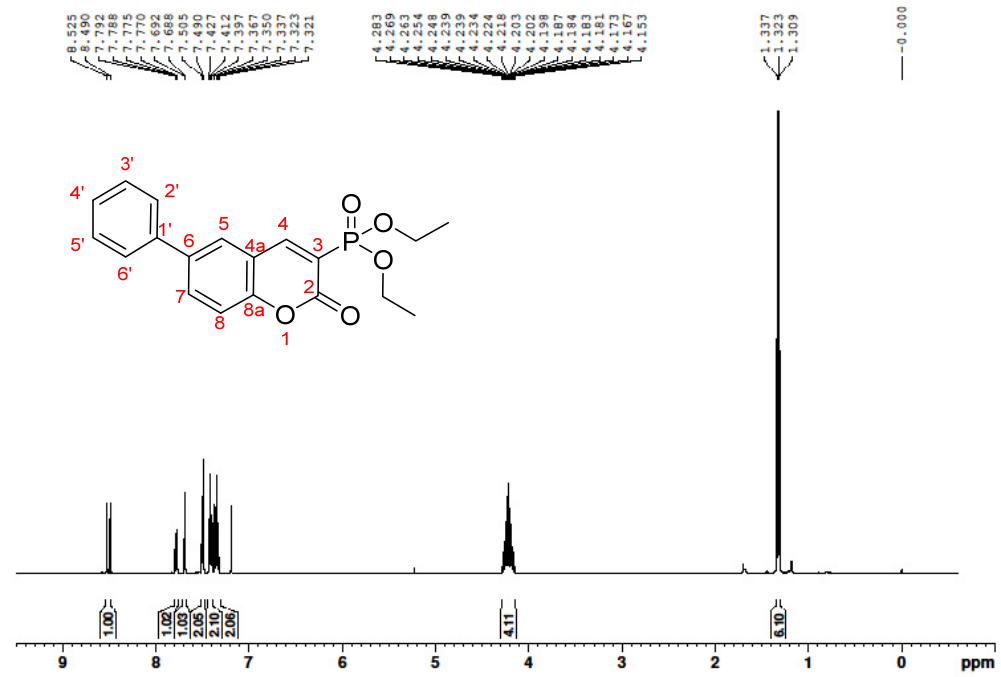
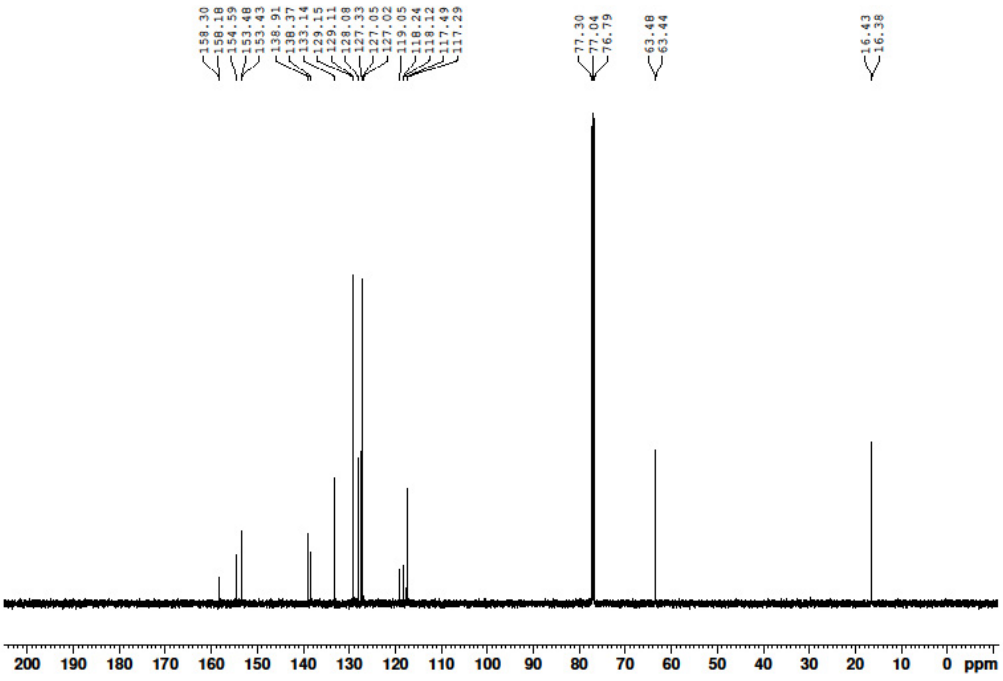
Supplementary Materials

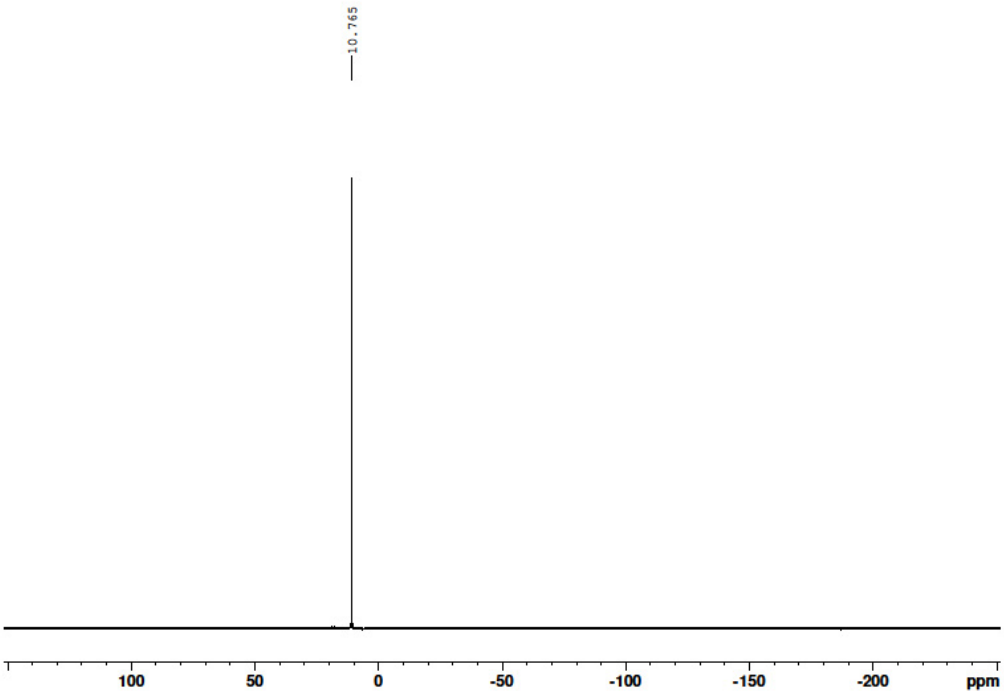
Efficient synthesis of fluorescent coumarins and phosphorous containing coumarin type heterocycles via palladium cross-coupling reactions.

List of content:

^{1}H, ^{13}C and ^{31}P NMR spectra of compound **3a**



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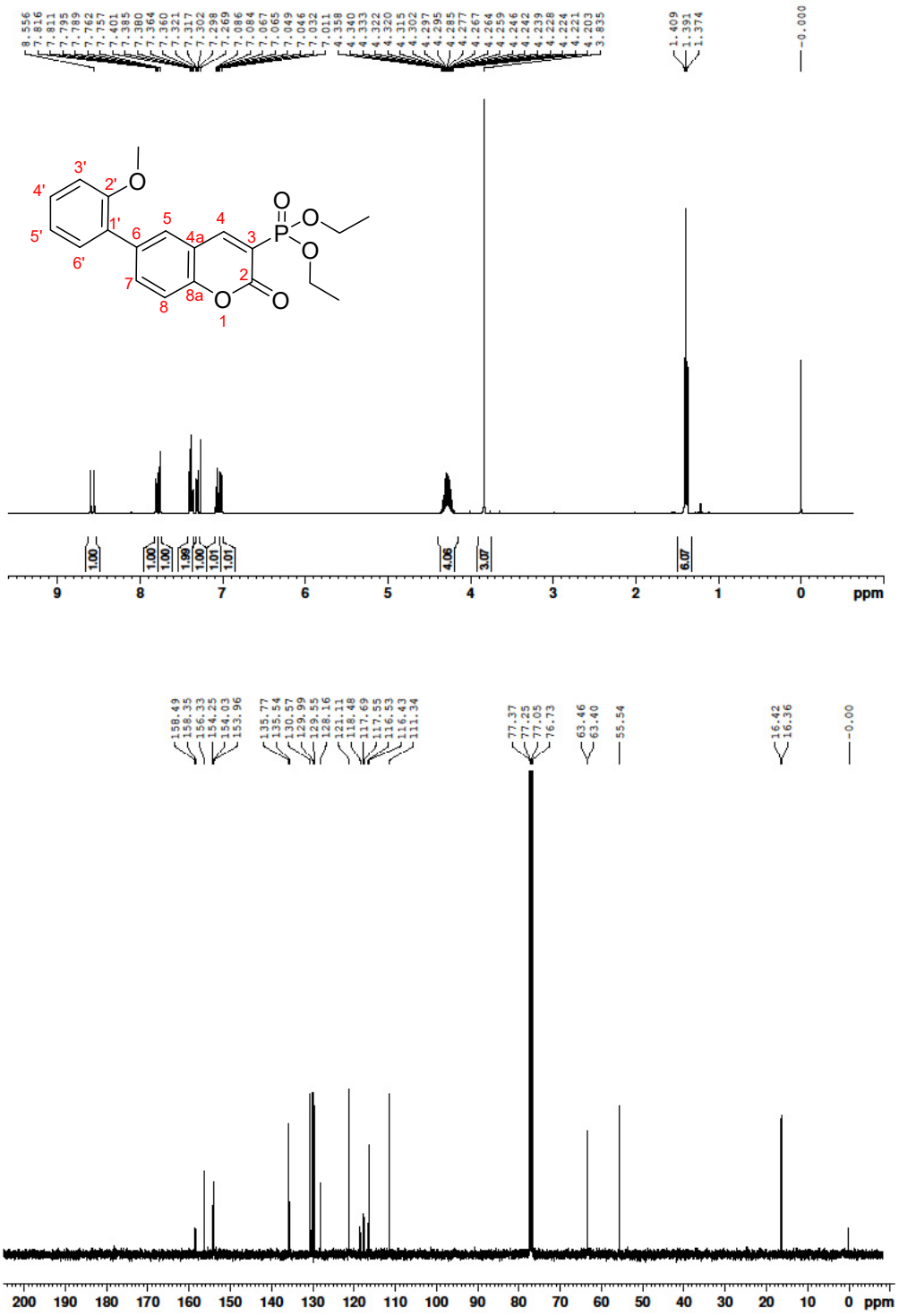
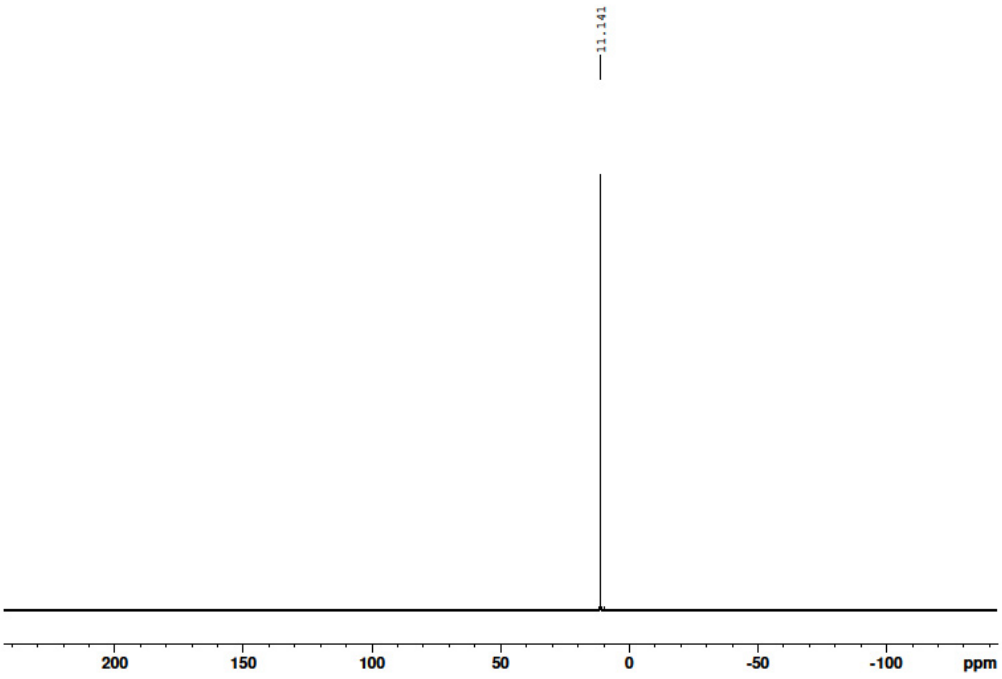
ppm

^{1}H, ^{13}C and ^{31}P NMR spectra of compound **3b**

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0
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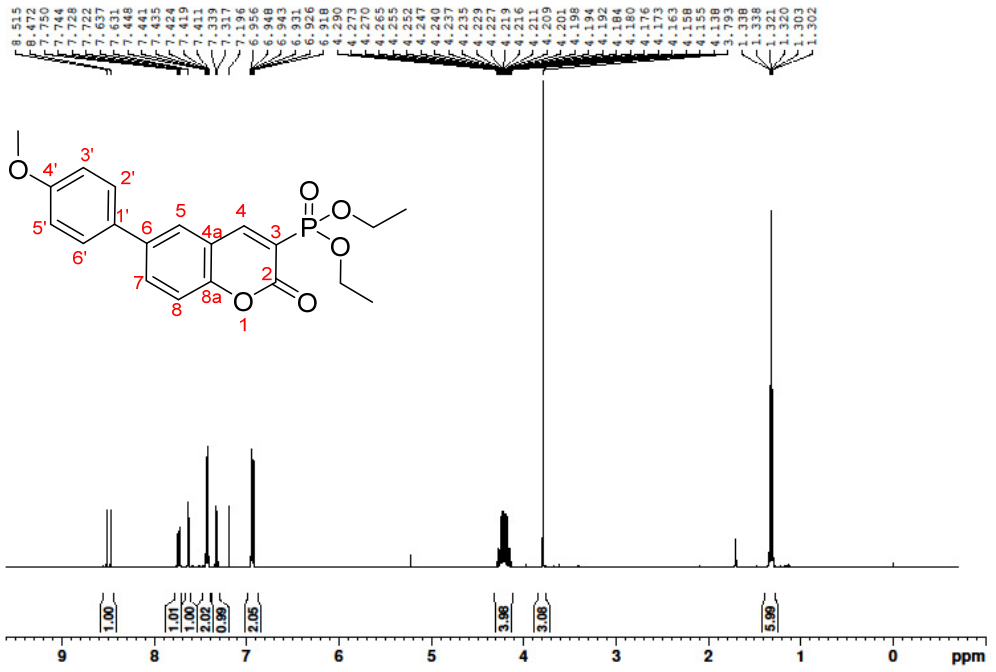
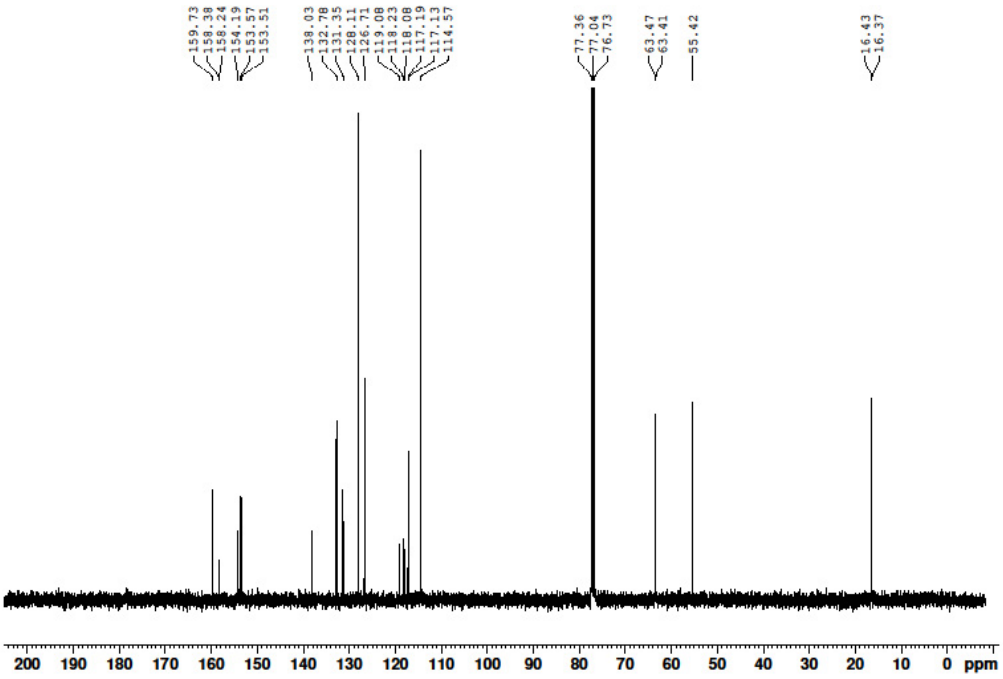
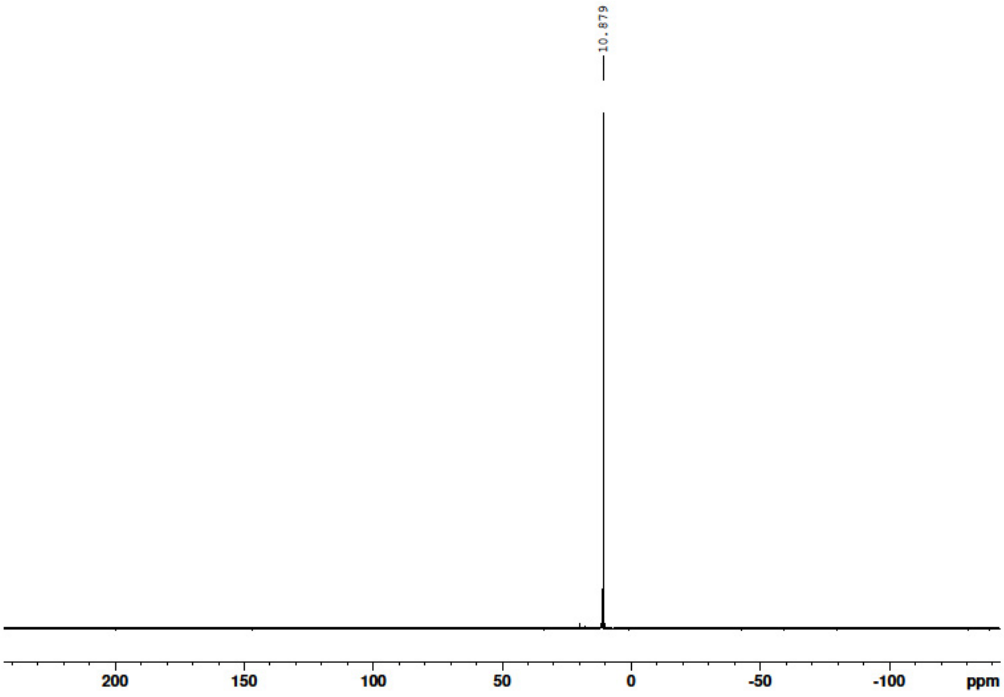
^{1}H, ^{13}C and ^{31}P NMR spectra of compound **3c**



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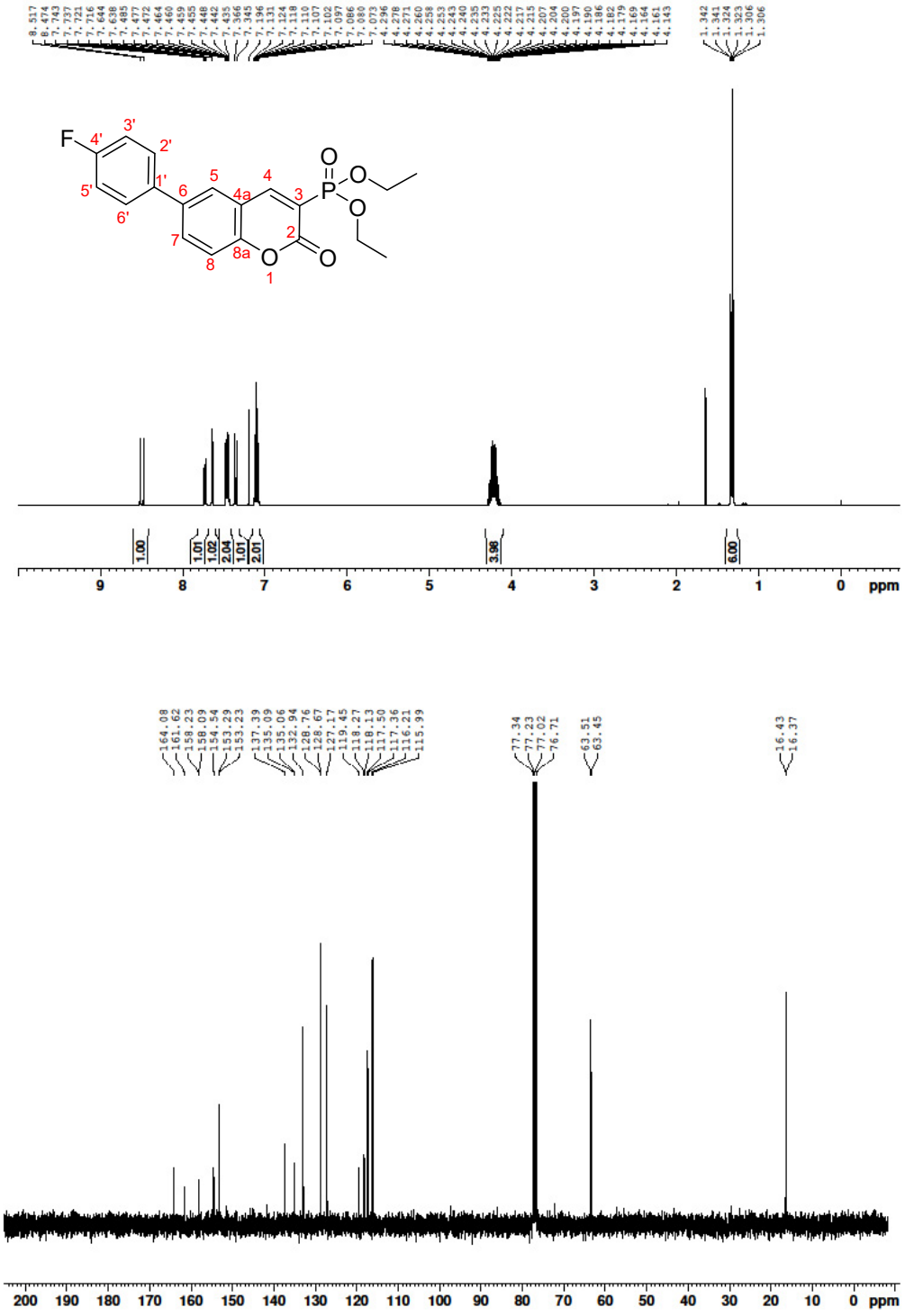
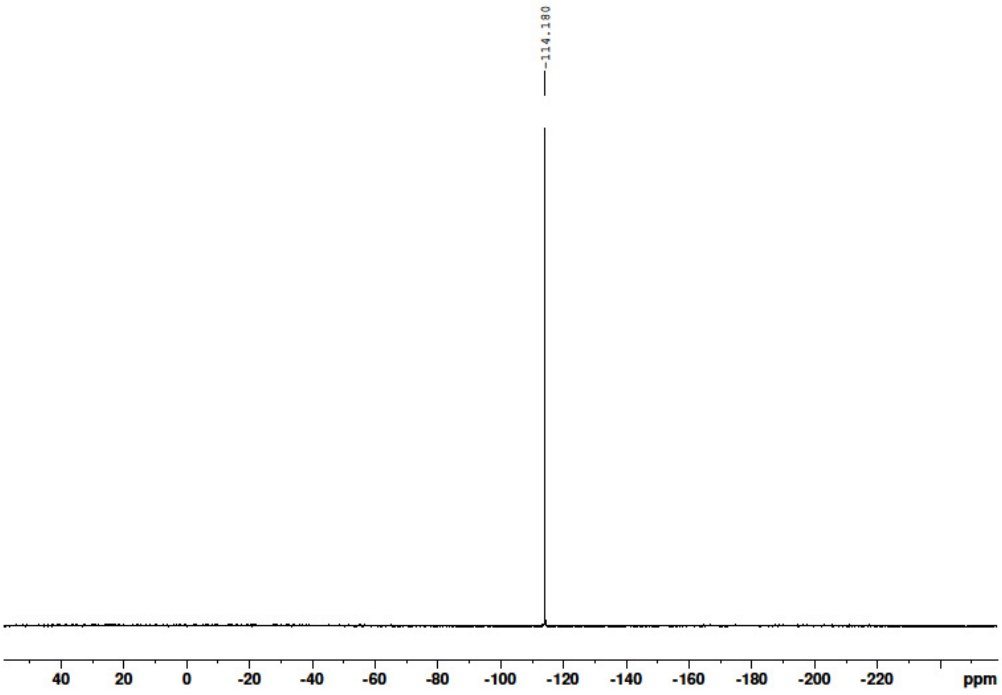
-50
-100
ppm

^{1}H, ^{13}C, ^{19}F and ^{31}P NMR spectra of compound **3d**

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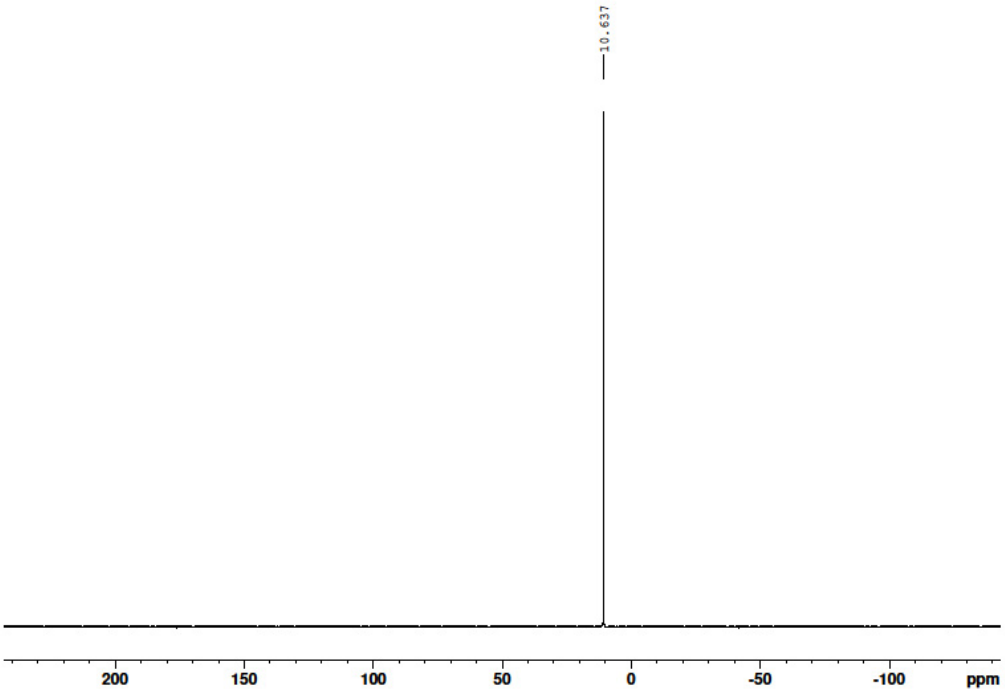
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
-220
ppm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150
100
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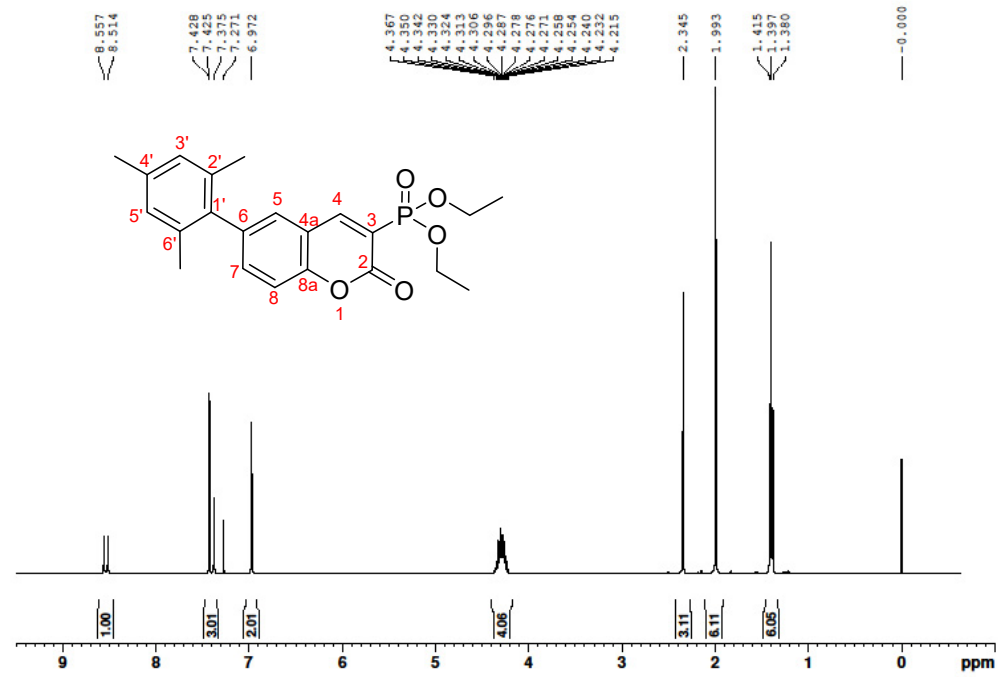
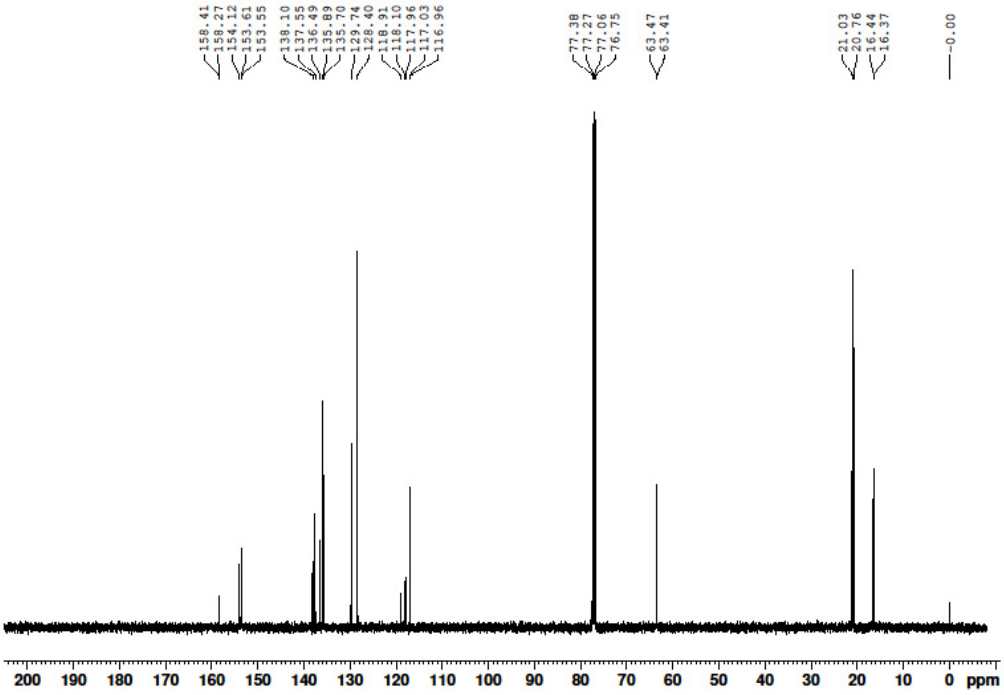
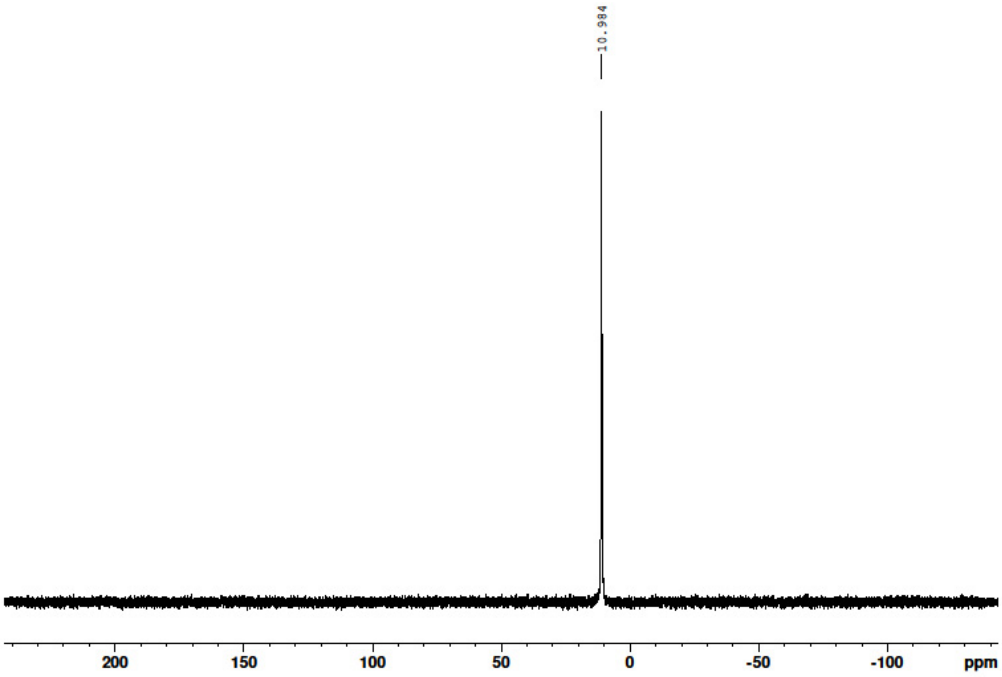
ppm

^{1}H, ^{13}C and ^{31}P NMR spectra of compound **3e**



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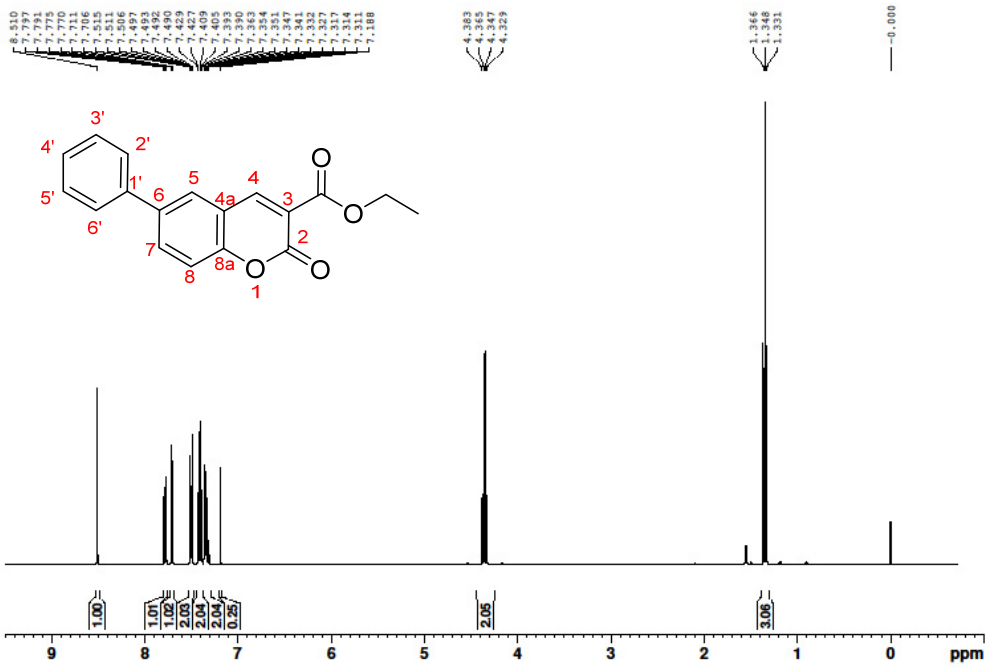
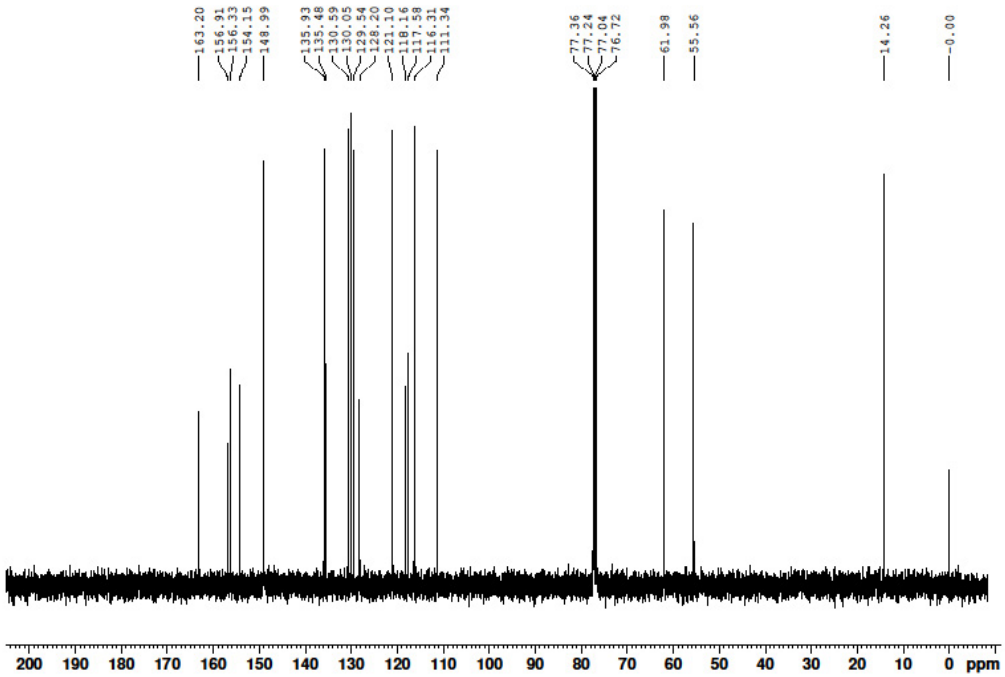
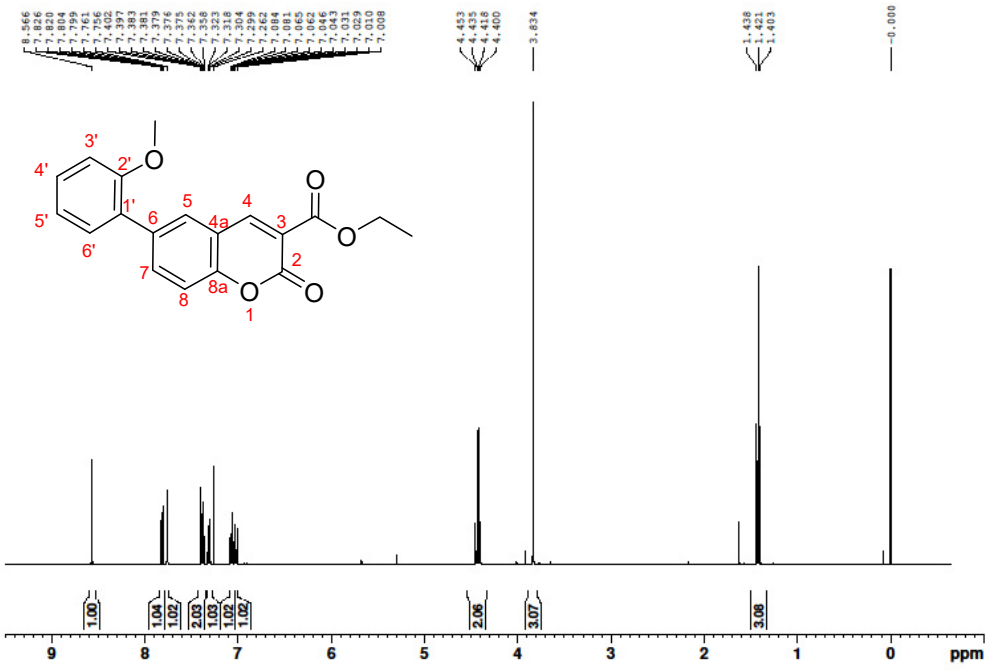
ppm

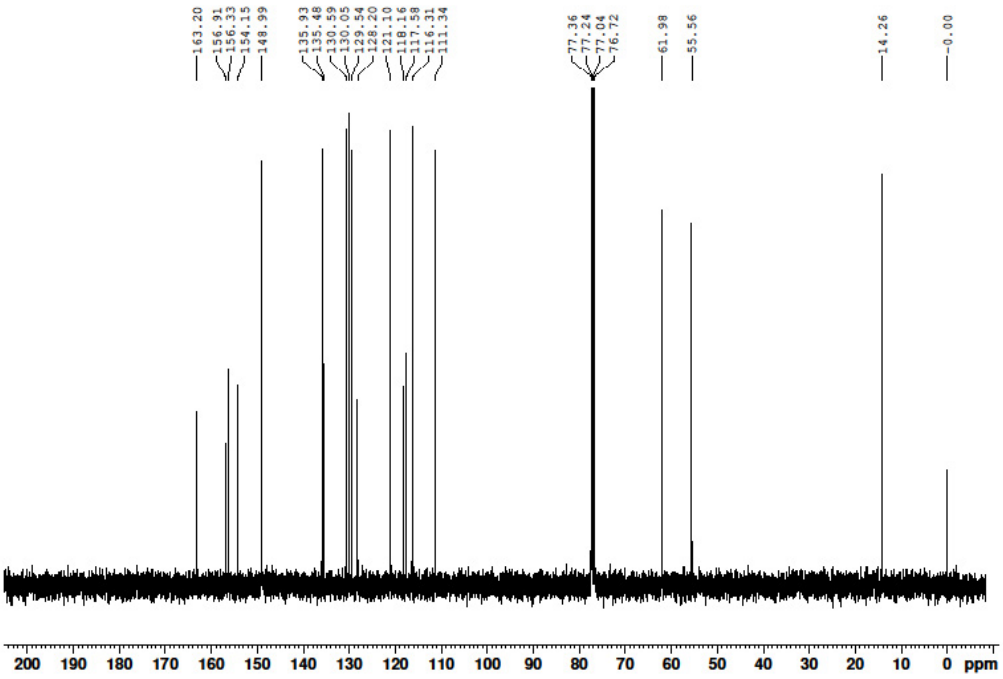
^{1}H and ^{13}C NMR spectra of compound **9a**



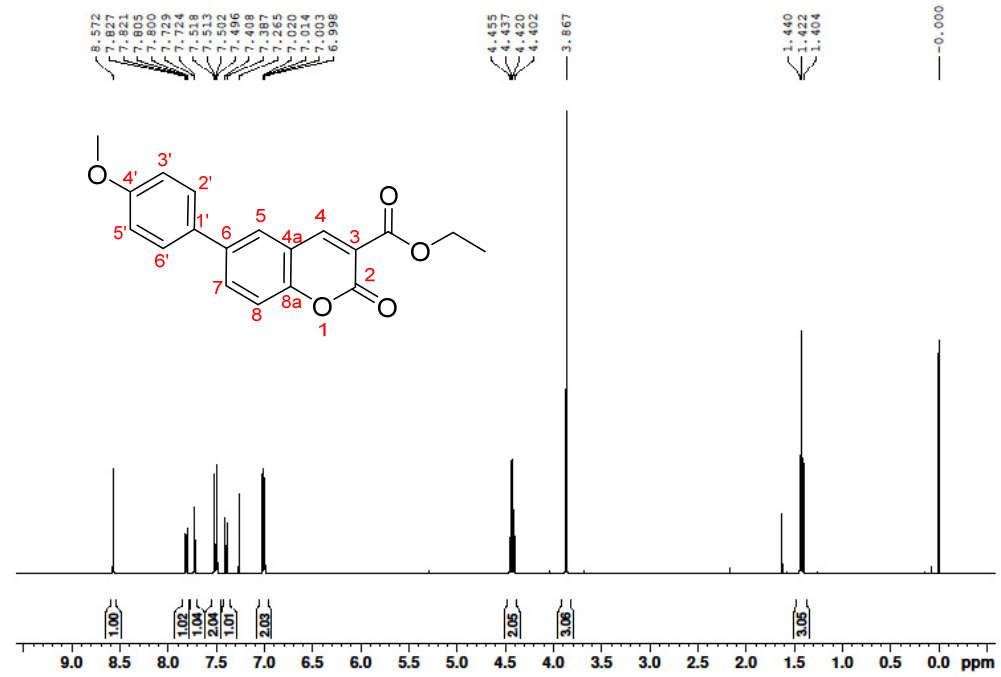


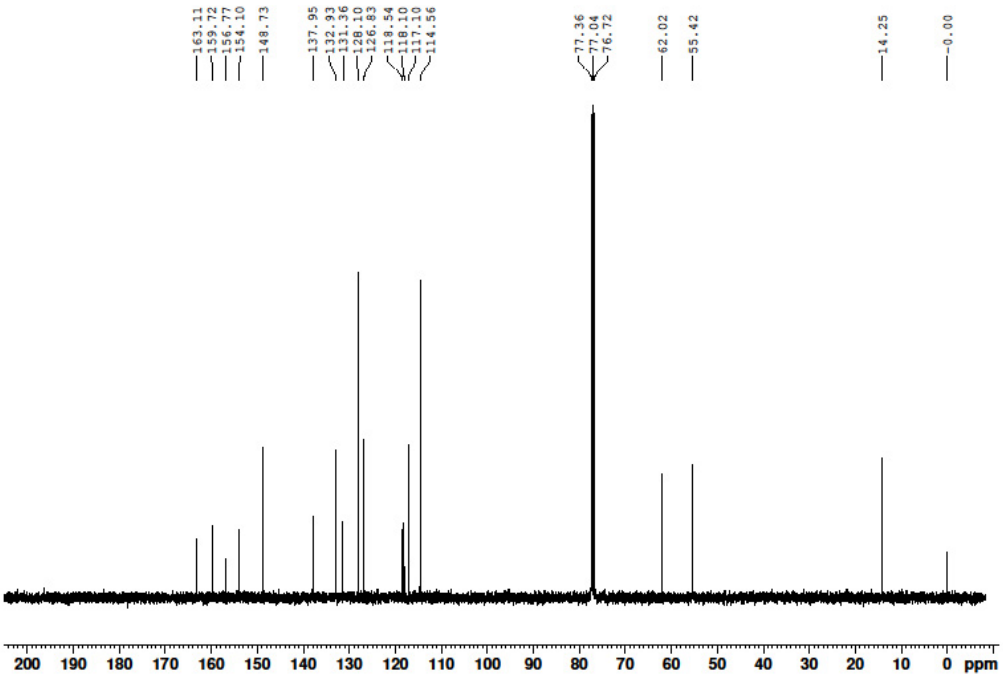
^{1}H and ^{13}C NMR spectra of compound **9b**



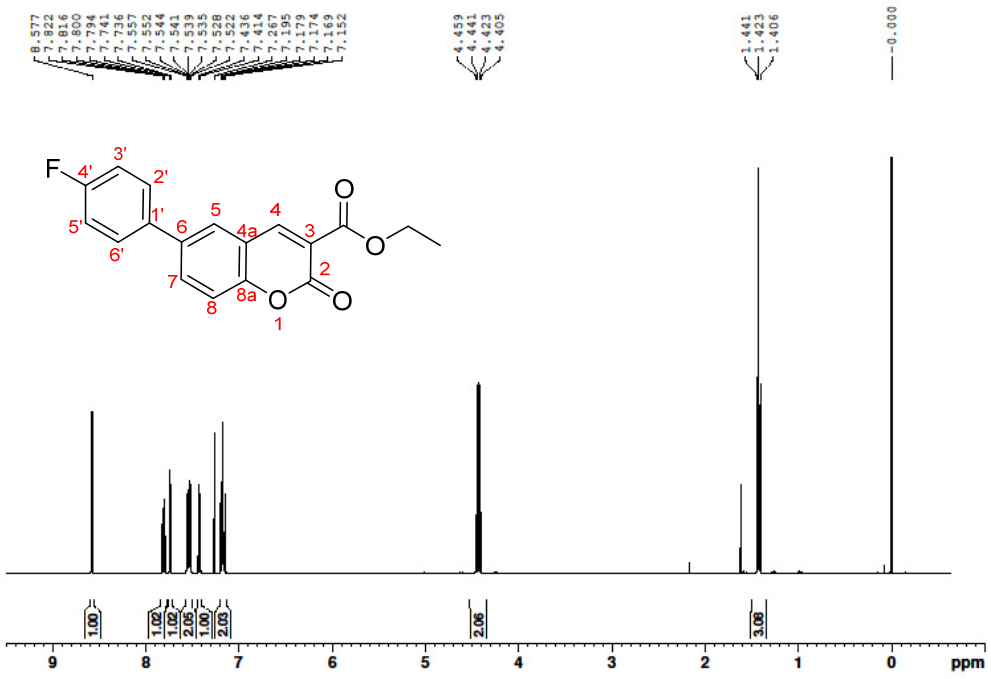


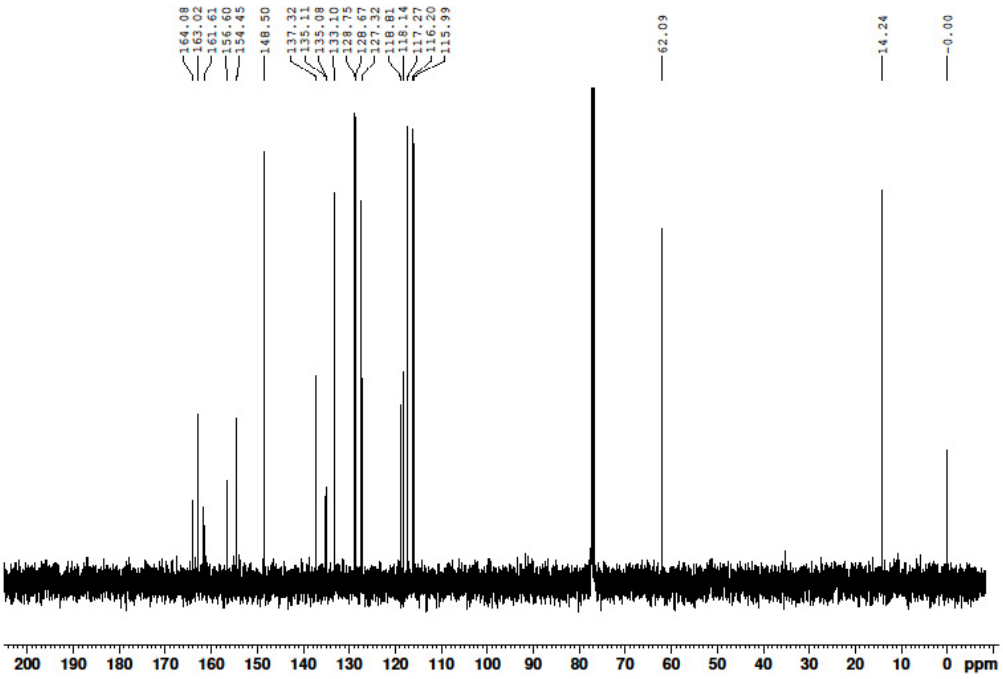
^{1}H and ^{13}C NMR spectra of compound **9c**

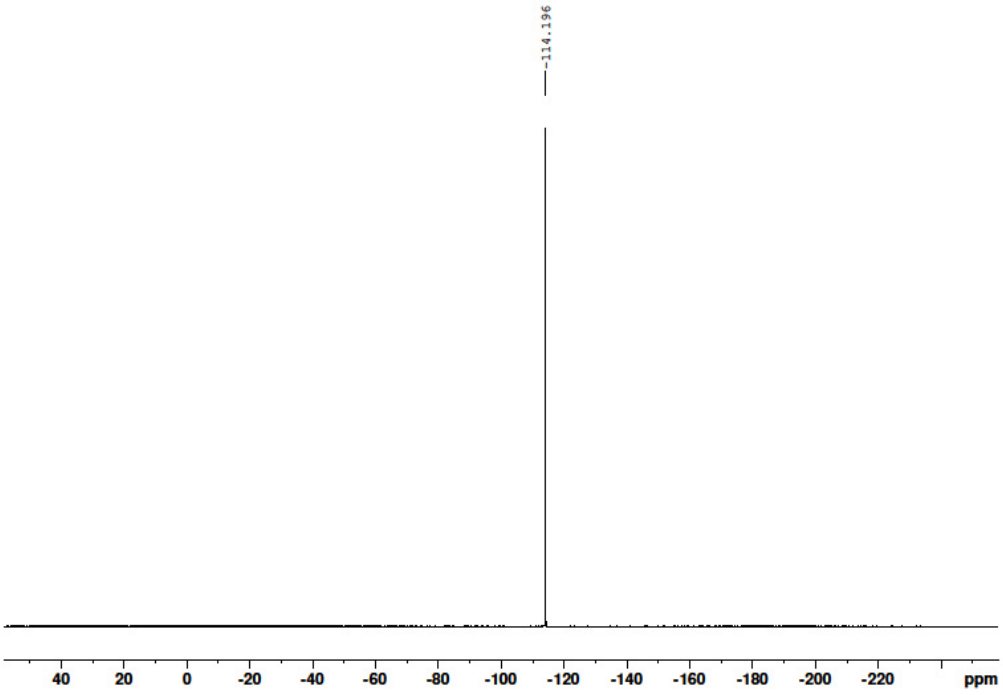




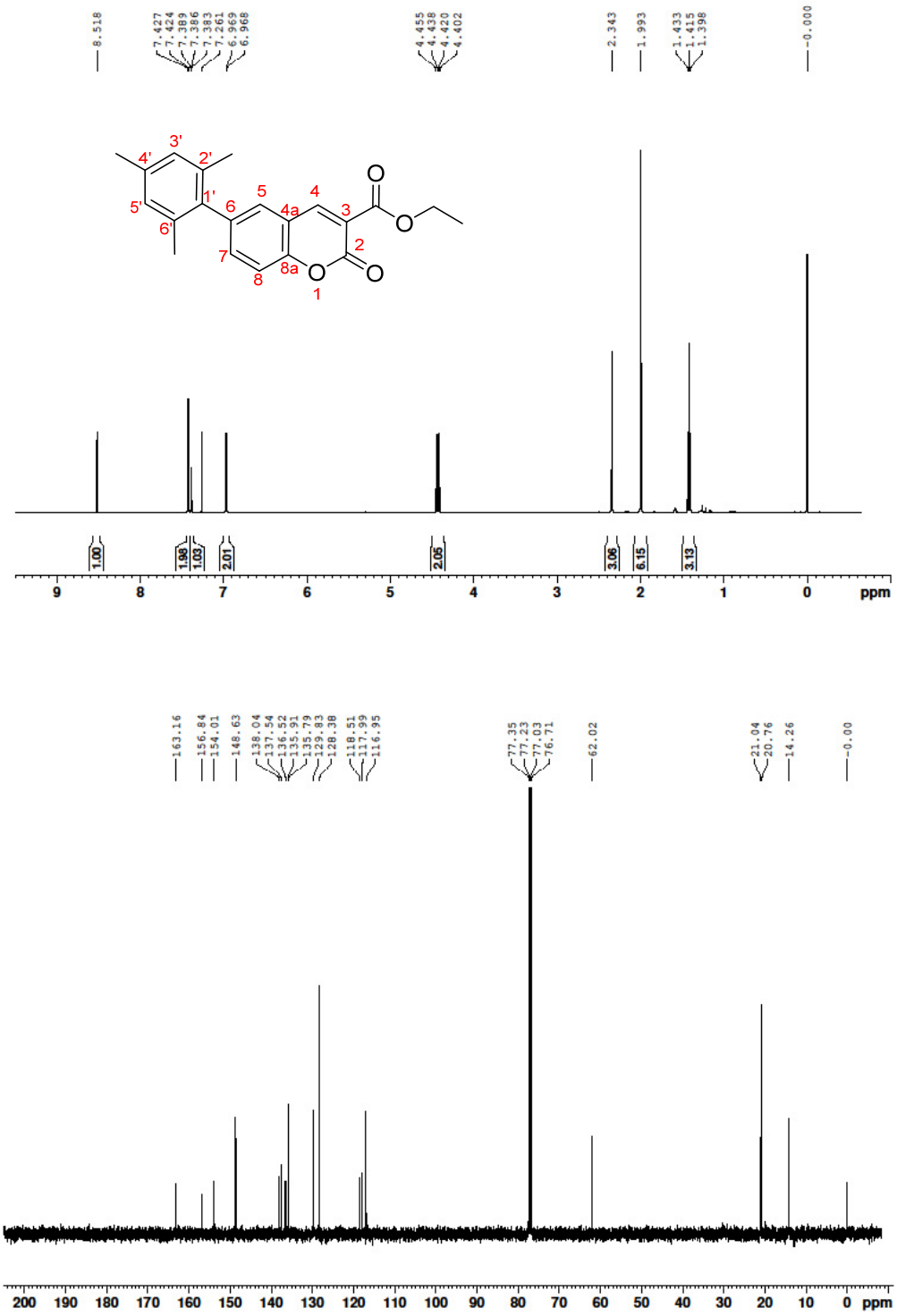
^{1}H, ^{13}C and ^{19}F NMR spectra of compound **9d**



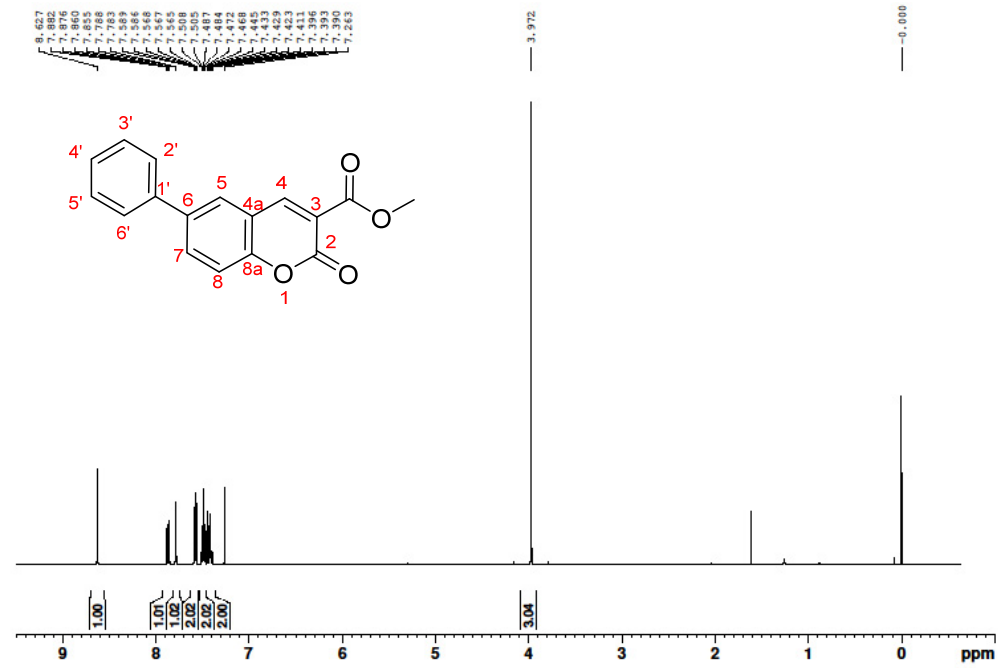


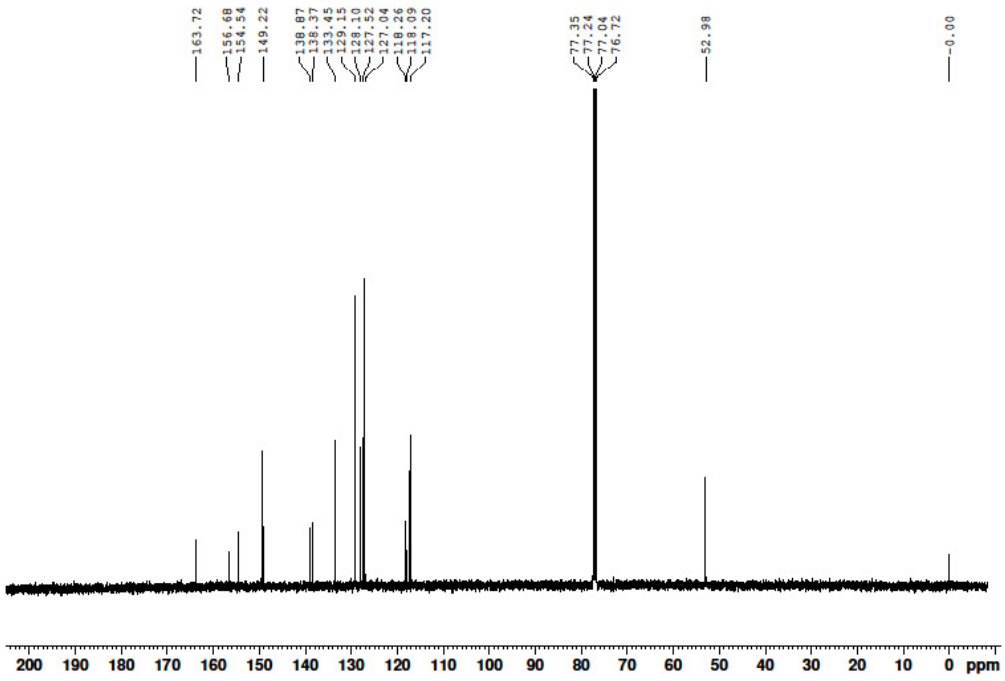

-114.196
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
-220
ppm

^{1}H and ^{13}C NMR spectra of compound **9e**

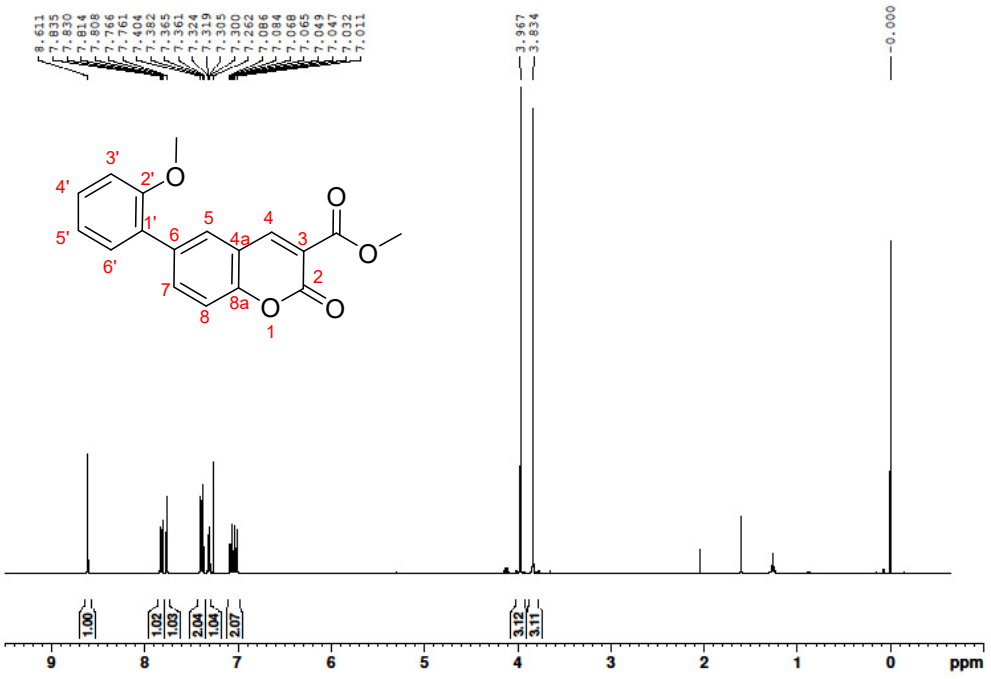


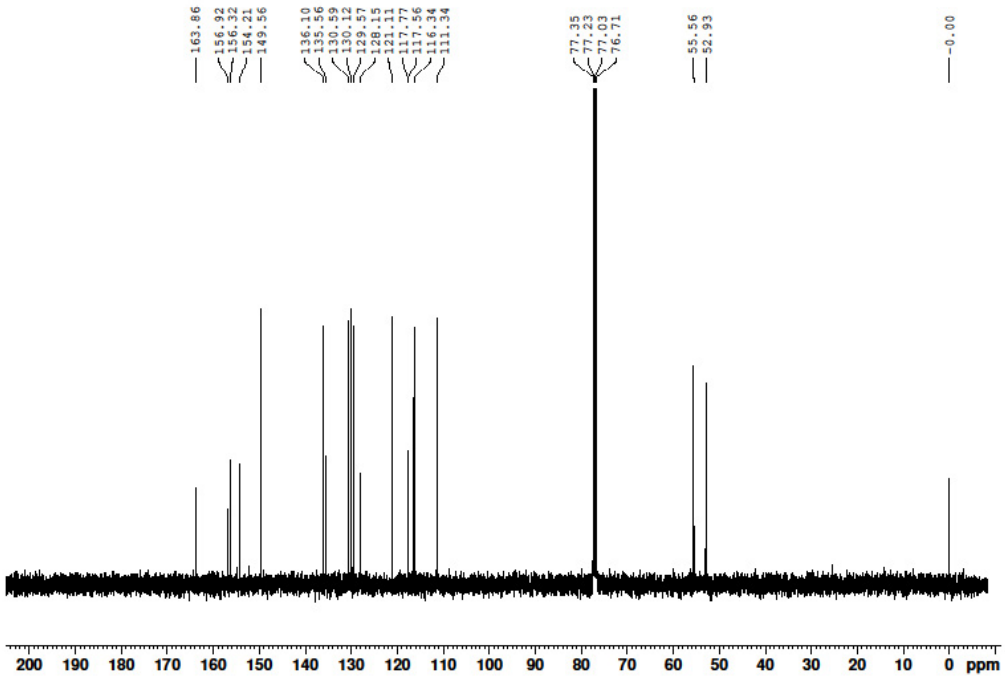
^{1}H and ^{13}C NMR spectra of compound **10a**



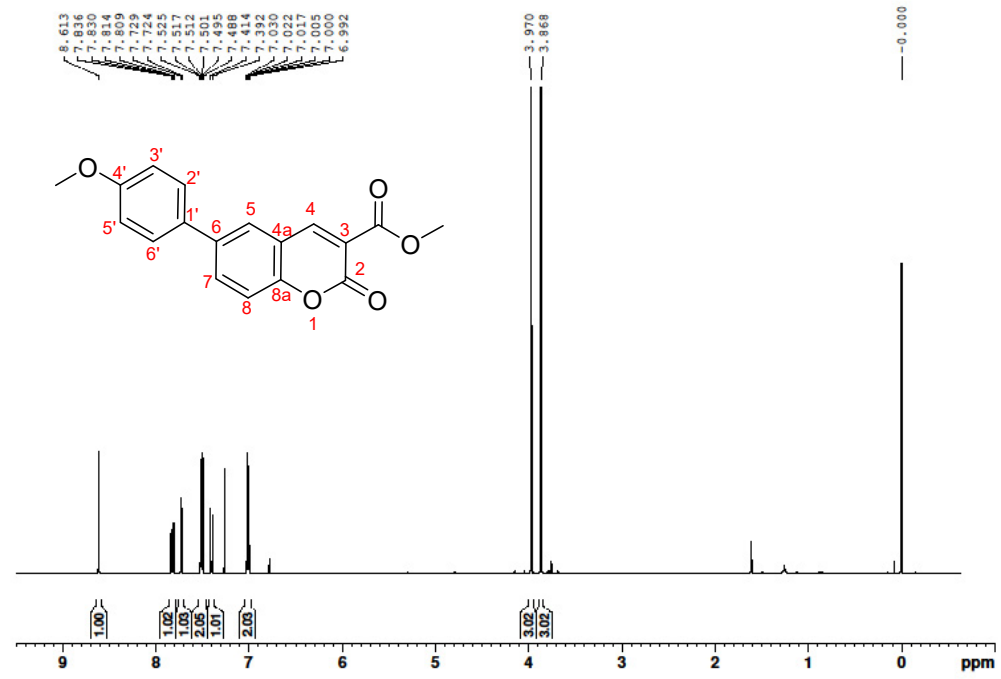


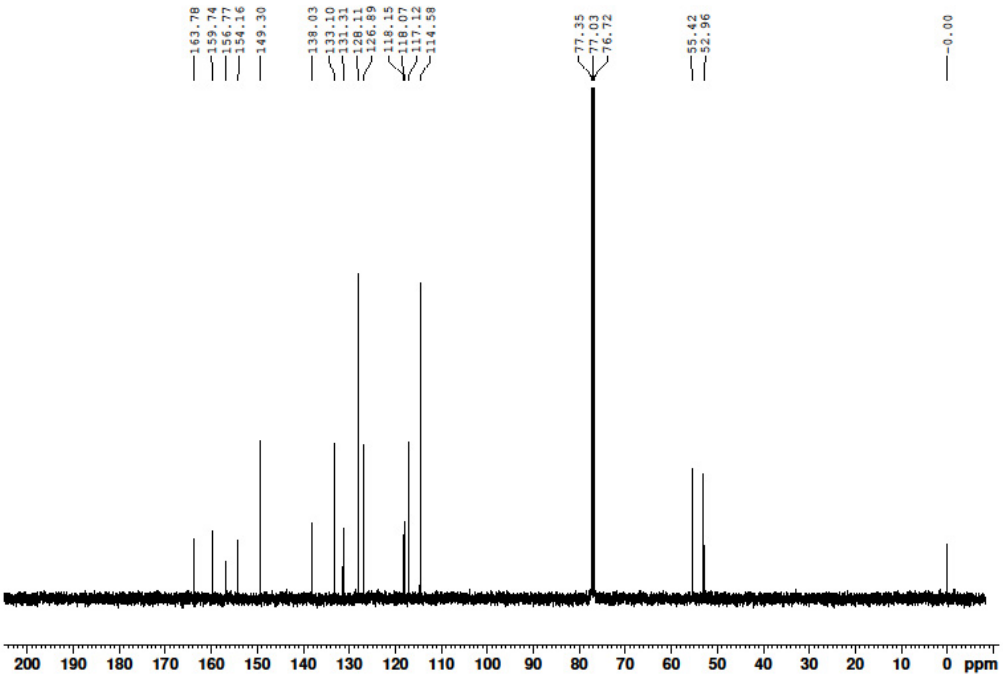
^{1}H and ^{13}C NMR spectra of compound **10b**



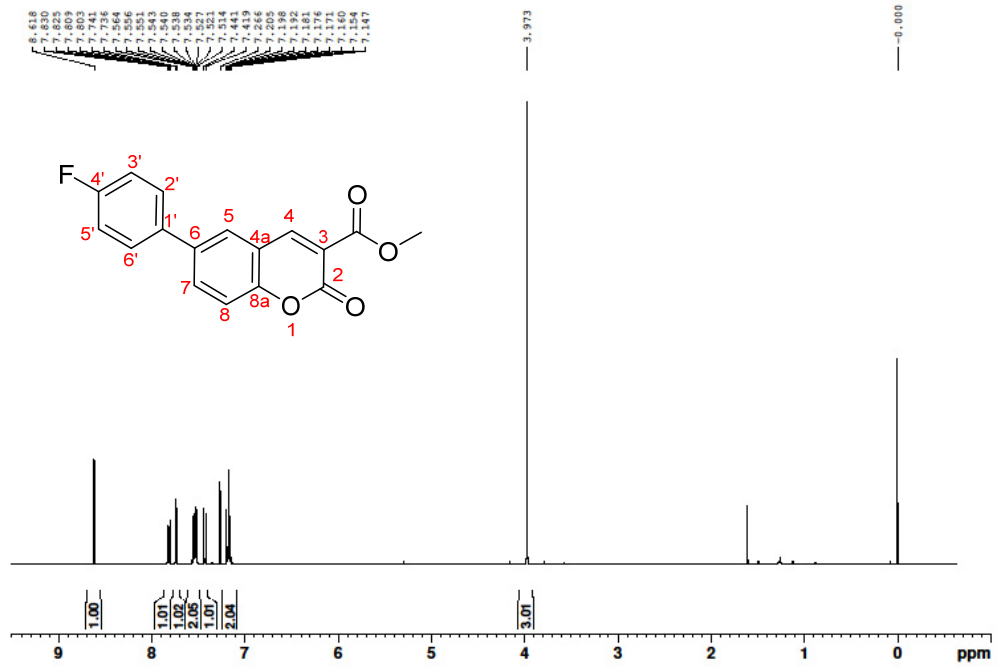


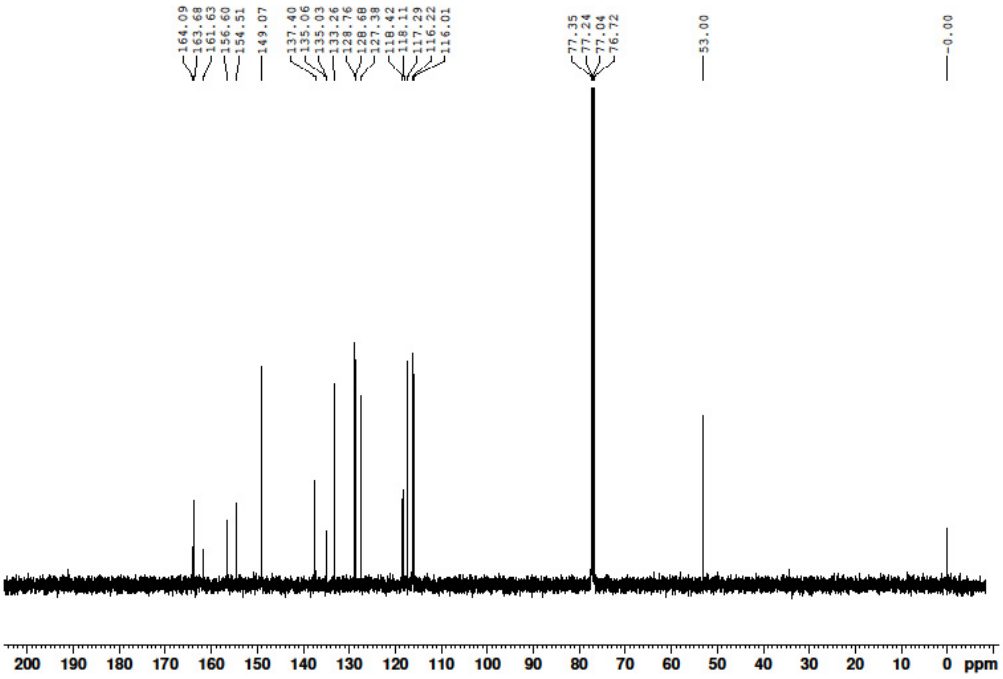
^{1}H and ^{13}C NMR spectra of compound **10c**

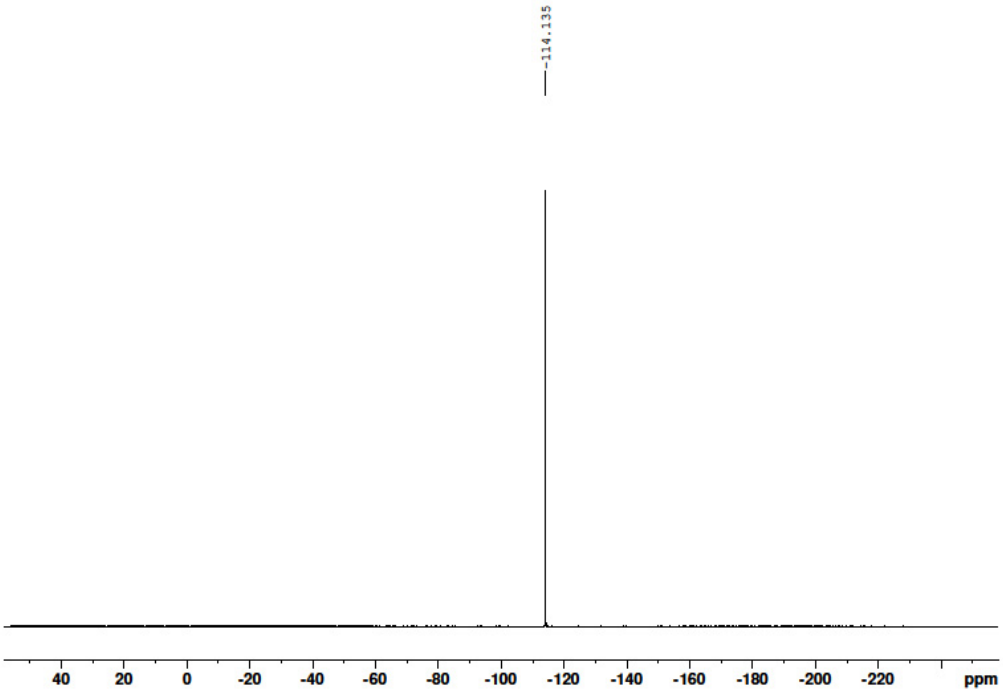




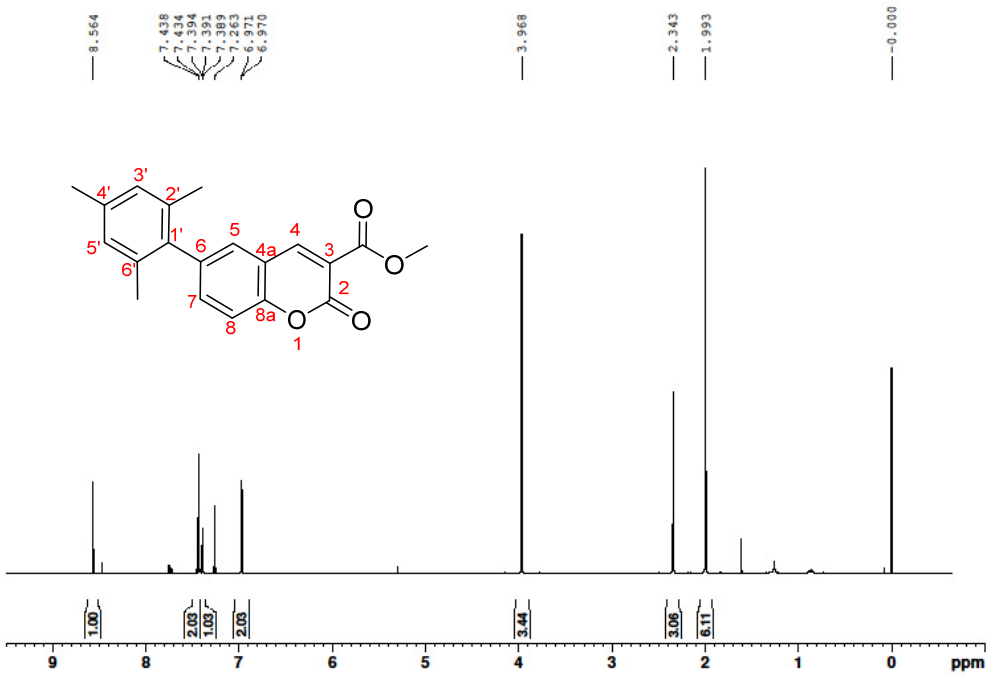
^{1}H, ^{13}C and ^{19}F NMR spectra of compound **10d**

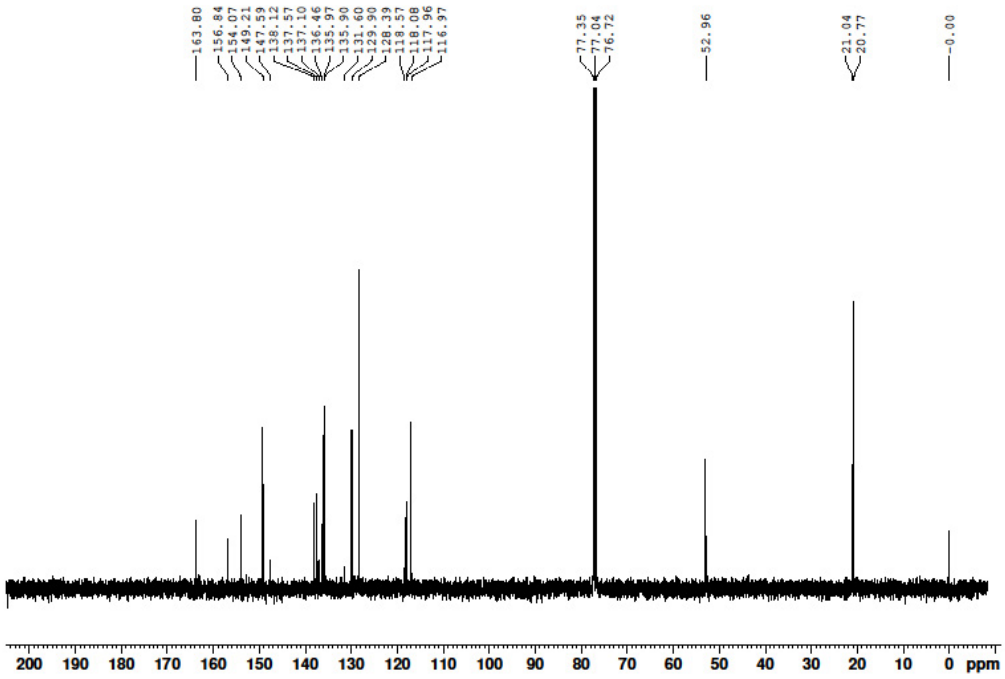




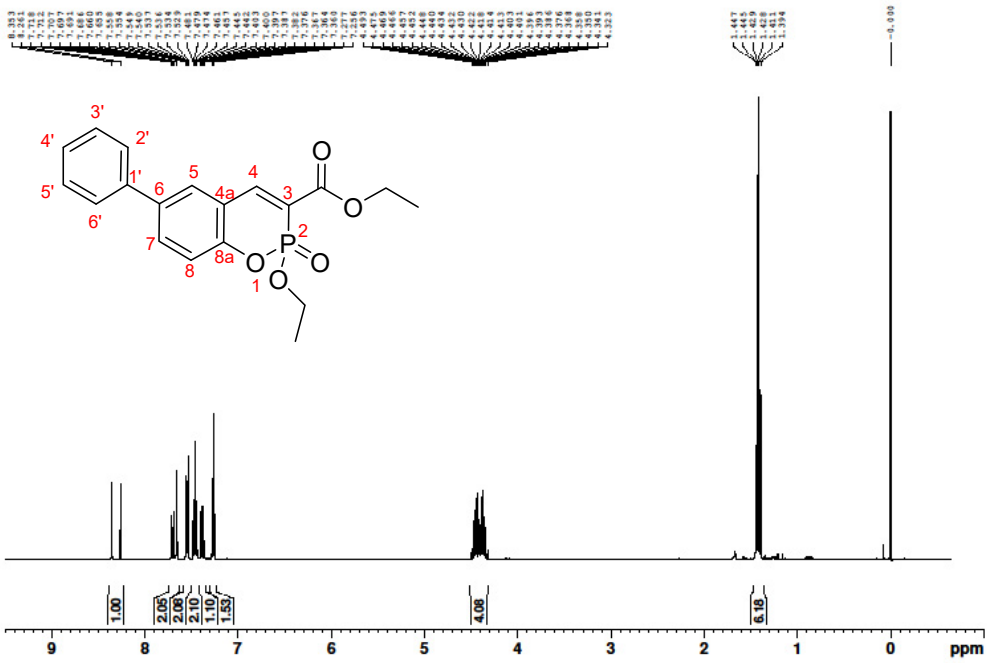

-114.135
40
20
0
-20
-40
-60
-80
-100
-120
-140
-160
-180
-200
-220
ppm

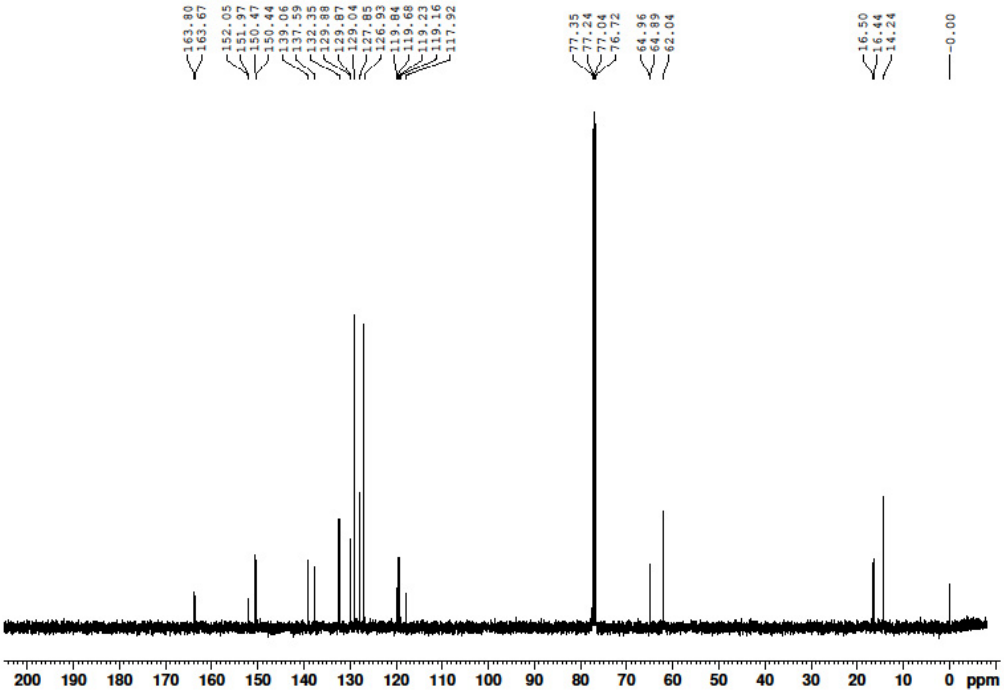
^{1}H and ^{13}C NMR spectra of compound **10e**

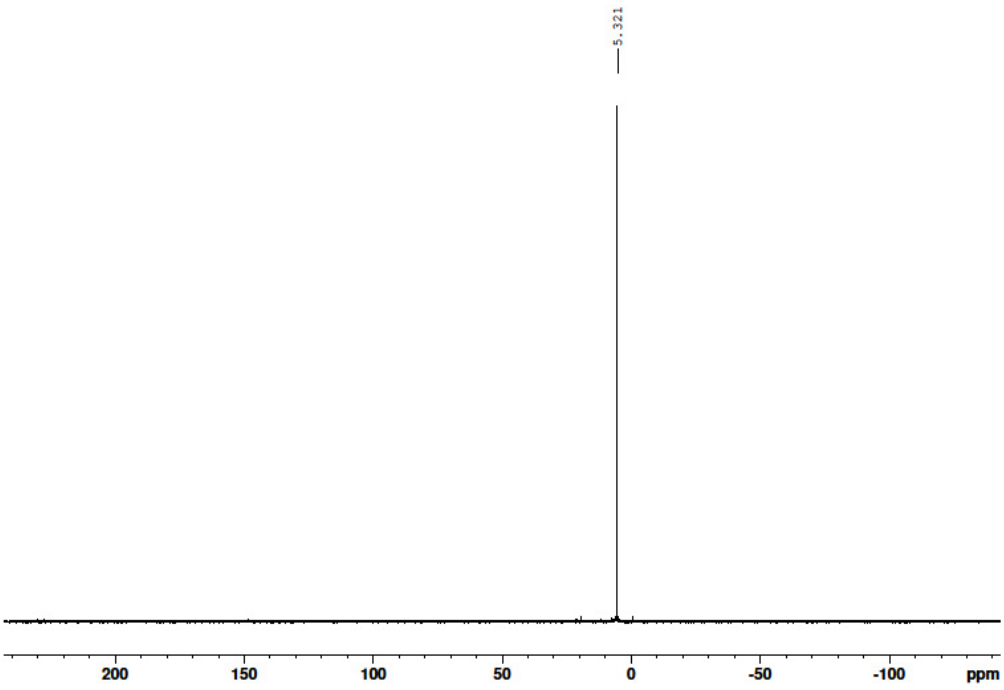




^{1}H, ^{13}C and ^{31}P NMR spectra of compound **11a**






5.321
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150
100
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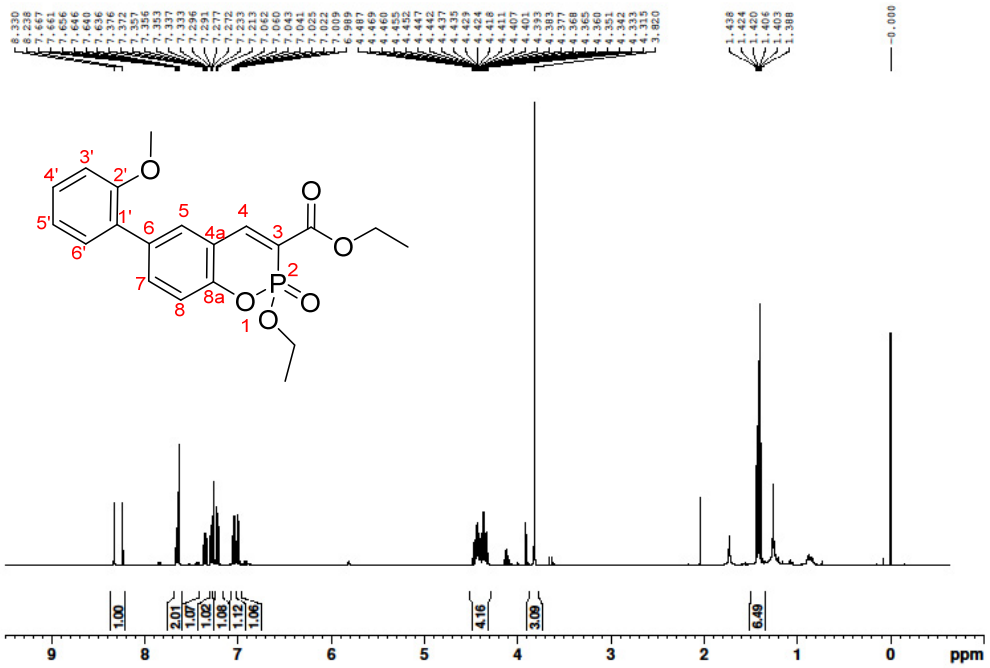
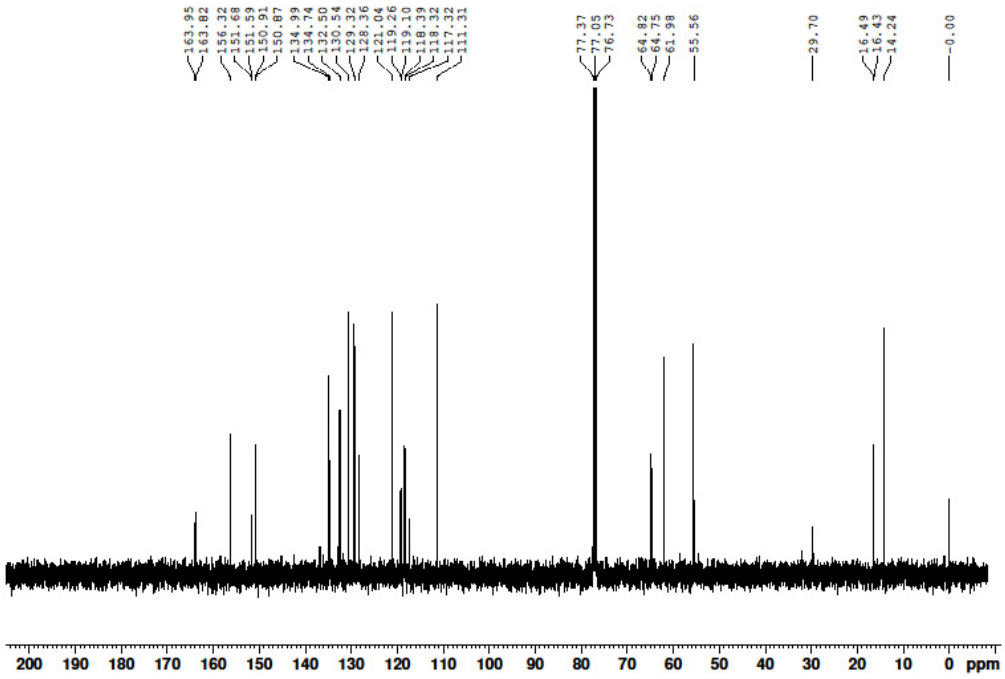
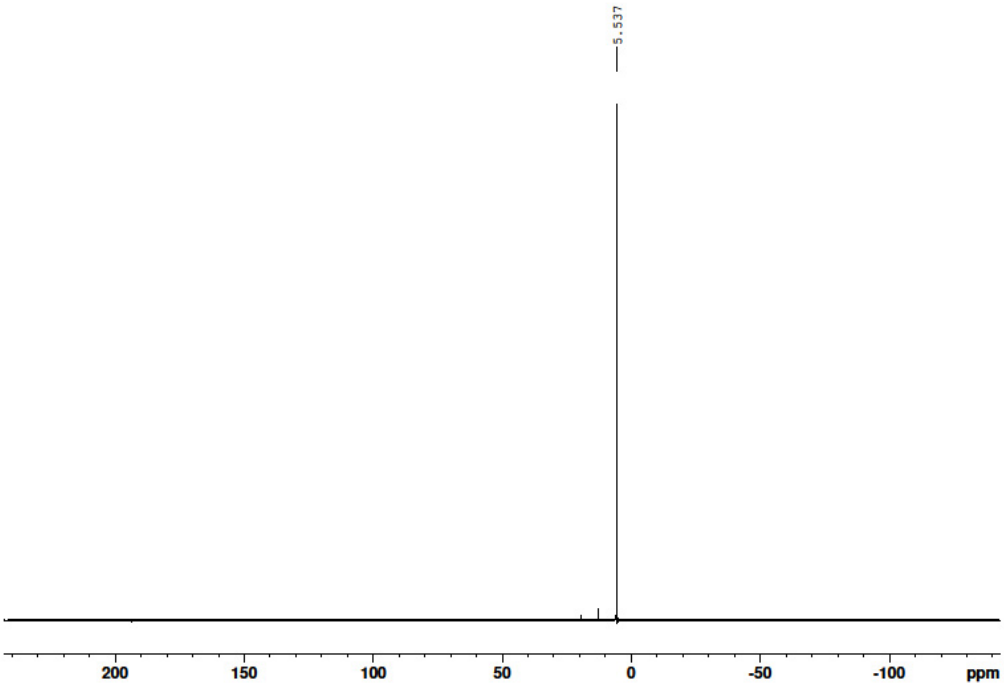
0
-50
-100
ppm

^{1}H, ^{13}C and ^{31}P NMR spectra of compound **11b**



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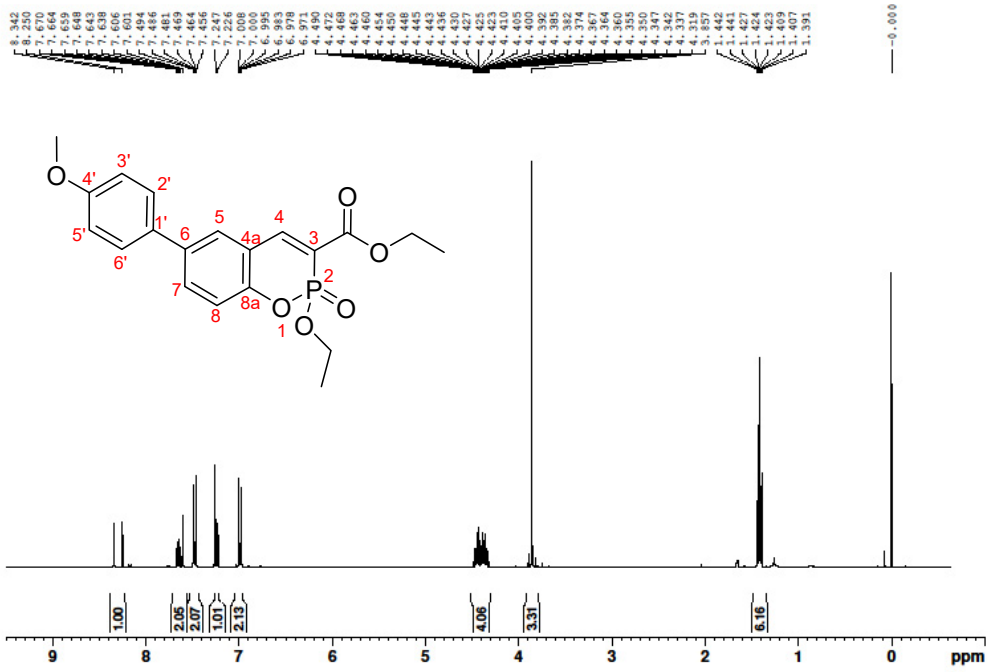
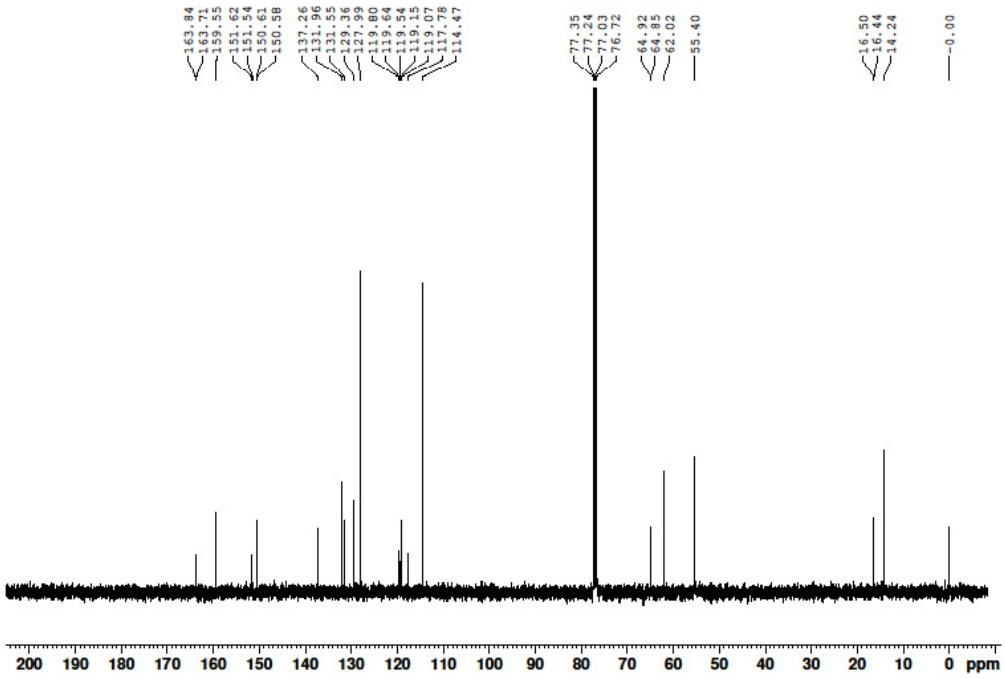
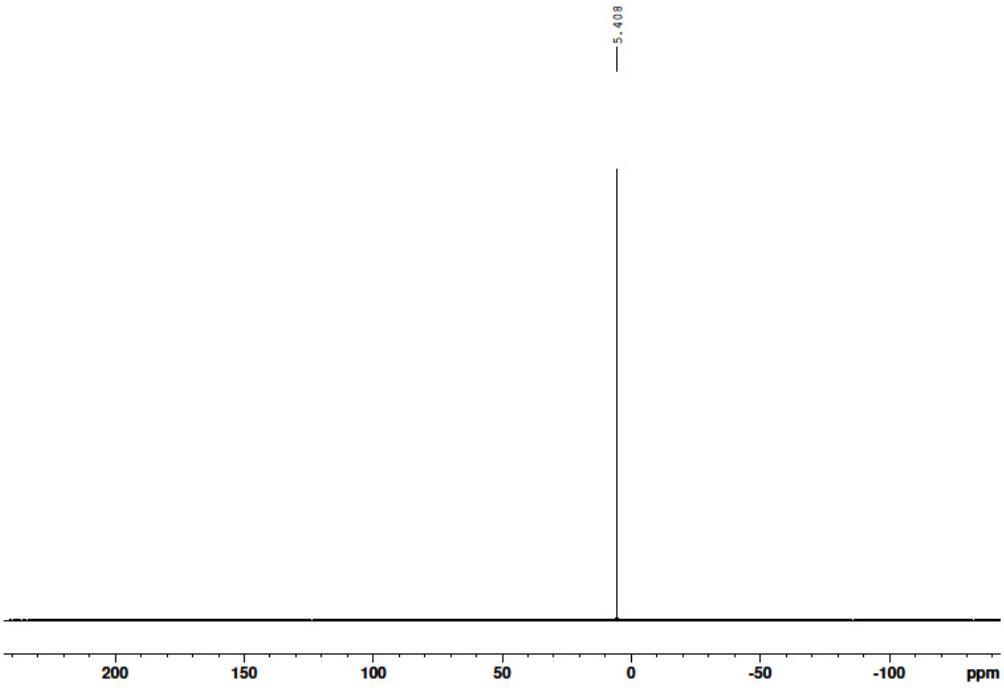
-50
-100
ppm

^{1}H, ^{13}C and ^{31}P NMR spectra of compound **11c**



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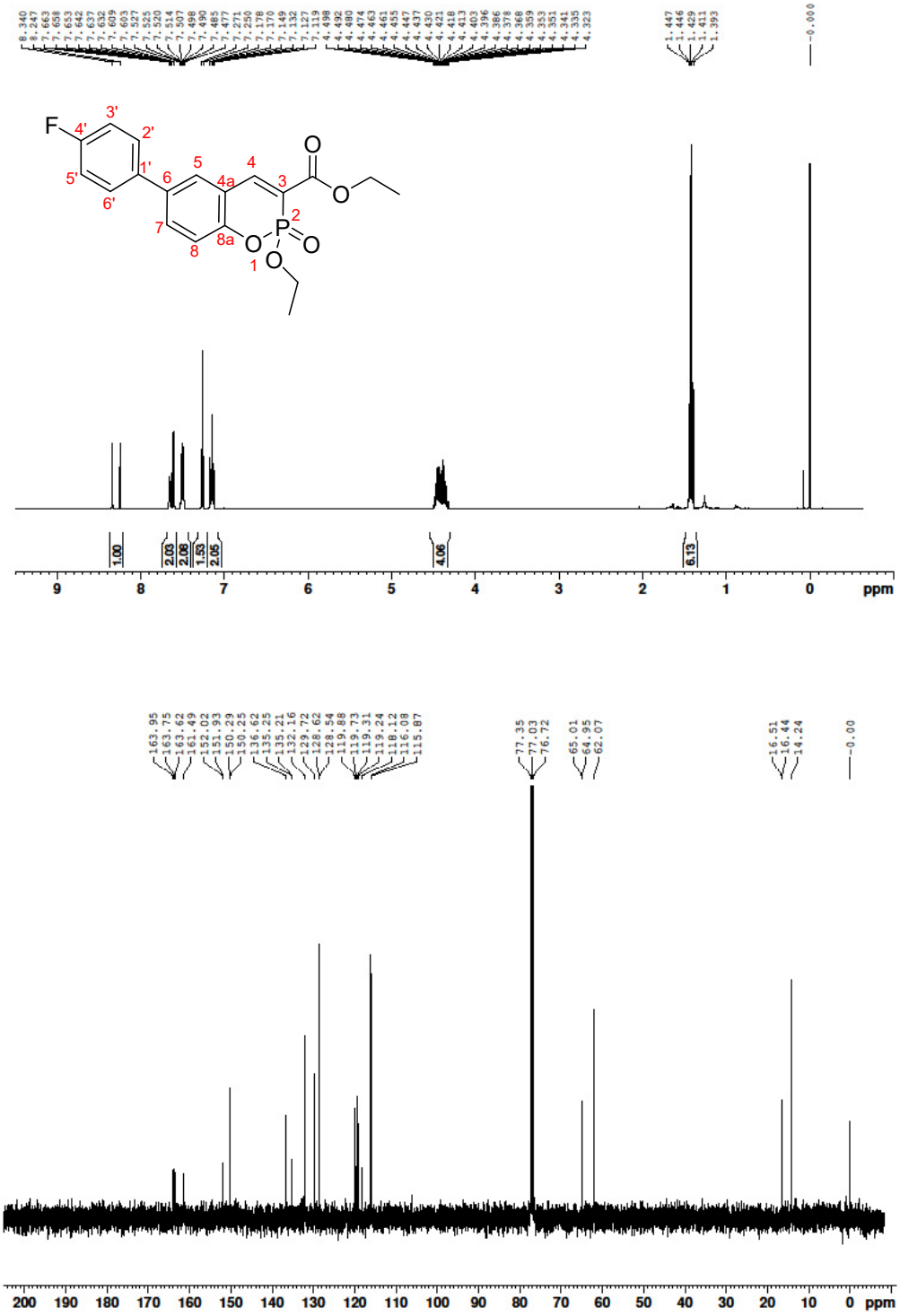
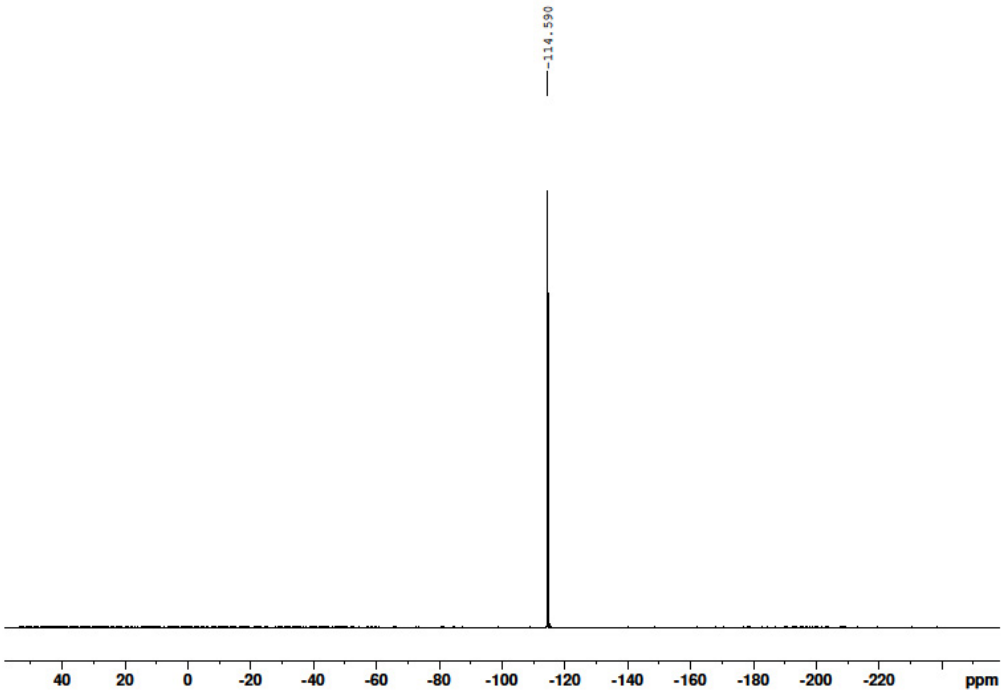
-50
-100
ppm

^{1}H, ^{13}C, ^{19}F and ^{31}P NMR spectra of compound **11d**

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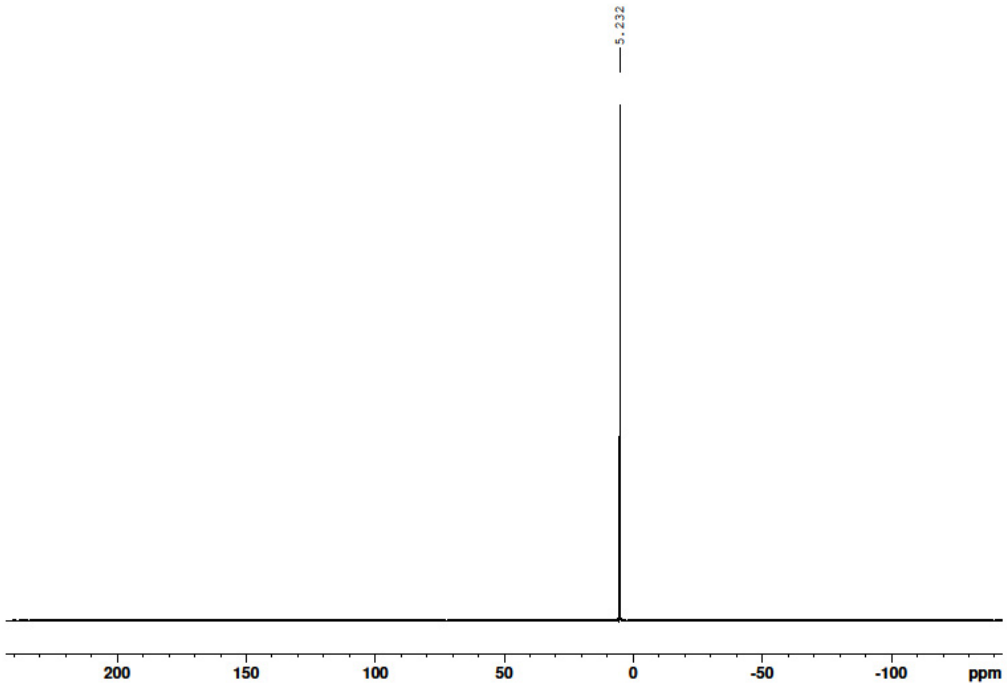
-40
-60
-80
-100
-120
-140
-160
-180
-200
-220
ppm


5.232
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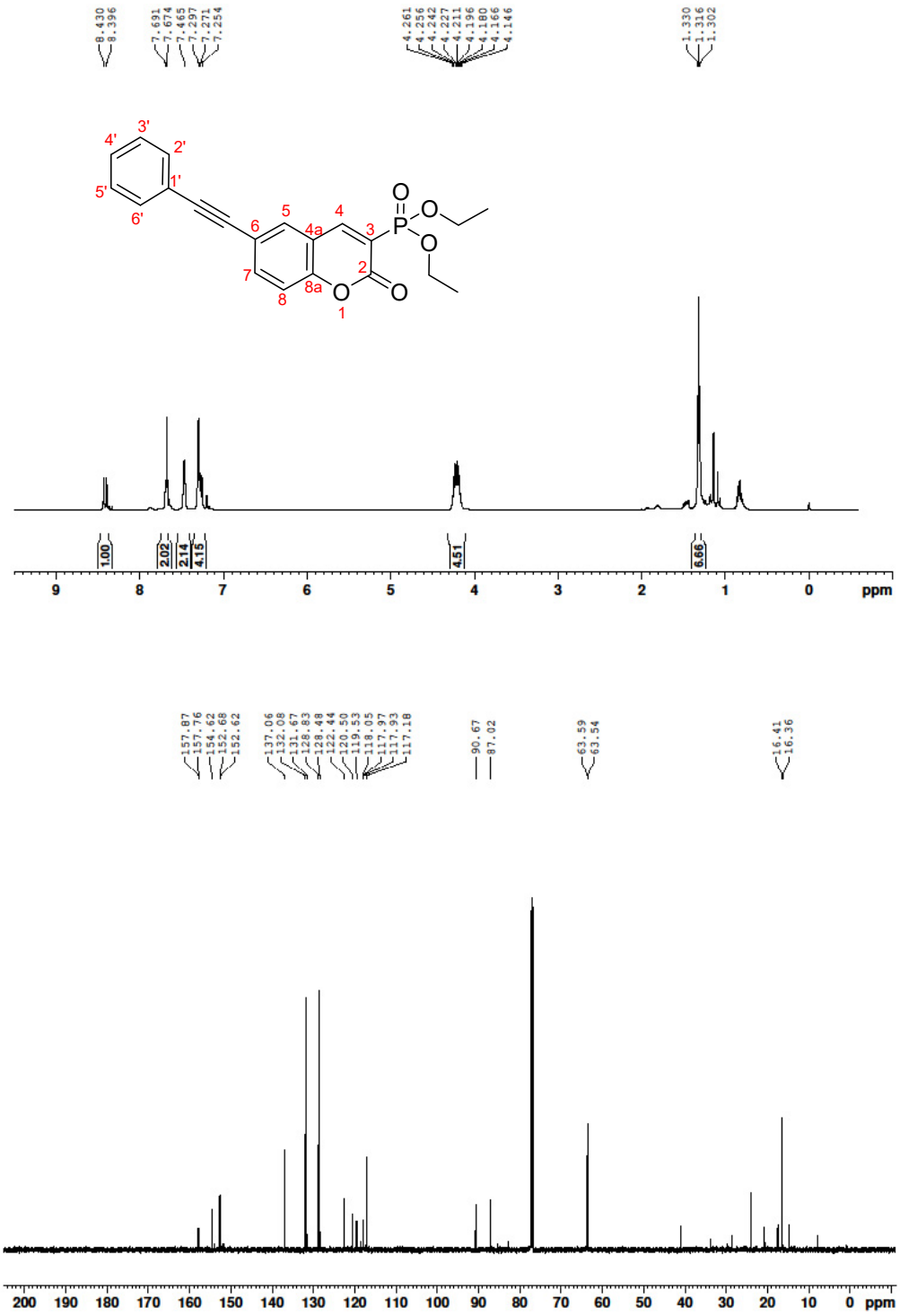
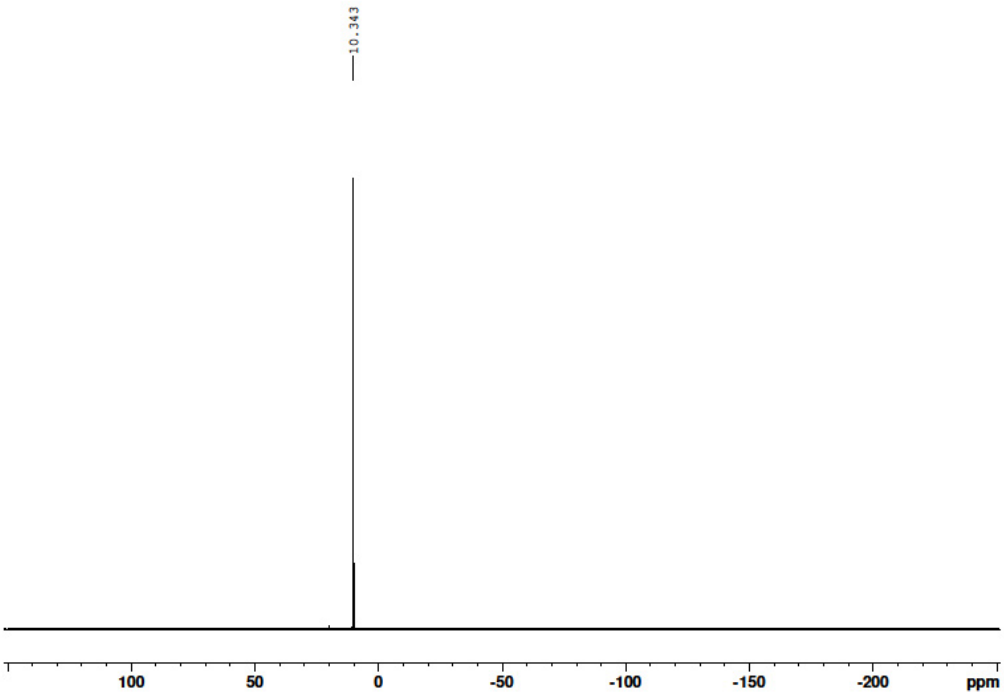
50
0
-50
-100
ppm

^{1}H, ^{13}C and ^{31}P NMR spectra of compound **12a**




10.343
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-50
-100
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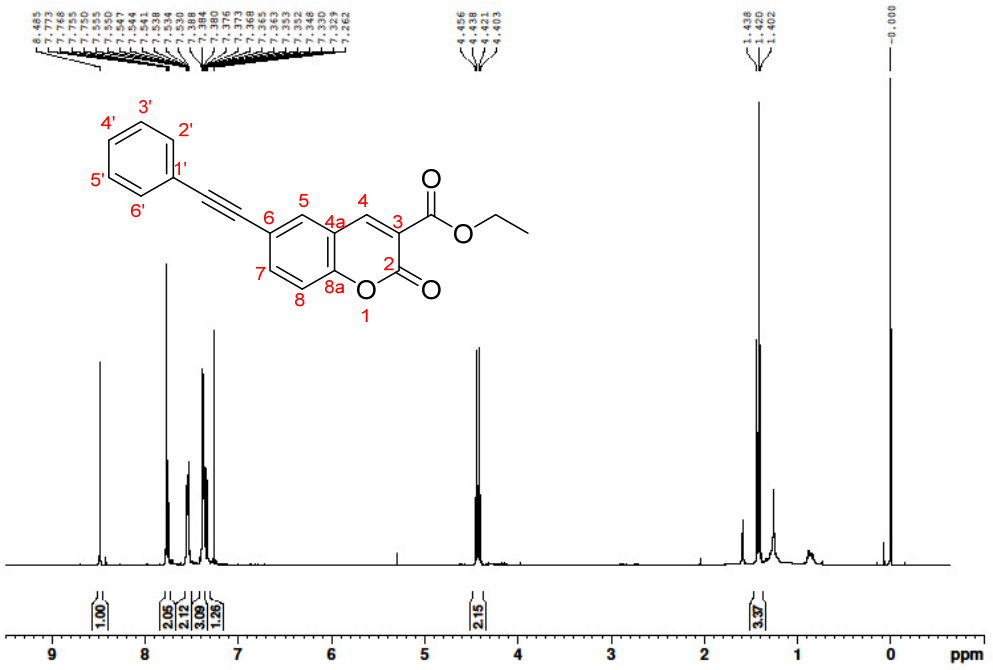
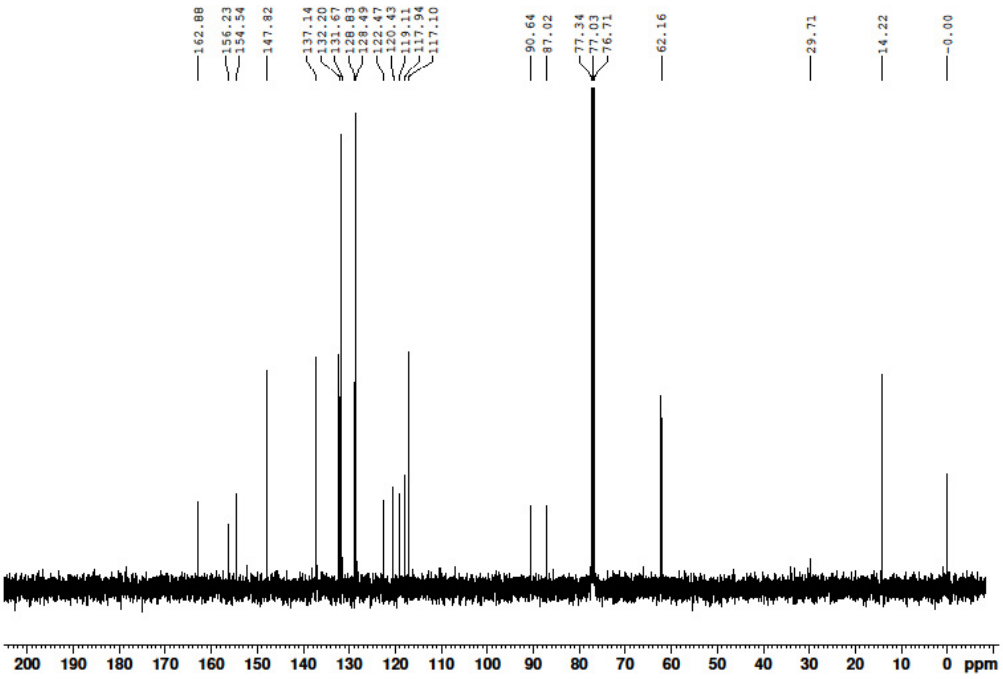
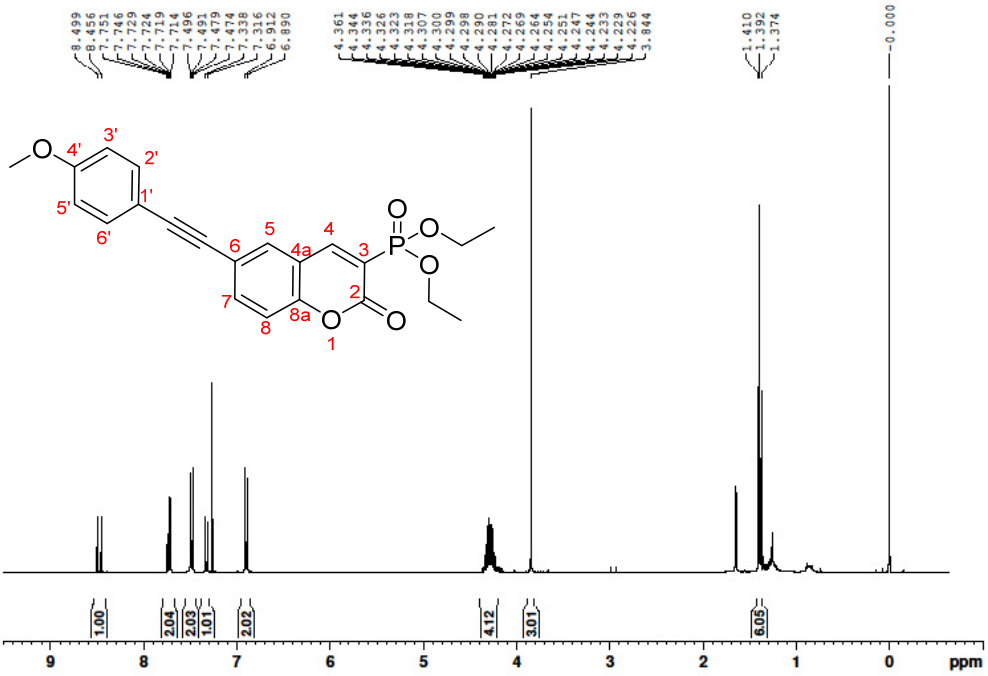
-200
ppm

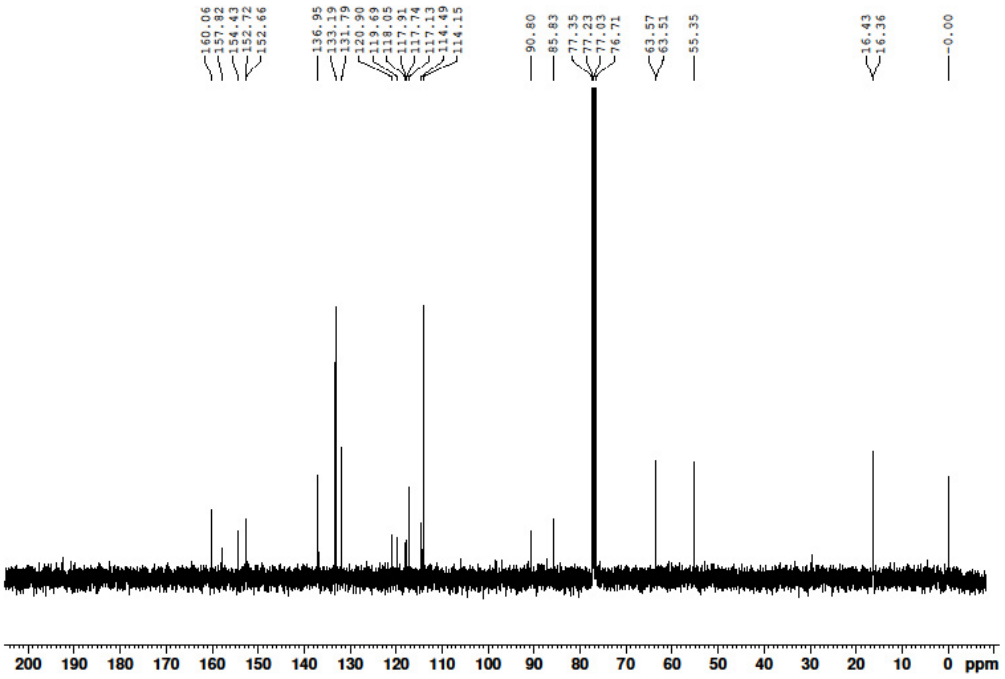
^{1}H and ^{13}C NMR spectra of compound **12b**

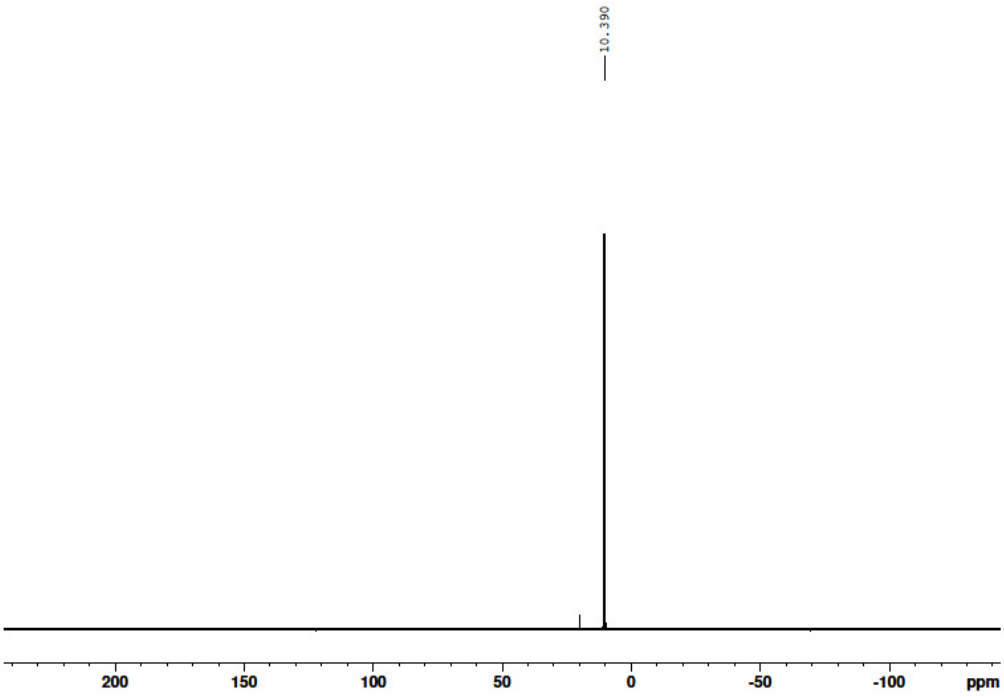




^{1}H, ^{13}C and ^{31}P NMR spectra of compound **12d**






10.390
200
150
100
50
0
-50
-100
ppm