

SUPPLEMENTARY MATERIAL (NMR SPECTRAL DATA)

Catalysis of Mukaiyama Aldol Reactions by a Tricyclic Aluminum Alkoxide Lewis Acid

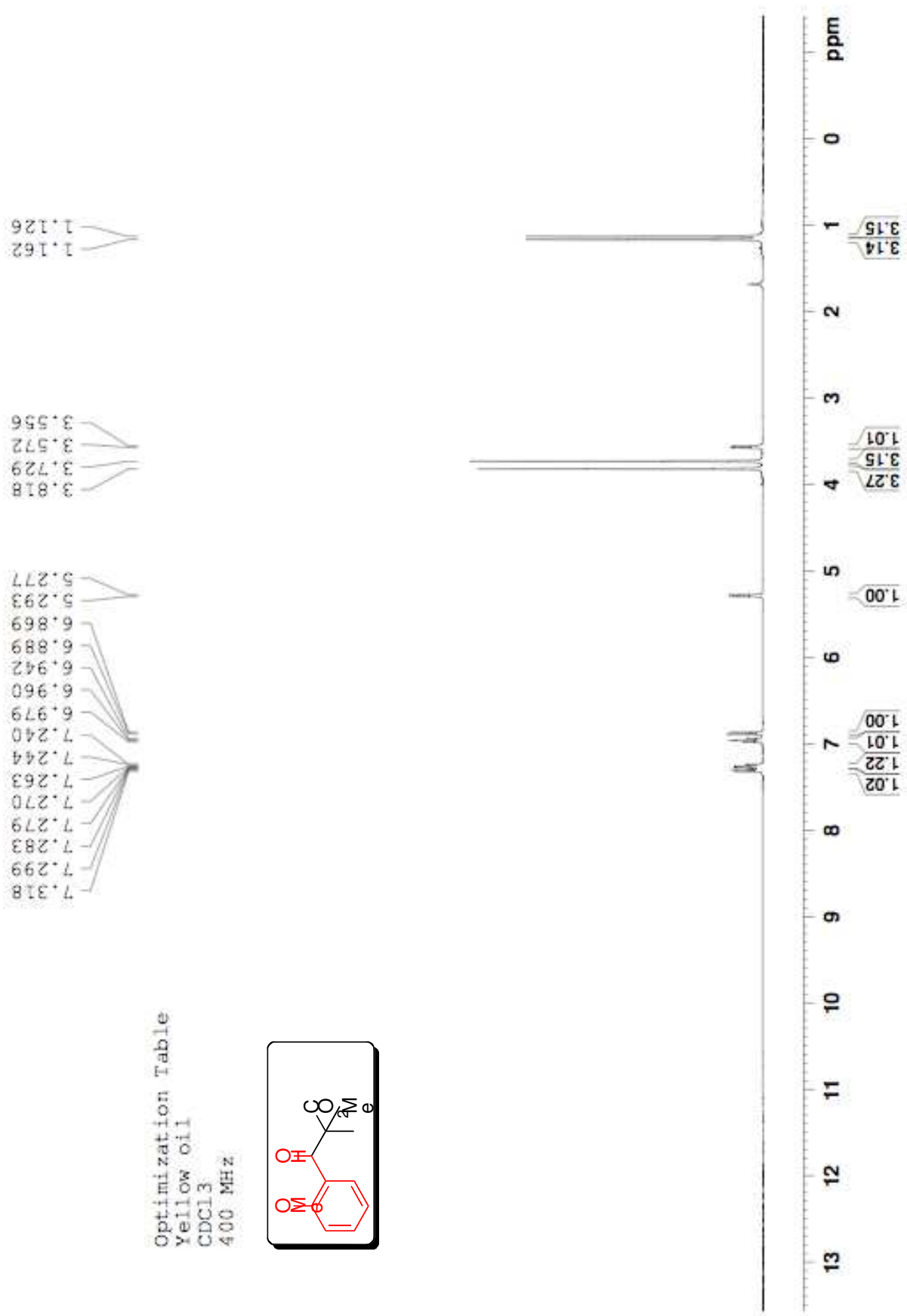
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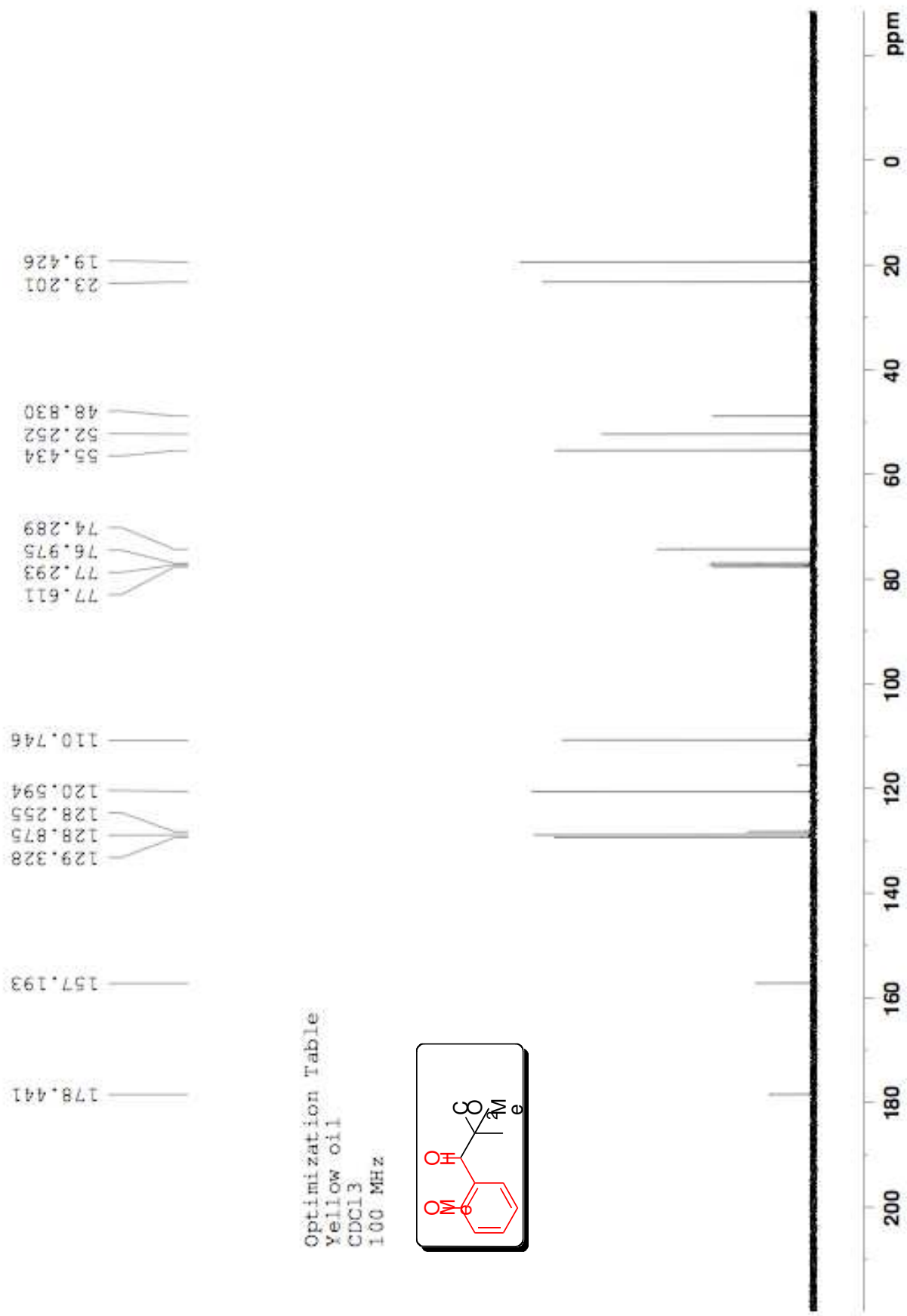
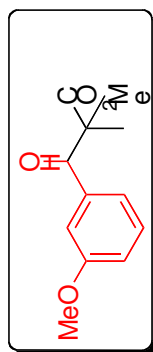


Table 2, entry 1
 Clear, colorless oil
 CDCl₃
 400 MHz



1.160
 1.128

3.073
 3.083

3.808
 3.733

4.882
 4.873

7.270
 7.259
 7.239
 7.218
 6.879
 6.874
 6.845
 6.826

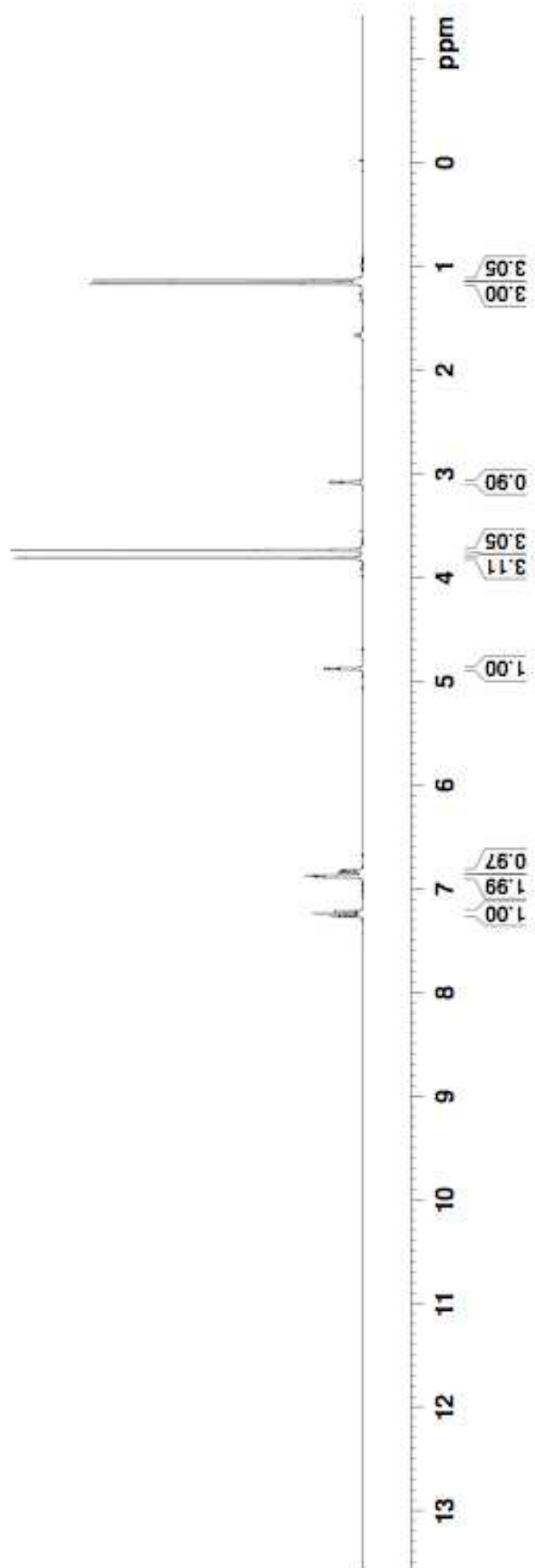


Table 2, entry 1
 Clear, colorless oil
 CDCl₃
 100 MHz

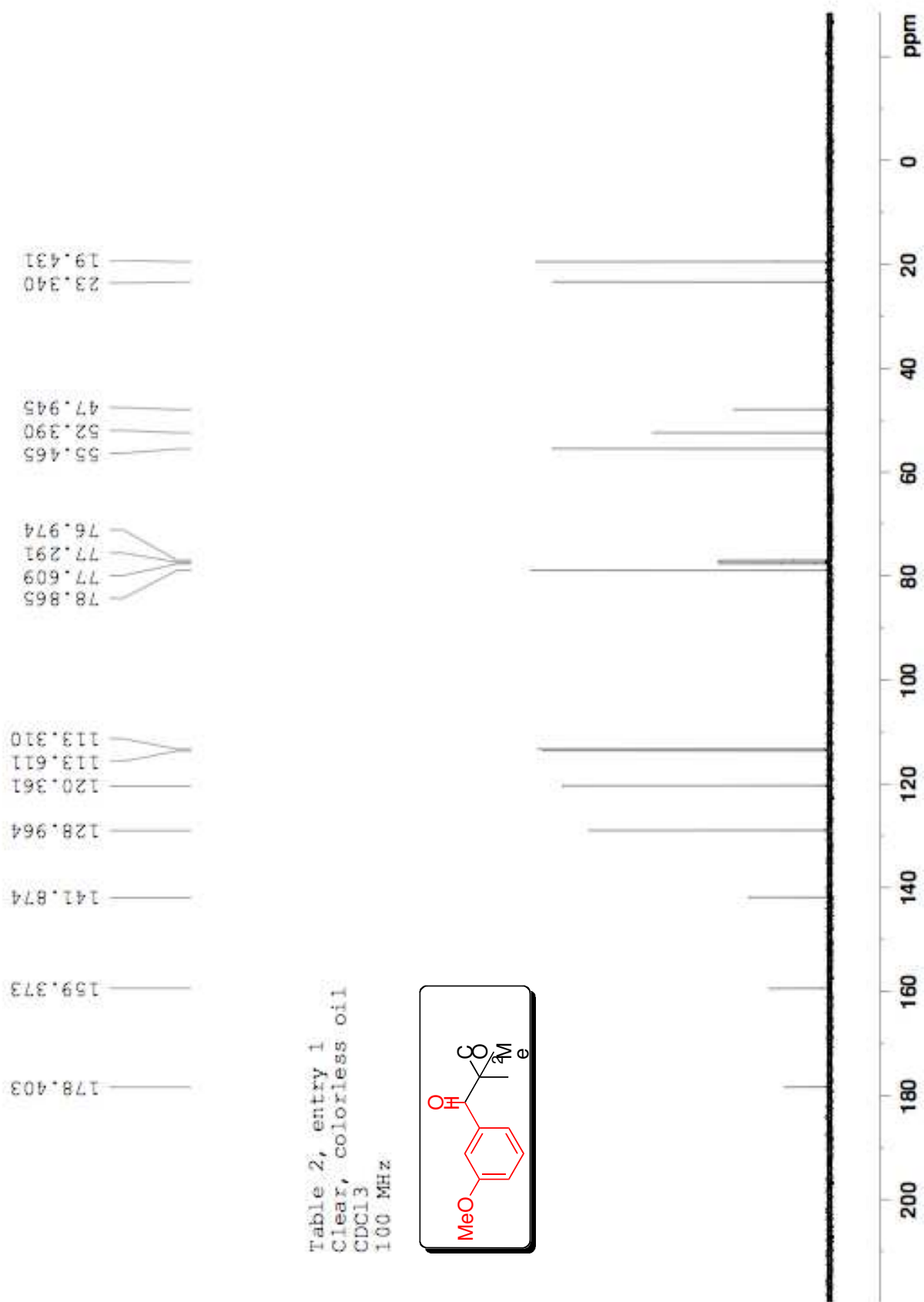
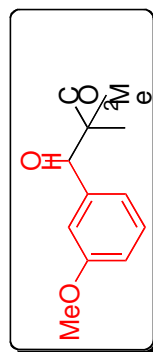
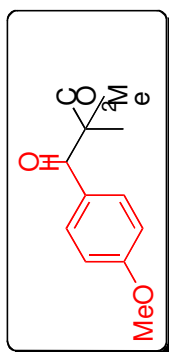


Table 2, entry 2
 White solid
 CDCl₃
 400 MHz



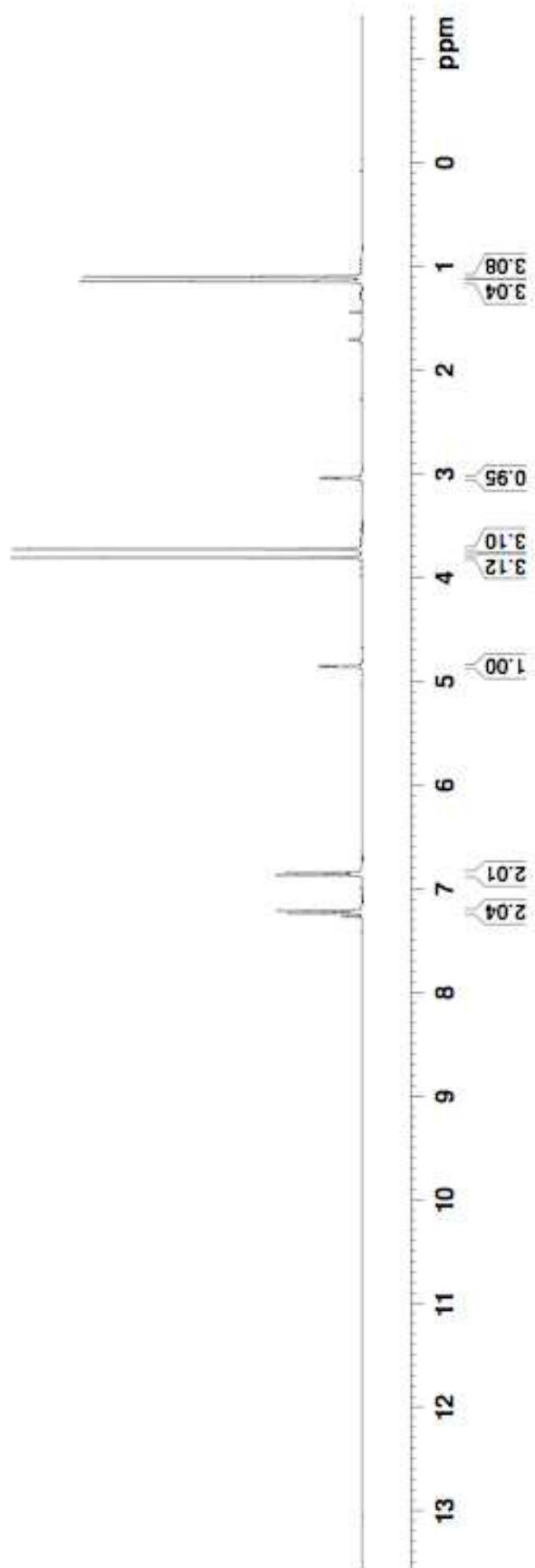
1.137
 1.093

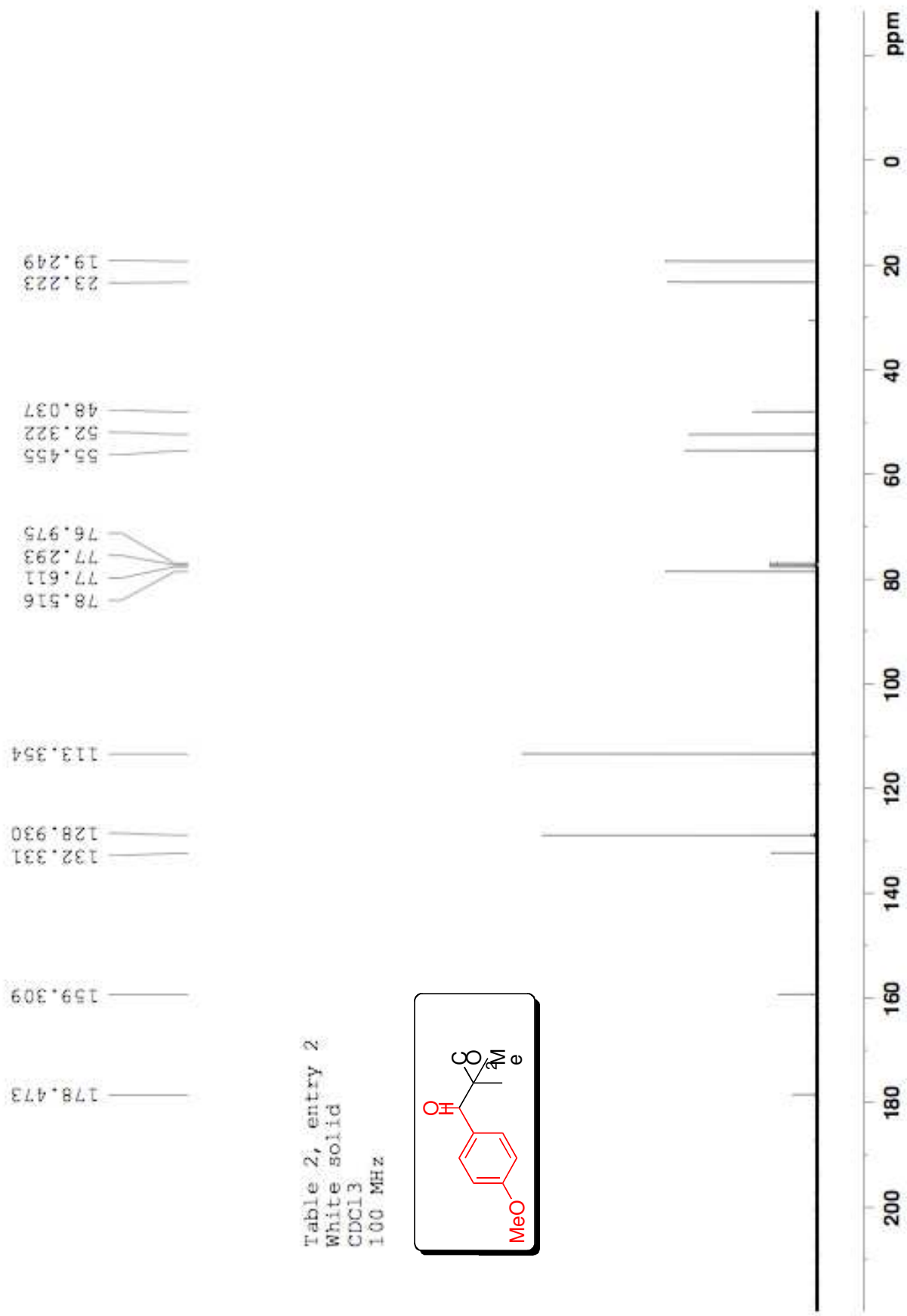
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 3.033

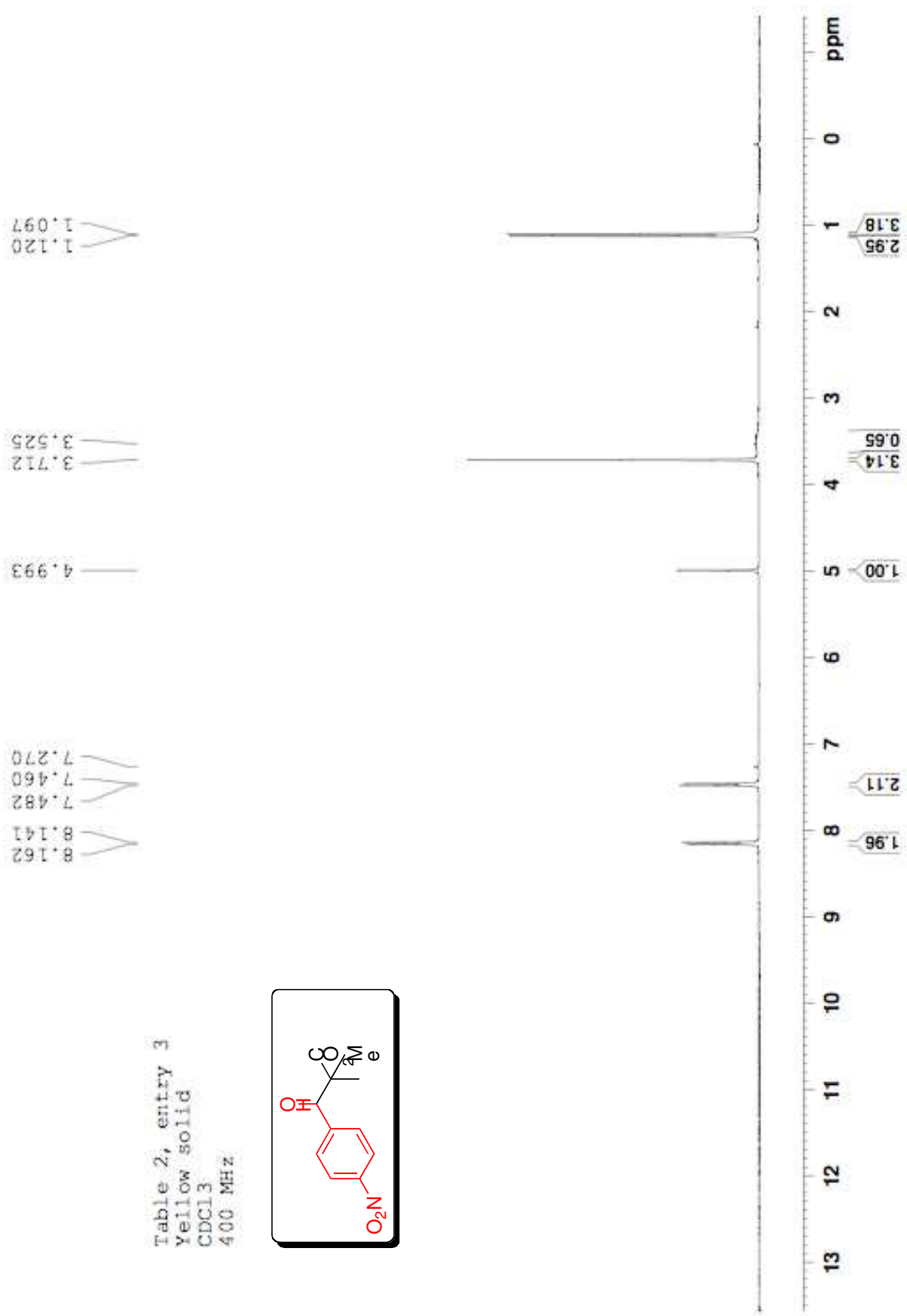
3.805
 3.722

4.859
 4.850

7.270
 7.235
 7.213
 6.869
 6.847







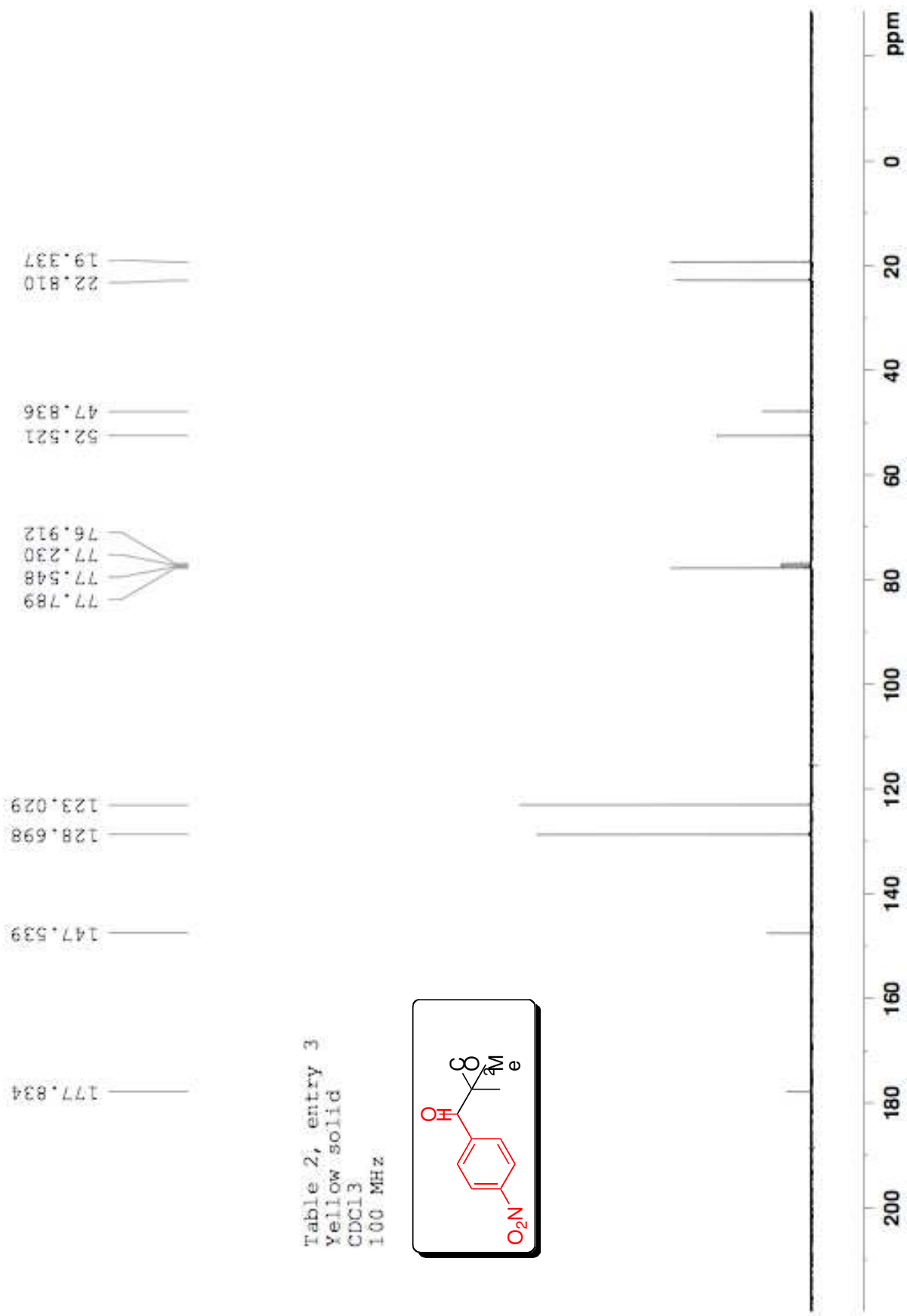
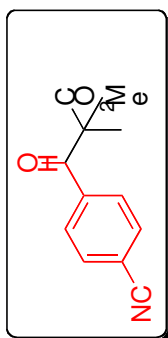


Table 2, entry 4
 Clear, crystalline solid
 CDCl₃
 400 MHz

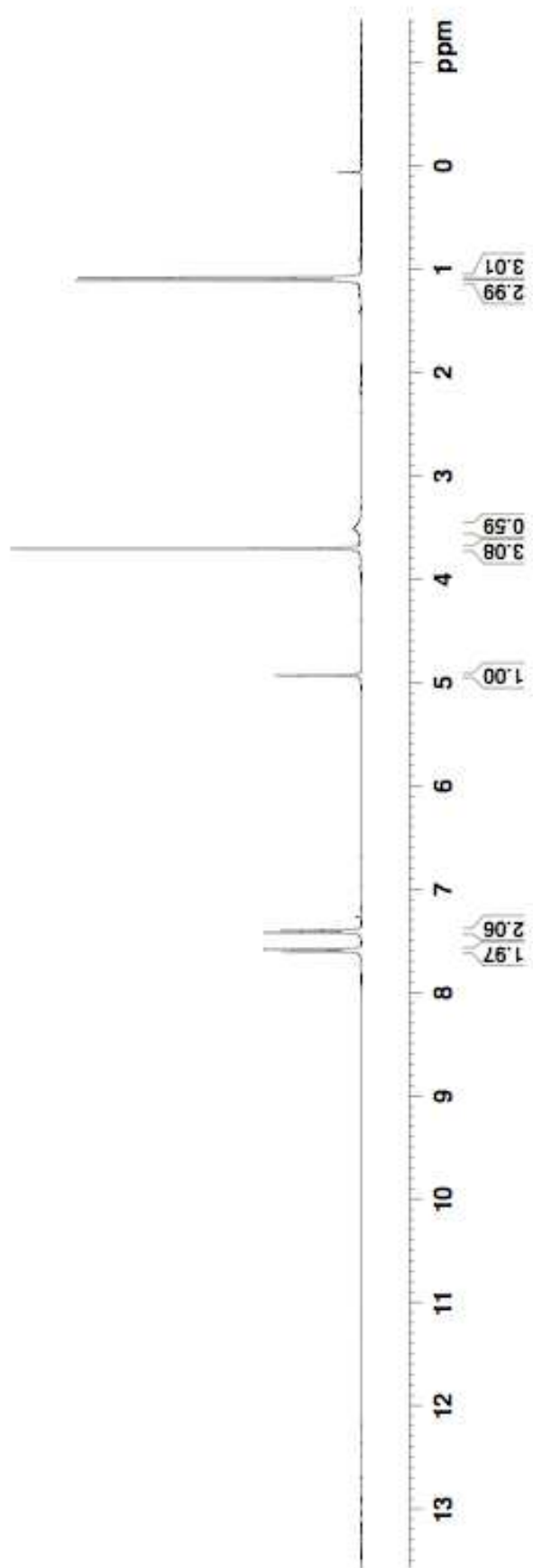


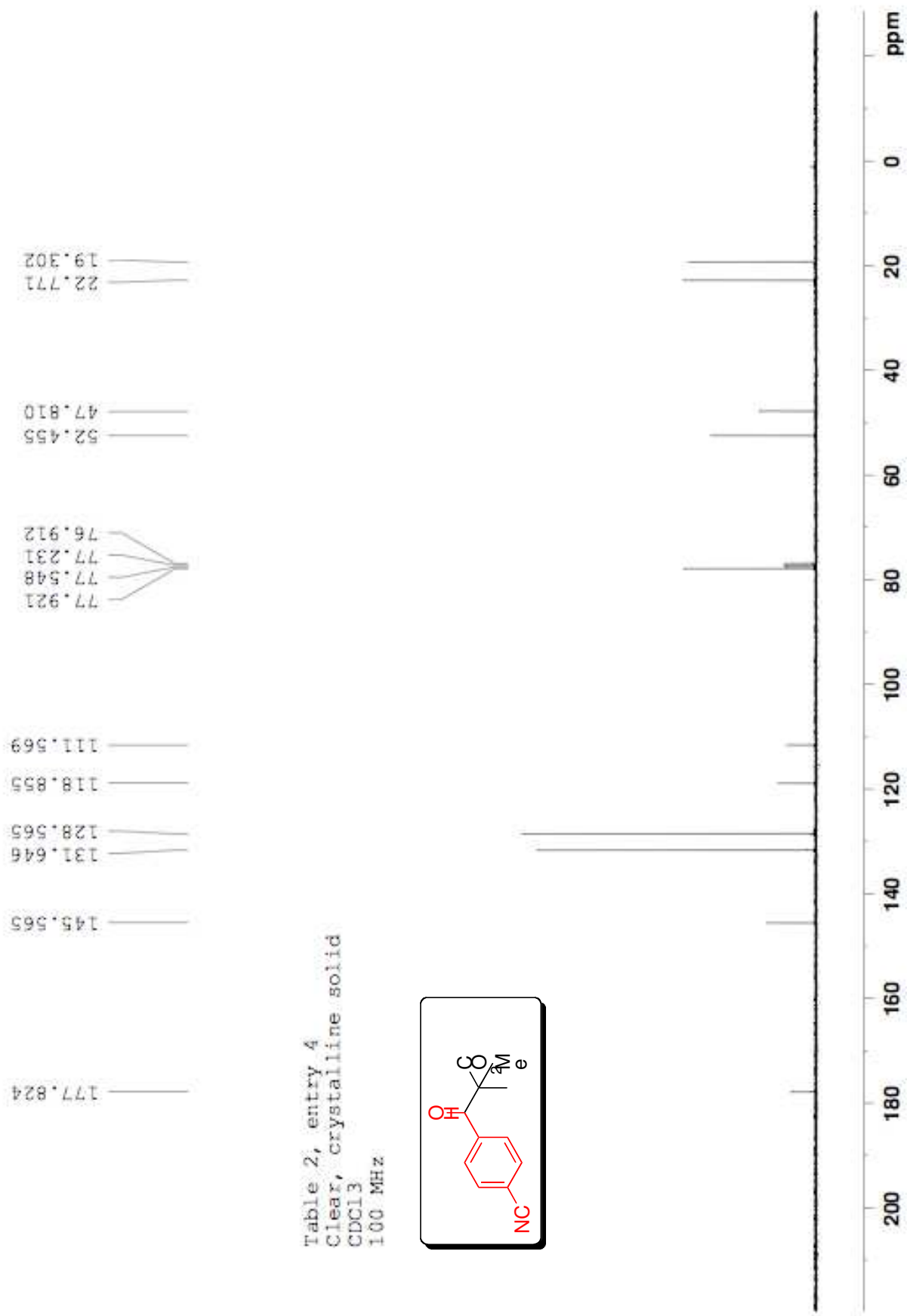
1.104
 1.077

3.702
 3.515

4.931

7.603
 7.582
 7.420
 7.399
 7.270





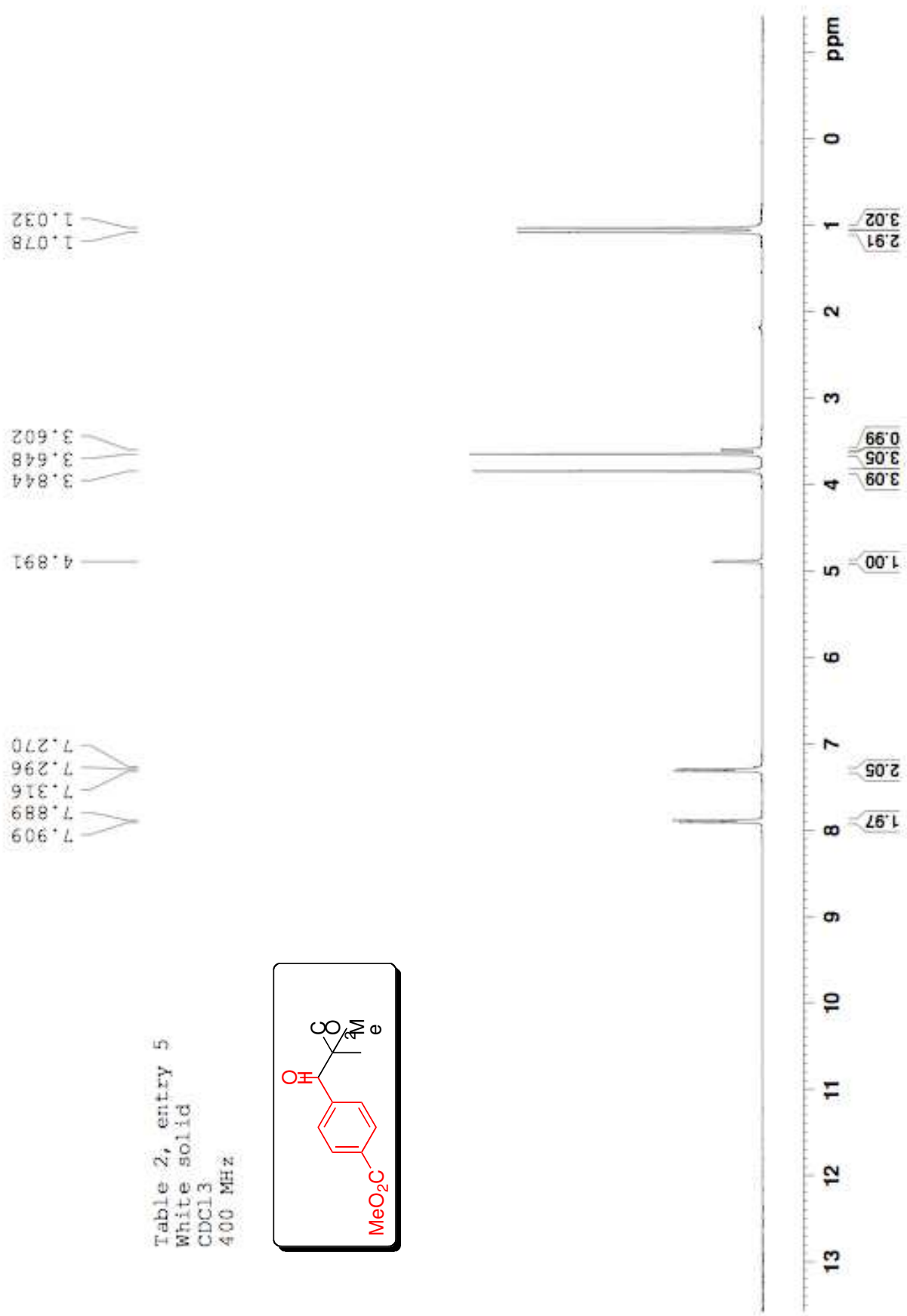
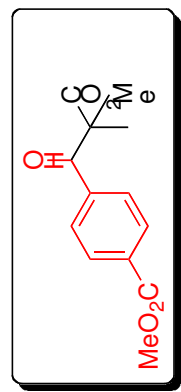


Table 2, entry 5
 White solid
 CDCl₃
 400 MHz



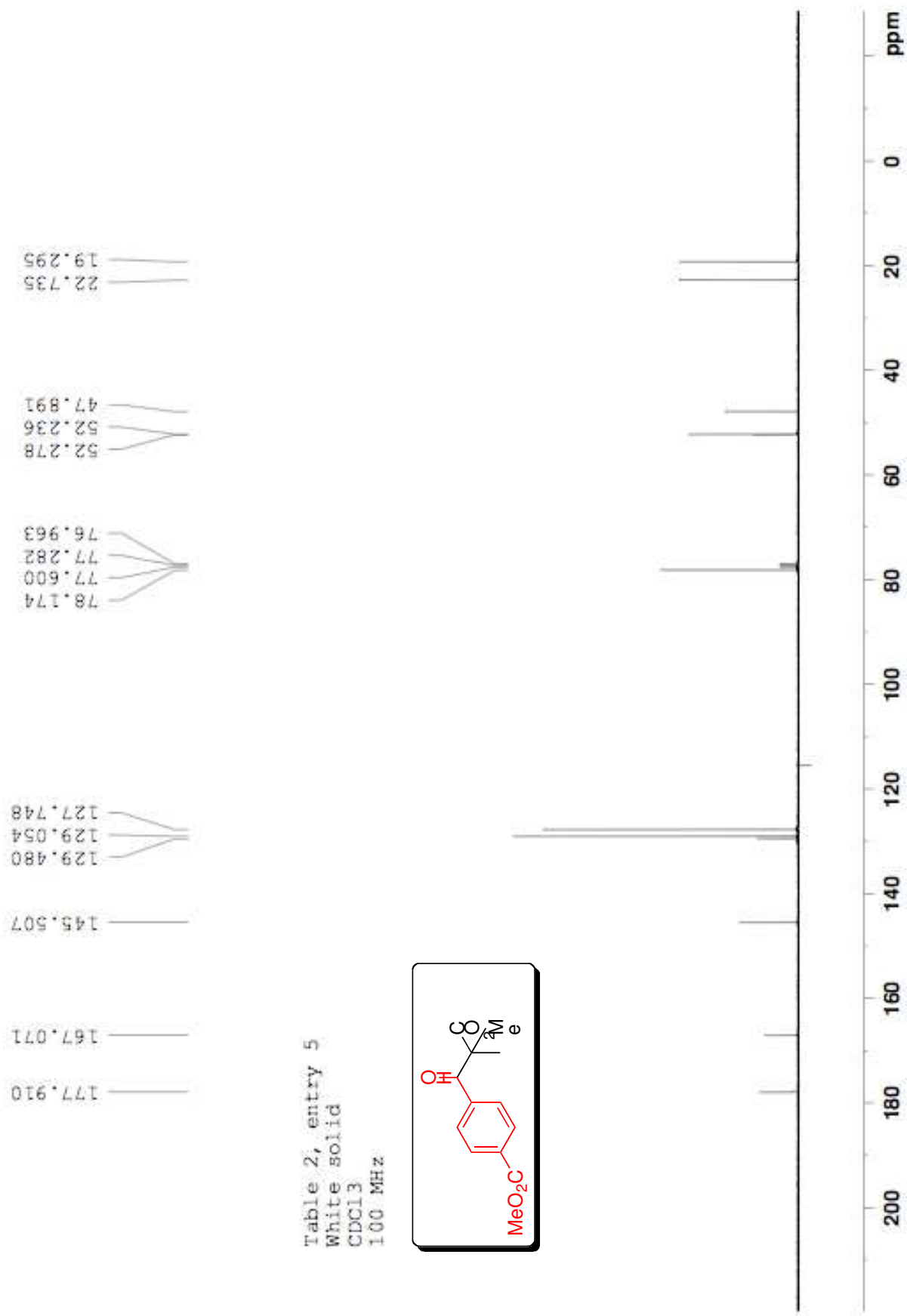


Table 2, entry 5
 White solid
 CDCl₃
 100 MHz

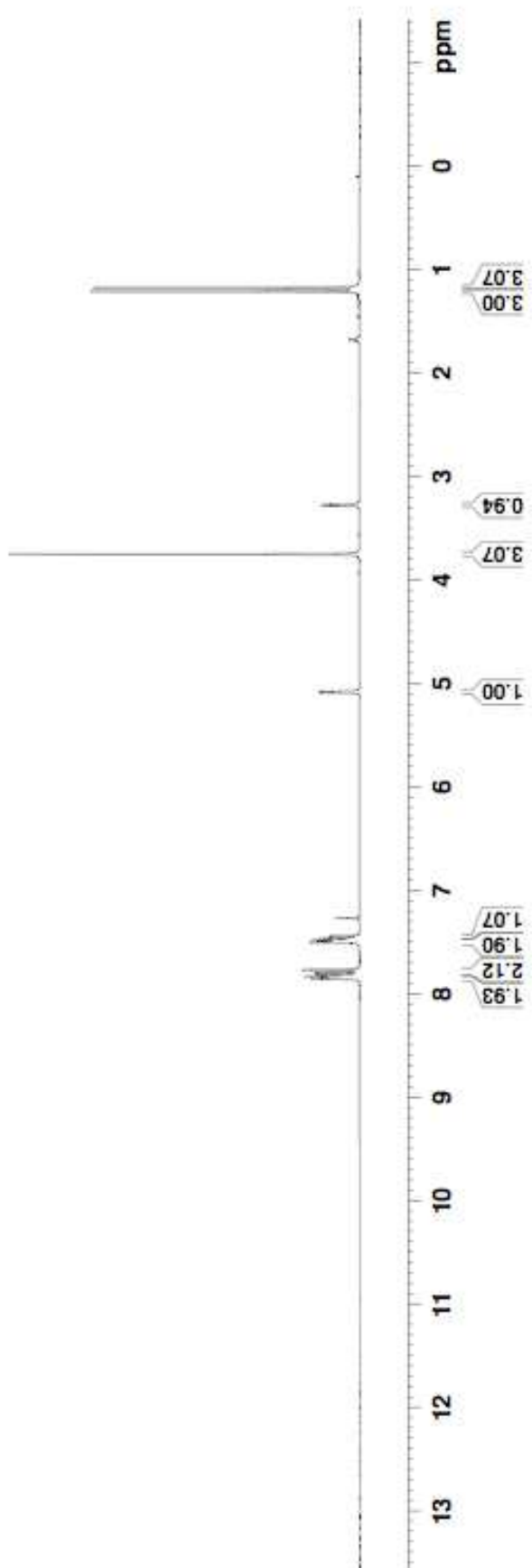
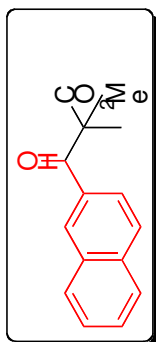
1.207
1.172

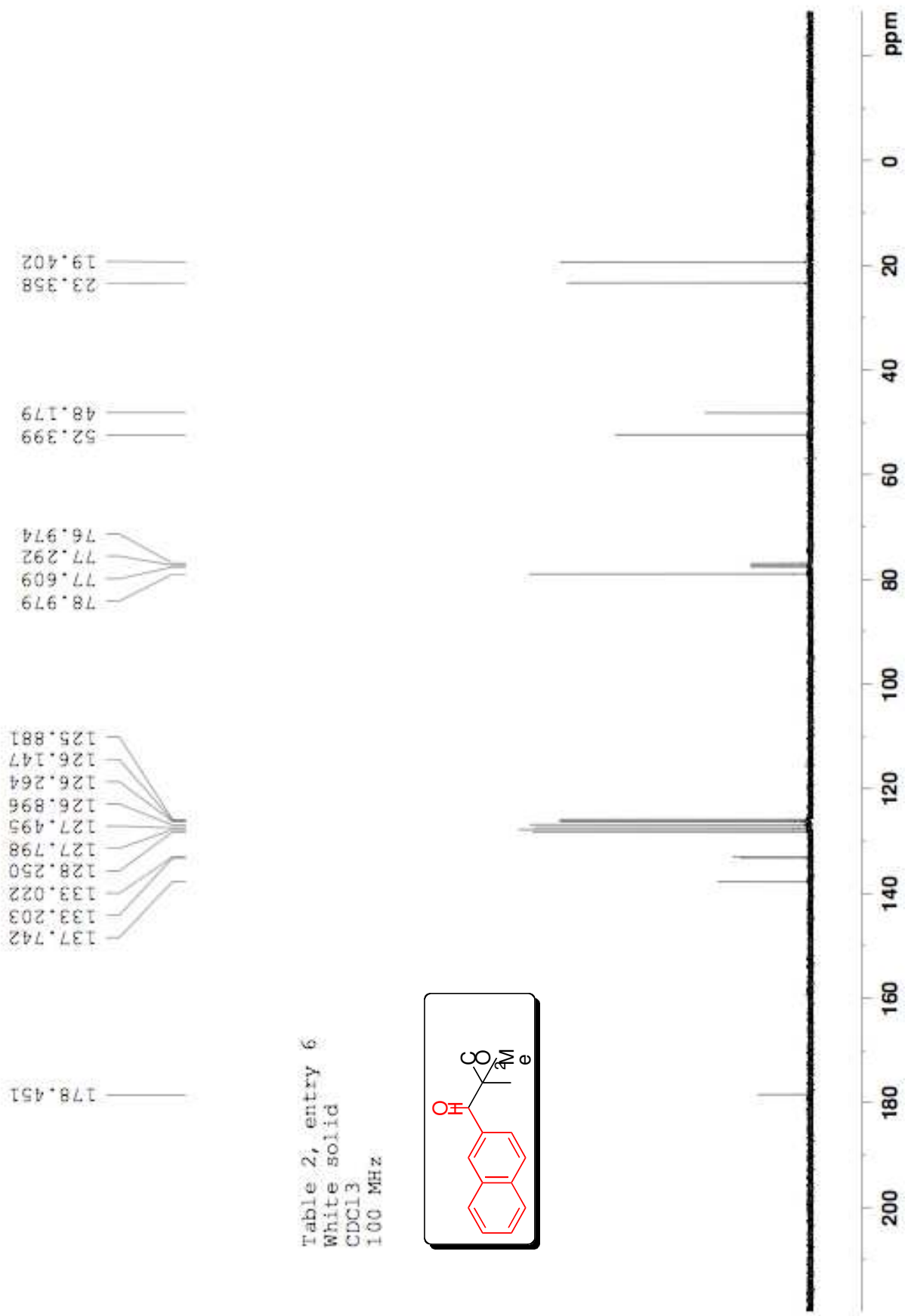
3.749
3.280
3.269

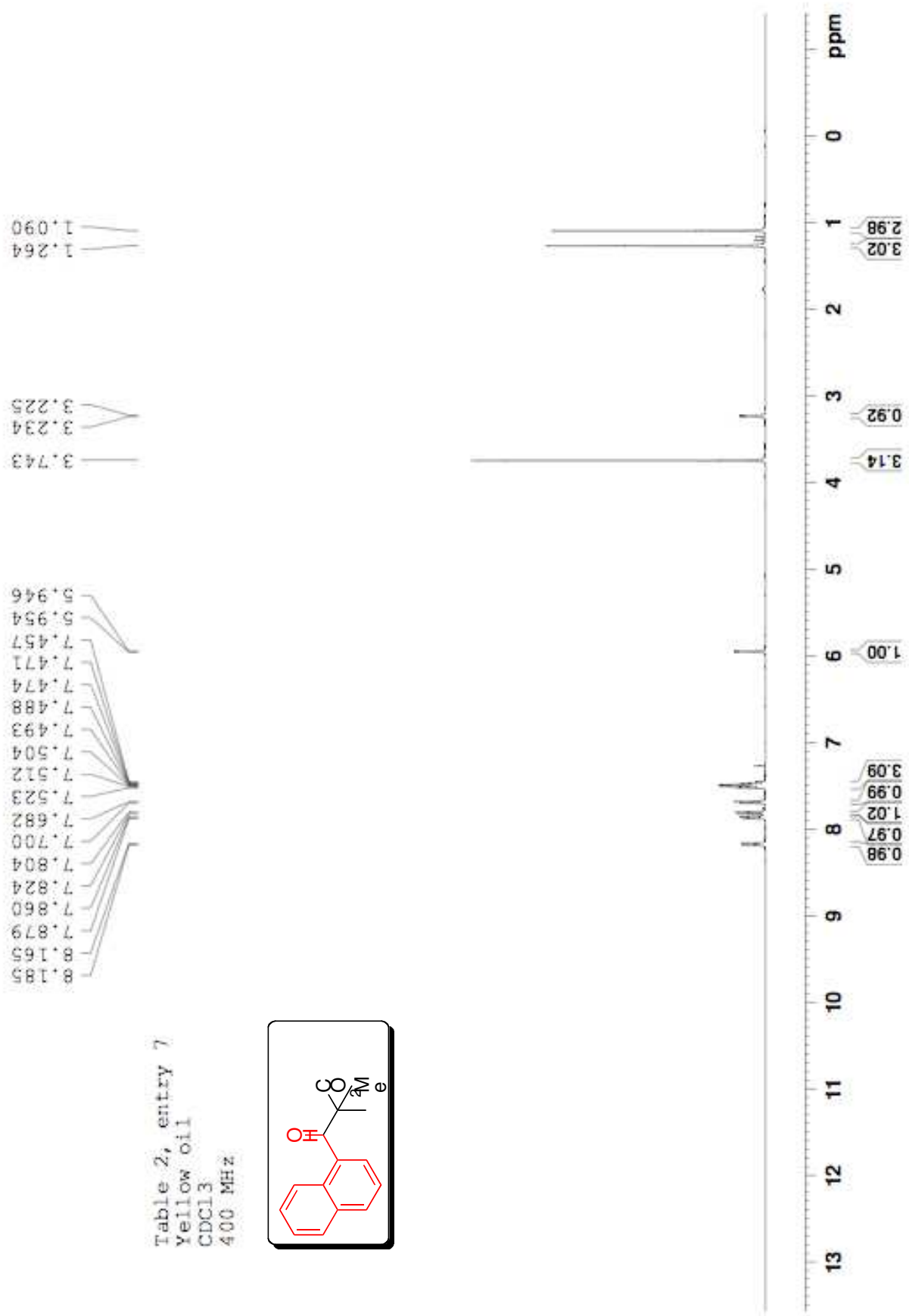
5.087
5.078

7.854
7.843
7.831
7.818
7.796
7.770
7.502
7.491
7.479
7.465
7.462
7.444
7.440
7.270

Table 2, entry 6
White solid
CDCl₃
400 MHz







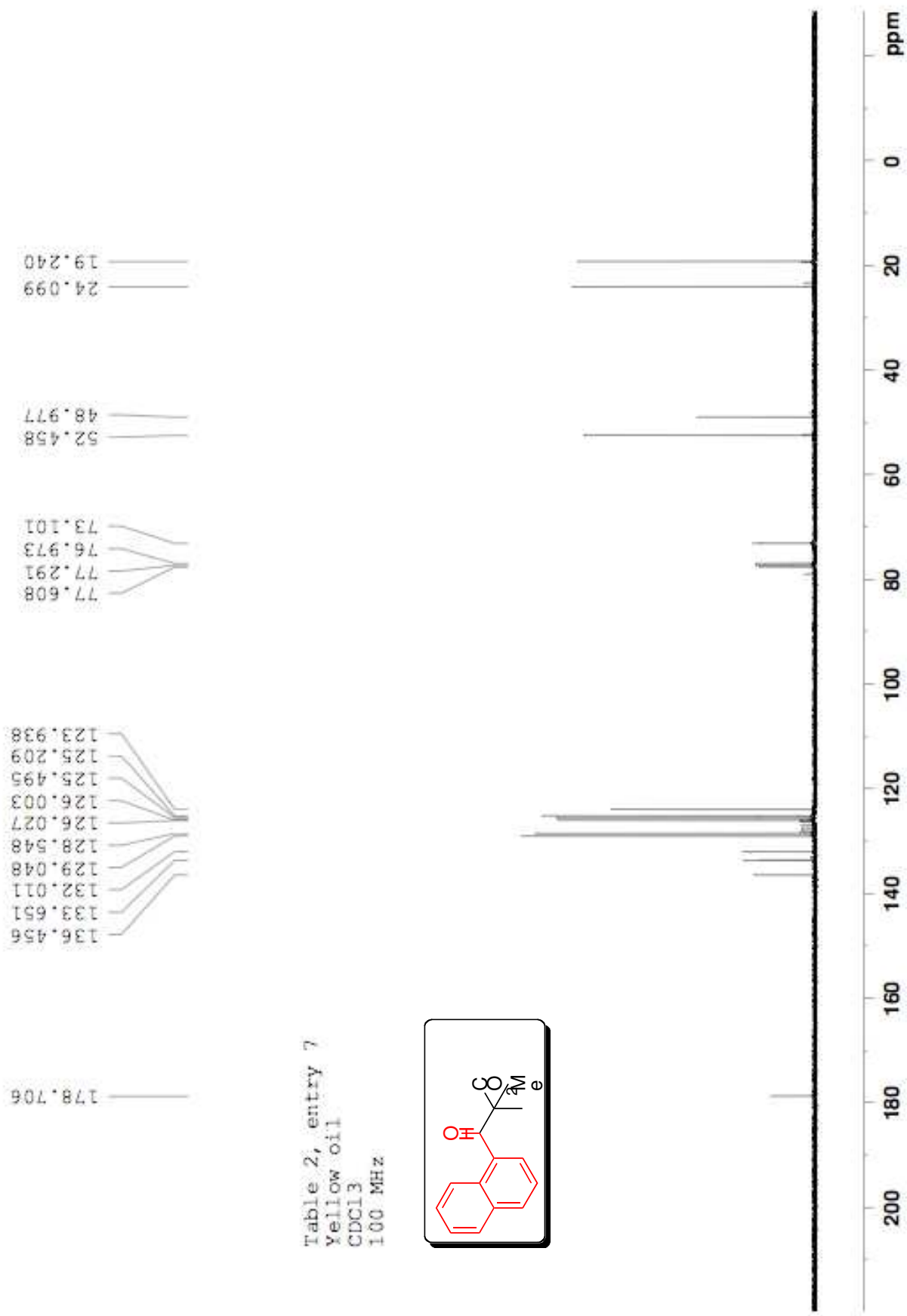
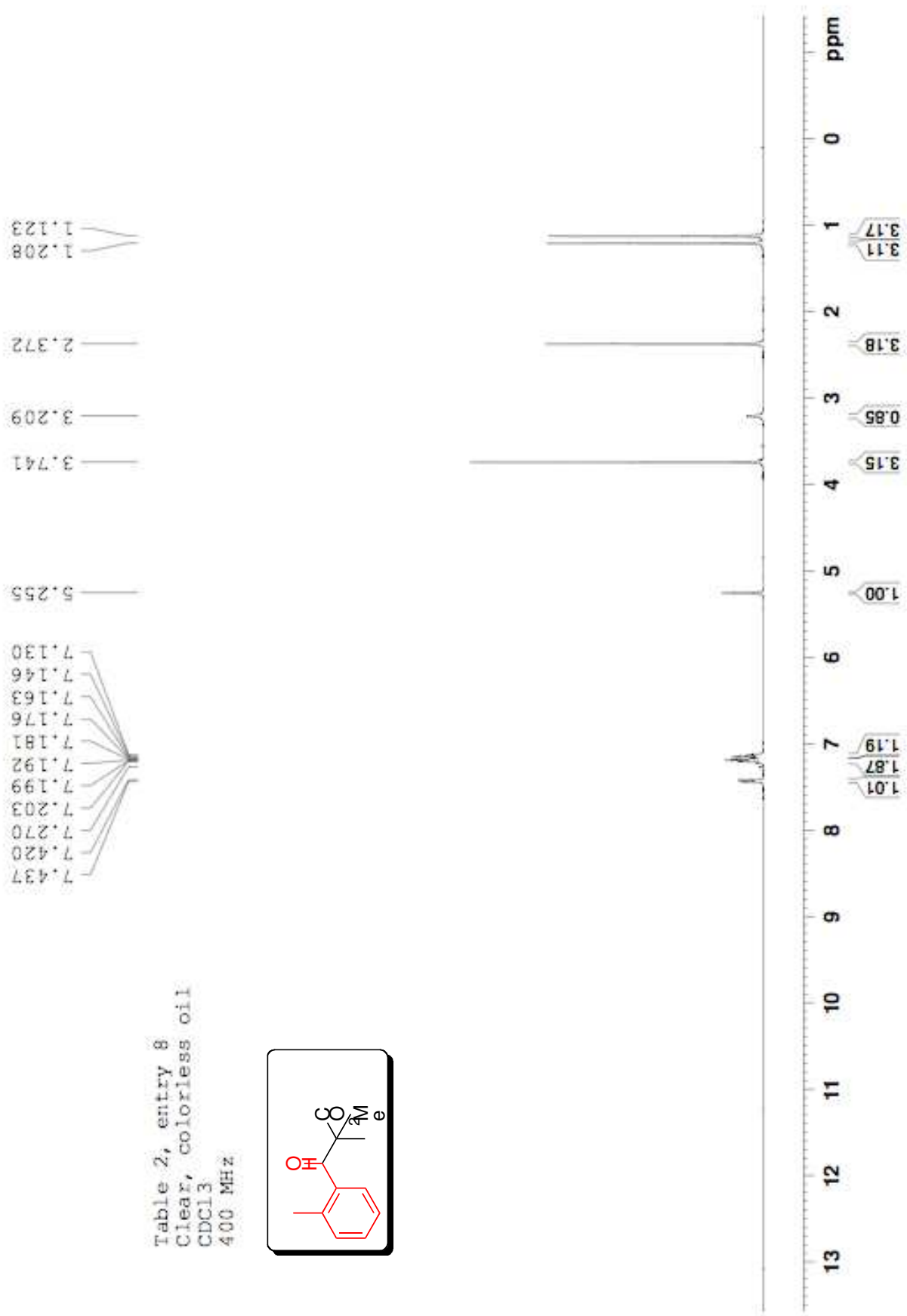
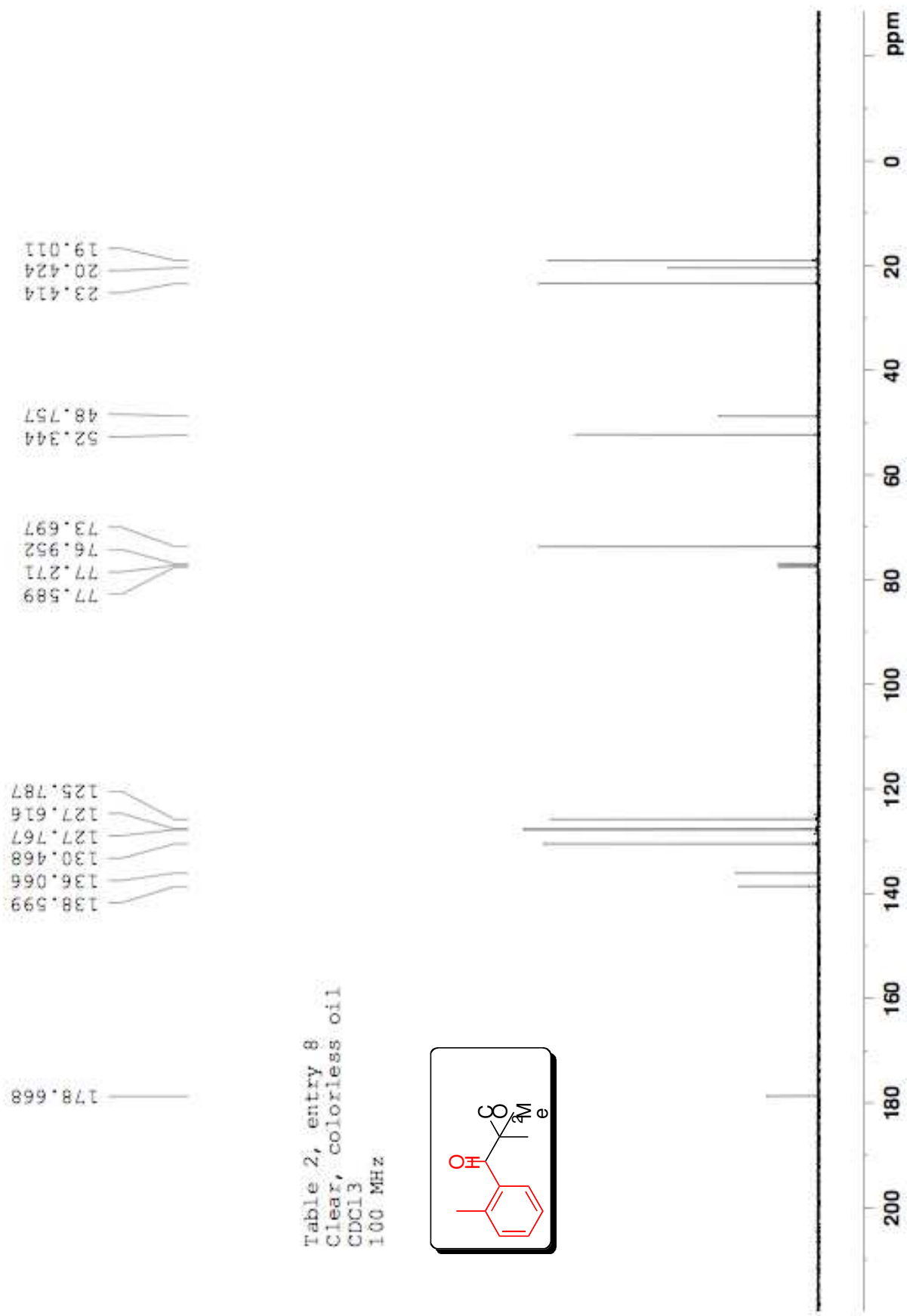


Table 2, entry 7
 Yellow oil
 CDCl₃
 100 MHz





1.137
1.093

2.340

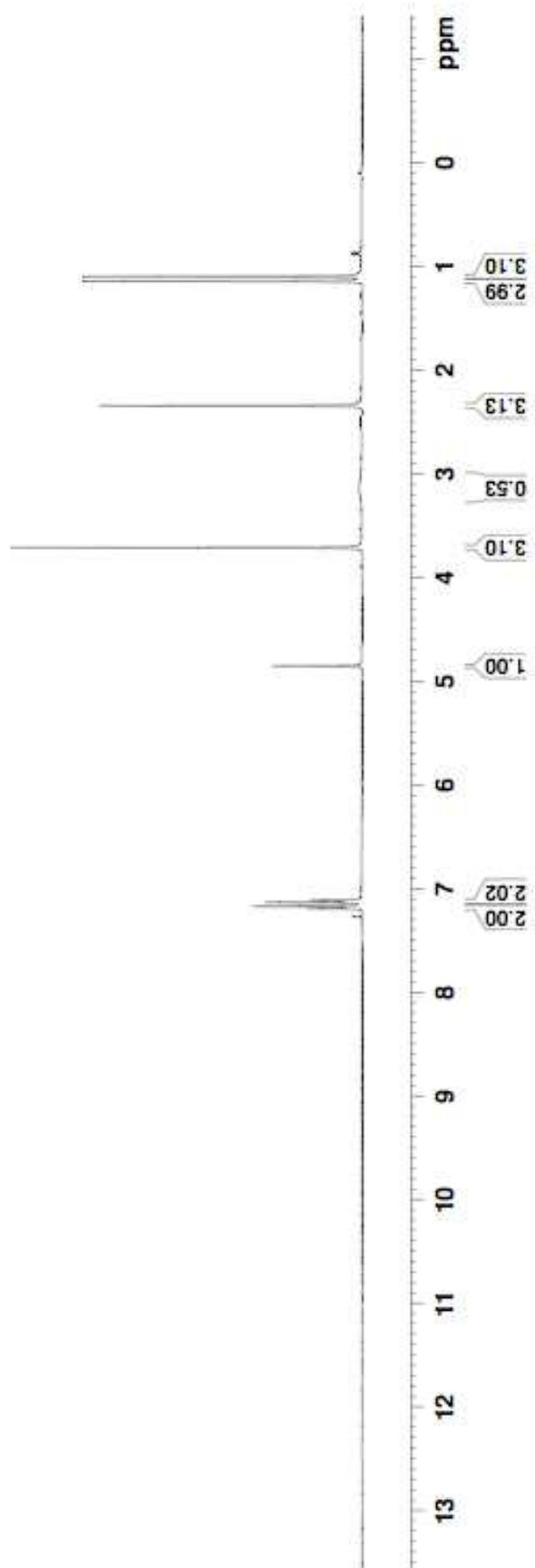
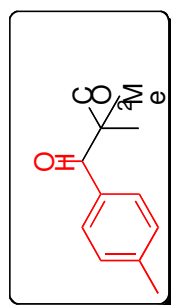
3.131

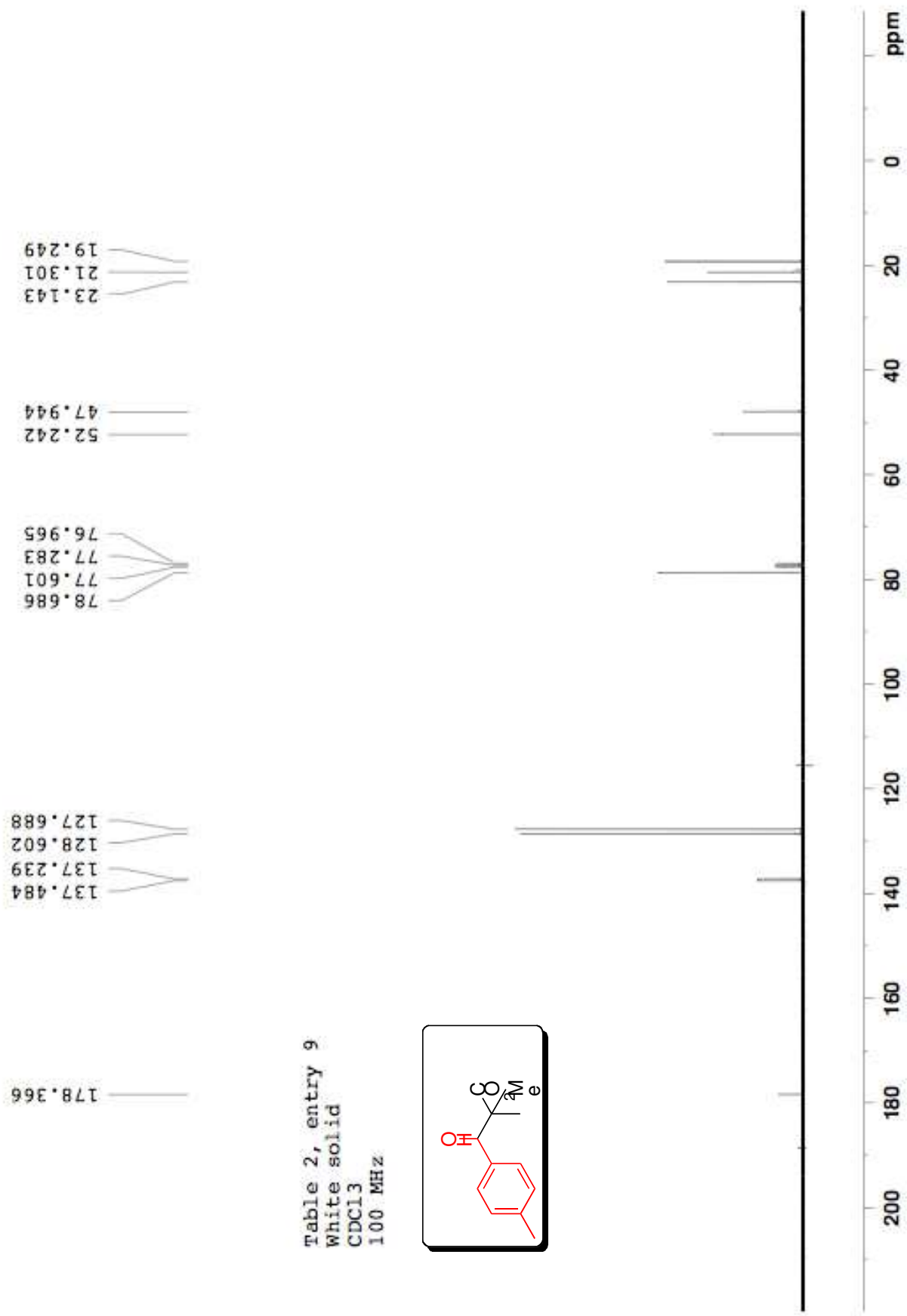
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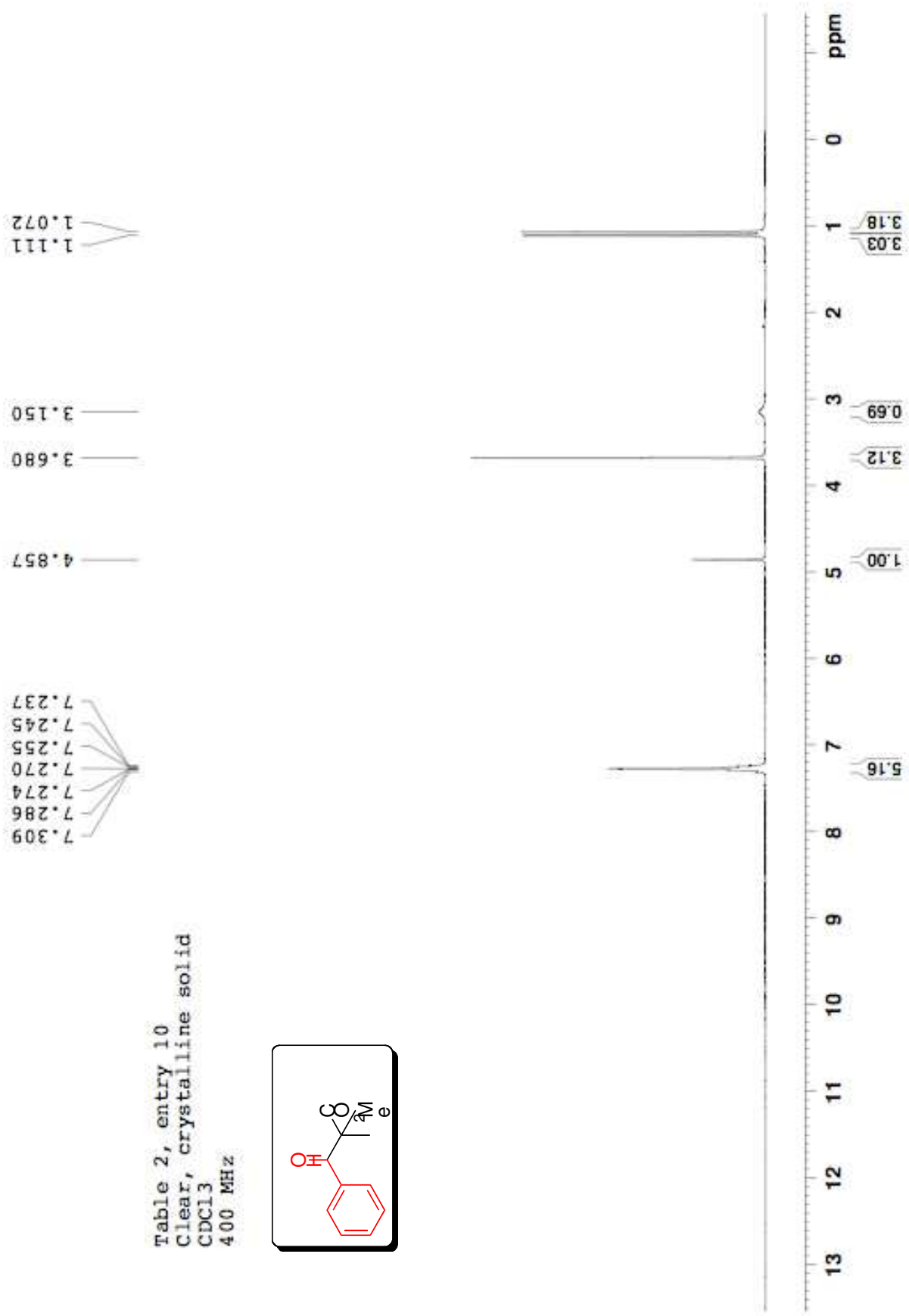
4.852

7.112
7.133
7.170
7.191
7.270

Table 2, entry 9
White solid
CDCl₃
400 MHz







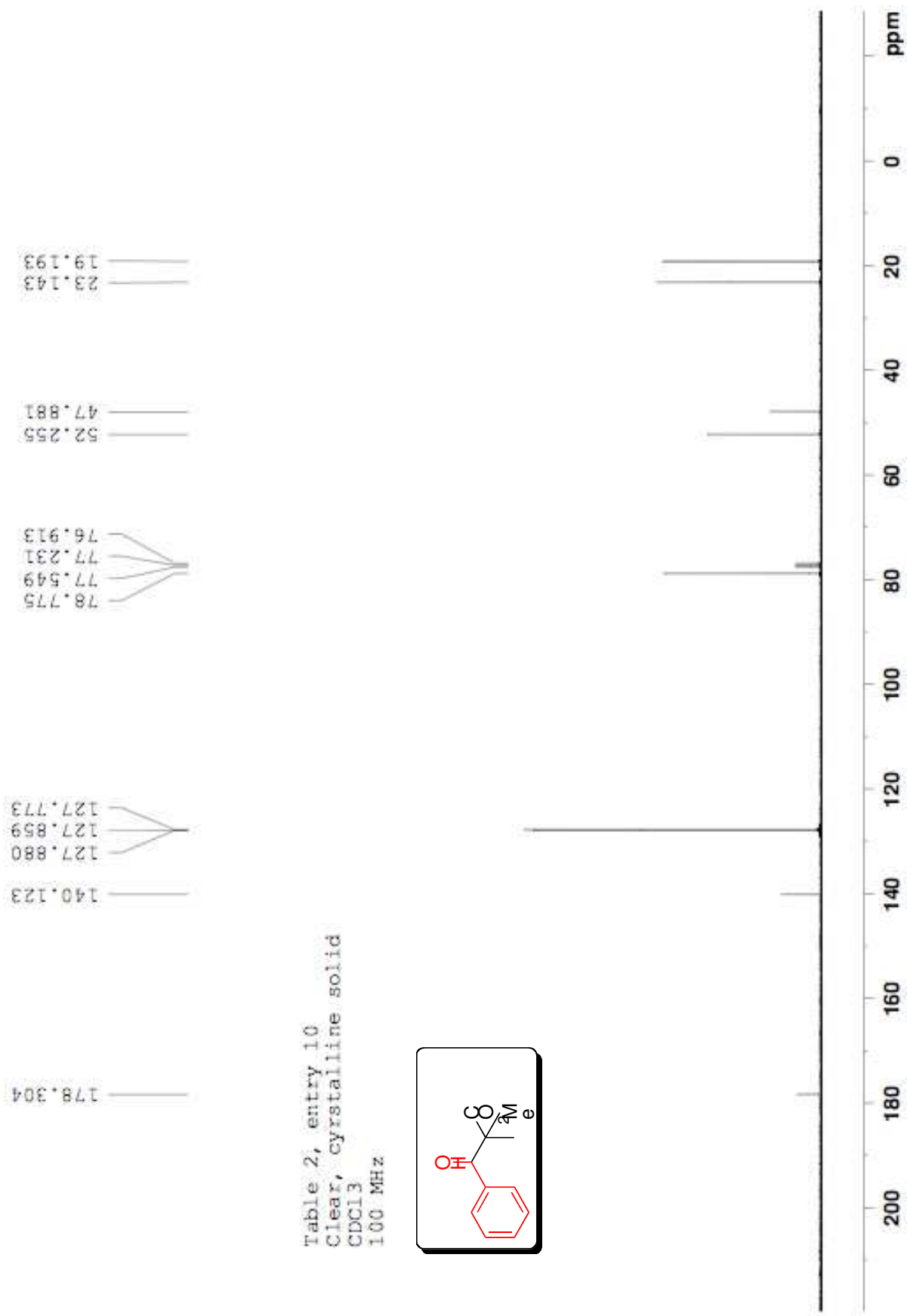
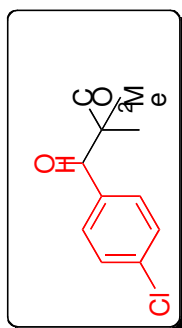


Table 2, entry 11
 Clear, crystalline solid
 CDCl₃
 400 MHz

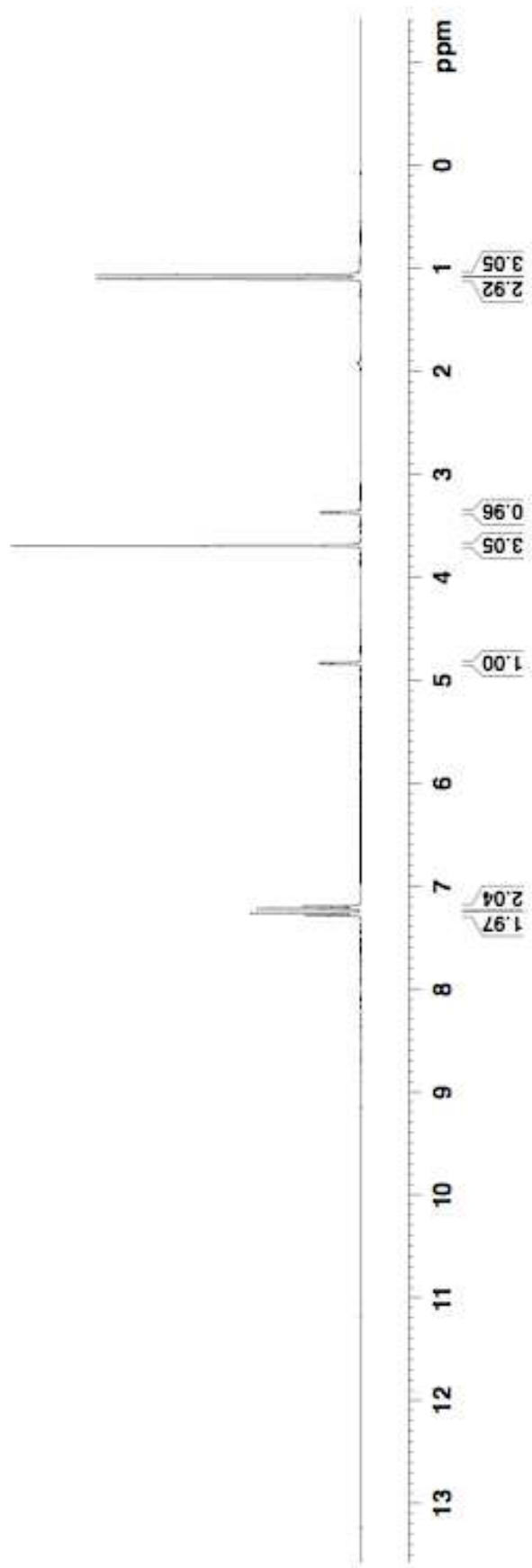


1.102
1.066

3.694
3.375
3.365

4.843
4.833

7.286
7.265
7.219
7.198



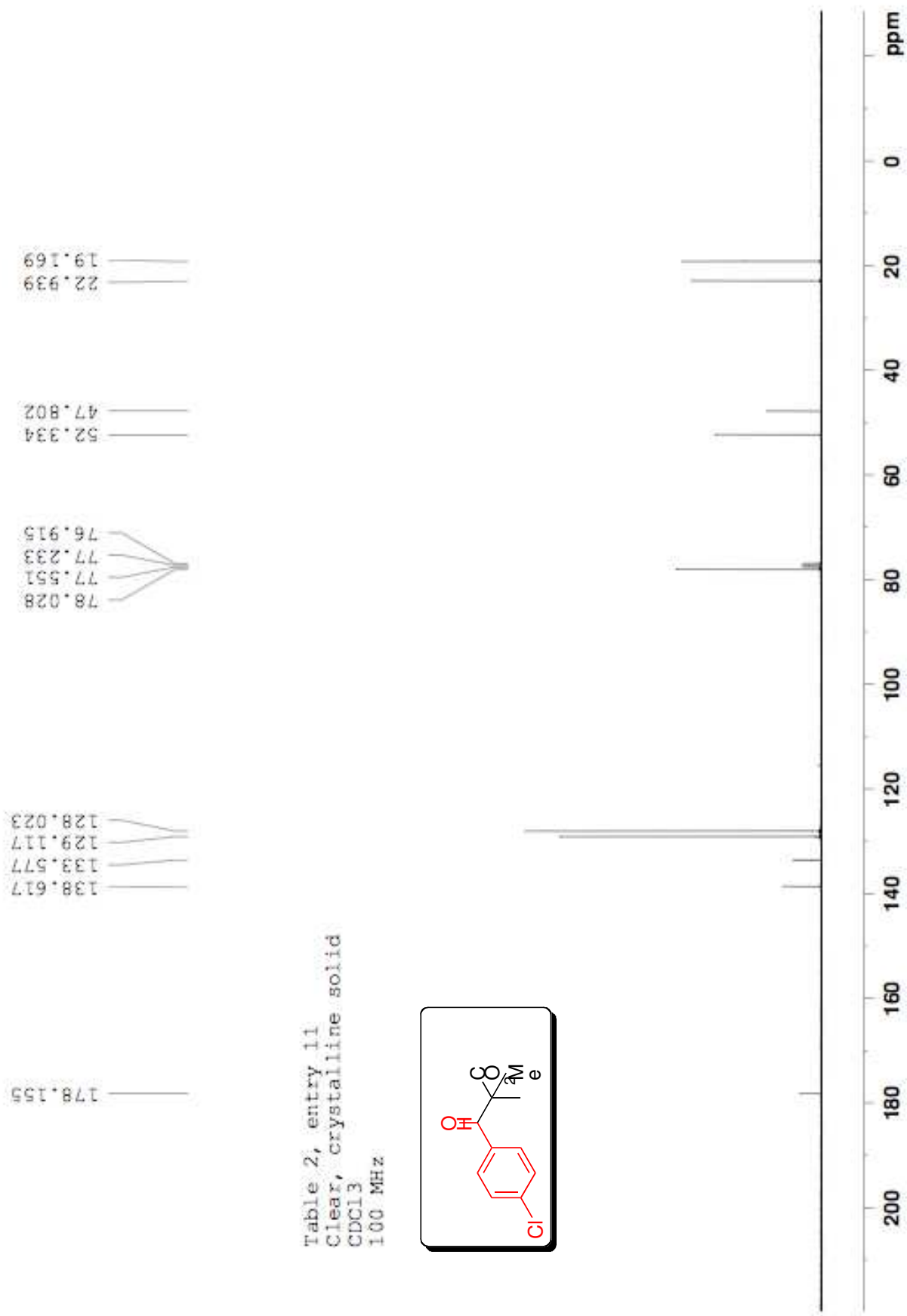
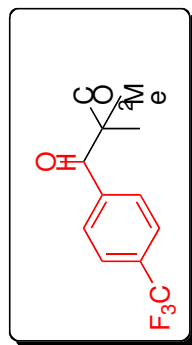


Table 2, entry 12
 White solid
 CDCl₃
 400 MHz

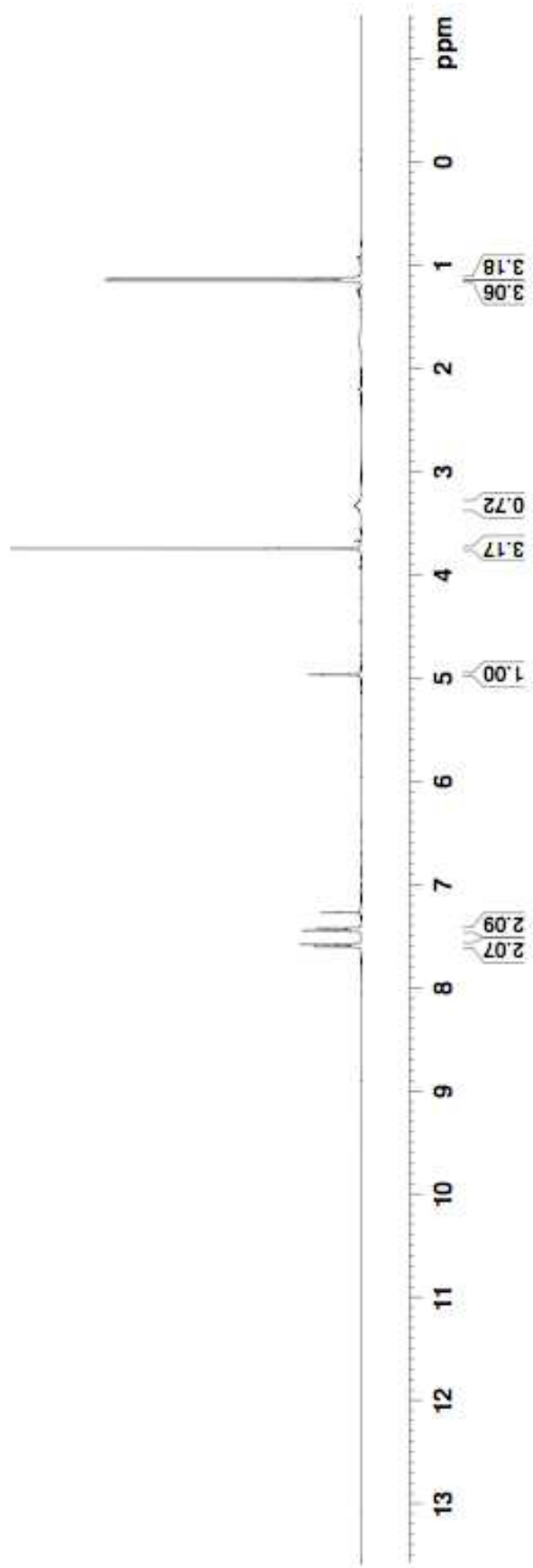


1.144
 1.124

3.741
 3.325

4.963

7.600
 7.580
 7.446
 7.426
 7.270



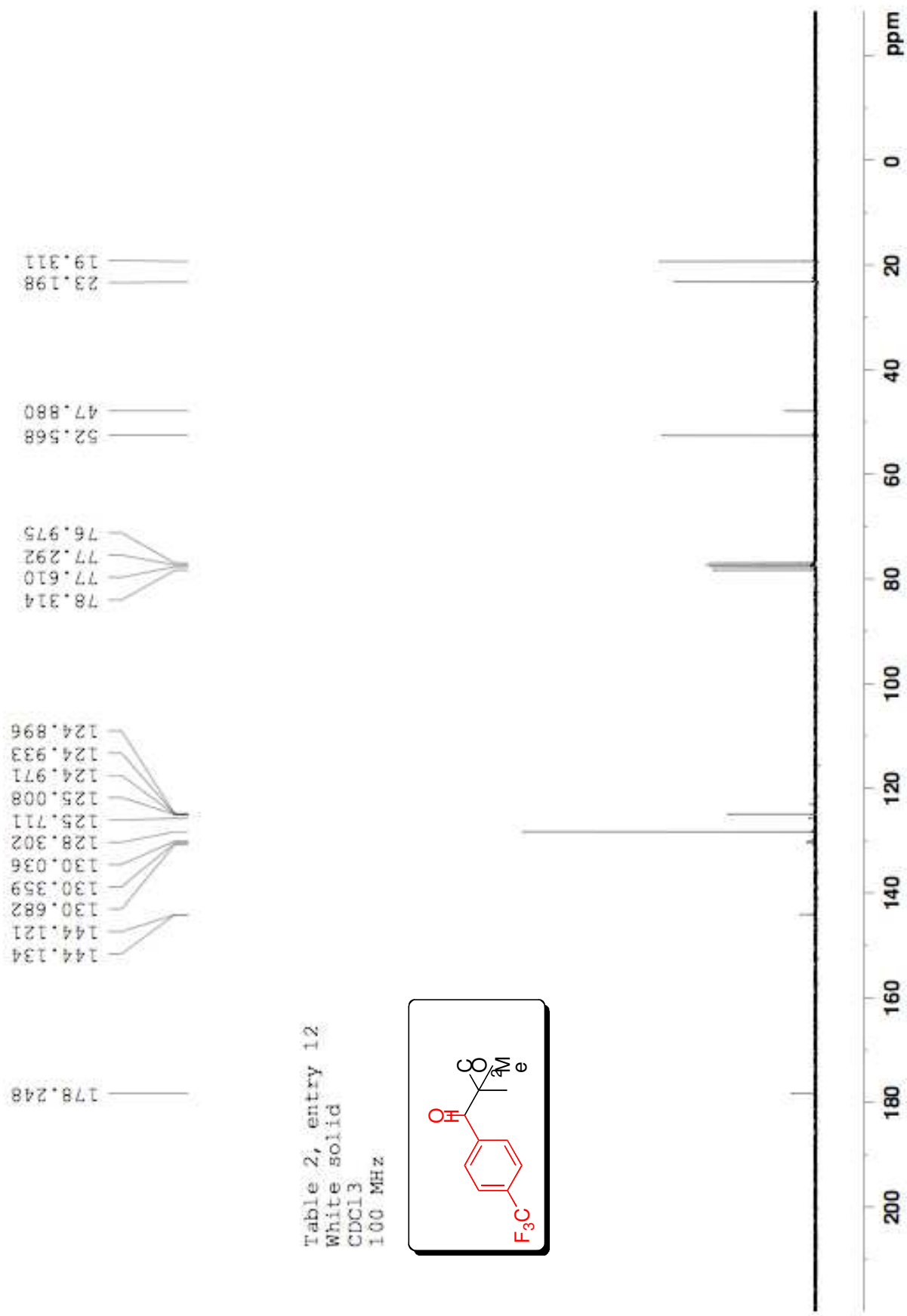
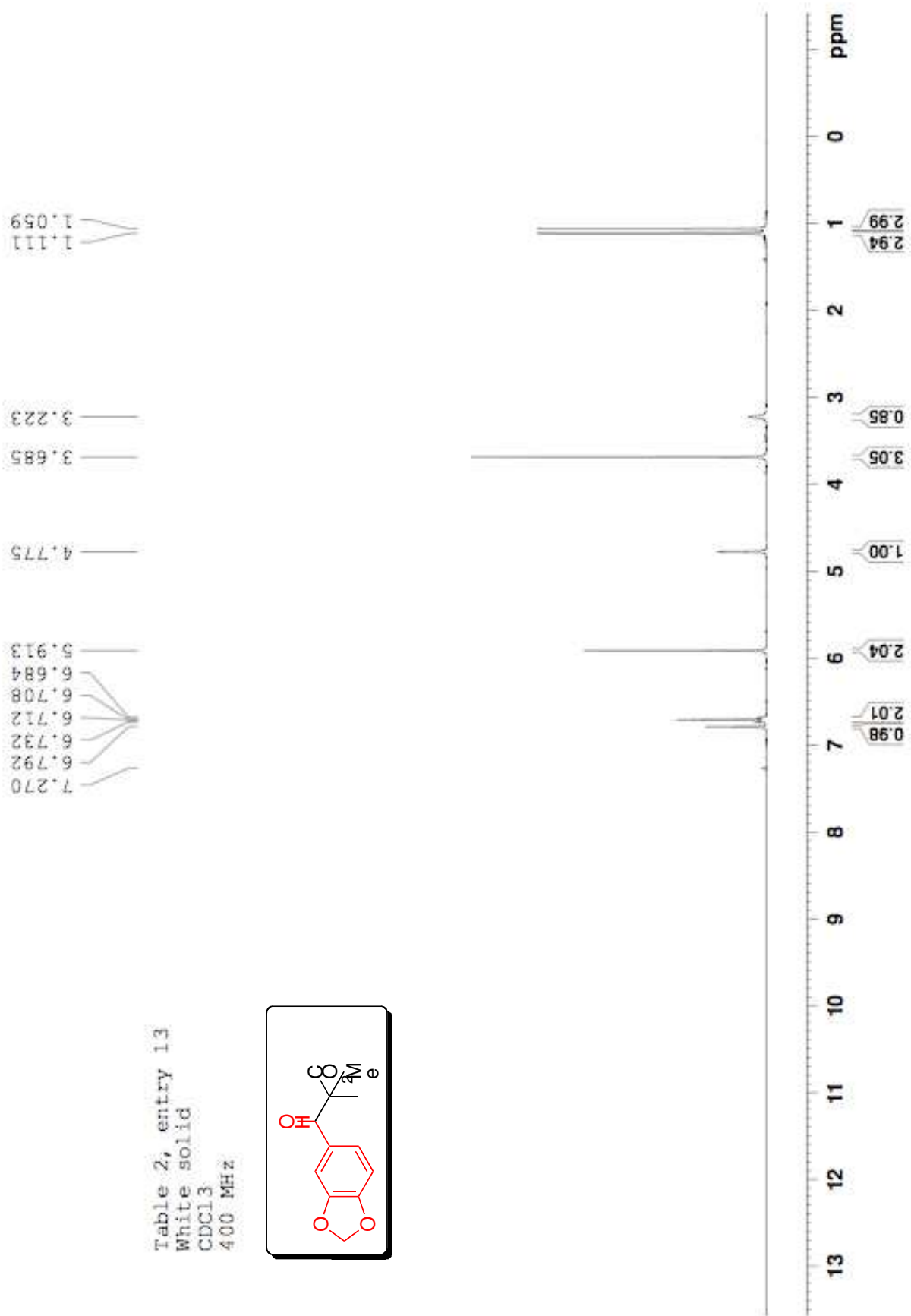
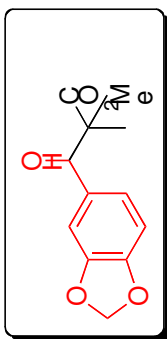


Table 2, entry 13
 White solid
 CDCl₃
 400 MHz



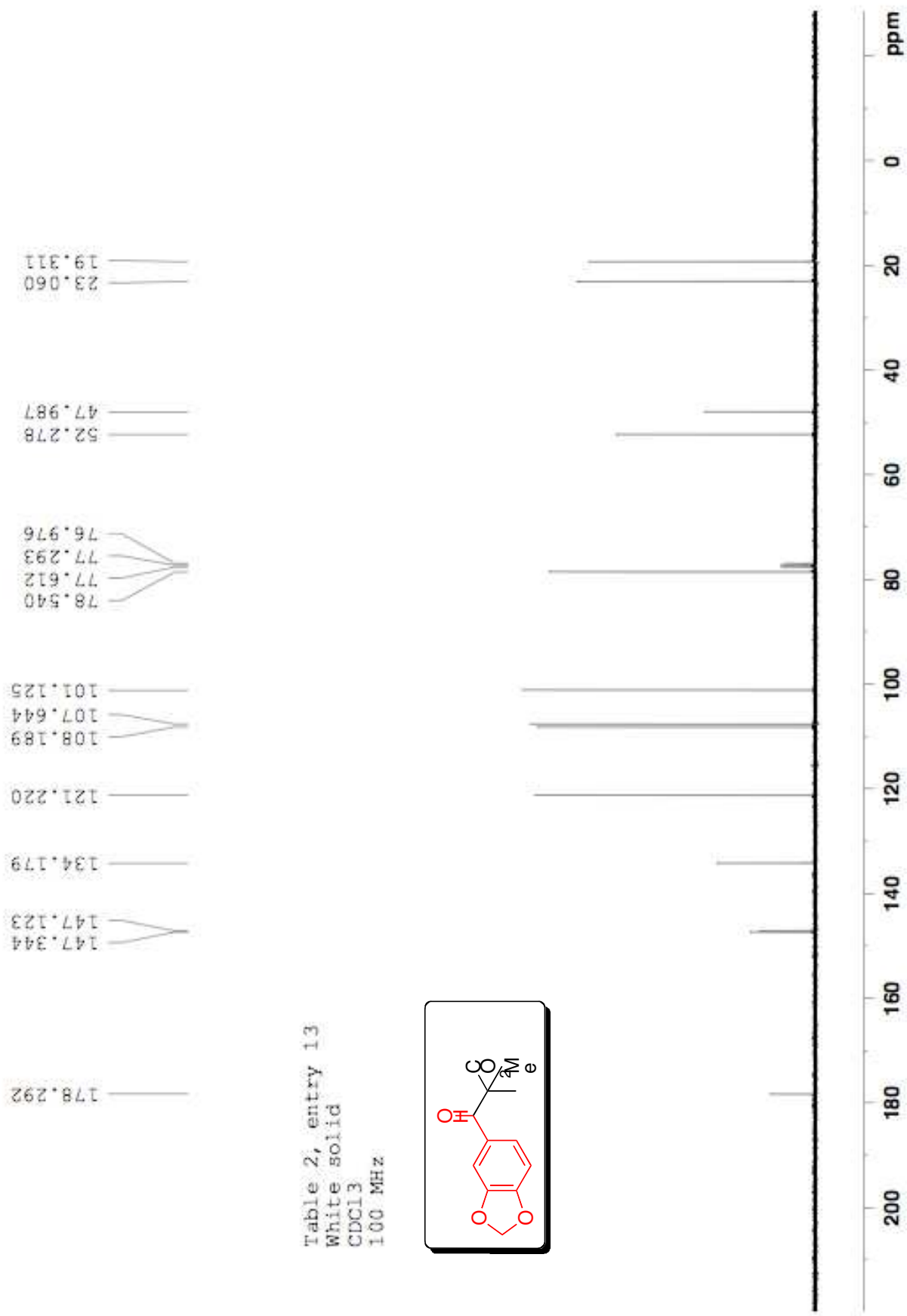
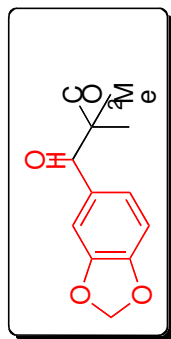
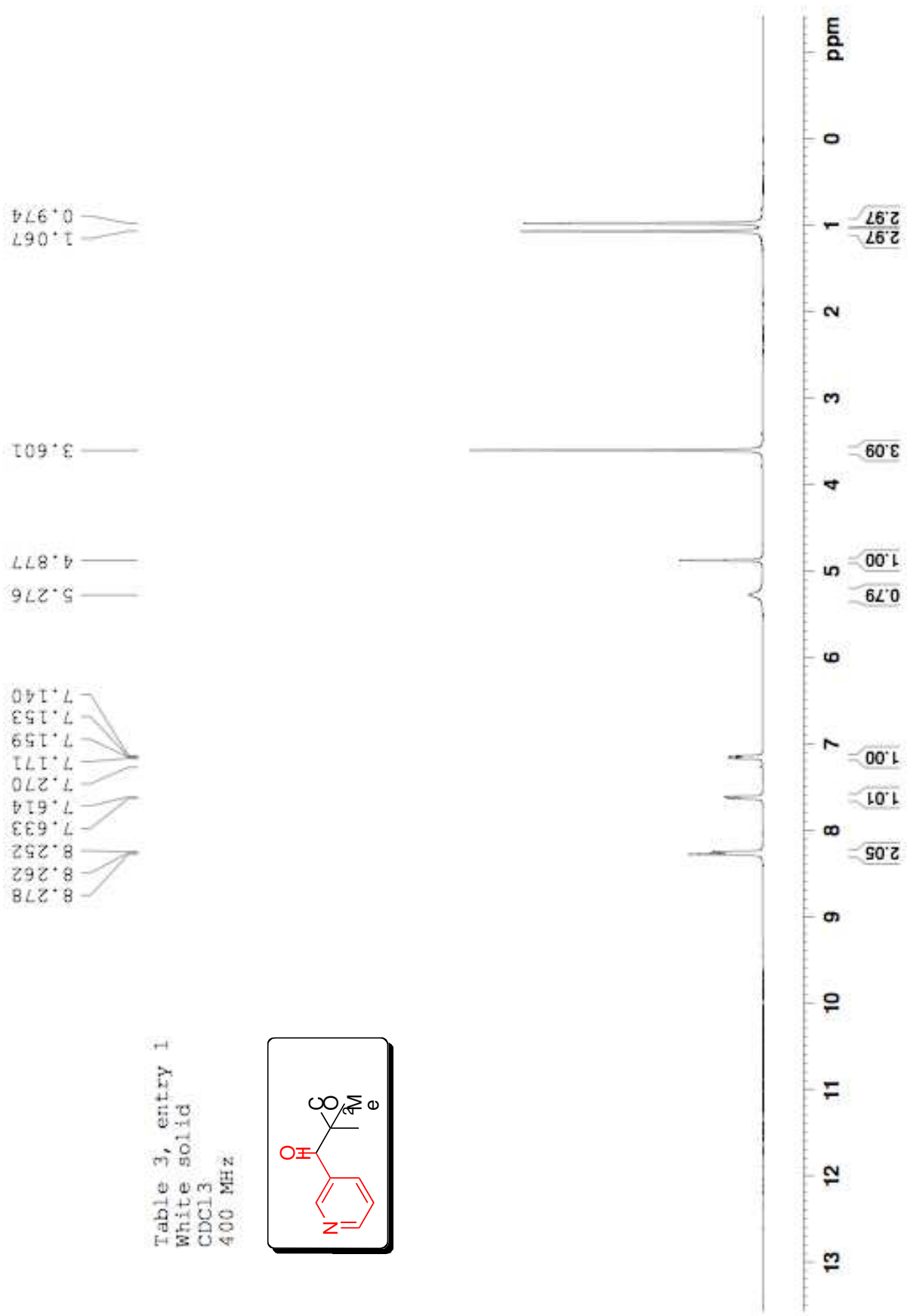


Table 2, entry 13
White solid
CDCl₃
100 MHz





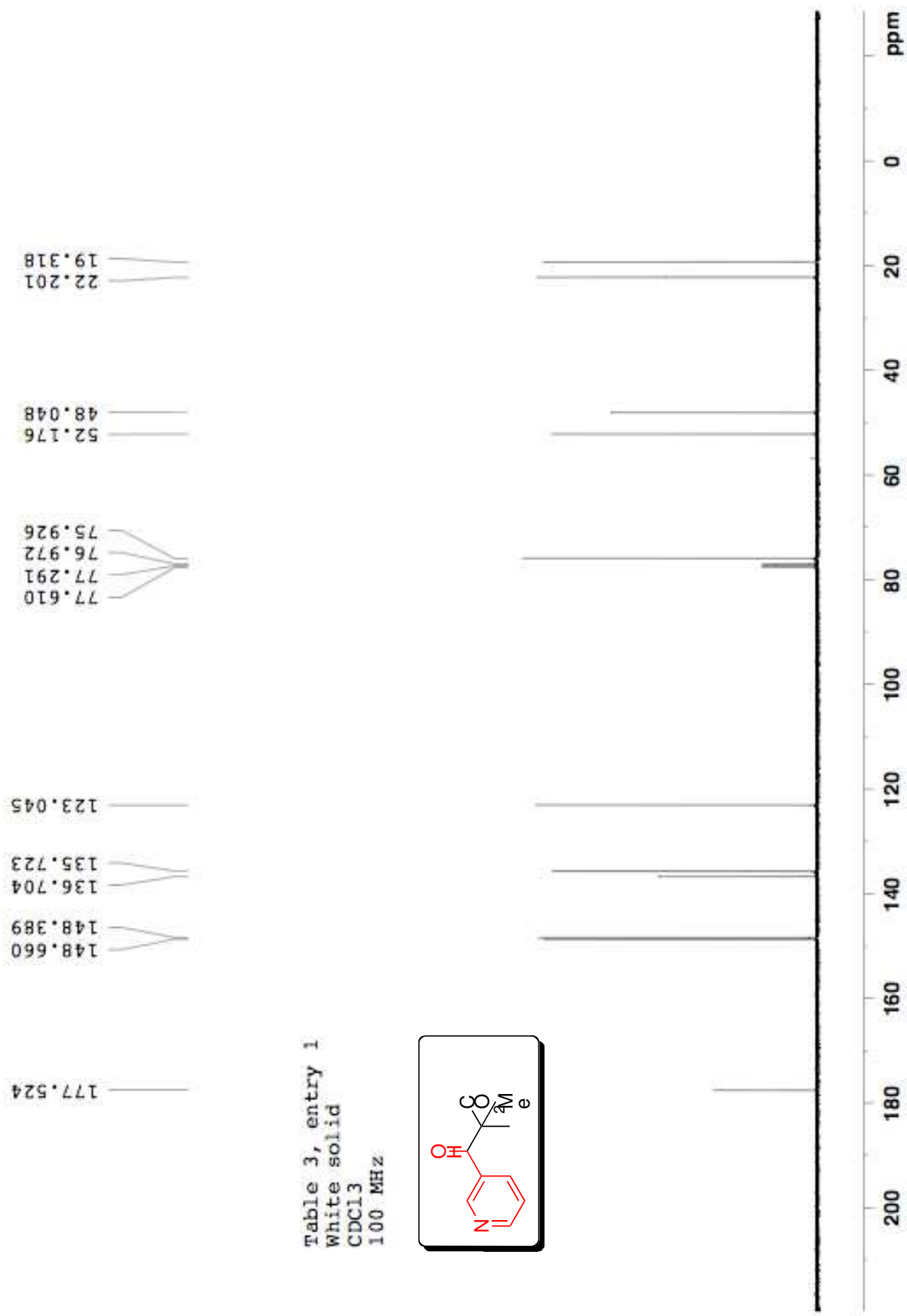
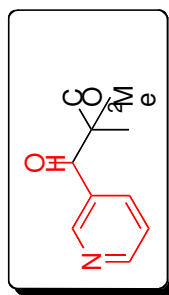
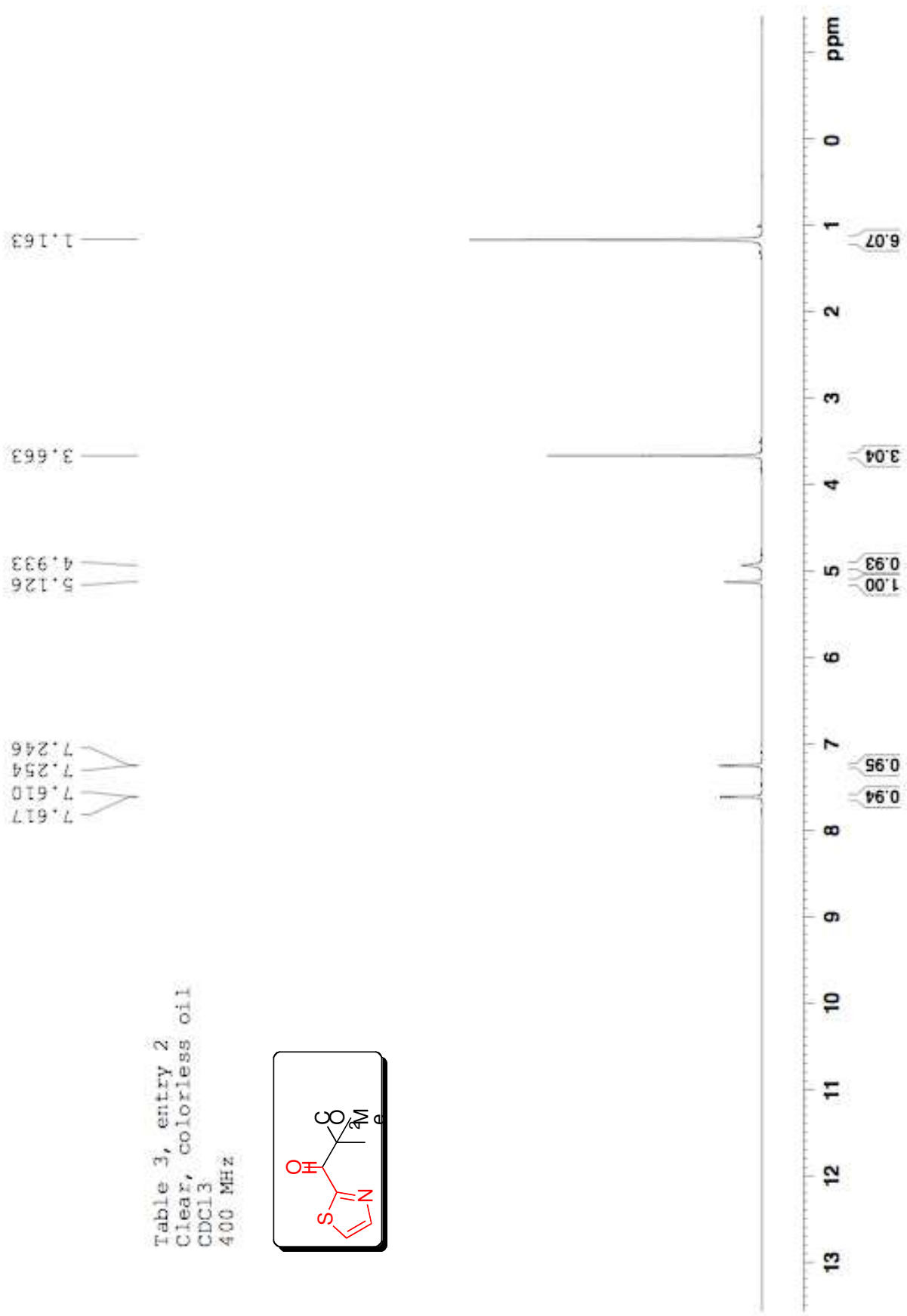


Table 3, entry 1
 White solid
 CDCl₃
 100 MHz





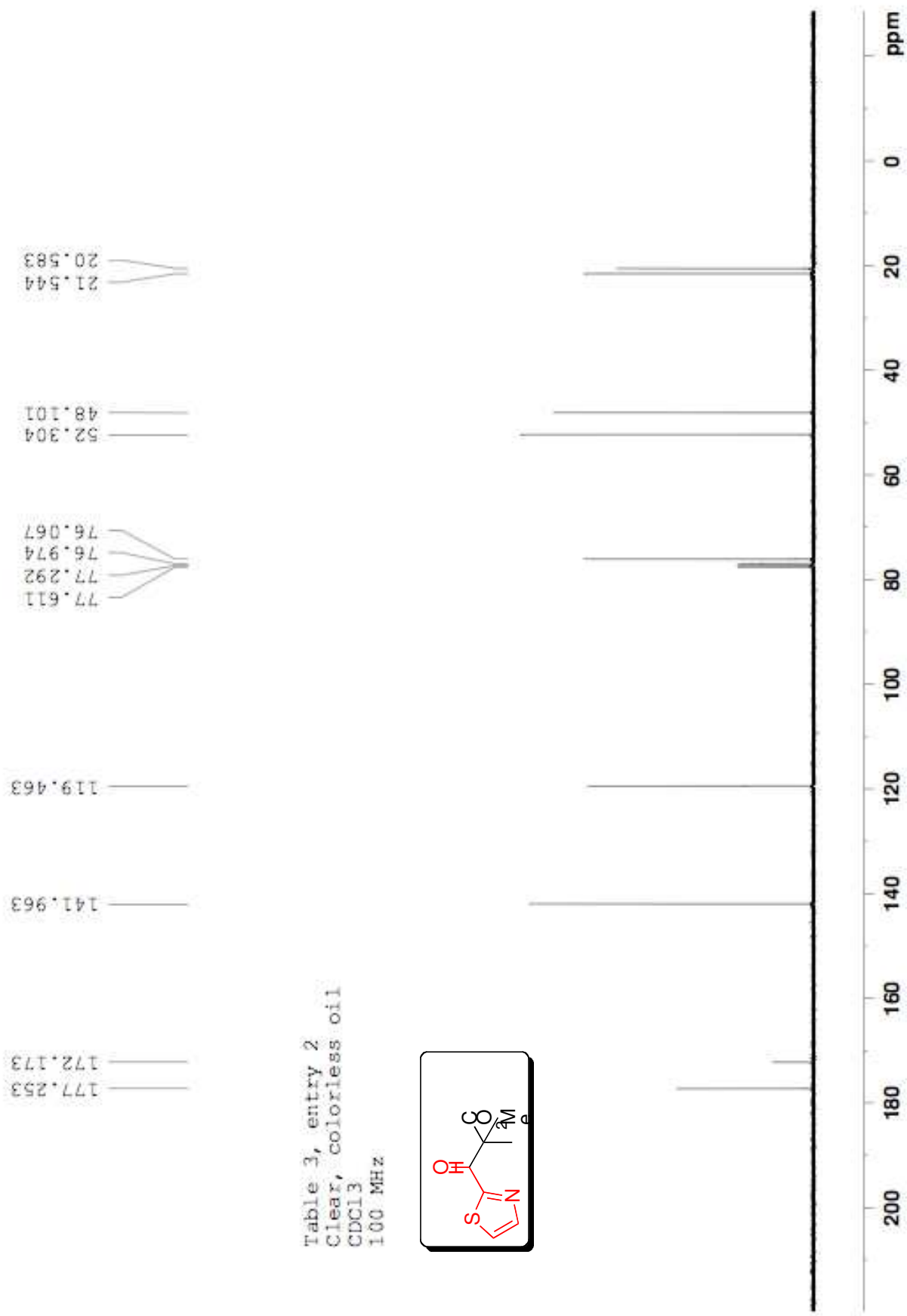
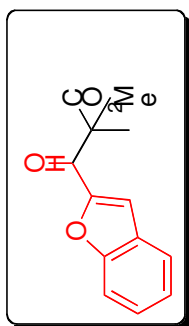


Table 3, entry 3
 White solid
 CDCl₃
 400 MHz

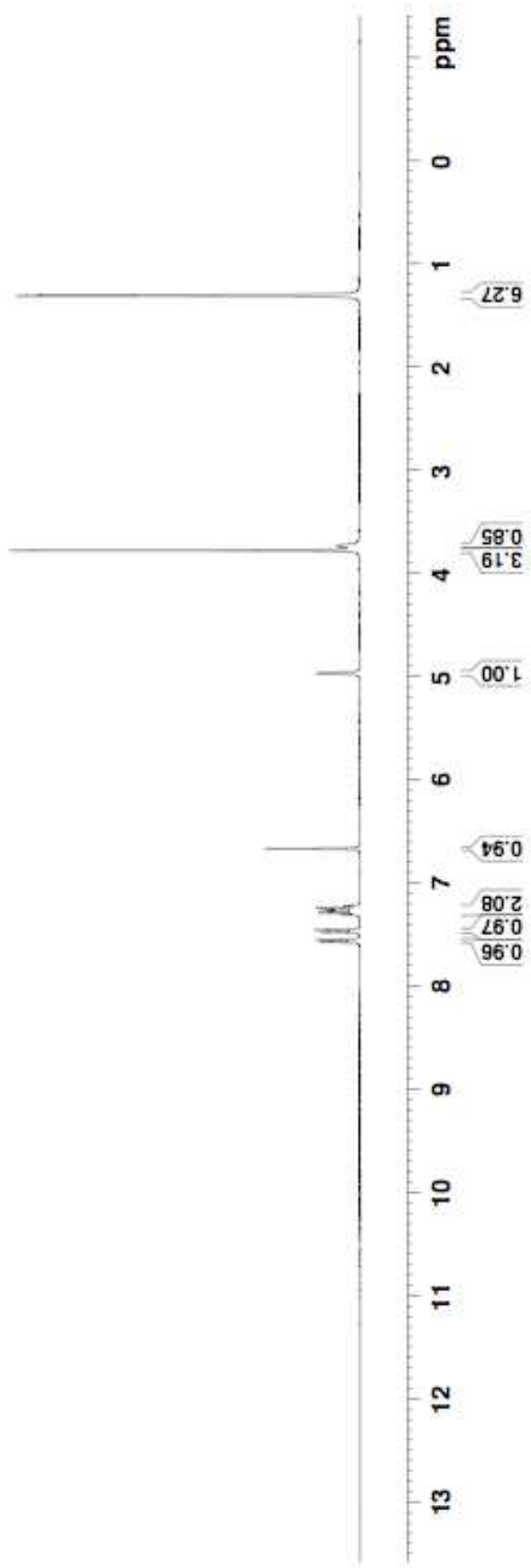


1.305
 1.297

3.773
 3.733

4.964

7.568
 7.550
 7.473
 7.453
 7.304
 7.286
 7.269
 7.266
 7.256
 7.238
 7.220
 6.666



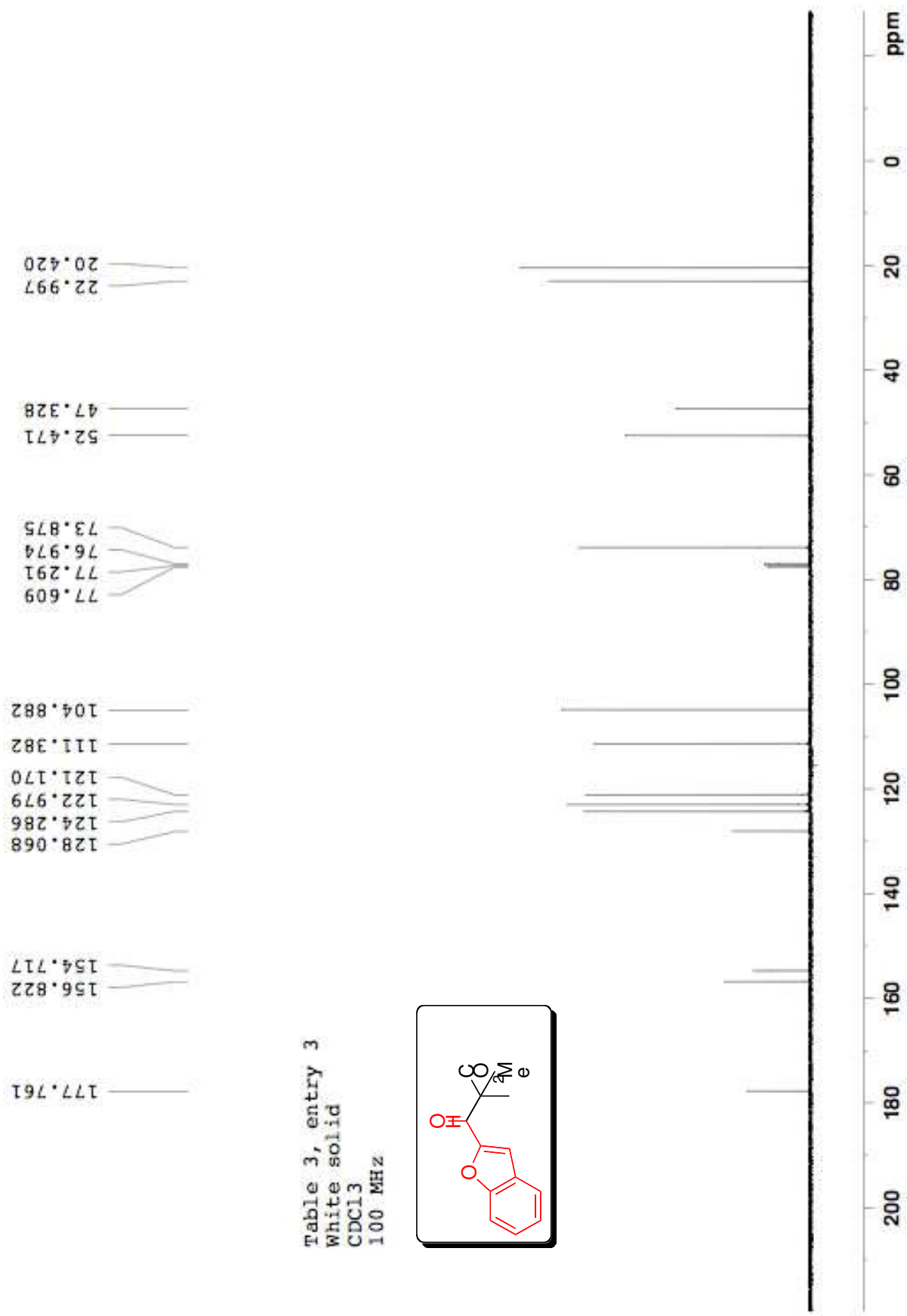
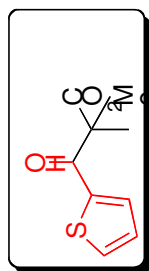


Table 3, entry 4
 White solid
 CDCl₃
 400 MHz

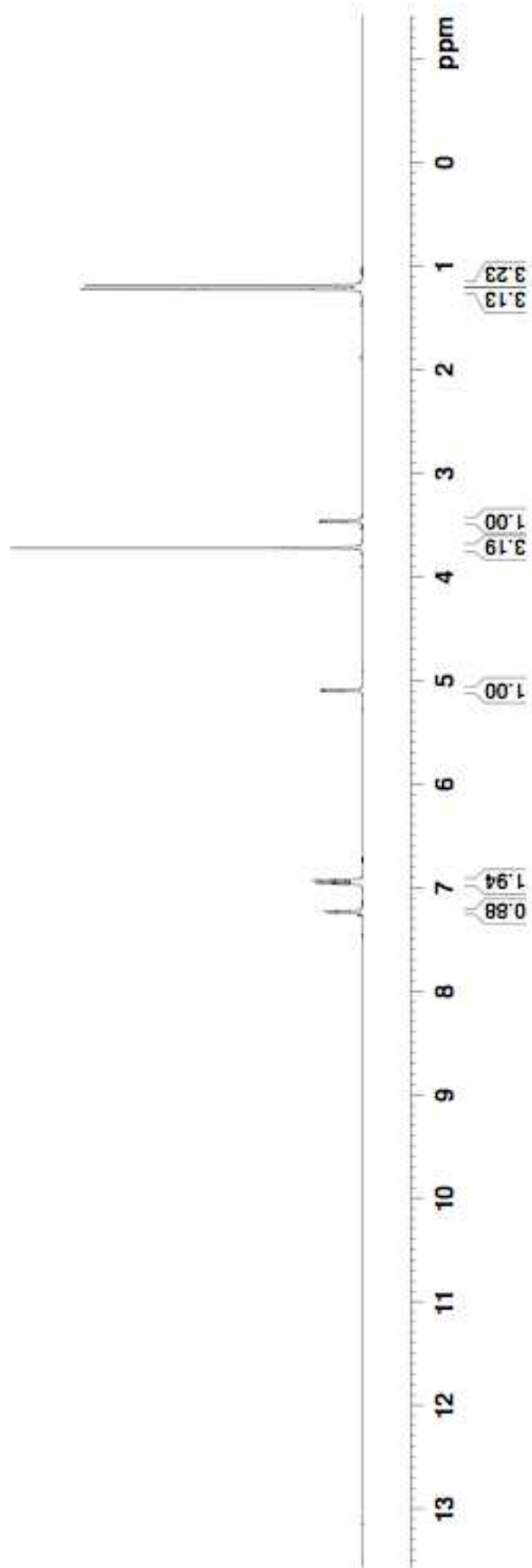


1.220
 1.185

3.719
 3.466
 3.454

5.101
 5.088

7.270
 7.241
 7.238
 7.229
 7.226
 6.967
 6.958
 6.945
 6.932
 6.926
 6.924



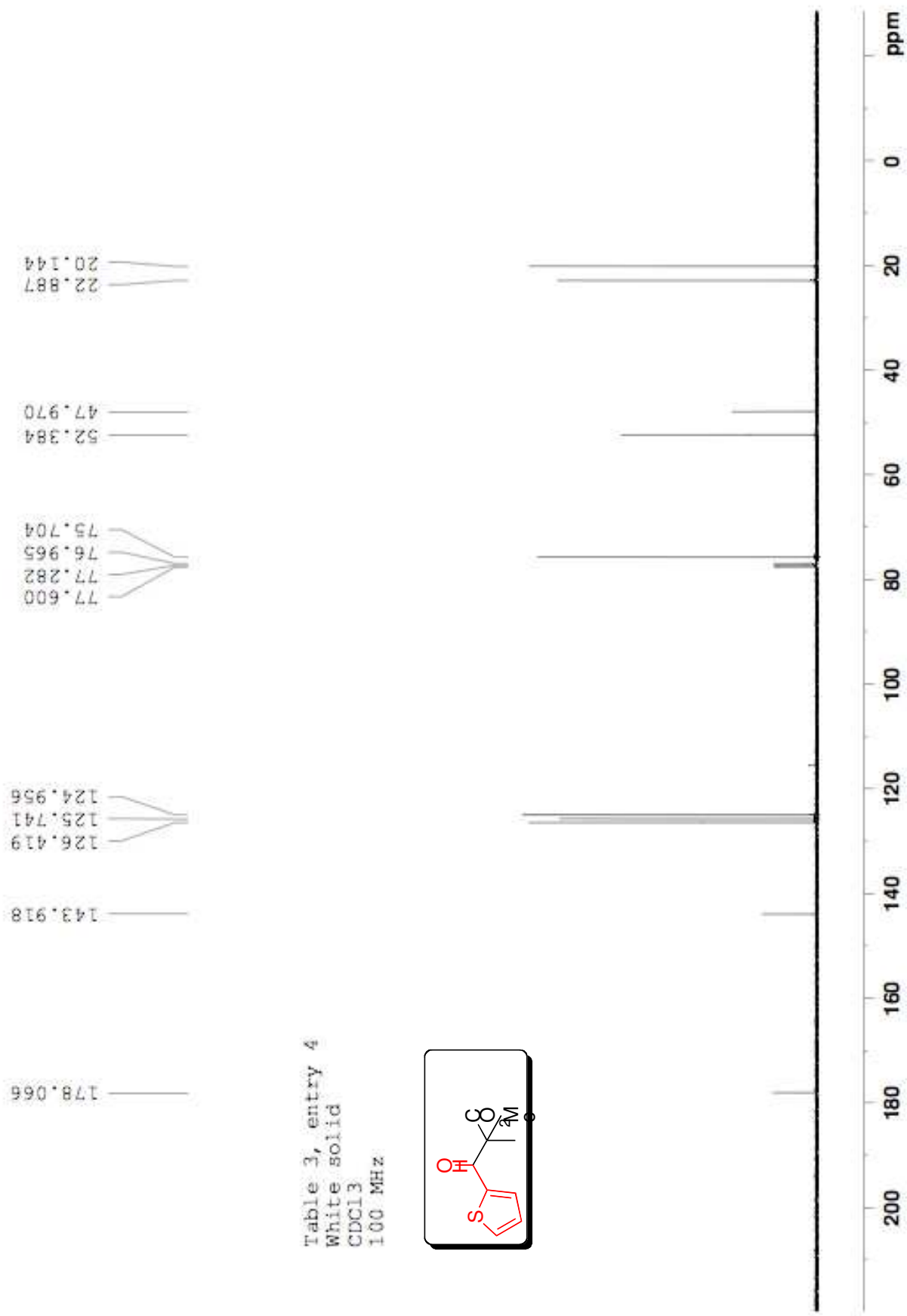


Table 3, entry 4
 White solid
 CDCl₃
 100 MHz

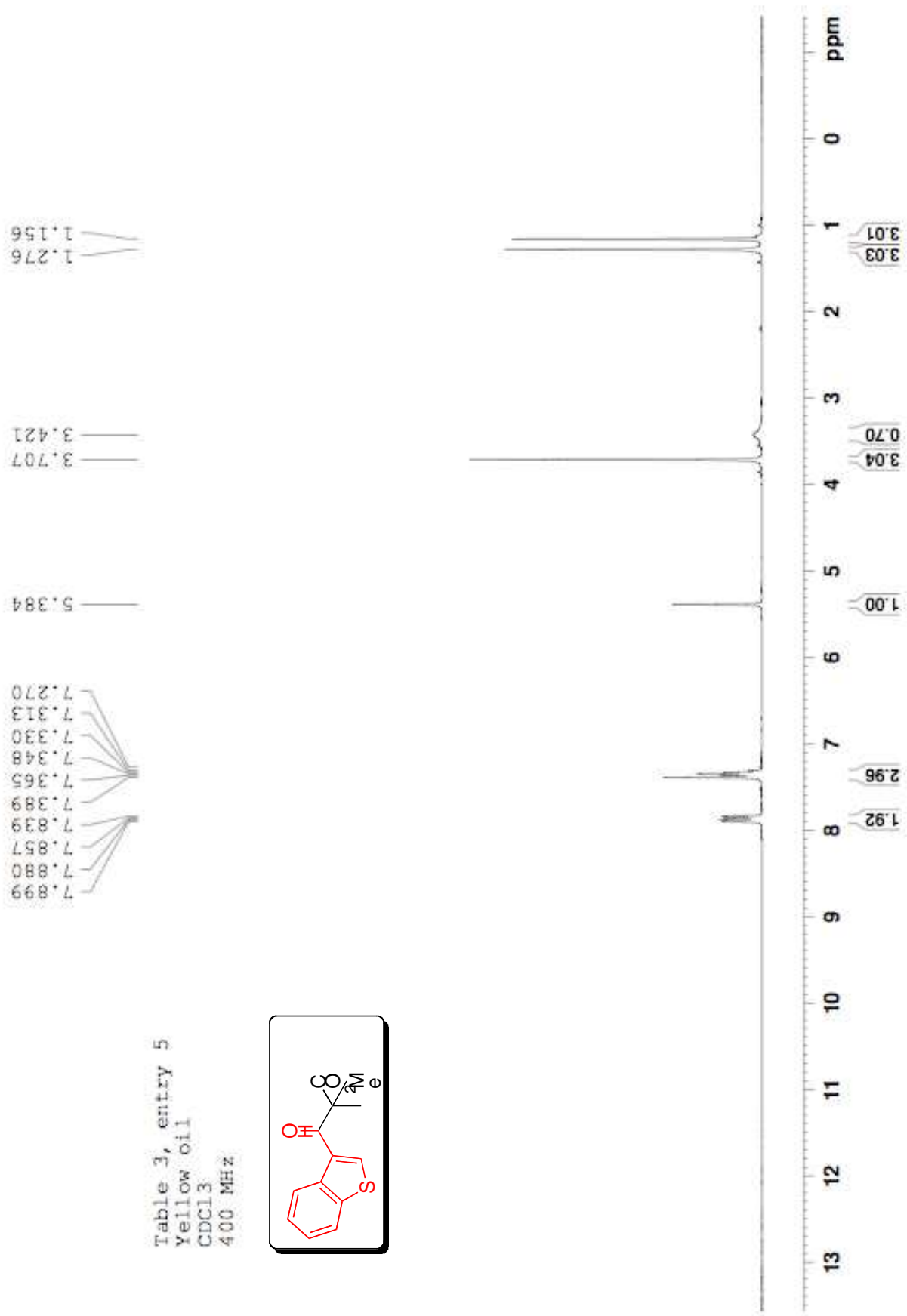
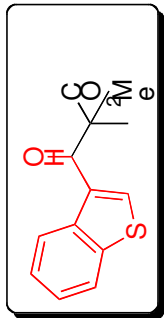
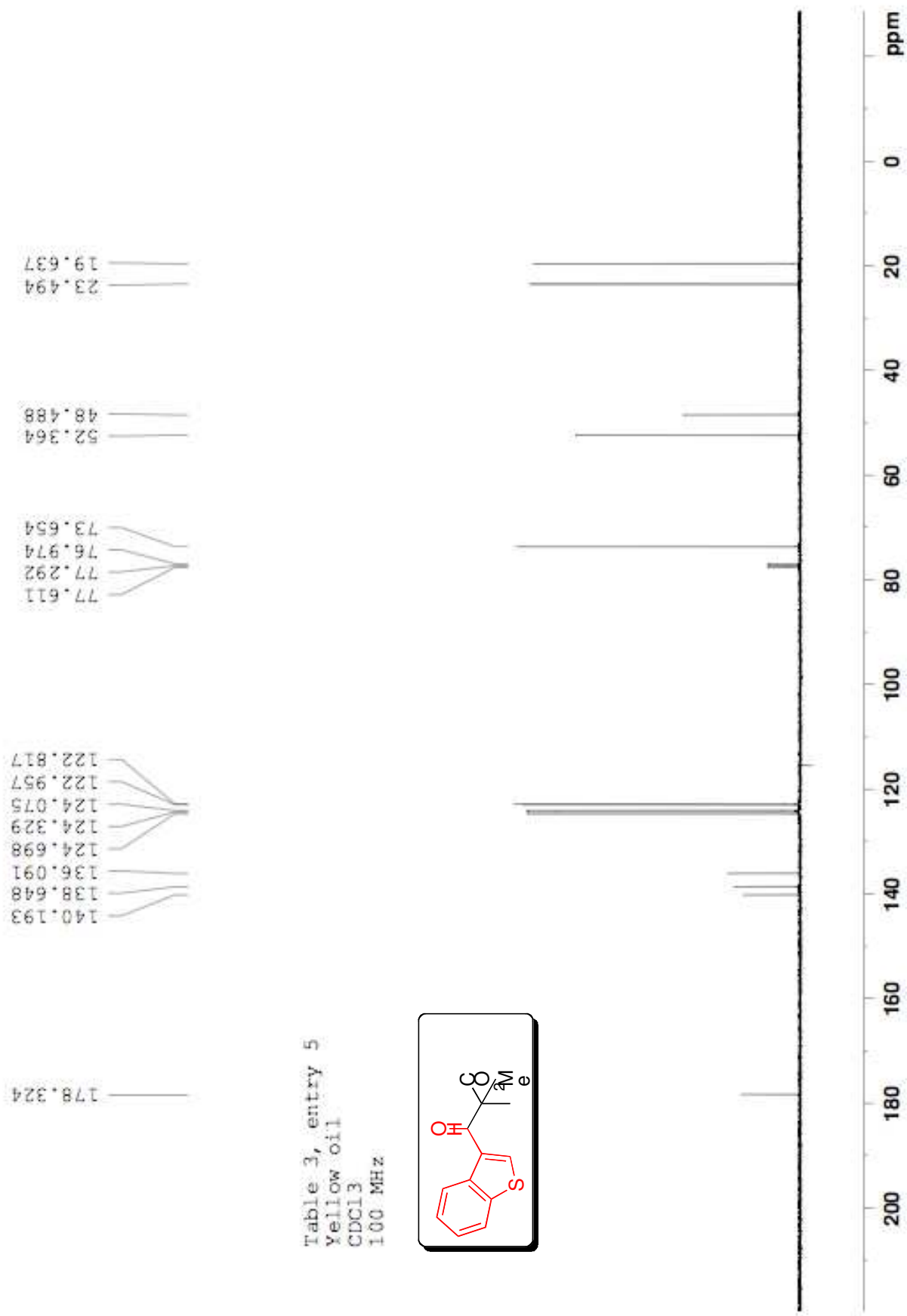


Table 3, entry 5
 yellow oil
 CDCl3
 400 MHz





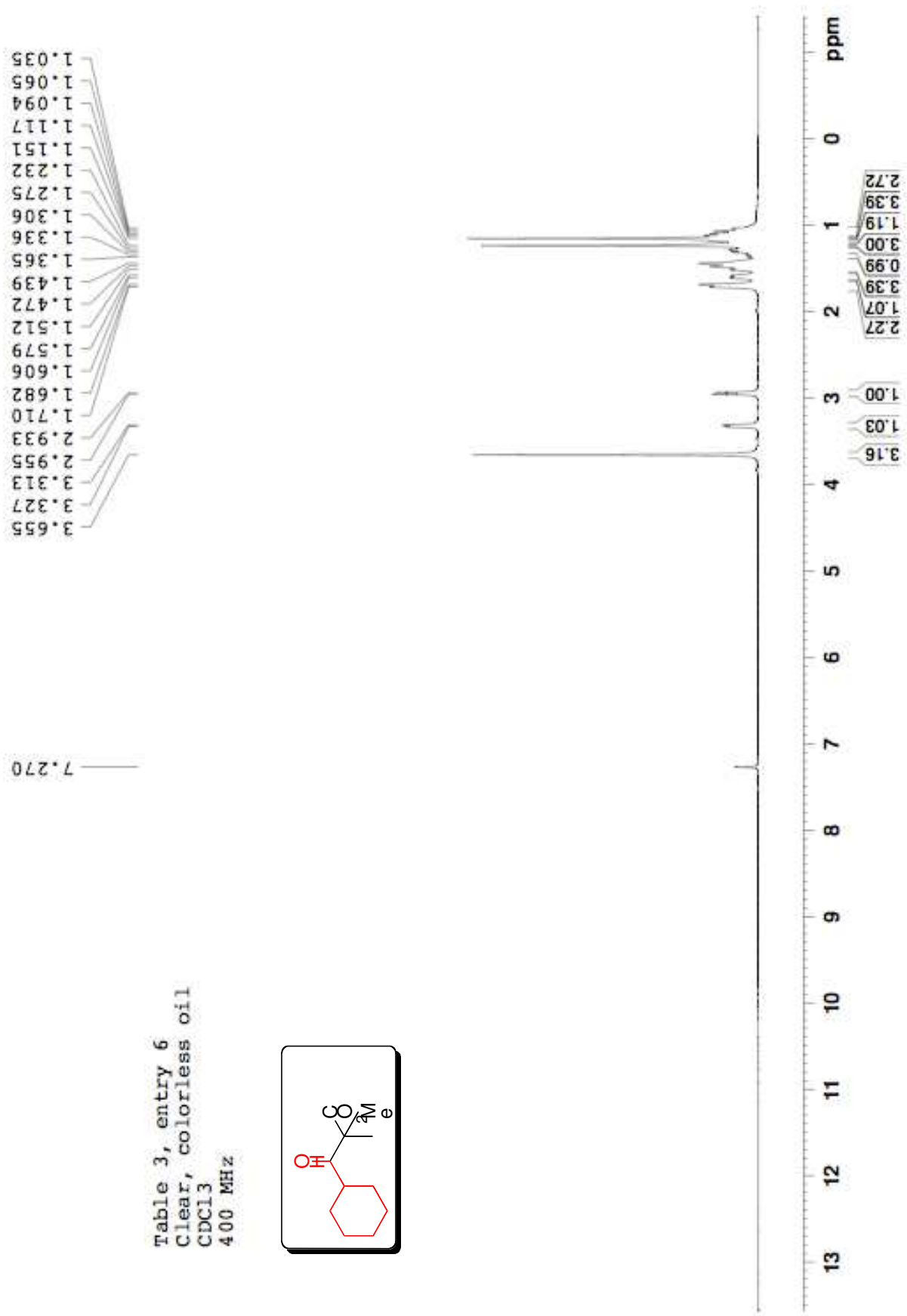
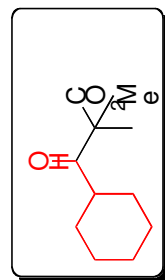
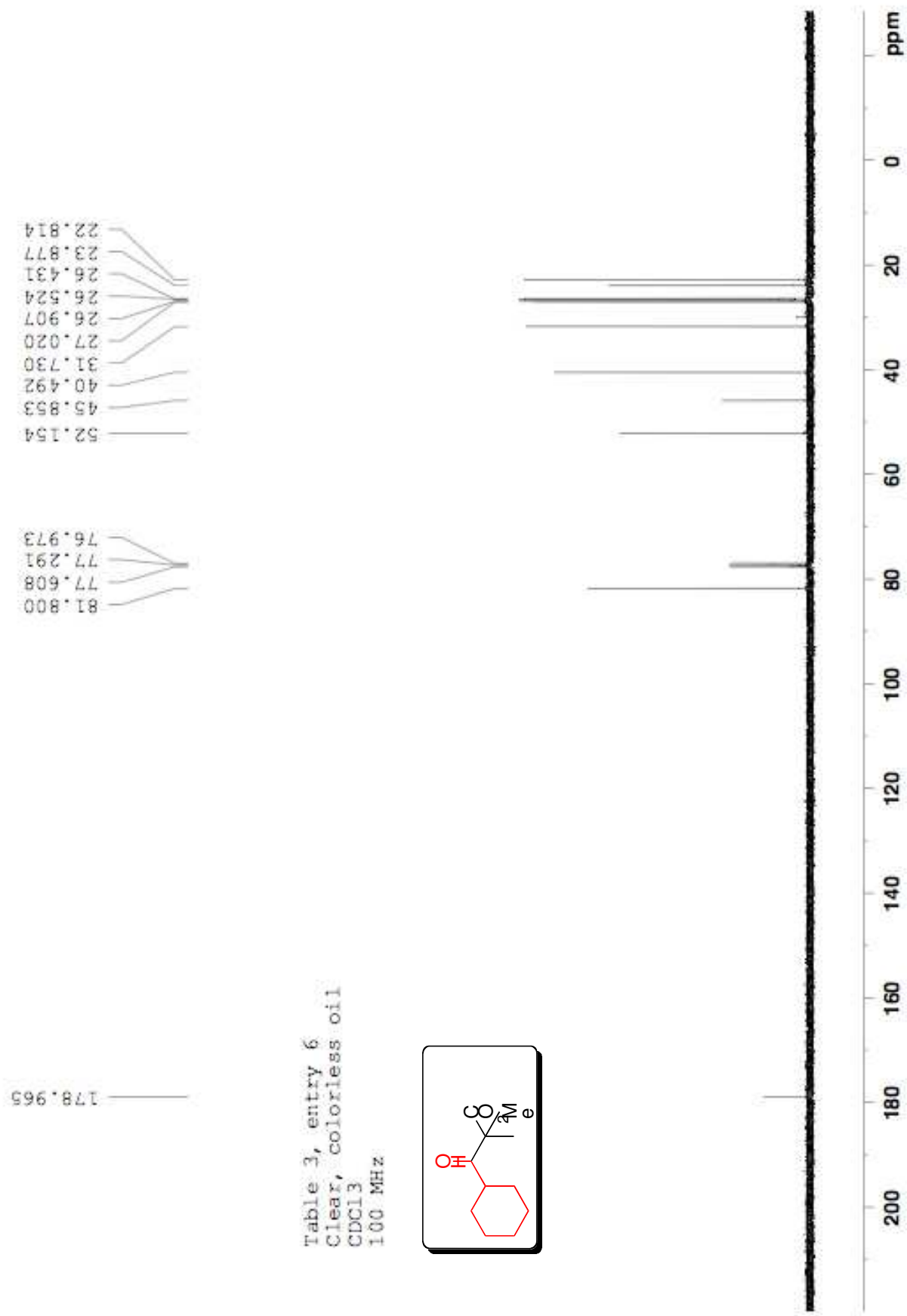
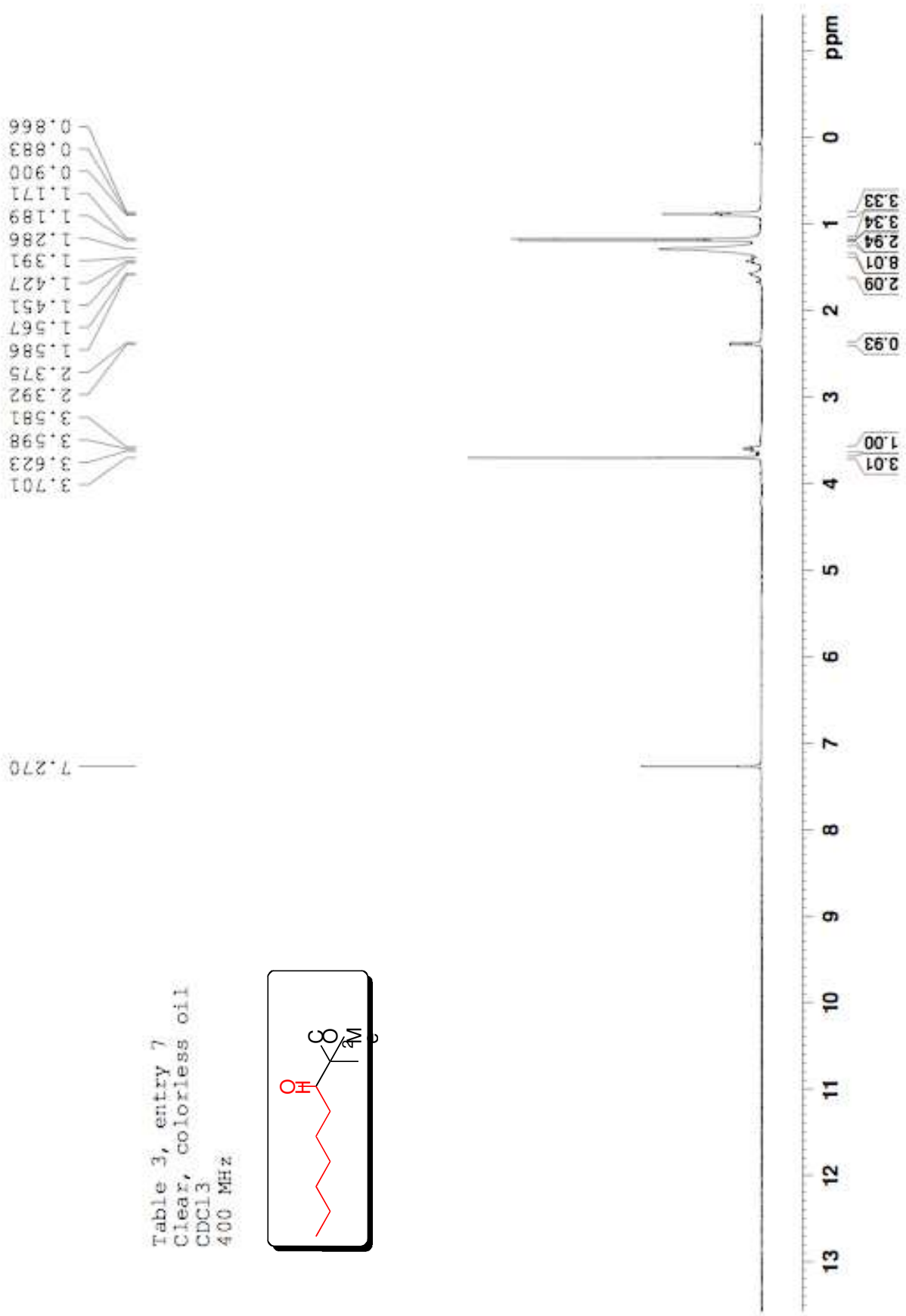
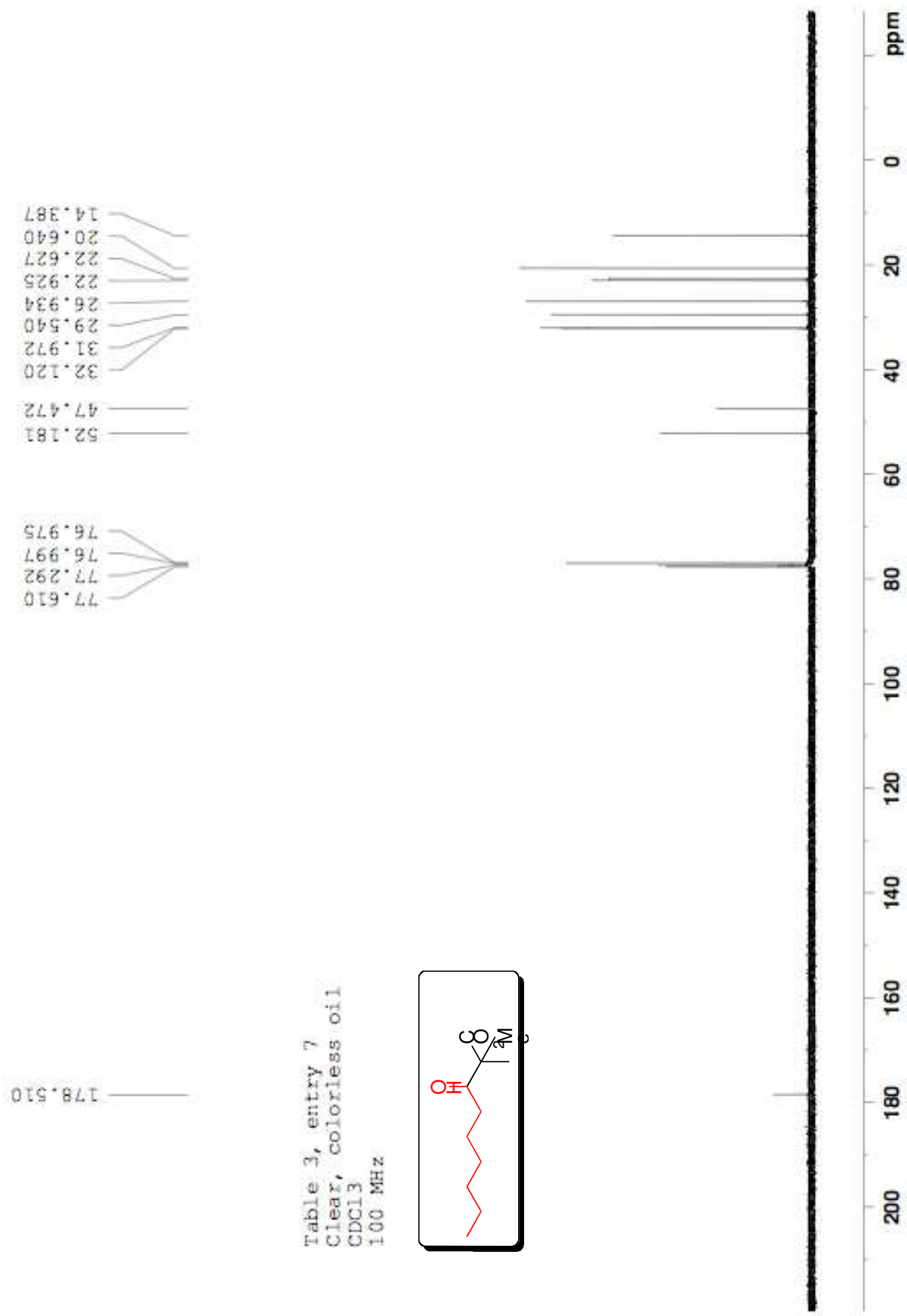


Table 3, entry 6
Clear, colorless oil
CDCl₃
400 MHz









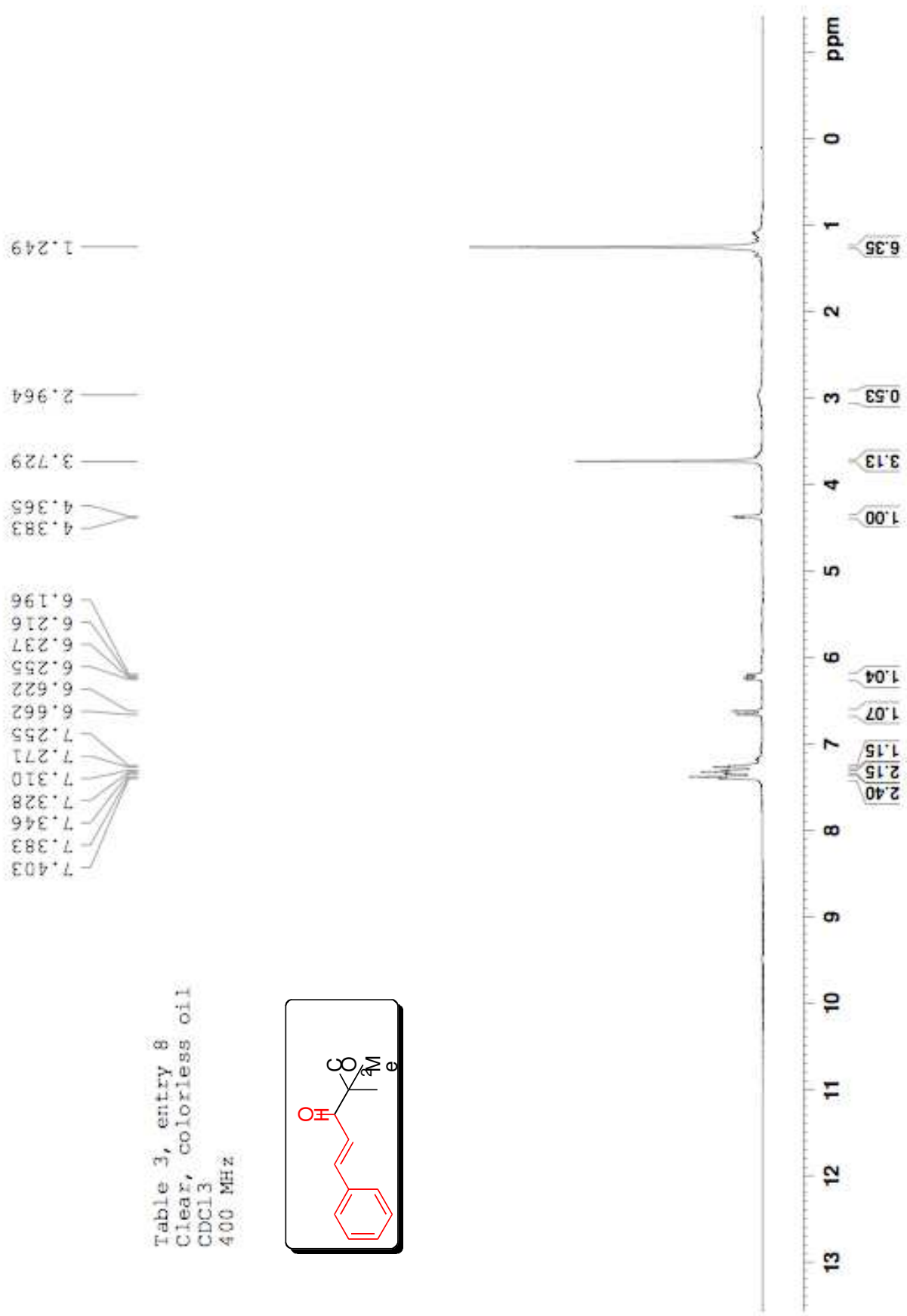
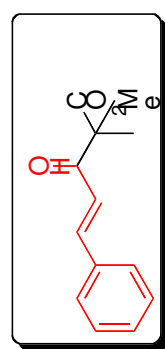


Table 3, entry 8
 Clear, colorless oil
 CDCl₃
 400 MHz



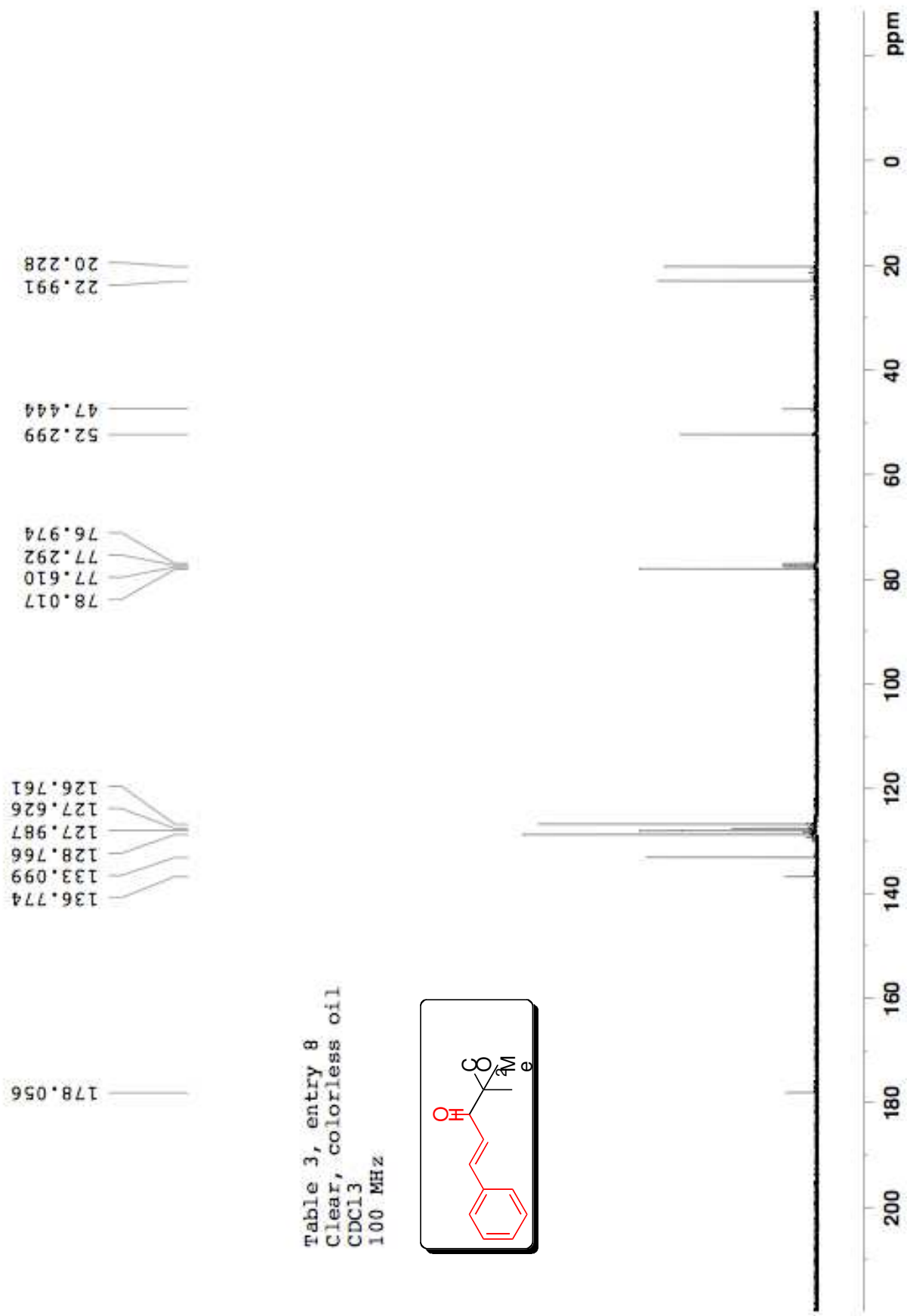
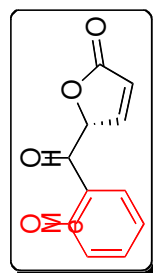
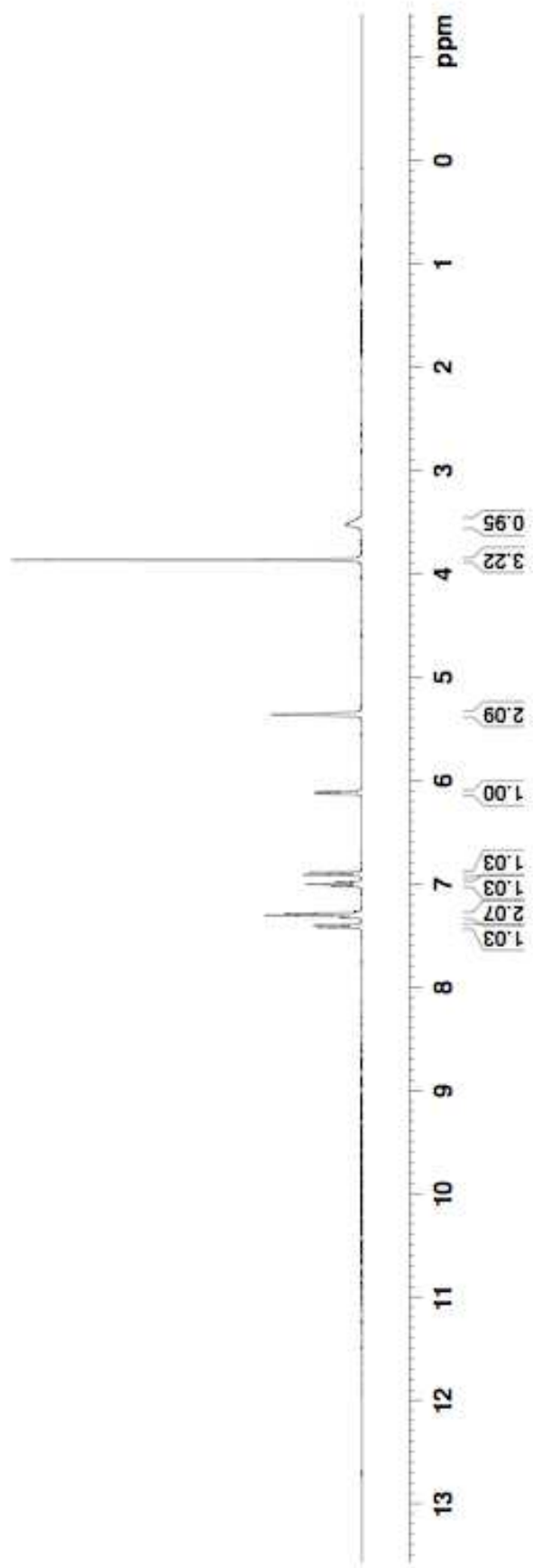


Table 4, entry 1
 Yellow oil
 Anti Isomer
 CDCl₃
 400 MHz



7.420
 7.401
 7.325
 7.305
 7.290
 7.269
 7.021
 7.002
 6.984
 6.913
 6.892
 6.125
 6.111
 5.362
 3.862
 3.523



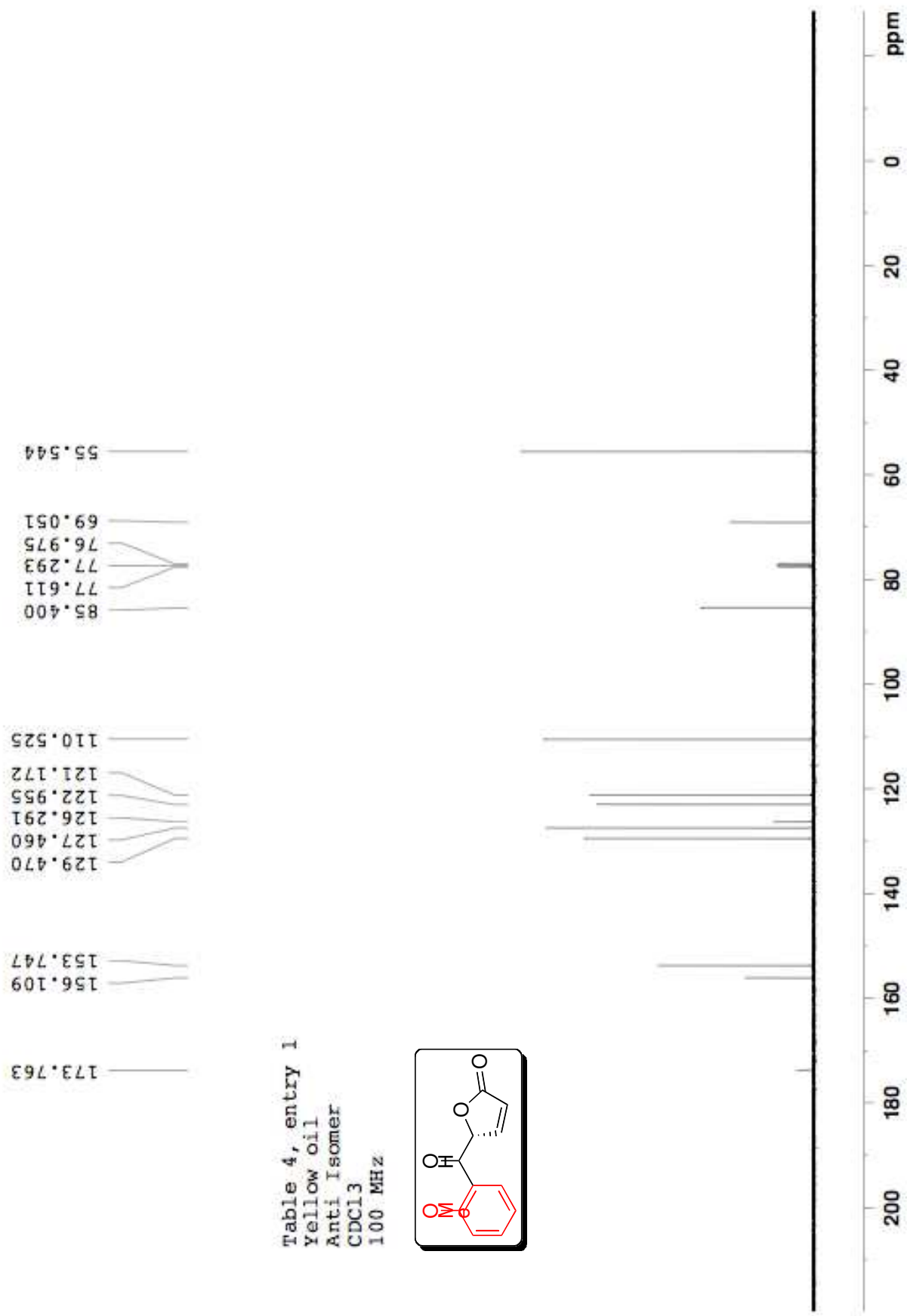


Table 4, entry 1
 Yellow oil
 Anti Isomer
 CDCl₃
 100 MHz

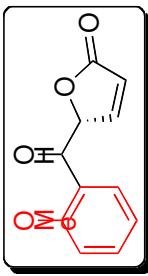
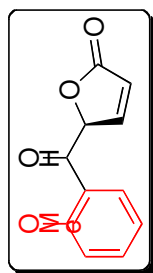
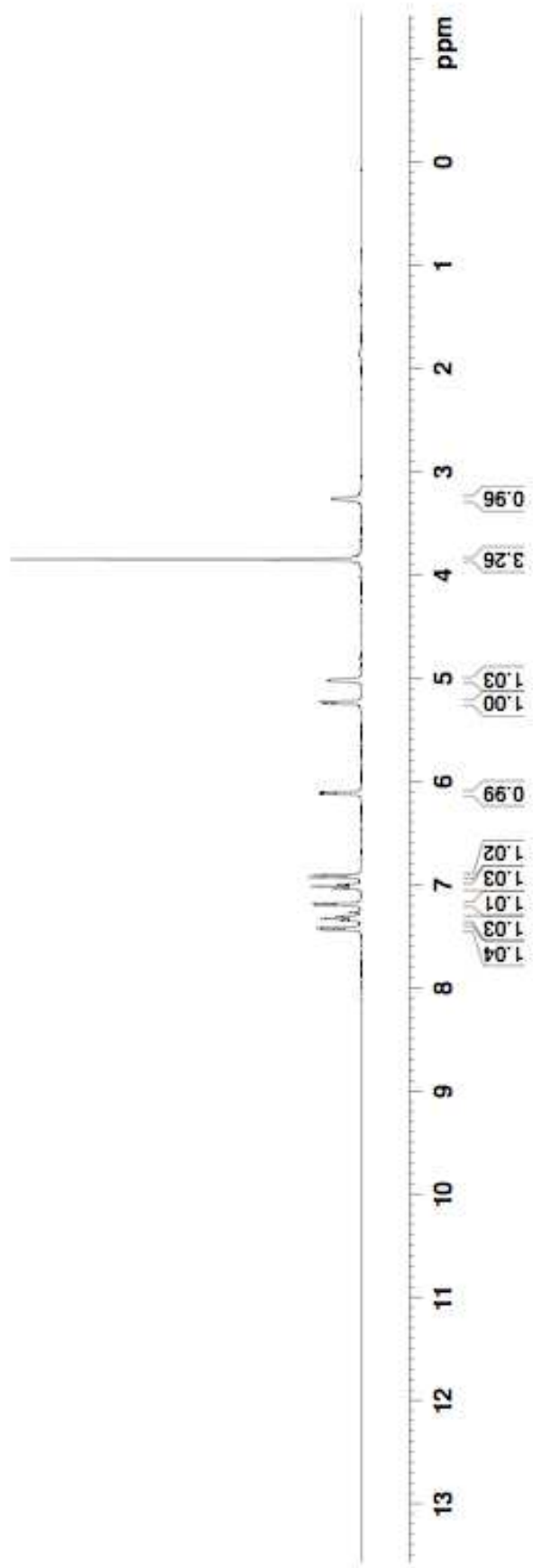
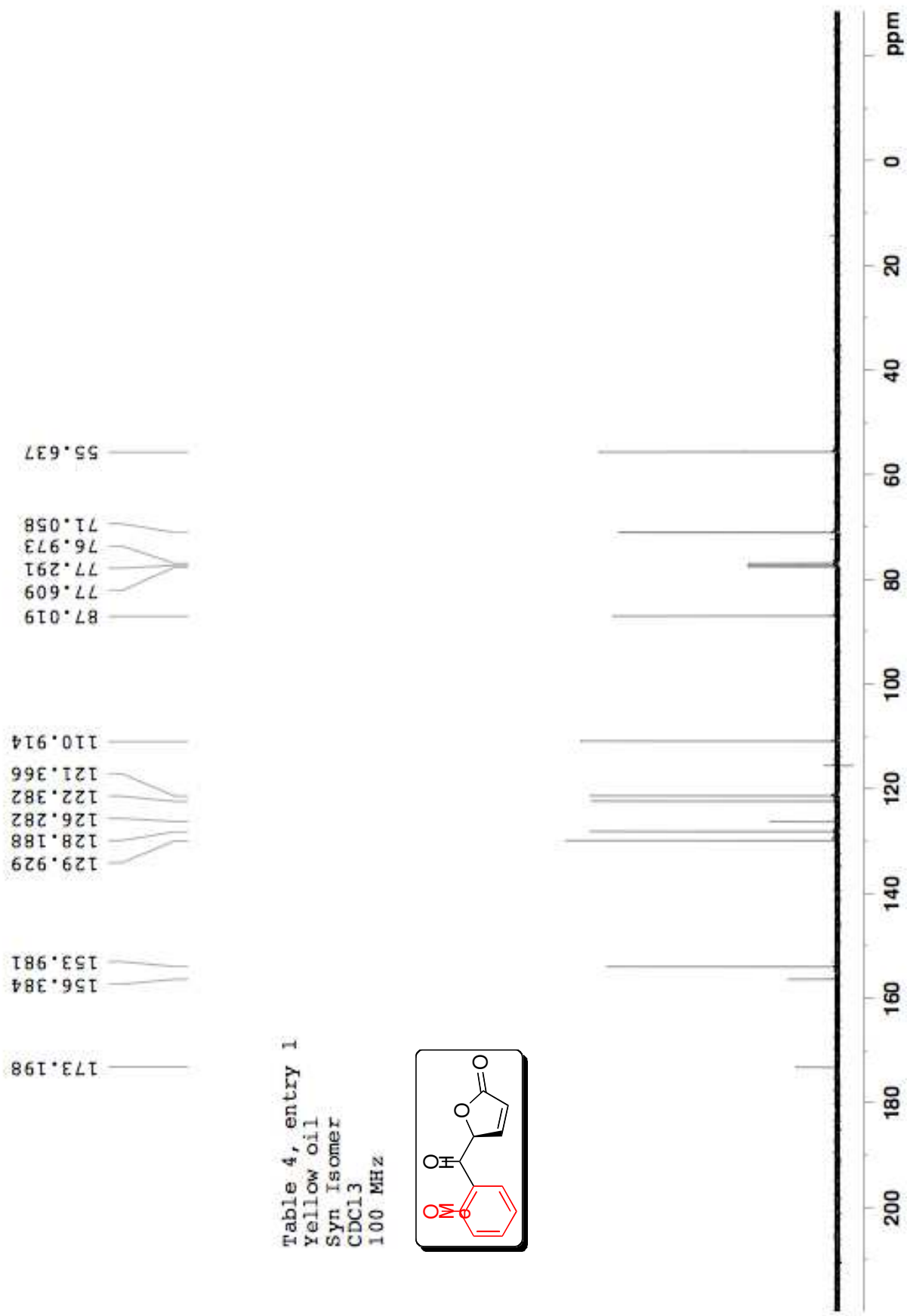


Table 4, entry 1
 yellow oil
 Syn Isomer
 CDCl₃
 400 MHz



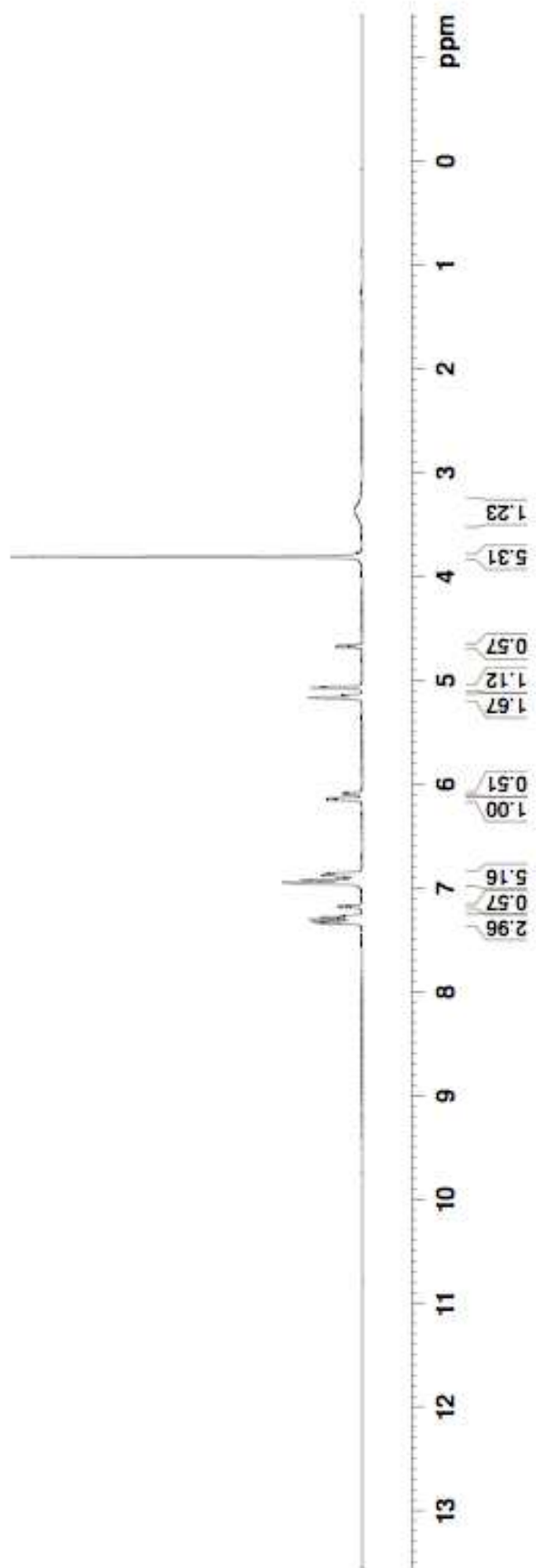
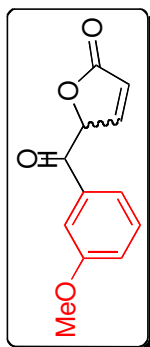
7.438
 7.420
 7.350
 7.330
 7.311
 7.270
 7.198
 7.184
 7.036
 7.018
 6.999
 6.929
 6.908
 6.121
 6.117
 6.107
 6.103
 5.243
 5.228
 5.019
 3.846
 3.262





7.341
7.326
7.301
7.282
7.269
7.184
7.170
6.946
6.923
6.904
6.878
6.872
6.859
6.150
6.136
6.097
6.082
5.163
5.142
5.070
5.061
4.678
4.661
3.809
3.449
3.364

Table 4, entry 2
Yellow oil
Mixture of Syn/Anti - 1/2
CDCl₃
400 MHz



173.395
 172.962
 160.101
 160.038
 153.582
 153.202
 153.176
 140.268
 139.745
 130.004
 129.994
 123.328
 123.305
 123.280
 123.024
 122.976
 119.145
 118.495
 117.634
 114.498
 114.063
 112.499
 112.482
 111.903
 86.871
 77.609
 77.291
 76.973
 75.564
 73.002
 55.550

Table 4, entry 2
 Yellow oil
 Mixture of Syn/Anti - 1/2
 CDCl₃
 100 MHz

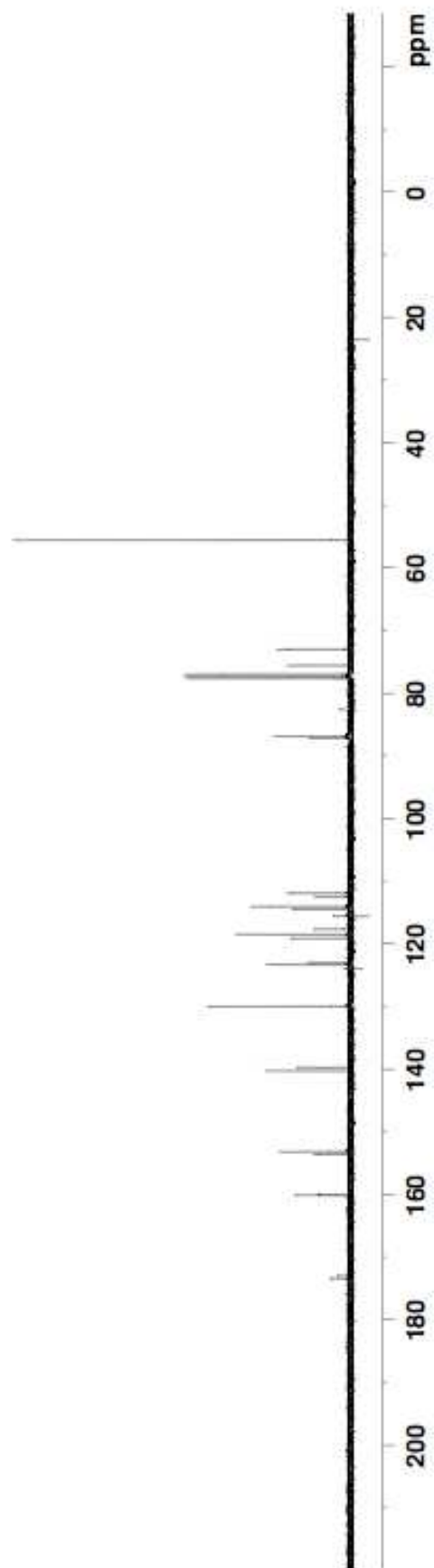
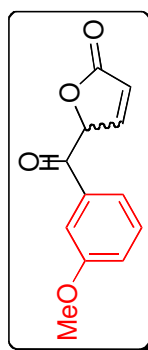
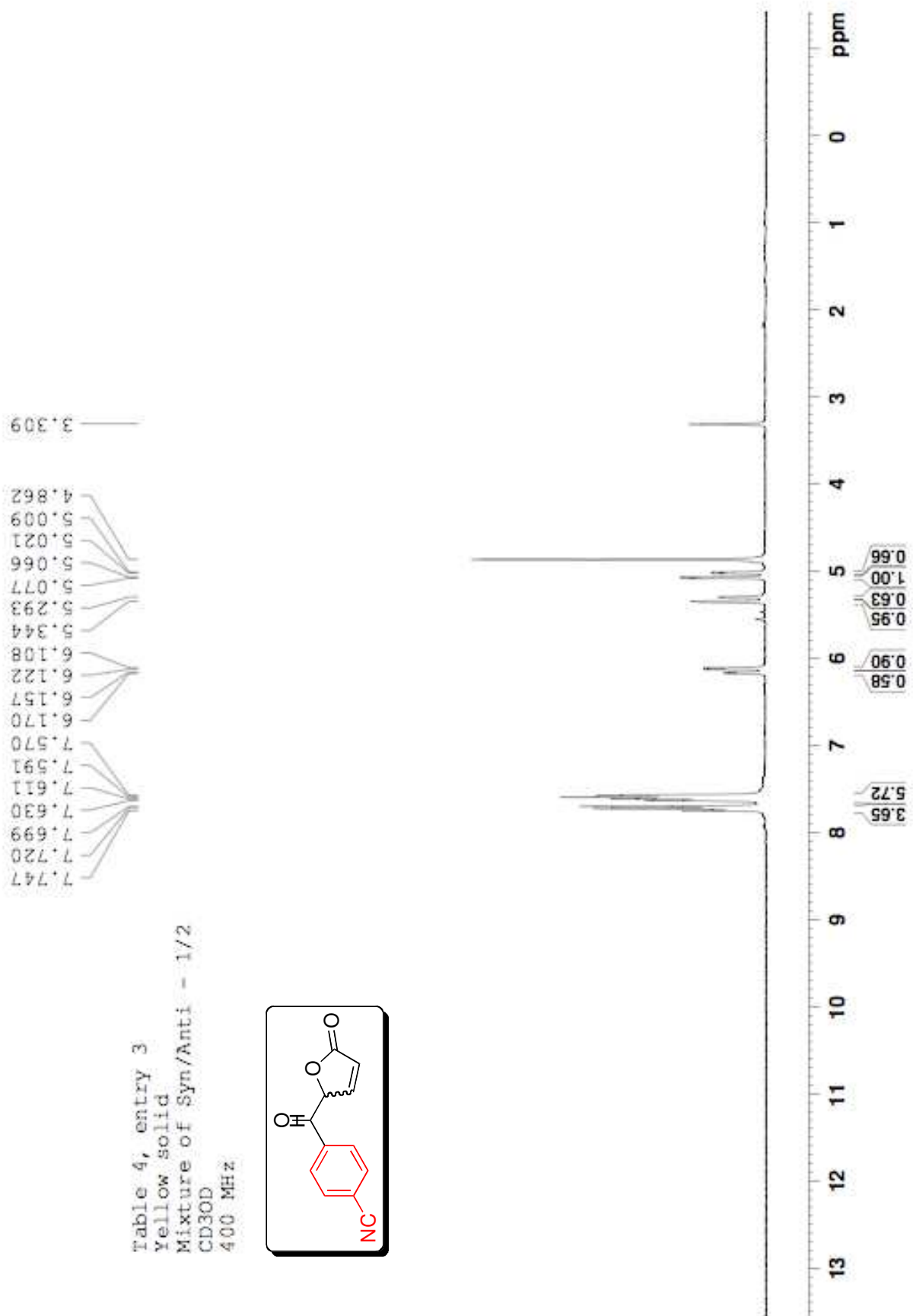
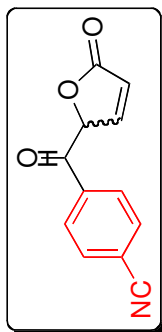
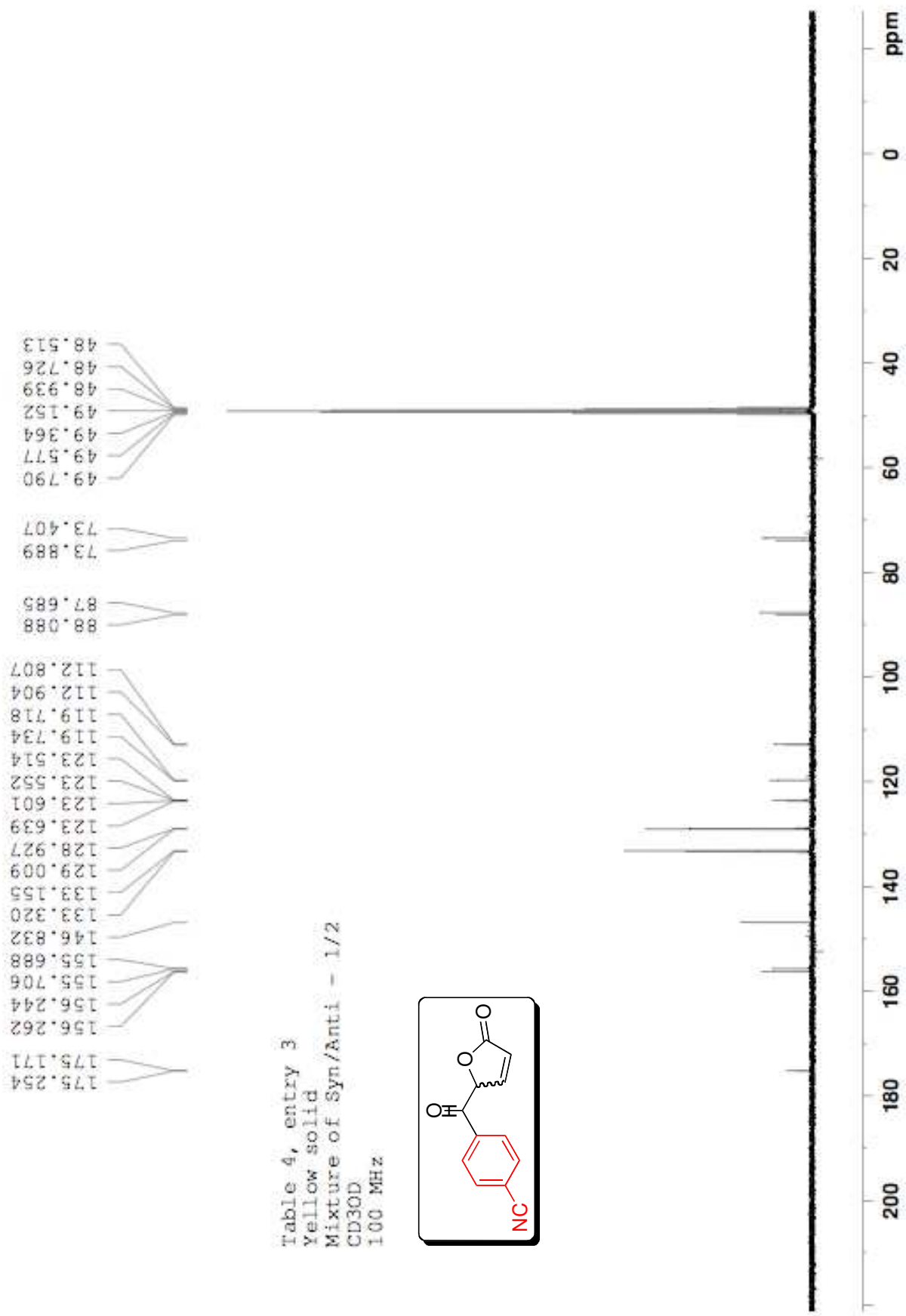


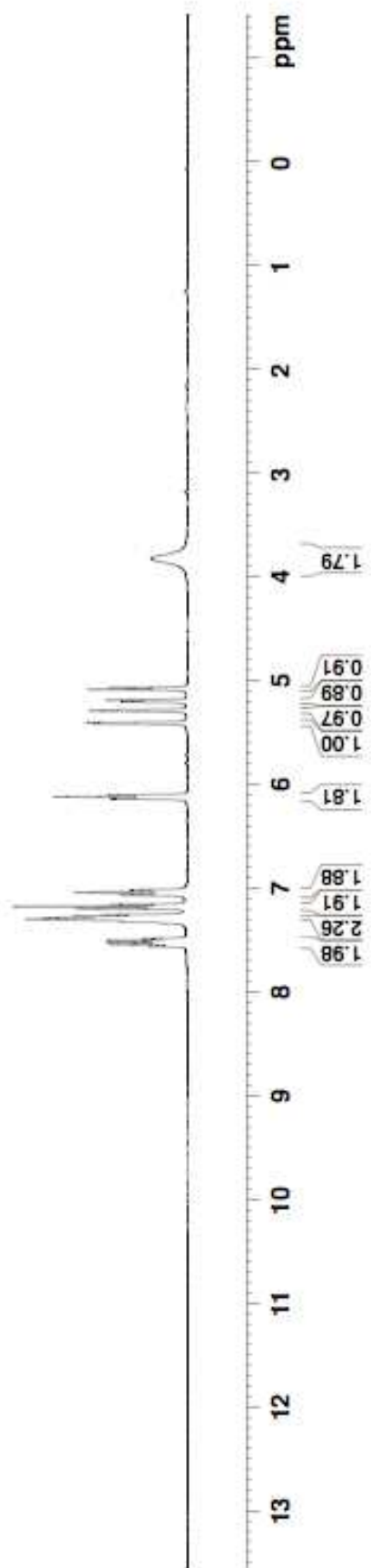
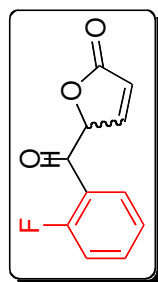
Table 4, entry 3
 Yellow solid
 Mixture of Syn/Anti - 1/2
 CD3OD
 400 MHz





7.559
7.540
7.522
7.505
7.486
7.297
7.284
7.270
7.255
7.194
7.176
7.157
7.061
7.040
7.018
6.137
6.118
6.103
5.411
5.403
5.290
5.285
5.200
5.185
5.083
5.067
3.823

Table 4, entry 4
Clear, colorless oil
Mixture of Syn/Anti - 1/1
CDCl₃
400 MHz



173.587
 173.224
 160.917
 160.829
 158.469
 158.389
 153.488
 153.016
 130.459
 130.376
 130.146
 130.064
 128.649
 128.613
 128.093
 128.055
 125.737
 125.607
 125.570
 125.438
 124.816
 123.407
 123.357
 123.153
 123.104
 115.732
 115.573
 115.517
 115.360
 86.742
 85.614
 77.611
 77.293
 76.975
 68.798
 67.332

Table 4, entry 4
 Clear, colorless oil
 Mixture of Syn/Anti - 1/1
 CDCl₃
 100 MHz

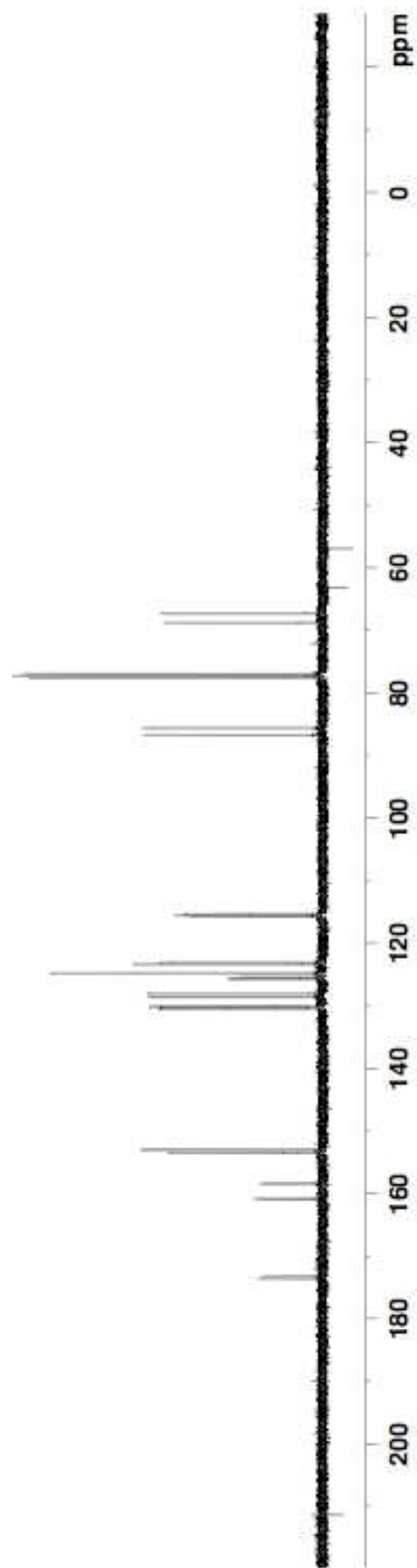
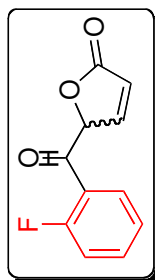
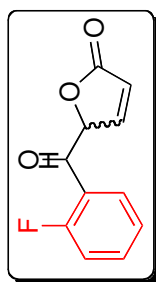
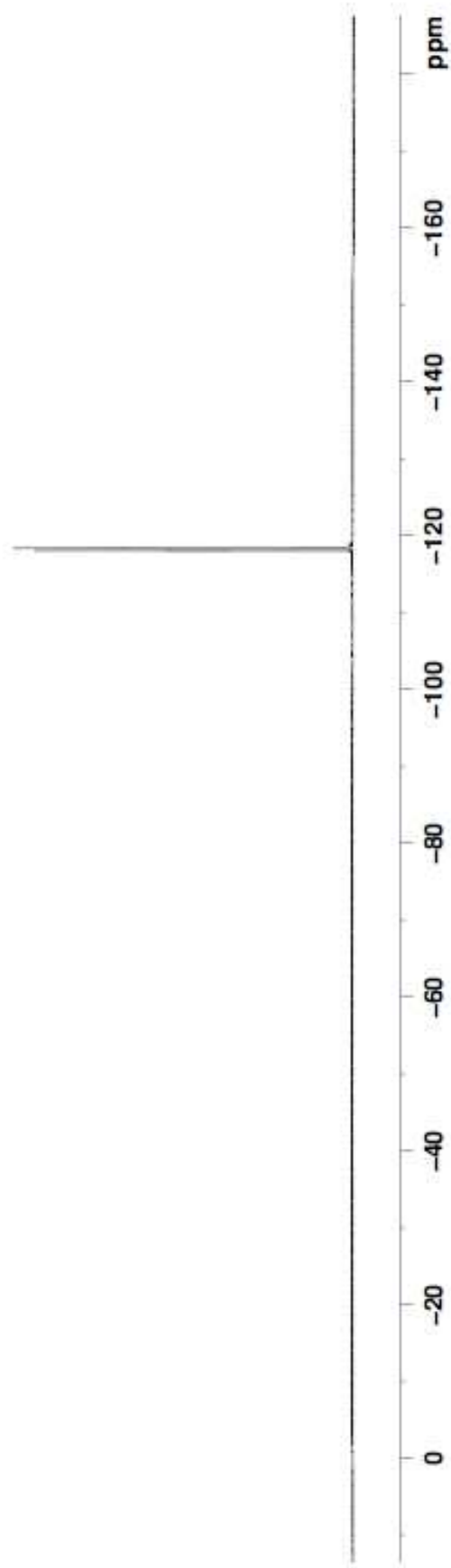


Table 4, entry 4
 Clear, colorless oil
 Mixture of Syn/Anti - 1/1
 CDCl₃
 376 MHz



-118.042
 -118.059
 -118.073
 -118.086
 -118.103
 -118.381
 -118.399
 -118.414
 -118.425
 -118.442



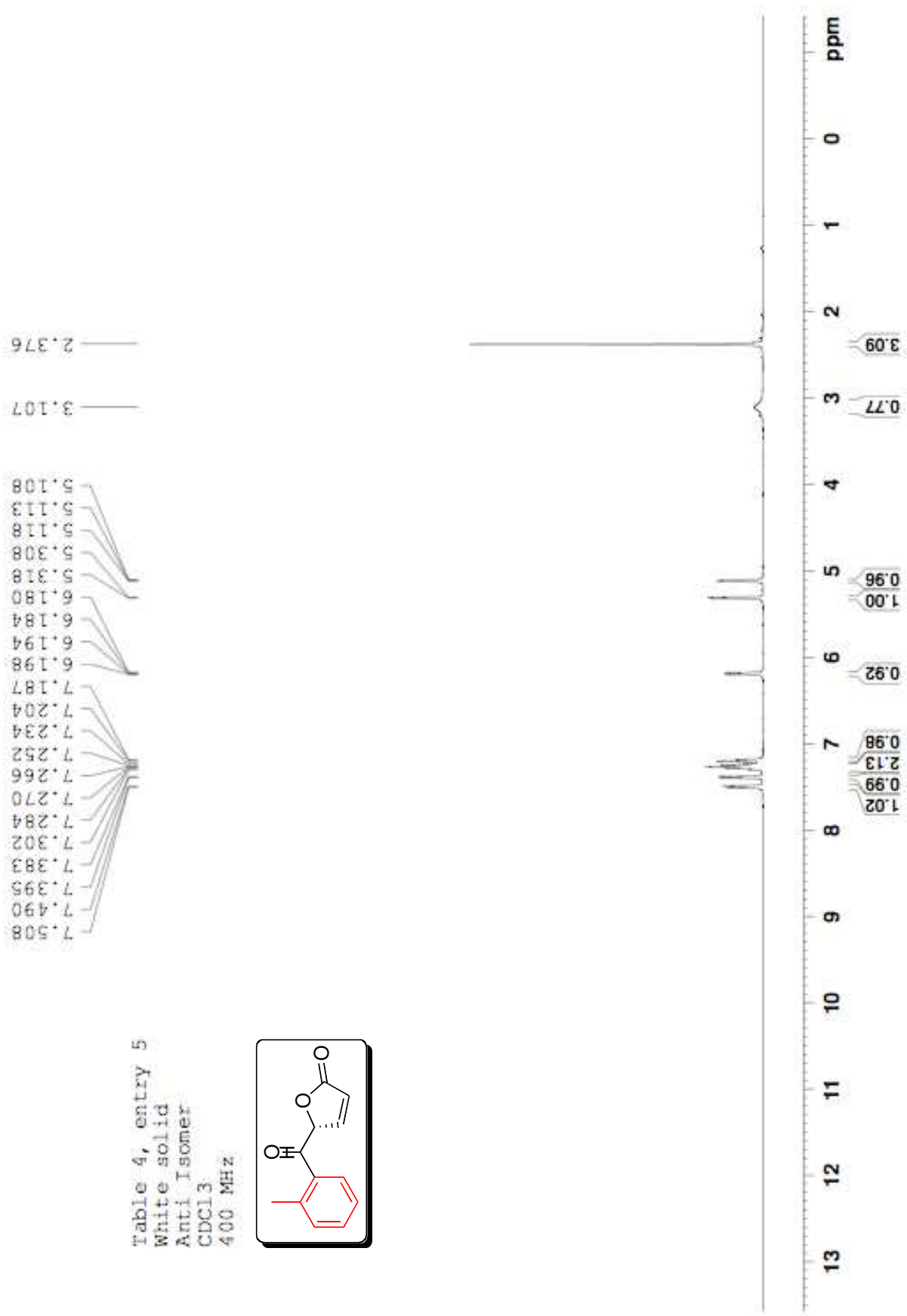
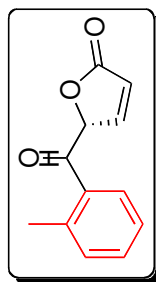
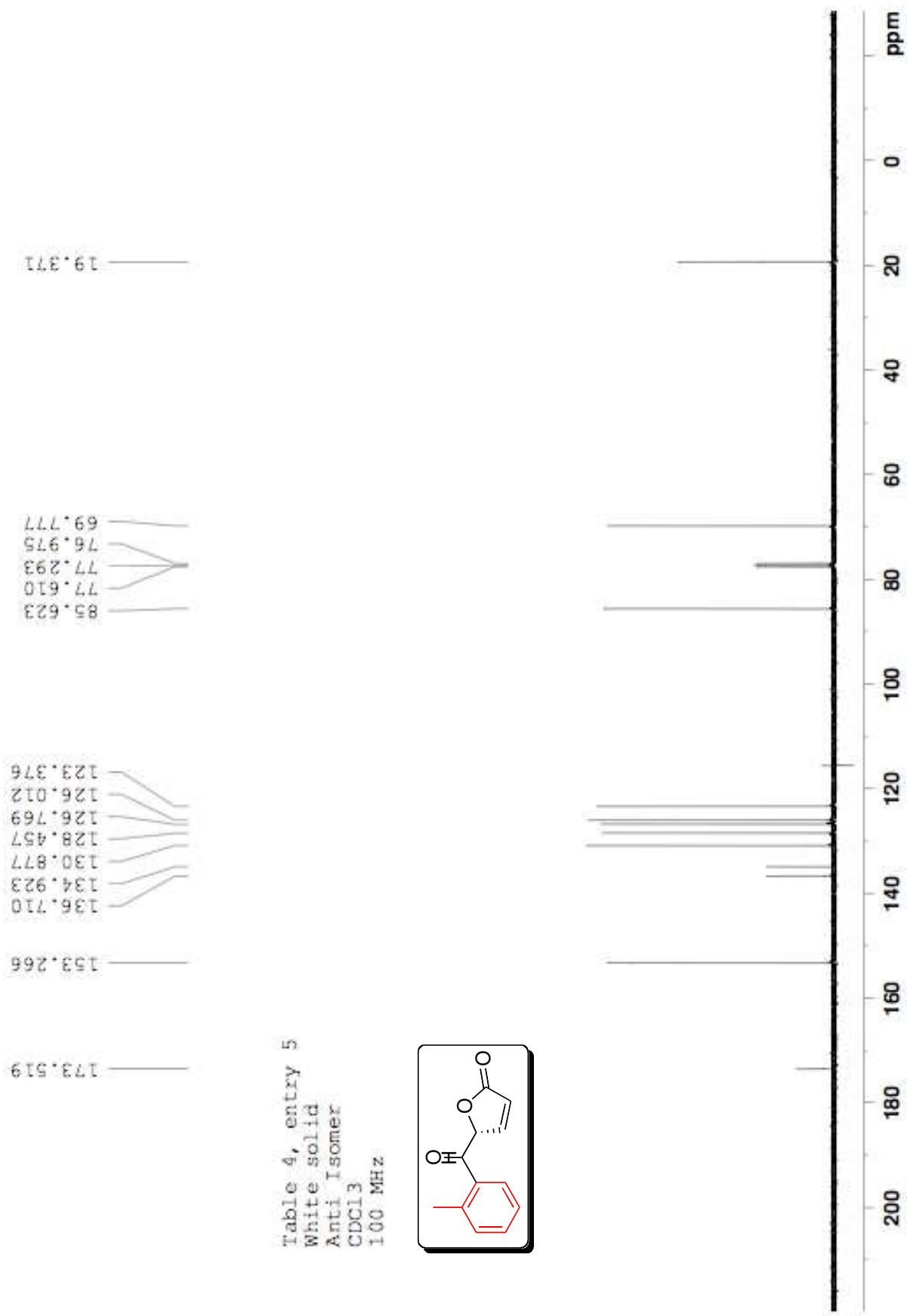


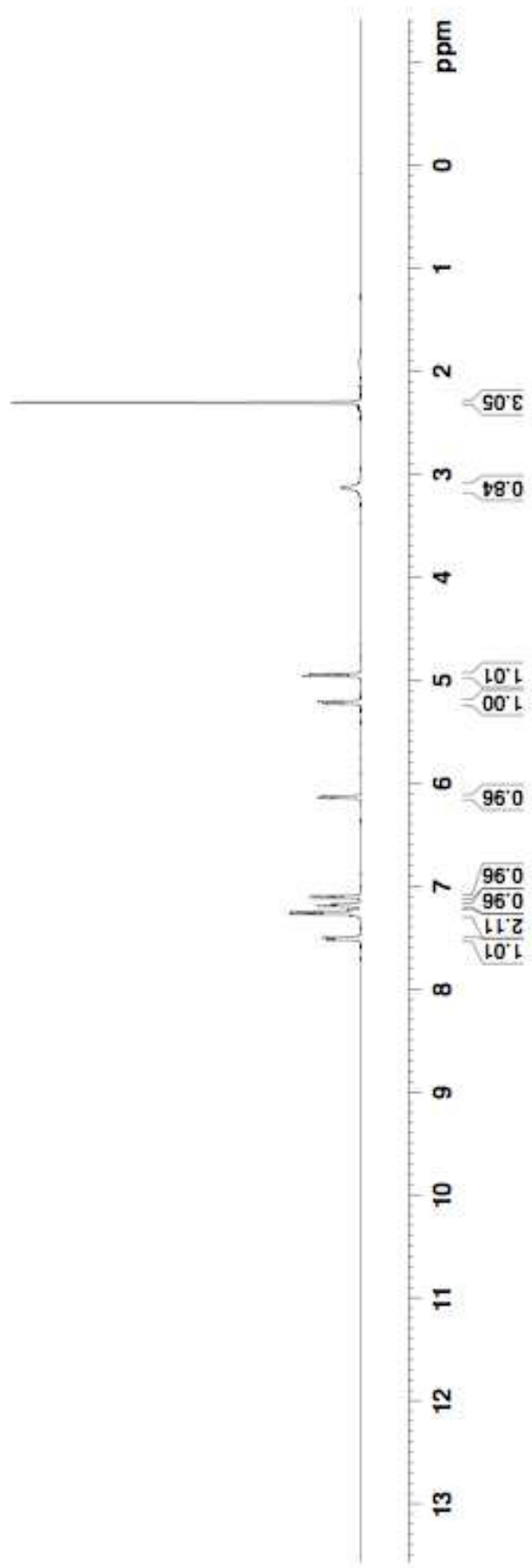
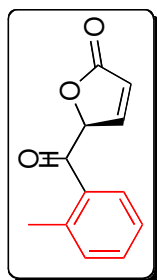
Table 4, entry 5
 White solid
 Anti Isomer
 CDCl₃
 400 MHz





7.522
 7.515
 7.500
 7.286
 7.270
 7.260
 7.250
 7.233
 7.191
 7.177
 7.111
 7.097
 6.144
 6.141
 6.130
 6.127
 5.225
 5.207
 4.957
 4.939
 3.129
 2.301

Table 4, entry 5
 Clear, crystalline solid
 Syn Isomer
 CDCl₃
 400 MHz



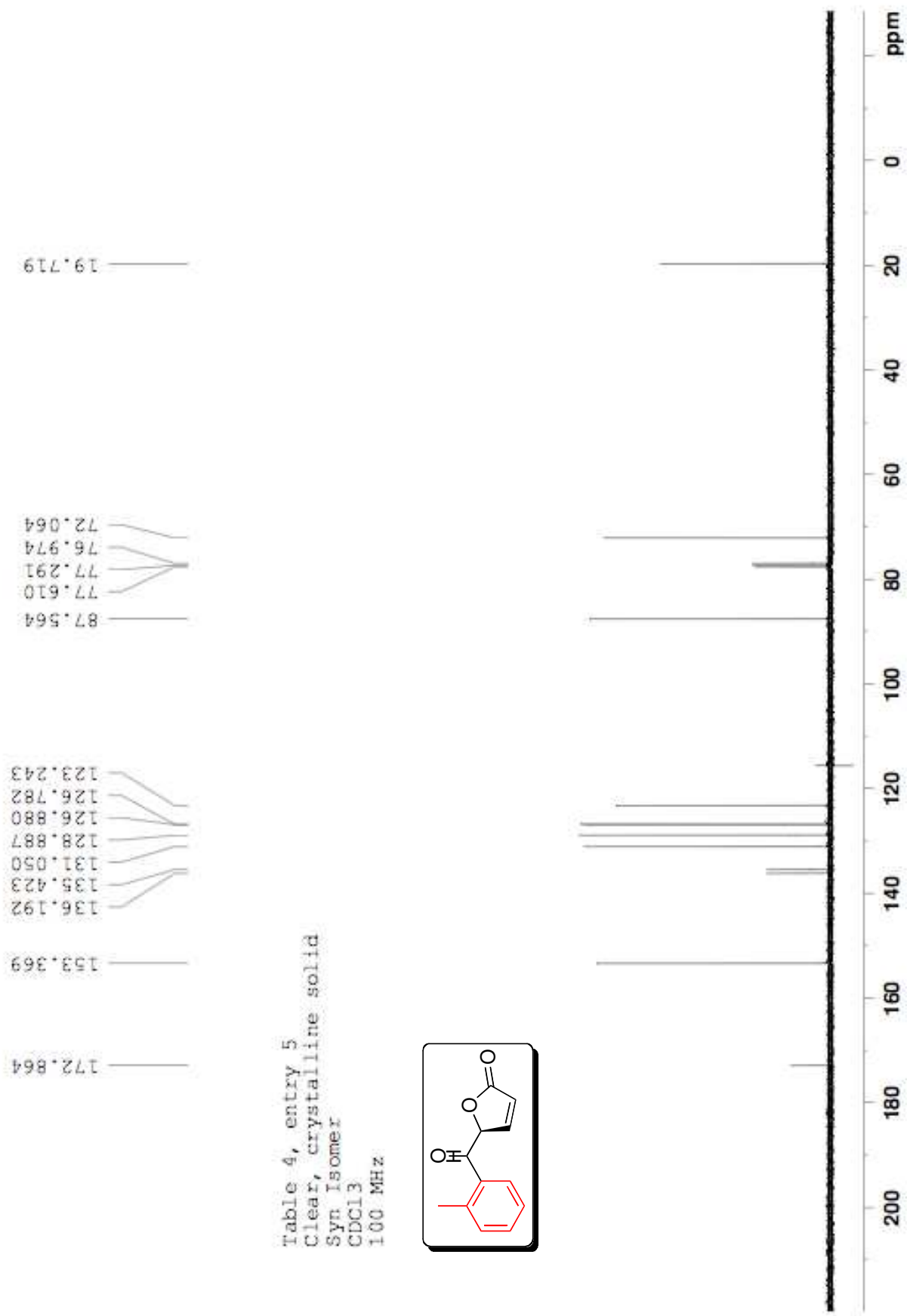
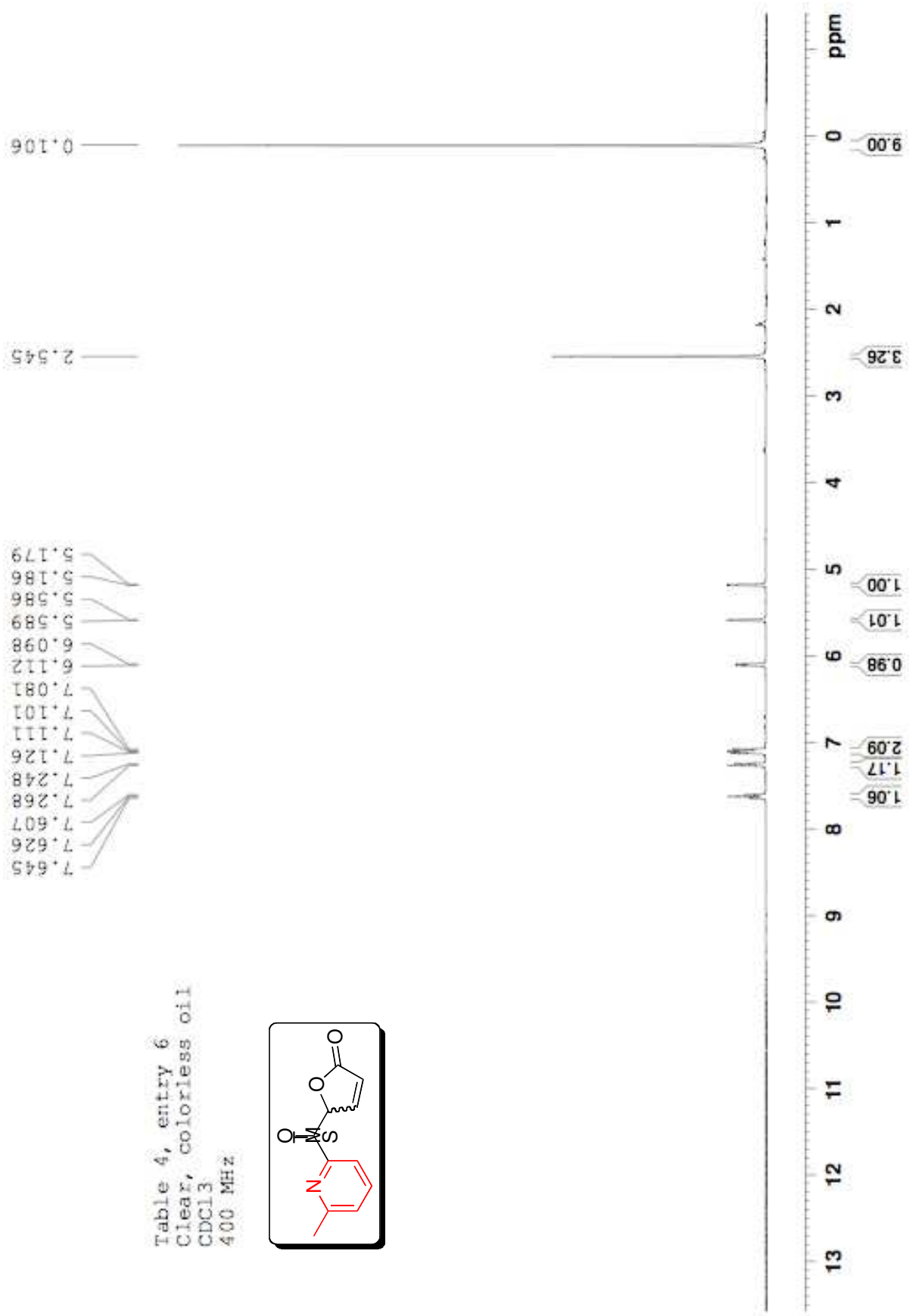
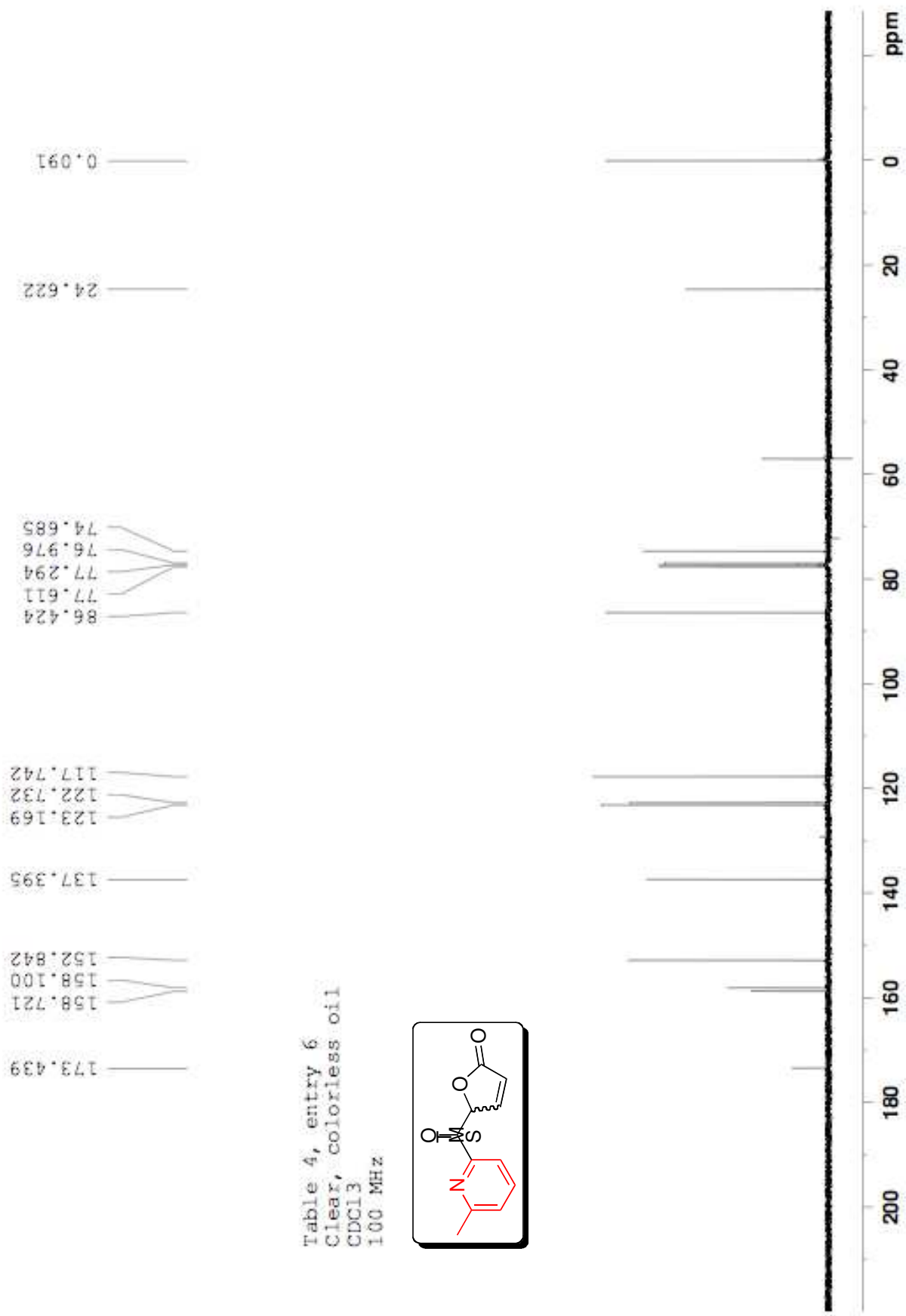
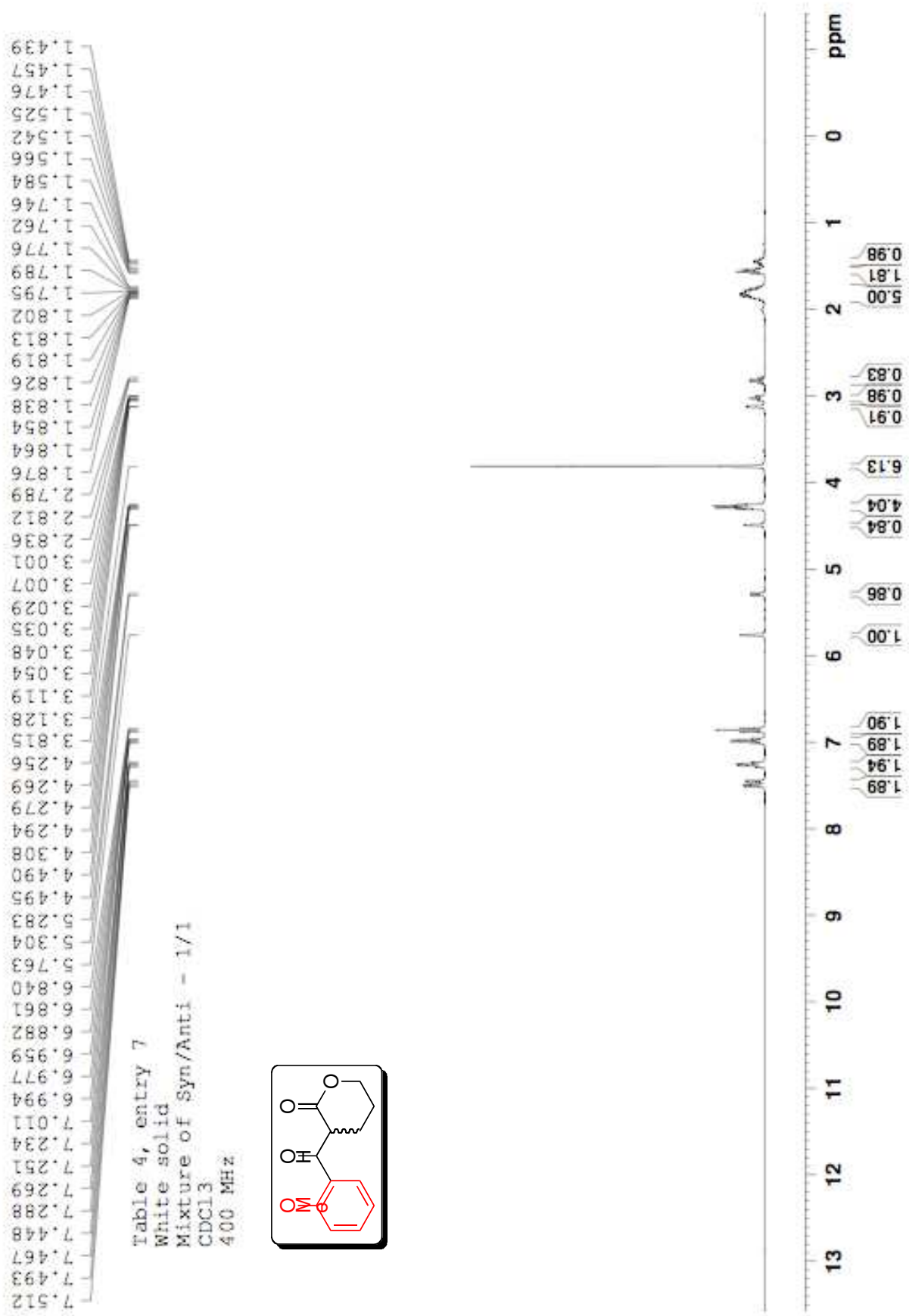


Table 4, entry 5
 Clear, crystalline solid
 Syn Isomer
 CDCl₃
 100 MHz







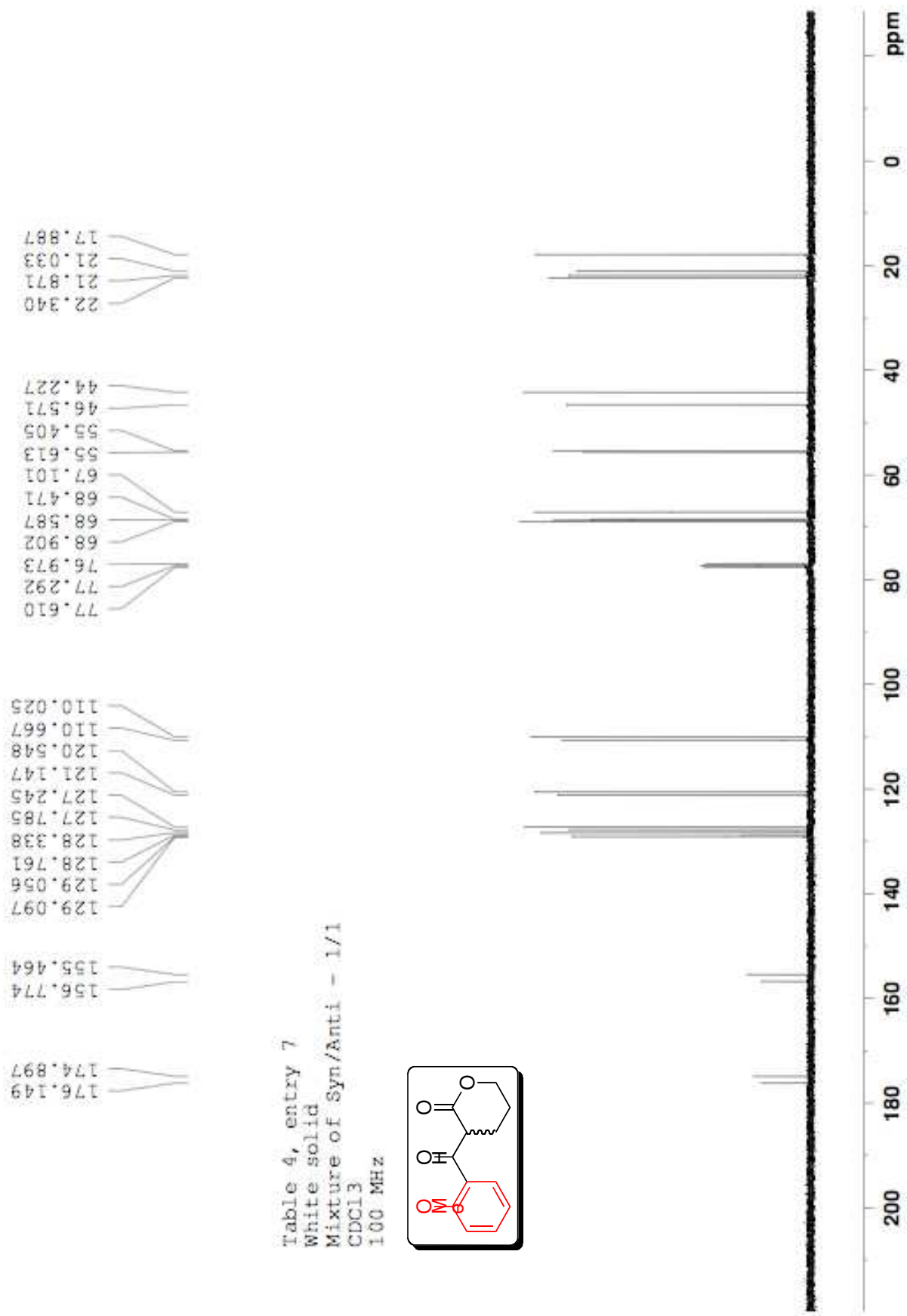
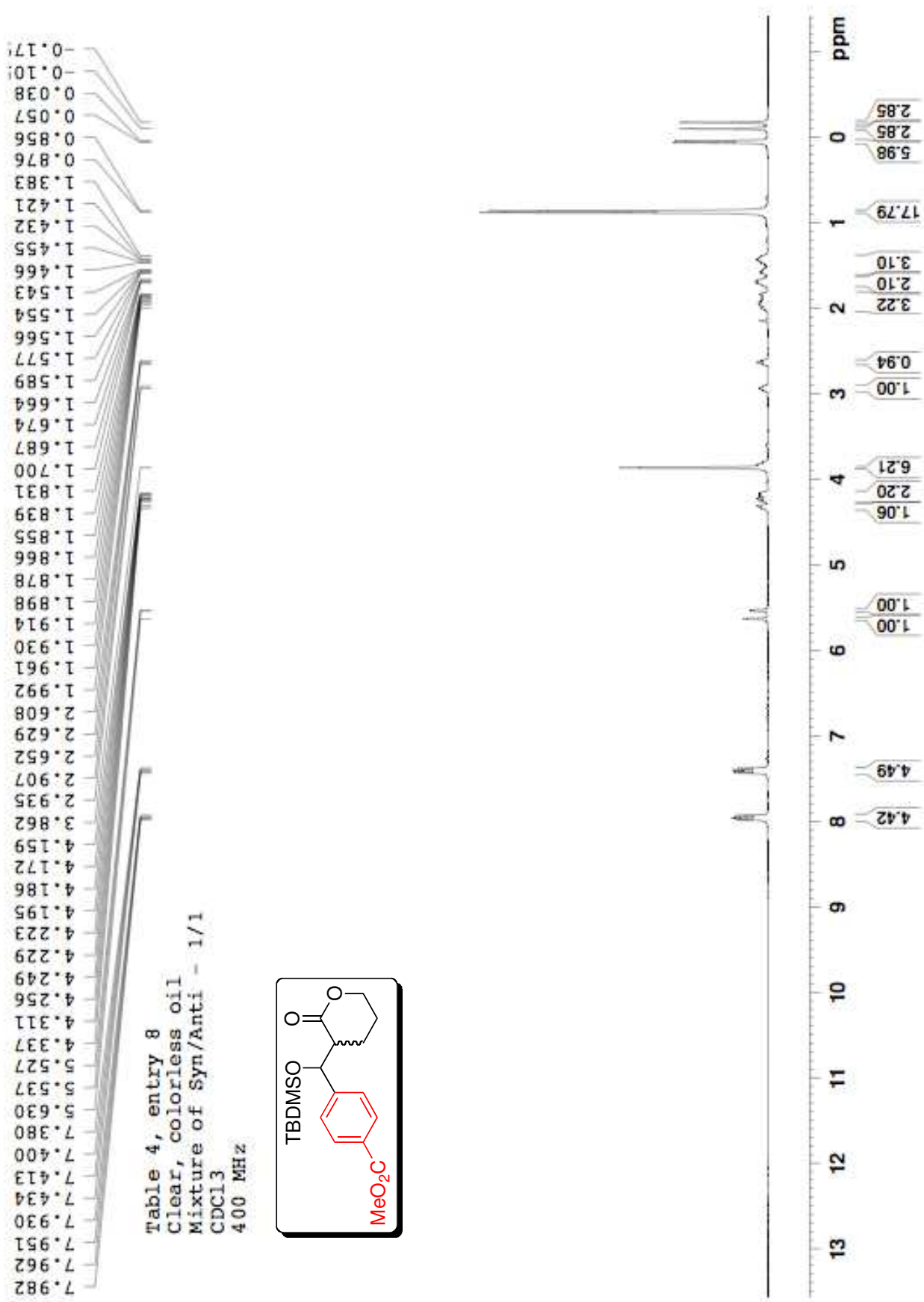


Table 4, entry 7
 White solid
 Mixture of Syn/Anti - 1/1
 CDCl_3
 100 MHz



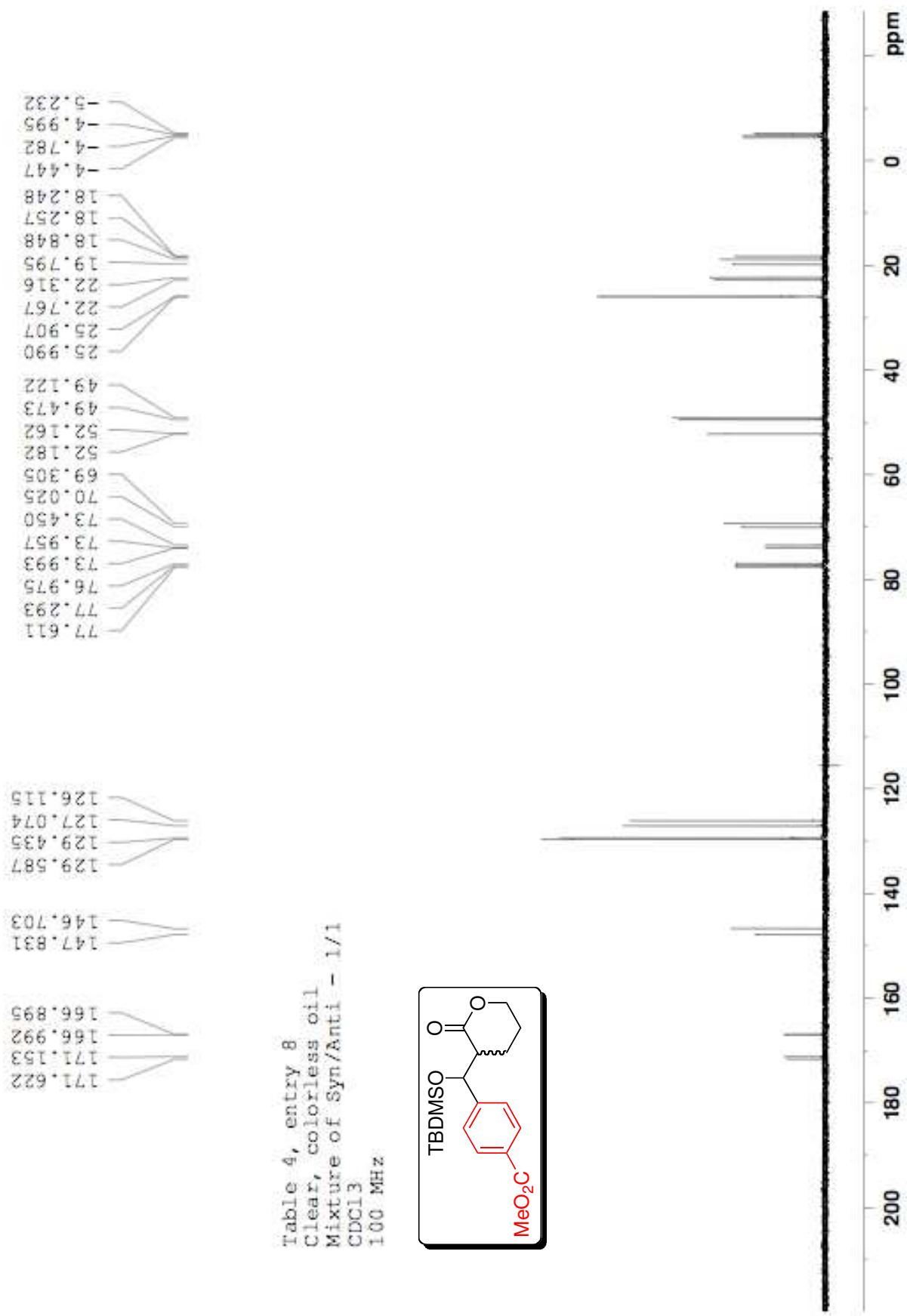
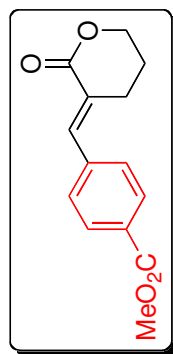
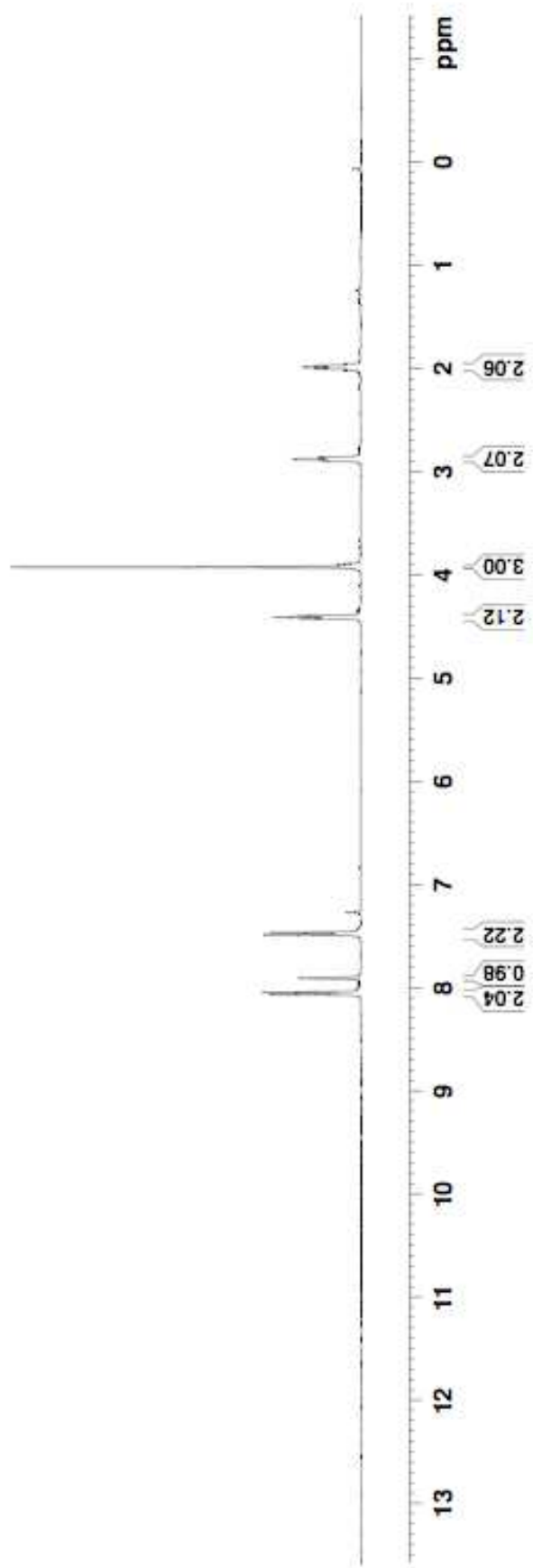


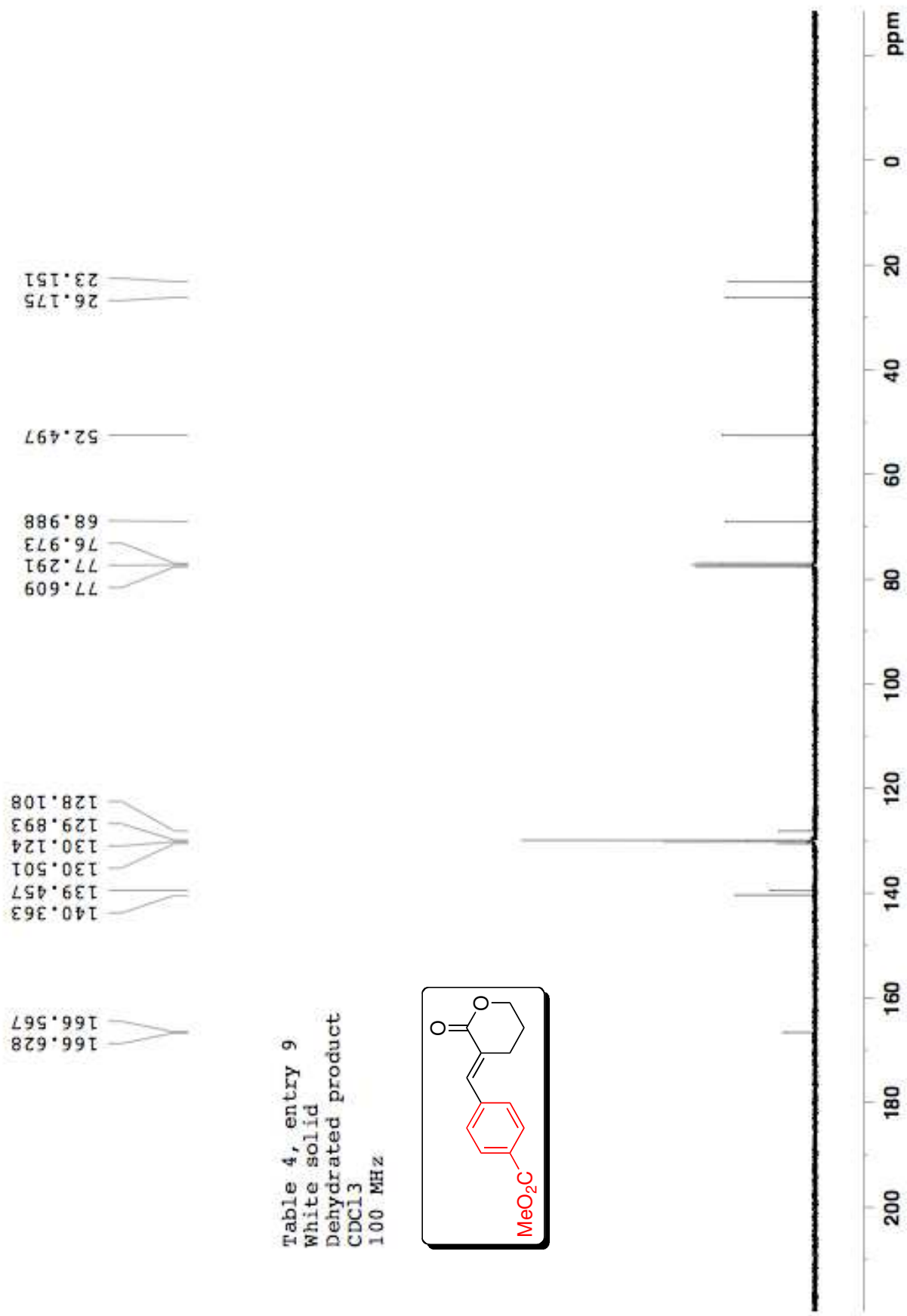
Table 4, entry 9
 White solid
 Dehydrated product
 CDCl₃
 400 MHz

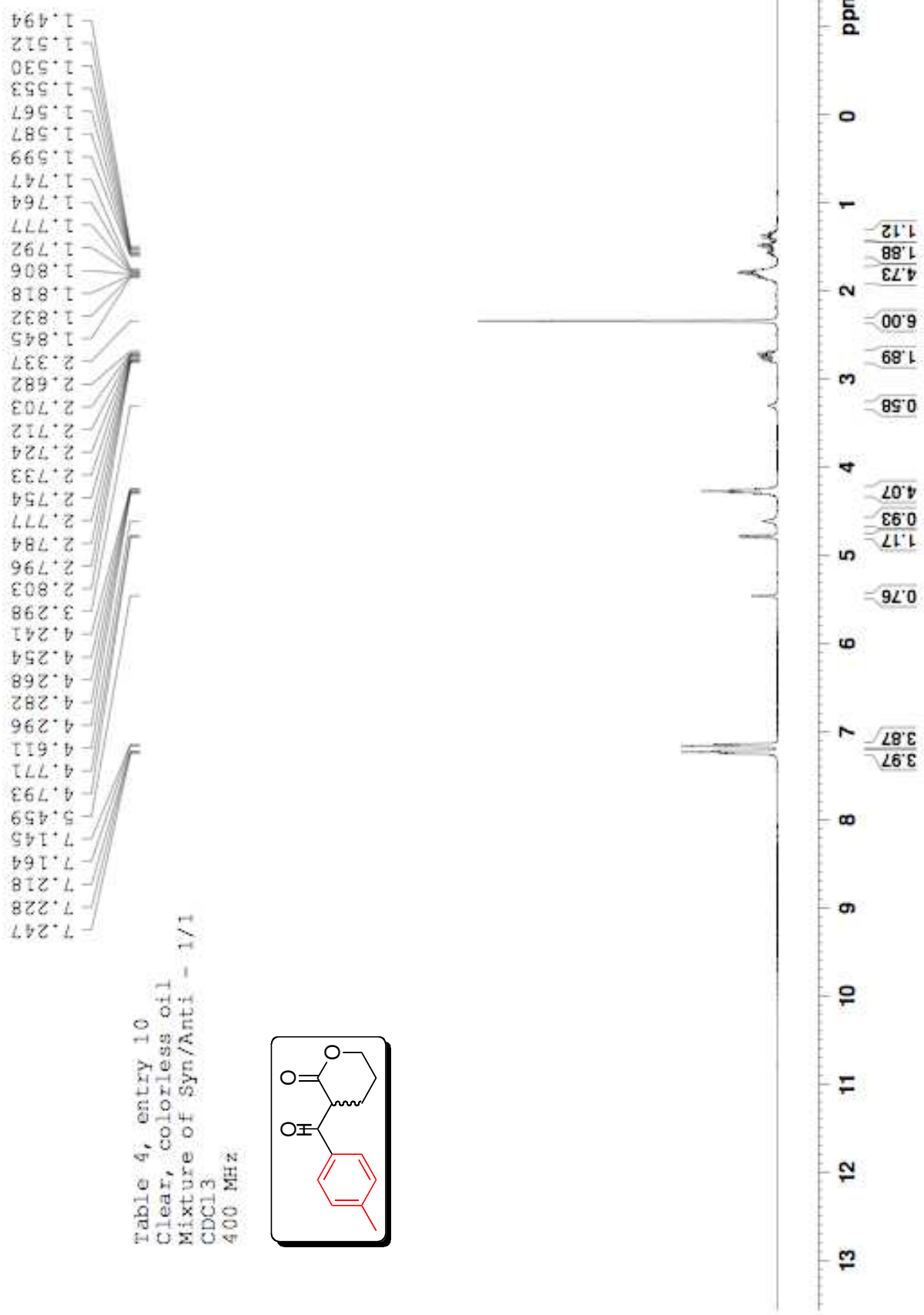


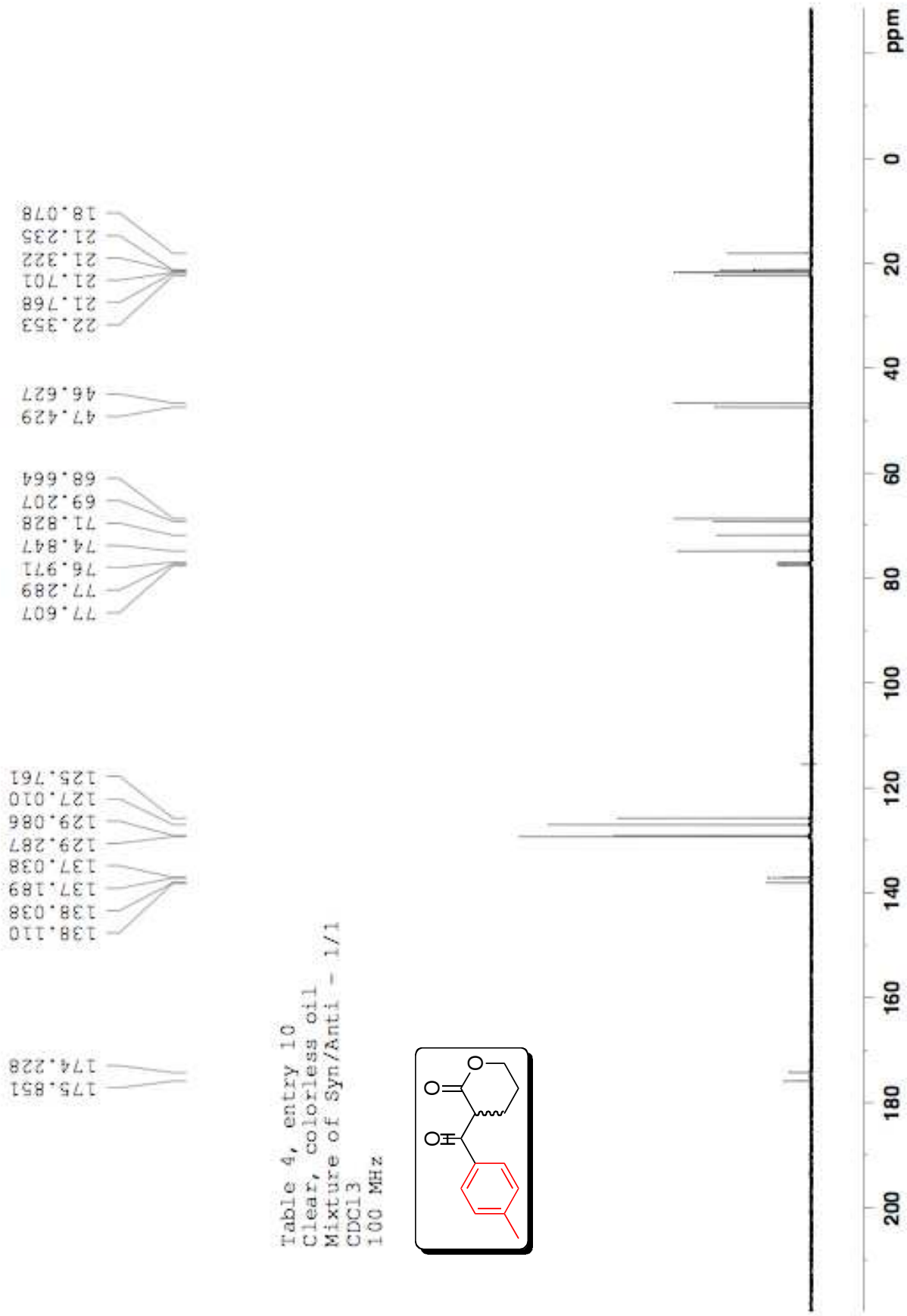
8.066
 8.046
 7.909
 7.487
 7.467
 7.270

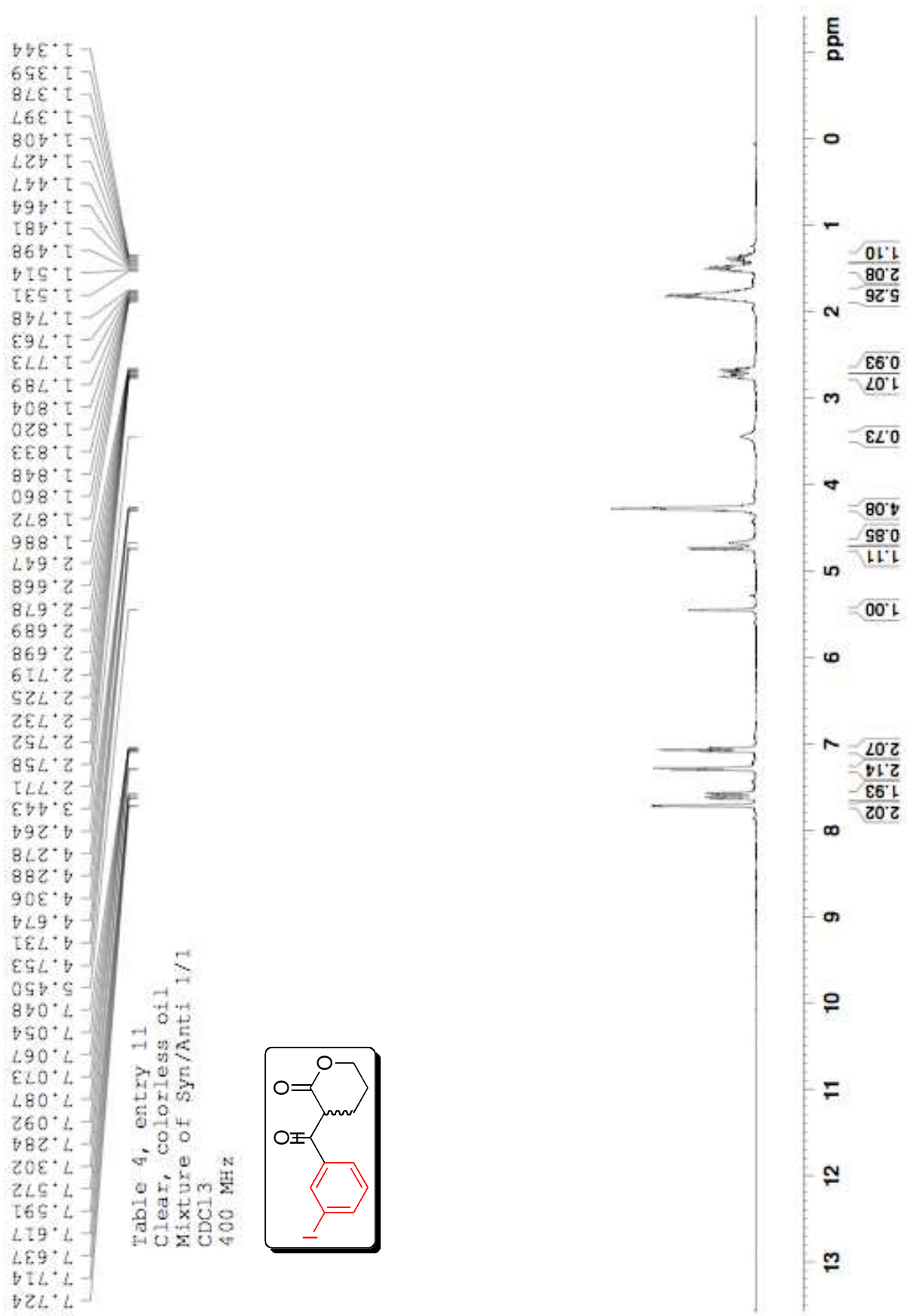
4.422
 4.409
 4.396
 3.923
 2.891
 2.875
 2.864
 2.014
 1.999
 1.985
 1.971
 1.956

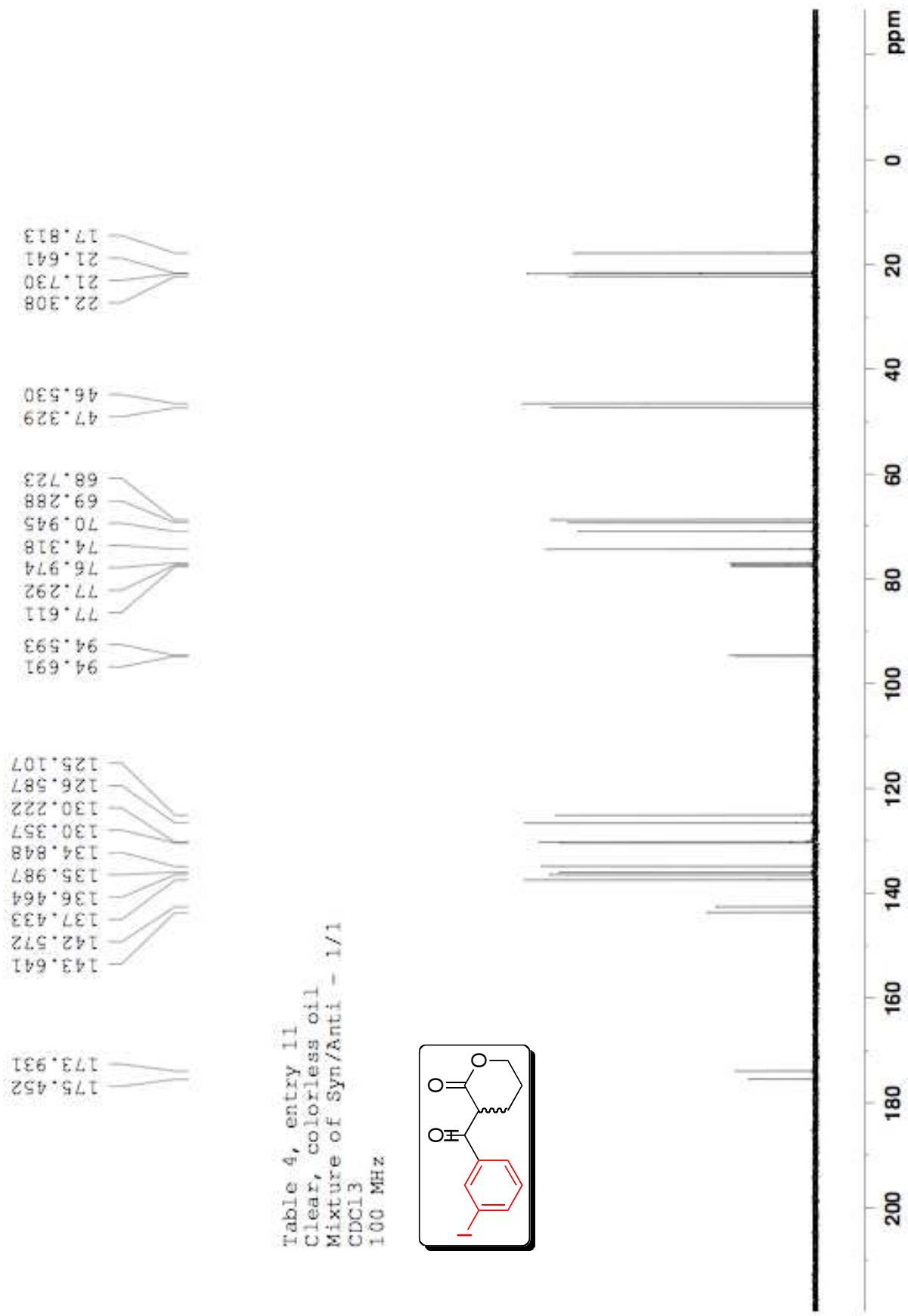












7.307
7.288
7.270
7.233
7.217
7.191
7.173
4.296
4.282
4.268
4.216
4.192
4.027
3.824
3.811
3.805
3.792
2.931
2.917
2.907
2.896
2.883
2.874
2.860
2.770
2.751
2.747
2.735
2.729
2.717
2.713
2.694
2.582
2.530
2.510
2.500
2.491
2.481
2.461
2.069
2.052
2.036
2.018
1.999
1.905
1.889
1.874
1.676
1.668
1.659
1.651
1.579
1.560
1.547
1.529
1.514
1.498

Table 4, entry 12
Clear, colorless oil
Mixture of Syn/Anti - 1/1
CDCl₃
400 MHz

