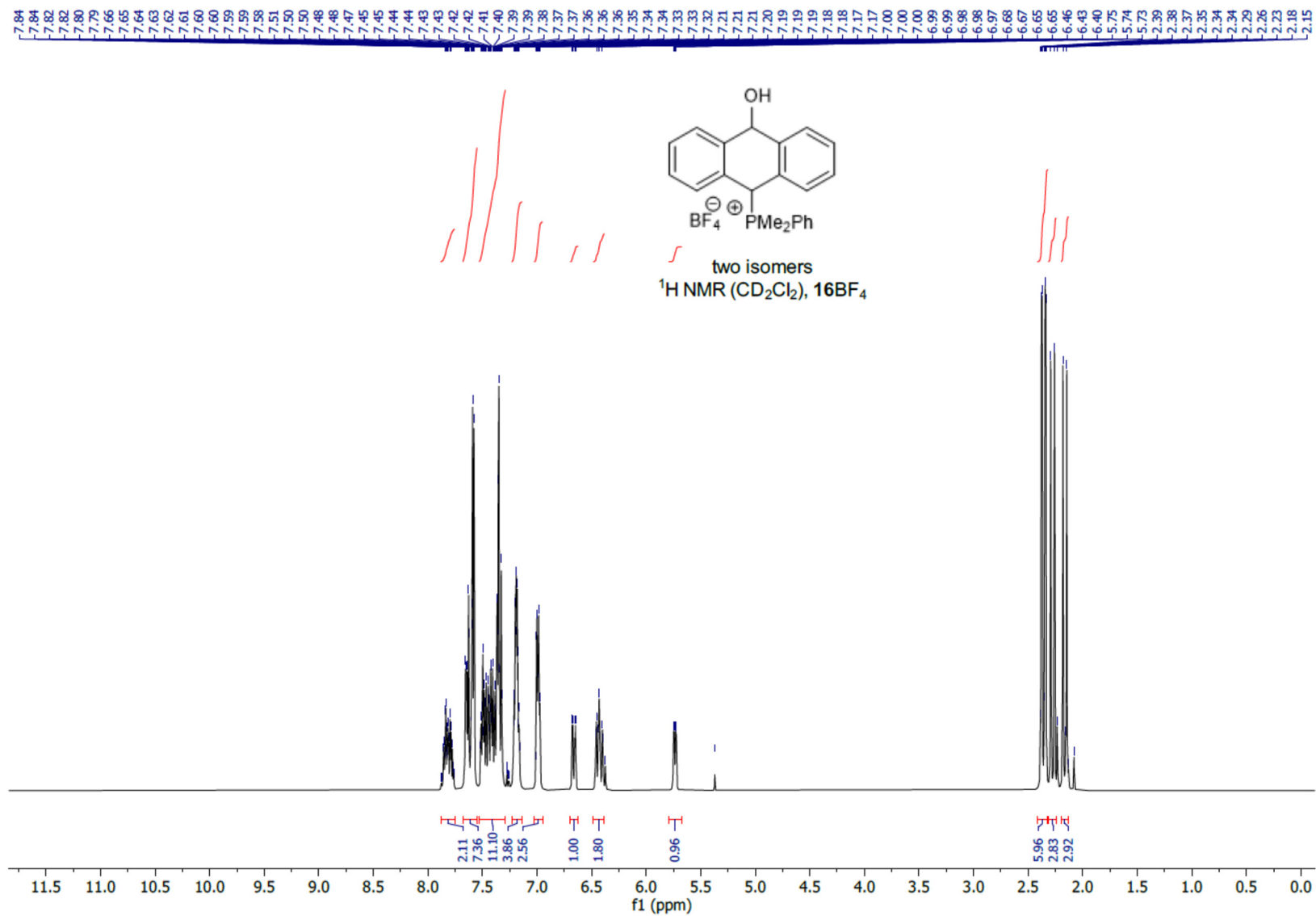
$^{19}\text{F}\{^1\text{H}\}$ NMR (CD_2Cl_2), 15BF_4

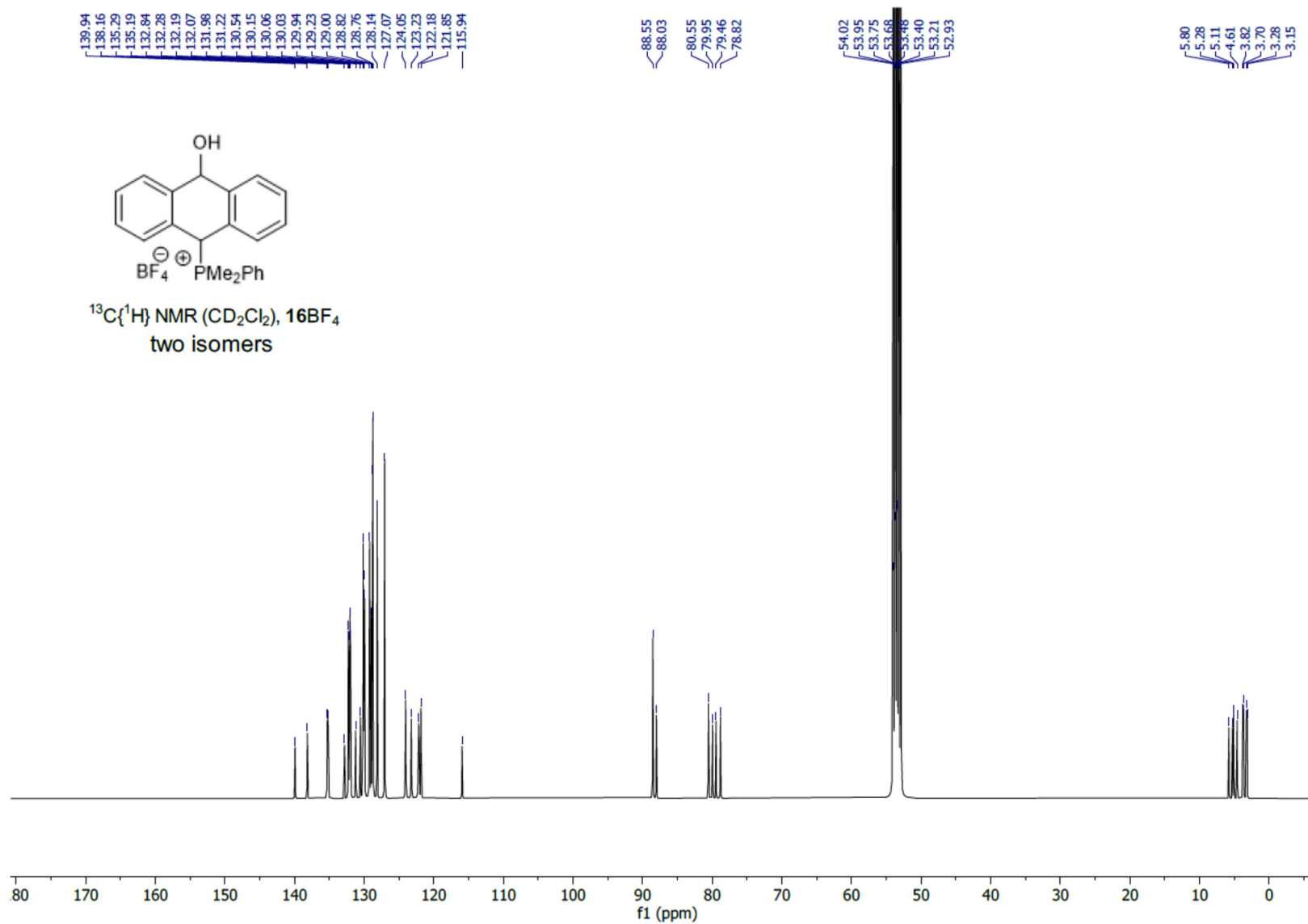


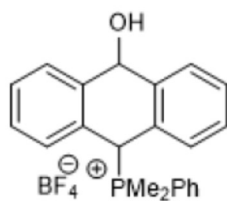


¹³C-DEPT-135 NMR (CD₂Cl₂), 15BF₄



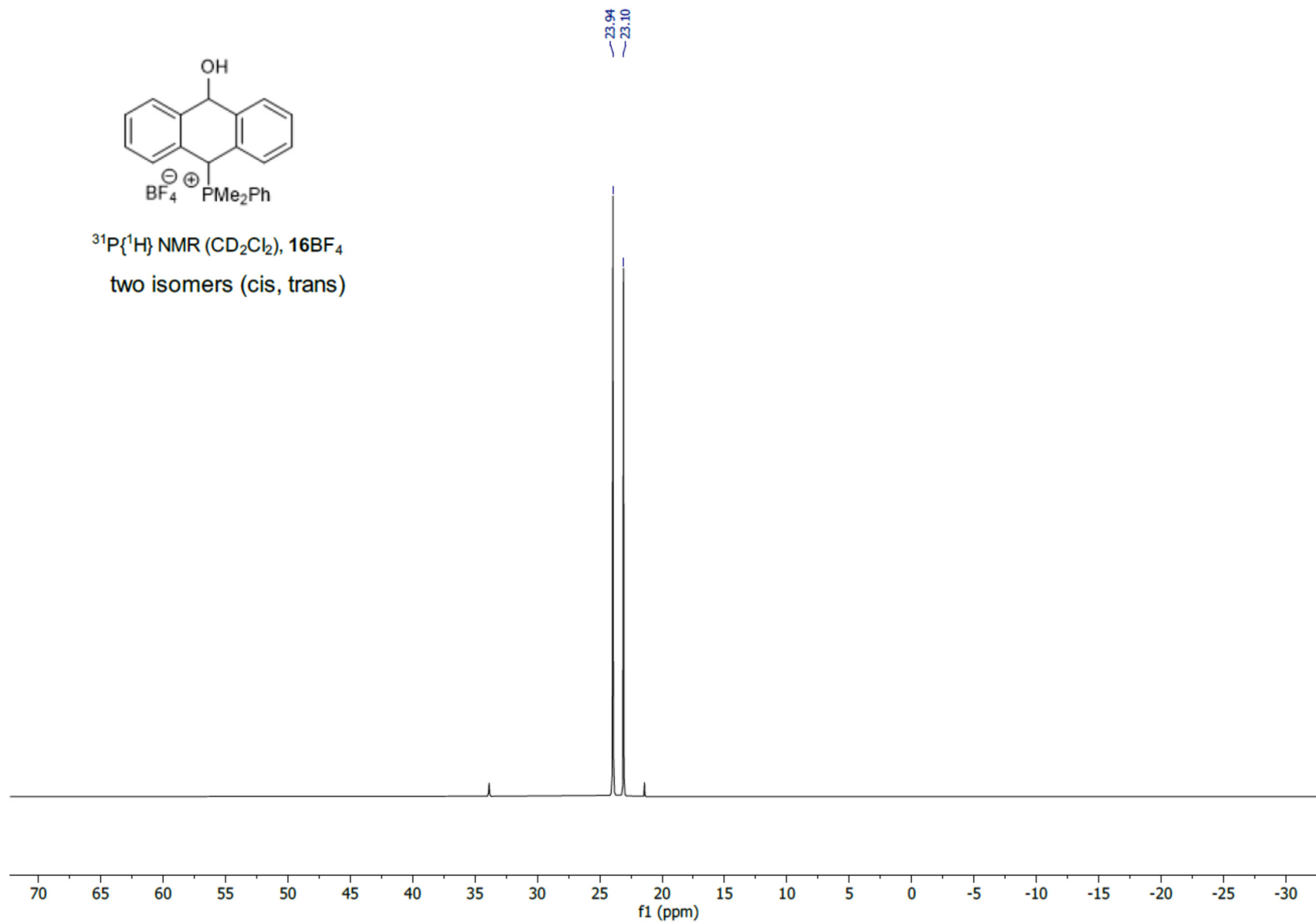


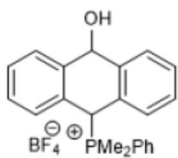




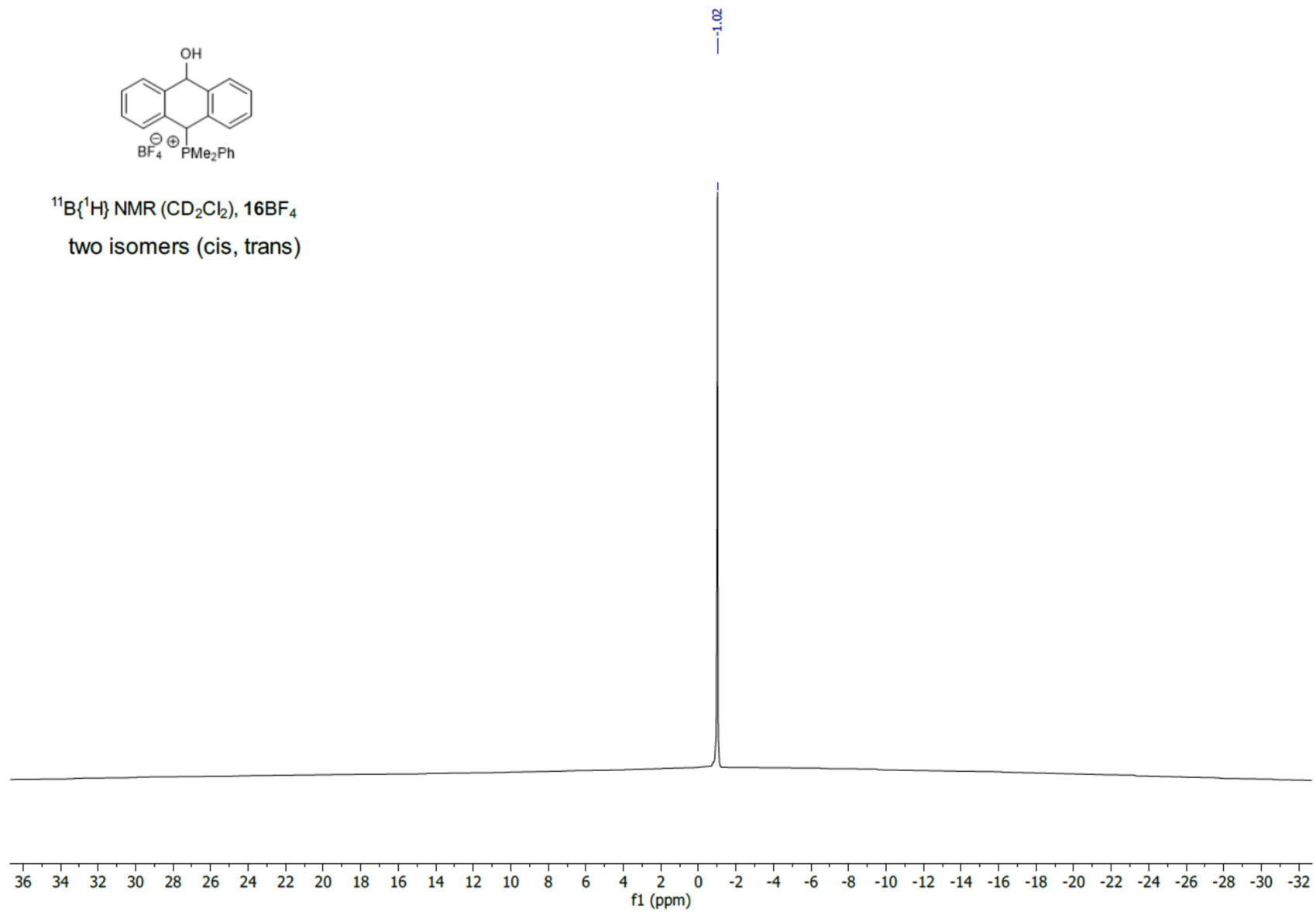
$^{31}\text{P}\{^1\text{H}\}$ NMR (CD_2Cl_2), **16** BF_4

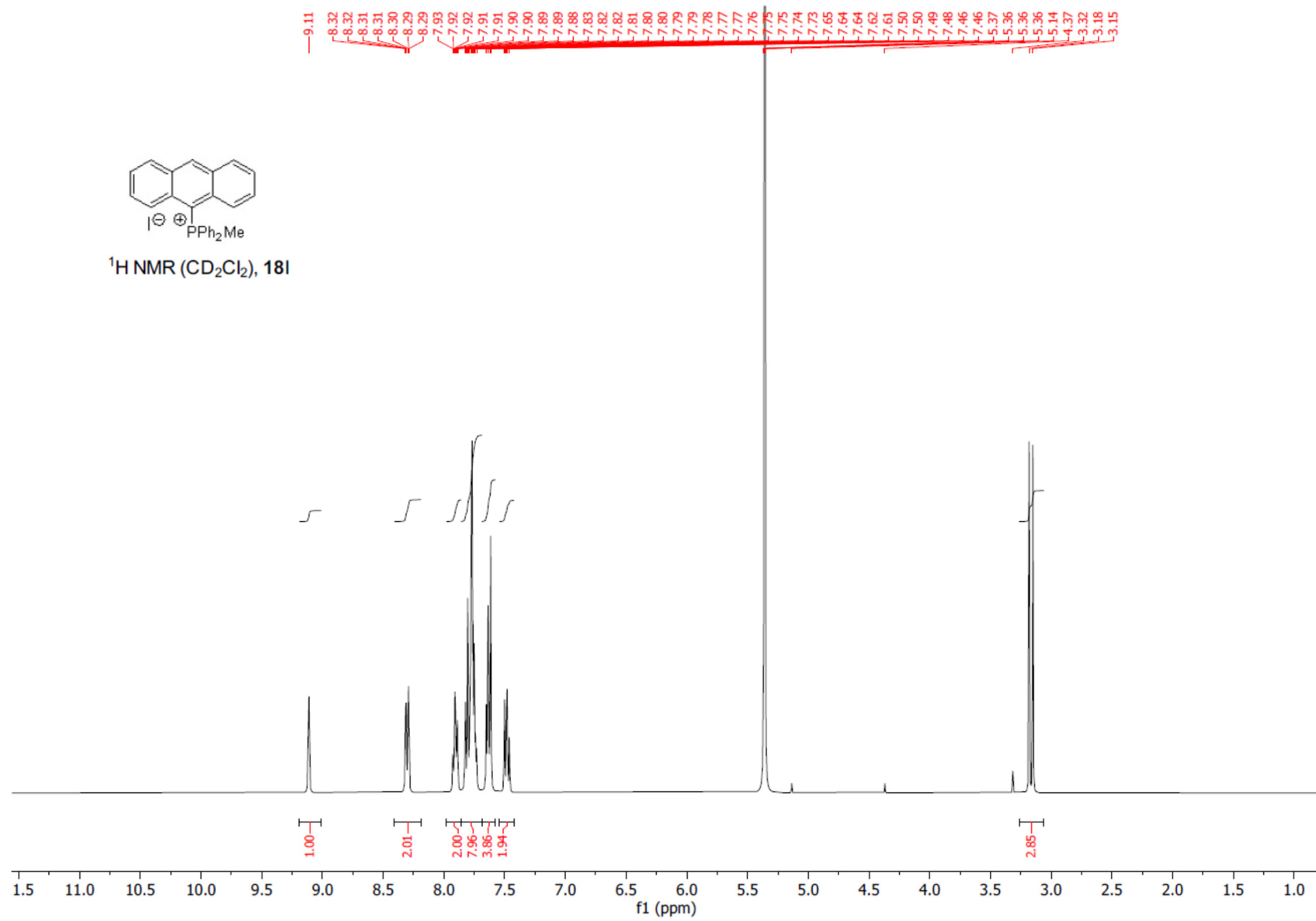
two isomers (cis, trans)

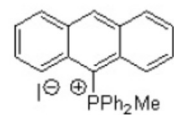




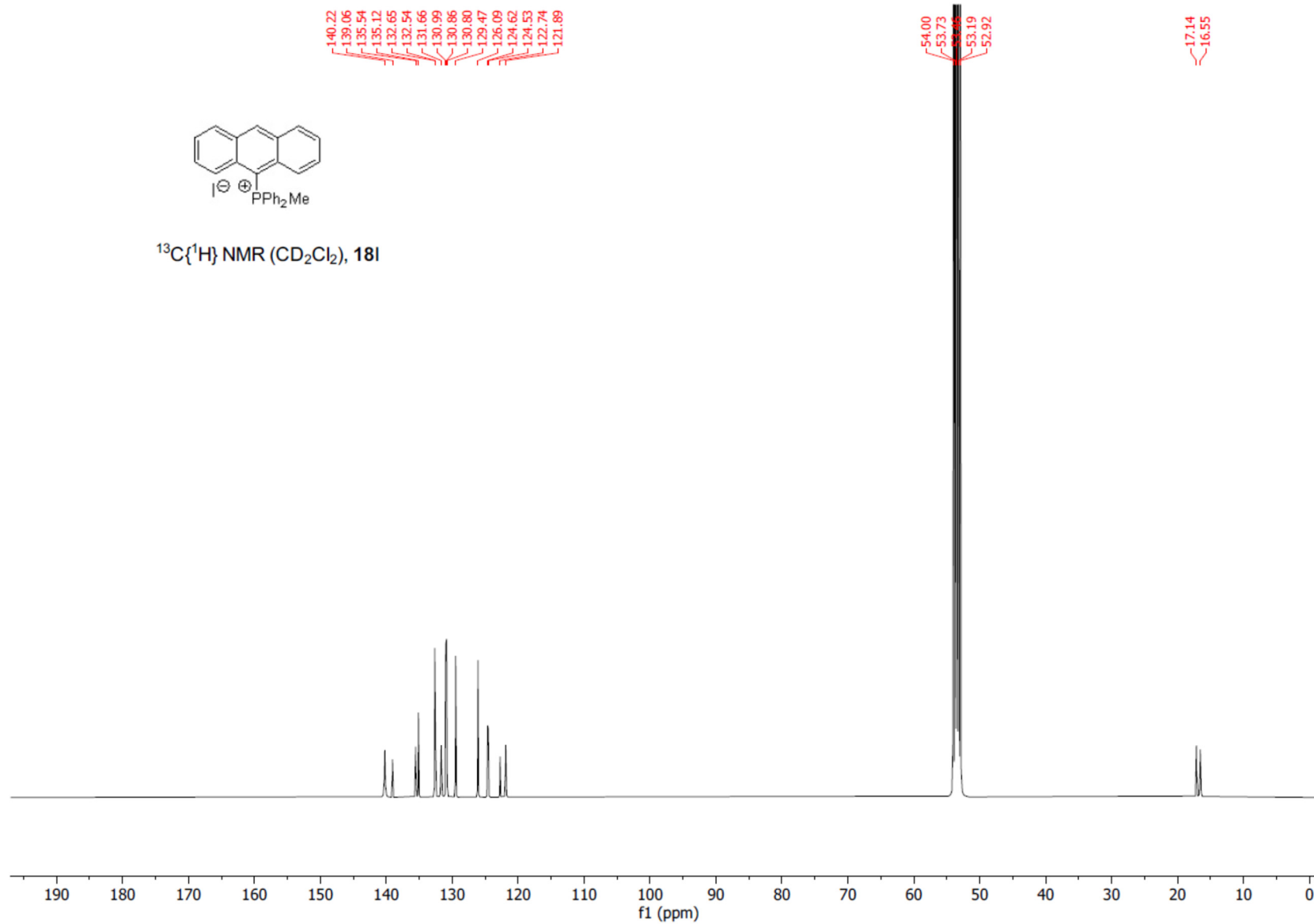
$^{11}\text{B}\{^1\text{H}\}$ NMR (CD_2Cl_2), 16BF_4
two isomers (cis, trans)

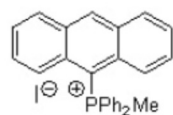




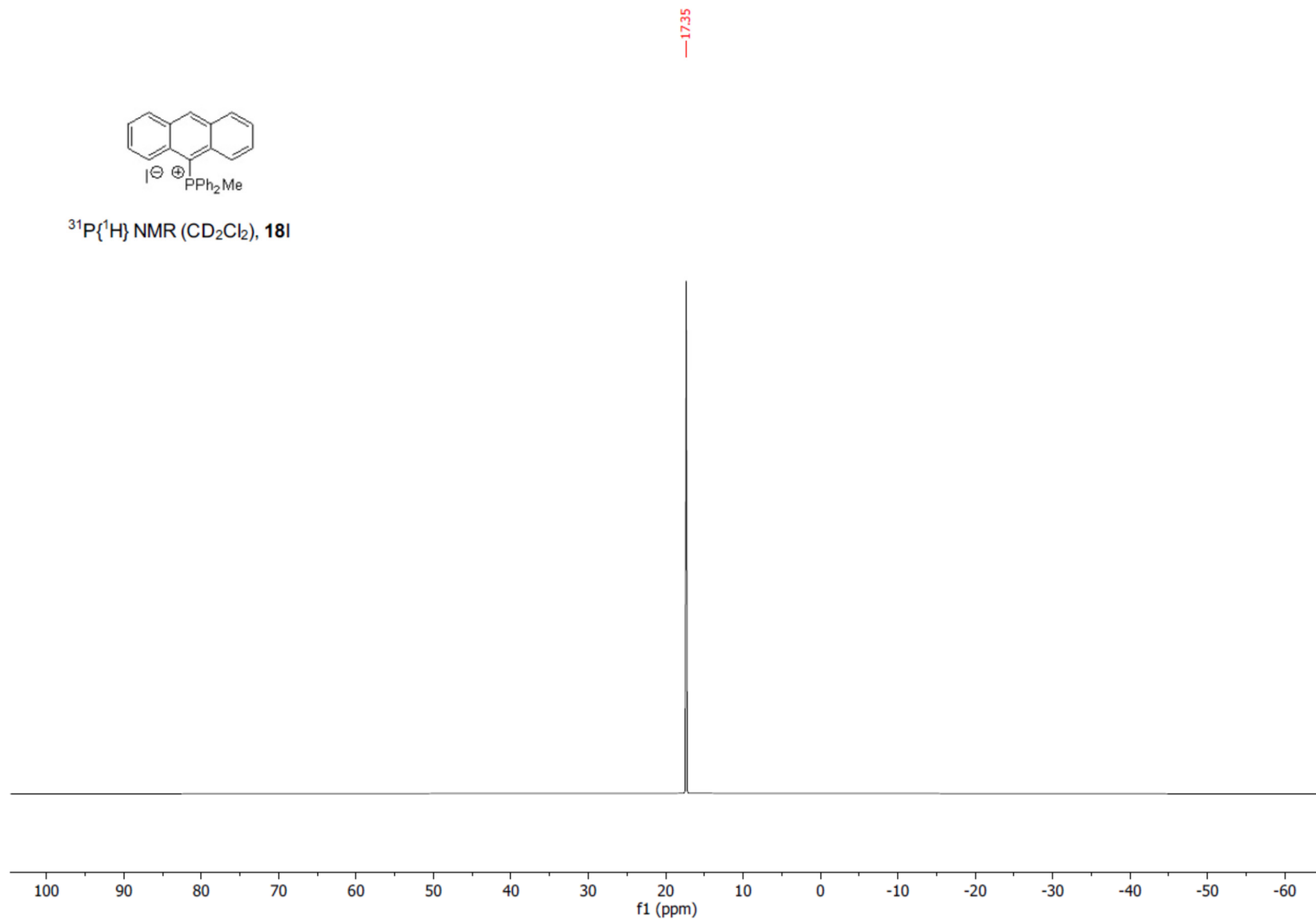


$^{13}\text{C}\{^1\text{H}\}$ NMR (CD_2Cl_2), **18I**





$^{31}\text{P}\{^1\text{H}\}$ NMR (CD_2Cl_2), **18l**



FT IR Spectra



FT-IR (KBr) for **14PF₆** (isomer *cis* and *trans*)



FT-IR (KBr) for 14Cl (isomer *cis* and *trans*)



FT-IR (KBr) for **14BPh₄** (isomer *cis* and *trans*)