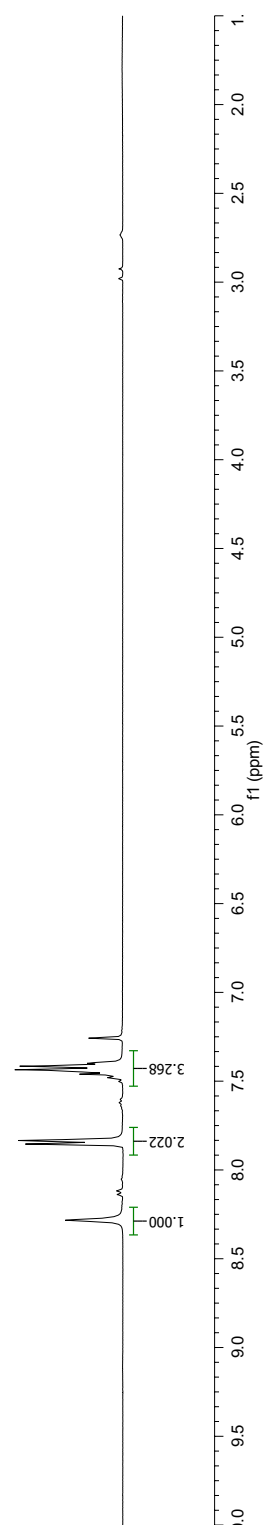
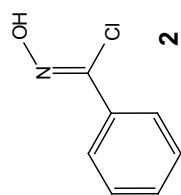
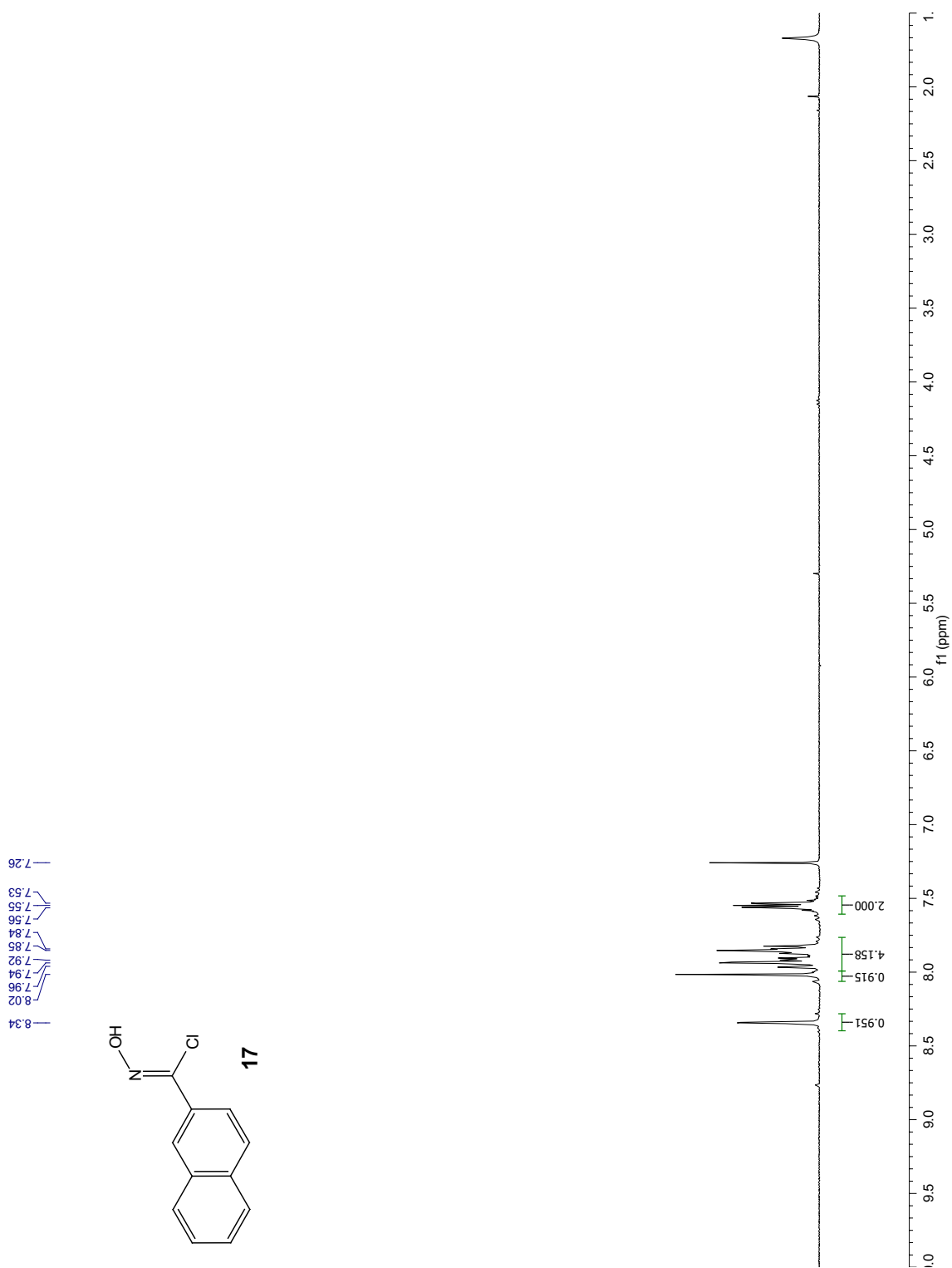


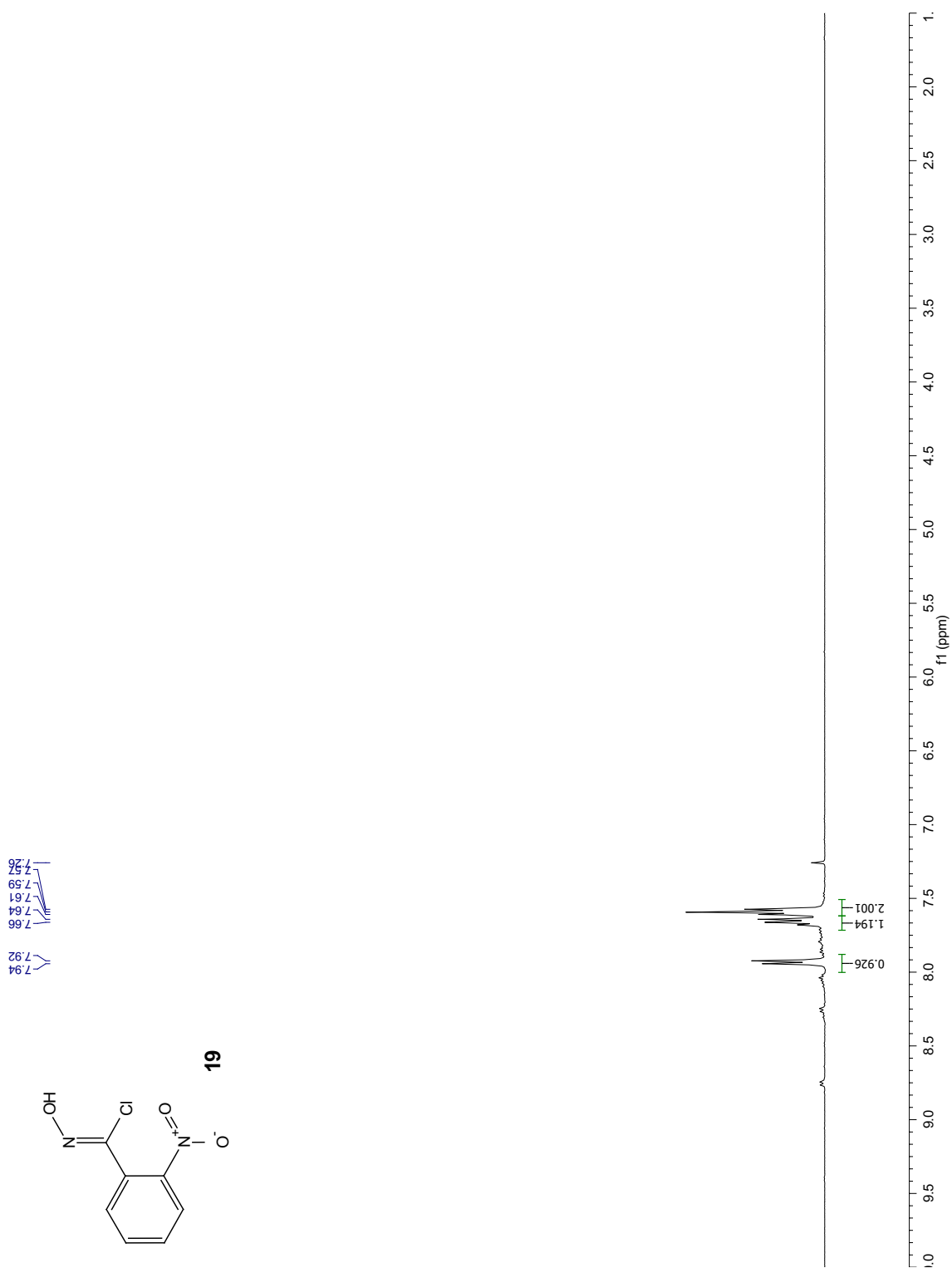
APPENDIX A. CHAPTER 3 ^1H AND ^{13}C NMR SPECTRA

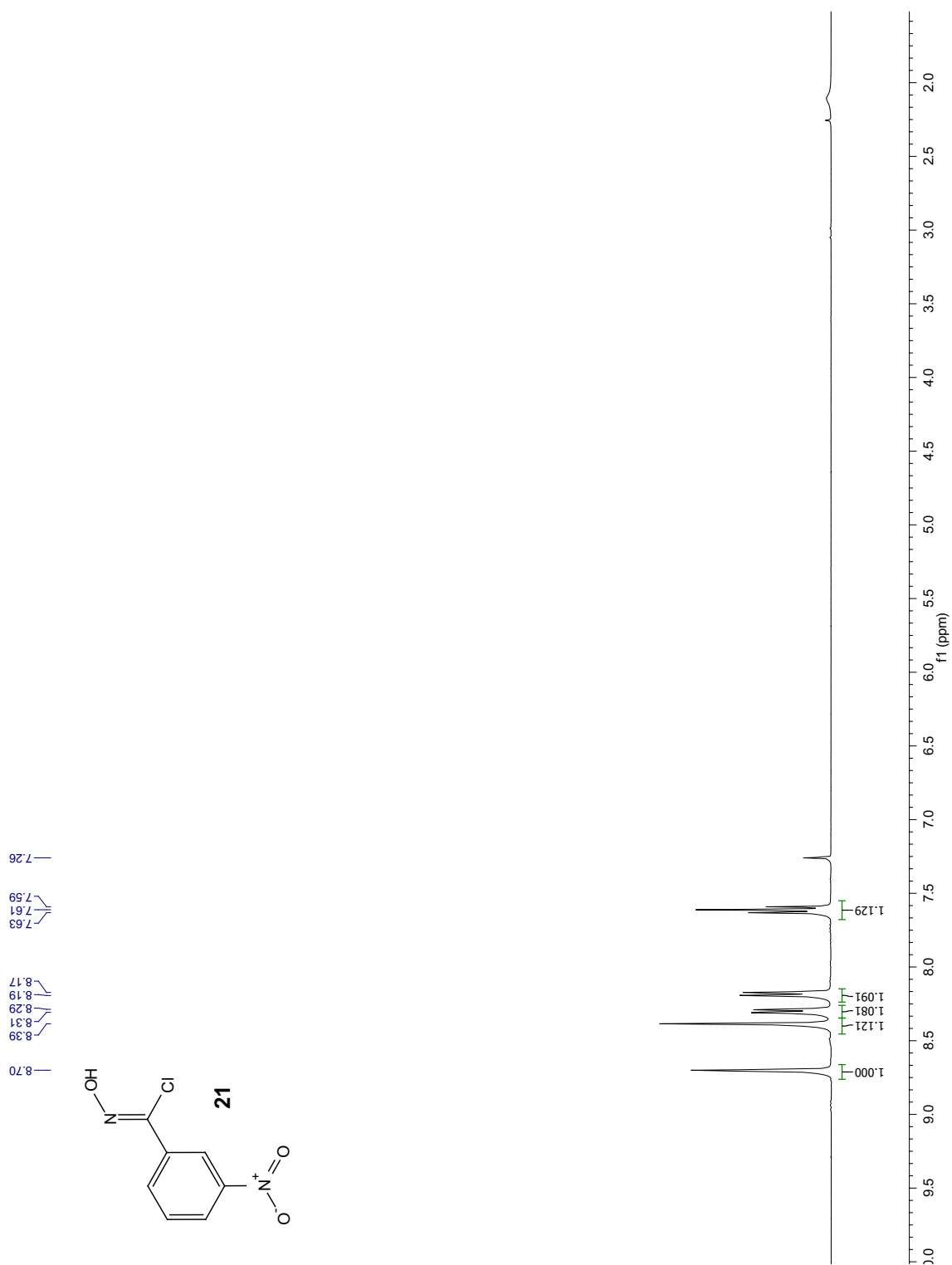


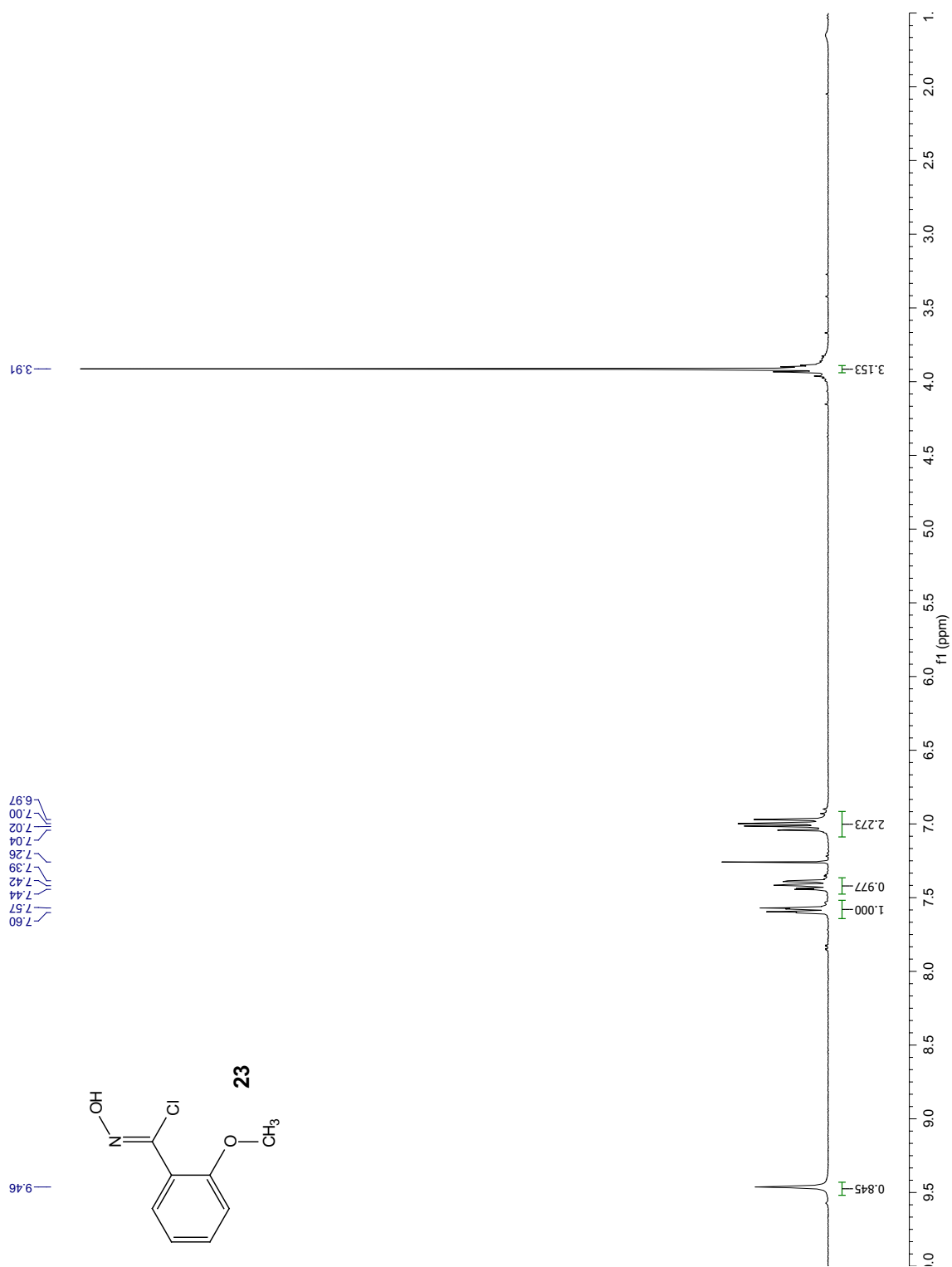
8.28
7.85
7.46
7.44
7.42
7.26

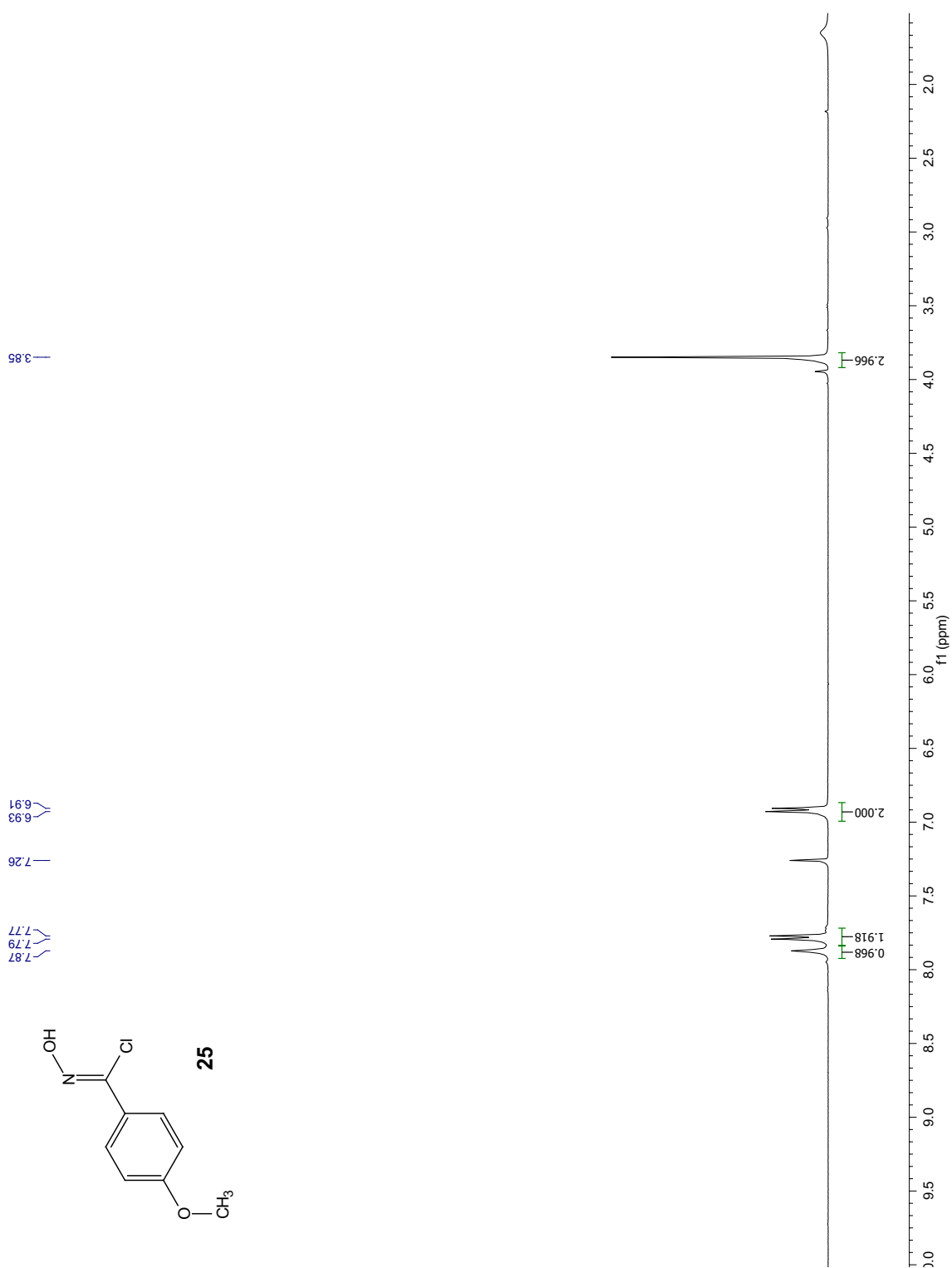






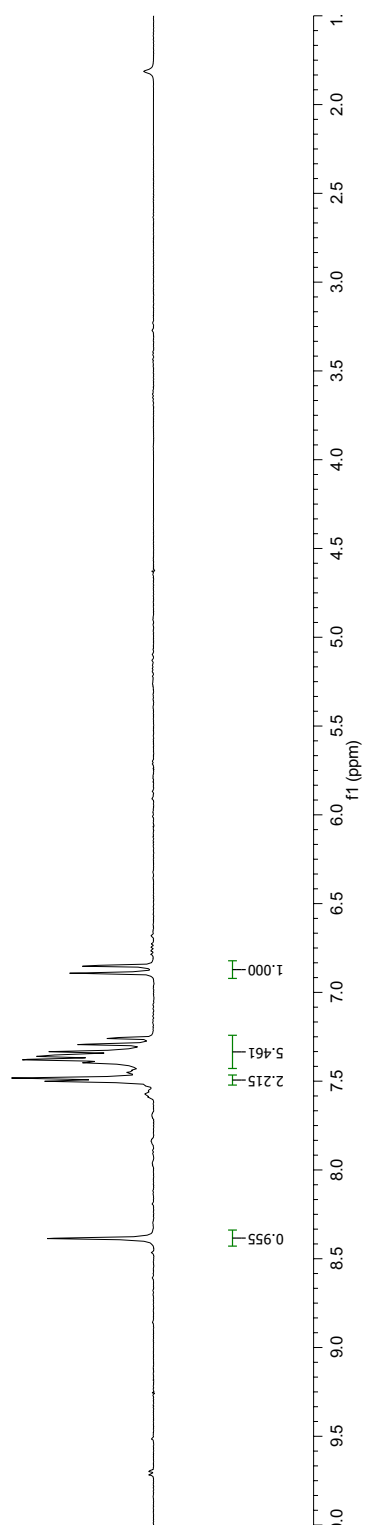
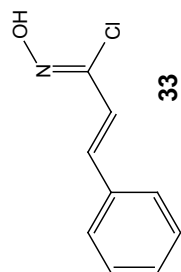


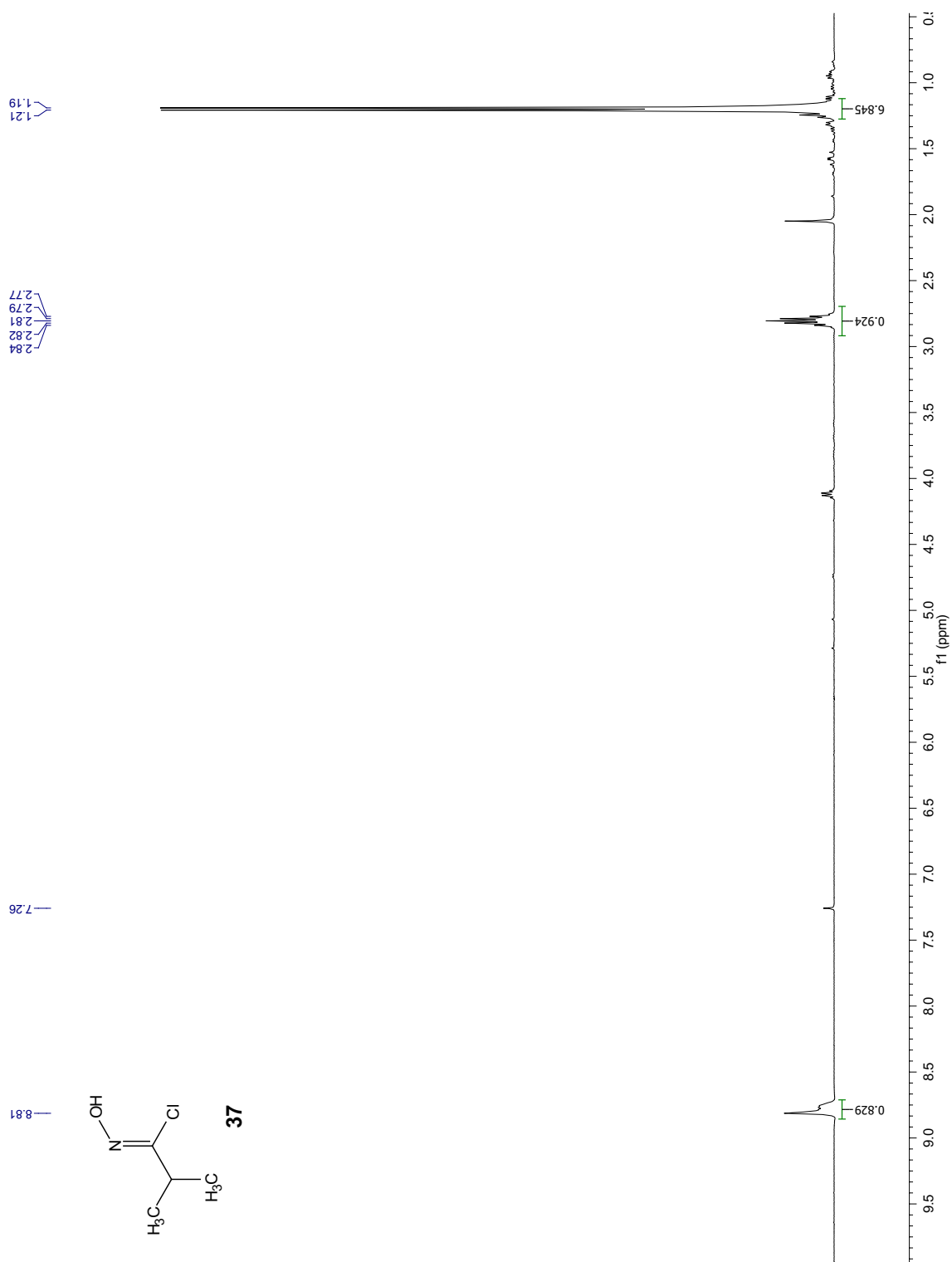


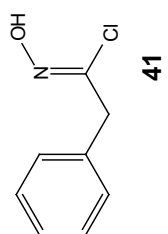
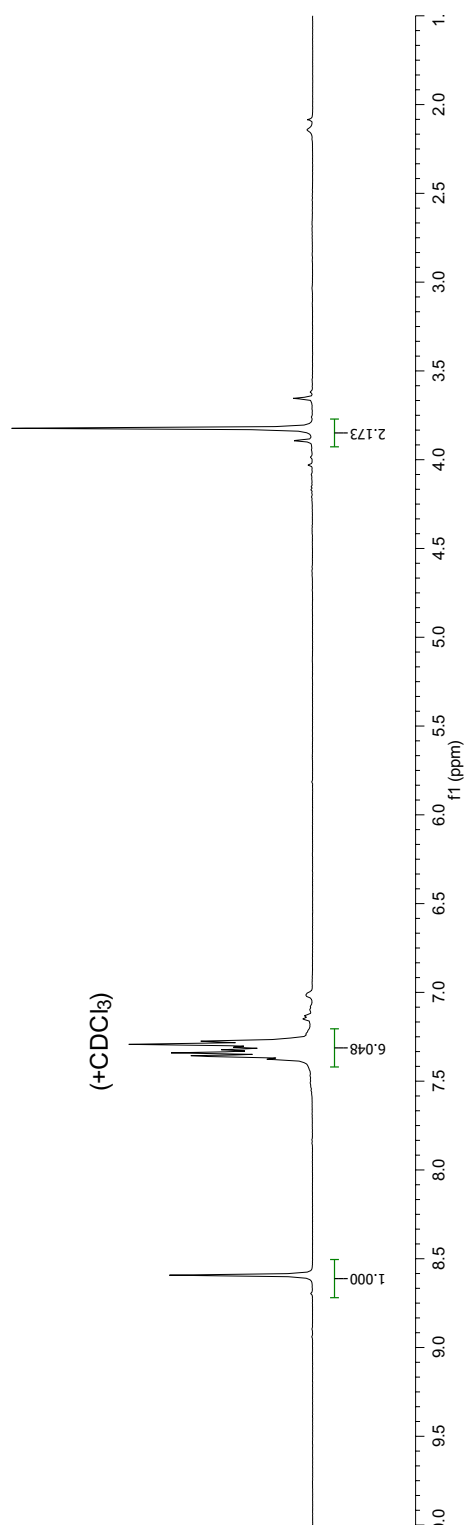


7.50
7.48
7.39
7.38
7.36
7.33
7.29
7.26
6.89
6.85

8.39



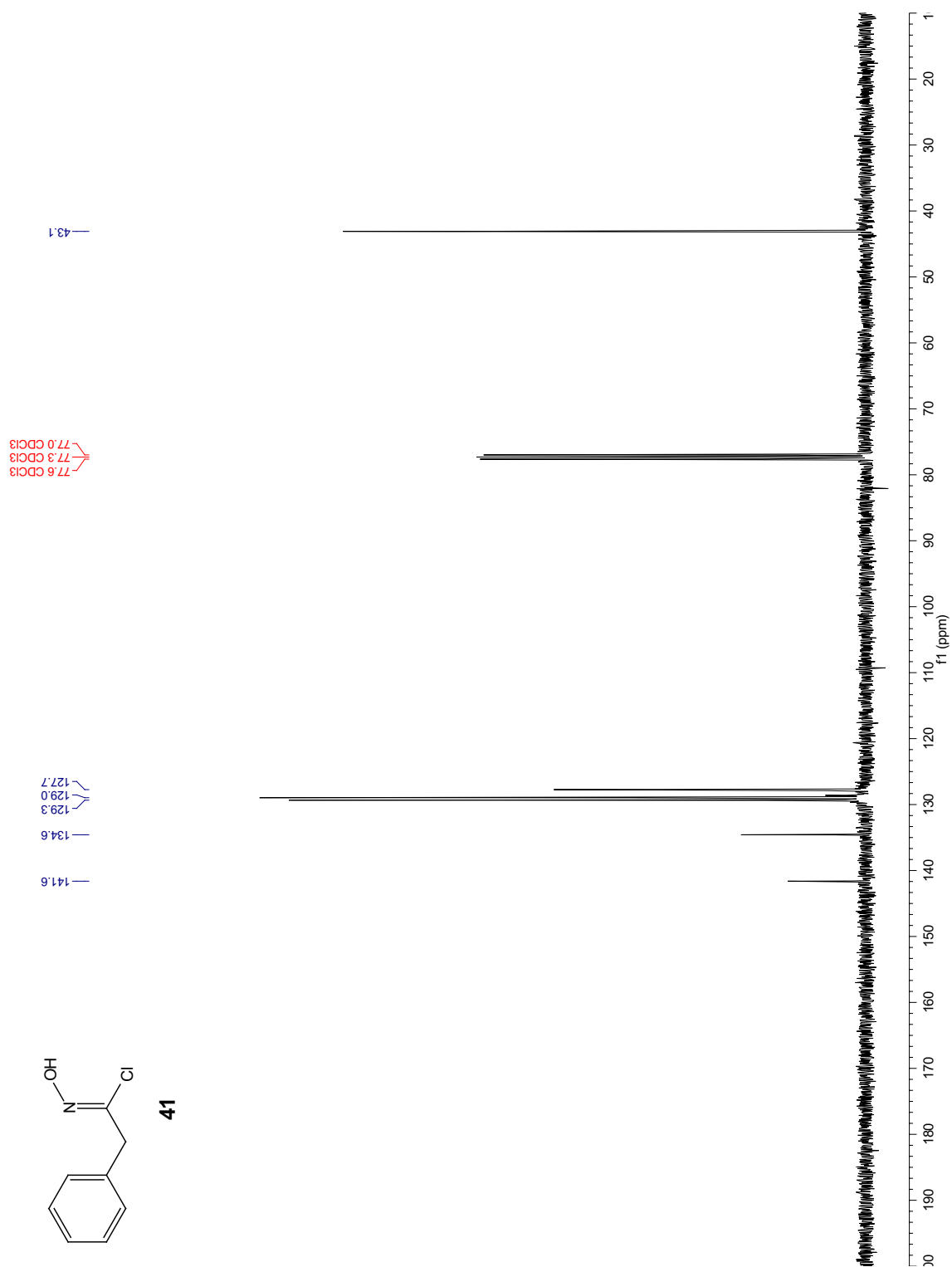


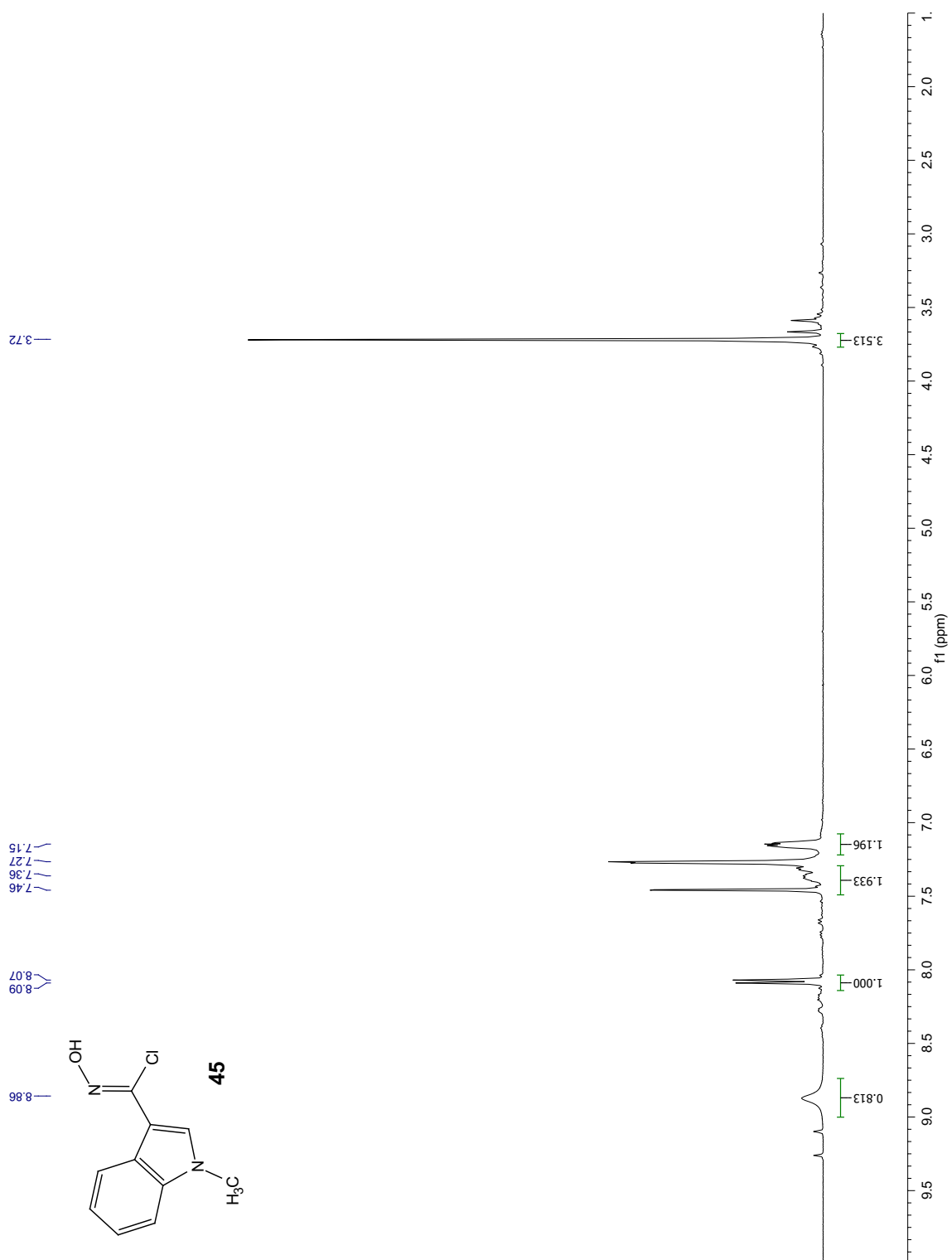


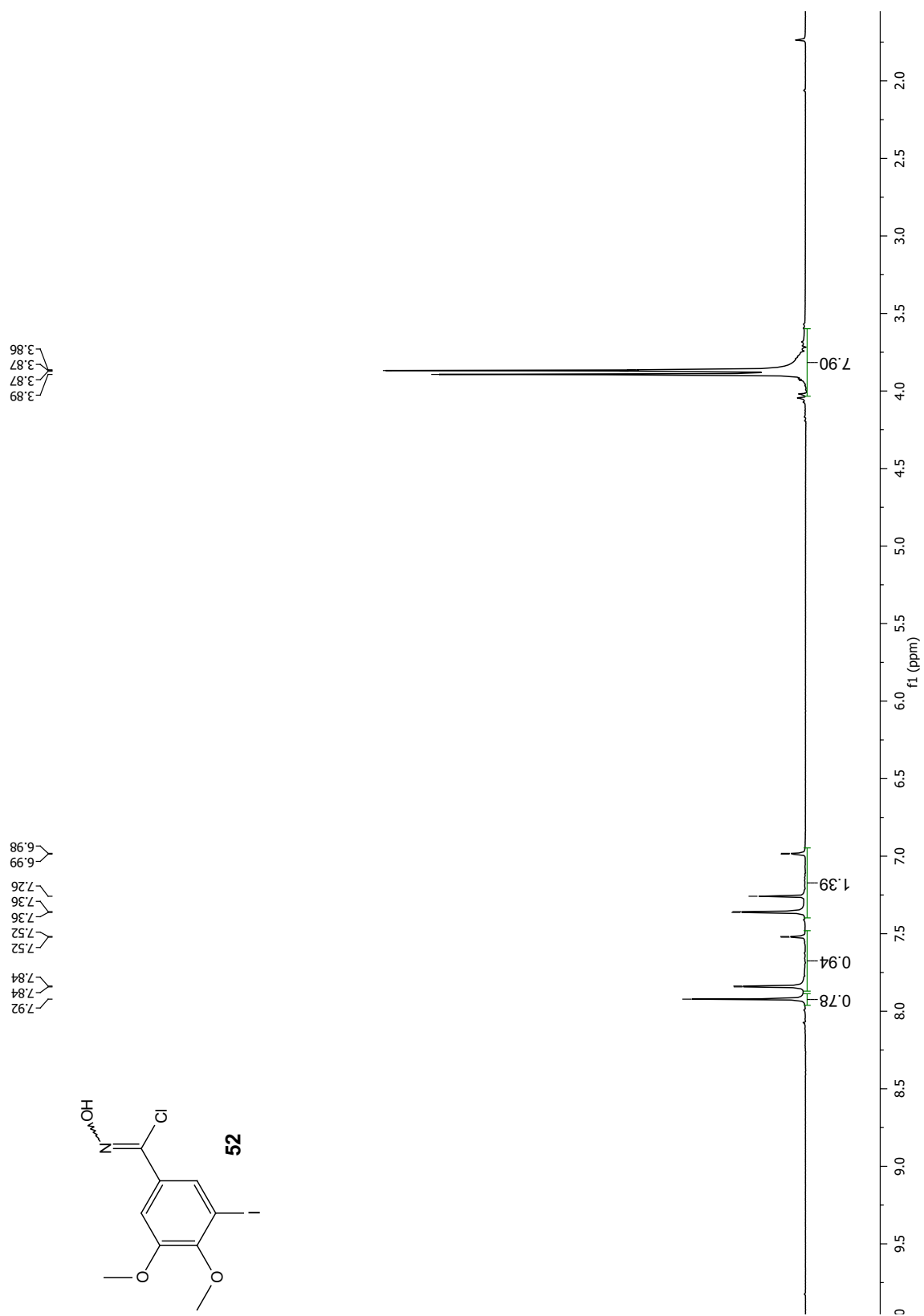
7.36
7.34
7.34
7.33
7.32
7.31
7.31
7.30
7.29
7.29
7.28
7.27

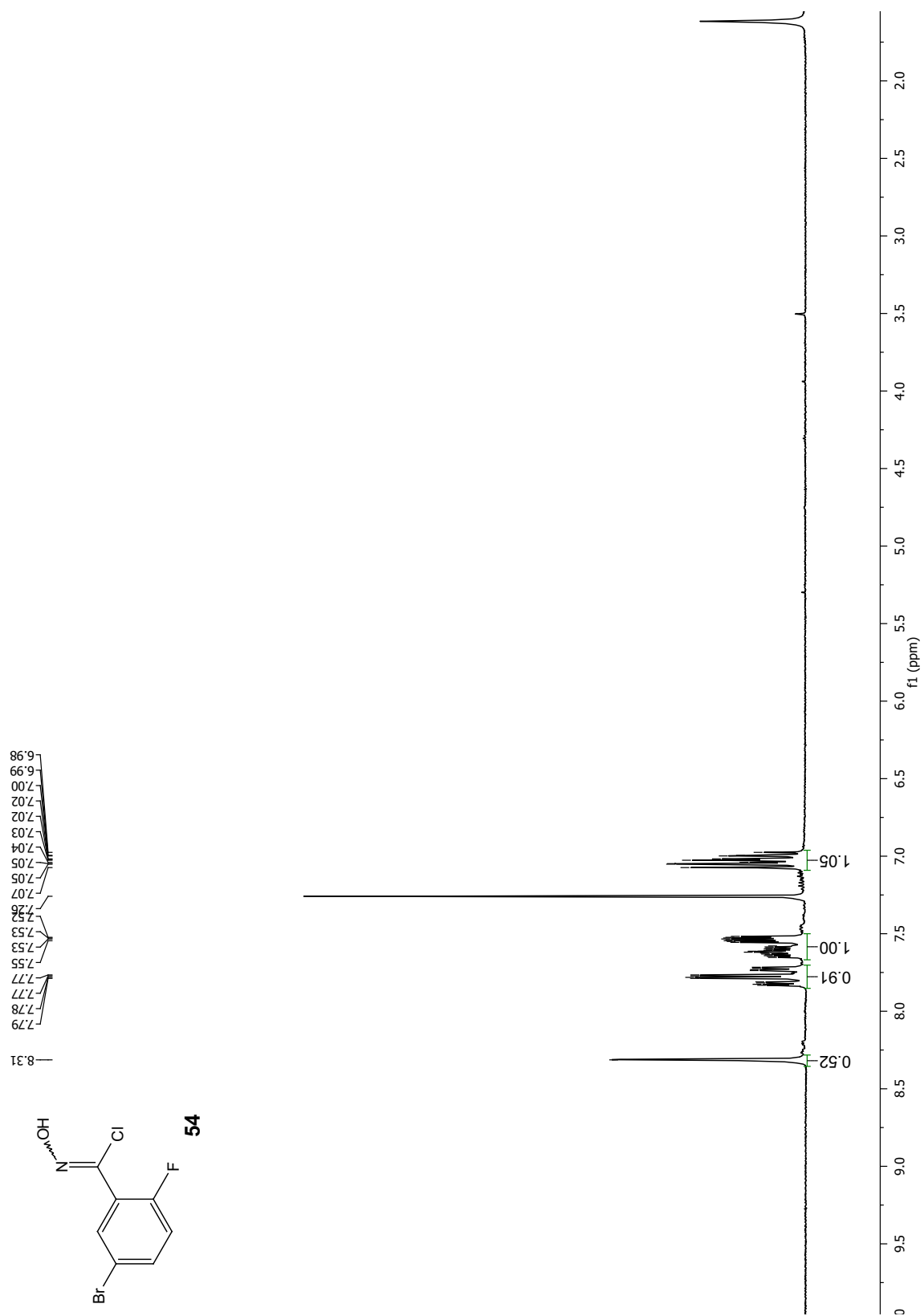
3.82

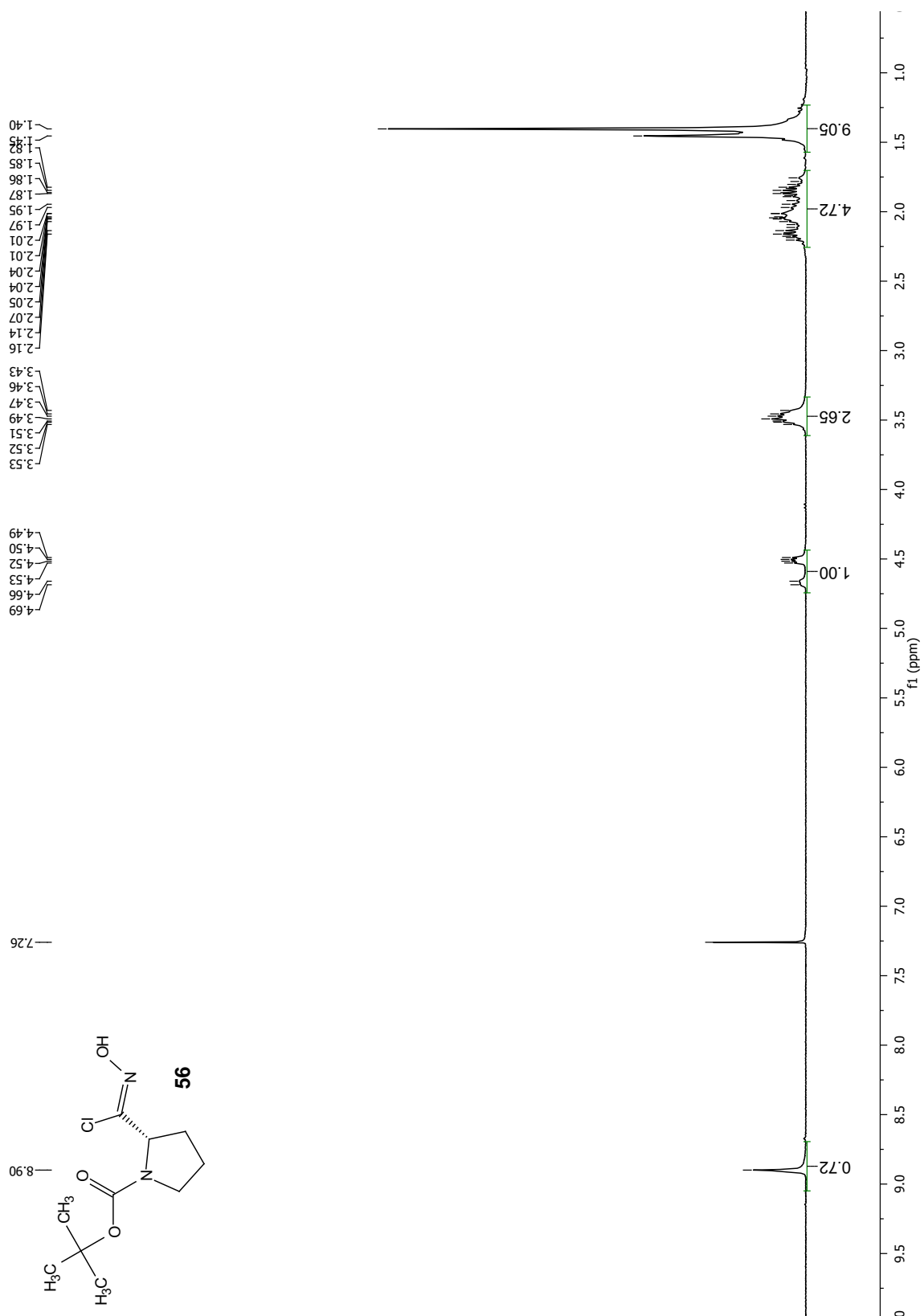
8.59

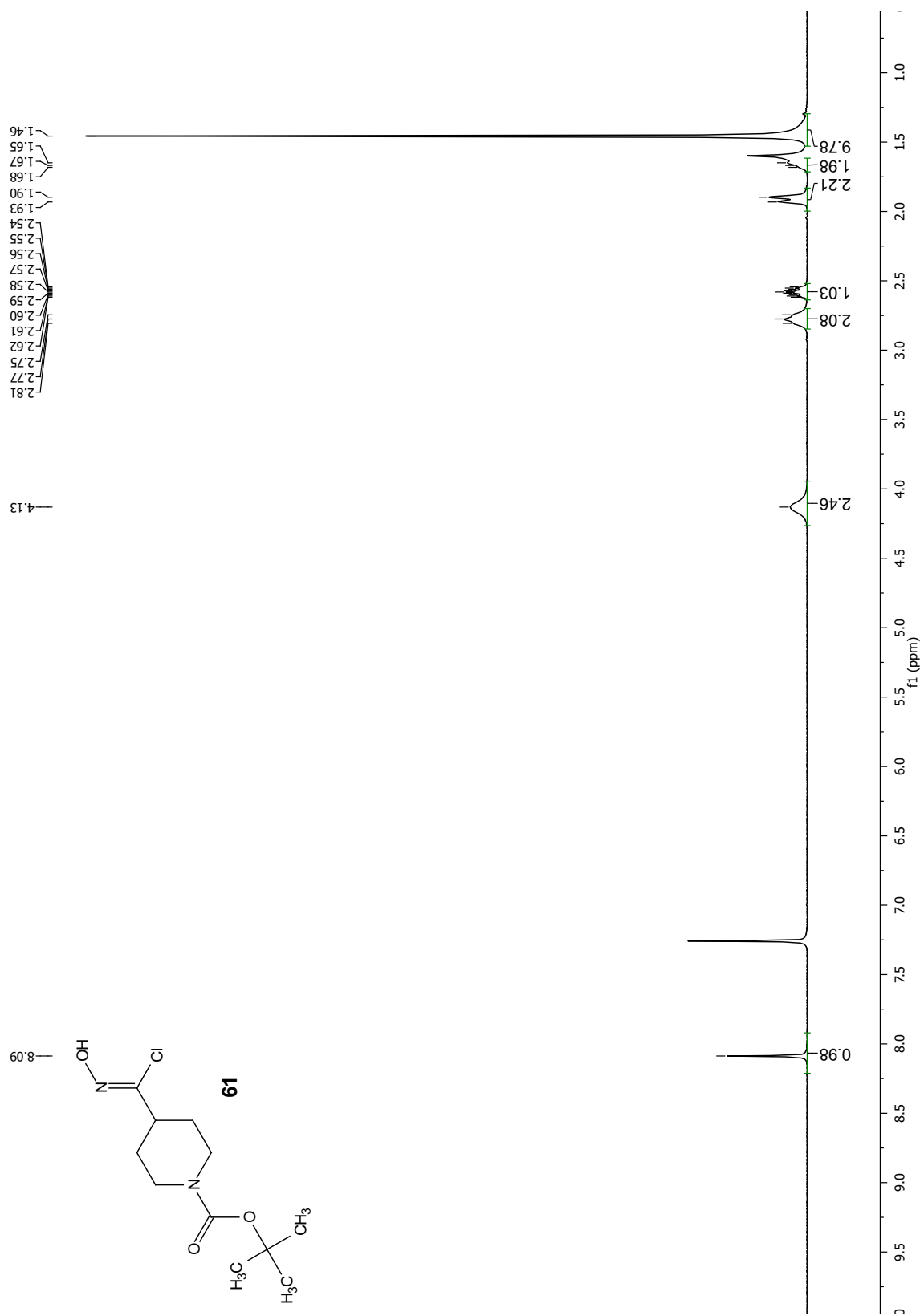


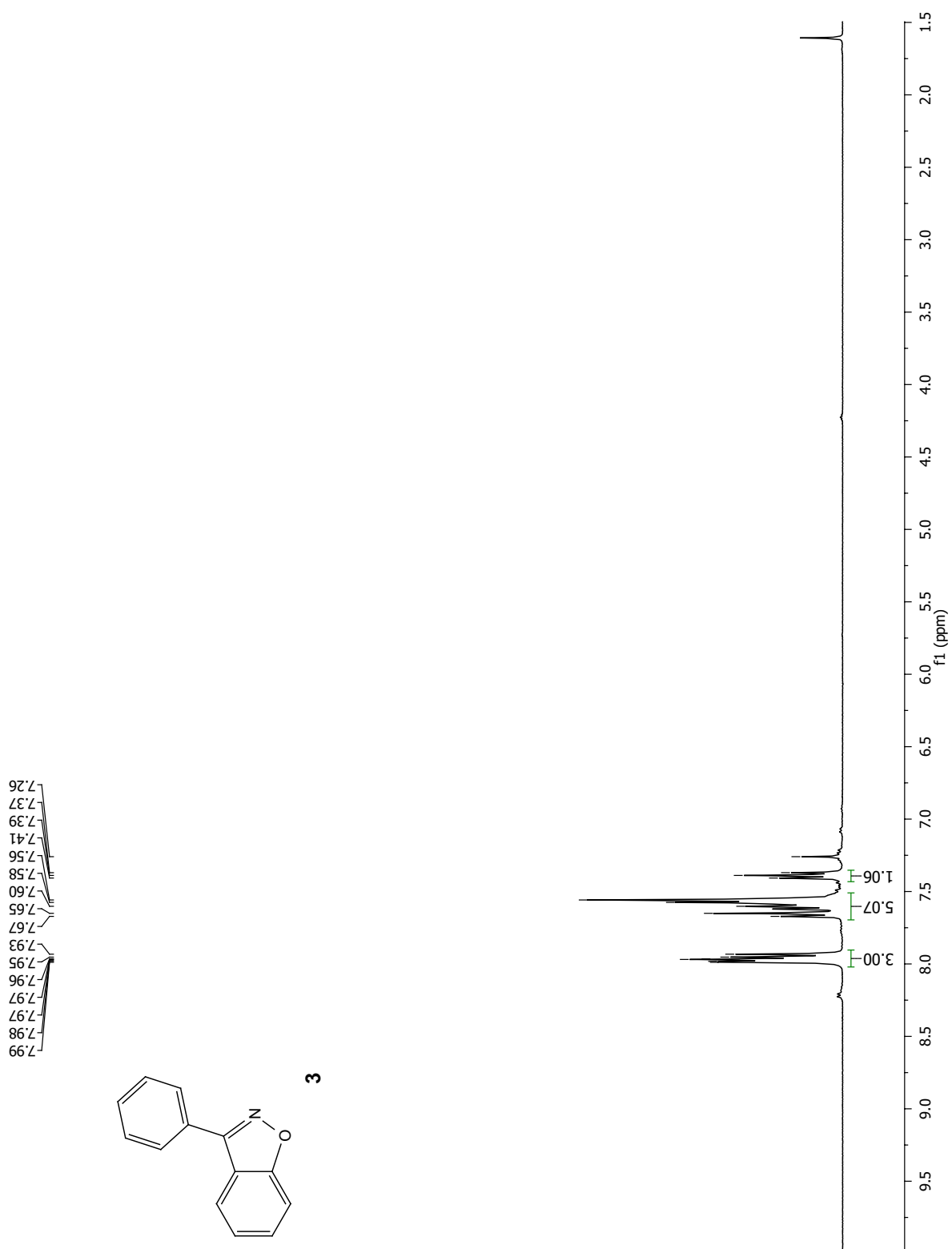


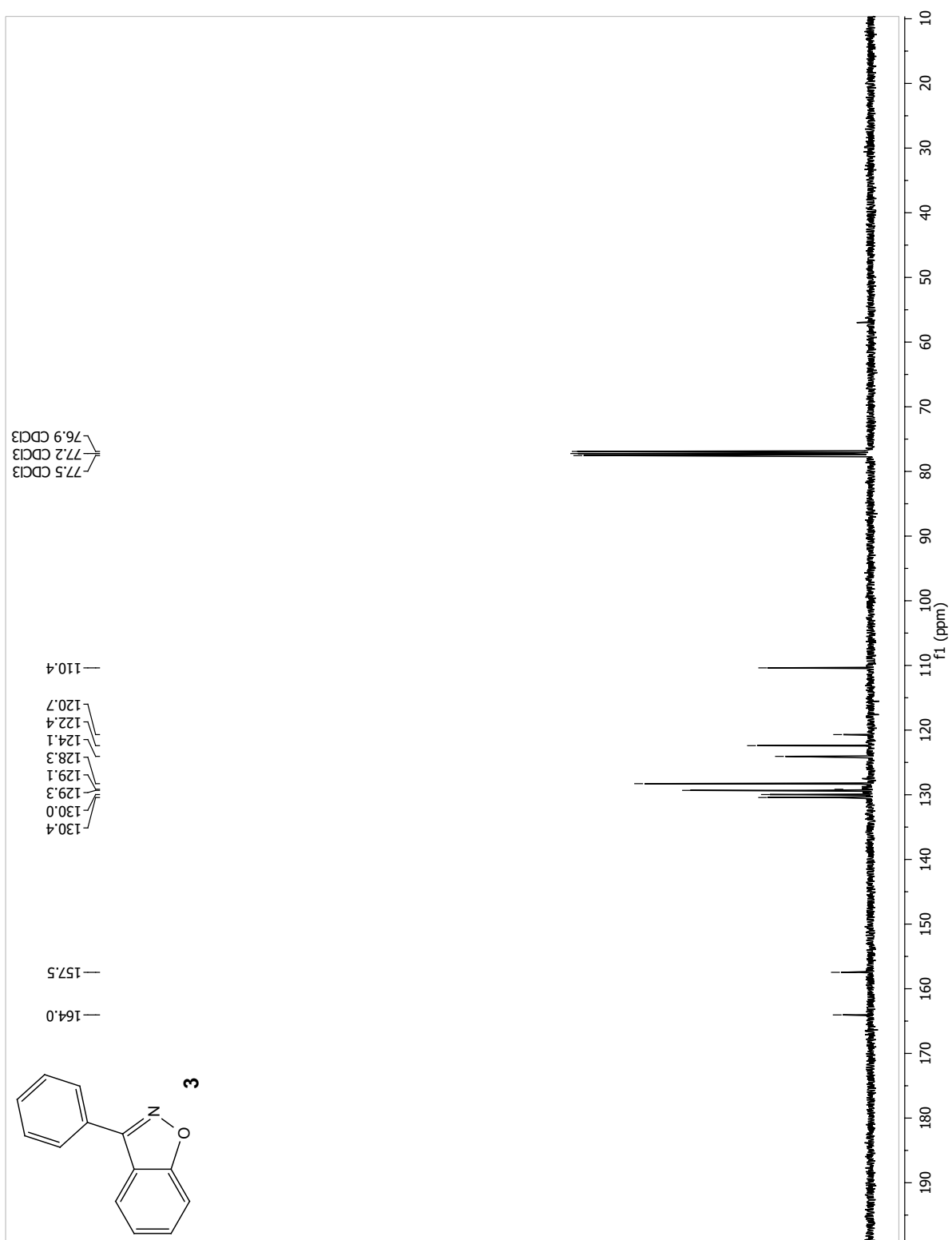


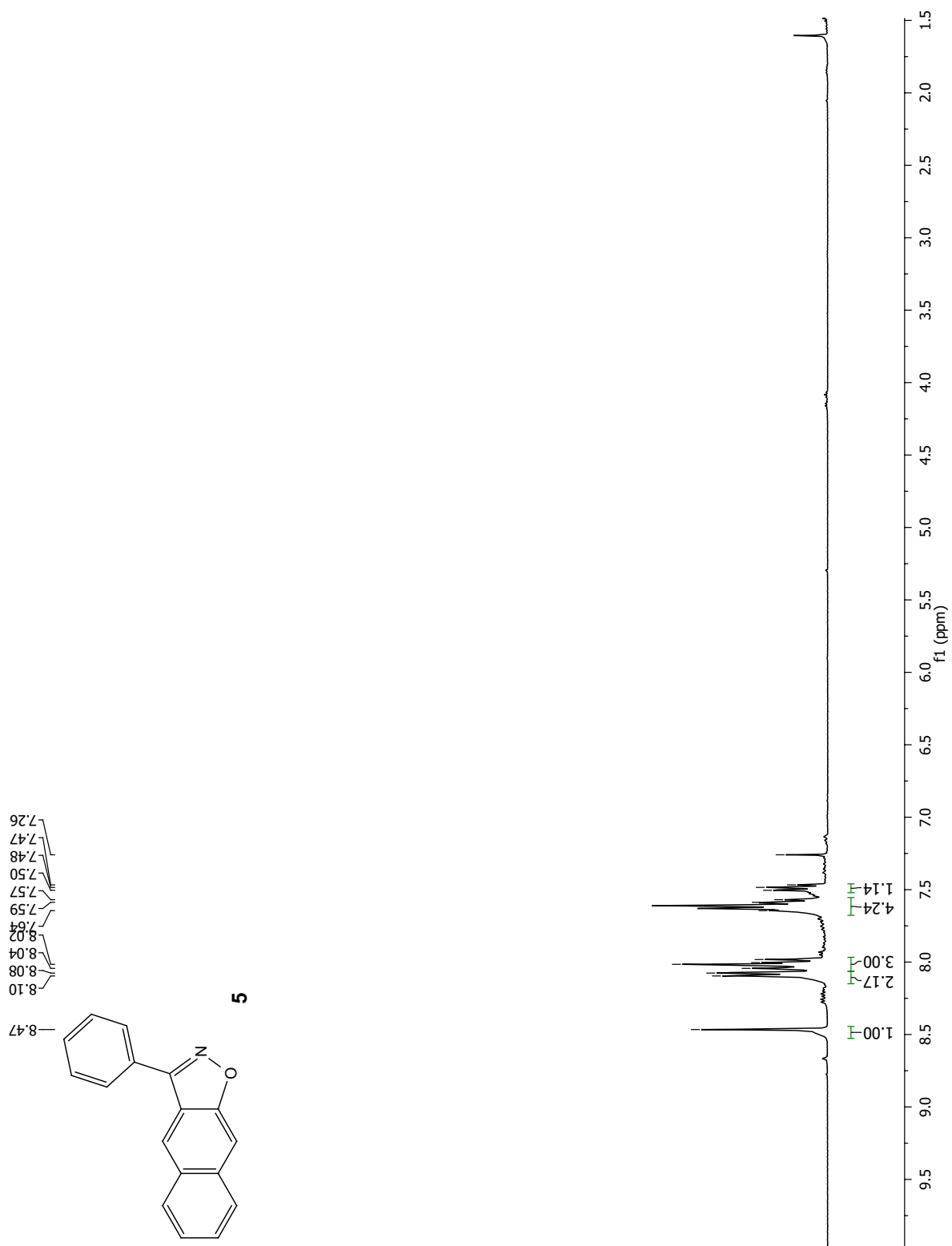


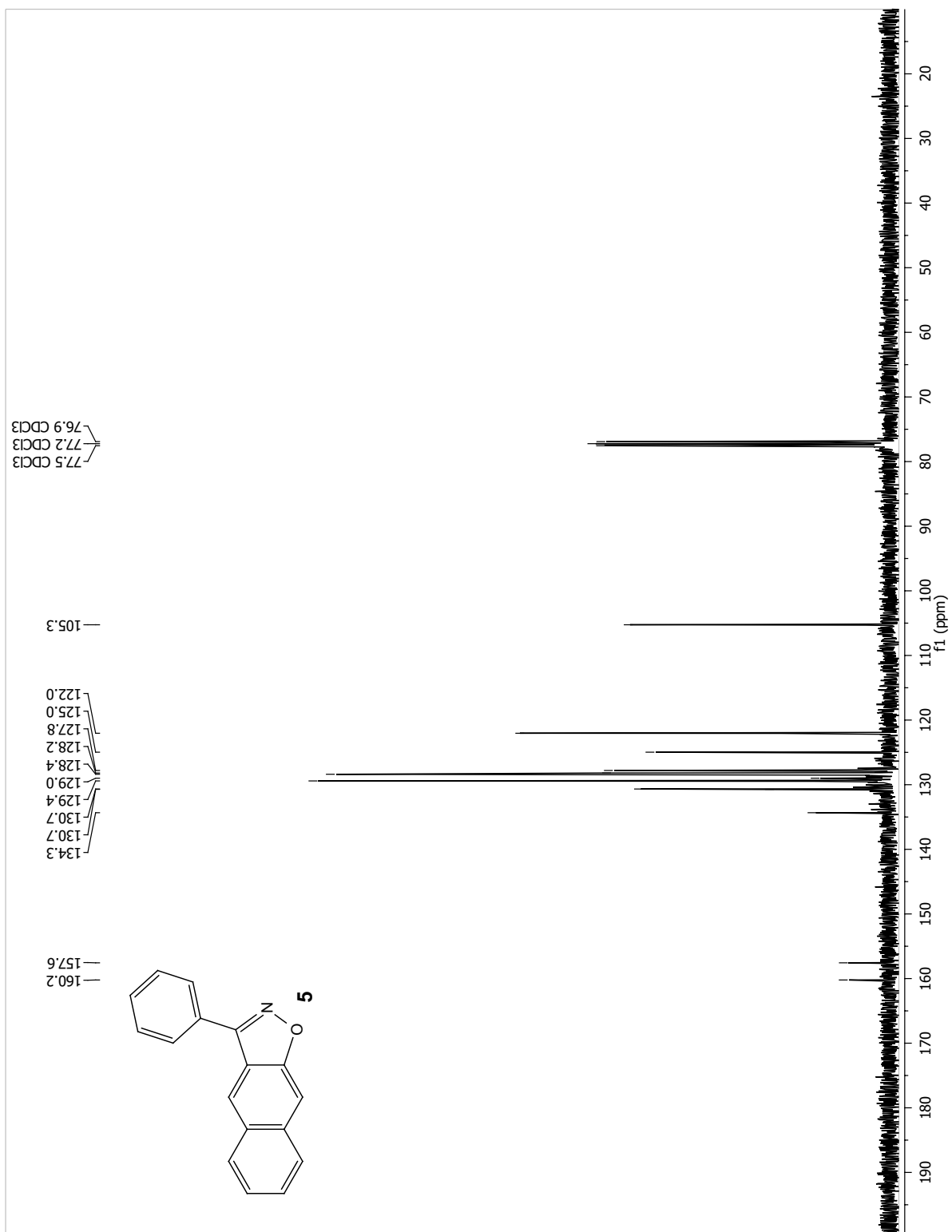




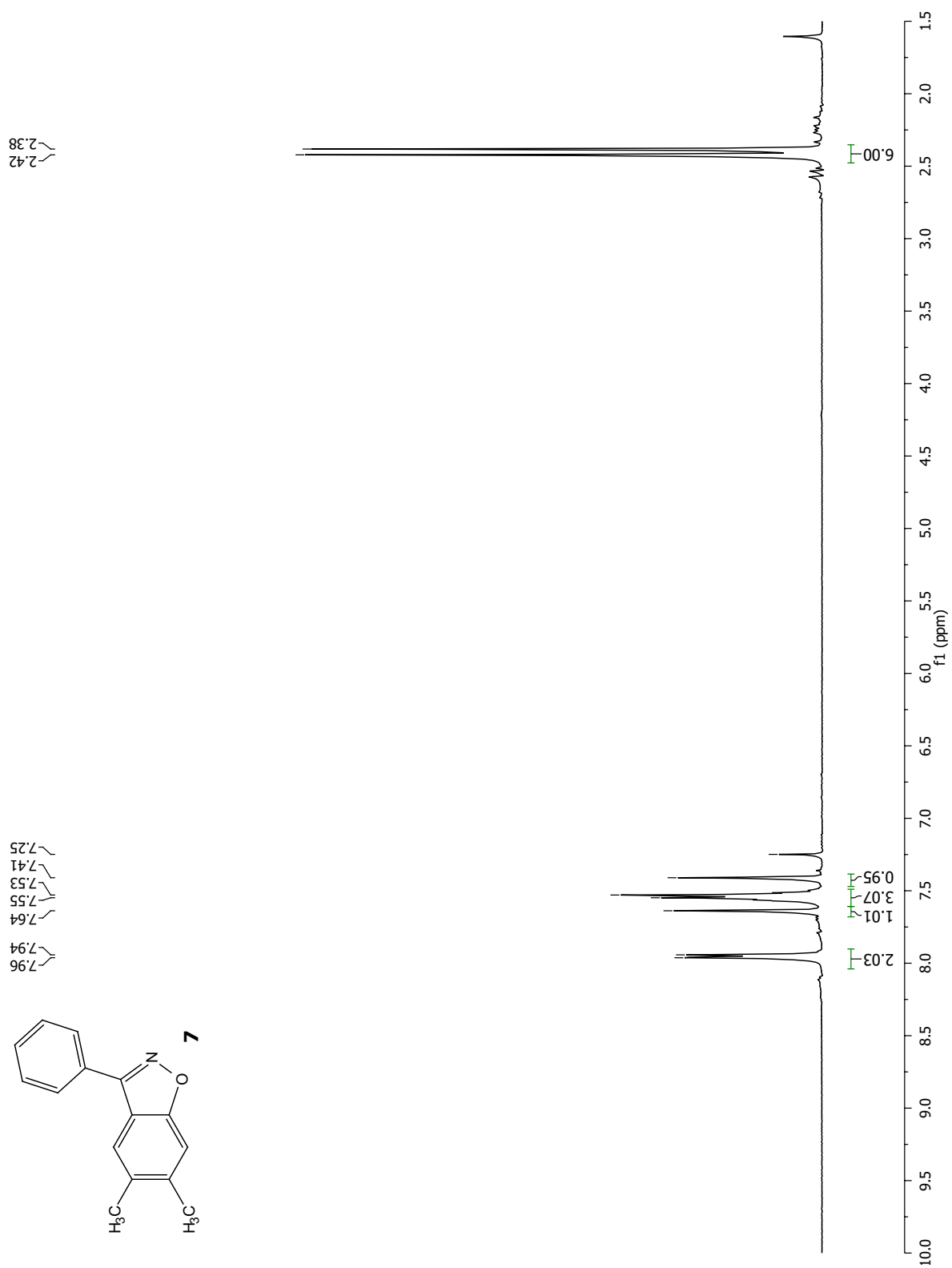


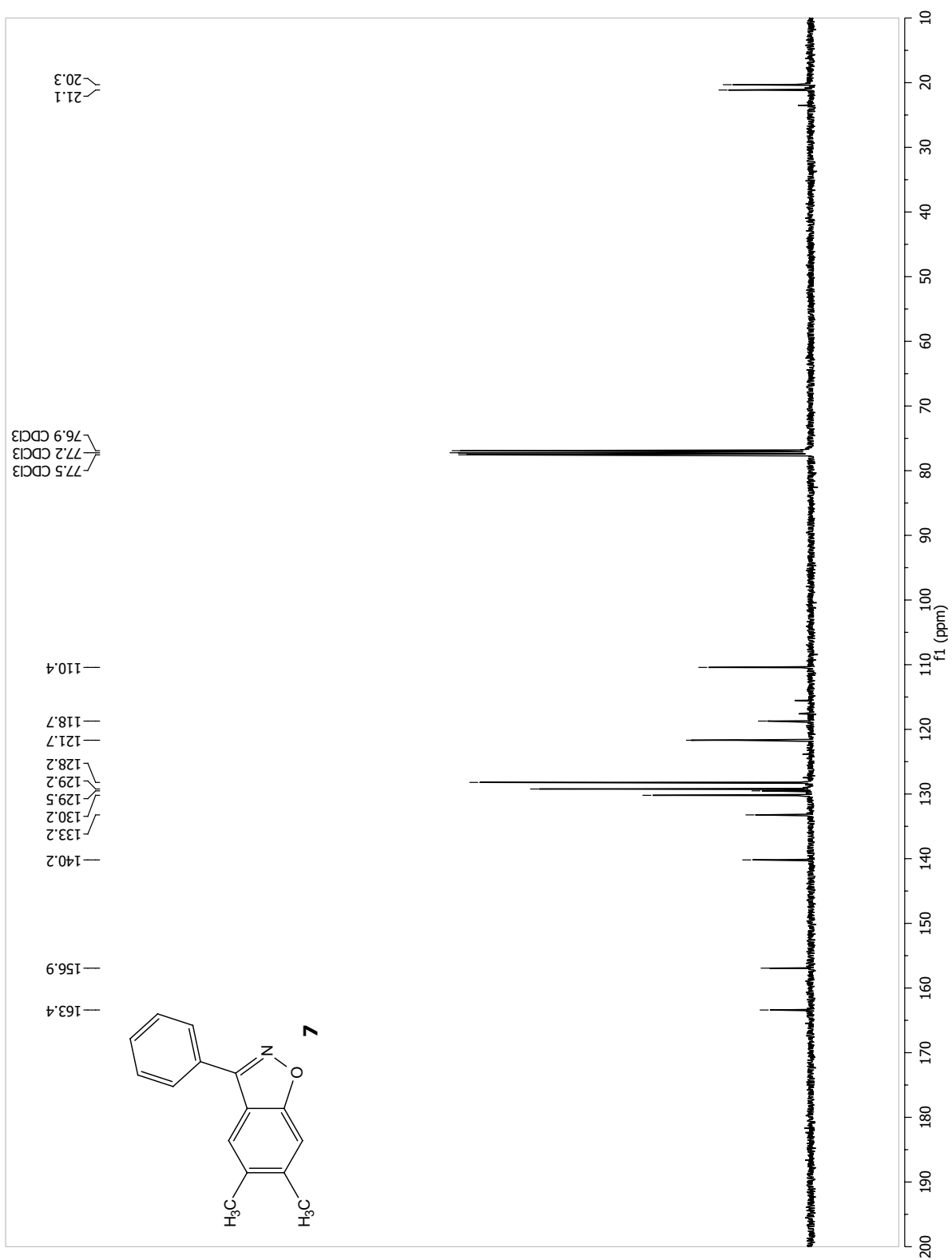


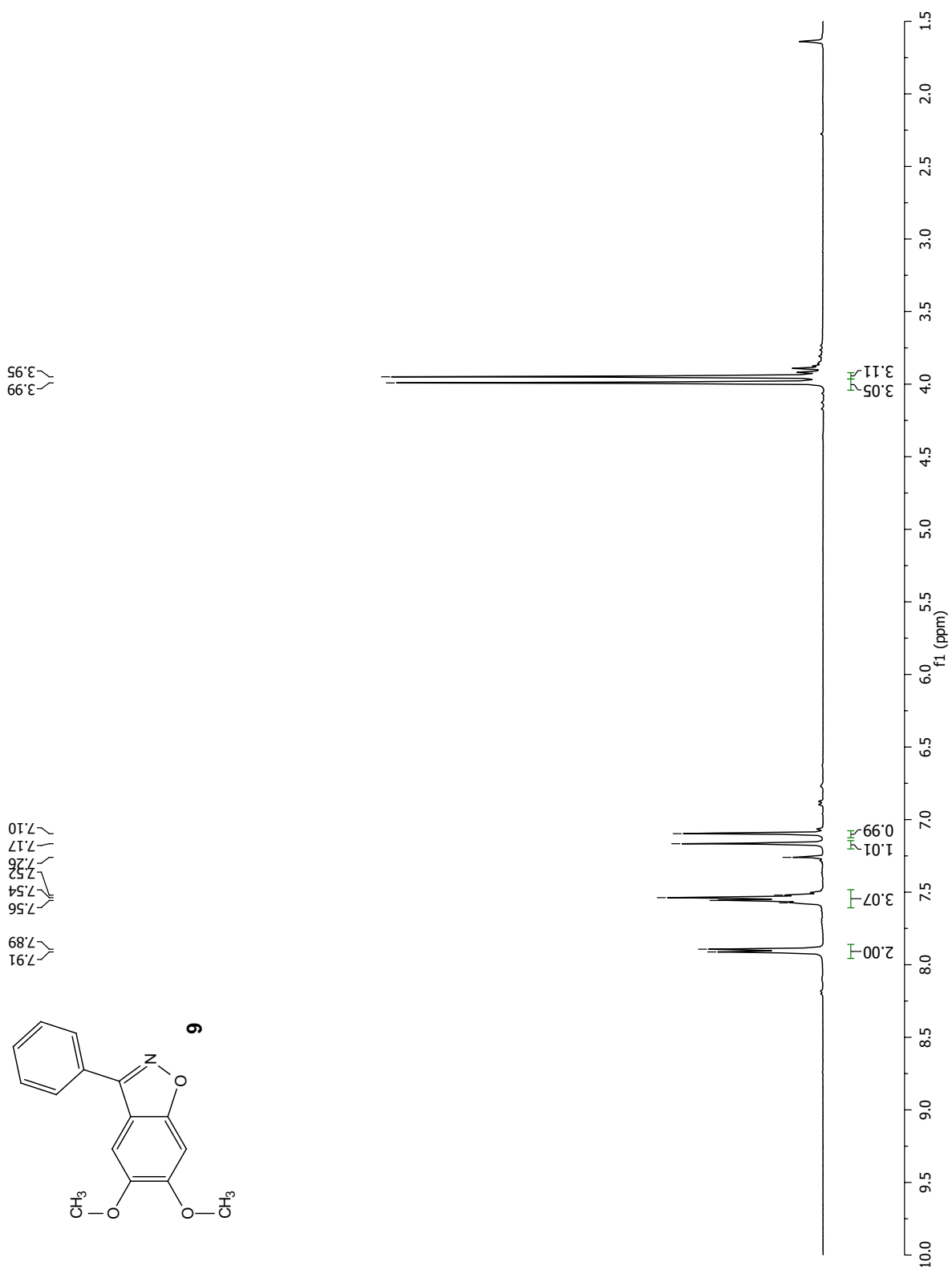


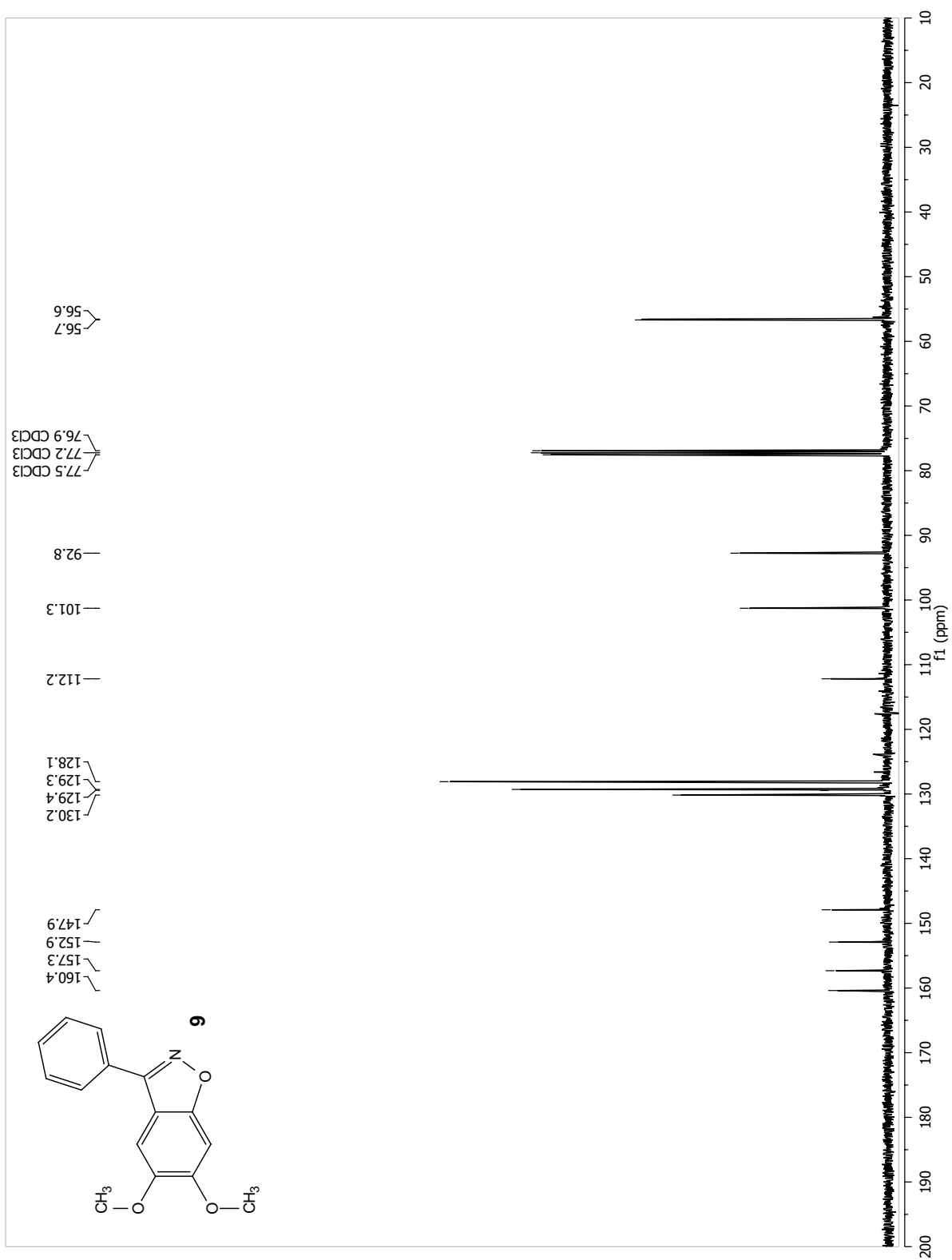


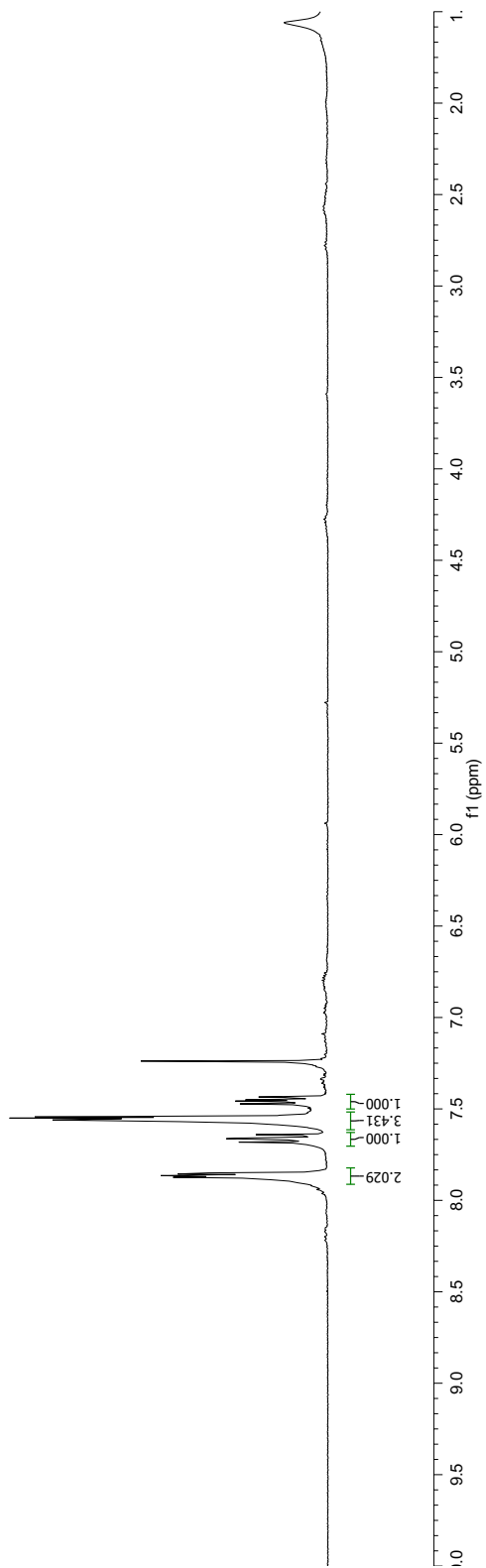
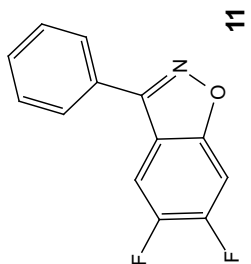
275

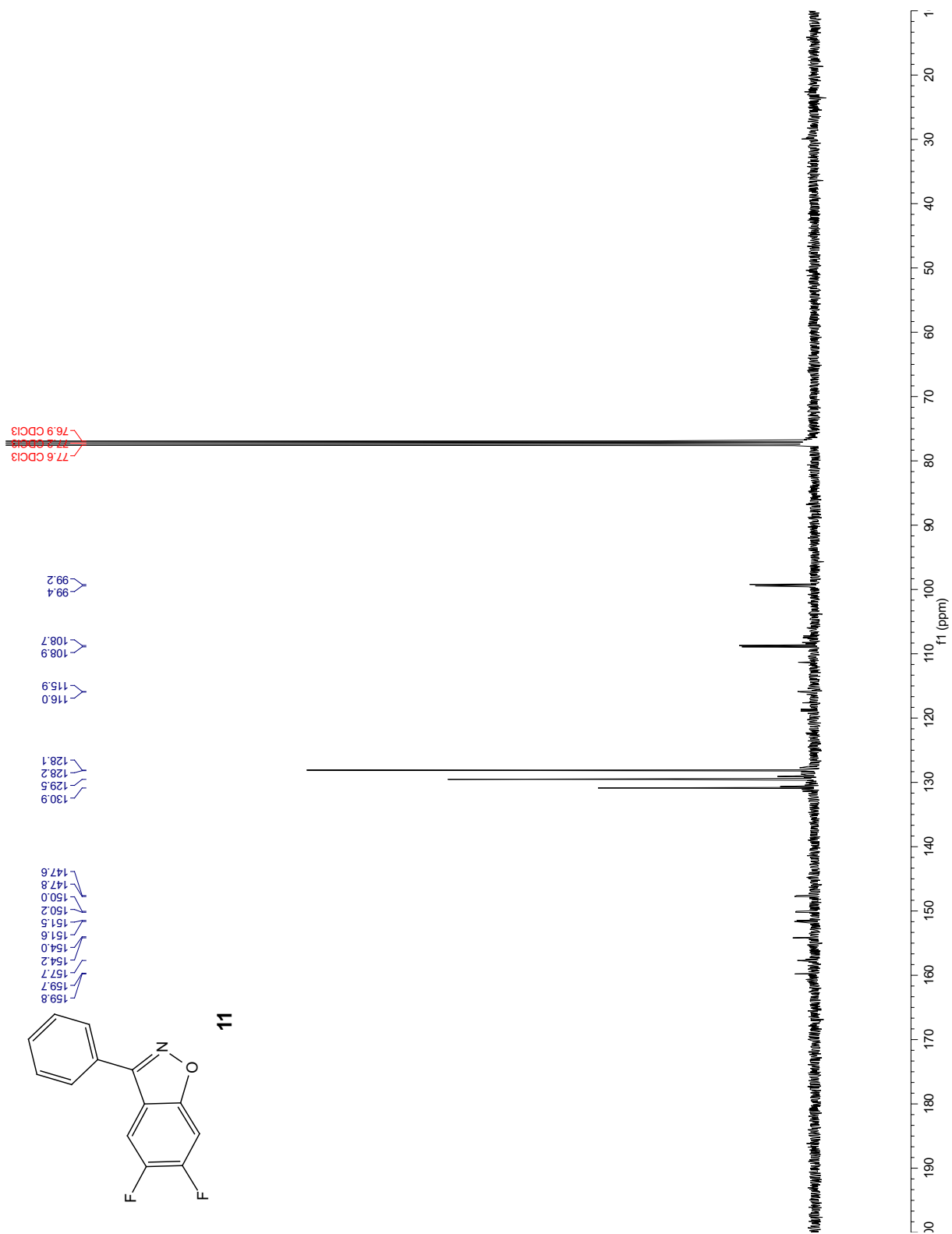


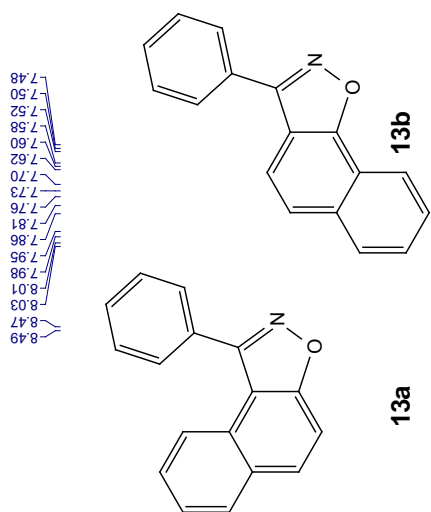






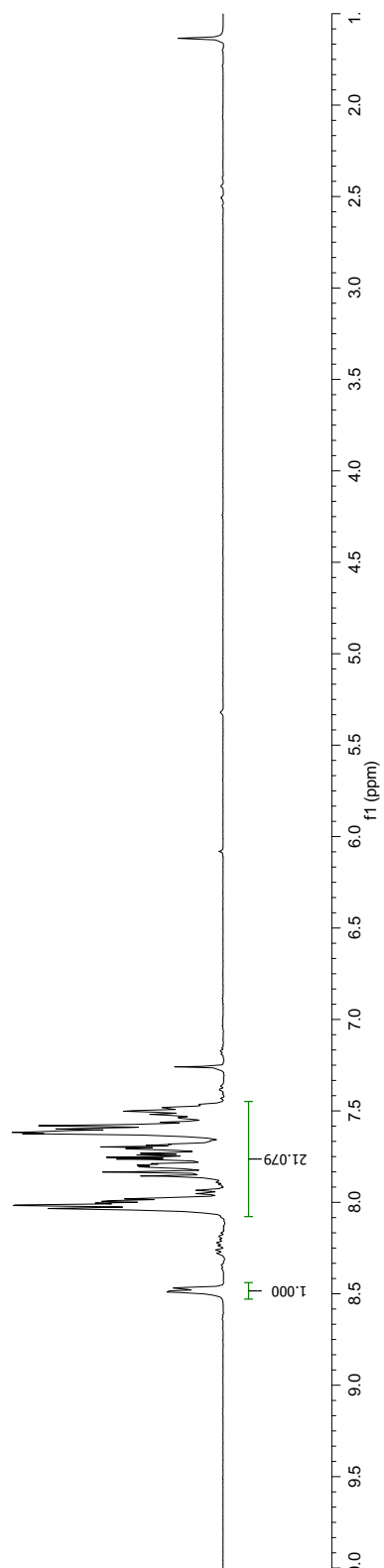


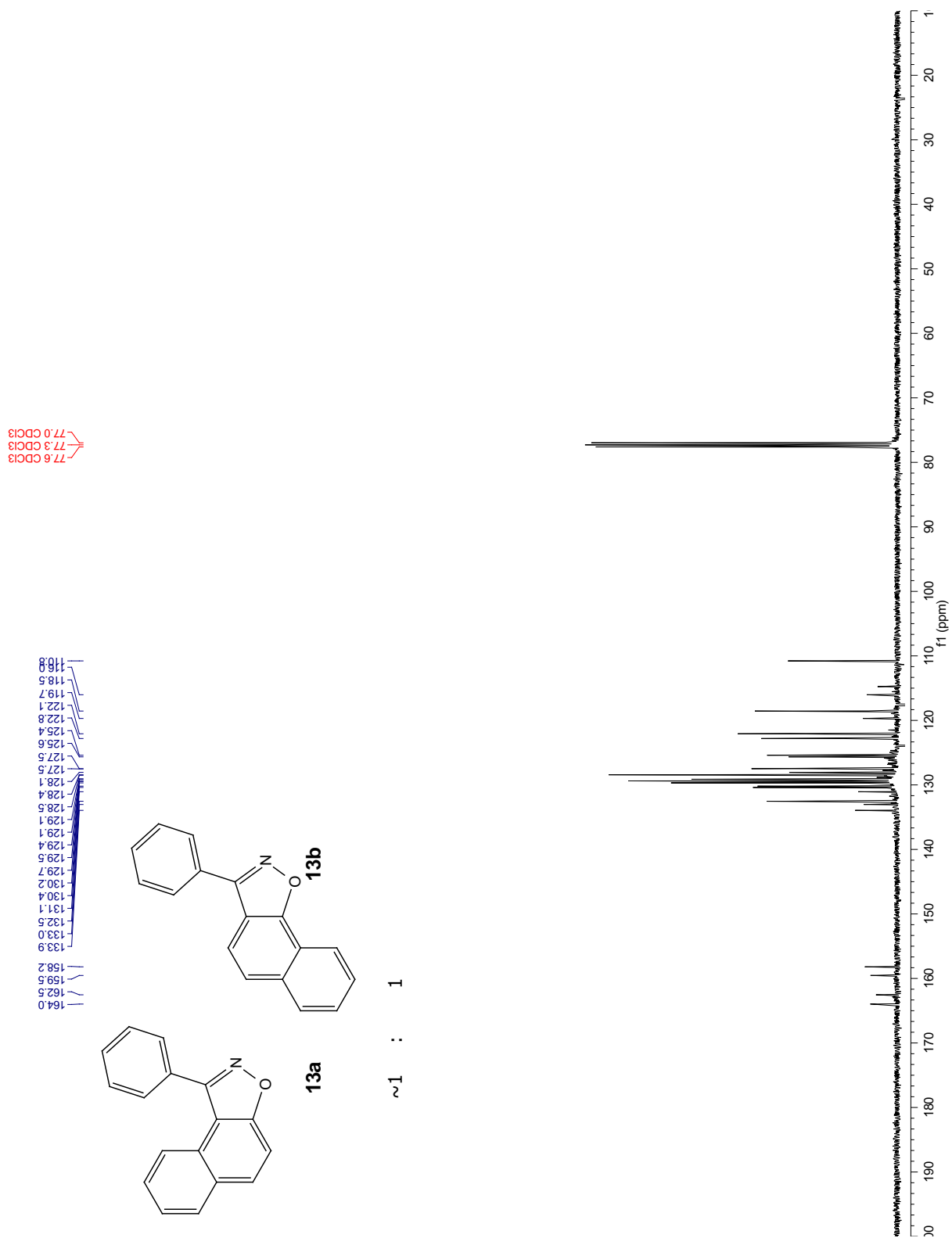


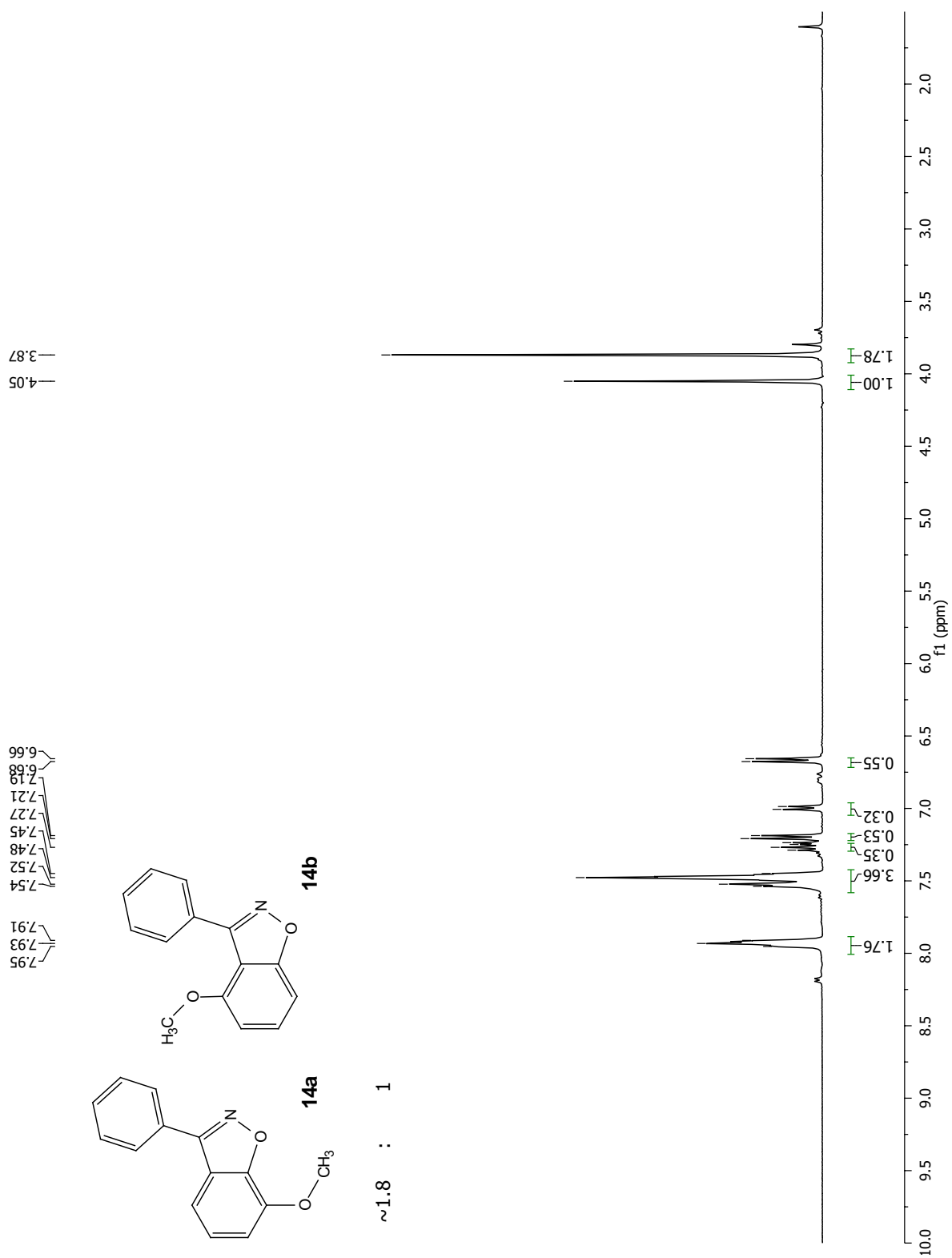


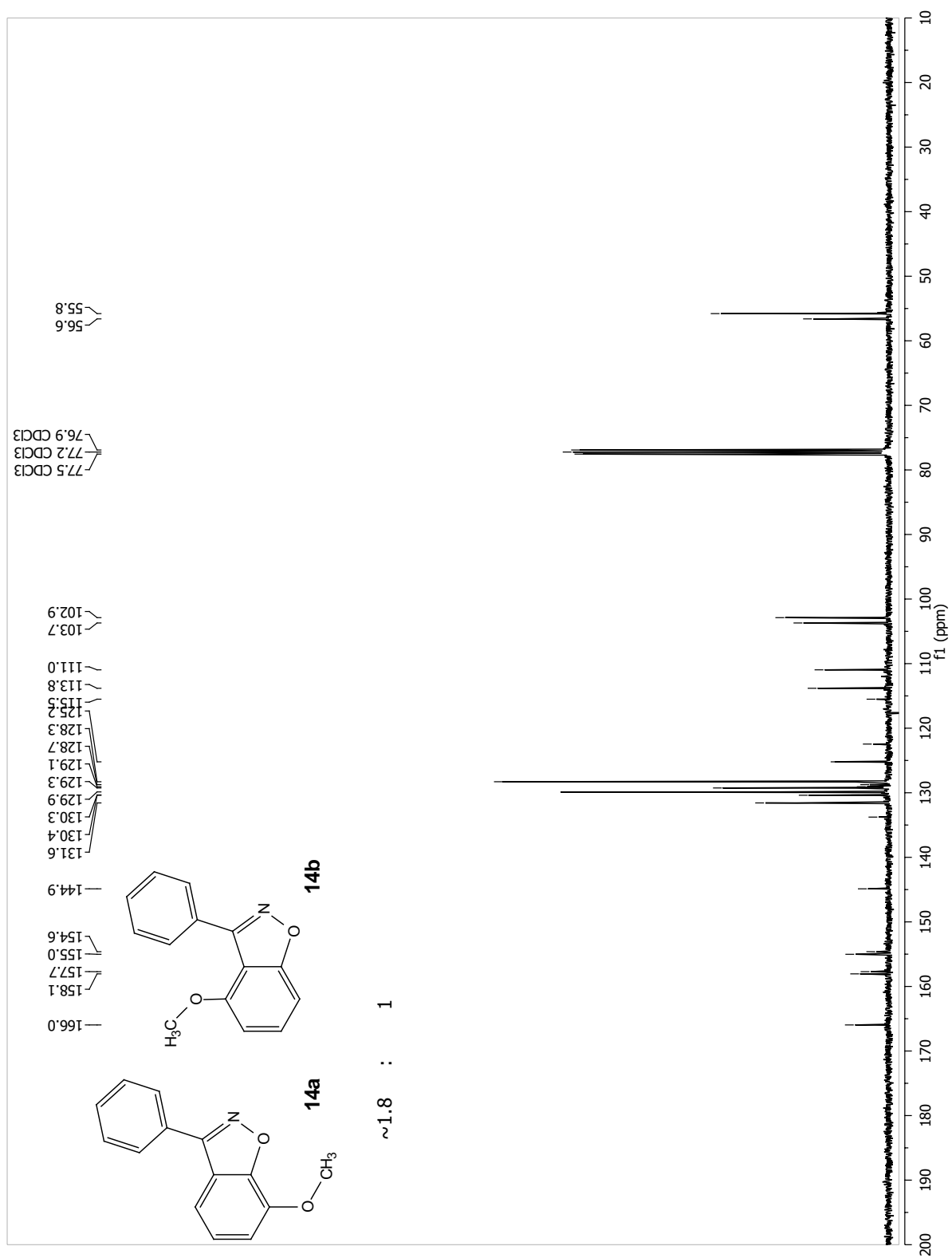
8.49
8.47
8.03
7.98
7.95
7.86
7.81
7.76
7.73
7.70
7.62
7.60
7.58
7.52
7.50
7.48

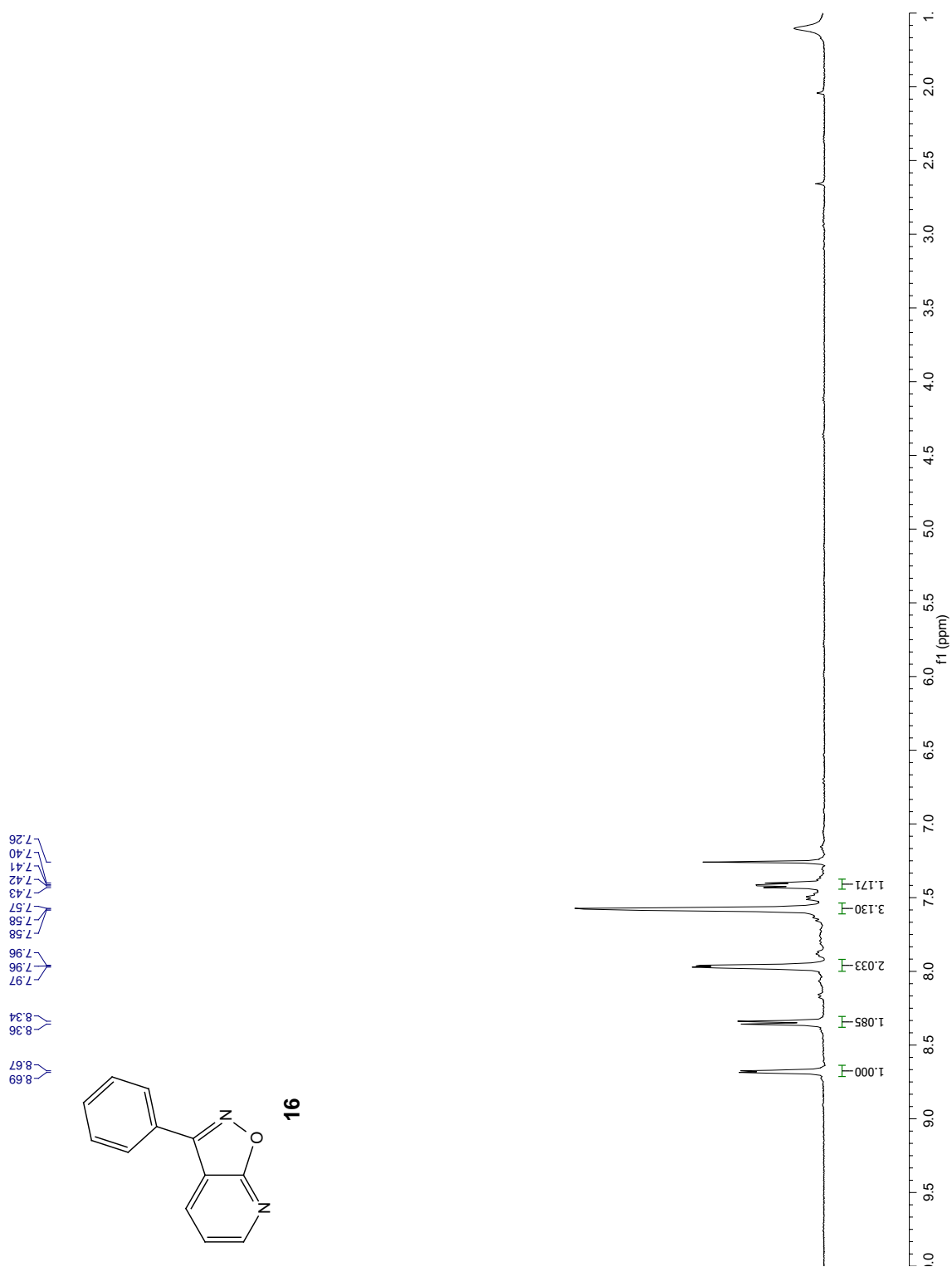
~1 : 1

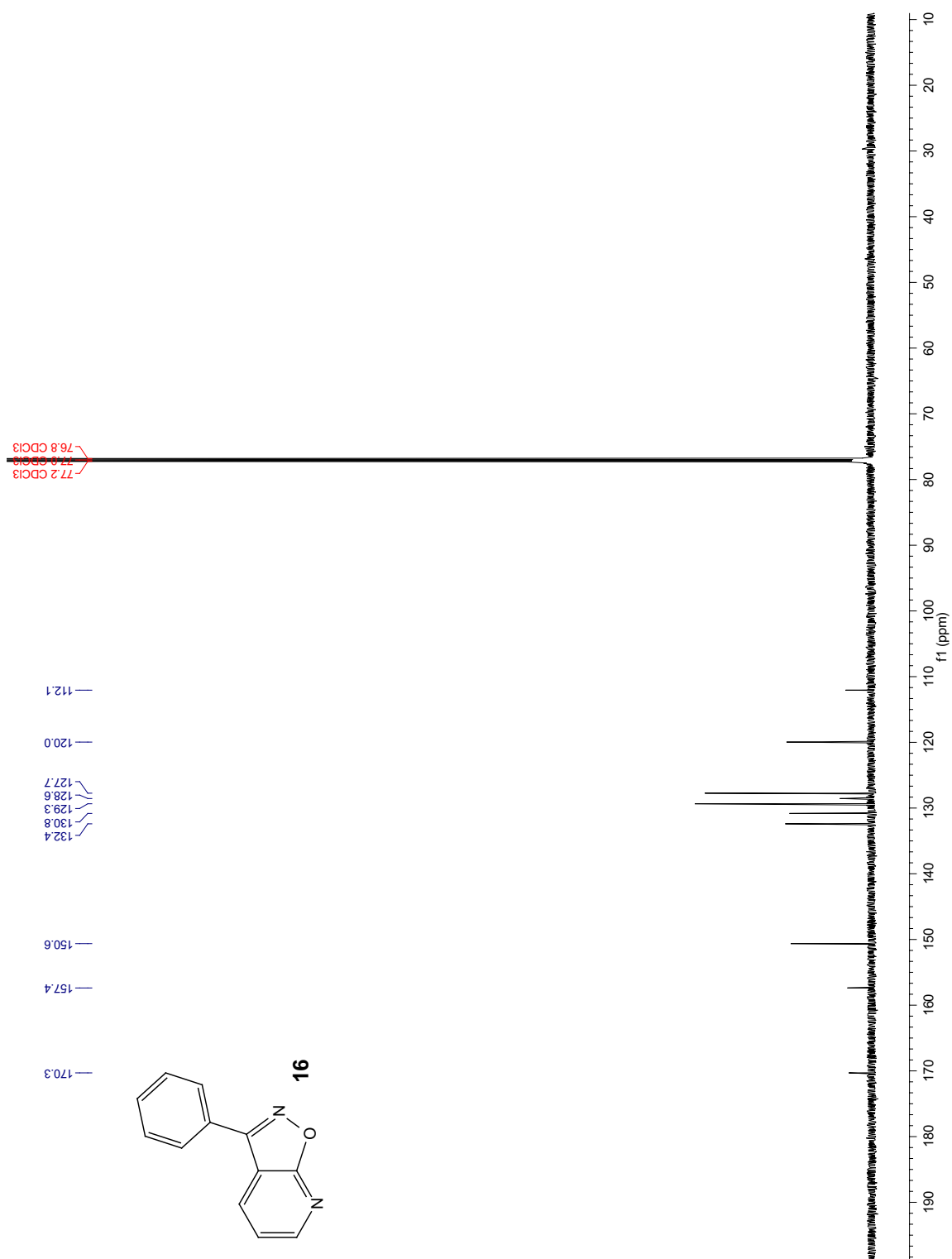


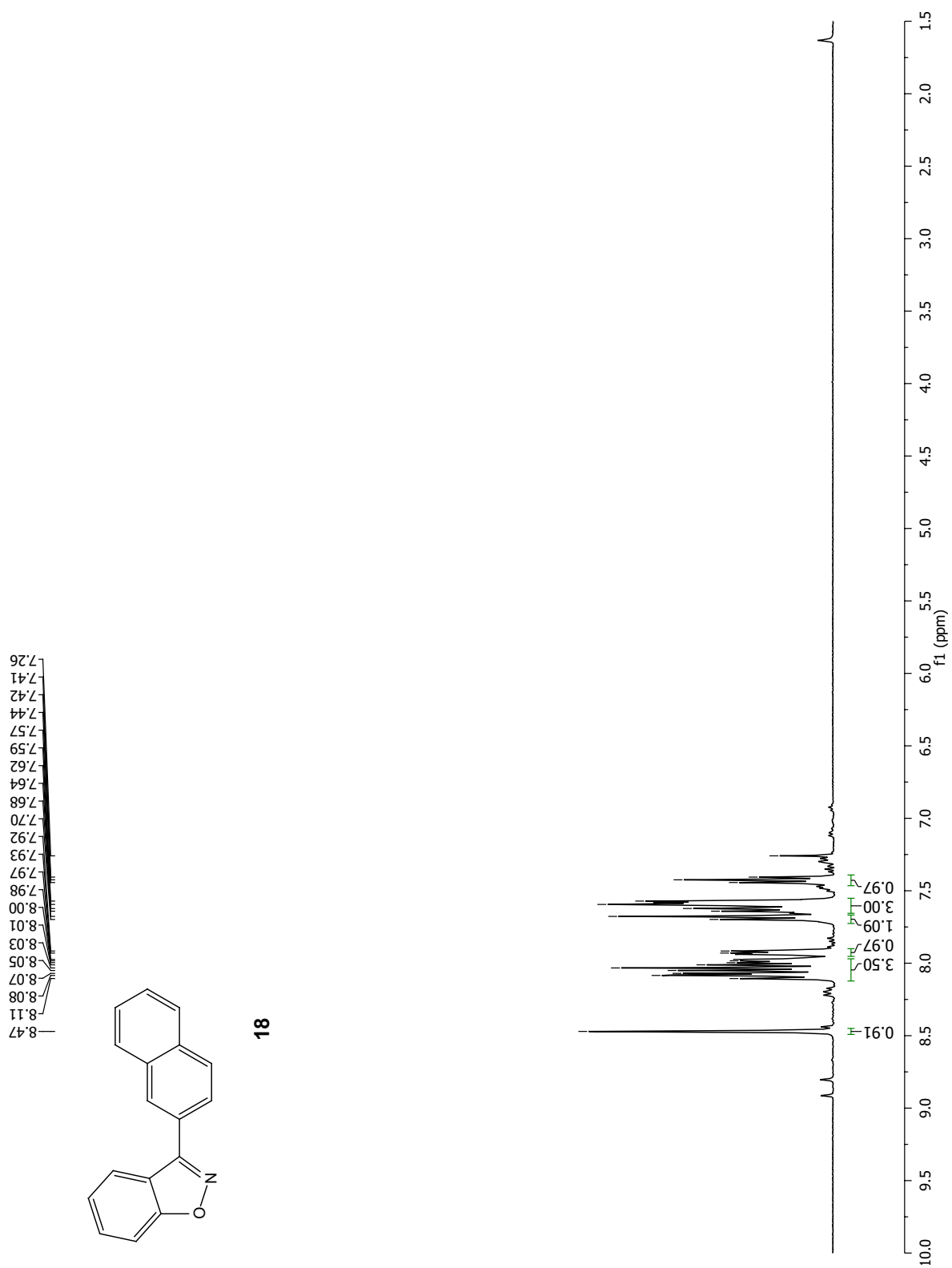


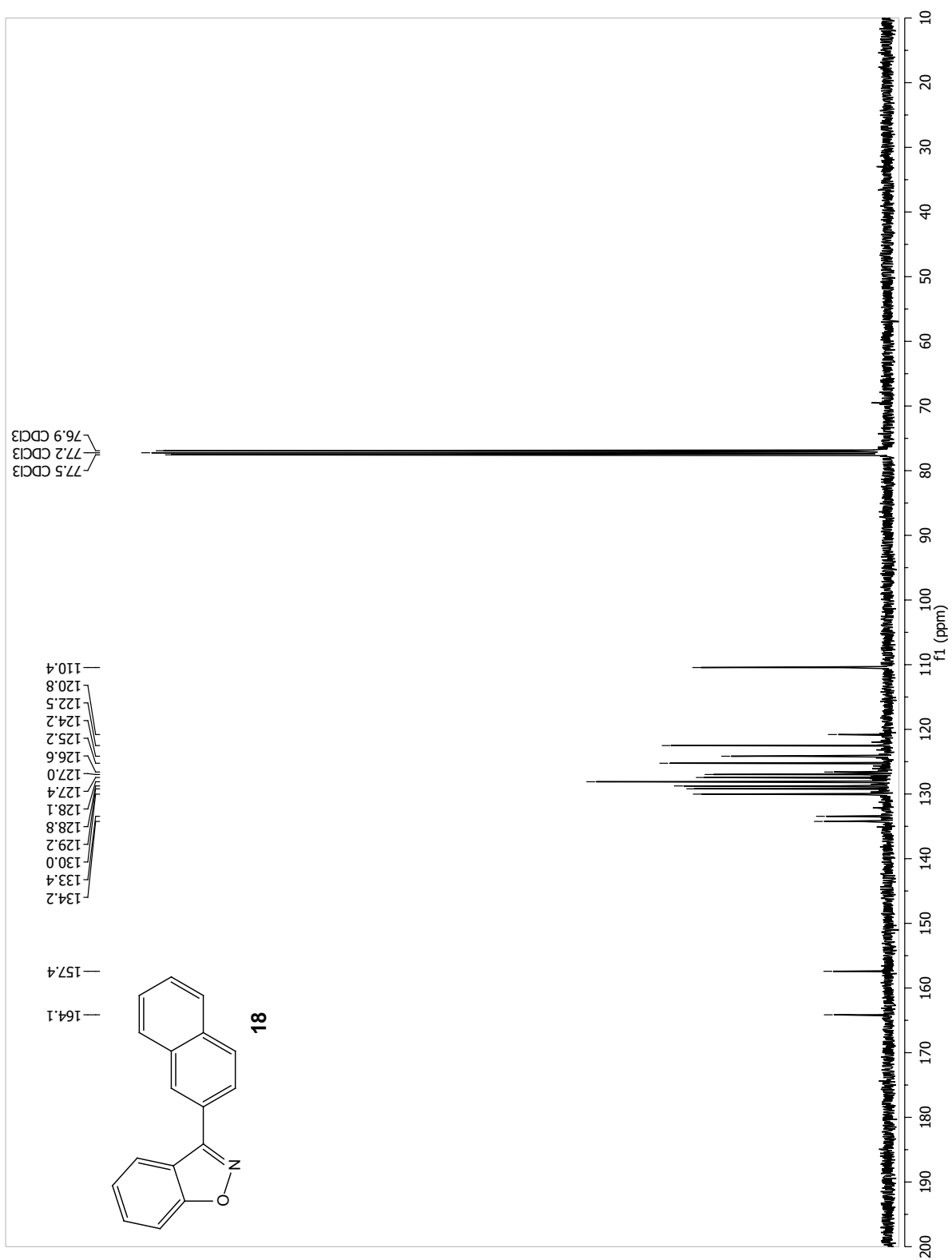


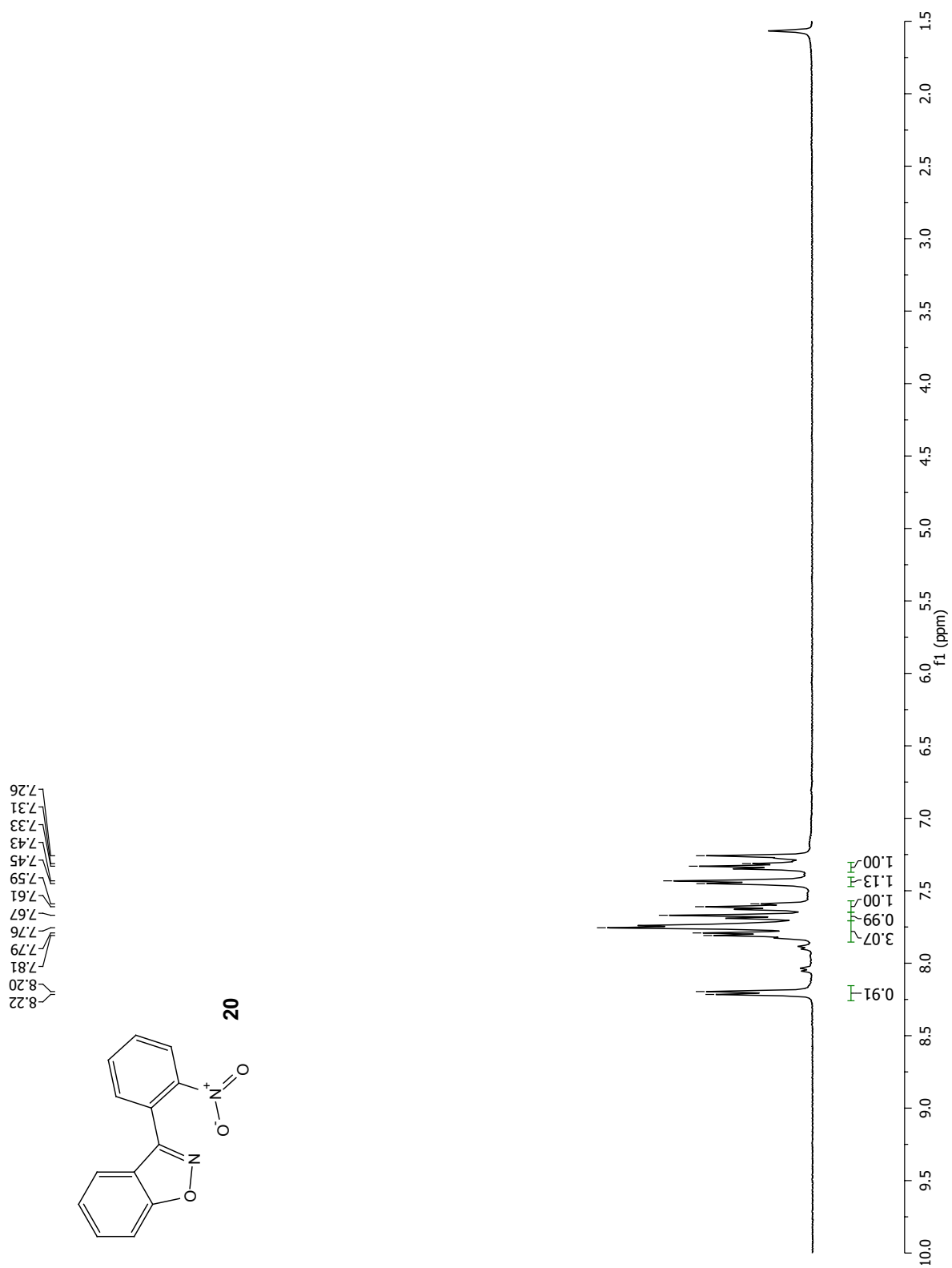


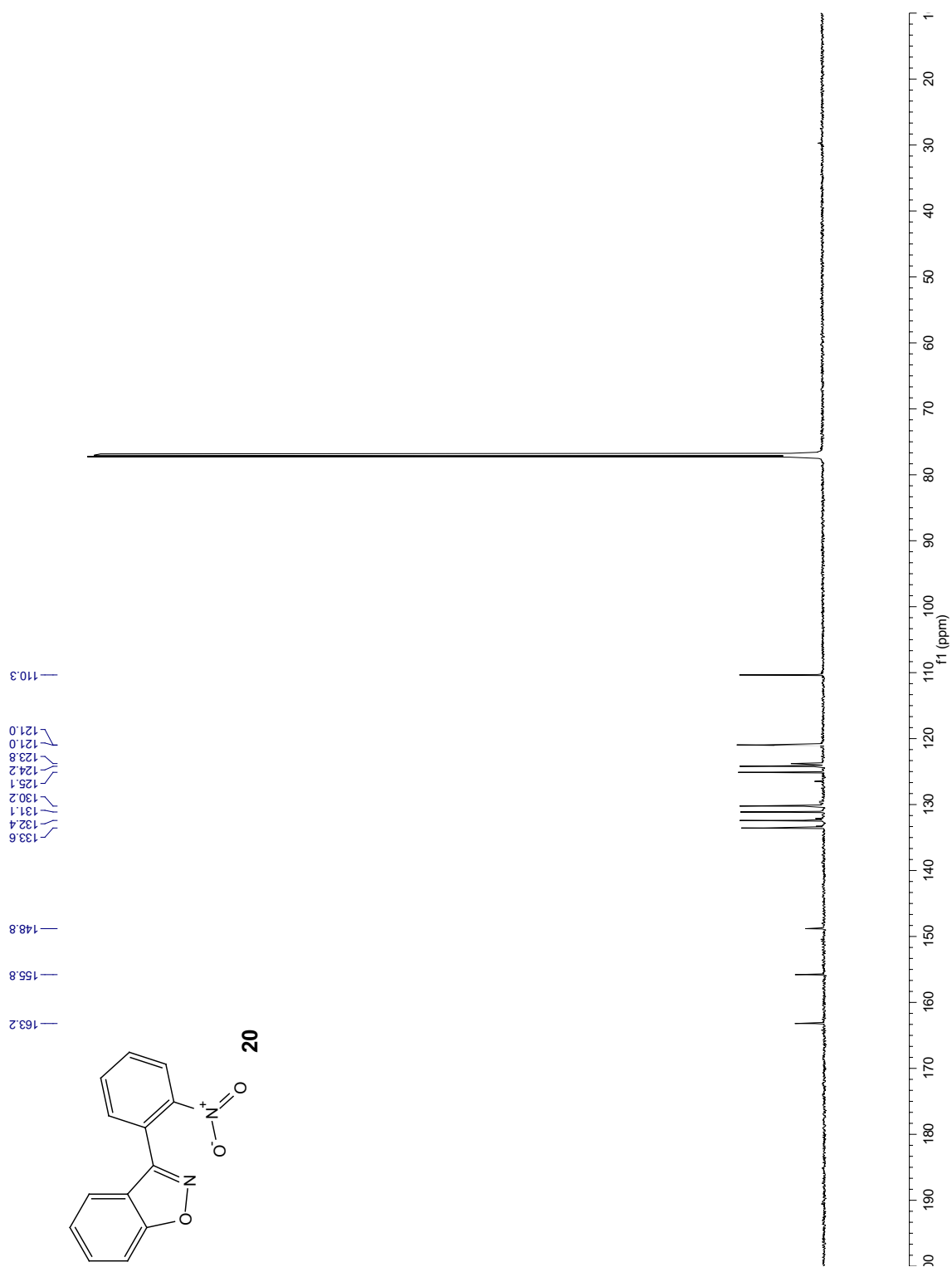


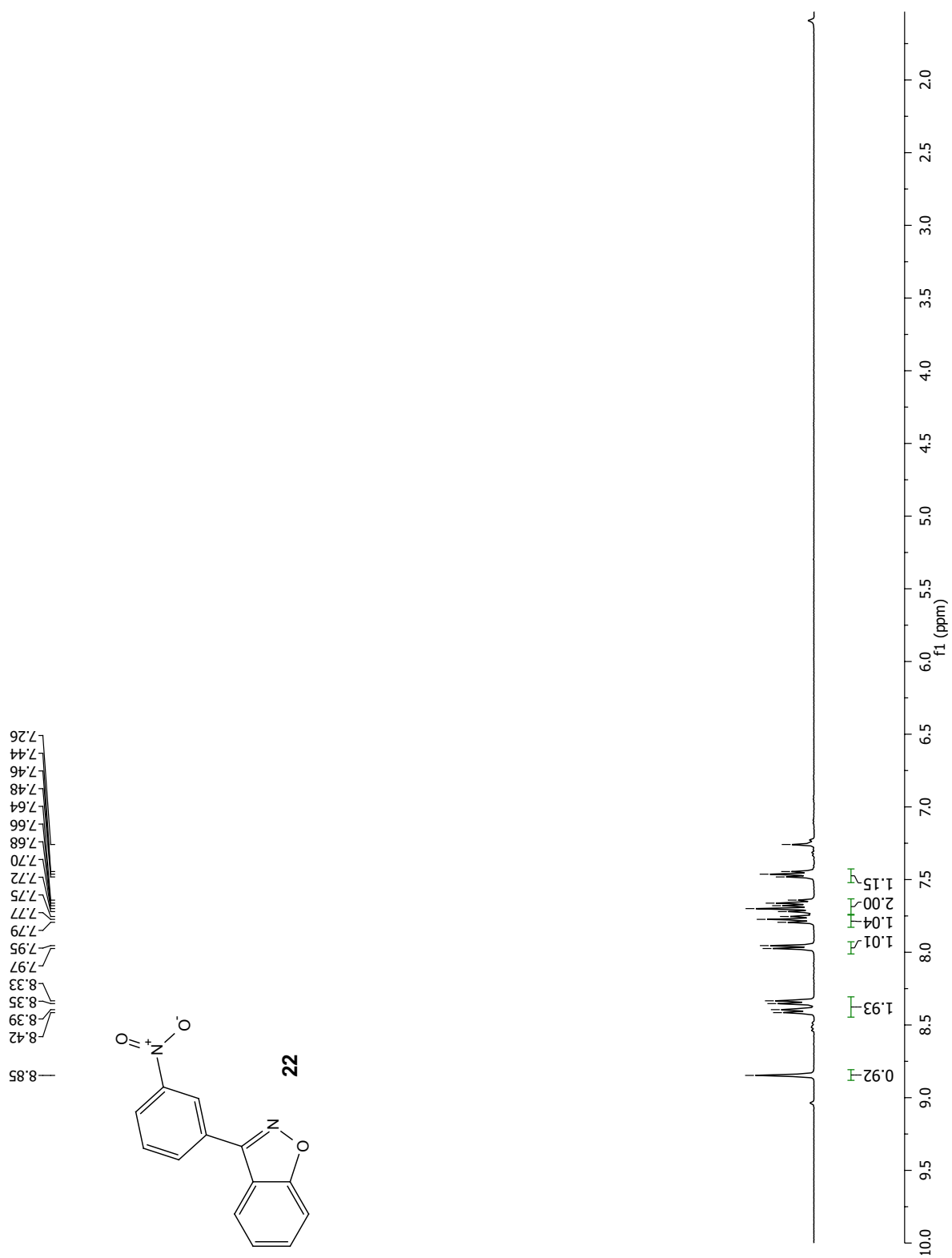


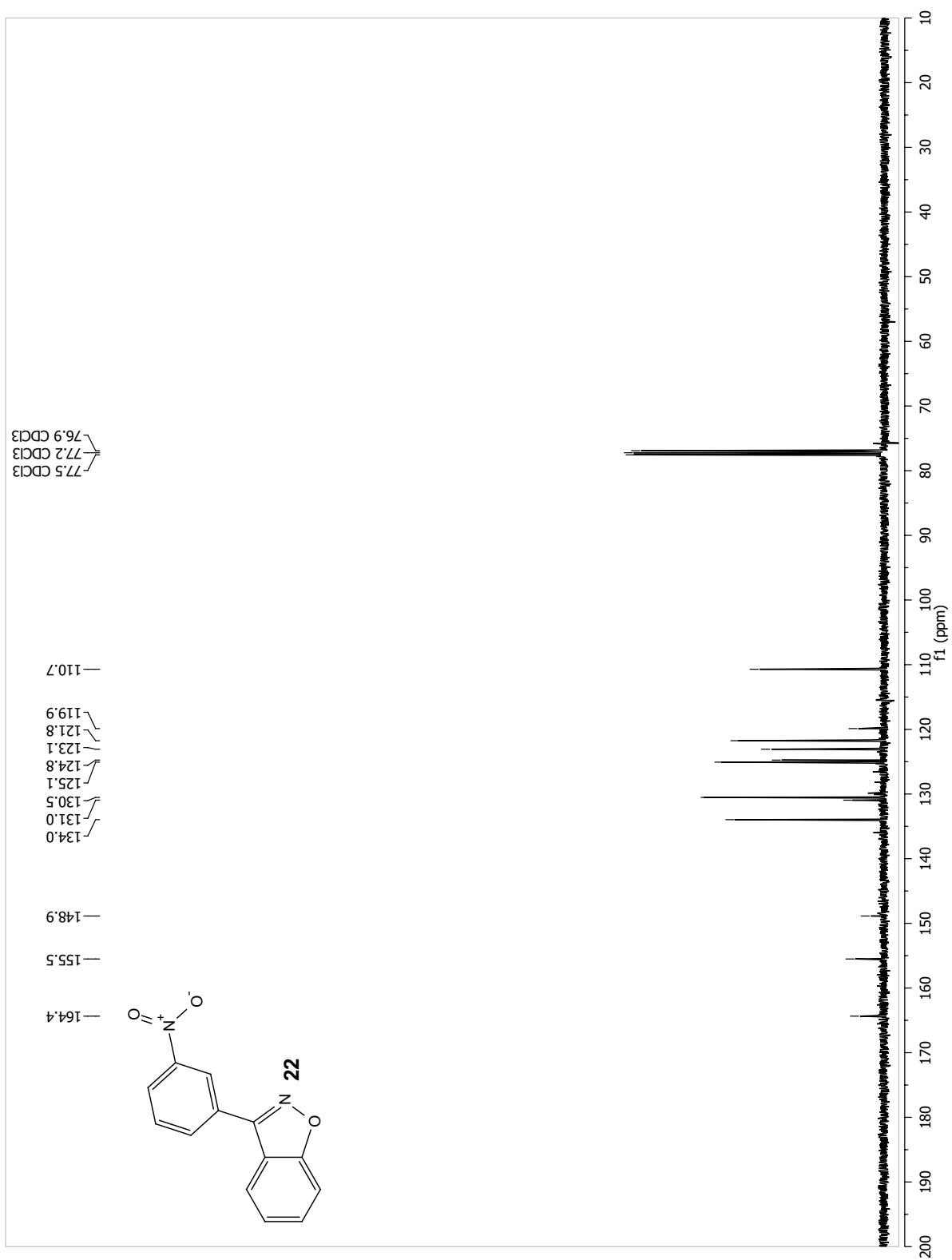


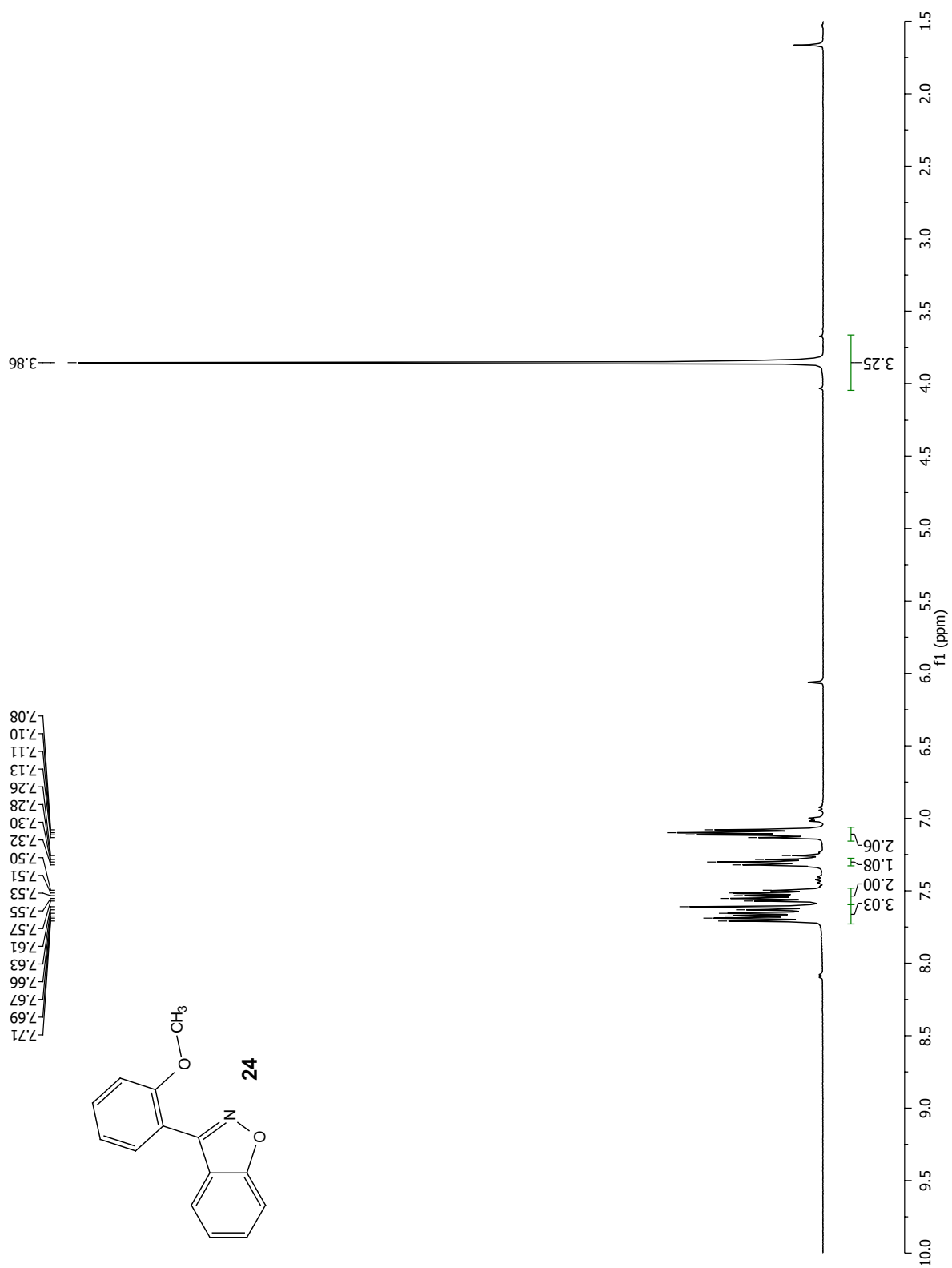


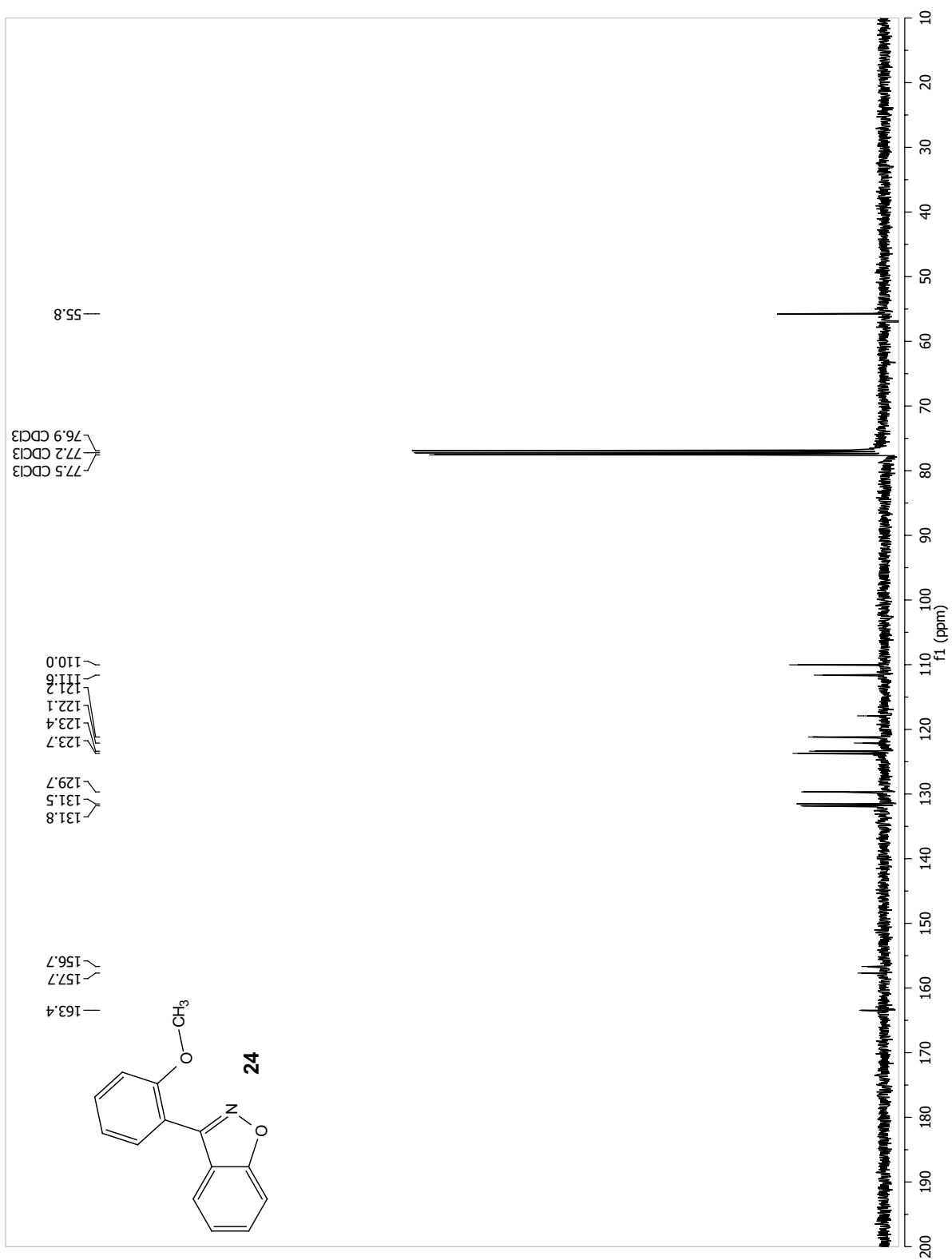


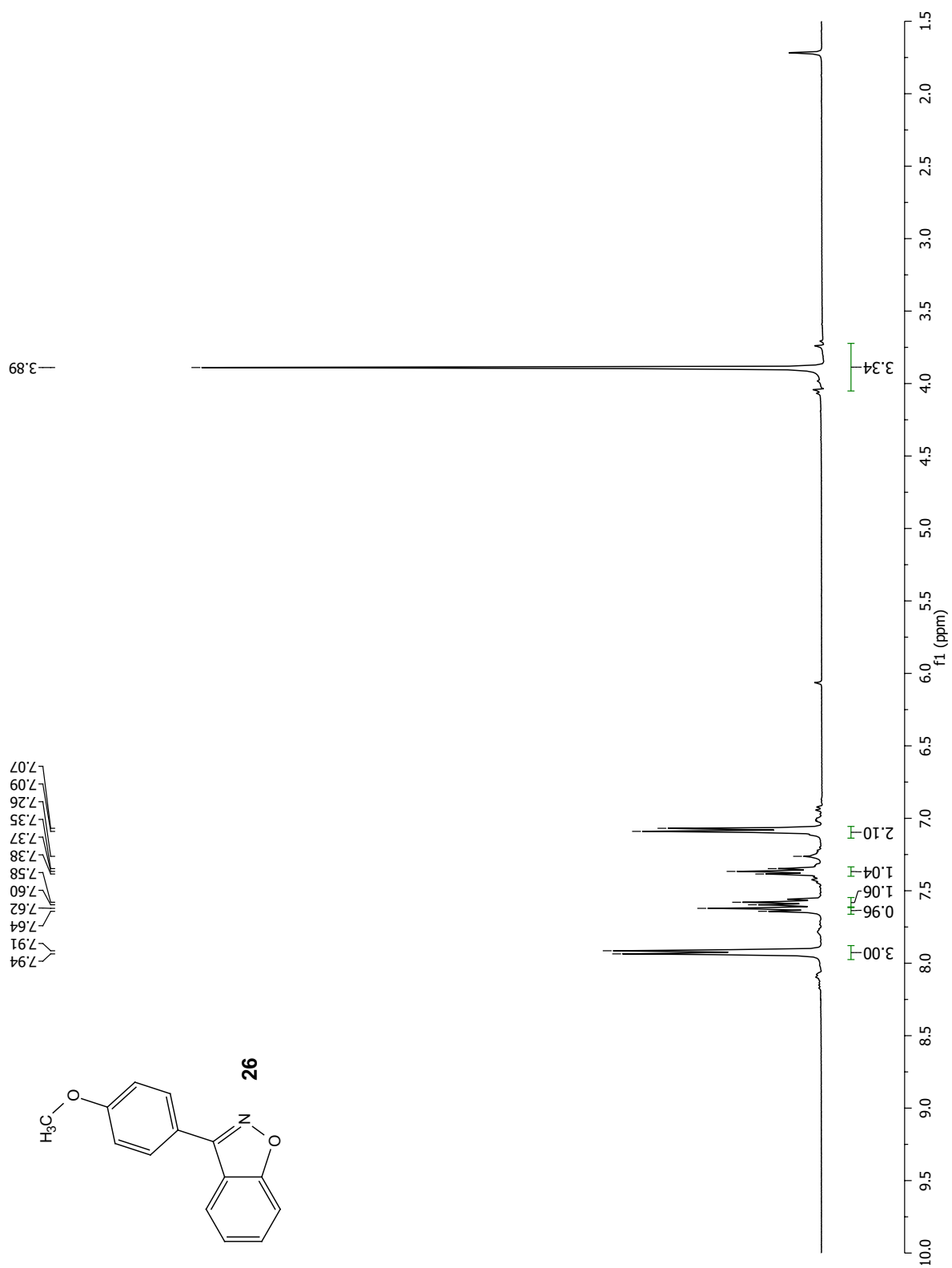


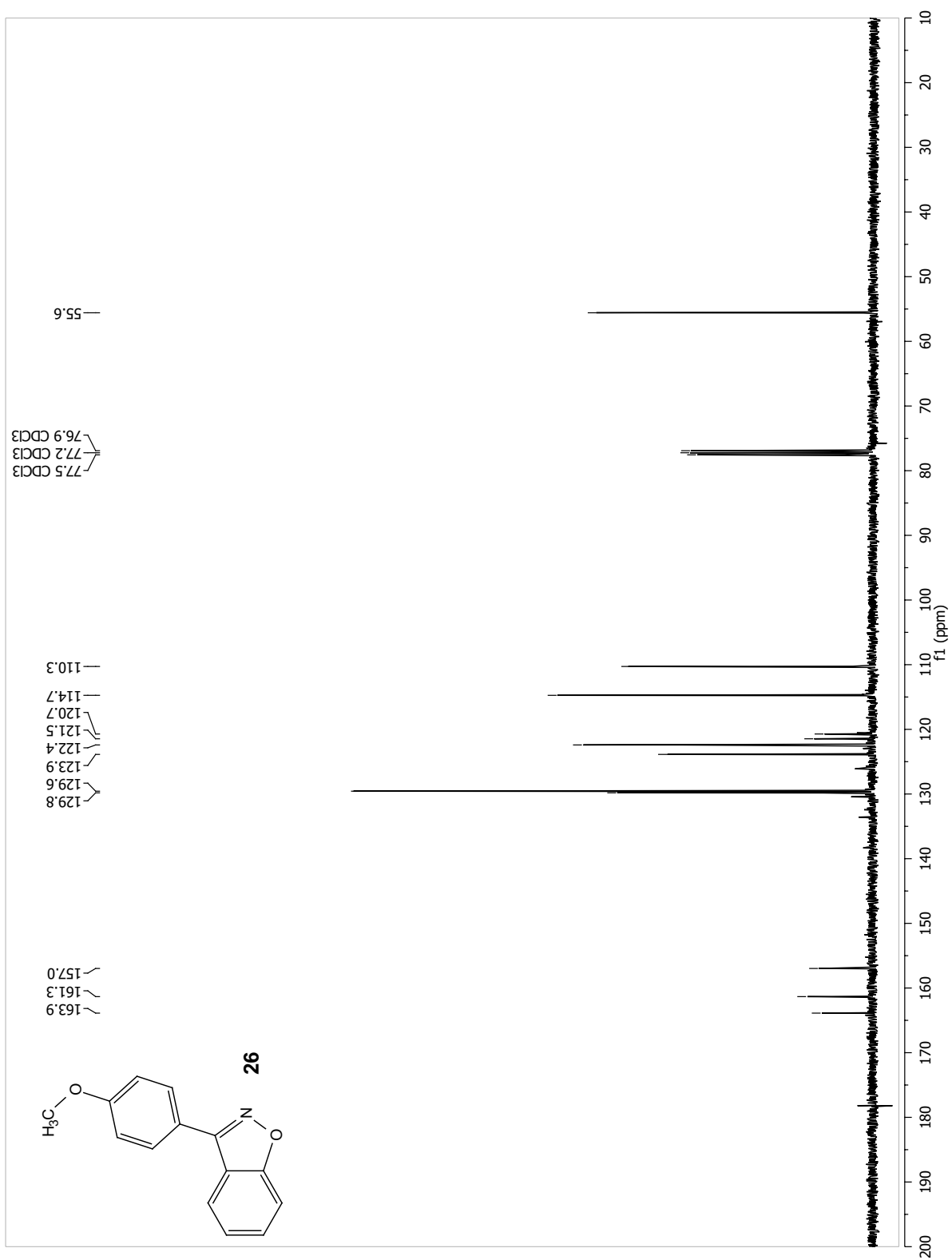


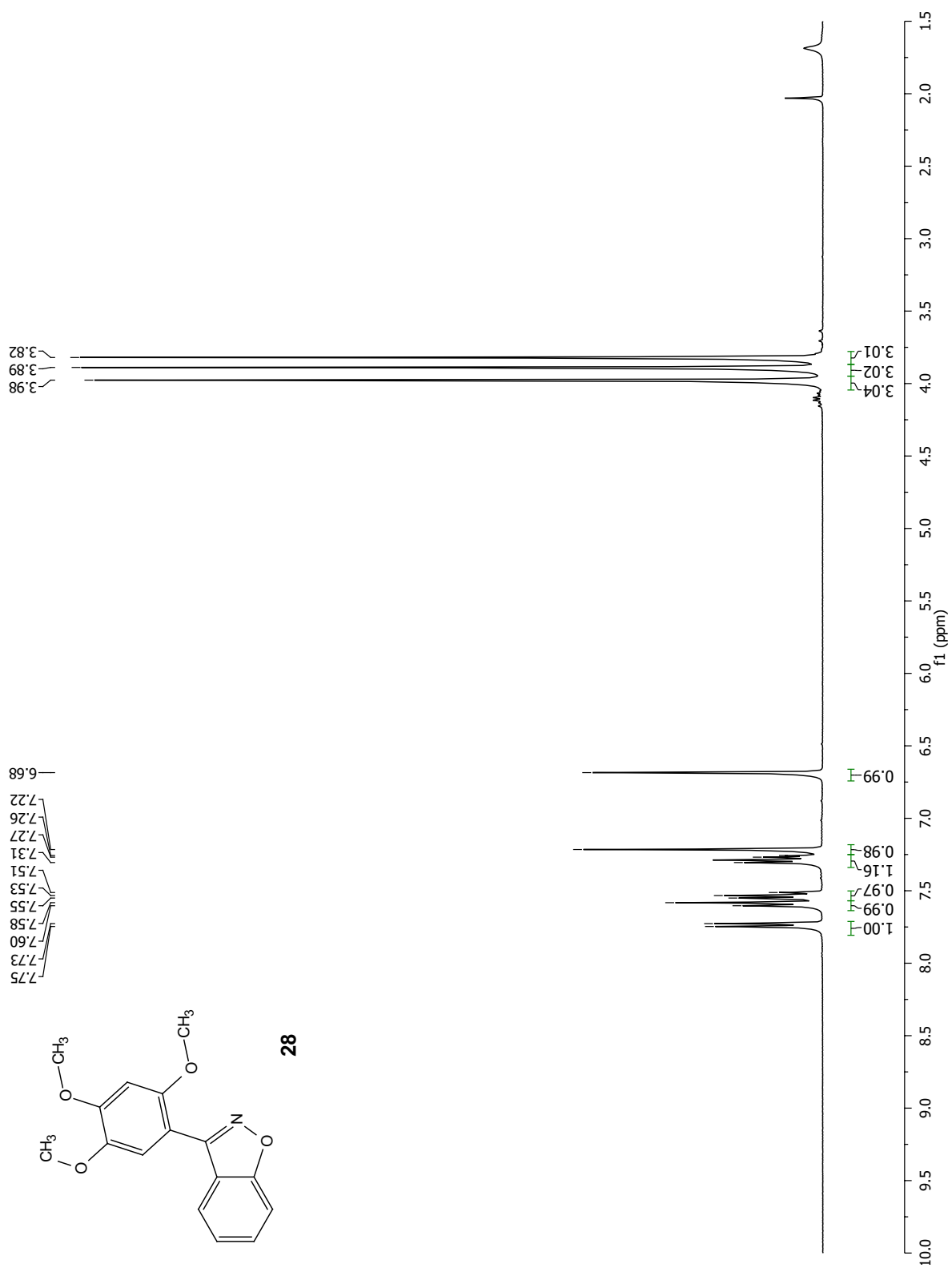


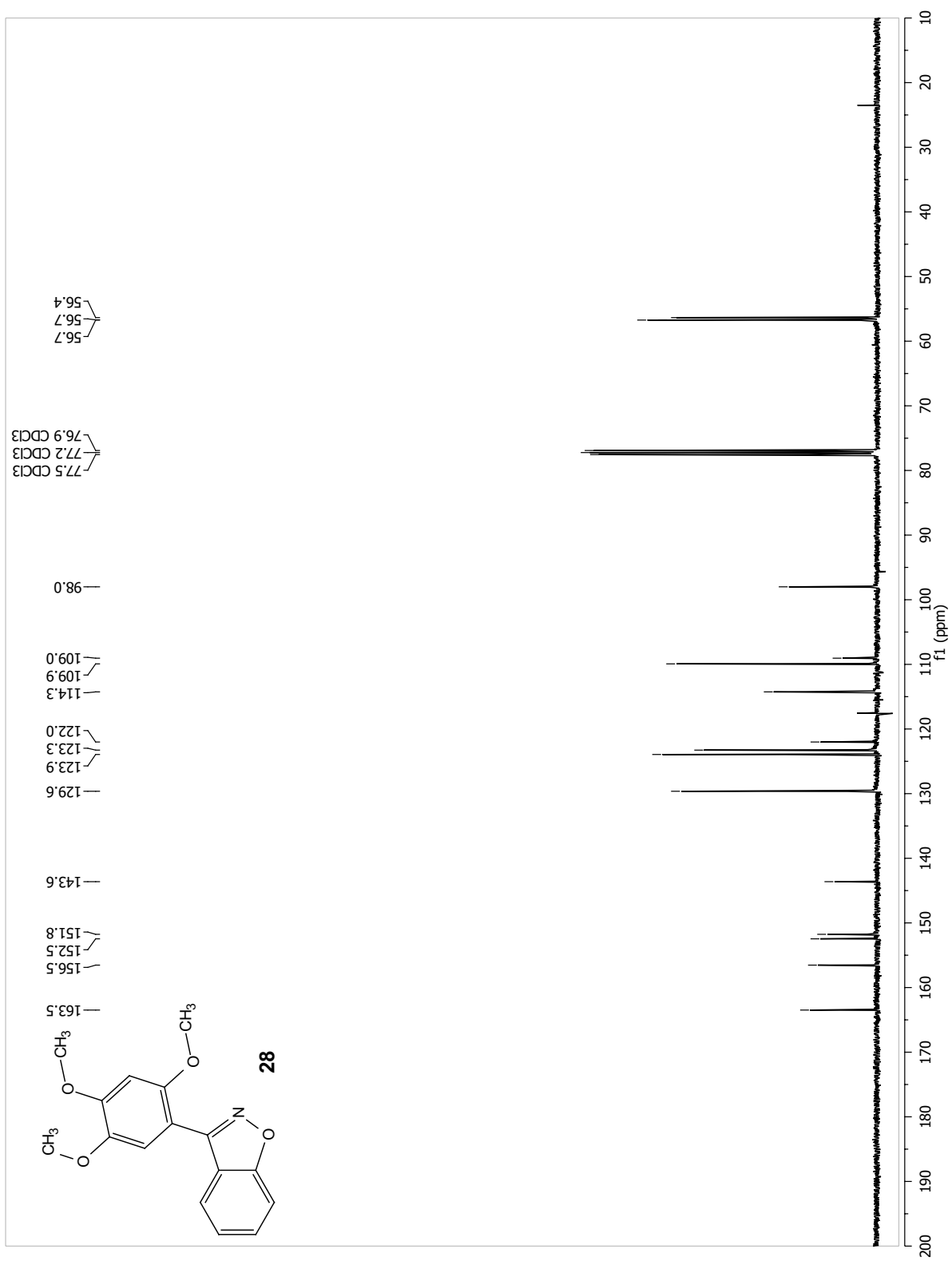


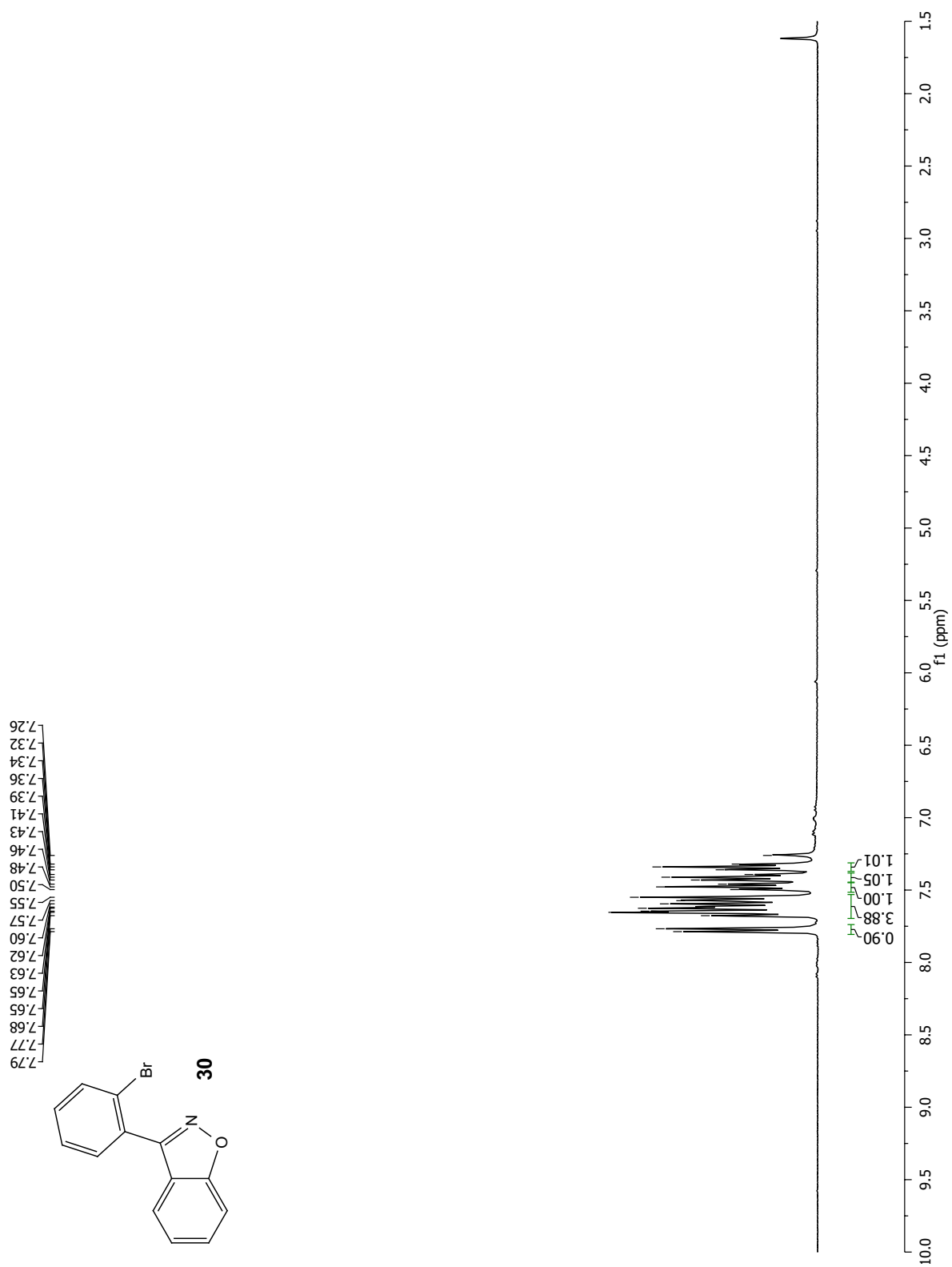


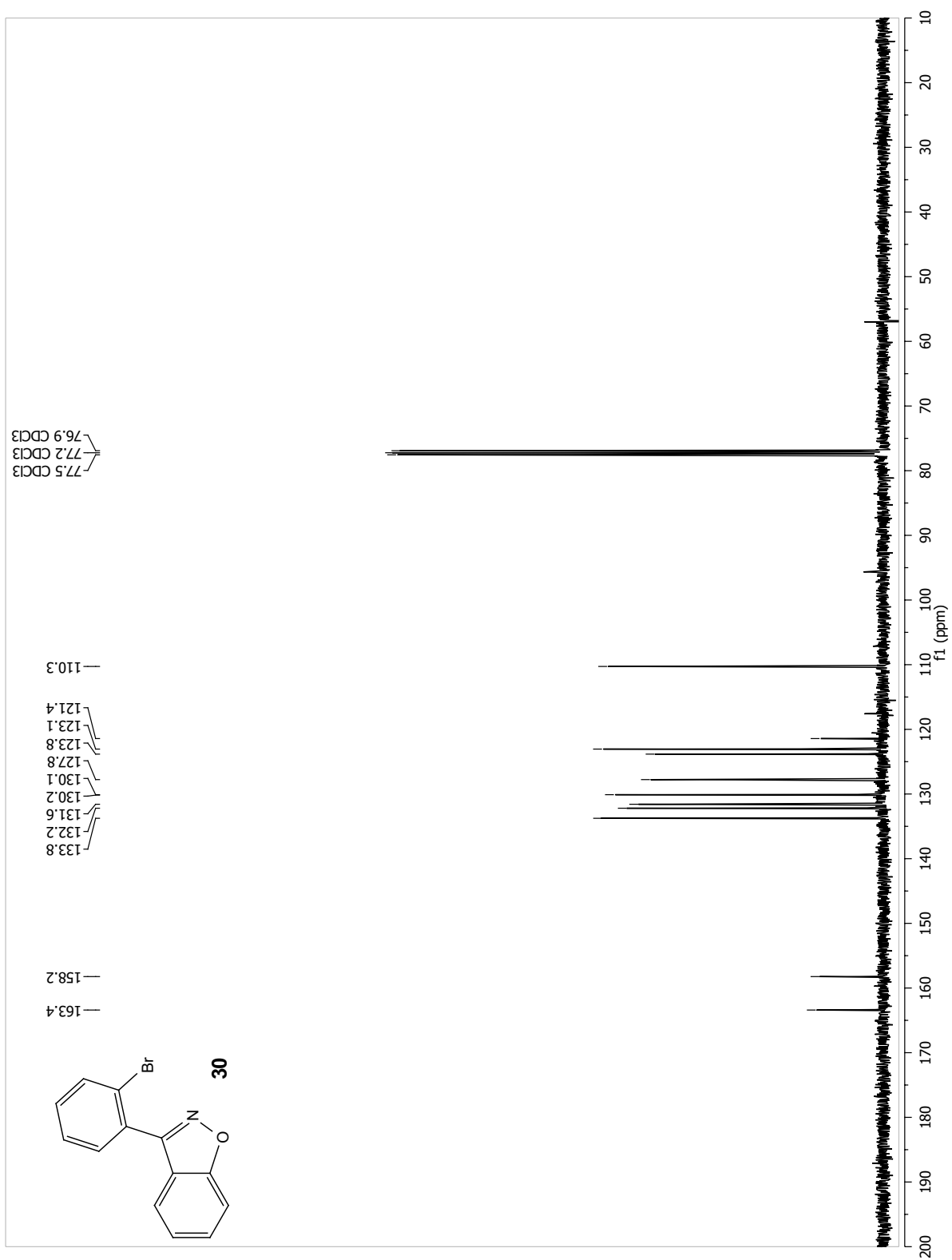




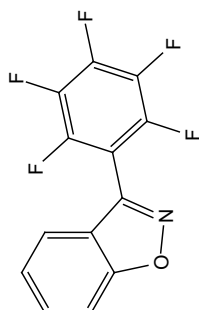




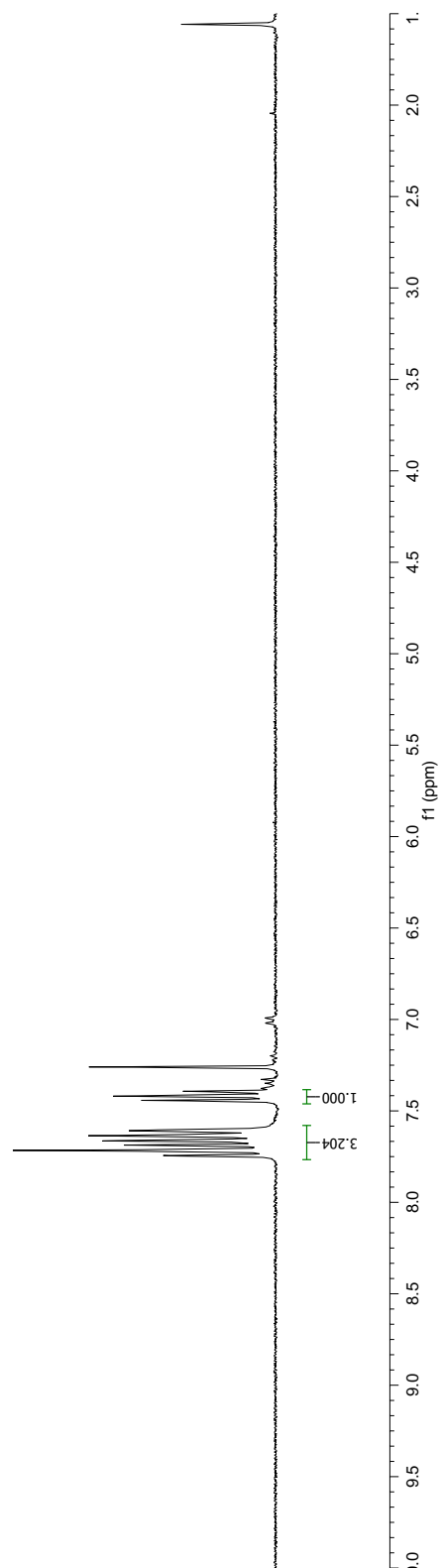


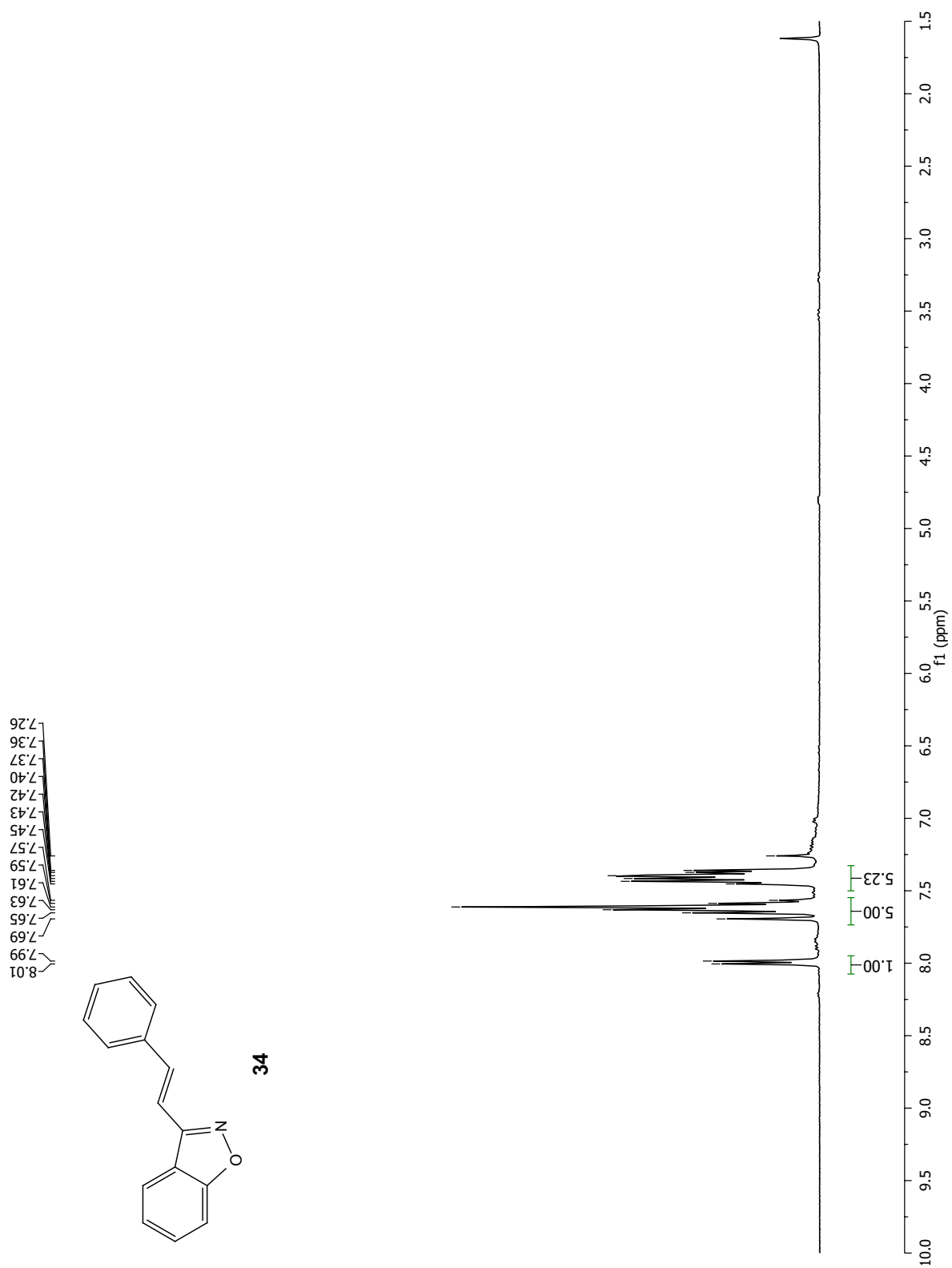


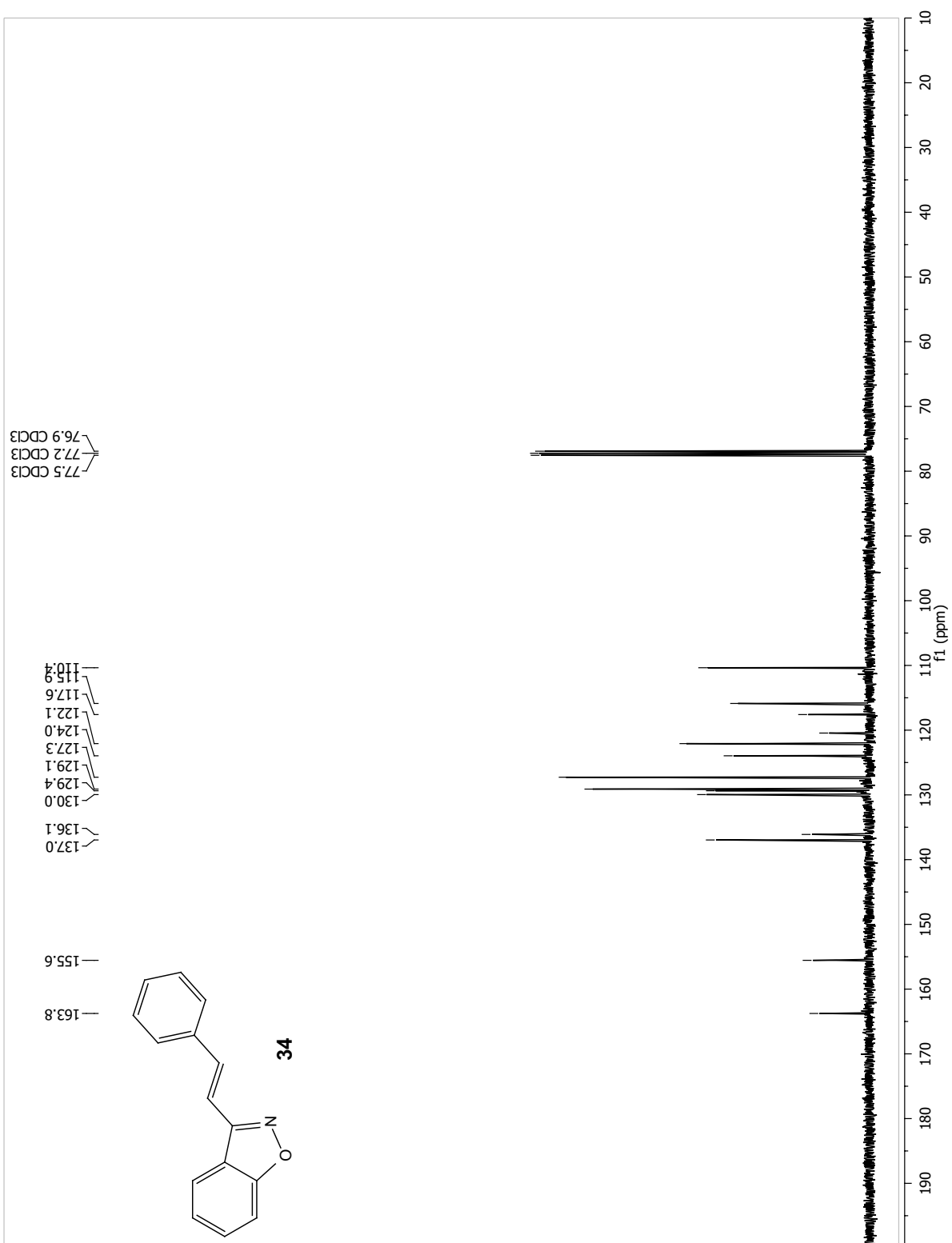
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7.64
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7.42
7.39
7.26

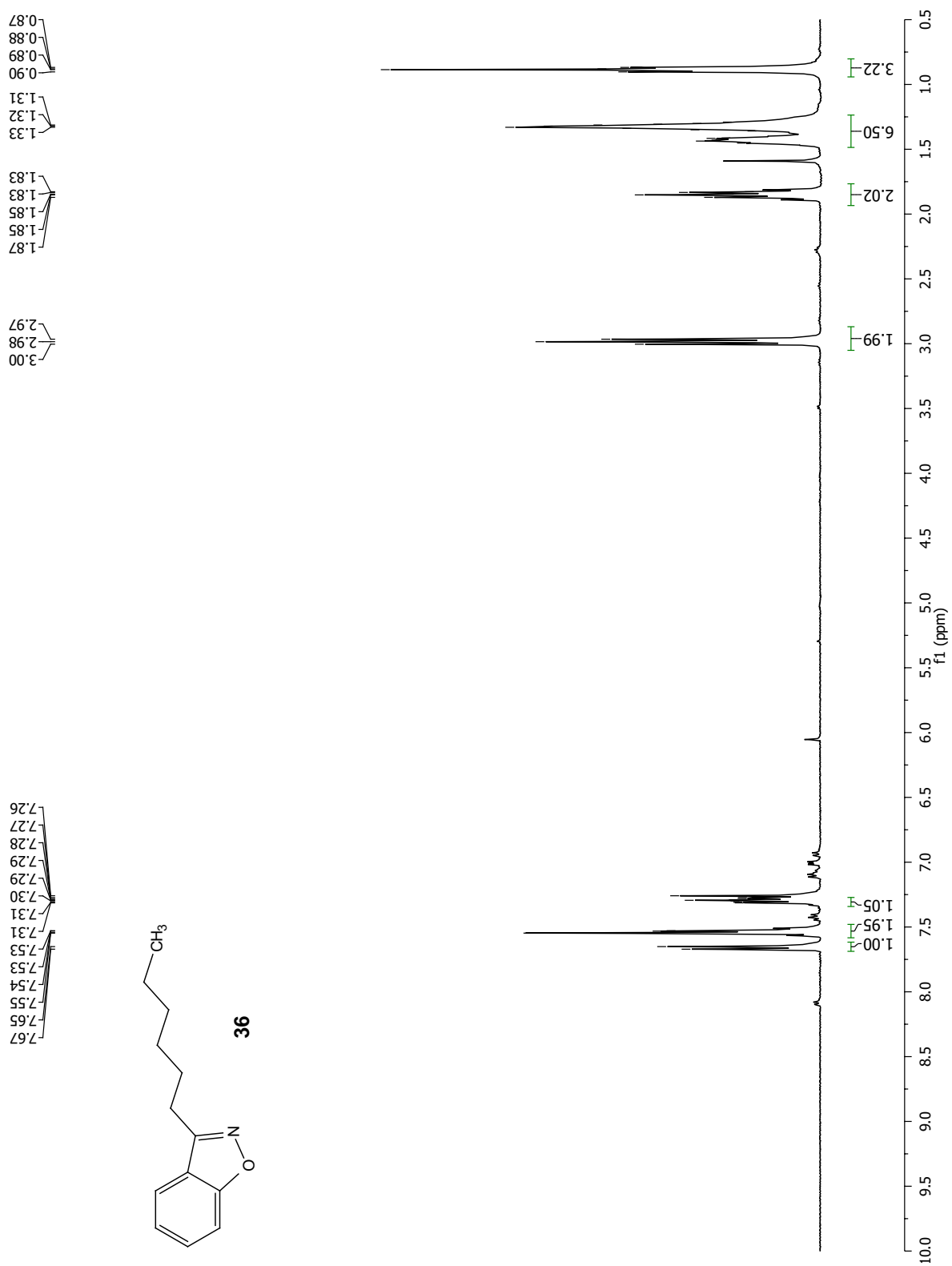


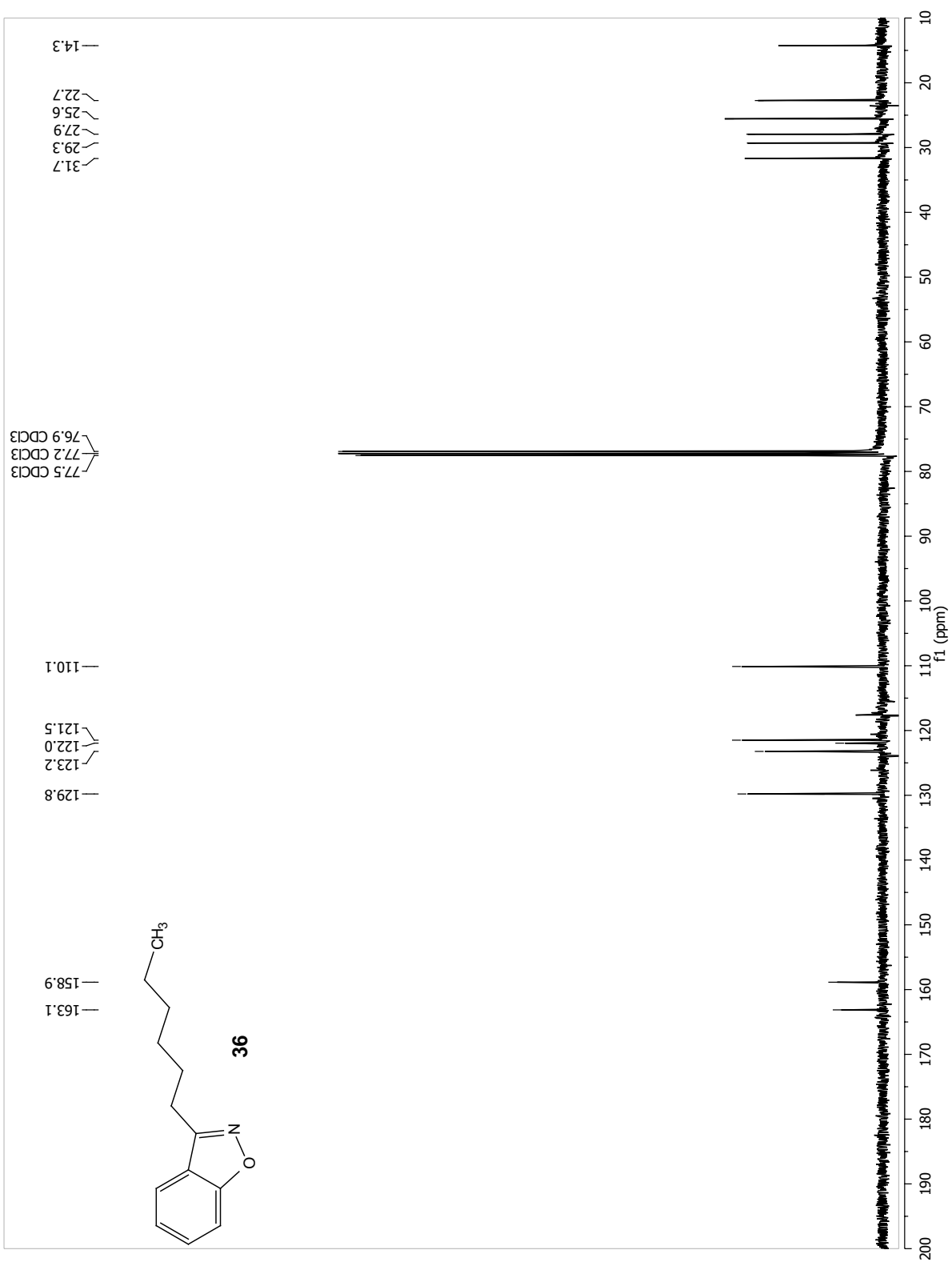
32

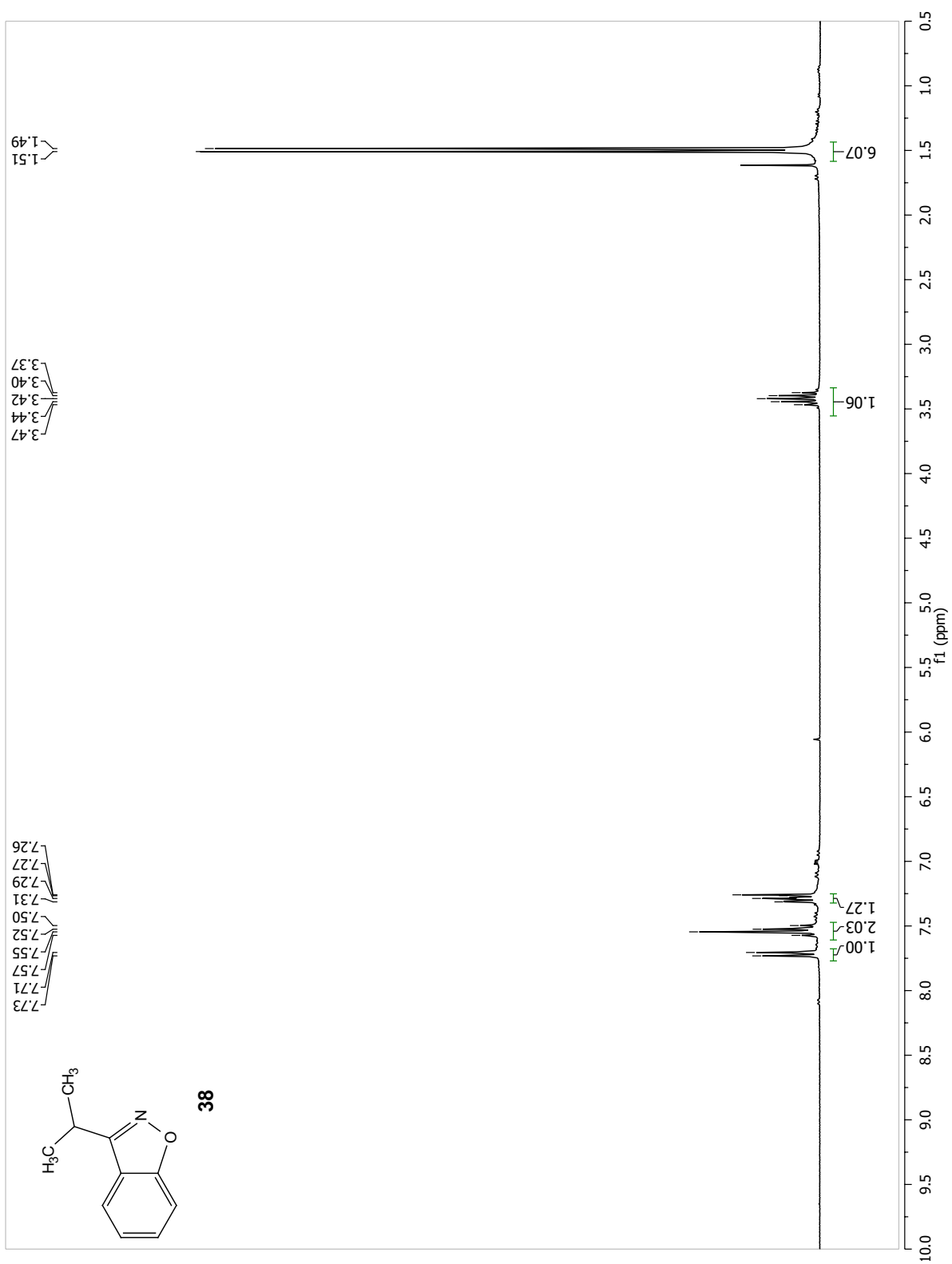


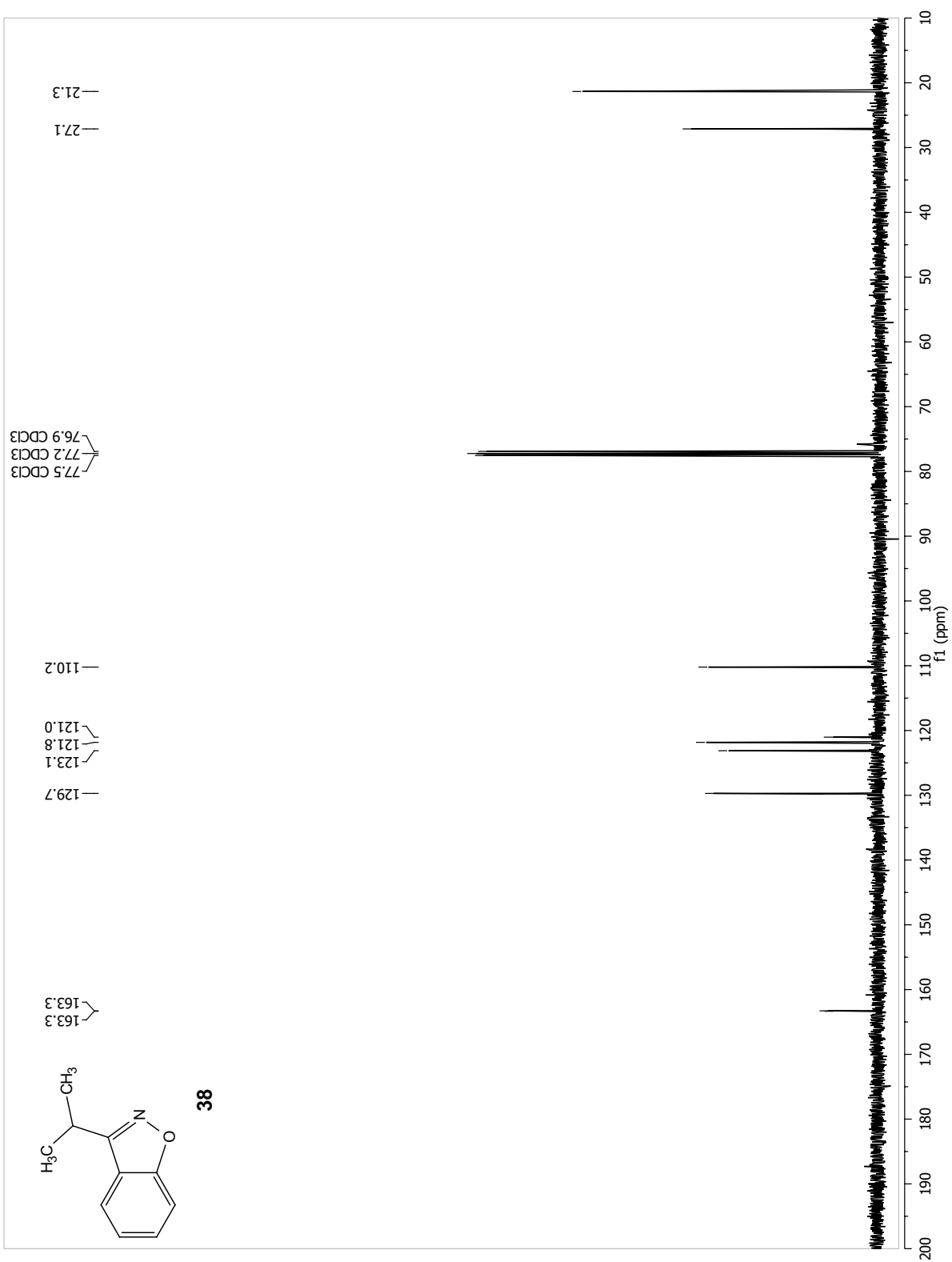


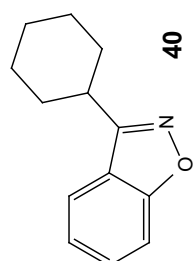
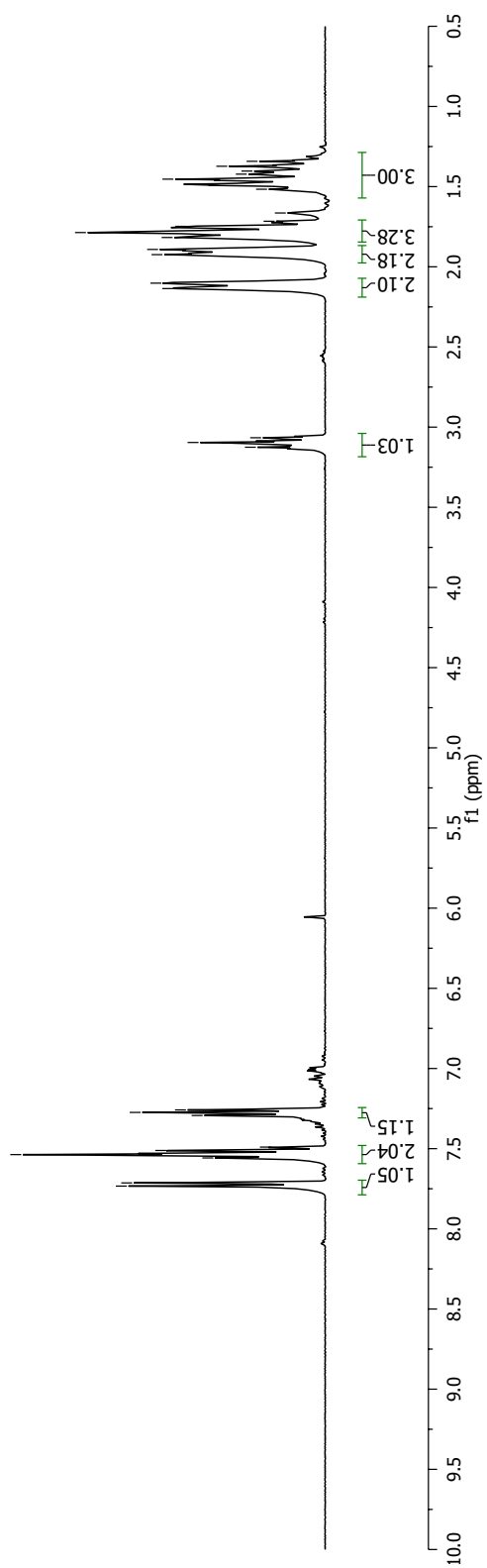


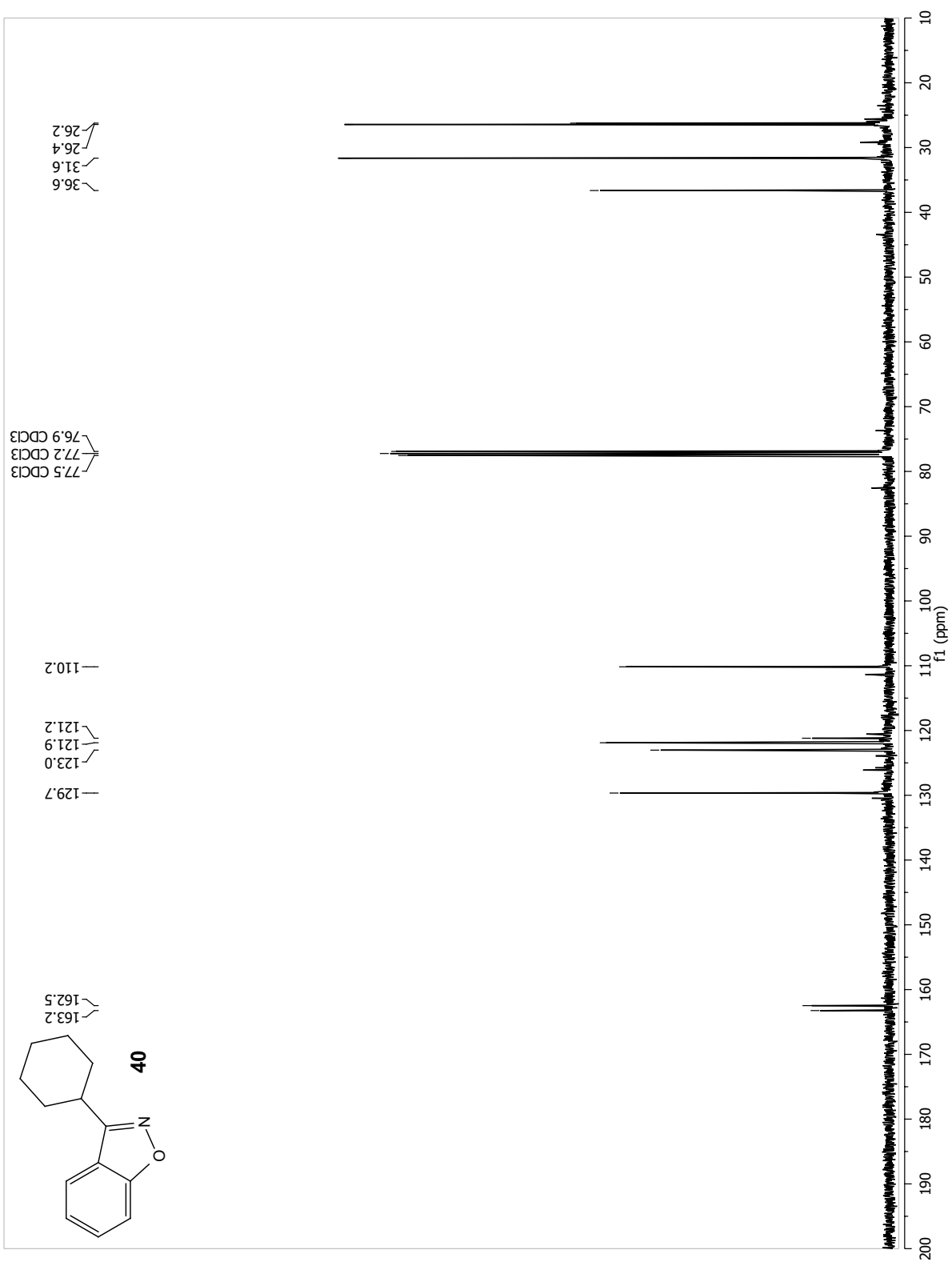


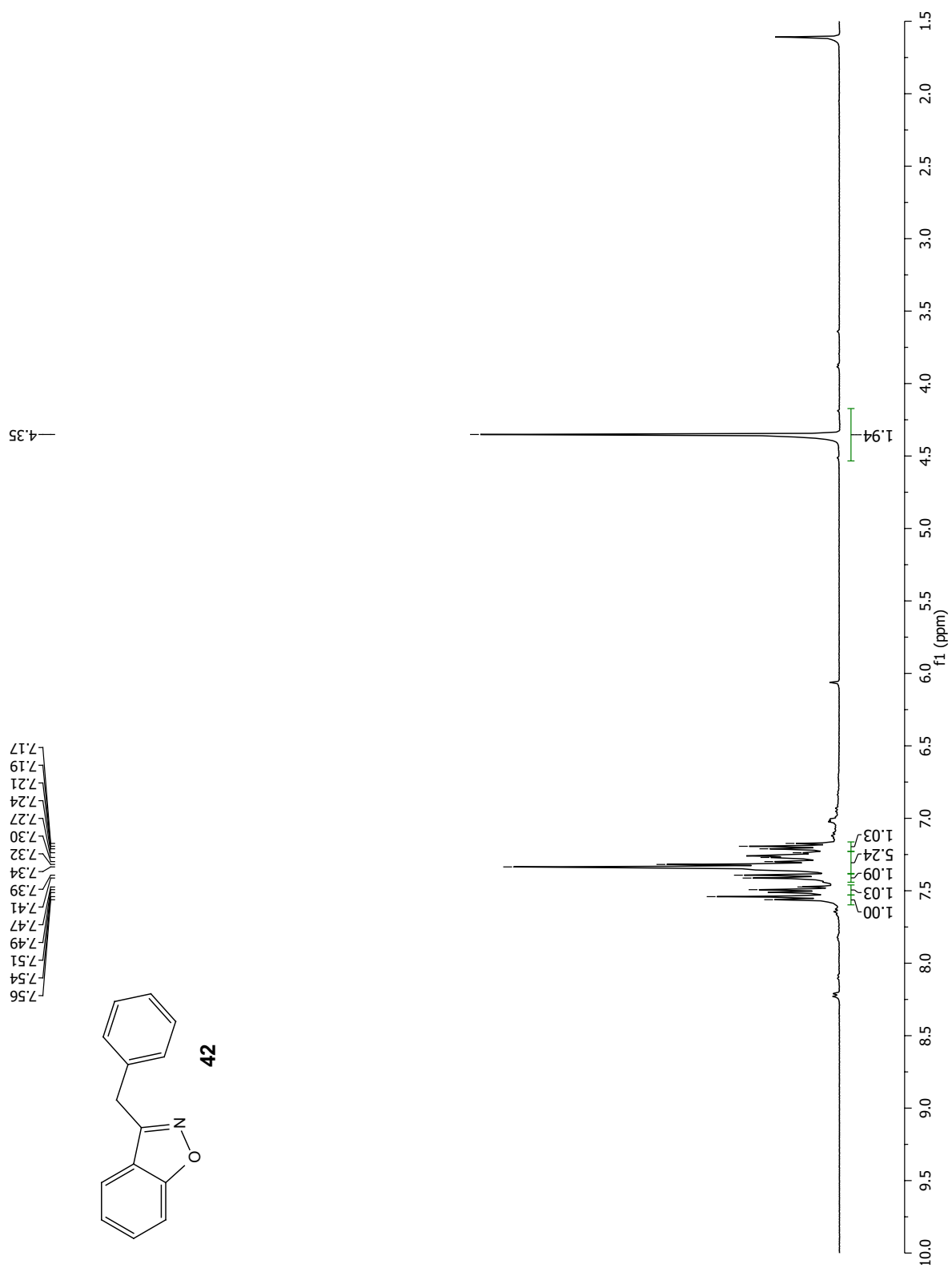


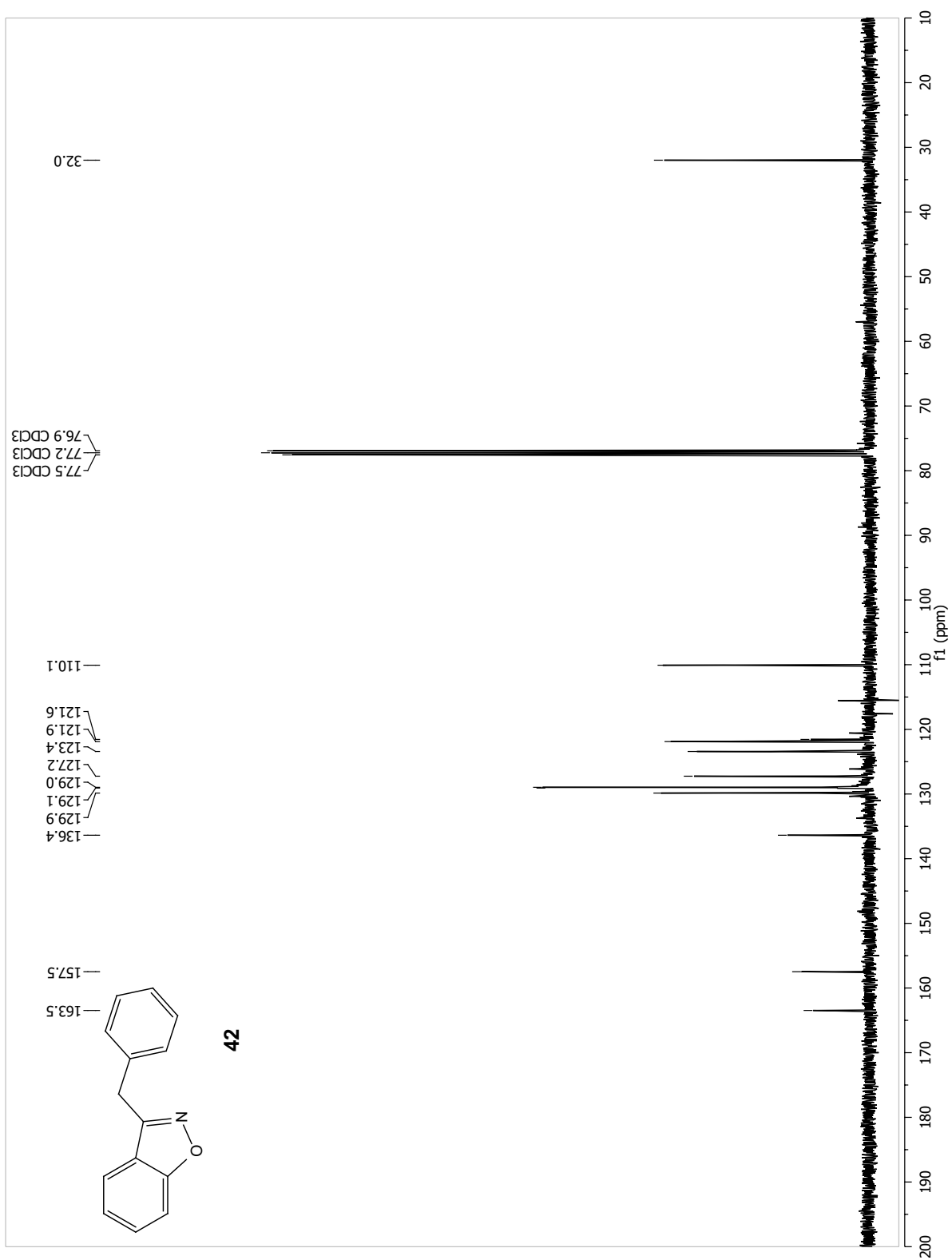


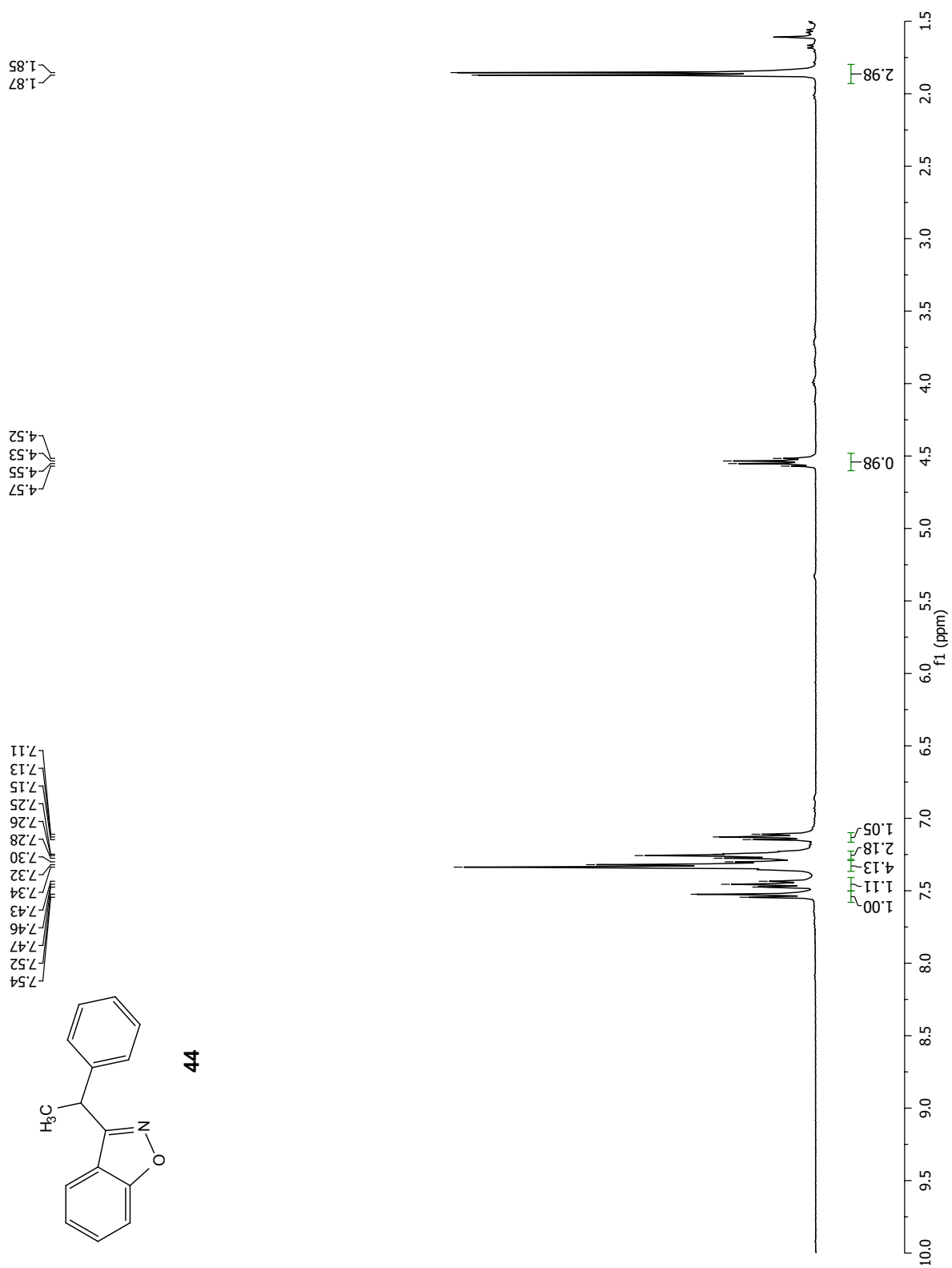


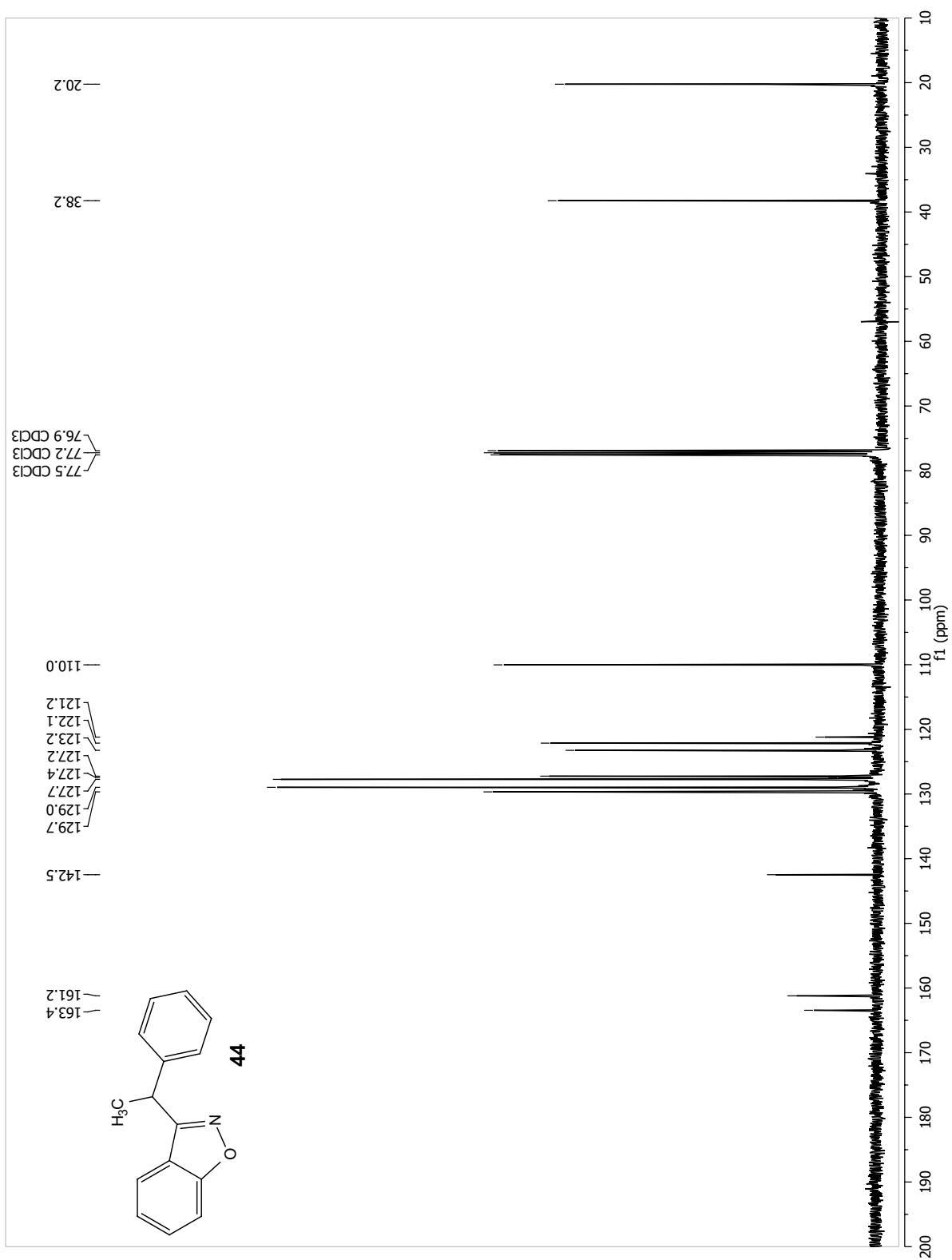


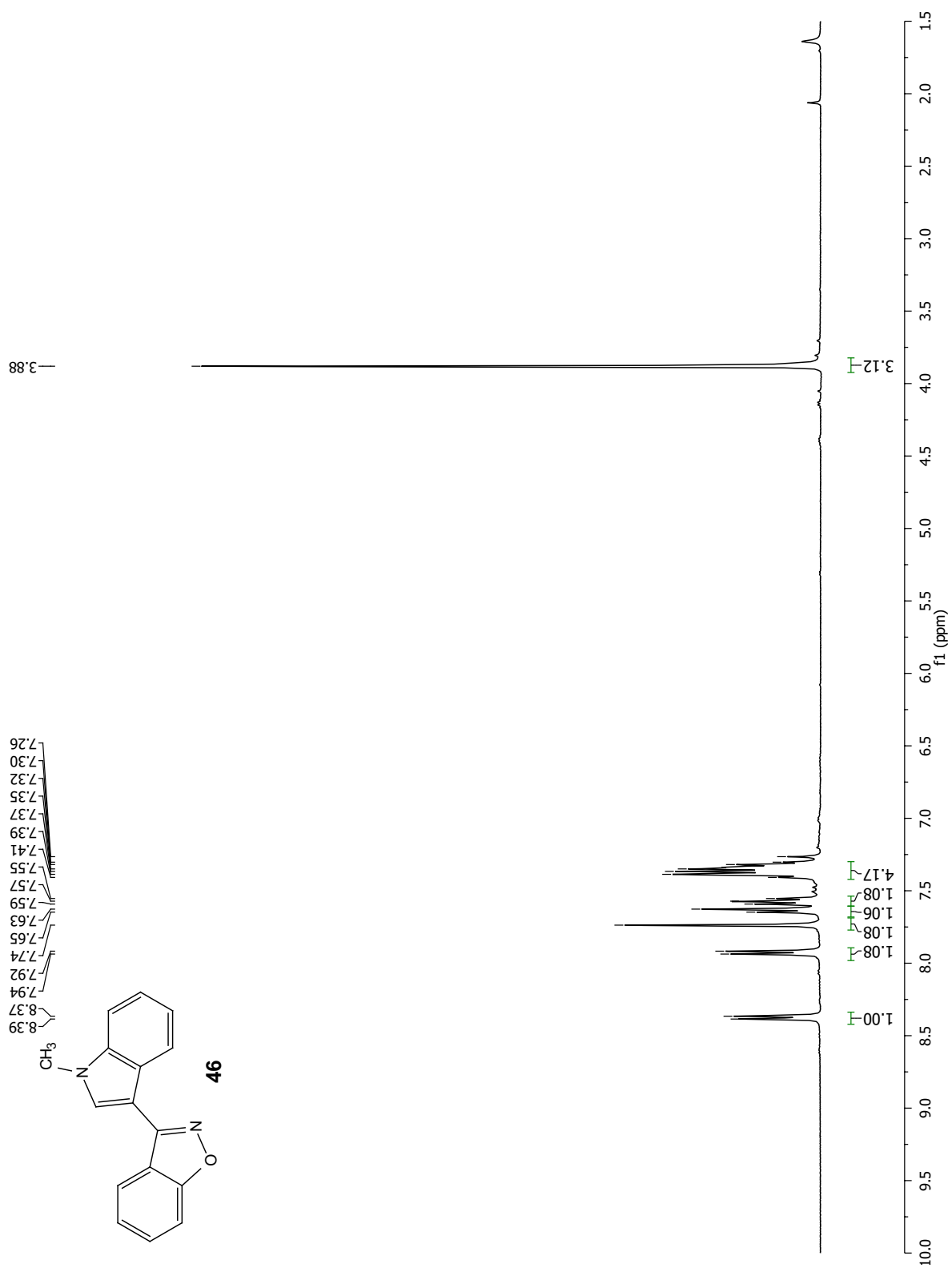


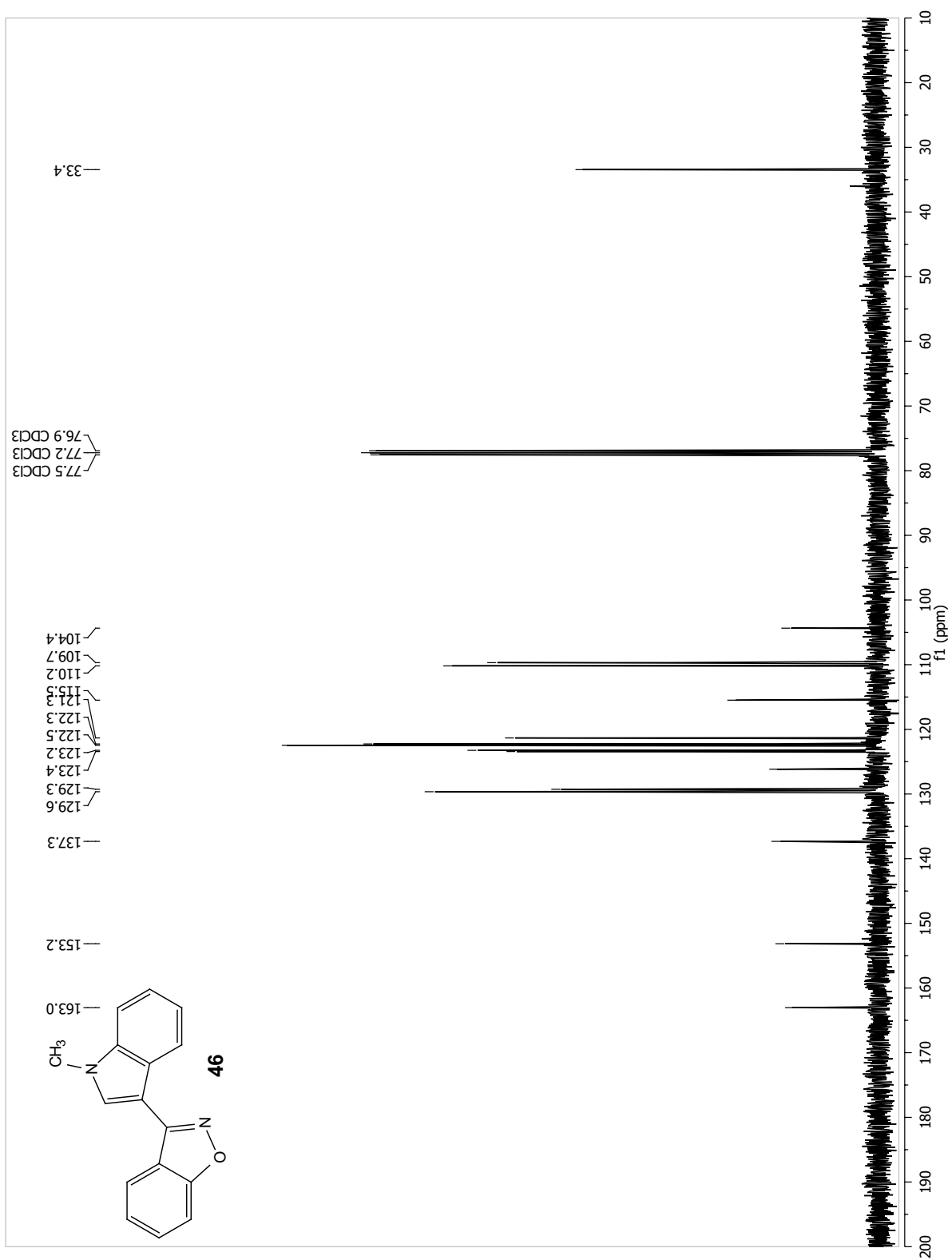


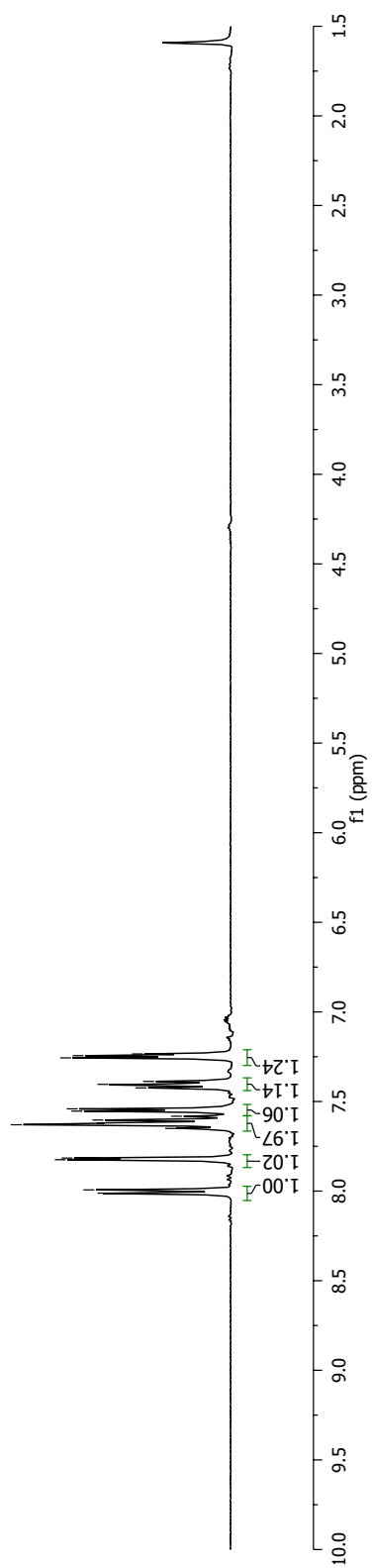
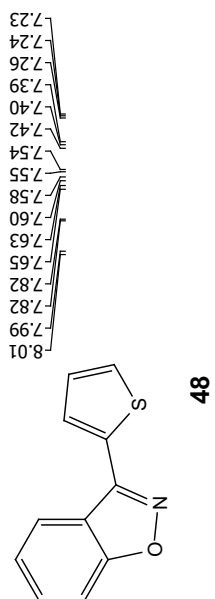


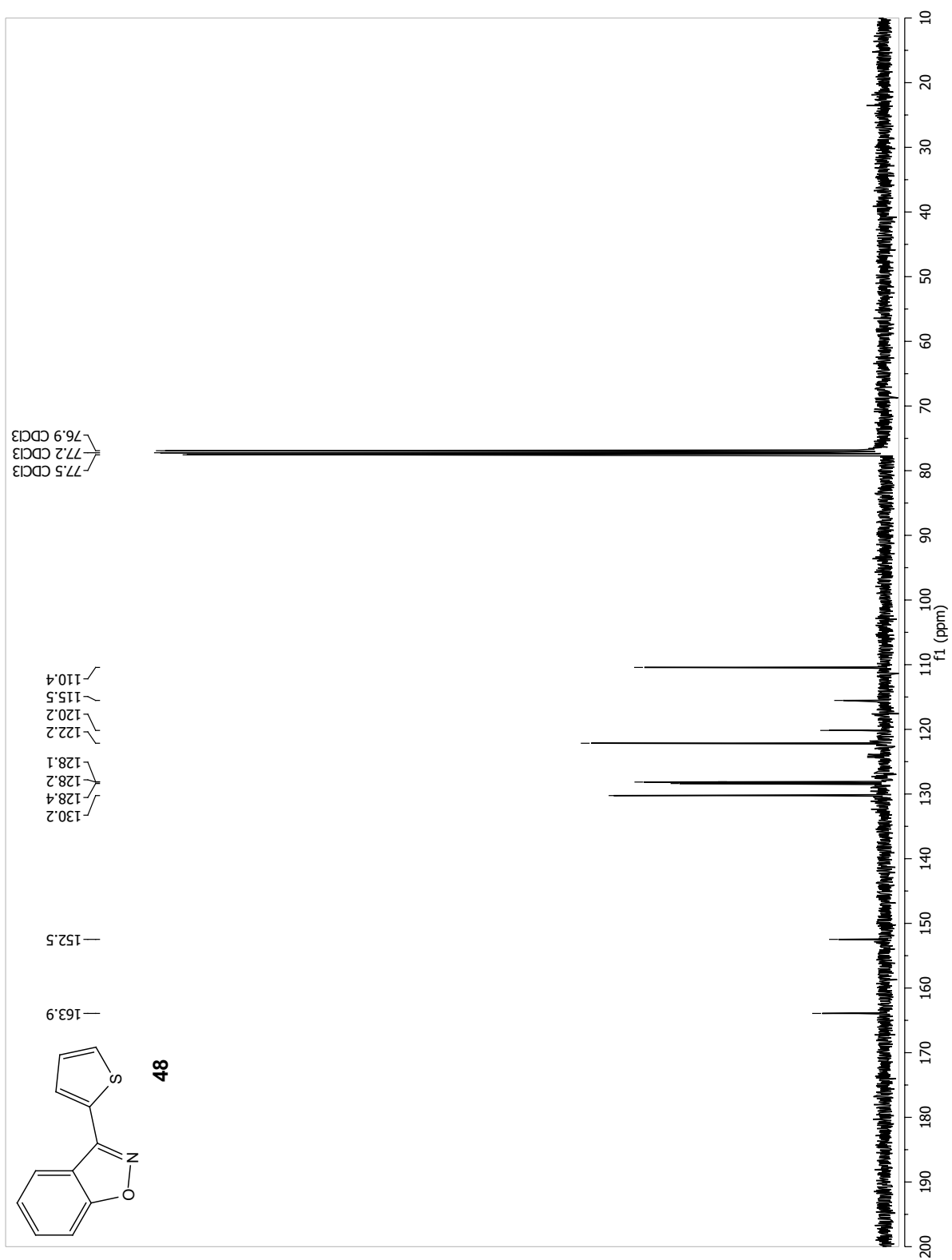


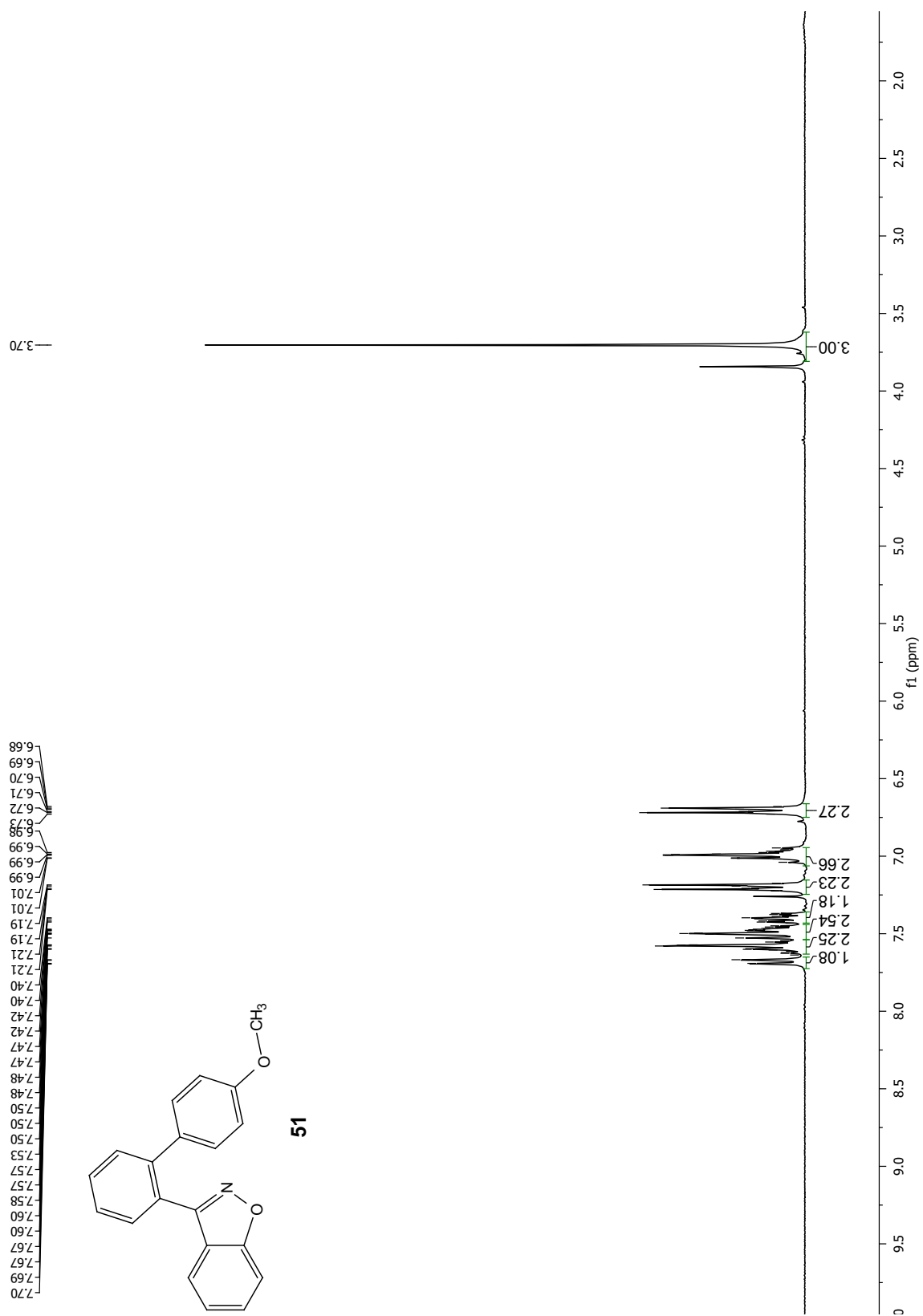


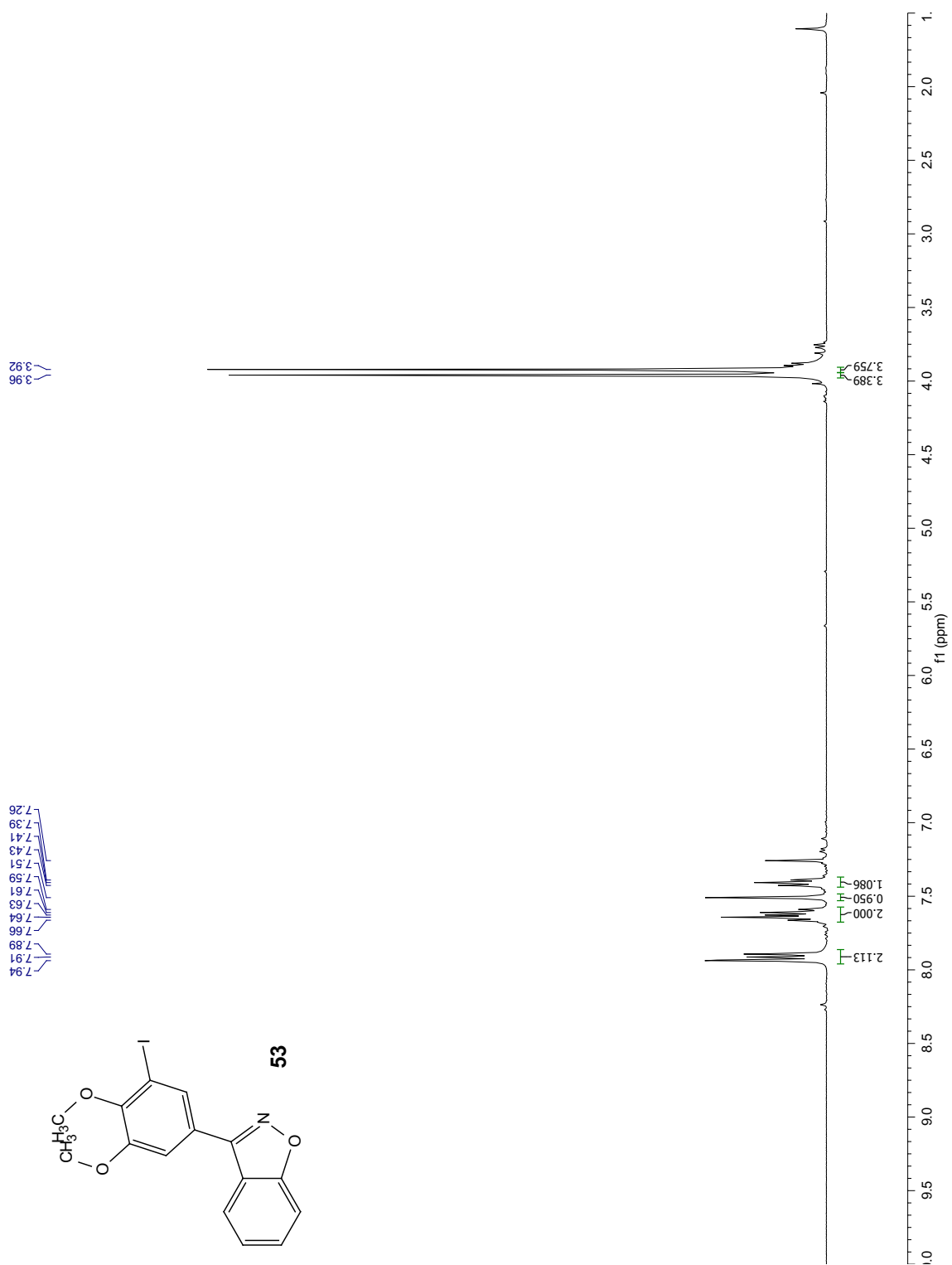


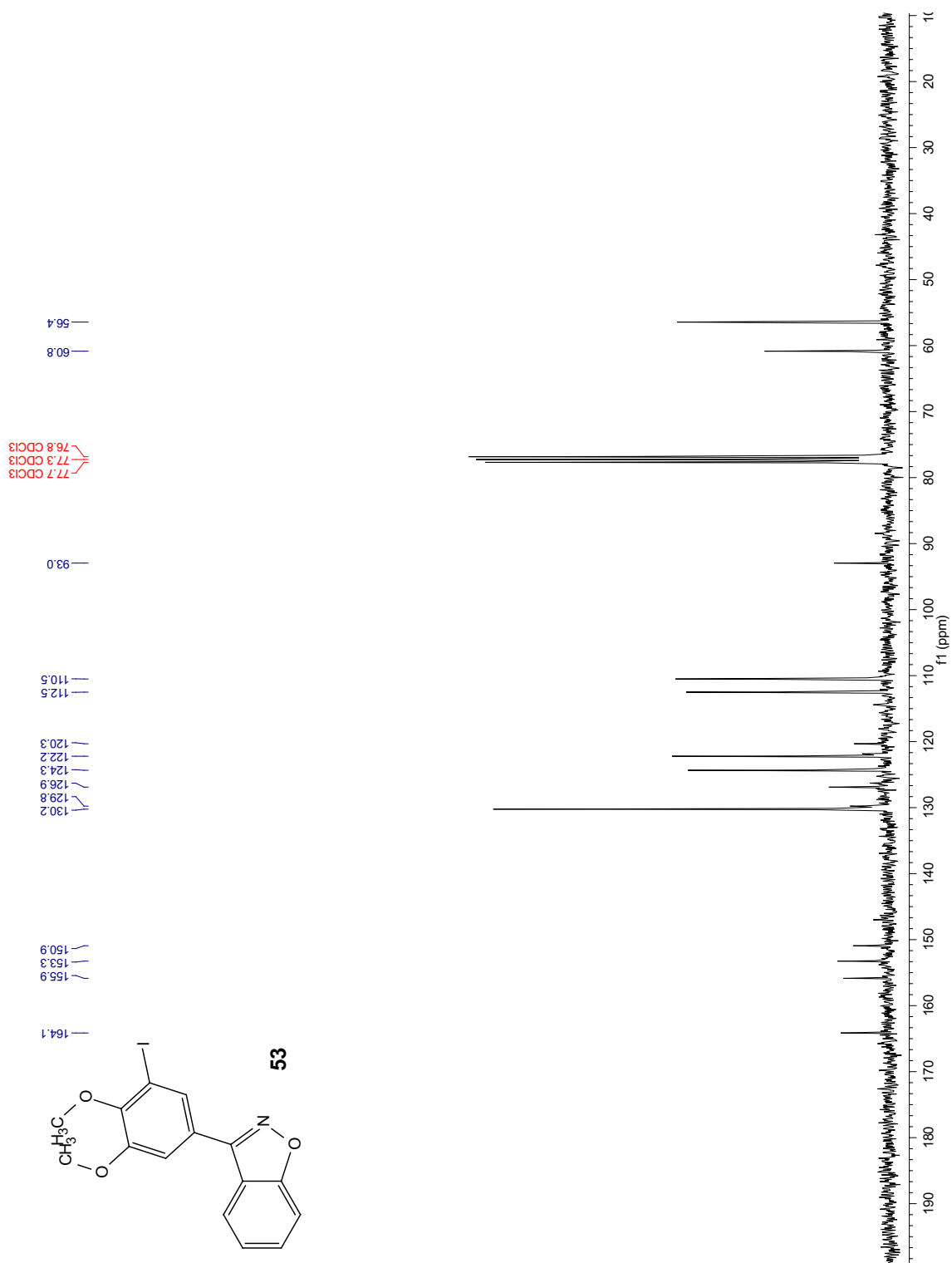


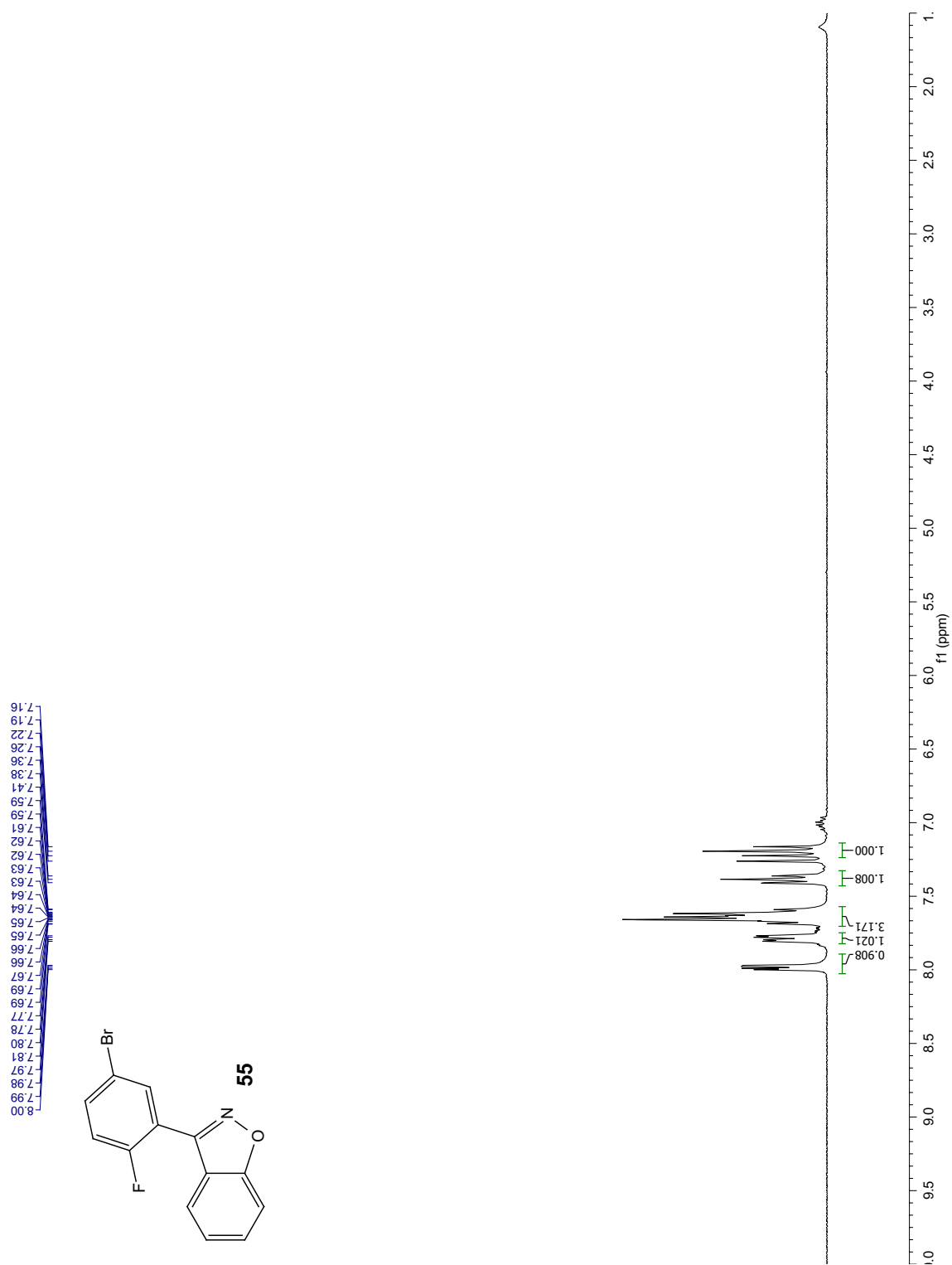


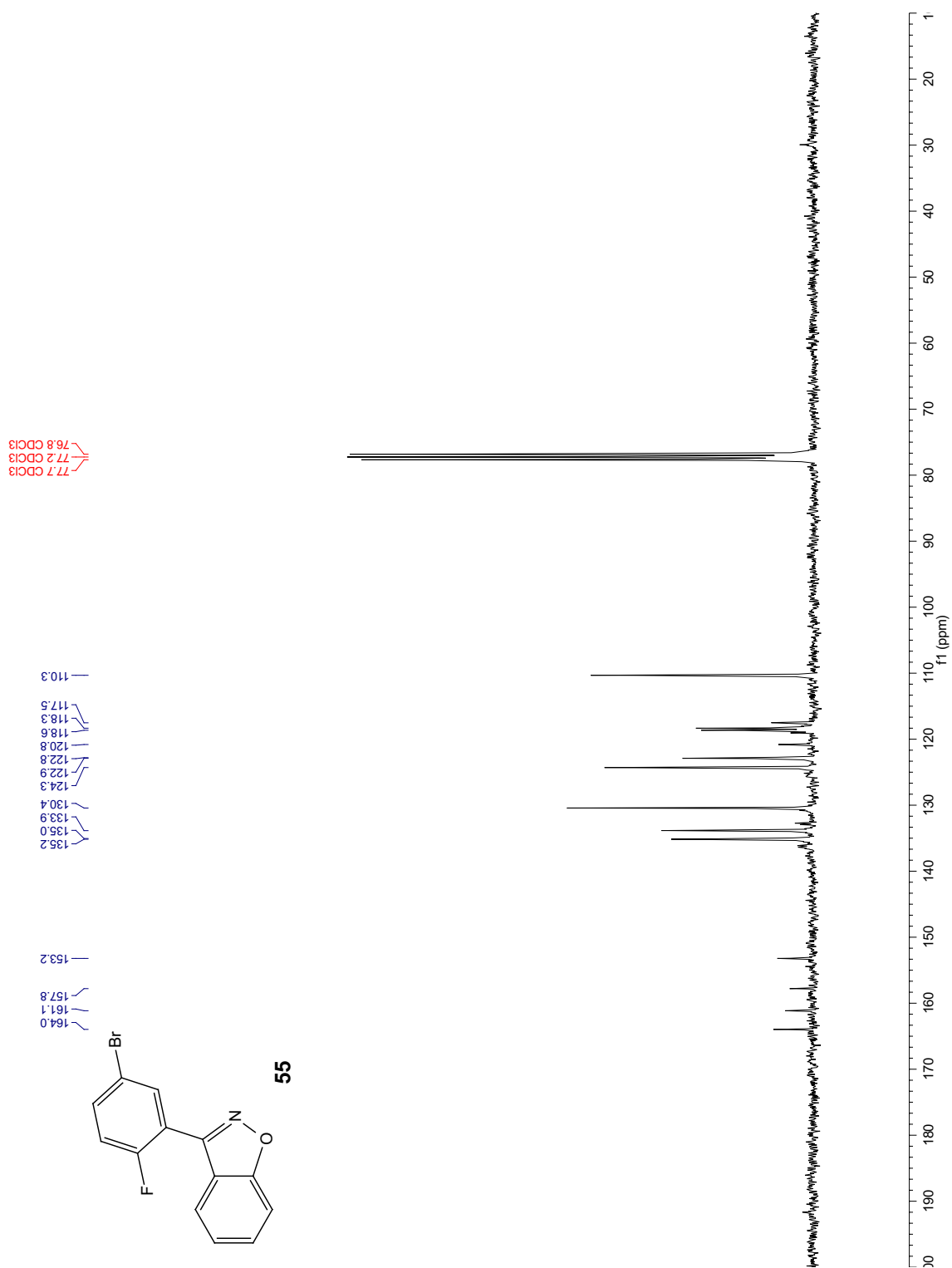


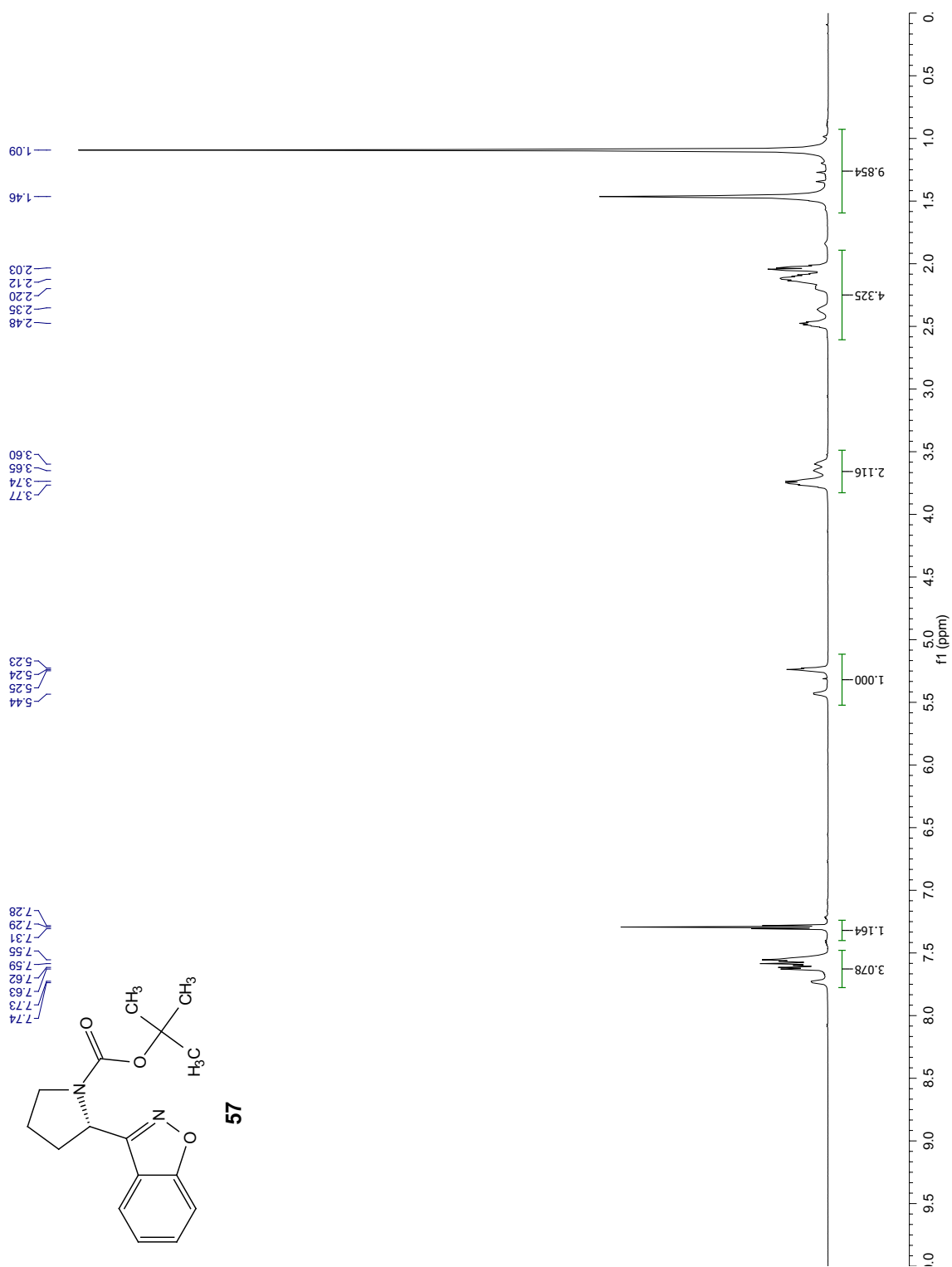


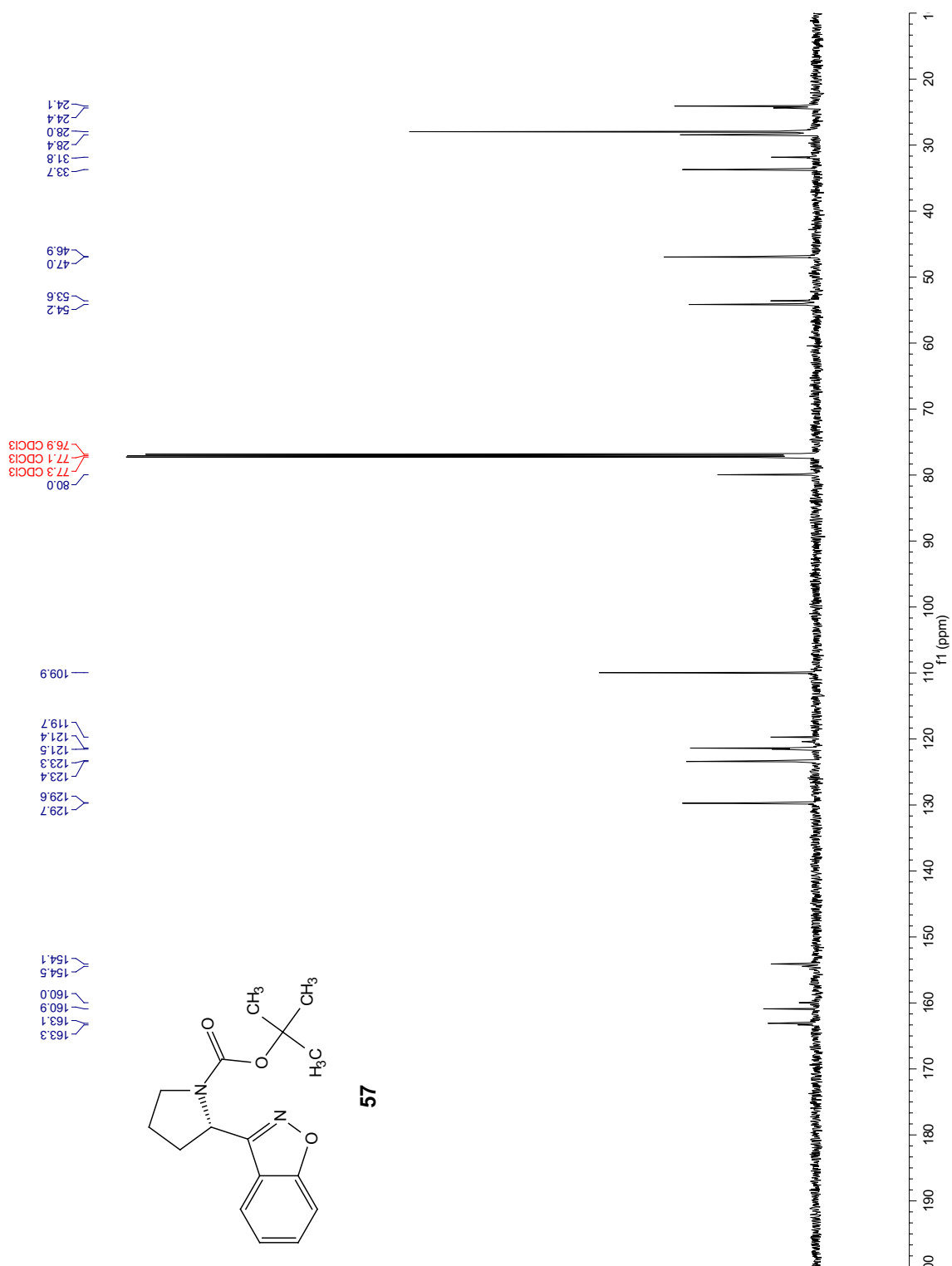


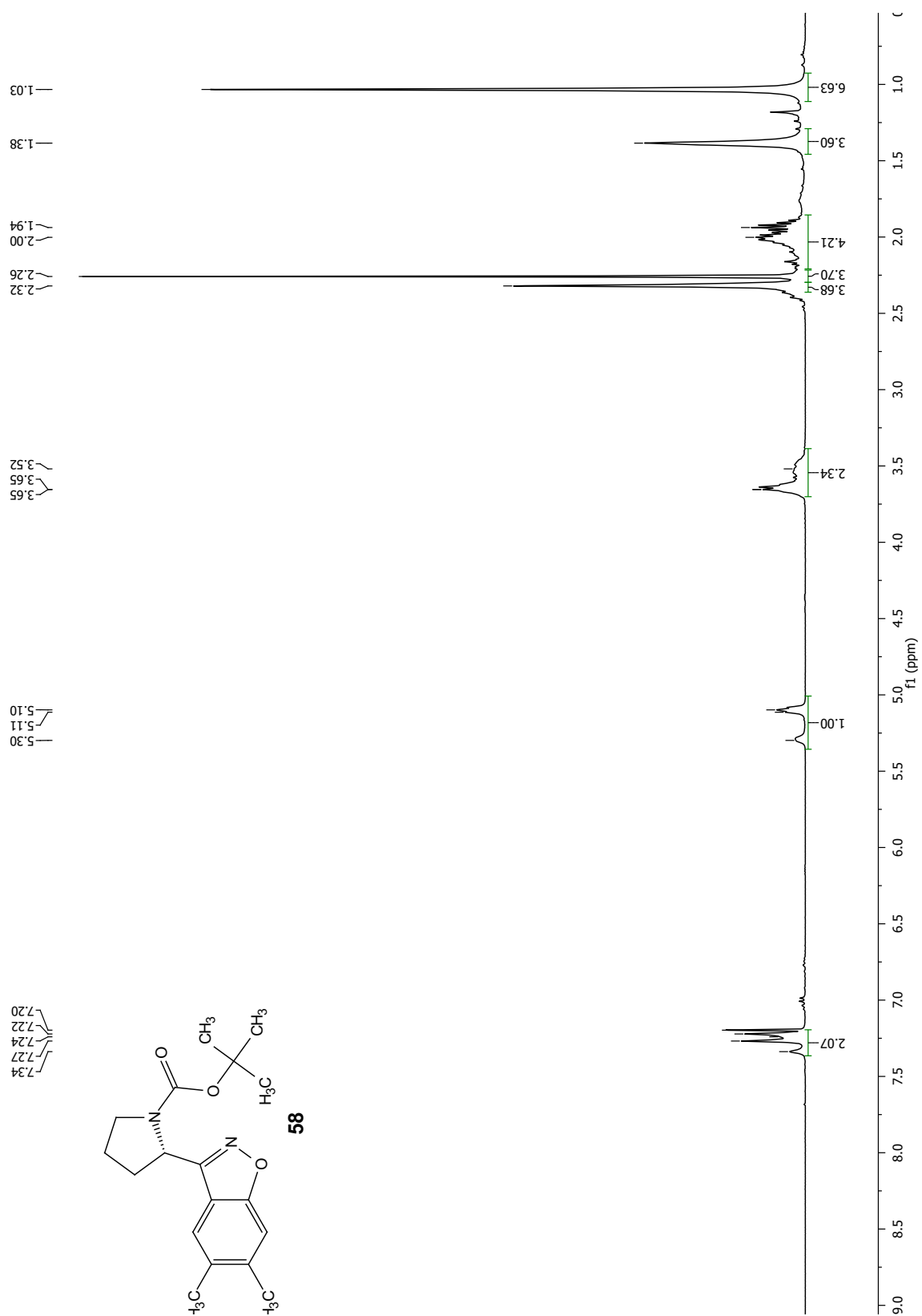


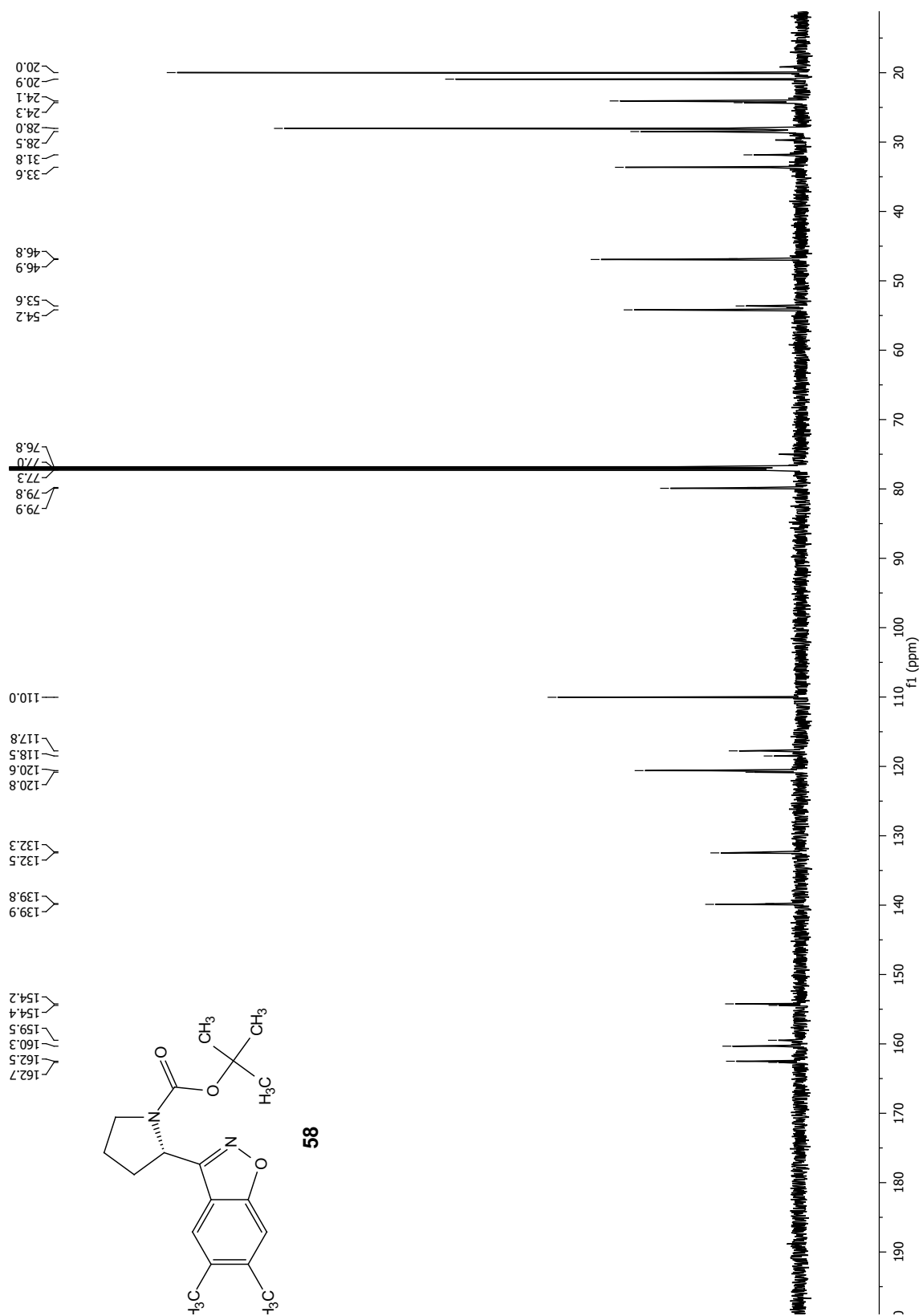


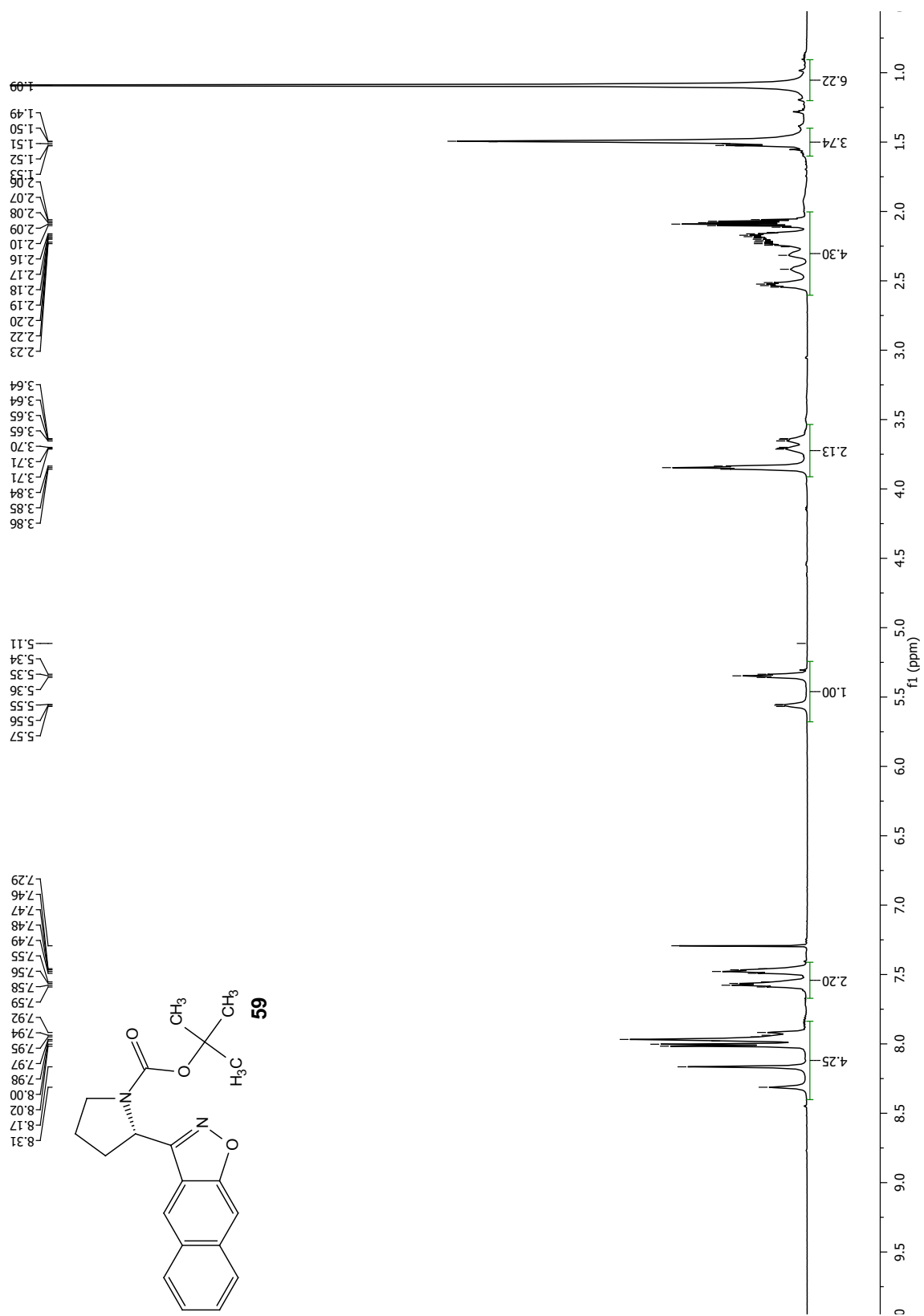


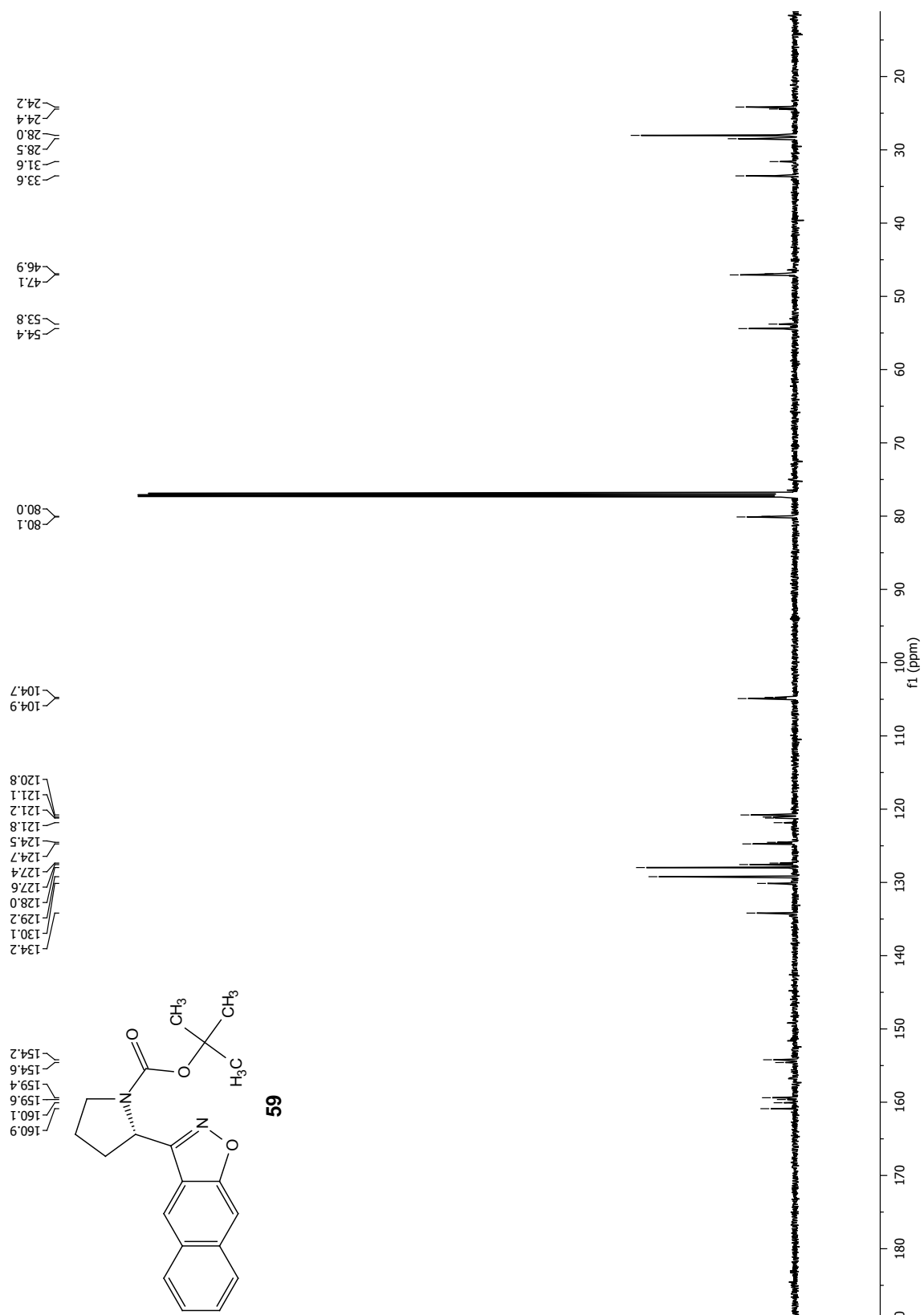


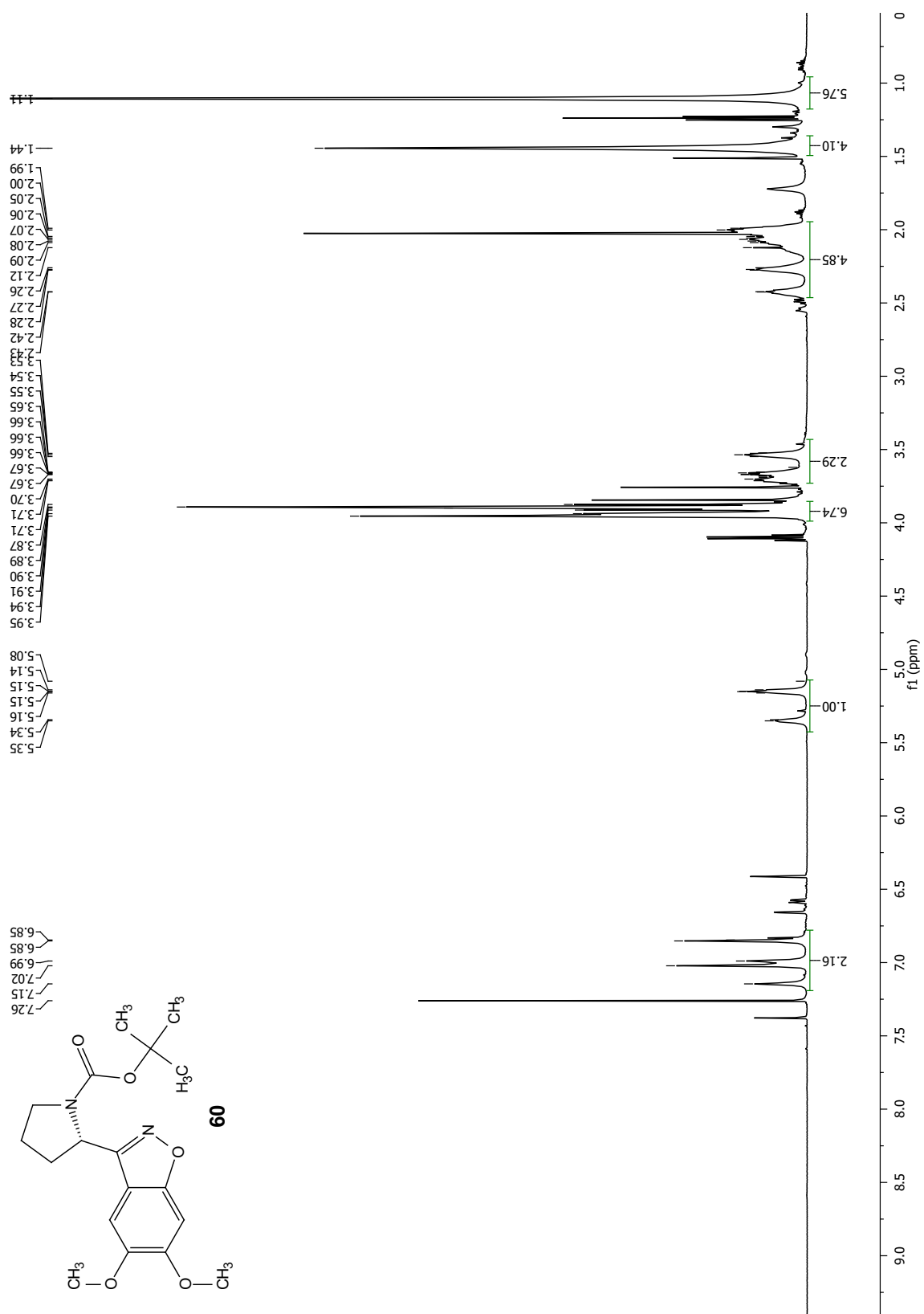


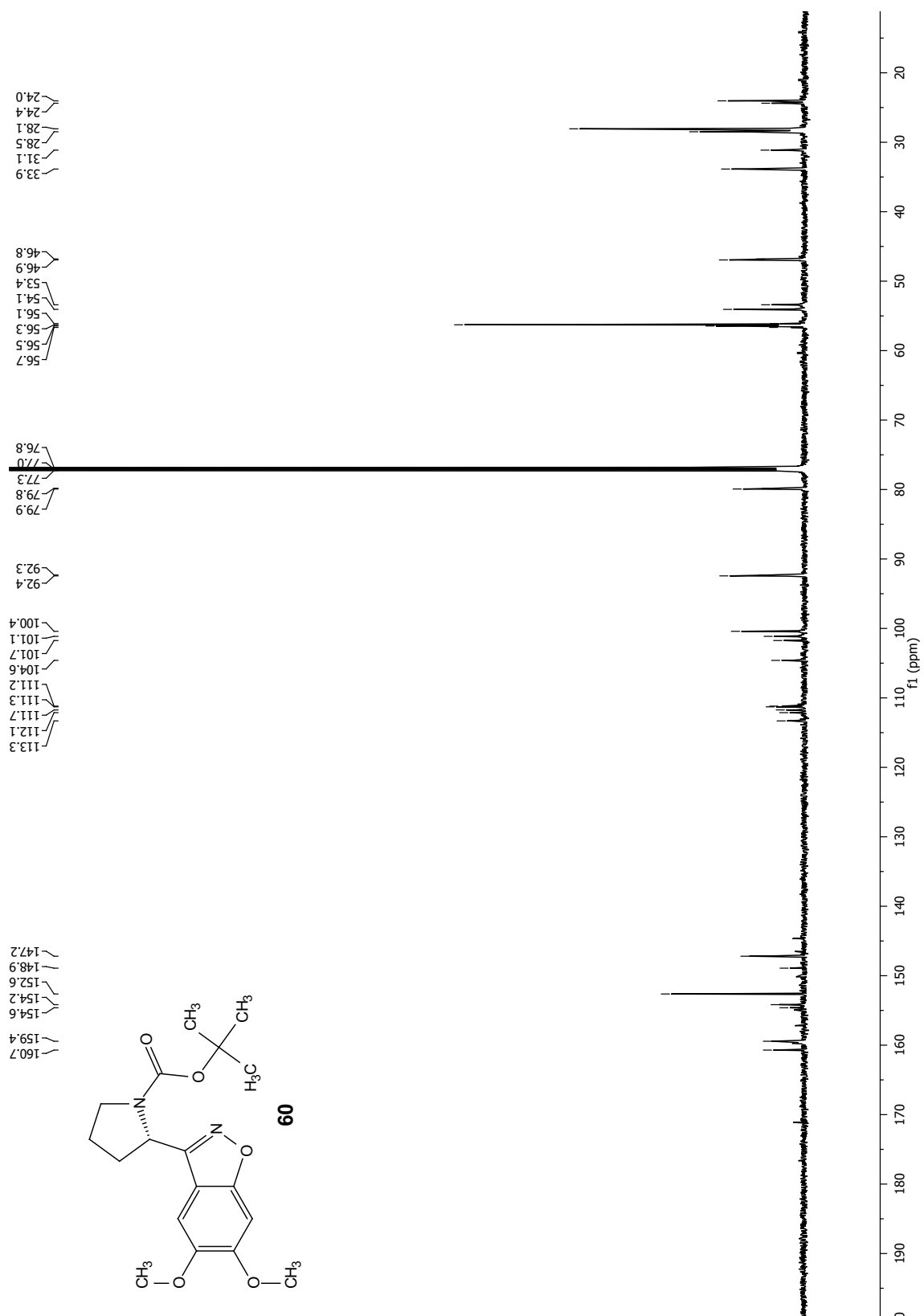


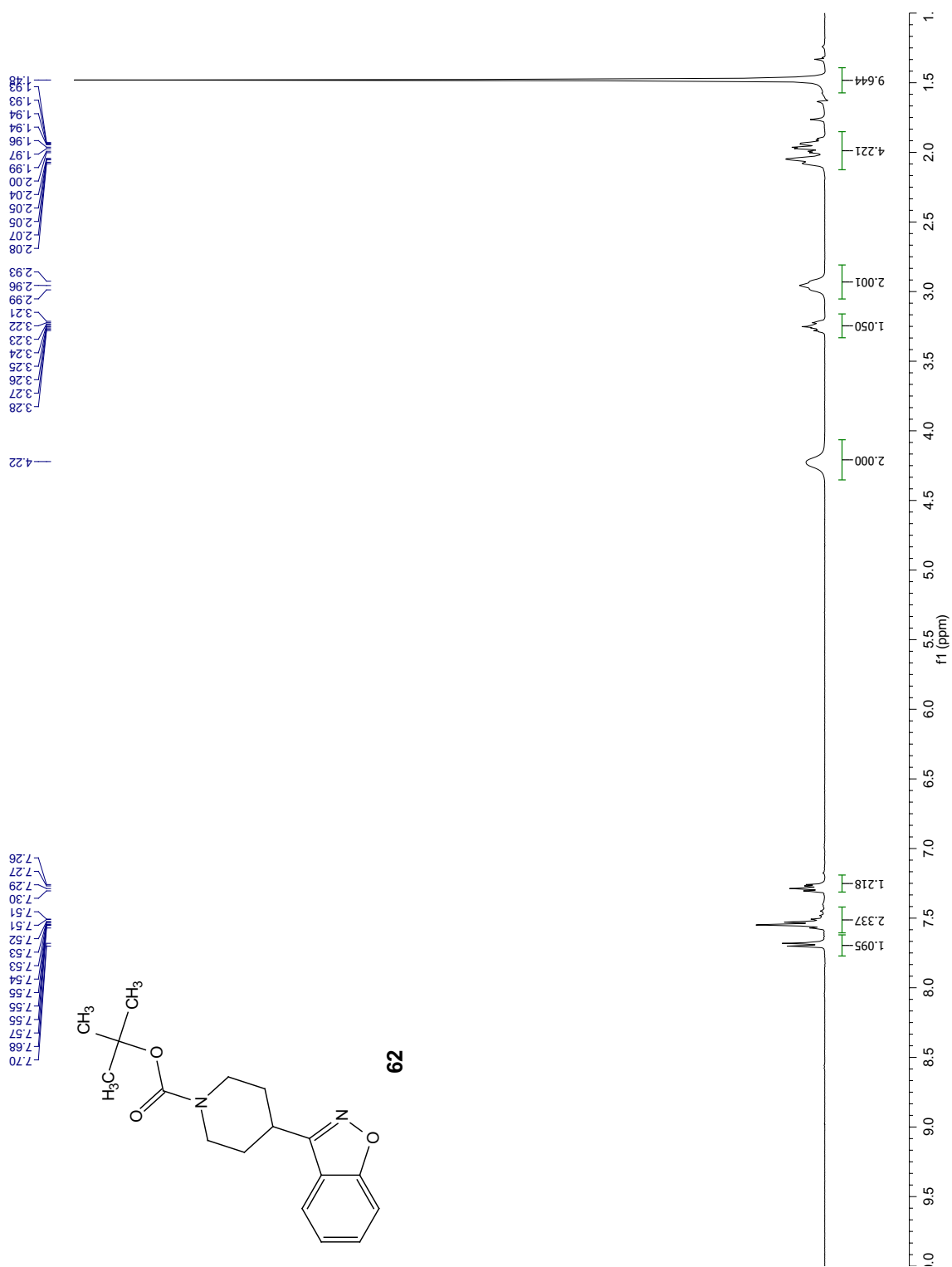


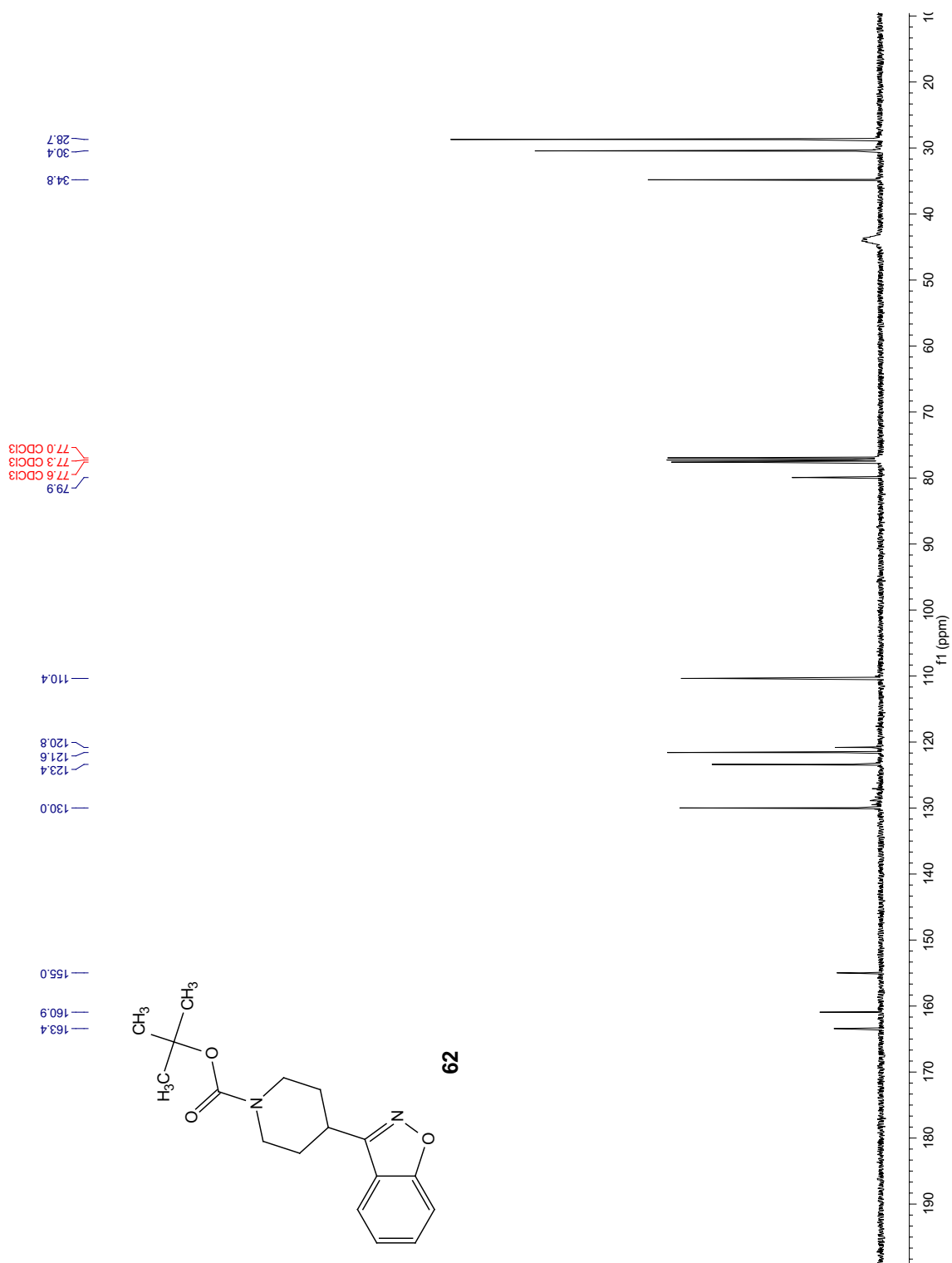


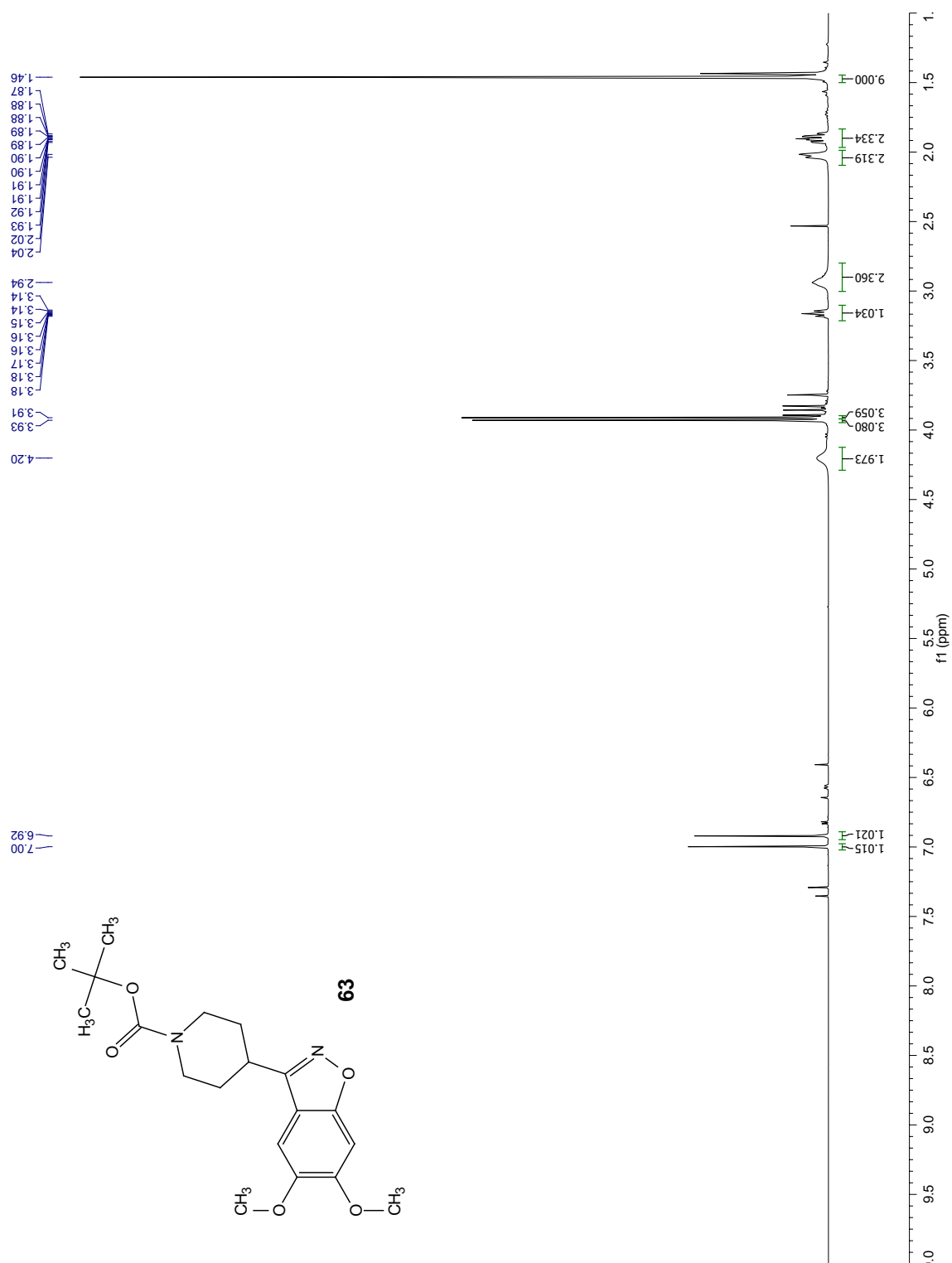


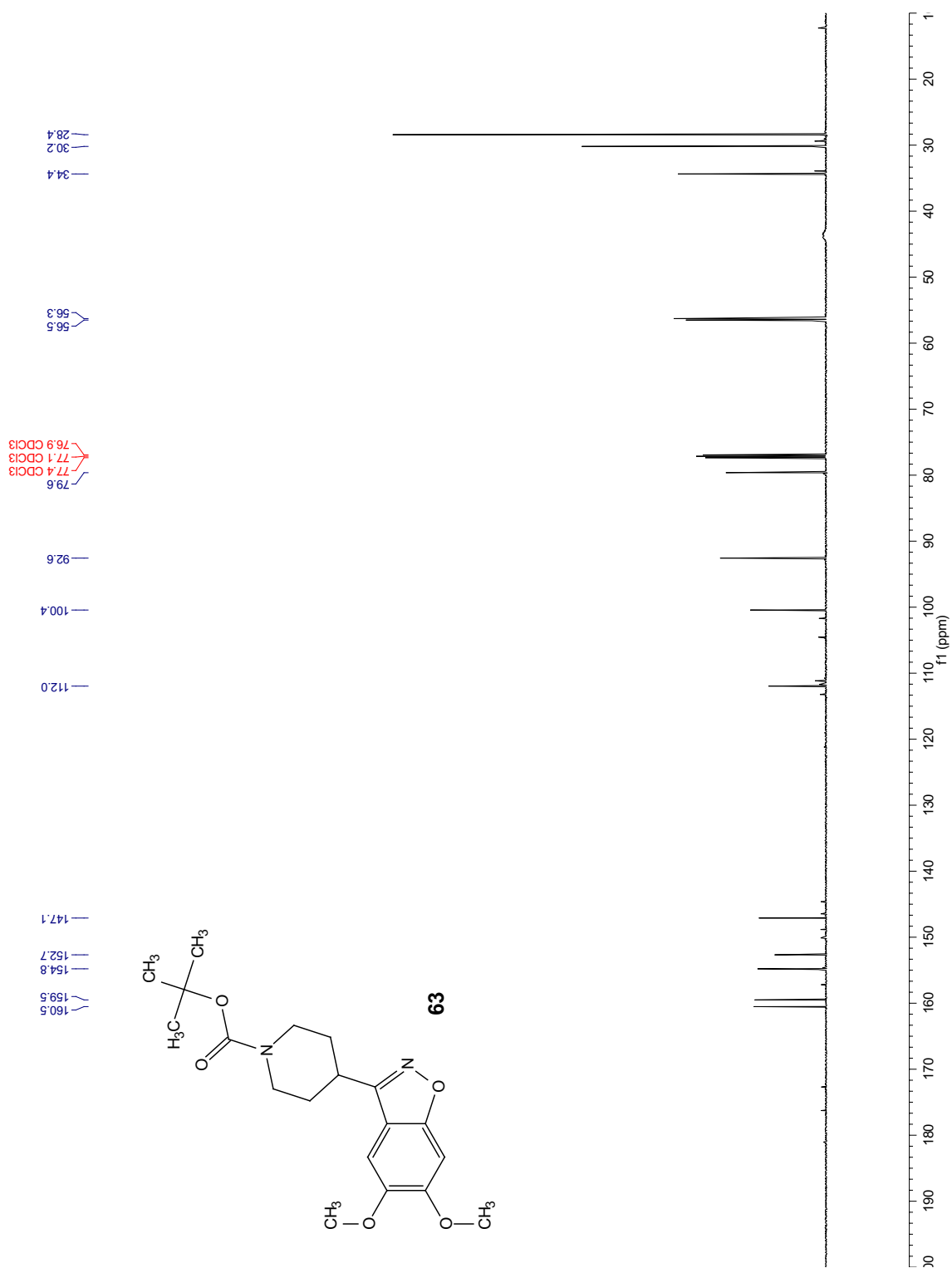


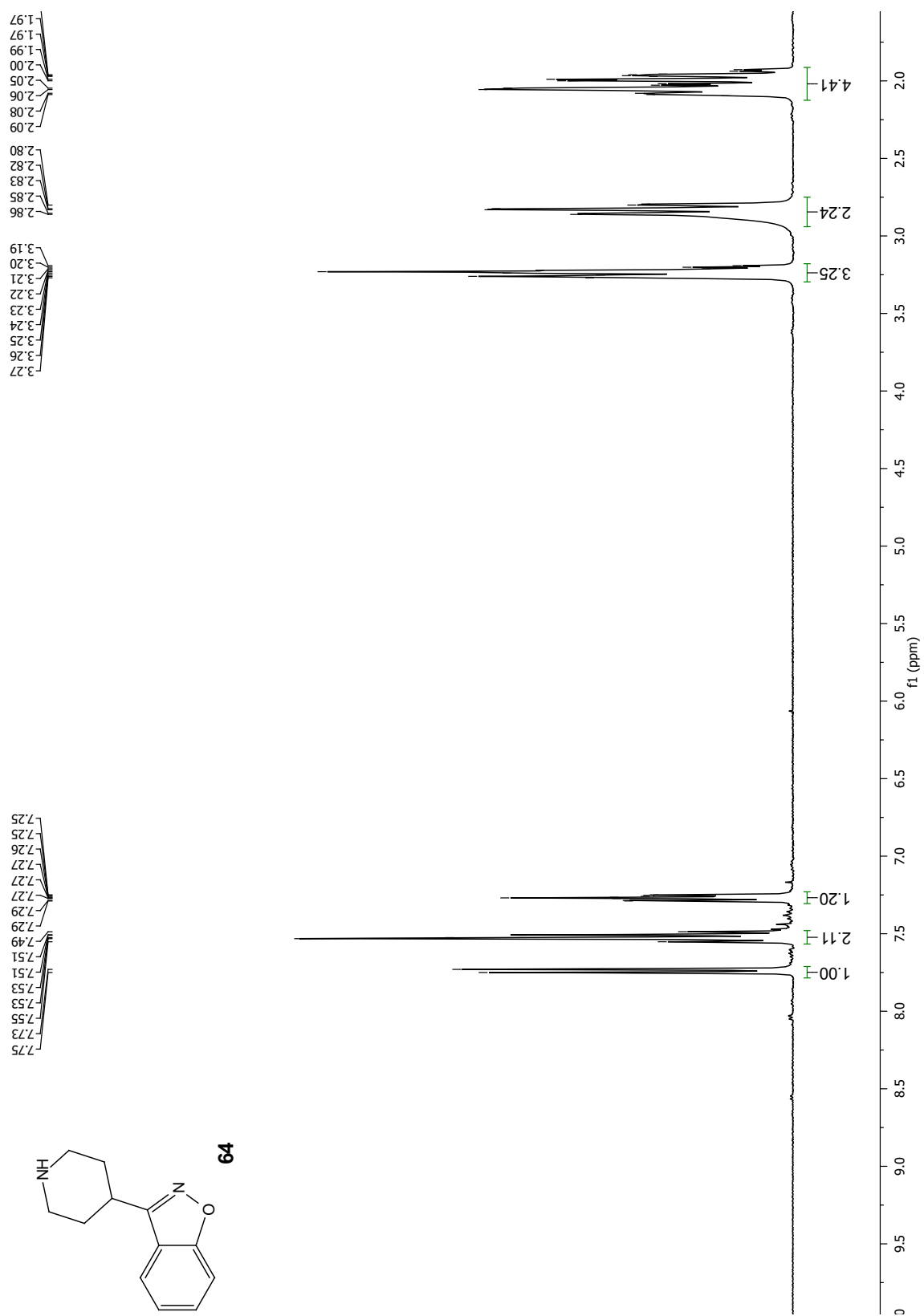


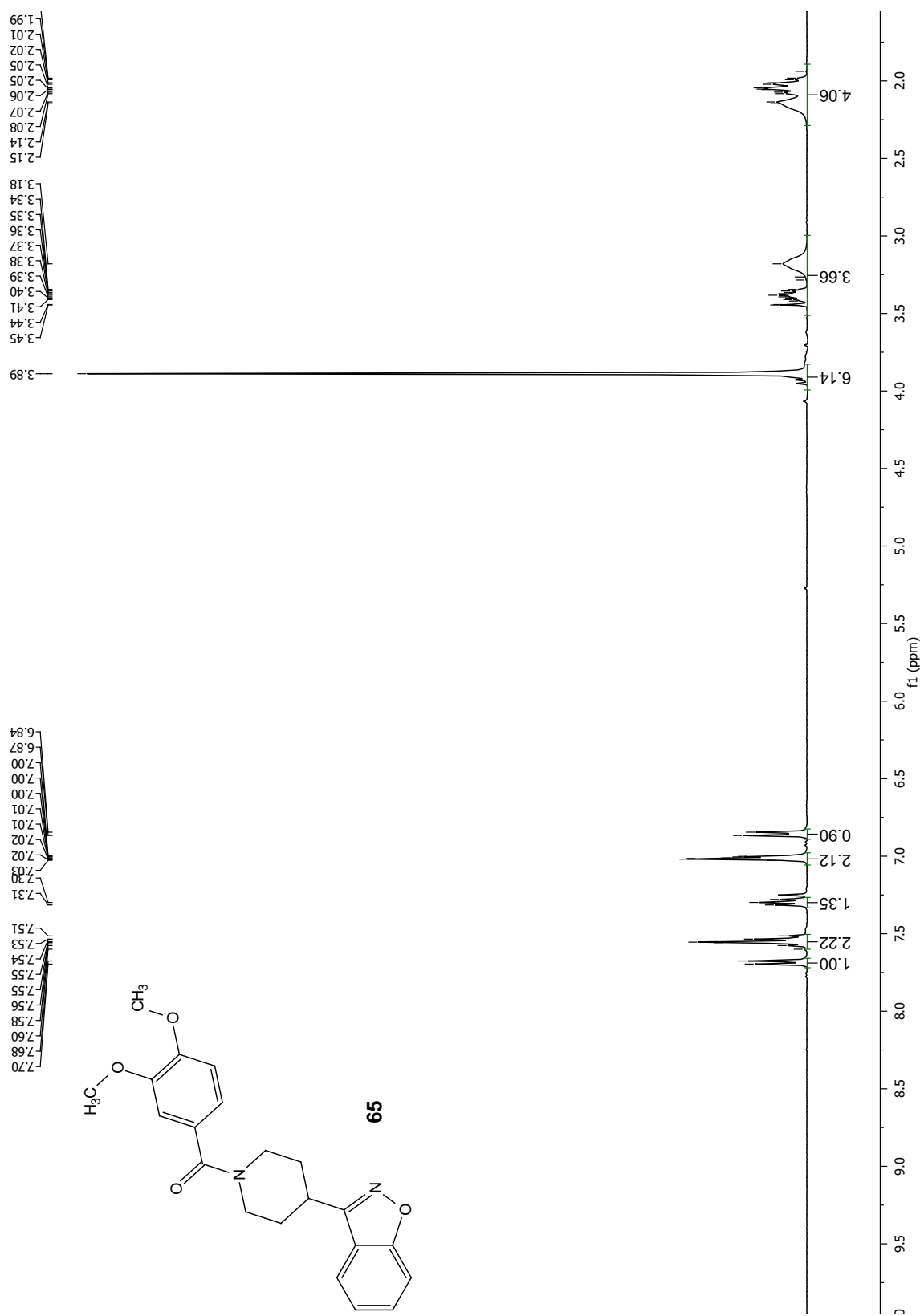


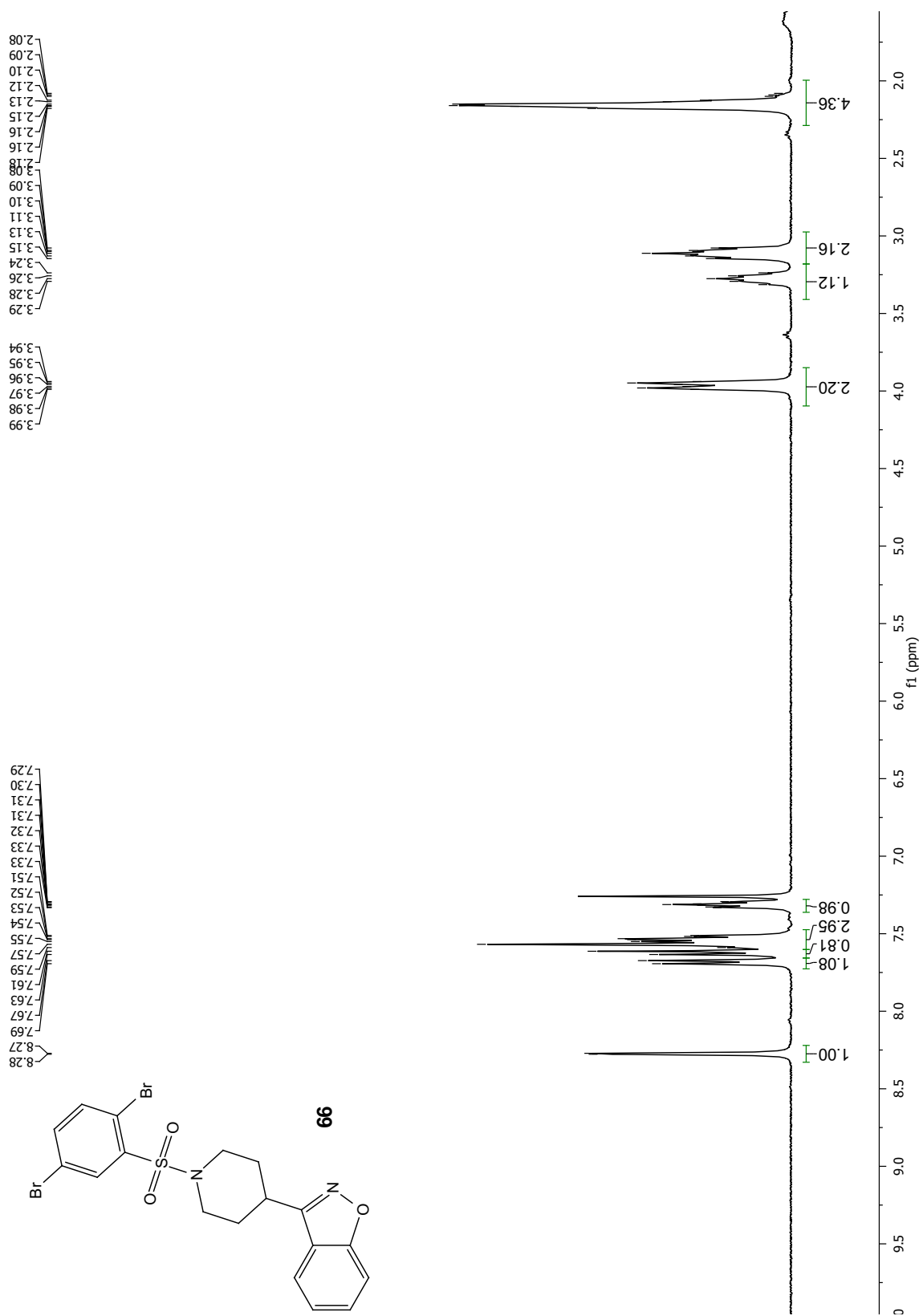




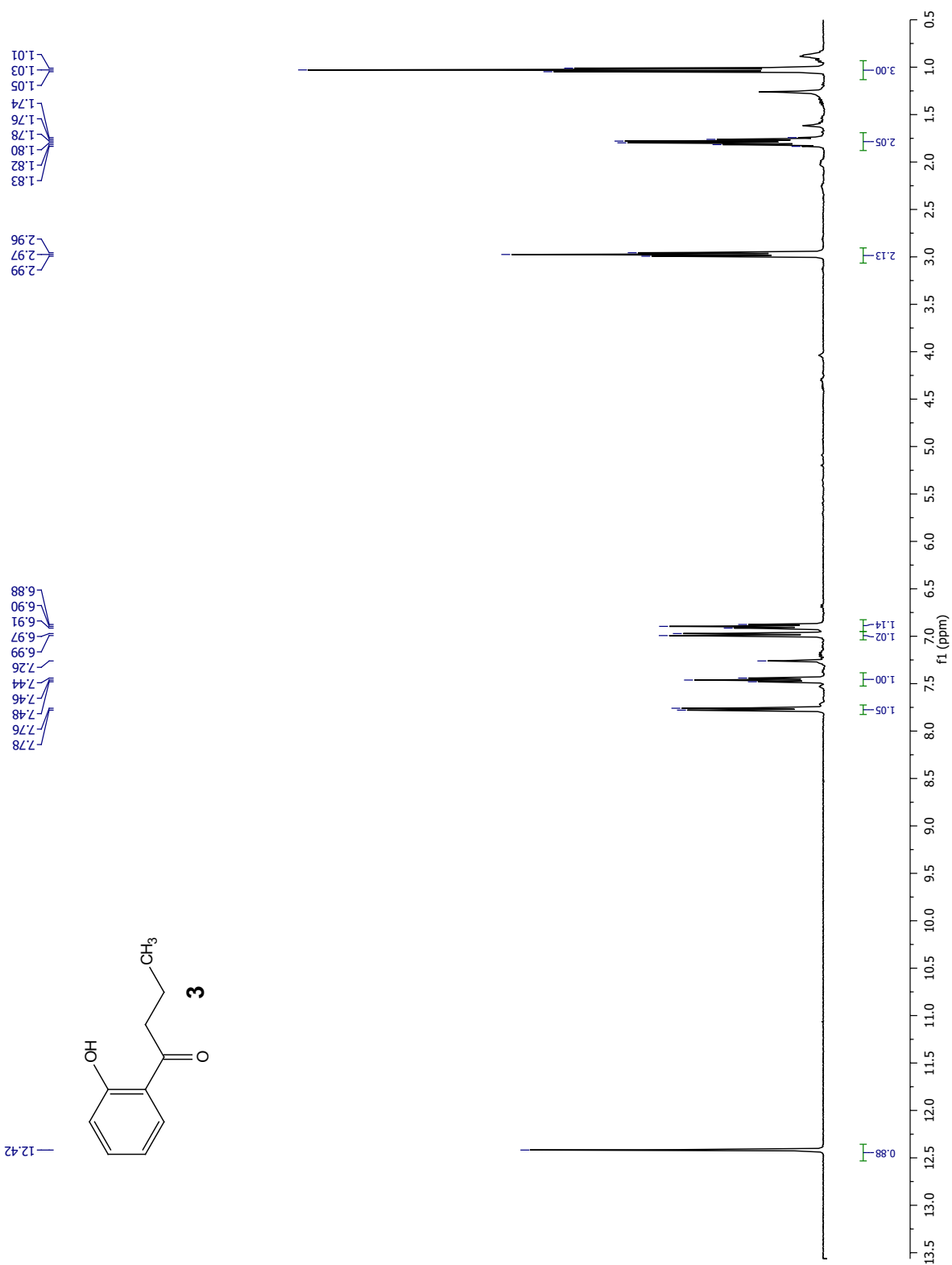


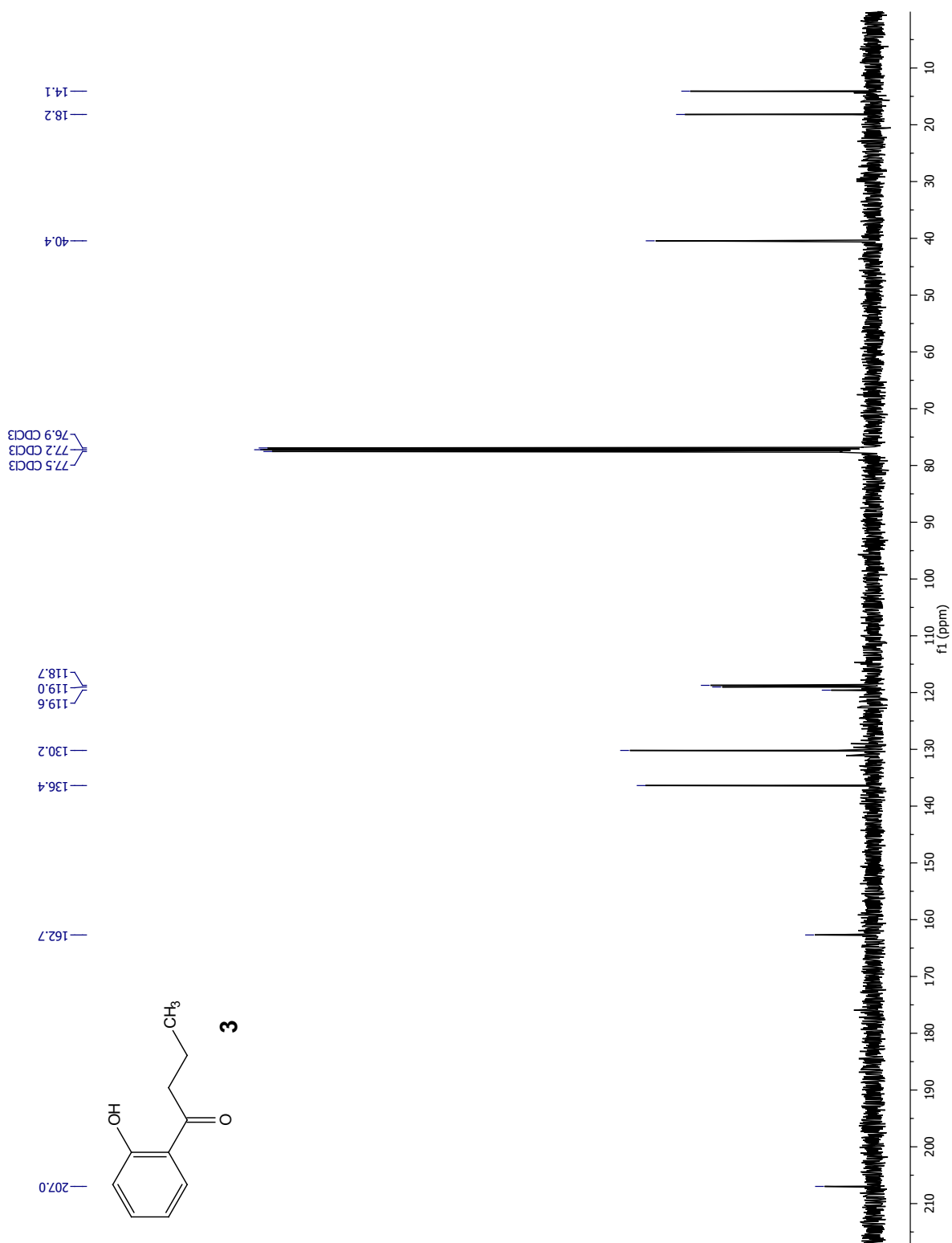


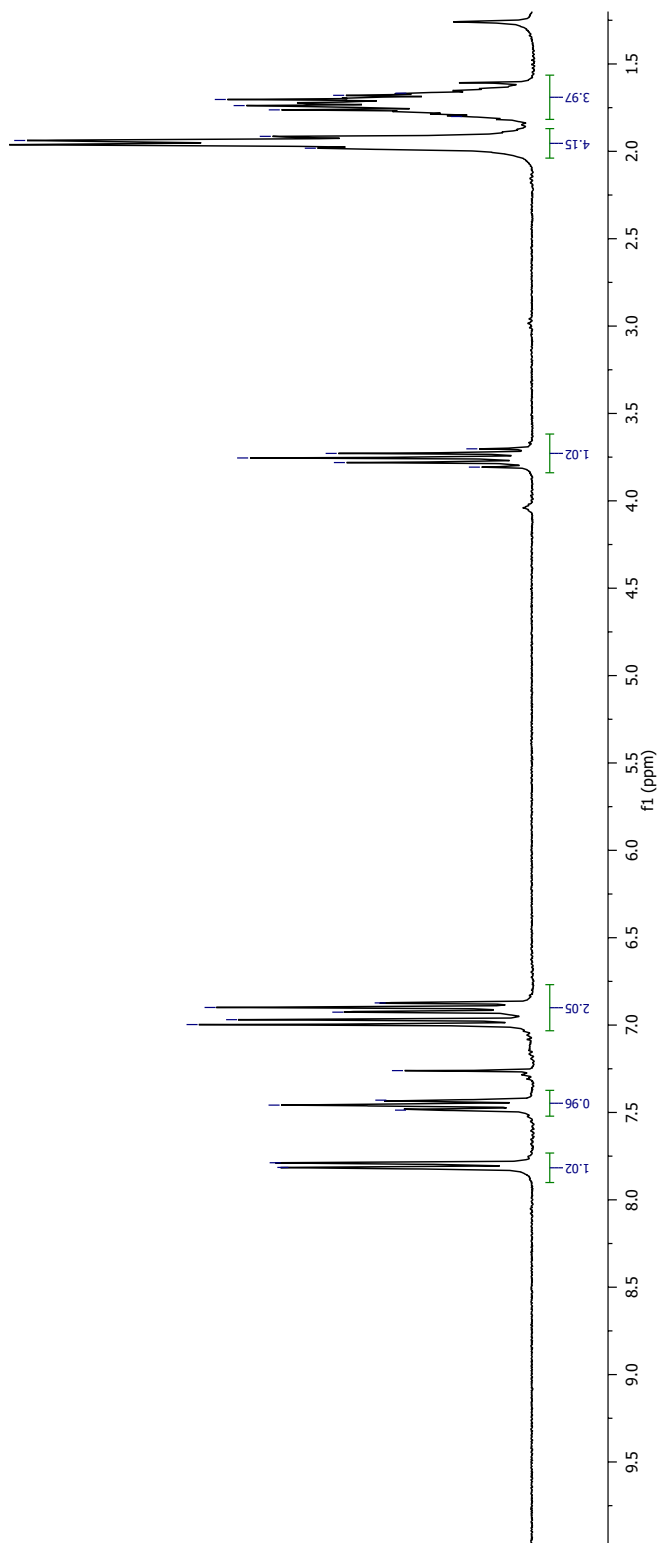




APPENDIX B. CHAPTER 4 ^1H AND ^{13}C NMR SPECTRA



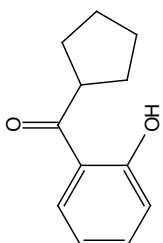


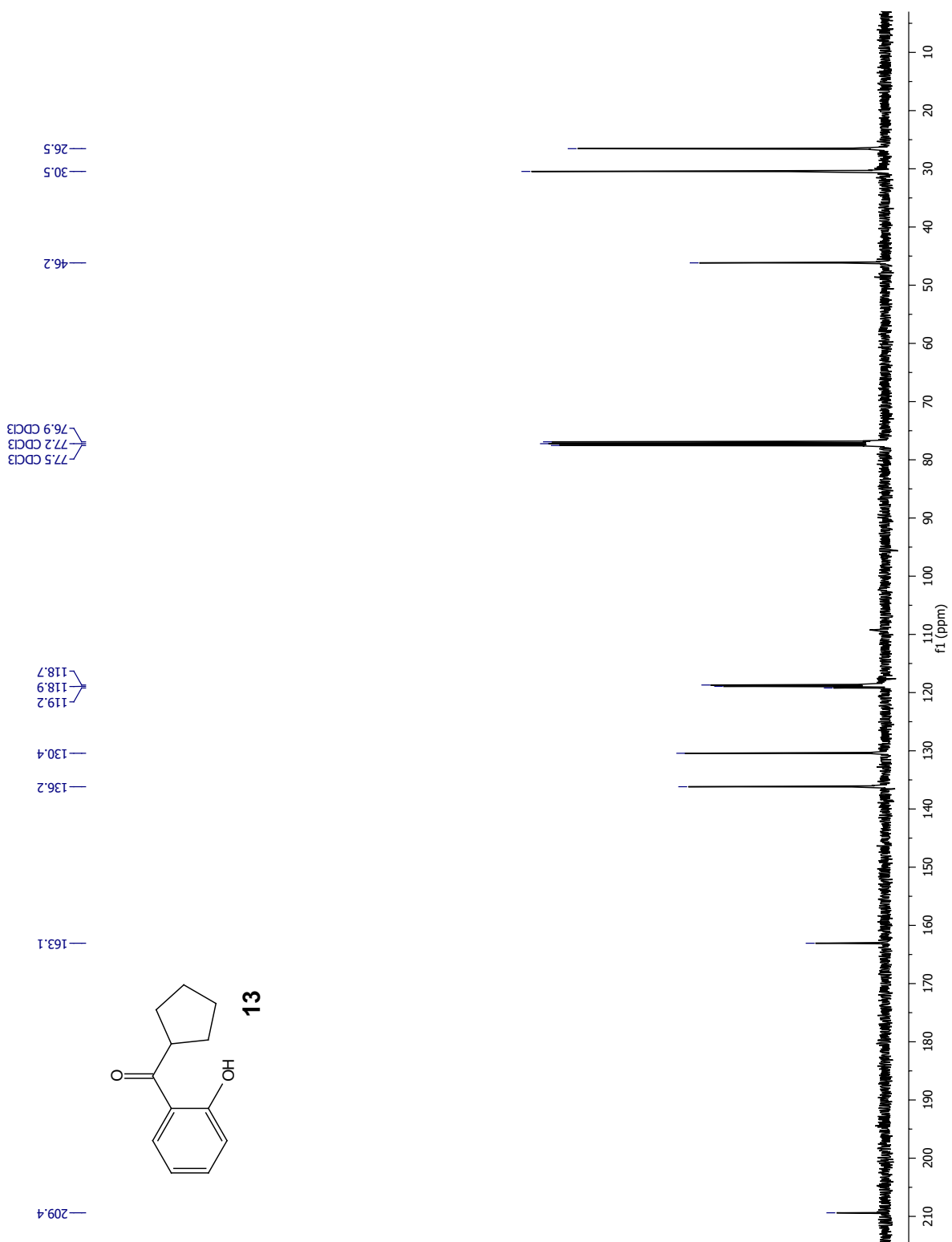


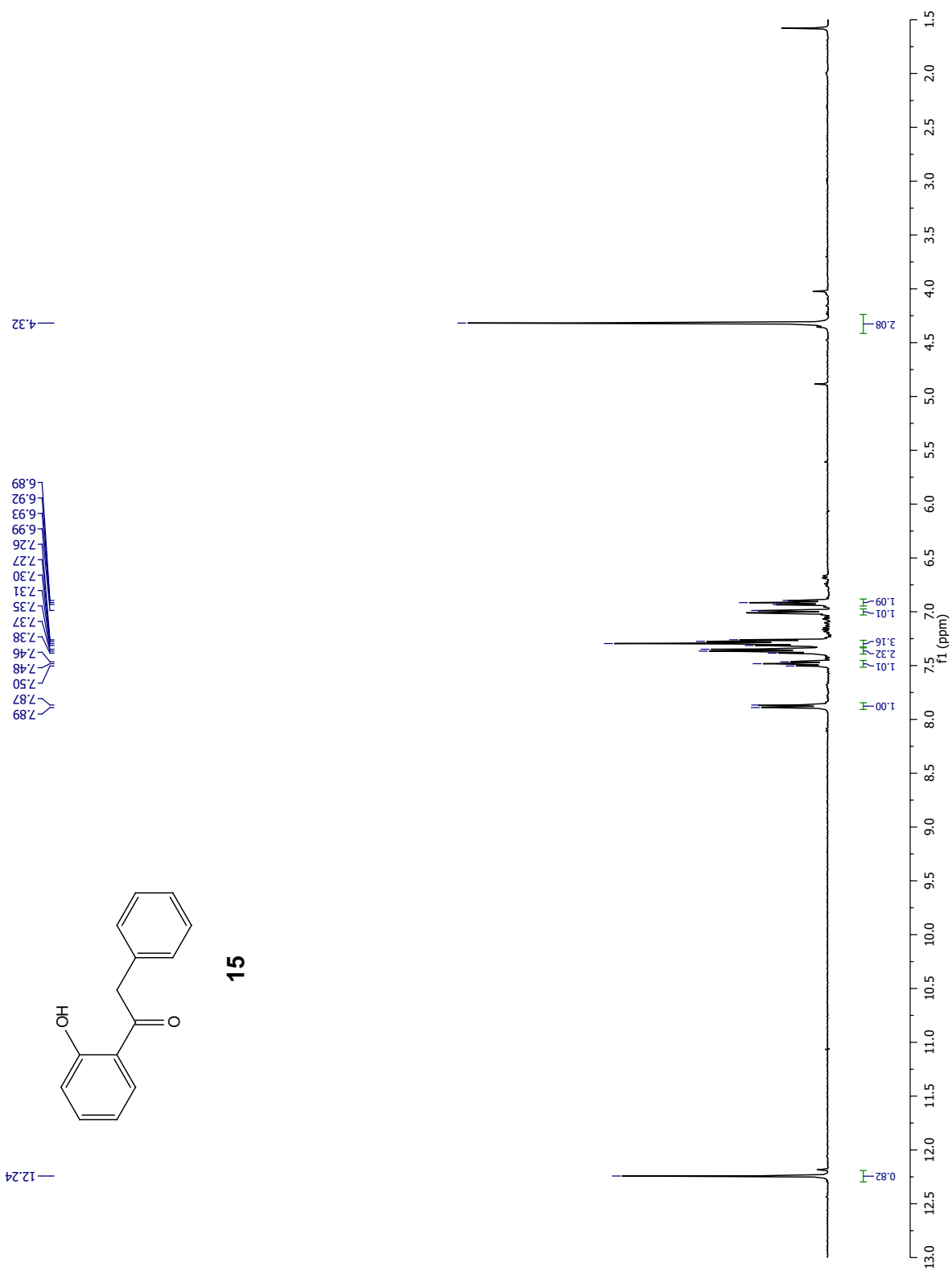
1.67
1.68
1.70
1.74
1.76
1.80
1.91
1.94
1.98

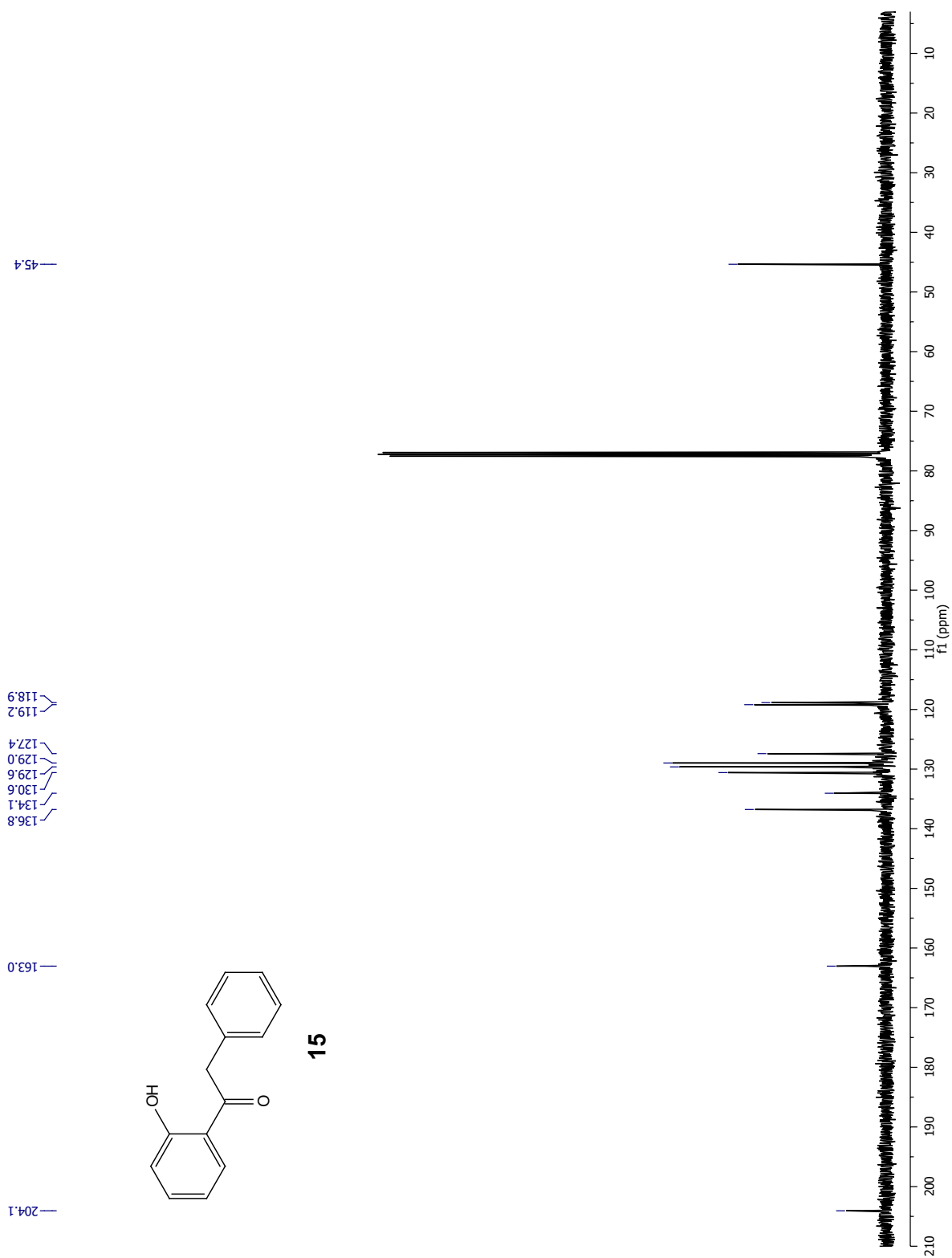
3.70
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3.75
3.78
3.81

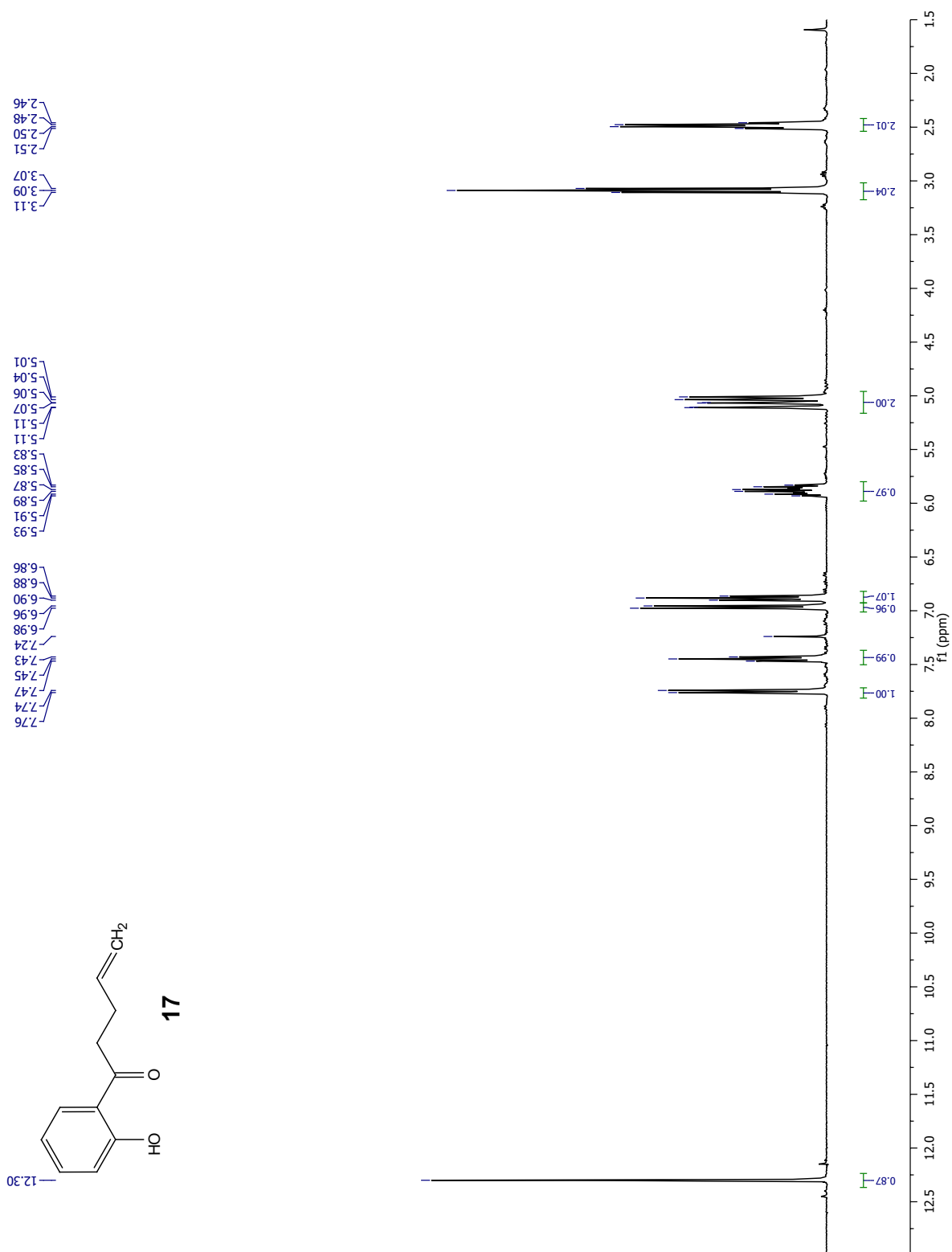
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7.00
7.26
7.43
7.46
7.49
7.79
7.81

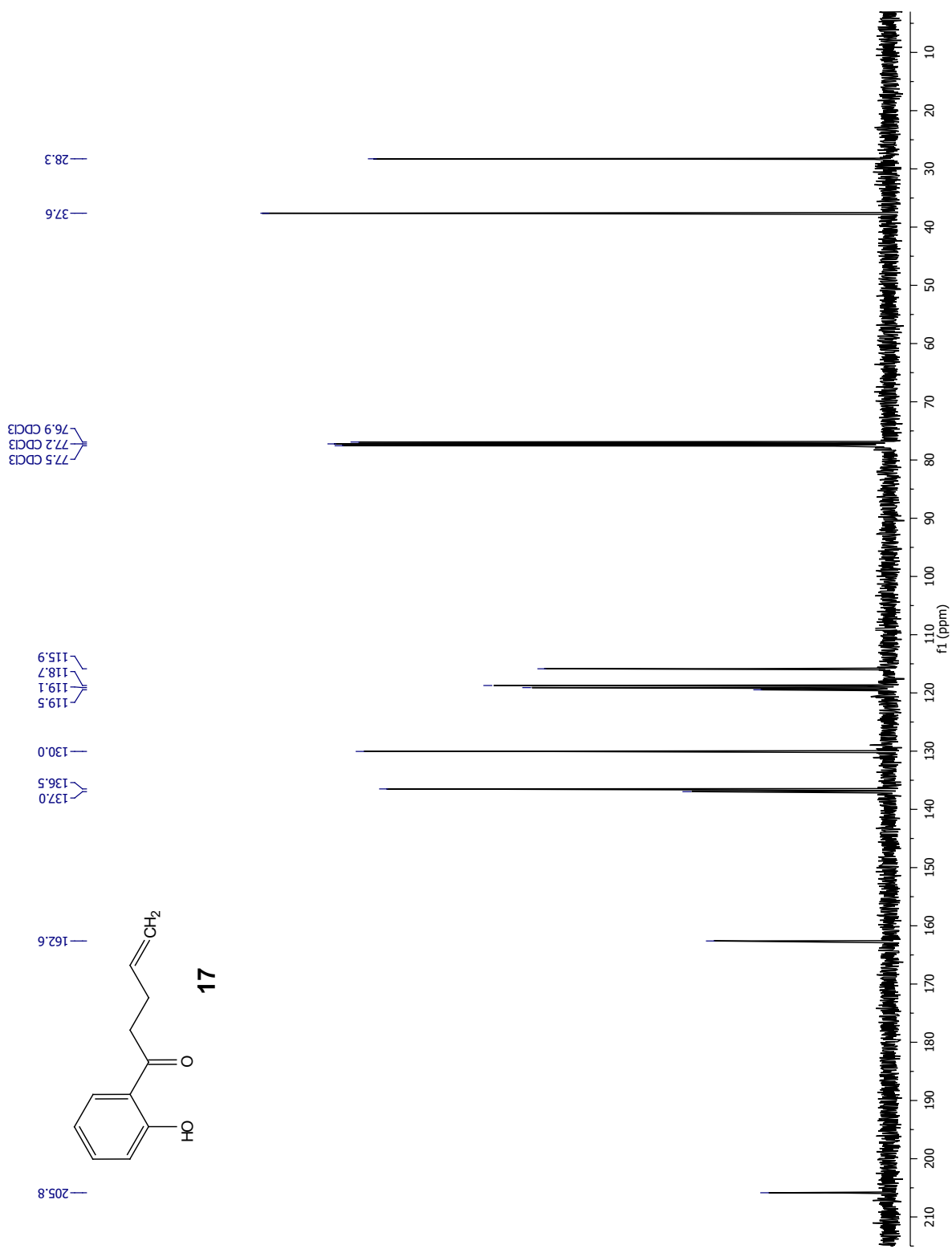
**13**

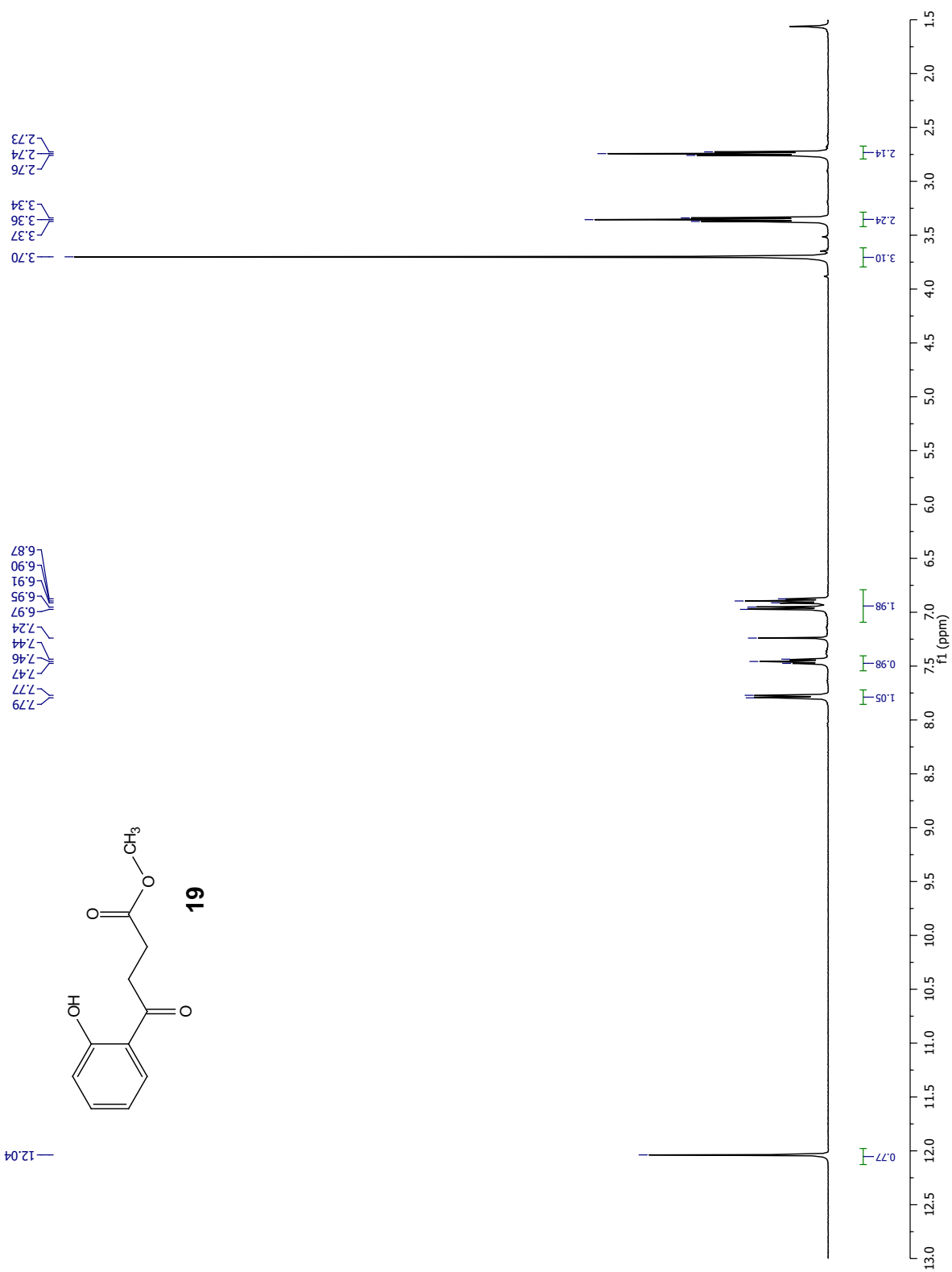


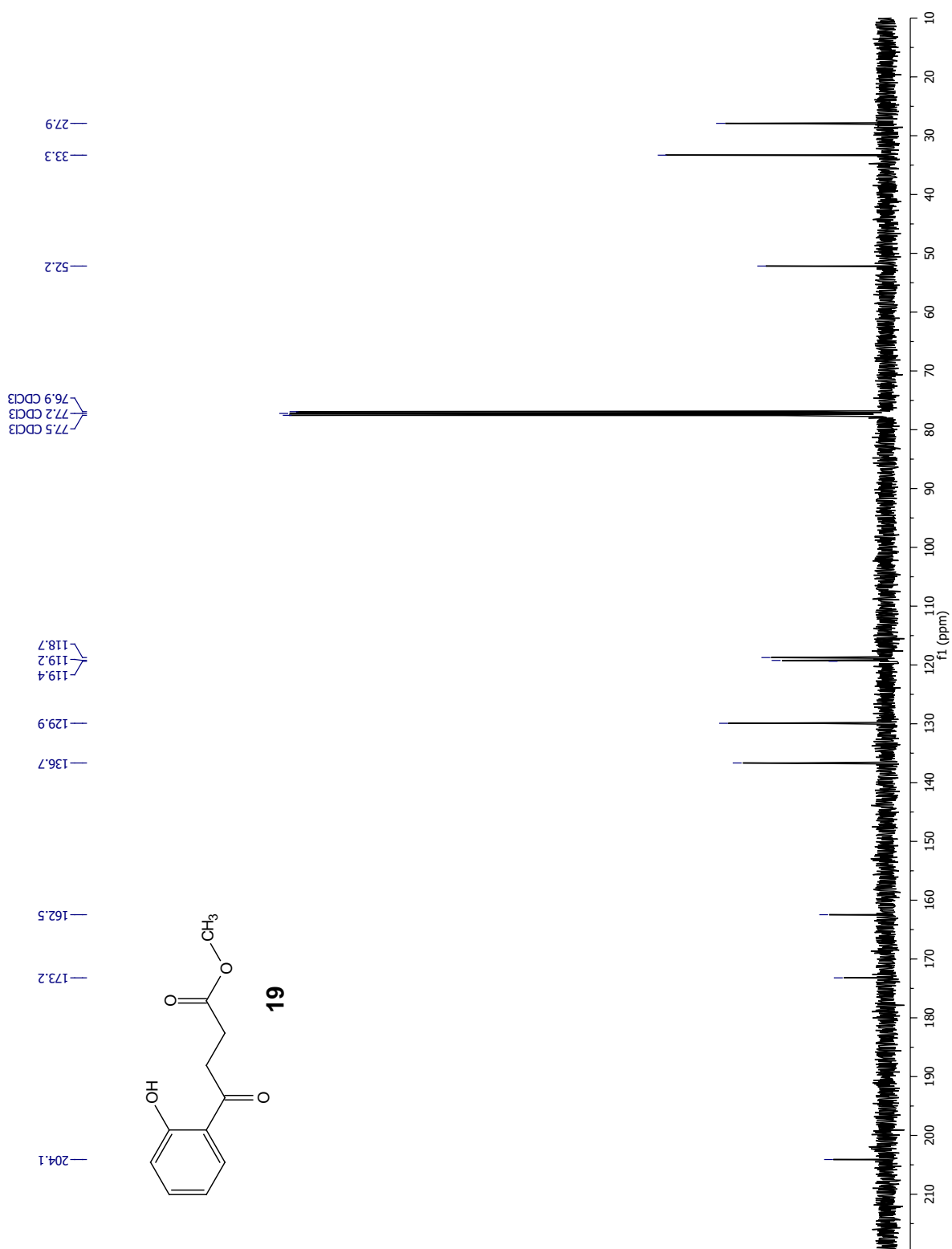


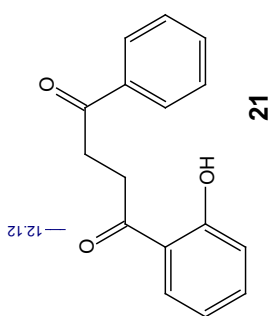
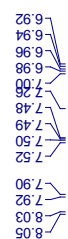
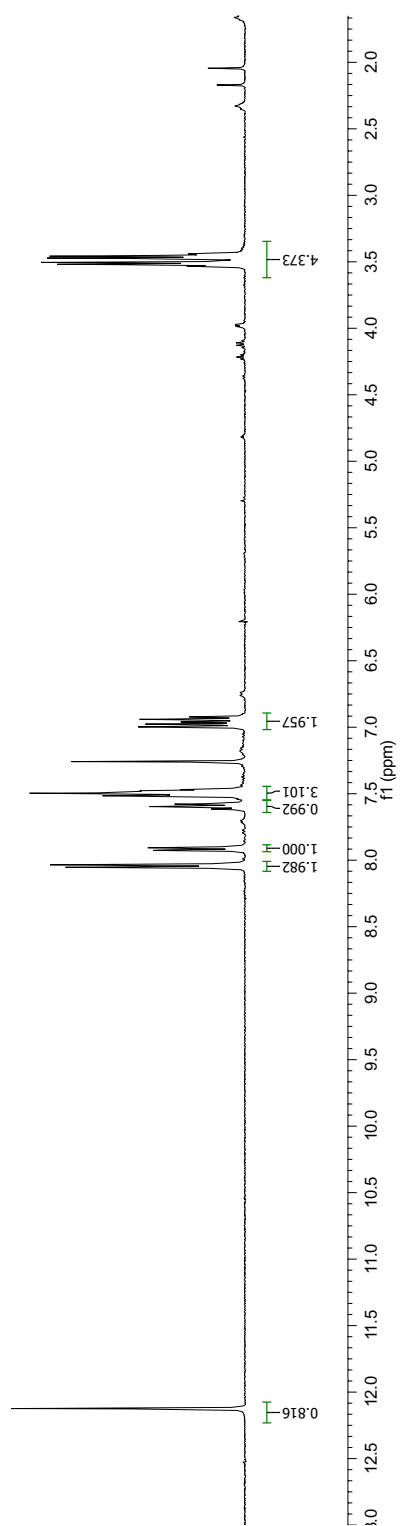




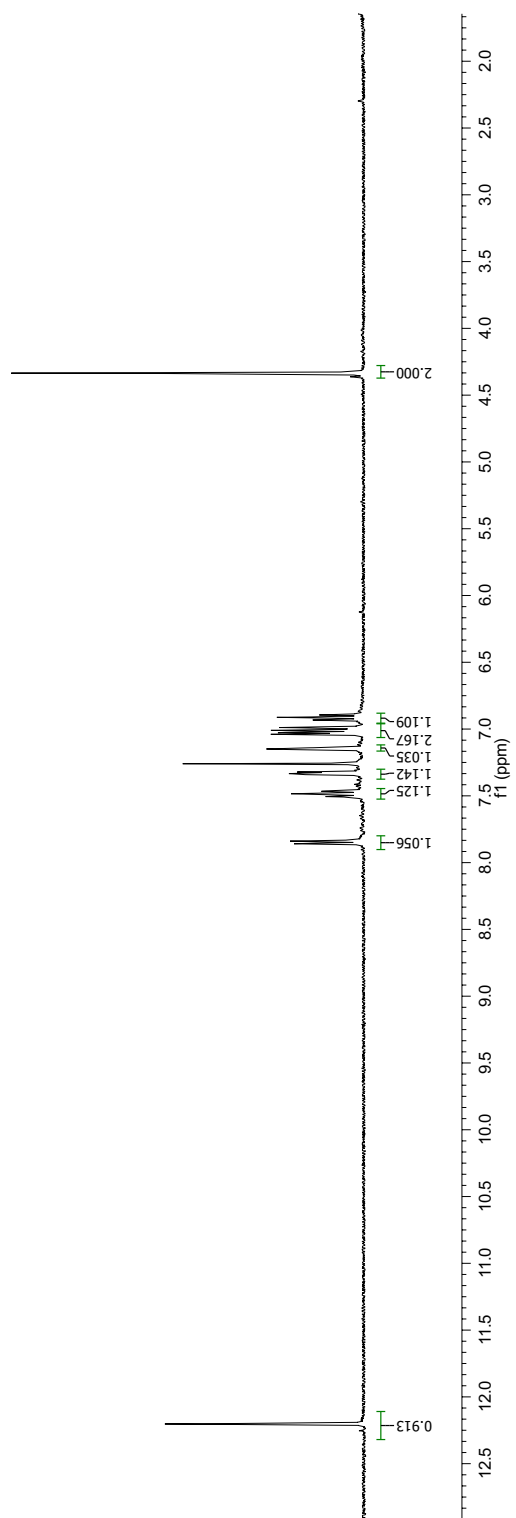




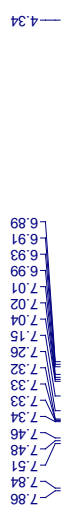
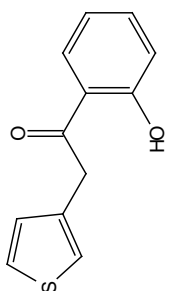




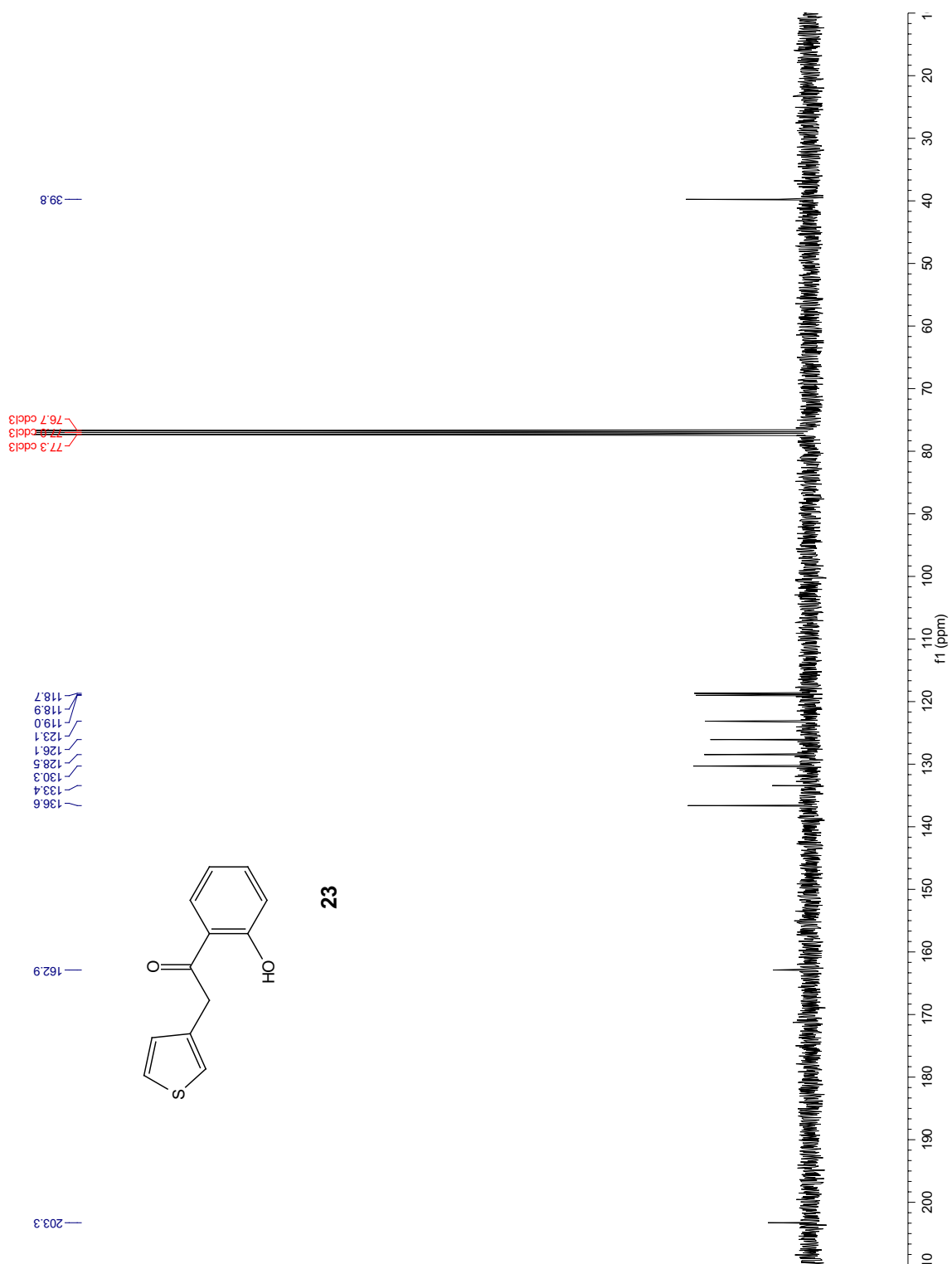
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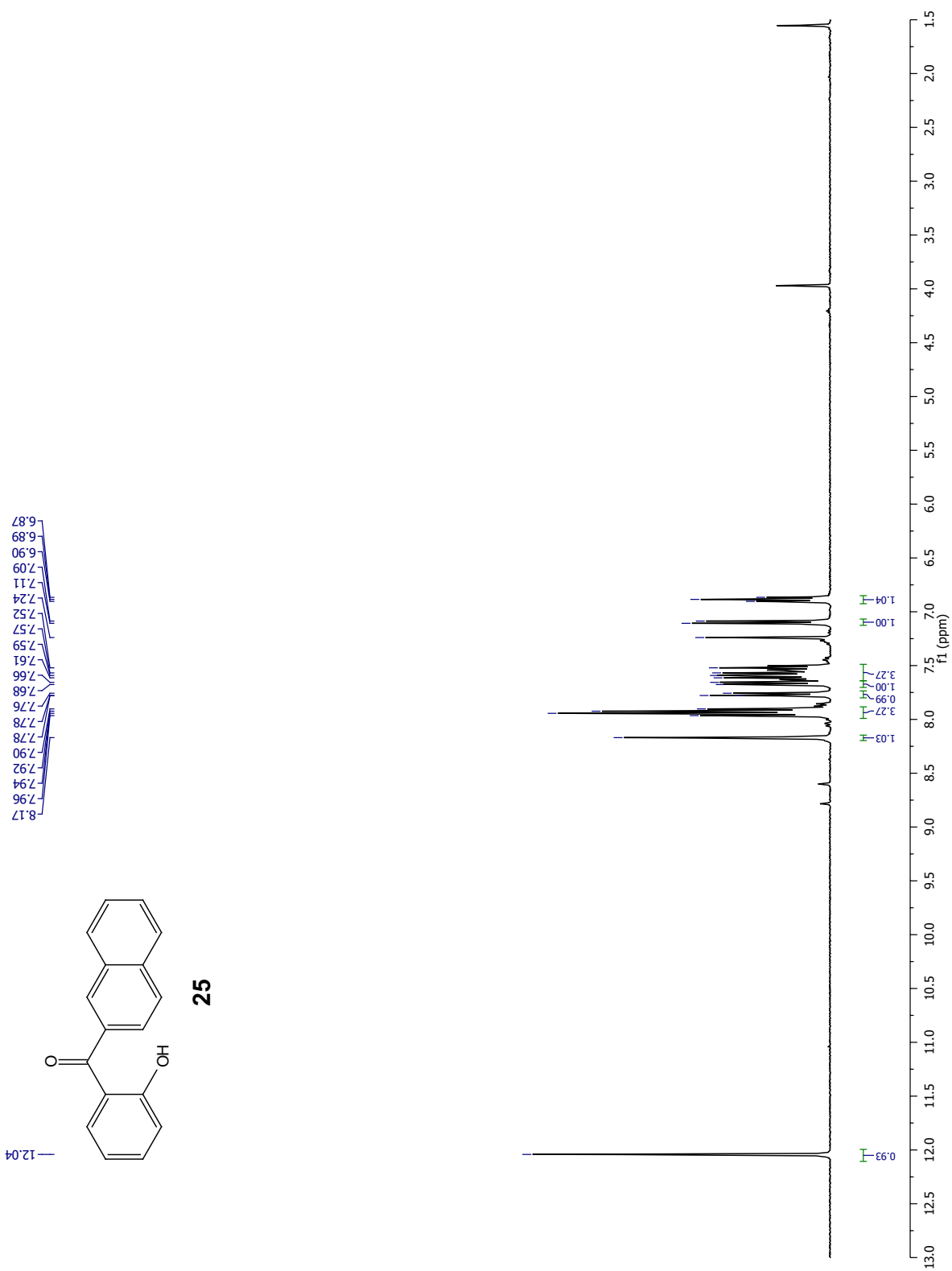


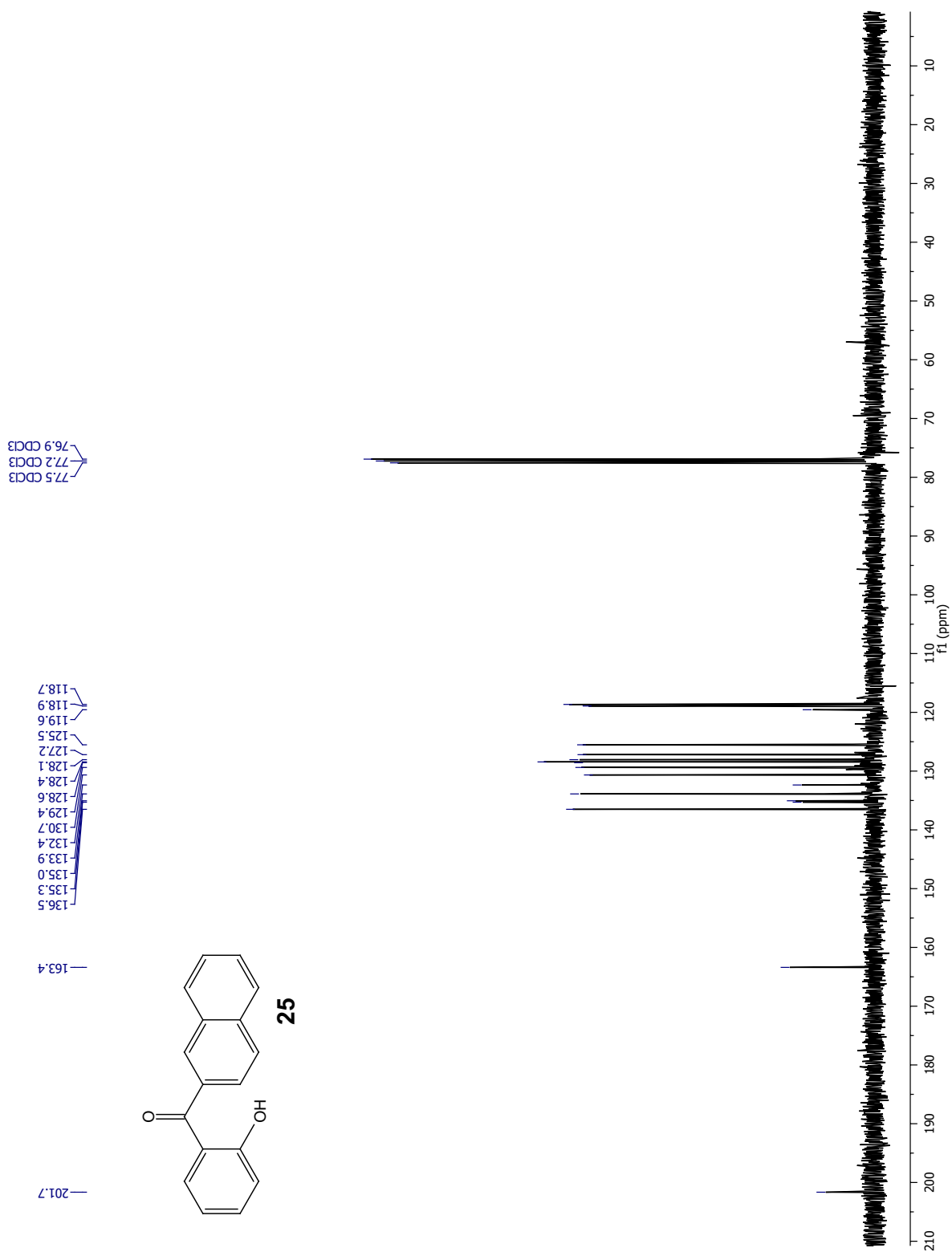
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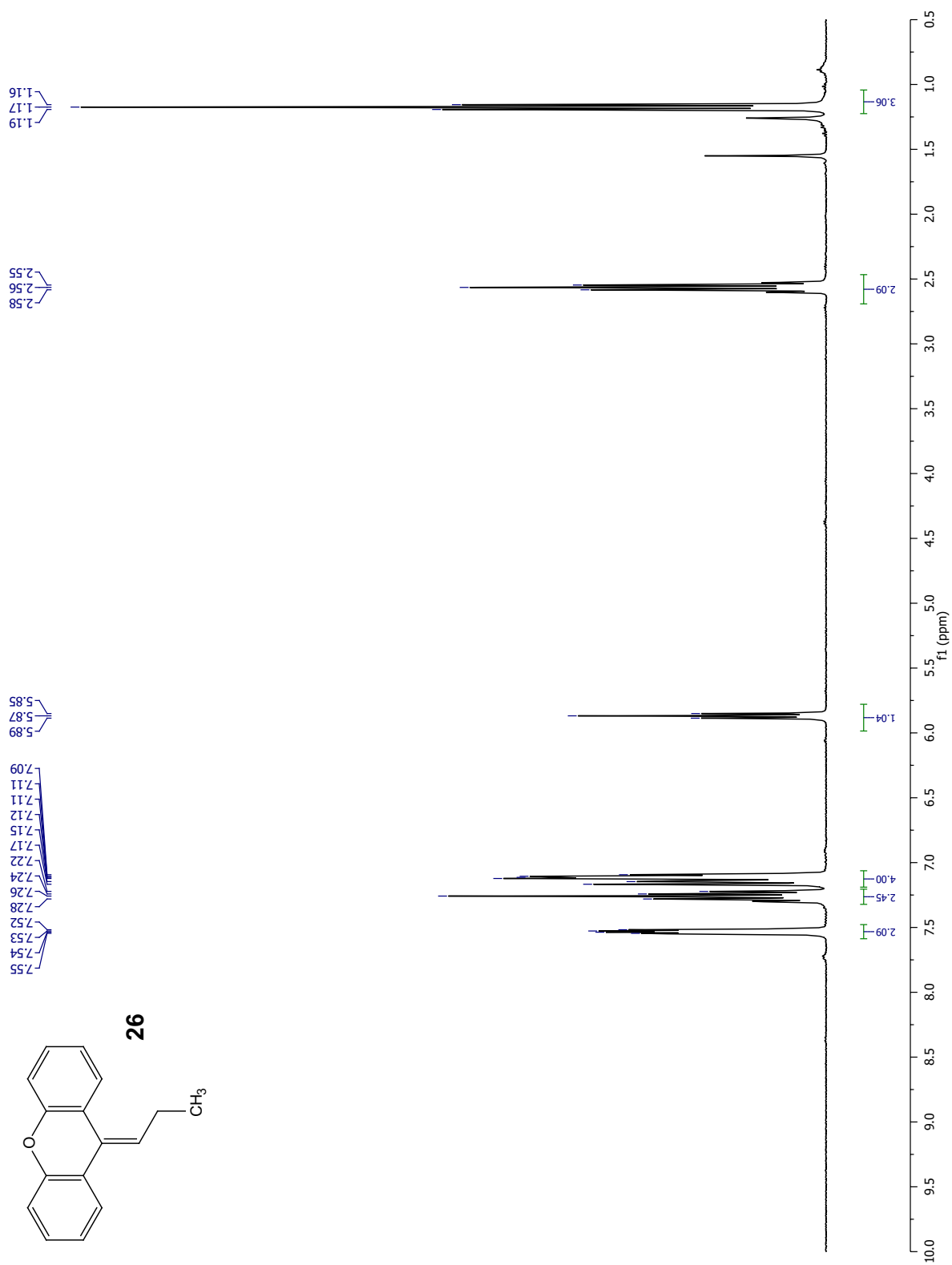


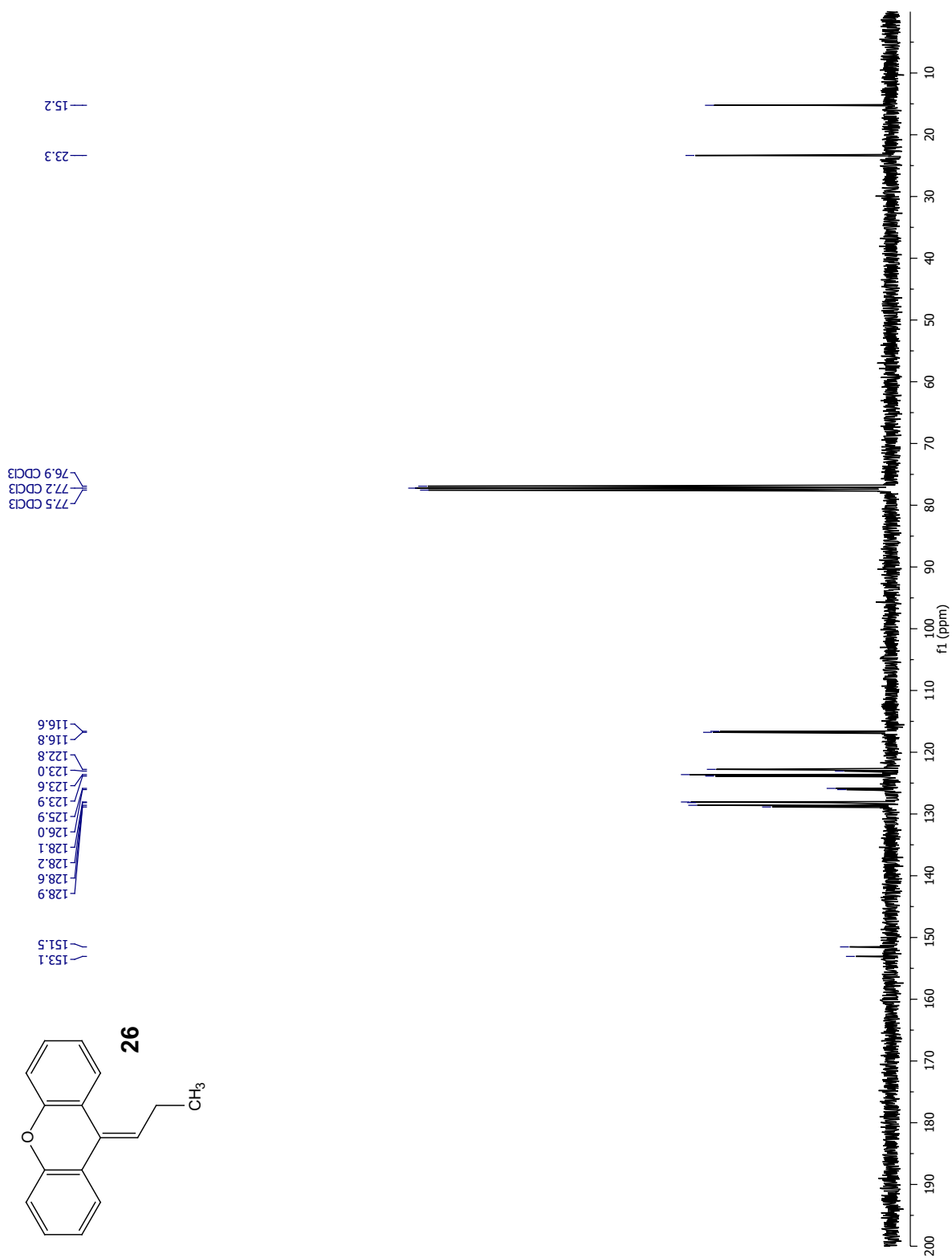
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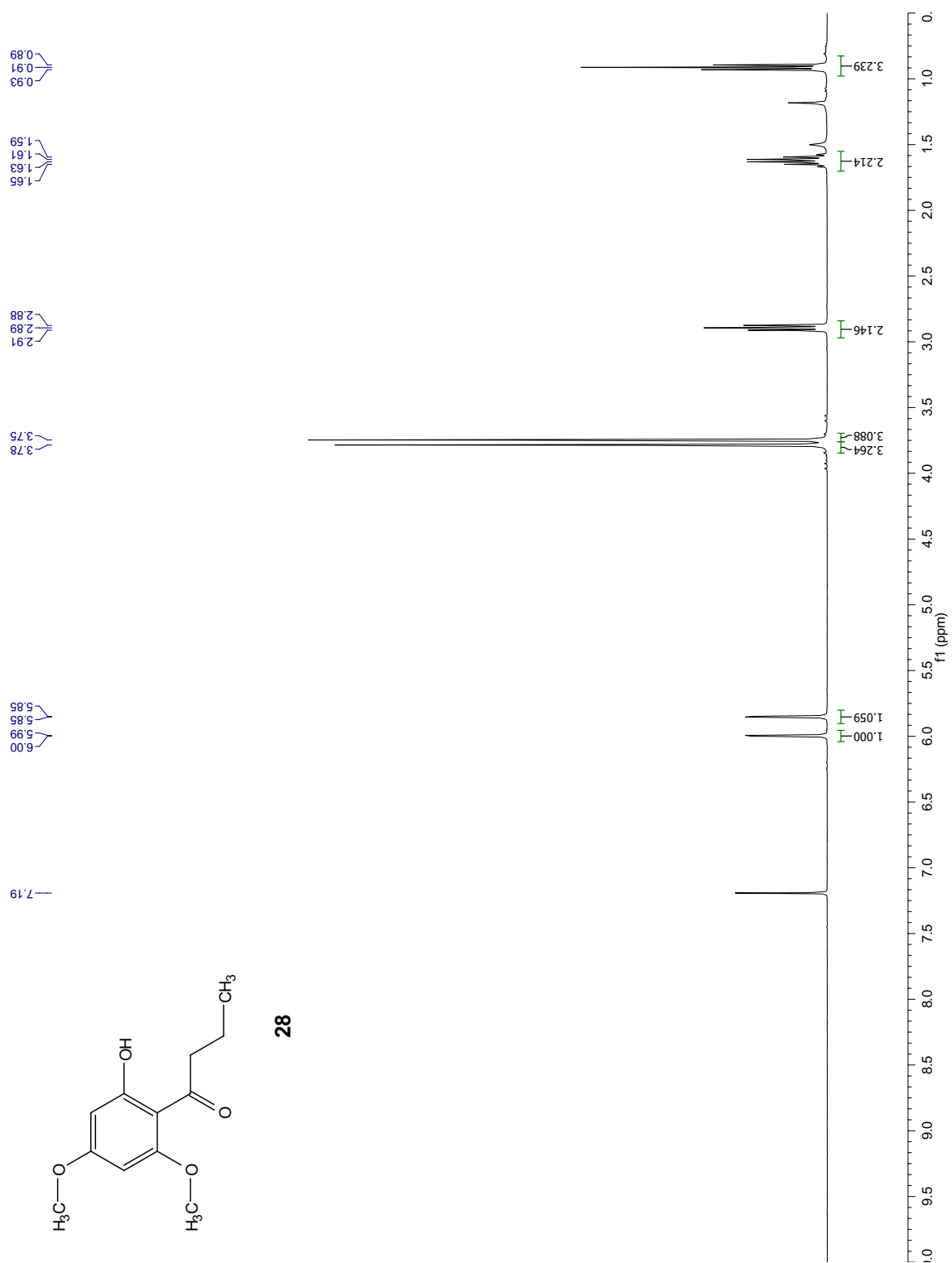


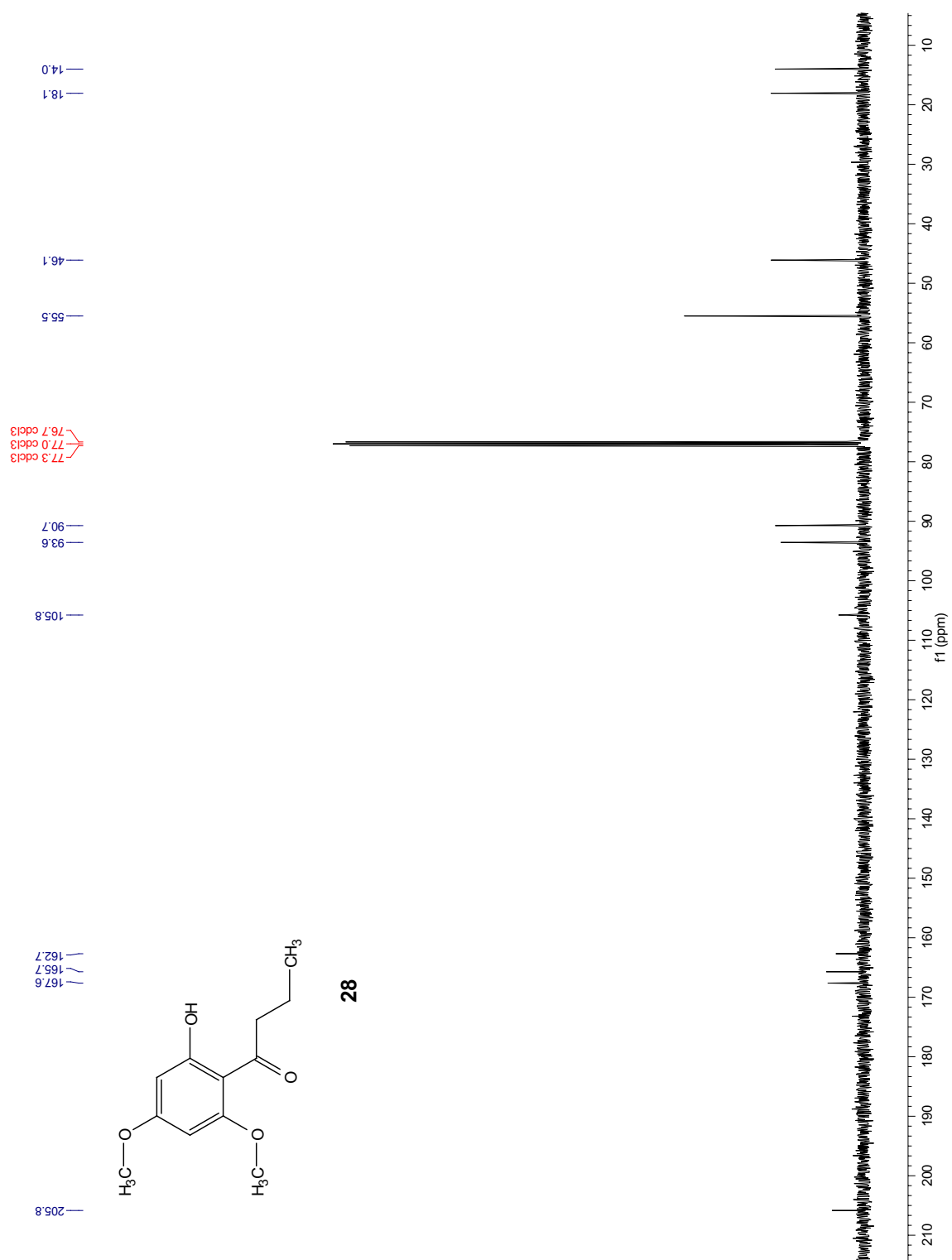




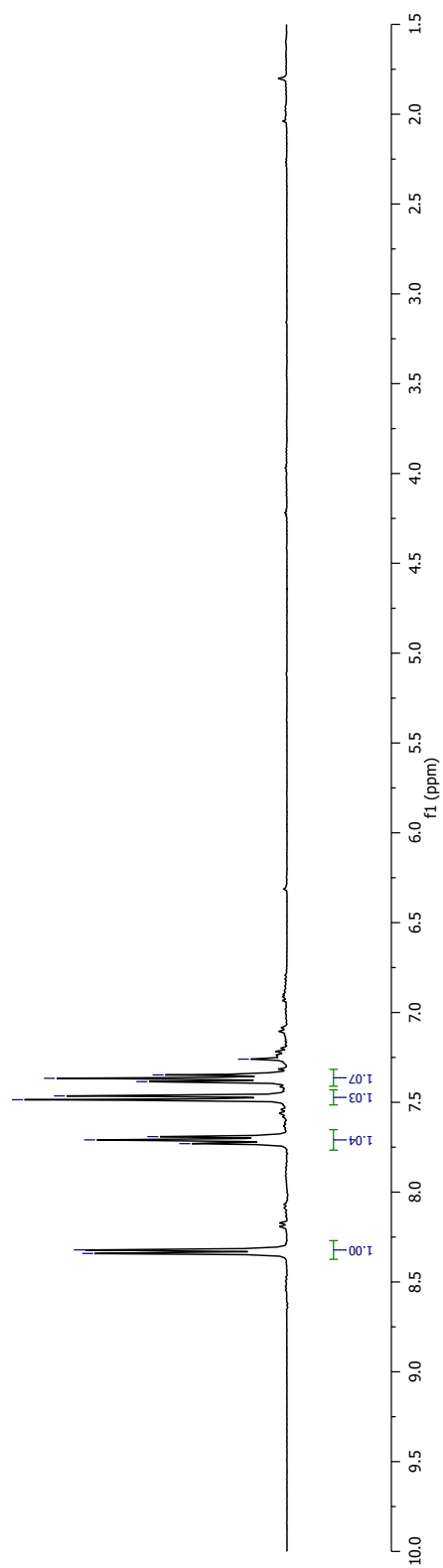
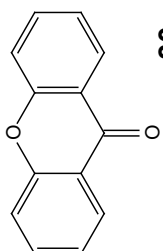


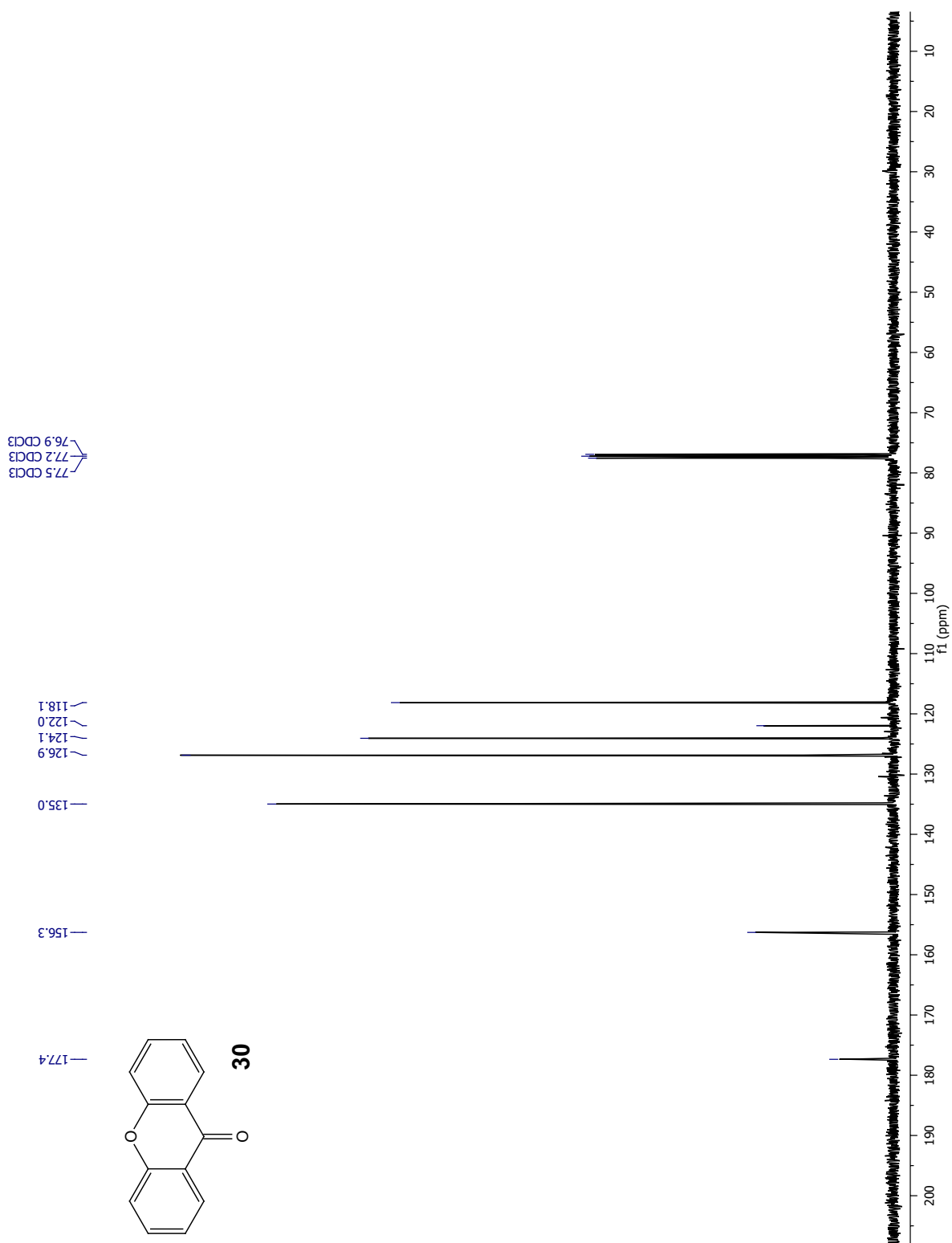


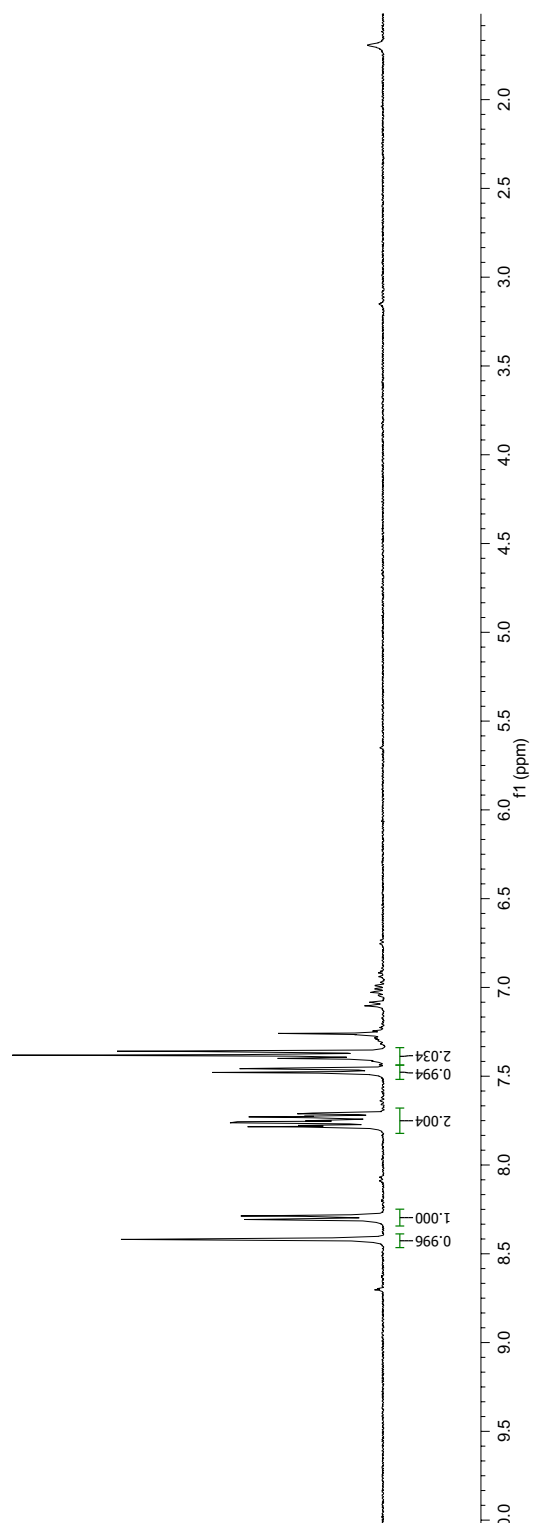
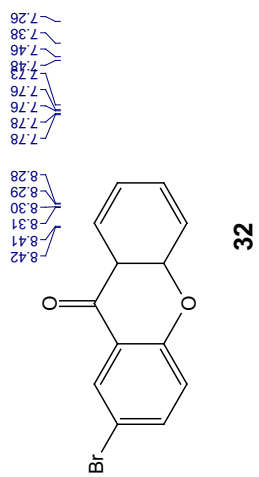


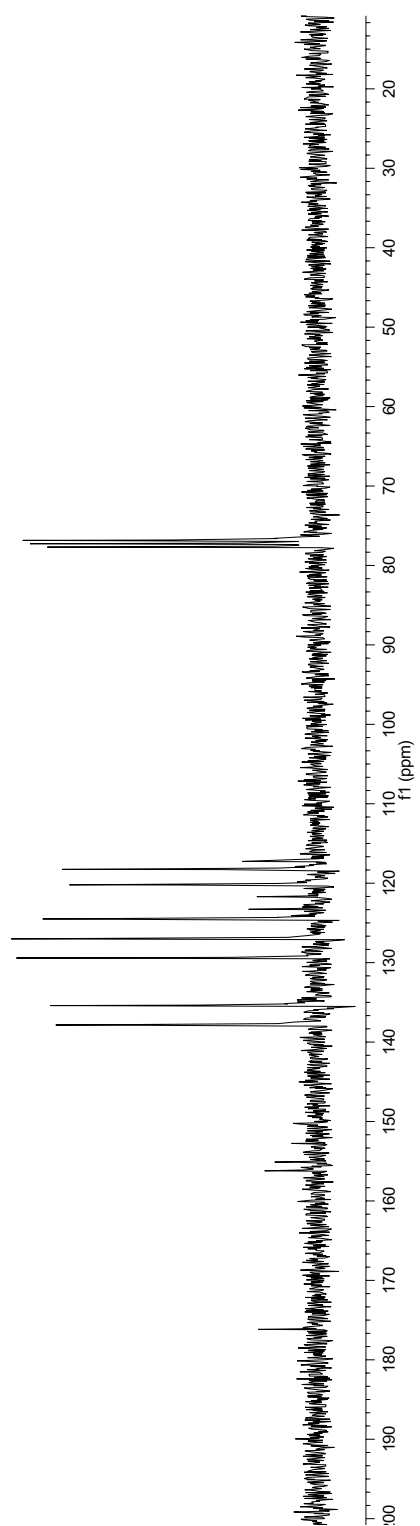


8.34
8.32
7.73
7.71
7.69
7.49
7.46
7.39
7.37
7.35
7.26

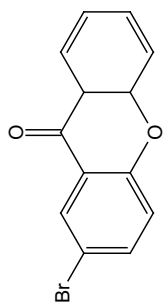






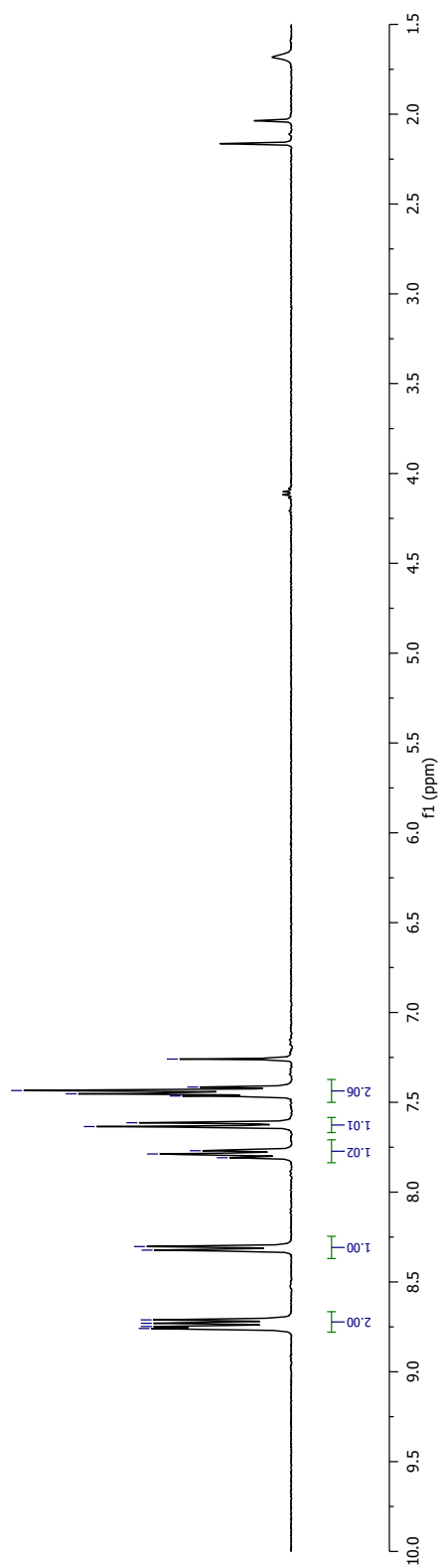
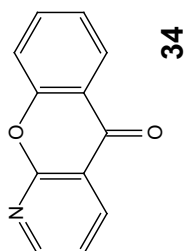


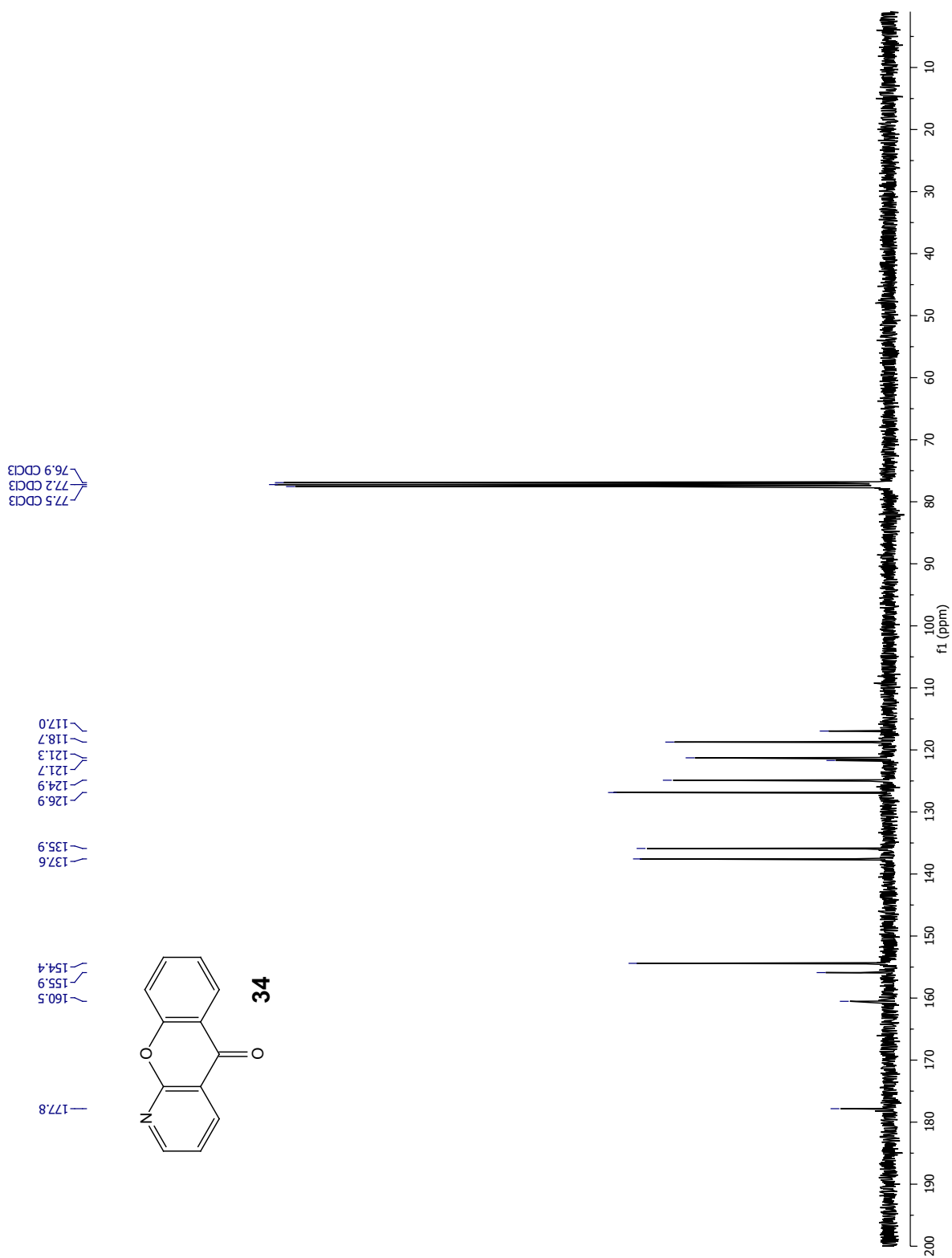
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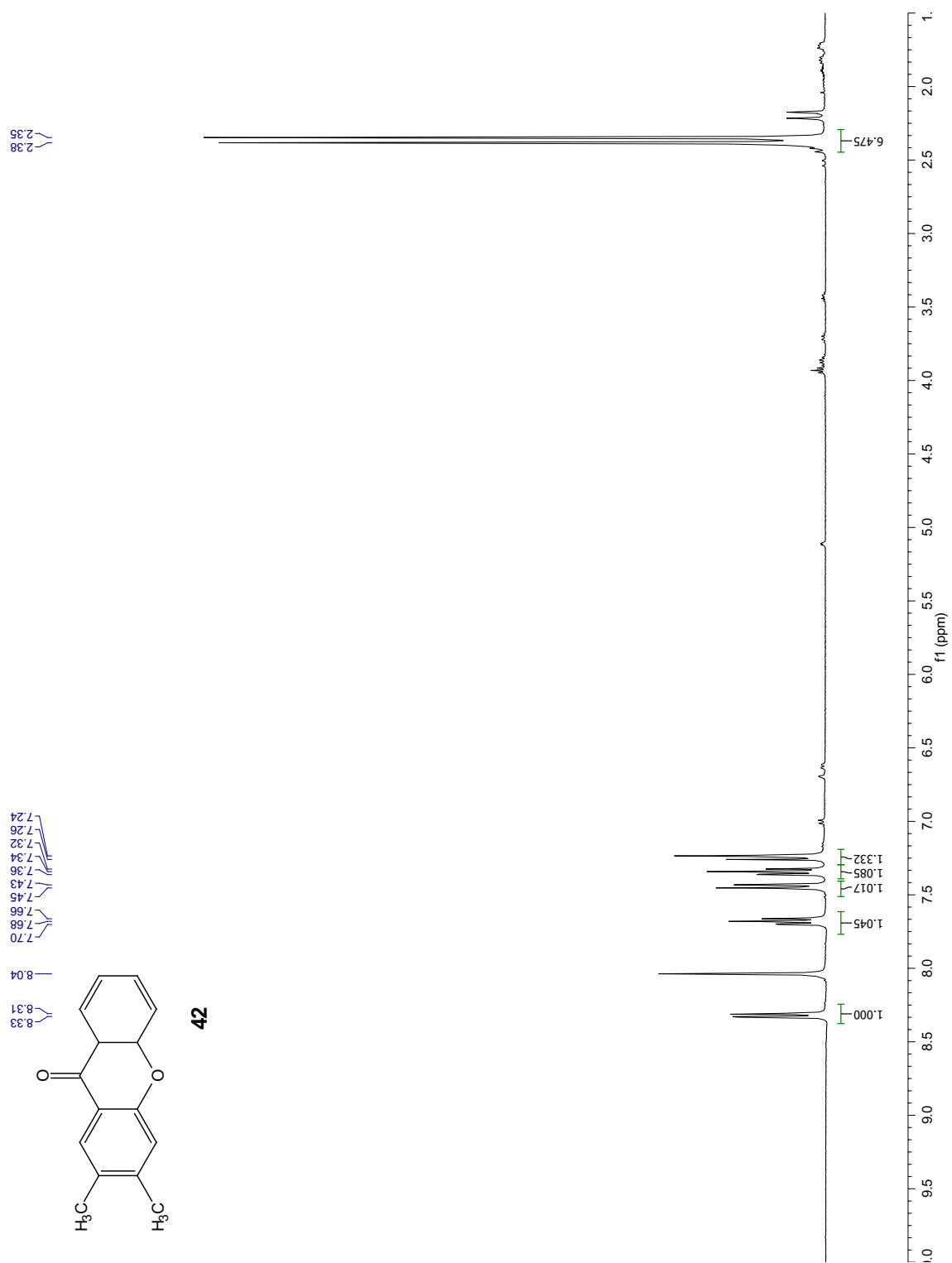


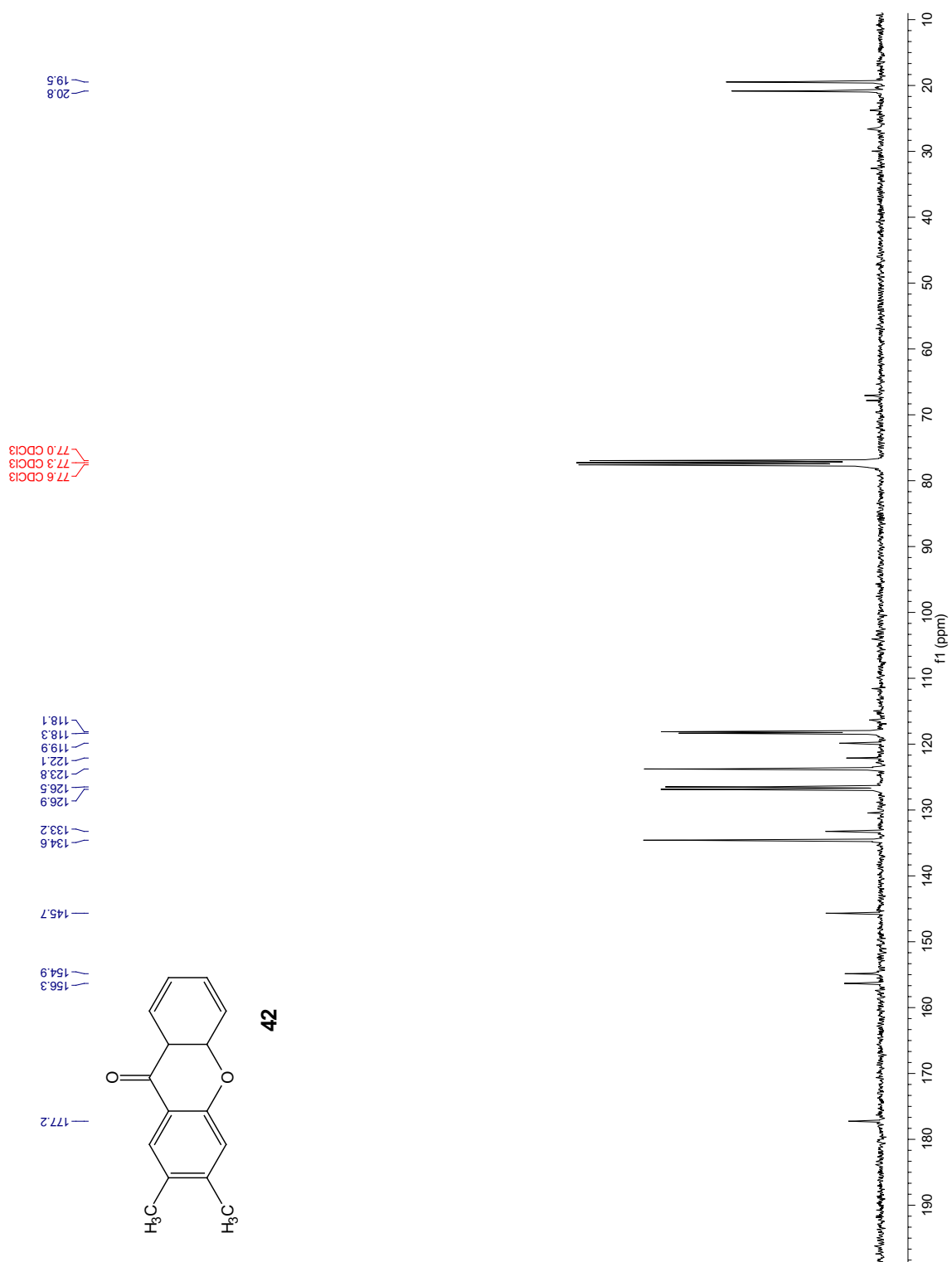
176.2	—
156.2	~
155.1	~
137.9	—
135.4	—
129.4	~
127.0	~
124.5	~
123.3	~
121.7	~
120.2	~
118.3	~
117.3	~

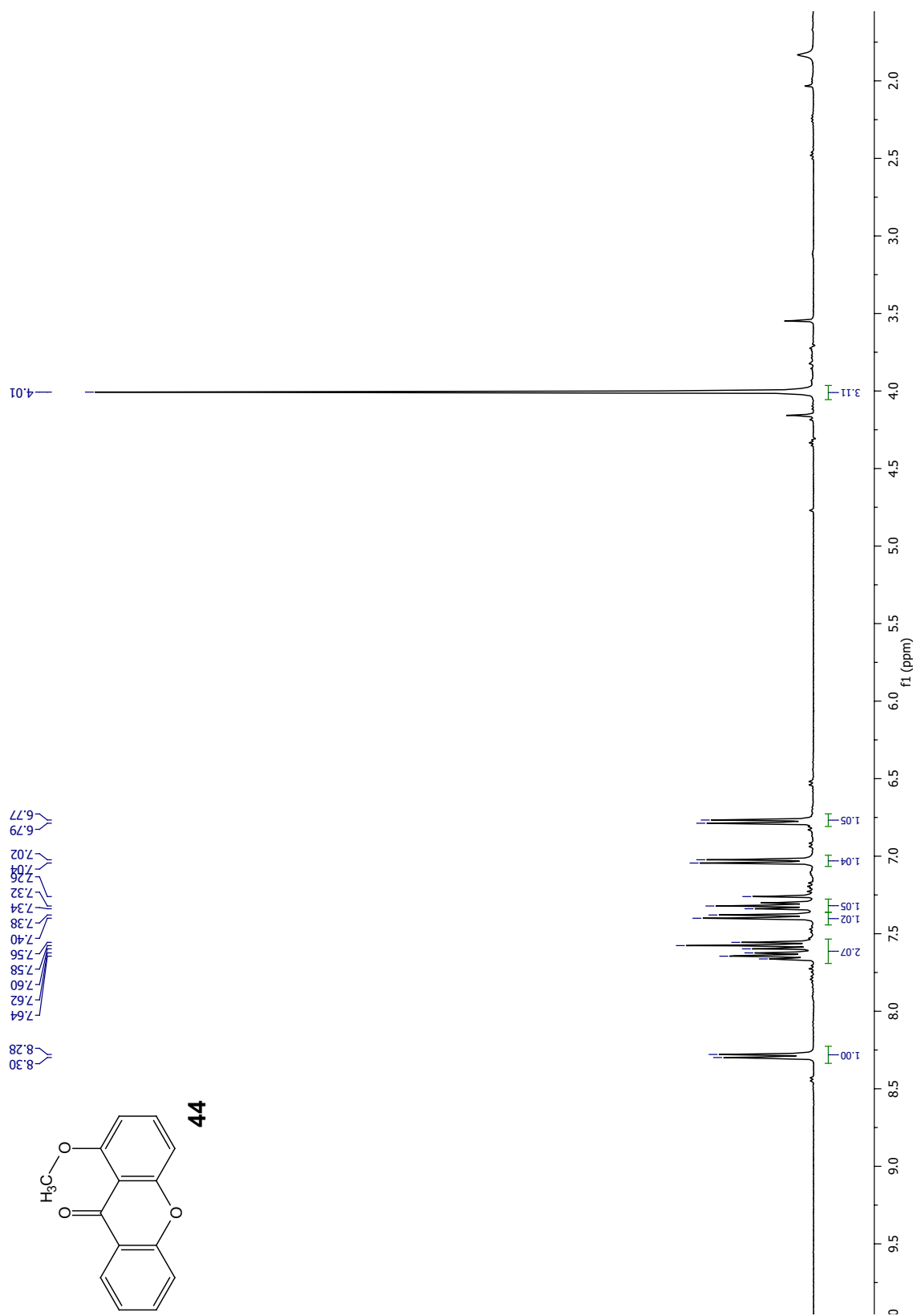
8.76
8.75
8.73
8.71
8.32
8.30
7.81
7.79
7.77
7.63
7.61
7.46
7.45
7.43
7.42
7.26

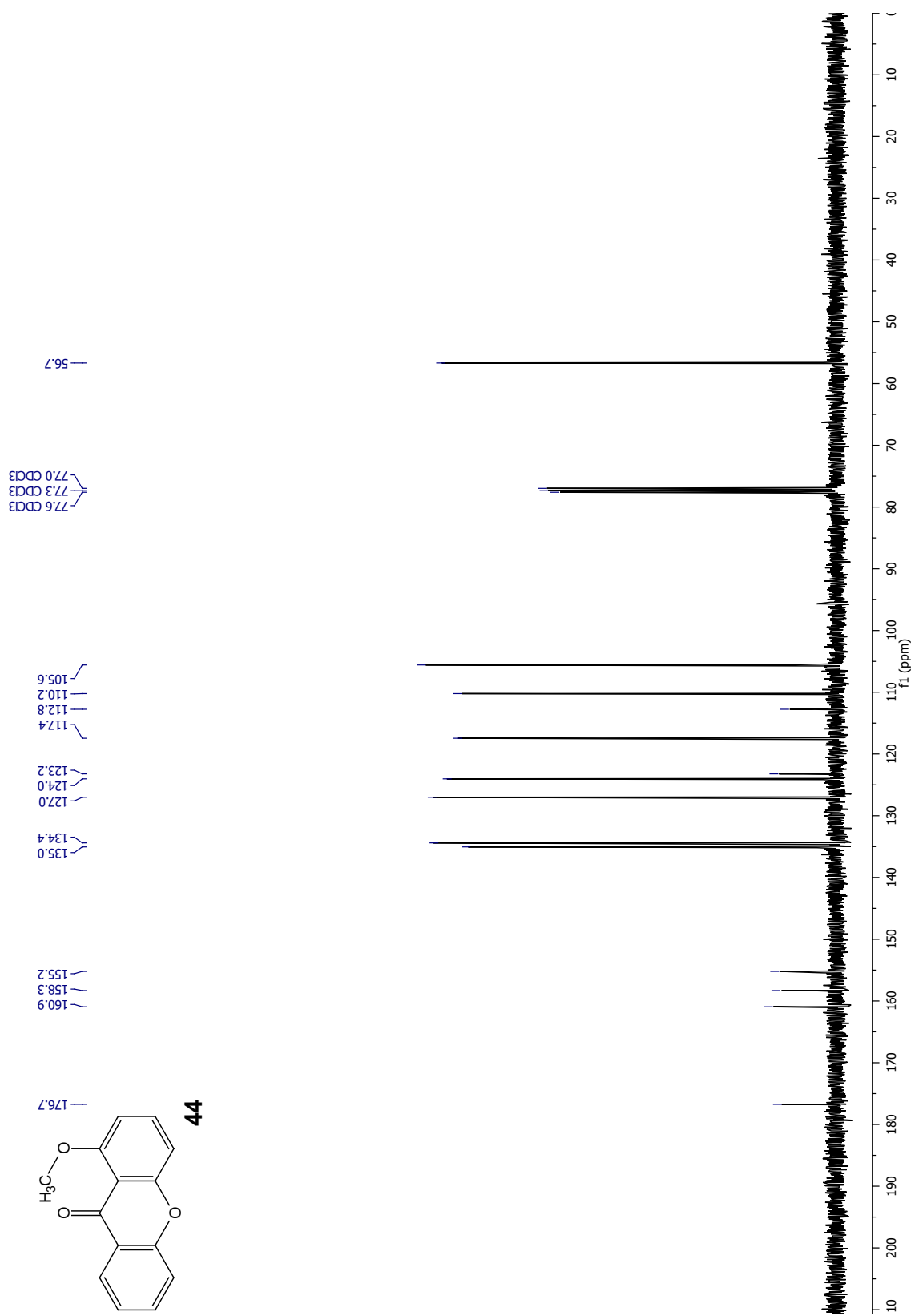


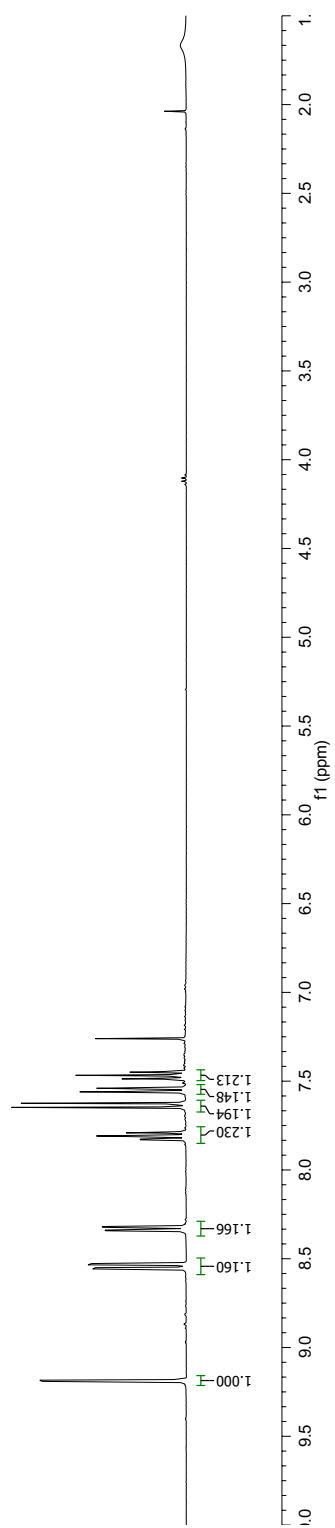
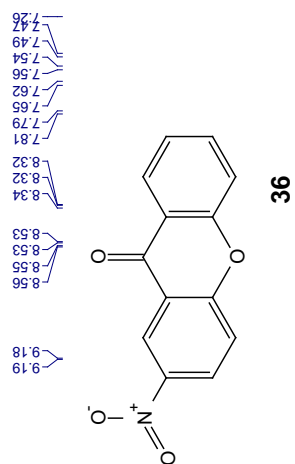


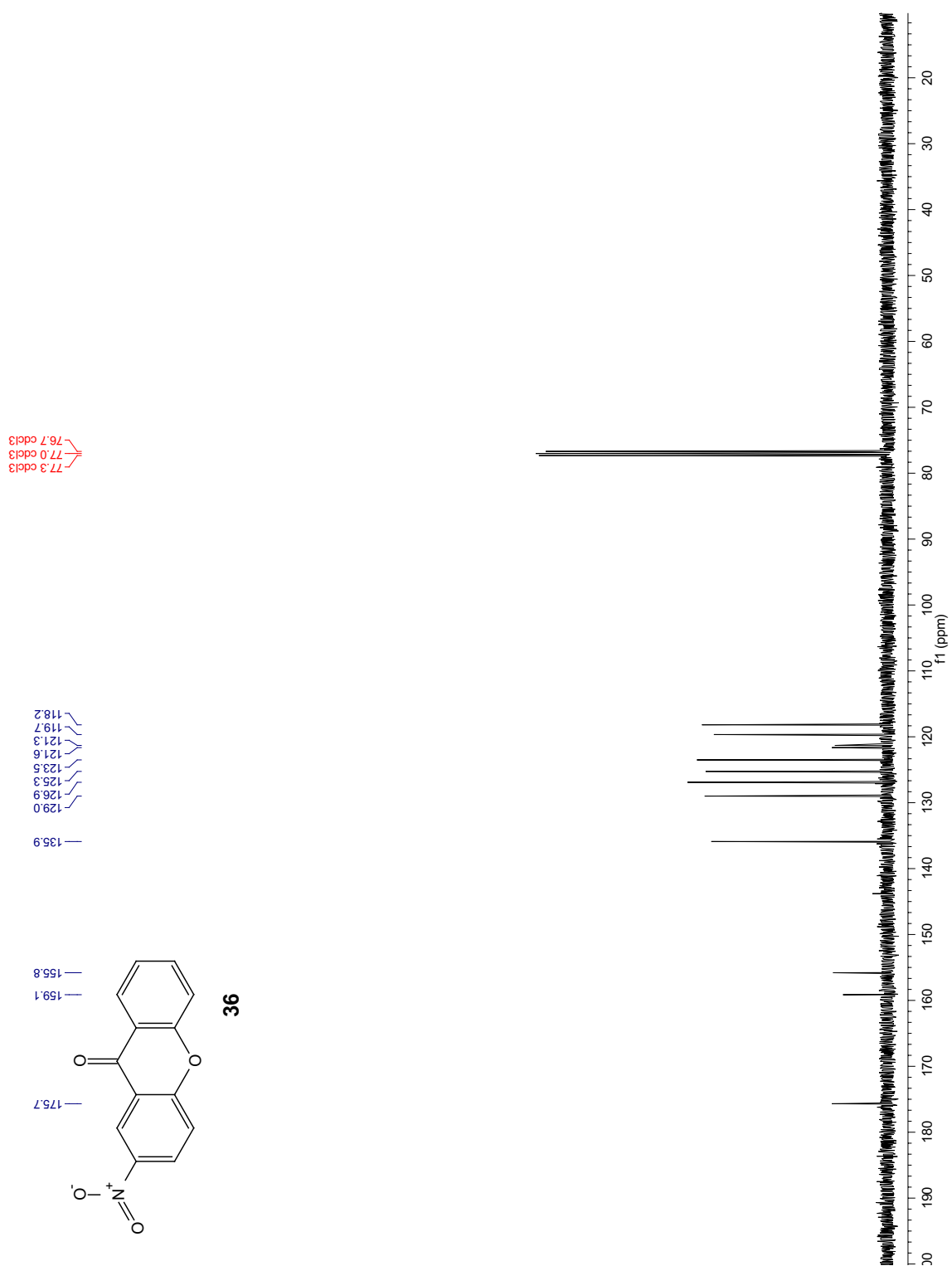


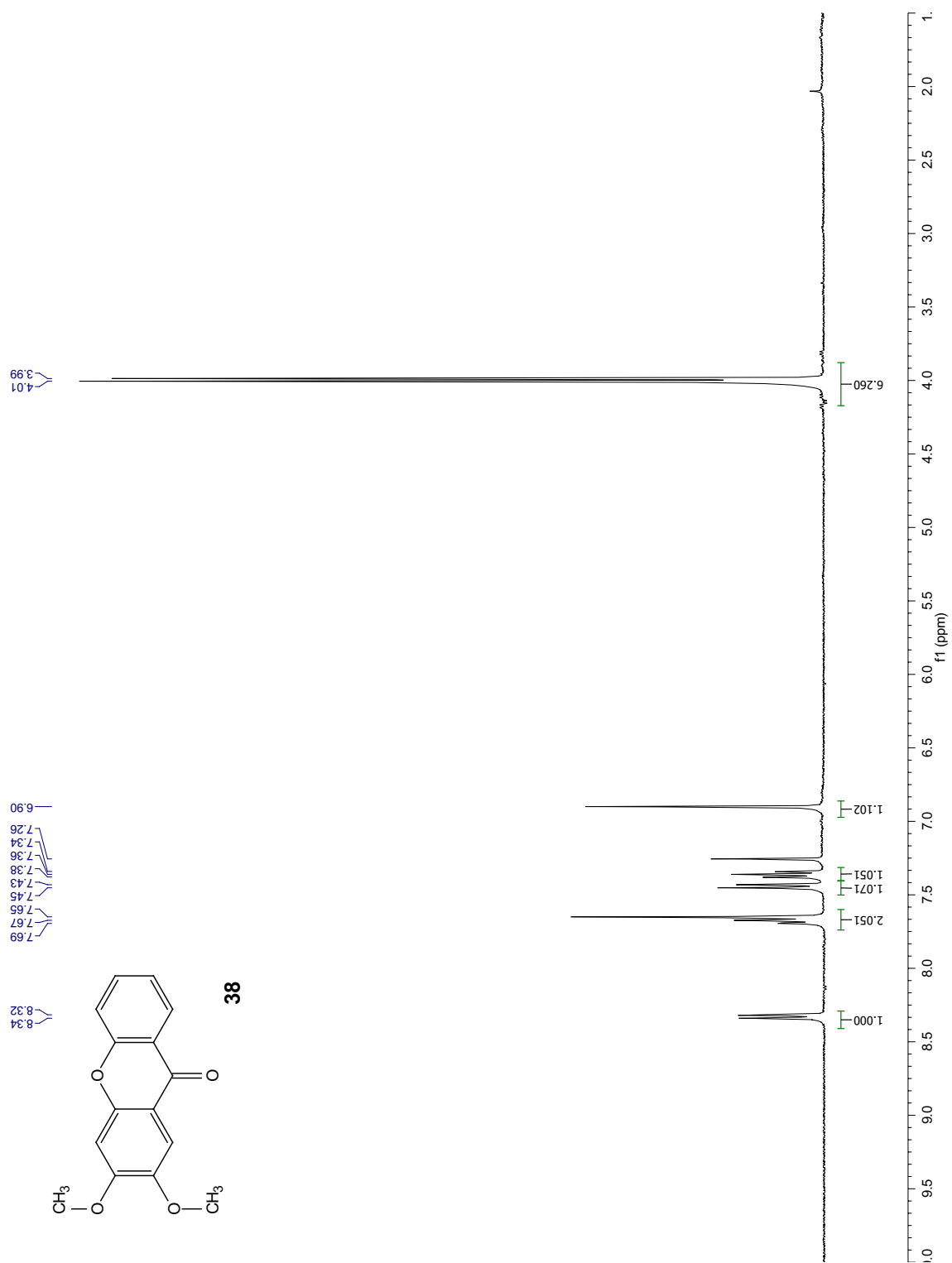


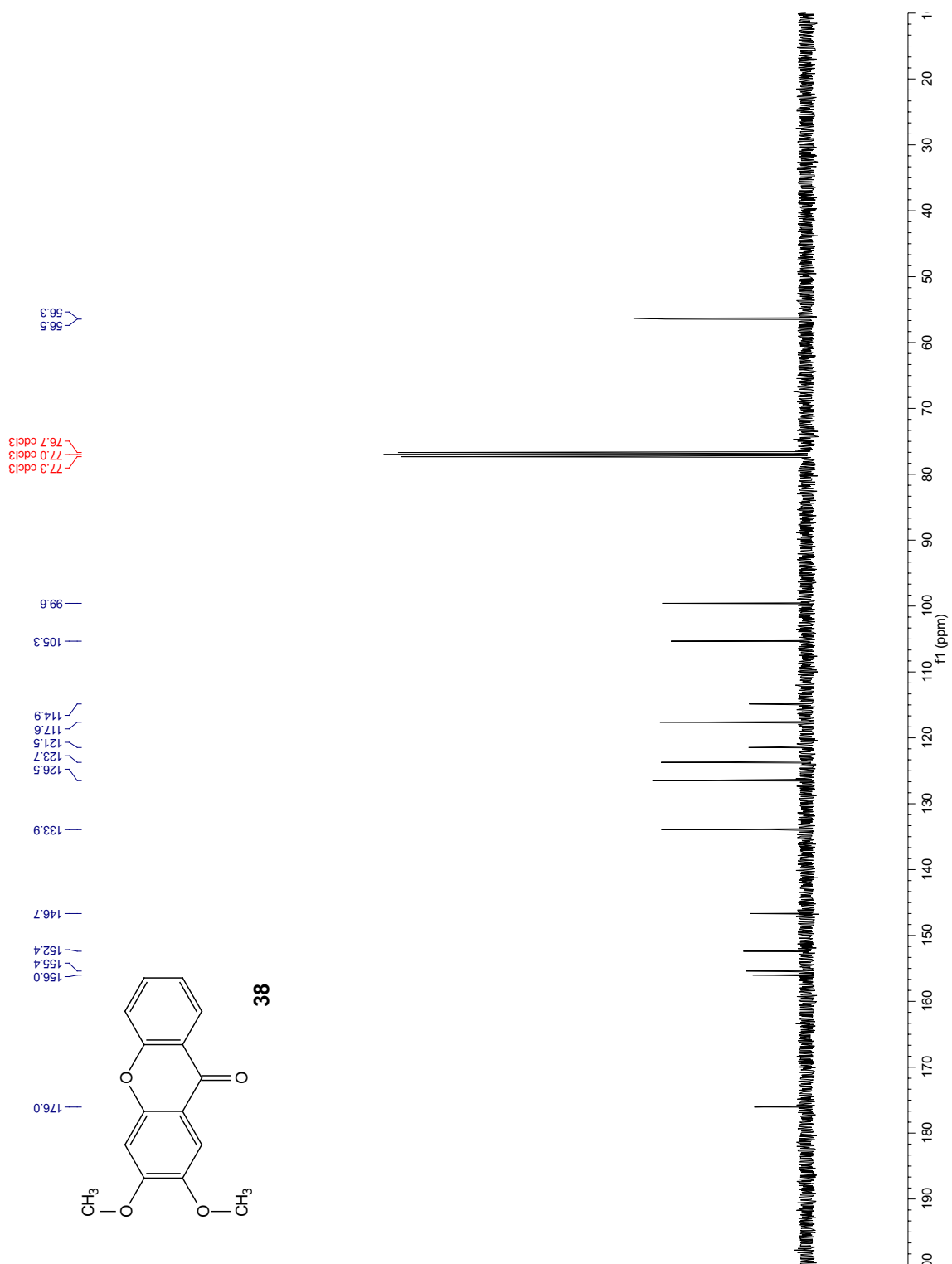


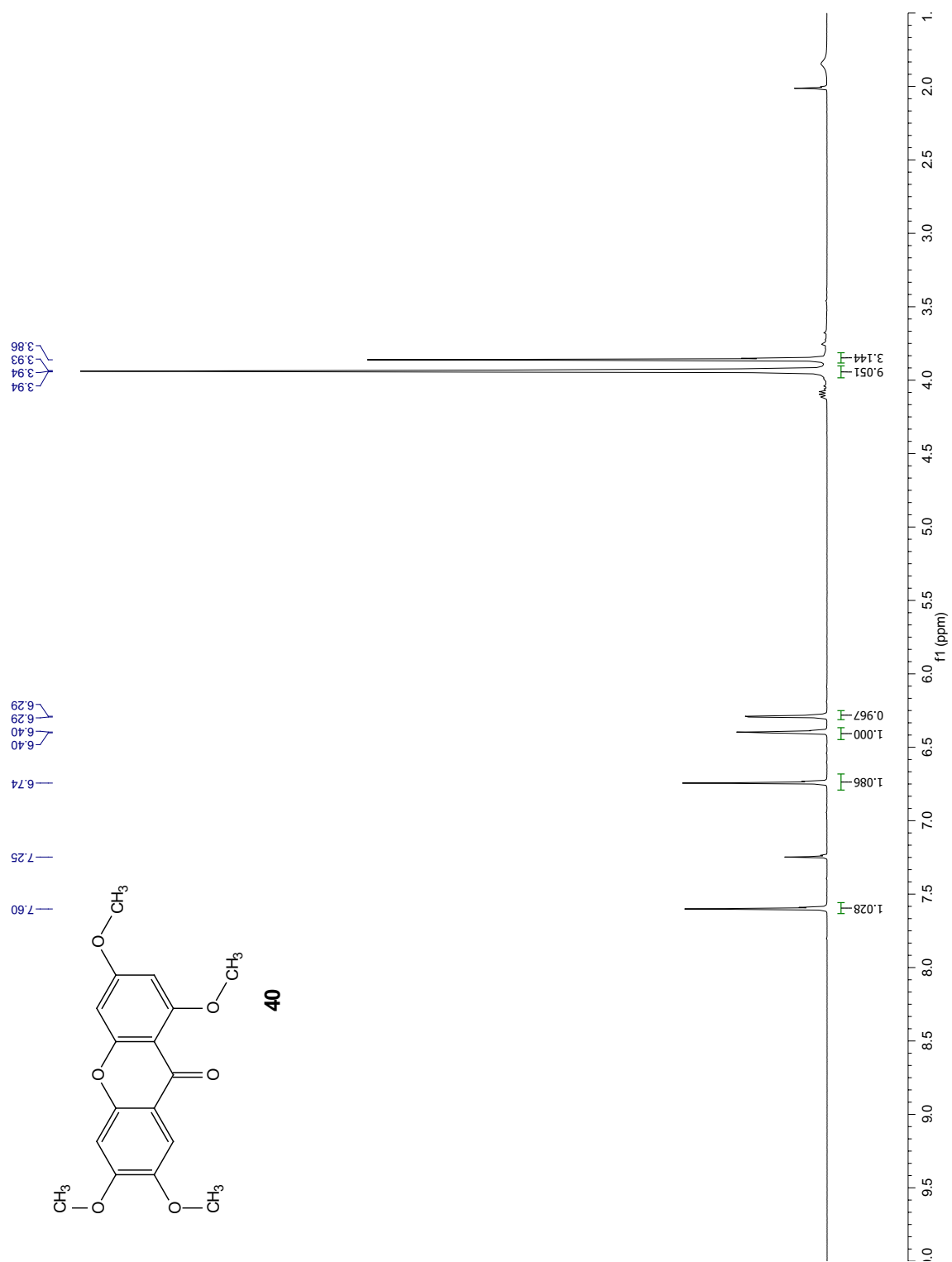


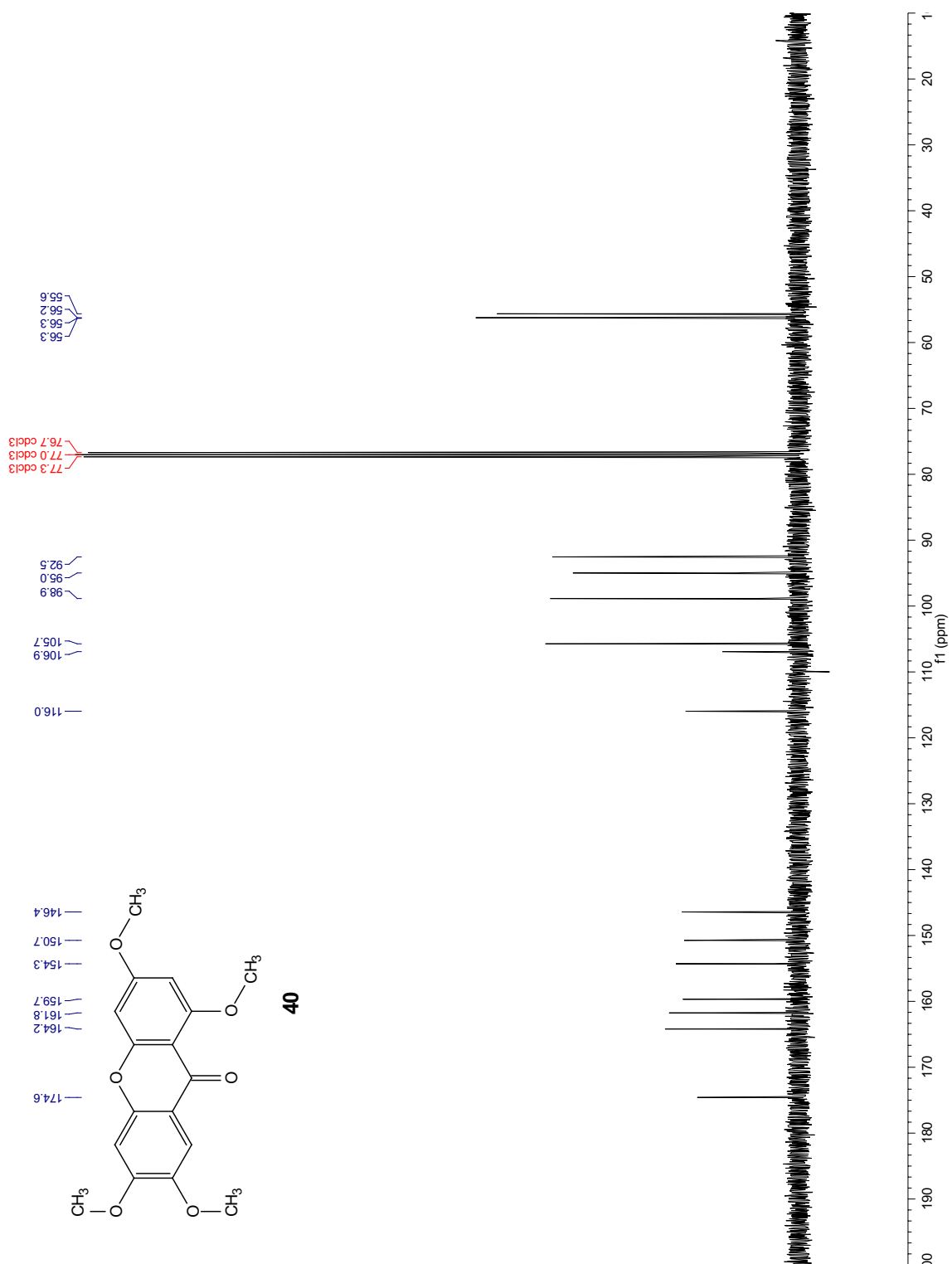


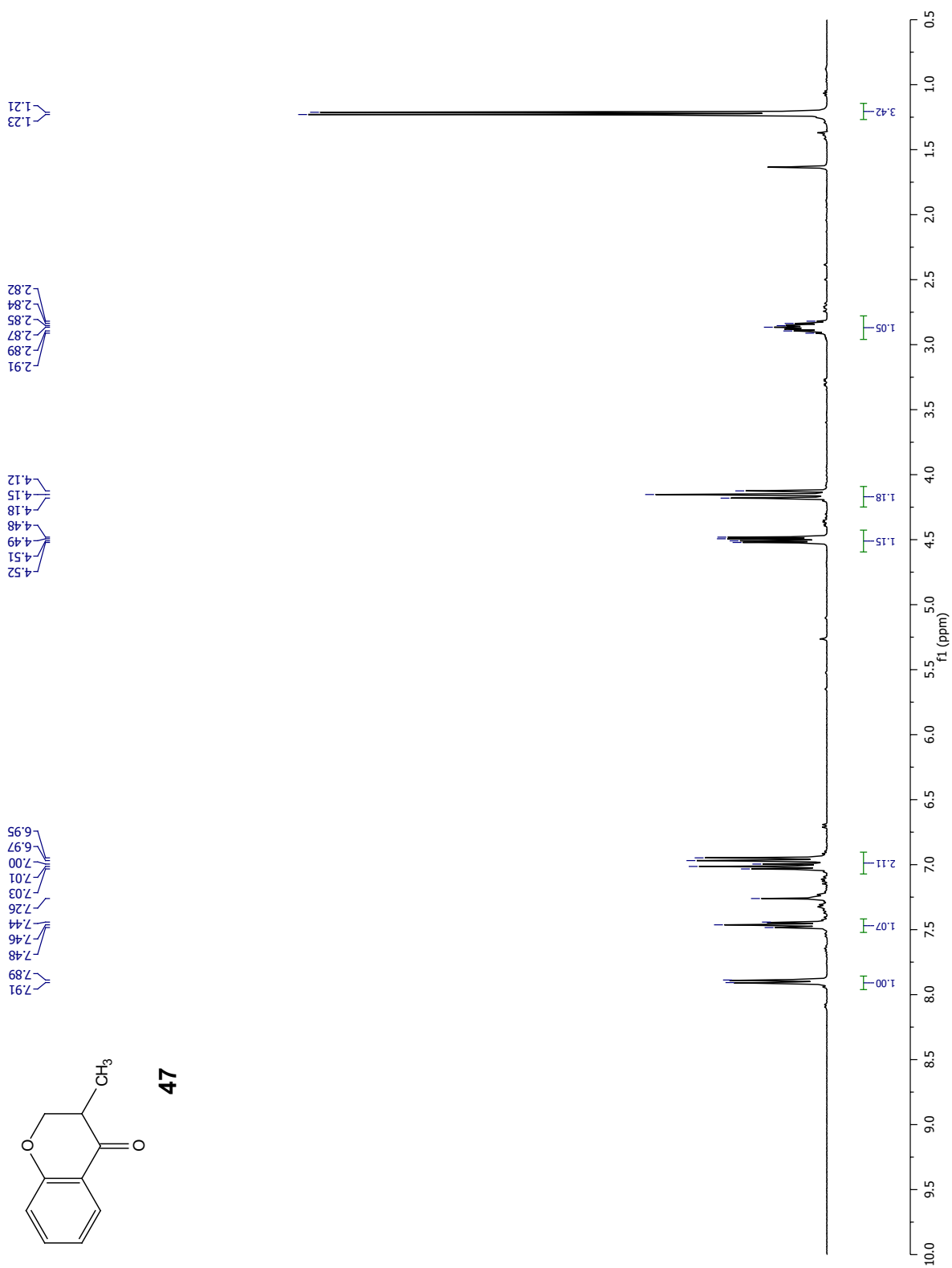


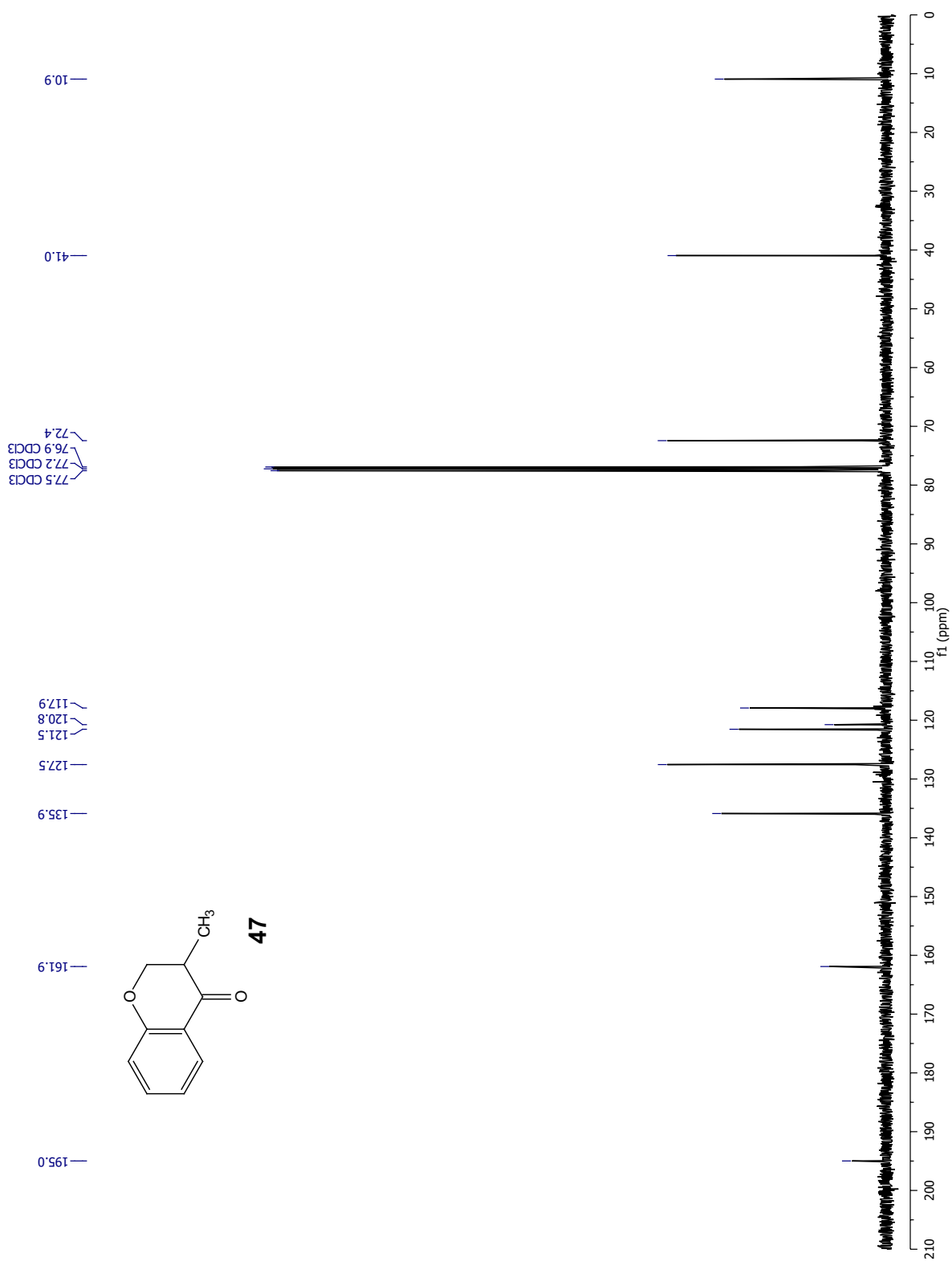


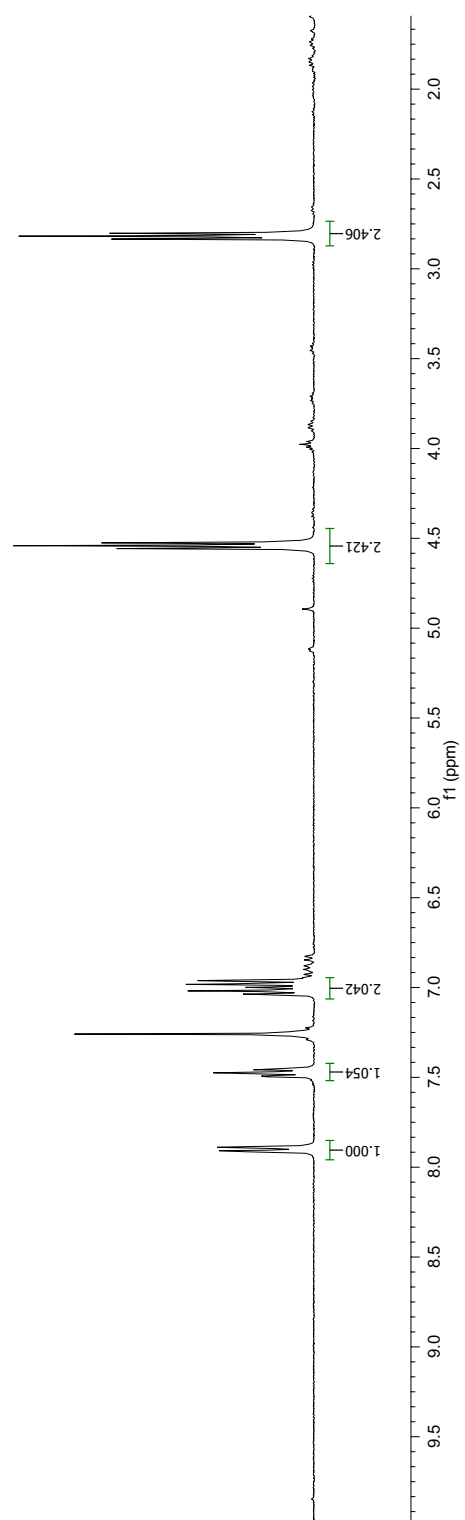










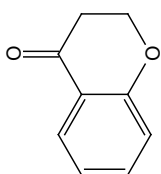


2.83
2.82
2.80

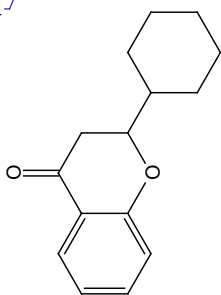
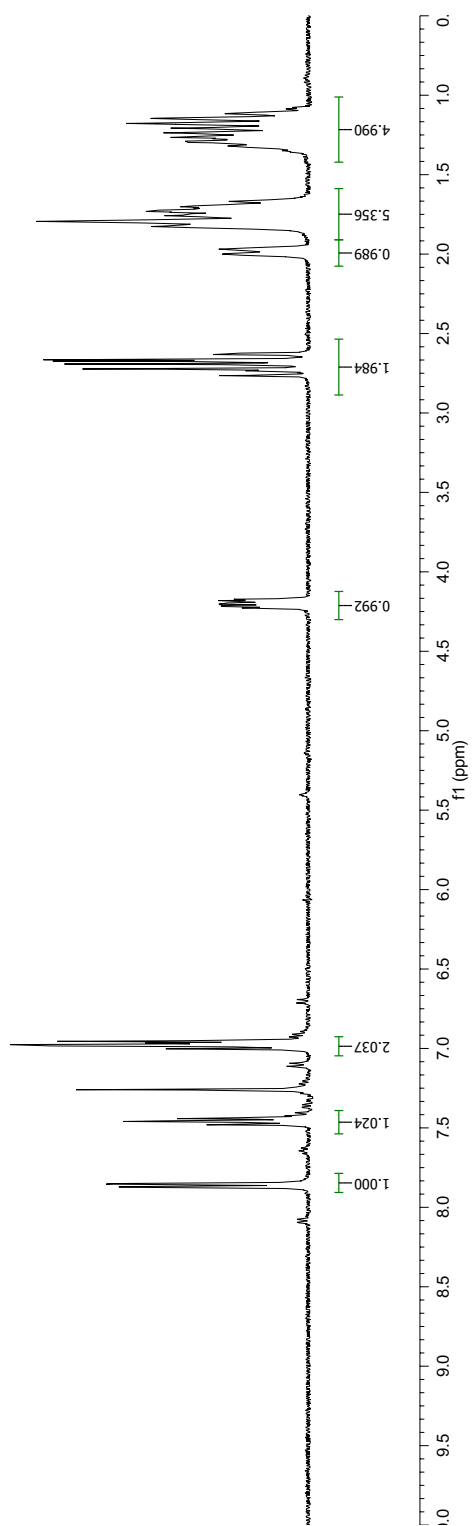
4.56
4.54
4.52

7.91
7.89
7.50
7.47
7.46
7.26
7.04
7.02
7.00
6.98
6.96

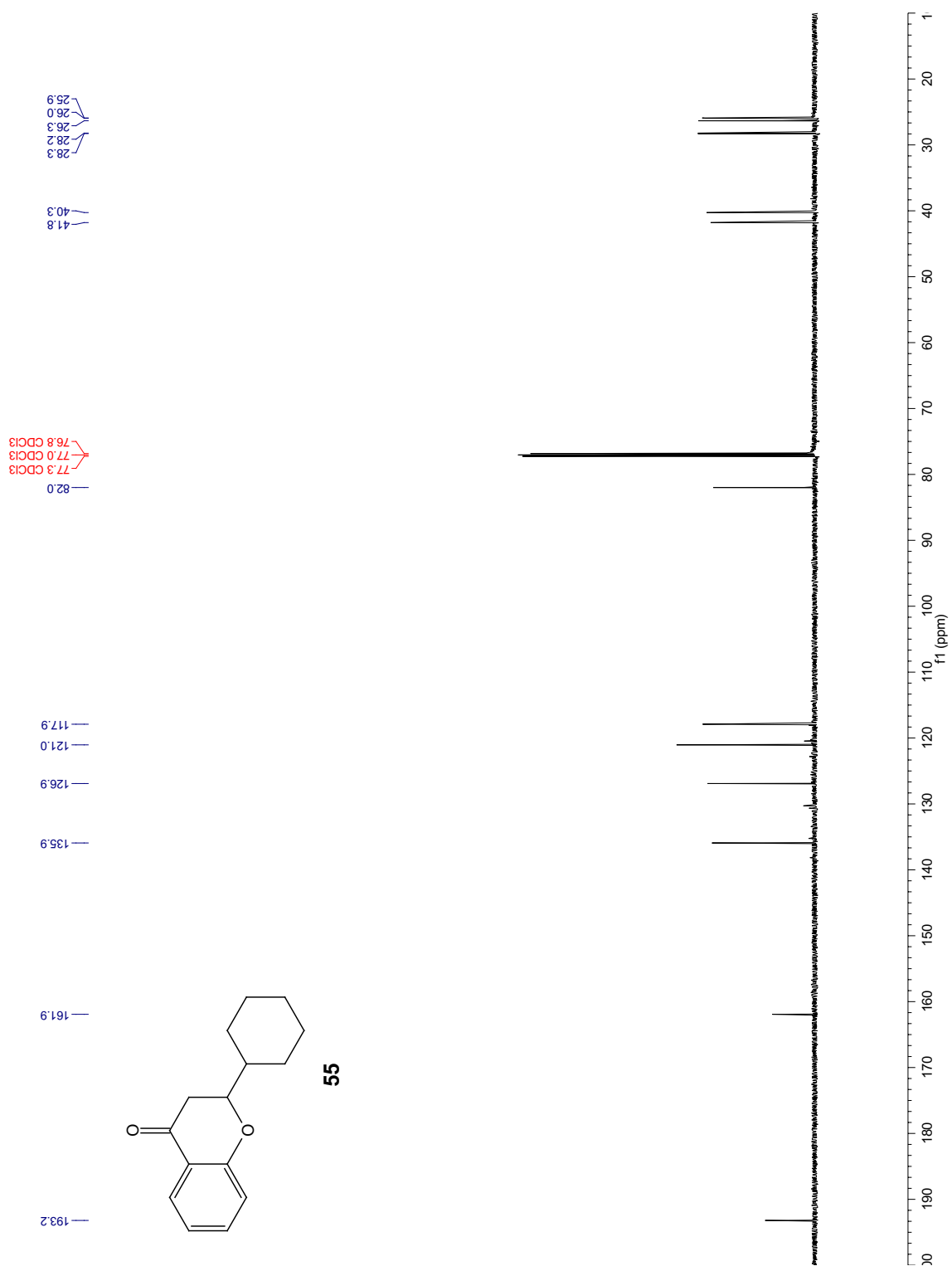
7.89
7.91

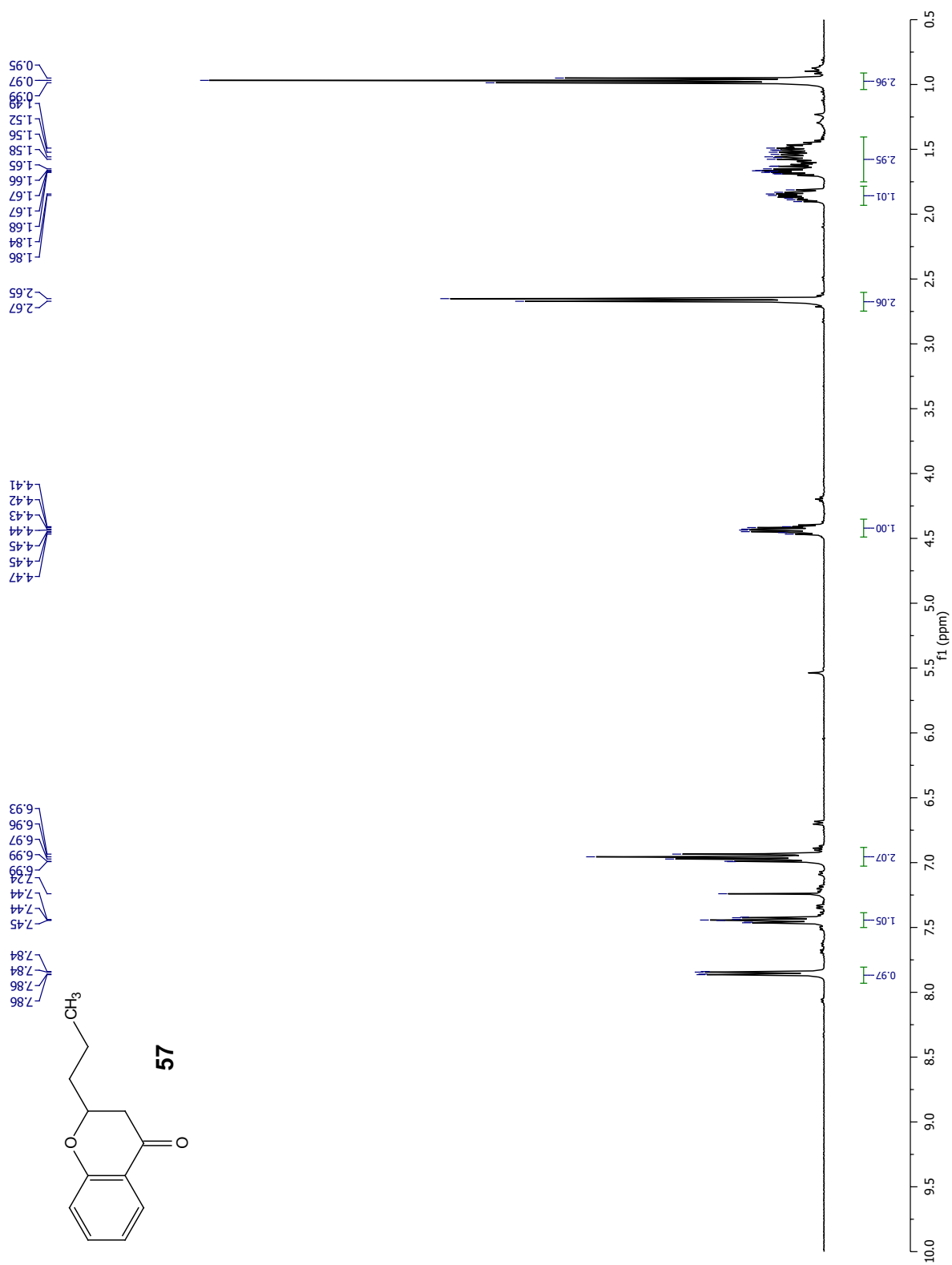


53

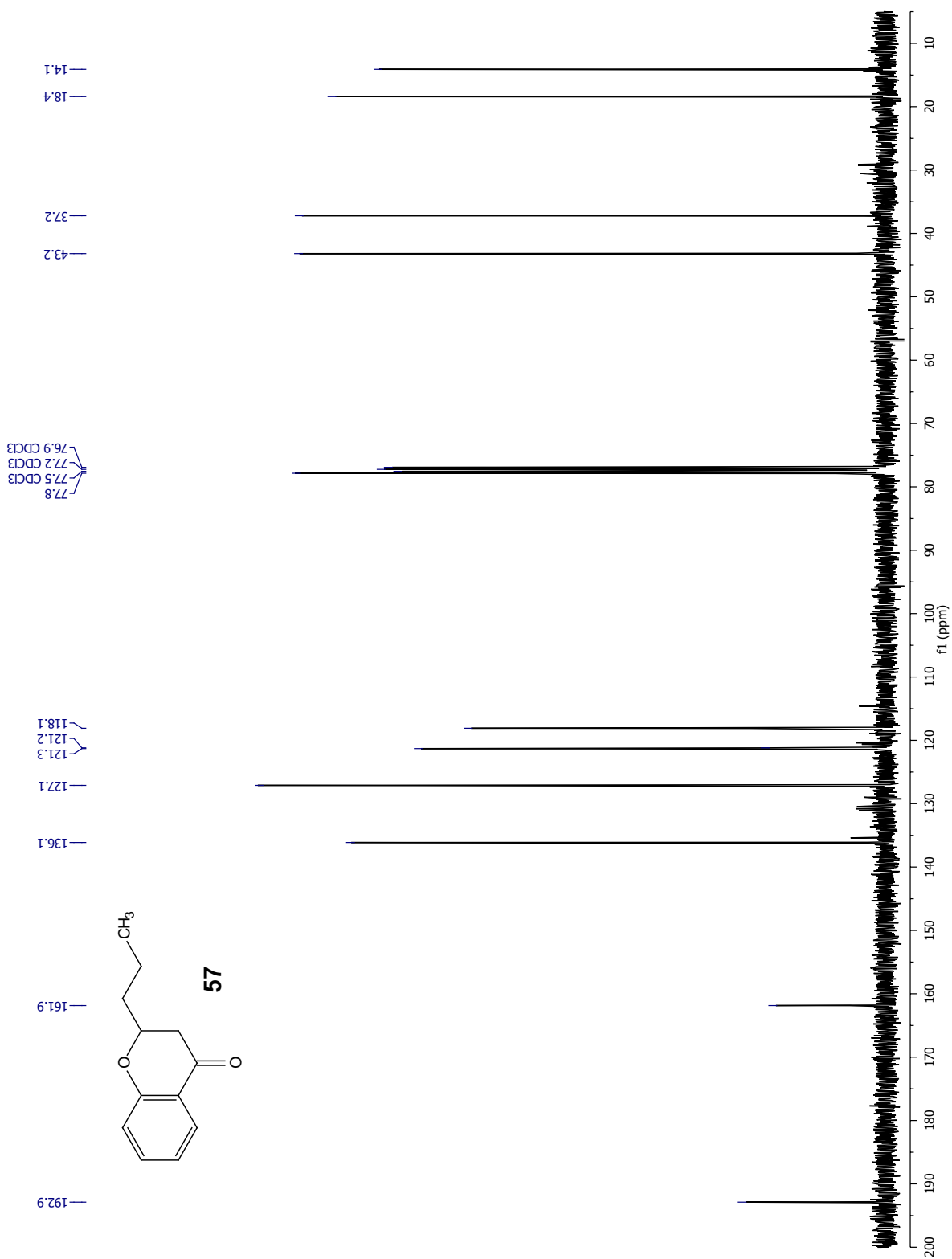


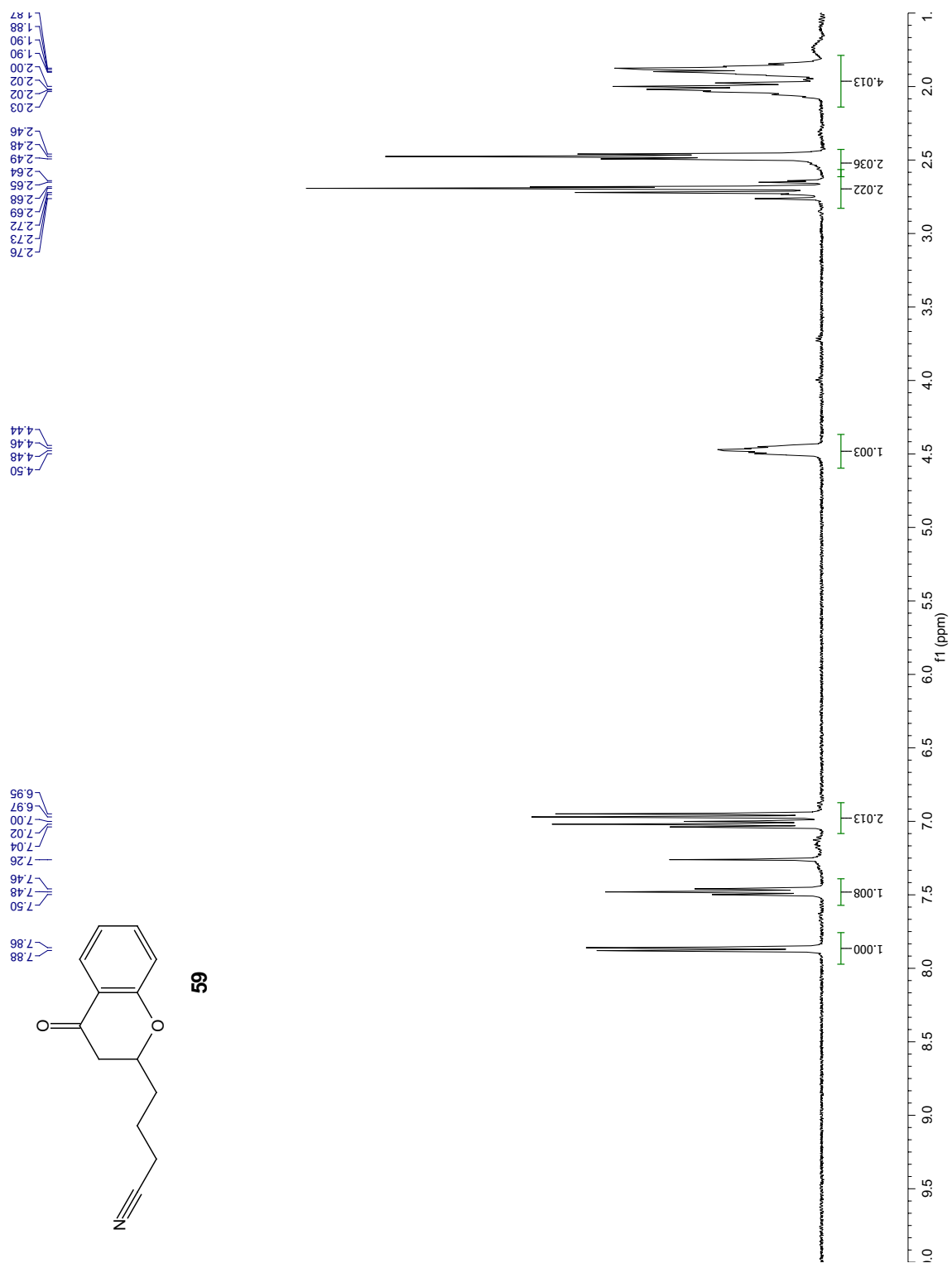
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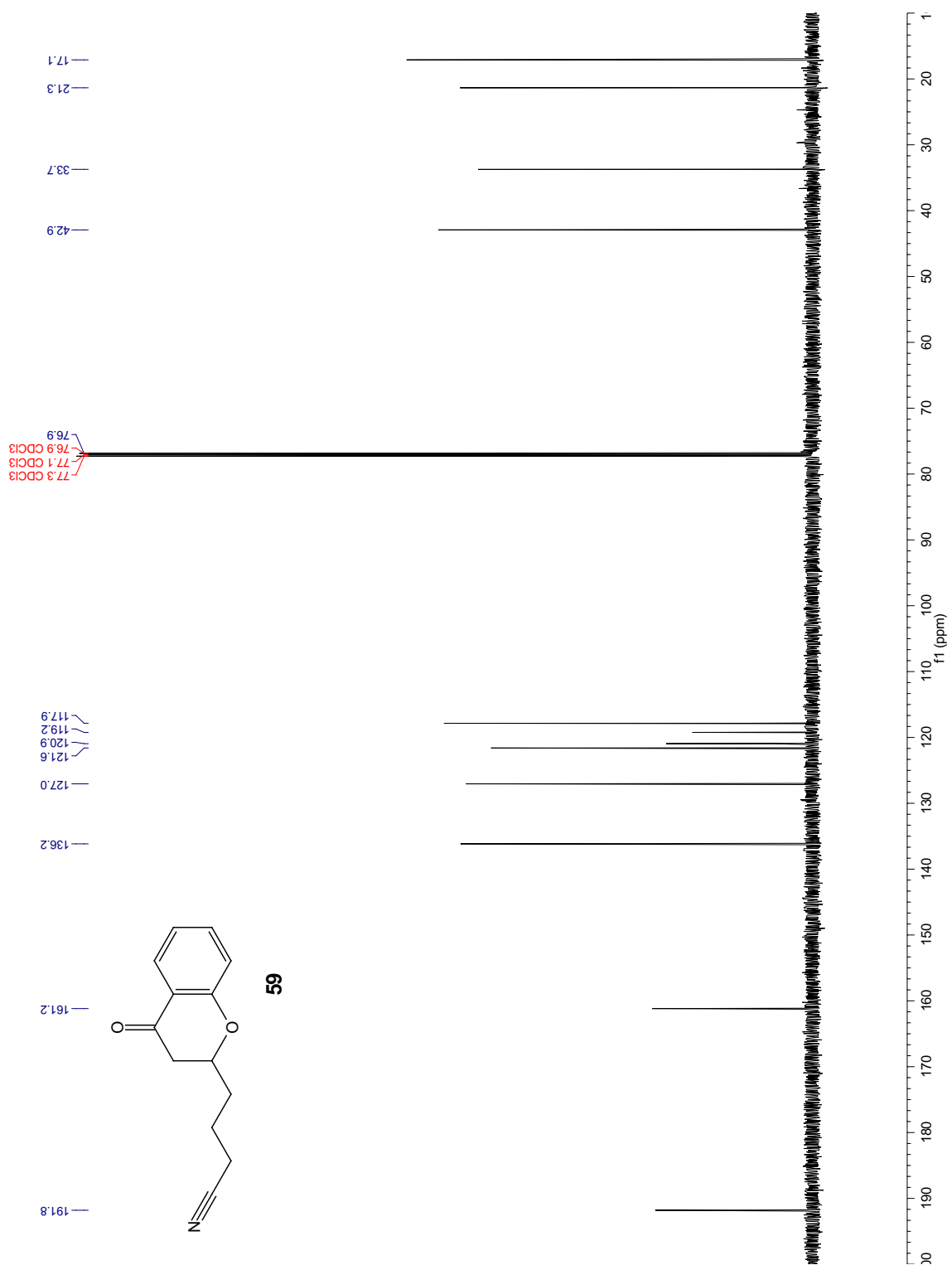


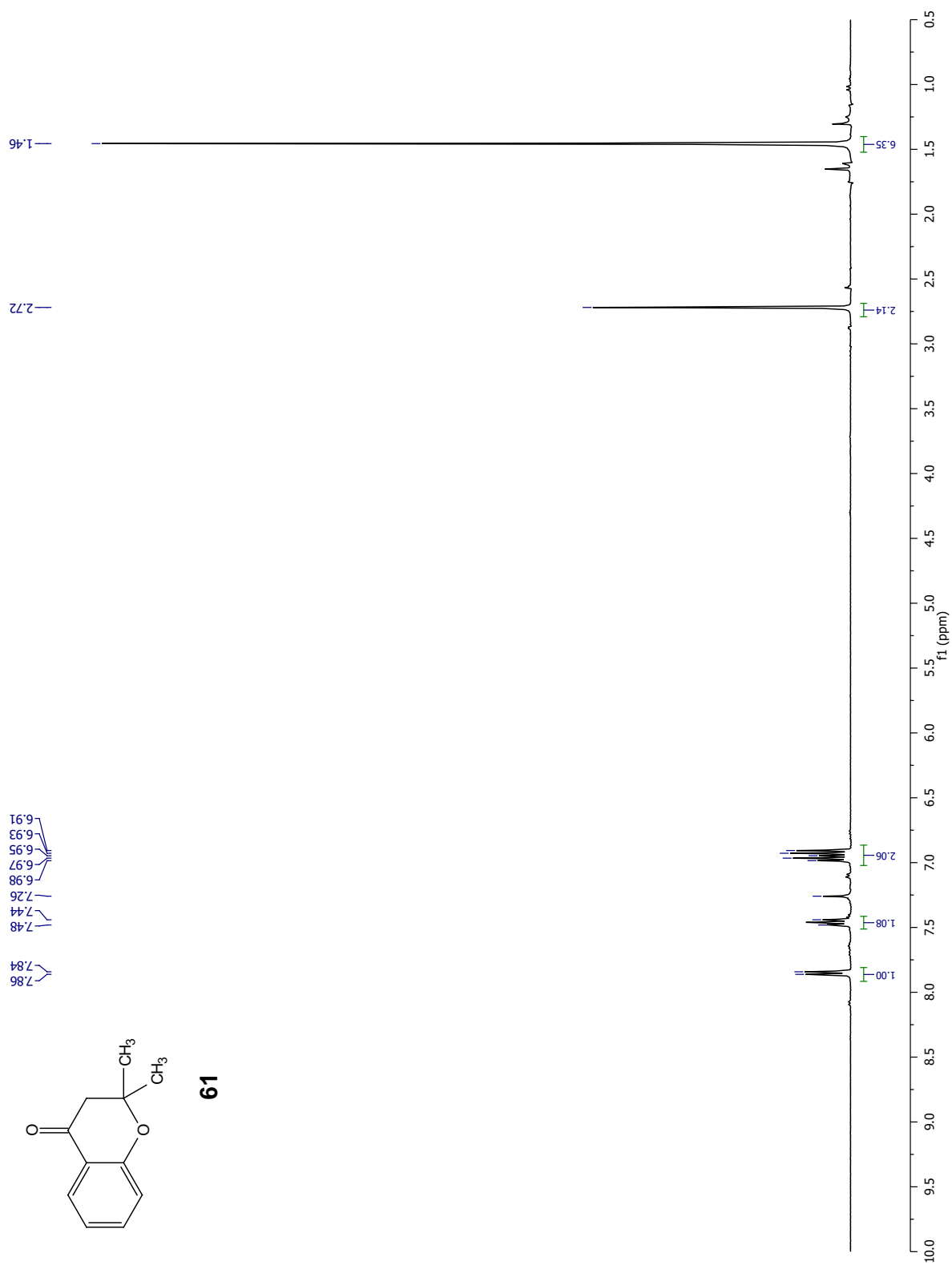
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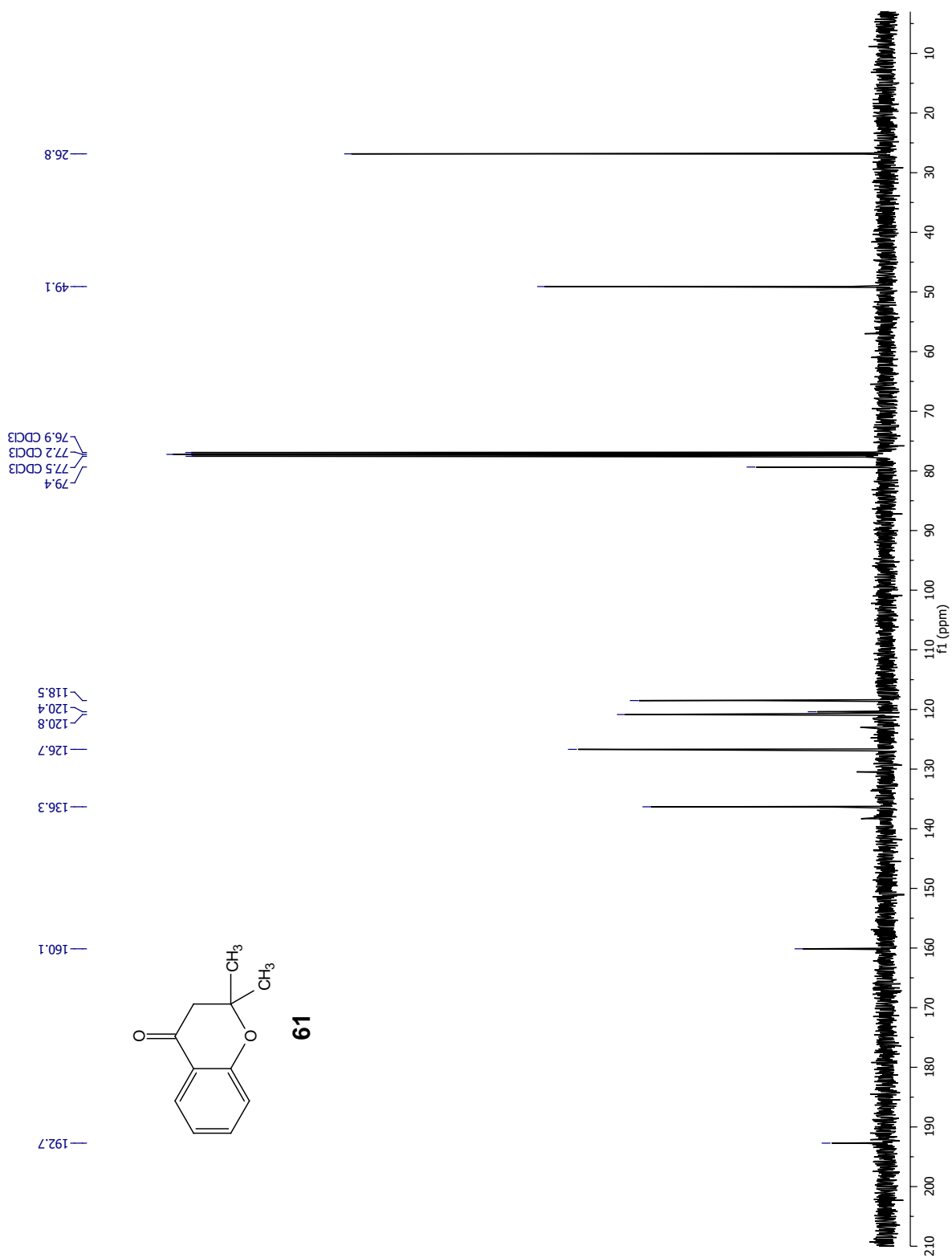


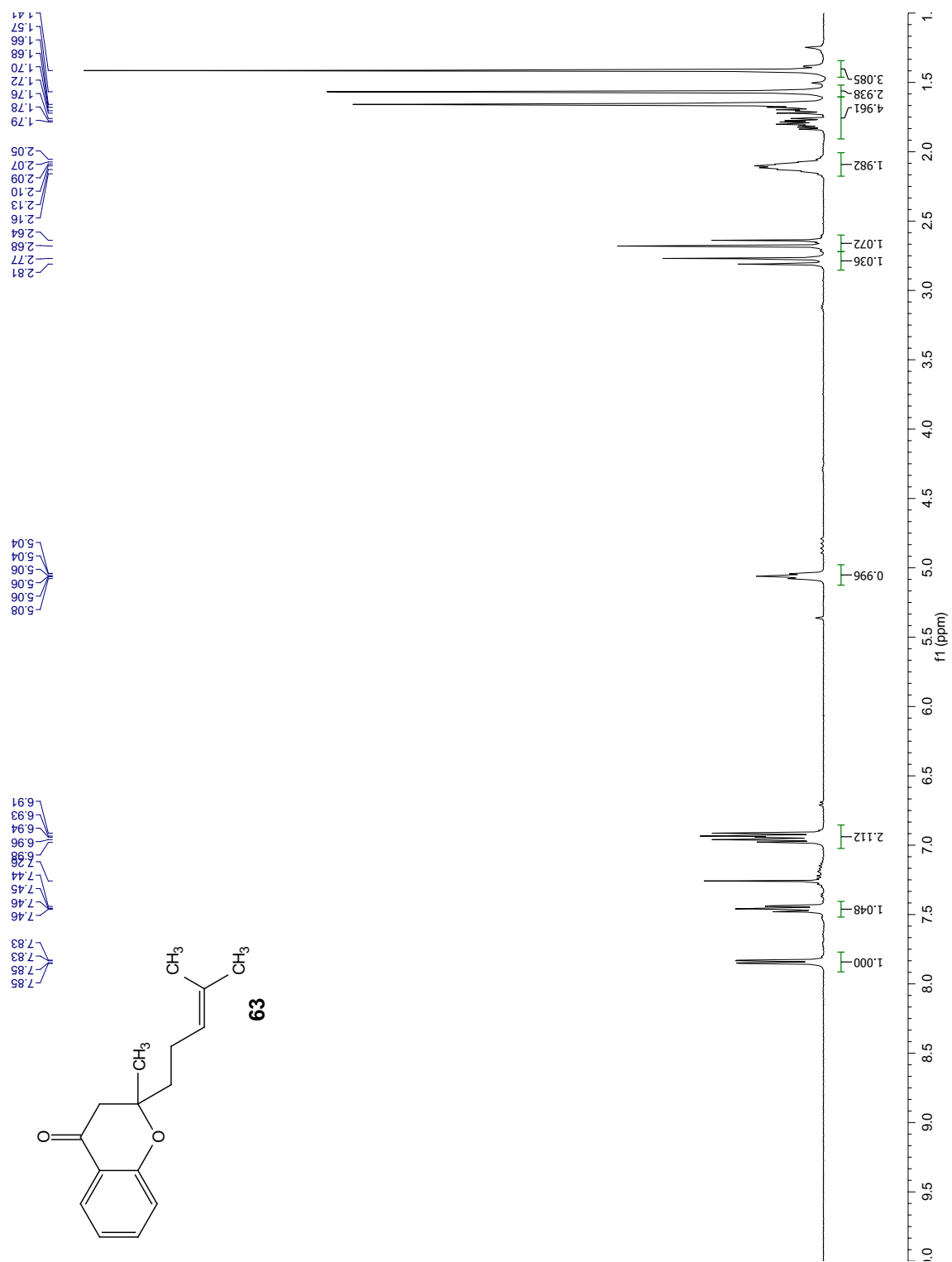
382

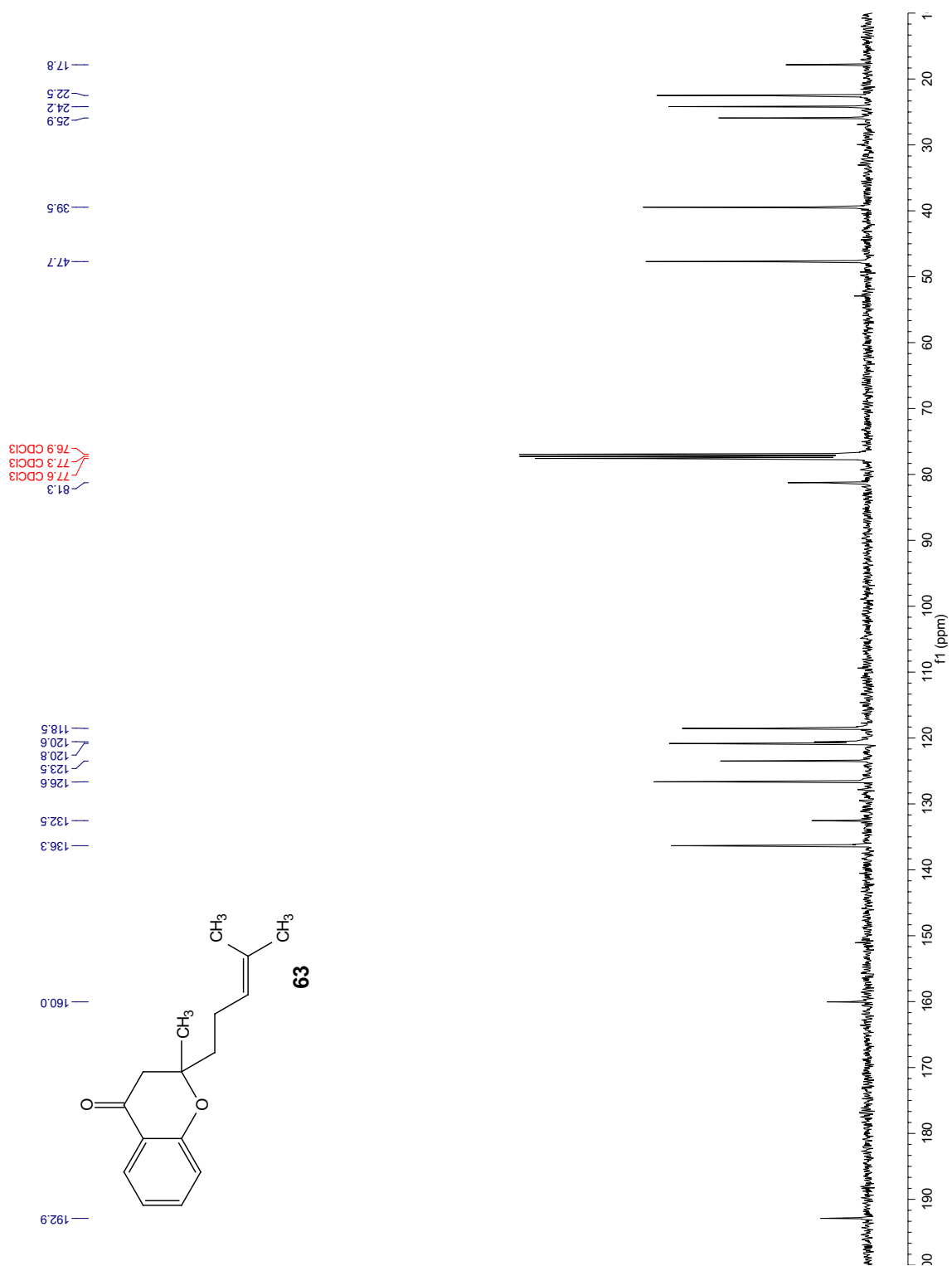


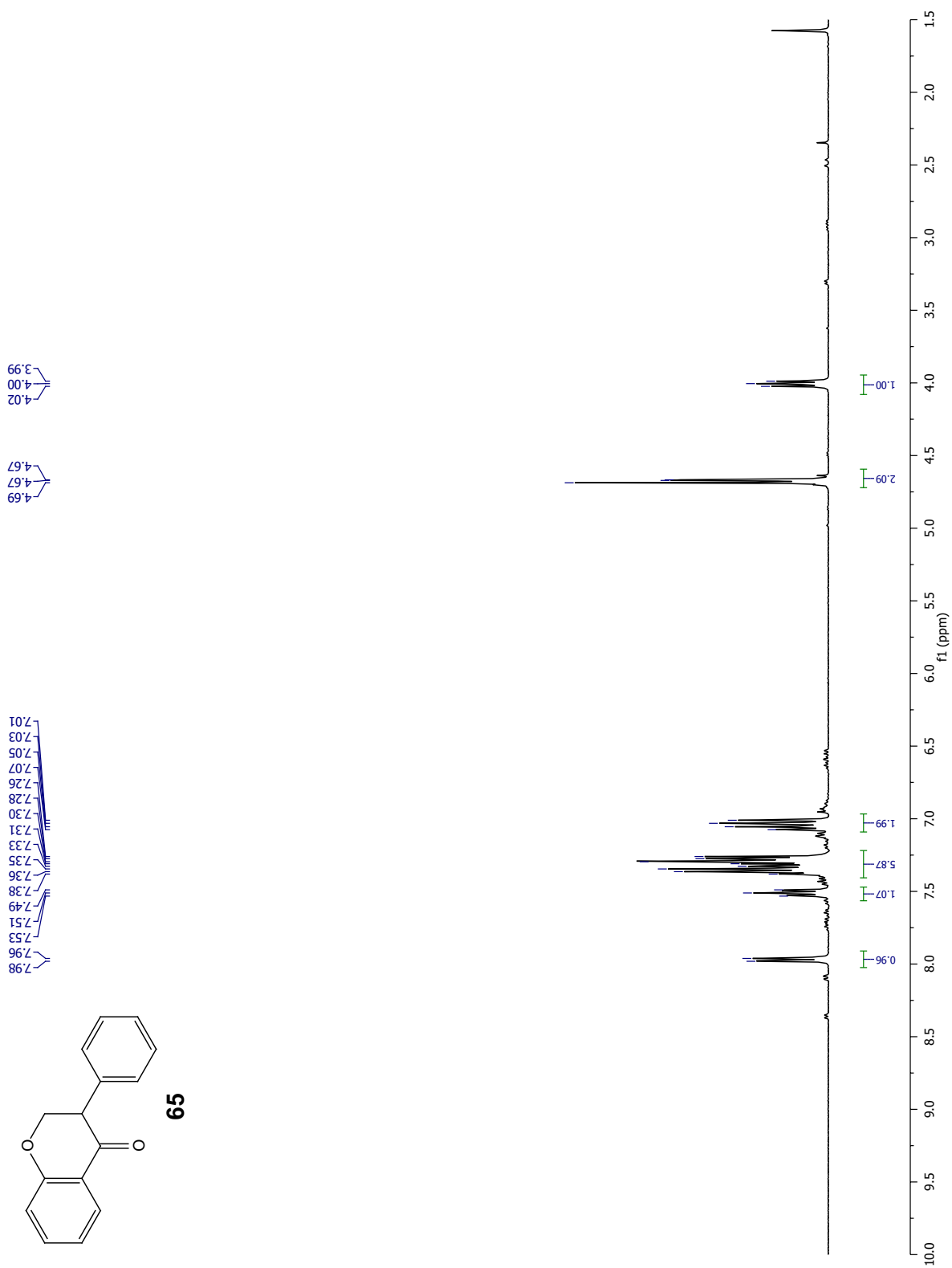


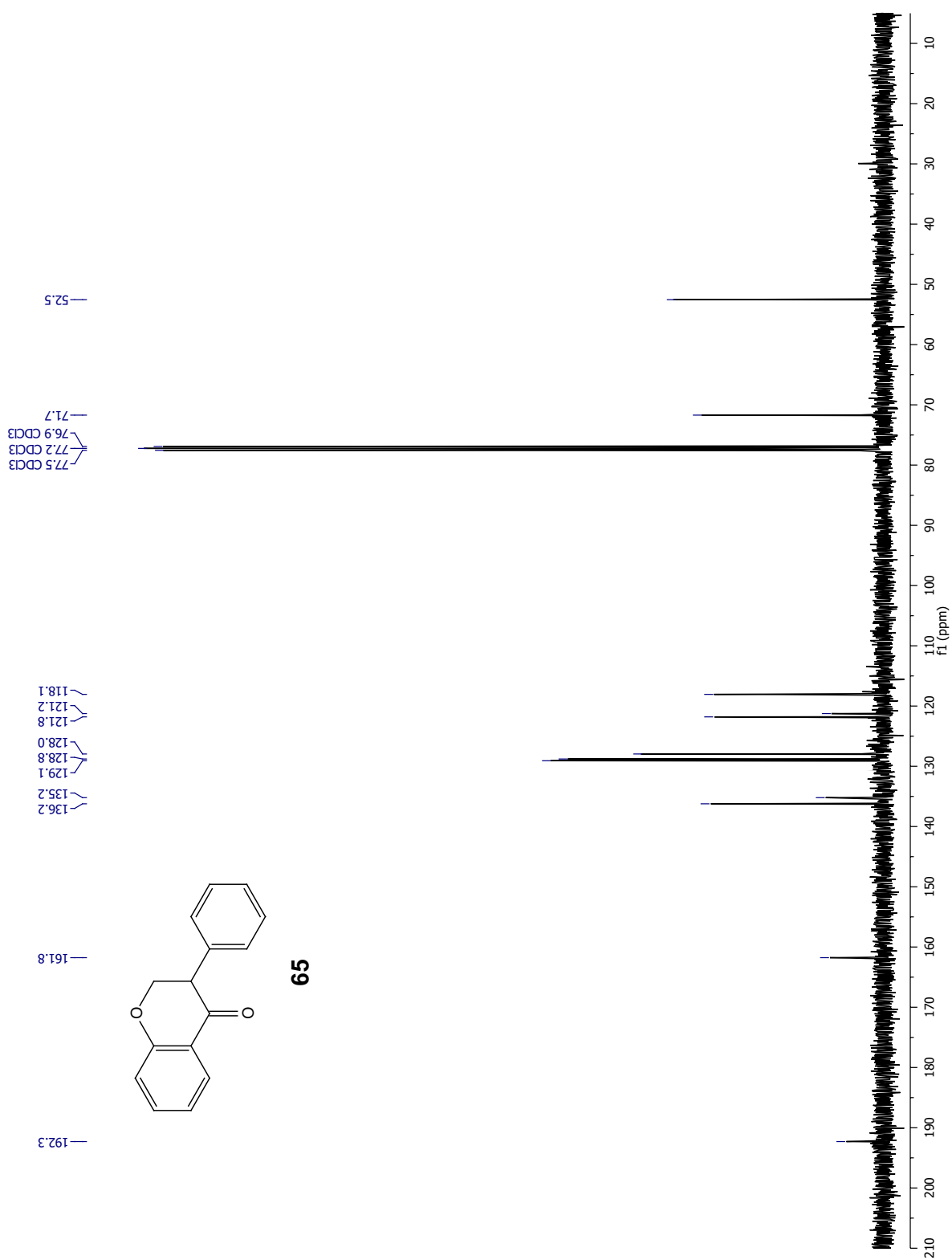
384

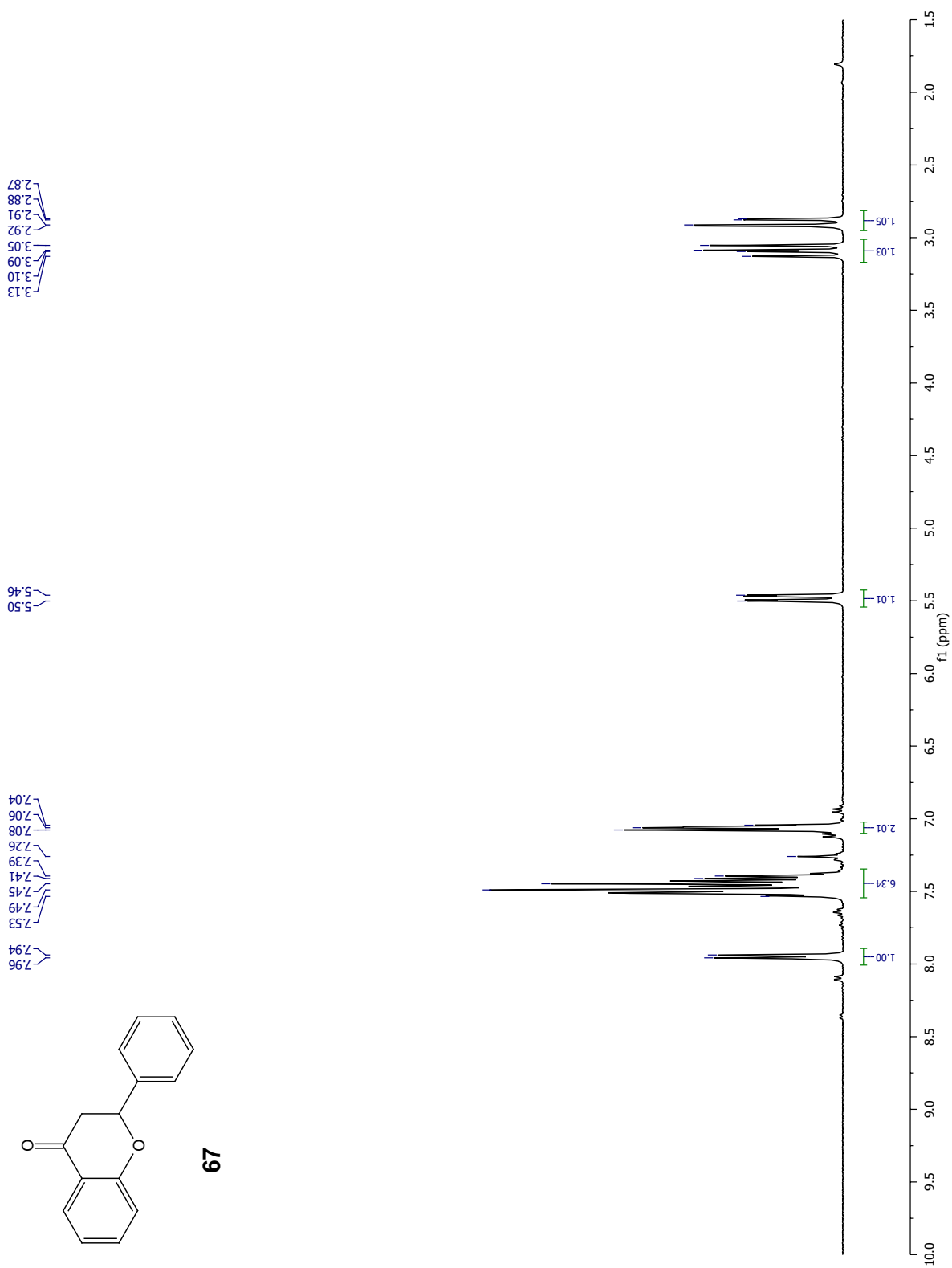


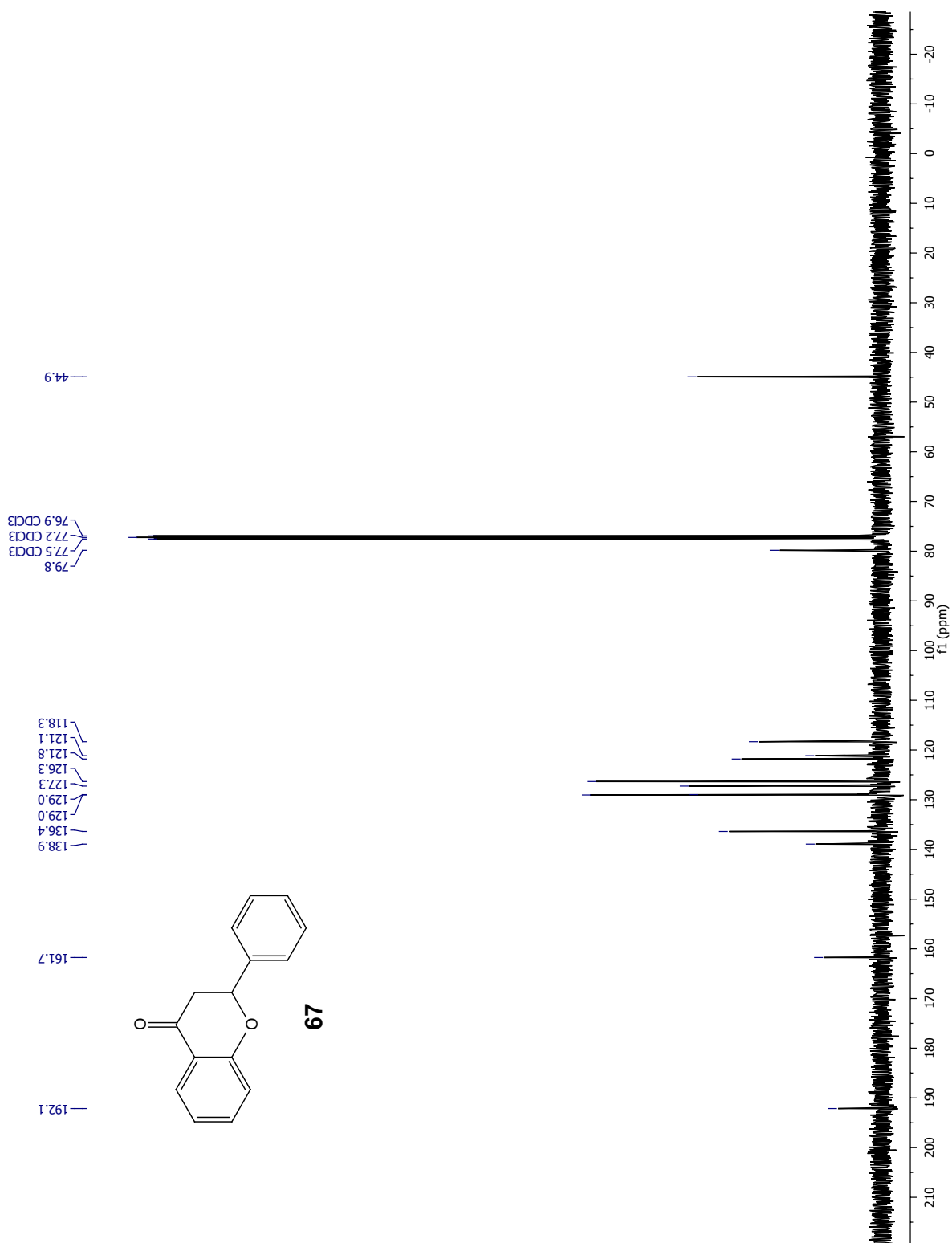


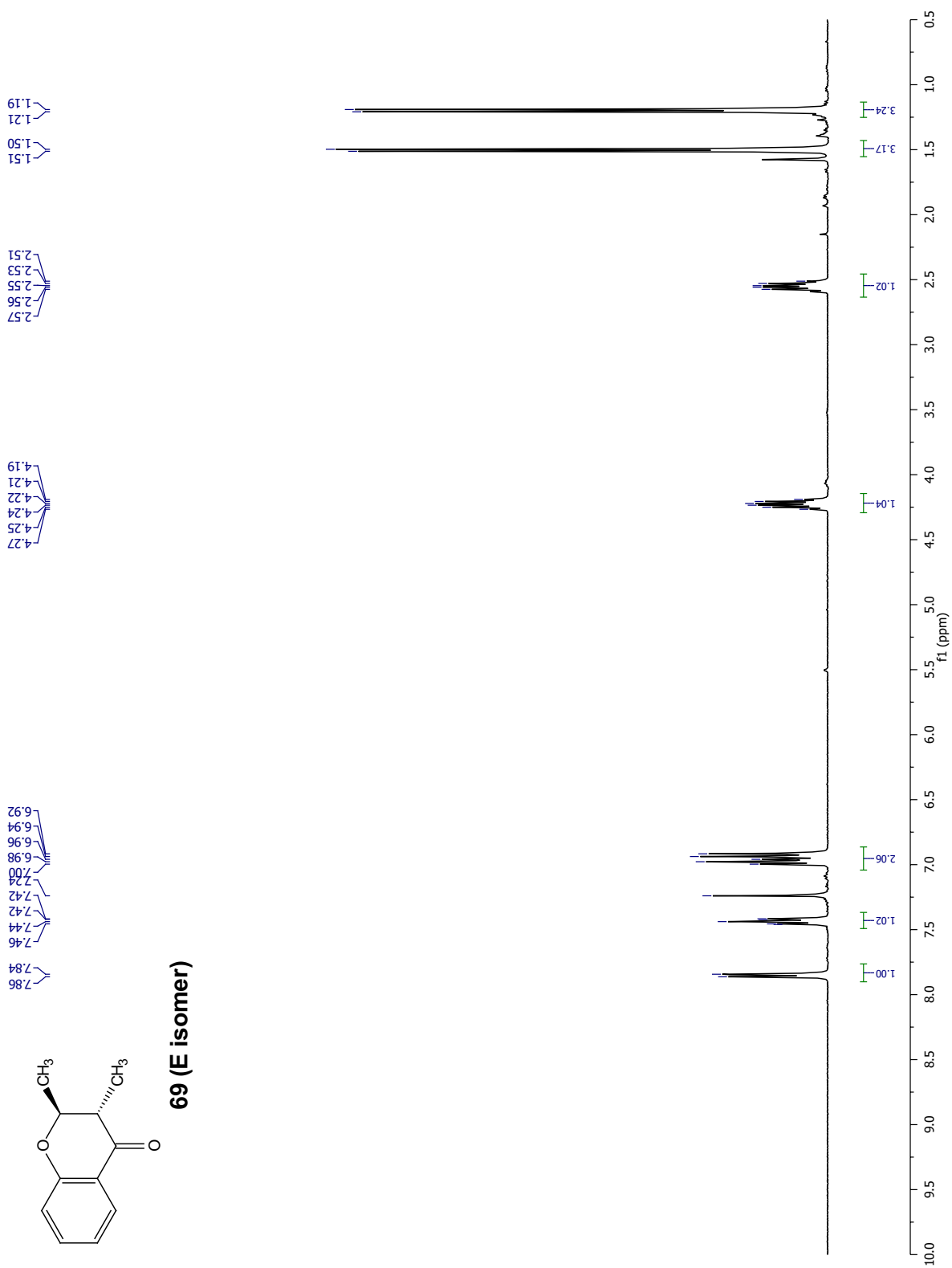


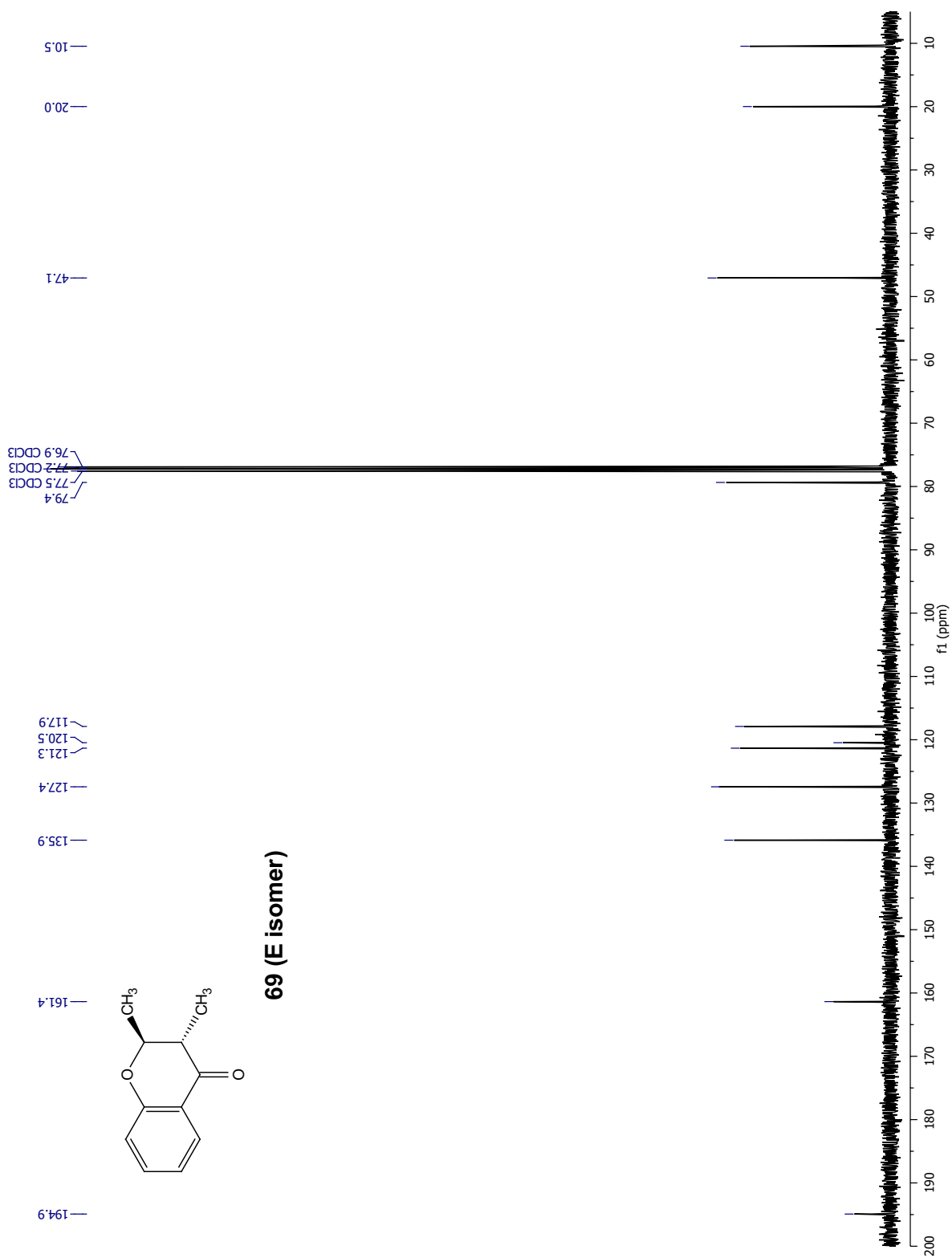


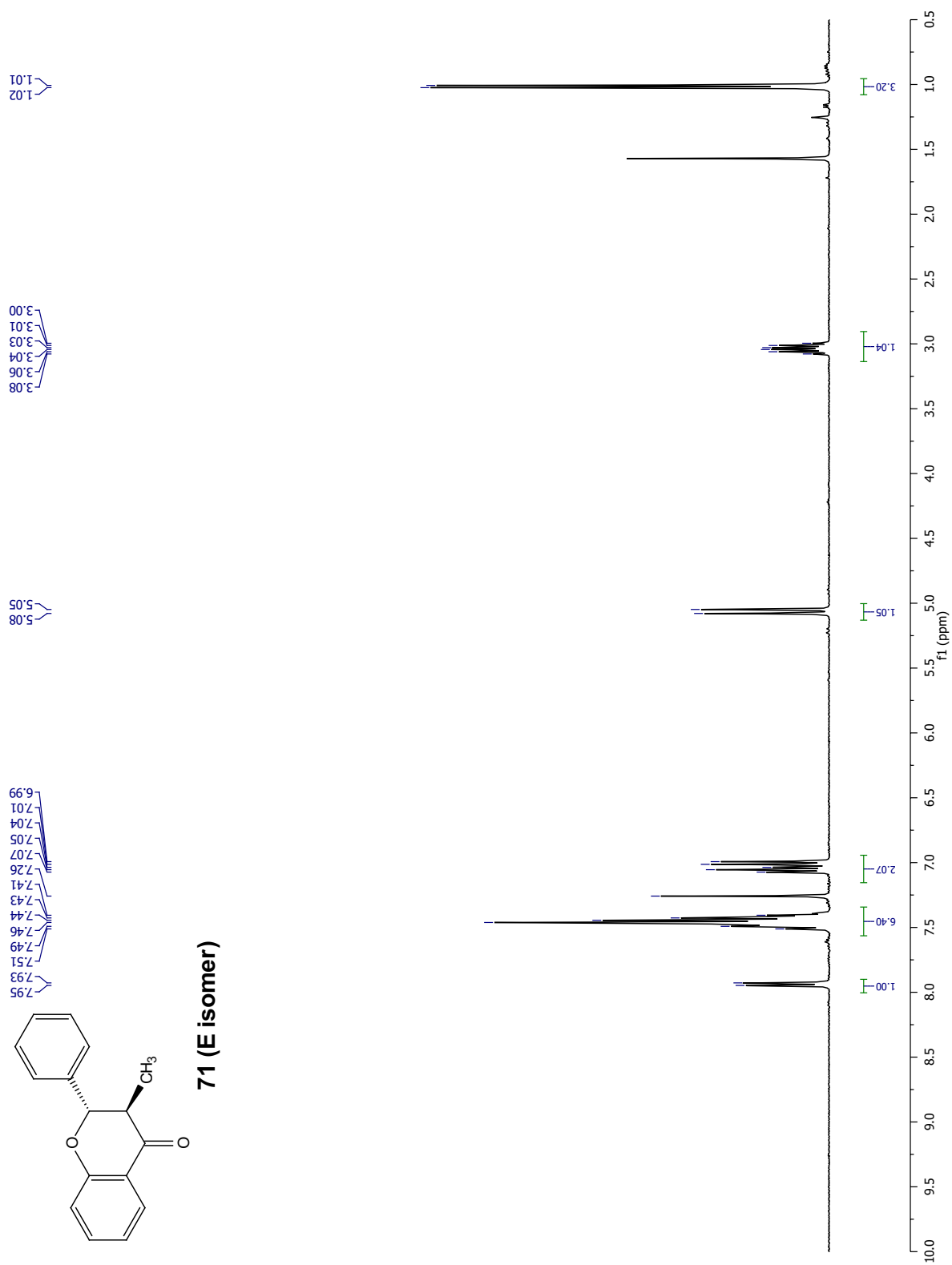


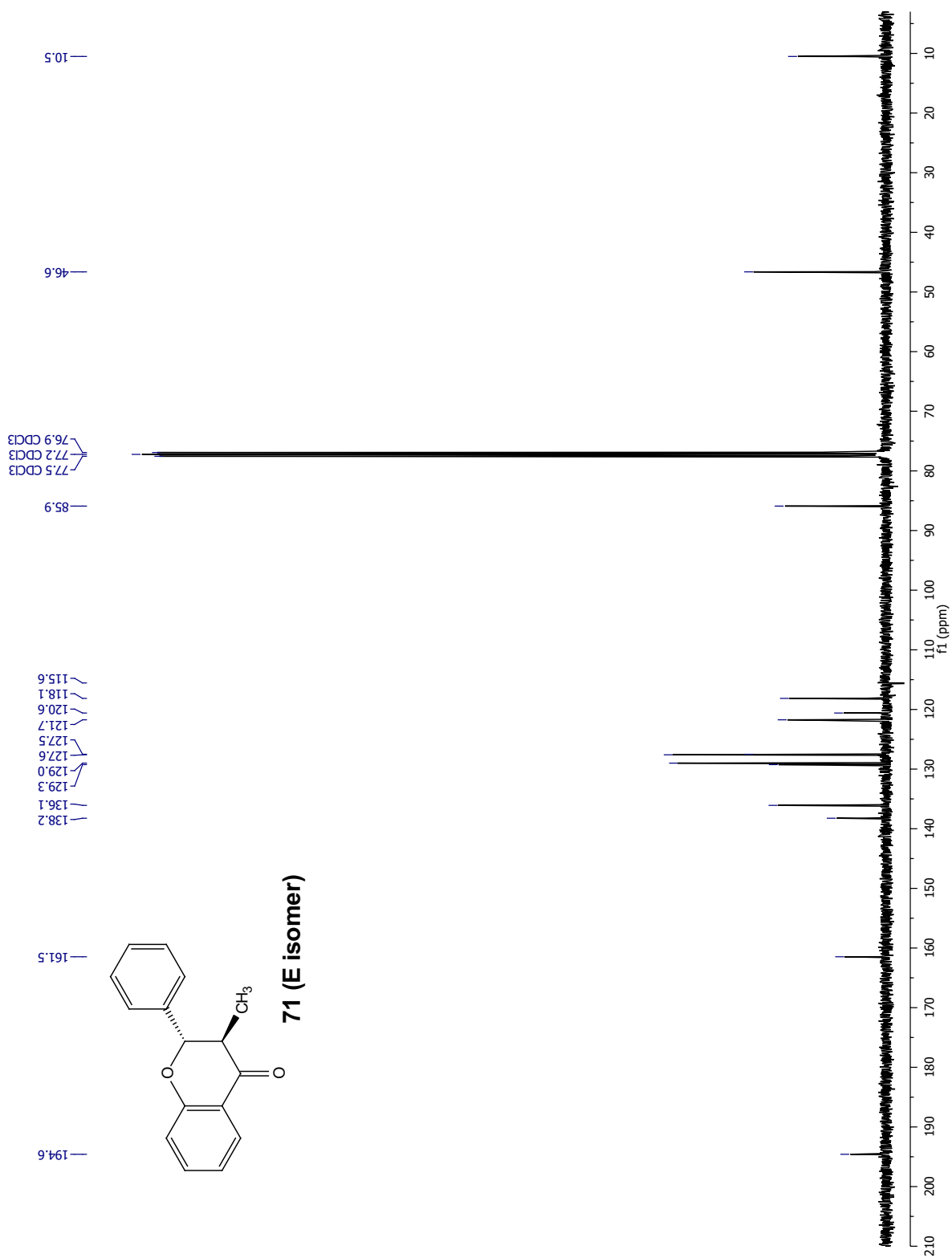


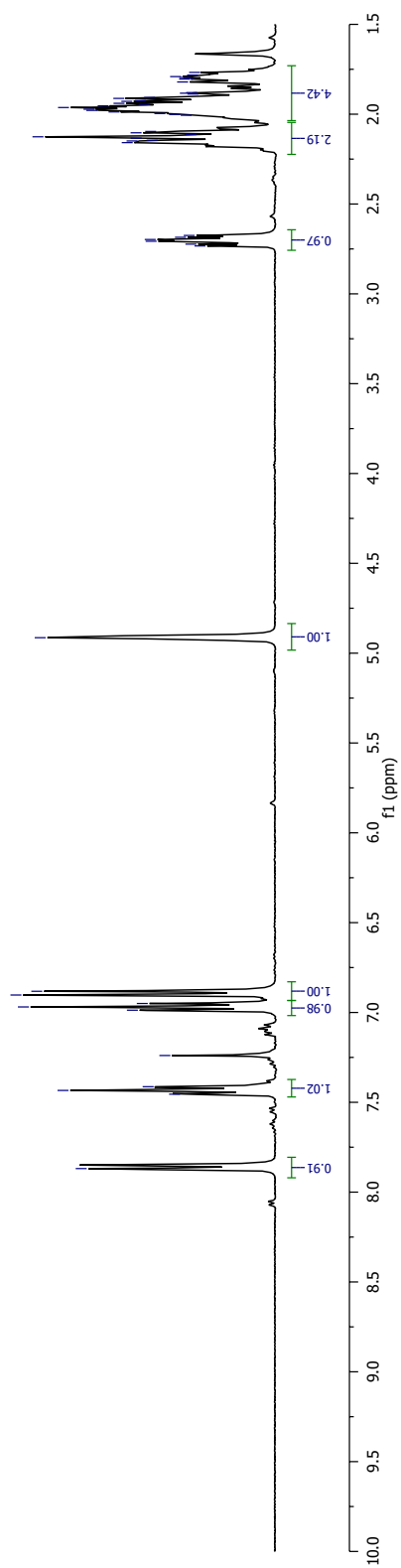












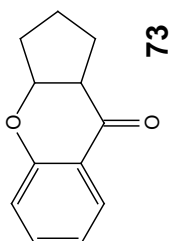
2.13
1.99
1.98
1.97
1.96
1.95
1.94
1.91

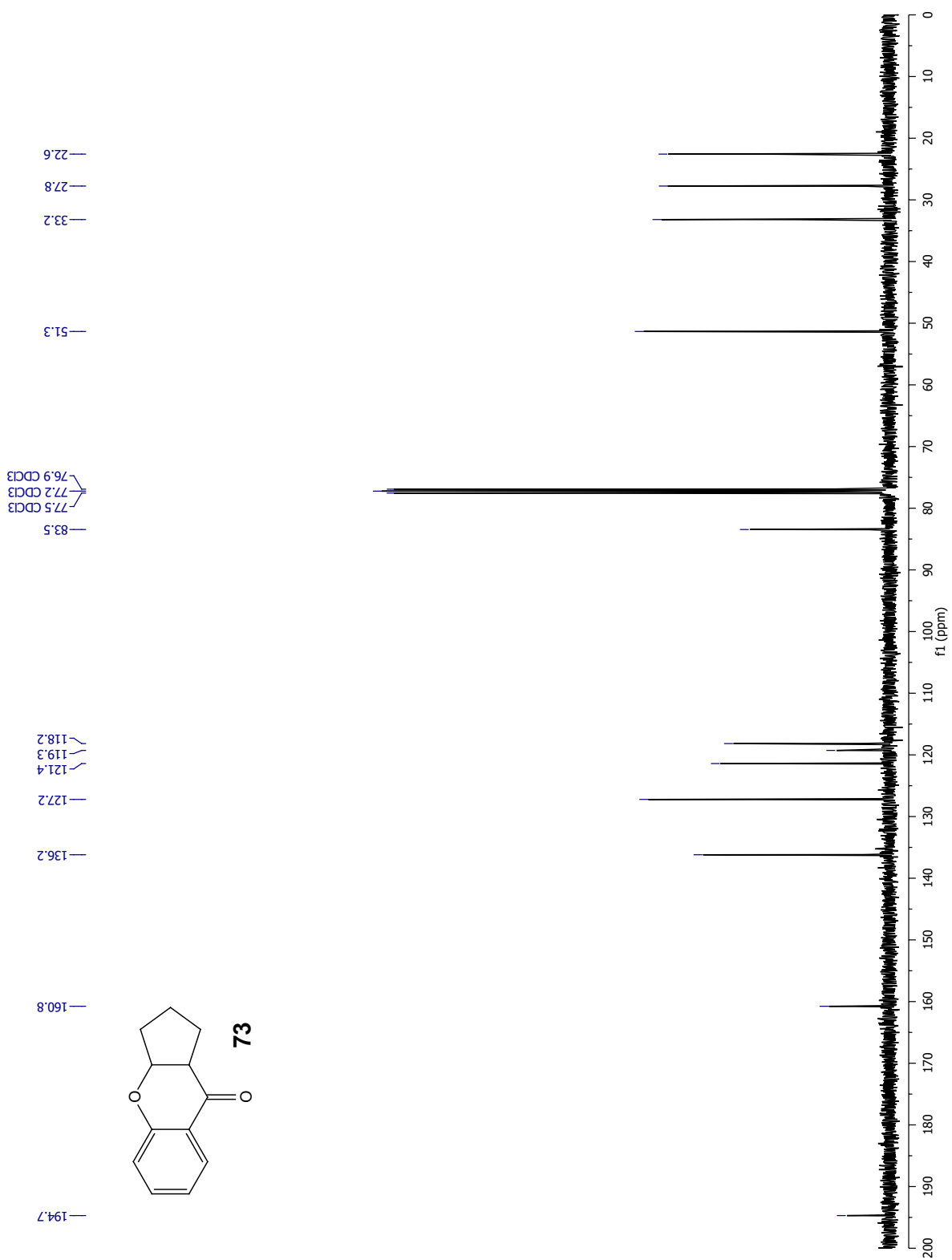
2.73
2.72
2.71
2.70
2.69
2.67

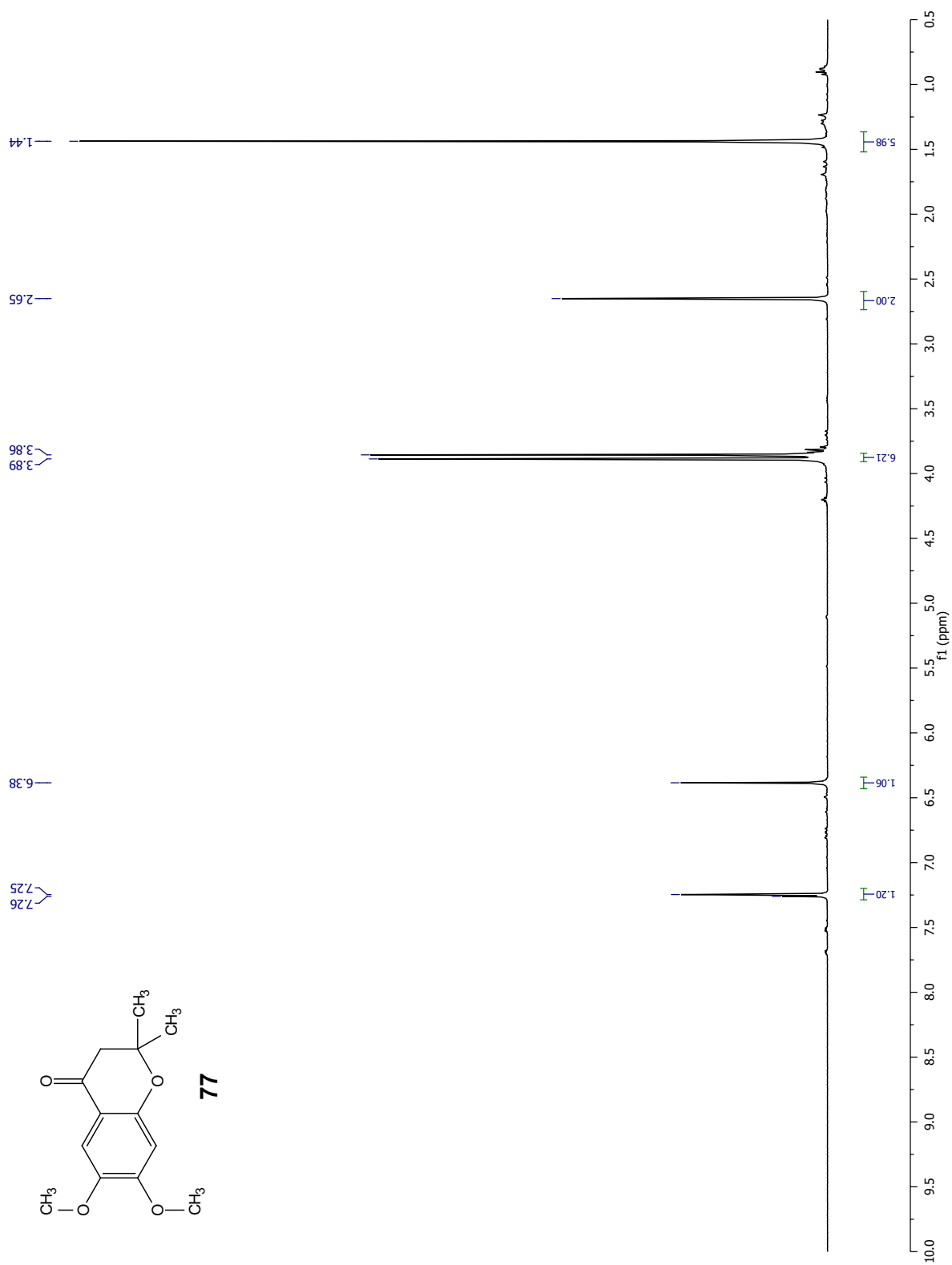
4.91

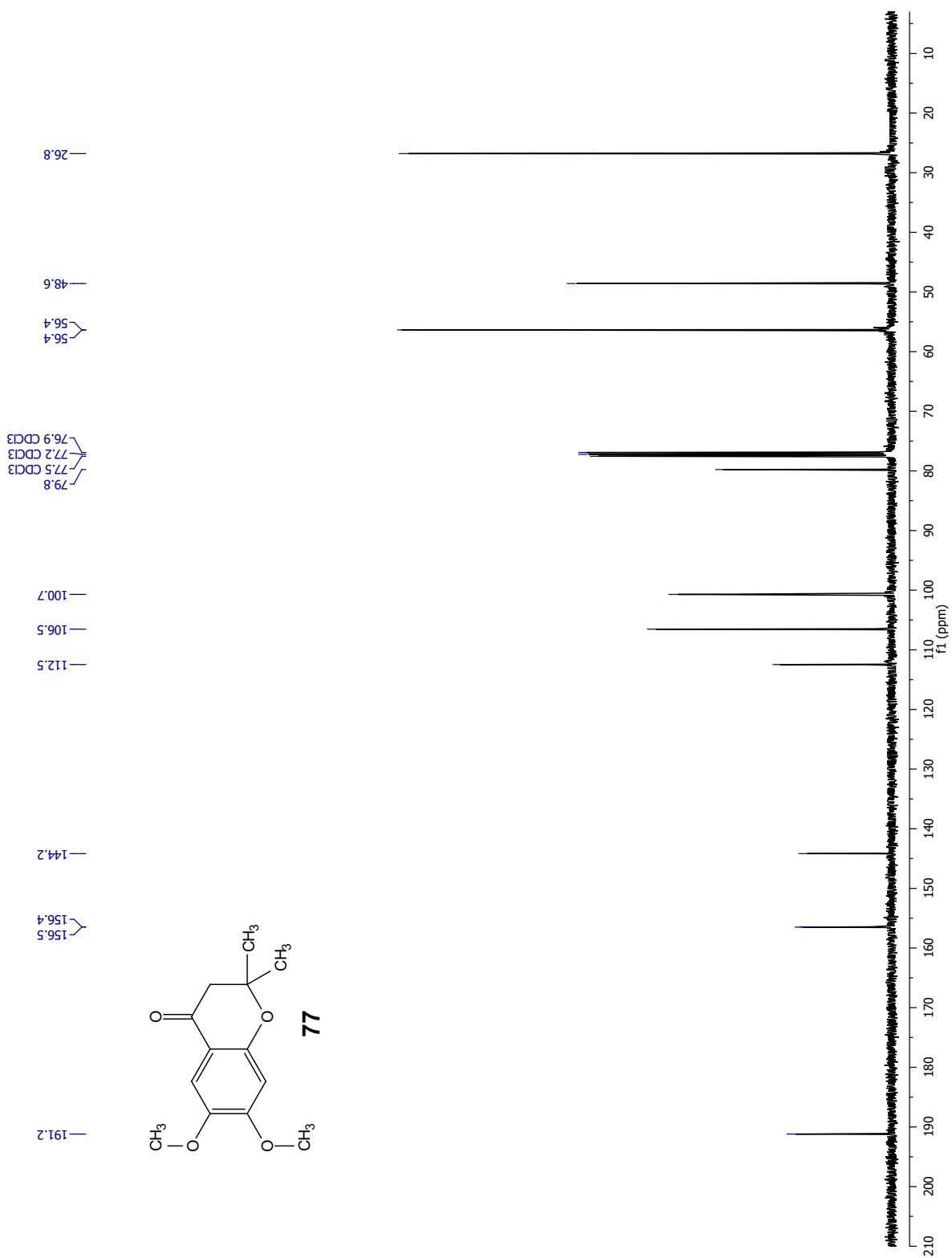
7.45
7.43
7.41
7.24
6.99
6.97
6.95
6.90
6.88

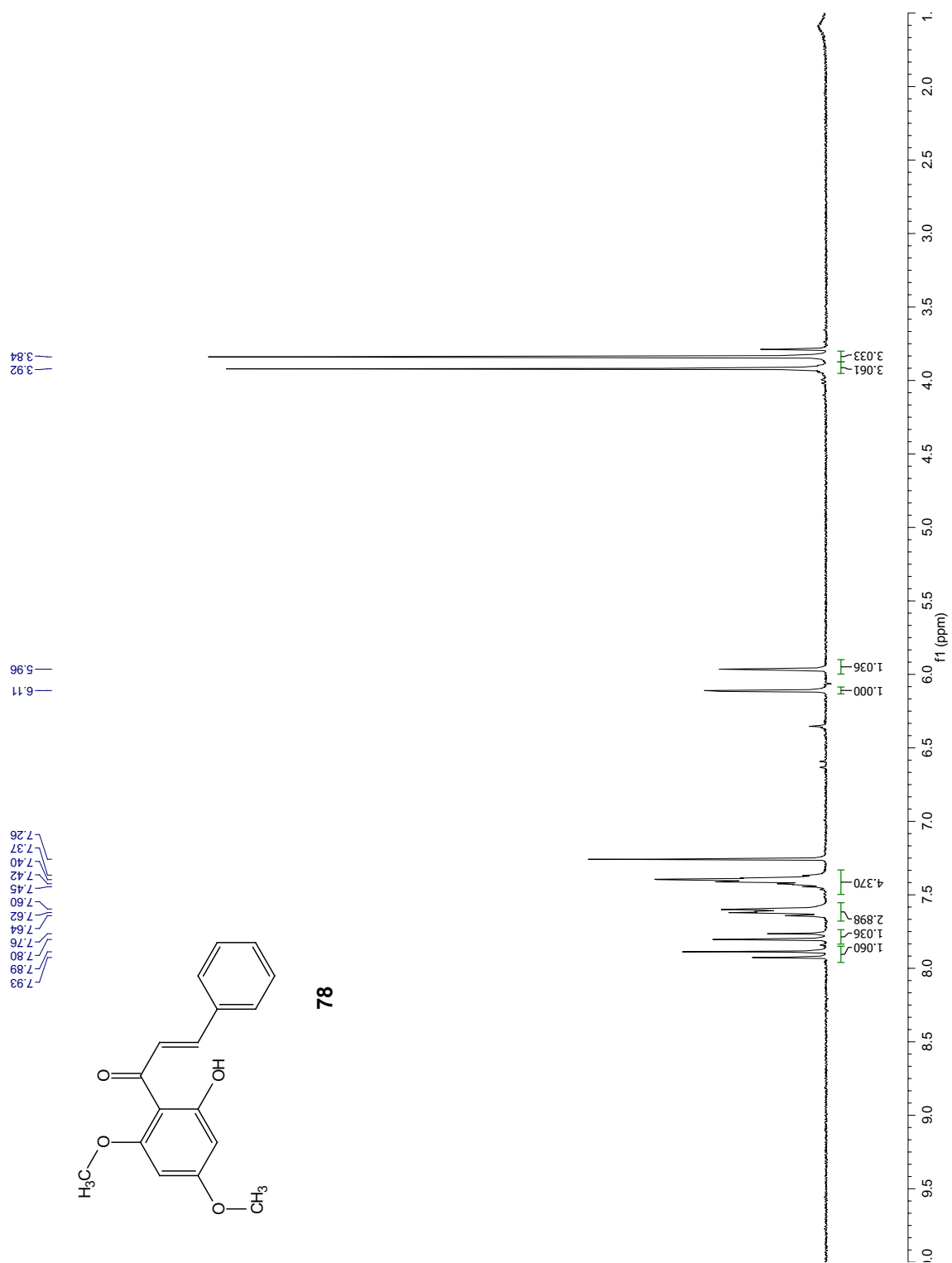
7.87

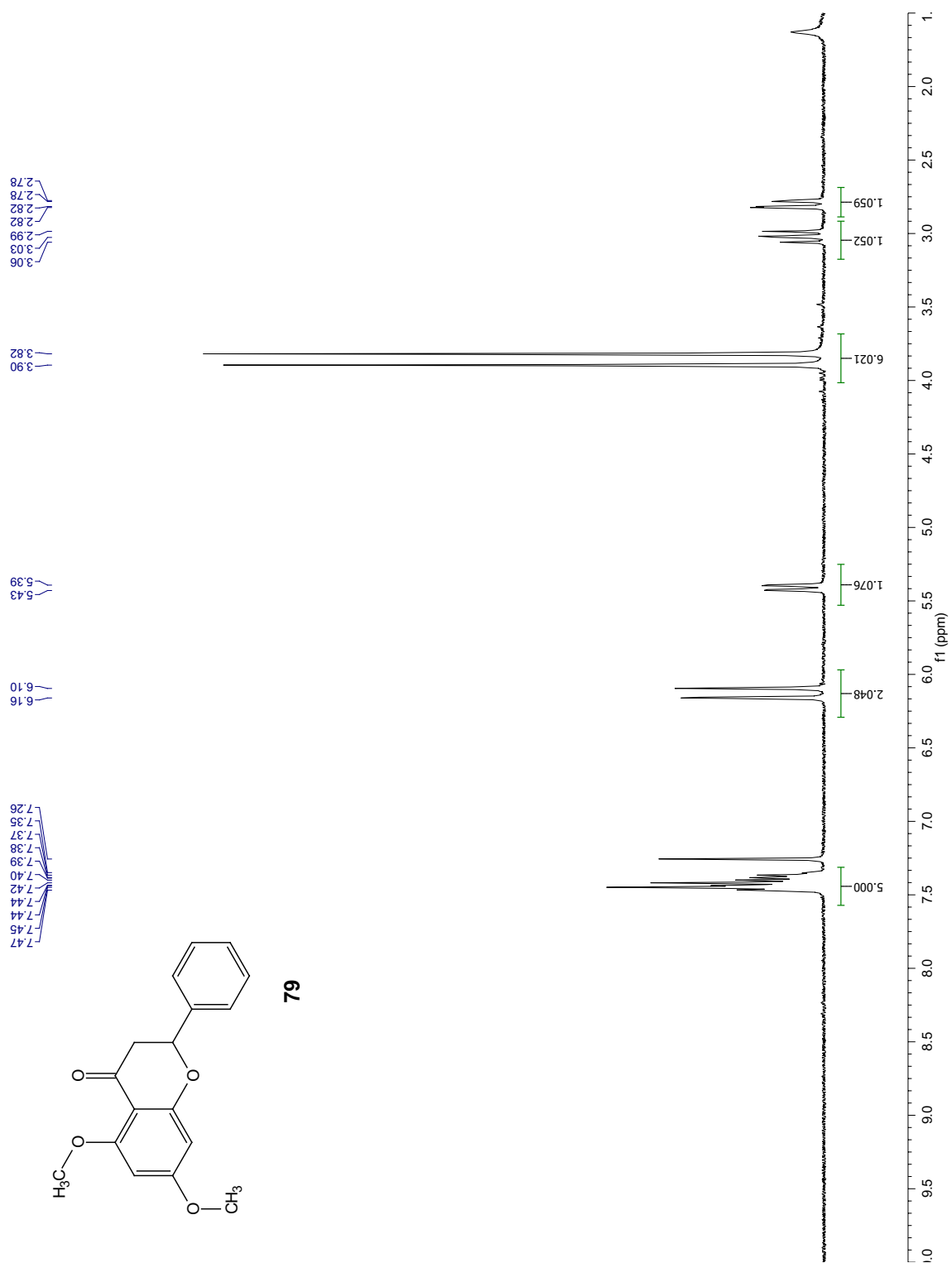


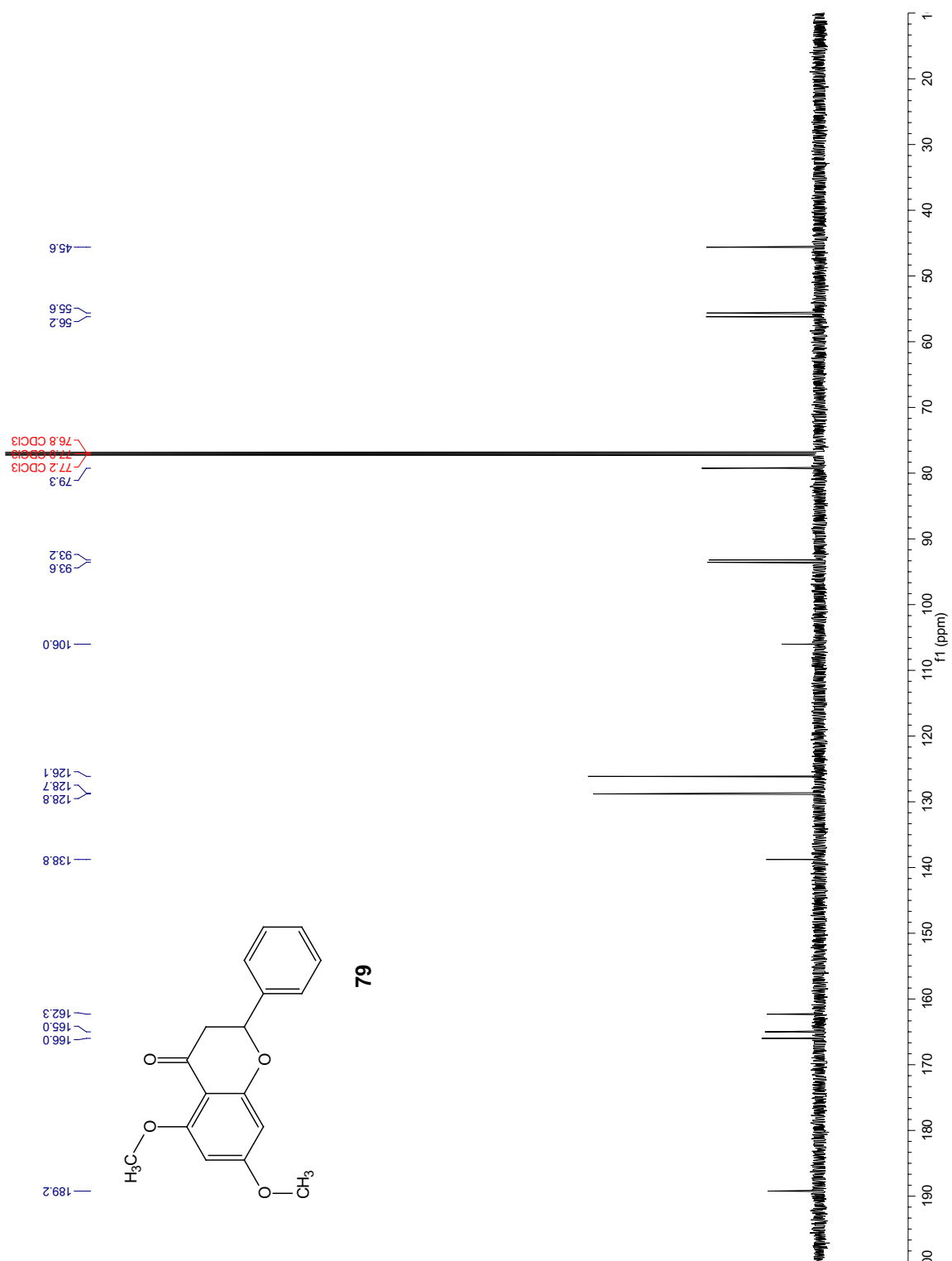


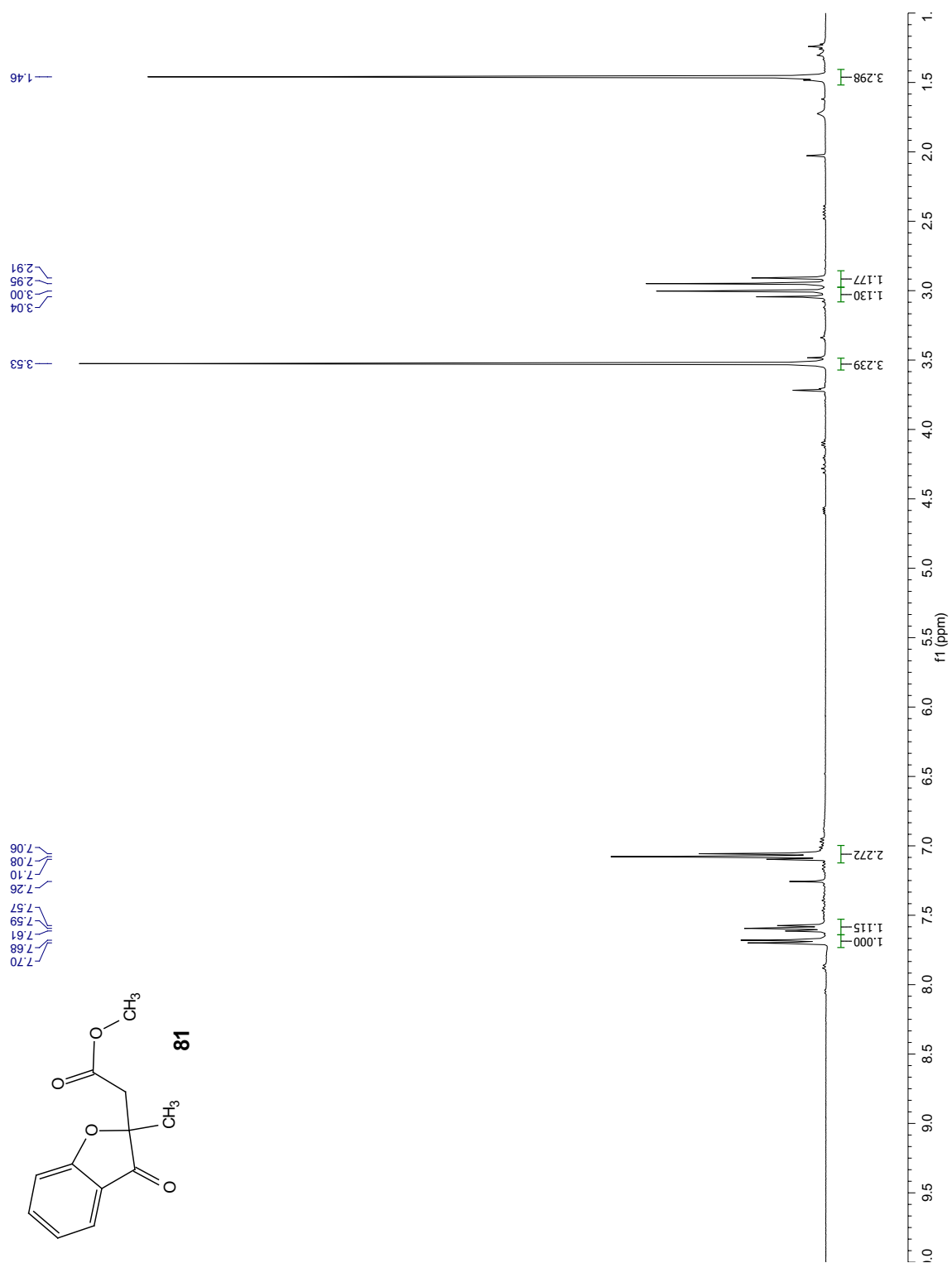


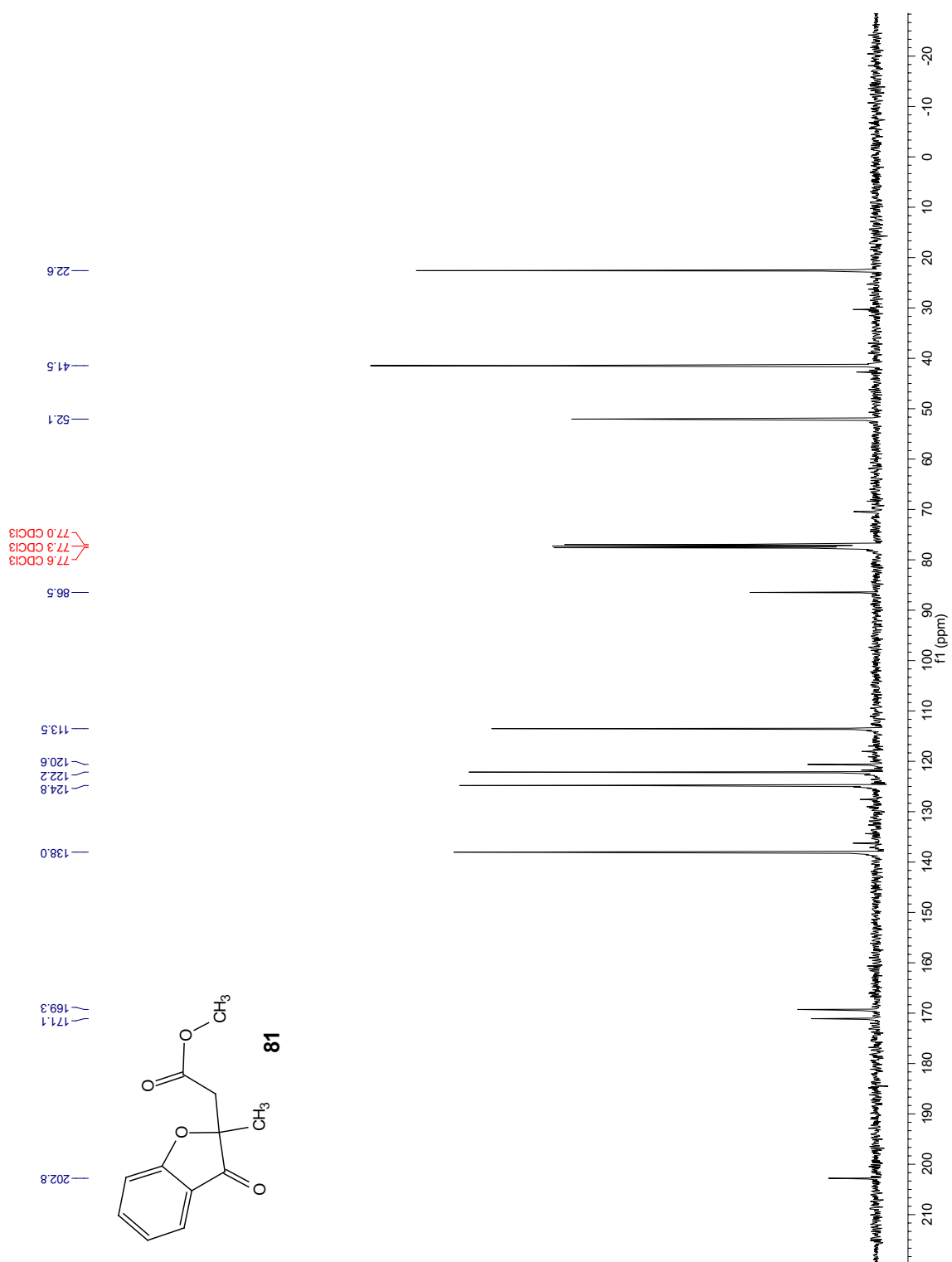


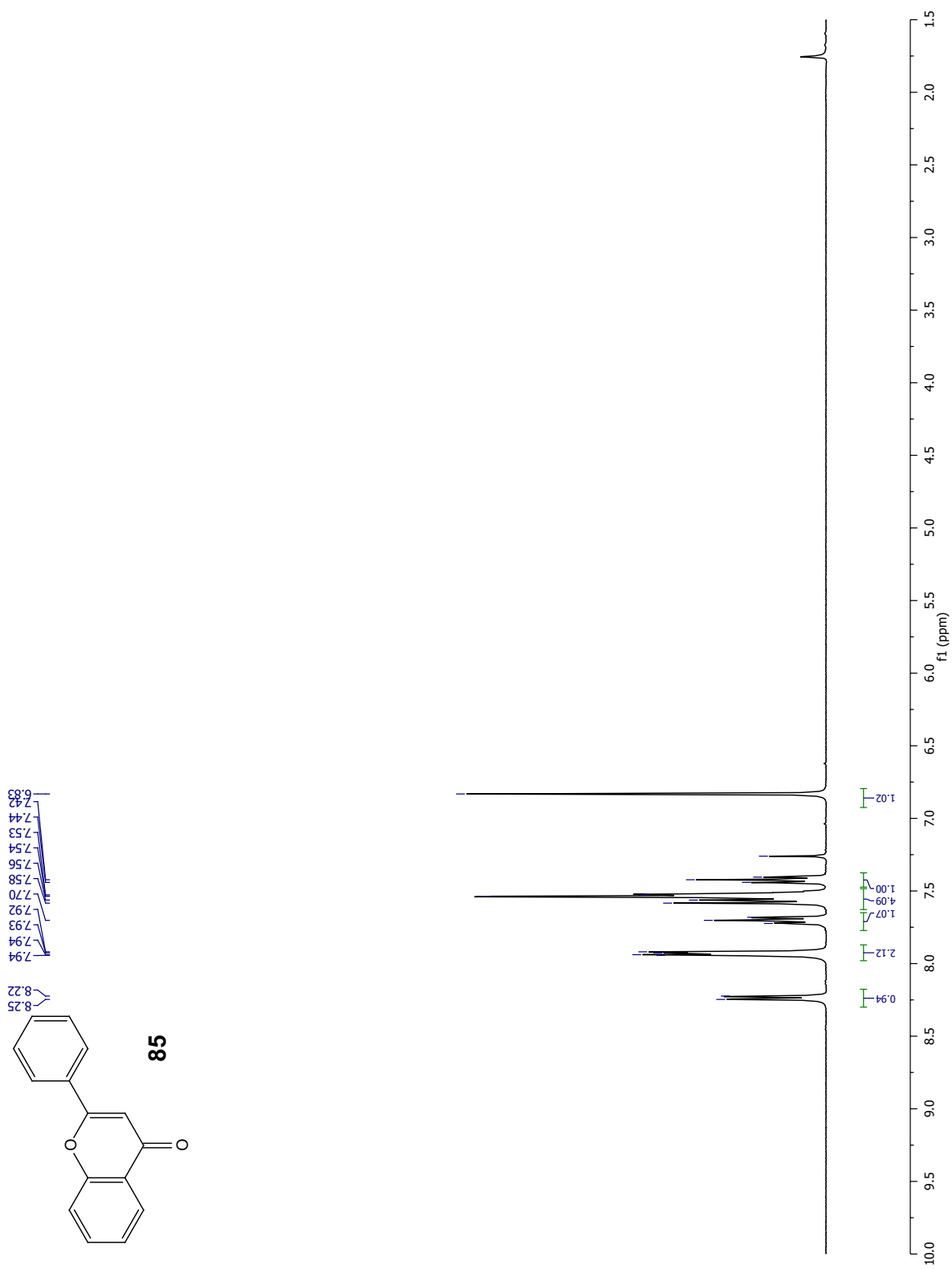


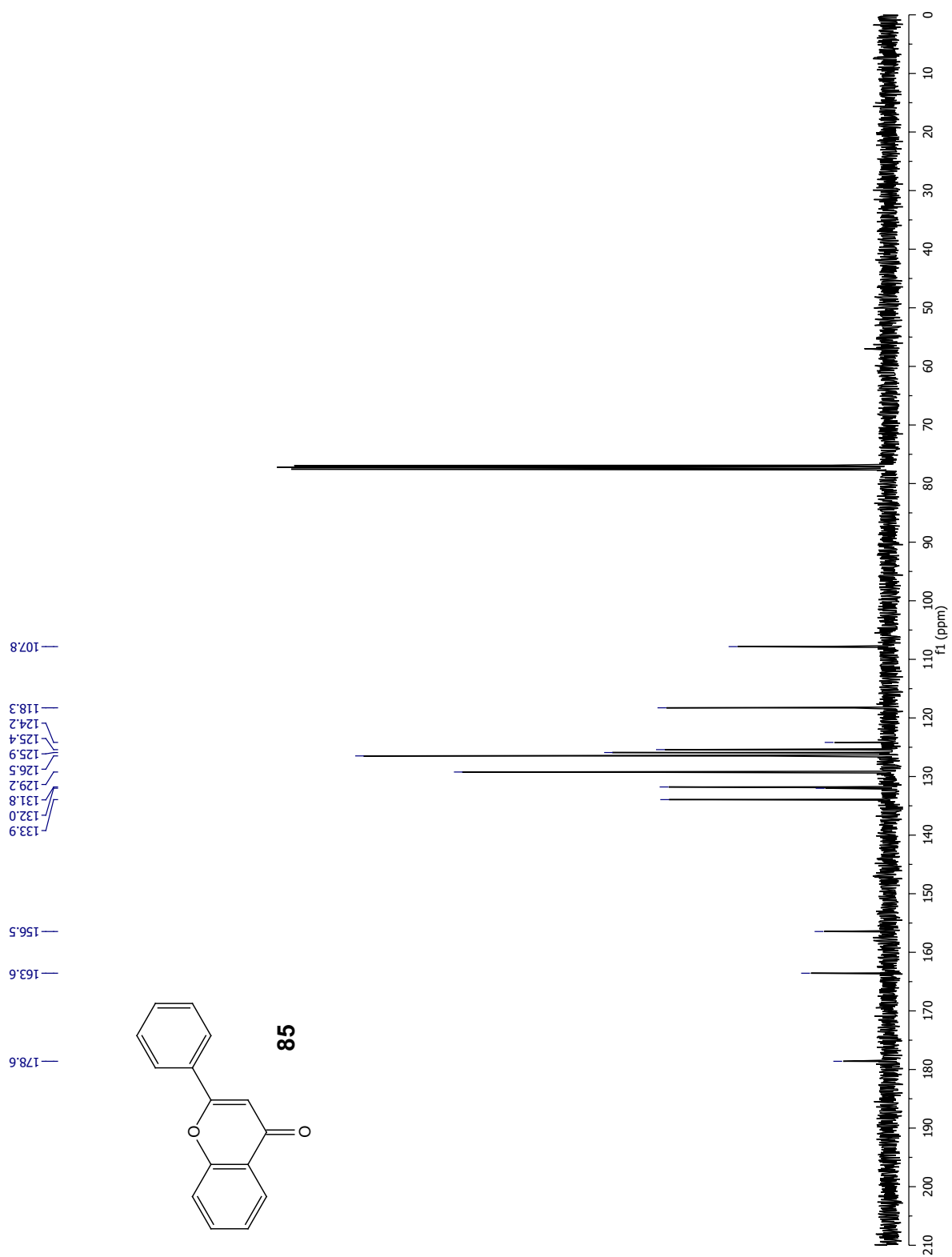


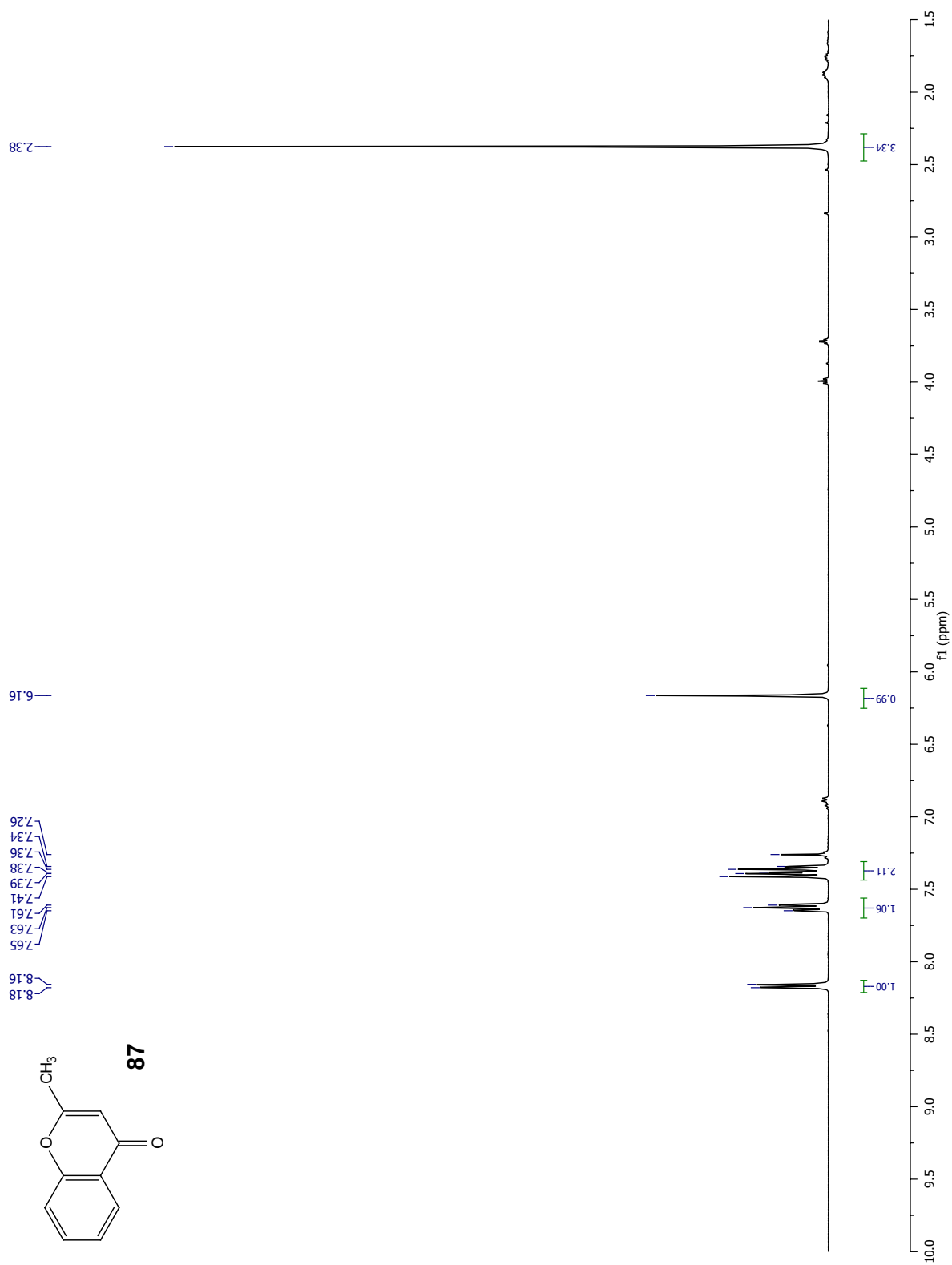


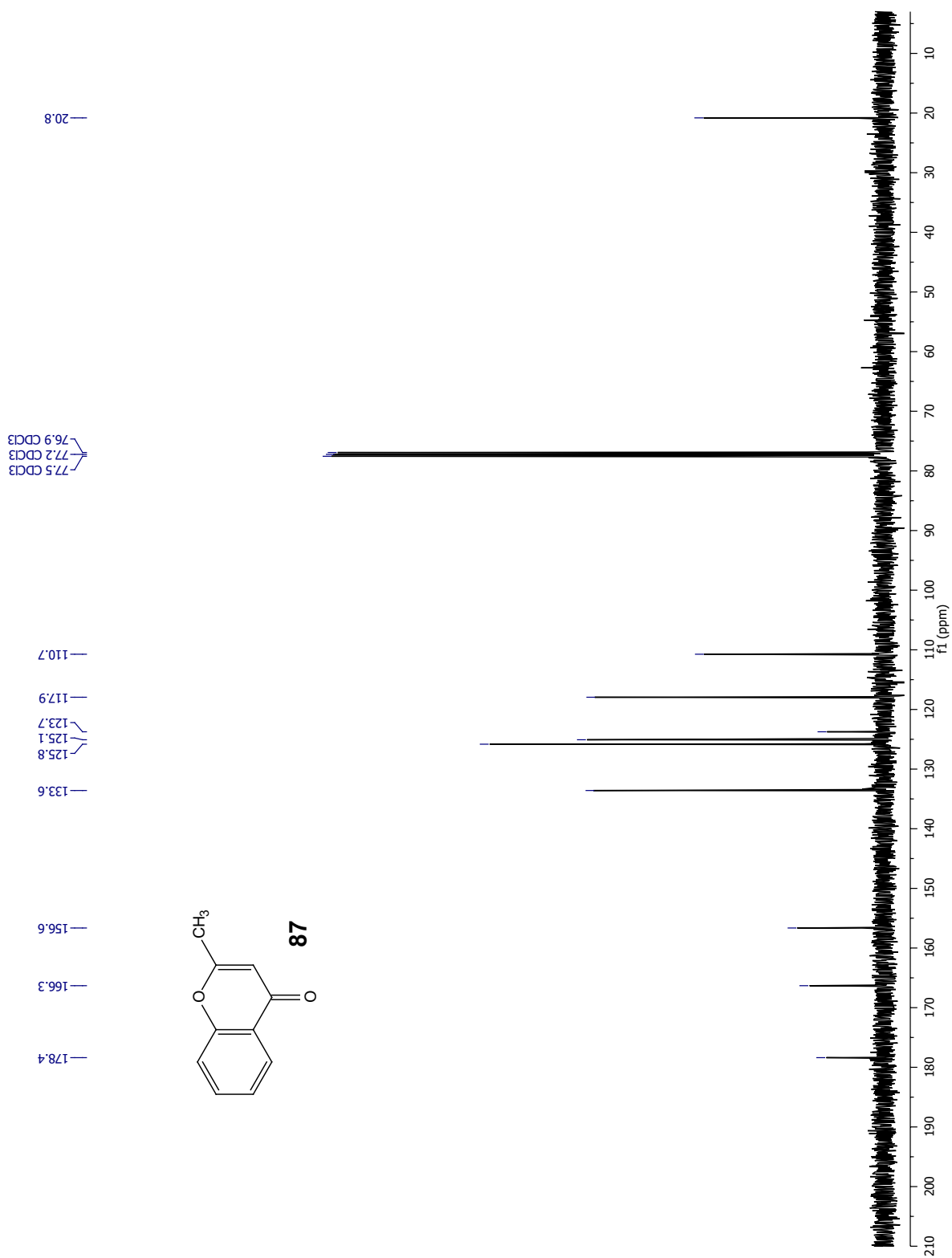


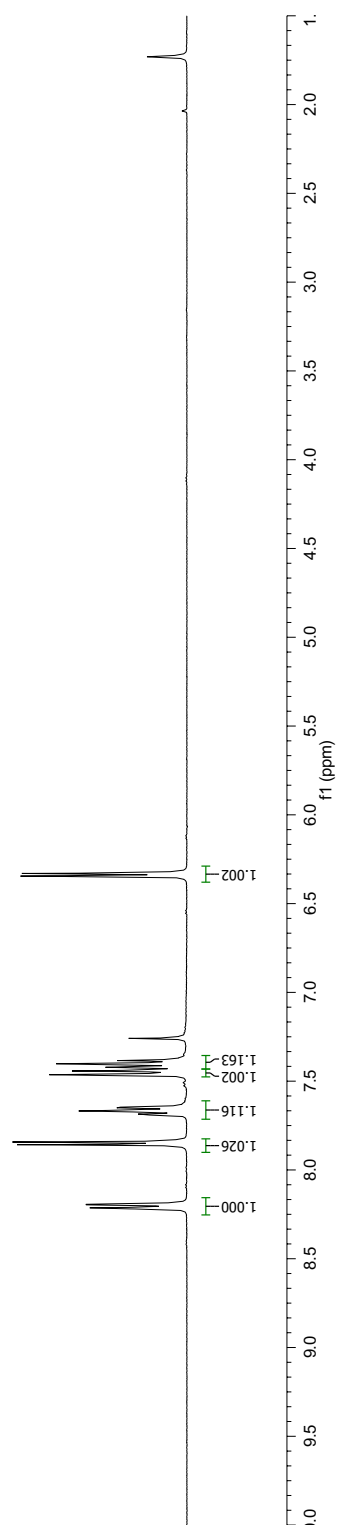






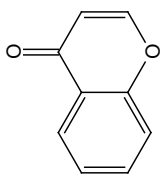




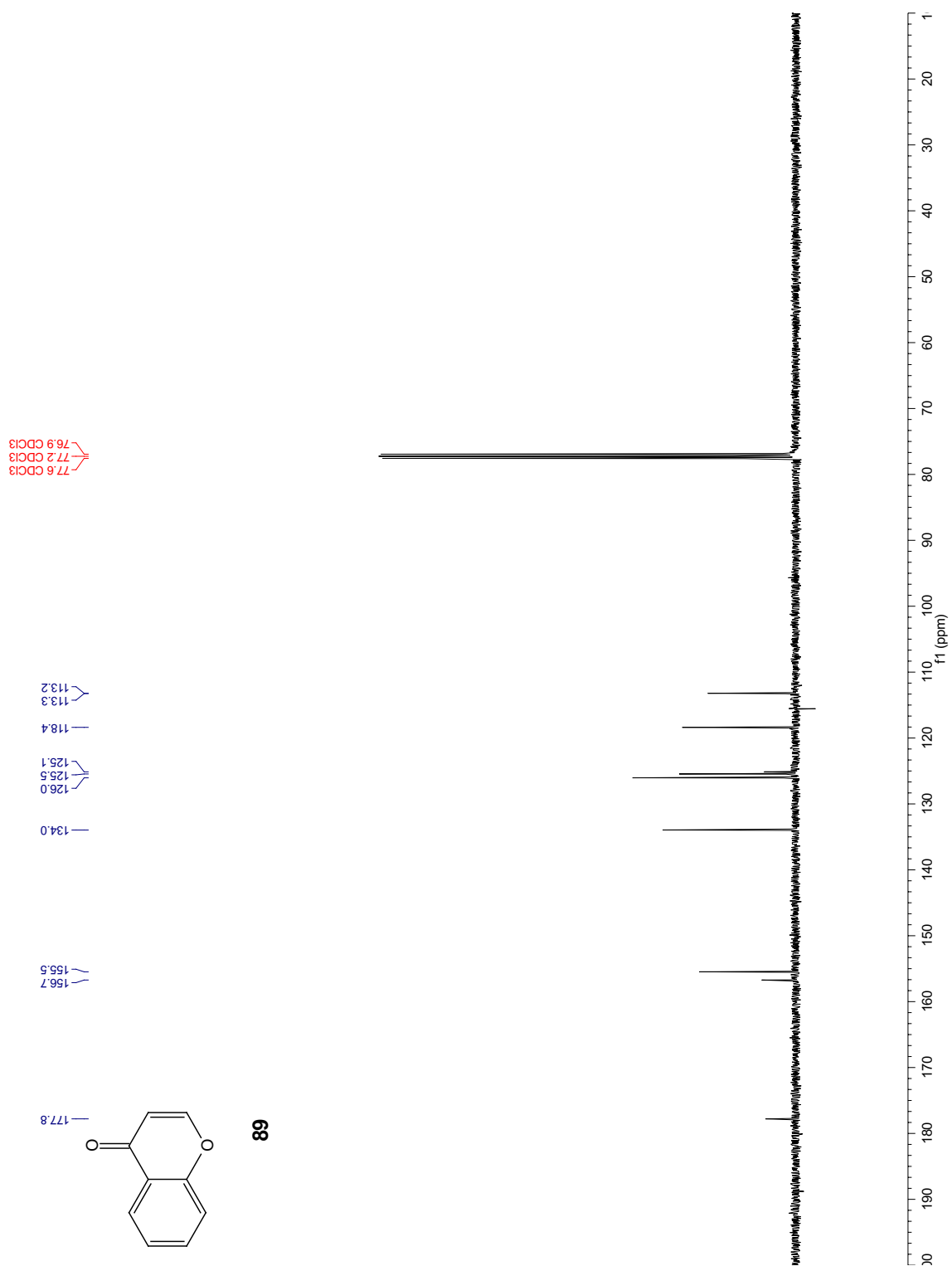


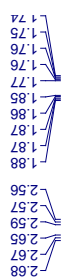
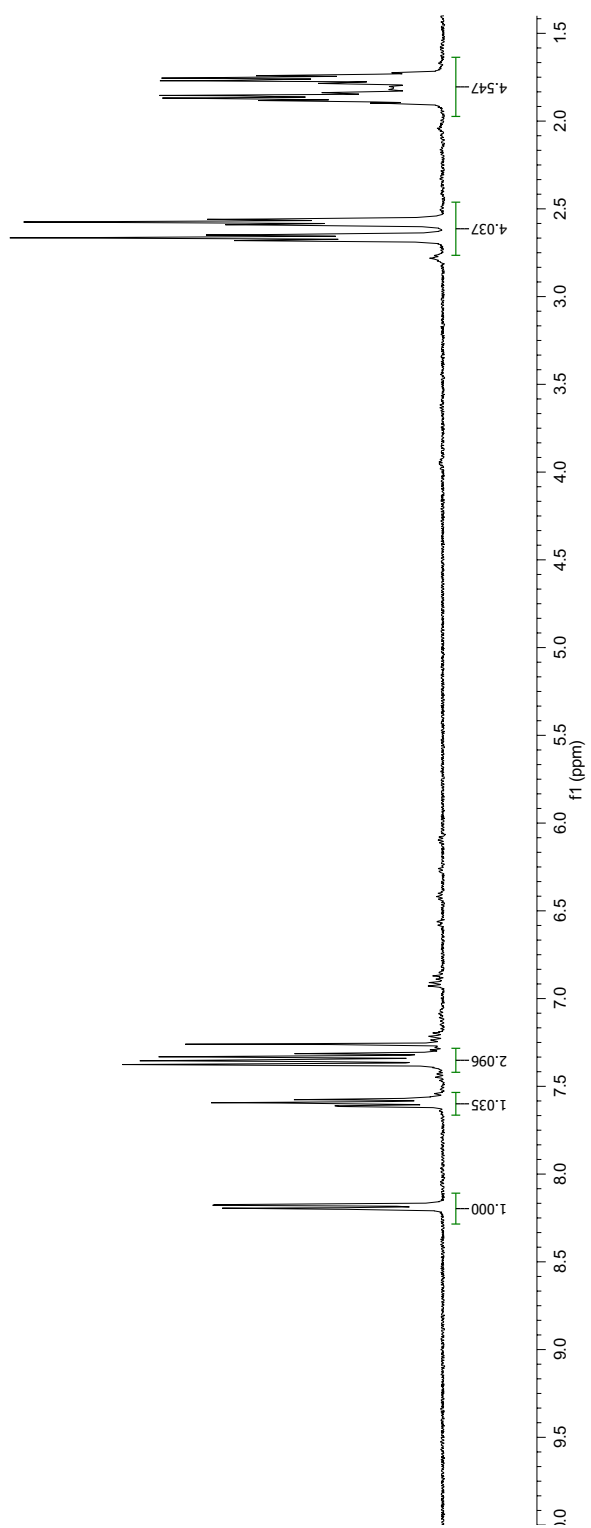
6.34
6.33

8.21
8.19
7.86
7.84
7.69
7.67
7.65
7.46
7.44
7.42
7.40
7.38
7.26

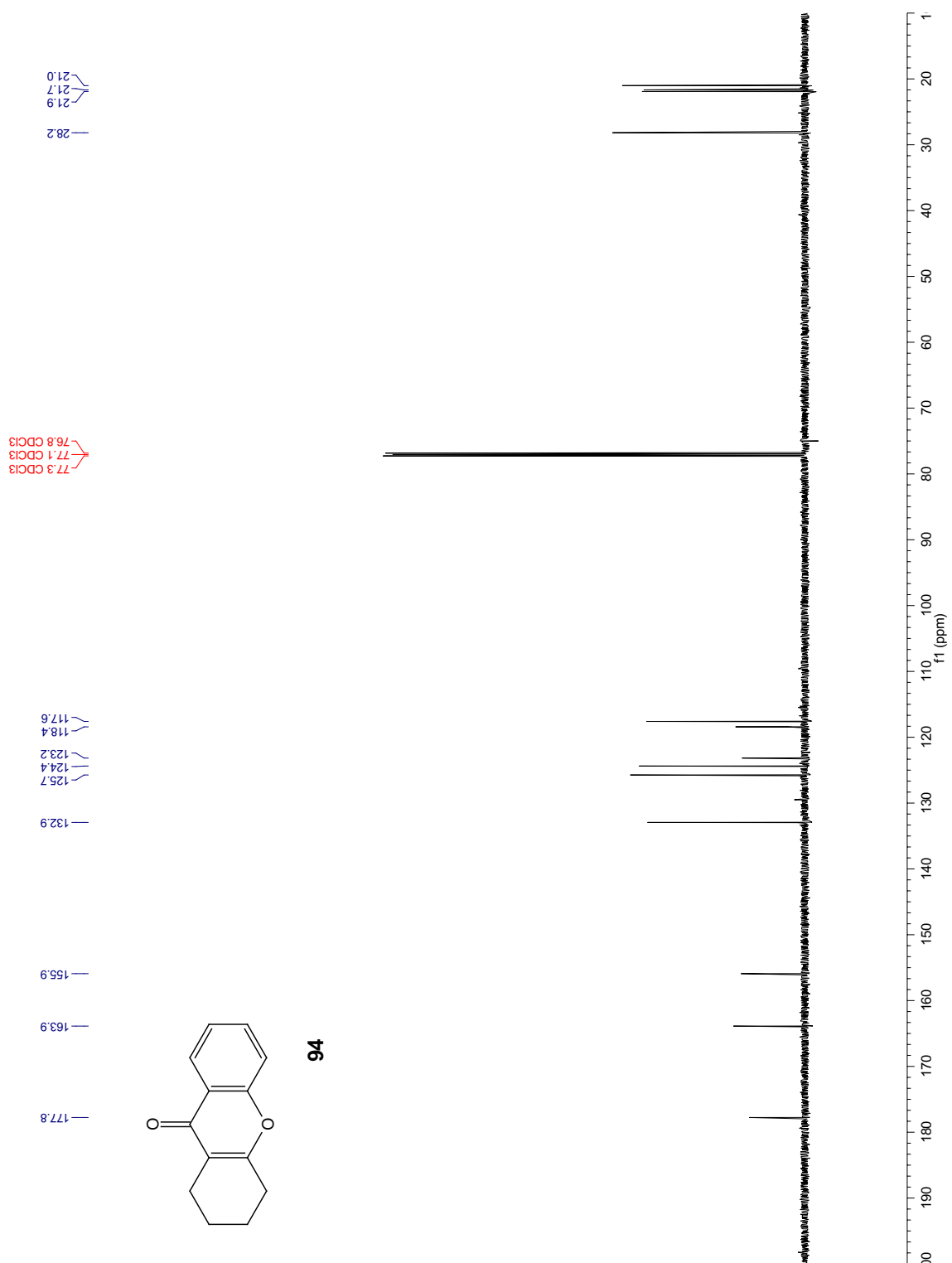


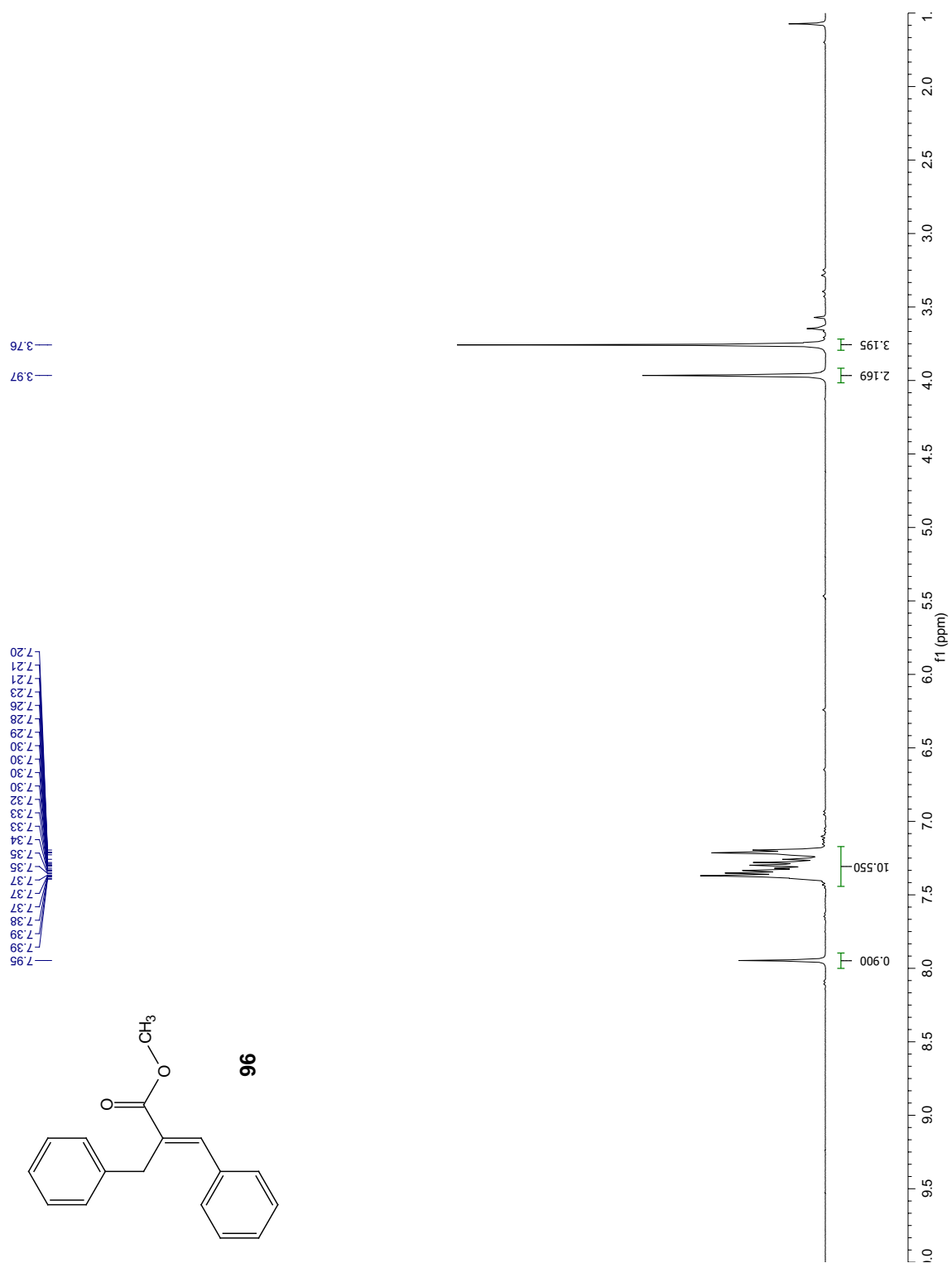
89

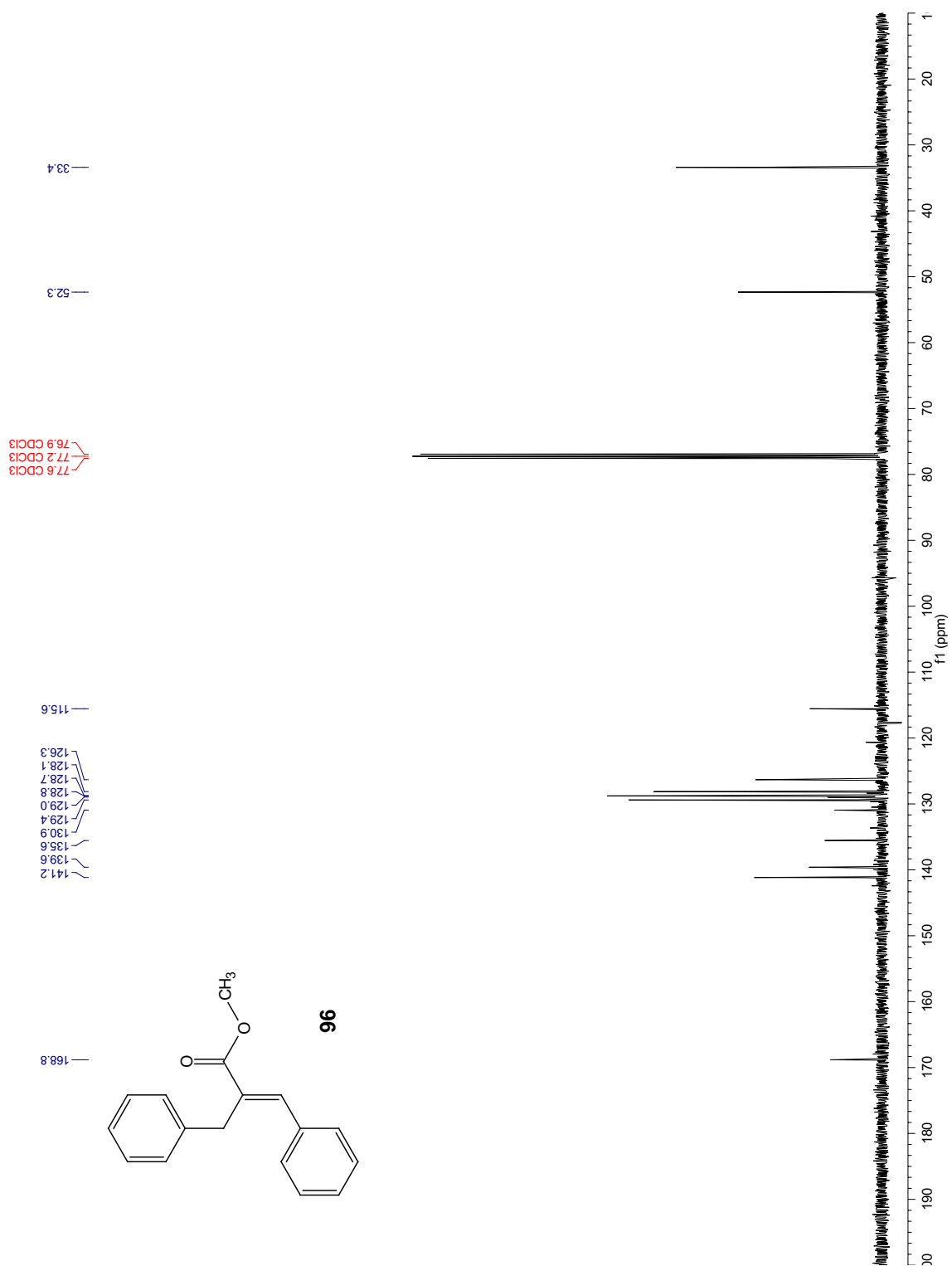




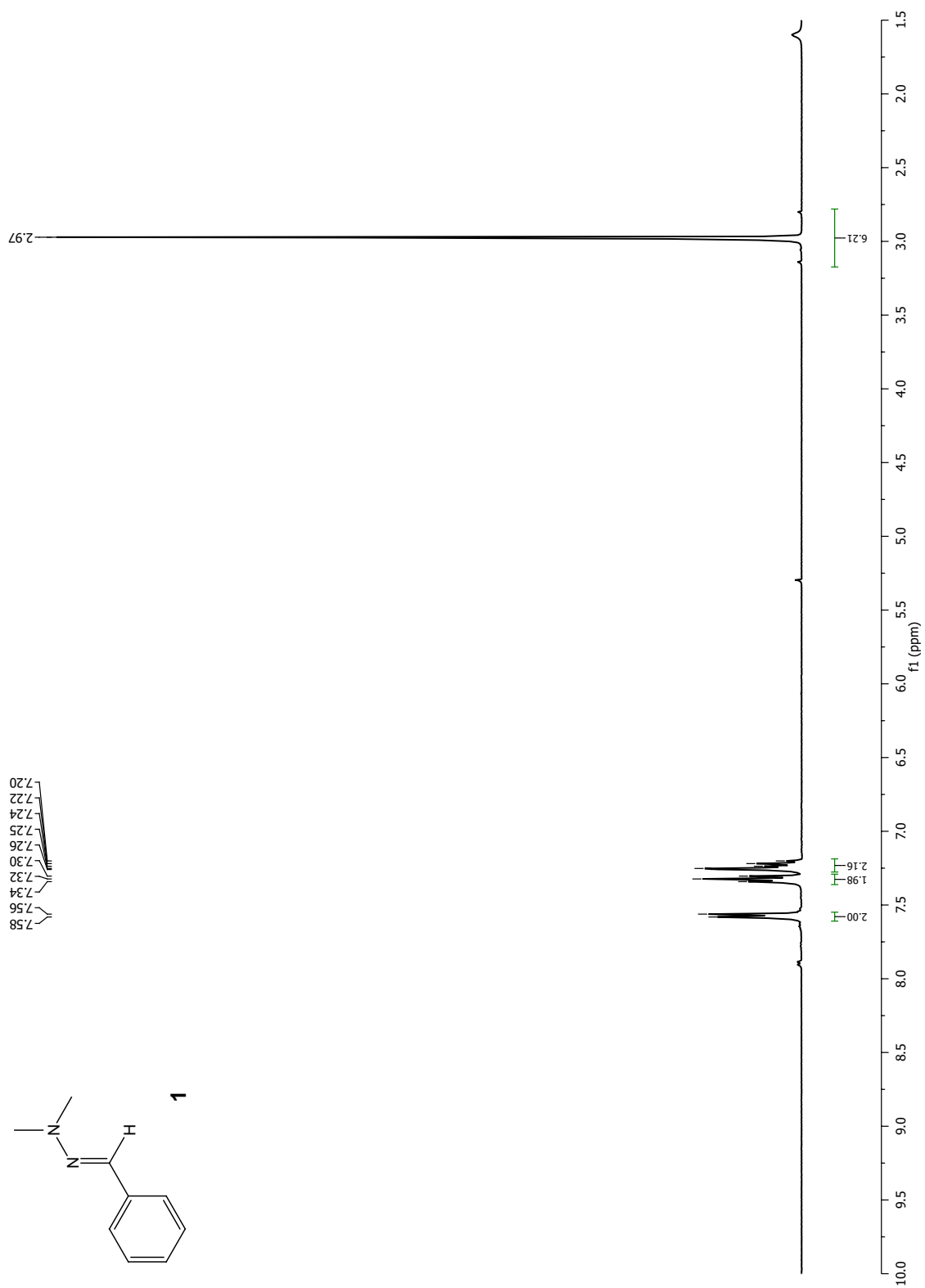
94

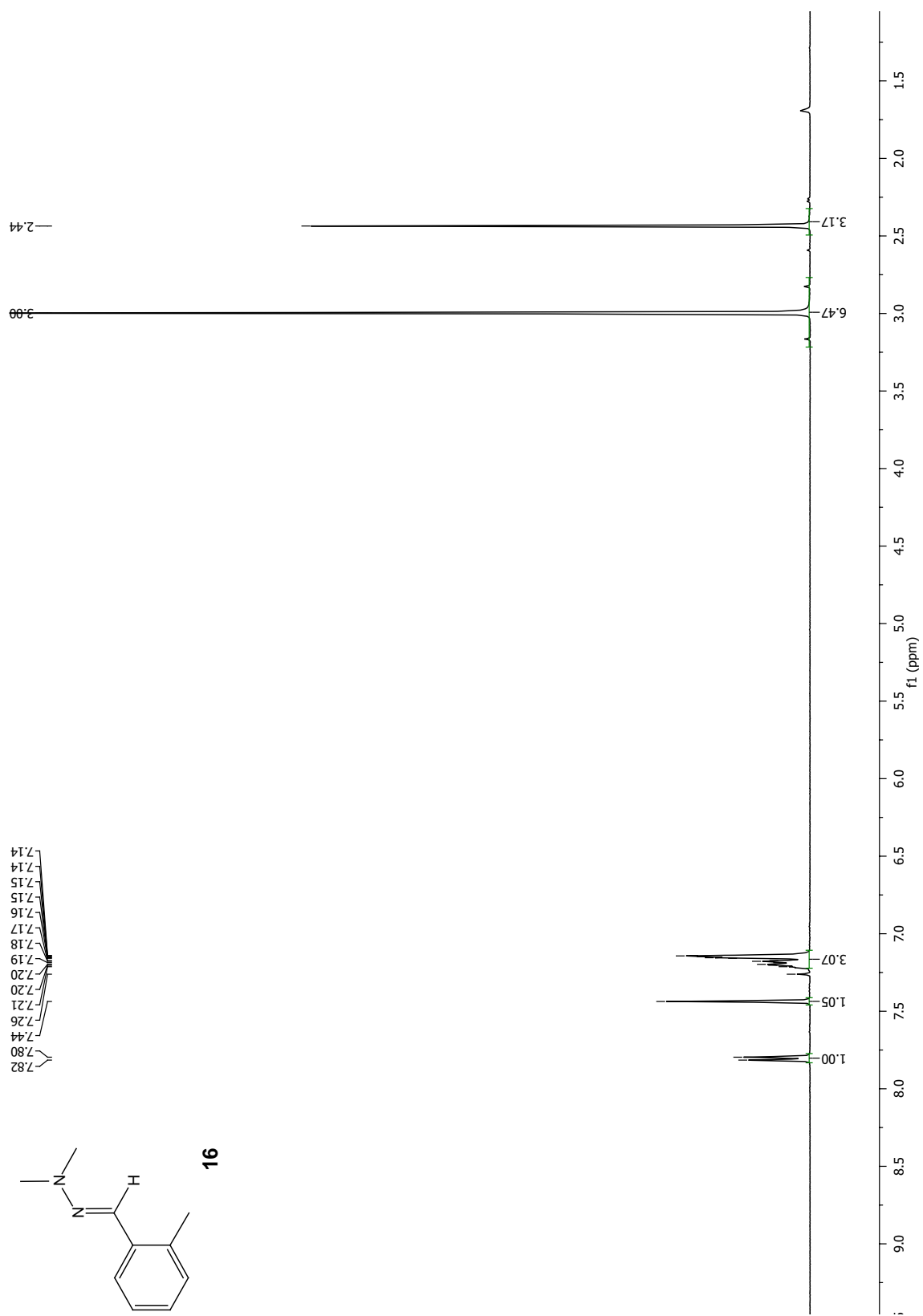


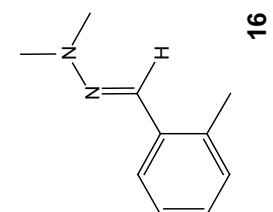




APPENDIX C. CHAPTER 5 ^1H AND ^{13}C NMR SPECTRA







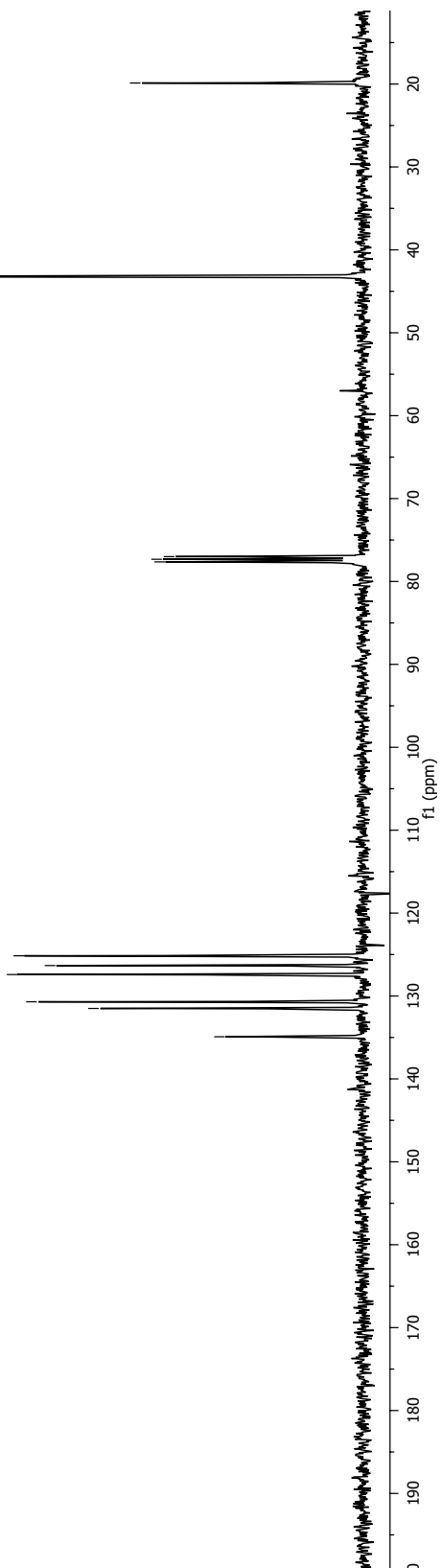
134.9
131.5
130.7
127.4
126.3
125.2

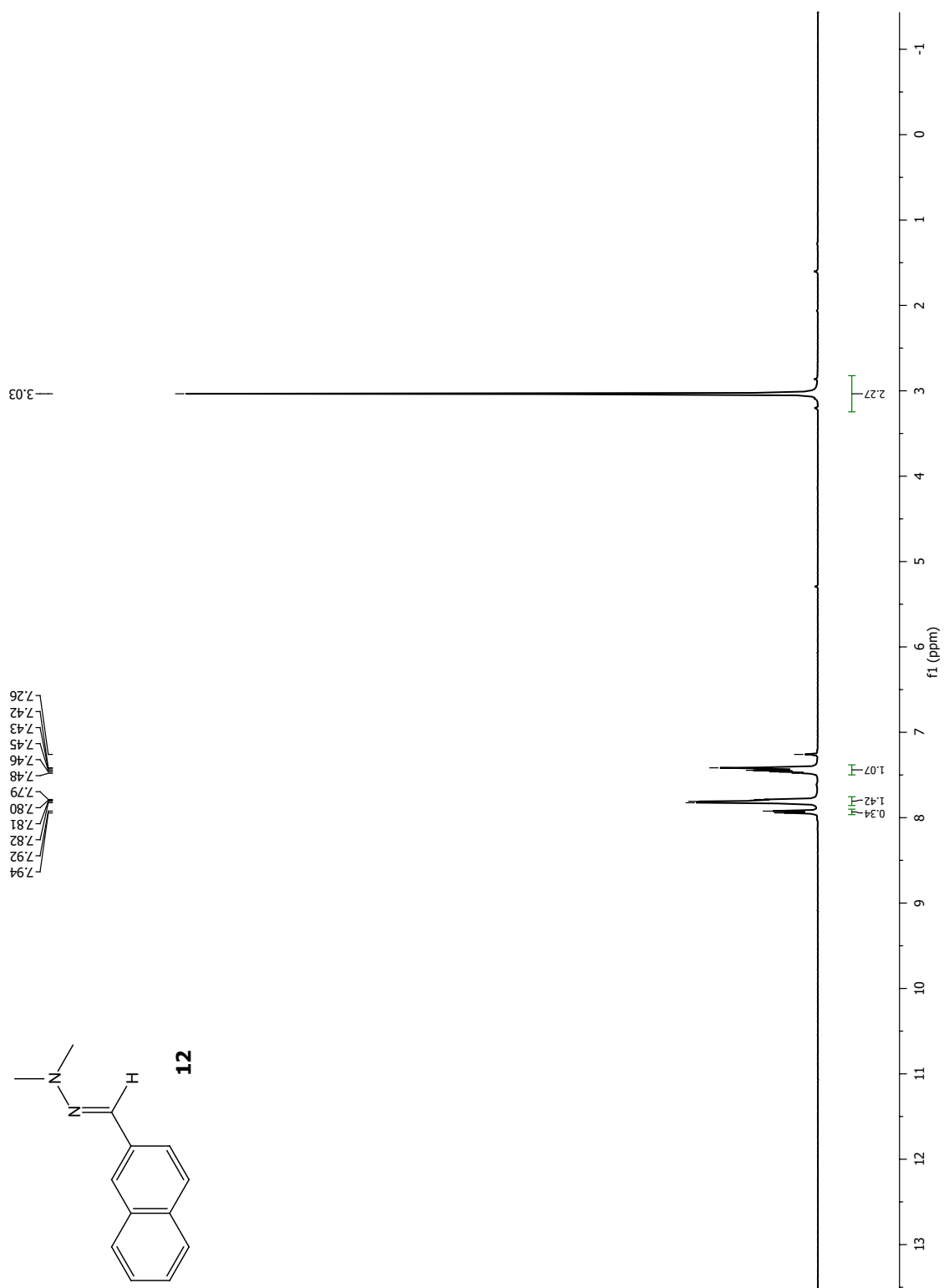
77.6 CDCl₃
77.3 CDCl₃
77.0 CDCl₃

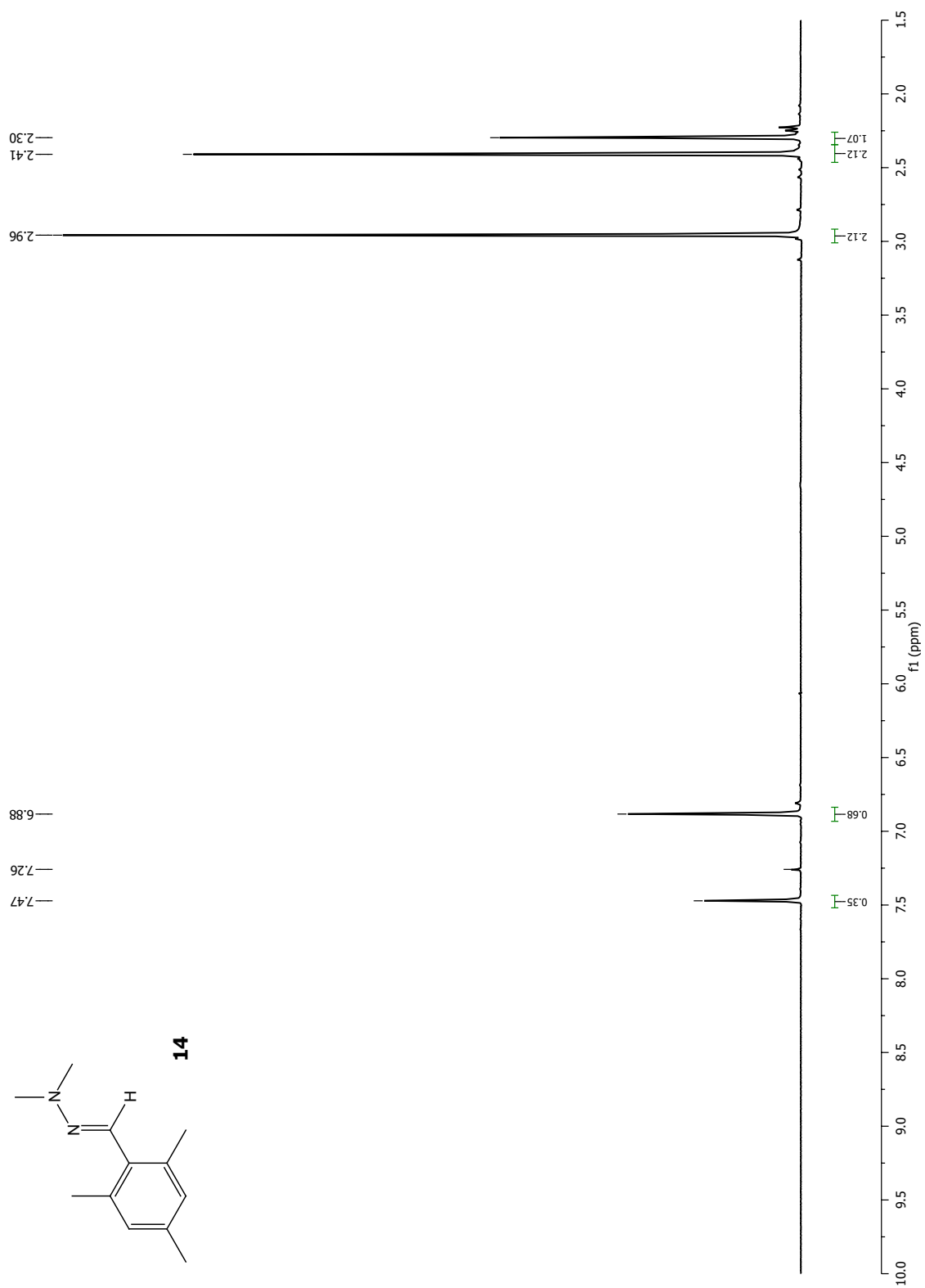
43.2

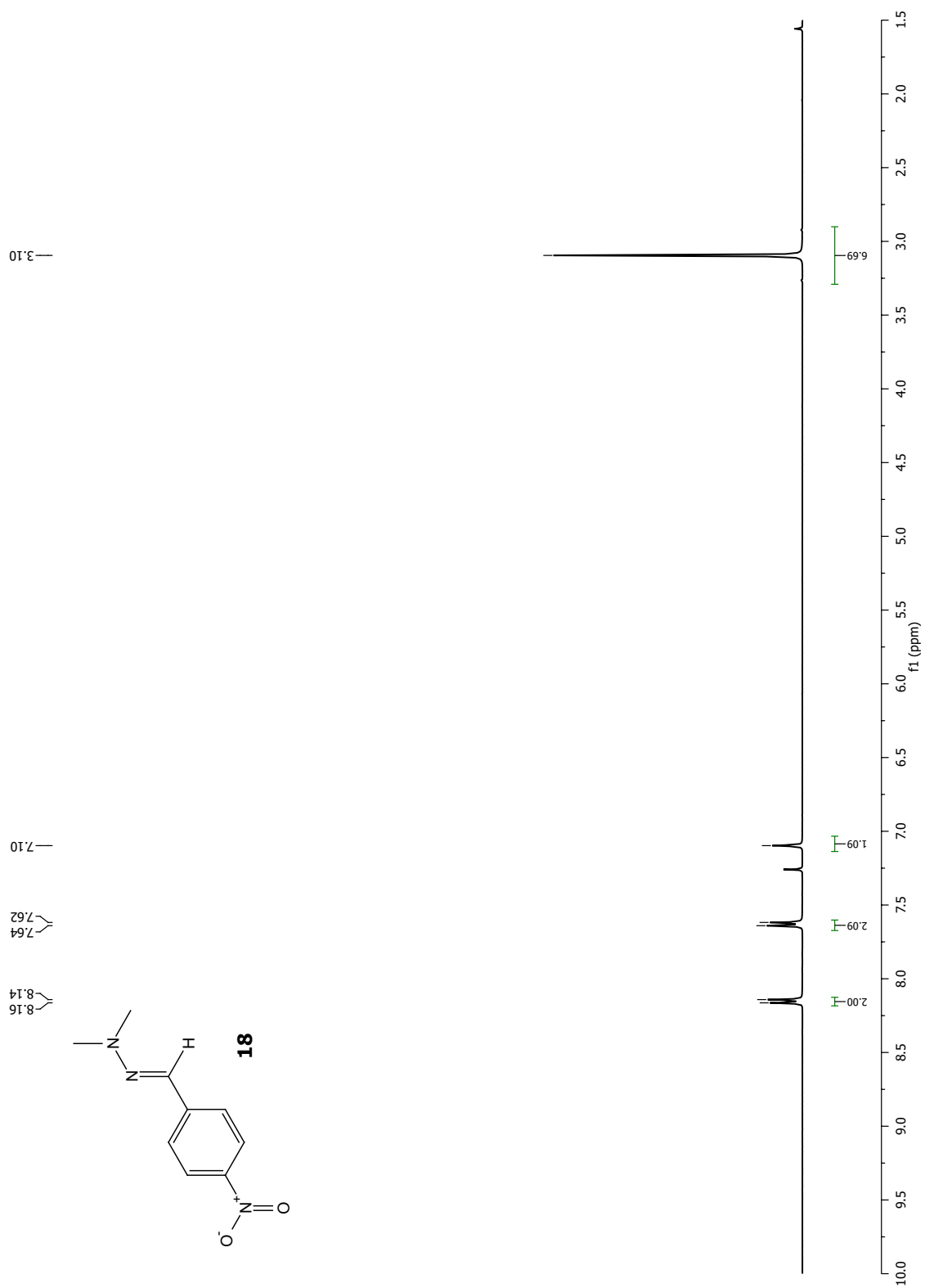
19.9

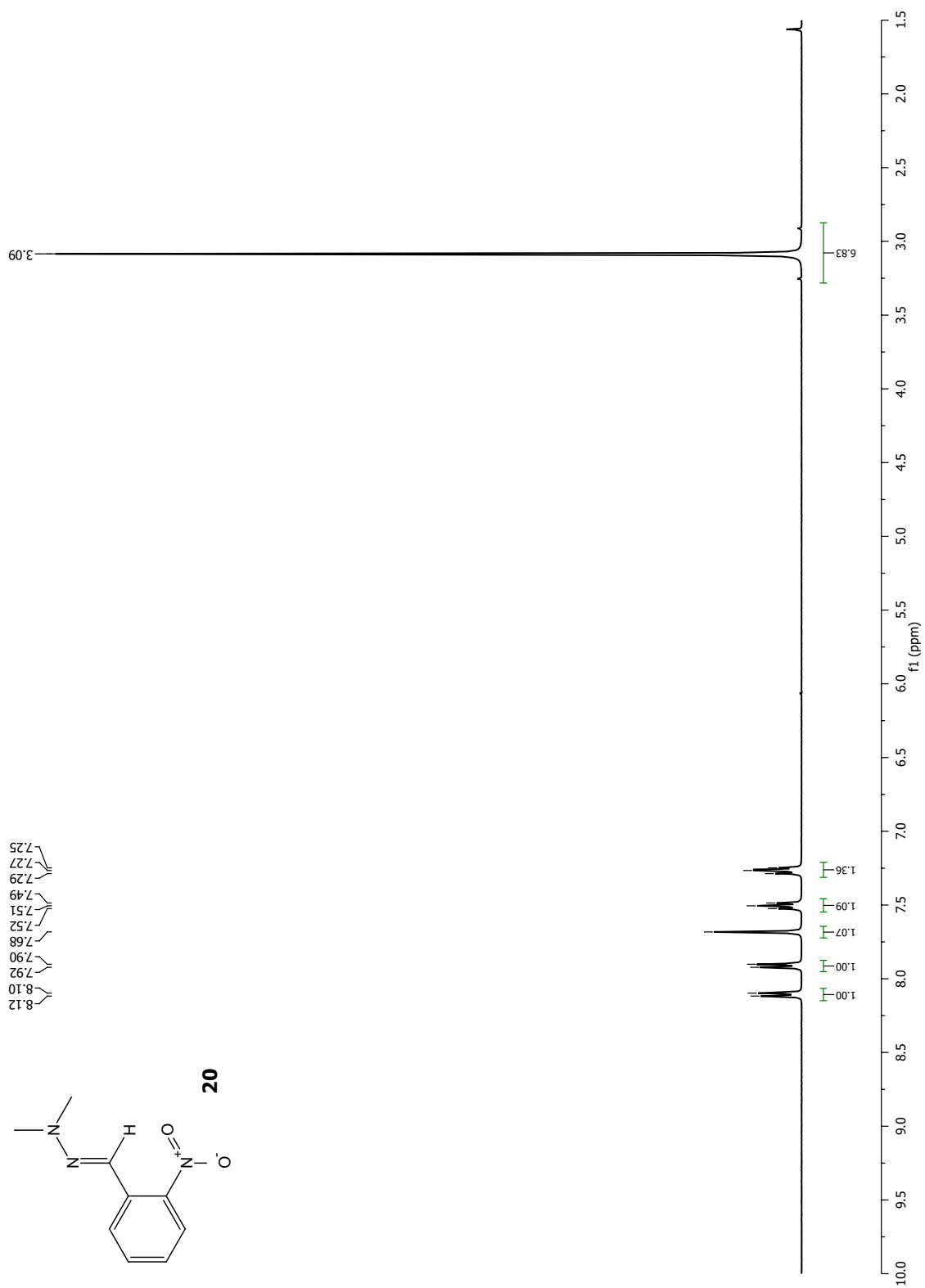
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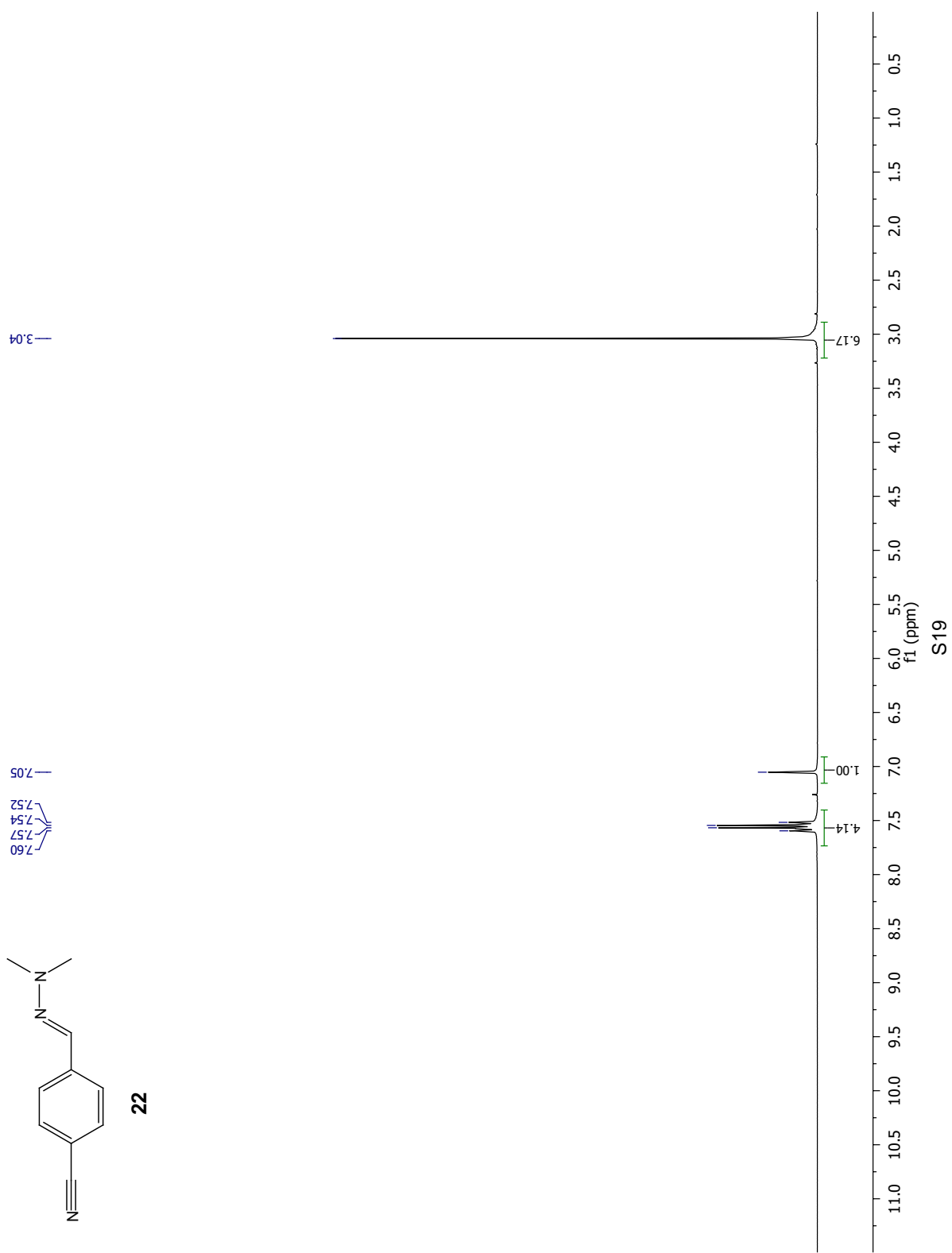




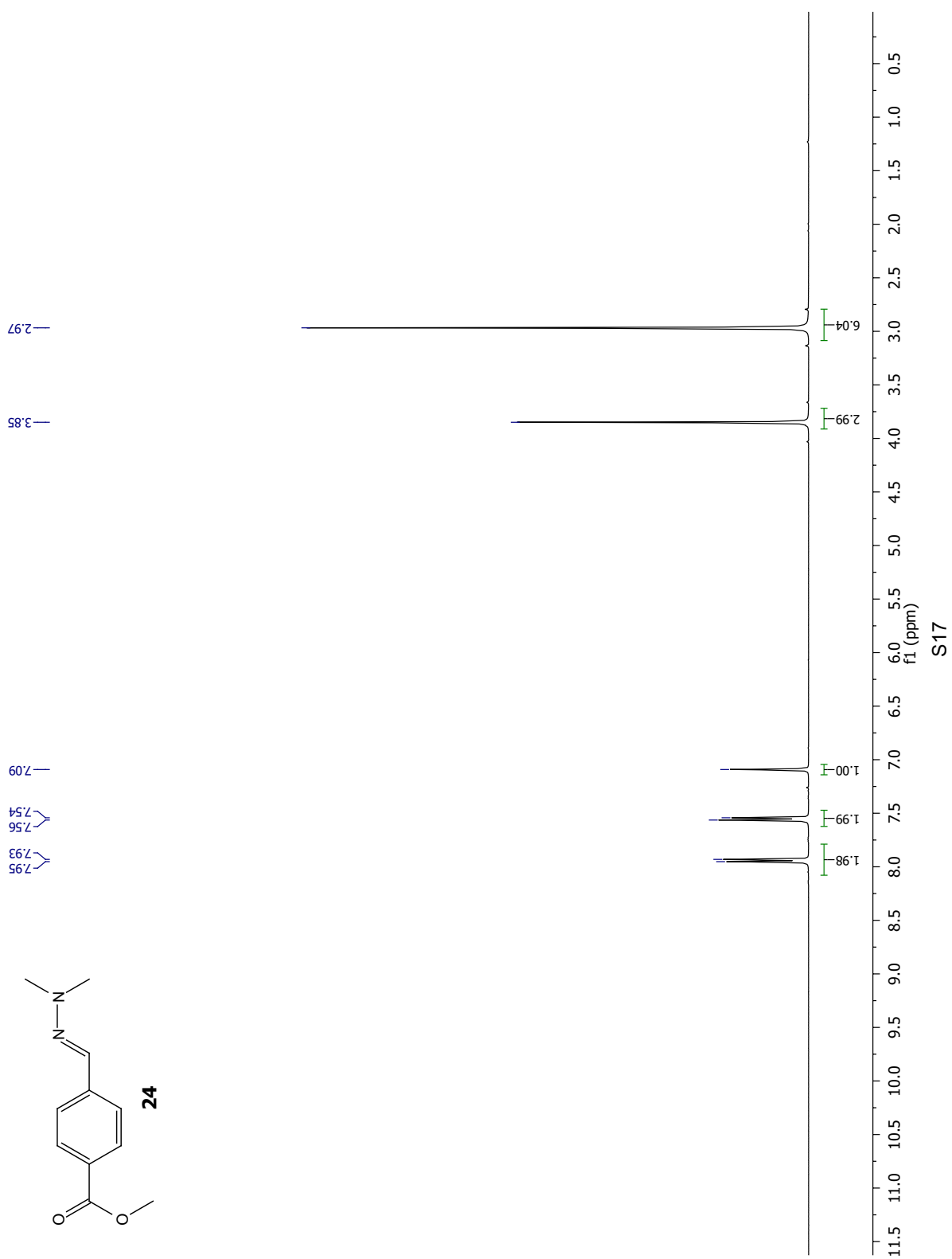


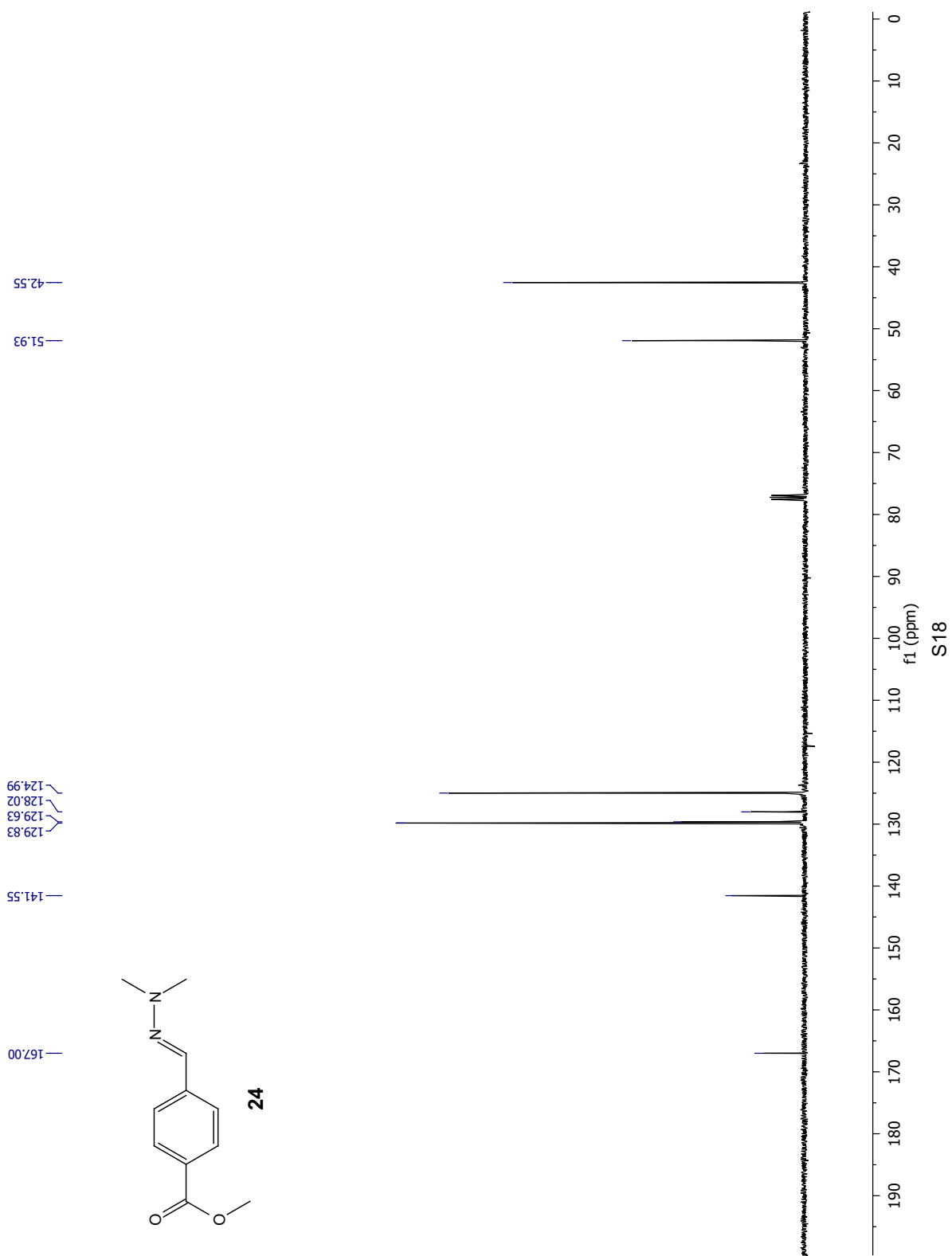


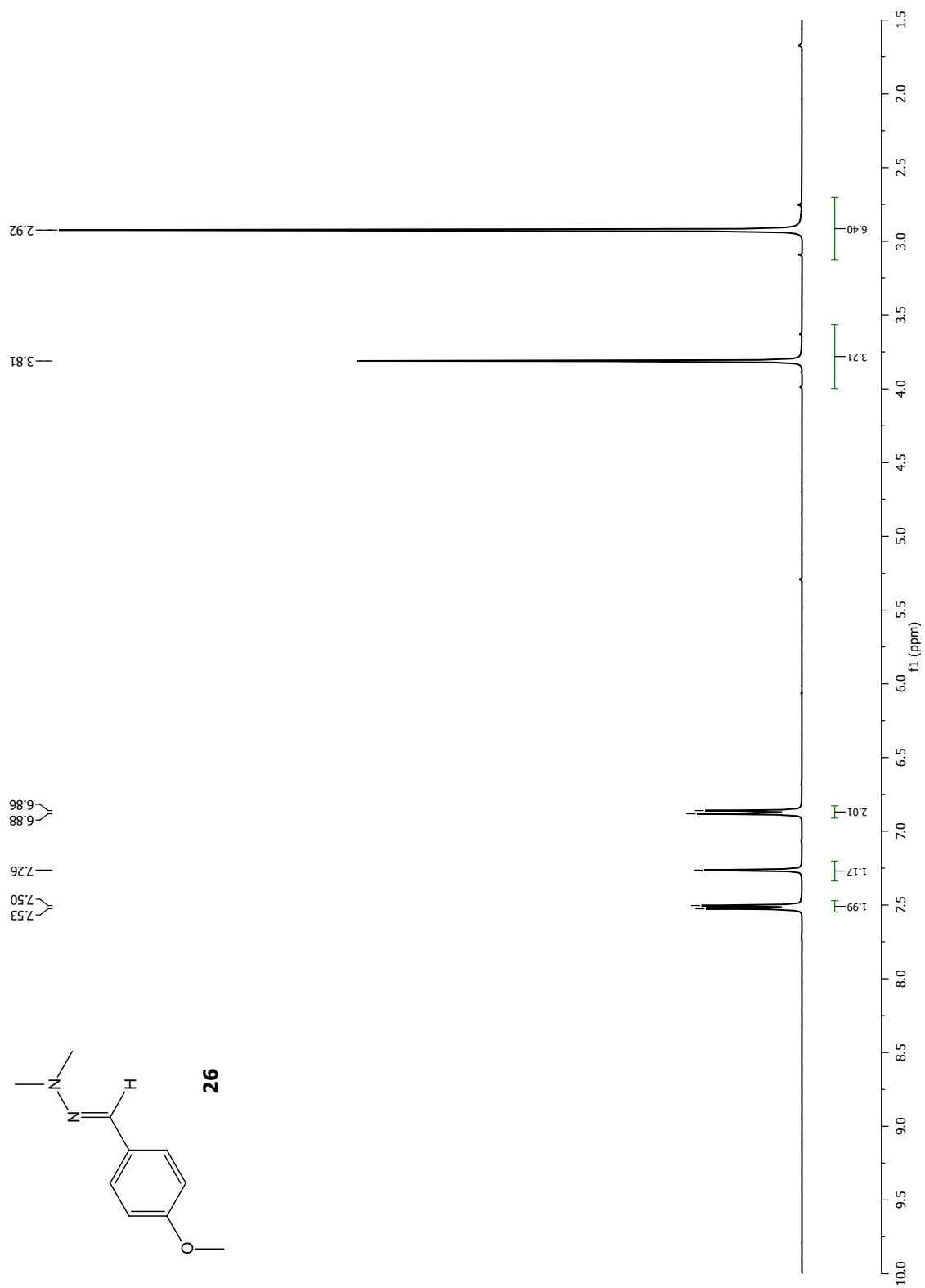


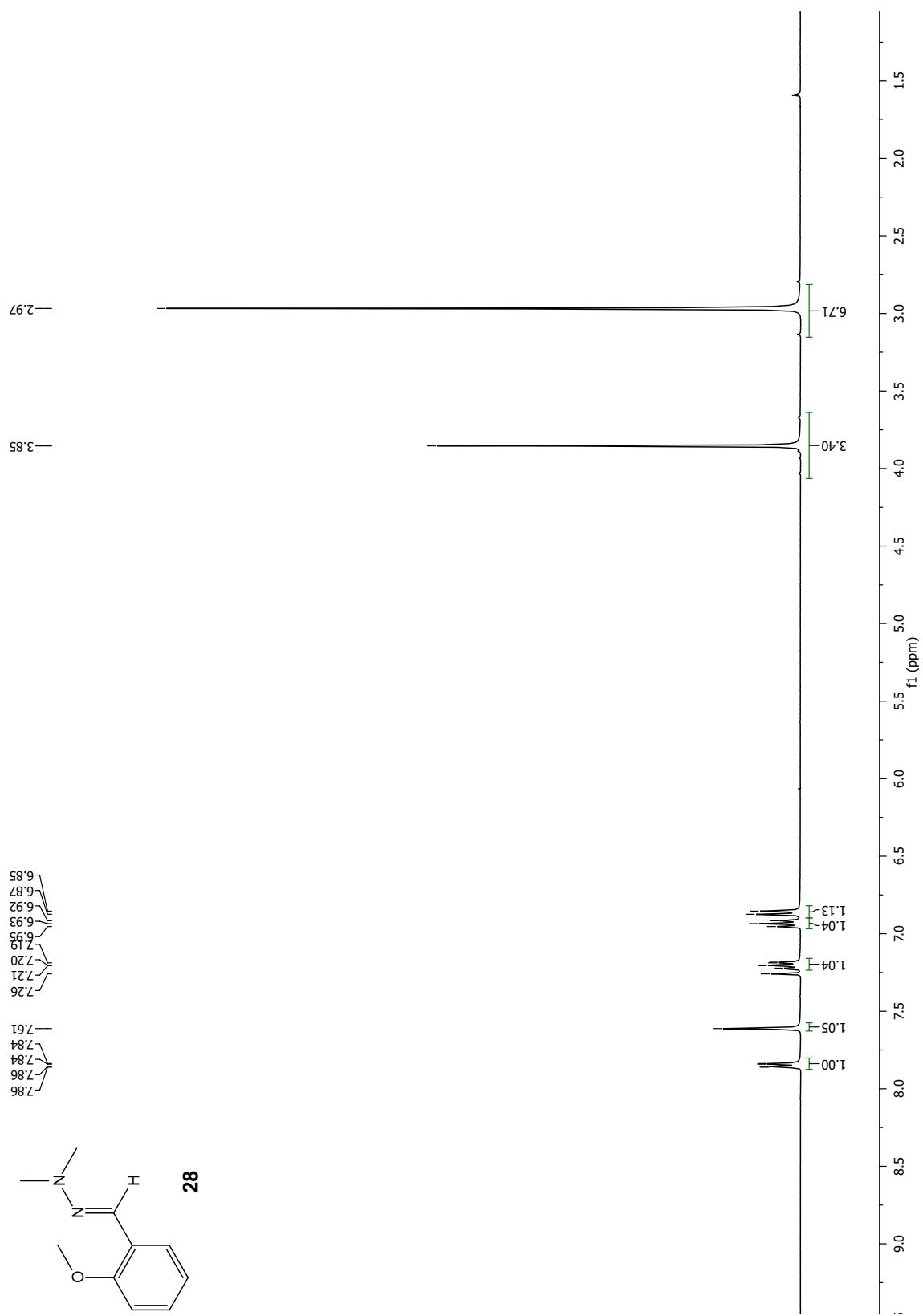


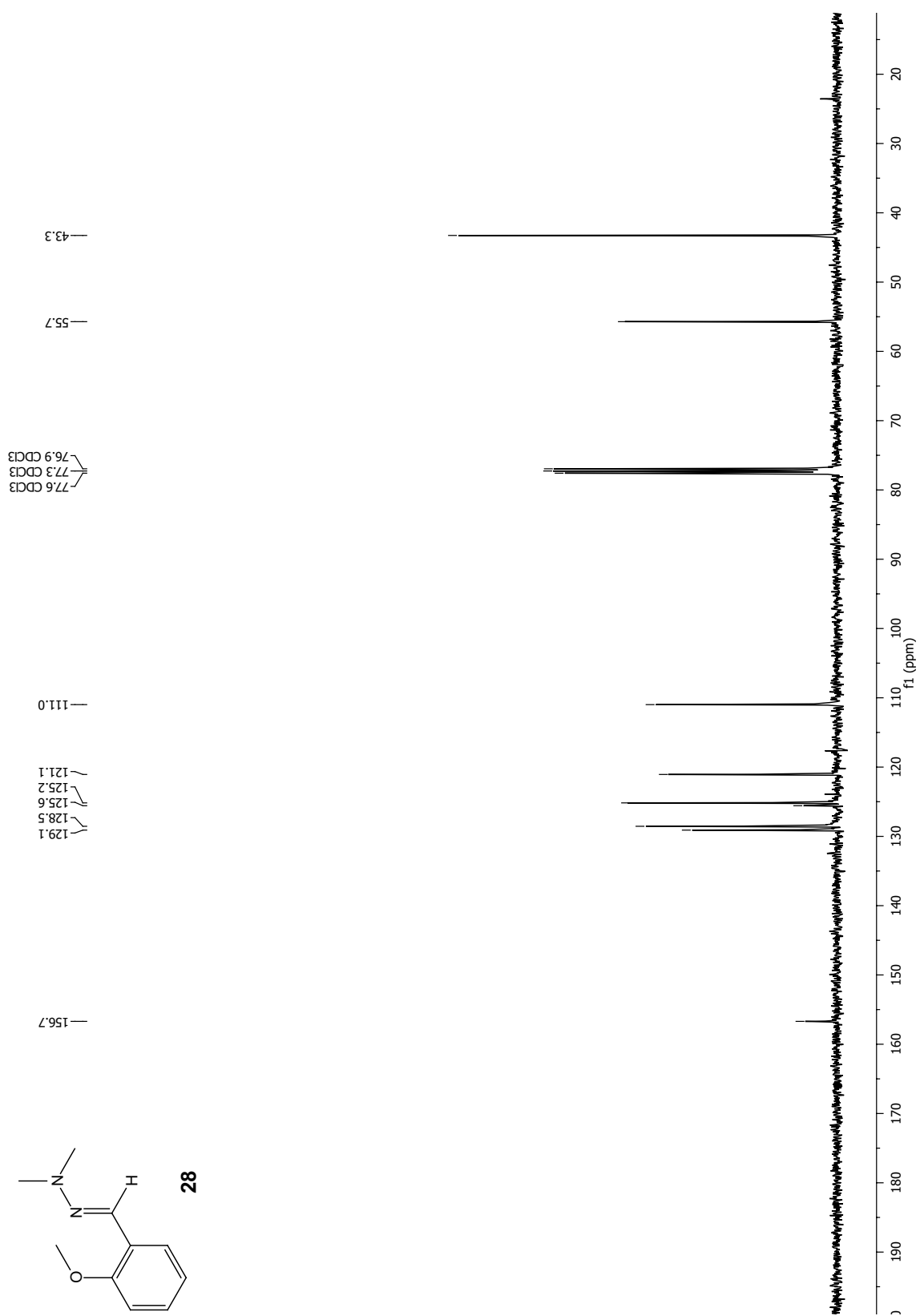


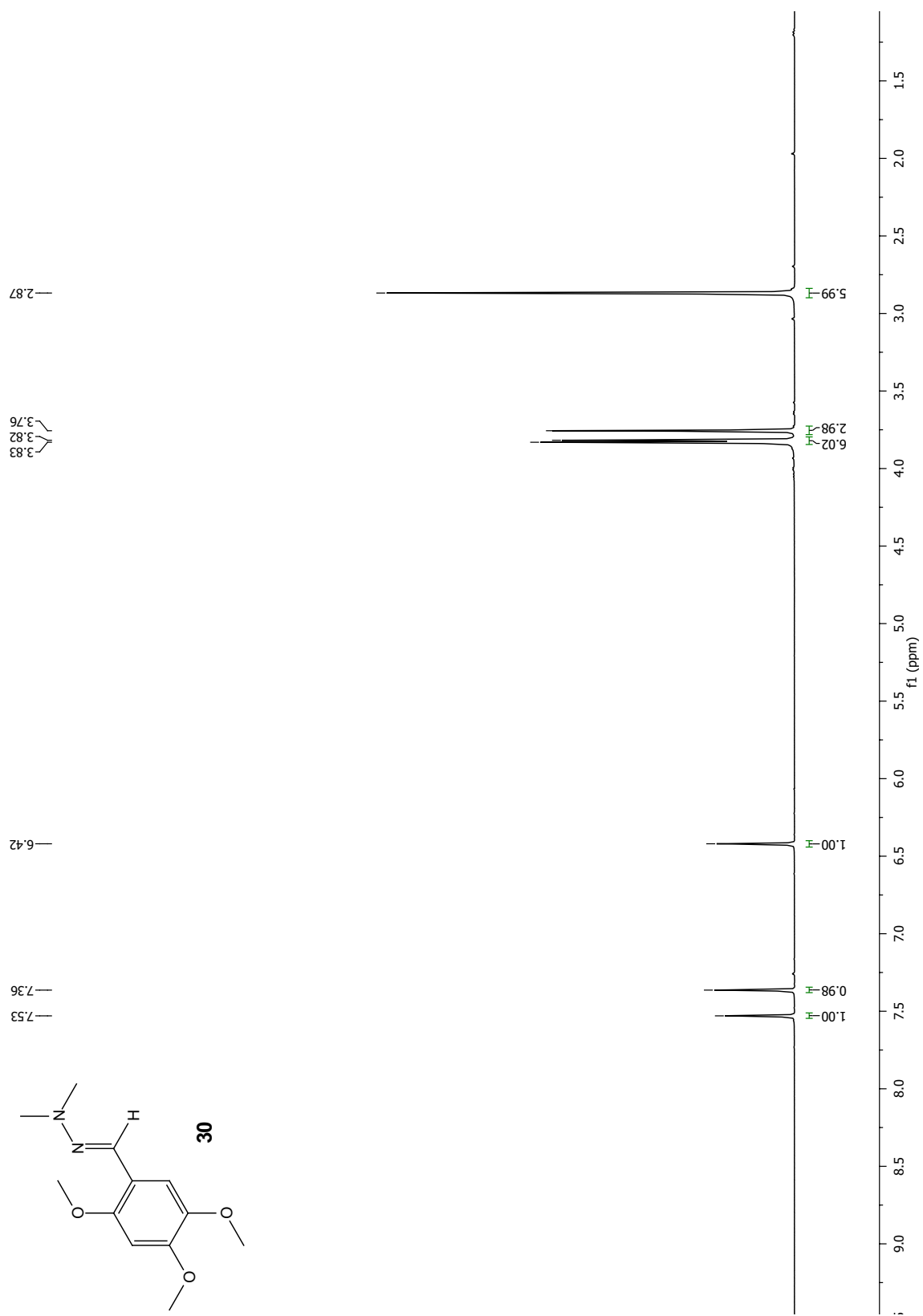




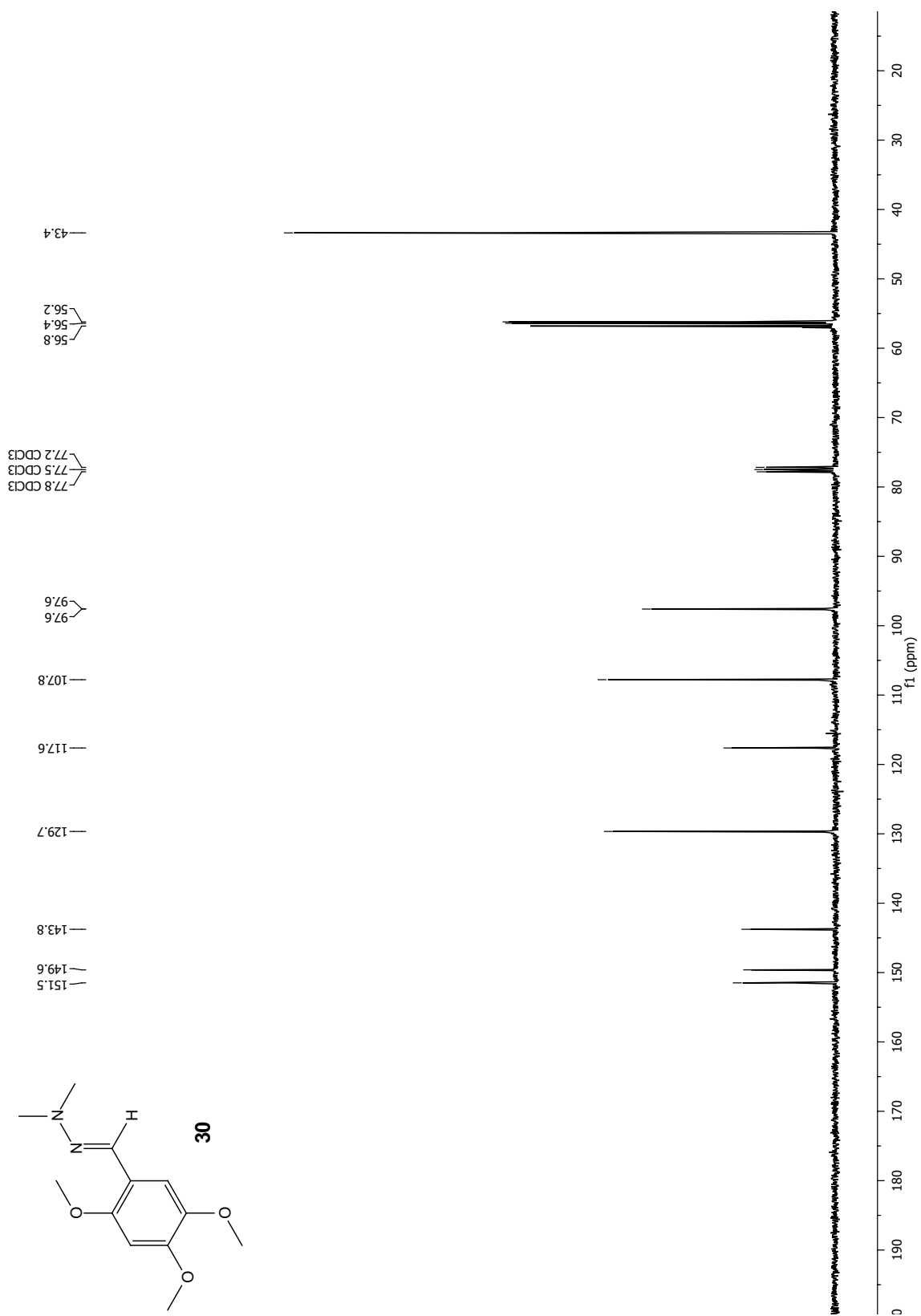


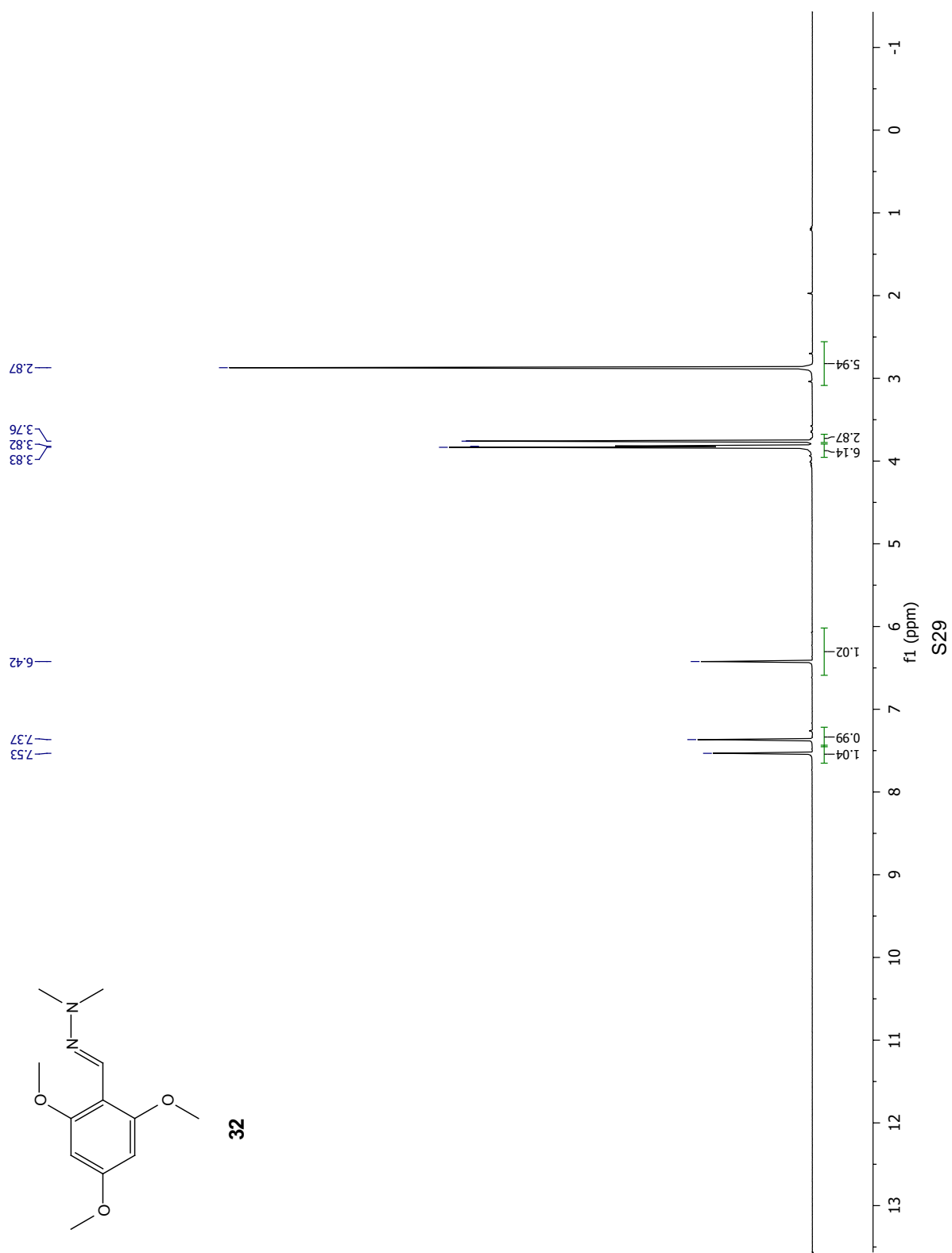


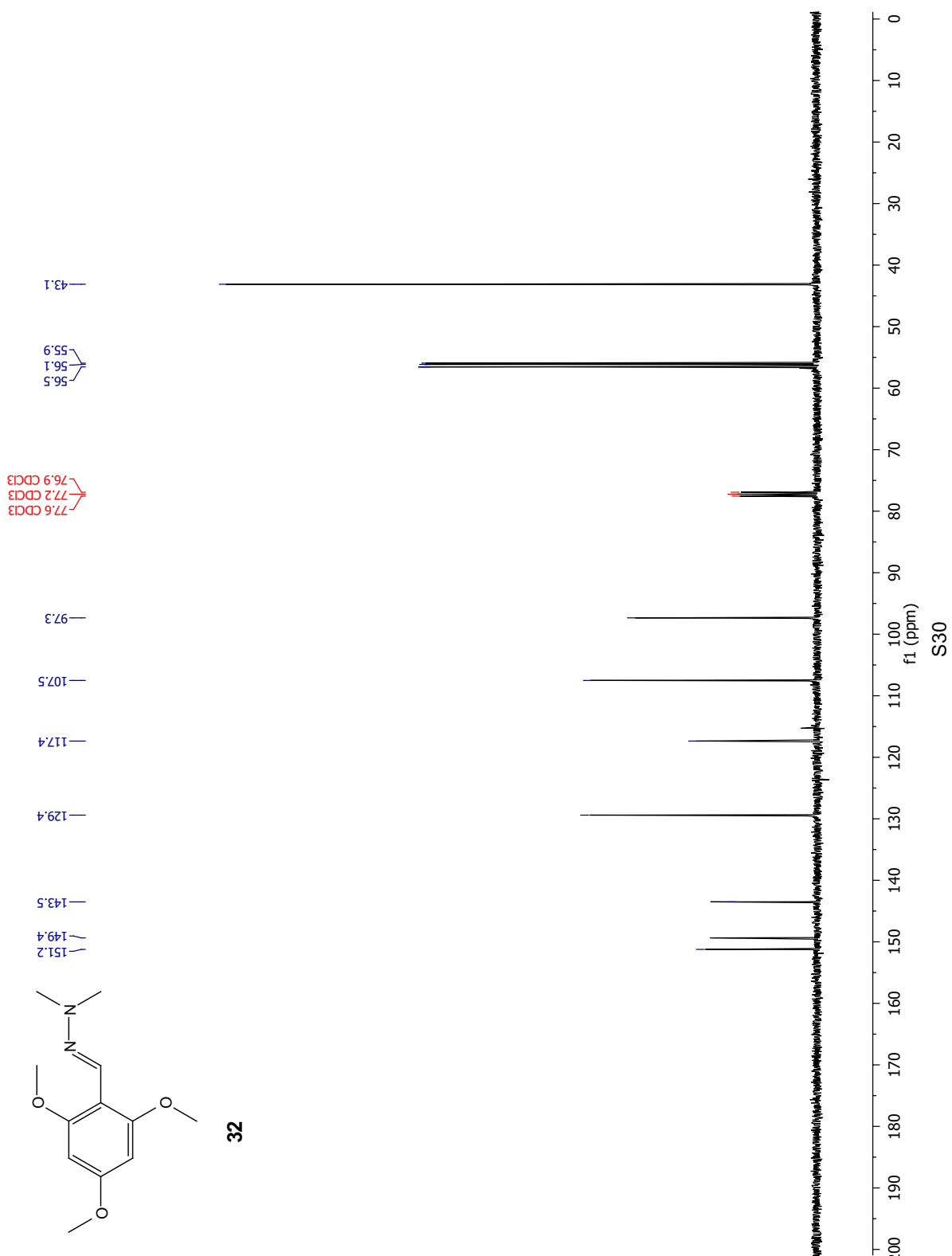


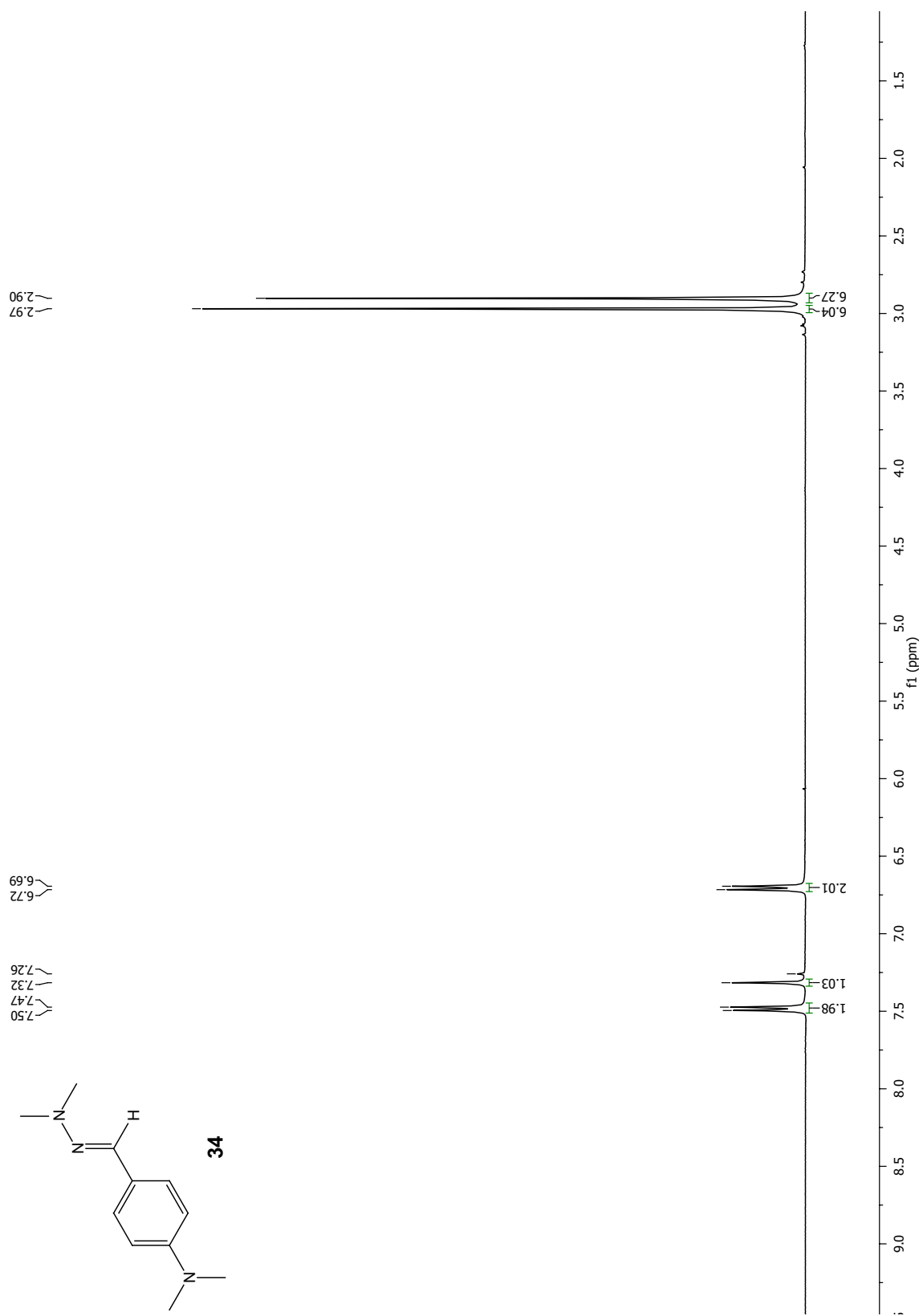


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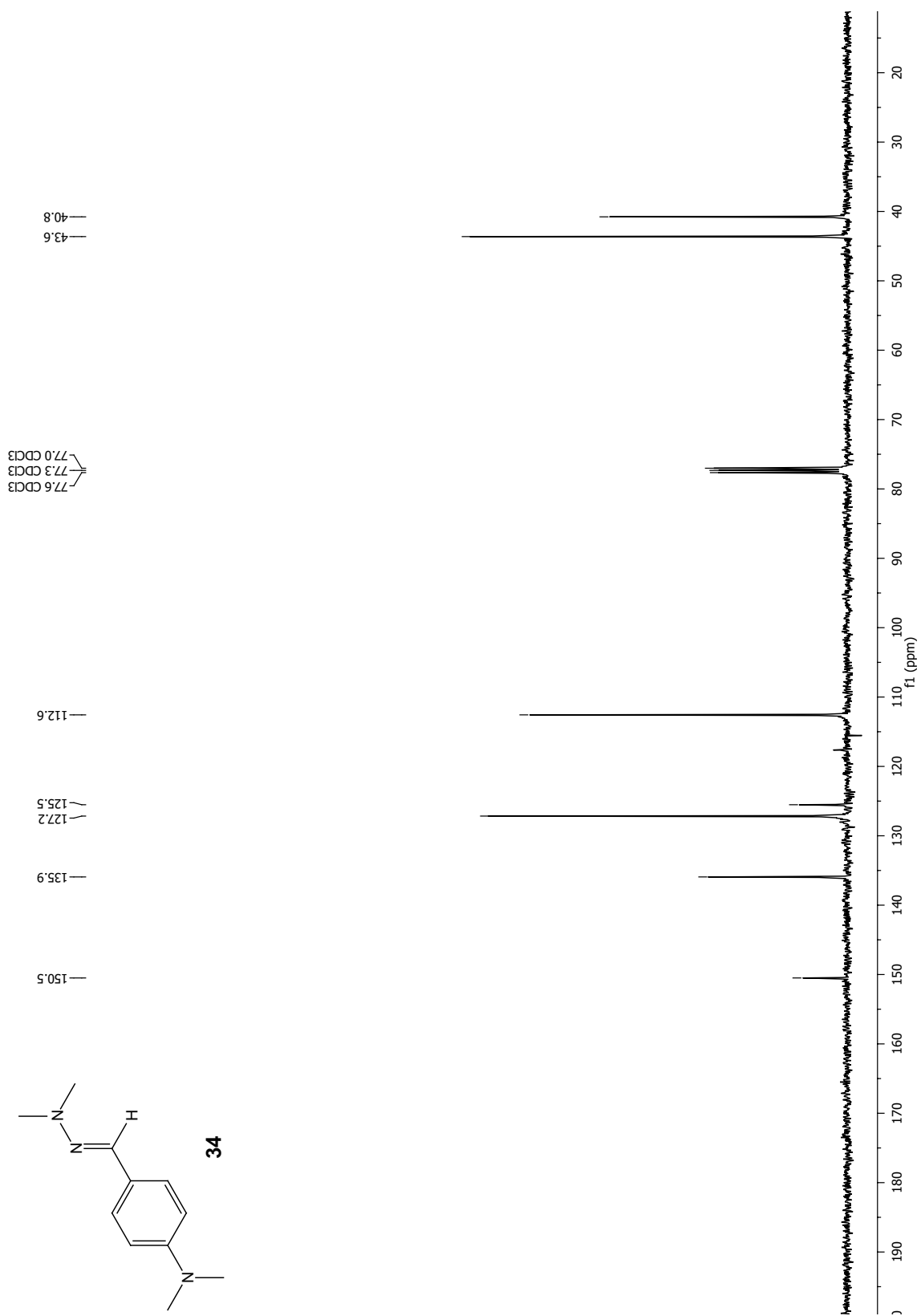


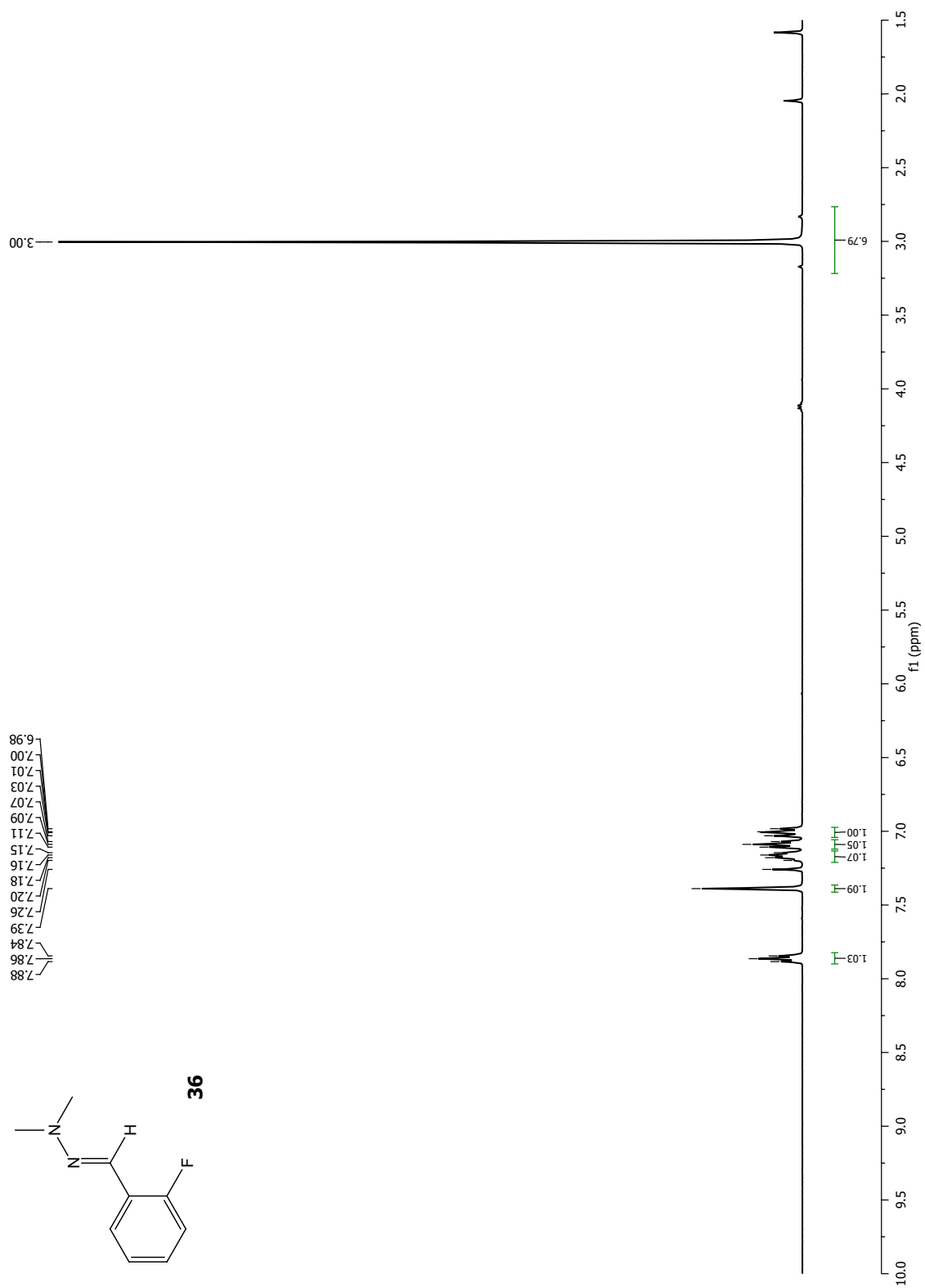


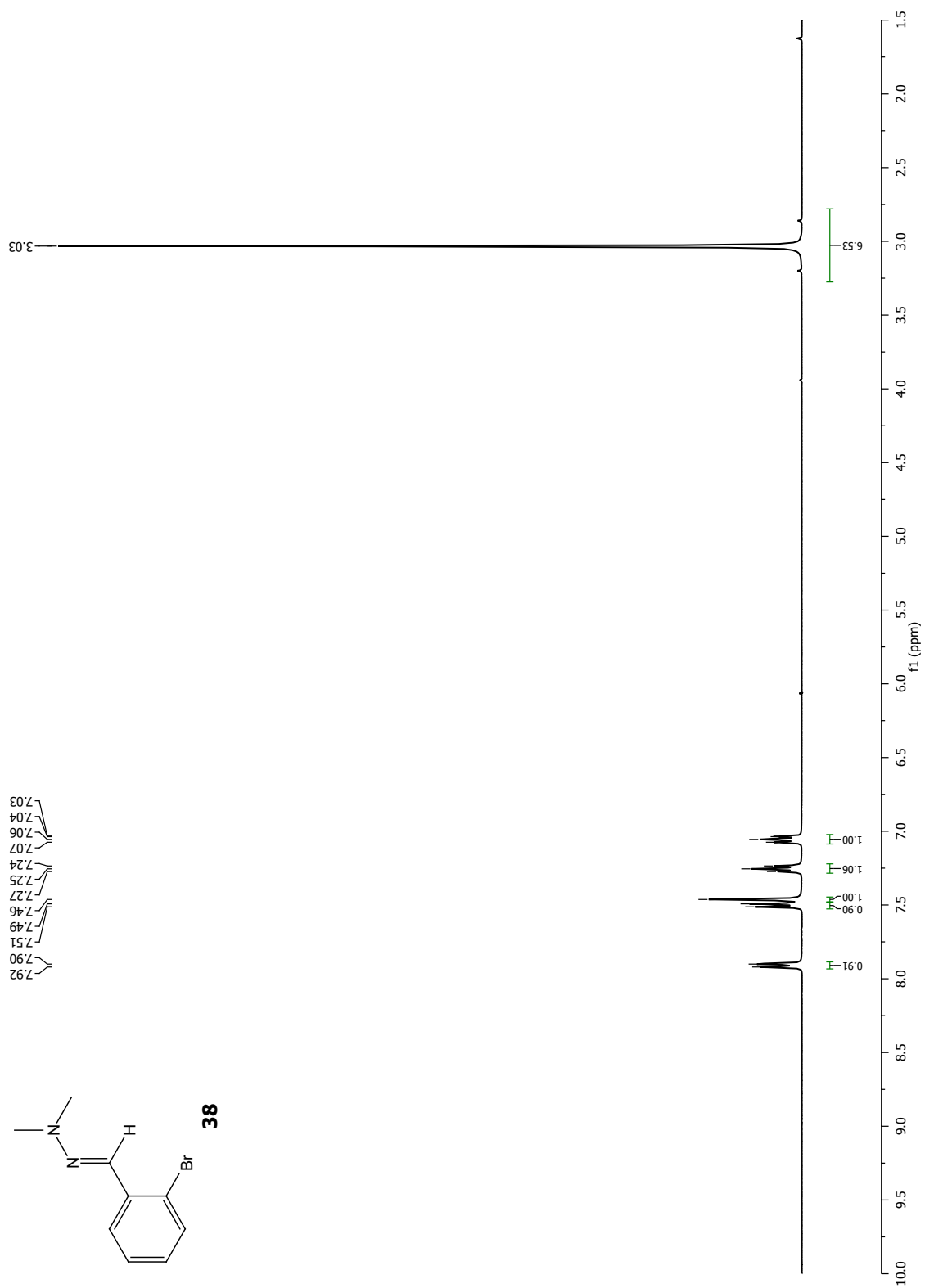


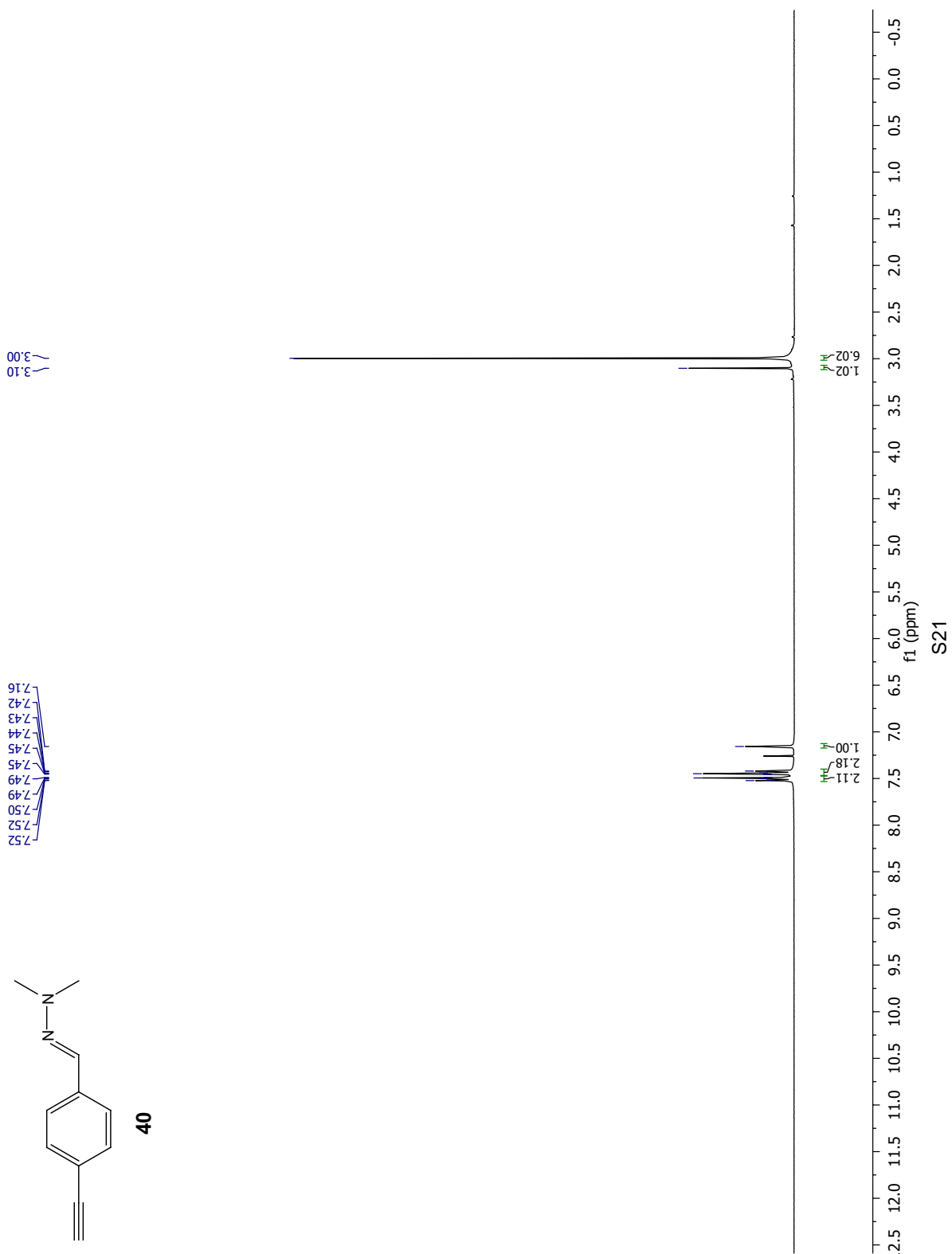


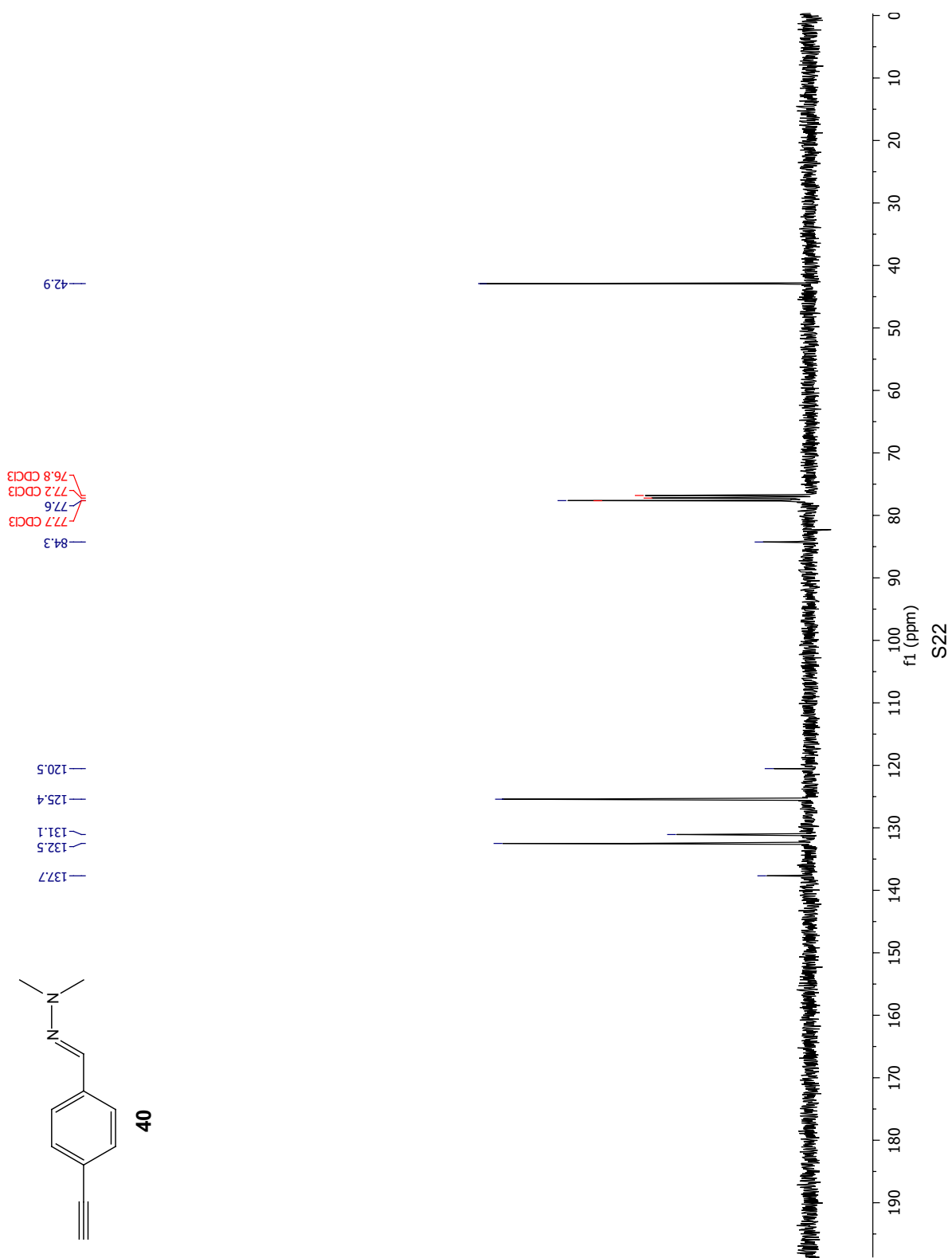
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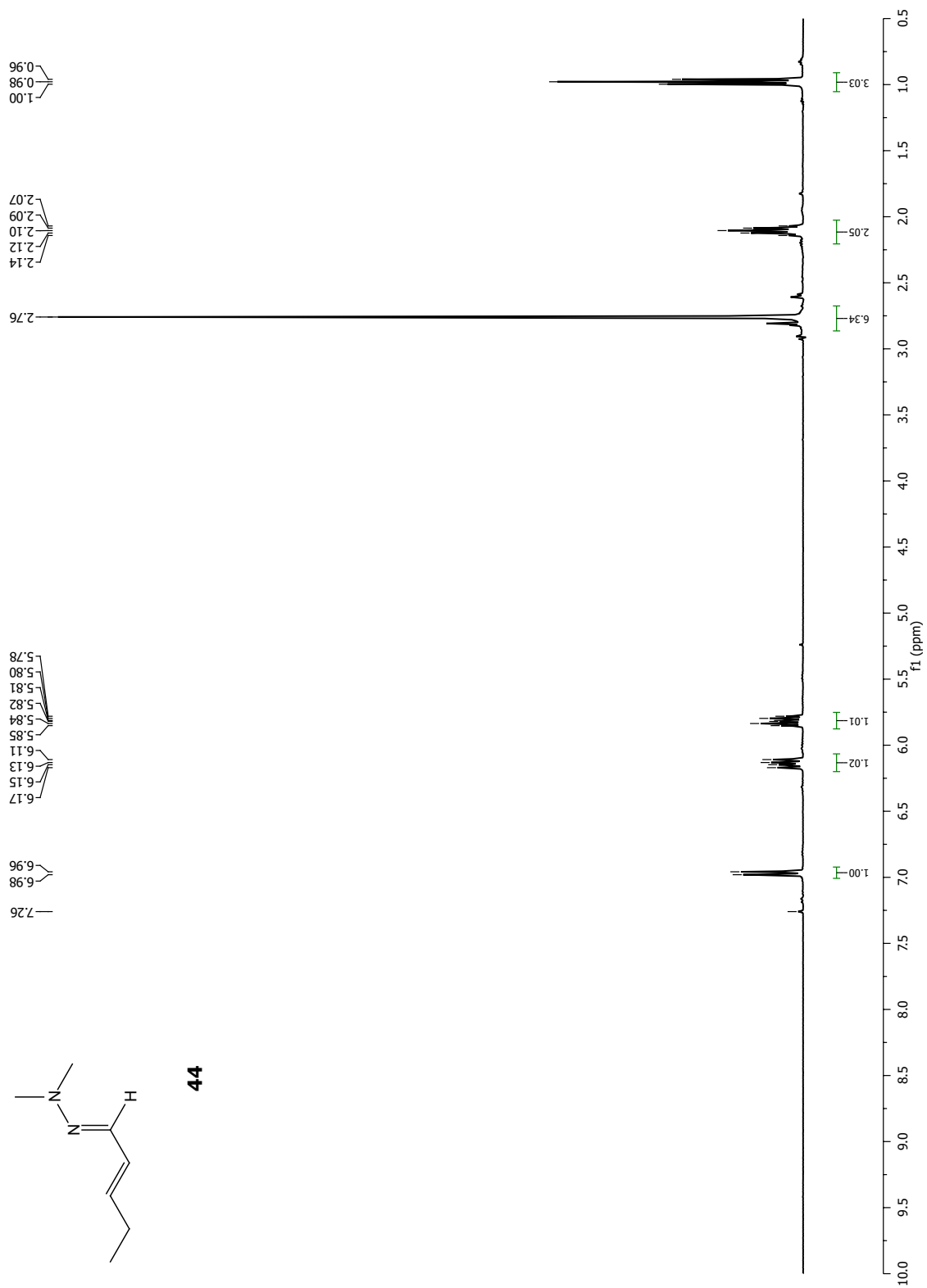


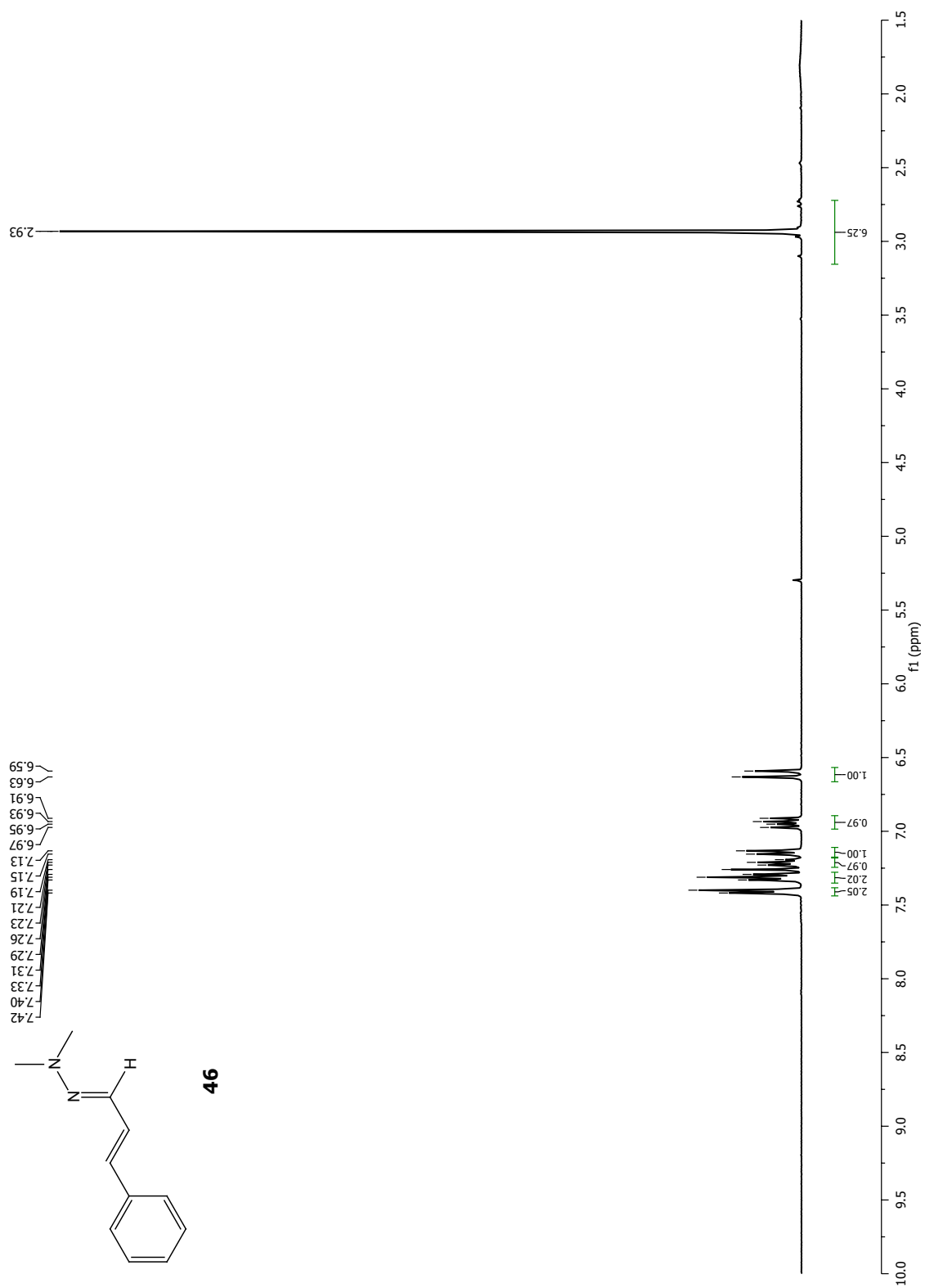




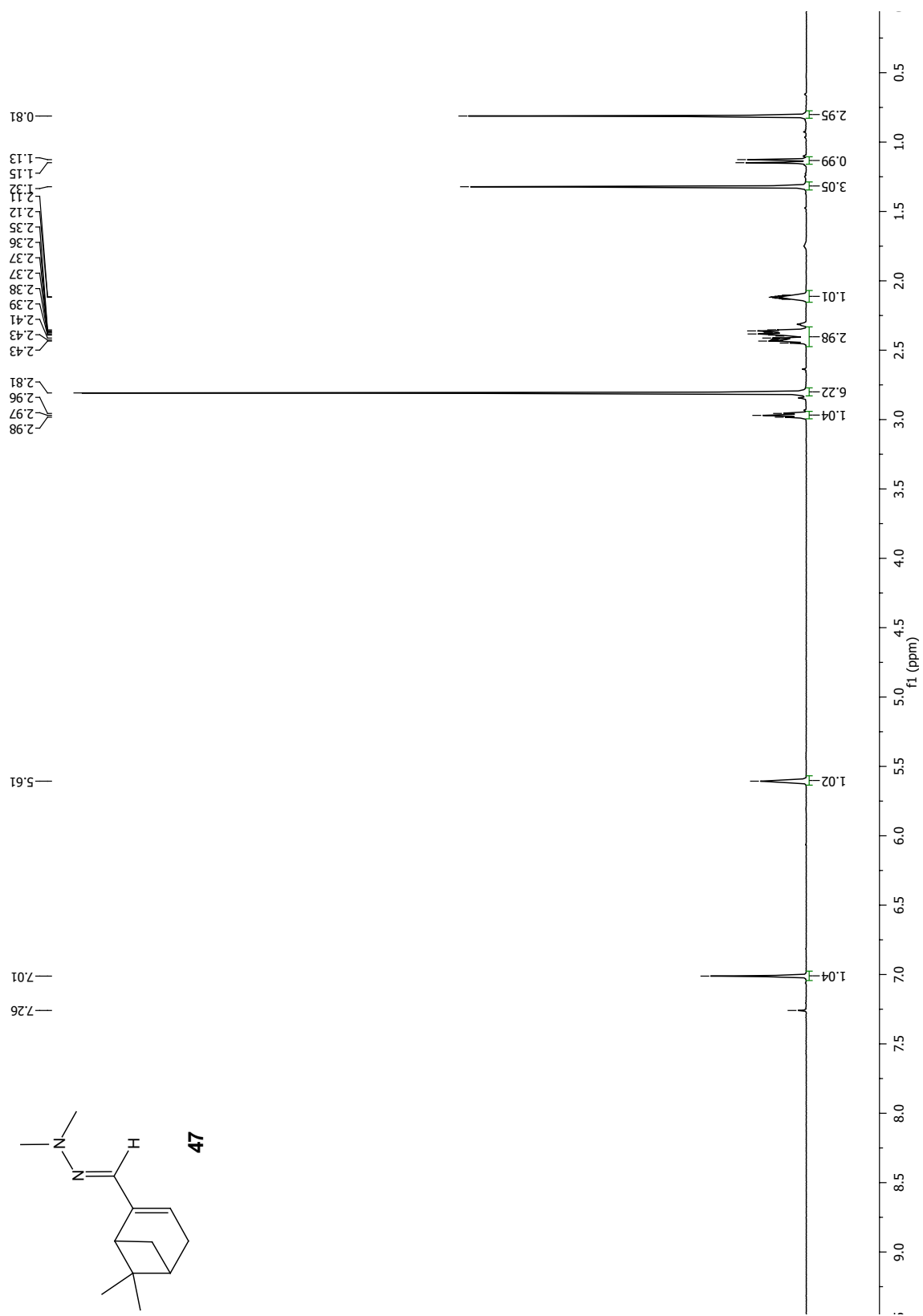


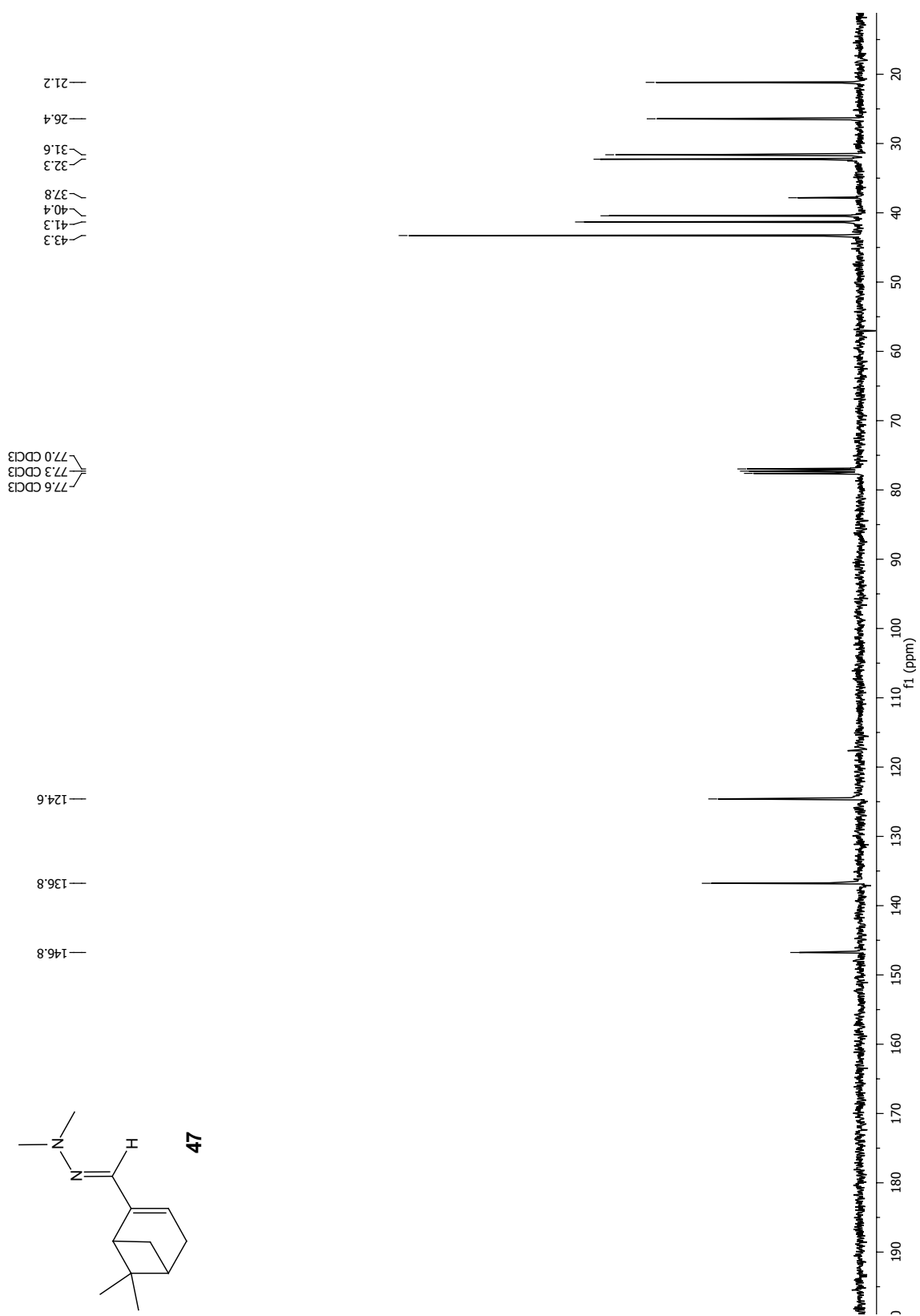




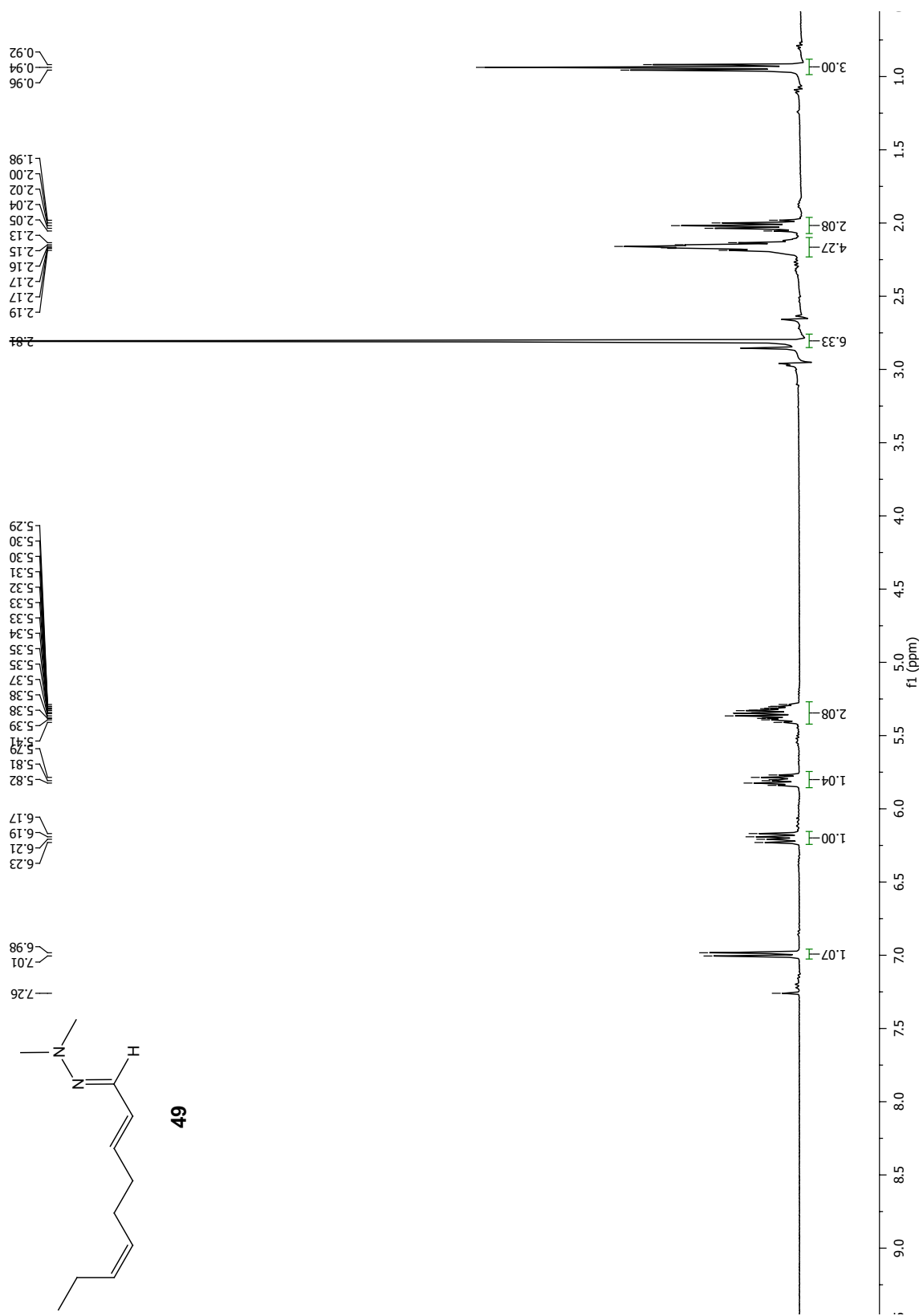


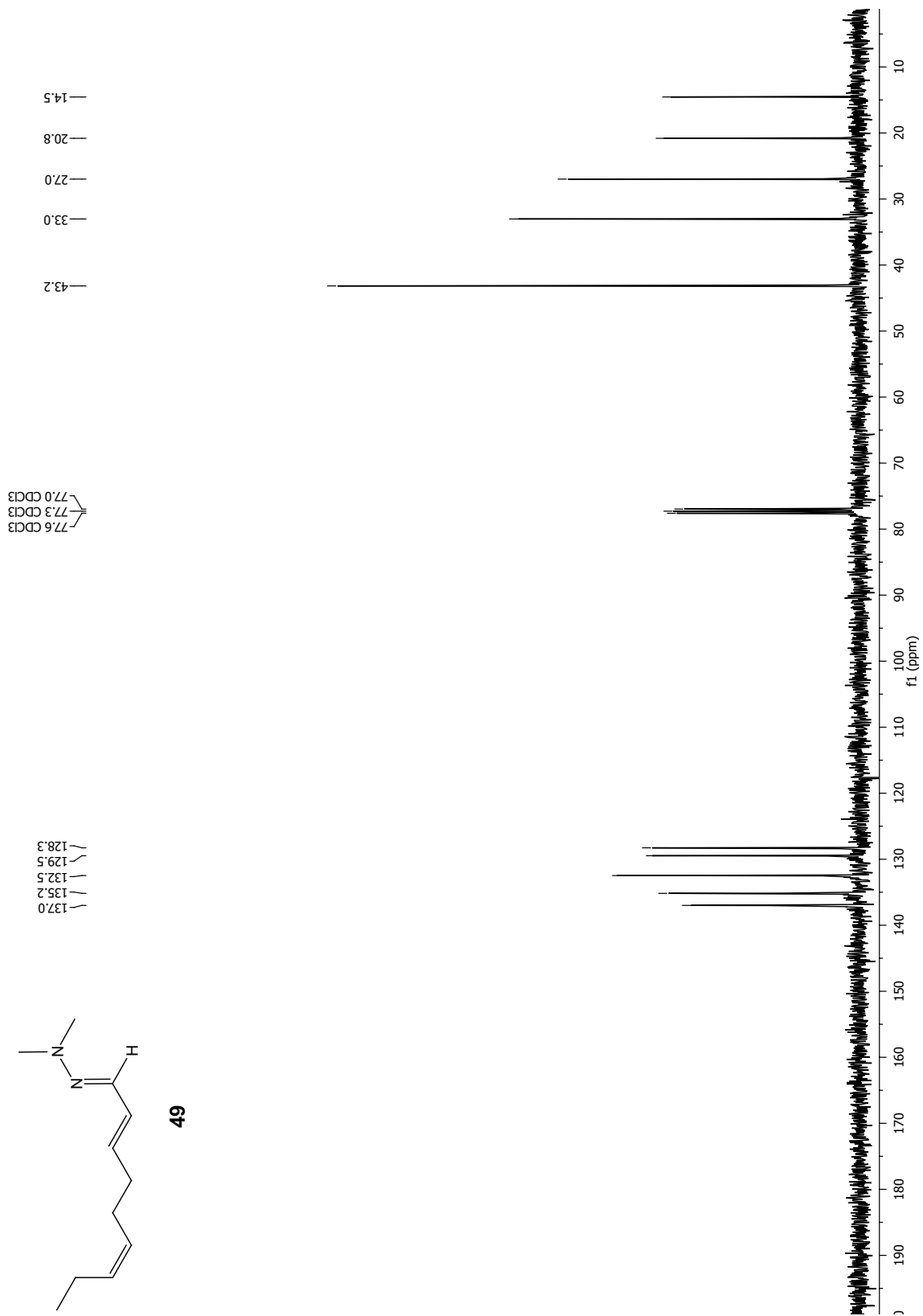
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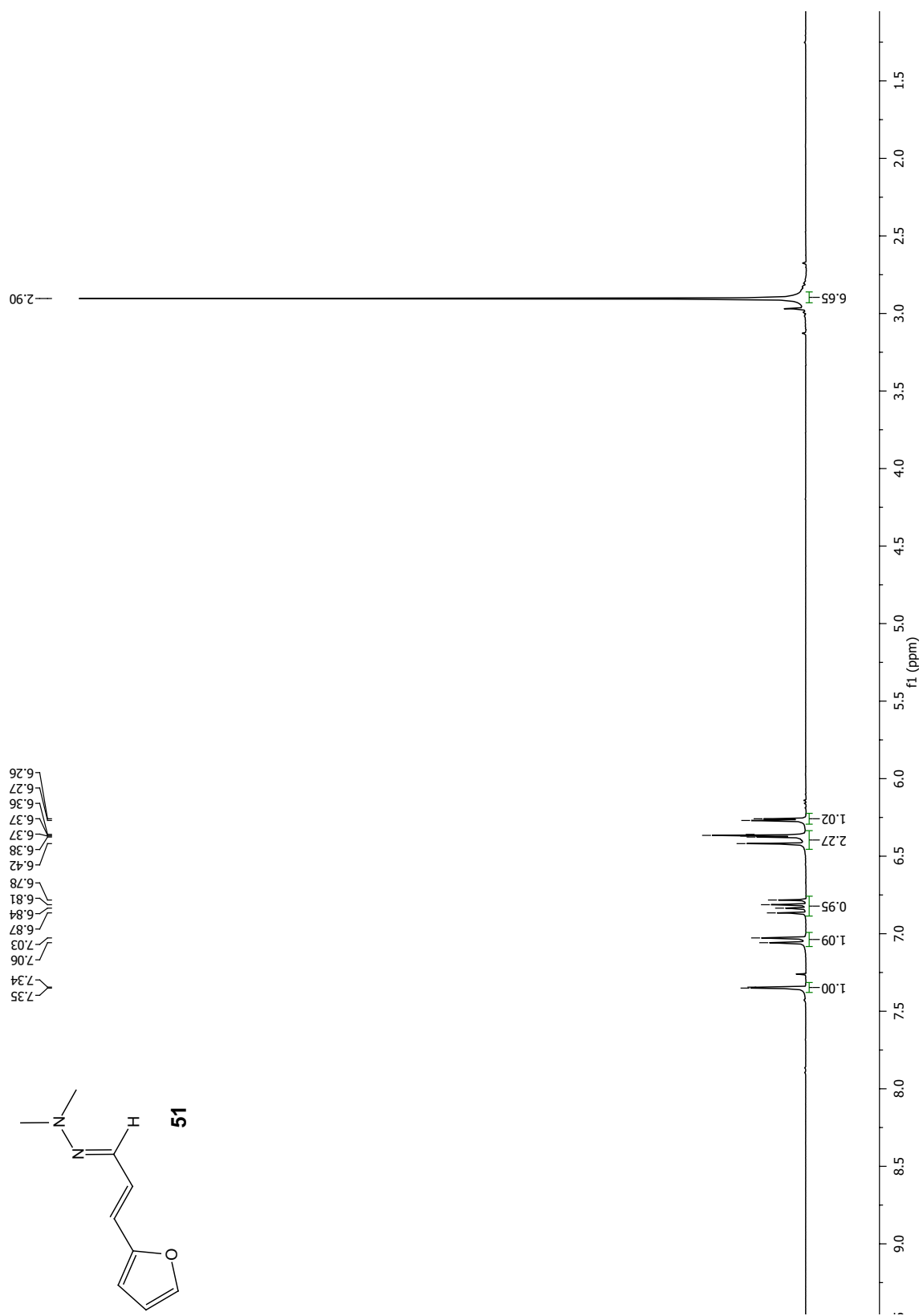


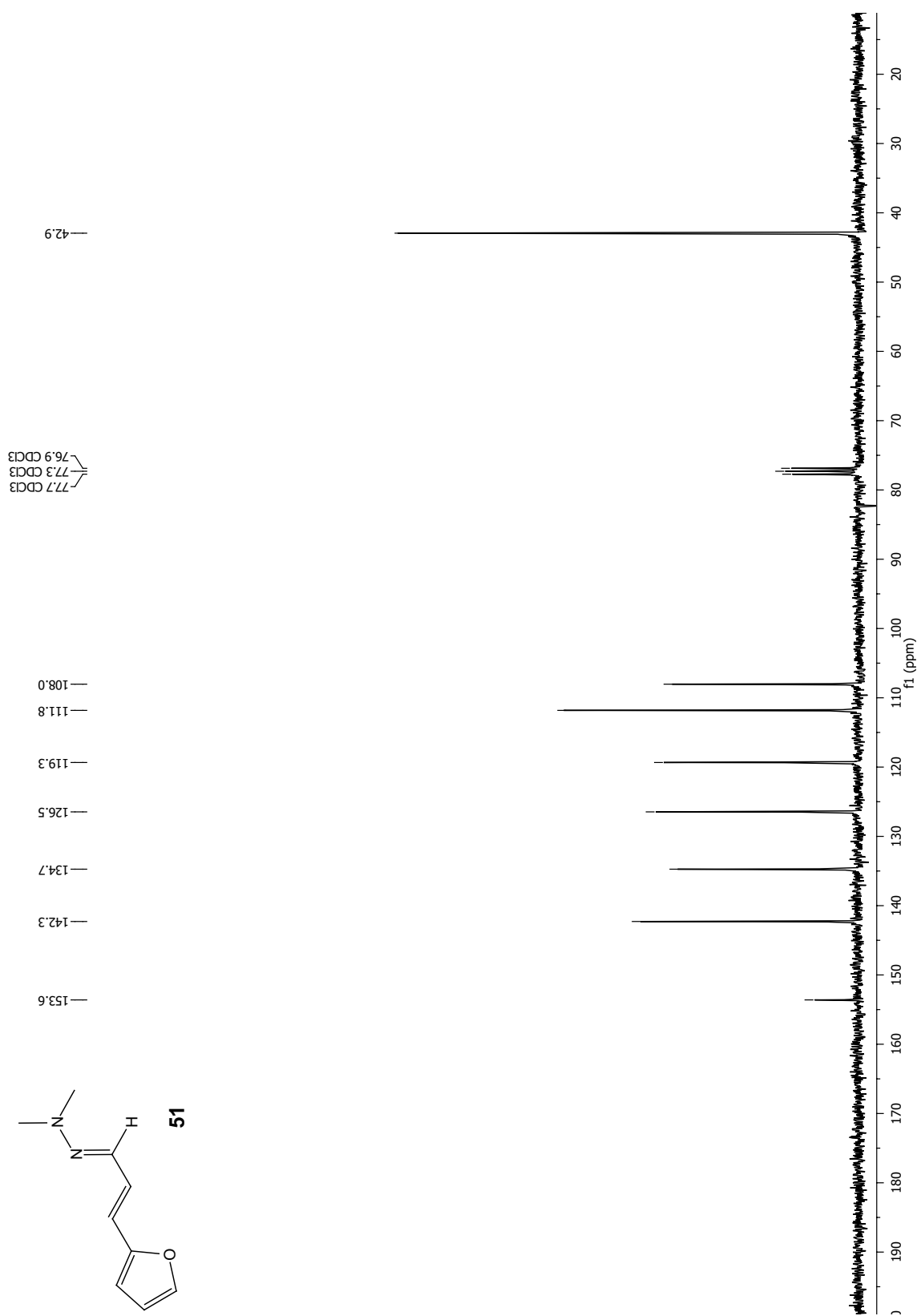


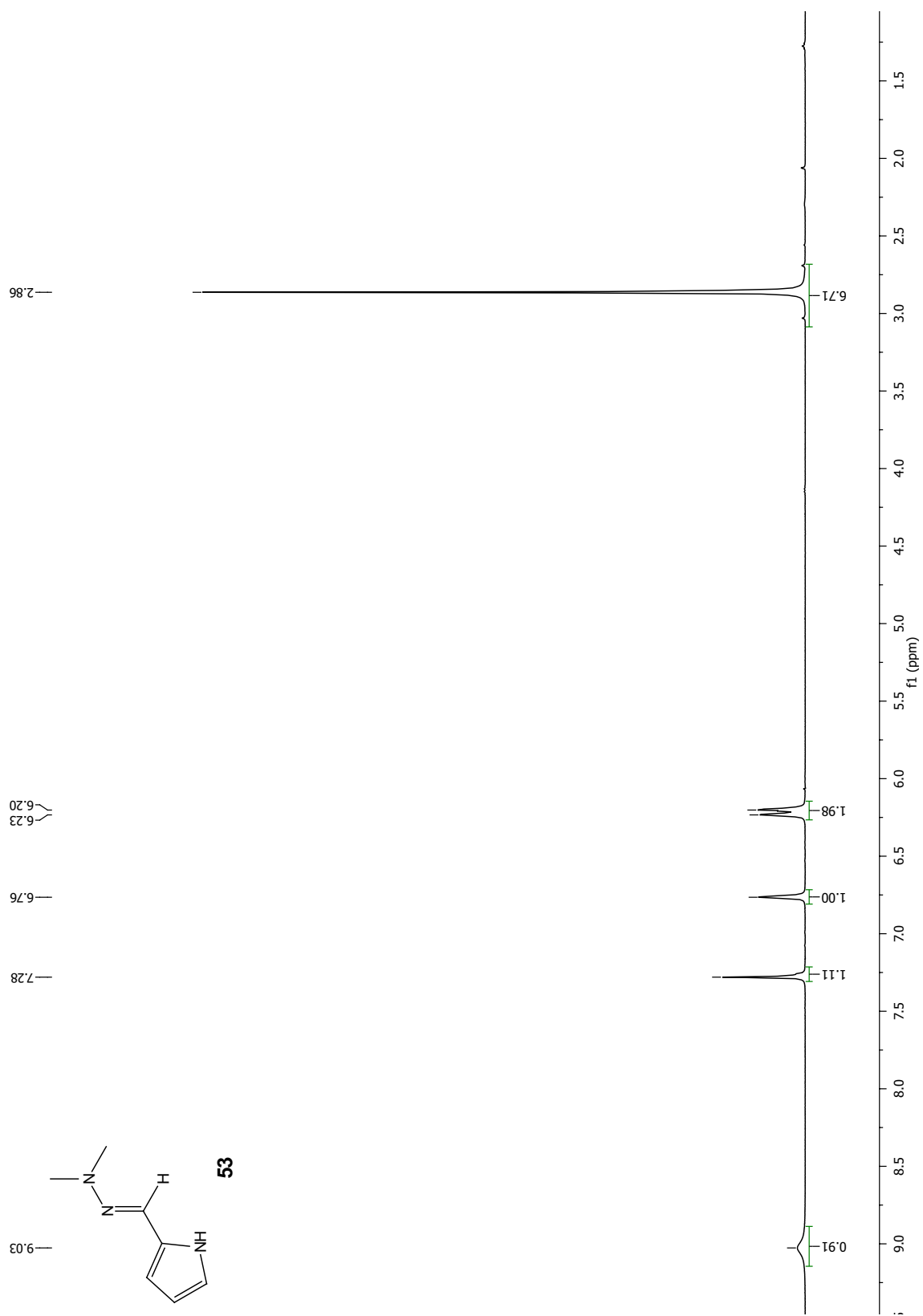
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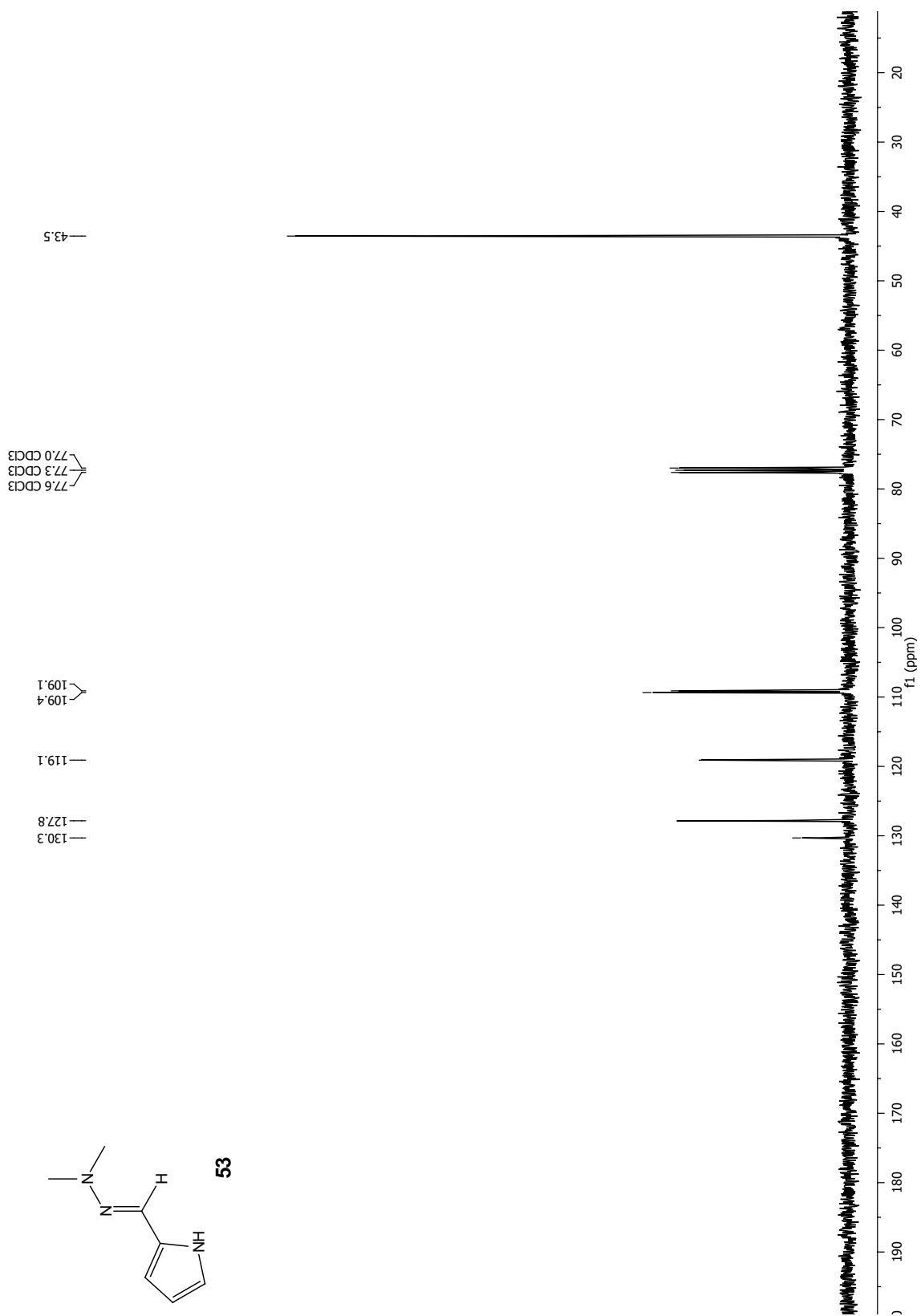


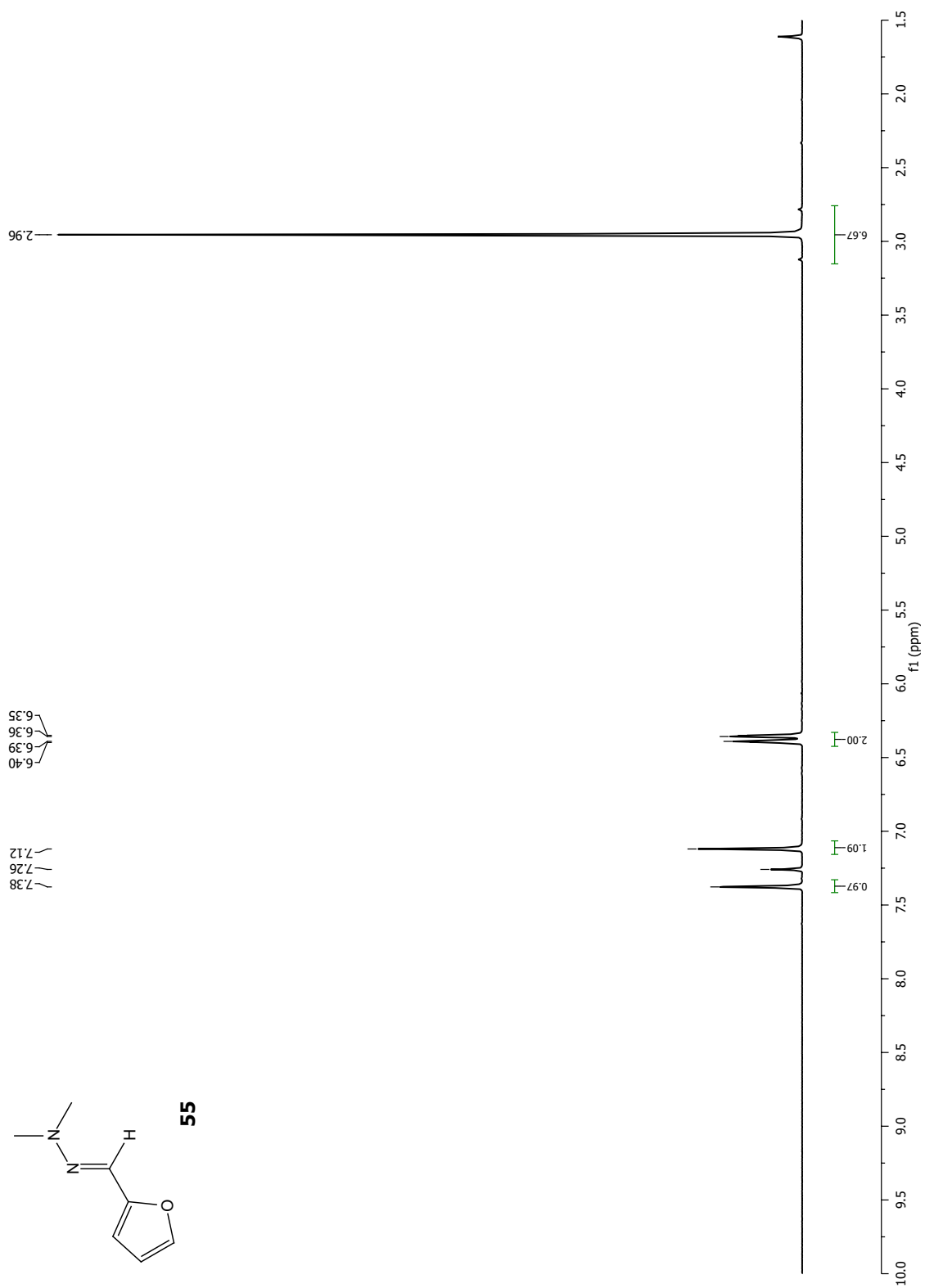




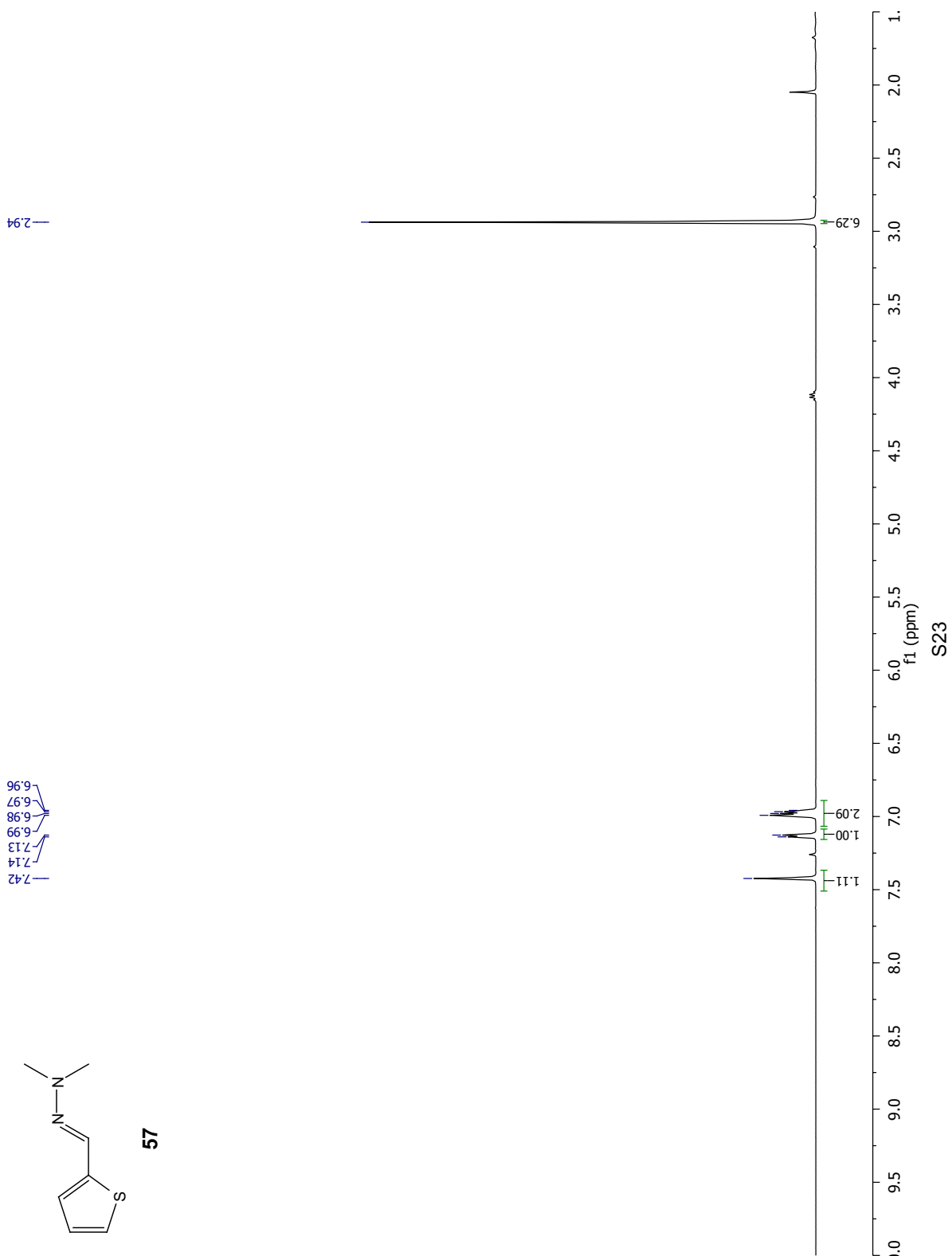


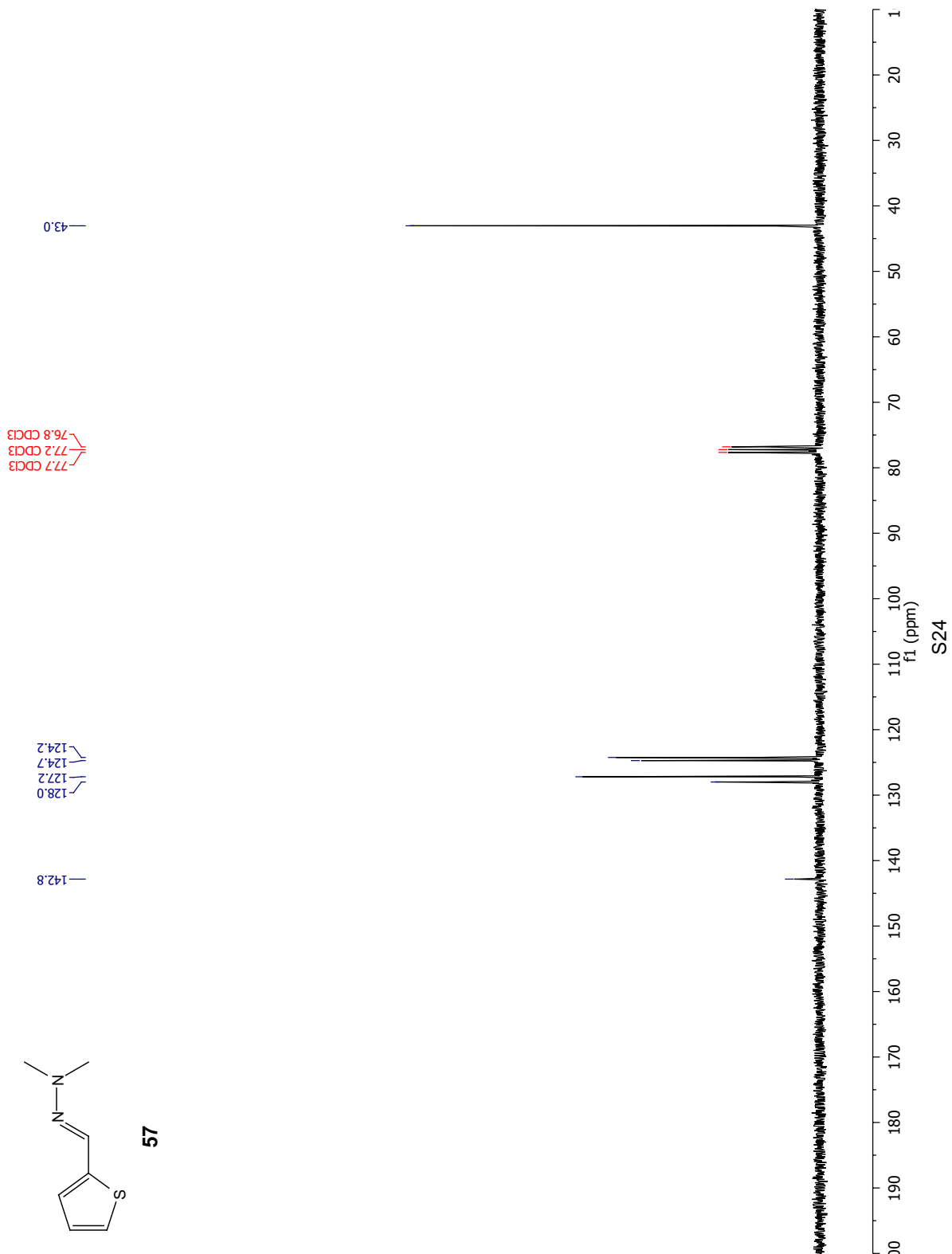
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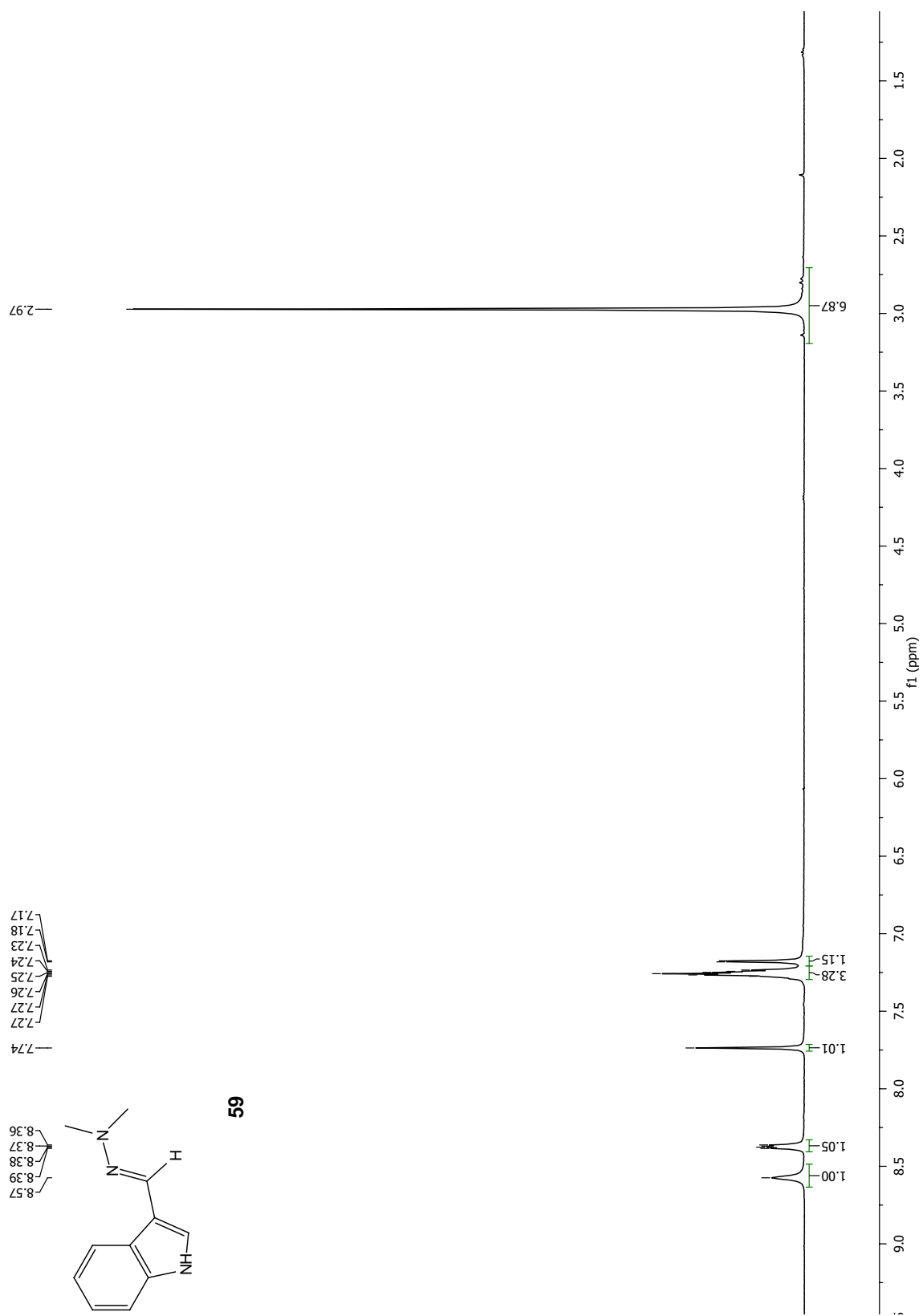




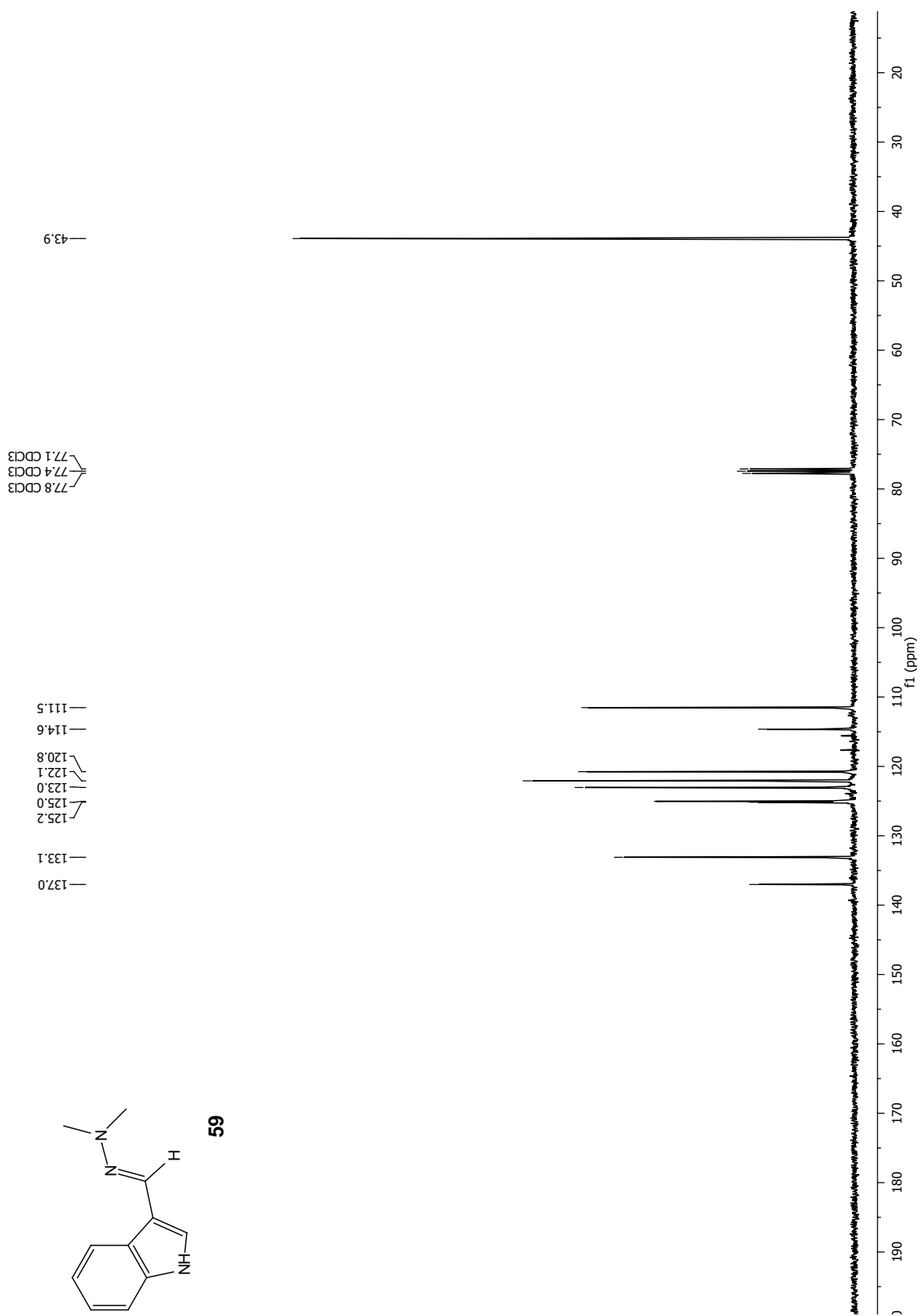
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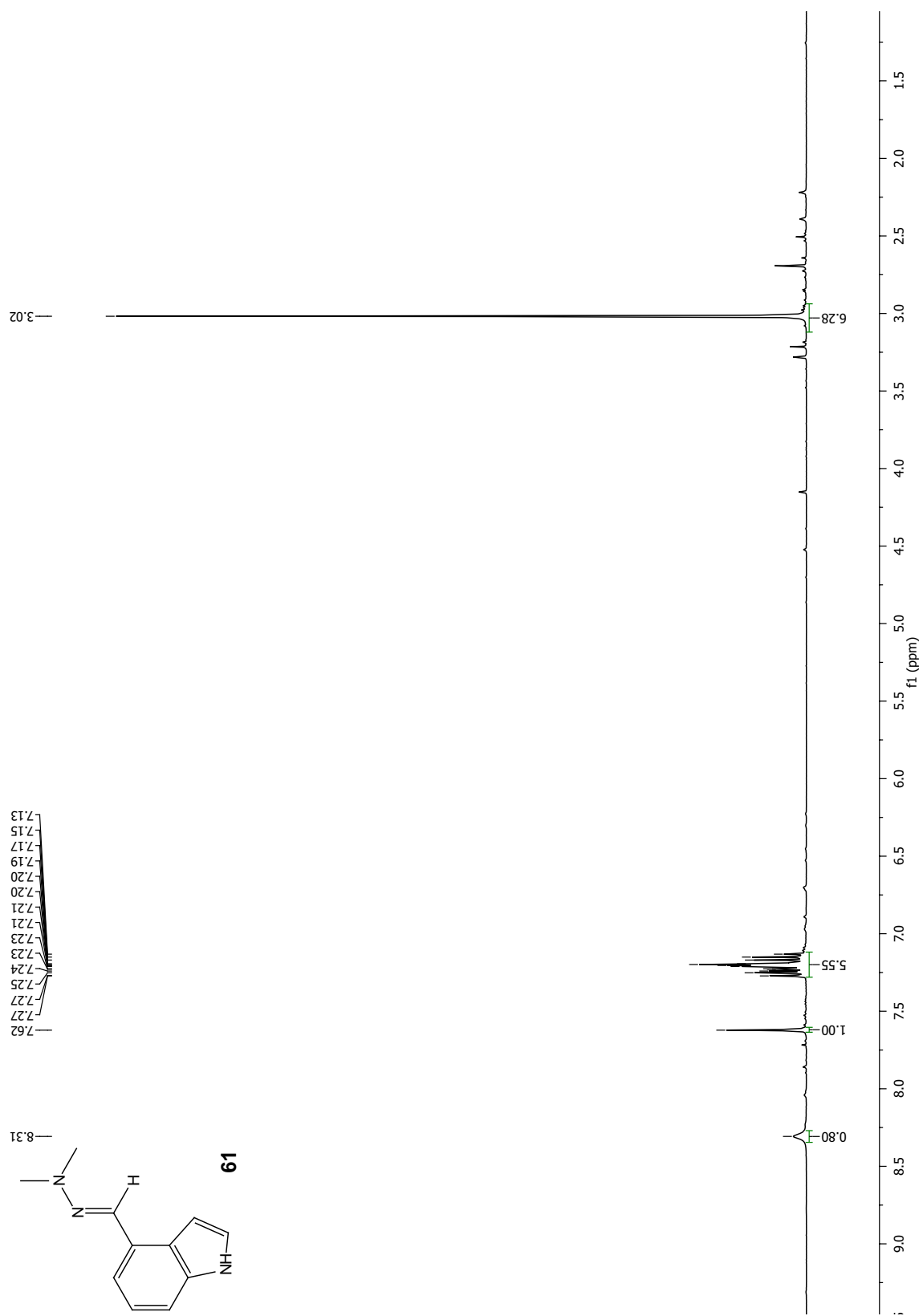




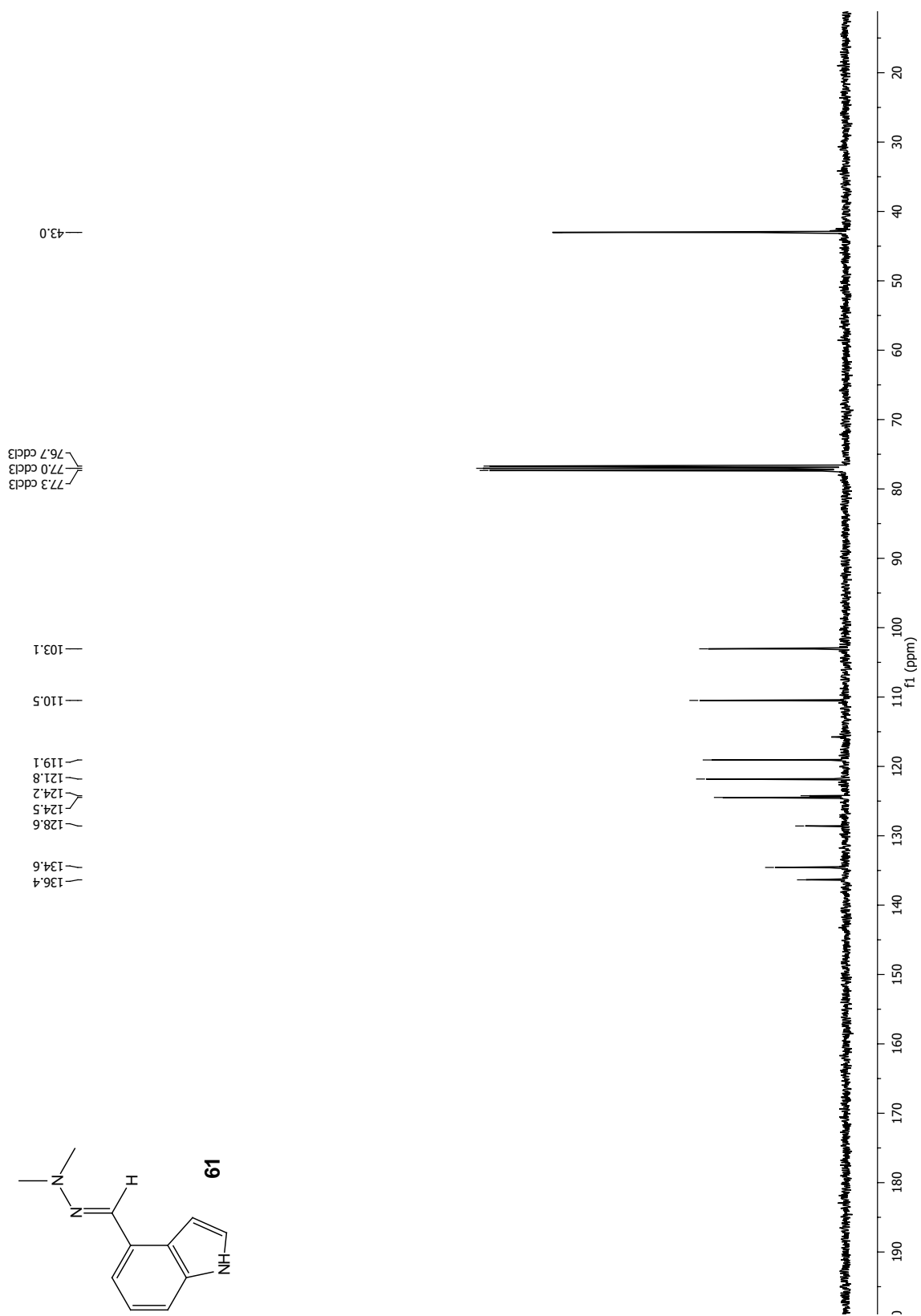


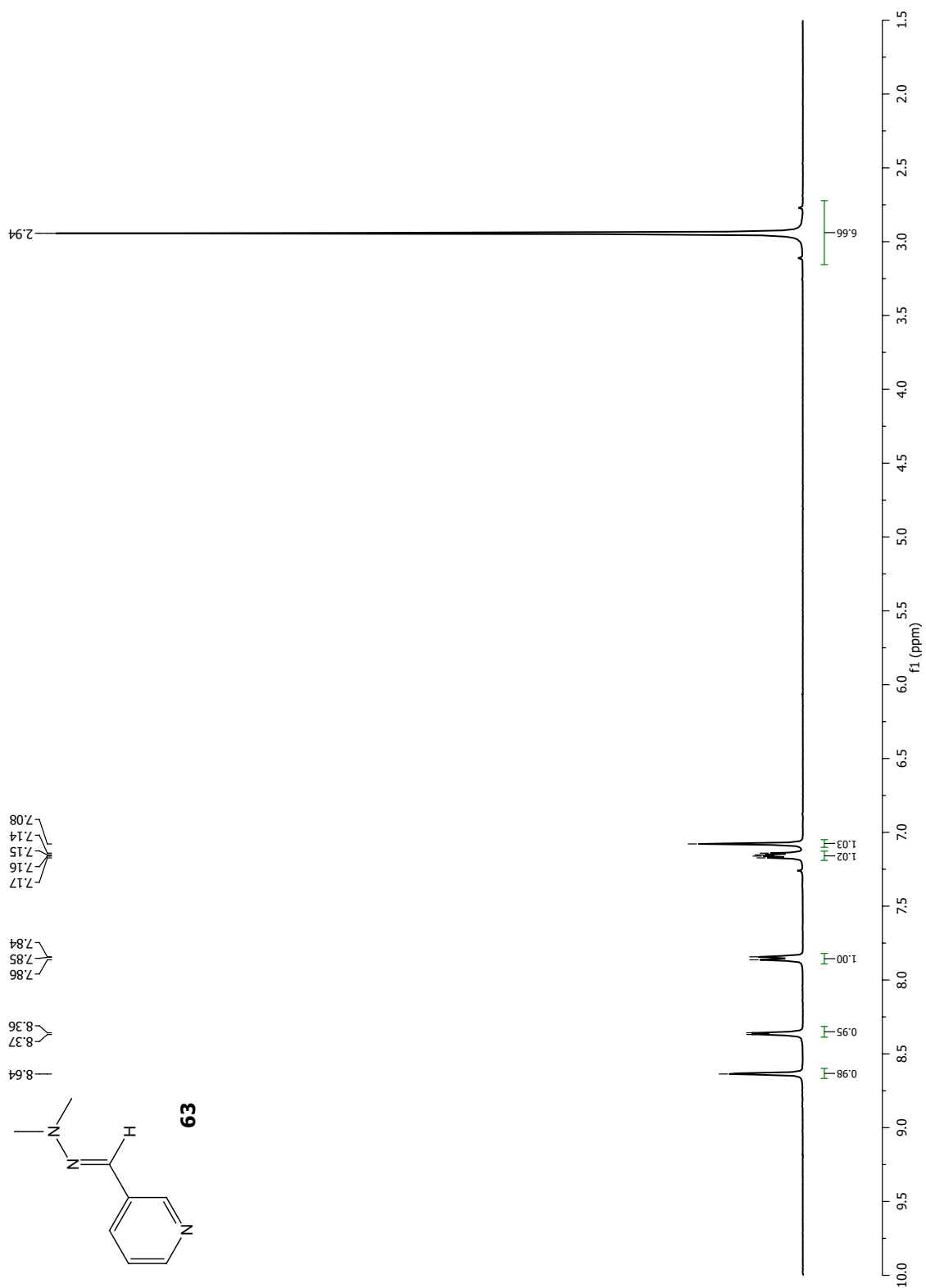
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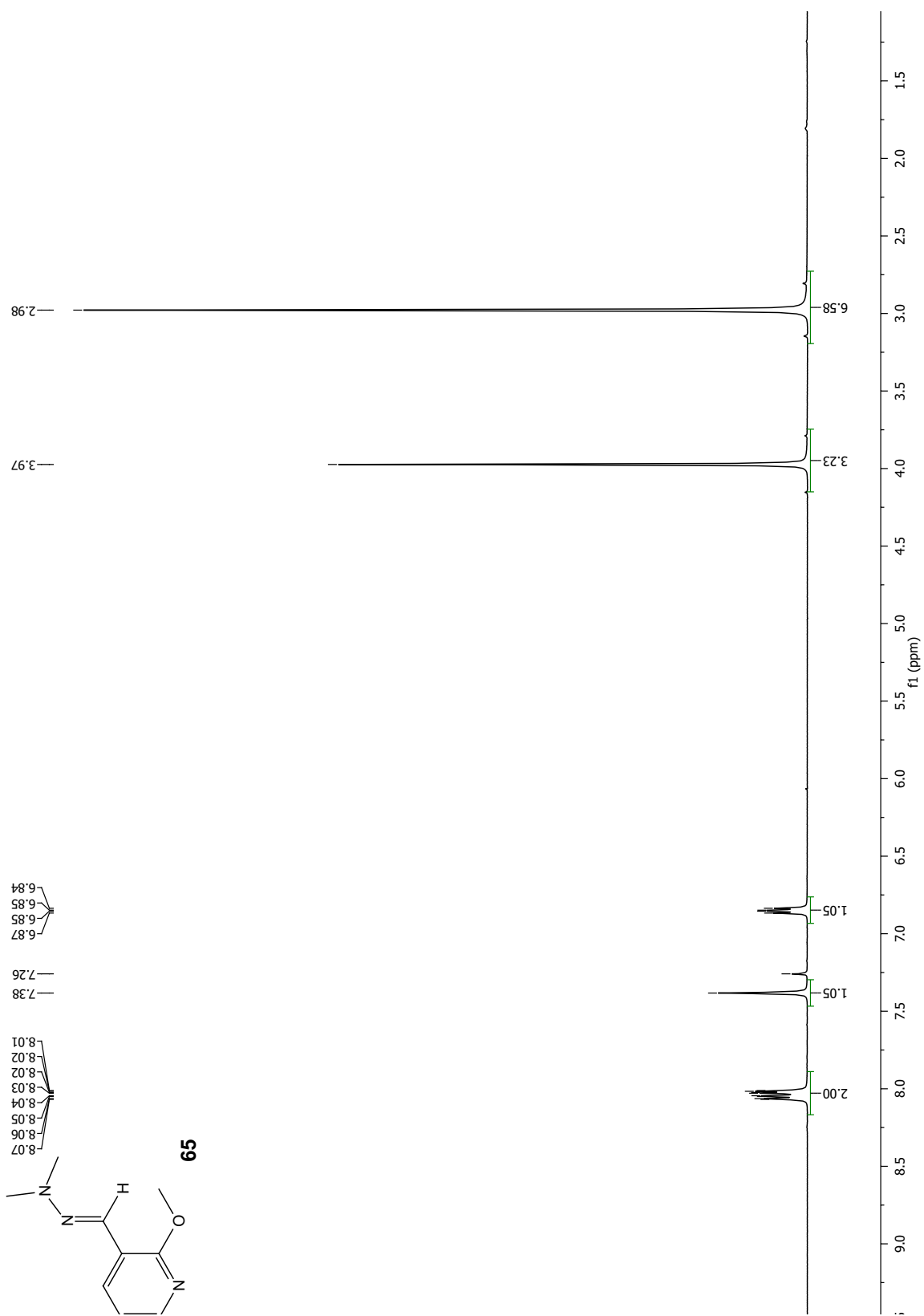


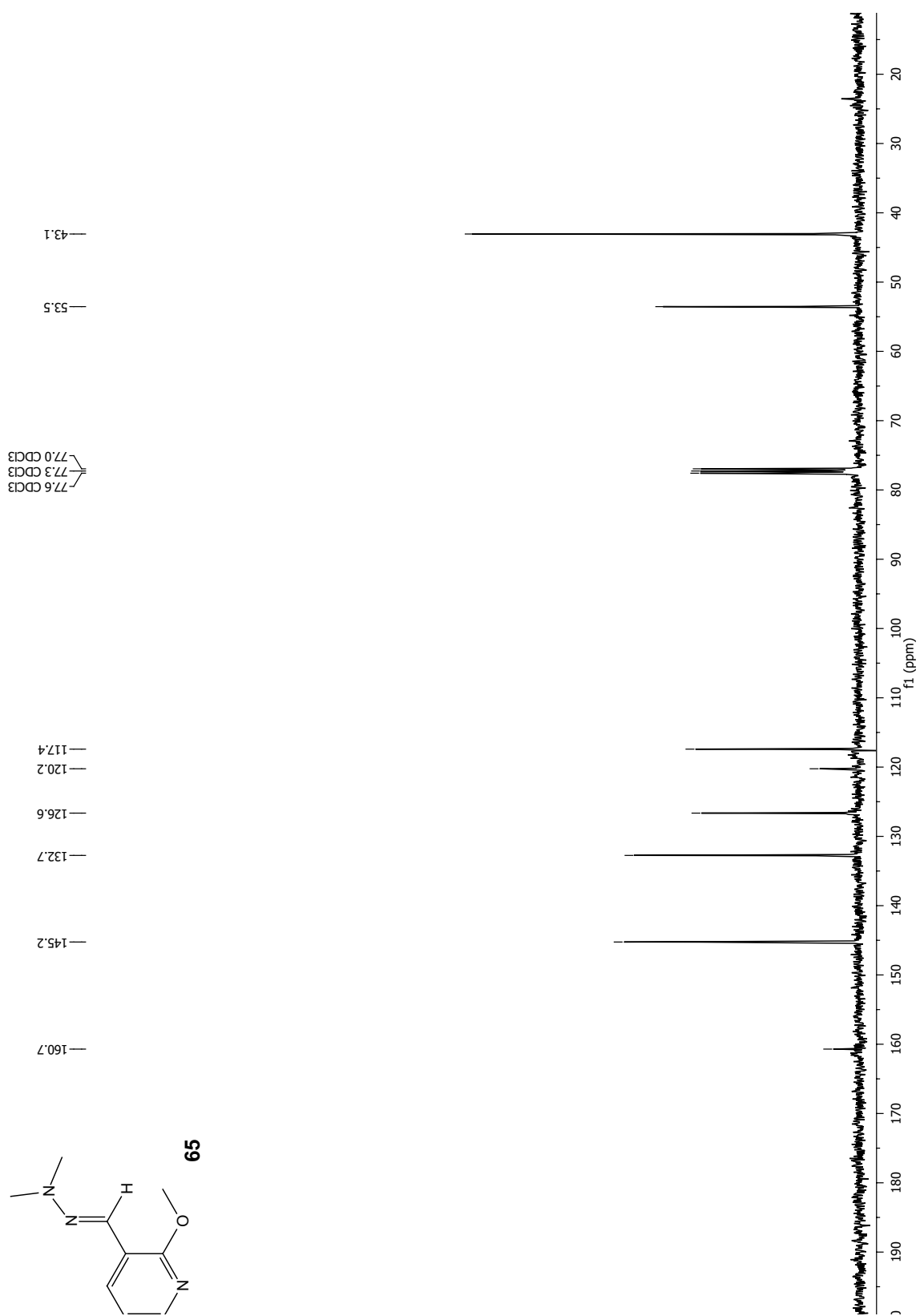


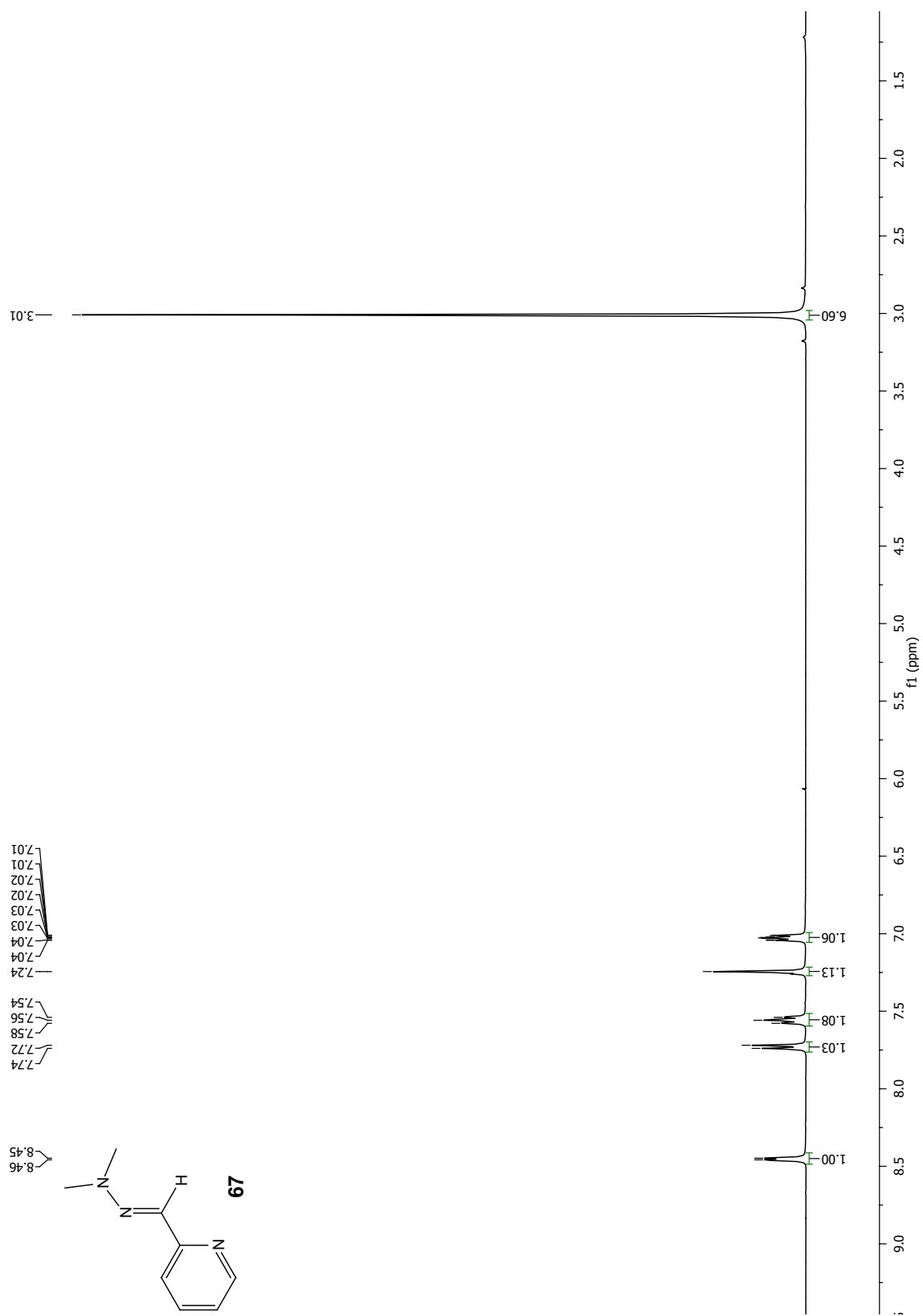
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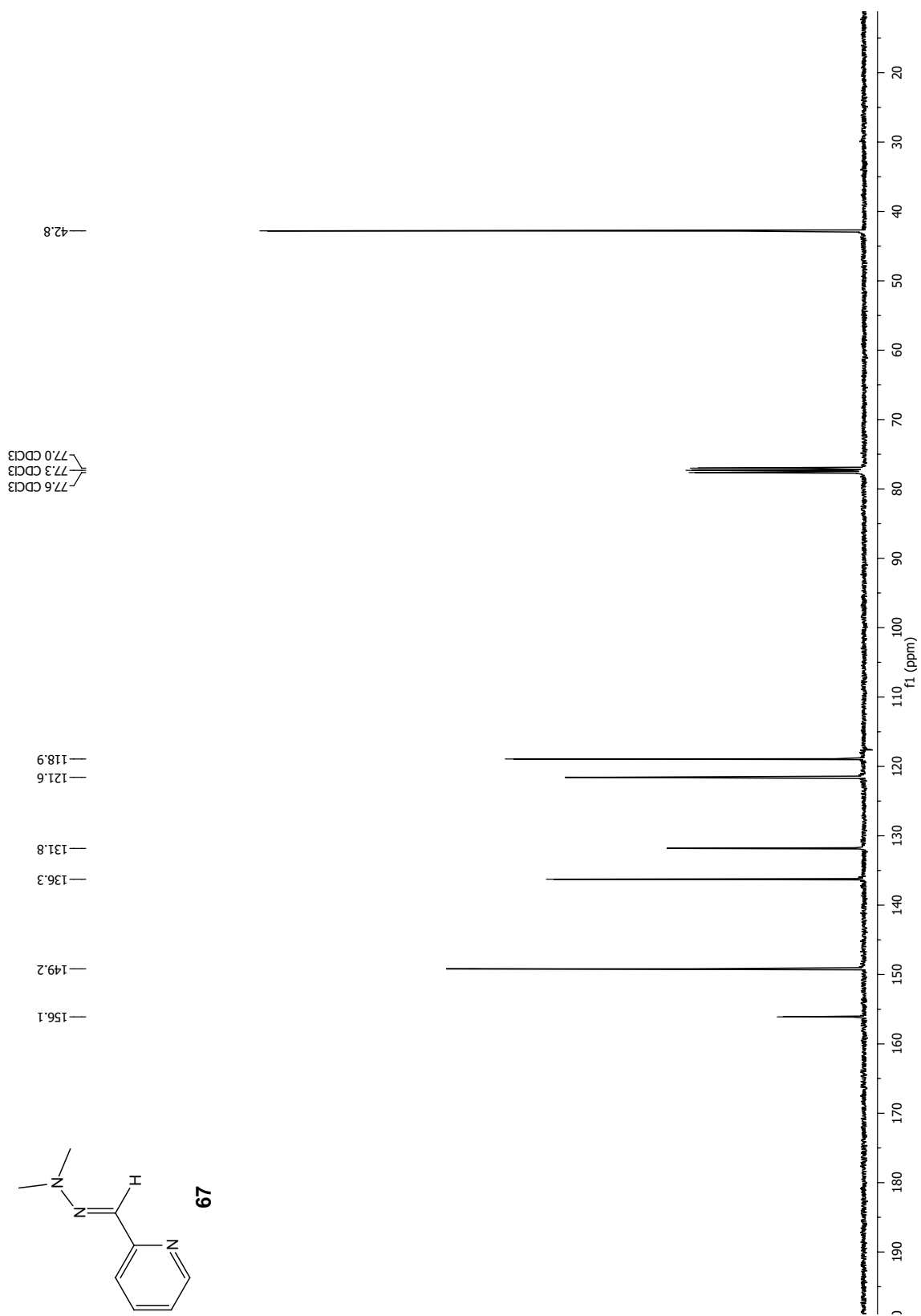


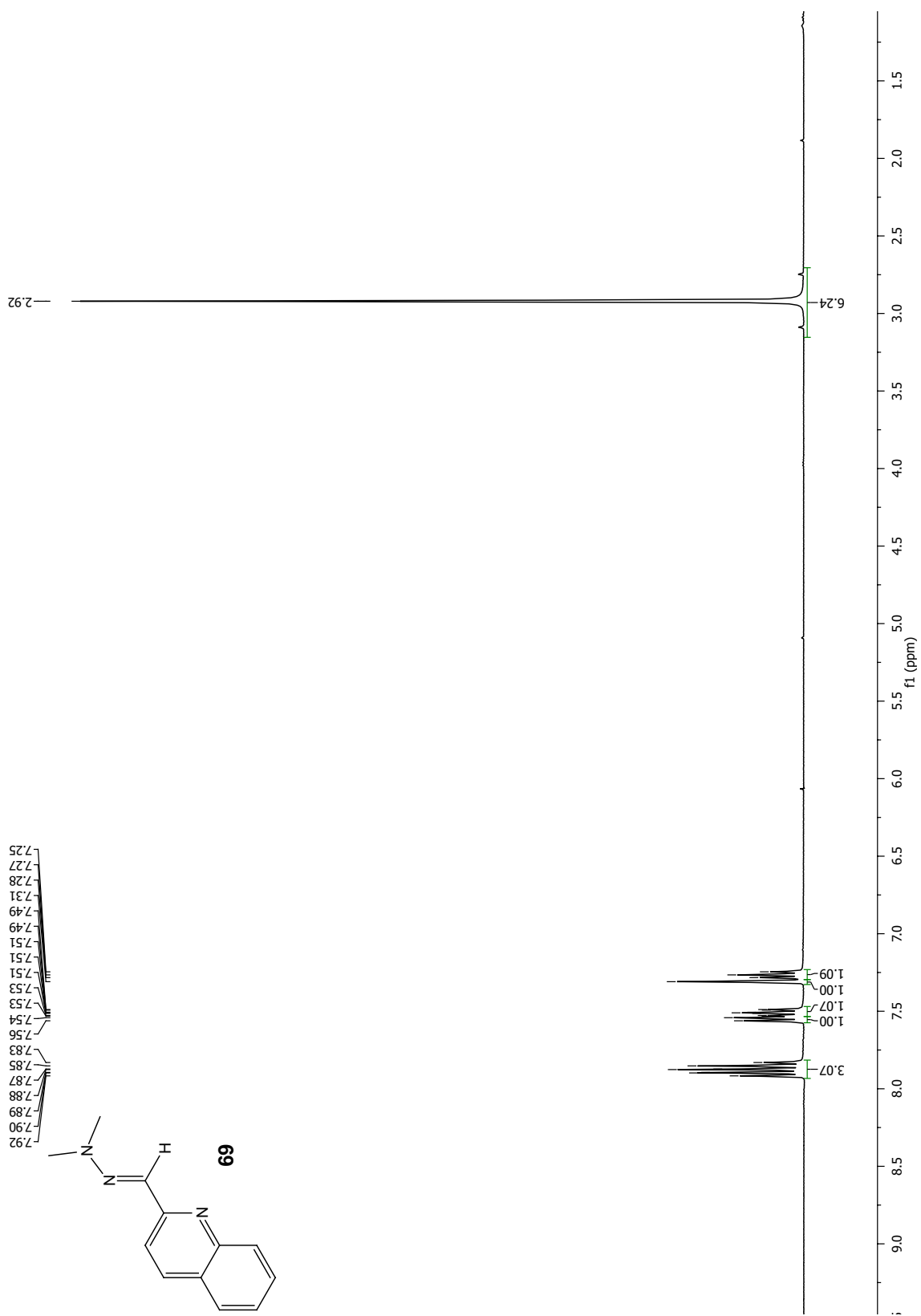




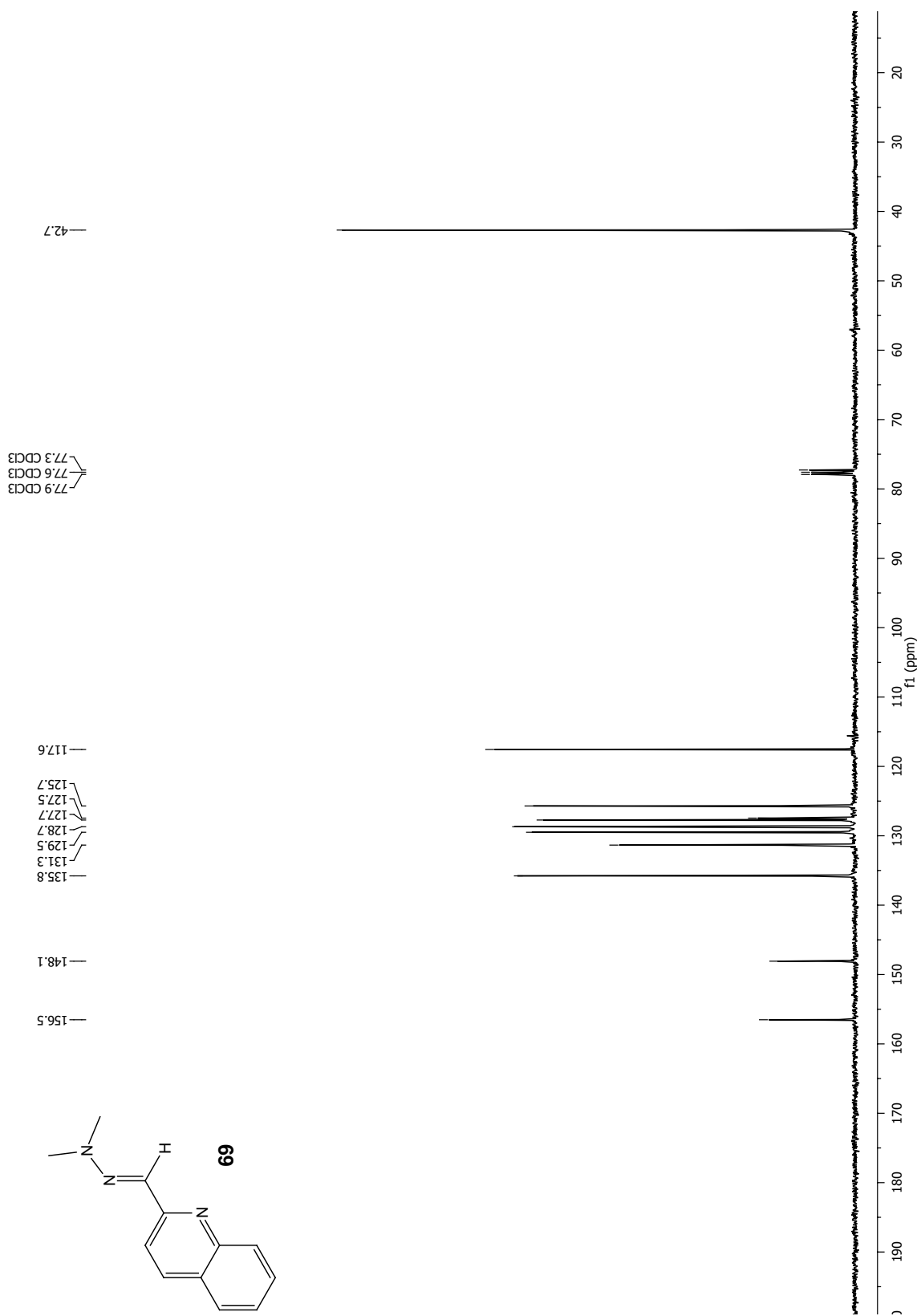


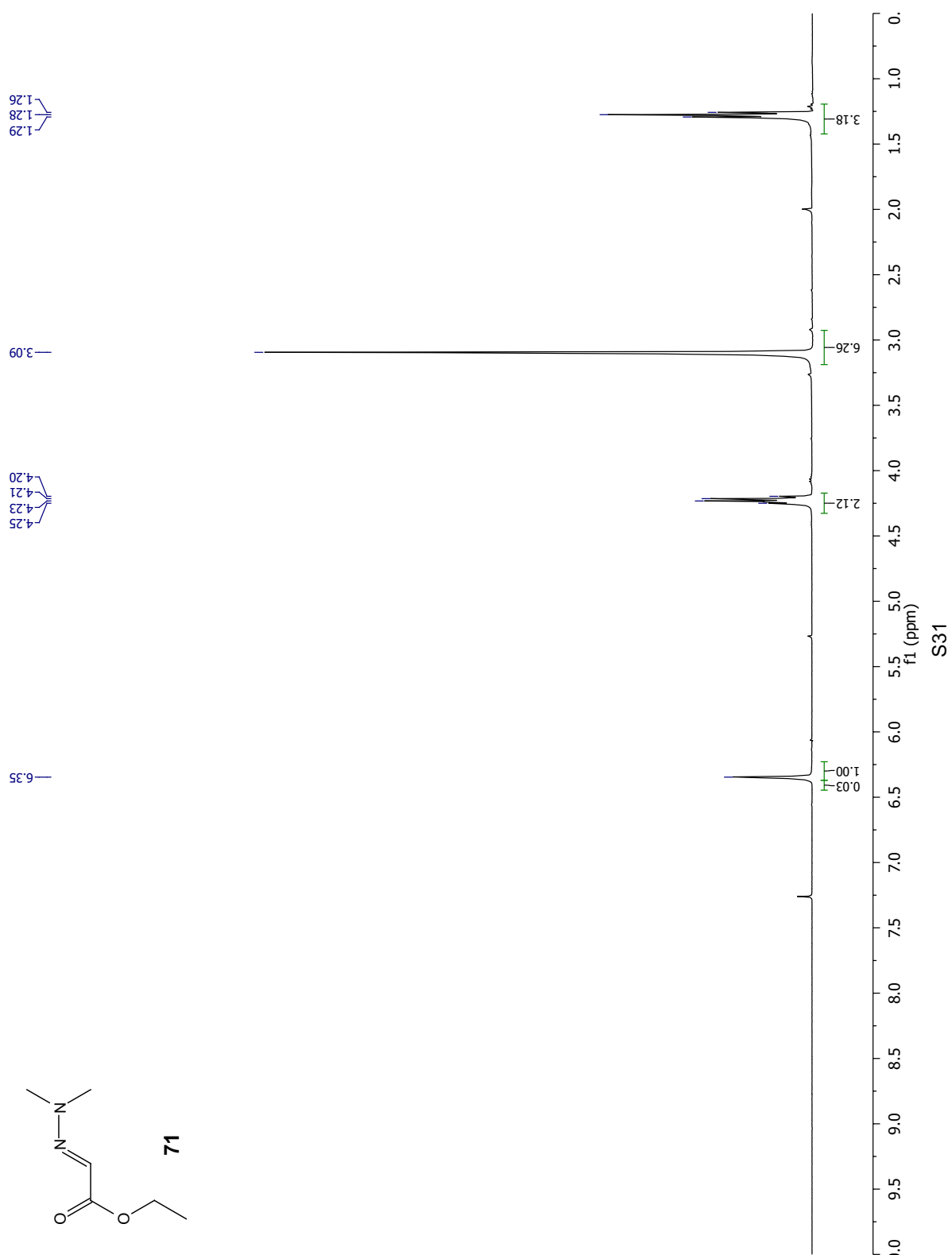
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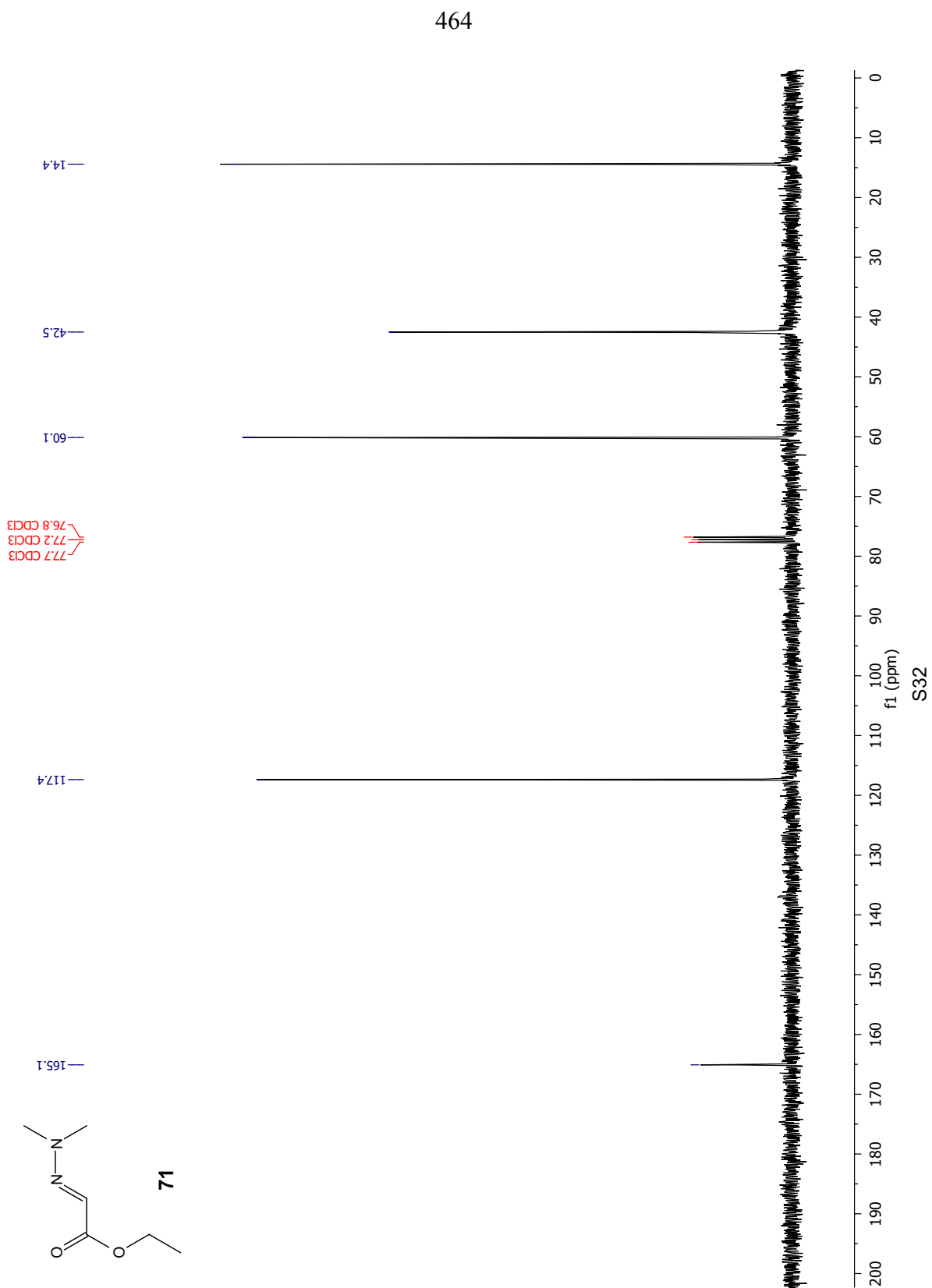


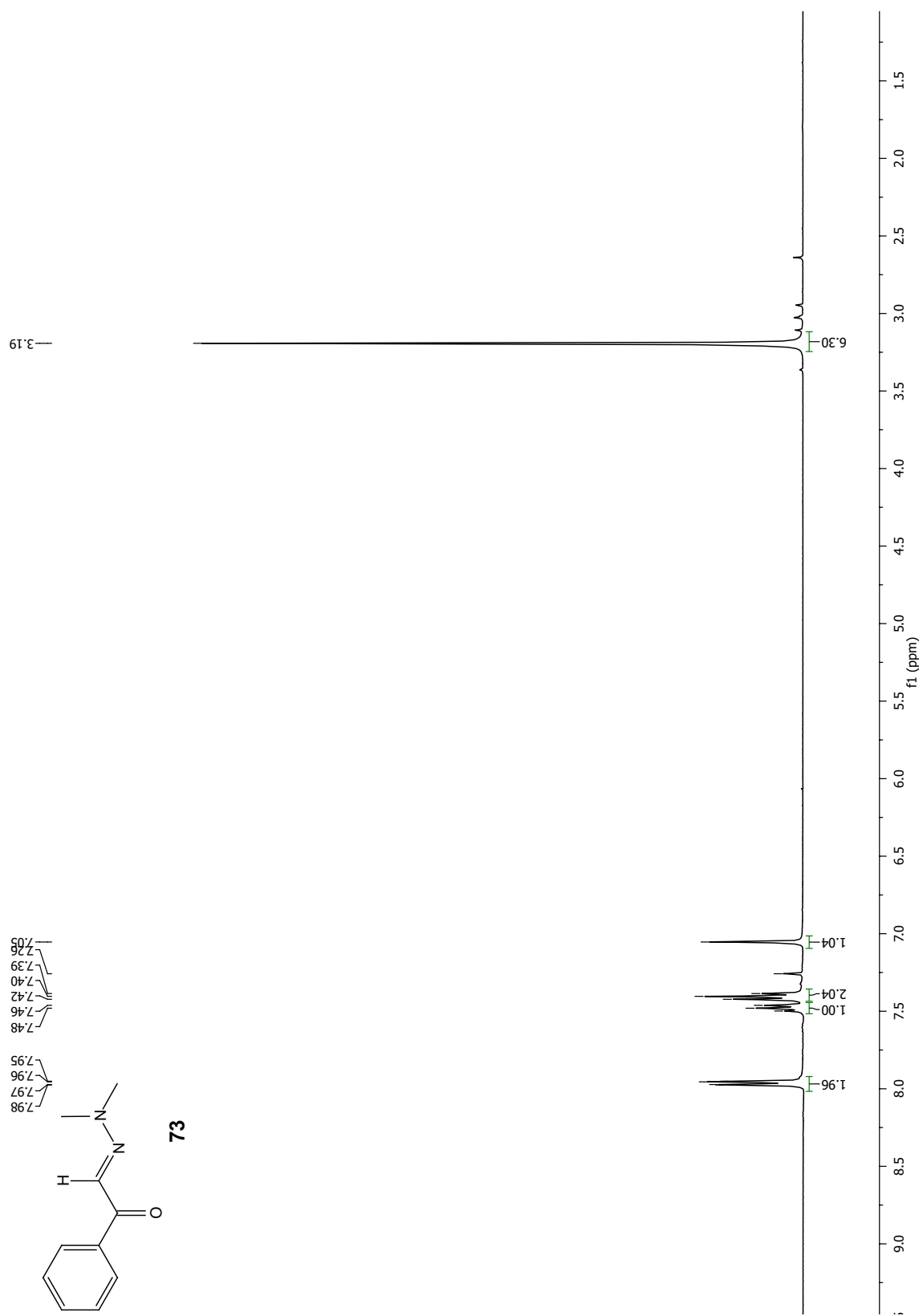


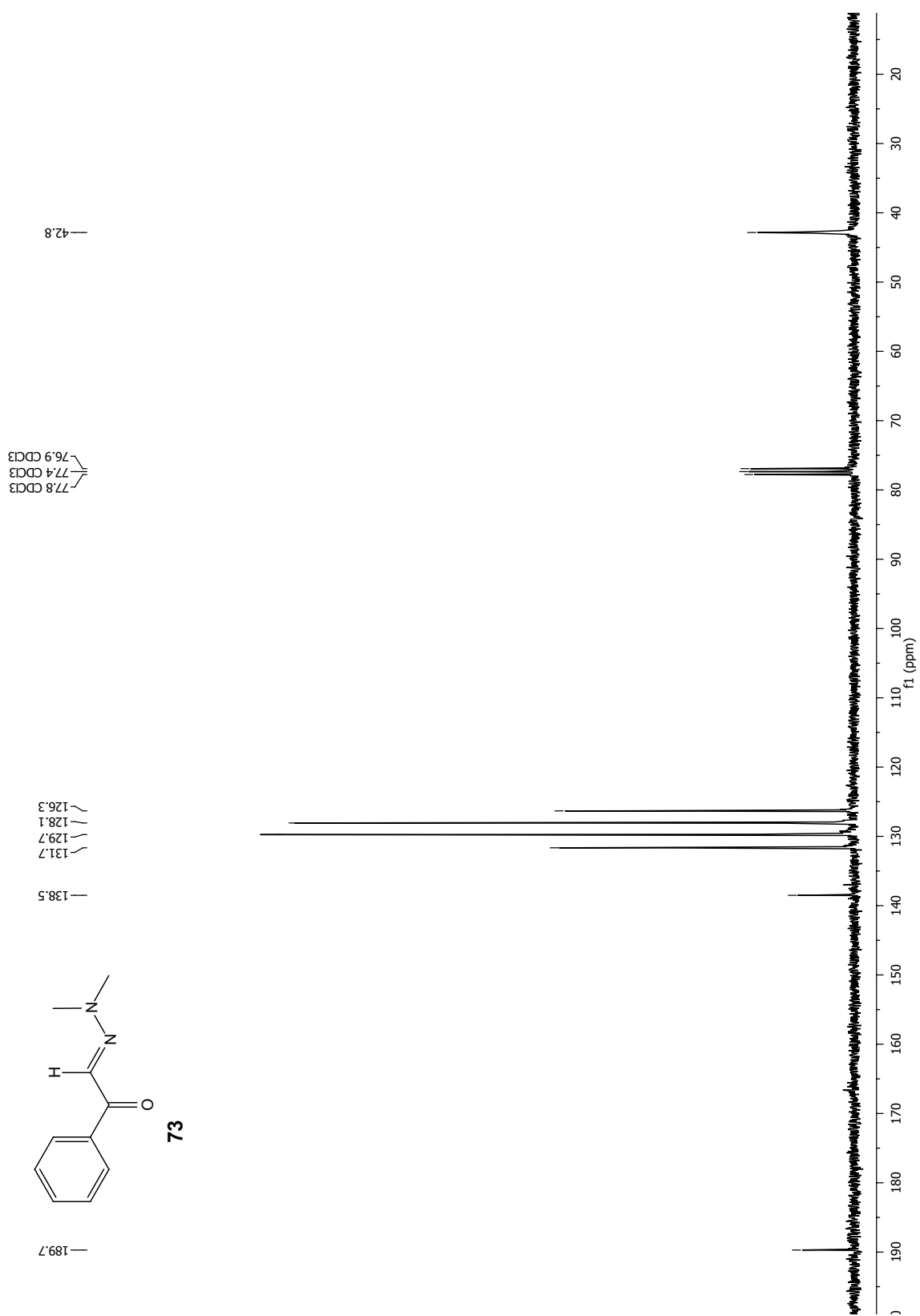
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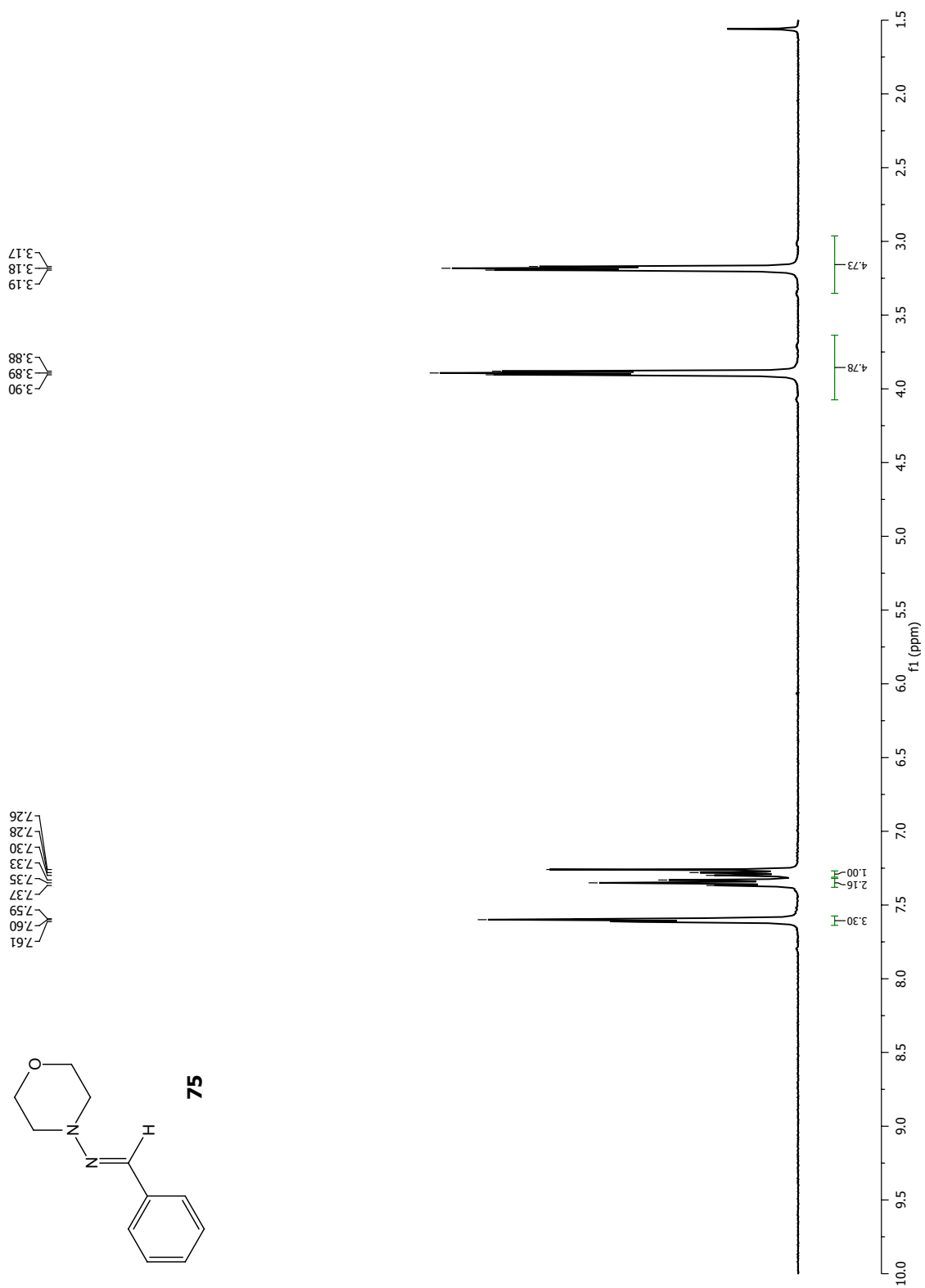


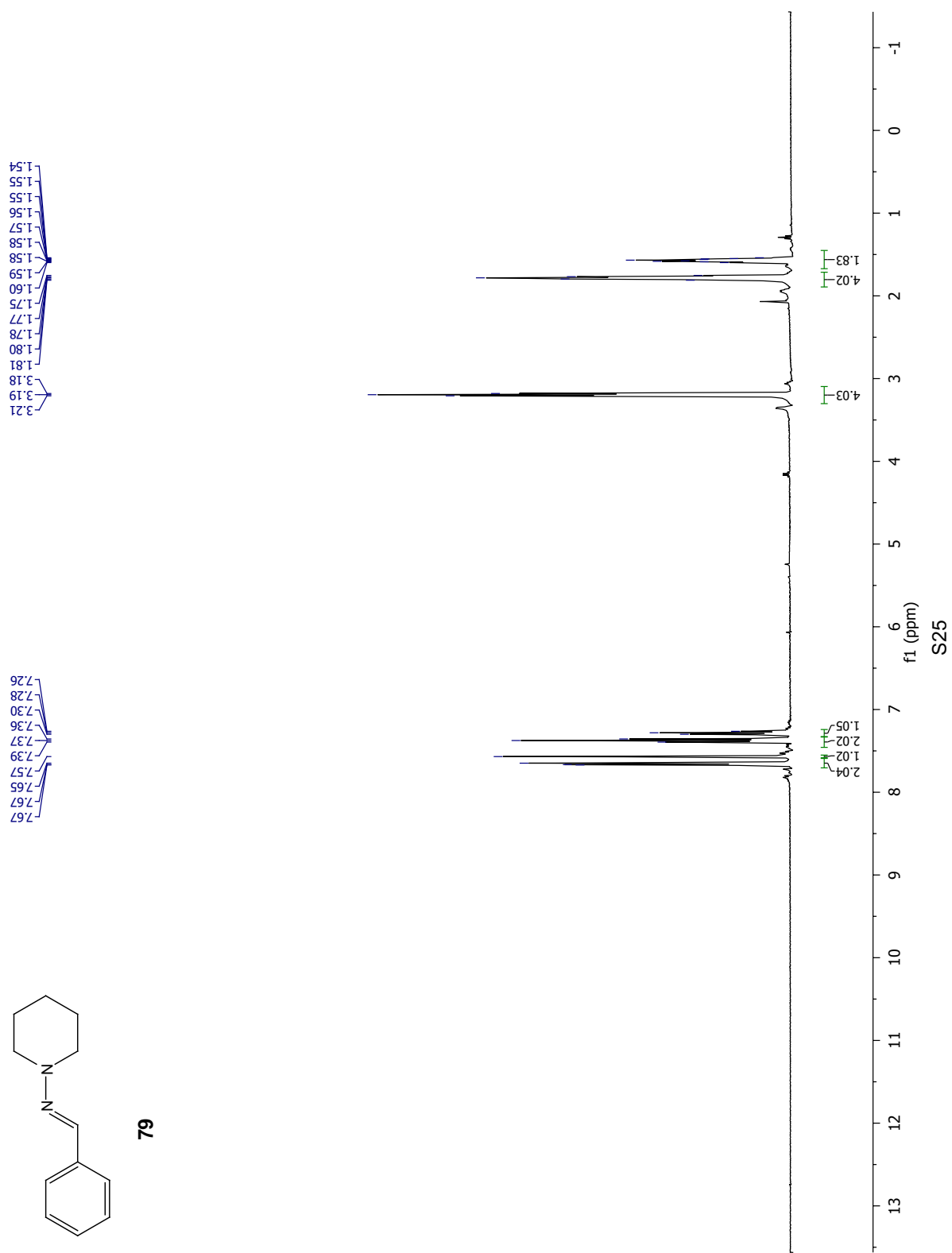




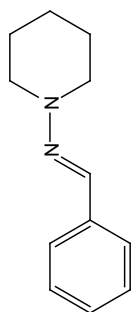
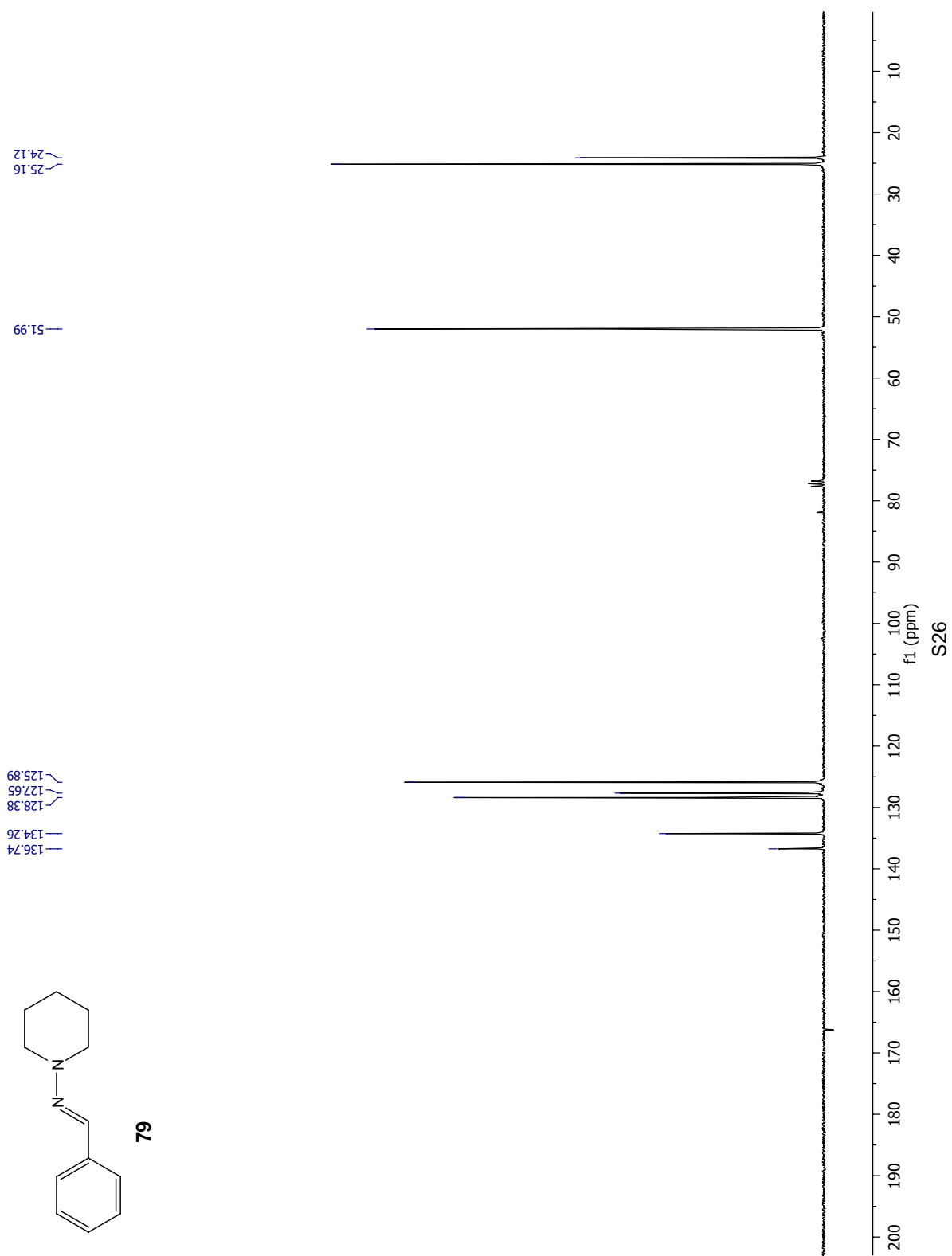




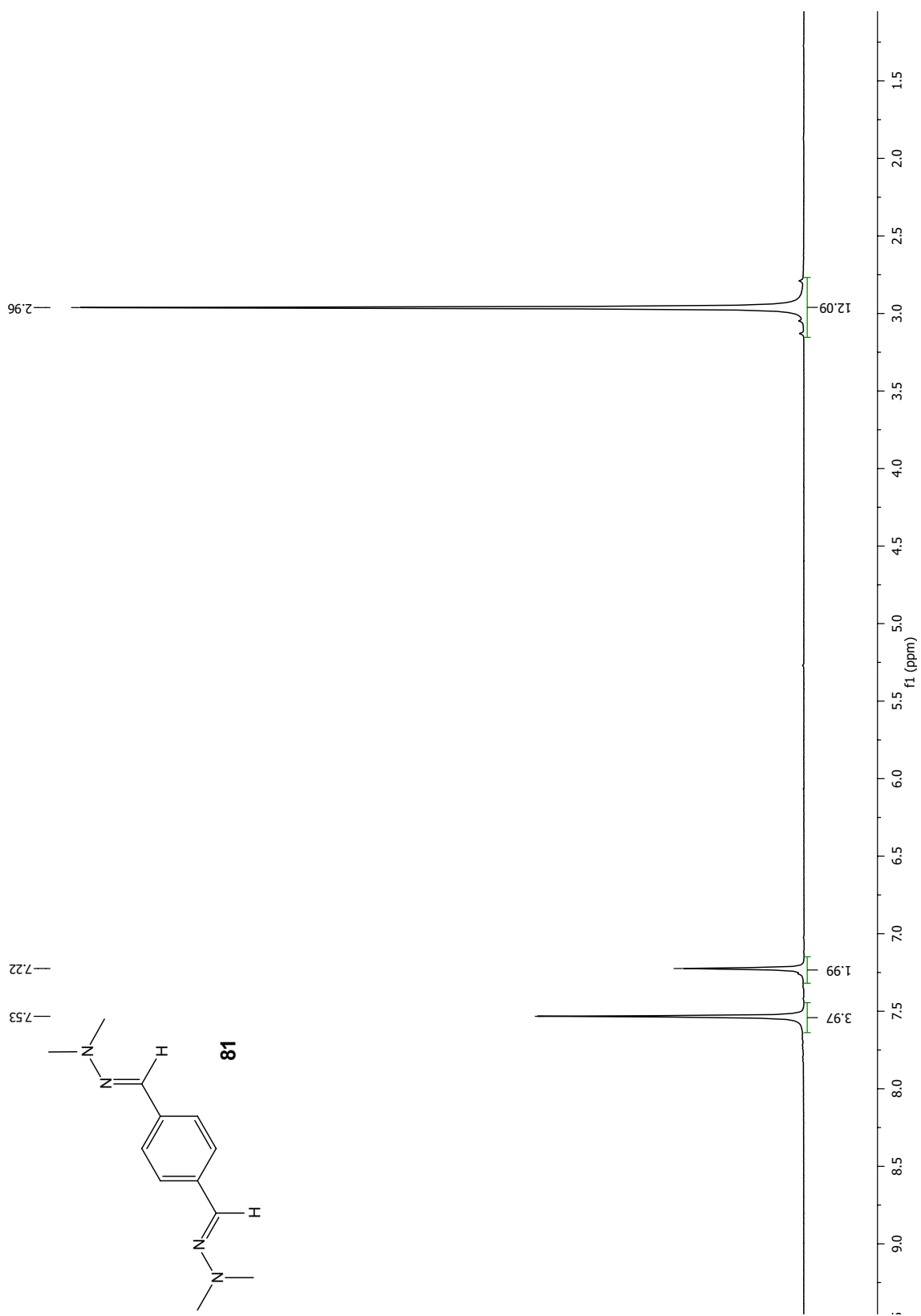


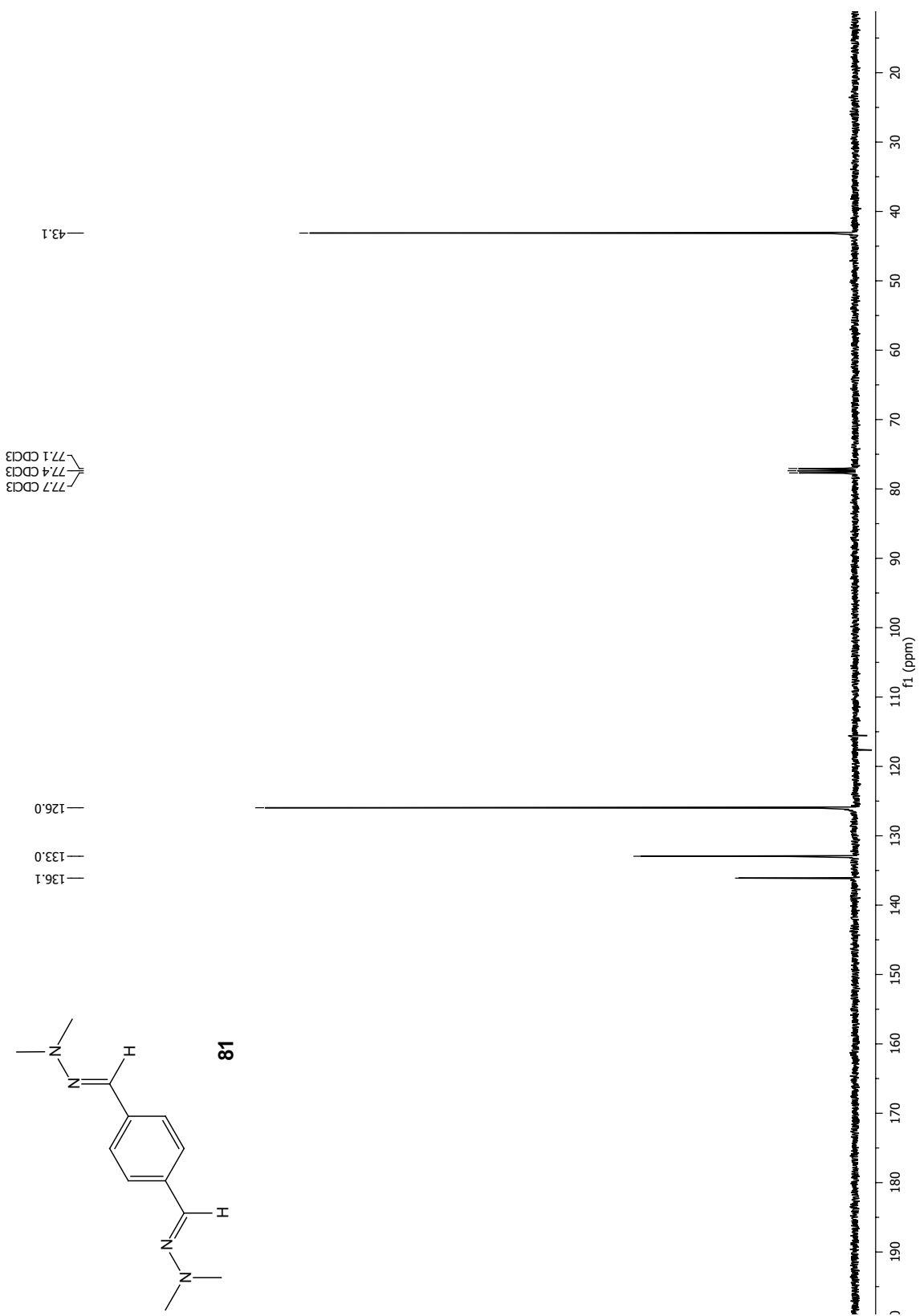
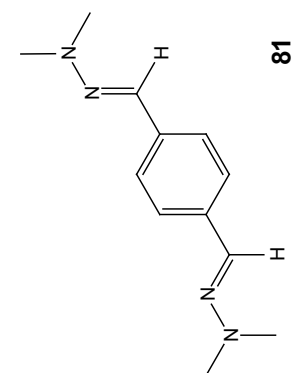


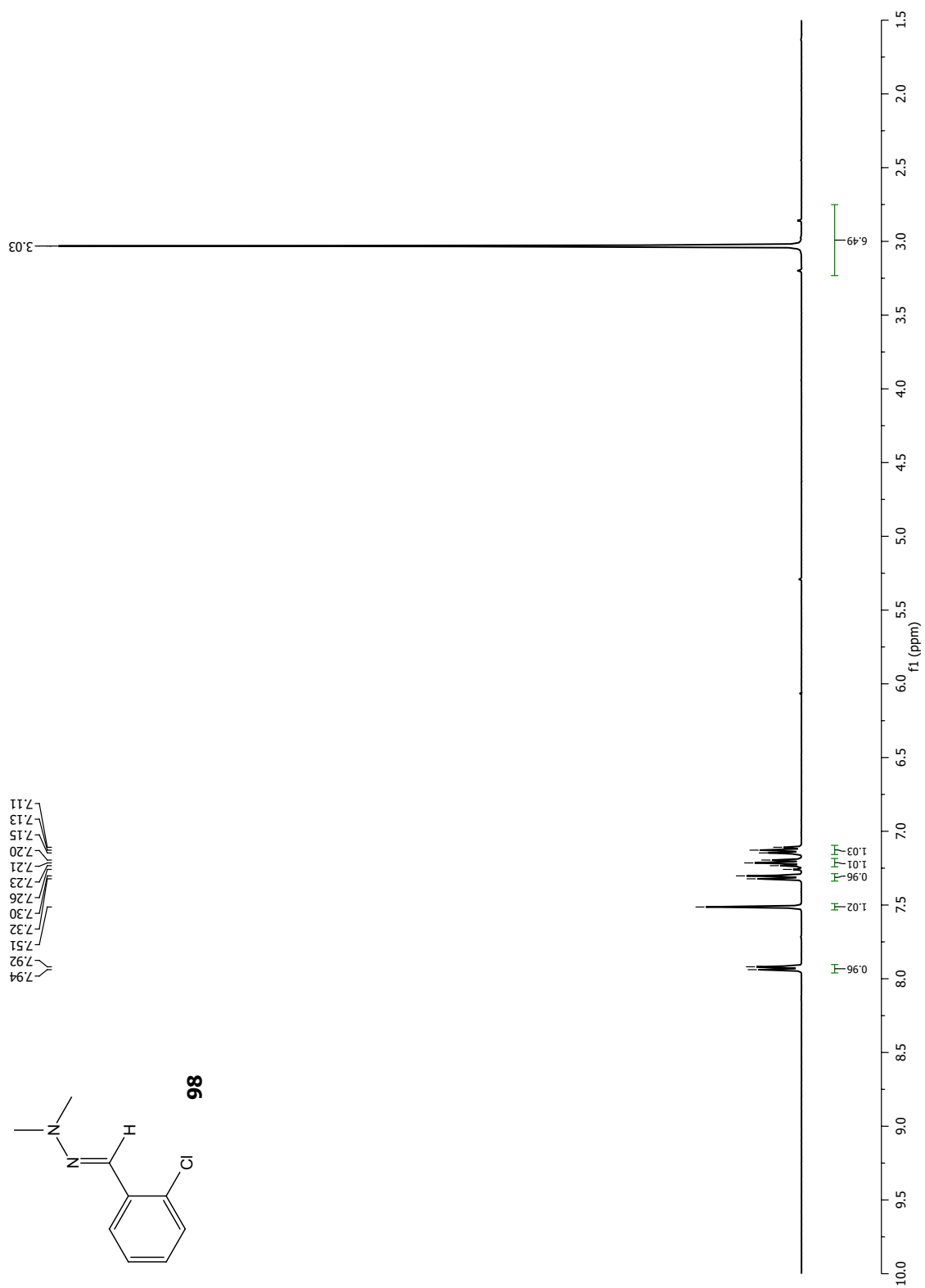
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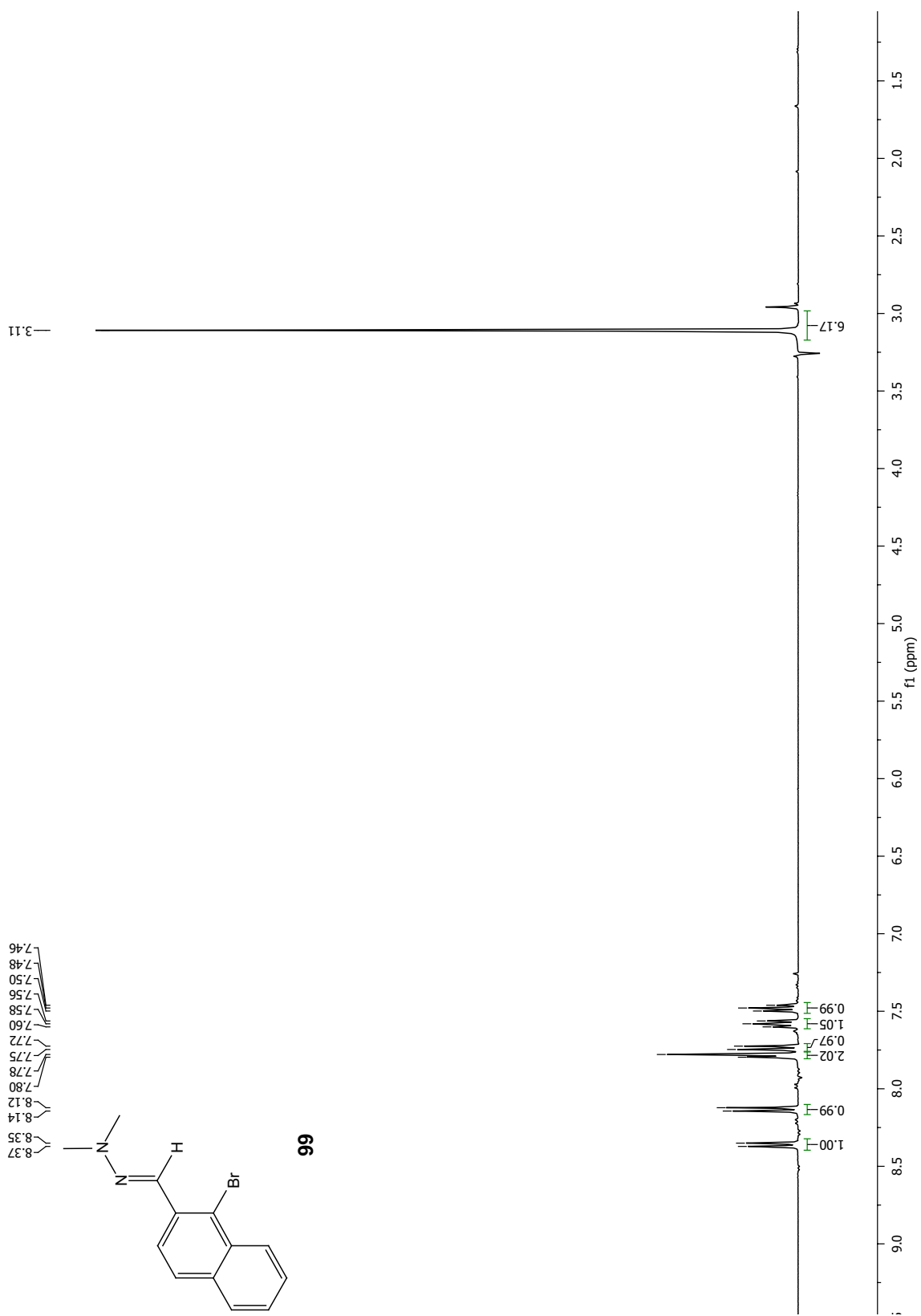


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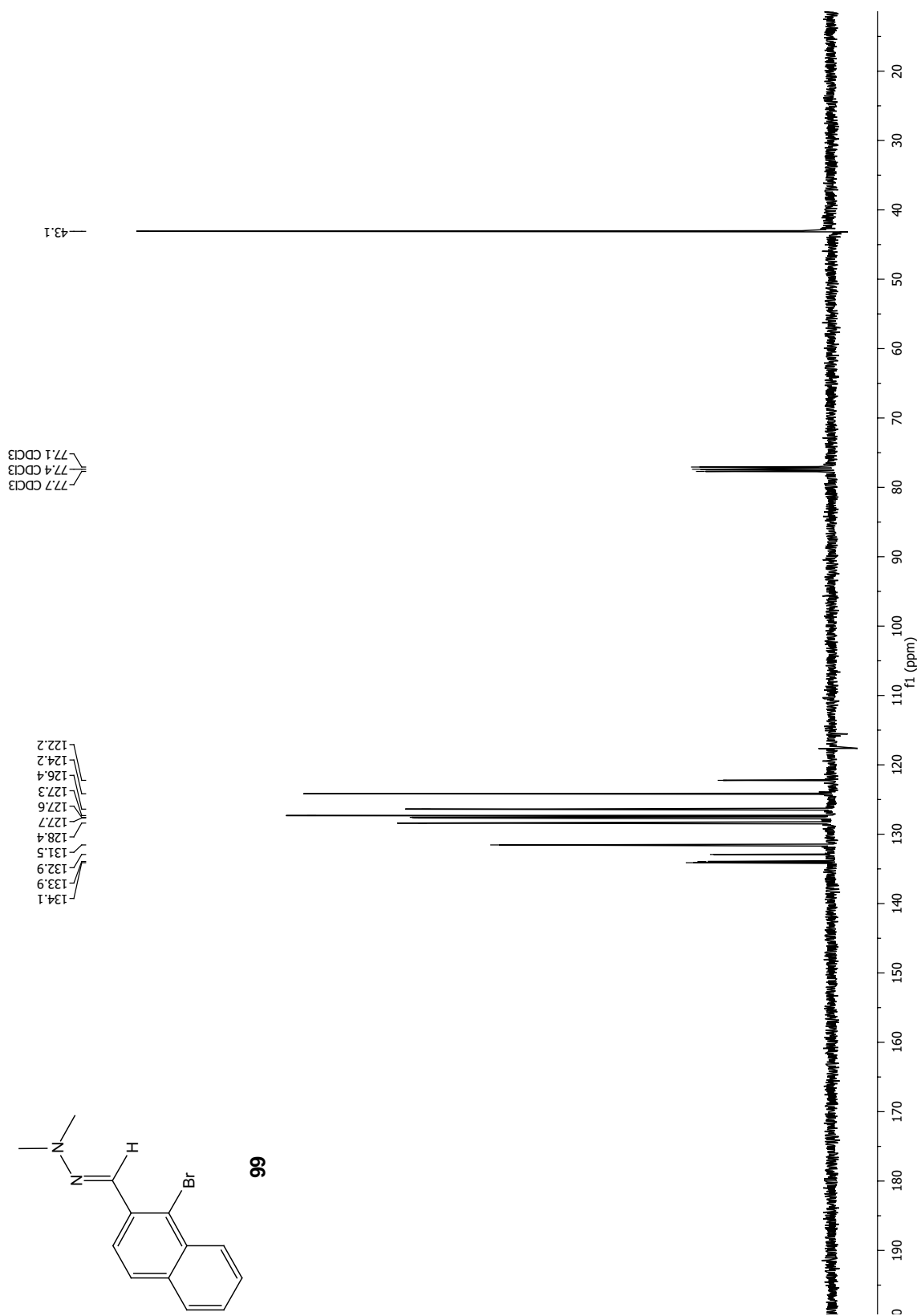


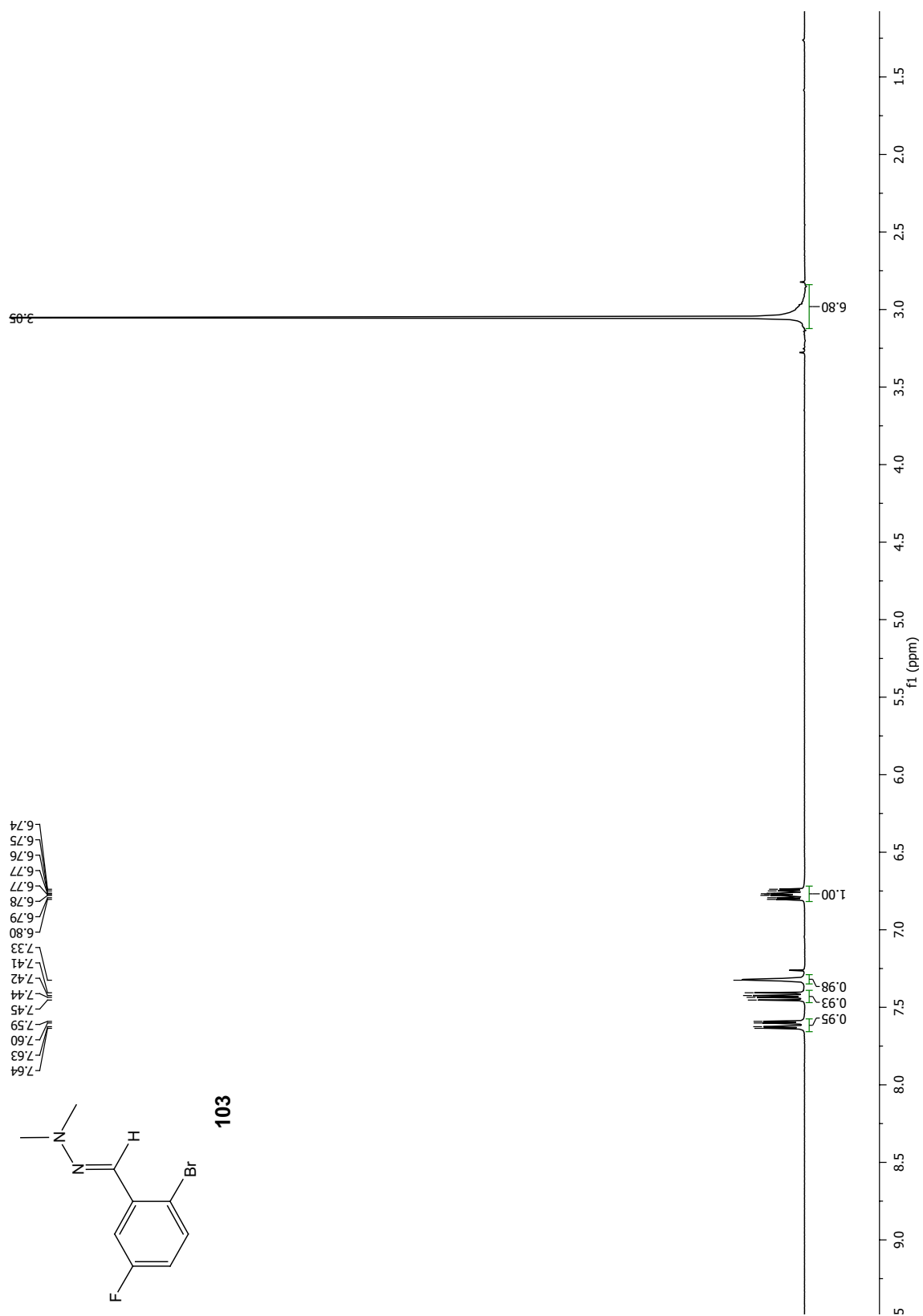


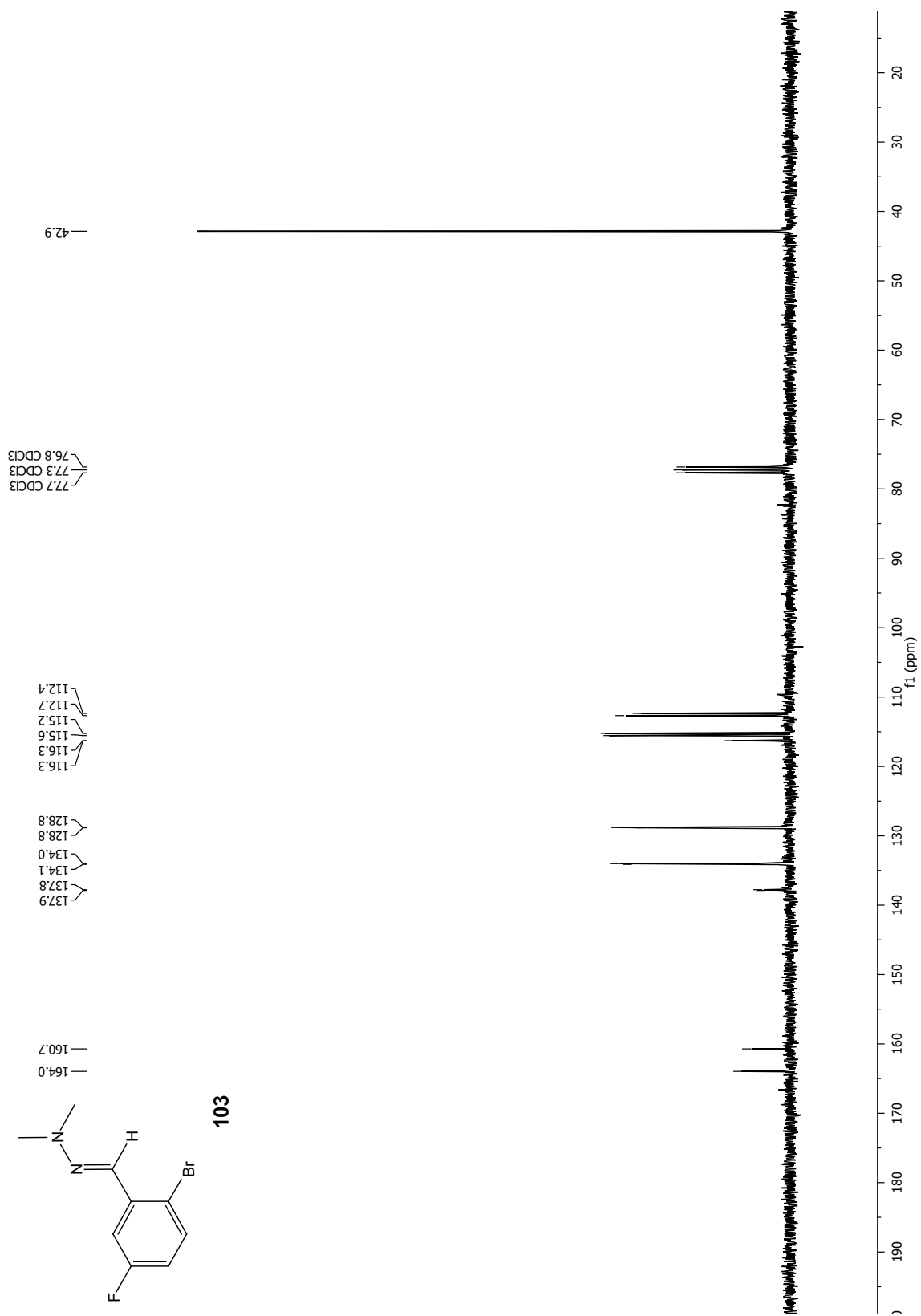


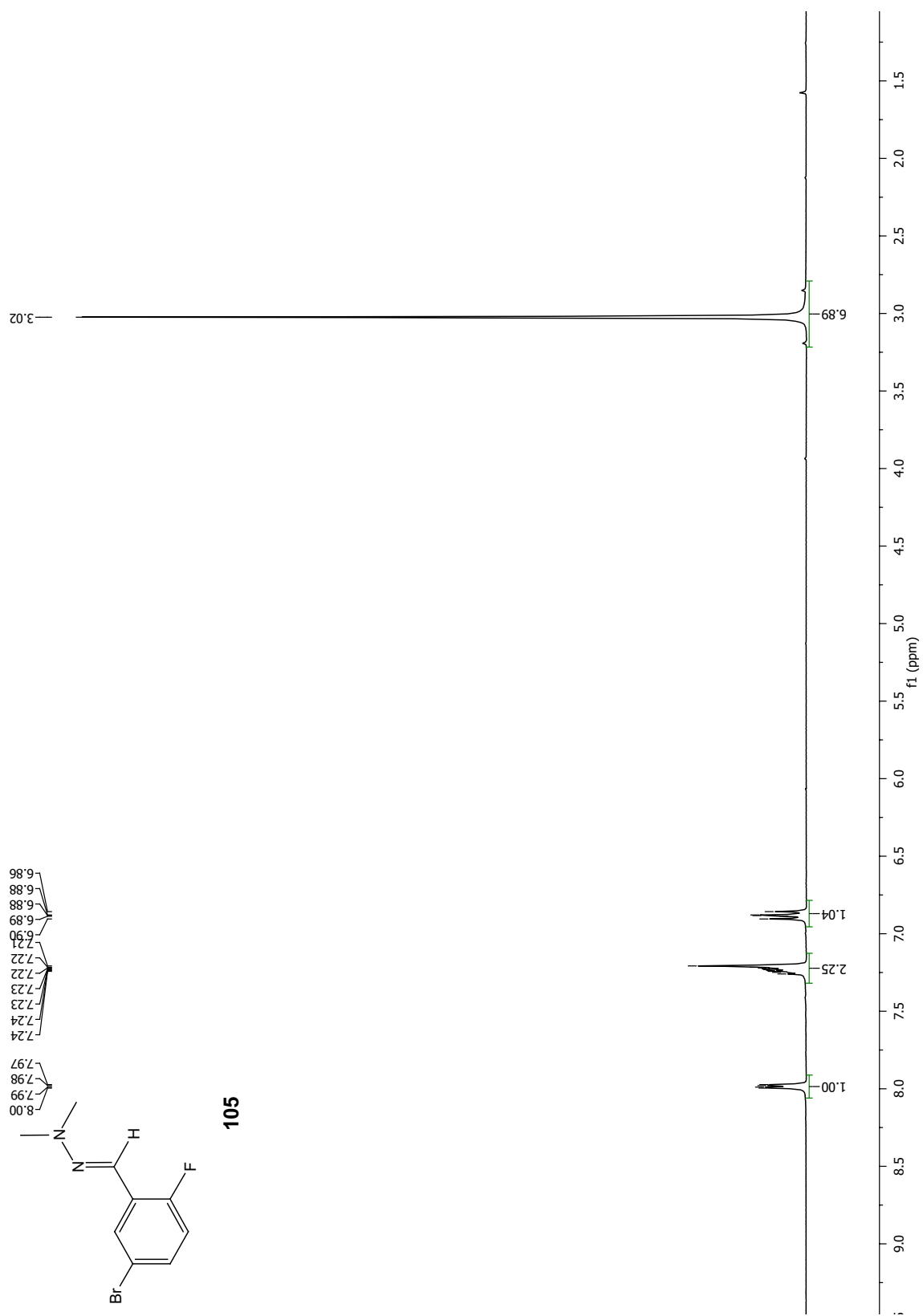


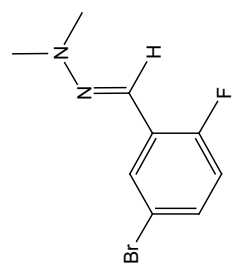
474











105

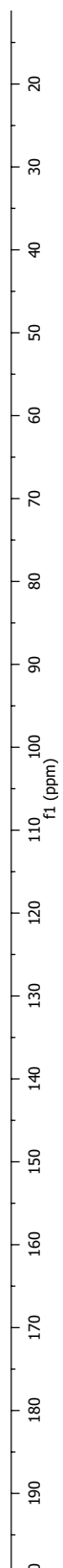
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157.8

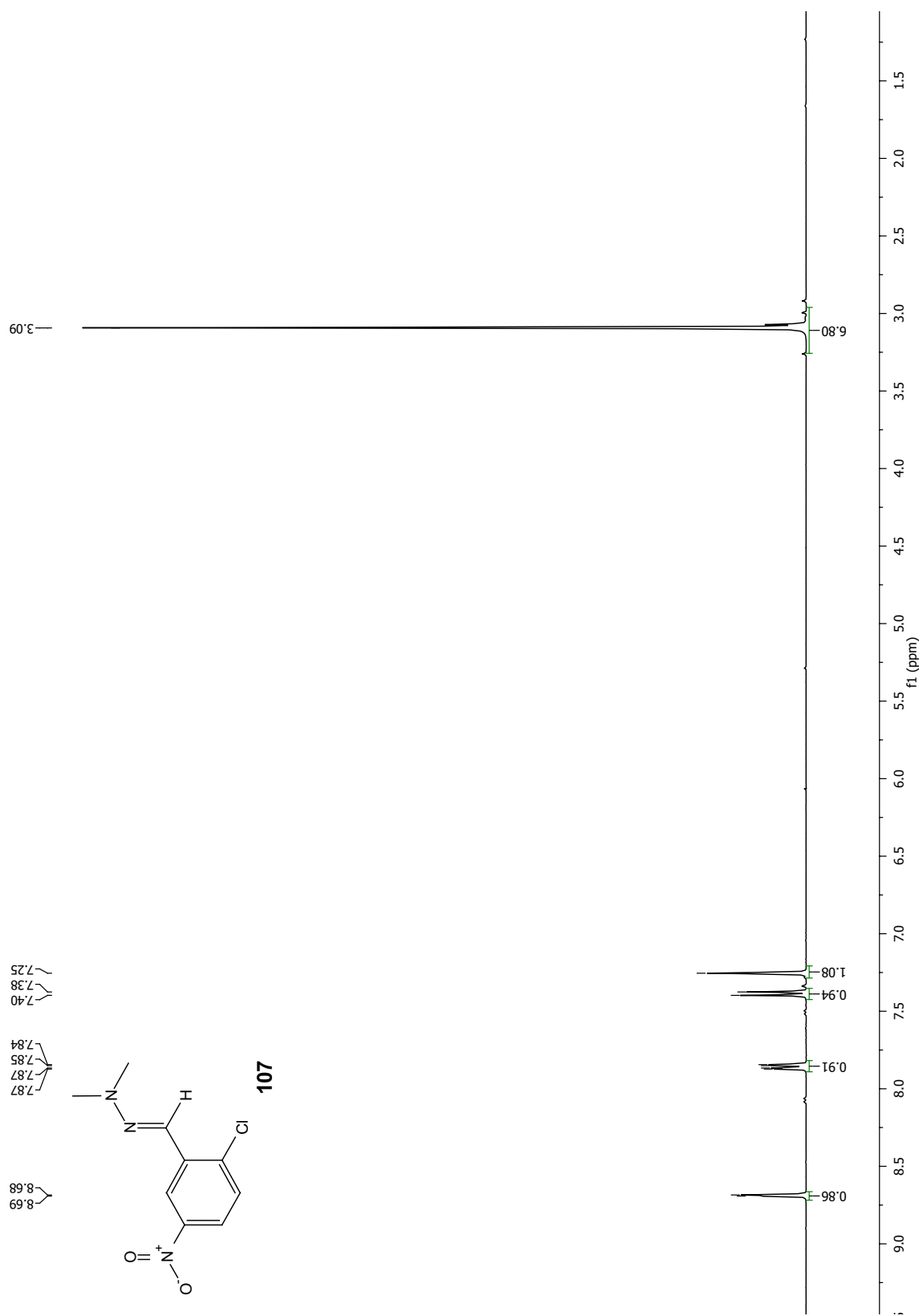
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130.5
128.0
128.0
127.1
127.0
122.3
122.2
117.4
117.3
117.3
117.2

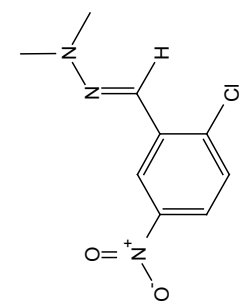
77.6 CDCl₃
77.3 CDCl₃
76.9 CDCl₃

42.9

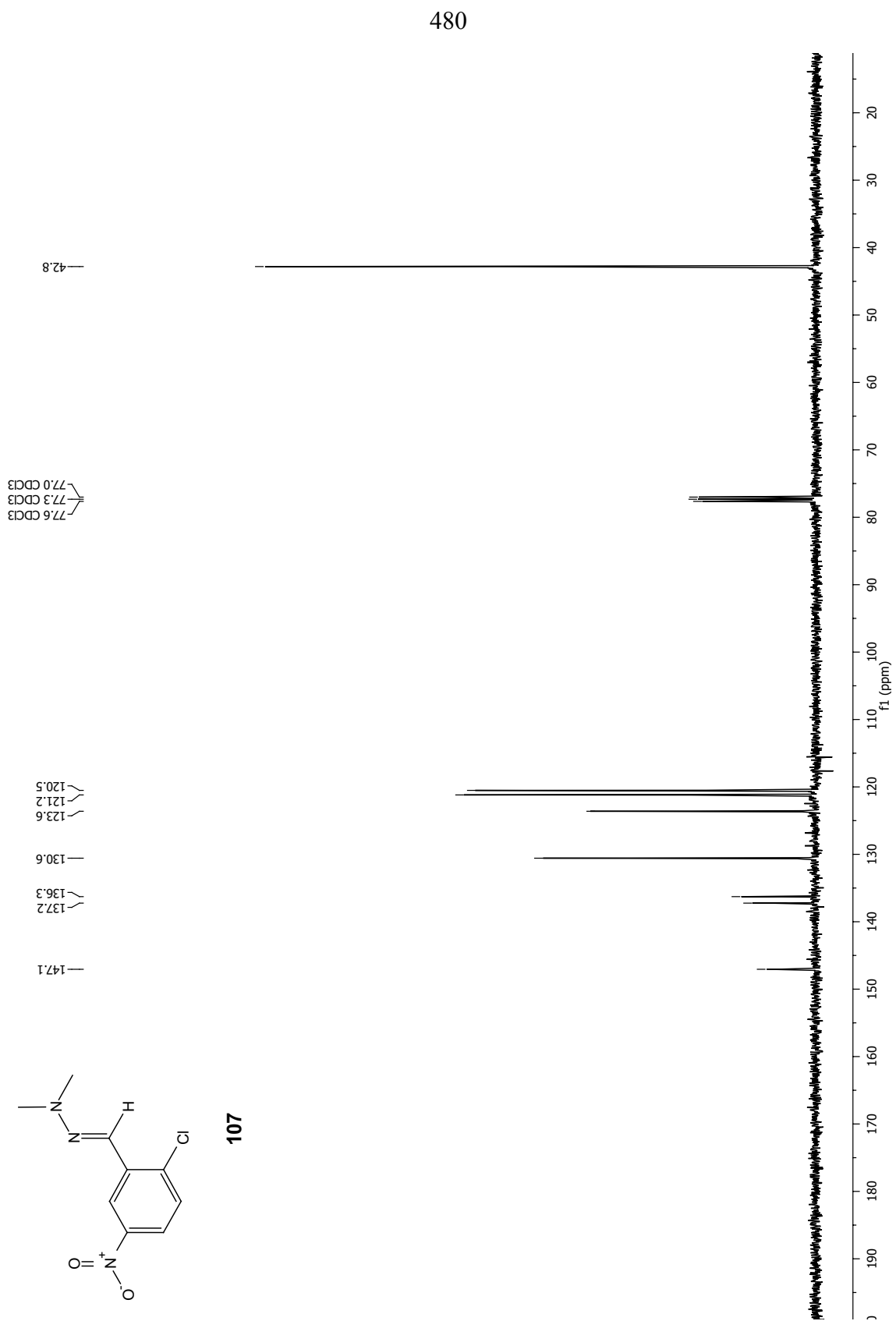
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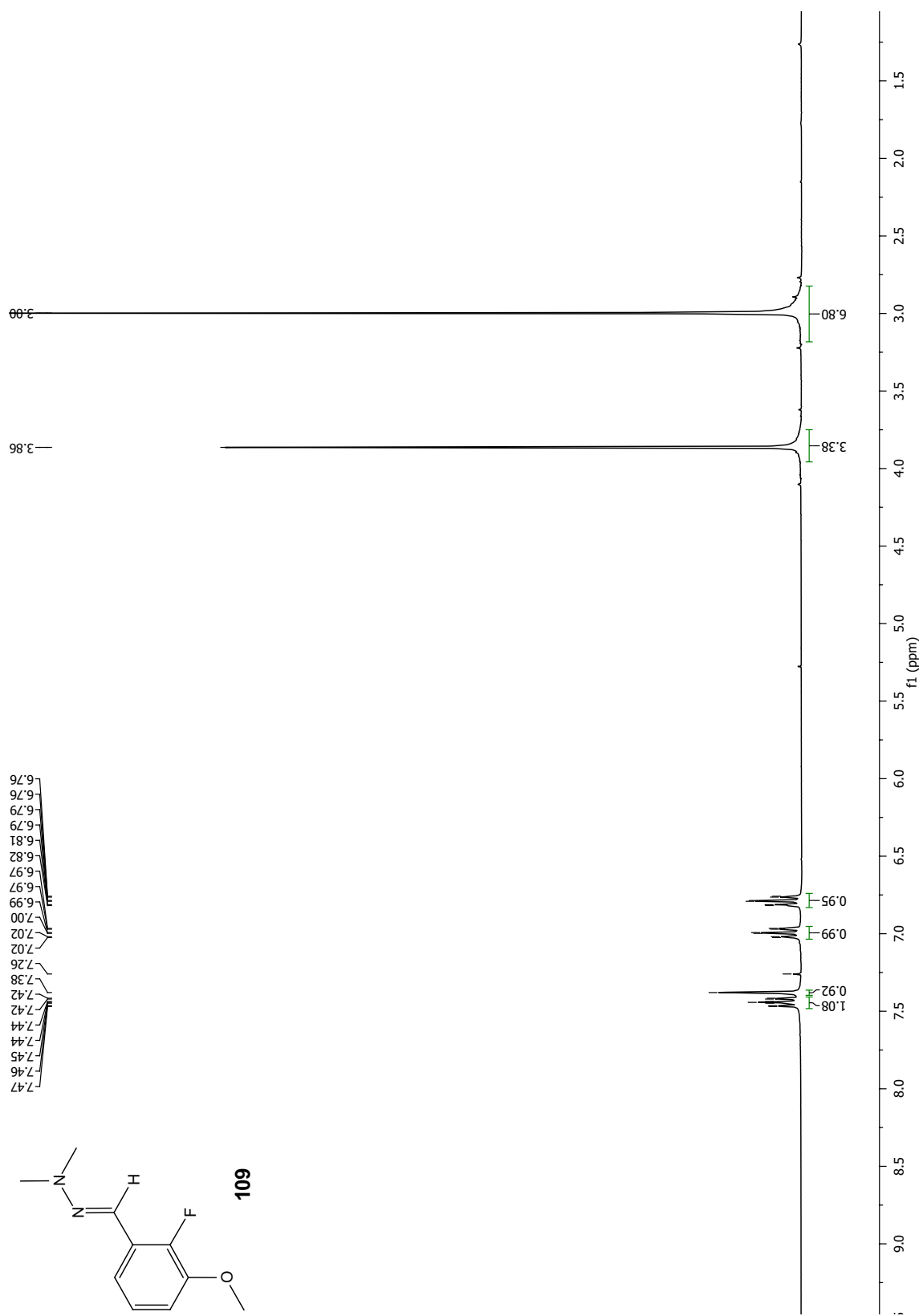


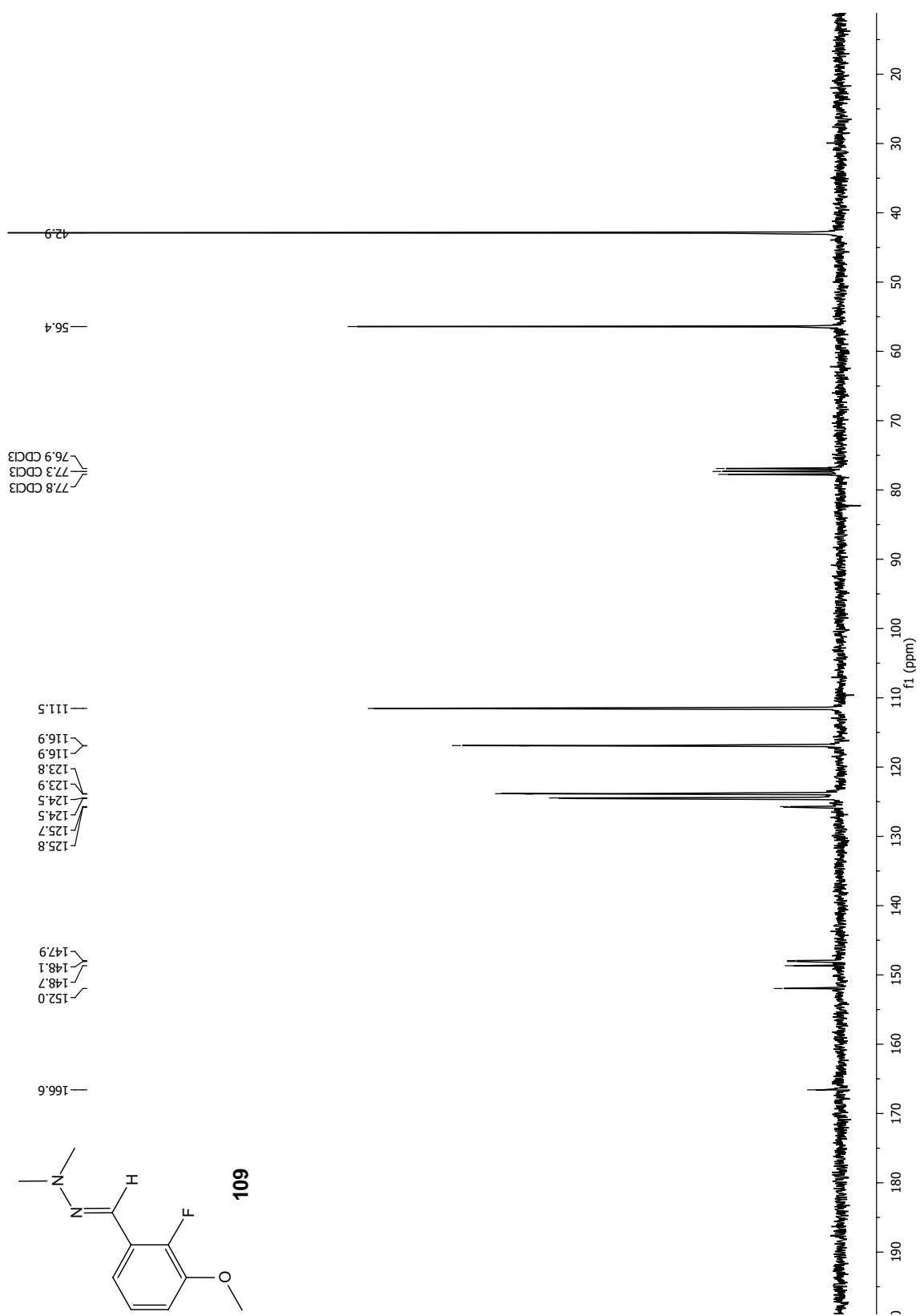


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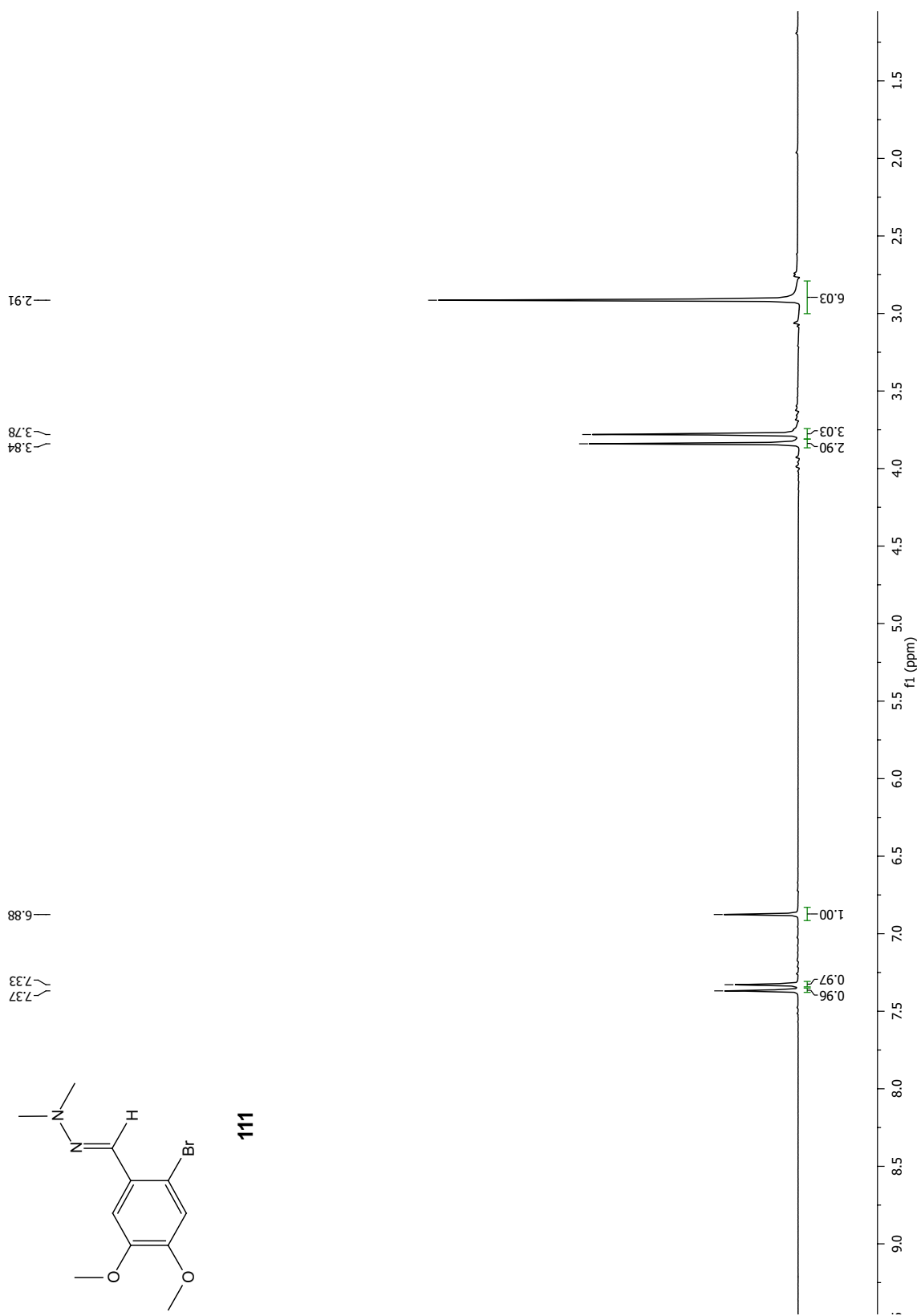


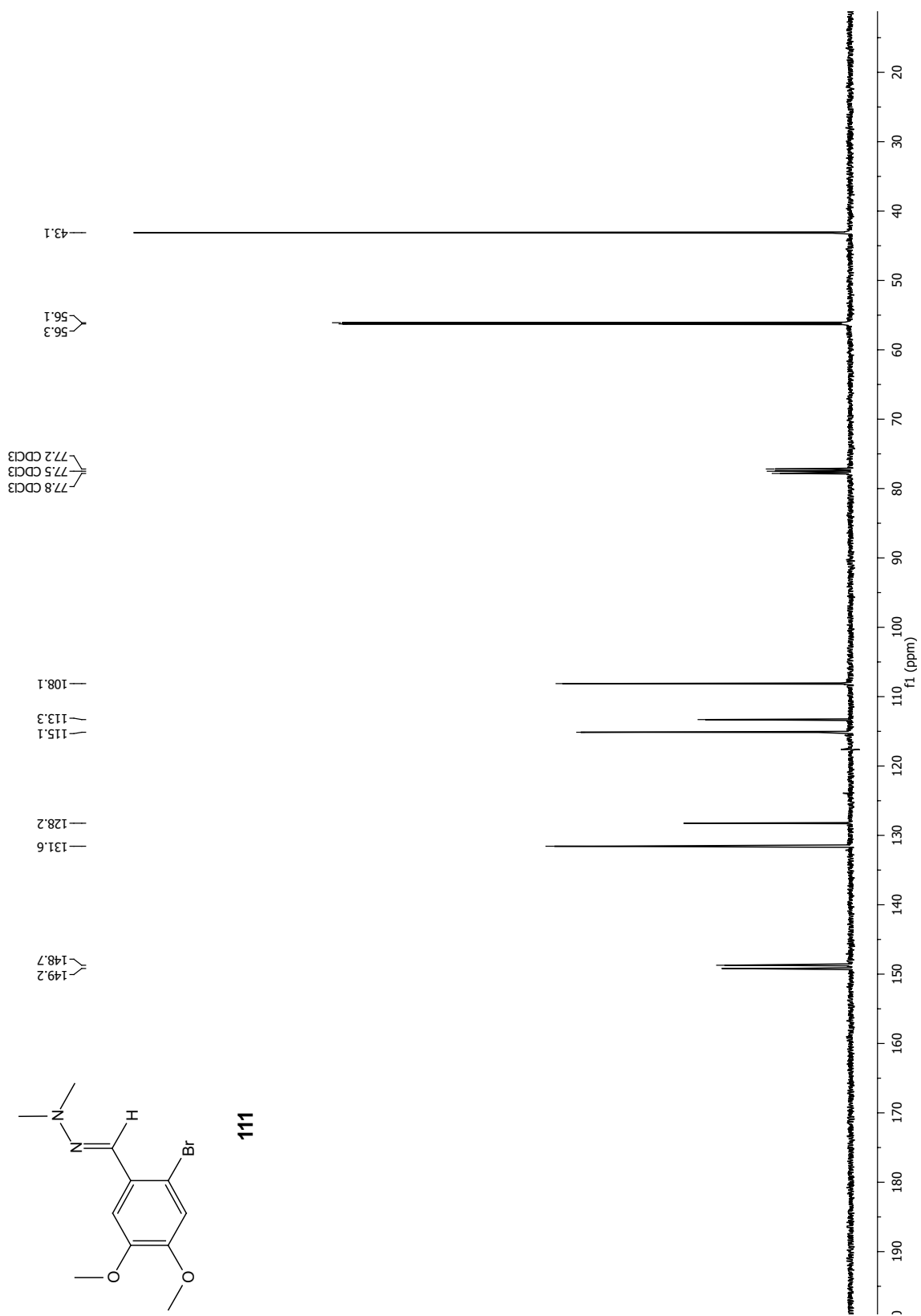
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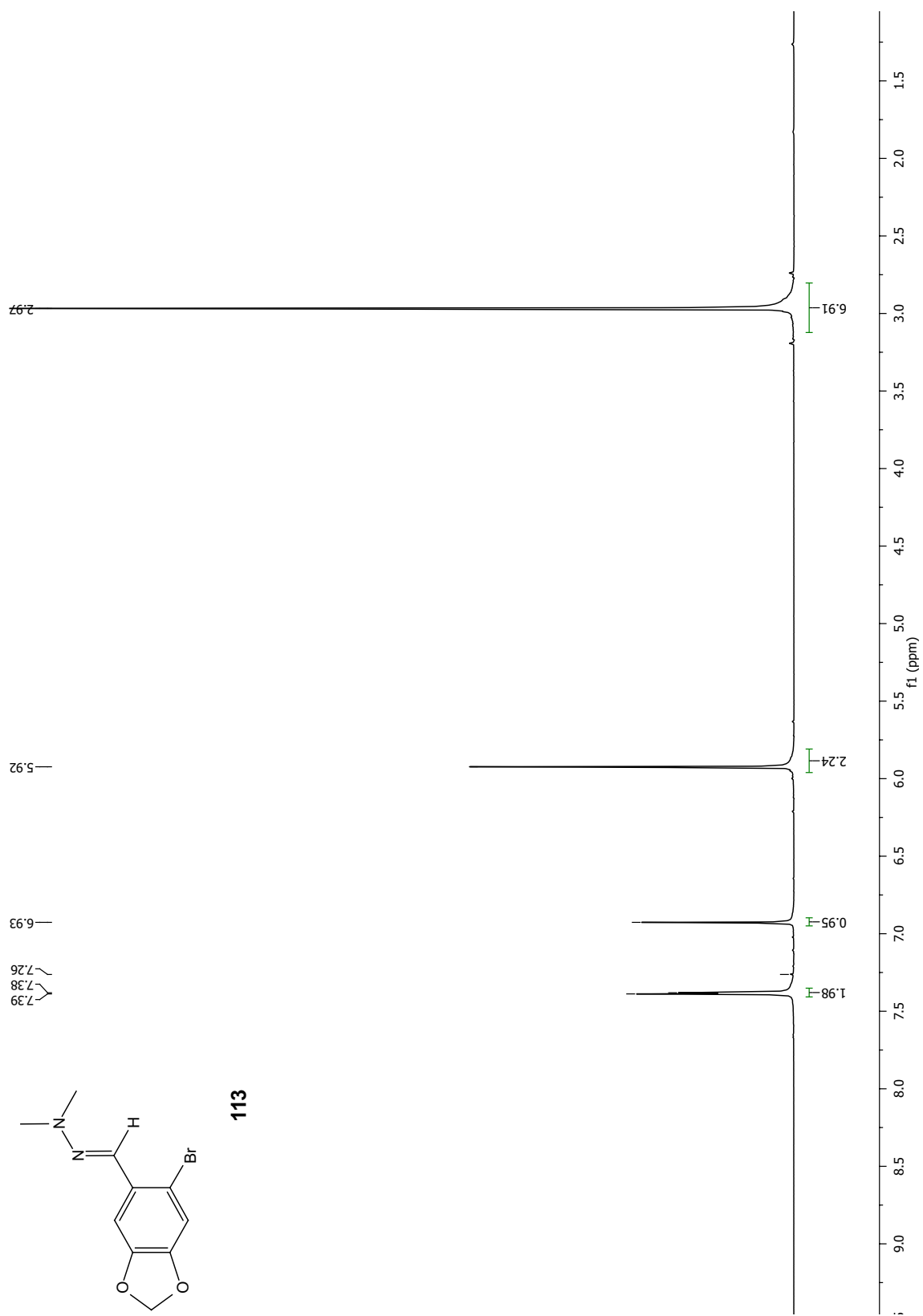


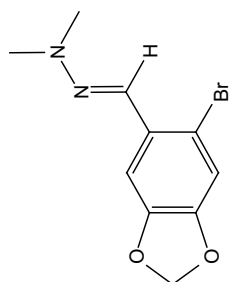


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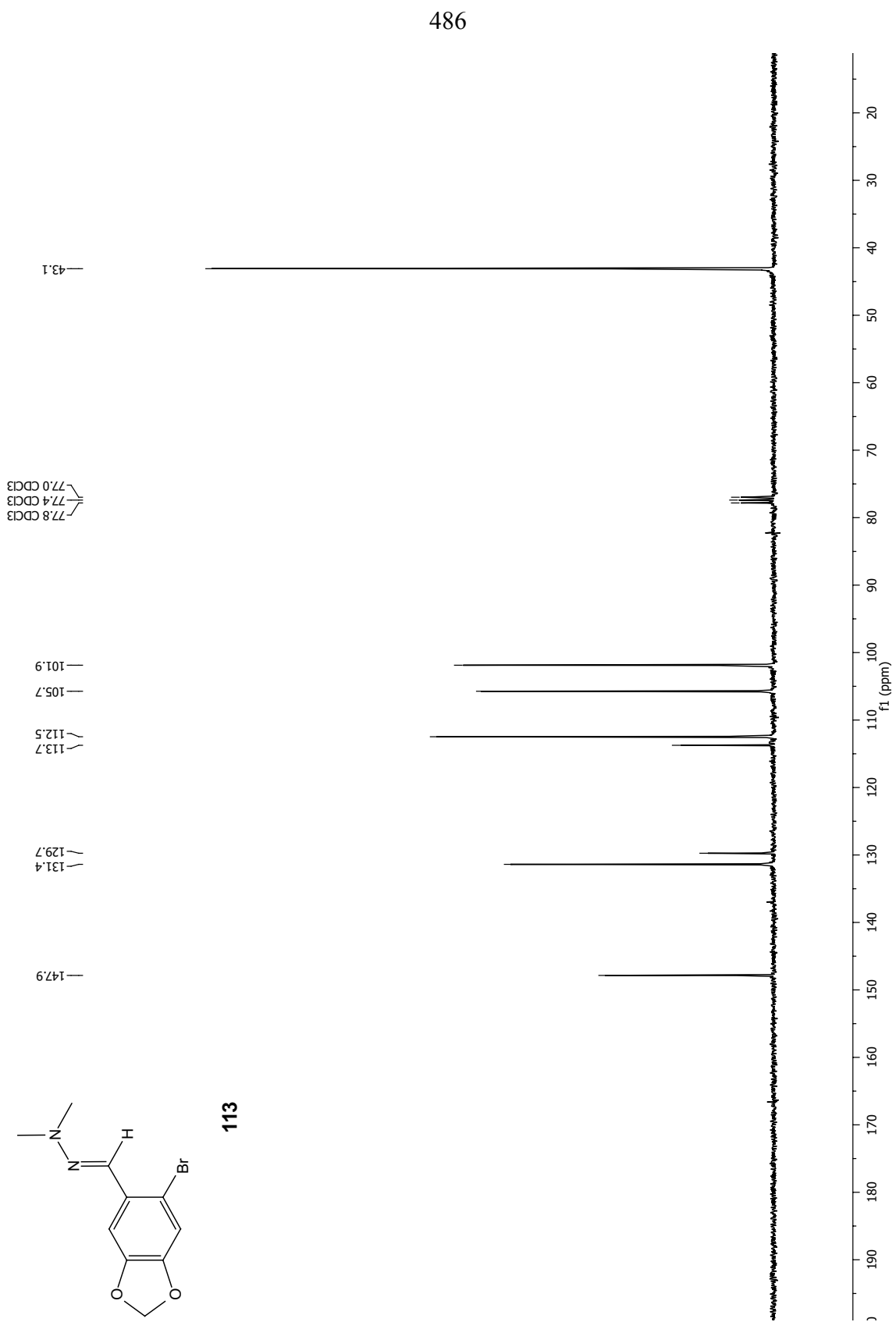




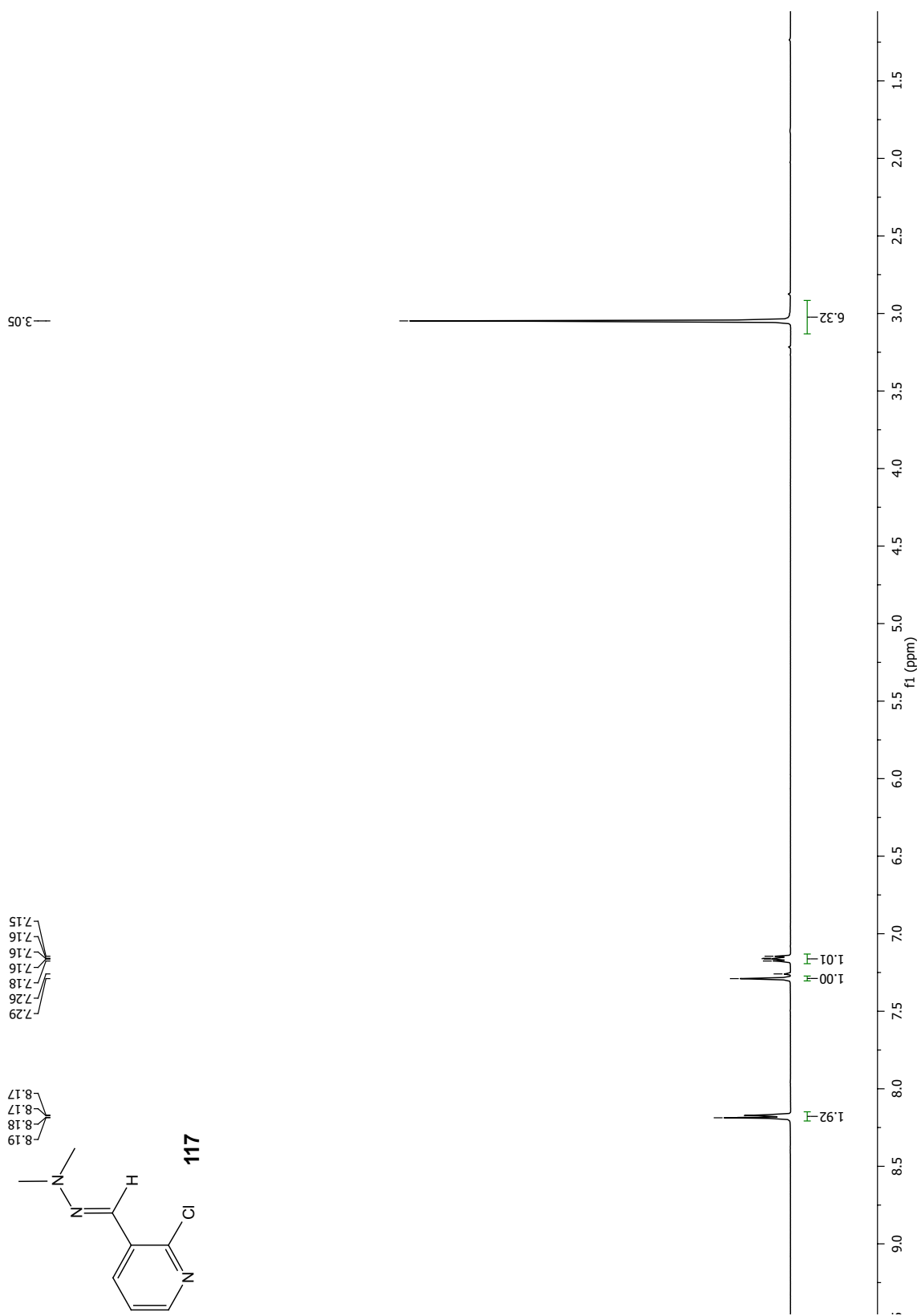


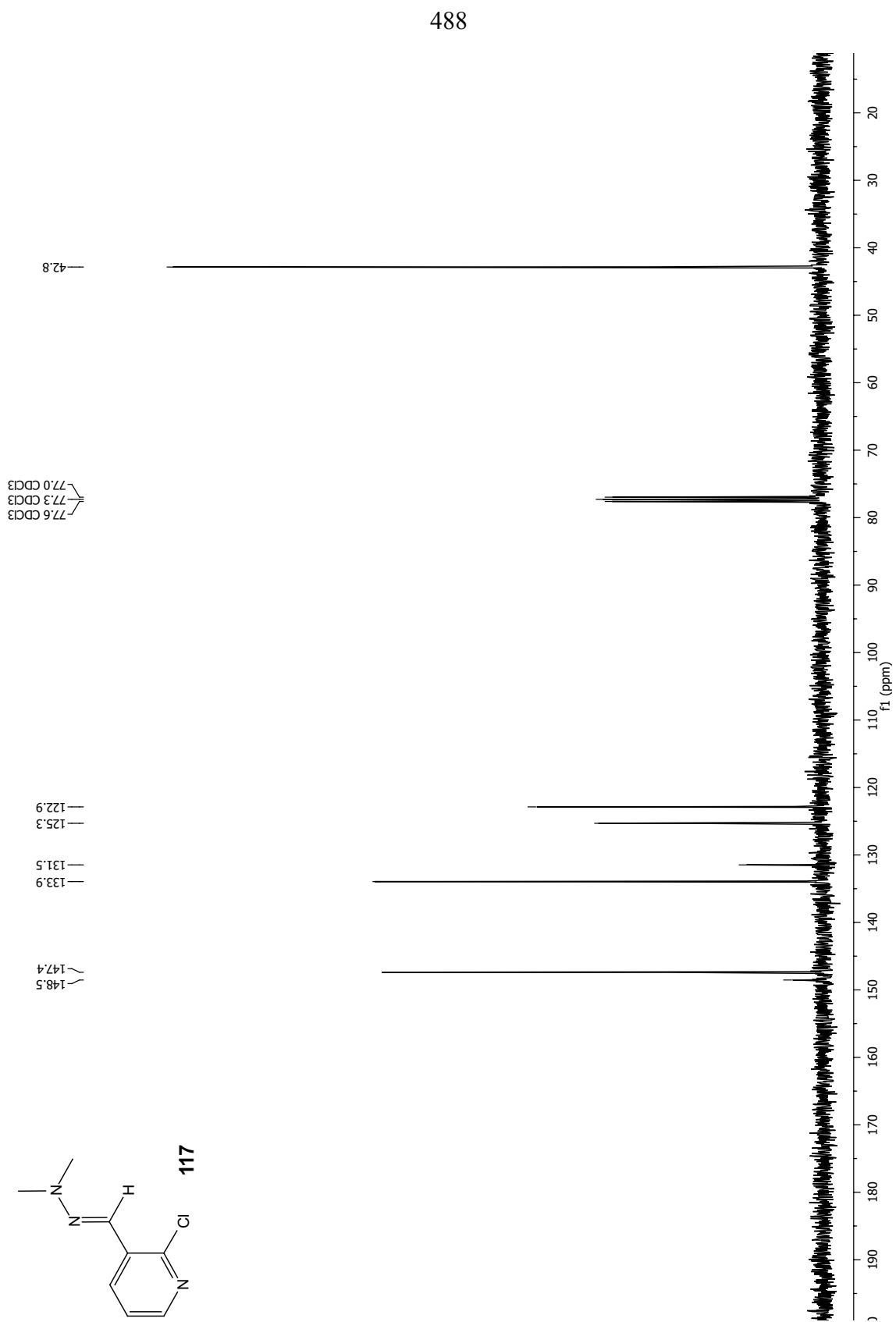
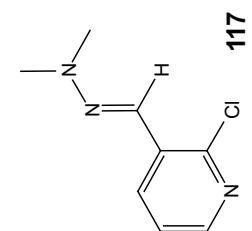


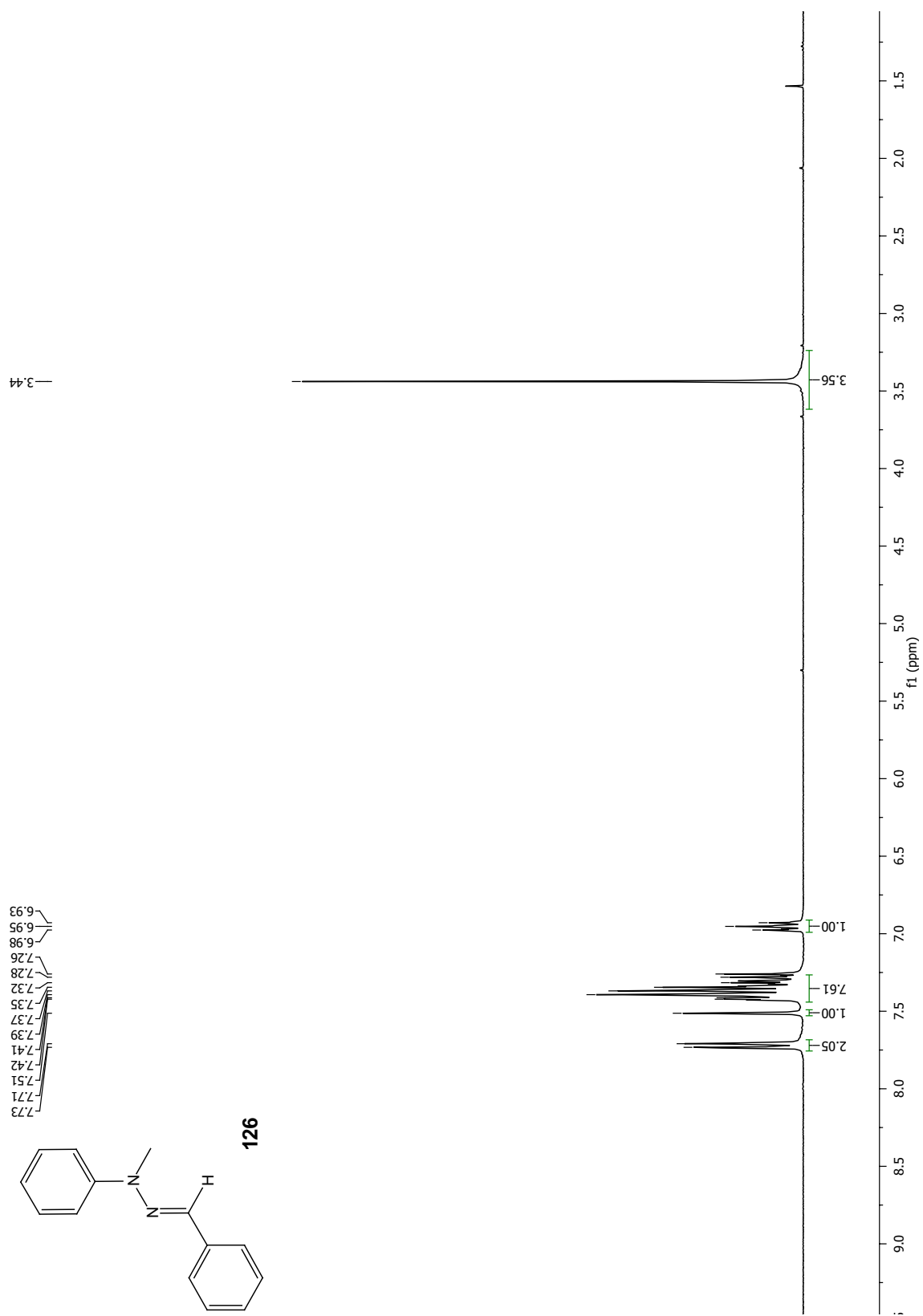
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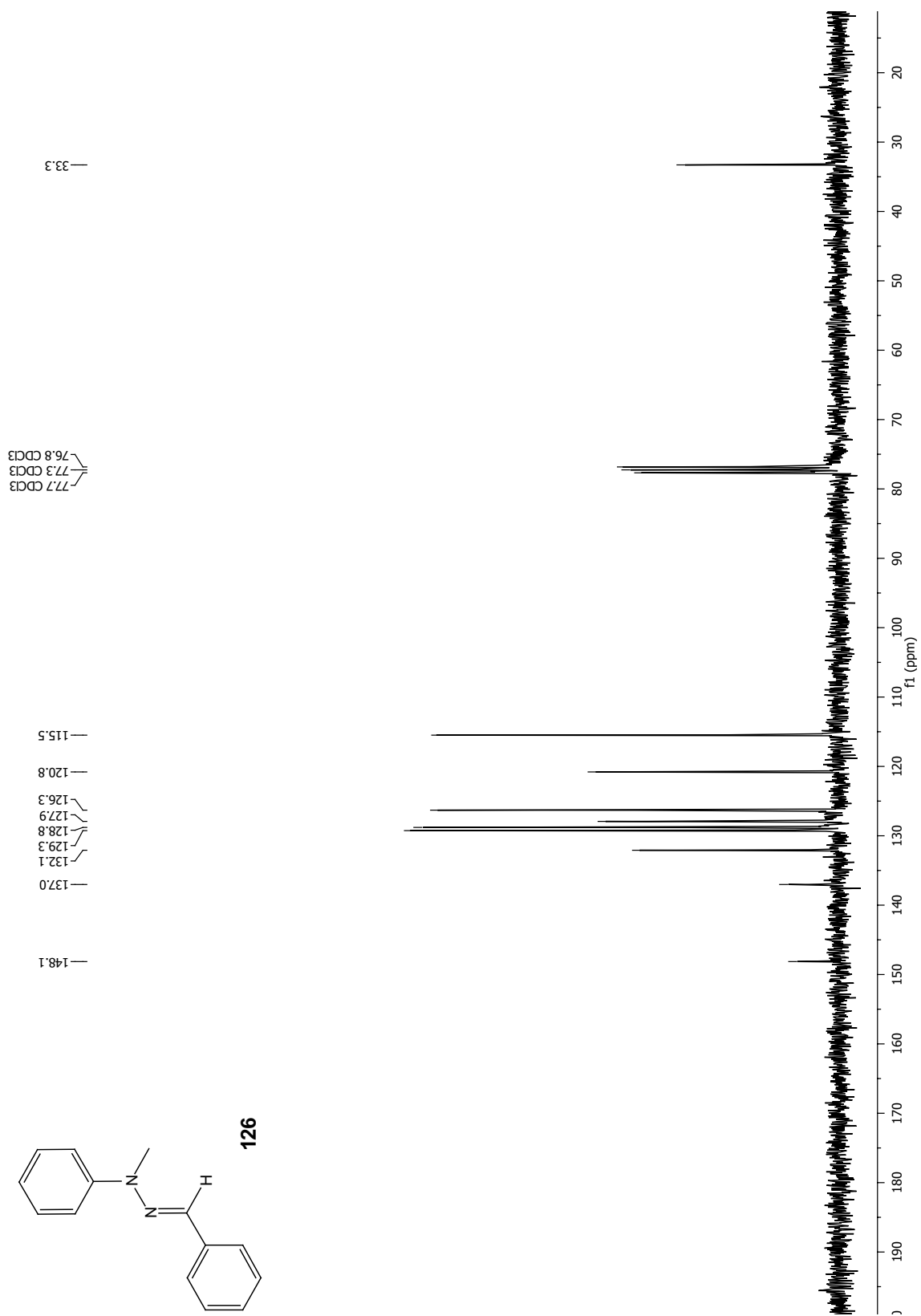
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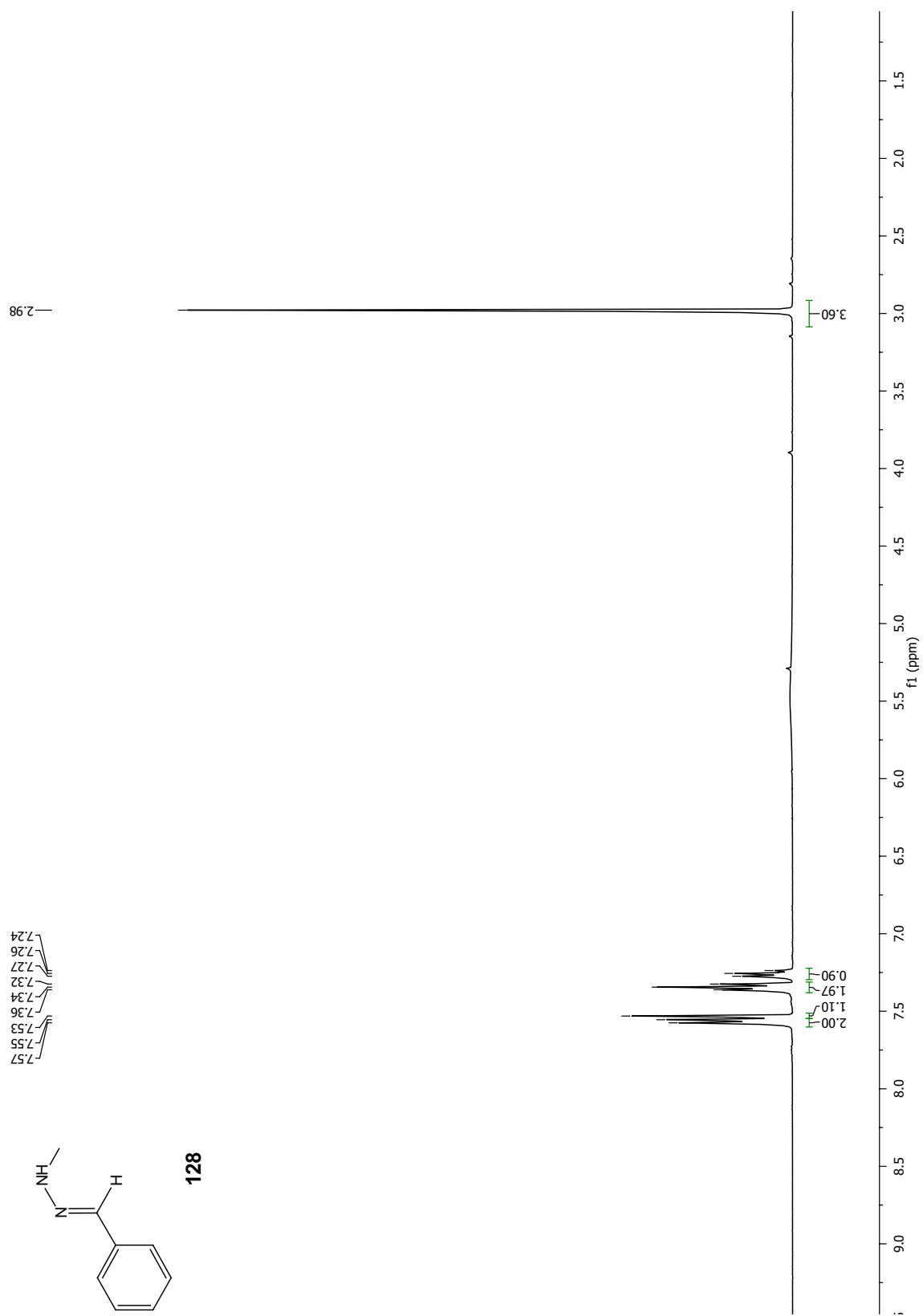


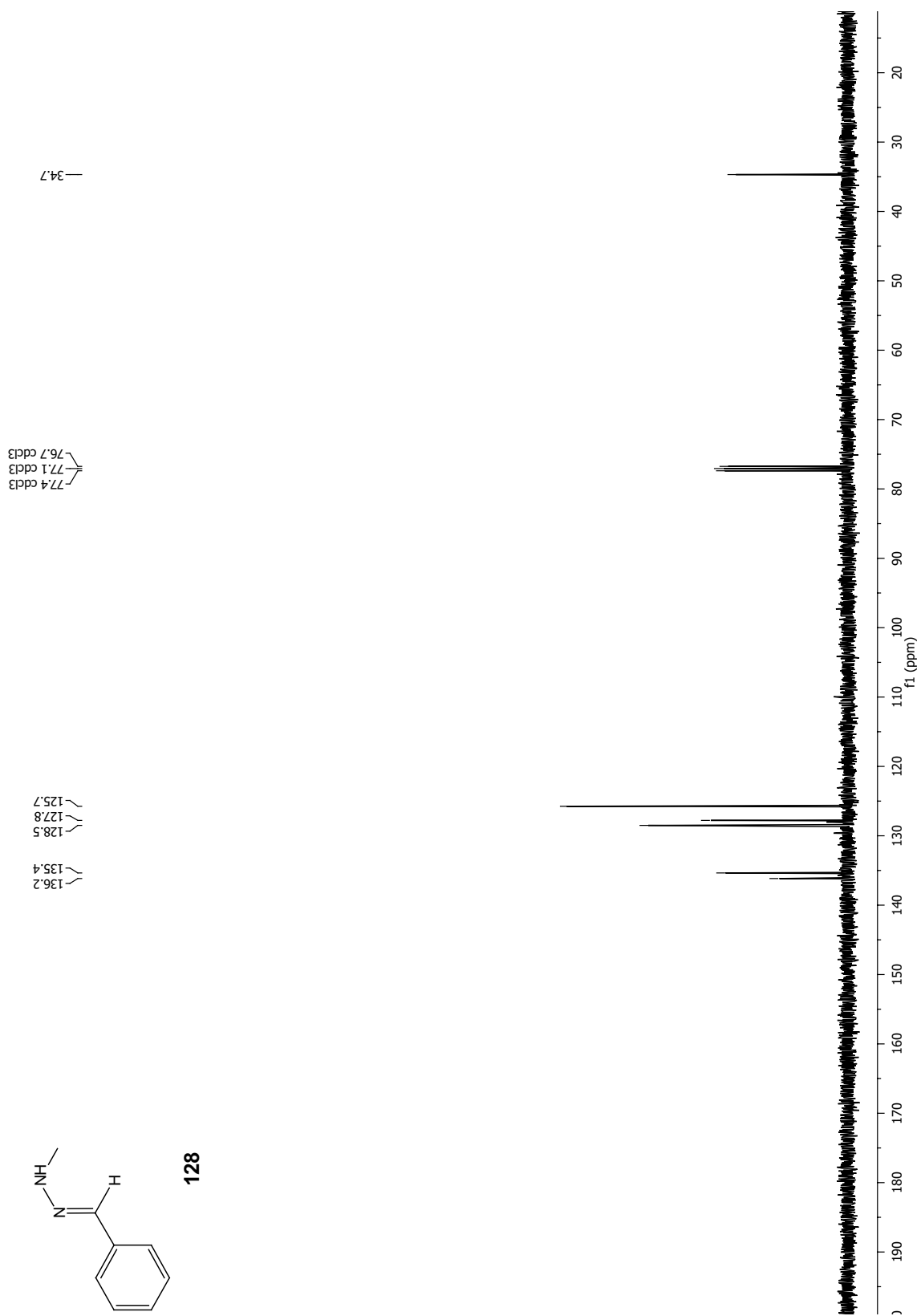


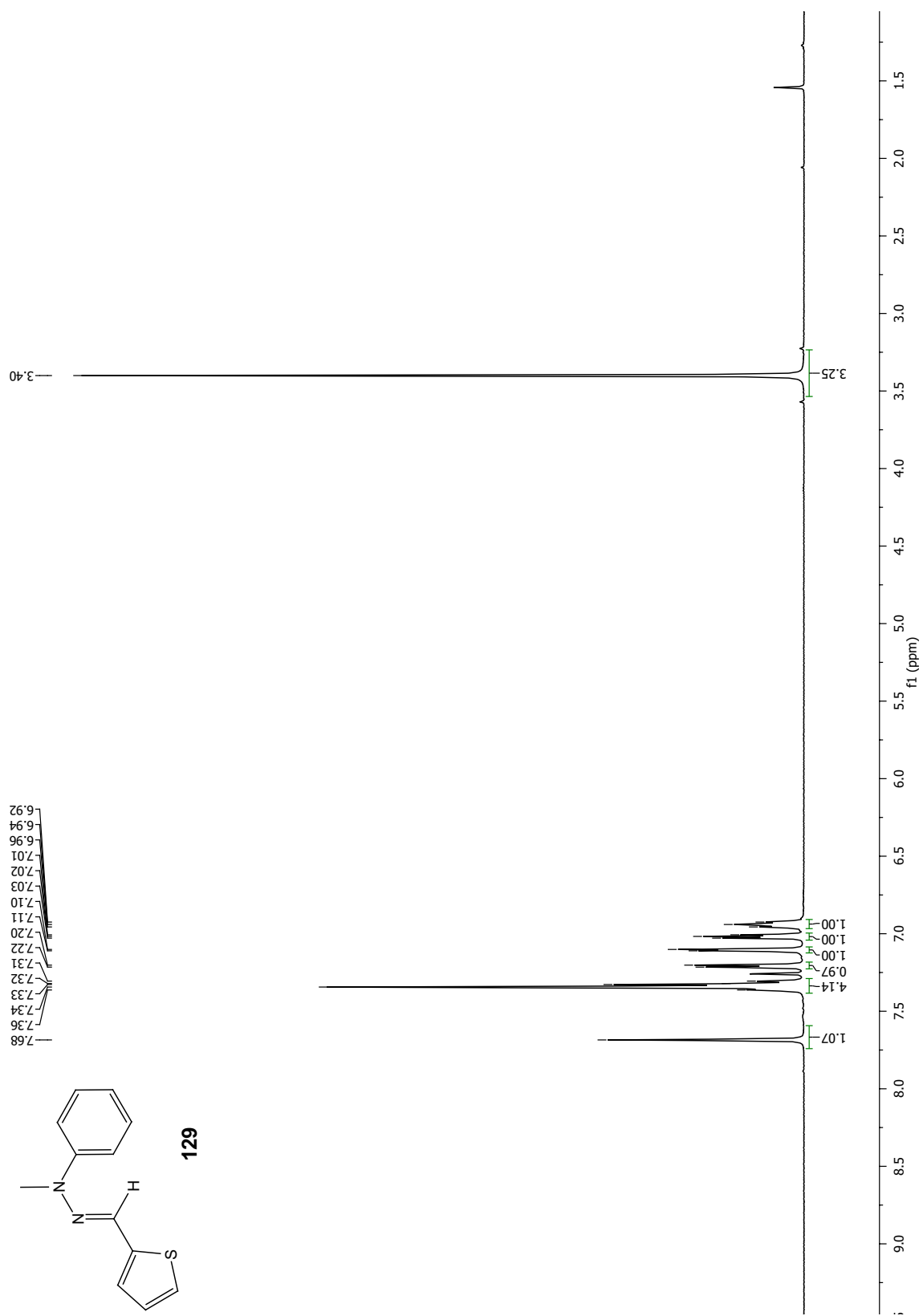


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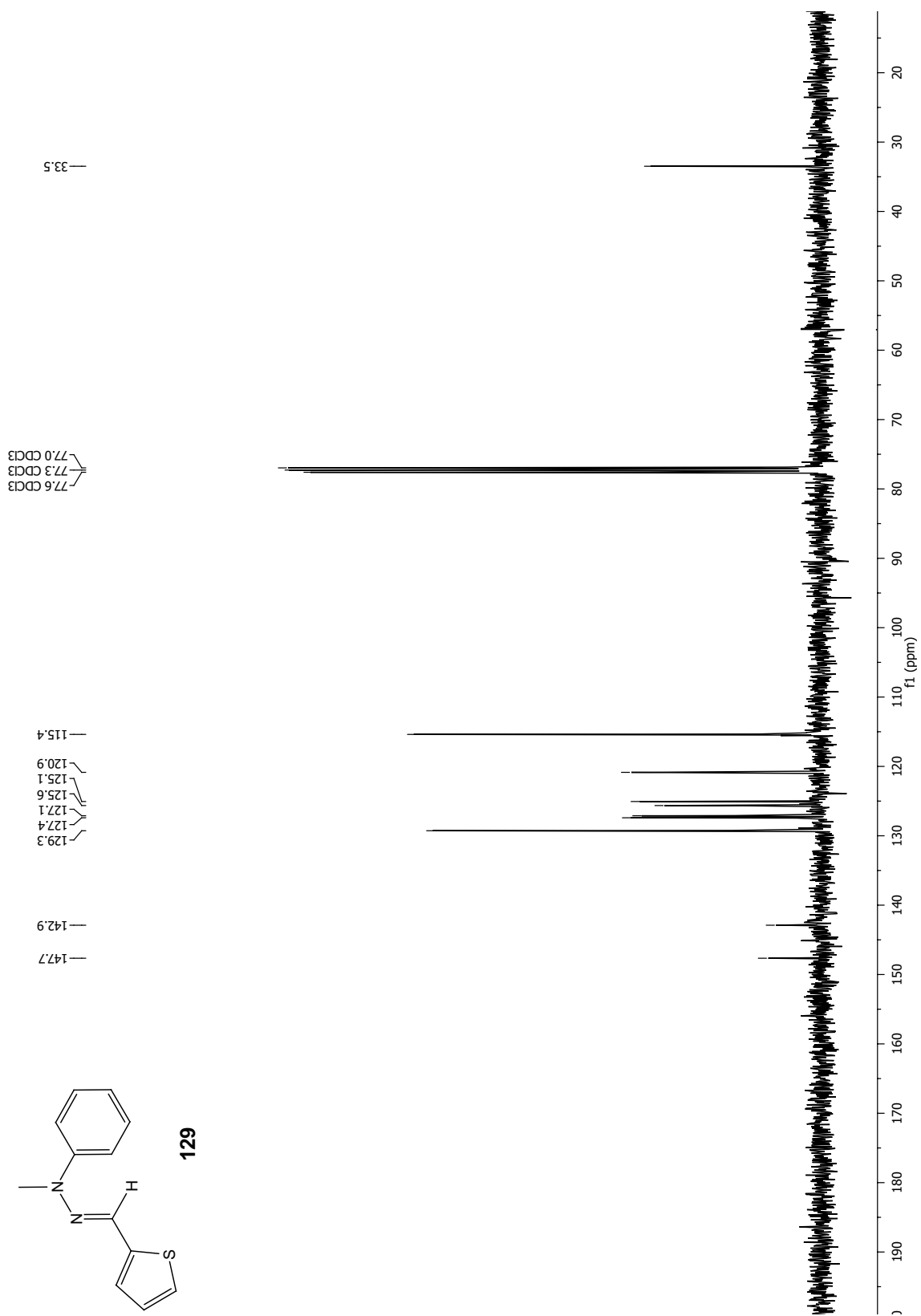


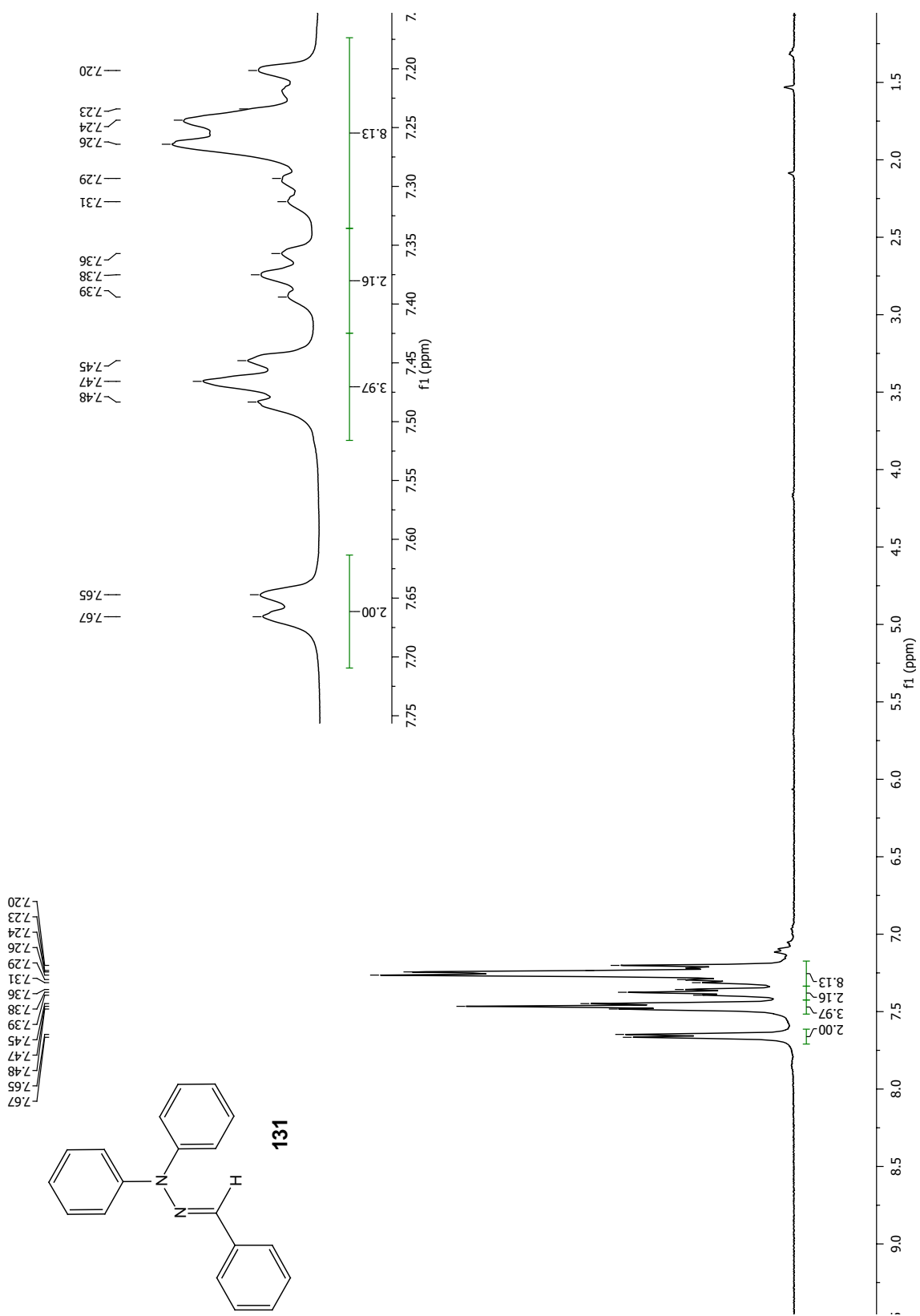


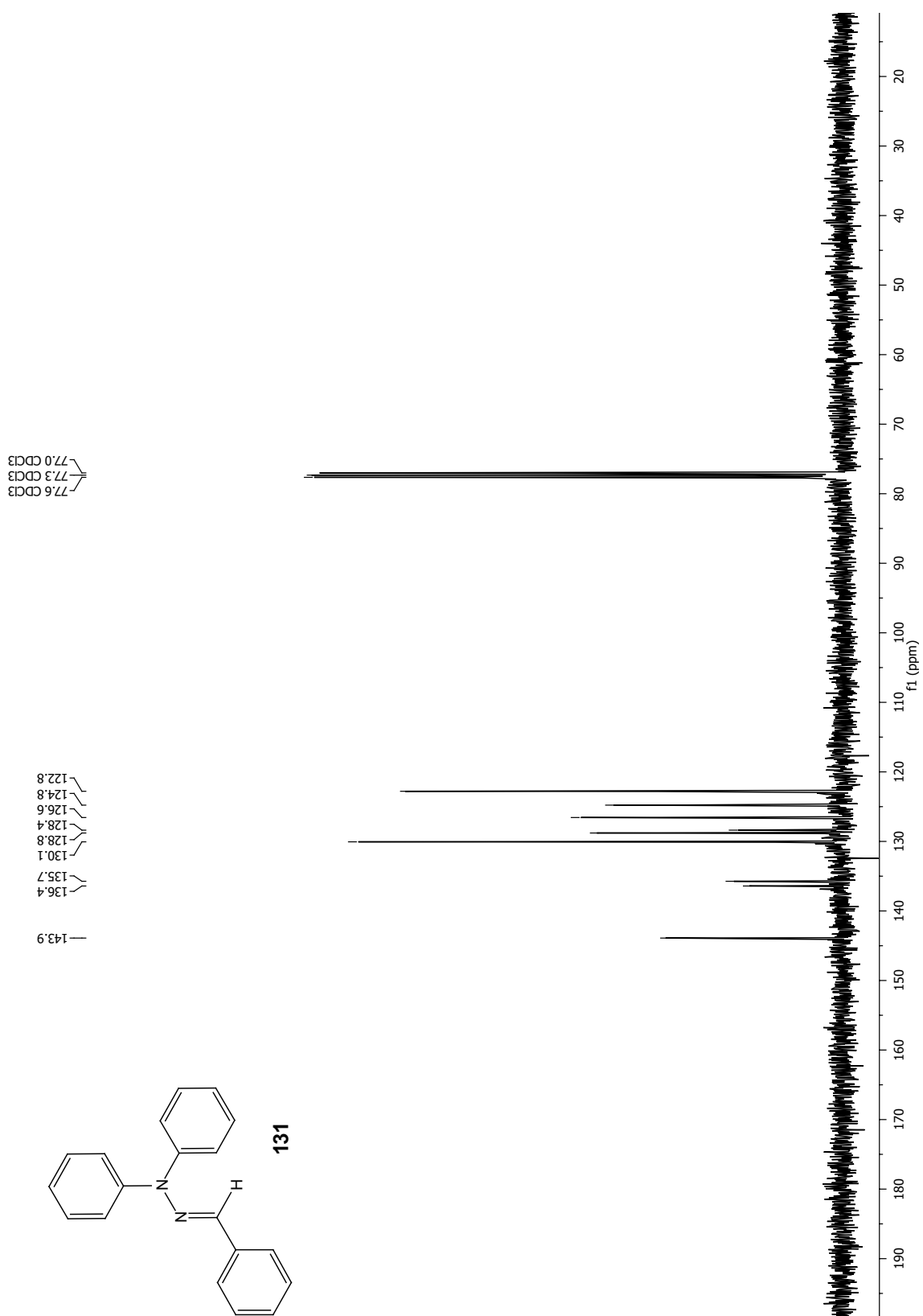


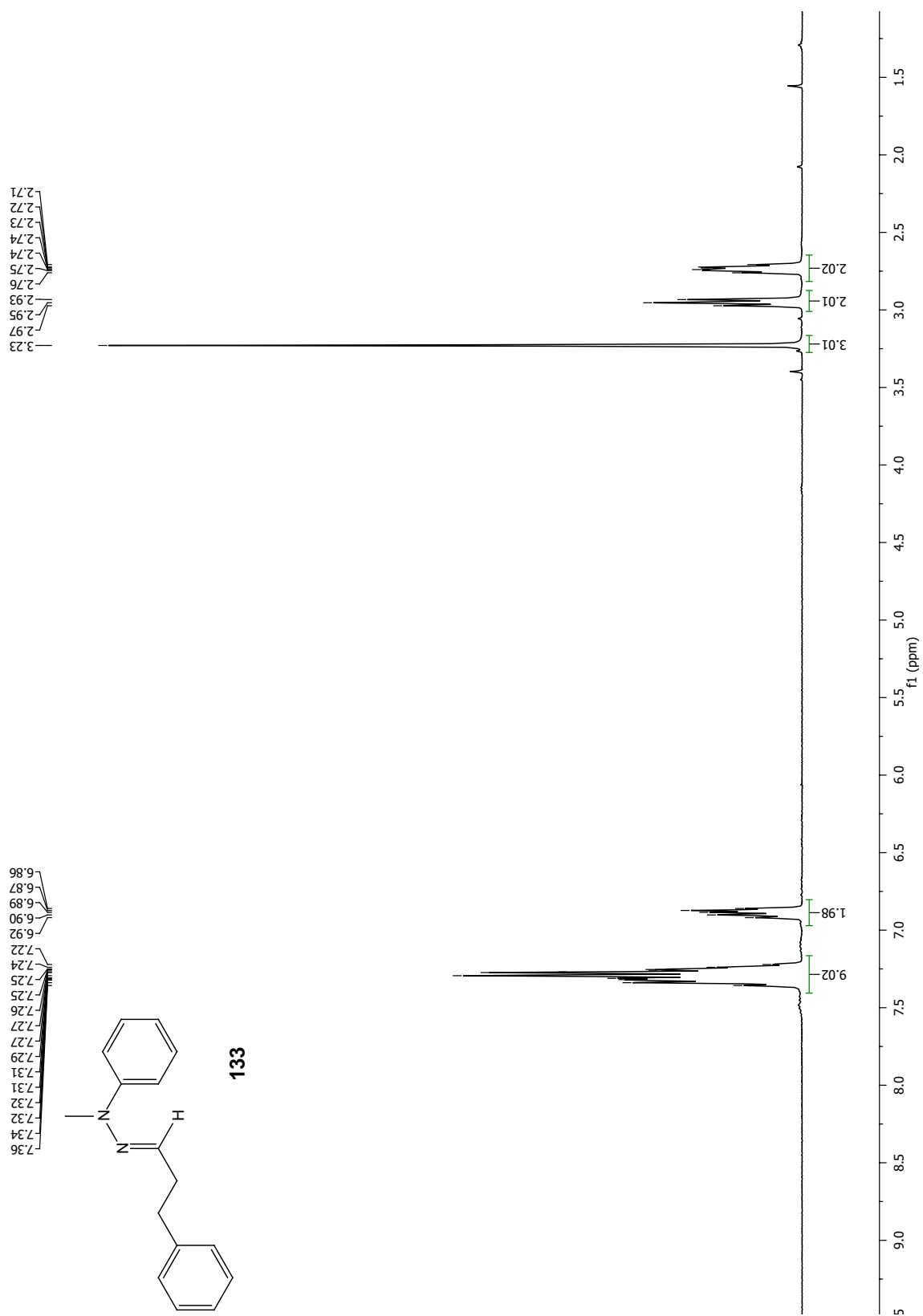


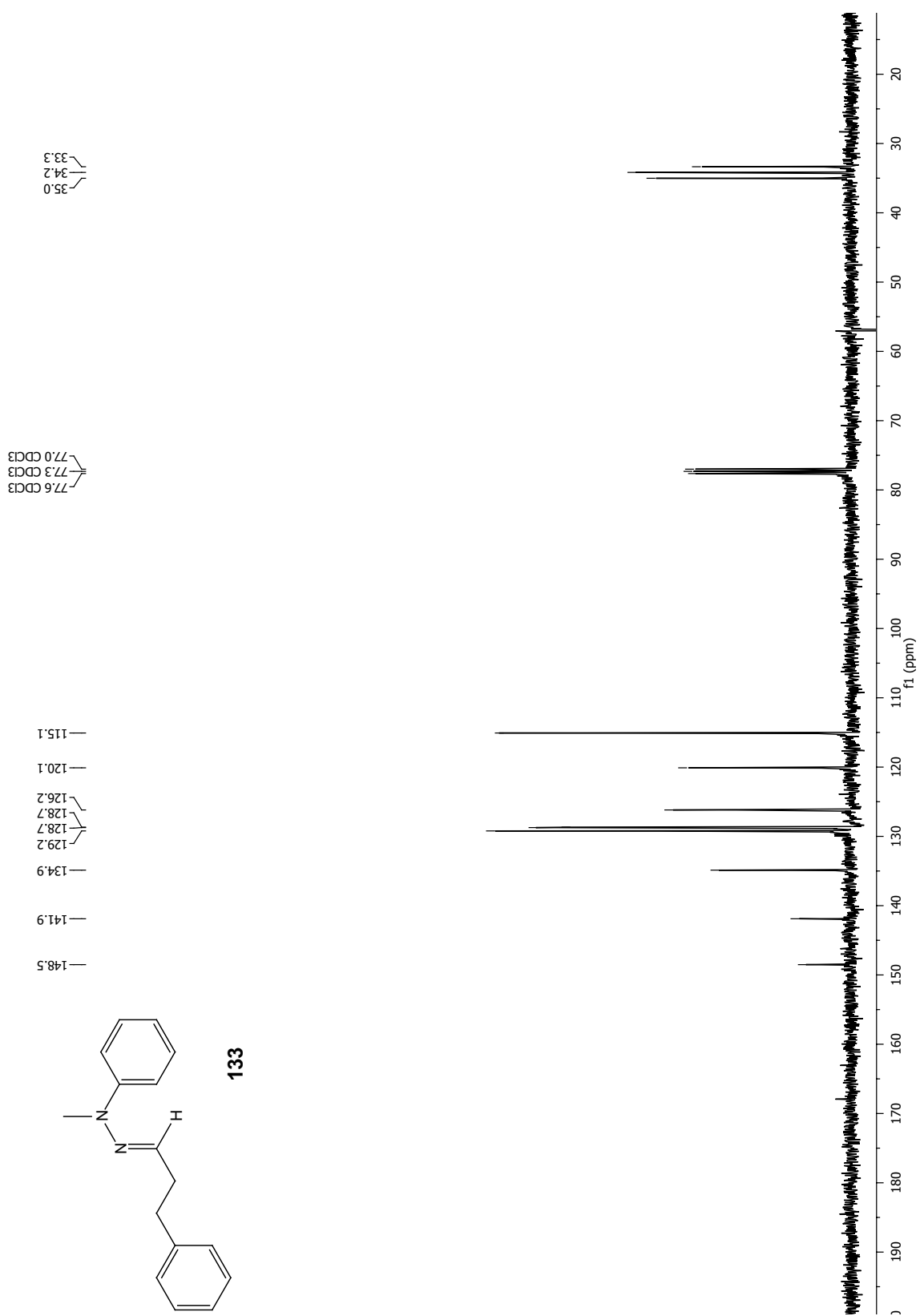
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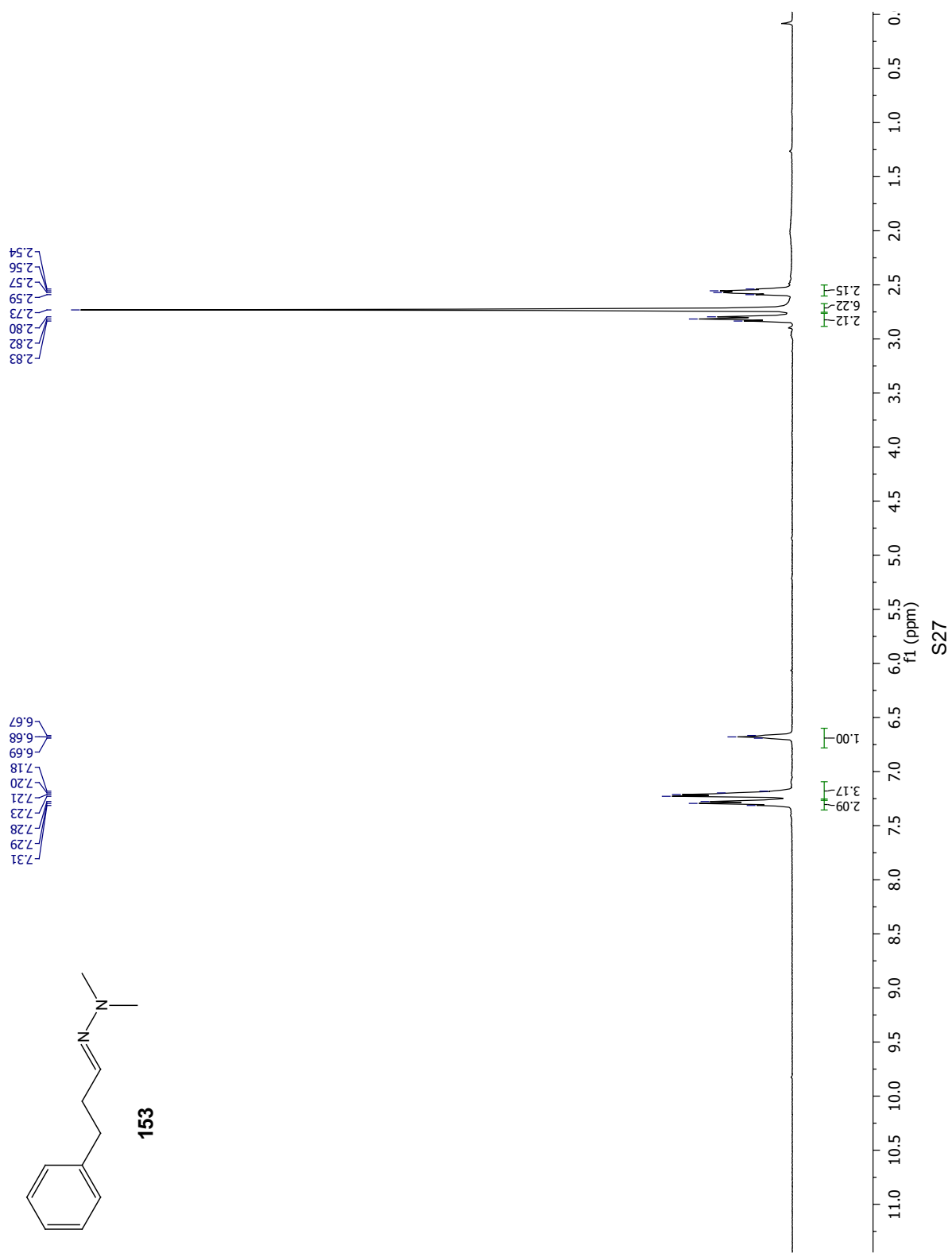




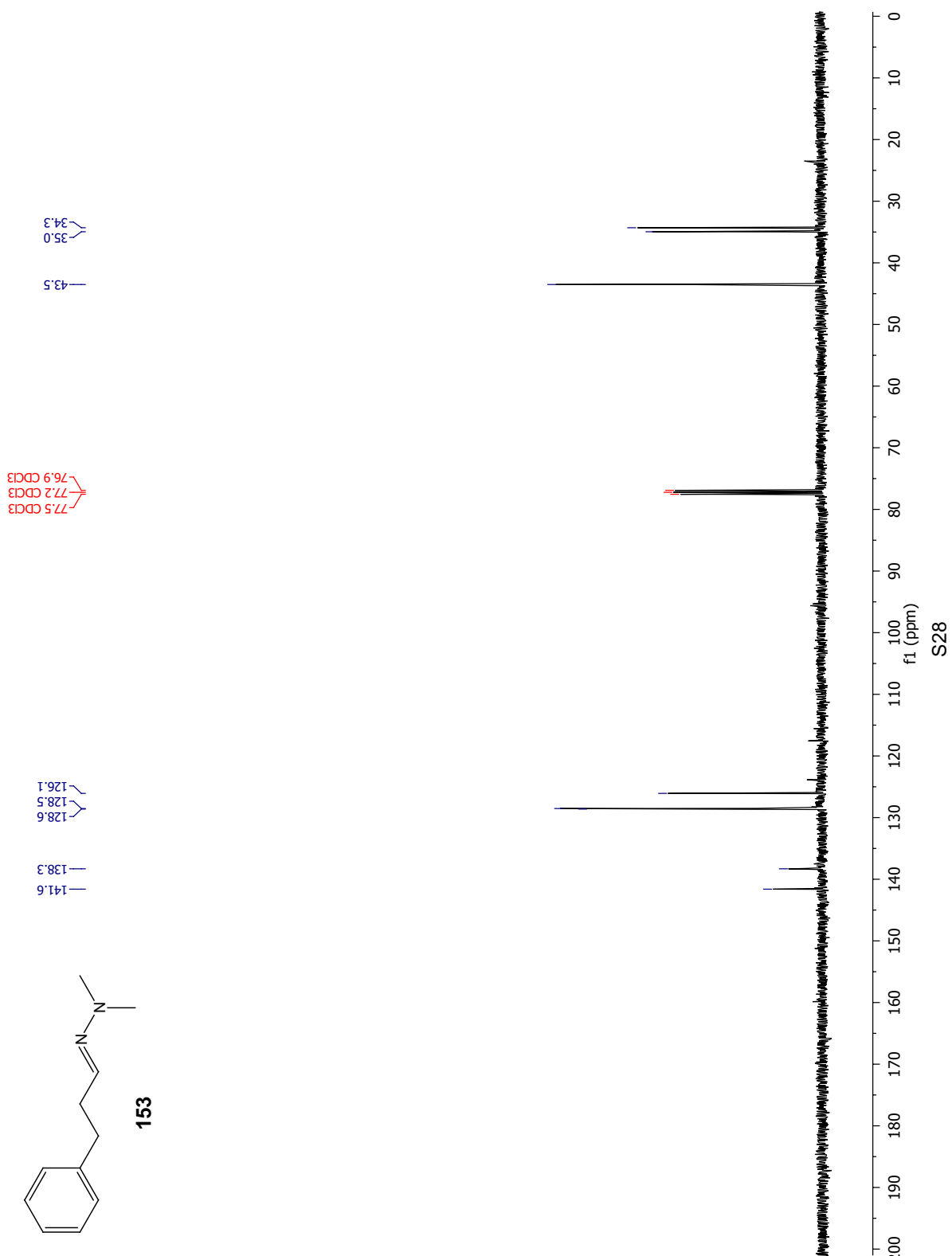


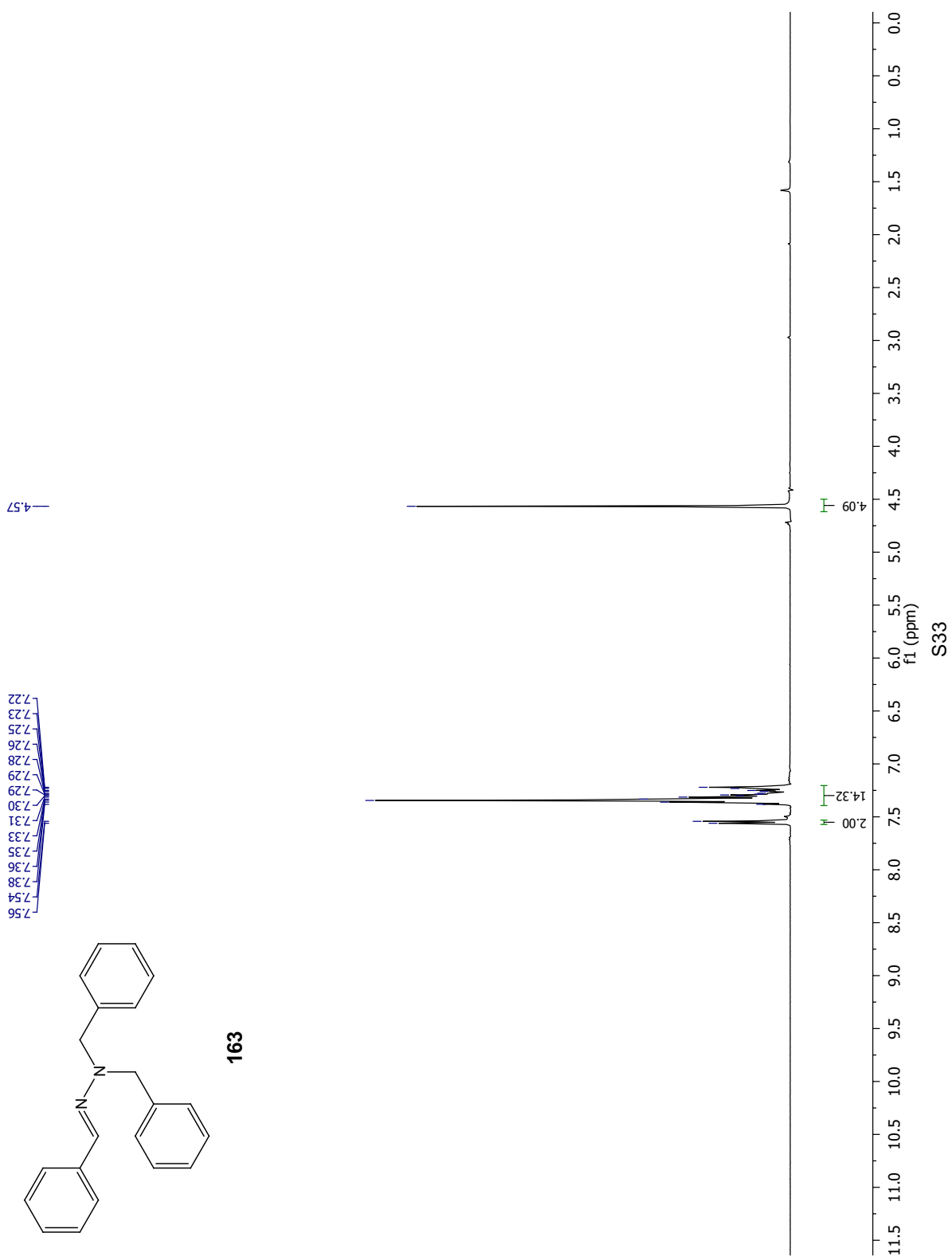


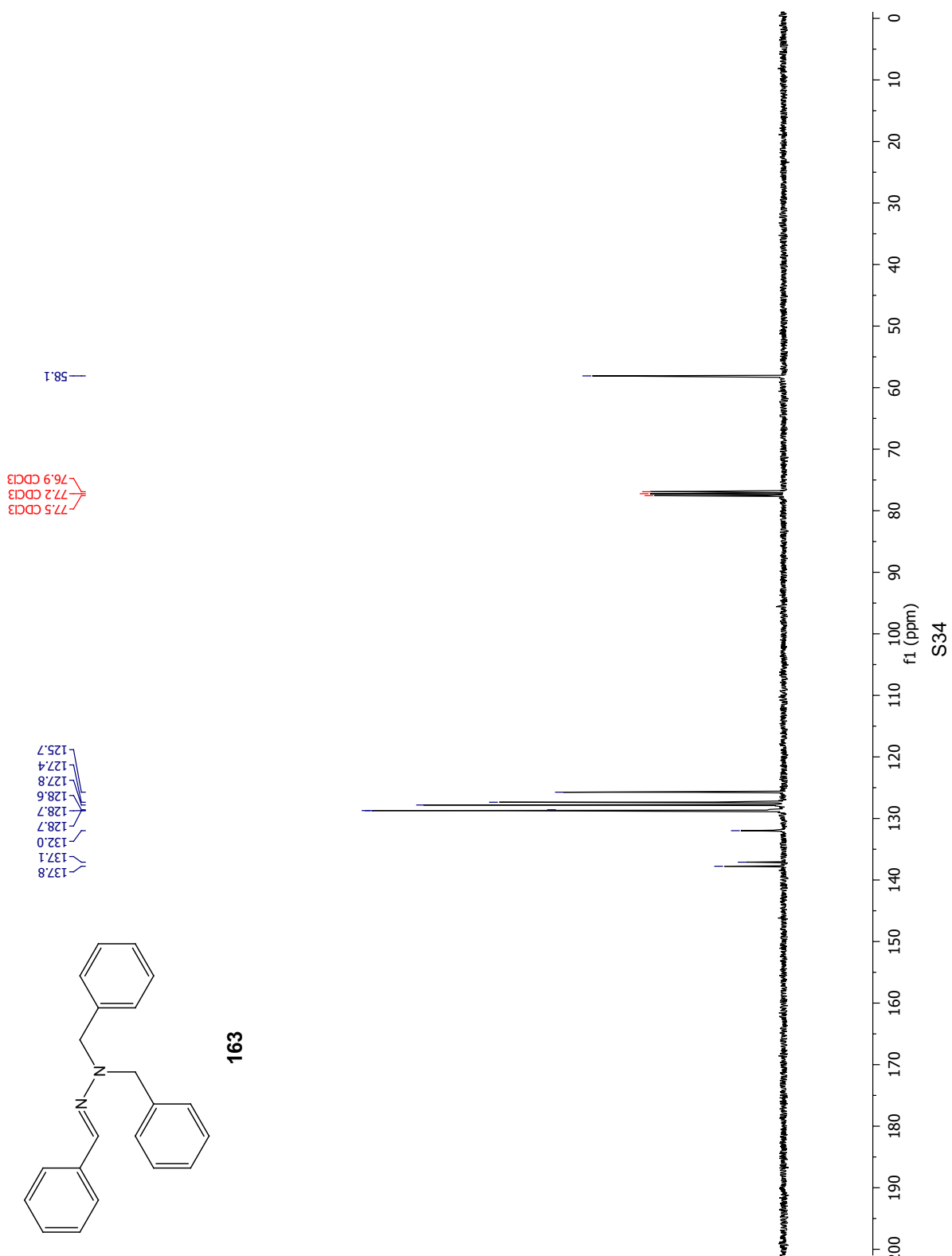


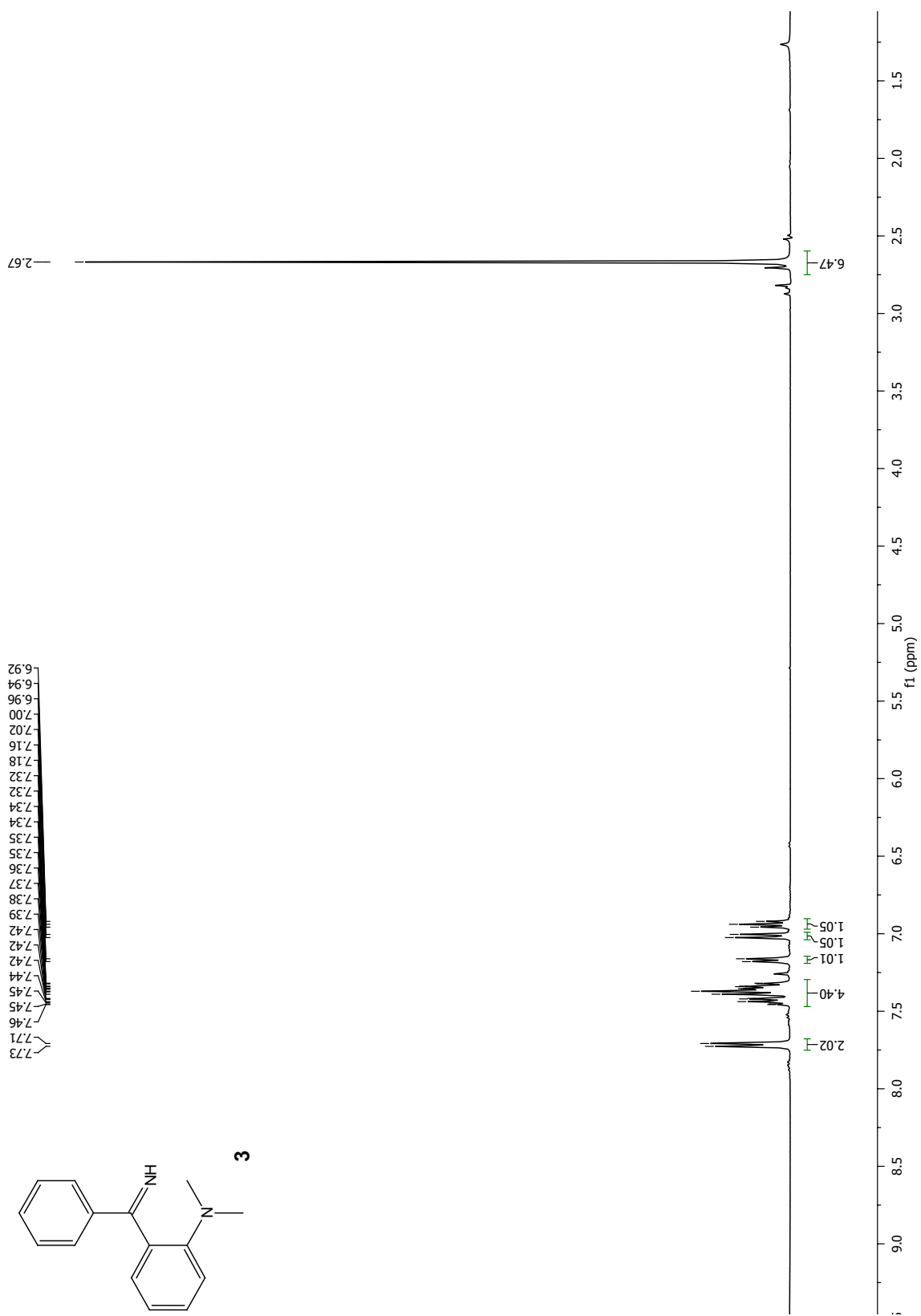


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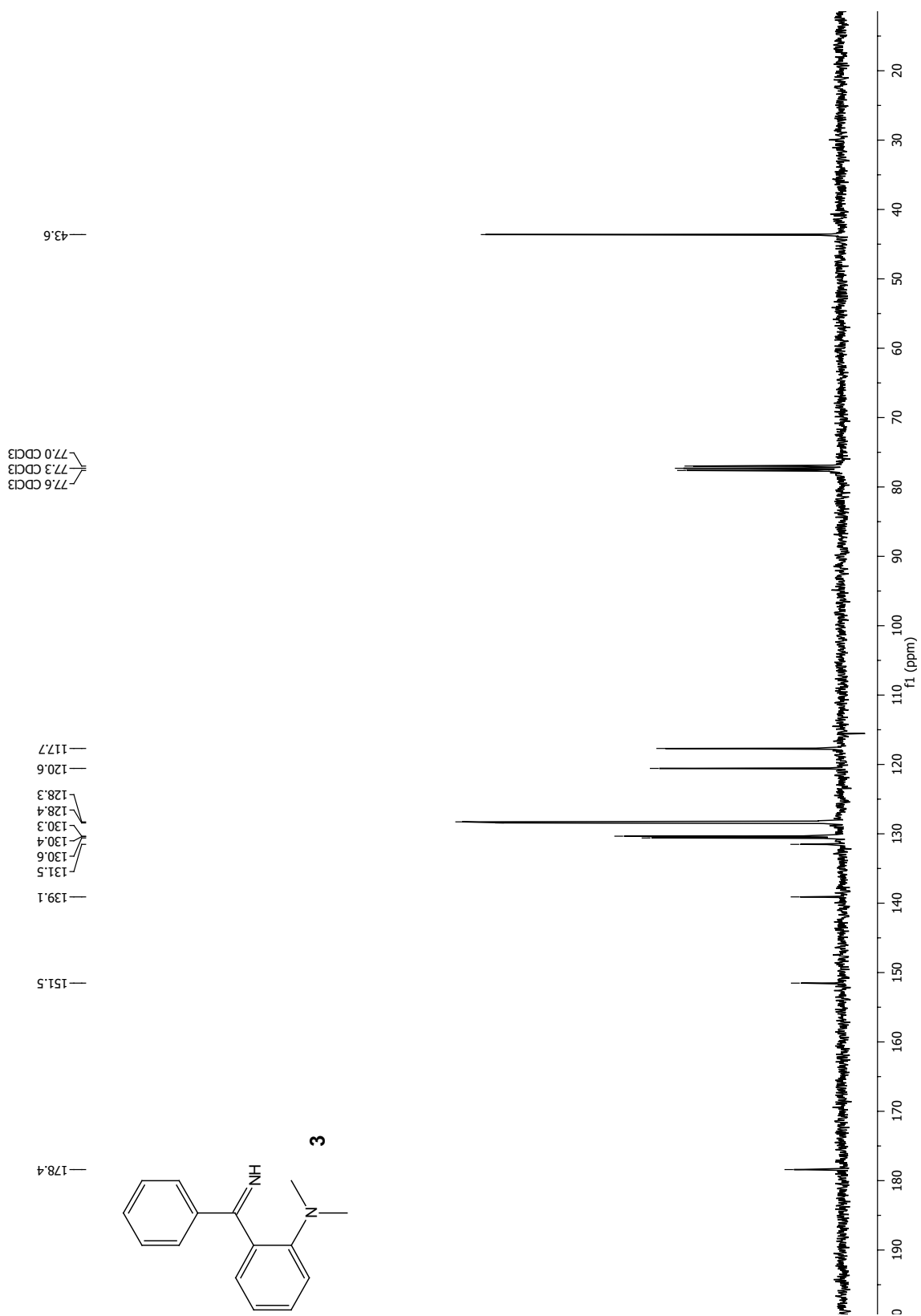


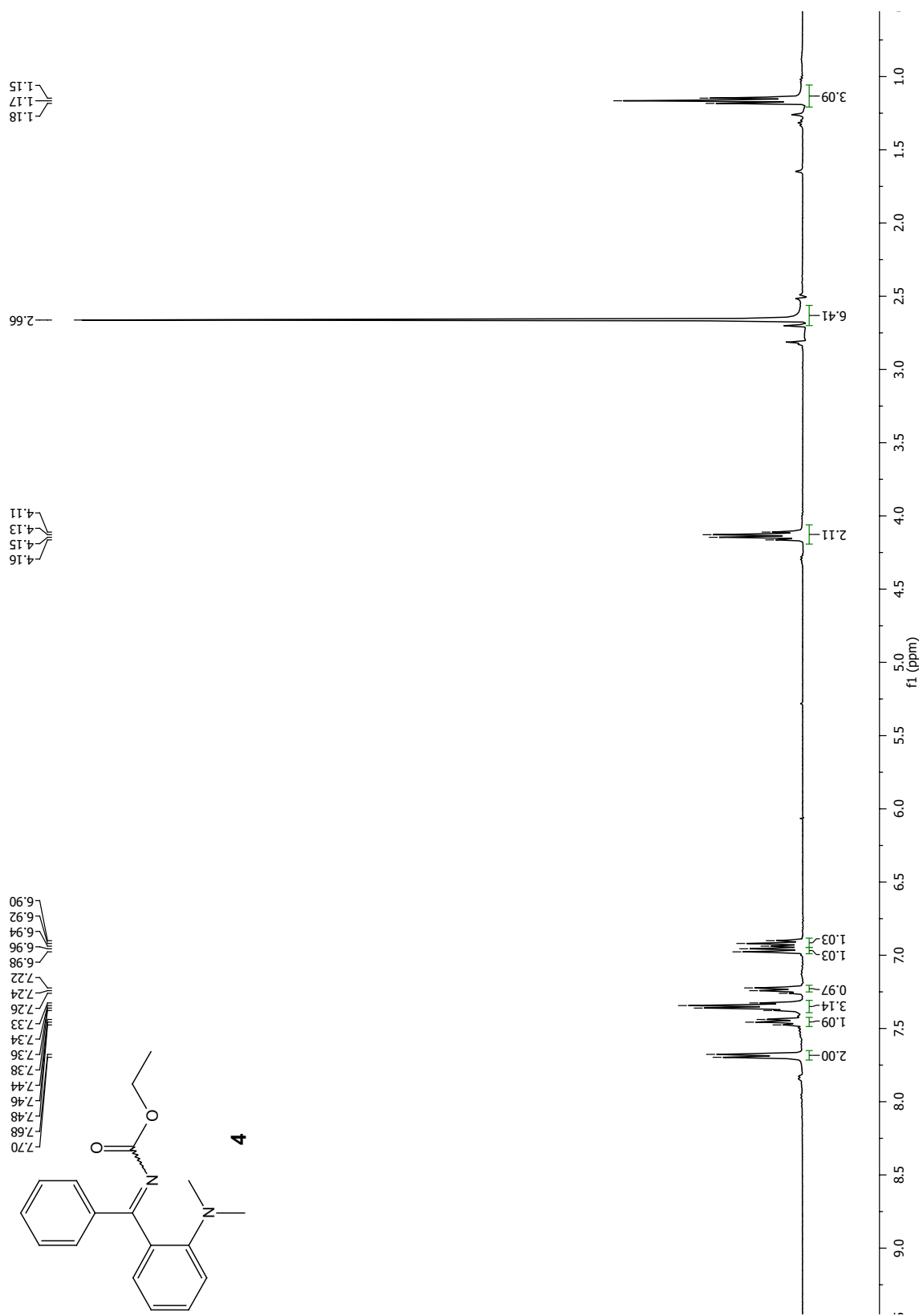


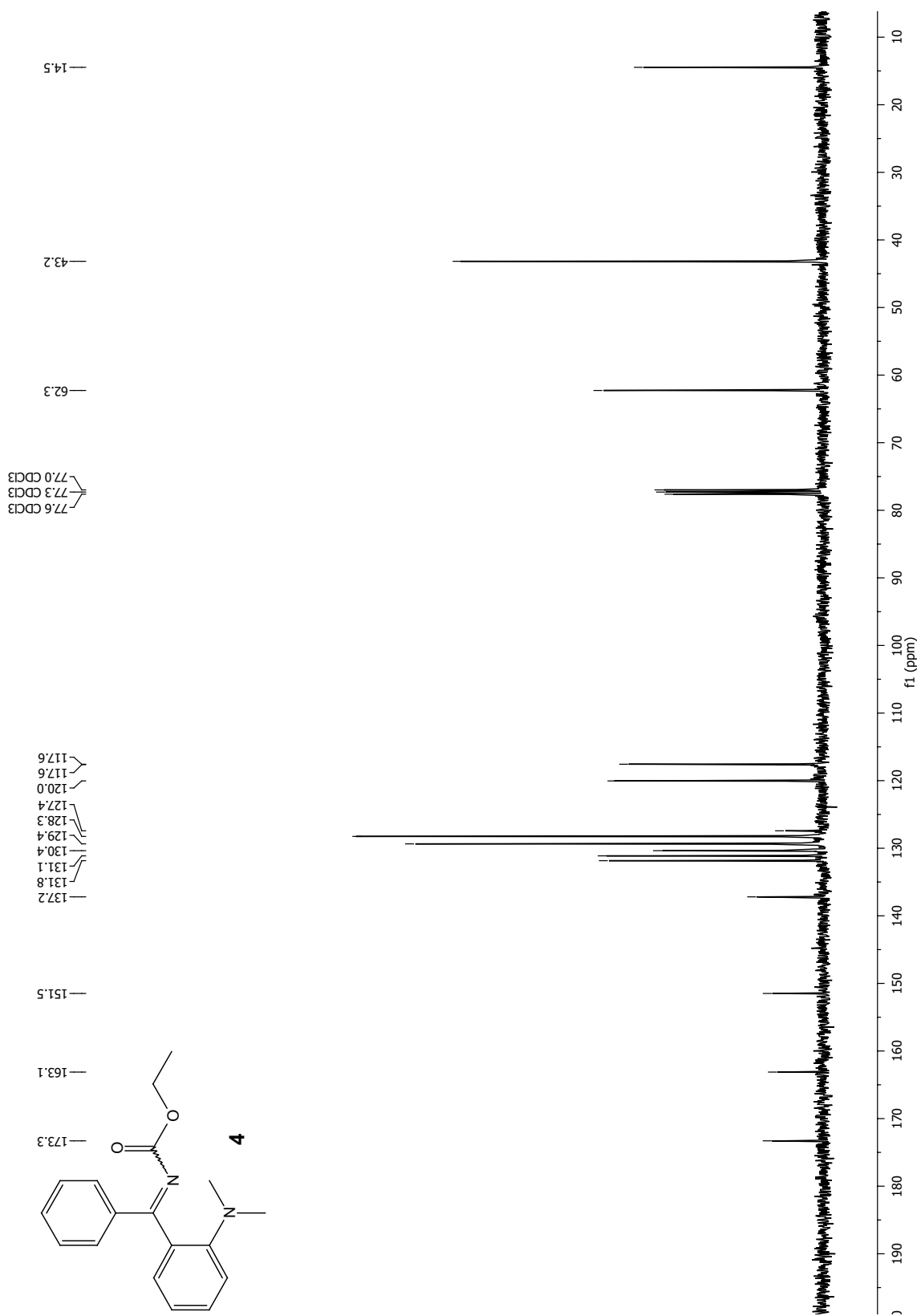




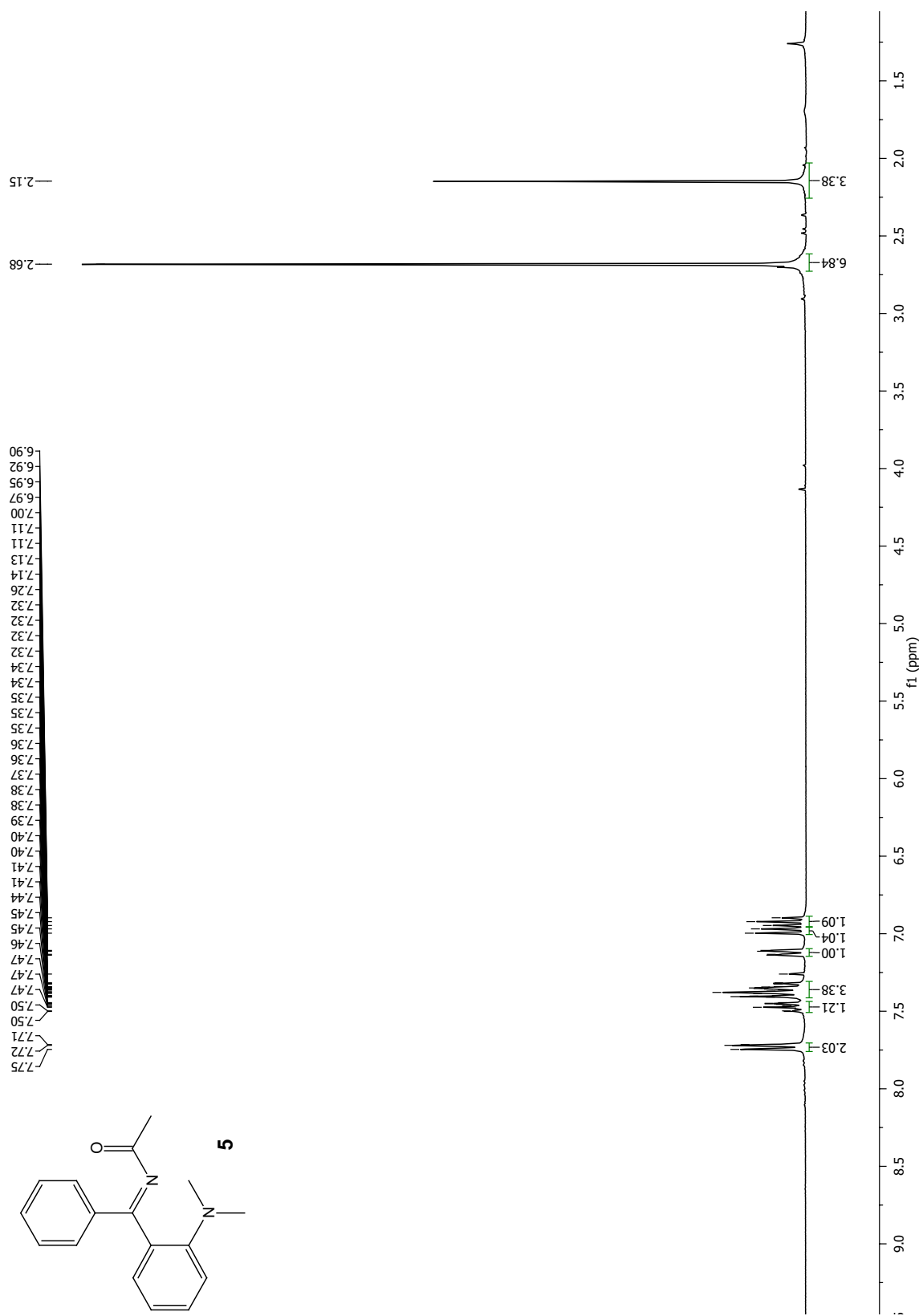
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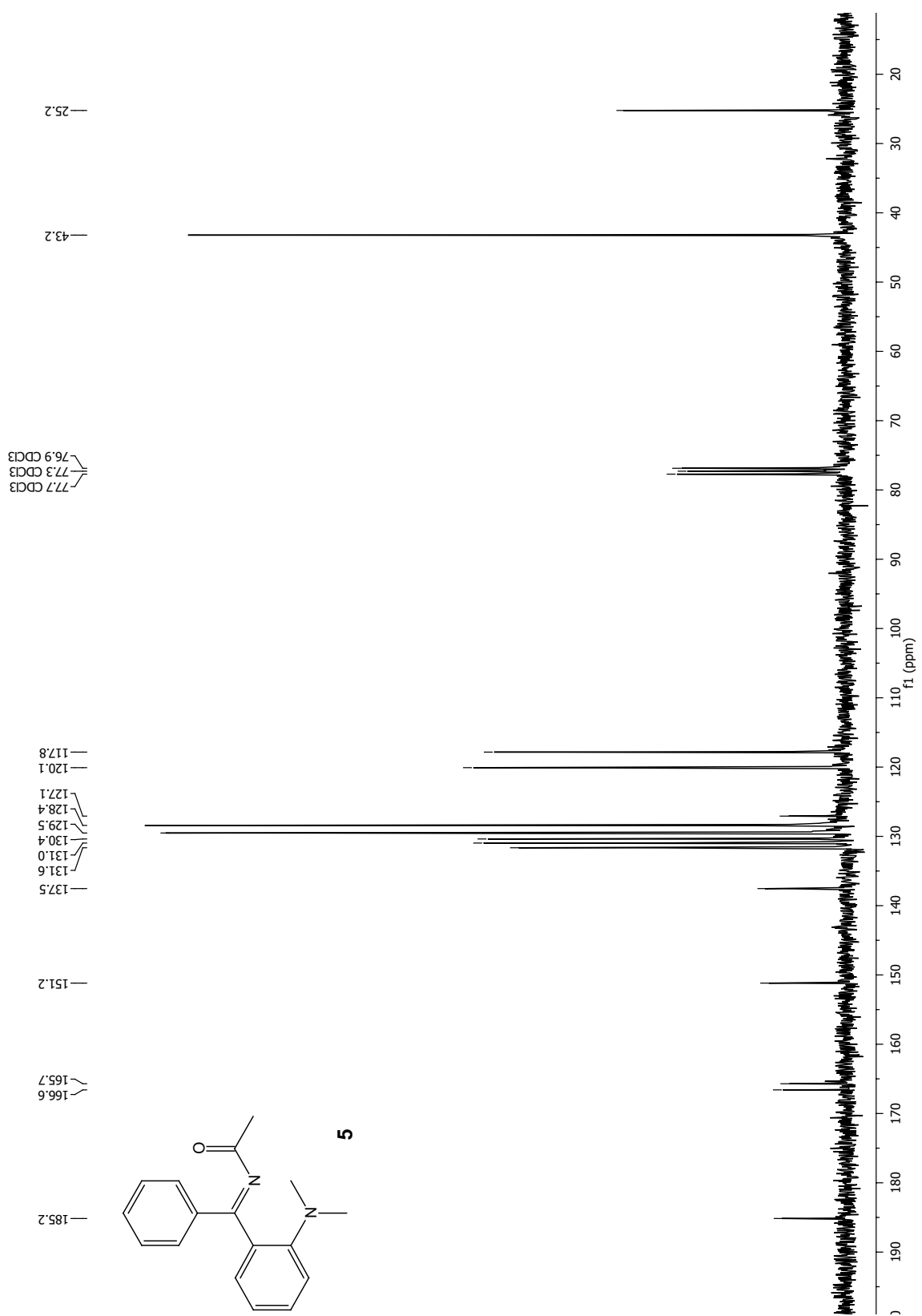


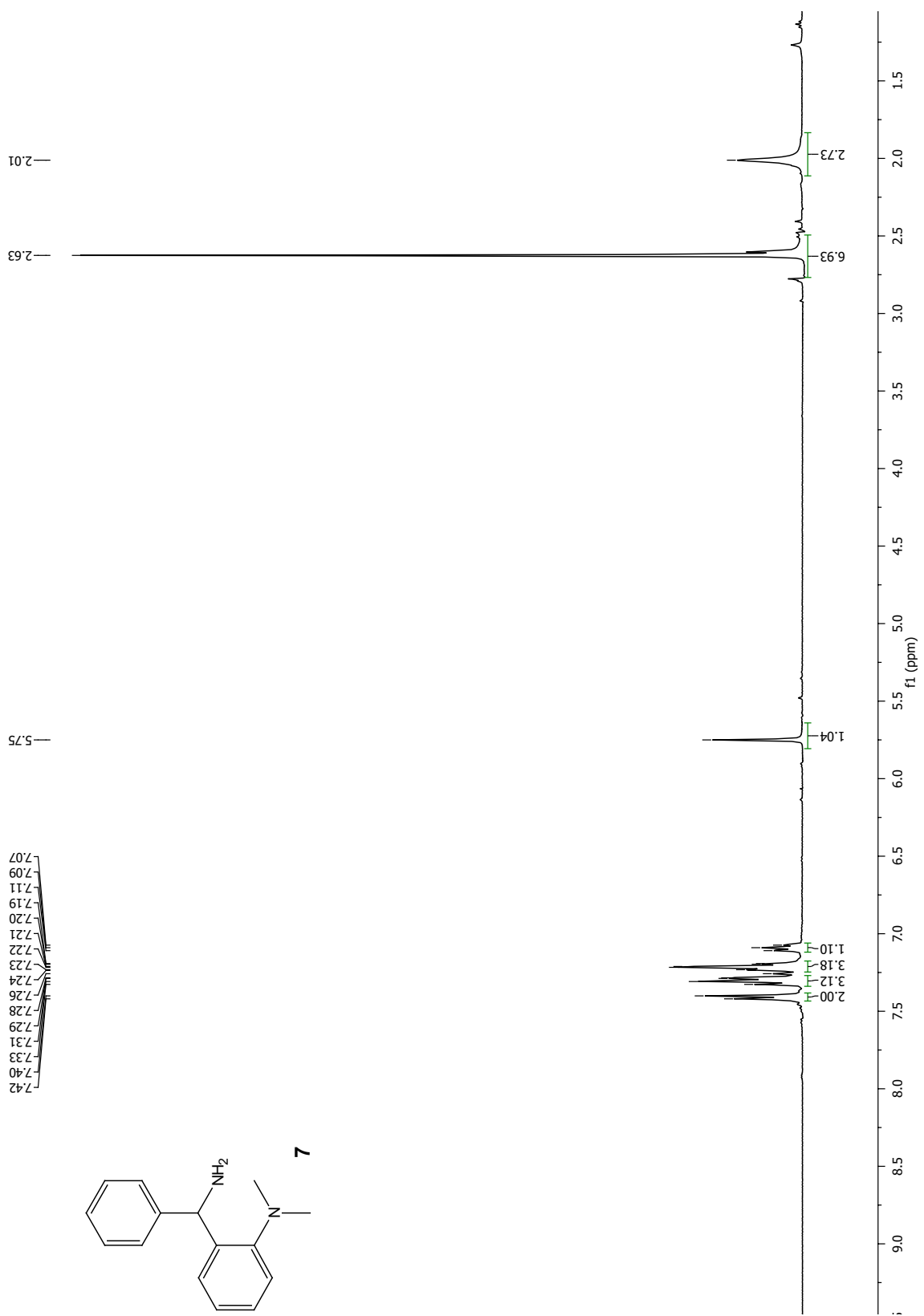


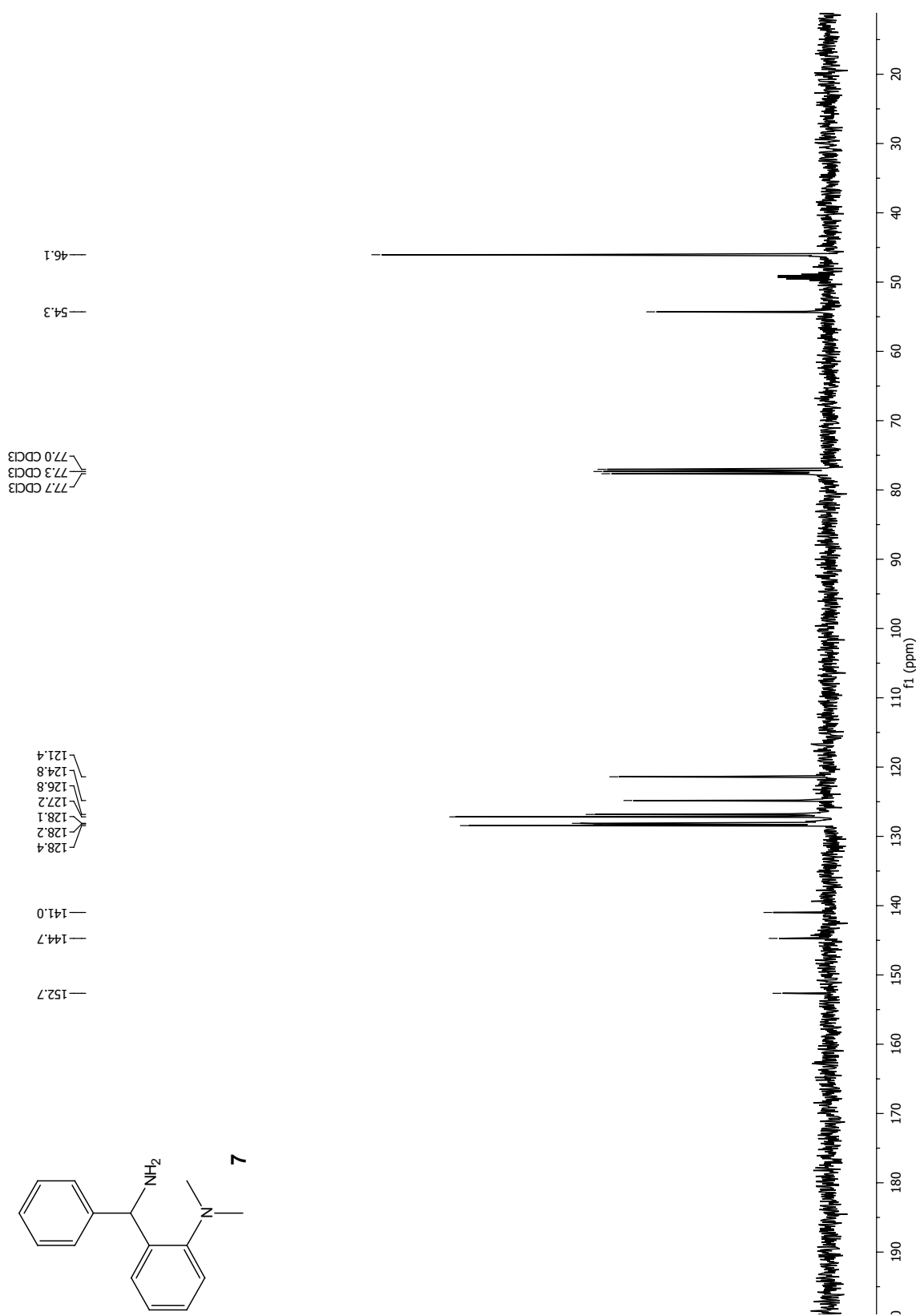


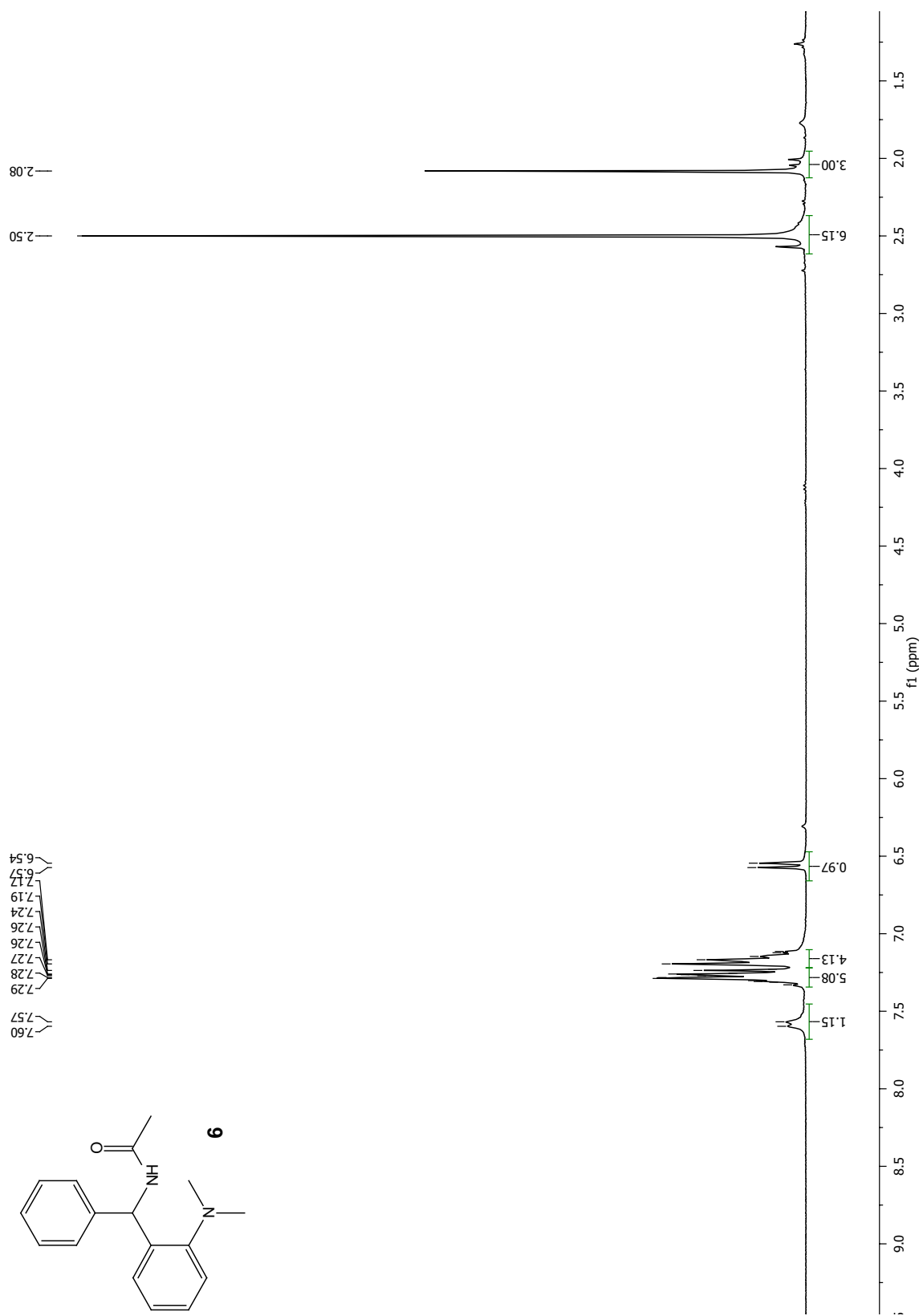
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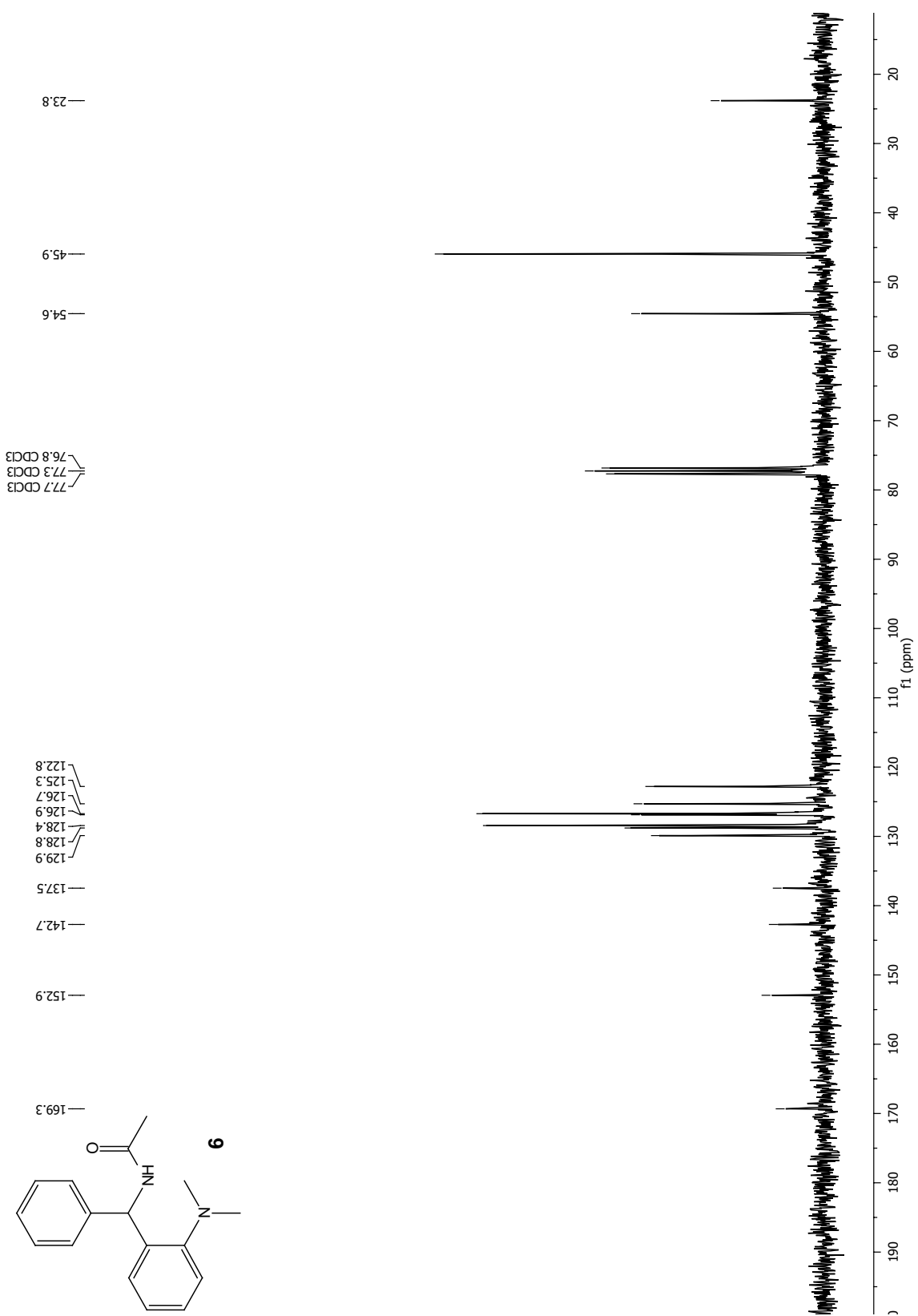


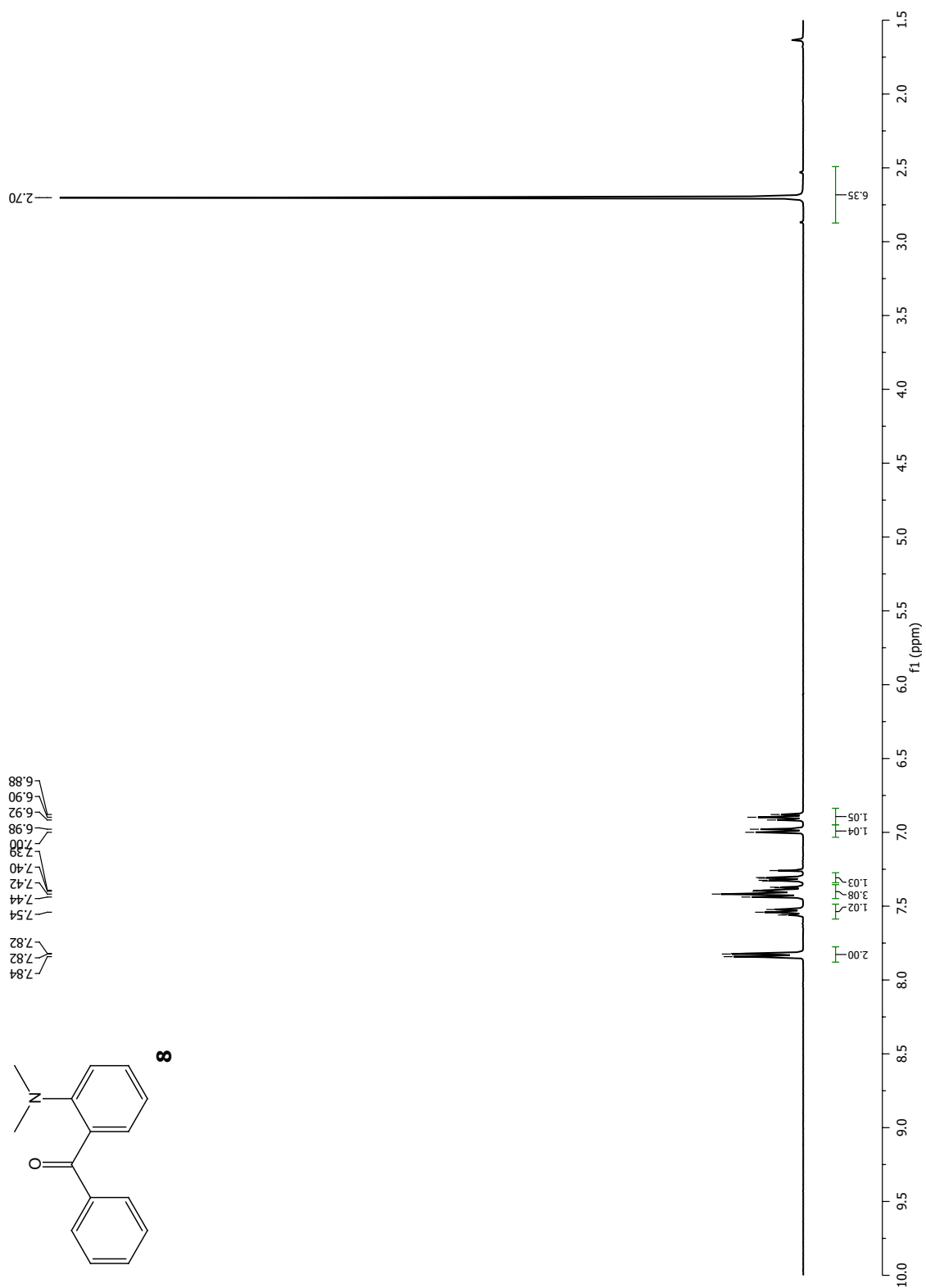




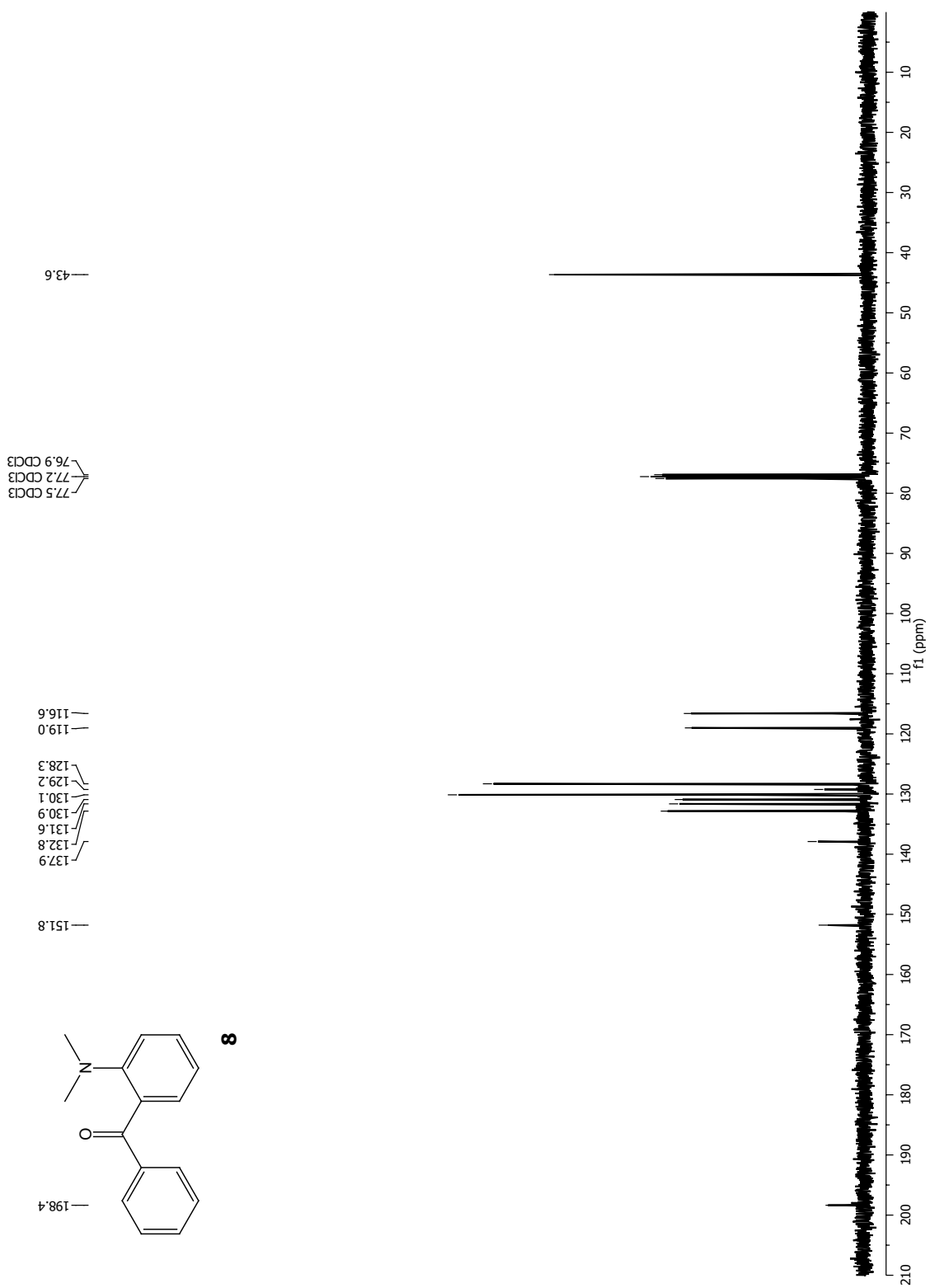


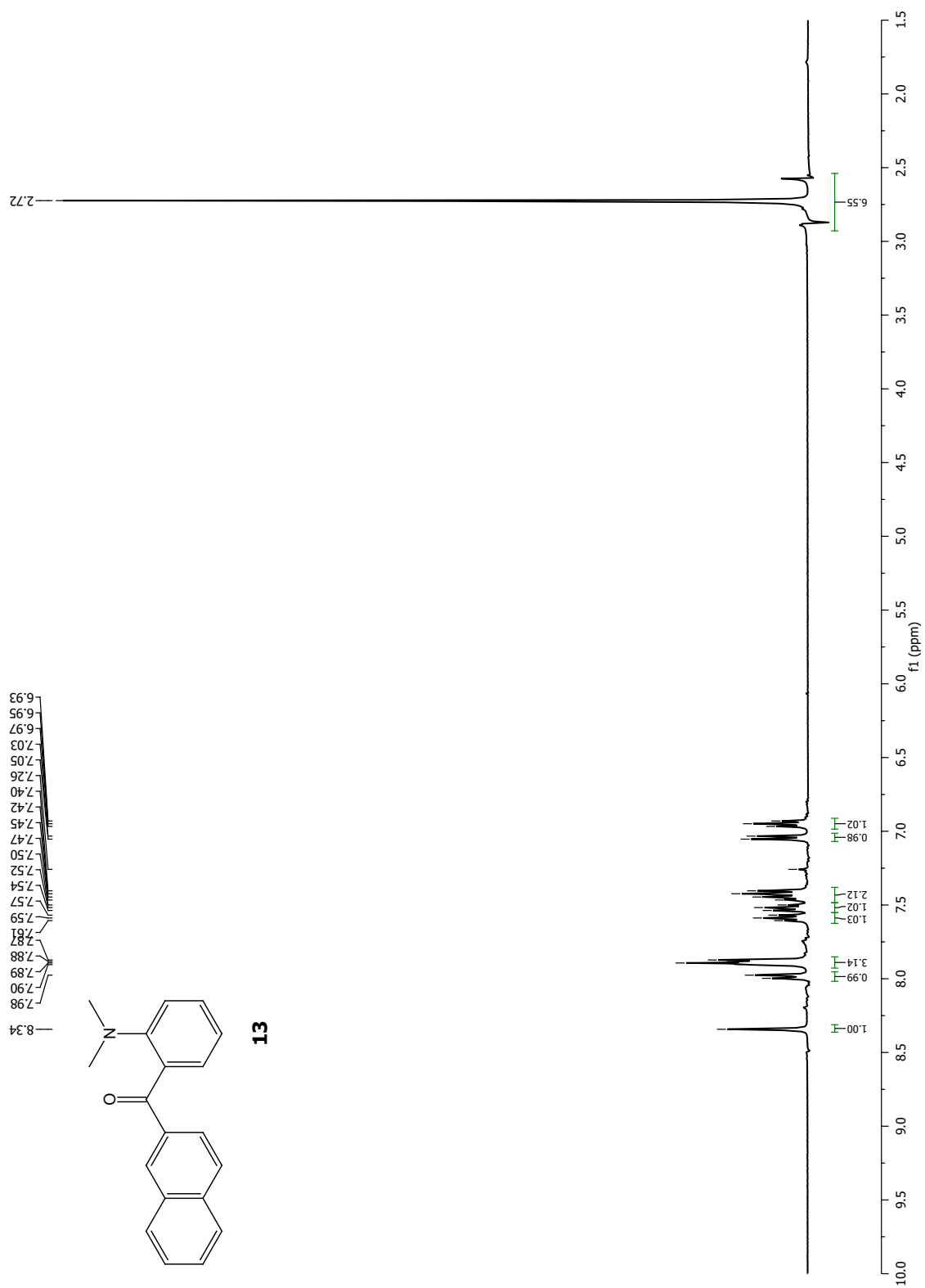


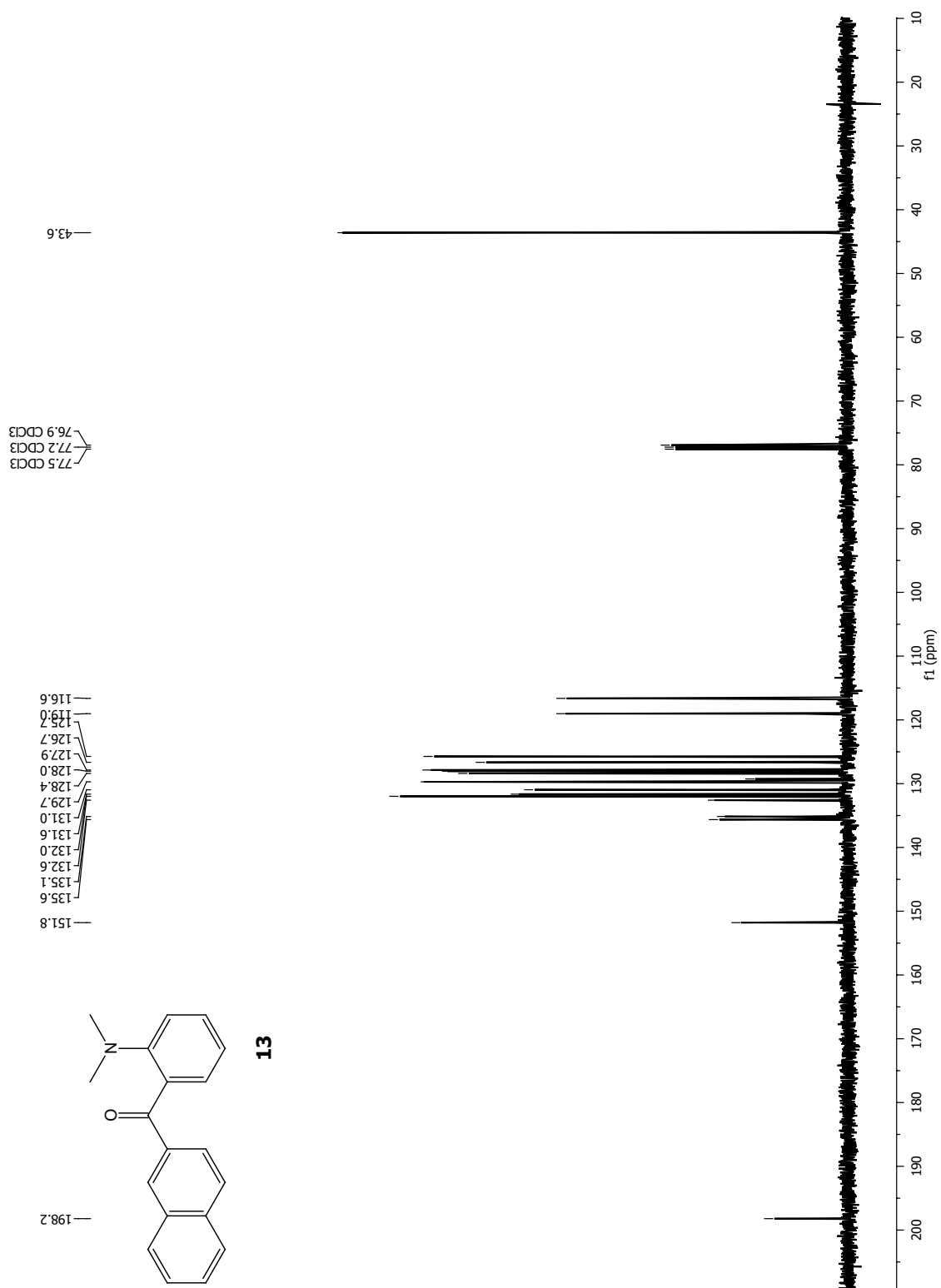




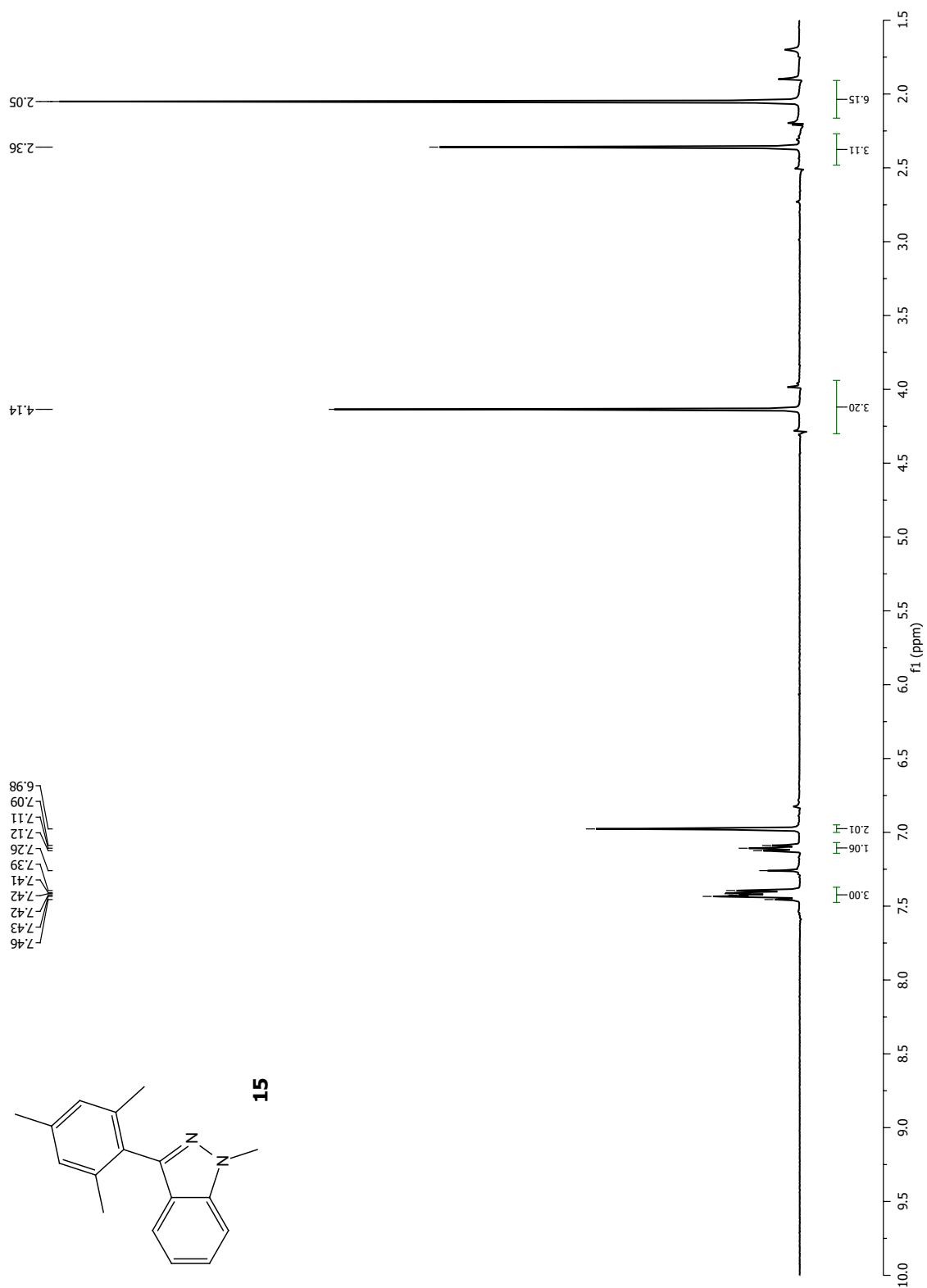
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7.40
7.39
7.00
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6.92
6.90
6.88

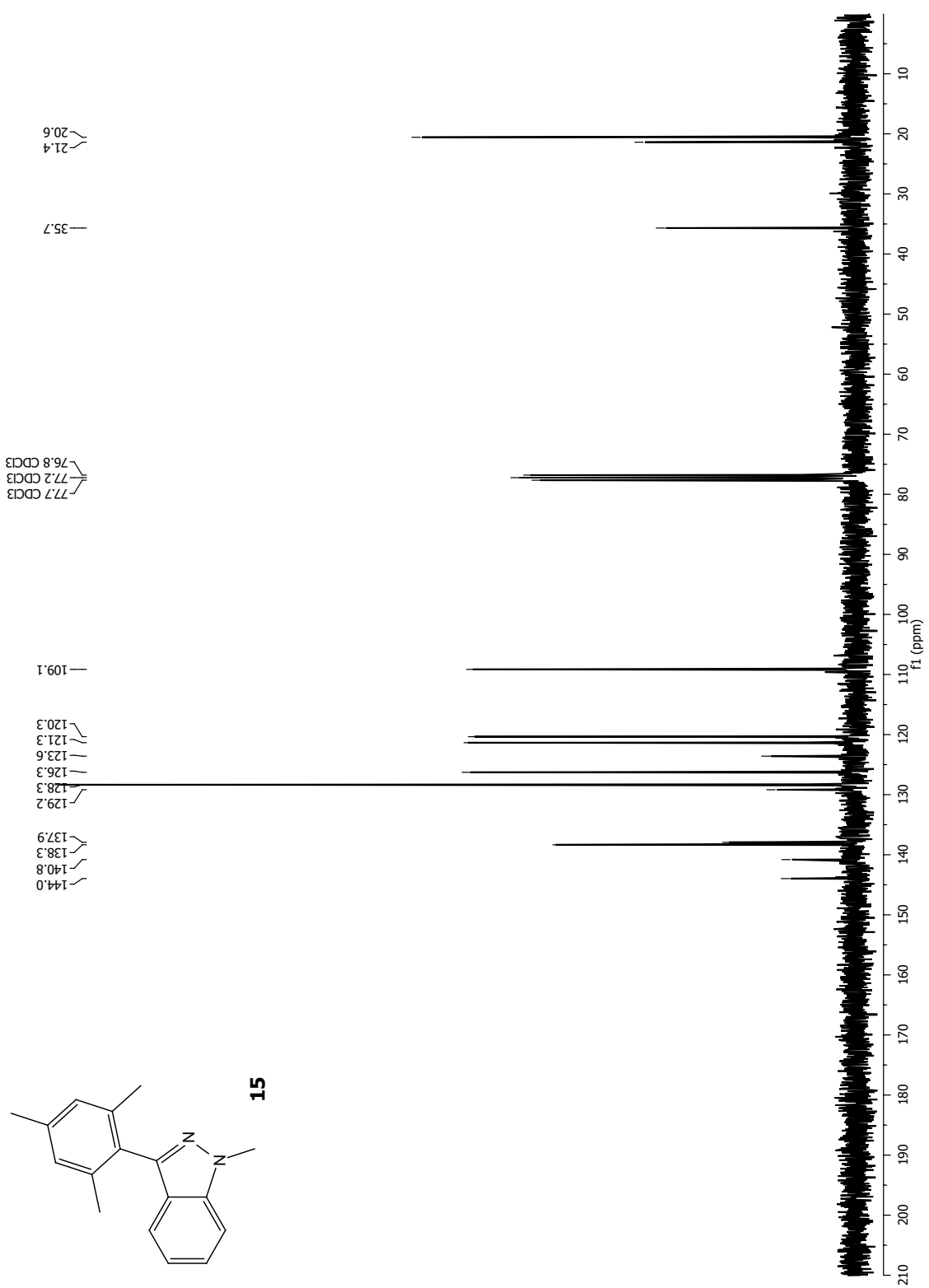


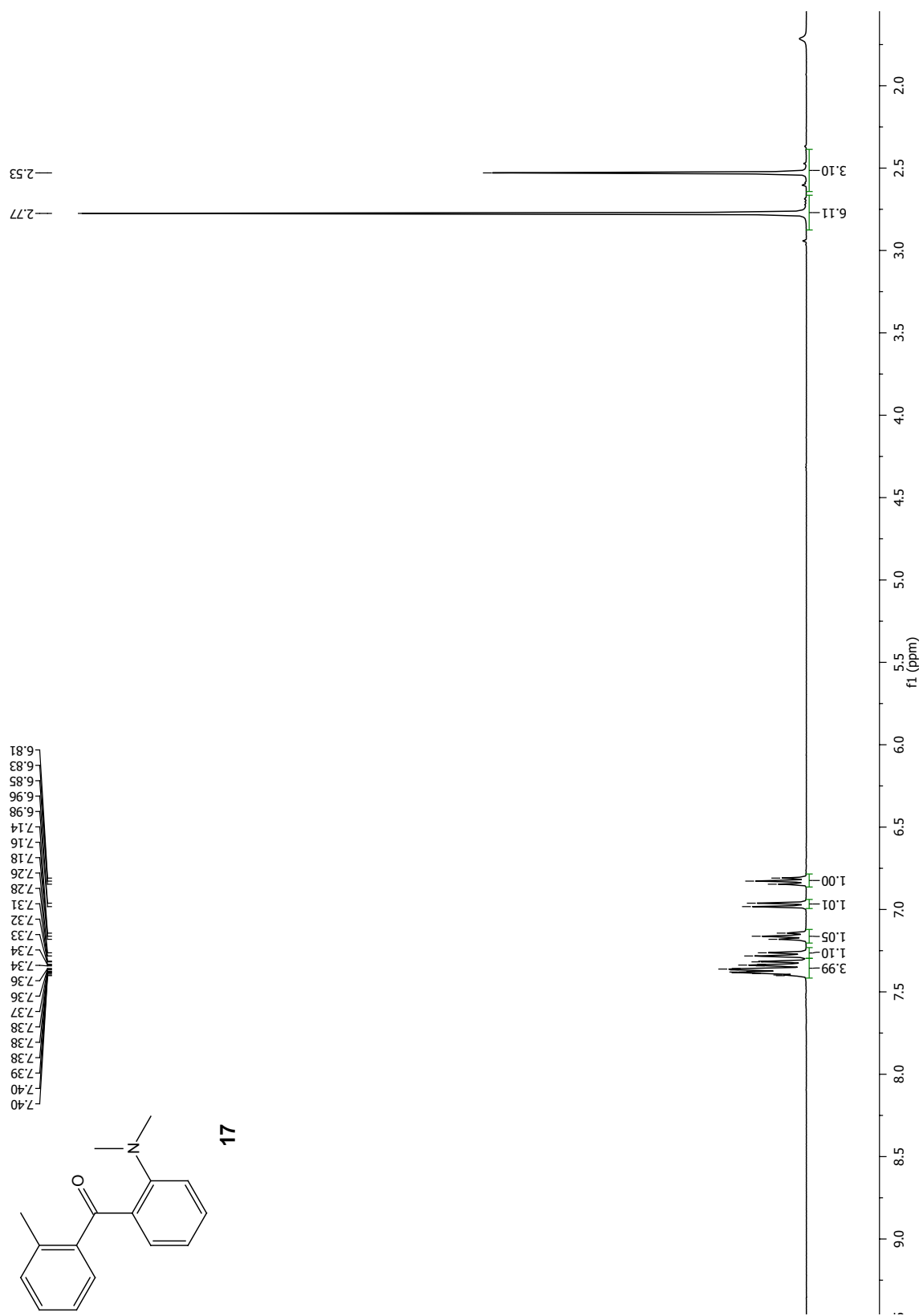




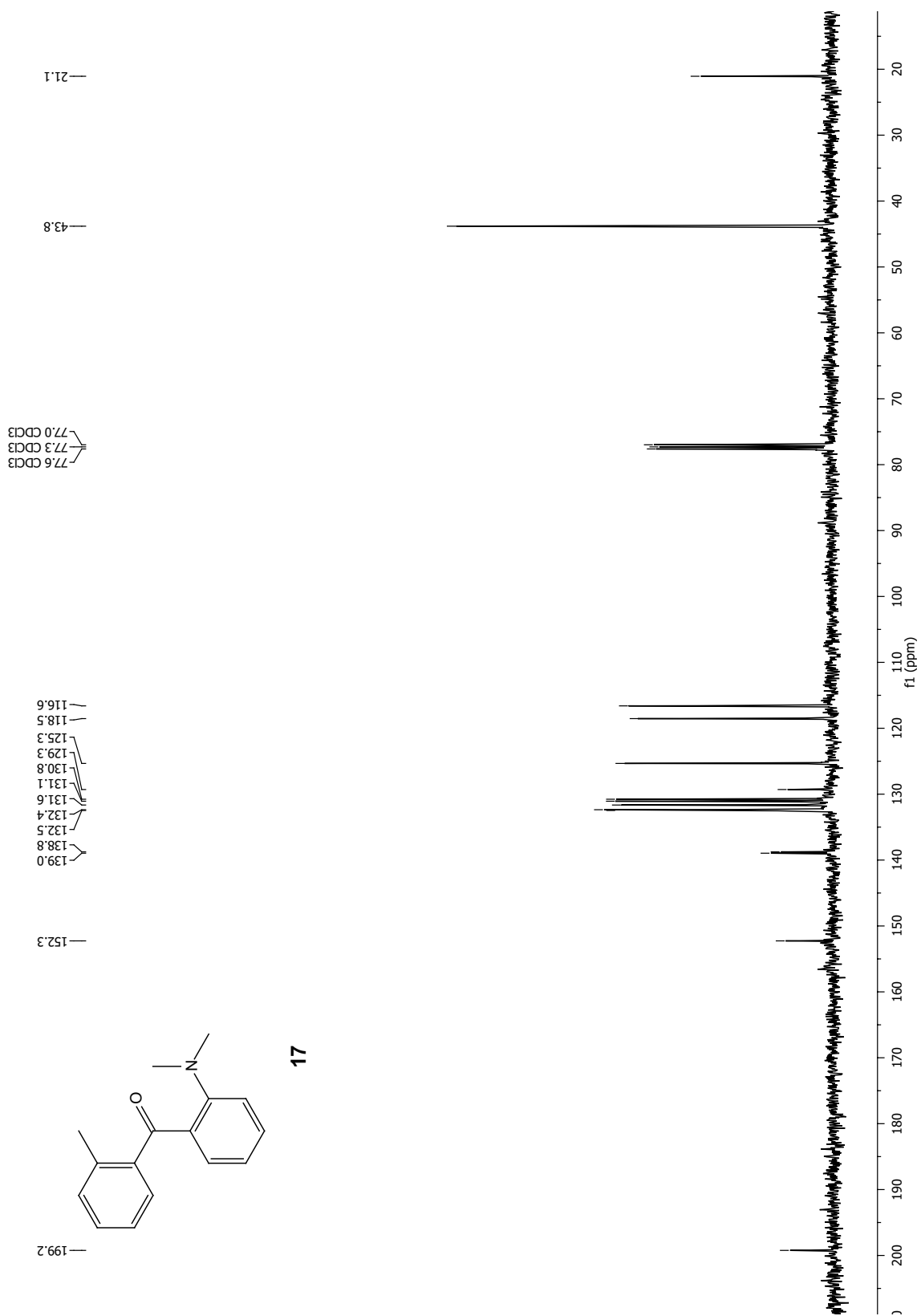
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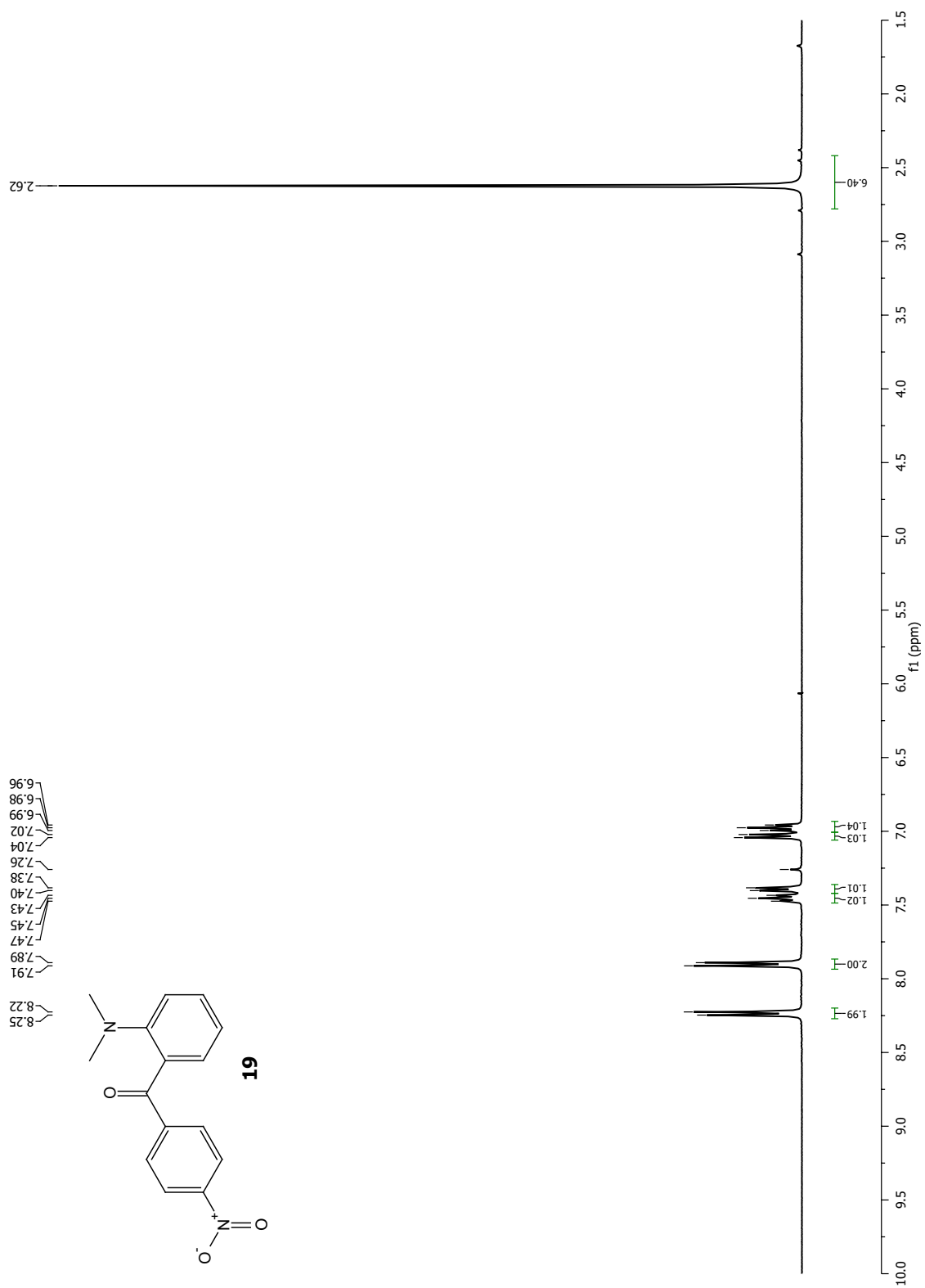


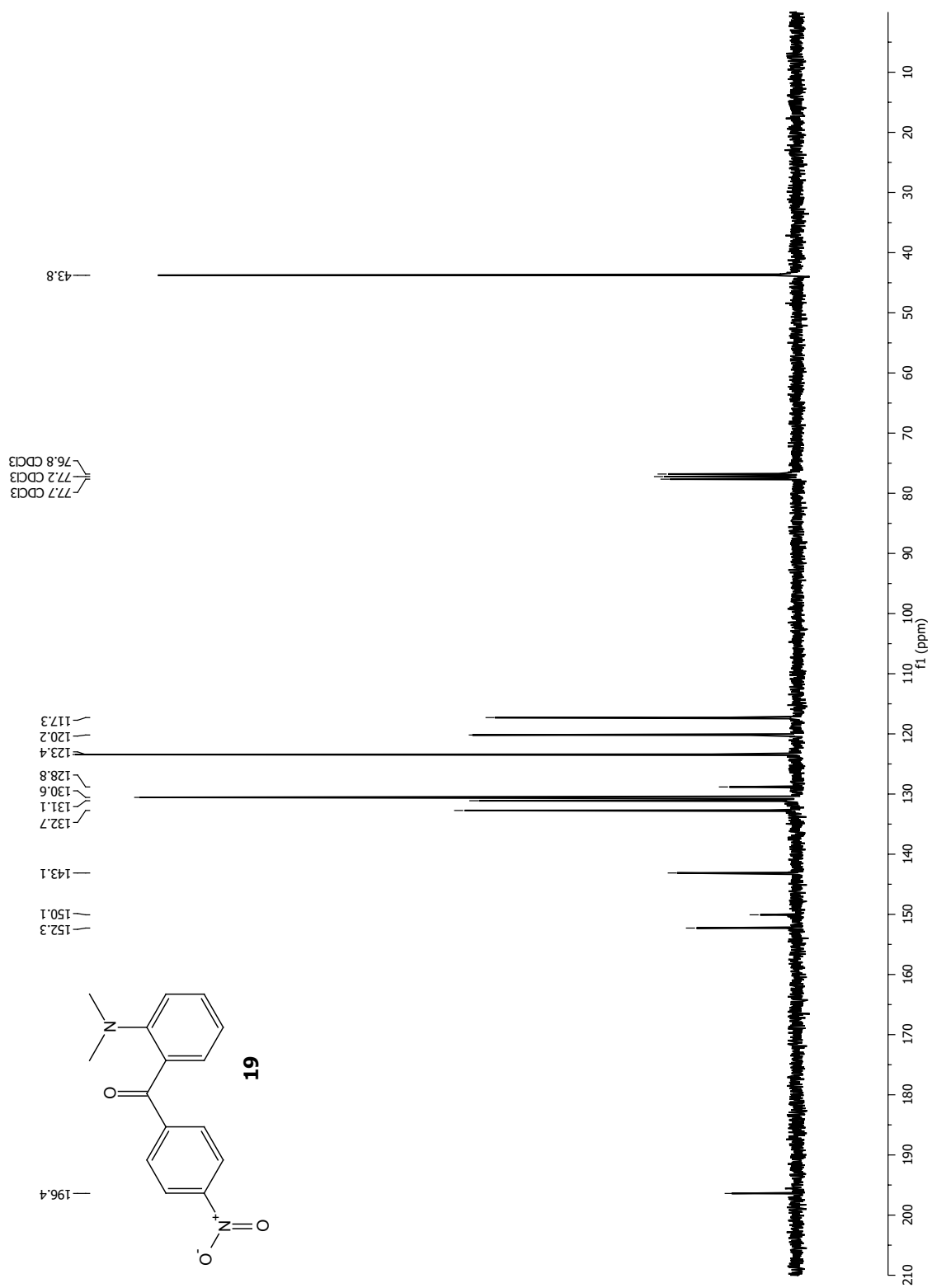


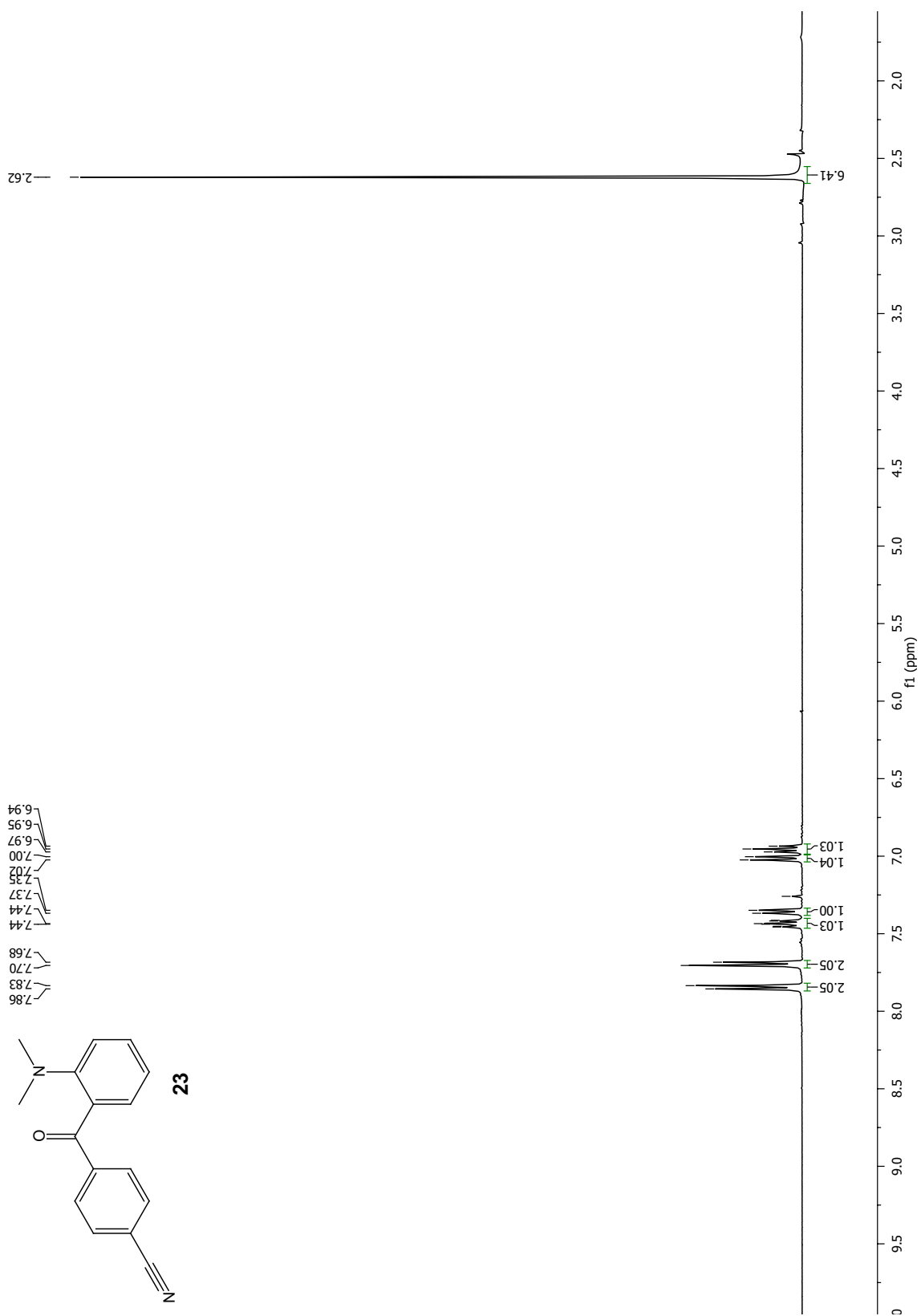


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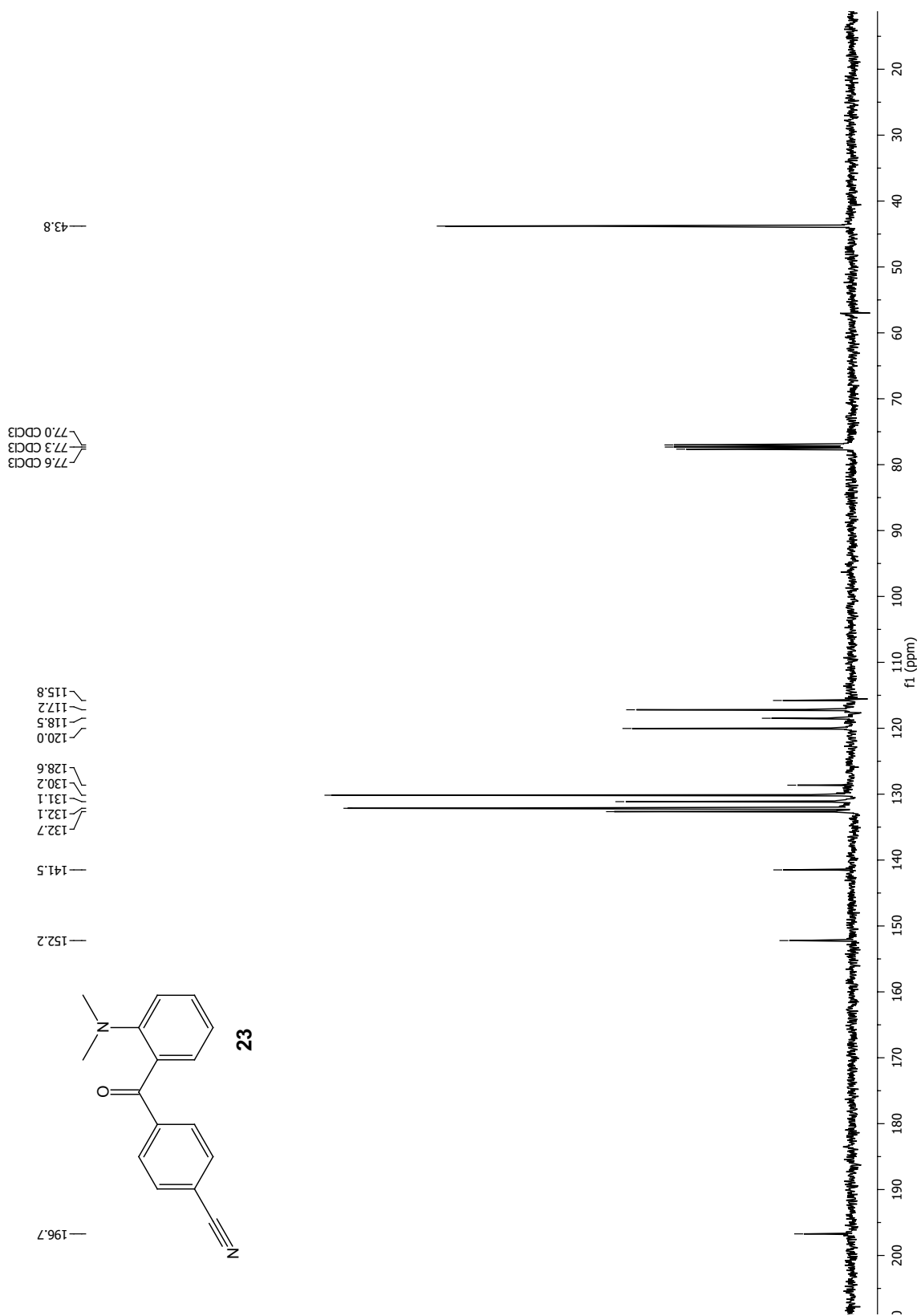


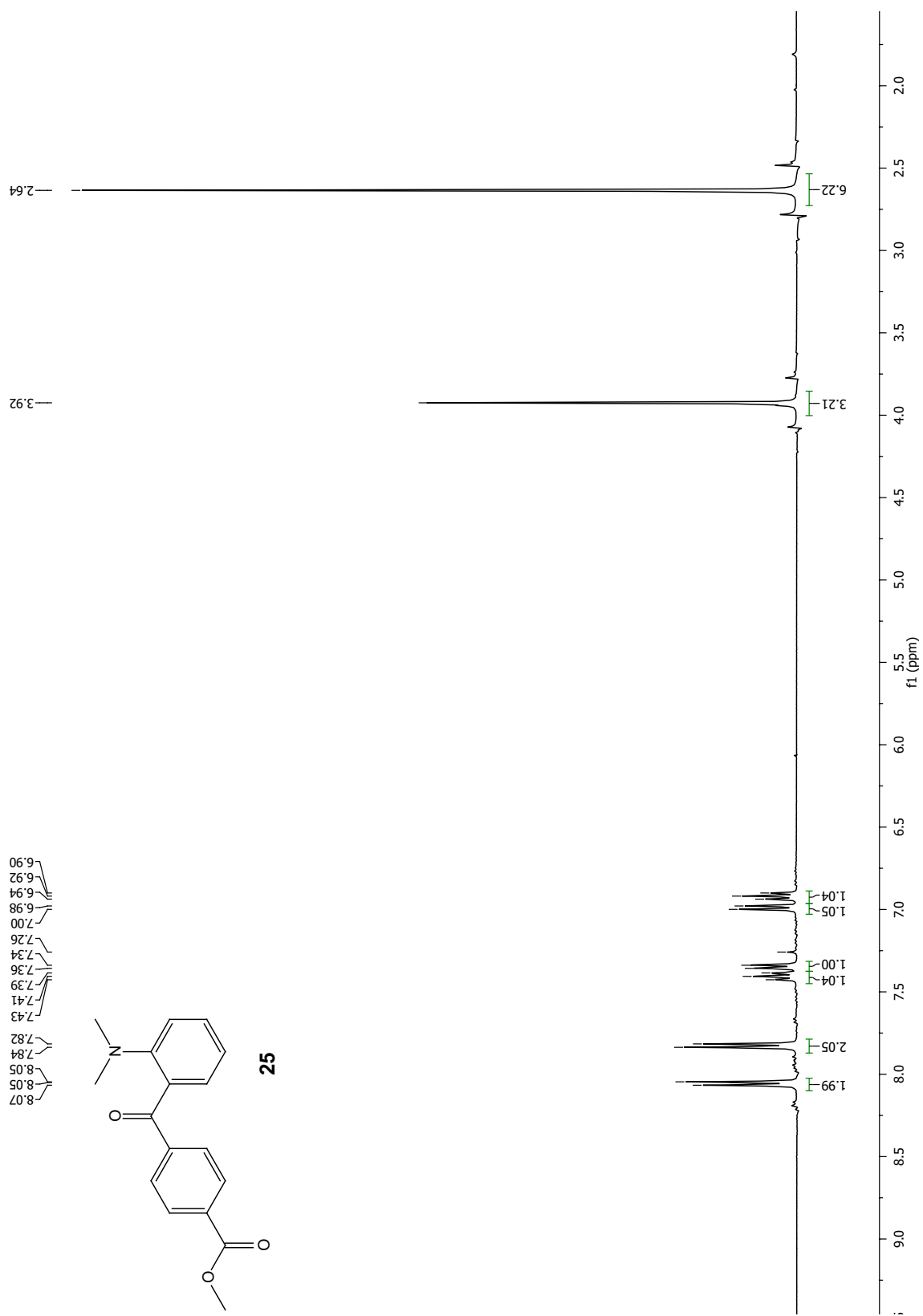


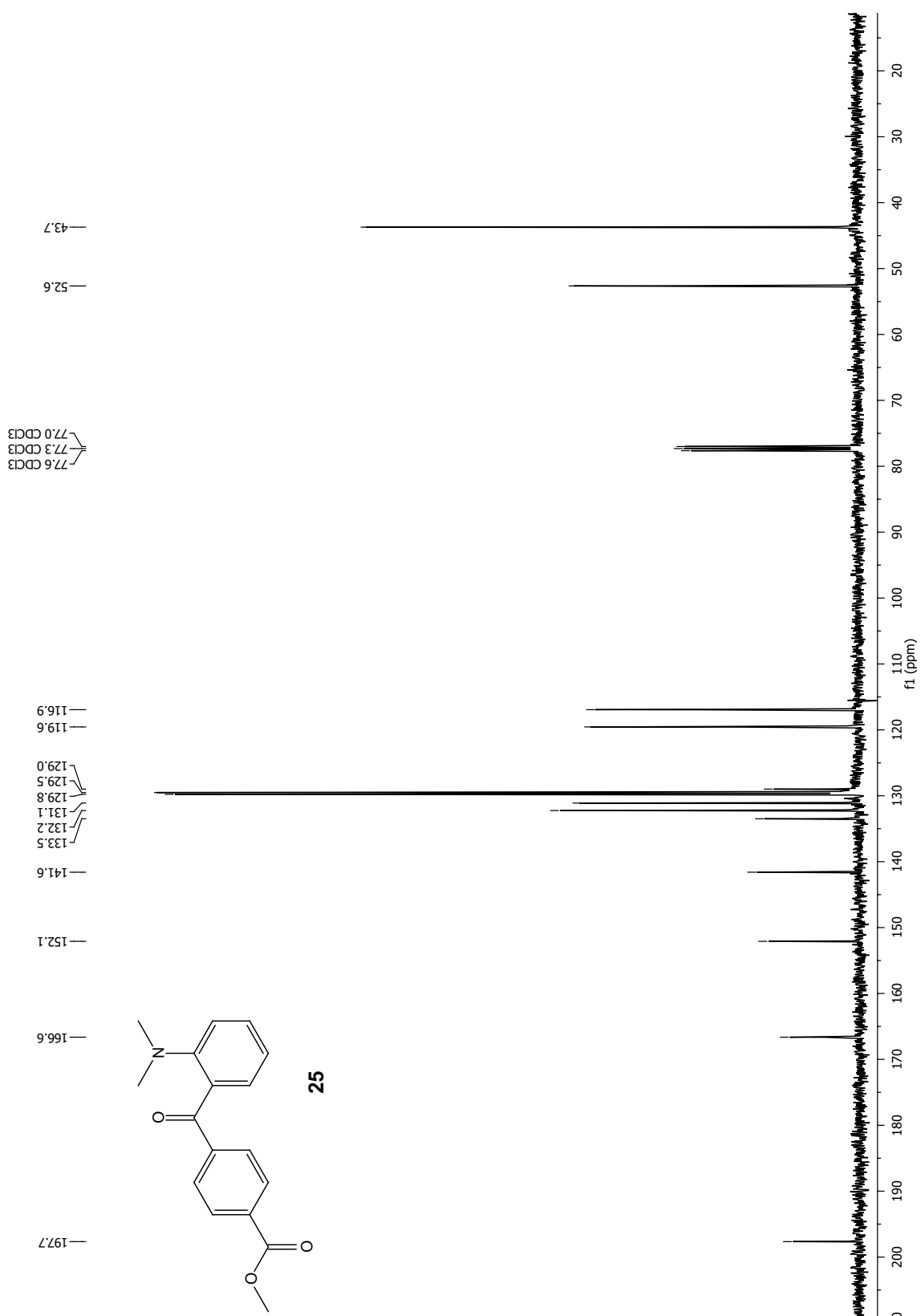


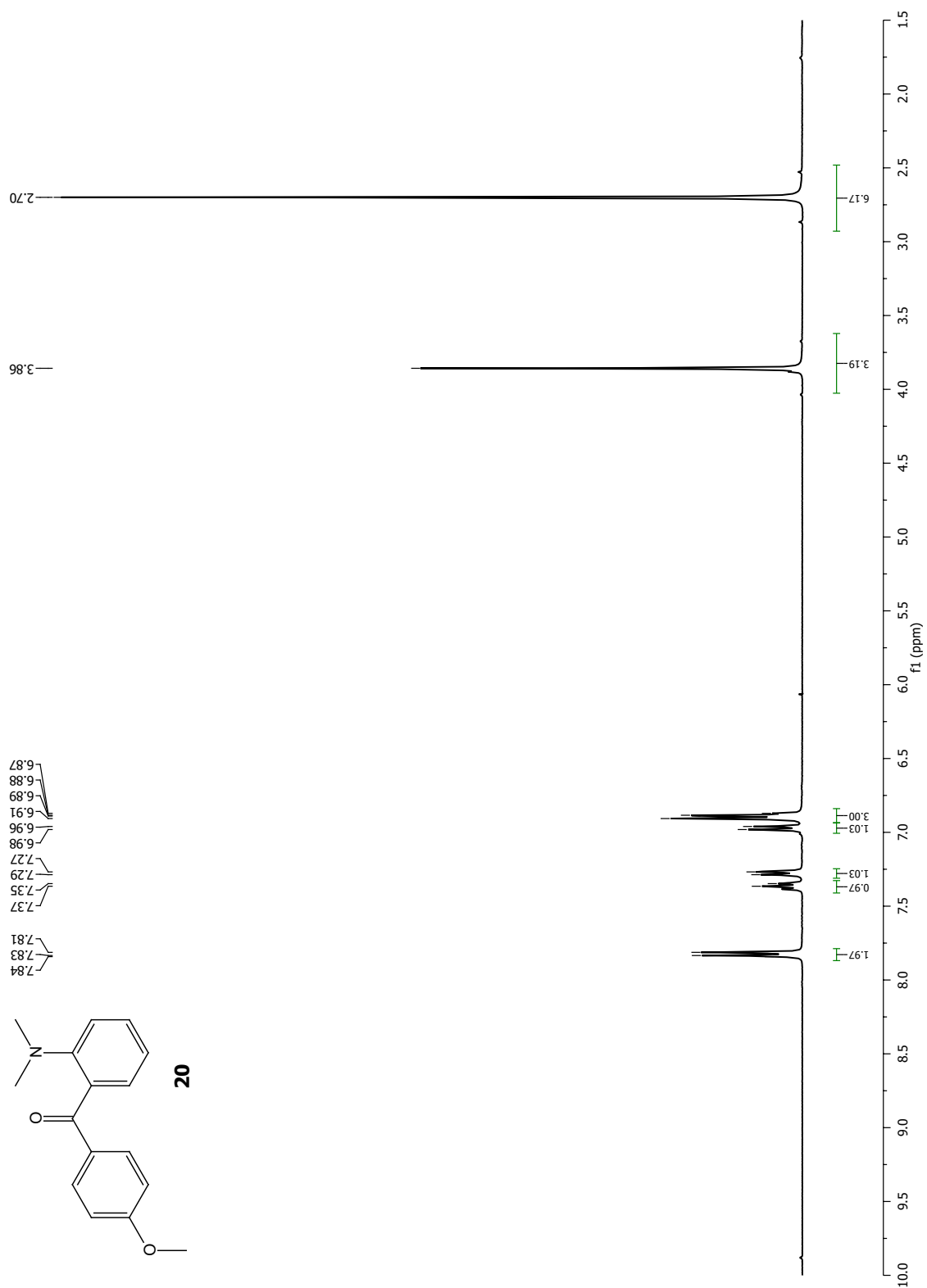


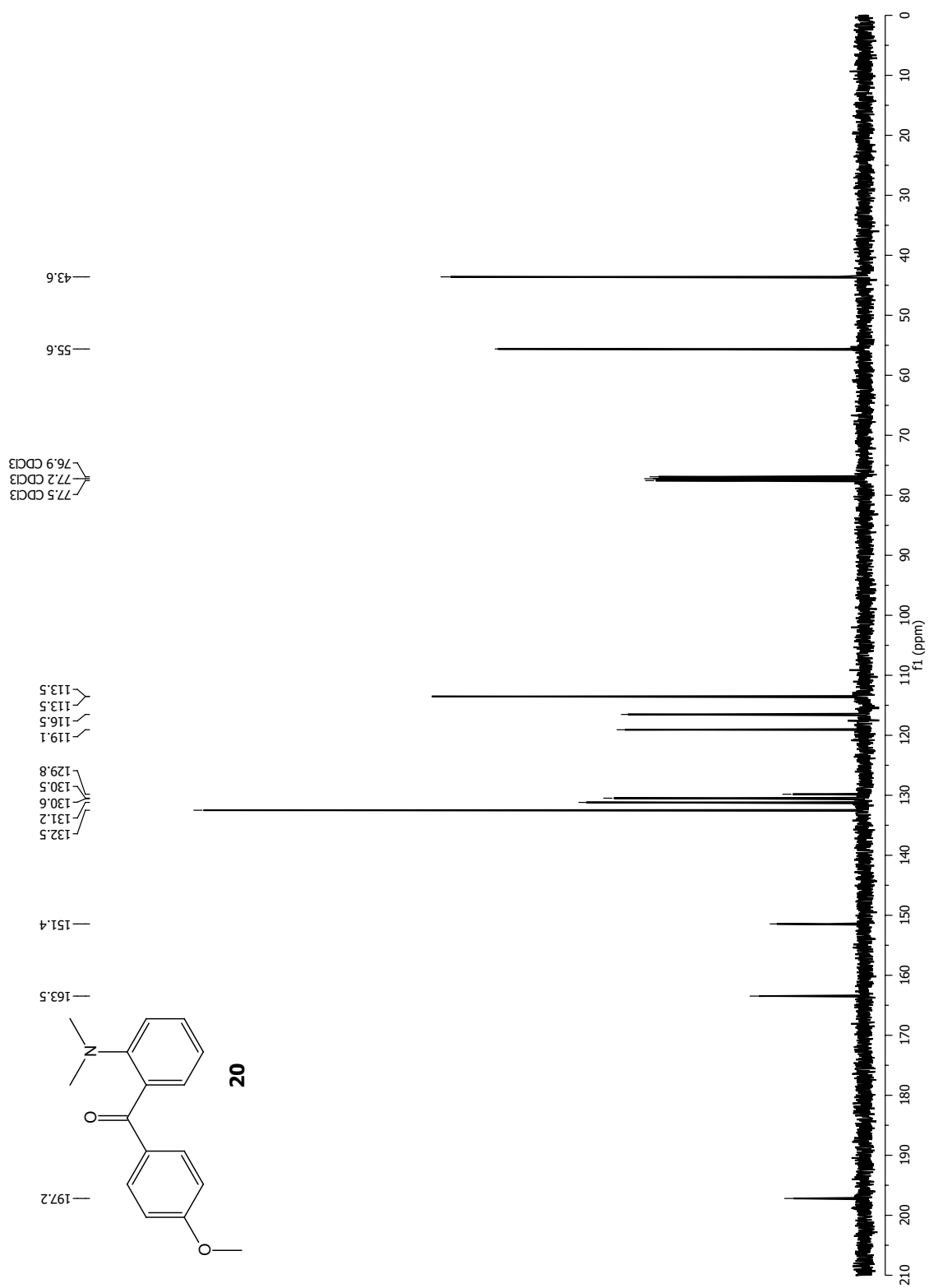
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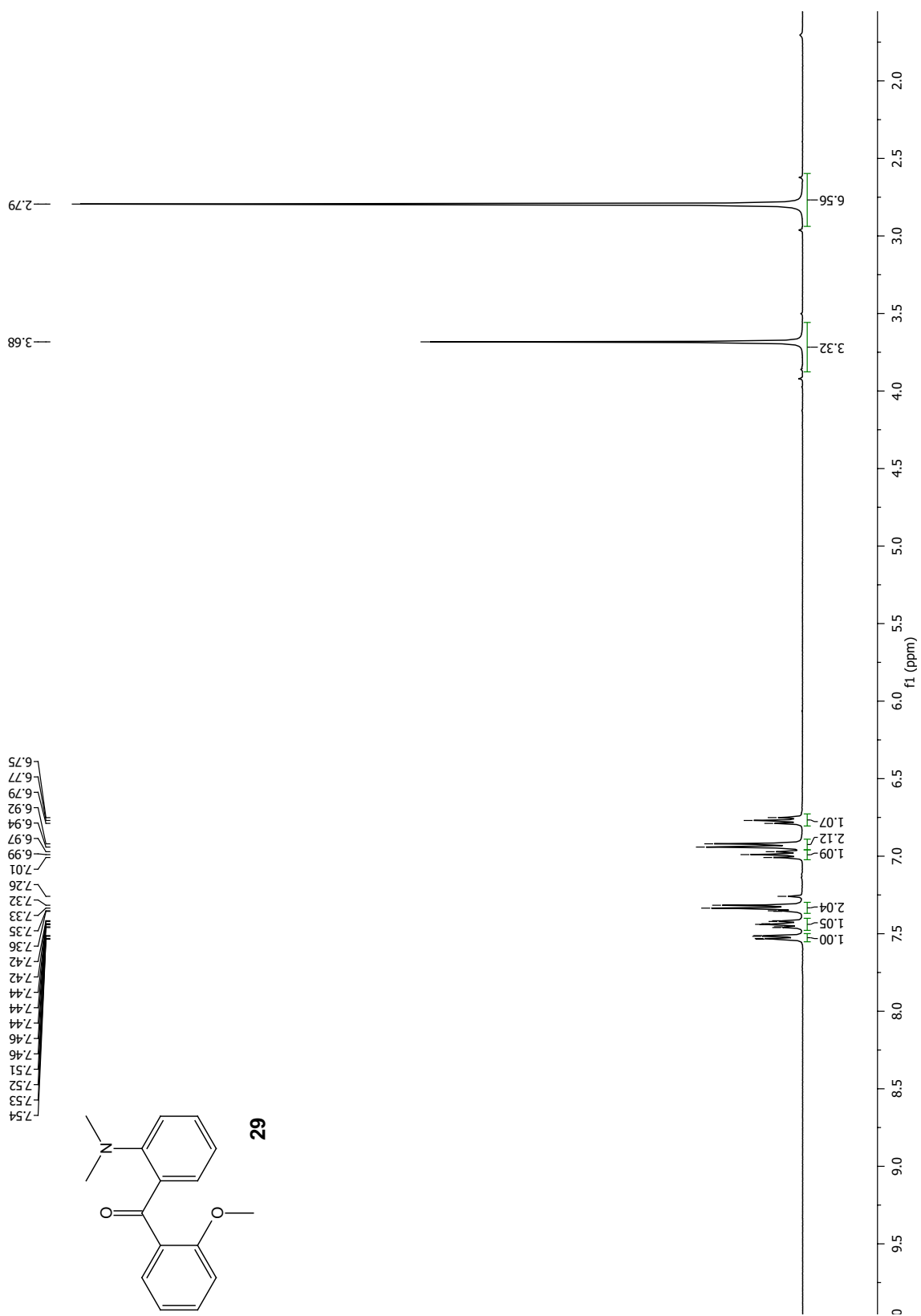




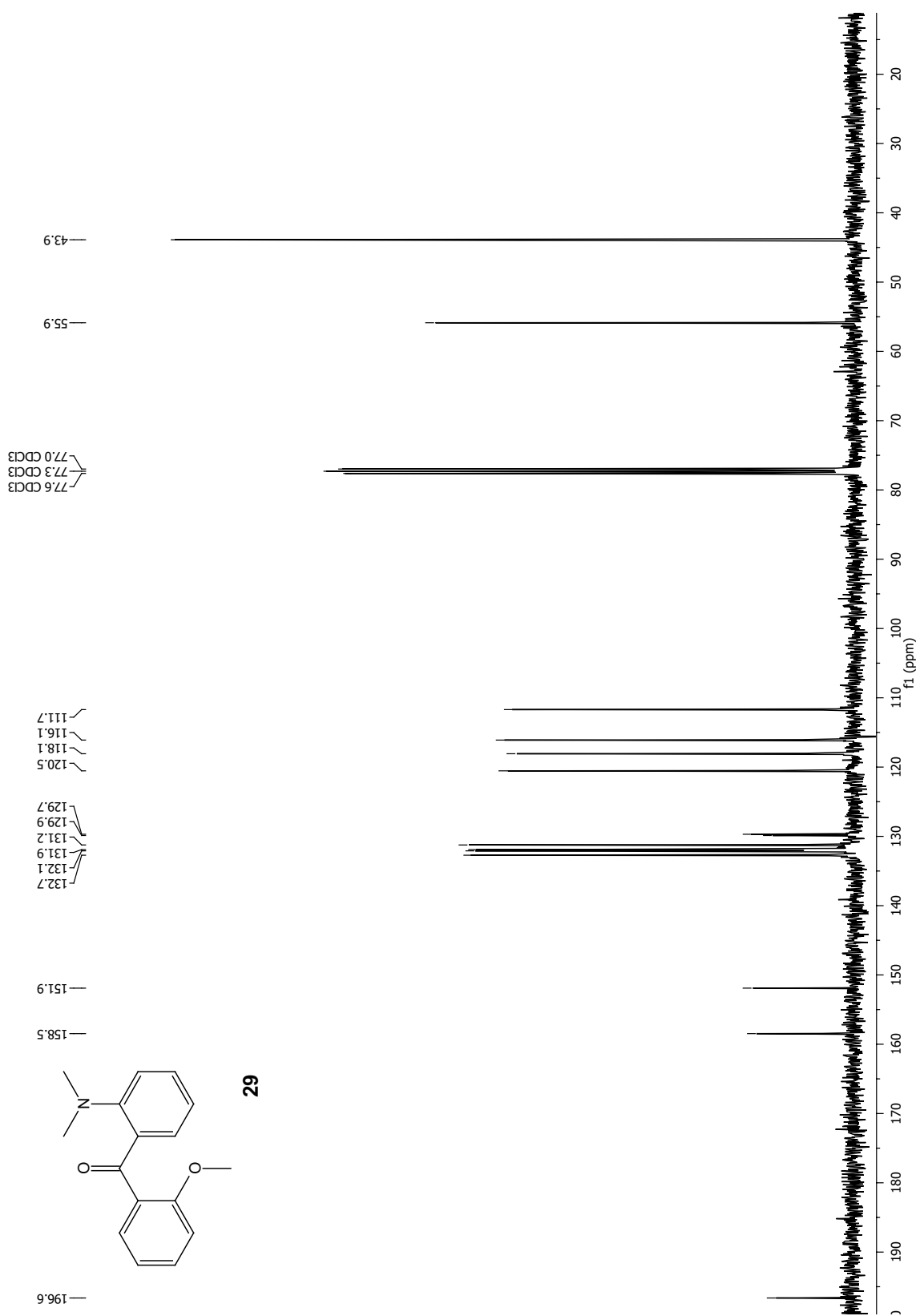


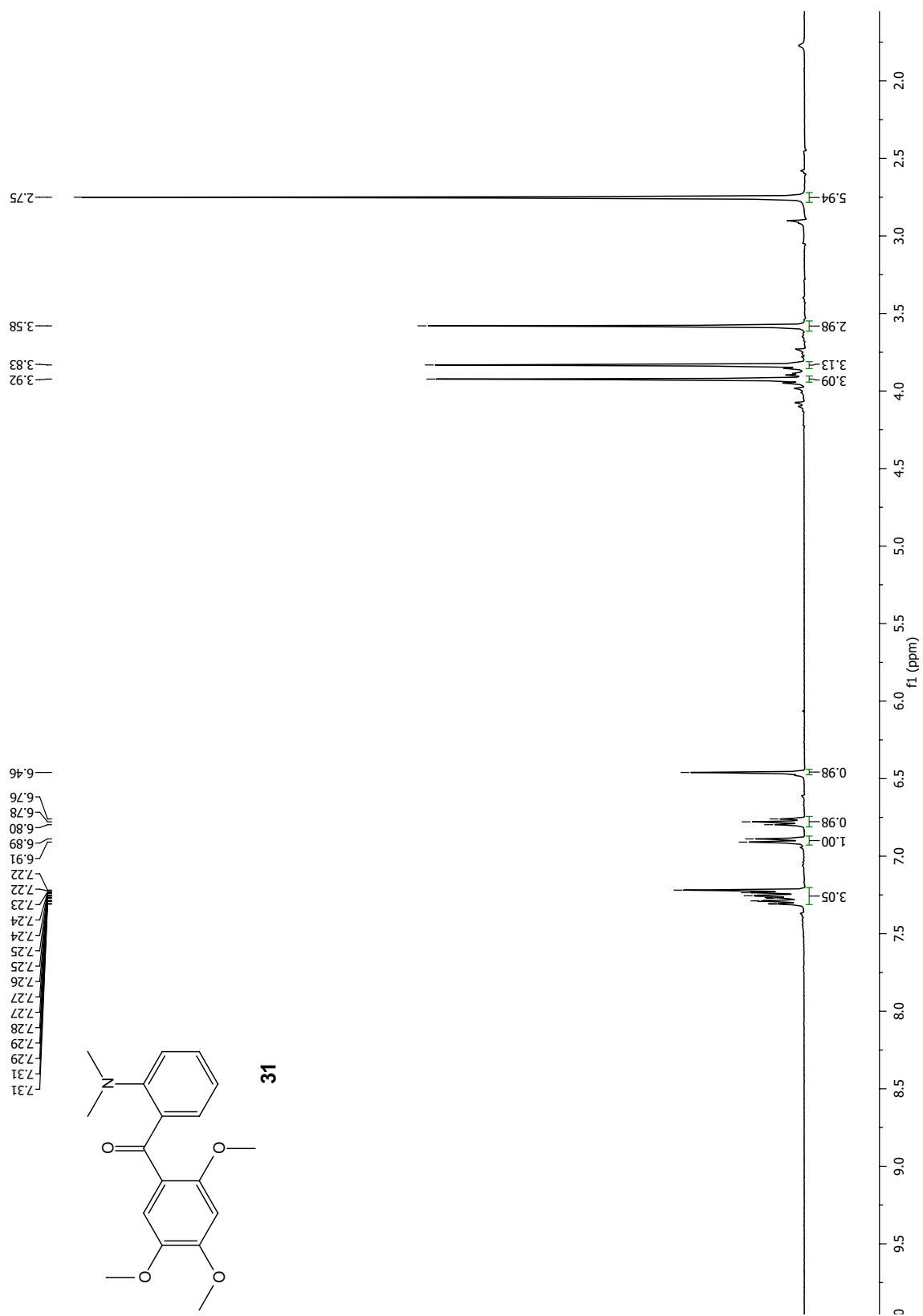


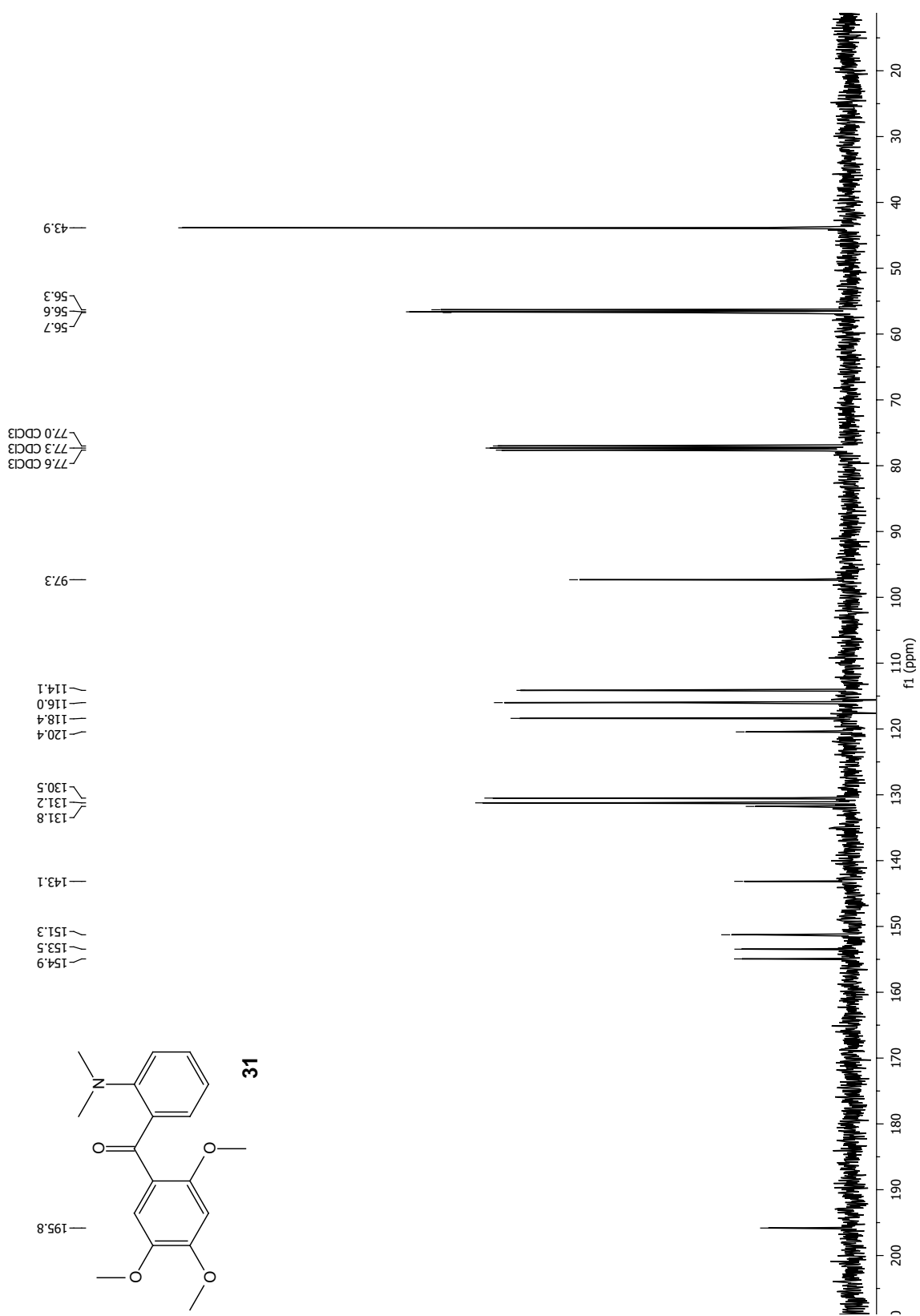




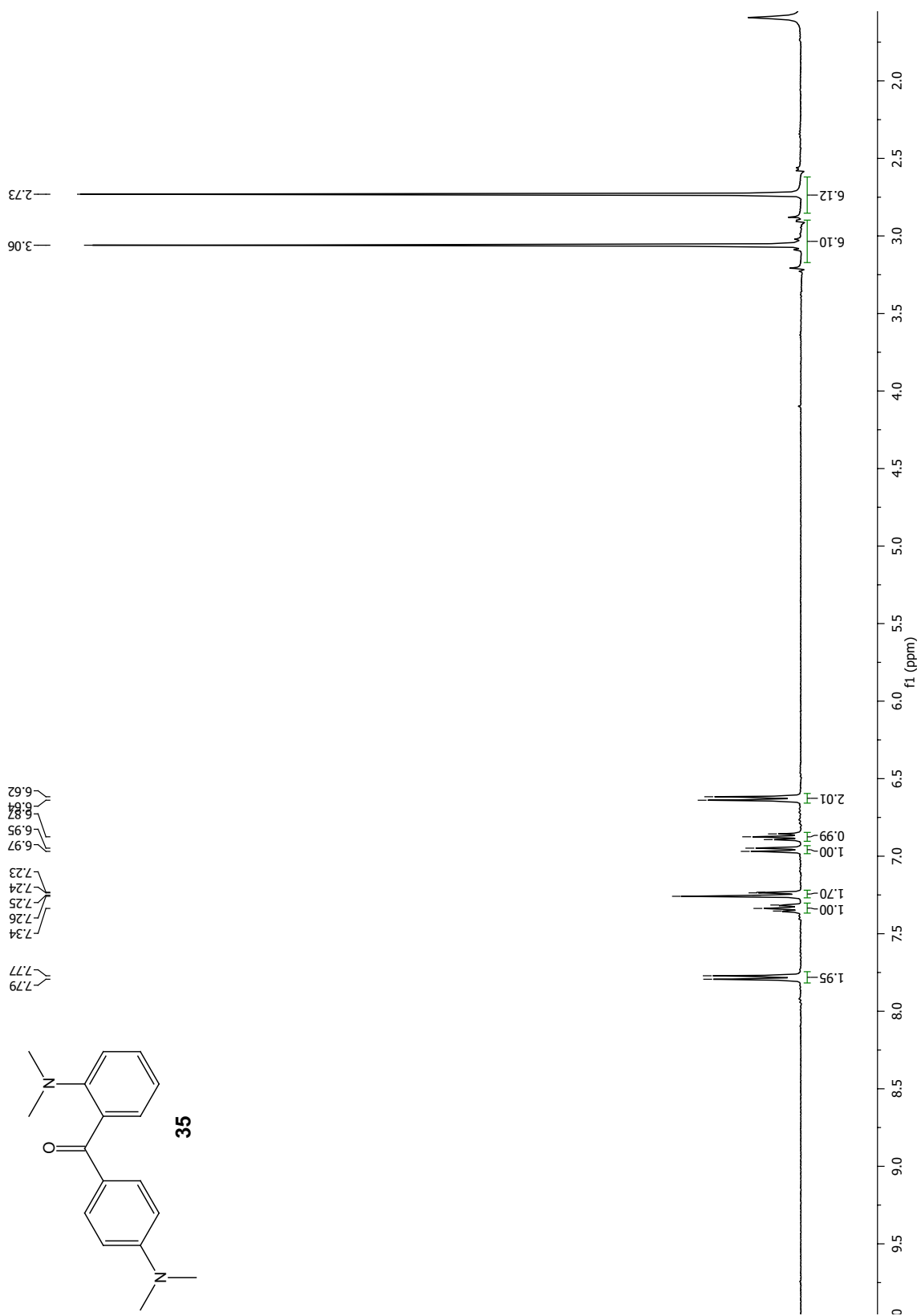
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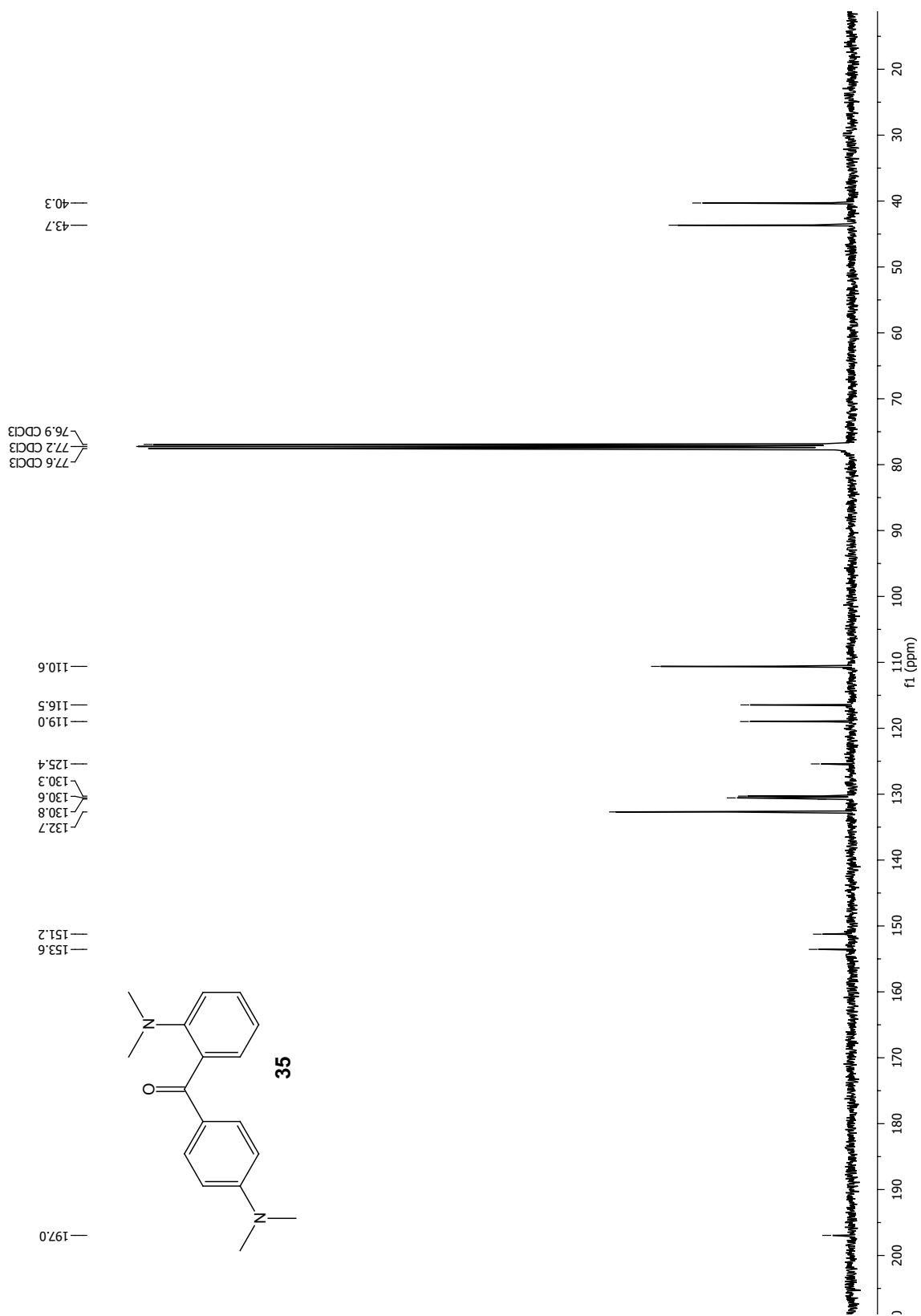


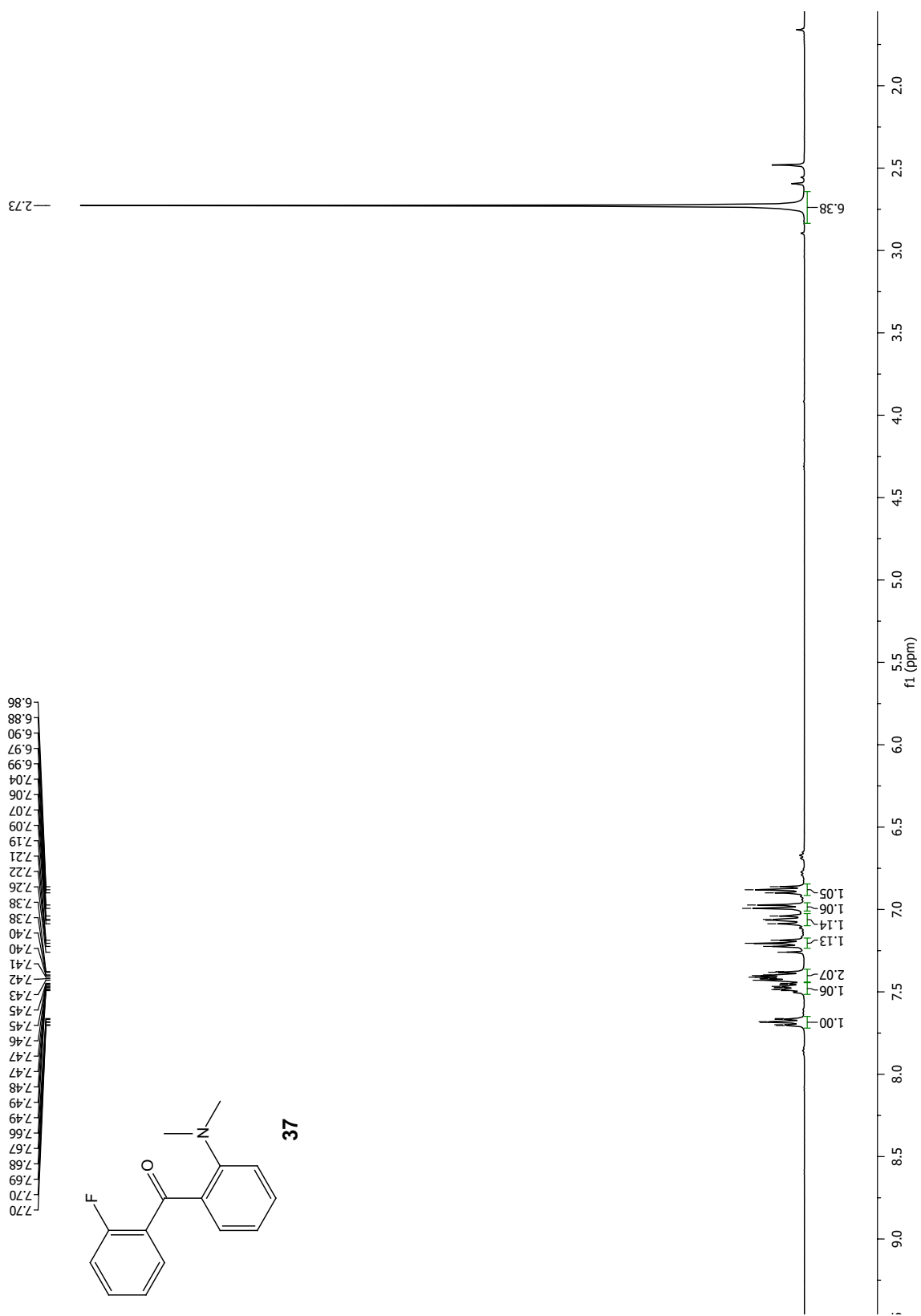


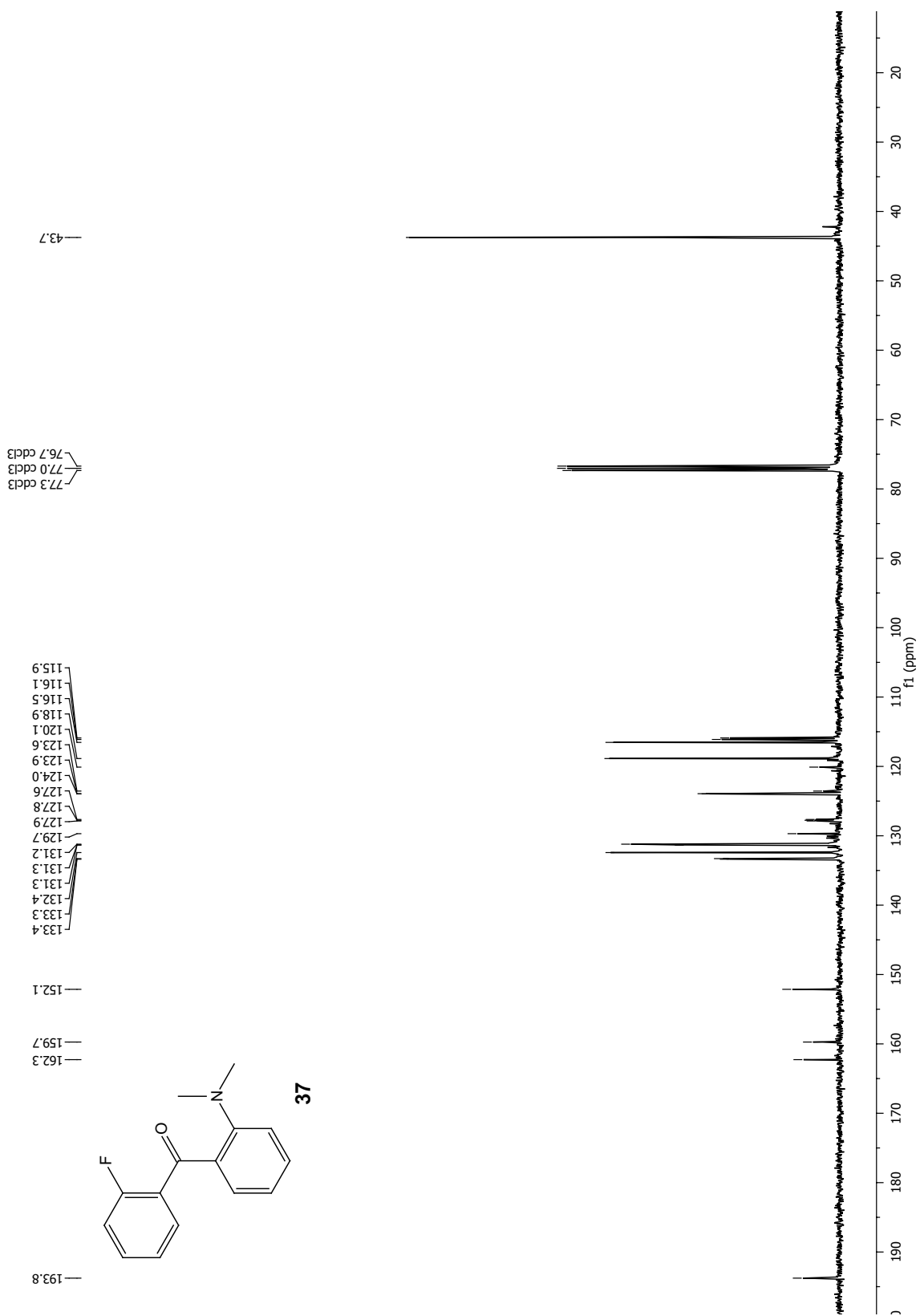


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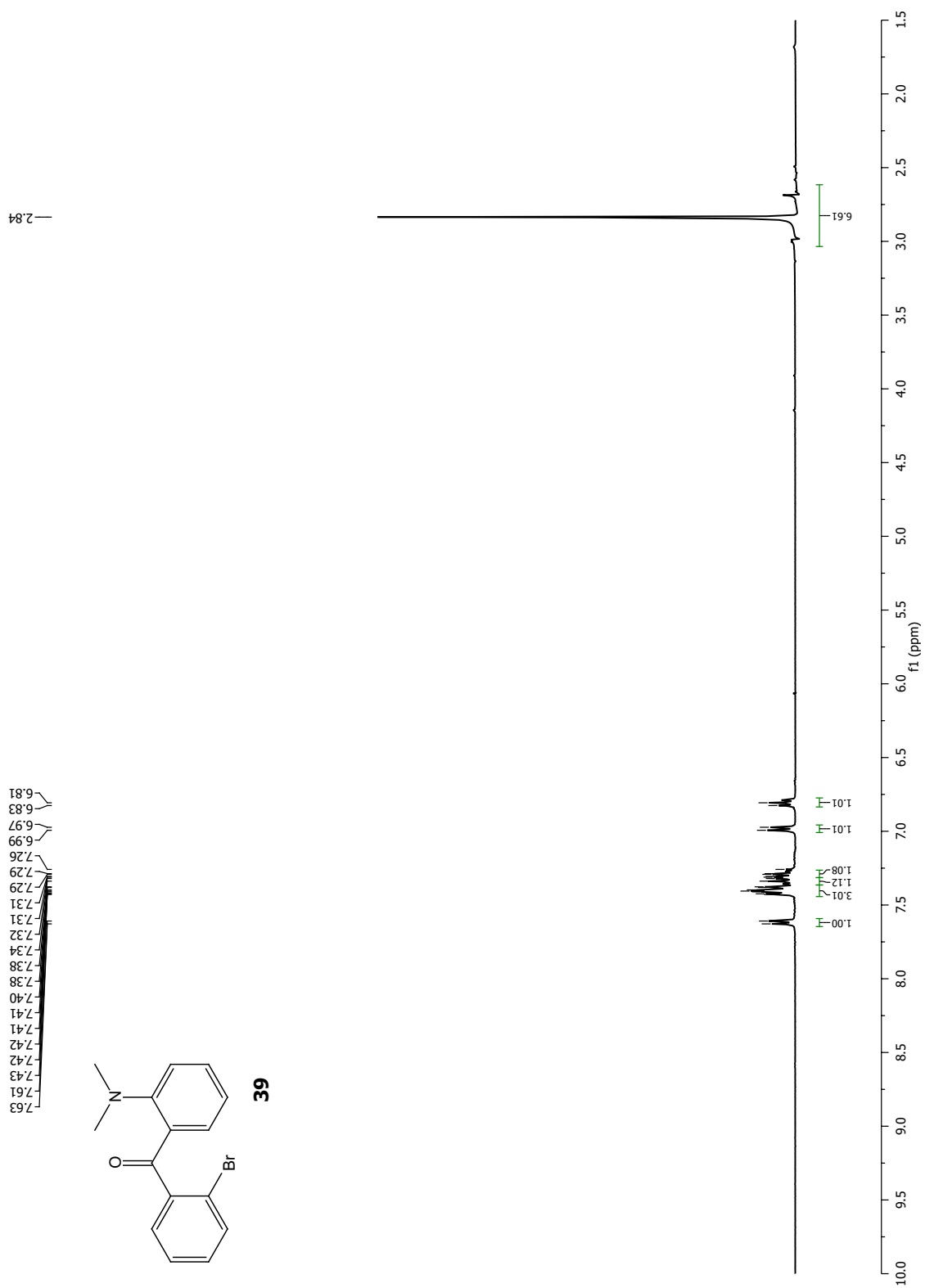


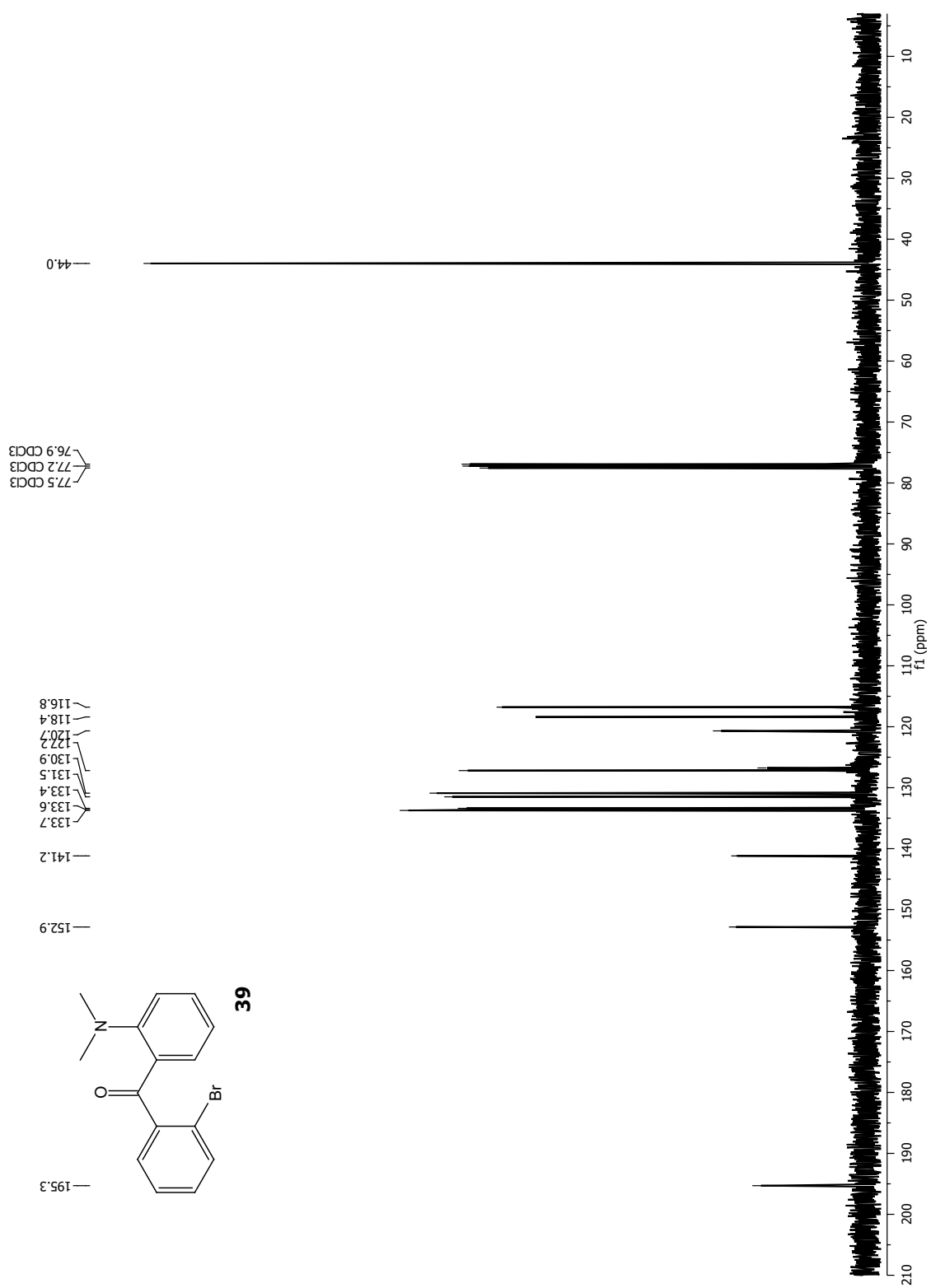


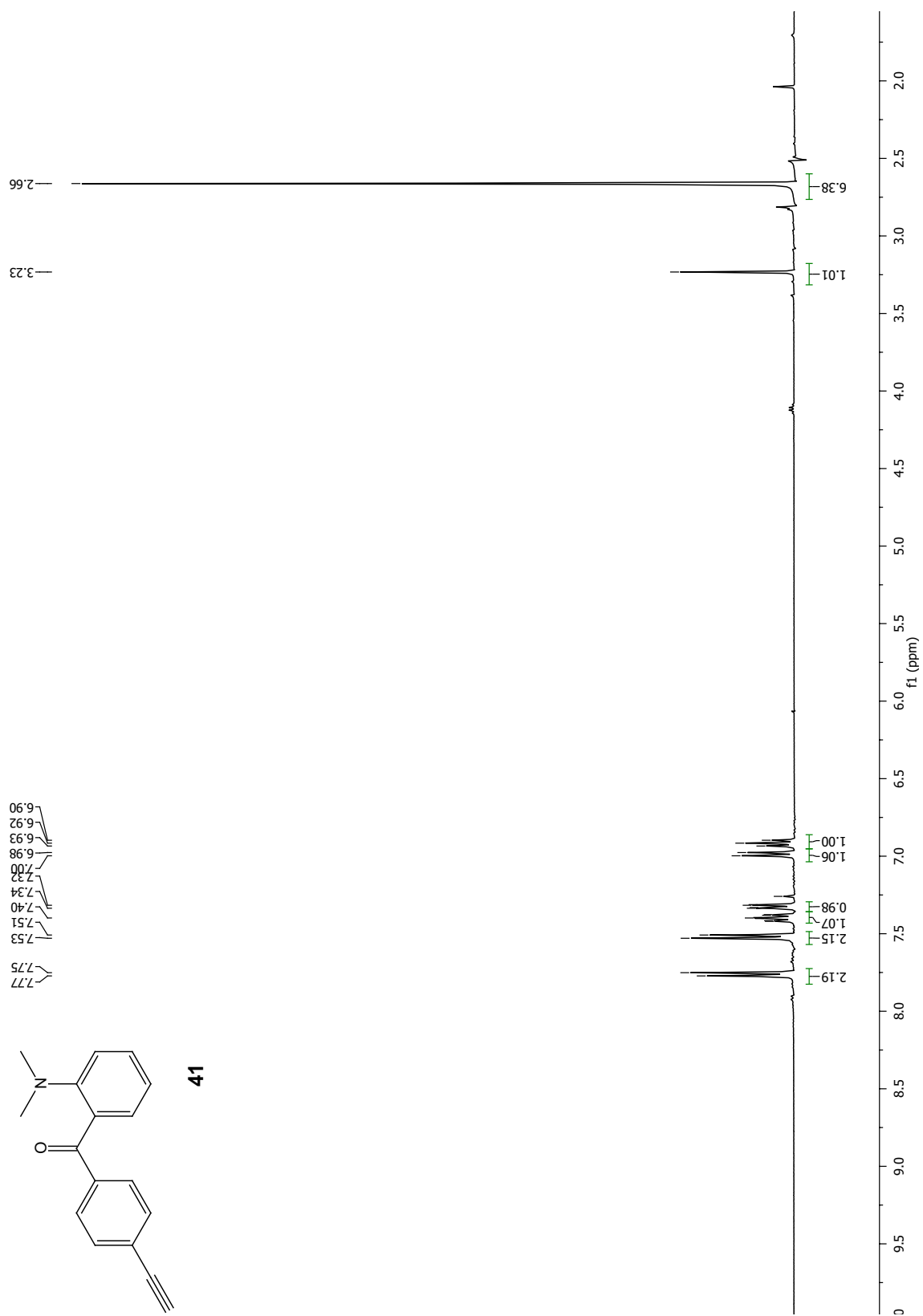




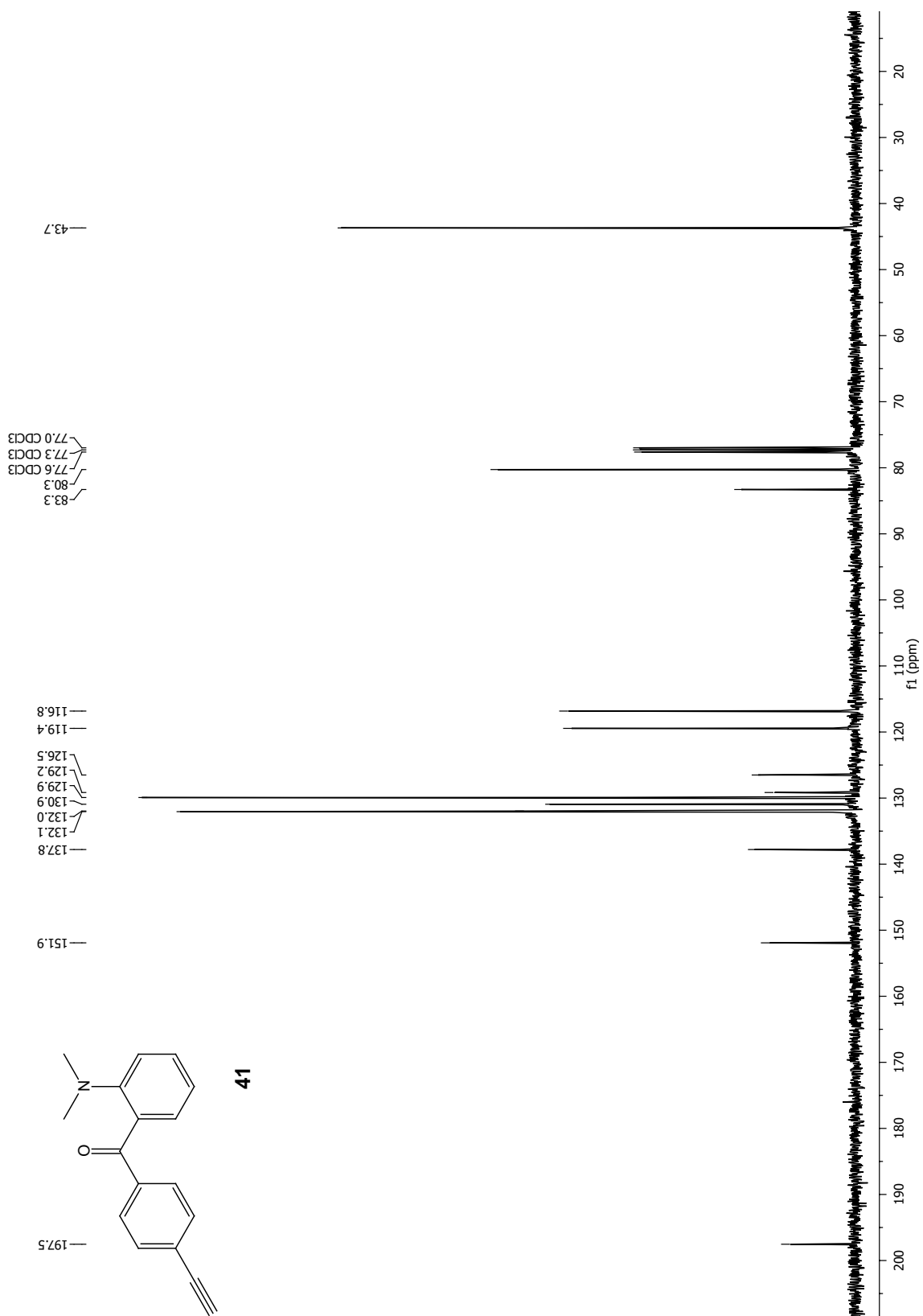
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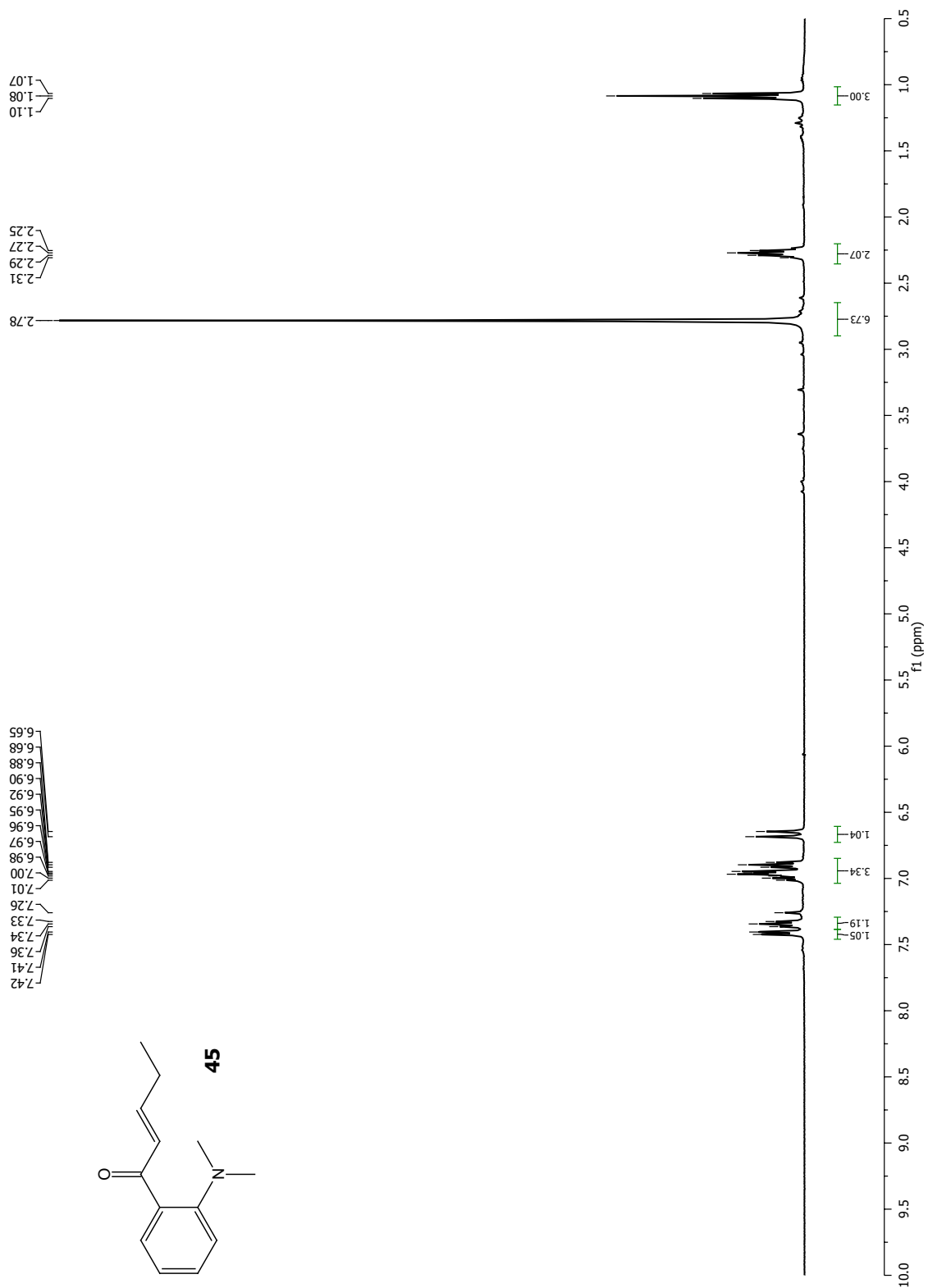


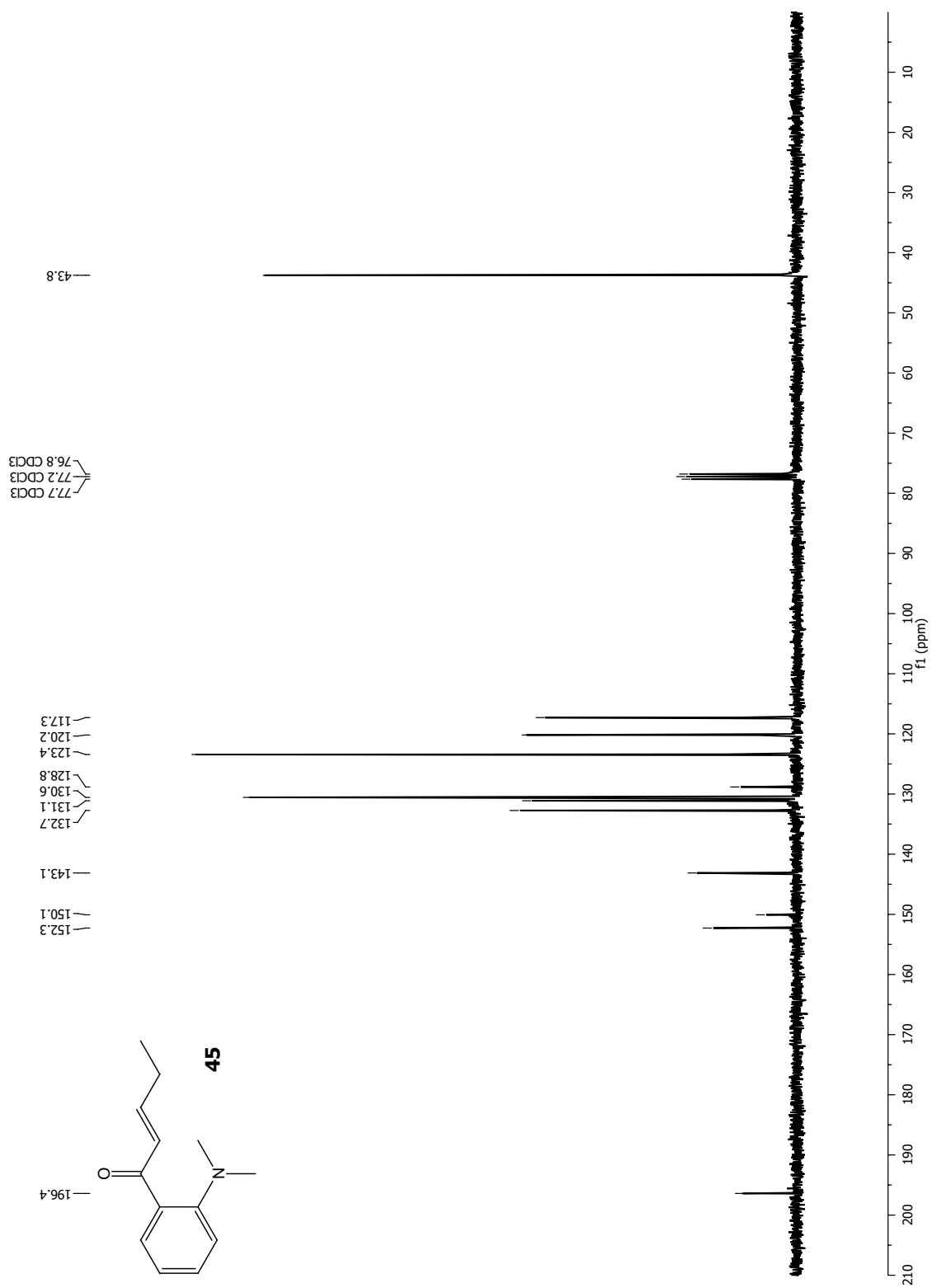


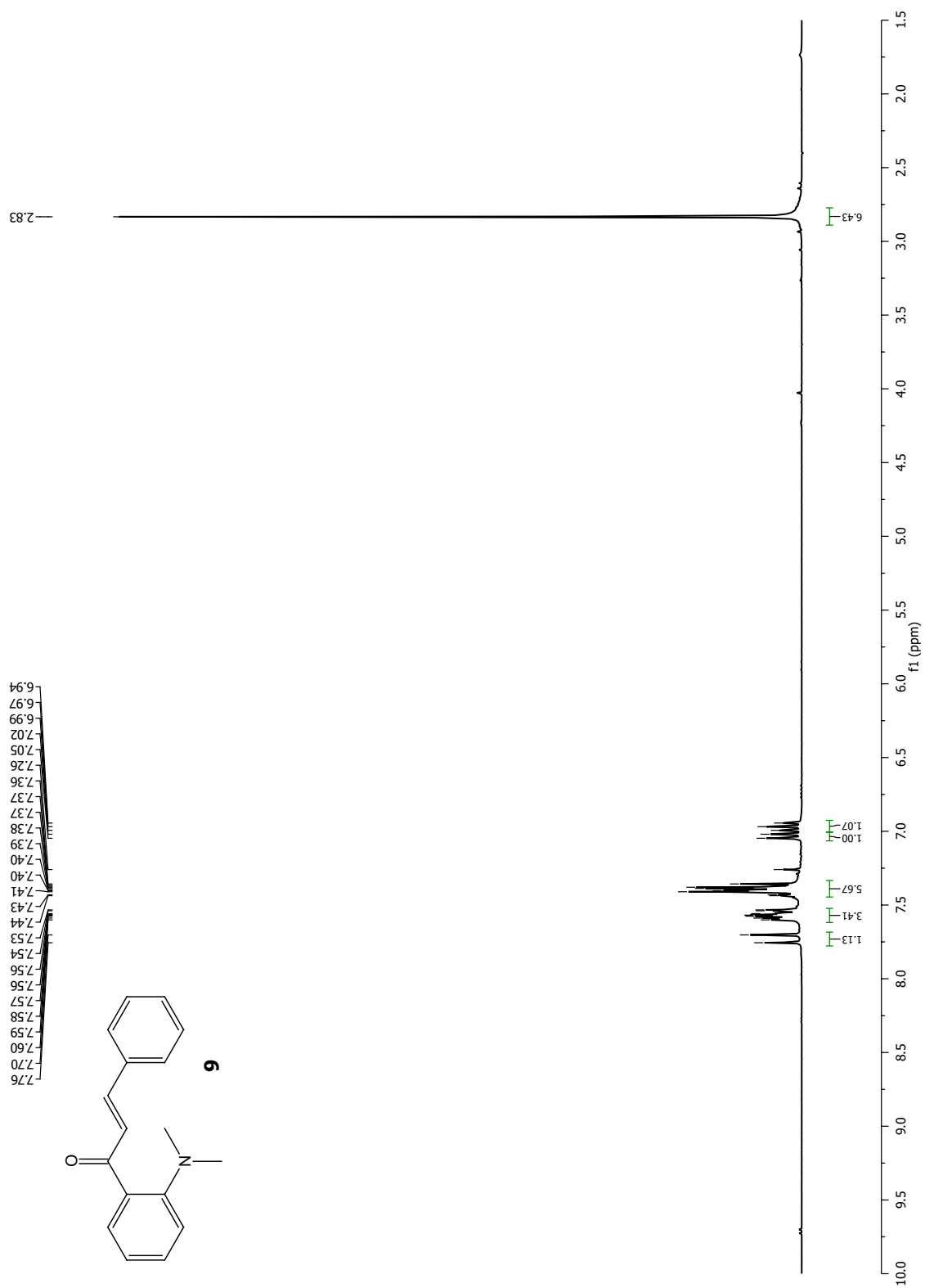


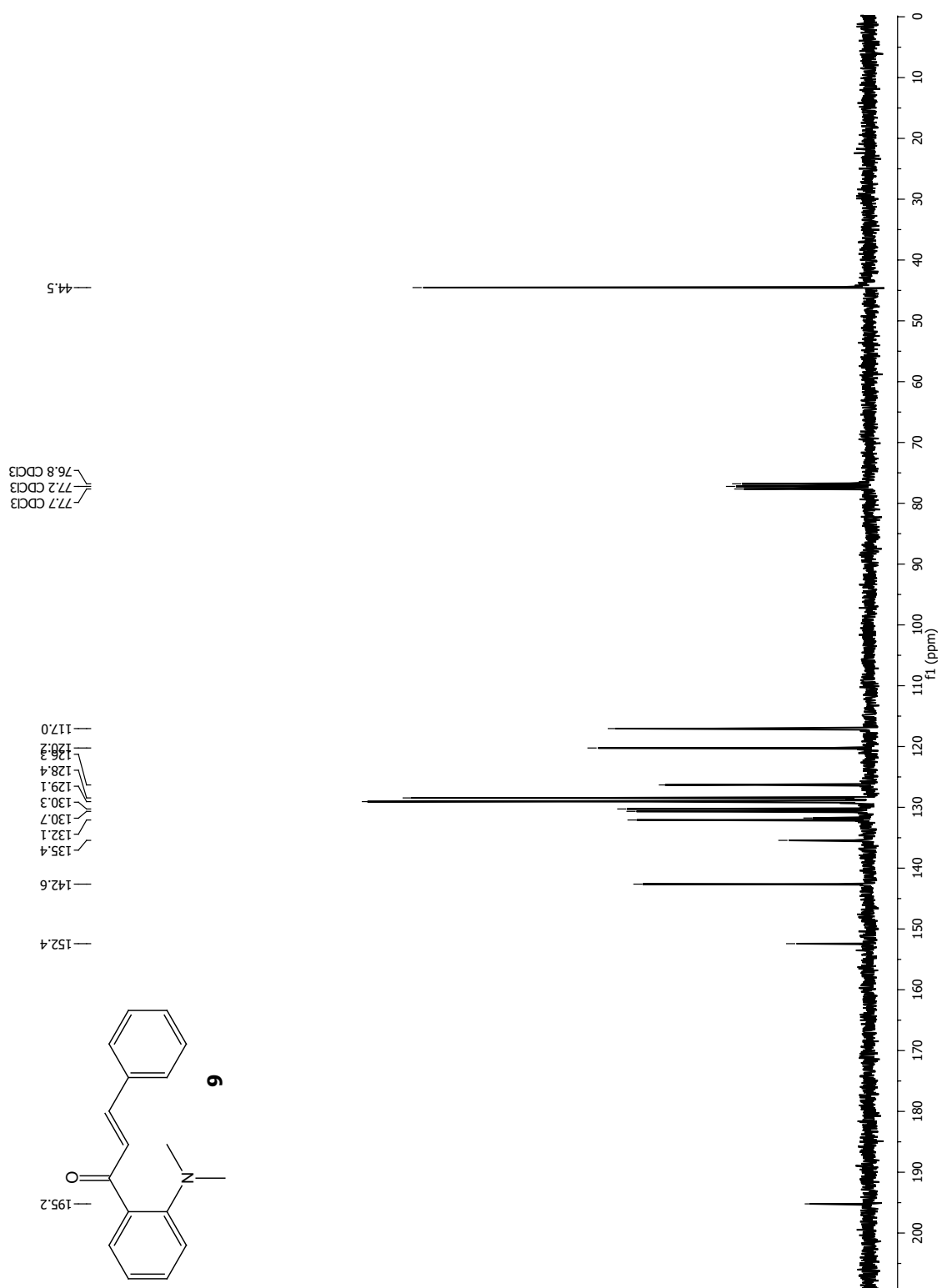
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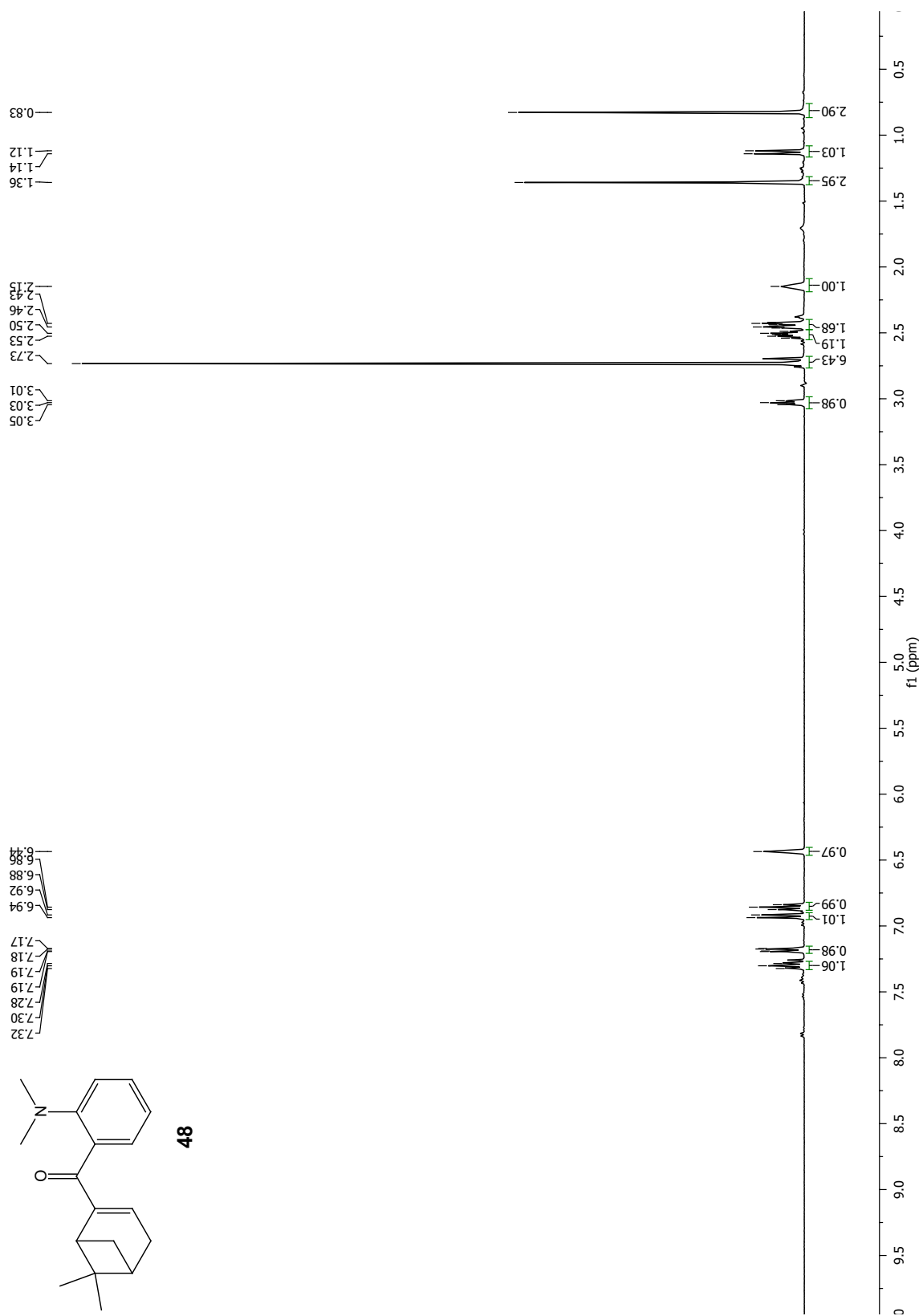




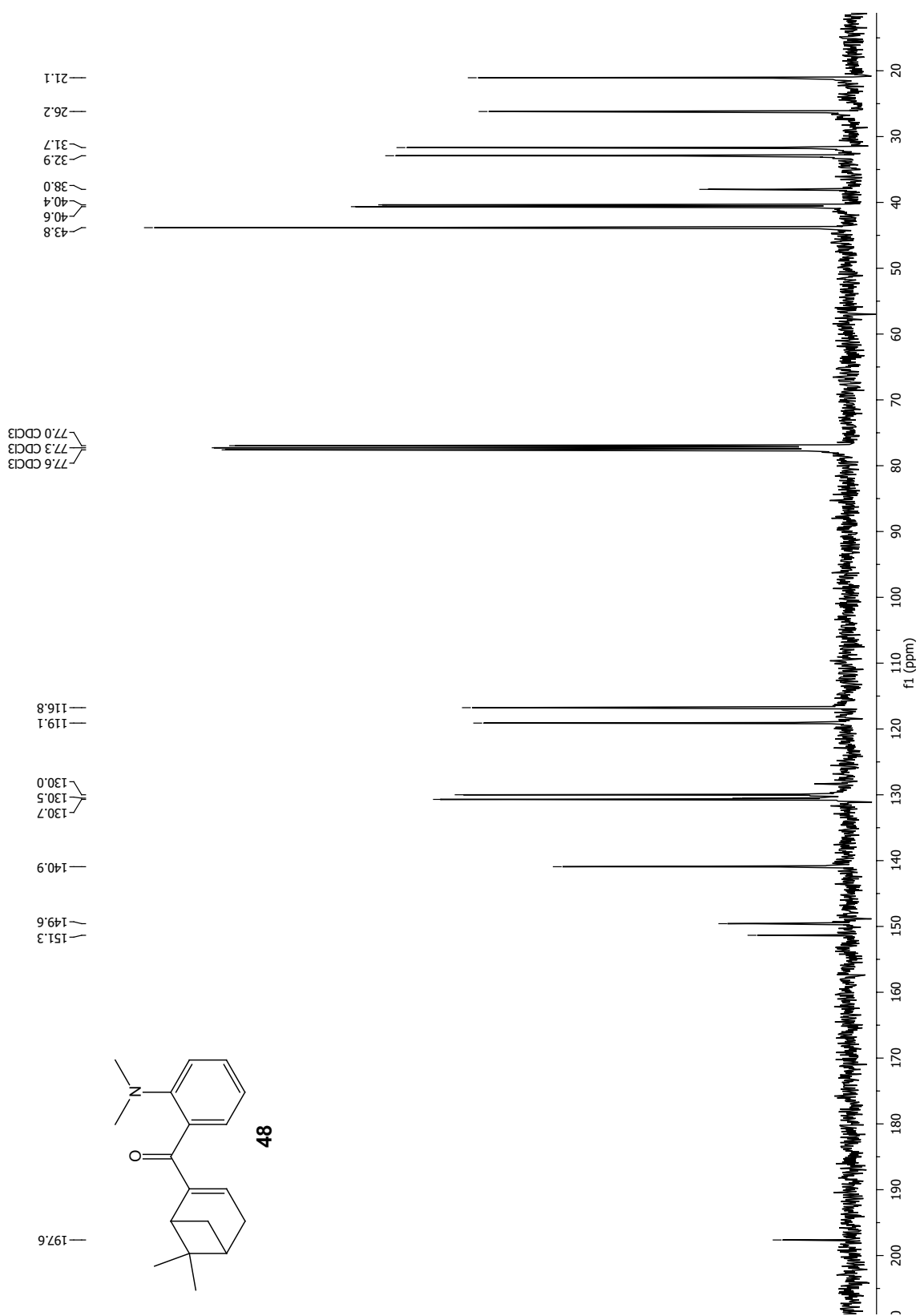




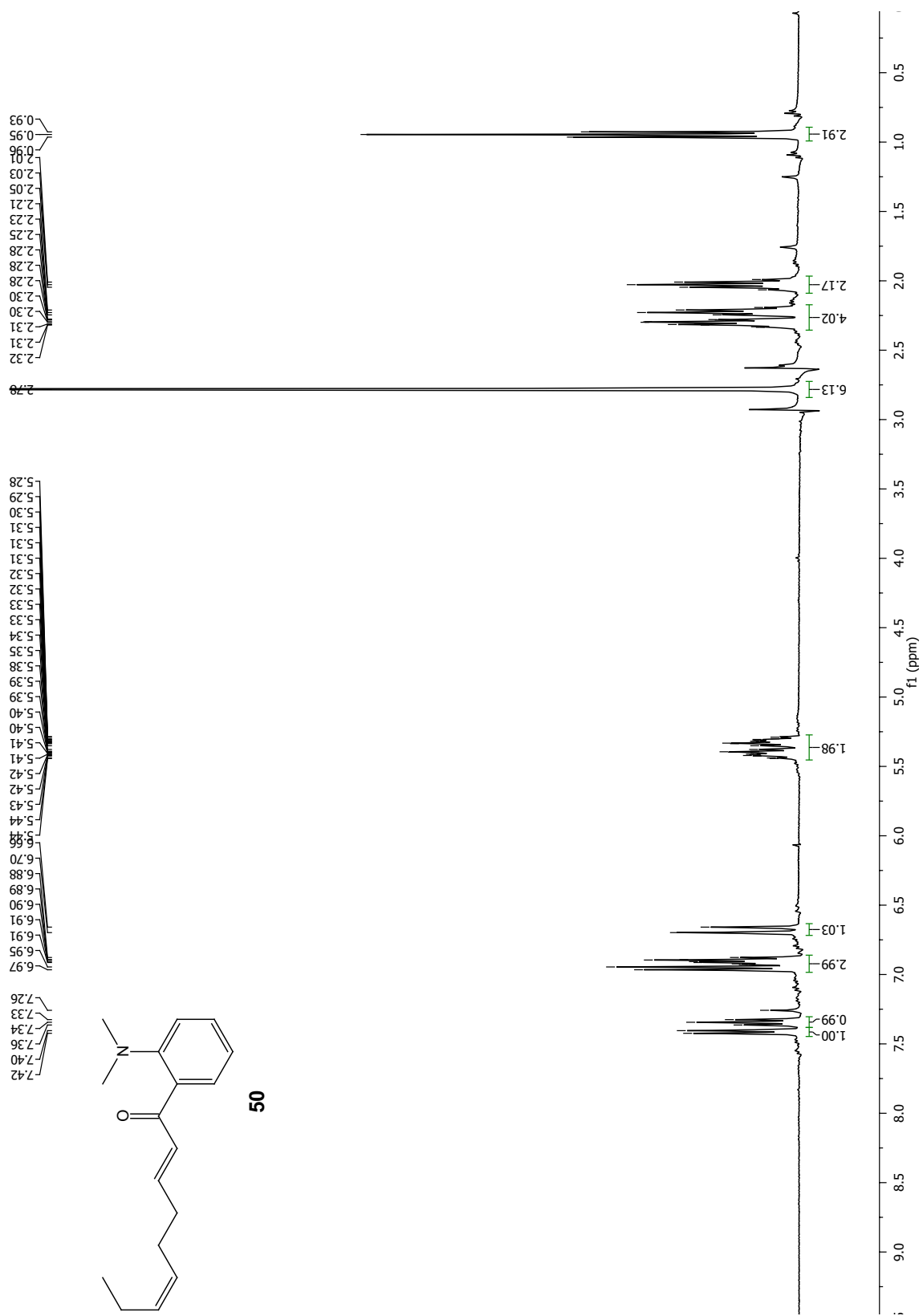
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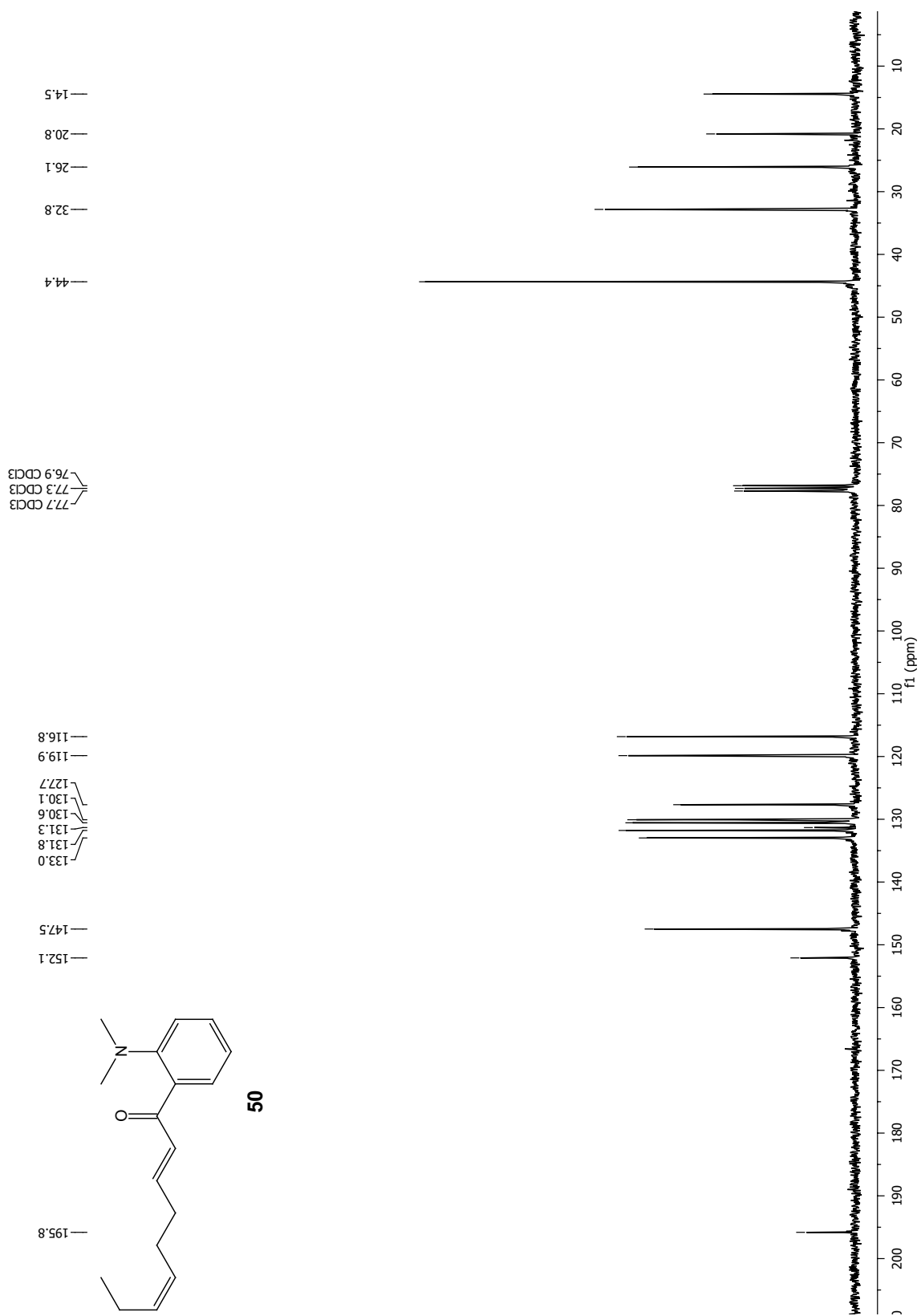
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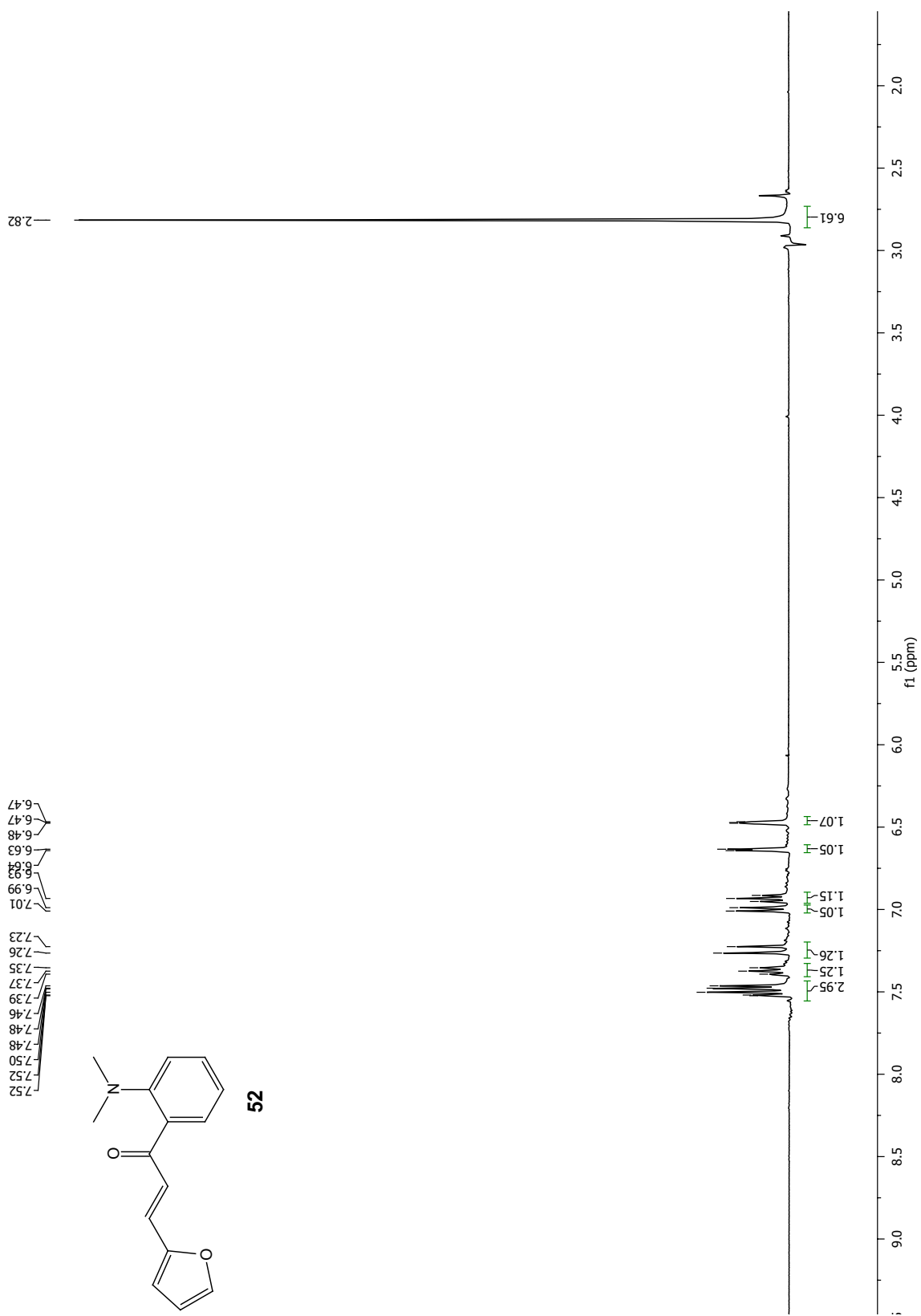


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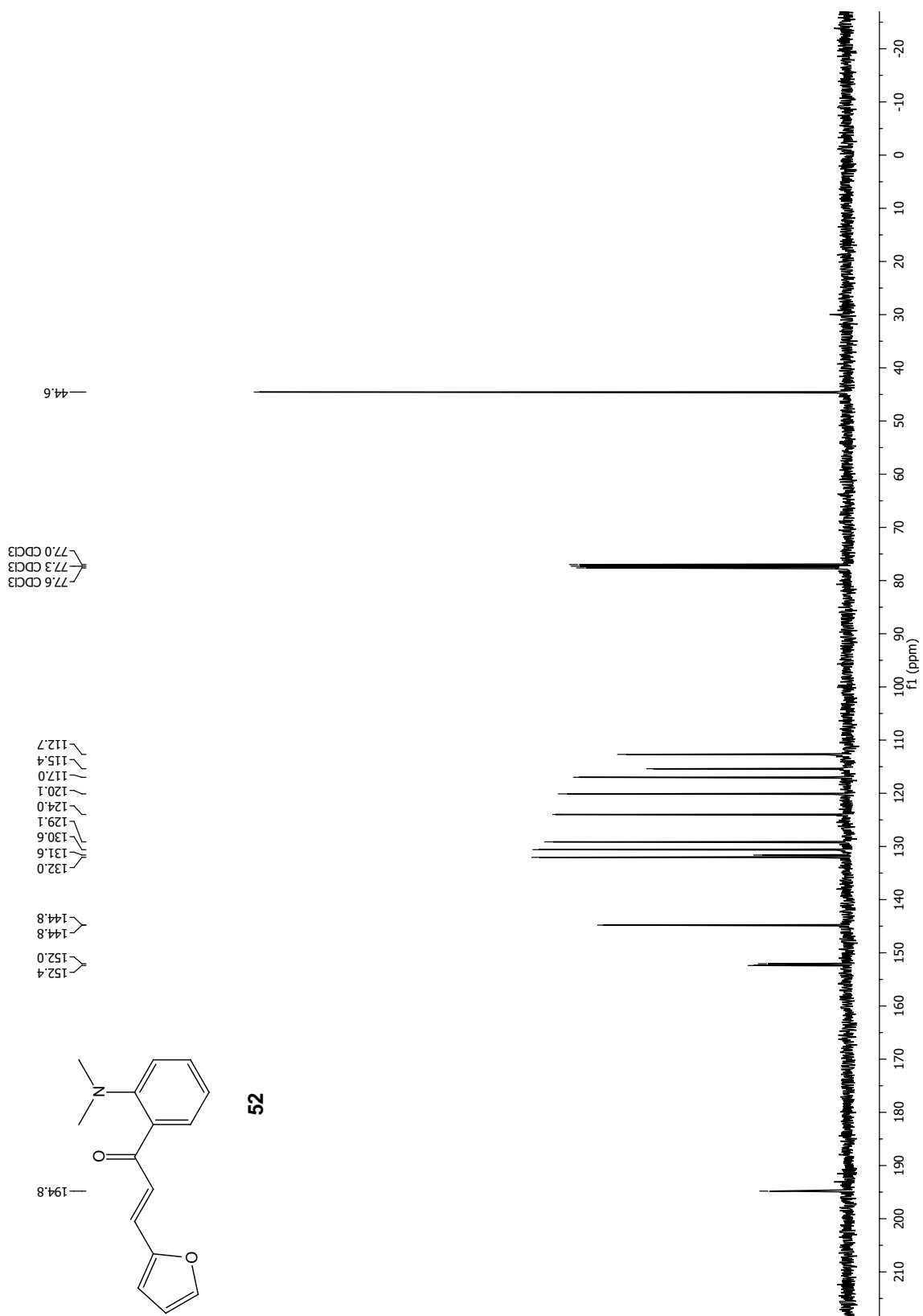


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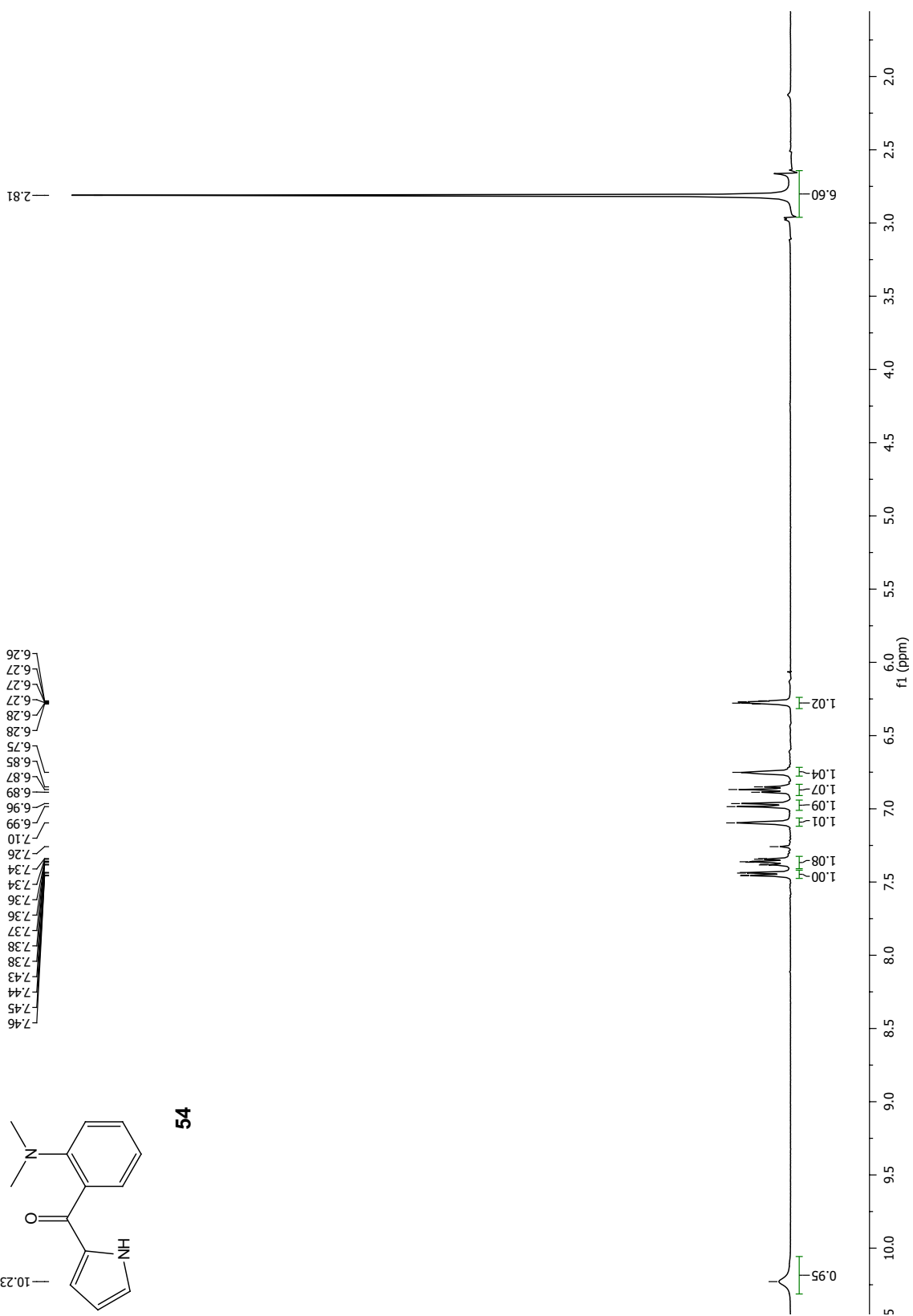




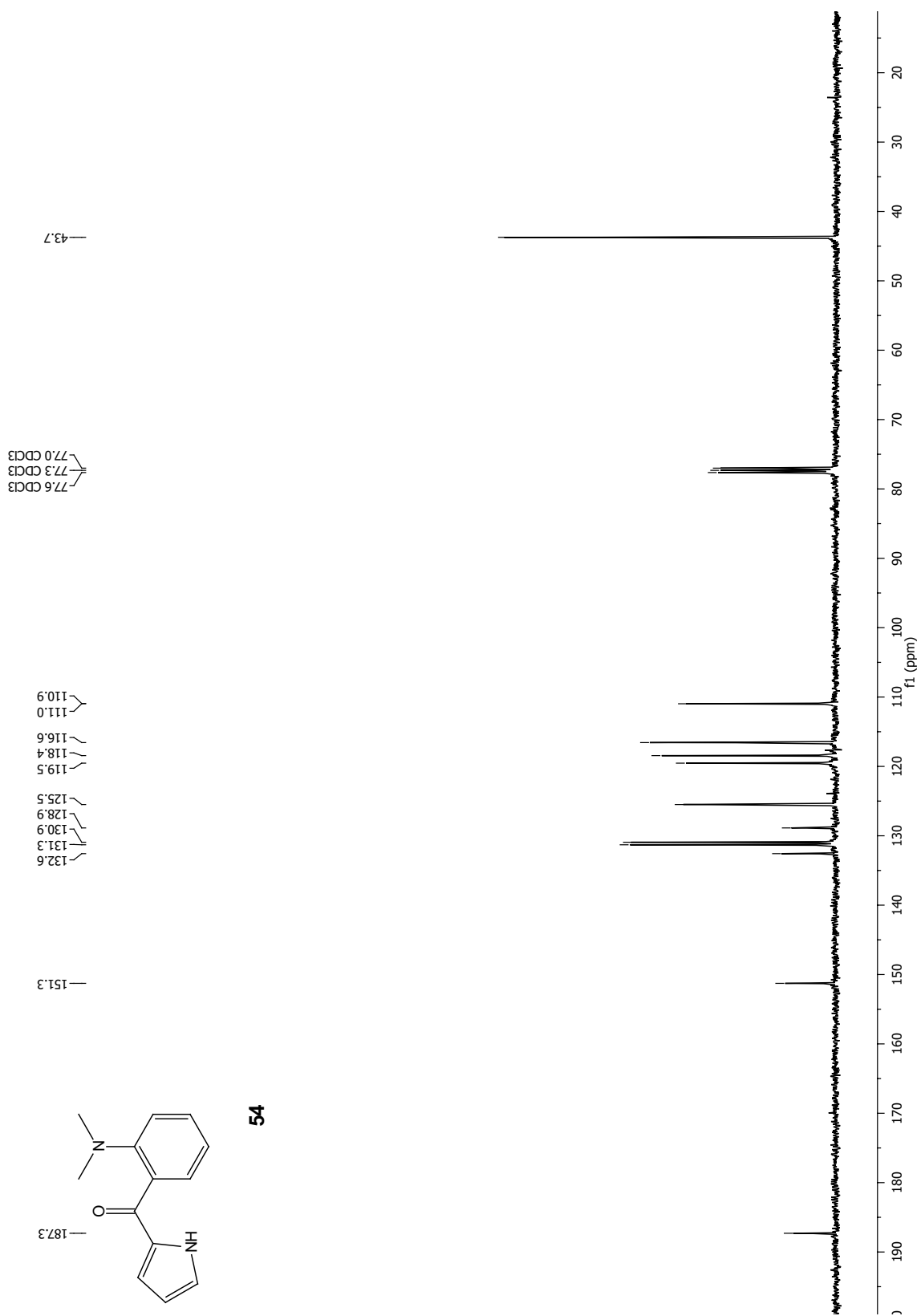
550



551

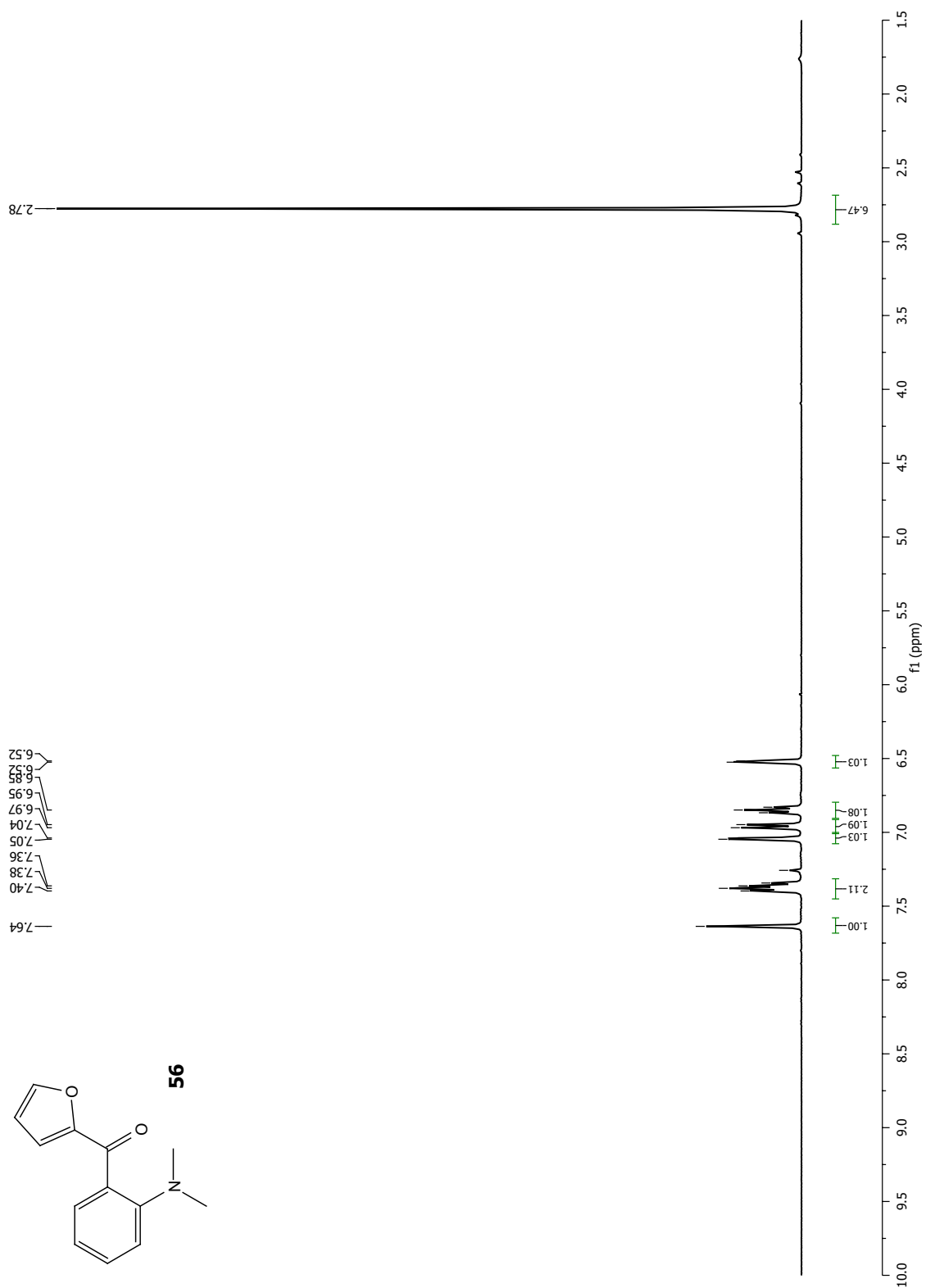


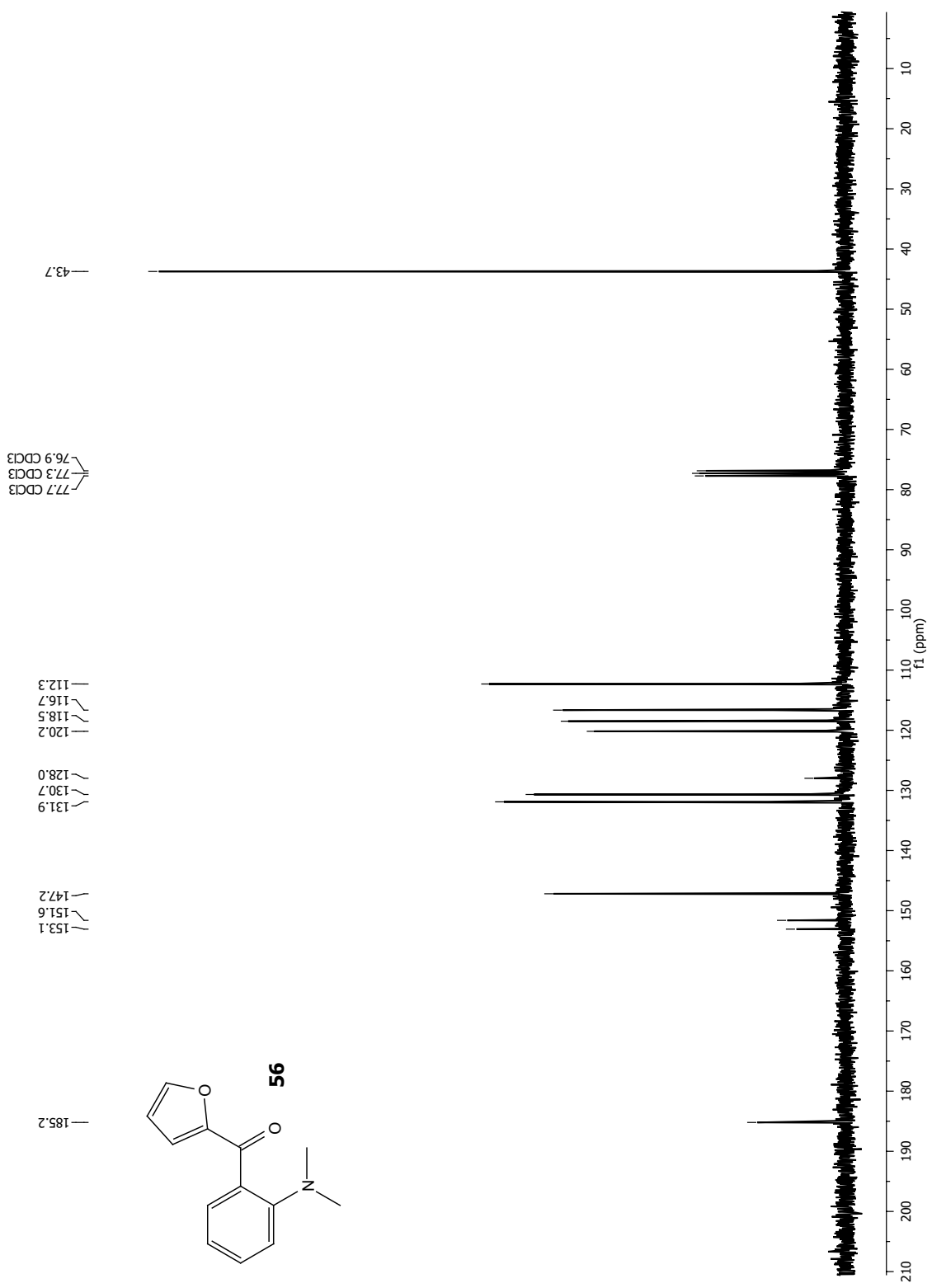
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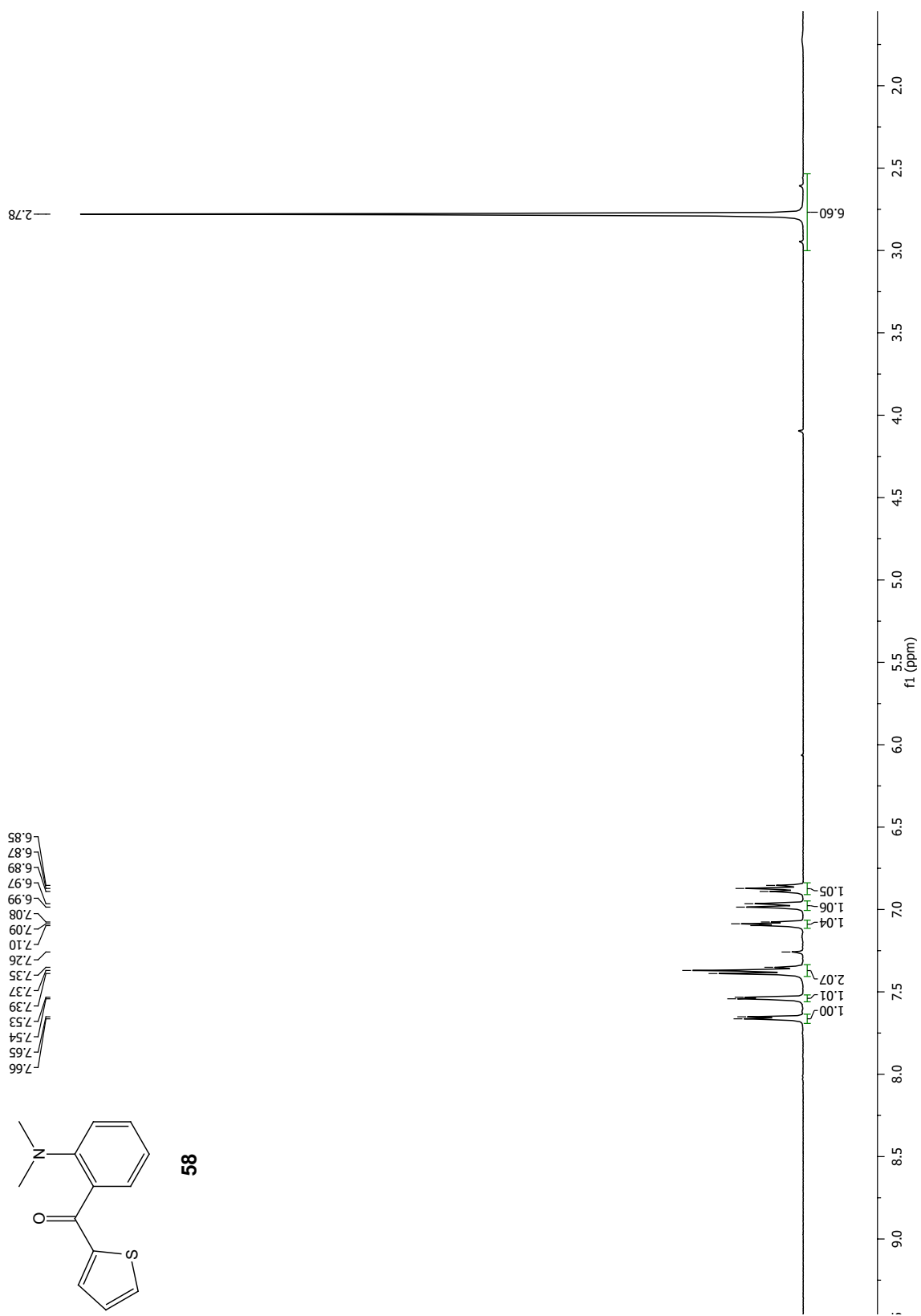
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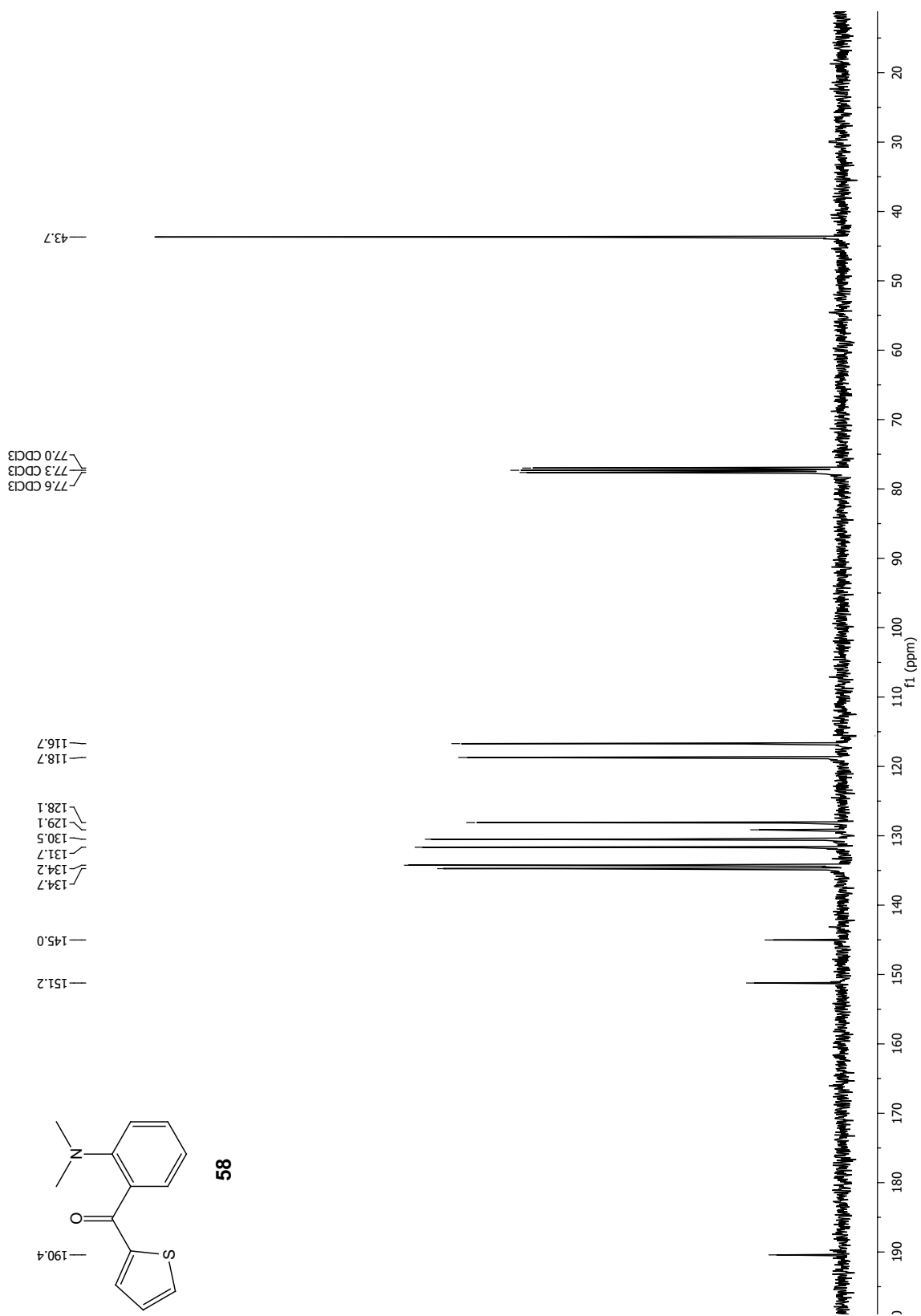




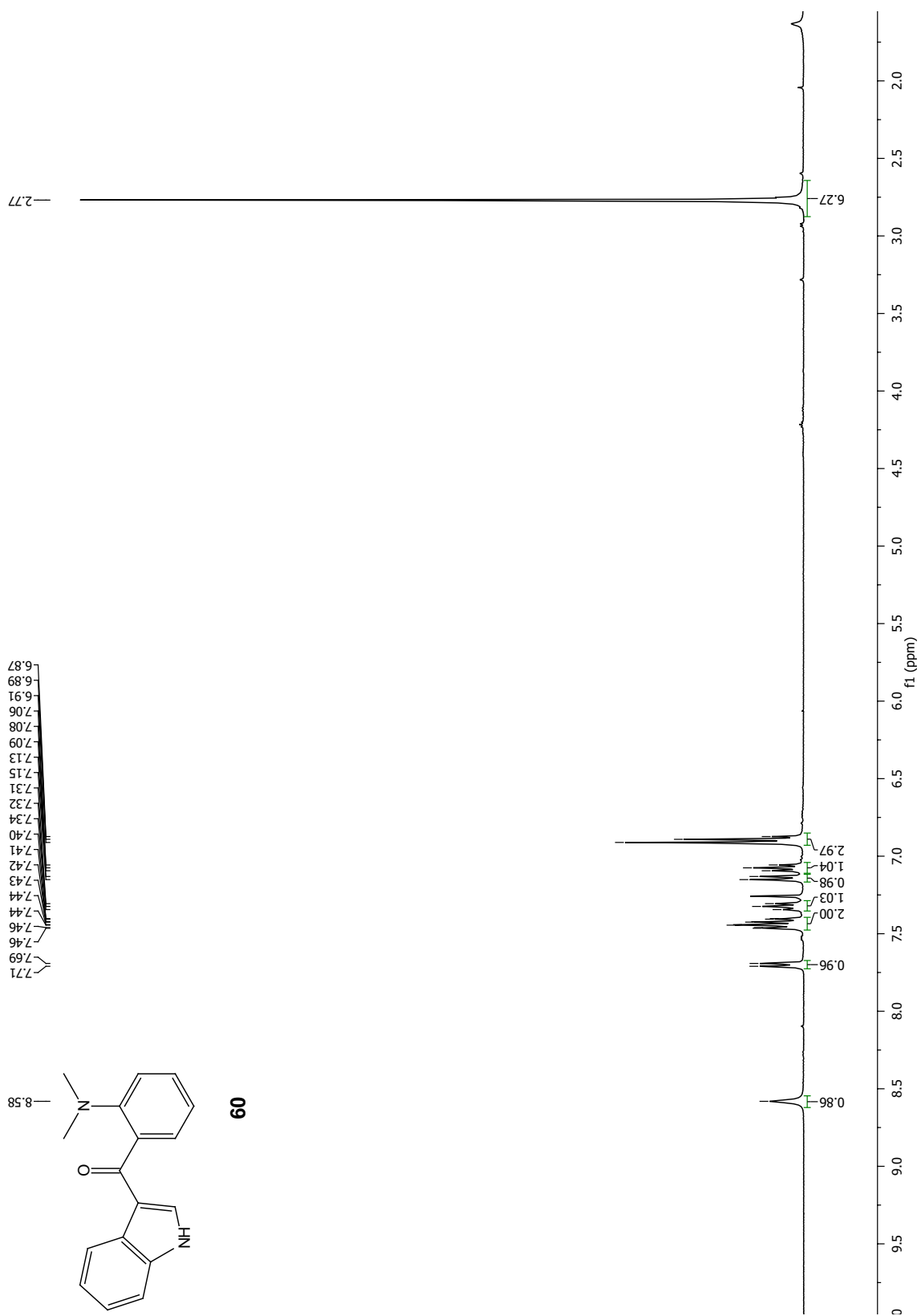
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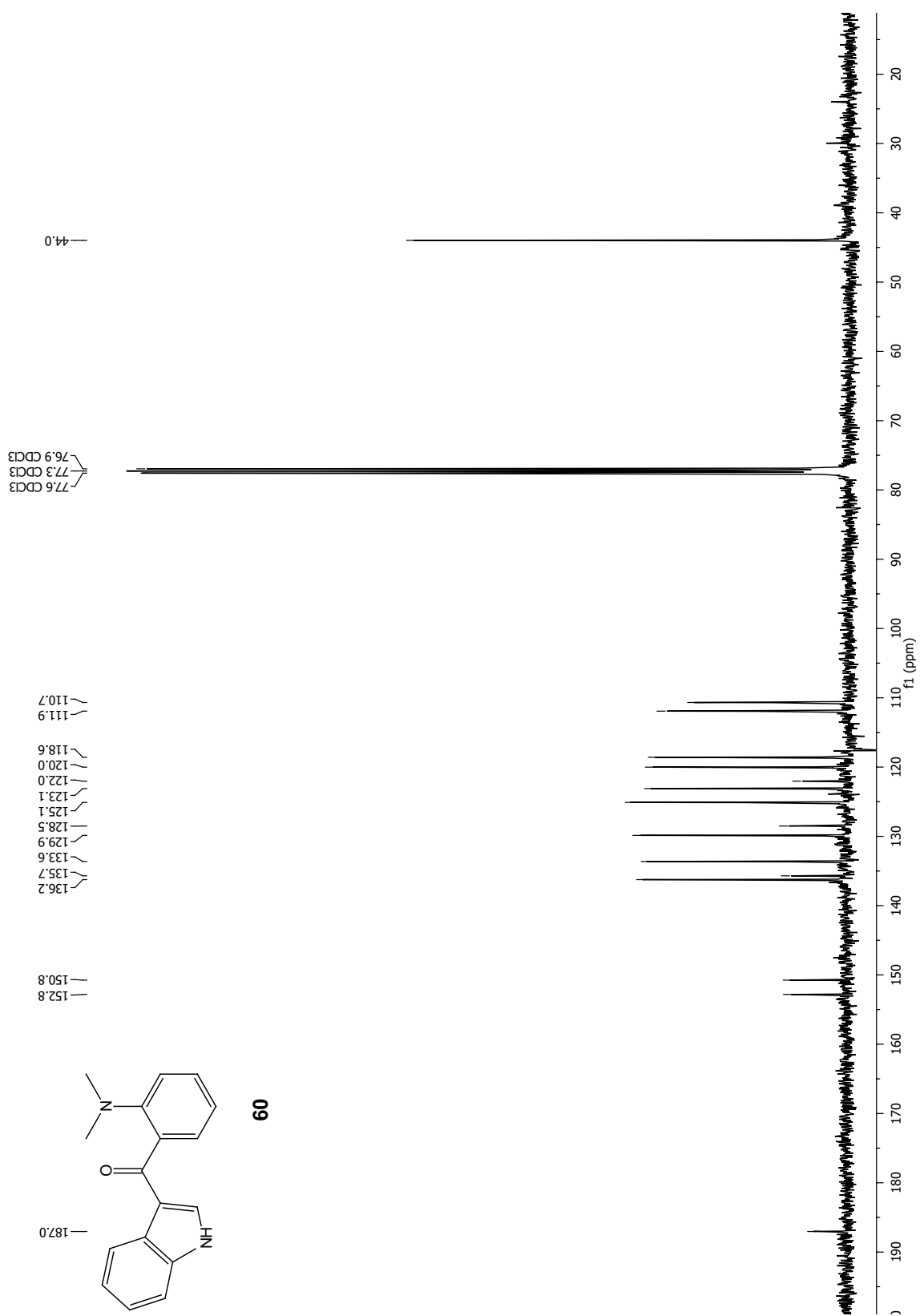


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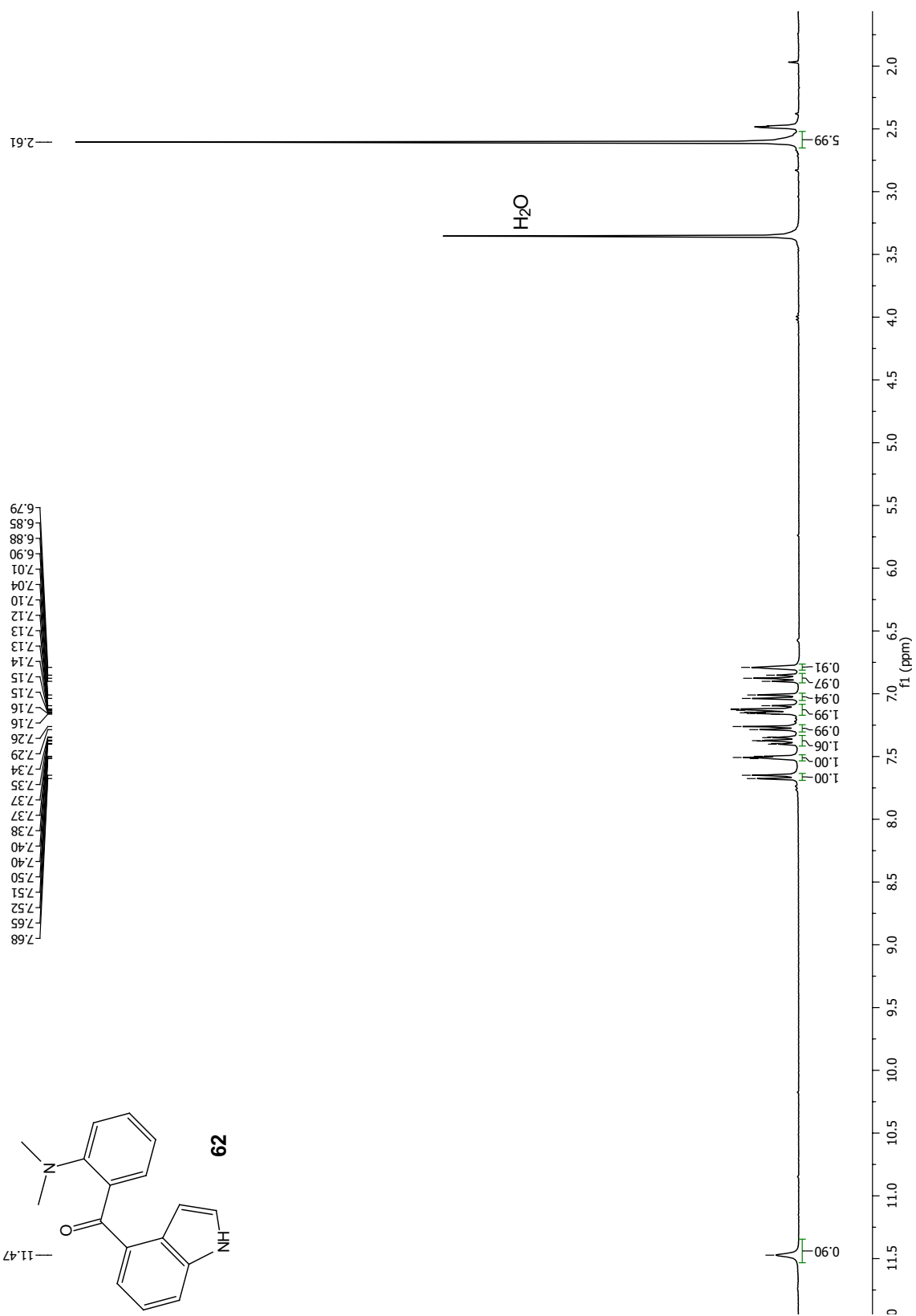


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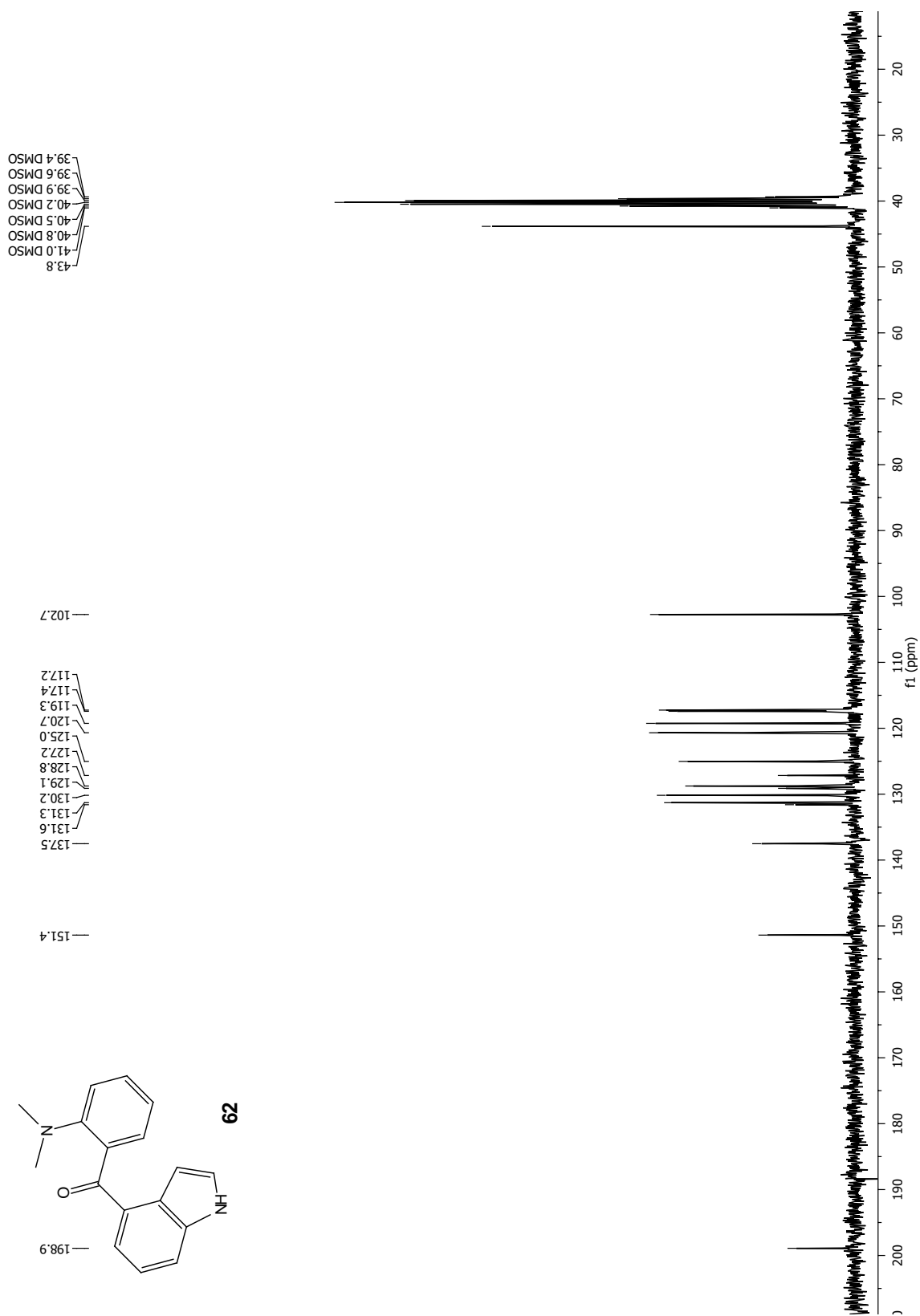


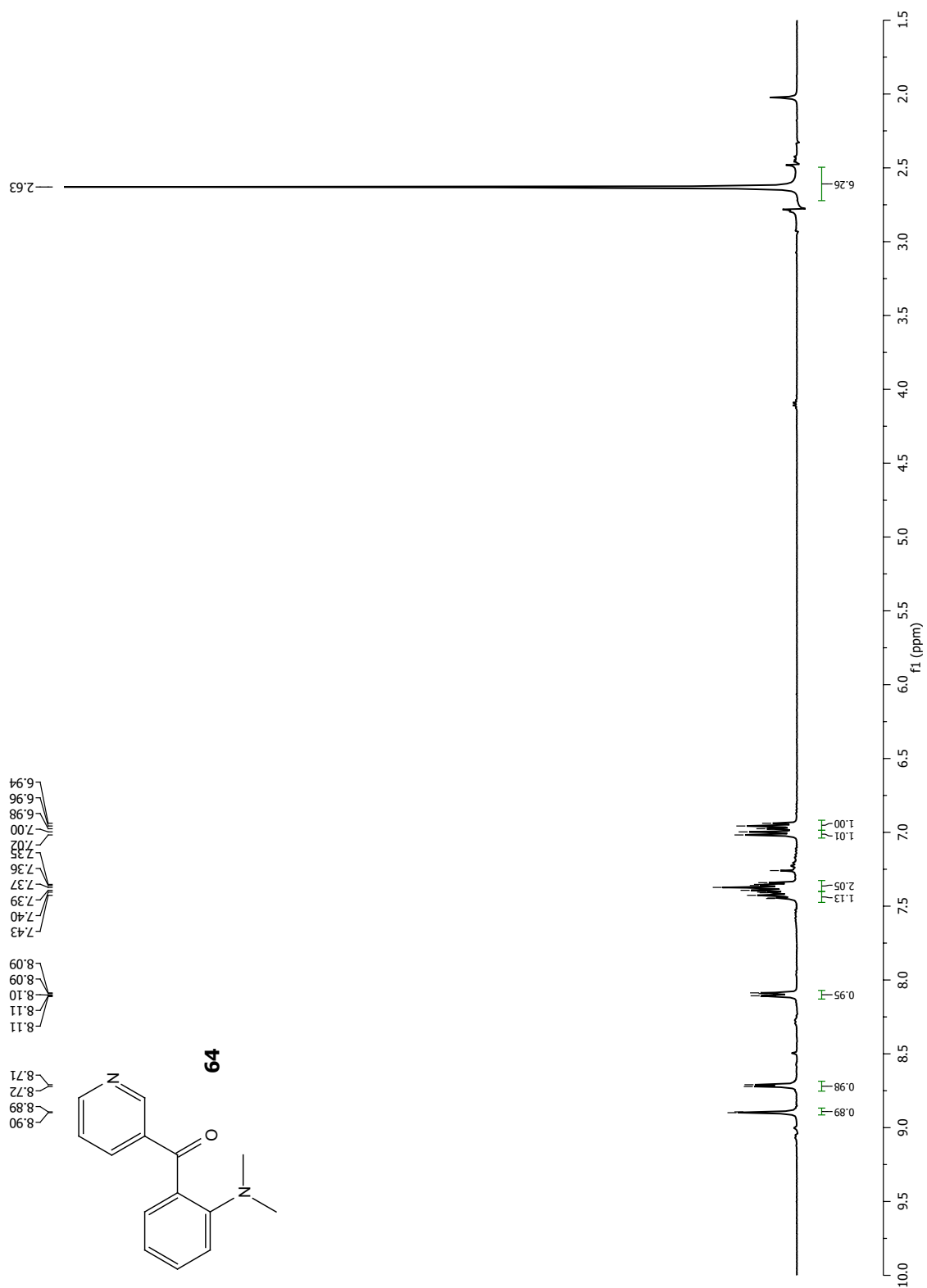


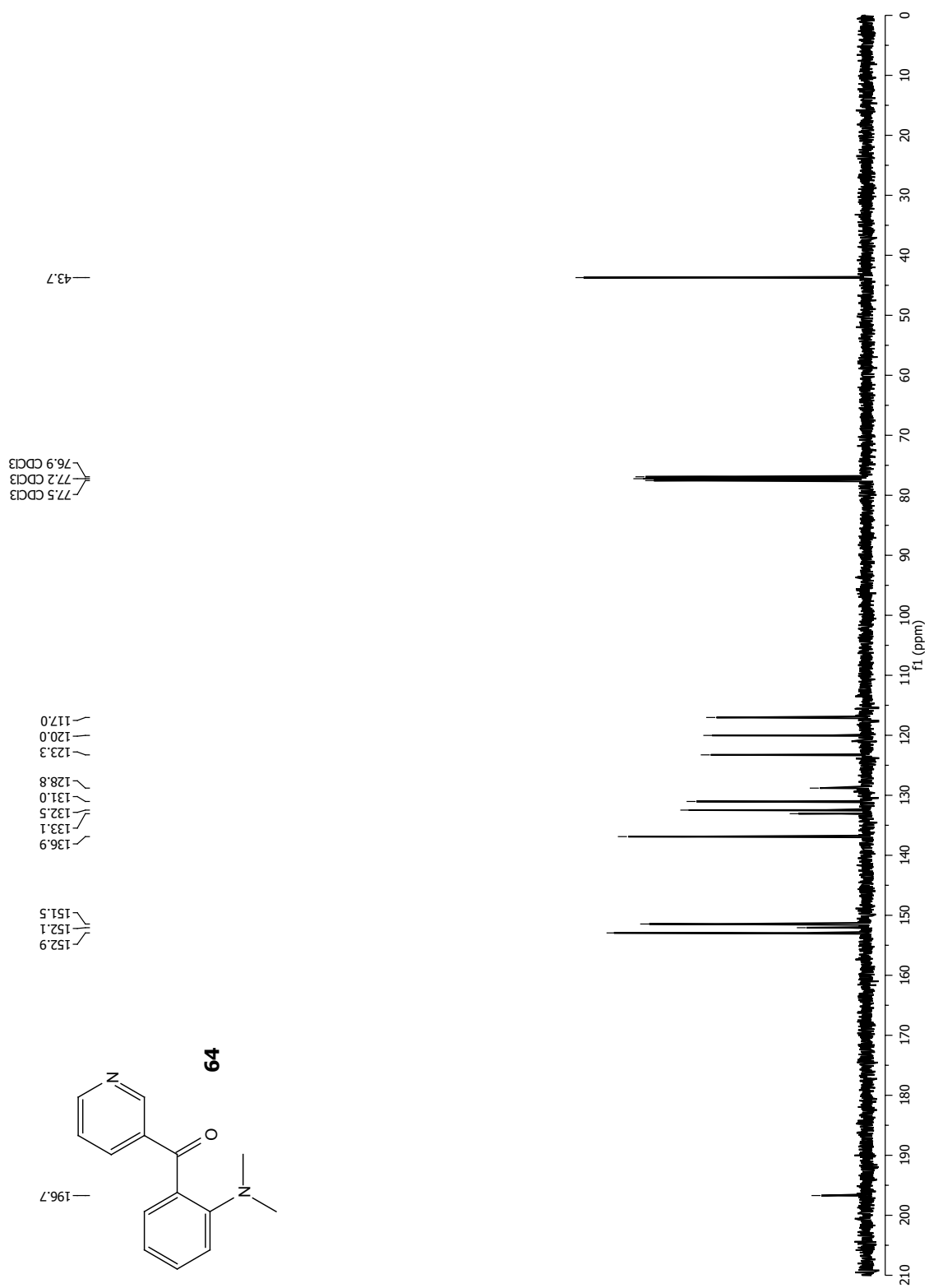
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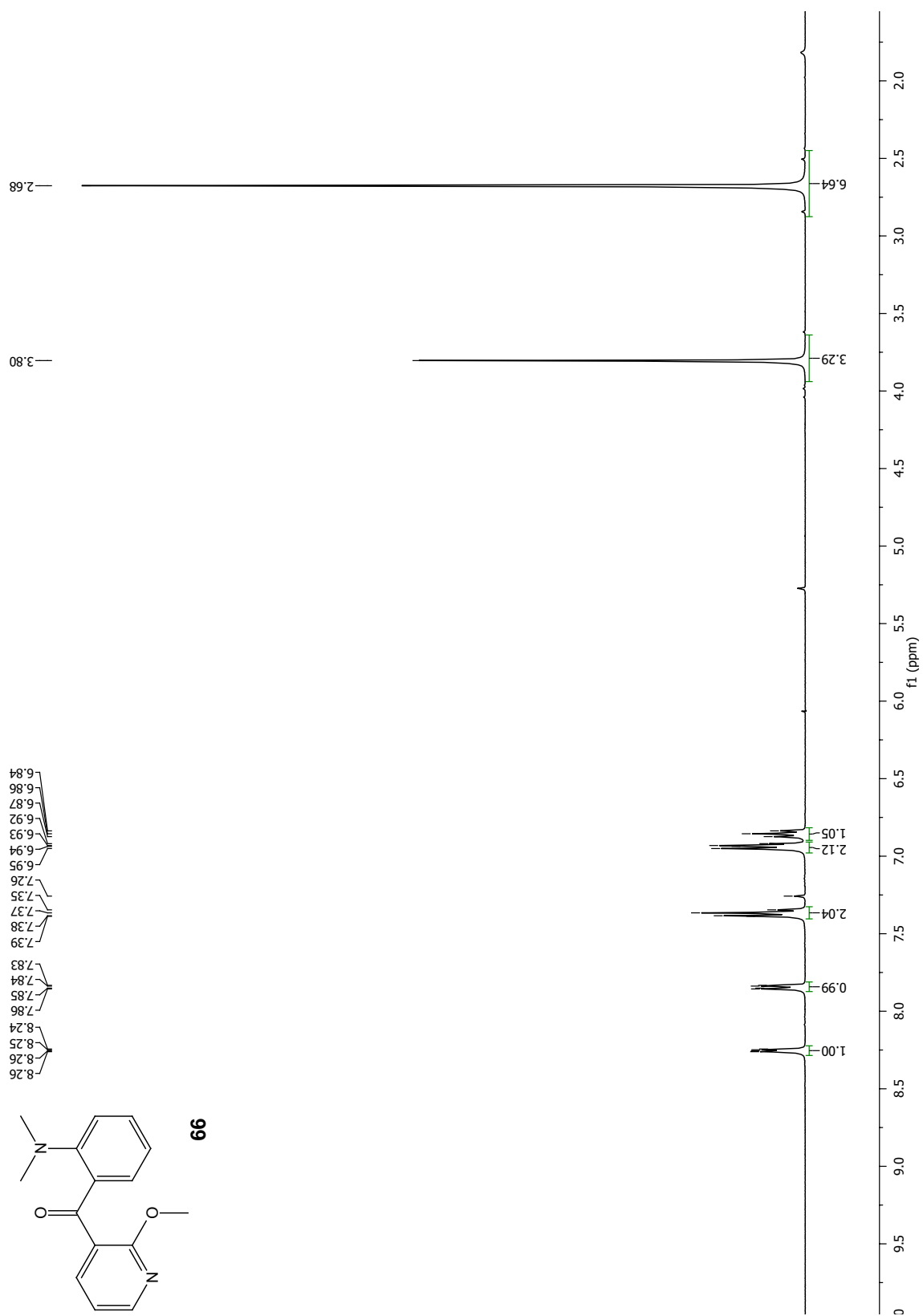


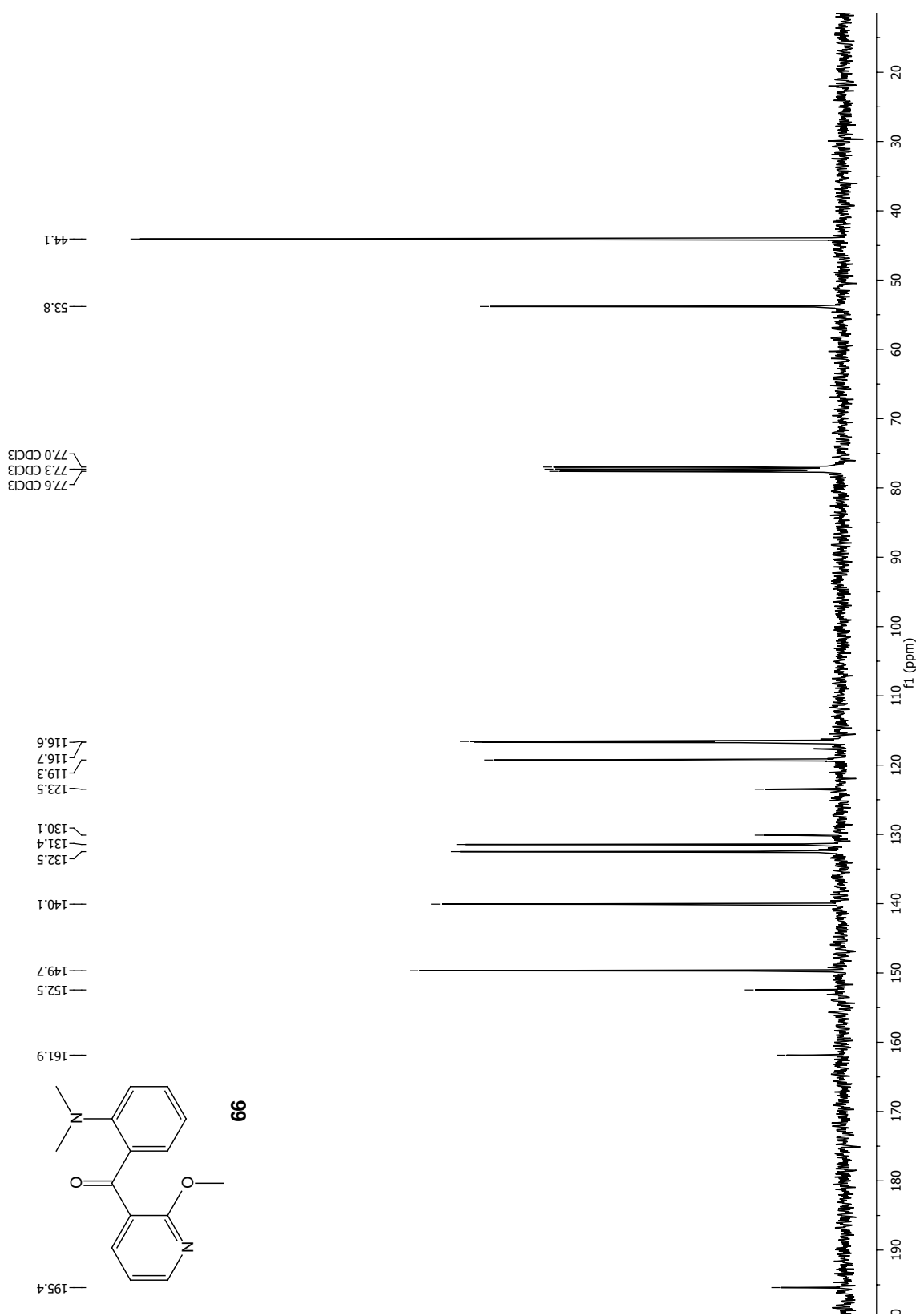
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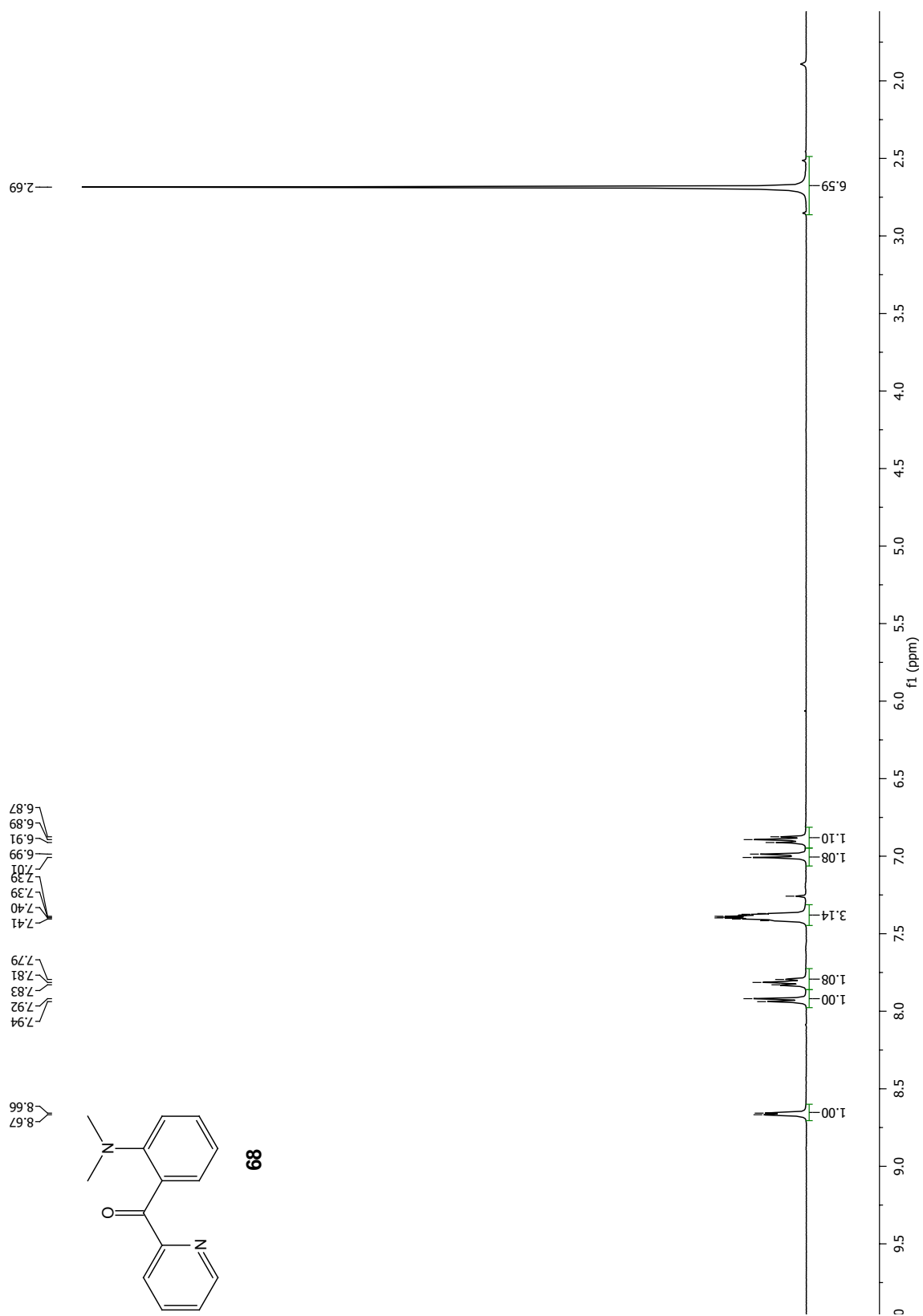




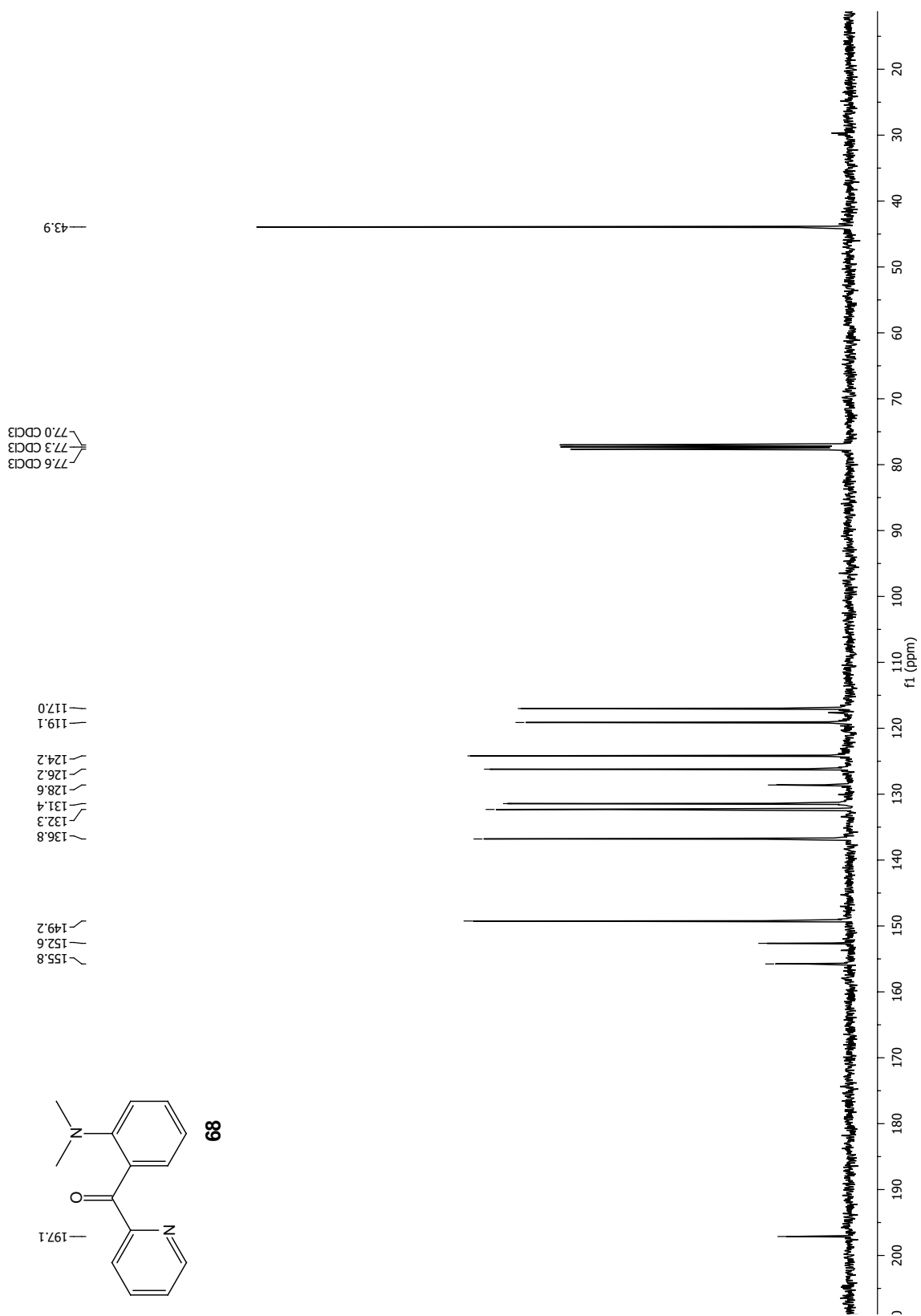




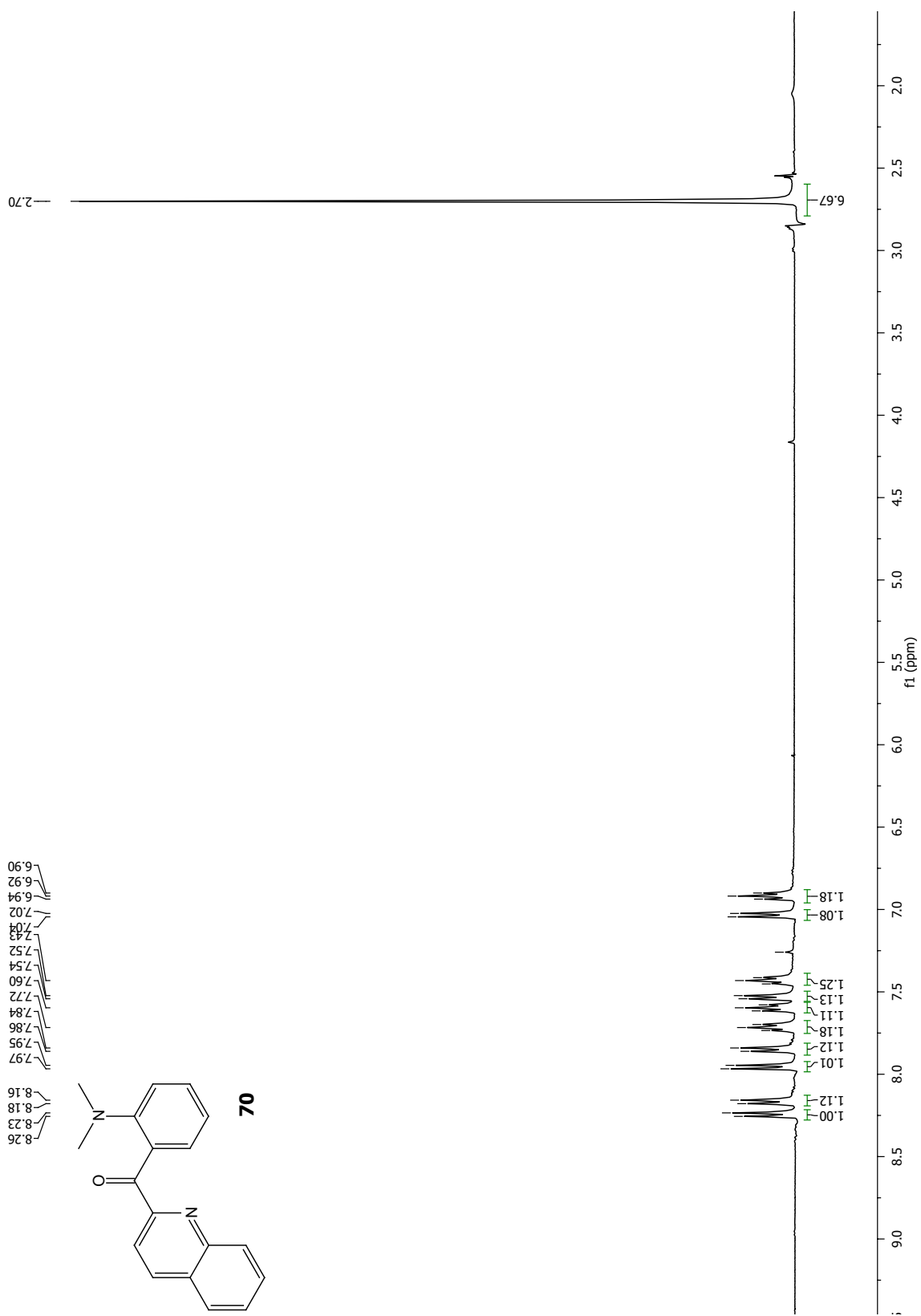




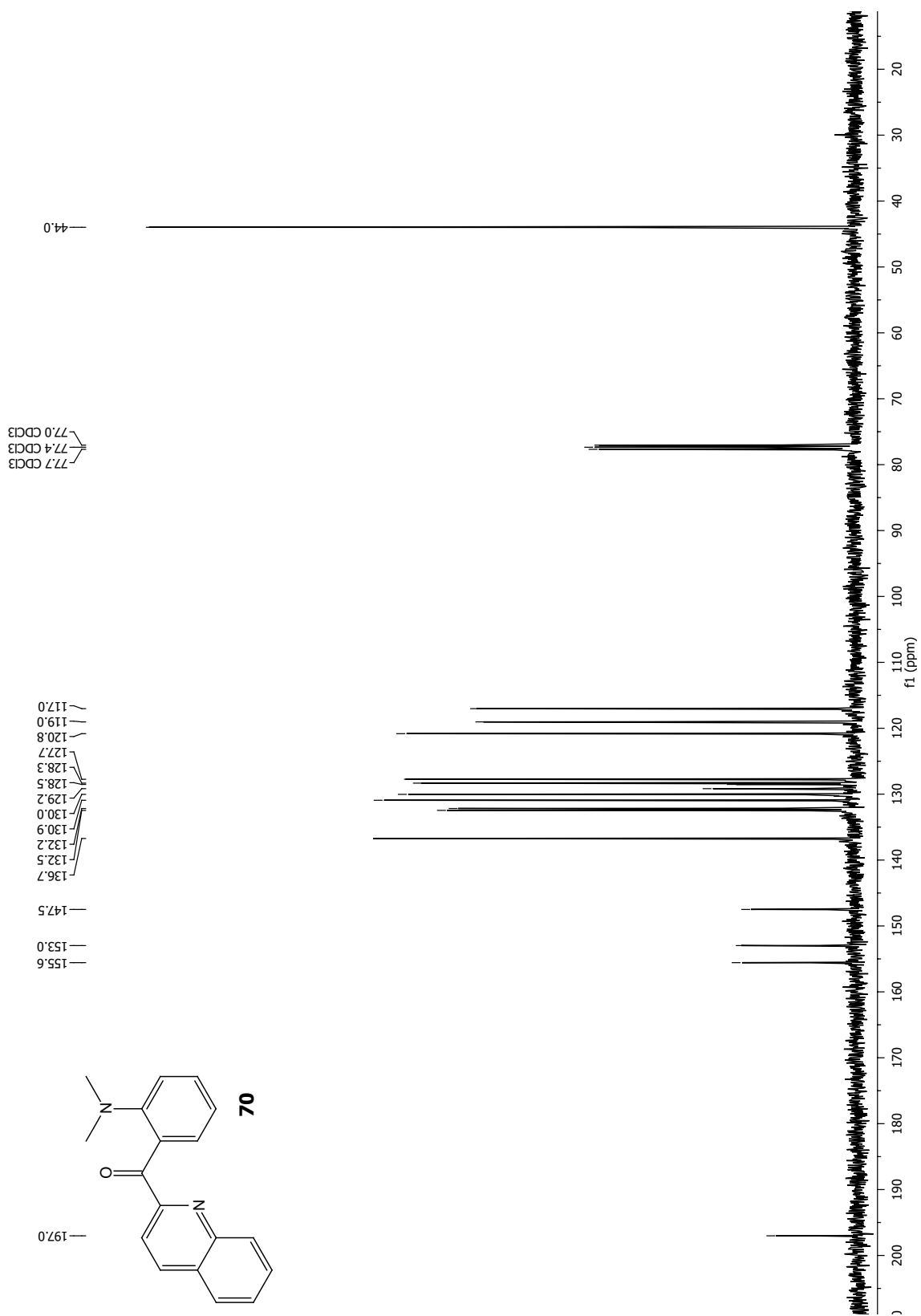
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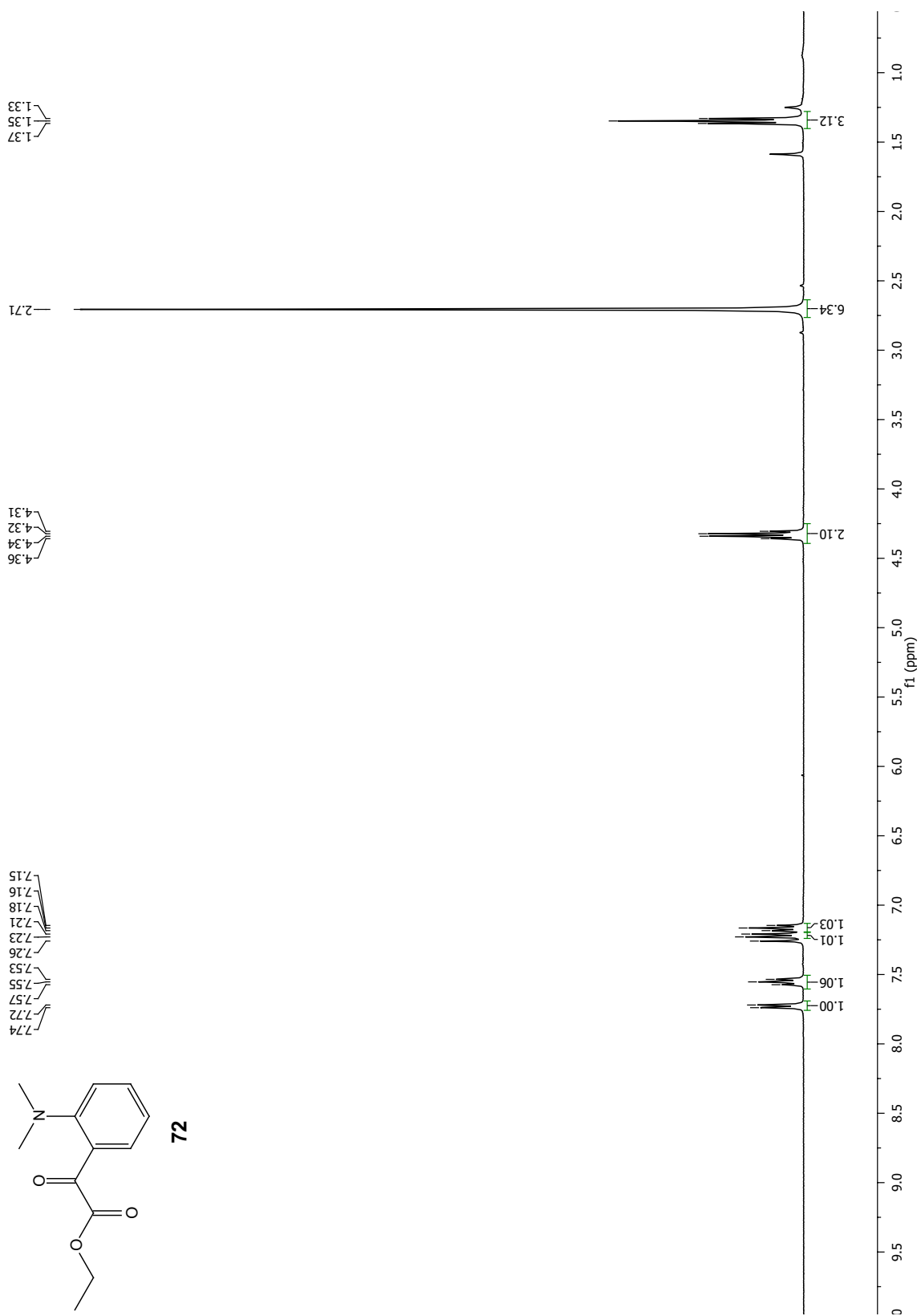


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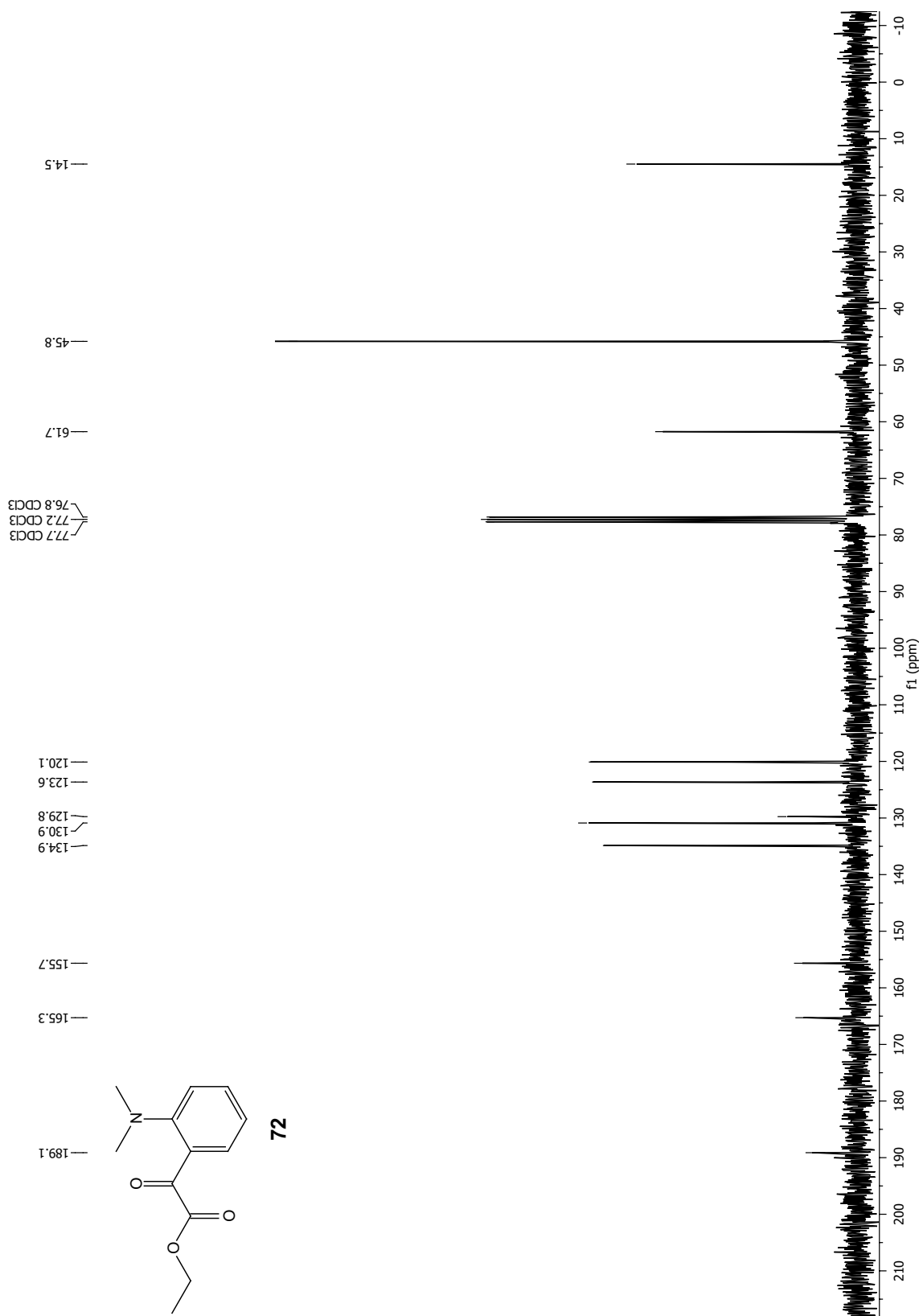


568

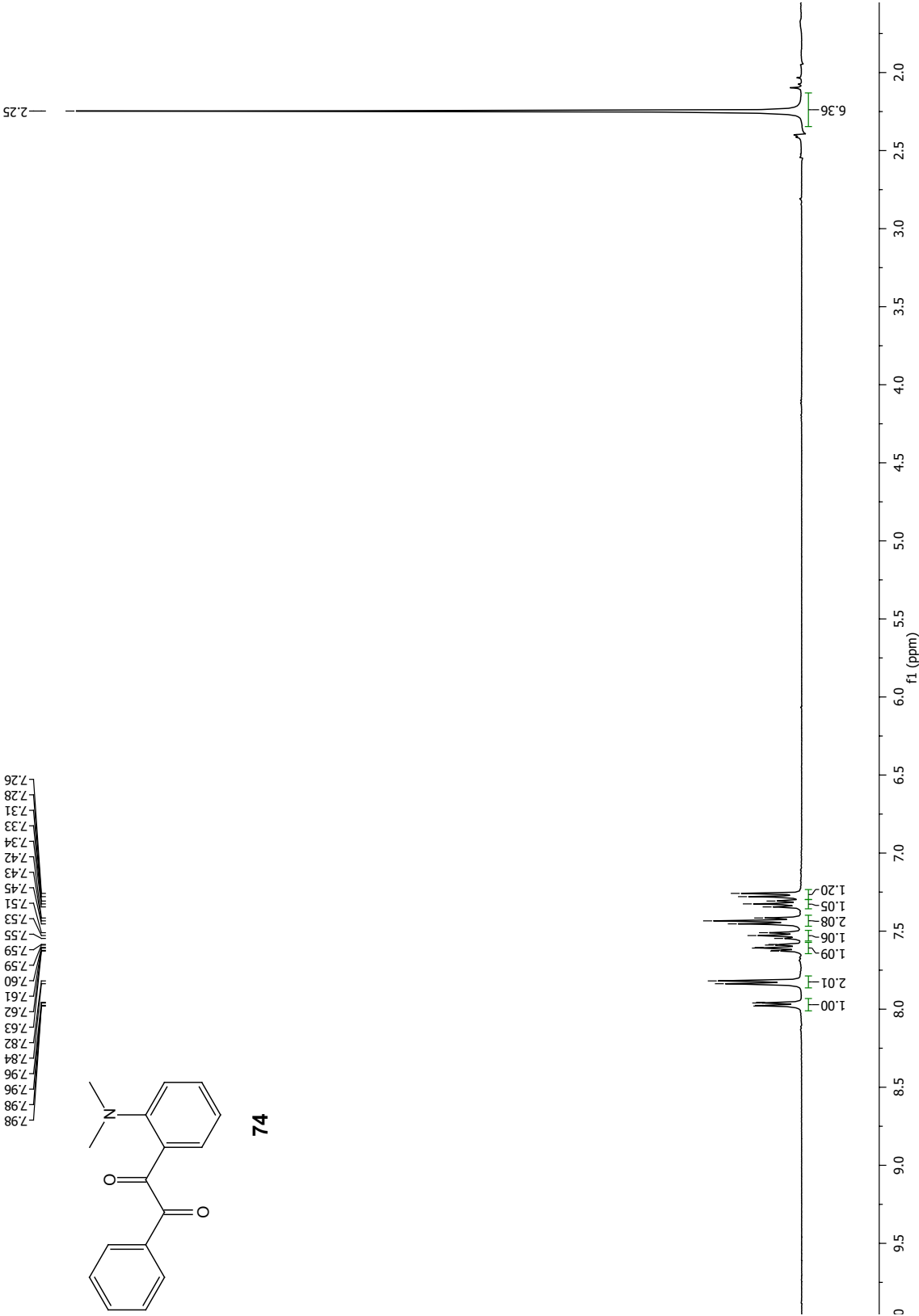


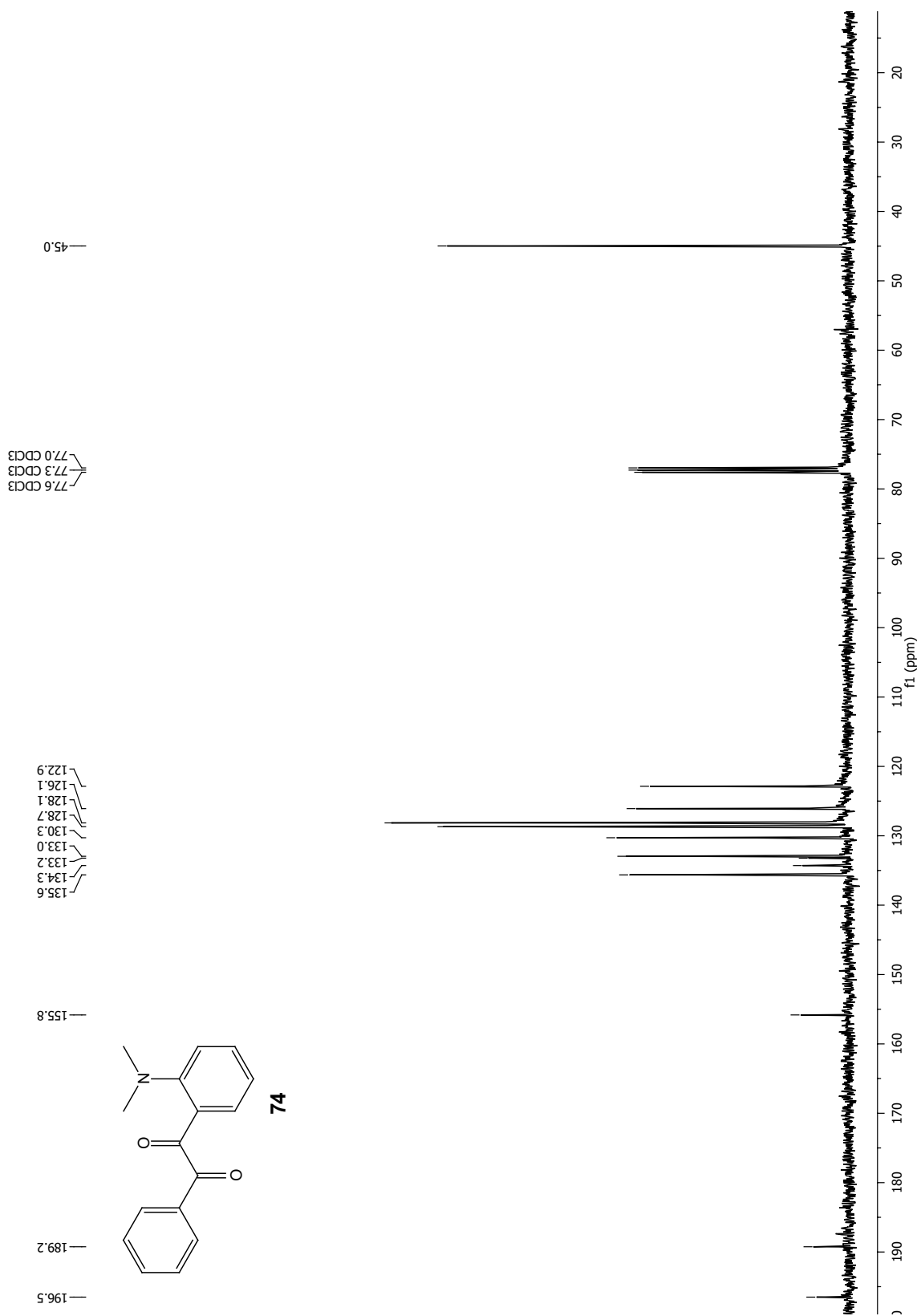


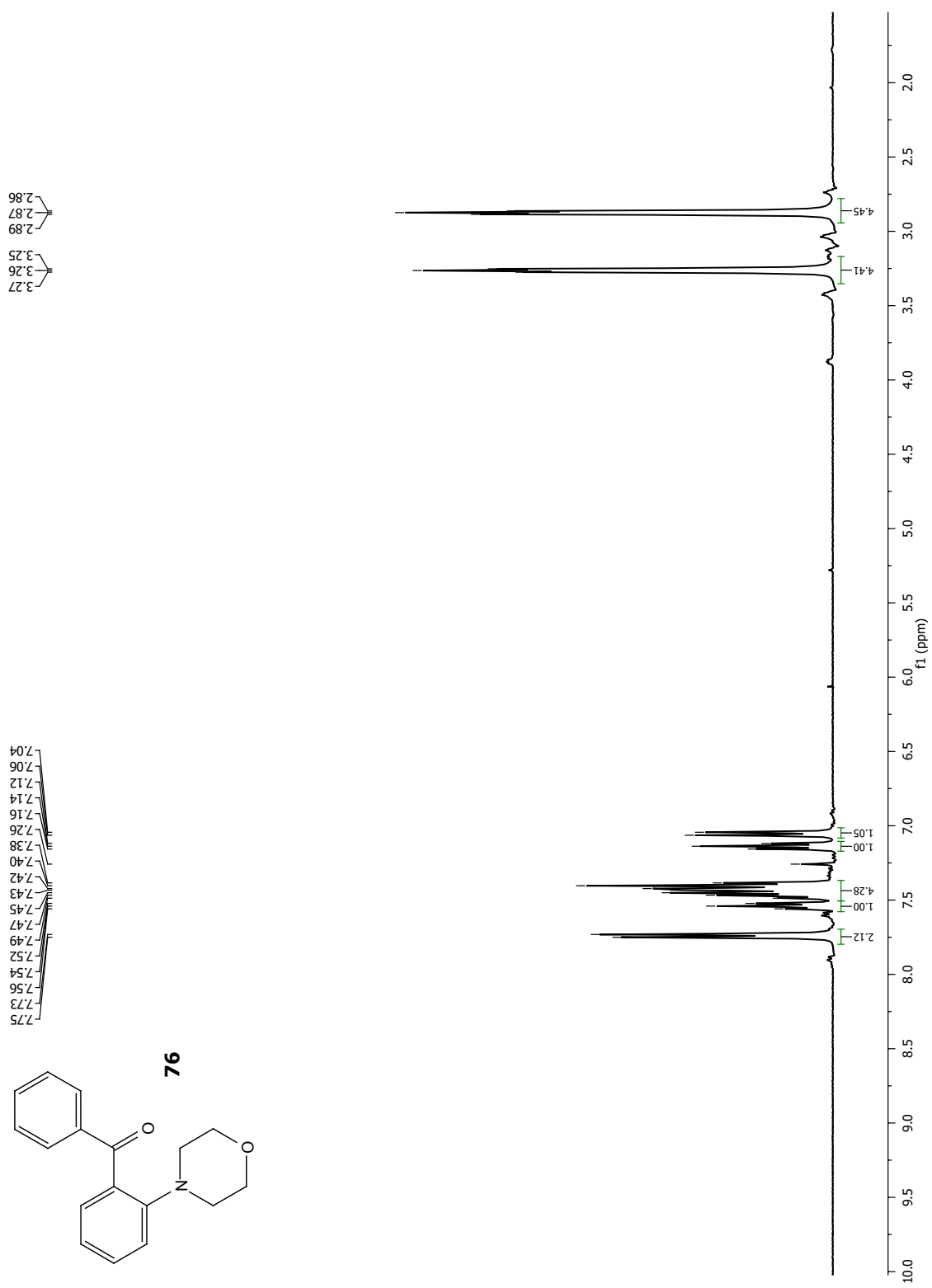
570

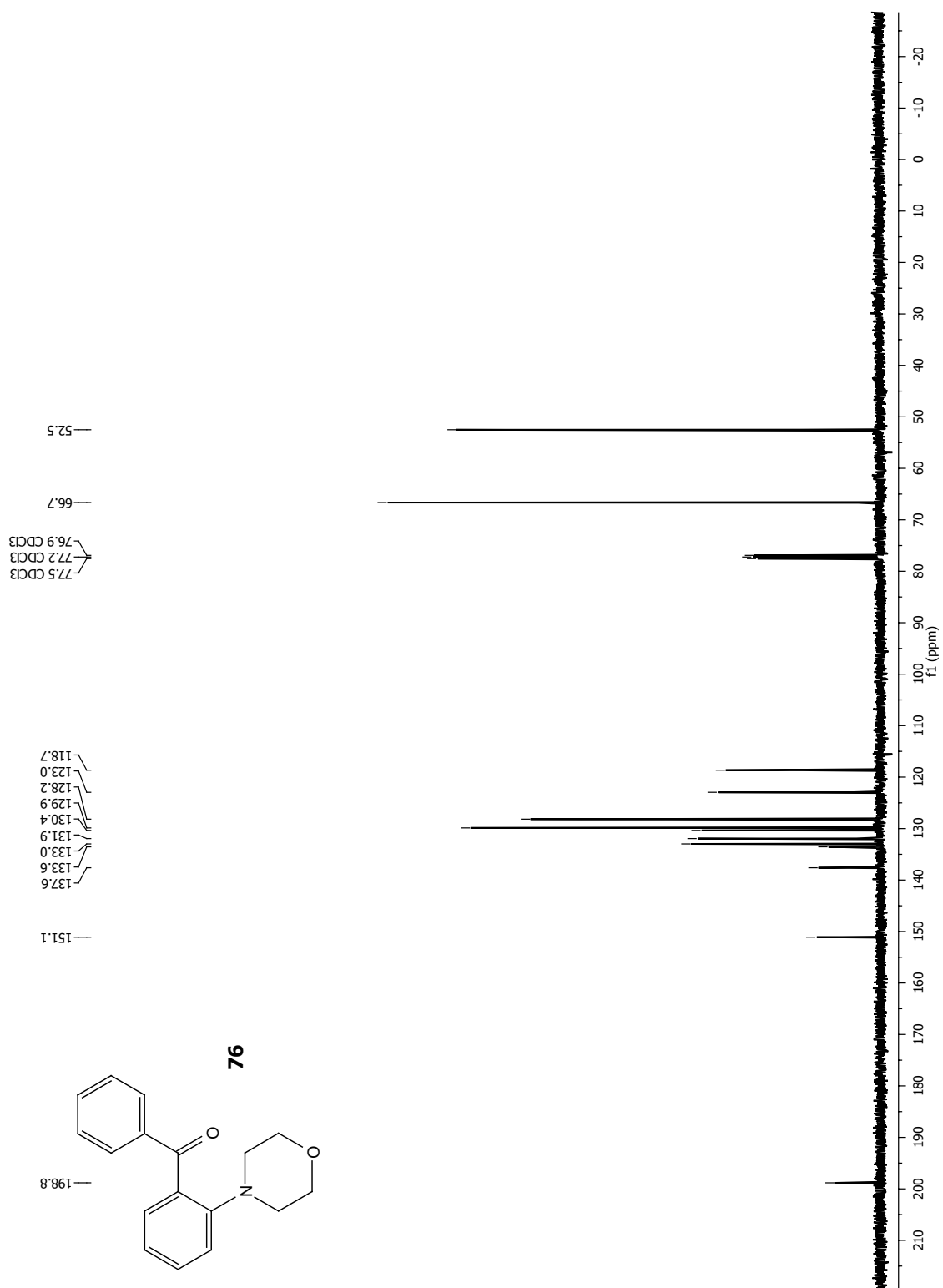


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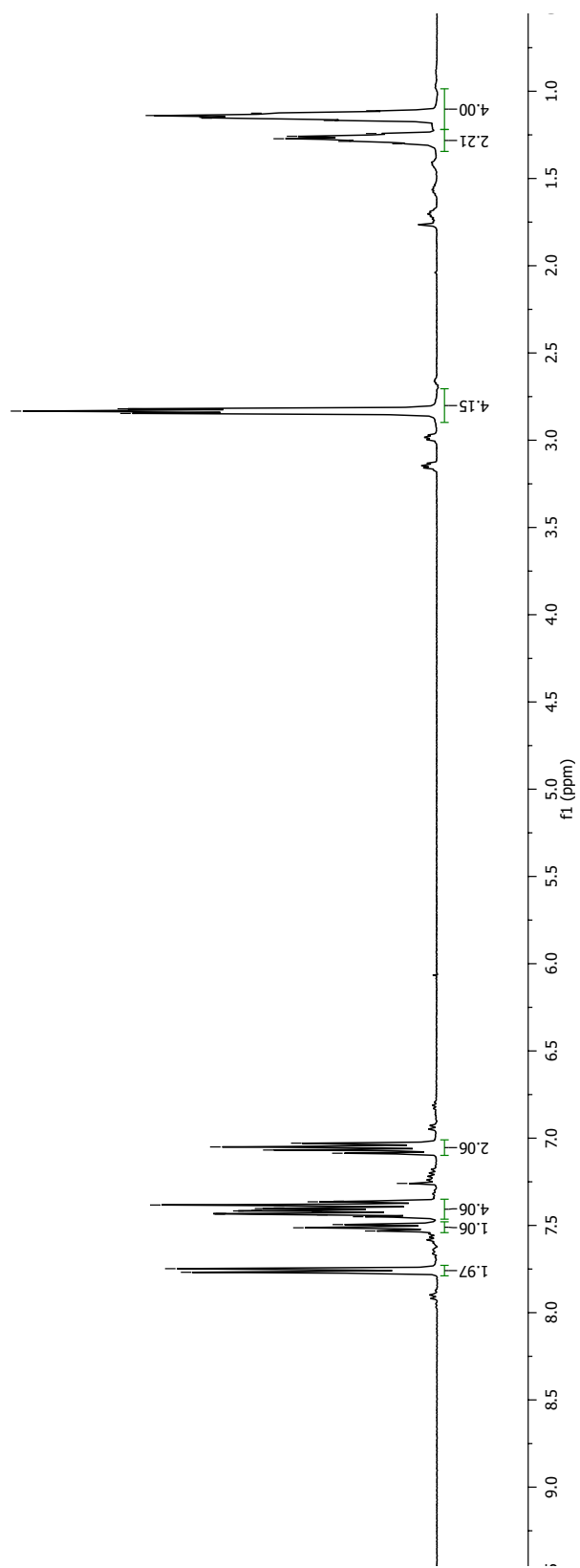








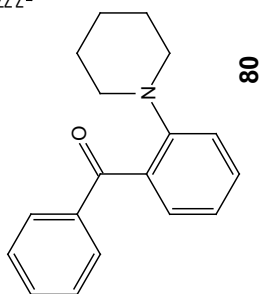
575



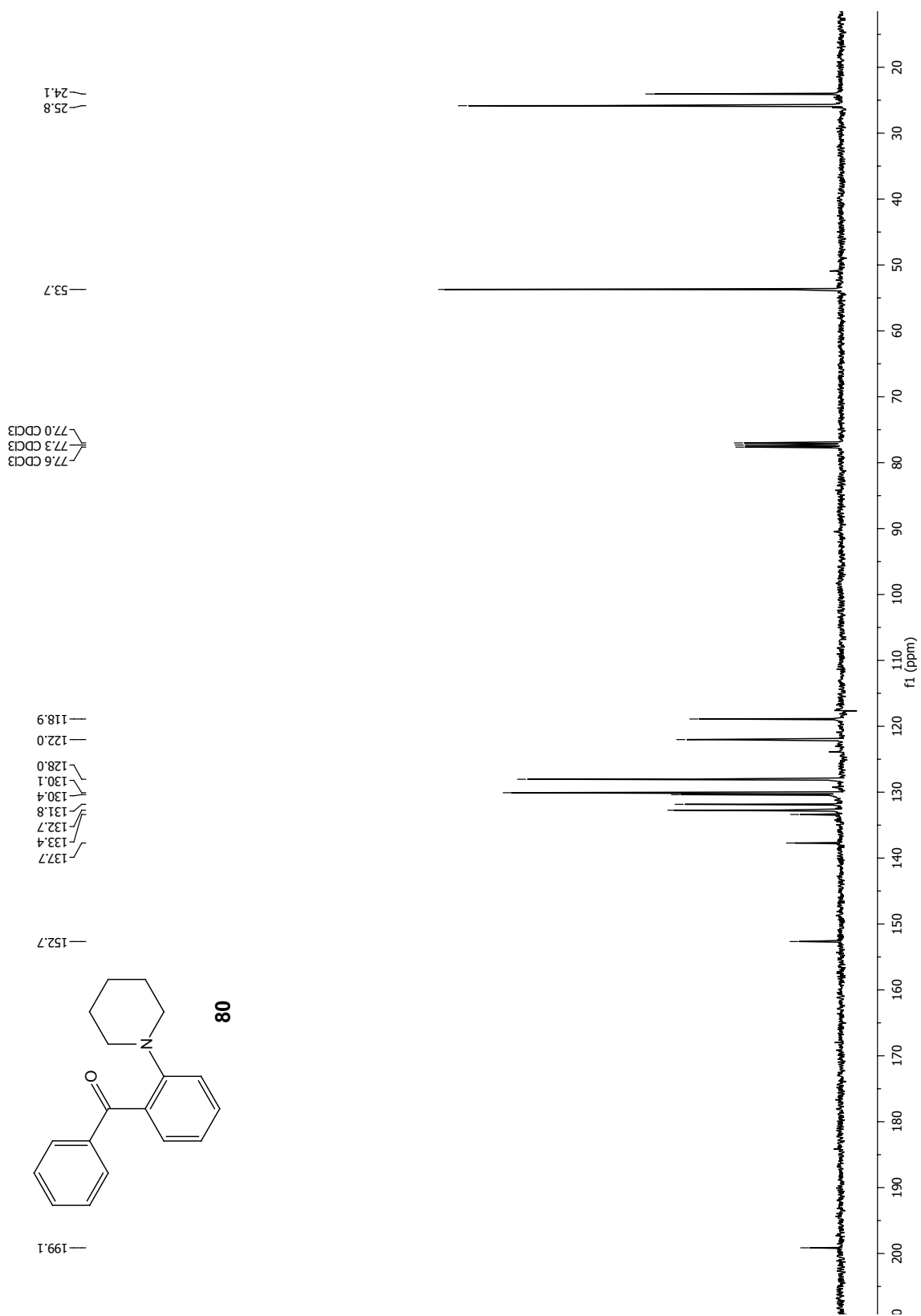
1.11
1.13
1.14
1.15
1.17
1.24
1.26
1.27
1.29
1.30

2.82
2.83
2.85

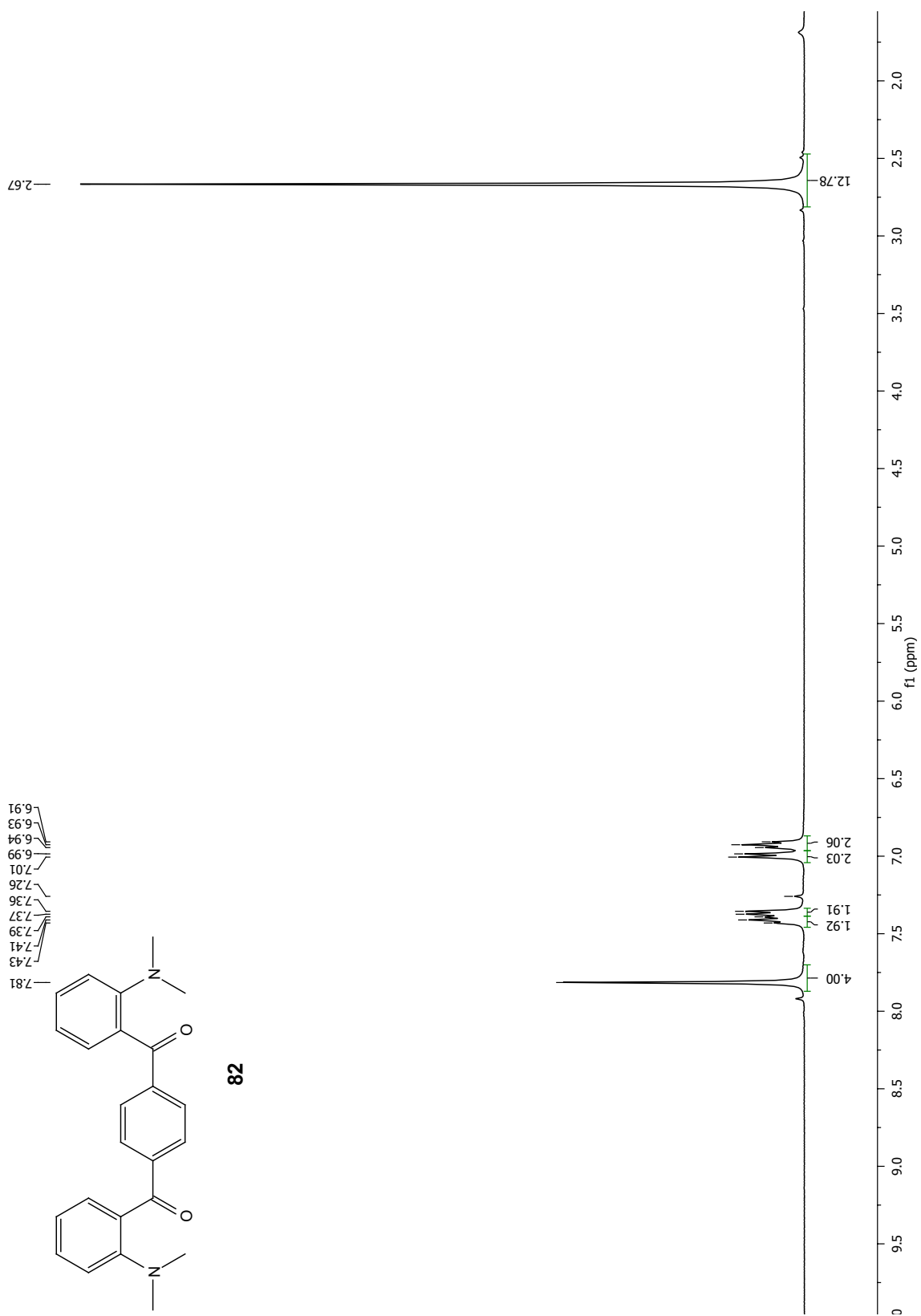
7.03
7.03
7.05
7.07
7.09
7.26
7.36
7.36
7.38
7.40
7.40
7.41
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7.44
7.45
7.50
7.51
7.53
7.75
7.77

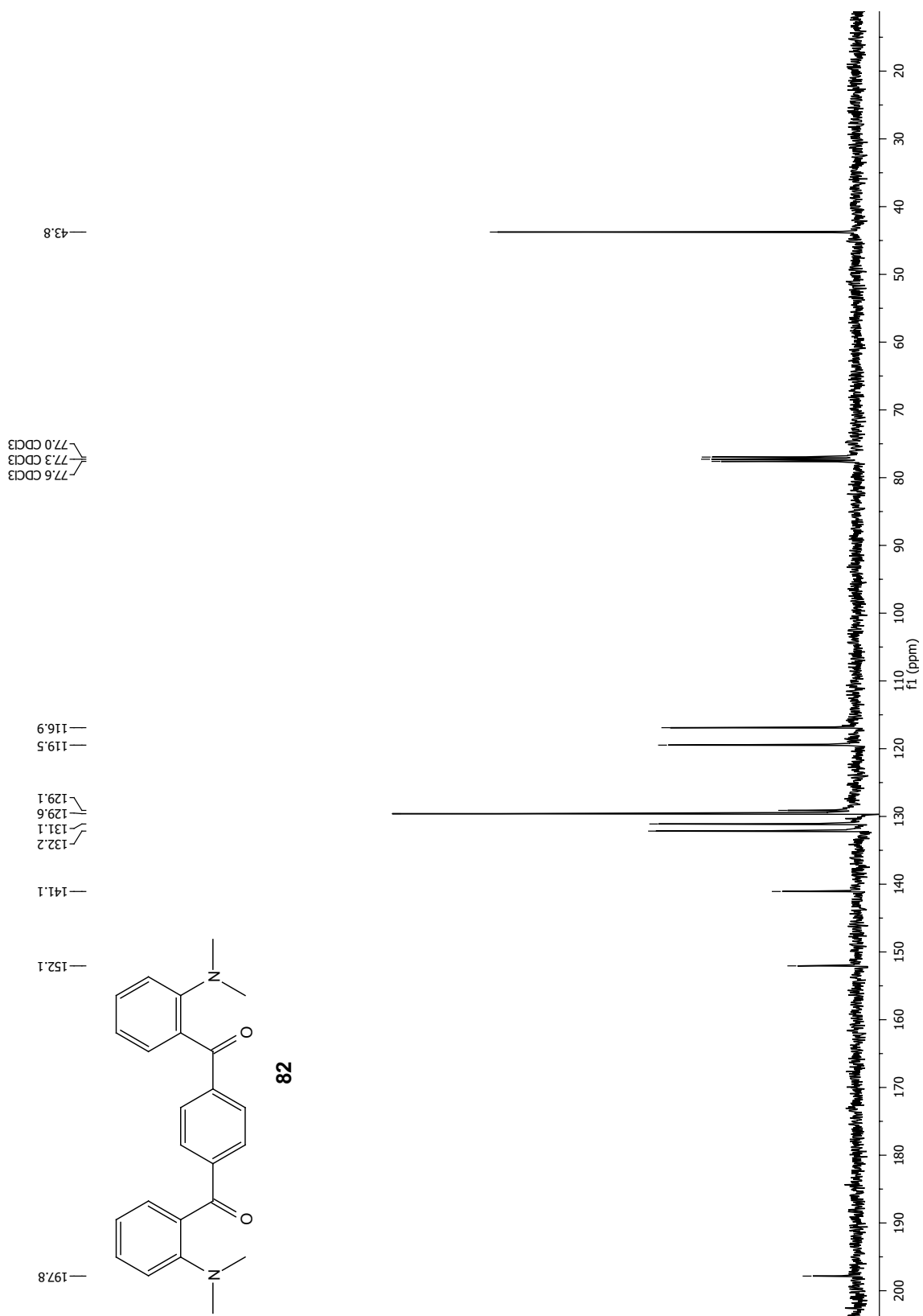


576

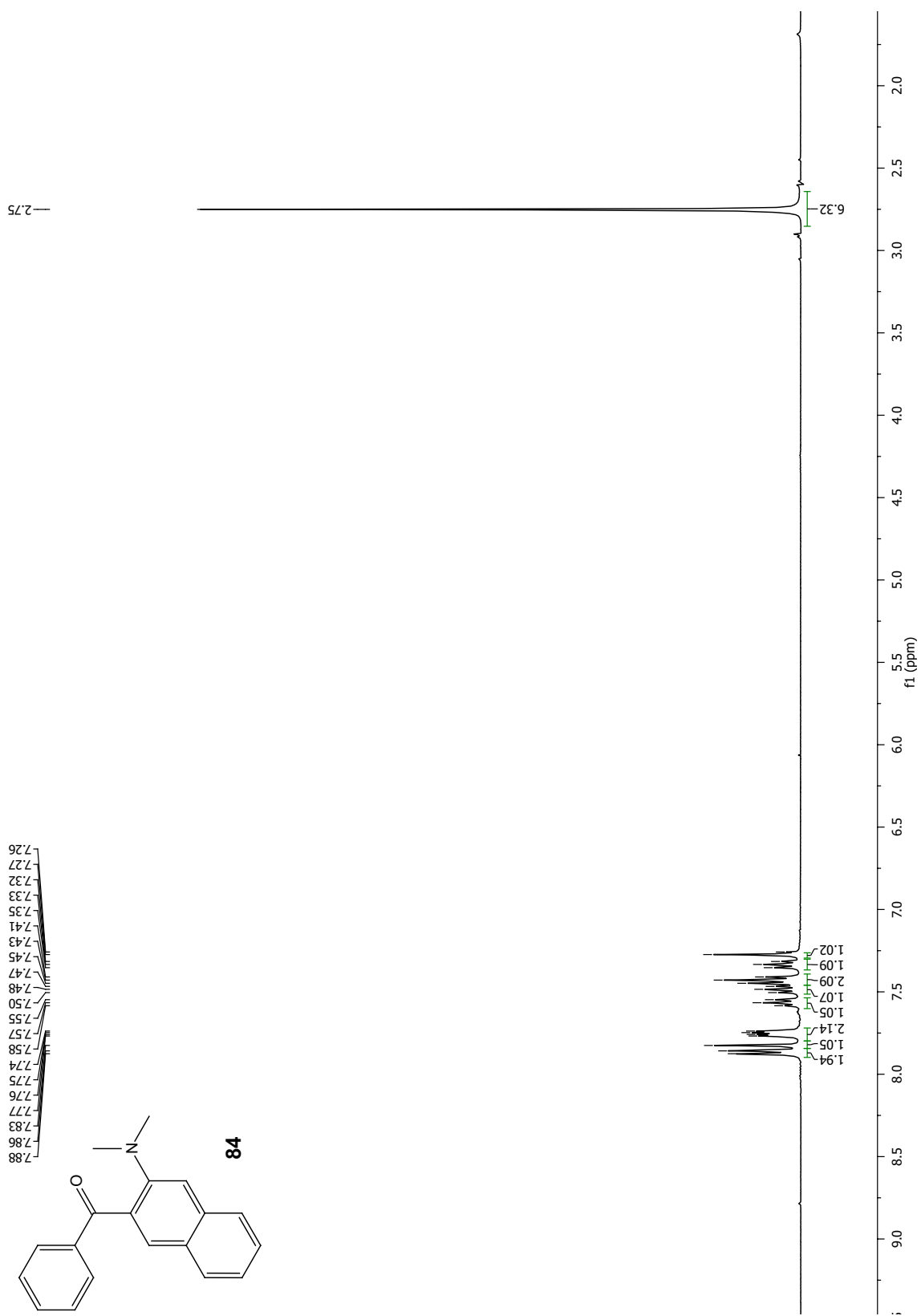


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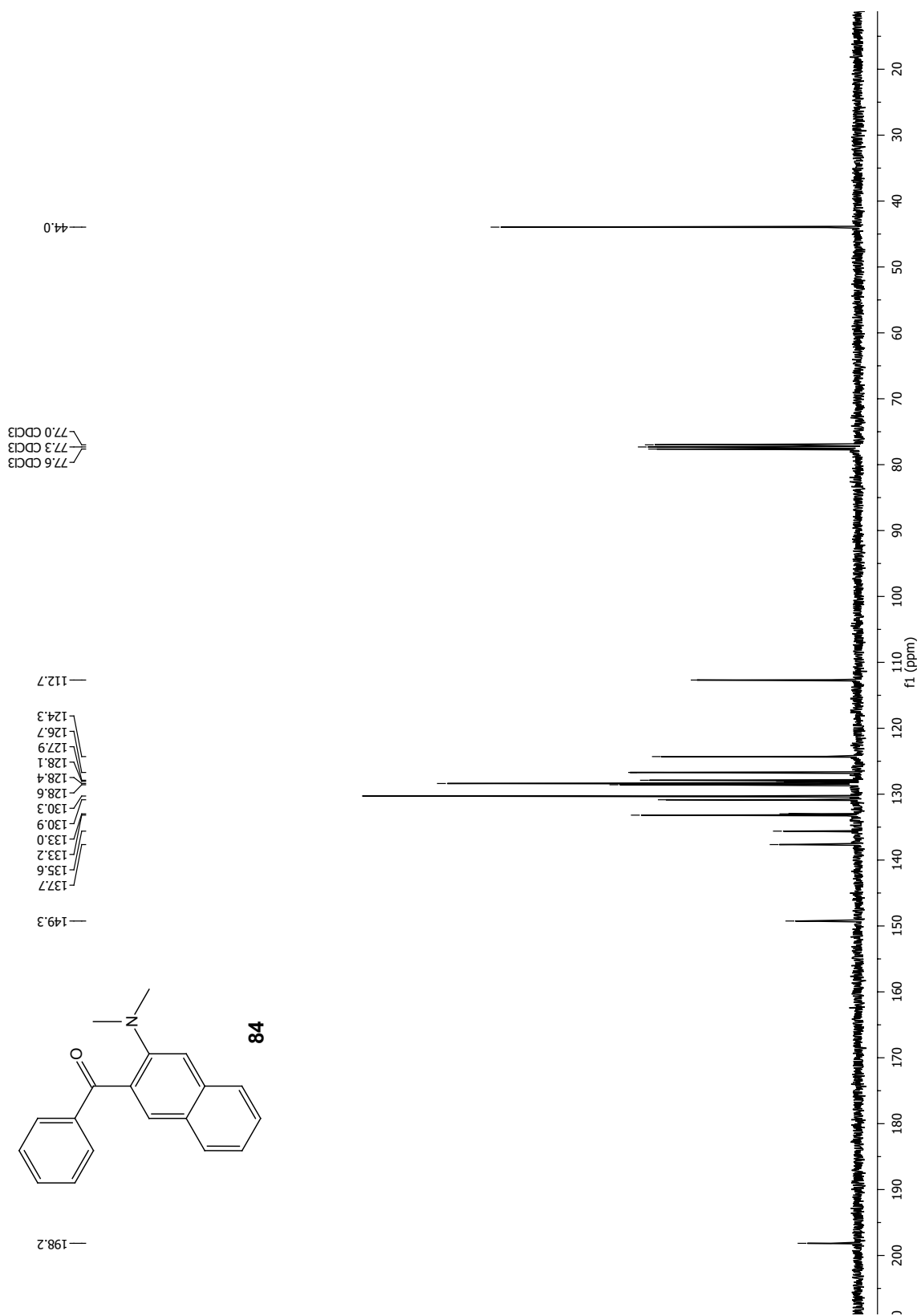




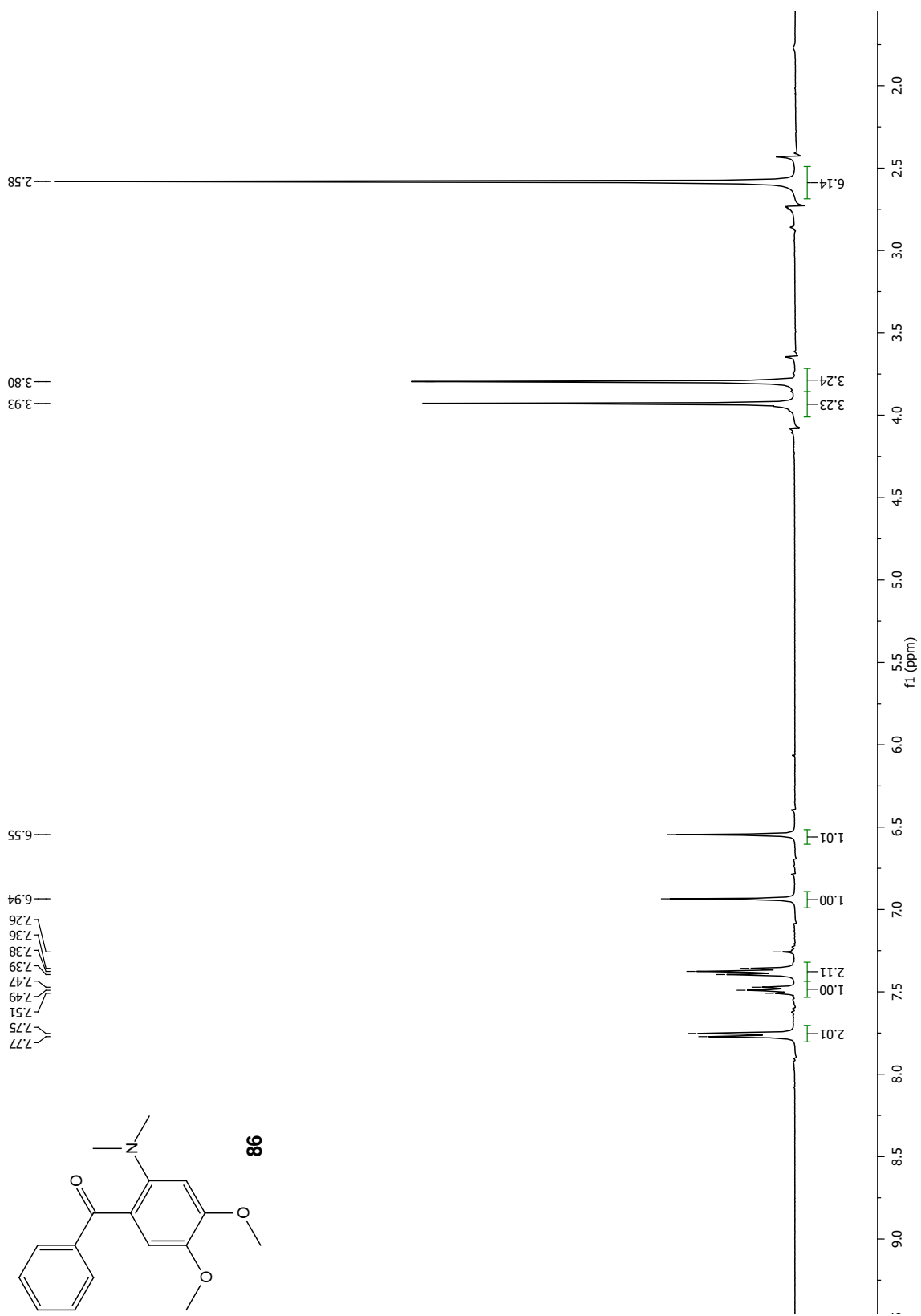
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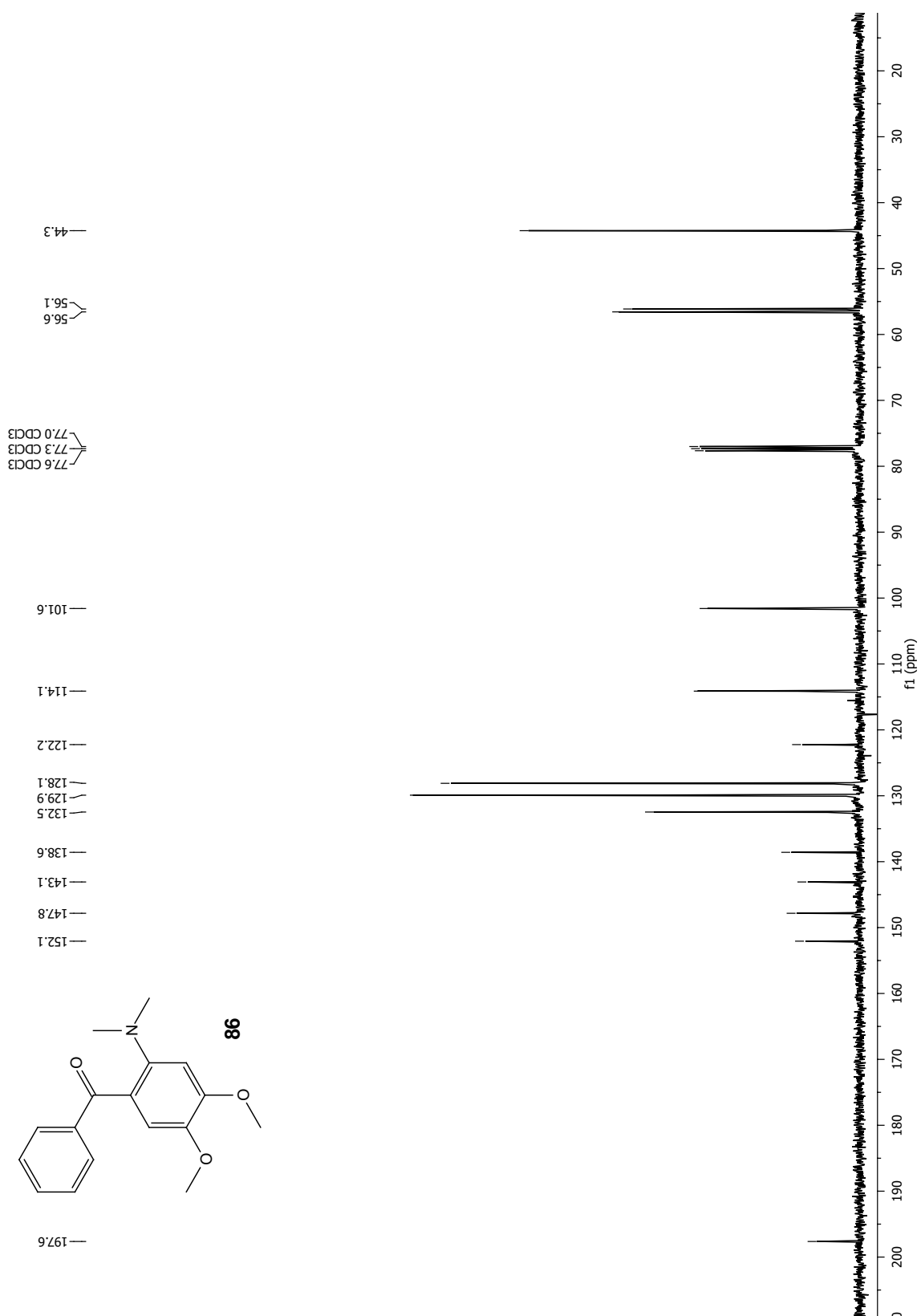


580

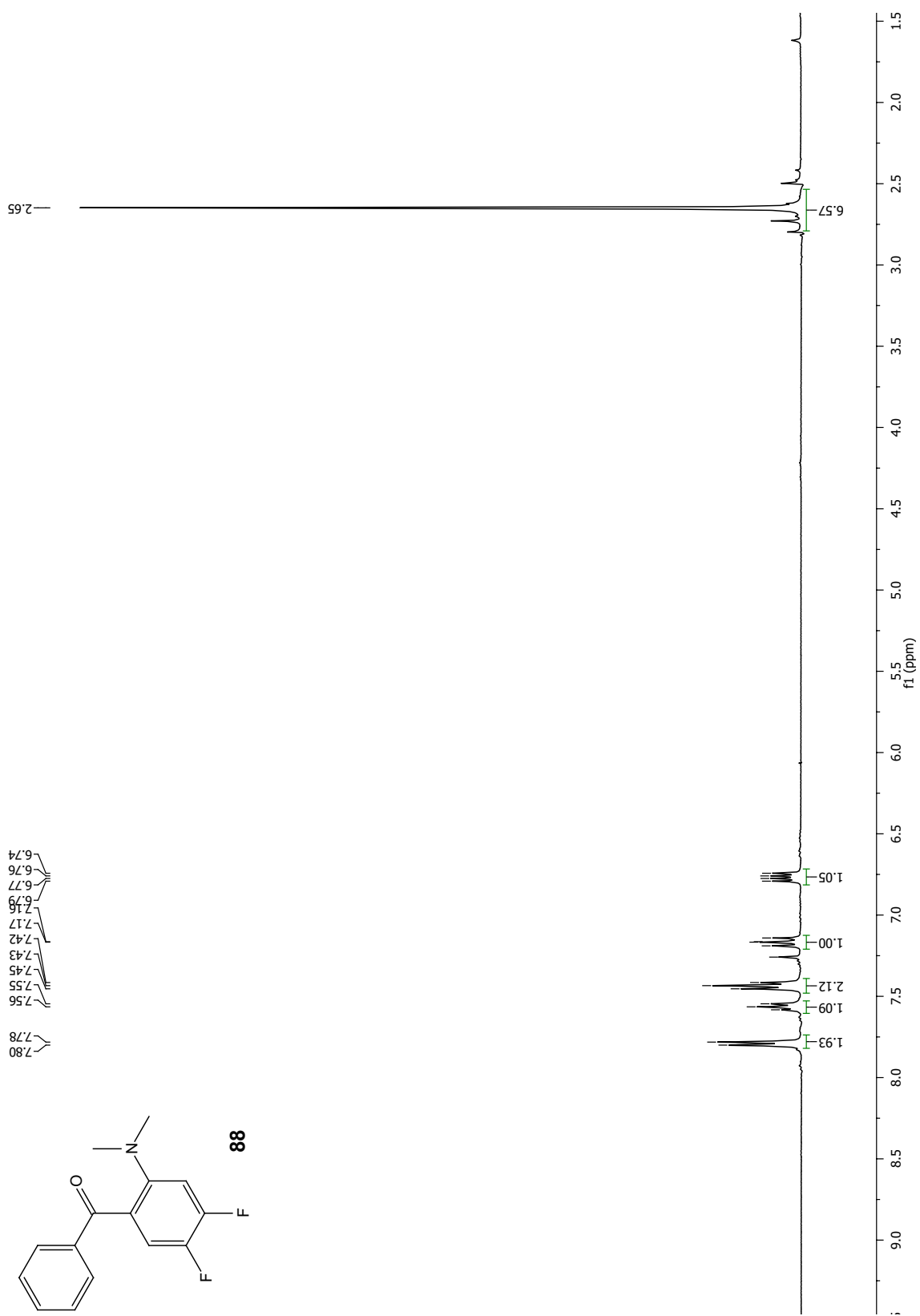


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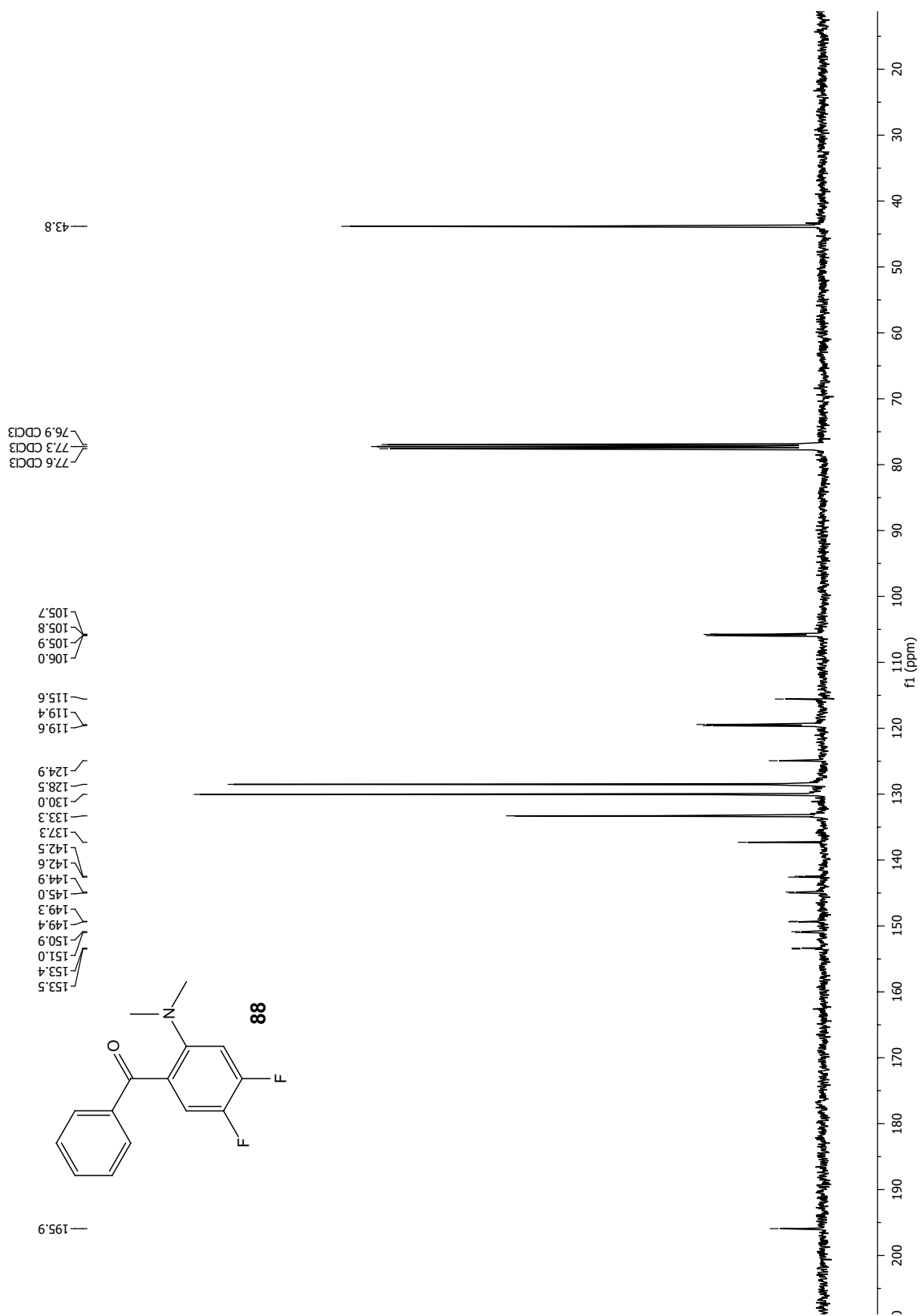




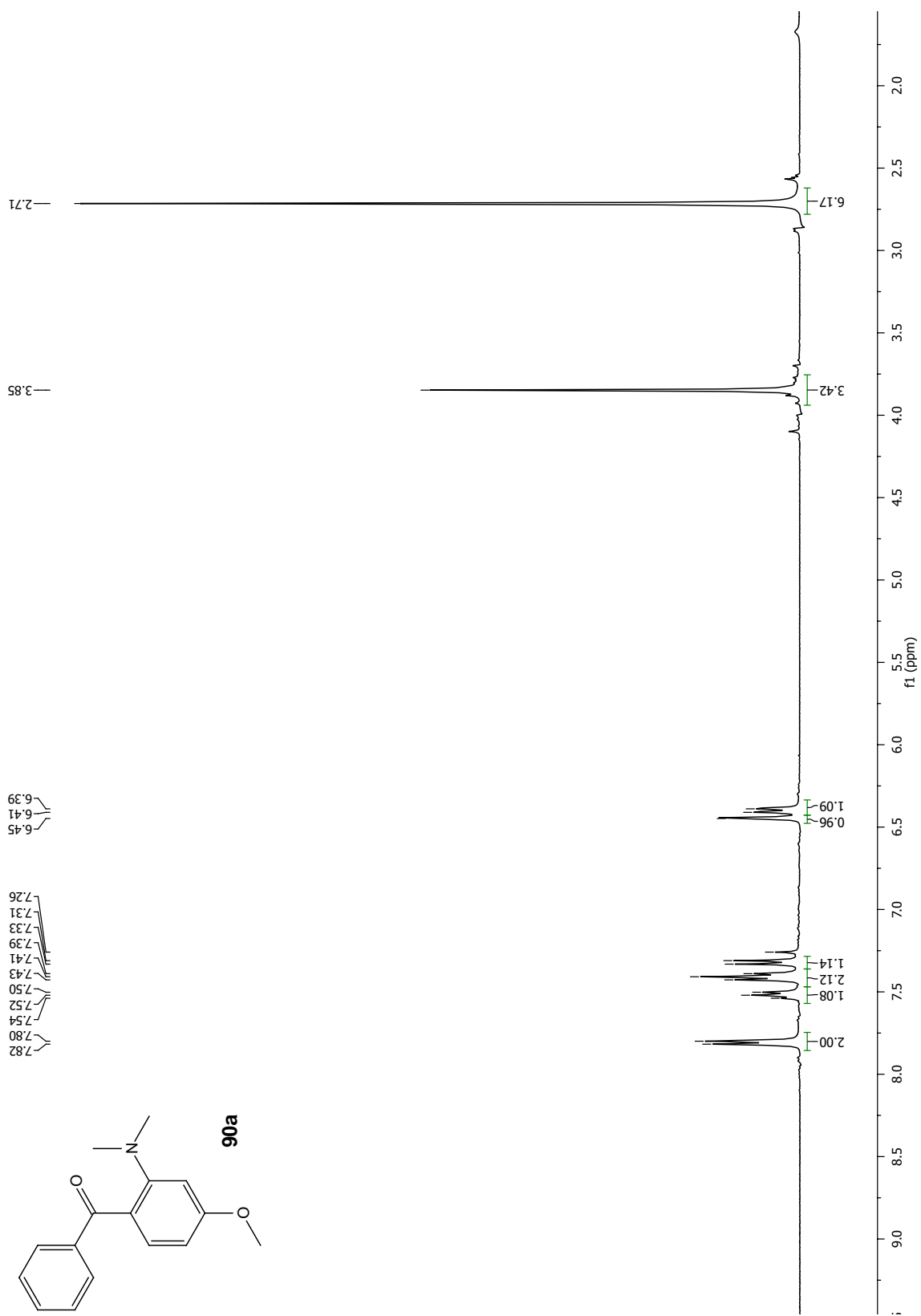
583

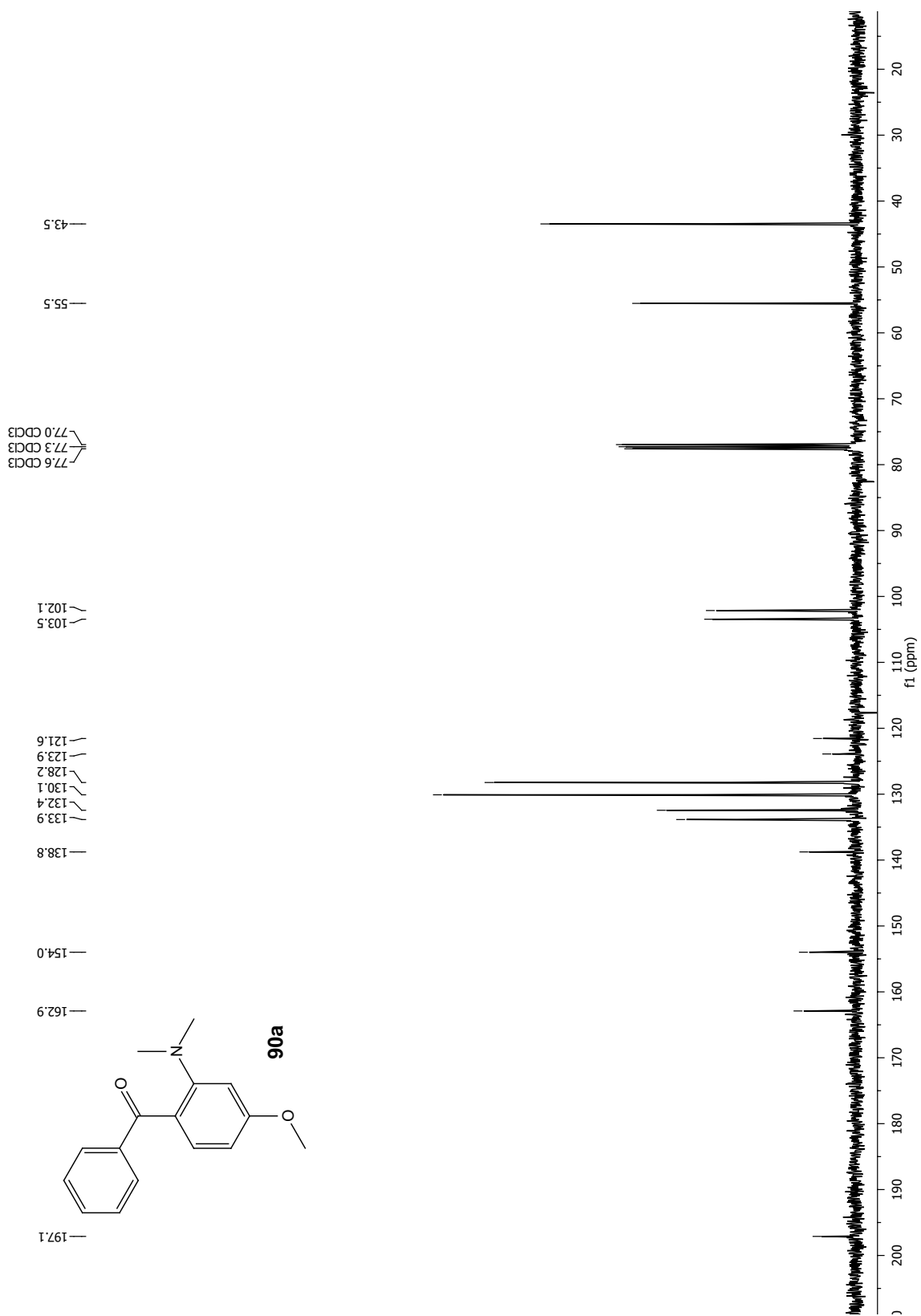


584

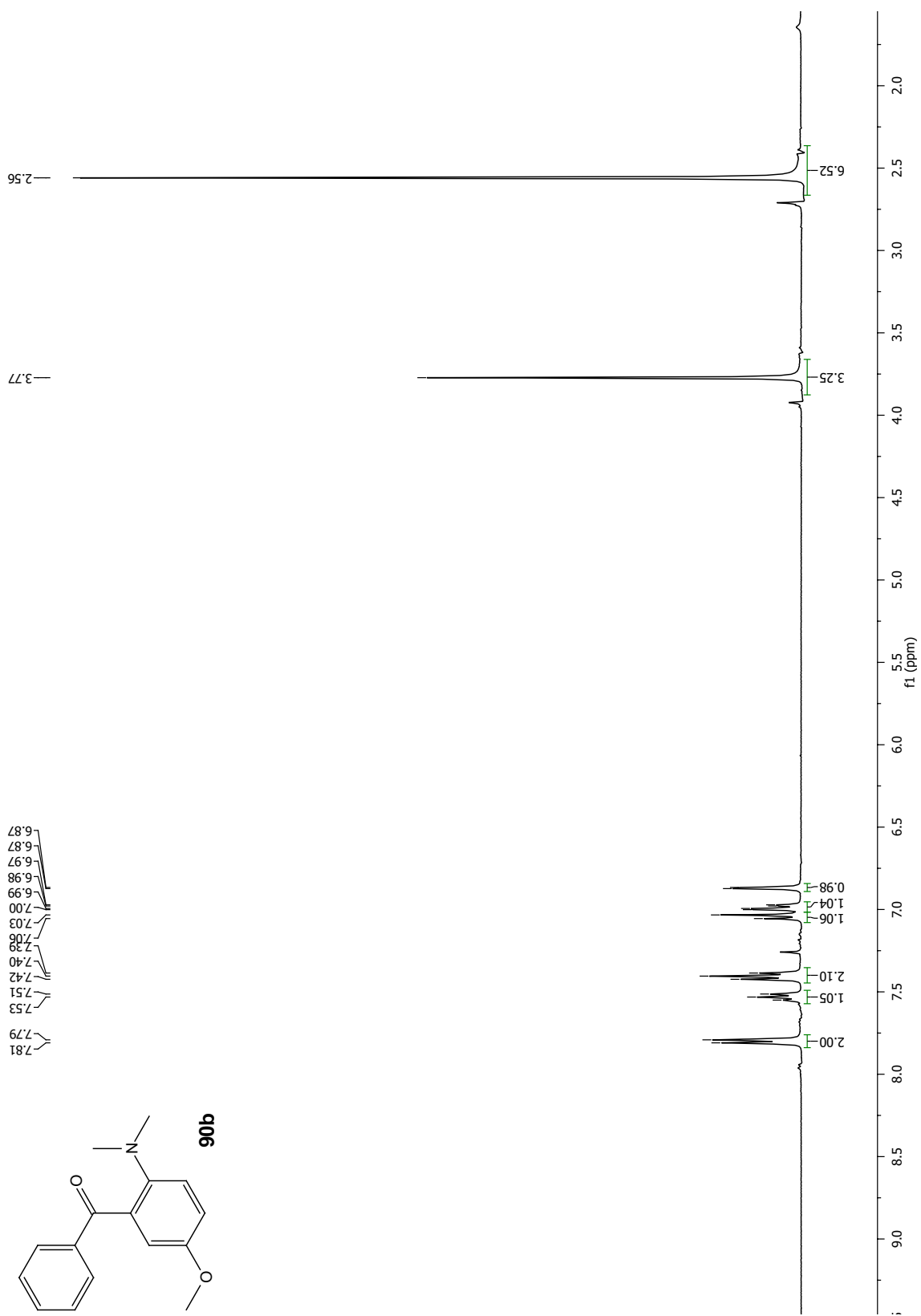


585

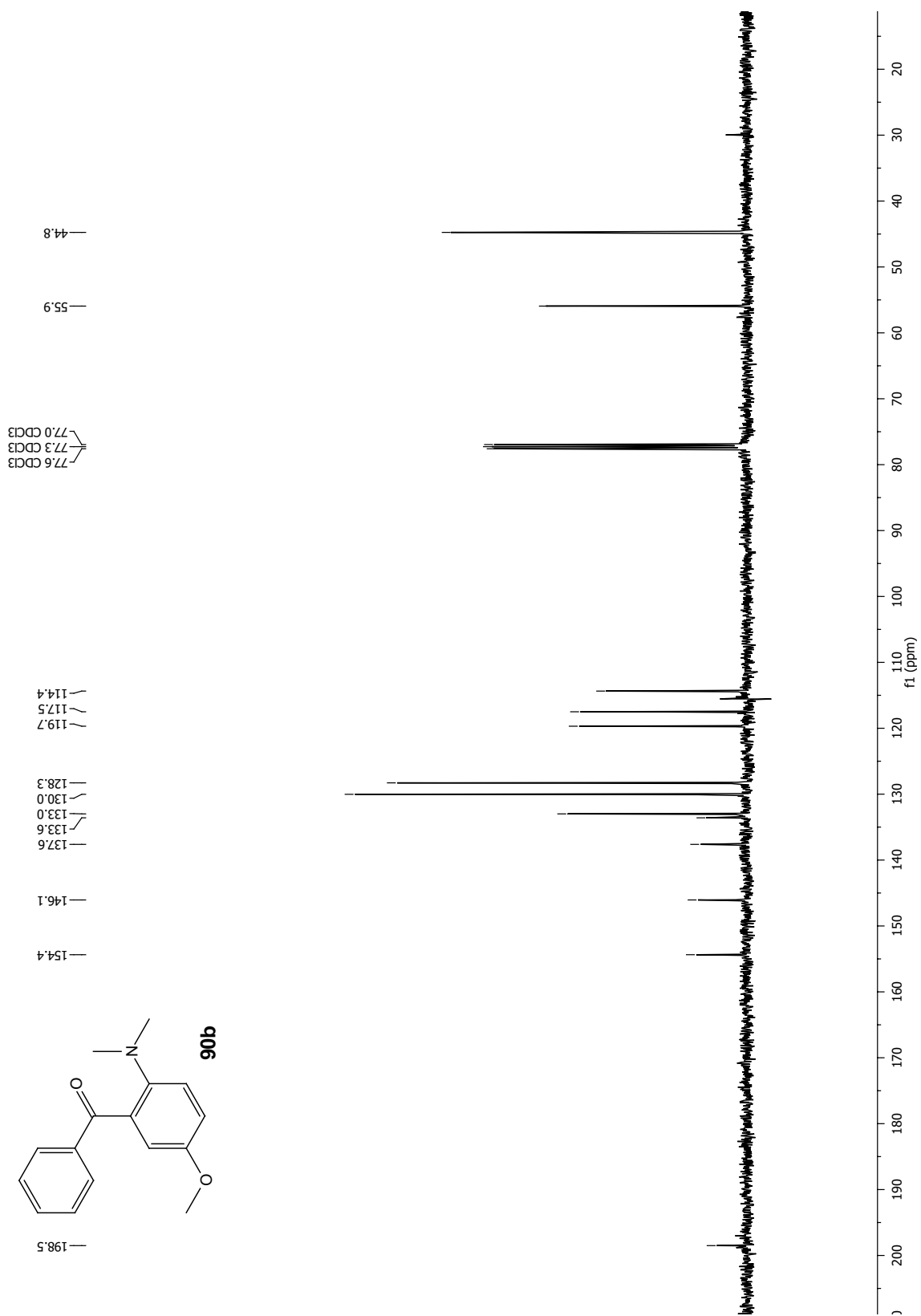


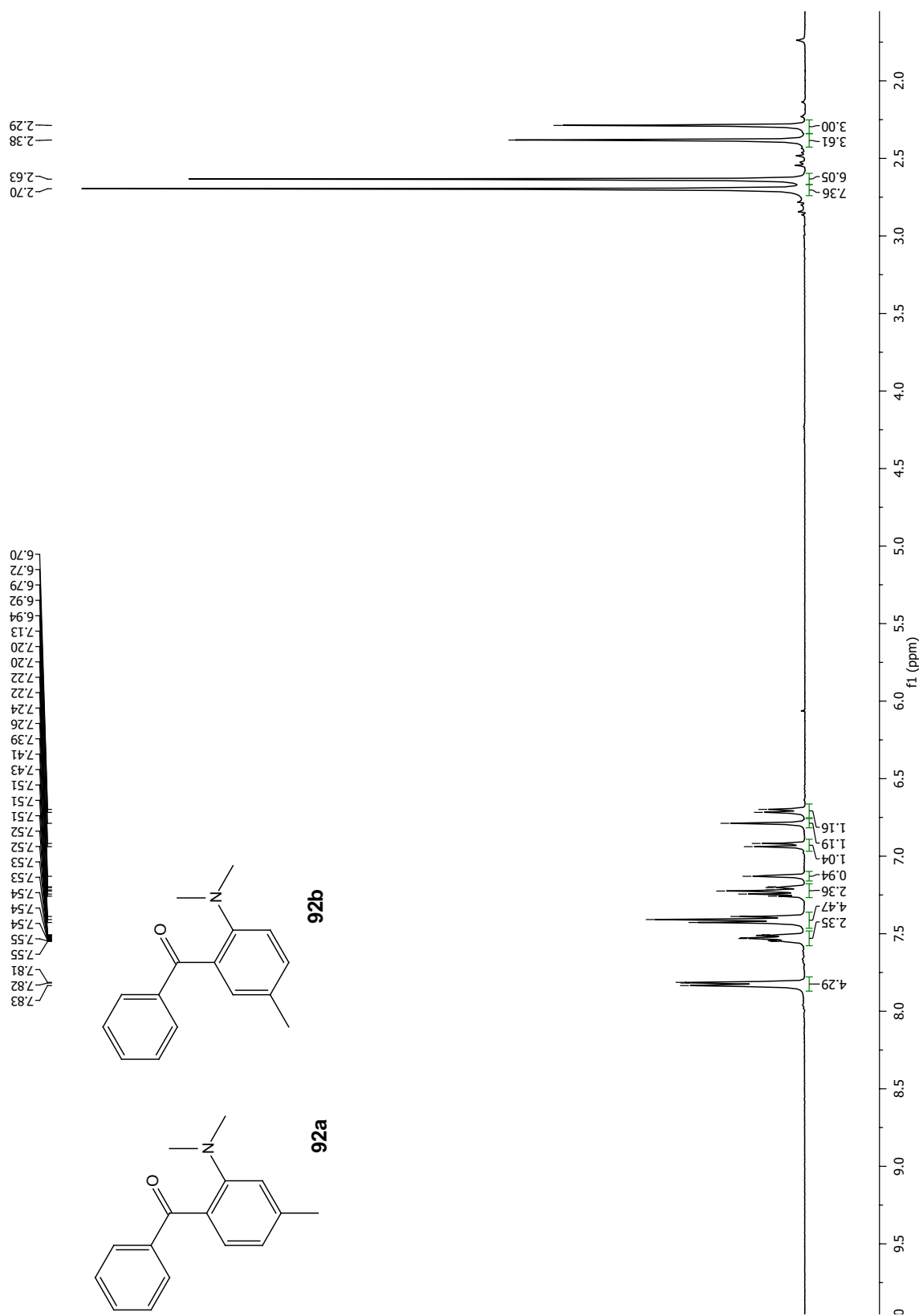


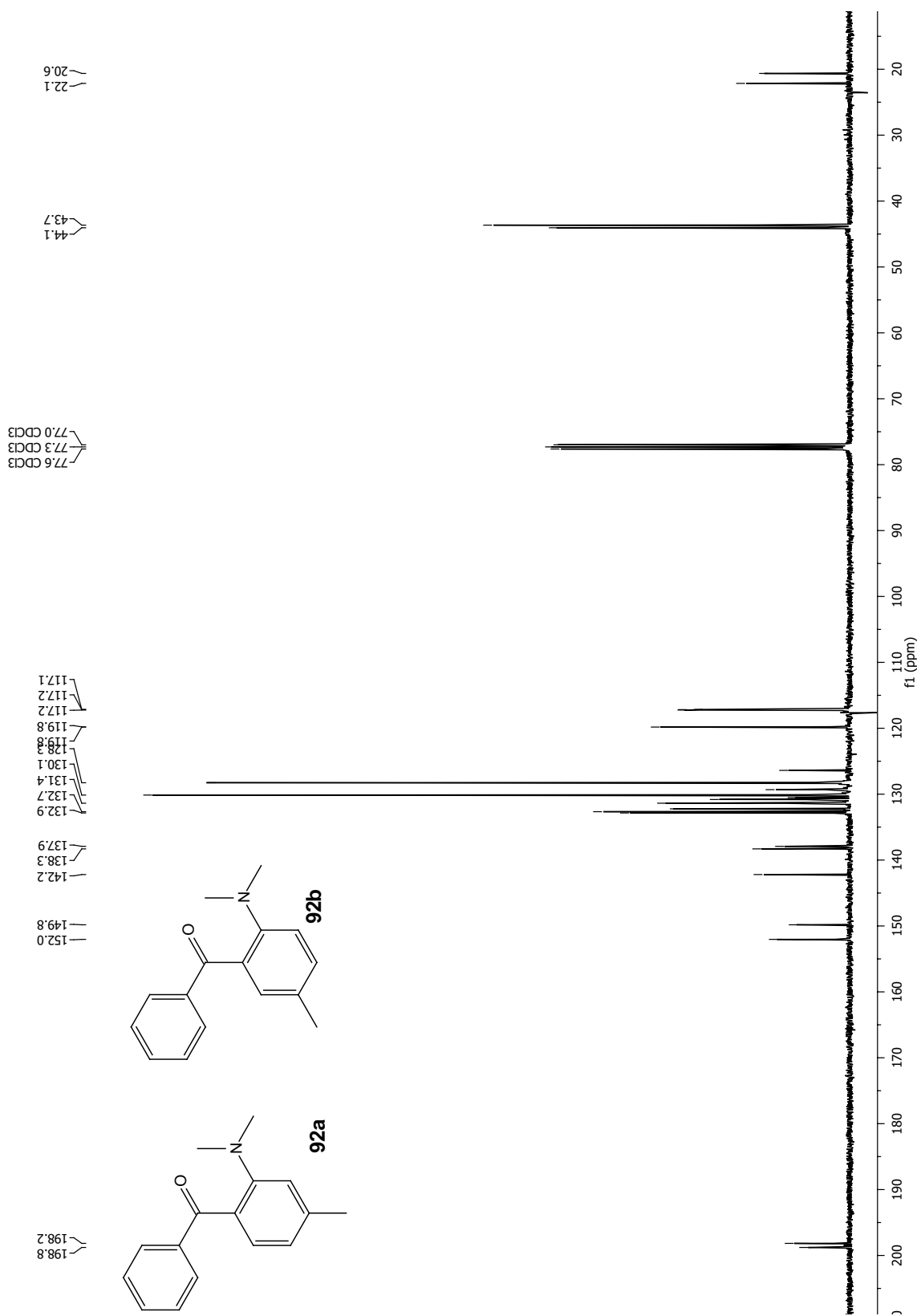
587

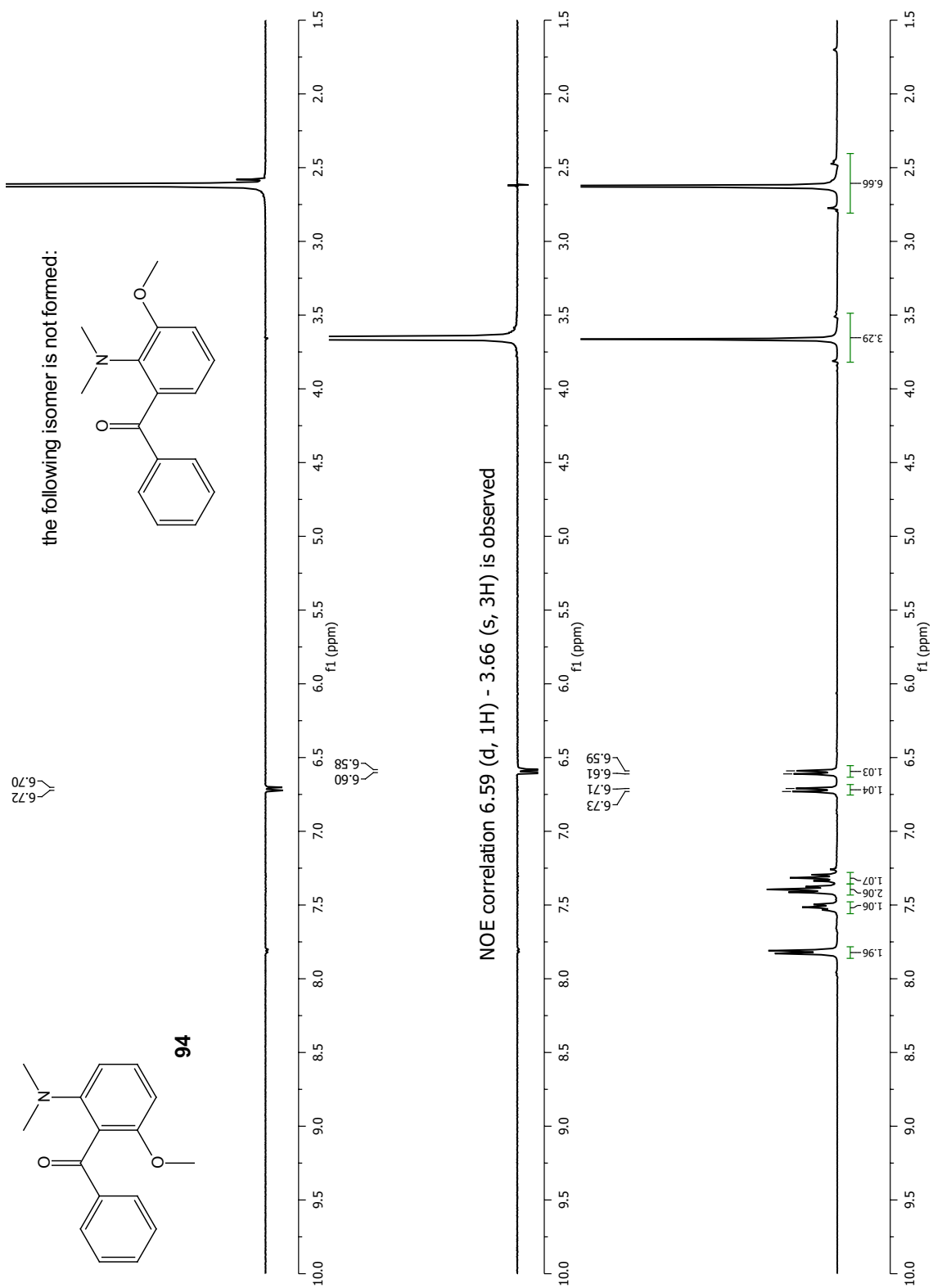


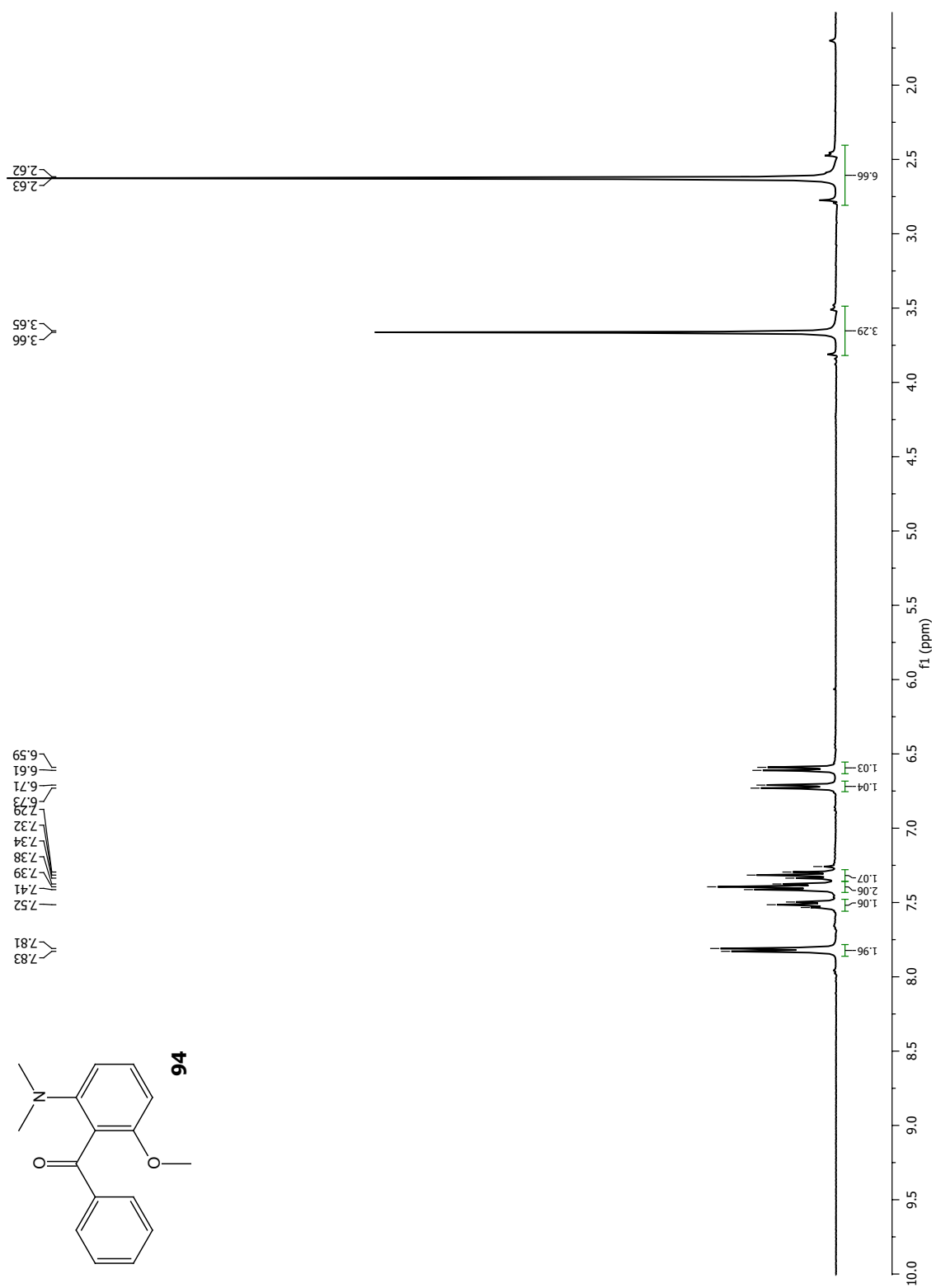
588

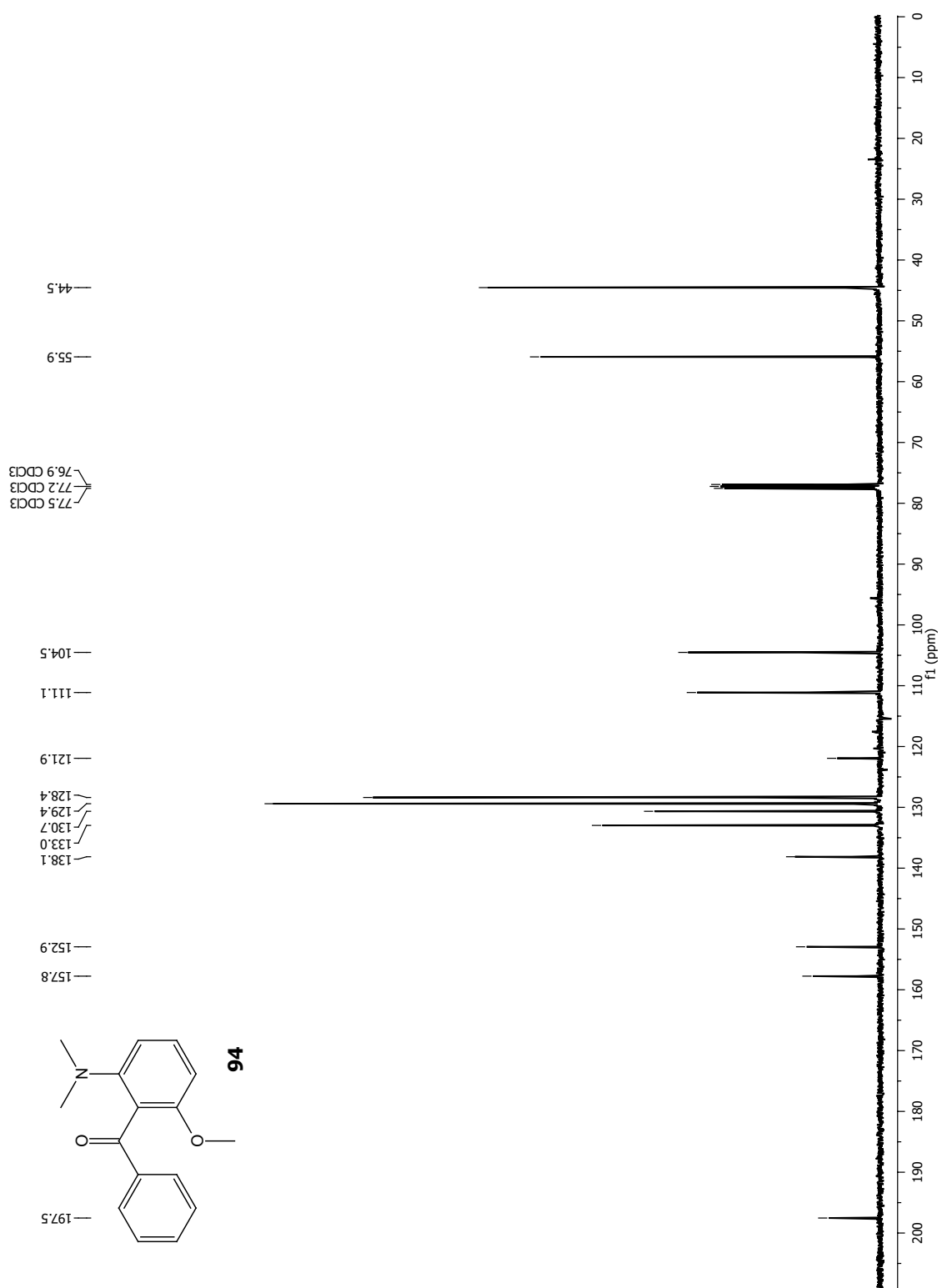




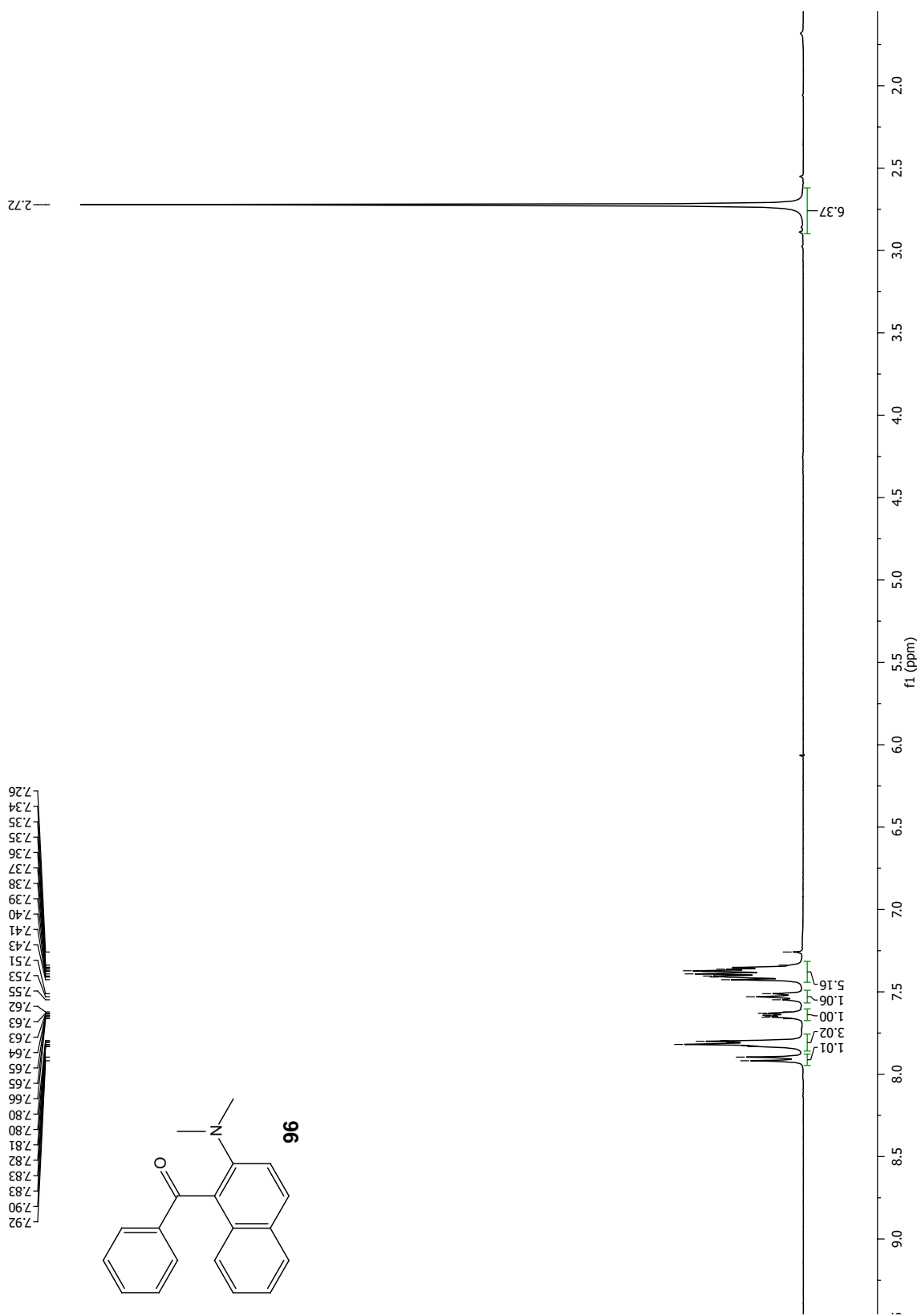




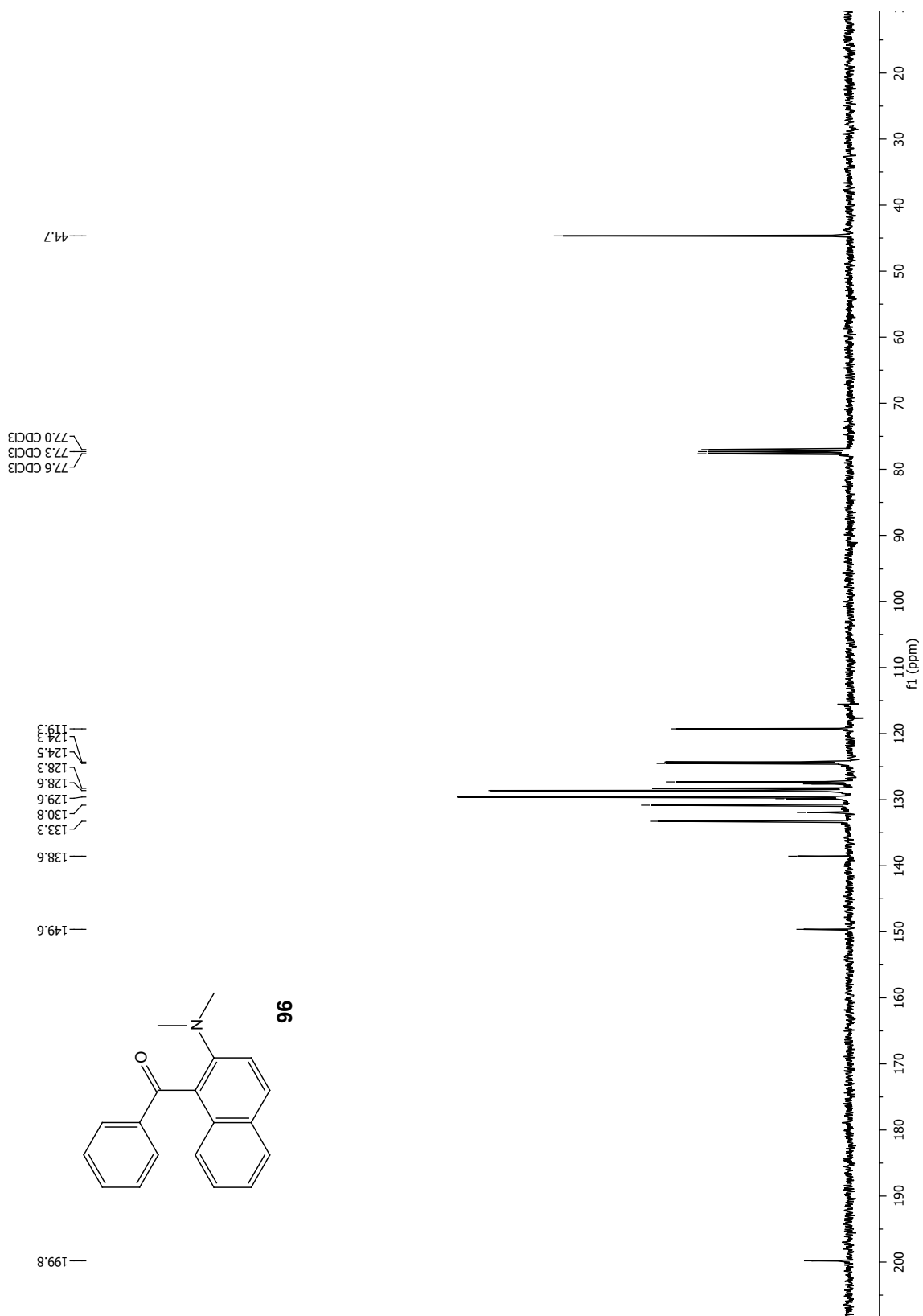


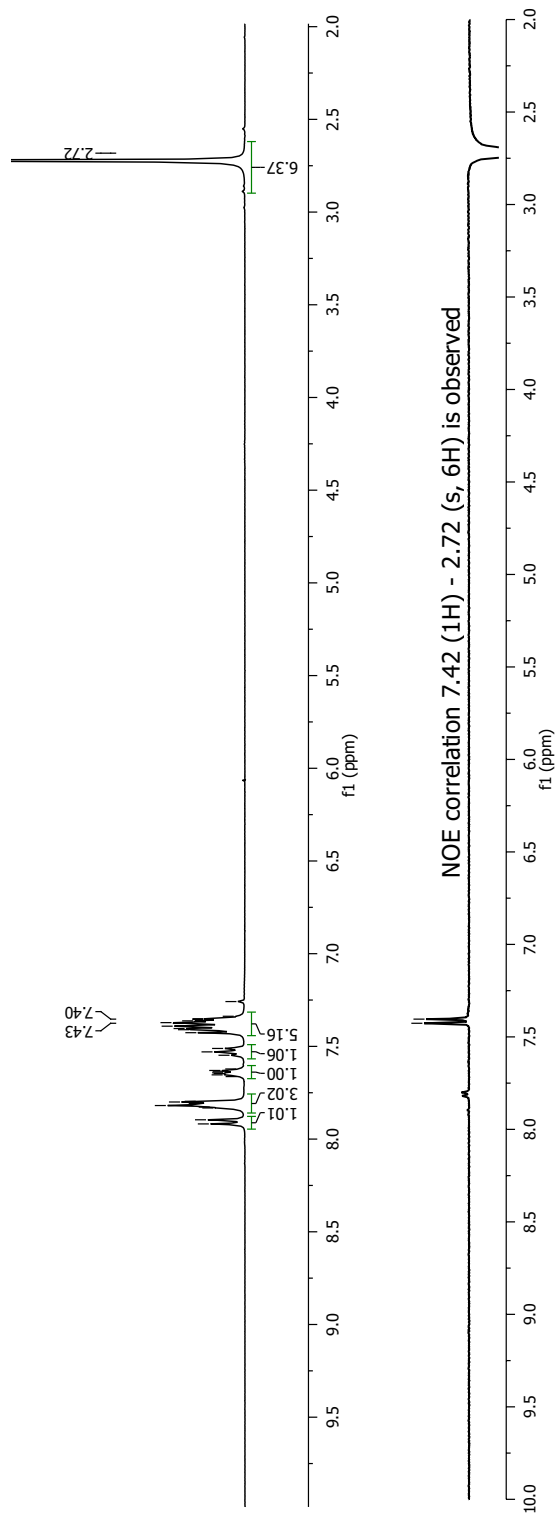


594



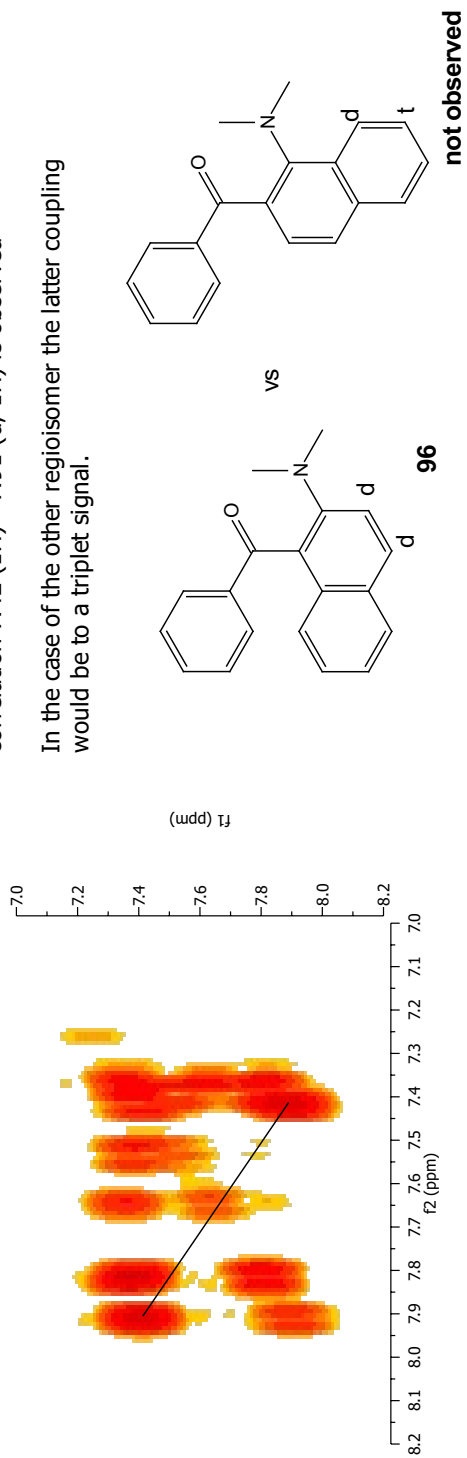
595



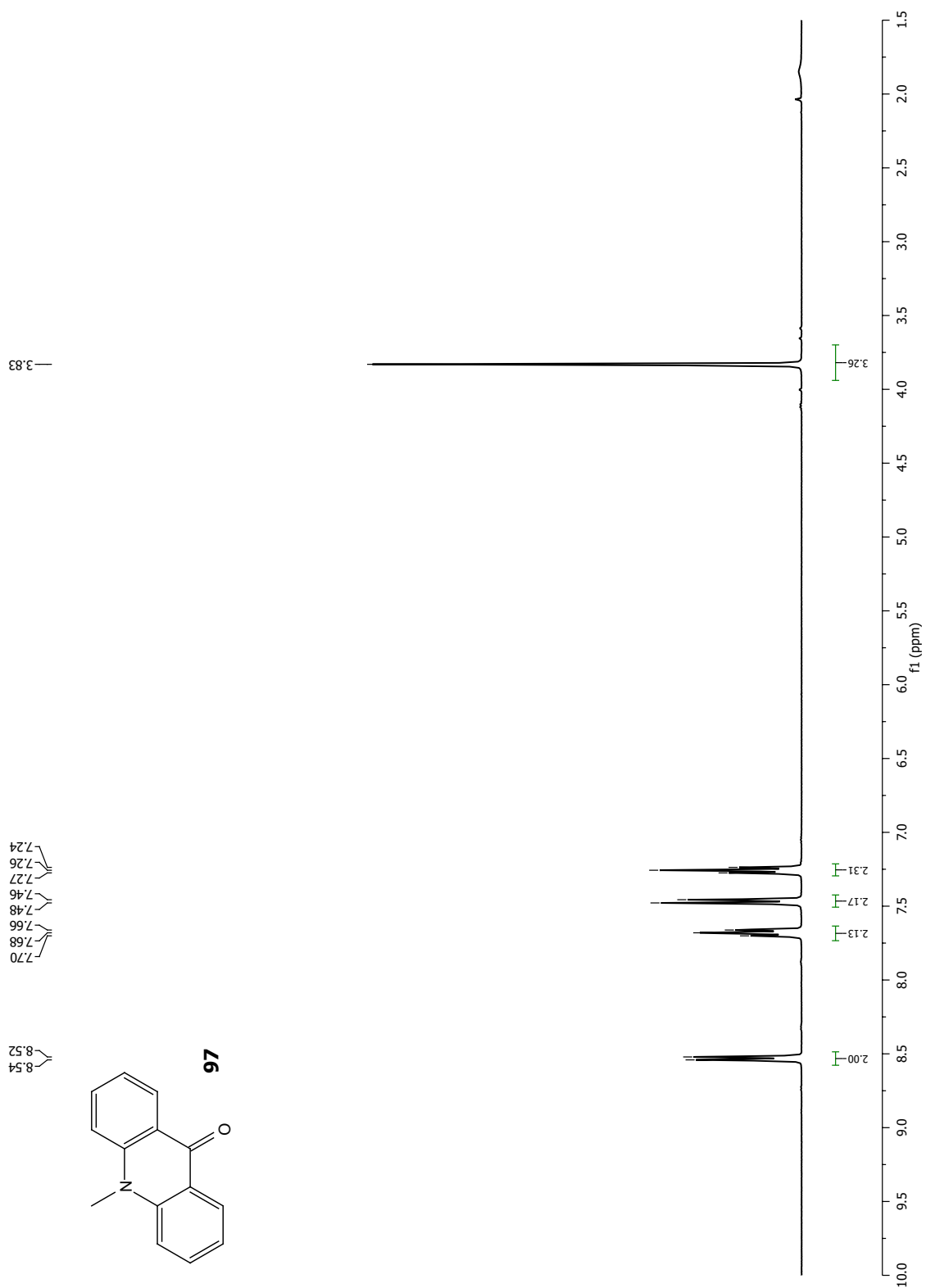


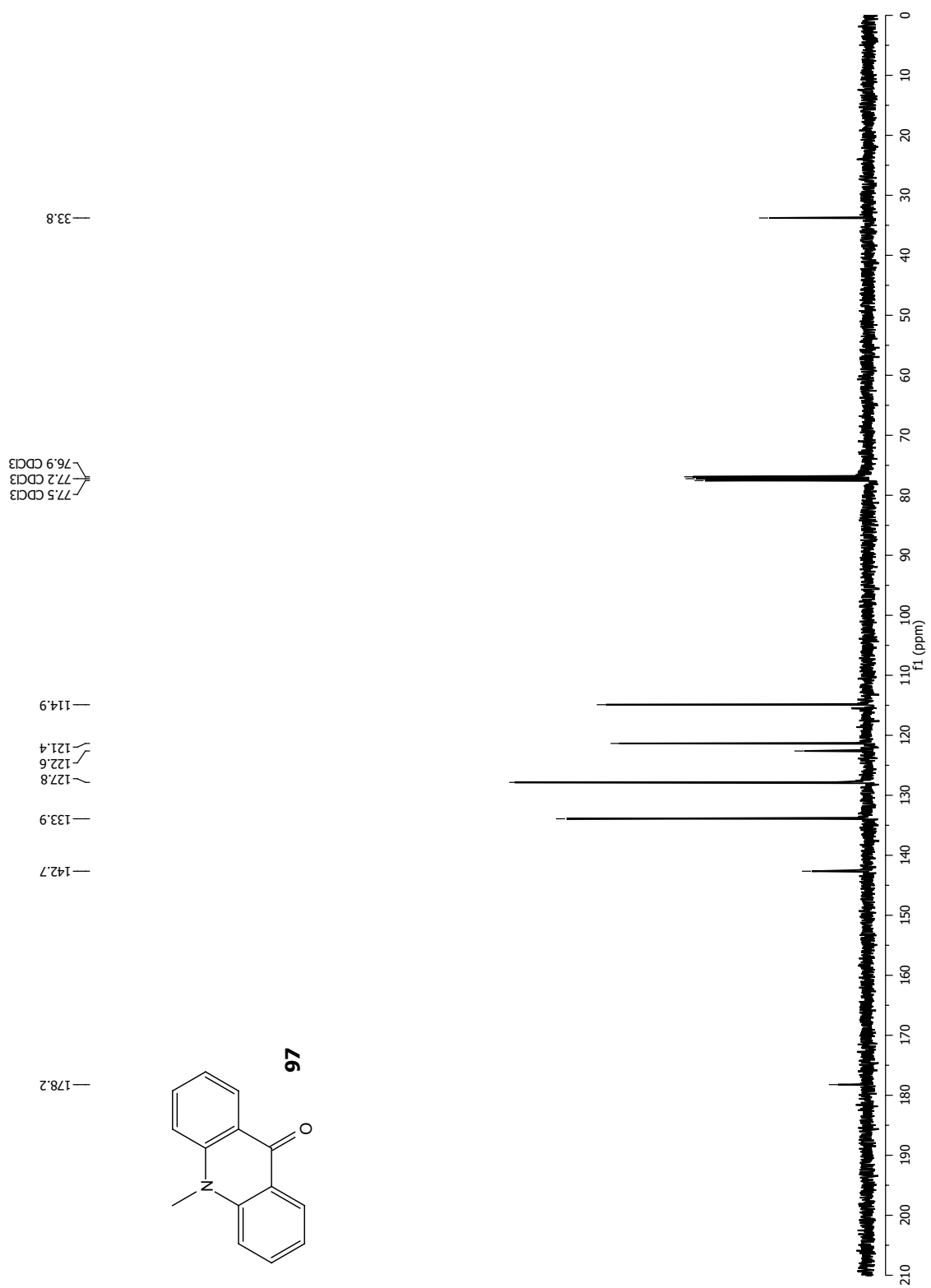
^1H - ^1H COSY
correlation 7.42 (1H) - 7.91 (d, 1H) is observed

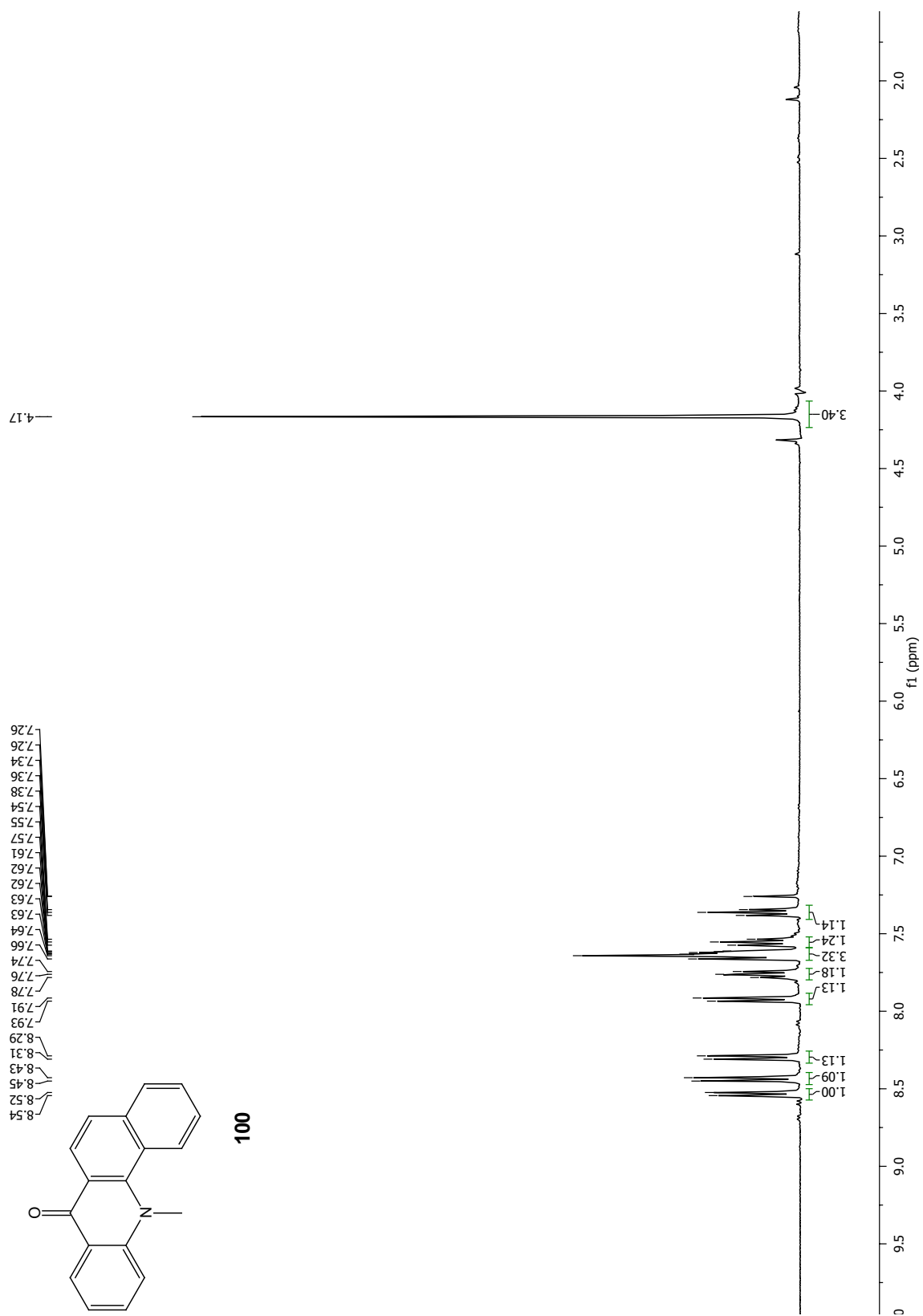
In the case of the other regioisomer the latter coupling would be to a triplet signal.

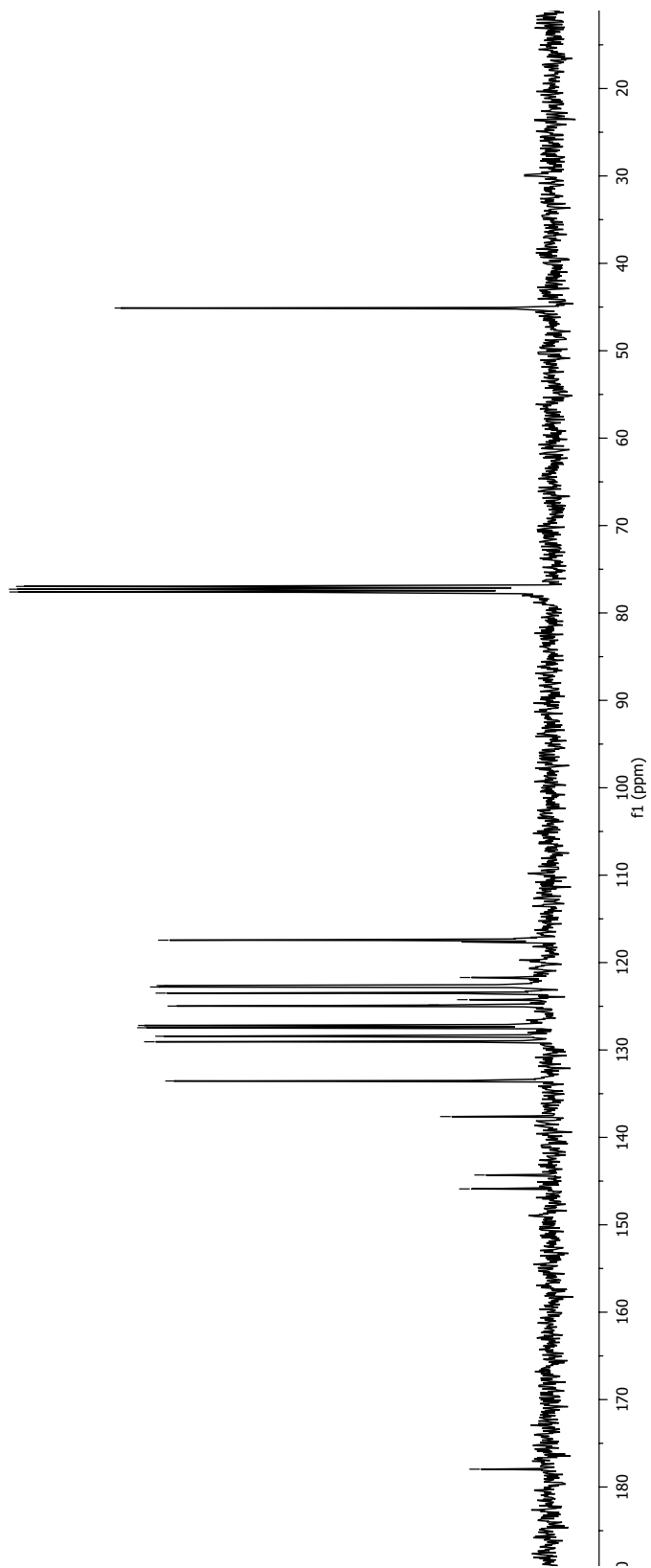


597



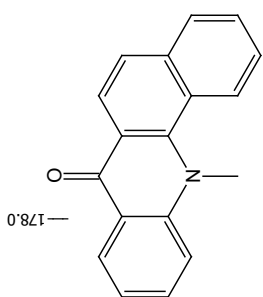






600

100

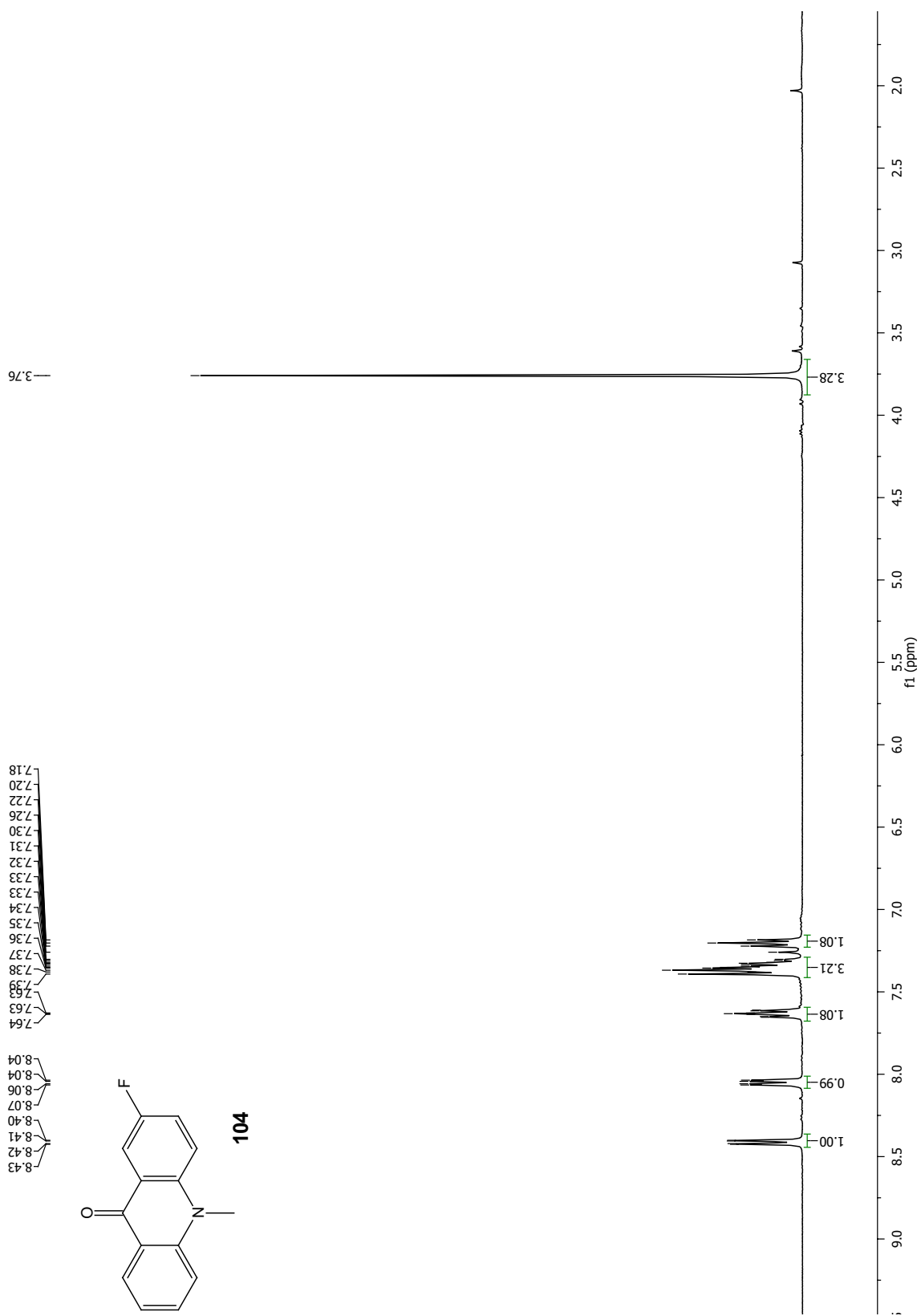


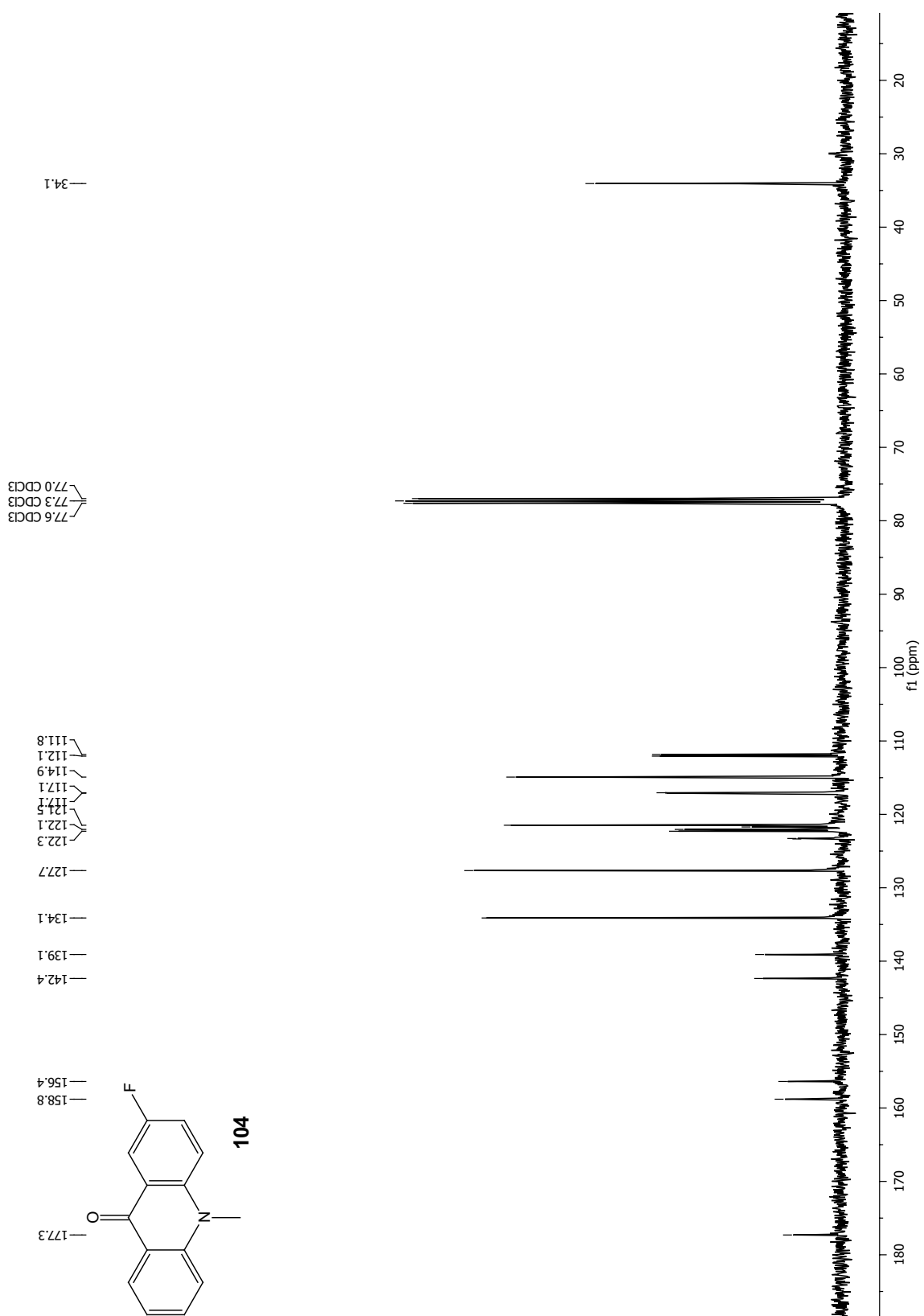
77.6 CDCl₃
77.3 CDCl₃
77.0 CDCl₃

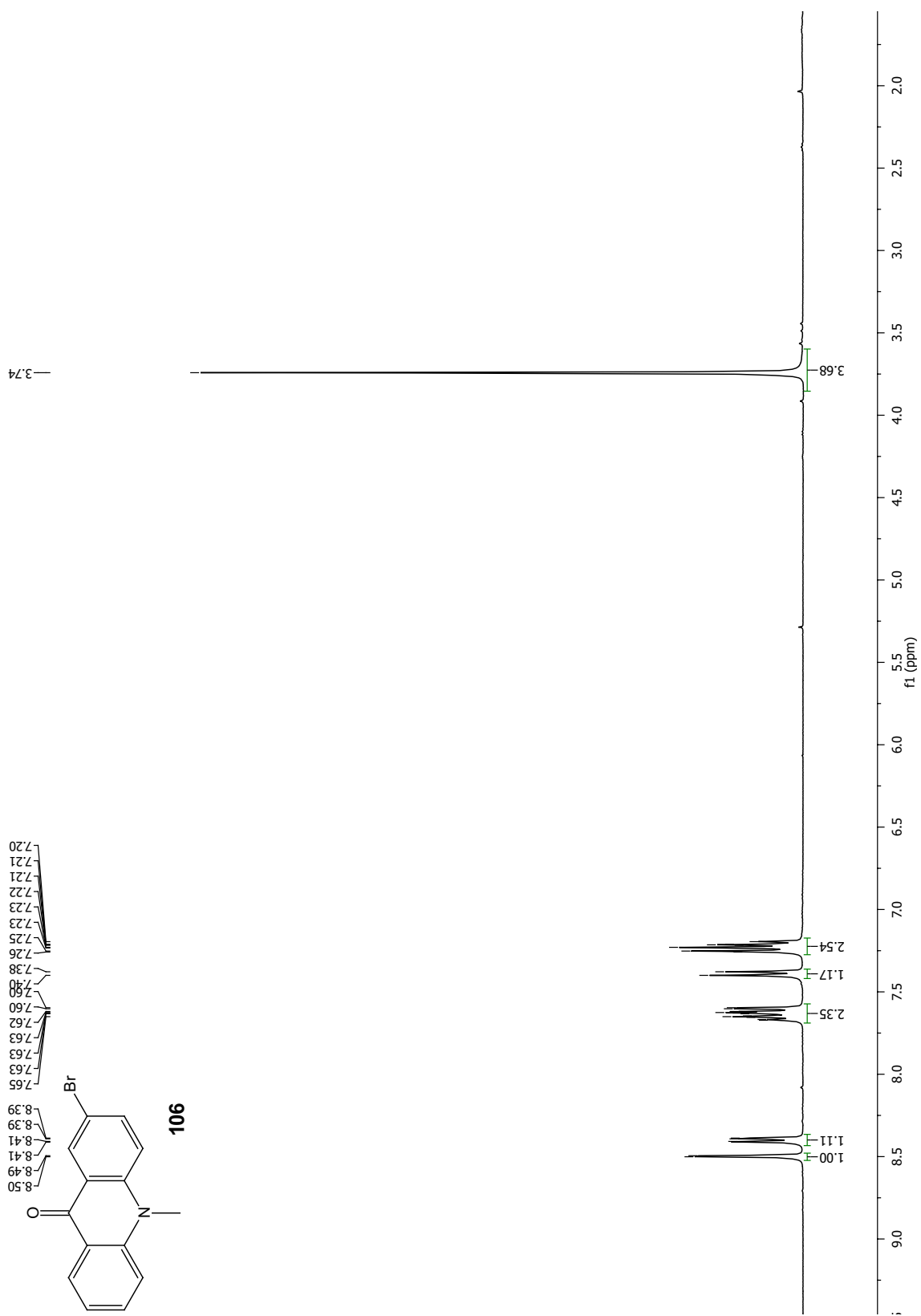
145.9
144.3
137.6
133.5
129.1
128.4
127.5
127.2
123.5
122.8
122.6
122.4

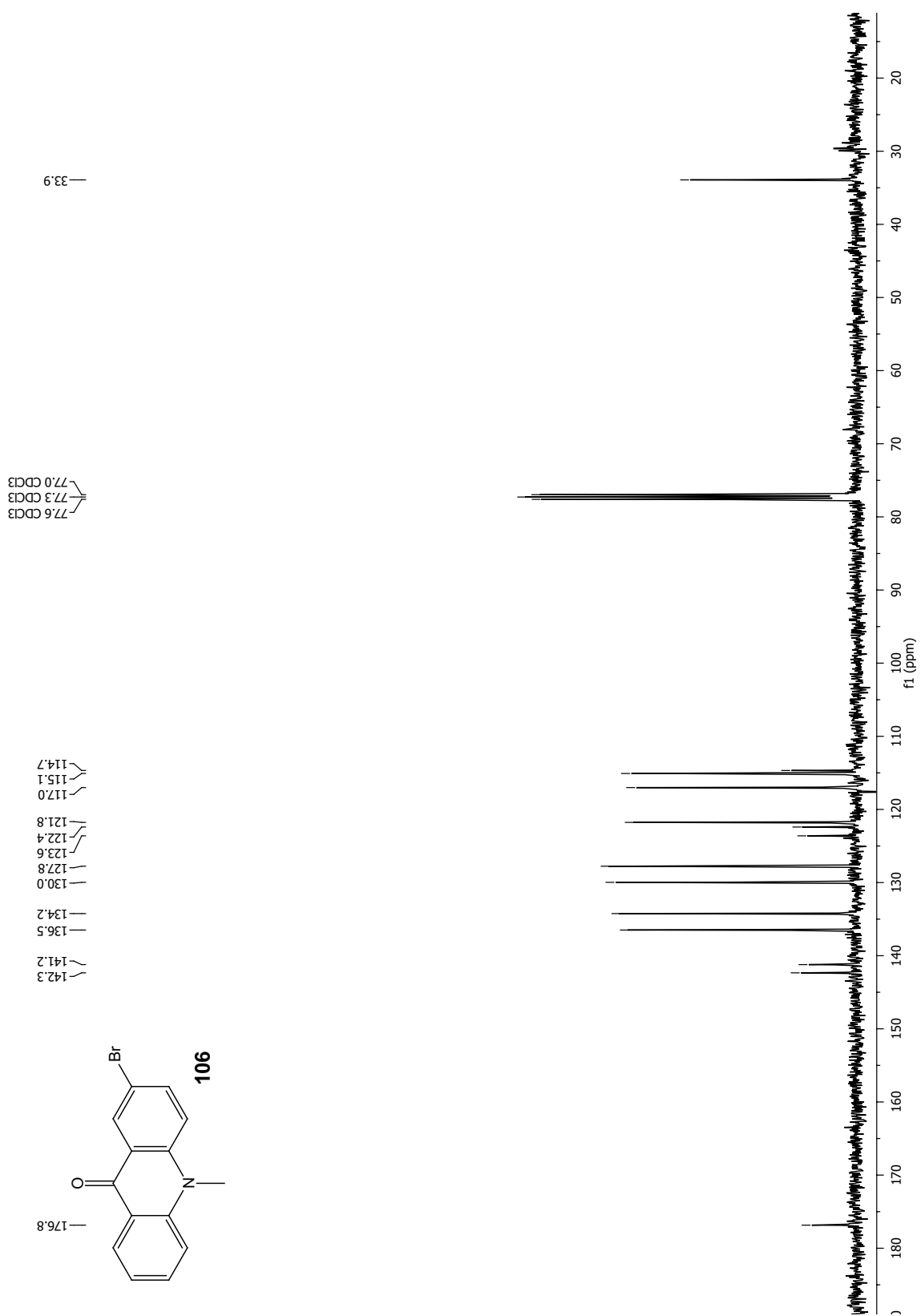
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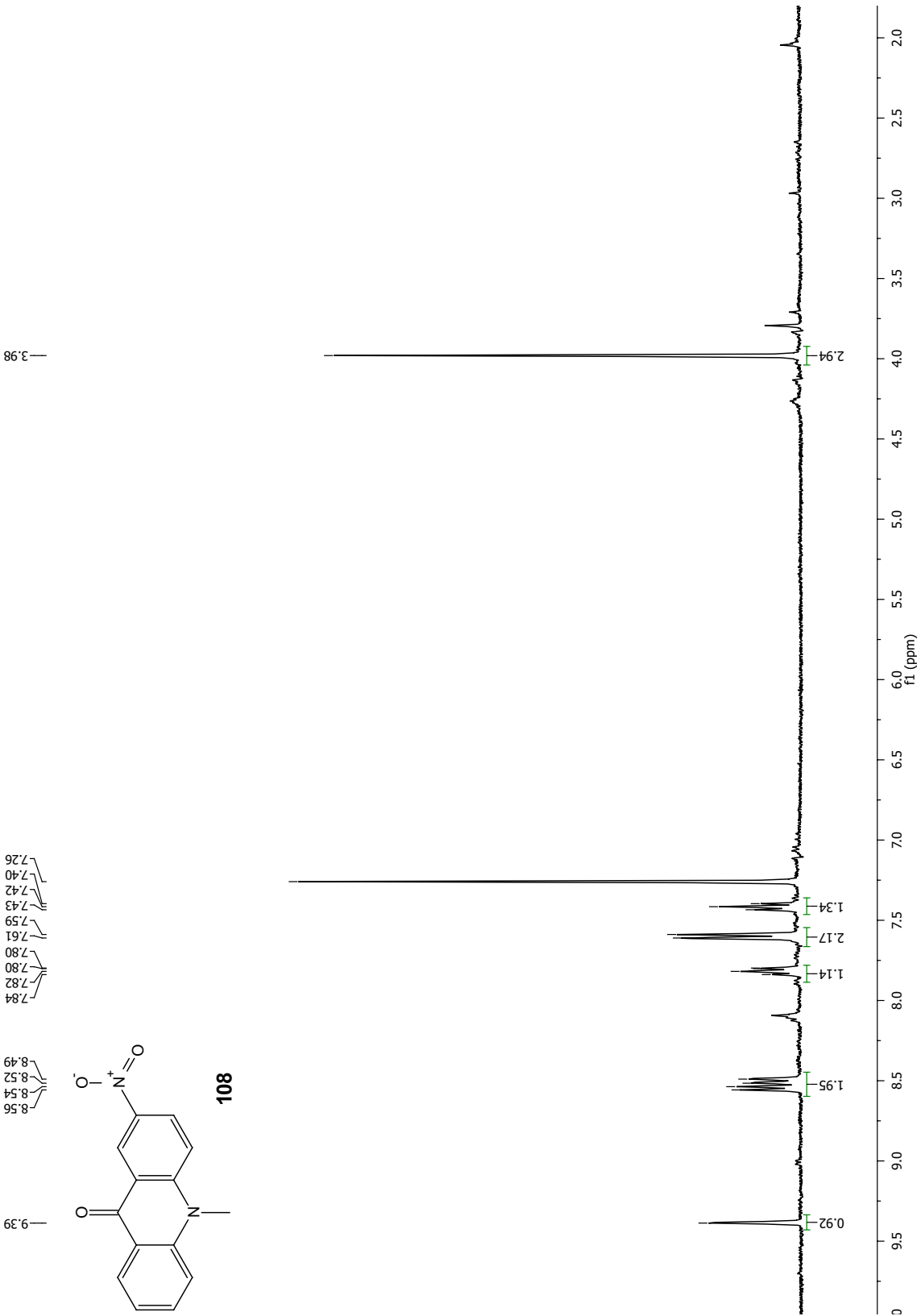
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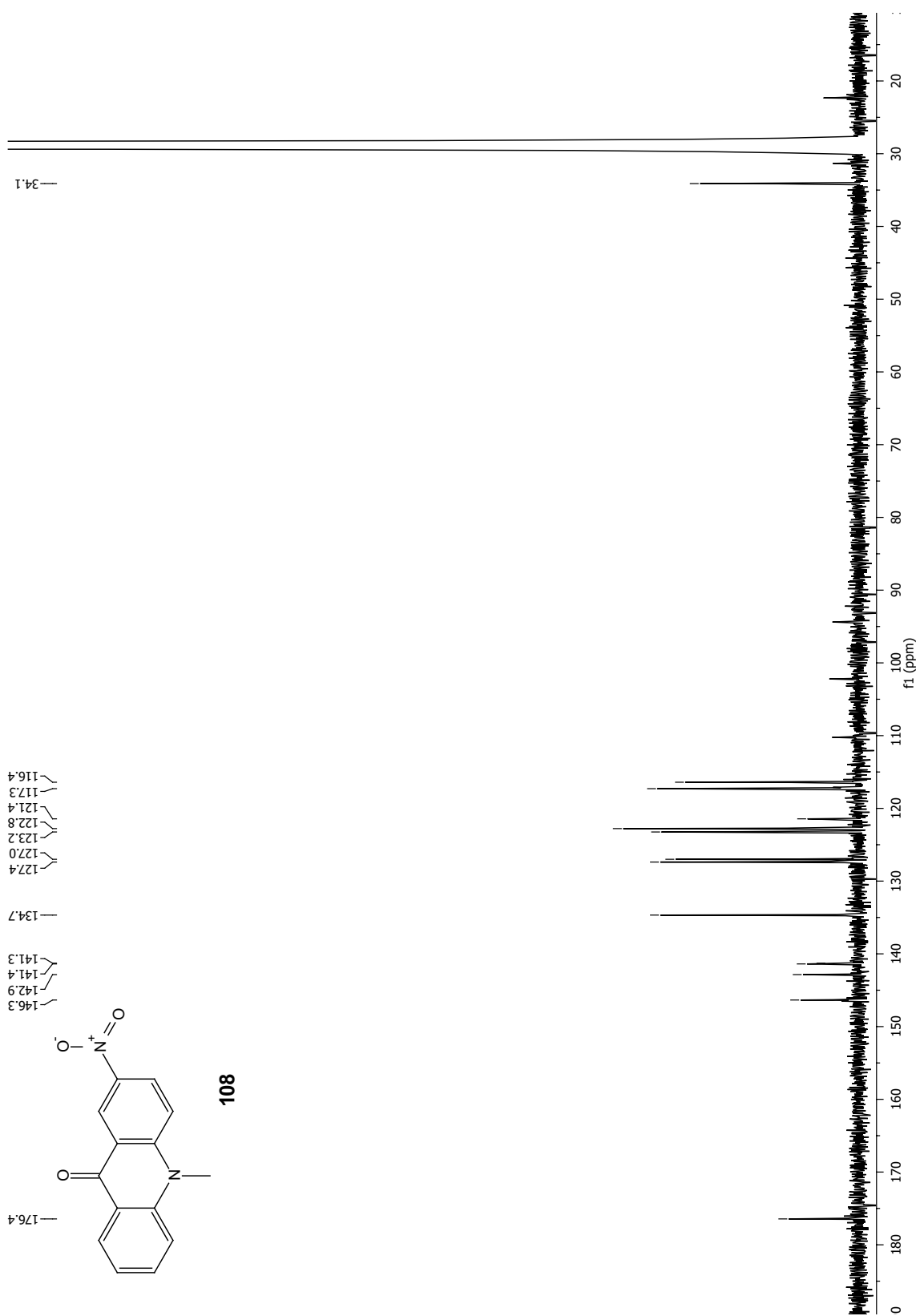


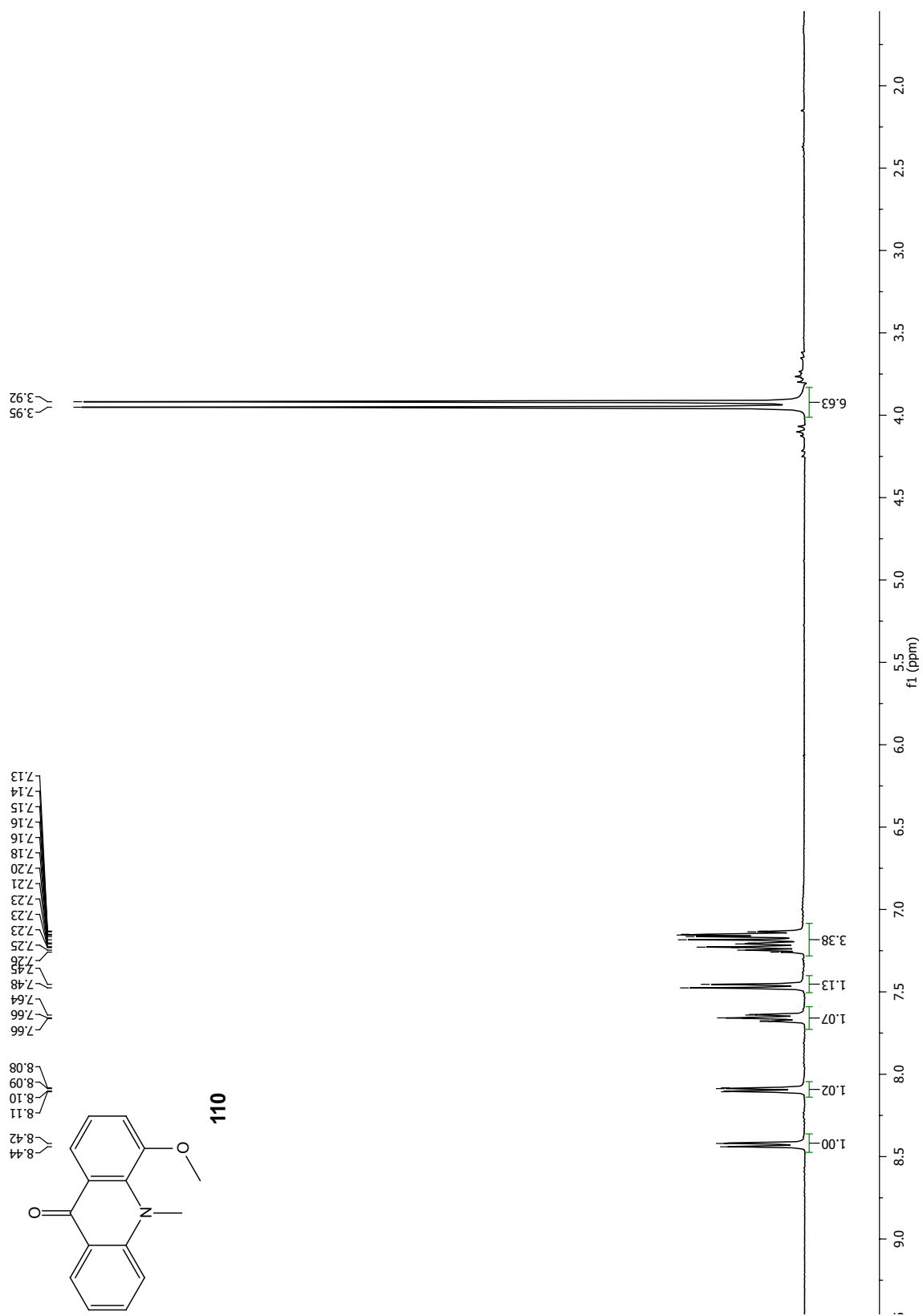


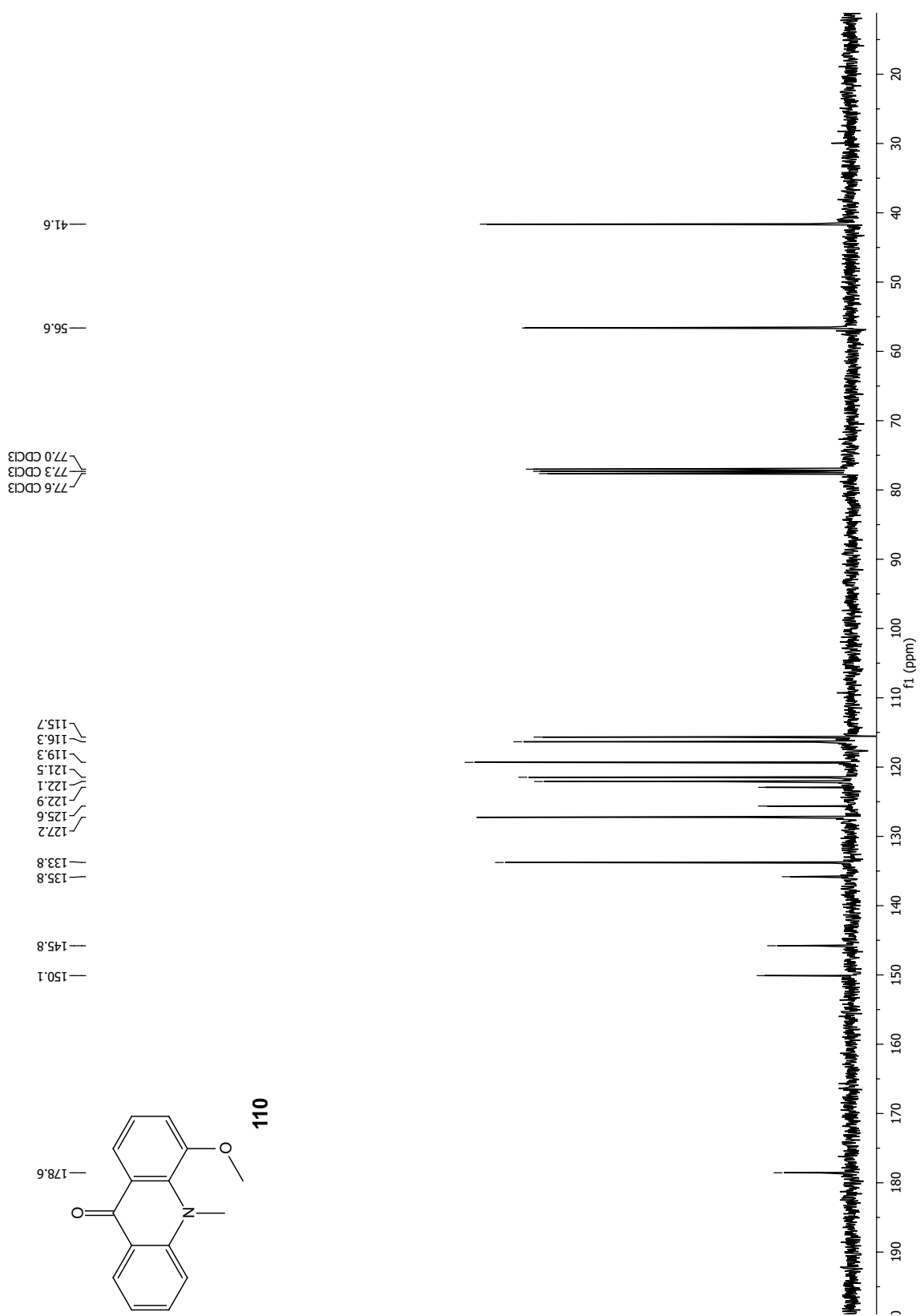


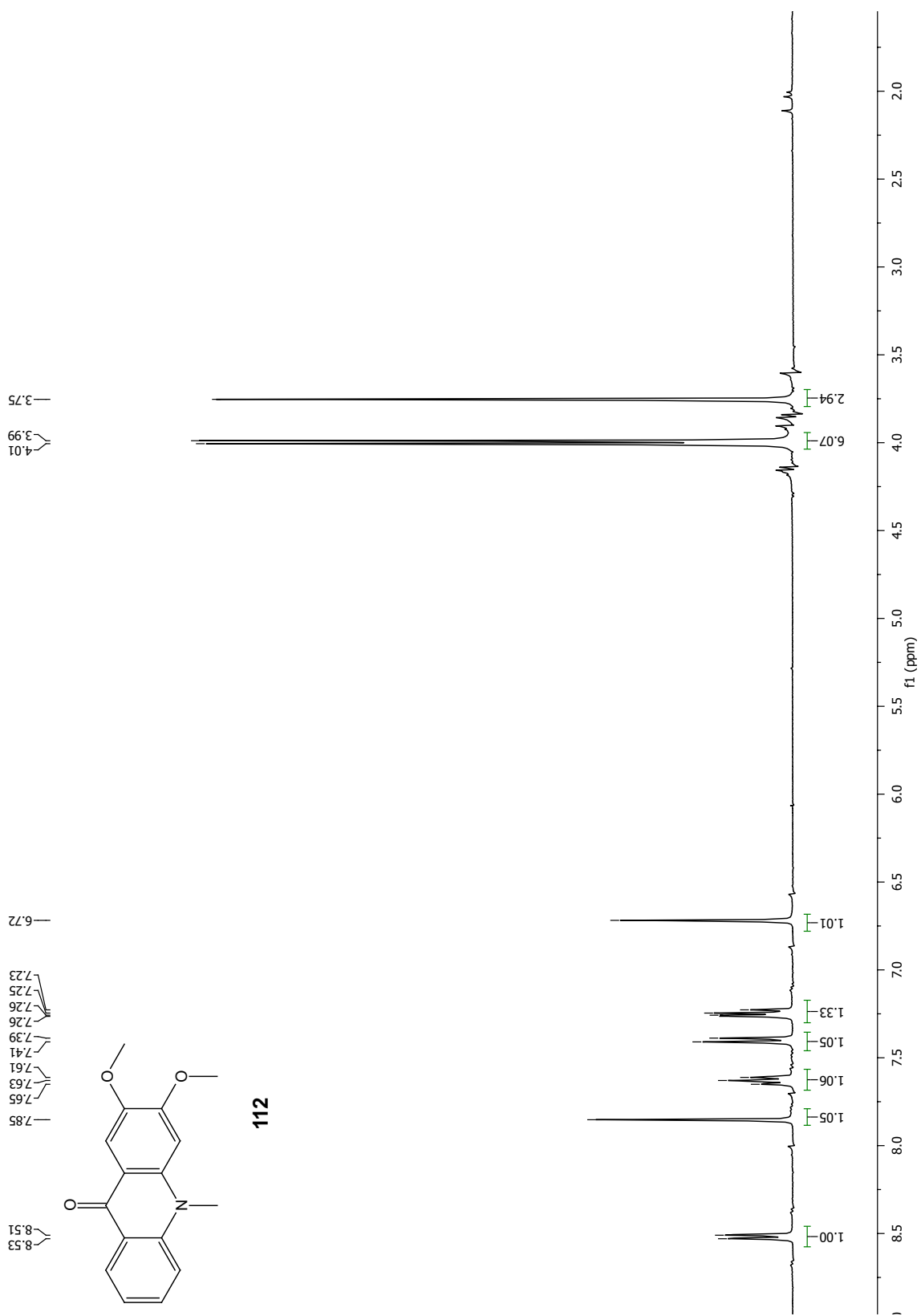




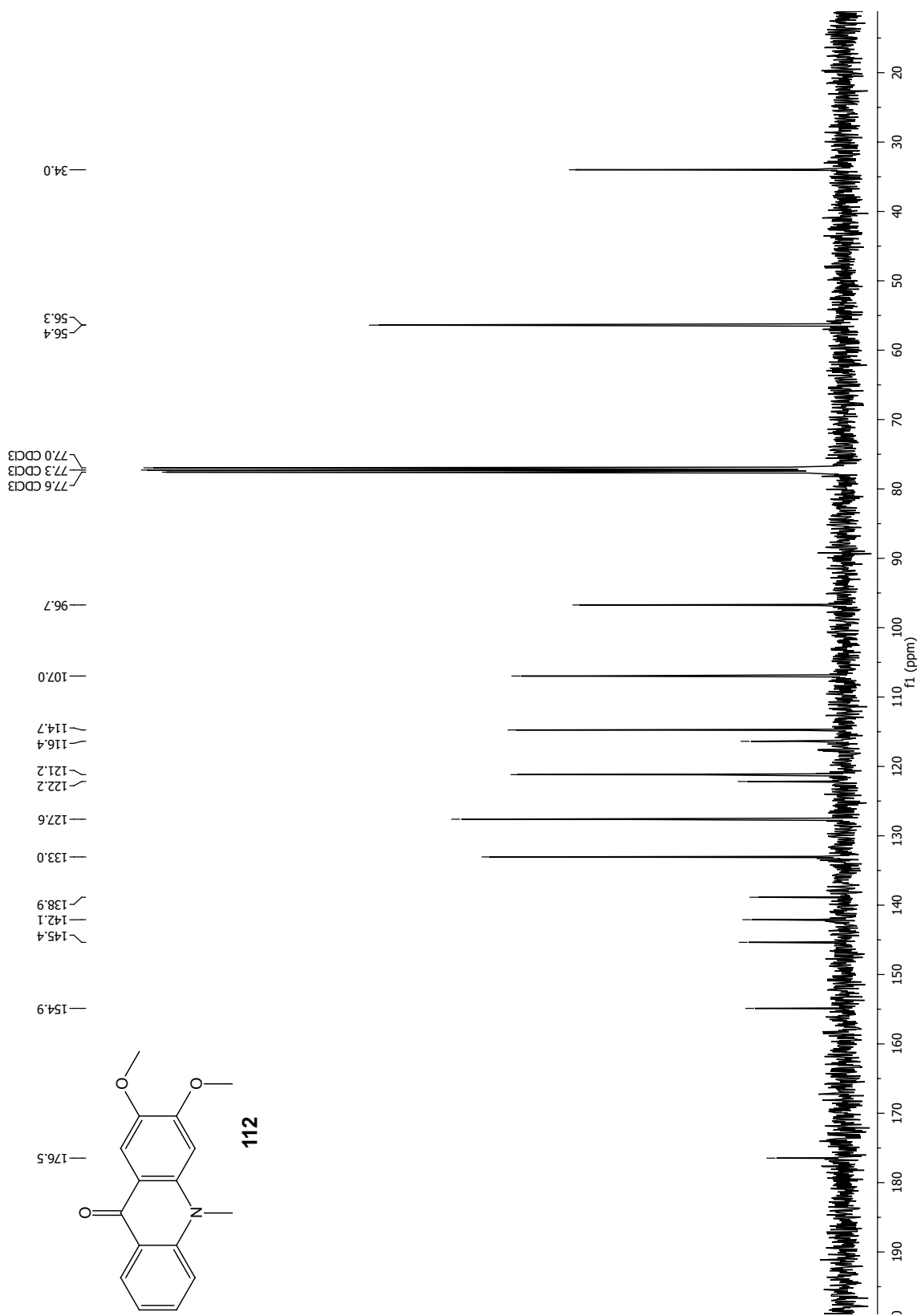


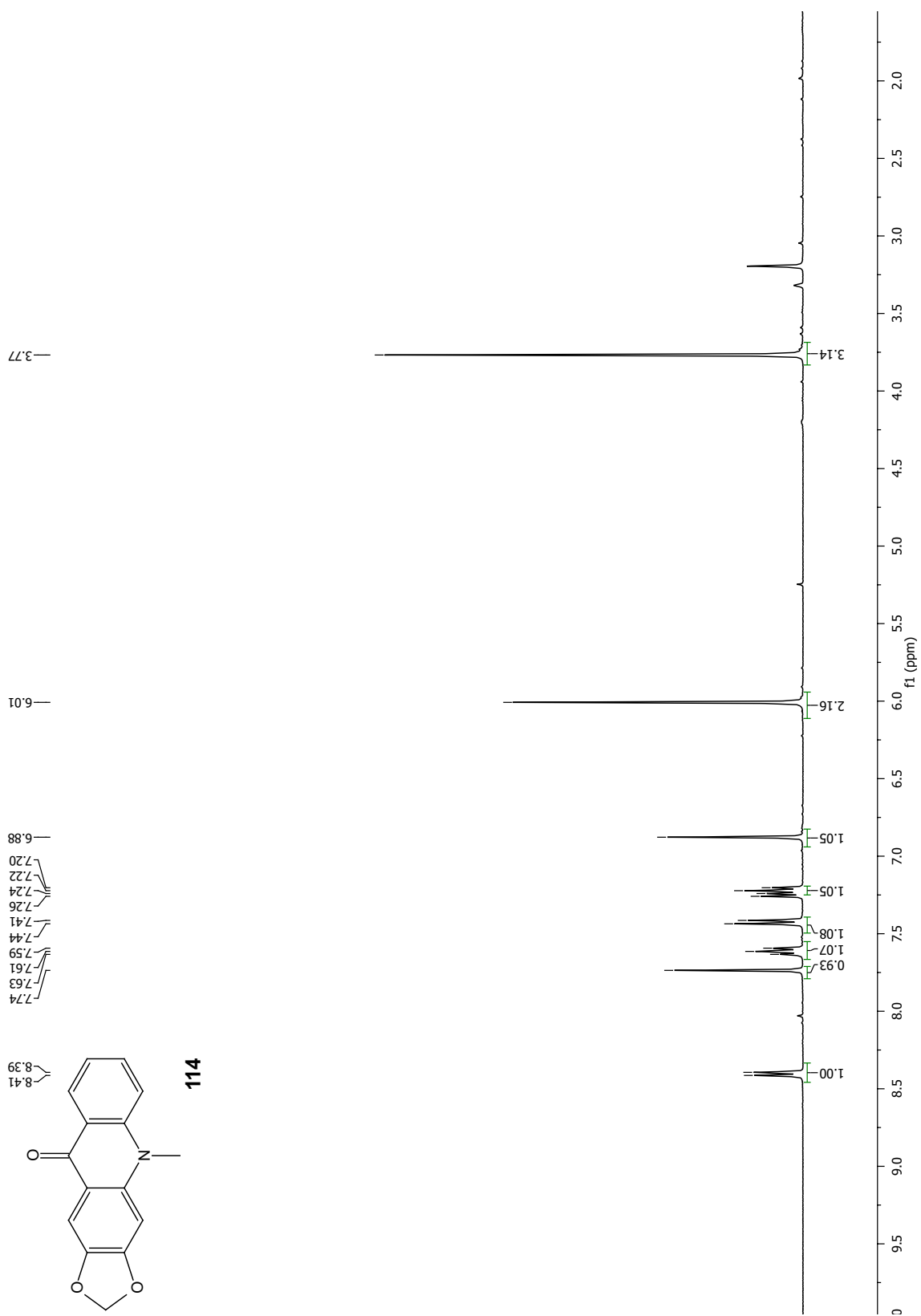


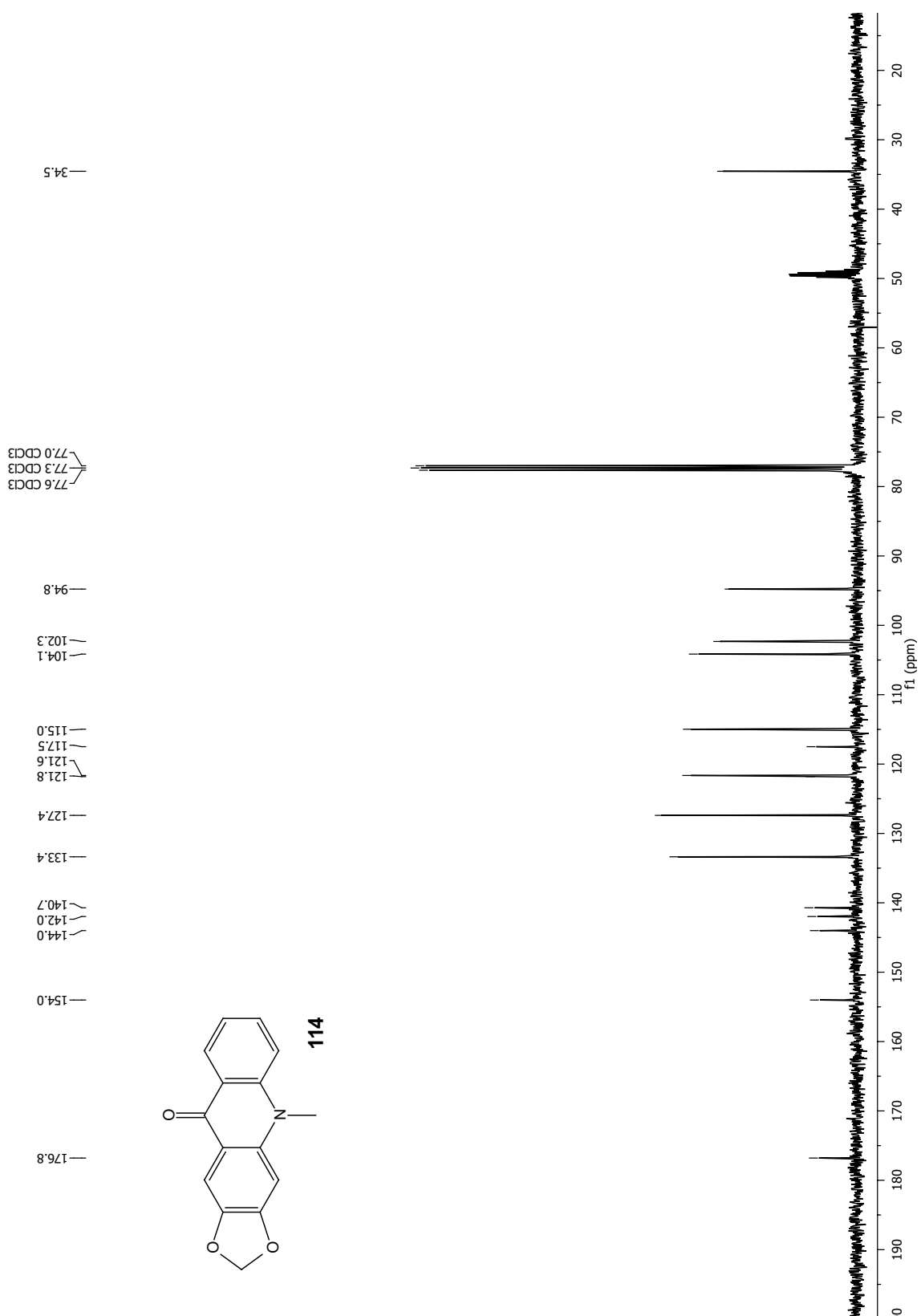


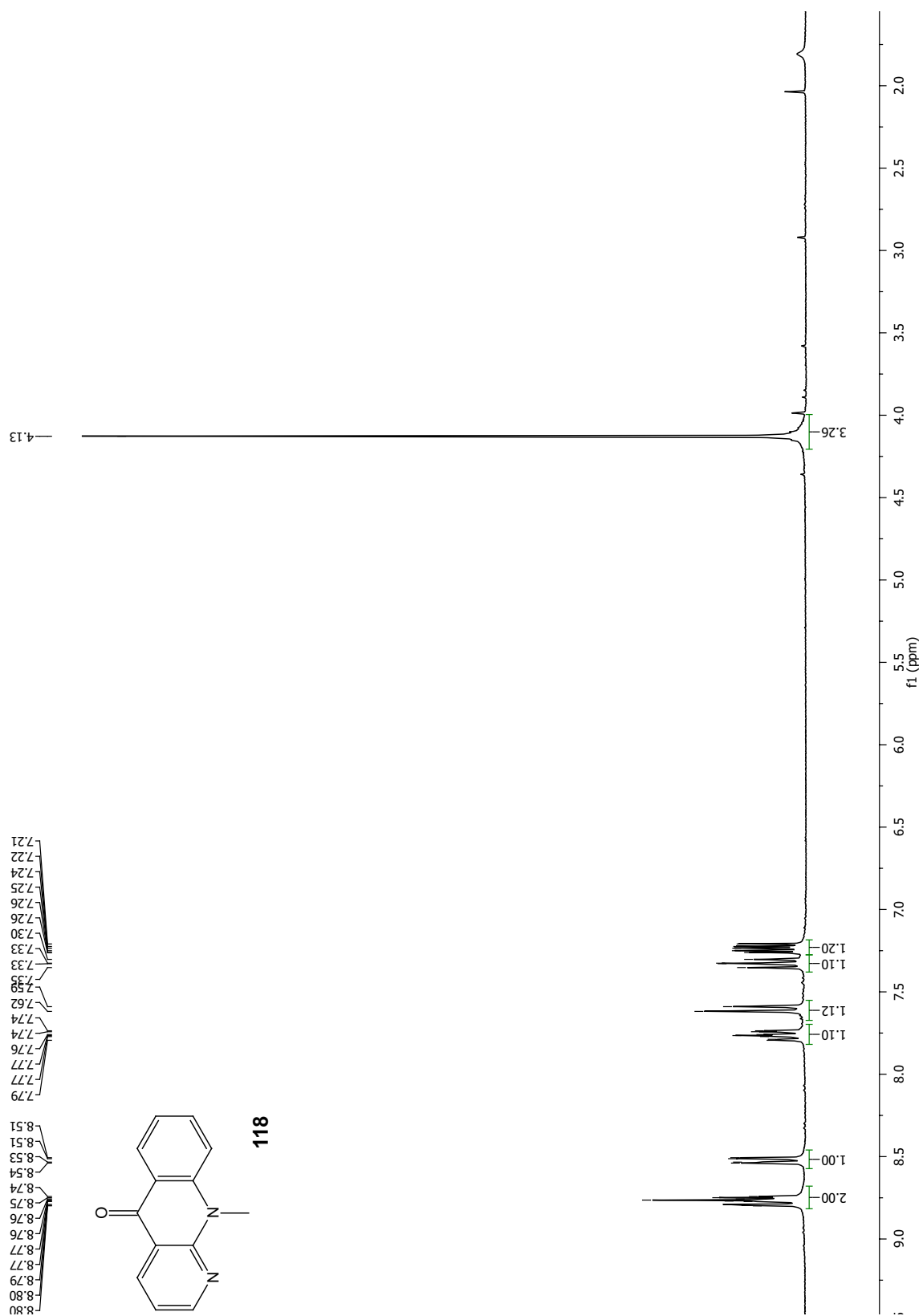


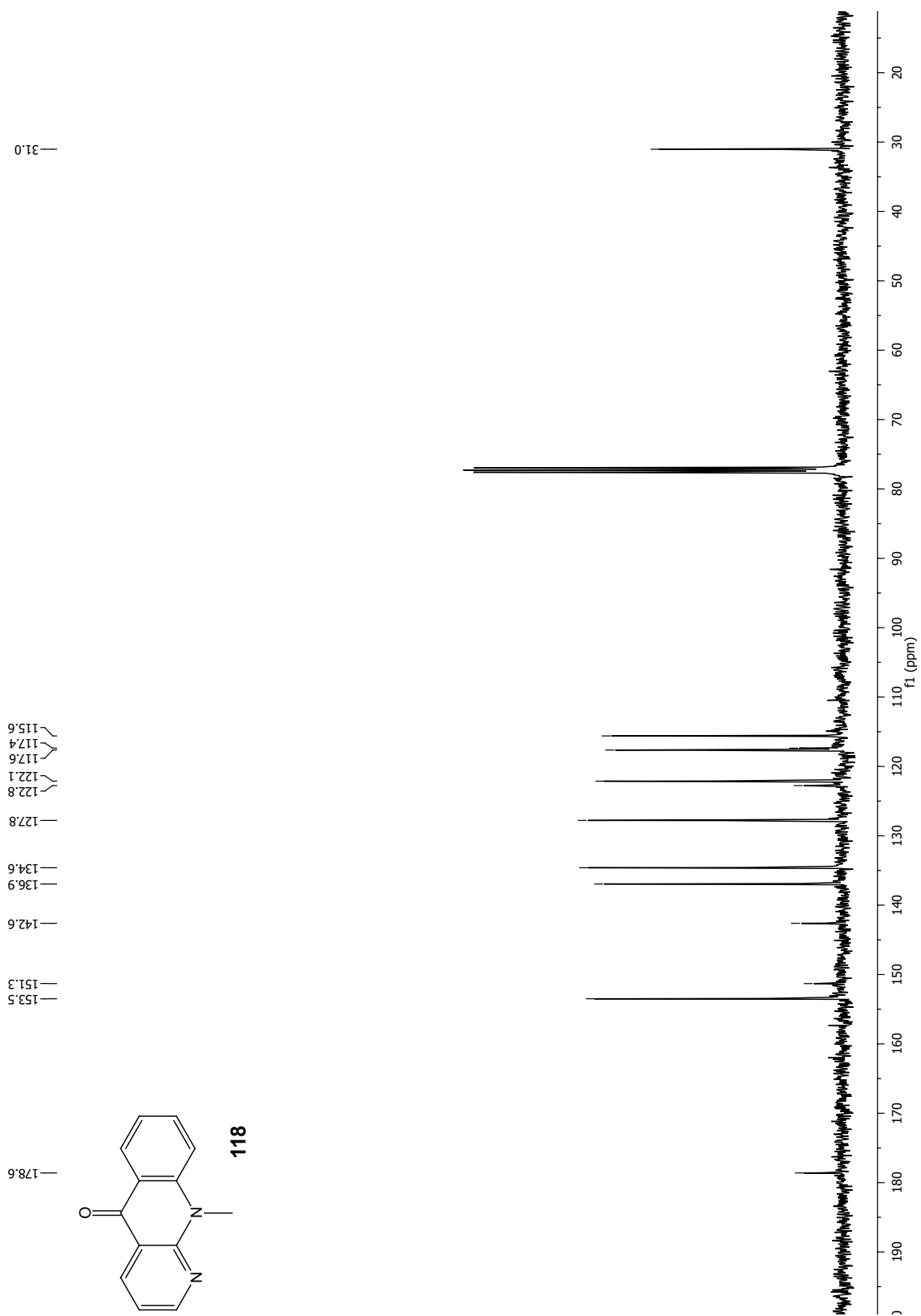
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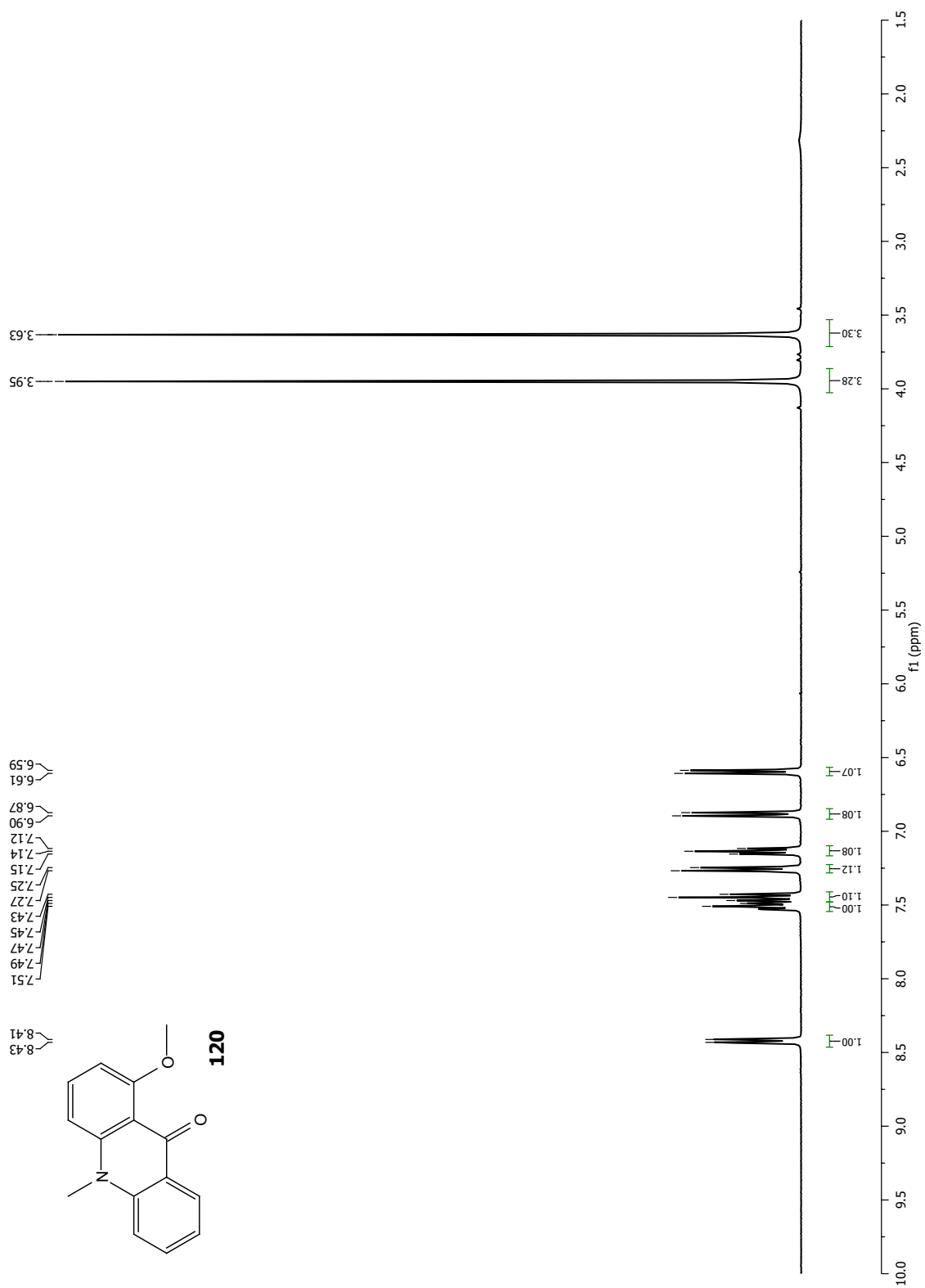


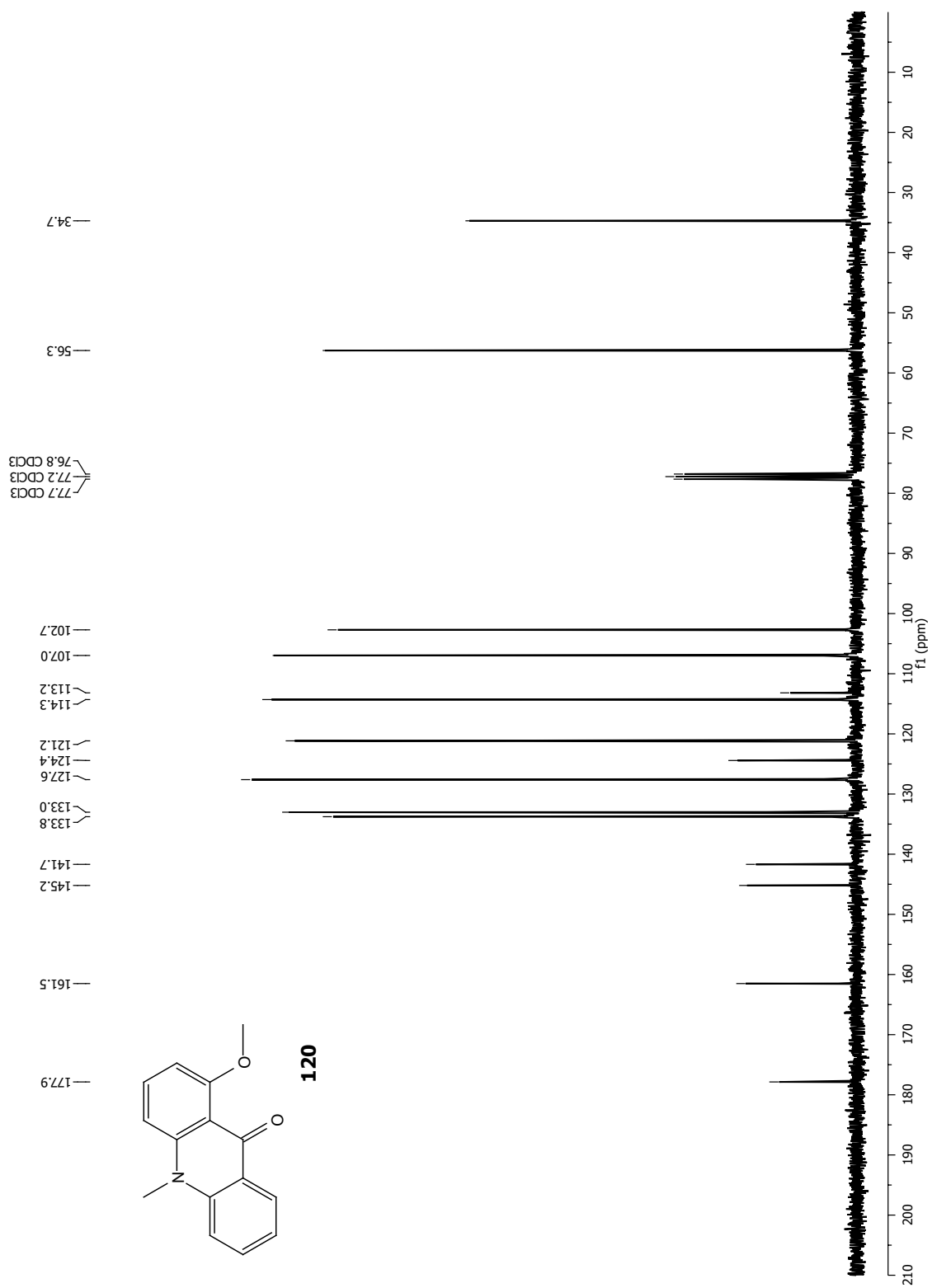


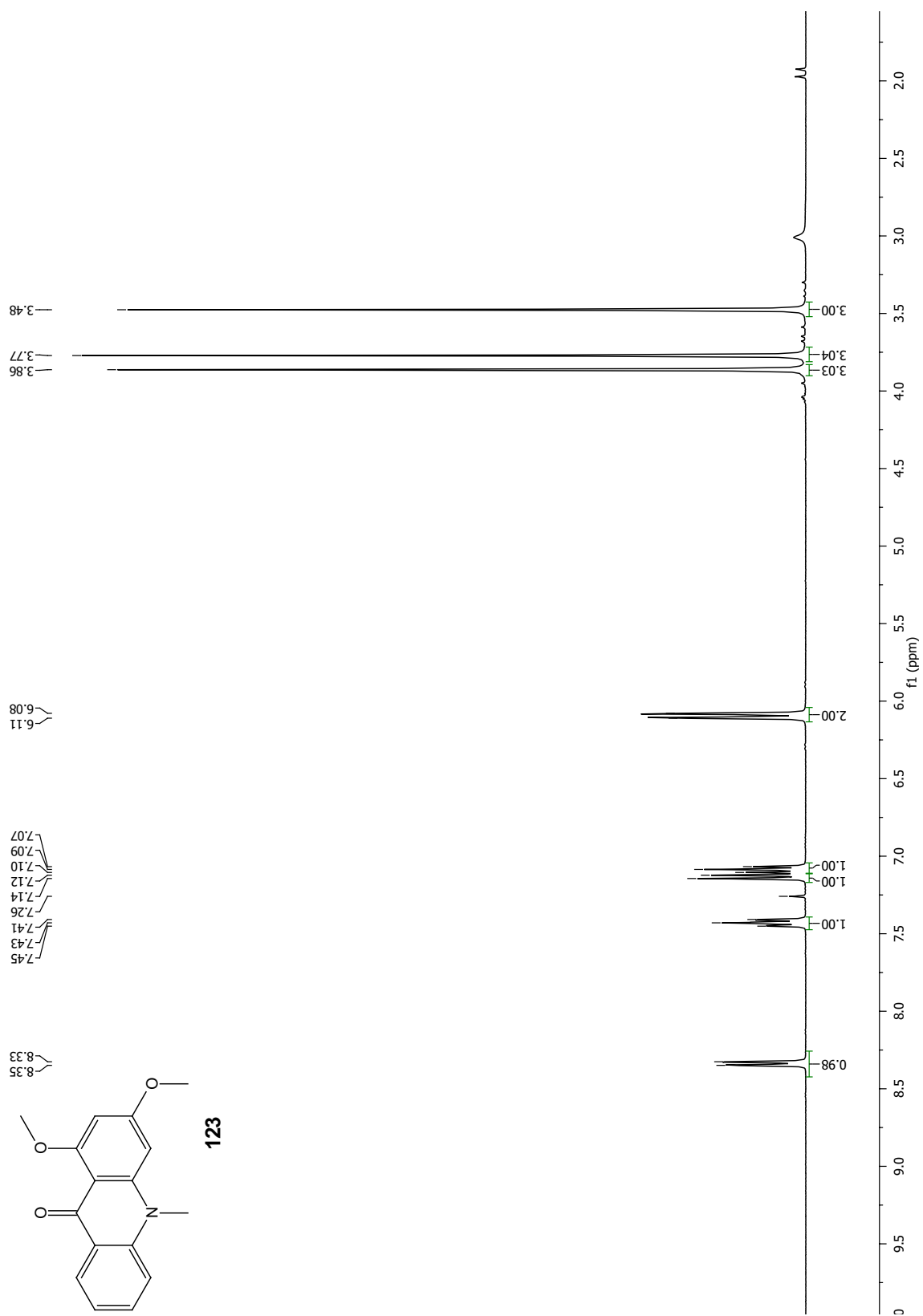


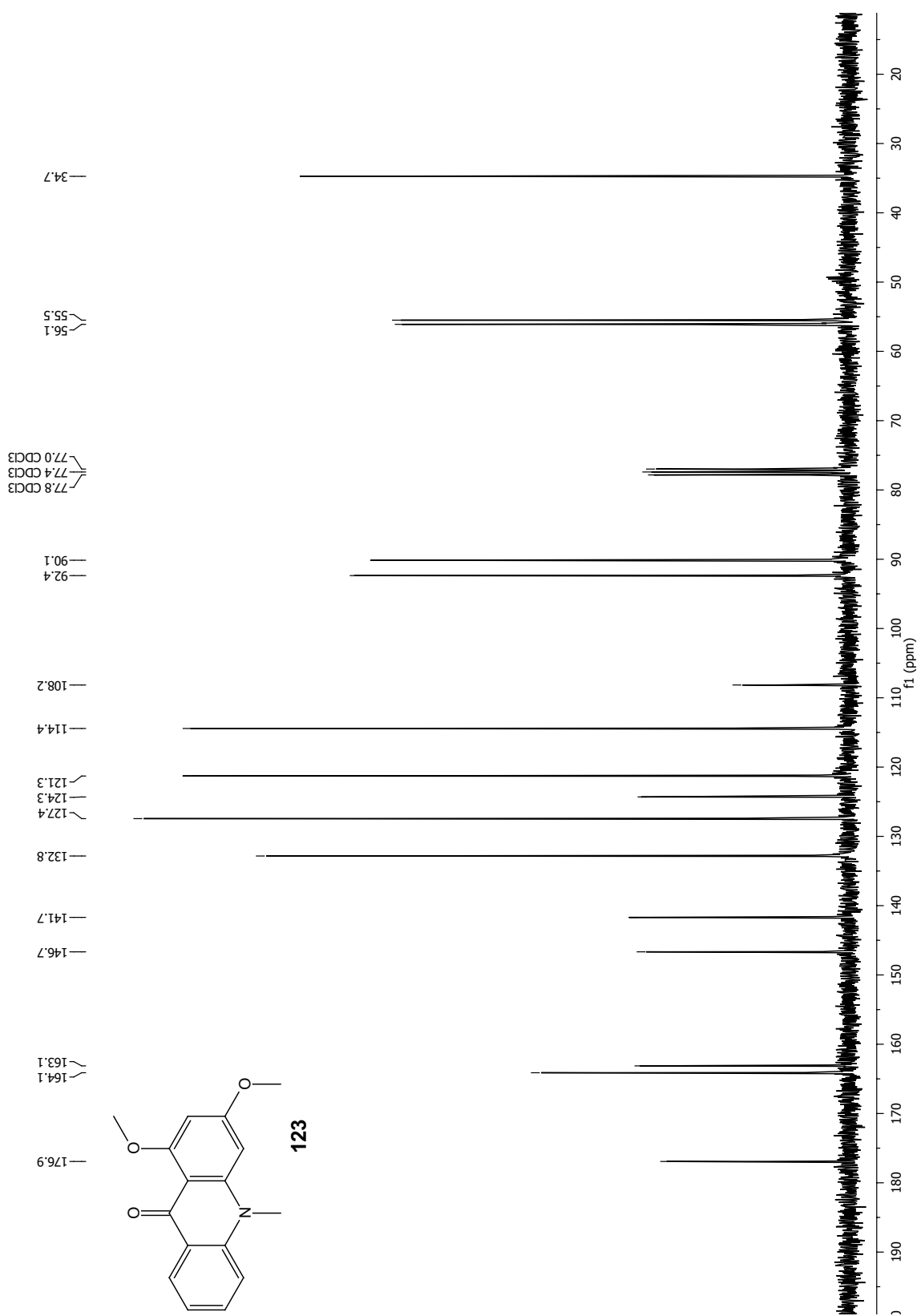


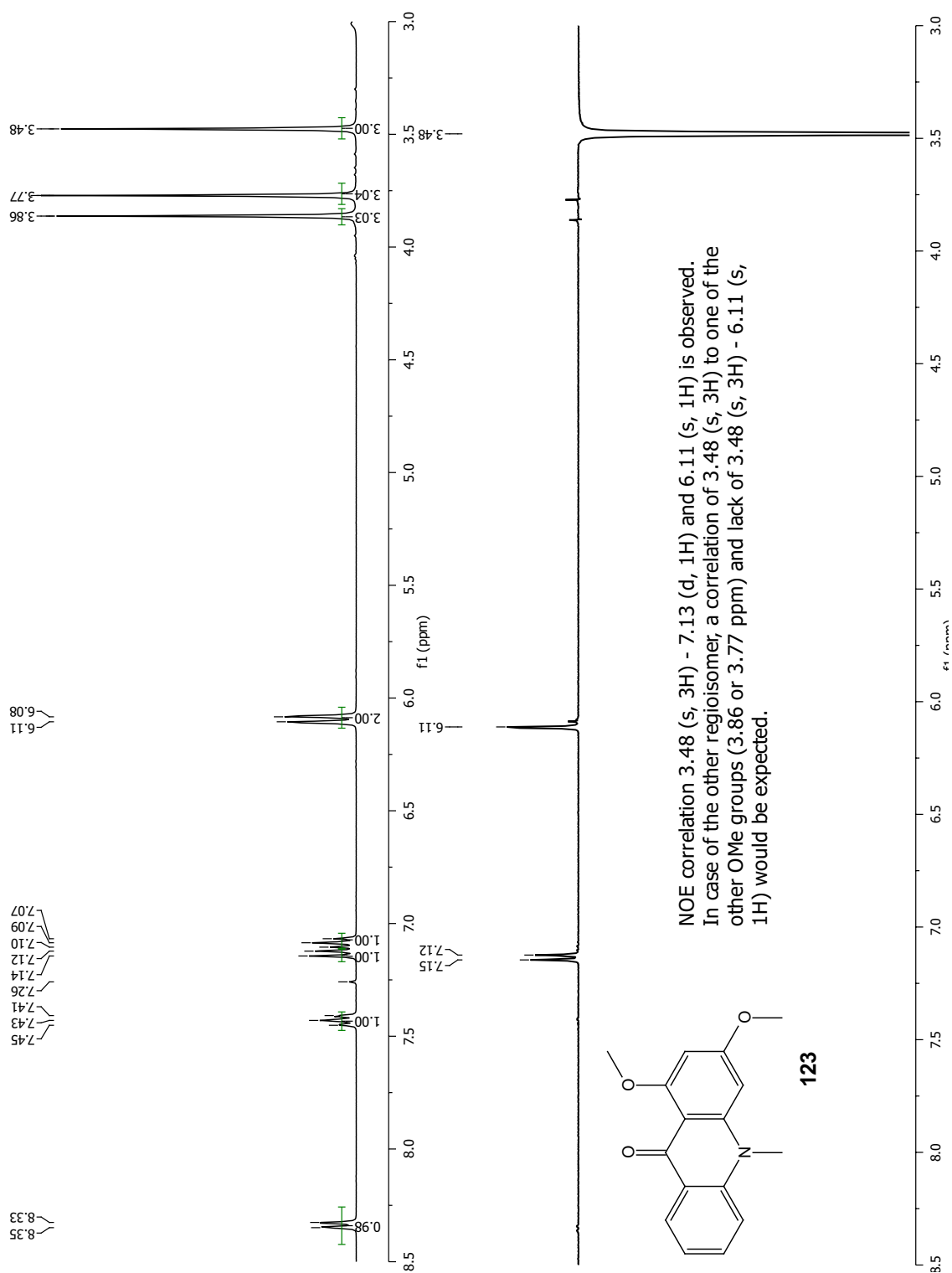




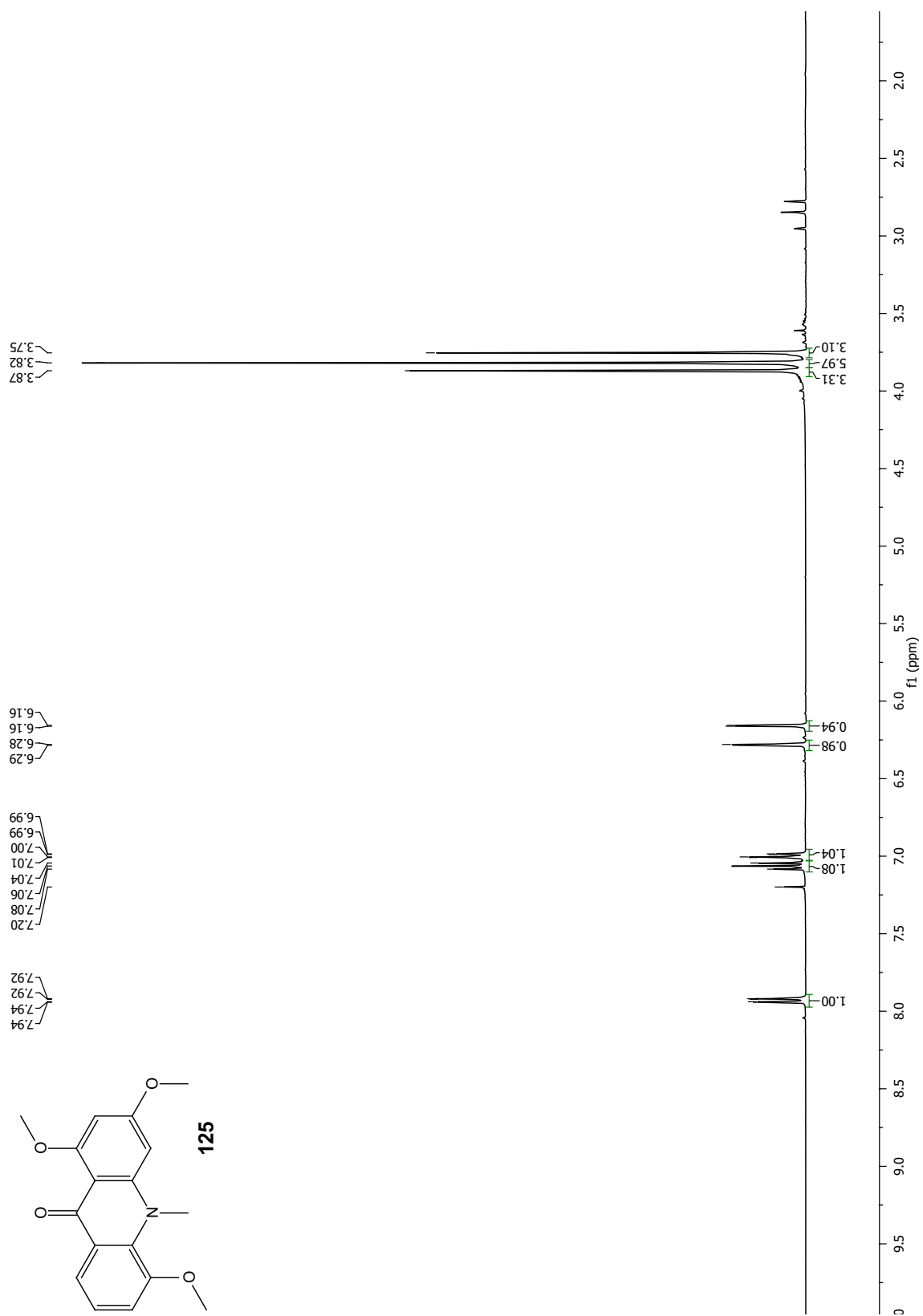


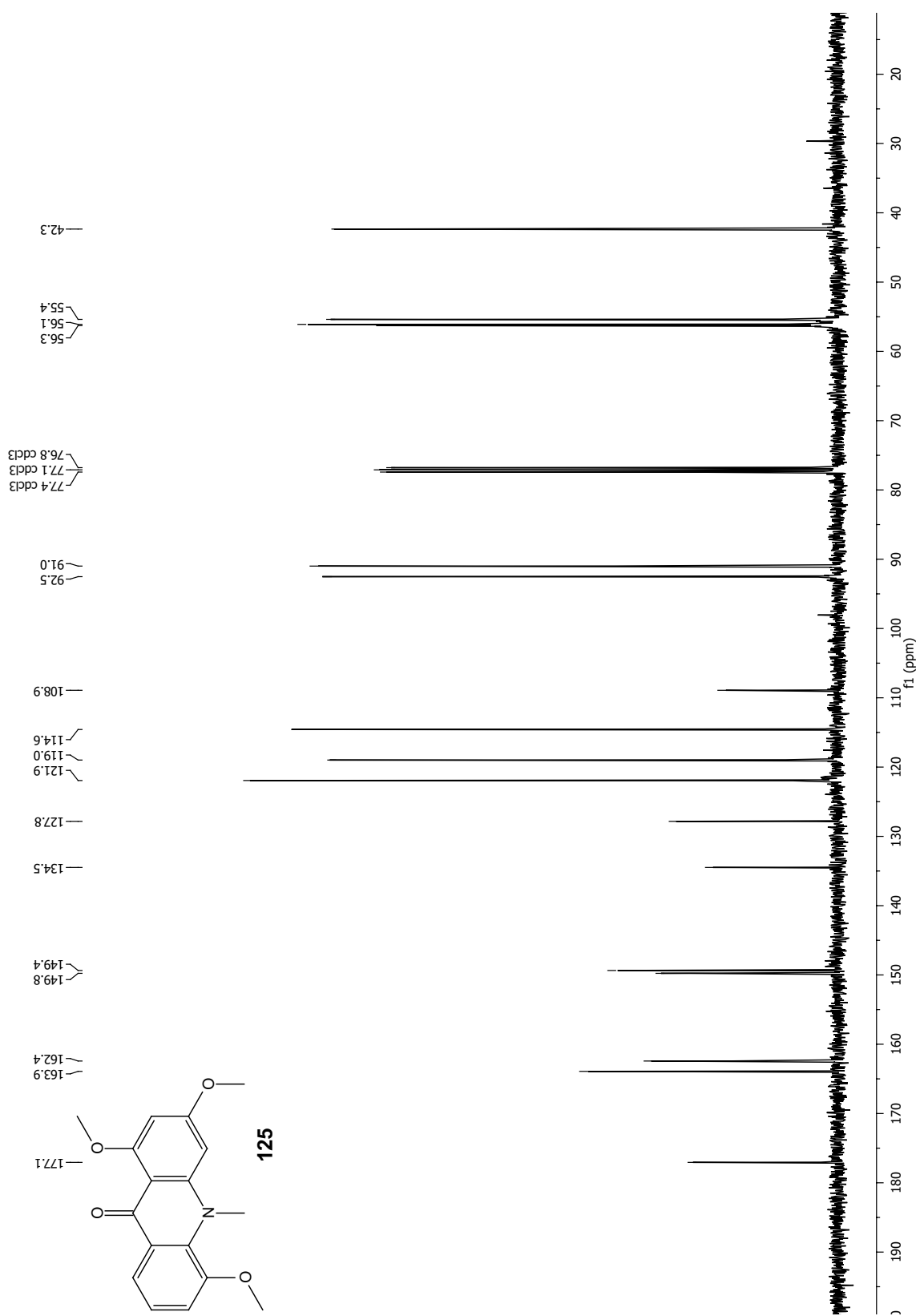


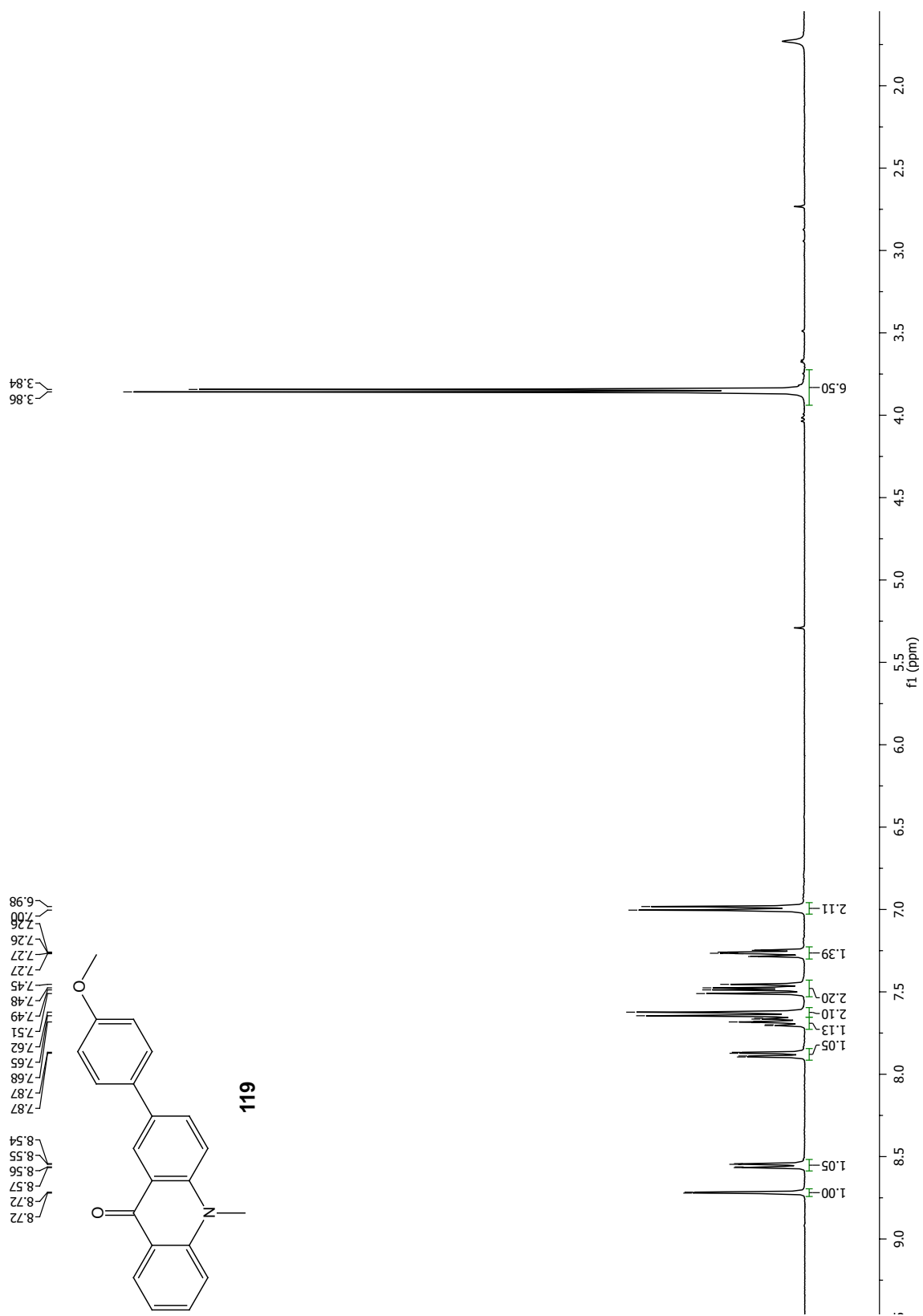


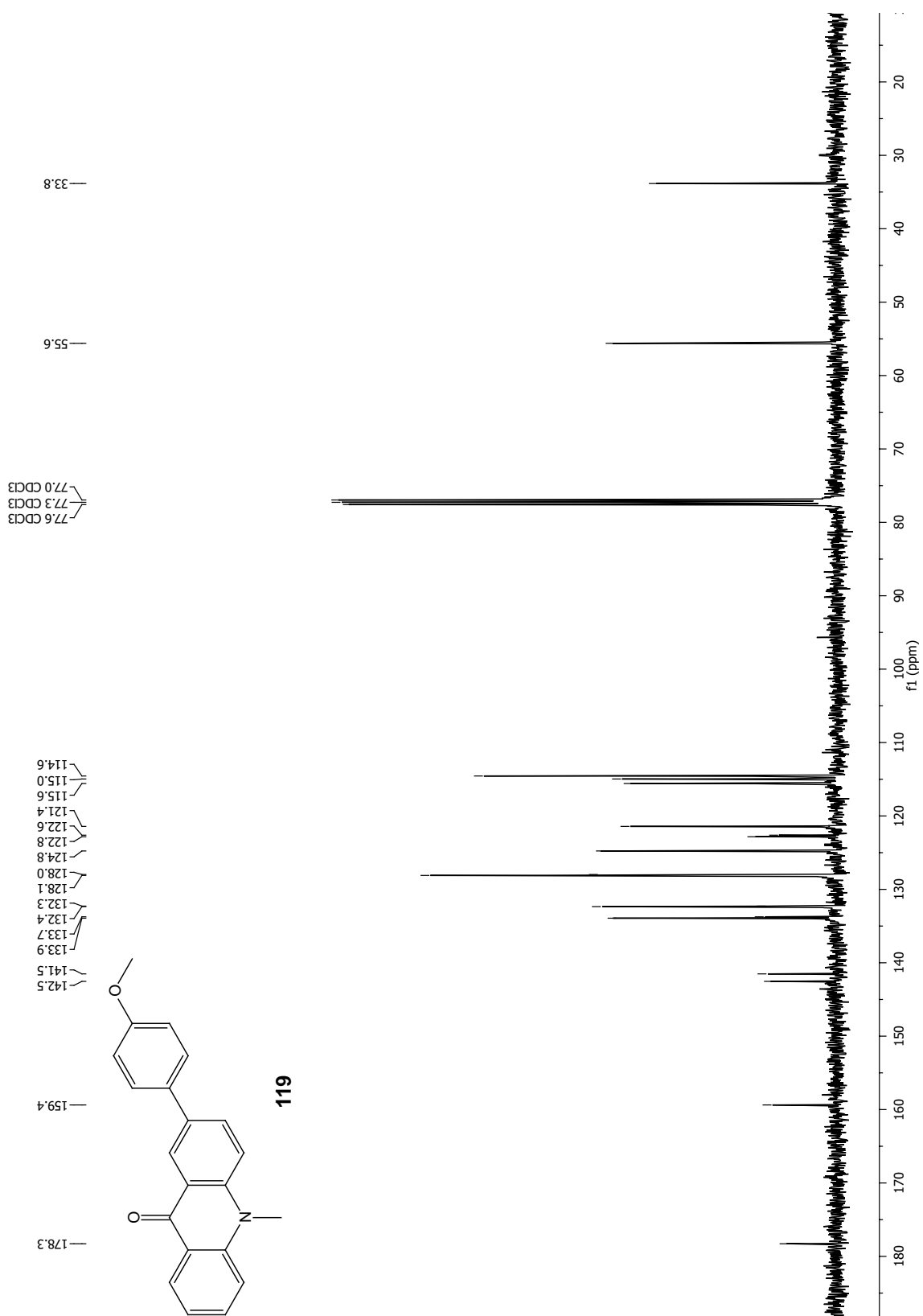


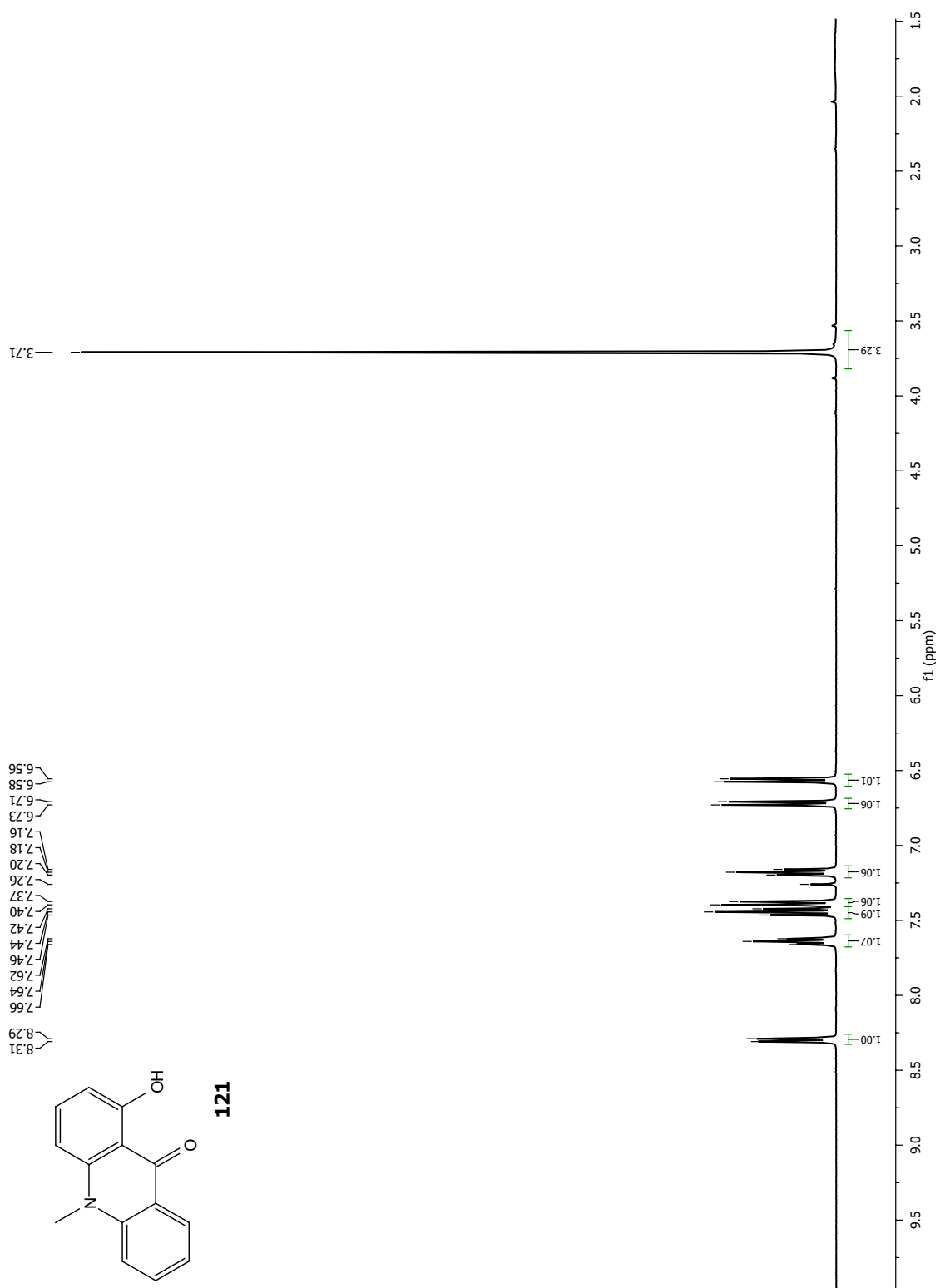
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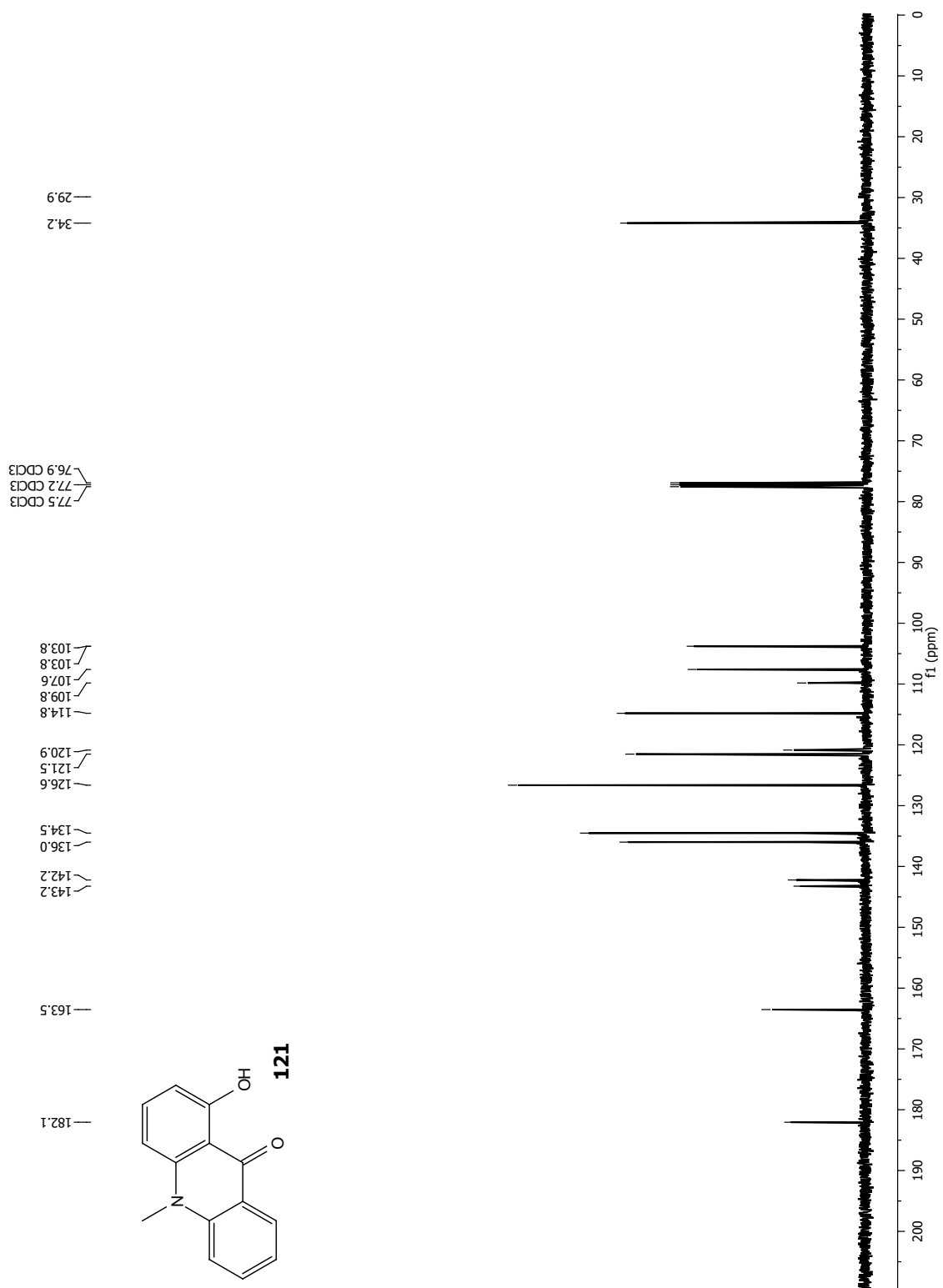


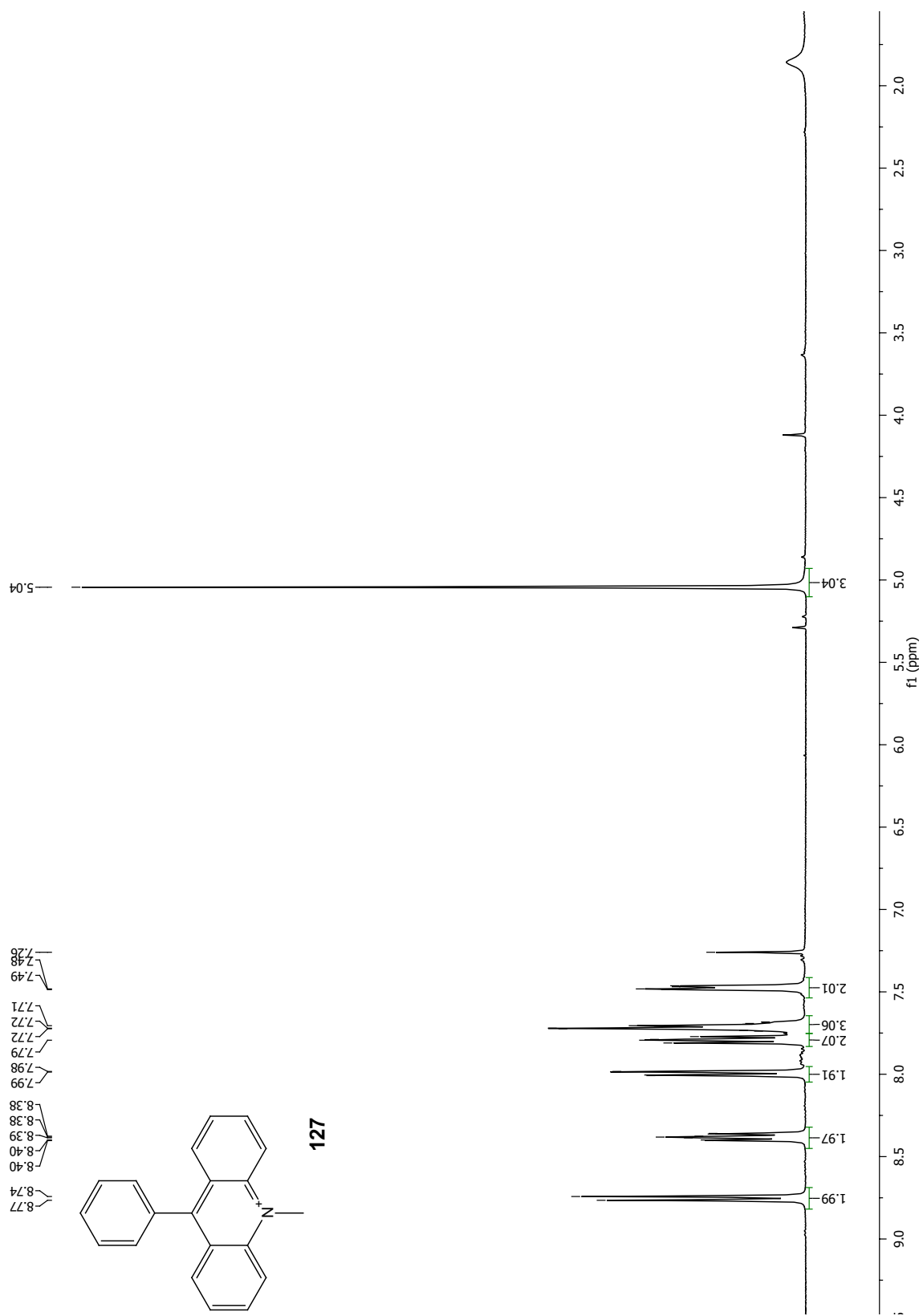




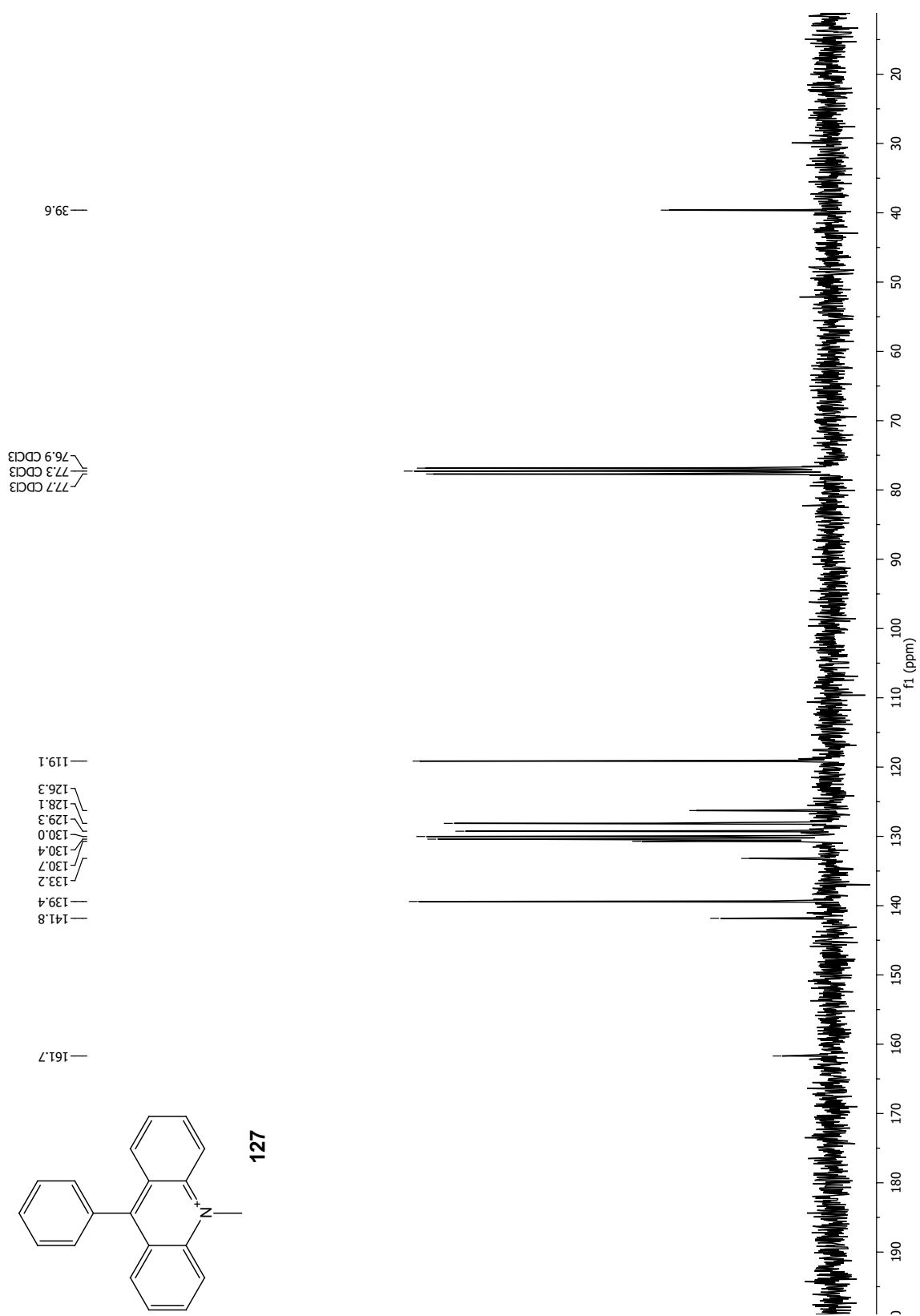


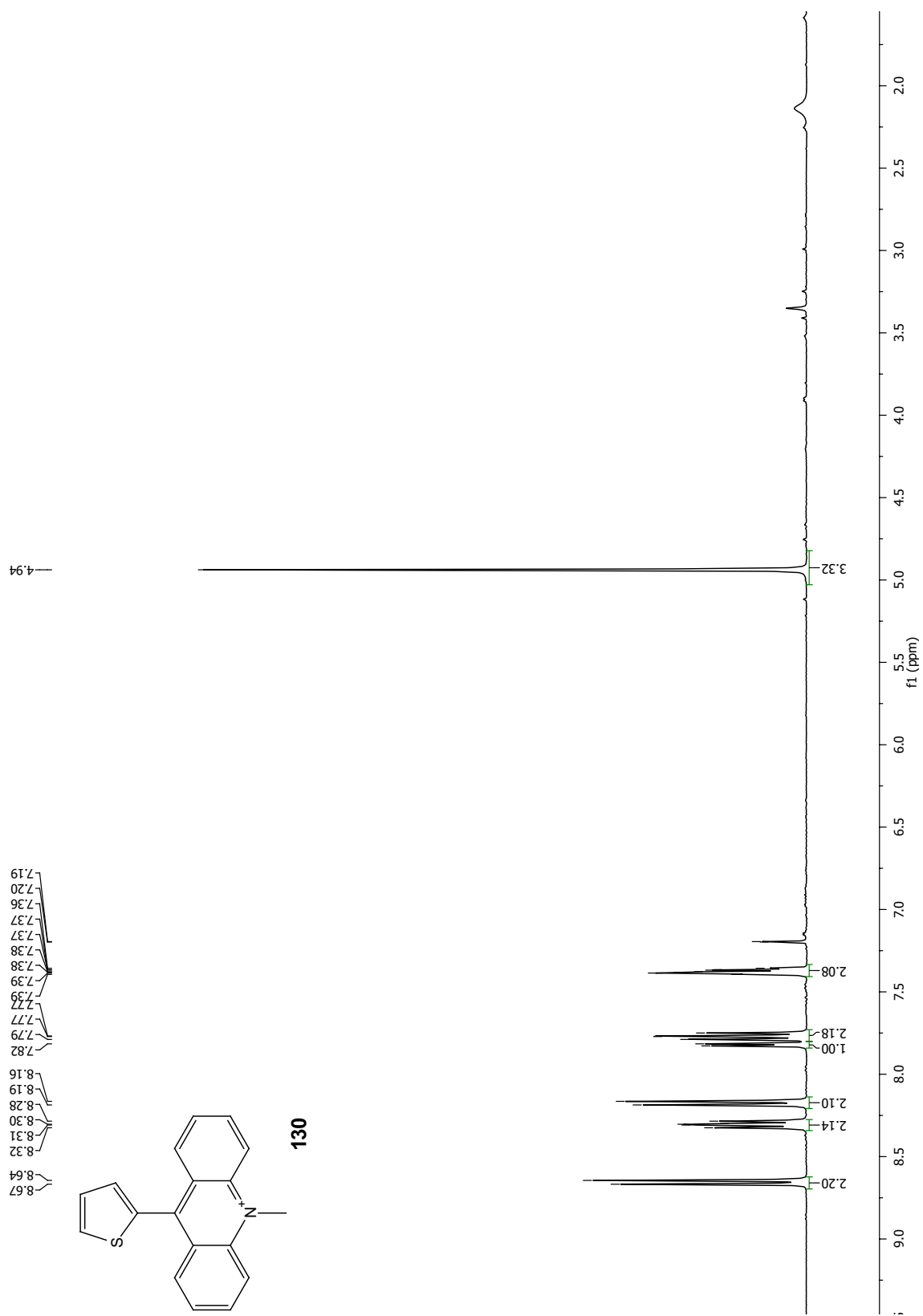


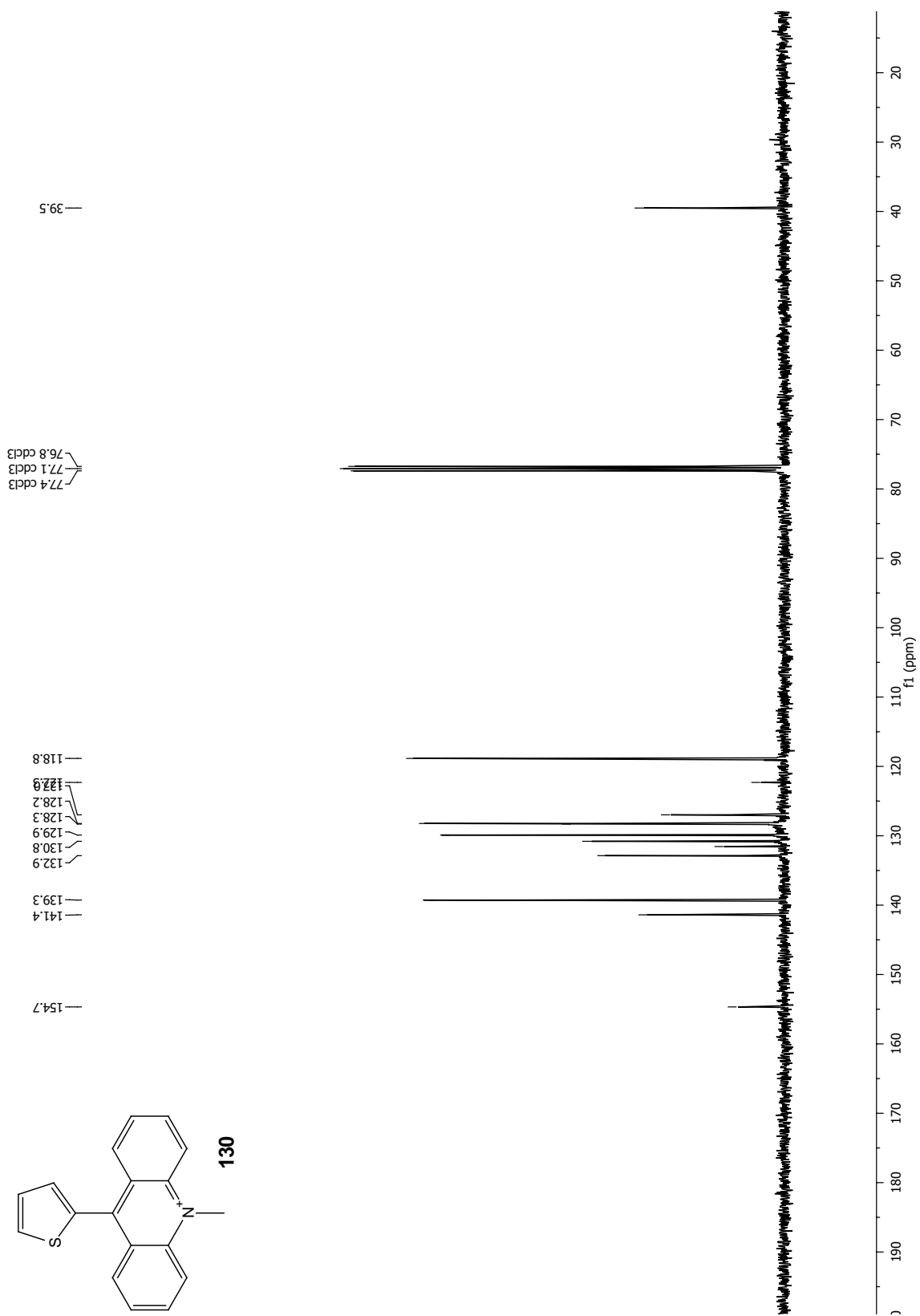




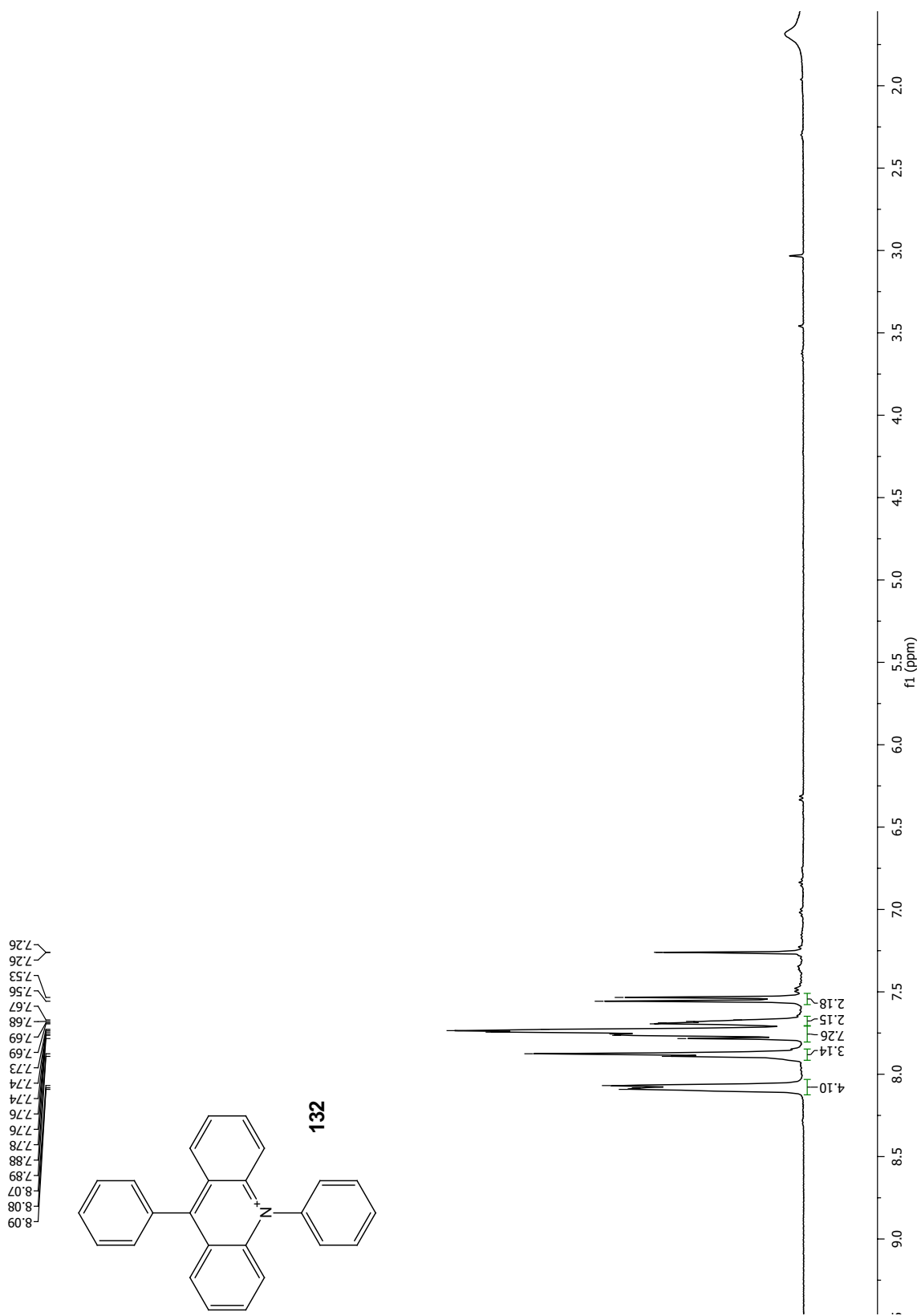
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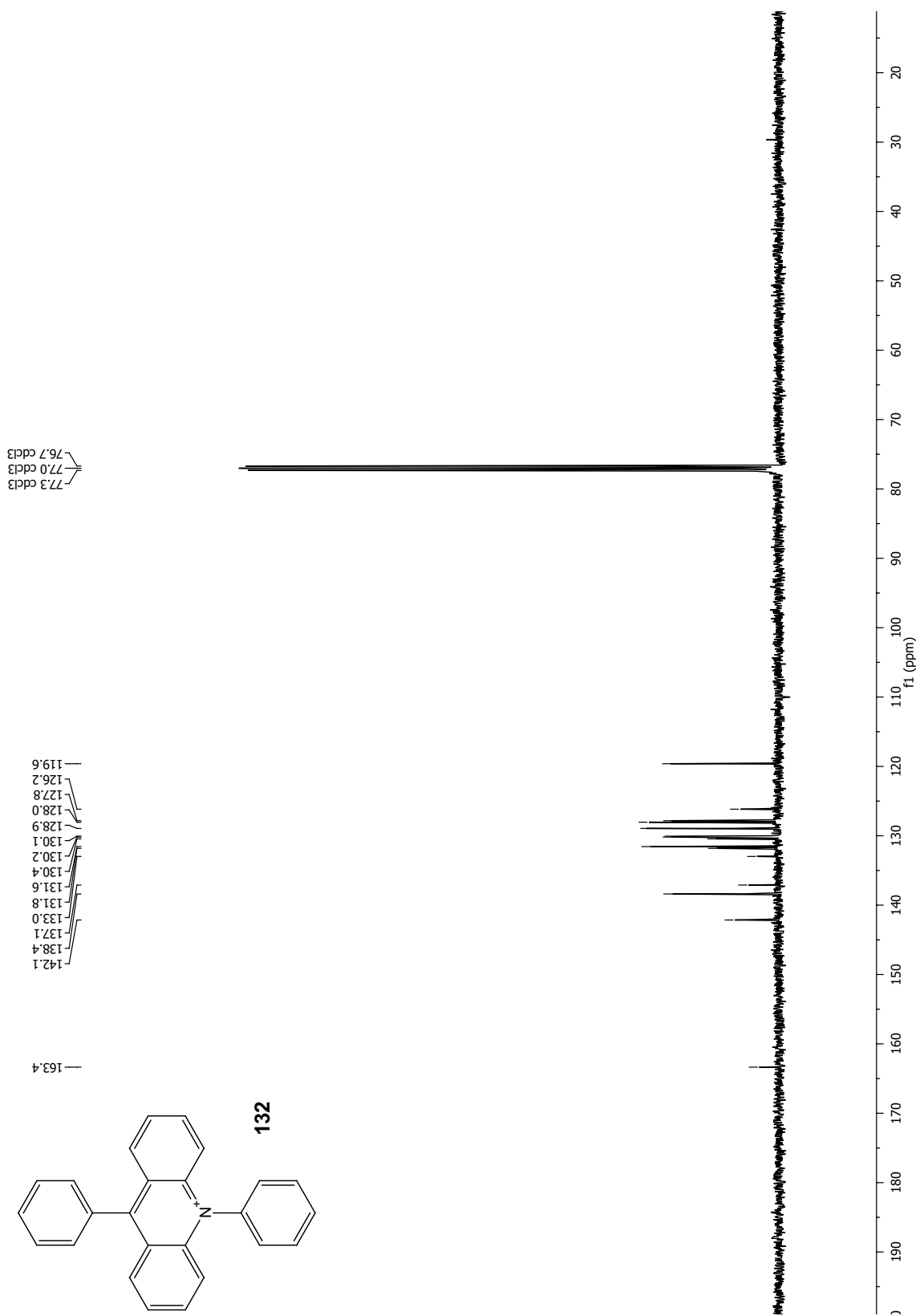


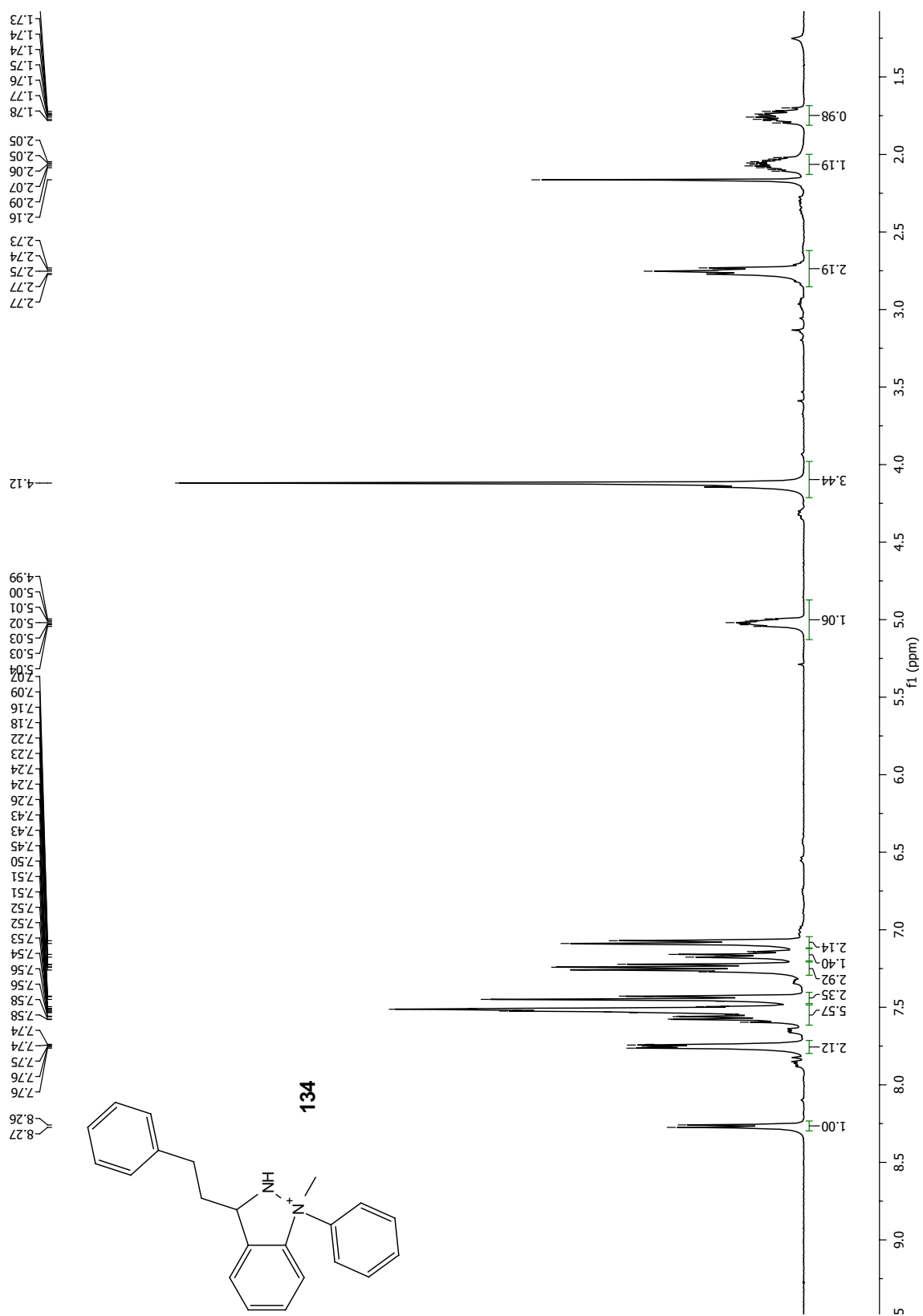


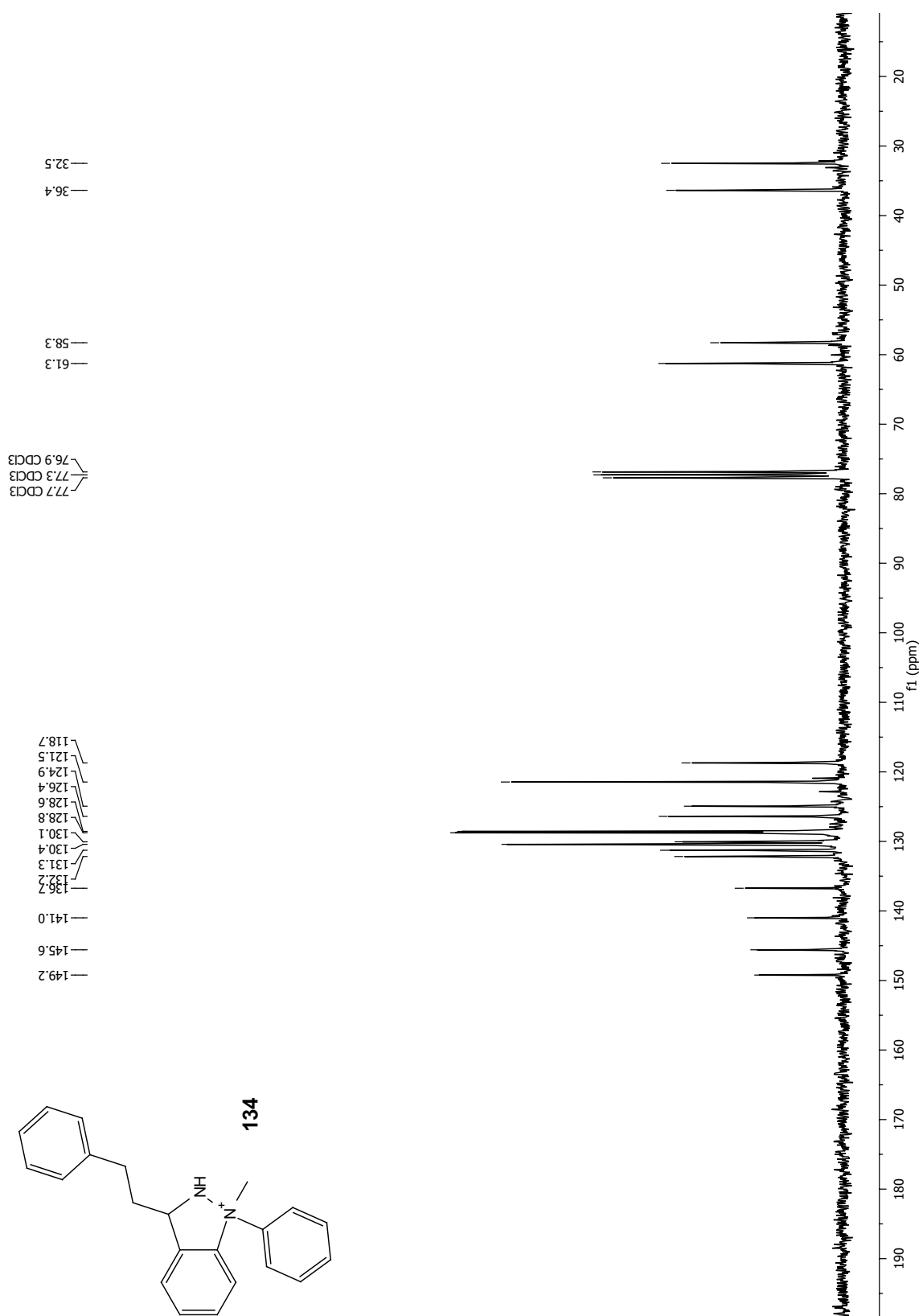


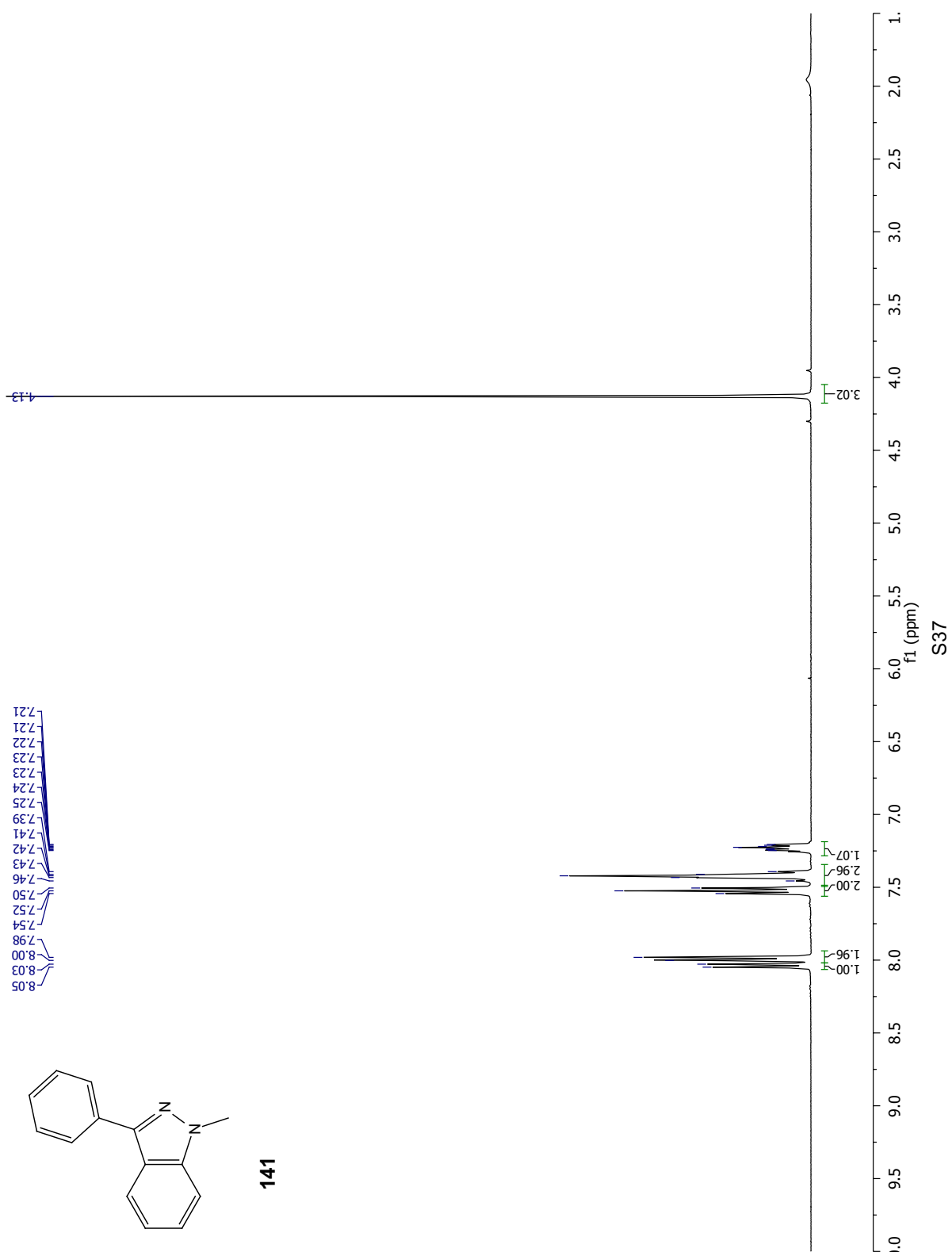
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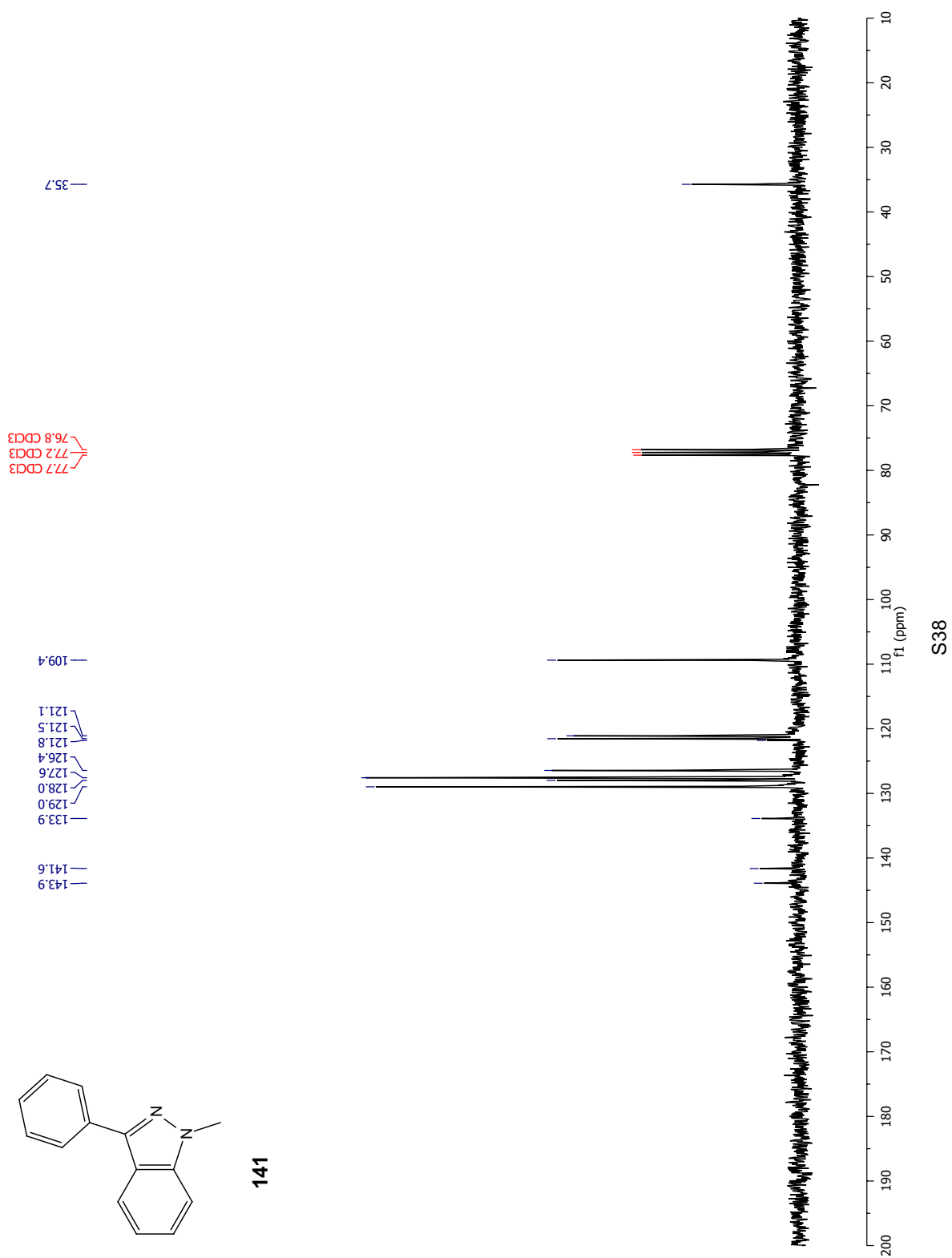


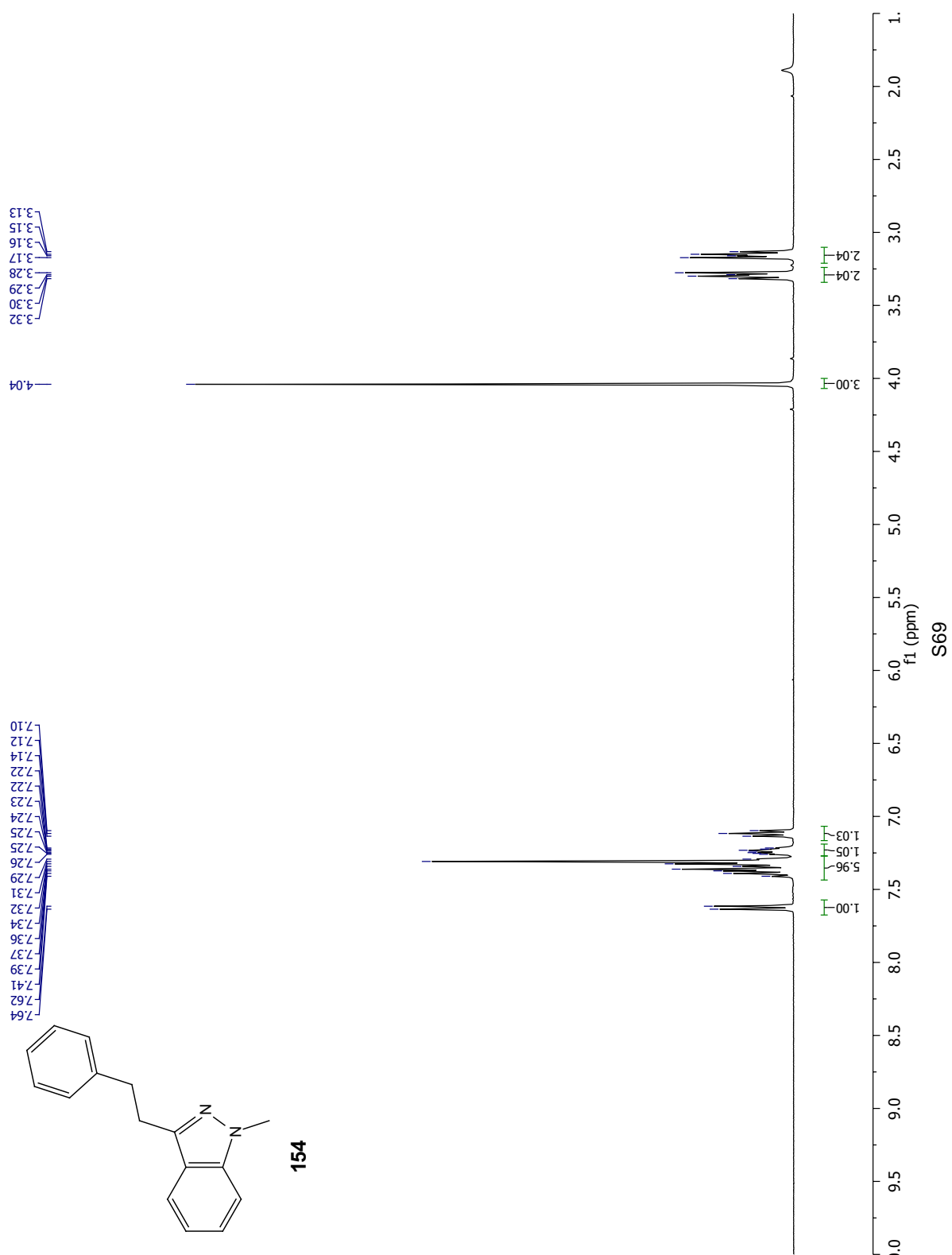


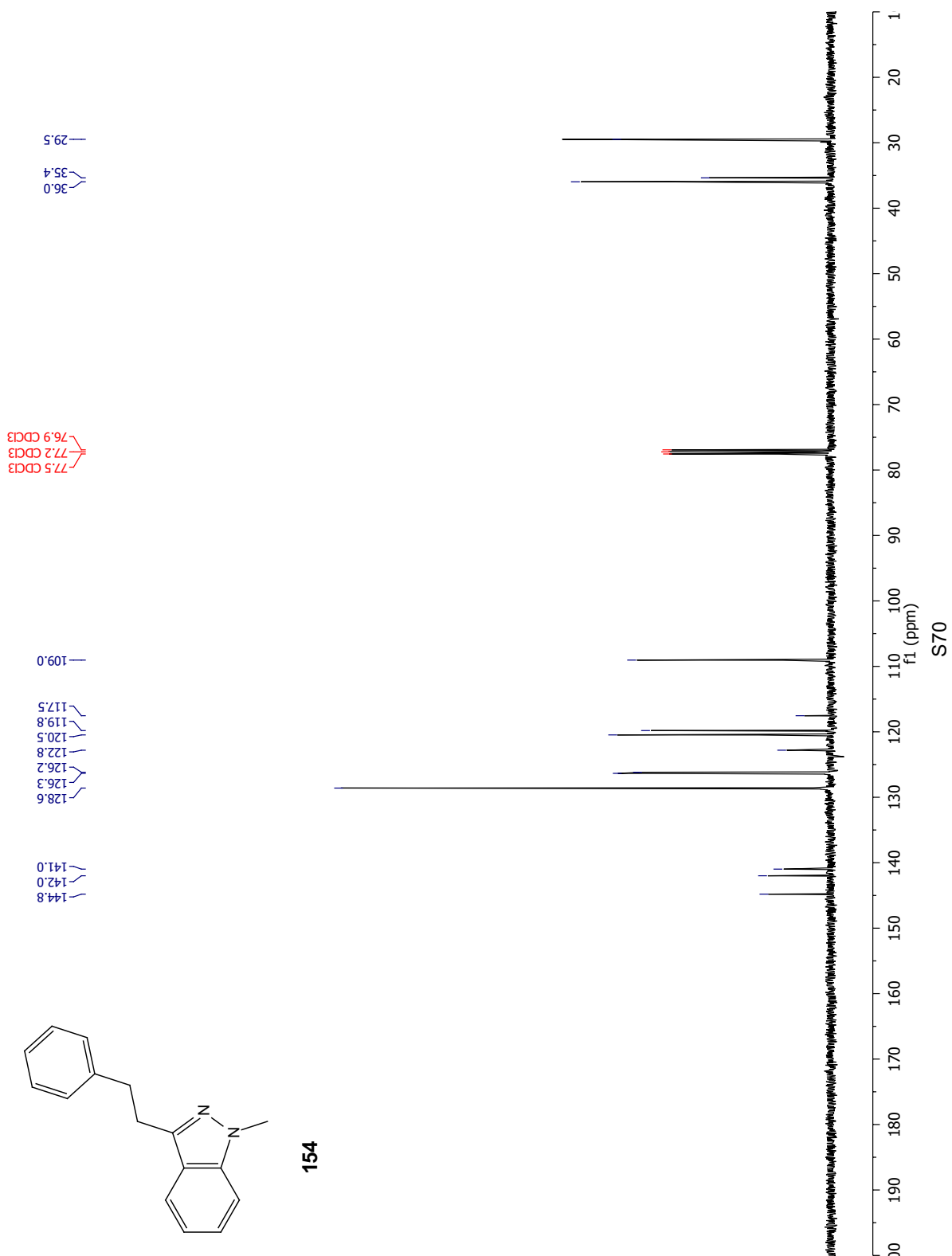


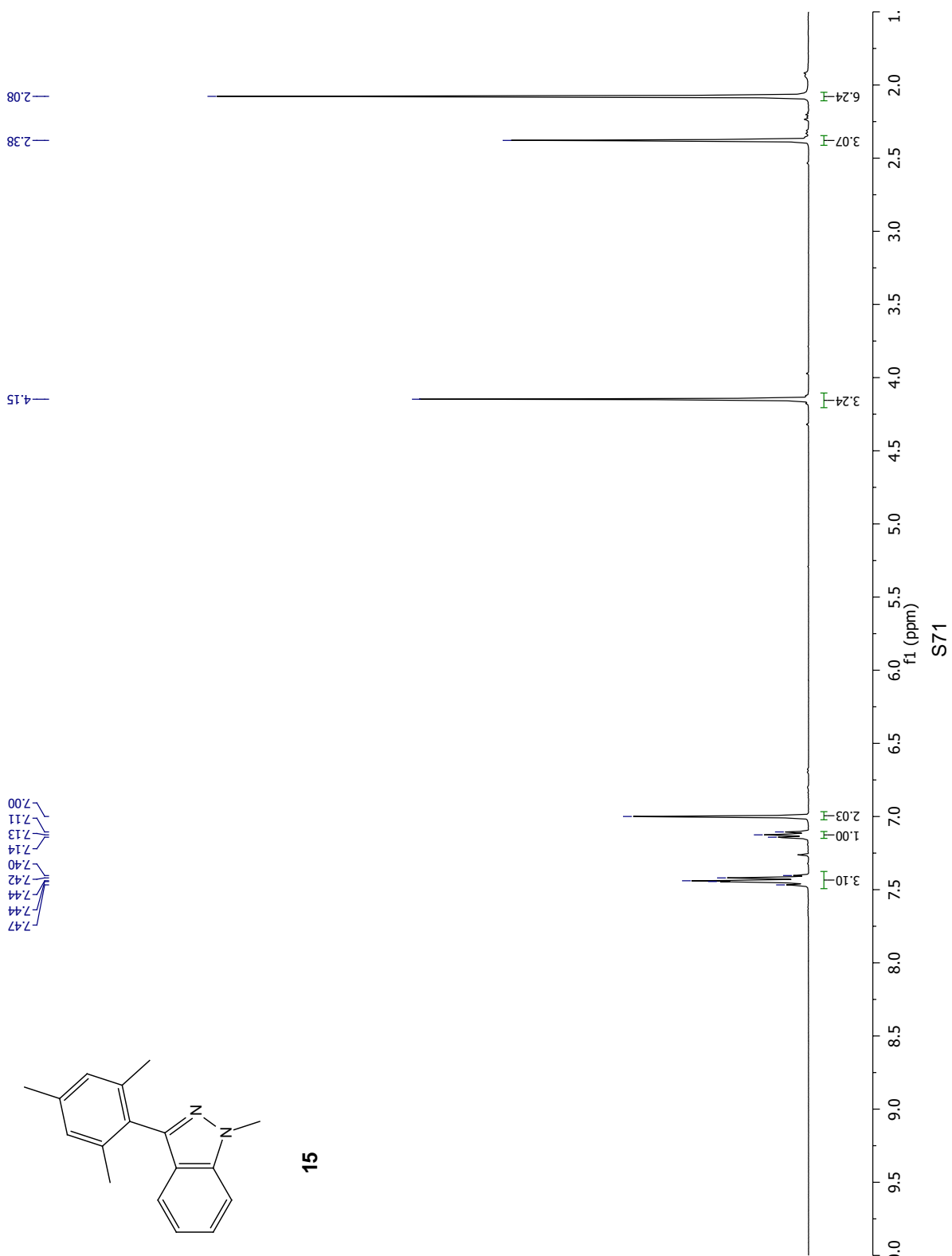


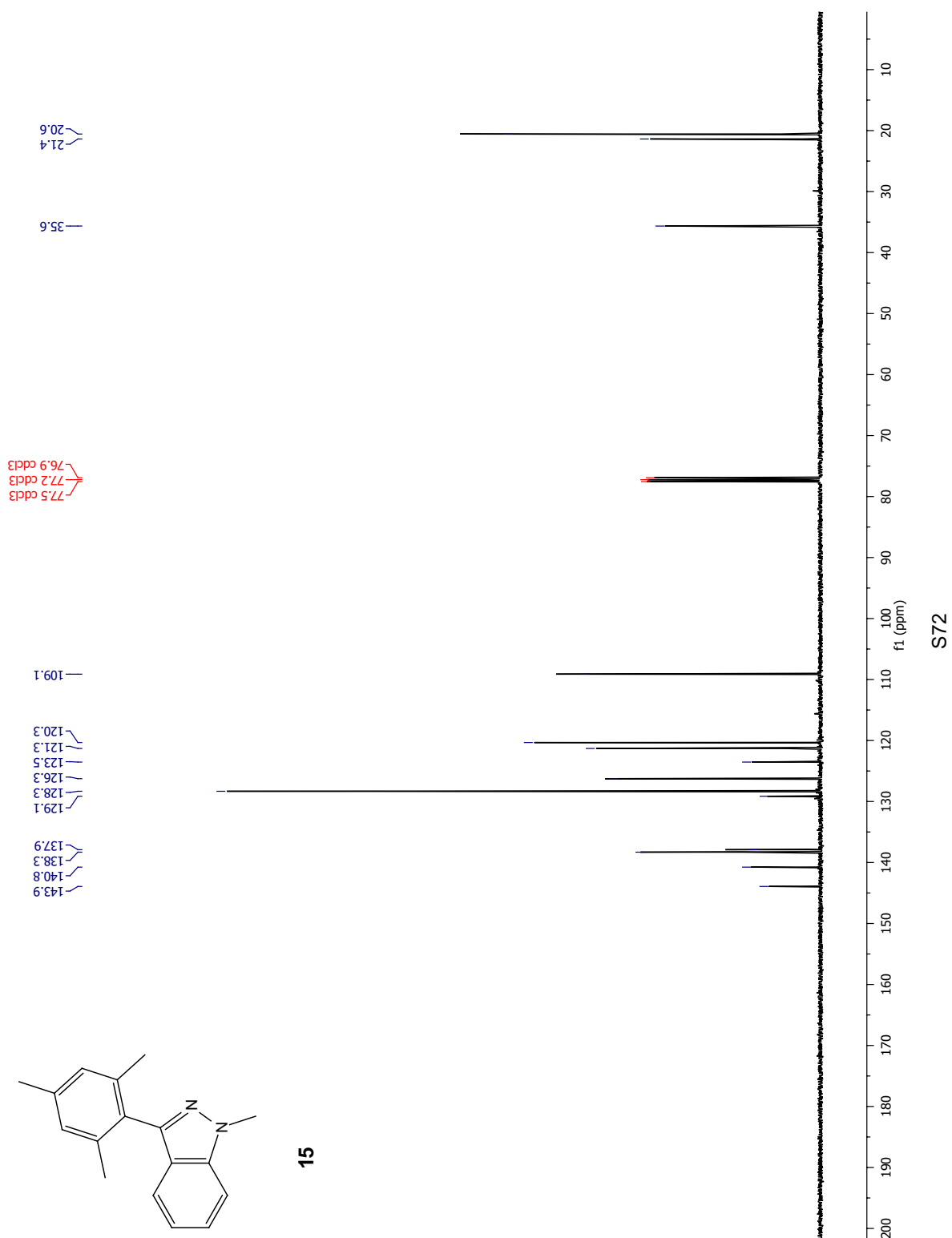




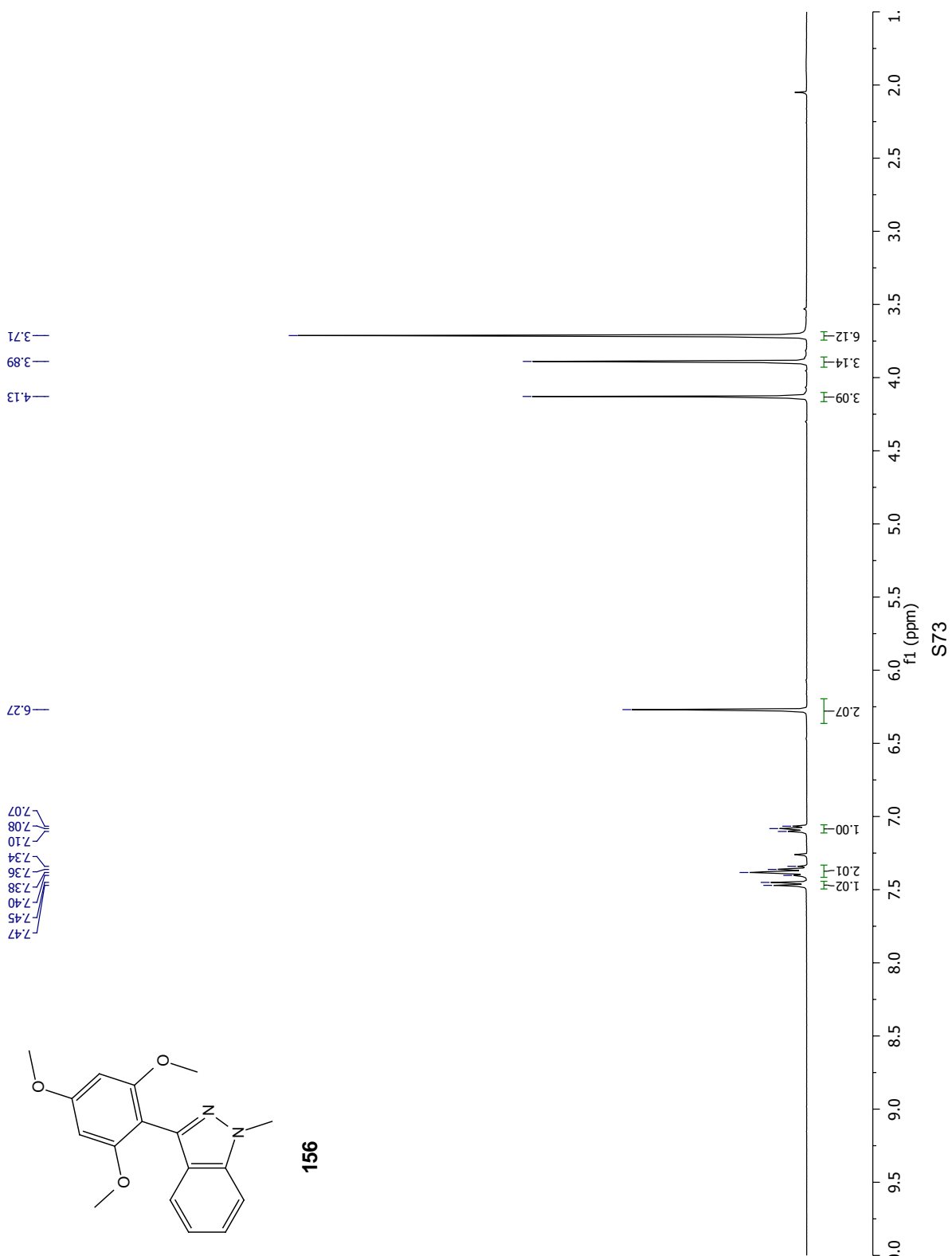


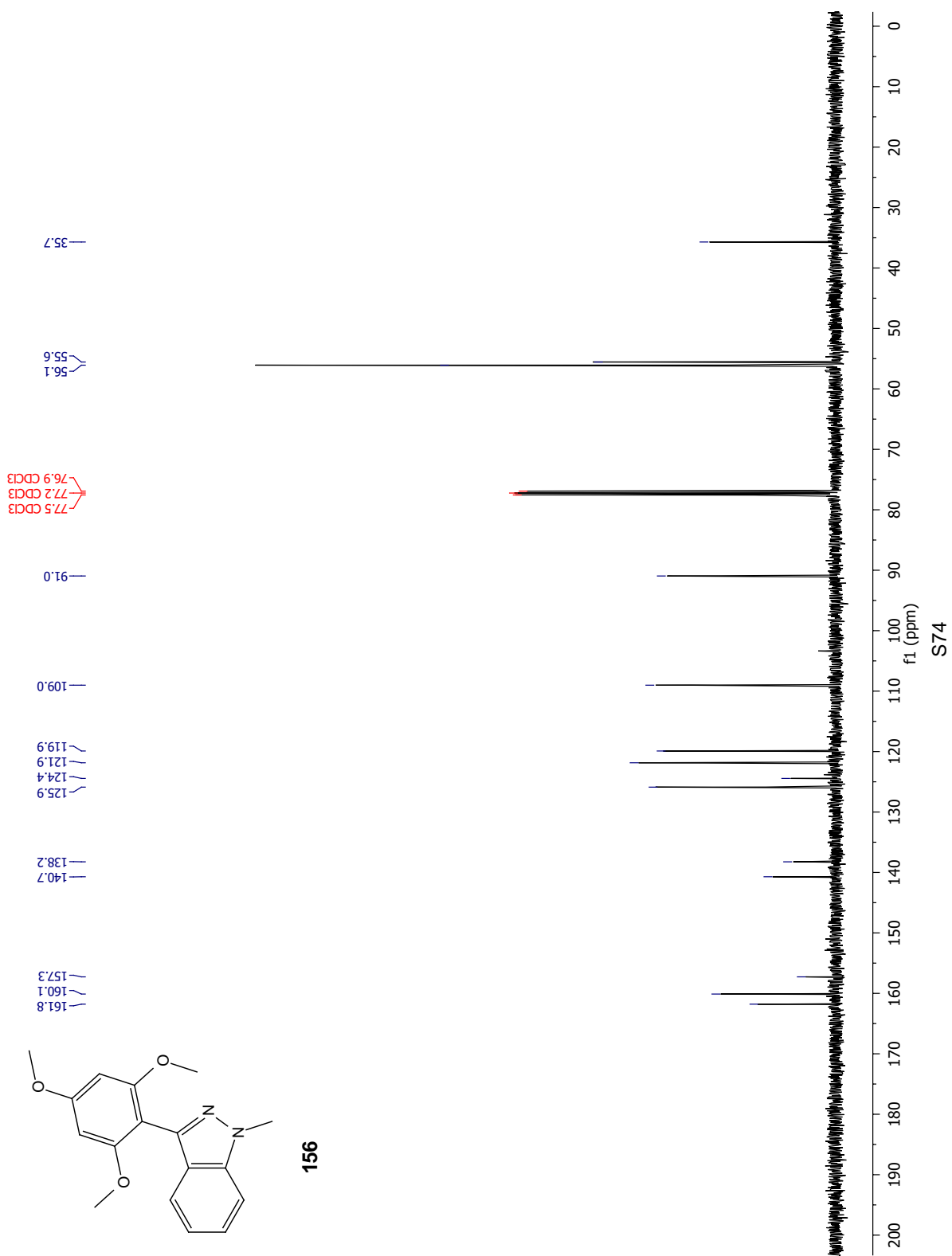


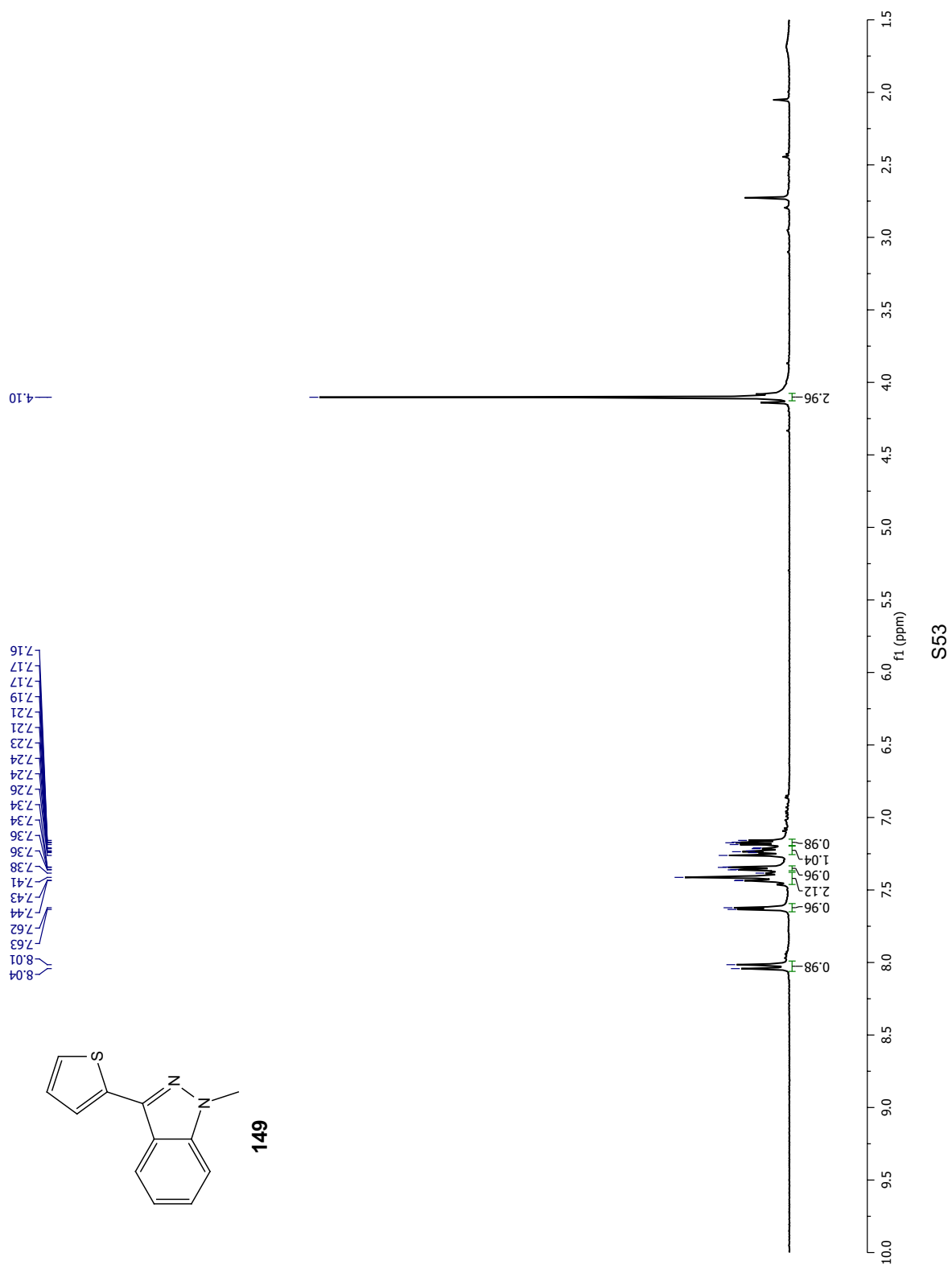


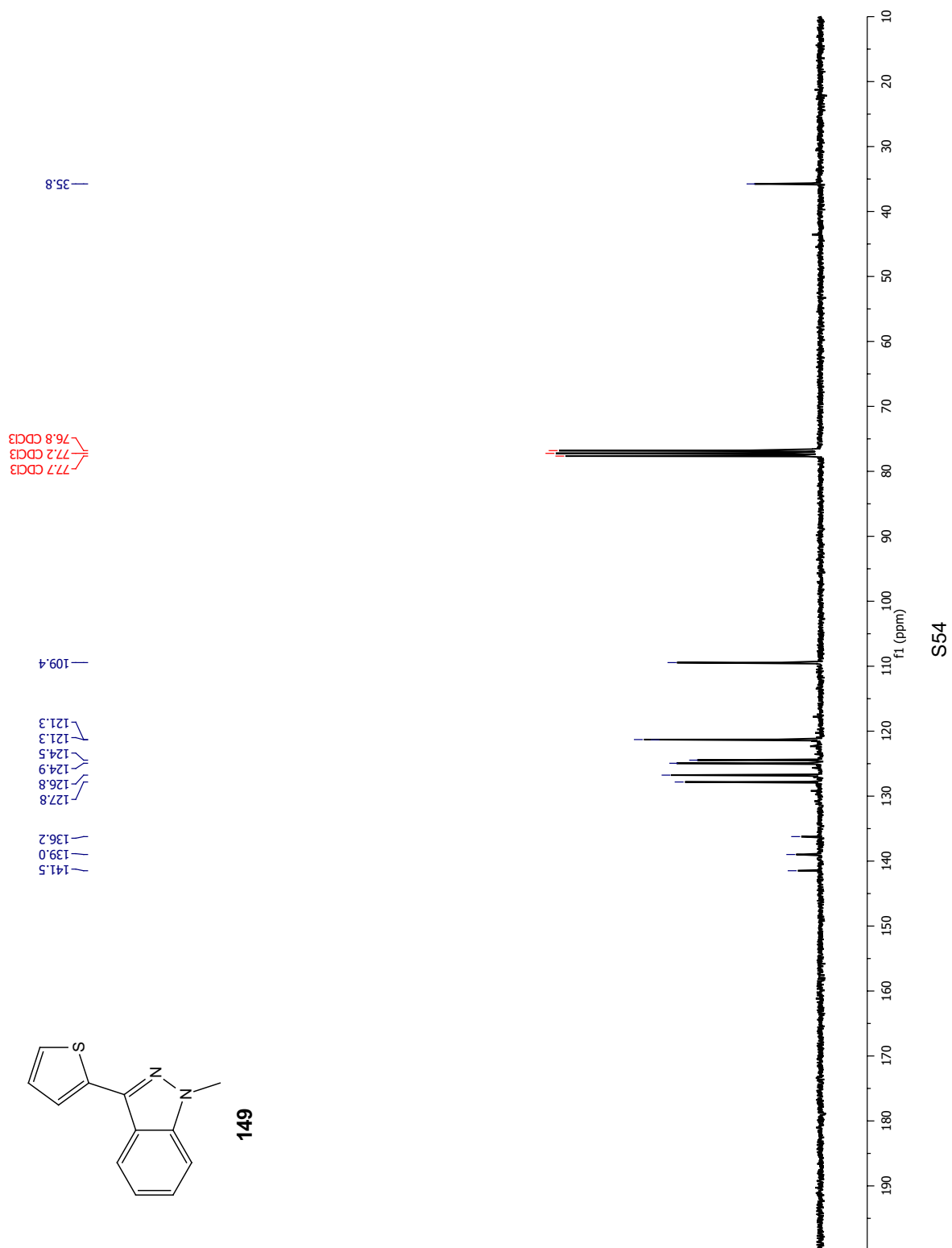


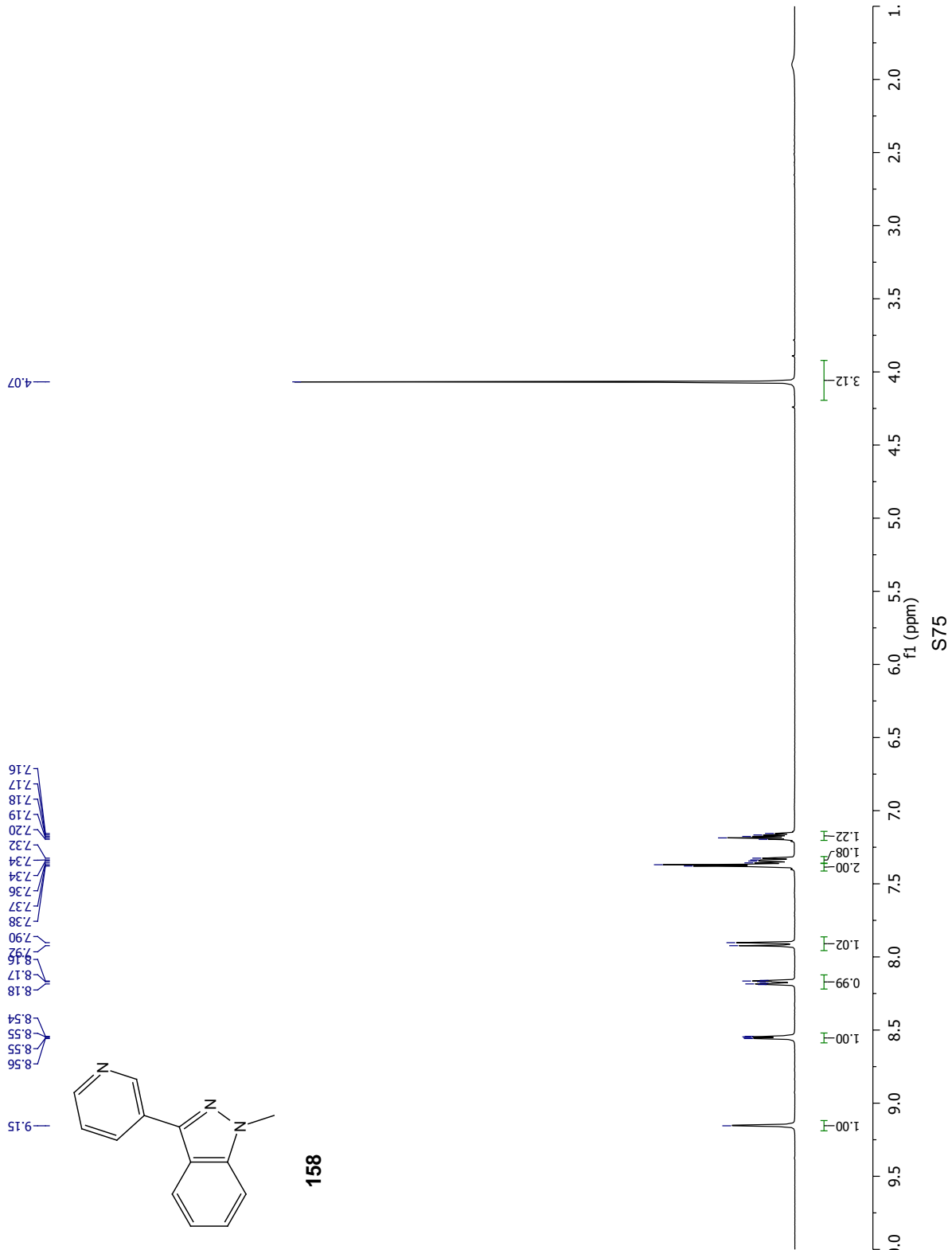
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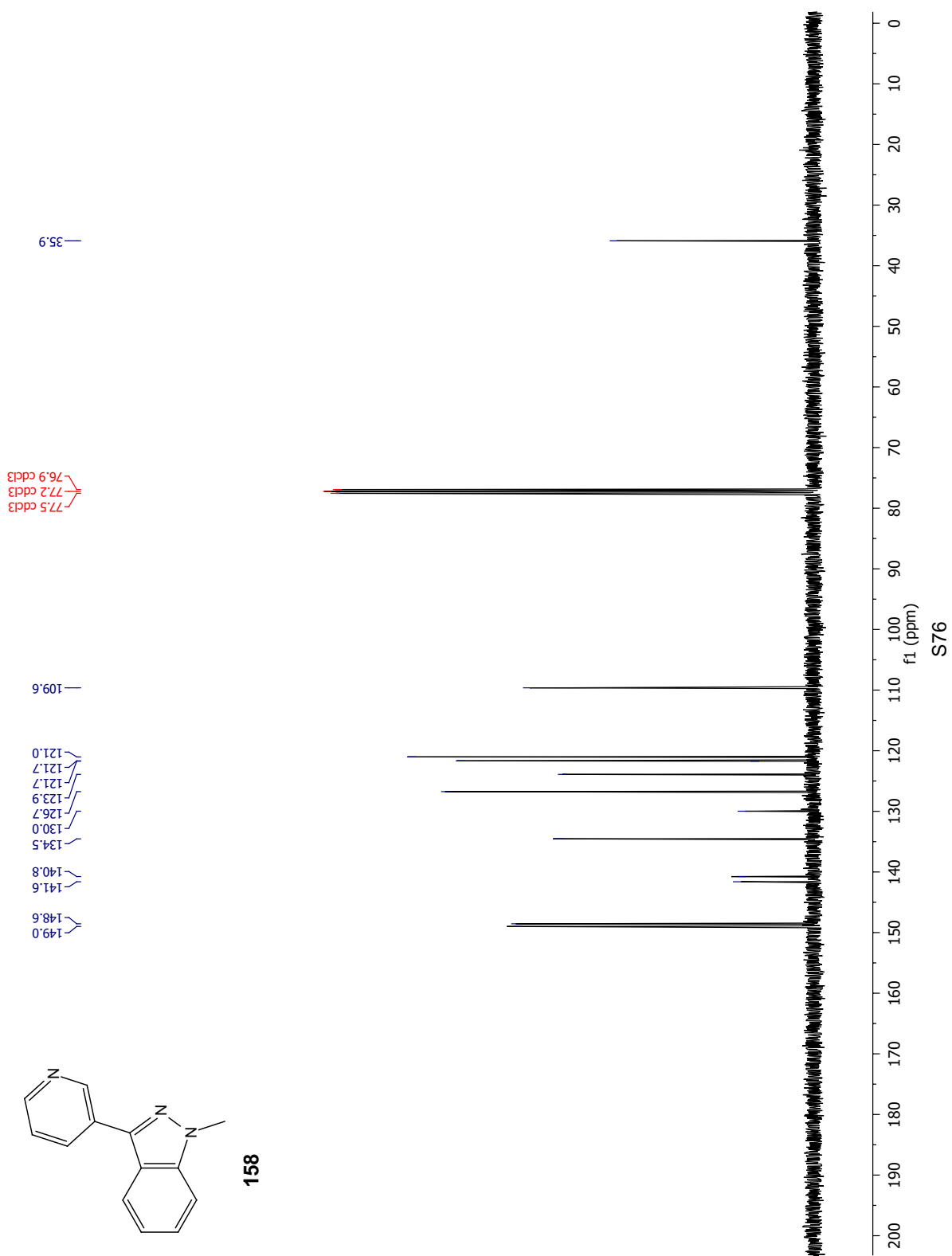




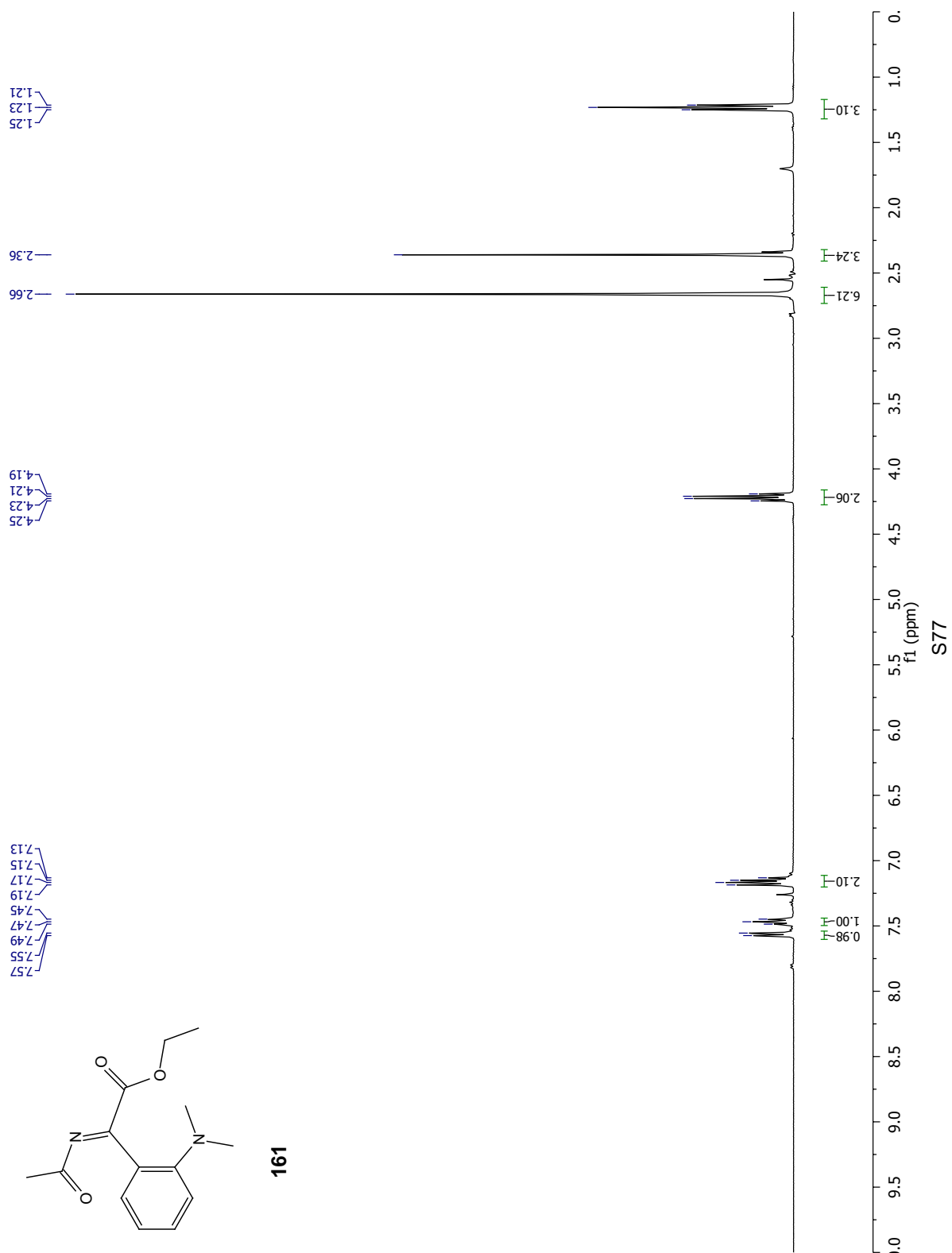




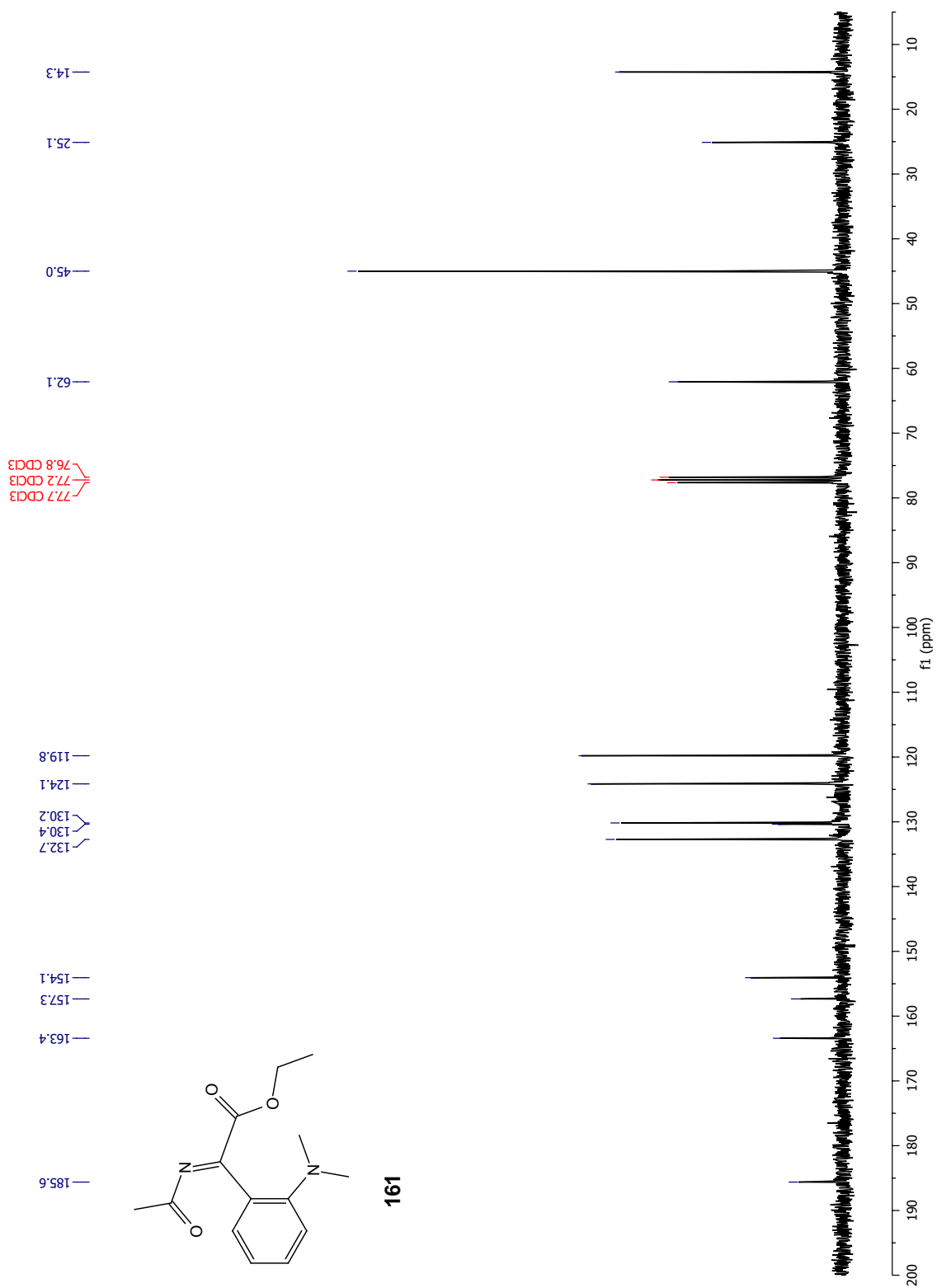
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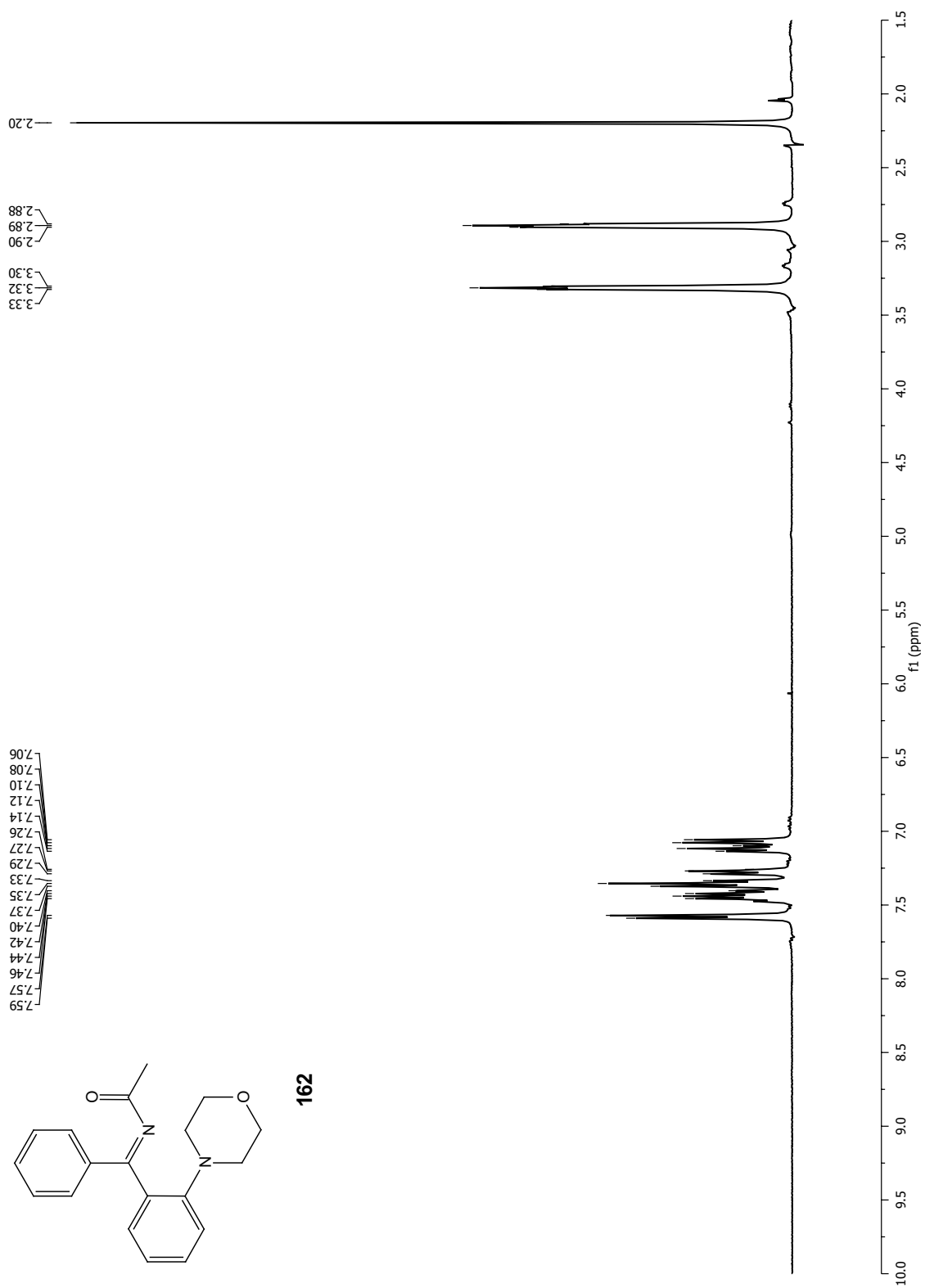
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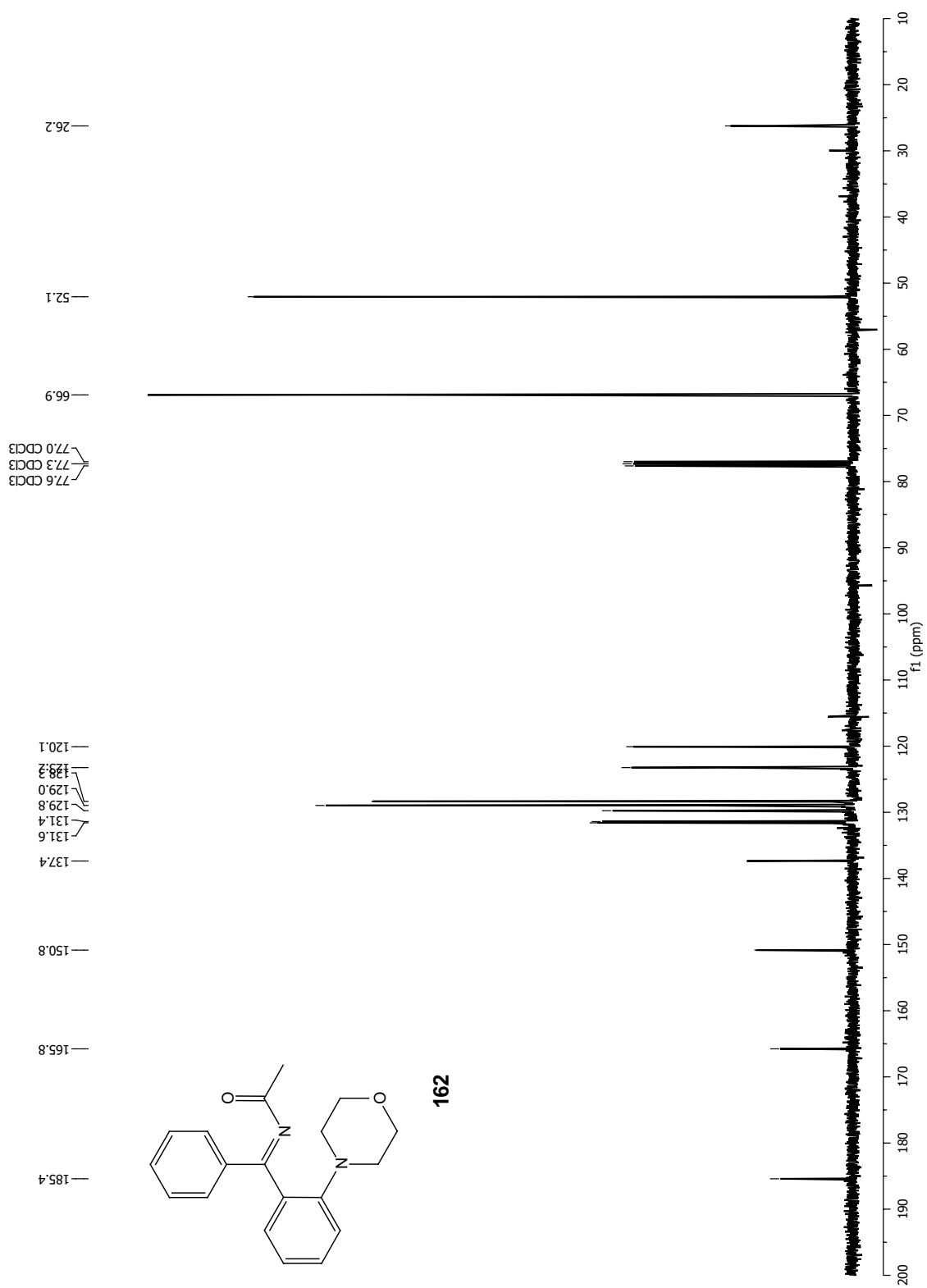


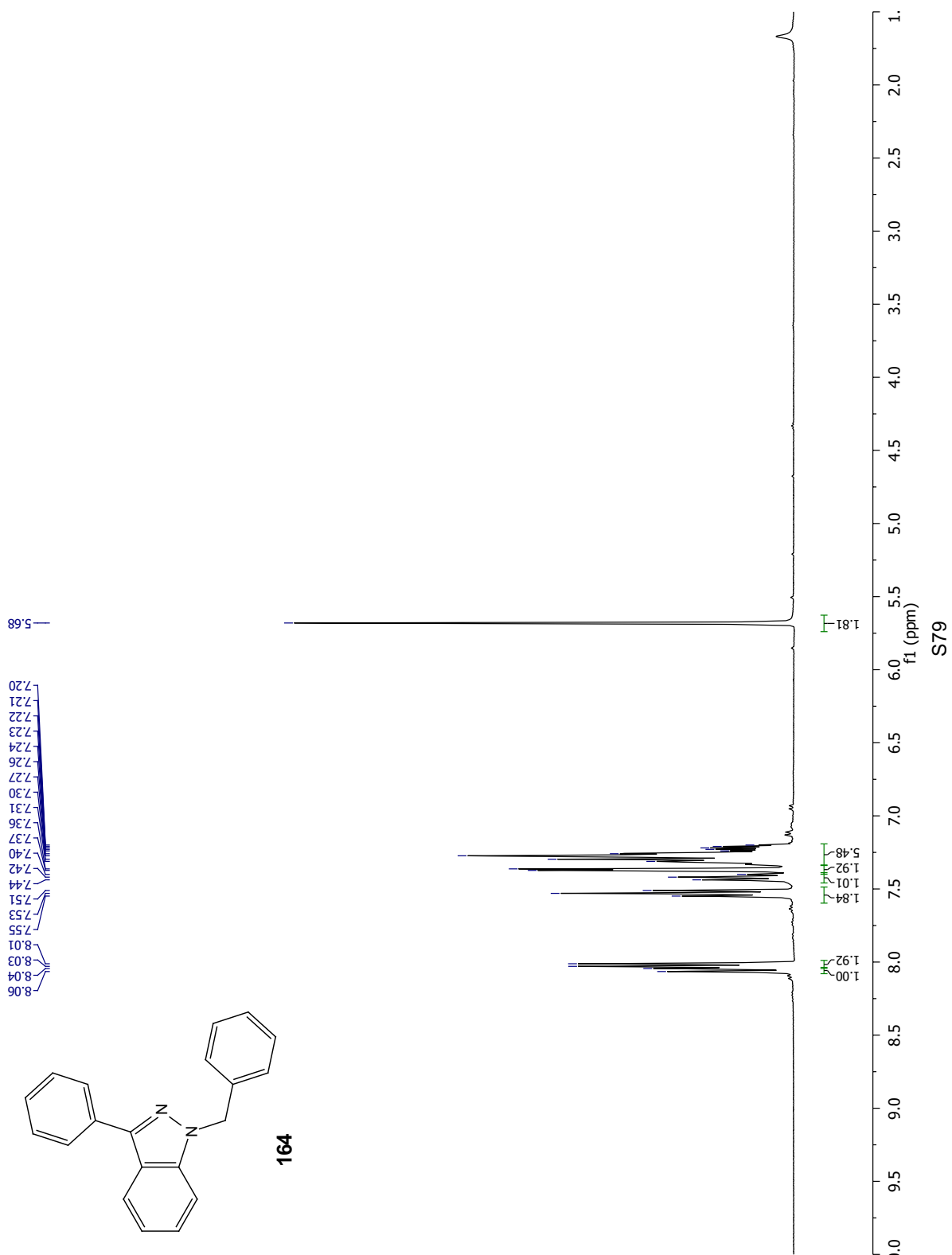
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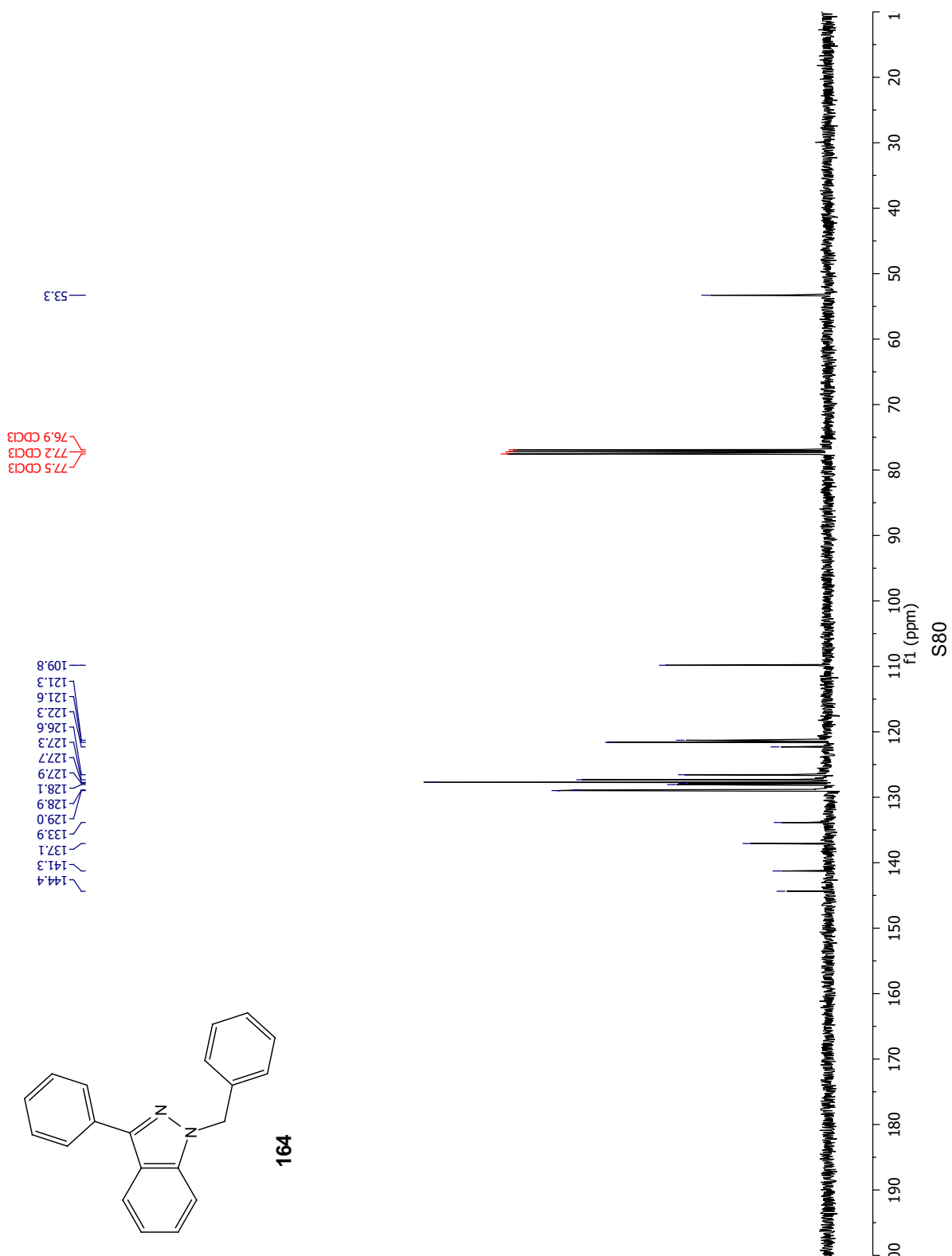


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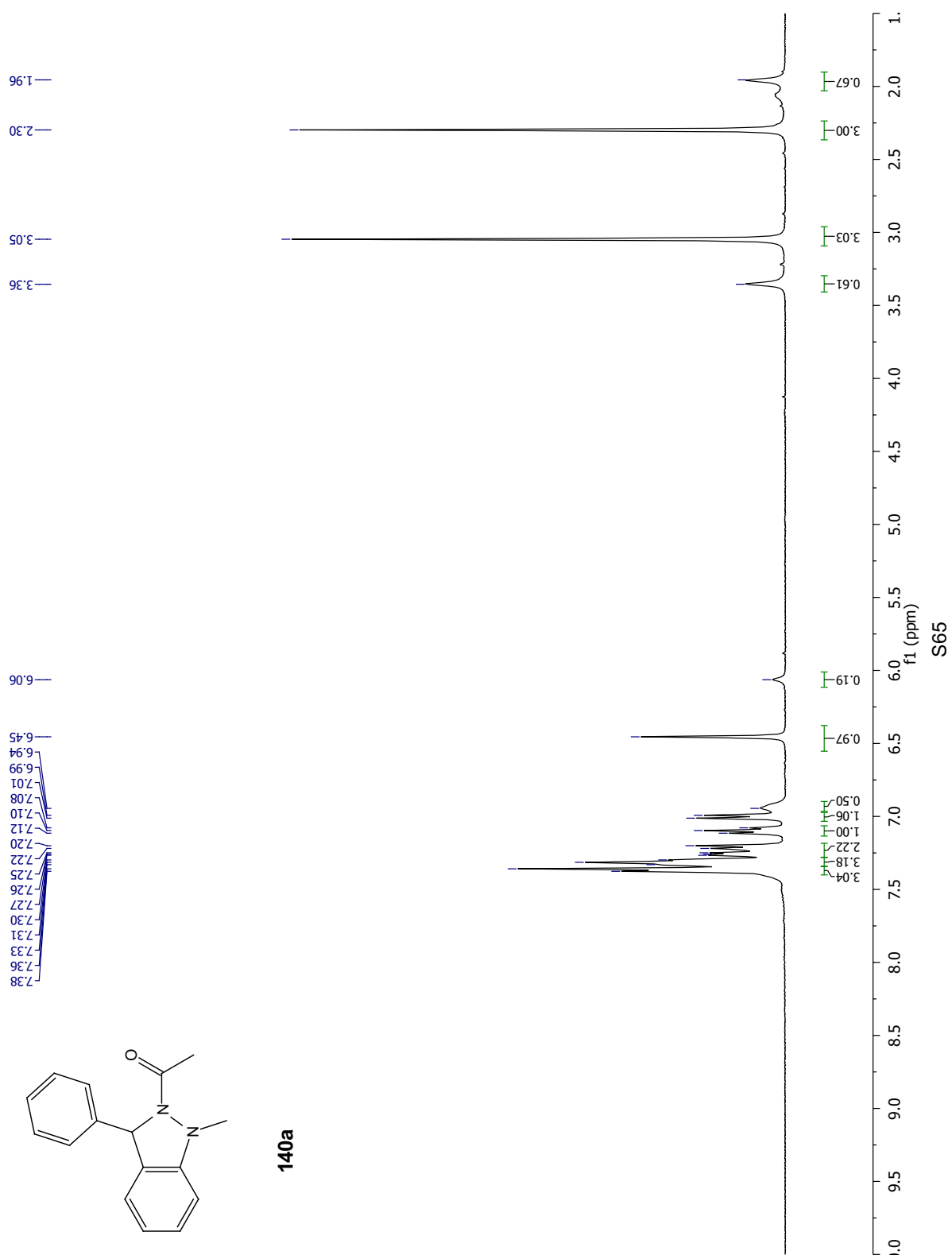


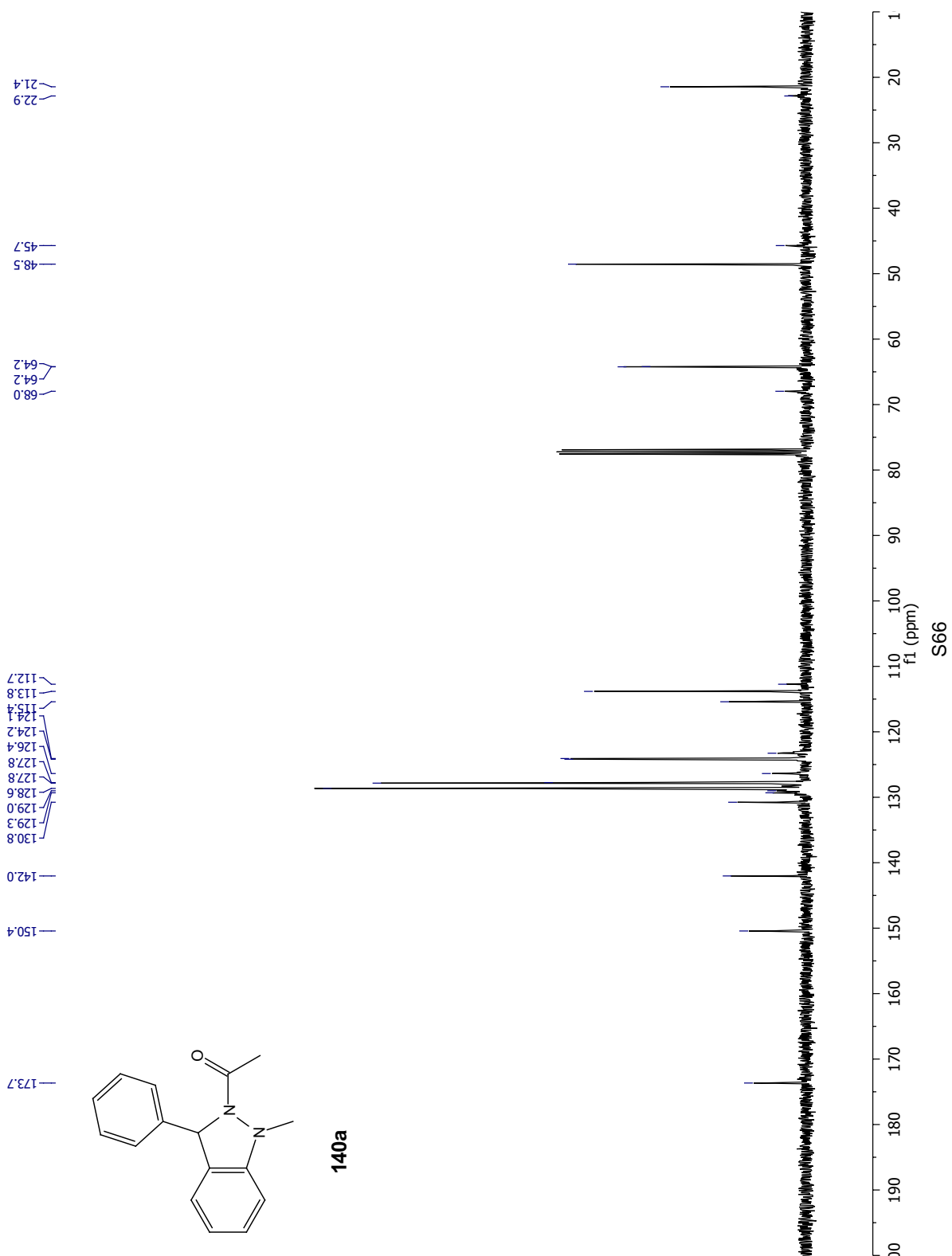






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