

**Synthesis of Functionalized Indolizines via Gold(I)-Catalyzed Intramolecular
Hydroarylation/aromatization of Pyrrole-Ynes**

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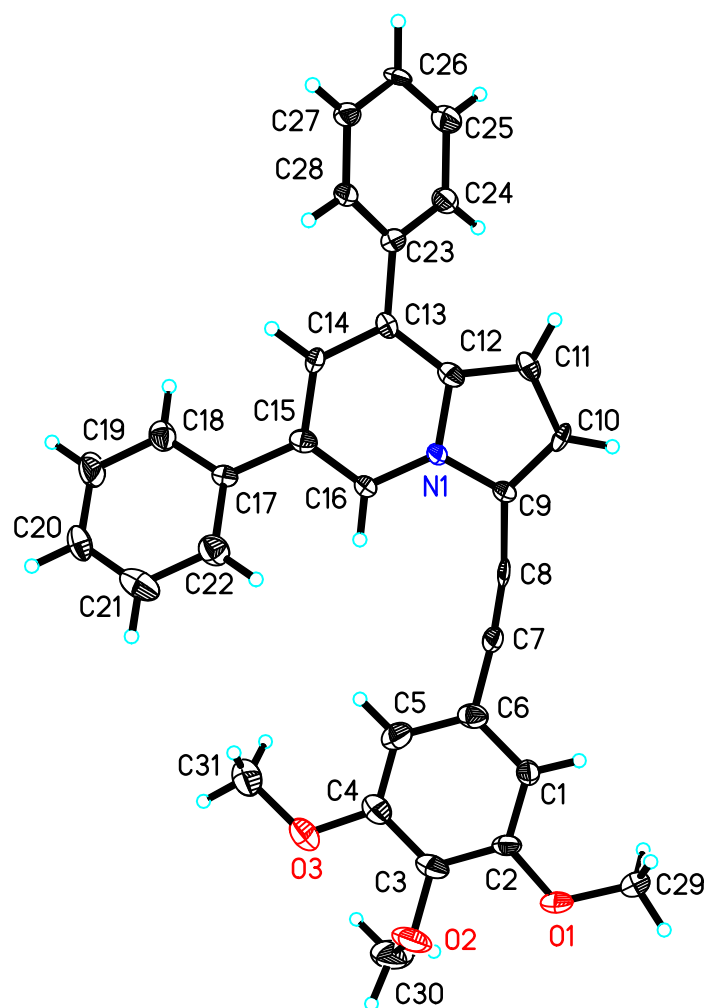
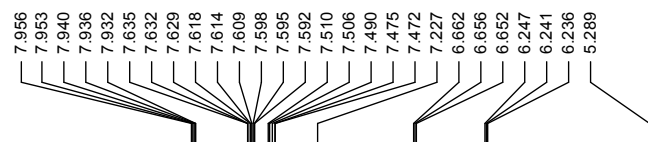


Figure 1. X-ray crystal structure of compound **7b**.

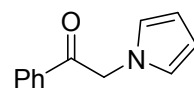
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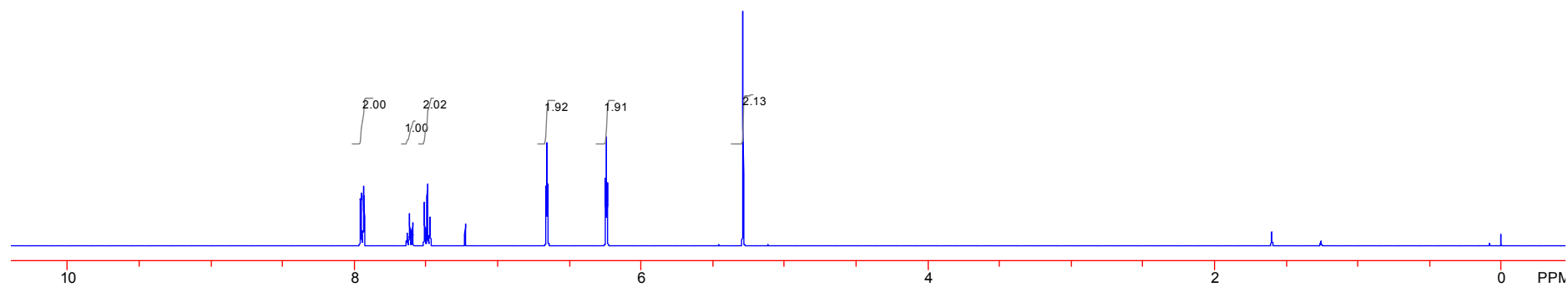
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1.257

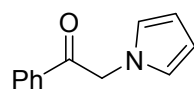
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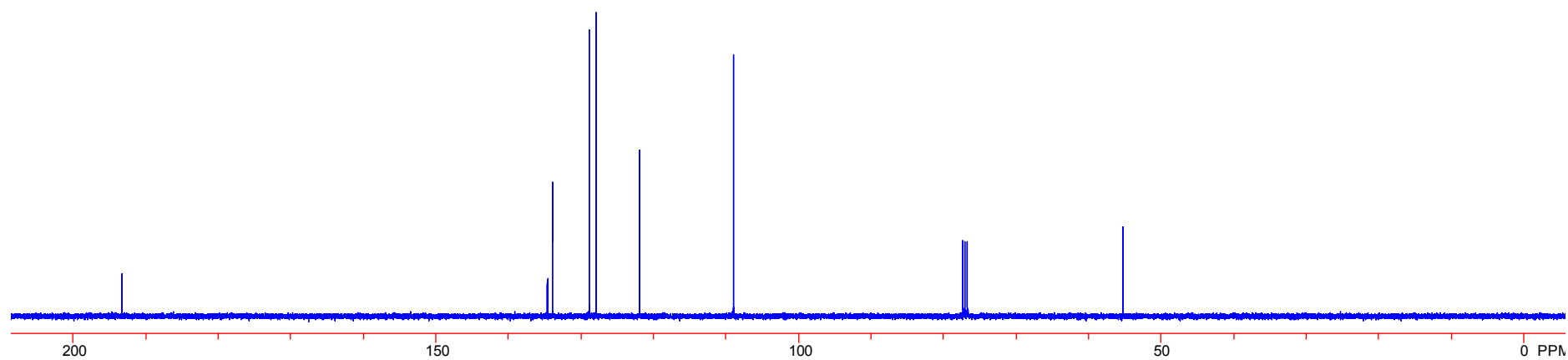
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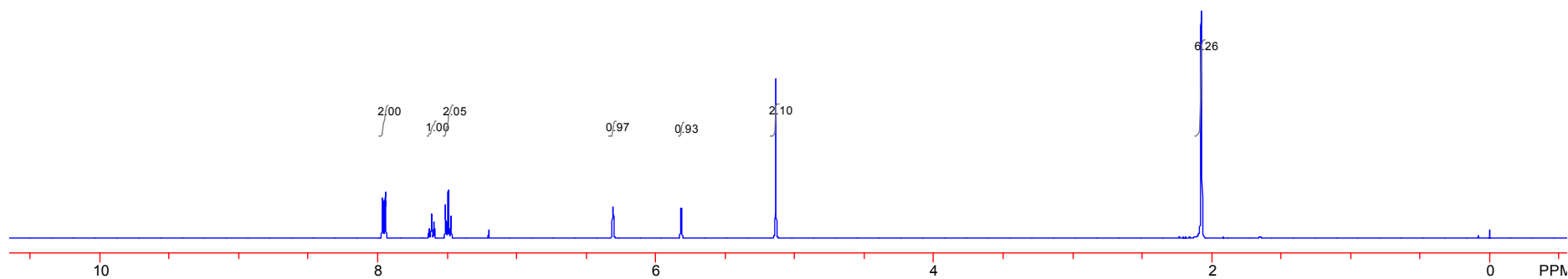
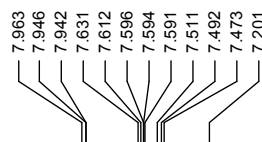
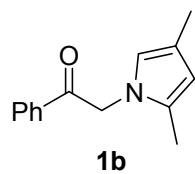
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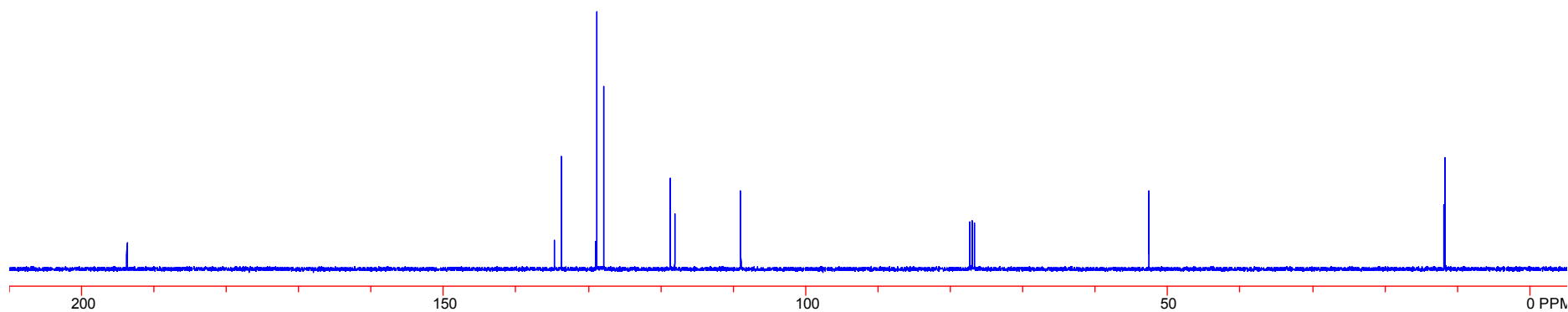
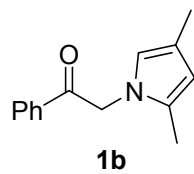
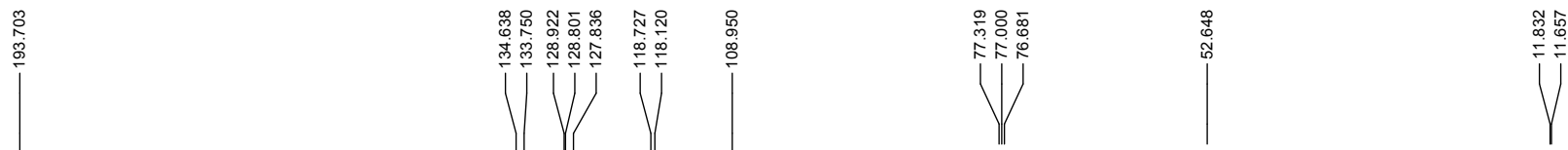
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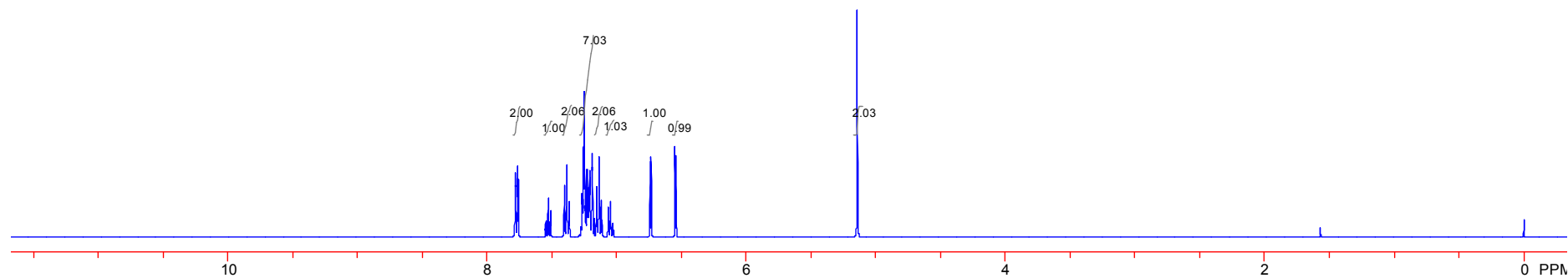
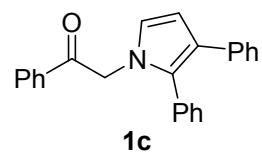
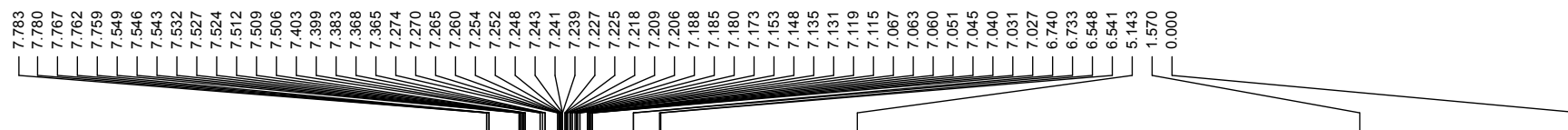
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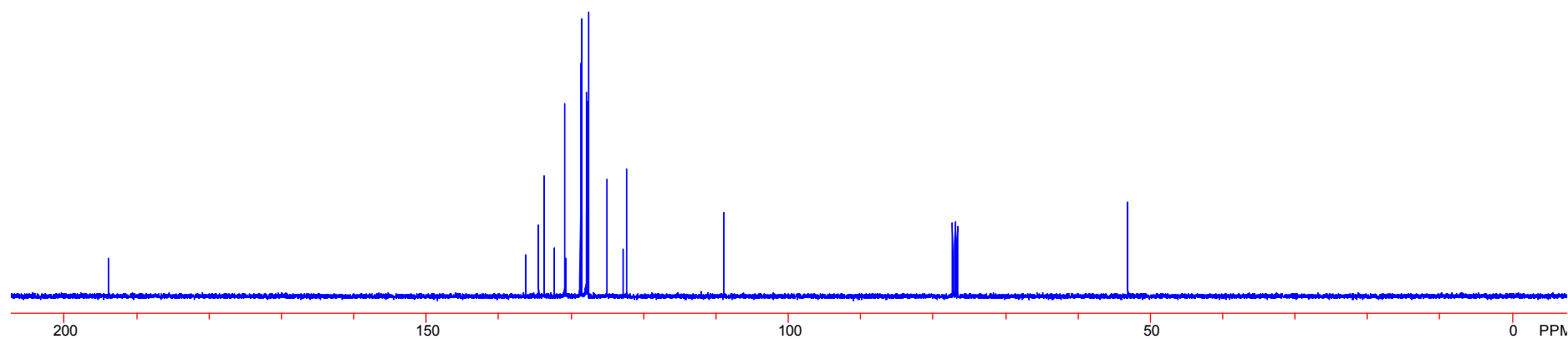
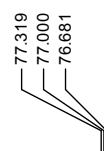
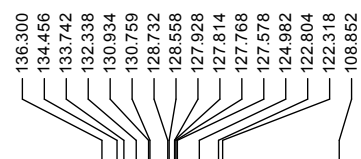
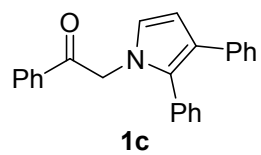
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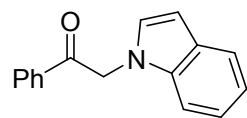
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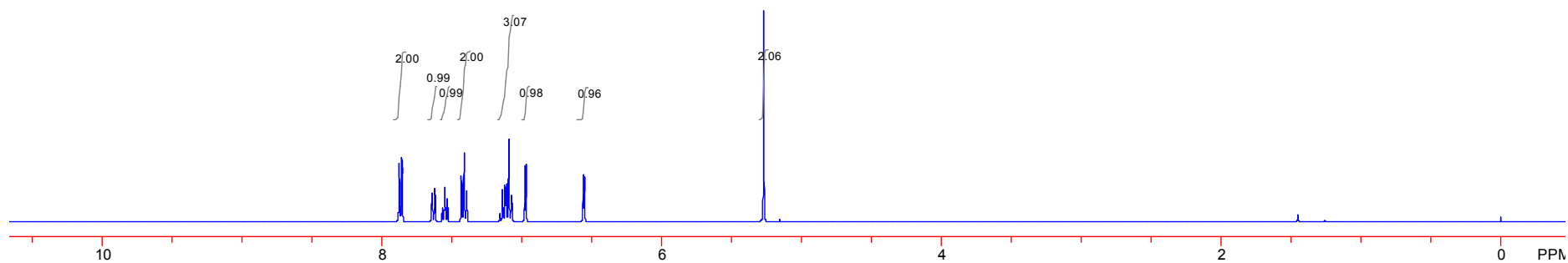
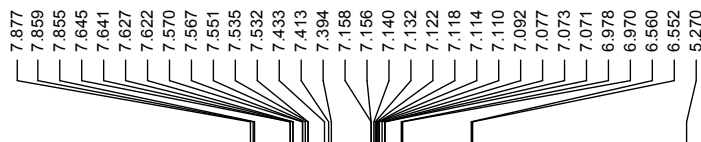
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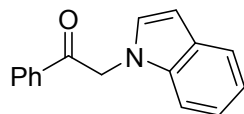
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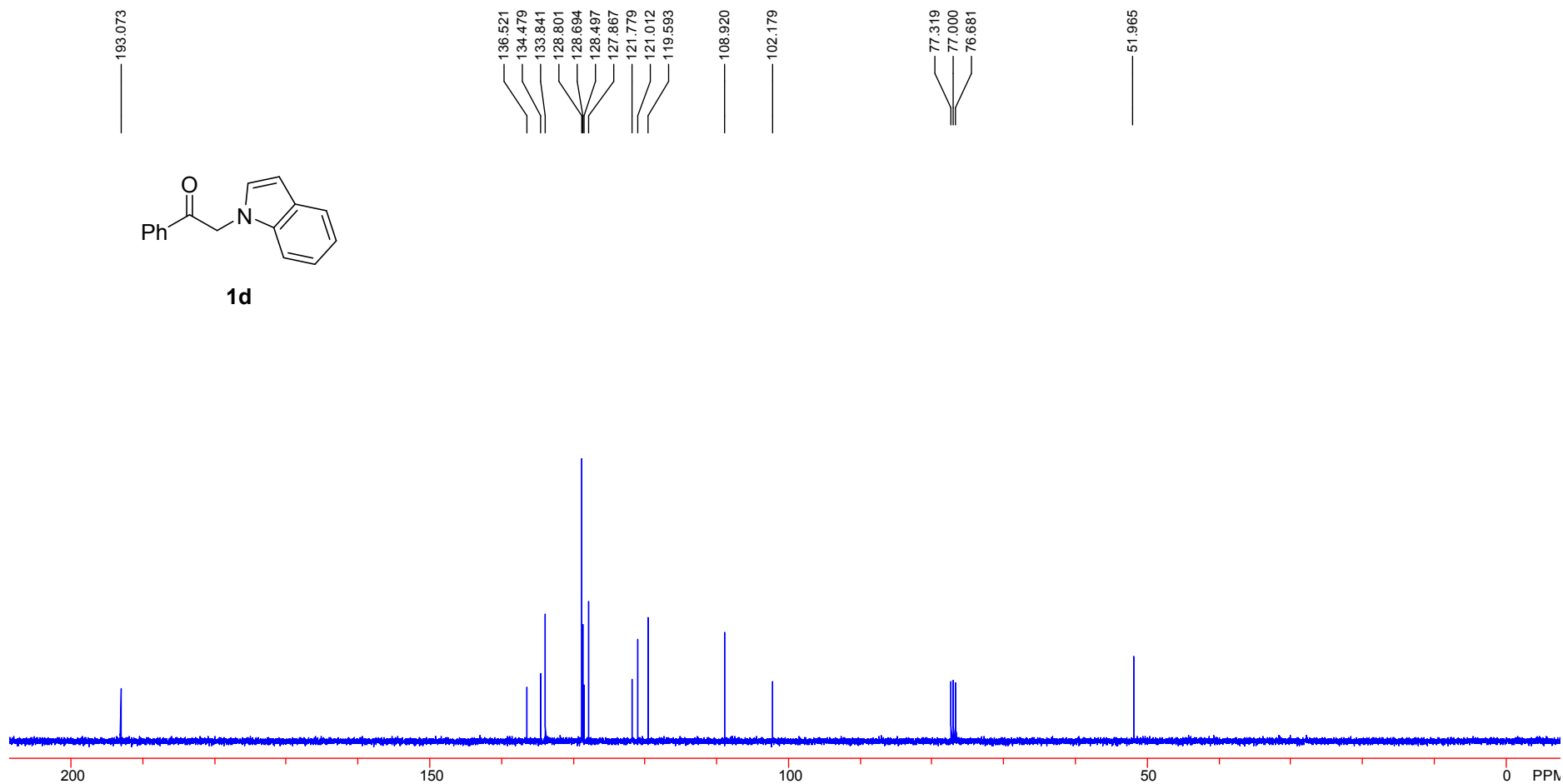
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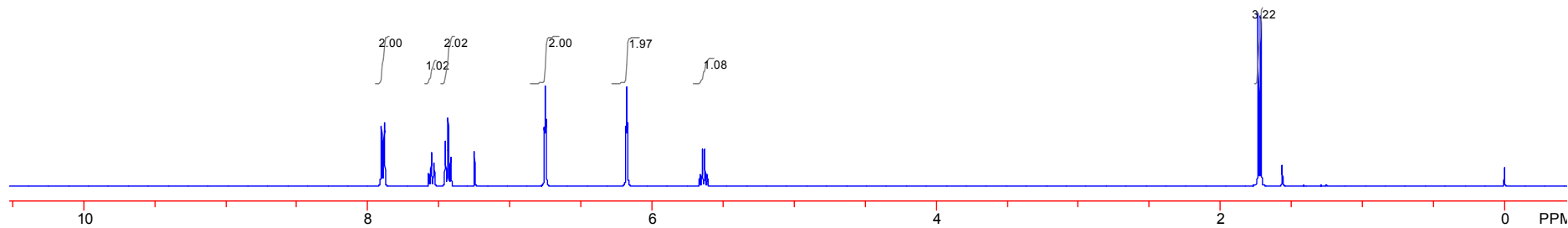
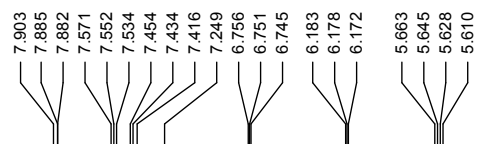
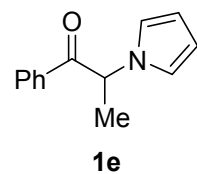
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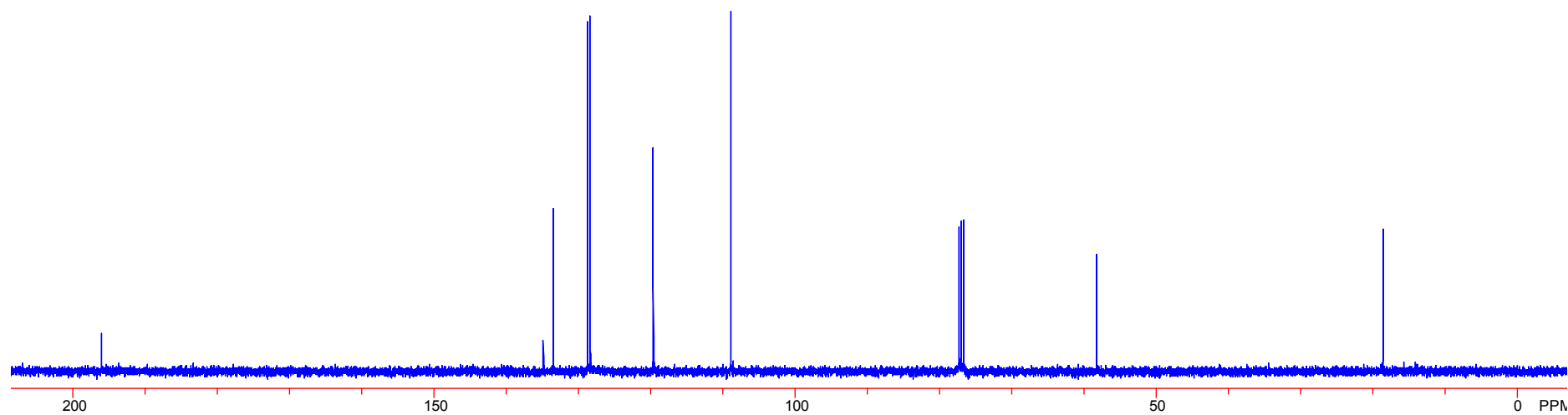
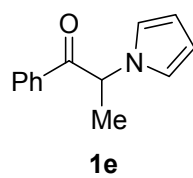
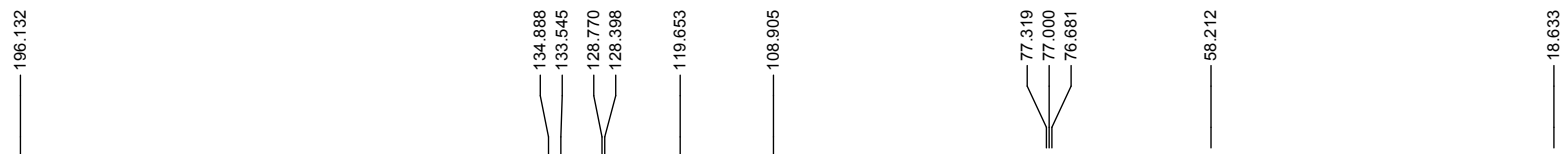
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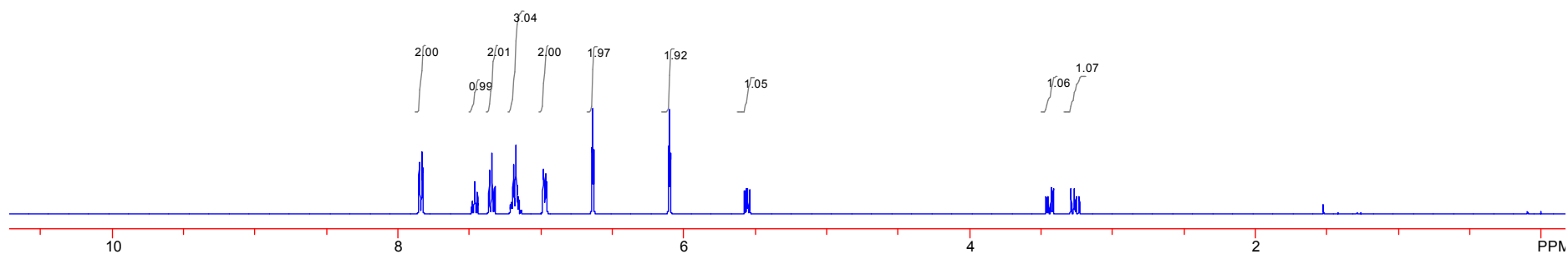
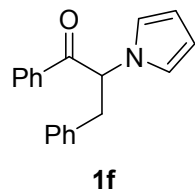
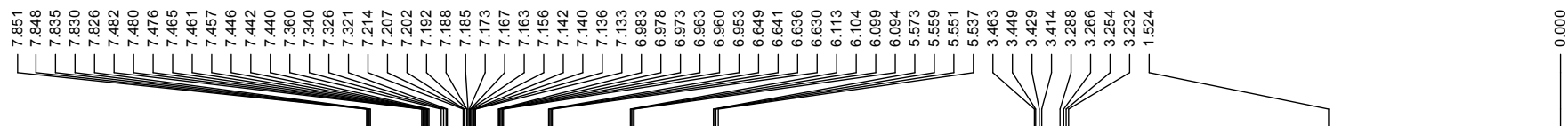
^1H NMR (400 MHz, CDCl_3)



^{13}C NMR (100 MHz, CDCl_3)



¹H NMR (400 MHz, CDCl₃)



^{13}C NMR (100 MHz, CDCl_3)

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137.089

135.180

133.479

128.933

128.644

128.394

128.318

126.682

119.820

109.022

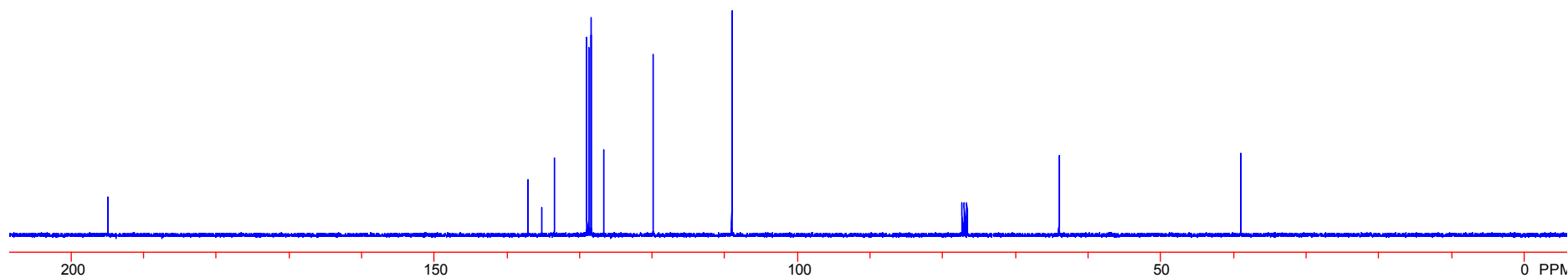
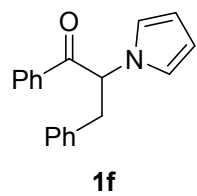
77.319

77.000

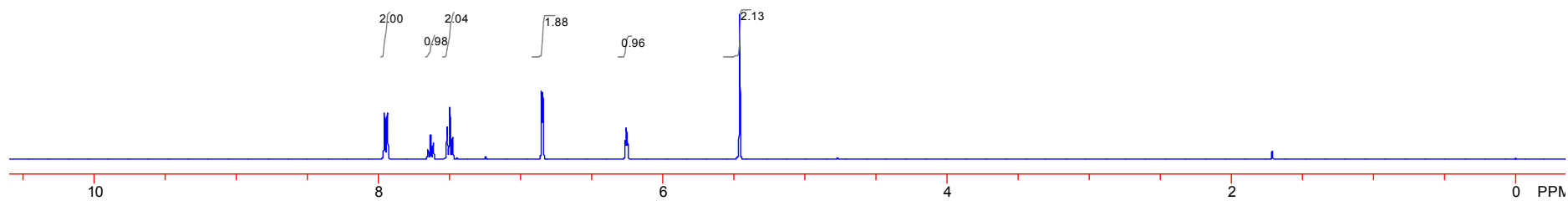
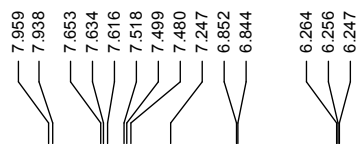
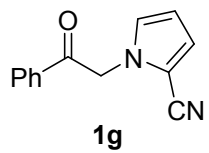
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64.039

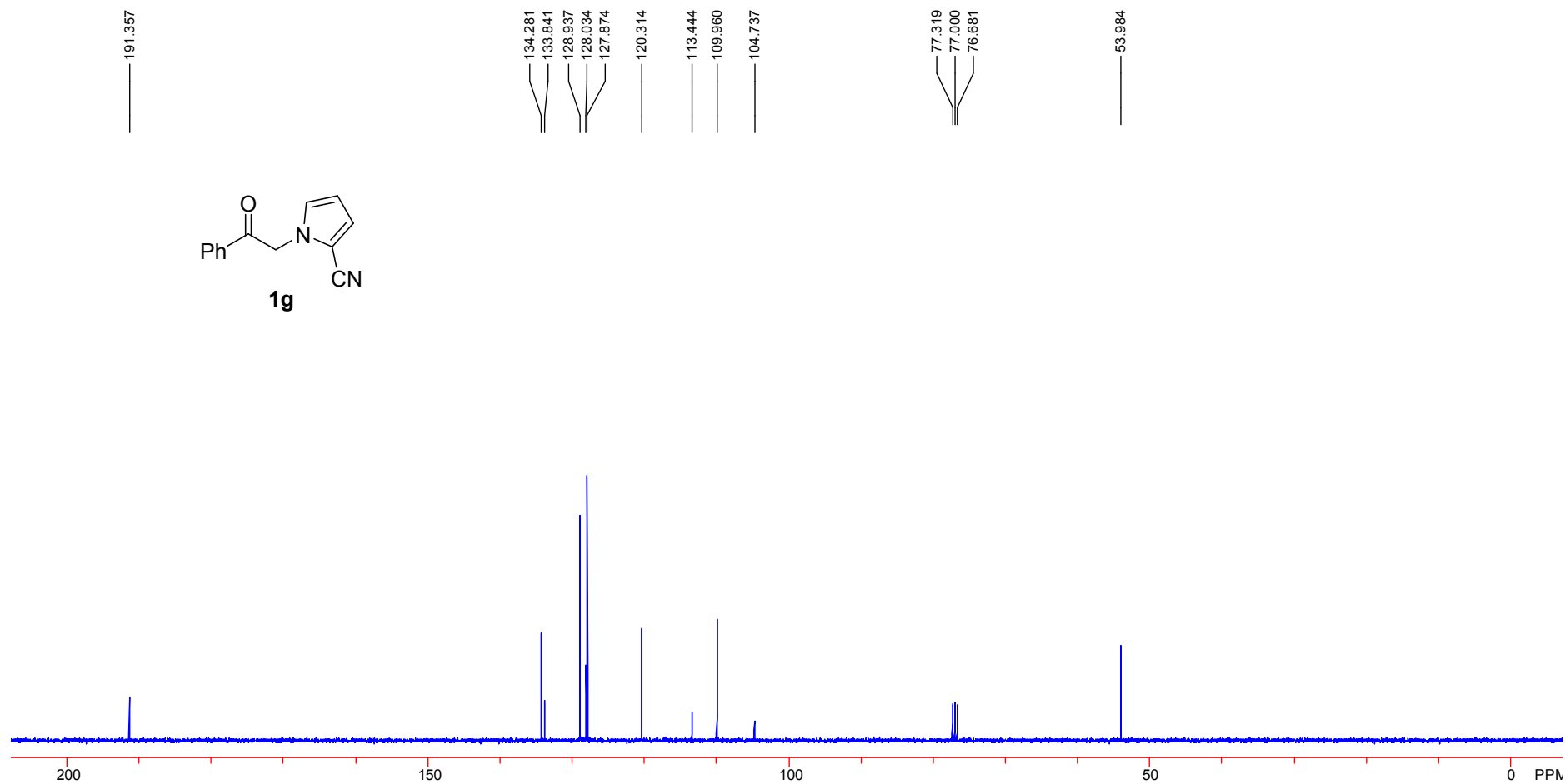
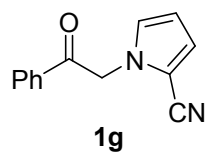
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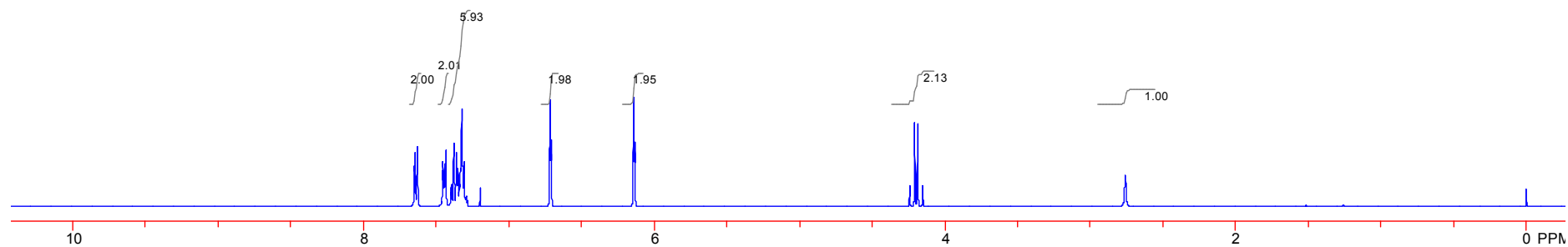
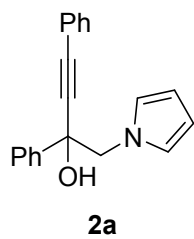
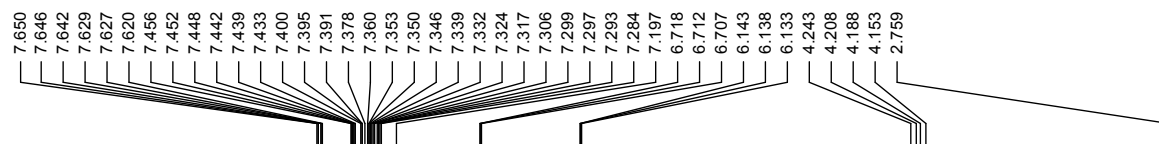
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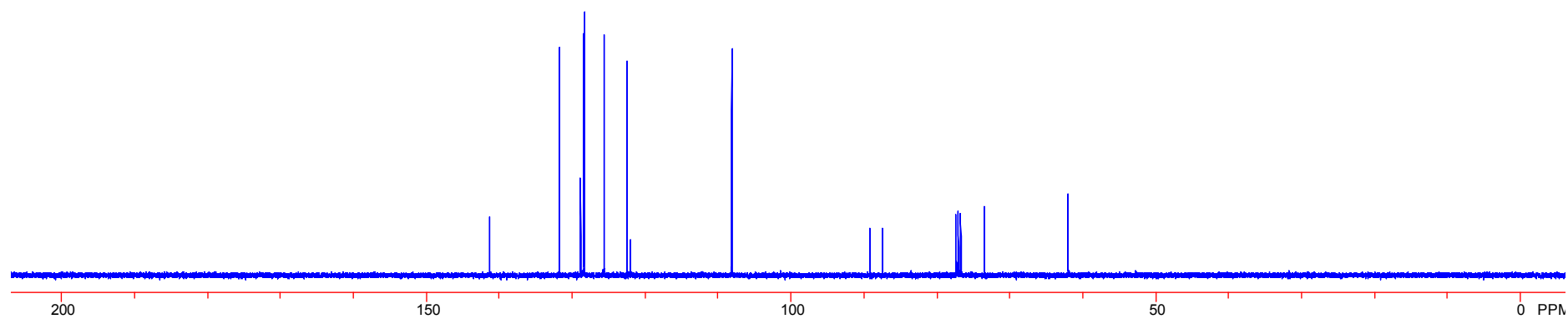
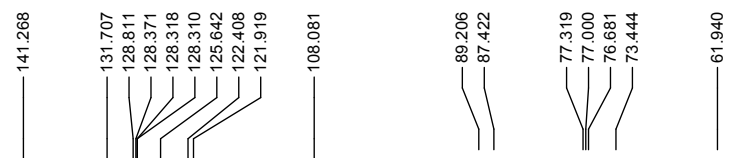
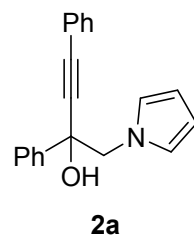
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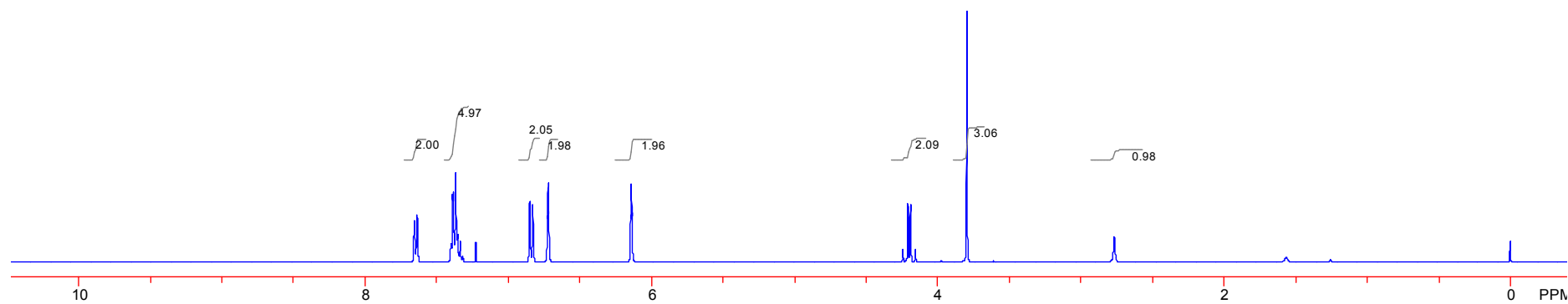
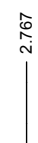
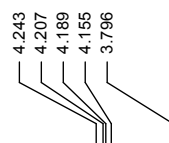
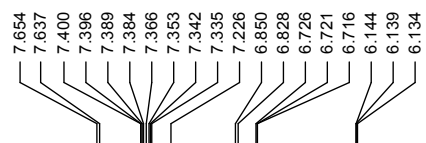
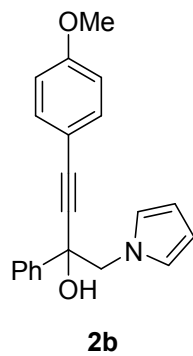
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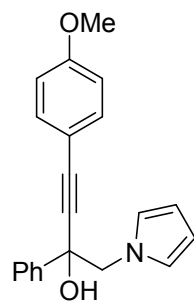
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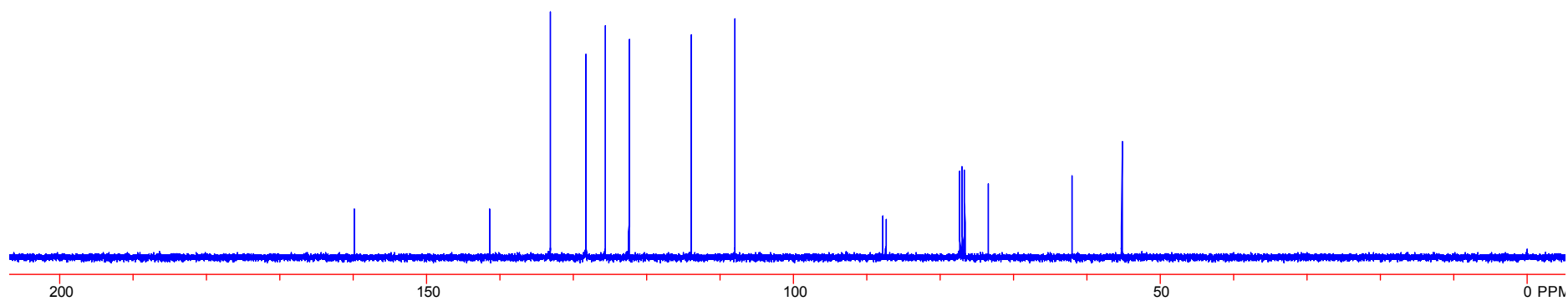
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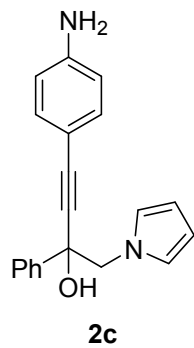
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2b



^1H NMR (400 MHz, CDCl_3)

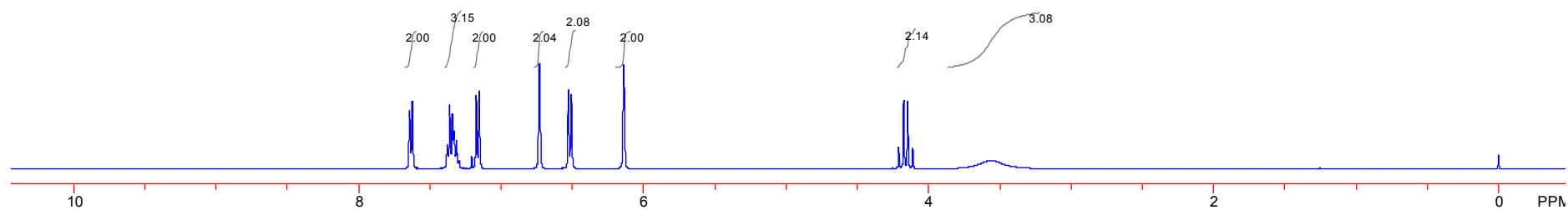


7.642
7.623
7.378
7.361
7.342
7.331
7.320
7.313
7.295
7.206
7.174
7.153
6.732
6.528
6.507
6.139

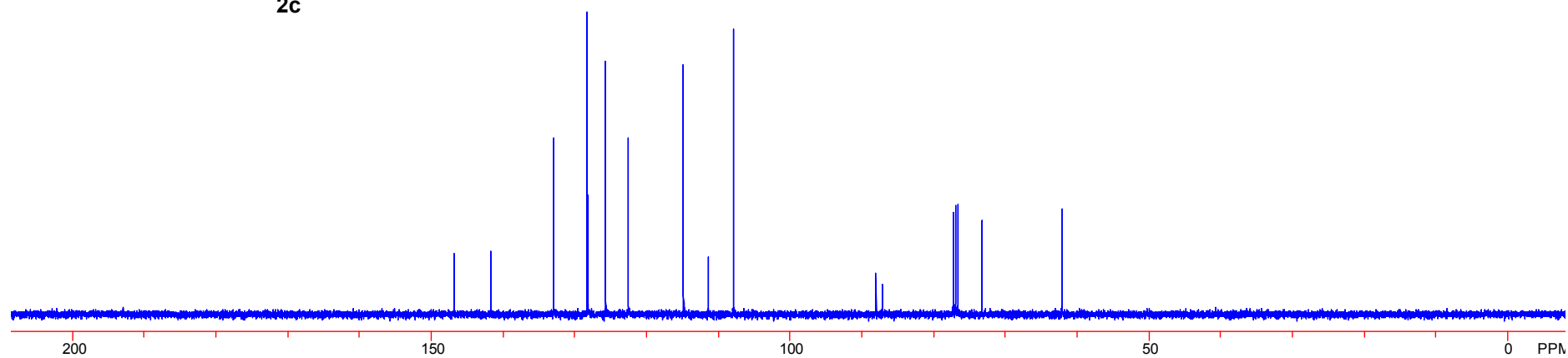
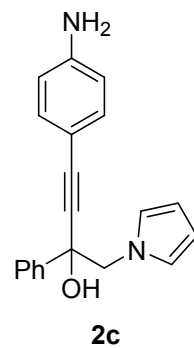
4.209
4.174
4.147
4.111

3.558

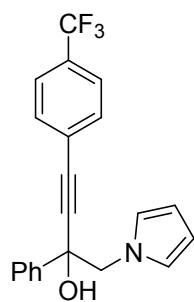
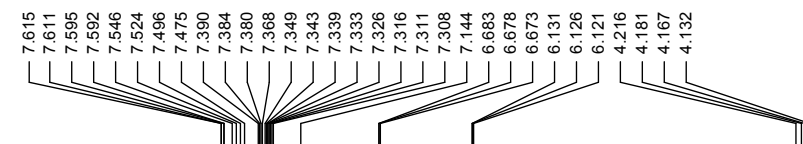
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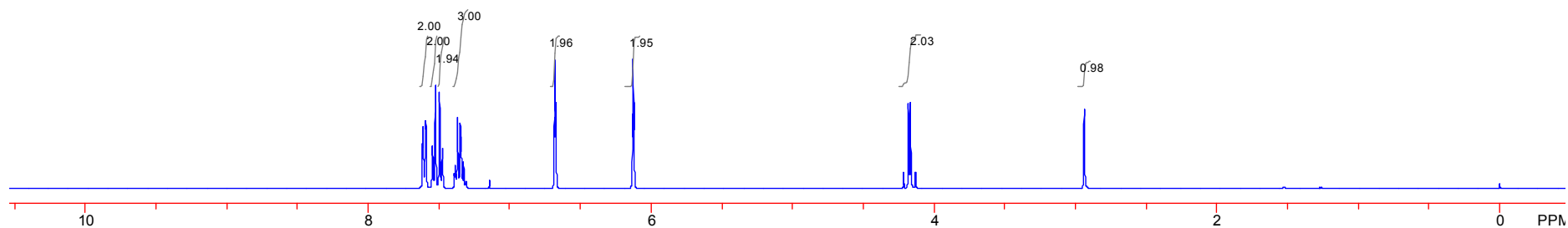
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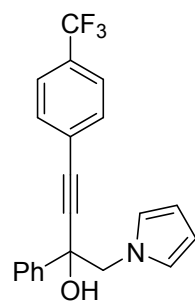
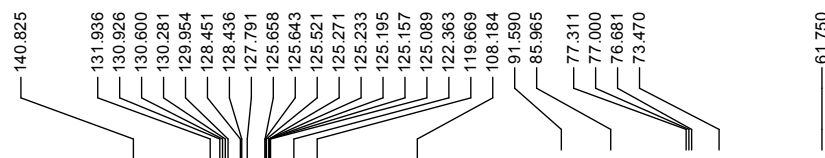
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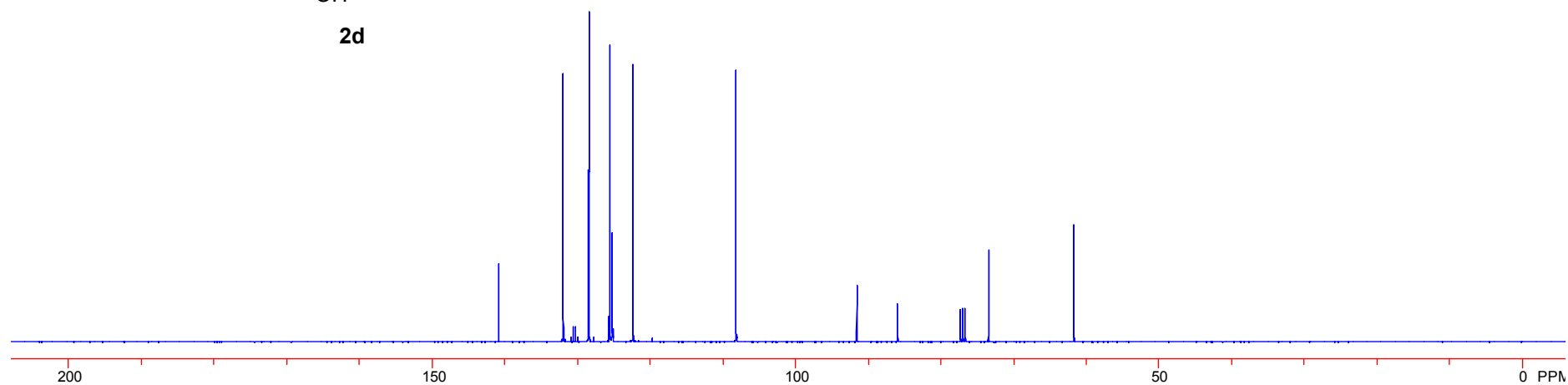
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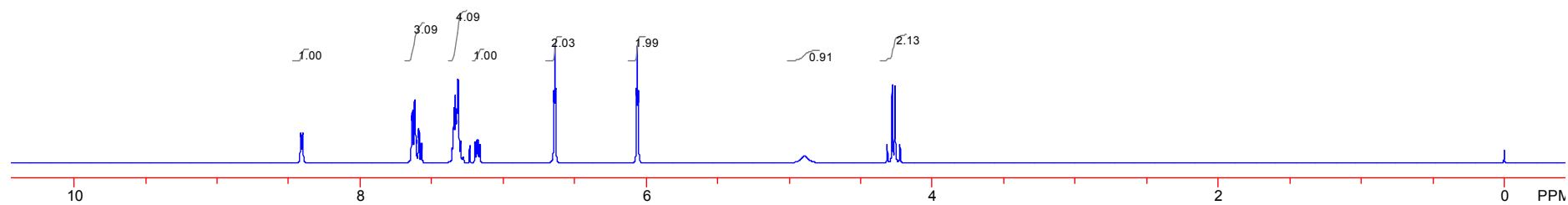
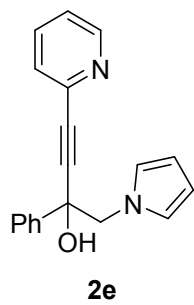
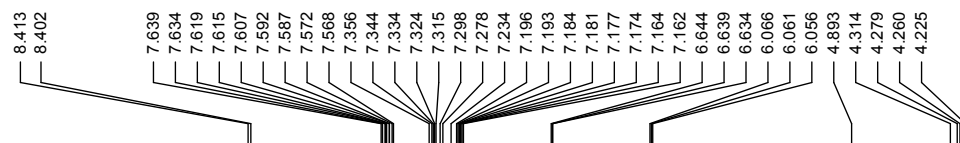
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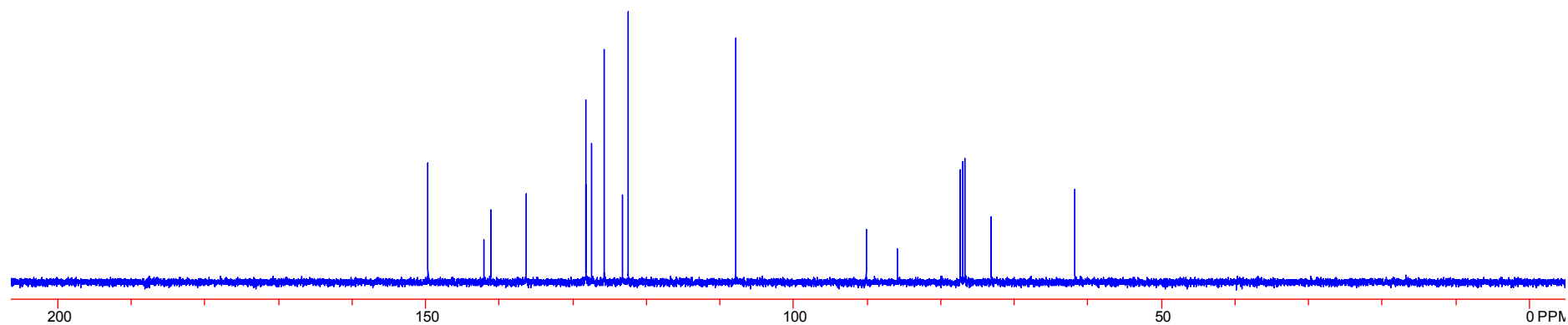
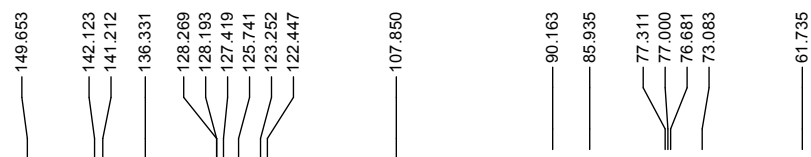
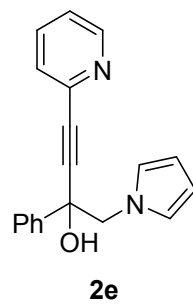
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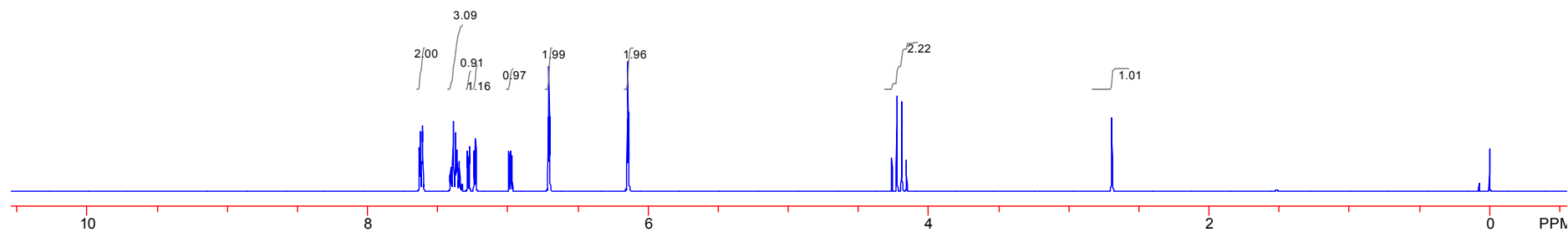
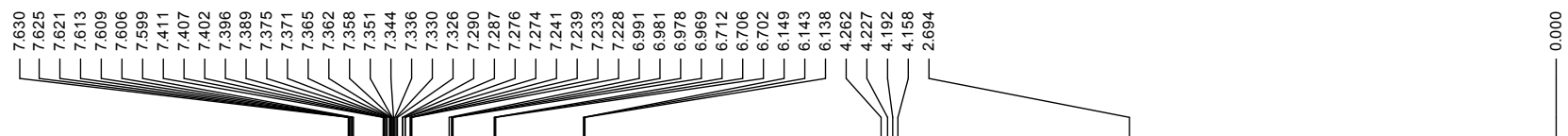
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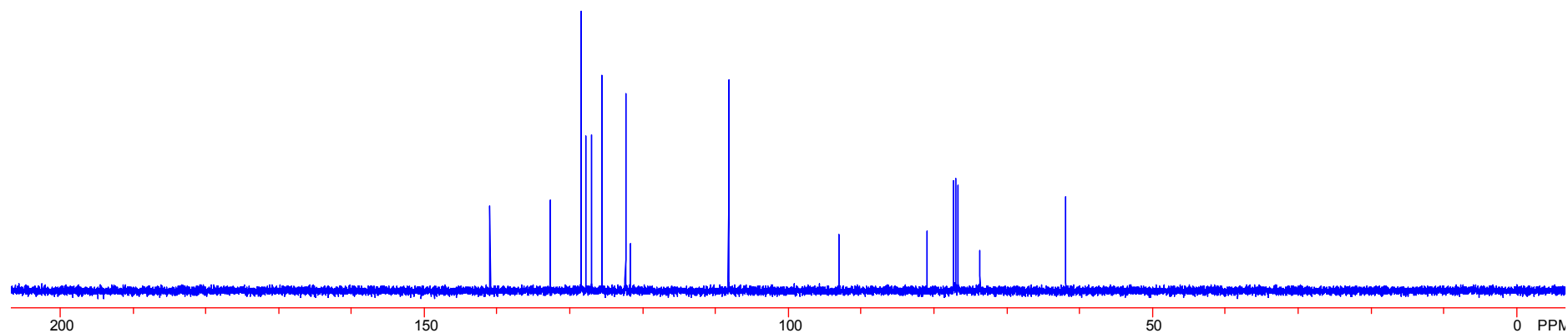
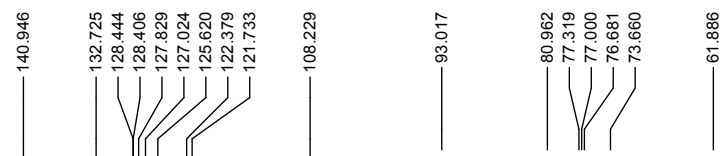
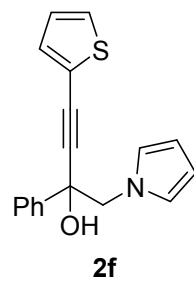
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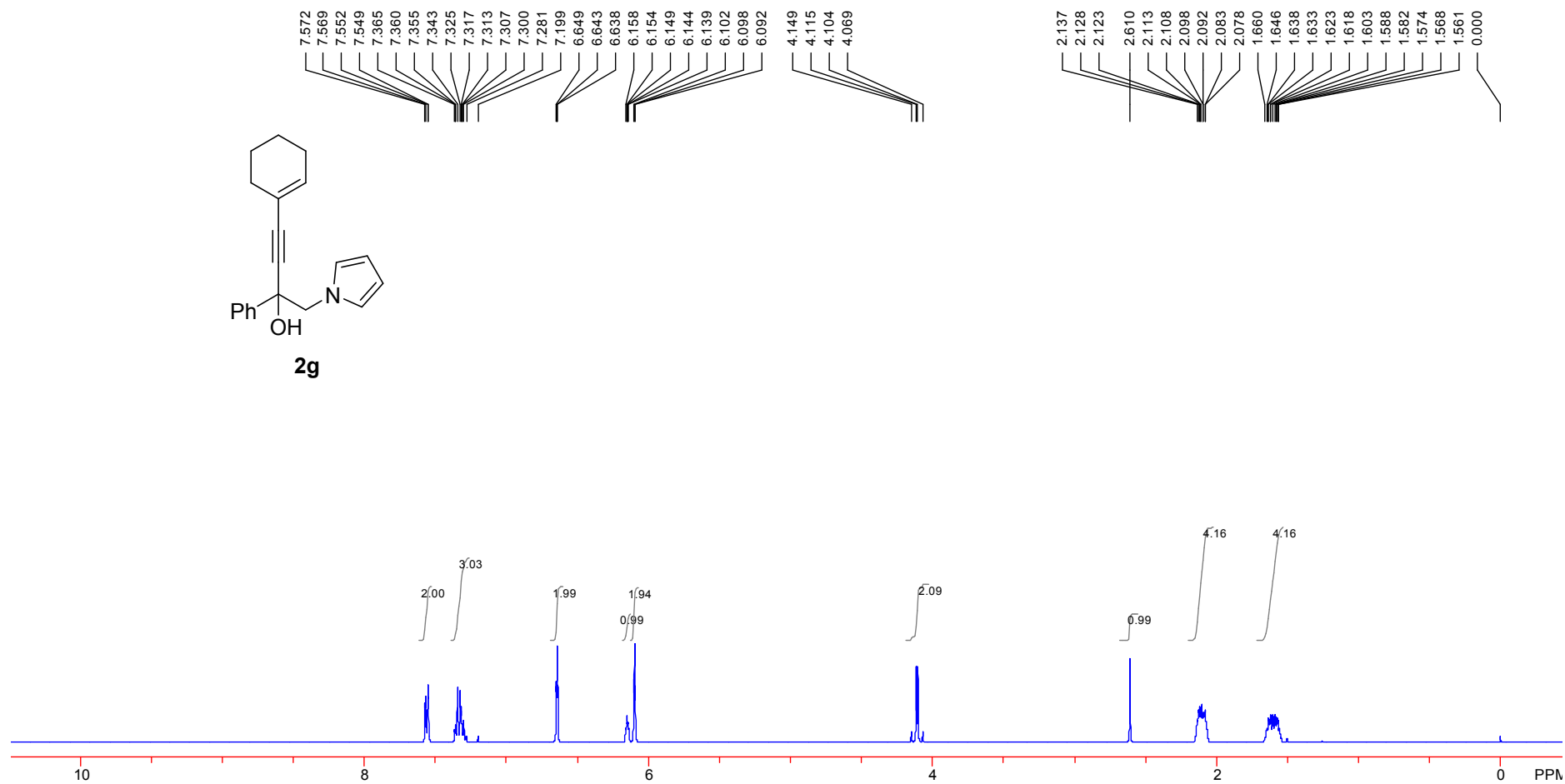
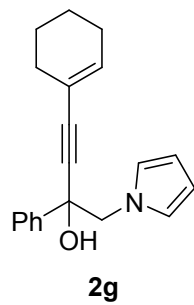
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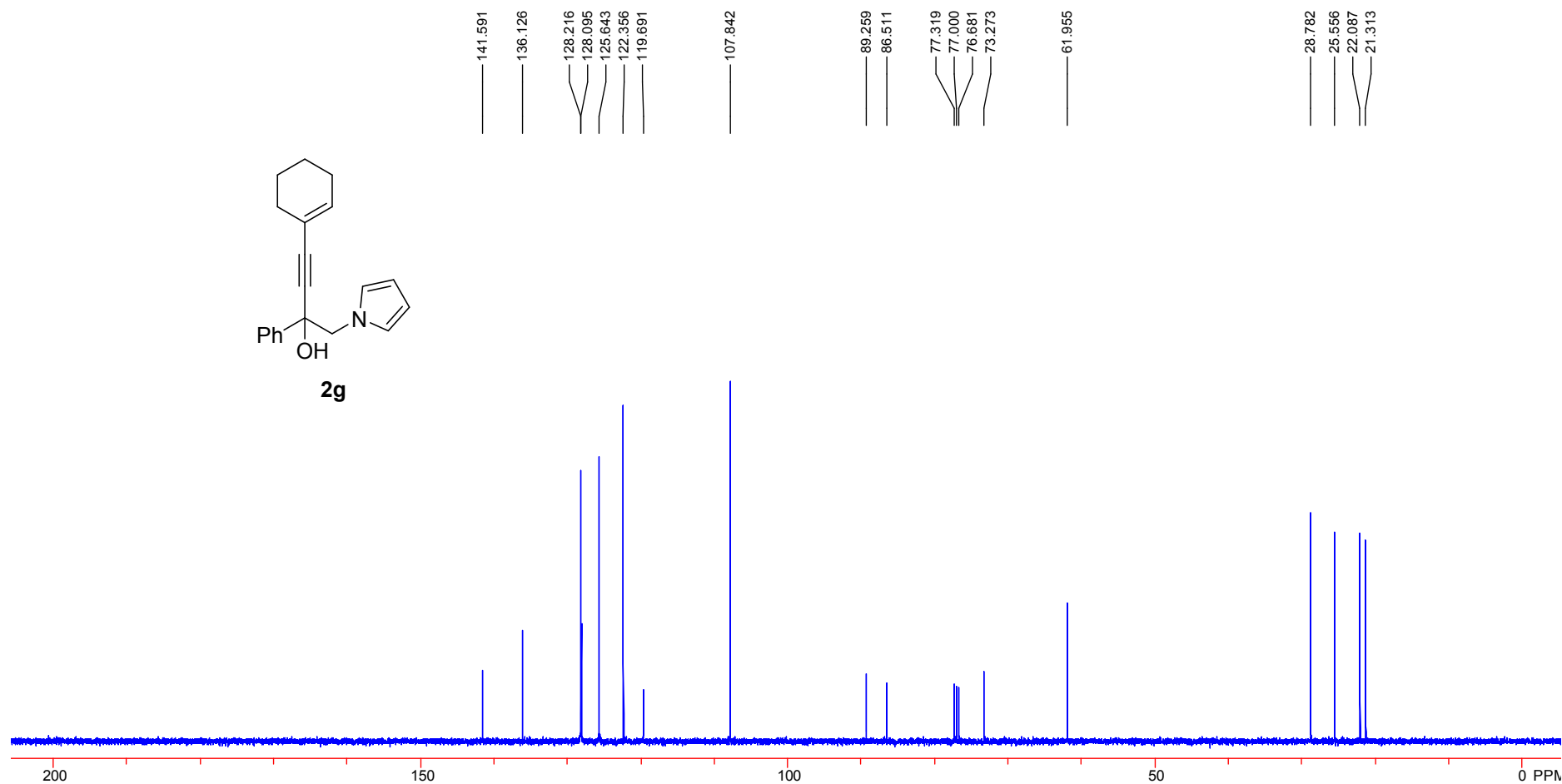
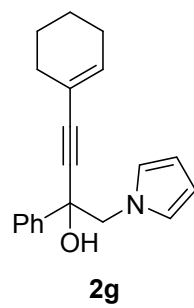
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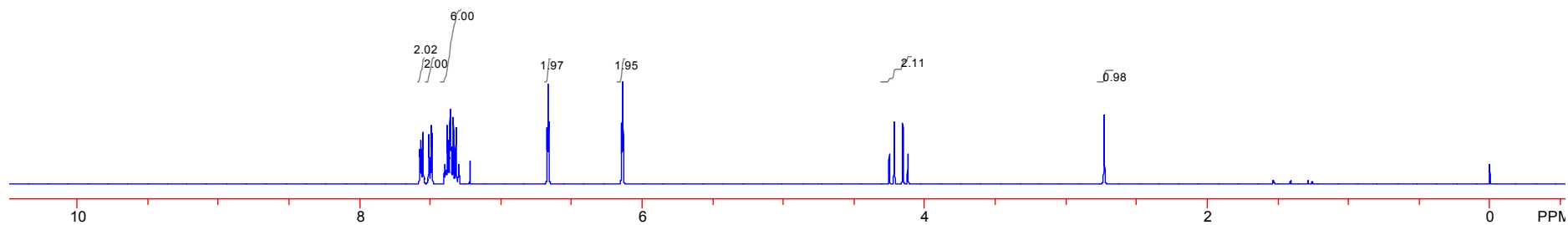
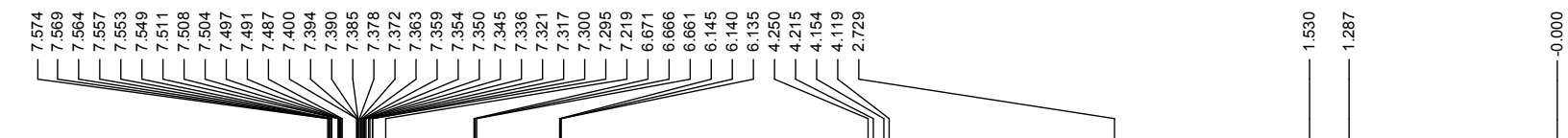
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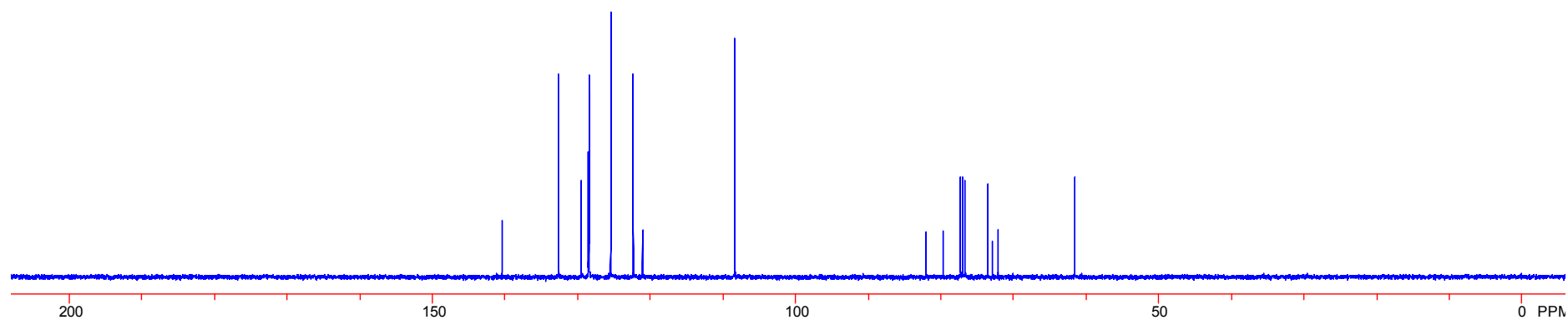
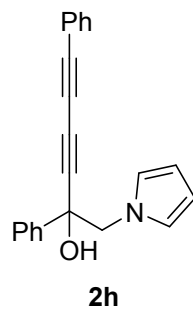
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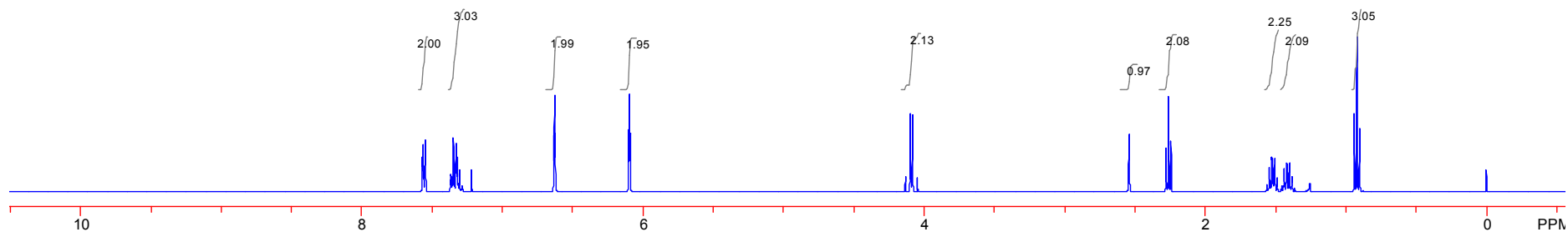
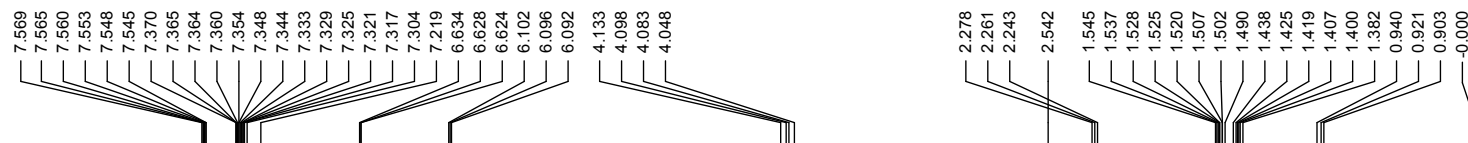
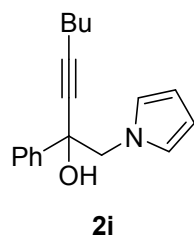
^1H NMR (400 MHz, CDCl_3)



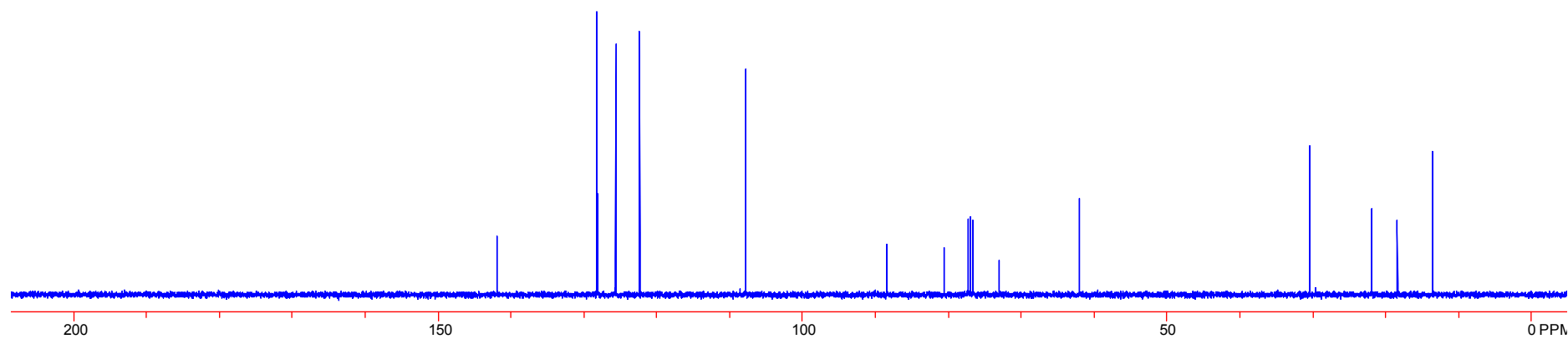
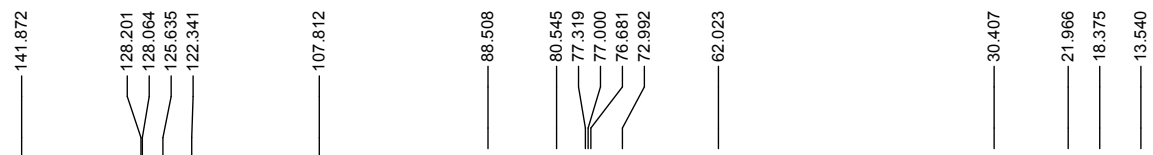
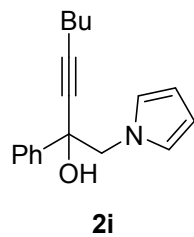
^{13}C NMR (100 MHz, CDCl_3)



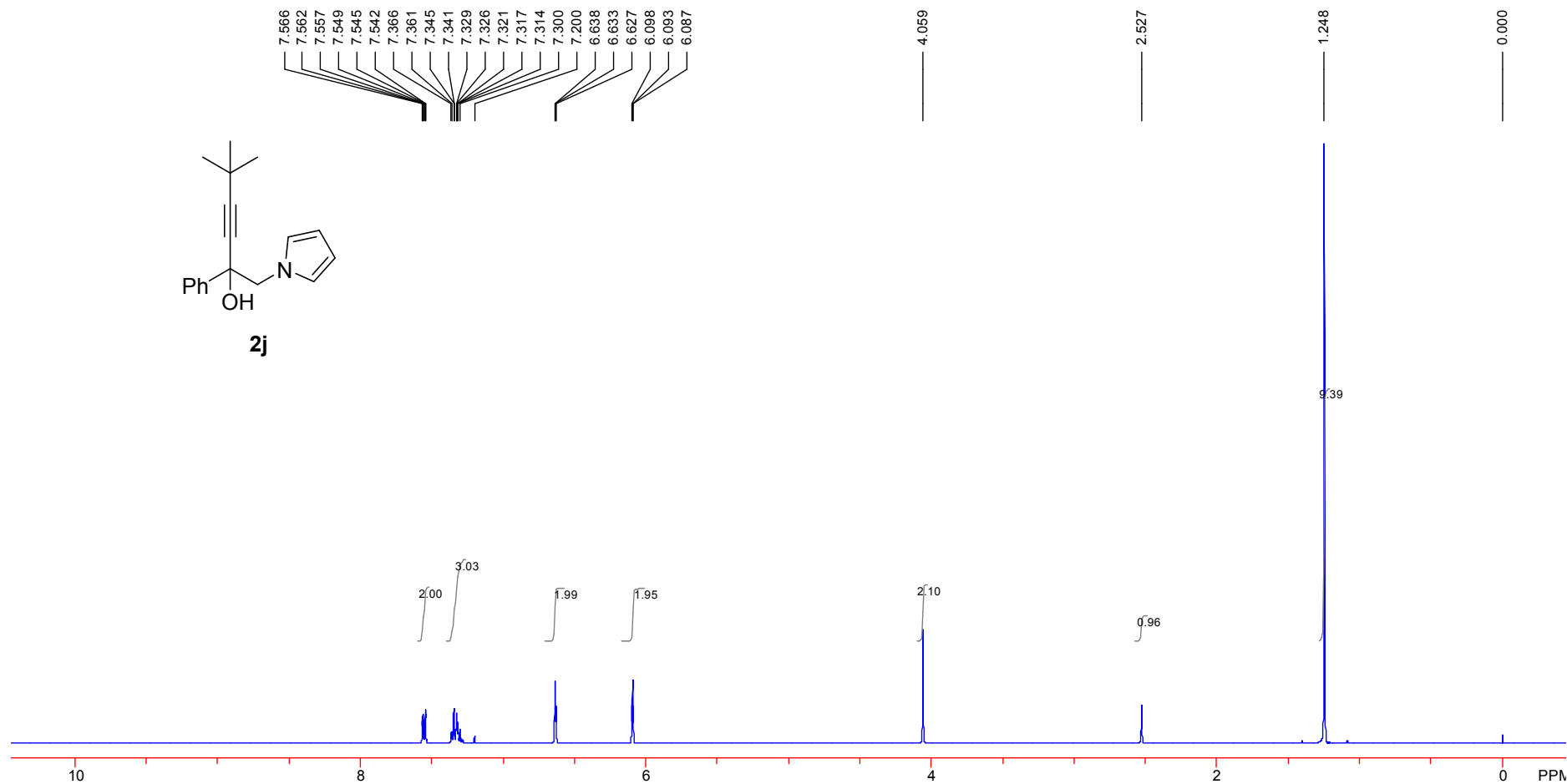
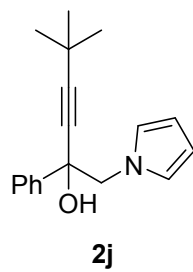
^1H NMR (400 MHz, CDCl_3)



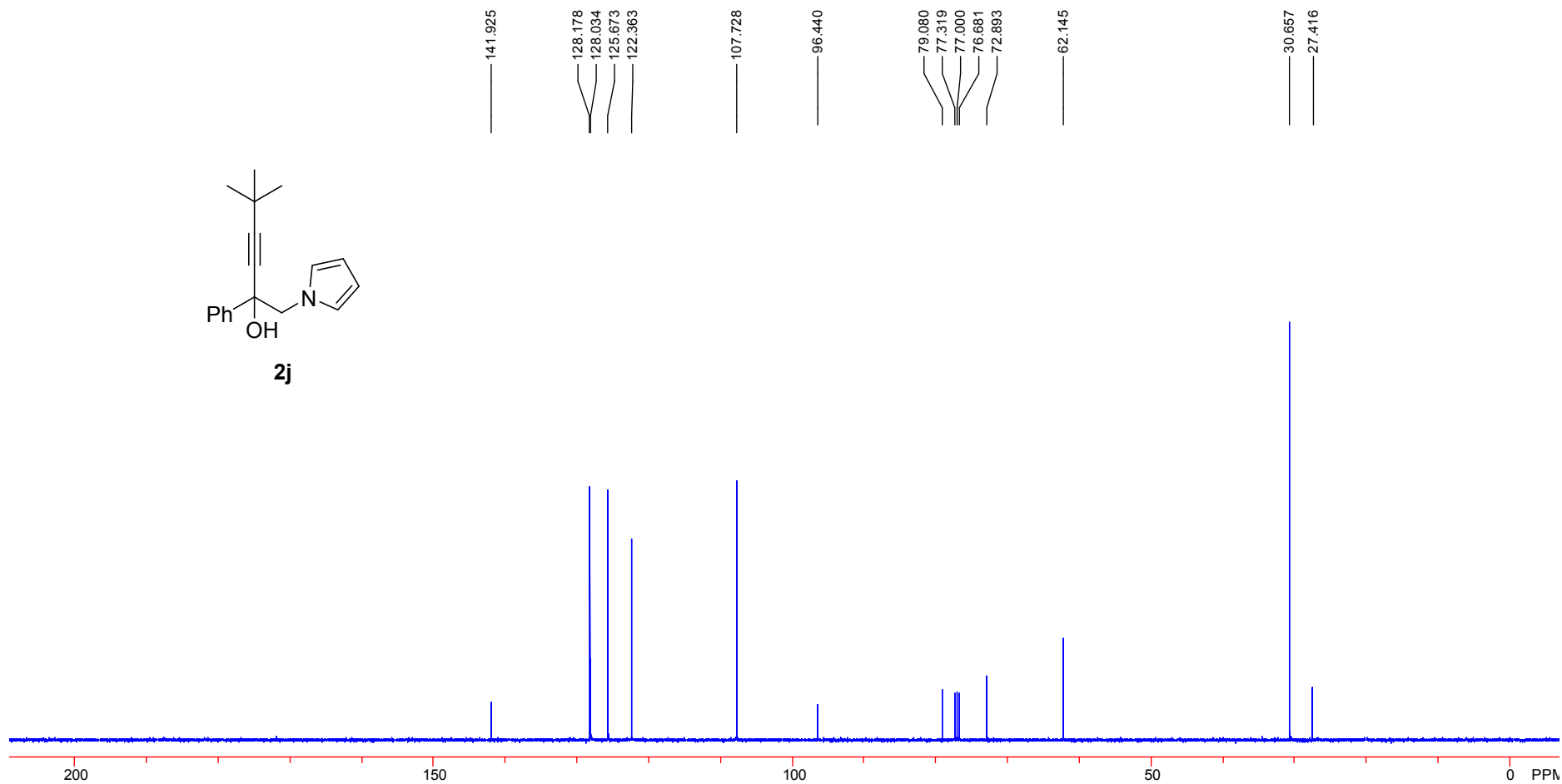
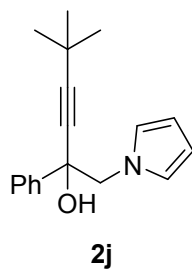
^{13}C NMR (100 MHz, CDCl_3)



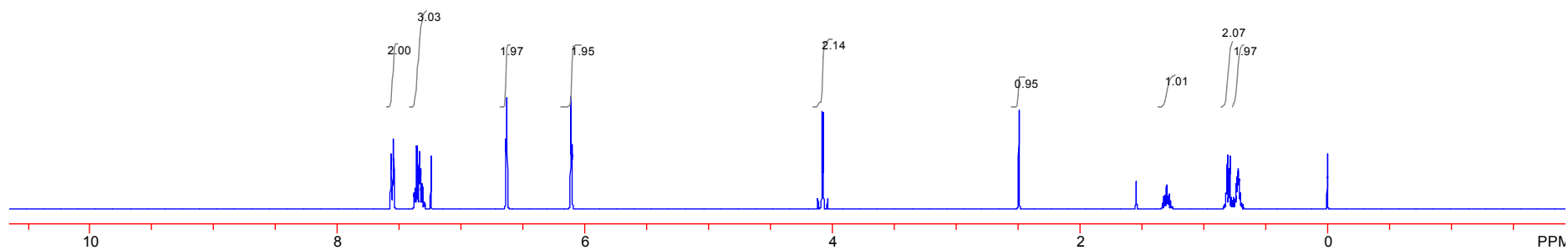
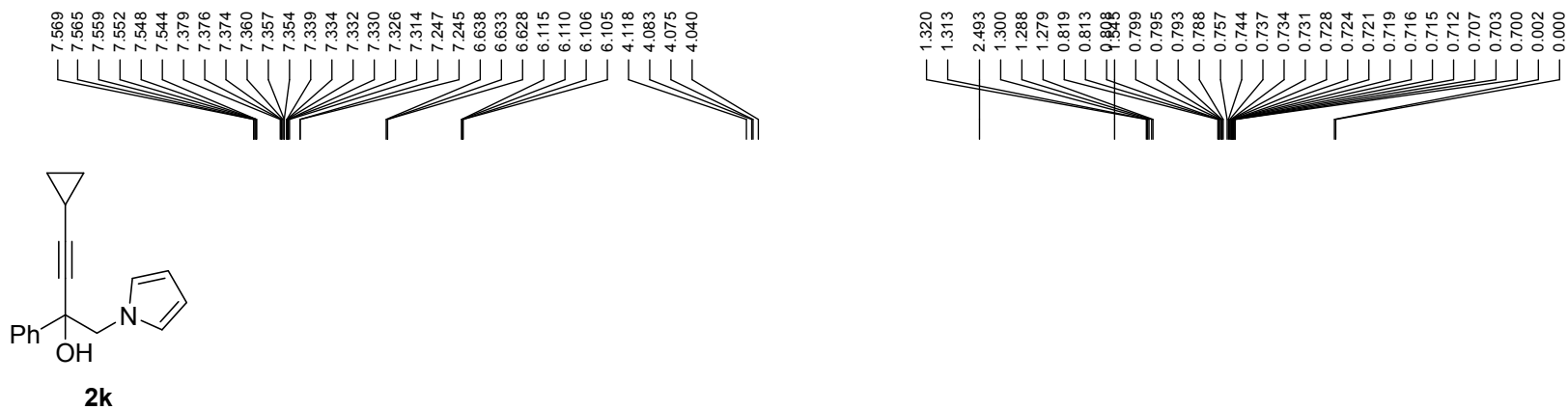
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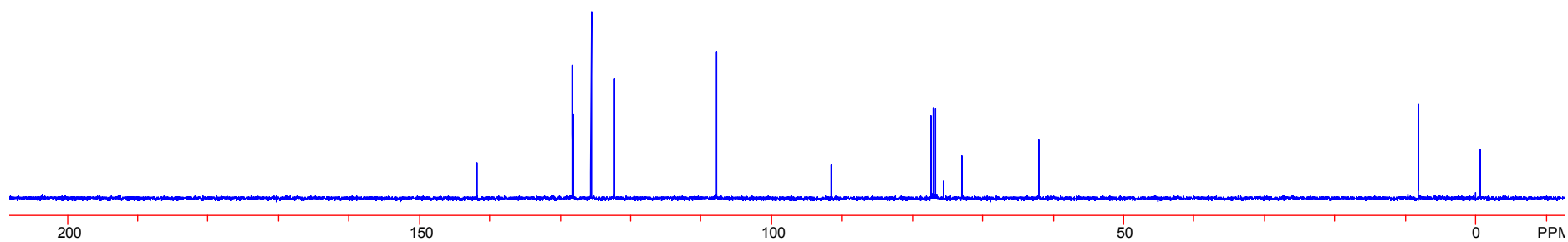
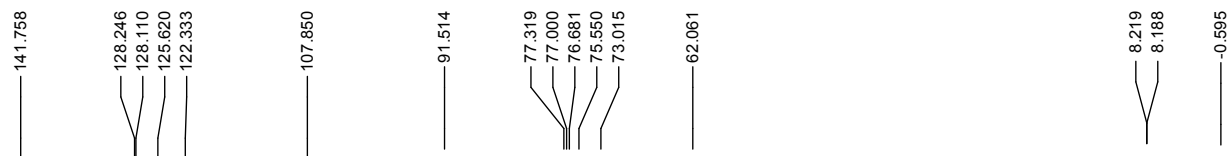
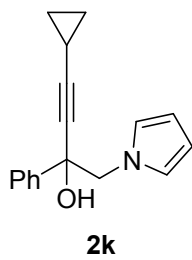
^{13}C NMR (100 MHz, CDCl_3)



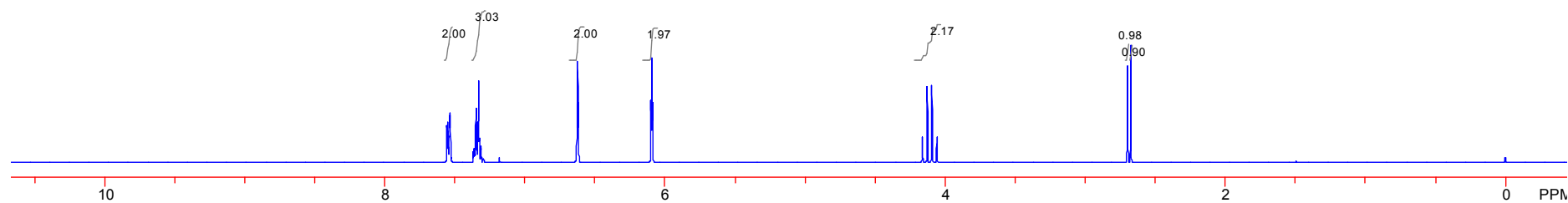
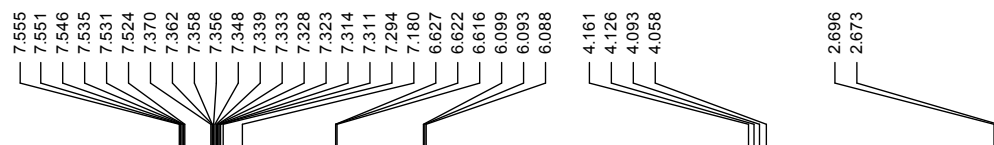
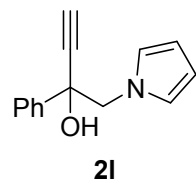
^1H NMR (400 MHz, CDCl_3)



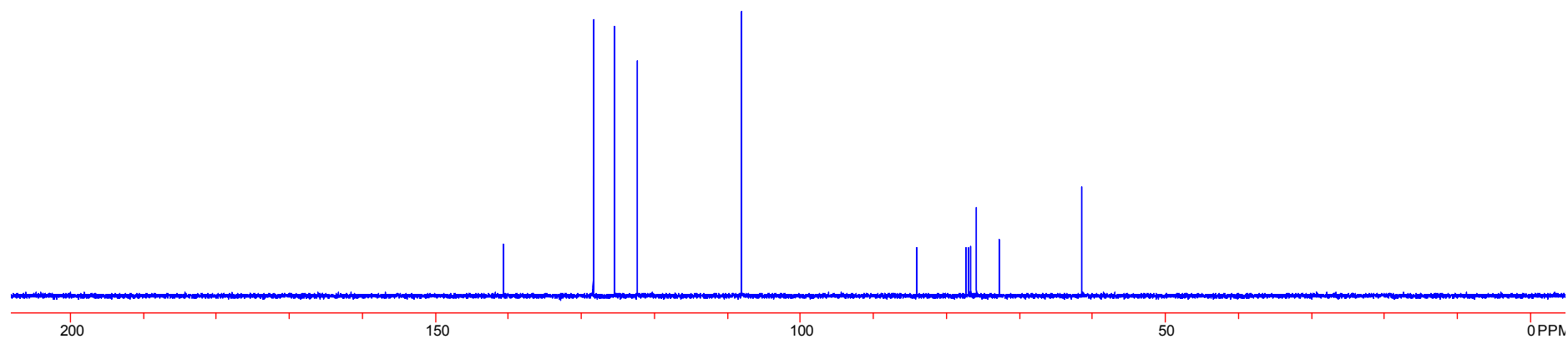
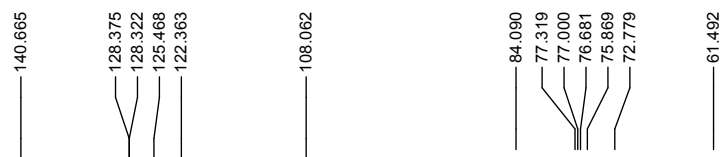
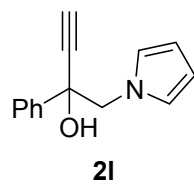
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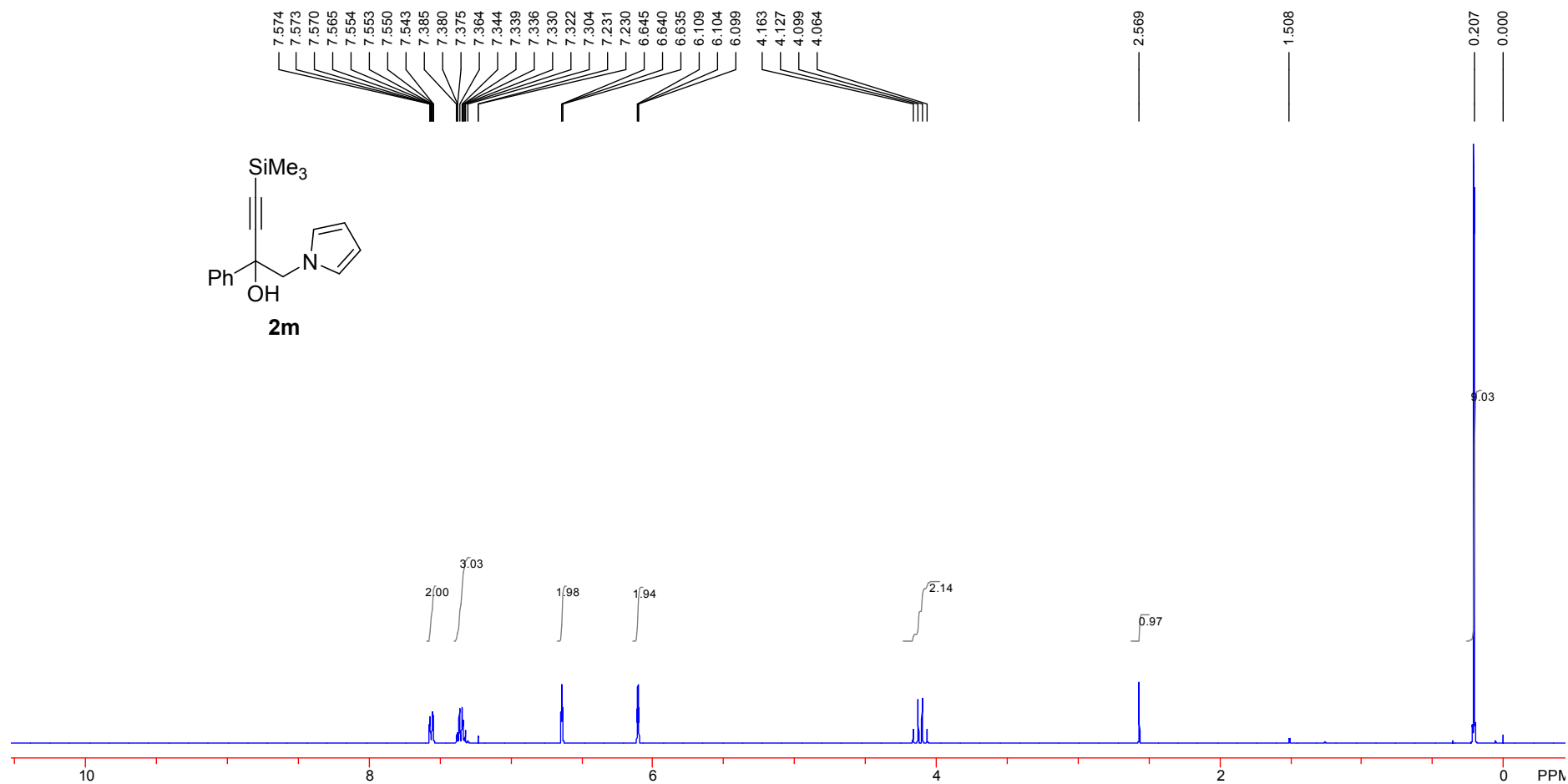
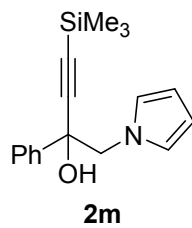
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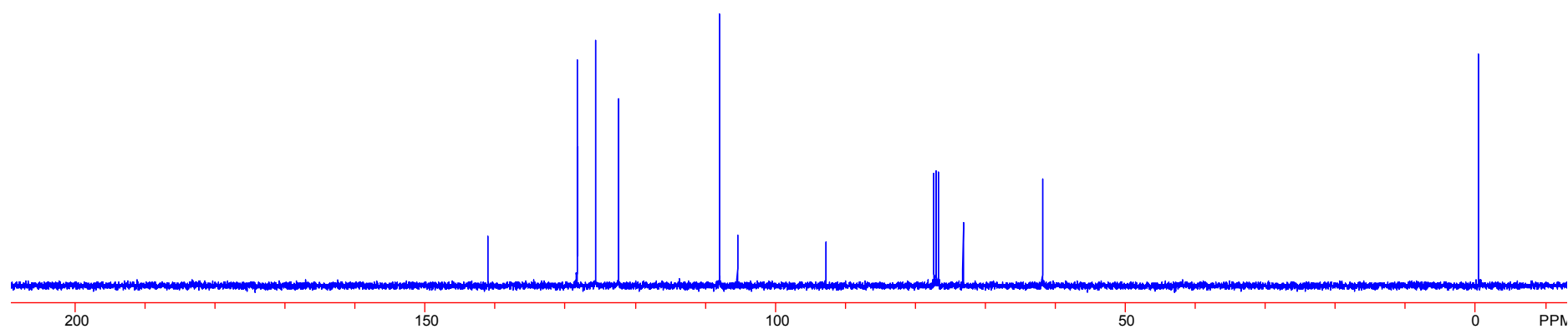
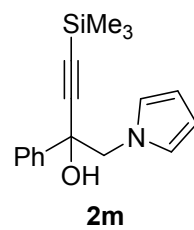
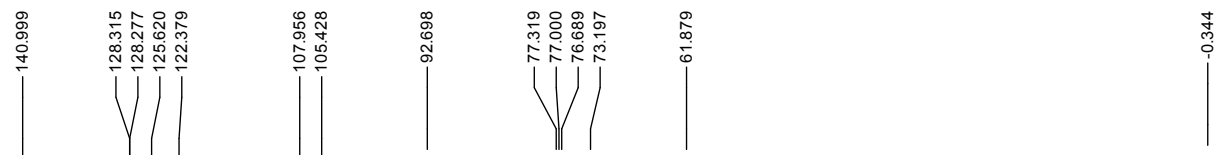
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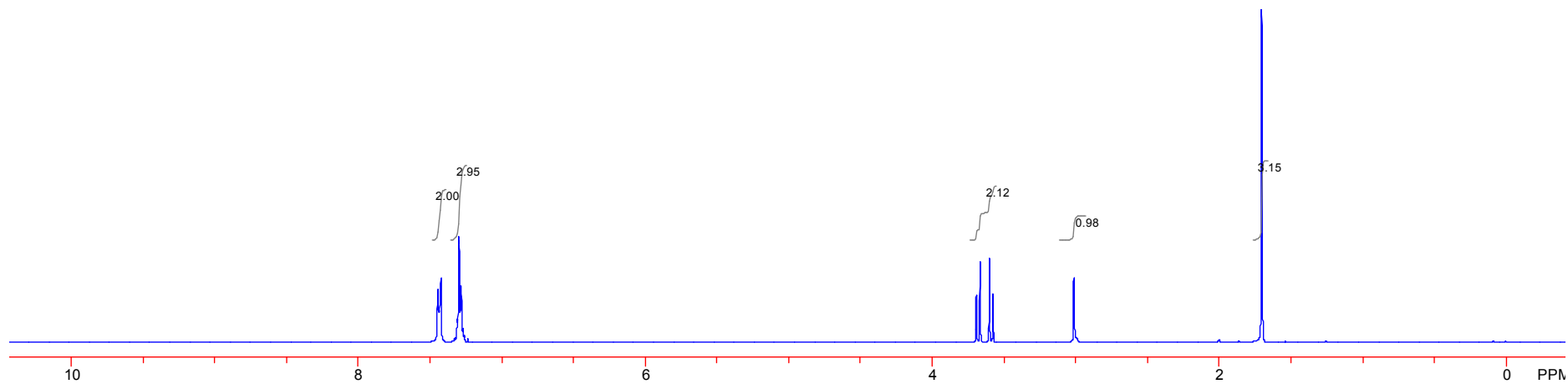
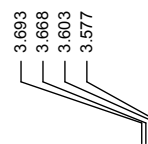
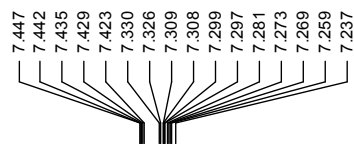
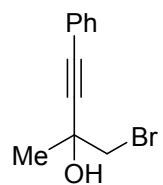
^1H NMR (400 MHz, CDCl_3)



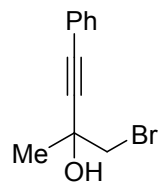
^{13}C NMR (100 MHz, CDCl_3)



^1H NMR (400 MHz, CDCl_3)



^{13}C NMR (100 MHz, CDCl_3)



131.678
128.565
128.178
121.885

89.624

84.318

77.319

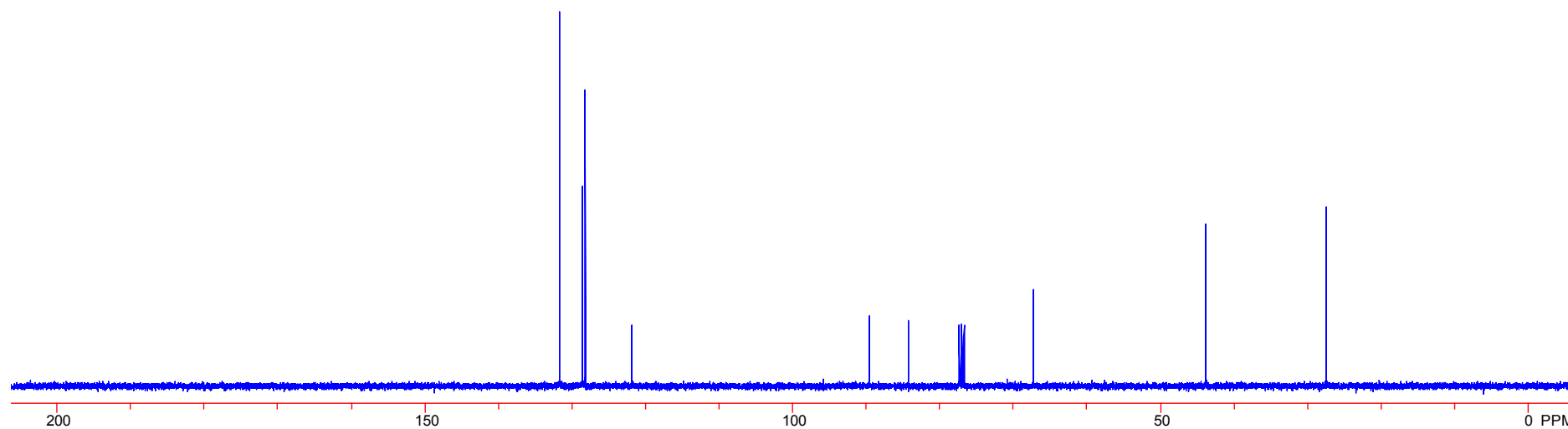
77.000

76.681

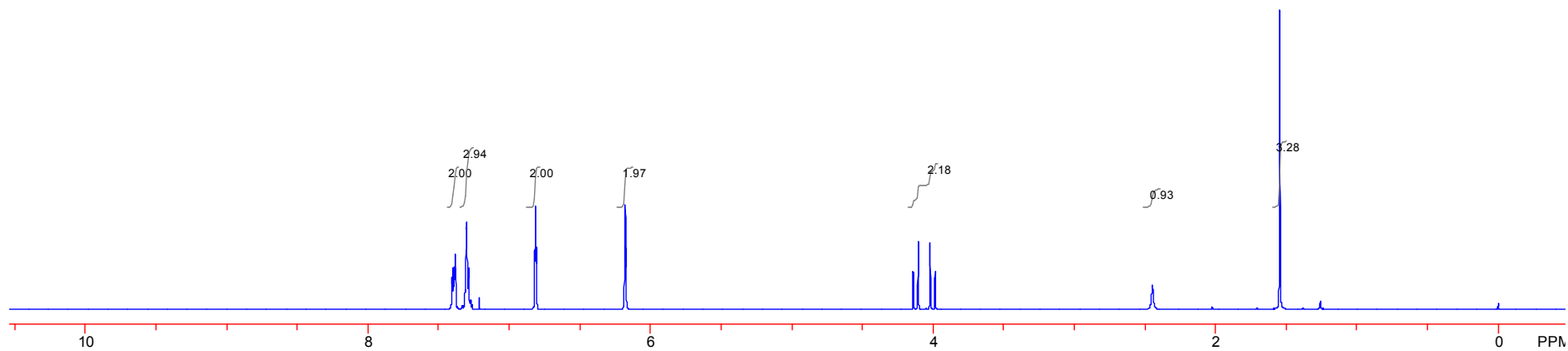
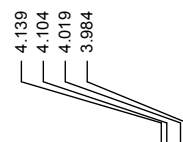
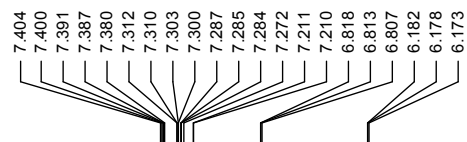
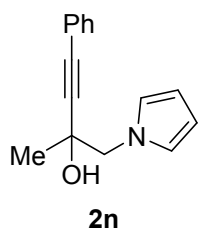
67.246

43.866

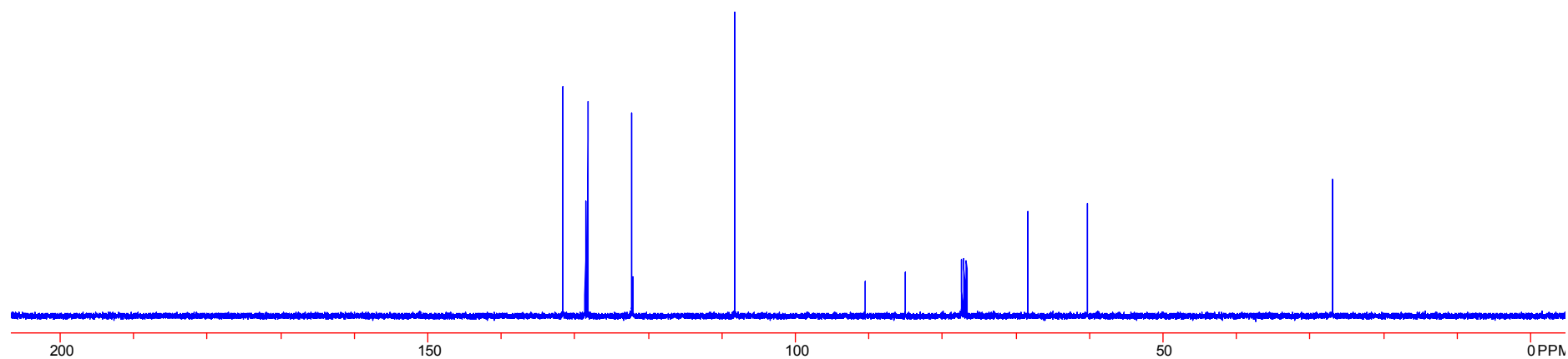
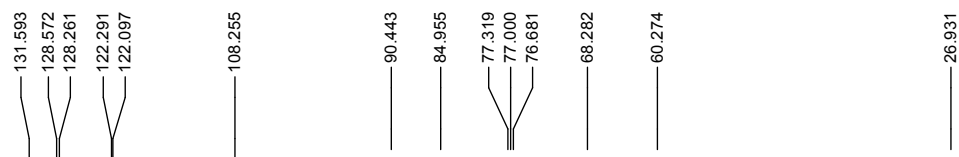
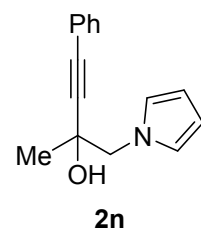
27.446



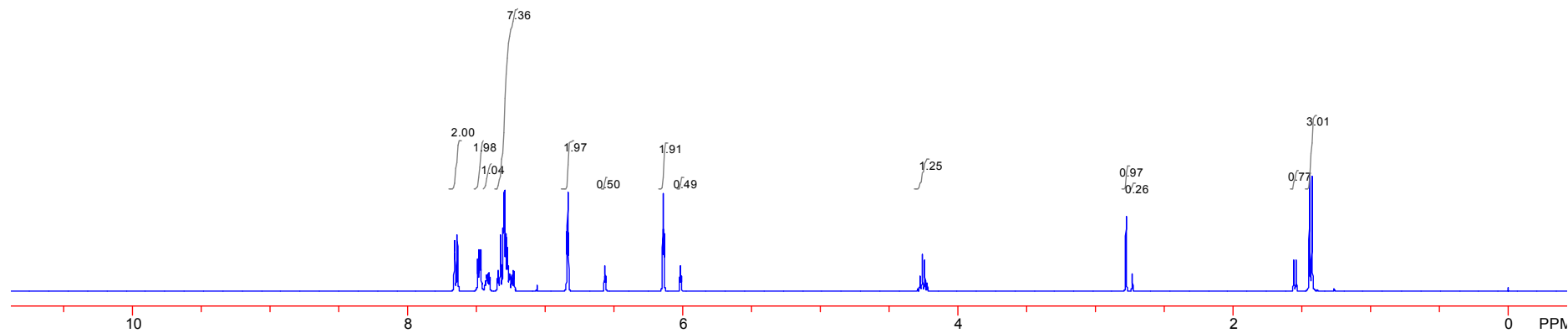
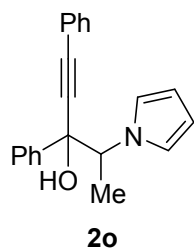
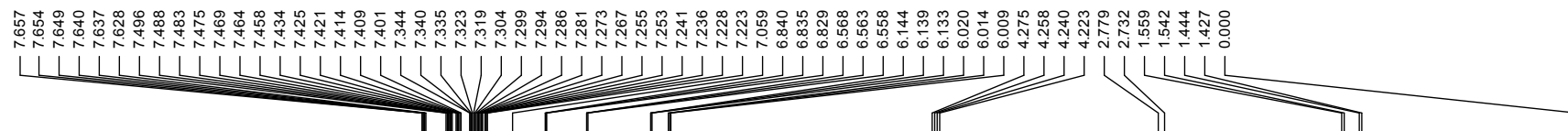
¹H NMR (400 MHz, CDCl₃)



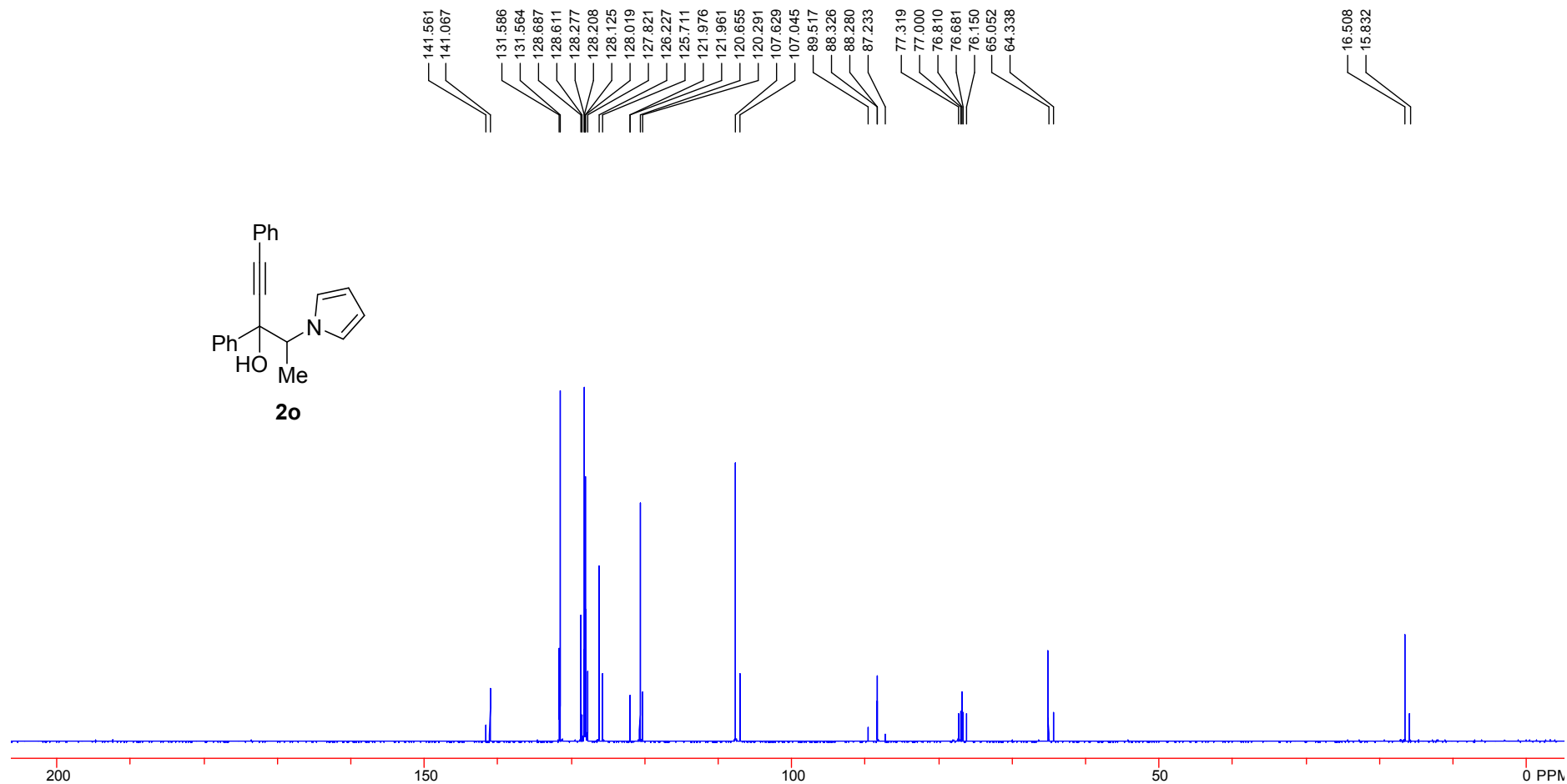
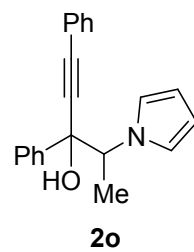
^{13}C NMR (100 MHz, CDCl_3)



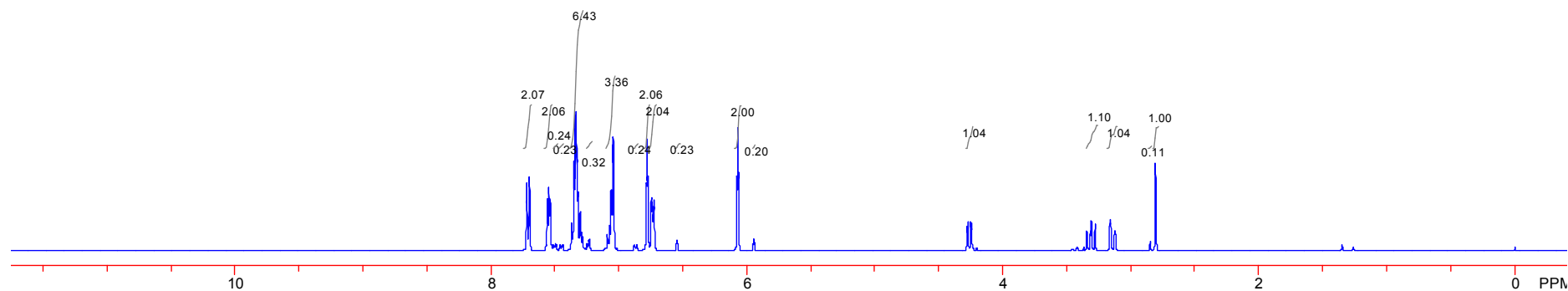
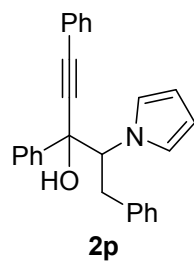
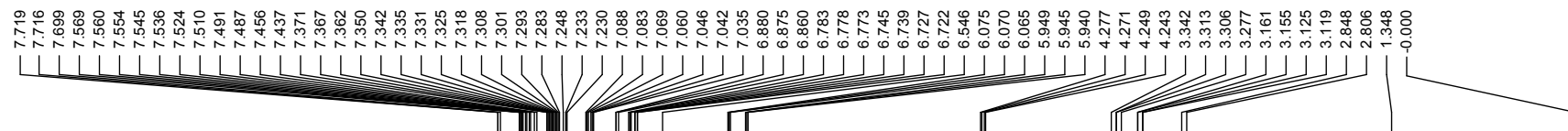
^1H NMR (400 MHz, CDCl_3)



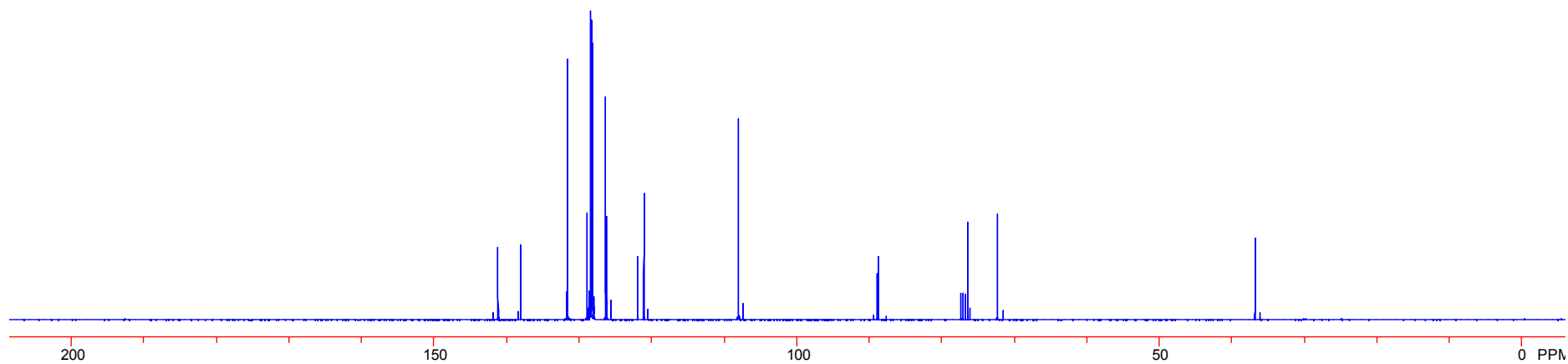
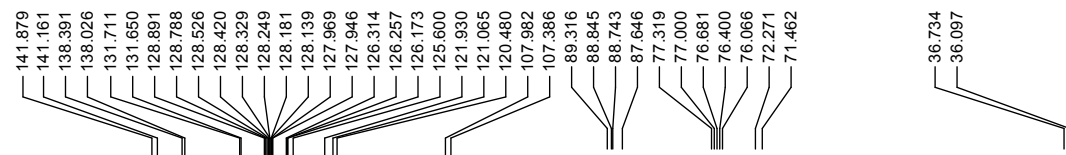
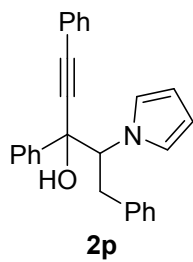
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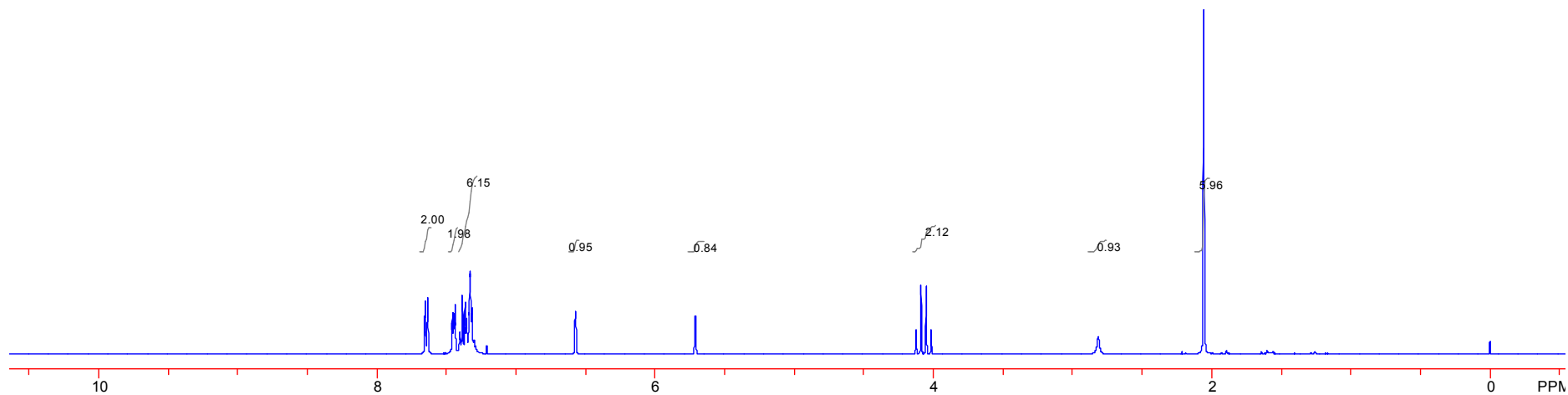
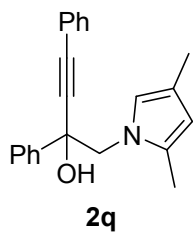
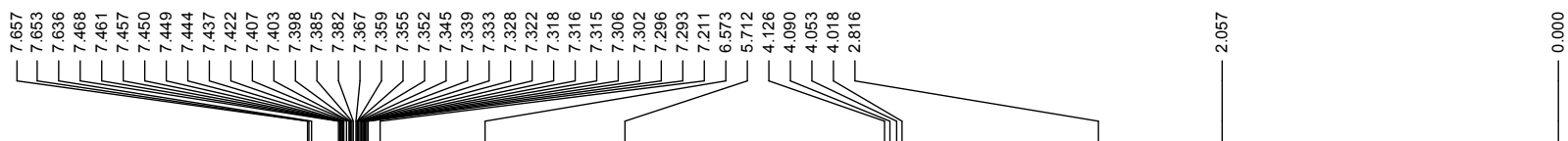
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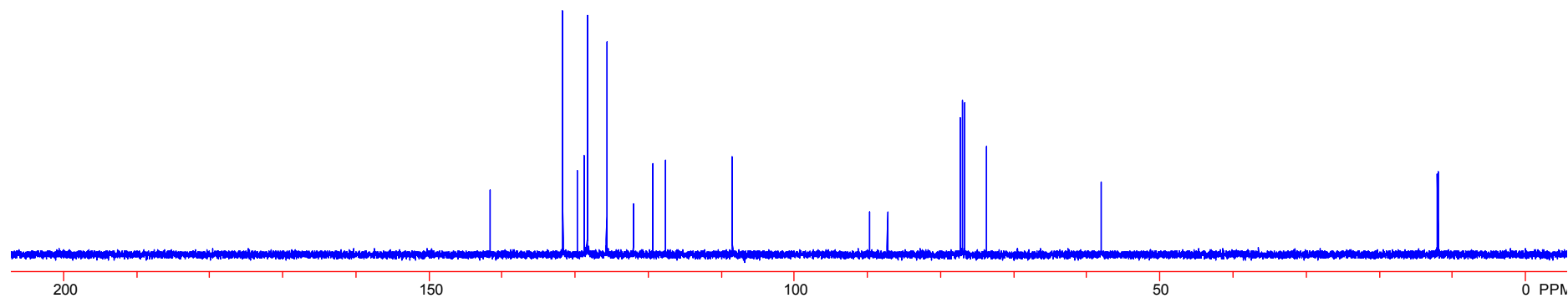
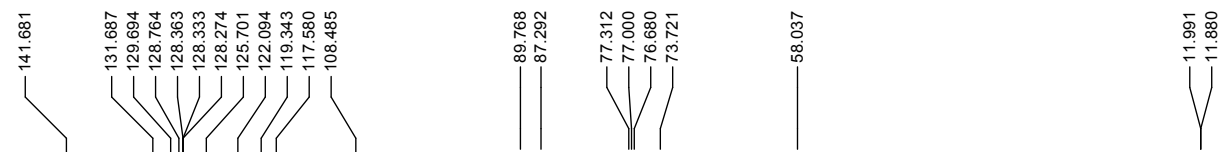
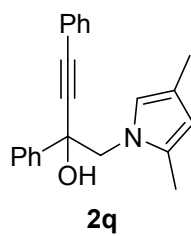
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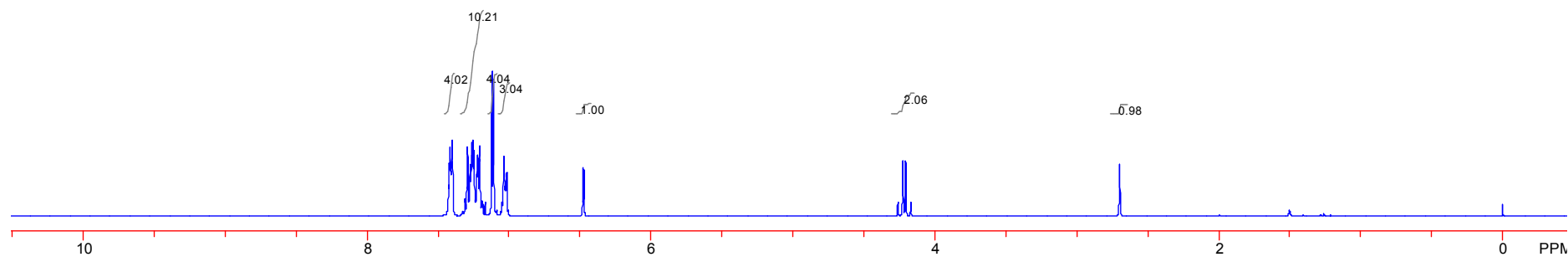
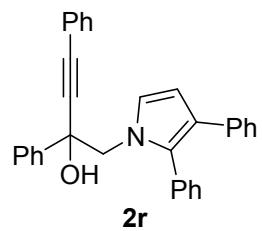
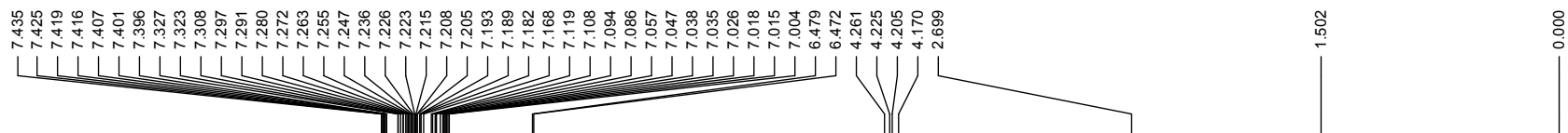
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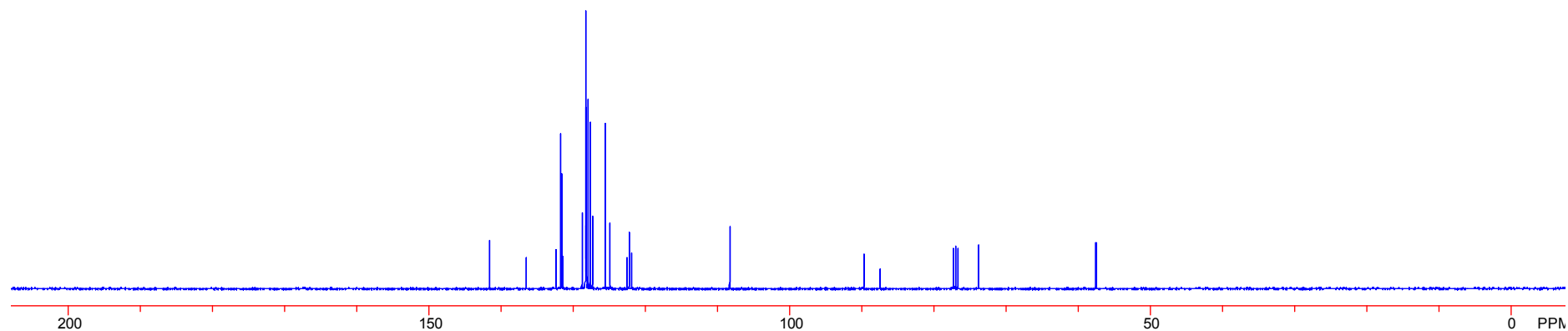
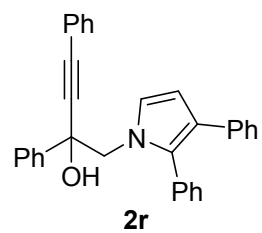
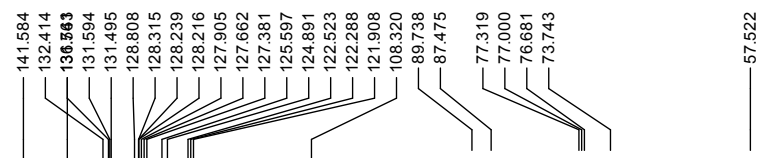
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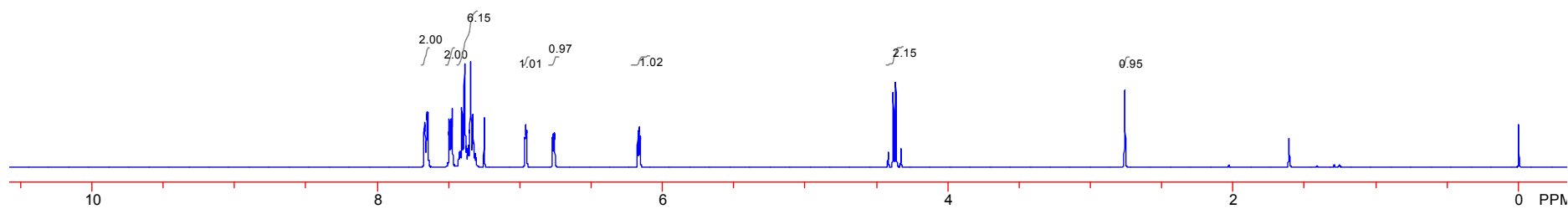
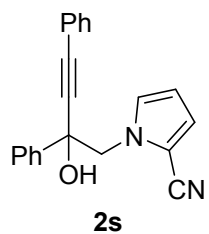
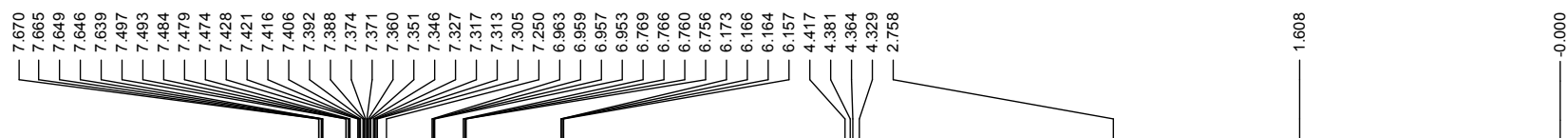
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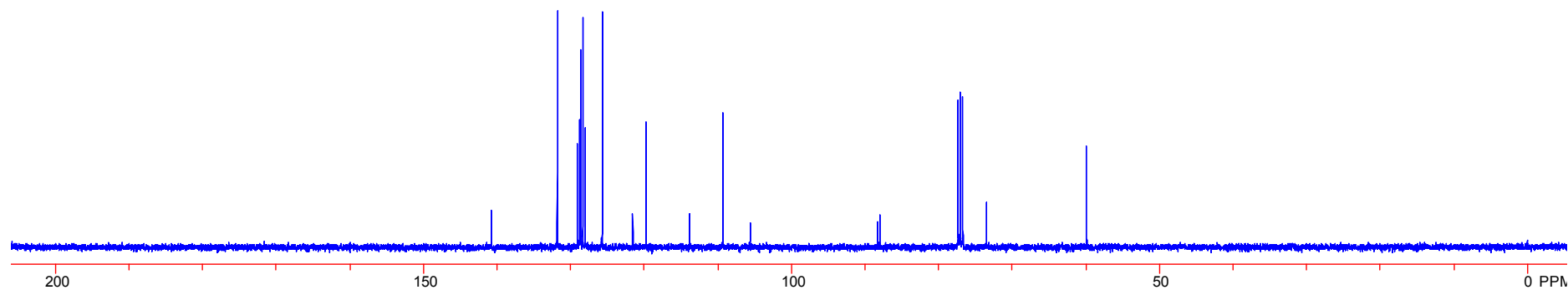
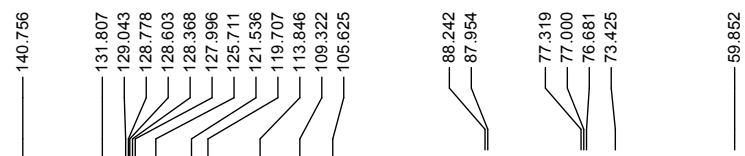
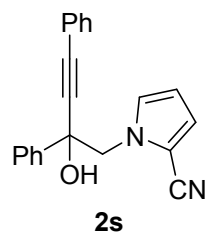
^{13}C NMR (100 MHz, CDCl_3)



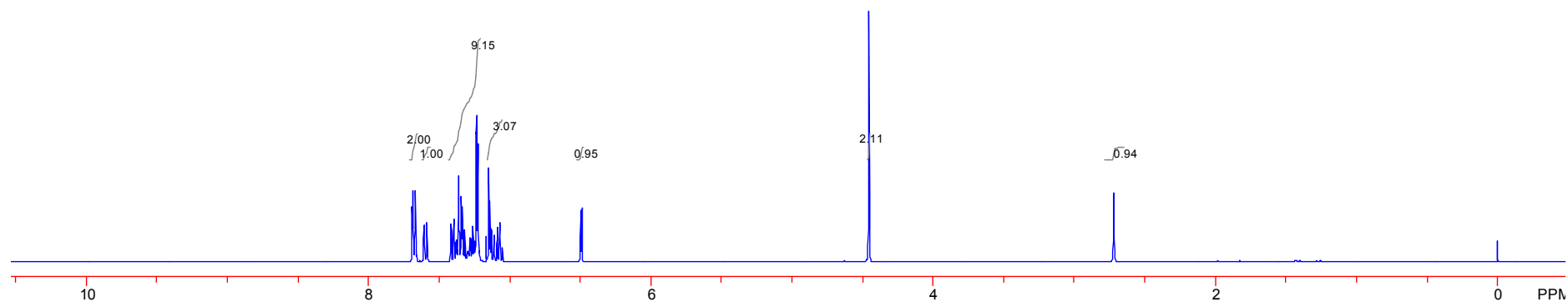
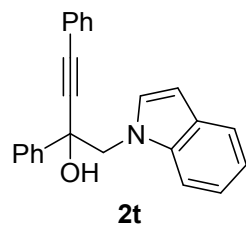
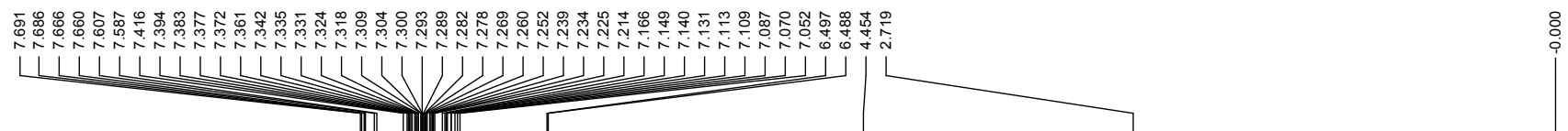
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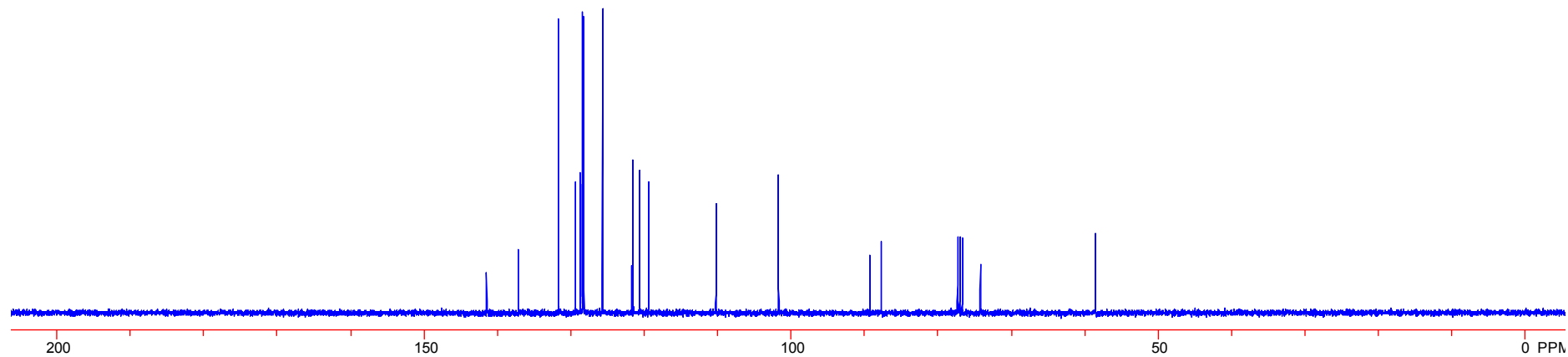
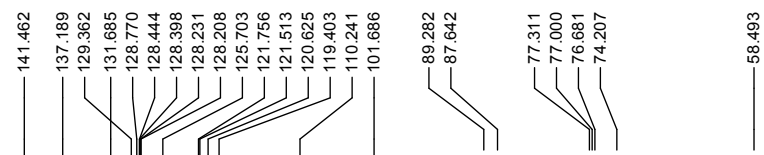
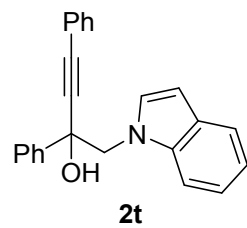
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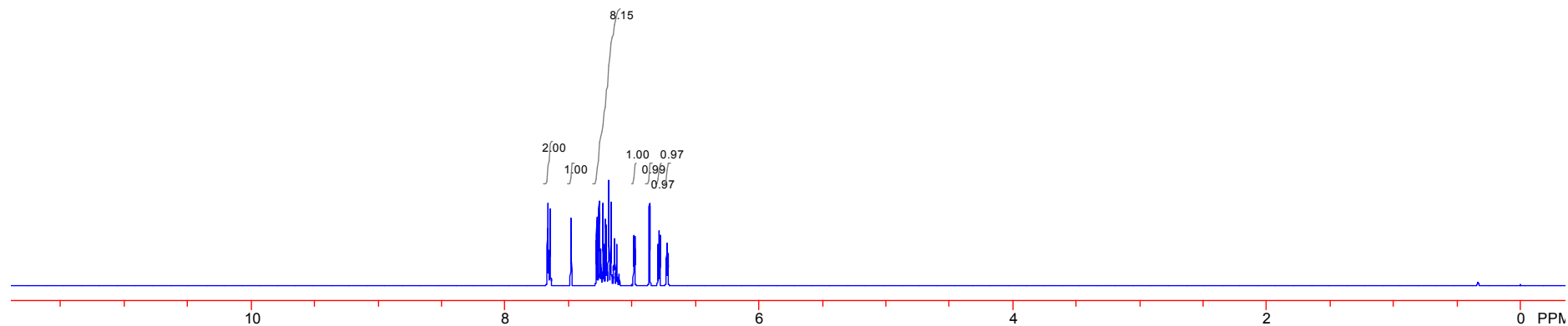
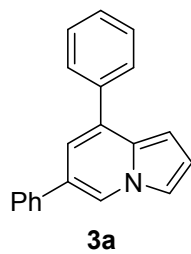
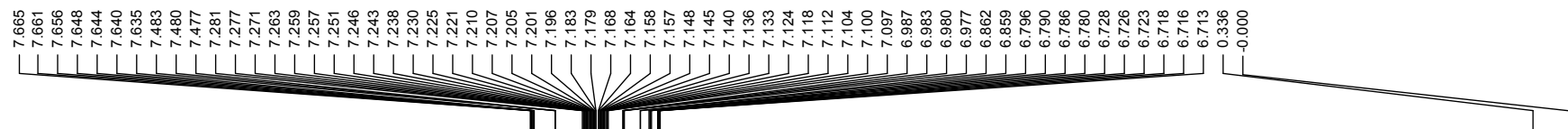
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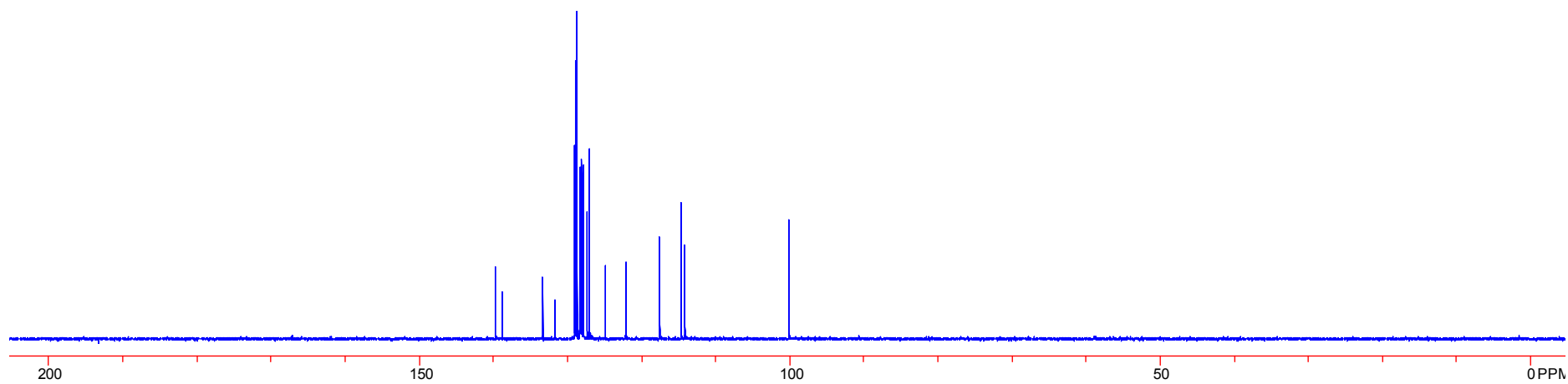
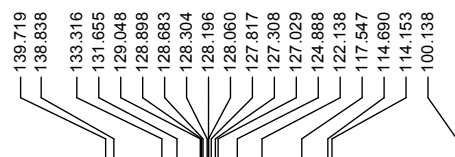
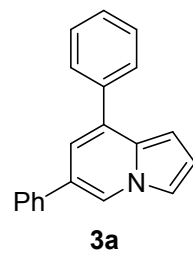
^{13}C NMR (100 MHz, CDCl_3)



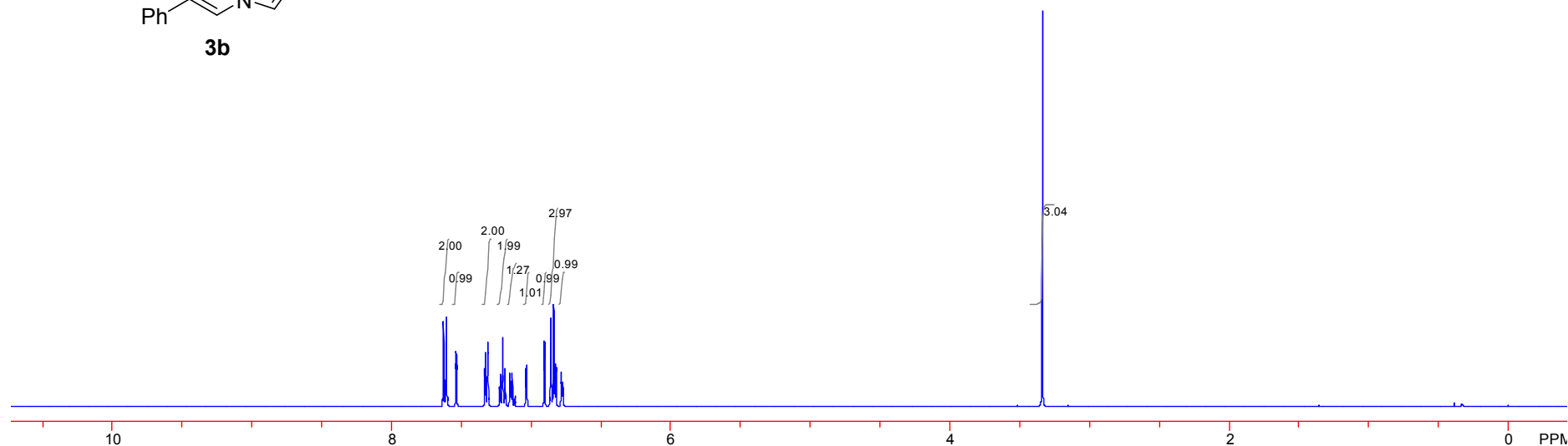
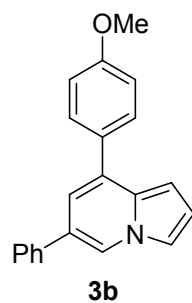
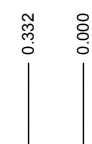
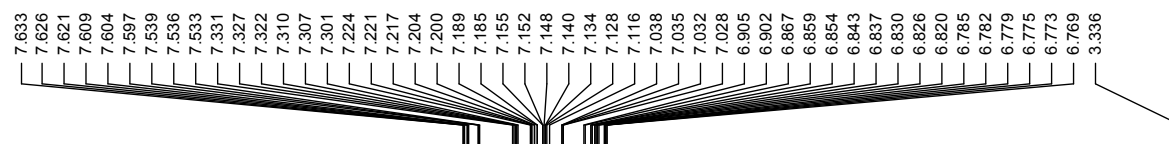
^1H NMR (400 MHz, C_6D_6)



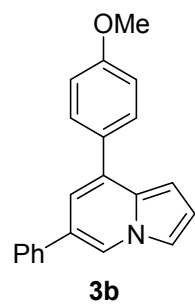
^{13}C NMR (100 MHz, C_6D_6)



^1H NMR (400 MHz, C_6D_6)



^{13}C NMR (100 MHz, C_6D_6)



160.057

133.073

138.981

132.035

131.913

129.807

129.077

128.304

128.060

127.824

127.301

127.057

125.002

121.787

117.053

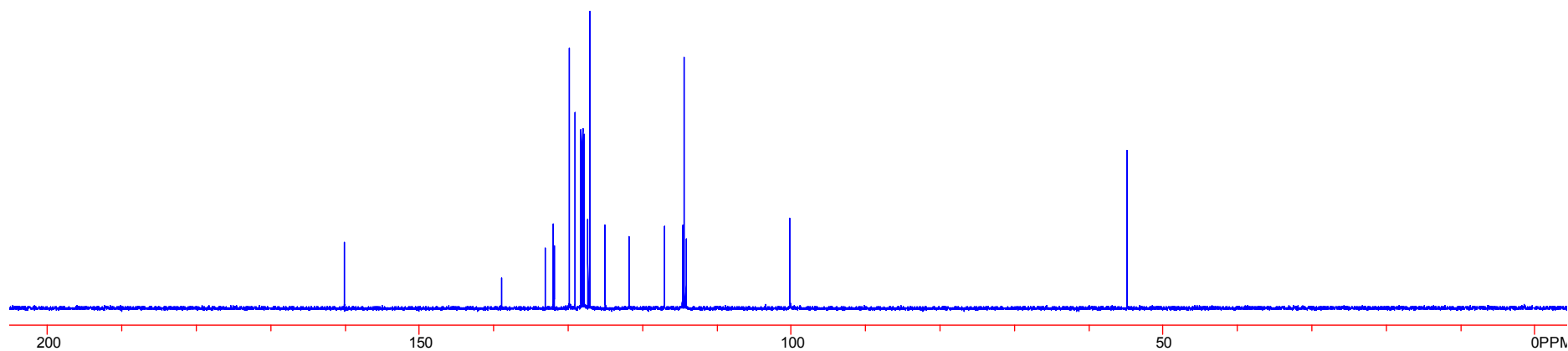
114.618

114.404

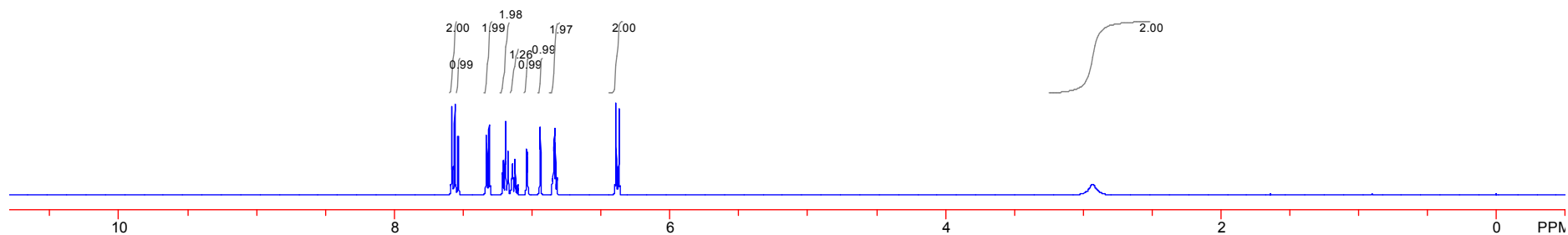
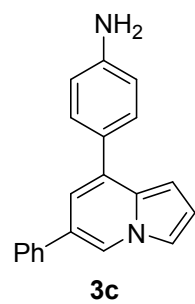
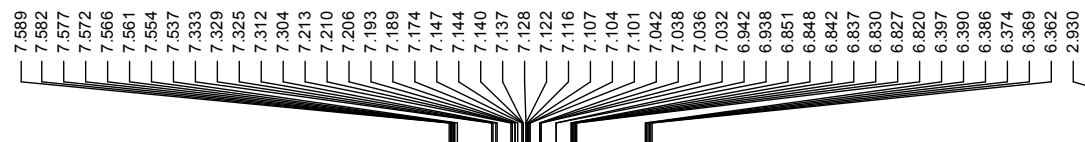
114.160

100.145

54.872



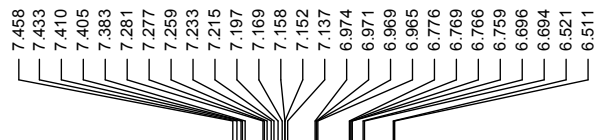
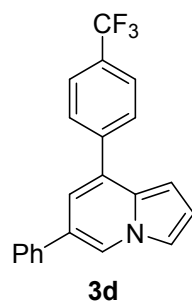
^1H NMR (400 MHz, C_6D_6)



3c

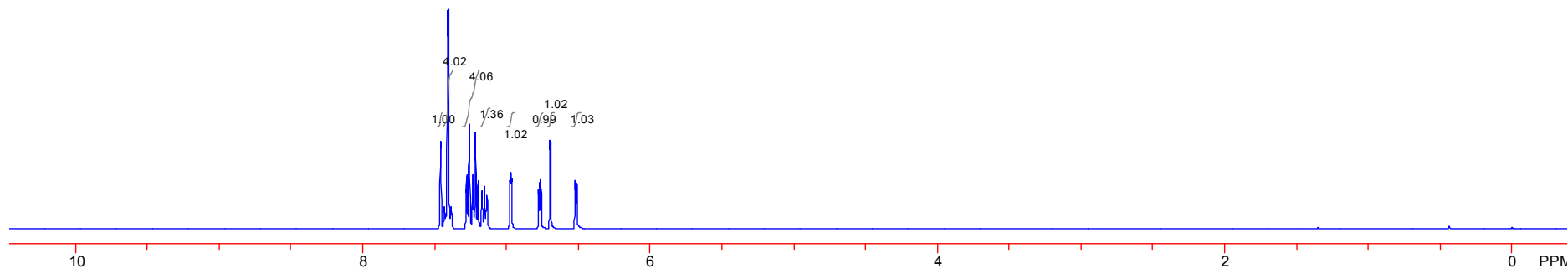
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^1H NMR (400 MHz, C_6D_6)

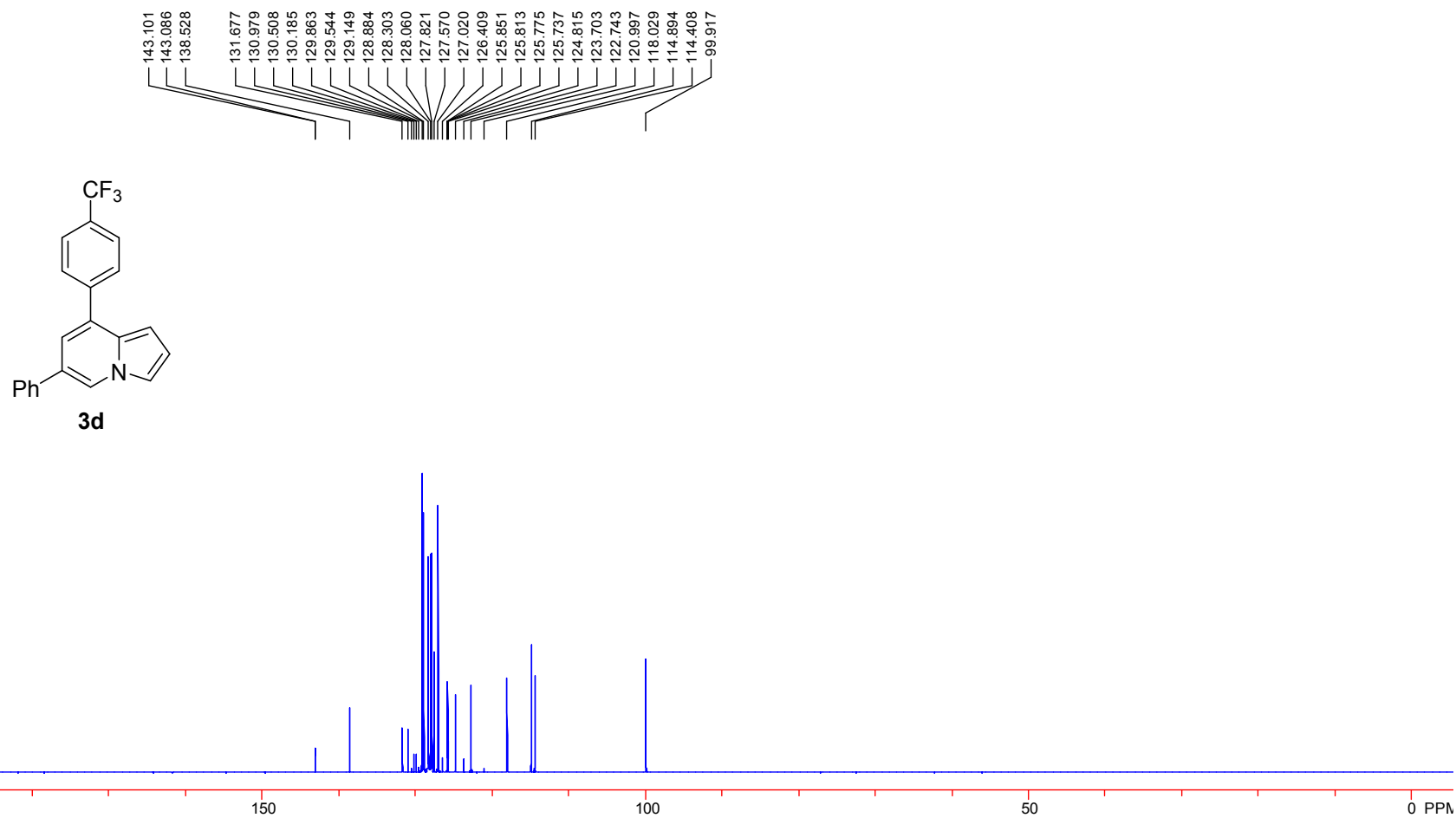


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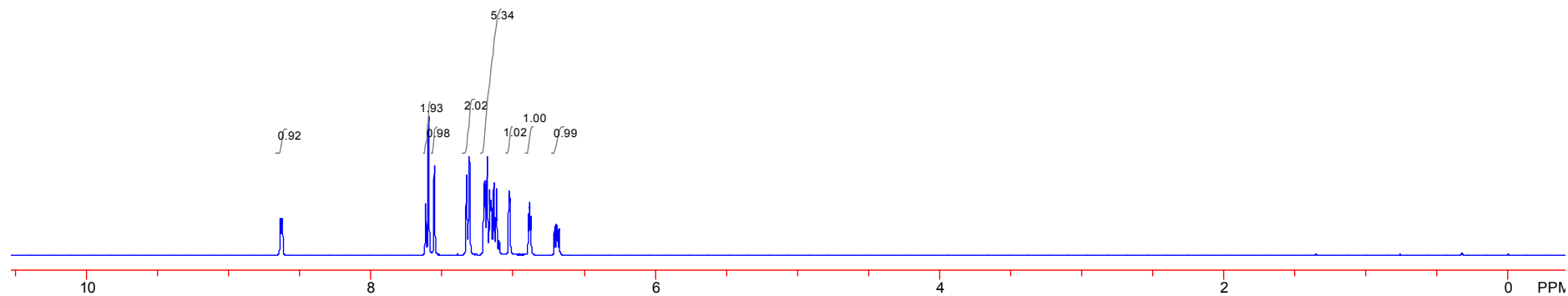
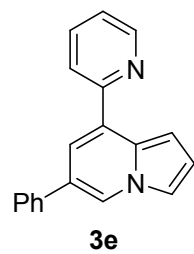
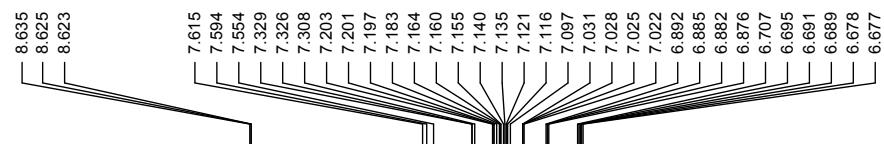
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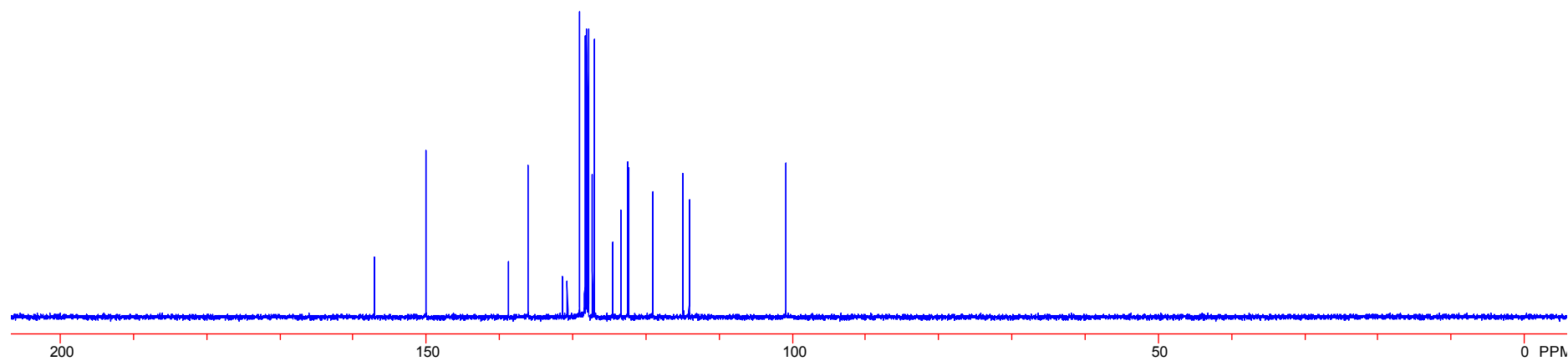
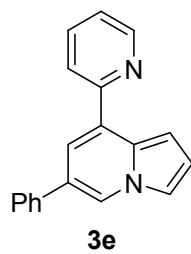
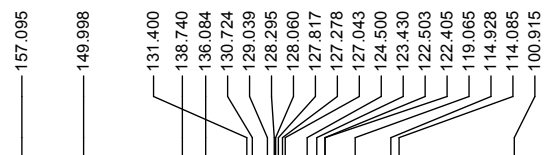
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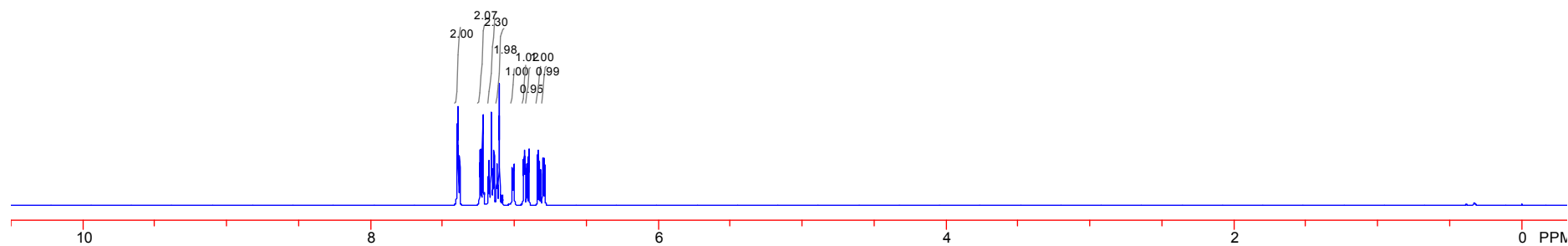
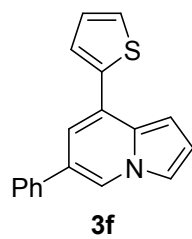
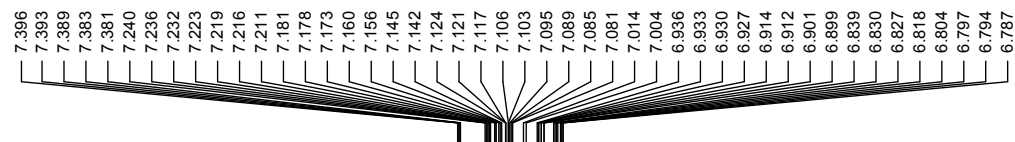
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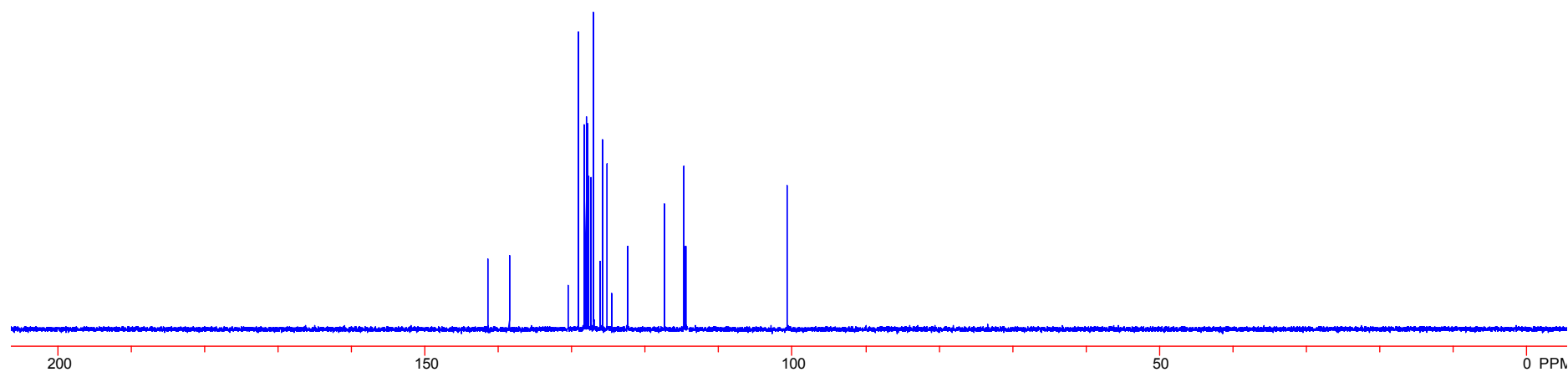
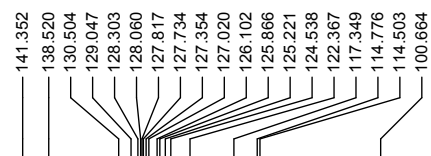
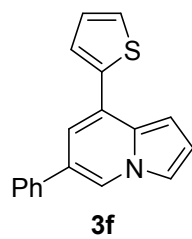
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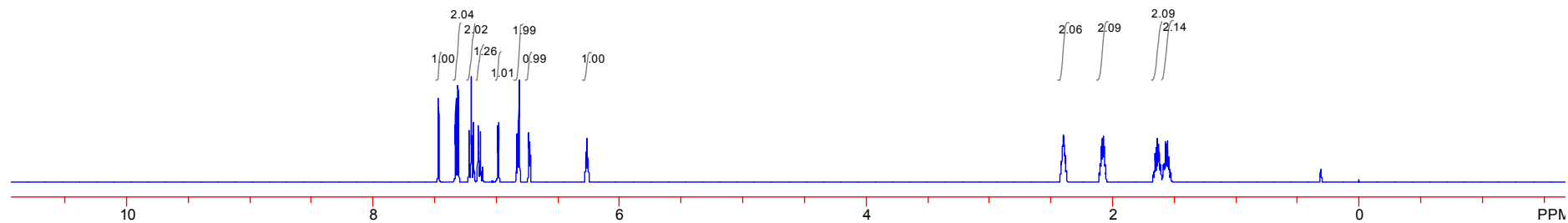
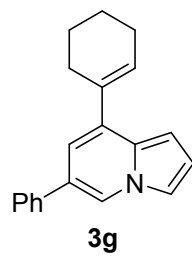
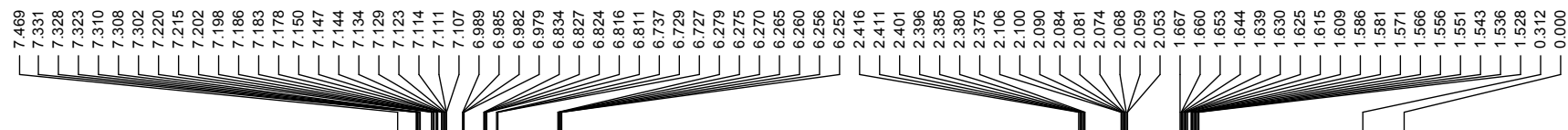
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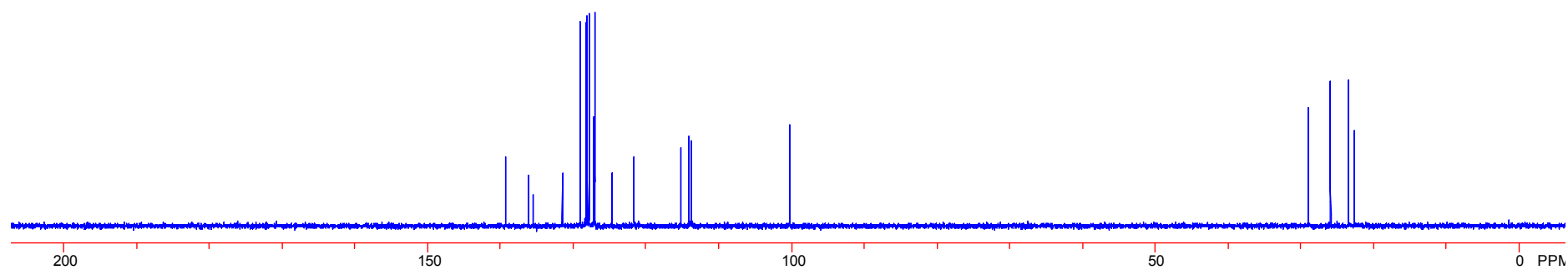
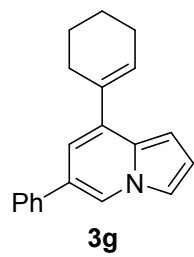
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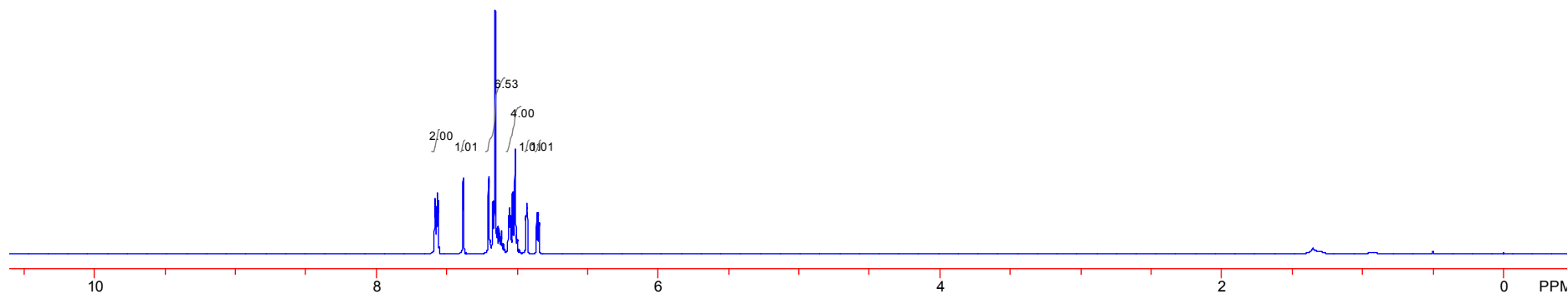
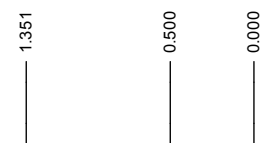
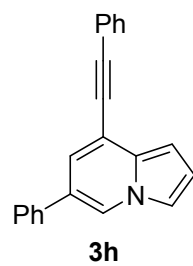
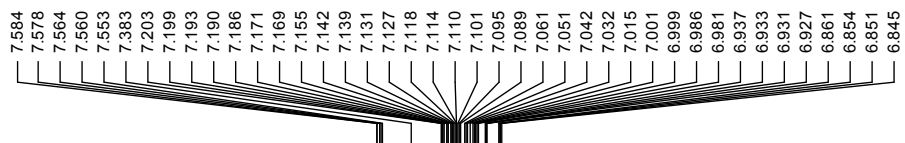
^1H NMR (400 MHz, C_6D_6)



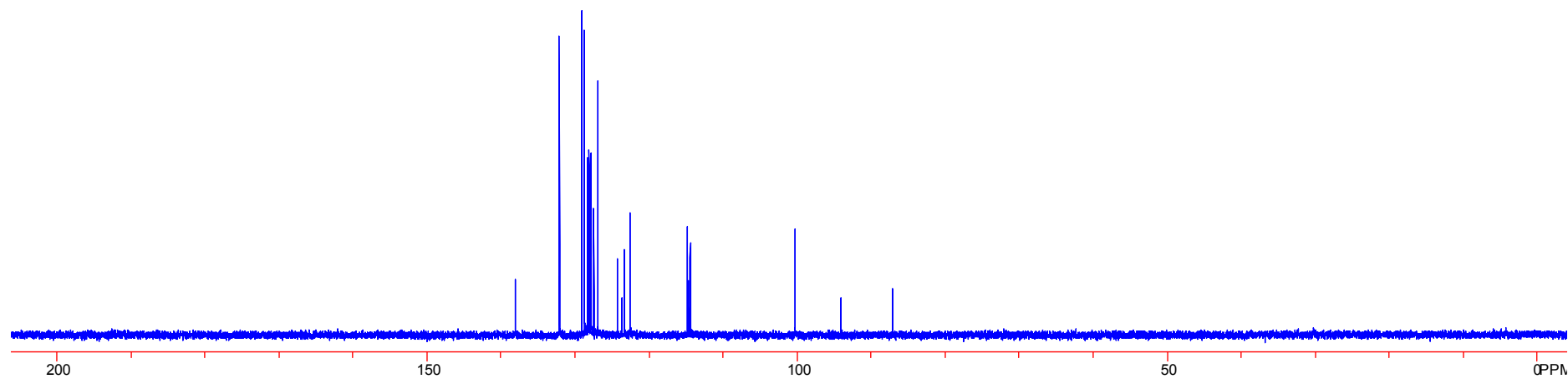
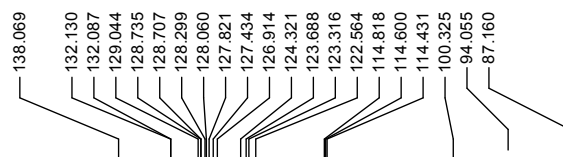
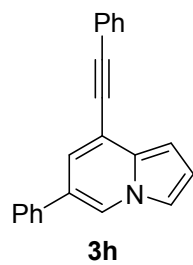
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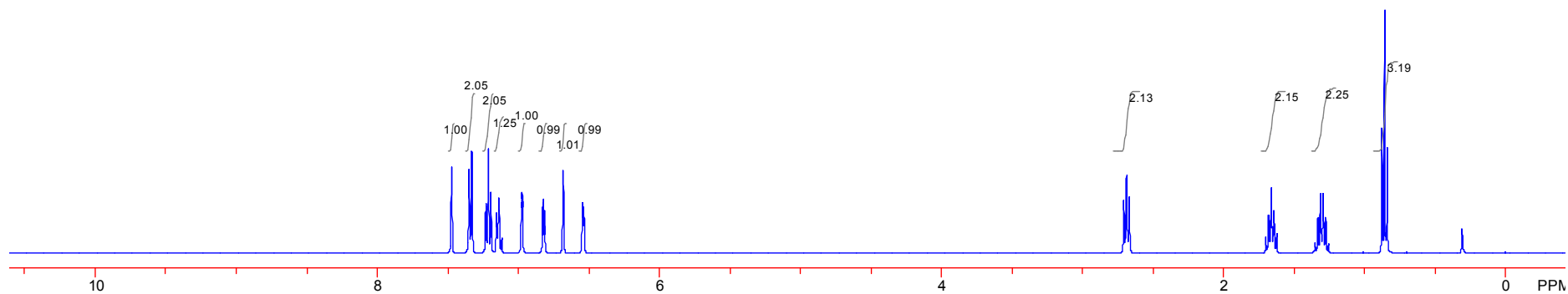
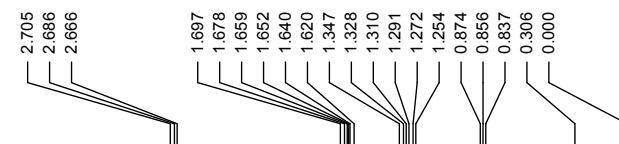
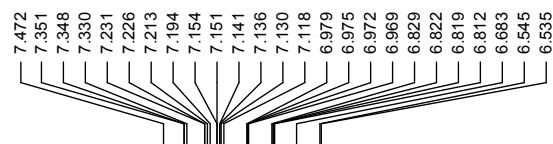
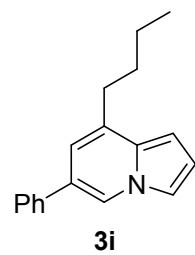
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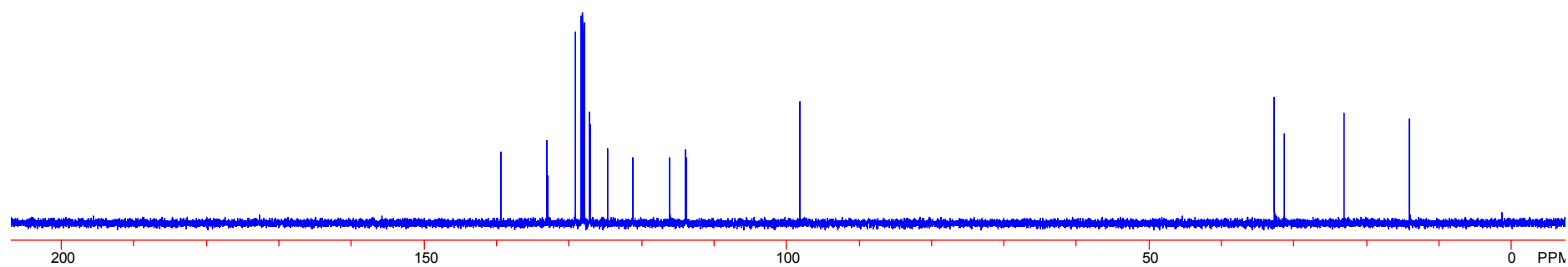
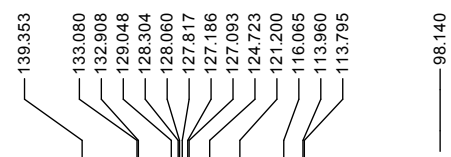
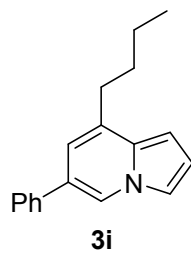
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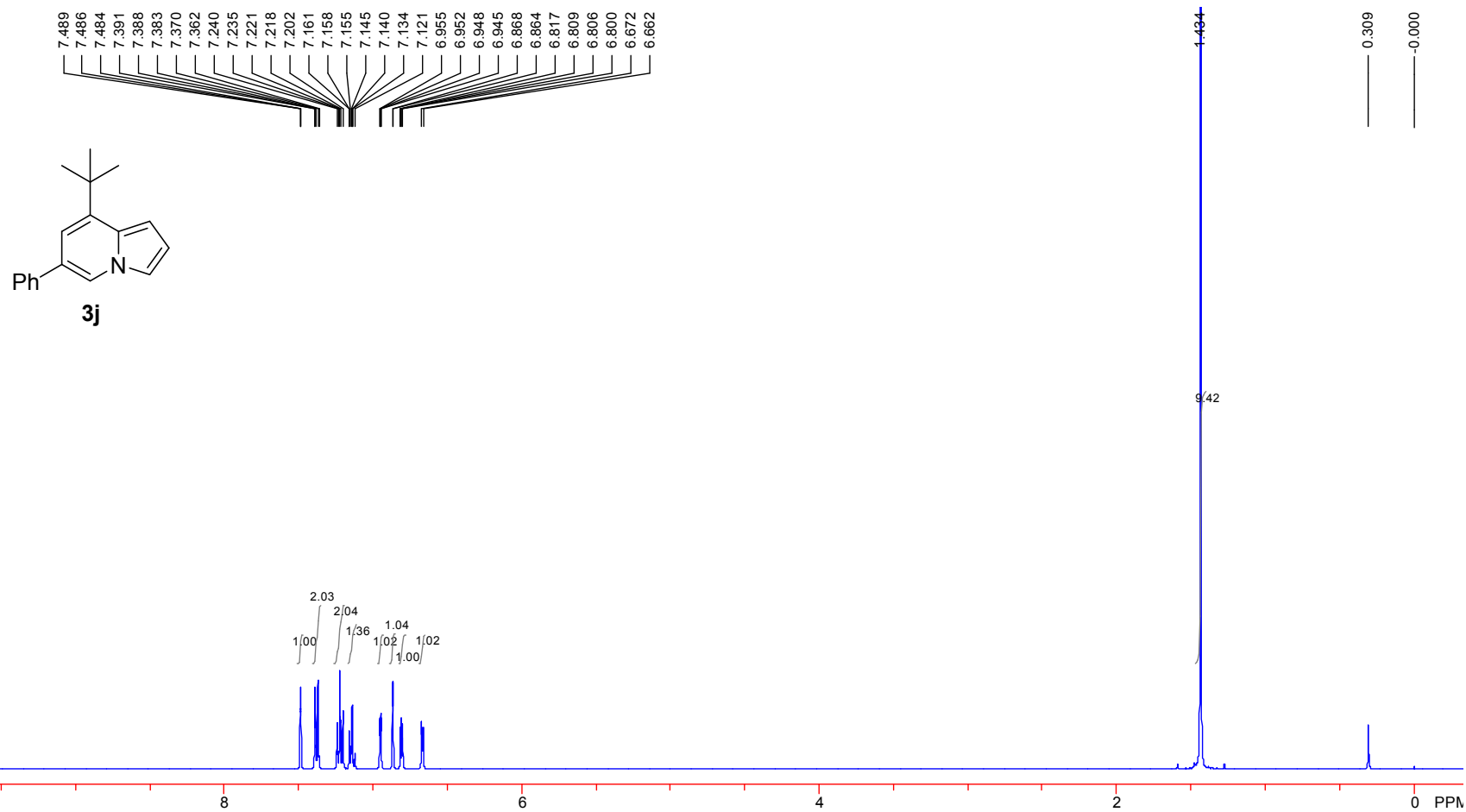
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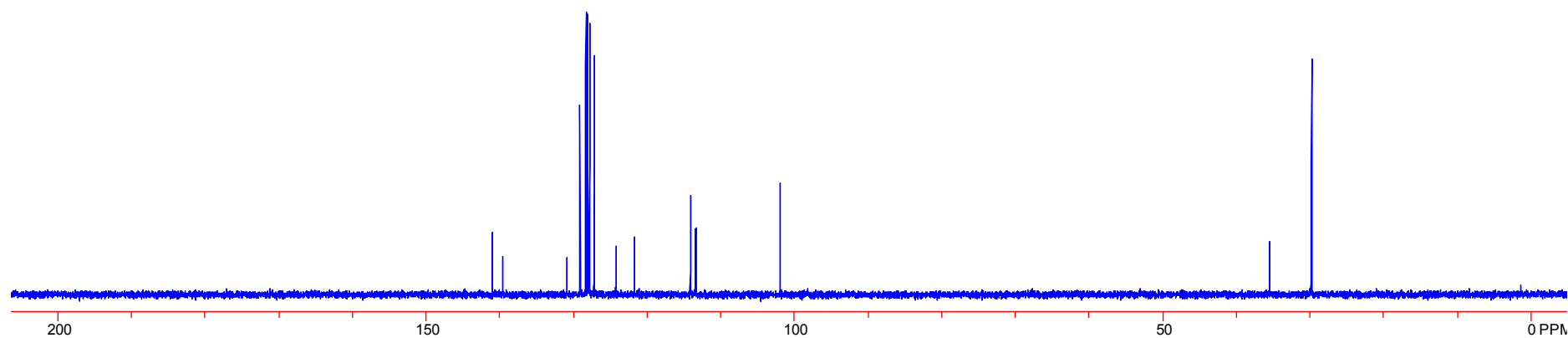
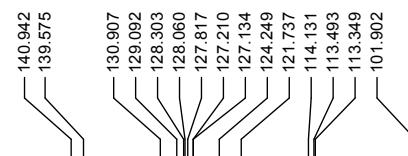
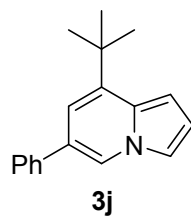
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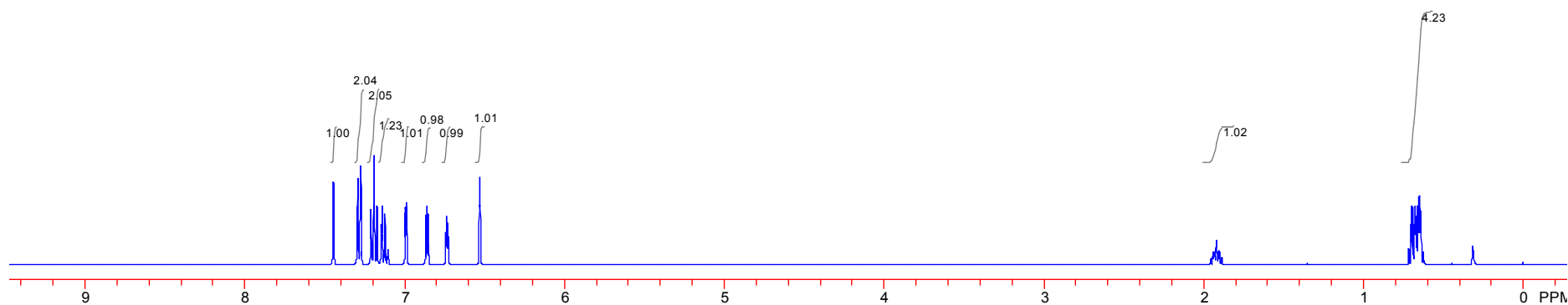
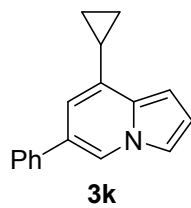
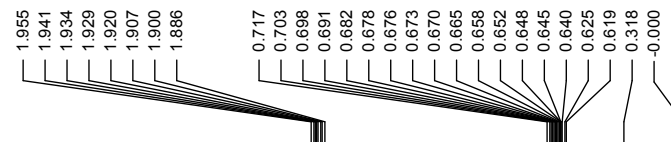
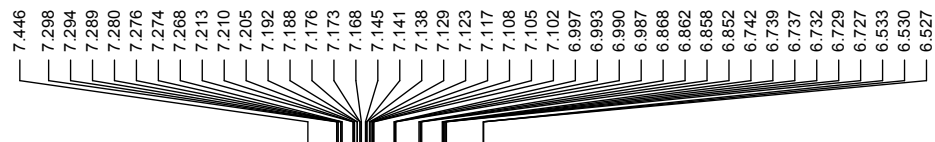
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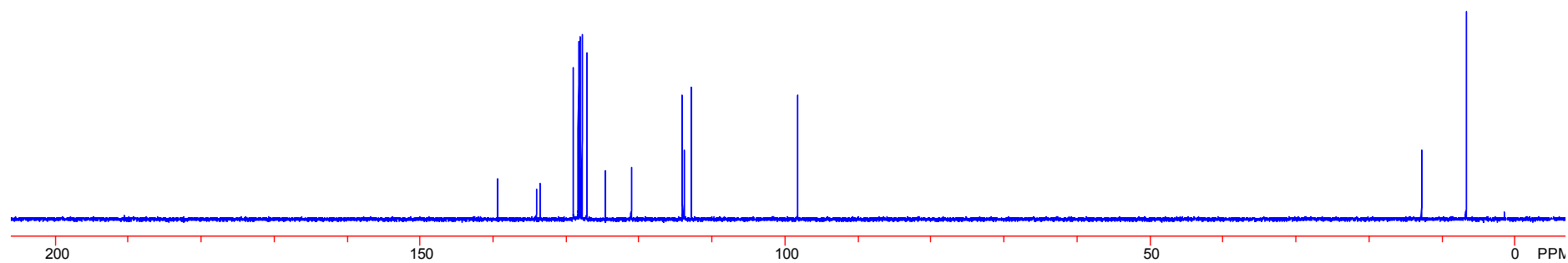
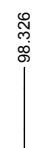
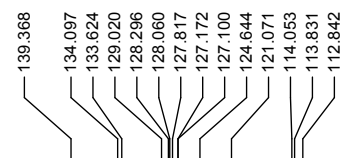
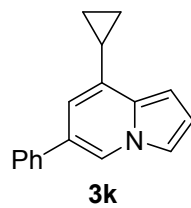
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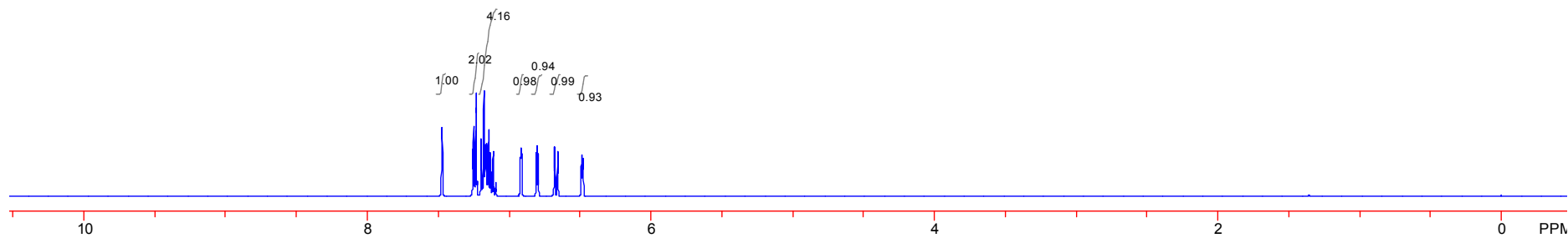
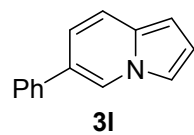
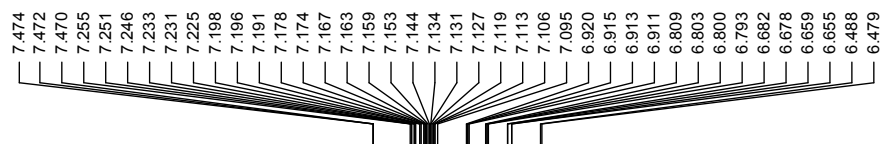
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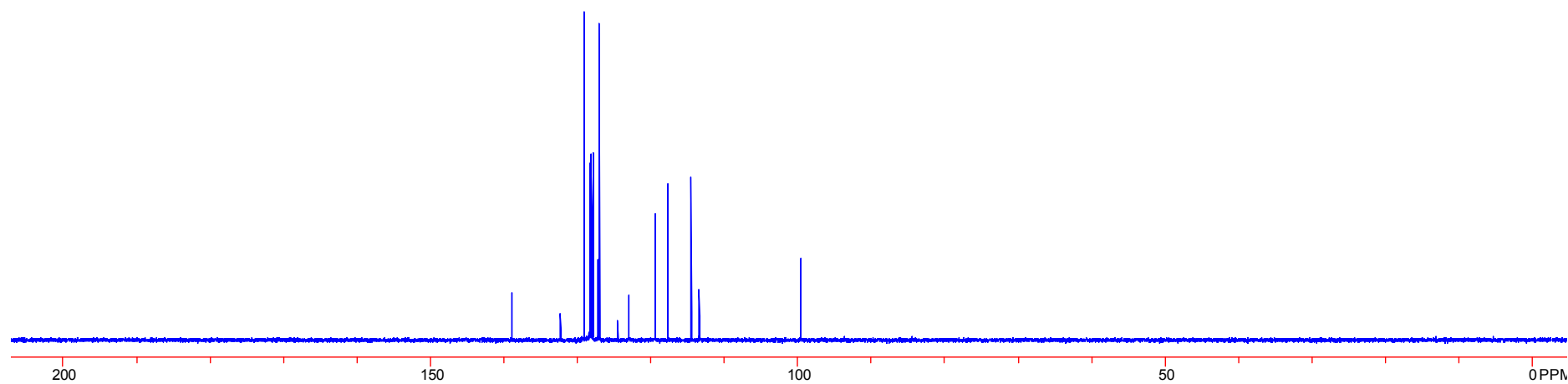
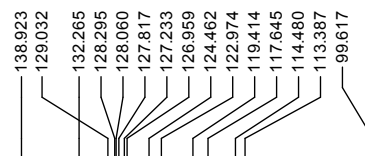
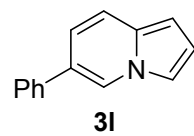
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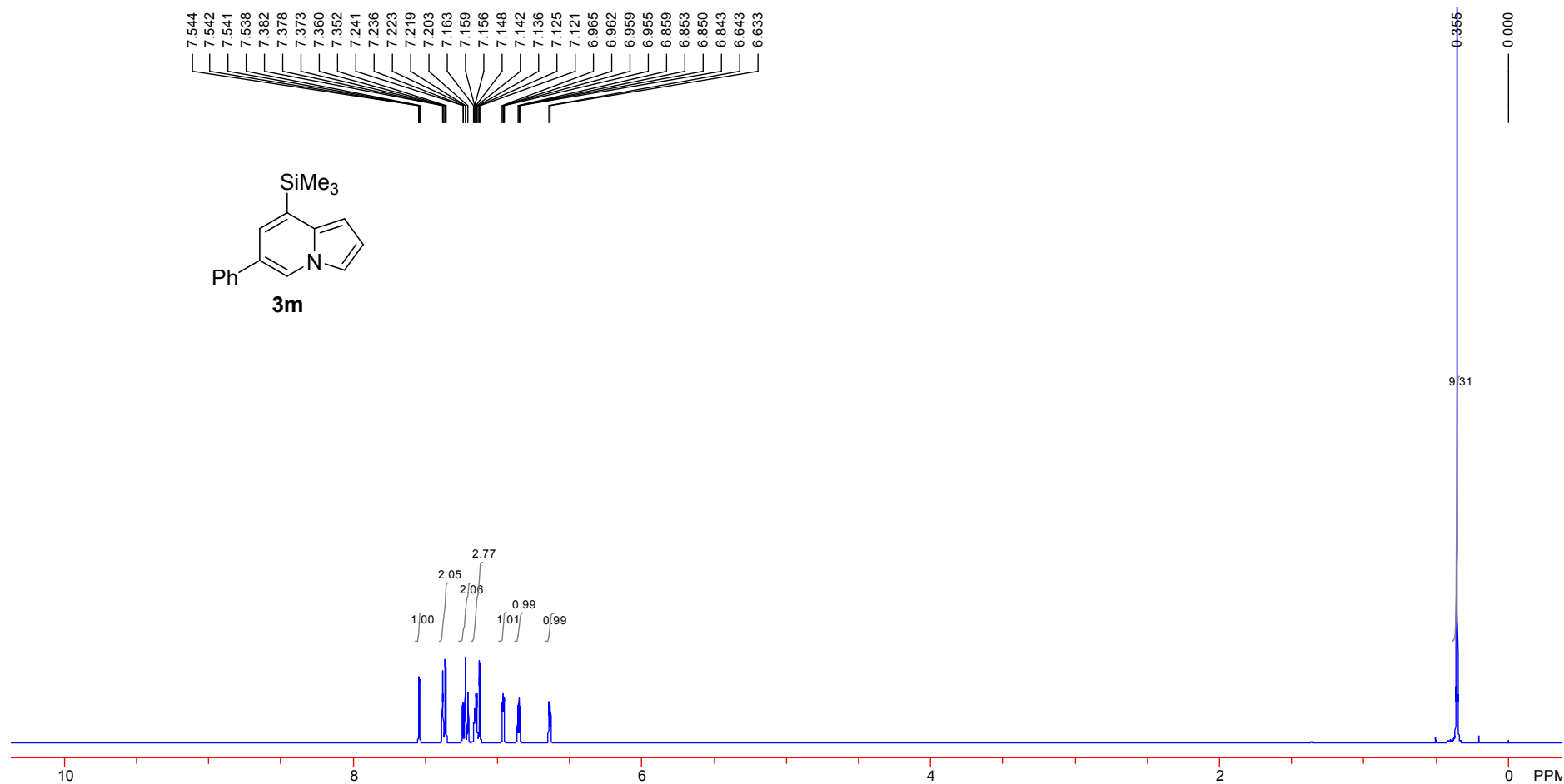
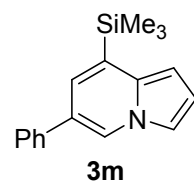
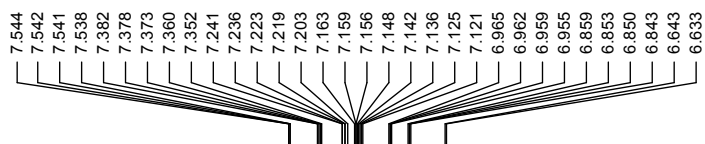
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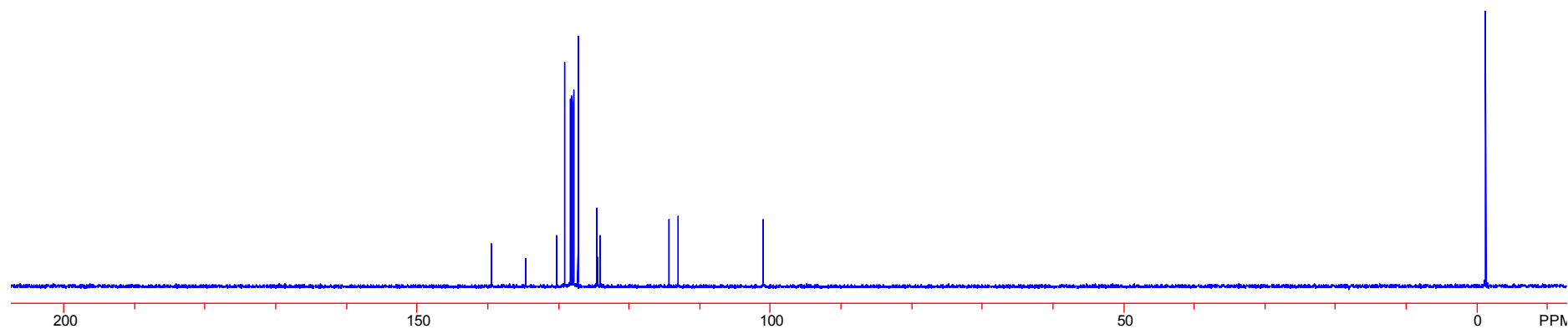
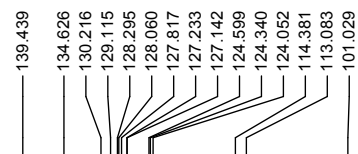
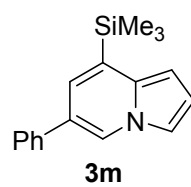
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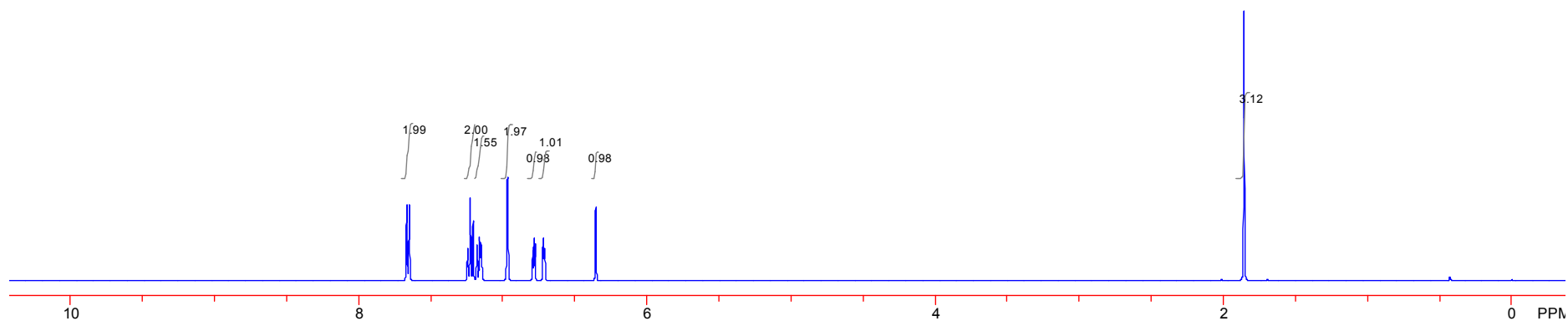
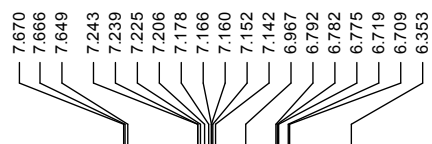
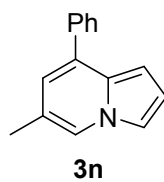
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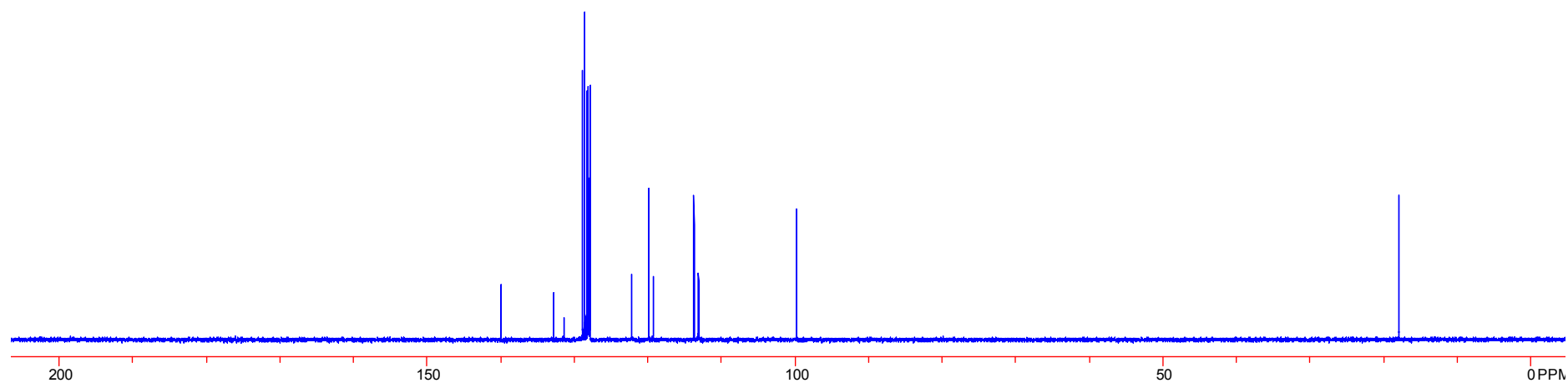
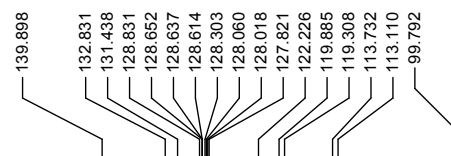
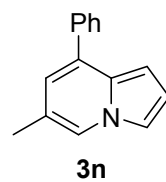
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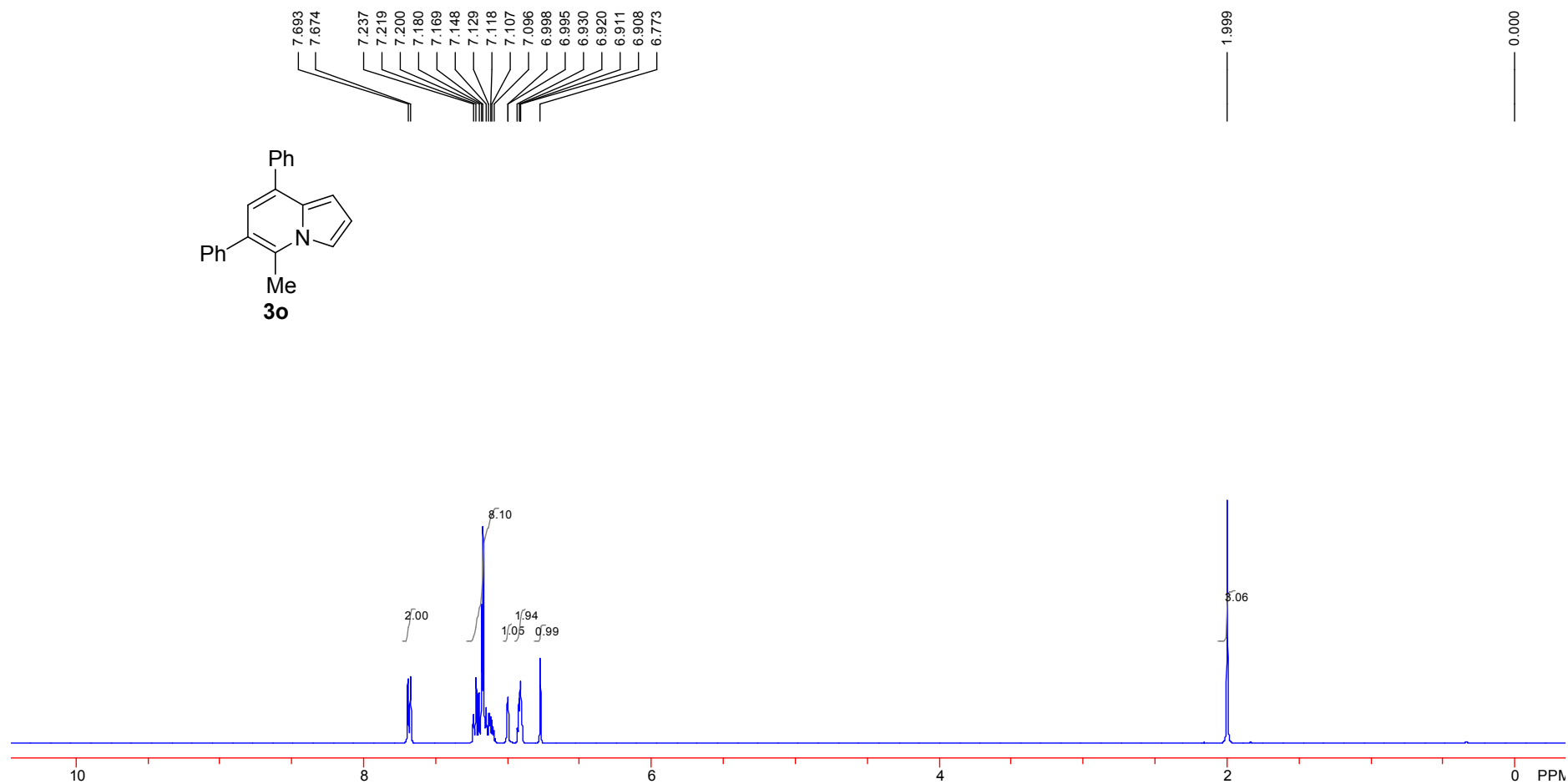
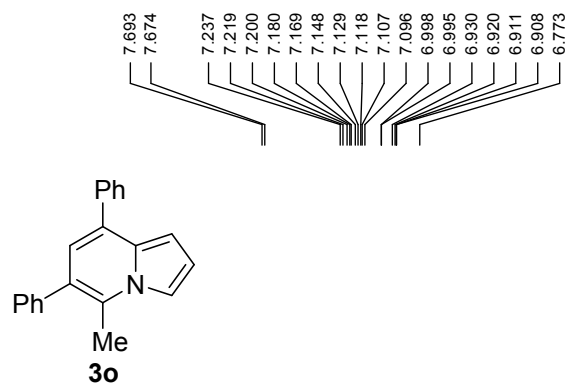
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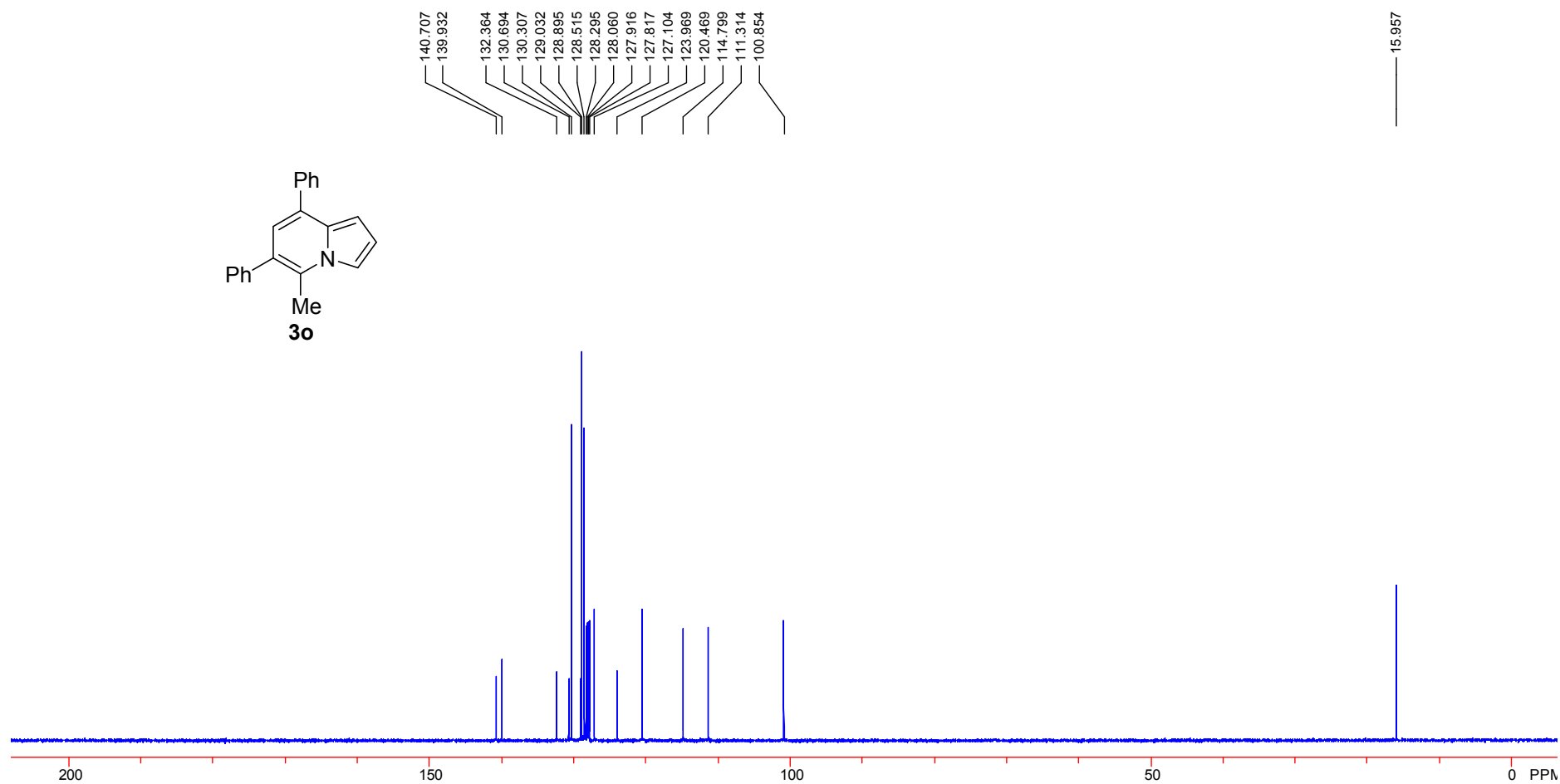
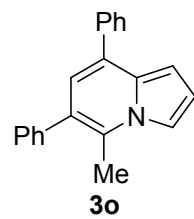
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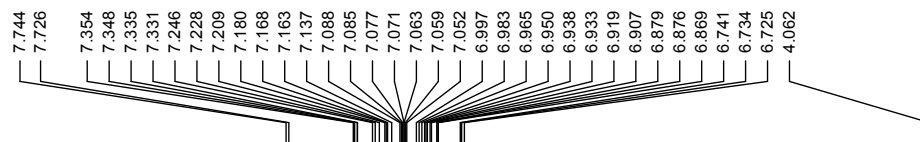
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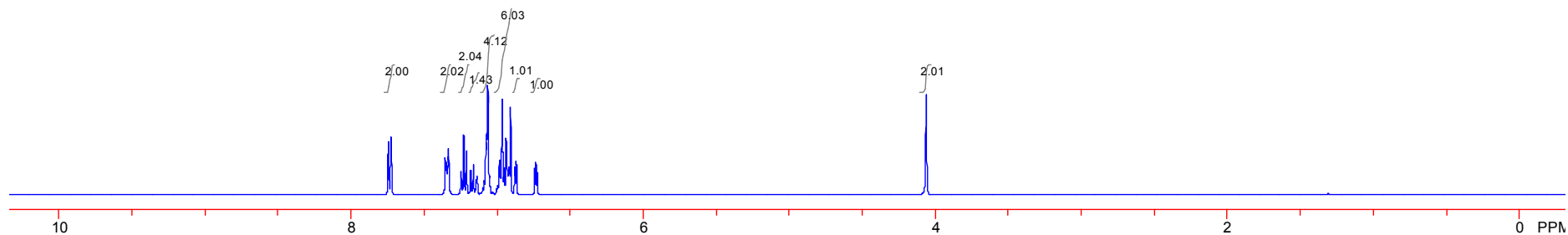
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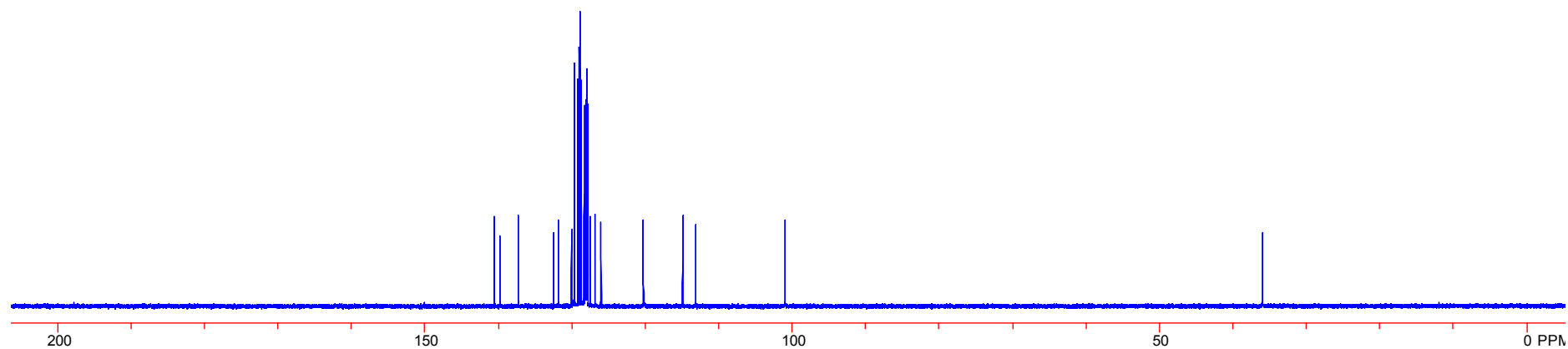
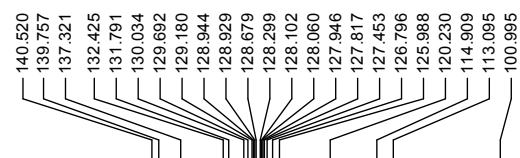
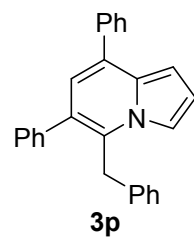
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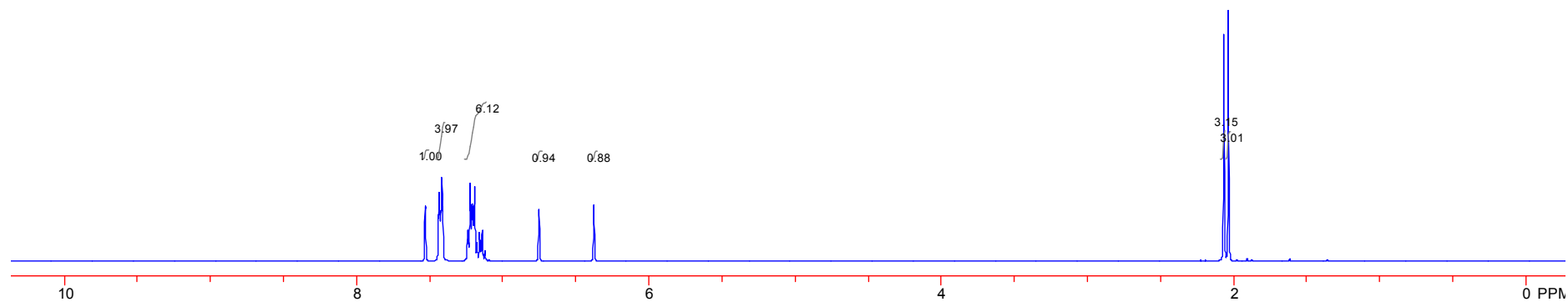
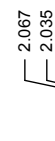
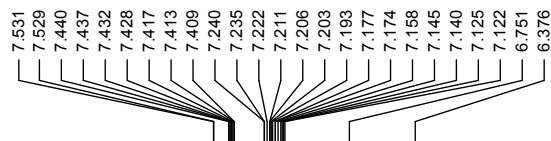
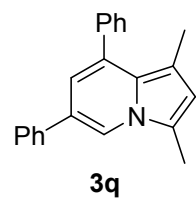
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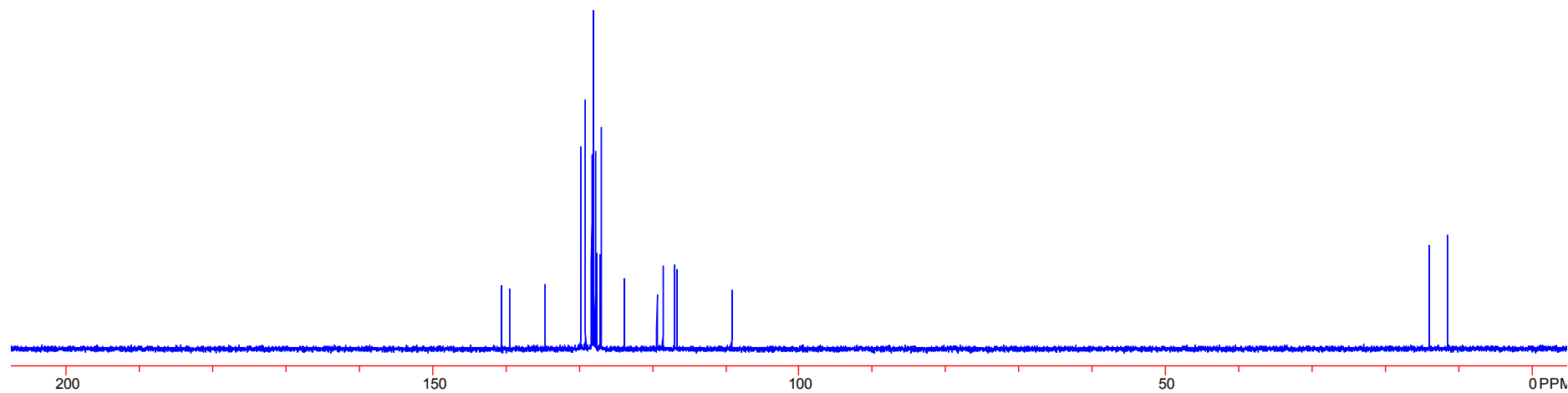
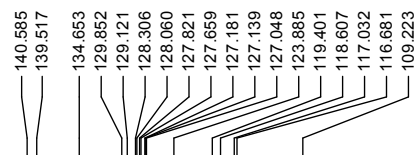
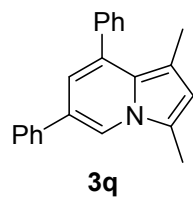
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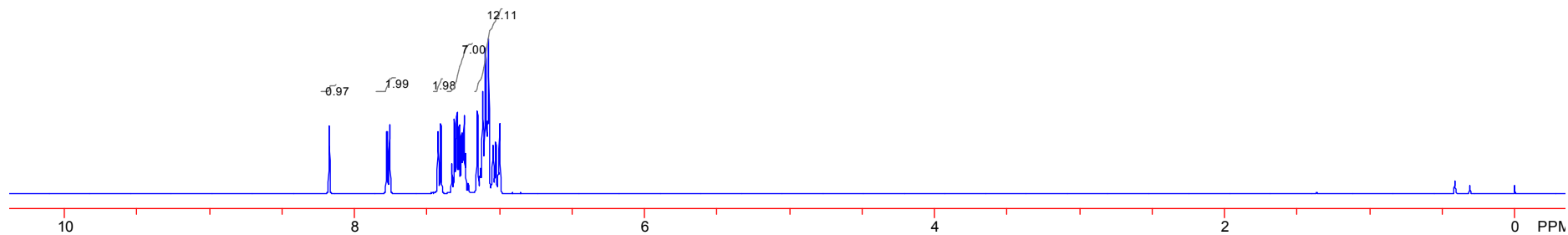
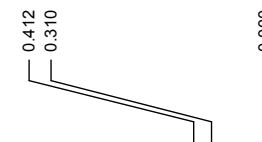
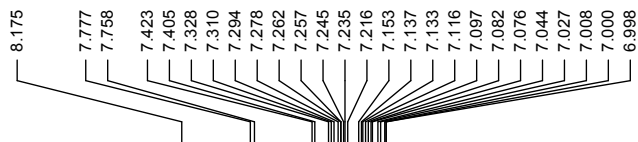
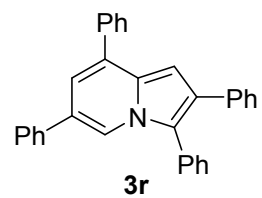
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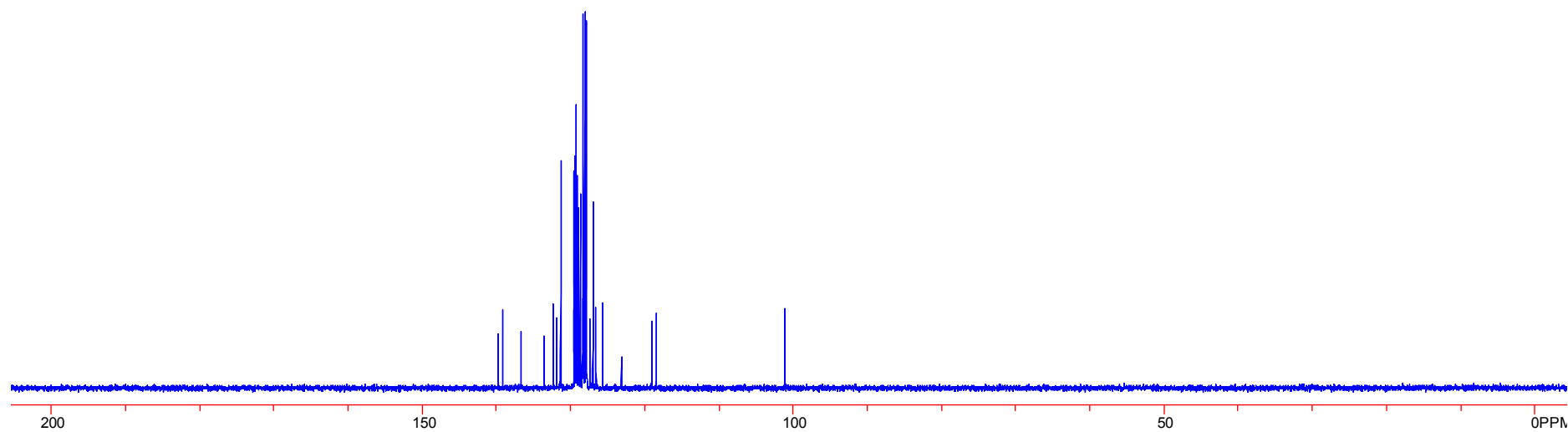
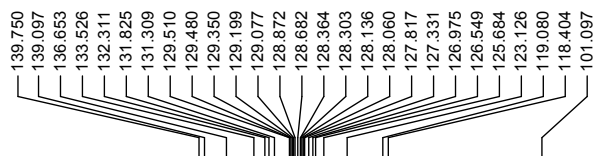
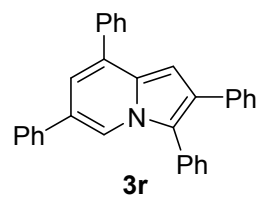
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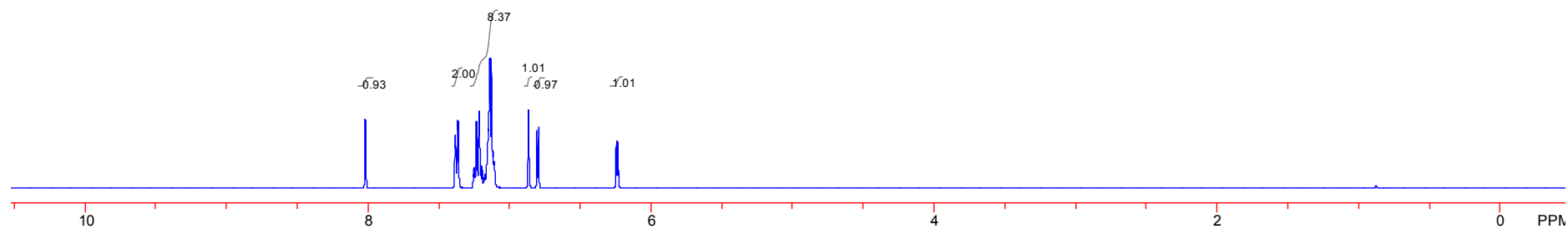
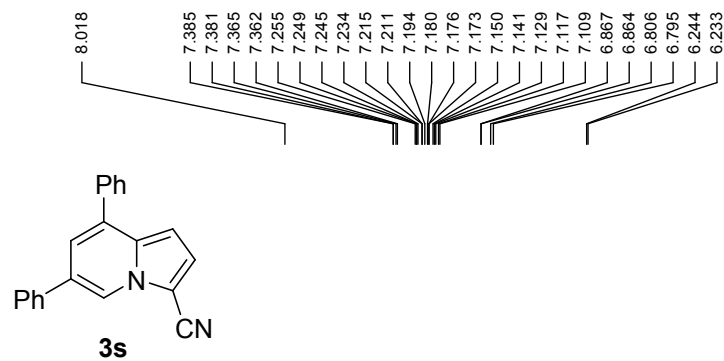
^1H NMR (400 MHz, C_6D_6)



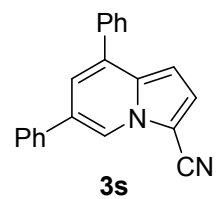
^{13}C NMR (100 MHz, C_6D_6)



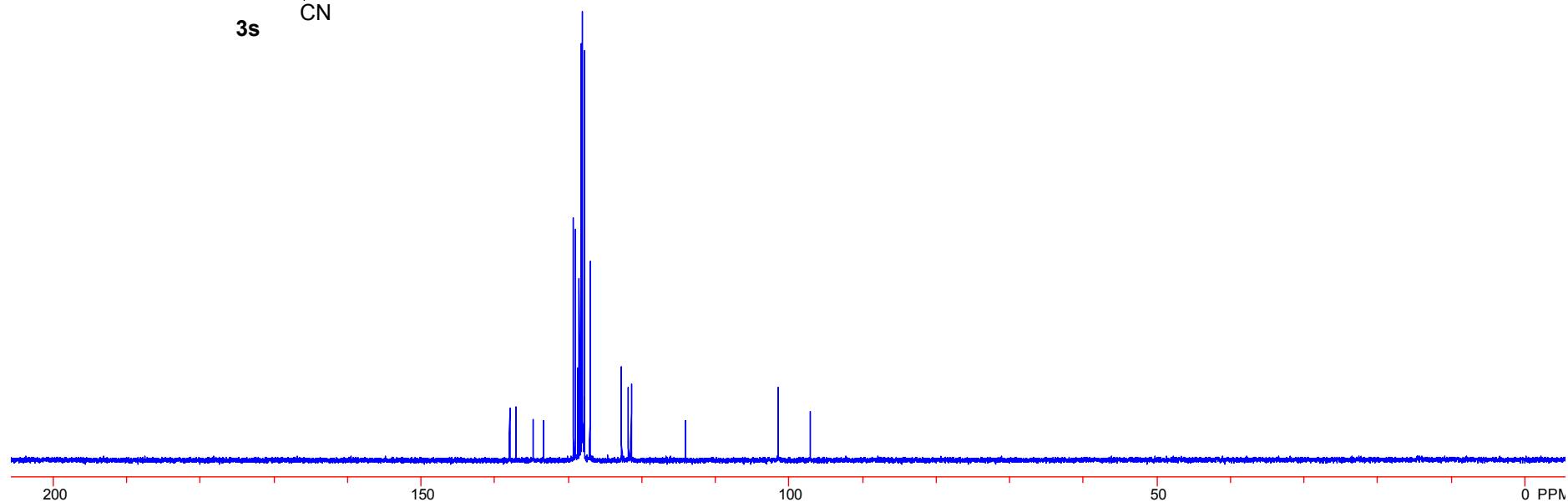
^1H NMR (400 MHz, C_6D_6)



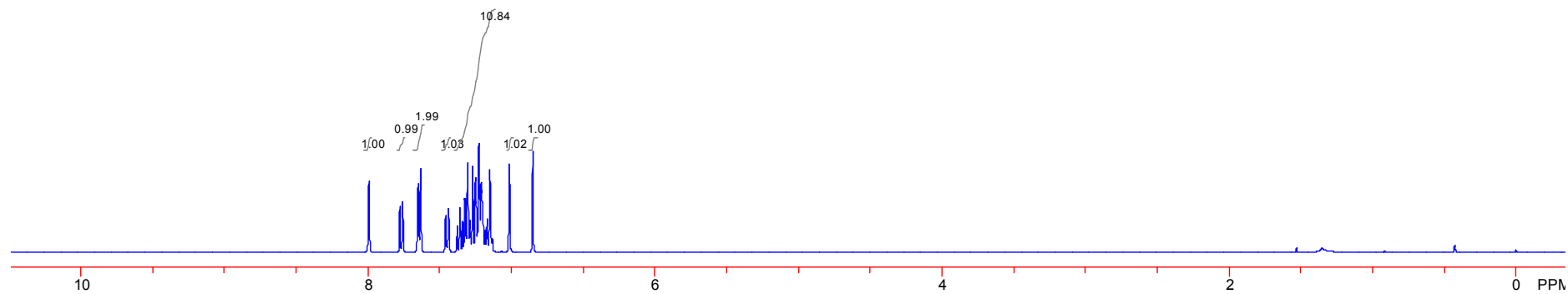
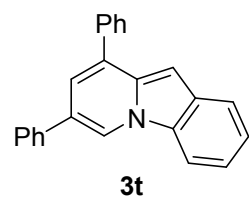
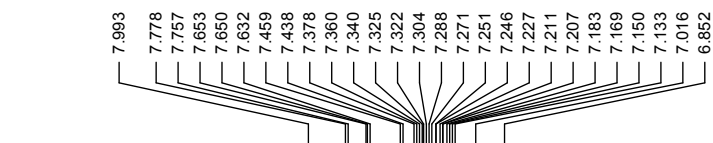
^{13}C NMR (100 MHz, C_6D_6)



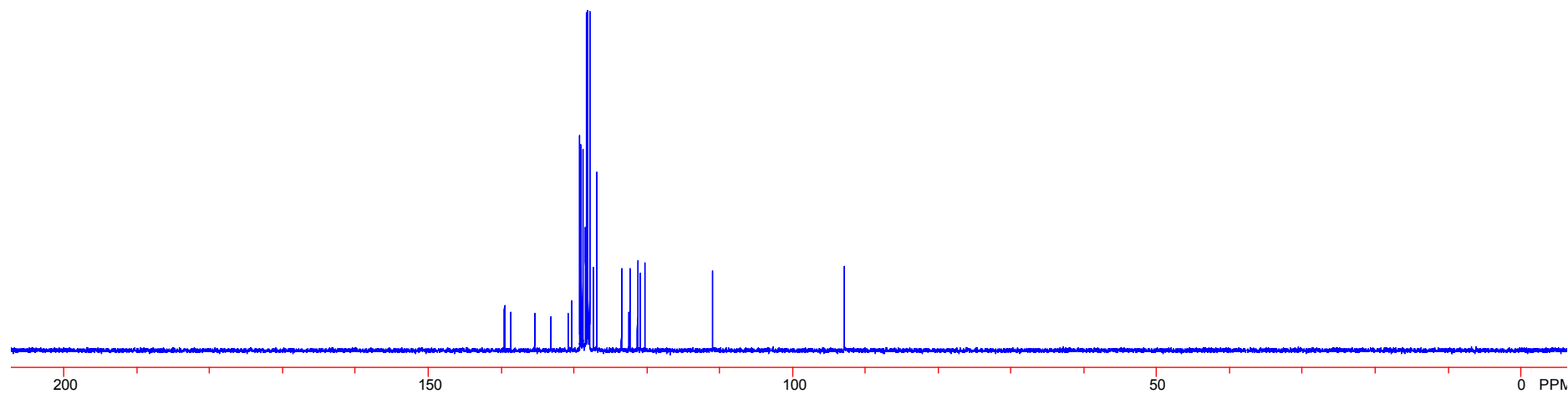
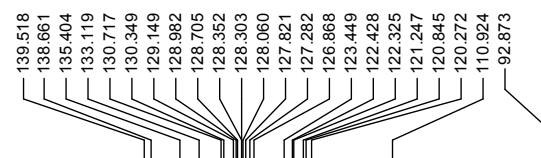
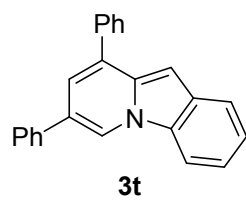
137.973
137.118
134.753
133.332
129.280
129.071
128.766
128.581
128.298
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127.815
127.755
127.071
122.743
121.813
121.471
114.050
101.490
97.169



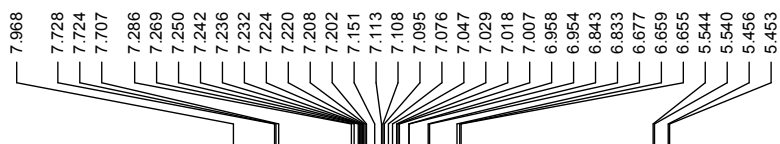
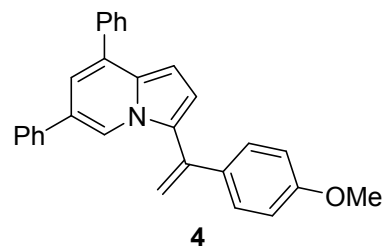
^1H NMR (400 MHz, C_6D_6)



^{13}C NMR (100 MHz, C_6D_6)

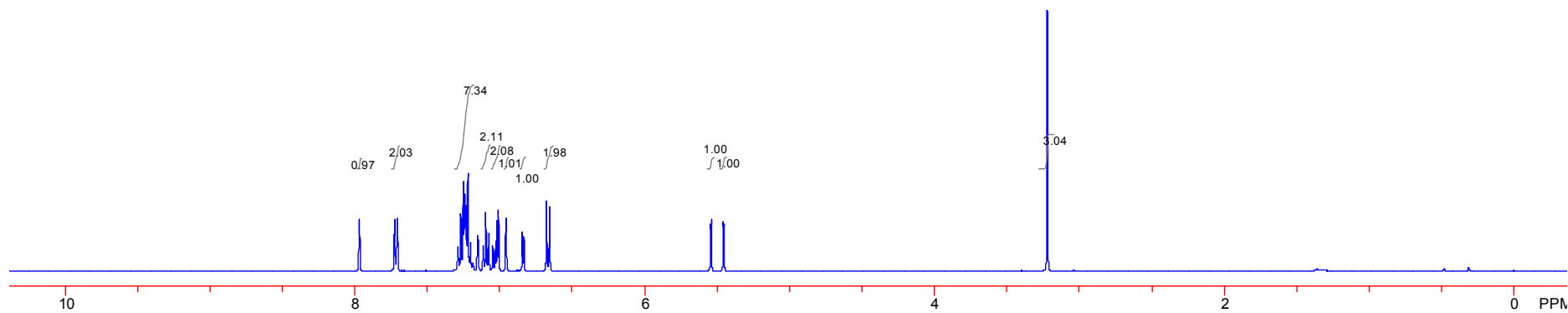


^1H NMR (400 MHz, C_6D_6)

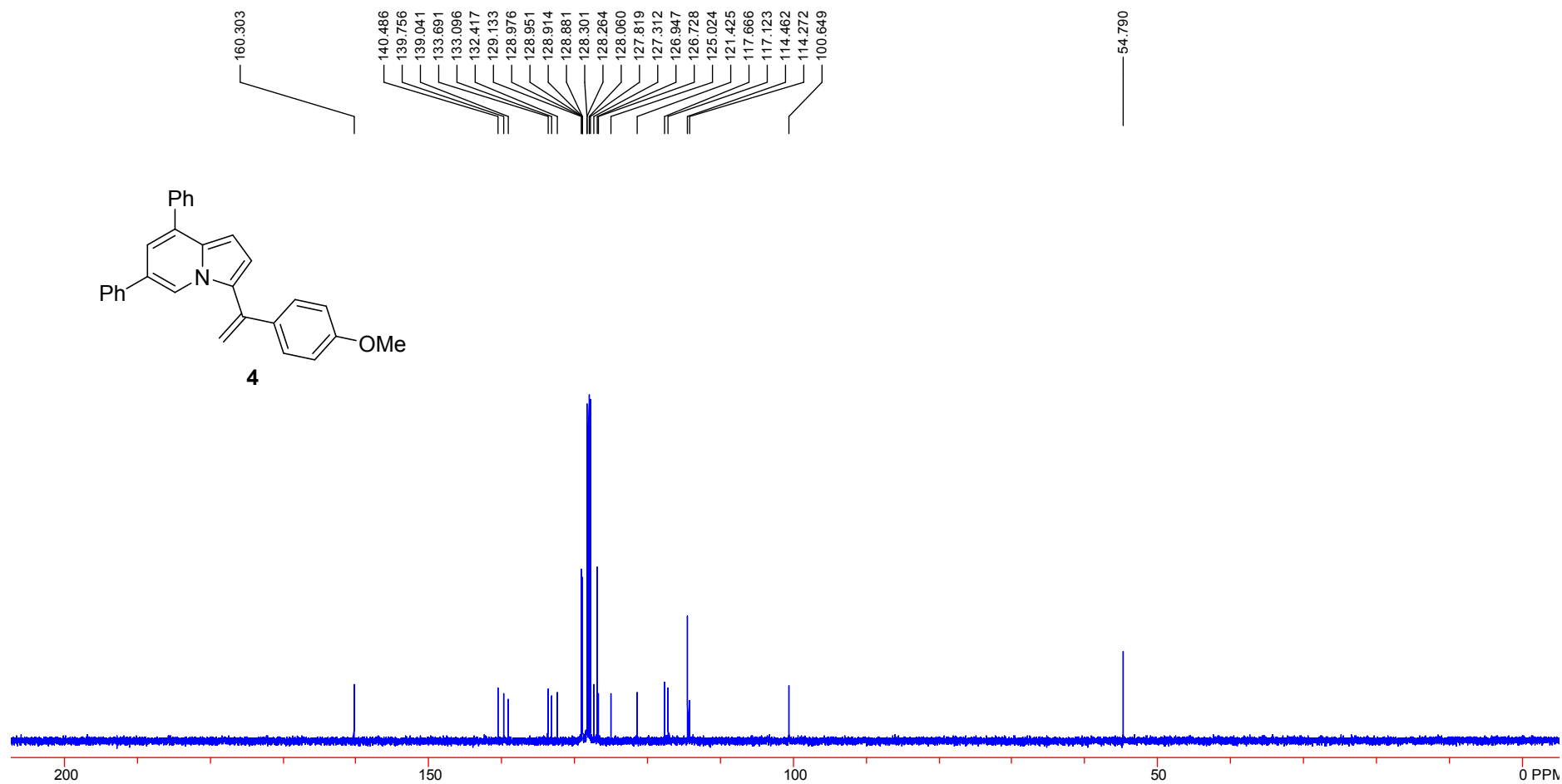
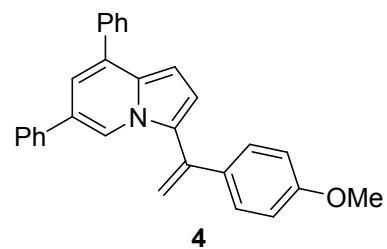


3.222

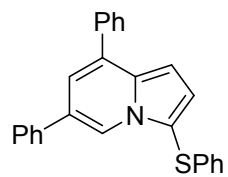
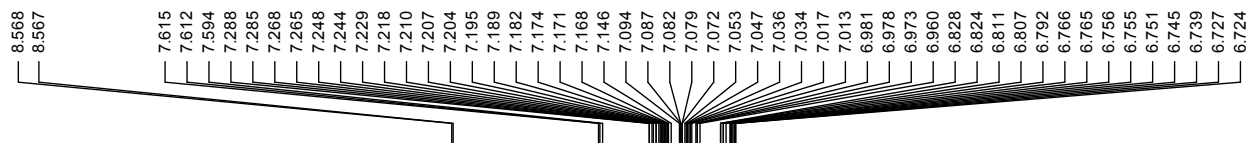
0.000



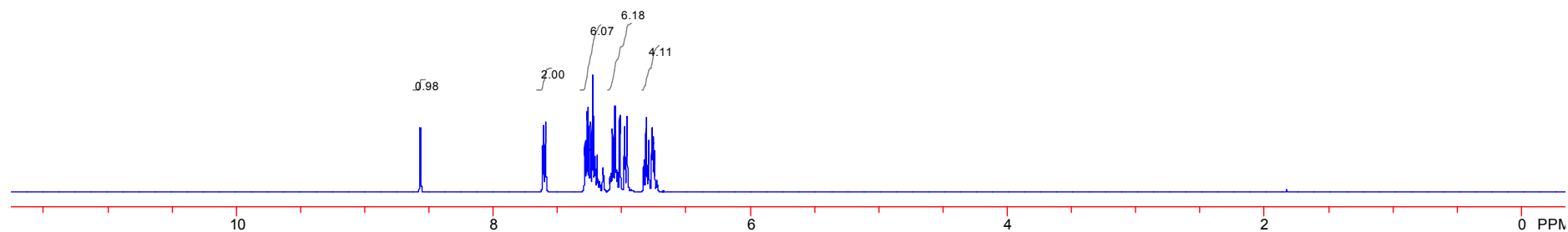
^{13}C NMR (100 MHz, C_6D_6)



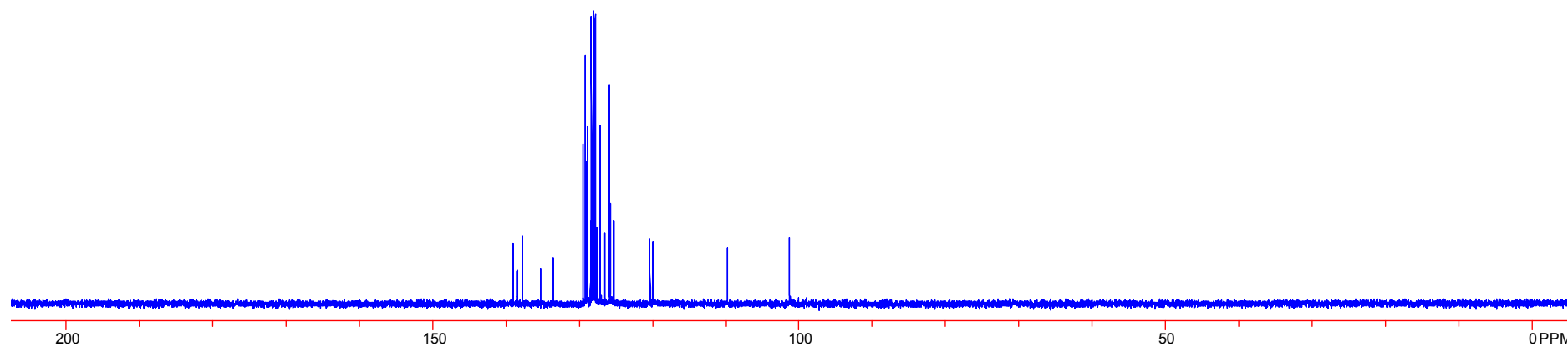
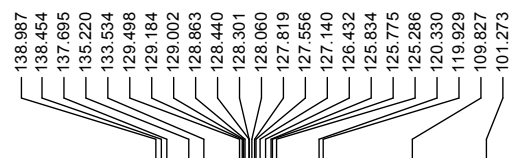
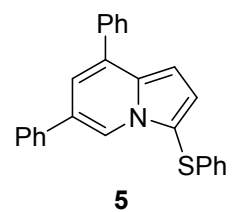
^1H NMR (400 MHz, C_6D_6)



5



^{13}C NMR (100 MHz, C_6D_6)



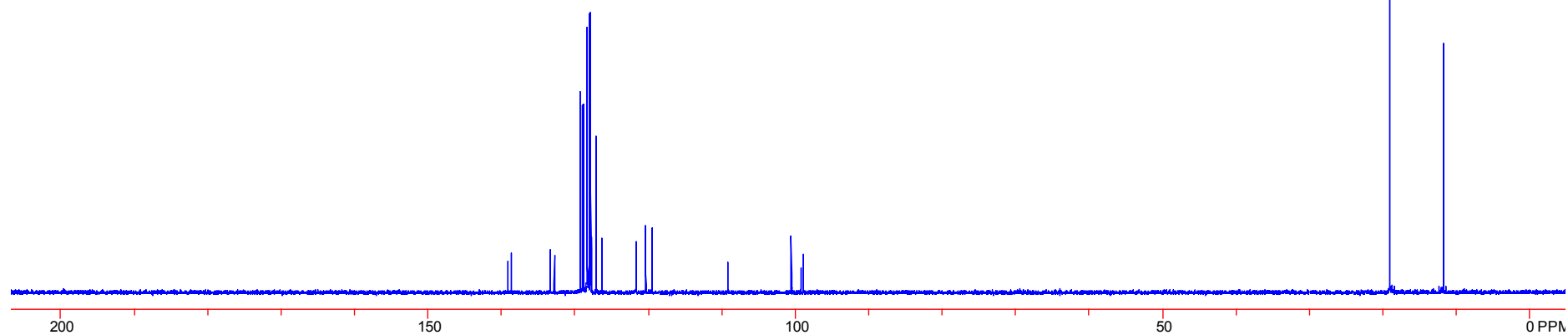
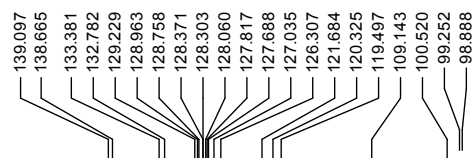
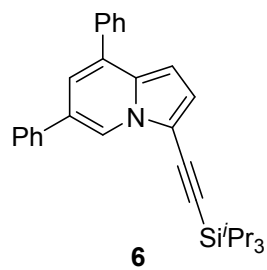
Chemical structure of compound 6: c1ccc(cc1)-c2cc3c(cc2n3)C#CC[Si](C)(C)C

¹H NMR spectrum (CDCl₃):

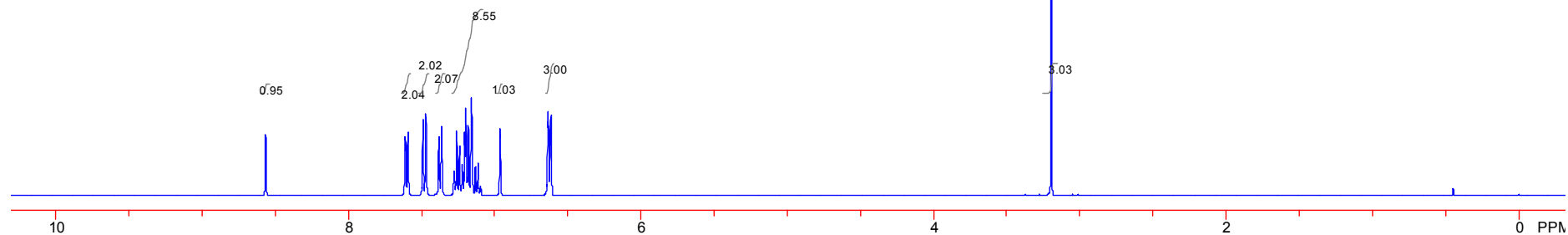
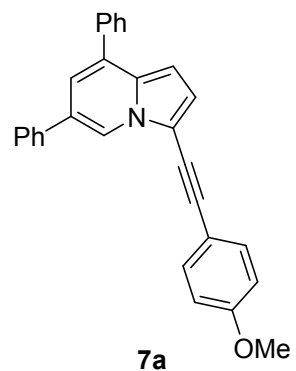
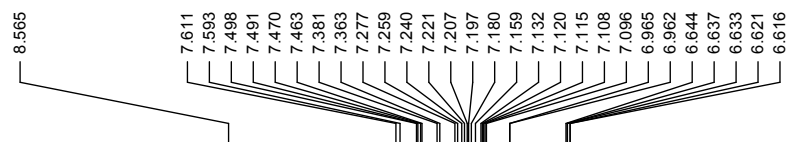
- Aromatic region (6.5–8.6 ppm):** Multiple peaks with integration values: 0.96, 2.03, 2.05, 1.85, 1.00, 1.01, 1.00.
- Aliphatic region (1.1–1.3 ppm):** A large peak at ~1.17 ppm with integration 21.17.

Peak list (ppm): 8.580, 7.570, 7.553, 7.467, 7.447, 7.266, 7.249, 7.234, 7.231, 7.215, 7.203, 7.197, 7.178, 7.152, 7.132, 7.114, 7.075, 7.064, 6.942, 6.939, 6.487, 6.476, 1.245, 1.231, 1.205, 1.191, 1.176, 1.170, 1.160, 1.155, 1.147, 1.135.

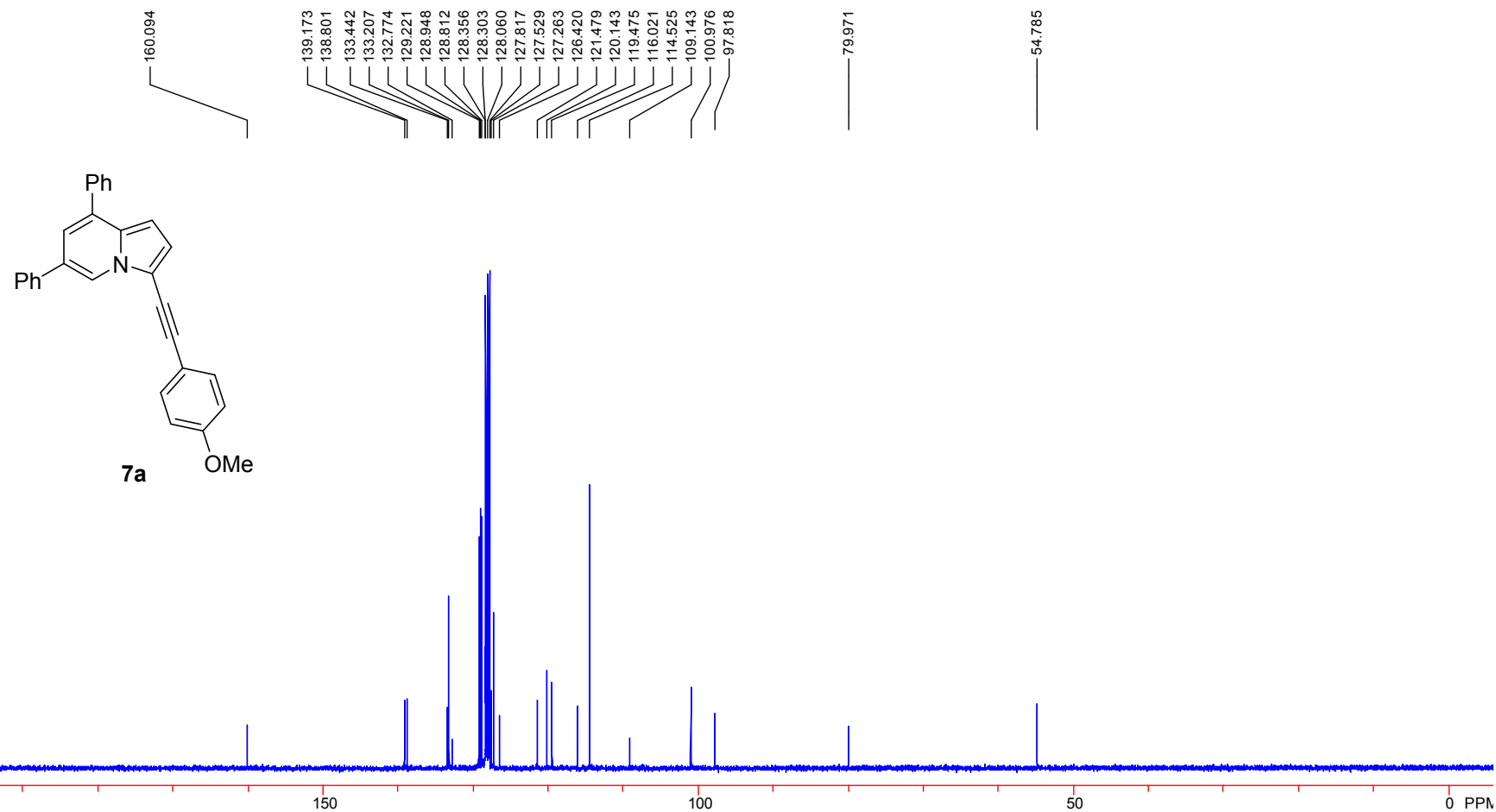
^{13}C NMR (100 MHz, C_6D_6)



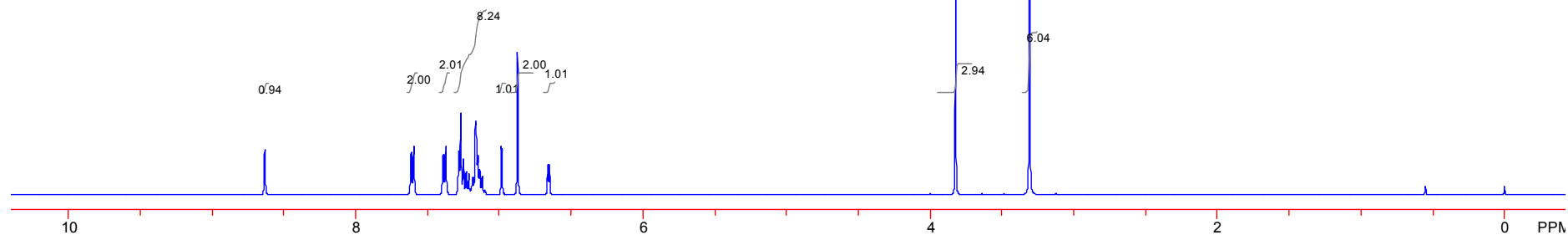
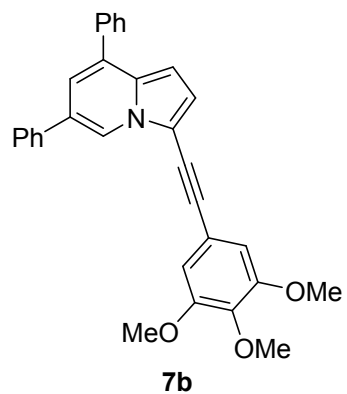
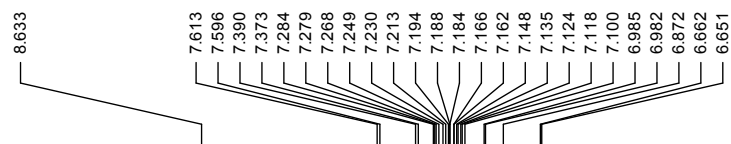
^1H NMR (400 MHz, C_6D_6)



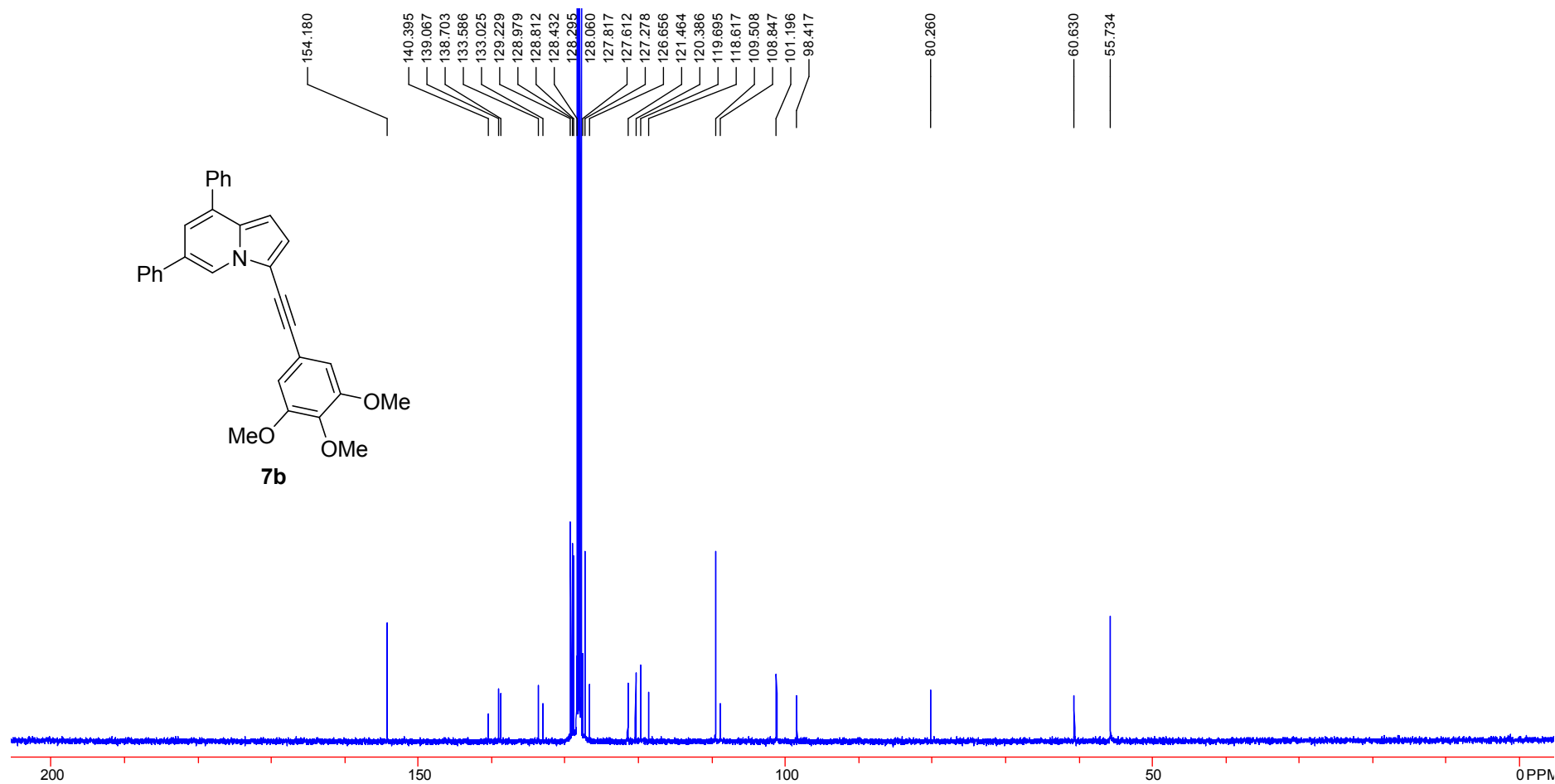
^{13}C NMR (100 MHz, C_6D_6)



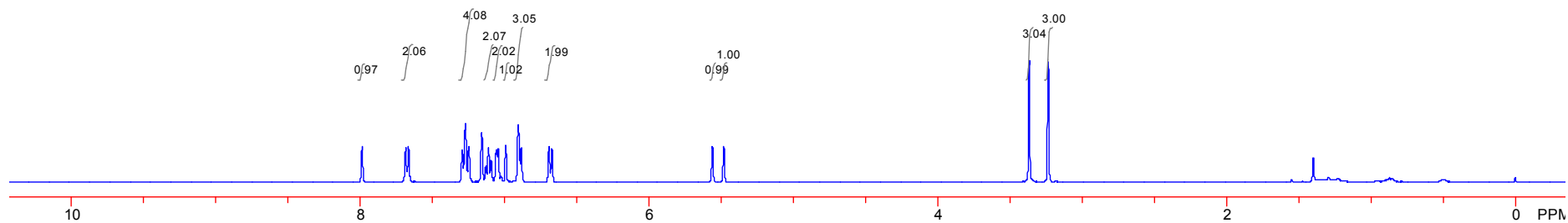
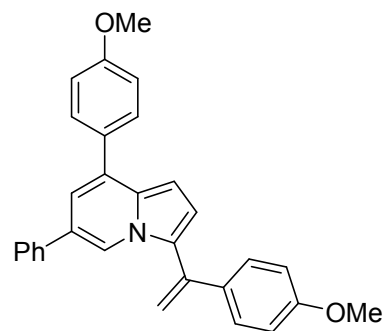
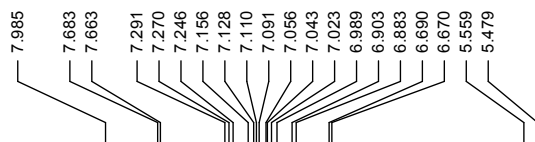
^1H NMR (400 MHz, C_6D_6)



^{13}C NMR (100 MHz, C_6D_6)



^1H NMR (400 MHz, C_6D_6)



^{13}C NMR (100 MHz, C_6D_6)

