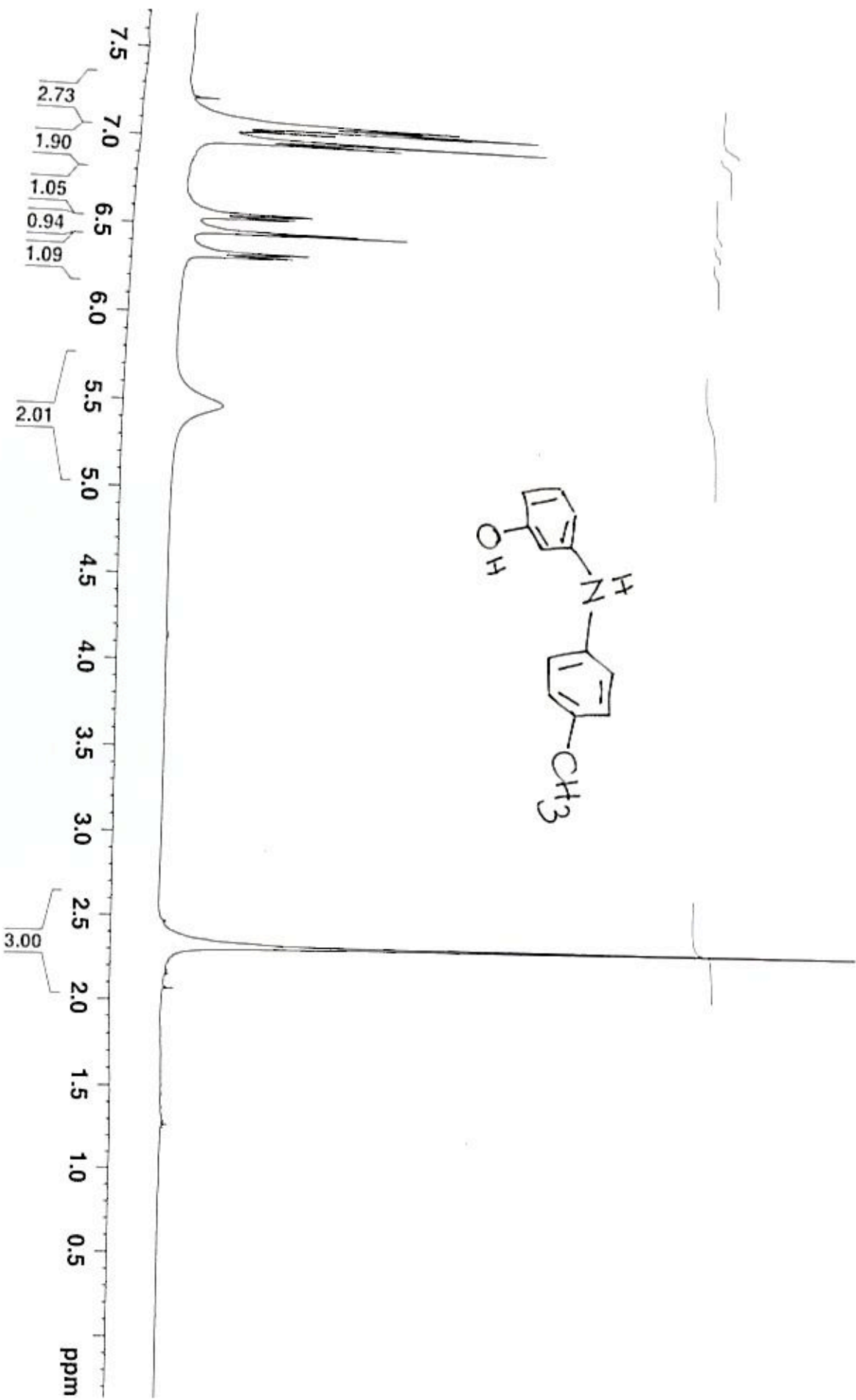
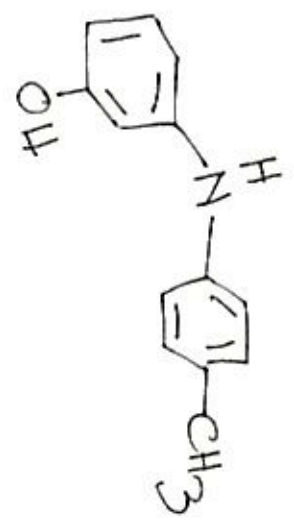
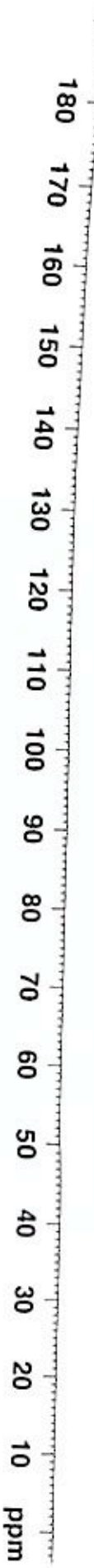


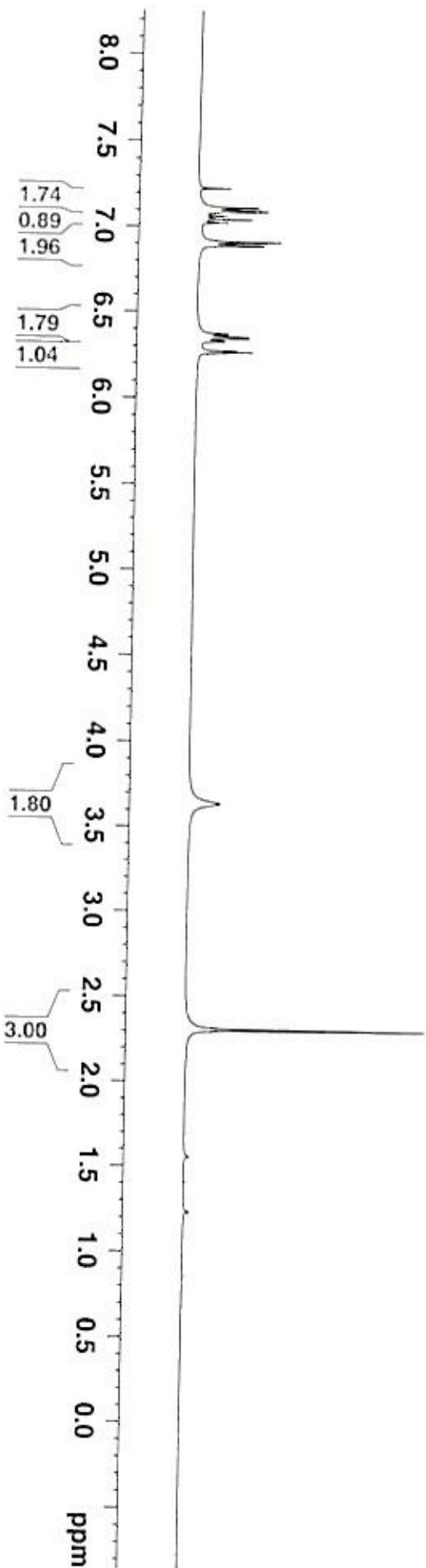
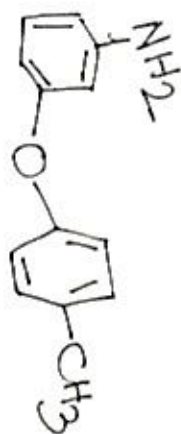
**Orthogonal Cu- and Pd-Based Catalyst Systems for the O- and N-Arylation of Aminophenols**

Debabrata Maiti and Stephen L. Buchwald\*

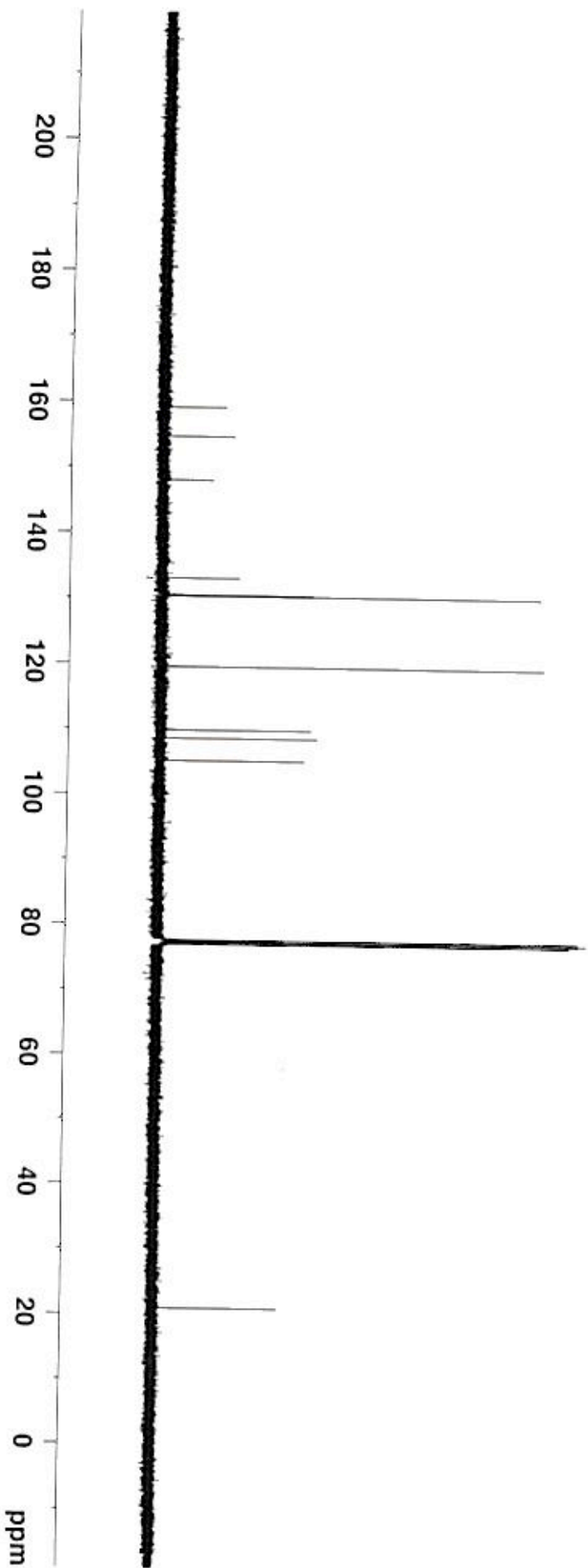
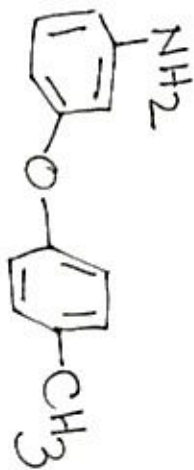
Department of Chemistry, Massachusetts Institute of Technology, 77 Massachusetts Avenue, Cambridge Massachusetts 02139

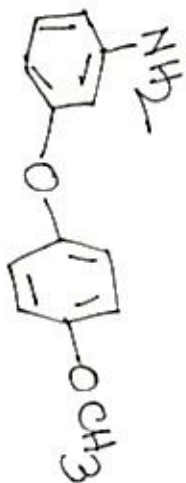
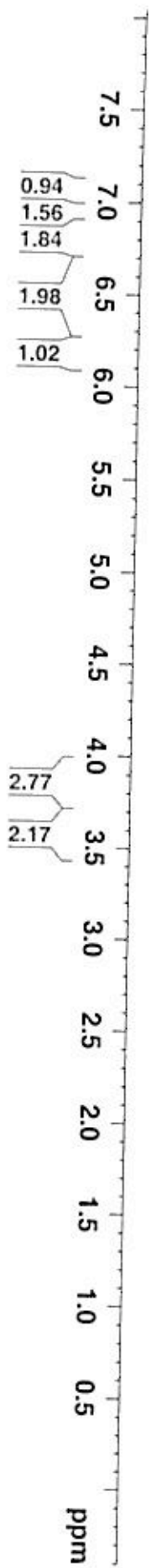


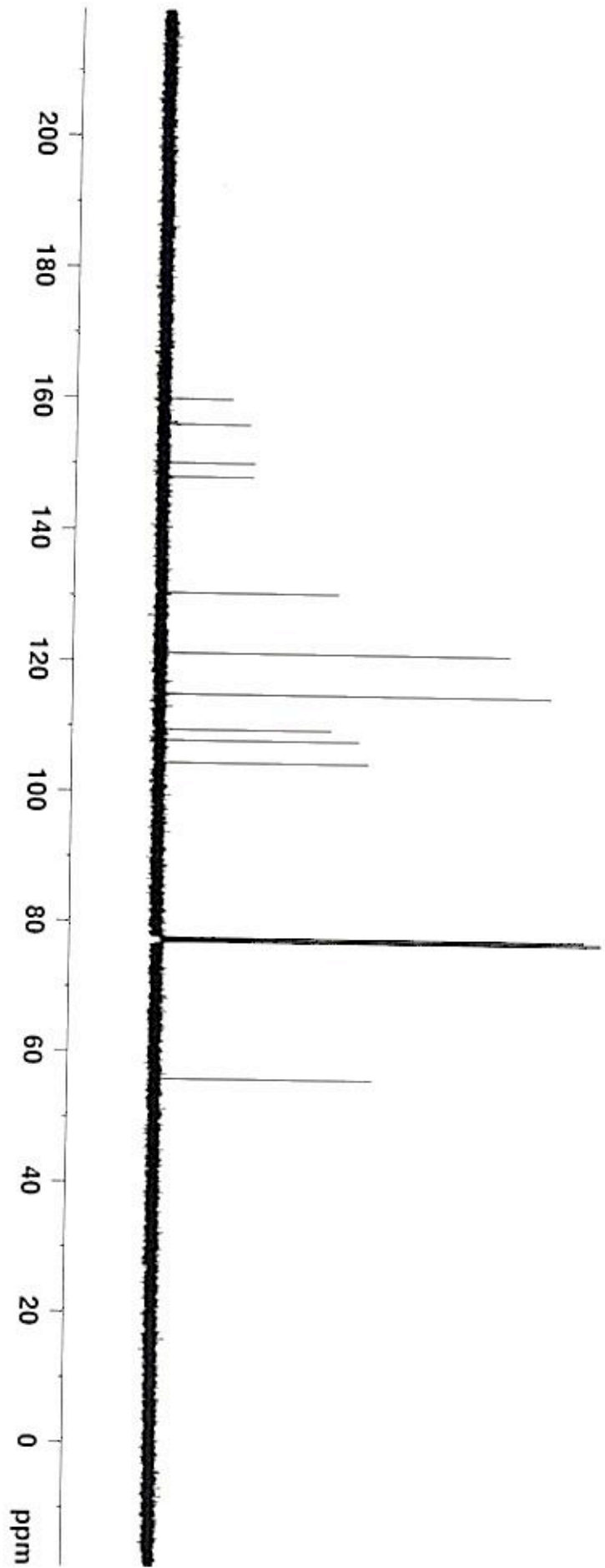
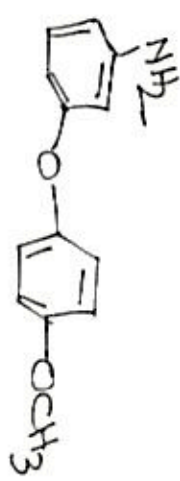


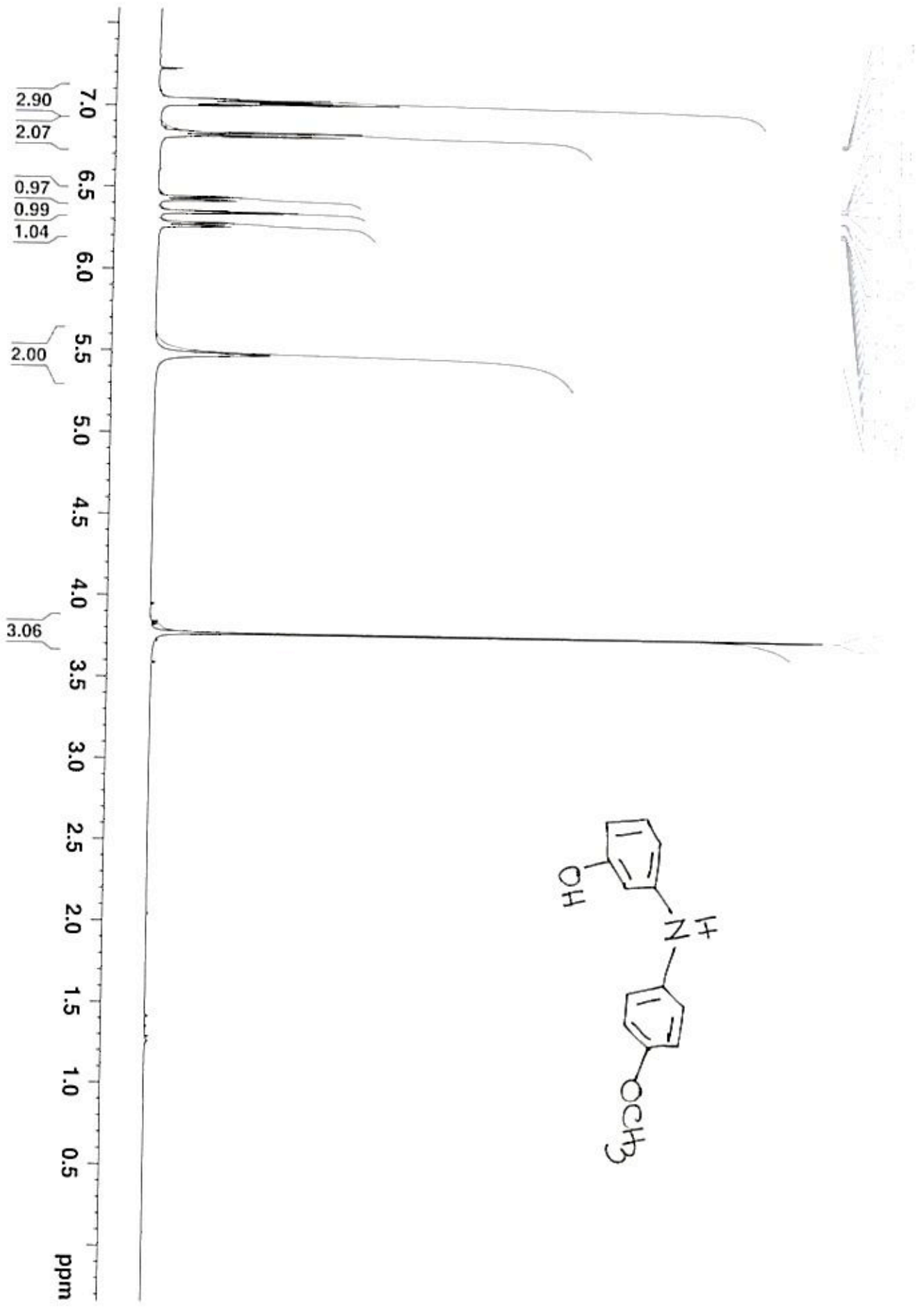
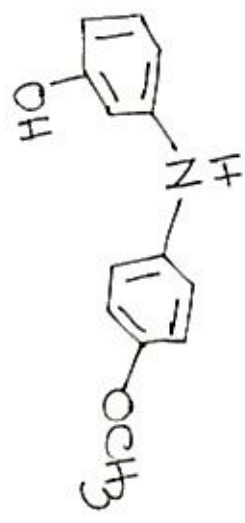


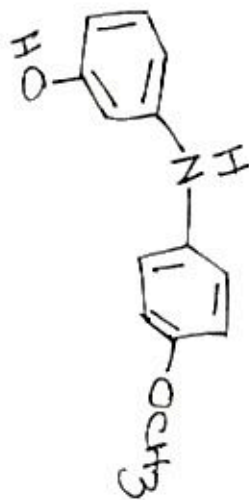


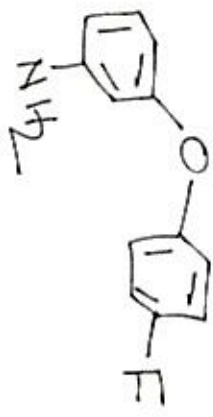
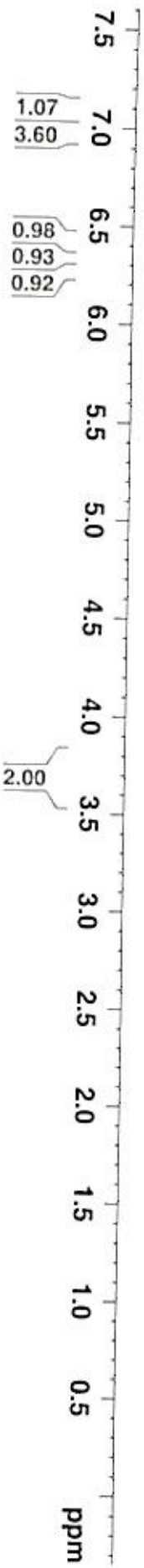


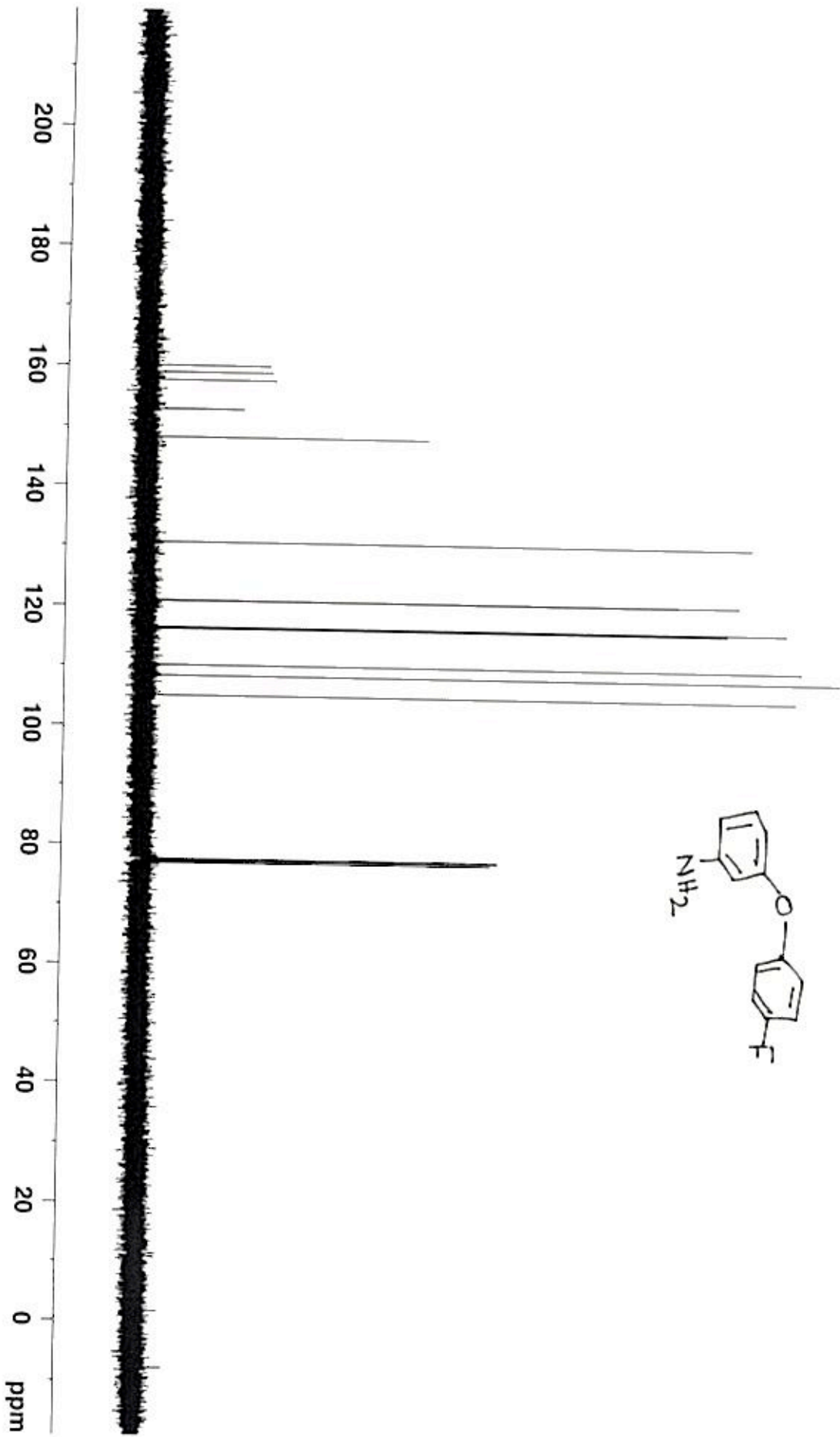
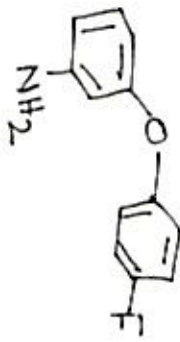


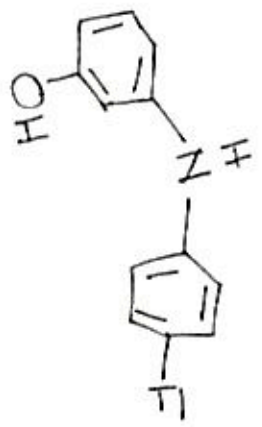
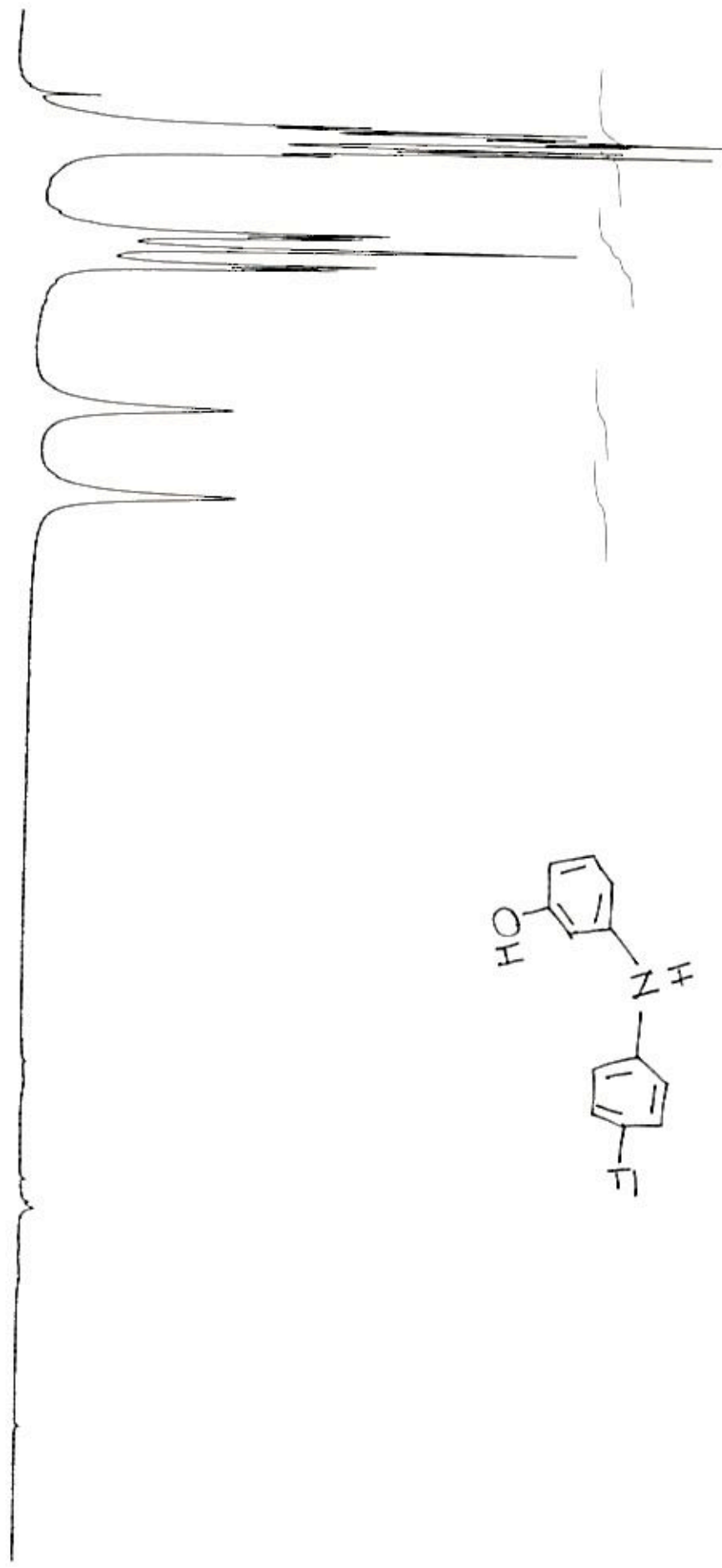
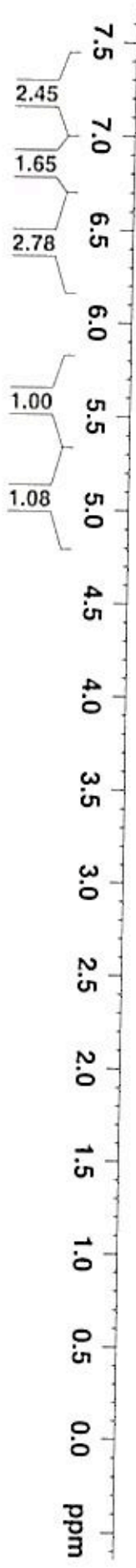




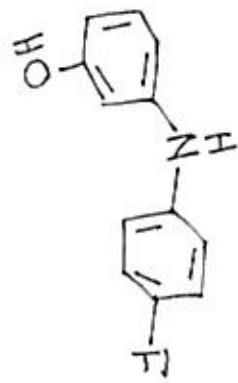
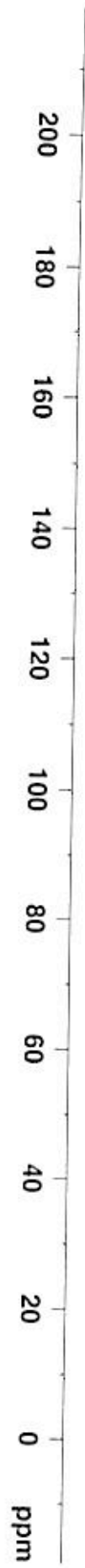


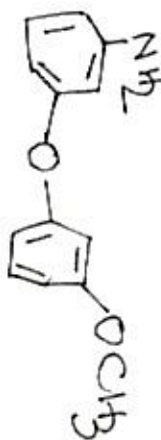
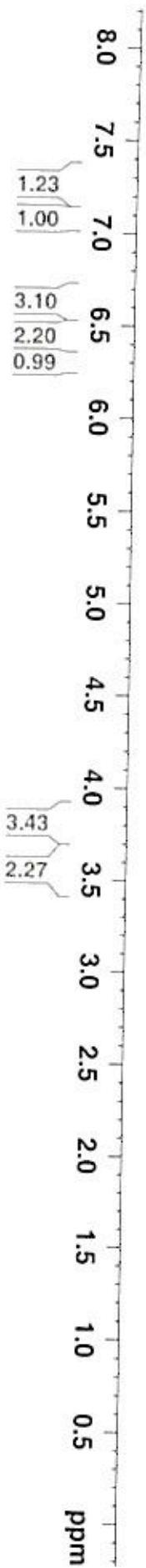


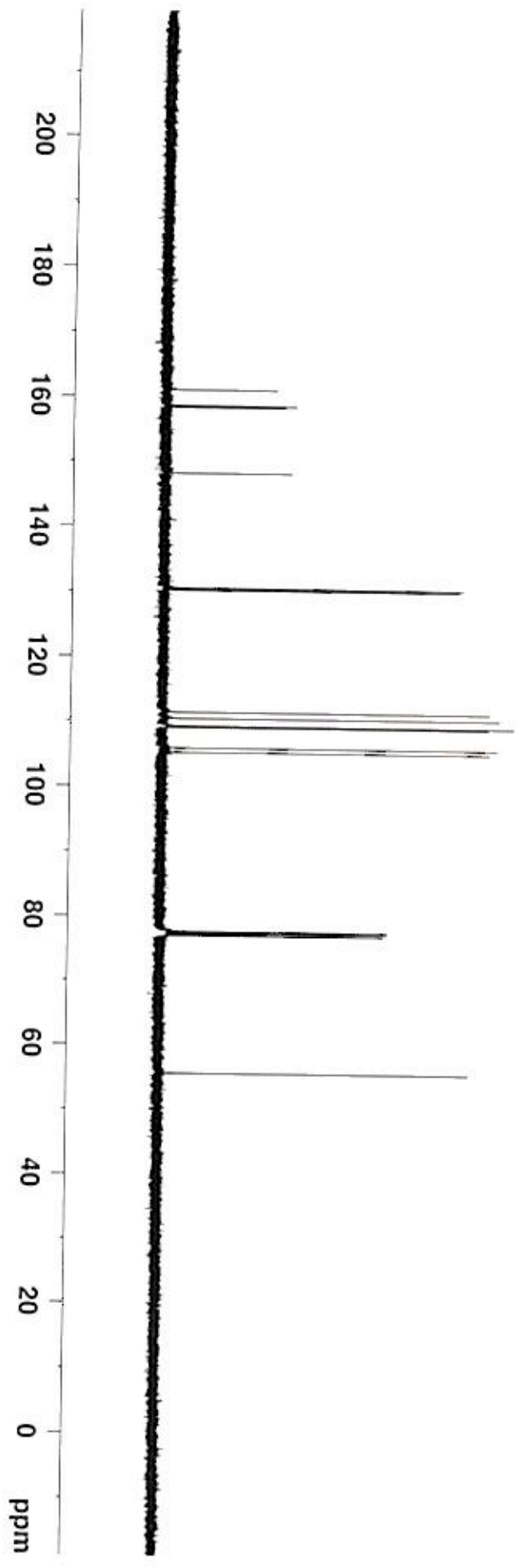
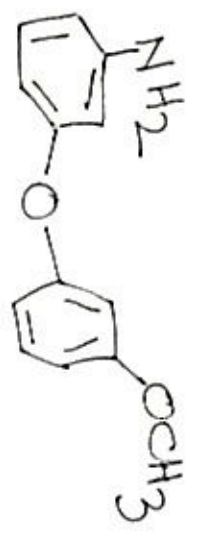


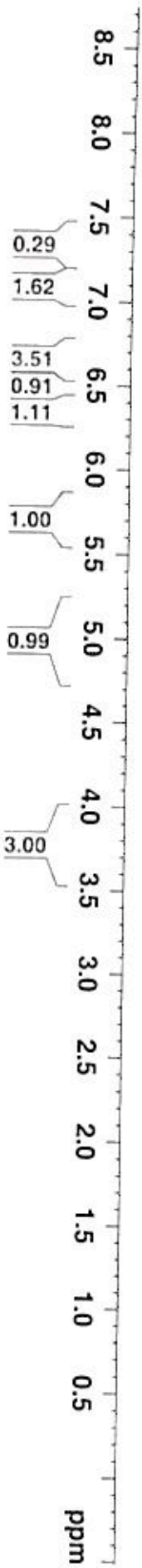
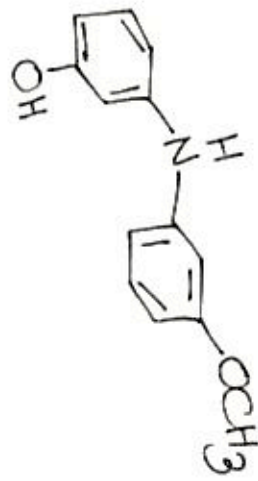


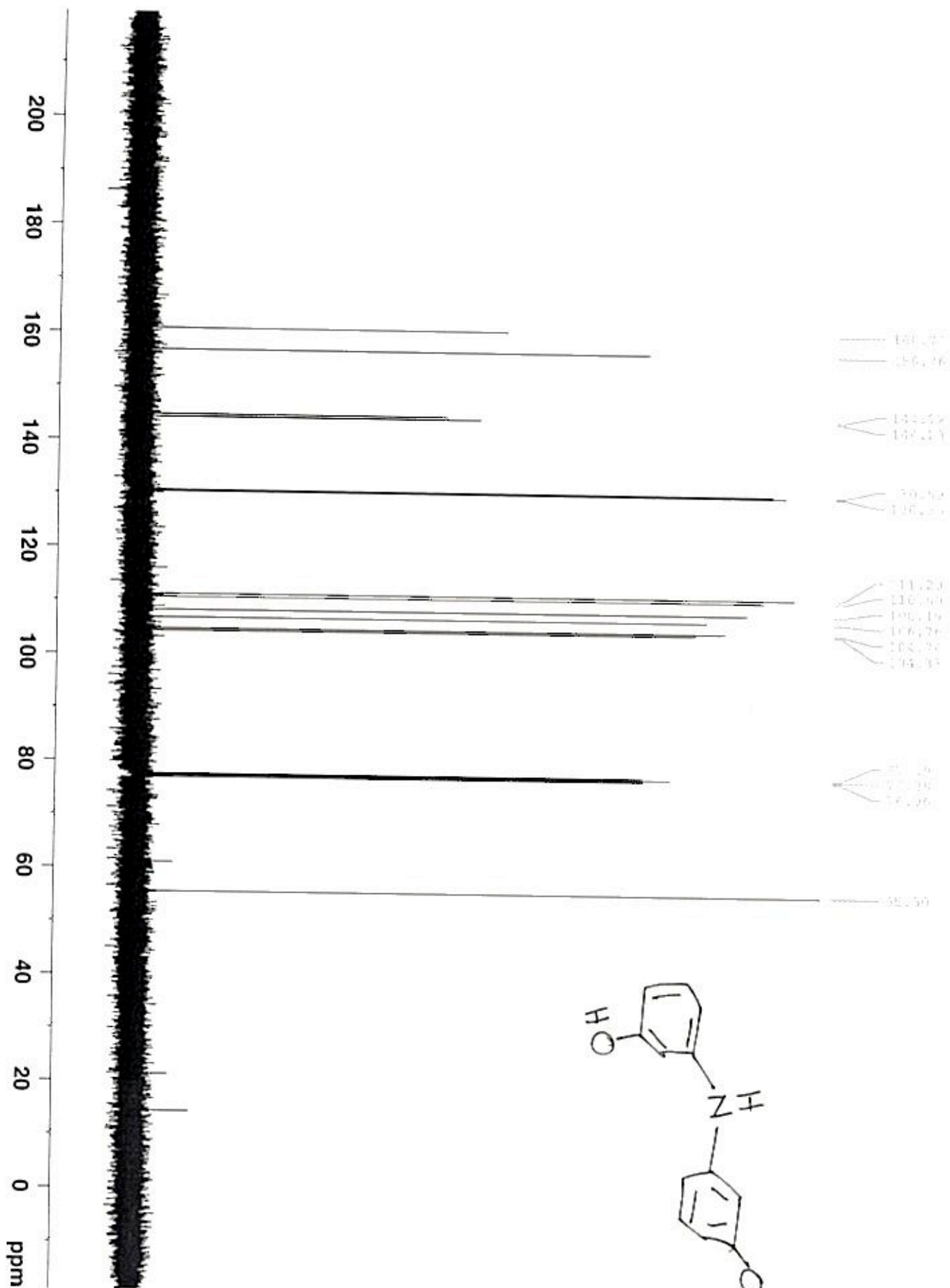


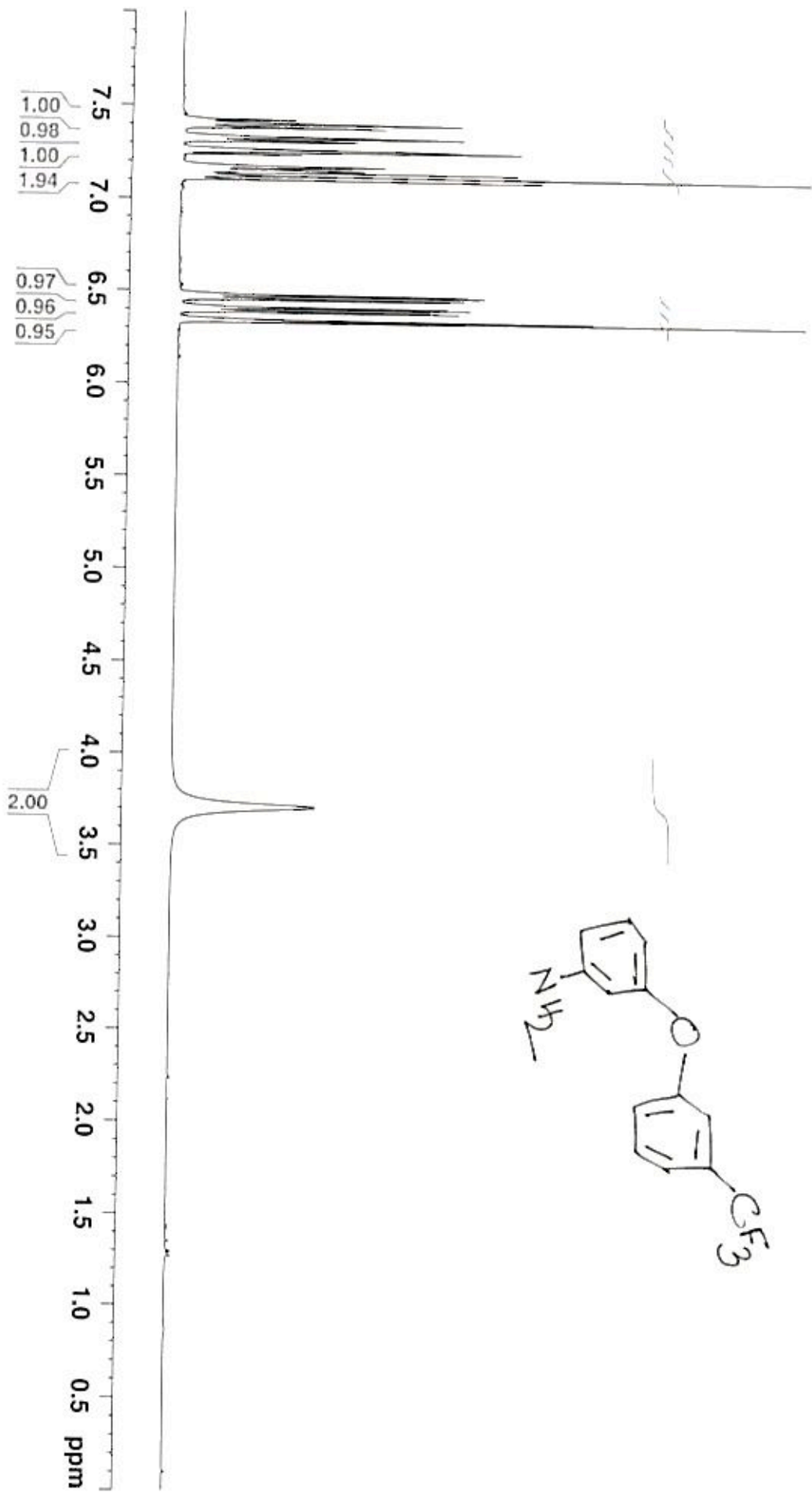


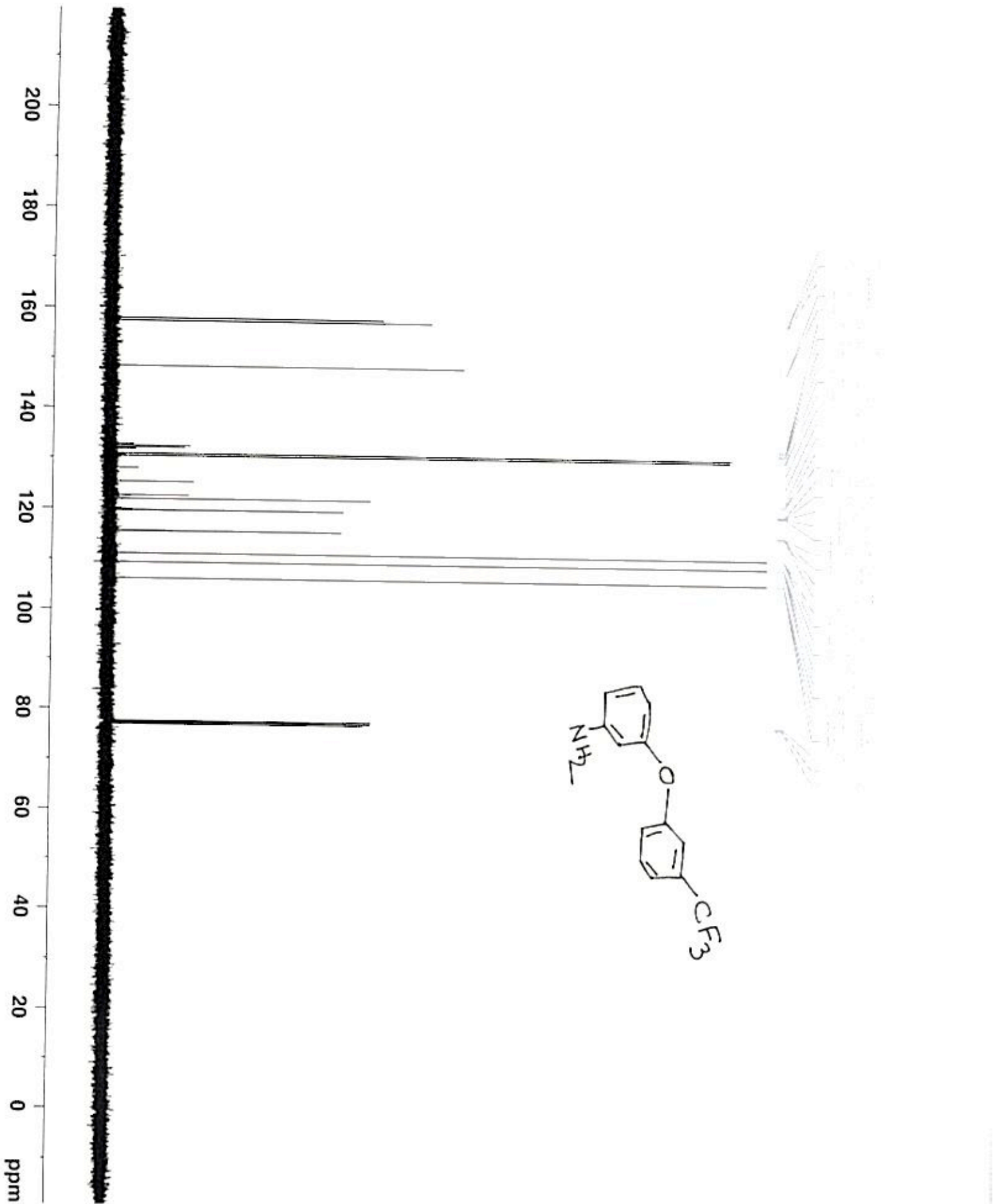


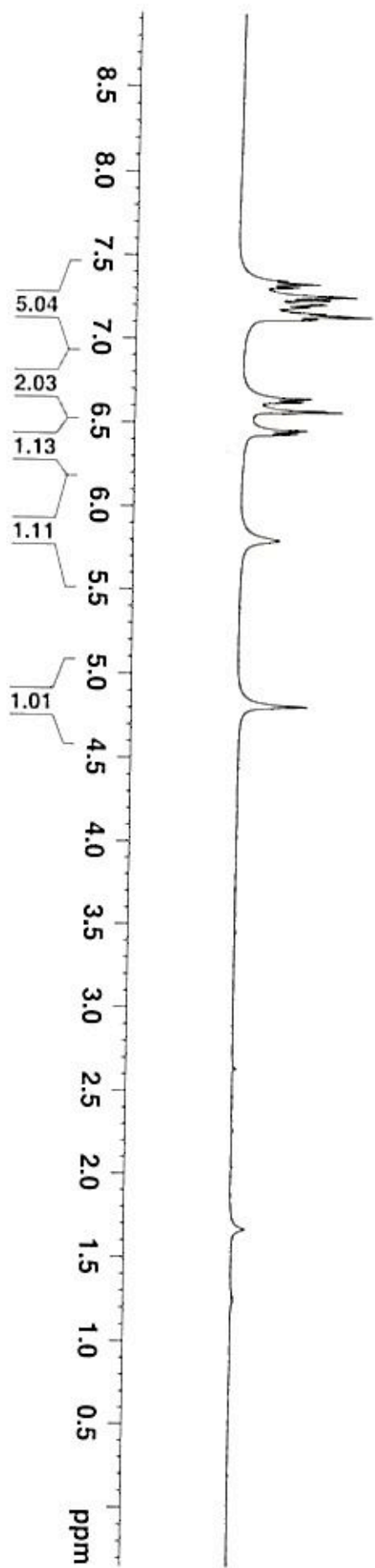
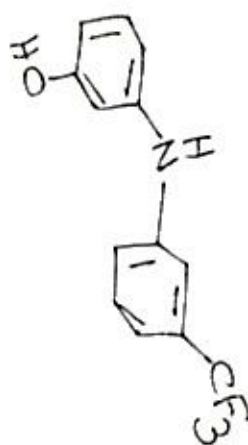




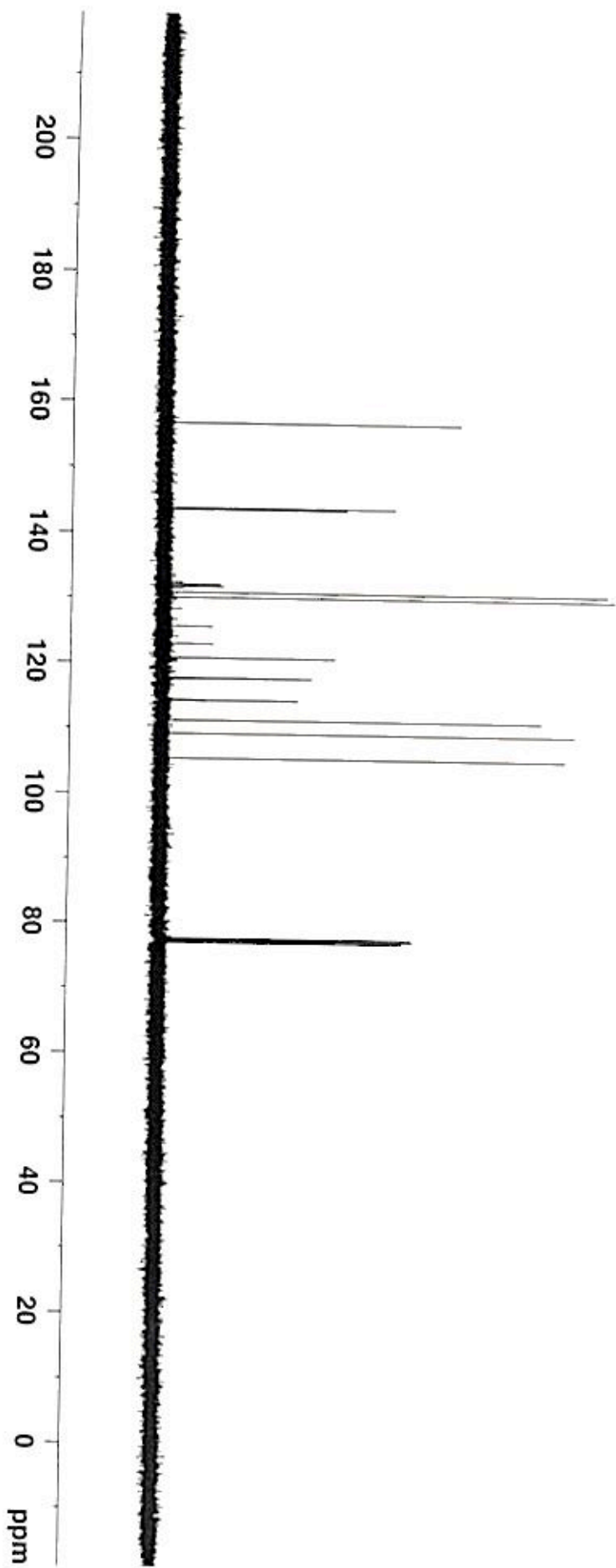
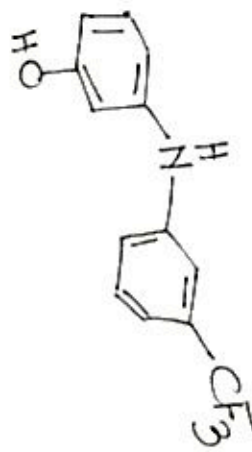


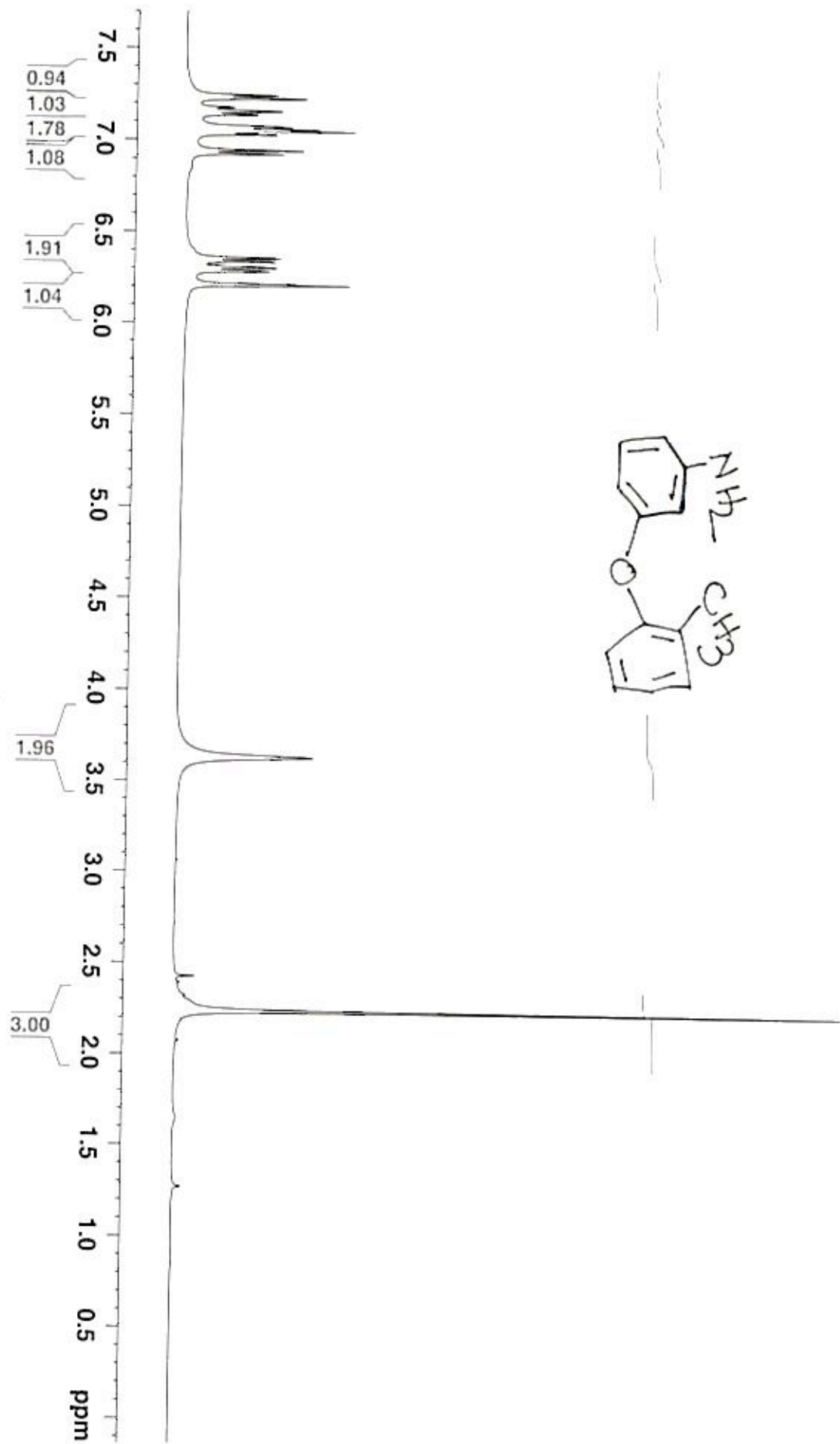


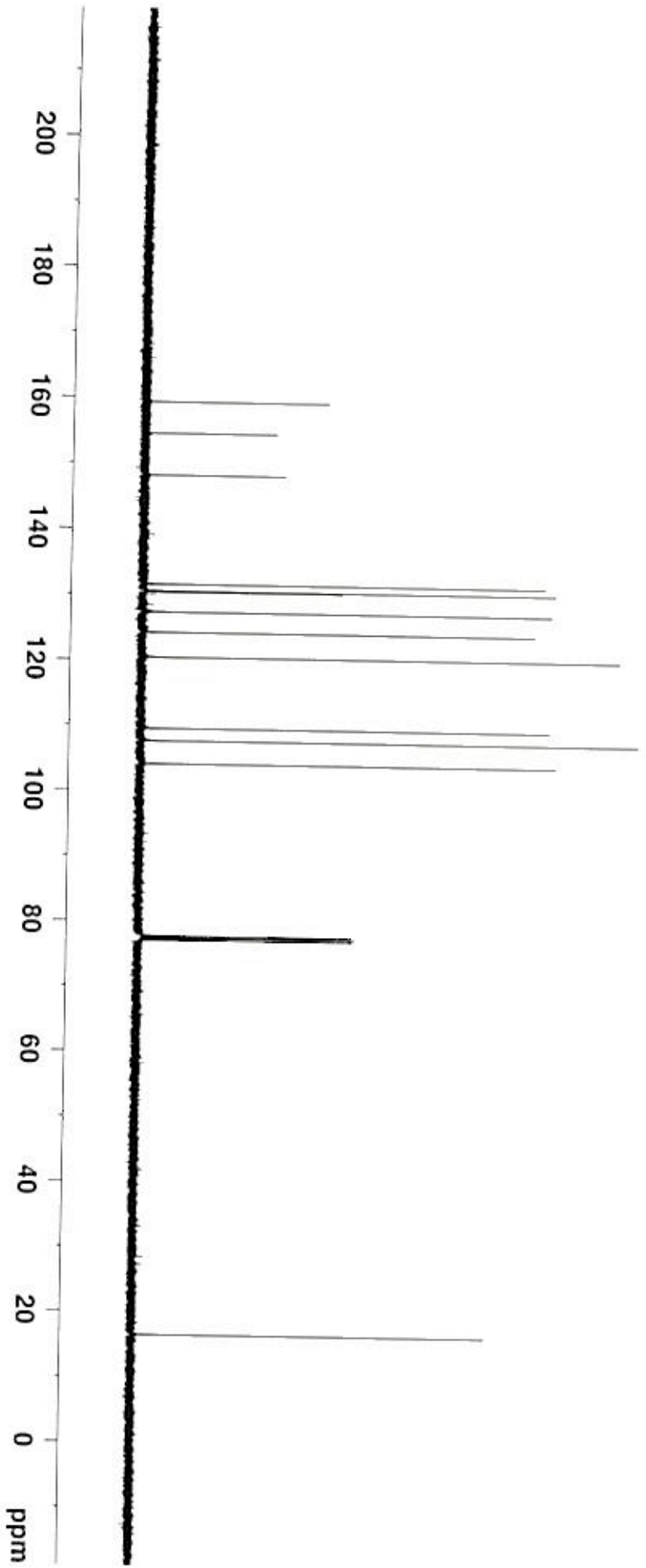
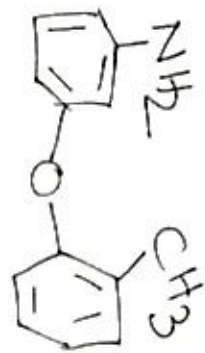


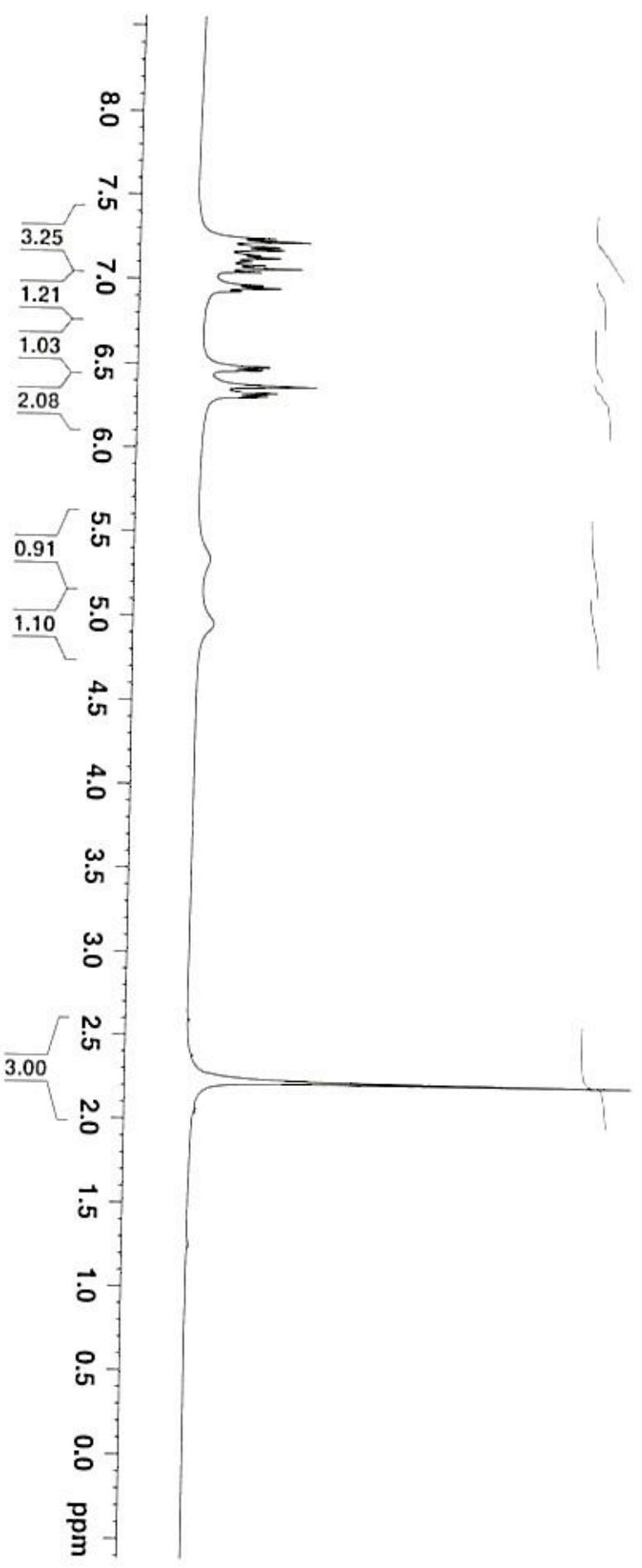
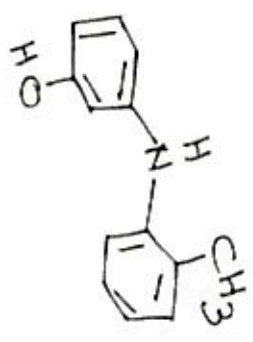




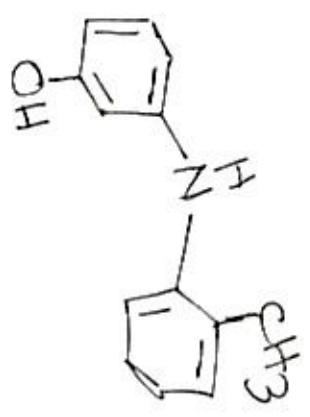
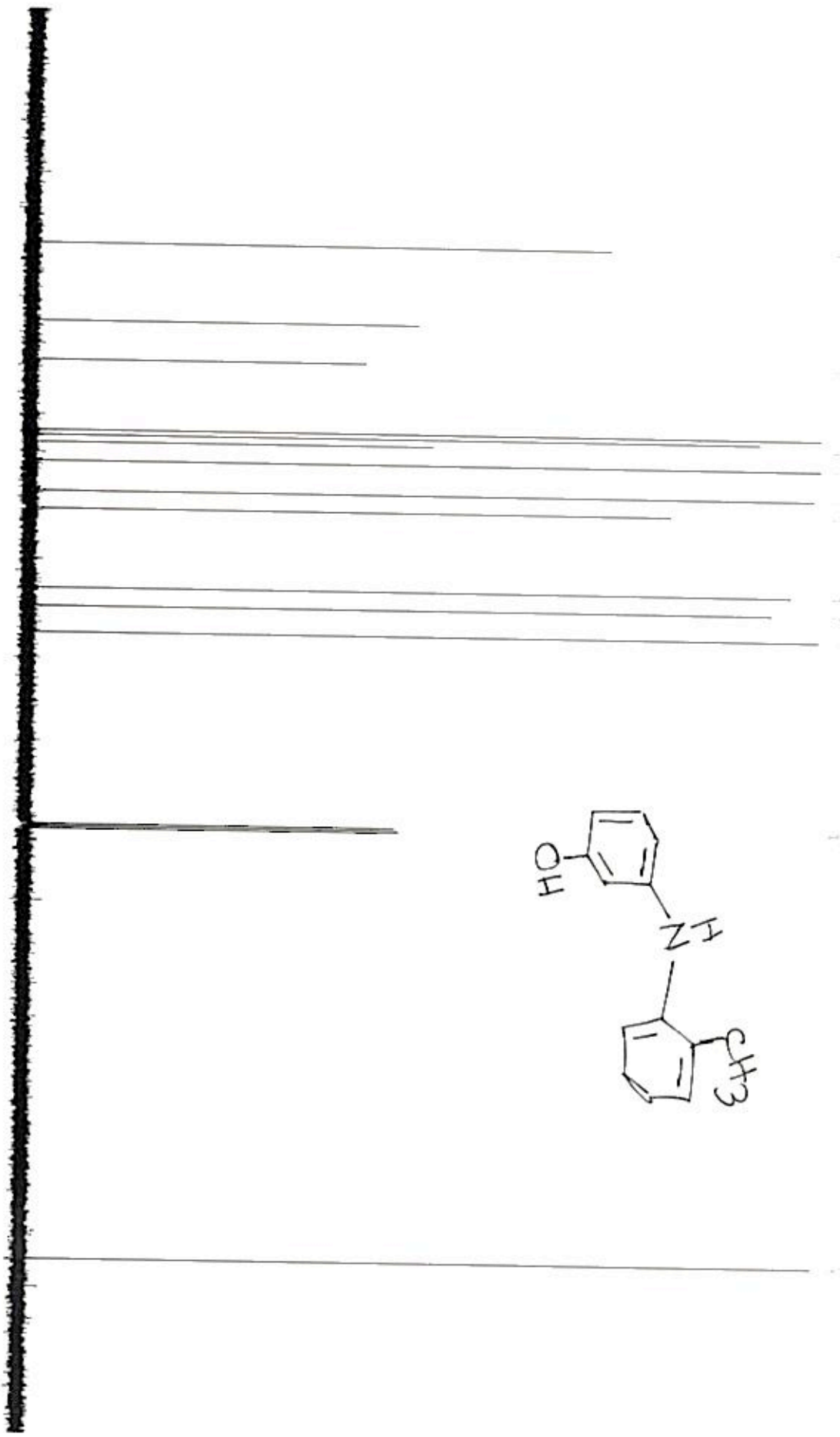


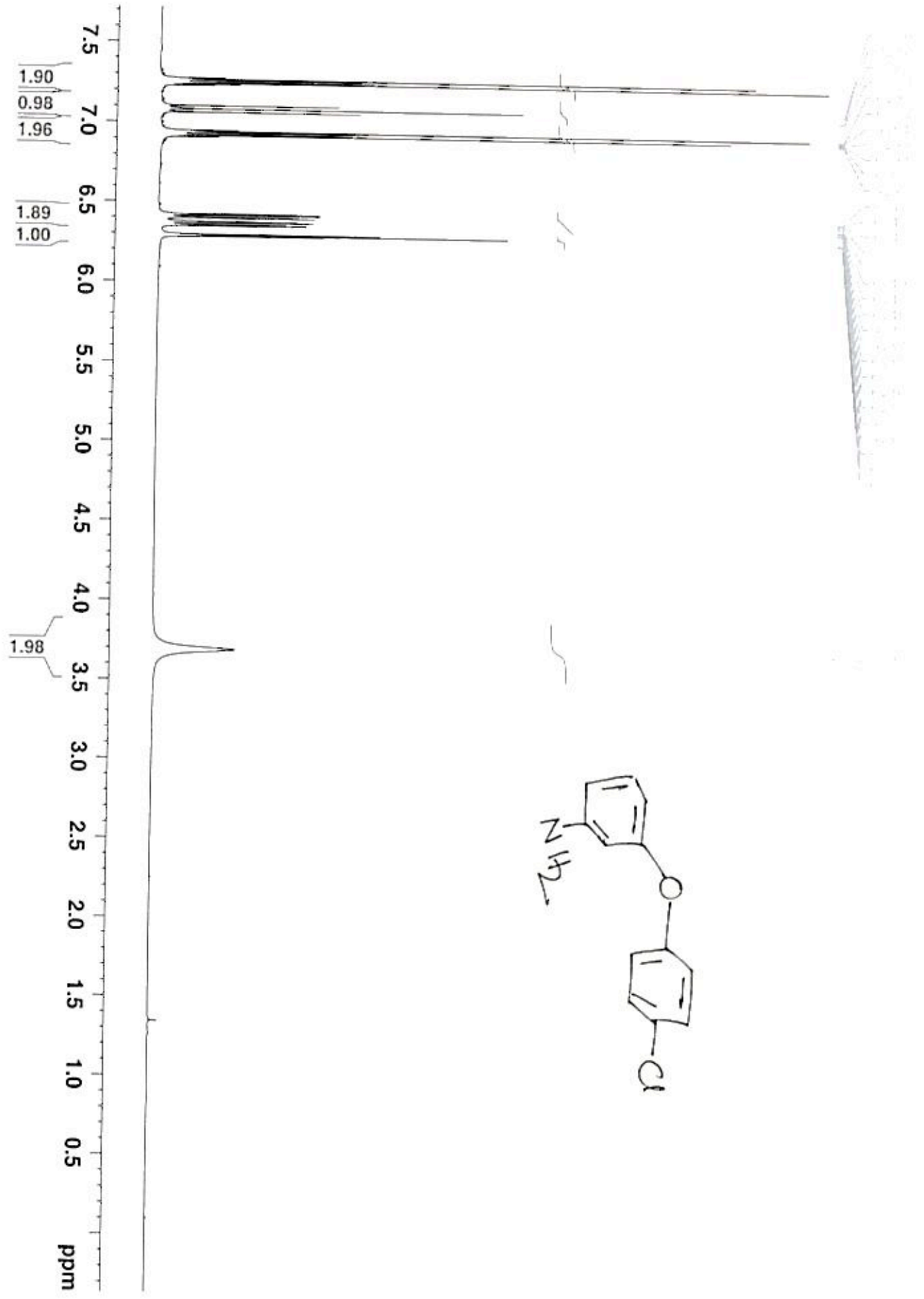
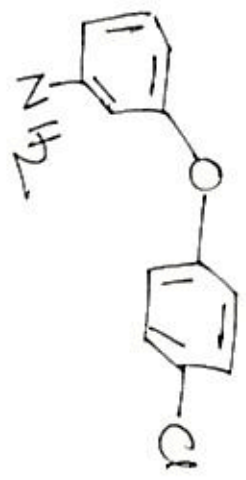


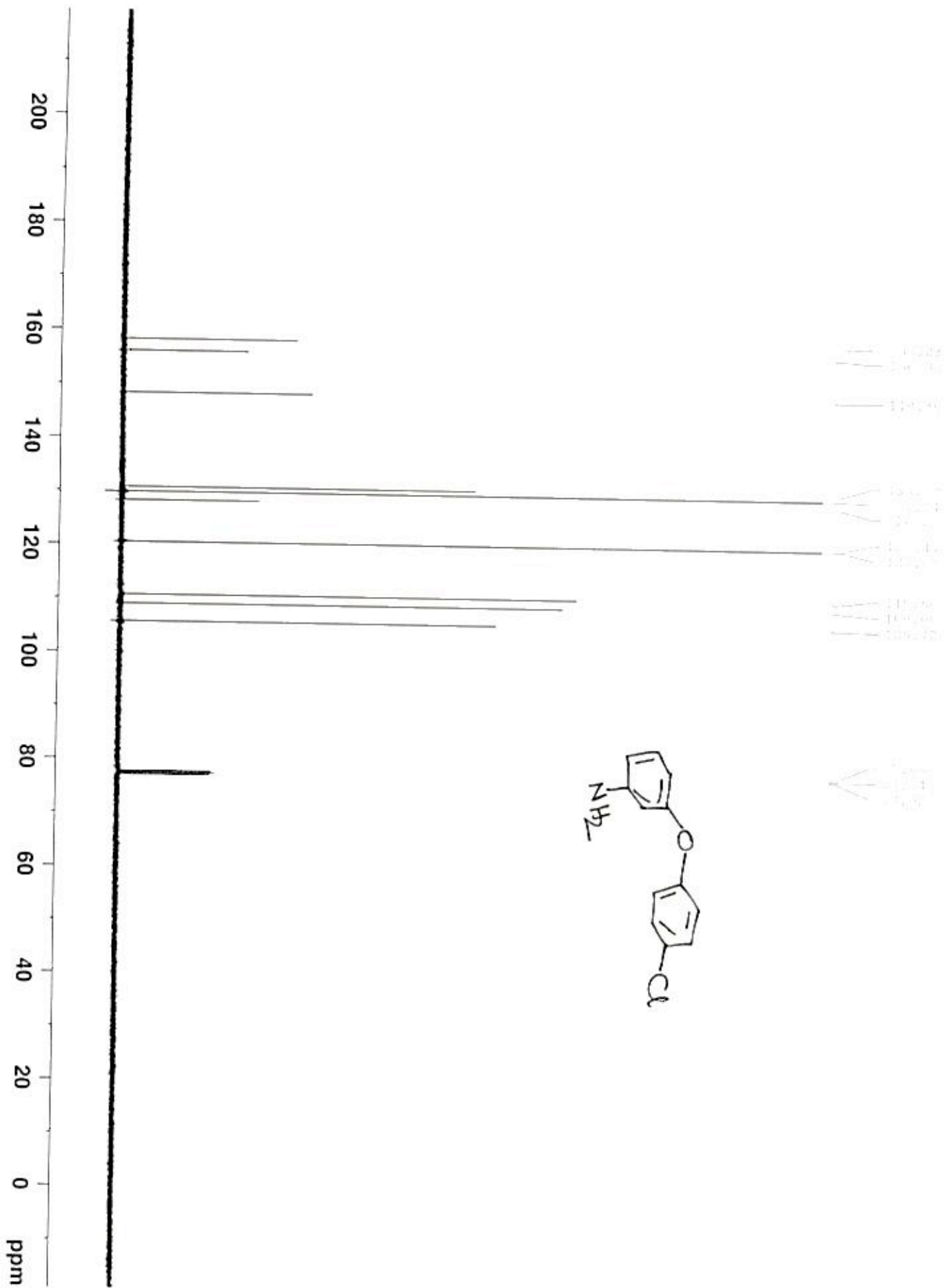


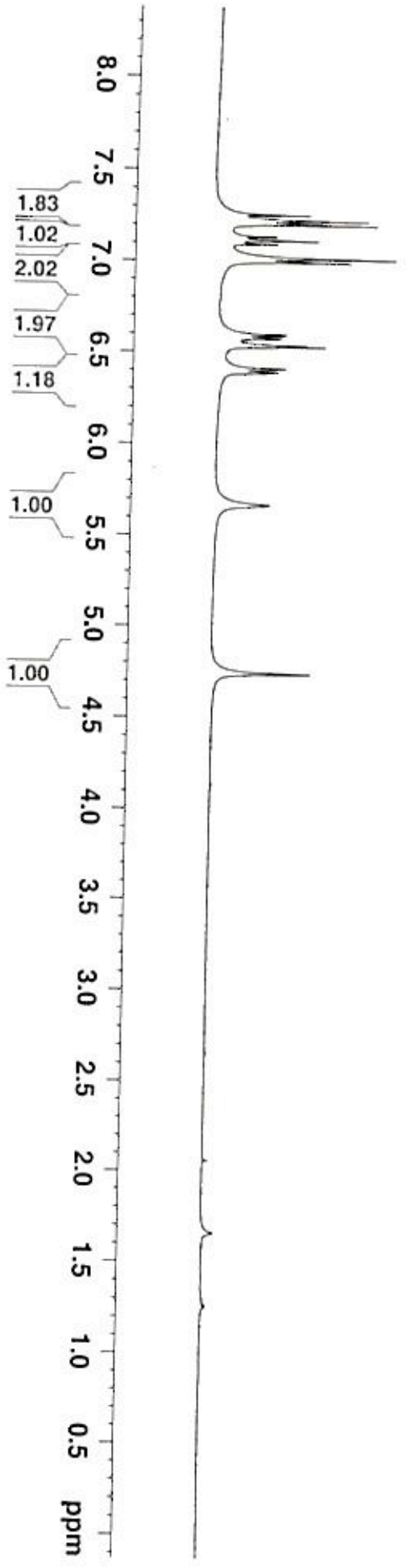
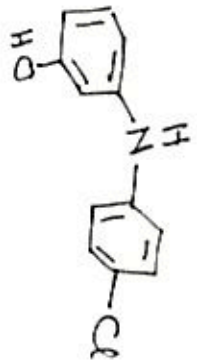


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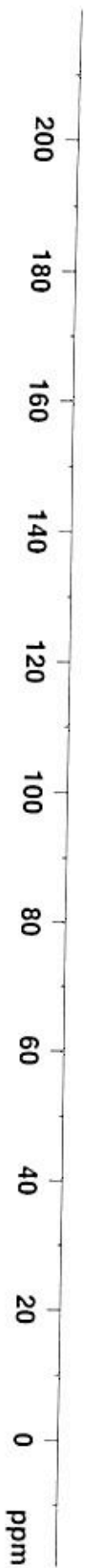
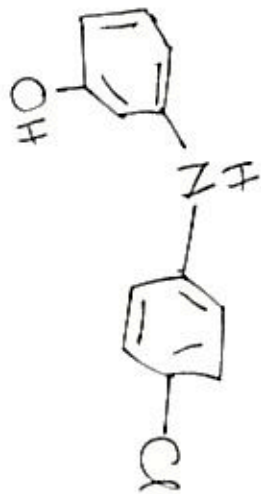


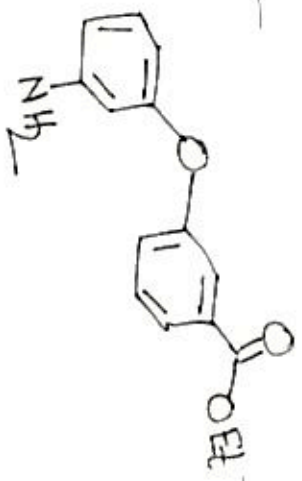
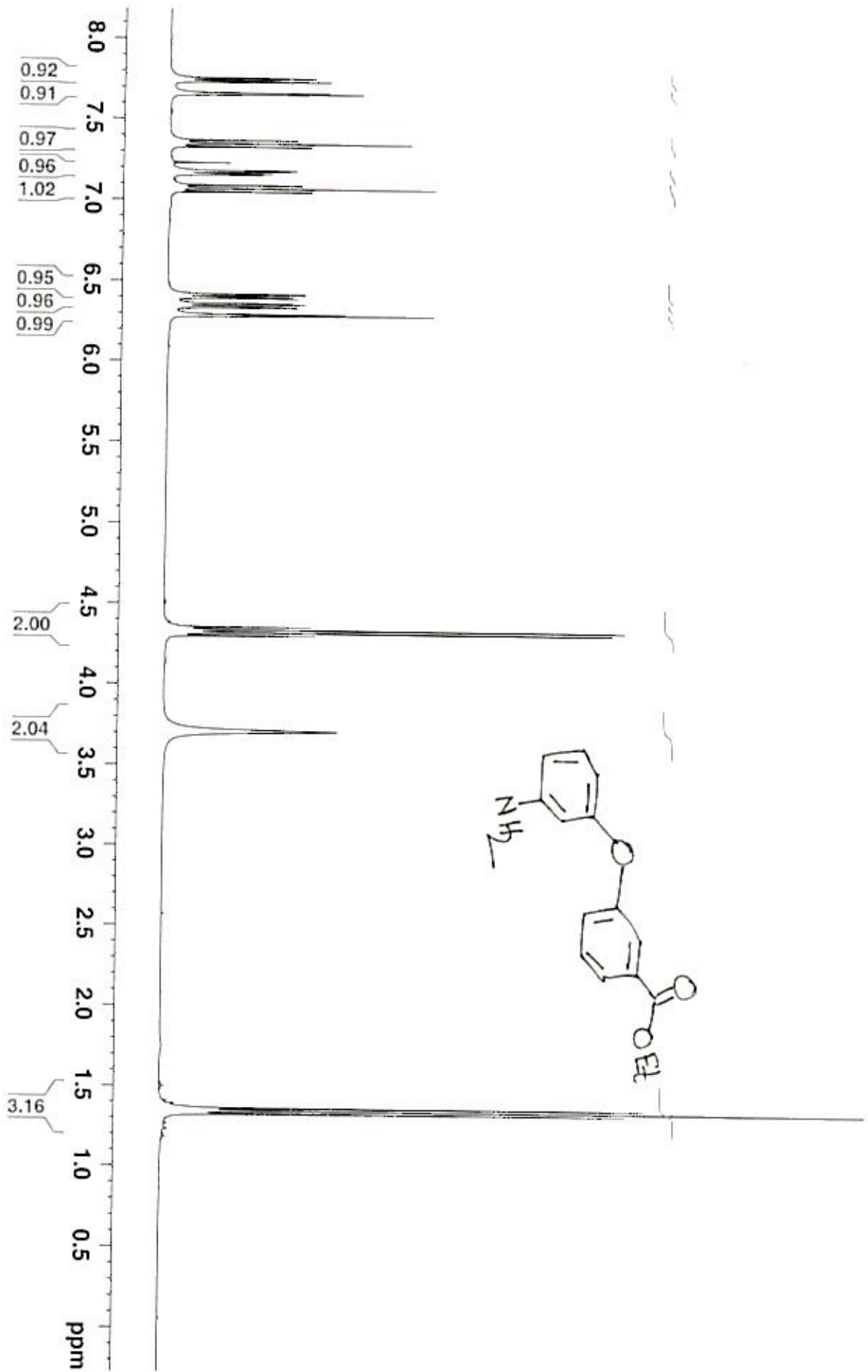


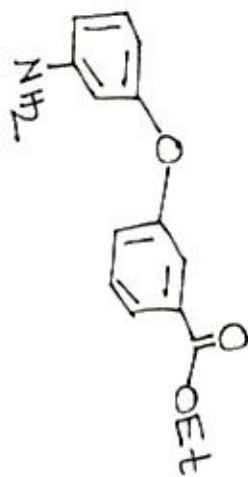


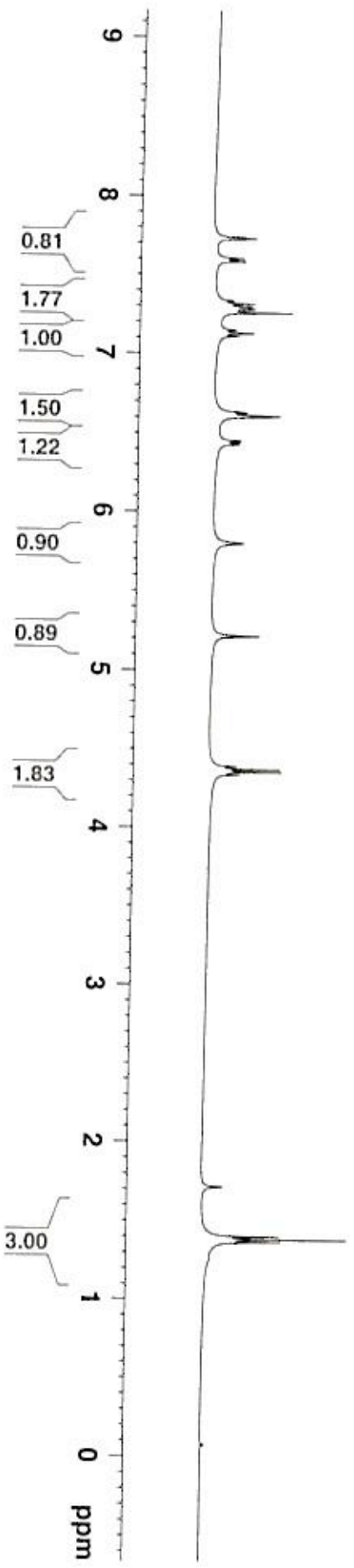
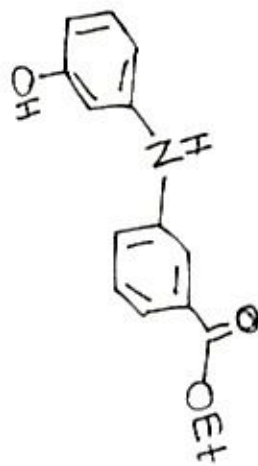


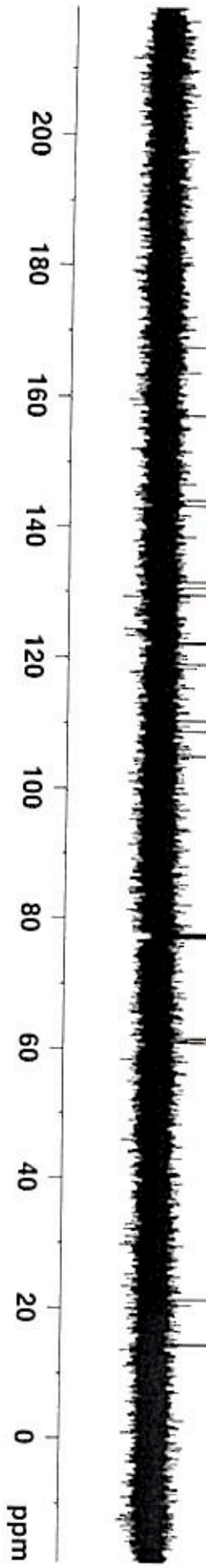
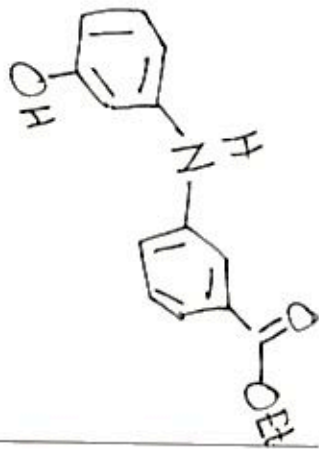


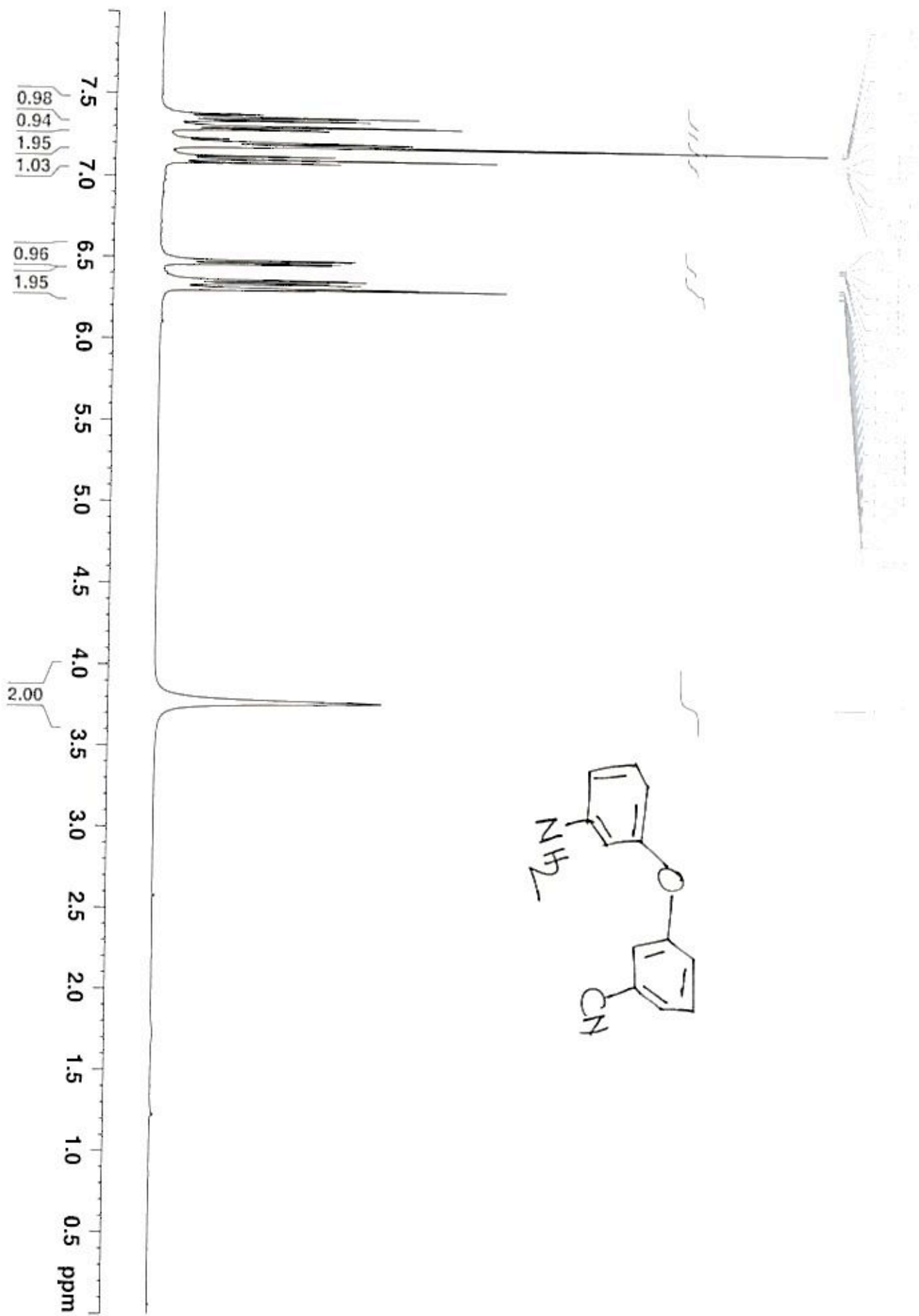
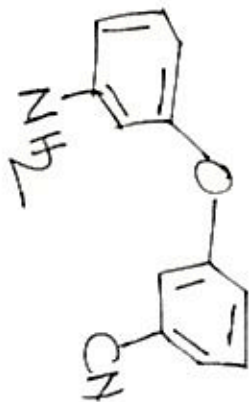


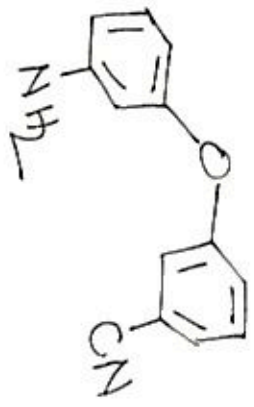
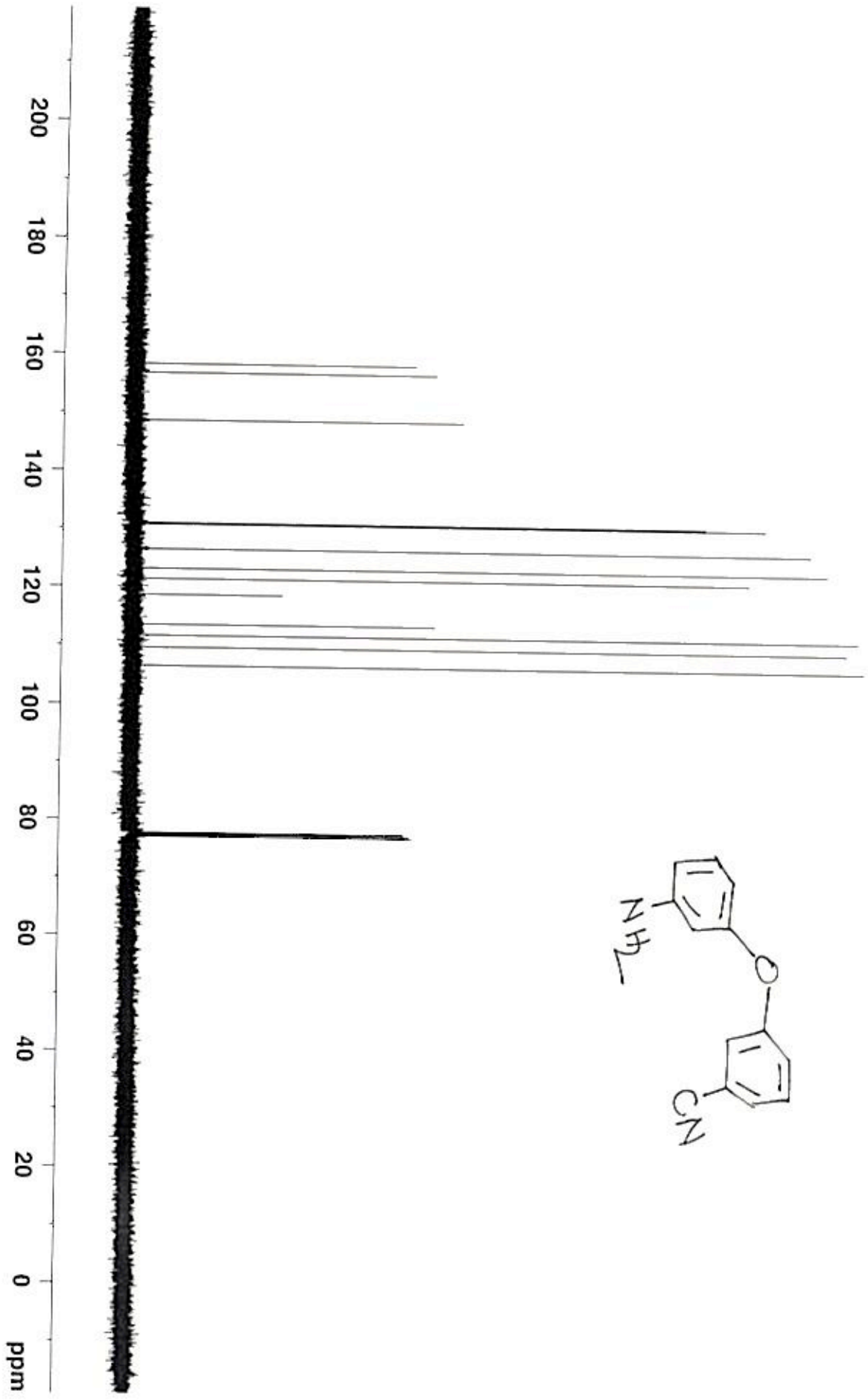


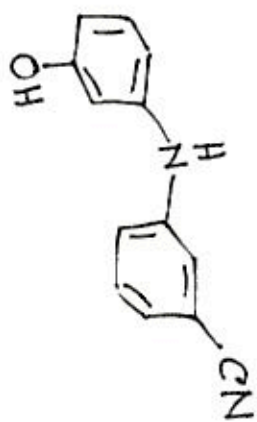
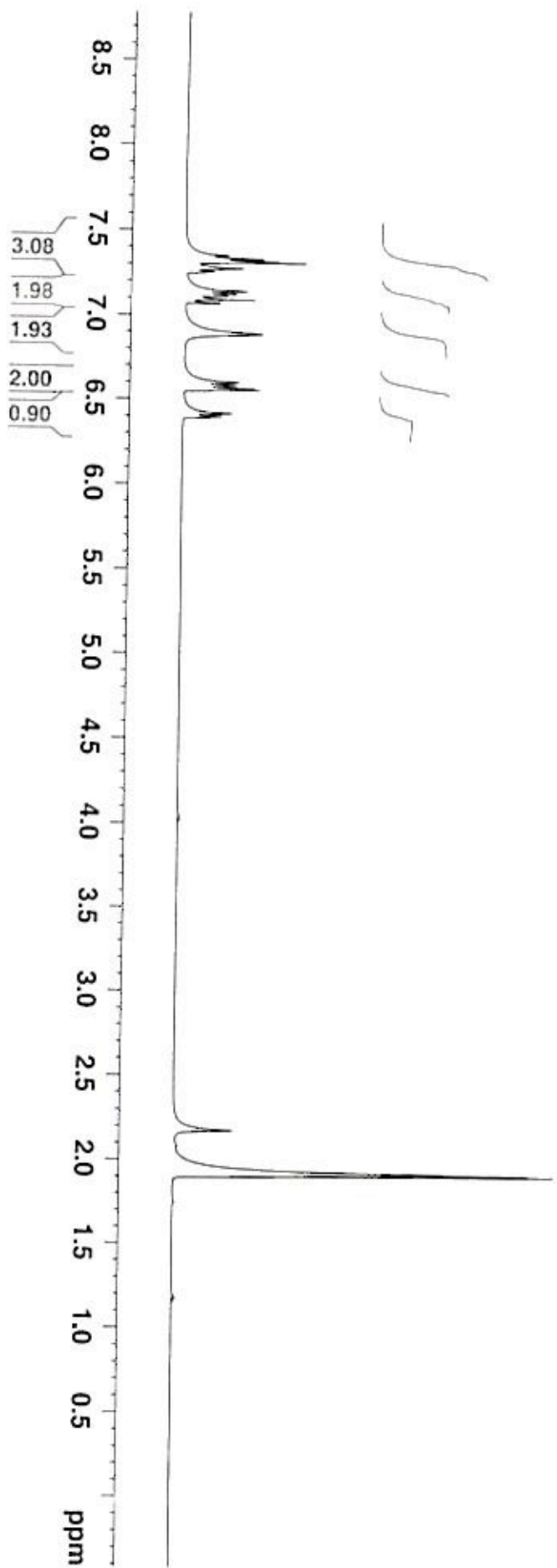




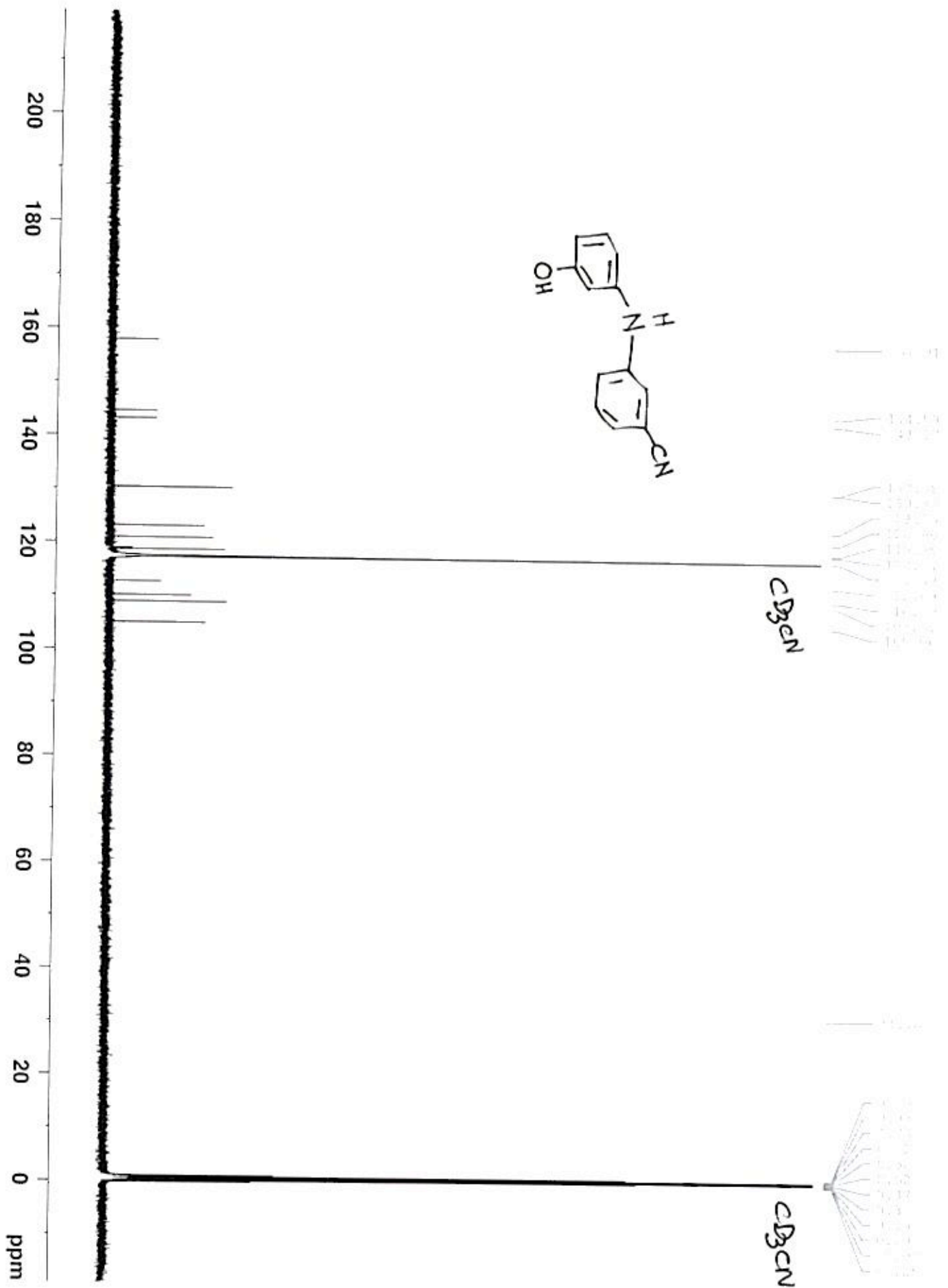


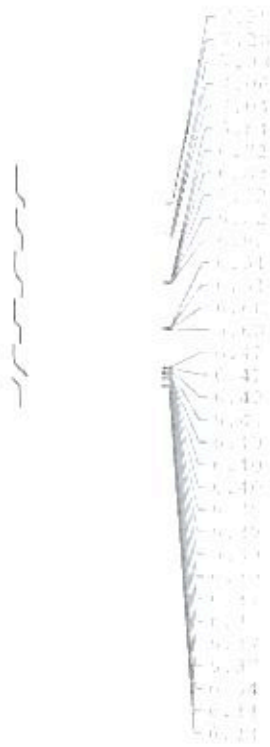
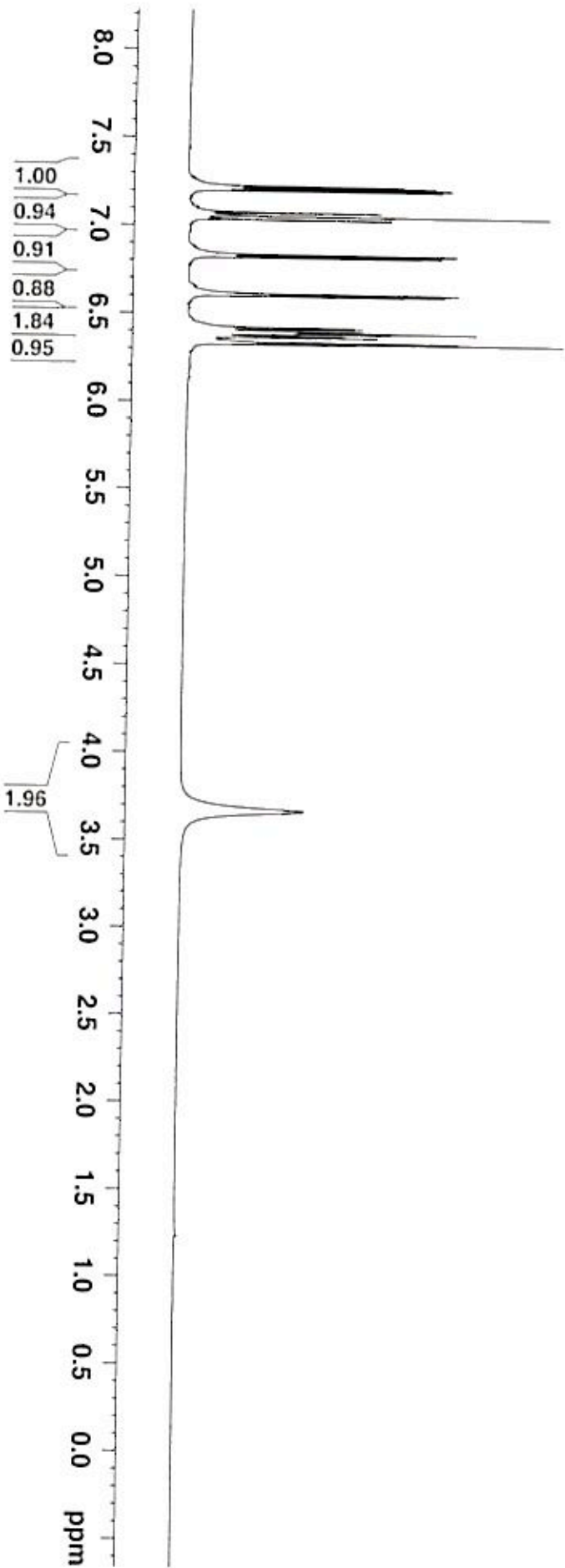
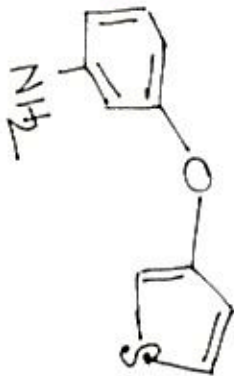


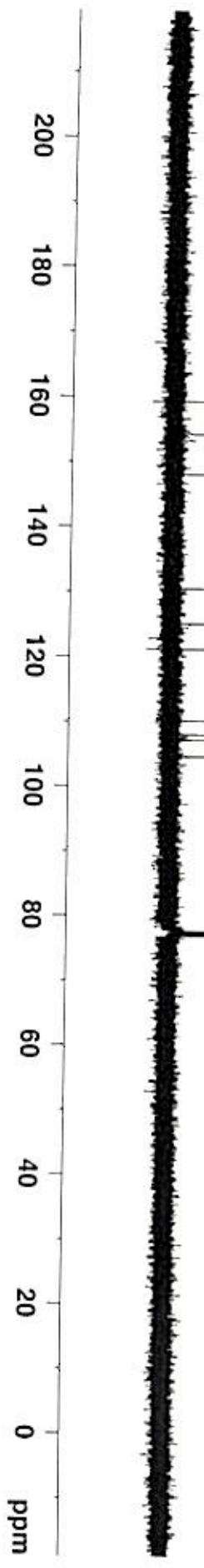
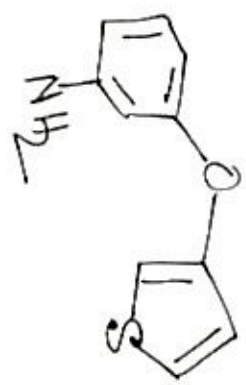


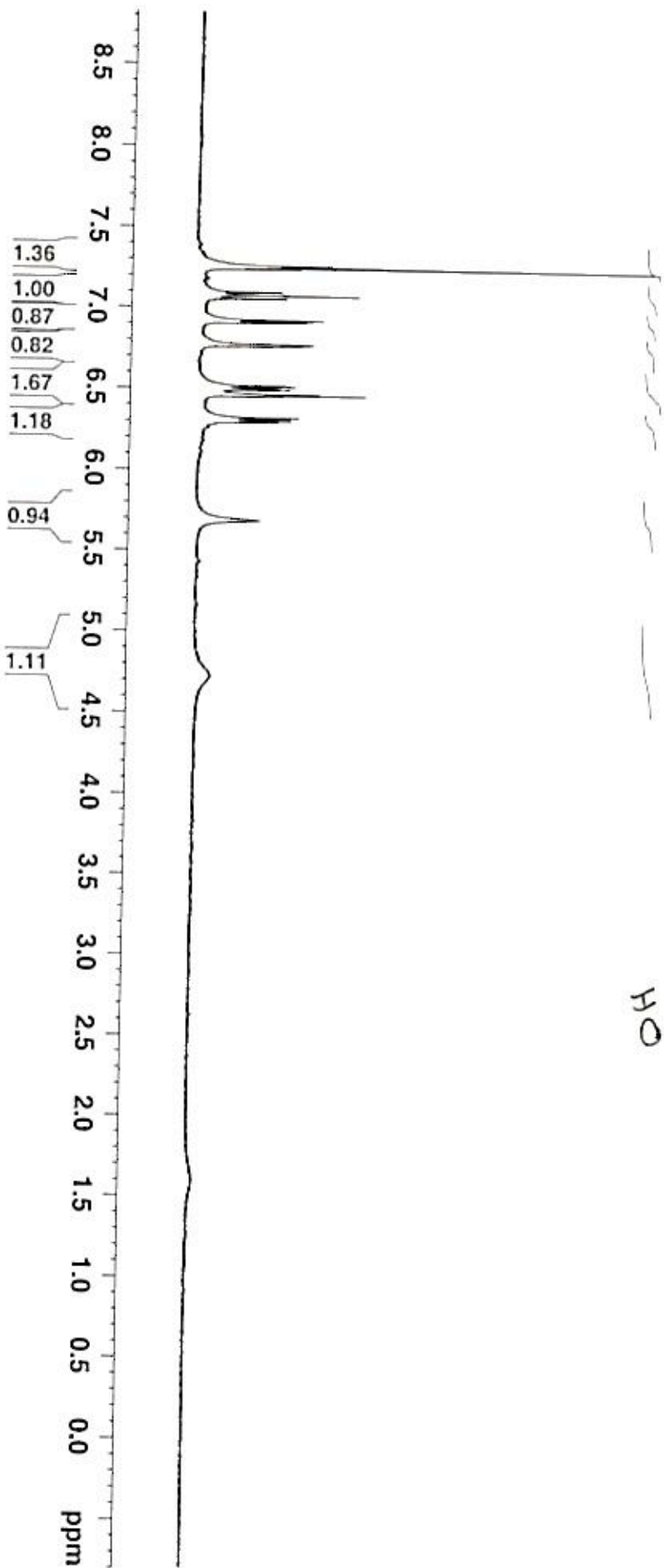
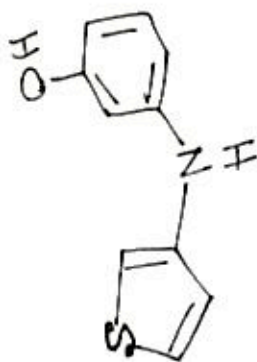


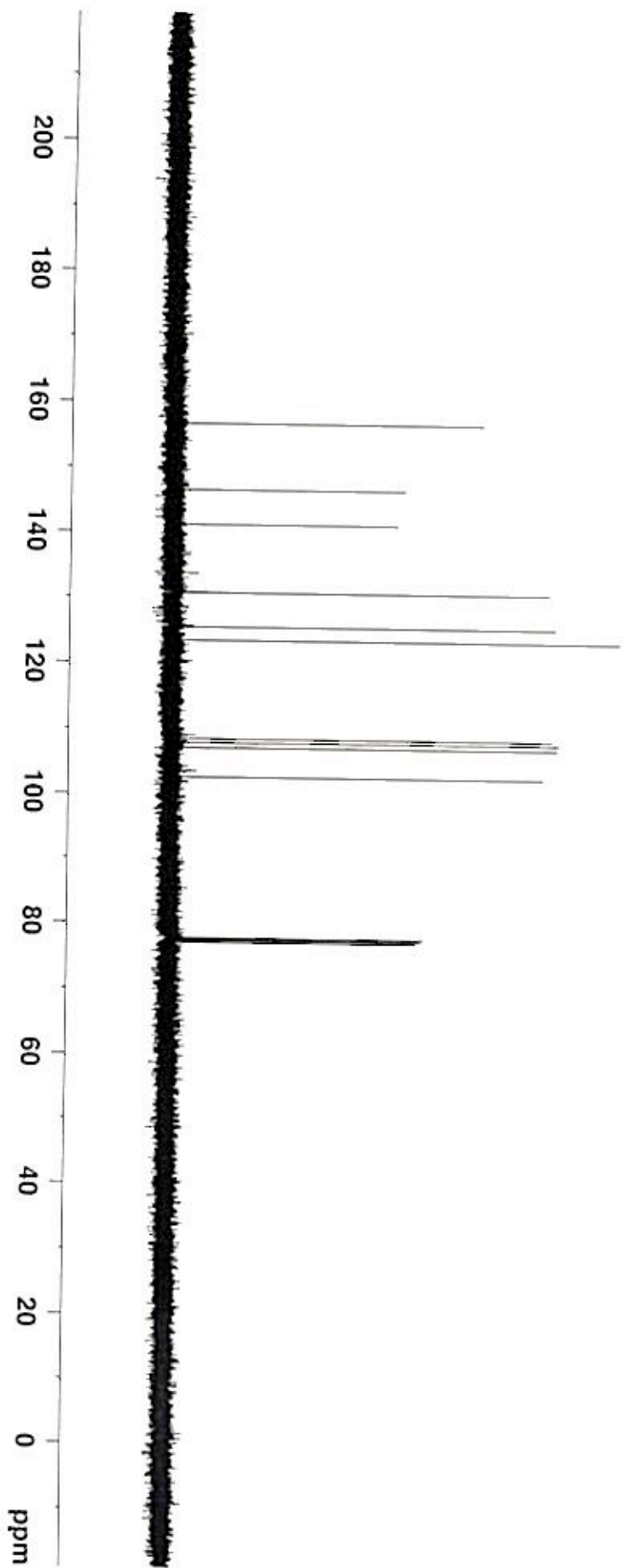
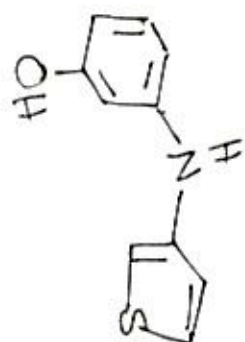


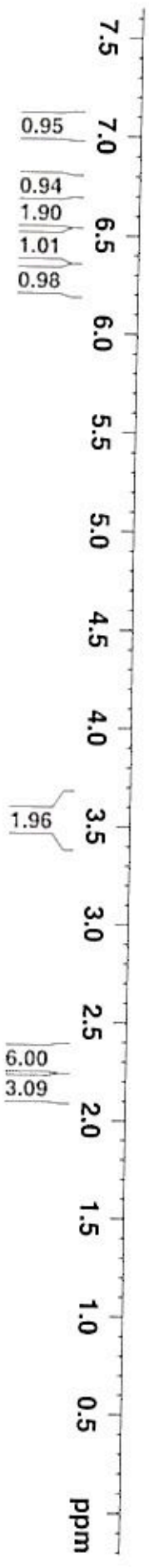
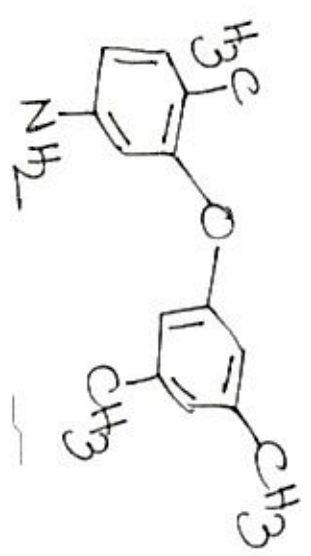




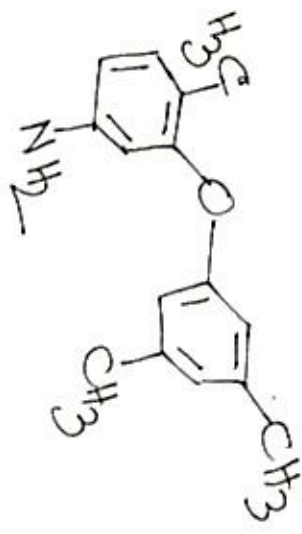
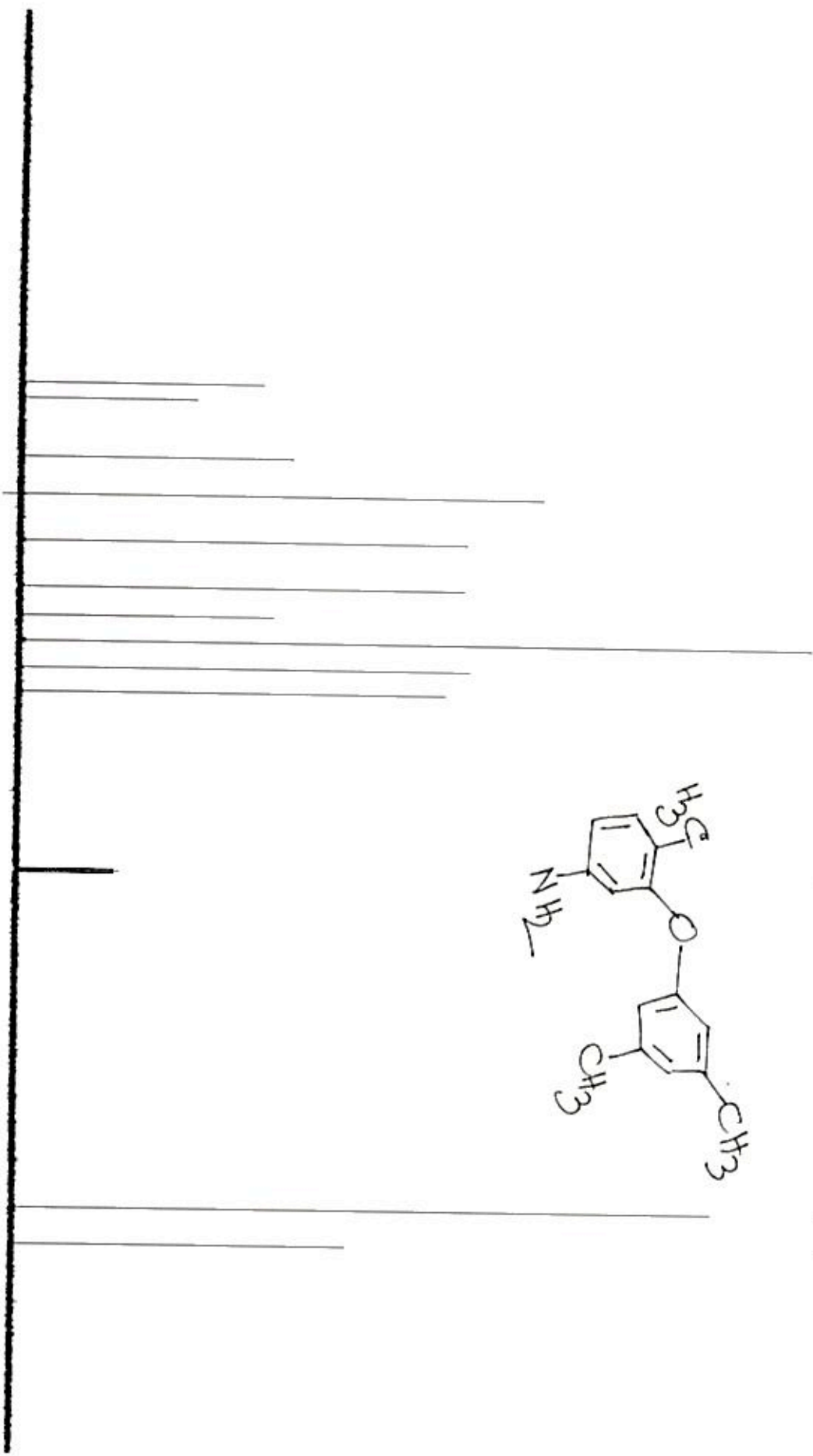


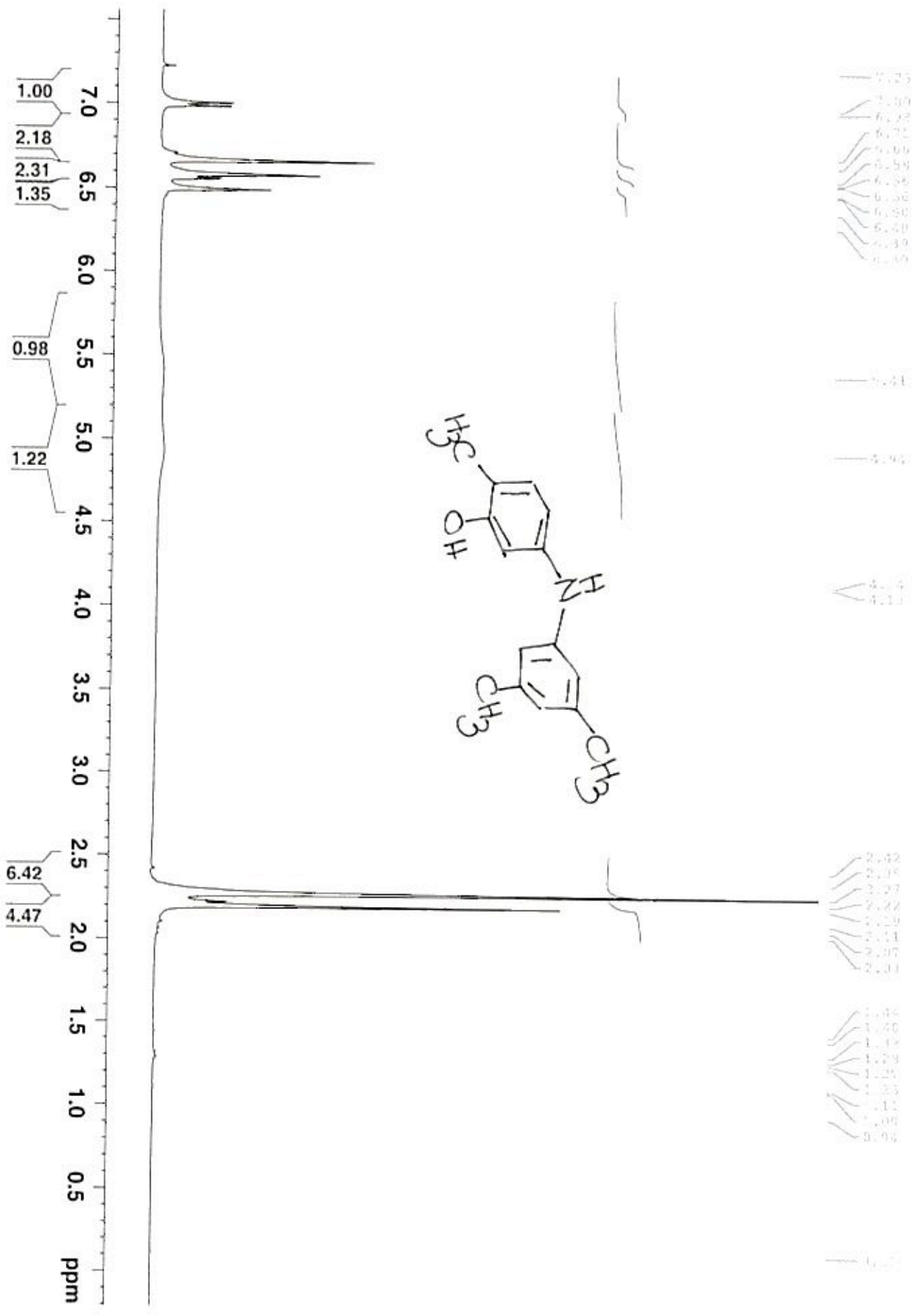




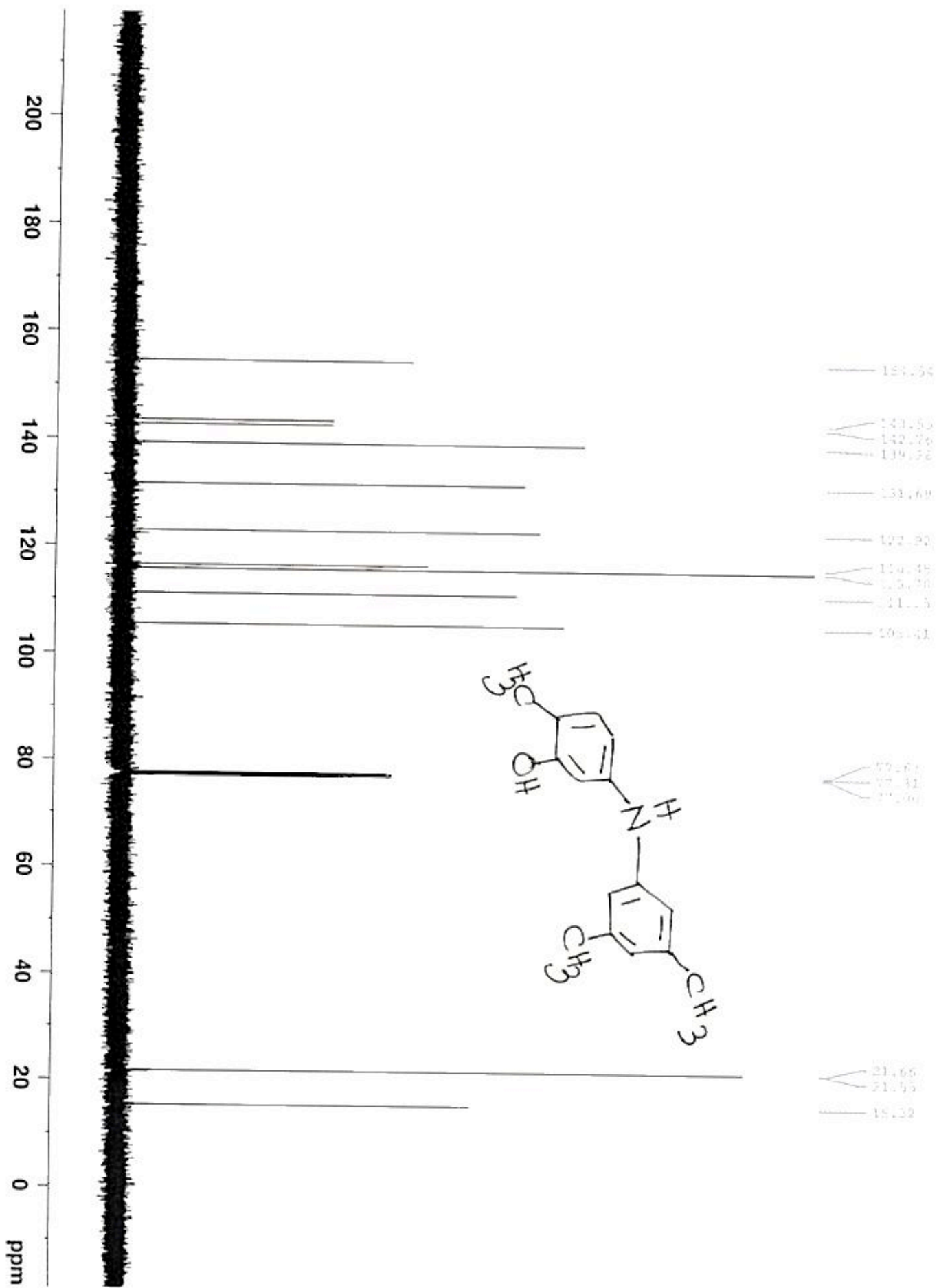


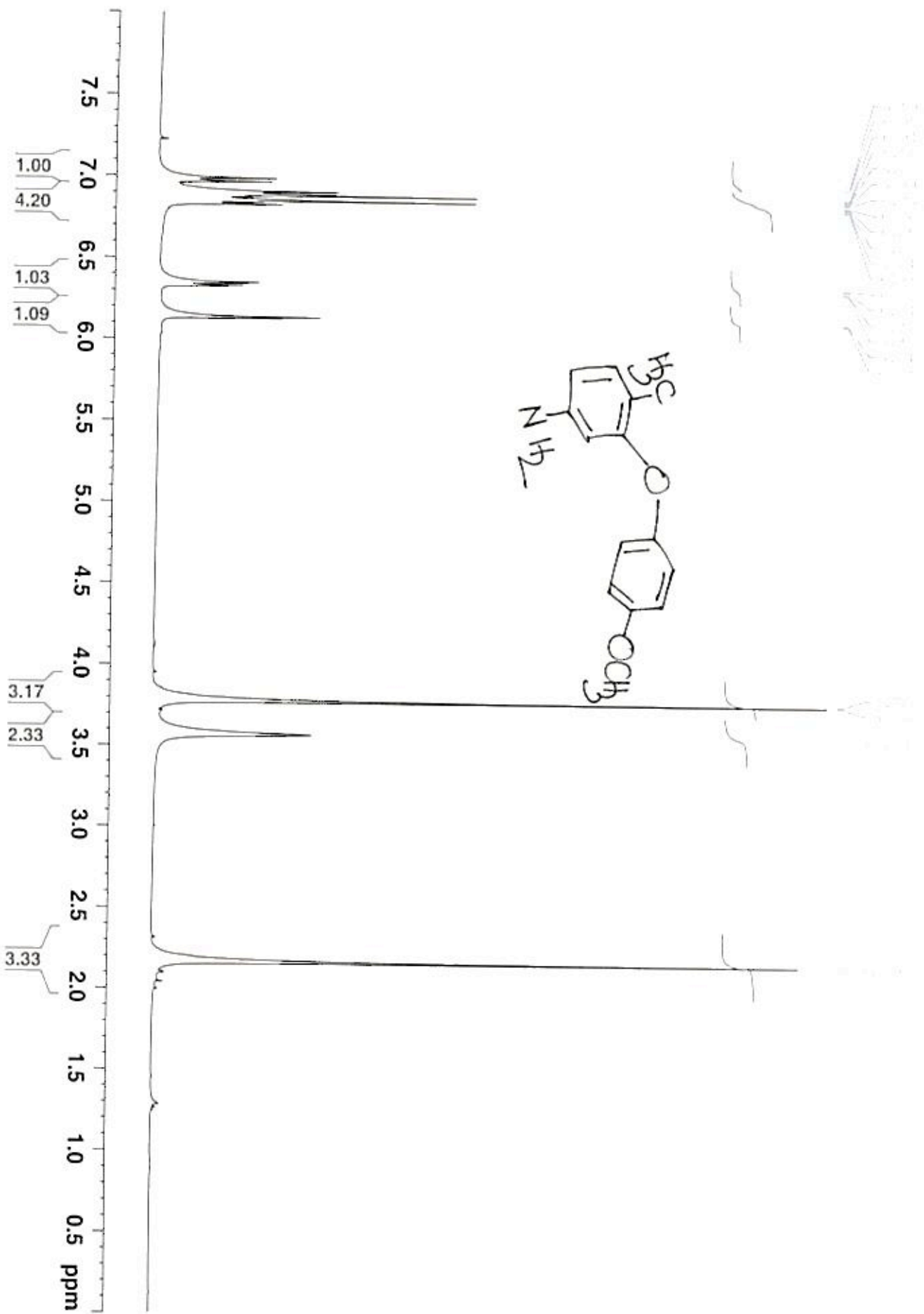
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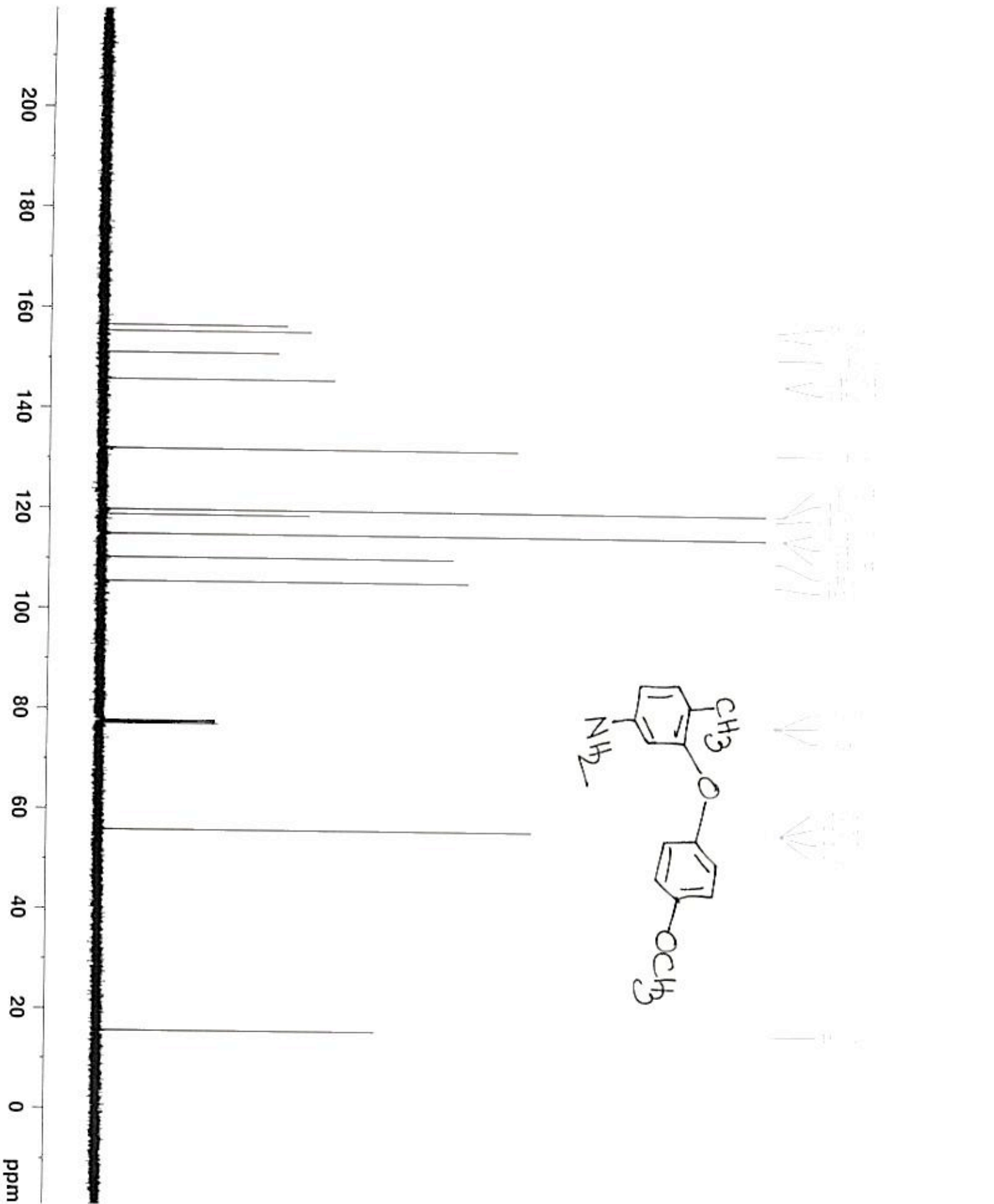


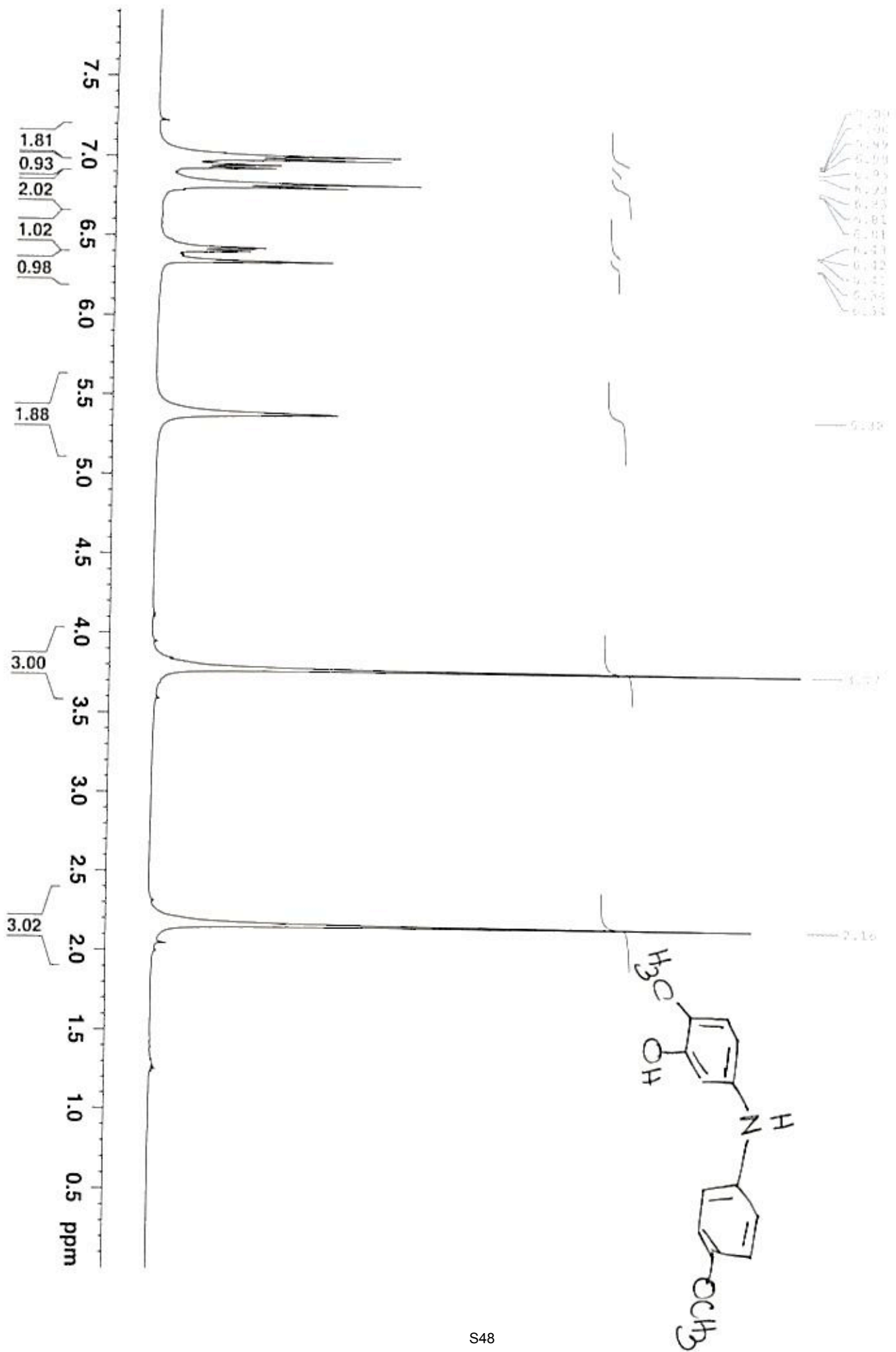


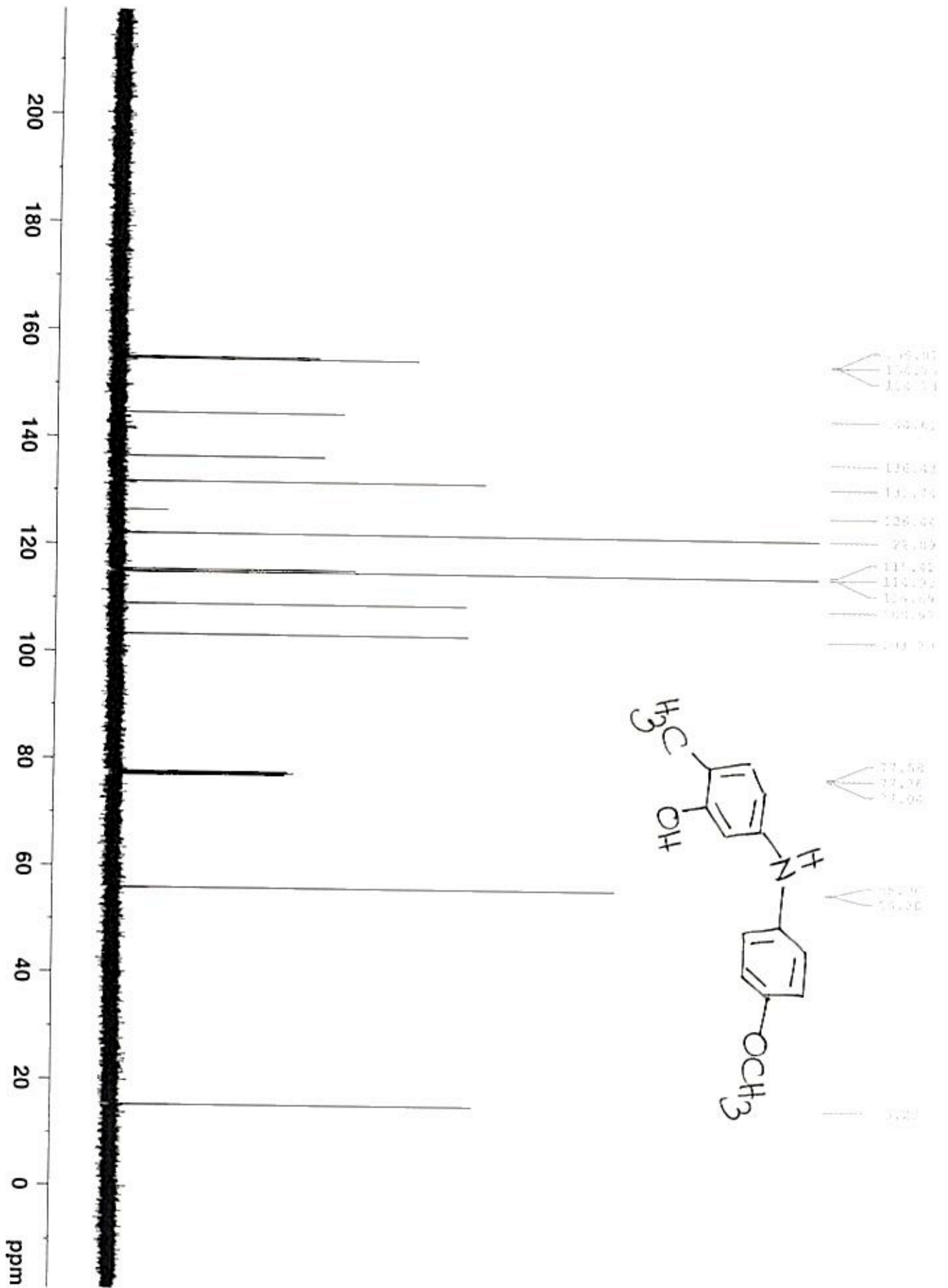


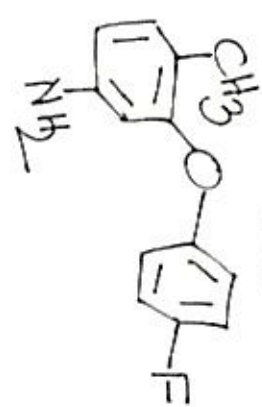
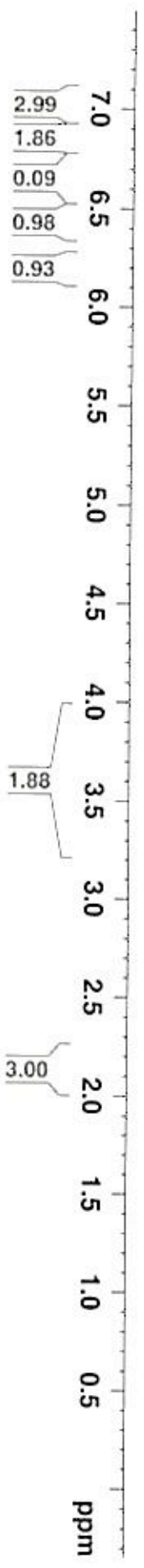


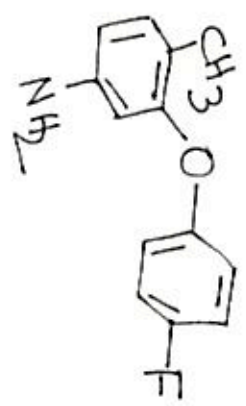
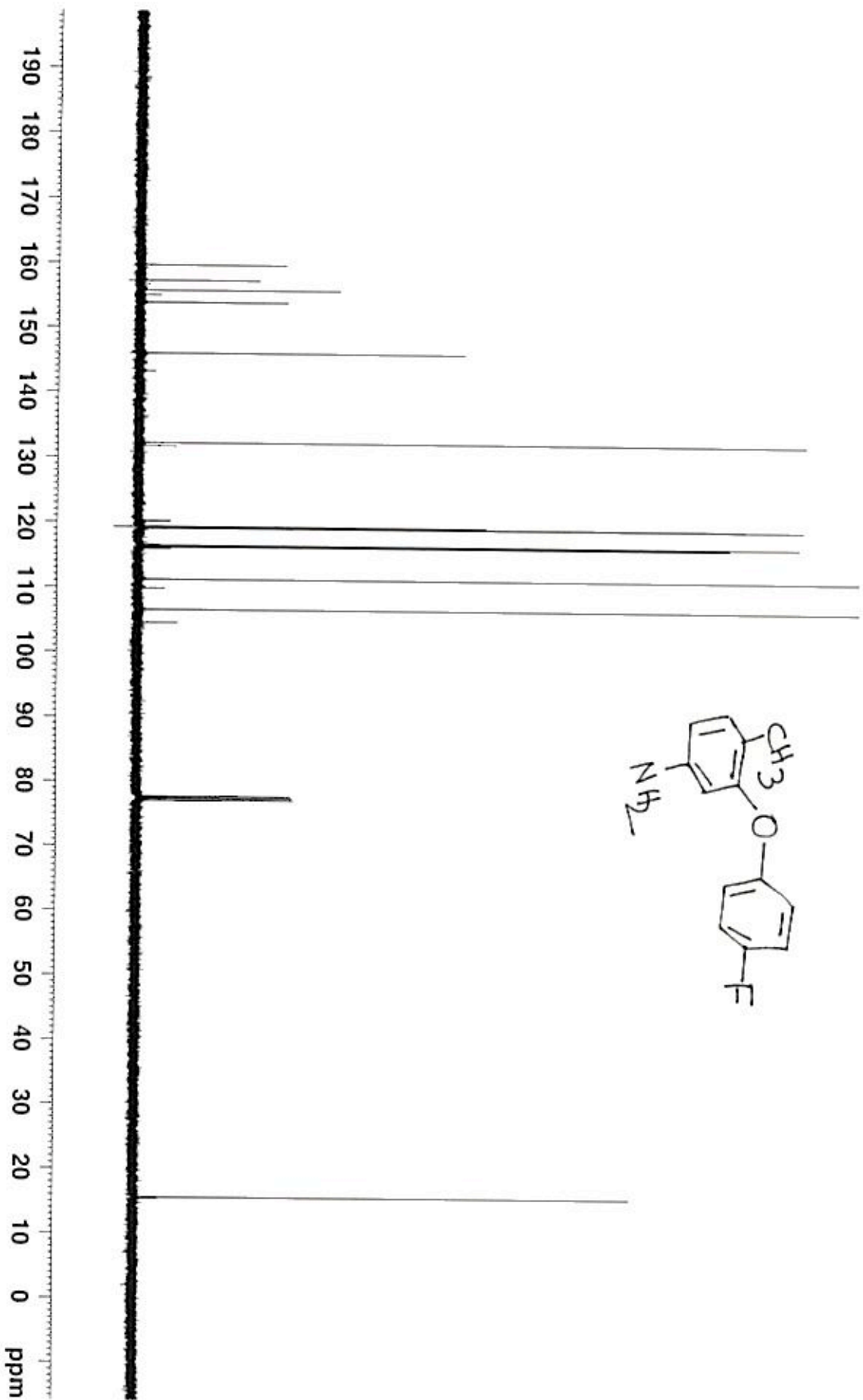






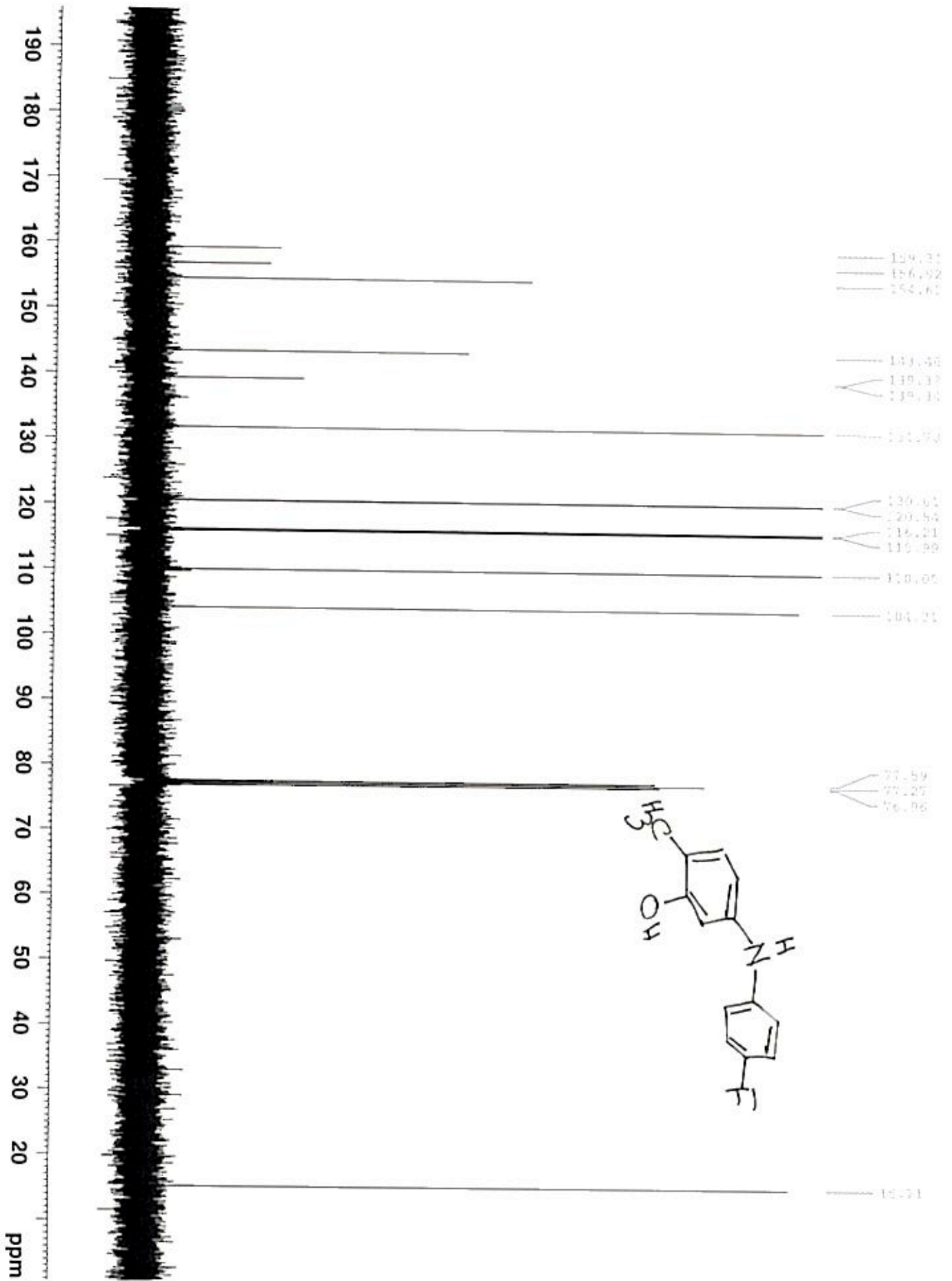


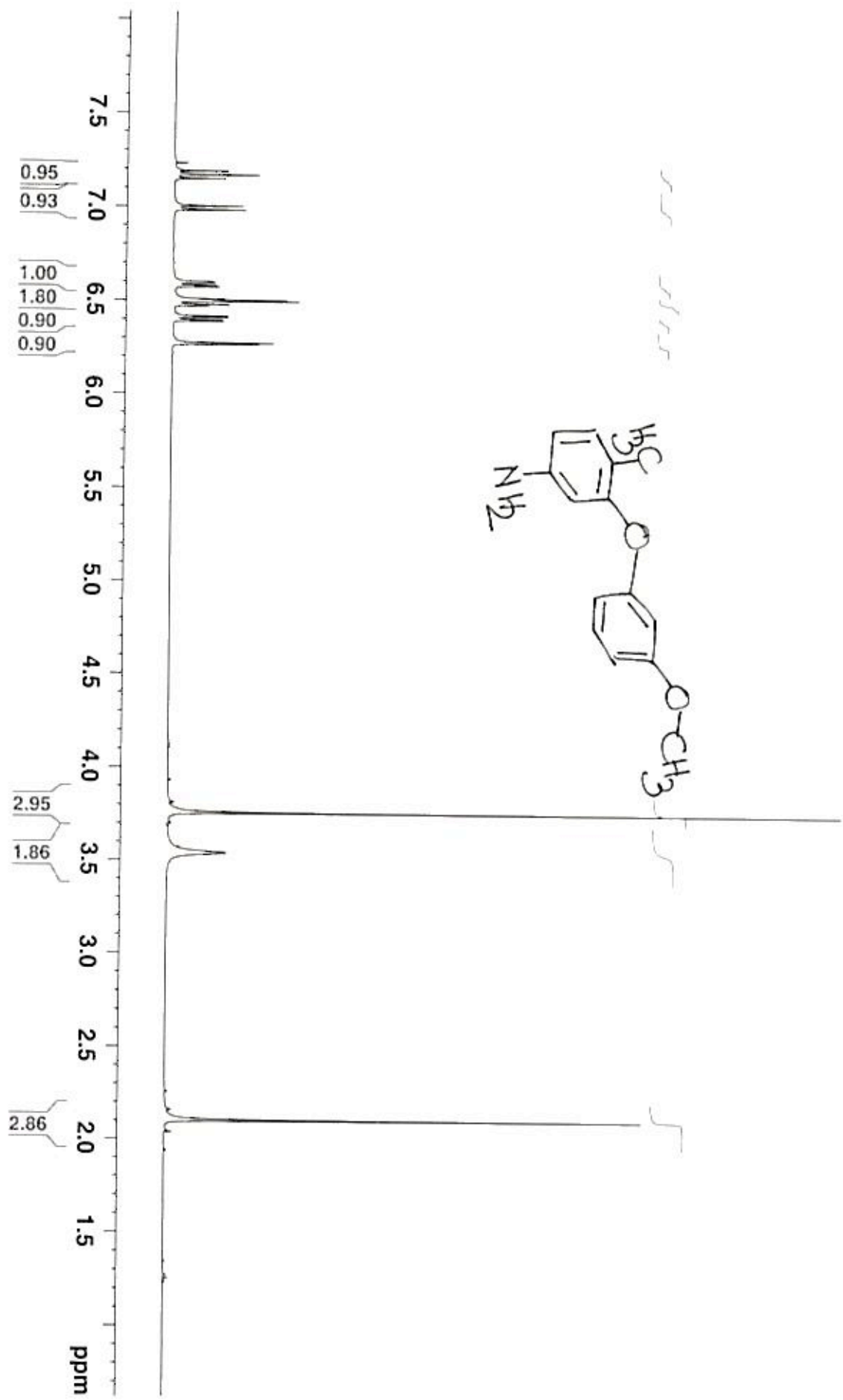


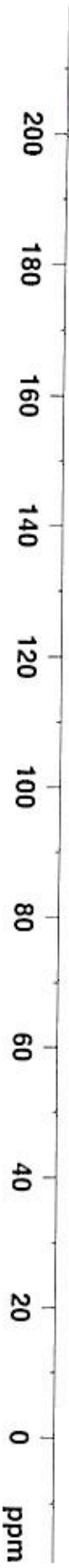
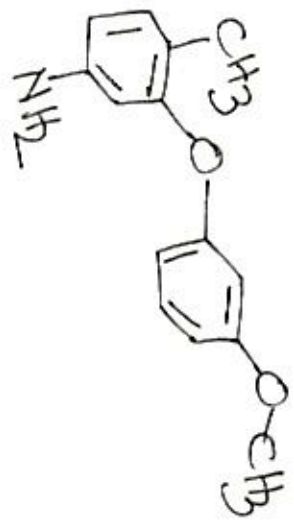


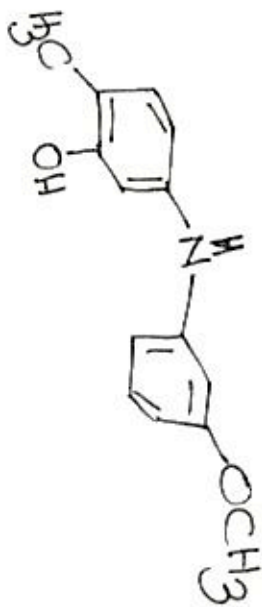
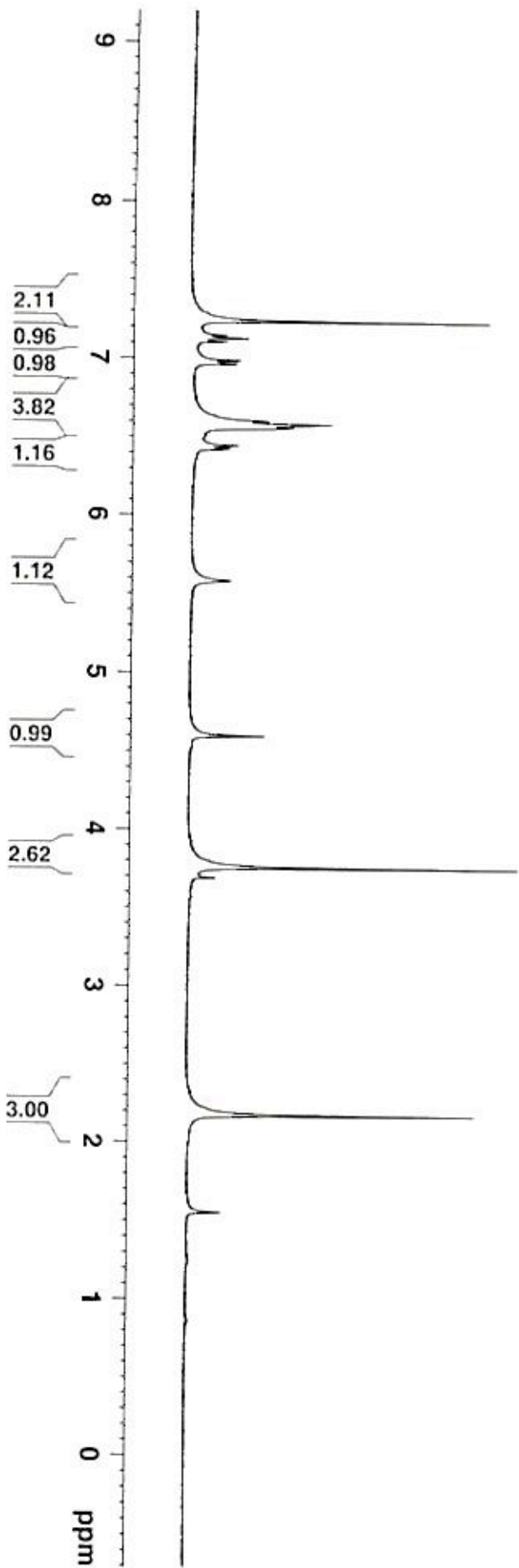


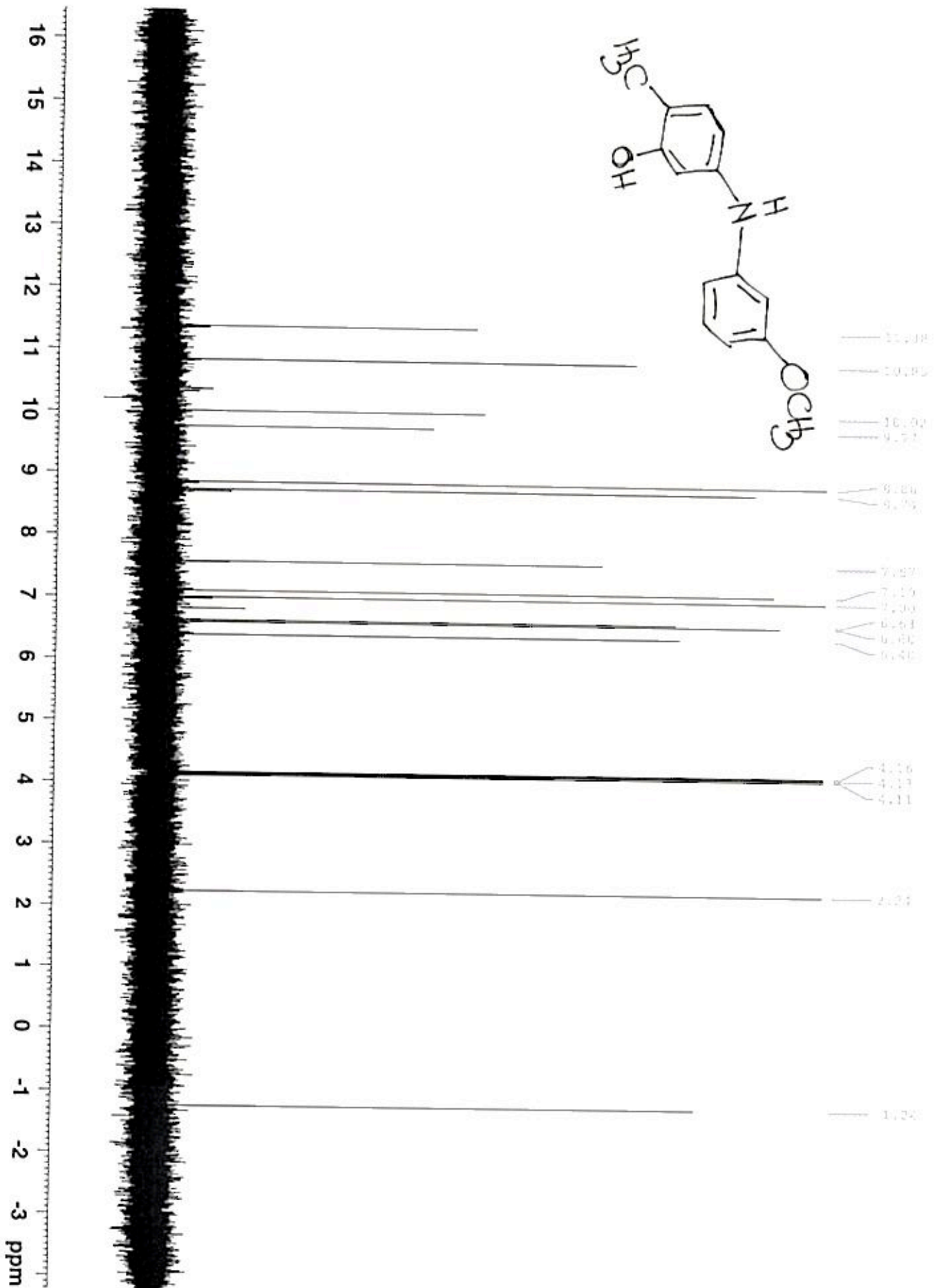


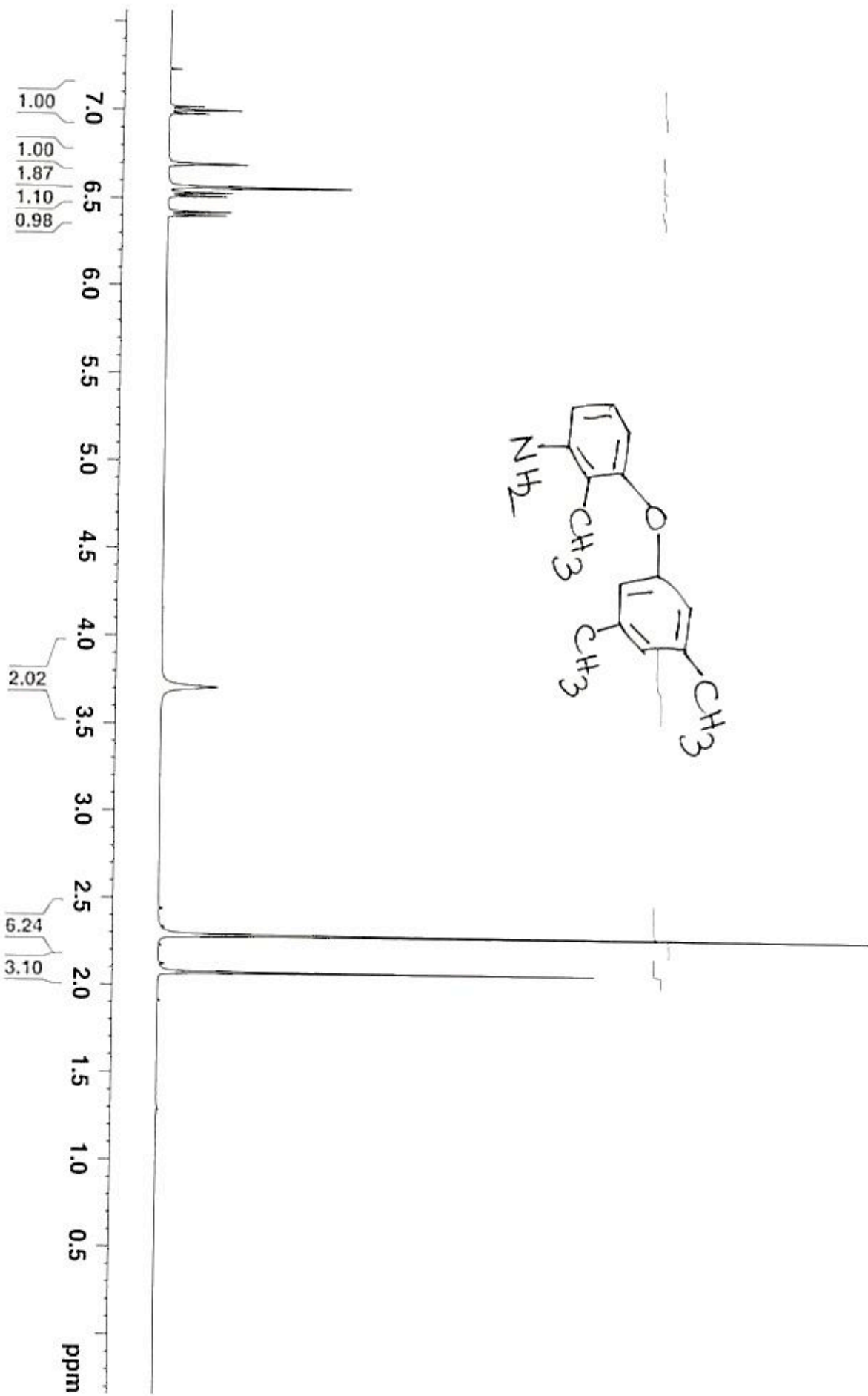


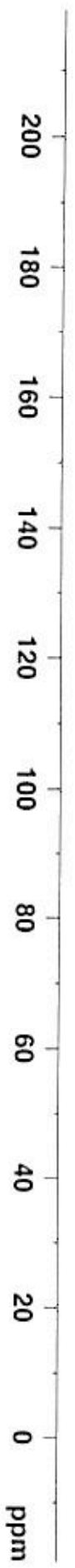
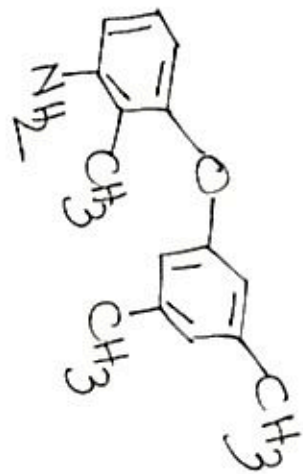


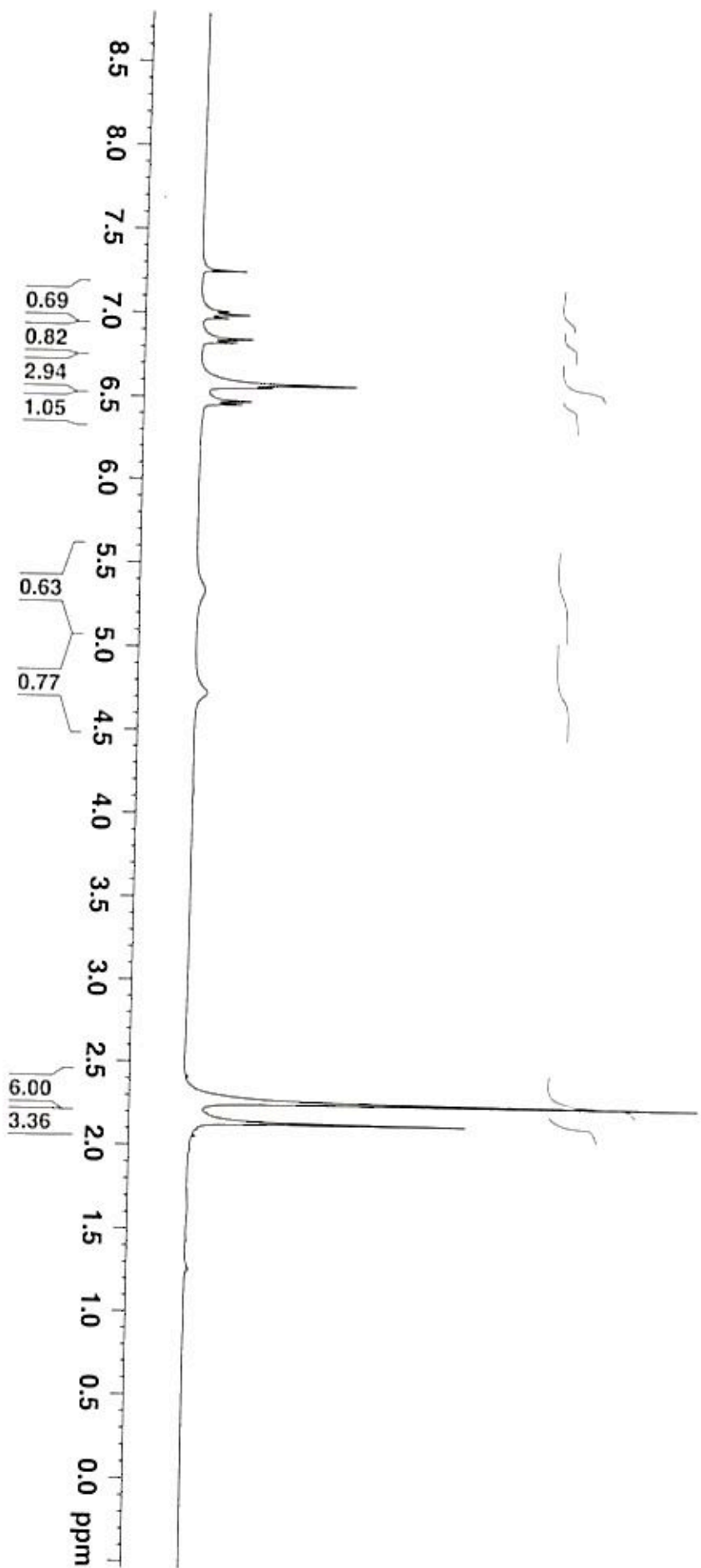
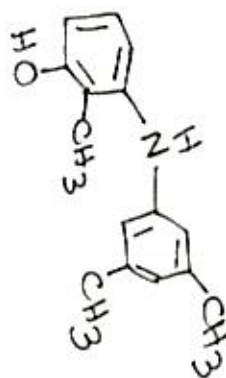




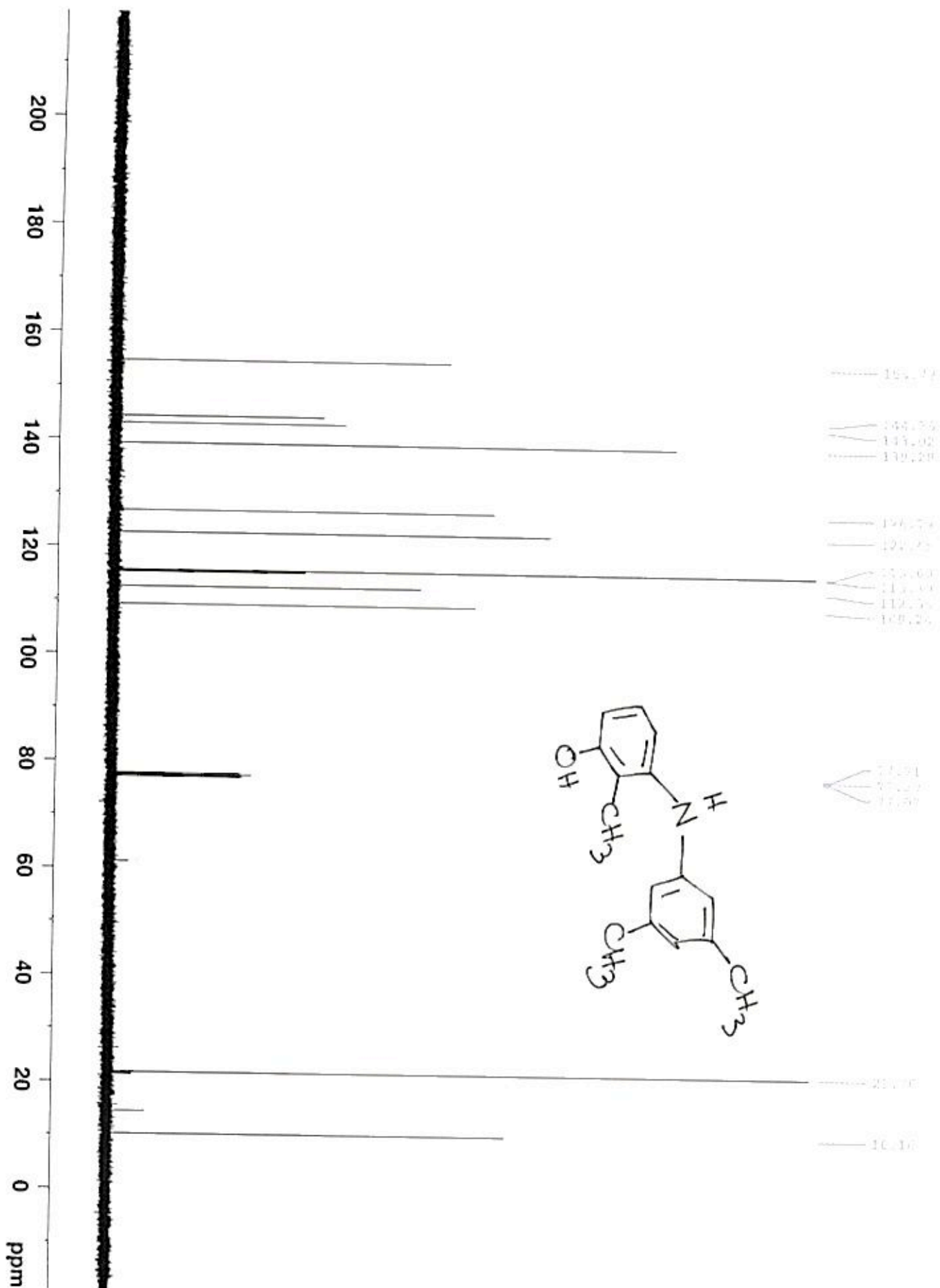


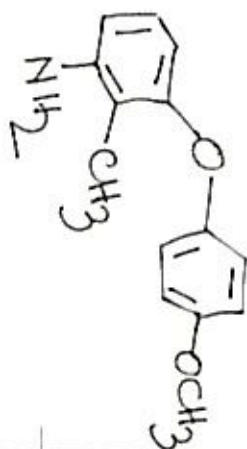
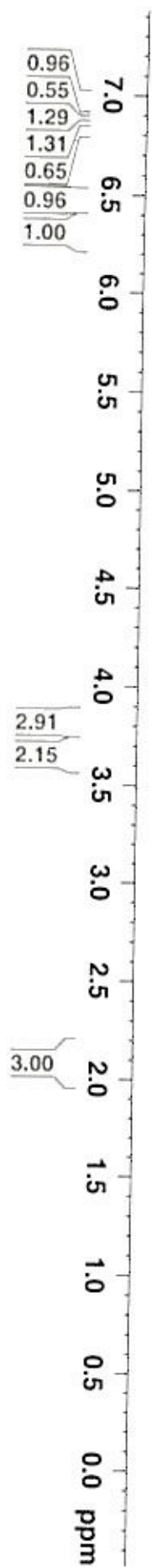


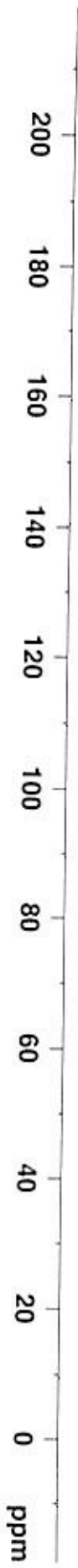
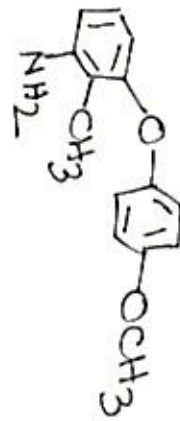


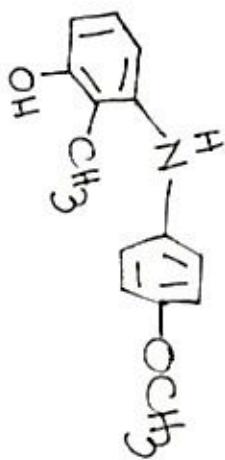
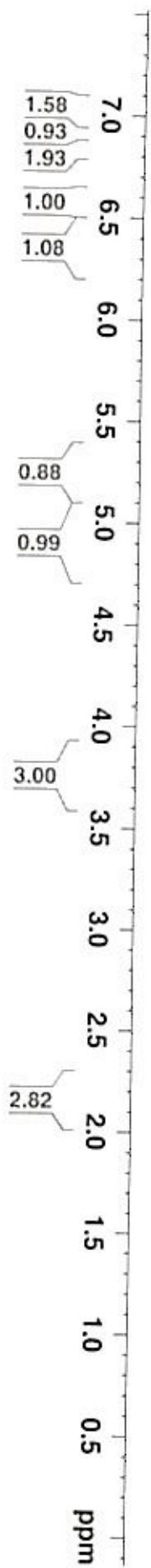


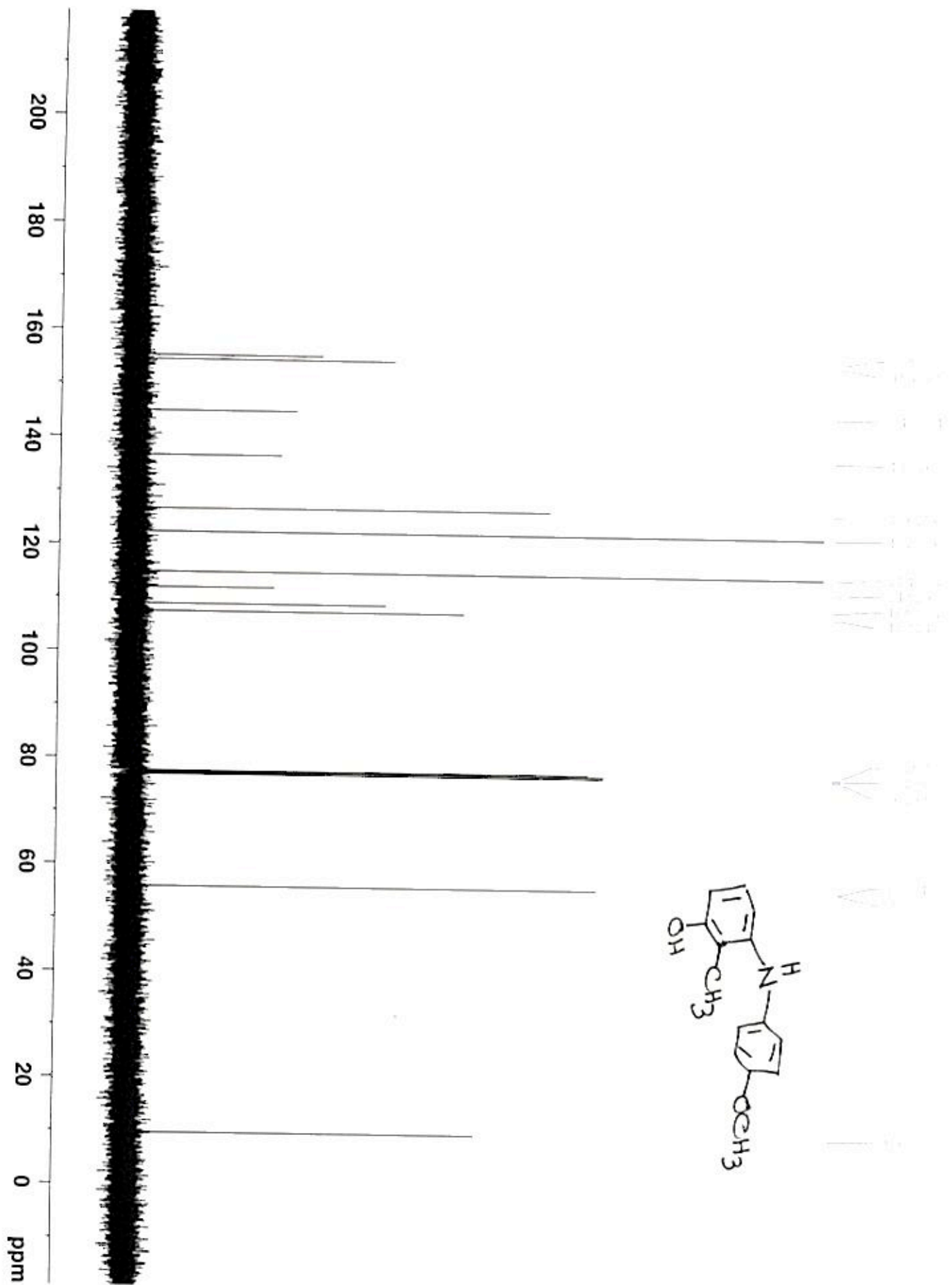


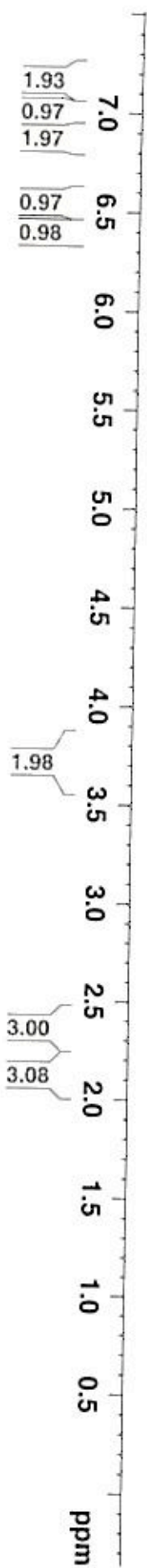
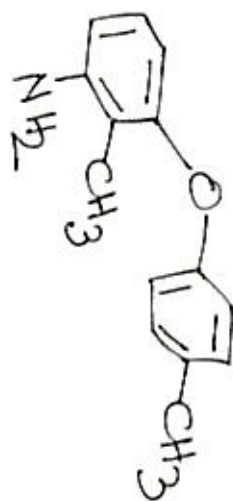


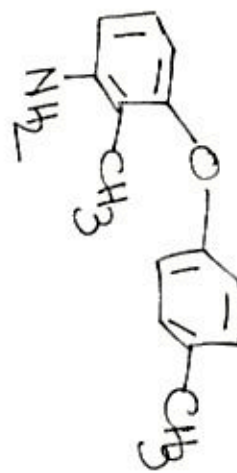
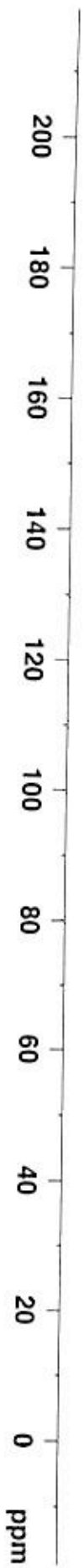


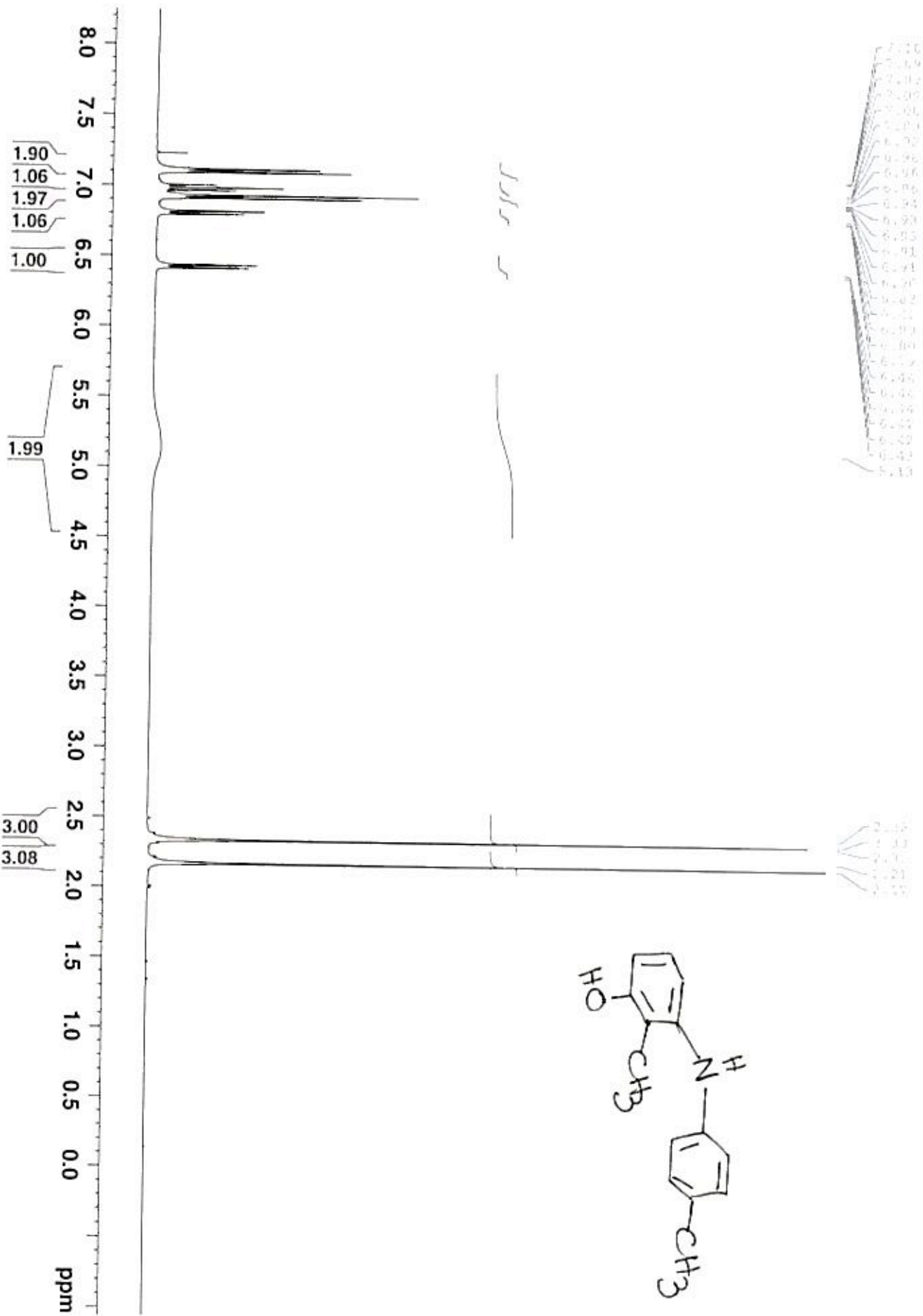
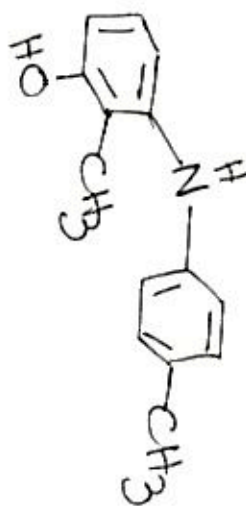




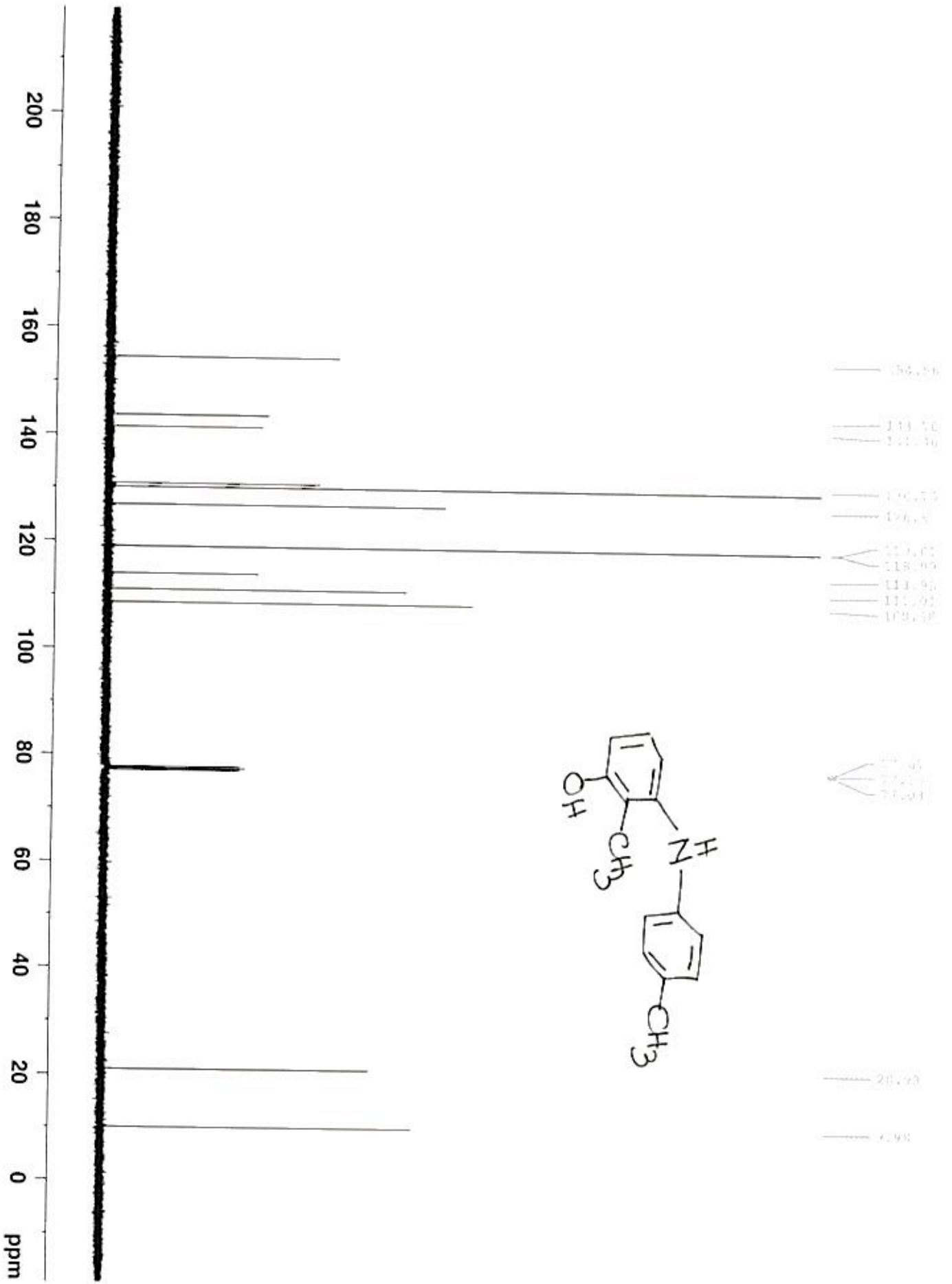


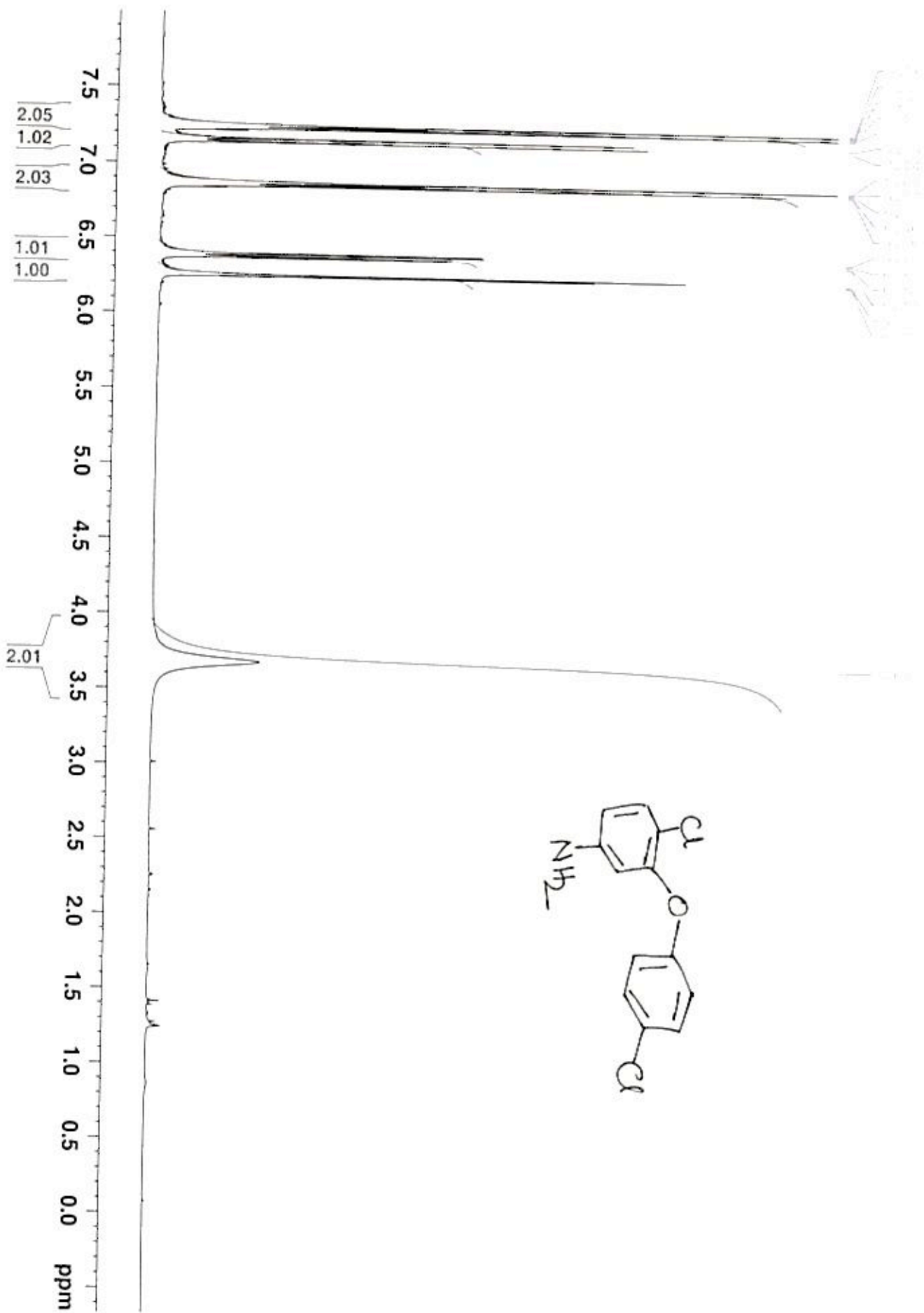
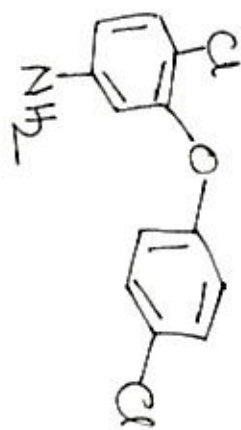


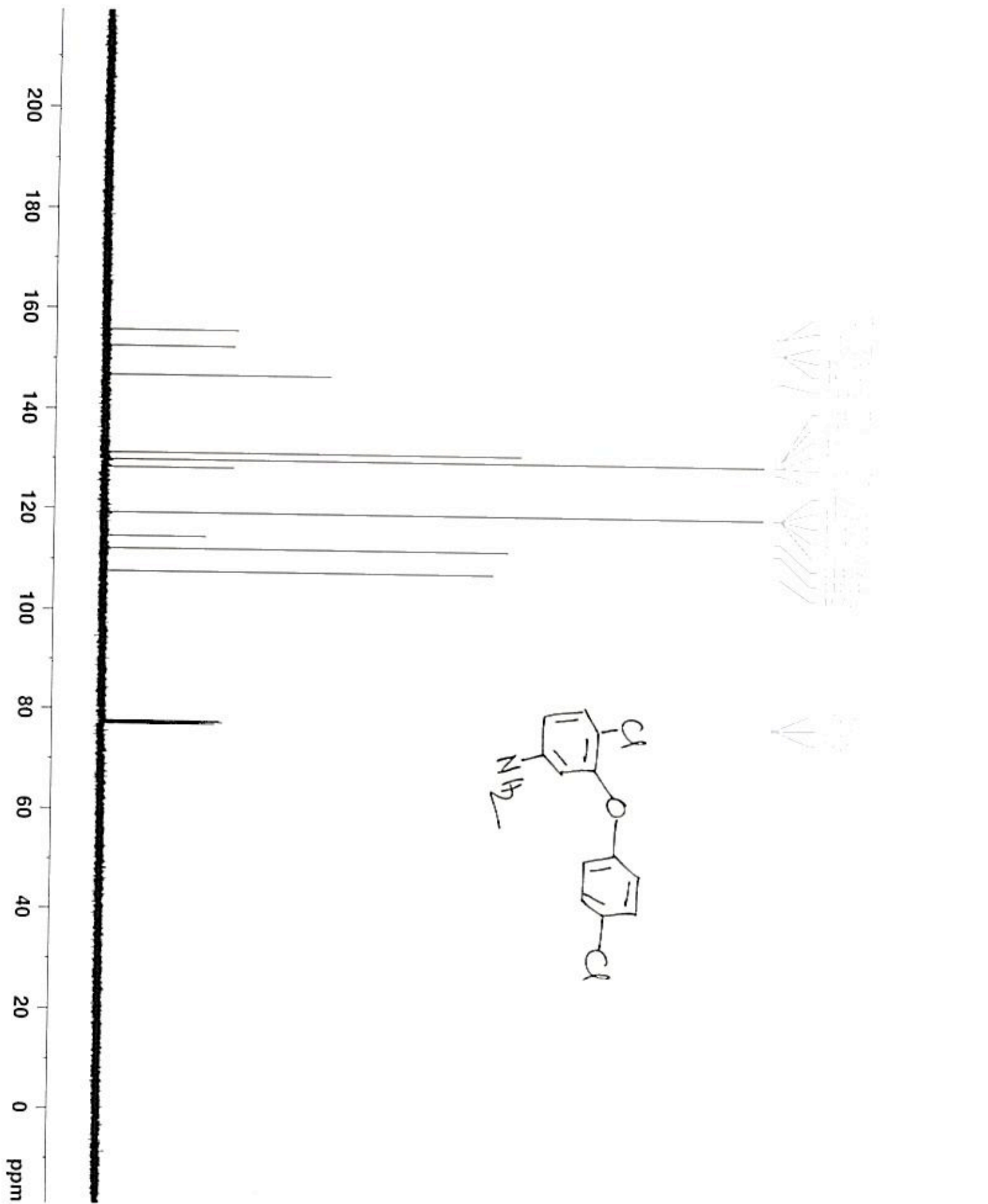
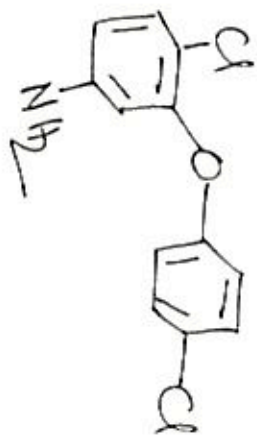


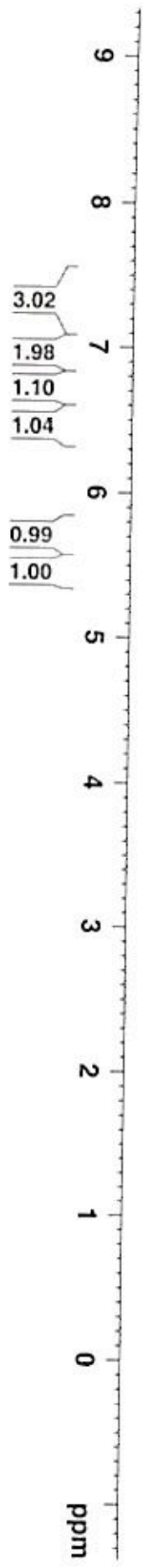
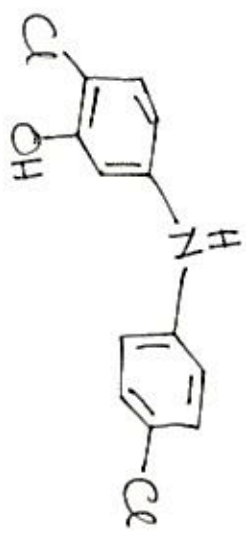


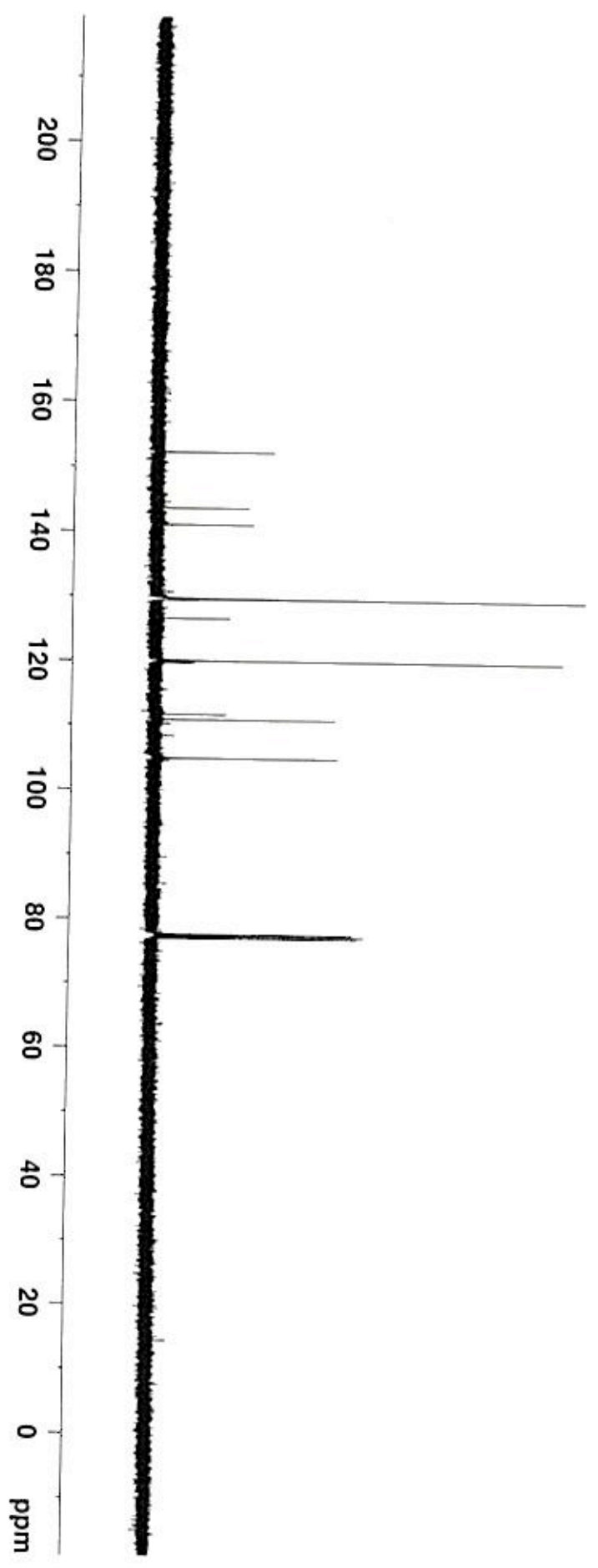
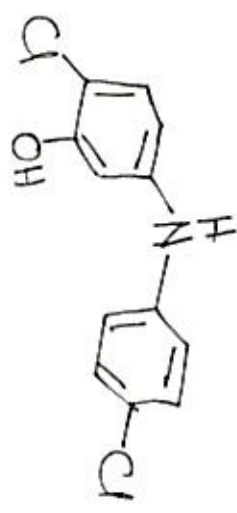


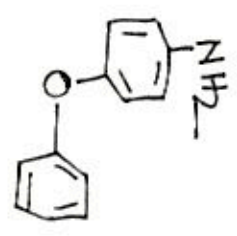
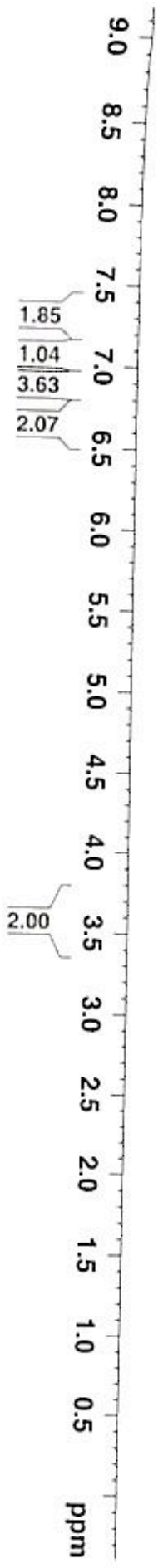


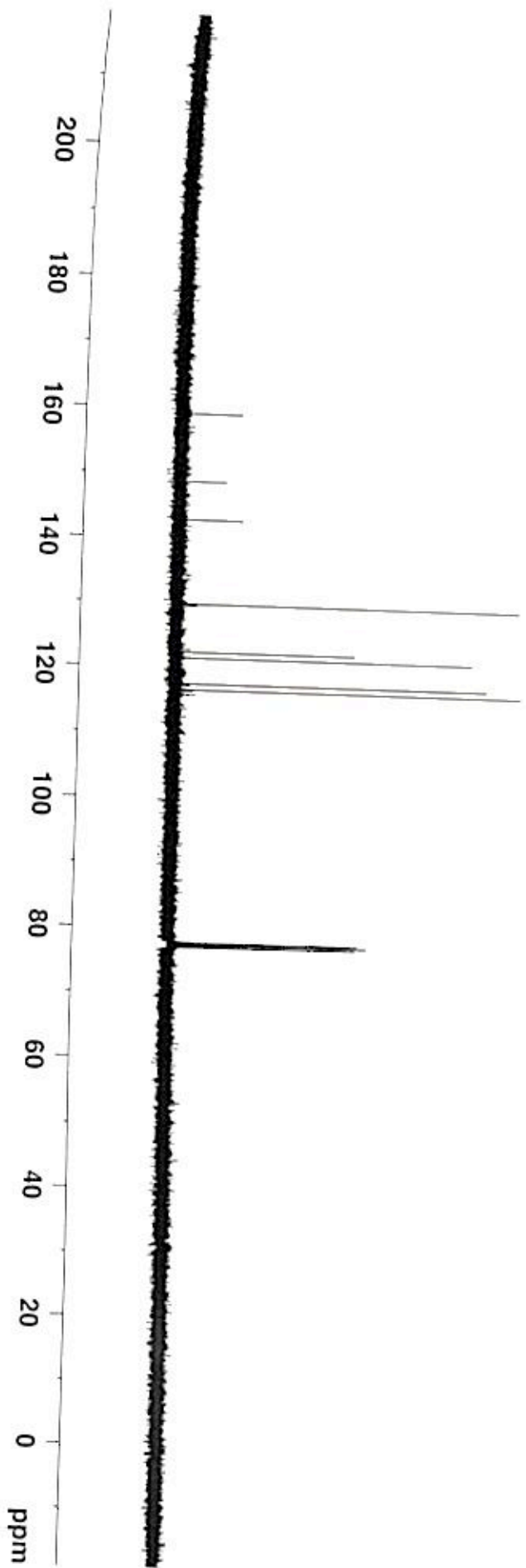


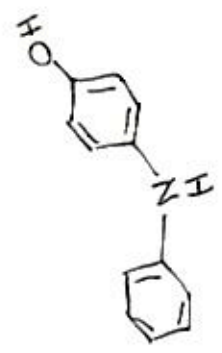
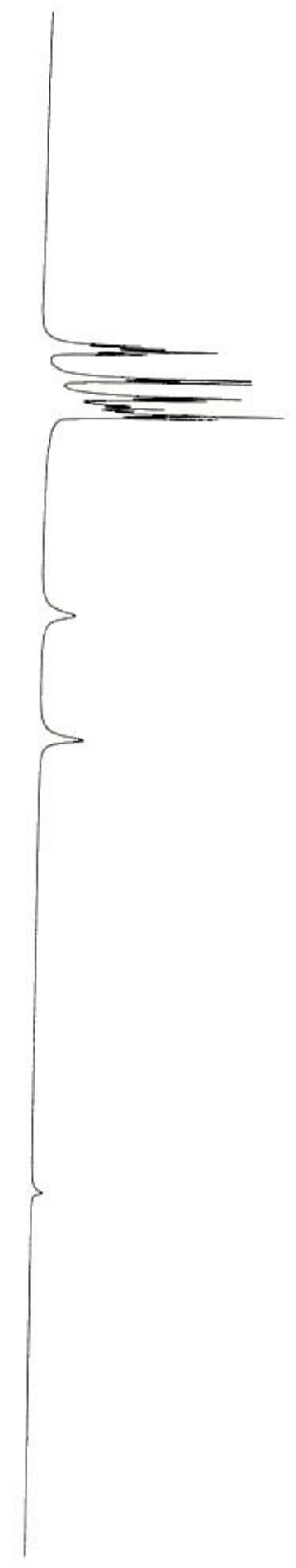
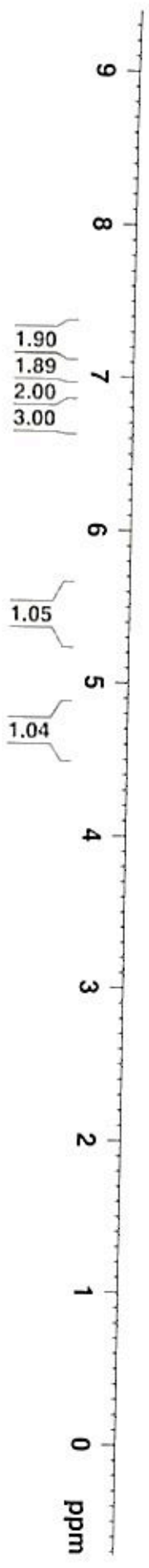




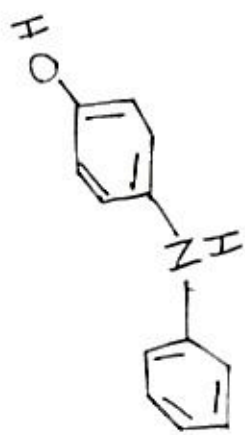
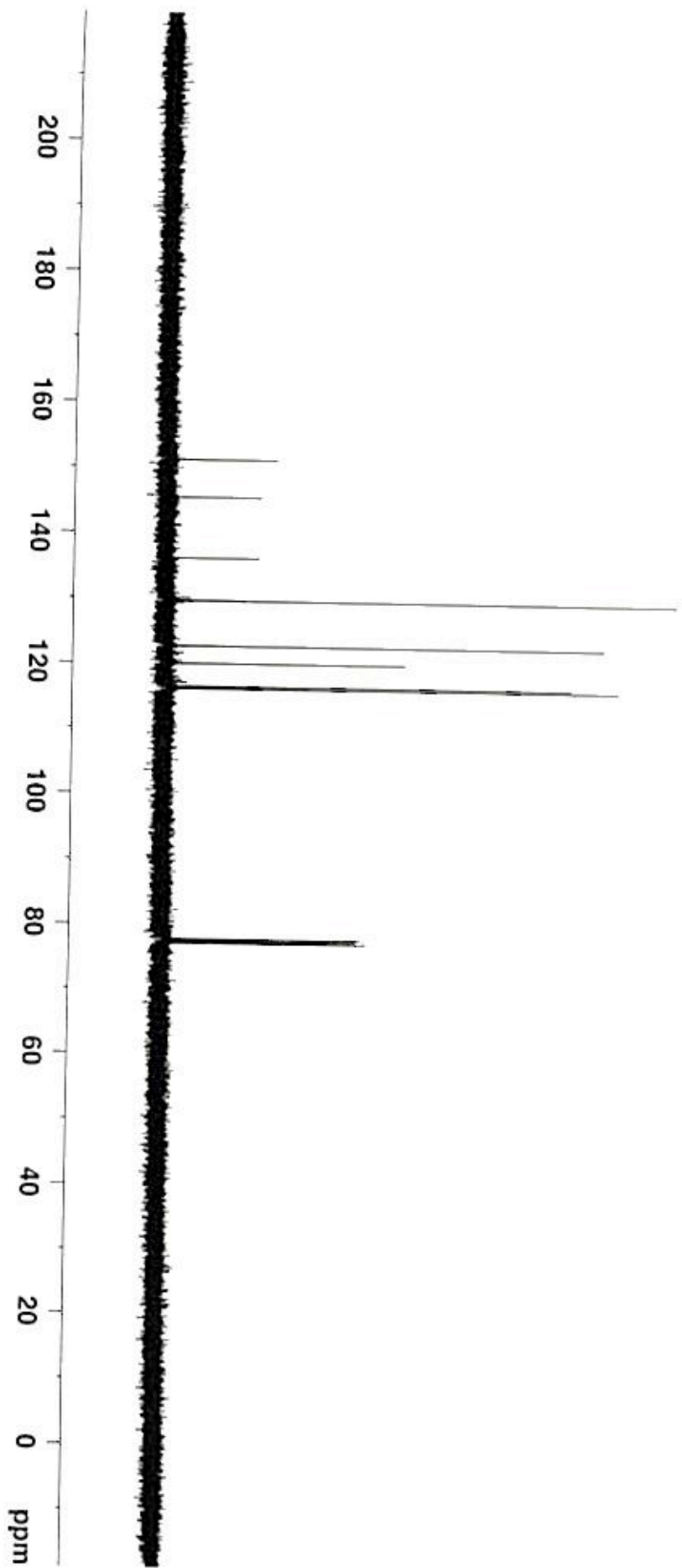




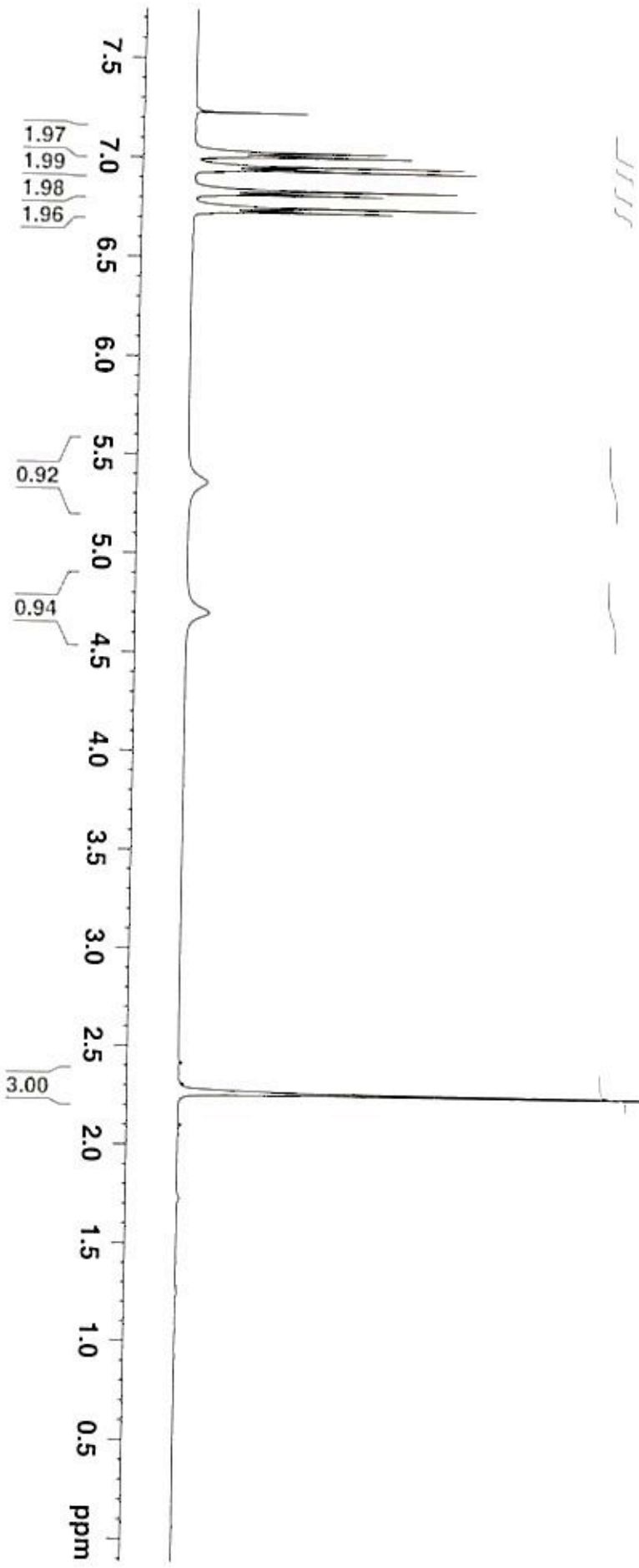
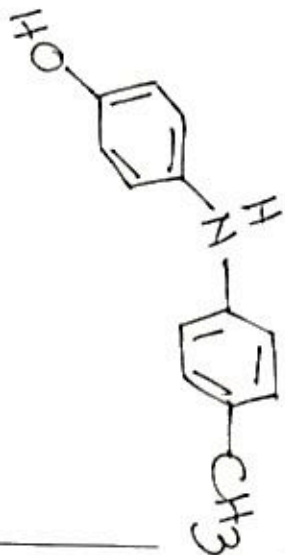


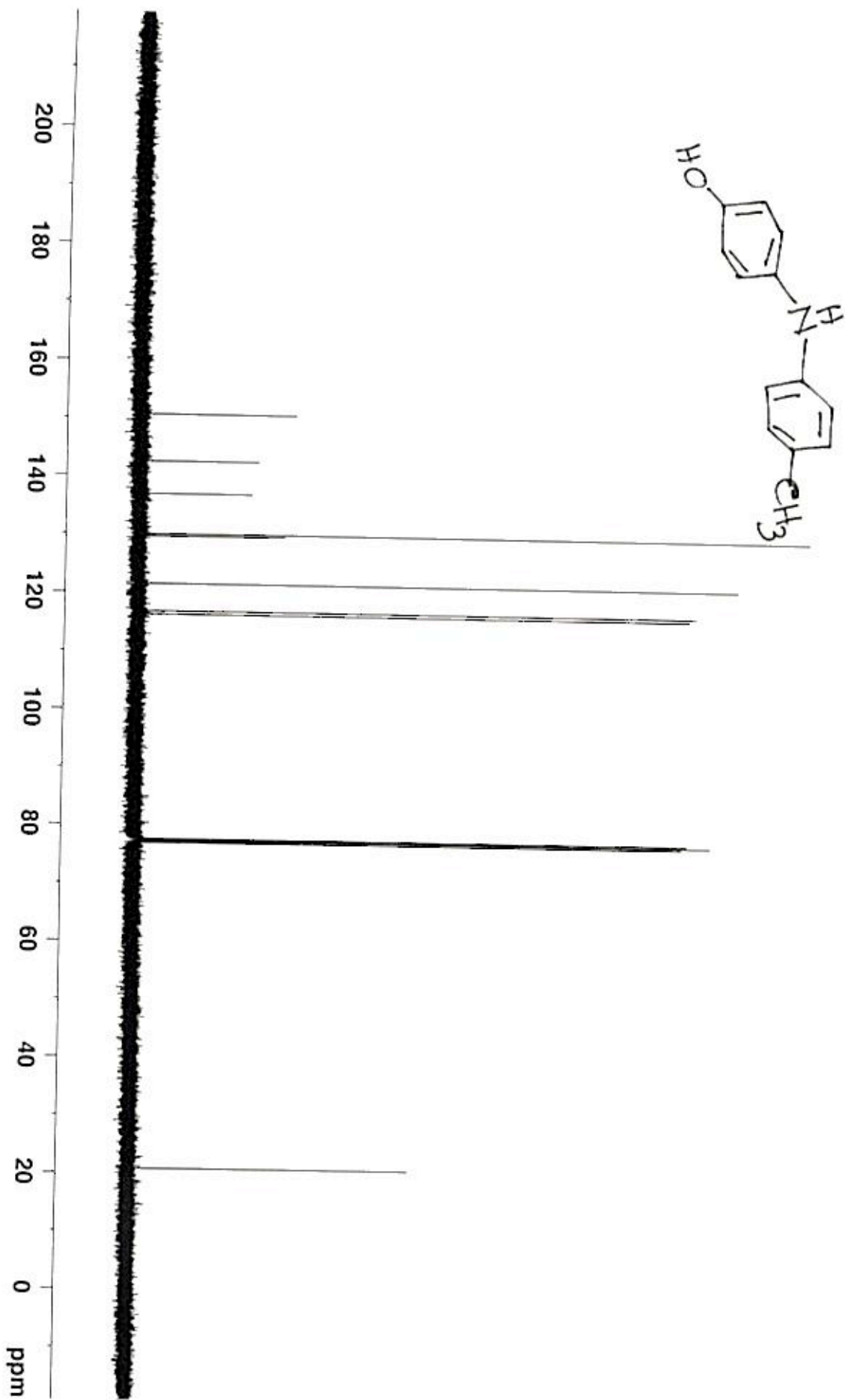






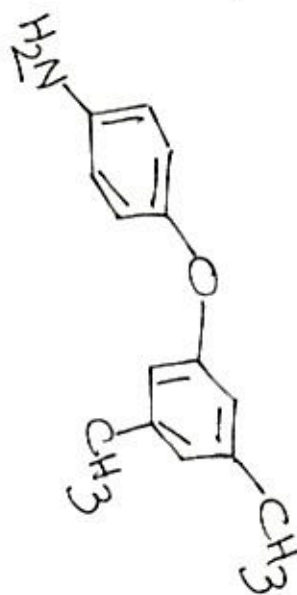
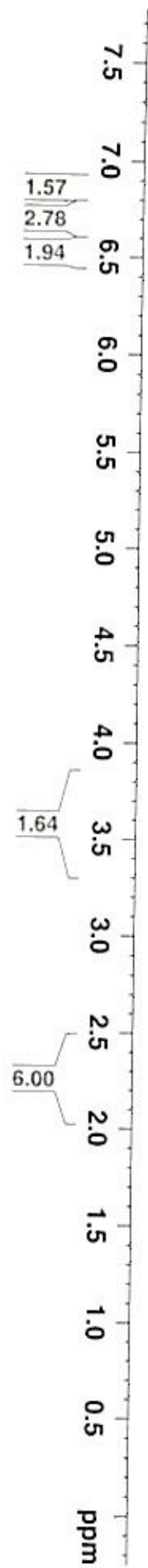
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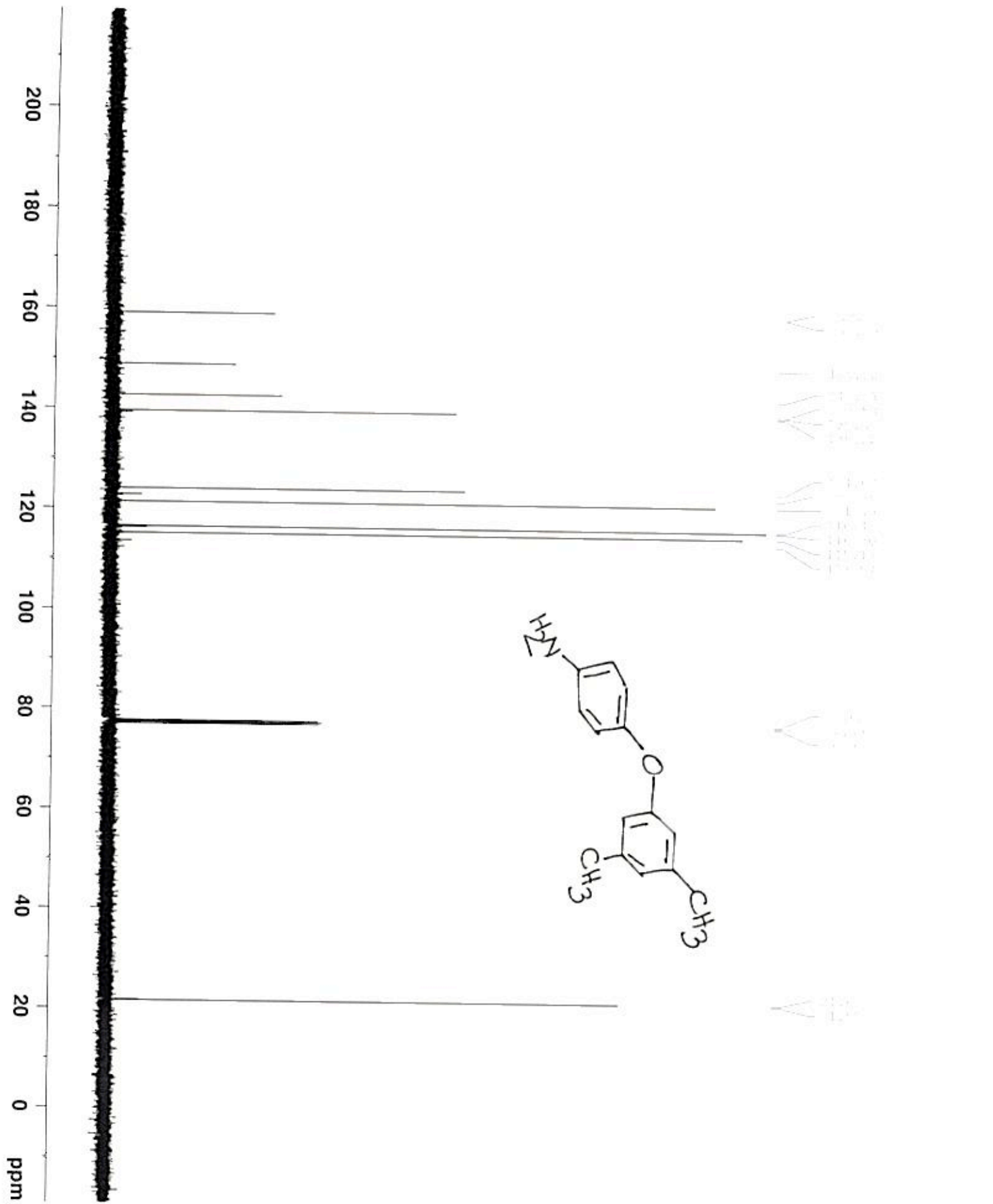


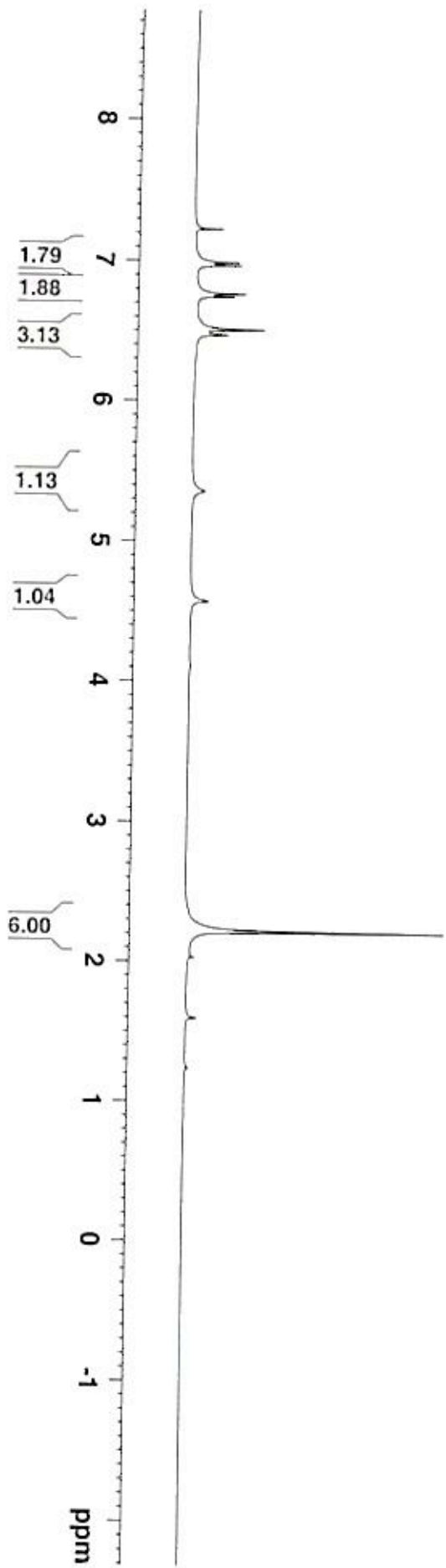
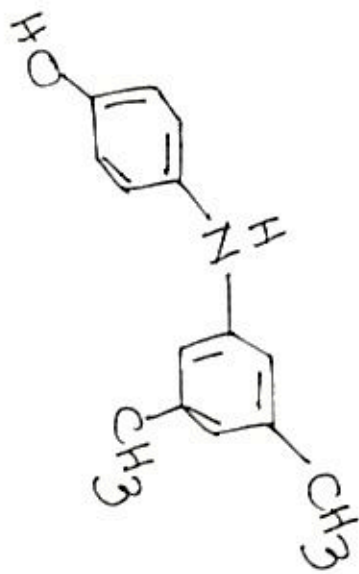


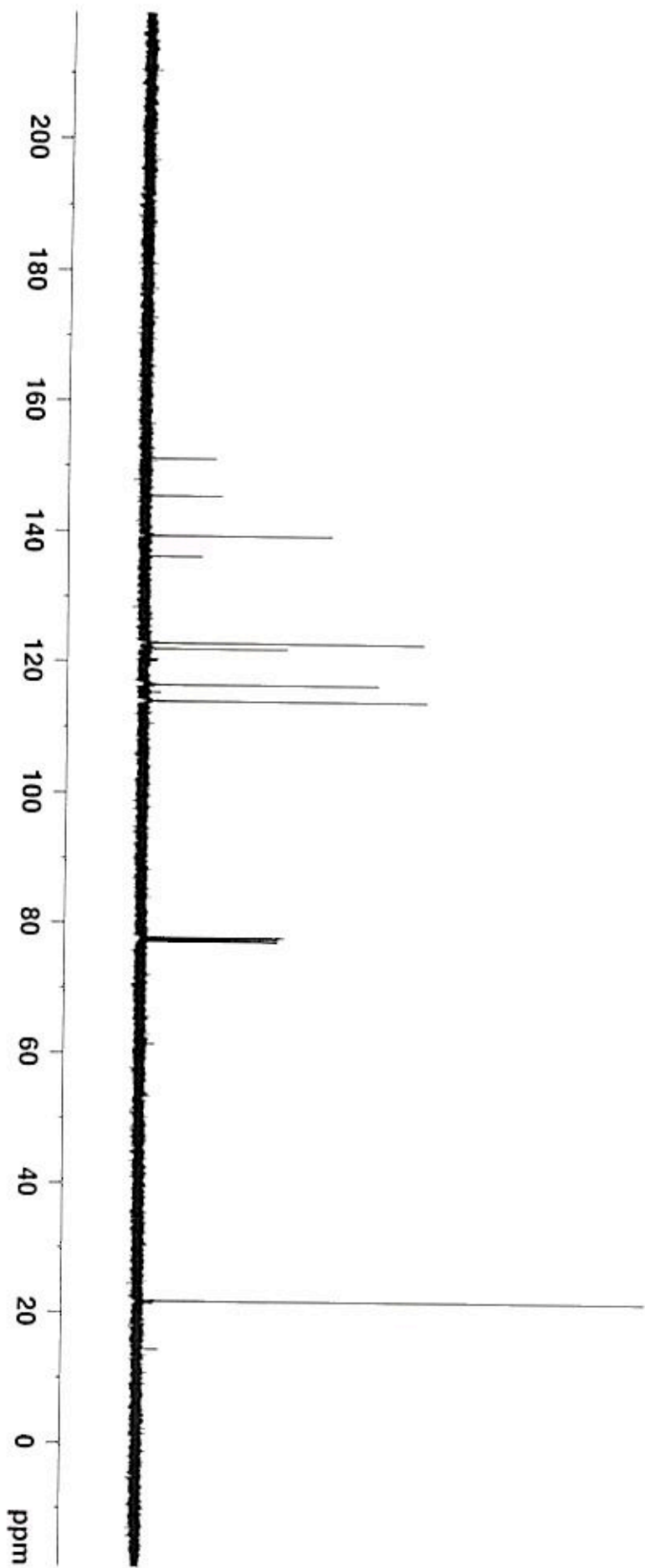
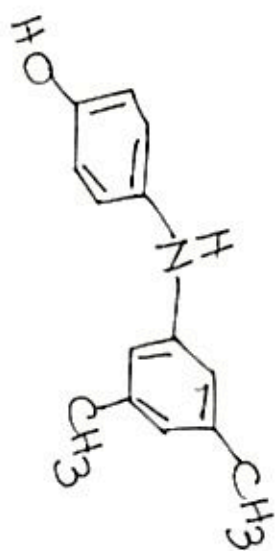
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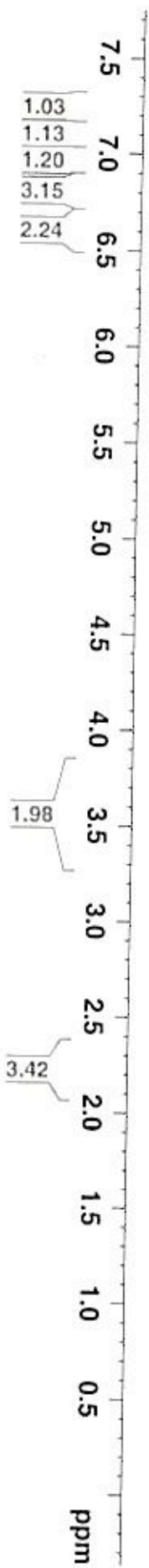
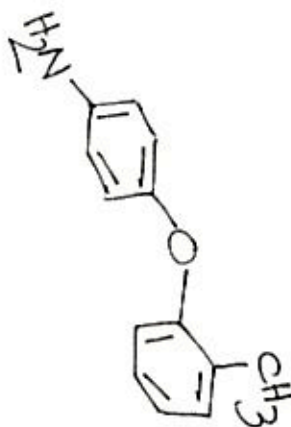




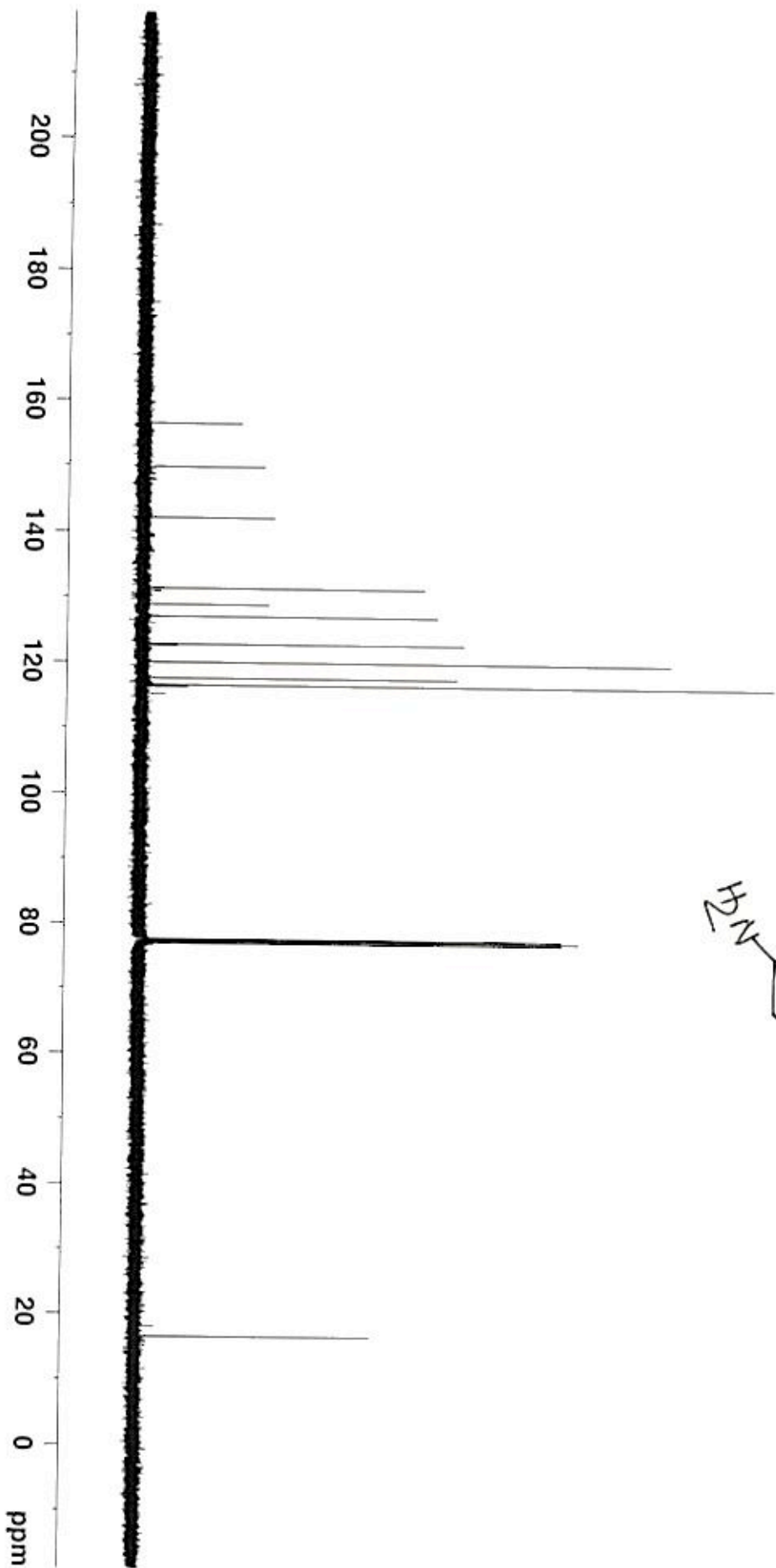
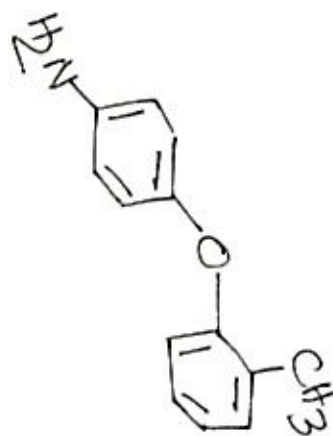


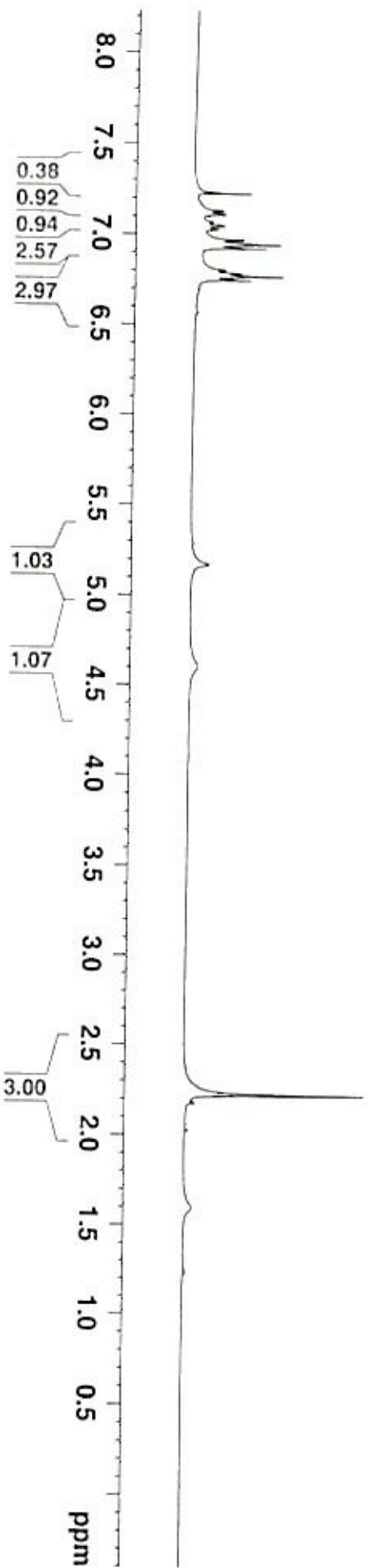
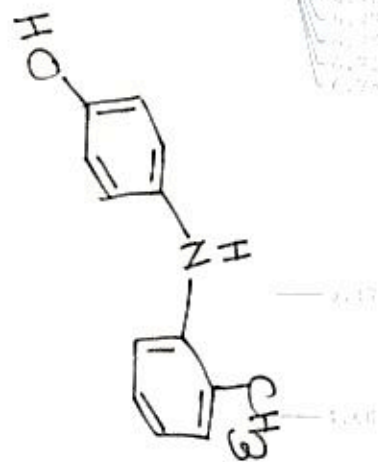


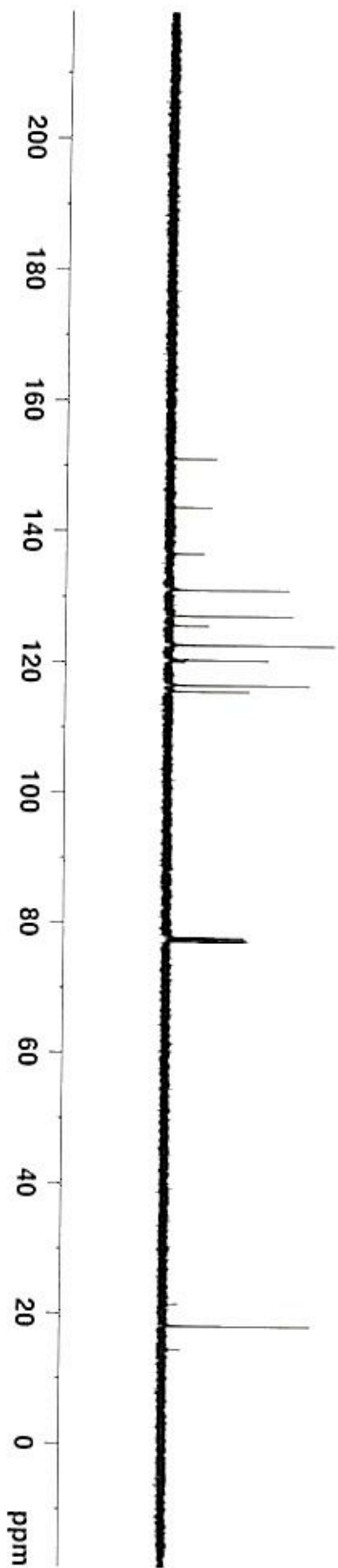
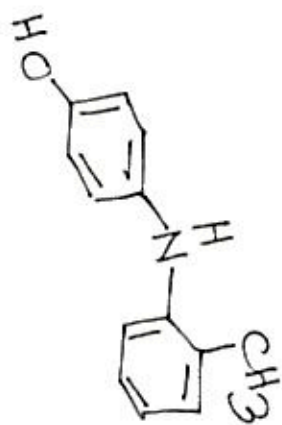


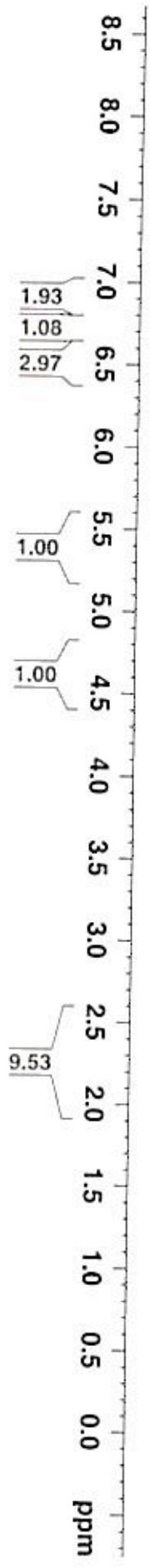
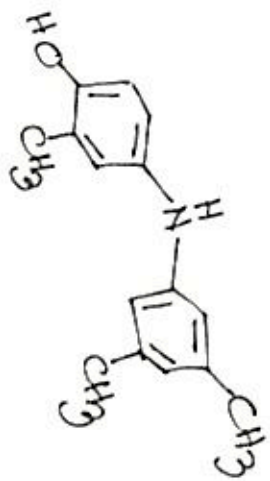




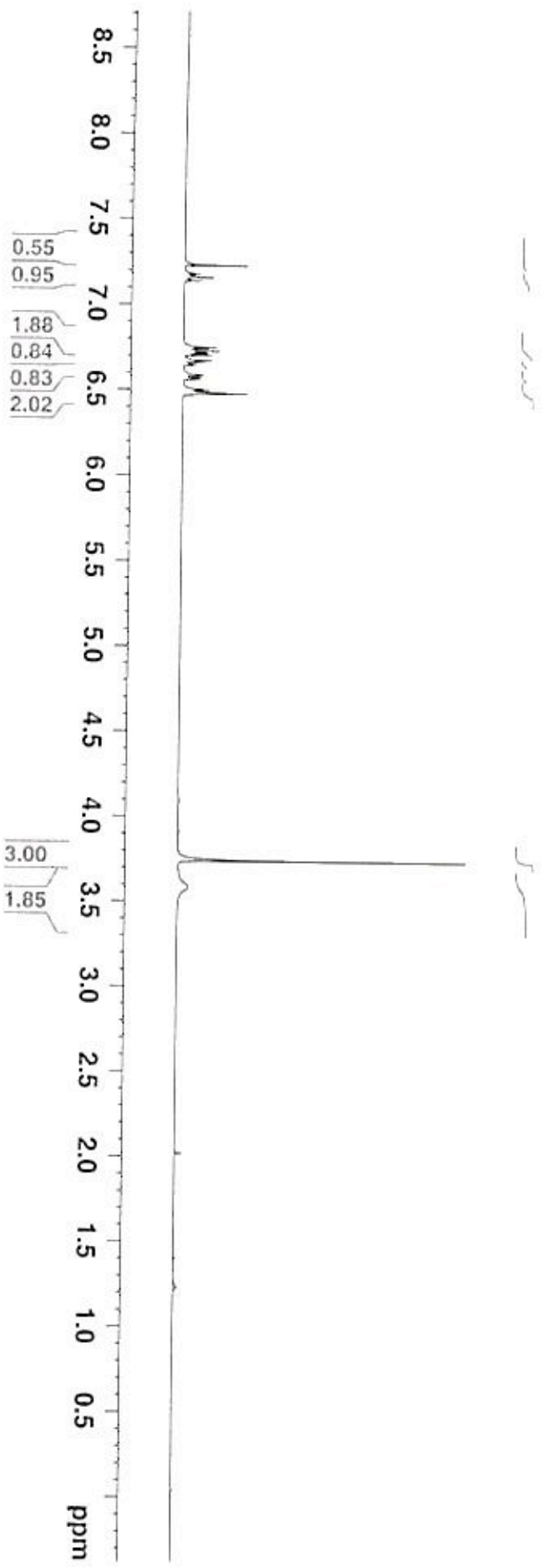
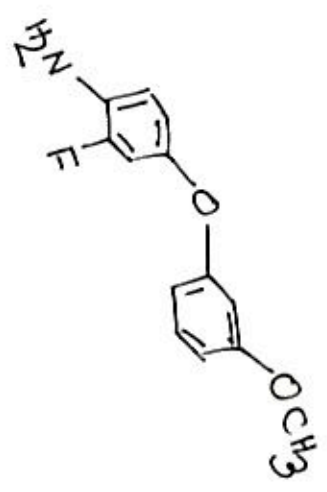


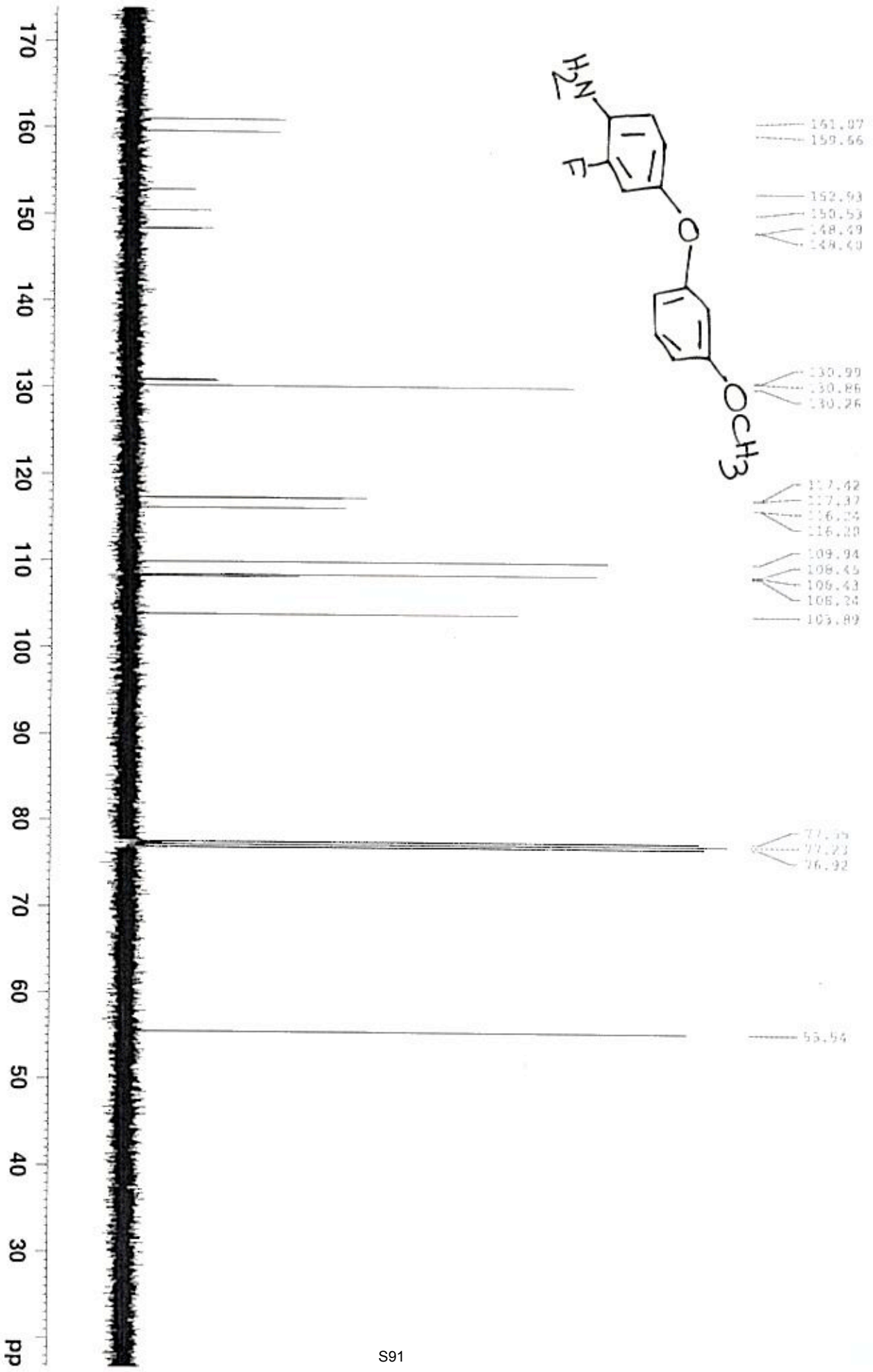


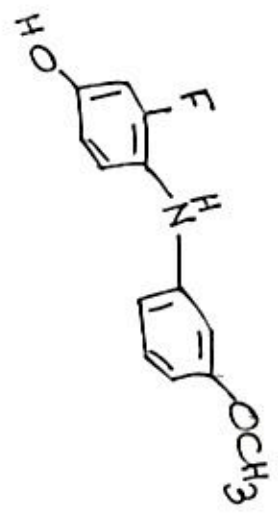




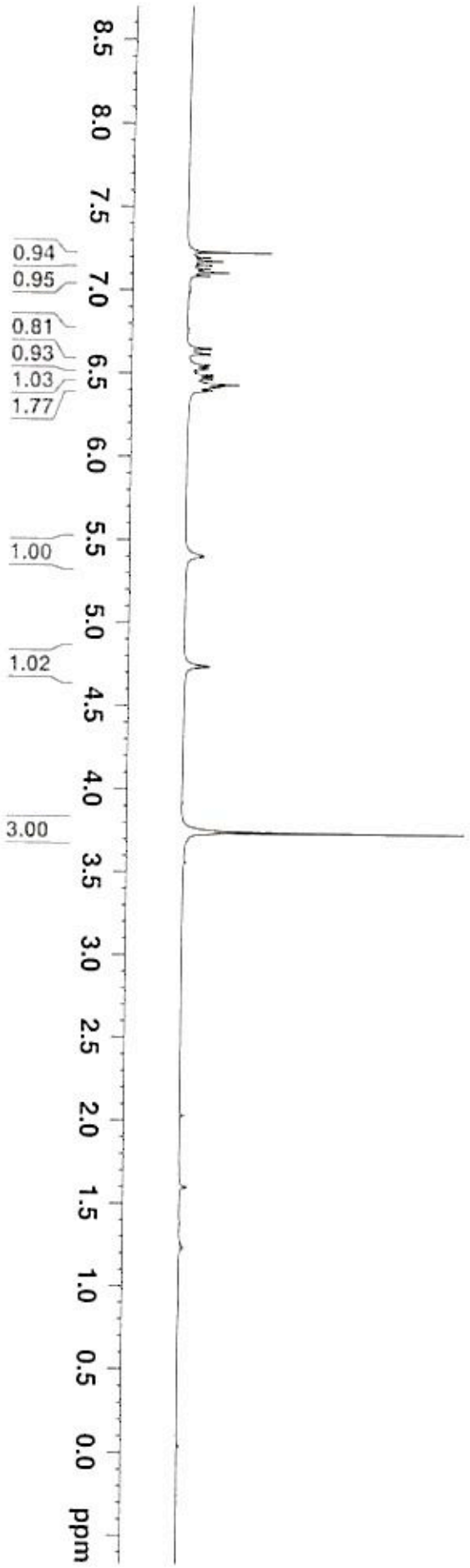






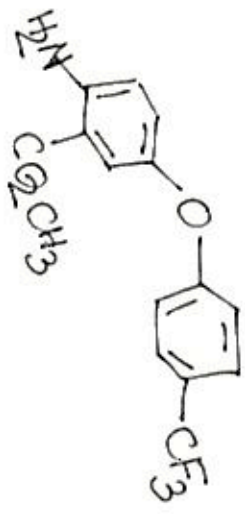
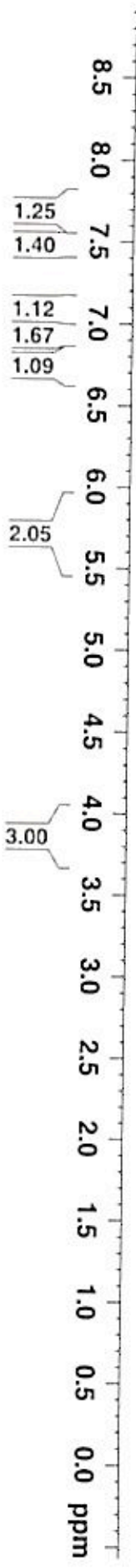


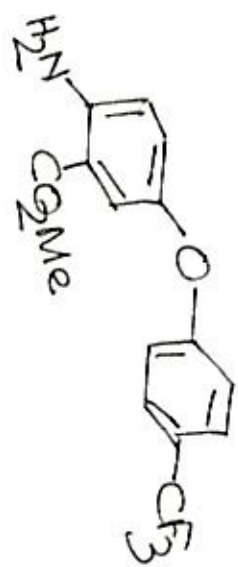
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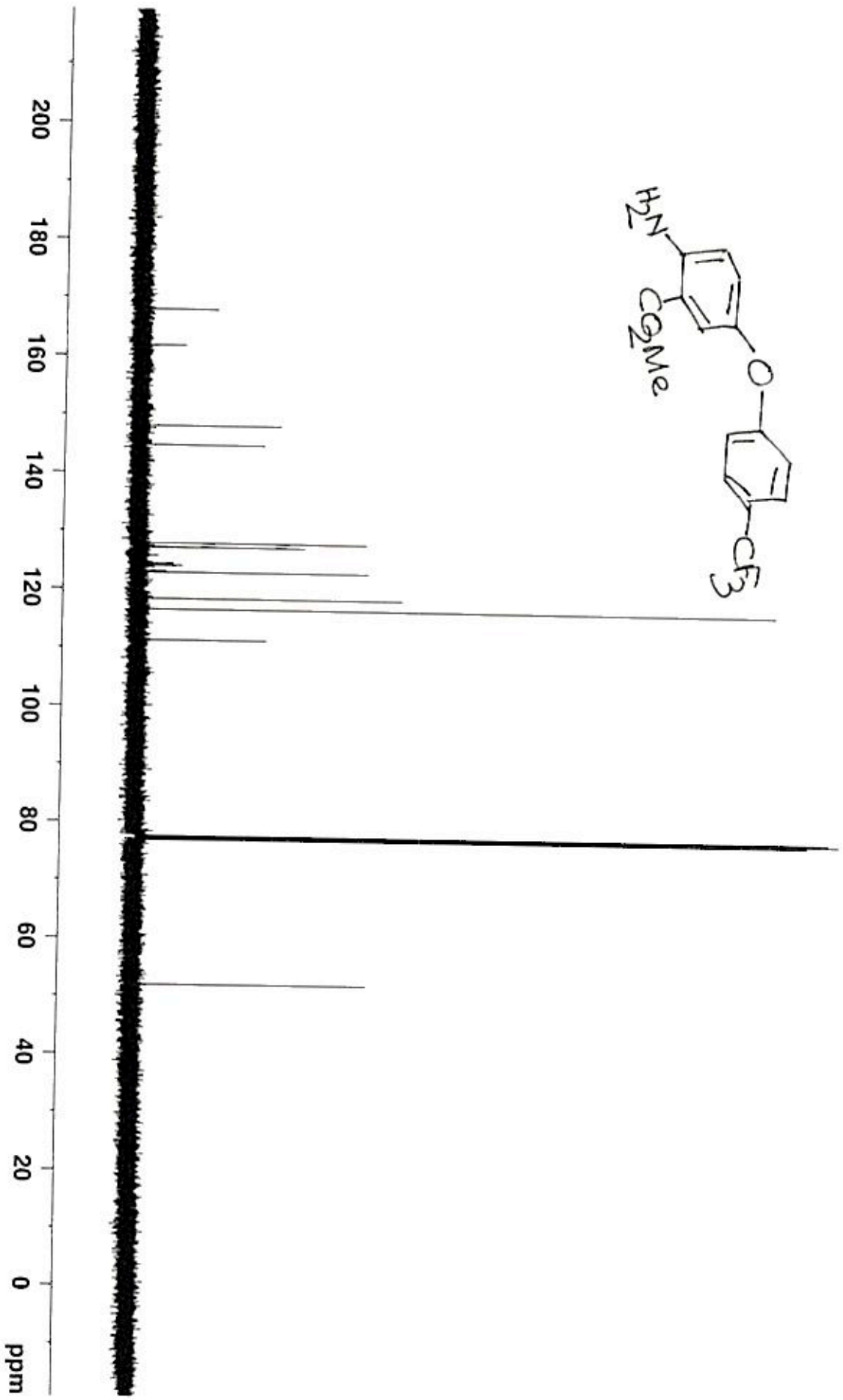


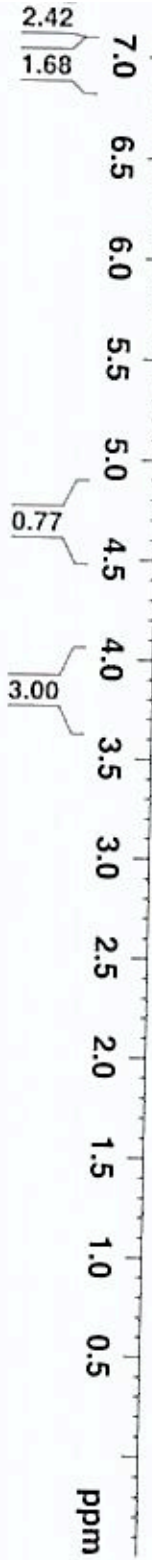
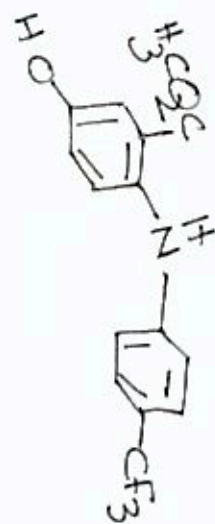


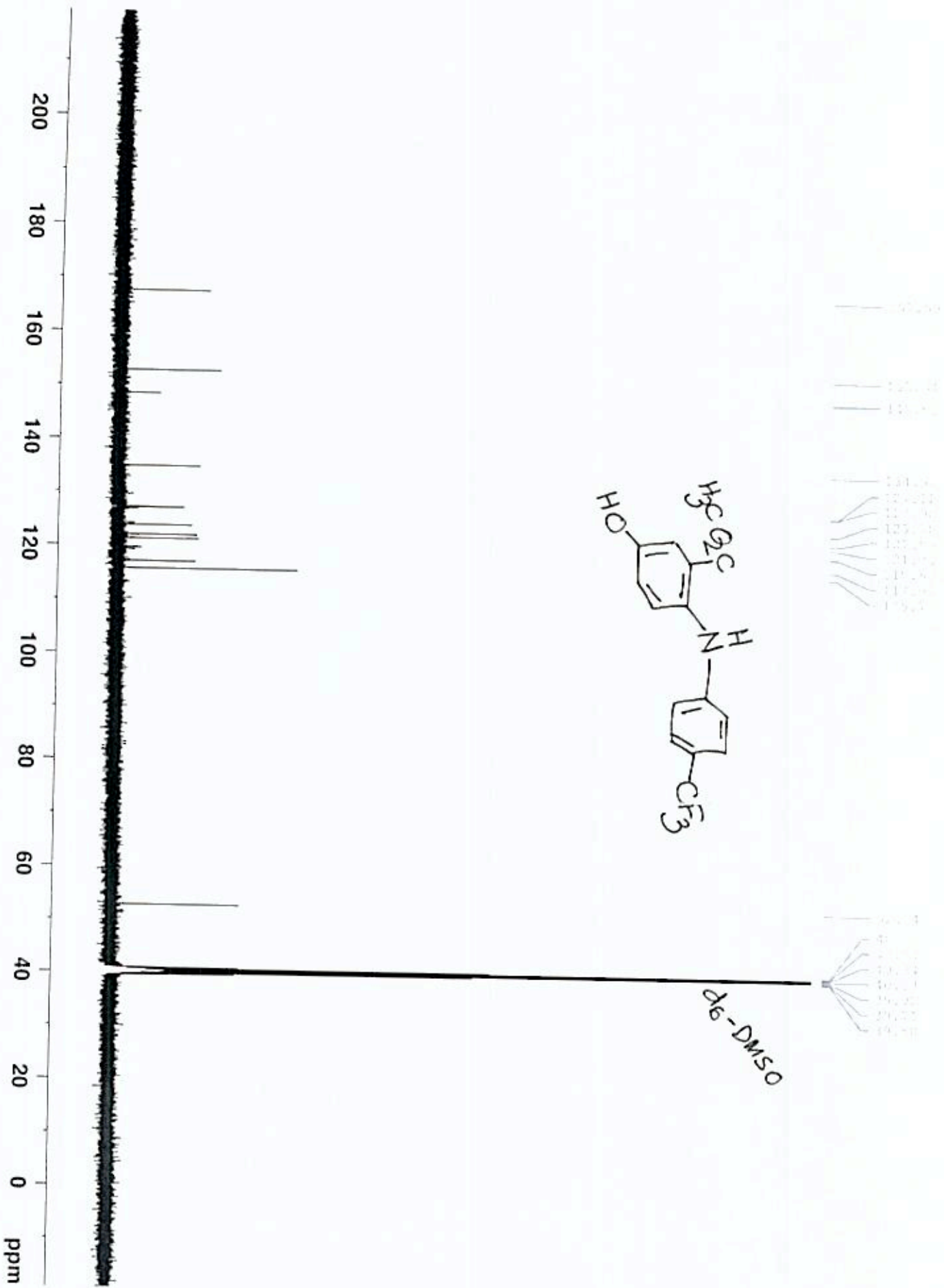
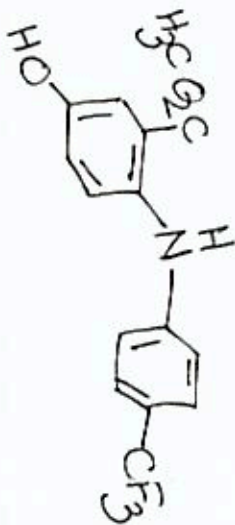
- 161.21
- 141.90
- 127.93
- 127.03
- 127.01
- 127.11
- 124.87
- 124.72
- 121.77
- 120.96
- 118.40
- 119.09
- 111.30

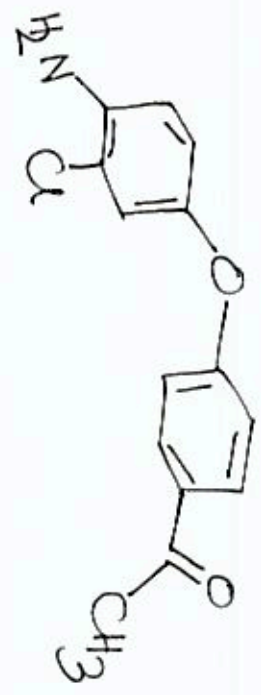
- 77.44
- 77.00
- 76.56

- 55.95

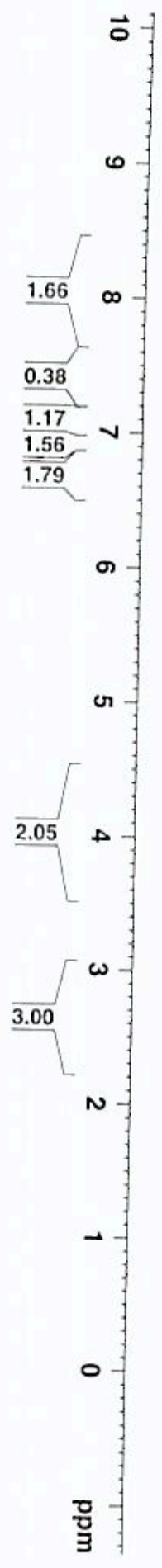


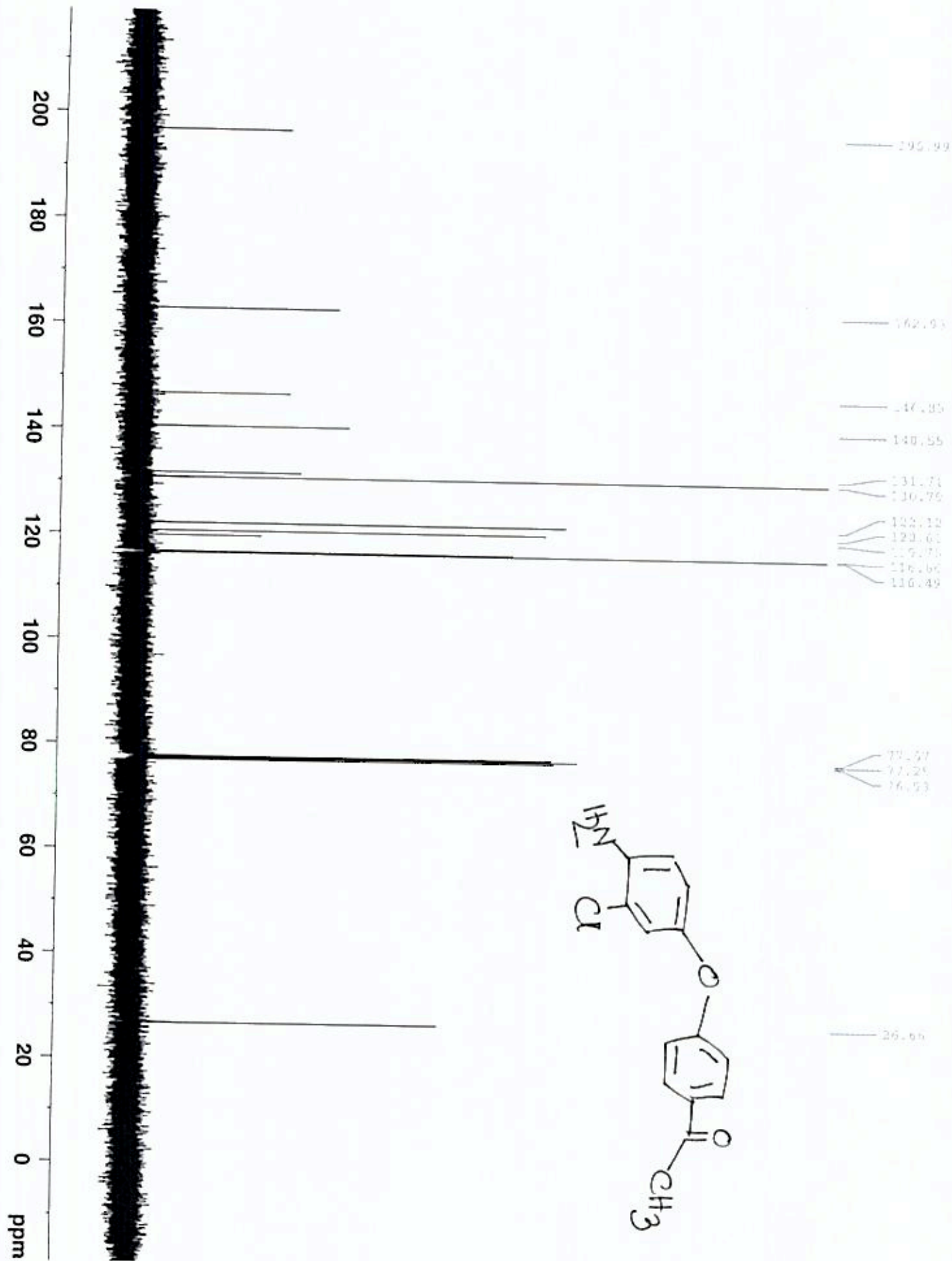


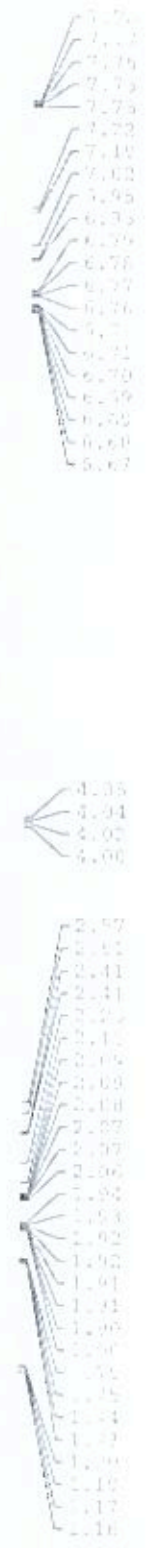




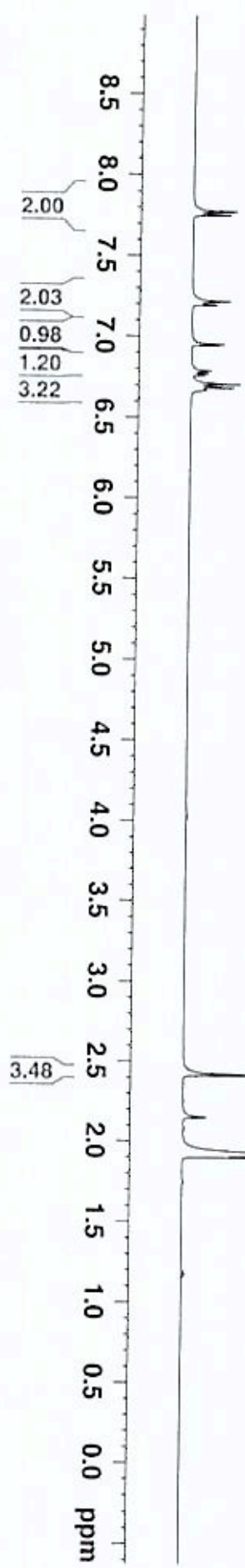
- 7.99
- 7.87
- 7.33
- 7.00
- 6.91
- 6.89
- 6.82
- 6.81
- 6.79
- 6.75
- 6.76
- 5.74
- 4.09
- 4.07
- 4.06
- 2.53
- 2.02







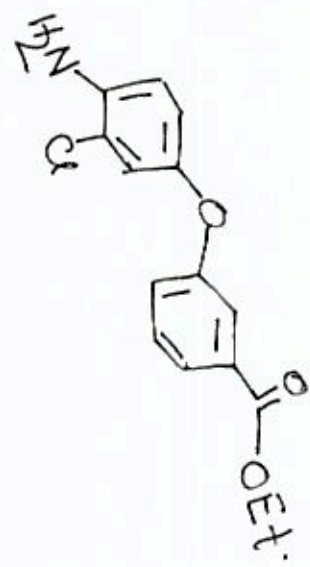
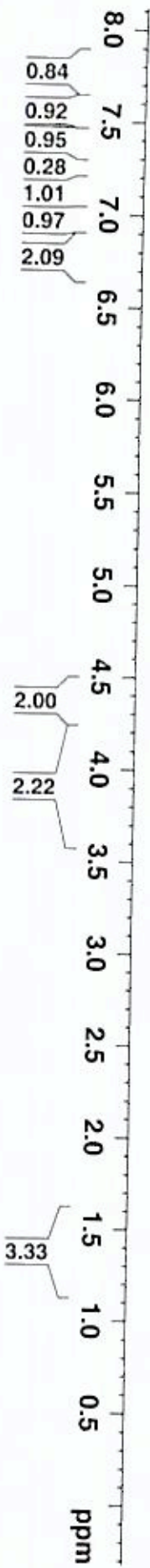
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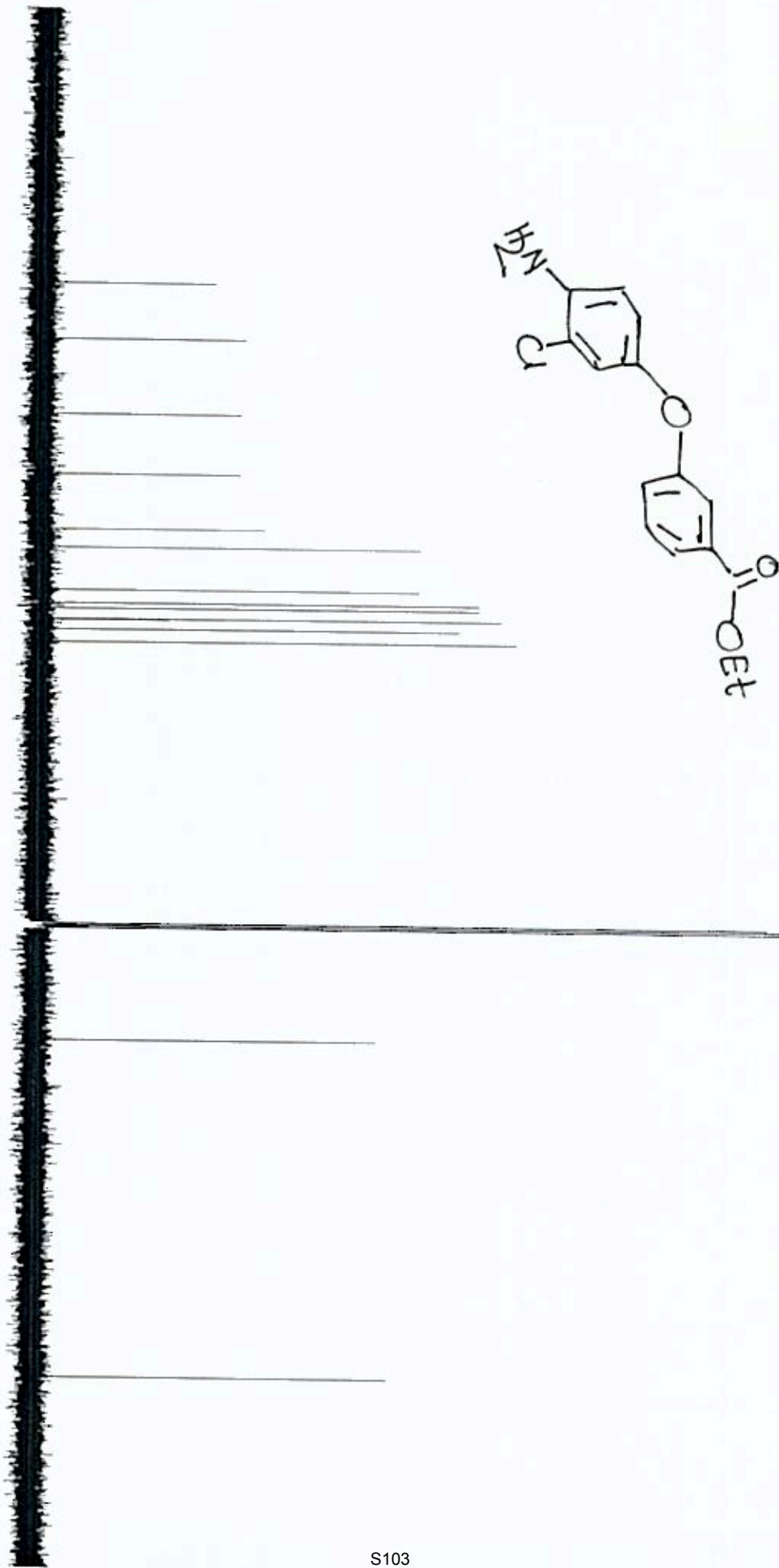
CD<sub>3</sub>CN



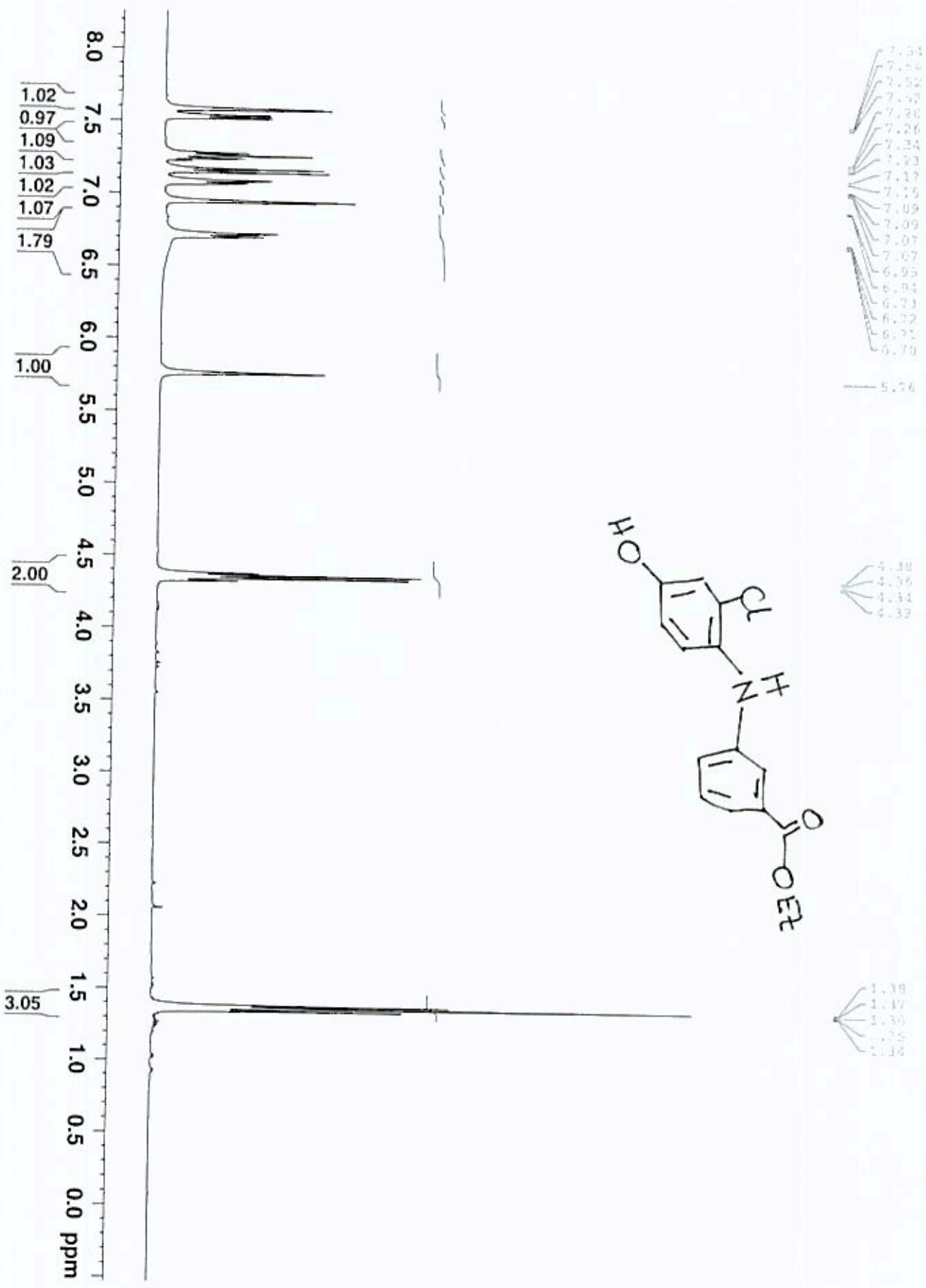


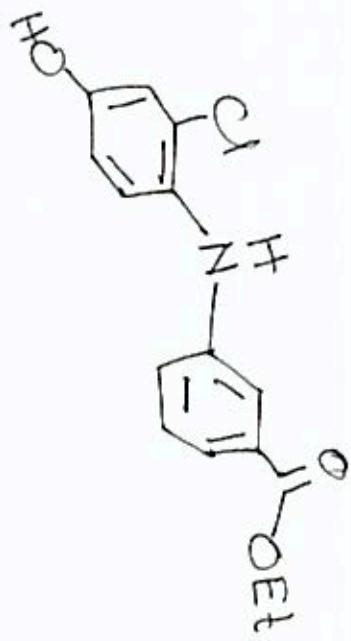
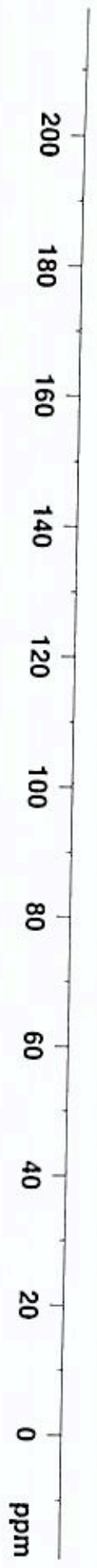


200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

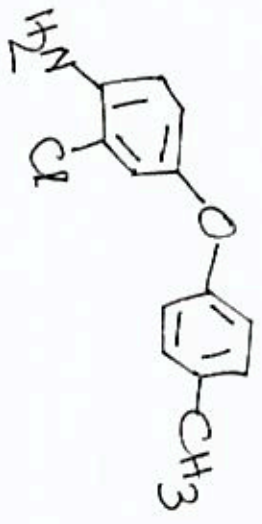
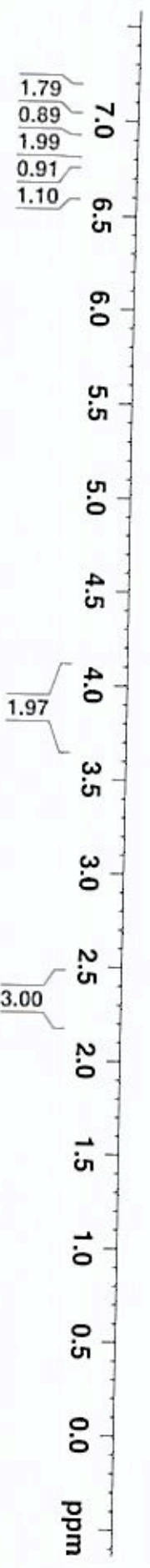


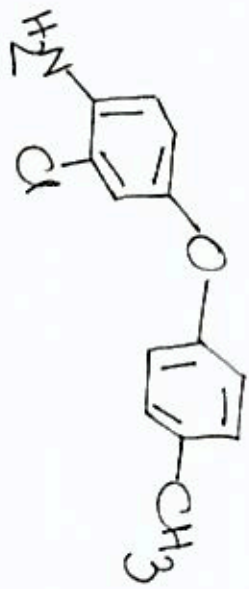
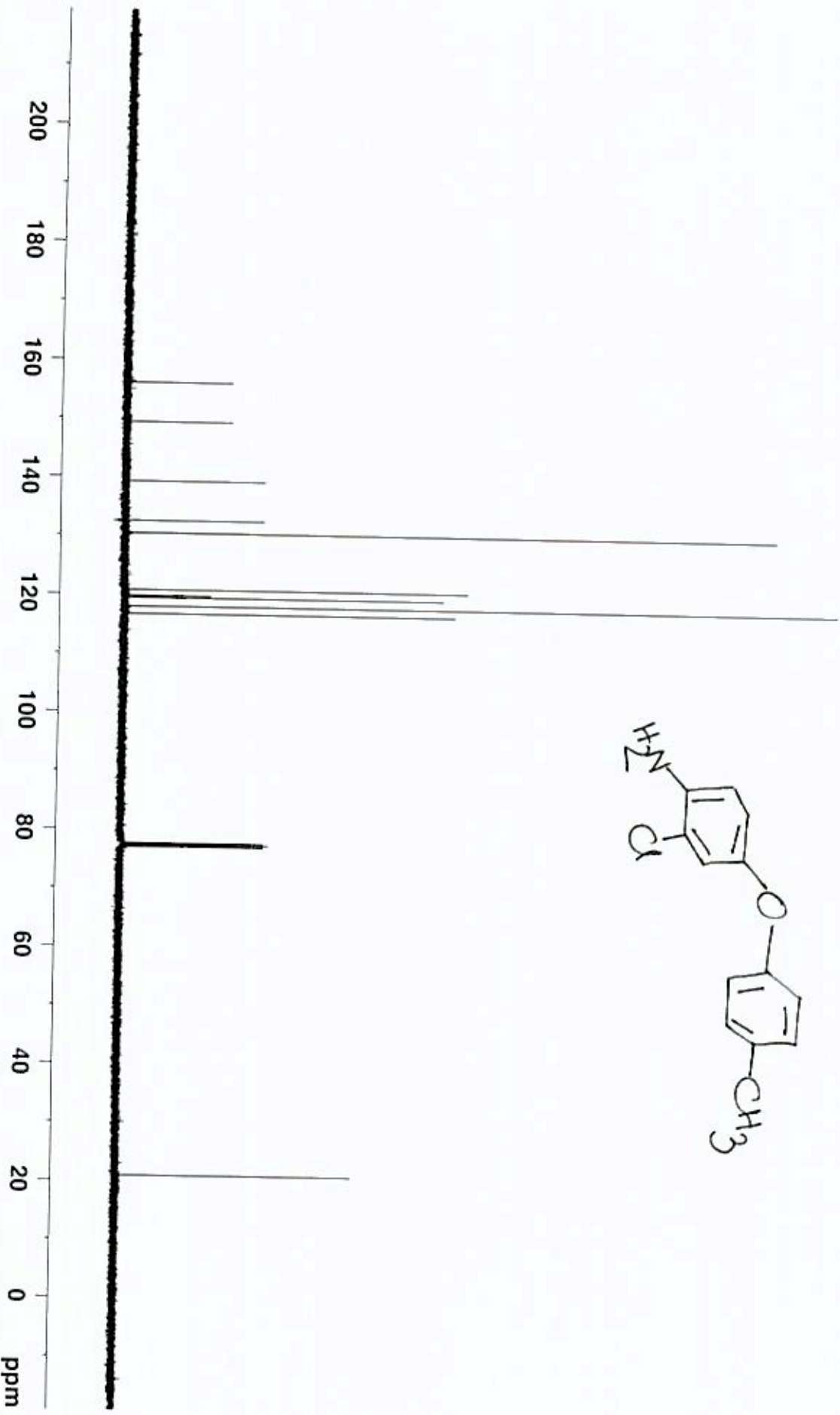
- 166.31
- 158.59
- 148.18
- 139.89
- 133.36
- 129.81
- 123.92
- 122.10
- 121.30
- 119.92
- 118.49
- 116.74
- 77.55
- 77.23
- 76.91
- 61.36
- 14.50



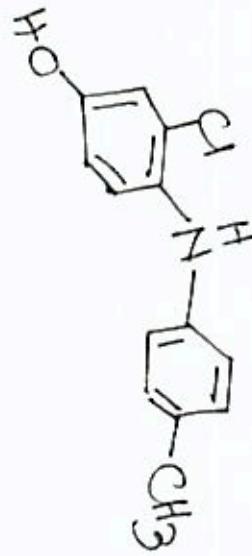


- 167.78
- 152.66
- 146.57
- 131.95
- 131.43
- 129.62
- 126.47
- 122.23
- 121.66
- 121.15
- 117.38
- 117.26
- 115.13
- 77.61
- 77.29
- 76.97
- 61.71
- 14.43

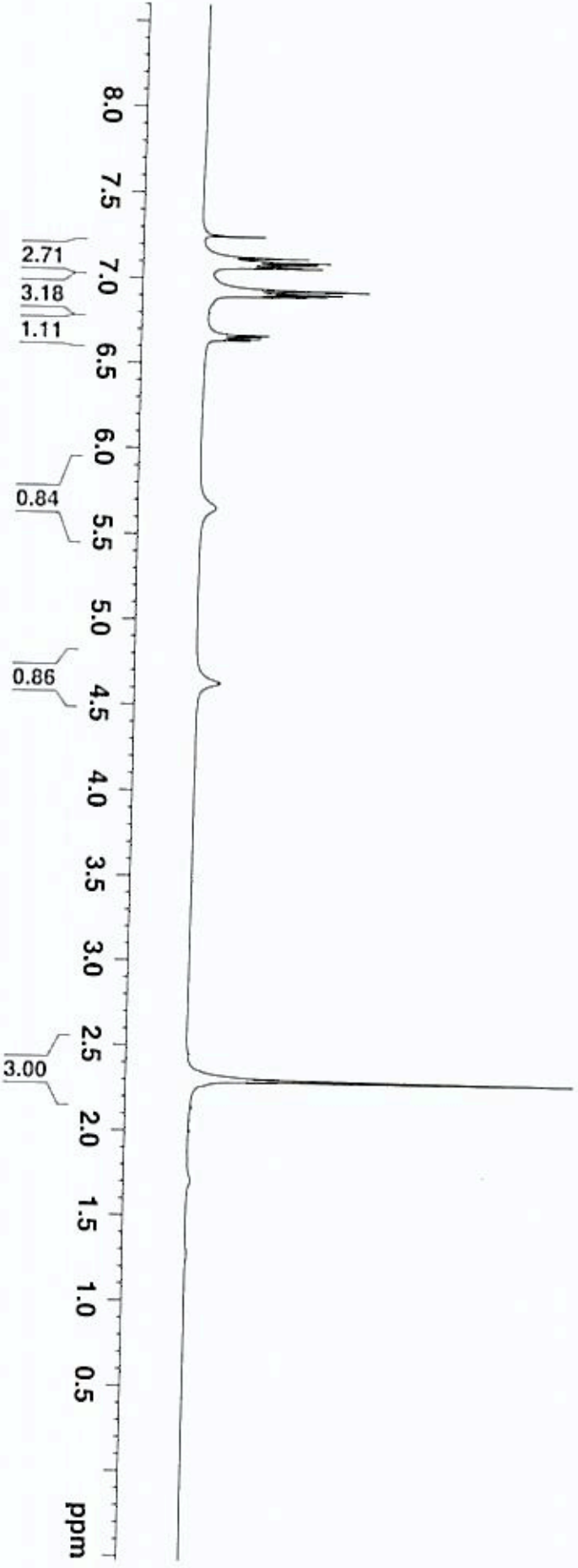




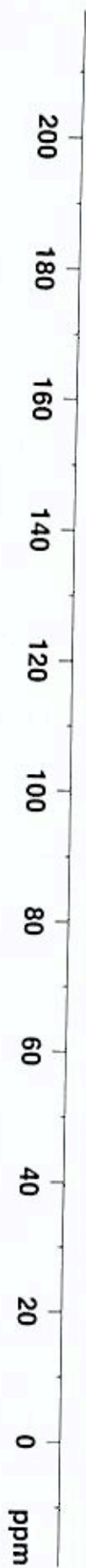
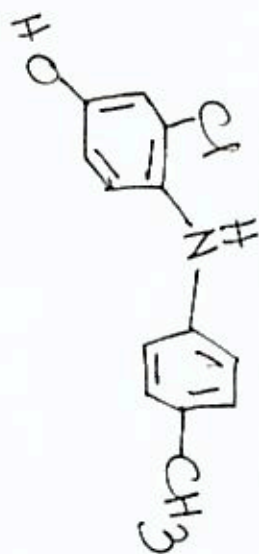


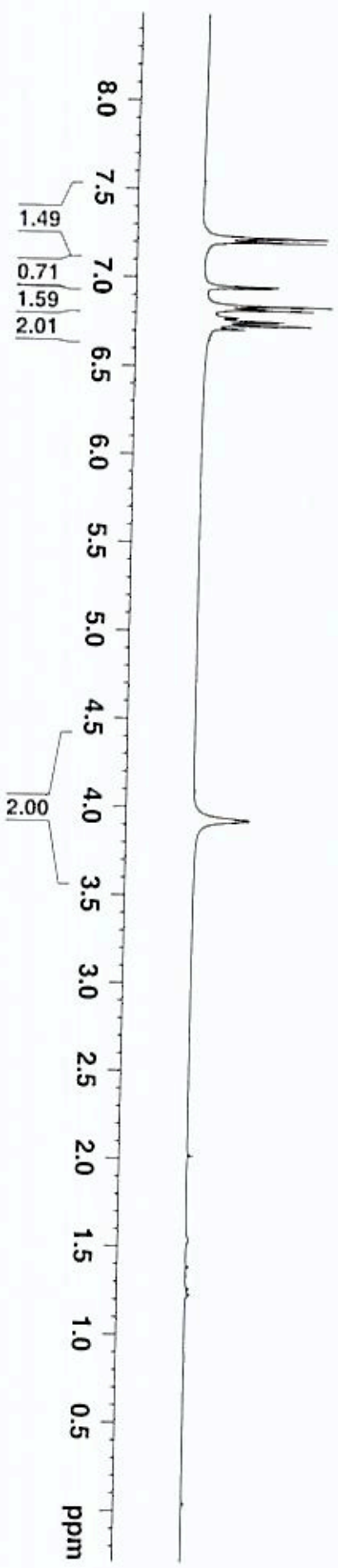
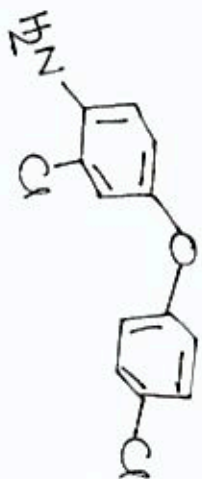


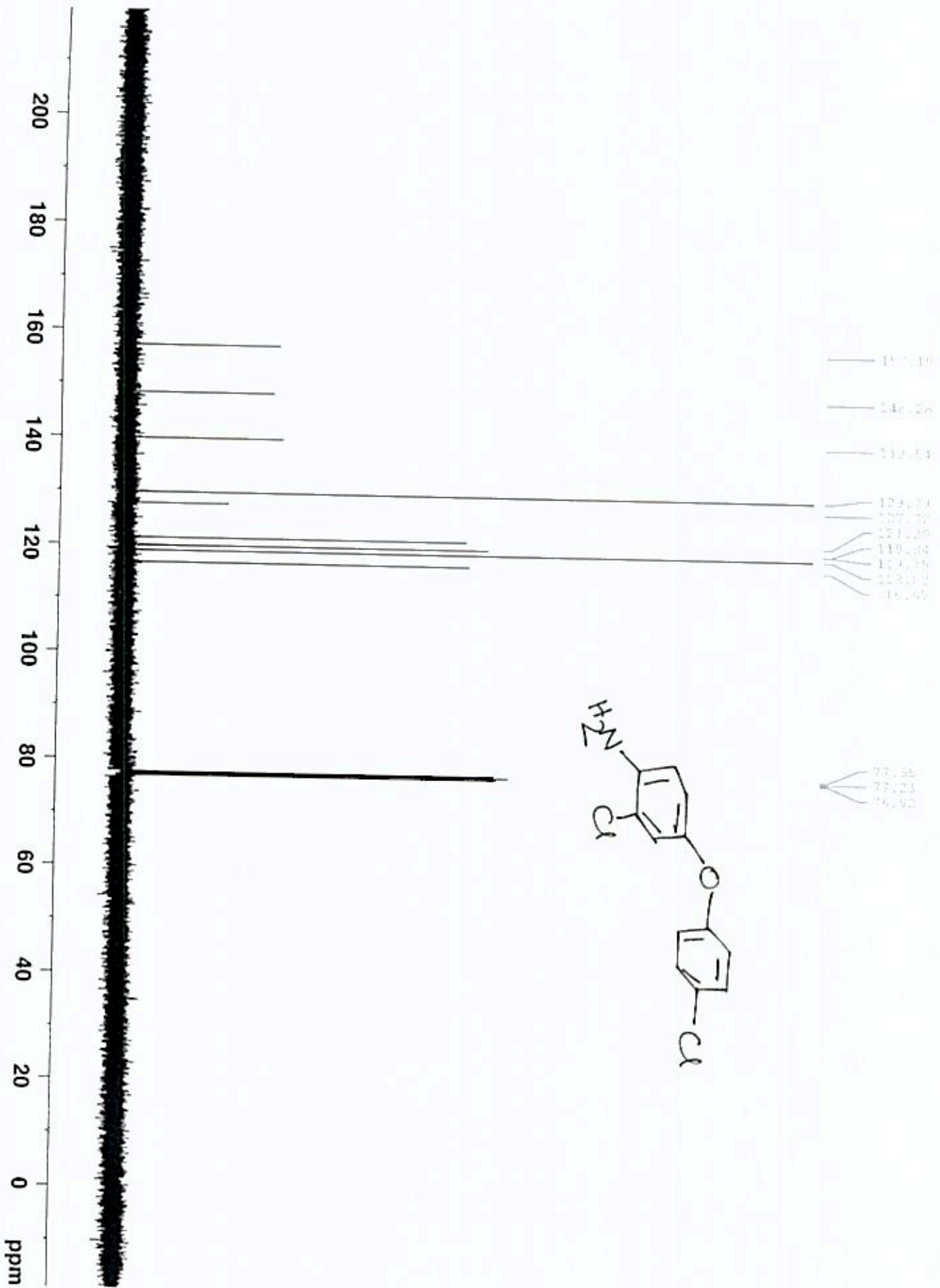
- 7.24
- 7.23
- 7.20
- 7.05
- 7.07
- 6.94
- 6.93
- 6.92
- 6.91
- 6.90
- 6.89
- 6.88
- 6.87
- 6.86
- 6.85
- 5.00
- 4.62
- 2.30

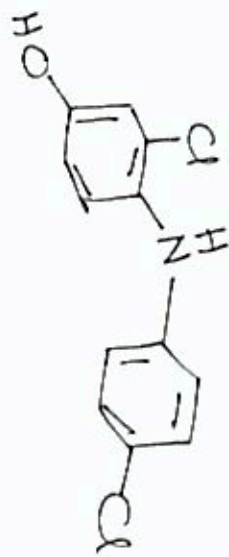




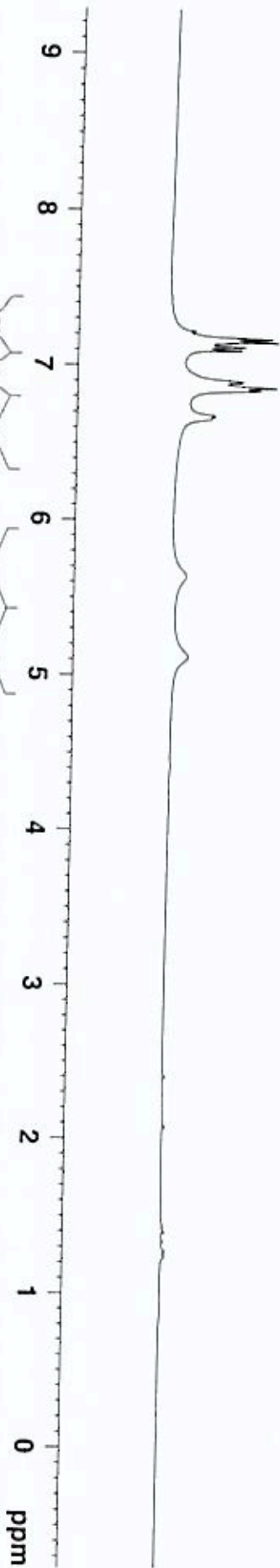


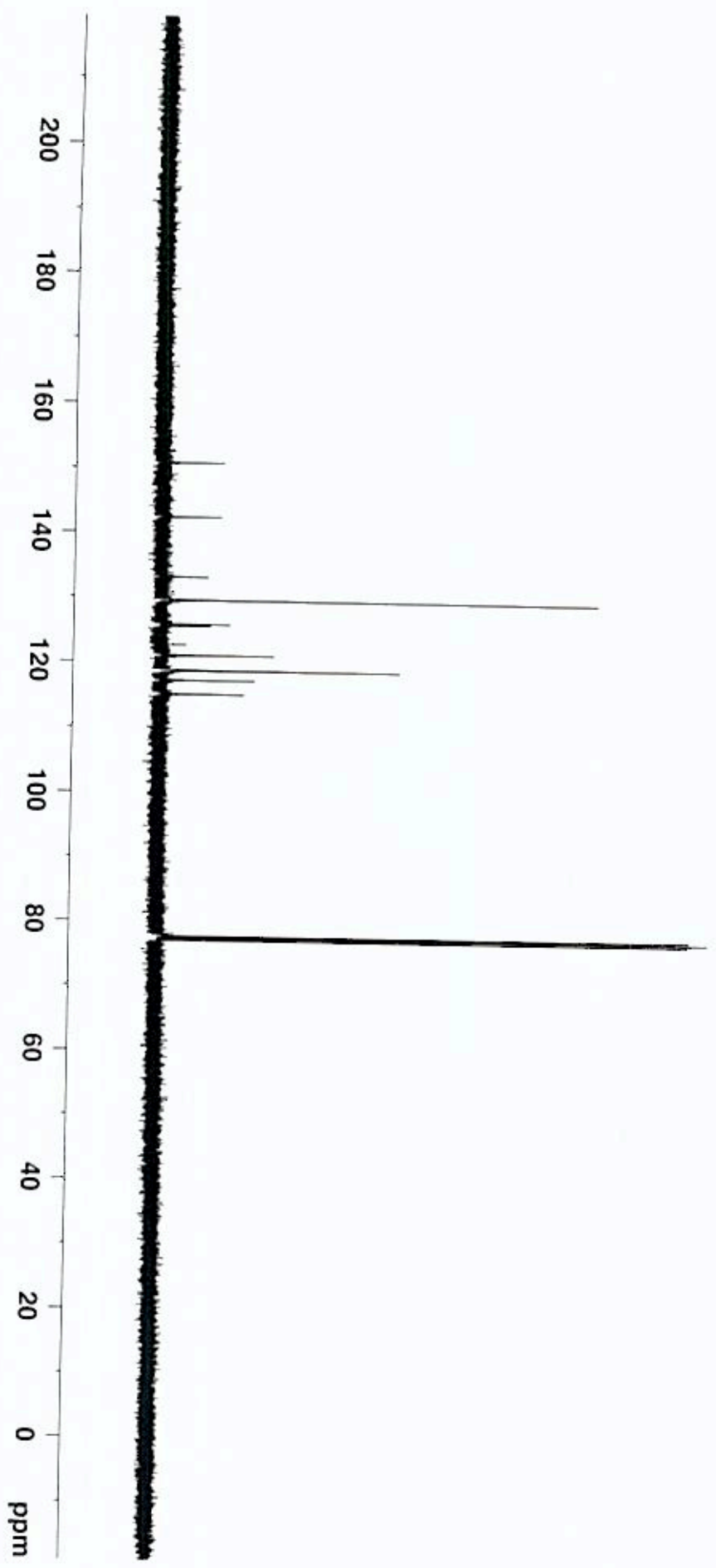
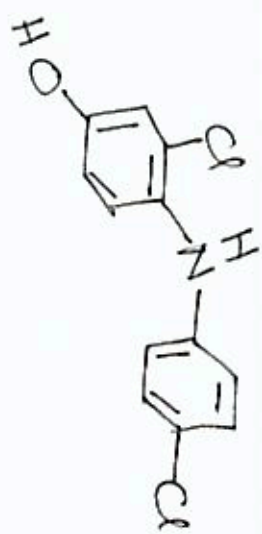


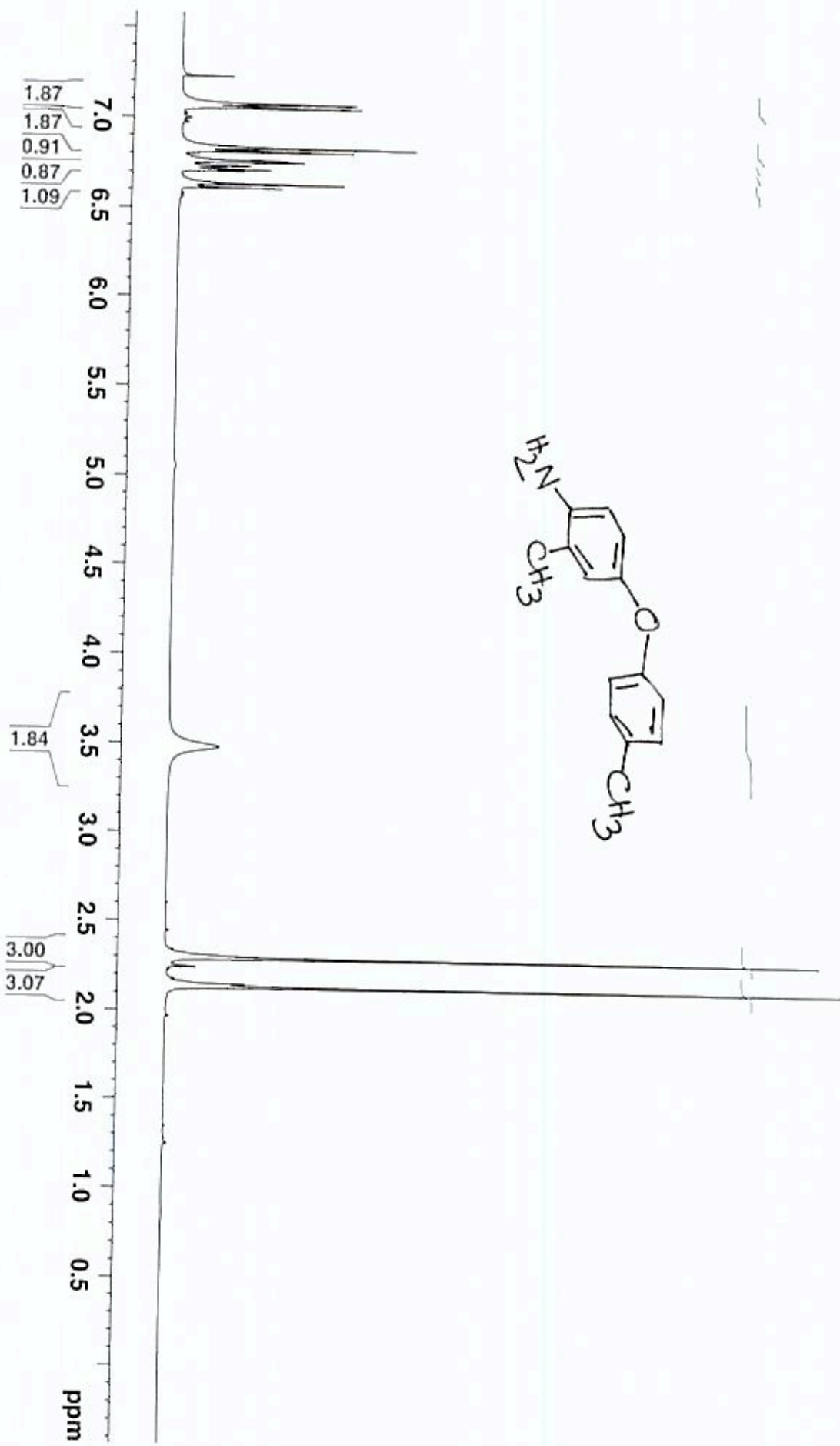


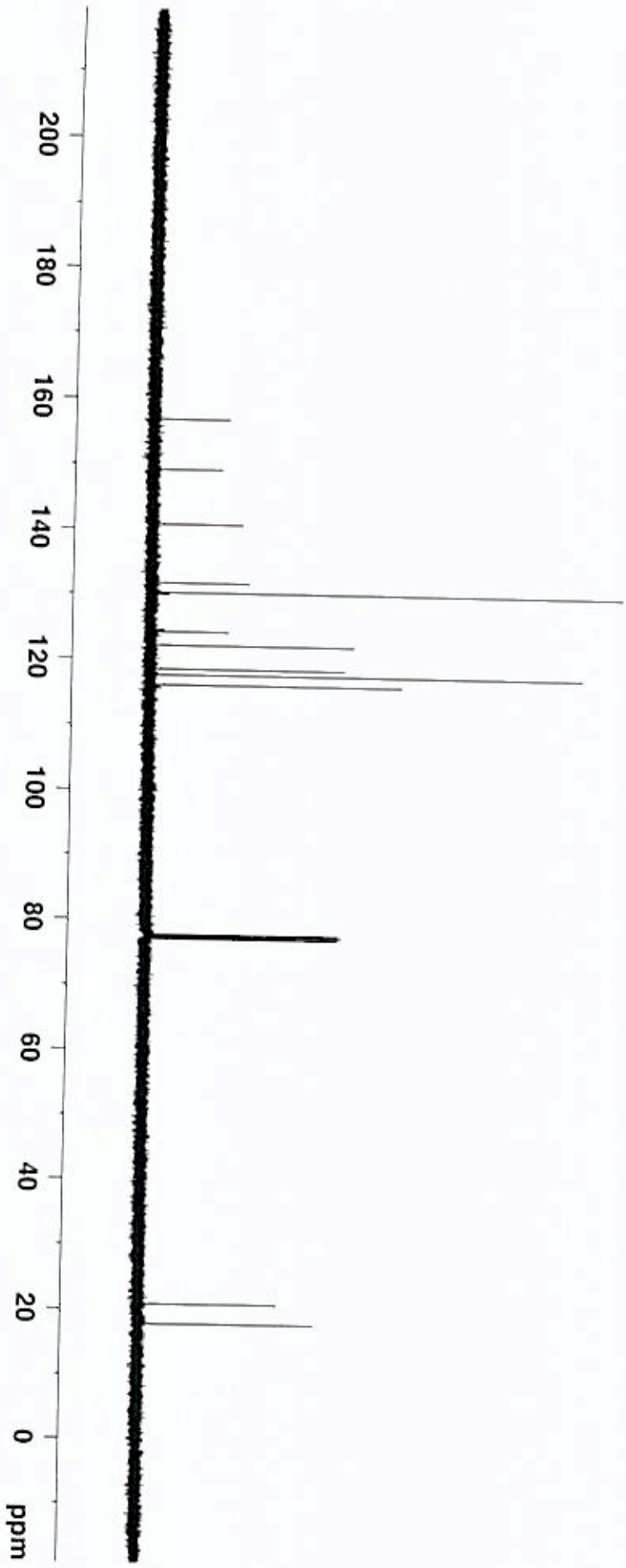
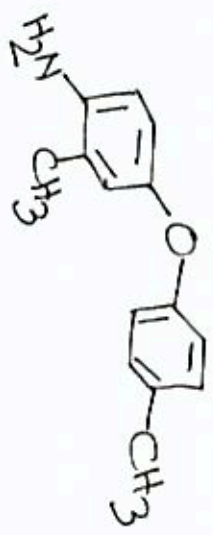


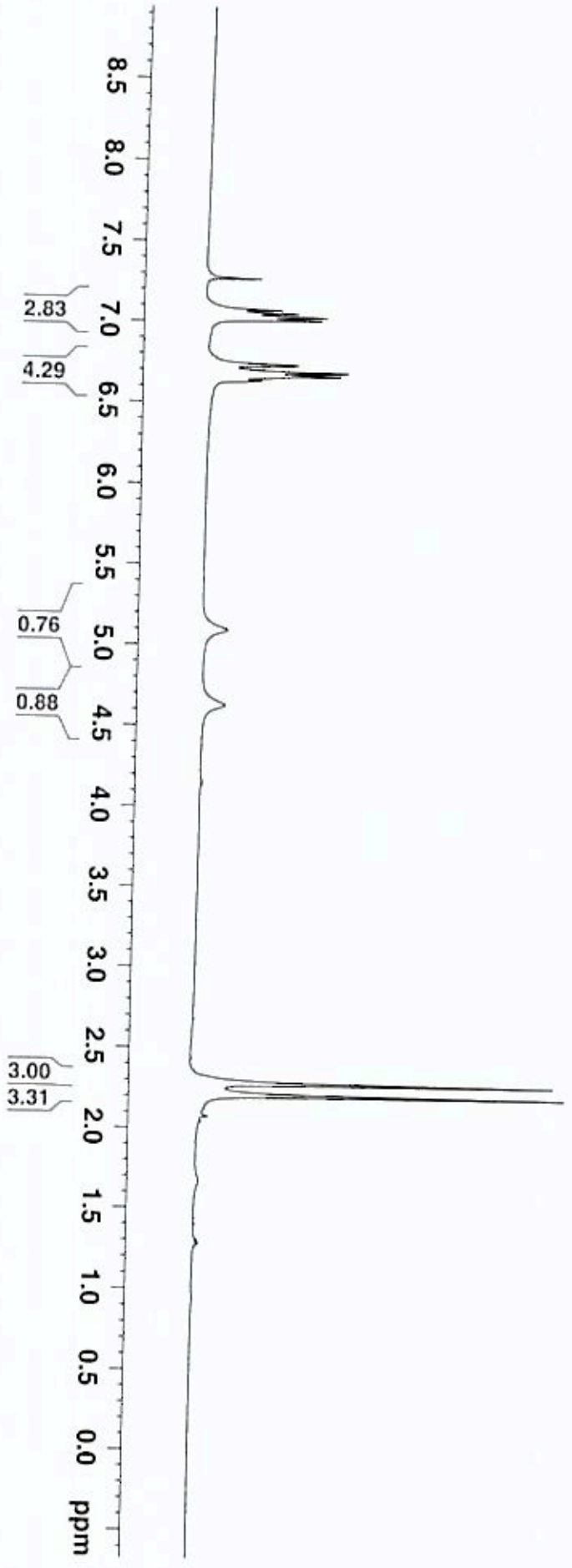
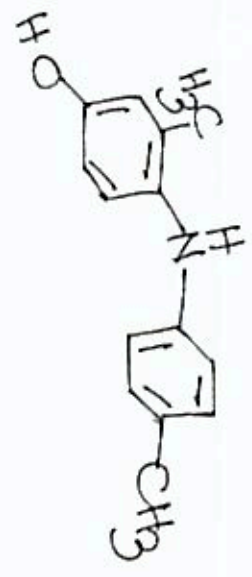
3.75  
3.13



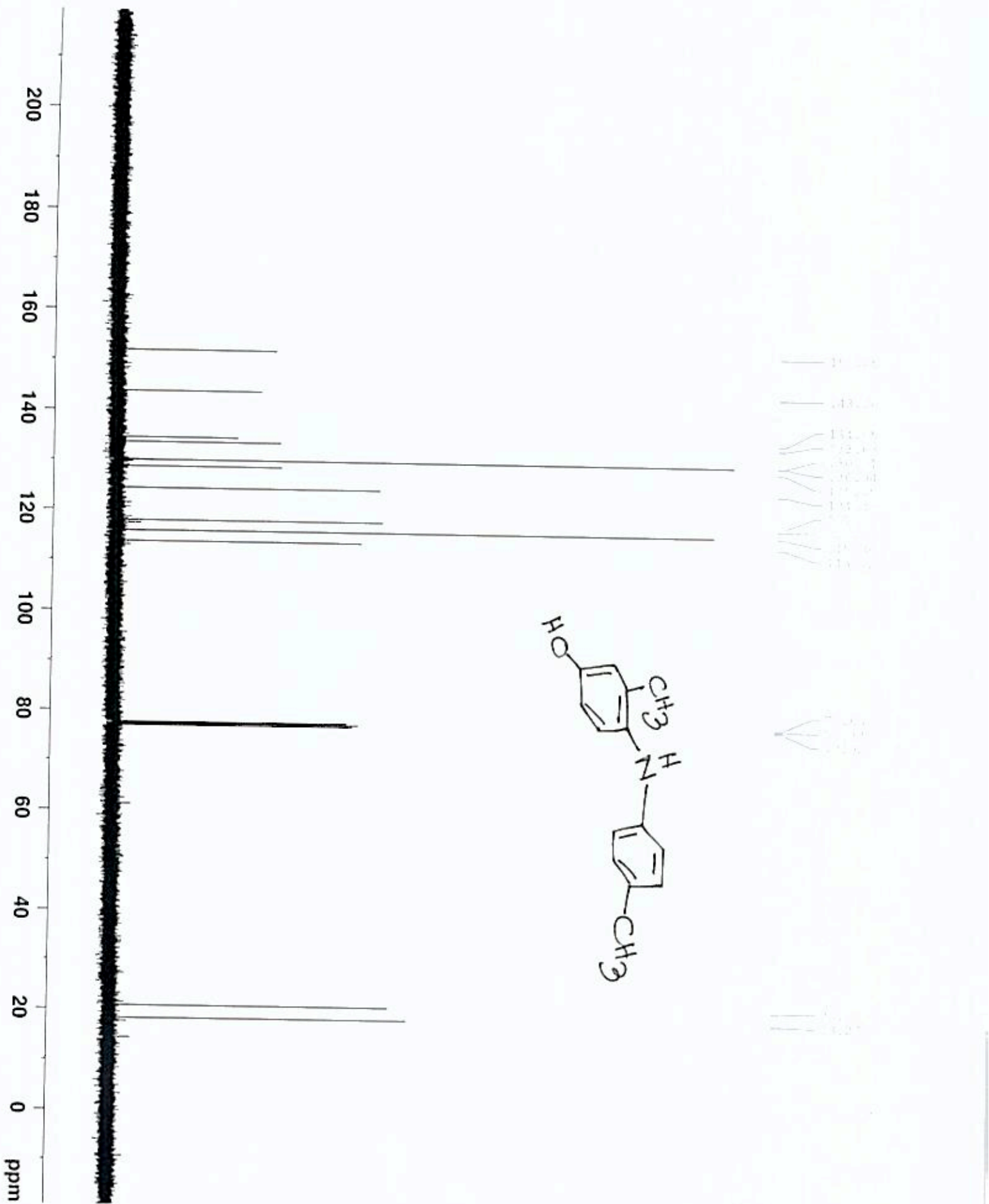


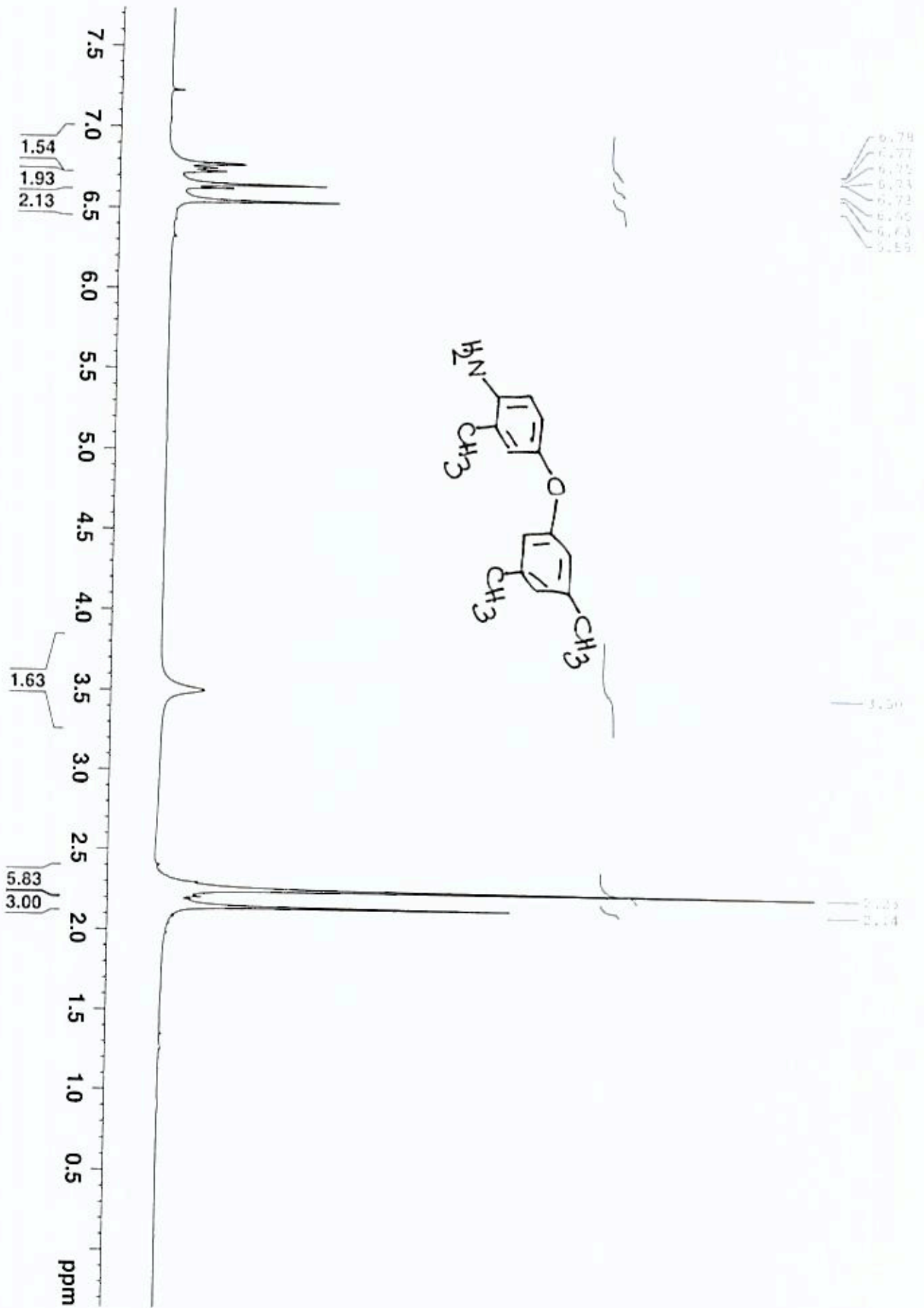


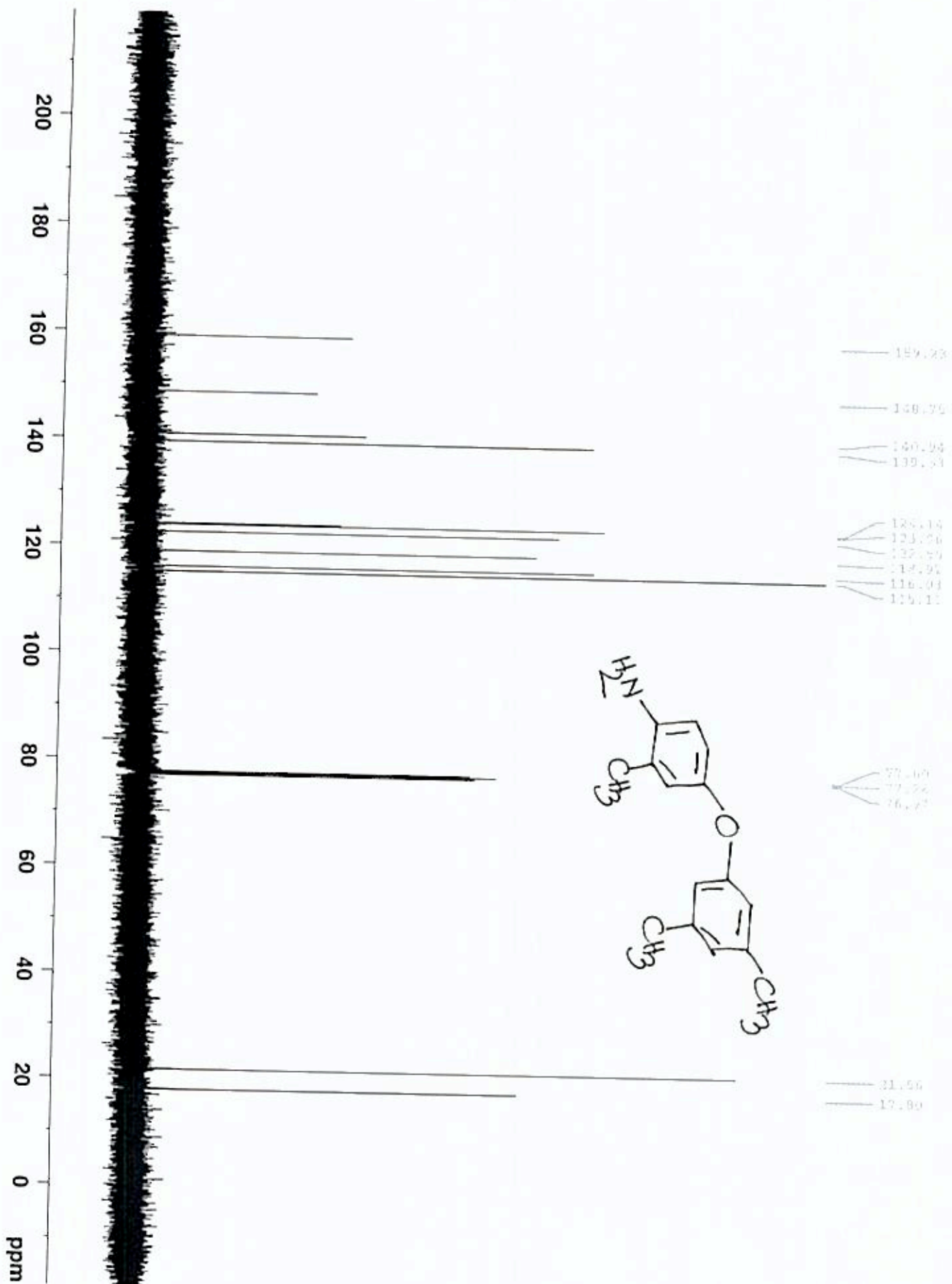


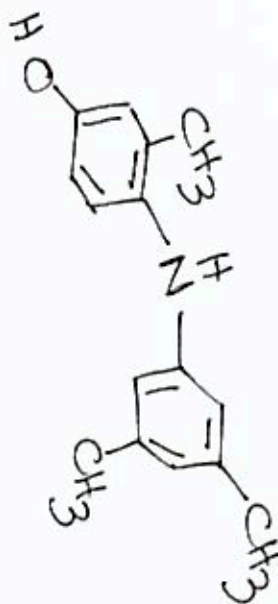
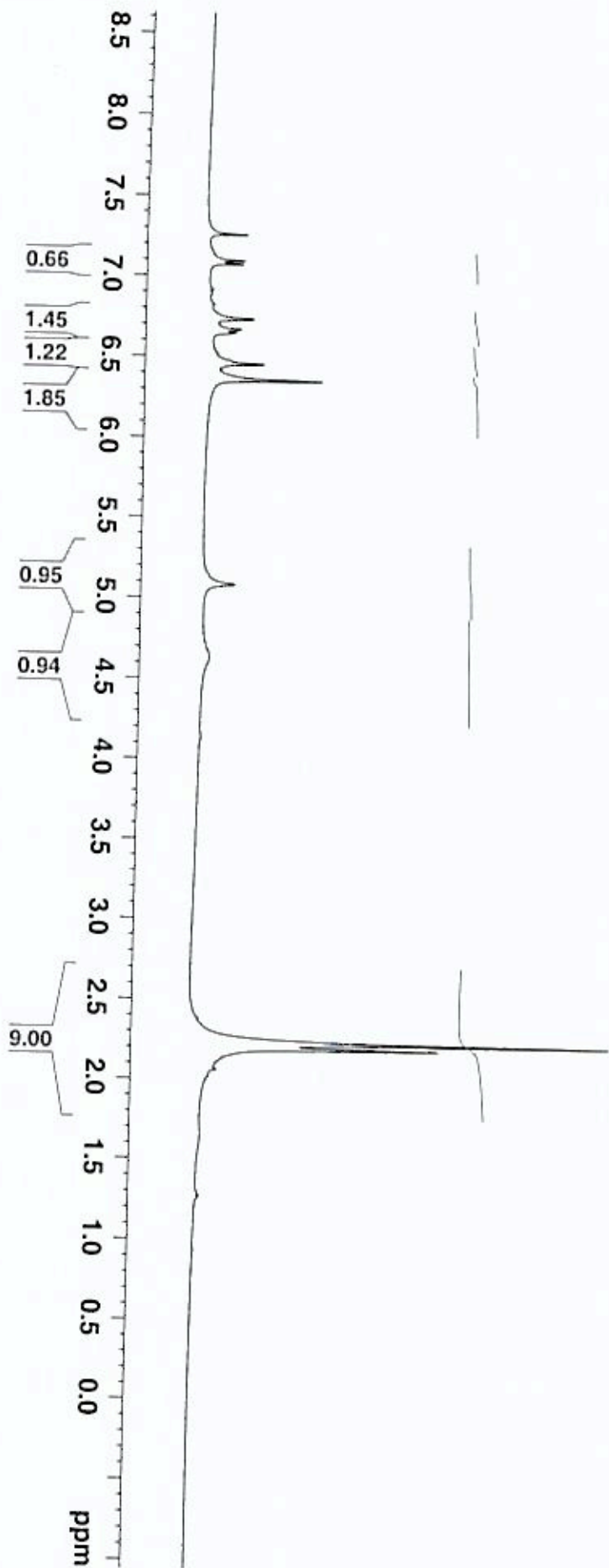




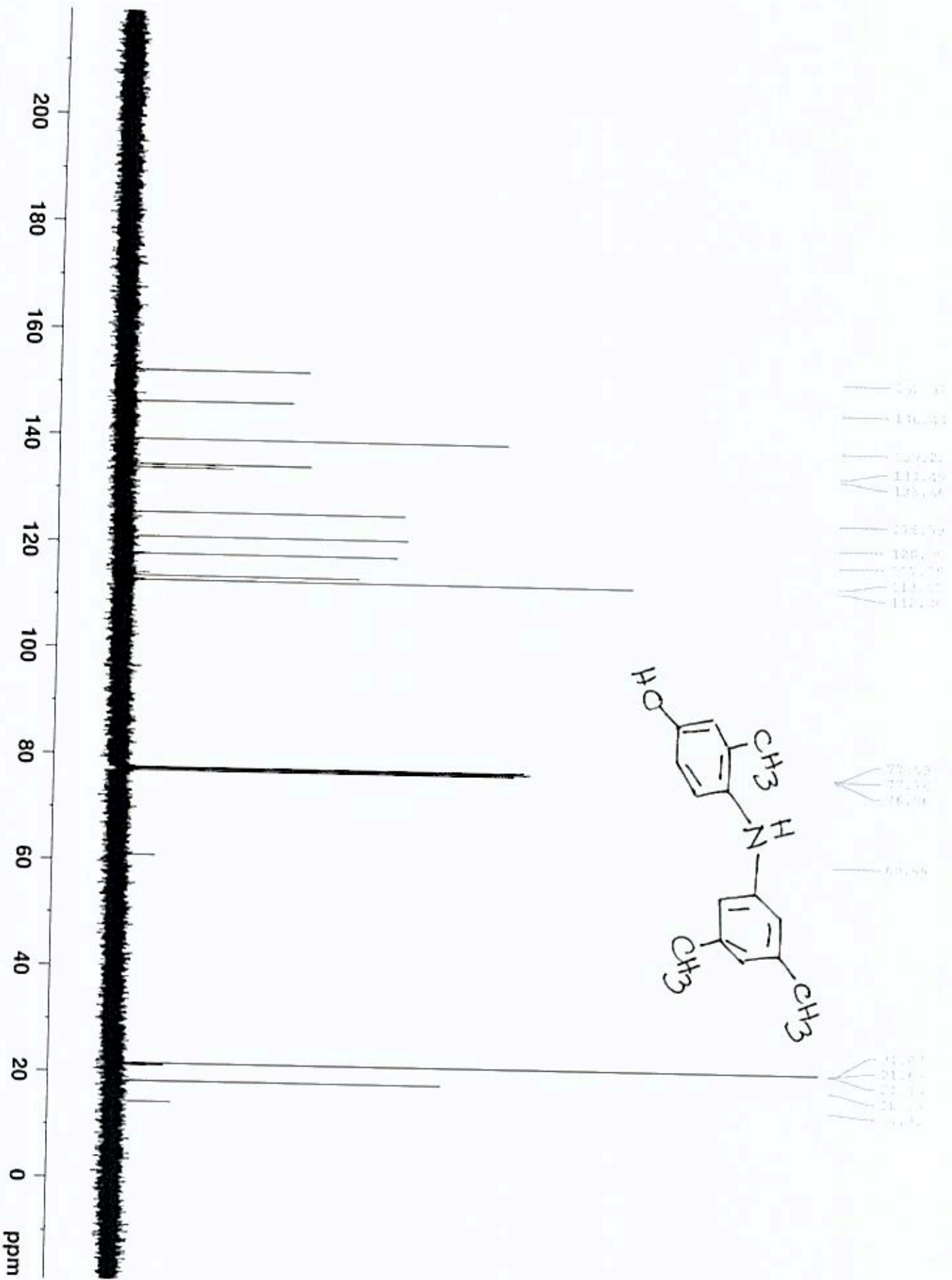


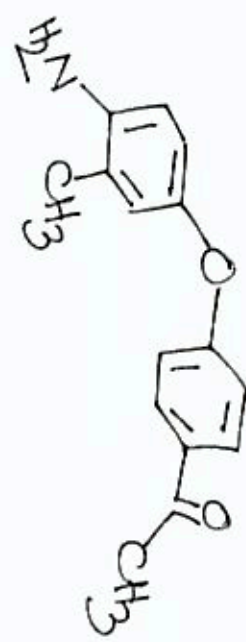
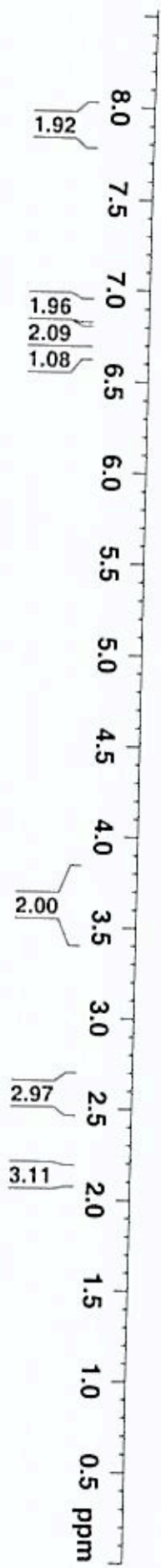


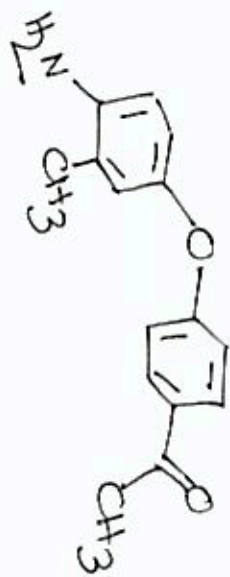
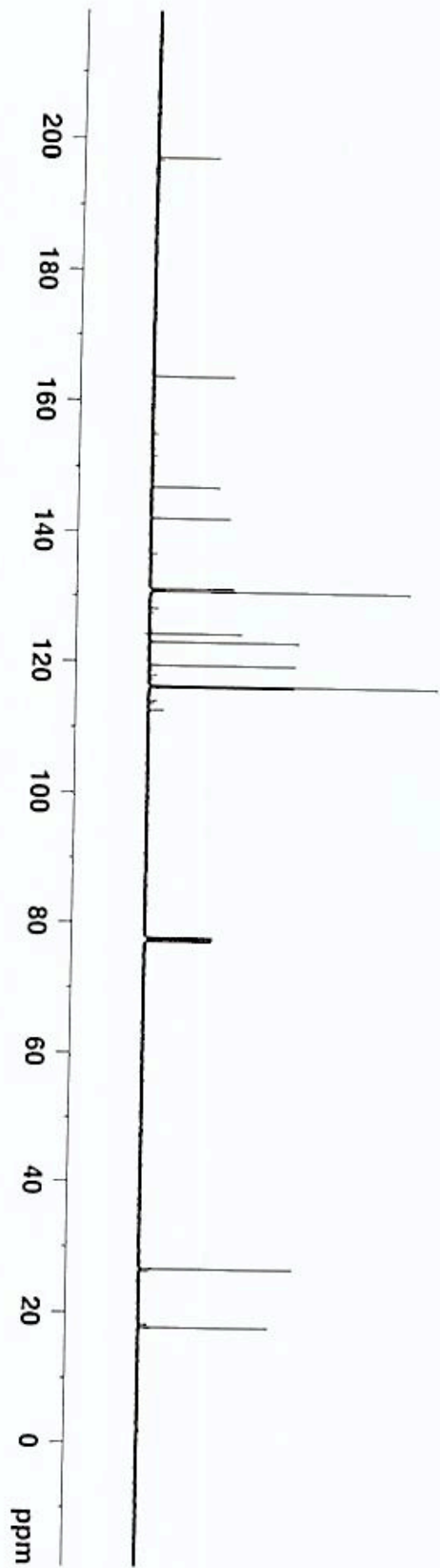




Chemical Shift (ppm)	Integration
7.26	0.66
7.17	1.45
7.07	1.22
6.23	1.85
5.87	0.94
6.03	0.95
6.45	
6.36	
2.20	9.00

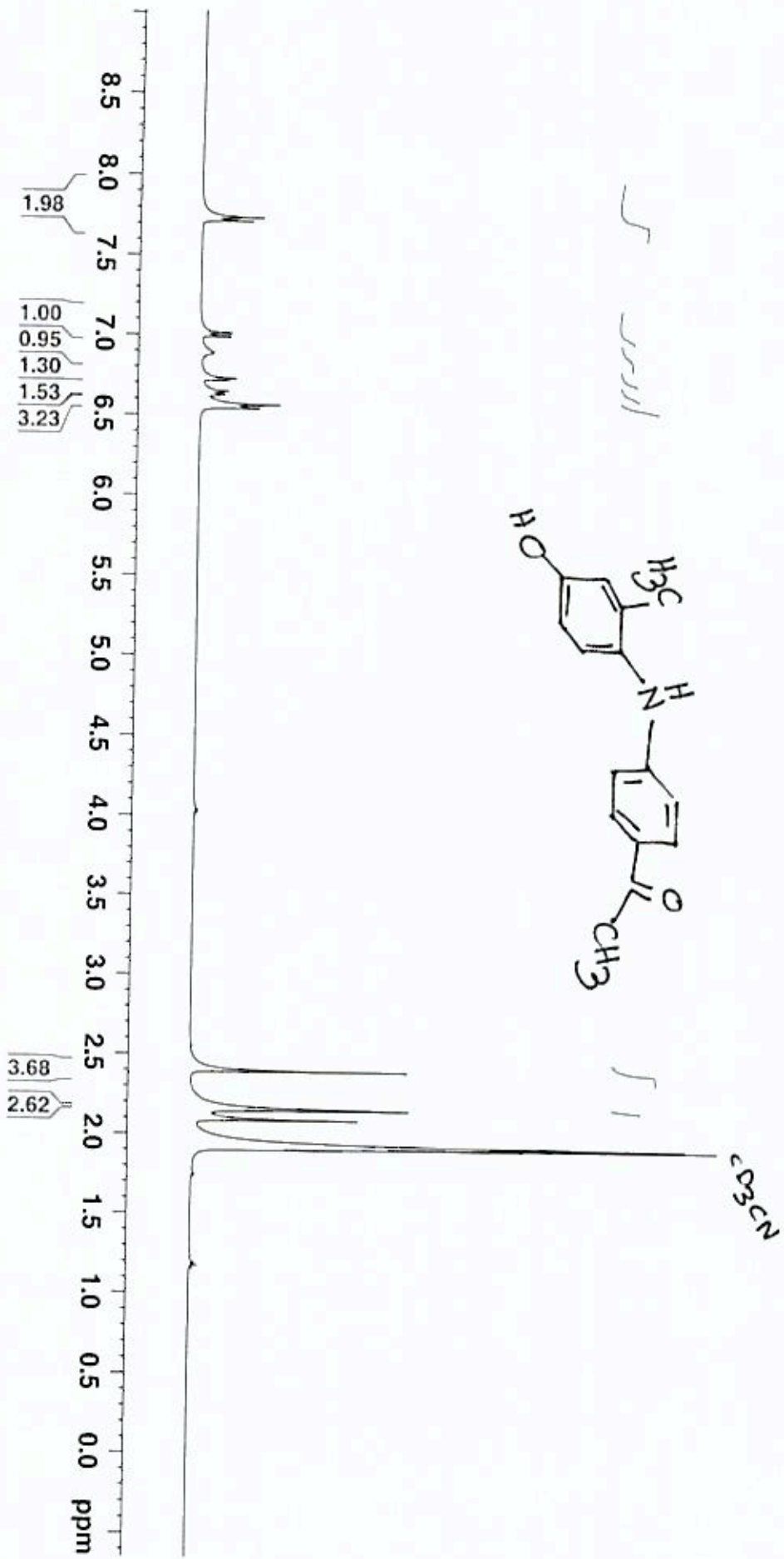




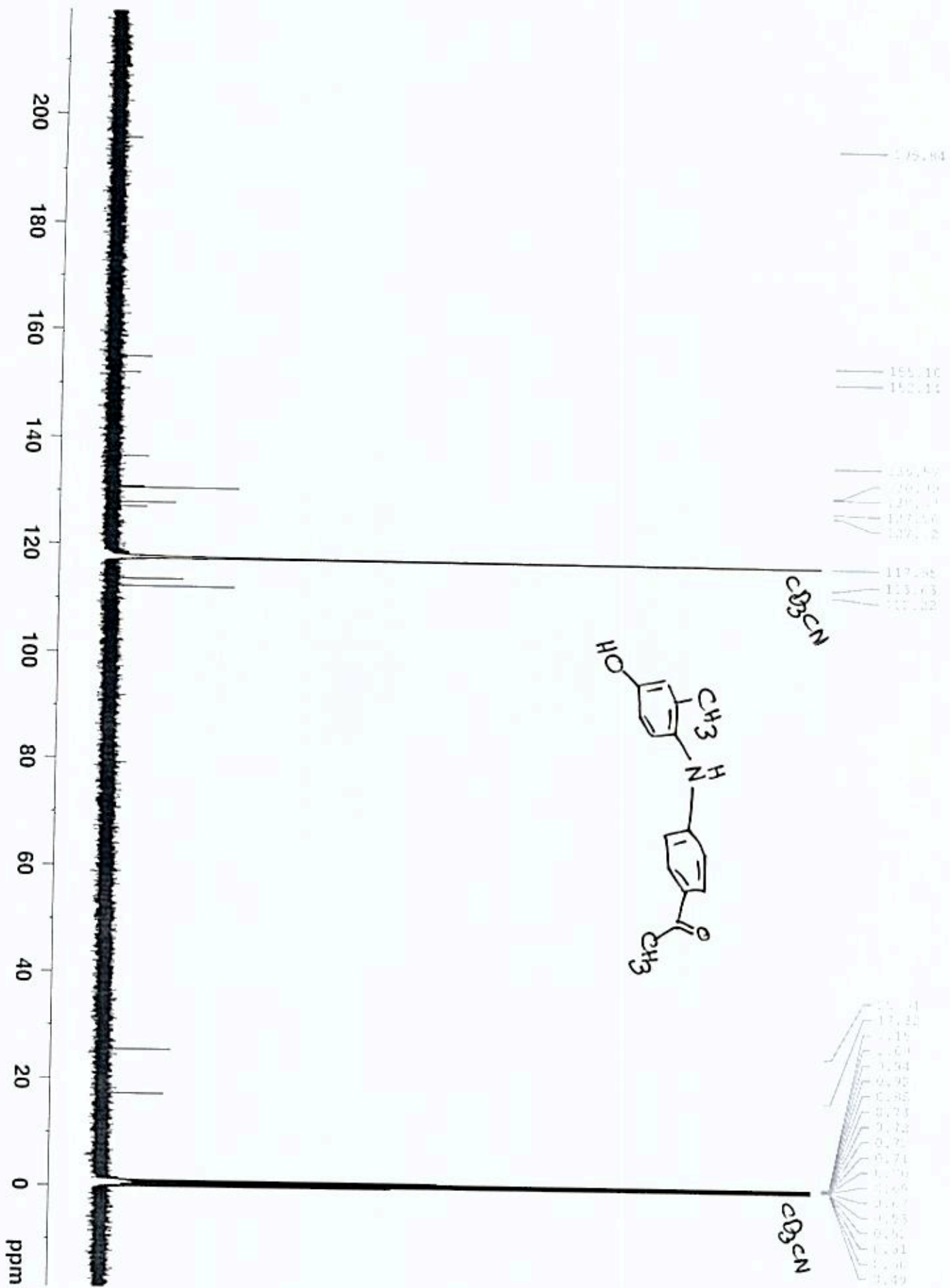


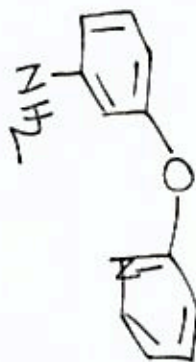
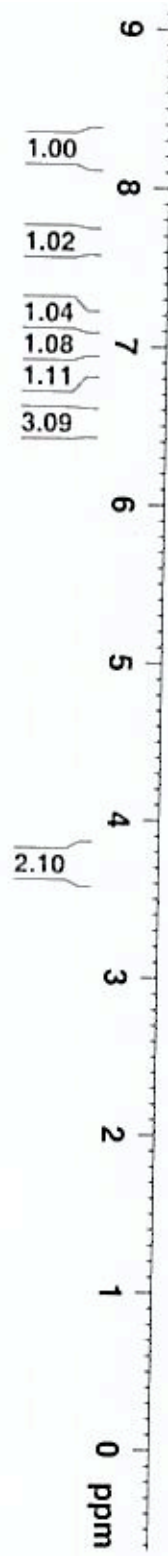
- 197.07
- 163.07
- 148.91
- 142.09
- 130.17
- 128.75
- 124.28
- 122.83
- 119.45
- 116.19
- 116.06
- 77.26
- 75.34
- 73.10
- 28.11
- 17.77

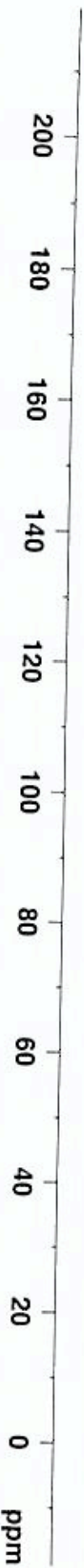






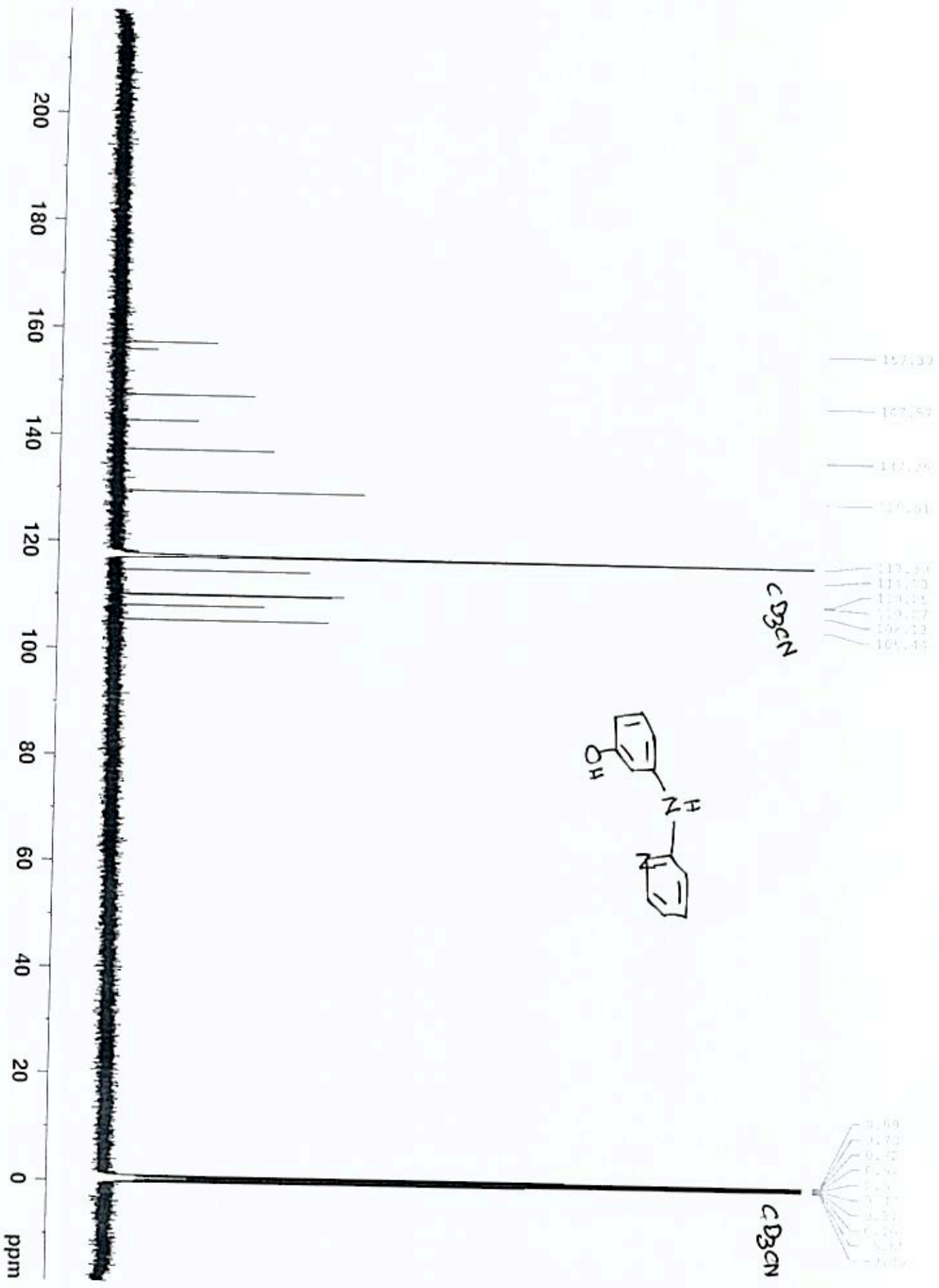


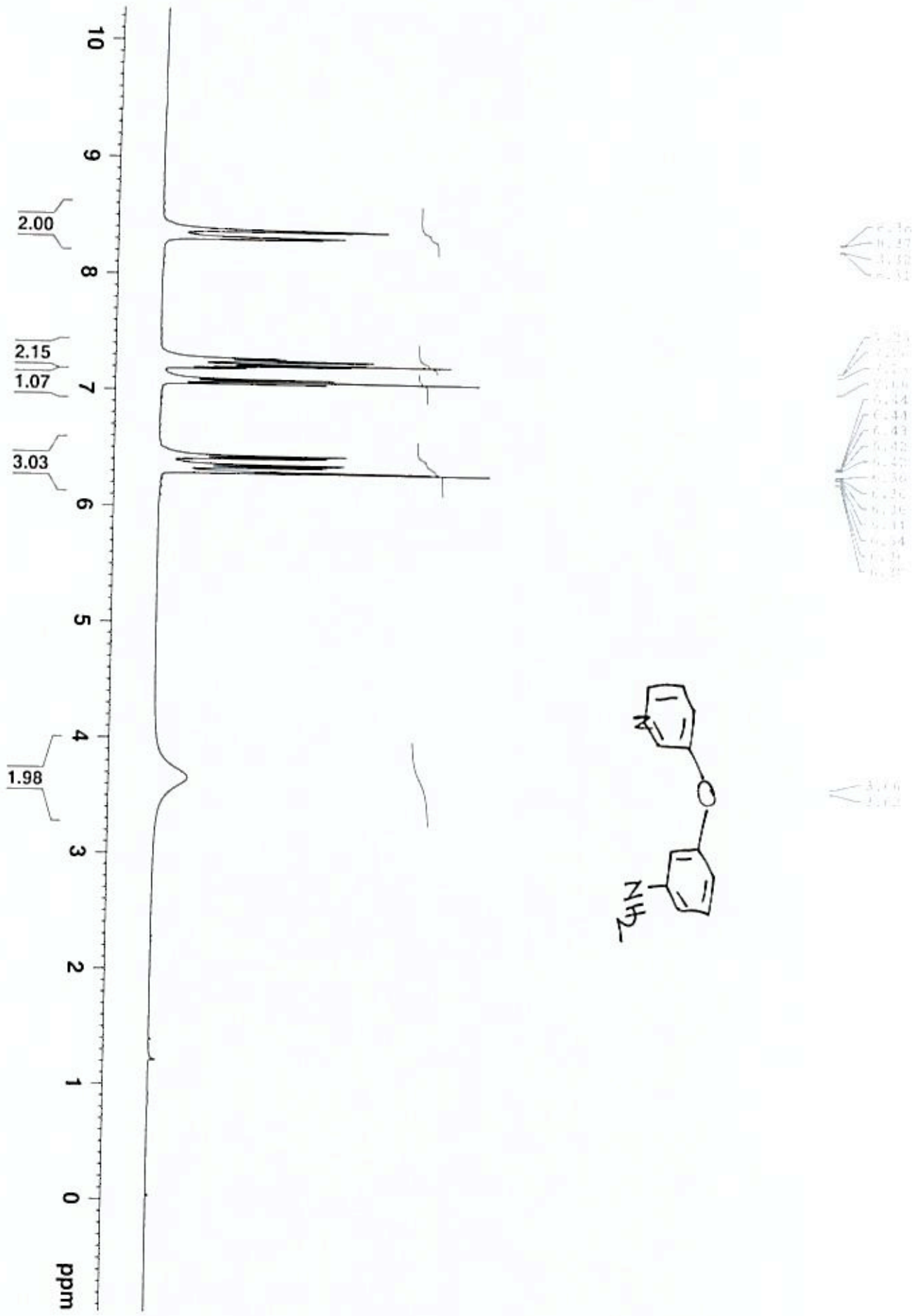


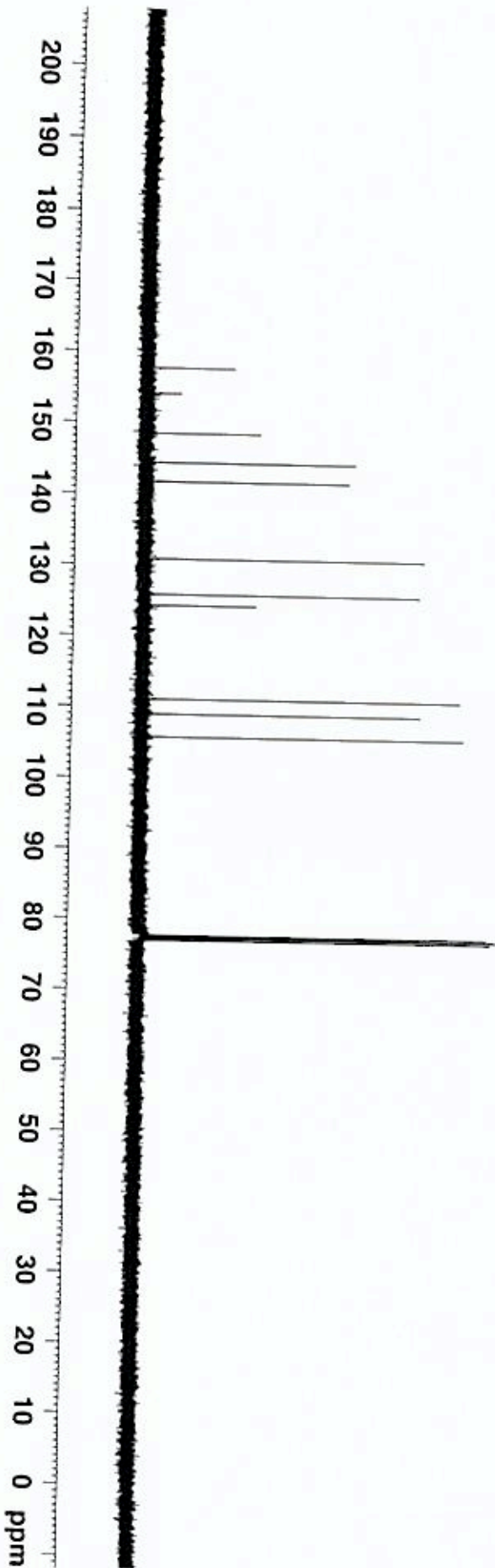


Chemical Shift (ppm)	Assignment
148.1	Aromatic C-O
147.2	Aromatic C-O
146.3	Aromatic C-O
145.4	Aromatic C-O
144.5	Aromatic C-O
143.6	Aromatic C-O
142.7	Aromatic C-O
141.8	Aromatic C-O
140.9	Aromatic C-O
140.0	Aromatic C-O
139.1	Aromatic C-O
138.2	Aromatic C-O
137.3	Aromatic C-O
136.4	Aromatic C-O
135.5	Aromatic C-O
134.6	Aromatic C-O
133.7	Aromatic C-O
132.8	Aromatic C-O
131.9	Aromatic C-O
131.0	Aromatic C-O
130.1	Aromatic C-O
129.2	Aromatic C-O
128.3	Aromatic C-O
127.4	Aromatic C-O
126.5	Aromatic C-O
125.6	Aromatic C-O
124.7	Aromatic C-O
123.8	Aromatic C-O
122.9	Aromatic C-O
122.0	Aromatic C-O
121.1	Aromatic C-O
120.2	Aromatic C-O
119.3	Aromatic C-O
118.4	Aromatic C-O
117.5	Aromatic C-O
116.6	Aromatic C-O
115.7	Aromatic C-O
114.8	Aromatic C-O
113.9	Aromatic C-O
113.0	Aromatic C-O
112.1	Aromatic C-O
111.2	Aromatic C-O
110.3	Aromatic C-O
109.4	Aromatic C-O
108.5	Aromatic C-O
107.6	Aromatic C-O
106.7	Aromatic C-O
105.8	Aromatic C-O
104.9	Aromatic C-O
104.0	Aromatic C-O
103.1	Aromatic C-O
102.2	Aromatic C-O
101.3	Aromatic C-O
100.4	Aromatic C-O
99.5	Aromatic C-O
98.6	Aromatic C-O
97.7	Aromatic C-O
96.8	Aromatic C-O
95.9	Aromatic C-O
95.0	Aromatic C-O
94.1	Aromatic C-O
93.2	Aromatic C-O
92.3	Aromatic C-O
91.4	Aromatic C-O
90.5	Aromatic C-O
89.6	Aromatic C-O
88.7	Aromatic C-O
87.8	Aromatic C-O
86.9	Aromatic C-O
86.0	Aromatic C-O
85.1	Aromatic C-O
84.2	Aromatic C-O
83.3	Aromatic C-O
82.4	Aromatic C-O
81.5	Aromatic C-O
80.6	Aromatic C-O
79.7	Aromatic C-O
78.8	Aromatic C-O
77.9	Aromatic C-O
77.0	CDCl <sub>3</sub>
76.1	Aromatic C-O
75.2	Aromatic C-O
74.3	Aromatic C-O
73.4	Aromatic C-O
72.5	Aromatic C-O
71.6	Aromatic C-O
70.7	Aromatic C-O
69.8	Aromatic C-O
68.9	Aromatic C-O
68.0	Aromatic C-O
67.1	Aromatic C-O
66.2	Aromatic C-O
65.3	Aromatic C-O
64.4	Aromatic C-O
63.5	Aromatic C-O
62.6	Aromatic C-O
61.7	Aromatic C-O
60.8	Aromatic C-O
59.9	Aromatic C-O
59.0	Aromatic C-O
58.1	Aromatic C-O
57.2	Aromatic C-O
56.3	Aromatic C-O
55.4	Aromatic C-O
54.5	Aromatic C-O
53.6	Aromatic C-O
52.7	Aromatic C-O
51.8	Aromatic C-O
50.9	Aromatic C-O
50.0	Aromatic C-O
49.1	Aromatic C-O
48.2	Aromatic C-O
47.3	Aromatic C-O
46.4	Aromatic C-O
45.5	Aromatic C-O
44.6	Aromatic C-O
43.7	Aromatic C-O
42.8	Aromatic C-O
41.9	Aromatic C-O
41.0	Aromatic C-O
40.1	Aromatic C-O
39.2	Aromatic C-O
38.3	Aromatic C-O
37.4	Aromatic C-O
36.5	Aromatic C-O
35.6	Aromatic C-O
34.7	Aromatic C-O
33.8	Aromatic C-O
32.9	Aromatic C-O
32.0	Aromatic C-O
31.1	Aromatic C-O
30.2	Aromatic C-O
29.3	Aromatic C-O
28.4	Aromatic C-O
27.5	Aromatic C-O
26.6	Aromatic C-O
25.7	Aromatic C-O
24.8	Aromatic C-O
23.9	Aromatic C-O
23.0	Aromatic C-O
22.1	Aromatic C-O
21.2	Aromatic C-O
20.3	Aromatic C-O
19.4	Aromatic C-O
18.5	Aromatic C-O
17.6	Aromatic C-O
16.7	Aromatic C-O
15.8	Aromatic C-O
14.9	Aromatic C-O
14.0	Aromatic C-O
13.1	Aromatic C-O
12.2	Aromatic C-O
11.3	Aromatic C-O
10.4	Aromatic C-O
9.5	Aromatic C-O
8.6	Aromatic C-O
7.7	Aromatic C-O
6.8	Aromatic C-O
5.9	Aromatic C-O
5.0	Aromatic C-O
4.1	Aromatic C-O
3.2	Aromatic C-O
2.3	Aromatic C-O
1.4	Aromatic C-O
0.5	Aromatic C-O

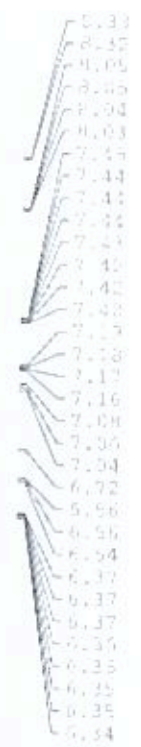
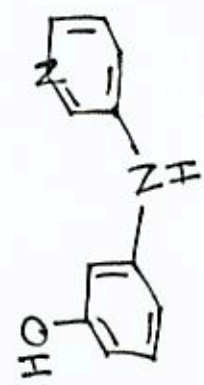
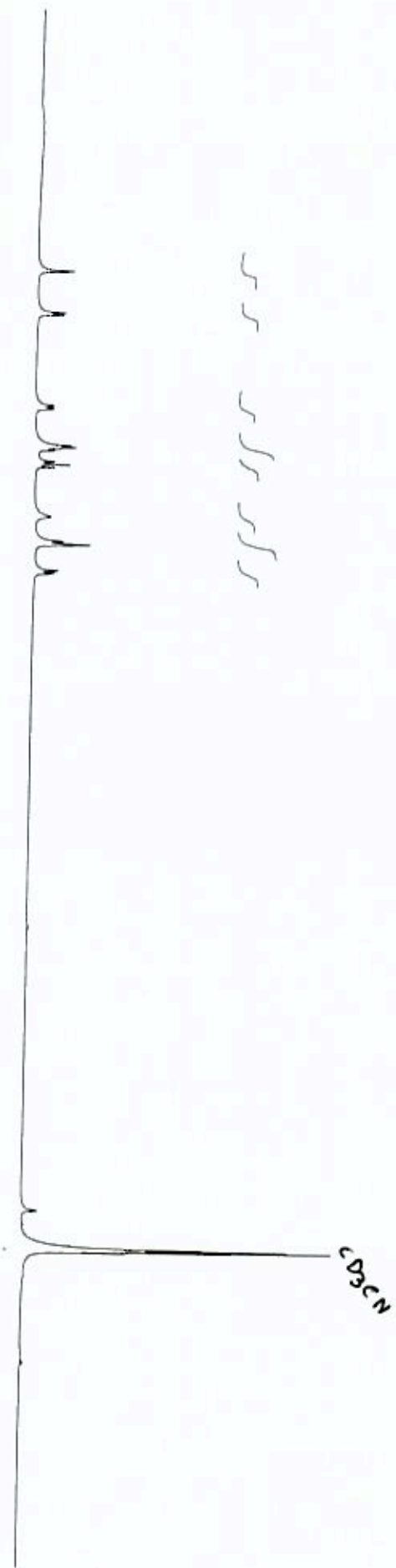
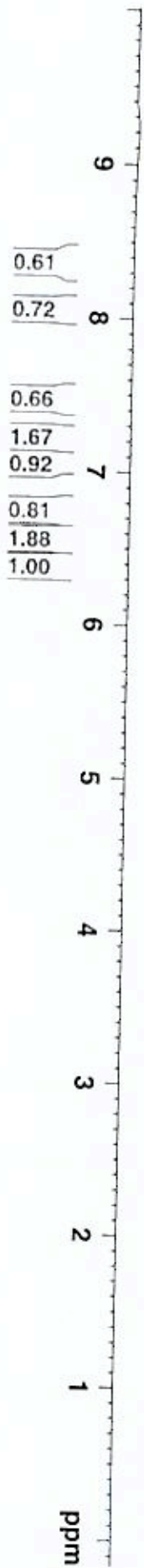




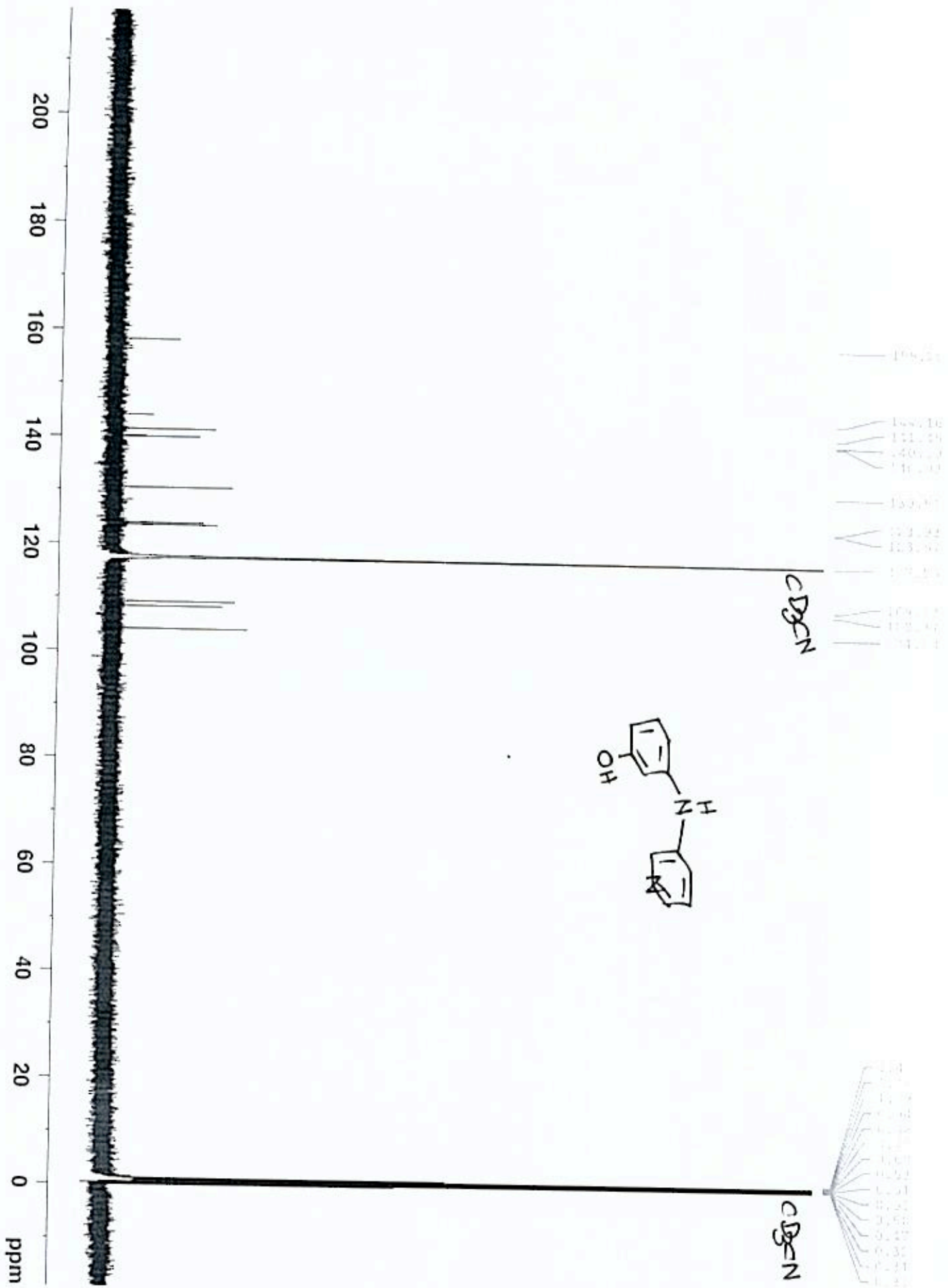


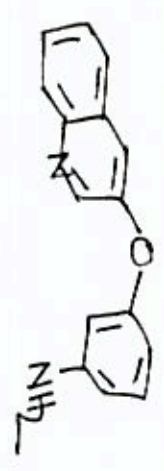
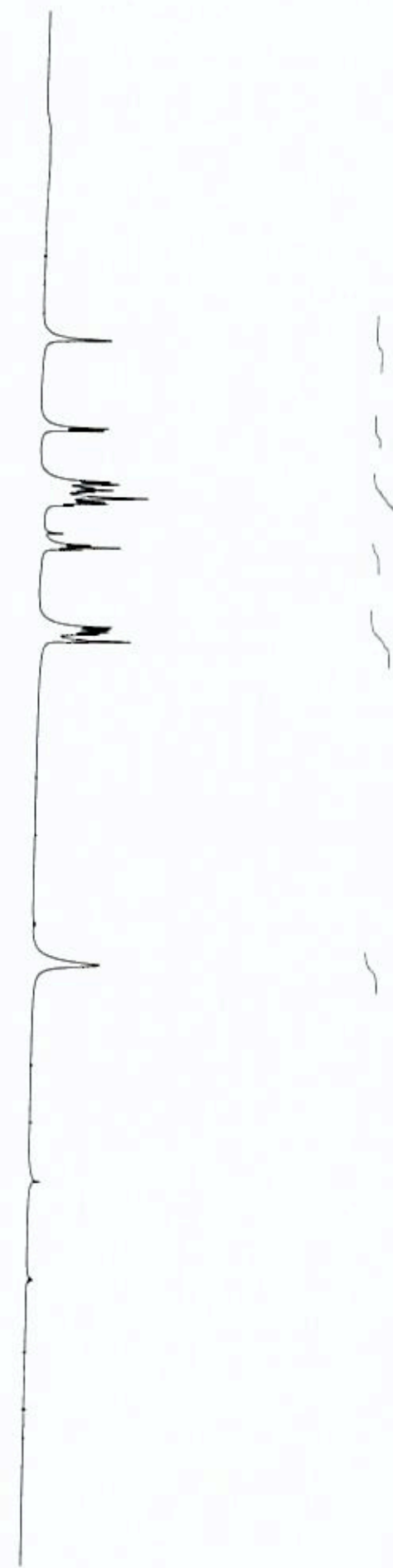


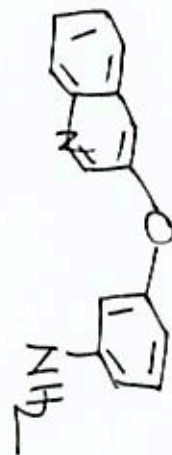




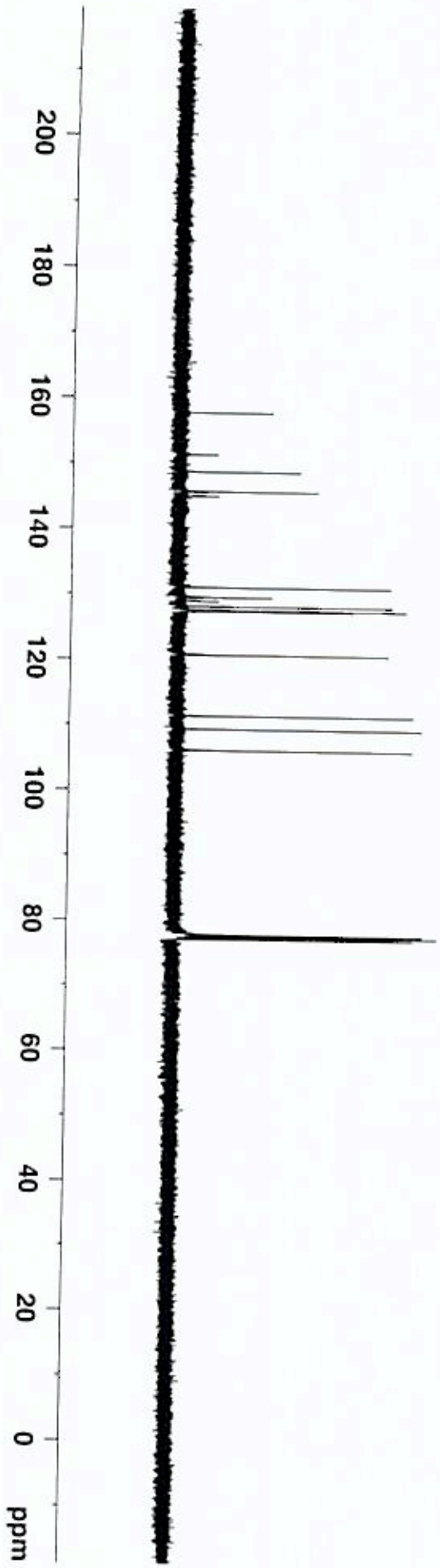


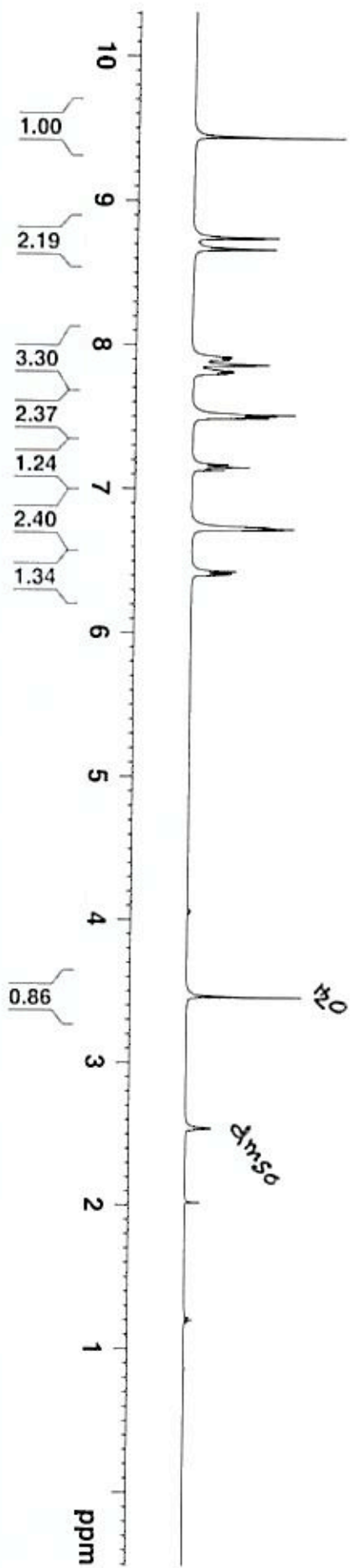


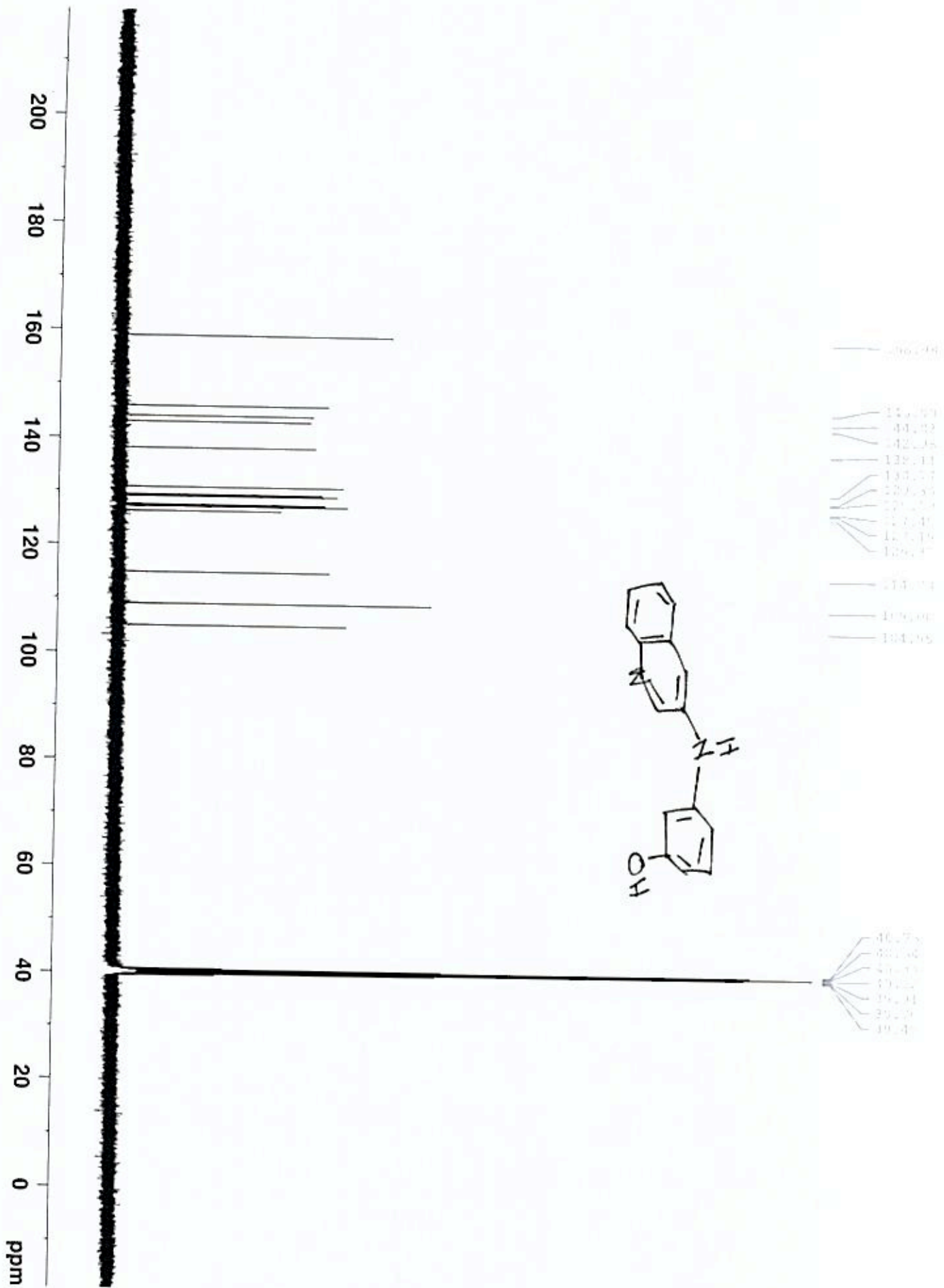




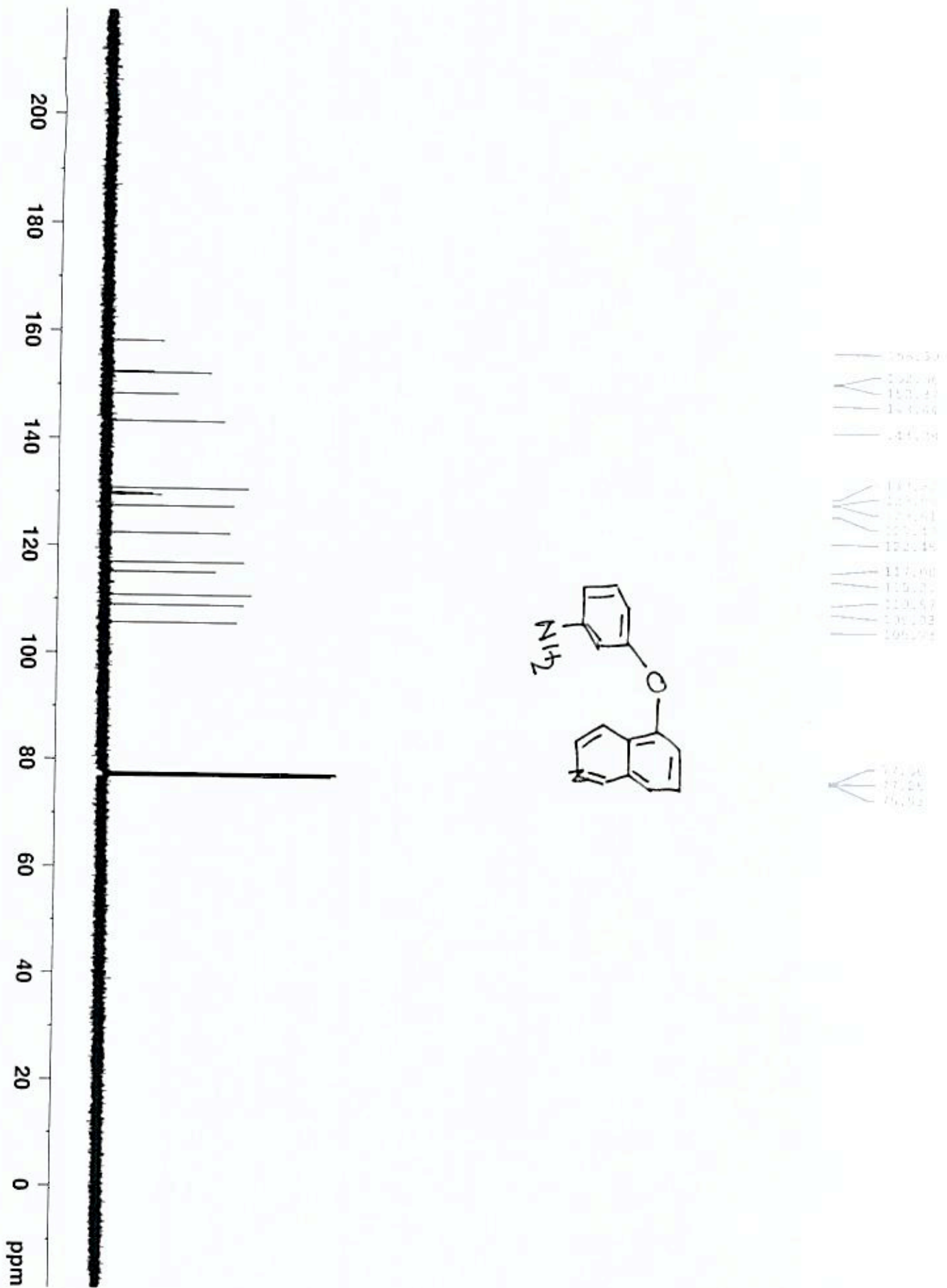
Chemical Shift (ppm)	Integration
7.81	1.00
7.71	1.00
7.61	1.00
7.51	1.00
7.41	1.00
7.31	1.00
7.21	1.00
7.11	1.00
7.01	1.00
6.91	1.00
6.81	1.00
6.71	1.00
6.61	1.00
6.51	1.00
6.41	1.00
6.31	1.00
6.21	1.00
6.11	1.00
6.01	1.00
5.91	1.00
5.81	1.00
5.71	1.00
5.61	1.00
5.51	1.00
5.41	1.00
5.31	1.00
5.21	1.00
5.11	1.00
5.01	1.00
4.91	1.00
4.81	1.00
4.71	1.00
4.61	1.00
4.51	1.00
4.41	1.00
4.31	1.00
4.21	1.00
4.11	1.00
4.01	1.00
3.91	1.00
3.81	1.00
3.71	1.00
3.61	1.00
3.51	1.00
3.41	1.00
3.31	1.00
3.21	1.00
3.11	1.00
3.01	1.00
2.91	1.00
2.81	1.00
2.71	1.00
2.61	1.00
2.51	1.00
2.41	1.00
2.31	1.00
2.21	1.00
2.11	1.00
2.01	1.00
1.91	1.00
1.81	1.00
1.71	1.00
1.61	1.00
1.51	1.00
1.41	1.00
1.31	1.00
1.21	1.00
1.11	1.00
1.01	1.00
0.91	1.00
0.81	1.00
0.71	1.00
0.61	1.00
0.51	1.00
0.41	1.00
0.31	1.00
0.21	1.00
0.11	1.00
0.01	1.00

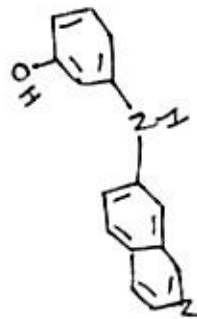
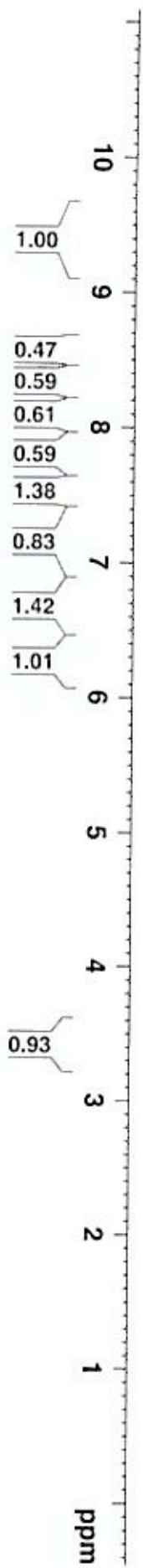




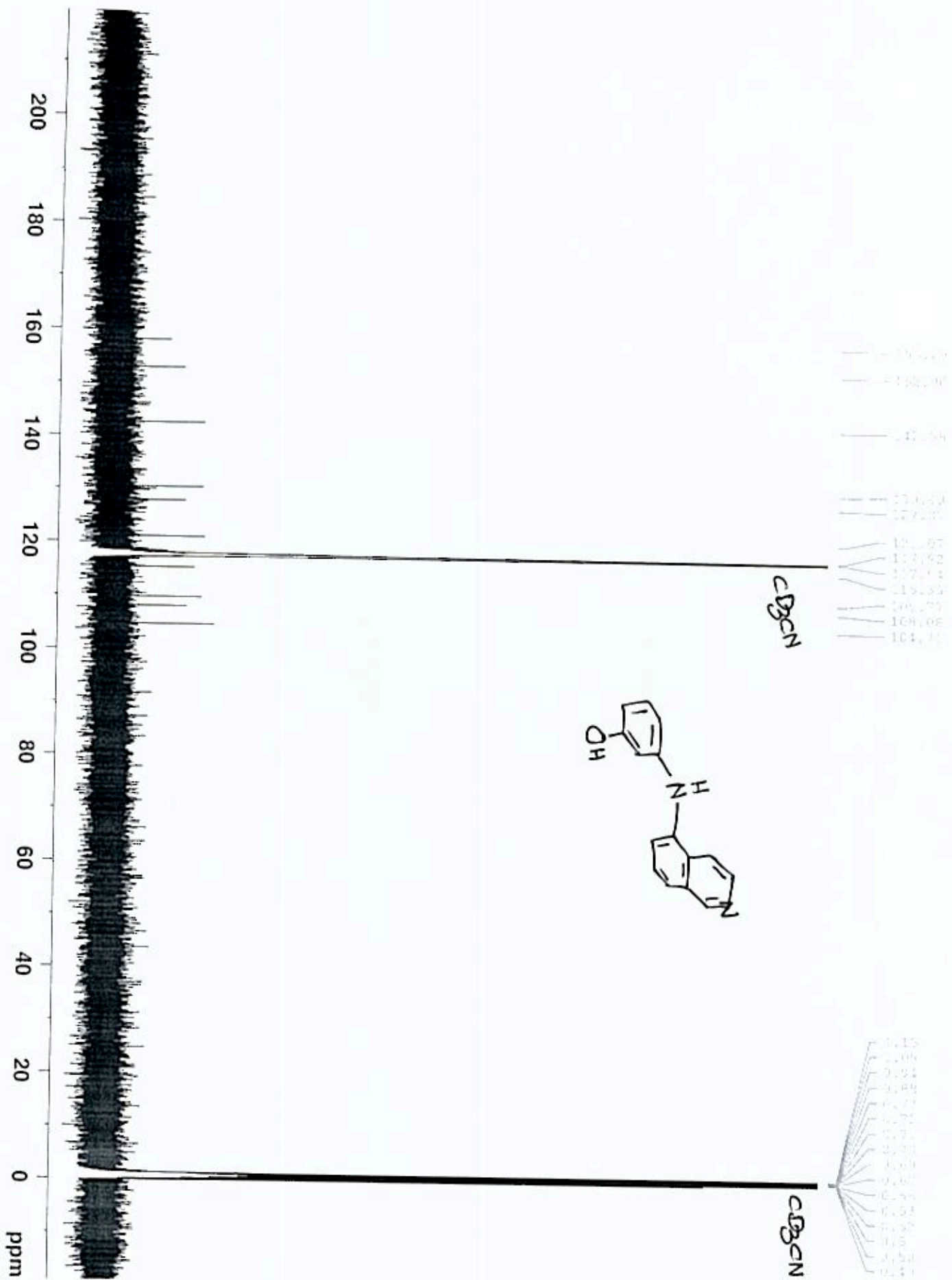


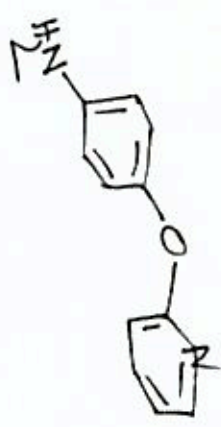
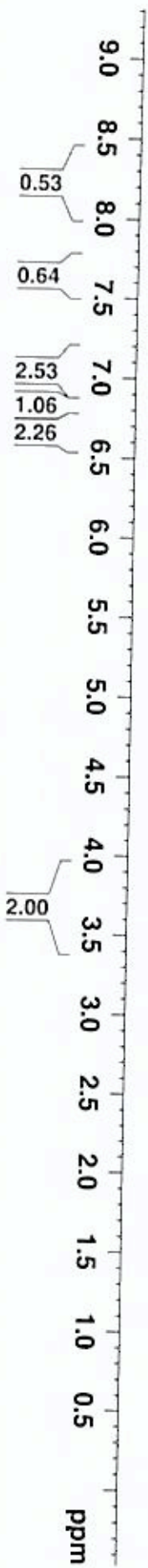










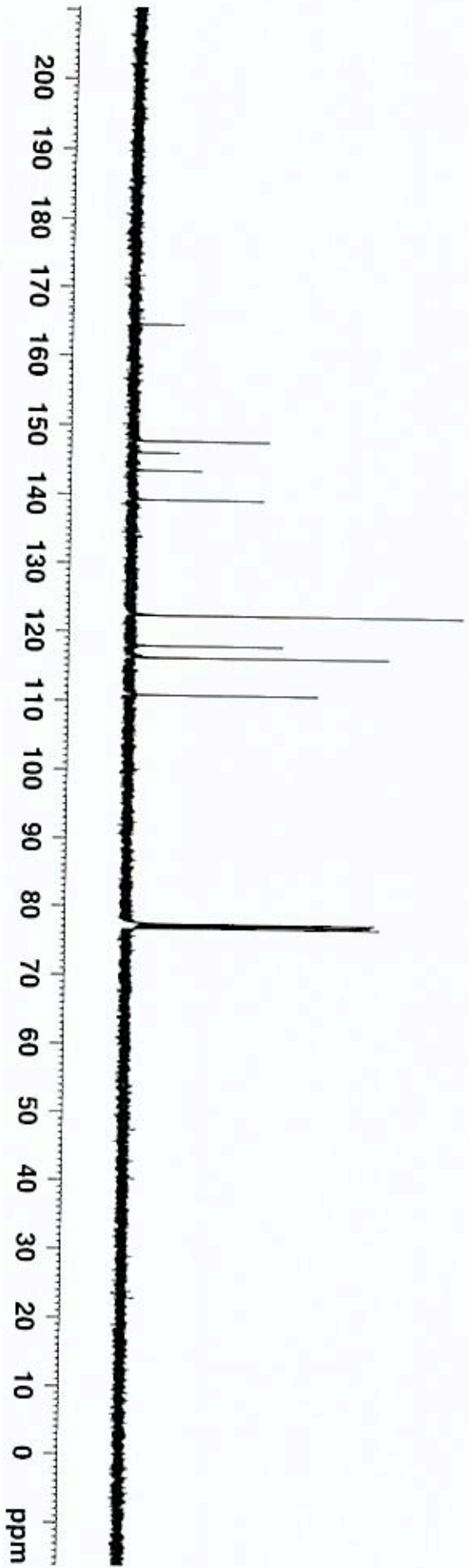


2.00

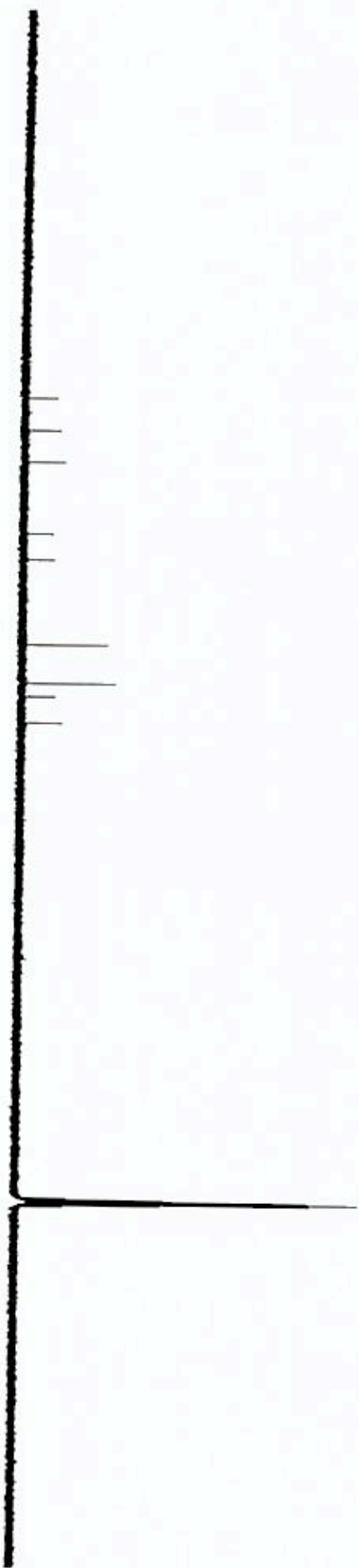


- 161.38
- 147.38
- 146.15
- 141.59
- 140.85
- 122.34
- 117.55
- 116.17
- 110.91

- 77.46
- 77.02
- 76.57



210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 ppm

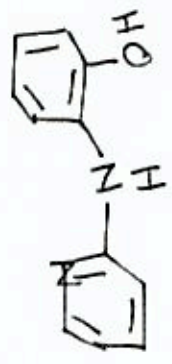


- 155.88
- 149.26
- 145.98
- 139.78
- 139.68
- 122.48
- 115.88
- 115.78
- 110.28

- 40.00
- 39.98
- 39.96
- 39.94
- 39.92
- 39.90
- 39.88
- 39.86
- 39.84
- 39.82
- 39.80

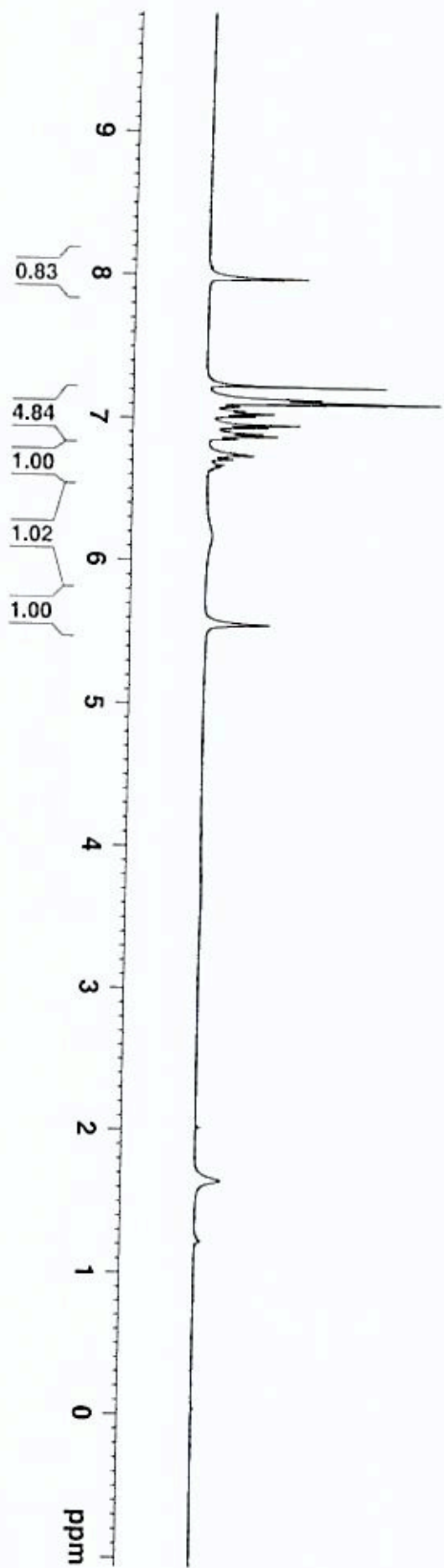


200  
180  
160  
140  
120  
100  
80  
60  
40  
20  
0  
ppm



- 155.47
- 149.89
- 149.36
- 138.29
- 125.31
- 125.27
- 122.31
- 120.29
- 118.11
- 115.58

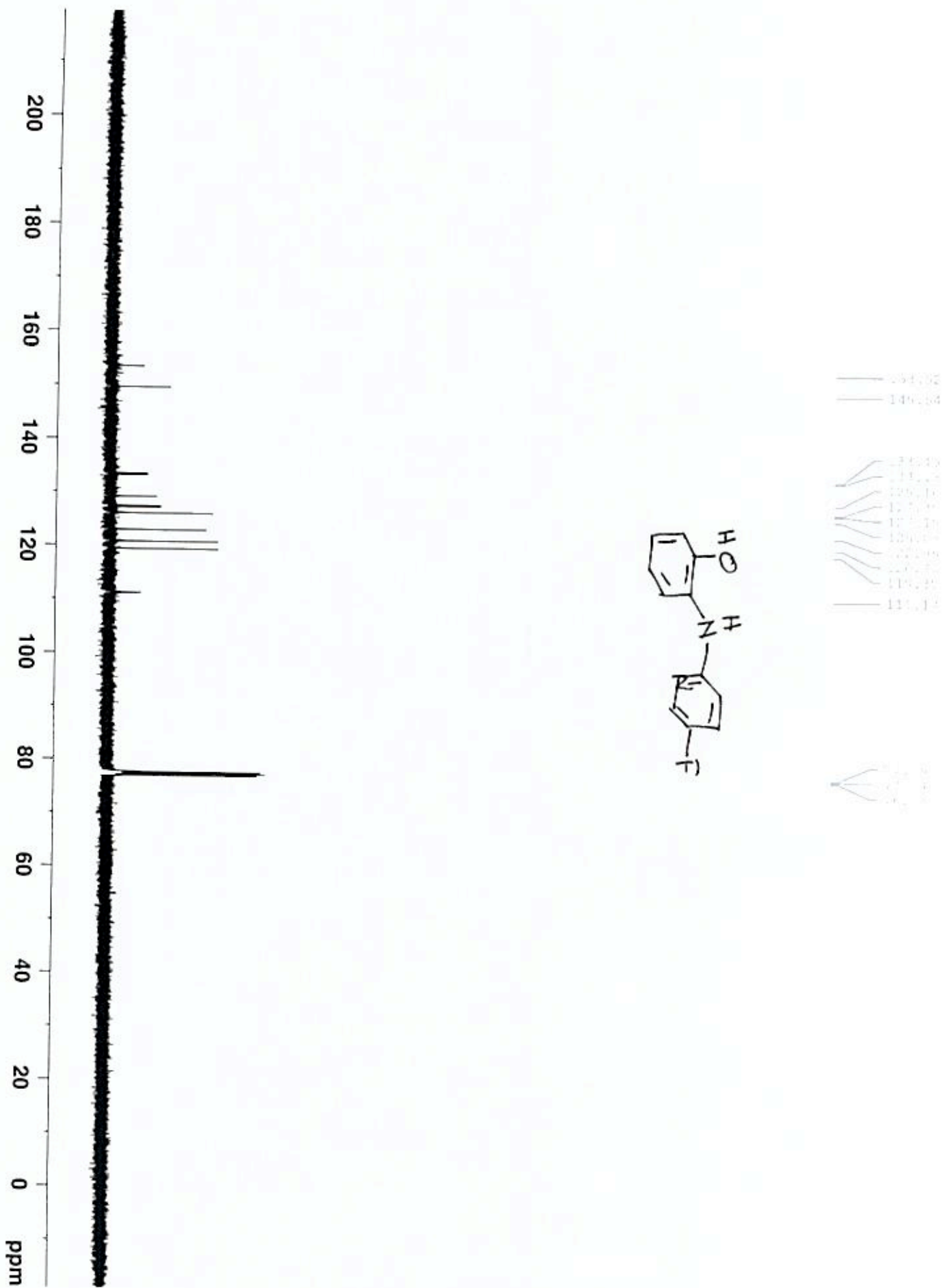
- 77.33
- 77.06
- 76.71

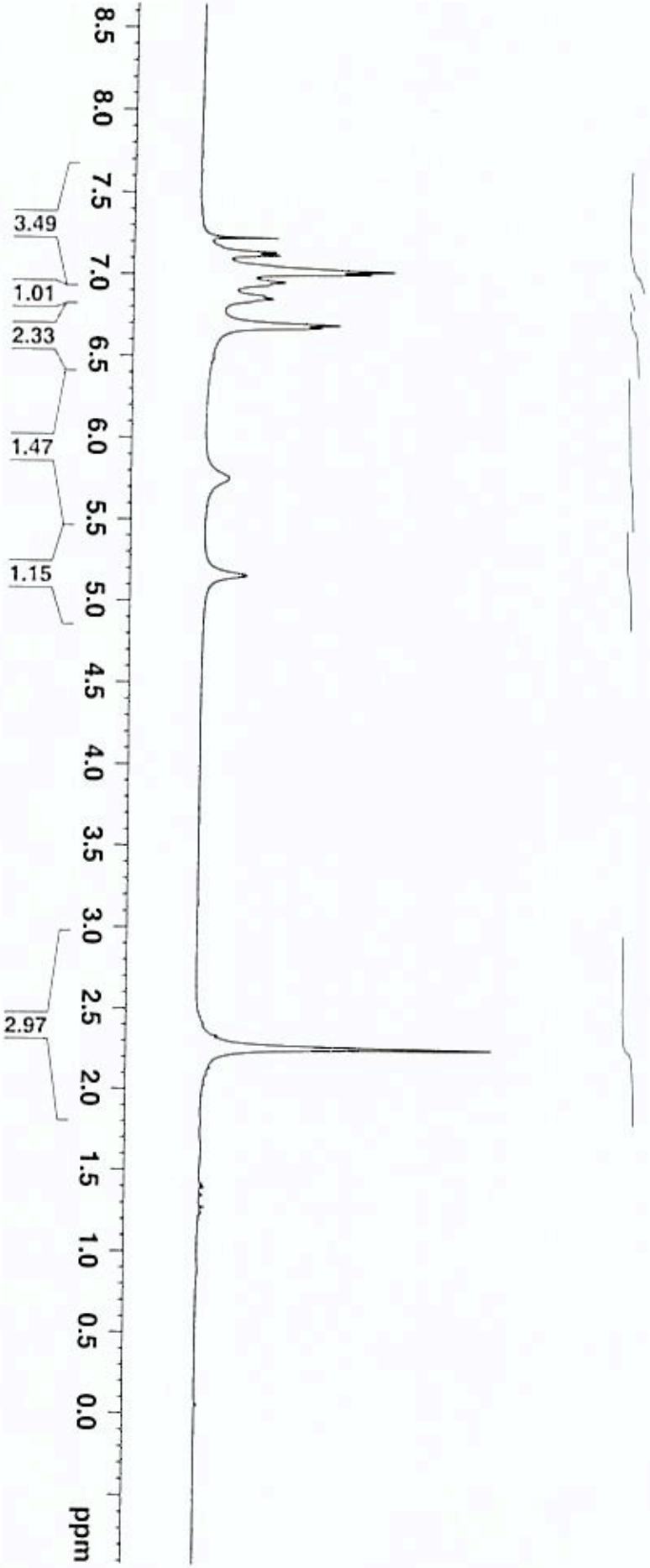
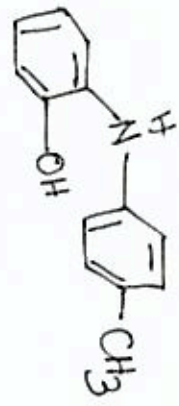


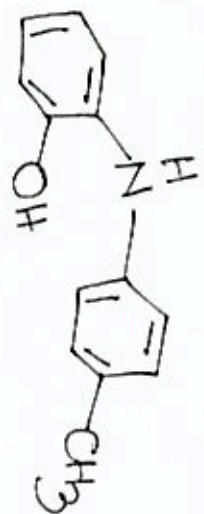








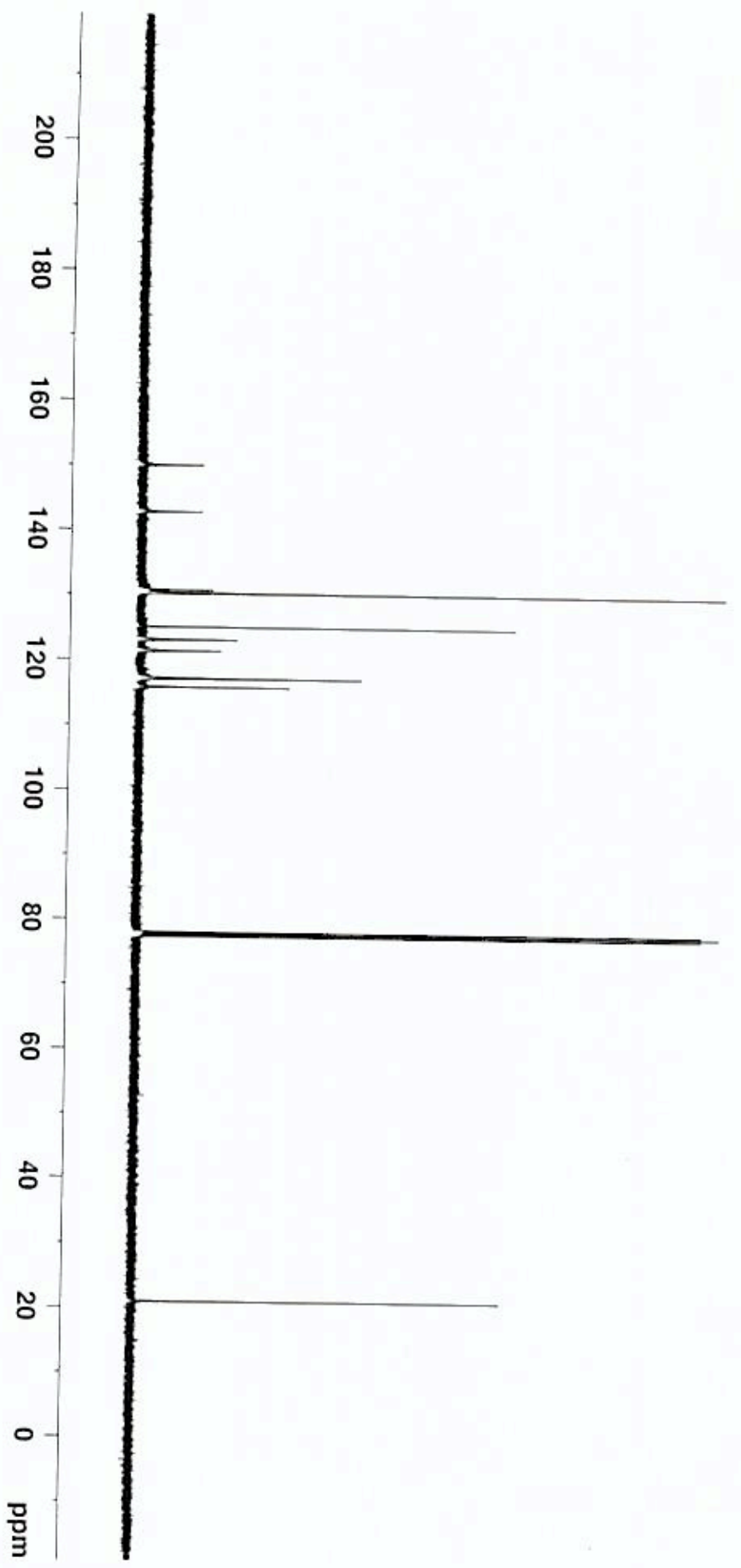


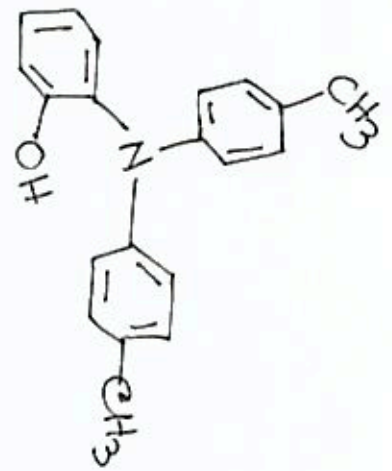


11/11/11

11/11/11

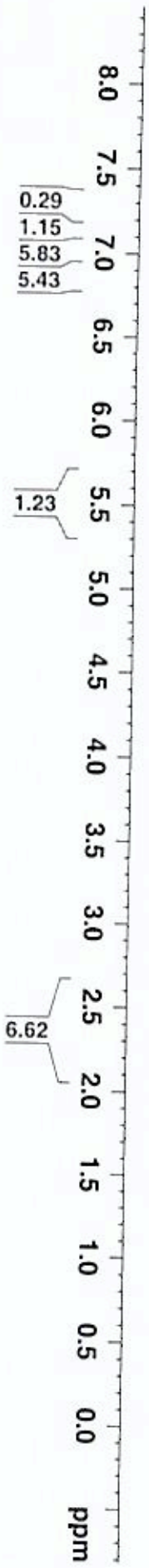
11/11/11

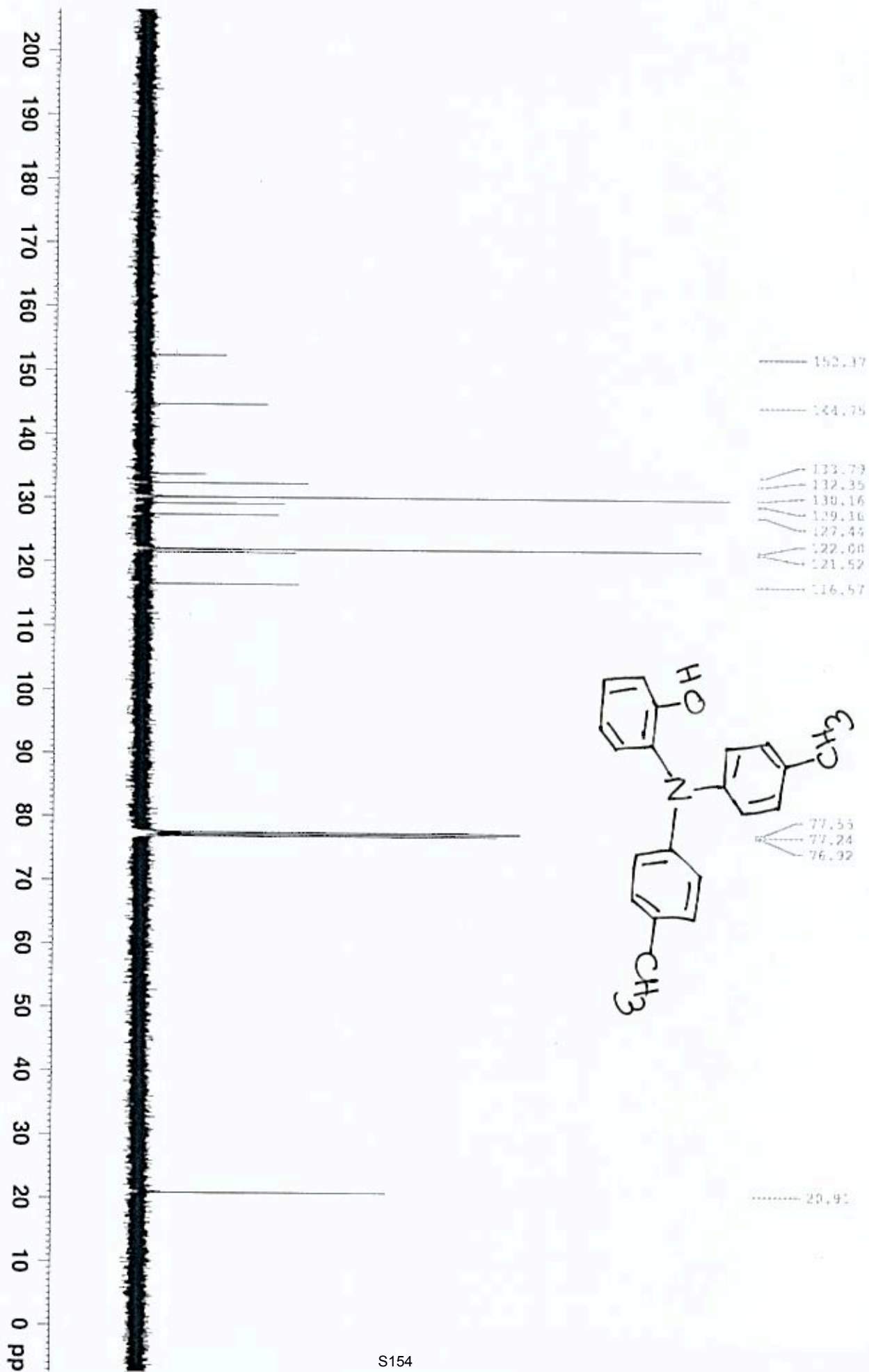


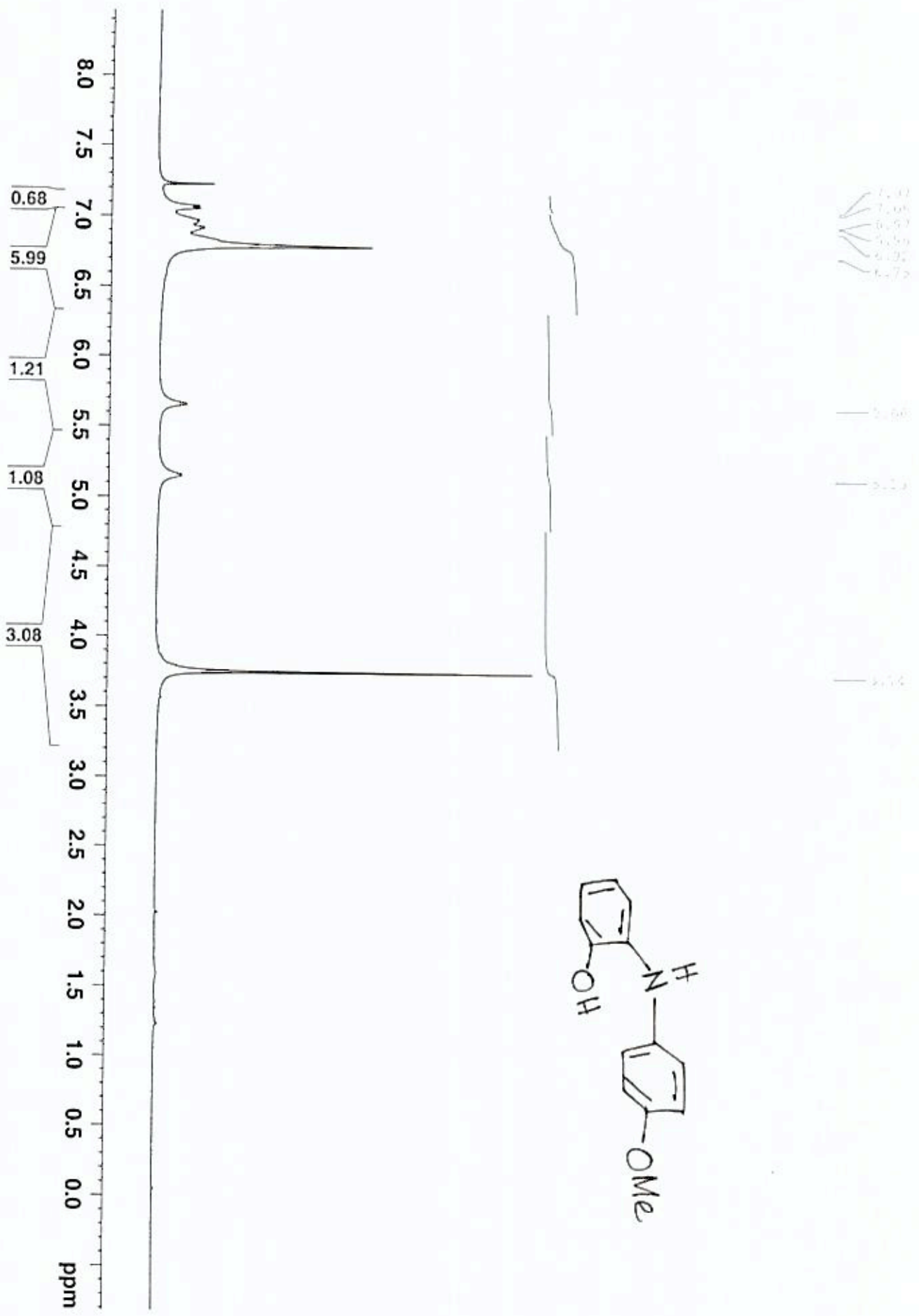
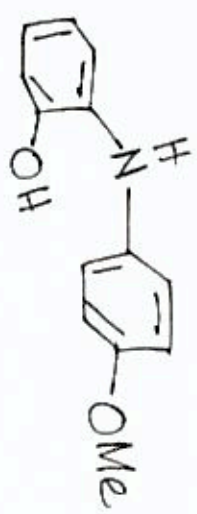


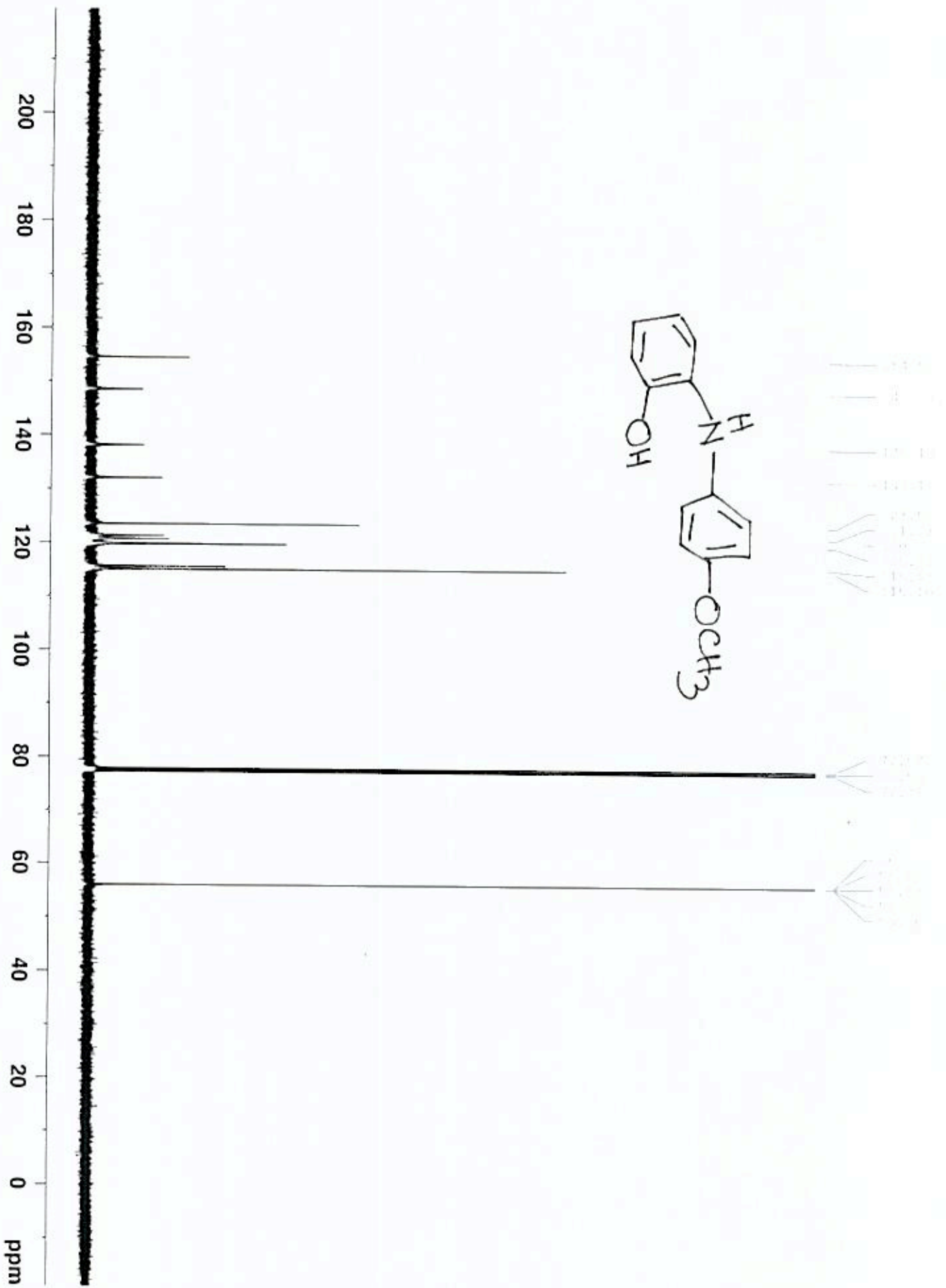
1.23

6.62



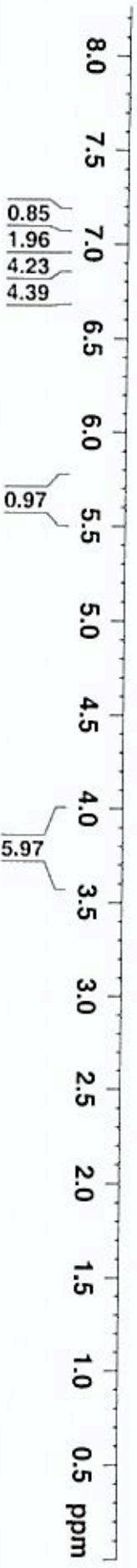
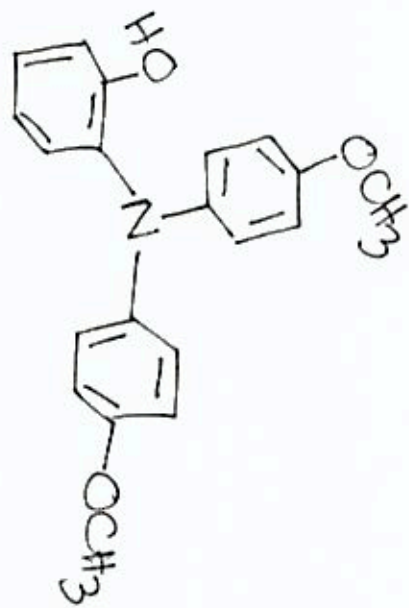


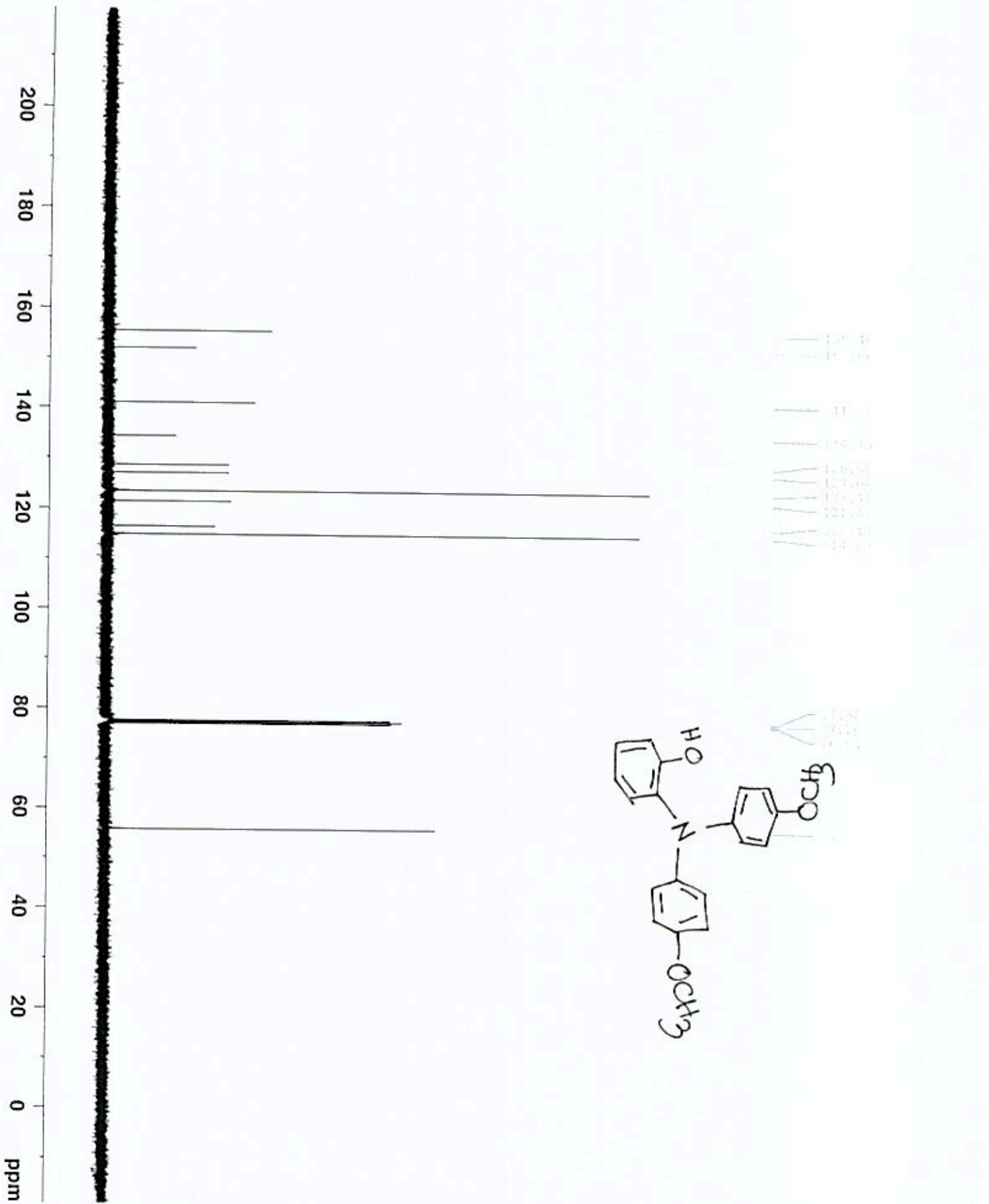




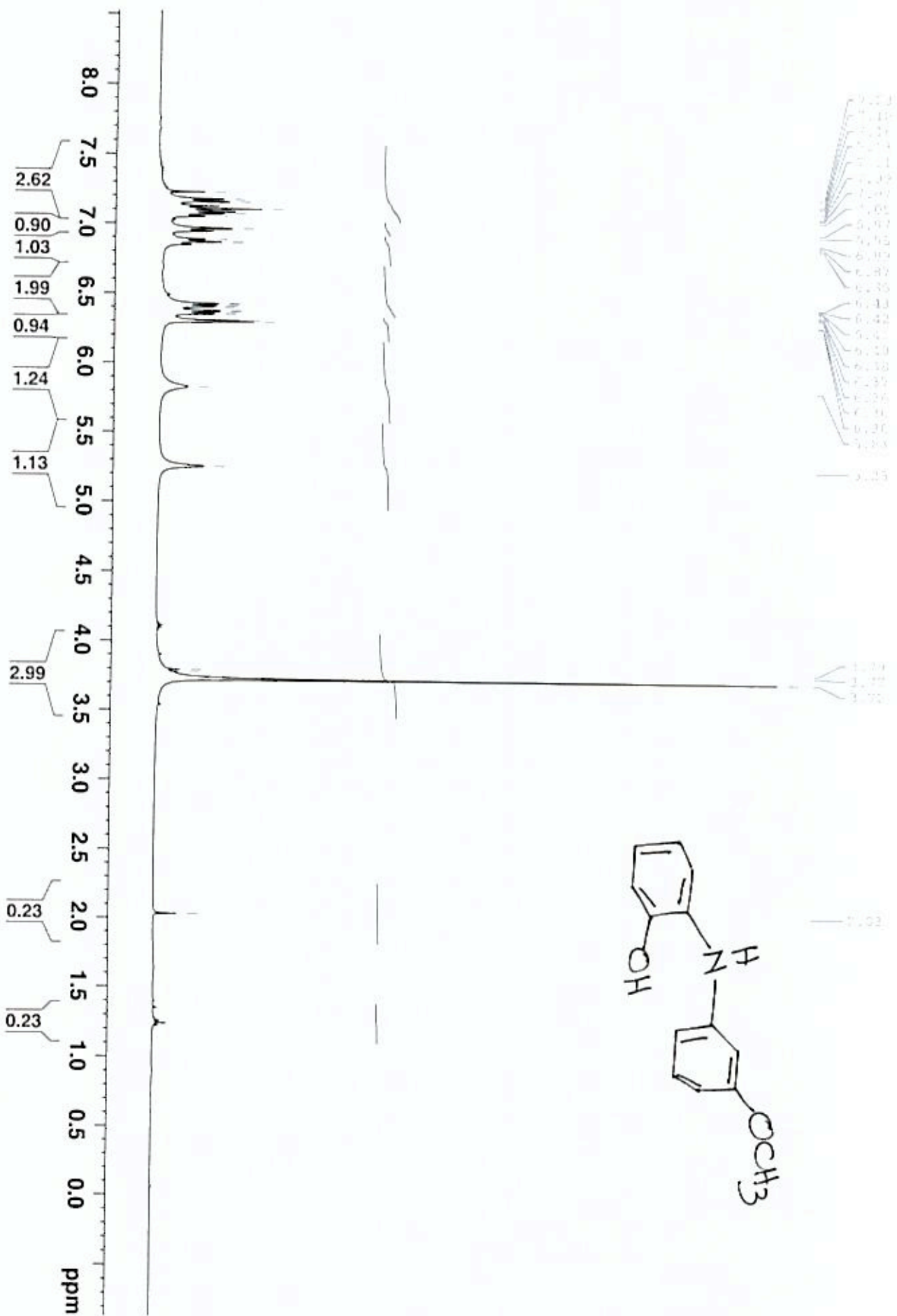


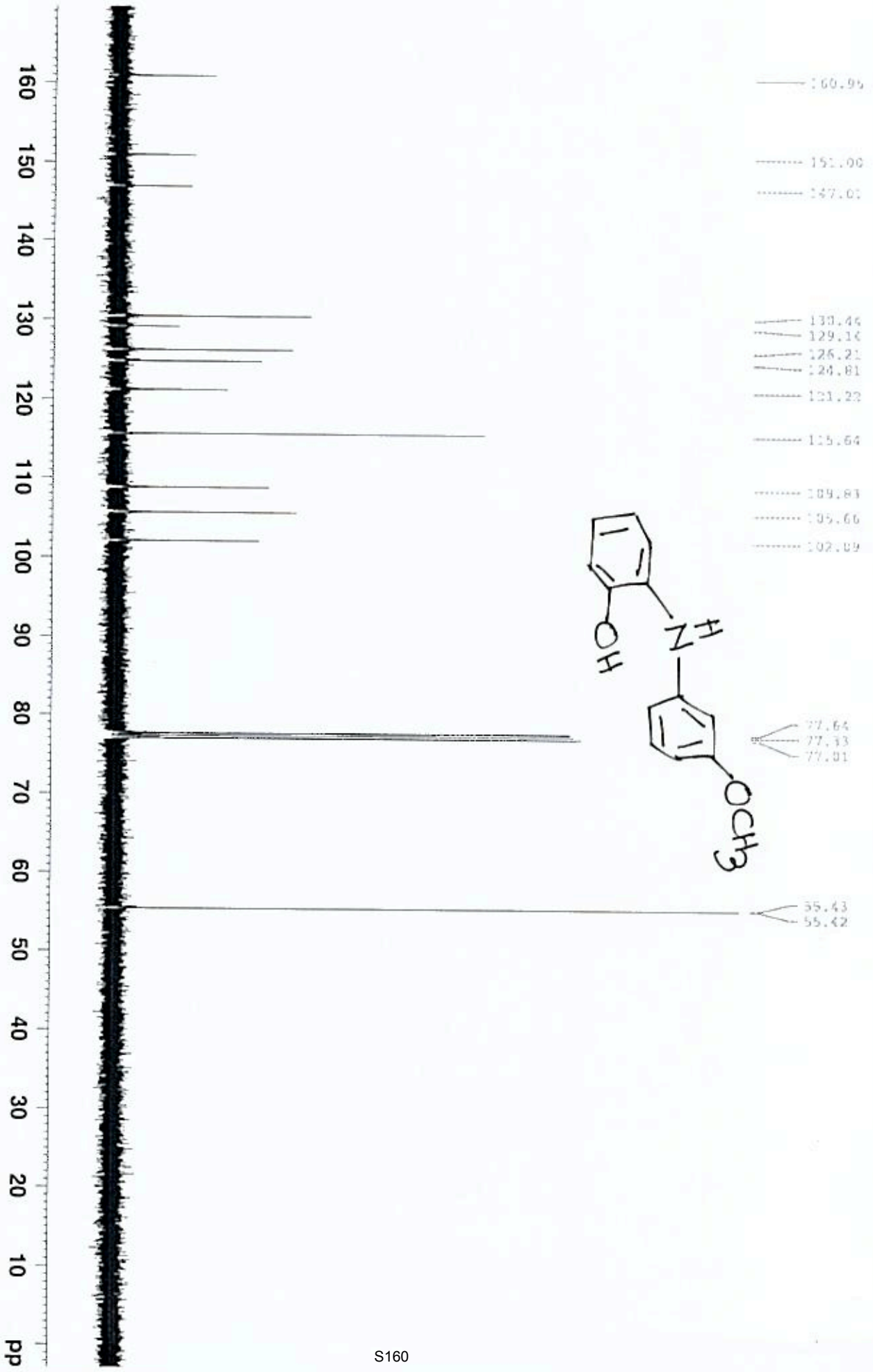
1H-dcif parameter set

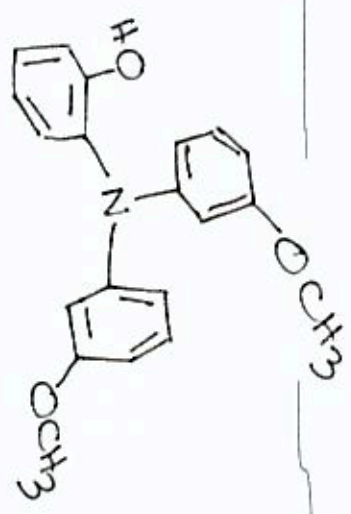
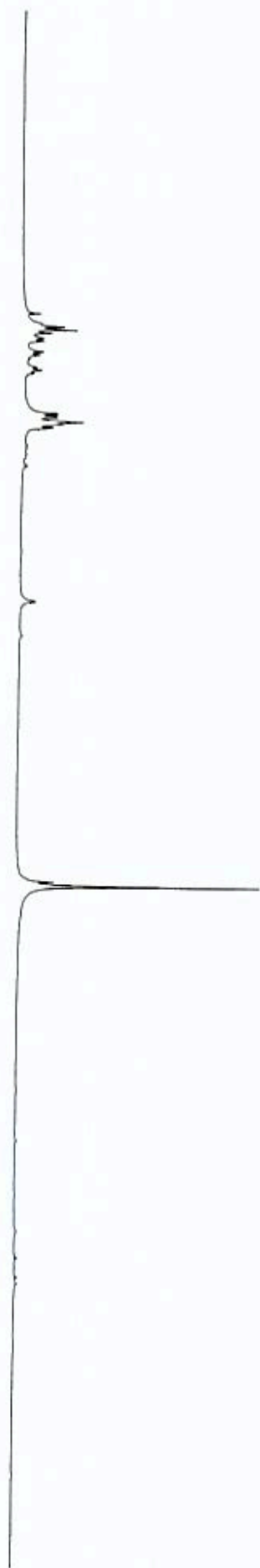


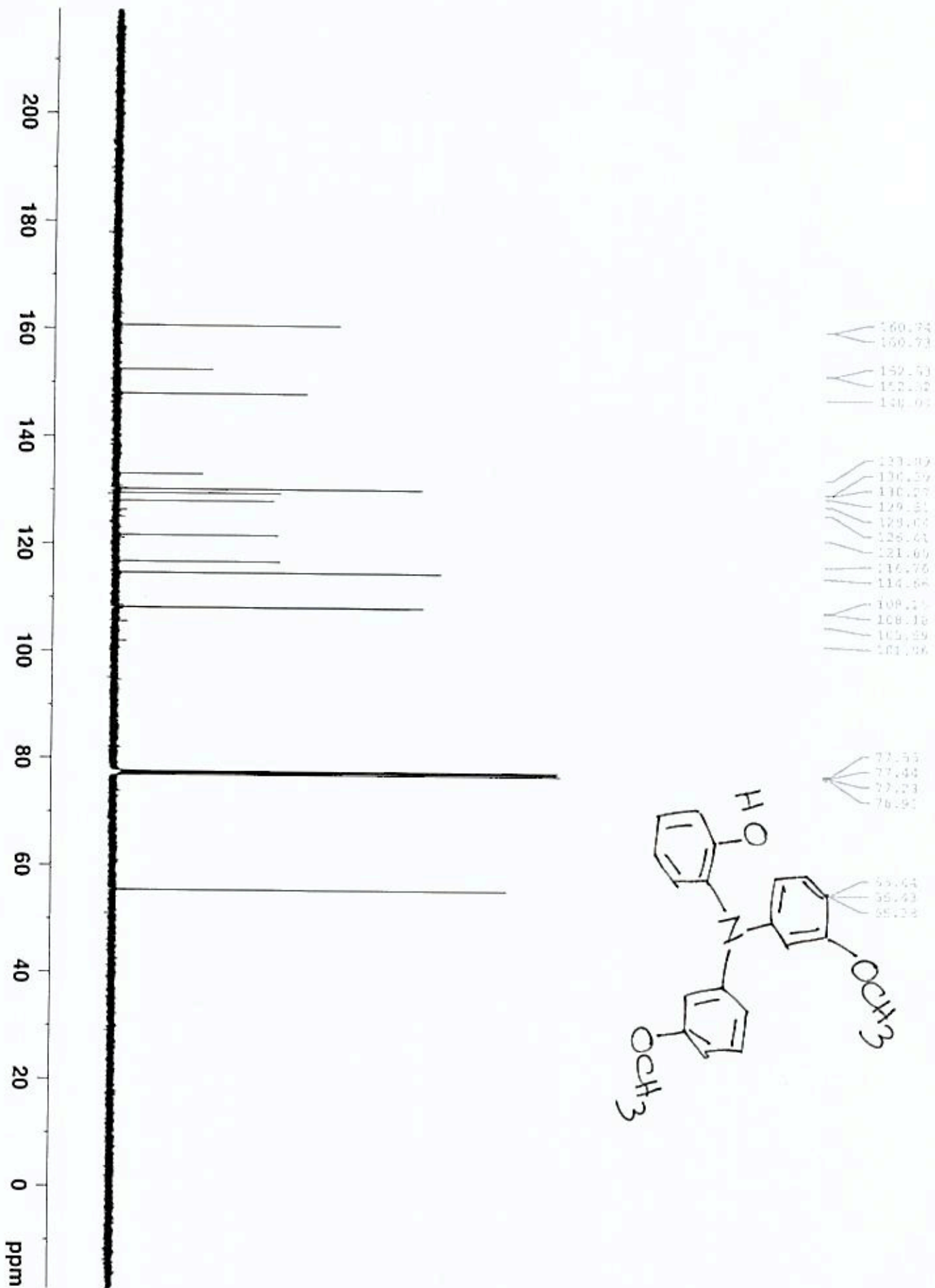


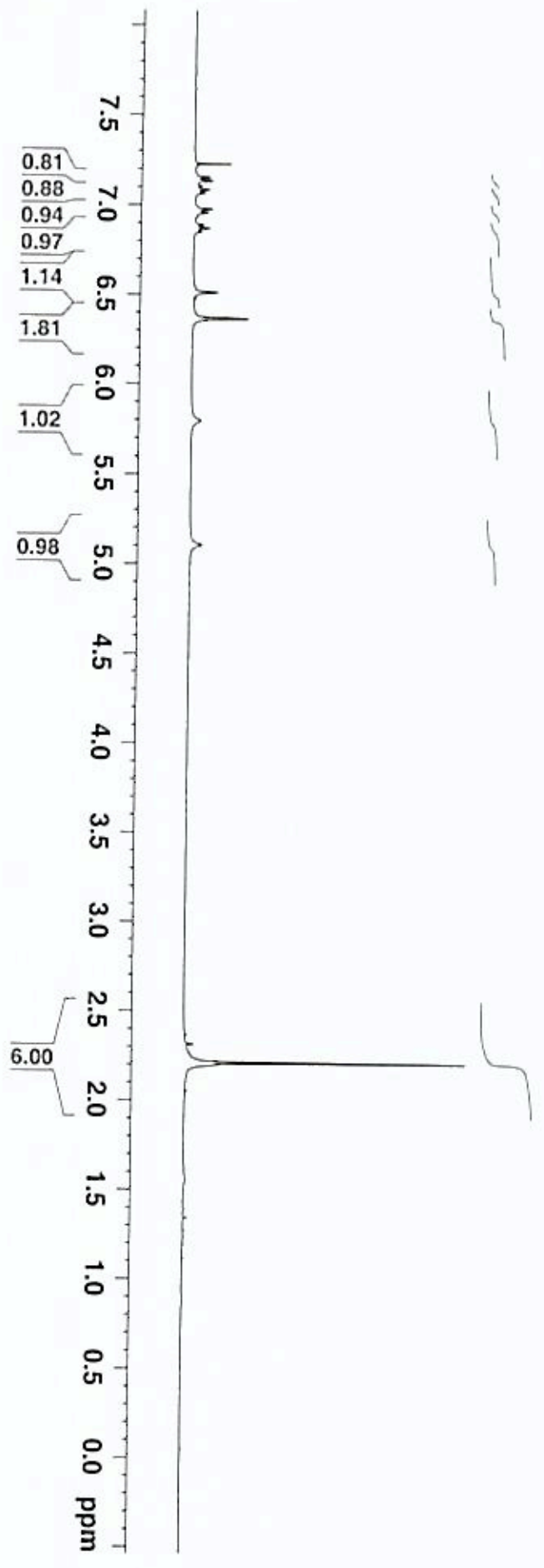
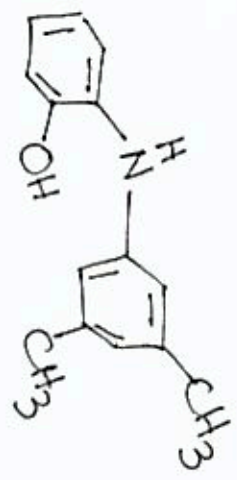
<sup>1</sup>H-dc1f parameter set





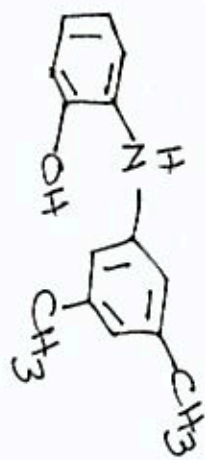
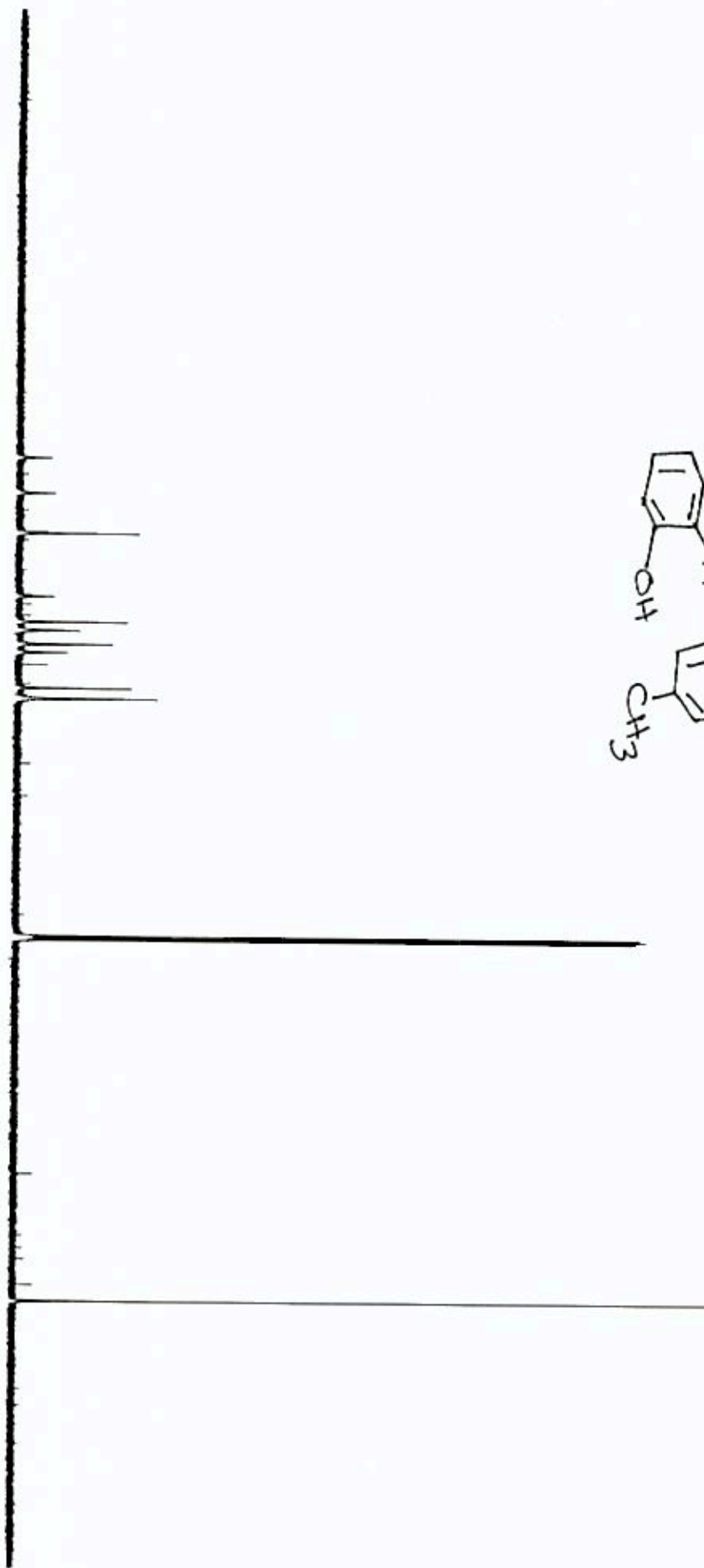






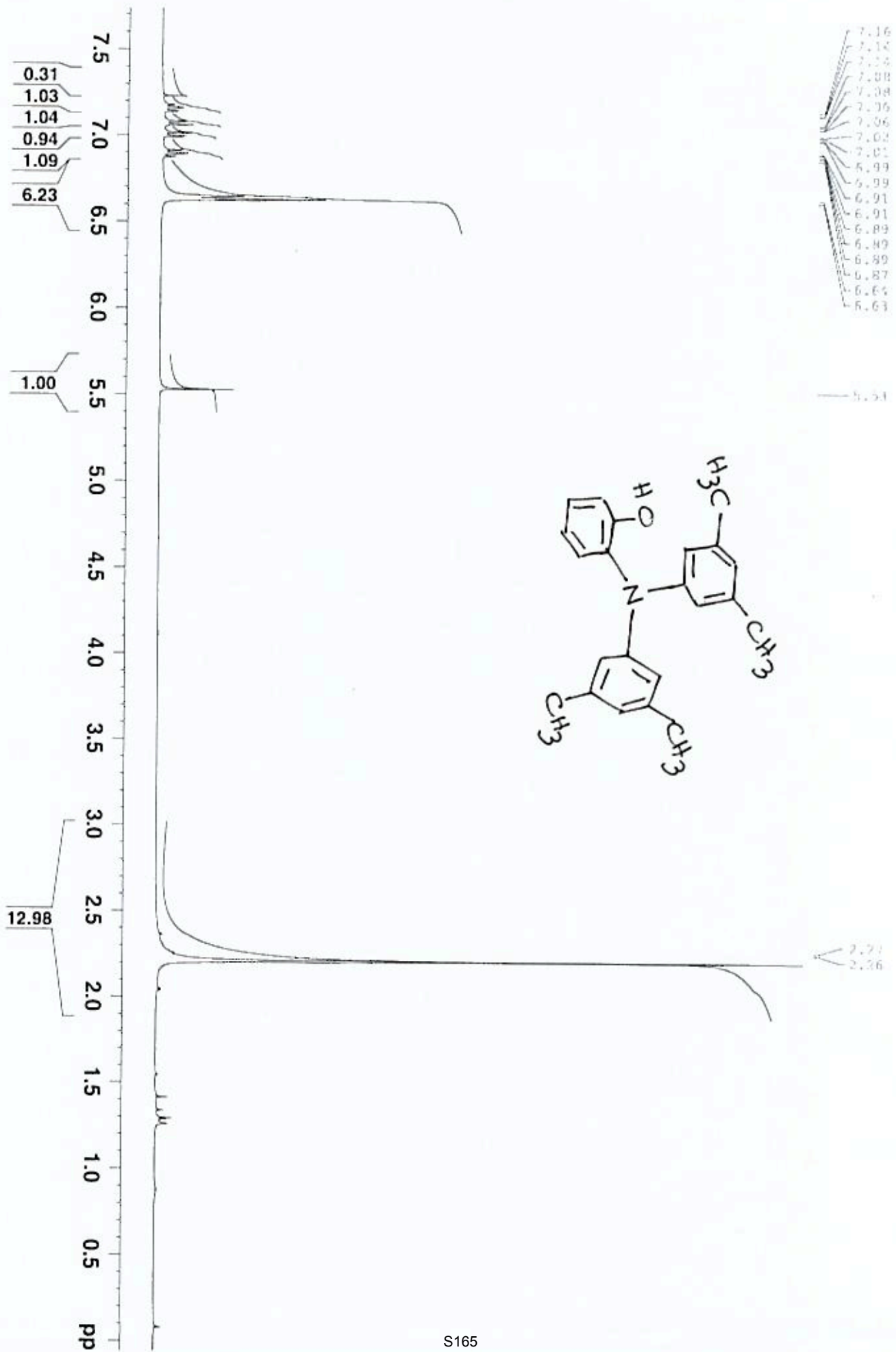


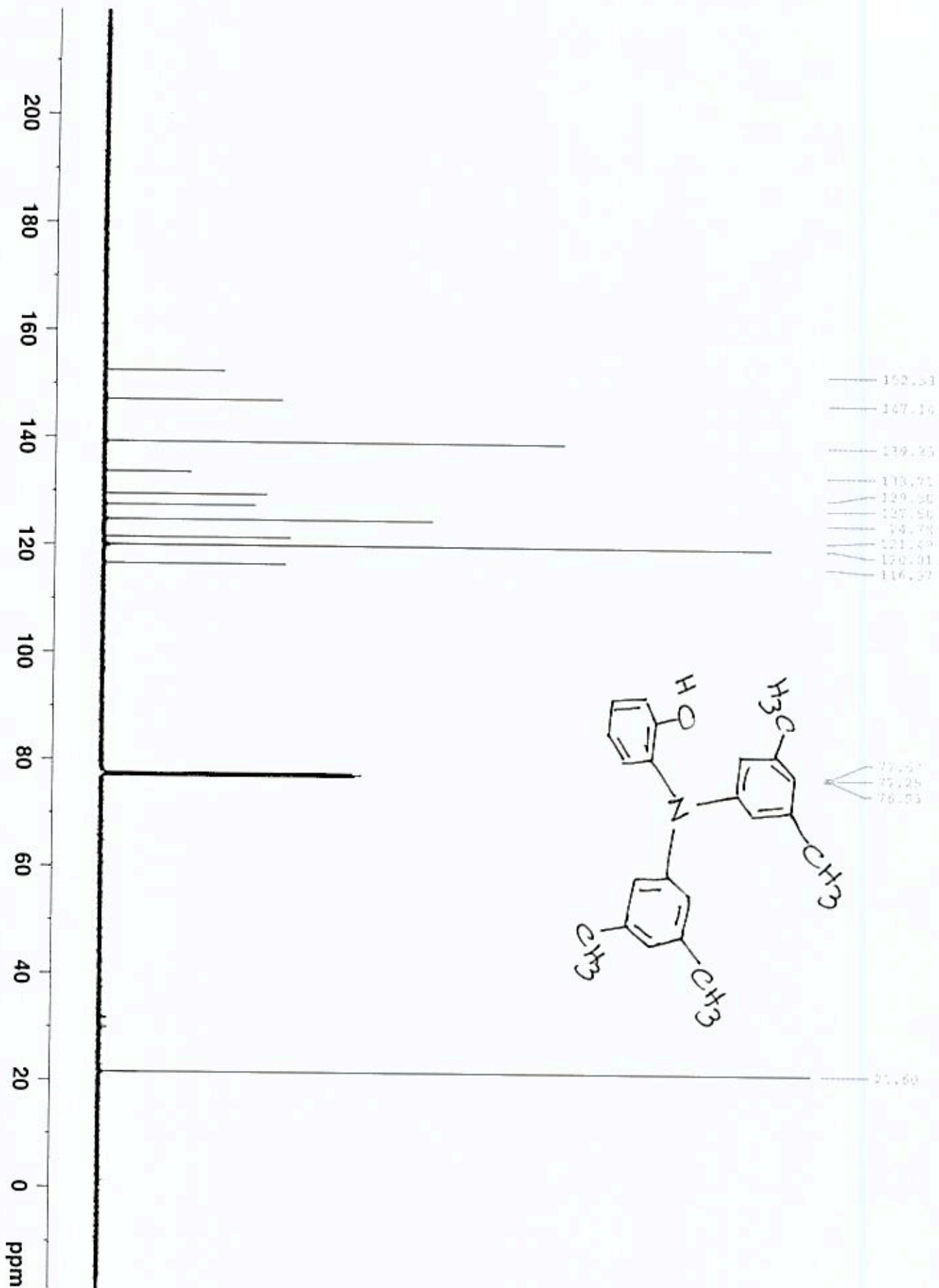
200  
180  
160  
140  
120  
100  
80  
60  
40  
20  
0  
ppm

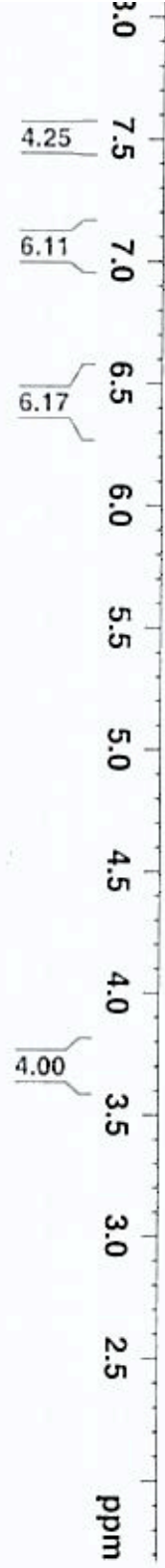


- 150.97
- 148.60
- 139.72
- 139.45
- 129.79
- 127.90
- 124.61
- 122.46
- 121.23
- 119.38
- 115.75
- 114.10
- 77.81
- 77.59
- 77.13
- 21.71
- 21.64

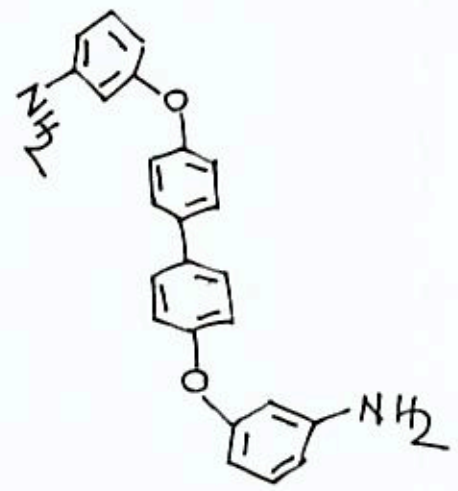




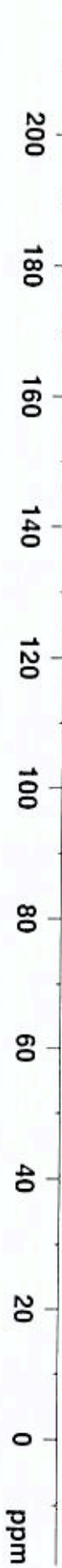
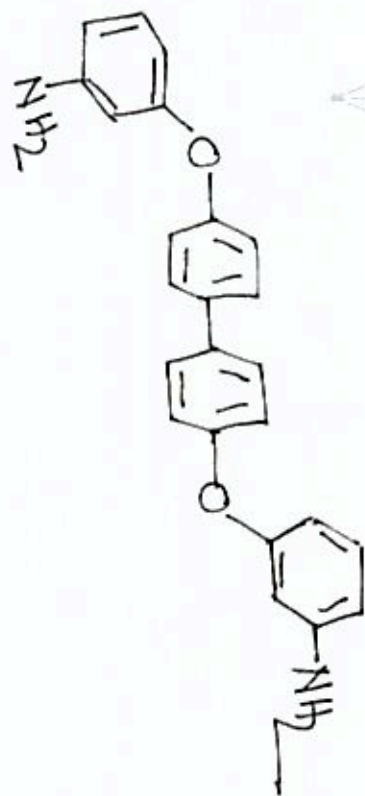


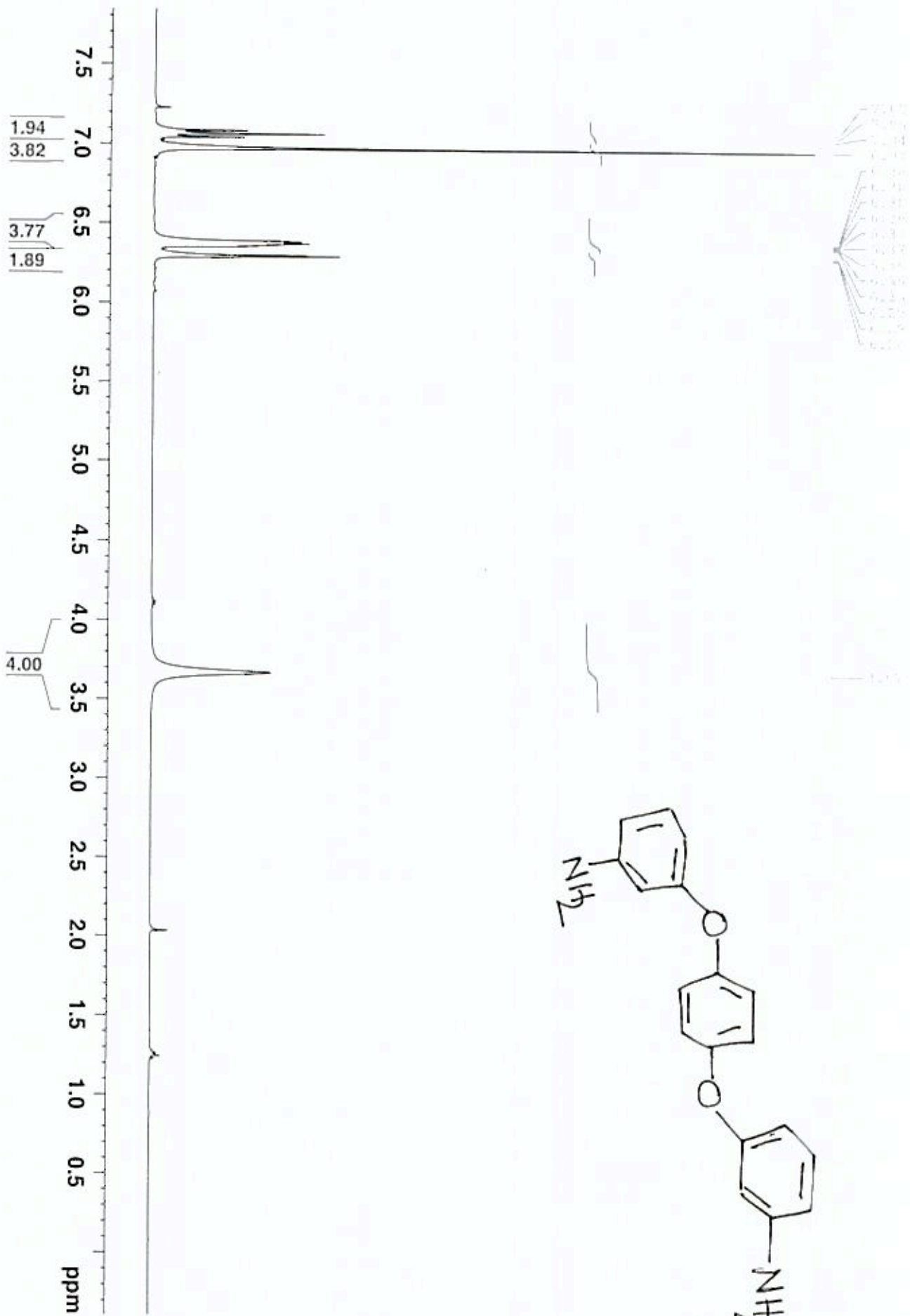
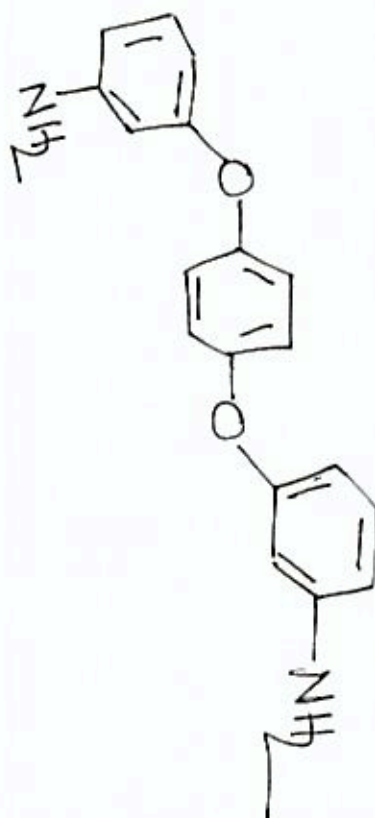


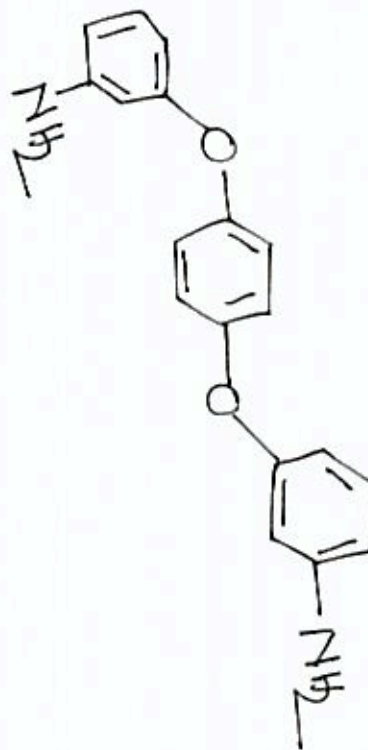
- 7.53
- 7.47
- 7.47
- 7.30
- 7.28
- 7.13
- 7.11
- 7.10
- 7.06
- 7.06
- 7.03
- 6.48
- 6.42
- 6.41
- 6.33
- 6.31



3.49







- 150.00
- 148.00
- 147.00
- 132.00
- 115.00
- 113.00
- 105.00
- 103.00

- 7.50
- 7.40
- 7.30

