

## Electronic Supplementary Information (ESI)

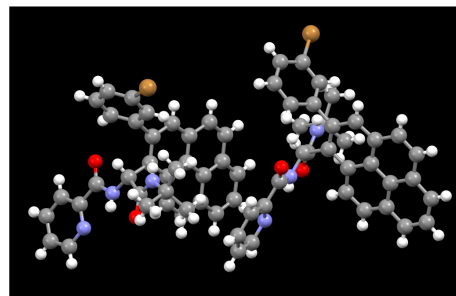
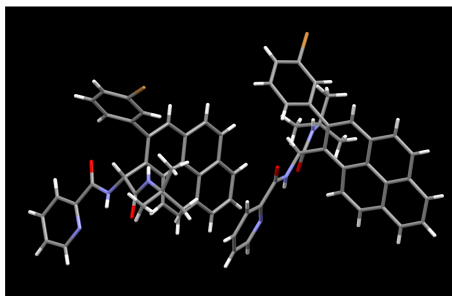
### Picolinamide-assisted ortho-C-H functionalization of pyrenylglycine derivatives using aryl iodides

Arup Dalal, Subhankar Bodak and Srinivasarao Arulananda Babu\*

*Department of Chemical Sciences, Indian Institute of Science Education and Research (IISER) Mohali, Knowledge City, Sector 81, SAS Nagar, Mohali, Manauli P.O., Punjab, India, 140306. E-mail: sababu@iisermohali.ac.in.*

#### Contents

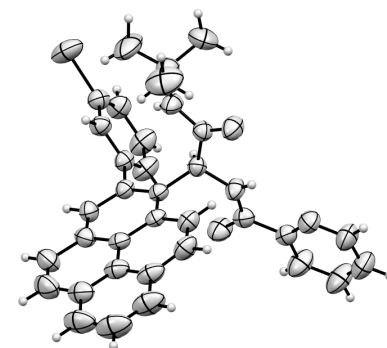
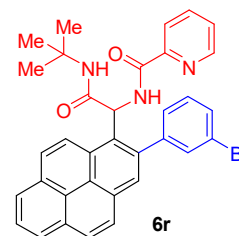
X-ray structure and brief crystal data of compounds <b>6r</b>	= pages 2-3
Copies of NMR spectra (proton, carbon and fluorine NMR) of compounds	= pages 4-388
Copies of absorption and preliminary emission spectral data, and integrated fluorescence intensity vs absorbance plots	= pages 389-410
Experimental Procedures	= pages 411-412



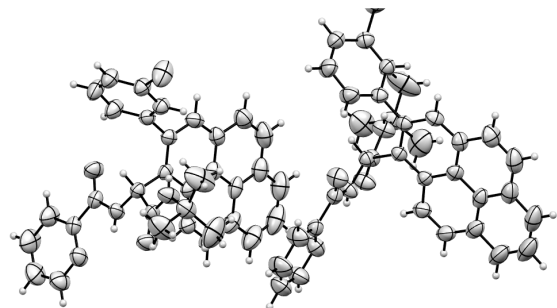
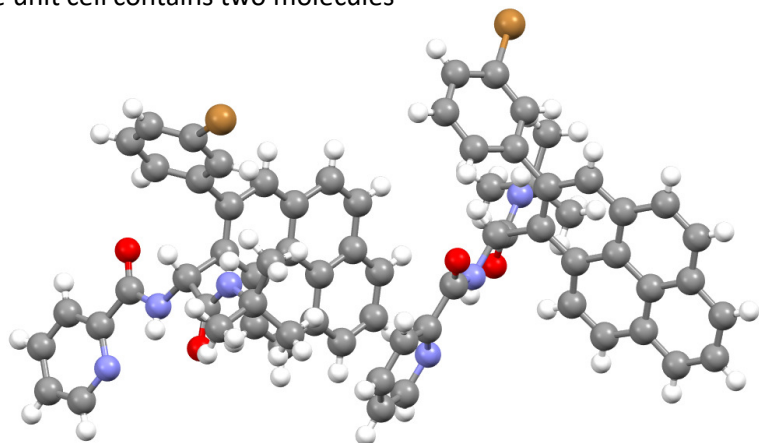
The unit cell contains two molecules

X-ray structure of compound **6r**

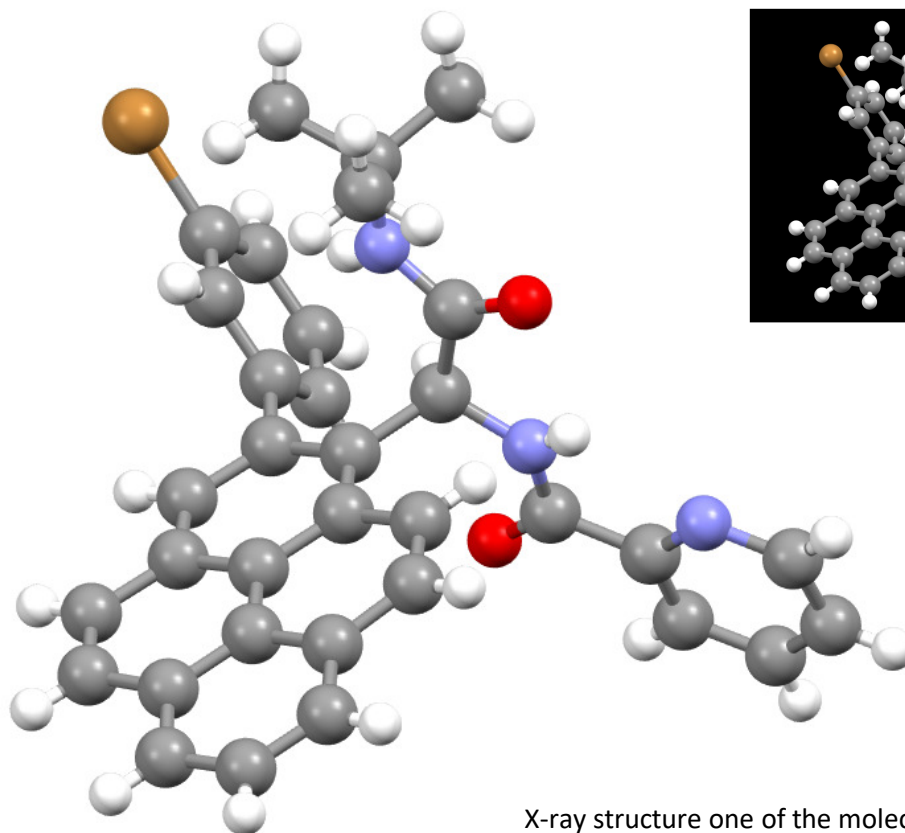
CCDC 2294407



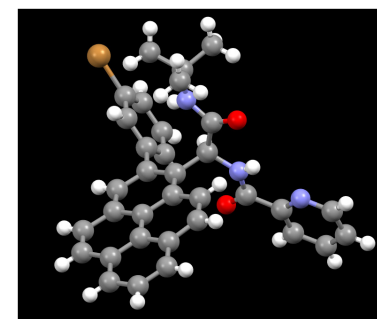
Ellipsoid probability = 50 %



Ellipsoid probability = 50 %

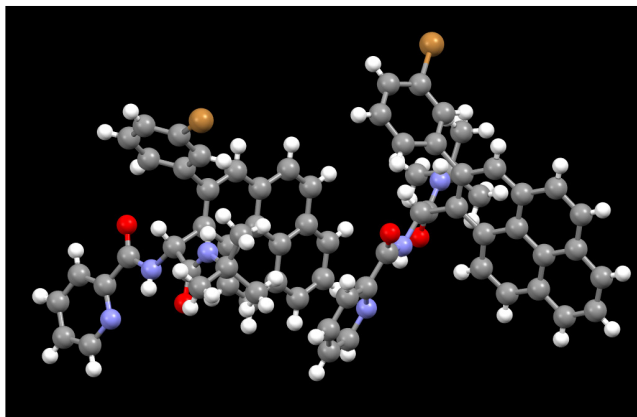
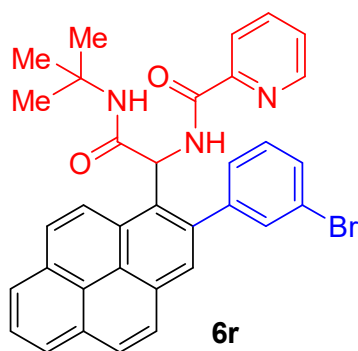


X-ray structure one of the molecule  
The unit cell contains two molecules<sub>2</sub>



## Brief crystal data of compound **6r**

CCDC 2294407



## checkCIF/PLATON report

Structure factors have been supplied for datablock(s) exp\_603

THIS REPORT IS FOR GUIDANCE ONLY. IF USED AS PART OF A REVIEW PROCEDURE FOR PUBLICATION, IT SHOULD NOT REPLACE THE EXPERTISE OF AN EXPERIENCED CRYSTALLOGRAPHIC REFEREE.

No syntax errors found. CIF dictionary Interpreting this report

## Datablock: exp\_603

Bond precision: C-C = 0.0056 Å Wavelength=0.71073  
Cell: a=9.6137 (19) b=18.354 (3) c=18.491 (3)  
alpha=61.325 (17) beta=89.722 (15) gamma=89.850 (15)  
Temperature: 293 K

	Calculated	Reported
Volume	2862.5 (10)	2862.5 (10)
Space group	P -1	P -1
Hall group	-P 1	-P 1
Moiety formula	C34 H28 Br N3 O2	C34 H28 Br N3 O2
Sum formula	C34 H28 Br N3 O2	C34 H28 Br N3 O2
Mr	590.49	590.50
Dx, g cm <sup>-3</sup>	1.370	1.370
Z	4	4
Mu (mm <sup>-1</sup> )	1.472	1.472
F000	1216.0	1216.0
F000'	1215.28	
h, k, lmax	14, 27, 28	14, 26, 27
Nref	21108	17050
Tmin, Tmax	0.484, 0.555	0.579, 1.000
Tmin'	0.474	

Correction method= # Reported T Limits: Tmin=0.579 Tmax=1.000  
AbsCorr = MULTI-SCAN

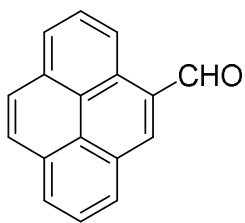
Data completeness= 0.808 Theta(max)= 32.723

R(reflections)= 0.0597 ( 8340)

wR2(reflections)=  
0.2088 ( 17050)

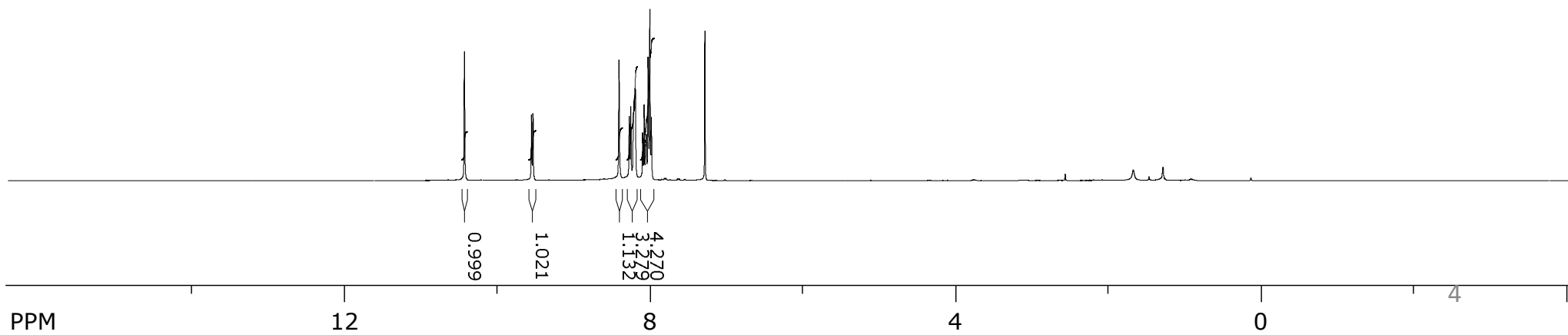
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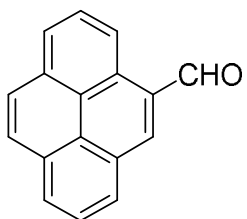
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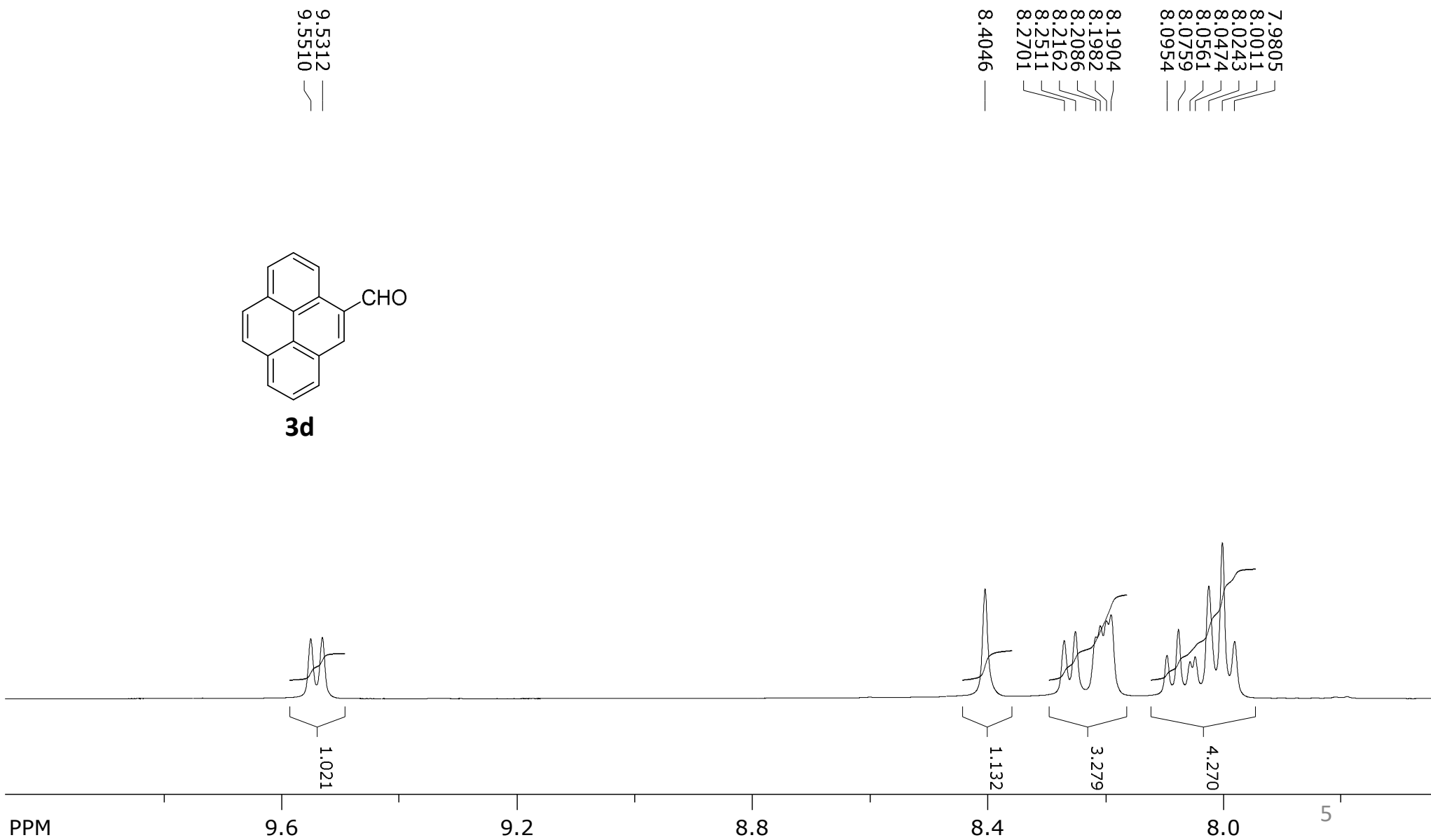
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7.9805  
8.0011  
8.0243  
8.0474  
8.0561  
8.0759  
8.0954  
8.0954  
8.1982  
8.2086  
8.2162  
8.2511  
8.2701  
8.4046  
9.5312  
9.5510  
10.4294





**3d**

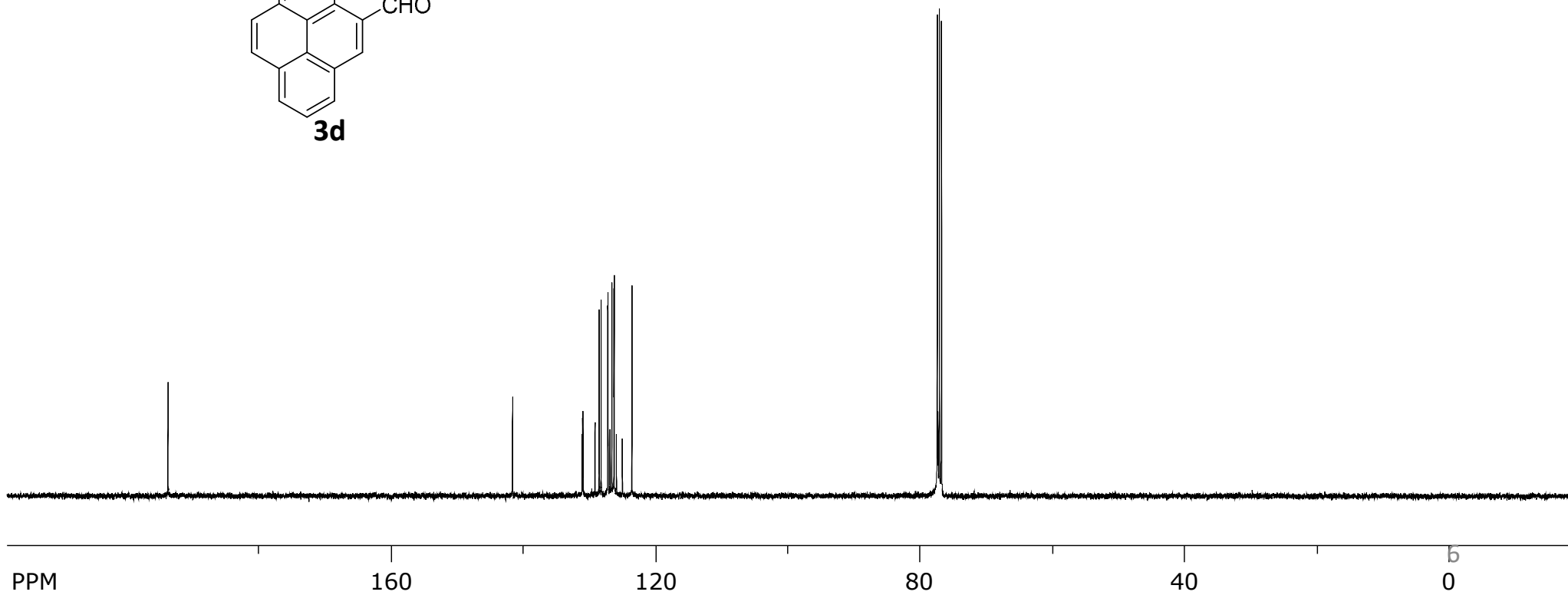
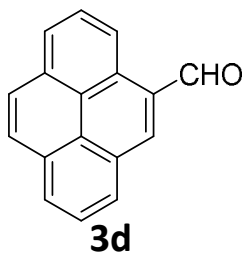


SpinWorks 4: AD-2267-A

193.7902

123.6007  
125.0524  
125.9471  
126.2812  
126.3211  
126.6399  
126.9289  
127.1154  
127.2597  
128.2624  
129.5616  
129.1845  
130.9886  
131.0479  
131.1455  
141.6551

76.7590  
77.0766  
77.3941

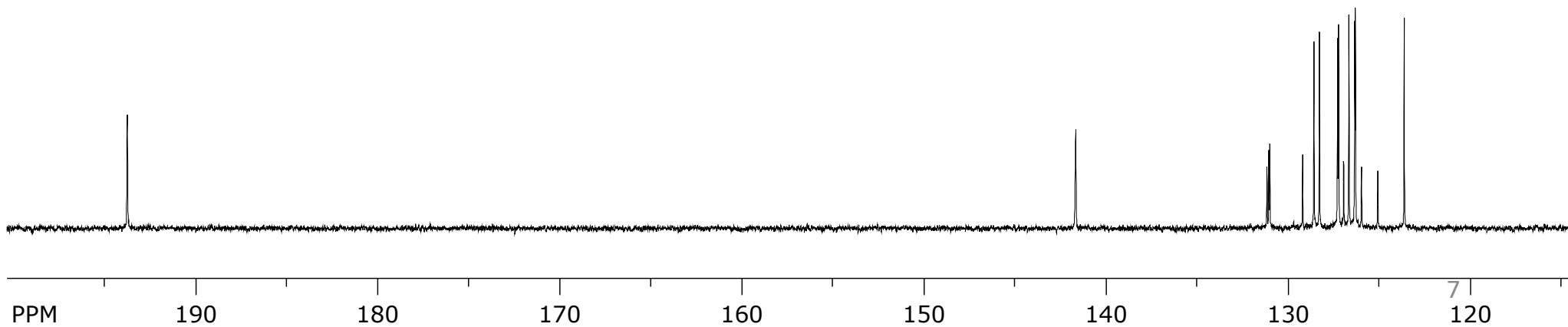
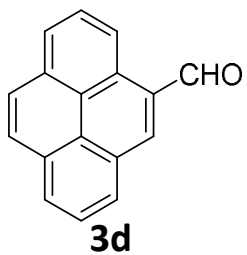


SpinWorks 4: AD-2267-A

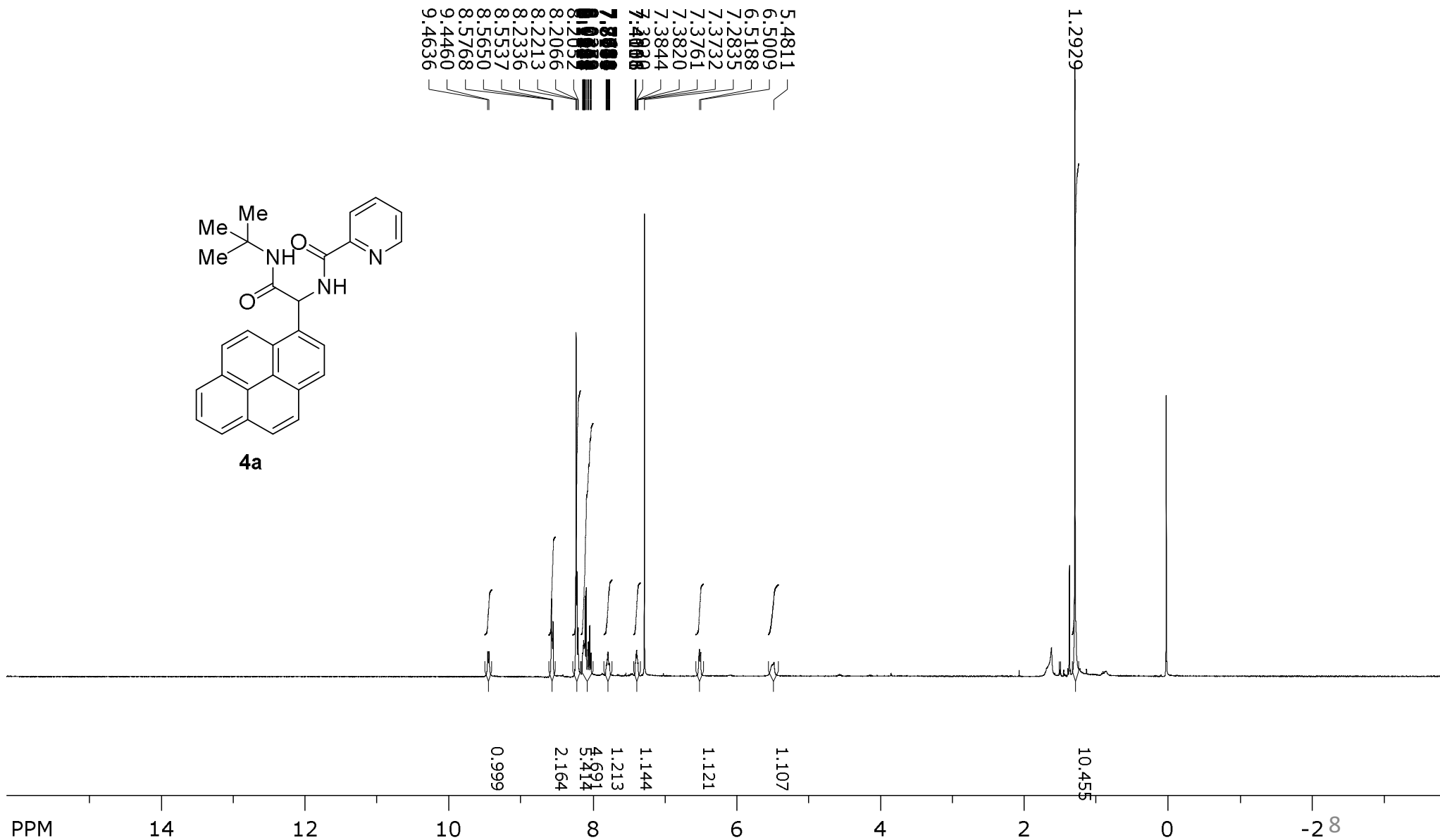
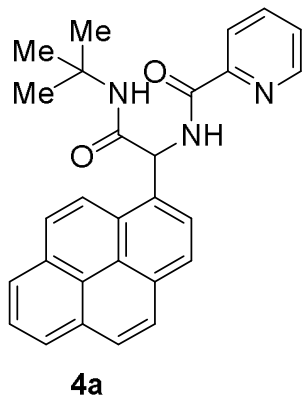
193.7902 —

141.6551 —

123.6007  
125.0524  
125.9471  
126.2812  
126.3211  
126.6399  
126.9280  
127.2027  
127.2597  
128.2624  
128.5616  
129.1845  
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131.0479  
131.1455



SpinWorks 4: AD-1821  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 19

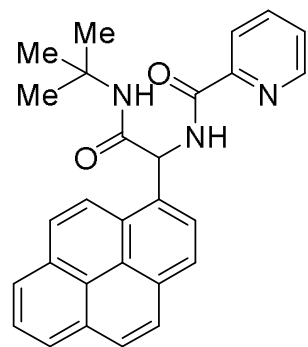




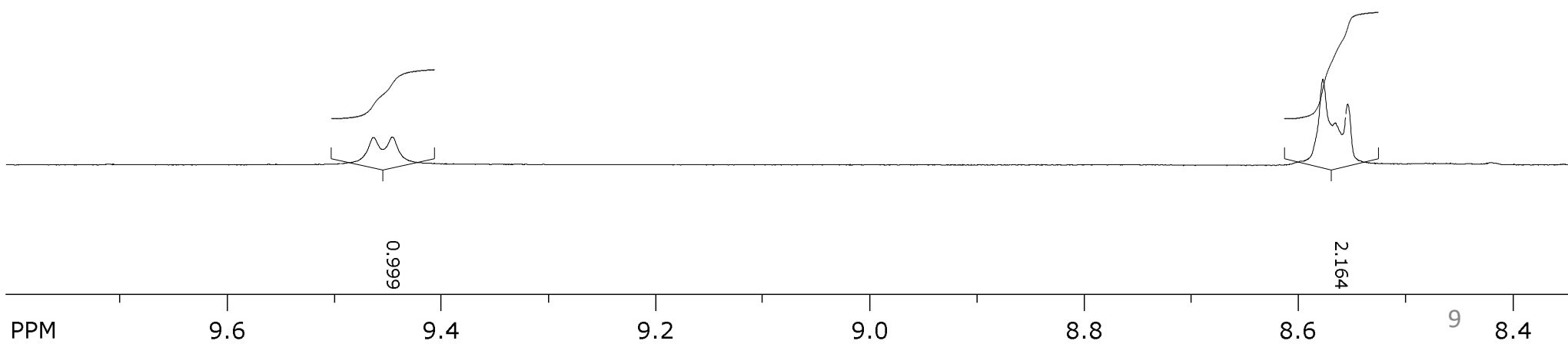
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9.4460  
9.4636

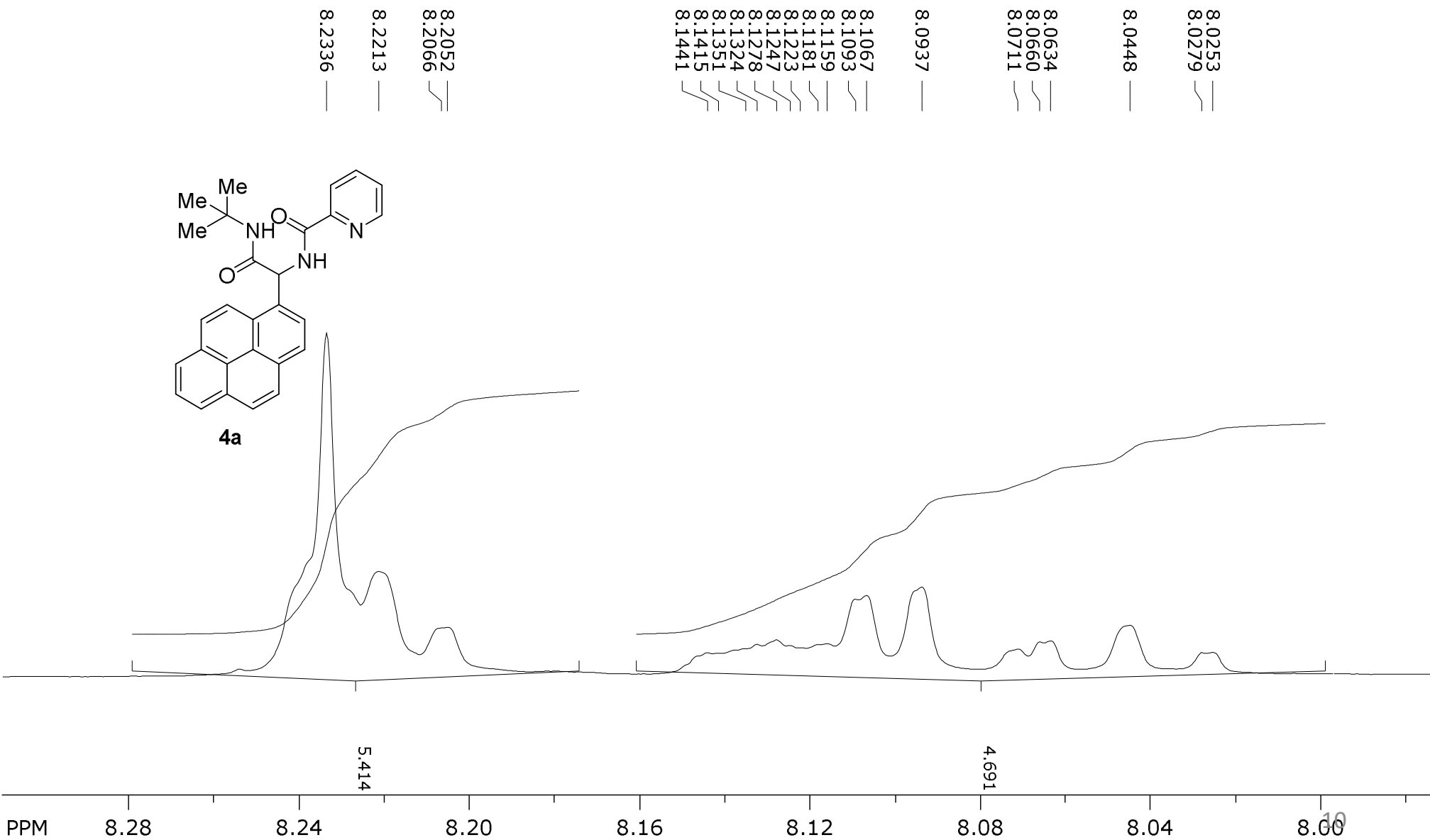
8.5537  
8.5650  
8.5768



**4a**

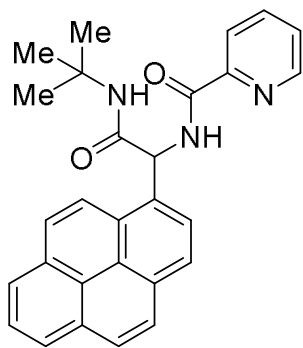


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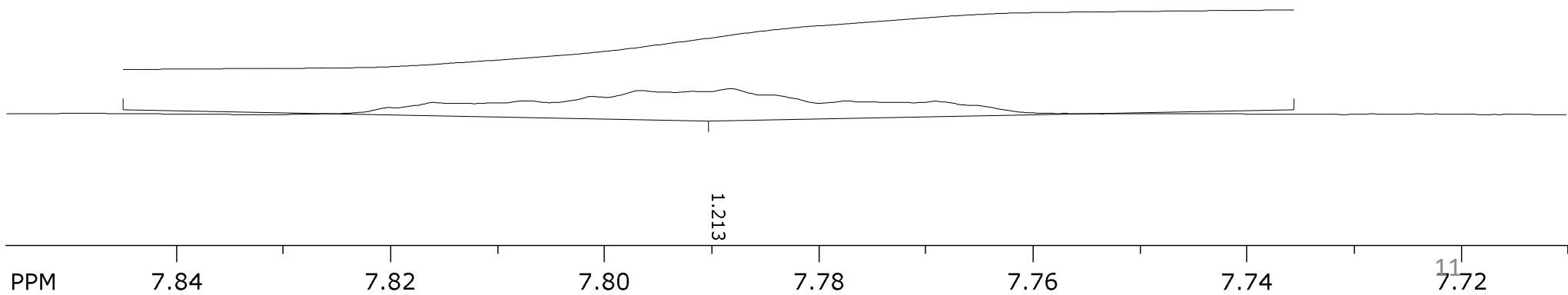


SpinWorks 4: AD-1821  
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7.7691 —  
7.7720 —  
7.7730 —  
7.7754 —  
7.7774 —  
7.7846 —  
7.7884 —  
7.7917 —  
7.7966 —  
7.8012 —  
7.8074 —  
7.8105 —  
7.8137 —  
7.8160 —



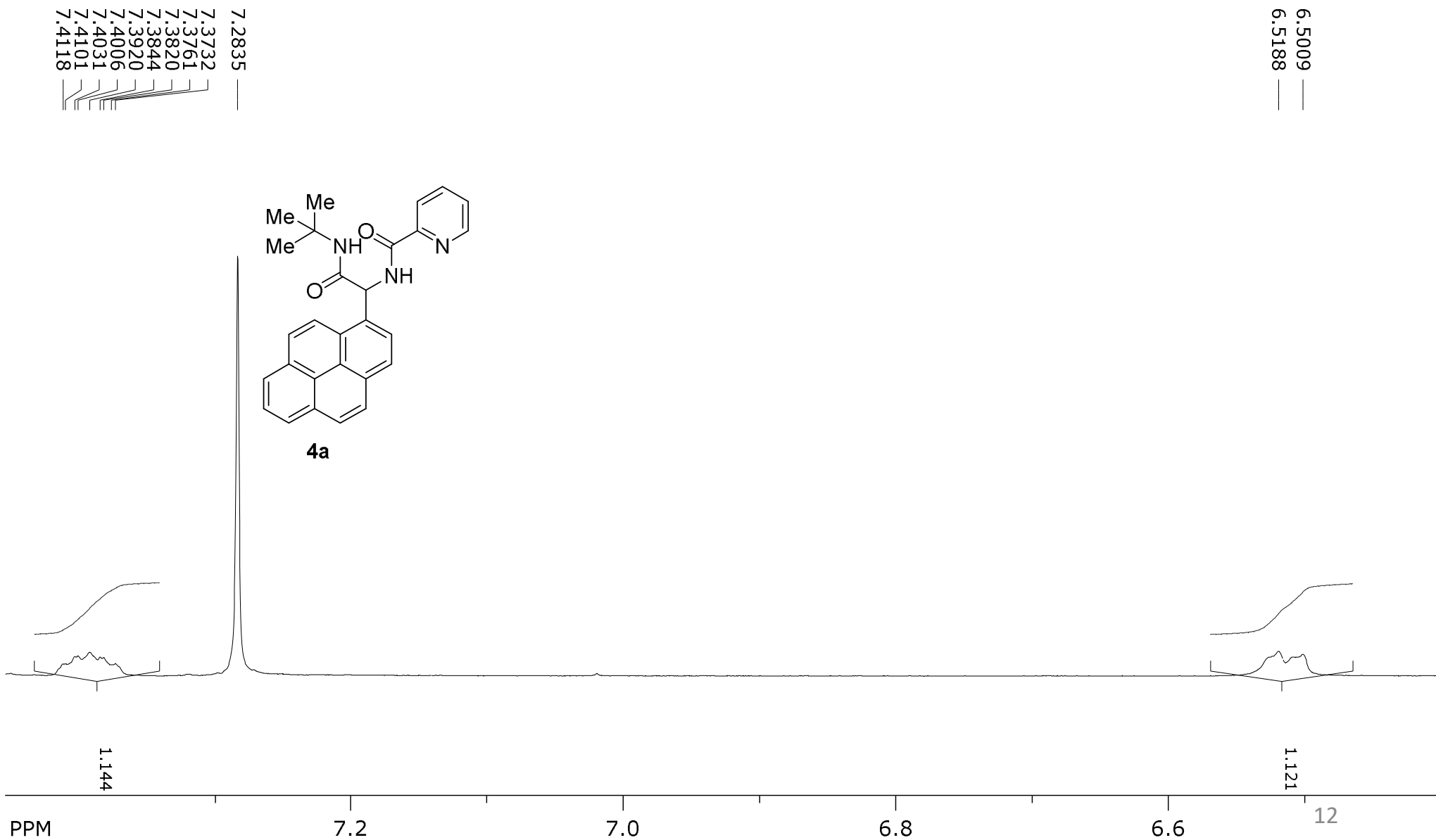
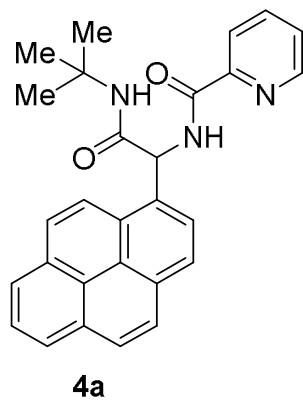
**4a**



SpinWorks 4: AD-1821  
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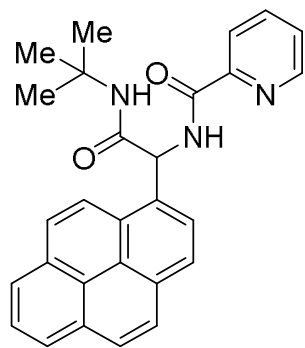
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7.3732  
7.3761  
7.3820  
7.3844  
7.3920  
7.4006  
7.4031  
7.4101  
7.4118

6.5009  
6.5188



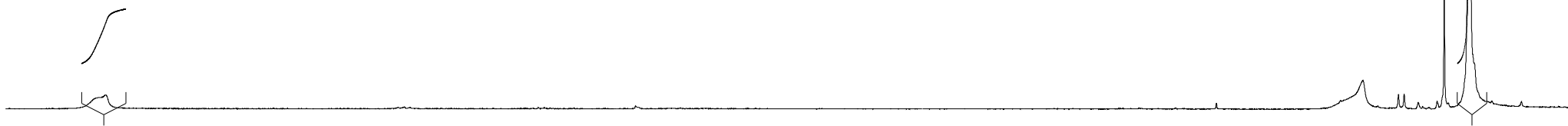
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5.4811



4a

1.2929



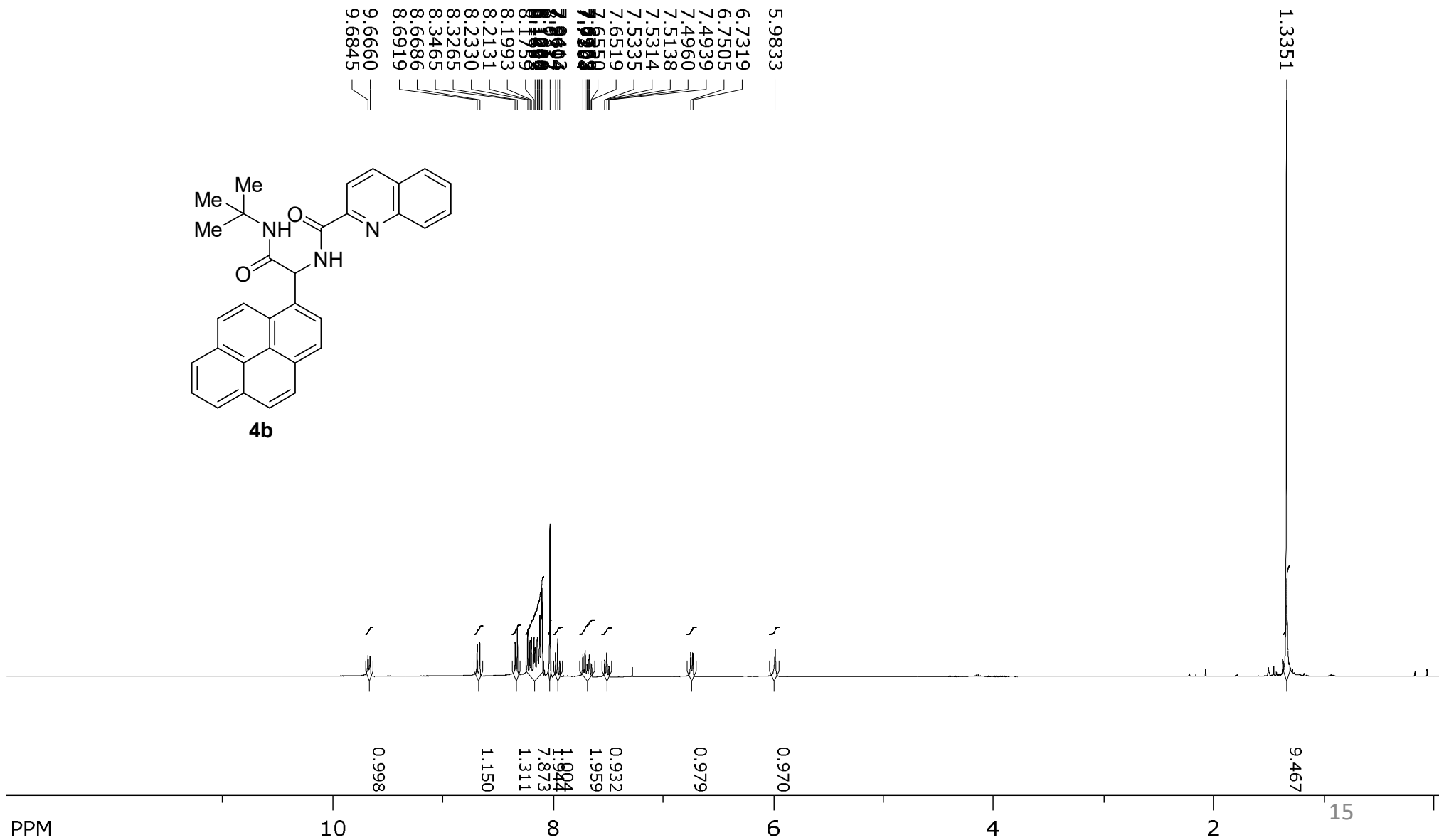
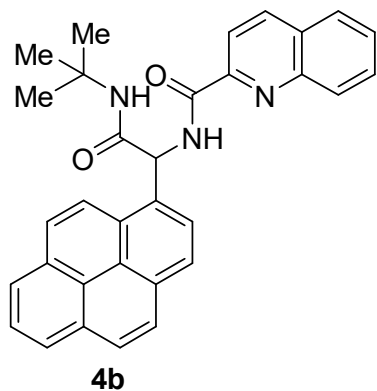
1.107

10.455

PPM 5.2 4.8 4.4 4.0 3.6 3.2 2.8 2.4 2.0 1.6 13 1.2



SpinWorks 4: AD 1872  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 34

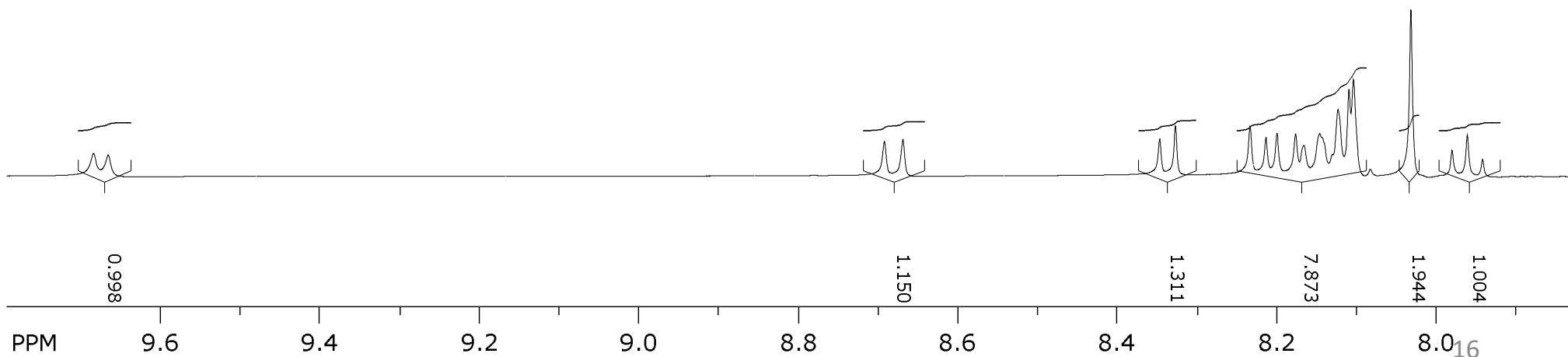
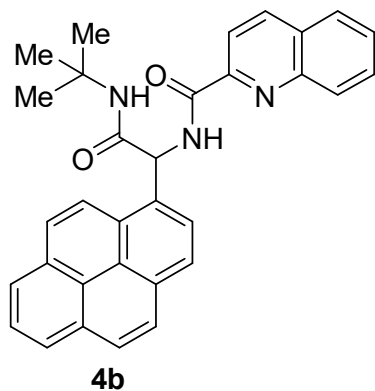


SpinWorks 4: AD 1872  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 34

9.6660  
9.6845

8.6686  
8.6919

8.1032  
8.1088  
8.1226  
8.1299  
8.1457  
8.1653  
8.1759  
8.1993  
8.2131  
8.2330  
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8.3465  
8.0312  
7.9413  
7.9604  
7.9794



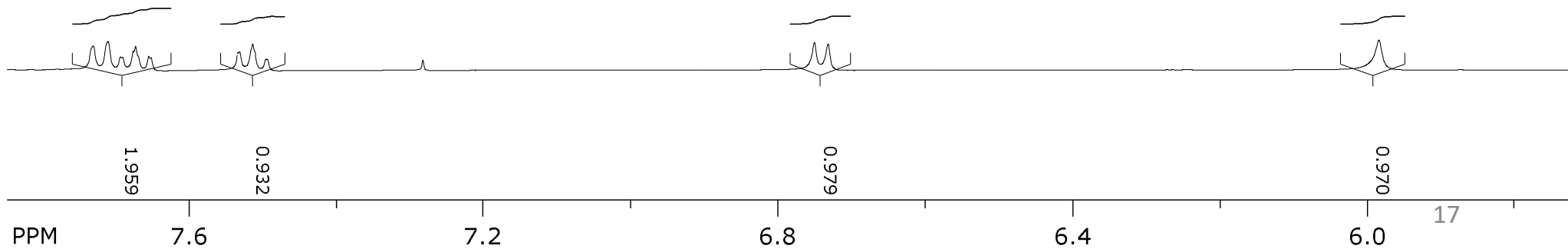
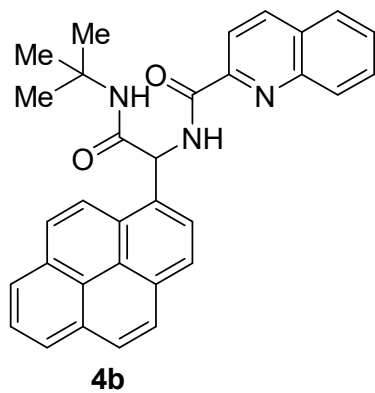


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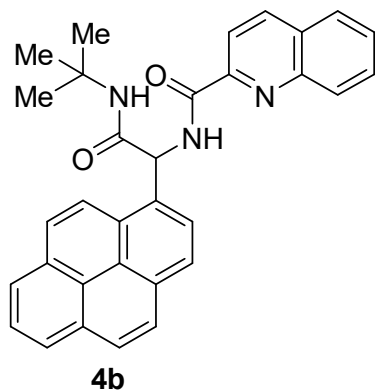
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7.53144  
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7.65119  
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7.69335  
7.71033  
7.73044

6.7319  
6.7505

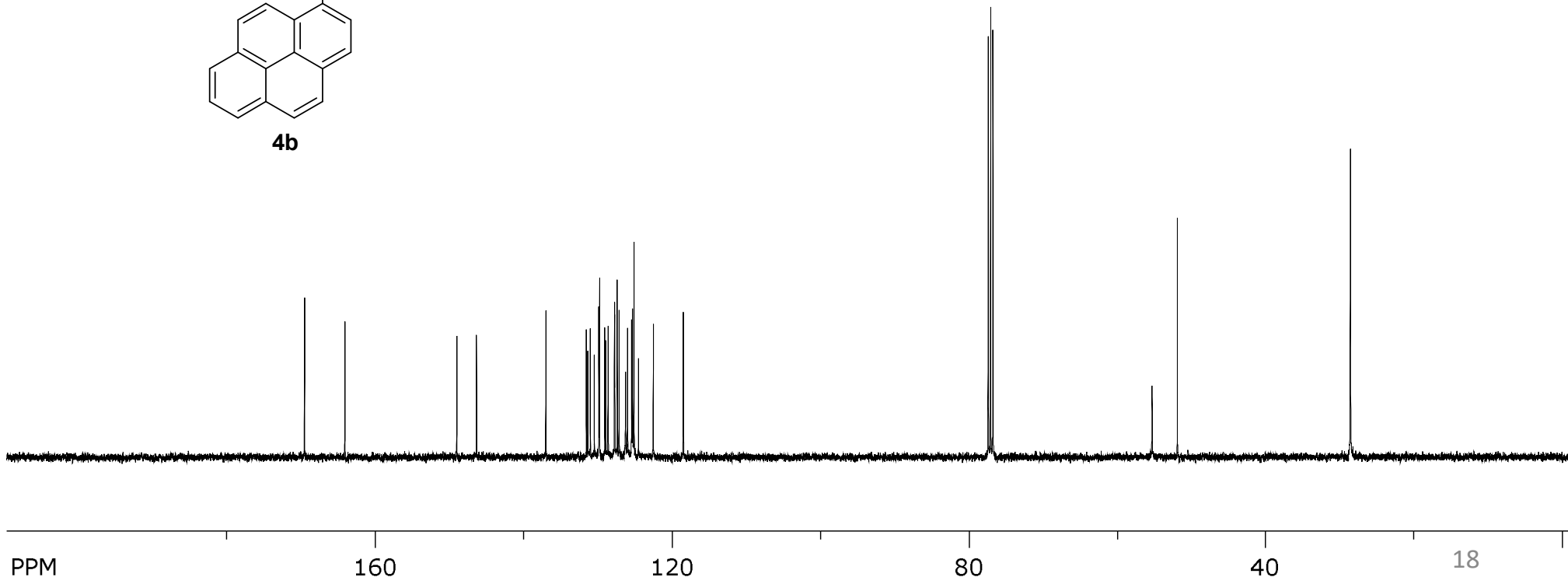
5.9833



SpinWorks 4: AD 1872  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 34



169.601 —  
164.153 —  
149.061 —  
146.400 —  
137.052 —  
131.584 —  
131.393 —  
131.045 —  
130.517 —  
129.901 —  
129.811 —  
129.099 —  
128.999 —  
128.900 —  
126.031 —  
125.481 —  
125.343 —  
125.156 —  
124.562 —  
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55.277 —  
51.877 —  
28.532 —



PPM

160

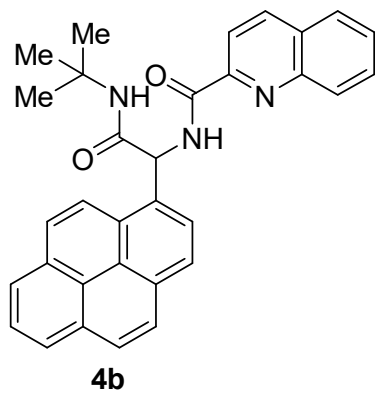
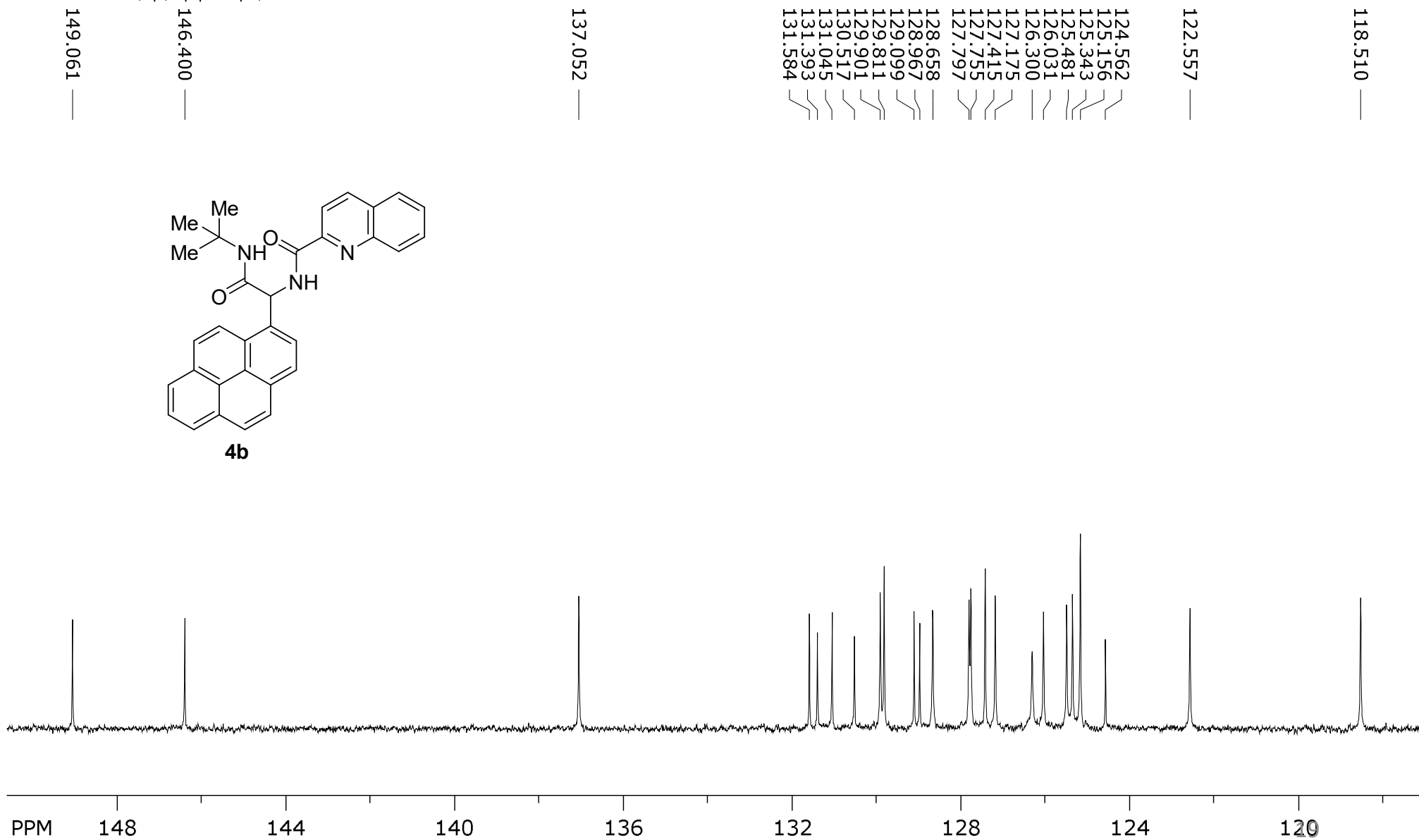
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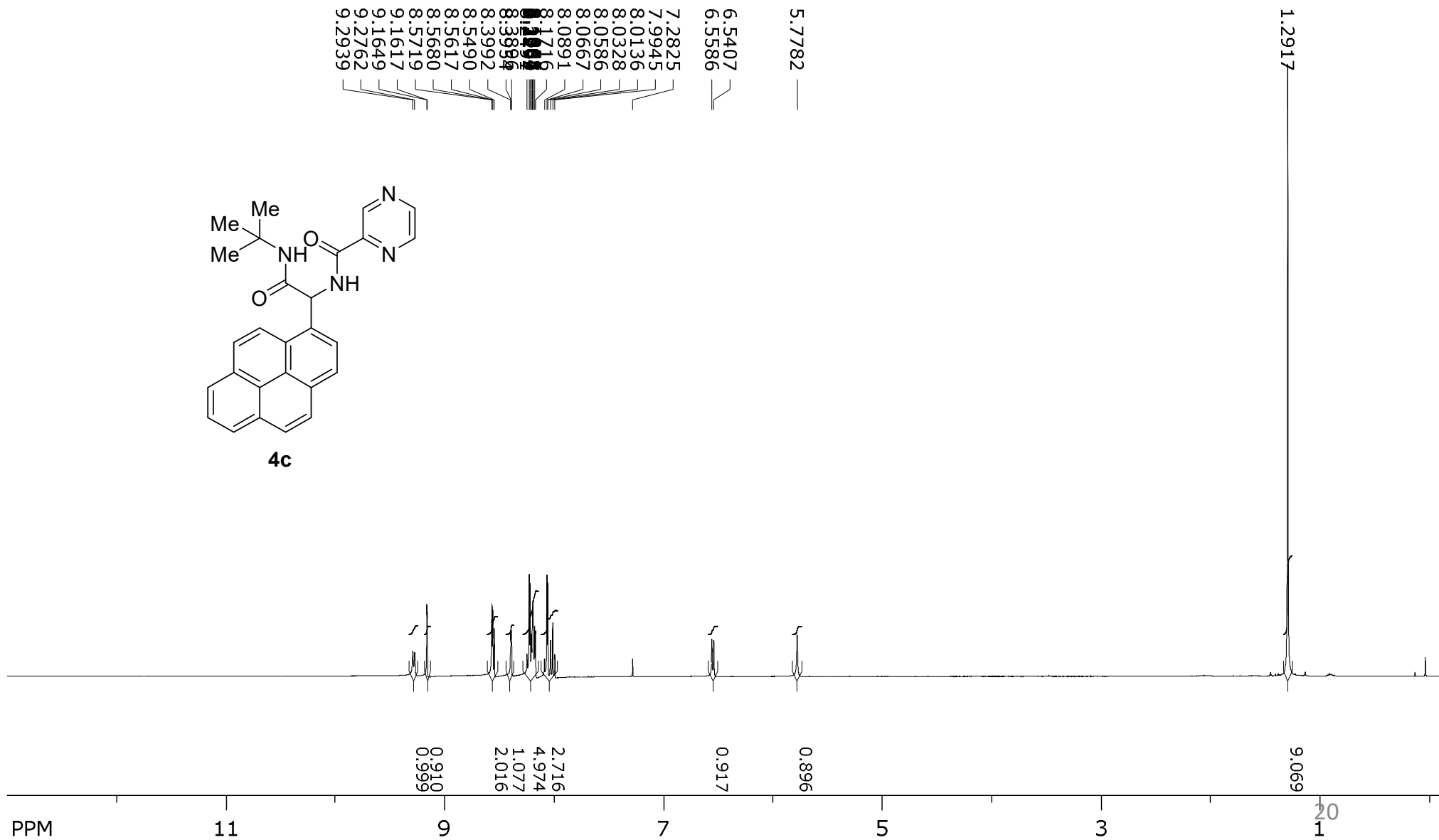
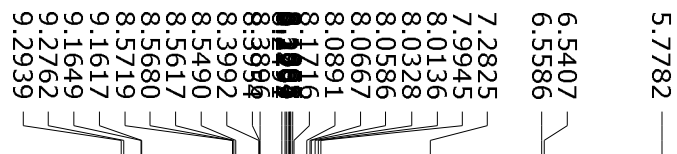
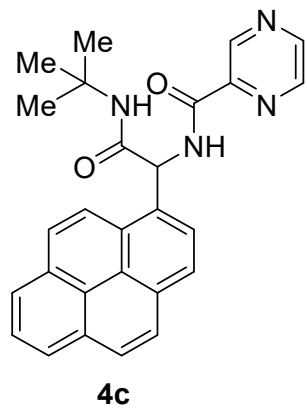
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18

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C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 34



SpinWorks 4: AD 1875RE  
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SpinWorks 4: AD 1875RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 4

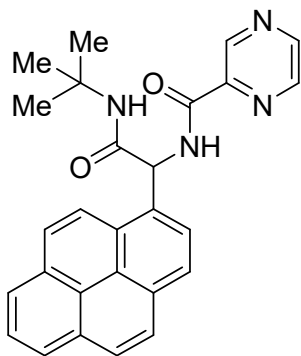
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9.2939

9.1617  
9.1649

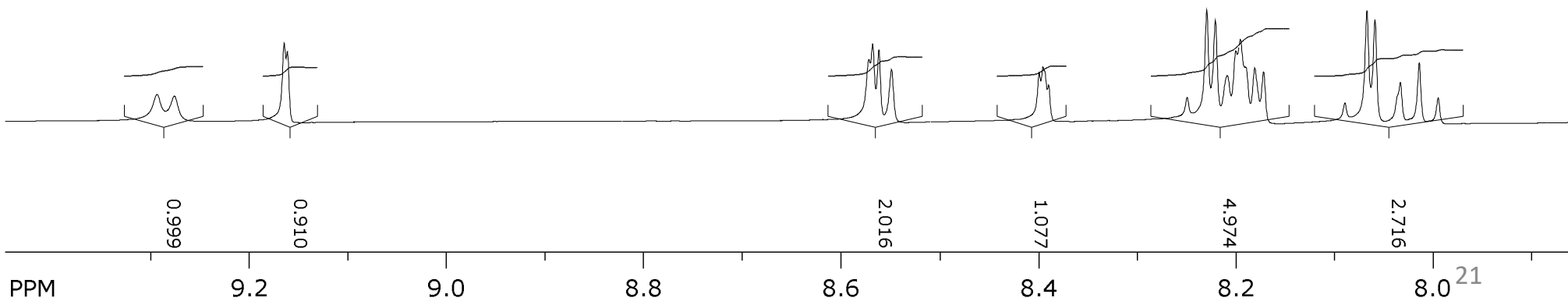
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8.3896  
8.3954  
8.3992

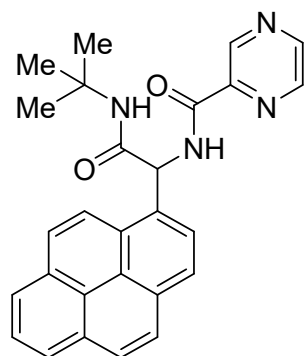
7.9945  
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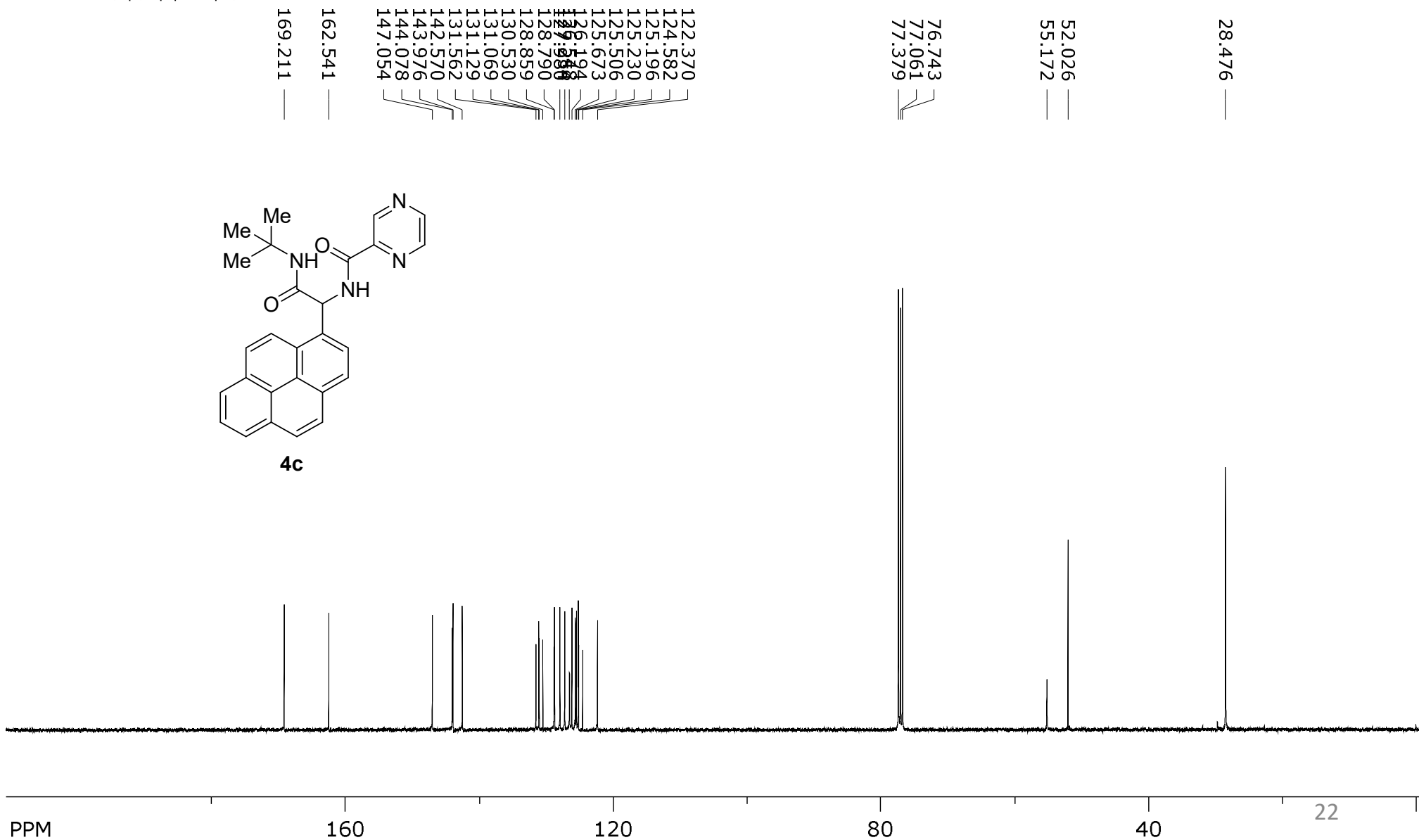
4c



SpinWorks 4: AD 1875RE  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 4

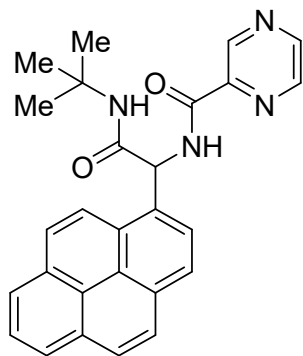


4c

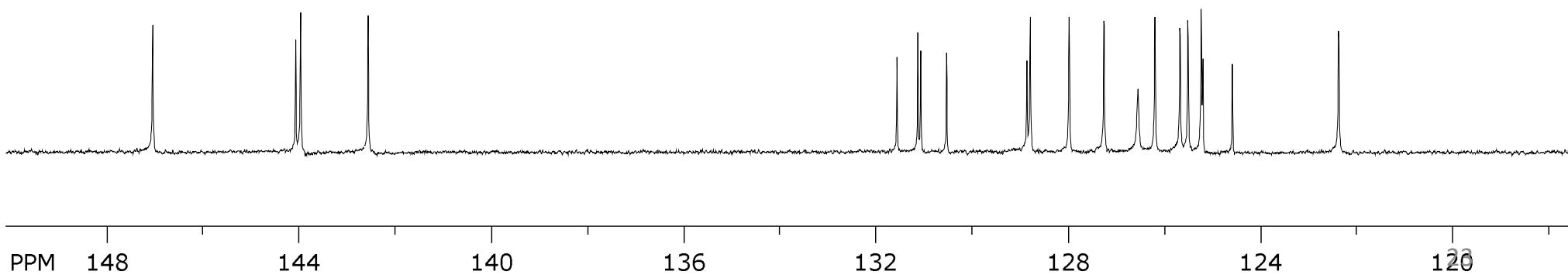


SpinWorks 4: AD 1875RE  
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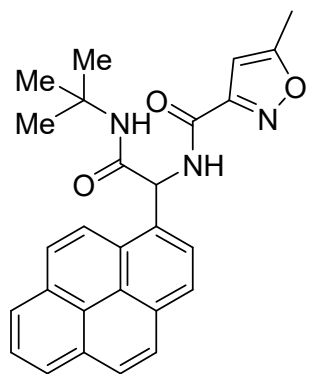
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125.673 —  
126.194 —  
126.548 —  
127.254 —  
127.980 —  
128.790 —  
128.859 —  
130.530 —  
131.069 —  
131.129 —  
131.562 —



**4c**



SpinWorks 4: AD-1873 RE  
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4d

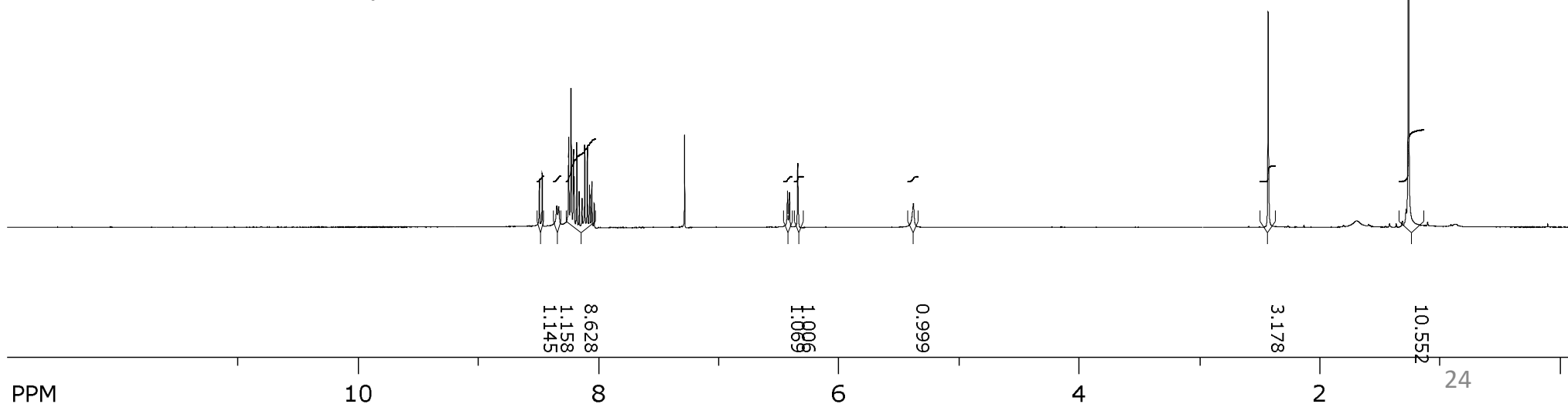
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8.1376  
8.1418  
8.2086  
8.2297  
8.2494  
8.3318  
8.3480  
8.4691  
8.4923

6.3425  
6.4108  
6.4274

5.3794

2.4260

1.2589



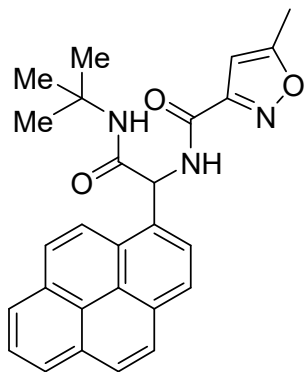


SpinWorks 4: AD-1873 RE  
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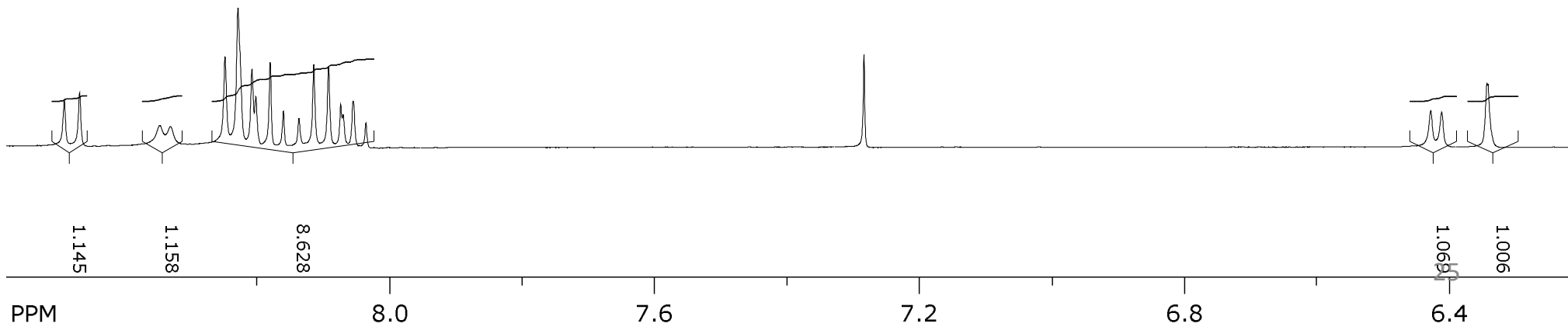
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8.1612  
8.1811  
8.2028  
8.2086  
8.2297  
8.2494  
8.3318  
8.3480  
8.4691  
8.4923

7.2838

6.3425  
6.4108  
6.4274



4d



SpinWorks 4: AD-1873 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 47

168.826  
171.049  
158.321  
158.842

122.288  
124.713  
125.280  
125.306  
125.585  
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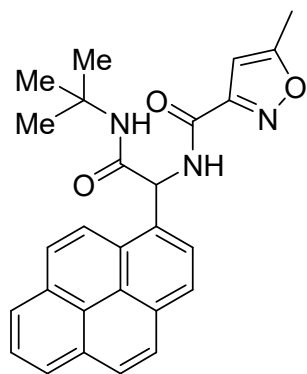
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52.055  
55.379

28.492

12.320



4d



PPM

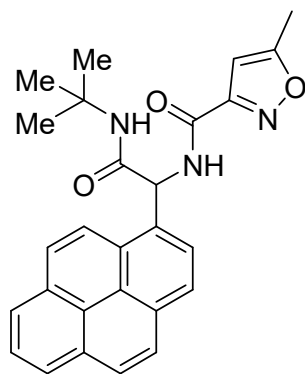
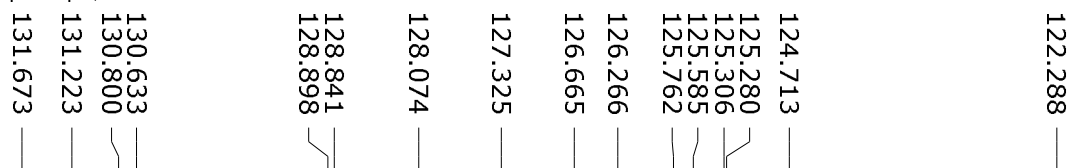
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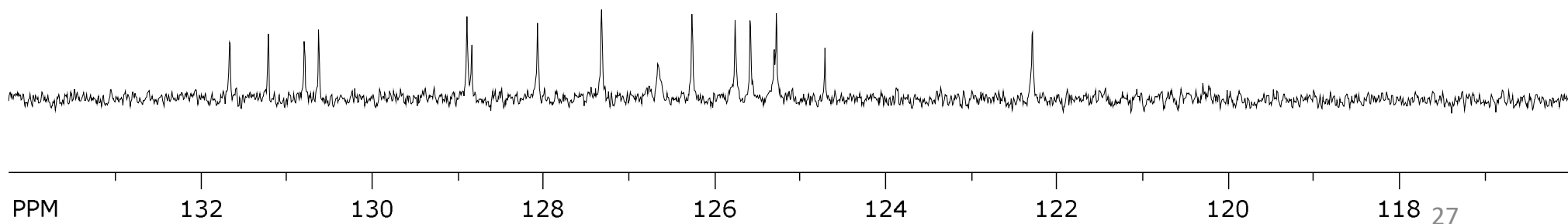
80

40

SpinWorks 4: AD-1873 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 47



4d





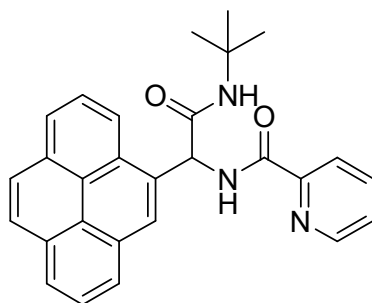
SpinWorks 4: AD 2267 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 51

9.4369  
9.4546

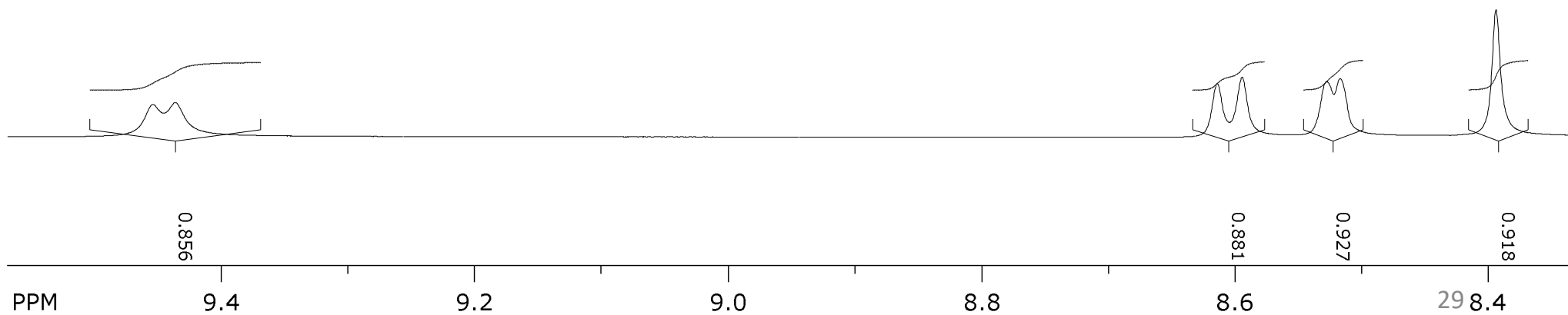
8.5938  
8.6134

8.5162  
8.5270

8.3931



**4e**



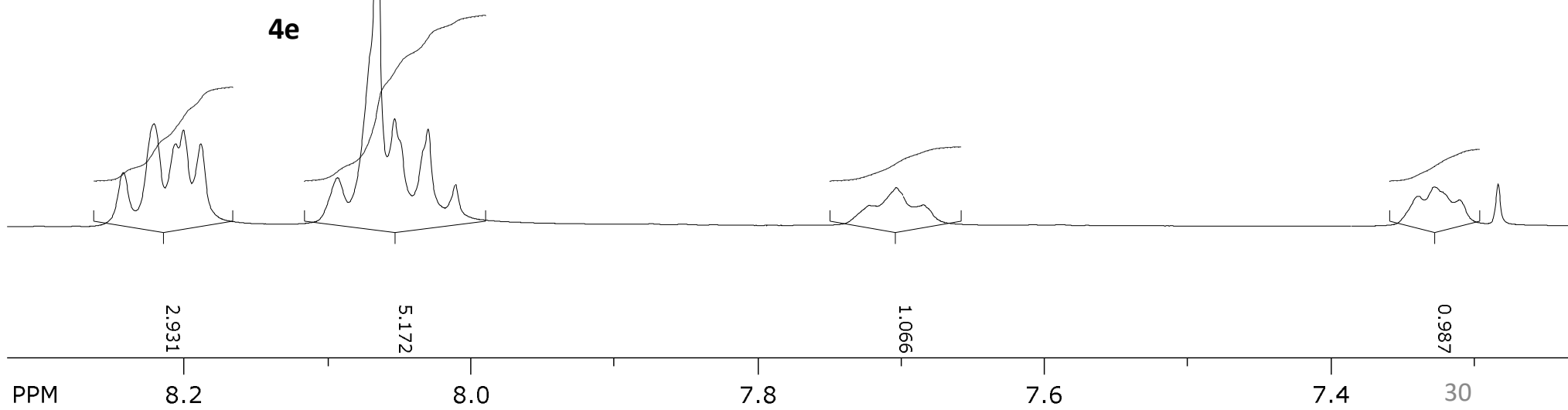
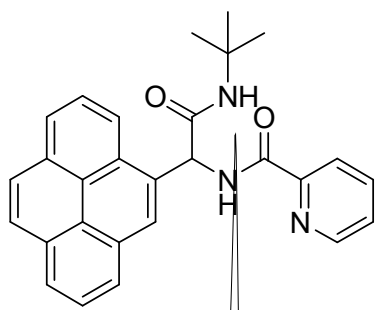
SpinWorks 4: AD 2267 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 51

8.1889  
8.2011  
8.2065  
8.2216  
8.2430

8.0934  
8.0536  
8.0654  
8.0110  
8.0302

7.6842  
7.7032  
7.7186  
7.7221

7.2829  
7.3098  
7.3276  
7.3382

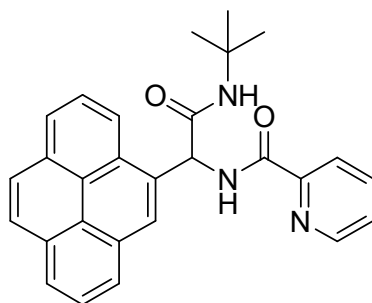


SpinWorks 4: AD 2267 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 51

6.4428  
6.4609



5.9122



**4e**

1.3034



8.758



PPM

6.0

5.0

4.0

3.0

2.0

31

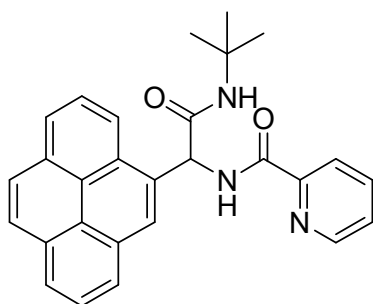
1.0

1.000

1.003

8.758

SpinWorks 4: AD 2267 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 51



4e

121.306  
122.084  
124.422  
125.427  
125.606  
125.707  
125.764  
125.788  
125.799  
128.868  
129.231  
130.256  
130.884  
131.627  
133.159  
137.029  
148.240  
149.351  
164.183  
169.320

76.742  
77.060  
77.378

51.889  
56.277

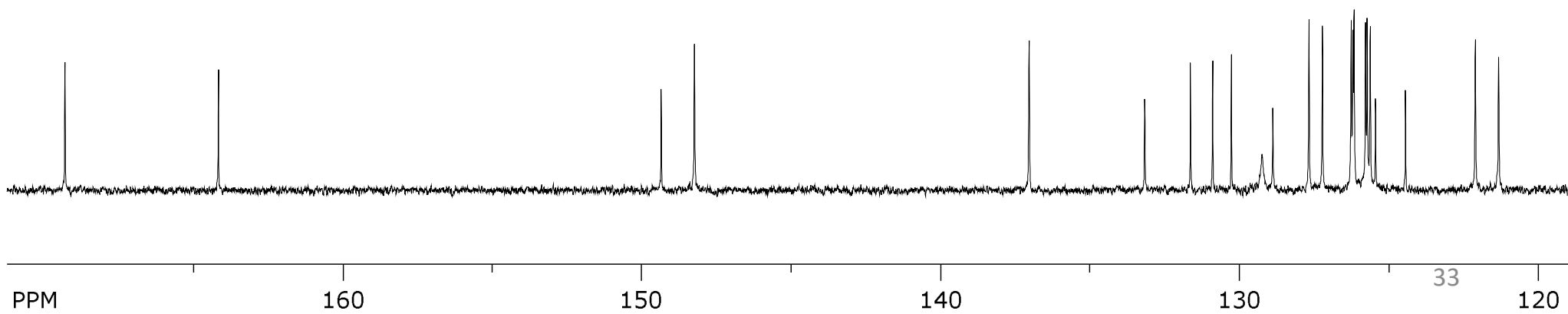
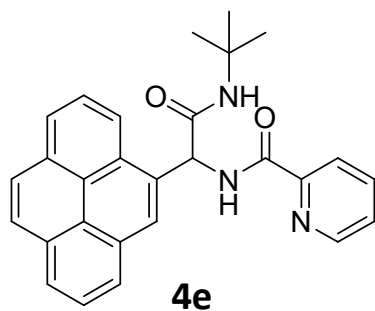
28.486

PPM 160 120 80 40 0 32



SpinWorks 4: AD 2267 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 51

169.320 —  
164.183 —  
148.240 —  
149.351 —  
137.029 —  
121.306 —  
122.084 —  
124.422 —  
125.427 —  
125.606 —  
125.707 —  
125.764 —  
126.146 —  
126.183 —  
126.245 —  
127.208 —  
127.659 —  
128.868 —  
129.231 —  
130.256 —  
130.884 —  
131.627 —  
133.159 —

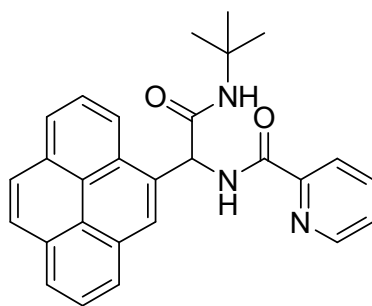


SpinWorks 4: AD 2267 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 51

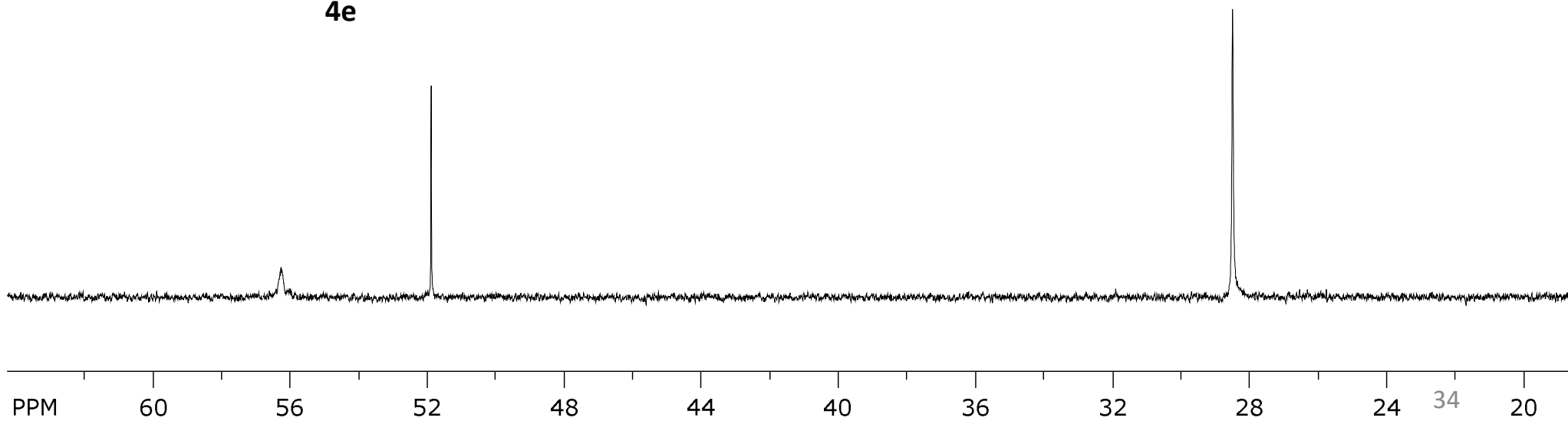
56.277

51.889

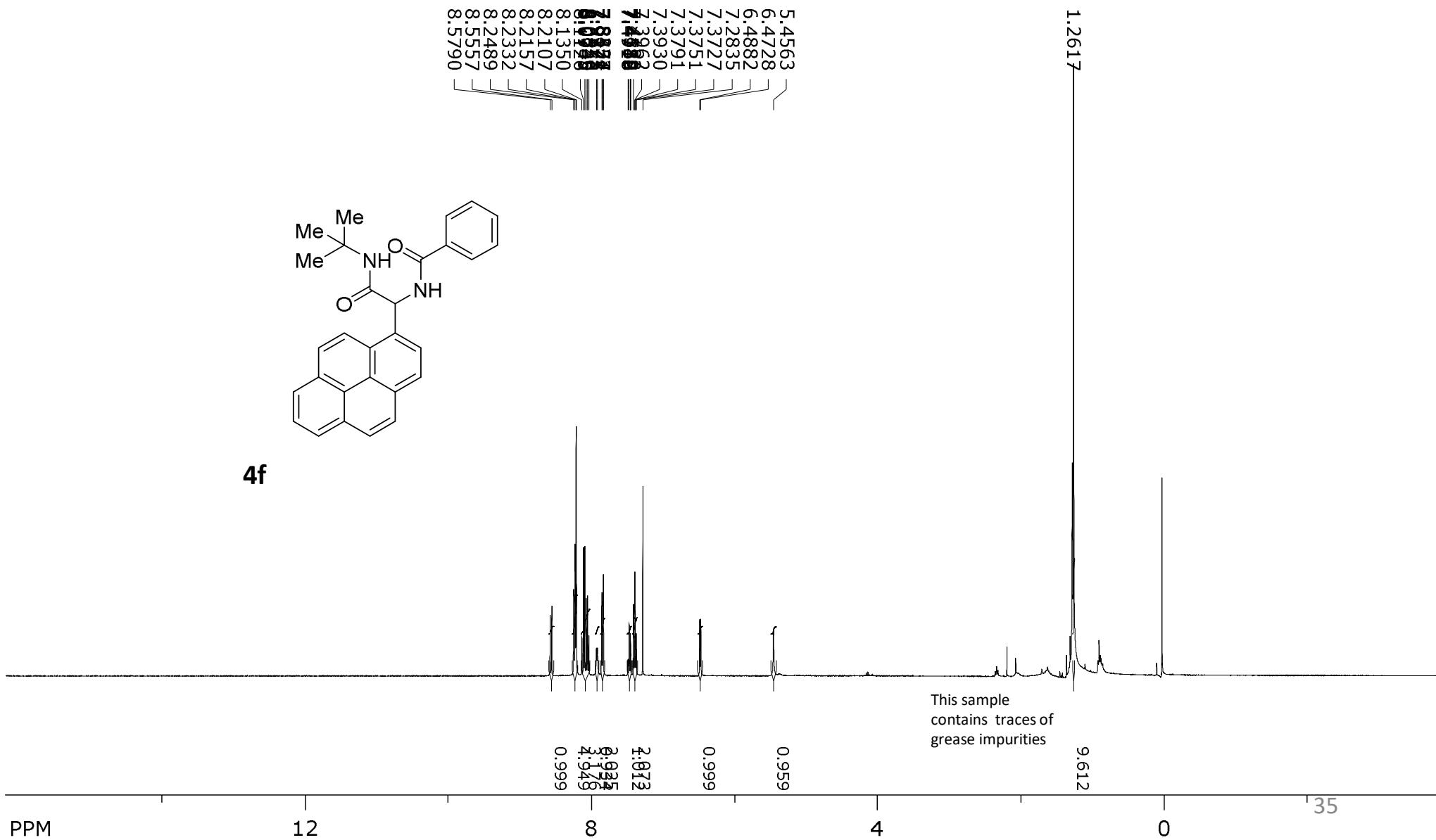
28.486



**4e**



SpinWorks 4: SUB 62  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55



SpinWorks 4: SUB 62  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

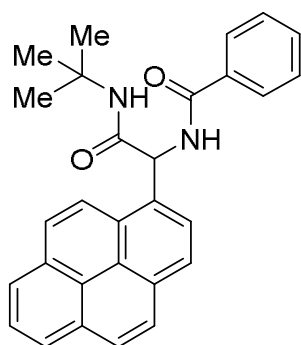
8.5790 —  
8.5557 —

8.2489 —  
8.2157 —  
8.2107 —

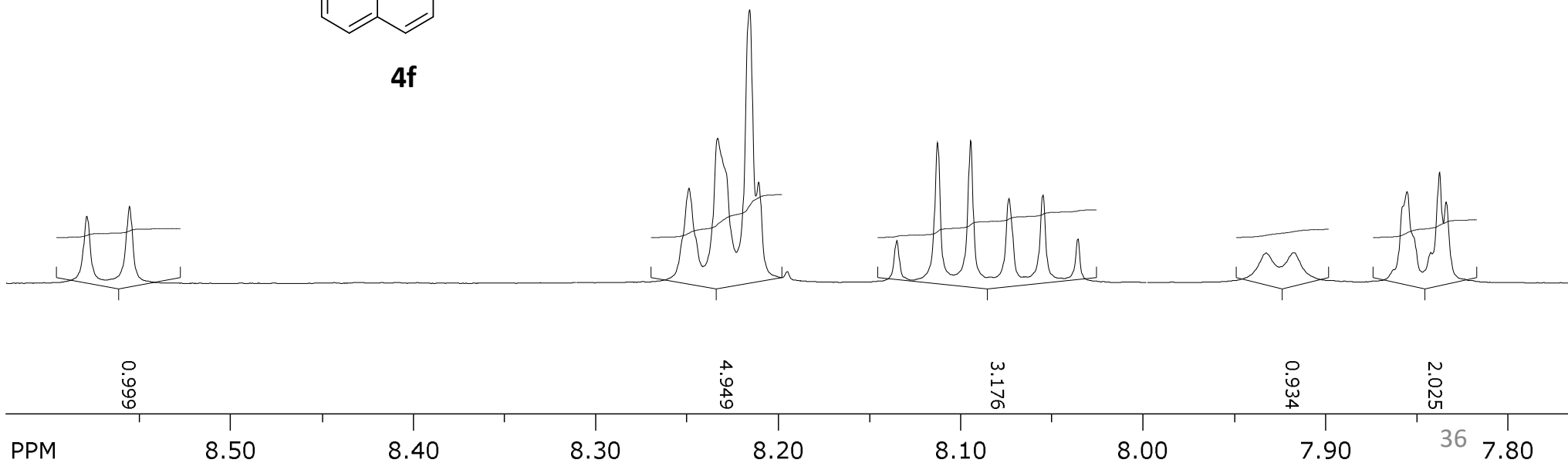
8.1350 —  
8.1126 —  
8.0945 —  
8.0735 —  
8.0549 —  
8.0356 —

7.9325 —  
7.9173 —

7.8337 —  
7.8374 —  
7.8422 —  
7.8551 —

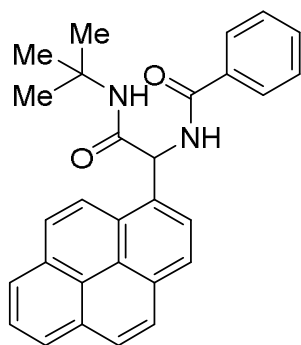


4f

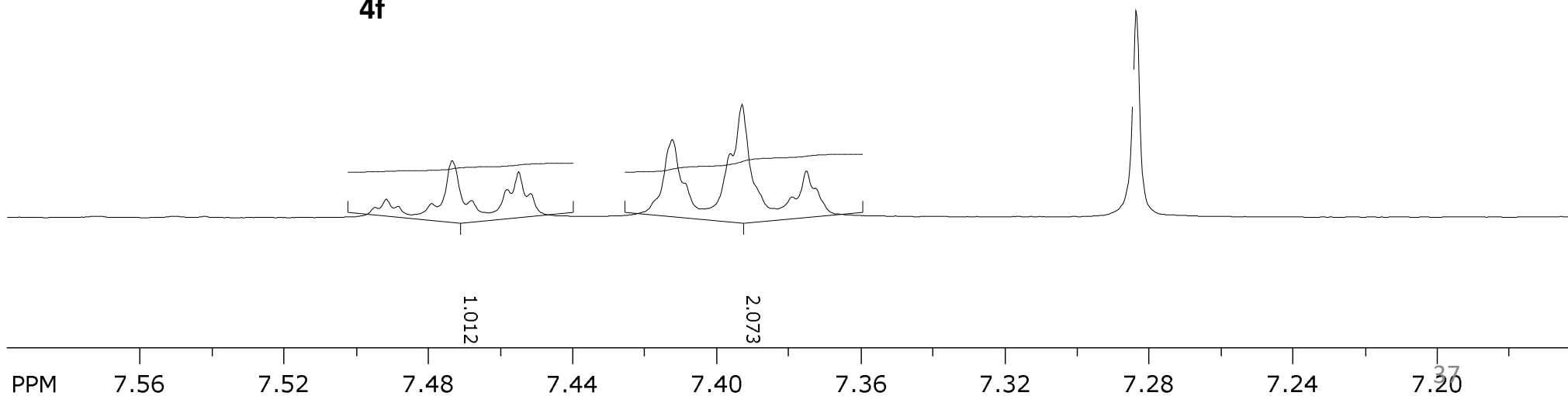


SpinWorks 4: SUB 62  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

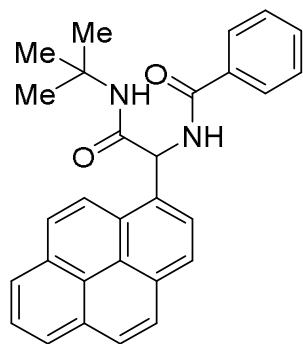
7.4518 —  
7.4550 —  
7.4582 —  
7.4735 —  
7.4918 —  
  
7.4123 —  
7.3930 —  
7.3962 —  
7.3727 —  
7.3751 —  
7.3791 —  
  
7.2835 —



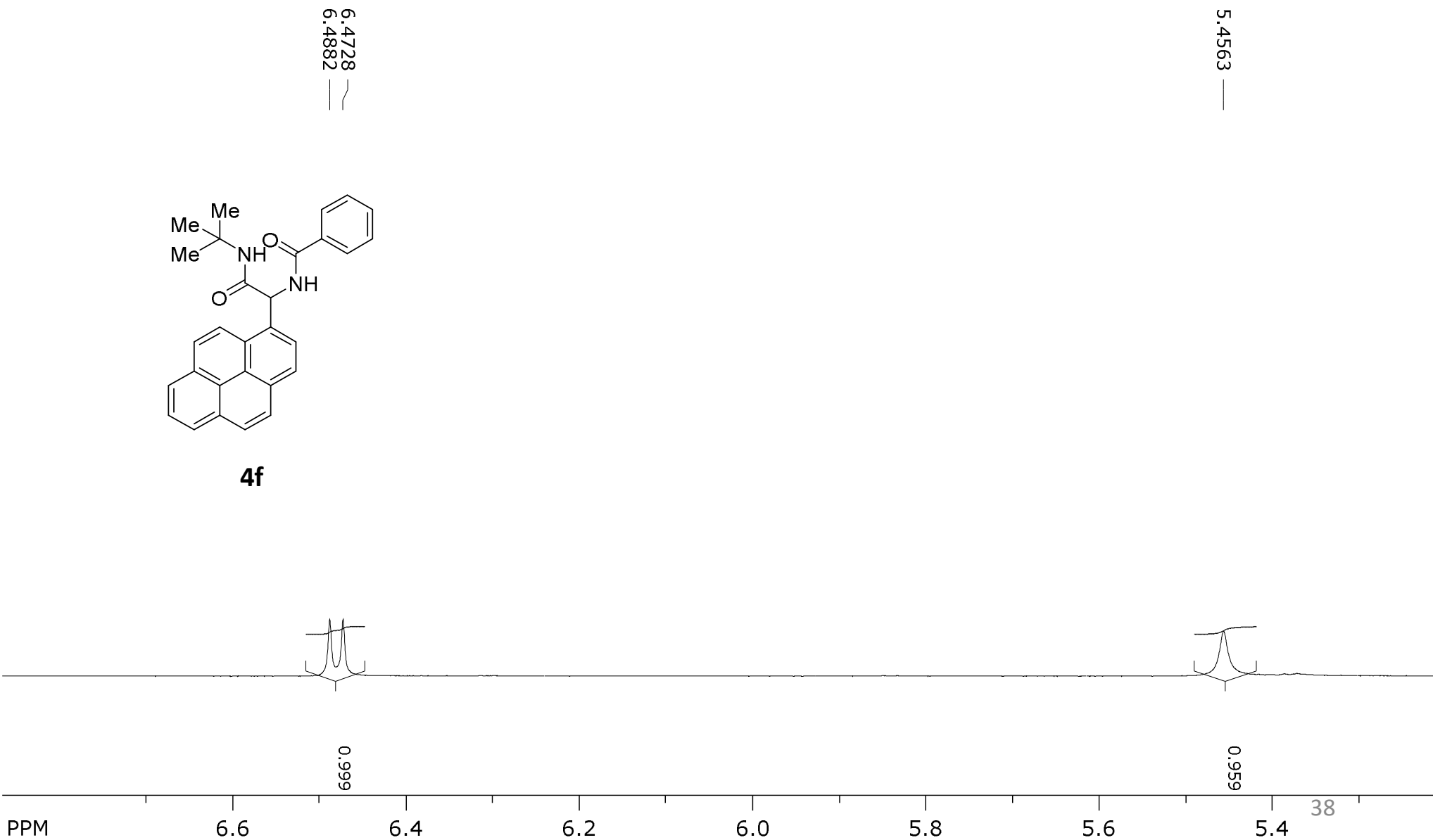
**4f**



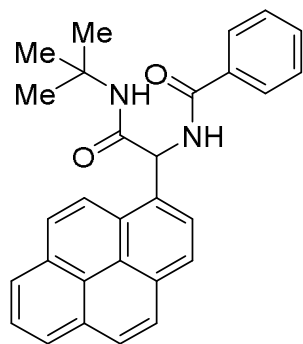
SpinWorks 4: SUB 62  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55



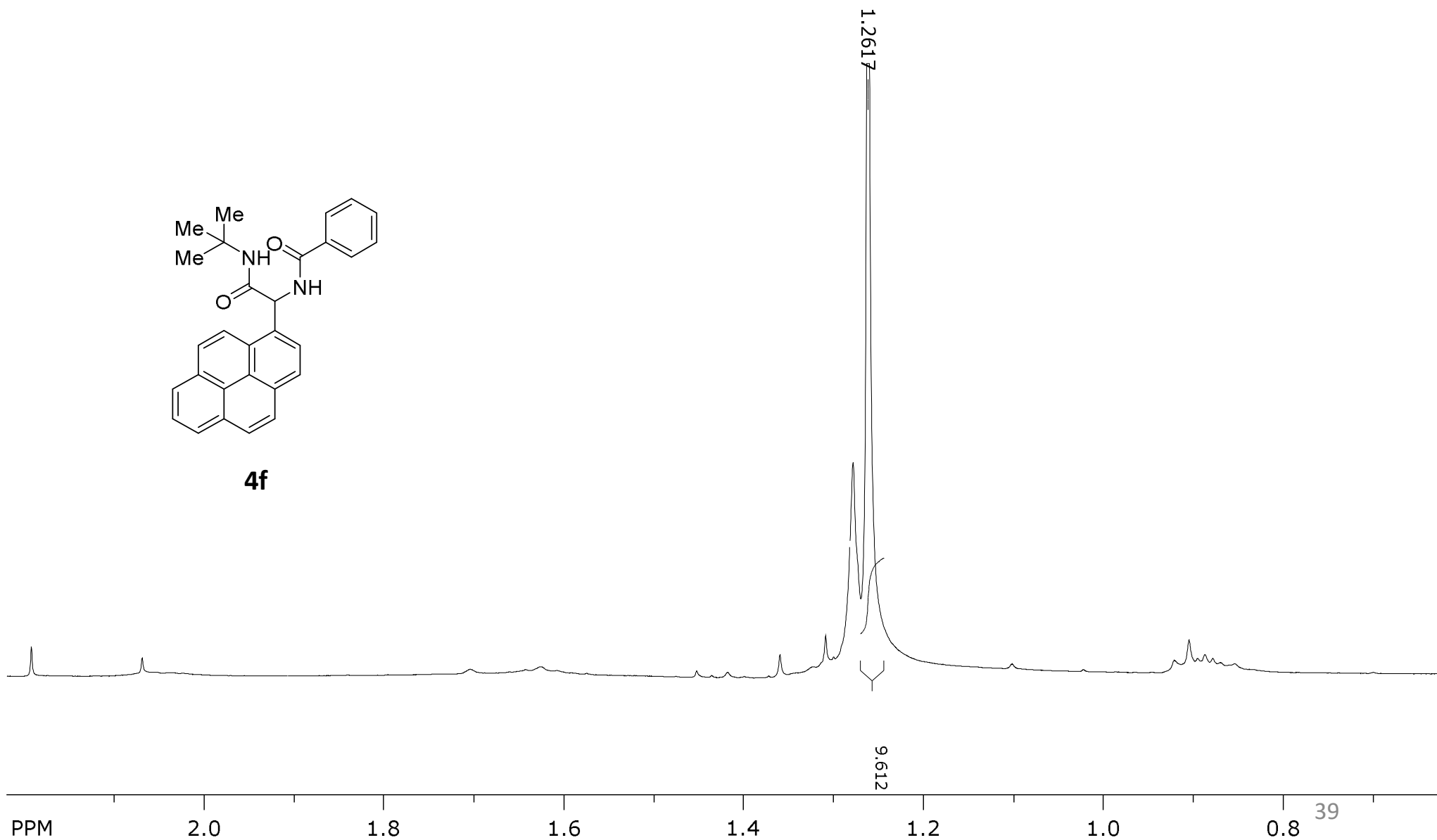
**4f**



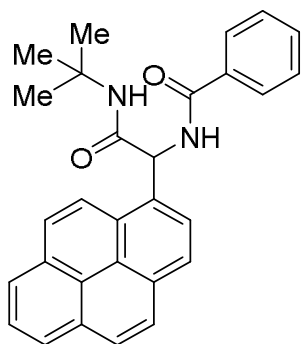
SpinWorks 4: SUB 62  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55



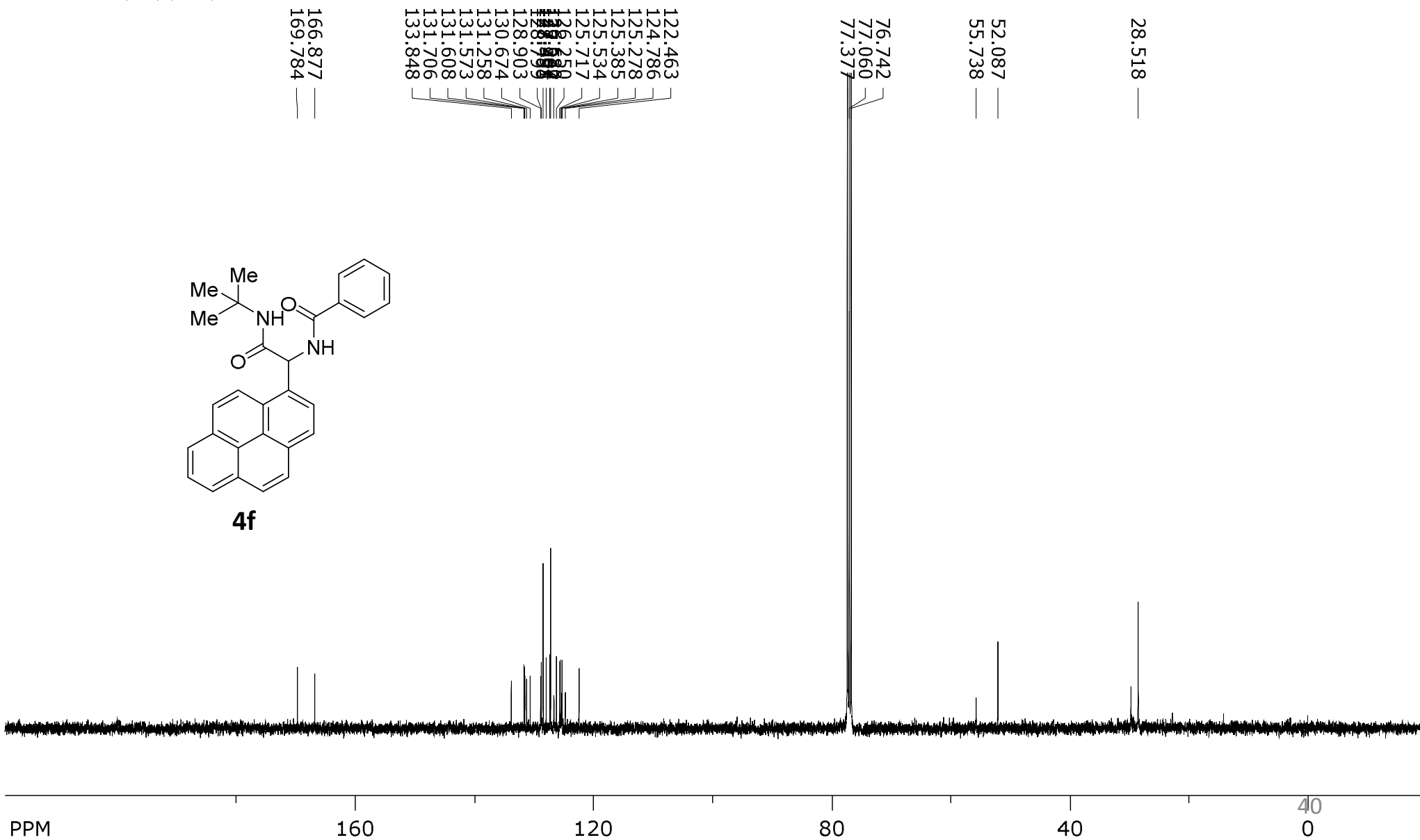
**4f**



SpinWorks 4: SUB 62  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

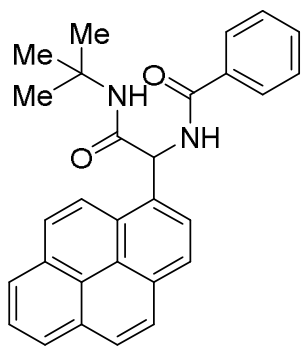
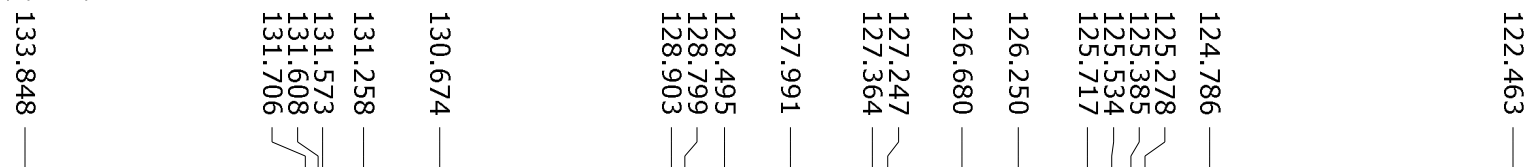


4f

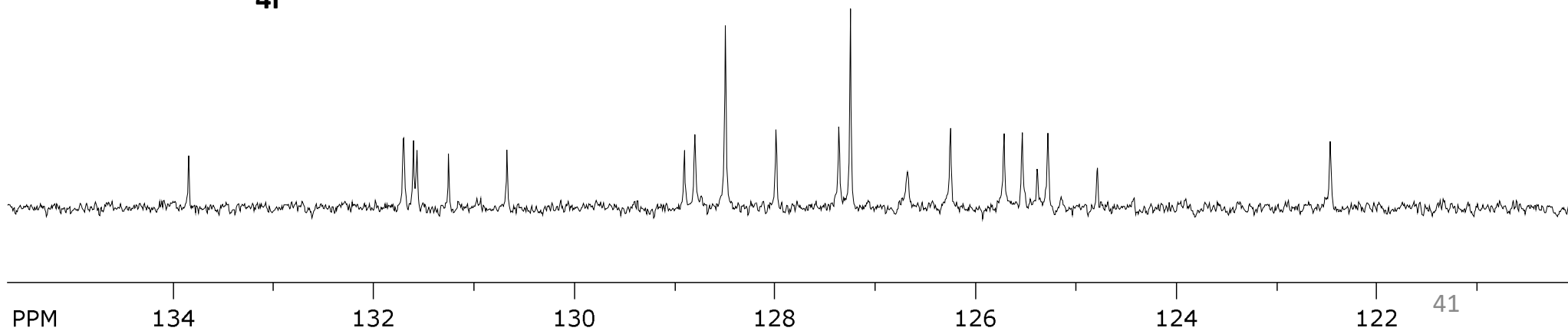




SpinWorks 4: SUB 62  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55



**4f**

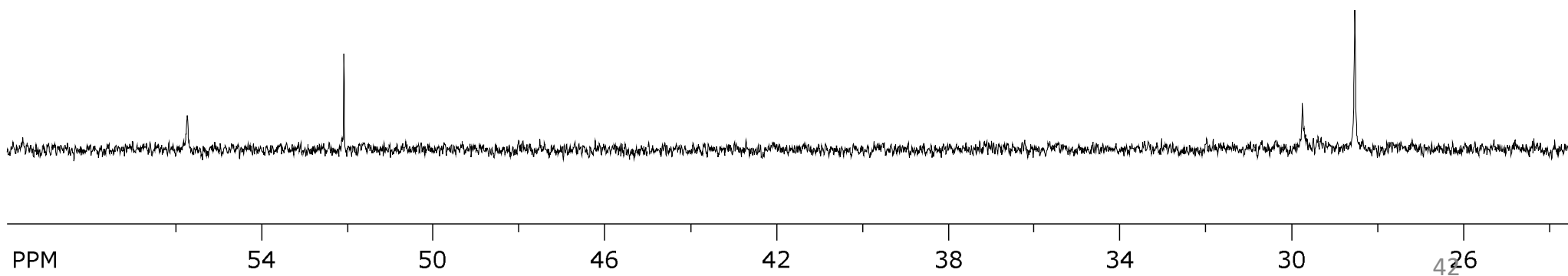
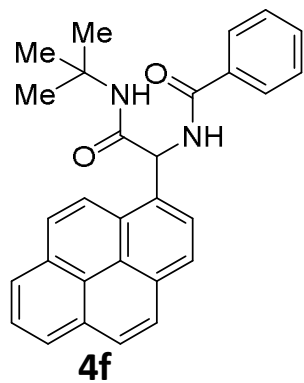


SpinWorks 4: SUB 62  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

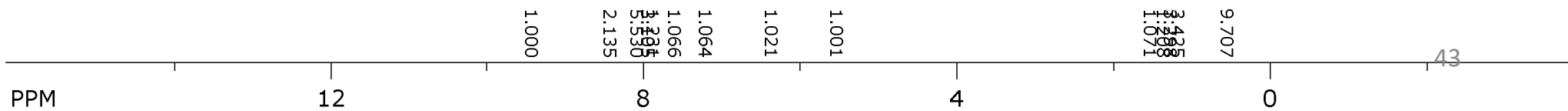
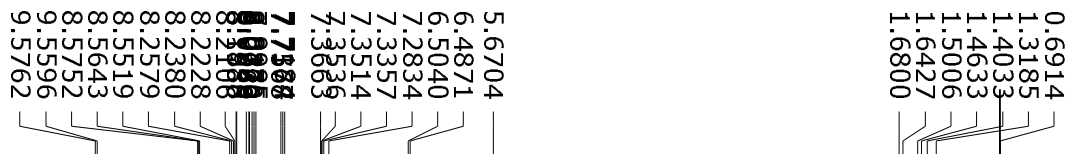
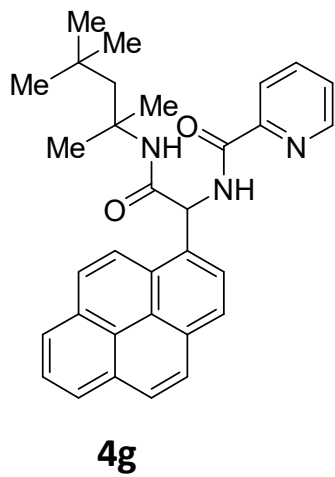
55.738 —

52.087 —

28.518 —



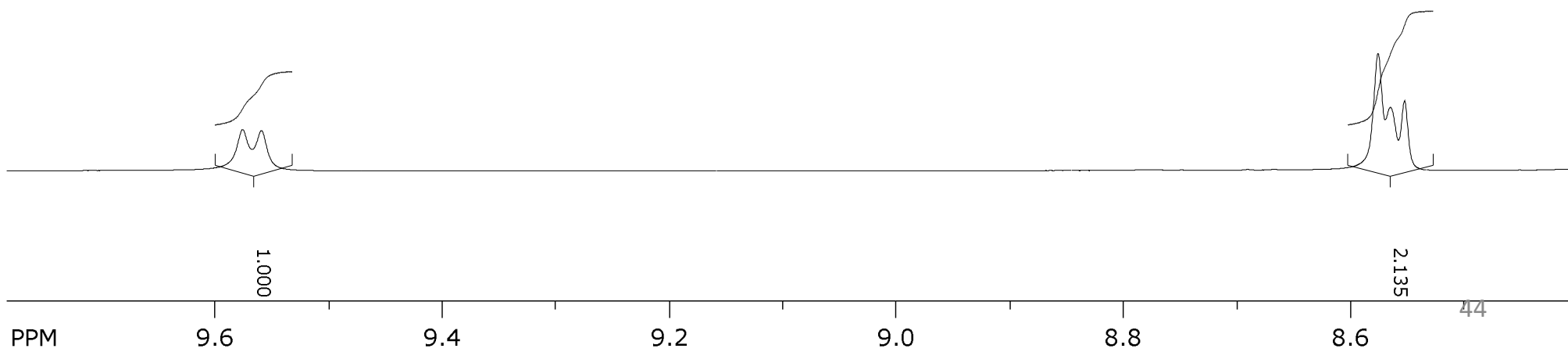
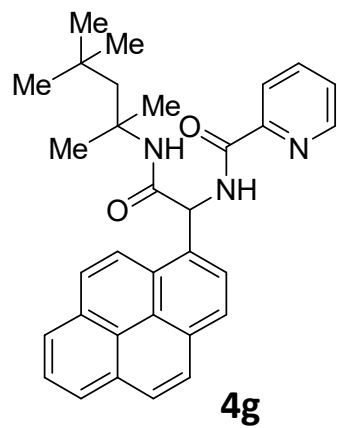
SpinWorks 4: AD-2252  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 2



SpinWorks 4: AD-2252  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 2

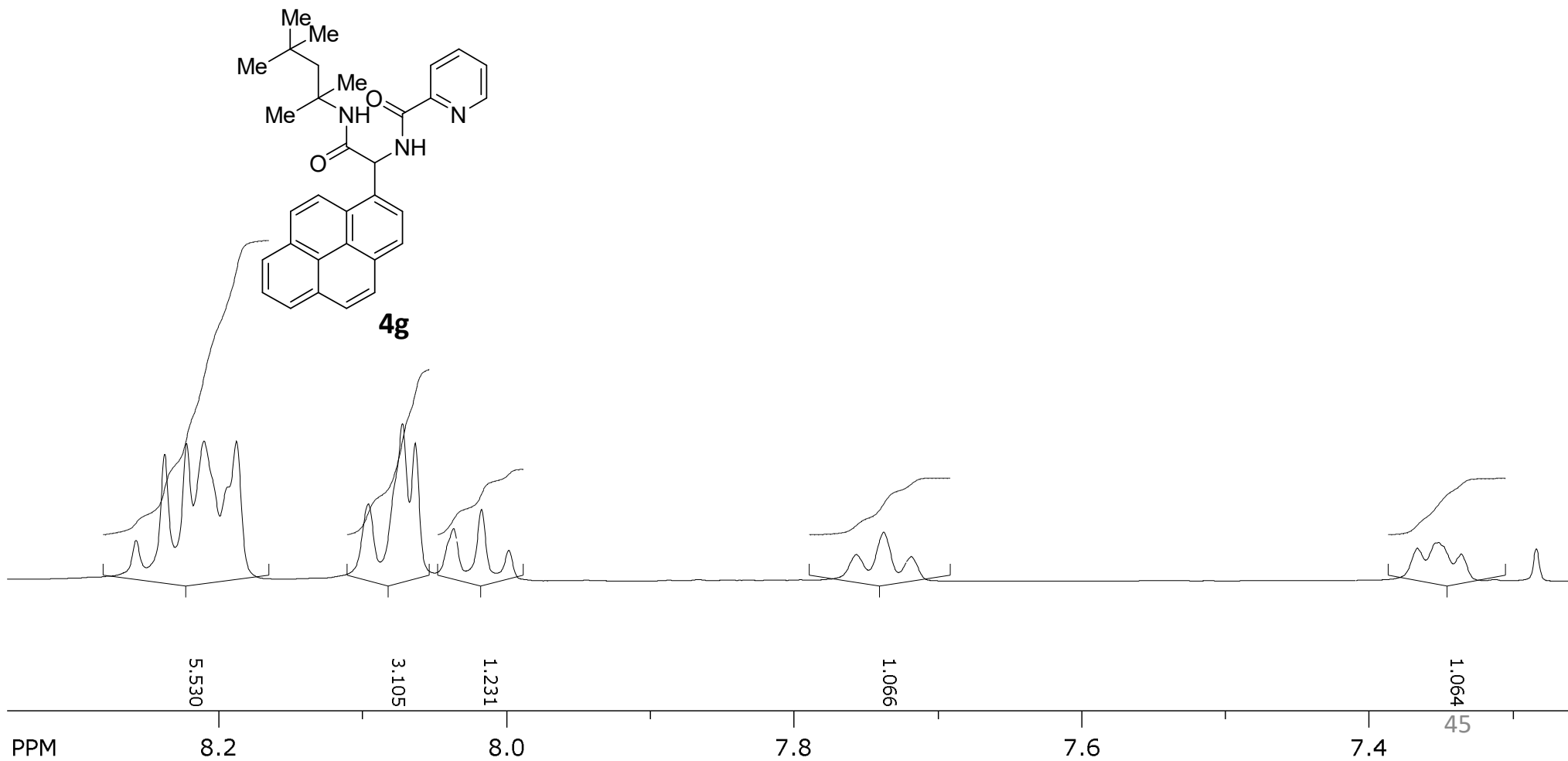
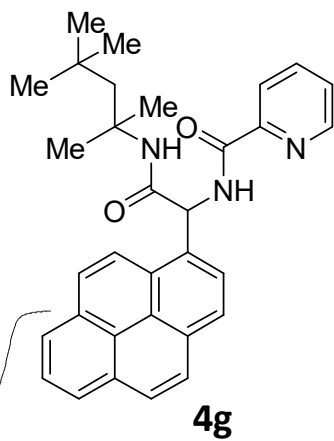
9.5596  
9.5762

8.5519  
8.5643  
8.5752



SpinWorks 4: AD-2252  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 2

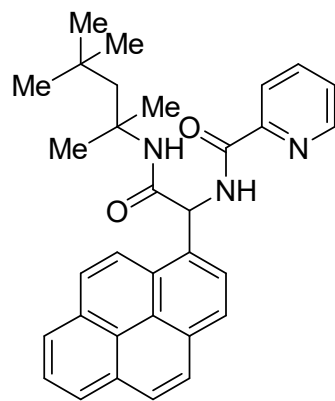
8.1880	8.0963	7.9985	7.7184	7.3357	7.2834
8.1938	8.0636	8.0175	7.7377	7.3514	
8.2106	8.0726	8.0370	7.7568	7.3536	
8.2228				7.3663	
8.2380					
8.2579					



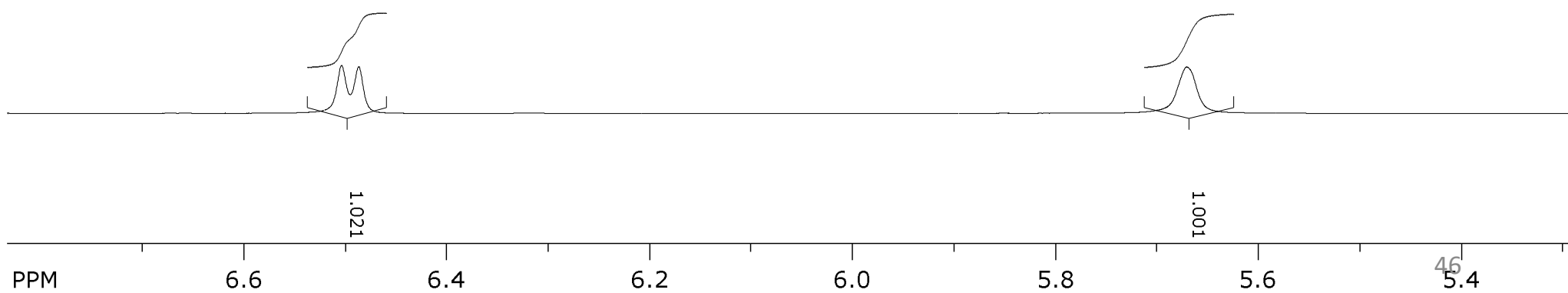
SpinWorks 4: AD-2252  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 2

6.4871  
6.5040

5.6704

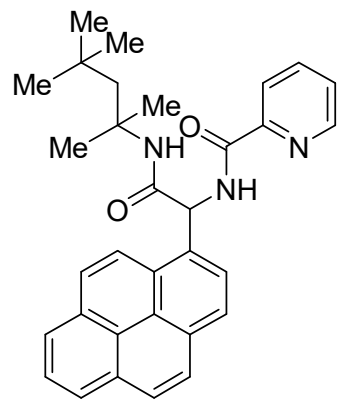


**4g**



SpinWorks 4: AD-2252  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 2

1.6800  
1.6427  
1.5006  
1.4633  
1.4033  
1.3185



4g

0.6914

1.071

1.208

3.298

3.425

9.707

PPM

1.6

1.4

1.2

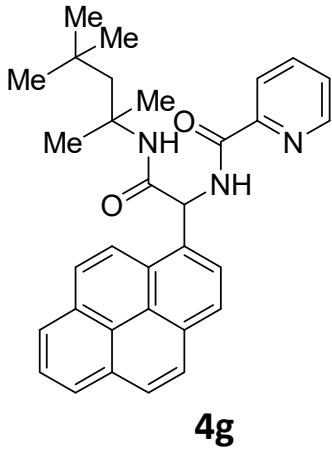
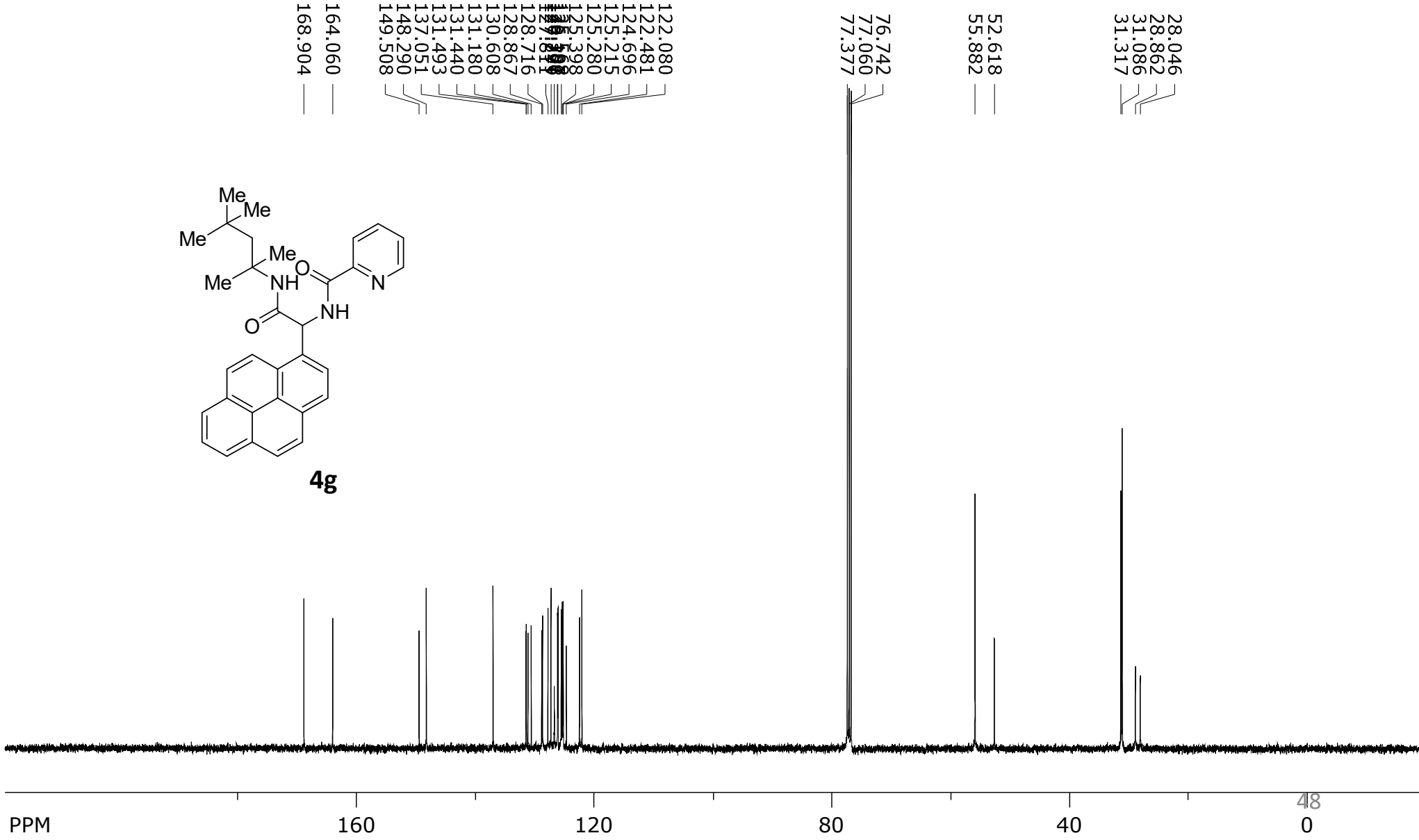
1.0

0.8

0.6

47

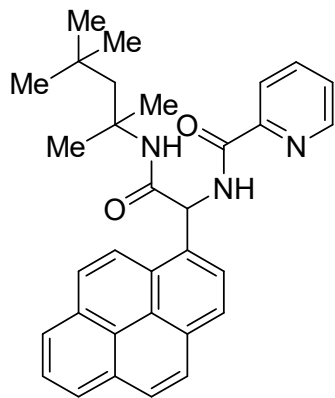
SpinWorks 4: AD-2252  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 2



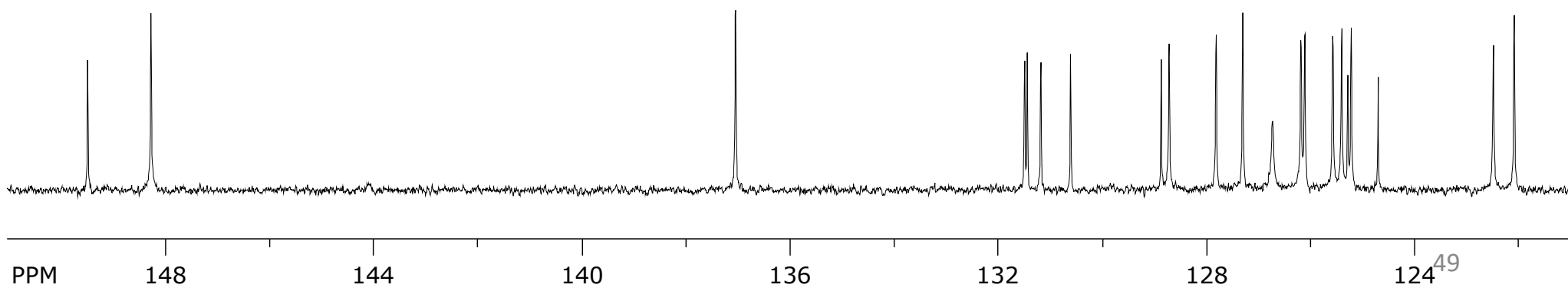


SpinWorks 4: AD-2252  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 2

149.508 —  
148.290 —  
137.051 —  
131.493 —  
131.440 —  
131.180 —  
130.608 —  
128.867 —  
128.716 —  
127.811 —  
127.299 —  
126.726 —  
126.181 —  
126.107 —  
125.568 —  
125.398 —  
125.280 —  
125.215 —  
124.696 —  
122.481 —  
122.080 —



**4g**





SpinWorks 4: AD-2253  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 3

9.4159  
9.4339

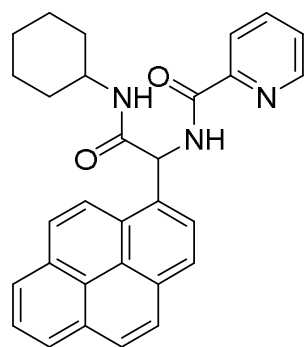
8.5647  
8.5877

8.4453

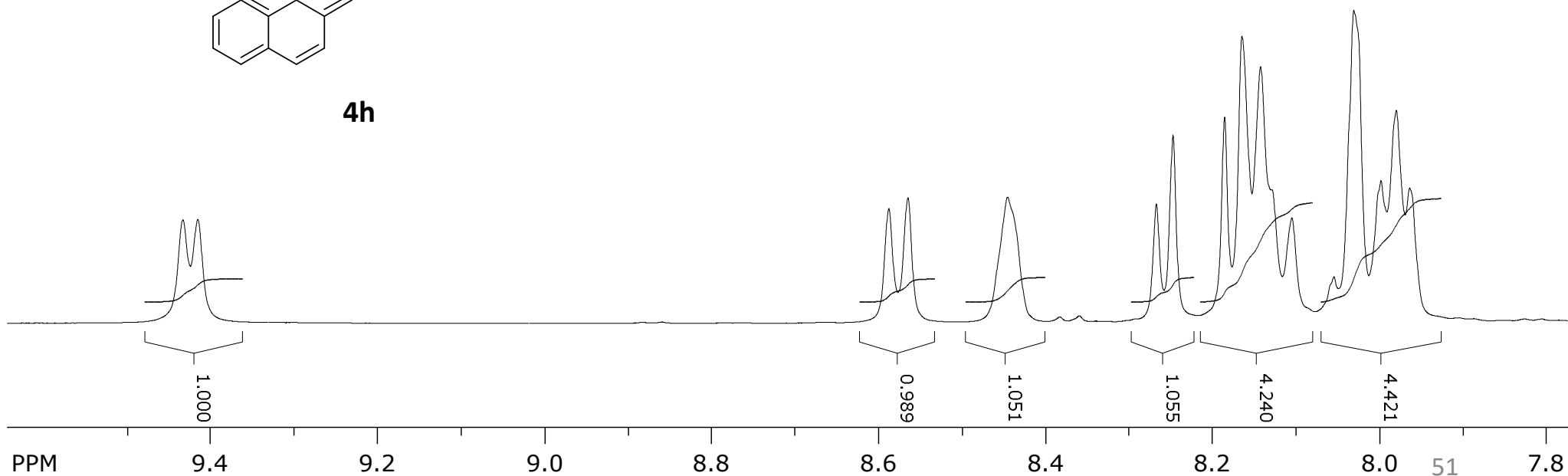
8.2470  
8.2669

8.1852  
8.1642  
8.1420  
8.1285

8.1044  
8.0304  
8.0540  
7.9976  
7.9792  
7.9632



**4h**



SpinWorks 4: AD-2253  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 3

7.6131  
7.6237



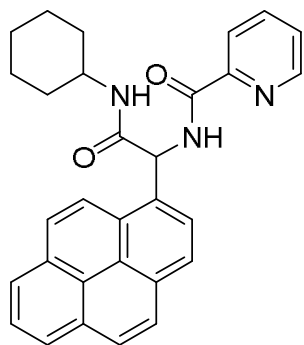
7.2350  
7.2417  
7.2503  
7.2829



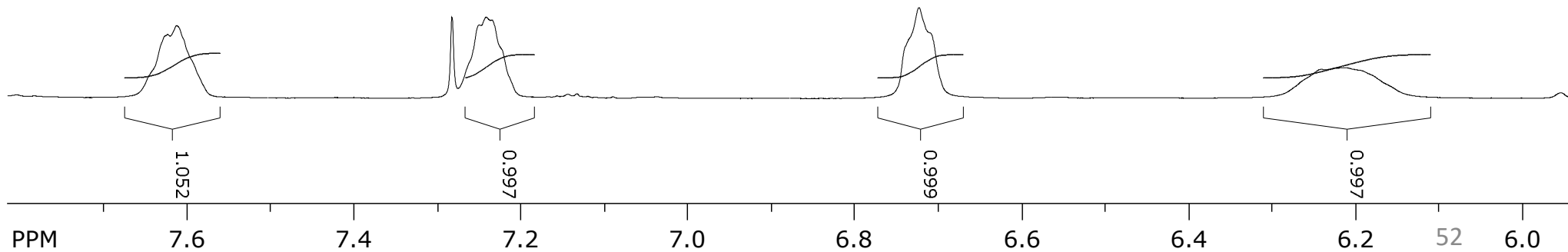
6.7066  
6.7236  
6.7408



6.2137  
6.2440

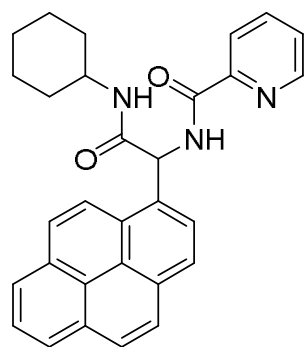


**4h**

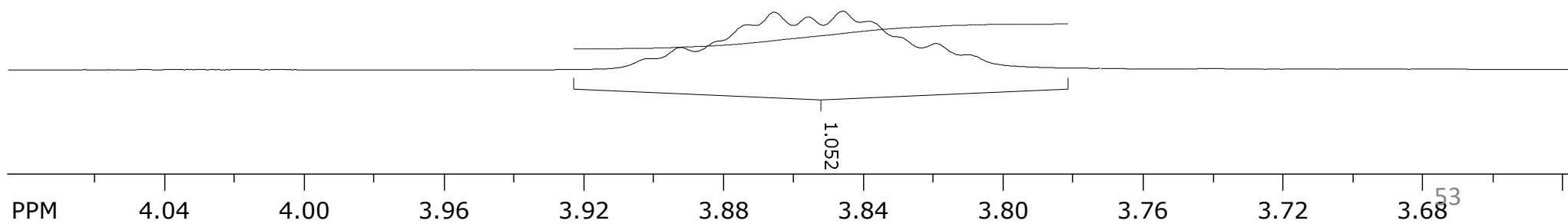


SpinWorks 4: AD-2253  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 3

3.8923 —  
3.8731 —  
3.8656 —  
3.8558 —  
3.8459 —  
3.8384 —  
3.8192 —



**4h**



SpinWorks 4: AD-2253  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 3

1.8856  
1.9120

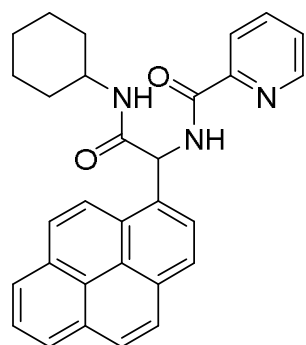
1.7055  
1.7226  
1.7334

1.5454  
1.5775  
1.5782

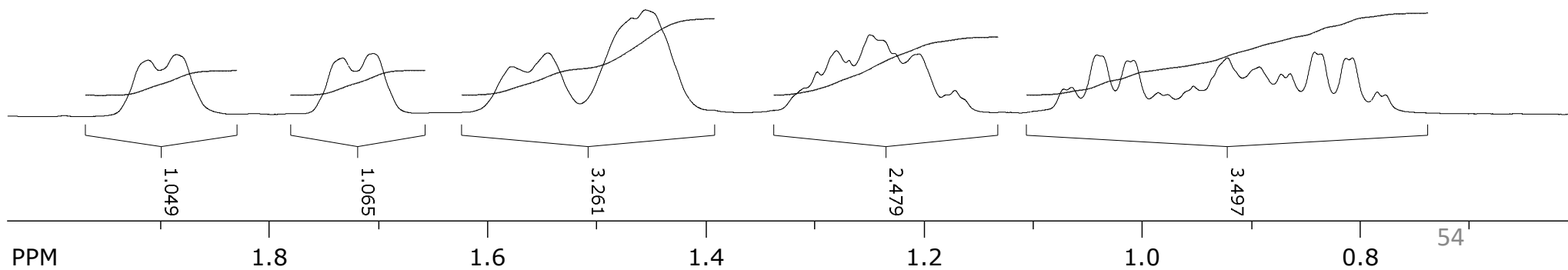
1.4554  
1.4685

1.1717  
1.1785  
1.1792  
1.2046  
1.2271  
1.2386  
1.2498  
1.2690  
1.2804  
1.2980

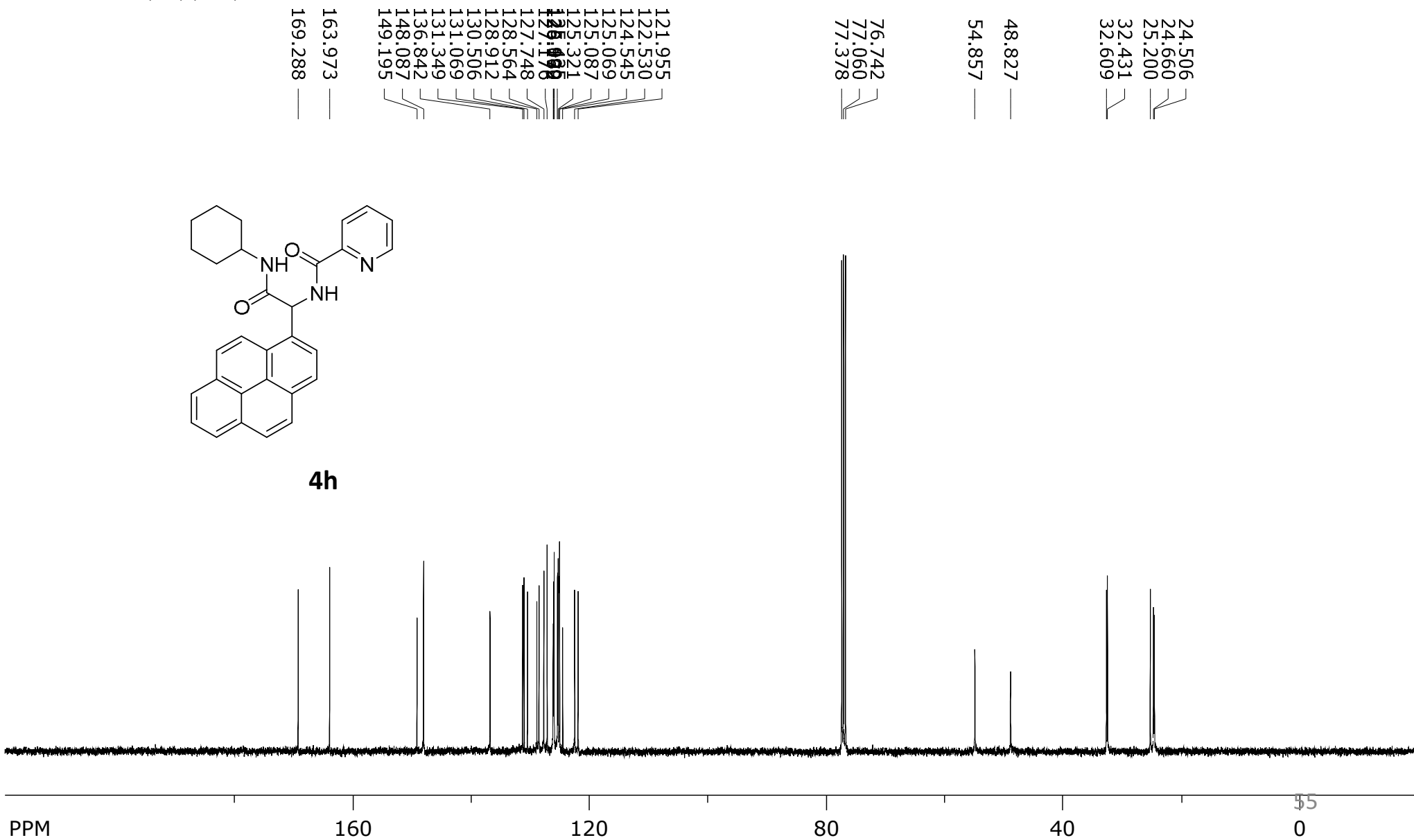
0.7767  
0.7843  
0.8070  
0.8128  
0.8362  
0.8417  
0.8641  
0.8724  
0.8923  
0.9215  
0.9529  
0.9767  
0.9853  
1.0078  
1.0134  
1.0376  
1.0416  
1.0645  
1.0718



**4h**

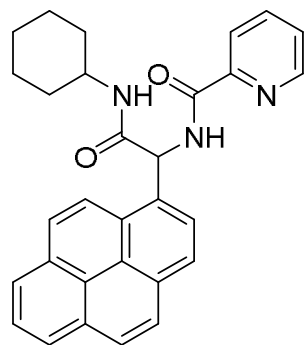


SpinWorks 4: AD-2253  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 3

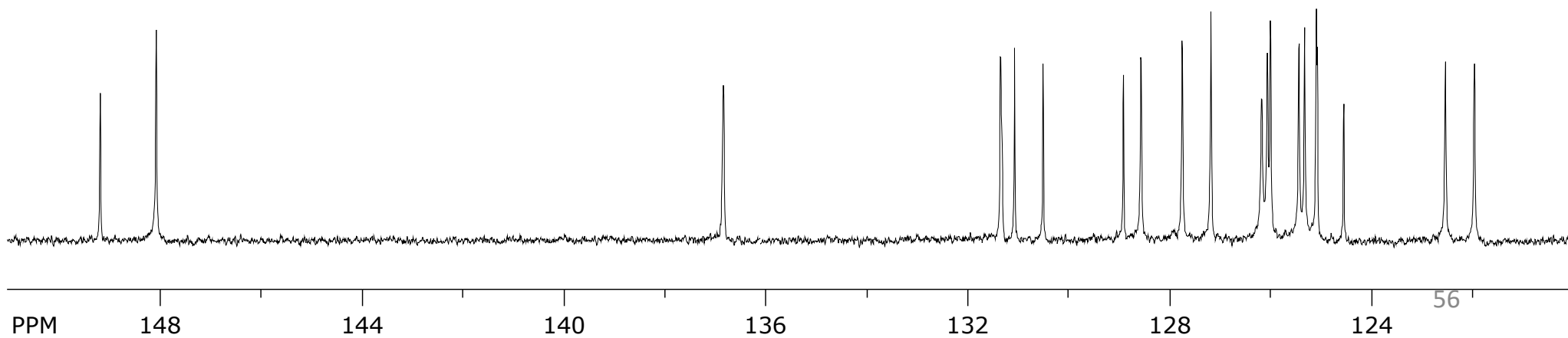


SpinWorks 4: AD-2253  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 3

149.195 —  
148.087 —  
136.842 —  
131.349 —  
131.069 —  
130.506 —  
128.912 —  
128.564 —  
127.748 —  
127.176 —  
126.172 —  
126.060 —  
125.999 —  
125.435 —  
125.321 —  
125.087 —  
125.069 —  
124.545 —  
122.530 —  
121.955 —



4h





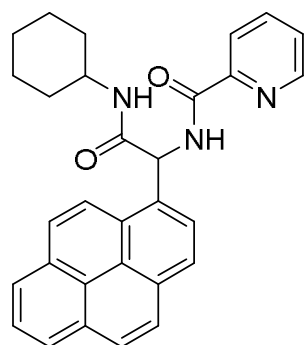
SpinWorks 4: AD-2253  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 3

54.857

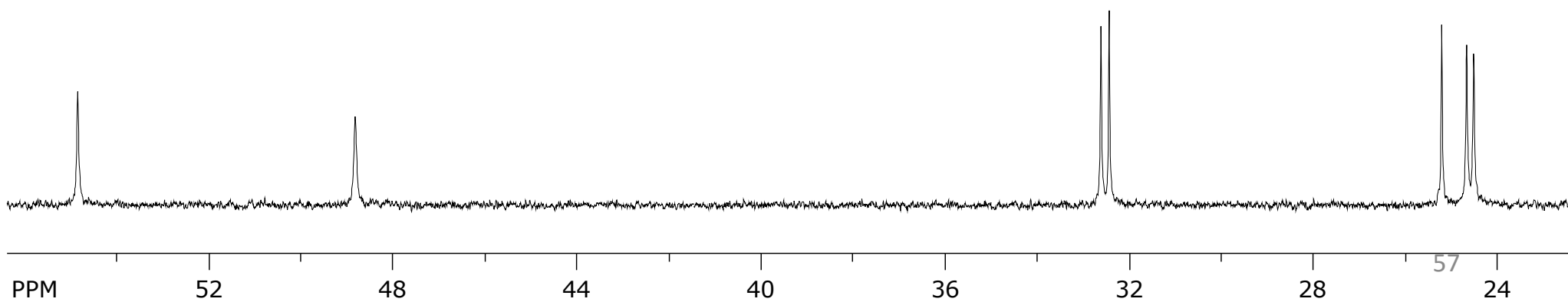
48.827

32.431  
32.609

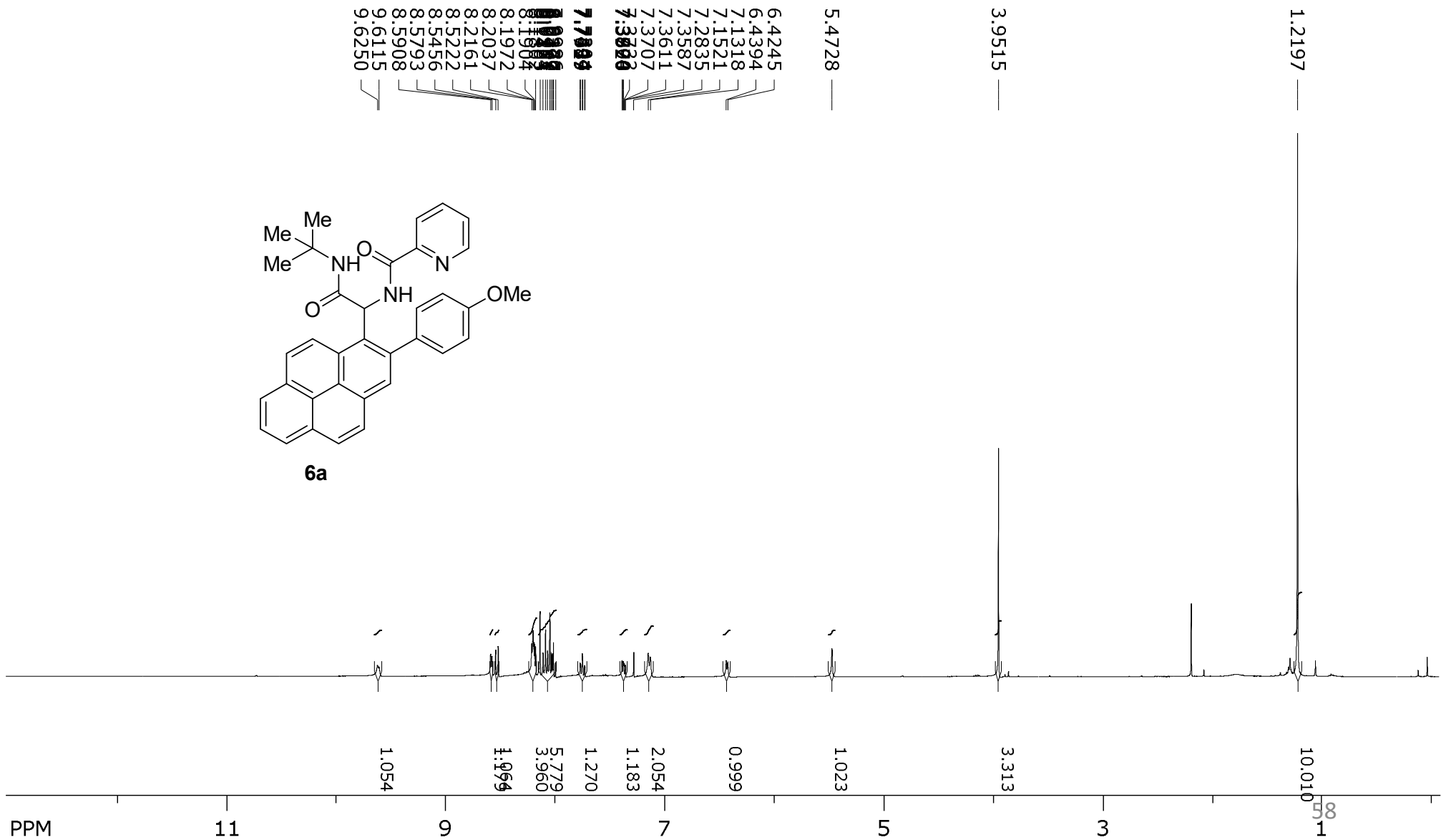
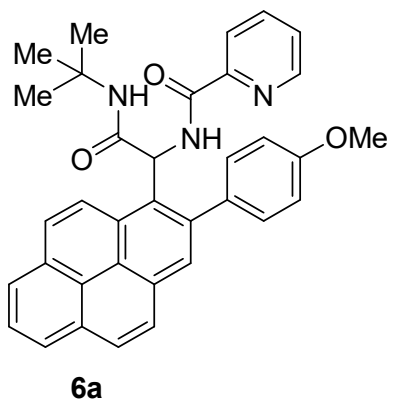
24.506  
24.660  
25.200



**4h**



SpinWorks 4: AD 1789  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 35



SpinWorks 4: AD 1789  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 35

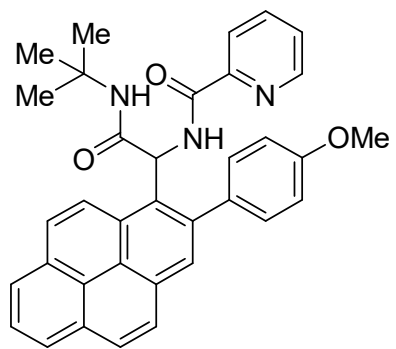
8.5222  
8.5456  
8.5793  
8.5908

7.9986  
8.0177  
8.0272  
8.0367  
8.0499  
8.0711  
8.0901  
8.1124  
8.1403  
8.1802  
8.1904  
8.1972  
8.2037  
8.2161

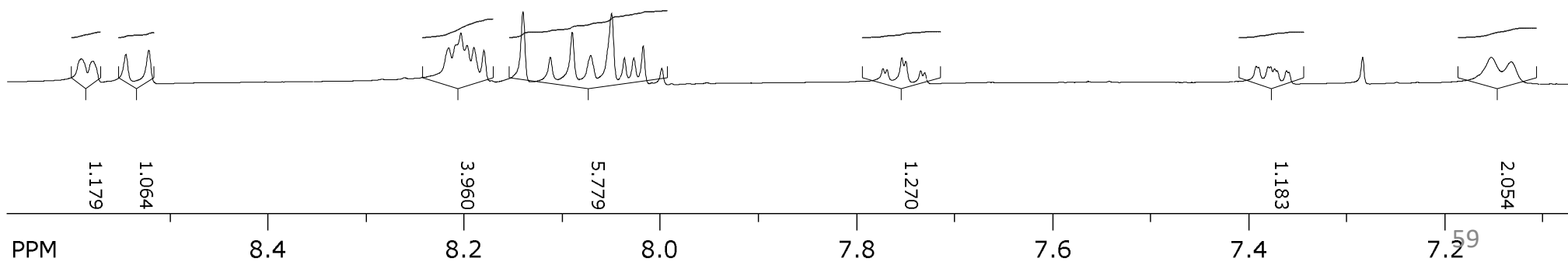
7.7304  
7.7344  
7.7497  
7.7537  
7.7689  
7.7729

7.2835  
7.3587  
7.3611  
7.3707  
7.3733  
7.3774  
7.3800  
7.3896  
7.3920

7.1318  
7.1521



6a





SpinWorks 4: AD 1789  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 35

149.698 —

148.312 —

141.009 —

137.075 —

133.964 —

131.121 —

131.031 —

130.456 —

129.501 —

129.144 —

128.696 —

128.272 —

127.436 —

127.225 —

126.143 —

125.619 —

125.513 —

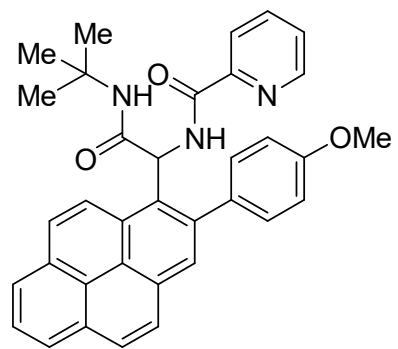
124.995 —

124.691 —

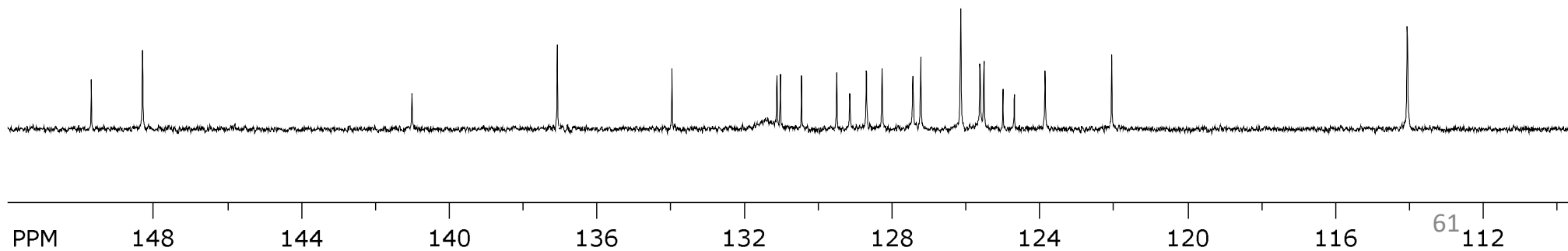
123.857 —

122.051 —

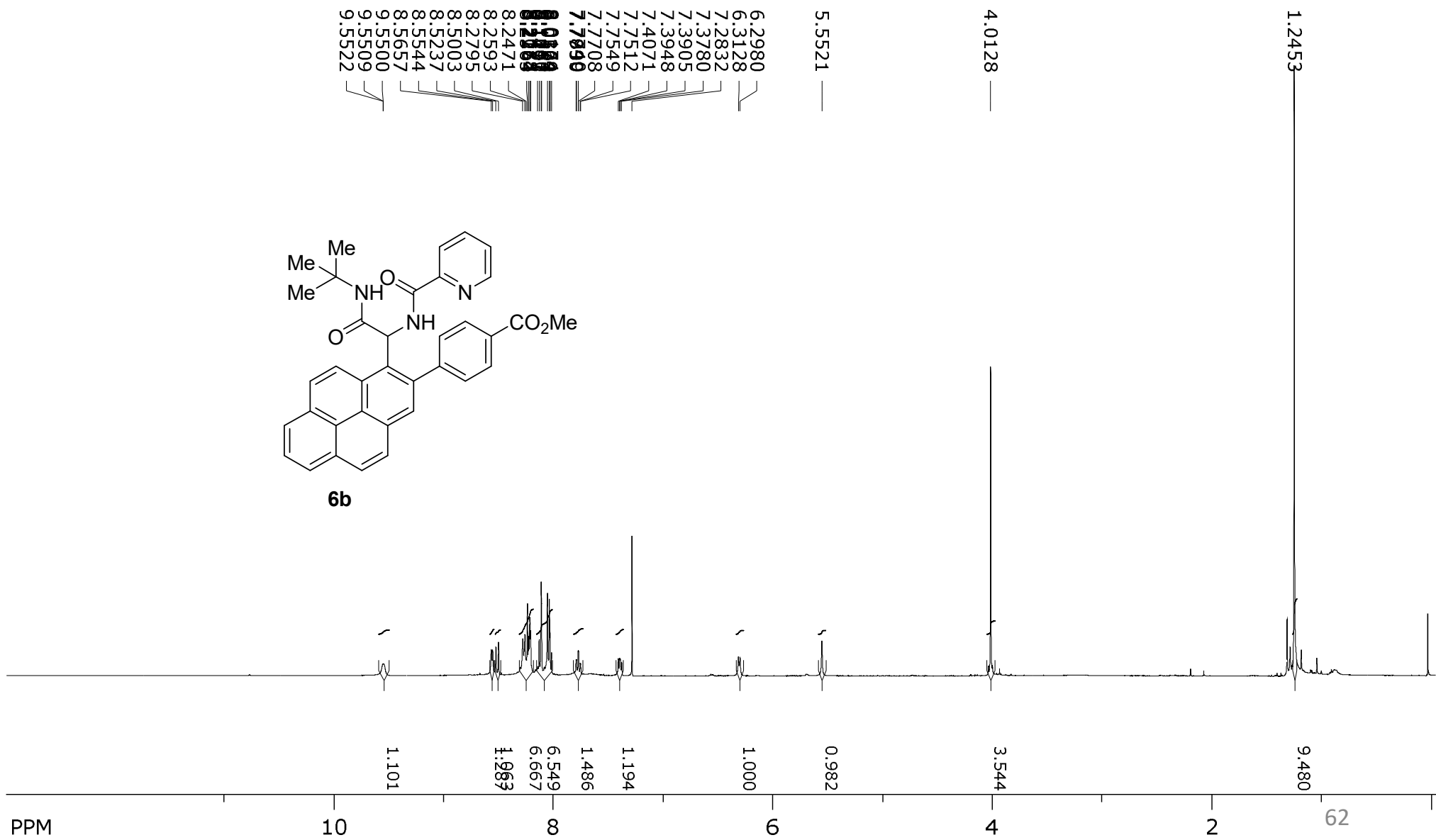
114.041 —



6a



SpinWorks 4: AD 1851 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 13



SpinWorks 4: AD 1851 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 13

8.5003  
8.5237  
8.5544  
8.5657

8.2078  
8.2152  
8.2264  
8.2363  
8.2471  
8.2593  
8.2795

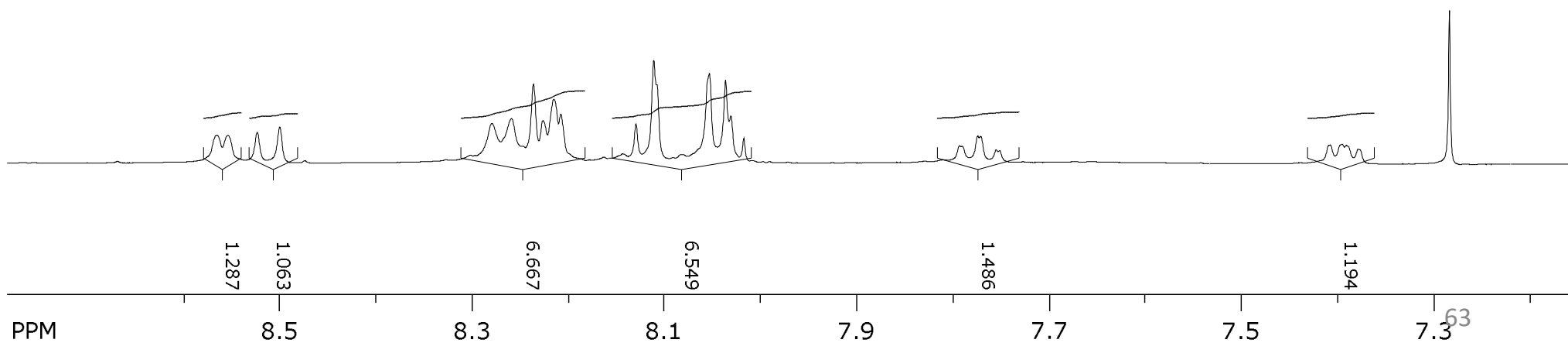
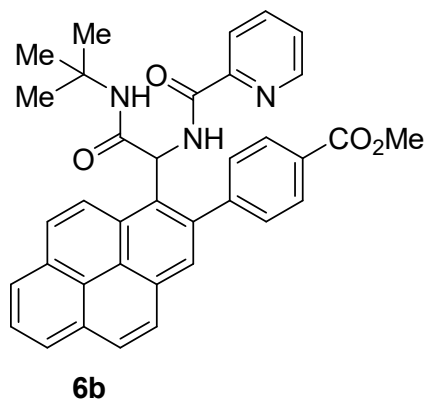
8.1080  
8.1111  
8.1297  
8.1433

8.0174  
8.0309  
8.0364  
8.0533

7.7512  
7.7549  
7.7708  
7.7740  
7.7899  
7.7930

7.3780  
7.3905  
7.3948  
7.4071

7.2832



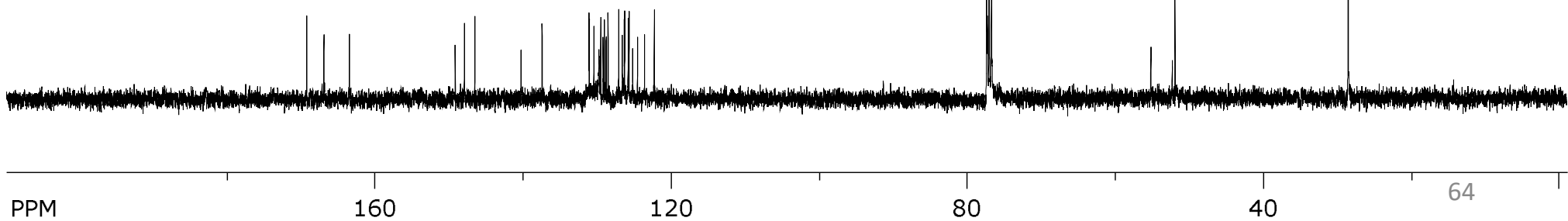
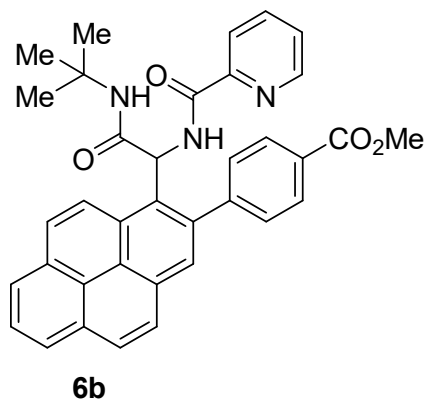
SpinWorks 4: AD-1851  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 16

163.536  
166.989  
169.305  
149.224  
147.980  
146.580  
140.334  
137.479  
131.143  
131.108  
130.490  
129.794  
129.775  
129.000  
128.980  
128.960  
125.854  
125.733  
125.228  
124.588  
123.632  
122.316

76.742  
77.059  
77.377

51.907  
52.260  
55.174

28.489





SpinWorks 4: AD-1851  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 16

140.334 —

137.479 —

131.108 —  
131.143 —

129.794 —  
129.775 —  
129.560 —  
129.236 —  
129.060 —  
128.828 —  
128.563 —

127.127 —

126.646 —

126.373 —

126.320 —

125.854 —

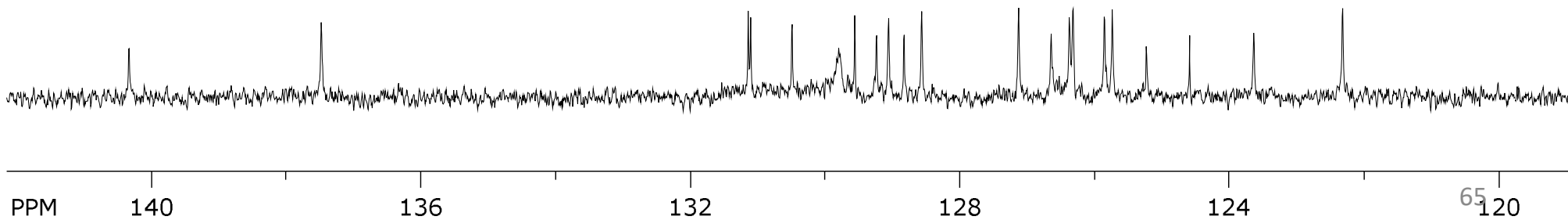
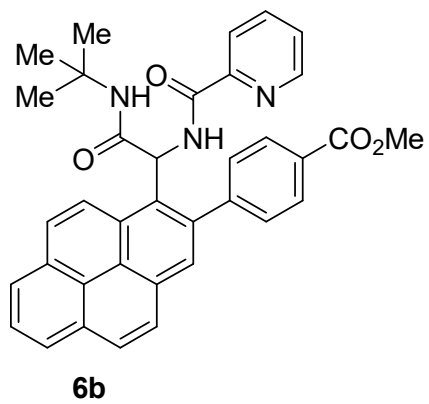
125.733 —

125.228 —

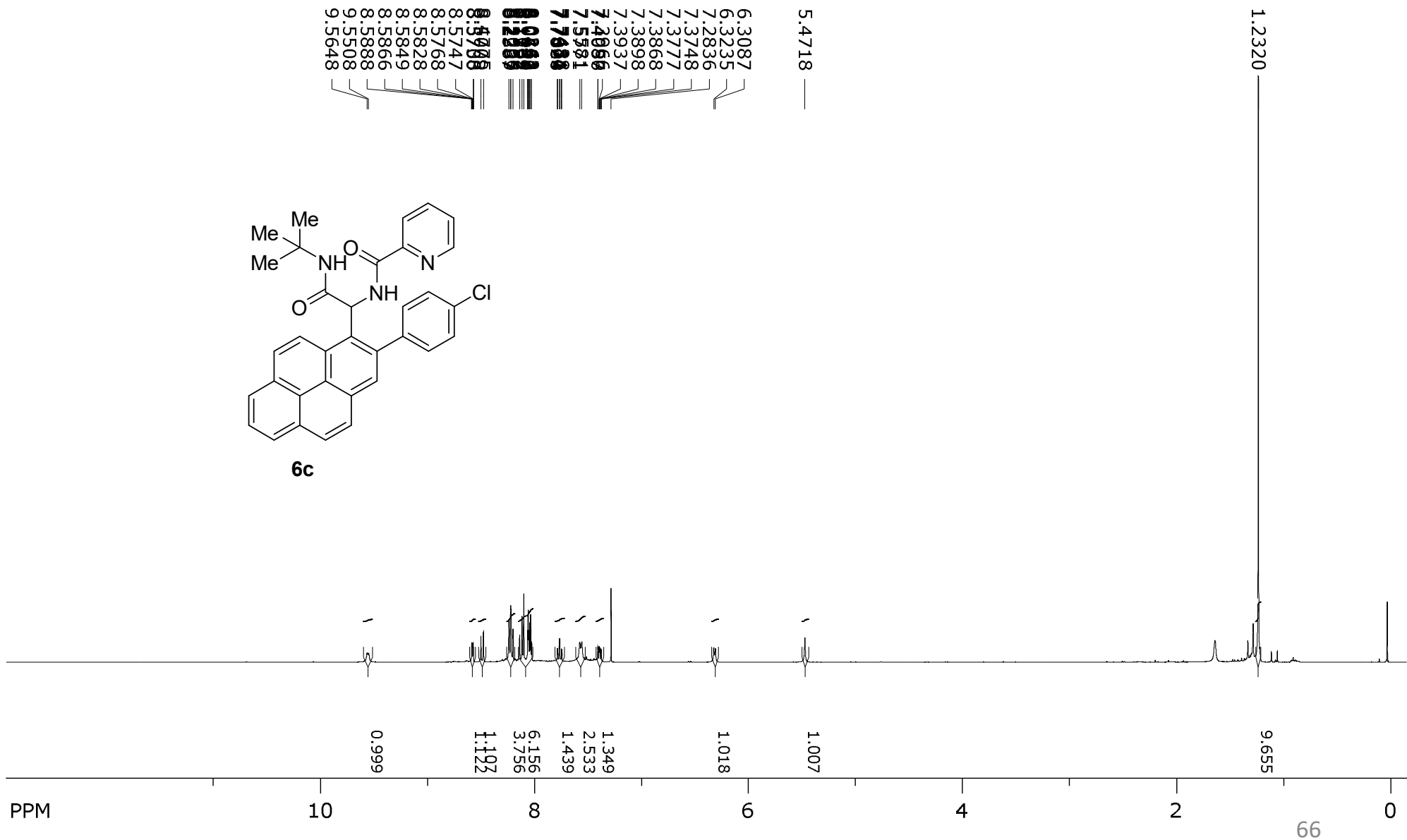
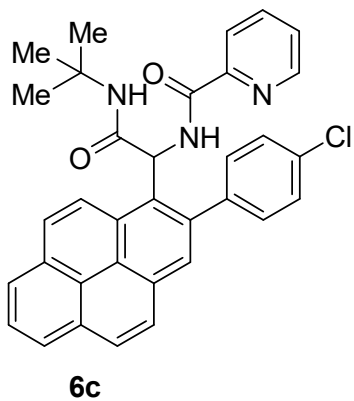
124.588 —

123.632 —

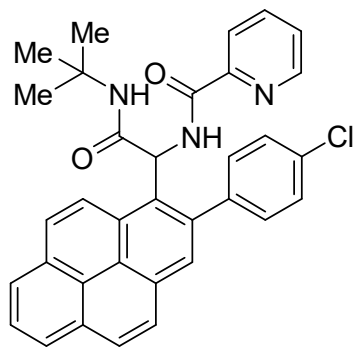
122.316 —



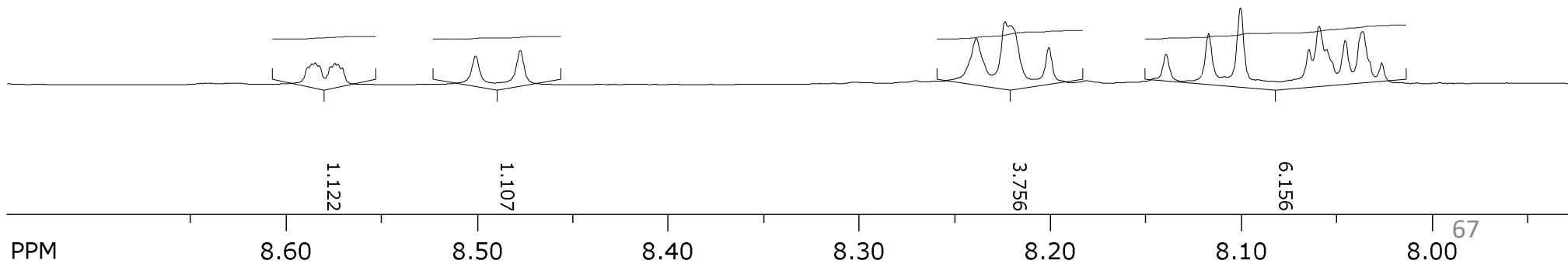
SpinWorks 4: AD 1813  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 23



SpinWorks 4: AD 1813  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 23



6c



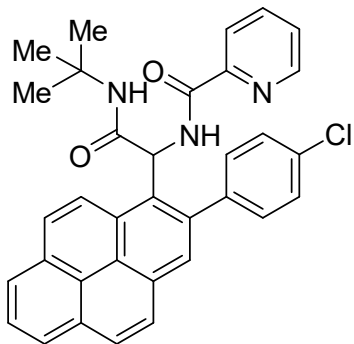
SpinWorks 4: AD 1813  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 23

7.7438  
7.7481  
7.7631  
7.7674  
7.7823  
7.7866

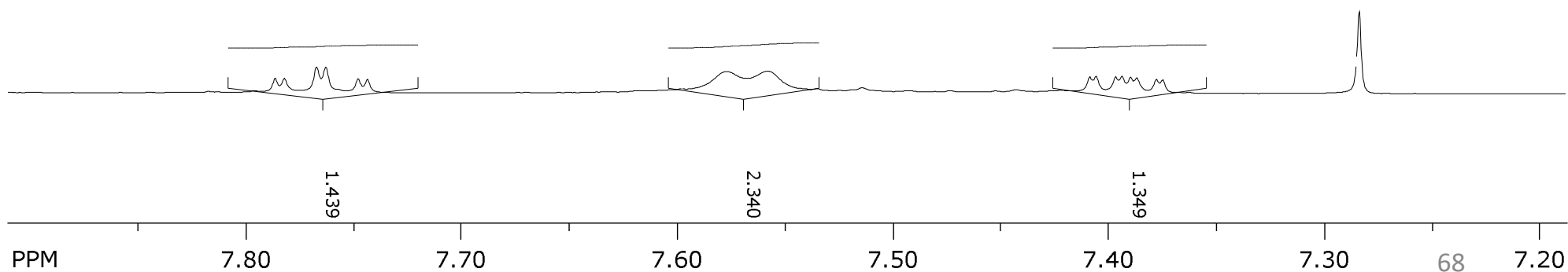
7.5581  
7.5771

7.3748  
7.3777  
7.3868  
7.3898  
7.3937  
7.3966  
7.4057  
7.4086

7.2836



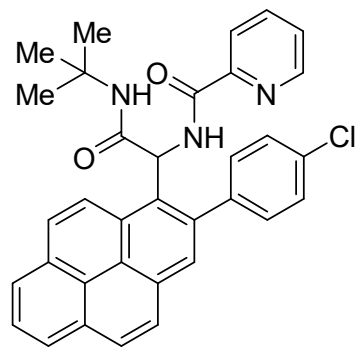
6c



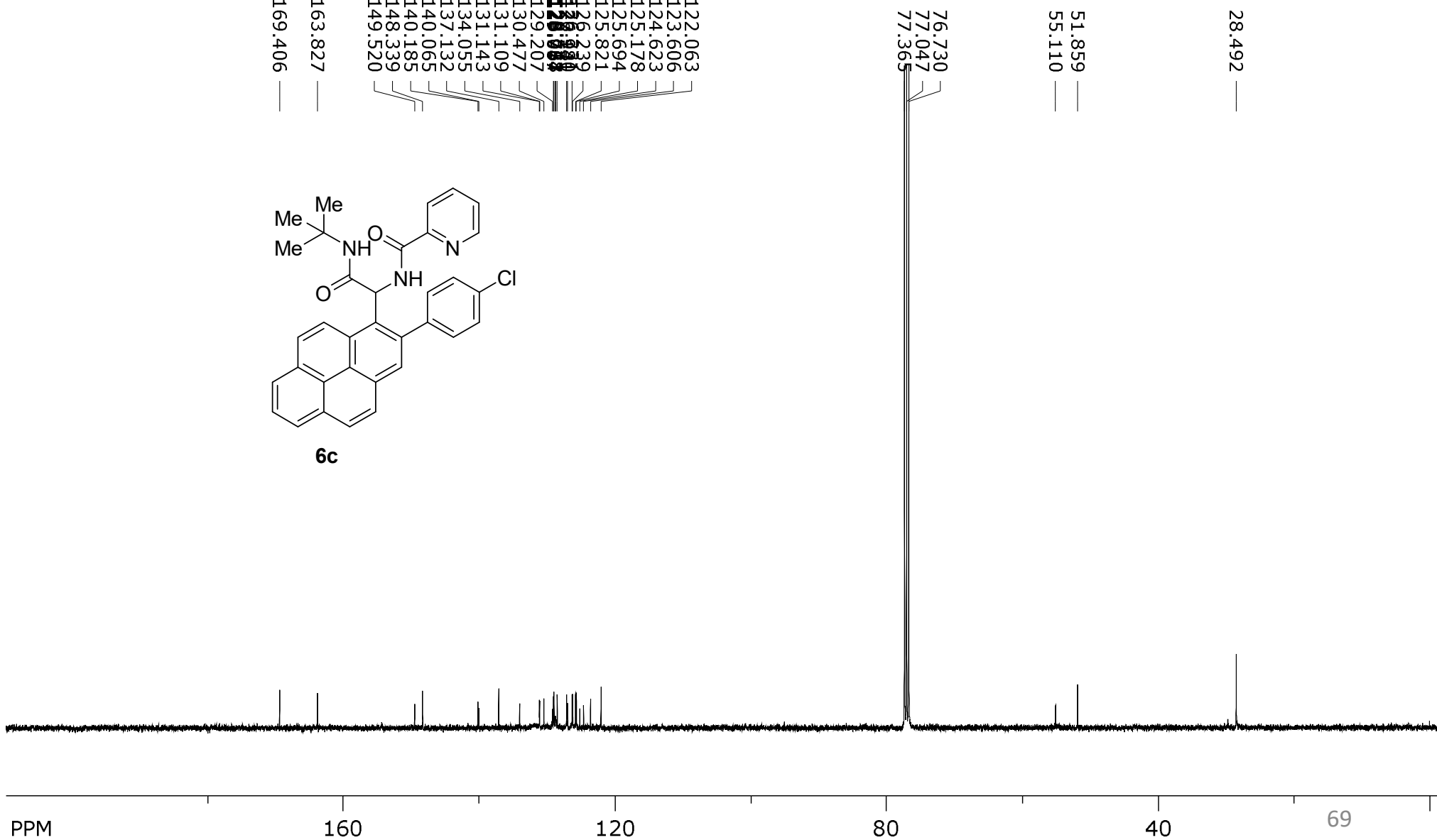
SpinWorks 4: AD 1813

C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 23

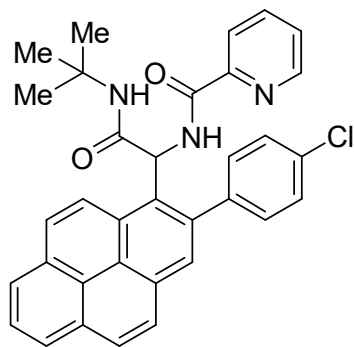
122.063  
123.606  
124.623  
125.178  
125.694  
126.821  
128.239  
128.988  
129.088  
129.207  
130.477  
131.109  
131.143  
134.055  
137.132  
140.065  
140.185  
148.339  
149.520  
163.827  
169.406



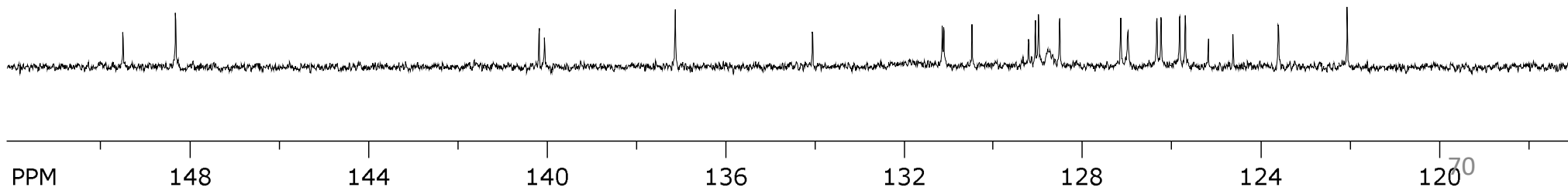
6c



SpinWorks 4: AD 1813  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 23



6c



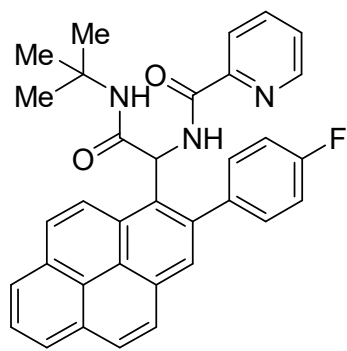


SpinWorks 4: AD-2084  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 34

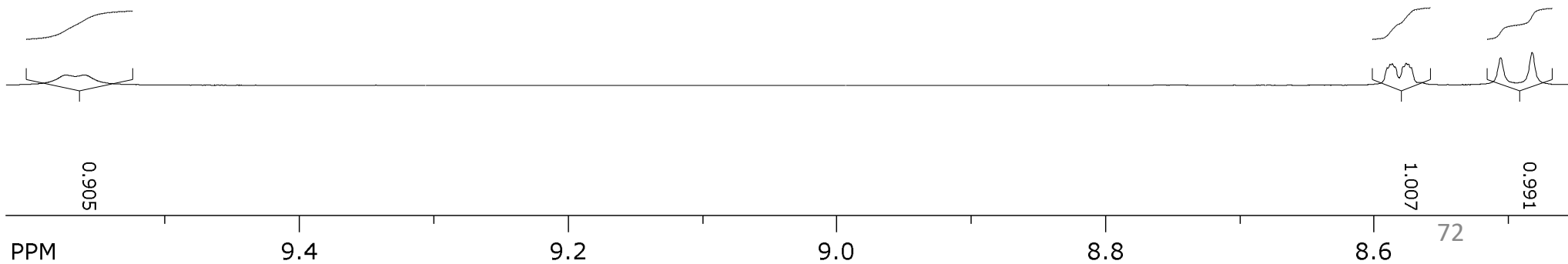
9.5604  
9.5745

8.5721  
8.5742  
8.5759  
8.5780  
8.5841  
8.5861  
8.5877  
8.5898

8.4820  
8.5054



6d





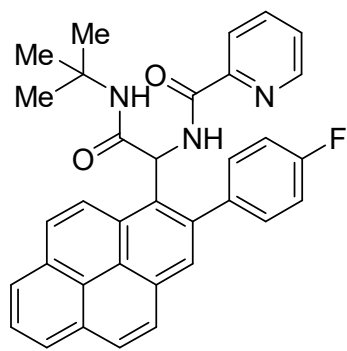
SpinWorks 4: AD-2084  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 34

8.2366  
8.2197  
8.1918  
8.1974

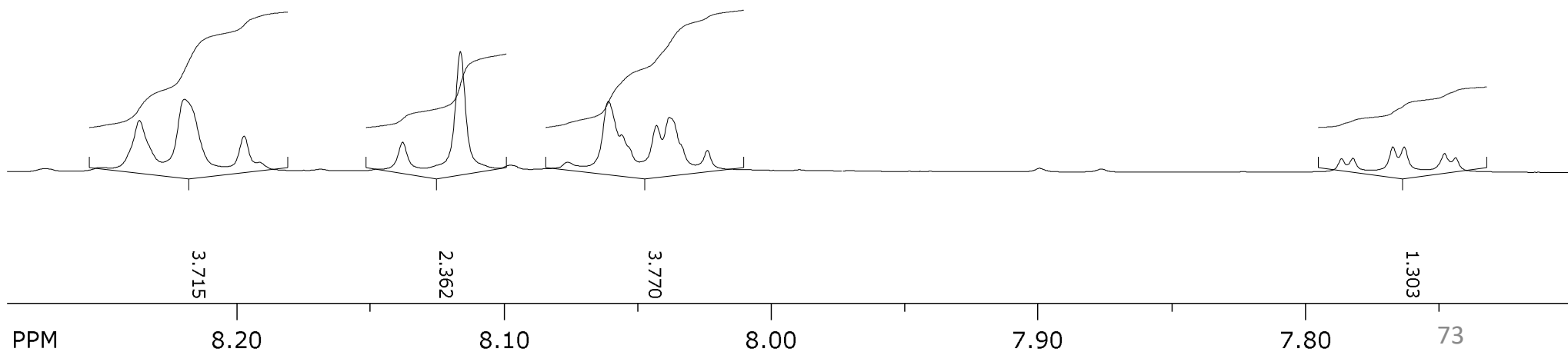
8.1381  
8.1164

8.0764  
8.0610  
8.0560  
8.0429  
8.0381  
8.0239

7.7436  
7.7478  
7.7629  
7.7671  
7.7821  
7.7863



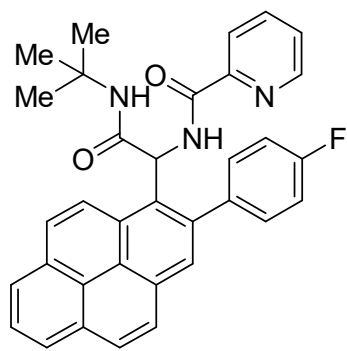
6d



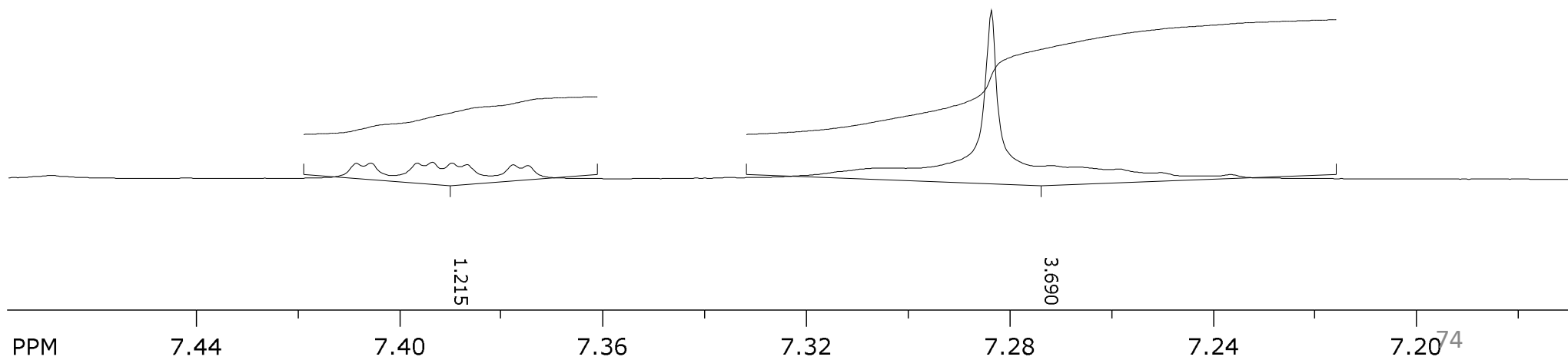
SpinWorks 4: AD-2084  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 34

7.3748  
7.3777  
7.3868  
7.3897  
7.3936  
7.3965  
7.4057  
7.4085

7.3009  
7.3036  
7.3054  
7.2836  
7.2665  
7.2719  
7.2585



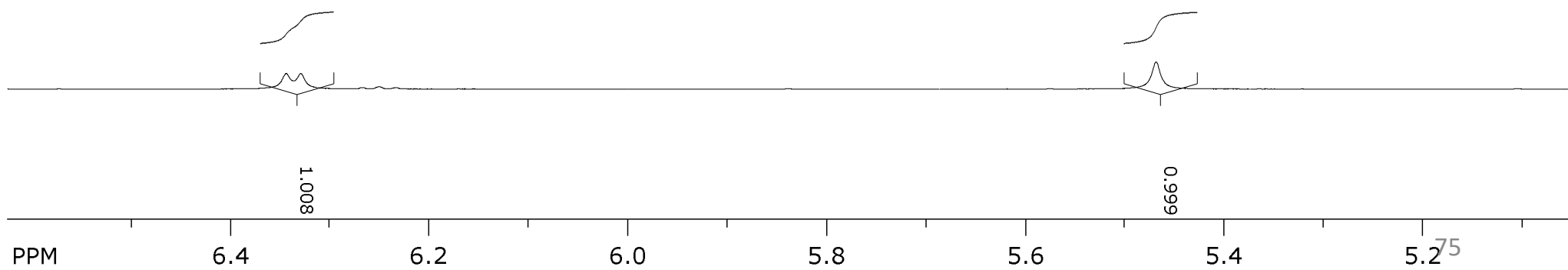
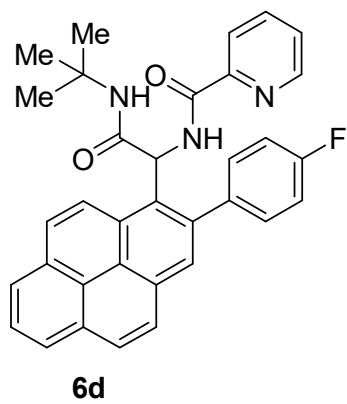
6d



SpinWorks 4: AD-2084  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 34

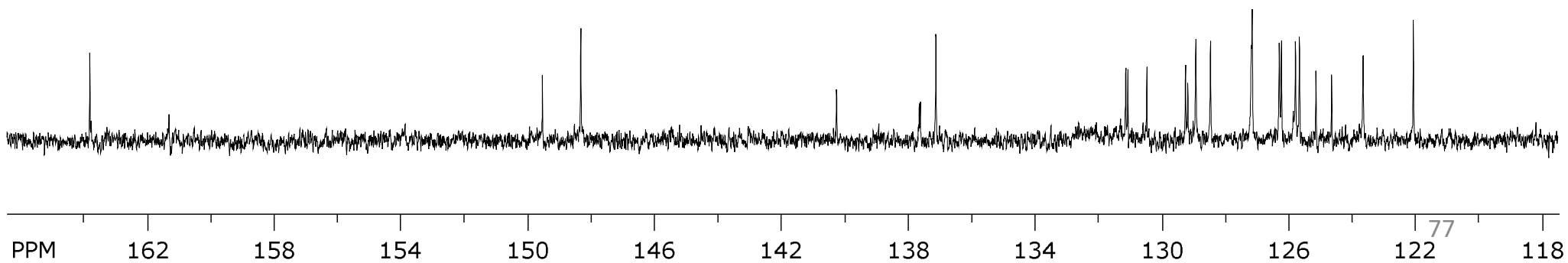
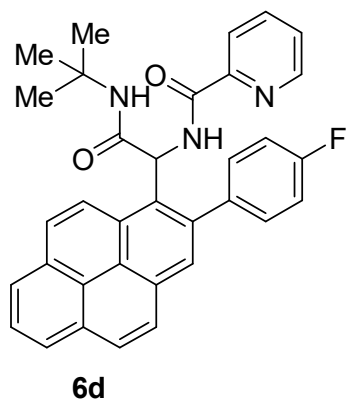
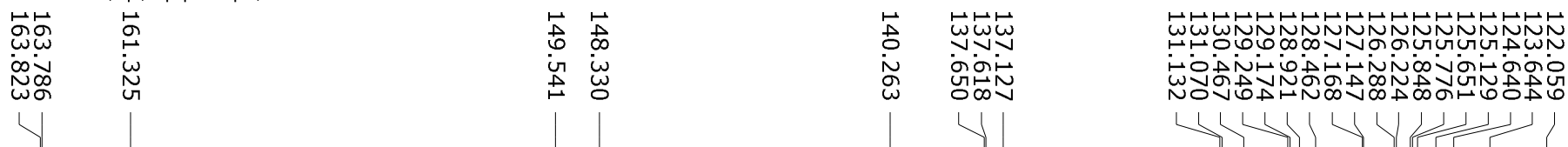
6.3293  
6.3442

5.4681





SpinWorks 4: AD-2084  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 34

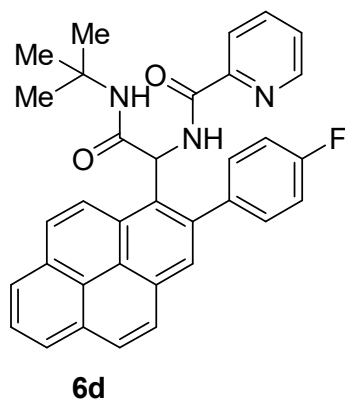


# $^{19}\text{F}$ NMR (~376 MHz, $\text{CDCl}_3$ )

SpinWorks 4: AD 2084

F19CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 17

-114.369



PPM

0

-40

-80

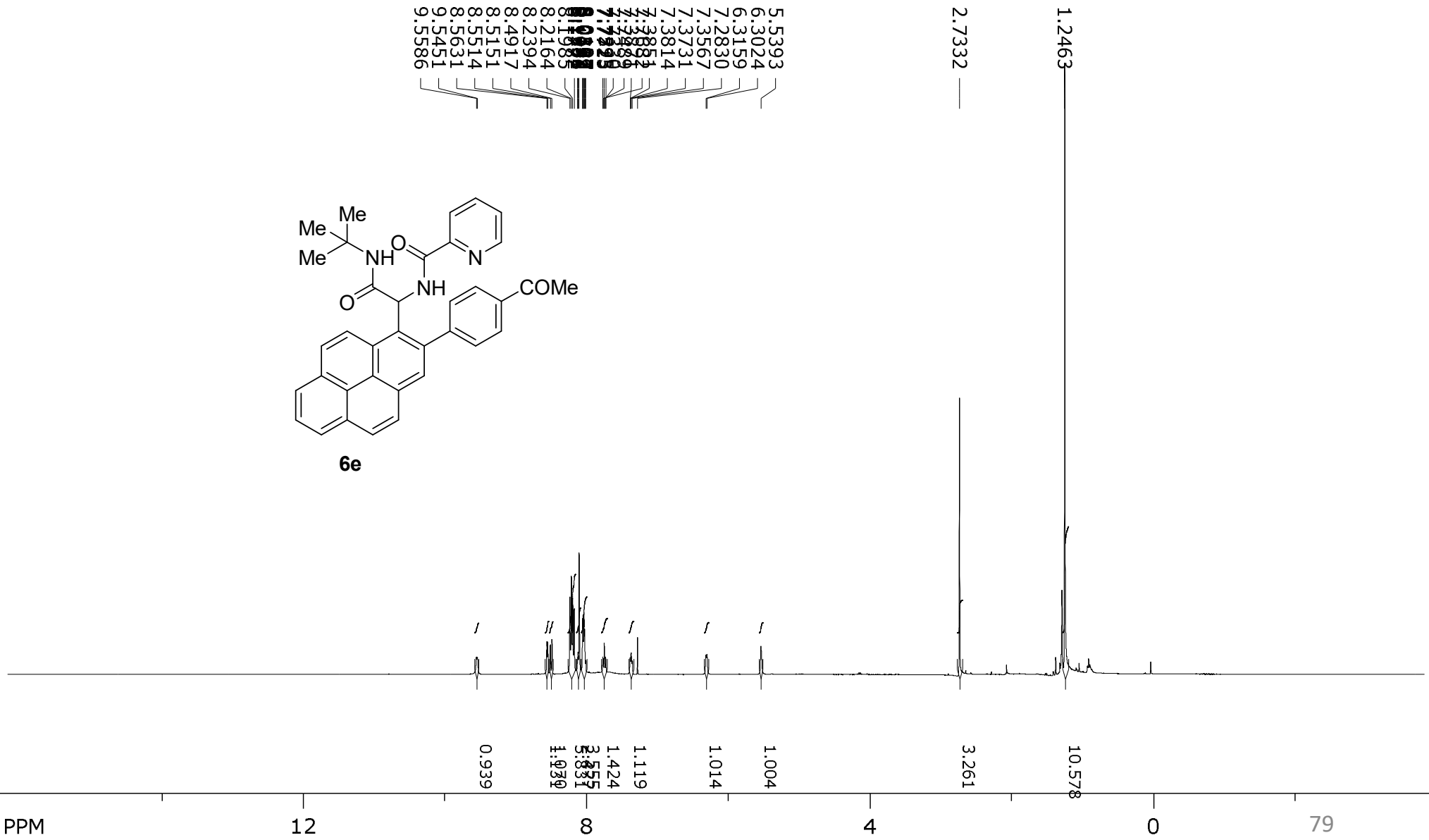
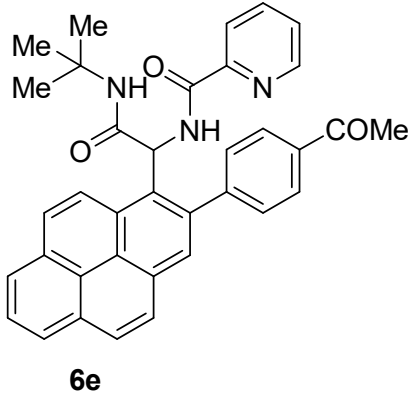
-120

-160

-200

78

SpinWorks 4: SUB-45  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18

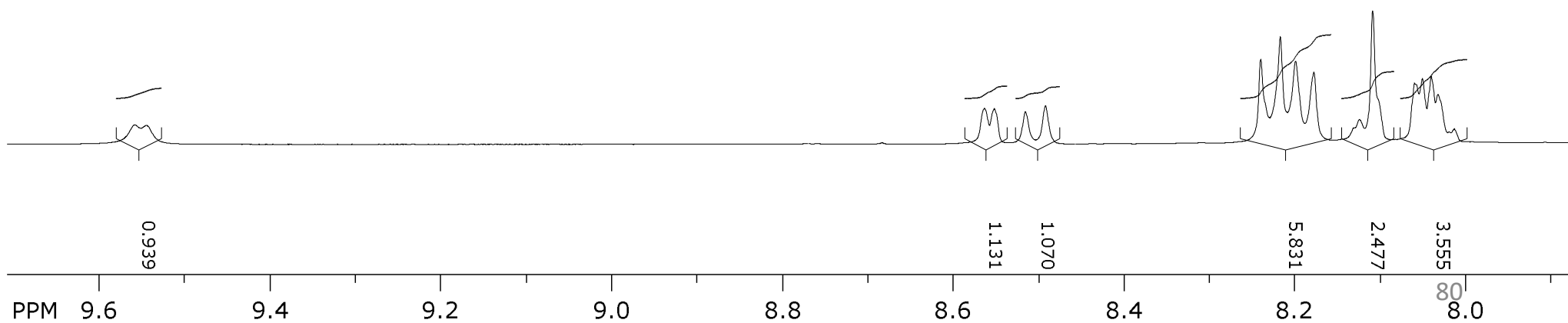
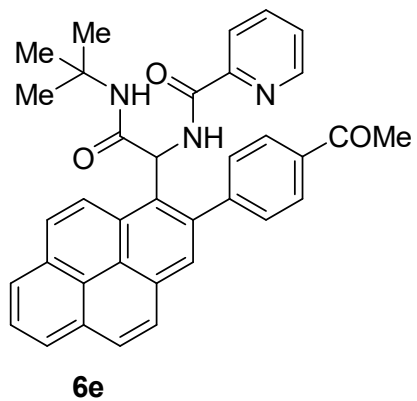


SpinWorks 4: SUB-45  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18

9.5451  
9.5586

8.4917  
8.5151  
8.5514  
8.5631

8.0127  
8.0187  
8.0317  
8.0397  
8.0499  
8.0573  
8.1082  
8.1301  
8.1772  
8.2164  
8.2394



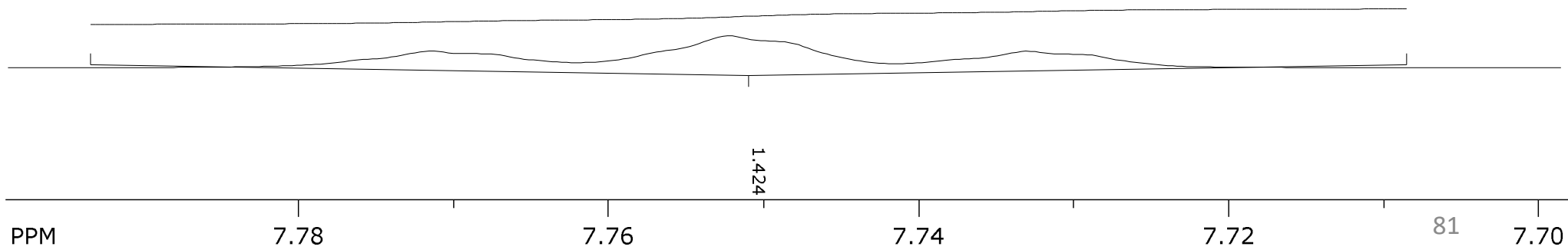
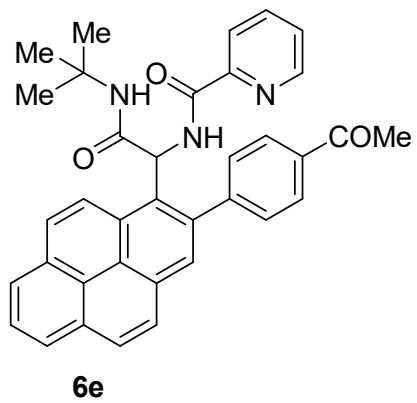


SpinWorks 4: SUB-45  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18

7.7715 —  
7.7682 —

7.7523 —  
7.7489 —

7.7330 —  
7.7295 —

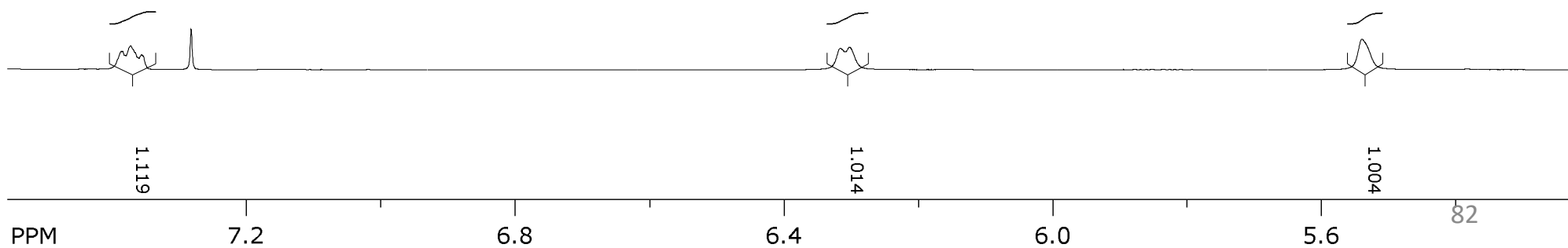
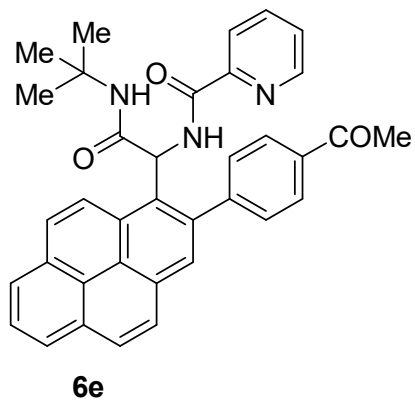


SpinWorks 4: SUB-45  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18

7.2830  
7.3567  
7.3731  
7.3814  
7.3851  
7.3871

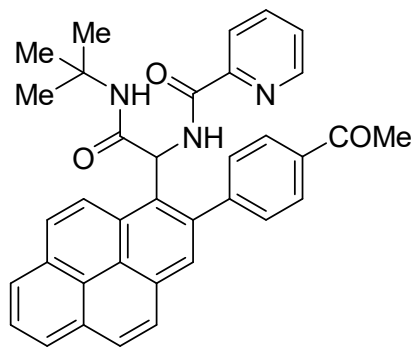
6.3024  
6.3159

5.5393

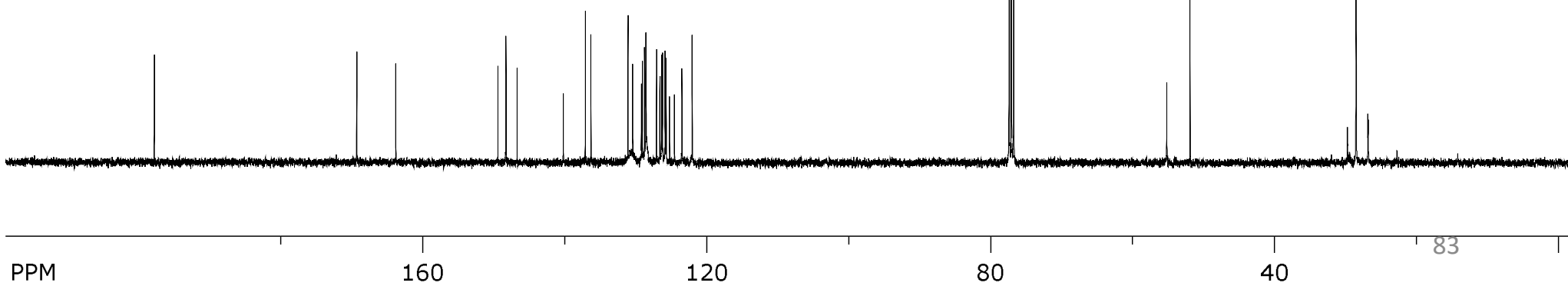


SpinWorks 4: SUB-45  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18

197.878  
169.346  
163.838  
149.436  
148.297  
146.734  
140.221  
137.113  
136.318  
131.108  
130.447  
129.225  
129.076  
128.969  
128.889  
126.243  
125.875  
125.727  
125.240  
124.555  
123.503  
122.051  
76.742  
77.060  
77.378  
55.154  
51.870  
28.471  
26.803



6e



SpinWorks 4: SUB-45  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18

169.346

163.838

149.436

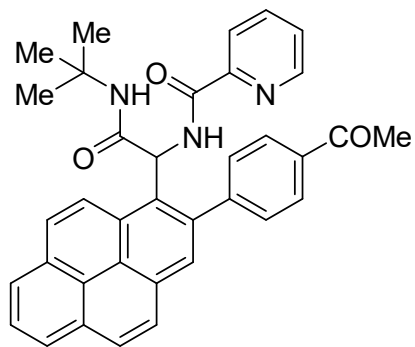
148.297

146.734

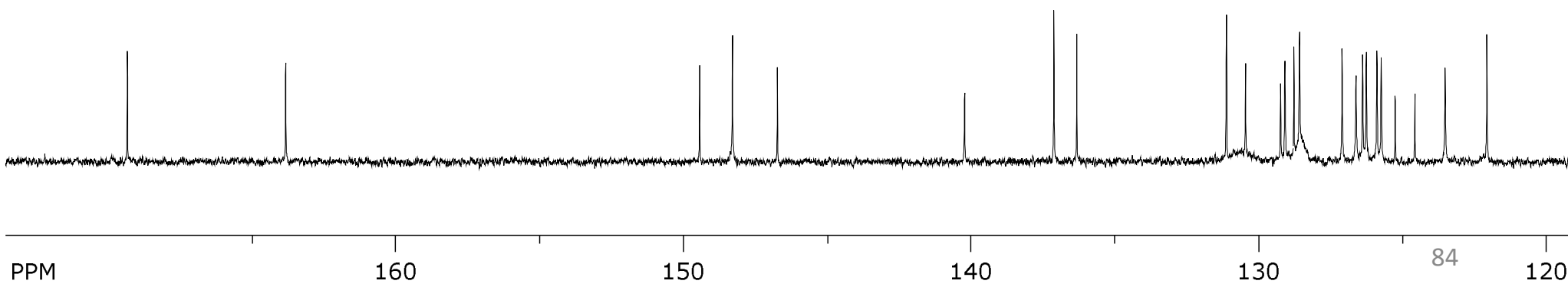
140.221

136.318  
137.113

122.051  
123.503  
124.555  
125.240  
125.727  
125.875  
126.243  
126.374  
126.604  
127.087  
128.569  
128.763  
129.076  
129.225  
130.447  
131.108

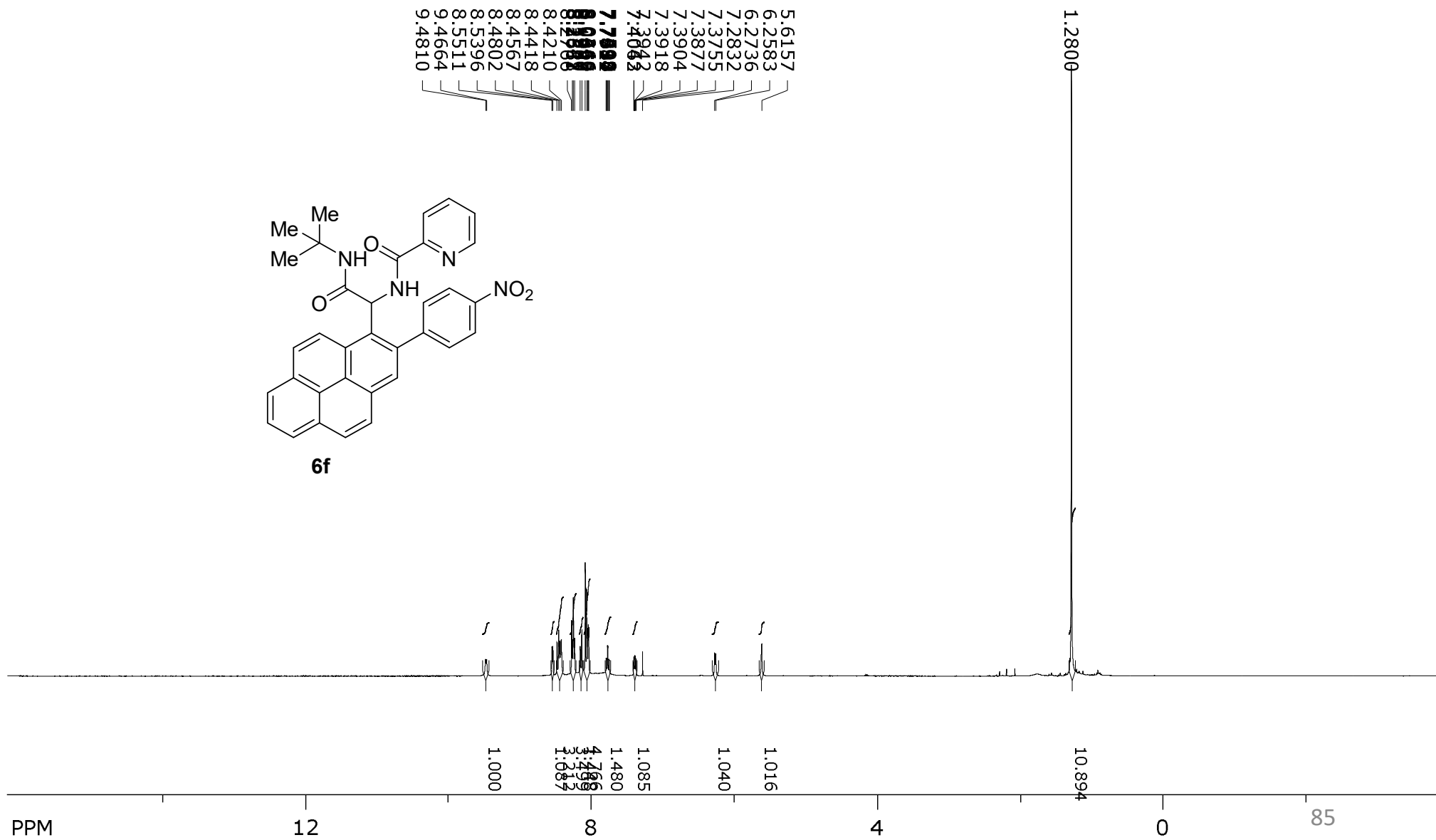
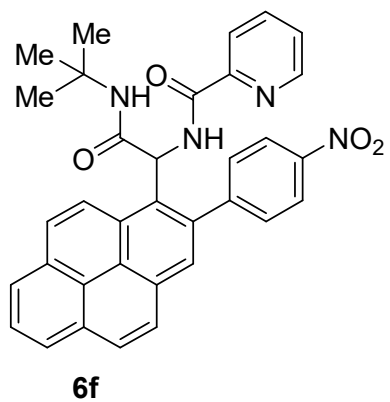


6e



SpinWorks 4: AD-2082  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 58

5.6157  
6.2583  
6.2736  
7.2832  
7.3755  
7.3877  
7.3904  
7.3918  
7.4043  
7.4063  
7.7888  
7.7888  
7.7888  
7.7888  
7.7888  
8.1988  
8.2170  
8.4210  
8.4418  
8.4567  
8.4802  
8.5396  
8.5511  
9.4664  
9.4810



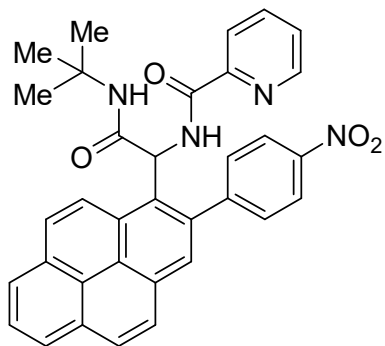
SpinWorks 4: AD-2082  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 58

9.4664  
9.4810

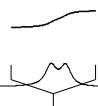
8.4210  
8.4418  
8.4567  
8.4802  
8.5396  
8.5511

8.2347  
8.2531  
8.2663  
8.1560  
8.1337  
8.0852  
8.0655  
8.0562  
8.0440  
8.0366

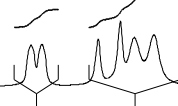
7.7499  
7.7537  
7.7698  
7.7730  
7.7884  
7.7922



6f



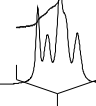
1.000



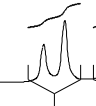
1.087



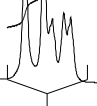
3.212



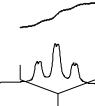
3.499



1.448



4.766



1.480

PPM

9.2

8.8

8.4

8.0

86

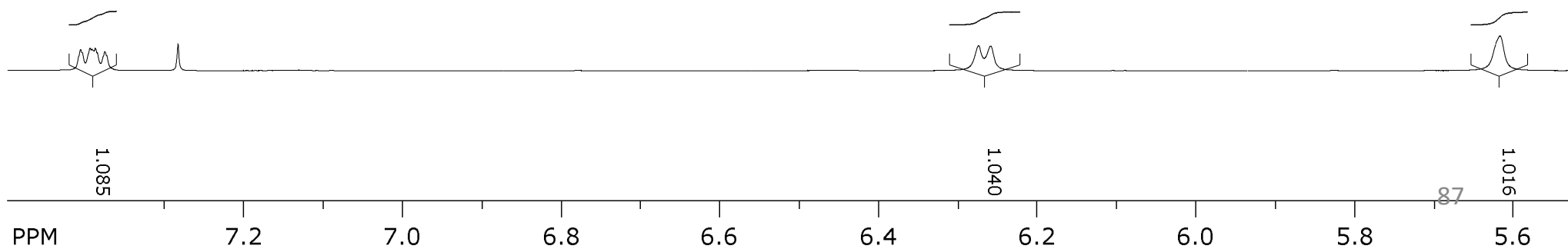
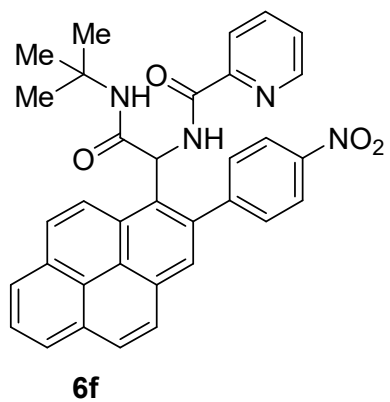
7.6

SpinWorks 4: AD-2082  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 58

7.2832  
7.3755  
7.3877  
7.3904  
7.3918  
7.3942  
7.4043  
7.4062

6.2583  
6.2736

5.6157



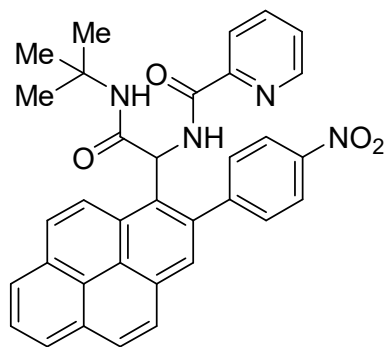
SpinWorks 4: AD-2082  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 58

122.152  
123.217  
123.655  
123.674  
124.526  
125.428  
125.952  
128.830  
129.347  
129.453  
130.488  
131.173  
131.203  
137.260  
139.096  
147.493  
148.365  
148.667  
149.219  
163.999  
169.306

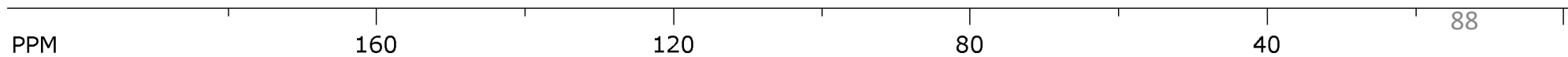
76.768  
77.086  
77.404

52.019  
55.060

28.518



6f





SpinWorks 4: AD-2082  
C13CPD256 CDCl3 /opt/topspin3.5p12/nmrdata nmrsu 58

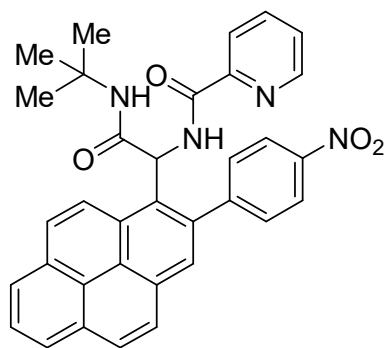
147.493 —  
148.365 —  
148.667 —  
149.219 —

139.096 —

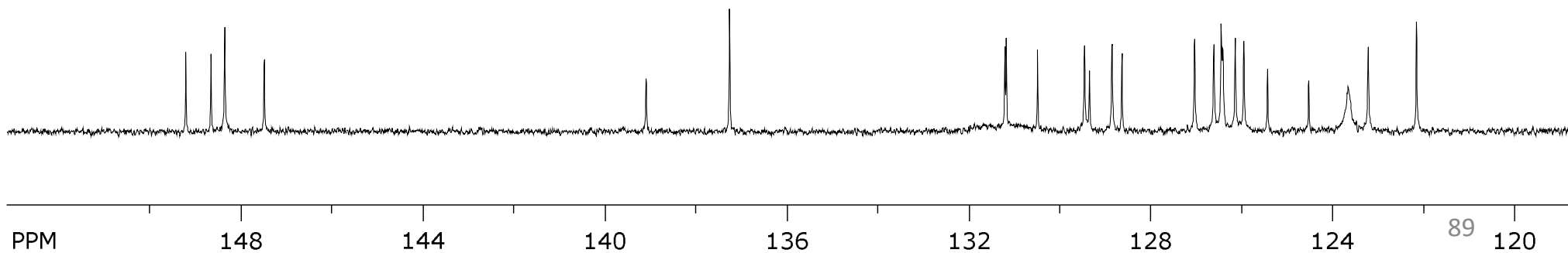
137.260 —

128.630 —  
128.850 —  
129.347 —  
129.453 —  
130.488 —  
131.173 —  
131.203 —

122.152 —  
123.217 —  
123.655 —  
123.674 —  
124.526 —  
125.428 —  
125.952 —  
126.141 —  
126.416 —  
126.447 —  
126.609 —  
127.034 —

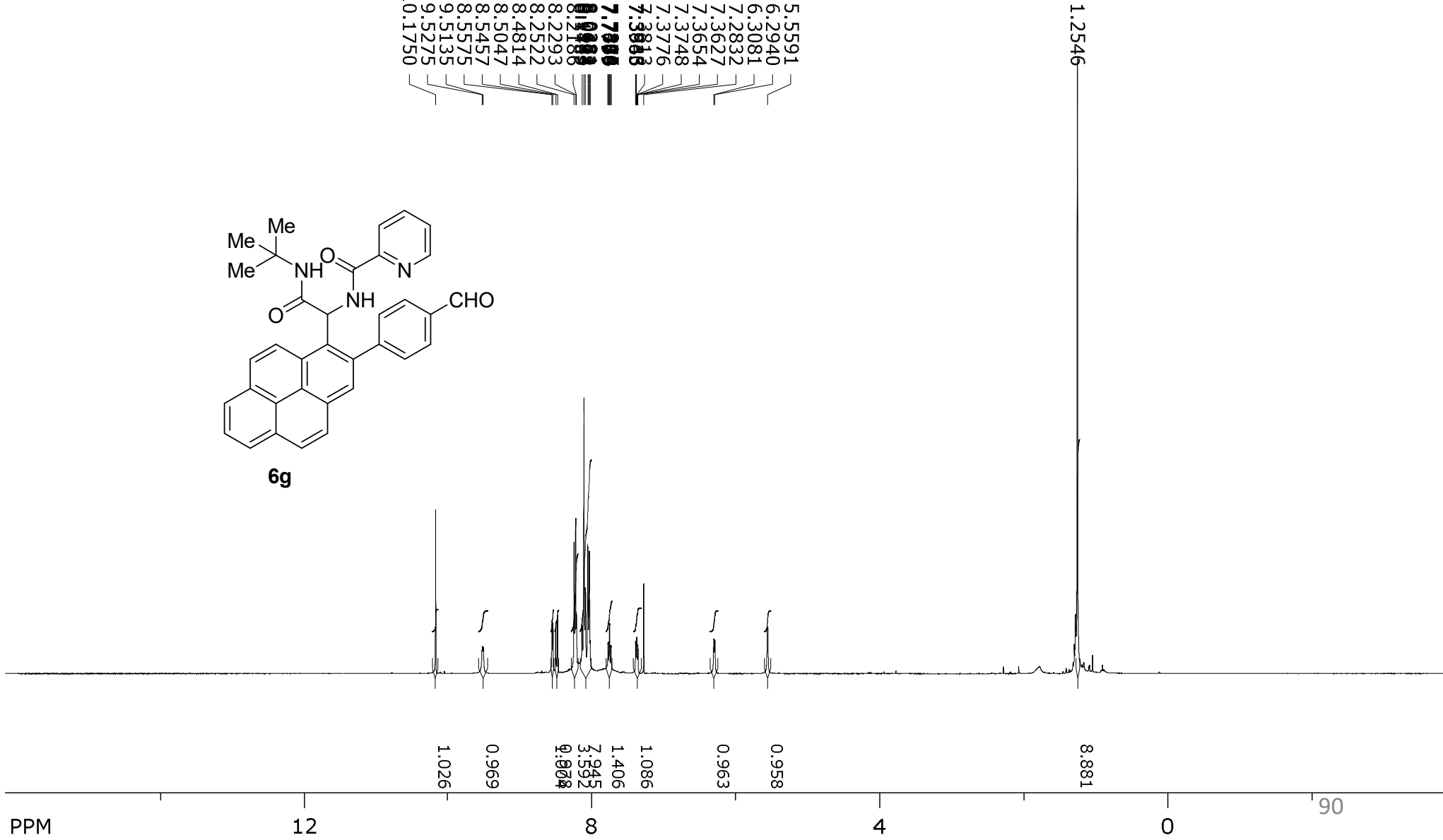
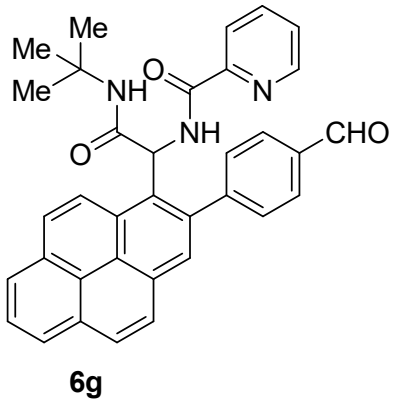


**6f**



SpinWorks 4: AD 1946  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 13

10.1750  
9.5275  
9.5135  
8.5575  
8.5457  
8.5047  
8.4814  
8.2522  
8.2293  
8.2188  
8.1988  
8.1788  
7.7888  
7.7688  
7.3988  
7.3776  
7.3748  
7.3654  
7.3627  
7.2832  
6.3081  
6.2940  
5.5591

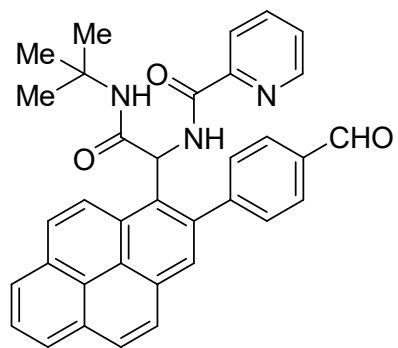


SpinWorks 4: AD 1946  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 13

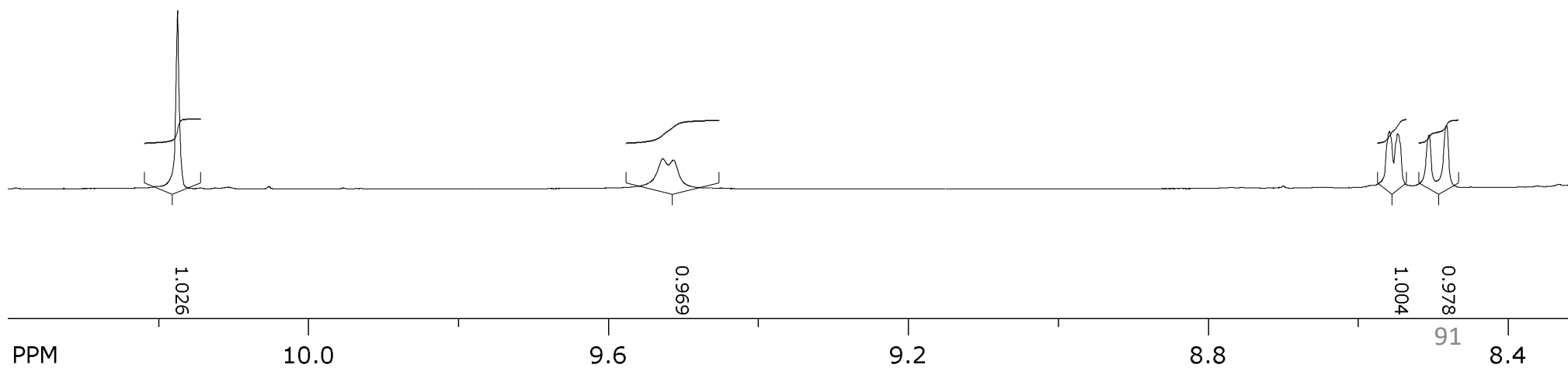
10.1750

9.5135  
9.5275

8.4814  
8.5047  
8.5457  
8.5575



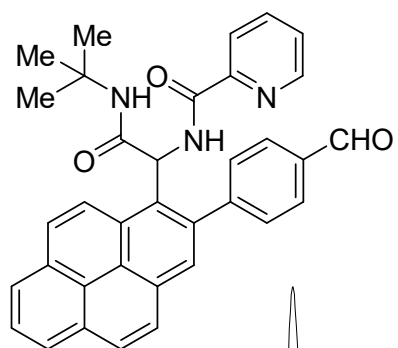
6g



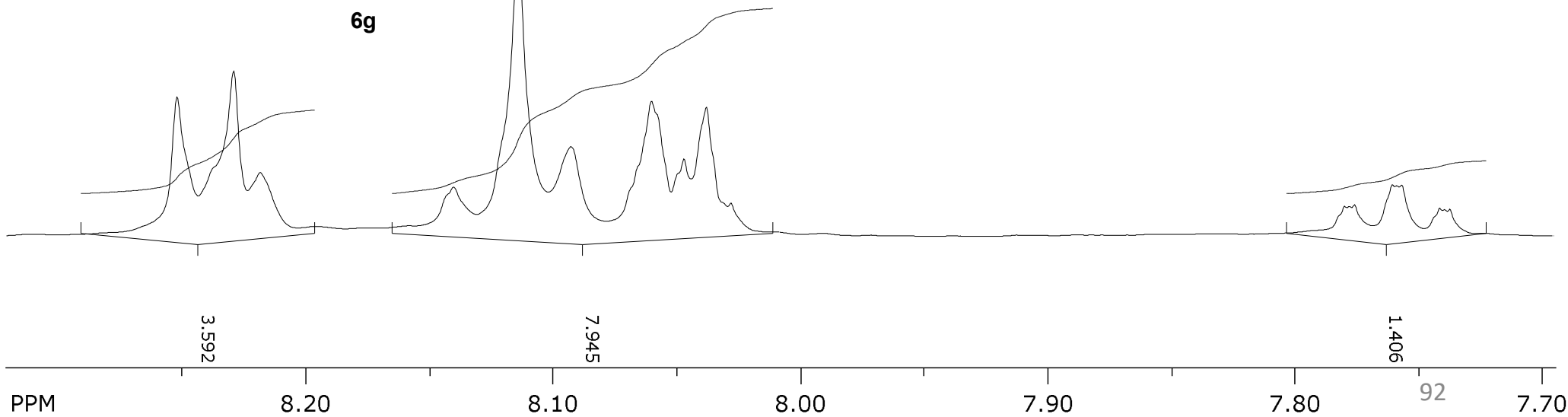
SpinWorks 4: AD 1946  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 13

8.2522 —  
8.2293 —  
8.2186 —  
8.1403 —  
8.1143 —  
8.0928 —  
8.0602 —  
8.0472 —  
8.0381 —  
8.0281 —

7.7374 —  
7.7395 —  
7.7414 —  
7.7568 —  
7.7588 —  
7.7606 —  
7.7759 —  
7.7779 —  
7.7799 —



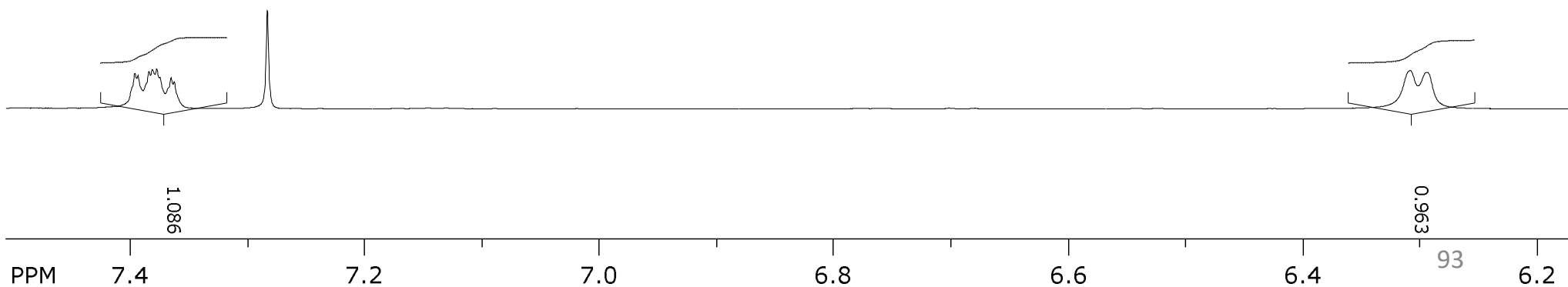
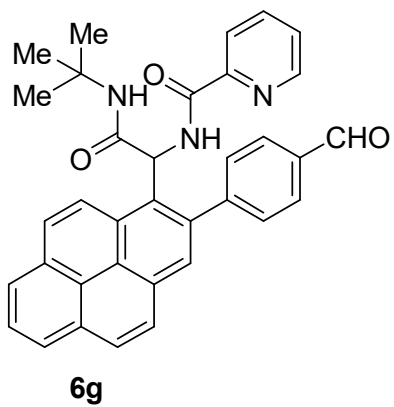
6g



SpinWorks 4: AD 1946  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 13

7.2832  
7.3627  
7.3654  
7.3748  
7.3776  
7.3813  
7.3843  
7.3936  
7.3963

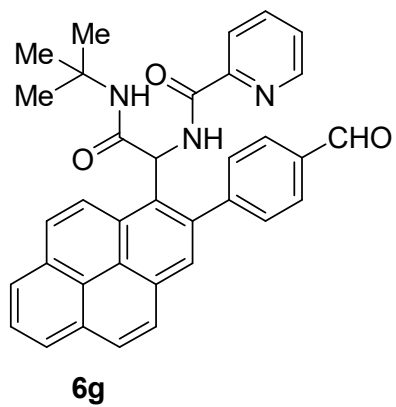
6.2940  
6.3081



SpinWorks 4: AD 1946  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 13

5.5591

1.2546



0.958

8.881

PPM

5.2

4.8

4.4

4.0

3.6

3.2

2.8

2.4

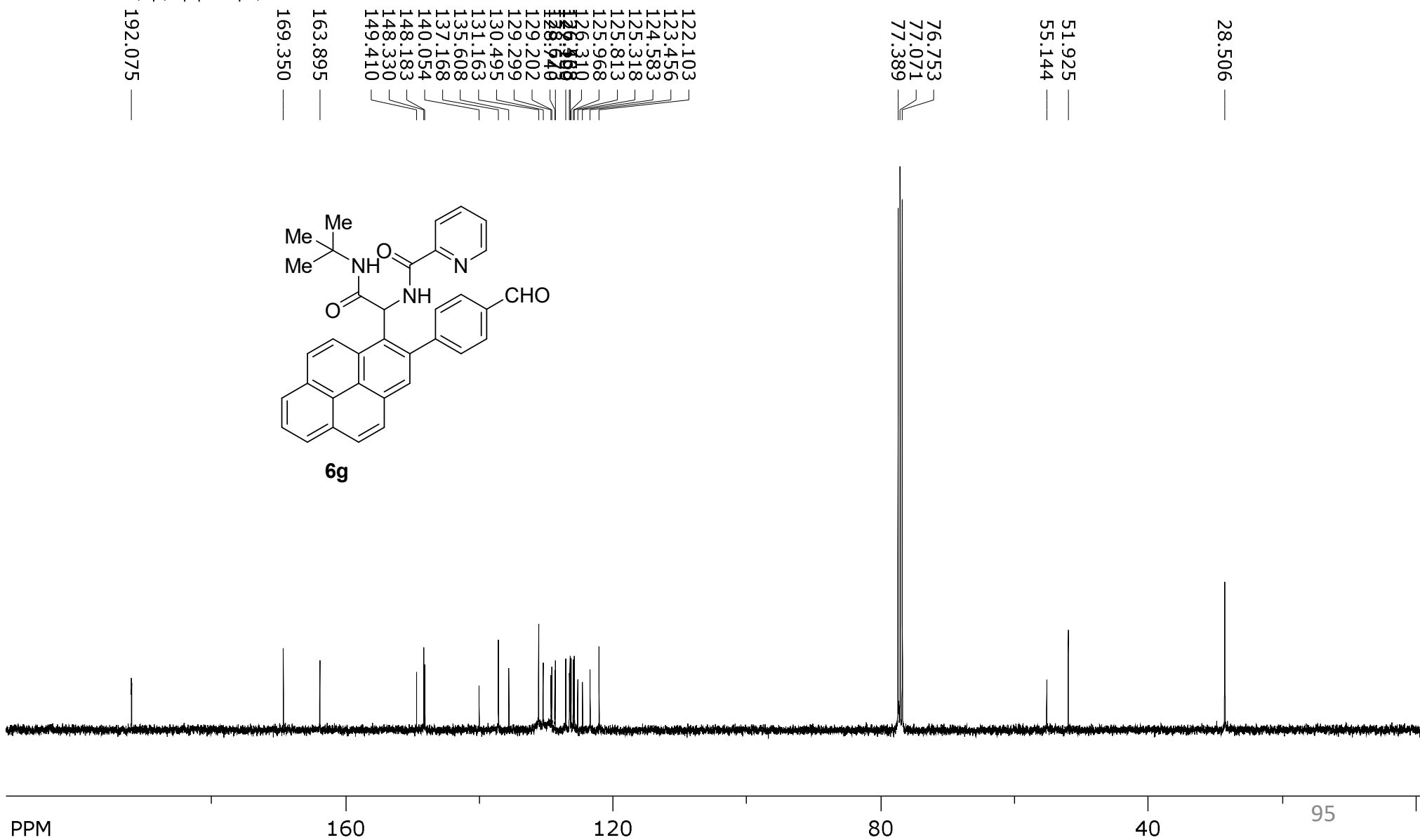
2.0

1.6

94

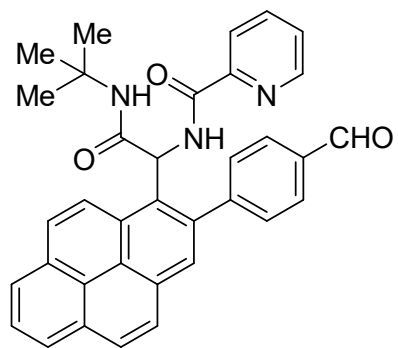
1.2

SpinWorks 4: AD-1946  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 19

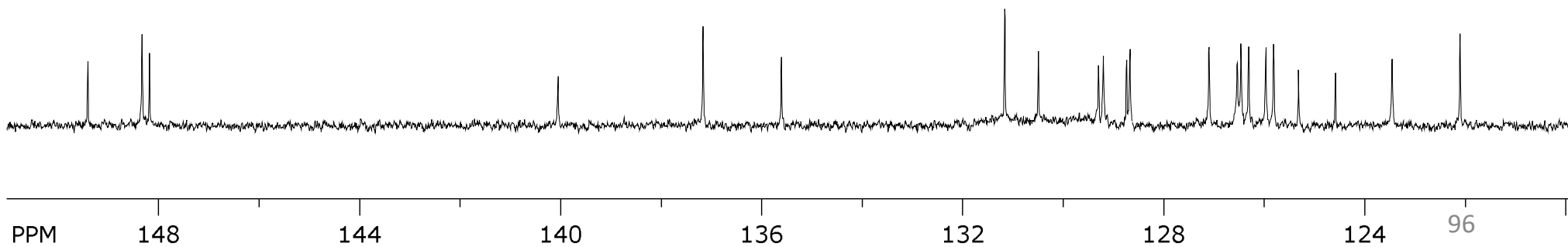


SpinWorks 4: AD-1946  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 19

149.410 —  
148.183 —  
148.330 —  
140.054 —  
137.168 —  
135.608 —  
131.163 —  
130.495 —  
129.299 —  
128.673 —  
128.740 —  
129.202 —  
127.100 —  
126.538 —  
126.463 —  
126.310 —  
125.968 —  
125.813 —  
125.318 —  
124.583 —  
123.456 —  
122.103 —

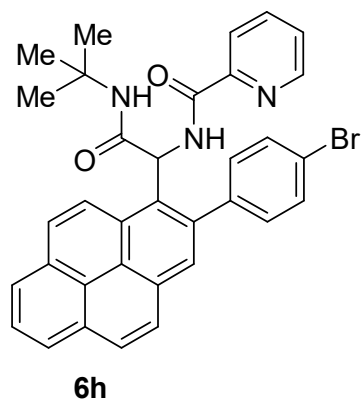


6g

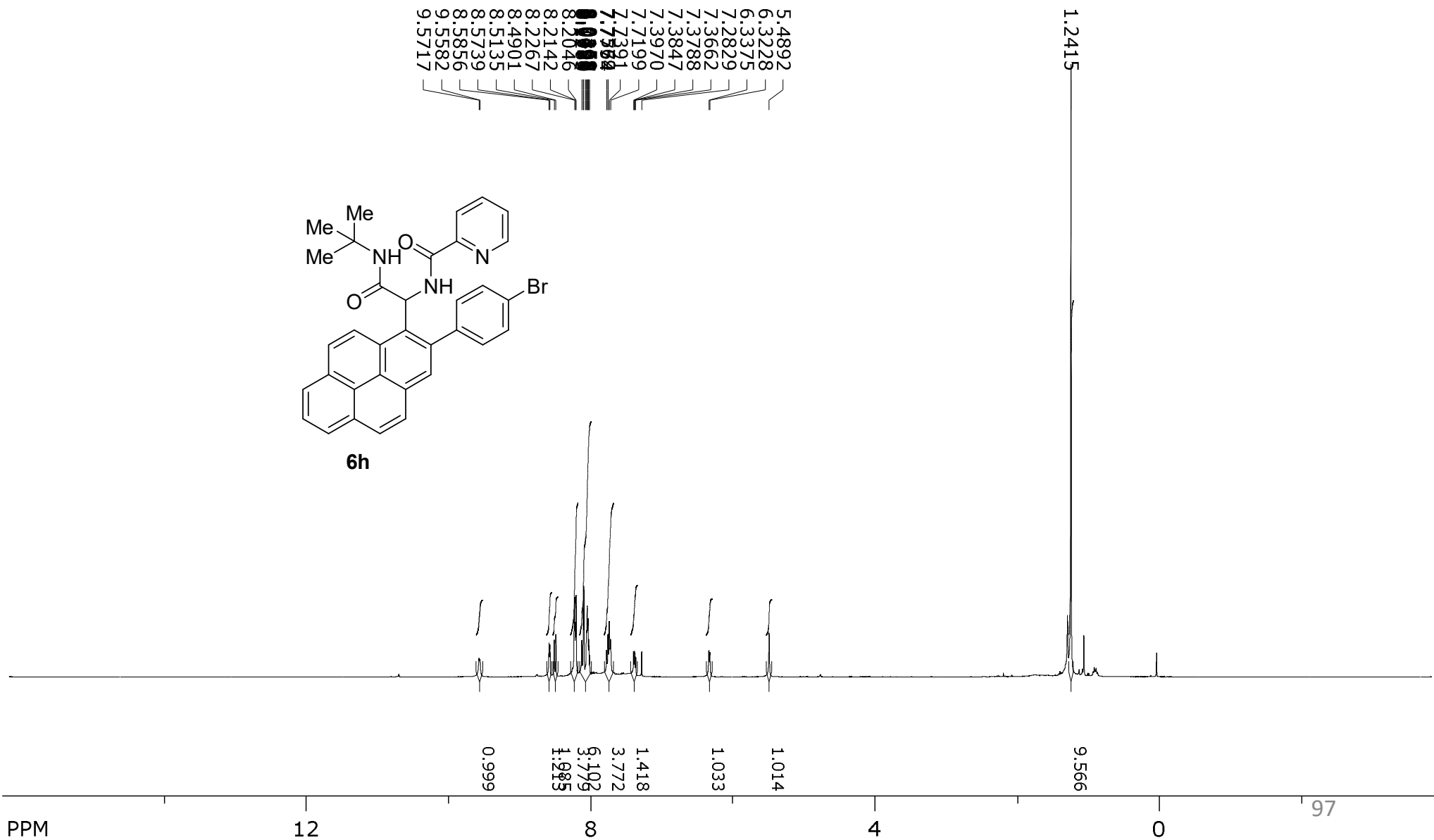




SpinWorks 4: AD 1852 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 28



5.4892  
6.33228  
6.33375  
7.28229  
7.3662  
7.3788  
7.3847  
7.3970  
7.7199  
7.7391  
7.7394  
7.7397  
8.0000  
8.0000  
8.2046  
8.2142  
8.2267  
8.4901  
8.5135  
8.5739  
8.5856  
9.5582  
9.5717

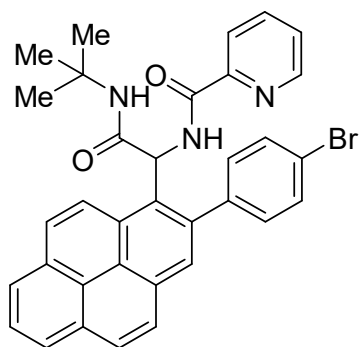


SpinWorks 4: AD 1852 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 28

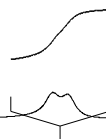
9.5582  
9.5717

8.5739  
8.5856  
8.4901  
8.5135

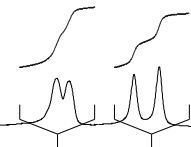
8.0159  
8.0268  
8.0355  
8.0407  
8.0491  
8.0598  
8.0756  
8.0958  
8.1039  
8.1263  
8.2046  
8.2142  
8.2267



6h

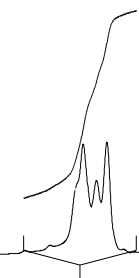


0.999

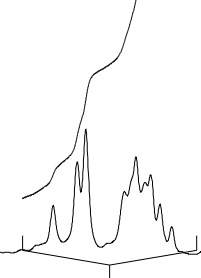


1.213

1.085



3.779



6.102

PPM

9.6

9.4

9.2

9.0

8.8

8.6

8.4

8.2

8.0

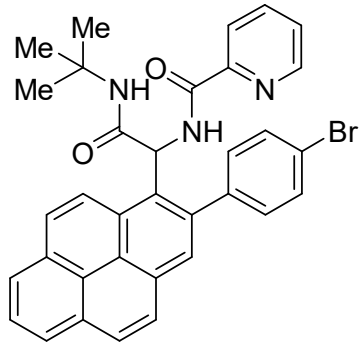
SpinWorks 4: AD 1852 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 28

7.7199  
7.7391  
7.7562  
7.7579  
7.7754

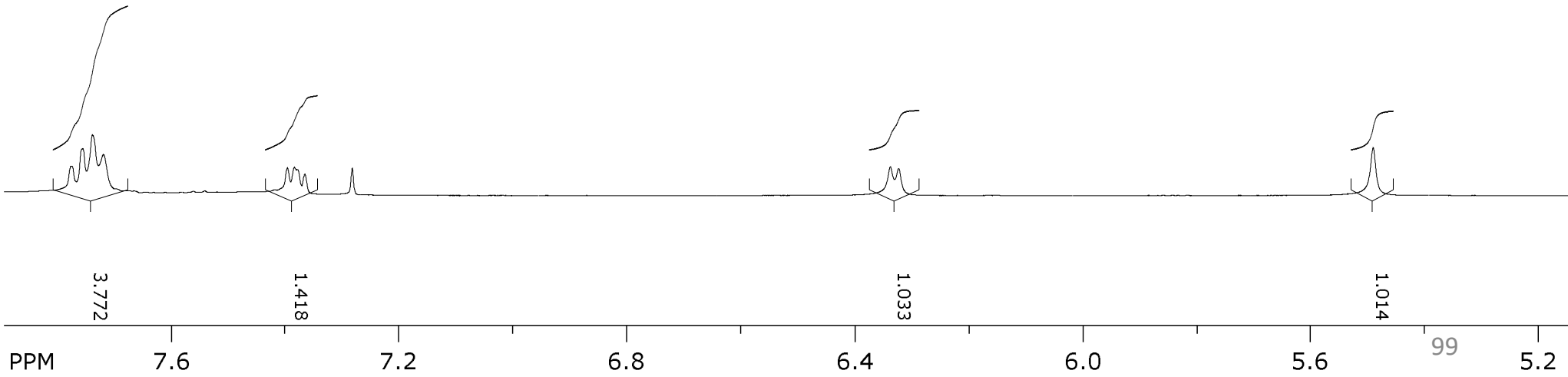
7.2829  
7.3662  
7.3788  
7.3847  
7.3970

6.3228  
6.3375

5.4892

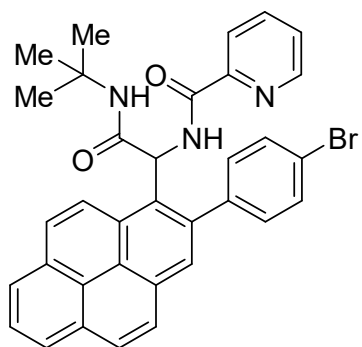


6h

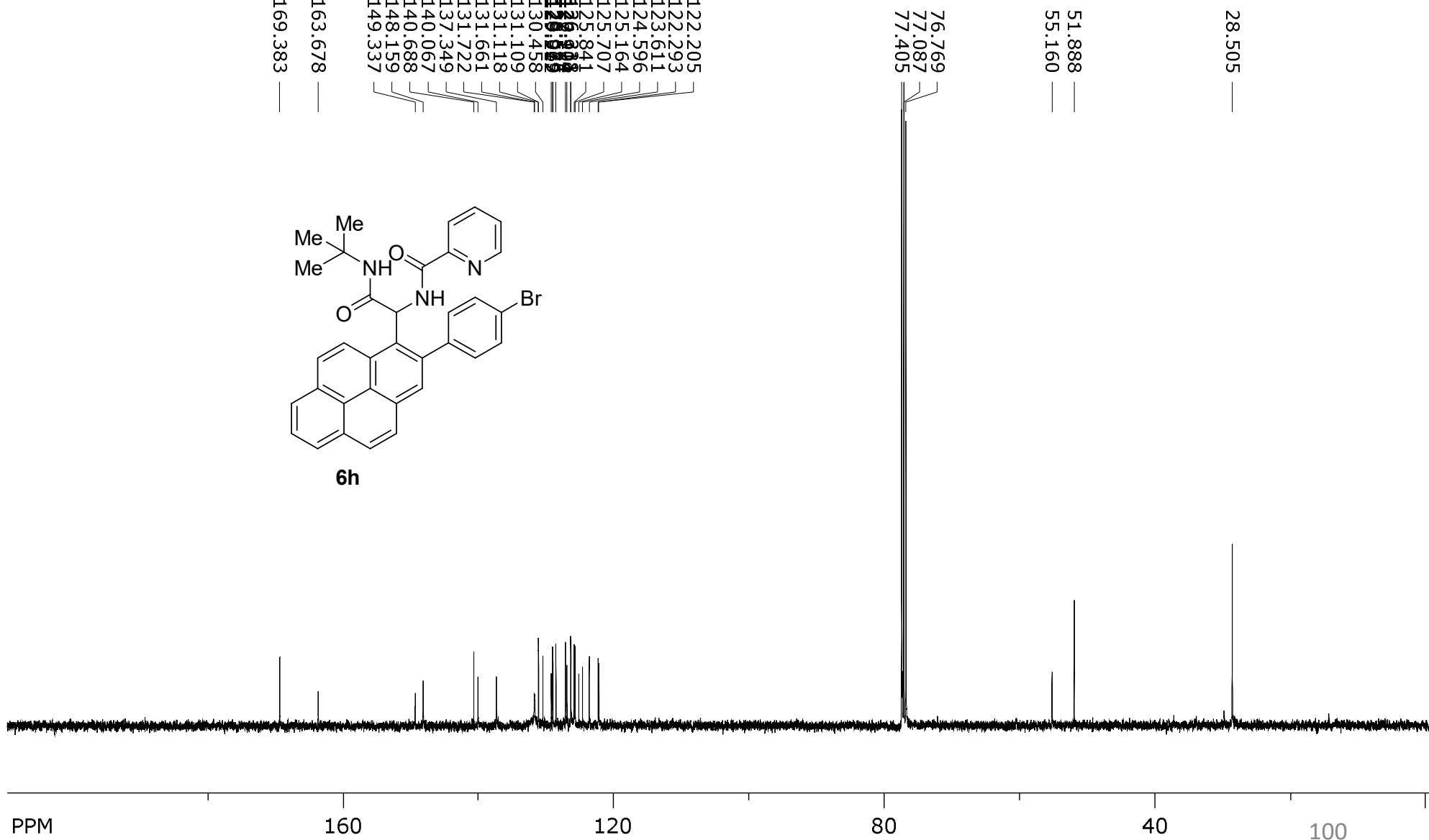


SpinWorks 4: AD-1852  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 43

122.205  
122.293  
123.611  
124.596  
125.164  
125.707  
125.841  
126.088  
126.109  
126.110  
130.458  
131.109  
131.118  
131.661  
131.722  
137.349  
140.067  
140.688  
148.159  
149.337  
163.678  
169.383

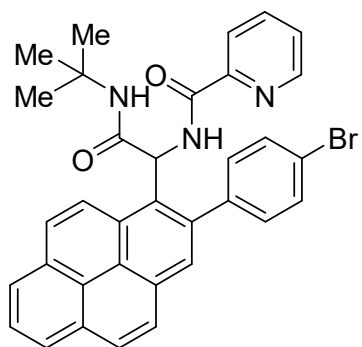


6h

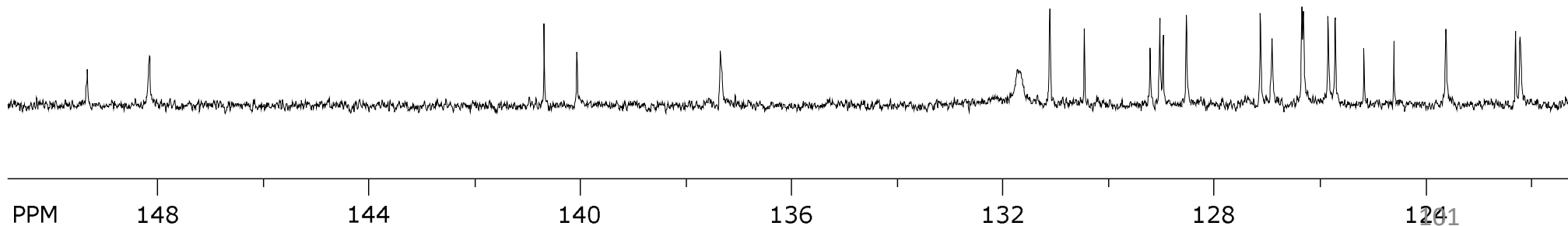


SpinWorks 4: AD-1852  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 43

149.337	148.159	140.667	140.688	137.349	131.722	131.661	131.118	131.109	130.458	129.212	129.029	128.965	128.525	127.124	126.904	126.338	126.311	125.841	125.707	125.164	124.596	123.611	122.293	122.205	
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—



6h





SpinWorks 4: AD 1899  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 7

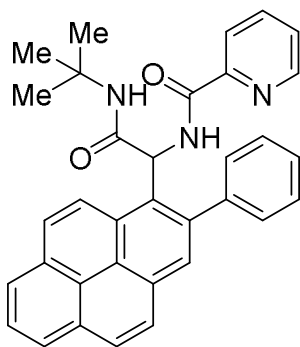
8.5464  
8.5698  
8.5801  
8.5921

8.1947  
8.2050  
8.2168  
8.2234  
8.1581  
8.1210  
8.0987  
8.0718  
8.0578  
8.0431  
8.0359  
8.0240  
8.0050

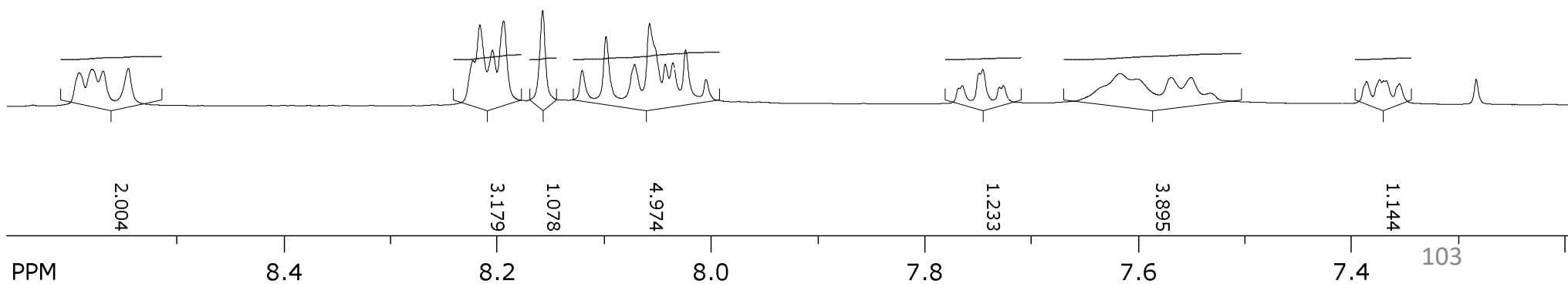
7.7263  
7.7300  
7.7456  
7.7491  
7.7648  
7.7684

7.5324  
7.5505  
7.5692  
7.6017  
7.6176

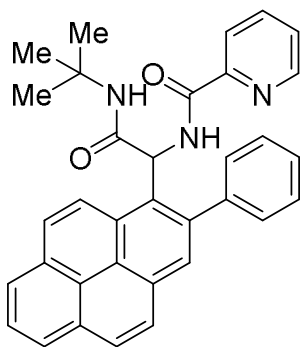
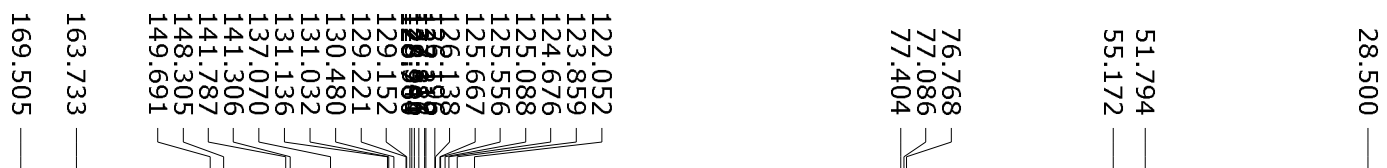
7.2833  
7.3552  
7.3674  
7.3700  
7.3739  
7.3860



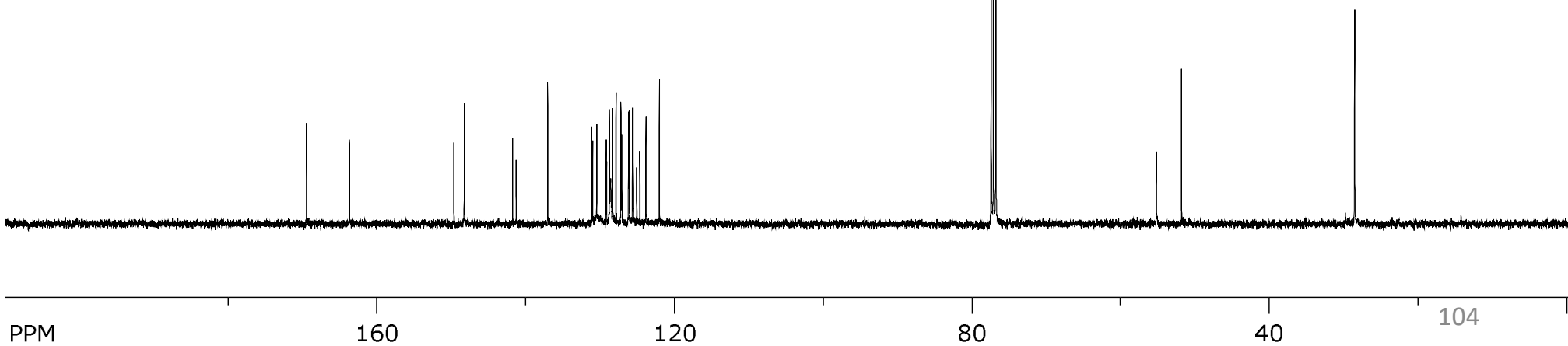
6i



SpinWorks 4: AD 1899  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 7



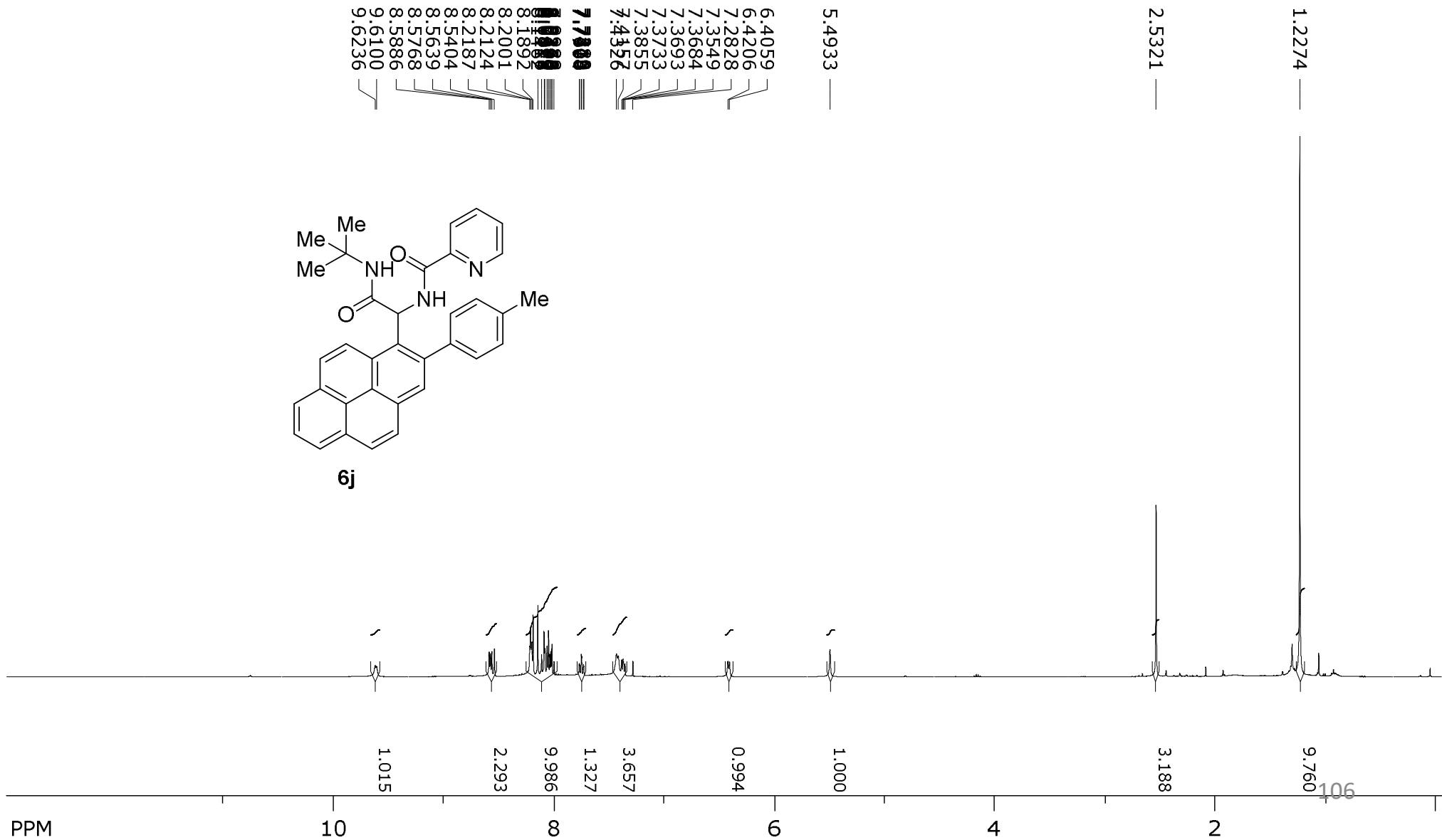
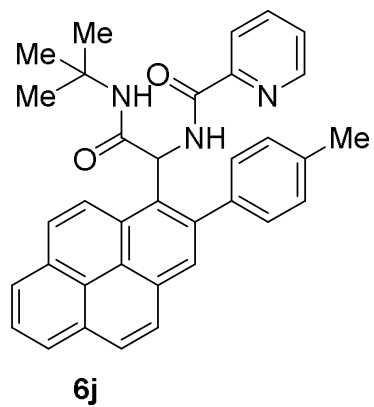
6i







SpinWorks 4: AD-1814  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 14



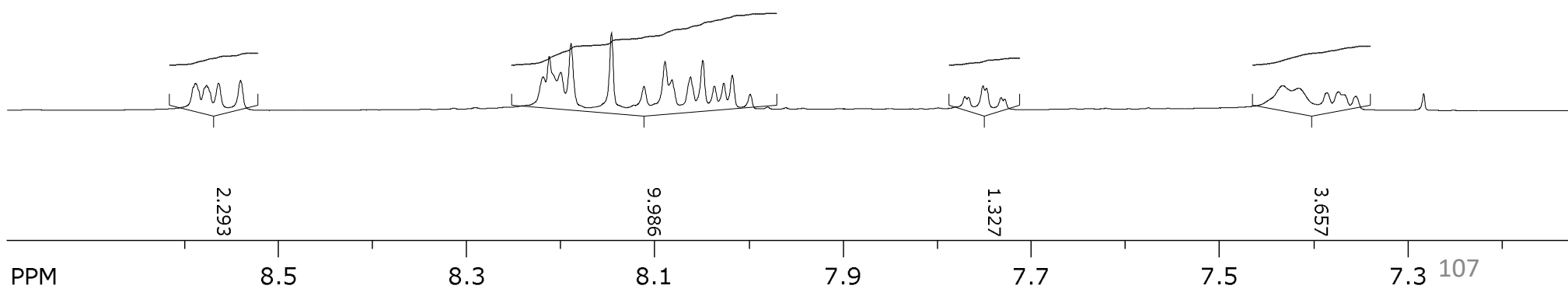
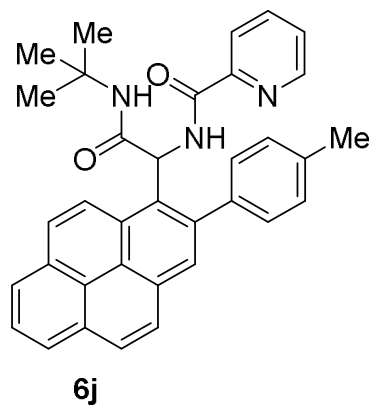
SpinWorks 4: AD-1814  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 14

8.5404  
8.5639  
8.5768  
8.5886

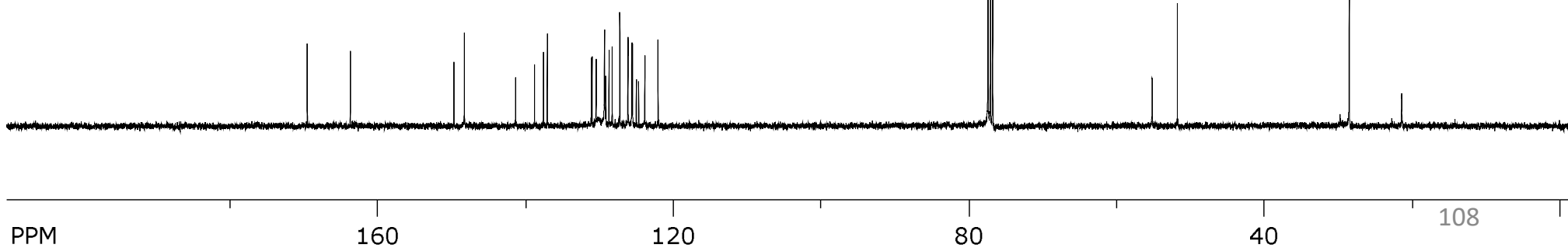
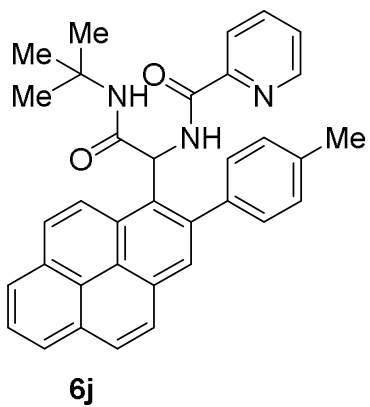
7.9988  
8.0178  
8.0268  
8.0368  
8.0492  
8.0622  
8.0819  
8.0892  
8.1116  
8.1462  
8.1892  
8.2001  
8.2124  
8.2187

7.7283  
7.7319  
7.7476  
7.7513  
7.7668  
7.7704

7.2828  
7.3549  
7.3684  
7.3693  
7.3733  
7.3855  
7.4157  
7.4326

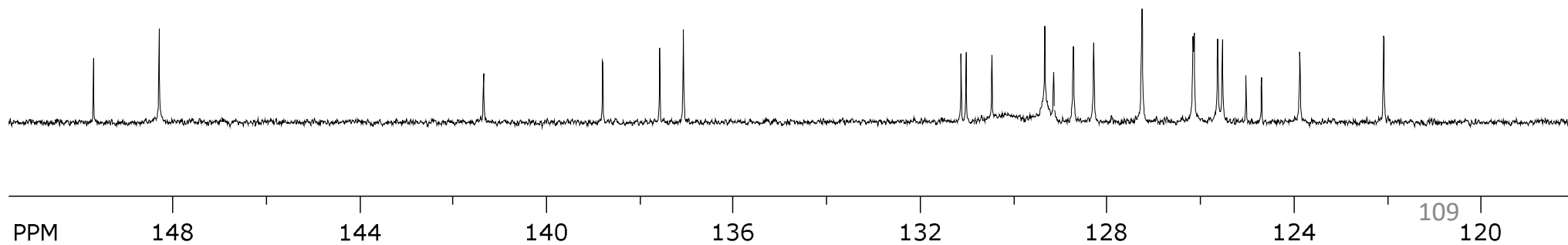
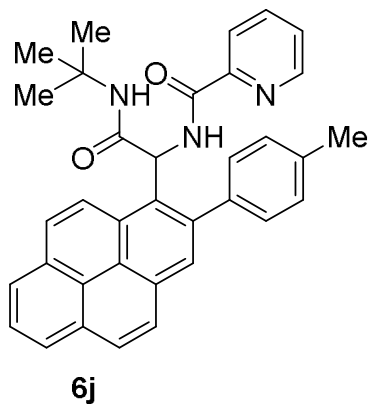


SpinWorks 4: AD 1814  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 47

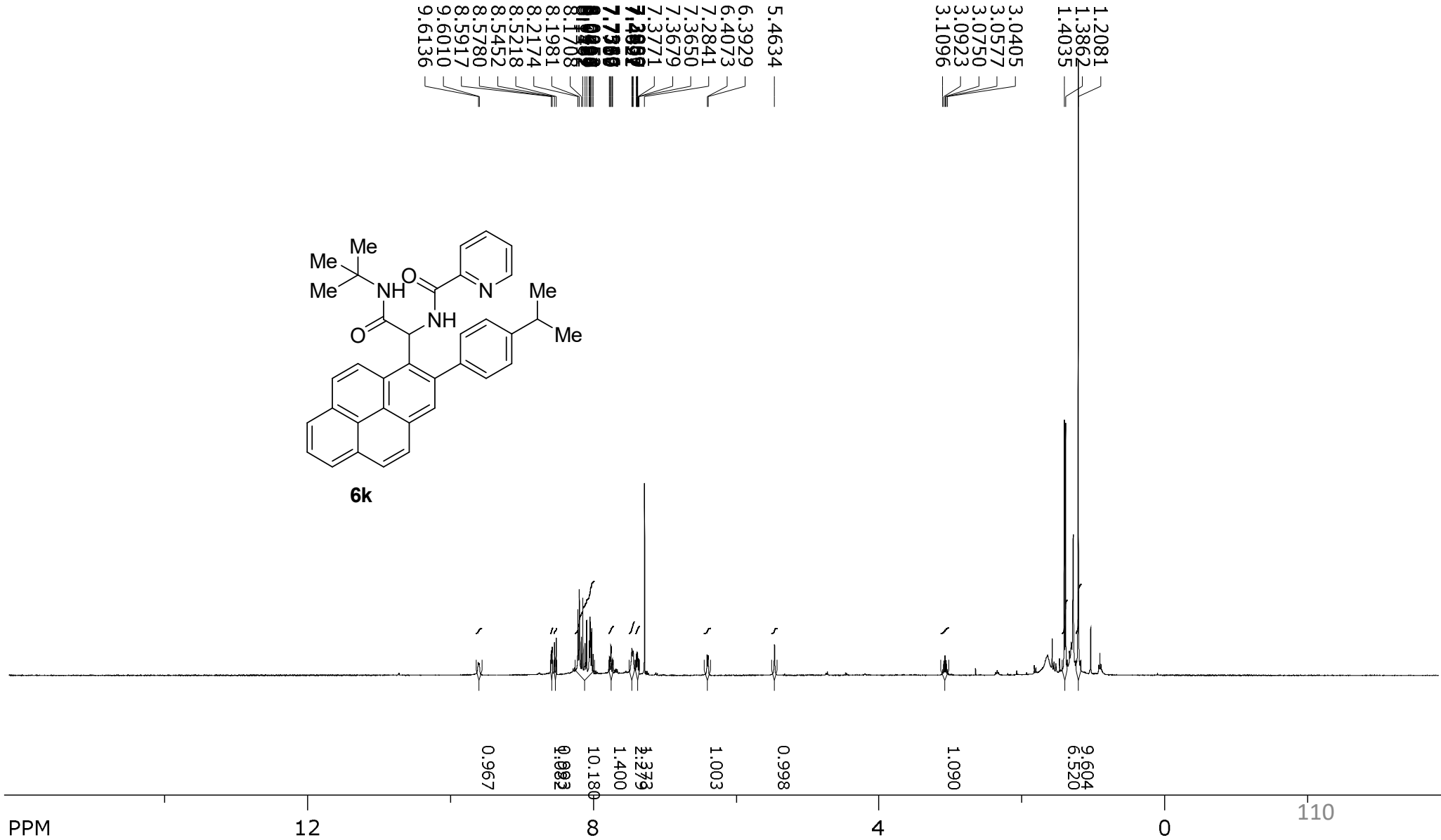


SpinWorks 4: AD 1814  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 47

149.705 —  
148.298 —  
141.350 —  
138.801 —  
137.071 —  
137.580 —  
130.464 —  
131.017 —  
131.126 —  
129.332 —  
128.283 —  
128.721 —  
129.144 —  
127.248 —  
126.158 —  
126.135 —  
125.629 —  
125.527 —  
125.023 —  
124.690 —  
123.871 —  
122.075 —



SpinWorks 4: AD-1957  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 6



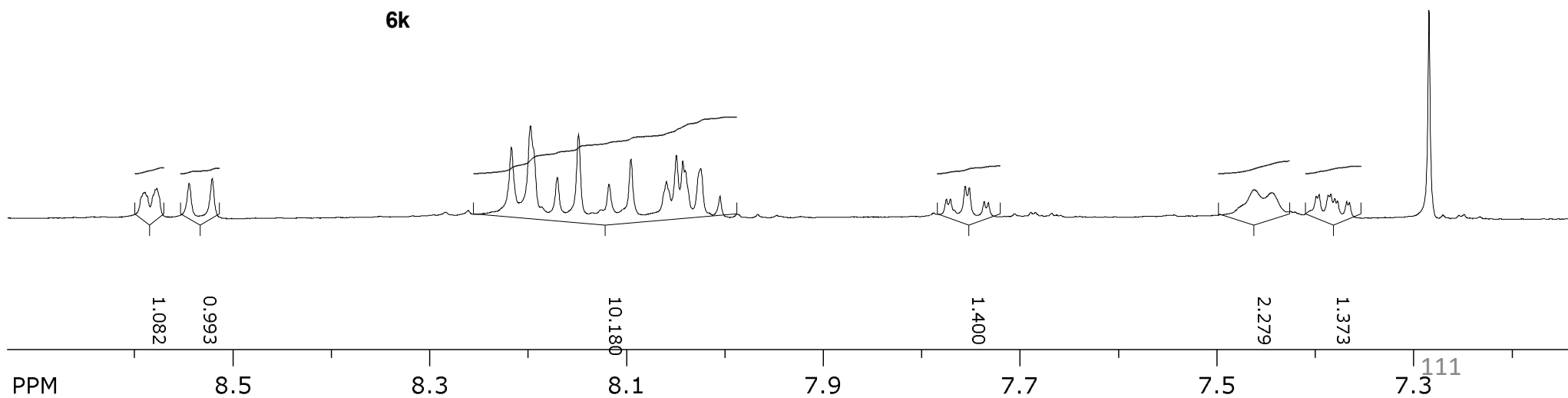
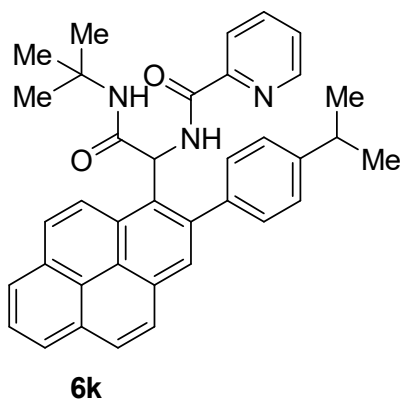
SpinWorks 4: AD-1957  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 6

8.5218  
8.5452  
8.5780  
8.5917

8.0053  
8.0250  
8.0406  
8.0431  
8.0497  
8.0598  
8.0959  
8.1182  
8.1492  
8.1708  
8.1981  
8.2174

7.7323  
7.7366  
7.7517  
7.7559  
7.7709  
7.7750

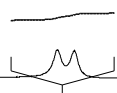
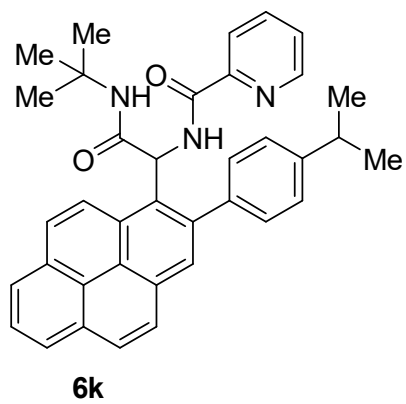
7.2841  
7.3650  
7.3679  
7.3771  
7.3800  
7.3839  
7.3867  
7.3959  
7.3987  
7.4437  
7.4522  
7.4621



SpinWorks 4: AD-1957  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 6

6.3929  
6.4073

5.4634



1.003

0.998

112

PPM 6.6 6.4 6.2 6.0 5.8 5.6 5.4 5.2

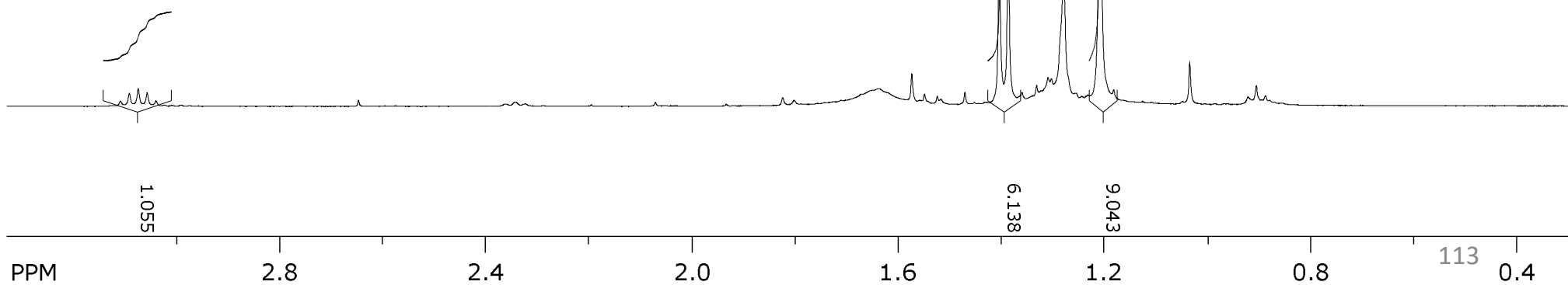
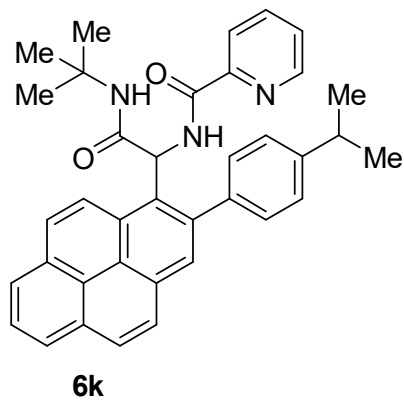


SpinWorks 4: AD-1957  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 6

3.0577  
3.0750  
3.0922

1.3861  
1.4034

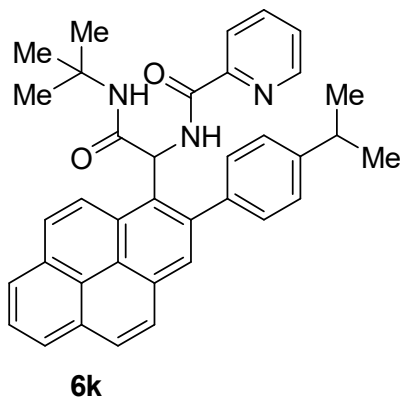
1.2081



SpinWorks 4: AD 1957  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18

122.030  
123.932  
124.698  
125.007  
125.484  
125.574  
126.083  
126.193  
129.103  
129.311  
130.476  
131.001  
131.138  
137.037  
139.103  
141.364  
148.293  
148.381  
149.756  
163.696  
169.532

76.718  
77.035  
77.353  
51.755  
55.239  
33.941  
28.483  
24.011



PPM

160

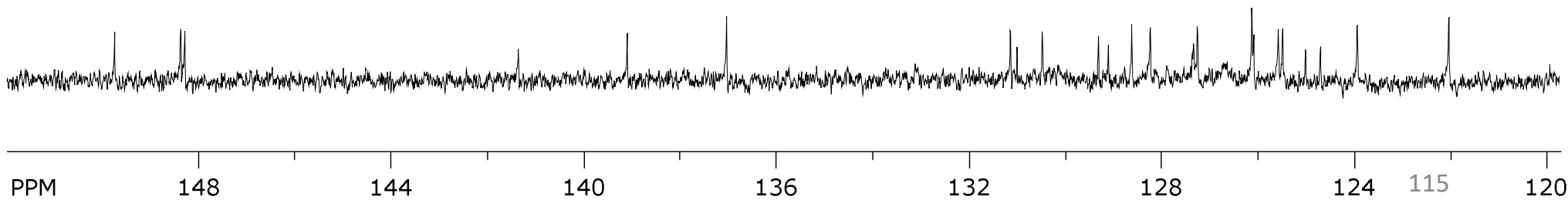
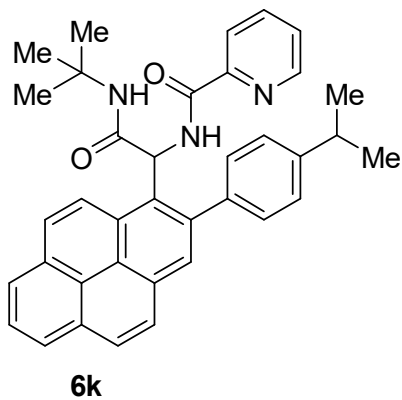
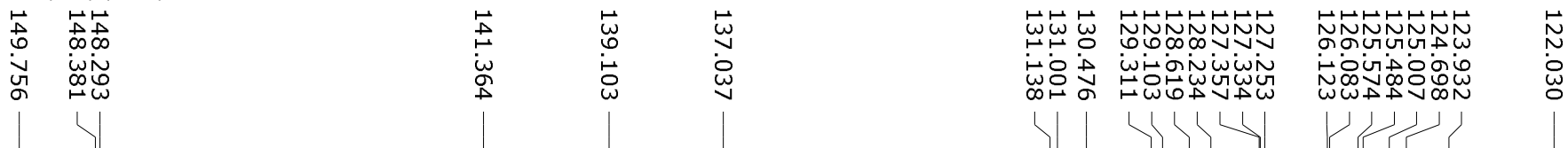
120

80

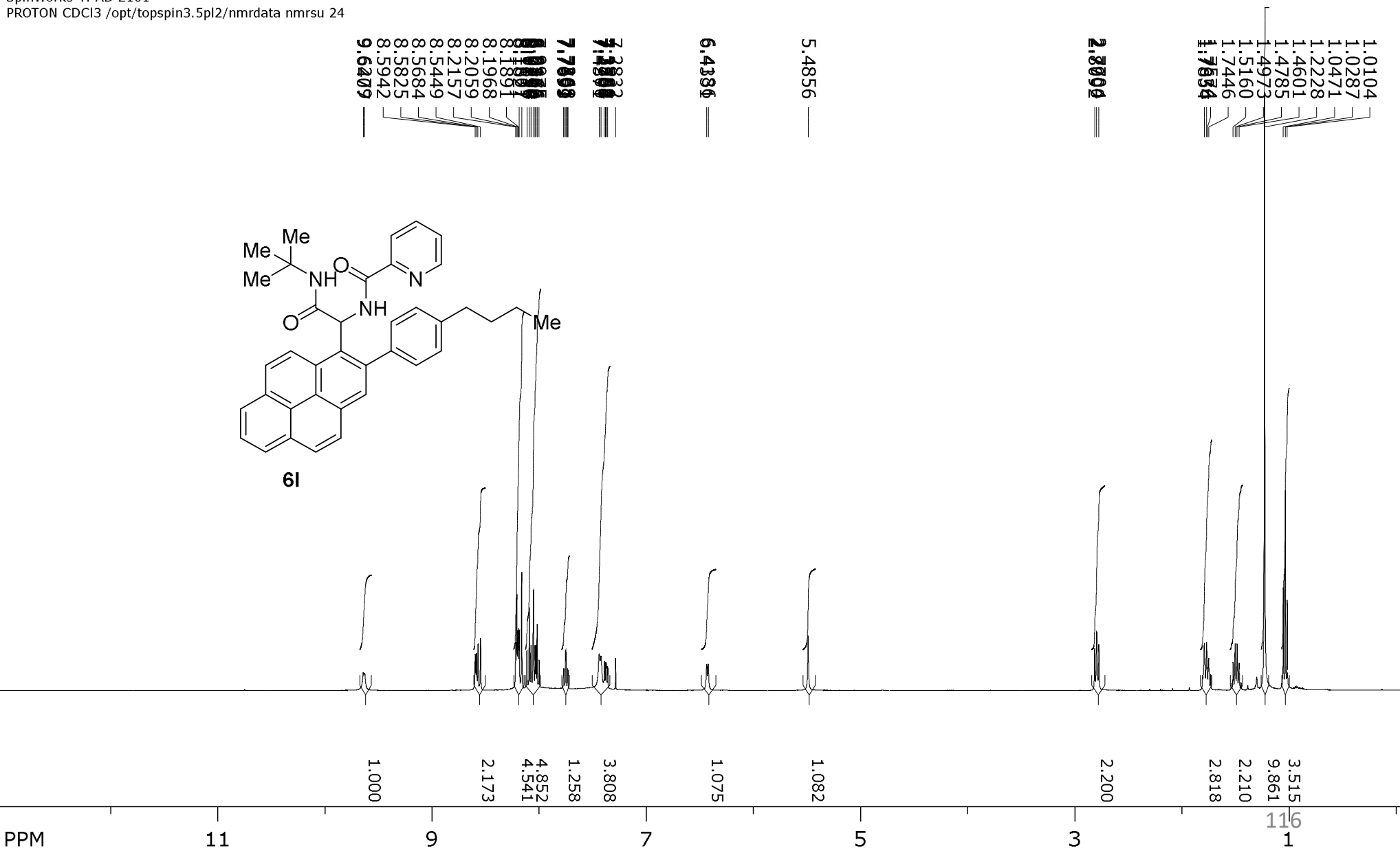
40

114

SpinWorks 4: AD 1957  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18



SpinWorks 4: AD 2101  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 24

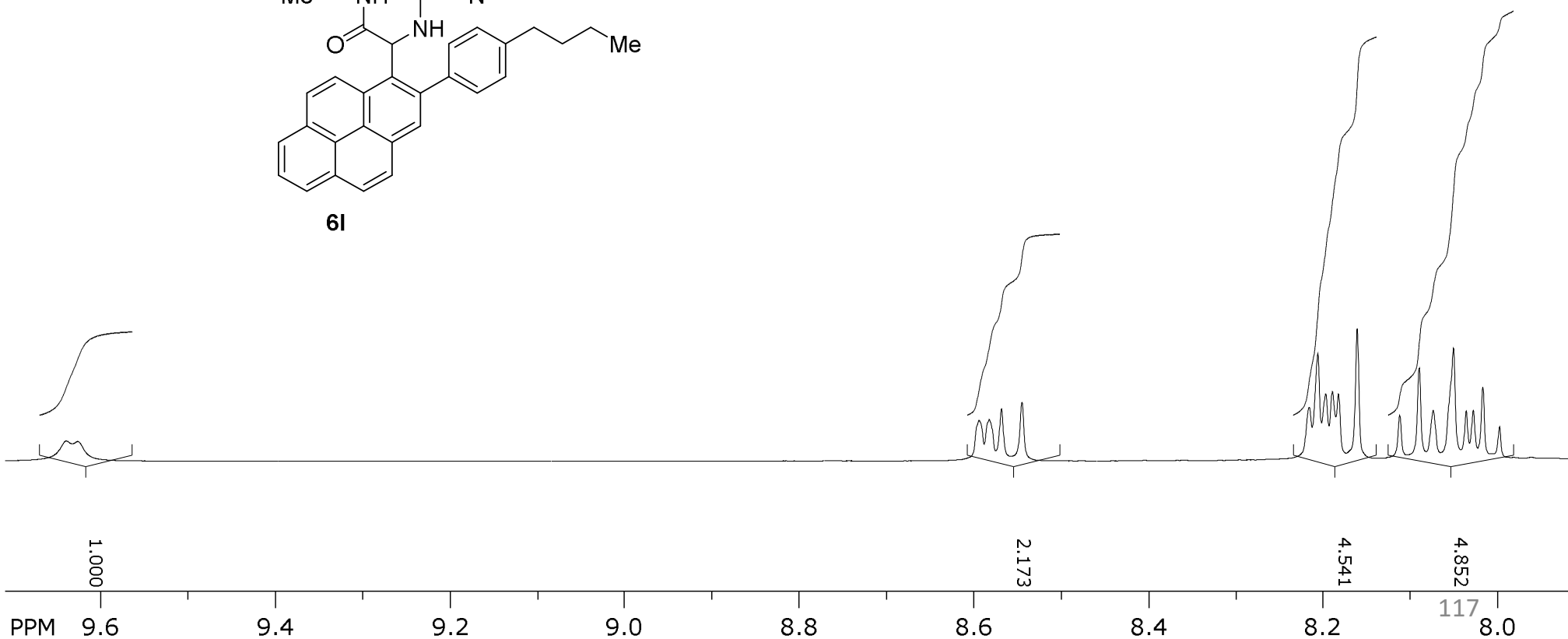
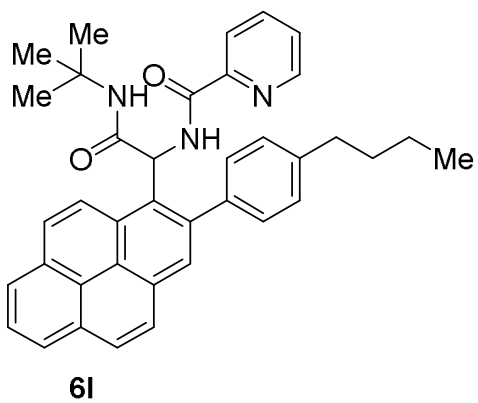


SpinWorks 4: AD 2101  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 24

9.6479  
==

8.5449  
8.5684  
8.5825  
8.5942

7.9975  
8.0166  
8.0276  
8.0356  
8.0504  
8.0734  
8.0896  
8.1119  
8.1607  
8.1821  
8.1891  
8.1968  
8.2059  
8.2157

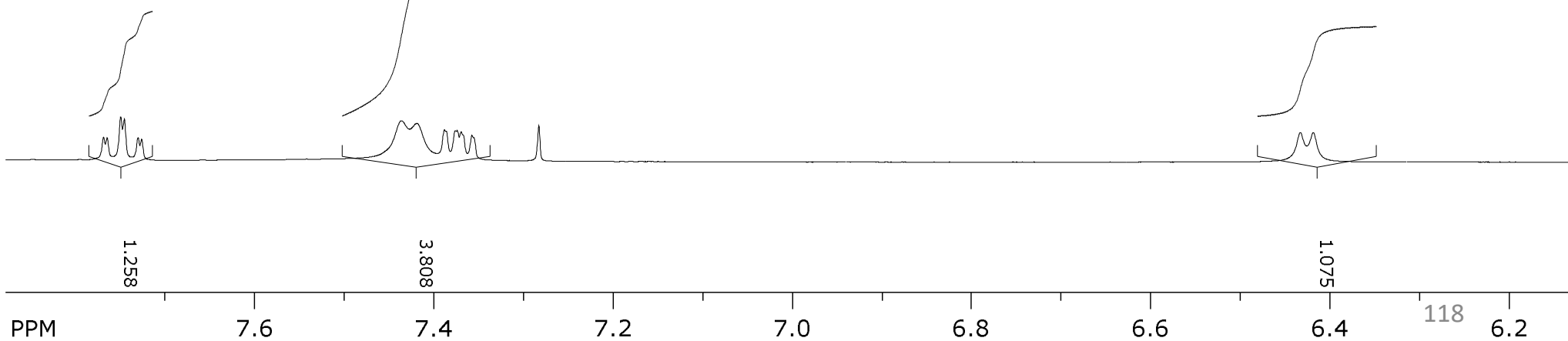
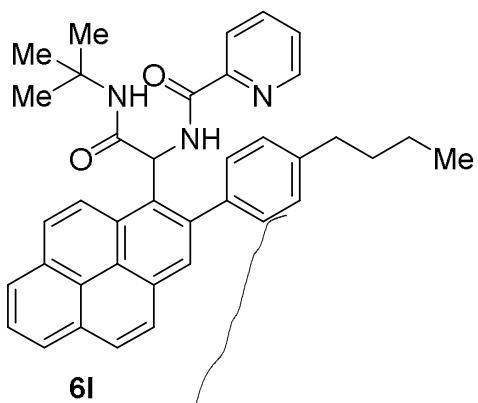


SpinWorks 4: AD 2101  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 24

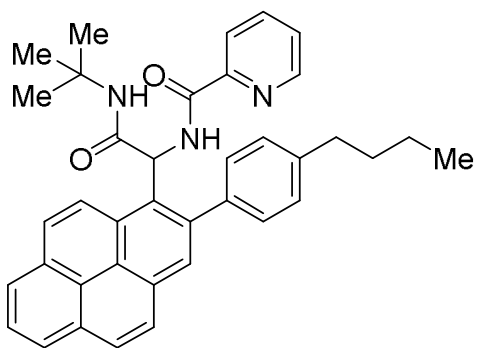
7.7268  
7.7308  
7.7461  
7.7501  
7.7653  
7.7693

7.2832  
7.3580  
7.3701  
7.3744  
7.3767  
7.3888  
7.4200  
7.4371

6.4186  
6.4331



SpinWorks 4: AD 2101  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 24



2.7704  
2.7900  
2.8092

1.7446  
1.7574  
1.7636  
1.7854

1.4601  
1.4785  
1.4973  
1.5160

1.22228

1.0104  
1.0287  
1.0471



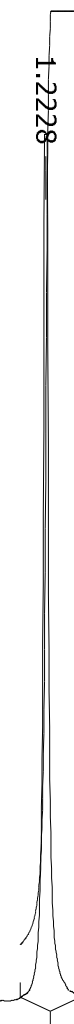
2.200



2.818



2.210



9.861



3.515

PPM

2.8

2.4

2.0

1.6

1.2

119

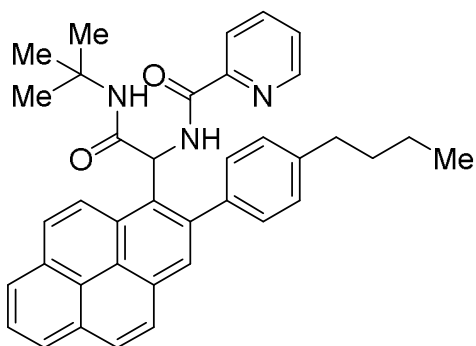
0.8



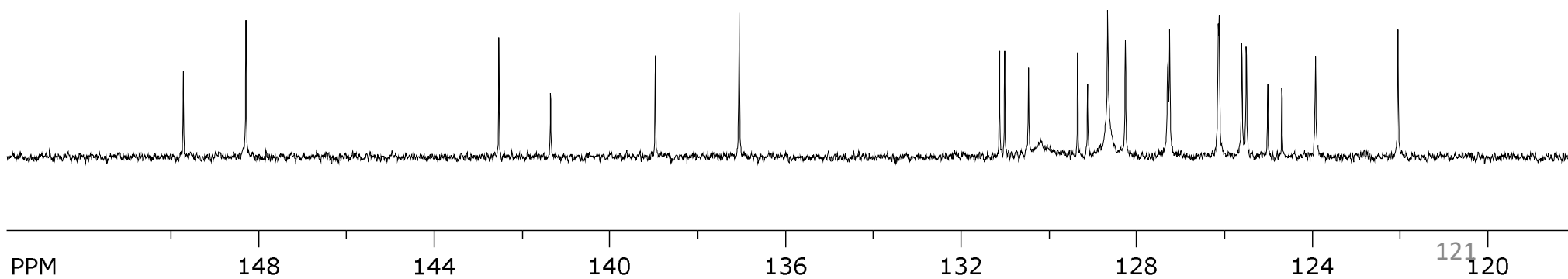


SpinWorks 4: AD-2101  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 8

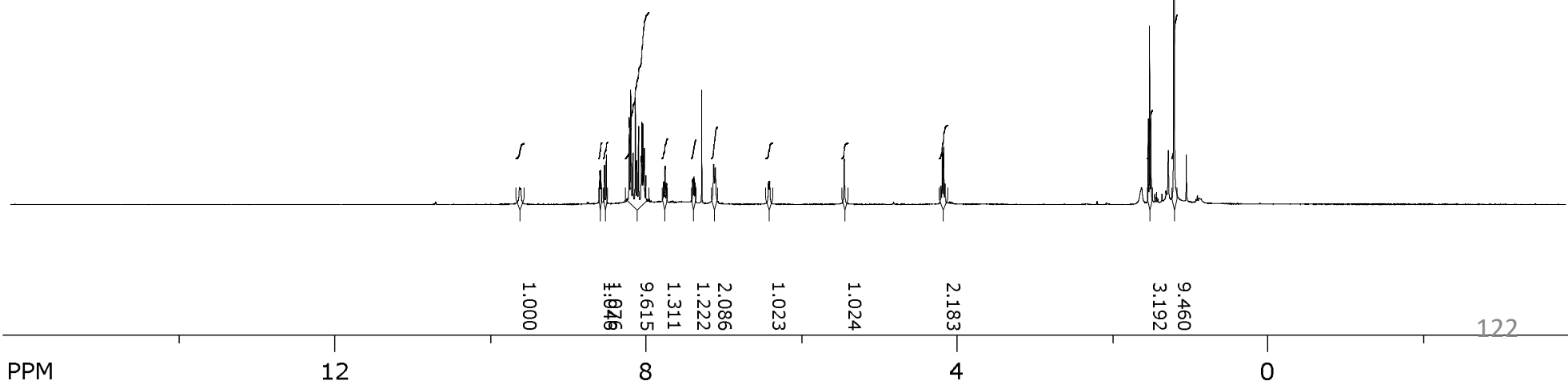
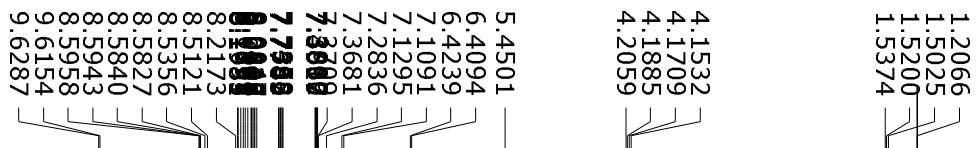
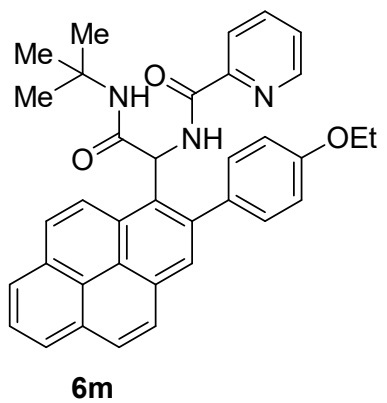
149.728 —  
148.300 —  
142.533 —  
141.356 —  
138.969 —  
137.058 —  
122.041 —  
123.921 —  
124.689 —  
125.011 —  
125.498 —  
125.600 —  
126.120 —  
126.135 —  
127.245 —  
127.288 —  
128.256 —  
128.658 —  
129.116 —  
129.343 —  
130.198 —  
130.462 —  
131.006 —  
131.122 —



6I



SpinWorks 4: SUB-61  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 24

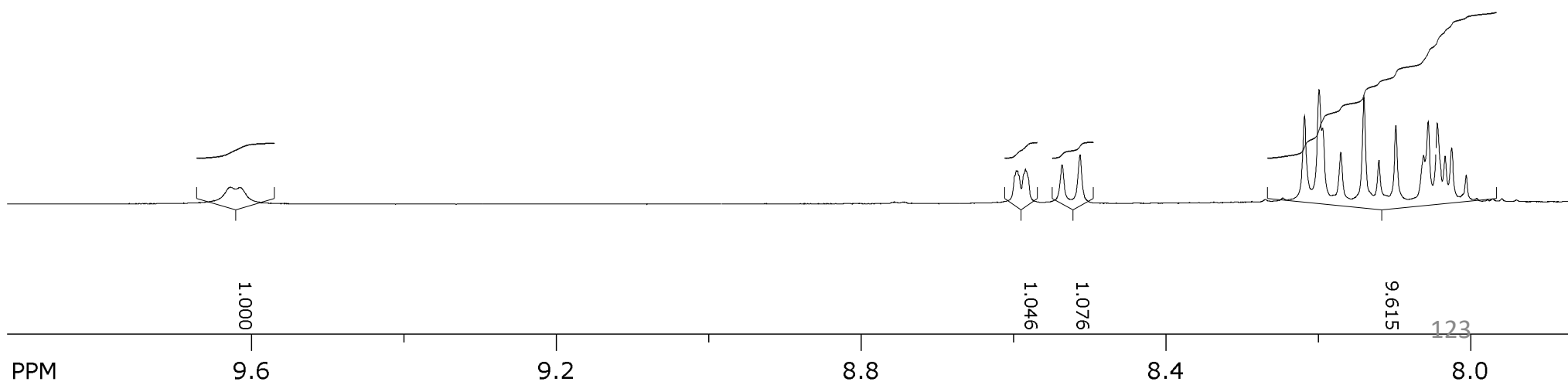
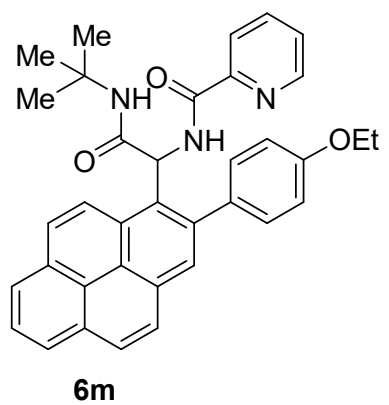


SpinWorks 4: SUB-61  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 24

9.6154  
9.6287

8.5121  
8.5356  
8.5827  
8.5840  
8.5943  
8.5958

8.0047  
8.0249  
8.0427  
8.0548  
8.0608  
8.0972  
8.1195  
8.1391  
8.1695  
8.1935  
8.1981  
8.2173



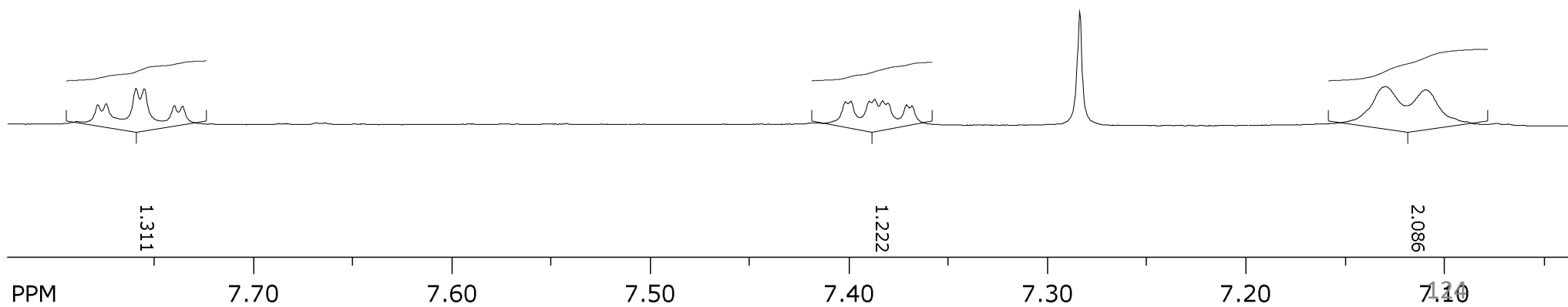
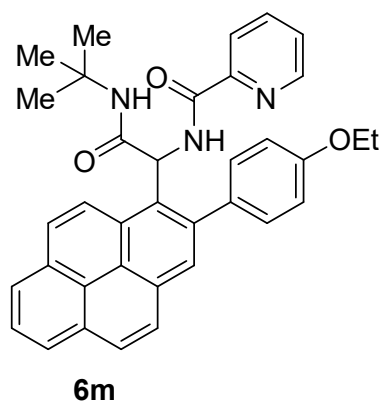
SpinWorks 4: SUB-61  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 24

7.7358  
7.7400  
7.7552  
7.7593  
7.7743  
7.7785

7.3681  
7.3709  
7.3802  
7.3830  
7.3869  
7.3897  
7.3990  
7.4017

7.2836

7.1091  
7.1295

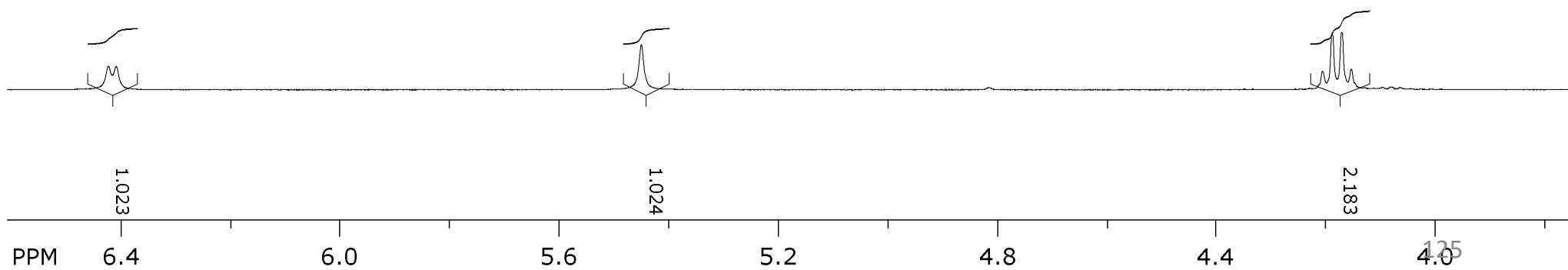
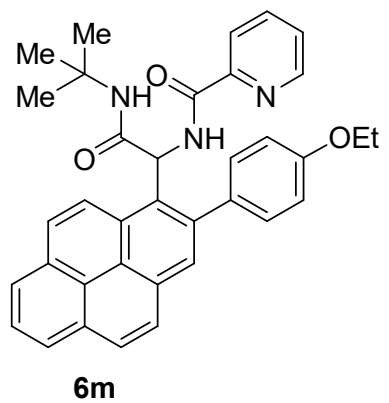


SpinWorks 4: SUB-61  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 24

6.4094  
6.4239

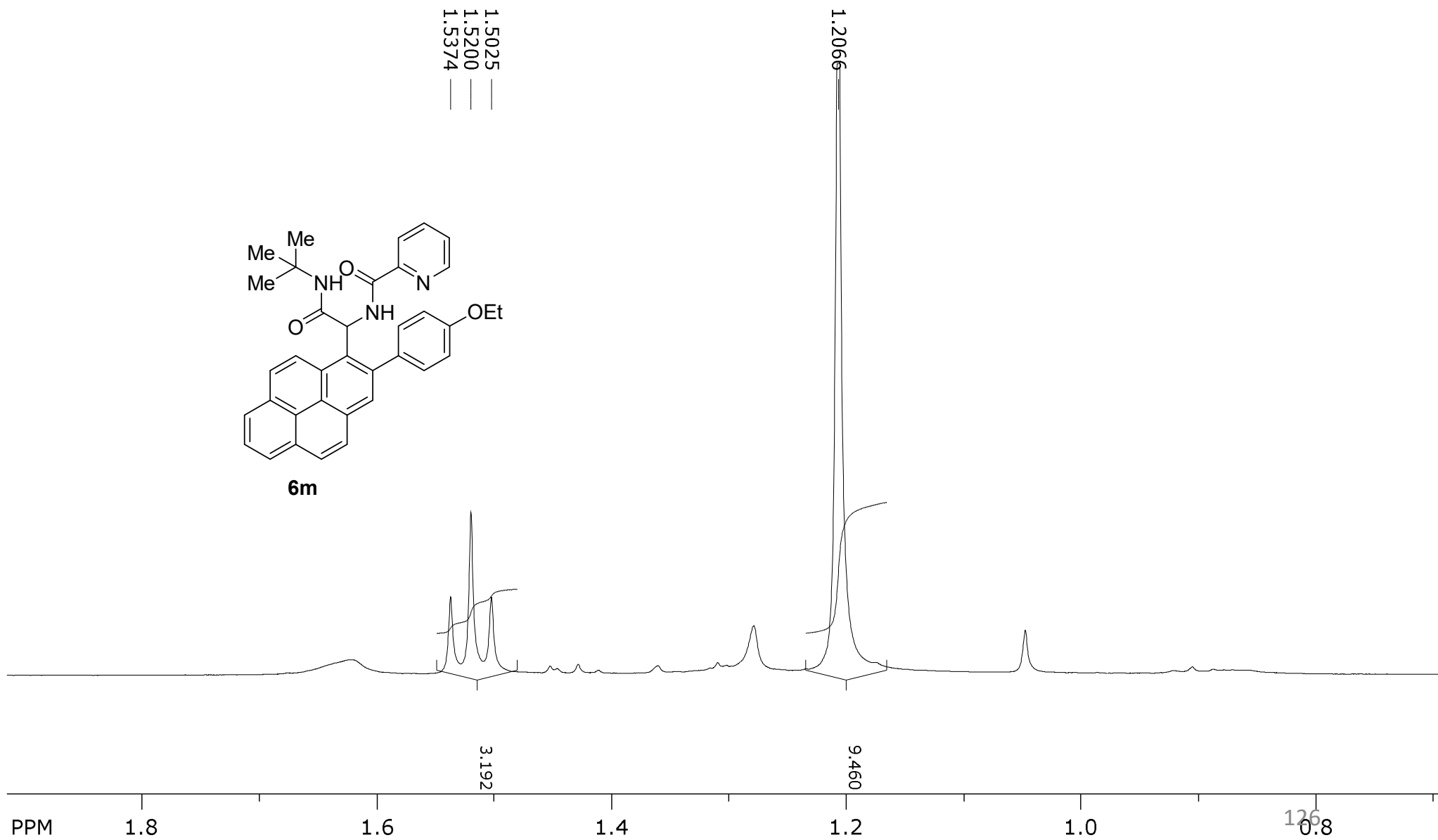
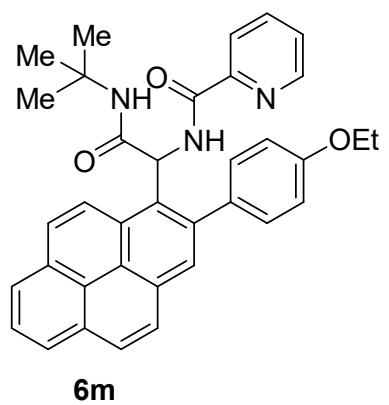
5.4501

4.1532  
4.1709  
4.1885  
4.2059

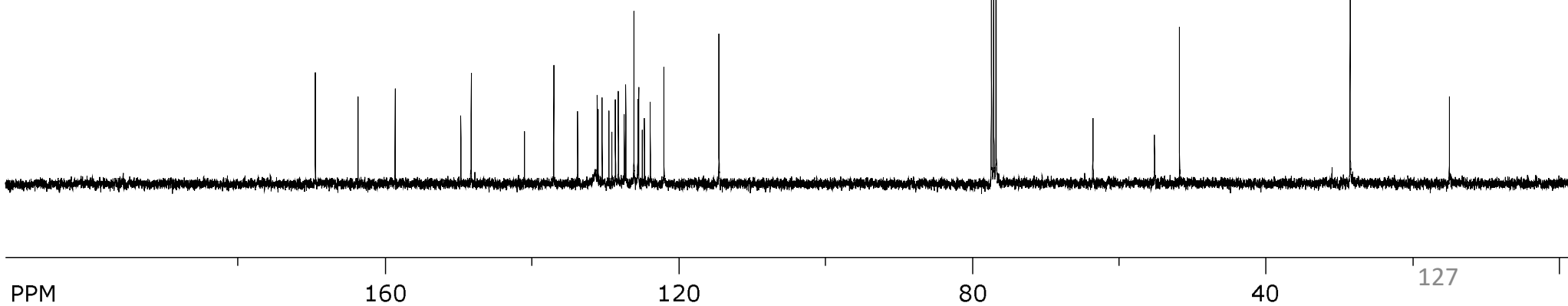
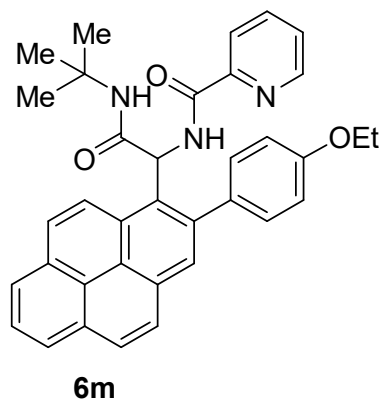


SpinWorks 4: SUB-61  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 24

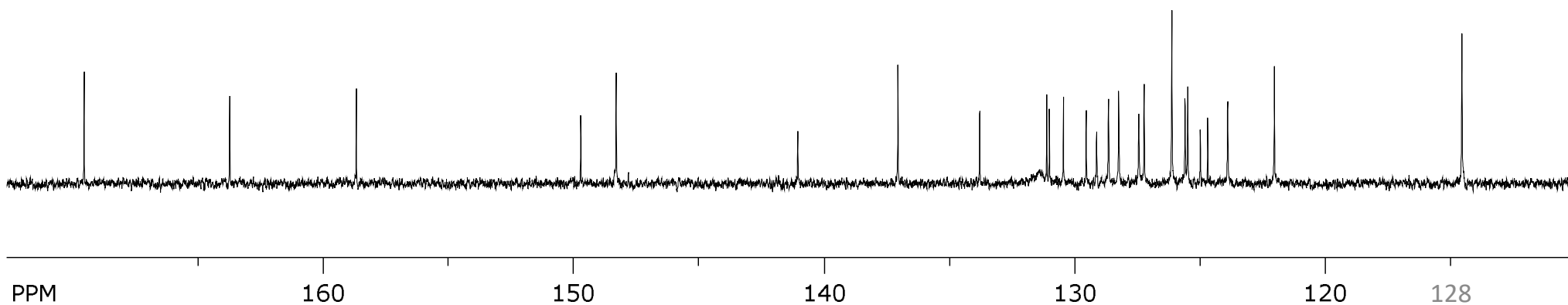
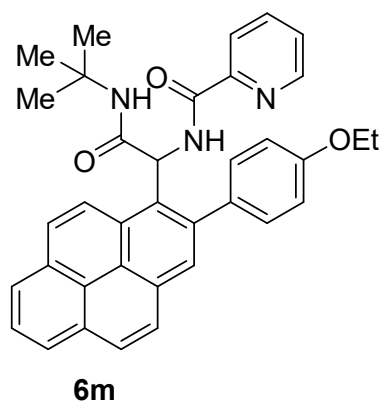
1.5025  
1.5200  
1.5374



SpinWorks 4: SUB 61  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18

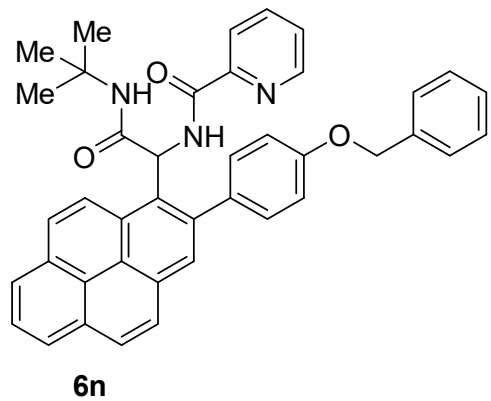


SpinWorks 4: SUB 61  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18

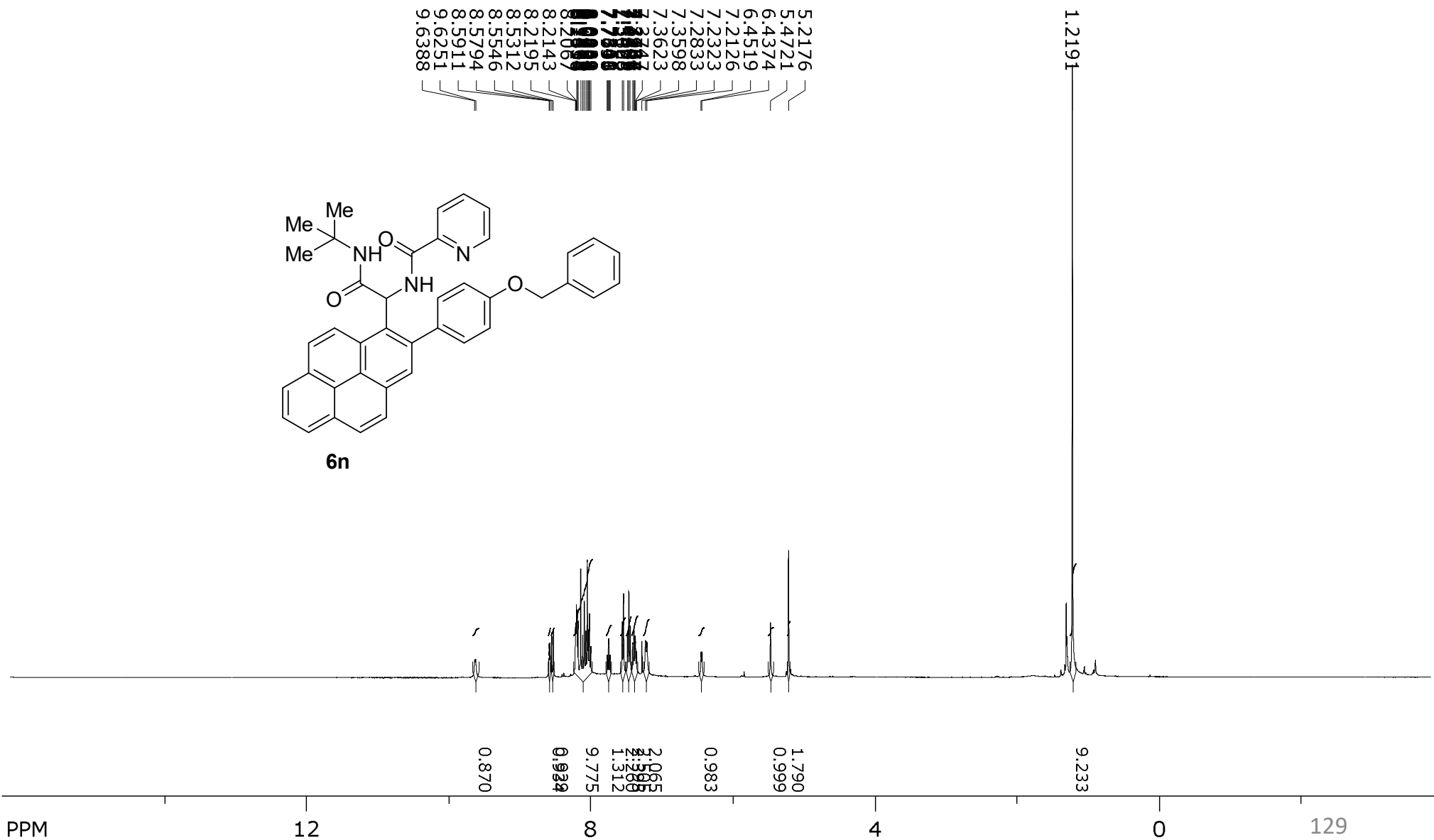




SpinWorks 4: AD 2086  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 21



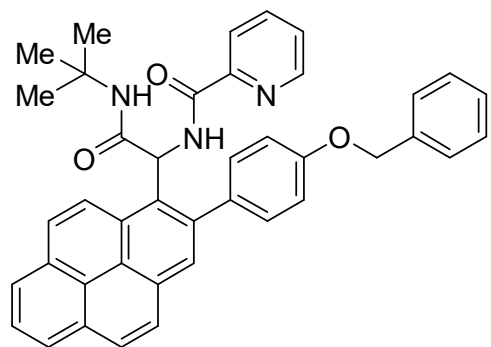
9.6388  
9.6251  
9.5911  
8.5794  
8.5546  
8.5312  
8.2195  
8.2143  
8.2067  
7.9919  
7.9868  
7.9817  
7.3623  
7.3598  
7.3598  
7.2833  
7.2323  
7.2126  
7.2126  
6.4519  
6.4374  
5.4721  
5.2176



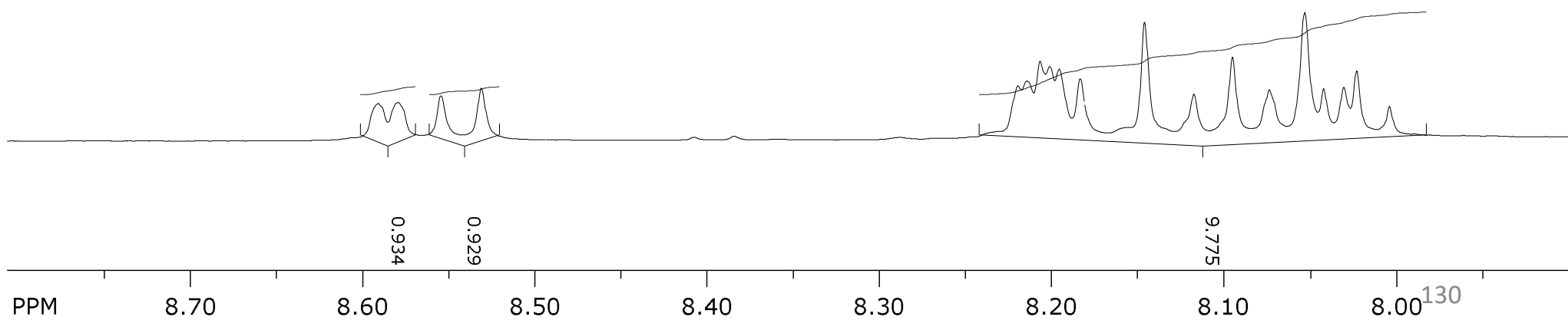
SpinWorks 4: AD 2086  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 21

8.5312 —  
8.5546 —  
8.5794 —  
8.5911 —

8.0039 —  
8.0229 —  
8.0304 —  
8.0420 —  
8.0531 —  
8.0736 —  
8.0950 —  
8.1175 —  
8.1460 —  
8.1834 —  
8.1956 —  
8.2010 —  
8.2067 —  
8.2143 —  
8.2195 —



**6n**



SpinWorks 4: AD 2086  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 21

7.7310  
7.7351  
7.7503  
7.7543  
7.7695  
7.7736

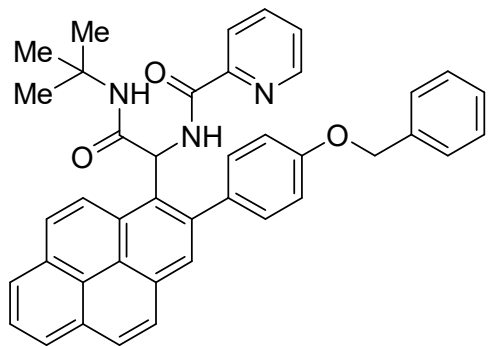
7.5423  
7.5606

7.4855  
7.4677  
7.4486

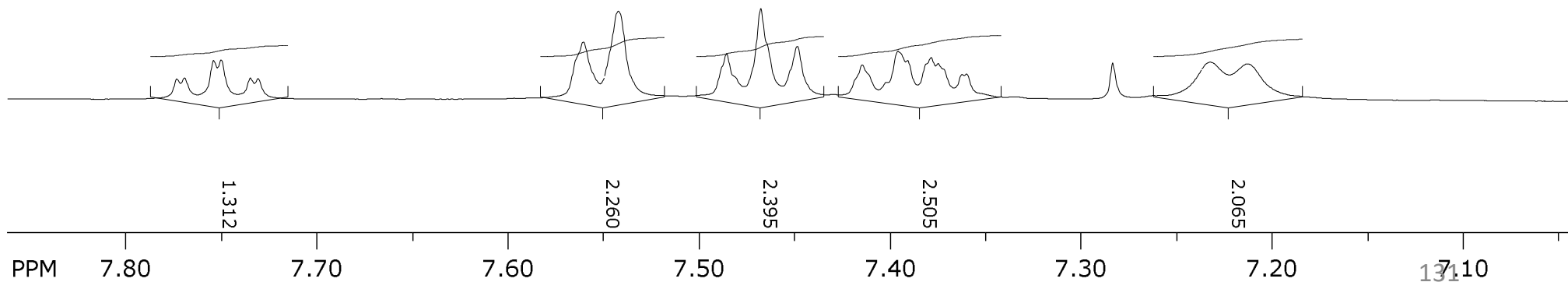
7.4145  
7.3957  
7.3907  
7.3784  
7.3747  
7.3623  
7.3598

7.2833

7.2323  
7.2126



6n

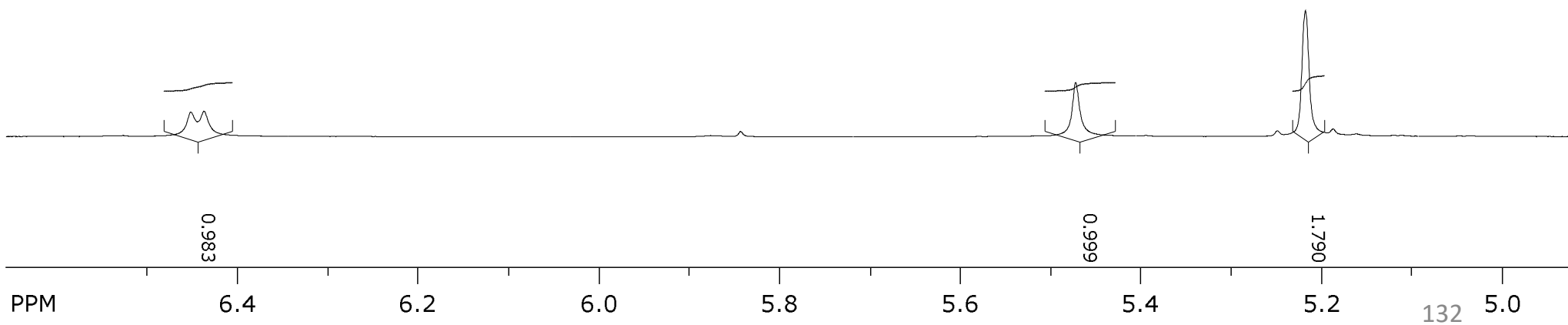
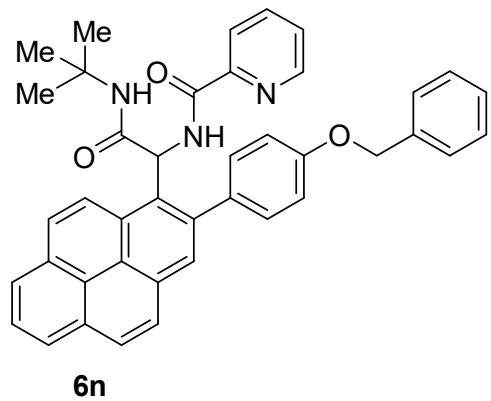


SpinWorks 4: AD 2086  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 21

6.4374  
6.4519

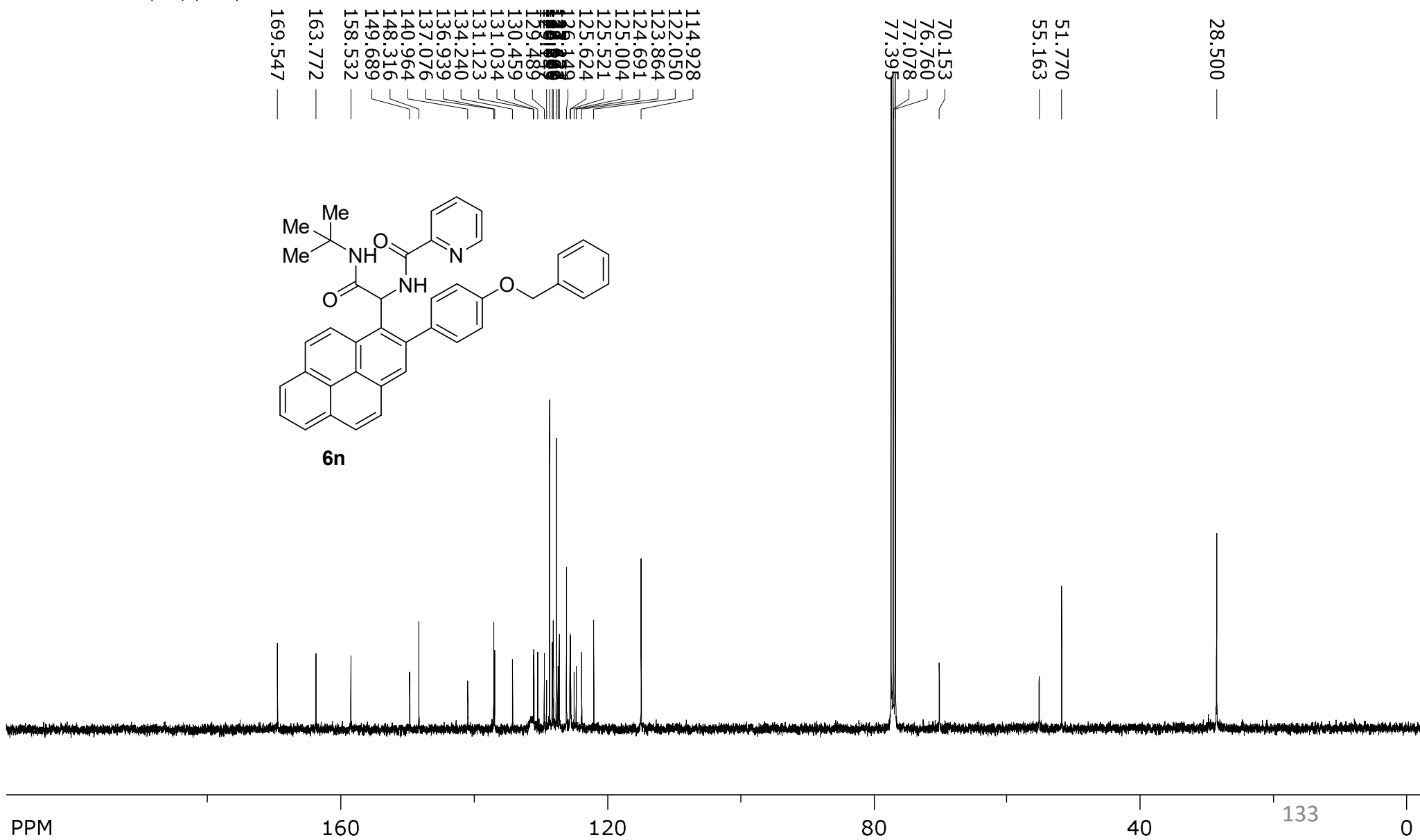
5.4721

5.2176



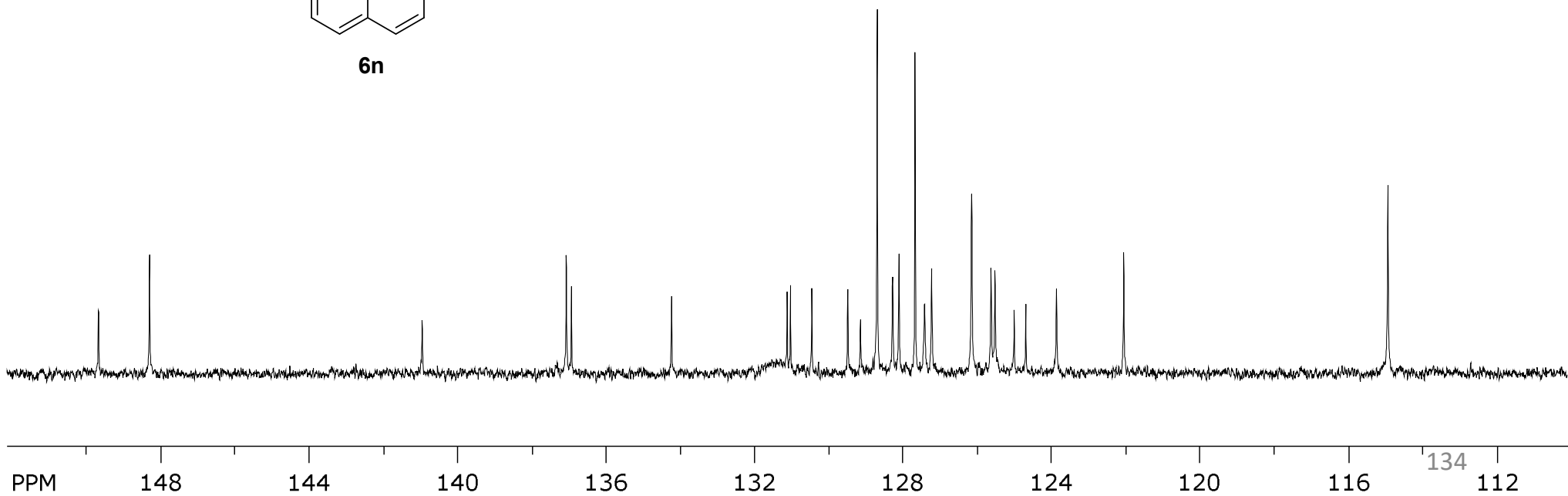
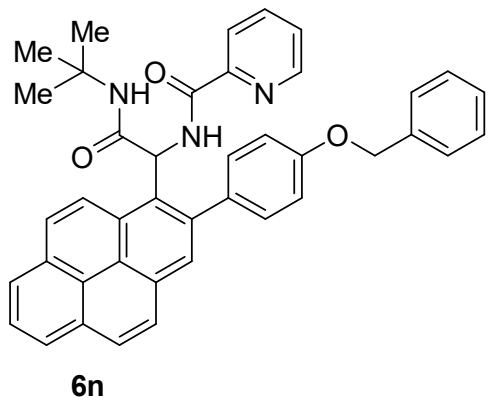
SpinWorks 4: AD-2086

C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 14

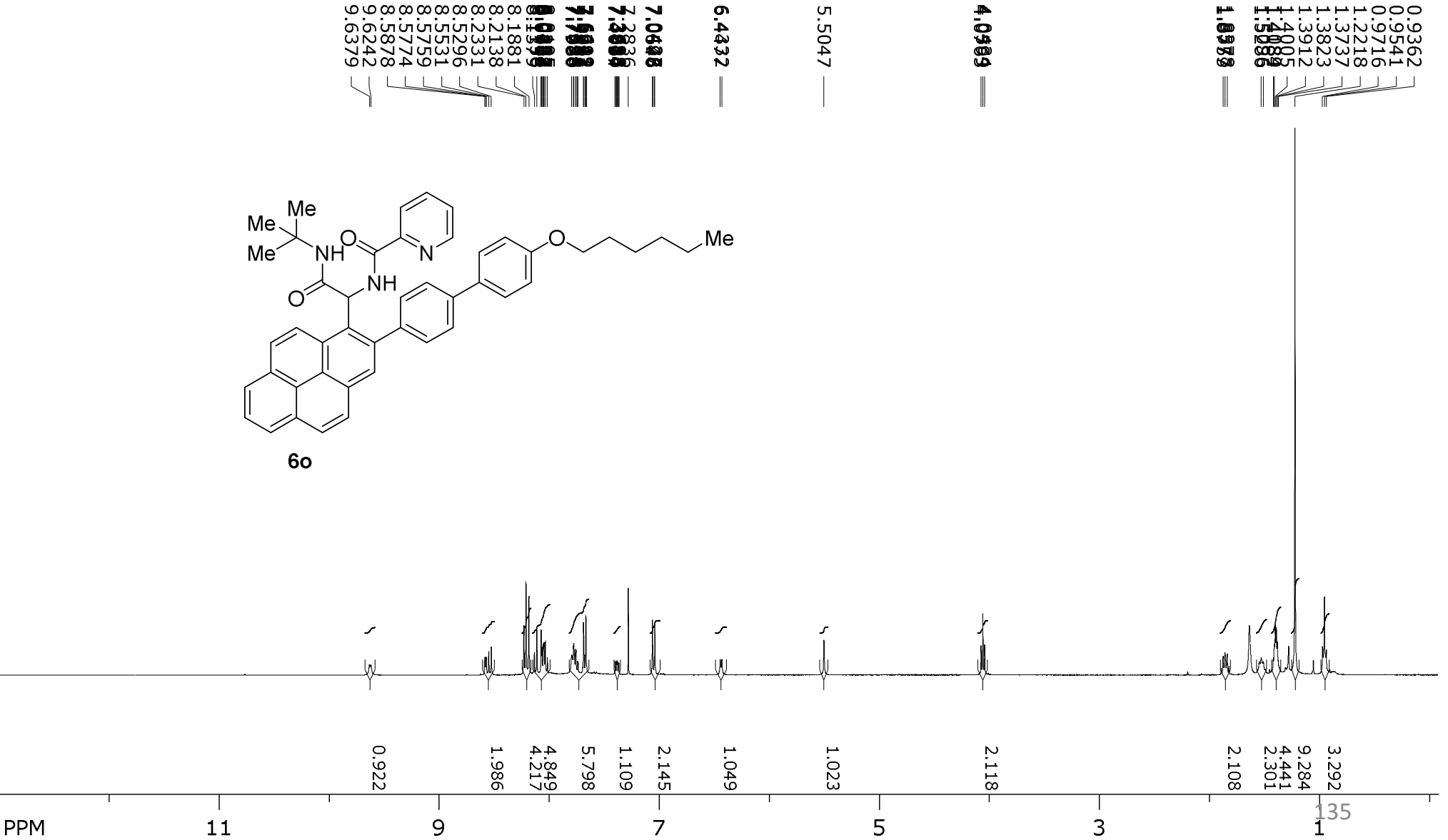


SpinWorks 4: AD-2086  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 14

149.689 —  
148.316 —  
140.964 —  
137.076 —  
136.939 —  
134.240 —  
131.123 —  
131.034 —  
130.459 —  
129.489 —  
129.147 —  
128.695 —  
128.280 —  
128.109 —  
127.673 —  
127.421 —  
127.227 —  
126.149 —  
125.624 —  
125.521 —  
125.004 —  
124.691 —  
123.864 —  
122.050 —  
114.928 —



SpinWorks 4: SUB-60  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 22



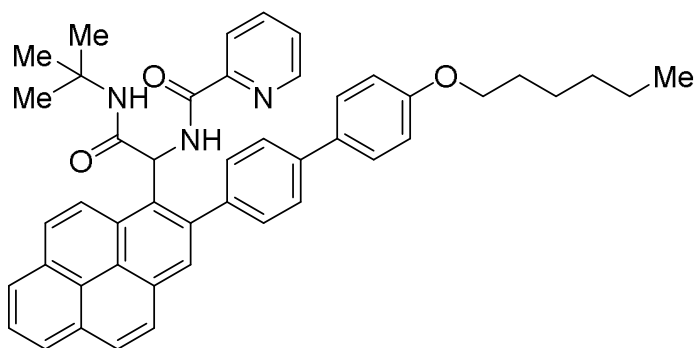
SpinWorks 4: SUB-60  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 22

8.5759  
8.5774  
8.5878  
8.5296  
8.5531

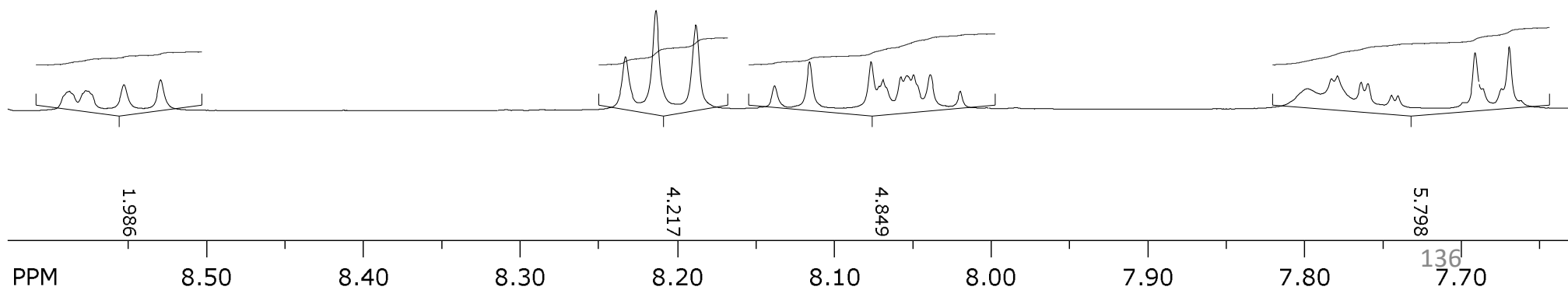
8.2331  
8.2138  
8.1881

8.1379  
8.1156  
8.0764  
8.0712  
8.0688  
8.0574  
8.0537  
8.0493  
8.0387  
8.0195

7.7980  
7.7828  
7.7788  
7.7638  
7.7595  
7.7444  
7.7402  
7.6911  
7.6862  
7.6742  
7.6619



60



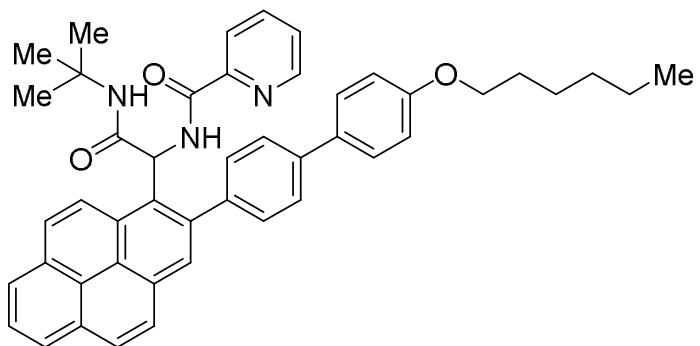


SpinWorks 4: SUB-60  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 22

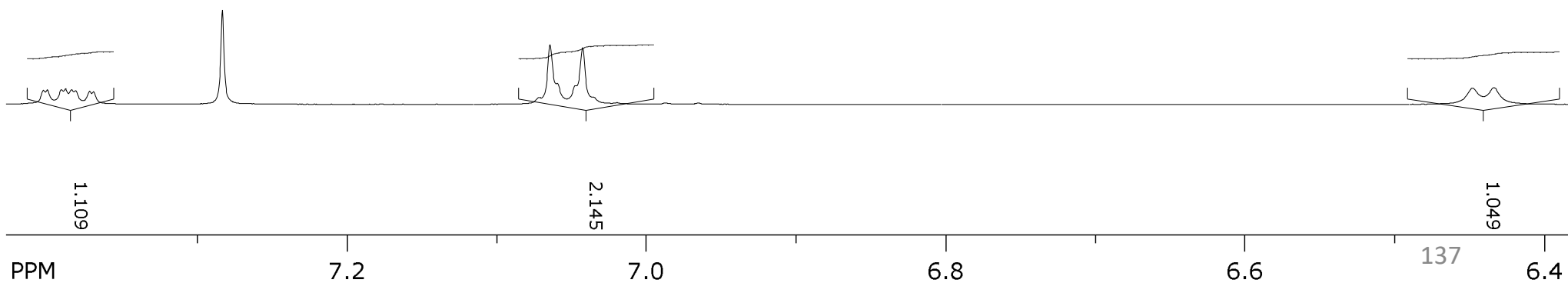
7.3698  
7.3725  
7.3818  
7.3846  
7.3886  
7.3914  
7.4007  
7.4034  
7.2836

7.0427  
7.0475  
7.0598  
7.0646

6.4332  
6.4477



60



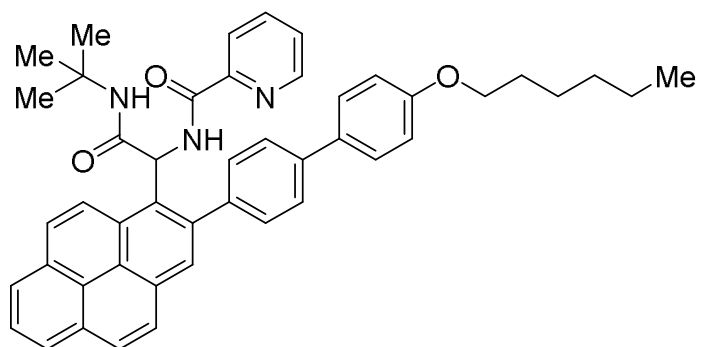
SpinWorks 4: SUB-60  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 22

4.0434  
4.0599  
4.0763

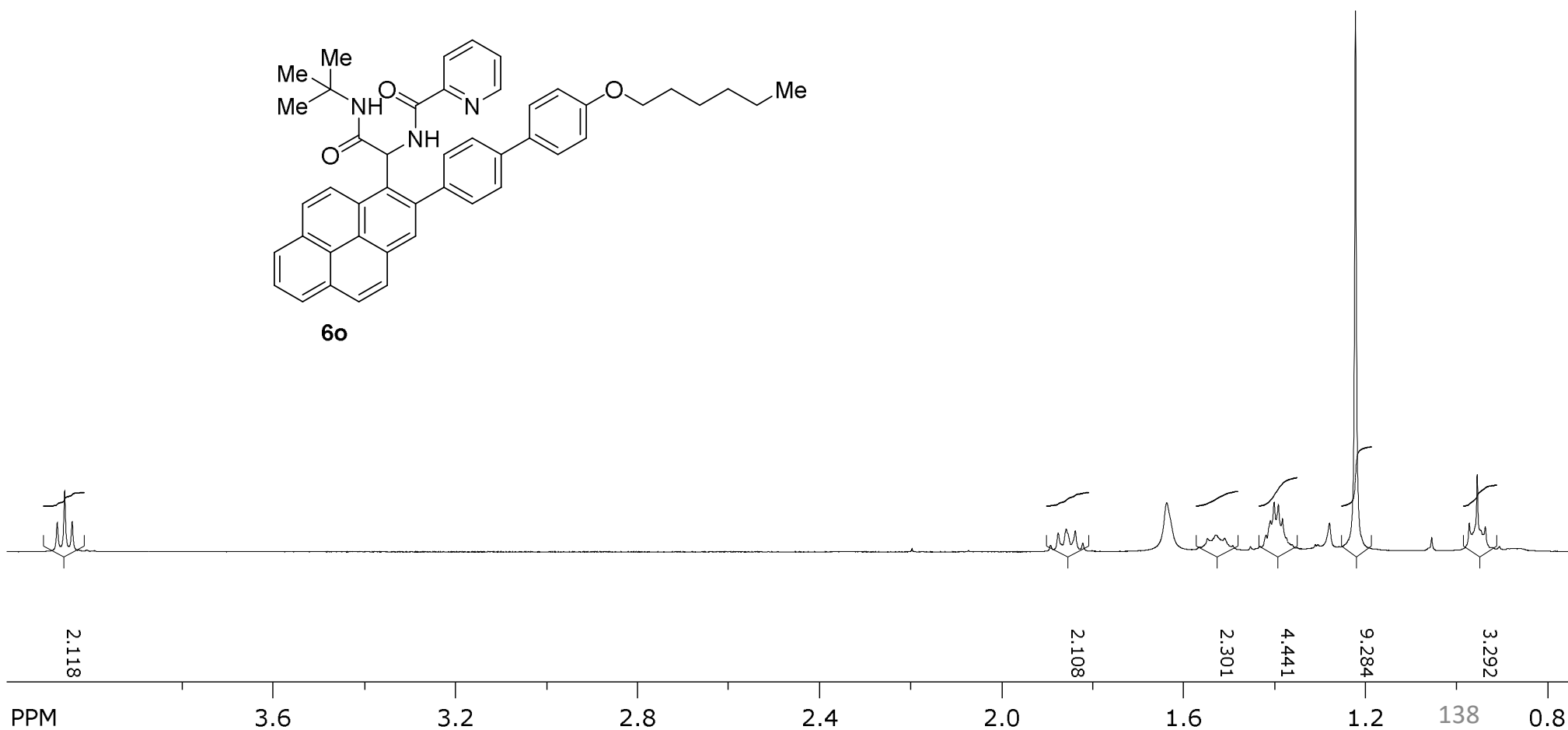
1.8378  
1.8577  
1.8753

1.2218  
1.3737  
1.3823  
1.3912  
1.4005  
1.4089  
1.4184  
1.5096  
1.5286

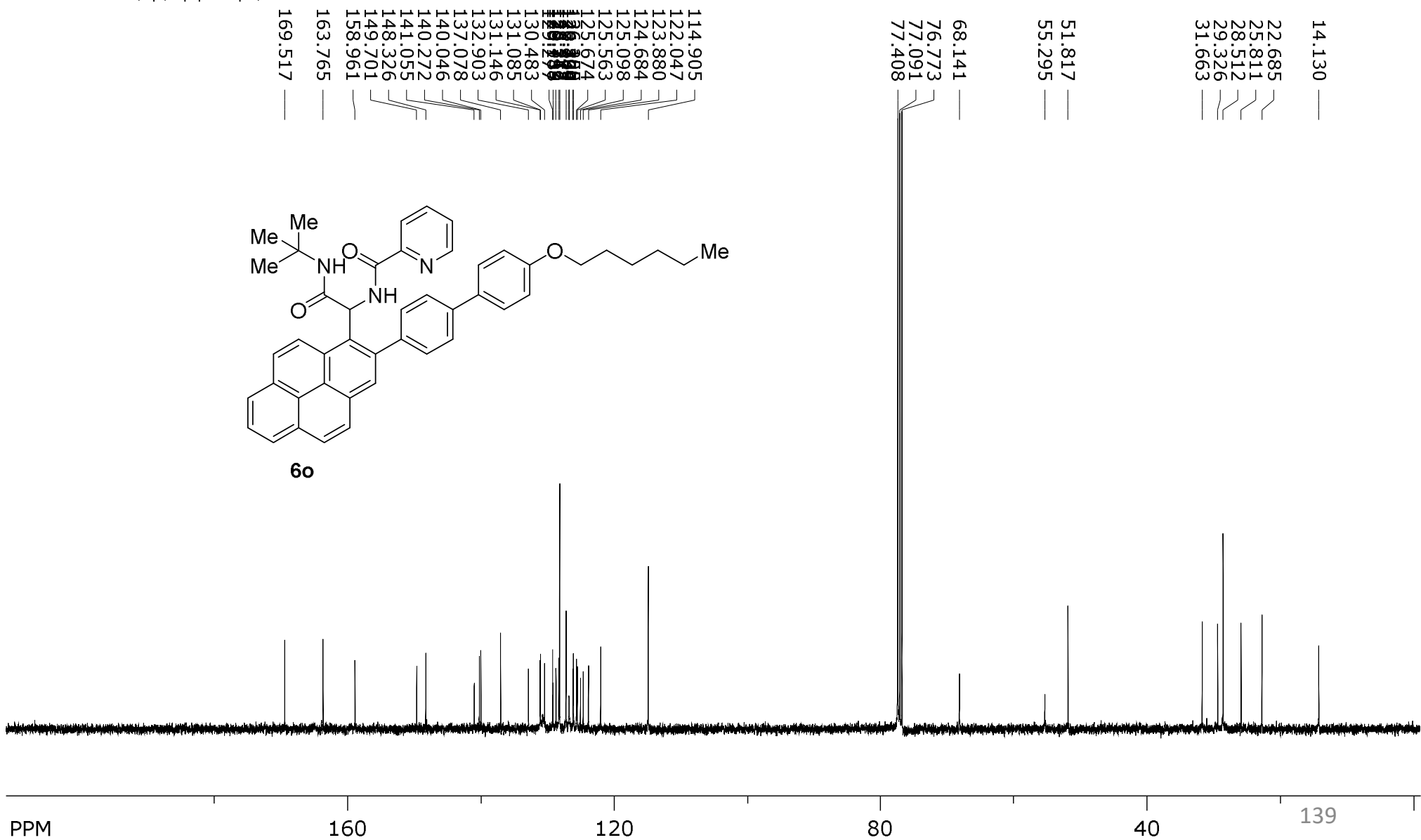
0.9362  
0.9541  
0.9716



60



SpinWorks 4: SUB-60  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 5



SpinWorks 4: SUB-60  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 5

149.701

148.326

140.046  
140.272  
141.055

137.078

132.903

131.085

131.146

130.483

129.277

129.188

128.759

128.342

128.212

127.249

126.805

126.794

126.769

126.205

126.150

125.674

125.563

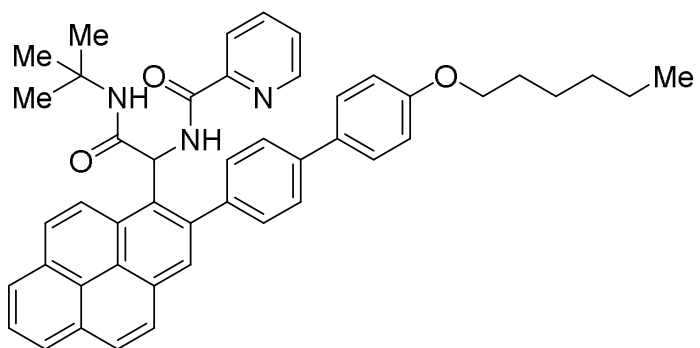
125.098

124.684

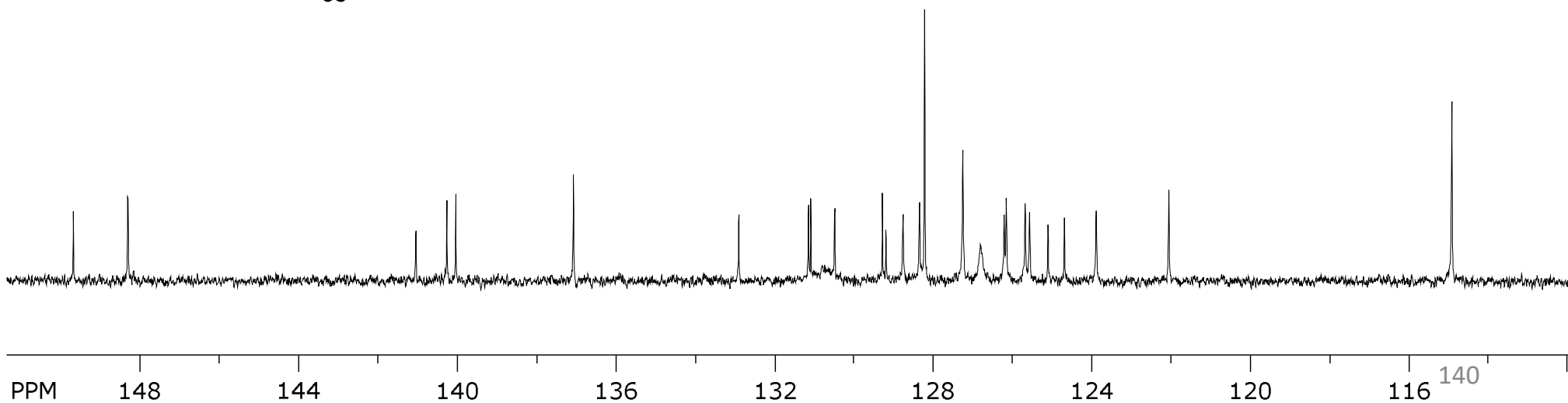
123.880

122.047

114.905



6o



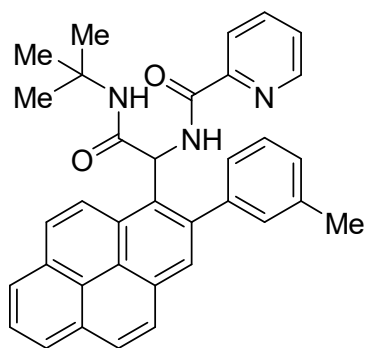
SpinWorks 4: SUB-47 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 32

6.3997  
6.4138  
7.2836  
7.3456  
7.3647  
7.3740  
7.3768  
7.3808  
7.3988  
7.3988  
7.7988  
7.7988  
8.1933  
8.2007  
8.2084  
8.2171  
8.2273  
8.5532  
8.5767  
8.5875  
9.5674

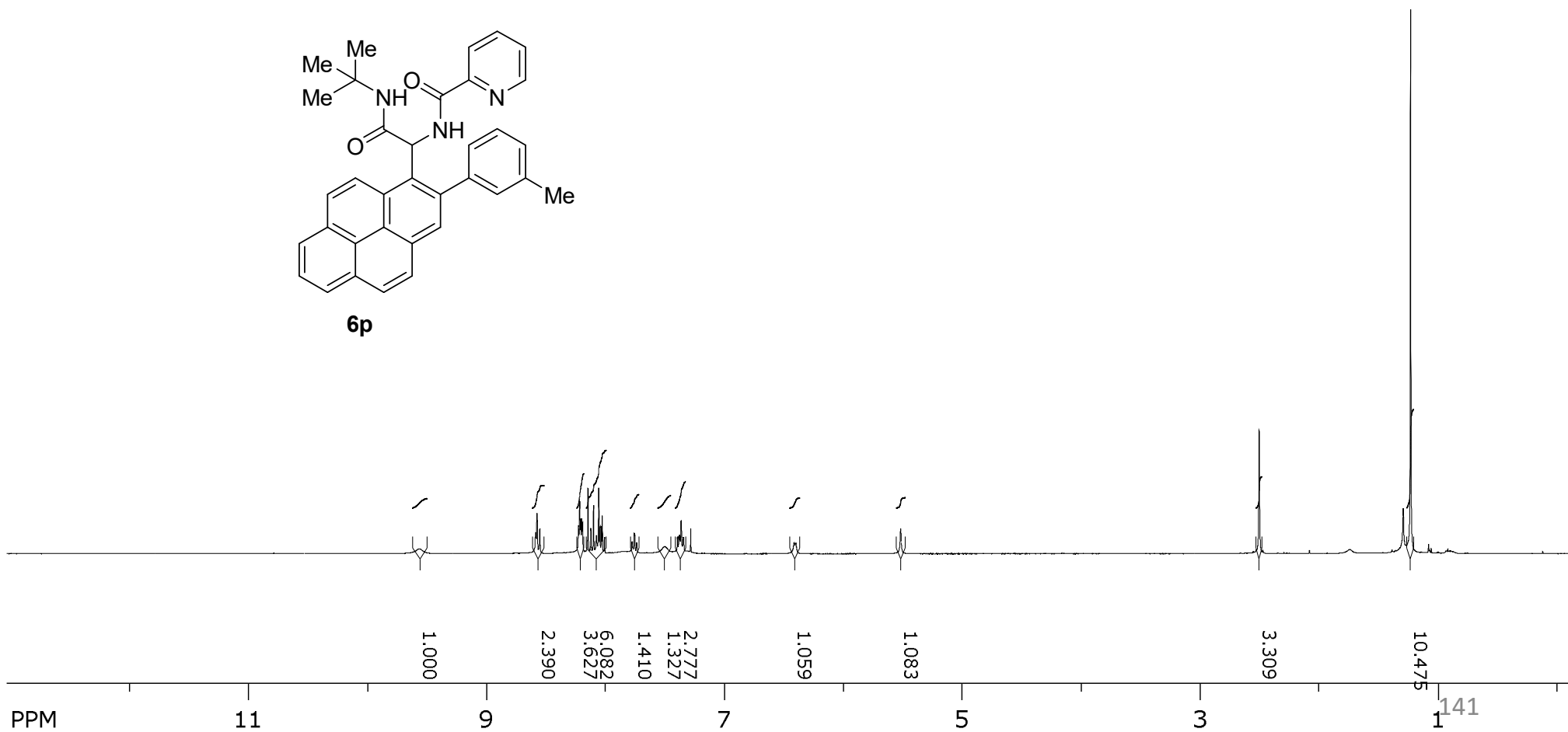
5.5176

2.5017

1.2283



6p



SpinWorks 4: SUB-47 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 32

8.5532  
8.5767  
8.5875

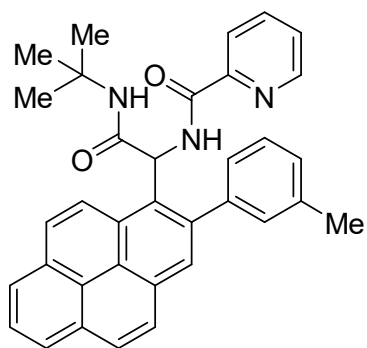
8.1933  
8.2007  
8.2084  
8.2171  
8.2273

8.1477  
8.1233  
8.1010  
8.0771  
8.0574  
8.0470  
8.0350  
8.0279  
8.0088

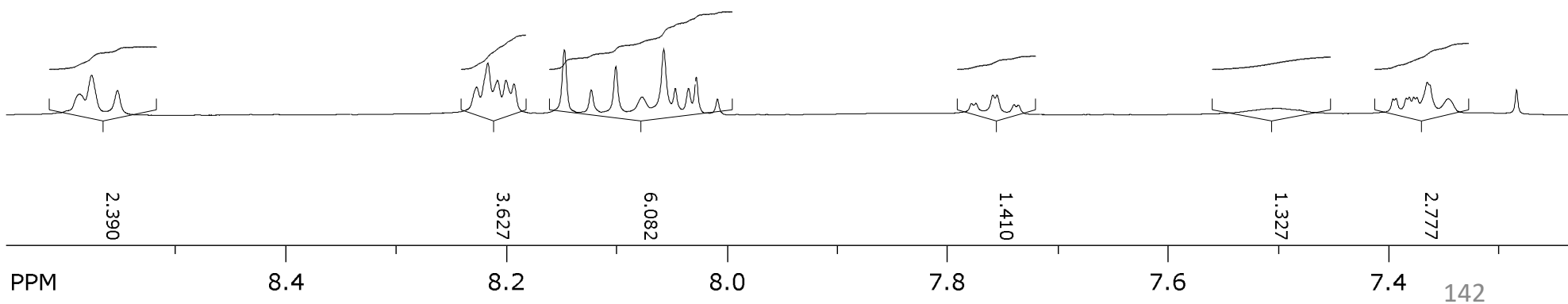
7.7356  
7.7396  
7.7550  
7.7589  
7.7741  
7.7781

7.4809  
7.4993  
7.5034

7.2836  
7.3456  
7.3647  
7.3740  
7.3768  
7.3808  
7.3836  
7.3930  
7.3956



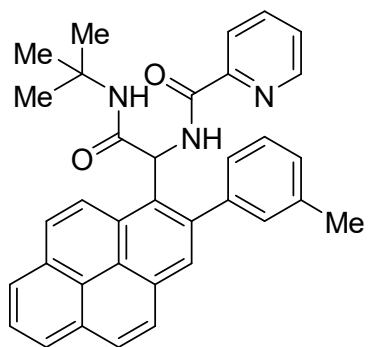
6p



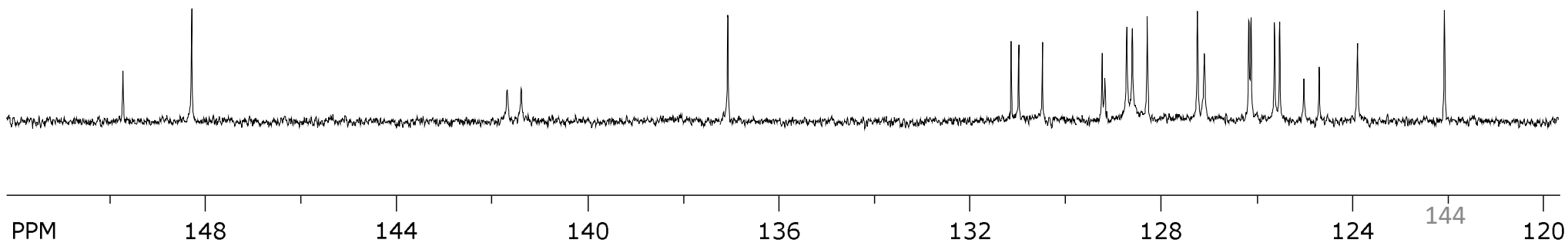


SpinWorks 4: SUB-47 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 32

149.732 —  
148.293 —  
141.394 —  
141.689 —  
137.068 —  
128.286 —  
128.600 —  
128.716 —  
129.128 —  
129.175 —  
129.233 —  
130.481 —  
130.978 —  
131.136 —  
127.092 —  
127.236 —  
126.160 —  
126.115 —  
125.623 —  
125.516 —  
125.007 —  
124.689 —  
123.888 —  
122.065 —

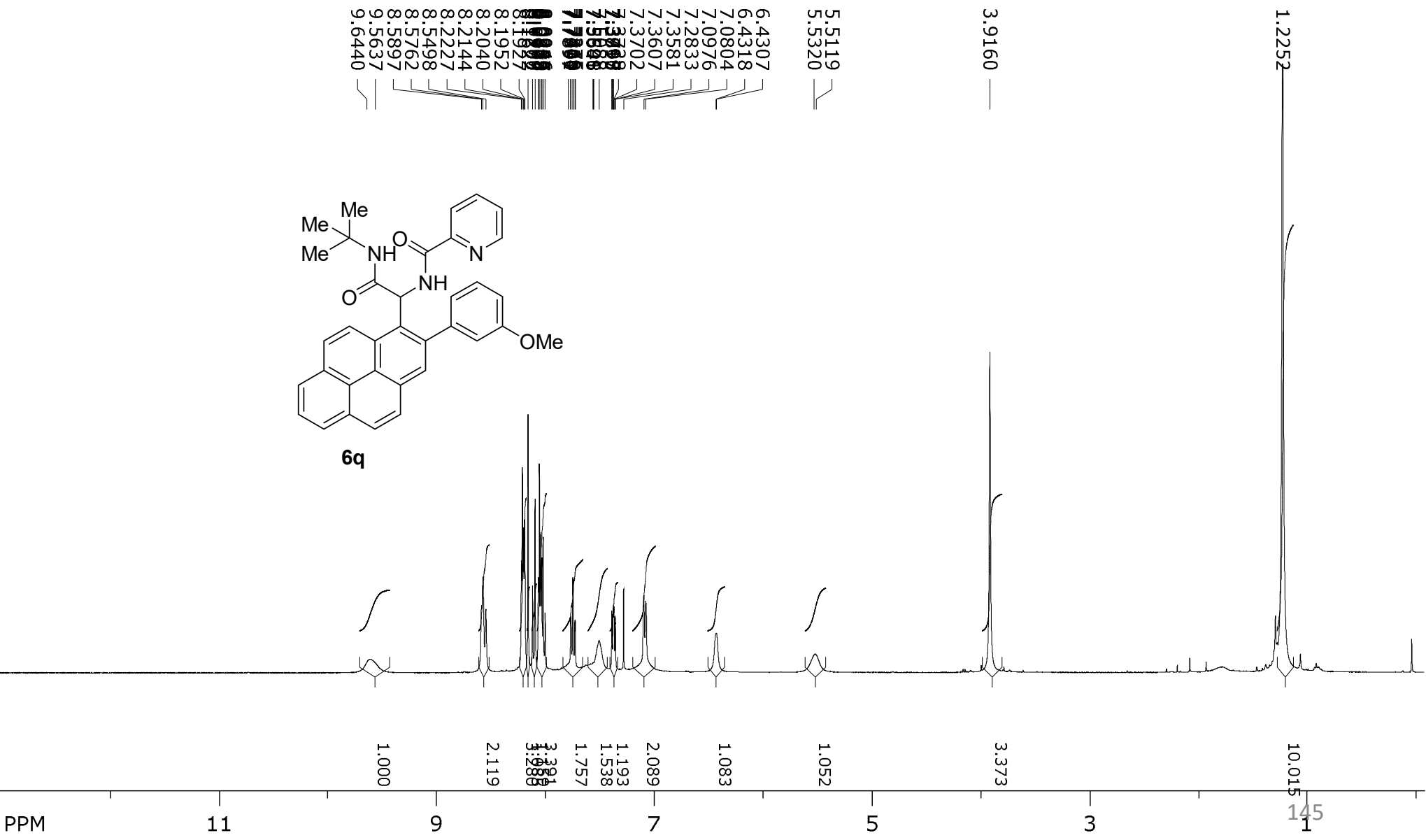
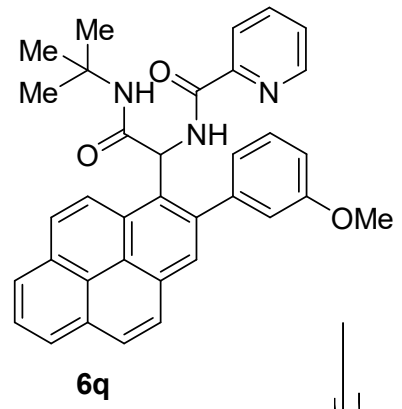


6p

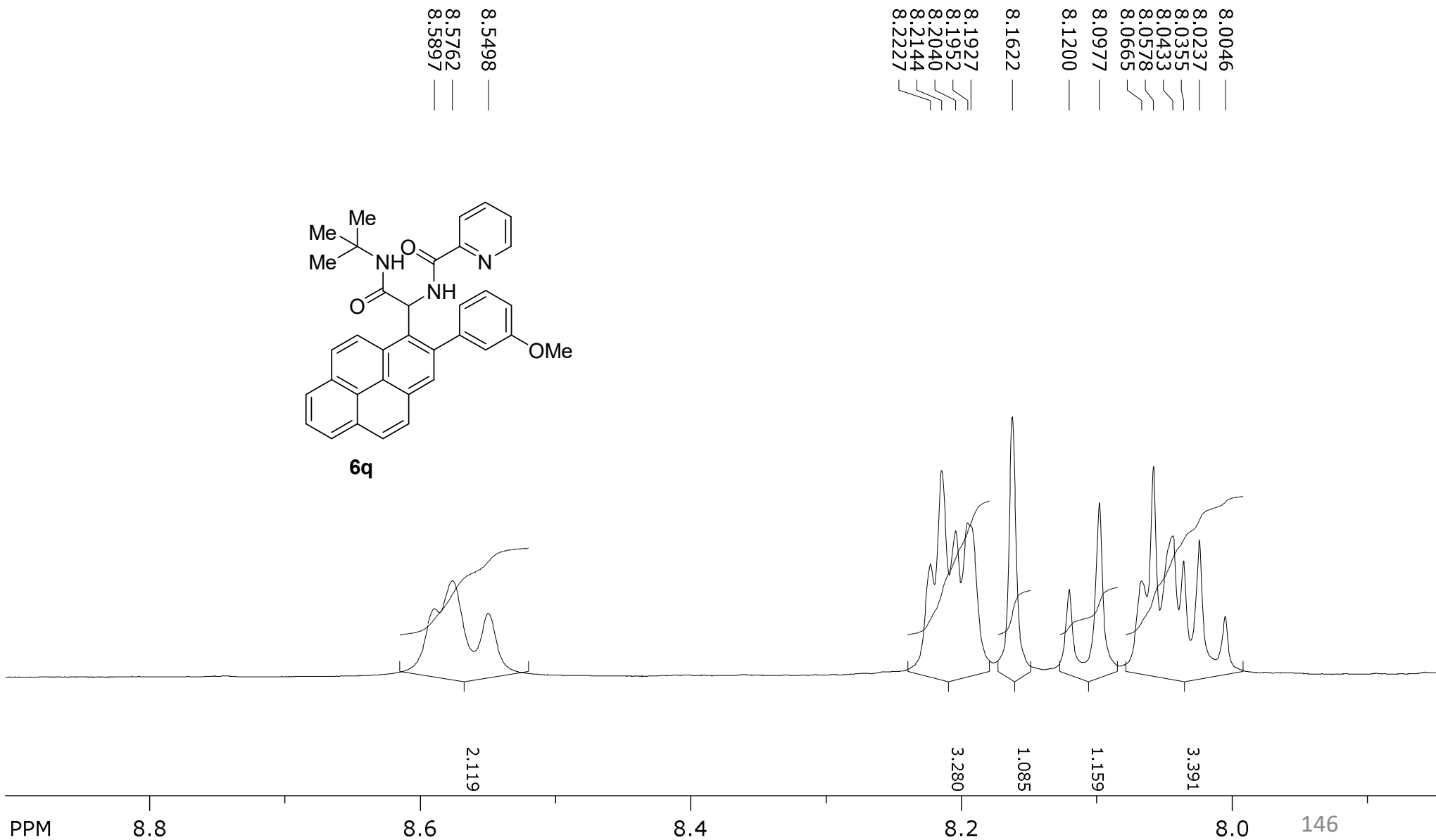
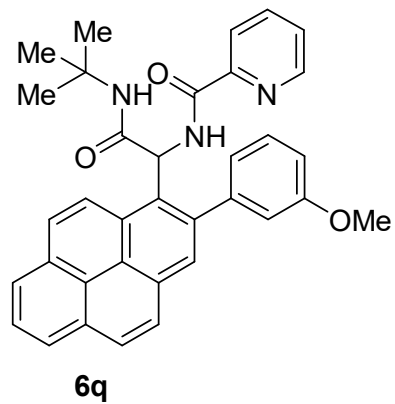




SpinWorks 4: SUB-48RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18



SpinWorks 4: SUB-48RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18



SpinWorks 4: SUB-48RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18

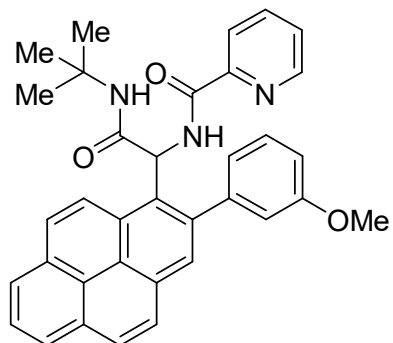
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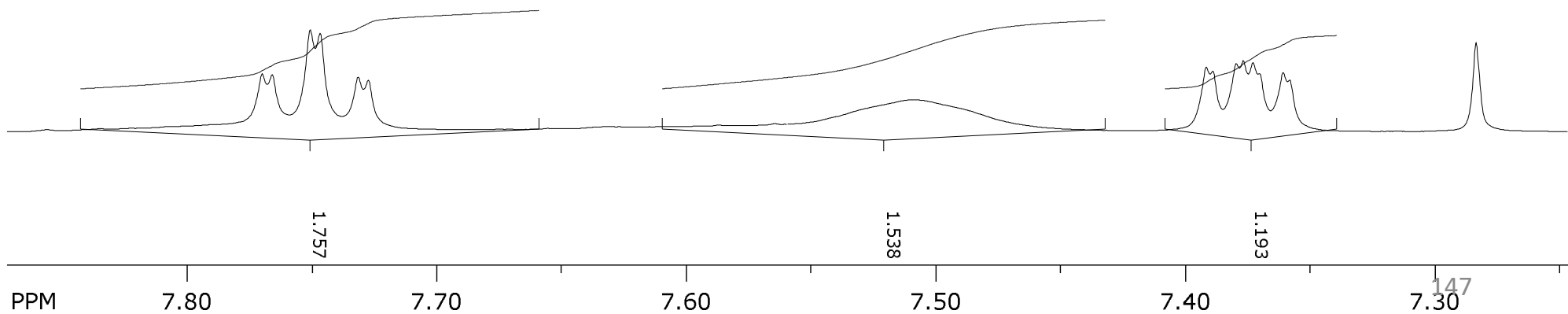
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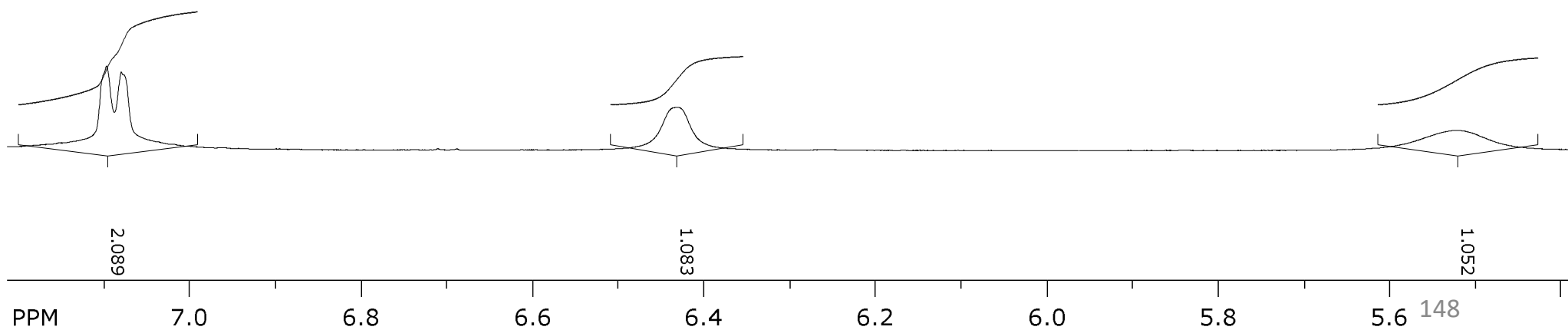
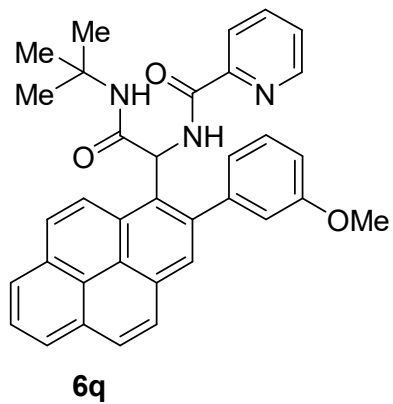


SpinWorks 4: SUB-48RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 18

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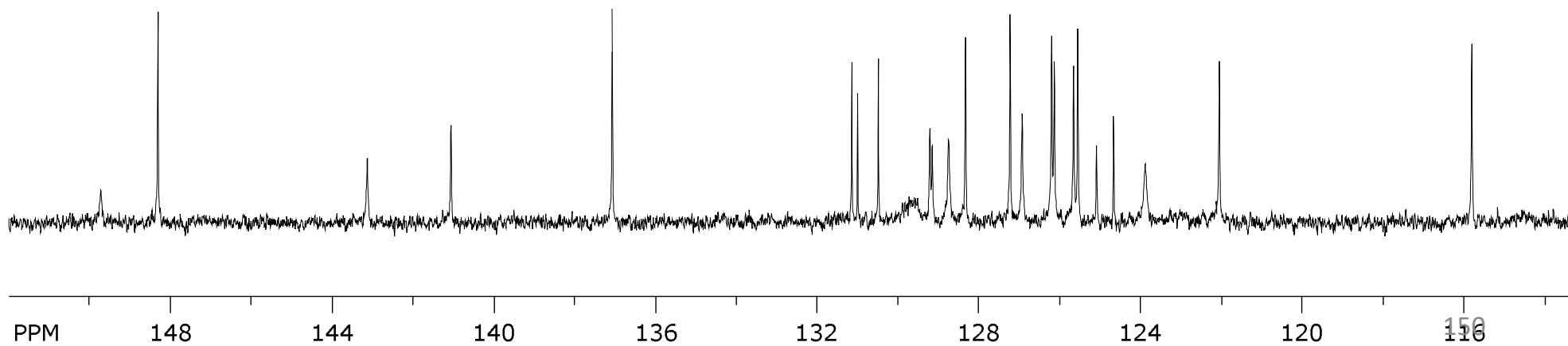
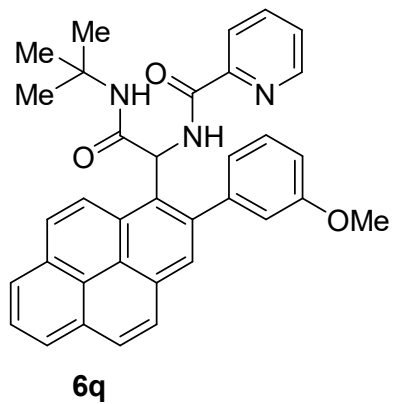


SpinWorks 4: SUB 48 R3  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 7

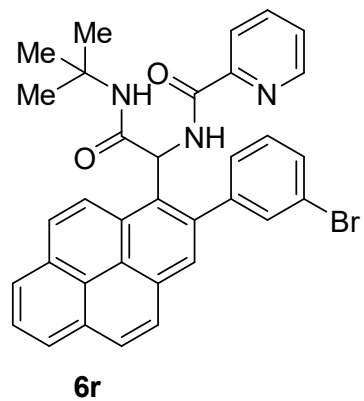
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140.493  
140.506  
140.519  
140.532  
140.545  
140.558  
140.571  
140.584  
140.597  
140.610  
140.623  
140.636  
140.649  
140.662  
140.675  
140.688  
140.701  
140.714  
140.727  
140.740  
140.753  
140.766  
140.779  
140.792  
140.805  
140.818  
140.831  
140.844  
140.857  
140.870  
140.883  
140.896  
140.909  
140.922  
140.935  
140.948  
140.961  
140.974  
140.987  
140.999  
141.012  
141.025  
141.038  
141.051  
141.064  
141.077  
141.090  
141.103  
141.116  
141.129  
141.142  
141.155  
141.168  
141.181  
141.194  
141.207  
141.220  
141.233  
141.246  
141.259  
141.272  
141.285  
141.298  
141.311  
141.324  
141.337  
141.350  
141.363  
141.376  
141.389  
141.402  
141.415  
141.428  
141.441  
141.454  
141.467  
141.480  
141.493  
141.506  
141.519  
141.532  
141.545  
141.558  
141.571  
141.584  
141.597  
141.610  
141.623  
141.636  
141.649  
141.662  
141.675  
141.688  
141.701  
141.714  
141.727  
141.740  
141.753  
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141.805  
141.818  
141.831  
141.844  
141.857  
141.870  
141.883  
141.896  
141.909  
141.922  
141.935  
141.948  
141.961  
141.974  
141.987  
141.999  
142.012  
142.025  
142.038  
142.051  
142.064  
142.077  
142.090  
142.103  
142.116  
142.129  
142.142  
142.155  
142.168  
142.181  
142.194  
142.207  
142.220  
142.233  
142.246  
142.259  
142.272  
142.285  
142.298  
142.311  
142.324  
142.337  
142.350  
142.363  
142.376  
142.389  
142.402  
142.415  
142.428  
142.441  
142.454  
142.467  
142.480  
142.493  
142.506  
142.519  
142.532  
142.545  
142.558  
142.571  
142.584  
142.597  
142.610  
142.623  
142.636  
142.649  
142.662  
142.675  
142.688  
142.701  
142.714  
142.727  
142.740  
142.753  
142.766  
142.779  
142.792  
142.805  
142.818  
142.831  
142.844  
142.857  
142.870  
142.883  
142.896  
142.909  
142.922  
142.935  
142.948  
142.961  
142.974  
142.987  
142.999  
143.012  
143.025  
143.038  
143.051  
143.064  
143.077  
143.090  
143.103  
143.116  
143.129  
143.142  
143.155  
143.168  
143.181  
143.194  
143.207  
143.220  
143.23

SpinWorks 4: SUB 48 R3  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 7

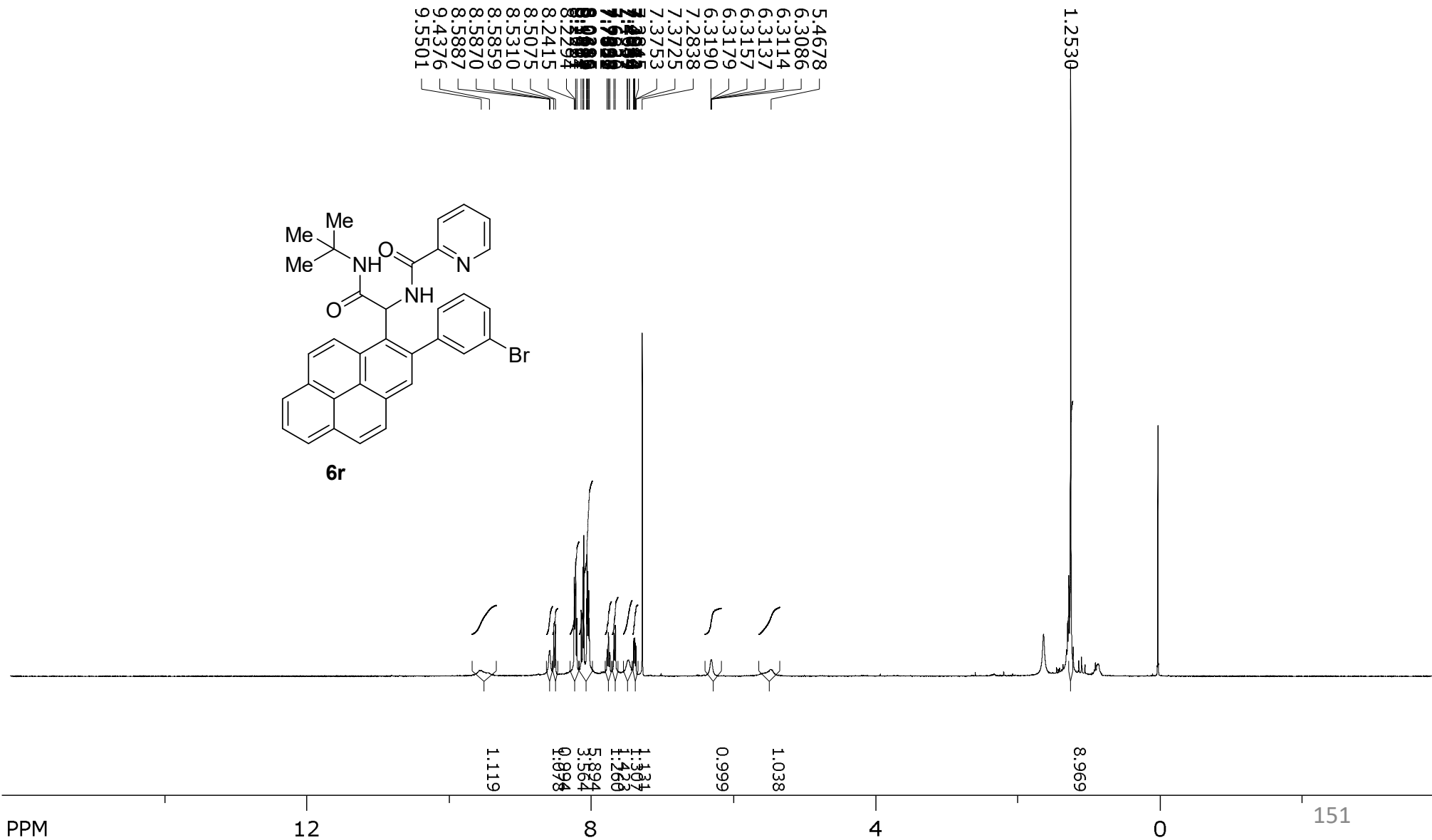
149.726 —  
148.313 —  
143.131 —  
141.060 —  
137.070 —  
122.049 —  
123.881 —  
124.665 —  
125.087 —  
125.551 —  
125.596 —  
125.655 —  
126.131 —  
126.199 —  
126.928 —  
127.225 —  
128.329 —  
128.747 —  
128.801 —  
129.153 —  
129.210 —  
129.726 —  
130.485 —  
130.998 —  
131.142 —  
115.801 —



SpinWorks 4: AD 2136 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 7



5.4678  
6.3086  
6.3114  
6.3137  
6.3157  
6.3179  
6.3190  
7.2838  
7.3725  
7.3753  
7.9815  
7.9845  
7.9875  
8.2294  
8.2415  
8.5075  
8.5310  
8.5859  
8.5870  
8.5887  
9.4376  
9.5501



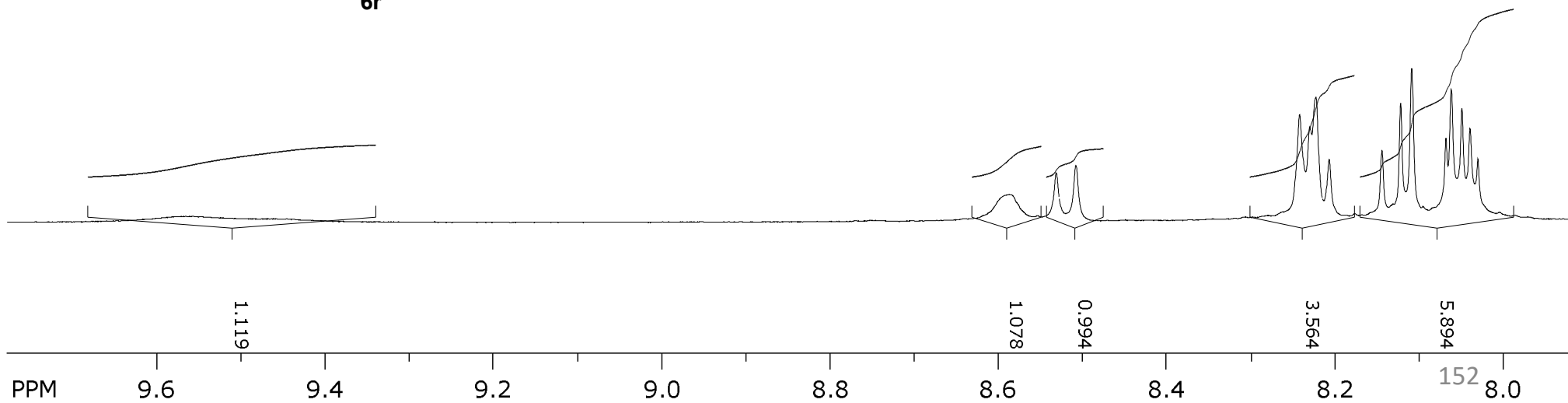
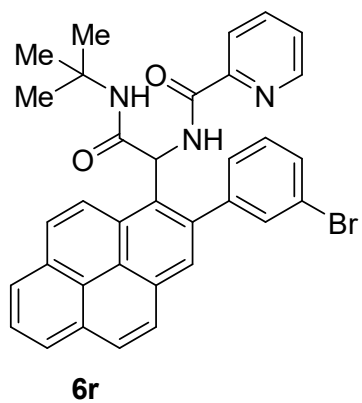
SpinWorks 4: AD 2136 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 7

9.5501

9.4376

8.5859  
8.5870  
8.5887  
8.5075  
8.5310

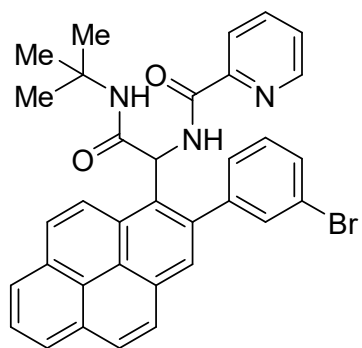
8.0295  
8.0389  
8.0486  
8.0612  
8.0676  
8.1081  
8.1214  
8.1437  
8.2064  
8.2221  
8.2294  
8.2415



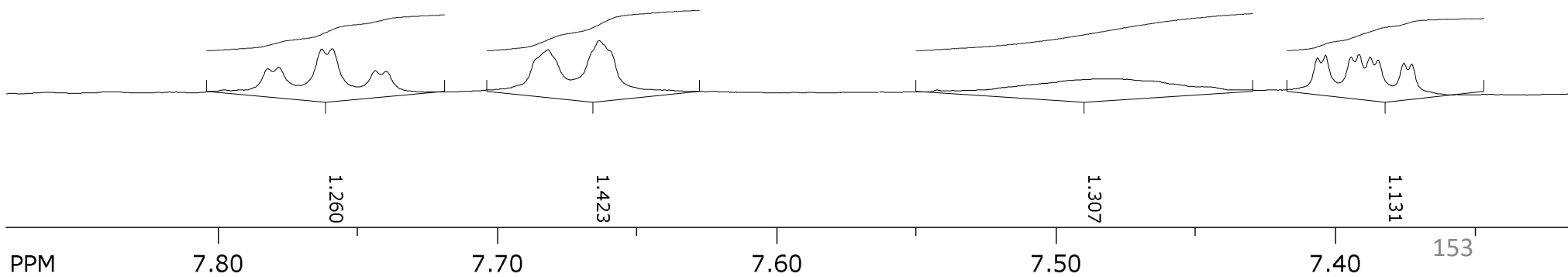


SpinWorks 4: AD 2136 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 7

7.7398  
7.7437  
7.7592  
7.7630  
7.7783  
7.7822  
7.6636  
7.6820  
7.4949  
7.4957  
7.4664  
7.4669  
7.3725  
7.3753  
7.3845  
7.3874  
7.3914  
7.3942  
7.4034  
7.4062



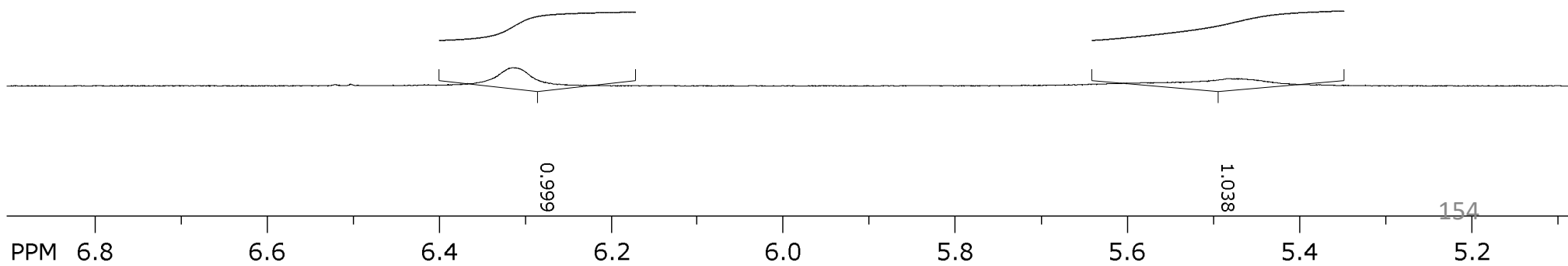
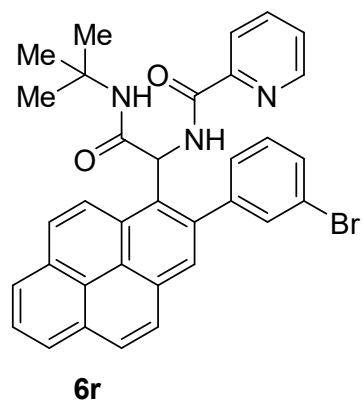
6r



SpinWorks 4: AD 2136 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 7

6.3086  
6.3114  
6.3137  
6.3157  
6.3179  
6.3190

5.4678



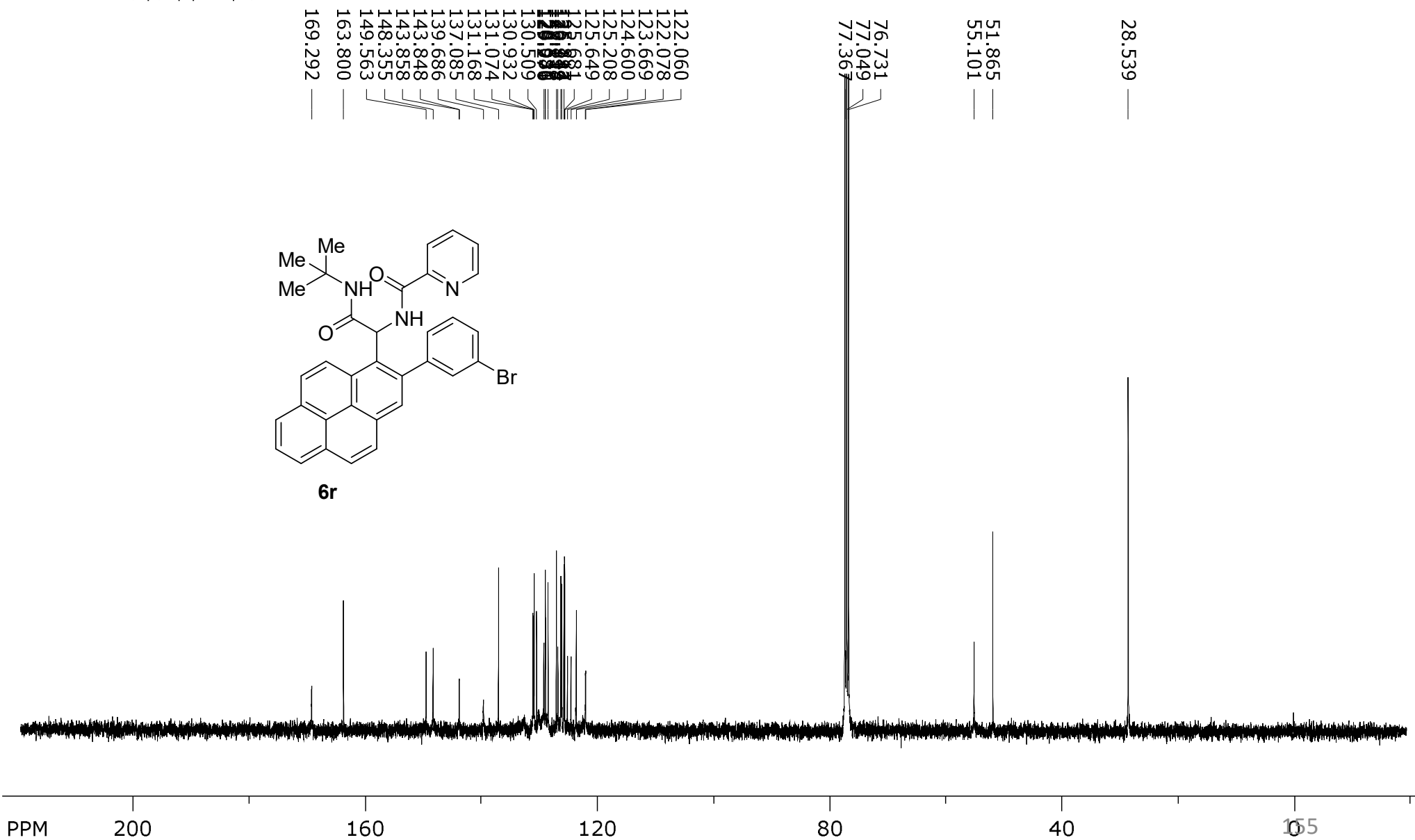
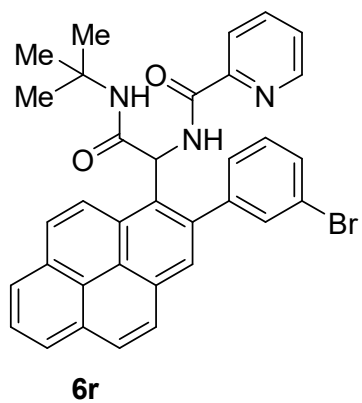
SpinWorks 4: AD-2136-RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 40

169.292  
163.800  
149.563  
148.355  
143.858  
143.848  
139.686  
137.085  
131.168  
131.074  
130.932  
130.509  
129.988  
129.988  
129.988  
129.988  
125.649  
125.208  
124.600  
123.669  
122.078  
122.060

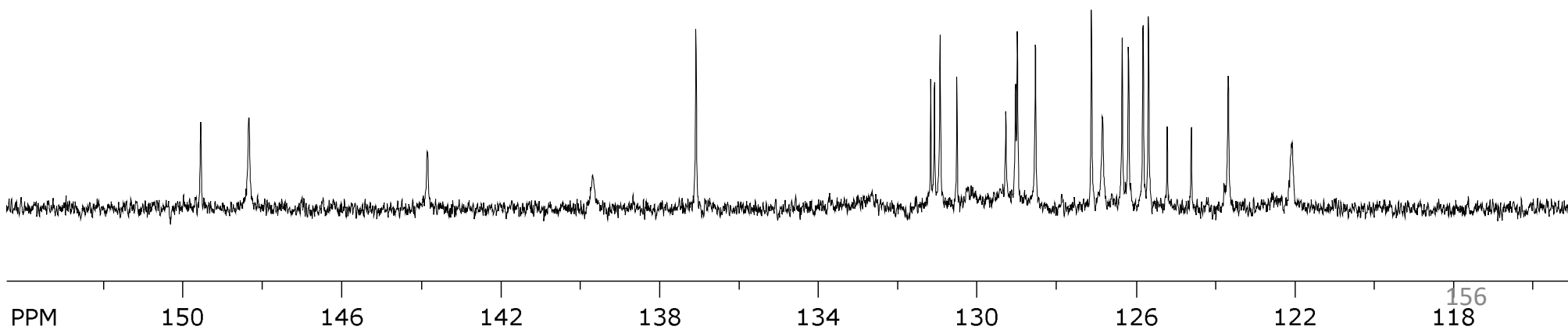
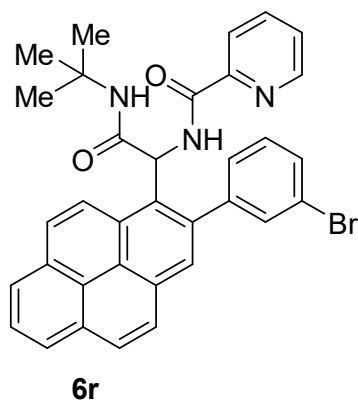
77.367  
77.049  
76.731

55.101  
51.865

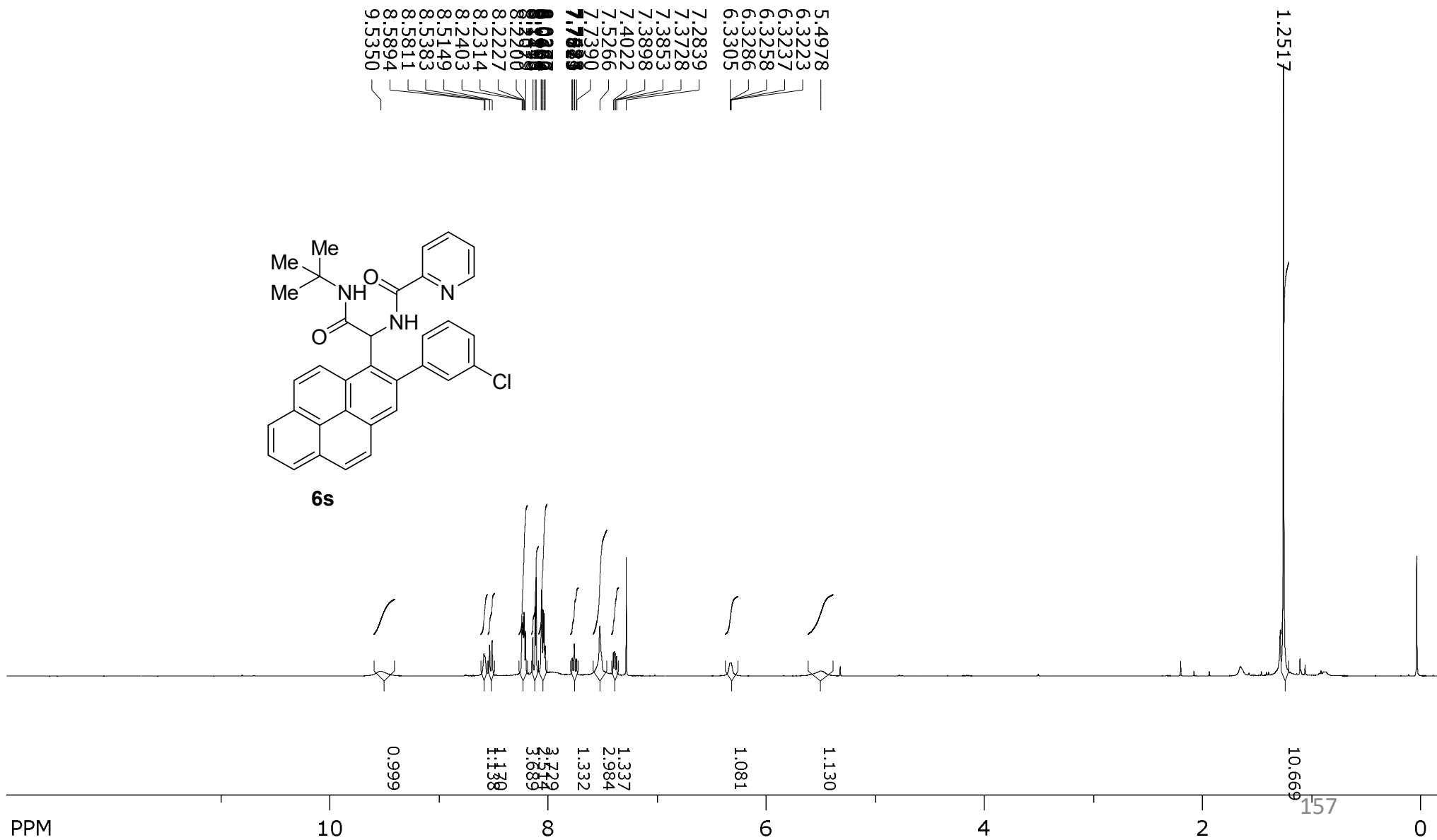
28.539



SpinWorks 4: AD-2136-RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 40



SpinWorks 4: AD-1934 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 40



SpinWorks 4: AD-1934 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 40

8.5149  
8.5383  
8.5811  
8.5894

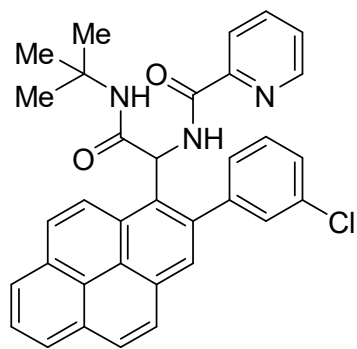
8.0277  
8.0380  
8.0466  
8.0602  
8.0654  
8.1109  
8.1193  
8.1416  
8.2079  
8.2200  
8.2227  
8.2314  
8.2403

7.7390  
7.7428  
7.7583  
7.7621  
7.7775  
7.7813

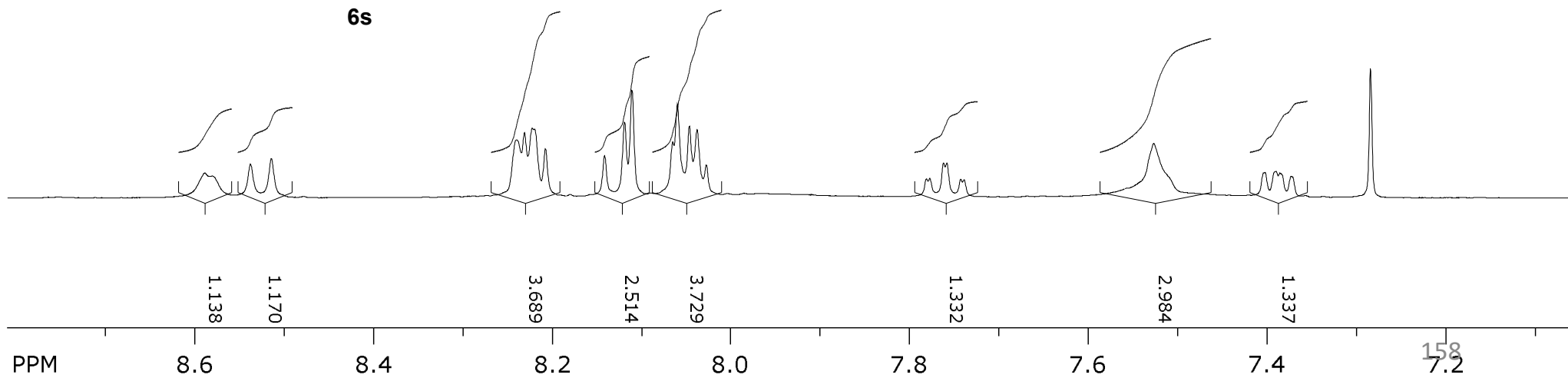
7.5266

7.3728  
7.3853  
7.3898  
7.4022

7.2839



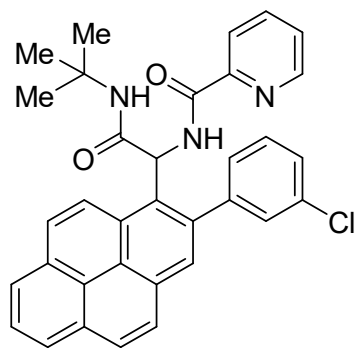
6s



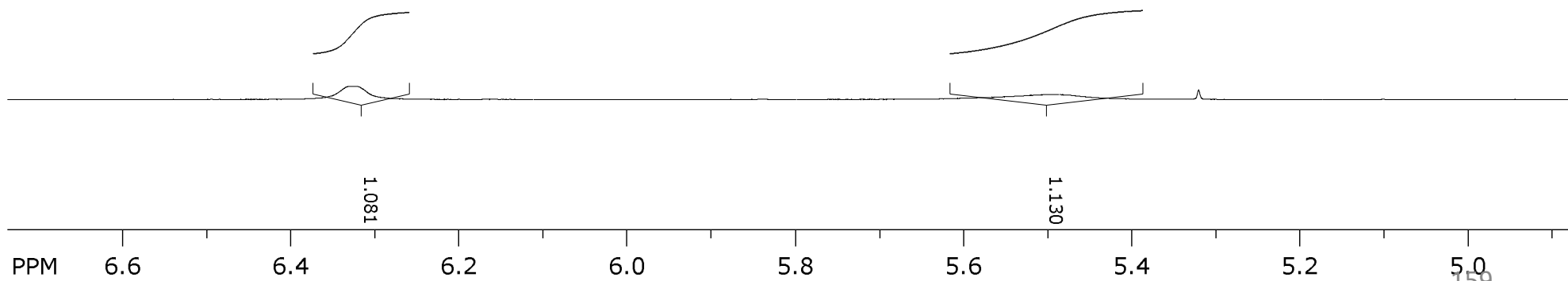
SpinWorks 4: AD-1934 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 40

6.32223  
6.32237  
6.32558  
6.32885  
6.33005

5.49778



6s



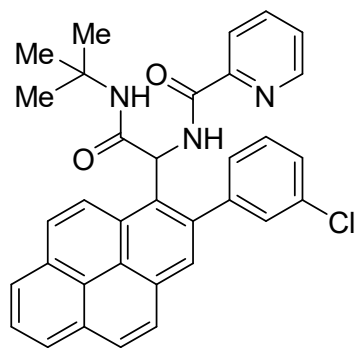
SpinWorks 4: AD-1934  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 33

122.089  
123.653  
124.586  
125.193  
125.649  
125.690  
125.835  
129.954  
129.970  
130.488  
131.079  
131.150  
137.123  
139.770  
143.548  
148.350  
149.516  
169.337  
163.826

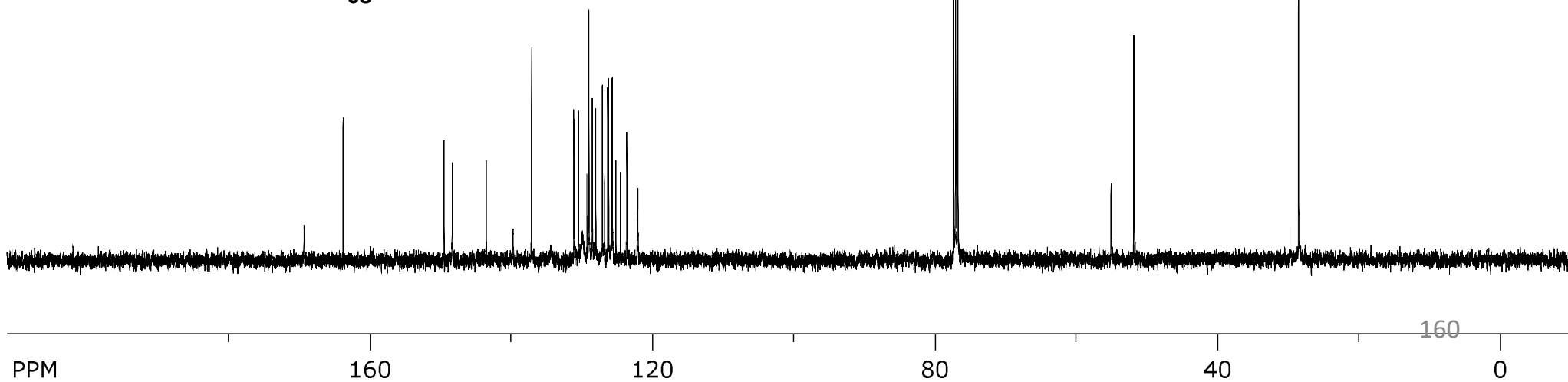
76.770  
77.087  
77.406

51.877  
55.084

28.528



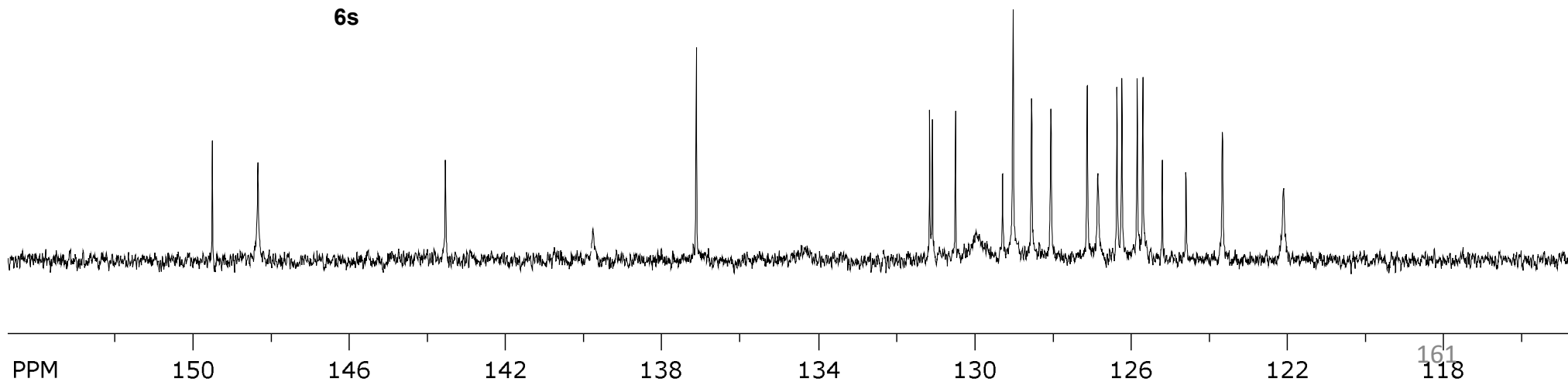
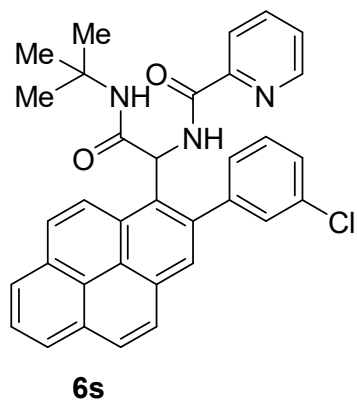
6s



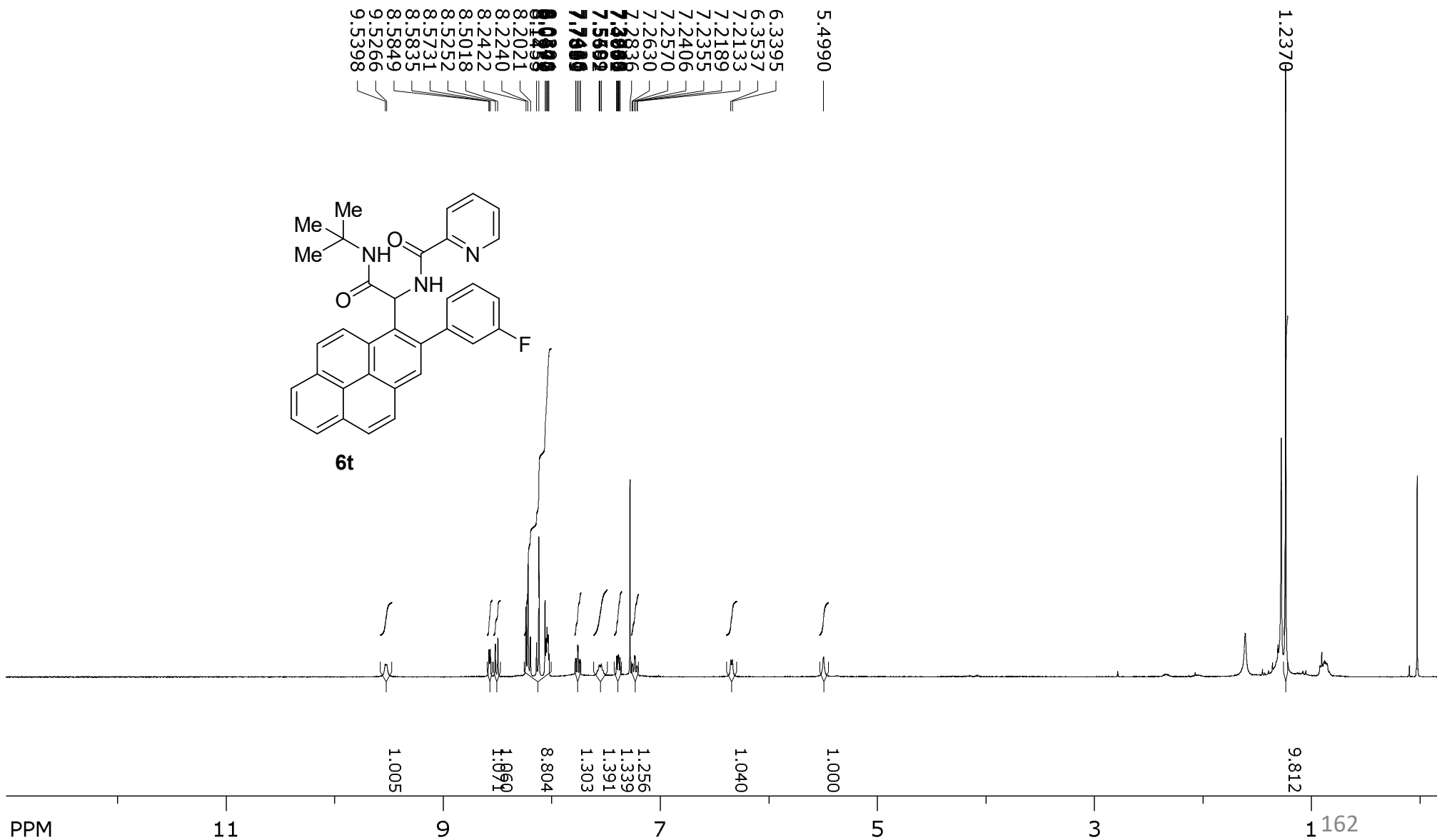


SpinWorks 4: AD-1934  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 33

149.516 —  
148.350 —  
143.548 —  
139.770 —  
137.123 —  
128.044 —  
128.507 —  
128.539 —  
129.011 —  
129.281 —  
129.954 —  
129.970 —  
130.488 —  
131.079 —  
131.150 —  
127.115 —  
126.843 —  
126.352 —  
126.229 —  
125.835 —  
125.690 —  
125.649 —  
125.193 —  
124.586 —  
123.653 —  
122.089 —



SpinWorks 4: SUB-49(R2)  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 36



SpinWorks 4: SUB-49(R2)  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 36

8.5731  
8.5849

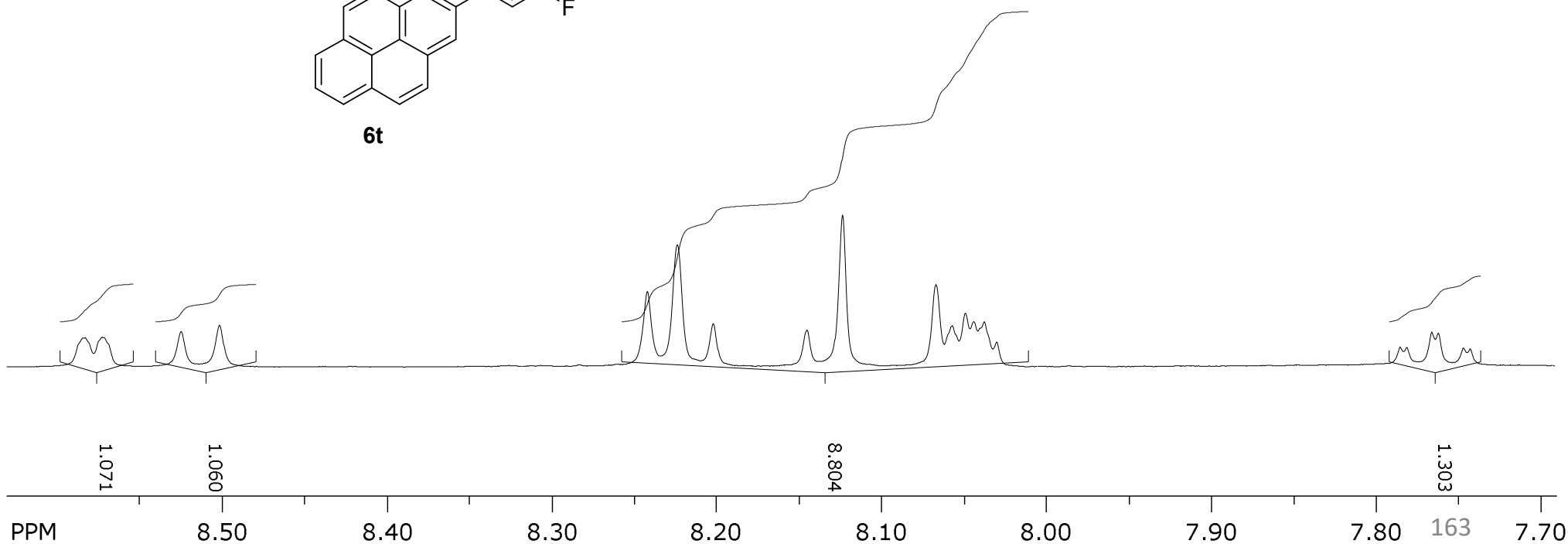
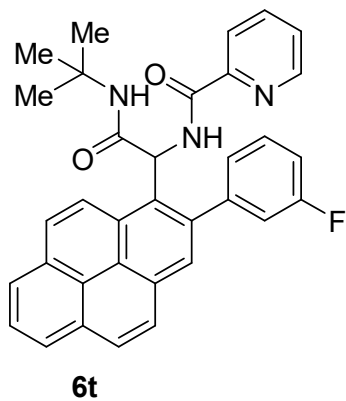
8.5252  
8.5018

8.2422  
8.2240  
8.2021

8.1455  
8.1238

8.0670  
8.0573  
8.0492  
8.0440  
8.0378  
8.0301

7.7853  
7.7811  
7.7660  
7.7620  
7.7468  
7.7426

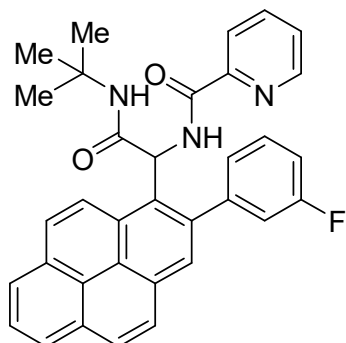


SpinWorks 4: SUB-49(R2)  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 36

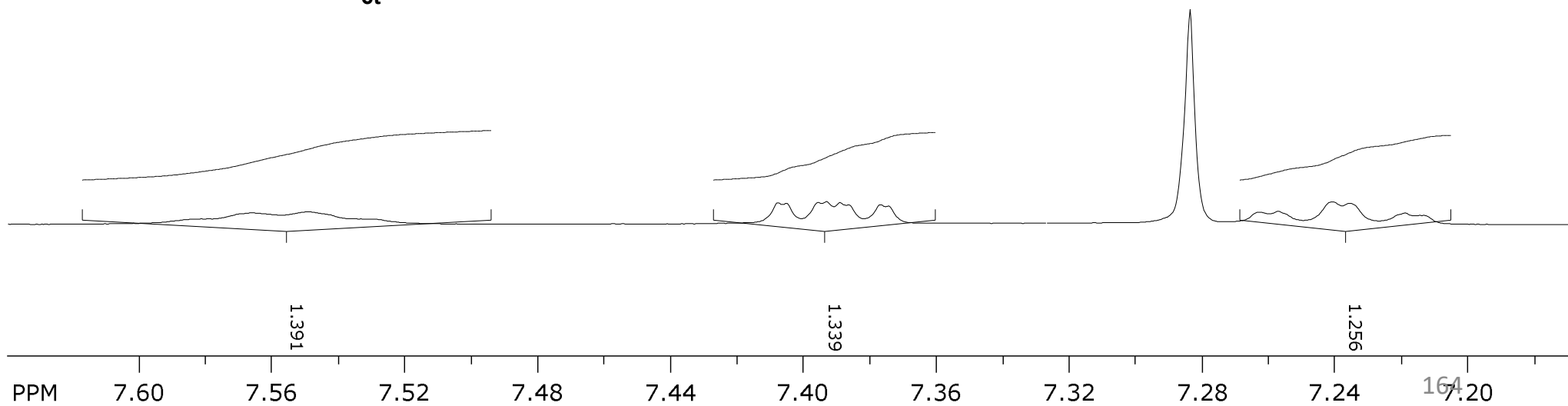
7.5491  
7.5589  
7.5662  
7.5692

7.3743  
7.3768  
7.3863  
7.3889  
7.3930  
7.3956  
7.4052  
7.4077

7.2133  
7.2189  
7.2355  
7.2406  
7.2570  
7.2630  
7.2836

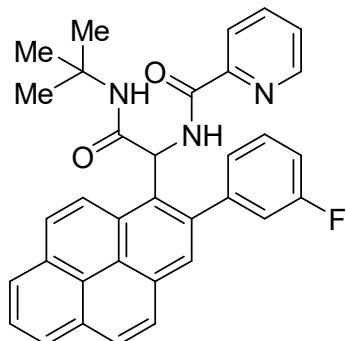


6t

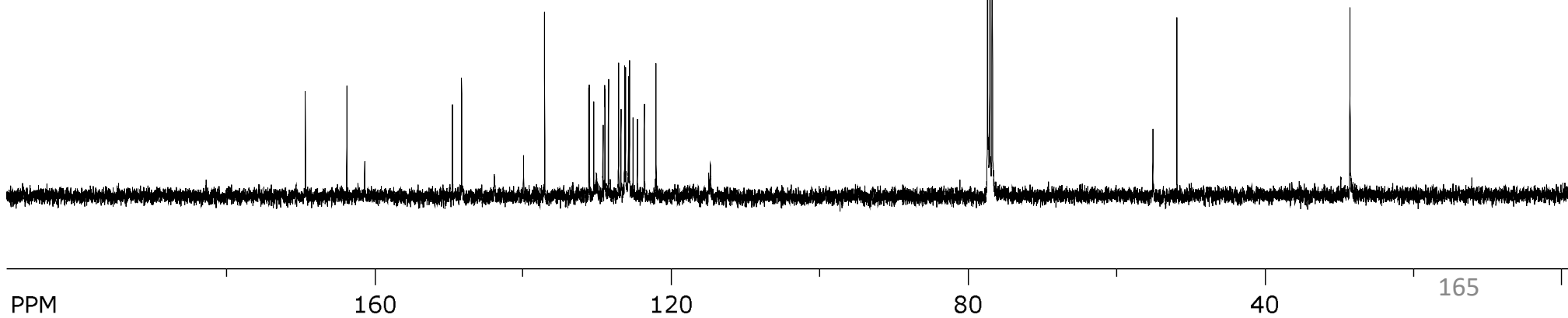


SpinWorks 4: SUB-49  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 11

114.758  
114.964  
122.094  
123.675  
124.610  
125.186  
125.674  
125.806  
126.859  
127.027  
127.027  
130.497  
131.078  
131.157  
137.115  
139.938  
139.948  
139.975  
143.846  
143.924  
148.313  
149.548  
161.386  
163.800  
163.847  
169.391

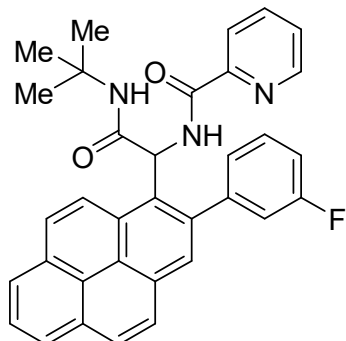


6t

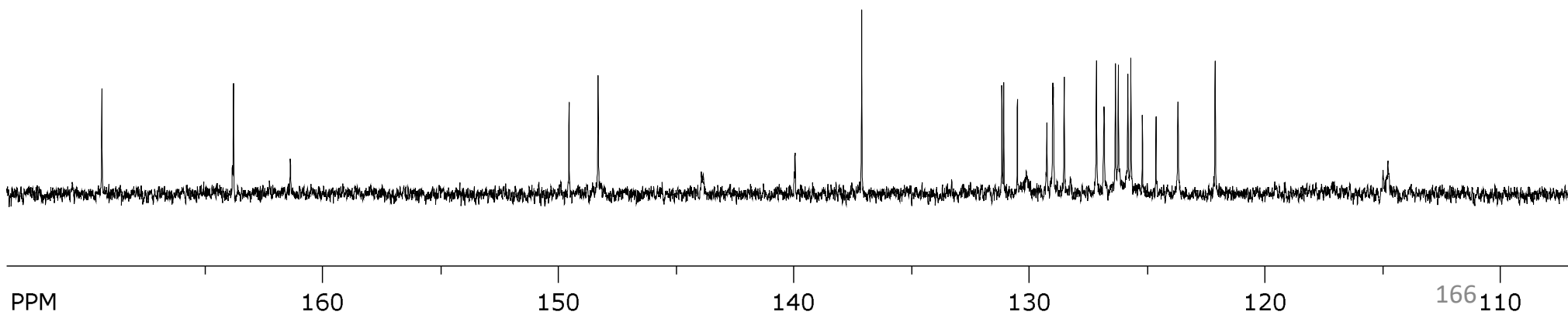


SpinWorks 4: SUB-49  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 11

169.391 —  
163.800 —  
163.847 —  
161.386 —  
149.548 —  
148.313 —  
143.846 —  
143.924 —  
139.938 —  
139.948 —  
139.975 —  
137.115 —  
131.157 —  
131.078 —  
130.497 —  
130.120 —  
129.242 —  
128.997 —  
128.971 —  
128.507 —  
127.139 —  
126.816 —  
126.331 —  
126.211 —  
125.806 —  
125.674 —  
125.186 —  
124.610 —  
123.675 —  
122.094 —  
114.758 —  
114.964 —



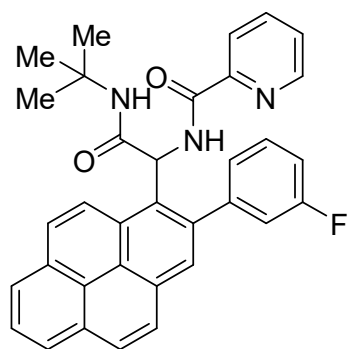
6t



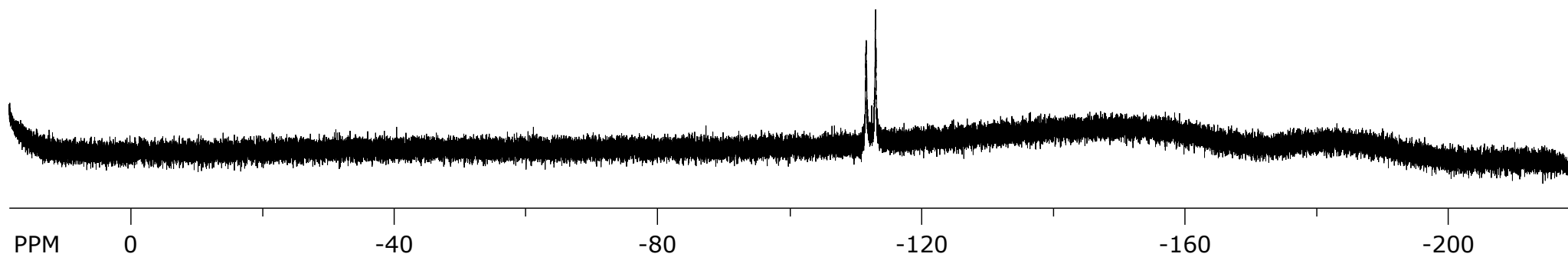
SpinWorks 4: SUB 49  
F19CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 23

$^{19}\text{F}$  NMR (~376 MHz,  $\text{CDCl}_3$ )

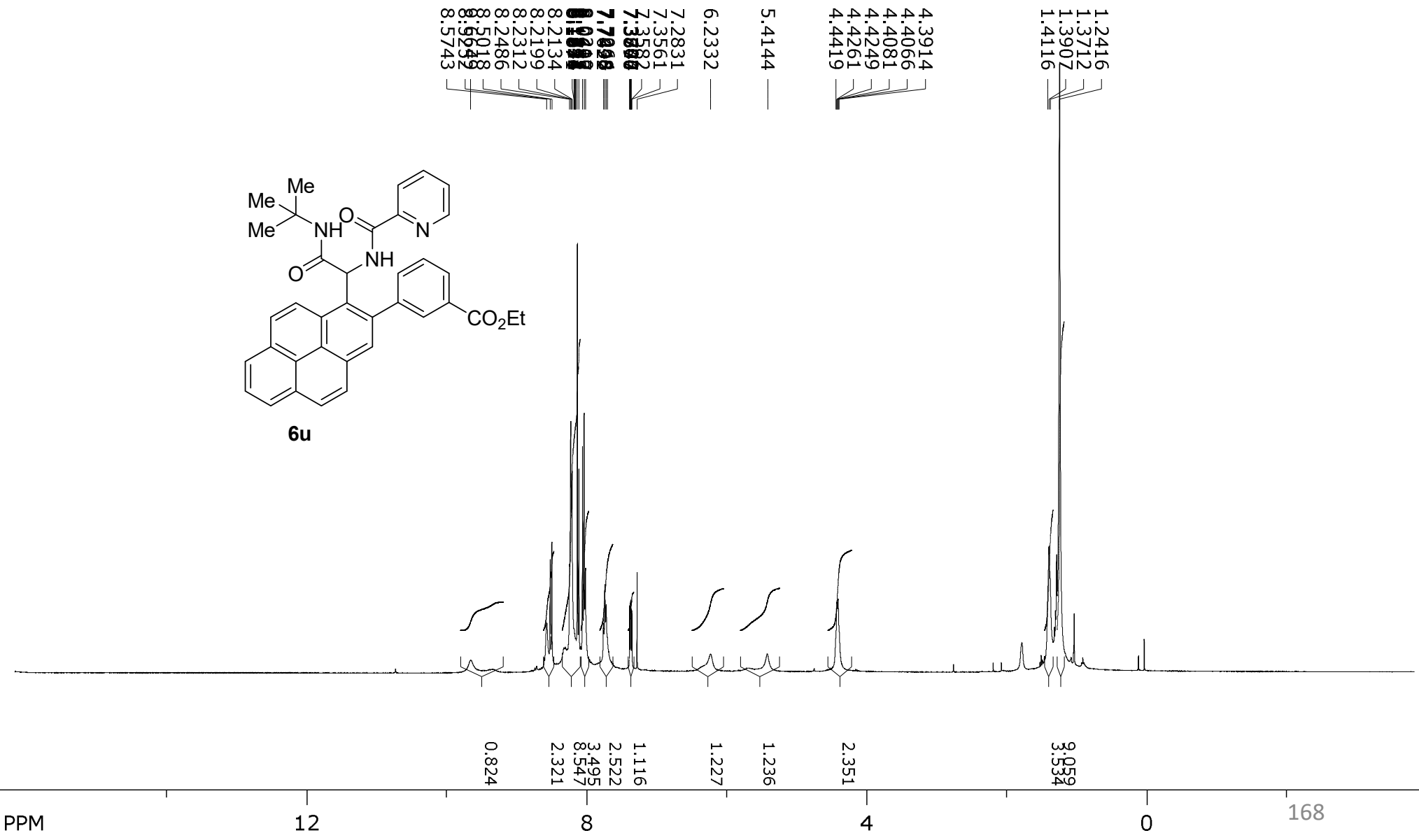
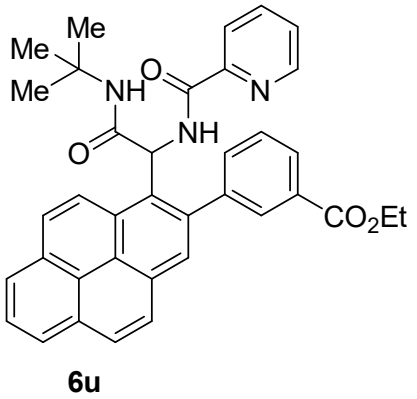
-113.074  
-111.643



6t

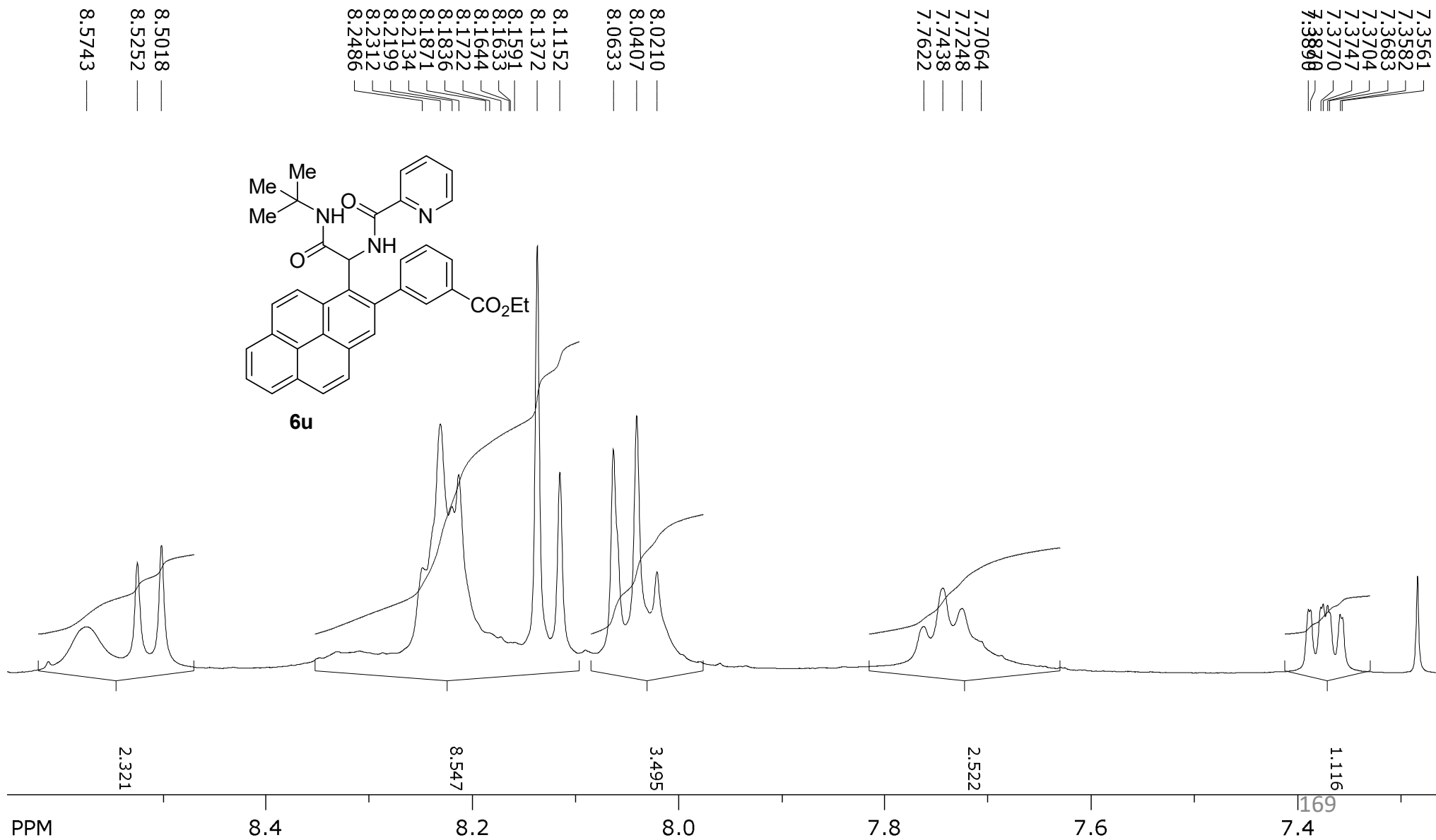


SpinWorks 4: AD-2114RE  
 PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 56

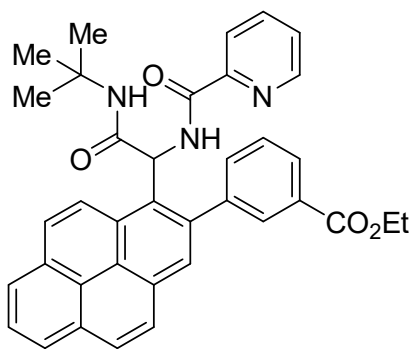




SpinWorks 4: AD-2114RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 56



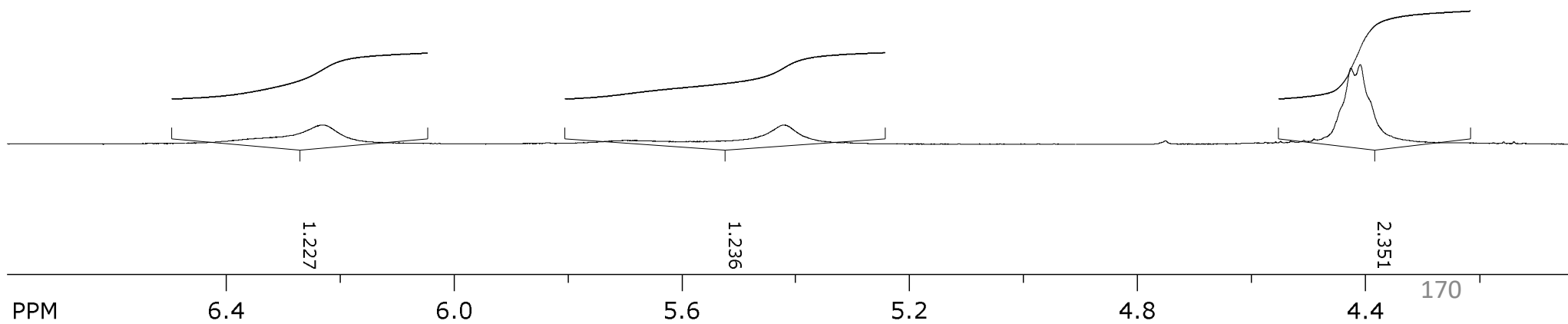
SpinWorks 4: AD-2114RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 56



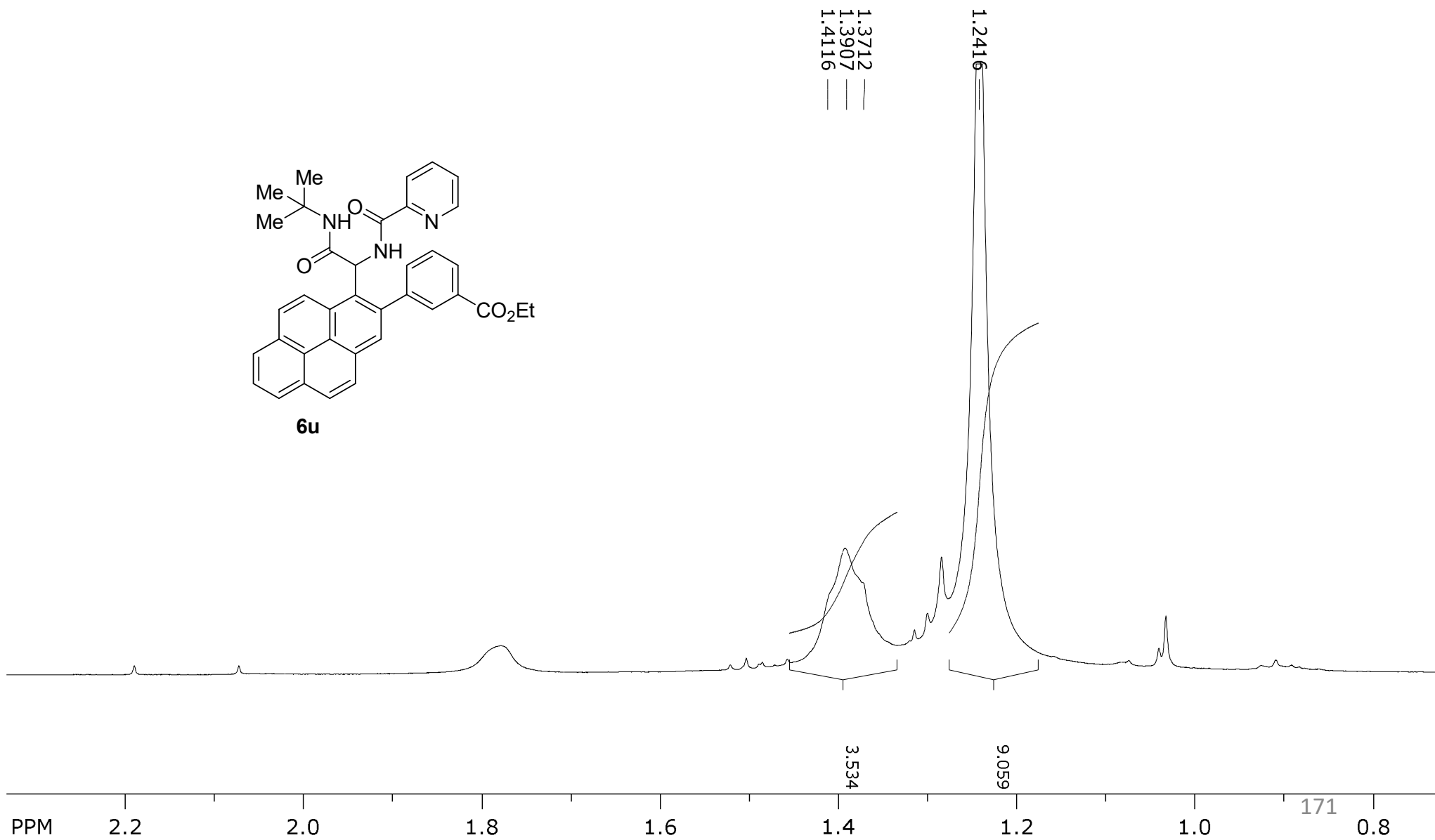
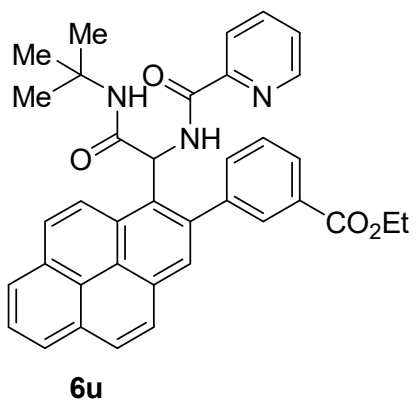
6.2332

5.4144

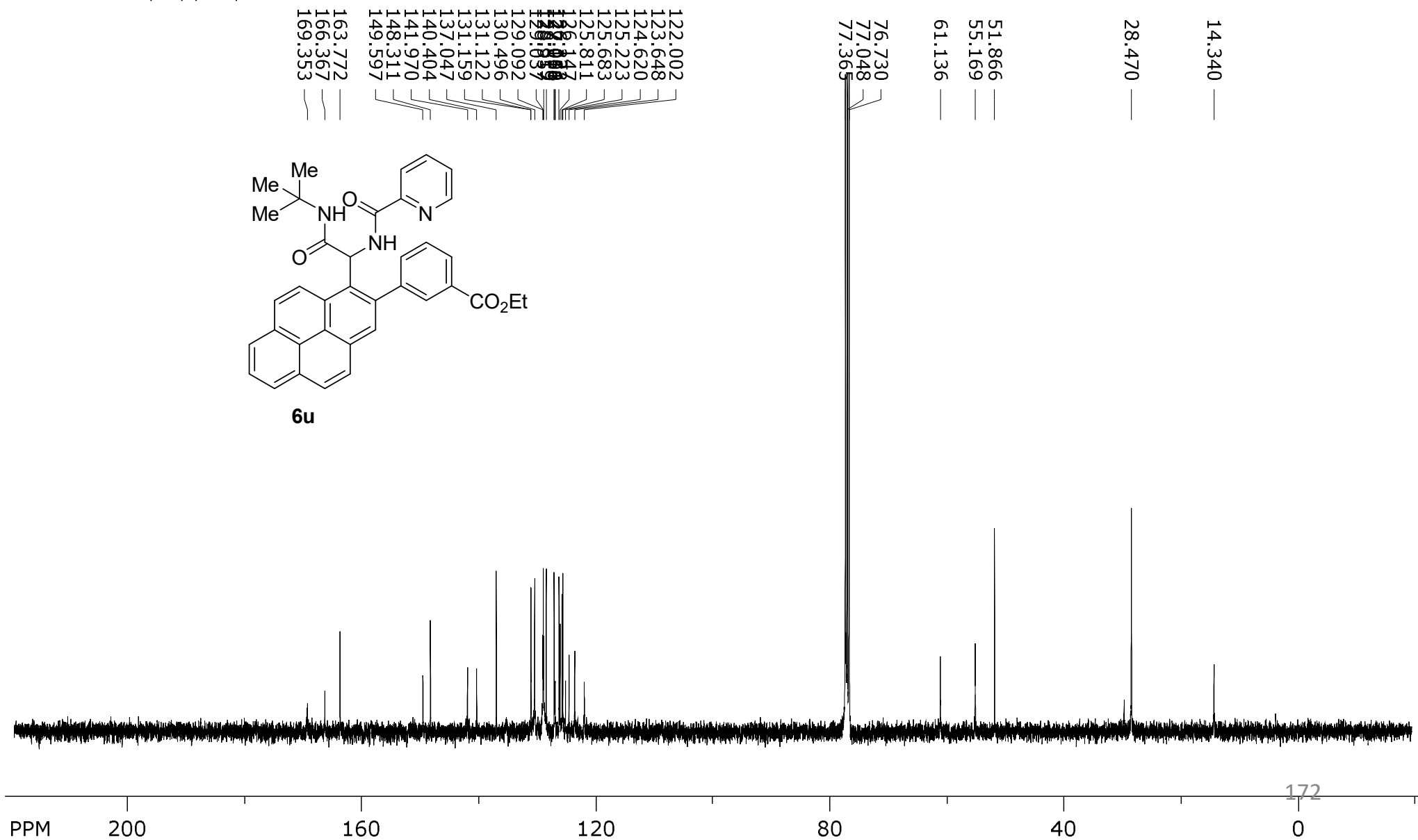
4.3914  
4.4066  
4.4261  
4.4419



SpinWorks 4: AD-2114RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 56

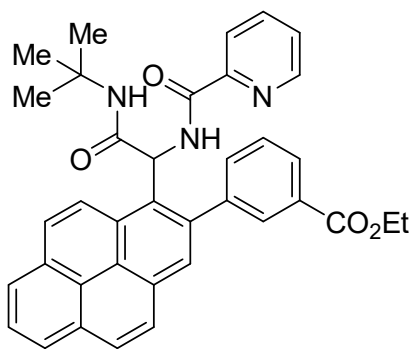


SpinWorks 4: AD-2114R-I  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 48

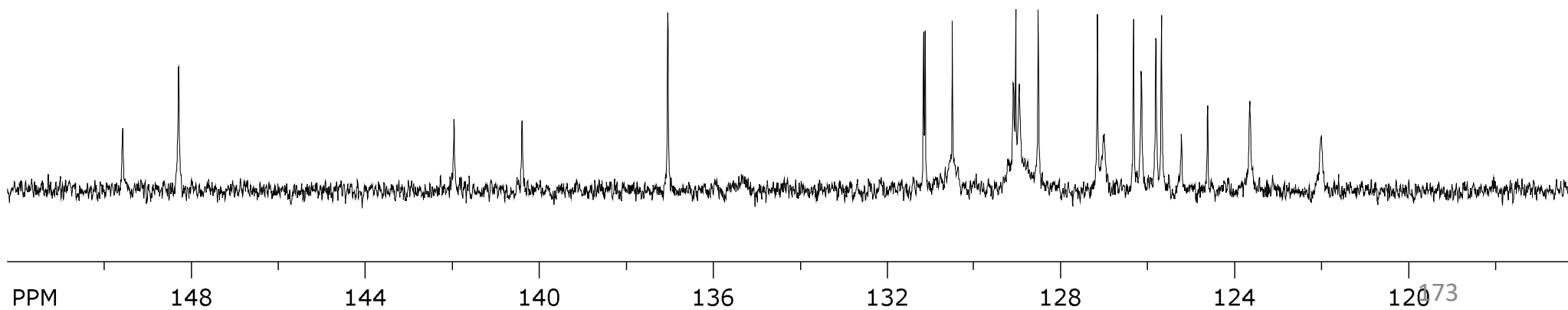


SpinWorks 4: AD-2114R-I  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 48

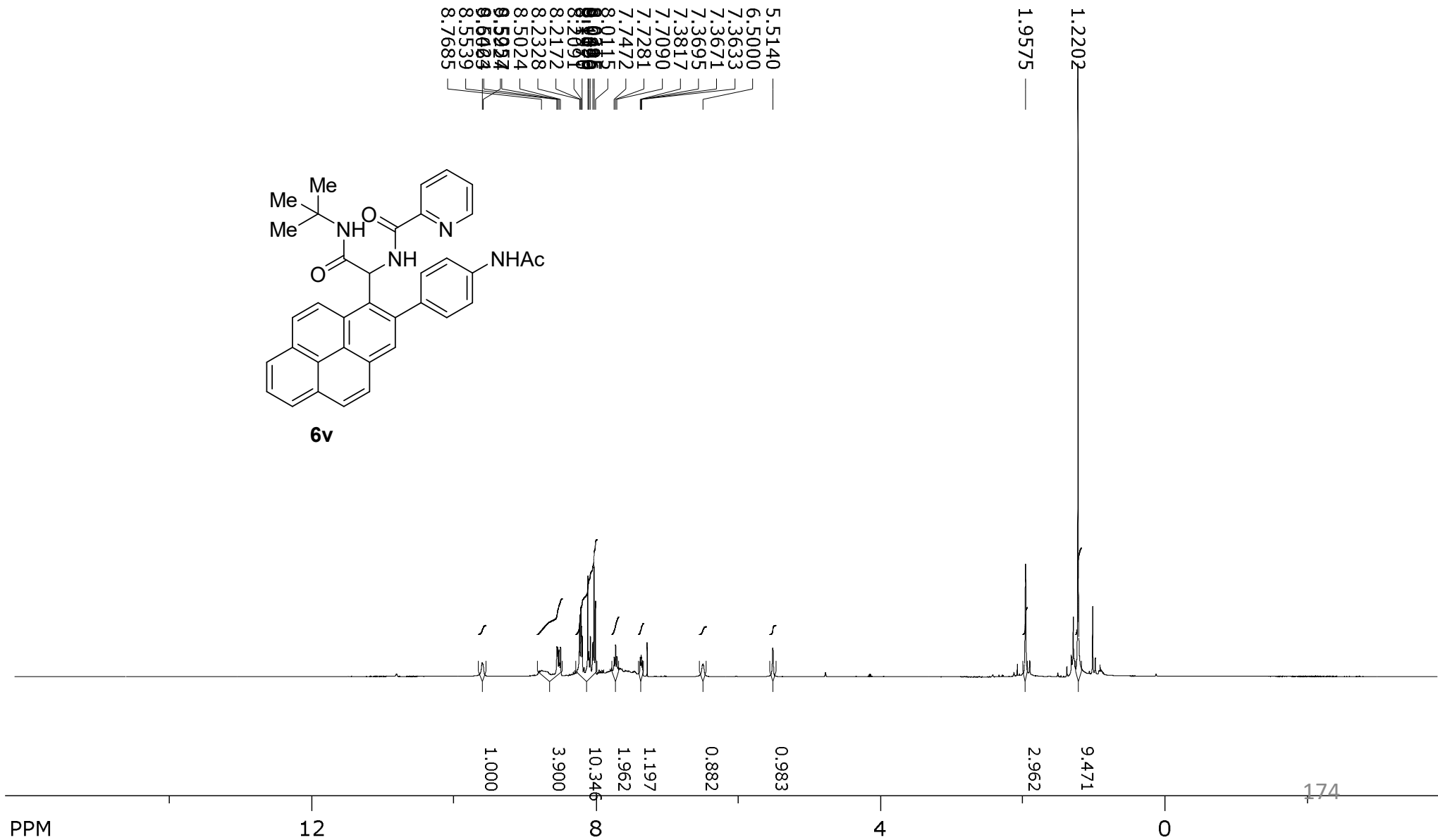
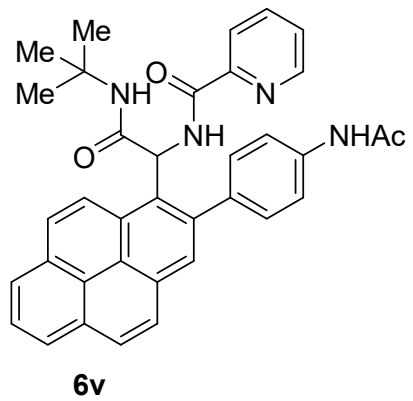
149.597 —  
148.311 —  
141.970 —  
140.404 —  
137.047 —  
131.159 —  
131.122 —  
130.496 —  
129.092 —  
129.037 —  
128.957 —  
128.519 —  
127.156 —  
127.058 —  
127.016 —  
127.001 —  
126.323 —  
126.147 —  
125.811 —  
125.683 —  
125.223 —  
124.620 —  
123.648 —  
122.002 —



6u



SpinWorks 4: AD 2071  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 16



SpinWorks 4: AD 2071  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 16

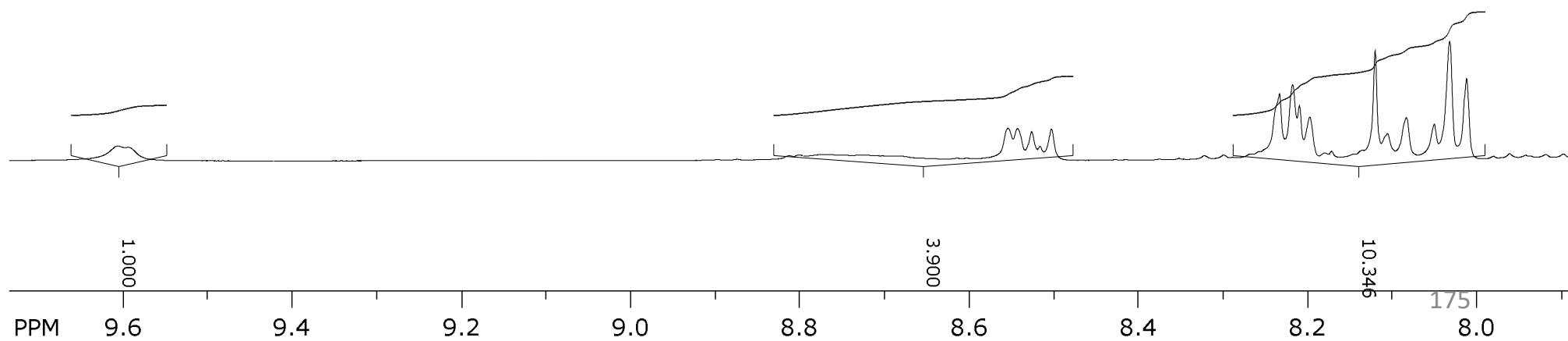
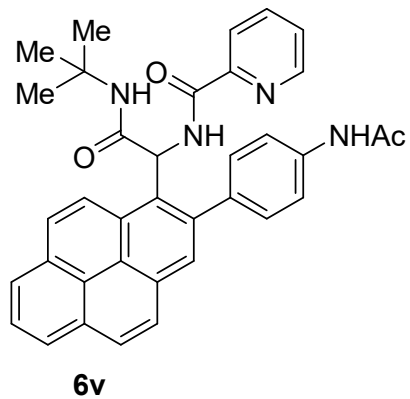
9.5924  
9.6063

8.7685

8.5024  
8.5257  
8.5424  
8.5539

8.1970  
8.2091  
8.2172  
8.2328

8.0115  
8.0315  
8.0495  
8.0826  
8.1050  
8.1196



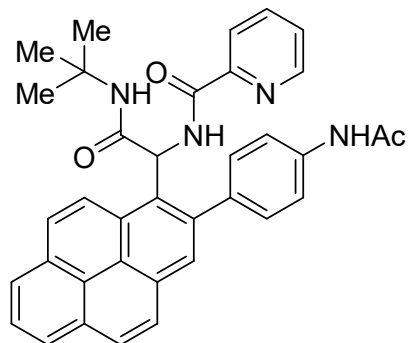
SpinWorks 4: AD 2071  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 16

7.7090  
7.7281  
7.7472

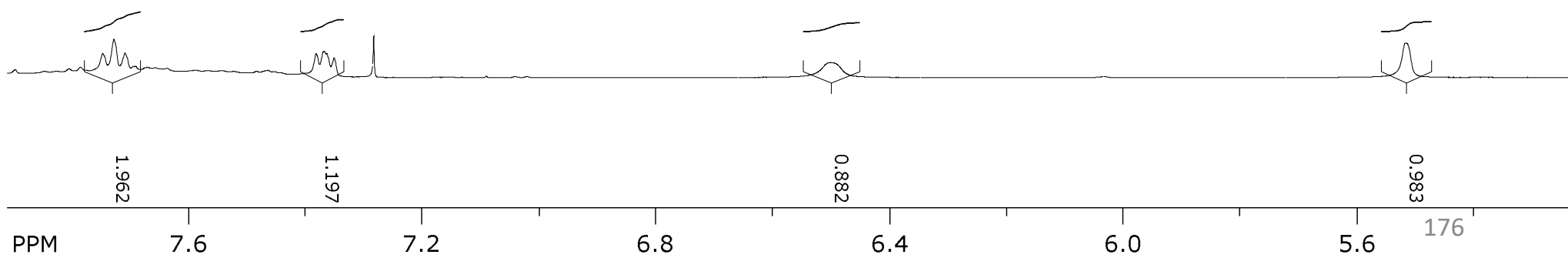
7.3633  
7.3671  
7.3695  
7.3817

6.5000

5.5140



6v





SpinWorks 4: AD 2071

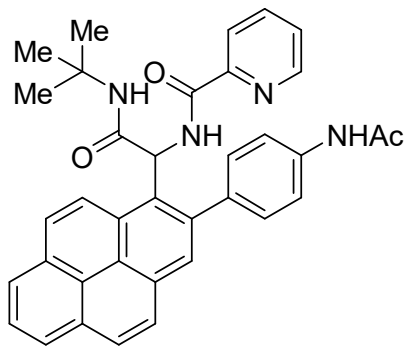
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 16

119.672  
121.975  
123.517  
124.622  
124.969  
125.666  
125.847  
125.889  
125.908  
125.927  
130.412  
131.121  
131.169  
136.687  
137.255  
138.477  
138.498  
141.139  
148.429  
149.315  
164.032  
169.283  
169.637

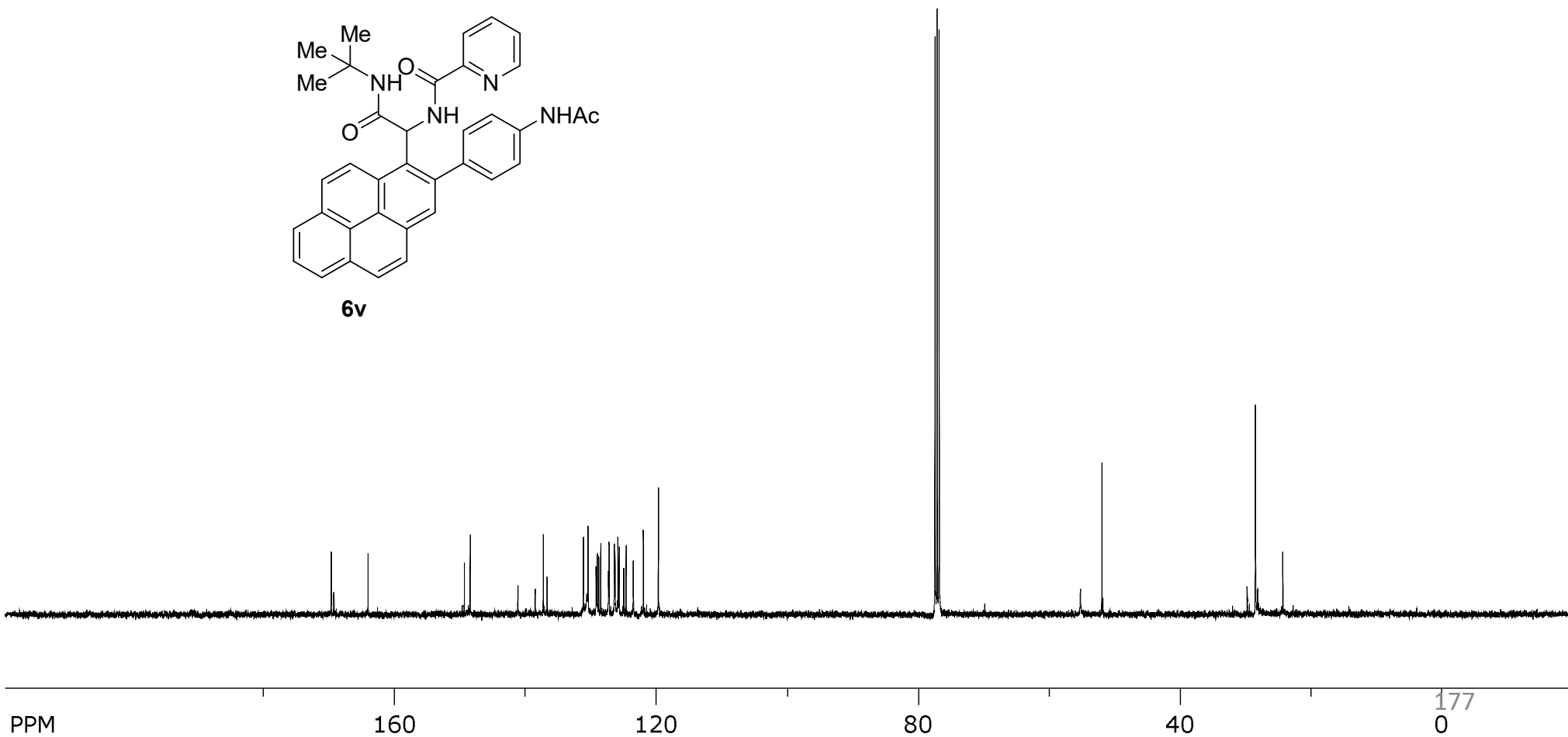
76.780  
77.098  
77.416

51.929  
55.207

24.290  
28.481

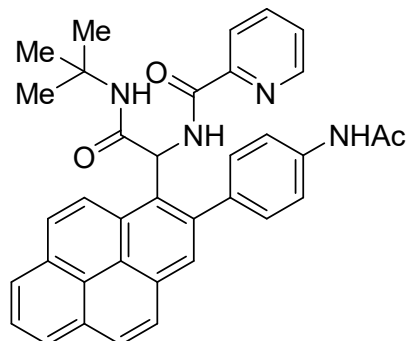


6v

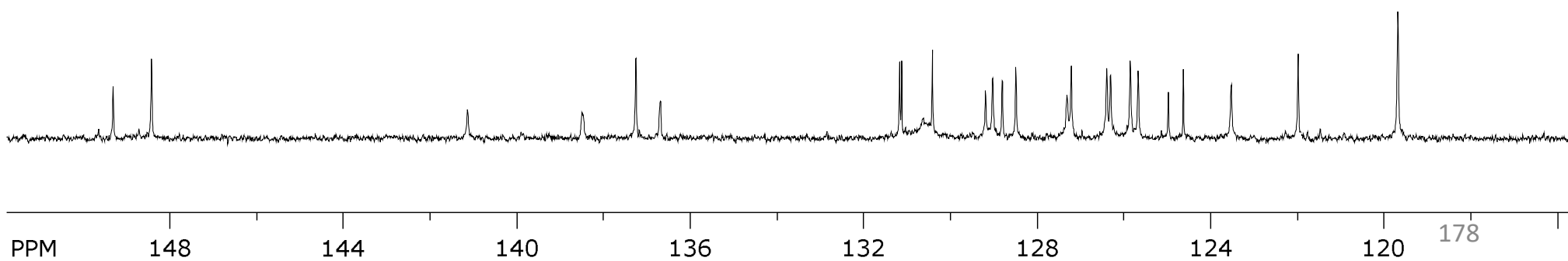


SpinWorks 4: AD 2071  
C13CPD CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 16

149.315 —  
148.429 —  
141.139 —  
138.477 —  
138.498 —  
137.255 —  
136.687 —  
131.121 —  
131.169 —  
130.412 —  
129.186 —  
129.022 —  
128.797 —  
128.487 —  
127.307 —  
127.209 —  
126.389 —  
126.303 —  
125.847 —  
125.666 —  
124.969 —  
124.622 —  
123.517 —  
121.975 —  
119.672 —

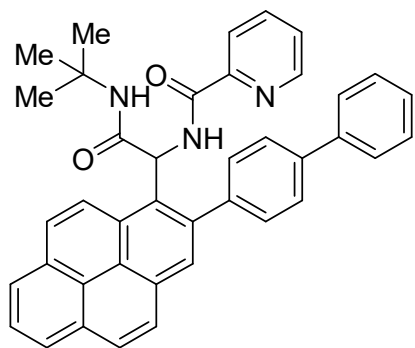


6v

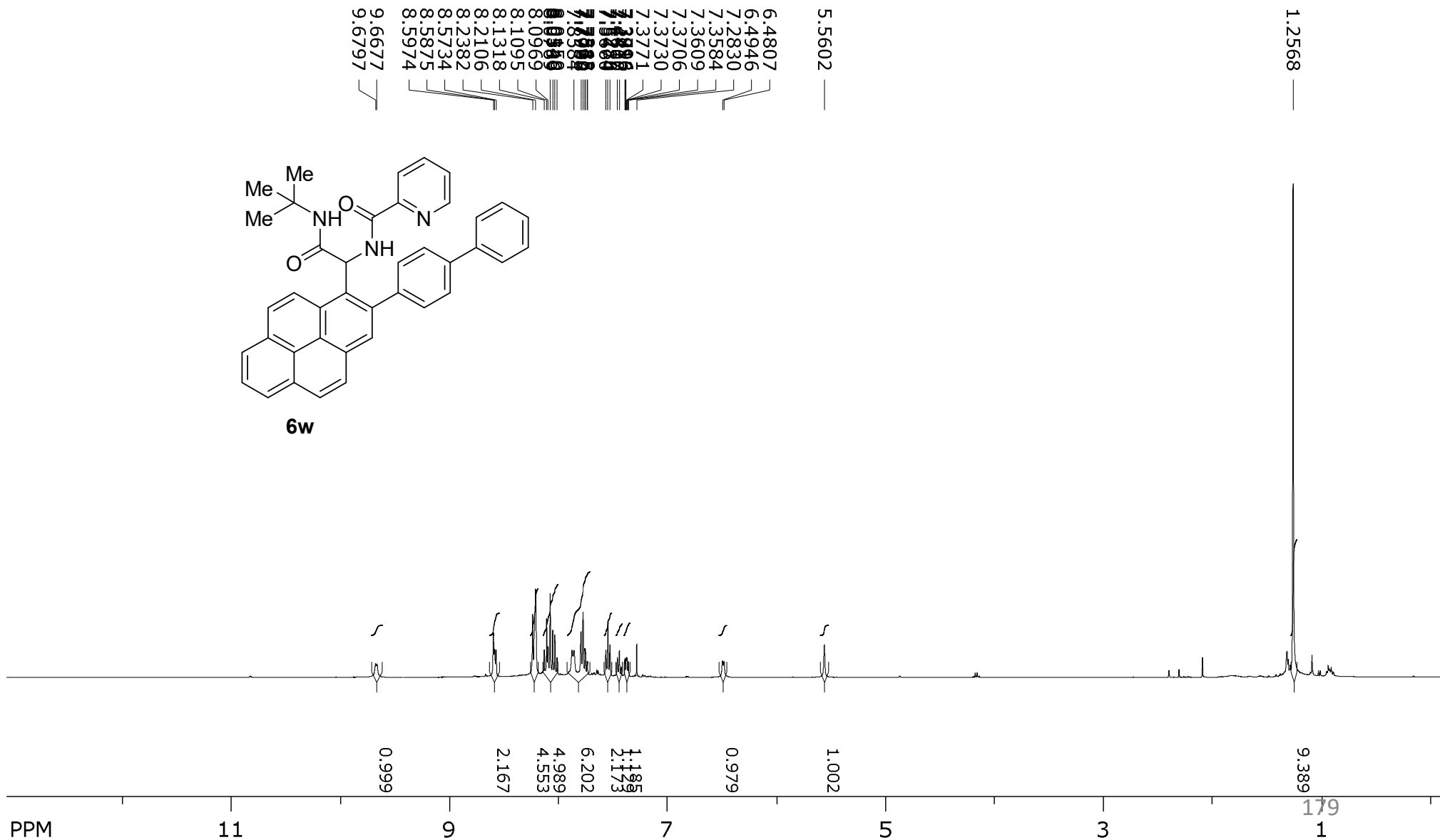


SpinWorks 4: AD-1858  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 12

9.6677  
9.6797  
8.5974  
8.5875  
8.5734  
8.2382  
8.2106  
8.1318  
8.1095  
8.0969  
7.8589  
7.8589  
7.8589  
7.8589  
7.8589  
7.3771  
7.3730  
7.3706  
7.3609  
7.3584  
7.2830  
6.4807  
6.4946  
5.5602

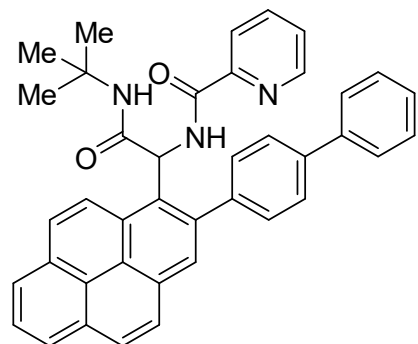


6w

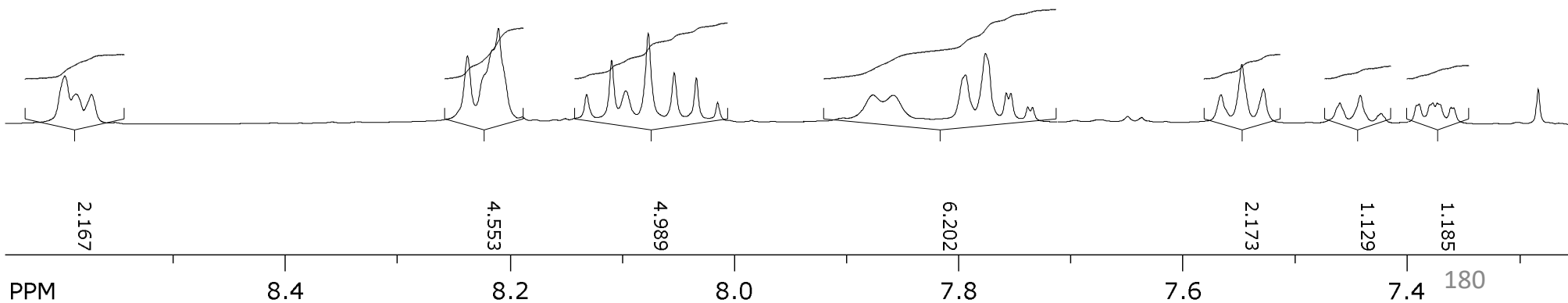


SpinWorks 4: AD-1858  
 PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 12

8.5734	8.2106	8.0150	7.7342	7.5280	7.2830
8.5875	8.2382	8.0340	7.7383	7.5474	7.3584
8.5974		8.0536	7.7535	7.5660	7.3609
		8.0769	7.7575		7.3706
		8.0969	7.7760		7.3730
		8.1095	7.7938		7.3771
		8.1318			7.3796
					7.3893
					7.3916
					7.4417
					7.4600



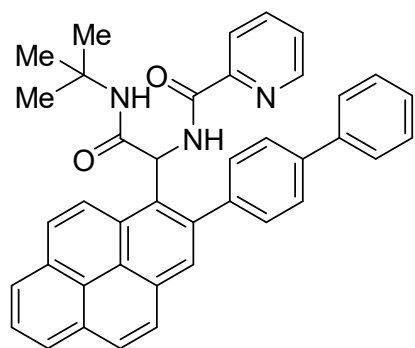
6w



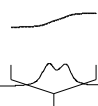
SpinWorks 4: AD-1858  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 12

6.4807  
6.4946

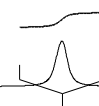
5.5602



**6w**



0.979



1.002

PPM

6.6

6.4

6.2

6.0

5.8

5.6

5.4

181

5.2

SpinWorks 4: AD-1858

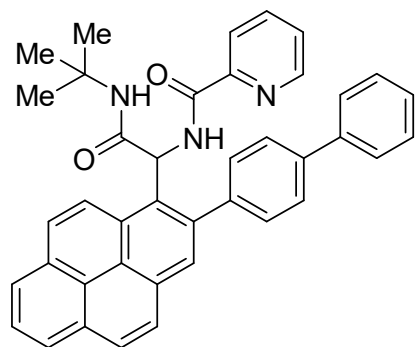
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 12

122.013  
123.800  
124.629  
125.082  
125.546  
125.666  
126.188  
126.188  
129.186  
129.186  
130.439  
131.059  
131.103  
137.051  
140.567  
140.618  
140.743  
140.913  
148.285  
149.631  
163.754  
169.476

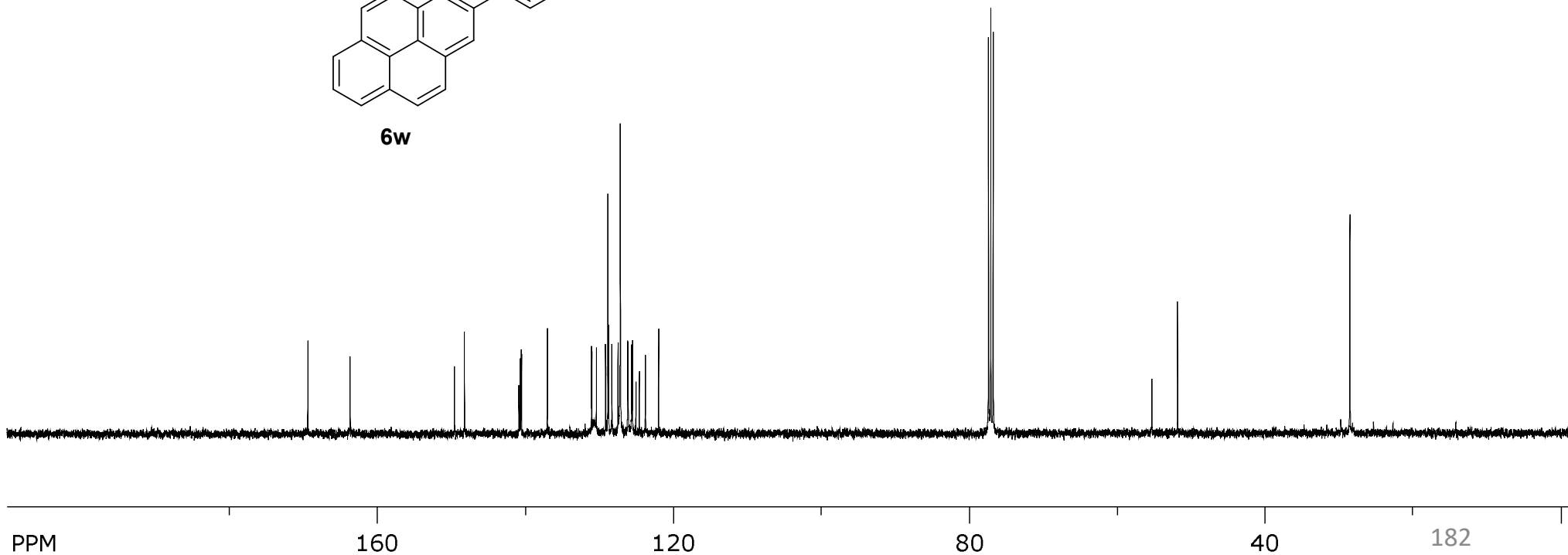
76.742  
77.060  
77.378

51.791  
55.270

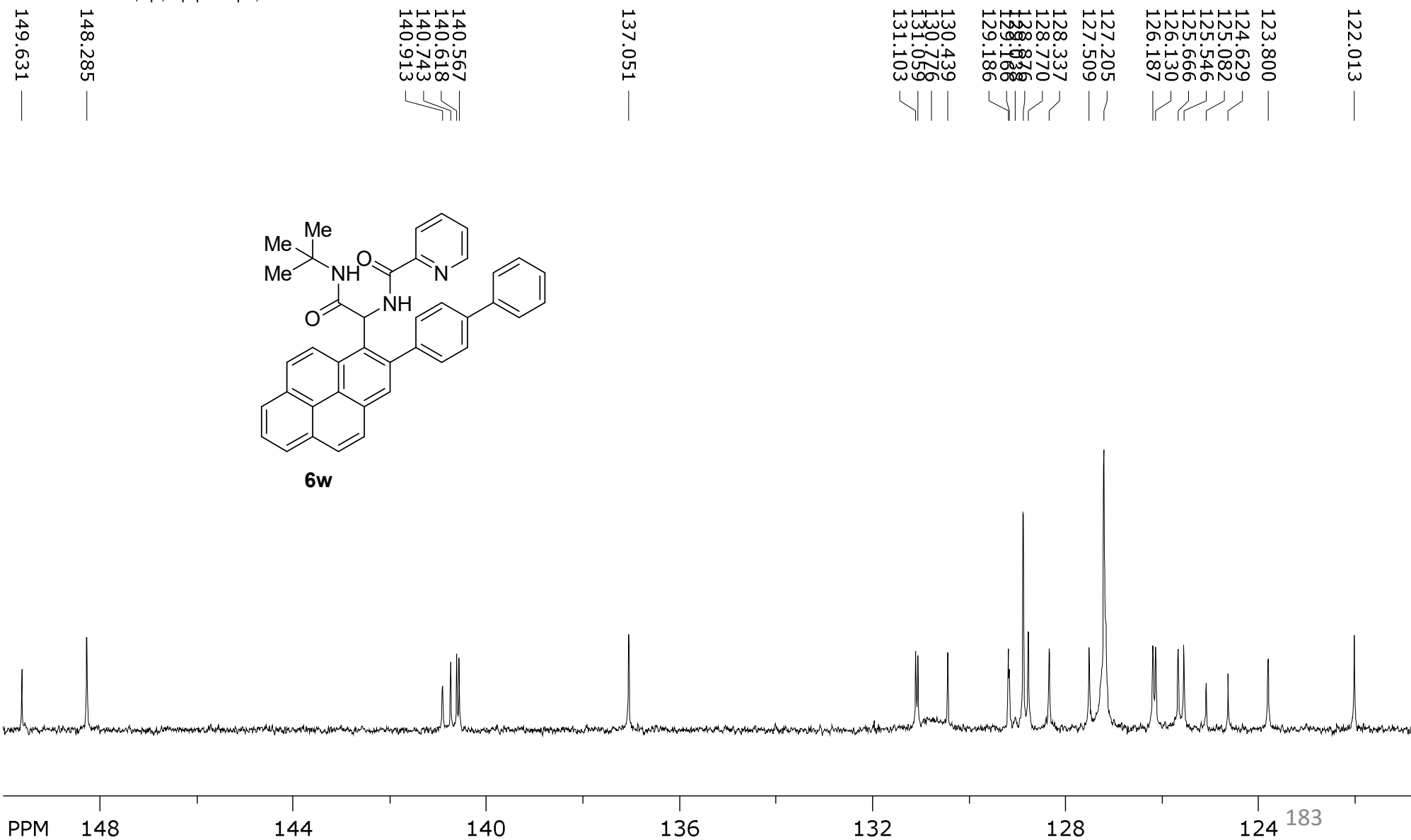
28.479



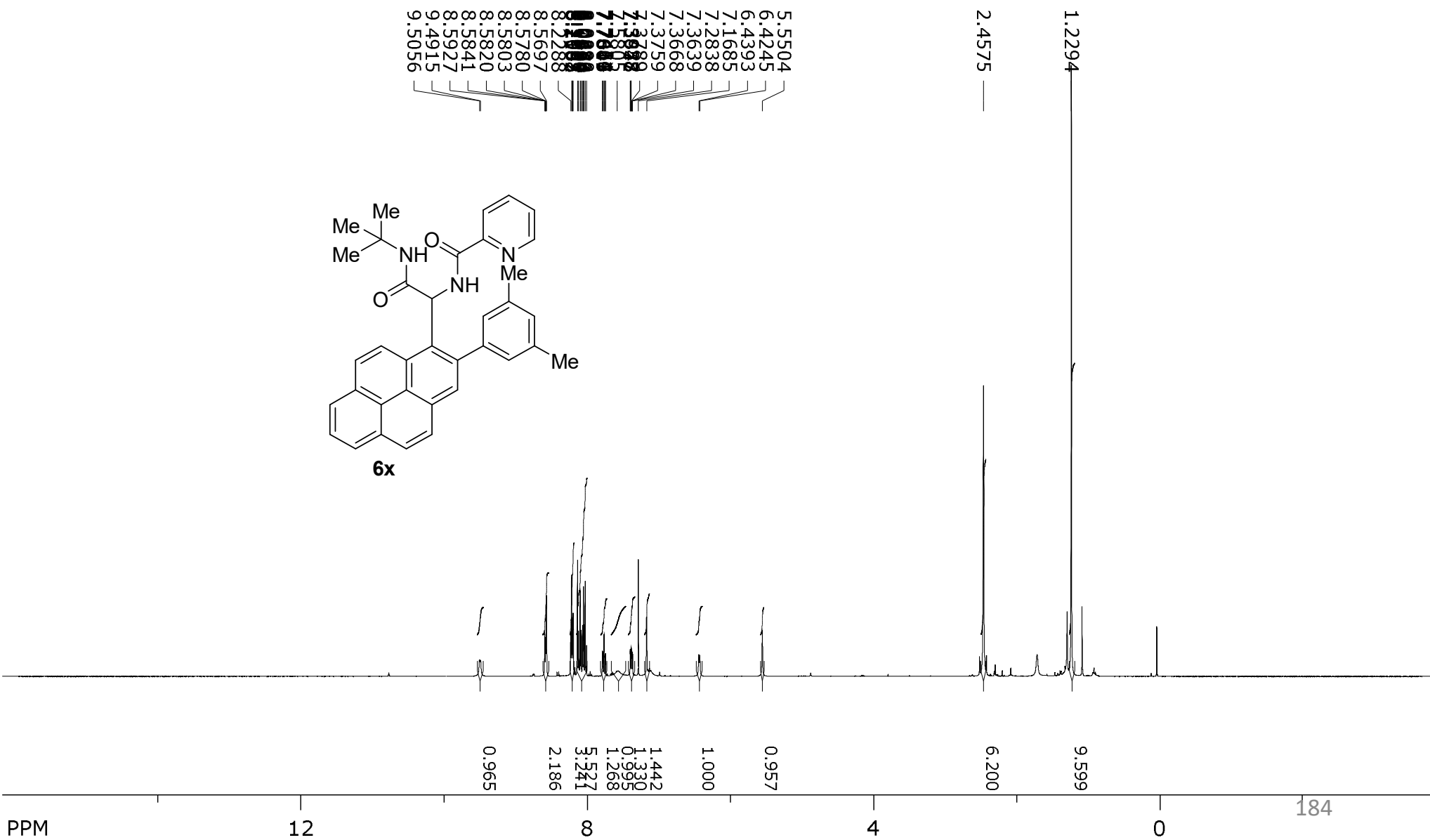
6w



SpinWorks 4: AD-1858  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 12

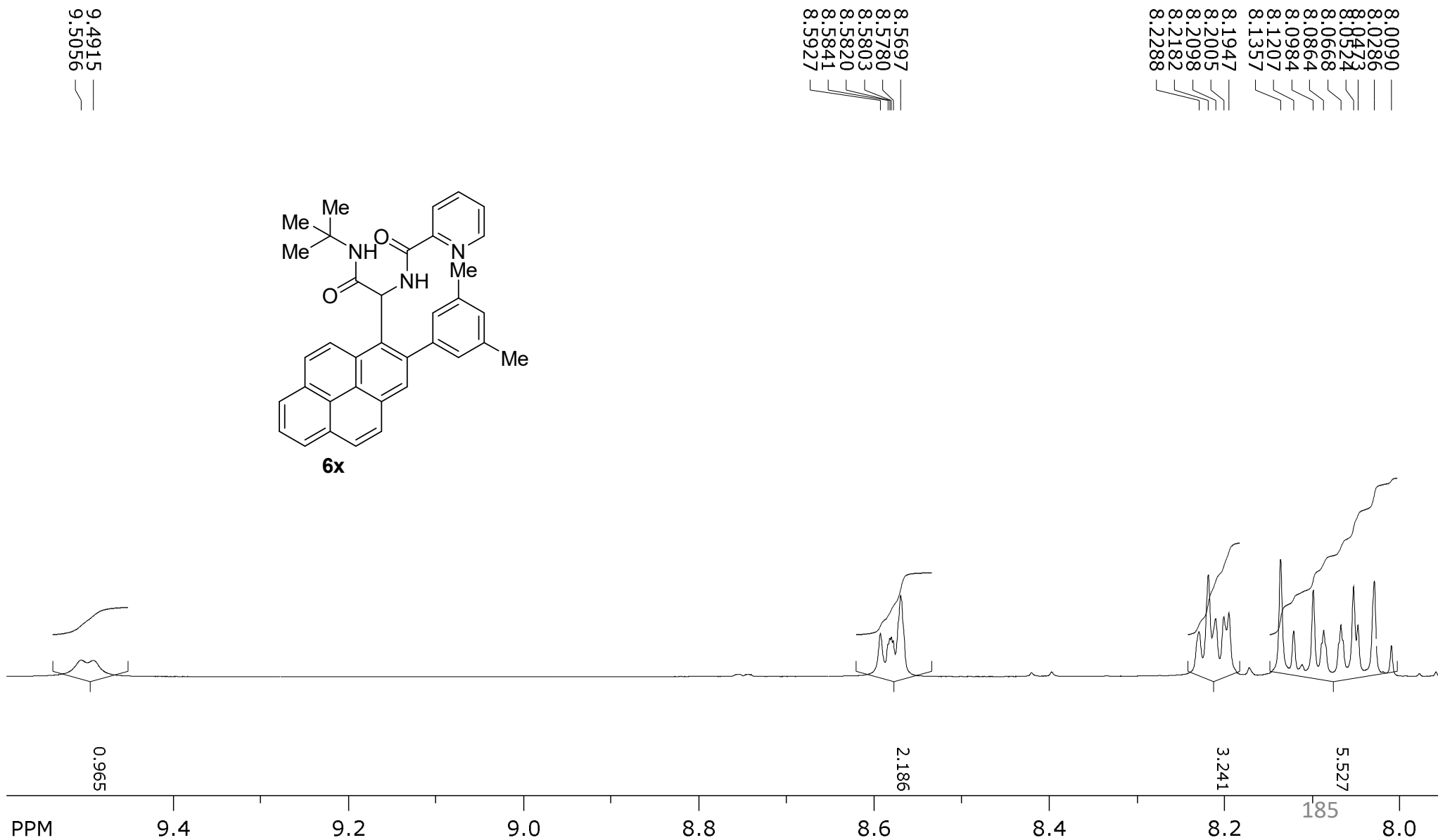
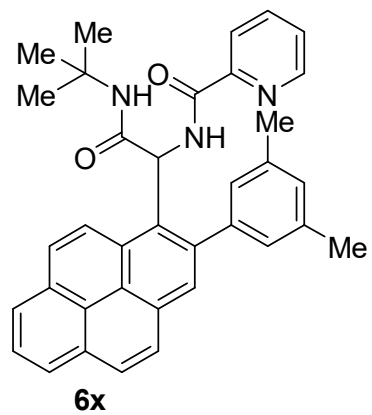


SpinWorks 4: AD-1816  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 28





SpinWorks 4: AD-1816  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 28



SpinWorks 4: AD-1816  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 28

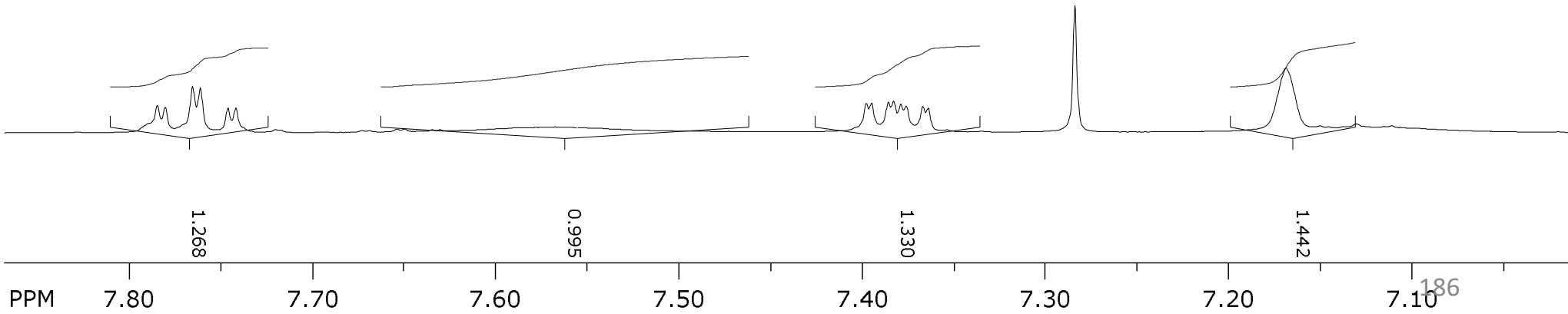
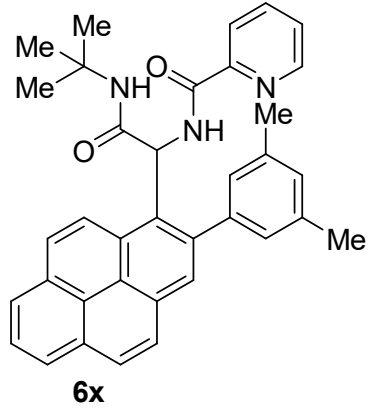
7.7421  
7.7464  
7.7615  
7.7657  
7.7806  
7.7849

7.5805

7.3639  
7.3668  
7.3759  
7.3789  
7.3828  
7.3857  
7.3948  
7.3977

7.2838

7.1685

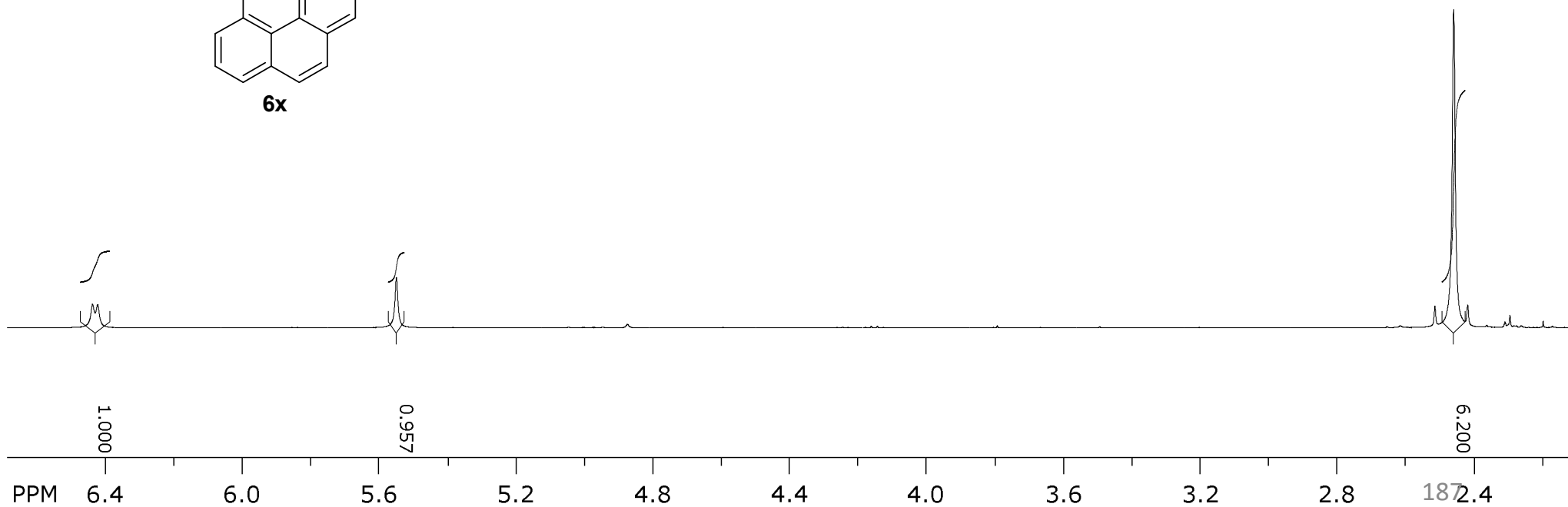
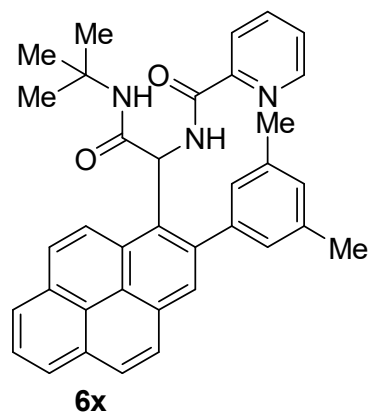


SpinWorks 4: AD-1816  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 28

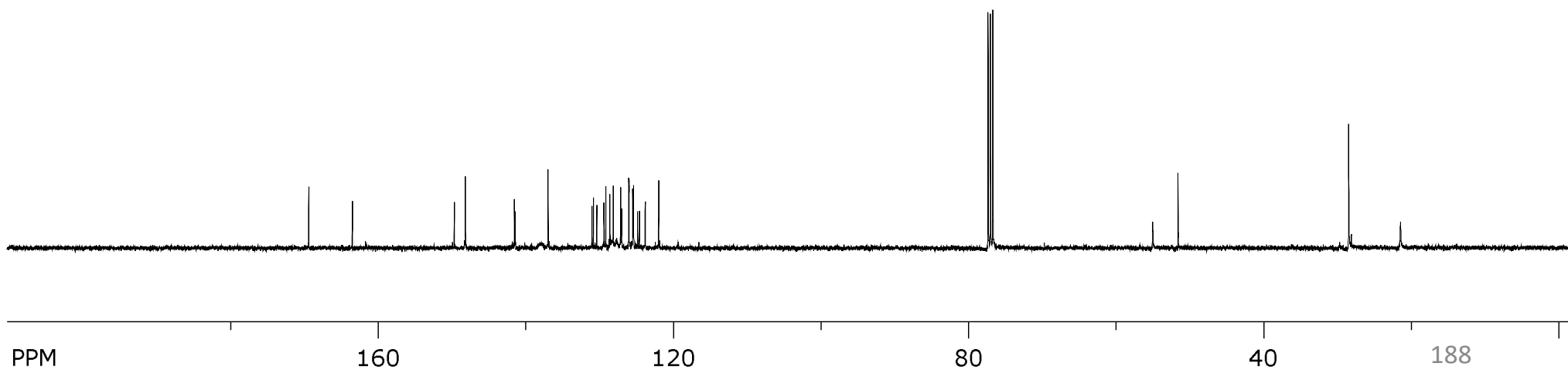
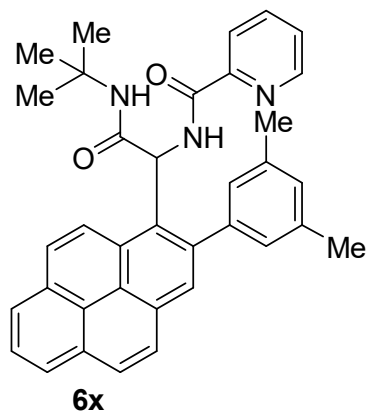
6.4245  
6.4393

5.5504

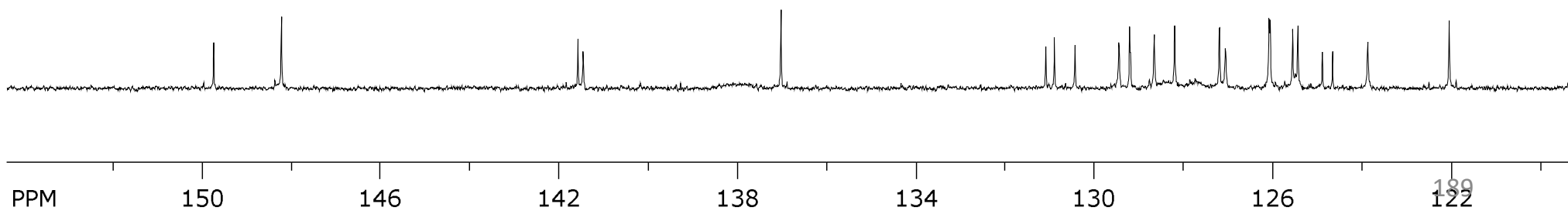
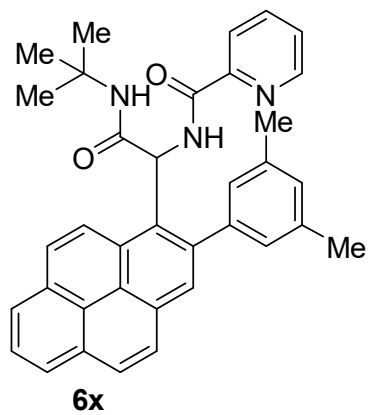
2.4575



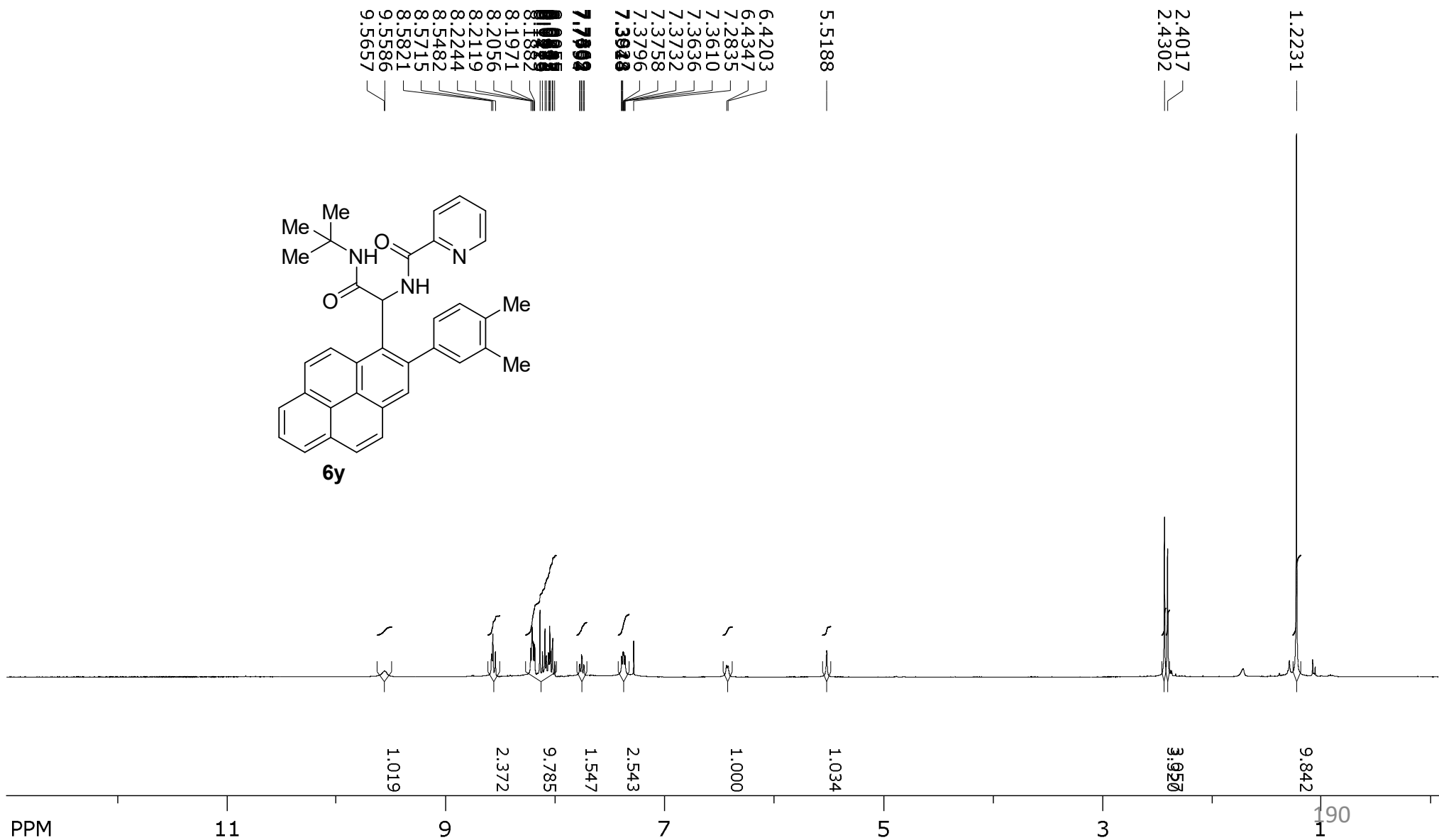
SpinWorks 4: AD-1816  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 3



SpinWorks 4: AD-1816  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 3



SpinWorks 4: SUB-51 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 33



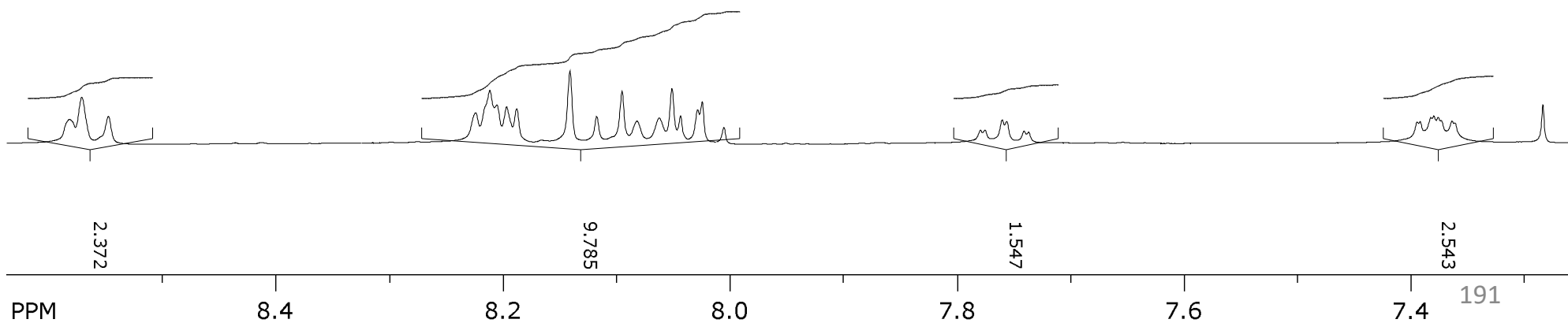
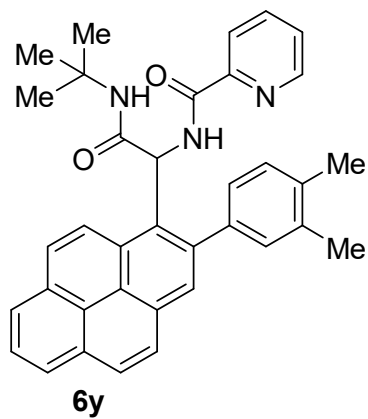
SpinWorks 4: SUB-51 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 33

8.5482  
8.5715  
8.5821

8.0055  
8.0247  
8.0287  
8.0437  
8.0513  
8.0625  
8.0822  
8.0953  
8.1176  
8.1413  
8.1882  
8.1971  
8.2056  
8.2119  
8.2244

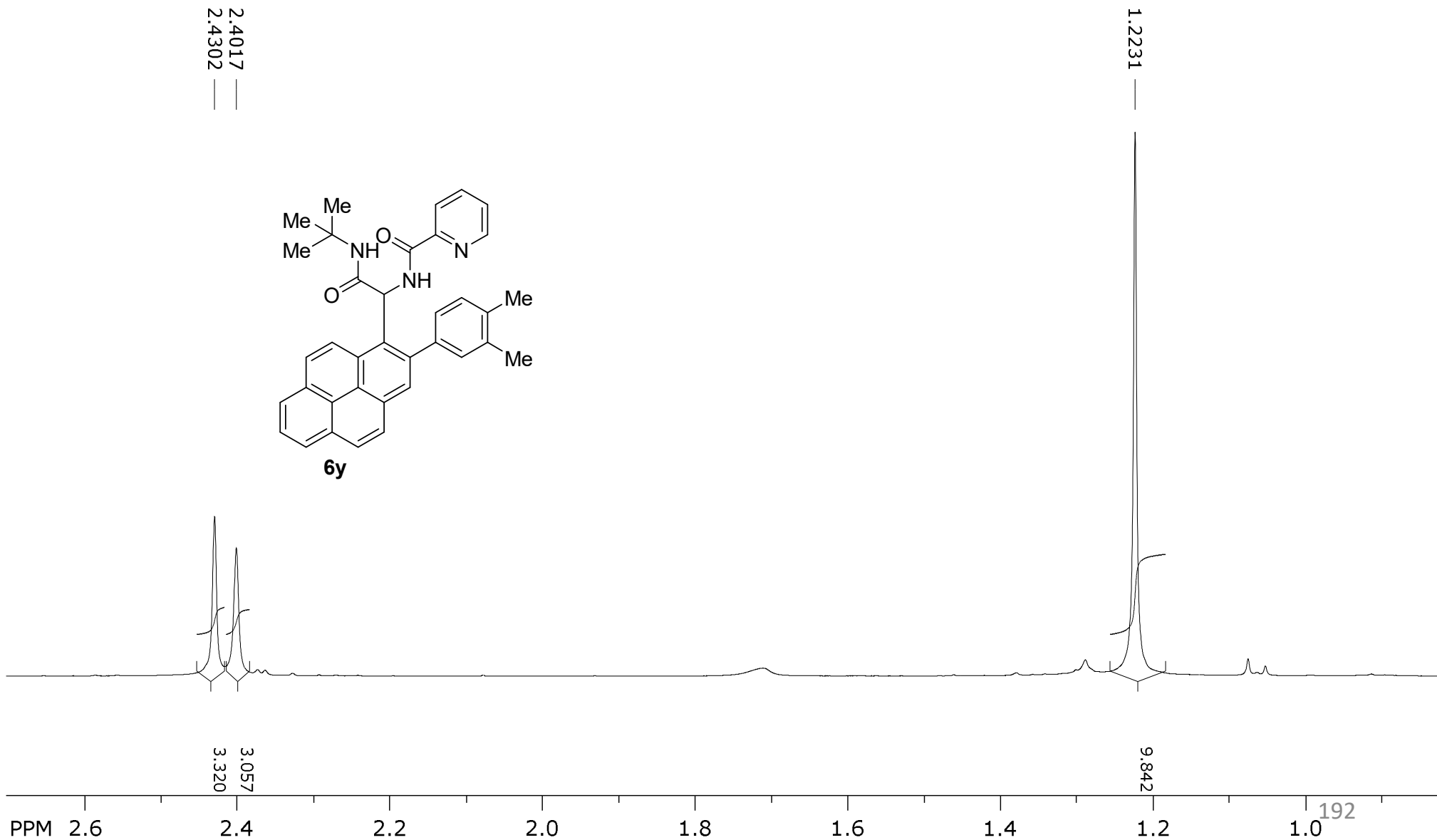
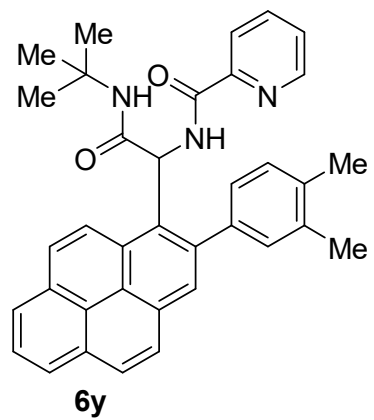
7.7369  
7.7409  
7.7562  
7.7602  
7.7753  
7.7794

7.3610  
7.3636  
7.3732  
7.3758  
7.3796  
7.3823  
7.3918  
7.3944



SpinWorks 4: SUB-51 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 33

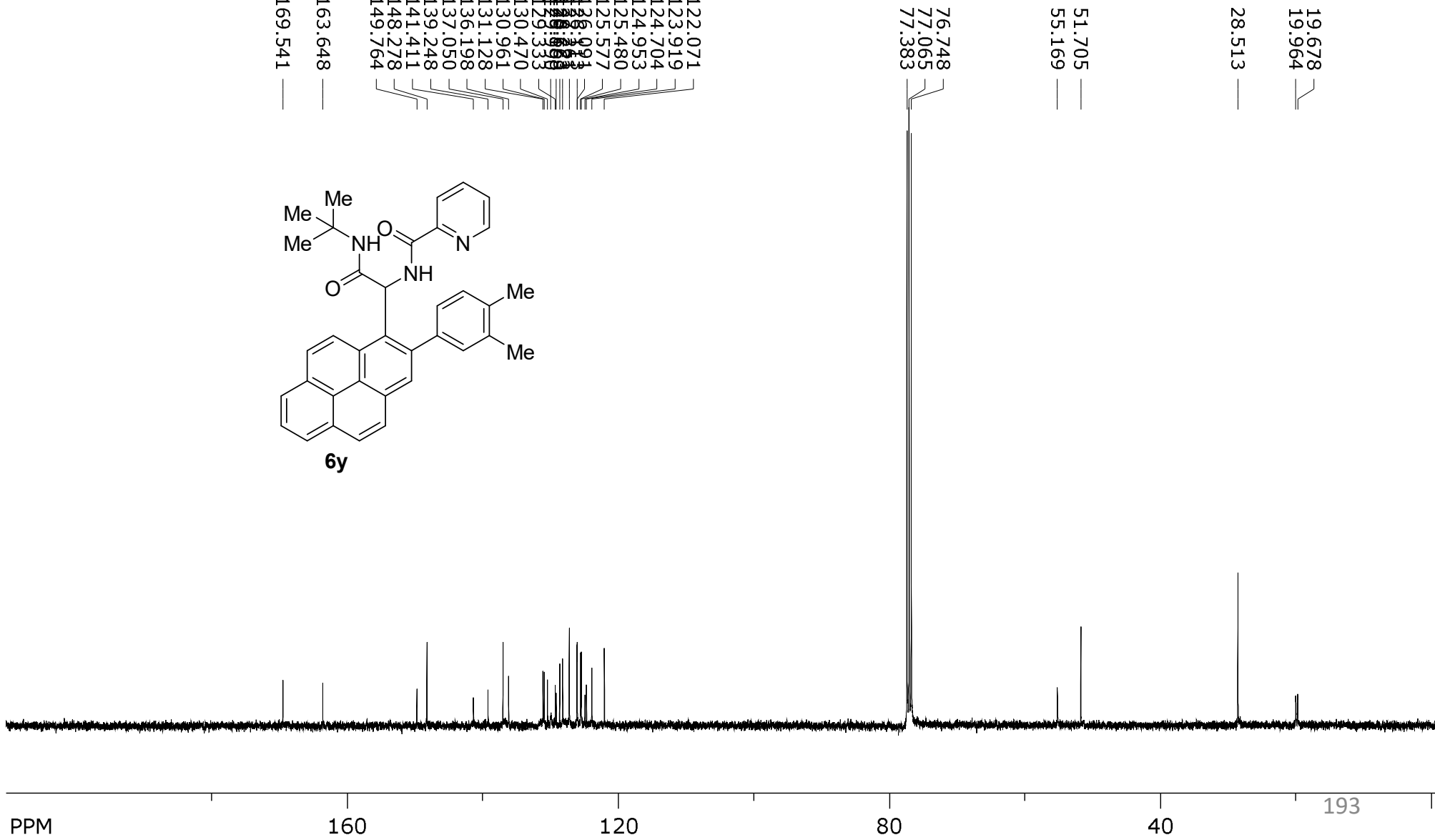
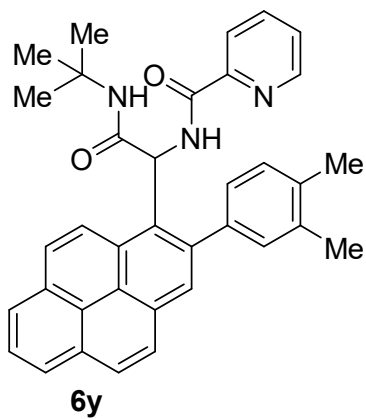
2.4017  
2.4302



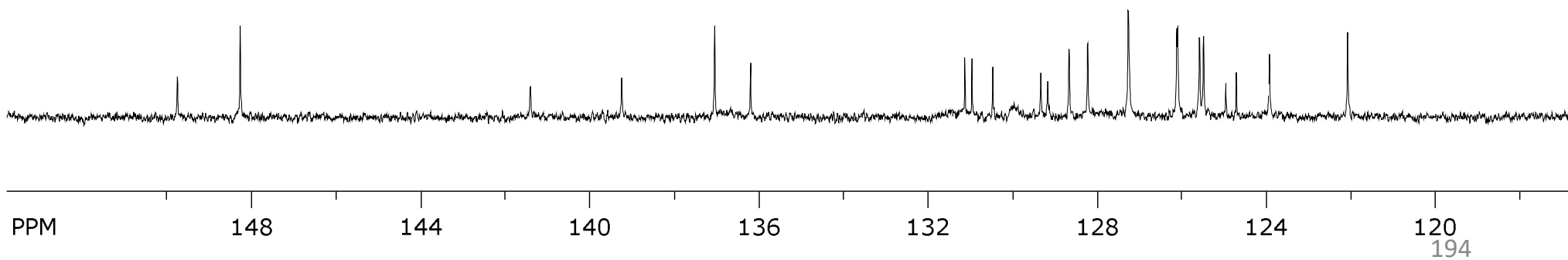
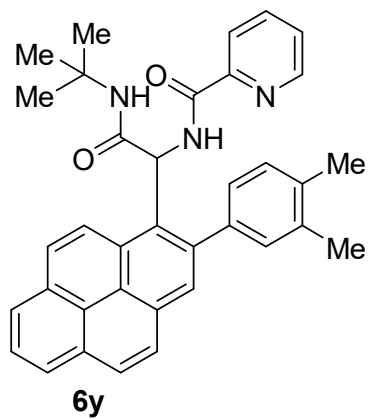


SpinWorks 4: SUB-51 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 33

122.071  
123.919  
124.704  
124.953  
125.480  
125.577  
129.091  
129.199  
129.333  
129.333  
130.470  
130.961  
131.128  
136.198  
137.050  
139.248  
141.411  
148.278  
149.764  
163.648  
169.541



SpinWorks 4: SUB-51 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 33



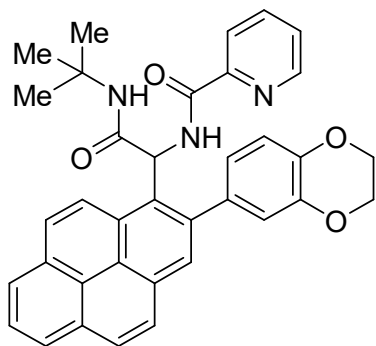


SpinWorks 4: AD 2081  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 10

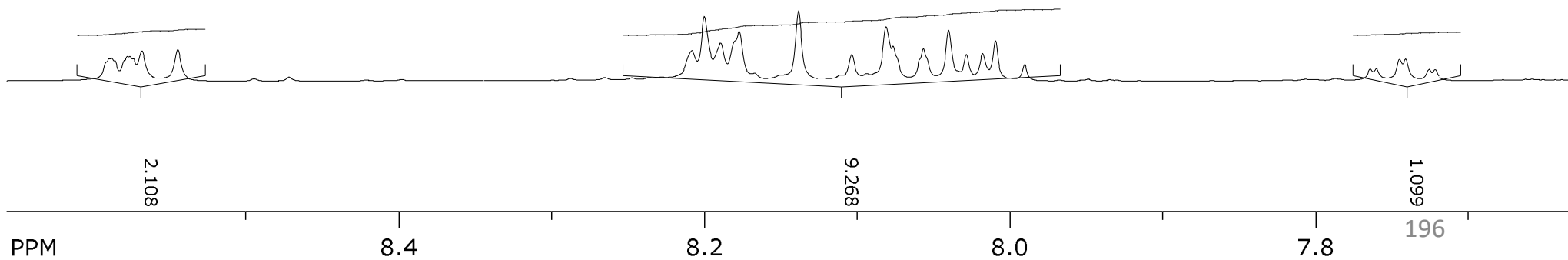
8.5452  
8.5688  
8.5744  
8.5766  
8.5781  
8.5867  
8.5886  
8.5899

8.1674  
8.1773  
8.1895  
8.2002  
8.2084  
8.1386  
8.1106  
8.1037  
8.0939  
8.0812  
8.0766  
8.0568  
8.0402  
8.0285  
8.0179  
8.0095  
7.9904

7.7214  
7.7255  
7.7408  
7.7448  
7.7600  
7.7640



6z



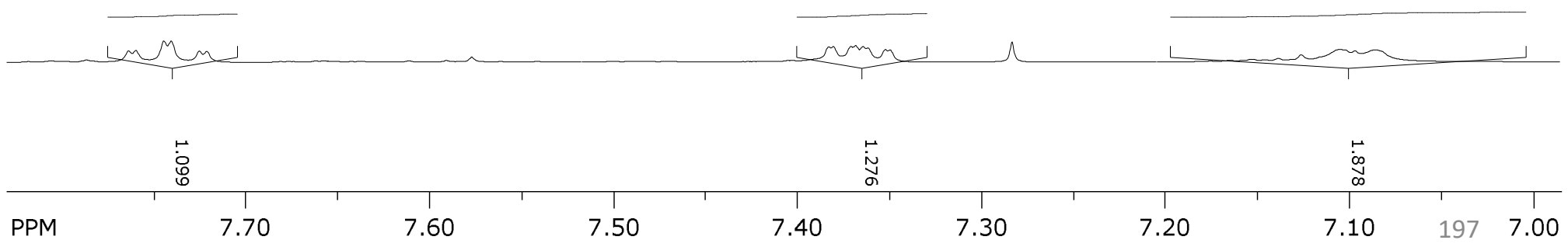
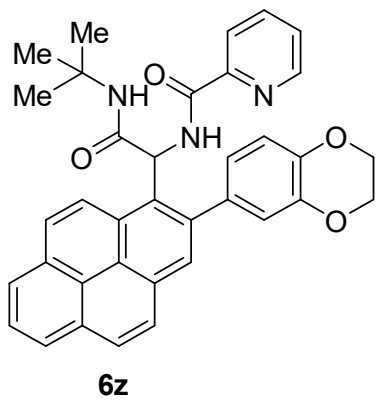
SpinWorks 4: AD 2081  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 10

7.7214  
7.7255  
7.7408  
7.7448  
7.7600  
7.7640

7.3497  
7.3522  
7.3618  
7.3644  
7.3685  
7.3710  
7.3806  
7.3831

7.2834

7.0857  
7.0967  
7.1025  
7.1051  
7.1261

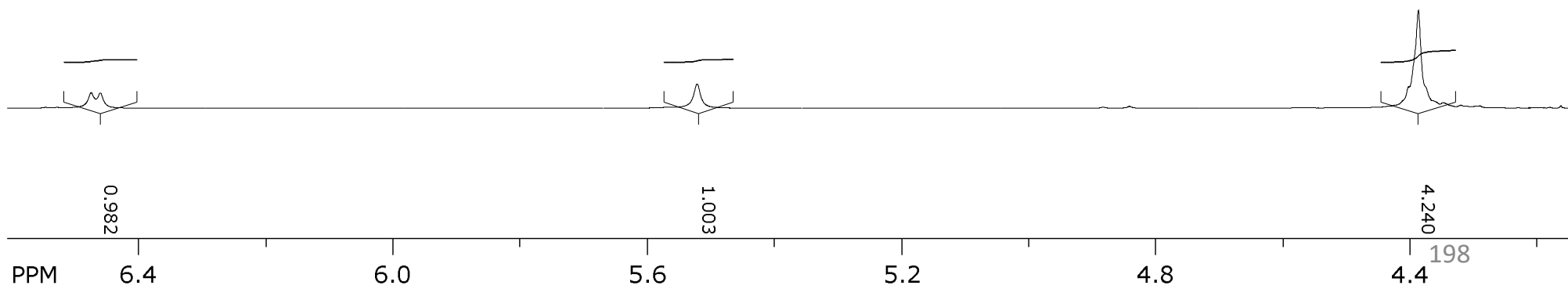
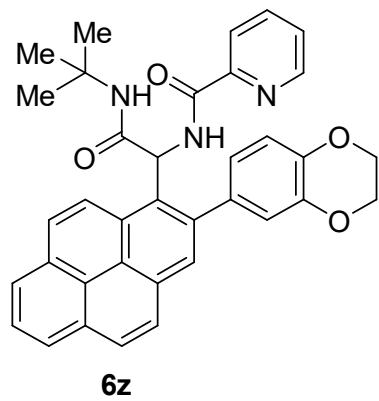


SpinWorks 4: AD 2081  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 10

6.4610  
6.4755

5.5216

4.3860



SpinWorks 4: AD 2081  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 10

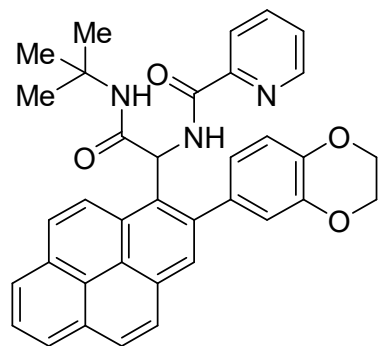
122.096  
123.932  
124.664  
124.997  
125.493  
125.597  
125.652  
125.717  
125.782  
129.408  
129.408  
129.408  
130.461  
130.977  
131.122  
134.972  
137.043  
140.709  
143.419  
143.507  
148.281  
149.734  
163.714  
169.510

76.773  
77.091  
77.409

64.491

51.750  
55.192

28.519



6z



PPM

160

120

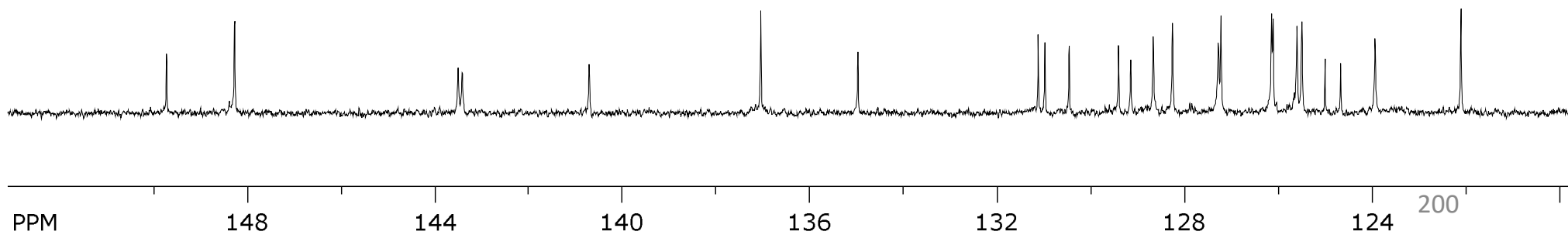
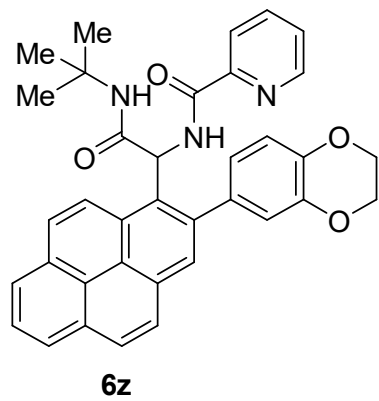
80

40

199

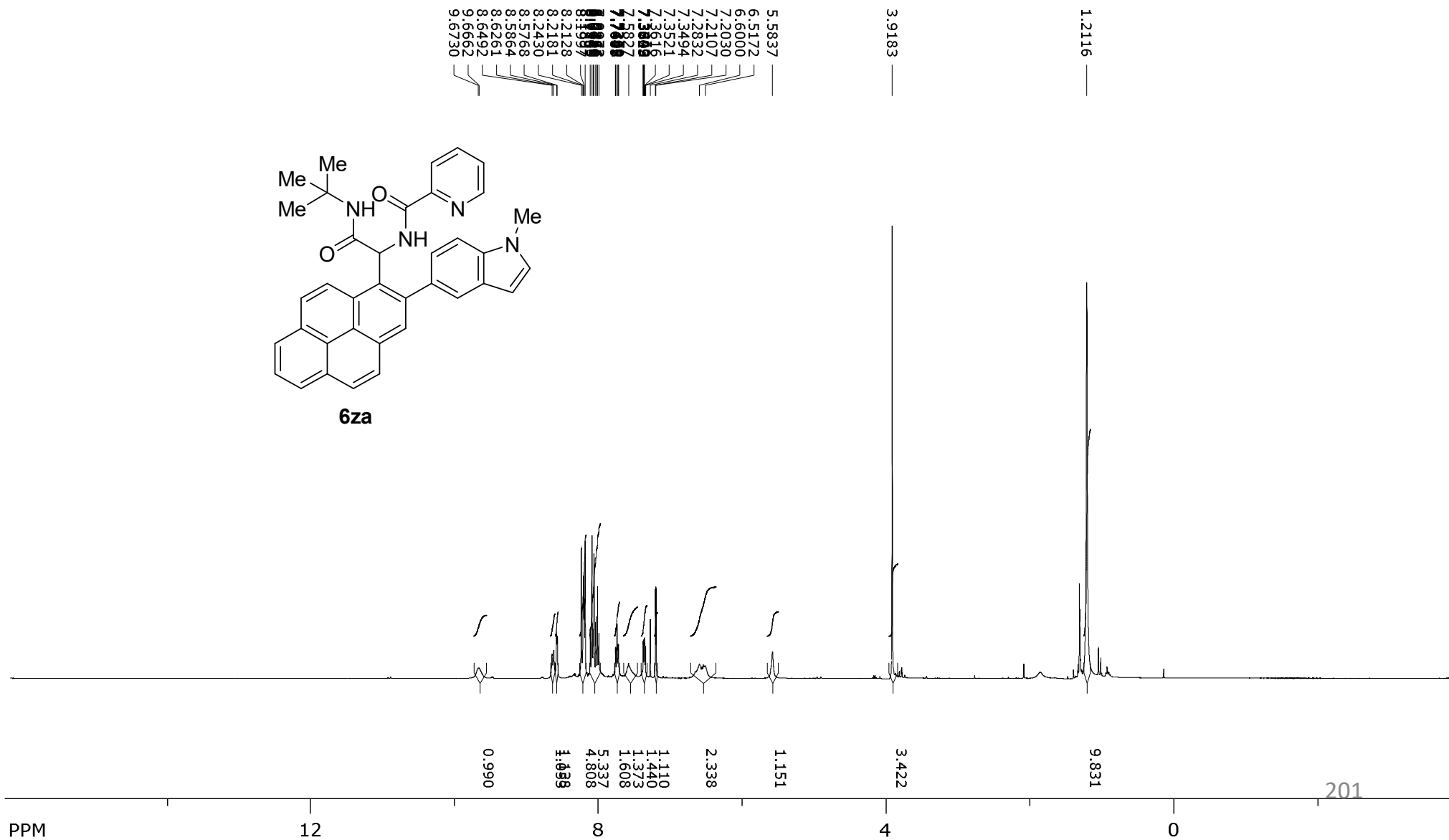
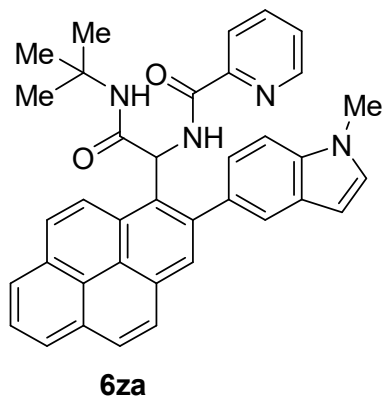
SpinWorks 4: AD 2081  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 10

149.734 —  
148.281 —  
143.419 —  
143.507 —  
140.709 —  
137.043 —  
134.972 —  
130.461 —  
130.977 —  
131.122 —  
129.408 —  
128.256 —  
128.665 —  
129.146 —  
127.220 —  
127.278 —  
126.141 —  
125.652 —  
125.597 —  
125.493 —  
124.997 —  
124.664 —  
123.932 —  
122.096 —





SpinWorks 4: AD-1991  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 28

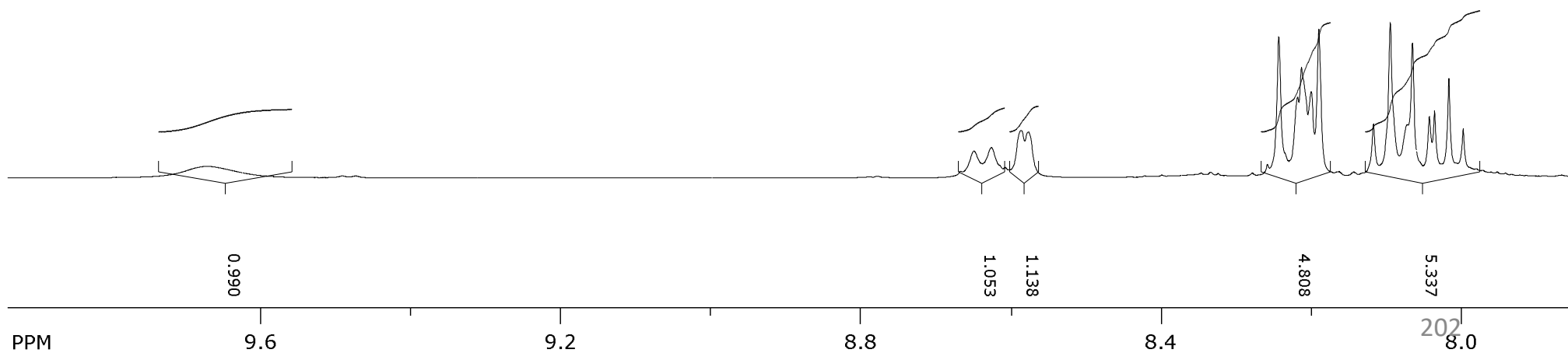
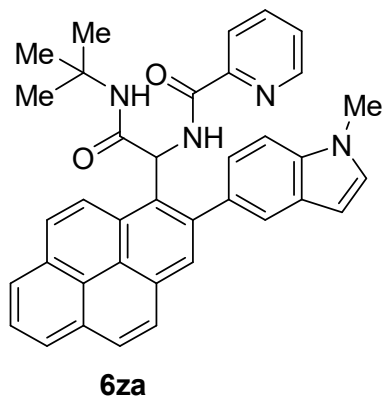


SpinWorks 4: AD-1991  
PROTON CDCI3 /opt/topspin3.5pl2/nmrdata nmrsu 28

9.6662  
9.6750

8.5768  
8.5864  
8.6261  
8.6492

7.9973  
8.0164  
8.0355  
8.0424  
8.0649  
8.0718  
8.0945  
8.1169  
8.1897  
8.1997  
8.2128  
8.2181  
8.2430



SpinWorks 4: AD-1991  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 28

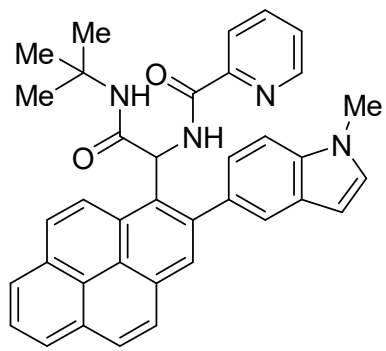
7.7259  
7.7300  
7.7452  
7.7492  
7.7645  
7.7685

7.5827

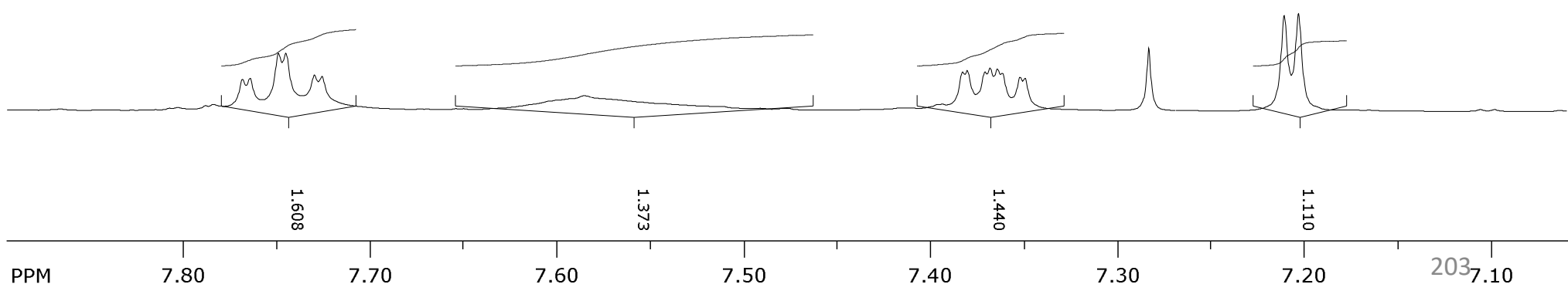
7.3494  
7.3521  
7.3616  
7.3643  
7.3682  
7.3709  
7.3803  
7.3829

7.2832

7.2030  
7.2107

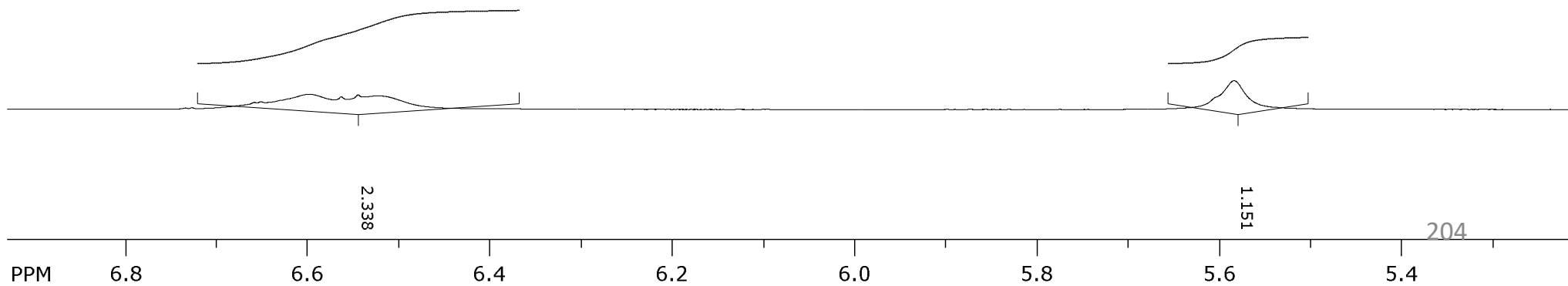
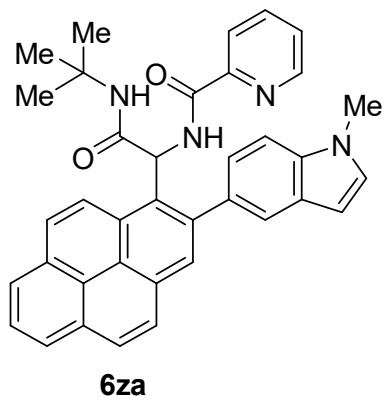


6za



SpinWorks 4: AD-1991  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 28

6.6000  
6.5172  
5.5837



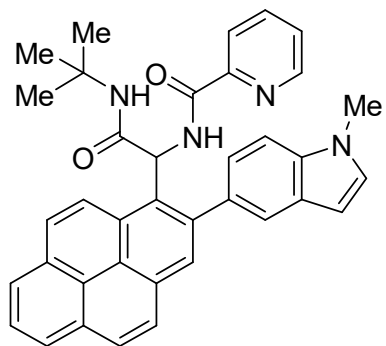
SpinWorks 4: AD-1991  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 28

121.997  
124.120  
124.744  
124.885  
125.342  
125.423  
125.996  
129.898  
129.900  
129.900  
130.456  
130.796  
131.111  
131.111  
136.249  
136.979  
142.353  
148.250  
149.829  
163.593  
169.485

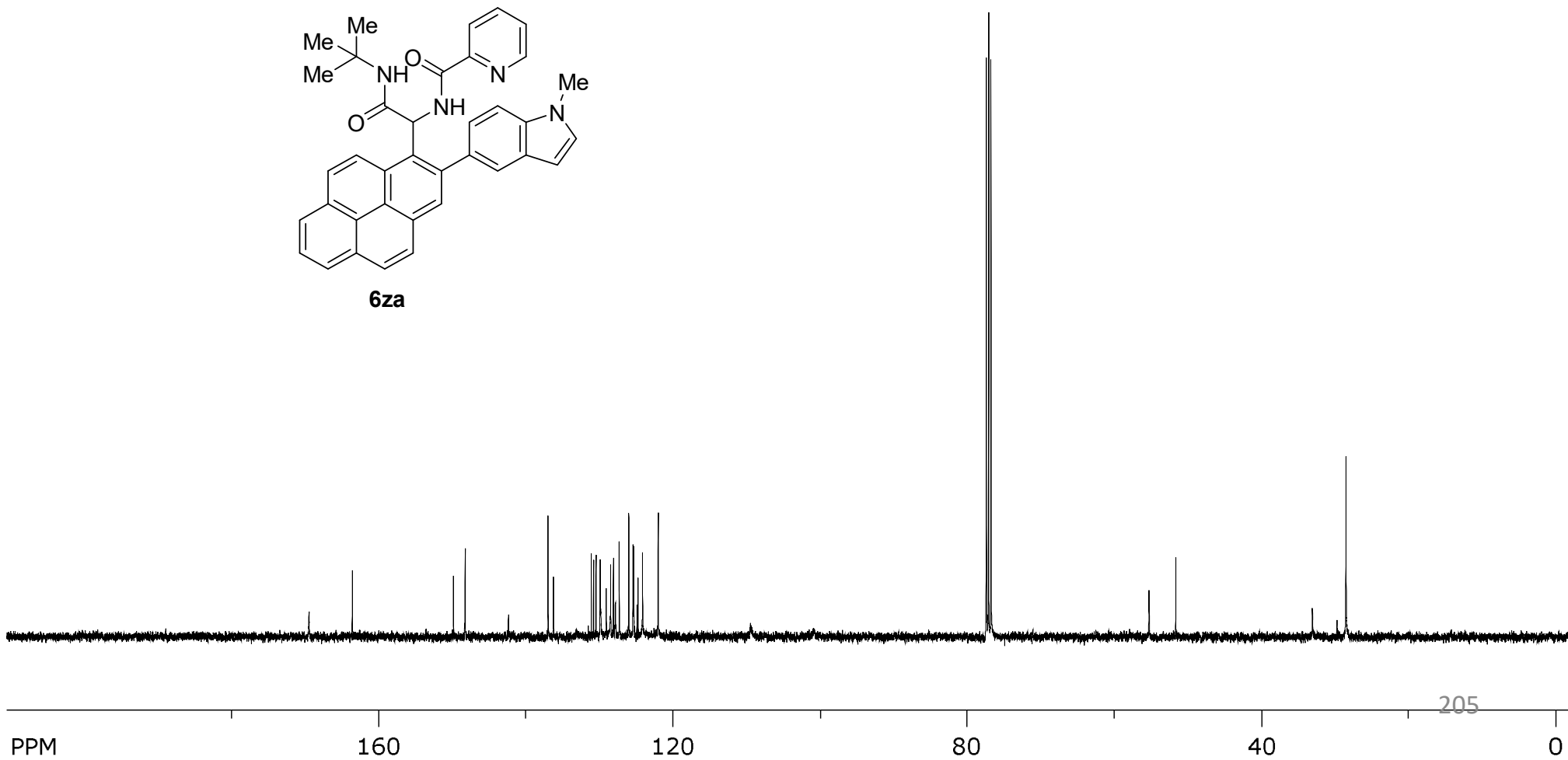
76.742  
77.060  
77.378

51.611  
55.246

28.467  
33.038



6za



SpinWorks 4: AD-1991  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 28

149,829

148,250

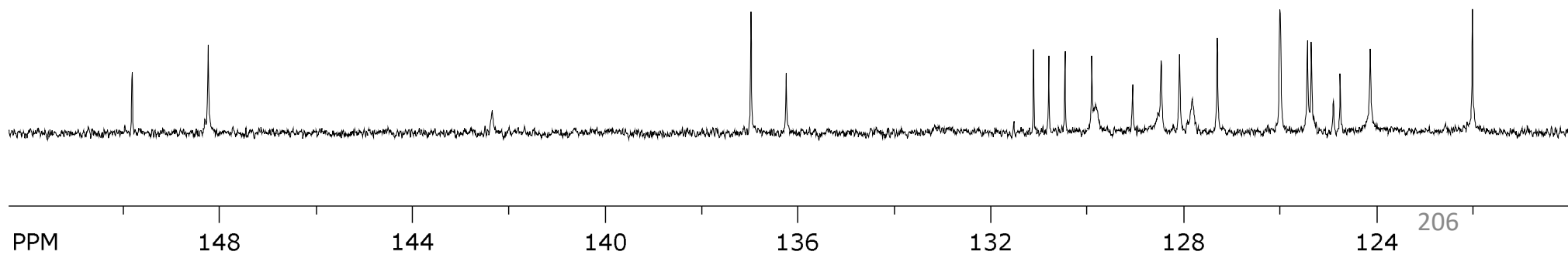
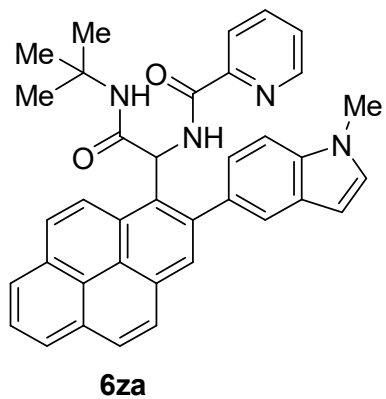
142,353

136,979

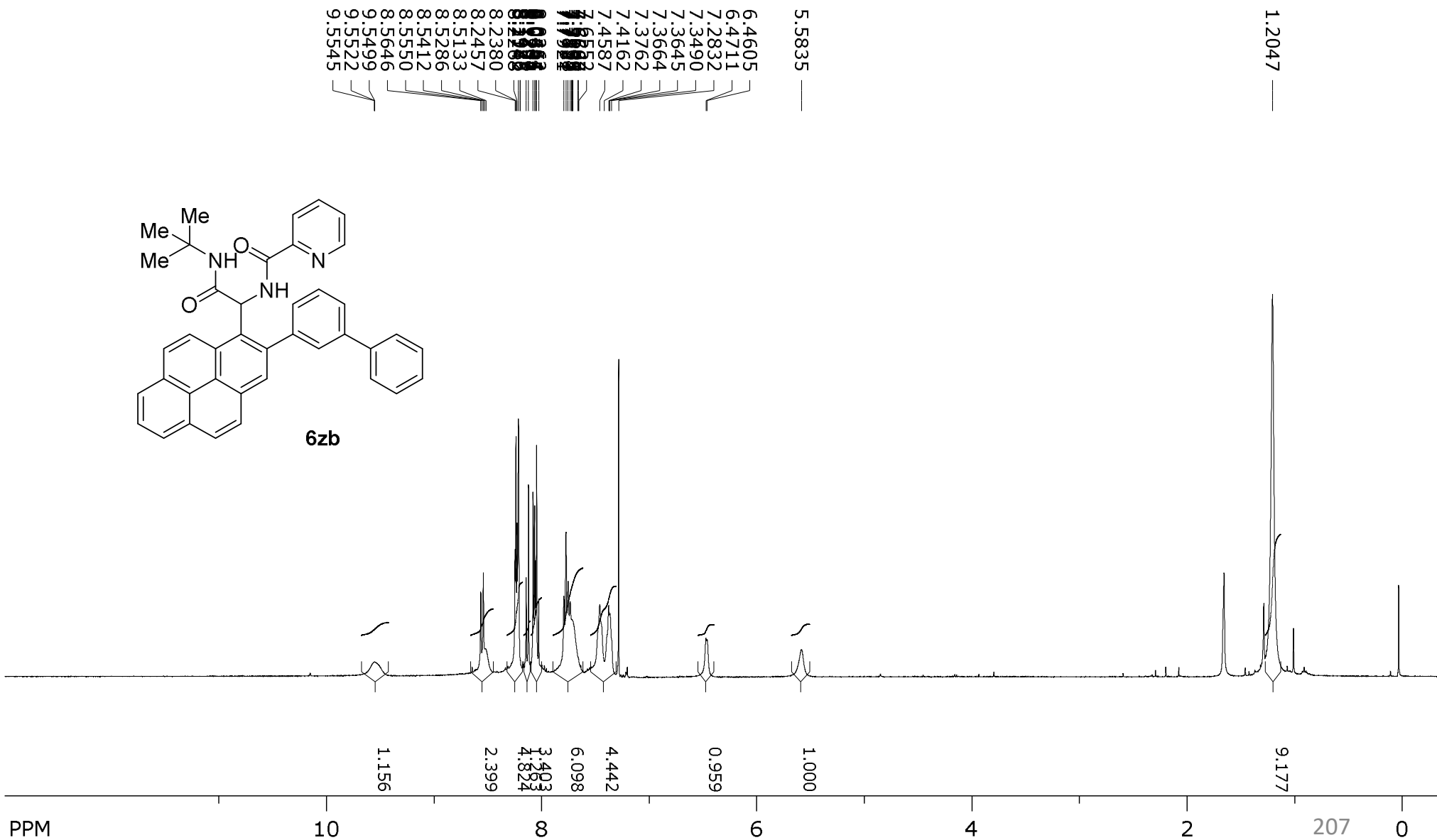
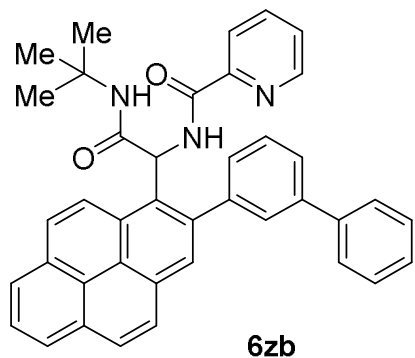
136,249

124,120  
124,744  
124,885  
125,342  
125,423  
125,996  
127,296  
127,814  
127,841  
127,917  
128,081  
128,462  
128,527  
128,557  
129,054  
129,747  
129,798  
129,821  
129,858  
129,900  
130,456  
130,796  
131,111

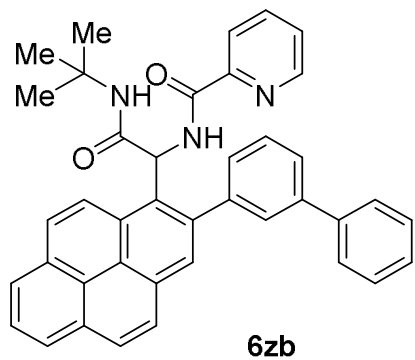
121,997



SpinWorks 4: AD-2175  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 39



SpinWorks 4: AD-2175  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 39

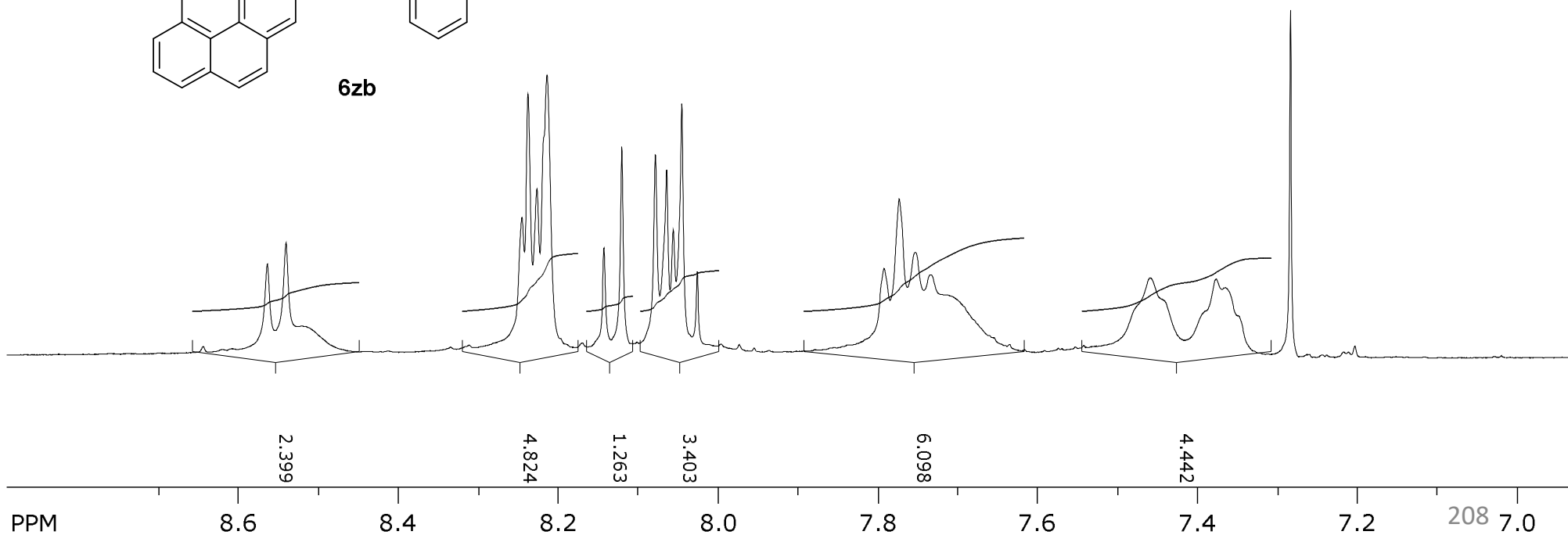


8.5133  
8.5286  
8.5412  
8.5550  
8.5646

8.0262  
8.0454  
8.0561  
8.0645  
8.0785  
8.1206  
8.1429  
8.1975  
8.1986  
8.2142  
8.2268  
8.2380  
8.2457

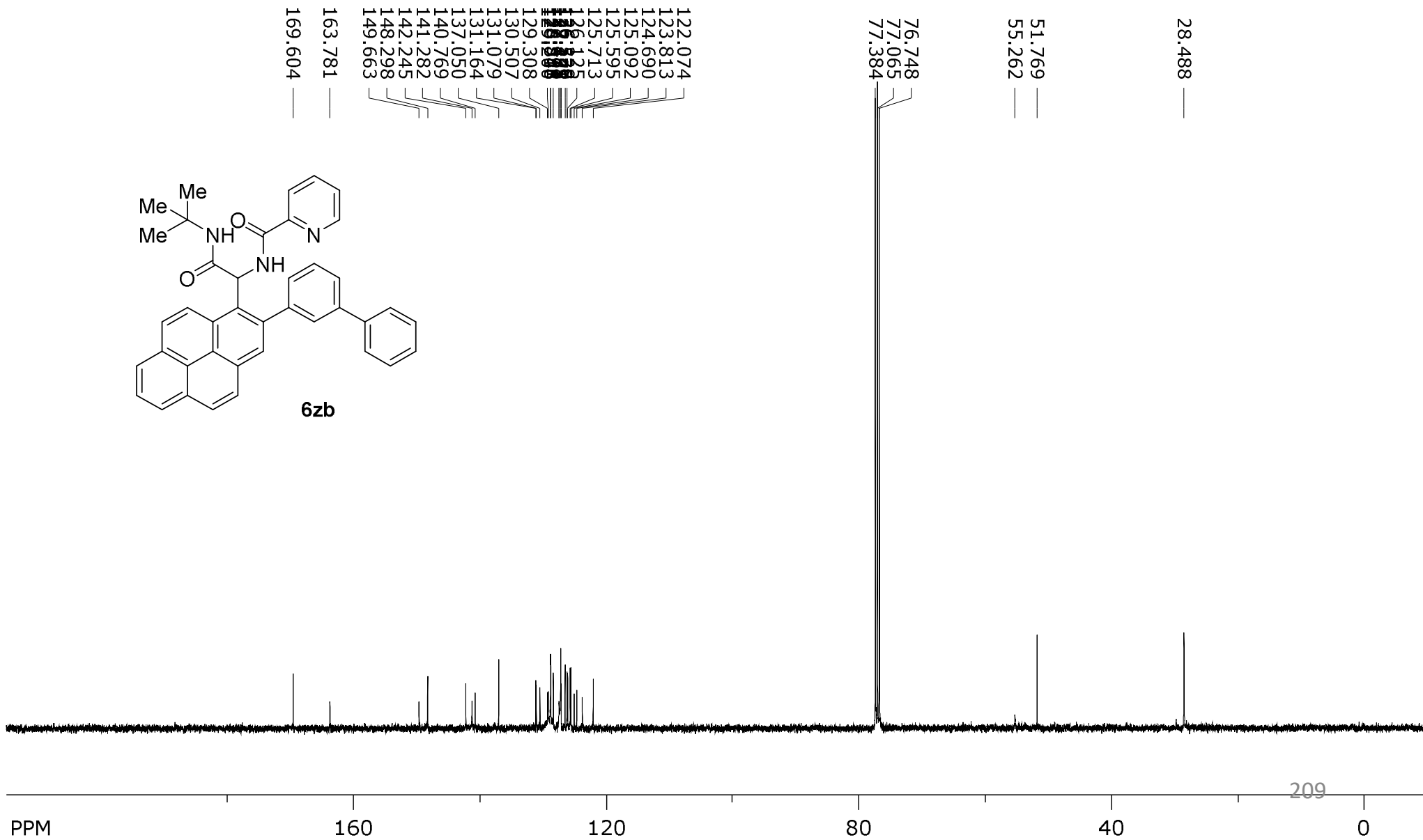
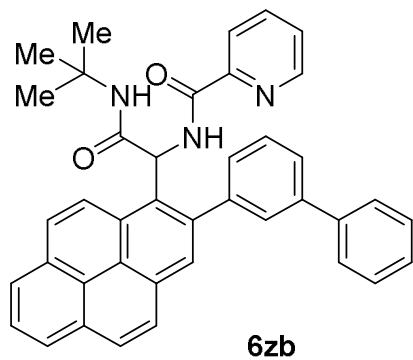
7.6552  
7.6567  
7.6603  
7.7069  
7.7137  
7.7155  
7.7175  
7.7195  
7.7234  
7.7288  
7.7732  
7.7921

7.2832  
7.3490  
7.3645  
7.3664  
7.3762  
7.4162  
7.4587





SpinWorks 4: AD-2175-RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 47



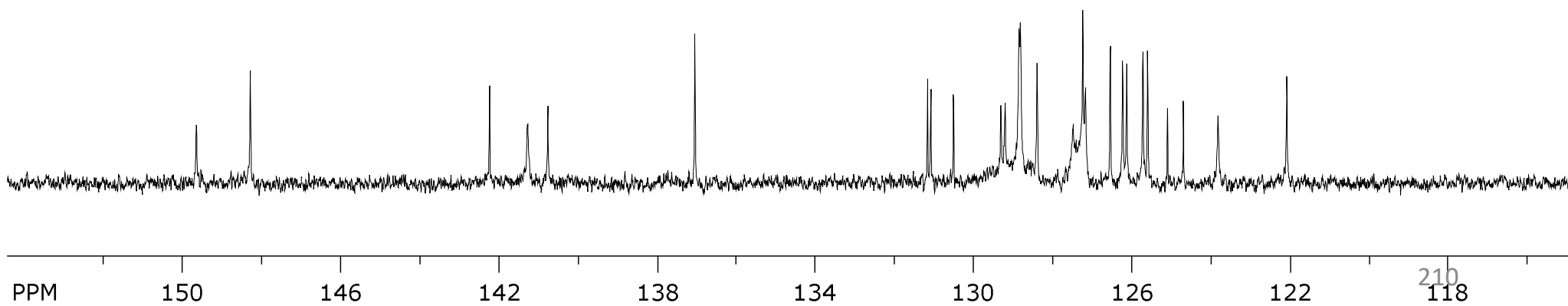
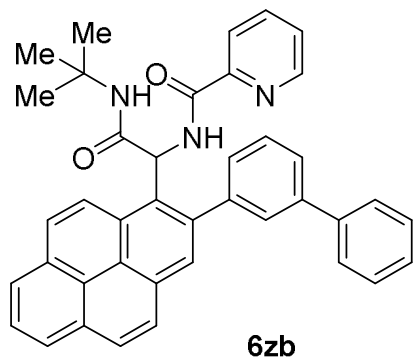
SpinWorks 4: AD-2175-RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 47

149.663 —  
148.298 —

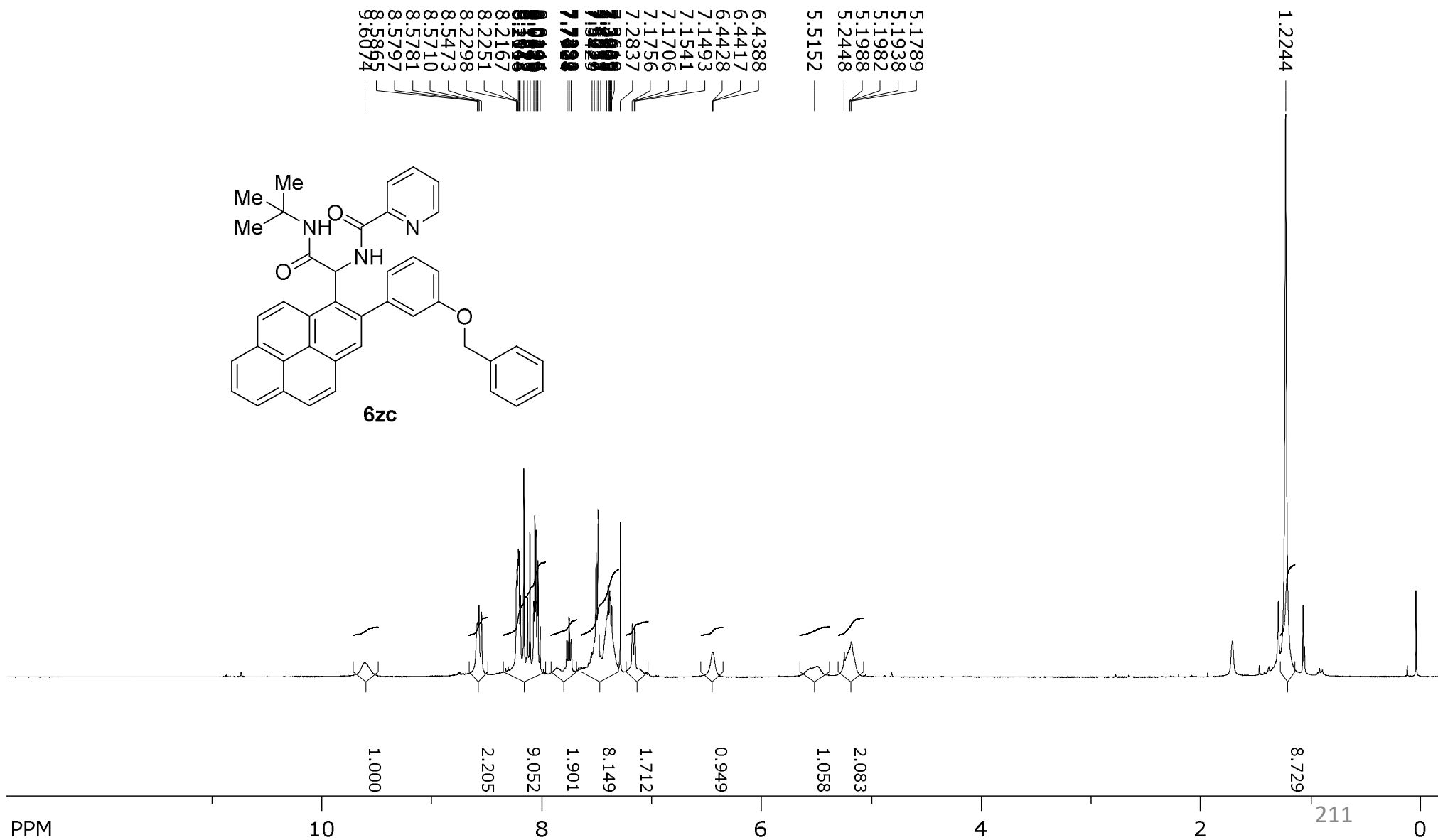
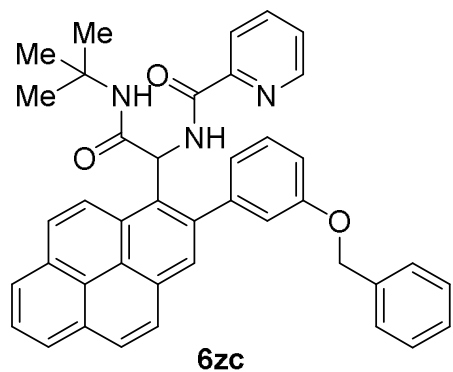
142.245 —  
140.769 —  
141.282 —

137.050 —

122.074 —  
123.813 —  
124.690 —  
125.092 —  
125.595 —  
125.713 —  
126.125 —  
126.228 —  
126.539 —  
127.171 —  
127.235 —  
127.477 —  
127.488 —  
128.391 —  
128.816 —  
128.848 —  
129.200 —  
129.308 —  
130.507 —  
131.079 —  
131.164 —



SpinWorks 4: AD-2178RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 53

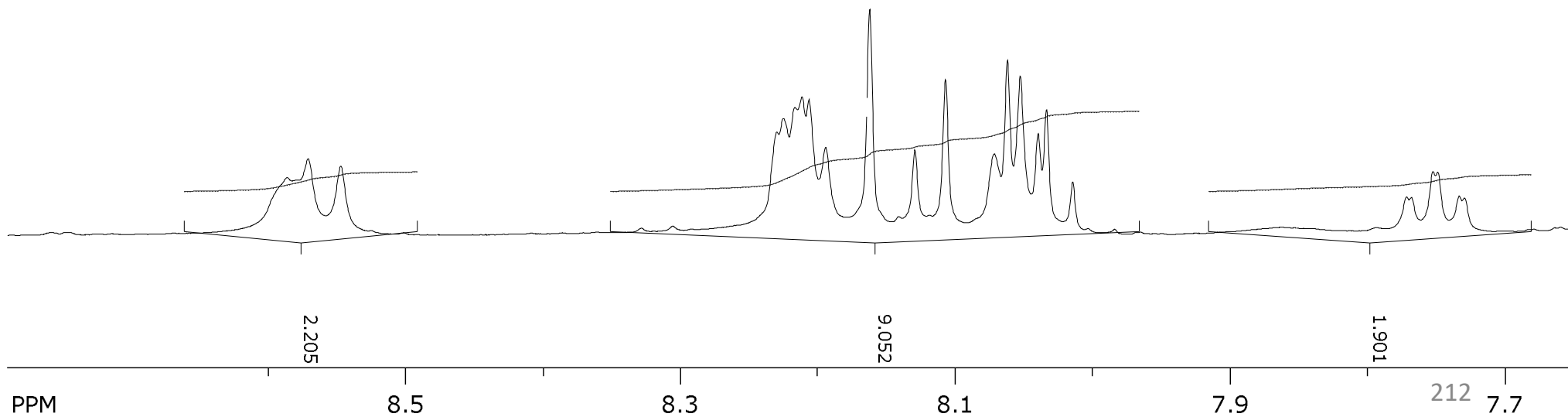
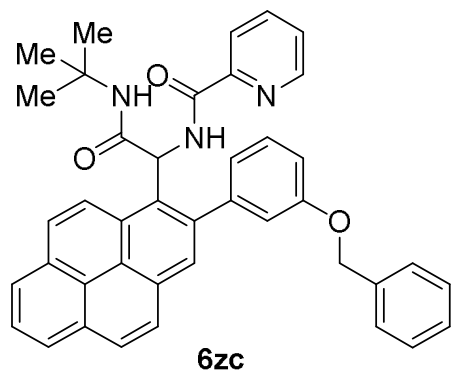


SpinWorks 4: AD-2178RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 53

8.5473  
8.5710  
8.5781  
8.5797  
8.5865

8.2298  
8.2251  
8.2167  
8.2116  
8.2064  
8.1943  
8.1622  
8.1293  
8.1070  
8.0716  
8.0619  
8.0526  
8.0335  
8.0144

7.7292  
7.7330  
7.7487  
7.7521  
7.7678  
7.7714



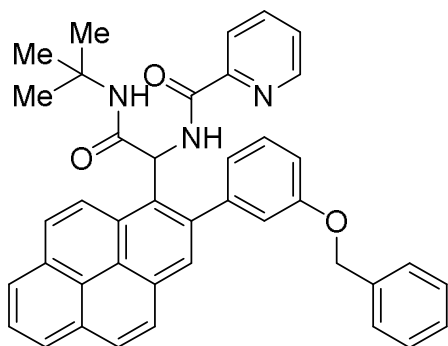
SpinWorks 4: AD-2178RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 53

7.4612  
7.4857  
7.5037  
7.5223  
7.5429

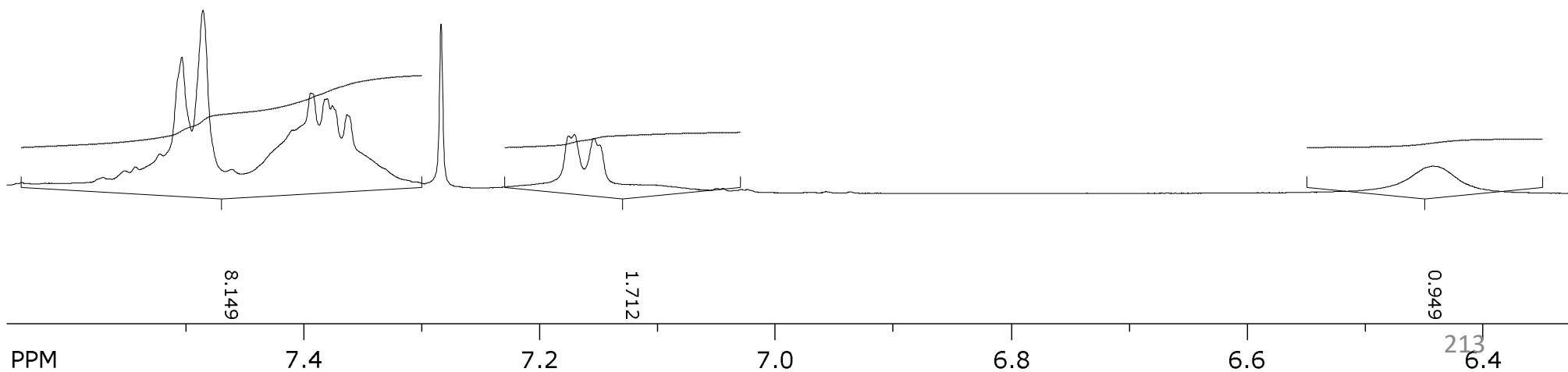
7.4097  
7.3925  
7.3822  
7.3802  
7.3759  
7.3635  
7.3619  
7.2837

7.1756  
7.1706  
7.1541  
7.1493

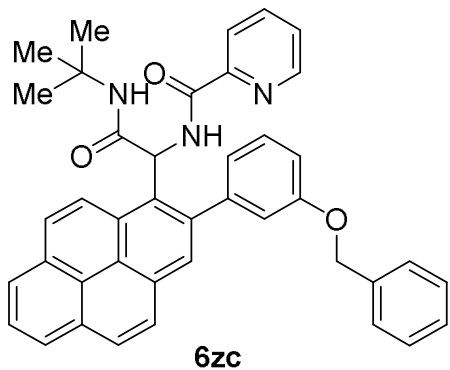
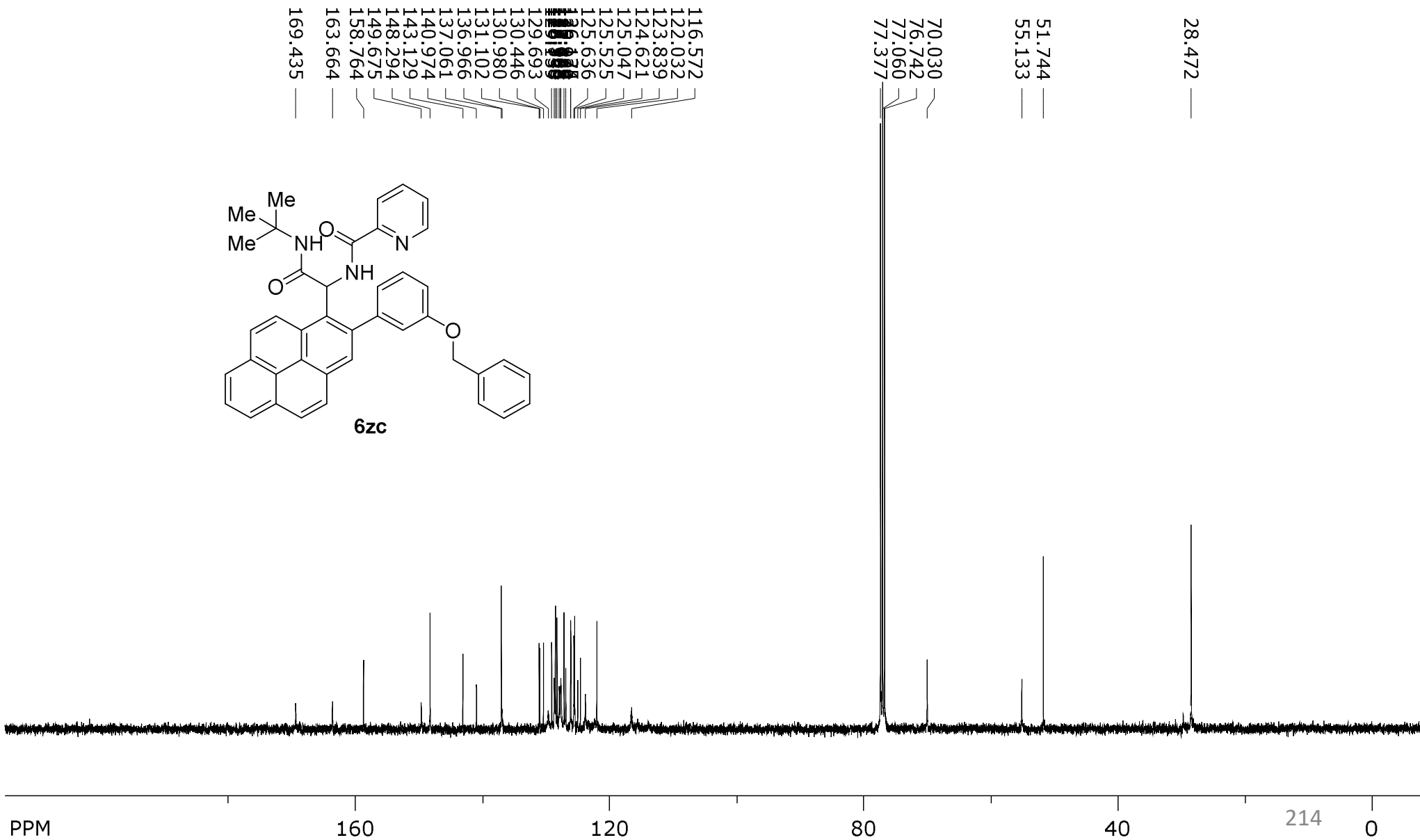
6.4428  
6.4417  
6.4388



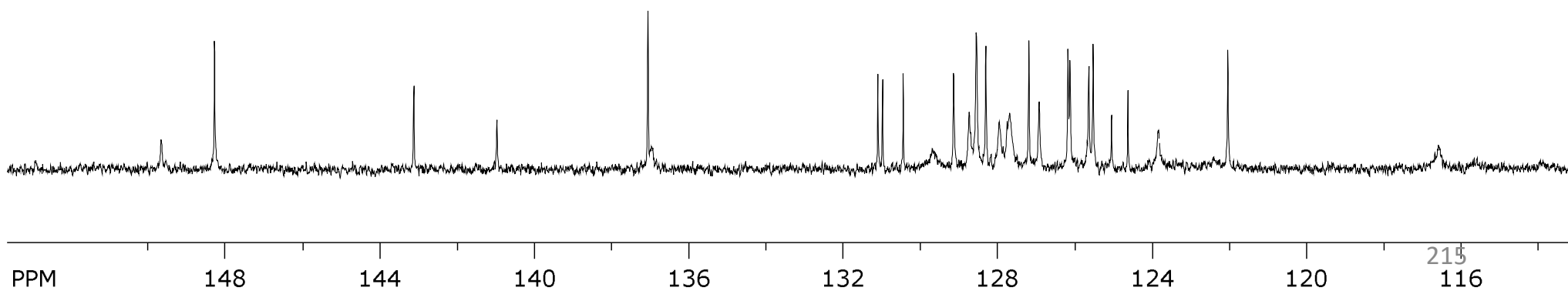
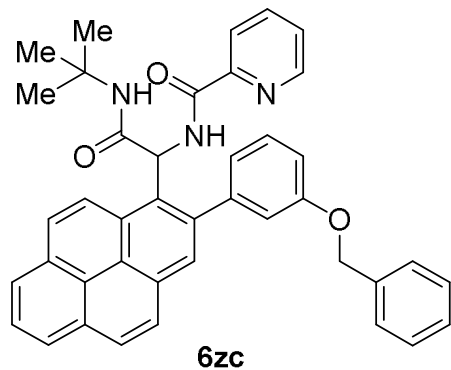
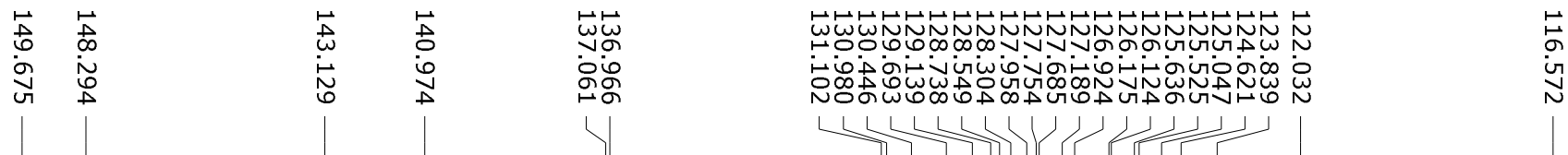
6zc



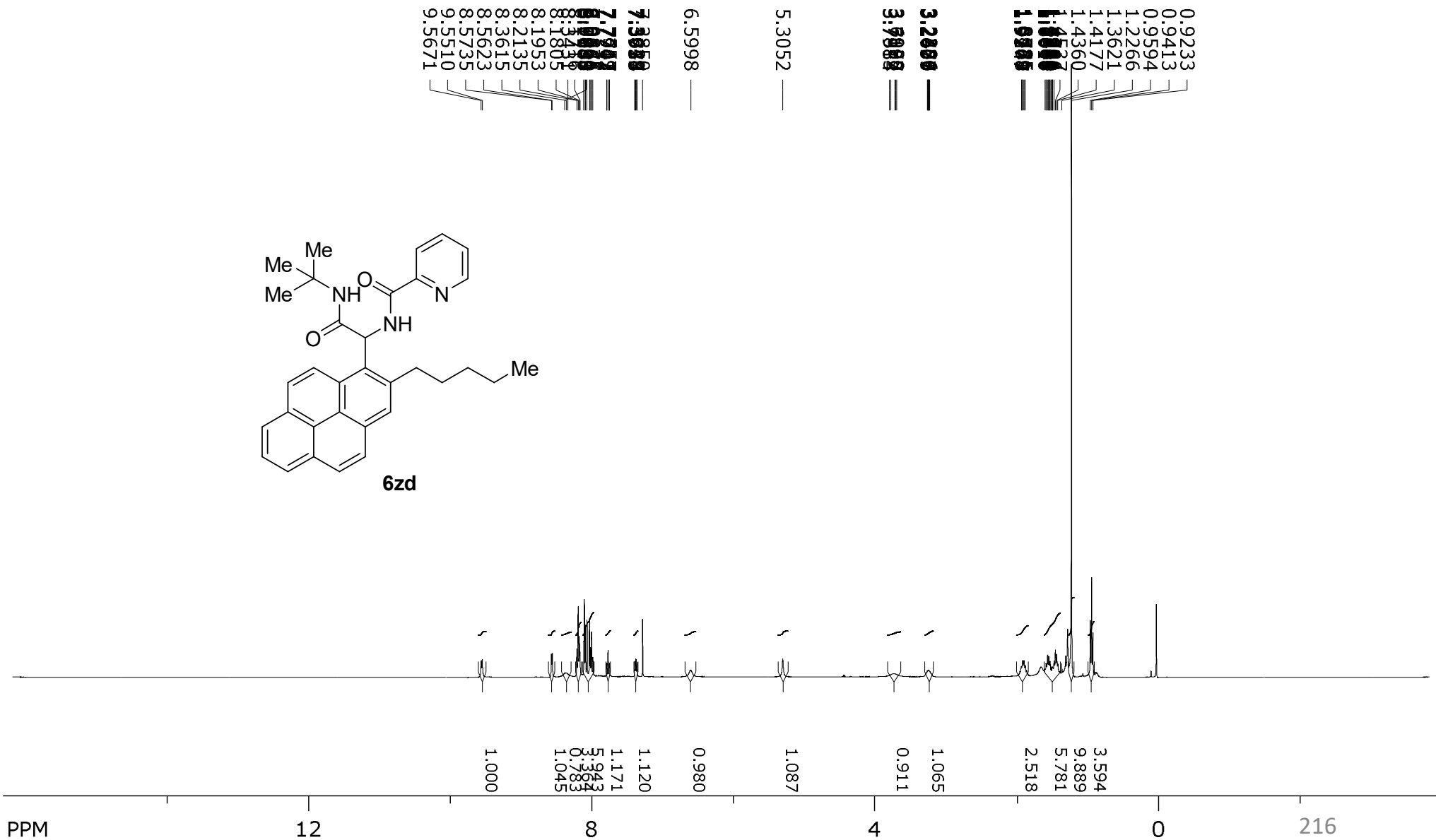
SpinWorks 4: AD-2178  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 29



SpinWorks 4: AD-2178  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 29

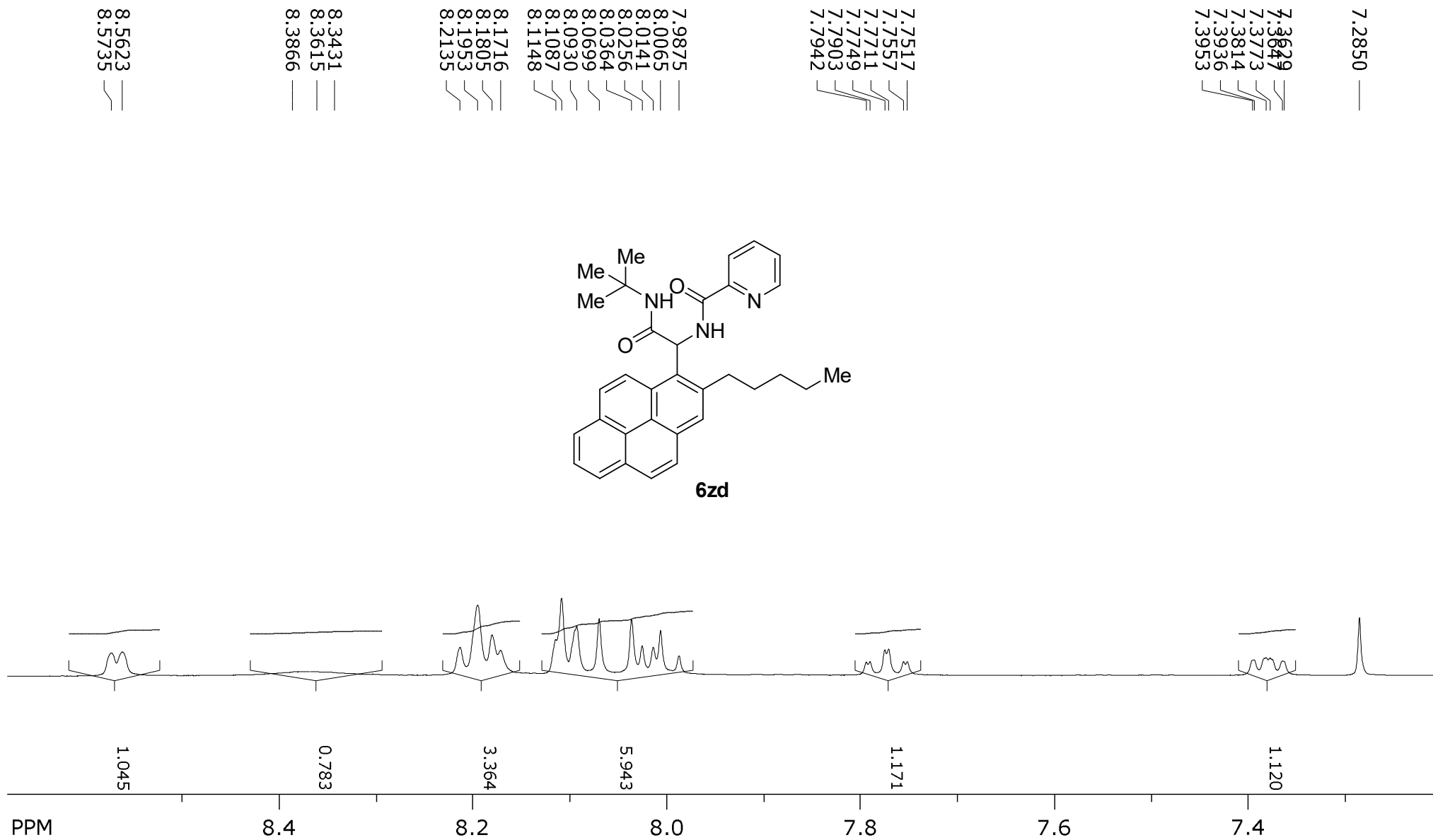


SpinWorks 4: AD-1976-Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 51





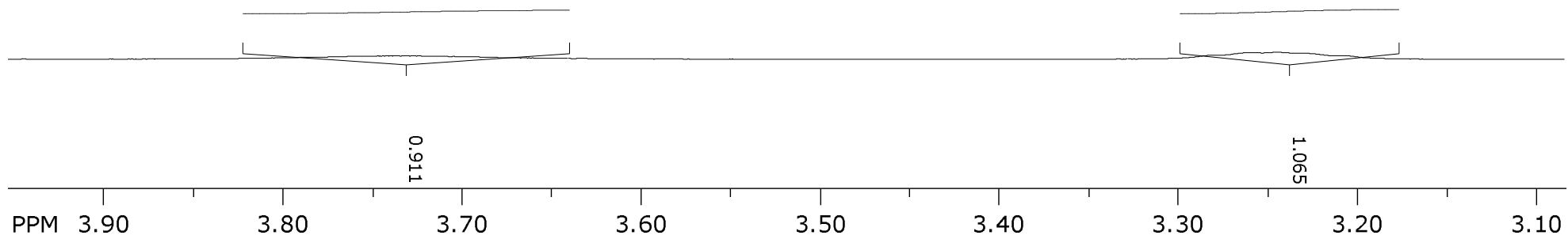
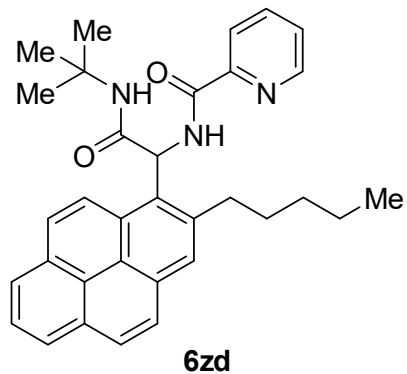
SpinWorks 4: AD-1976-Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 51



SpinWorks 4: AD-1976-Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 51

3.7813  
3.7984  
3.6928  
3.7057  
3.7199

3.2286  
3.2321  
3.2331  
3.2450  
3.2457  
3.2476  
3.2500  
3.2609  
3.2635

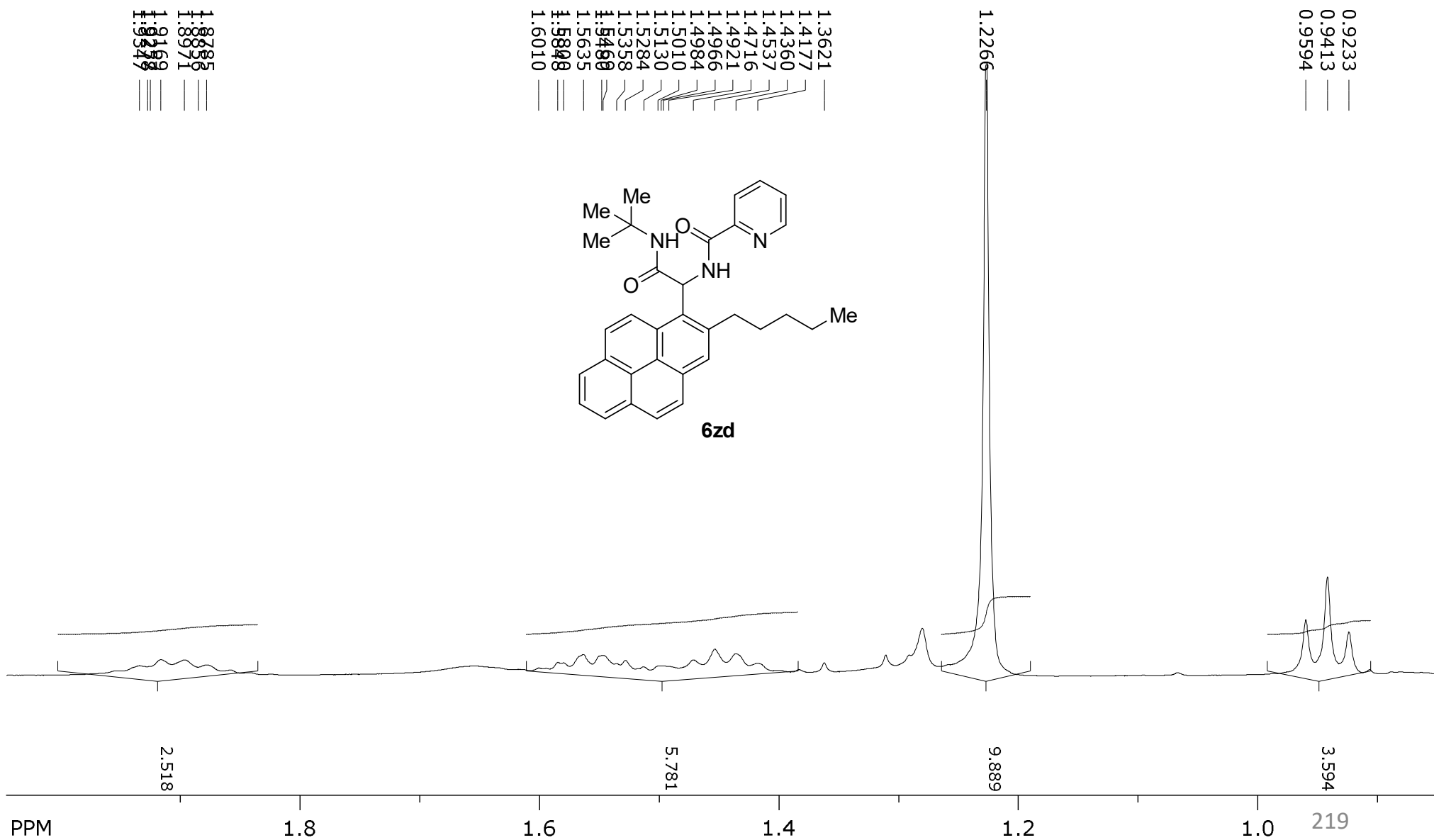
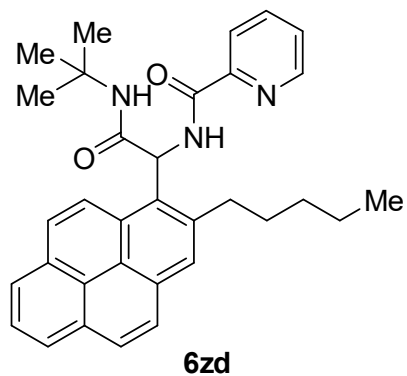


SpinWorks 4: AD-1976-Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 51

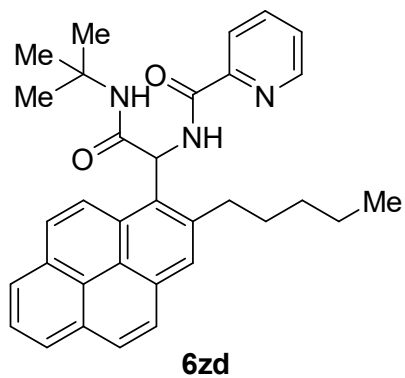
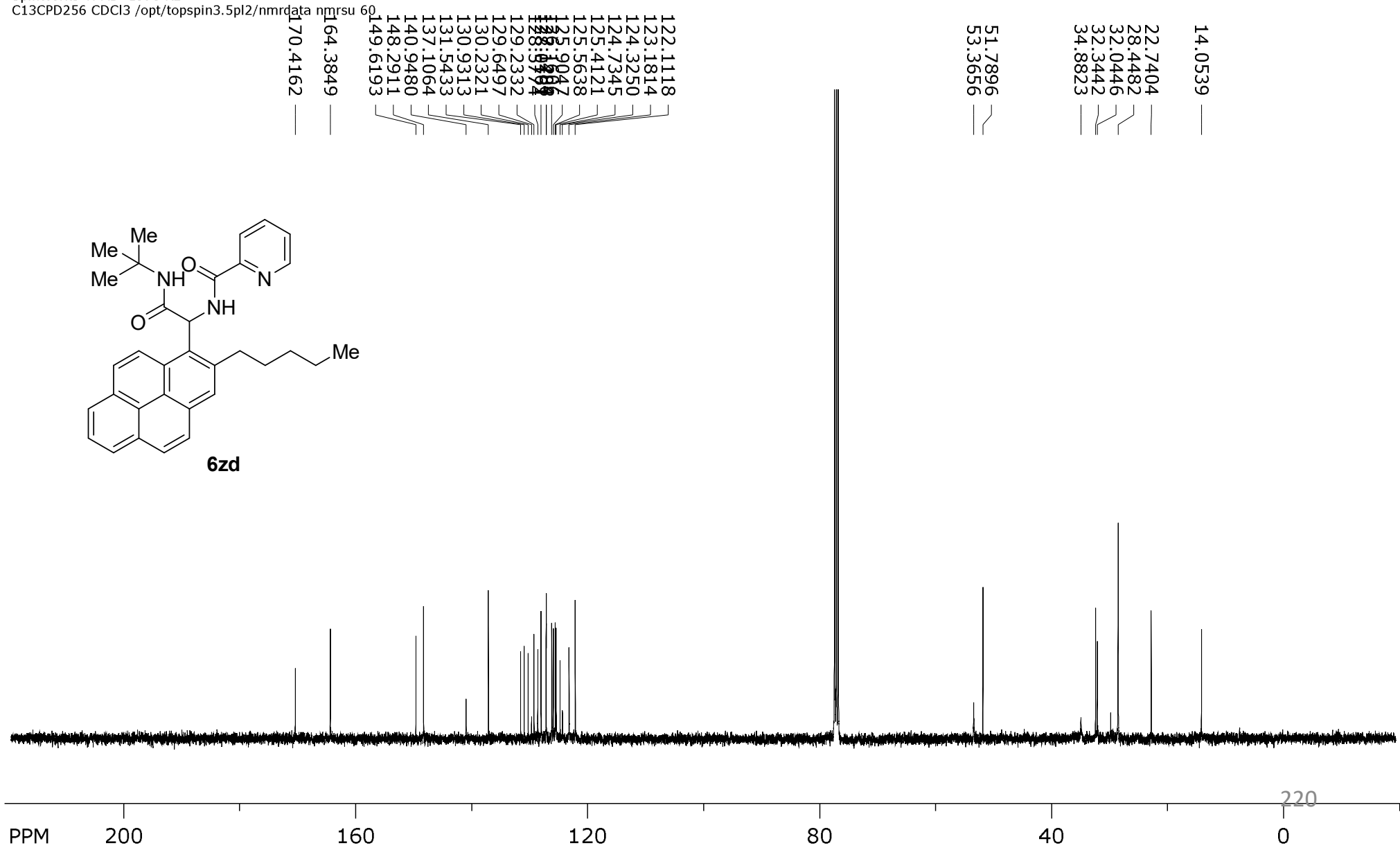
1.8785  
1.8825  
1.8971  
1.9159  
1.9279

1.3621  
1.4177  
1.4360  
1.4537  
1.4716  
1.4921  
1.4984  
1.5010  
1.5130  
1.5284  
1.5358  
1.5499  
1.5635  
1.5898  
1.6010

0.9233  
0.9413  
0.9594



SpinWorks 4: AD\_1976 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 60



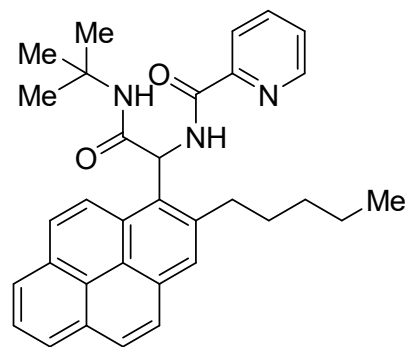
SpinWorks 4: AD 1976 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 60

149.6193  
148.2911

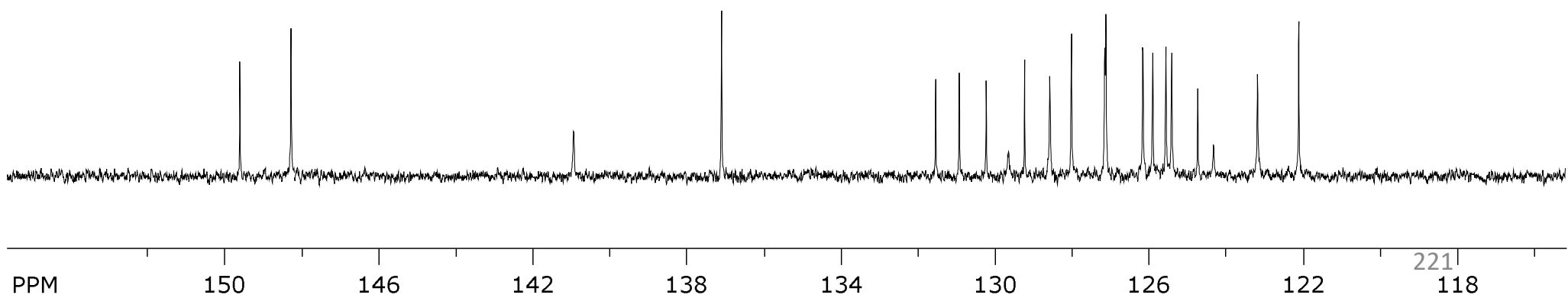
140.9480

137.1064

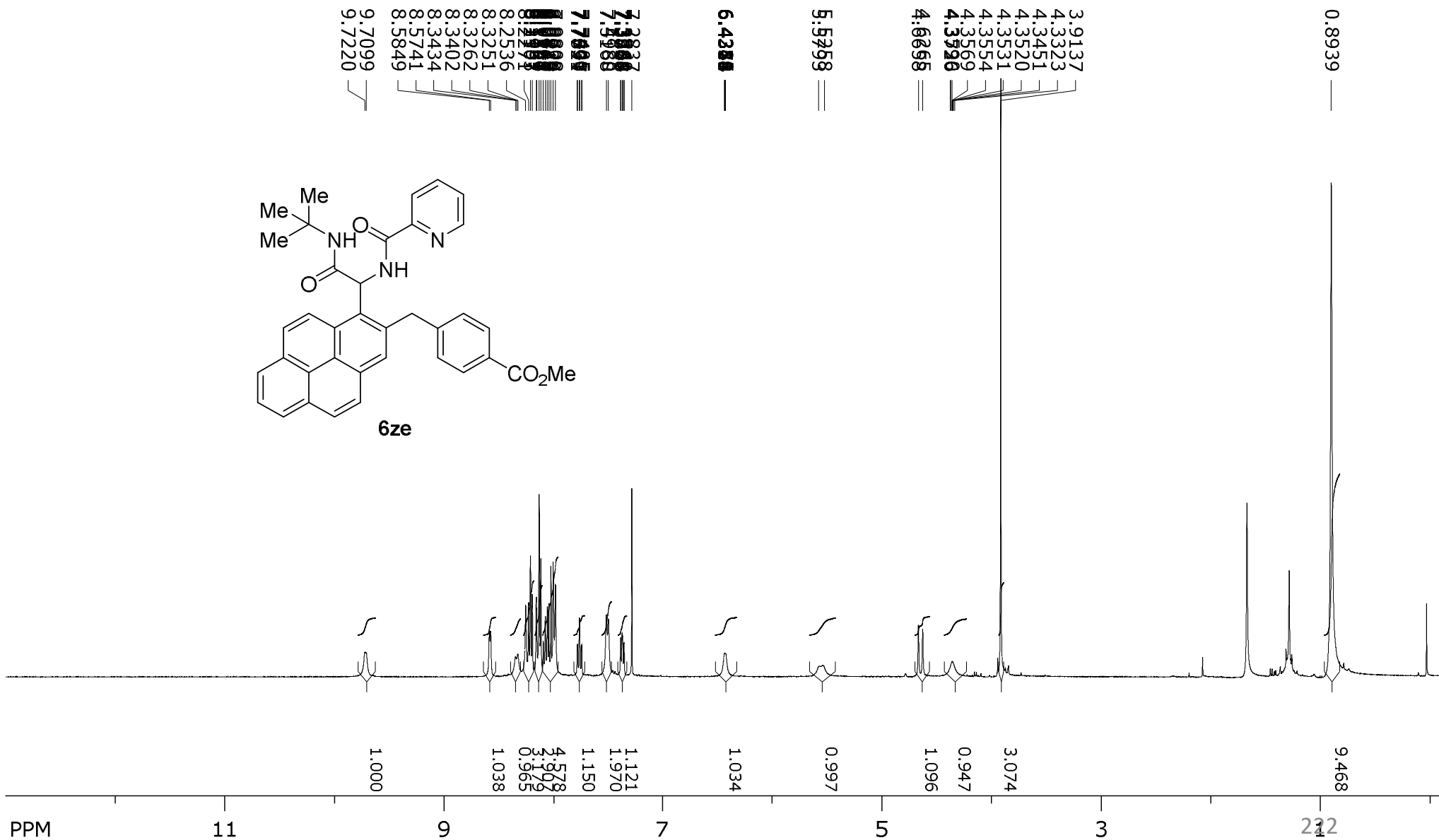
122.1118  
123.1814  
124.3250  
124.7345  
125.4121  
125.5638  
125.9047  
126.1606  
127.1204  
127.1486  
128.0161  
128.5774  
129.2332  
129.6497  
130.2321  
130.9313  
131.5433



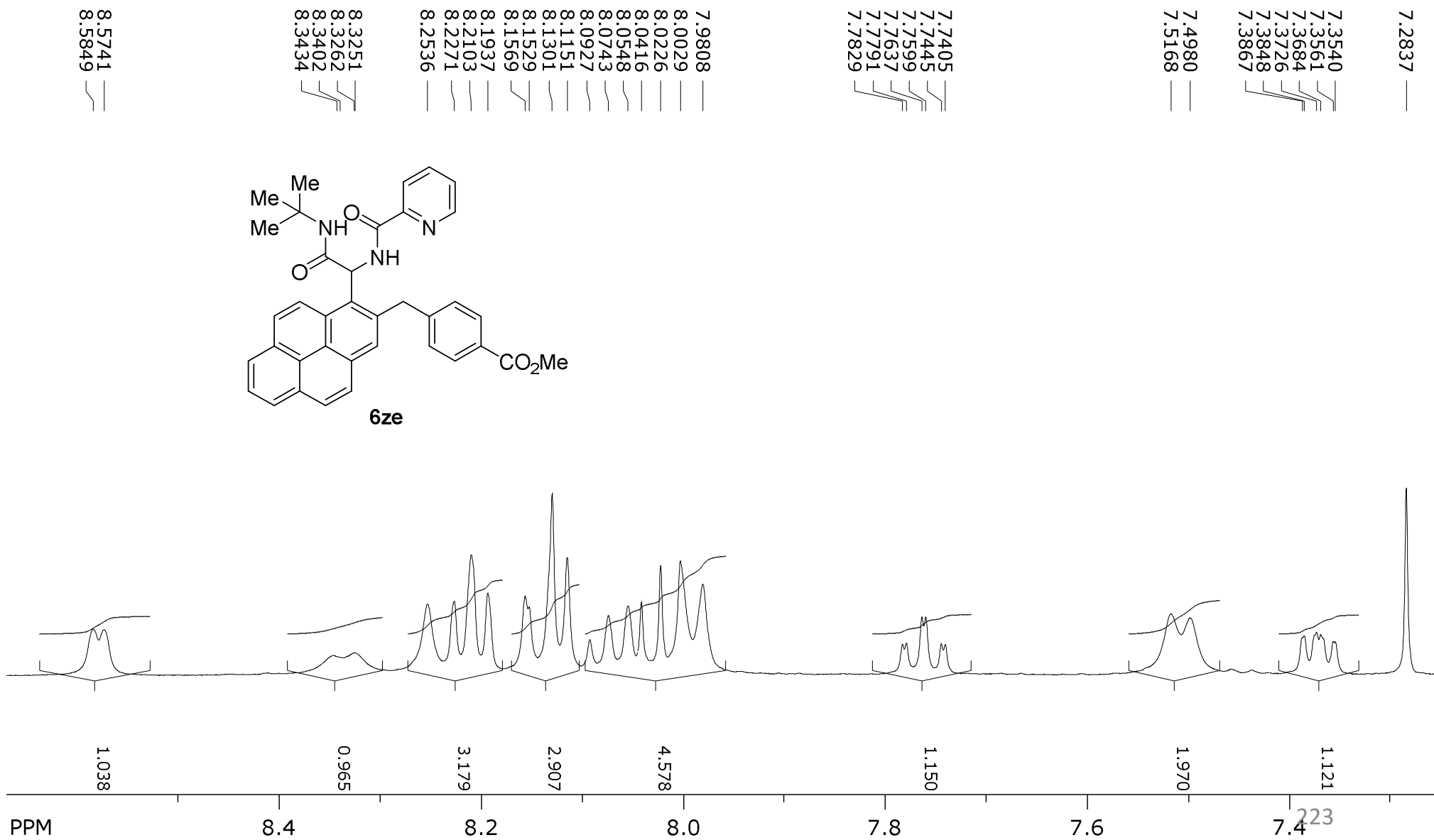
6zd



SpinWorks 4: AD-1927A  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 13



SpinWorks 4: AD-1927A  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 13



SpinWorks 4: AD-1927A  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 13

6.4270  
6.4364



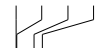
5.5258  
5.5793



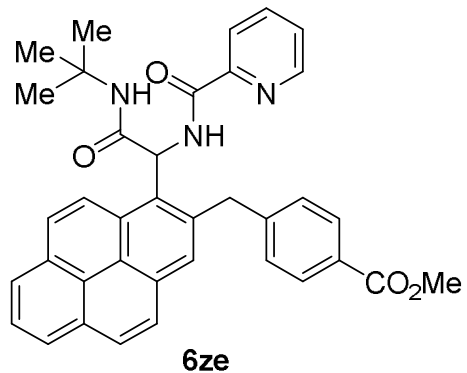
4.6265  
4.6658



4.3323  
4.3451  
4.3726  
4.3736



3.9137



1.034

0.997

1.096

0.947

3.074

PPM

6.4

6.0

5.6

5.2

4.8

4.4

4.0

2.24

3.6



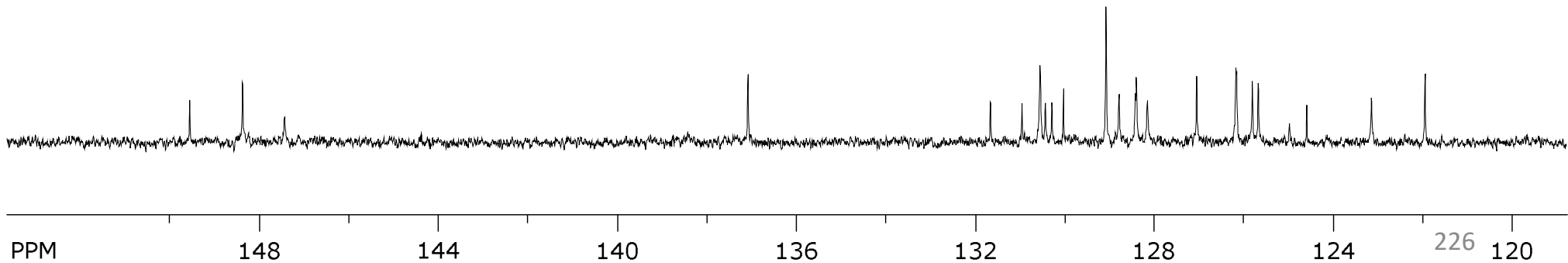
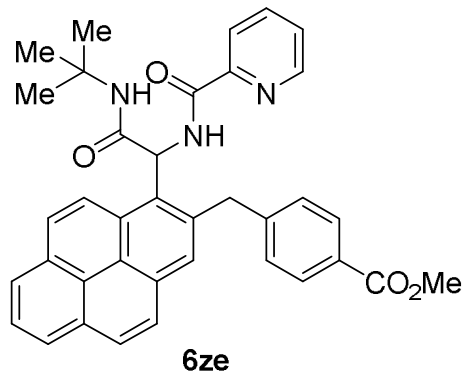


SpinWorks 4: AD-1927A  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 13

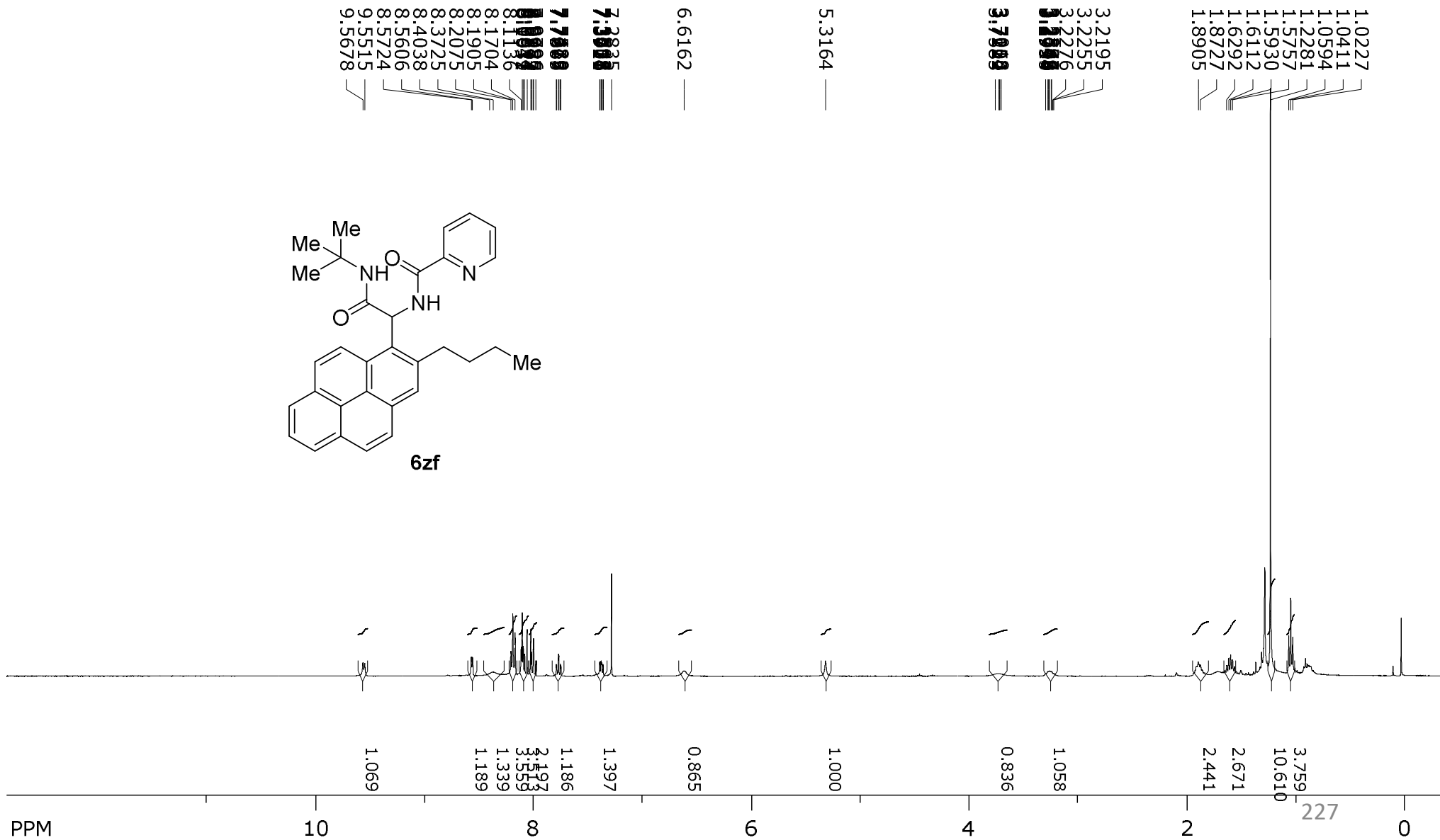
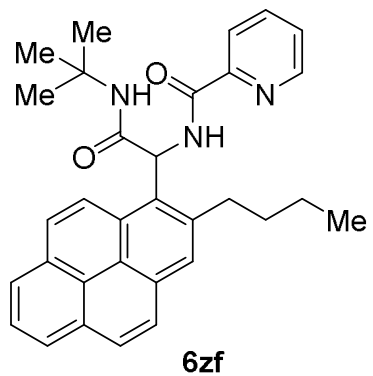
149.5640  
148.3844  
147.4427

137.0806

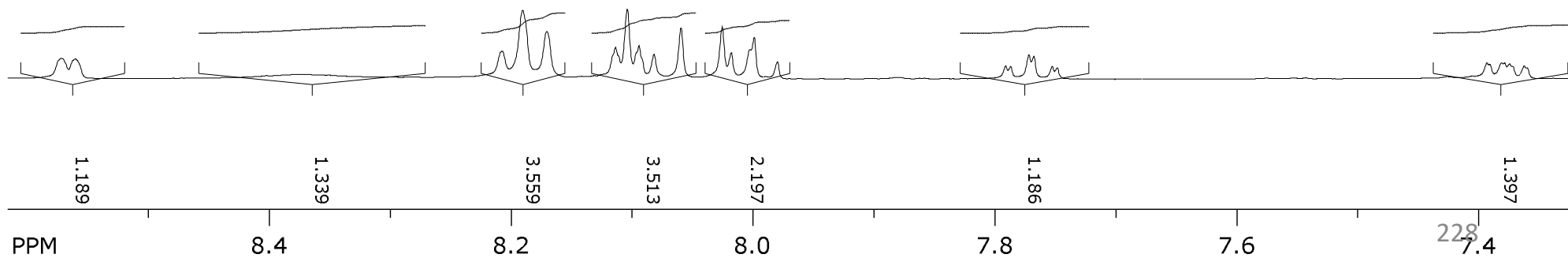
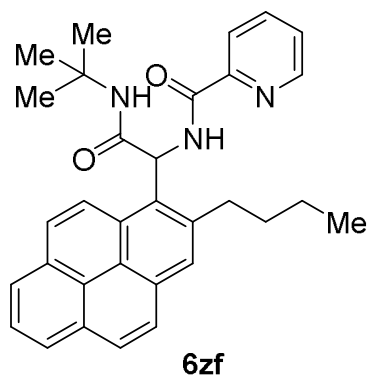
128.1462  
128.3941  
128.4164  
128.7820  
129.0730  
130.0216  
130.2815  
130.4298  
130.5457  
130.9515  
131.6580  
127.0455  
126.1966  
126.1525  
125.8003  
125.6657  
124.9708  
124.5821  
123.1362  
121.9366



SpinWorks 4: AD 1942 A  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54



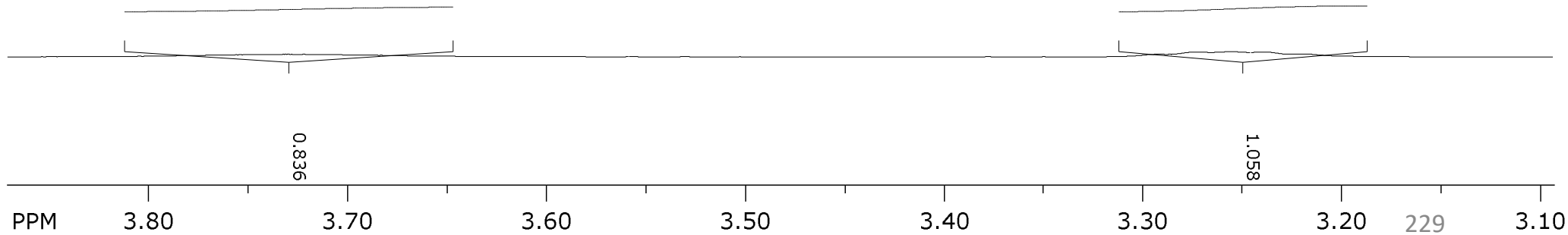
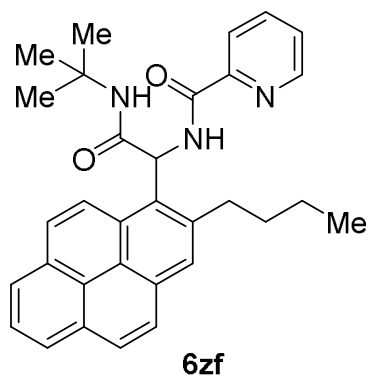
SpinWorks 4: AD 1942 A  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54



SpinWorks 4: AD 1942 A  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

3.7583 —  
3.7222  
3.7204  
3.7150  
3.7018

3.2195  
3.2255  
3.2276  
3.2377  
3.2393  
3.2549  
3.2566  
3.2698  
3.2743  
3.2924  
3.2935



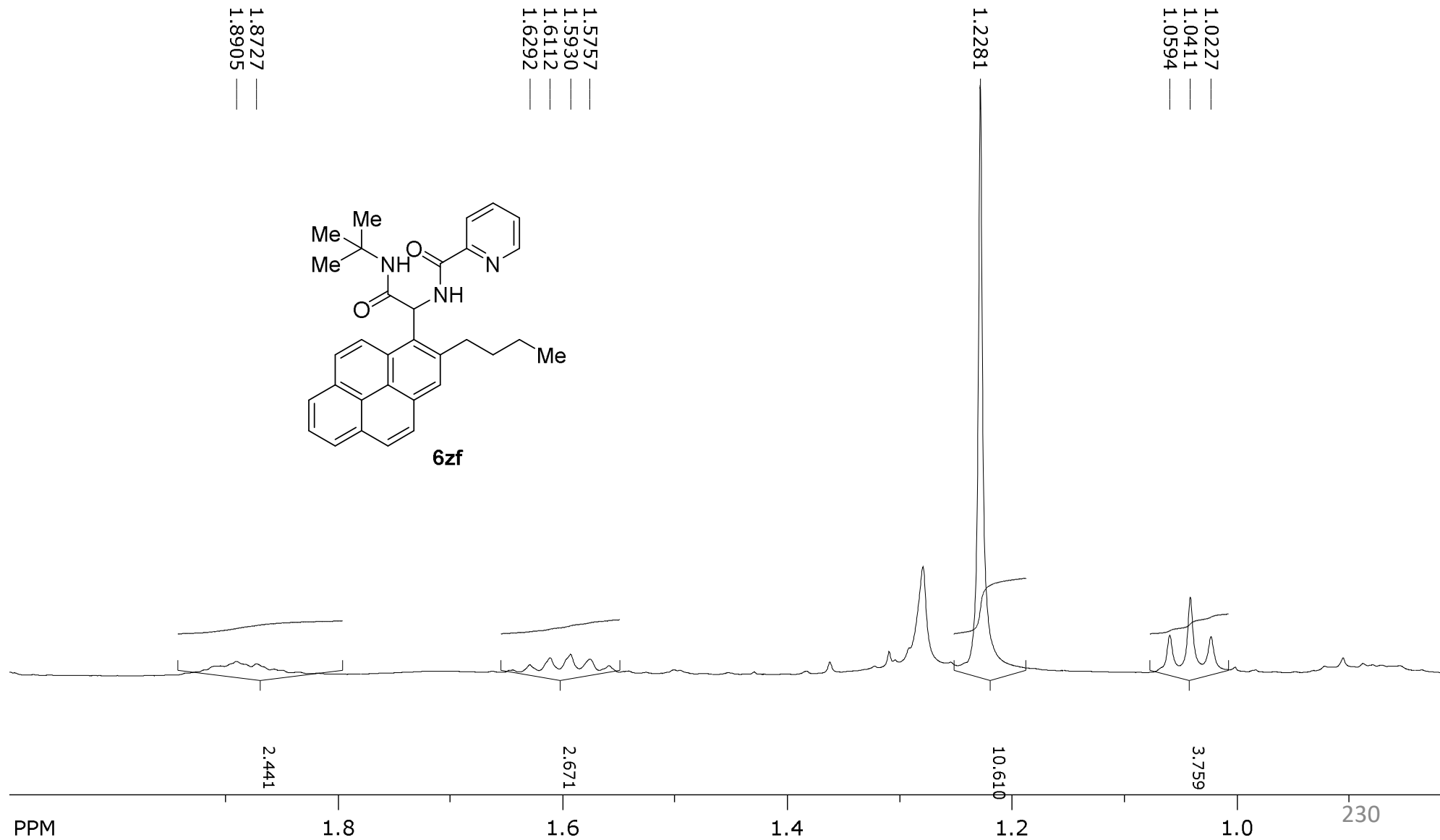
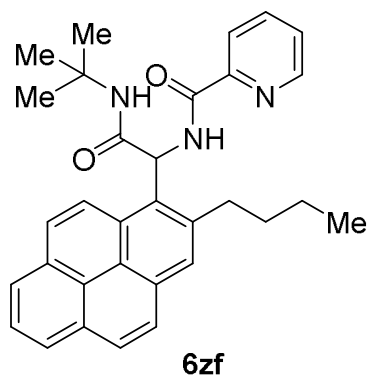
SpinWorks 4: AD 1942 A  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

1.8727  
1.8905

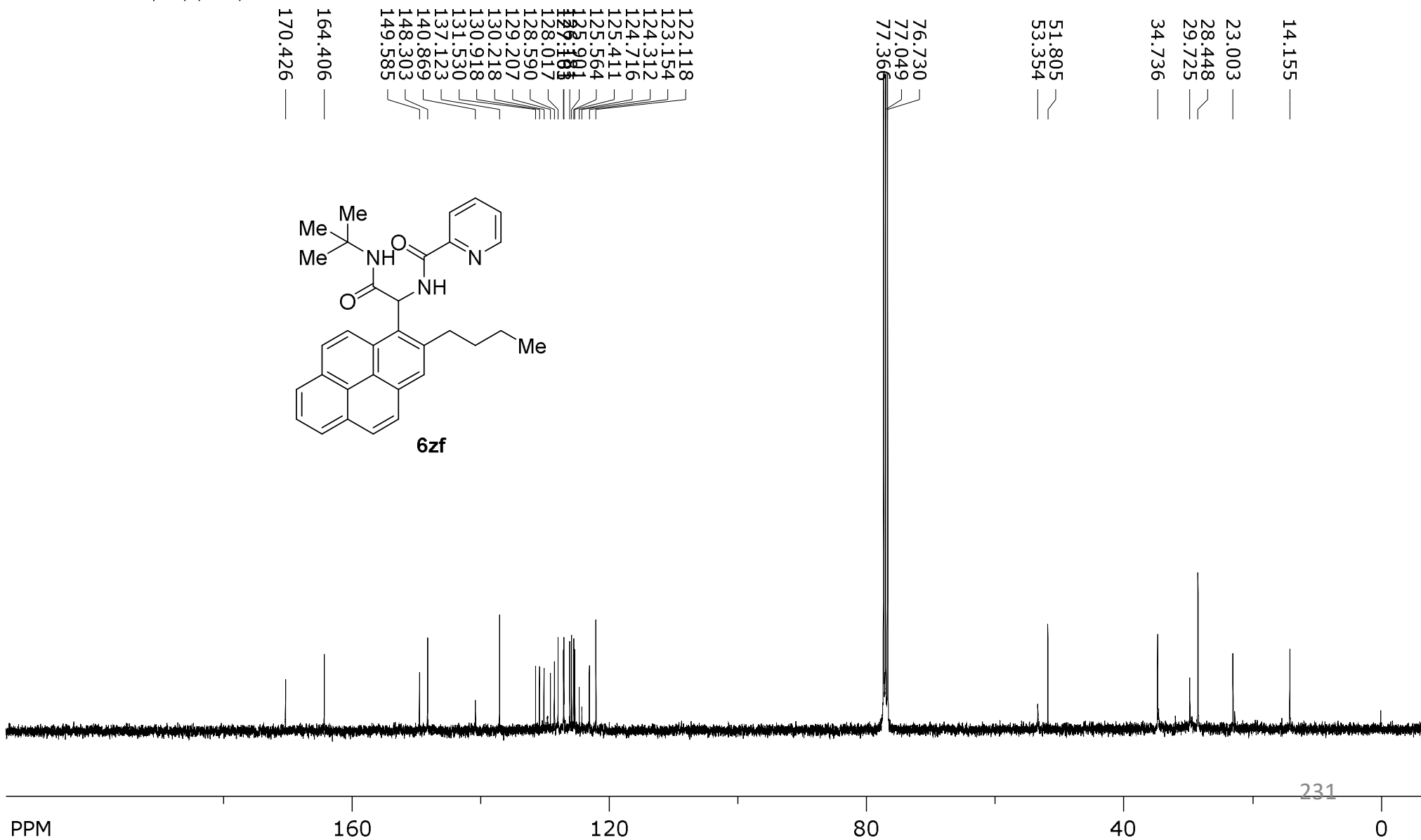
1.5757  
1.5930  
1.6112  
1.6292

1.2281

1.0227  
1.0411  
1.0594

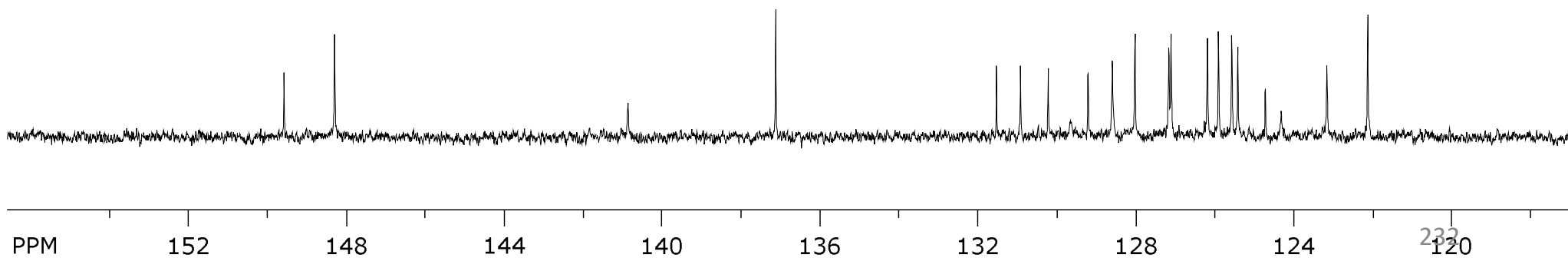
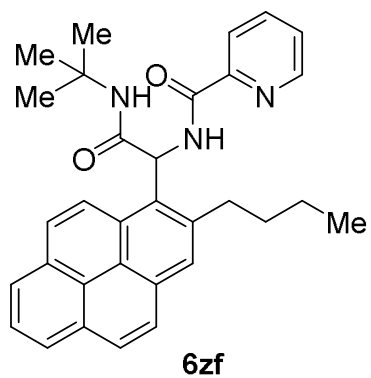


SpinWorks 4: AD-1942A  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 32

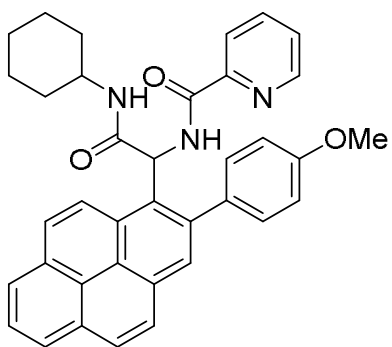


SpinWorks 4: AD-1942A  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 32

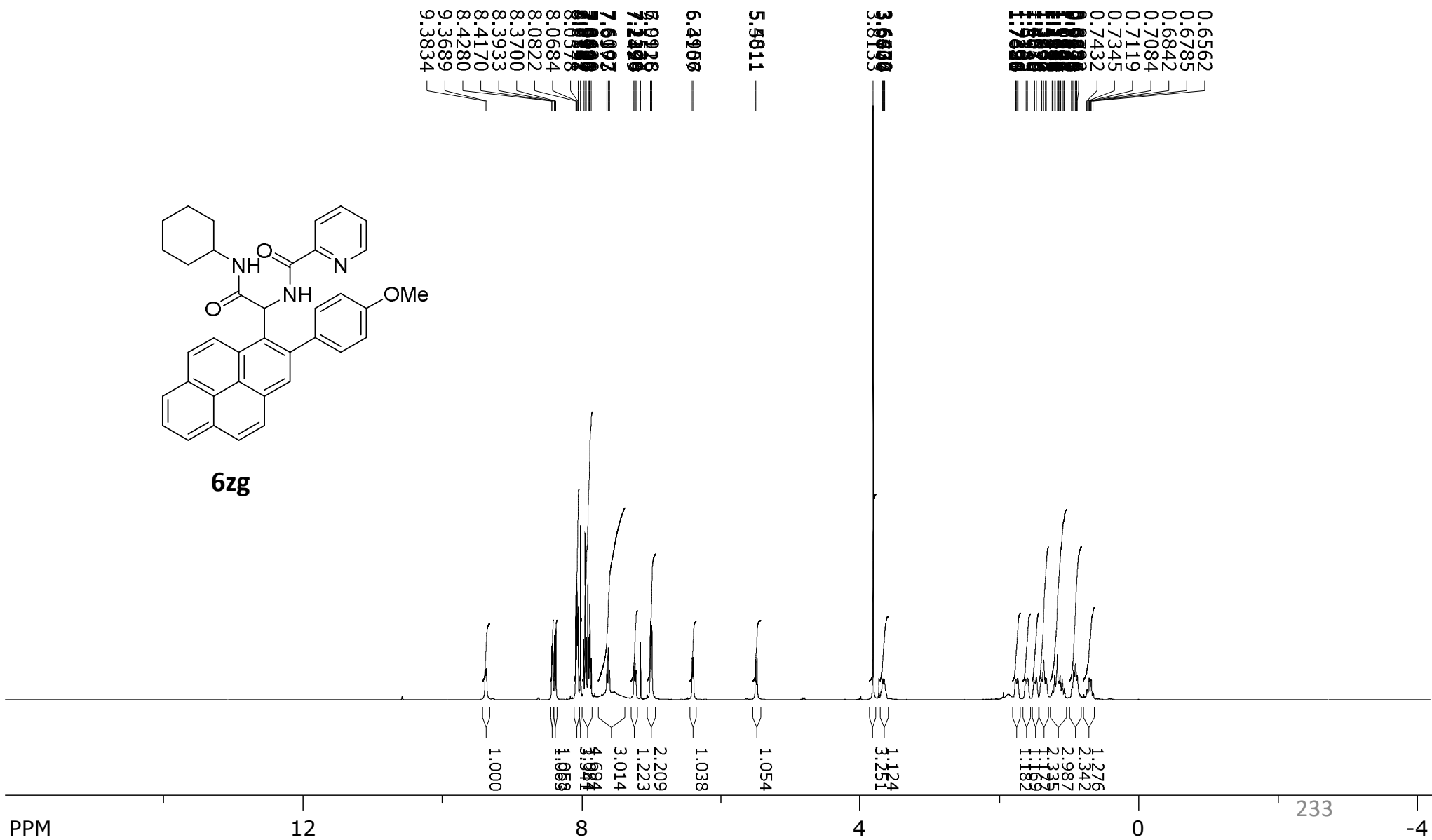
149.585 —  
148.303 —  
140.869 —  
137.123 —  
131.530 —  
130.918 —  
130.218 —  
129.207 —  
128.590 —  
128.017 —  
127.161 —  
127.103 —  
126.181 —  
125.901 —  
125.564 —  
125.411 —  
124.716 —  
124.312 —  
123.154 —  
122.118 —





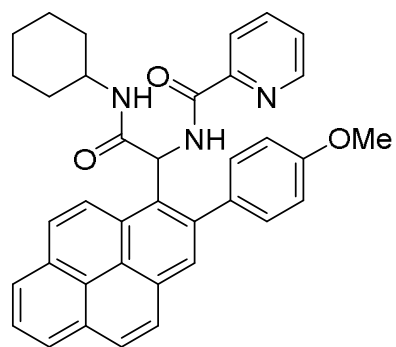


6zg

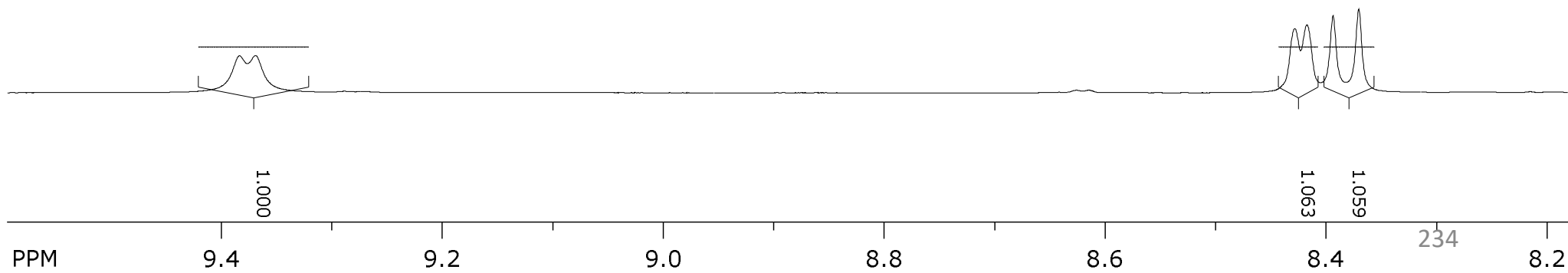


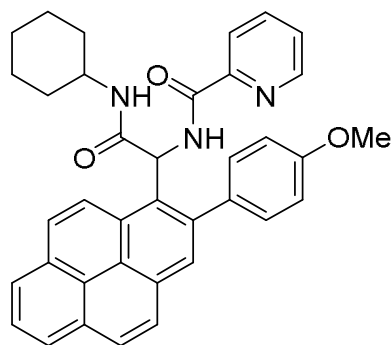
9.3689  
9.3834

8.3700  
8.3933  
8.4170  
8.4280



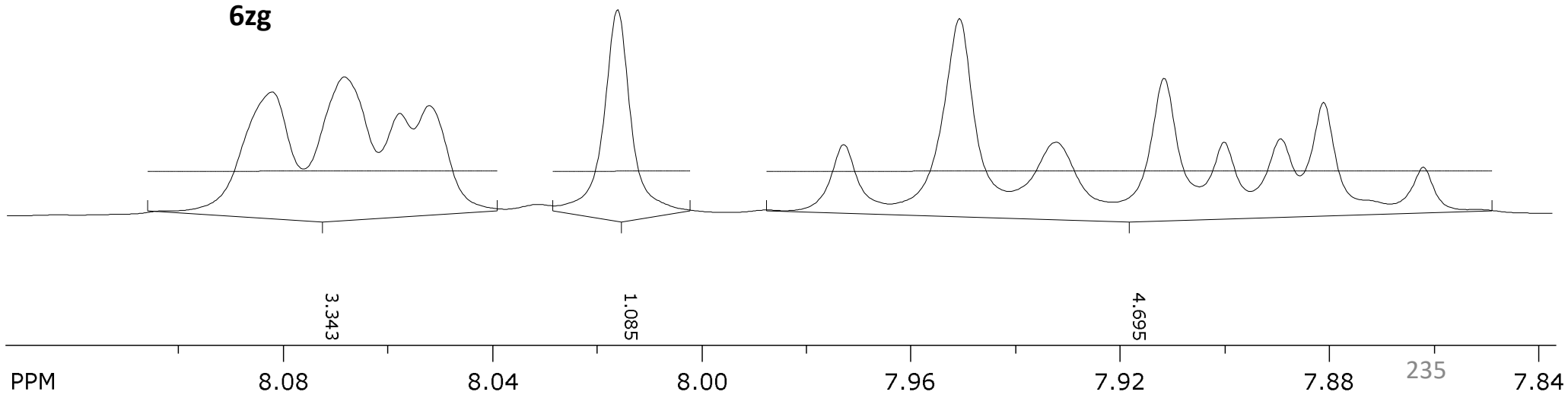
**6zg**

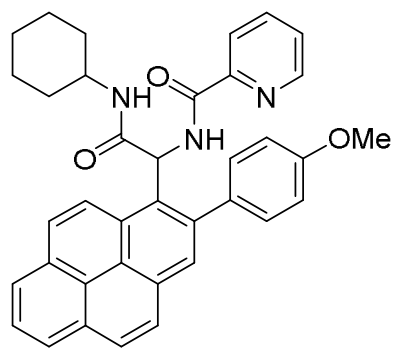




**6zg**

8.0822 —  
8.0684 —  
8.0578 —  
8.0521 —  
8.0162 —  
7.9729 —  
7.9507 —  
7.9323 —  
7.9116 —  
7.9001 —  
7.8893 —  
7.8811 —  
7.8620 —





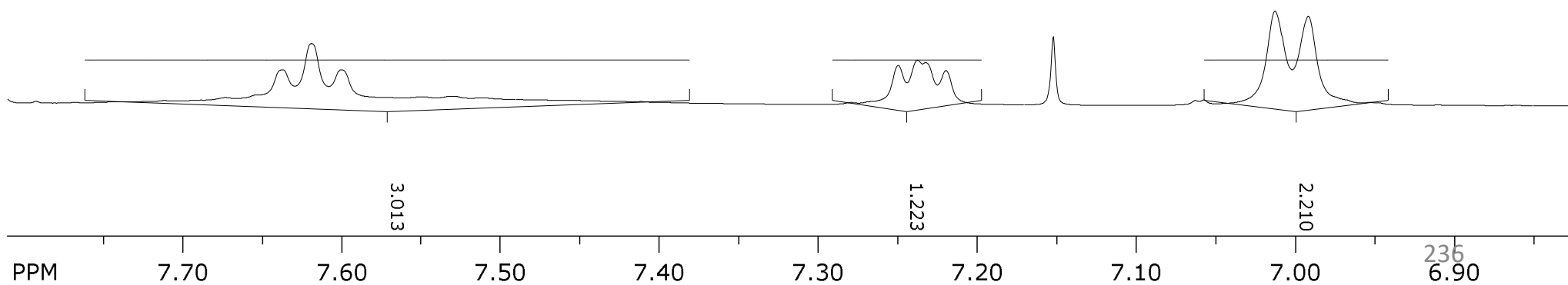
**6zg**

7.6007  
7.6192  
7.6373

7.2199  
7.2324  
7.2376  
7.2499

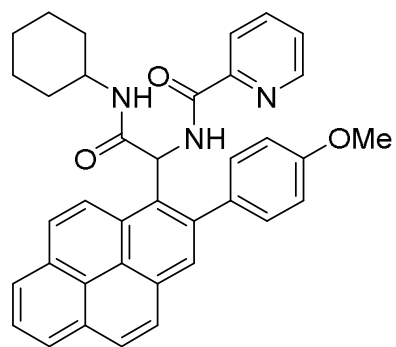
7.1524

6.9918  
7.0126

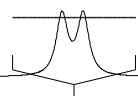


6.3956  
6.4107

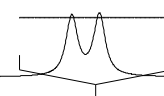
5.4811  
5.5011



**6zg**



1.038



1.054

PPM

6.4

6.2

6.0

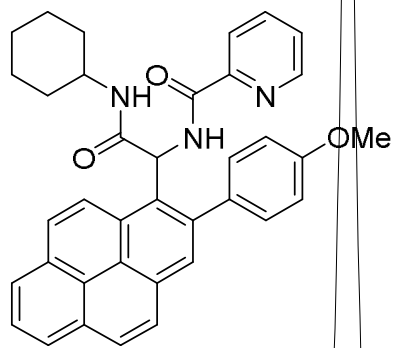
5.8

5.6

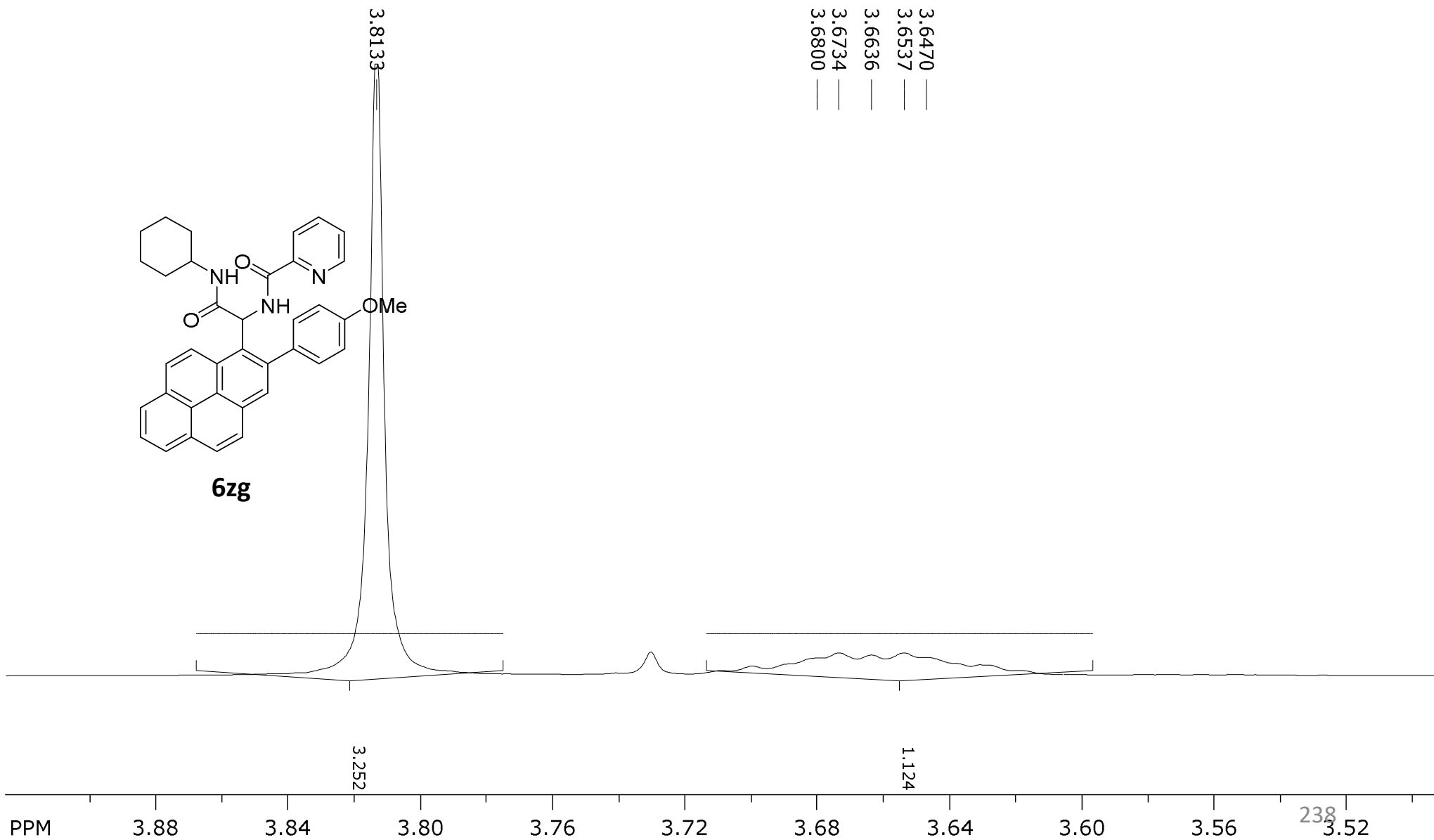
5.4

237

5.2



**6zg**



1.7324  
1.7390  
1.7498  
1.7625  
1.7681

1.5939  
1.6185

1.4676  
1.4910  
1.5010

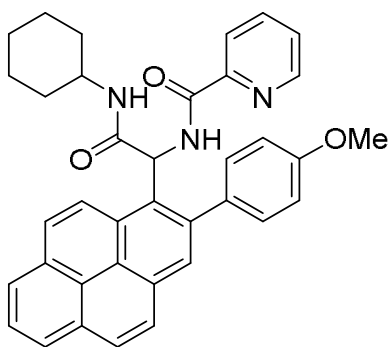
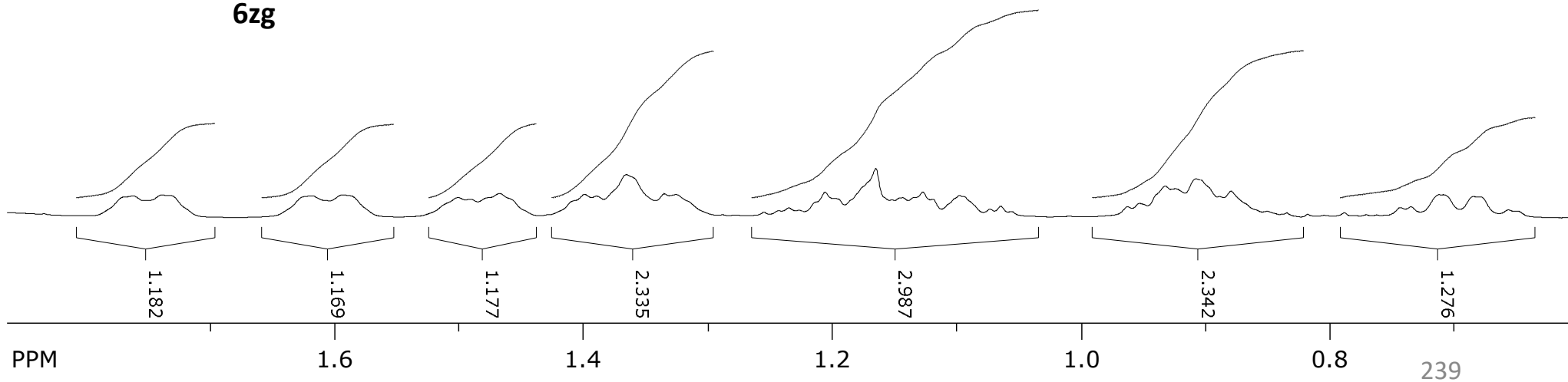
1.3258  
1.3352  
1.3657  
1.3896  
1.3992

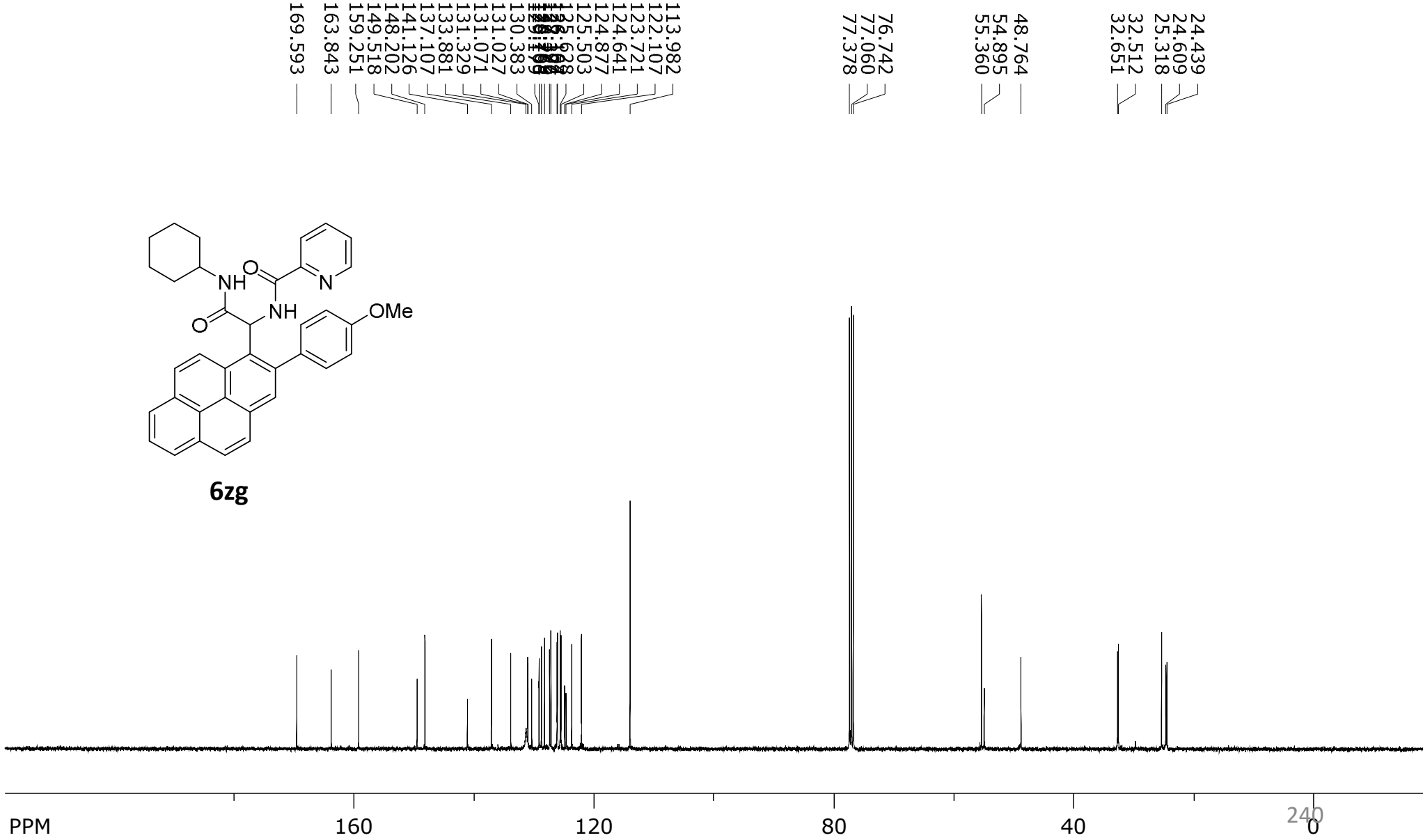
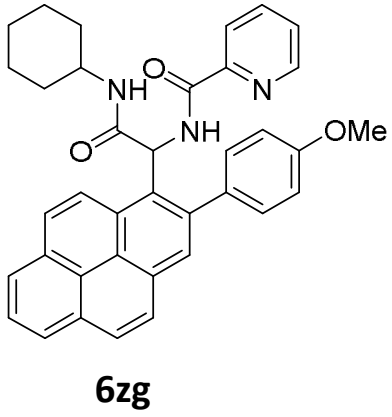
1.2429  
1.2267  
1.2058  
1.1975

1.1649  
1.1520  
1.1434  
1.1335  
1.1272  
1.1191  
1.0977  
1.0942  
1.0732  
1.0644

0.9625  
0.9528  
0.9321  
0.9238  
0.9075  
0.8884  
0.8792

0.7432  
0.7345  
0.7119  
0.7084  
0.6842  
0.6785  
0.6562

**6zg**





SpinWorks 4: AD-2258

169.593

163.843

159.251

149.518

148.202

141.126

137.107

133.881

131.329

131.071

130.383

129.179

129.165

128.764

128.265

127.396

127.172

126.167

126.104

125.628

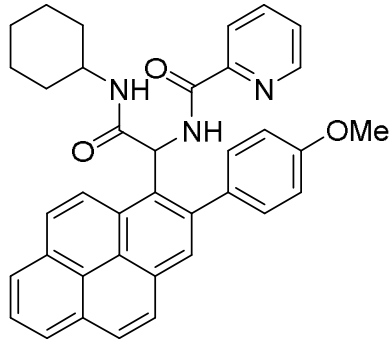
125.503

124.877

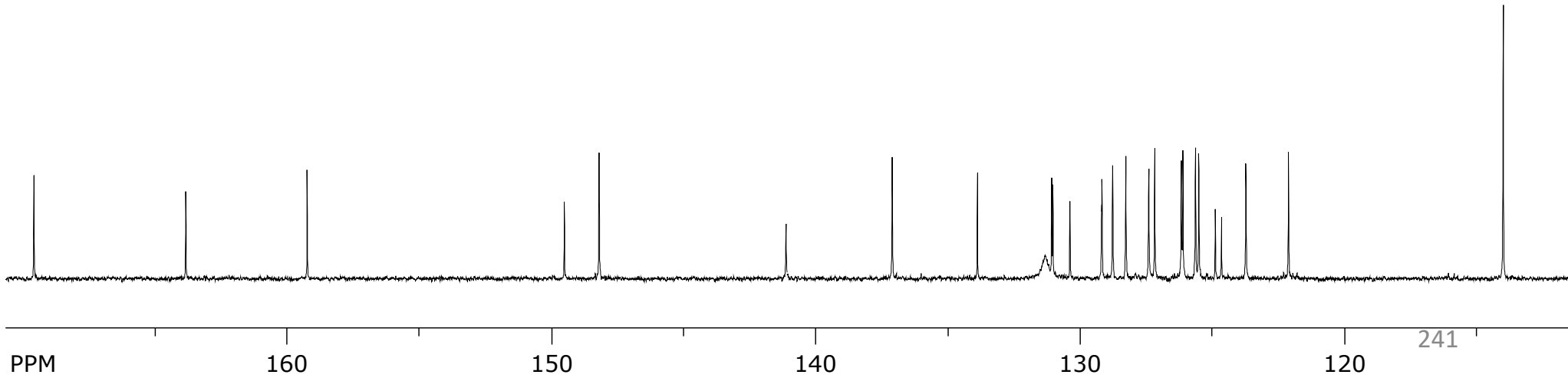
124.641

123.721

113.982



6zg



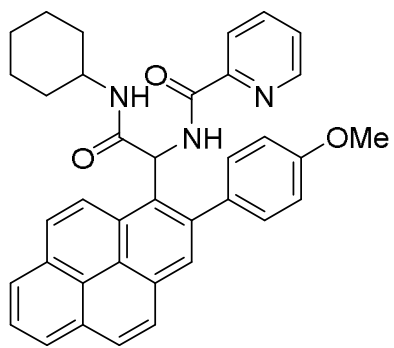
SpinWorks 4: AD-2258

54.895  
55.360

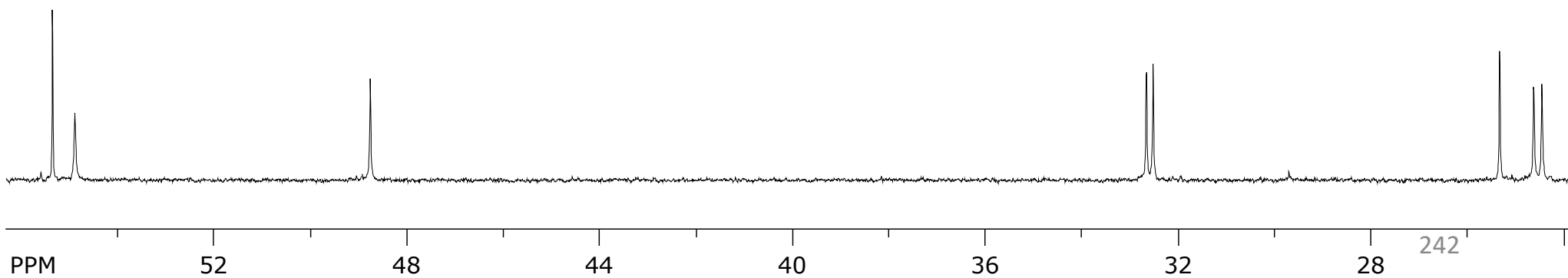
48.764

32.512  
32.651

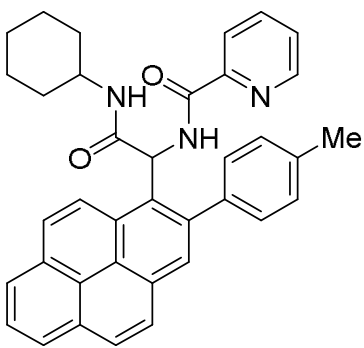
24.439  
24.609  
25.318



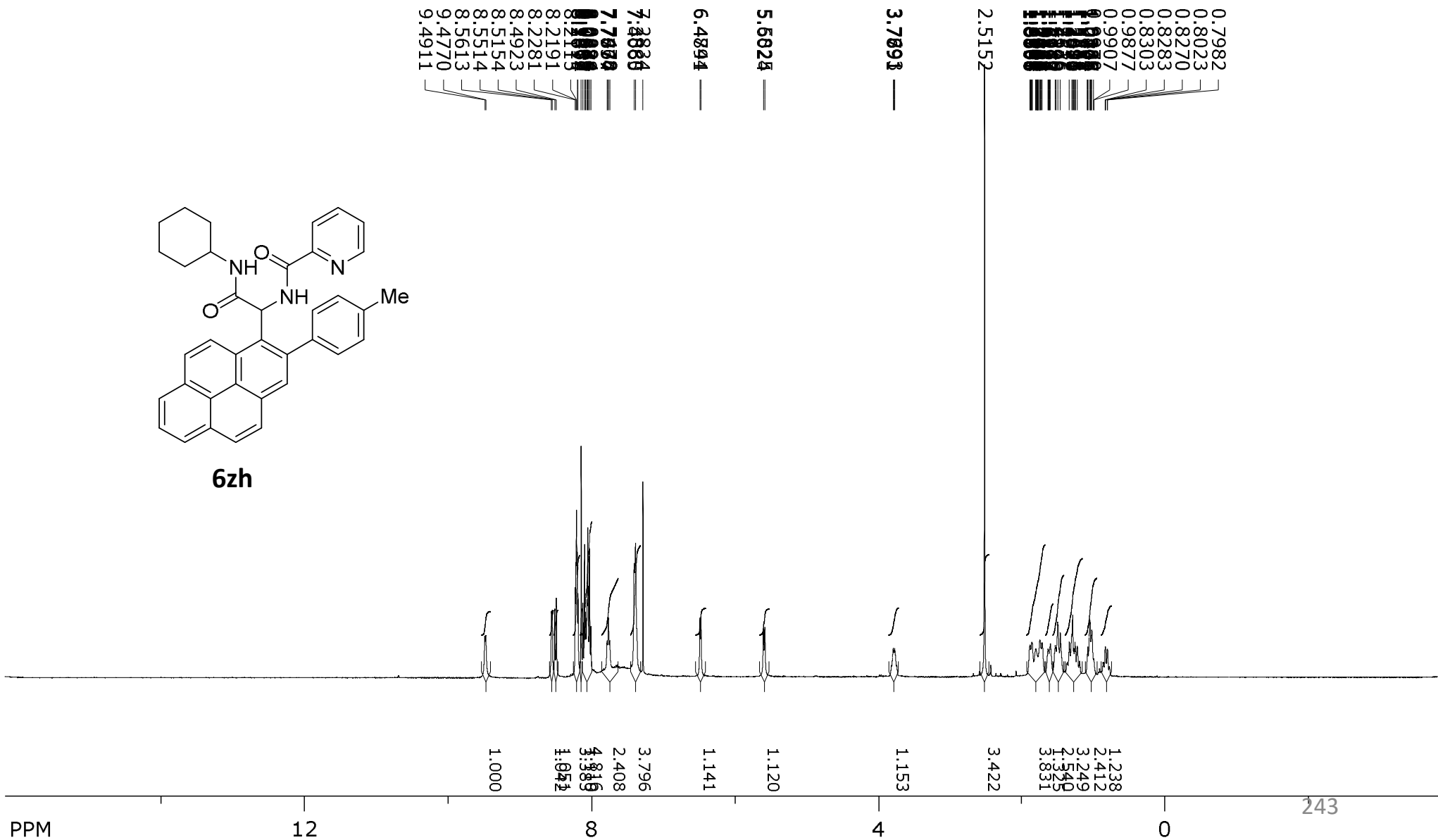
**6zg**



SpinWorks 4: AD-2265 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55



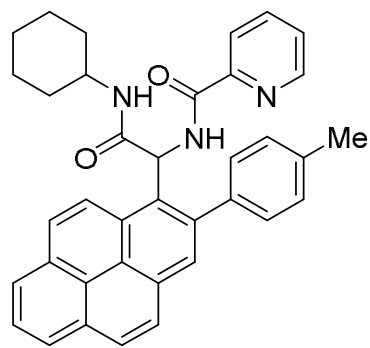
6zh



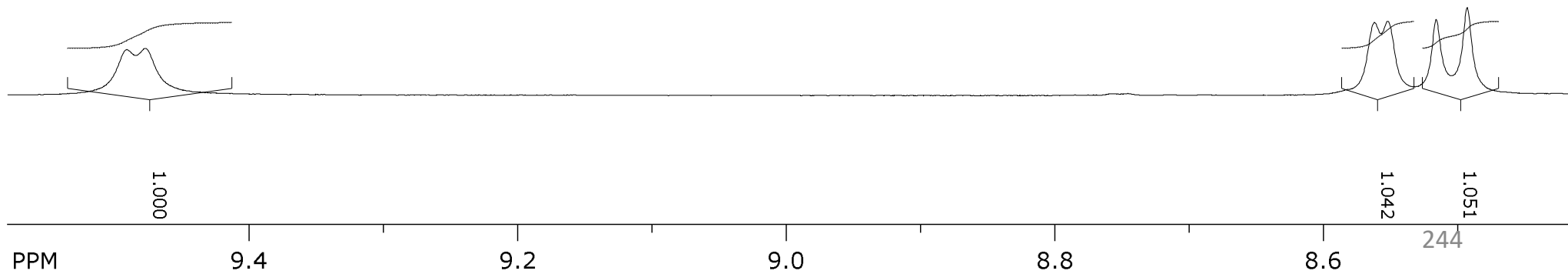
SpinWorks 4: AD-2265 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

9.4770  
9.4911

8.4923  
8.5154  
8.5514  
8.5613



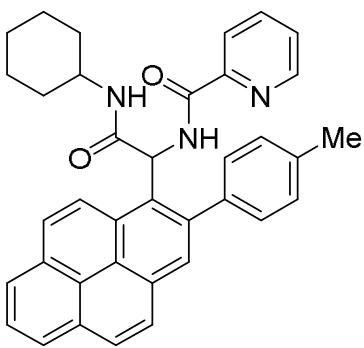
**6zh**



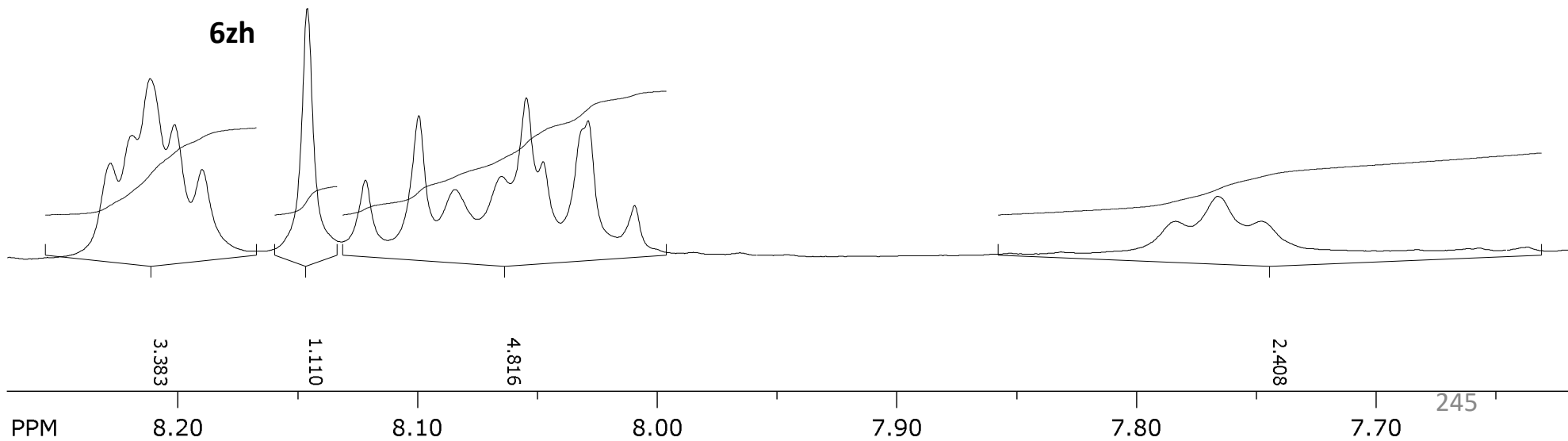
SpinWorks 4: AD-2265 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

8.1899 —  
8.2014 —  
8.2115 —  
8.2191 —  
8.2281 —  
8.1460 —  
8.1217 —  
8.0995 —  
8.0845 —  
8.0649 —  
8.0546 —  
8.0476 —  
8.0288 —  
8.0094 —

7.7478 —  
7.7660 —  
7.7774 —  
7.7837 —



**6zh**

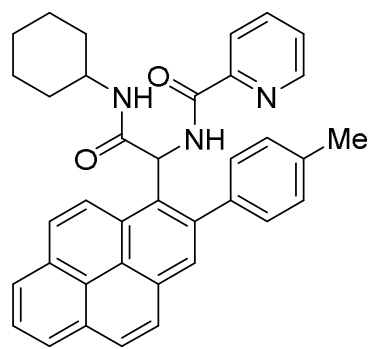


SpinWorks 4: AD-2265 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

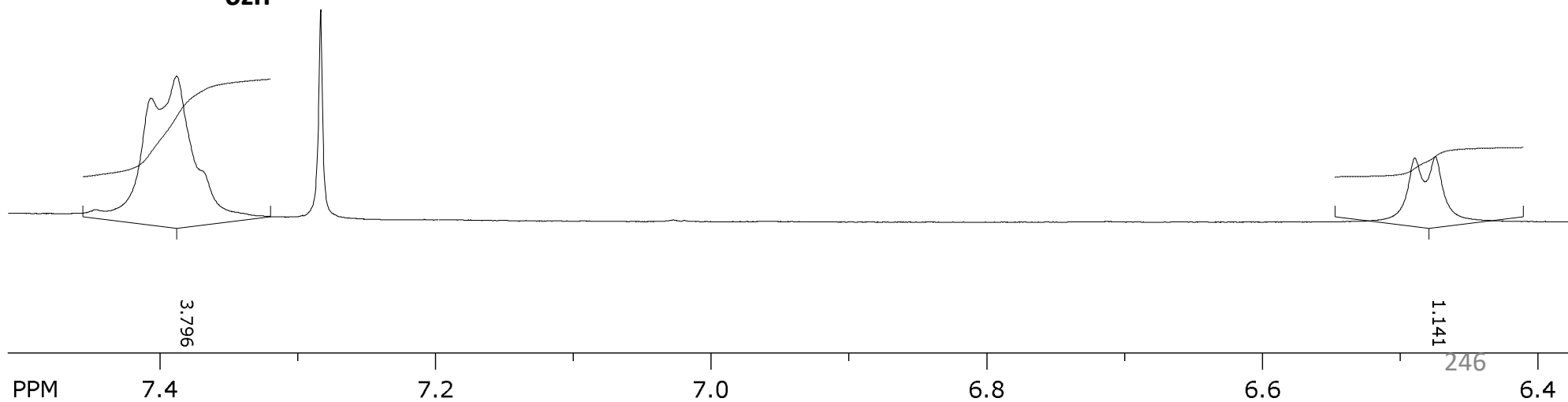
7.3880  
7.4065

7.2834

6.4744  
6.4891



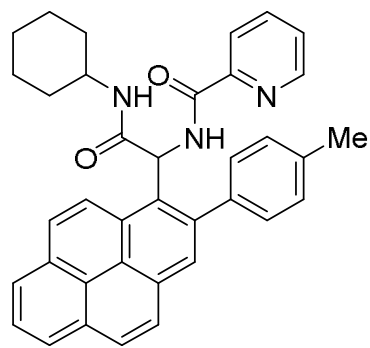
**6zh**



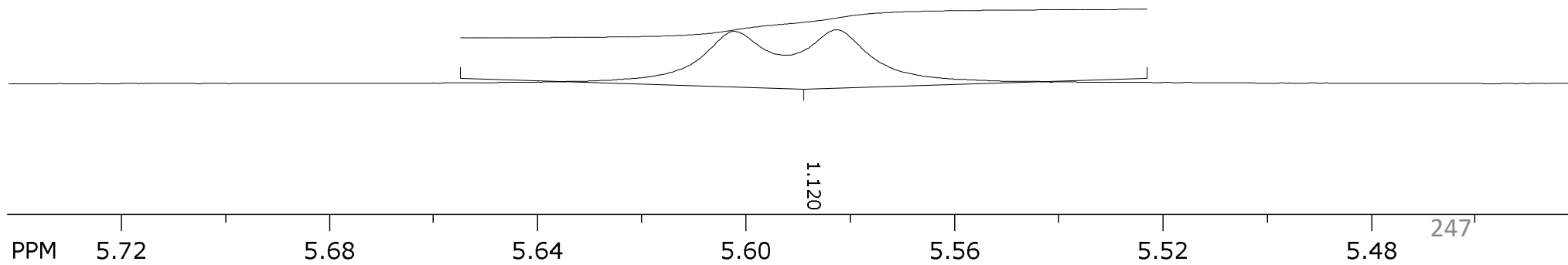
SpinWorks 4: AD-2265 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

5.6024

5.5825

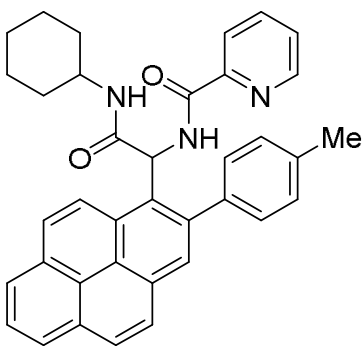


**6zh**

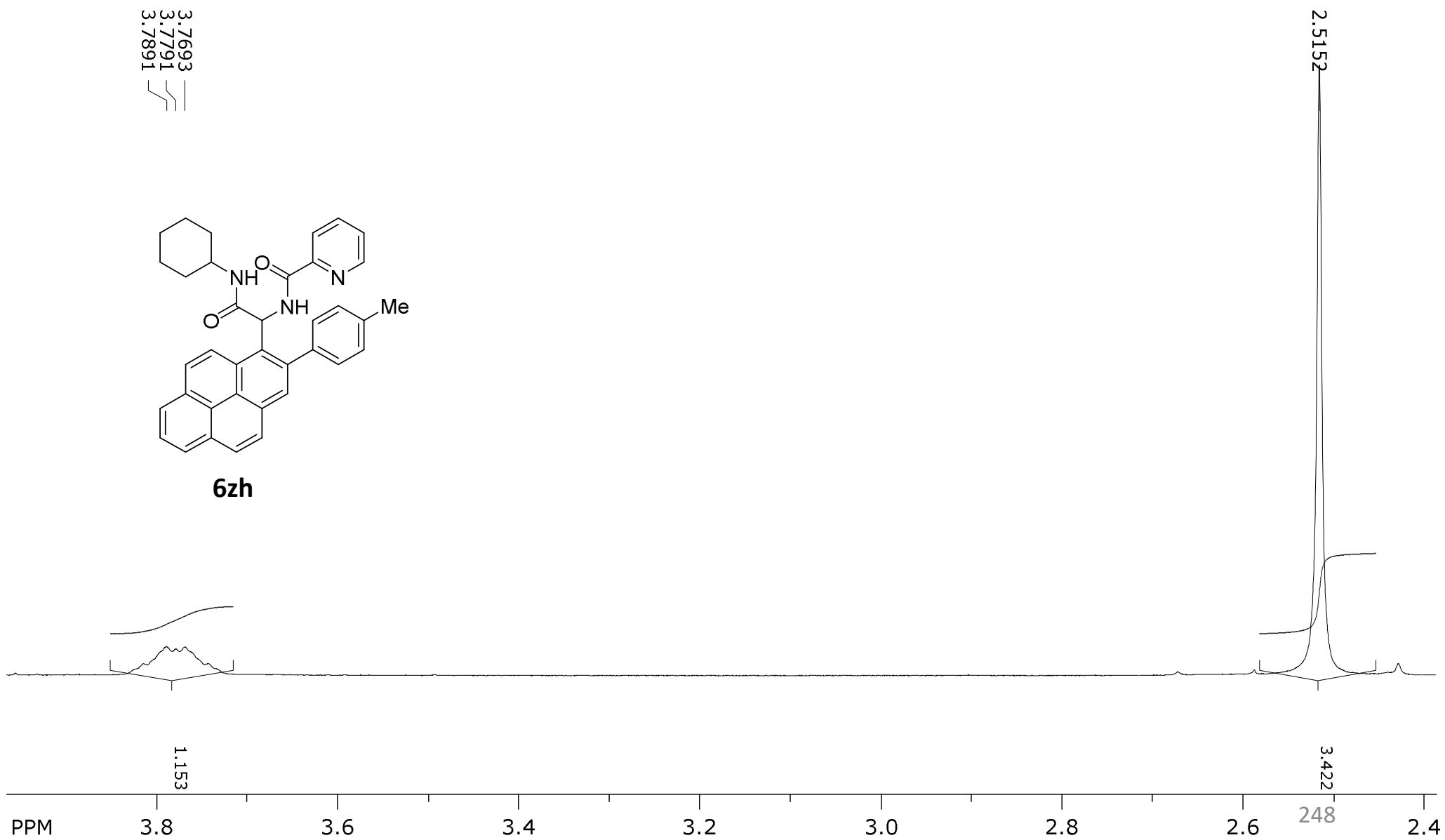


SpinWorks 4: AD-2265 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

3.7693  
3.7791  
3.7891



**6zh**





SpinWorks 4: AD-2265 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

1.8501  
1.8506  
1.8534  
1.8561  
1.8667  
1.8695  
1.8705  
1.8798  
1.8806

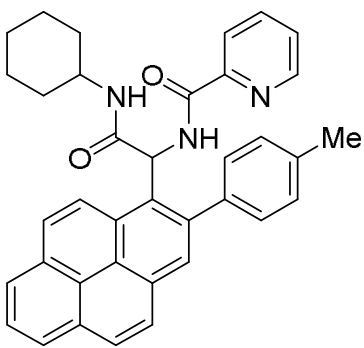
1.7134  
1.7232  
1.7386  
1.7416  
1.7443  
1.7648  
1.7666  
1.7685  
1.7710  
1.7725  
1.7735  
1.7850  
1.7900  
1.7972  
1.7987  
1.8014

1.5960  
1.6037  
1.6133  
1.6203  
1.6217  
1.6294

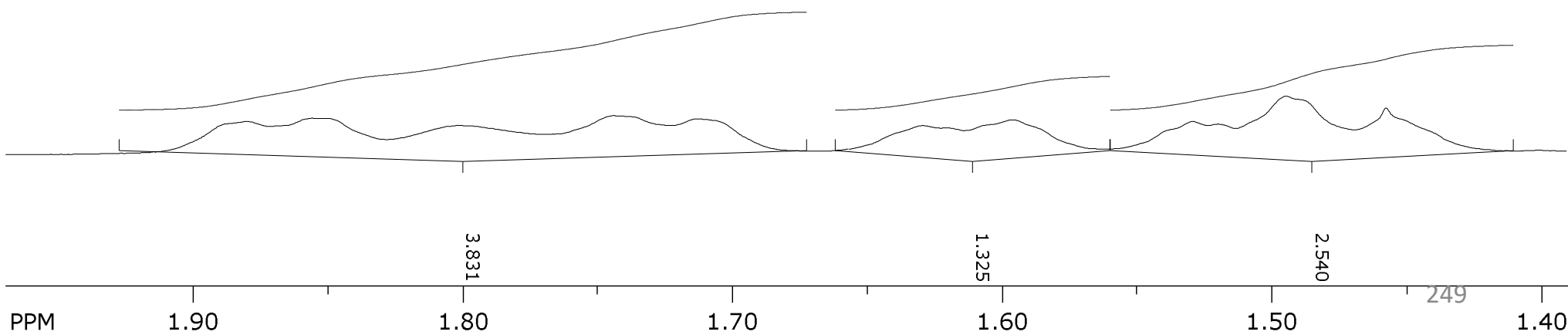
1.5198  
1.5290

1.4946

1.4576



**6zh**

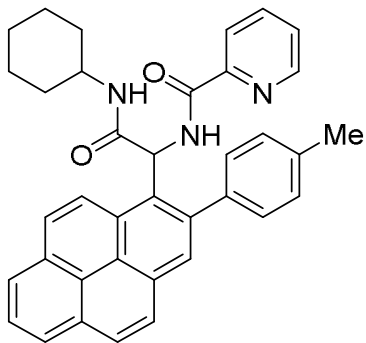


SpinWorks 4: AD-2265 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

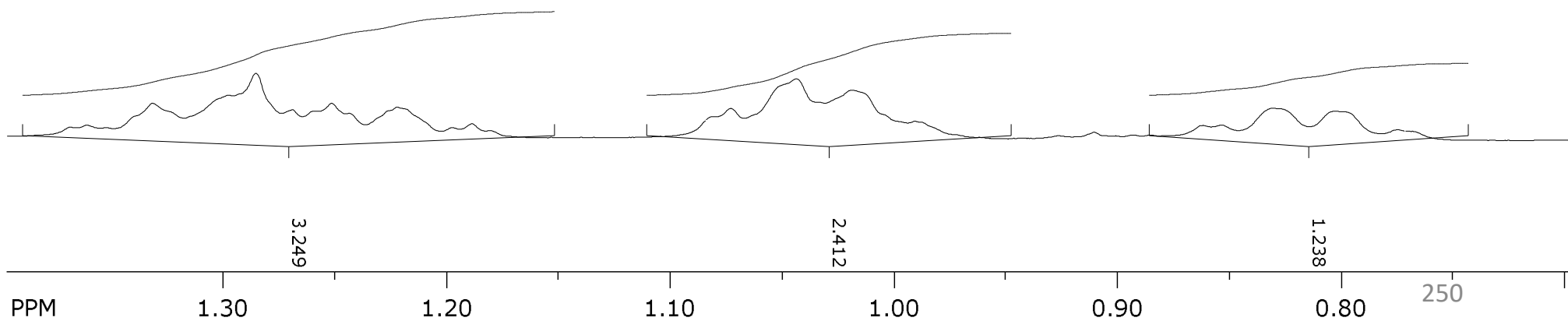
1.3317 —  
1.2976 —  
1.2855 —  
1.2693 —  
1.2591 —  
1.2516 —  
1.2438 —  
1.2223 —

1.0731 —  
1.0794 —  
1.0805 —  
1.0436 —  
1.0345 —  
1.0333 —  
1.0308 —  
1.0187 —  
0.9970 —  
0.9907 —  
0.9877 —

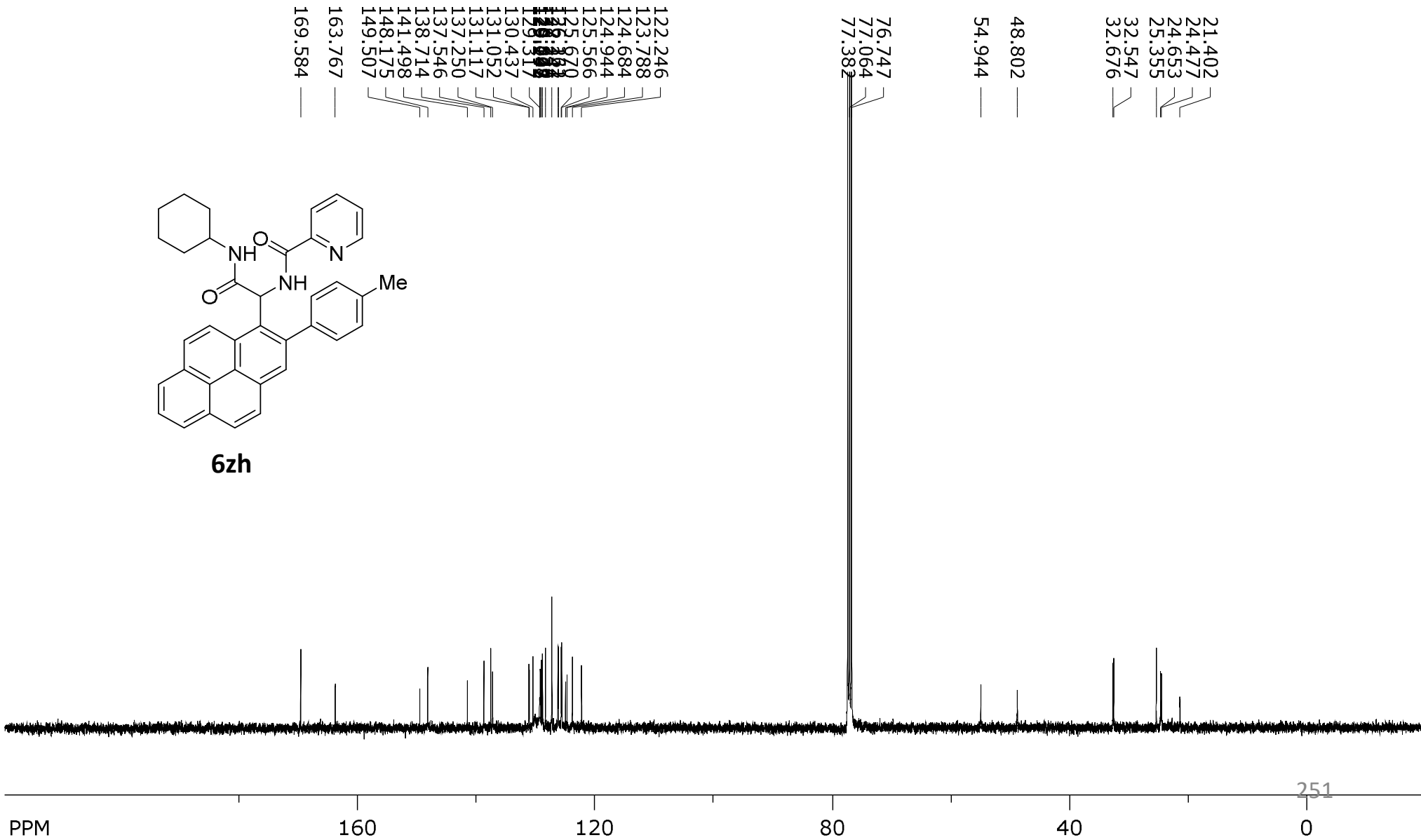
0.7982 —  
0.8023 —  
0.8270 —  
0.8283 —  
0.8303 —



**6zh**

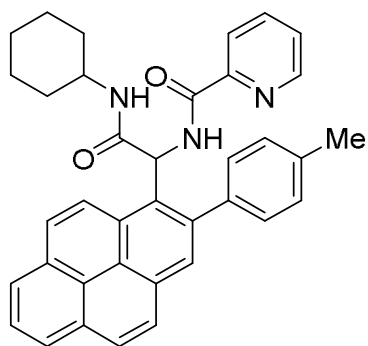


SpinWorks 4: AD-2265 Re  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

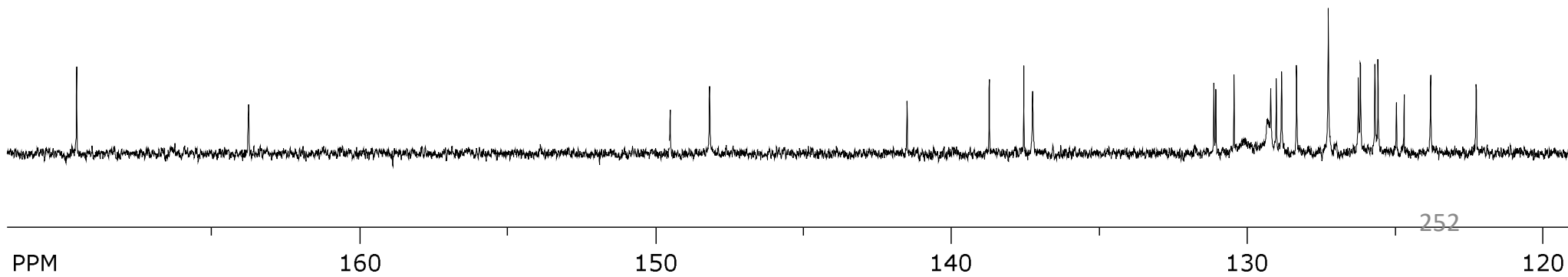


SpinWorks 4: AD-2265 Re  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

169.584 —  
163.767 —  
149.507 —  
148.175 —  
141.498 —  
138.714 —  
137.250 —  
137.546 —  
131.117  
131.052  
130.437  
129.317  
129.292  
129.247  
129.195  
129.008  
128.827  
128.320  
127.247  
126.232  
126.161  
125.670  
125.566  
124.944  
124.684  
123.788  
122.246



6zh



SpinWorks 4: AD-2265 Re  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 55

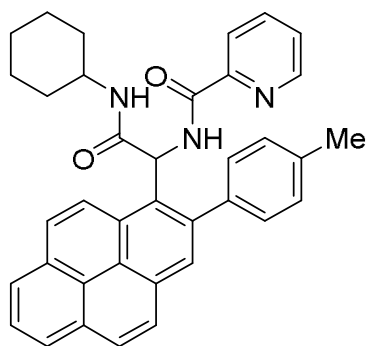
54.944

48.802

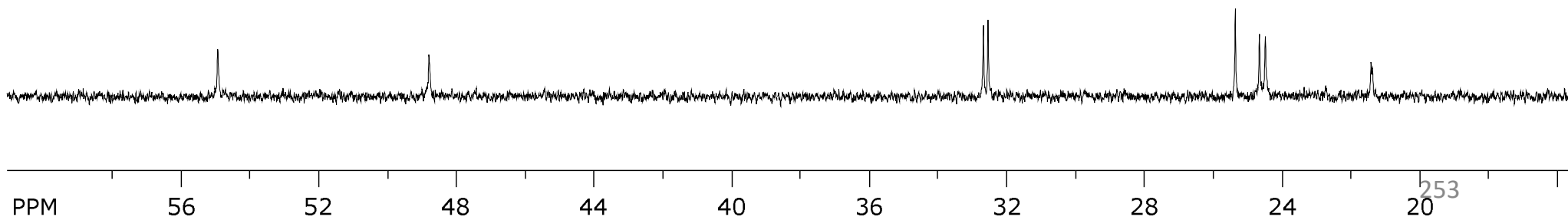
32.547  
32.676

24.477  
24.653  
25.355

21.402

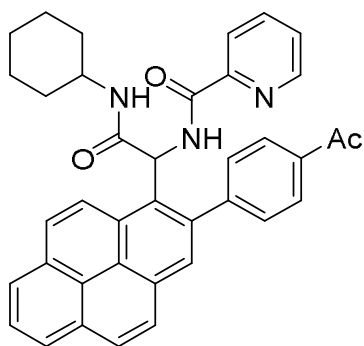


6zh

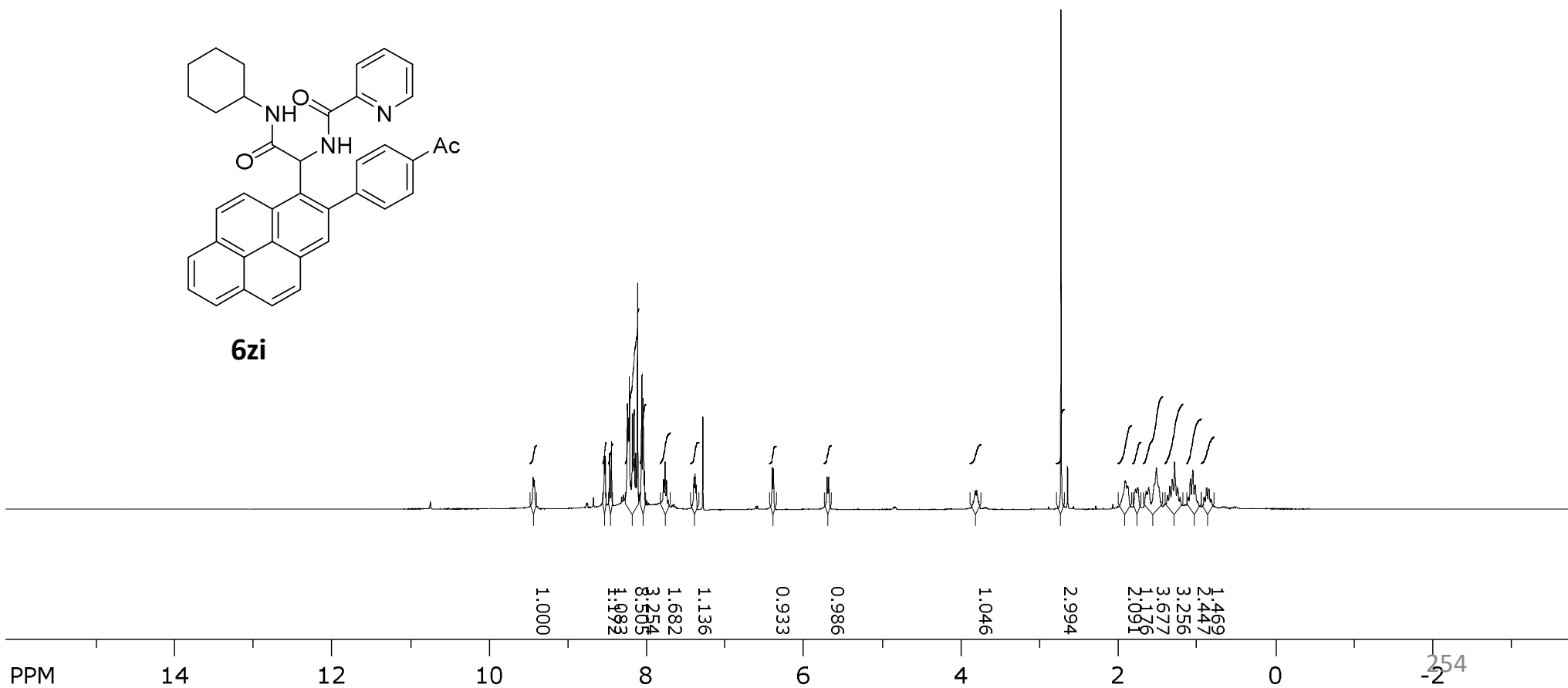


SpinWorks 4: AD-2262 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

0.8103  
0.8191  
0.8404  
0.8461  
0.8470  
0.8704  
0.8708  
0.8712  
0.8716  
0.8720  
0.8724  
0.8728  
0.8732  
0.8736  
0.8740  
0.8744  
0.8748  
0.8752  
0.8756  
0.8760  
0.8764  
0.8768  
0.8772  
0.8776  
0.8780  
0.8784  
0.8788  
0.8792  
0.8796  
0.8800  
0.8804  
0.8808  
0.8812  
0.8816  
0.8820  
0.8824  
0.8828  
0.8832  
0.8836  
0.8840  
0.8844  
0.8848  
0.8852  
0.8856  
0.8860  
0.8864  
0.8868  
0.8872  
0.8876  
0.8880  
0.8884  
0.8888  
0.8892  
0.8896  
0.8900  
0.8904  
0.8908  
0.8912  
0.8916  
0.8920  
0.8924  
0.8928  
0.8932  
0.8936  
0.8940  
0.8944  
0.8948  
0.8952  
0.8956  
0.8960  
0.8964  
0.8968  
0.8972  
0.8976  
0.8980  
0.8984  
0.8988  
0.8992  
0.8996  
0.9000  
0.9004  
0.9008  
0.9012  
0.9016  
0.9020  
0.9024  
0.9028  
0.9032  
0.9036  
0.9040  
0.9044  
0.9048  
0.9052  
0.9056  
0.9060  
0.9064  
0.9068  
0.9072  
0.9076  
0.9080  
0.9084  
0.9088  
0.9092  
0.9096  
0.9100  
0.9104  
0.9108  
0.9112  
0.9116  
0.9120  
0.9124  
0.9128  
0.9132  
0.9136  
0.9140  
0.9144  
0.9148  
0.9152  
0.9156  
0.9160  
0.9164  
0.9168  
0.9172  
0.9176  
0.9180  
0.9184  
0.9188  
0.9192  
0.9196  
0.9200  
0.9204  
0.9208  
0.9212  
0.9216  
0.9220  
0.9224  
0.9228  
0.9232  
0.9236  
0.9240  
0.9244  
0.9248  
0.9252  
0.9256  
0.9260  
0.9264  
0.9268  
0.9272  
0.9276  
0.9280  
0.9284  
0.9288  
0.9292  
0.9296  
0.9300  
0.9304  
0.9308  
0.9312  
0.9316  
0.9320  
0.9324  
0.9328  
0.9332  
0.9336  
0.9340  
0.9344  
0.9348  
0.9352  
0.9356  
0.9360  
0.9364  
0.9368  
0.9372  
0.9376  
0.9380  
0.9384  
0.9388  
0.9392  
0.9396  
0.9400  
0.9404  
0.9408  
0.9412  
0.9416  
0.9420  
0.9424  
0.9428  
0.9432  
0.9436  
0.9440  
0.9444  
0.9448  
0.9452  
0.9456  
0.9460  
0.9464  
0.9468  
0.9472  
0.9476  
0.9480  
0.9484  
0.9488  
0.9492  
0.9496  
0.9500  
0.9504  
0.9508  
0.9512  
0.9516  
0.9520  
0.9524  
0.9528  
0.9532  
0.9536  
0.9540  
0.9544  
0.9548  
0.9552  
0.9556  
0.9560  
0.9564  
0.9568  
0.9572  
0.9576  
0.9580  
0.9584  
0.9588  
0.9592  
0.9596  
0.9600  
0.9604  
0.9608  
0.9612  
0.9616  
0.9620  
0.9624  
0.9628  
0.9632  
0.9636  
0.9640  
0.9644  
0.9648  
0.9652  
0.9656  
0.9660  
0.9664  
0.9668  
0.9672  
0.9676  
0.9680  
0.9684  
0.9688  
0.9692  
0.9696  
0.9700  
0.9704  
0.9708  
0.9712  
0.9716  
0.9720  
0.9724  
0.9728  
0.9732  
0.9736  
0.9740  
0.9744  
0.9748  
0.9752  
0.9756  
0.9760  
0.9764  
0.9768  
0.9772  
0.9776  
0.9780  
0.9784  
0.9788  
0.9792  
0.9796  
0.9800  
0.9804  
0.9808  
0.9812  
0.9816  
0.9820  
0.9824  
0.9828  
0.9832  
0.9836  
0.9840  
0.9844  
0.9848  
0.9852  
0.9856  
0.9860  
0.9864  
0.9868  
0.9872  
0.9876  
0.9880  
0.9884  
0.9888  
0.9892  
0.9896  
0.9900  
0.9904  
0.9908  
0.9912  
0.9916  
0.9920  
0.9924  
0.9928  
0.9932  
0.9936  
0.9940  
0.9944  
0.9948  
0.9952  
0.9956  
0.9960  
0.9964  
0.9968  
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0.9980  
0.9984  
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1.0000



6zi

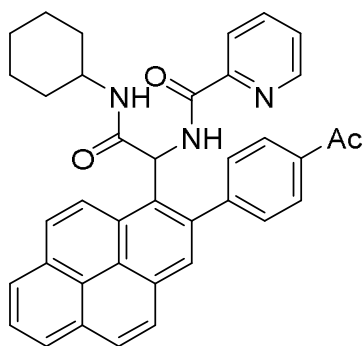


SpinWorks 4: AD-2262 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

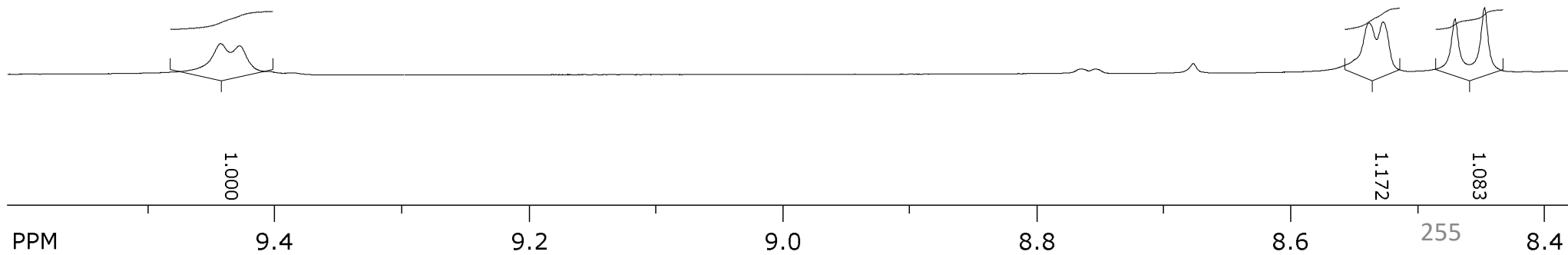
9.4281  
9.4430

8.5268  
8.5379

8.4469  
8.4702

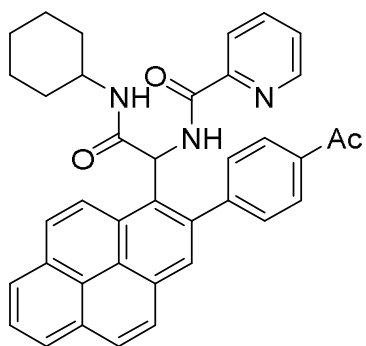


**6zi**

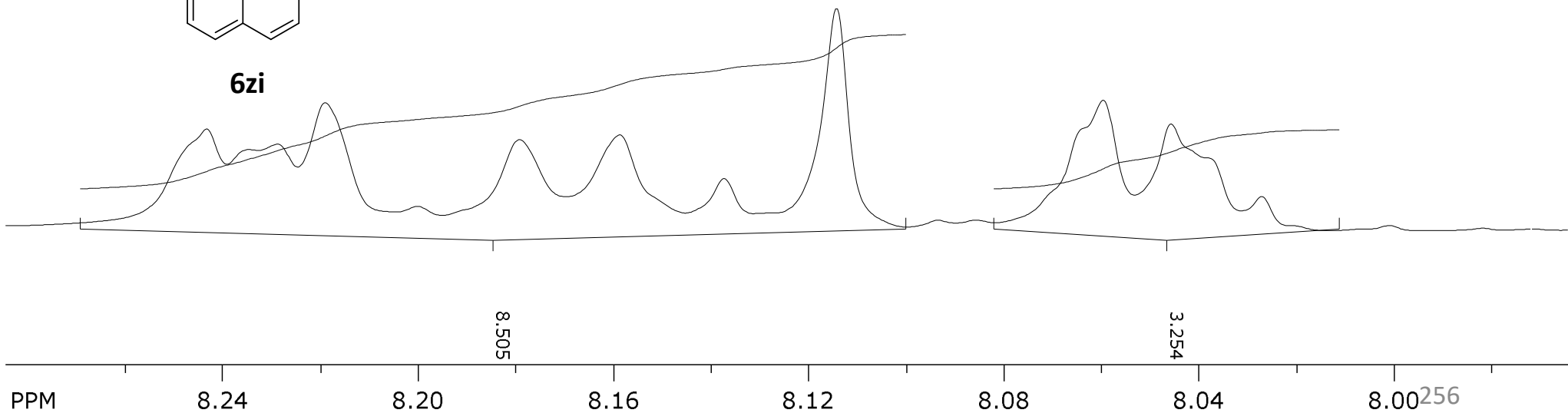


SpinWorks 4: AD-2262 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

8.2434 —  
8.2348 —  
8.2289 —  
8.2191 —  
8.2002 —  
8.1793 —  
8.1588 —  
8.1373 —  
8.1280 —  
8.1143 —  
8.0596 —  
8.0457 —  
8.0385 —  
8.0272 —



**6zi**



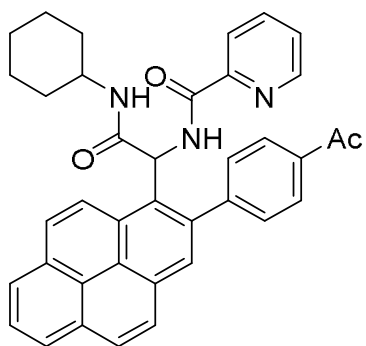


SpinWorks 4: AD-2262 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

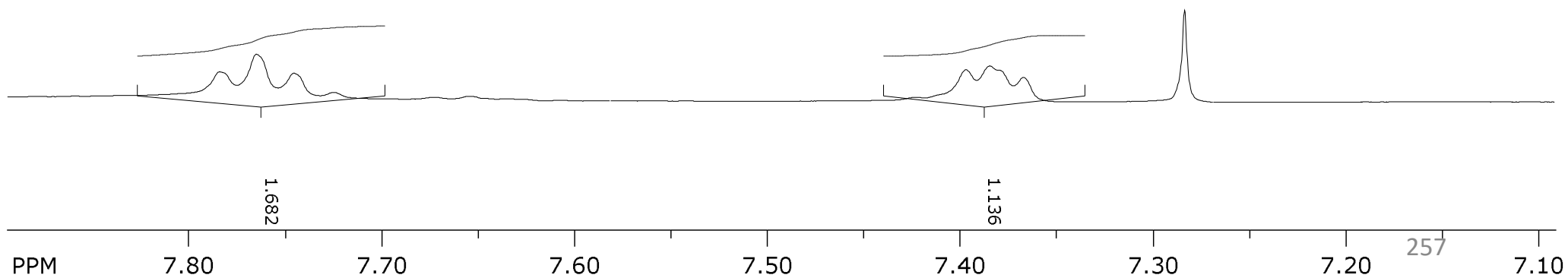
7.7459 —  
7.7652 —  
7.7844 —

7.3672 —  
7.3846 —  
7.3970 —

7.2835 —



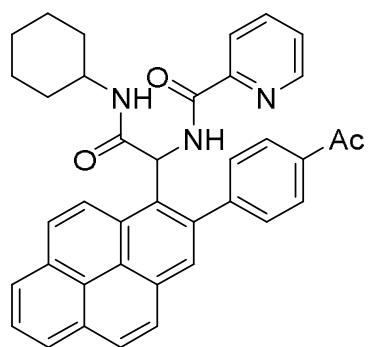
**6zi**



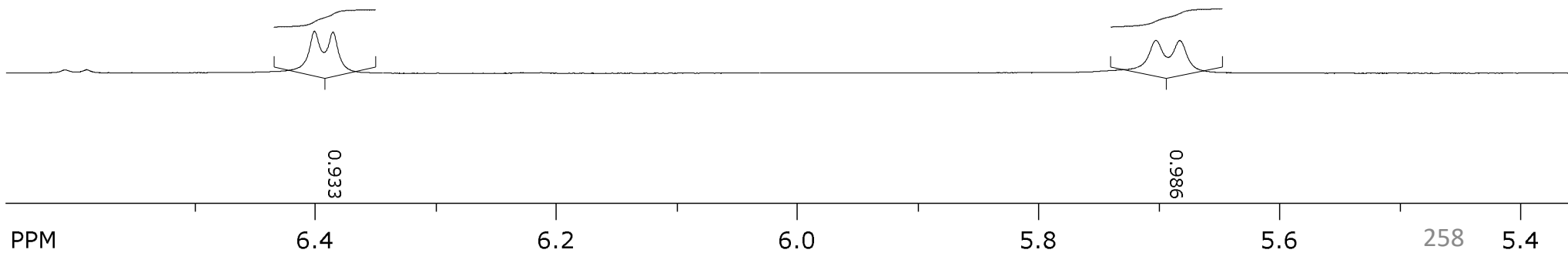
SpinWorks 4: AD-2262 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

6.3855  
6.4009

5.6829  
5.7027

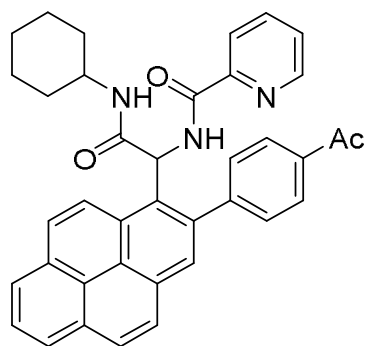


**6zi**

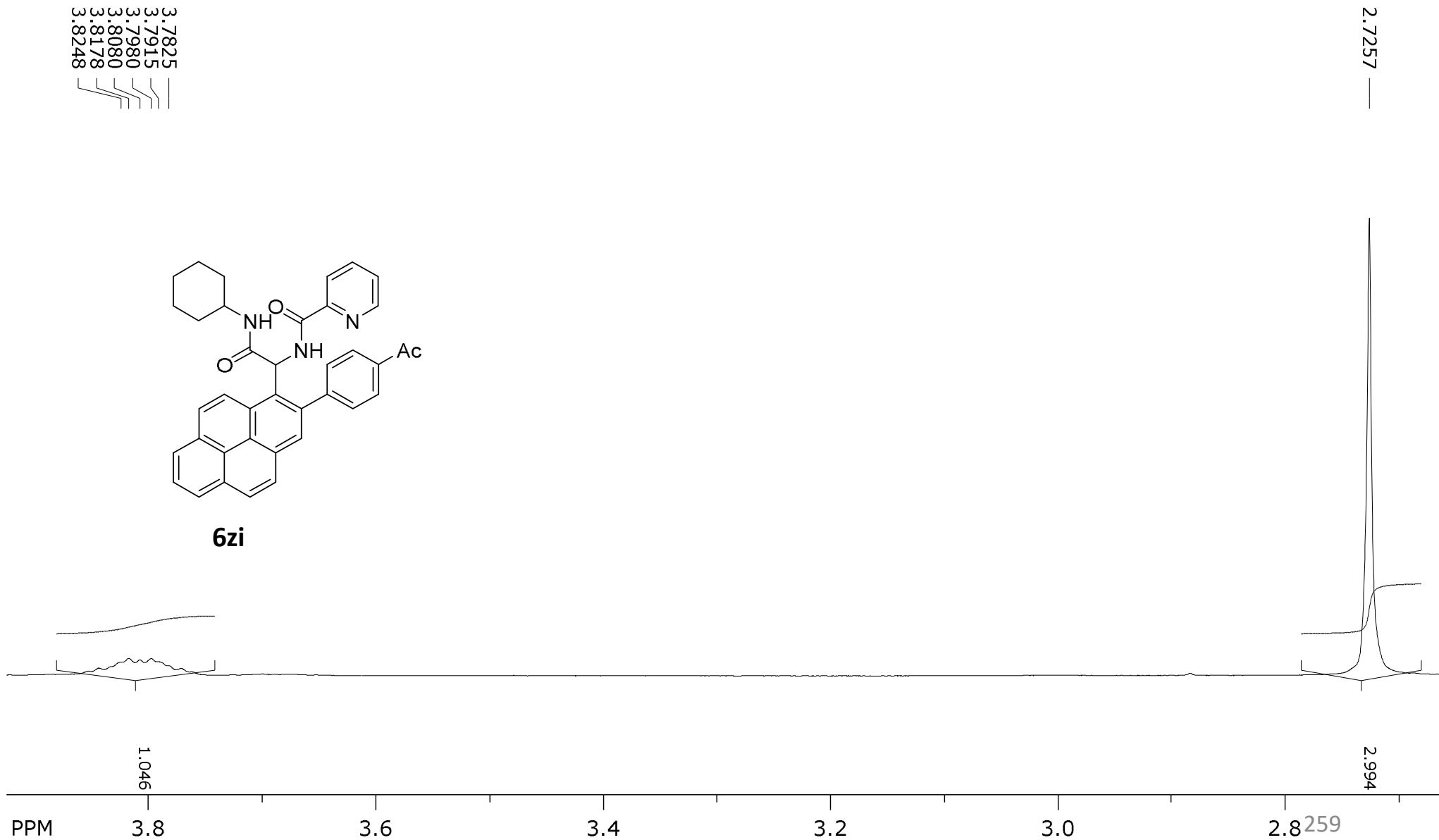


SpinWorks 4: AD-2262 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

3.7825  
3.7915  
3.7980  
3.8080  
3.8178  
3.8248



6zi



SpinWorks 4: AD-2262 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

1.9033  
1.9050  
1.9070  
1.9099

1.8718  
1.8790

1.7468  
1.7492  
1.7518  
1.7527  
1.7678  
1.7763

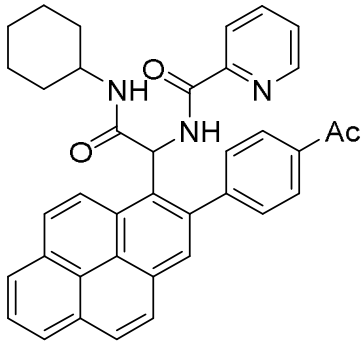
1.6093  
1.6331  
1.6427

1.5115  
1.5327  
1.5424  
1.4820  
1.4838  
1.4917

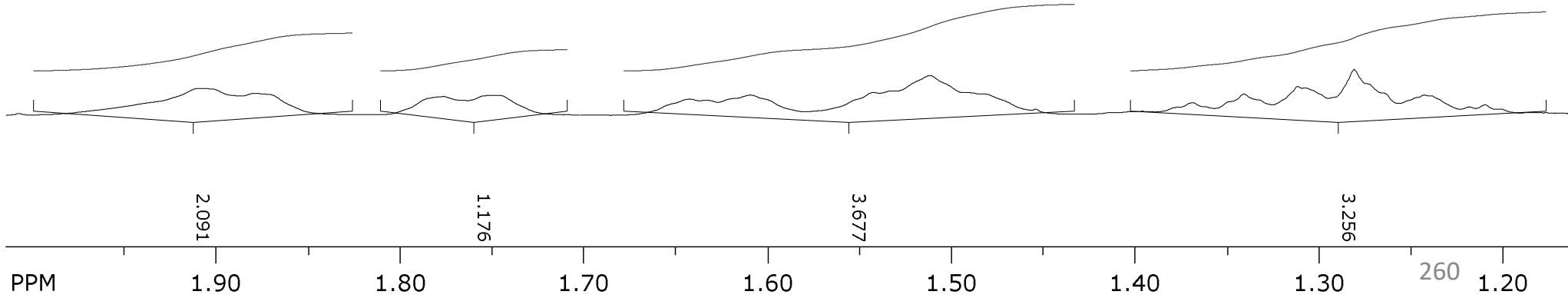
1.3407  
1.3624  
1.3687  
1.3777

1.2807  
1.3072  
1.3114

1.2094  
1.2182  
1.2390  
1.2427

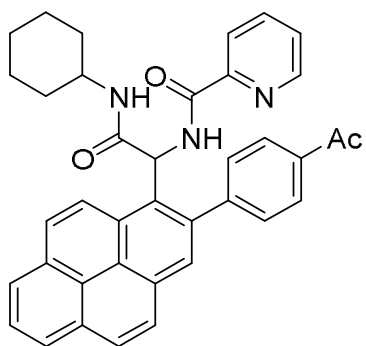


6zi

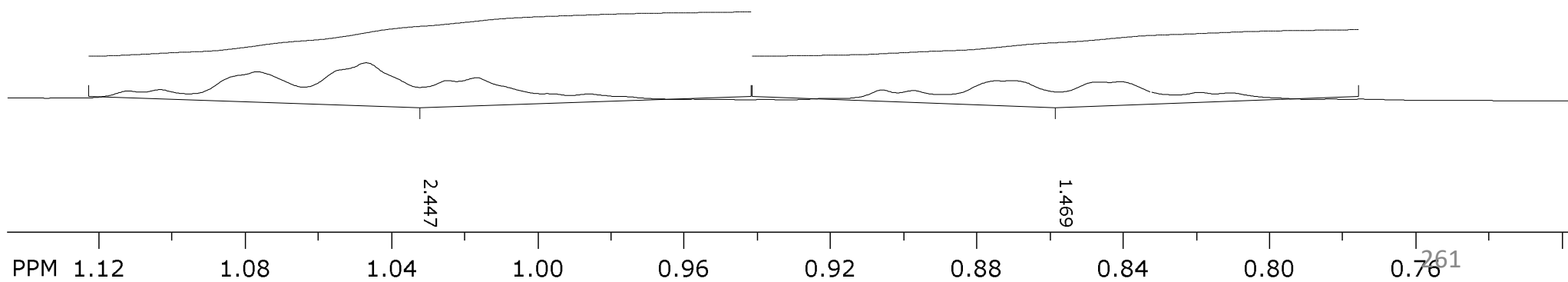


SpinWorks 4: AD-2262 Re  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

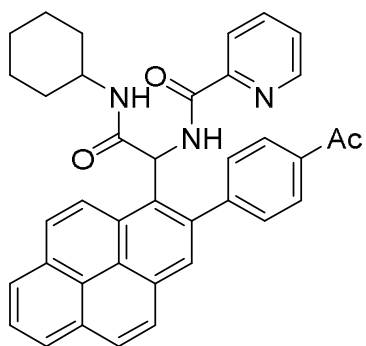
1.1121 —  
1.1034 —  
1.0767 —  
1.0469 —  
1.0248 —  
1.0167 —  
0.9059 —  
0.8972 —  
0.8746 —  
0.8708 —  
0.8704 —  
0.8470 —  
0.8461 —  
0.8404 —  
0.8191 —  
0.8103 —



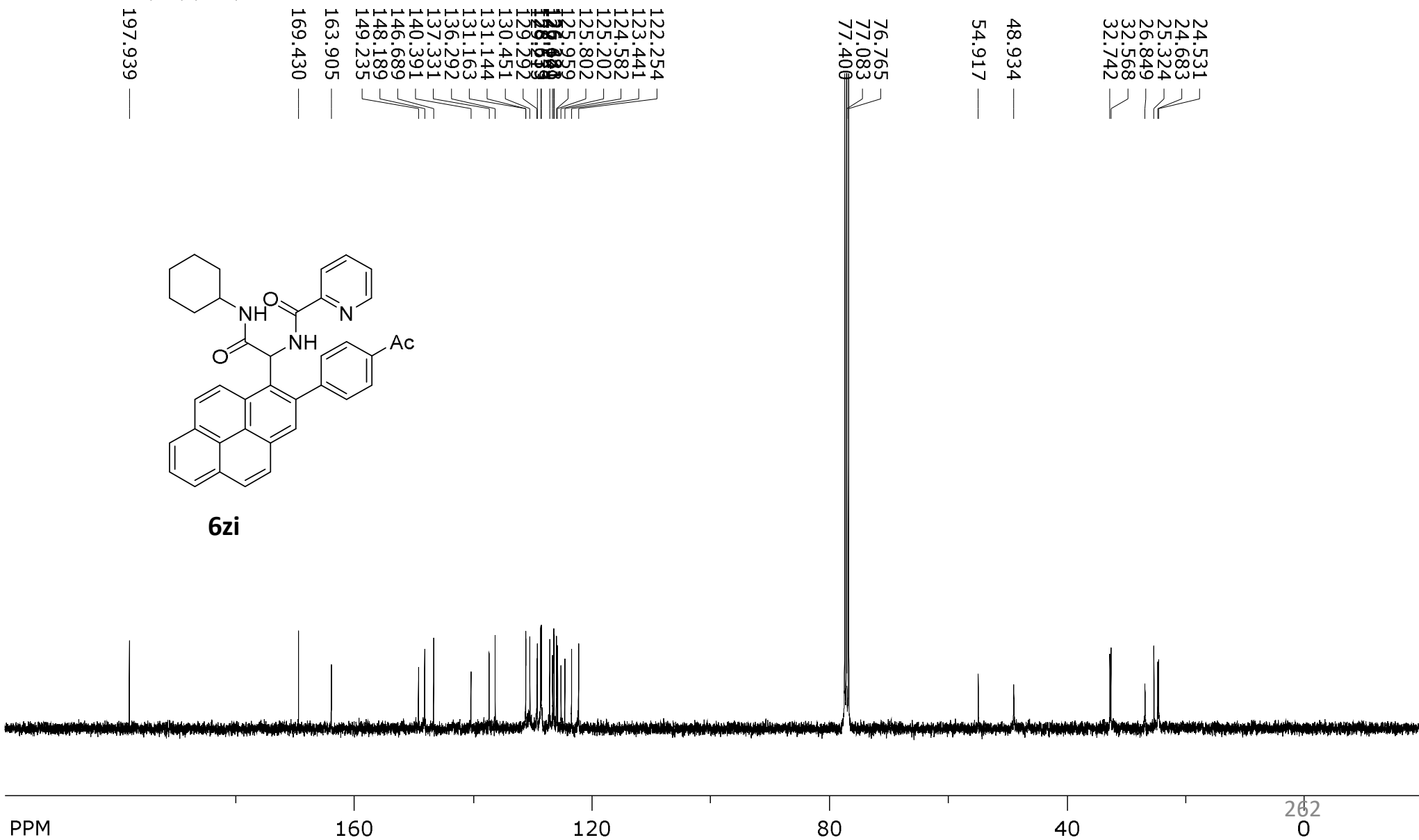
**6zi**



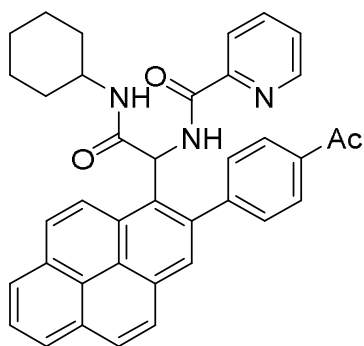
SpinWorks 4: AD-2262 Re  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54



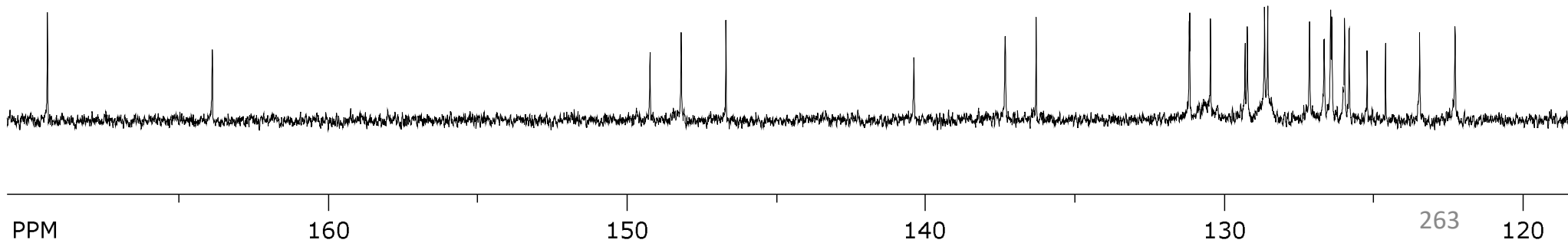
6zi



SpinWorks 4: AD-2262 Re  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54



6zi



SpinWorks 4: AD-2262 Re  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

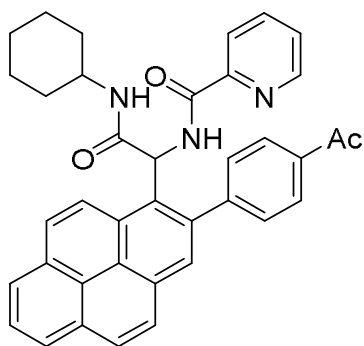
54.917

48.934

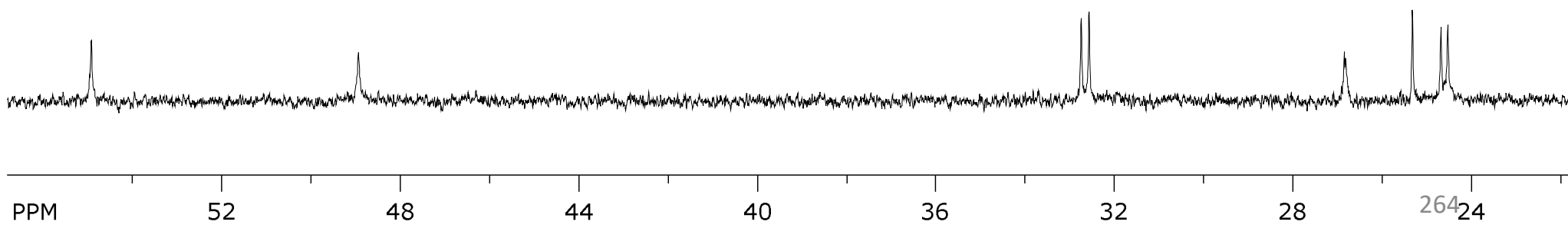
32.568  
32.742

26.849

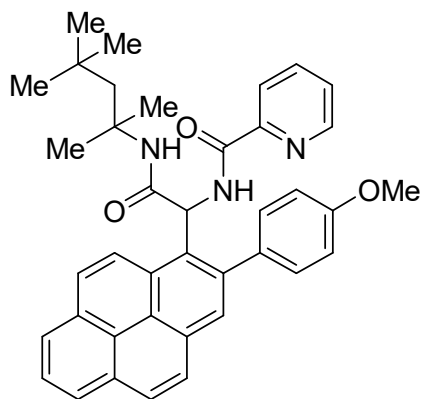
24.531  
24.683  
25.324



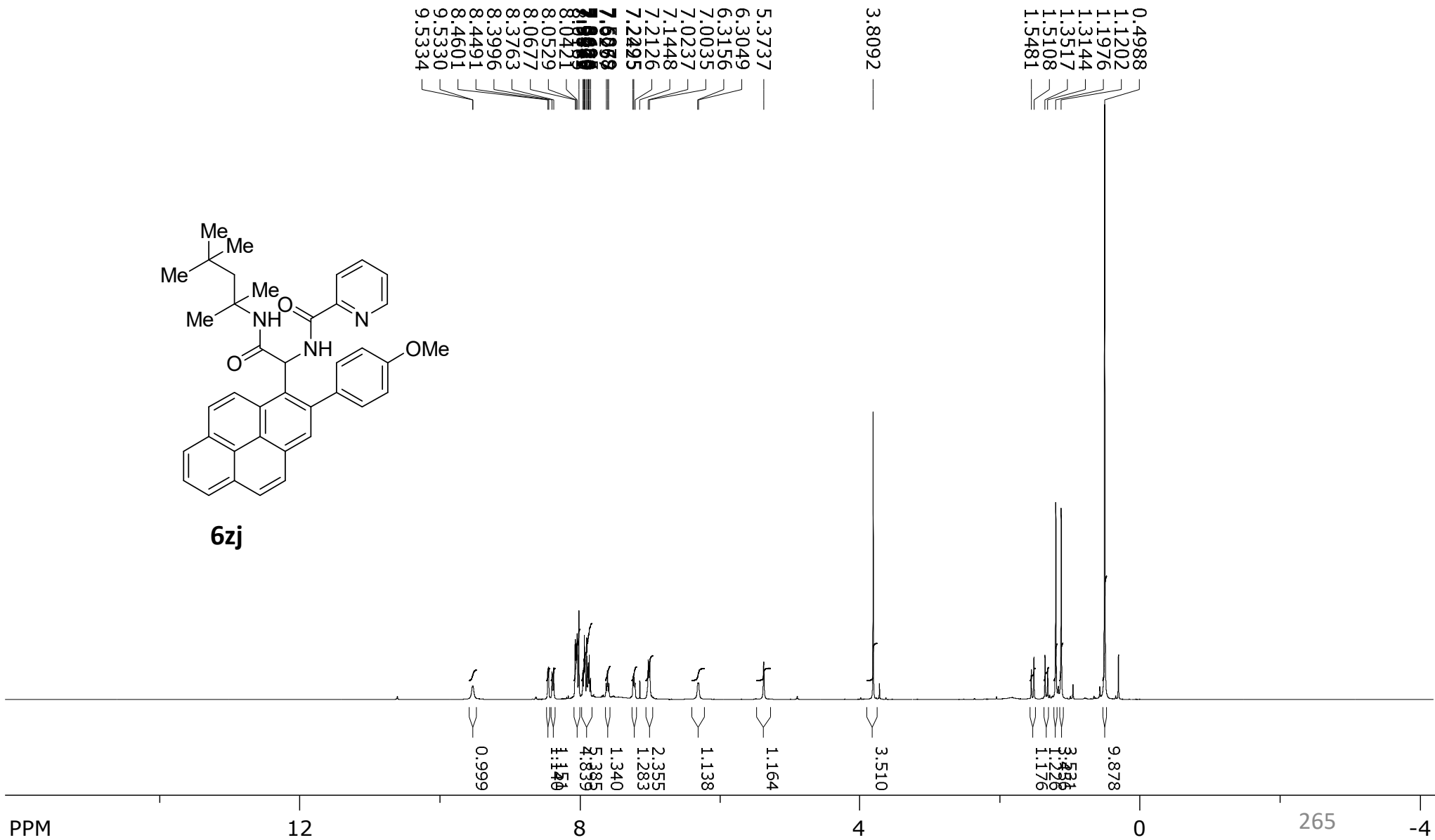
6zi

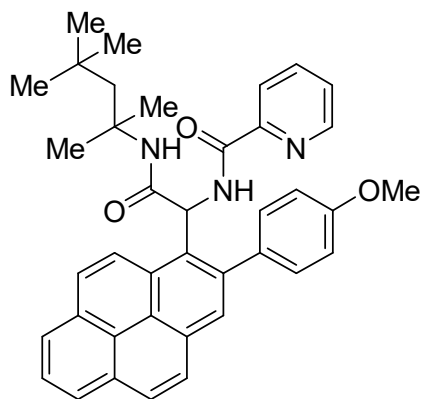




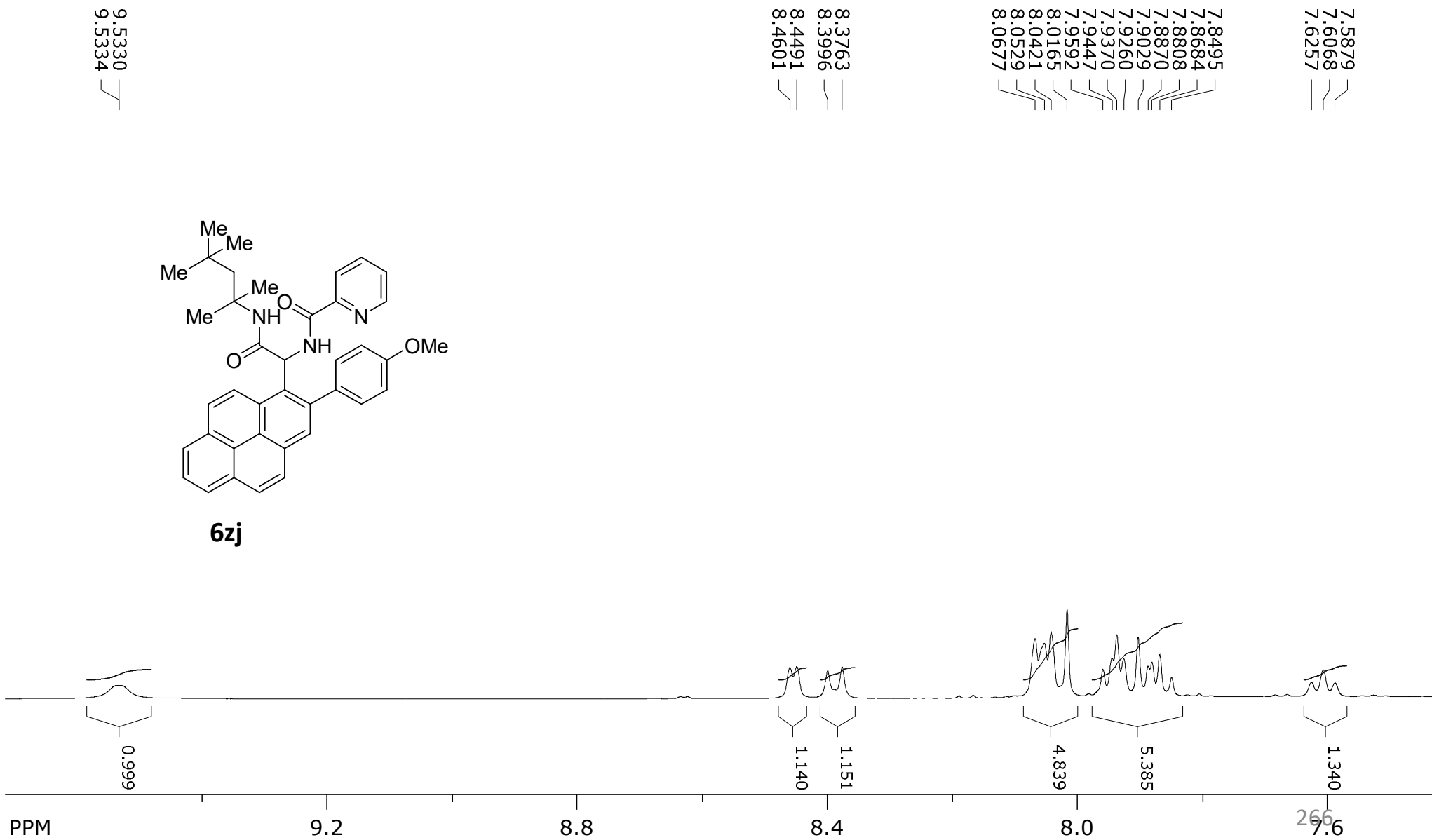


6zj





6zj



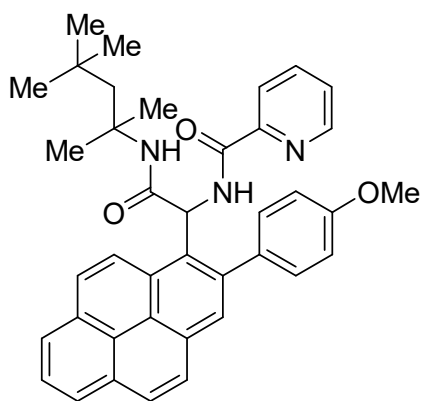
SpinWorks 4: AD-2259

7.0035  
7.0237  
7.1448  
7.2126  
7.2295  
7.2425

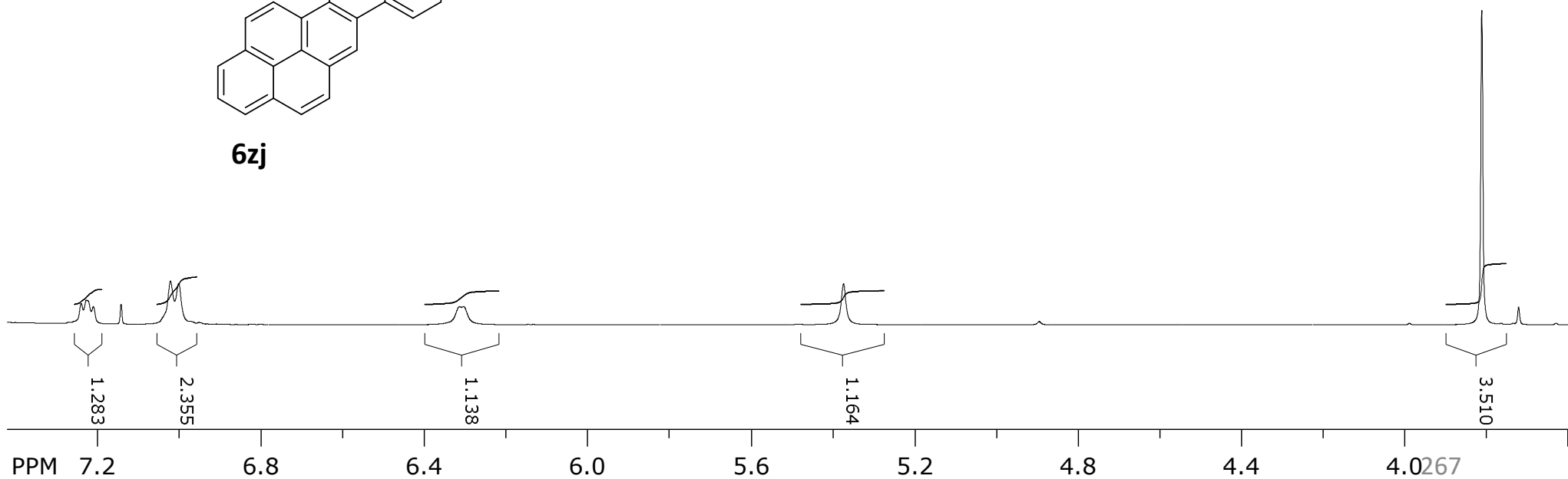
6.3049  
6.3156

5.3737

3.8092



6zj

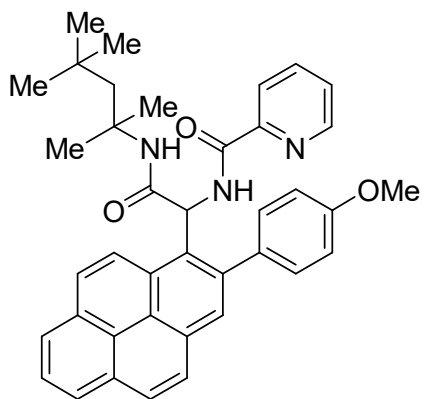


1.5481  
1.5108  
1.5481

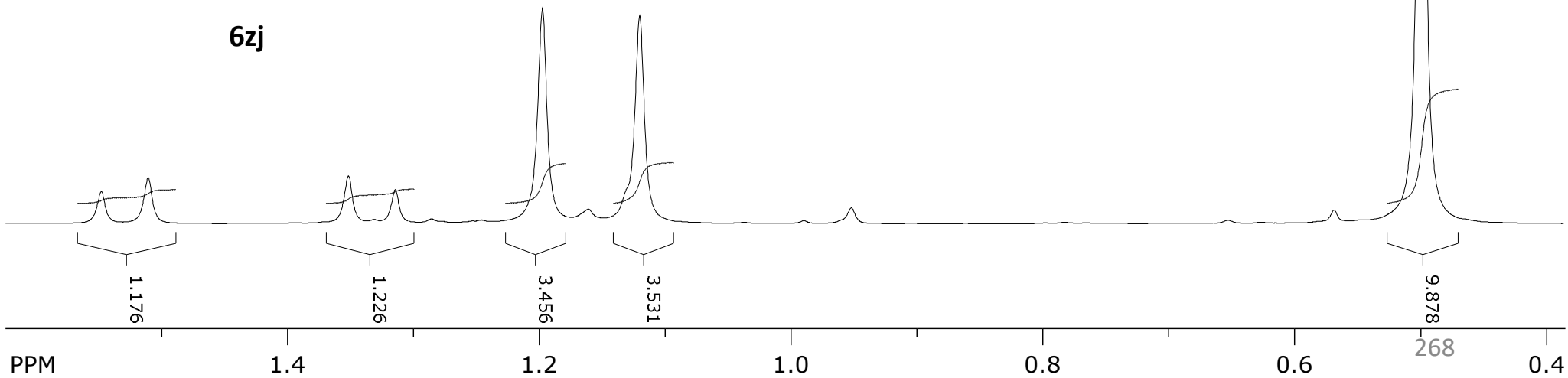
1.3517  
1.3144  
1.3517

1.1976  
1.1202

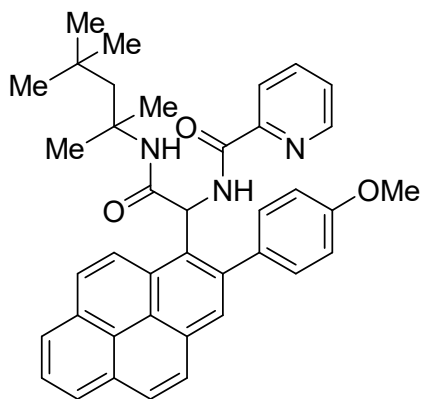
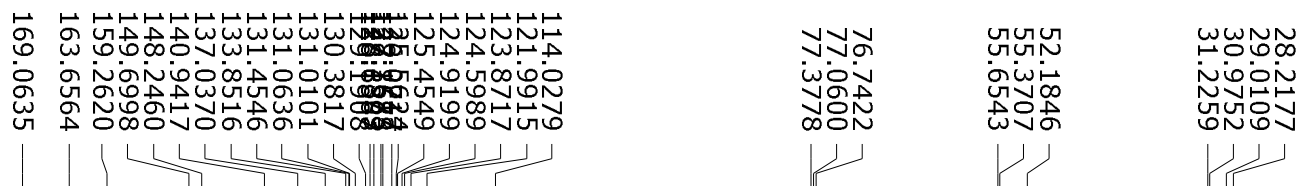
0.4988



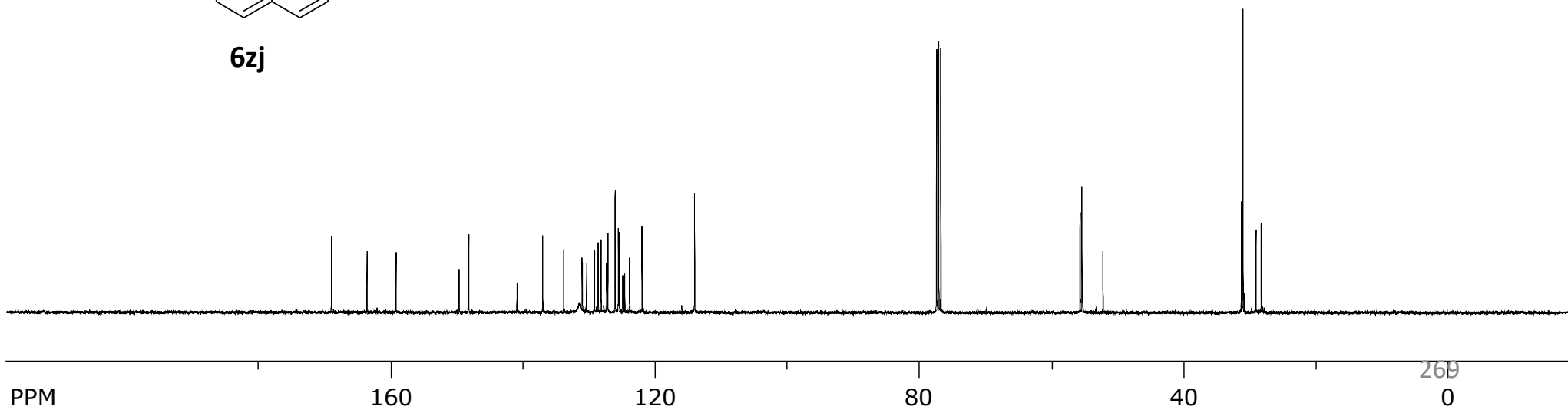
6zj



SpinWorks 4: AD-2259



6zj



SpinWorks 4: AD-2259

169.0635

163.6564

159.2620

149.6998

148.2460

140.9417

137.0370

133.8516

131.4546

131.0636

130.3817

129.1908

128.6387

128.1803

127.3588

127.1673

126.0717

125.5624

125.4549

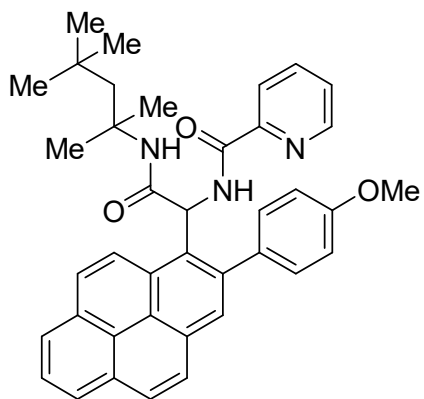
124.9199

124.5989

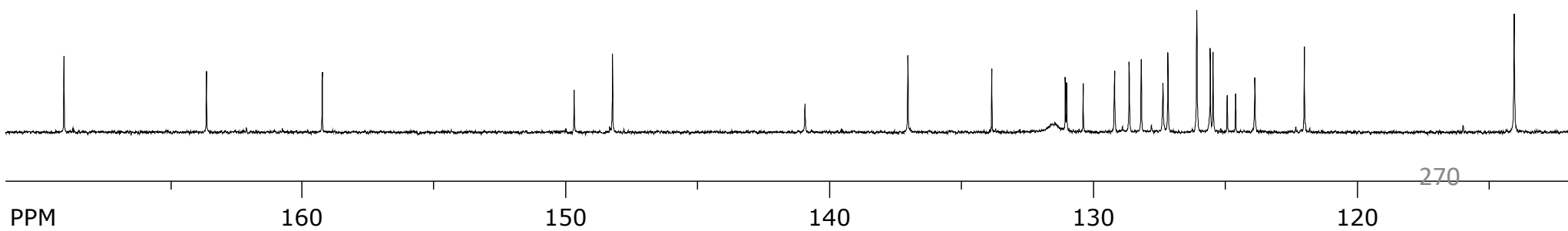
123.8717

121.9915

114.0279



6zj



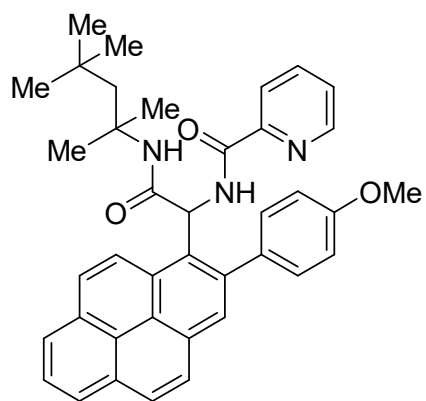
SpinWorks 4: AD-2259

55.371  
55.654

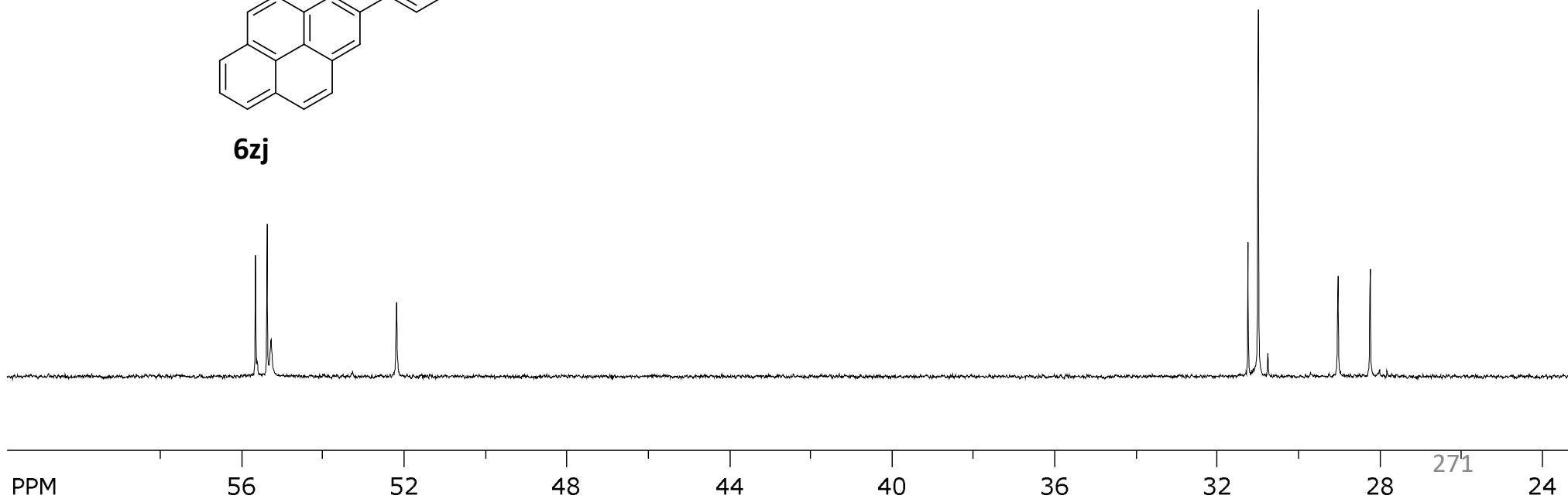
52.185

30.975  
31.226

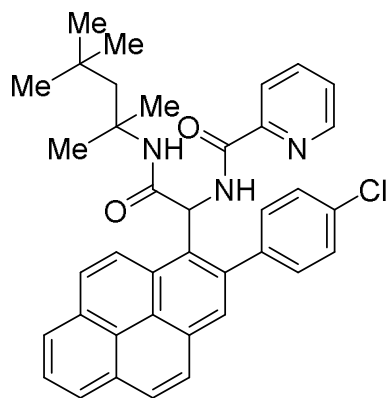
28.218  
29.011



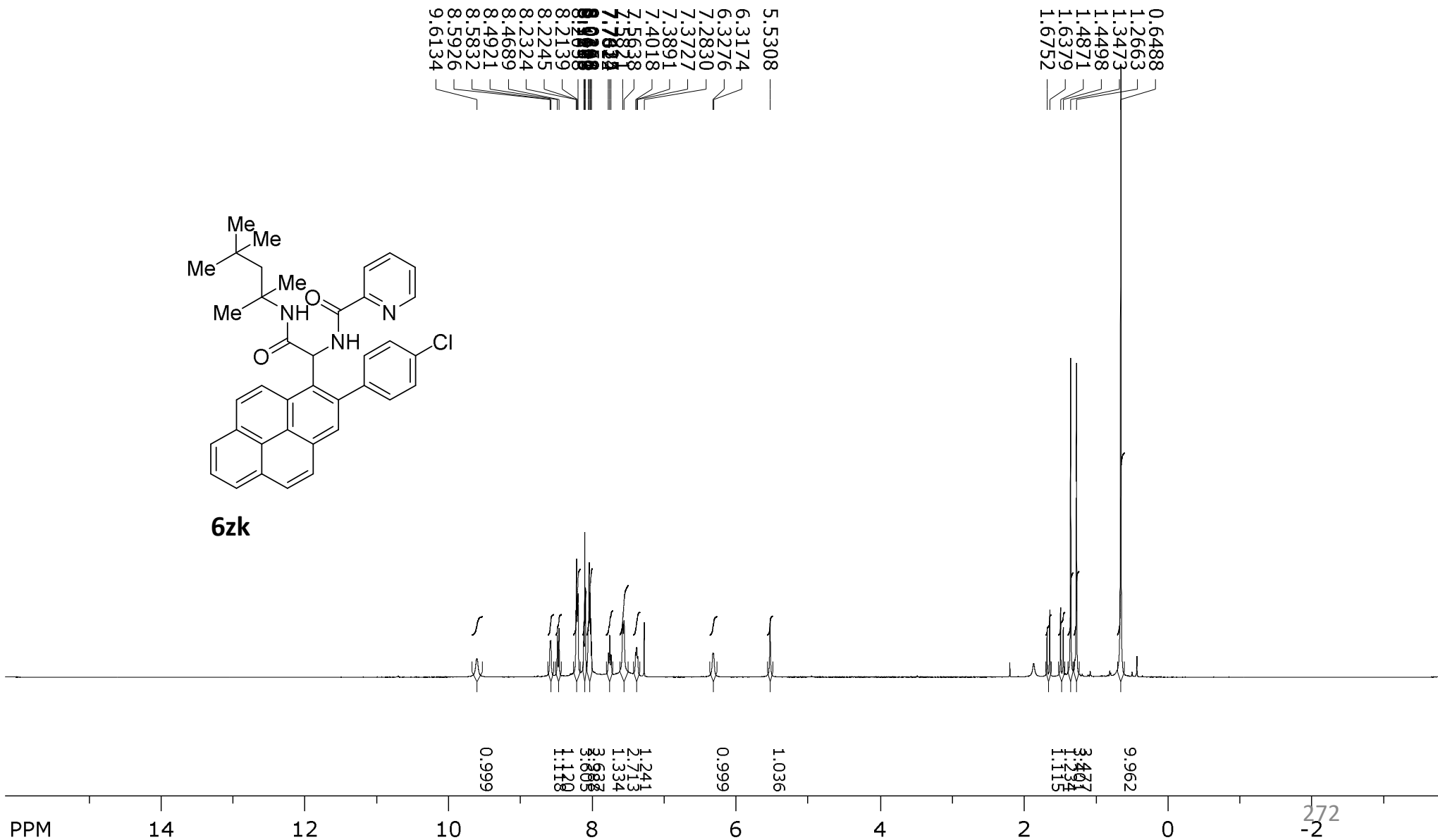
**6zj**



SpinWorks 4: AD-2274  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 49



6zk



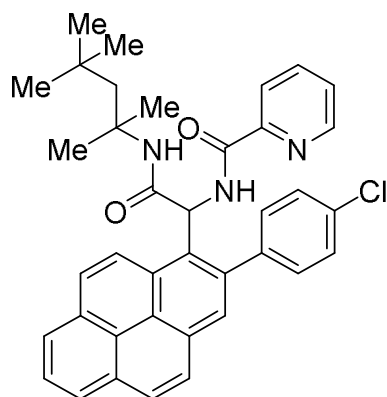


SpinWorks 4: AD-2274  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 49

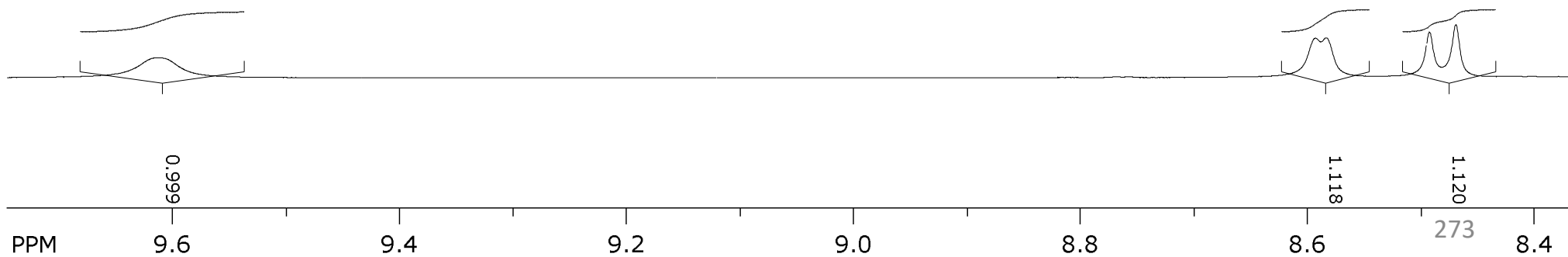
9.6134

8.5832  
8.5926

8.4689  
8.4921

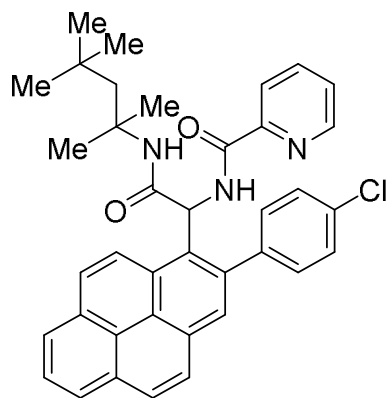


6zk

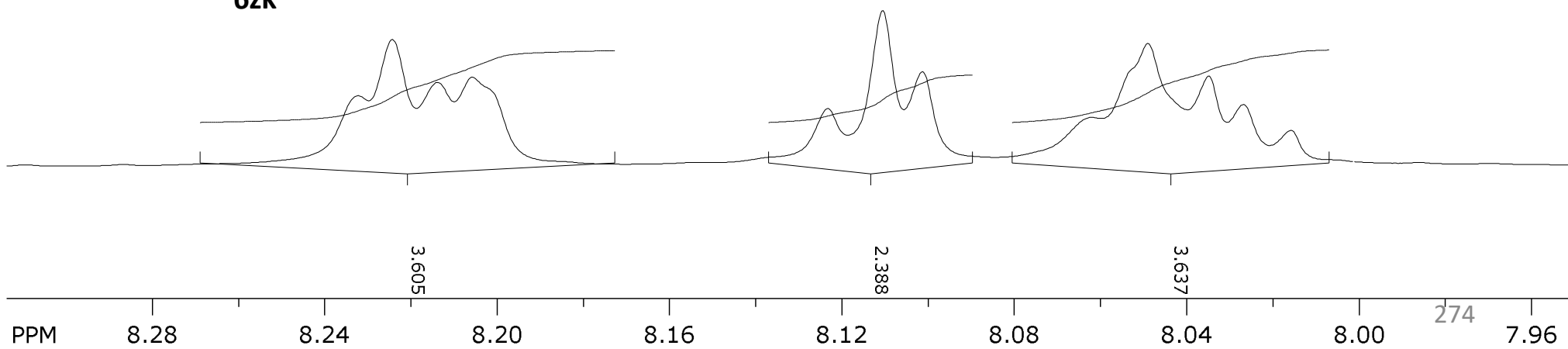


SpinWorks 4: AD-2274  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 49

8.2058 —  
8.2139 —  
8.2245 —  
8.2324 —  
  
8.1233 —  
8.1106 —  
8.1013 —  
  
8.0621 —  
8.0490 —  
8.0348 —  
8.0268 —  
8.0158 —



**6zk**



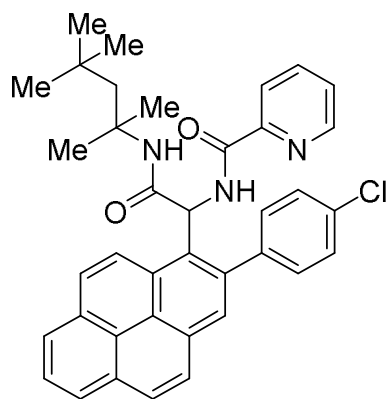
SpinWorks 4: AD-2274  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 49

7.7435 —  
7.7624 —  
7.7812 —

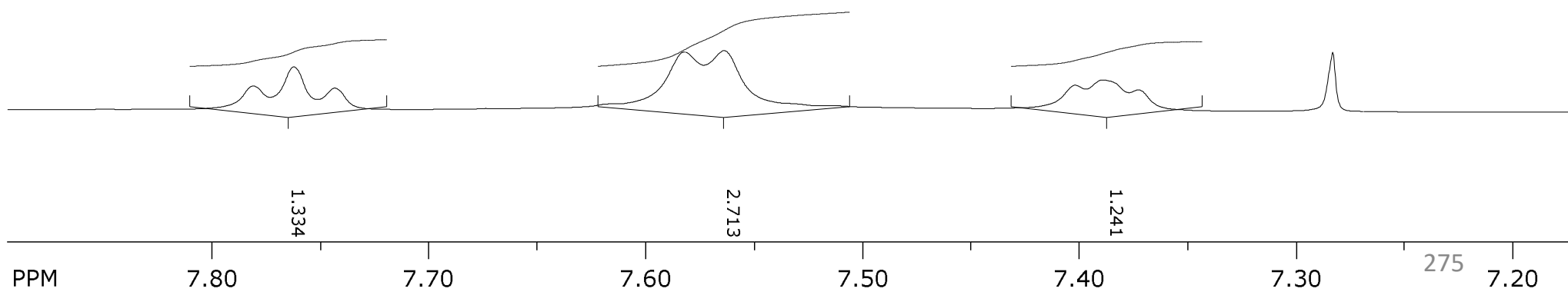
7.5638 —  
7.5821 —

7.3727 —  
7.3891 —  
7.4018 —

7.2830 —



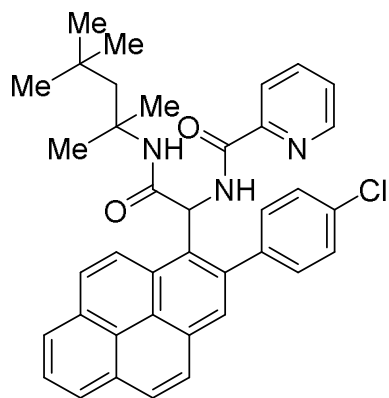
**6zk**



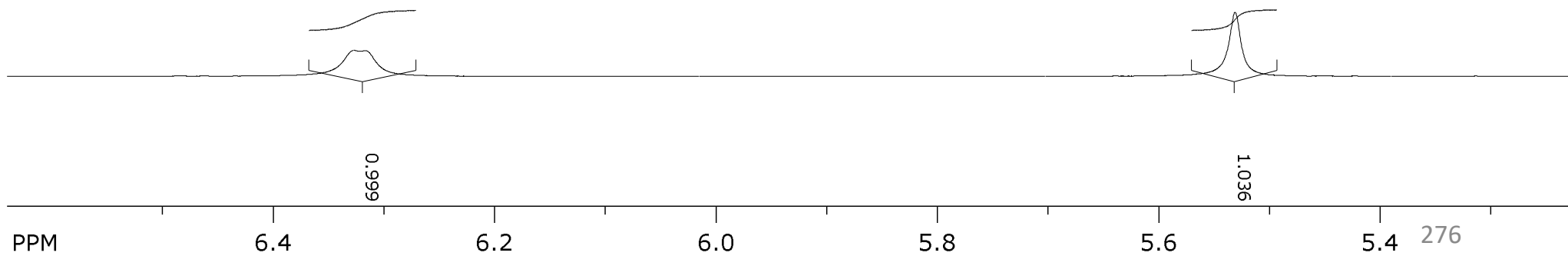
SpinWorks 4: AD-2274  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 49

6.3174  
6.3276

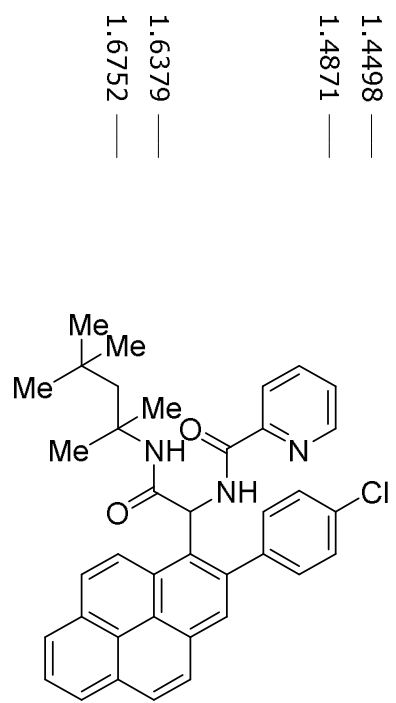
5.5308



**6zk**



SpinWorks 4: AD-2274  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 49



6zk

1.6379  
1.6752

1.4498  
1.4871

1.3473

1.2663

0.6488

1.115

1.234

3.401

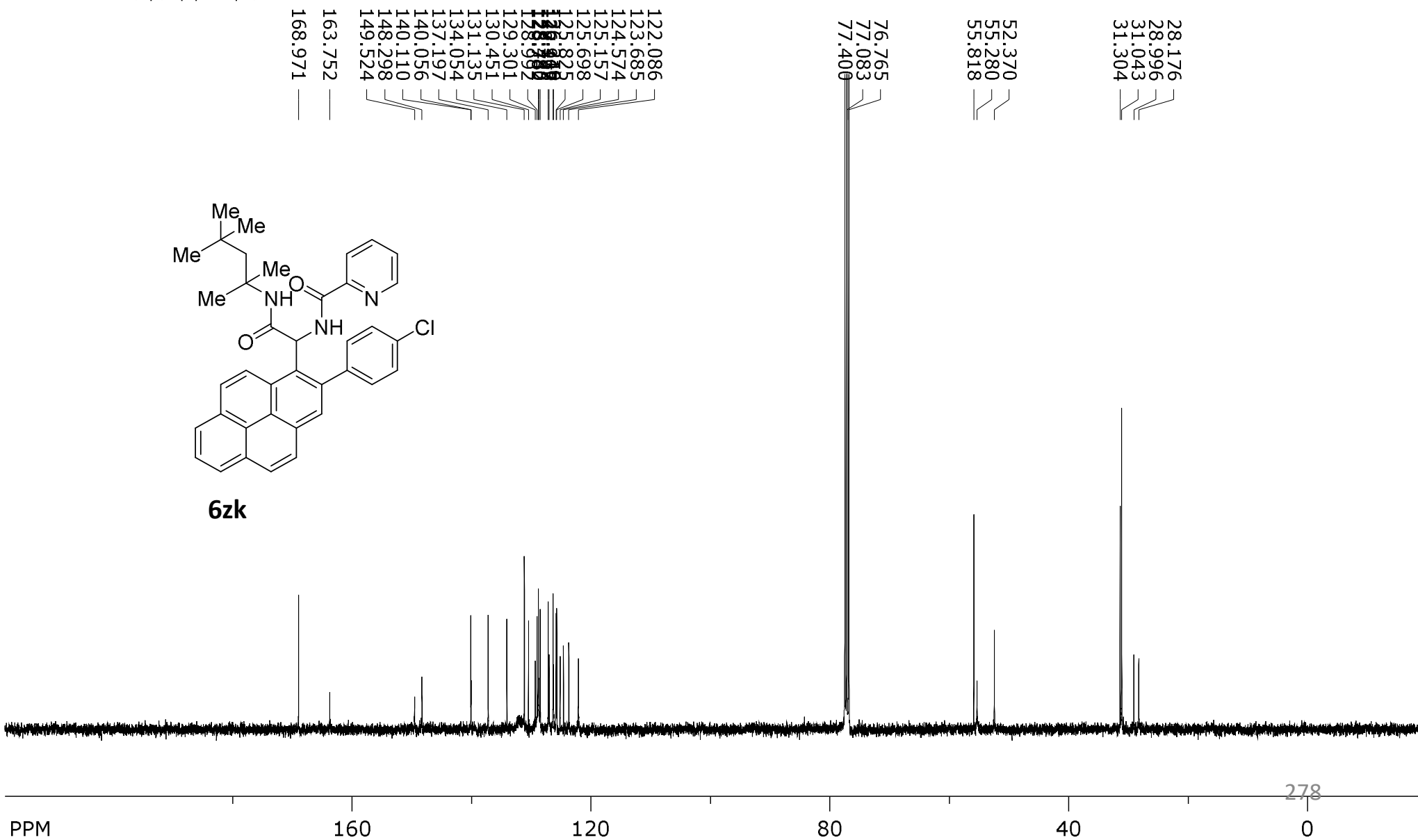
3.477

9.962

PPM 1.8 1.6 1.4 1.2 1.0 0.8 0.6 0.4 0.2

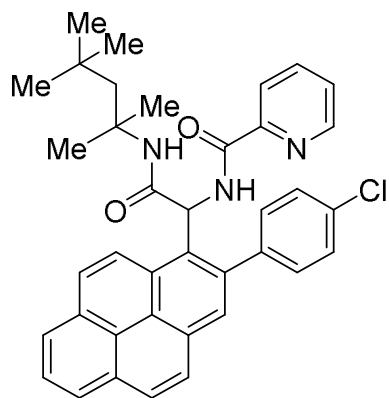
277

SpinWorks 4: AD-2274  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 49

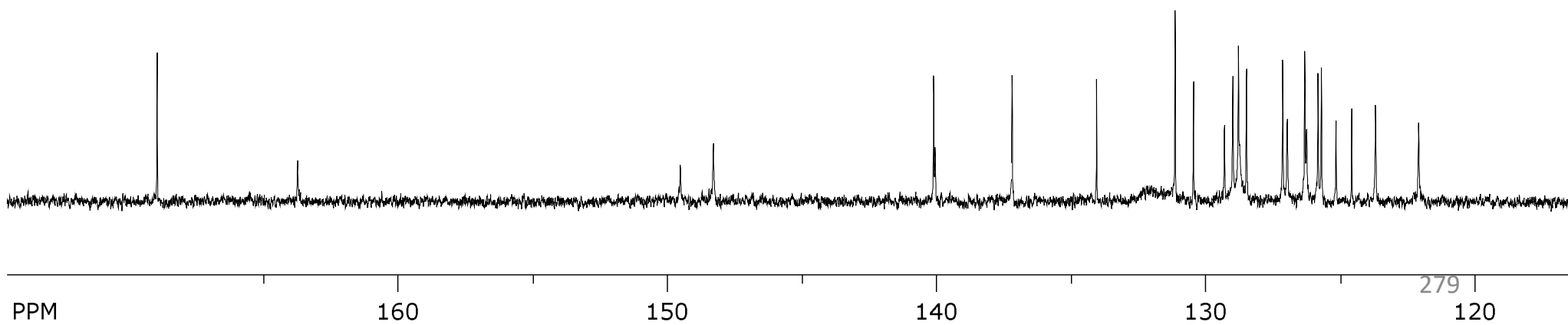


SpinWorks 4: AD-2274  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 49

168.971 —  
163.752 —  
149.524 —  
148.298 —  
140.110 —  
140.056 —  
137.197 —  
134.054 —  
131.135 —  
130.451 —  
129.301 —  
128.992 —  
128.782 —  
128.740 —  
128.485 —  
127.135 —  
126.967 —  
126.316 —  
126.249 —  
125.825 —  
125.698 —  
125.157 —  
124.574 —  
123.685 —  
122.086 —



6zk



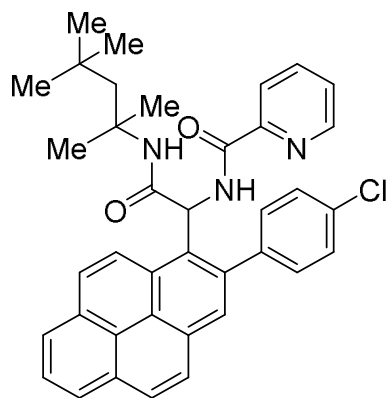
SpinWorks 4: AD-2274  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 49

55.280  
55.818

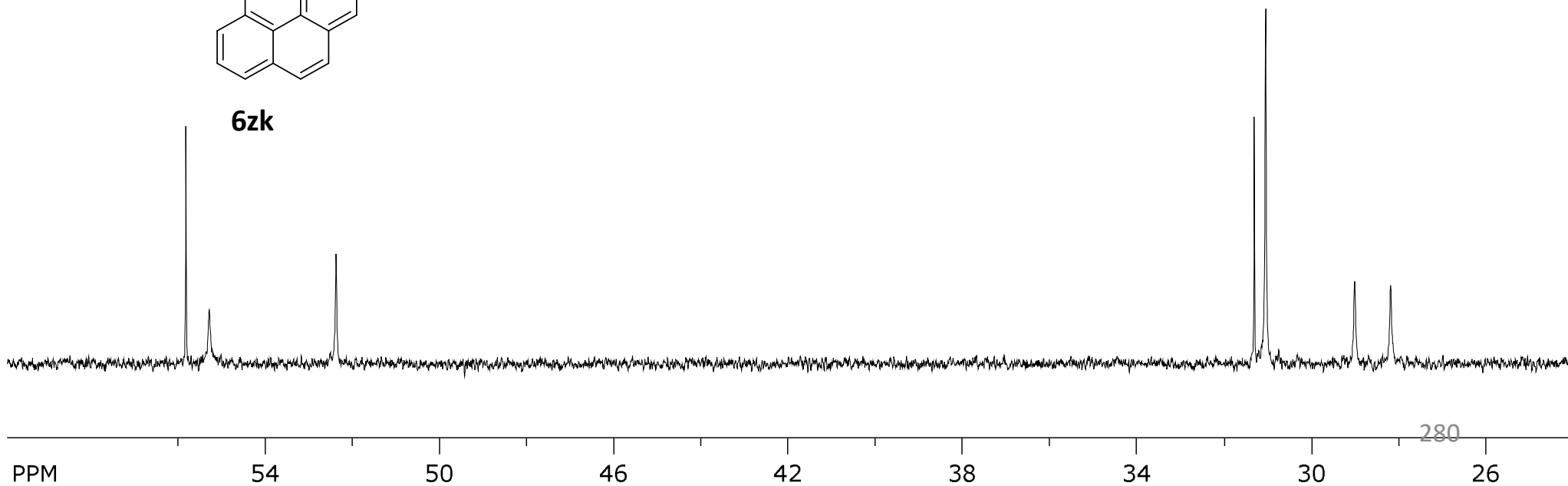
52.370

31.043  
31.304

28.176  
28.996

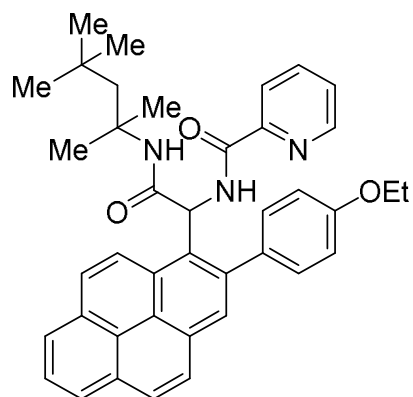


6zk

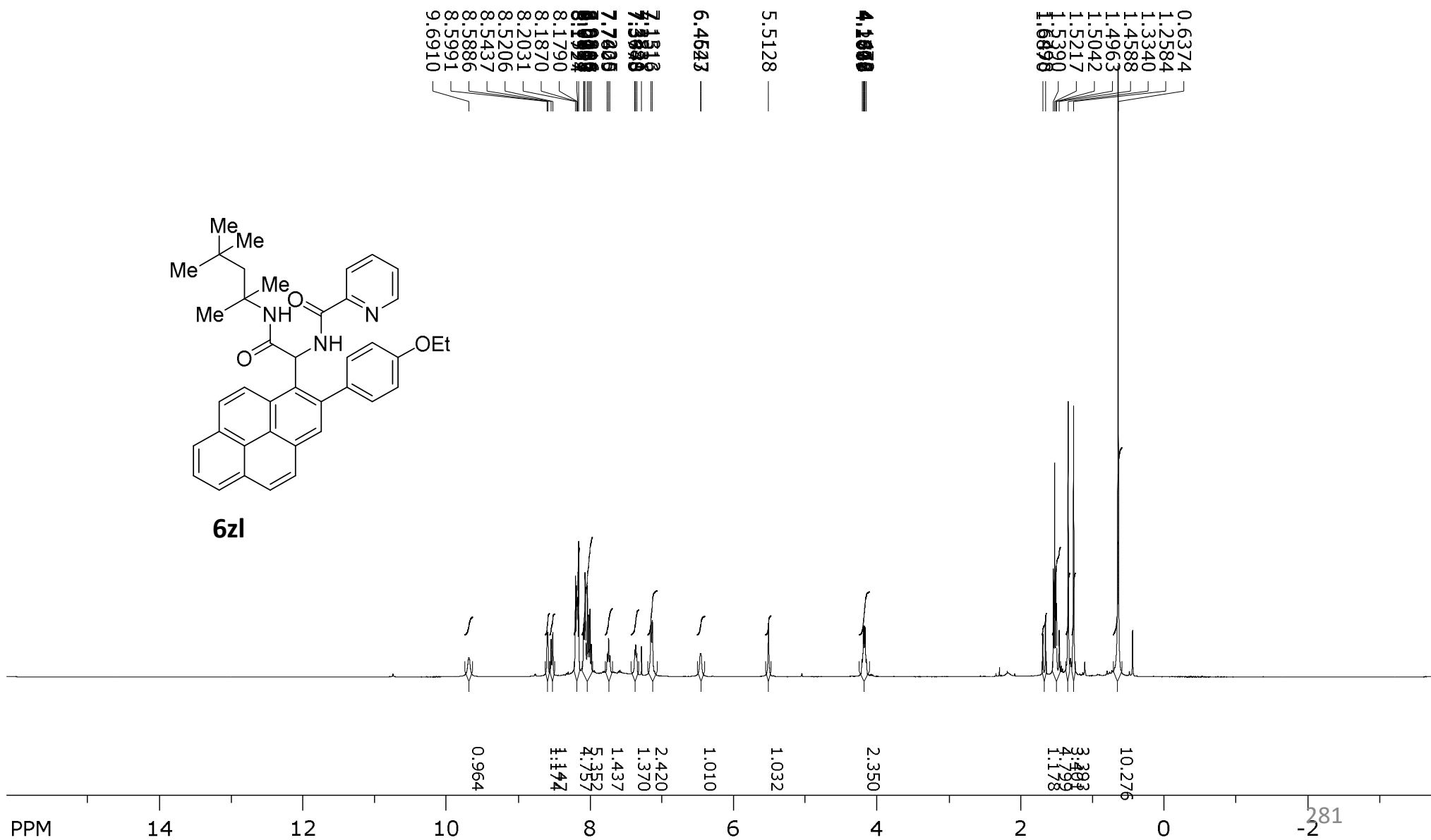




SpinWorks 4: AD-2275  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 50



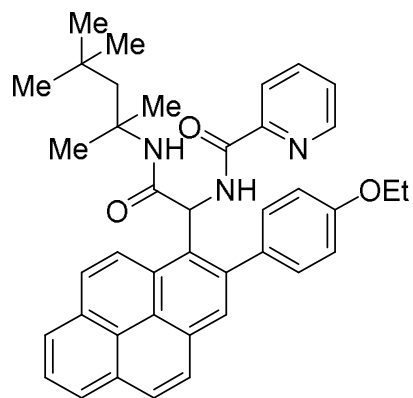
6zl



SpinWorks 4: AD-2275  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 50

9.6910

8.5206  
8.5437  
8.5886  
8.5991



**6zl**

0.964

1.174

1.147

282

PPM 9.8 9.6 9.4 9.2 9.0 8.8 8.6 8.4

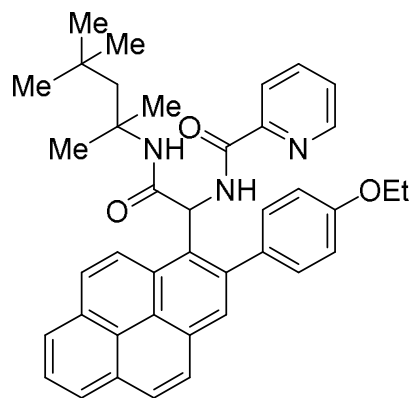
SpinWorks 4: AD-2275  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 50

8.1597  
8.1724  
8.1790  
8.1870  
8.2031

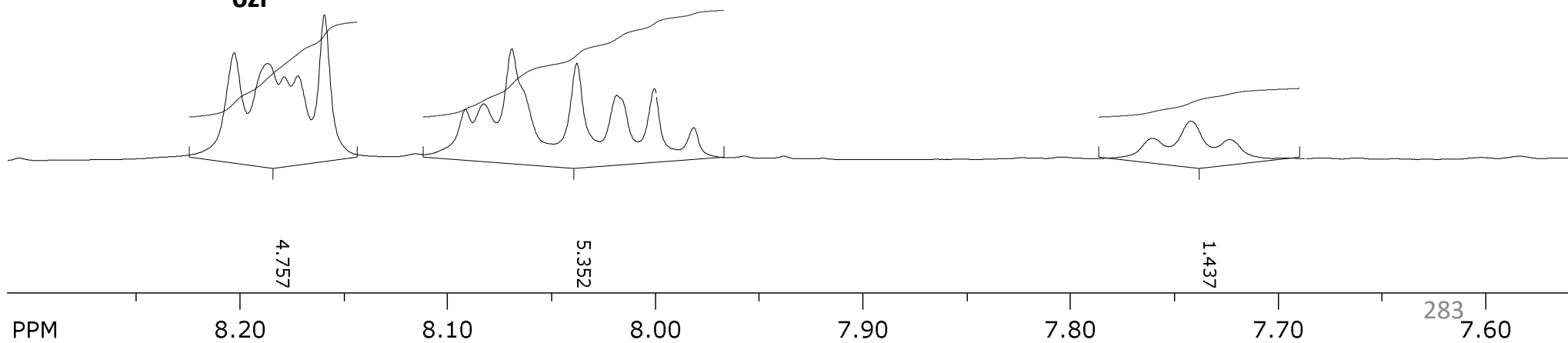
8.0693  
8.0828  
8.0917

8.0380  
8.0187  
8.0006  
7.9816

7.7235  
7.7420  
7.7605



**6zl**



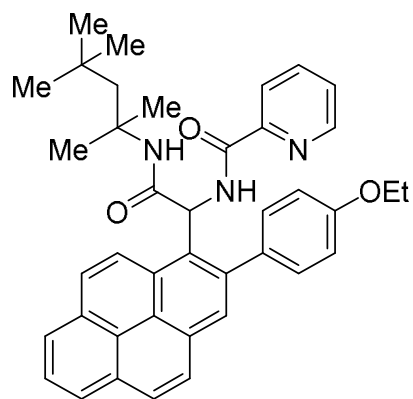
SpinWorks 4: AD-2275  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 50

7.3480  
7.3648  
7.3773

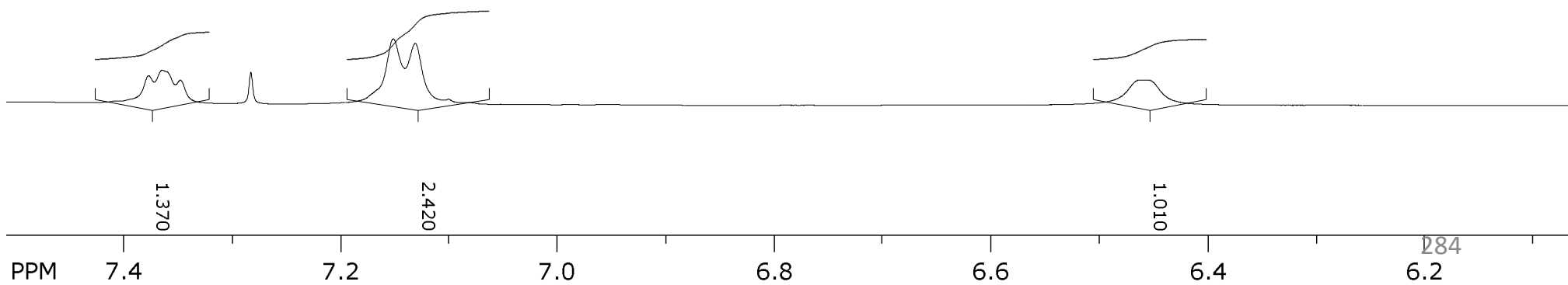
7.2831

7.1313  
7.1516

6.4547  
6.4623



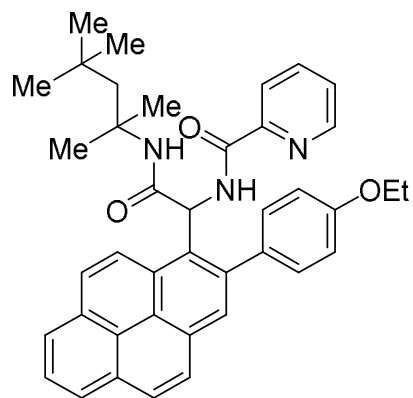
**6zl**



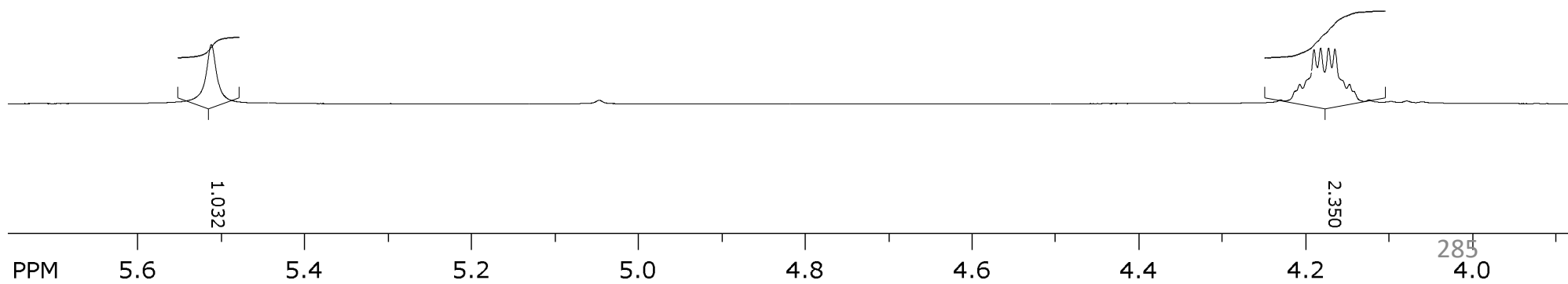
SpinWorks 4: AD-2275  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 50

5.5128

4.1472  
4.1645  
4.1722  
4.1818  
4.1895  
4.2069



**6zl**

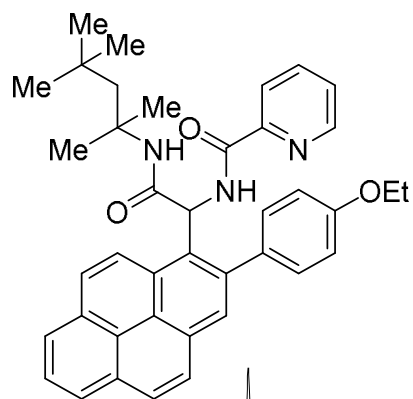


SpinWorks 4: AD-2275  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 50

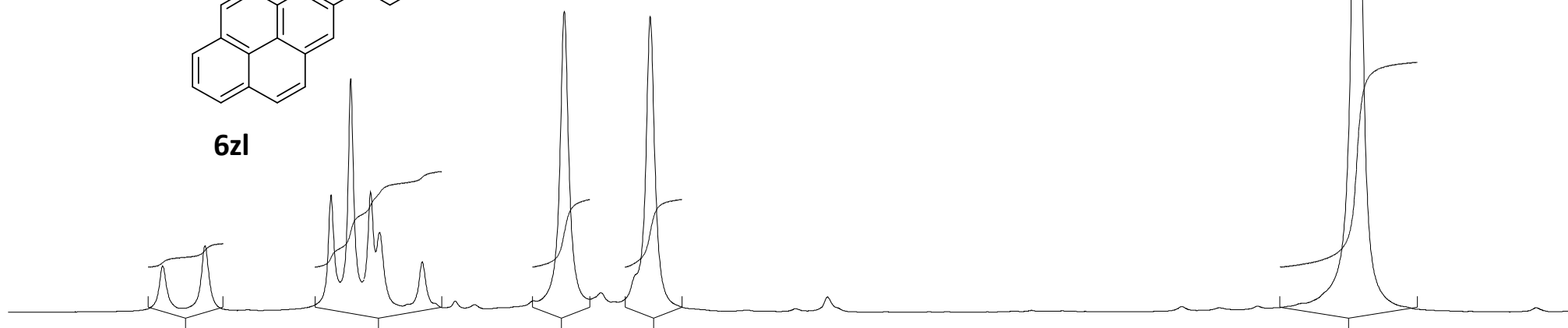
1.6870  
1.6498  
1.5390  
1.5217  
1.5042  
1.4963  
1.4588

1.3340  
1.2584

0.6374



6zl



1.178

4.799

3.401

3.393

10.276

286

PPM

1.6

1.4

1.2

1.0

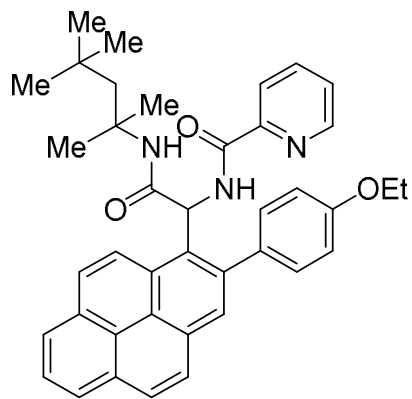
0.8

0.6

SpinWorks 4: AD-2275  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 50

114.522  
121.988  
123.877  
124.572  
124.879  
125.427  
130.985  
130.985  
130.985  
130.985  
131.031  
131.404  
131.512  
133.648  
137.066  
140.981  
148.203  
149.645  
158.616  
163.593  
169.040

76.742  
77.060  
77.378  
63.499  
52.104  
55.259  
55.627  
28.214  
29.001  
30.958  
31.209  
14.906



6zl

PPM

160

120

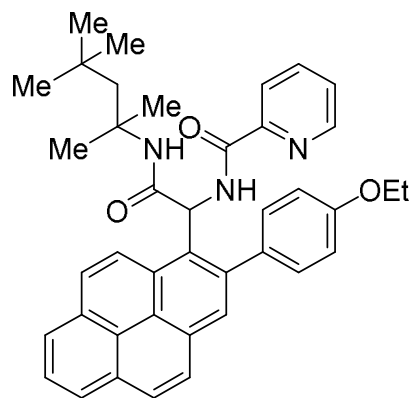
80

40

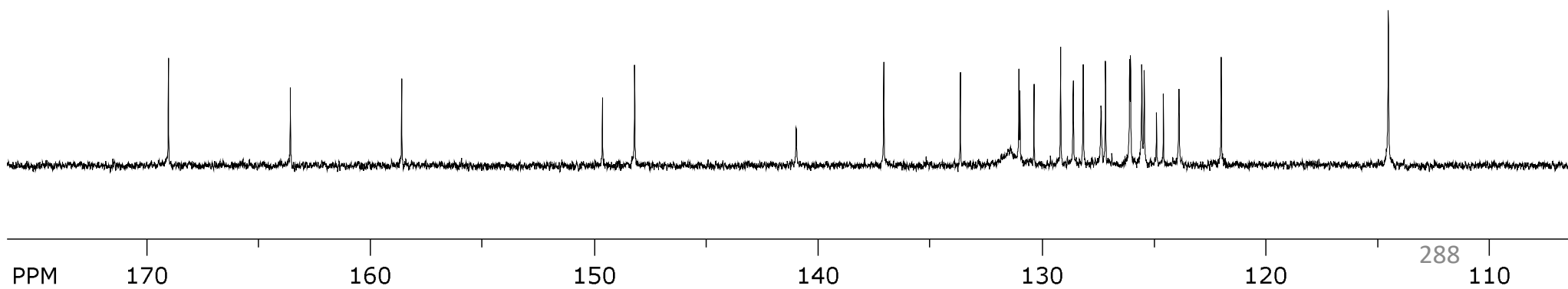
0<sup>287</sup>

SpinWorks 4: AD-2275  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 50

169.040 —  
163.593 —  
158.616 —  
148.203 —  
149.645 —  
140.981 —  
137.066 —  
133.648 —  
131.512 —  
131.404 —  
130.985 —  
130.352 —  
129.165 —  
128.603 —  
128.151 —  
127.357 —  
127.159 —  
126.079 —  
126.043 —  
125.535 —  
125.427 —  
124.879 —  
124.572 —  
123.877 —  
121.988 —  
114.522 —



**6zl**





SpinWorks 4: AD-2275  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 50

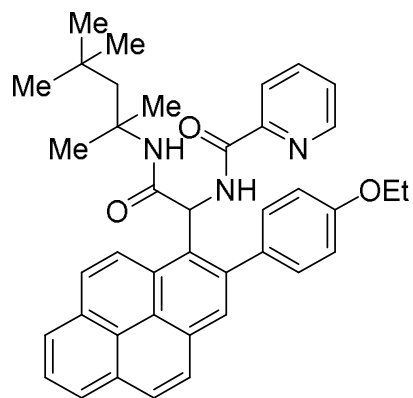
63.499

55.259  
55.627

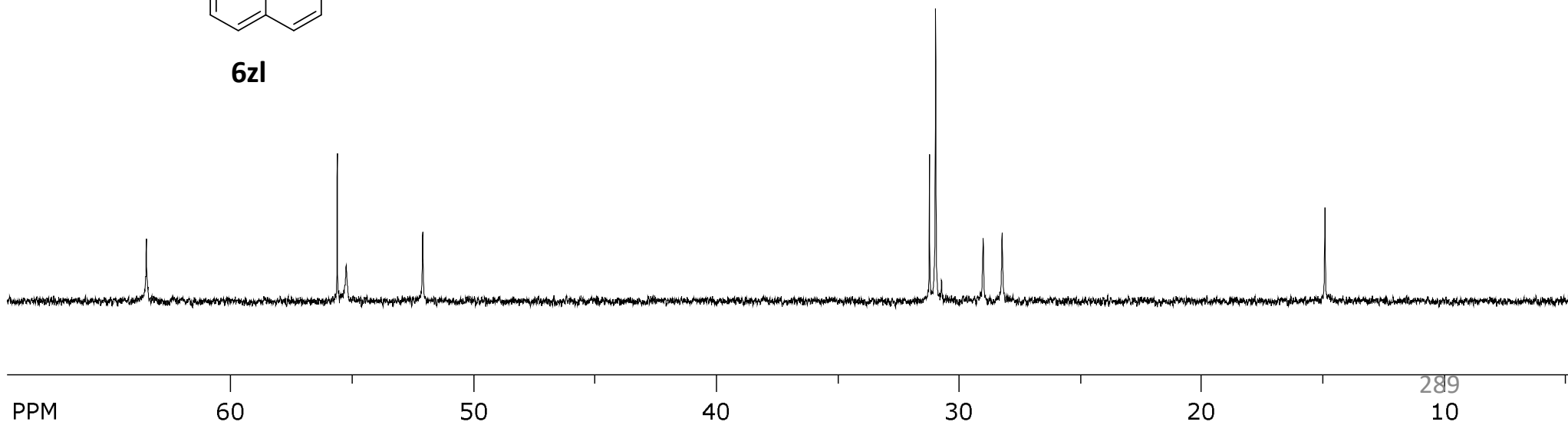
52.104

28.214  
29.001  
30.958  
31.209

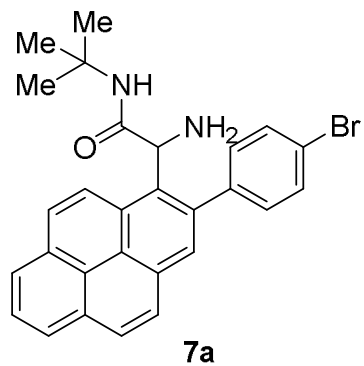
14.906



6zl



SpinWorks 4: AD 1949  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 59

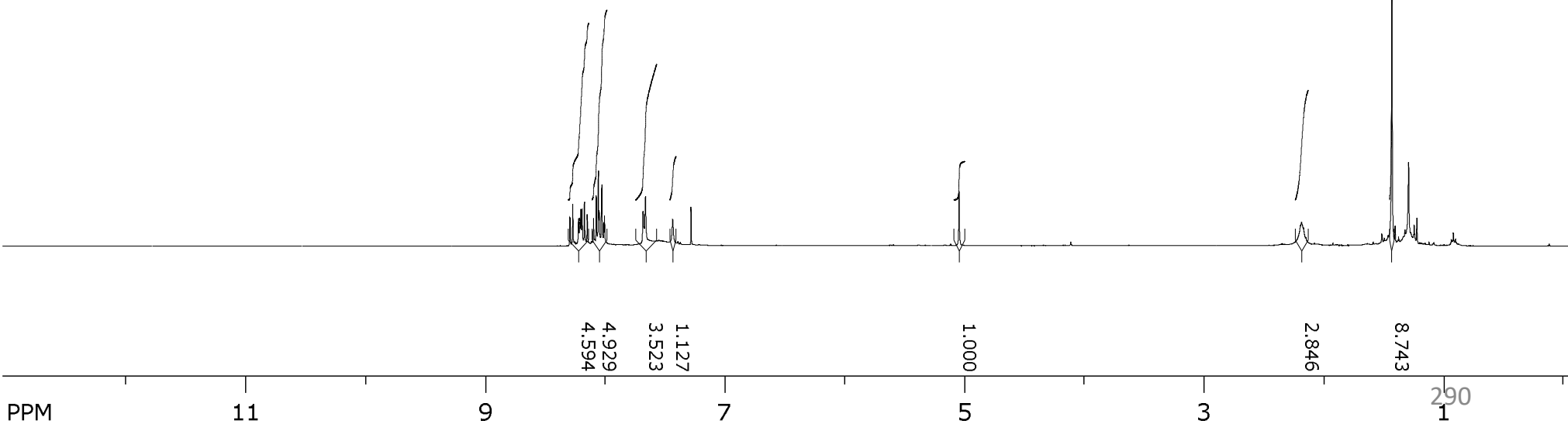


7.2834  
7.4365  
7.6638  
7.6845  
8.0059  
8.0124  
8.0285  
8.0309  
8.0508  
8.0508  
8.0508  
8.1740  
8.1948  
8.2034  
8.2135  
8.2224  
8.2715  
8.2948

5.0442

2.1834

1.4286



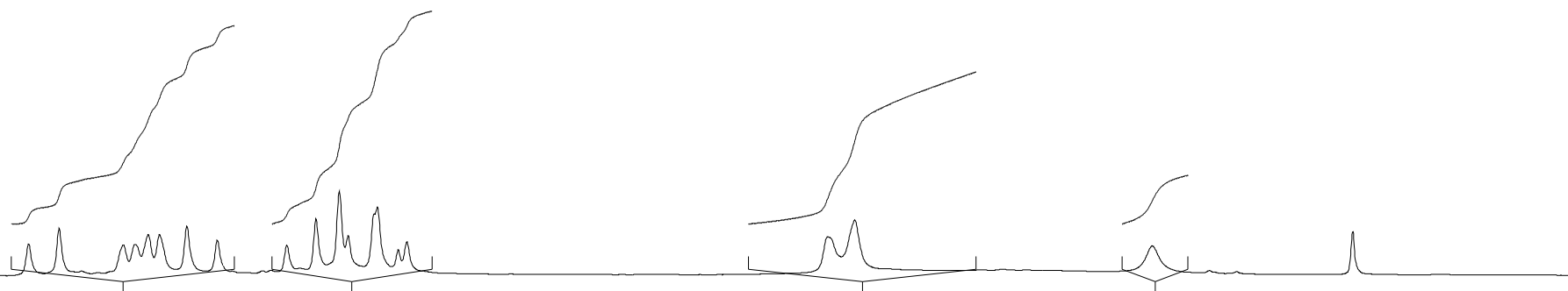
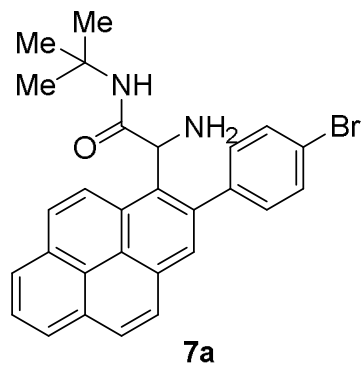
SpinWorks 4: AD 1949  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 59

8.0059  
8.0124  
8.0285  
8.0309  
8.0507  
8.0575  
8.0753  
8.0976  
8.1506  
8.1740  
8.1948  
8.2034  
8.2135  
8.2224  
8.2715  
8.2948

7.6638  
7.6845

7.4365

7.2834



4.594

4.929

3.523

1.127

PPM

8.2

8.0

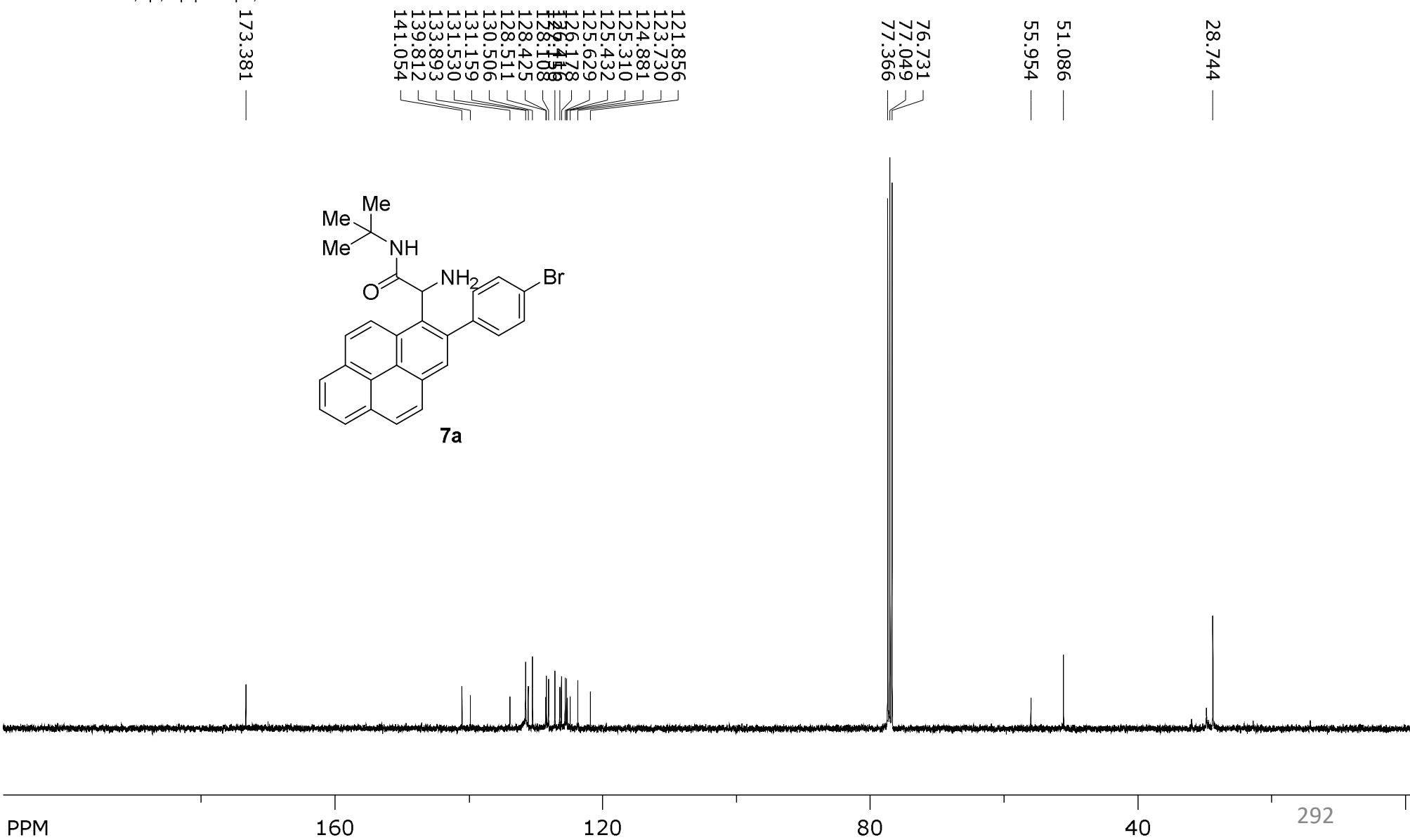
7.8

7.6

7.4

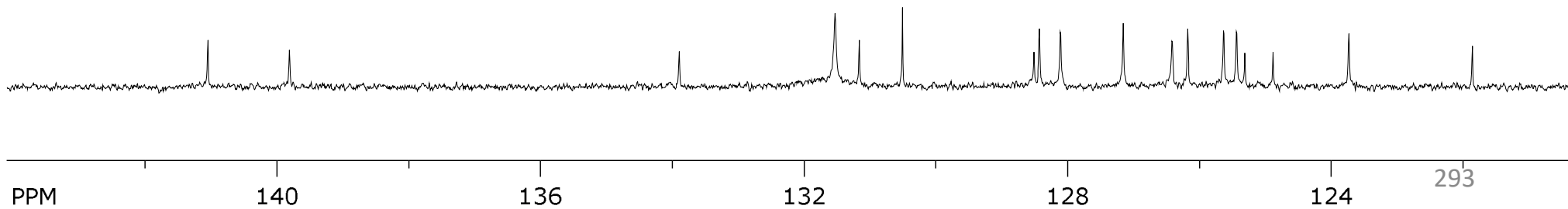
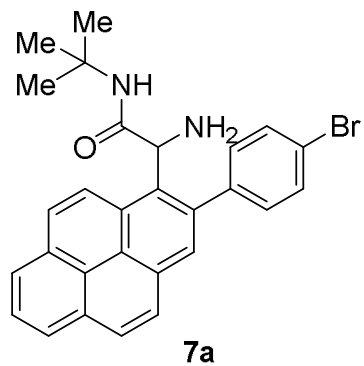
7.2  
291

SpinWorks 4: AD 1949  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 36

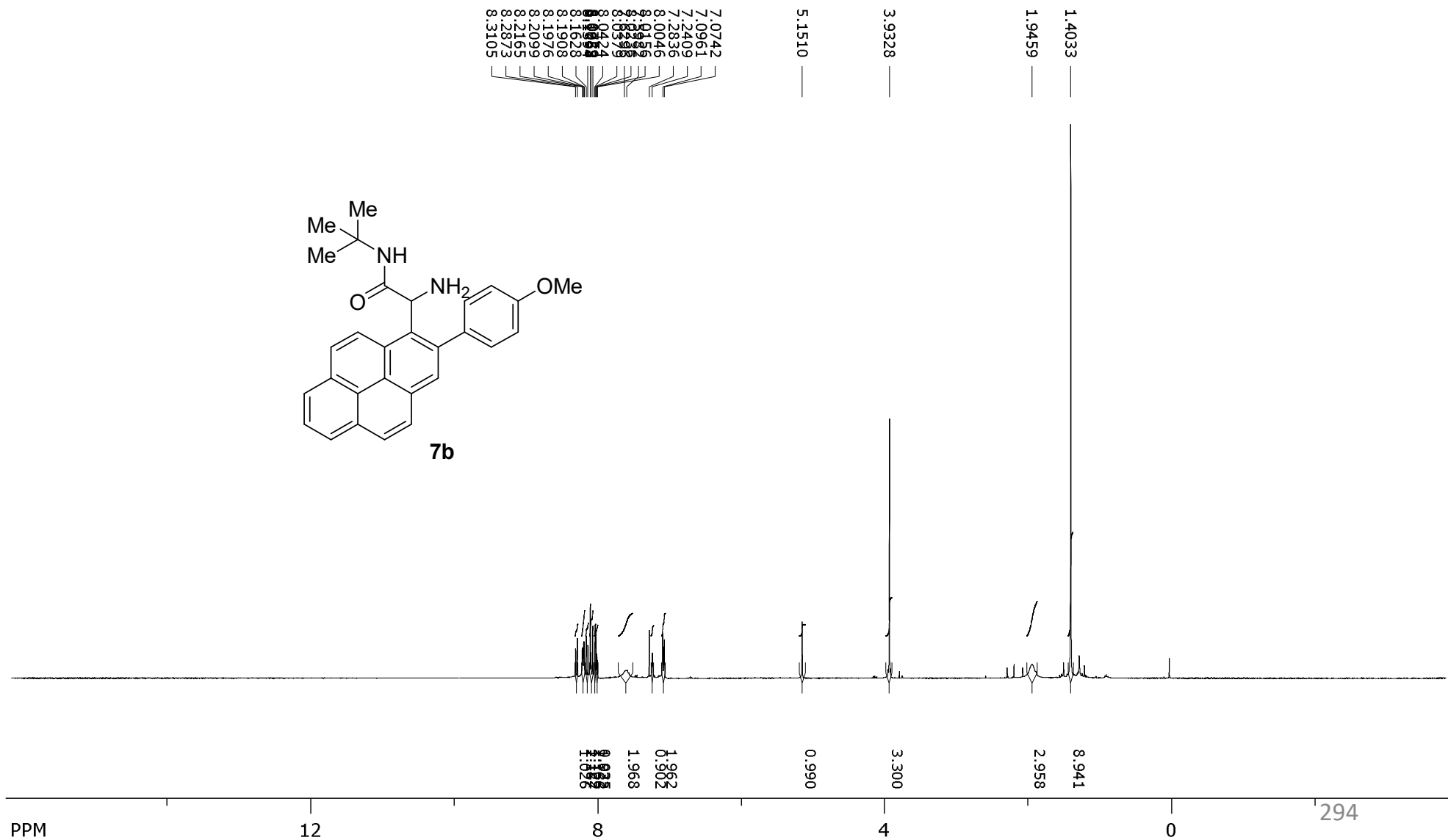
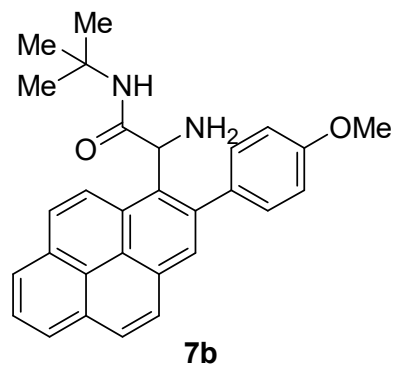


SpinWorks 4: AD 1949  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 36

141.054 —  
139.812 —  
133.893 —  
131.530 —  
131.159 —  
130.506 —  
128.511 —  
128.425 —  
128.108 —  
127.156 —  
126.416 —  
126.178 —  
125.629 —  
125.432 —  
125.310 —  
124.881 —  
123.730 —  
121.856 —



SpinWorks 4: AD-1844  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 47



SpinWorks 4: AD-1844

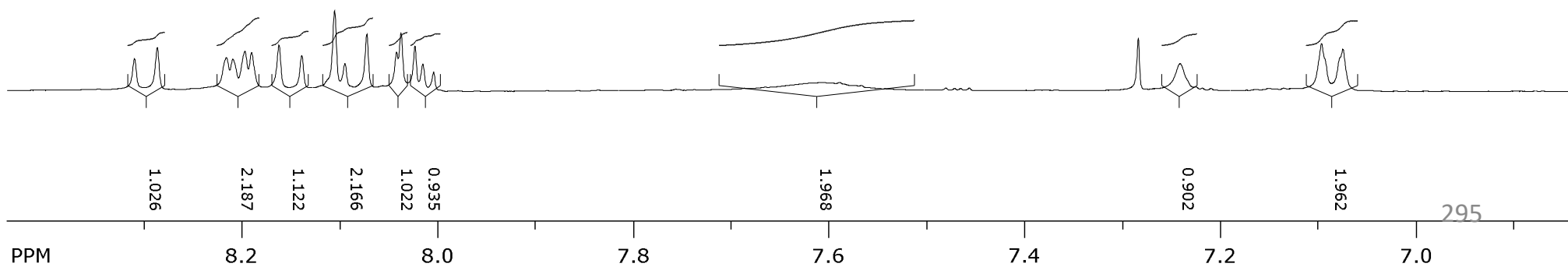
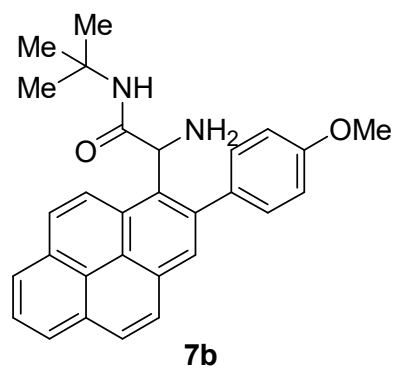
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 47

8.0046  
8.0156  
8.0236  
8.0379  
8.0424  
8.0729  
8.0953  
8.1058  
8.1394  
8.1628  
8.1908  
8.1976  
8.2099  
8.2165  
8.2873  
8.3105

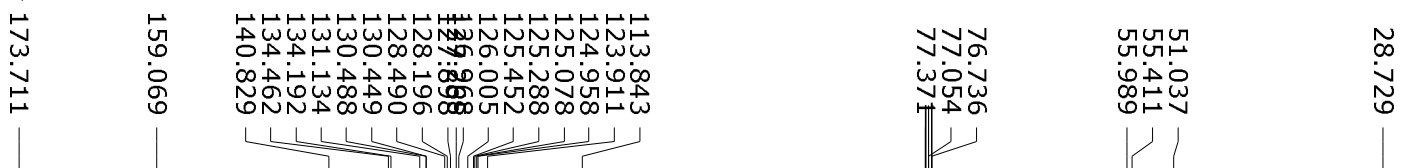
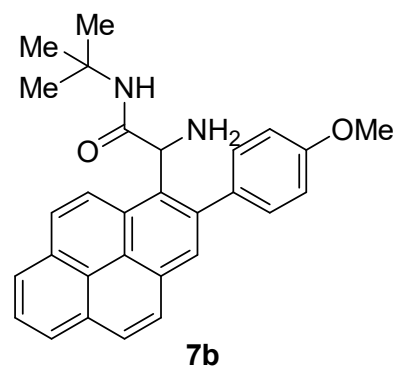
7.5982  
7.6296

7.2836  
7.2409

7.0742  
7.0961



SpinWorks 4: AD-1844  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 47



PPM 160 120 80 40 296 0



SpinWorks 4: AD-1844  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 47

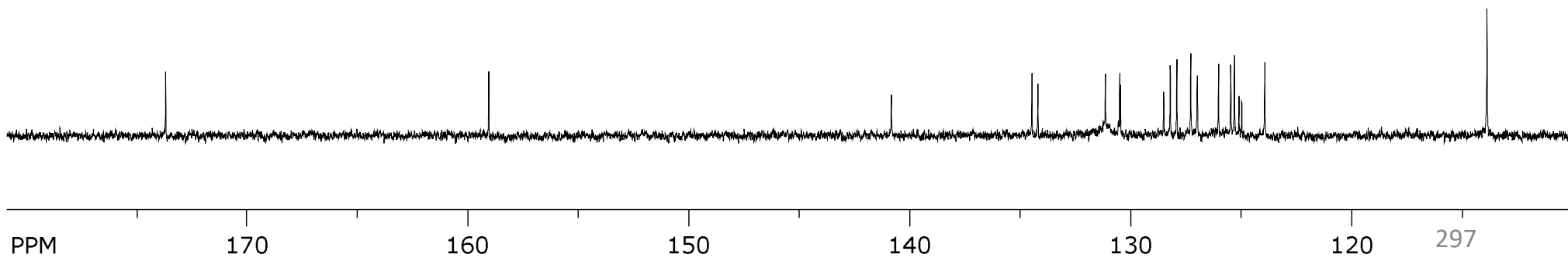
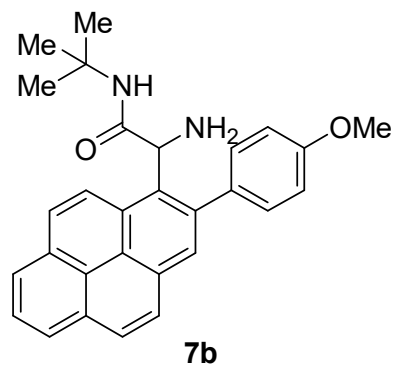
173.711

159.069

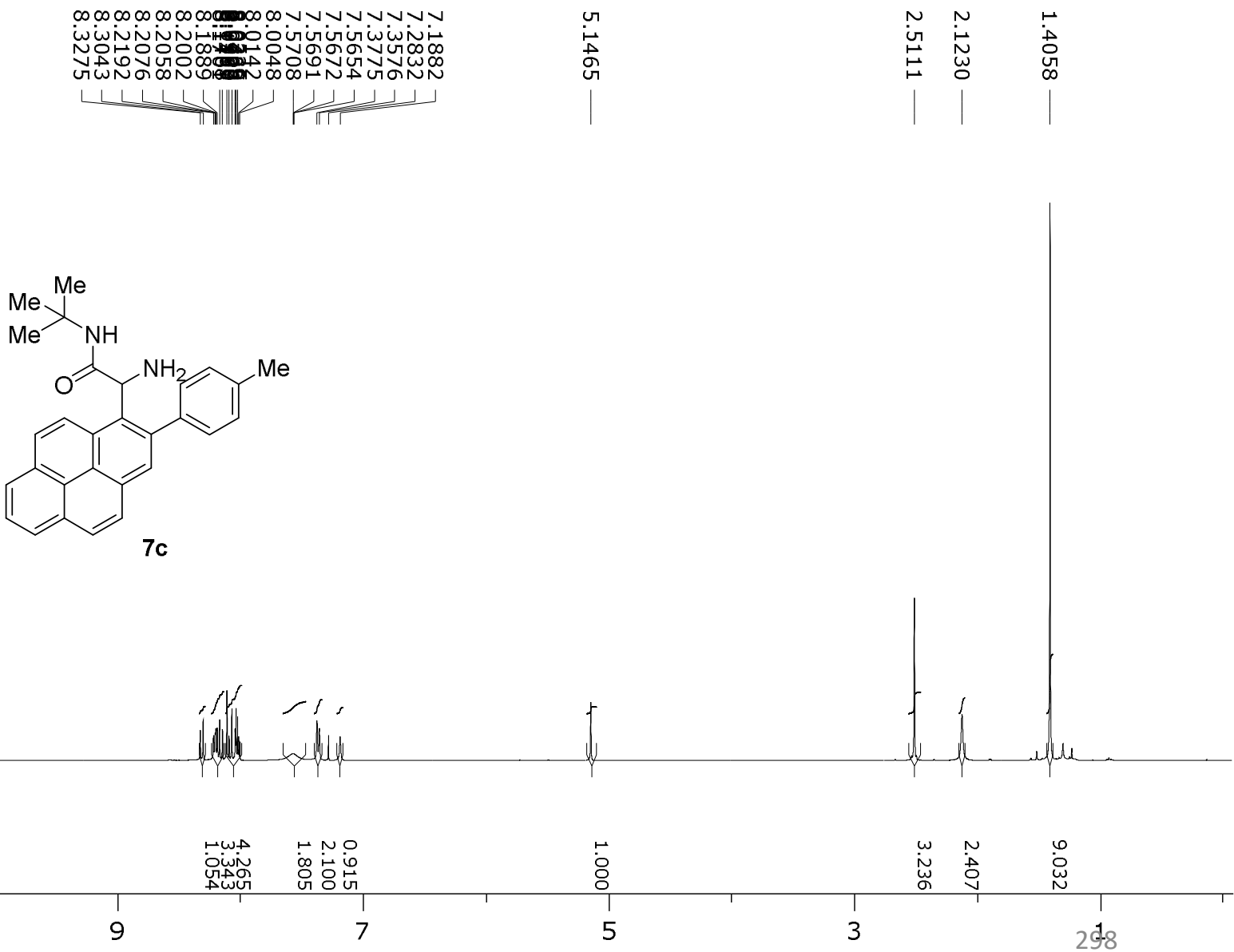
140.829

123.911  
124.958  
125.078  
125.288  
125.452  
126.005  
126.968  
127.265  
127.898  
128.196  
128.490  
130.449  
130.488  
131.134  
134.192  
134.462

113.843



SpinWorks 4: AD-1981  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 7



SpinWorks 4: AD-1981  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 7

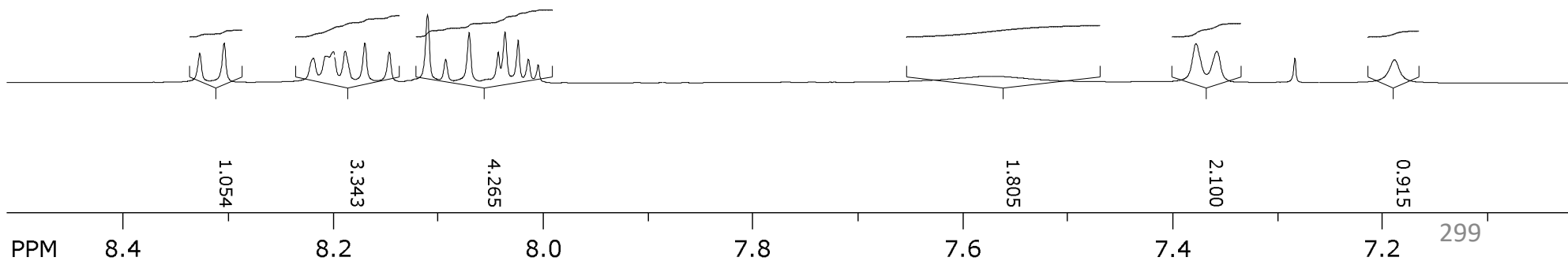
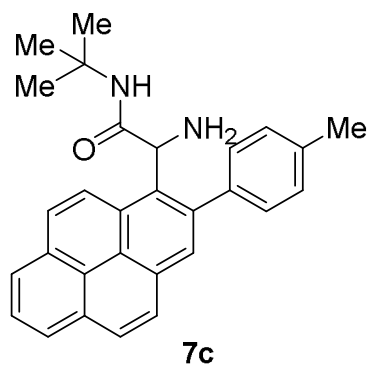
8.0048  
8.0142  
8.0239  
8.0365  
8.0429  
8.0706  
8.0930  
8.1103  
8.1468  
8.1701  
8.1889  
8.2002  
8.2058  
8.2076  
8.2192  
8.3043  
8.3275

7.5654  
7.5672  
7.5691  
7.5708

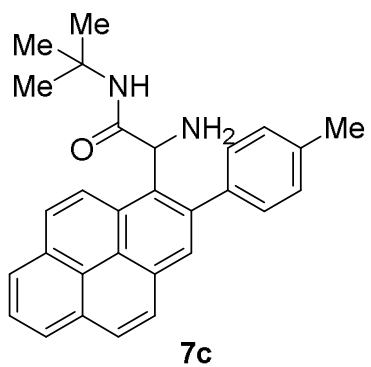
7.3576  
7.3775

7.2832

7.1882



SpinWorks 4: AD-1981  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 7



123.961  
124.954  
125.126  
125.303  
125.458  
126.023  
126.857  
127.899  
128.911  
129.134  
130.459  
130.515  
131.149  
134.015  
137.161  
139.231  
141.182

76.765  
77.083  
77.400

56.002  
51.042

28.731  
21.298

PPM

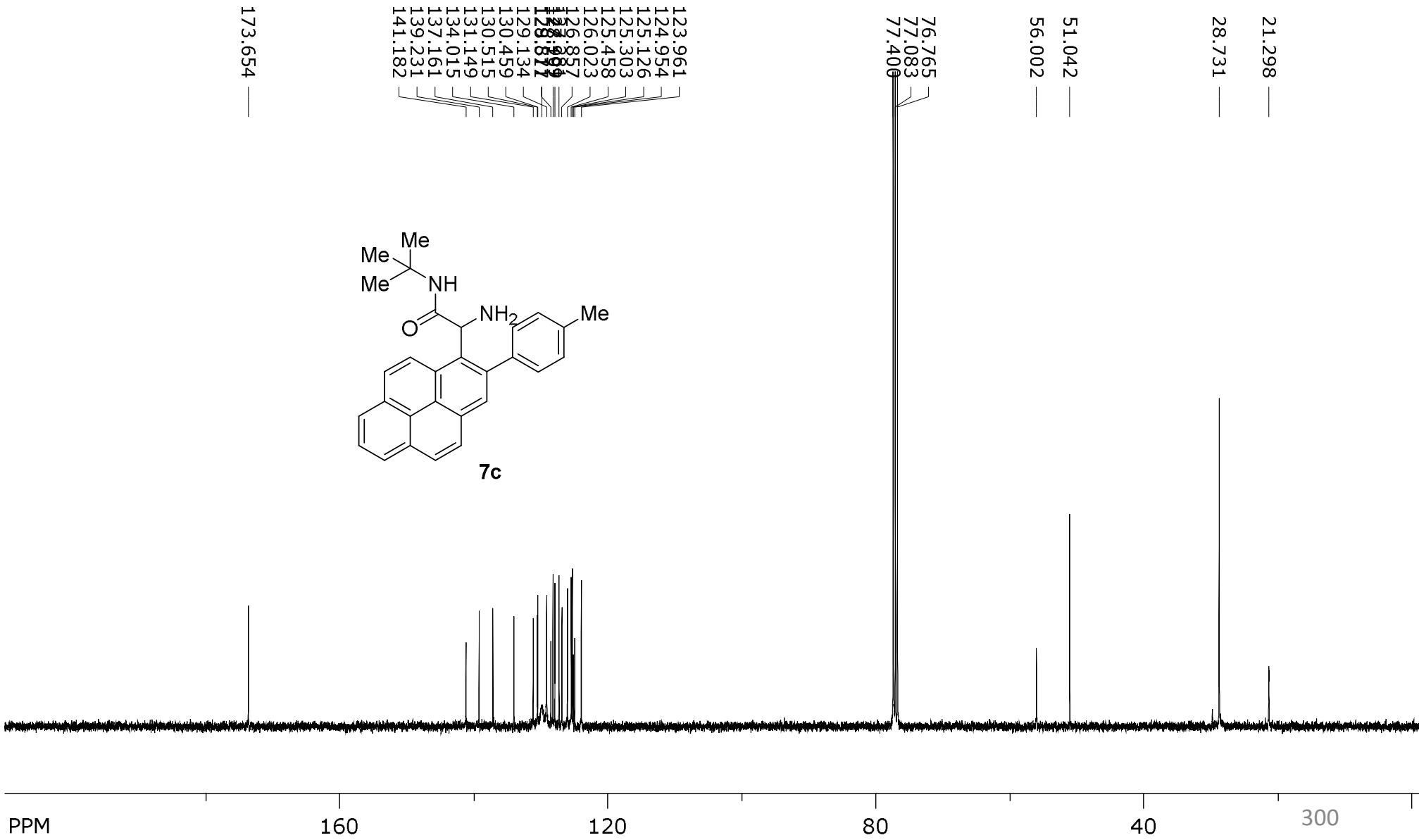
160

120

80

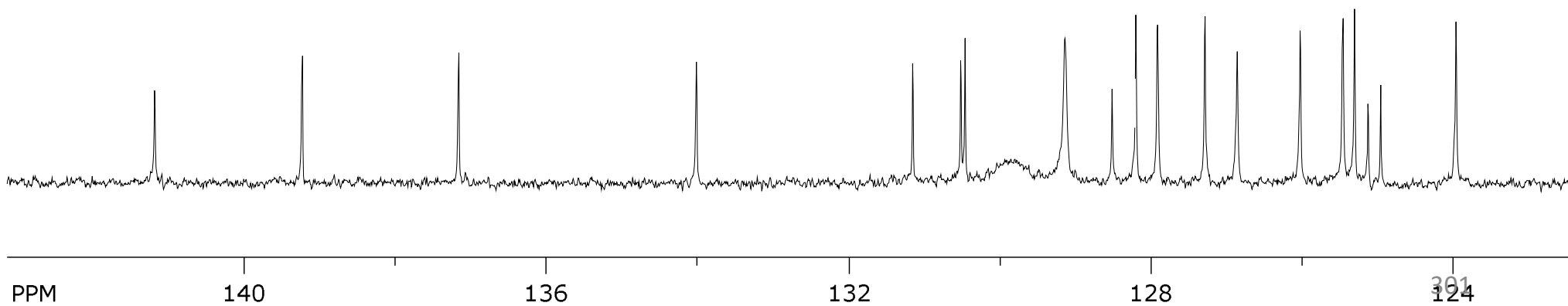
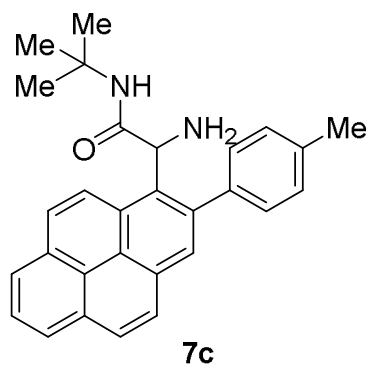
40

300

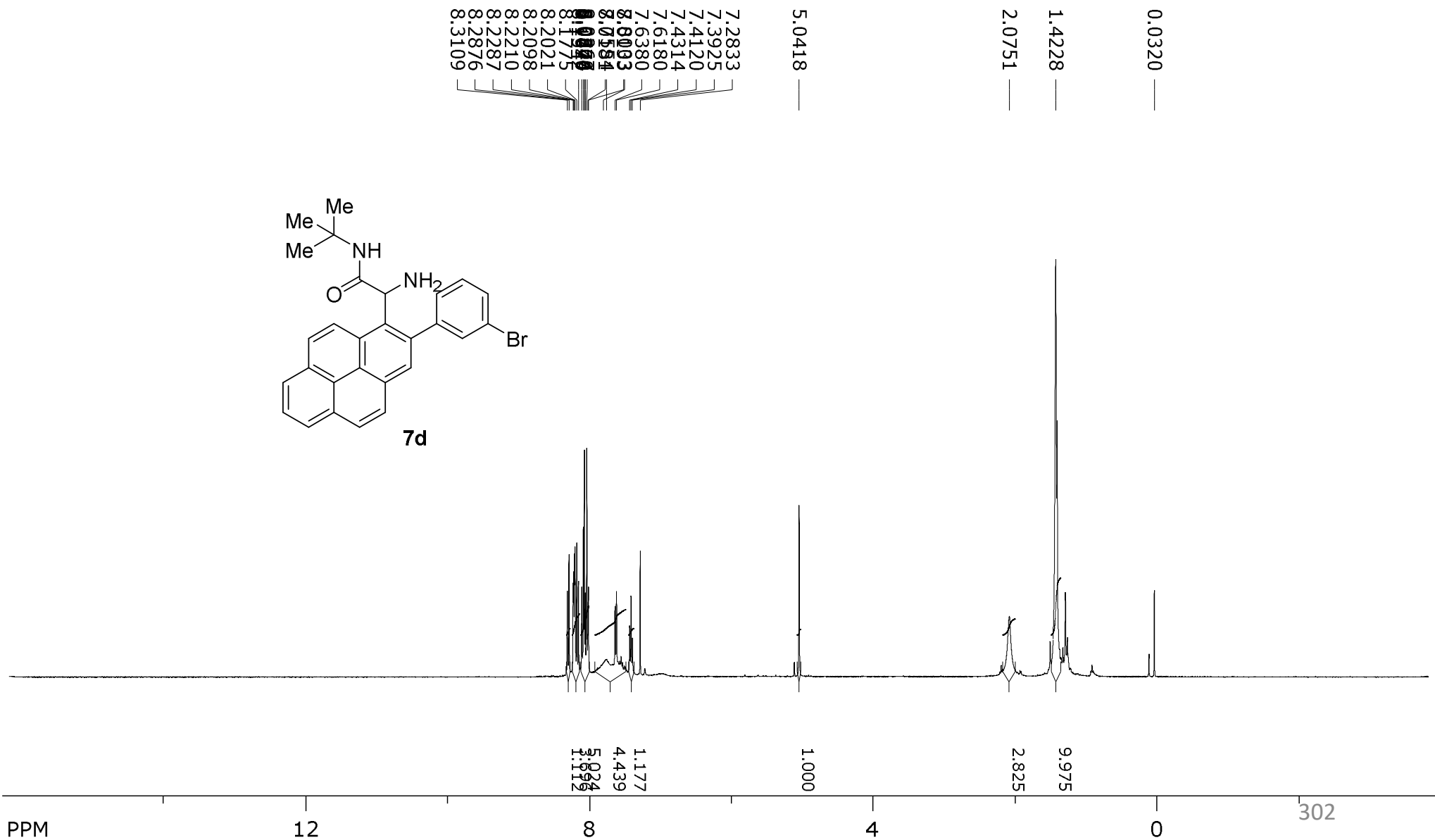
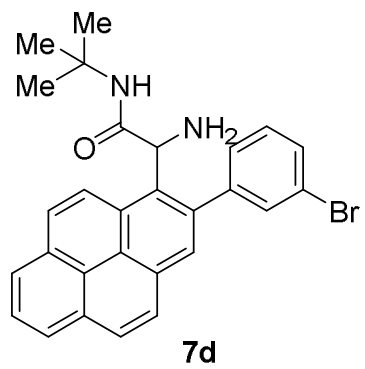


SpinWorks 4: AD-1981  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 7

141.182 —  
139.231 —  
137.161 —  
134.015 —  
131.149 —  
130.459 —  
130.515 —  
129.877 —  
129.134 —  
128.511 —  
127.909 —  
128.197 —  
127.281 —  
126.857 —  
126.023 —  
125.458 —  
125.303 —  
125.126 —  
124.954 —  
123.961 —

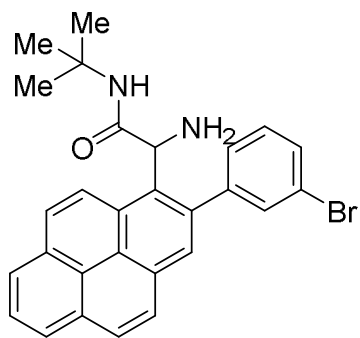


SpinWorks 4: AD-1886  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 30

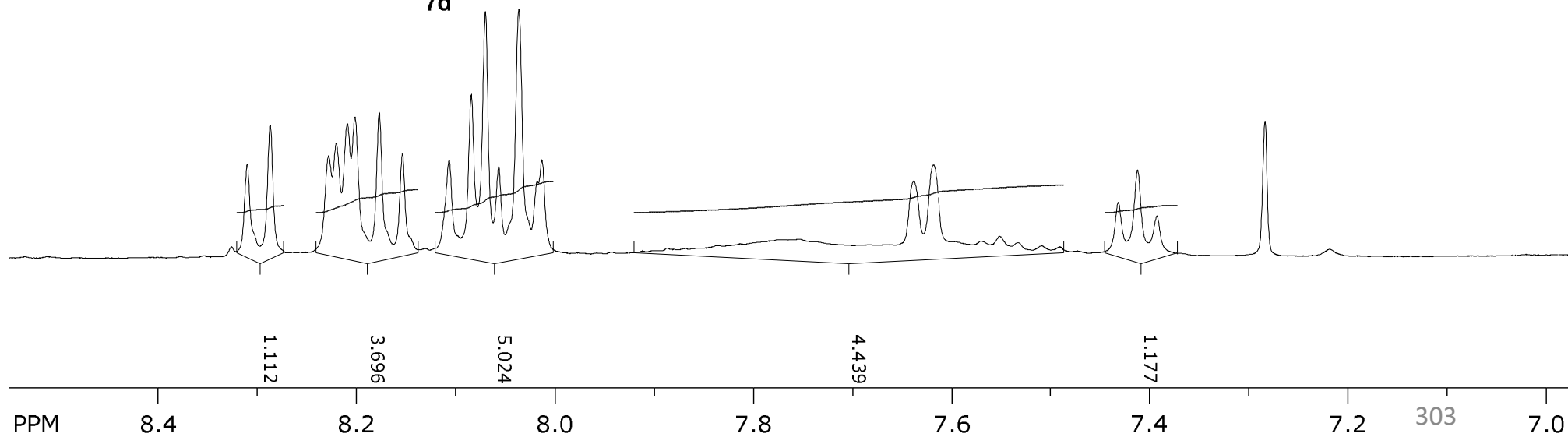


SpinWorks 4: AD-1886  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 30

8.0133  
8.0181  
8.0367  
8.0570  
8.0704  
8.0846  
8.1070  
8.1542  
8.1775  
8.2021  
8.2098  
8.2210  
8.2287  
8.2876  
8.3109  
7.8003  
7.7554  
7.6180  
7.6380  
7.3925  
7.4120  
7.4314  
7.2833



7d



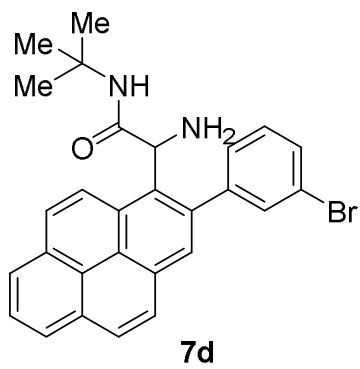
SpinWorks 4: AD 1886 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 44

173.262  
144.185  
139.480  
132.406  
131.111  
130.521  
130.462  
129.895  
128.514  
128.499  
128.498  
128.497  
125.609  
125.410  
125.284  
124.771  
123.731  
122.441

76.742  
77.060  
77.378

55.951  
51.086

28.702

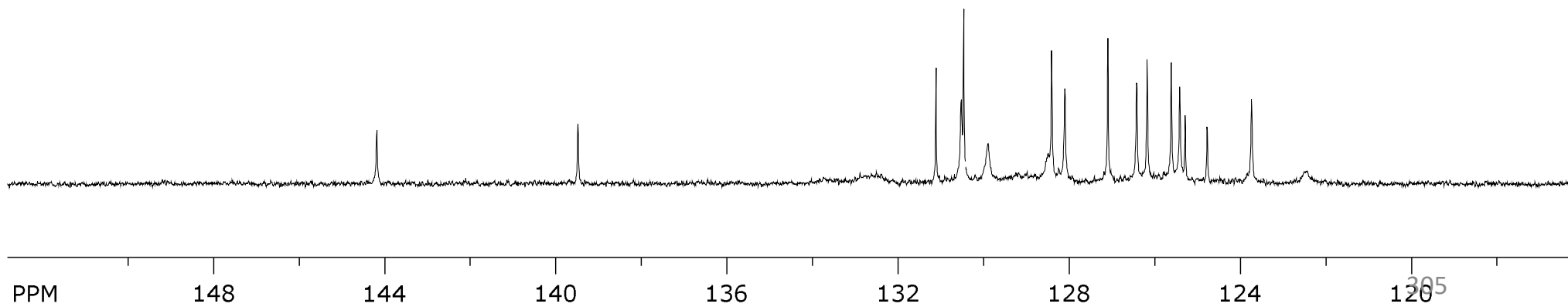
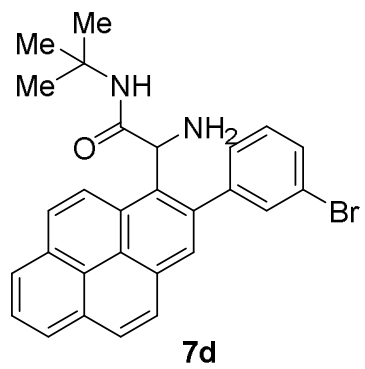


PPM 160 120 80 40 0

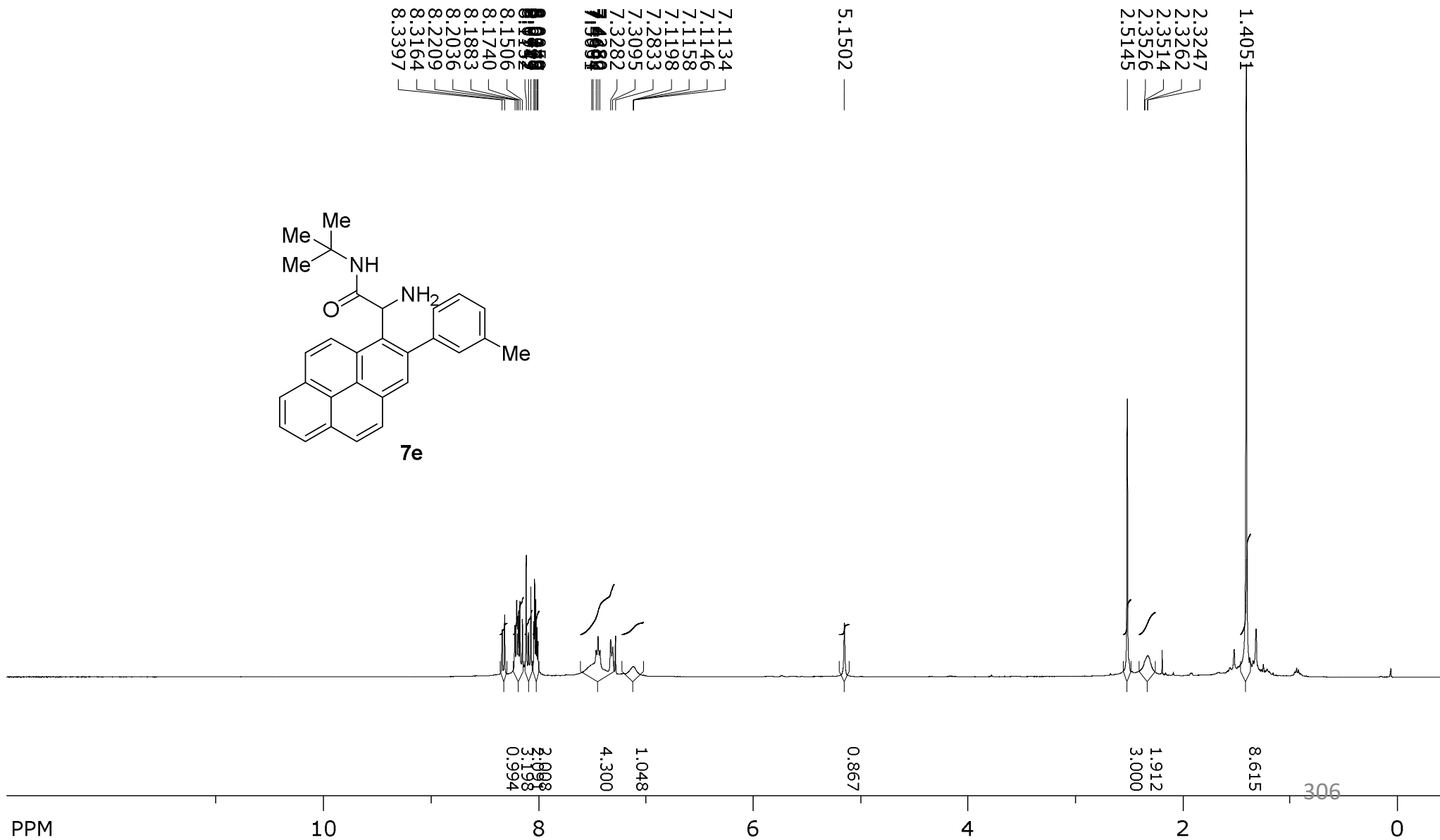
304



SpinWorks 4: AD 1886 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 44



SpinWorks 4: SUB 90 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 46



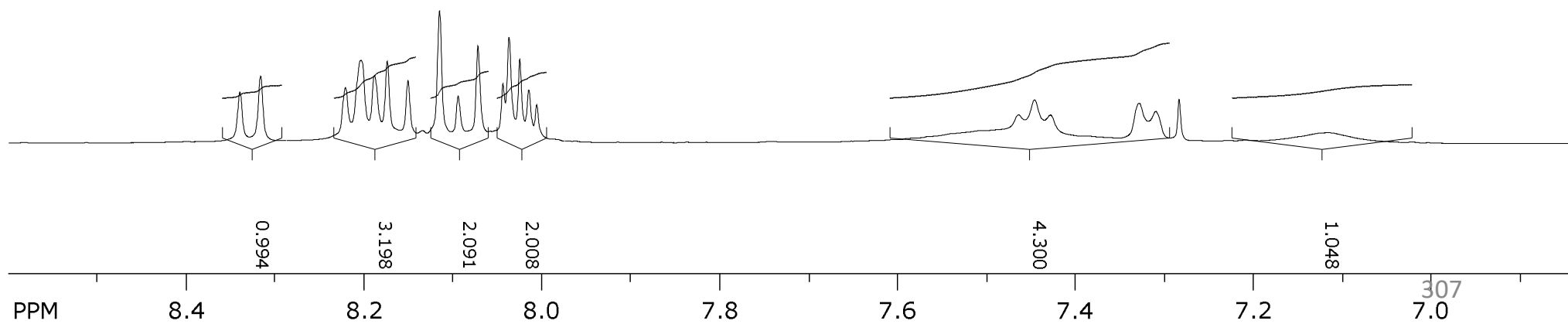
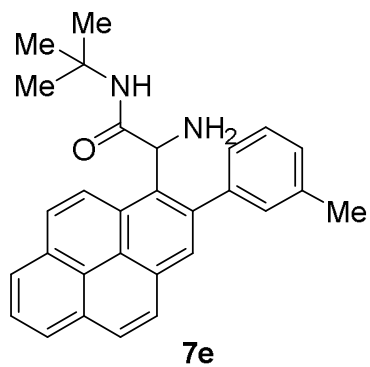
SpinWorks 4: SUB 90 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 46

8.0059  
8.0147  
8.0249  
8.0370  
8.0438  
8.0719  
8.0942  
8.1152  
8.11506  
8.1740  
8.1883  
8.2036  
8.2209  
8.3164  
8.3397

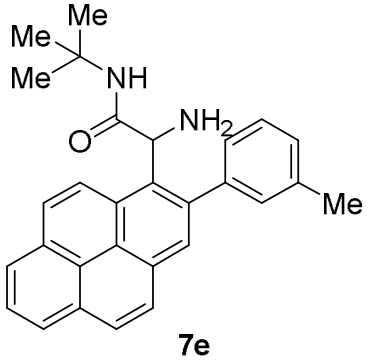
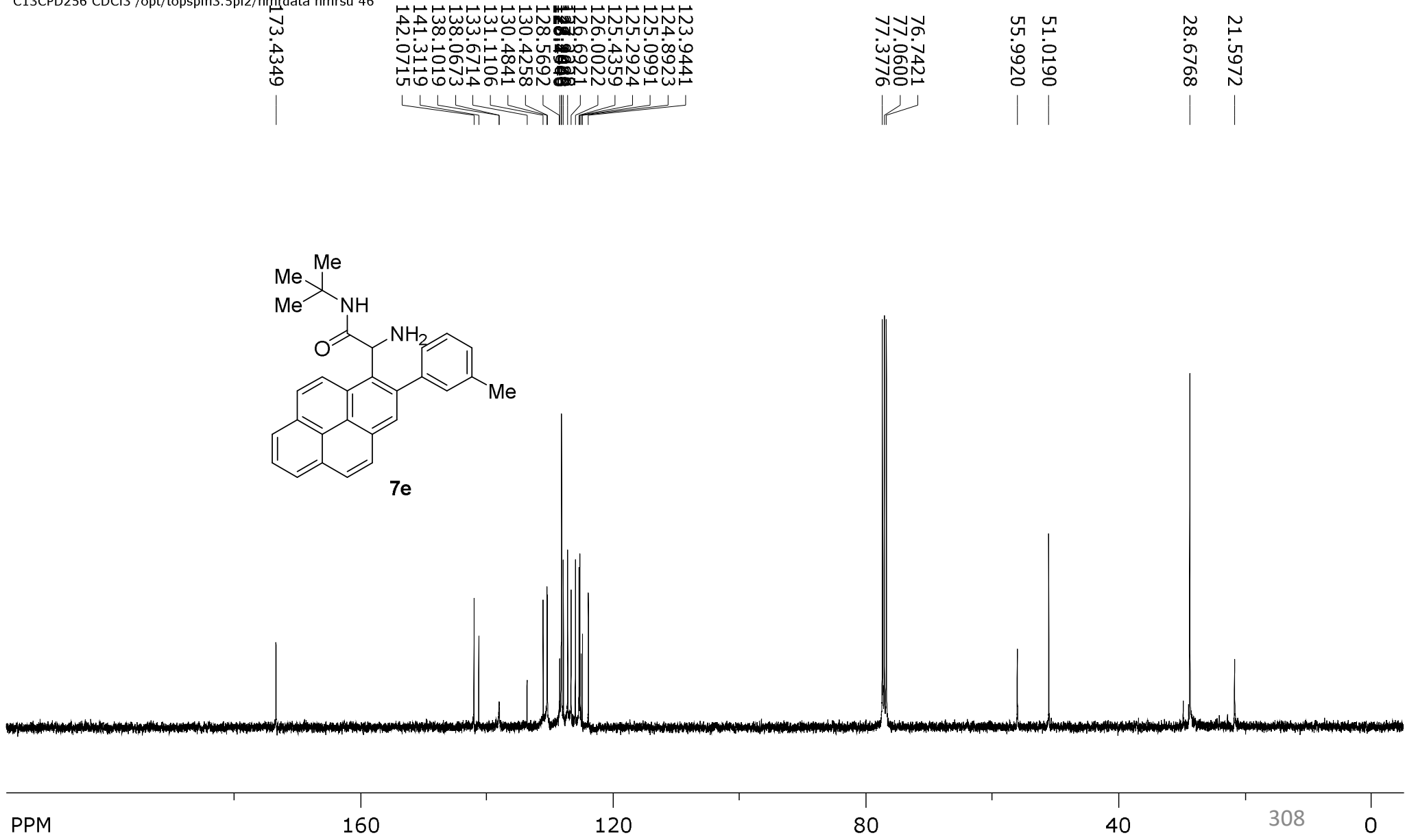
7.4280  
7.4459  
7.4640  
7.4904  
7.5051

7.2833  
7.3095  
7.3282

7.1134  
7.1146  
7.1158  
7.1198

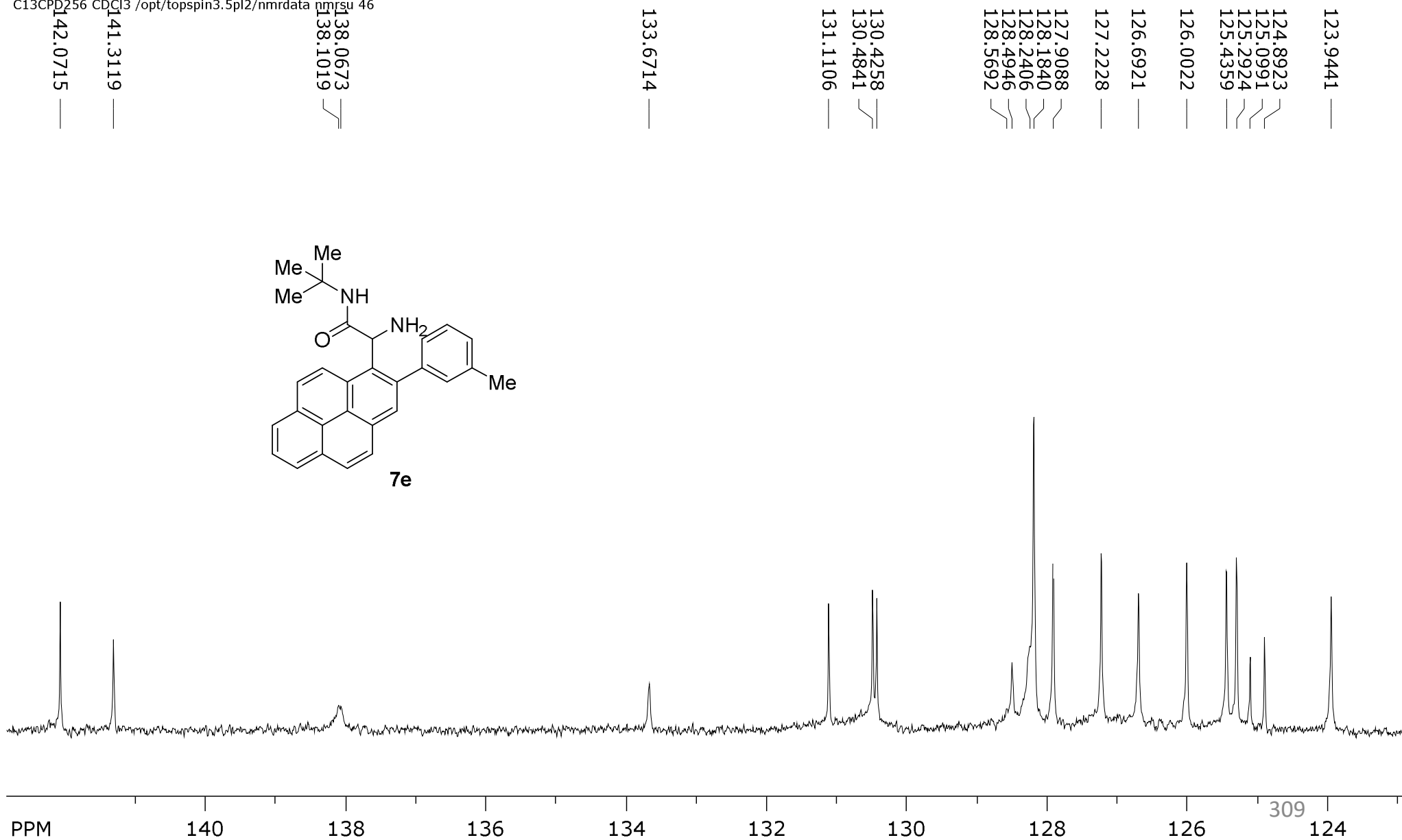


SpinWorks 4: SUB-90  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 46

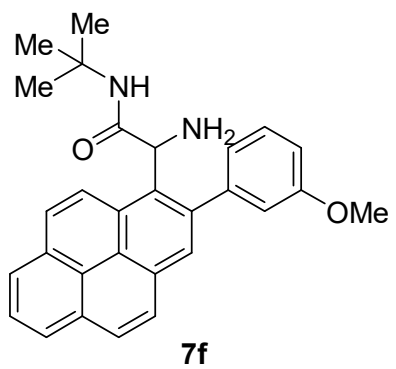


SpinWorks 4: SUB-90

C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmr su 46

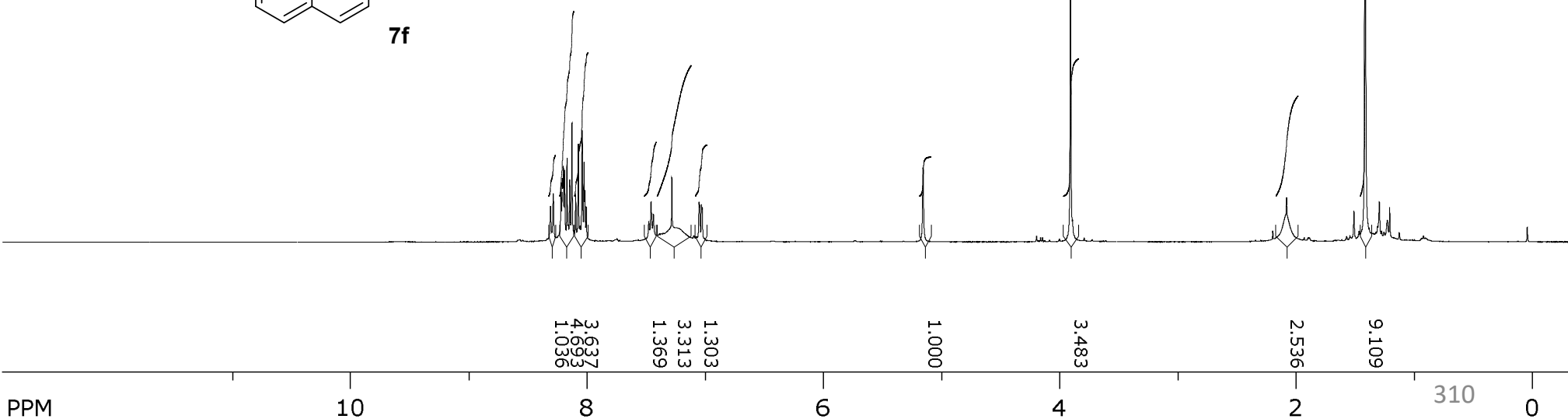


SpinWorks 4: SUB-210  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 5



7.0271  
7.0320  
7.0478  
7.0528  
7.2834  
7.4401  
7.4597  
7.4792  
8.0085  
8.0208  
8.0275  
8.0343  
8.0411  
8.1717  
8.1925  
8.2027  
8.2112  
8.2217  
8.2883  
8.3116

5.1557  
3.9065  
2.0762  
1.4108



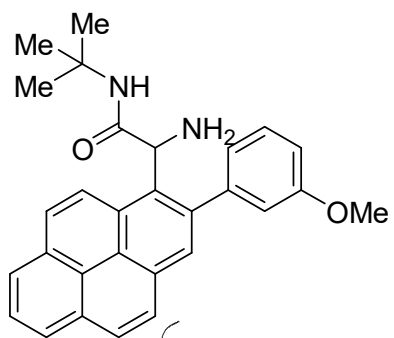
SpinWorks 4: SUB-210  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 5

8.0085  
8.0208  
8.0275  
8.0433  
8.0758  
8.0983  
8.1302  
8.1484  
8.1717  
8.1925  
8.2027  
8.2112  
8.2217  
8.2883  
8.3116

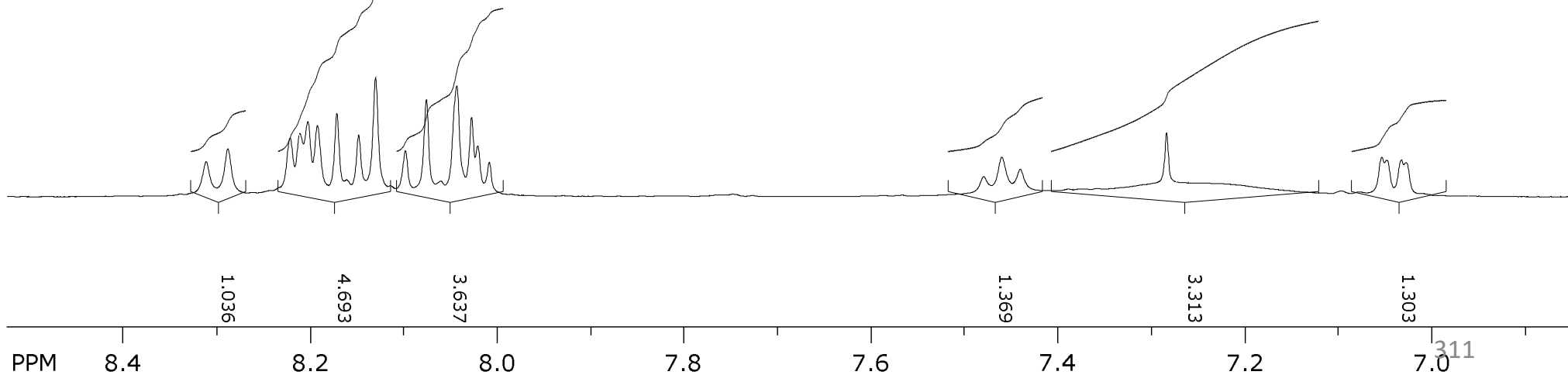
7.4401  
7.4597  
7.4792

7.2834

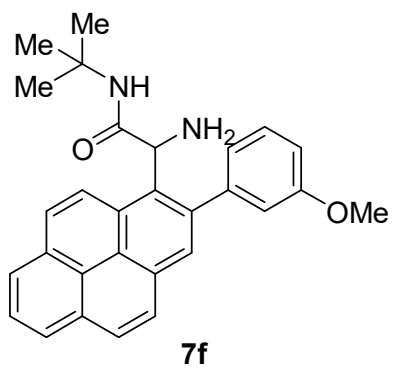
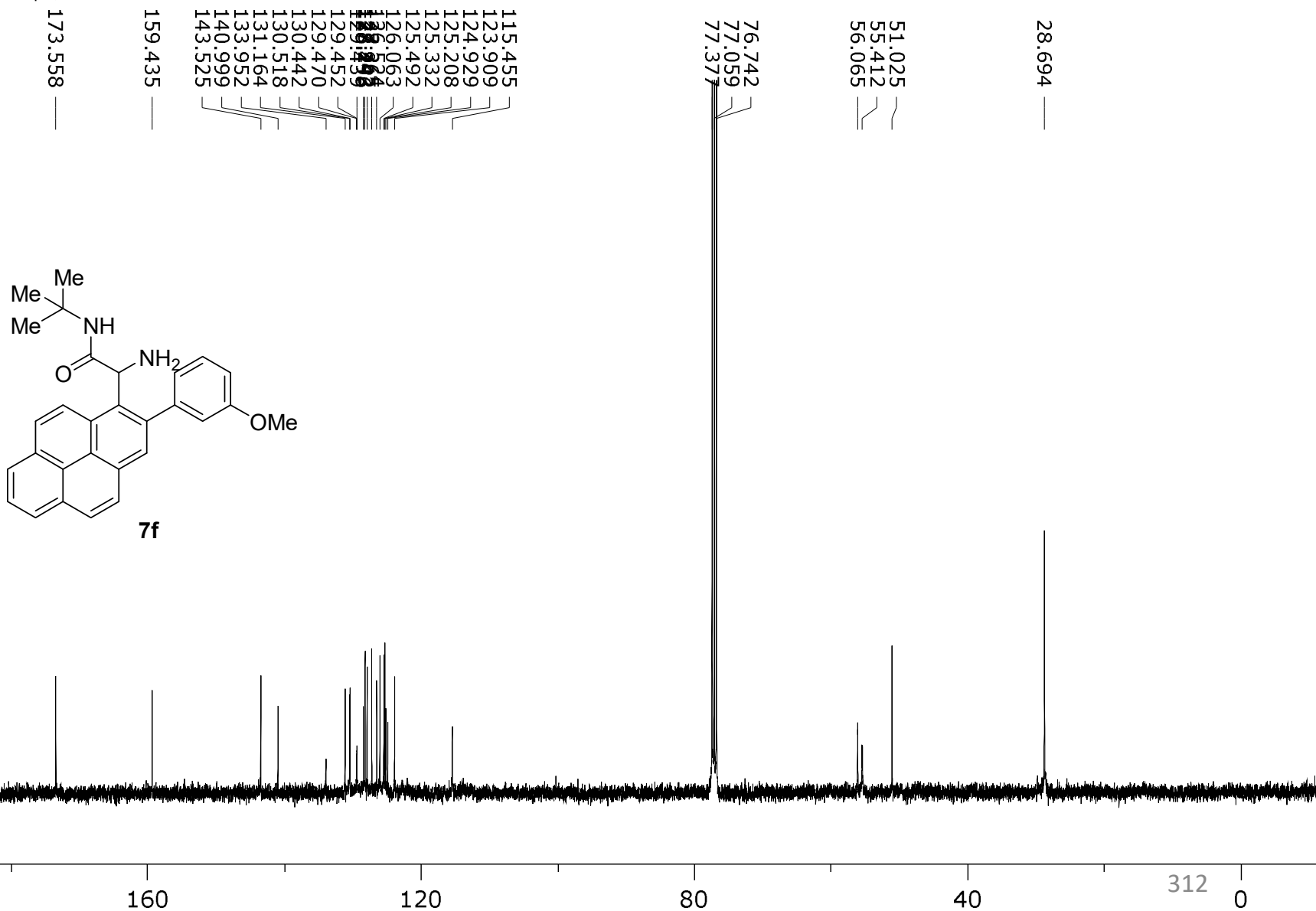
7.0271  
7.0320  
7.0478  
7.0528



7f



SpinWorks 4: SUB-210  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 5





SpinWorks 4: SUB-210  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 5

143.525

140.999

133.952

129.439

129.452

129.470

130.442

130.518

131.164

128.496

128.243

127.942

127.265

126.524

126.063

125.492

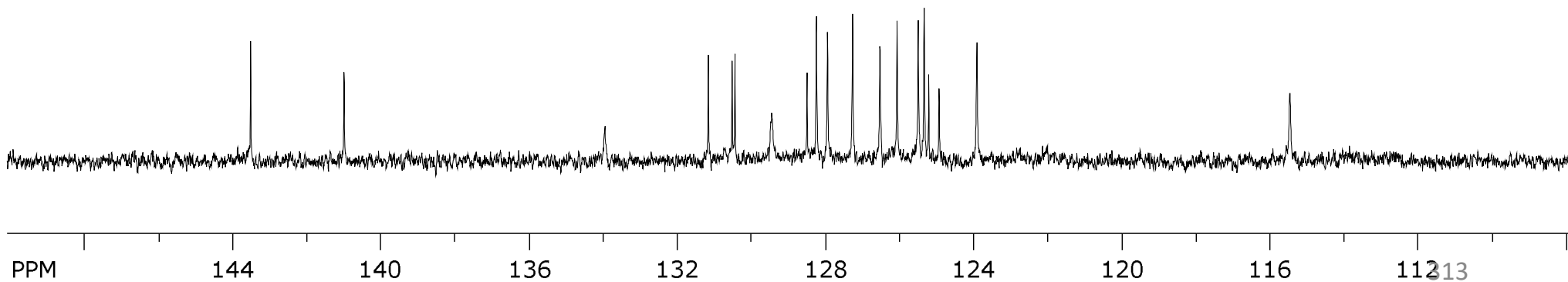
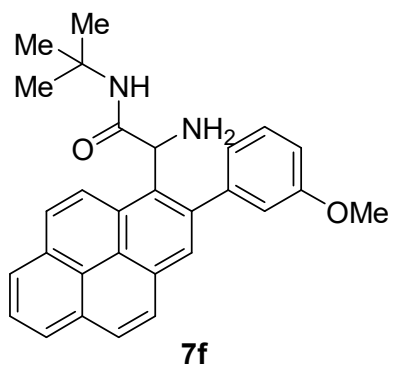
125.332

125.208

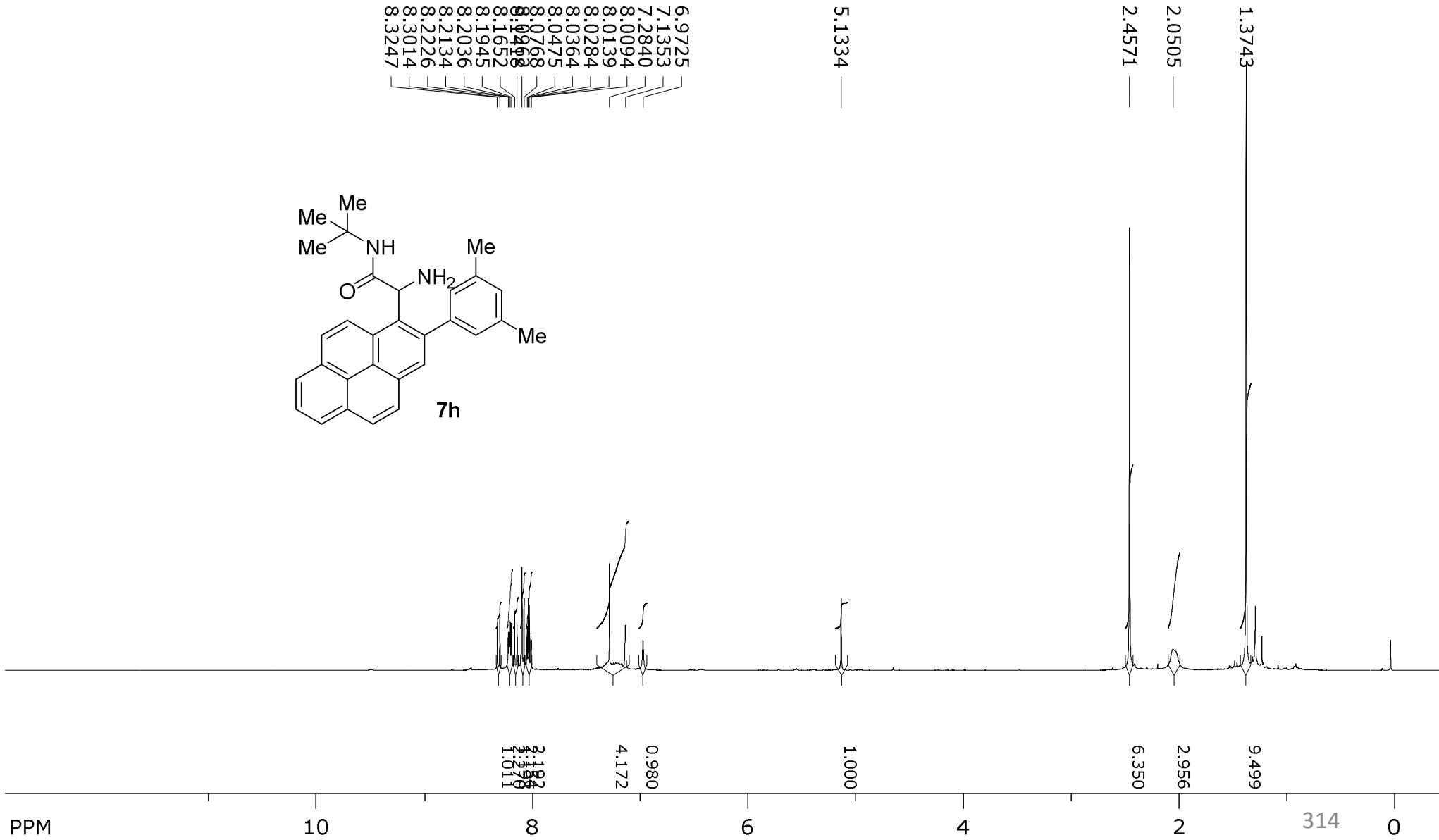
124.929

123.909

115.455



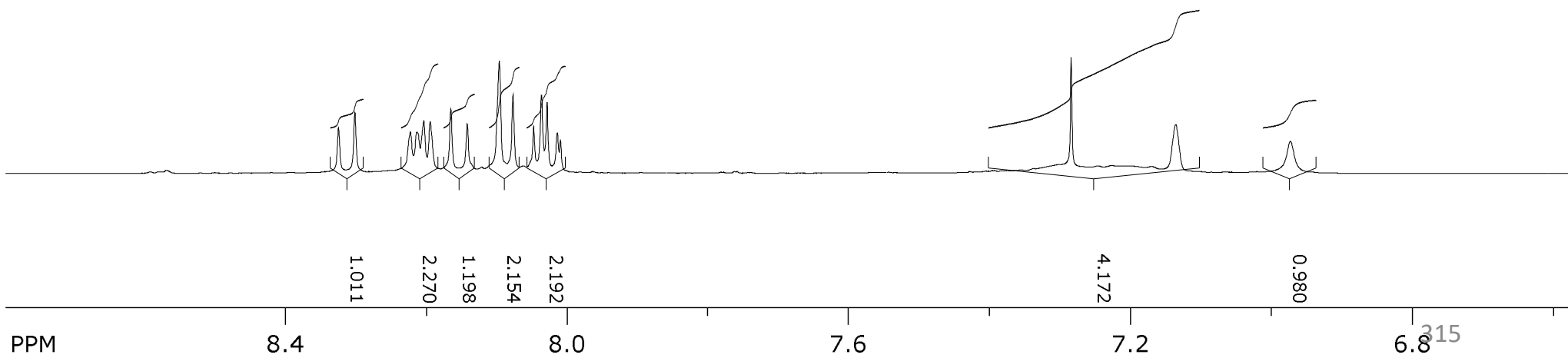
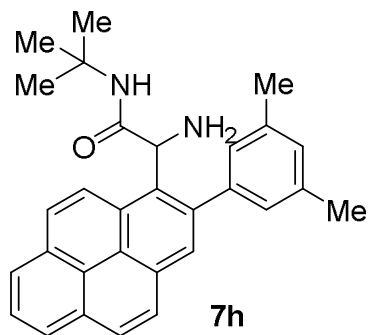
SpinWorks 4: AD-2190  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 29



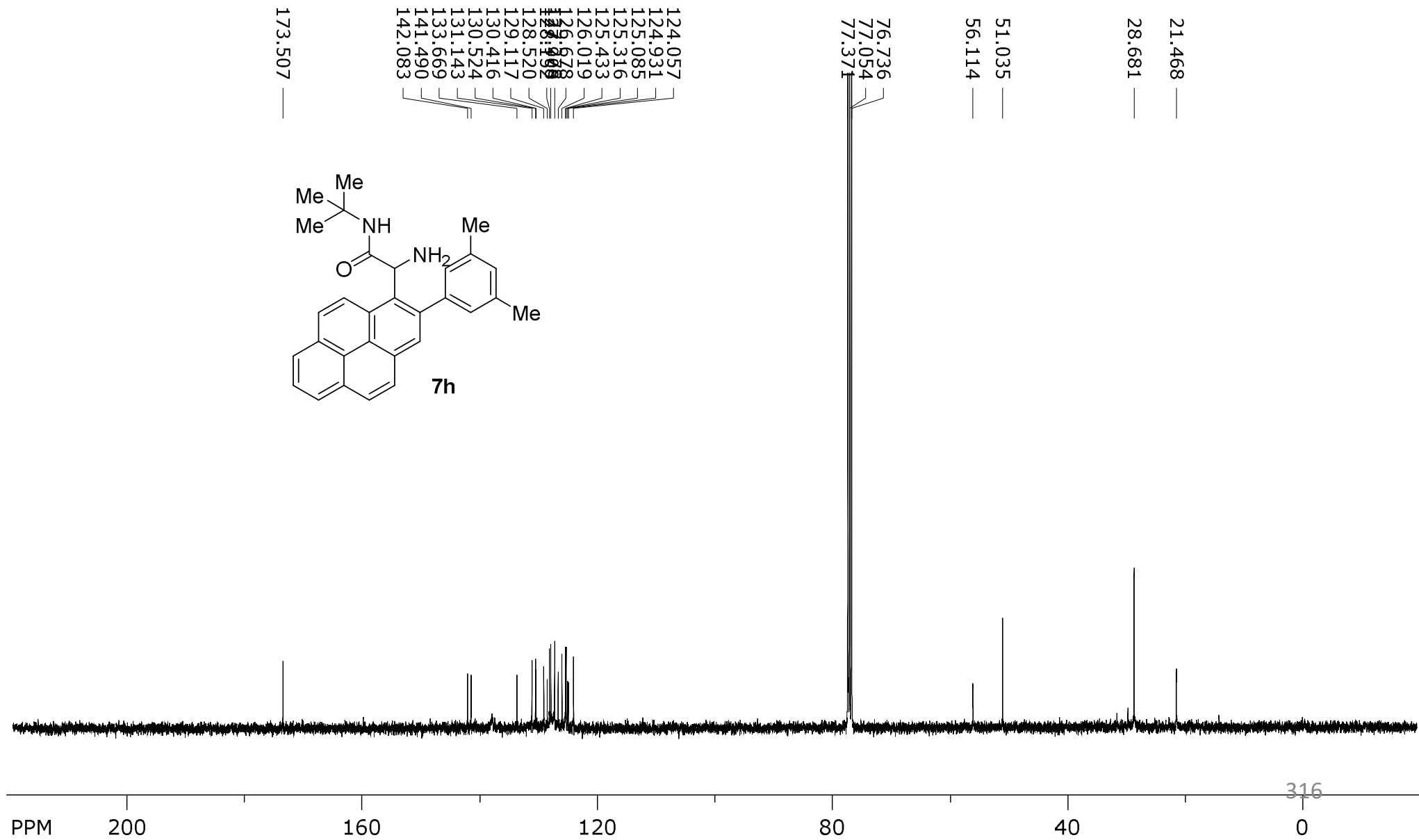
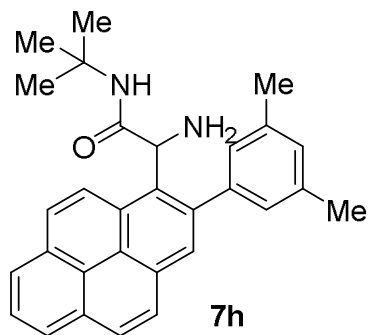
SpinWorks 4: AD-2190  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 29

8.0094  
8.0139  
8.0284  
8.0364  
8.0475  
8.0768  
8.0962  
8.1418  
8.1652  
8.1945  
8.2036  
8.2134  
8.2226  
8.3014  
8.3247

7.2840  
7.1353  
6.9725

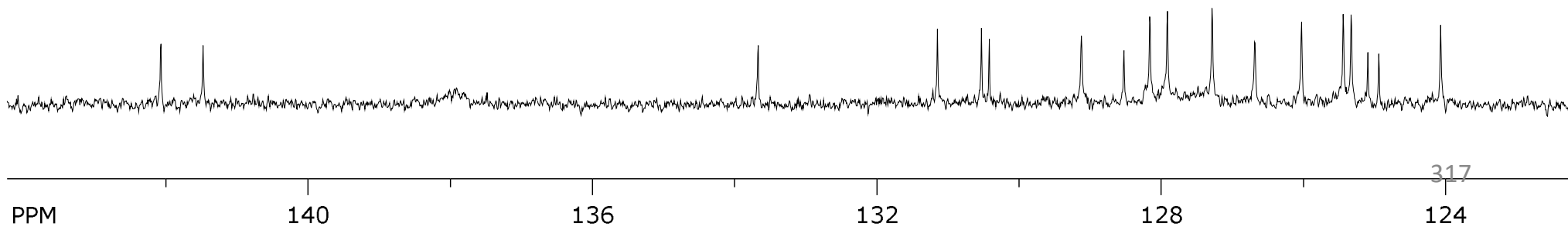
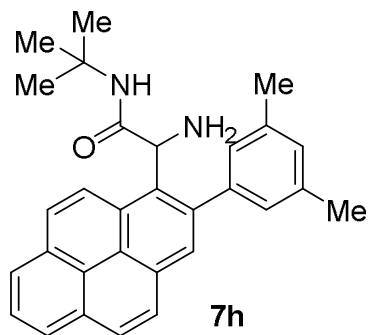


SpinWorks 4: AD 2190  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 11

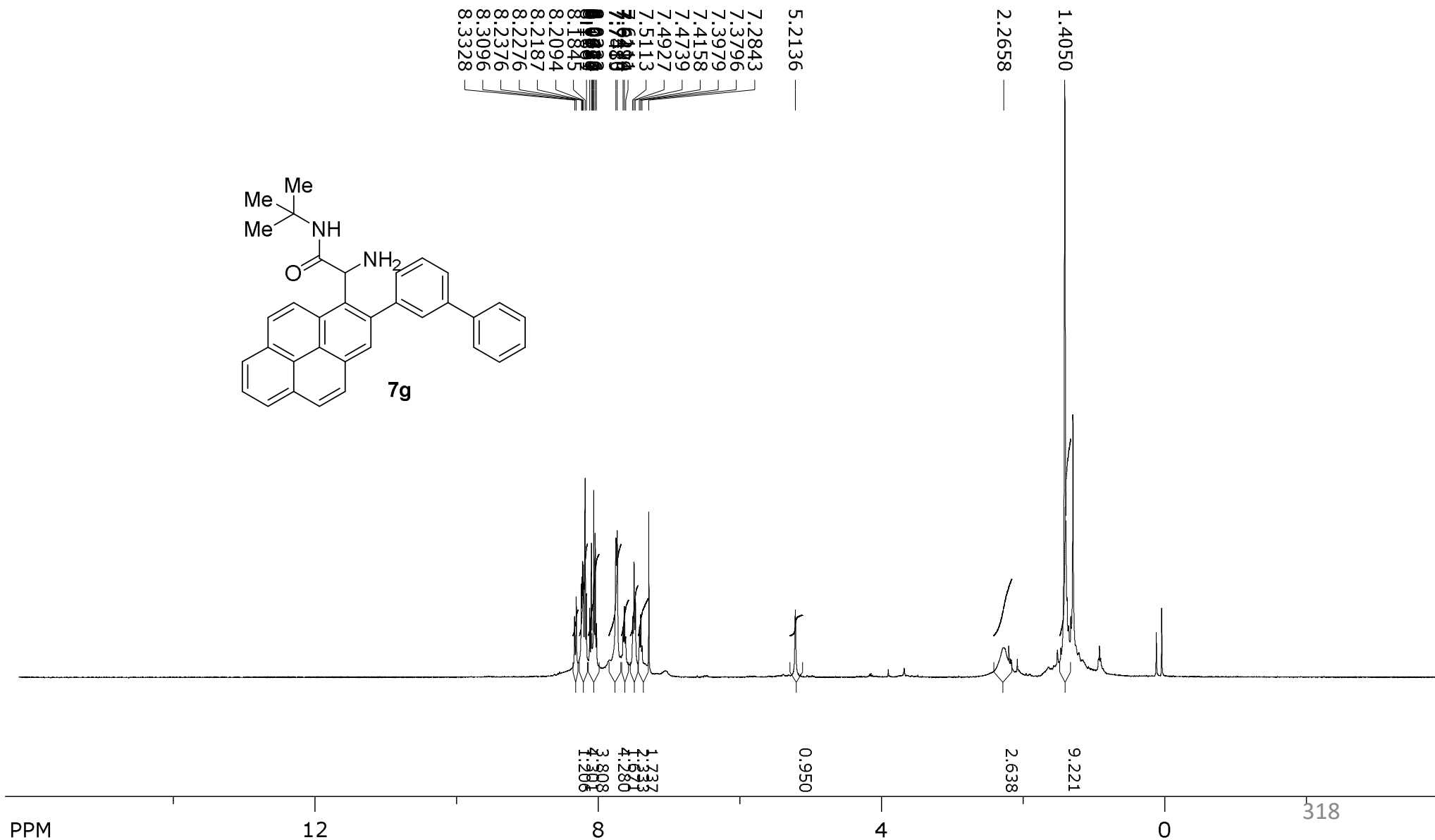
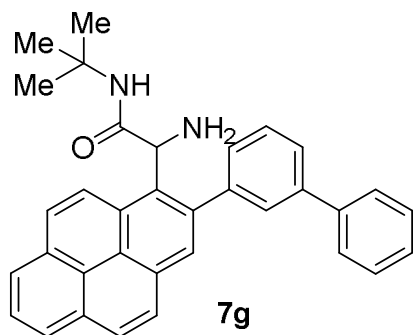


SpinWorks 4: AD 2190  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 11

142.083 —  
141.490 —  
133.669 —  
131.143 —  
130.524 —  
130.416 —  
129.117 —  
128.520 —  
128.152 —  
127.908 —  
127.278 —  
126.678 —  
126.019 —  
125.433 —  
125.316 —  
125.085 —  
124.931 —  
124.057 —

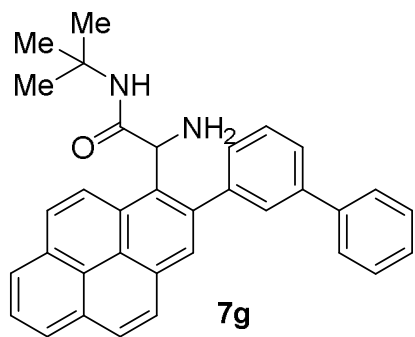


SpinWorks 4: AD 2181 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 53

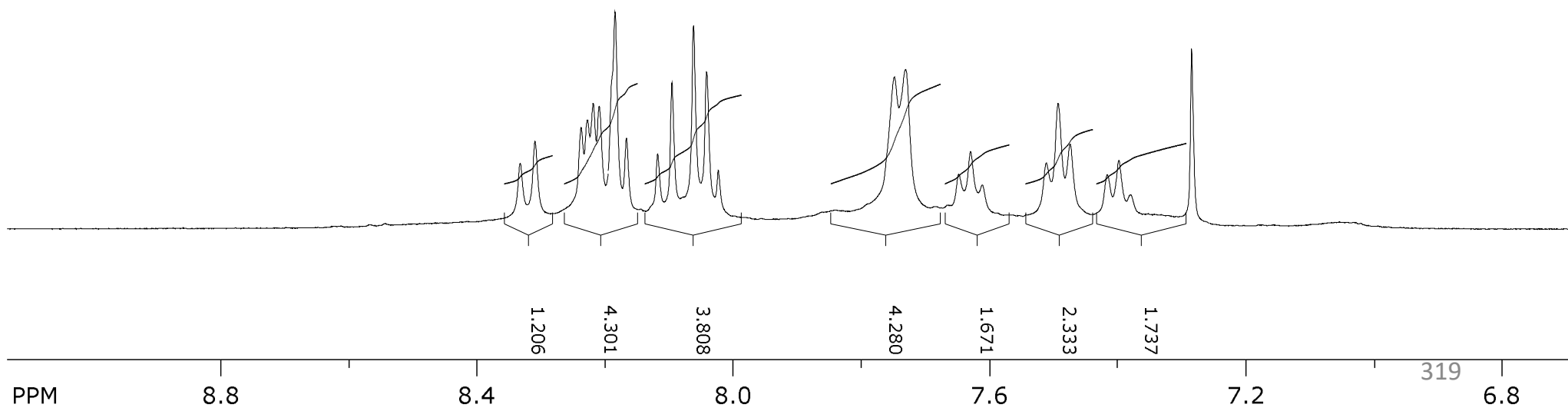


SpinWorks 4: AD 2181 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 53

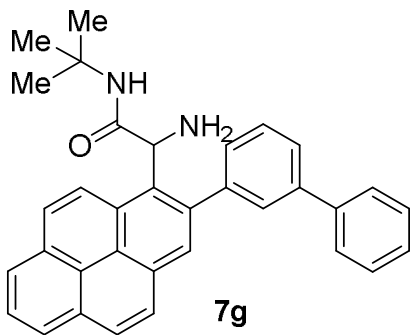
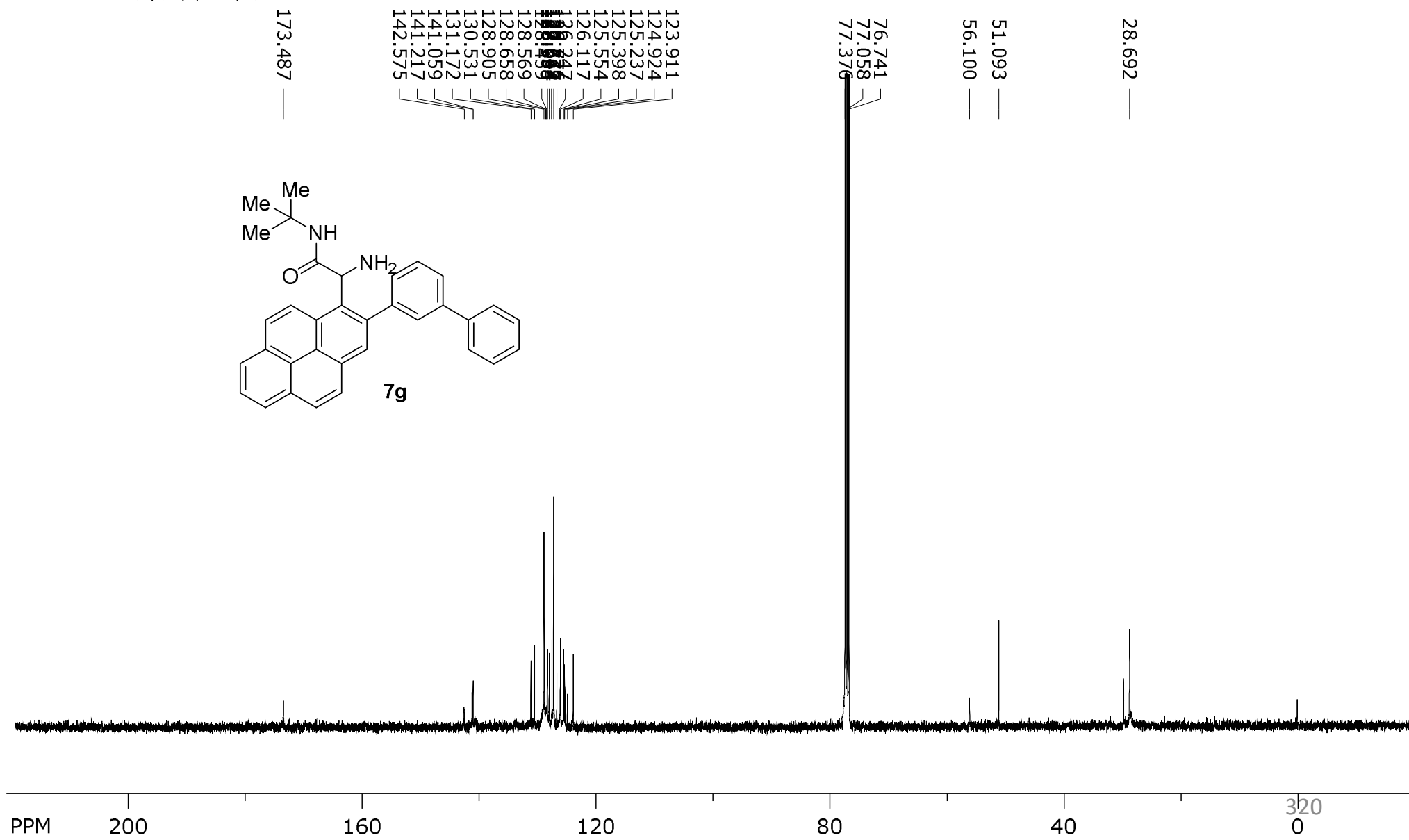
8.0233  
8.0416  
8.0620  
8.0774  
8.0833  
8.0957  
8.1181  
8.1669  
8.1845  
8.2094  
8.2187  
8.2276  
8.2376  
8.3096  
8.3328  
  
7.7310  
7.7485  
  
7.6111  
7.6294  
7.6479  
  
7.5113  
7.4927  
7.4739  
7.4158  
7.3979  
7.3796  
  
7.2843



7g



SpinWorks 4: AD 2181 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 9

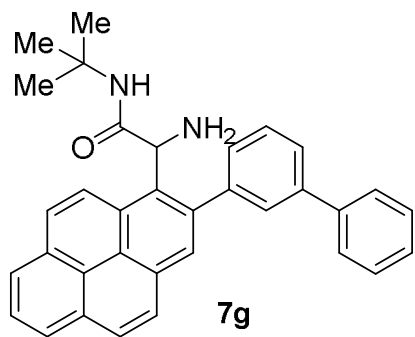




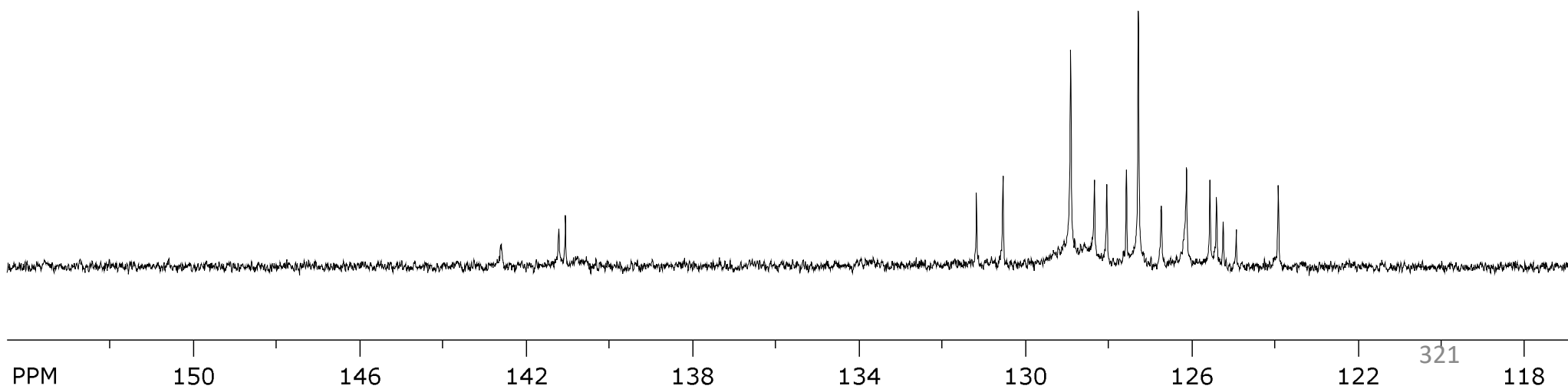
SpinWorks 4: AD 2181 RE  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 9

141.059  
141.217  
142.575

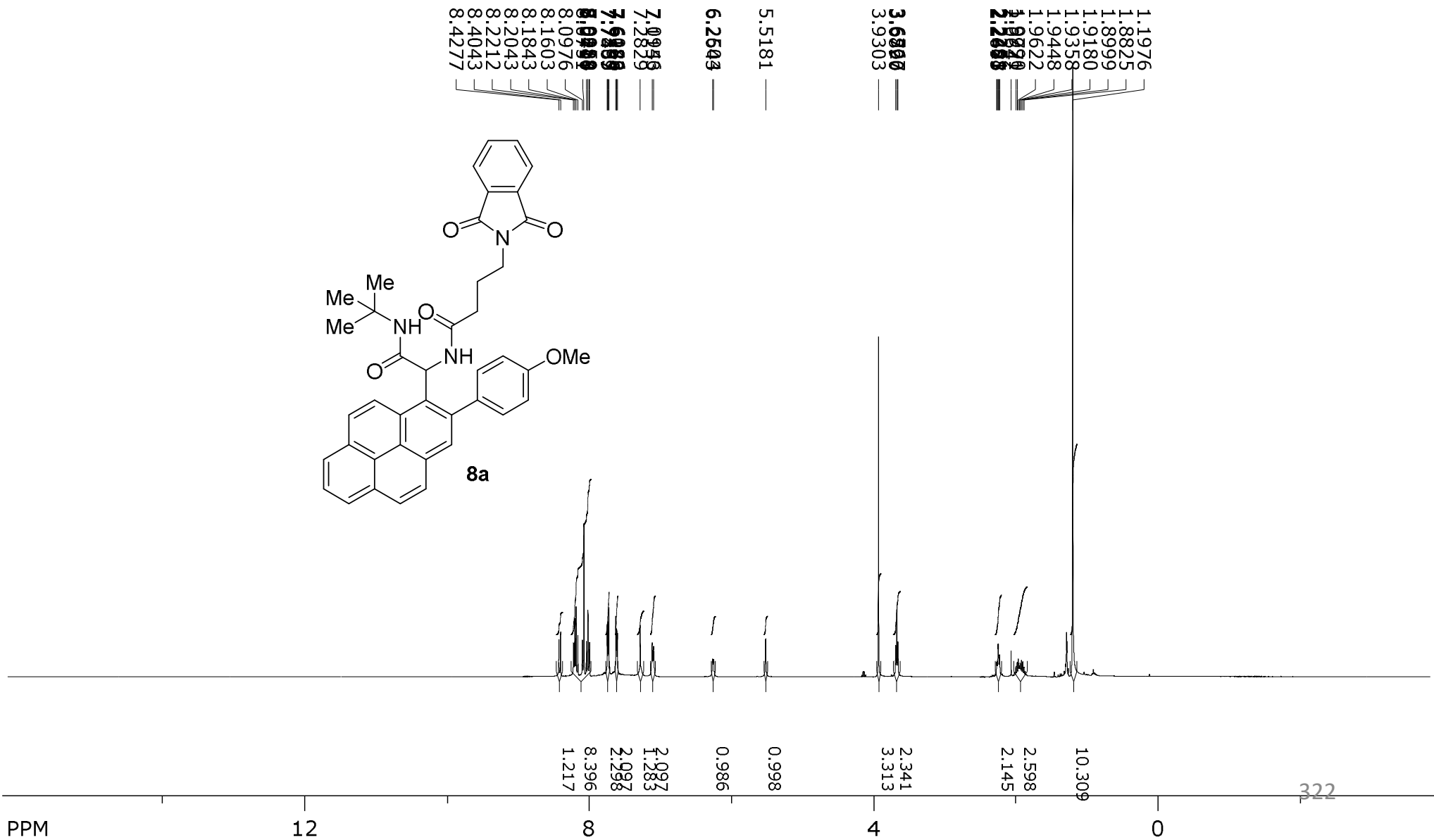
123.911  
124.924  
125.237  
125.398  
125.554  
126.117  
126.247  
126.726  
127.277  
127.564  
127.642  
128.034  
128.335  
128.459  
128.569  
128.658  
128.905  
130.531  
131.172



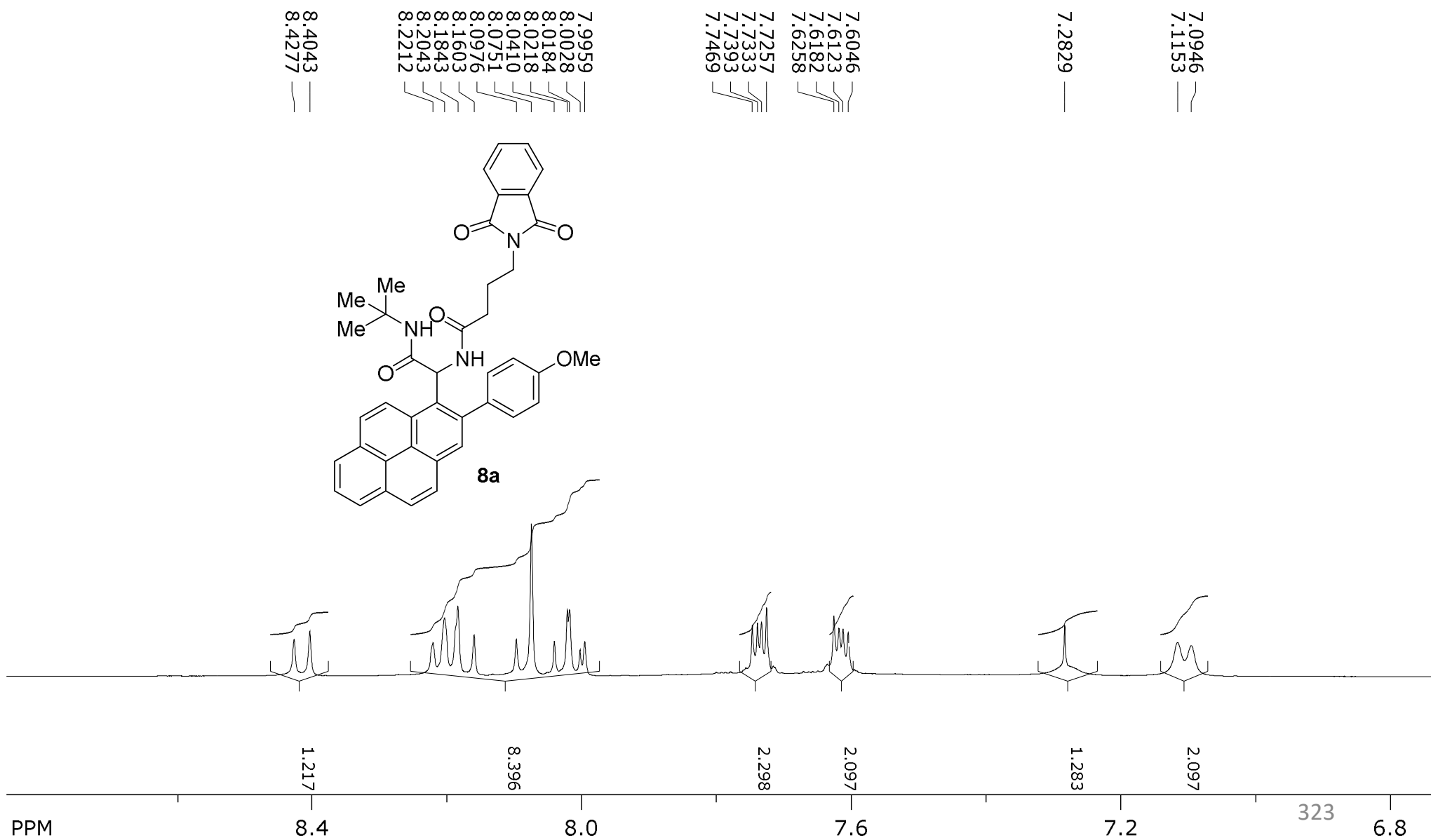
7g



SpinWorks 4: AD 1955  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 10



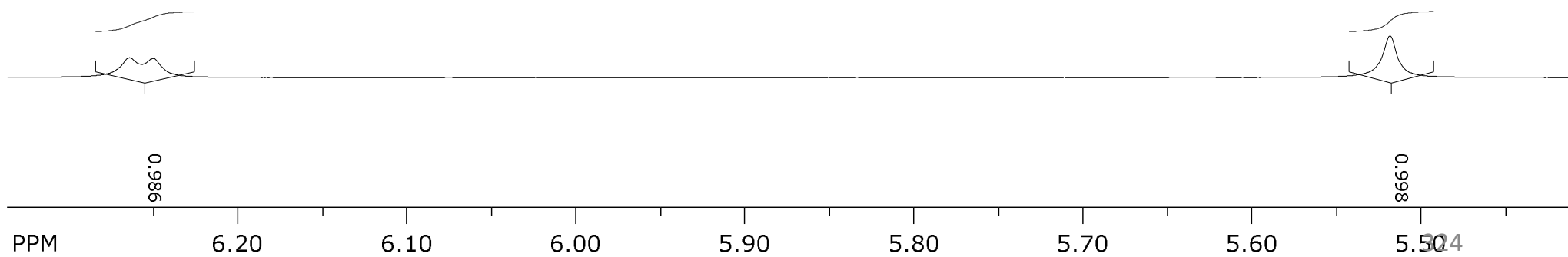
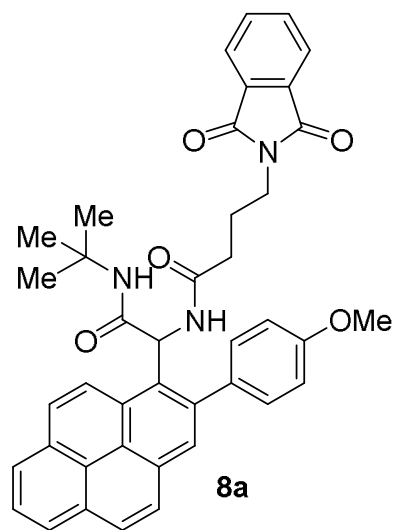
SpinWorks 4: AD 1955  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 10



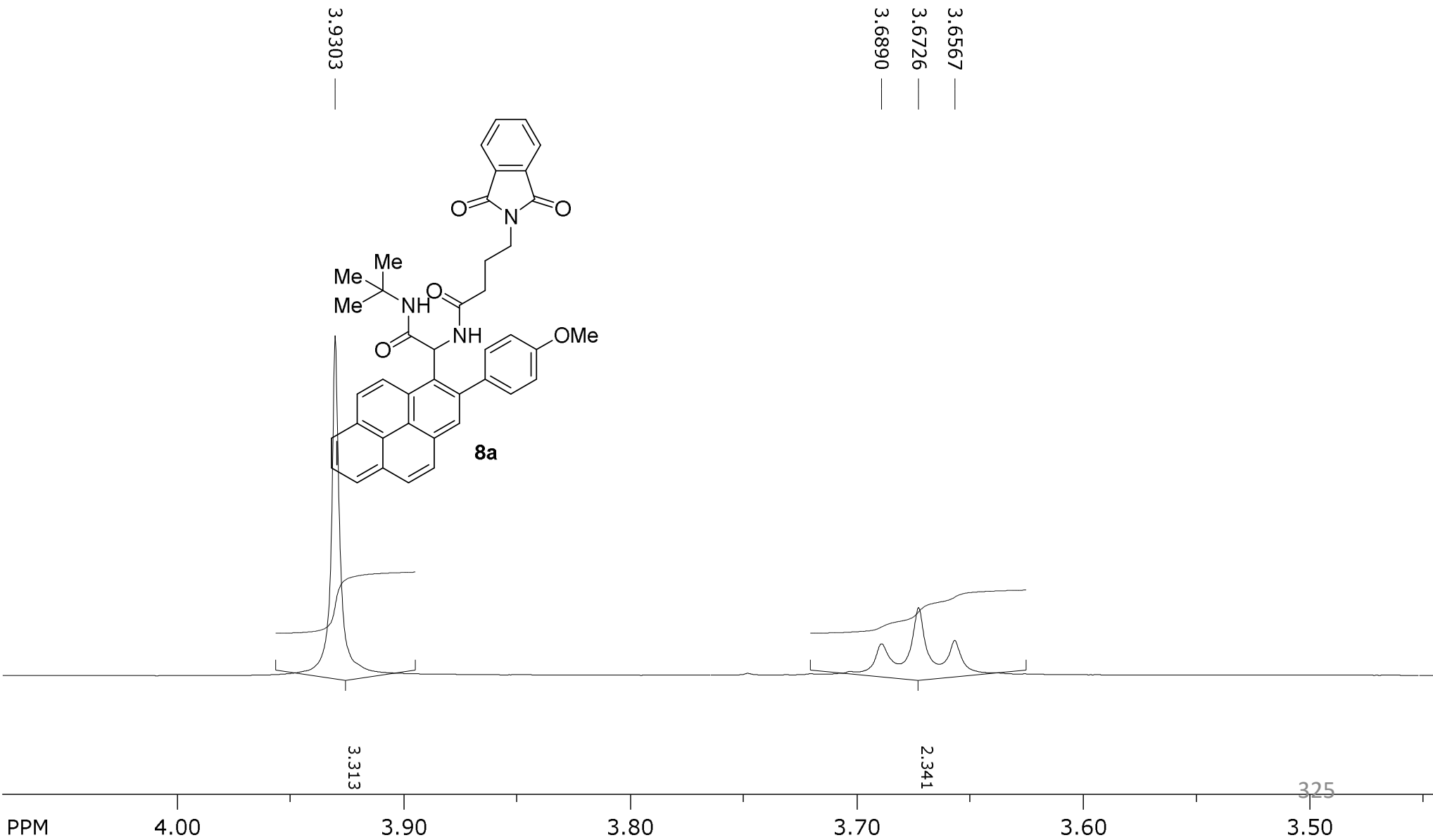
SpinWorks 4: AD 1955  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 10

6.2504  
6.2643  
—  
—

5.5181  
—

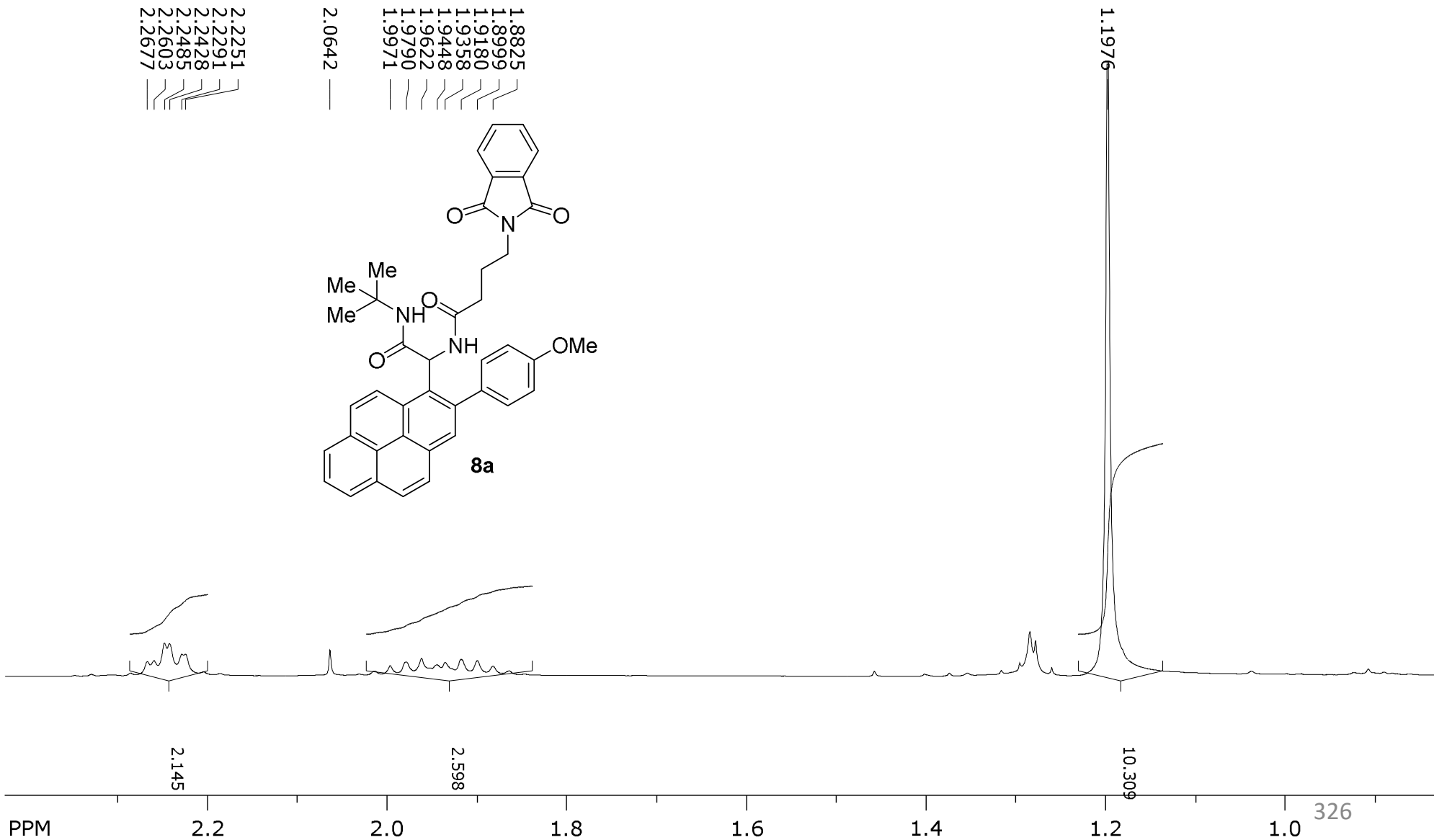
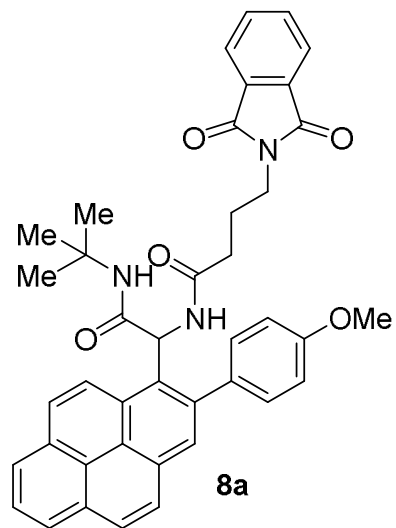


SpinWorks 4: AD 1955  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 10



SpinWorks 4: AD 1955  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 10

2.2251  
2.2291  
2.2428  
2.2485  
2.2603  
2.2677  
2.0642  
1.8825  
1.8999  
1.9180  
1.9358  
1.9448  
1.9622  
1.9790  
1.9971



SpinWorks 4: AD 1955  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 10

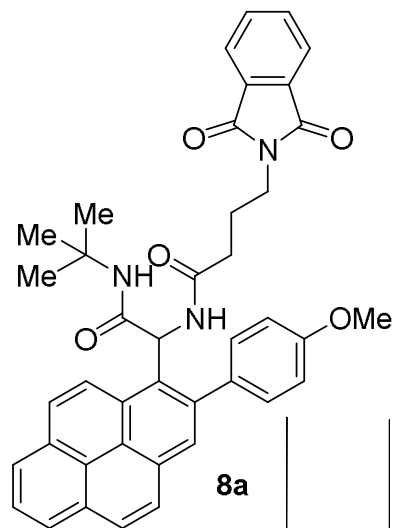
168.433  
169.700  
171.160

159.258

140.943  
133.884  
133.834  
131.895  
131.115  
130.888  
130.413  
129.708  
129.149  
129.091  
125.641  
125.499  
124.919  
124.674  
123.758  
123.144  
113.933

51.755  
55.048  
55.395

37.180  
33.596  
28.478  
24.814



PPM

160

120

80

40

327

SpinWorks 4: AD 1955  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 10

140.943

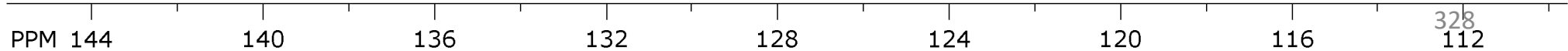
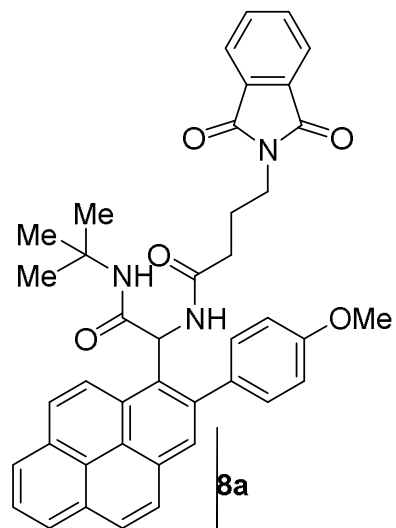
133.834  
133.884

131.895  
130.413  
130.888  
131.115

129.708  
128.931  
128.542  
128.222  
127.505  
127.202

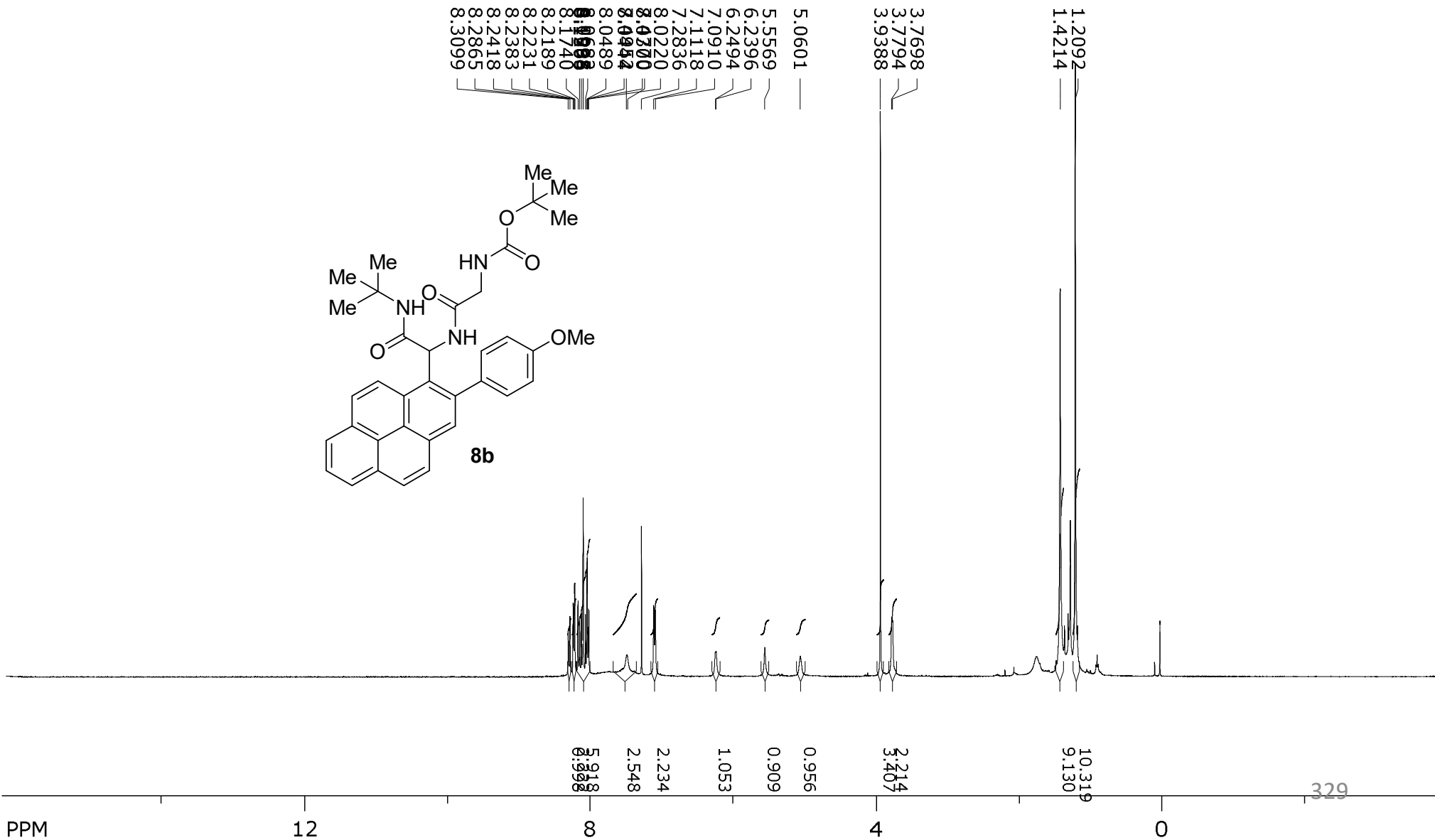
126.149  
125.641  
125.499  
124.919  
124.674  
123.758  
123.144

113.933





SpinWorks 4: AD-2121  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 20



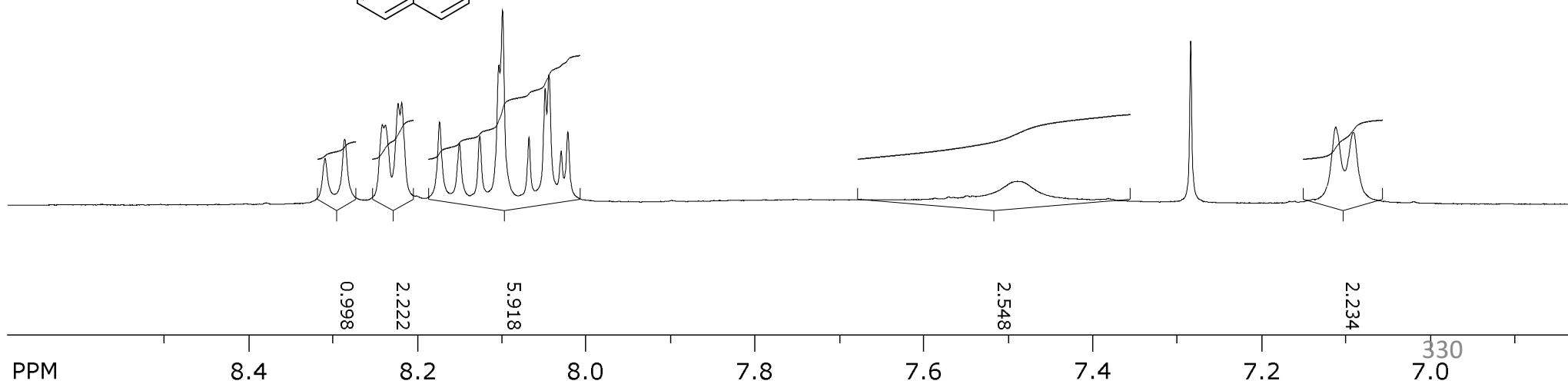
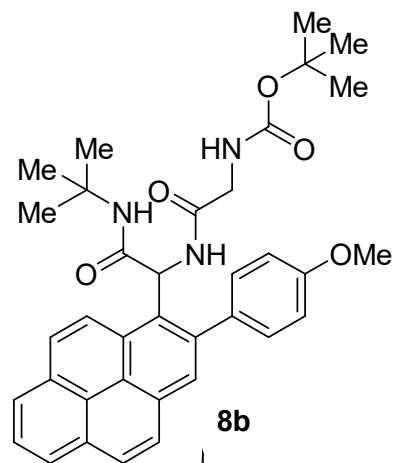
SpinWorks 4: AD-2121  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 20

8.0220  
8.0300  
8.0444  
8.0489  
8.0682  
8.0995  
8.1038  
8.1265  
8.1506  
8.1740  
8.2189  
8.2231  
8.2383  
8.2418  
8.2865  
8.3099

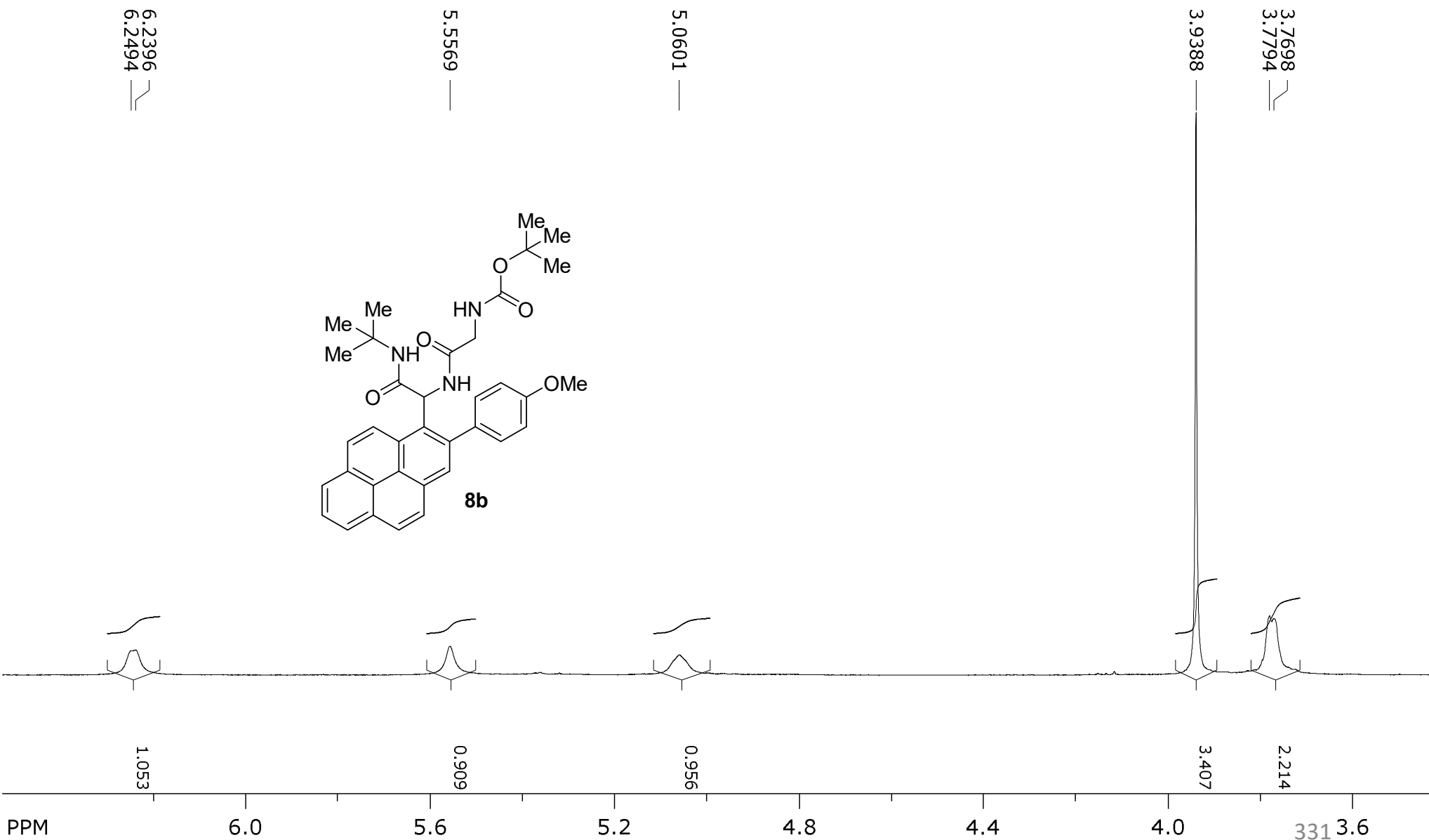
7.4770  
7.4952

7.2836

7.0910  
7.1118

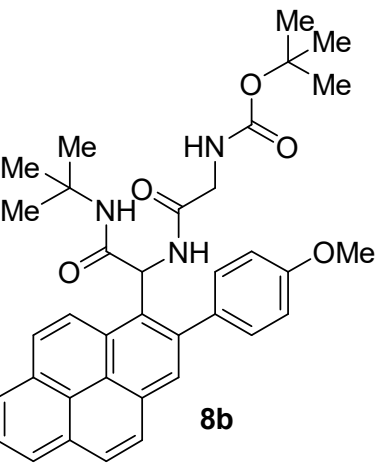


SpinWorks 4: AD-2121  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 20



SpinWorks 4: AD-2121  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 33

168.363  
169.392



159.276  
141.017  
133.781  
131.114  
131.006  
130.361  
129.159  
128.869  
128.764  
127.929  
127.499  
126.217  
125.773  
125.579  
124.939  
124.697  
123.245  
123.245  
113.954

80.166  
77.364  
77.047  
76.729

55.403  
54.791  
51.848

44.231

29.722  
28.448  
28.243

PPM

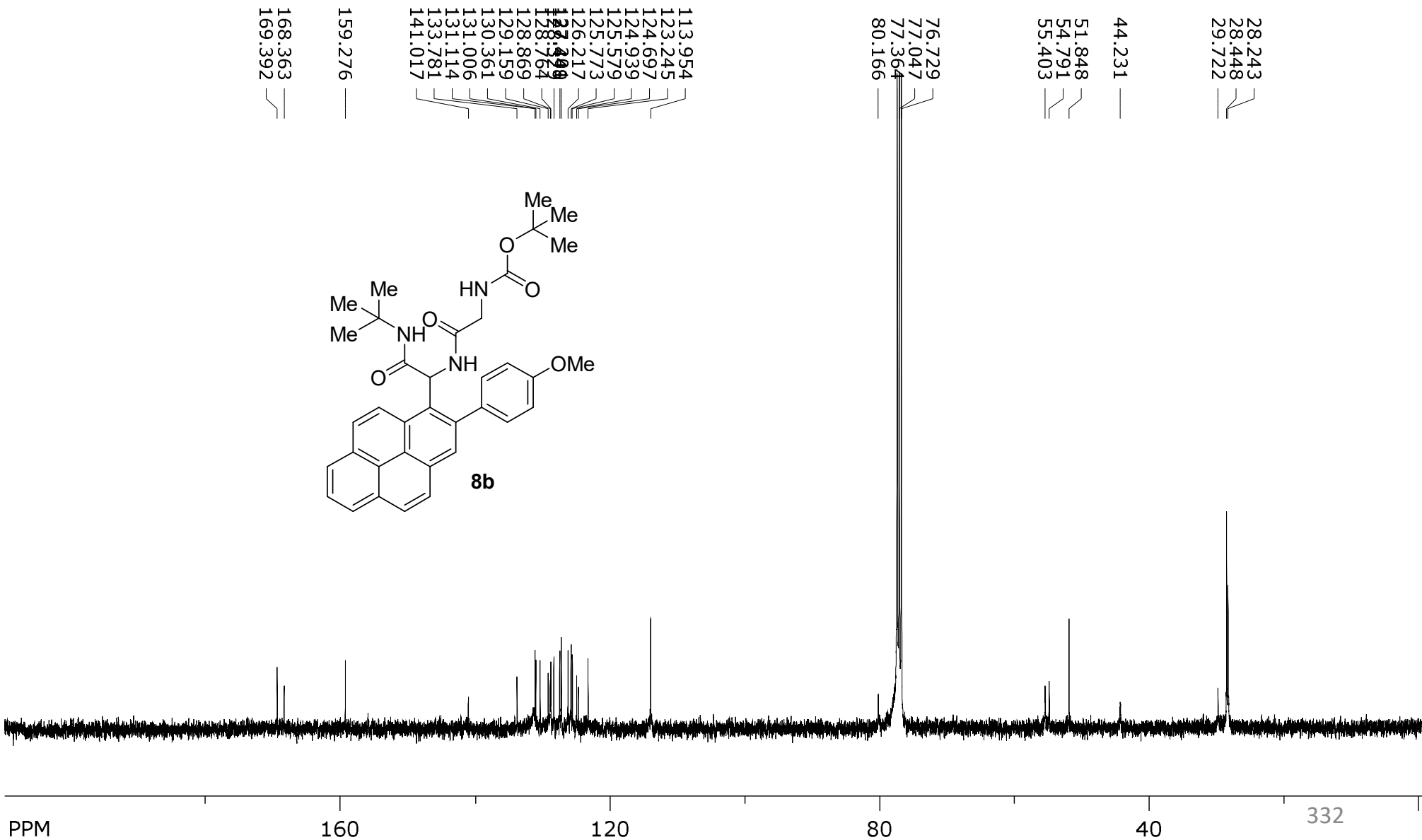
160

120

80

40

332



SpinWorks 4: AD-2121  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 33

141.017

133.781

131.114

131.006

130.361

129.159

128.869

128.764

128.329

127.449

127.201

126.217

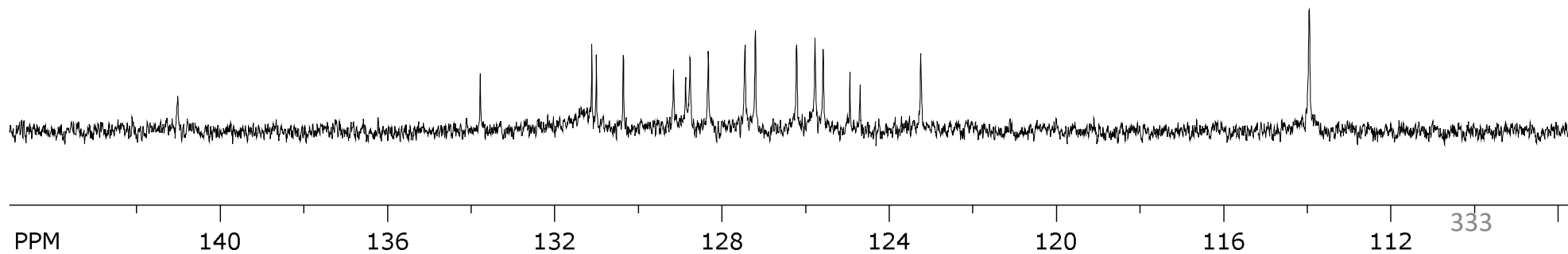
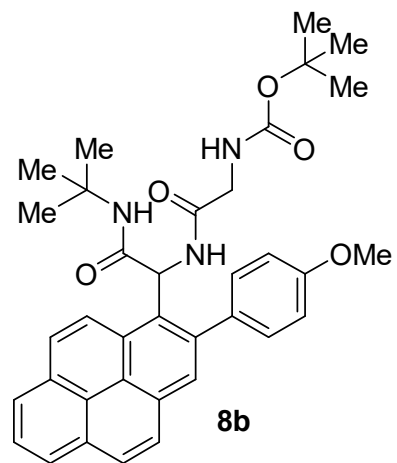
125.773

125.579

124.939

123.245

113.954



SpinWorks 4: AD-2121  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 33

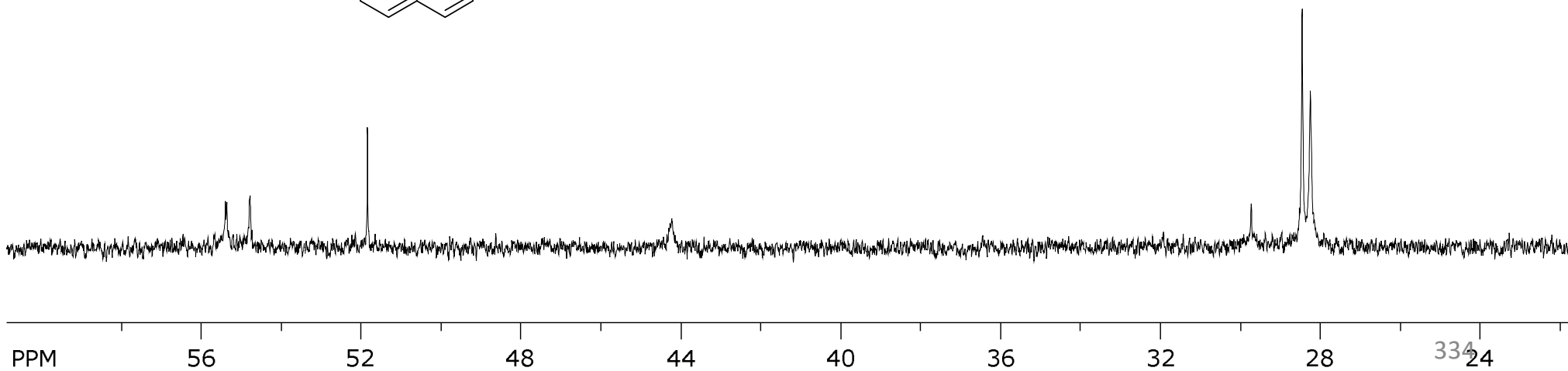
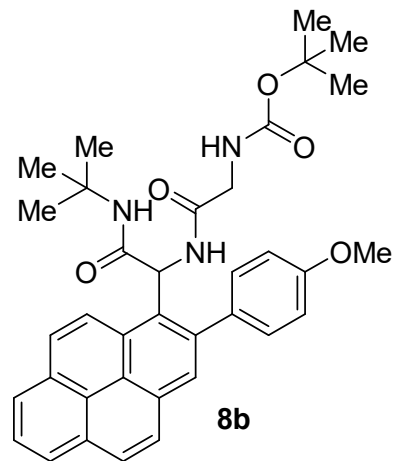
54.791  
55.403

51.848

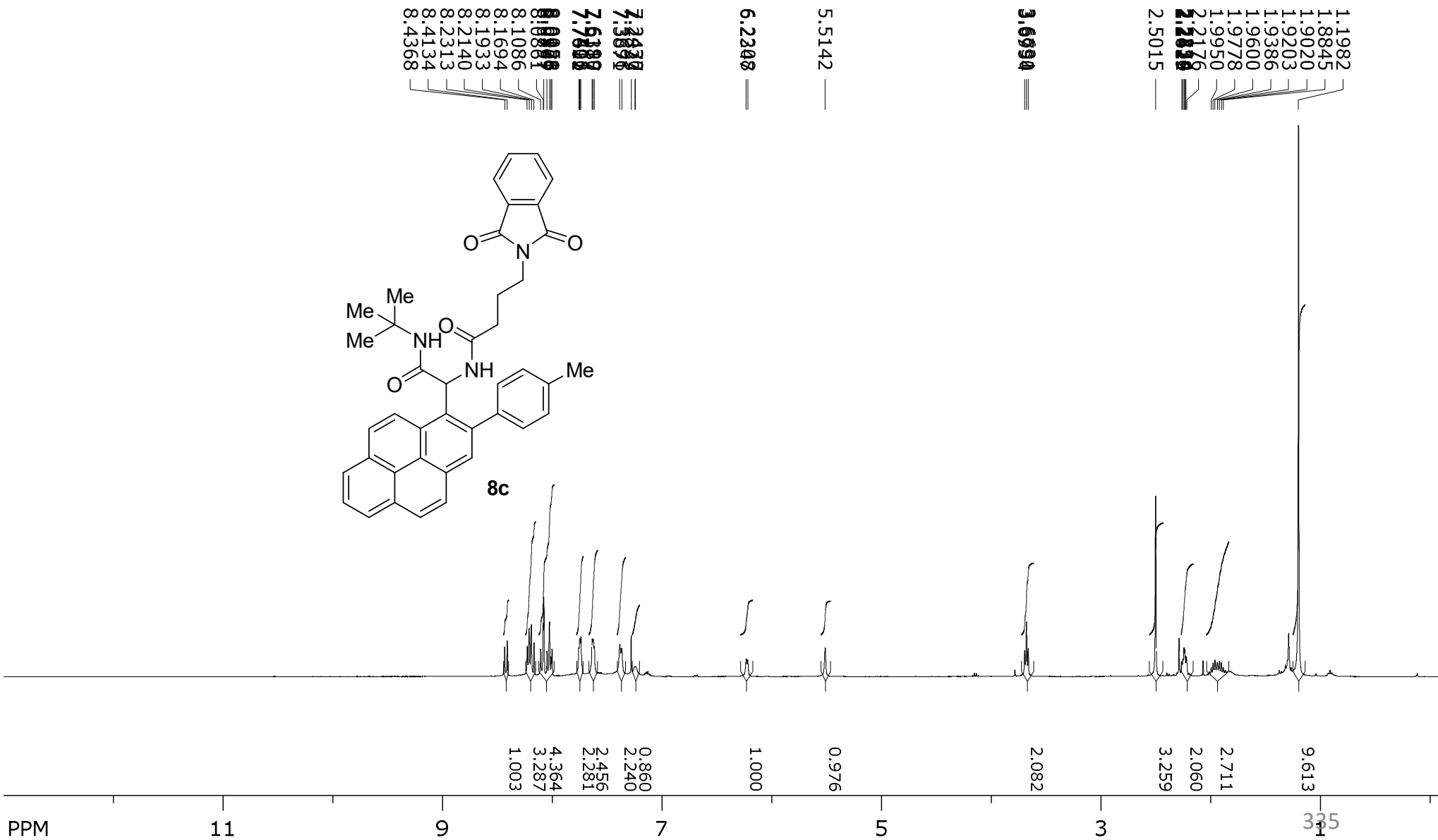
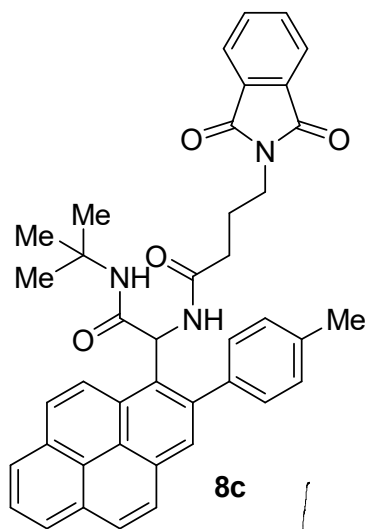
44.231

29.722

28.243  
28.448



SpinWorks 4: AD 1982  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 19



SpinWorks 4: AD 1982  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 19

8.4134  
8.4368  
—  
—

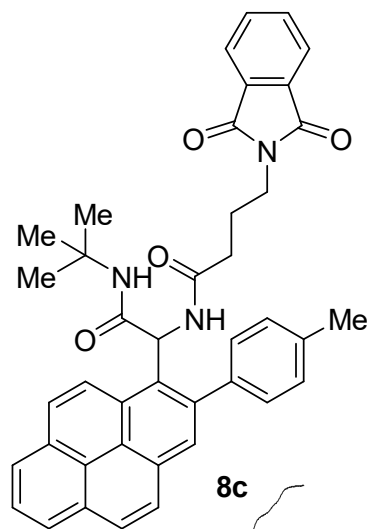
8.0051  
8.0128  
8.0278  
8.0509  
8.0797  
8.0861  
8.1086  
—  
—  
—  
—  
—  
—  
—  
—

7.7416  
7.7493  
7.7522  
7.7601  
—  
—  
—  
—

7.6199  
7.6310  
7.6387  
—  
—  
—  
—

7.3696  
7.3871  
—  
—

7.2437  
7.2470  
7.2833  
—  
—  
—



1.003  
8.4

3.287  
8.2

4.364  
8.0

2.281  
7.8

2.456  
7.6

2.240  
7.4

0.850  
7.2

336

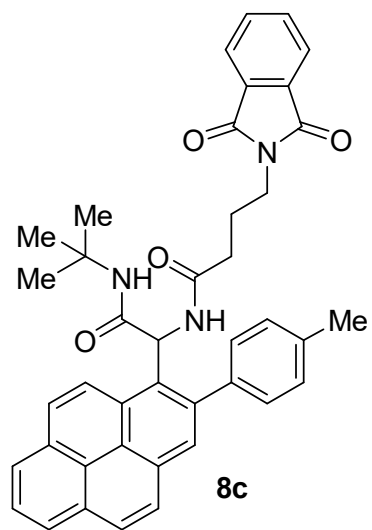
PPM



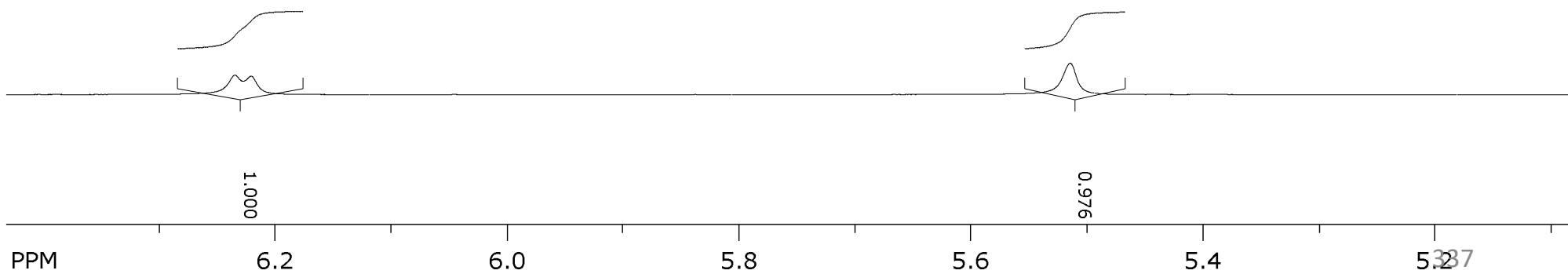
SpinWorks 4: AD 1982  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 19

6.2208  
6.2347

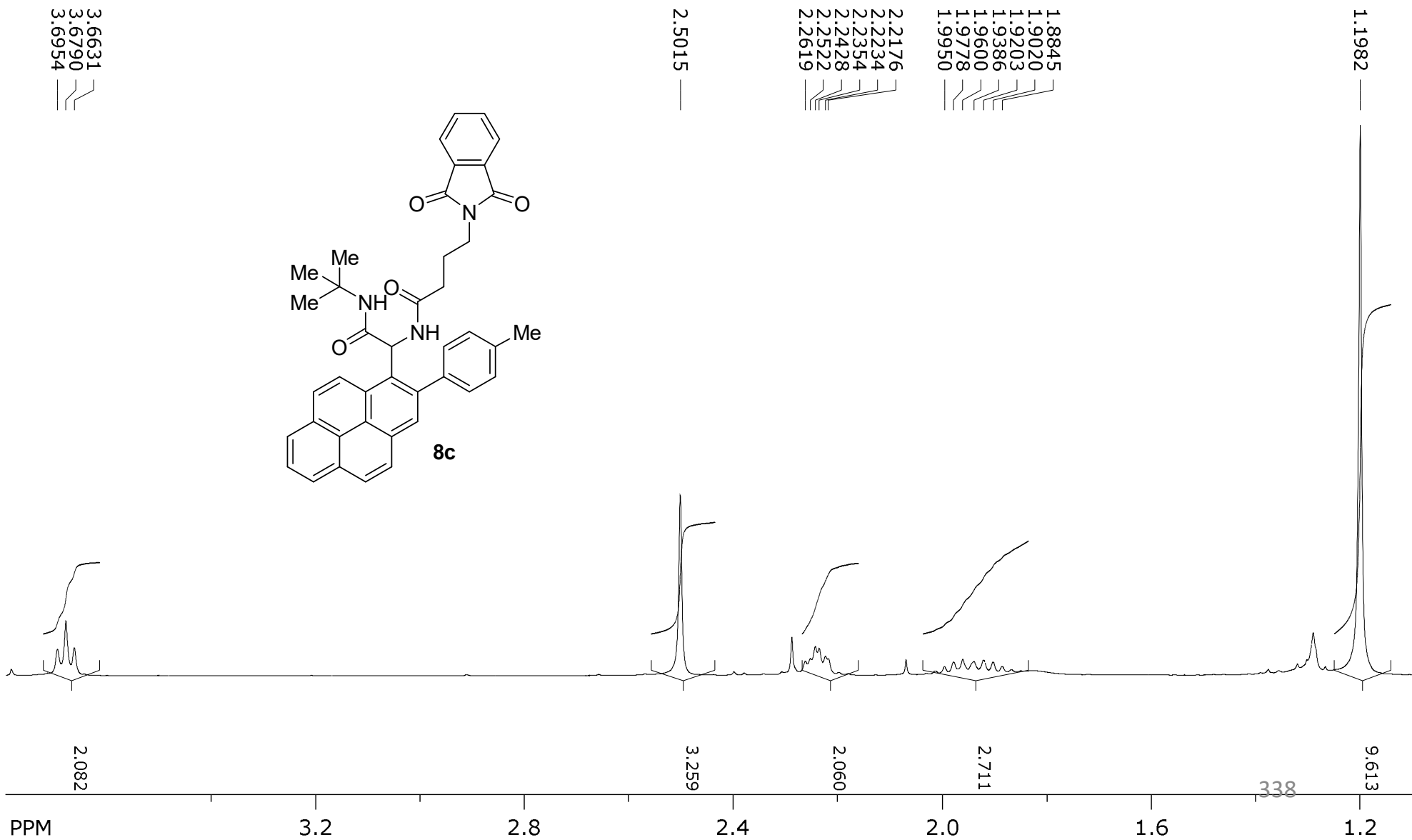
5.5142



8c



SpinWorks 4: AD 1982  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 19



SpinWorks 4: AD 1982  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata/mrsu 19

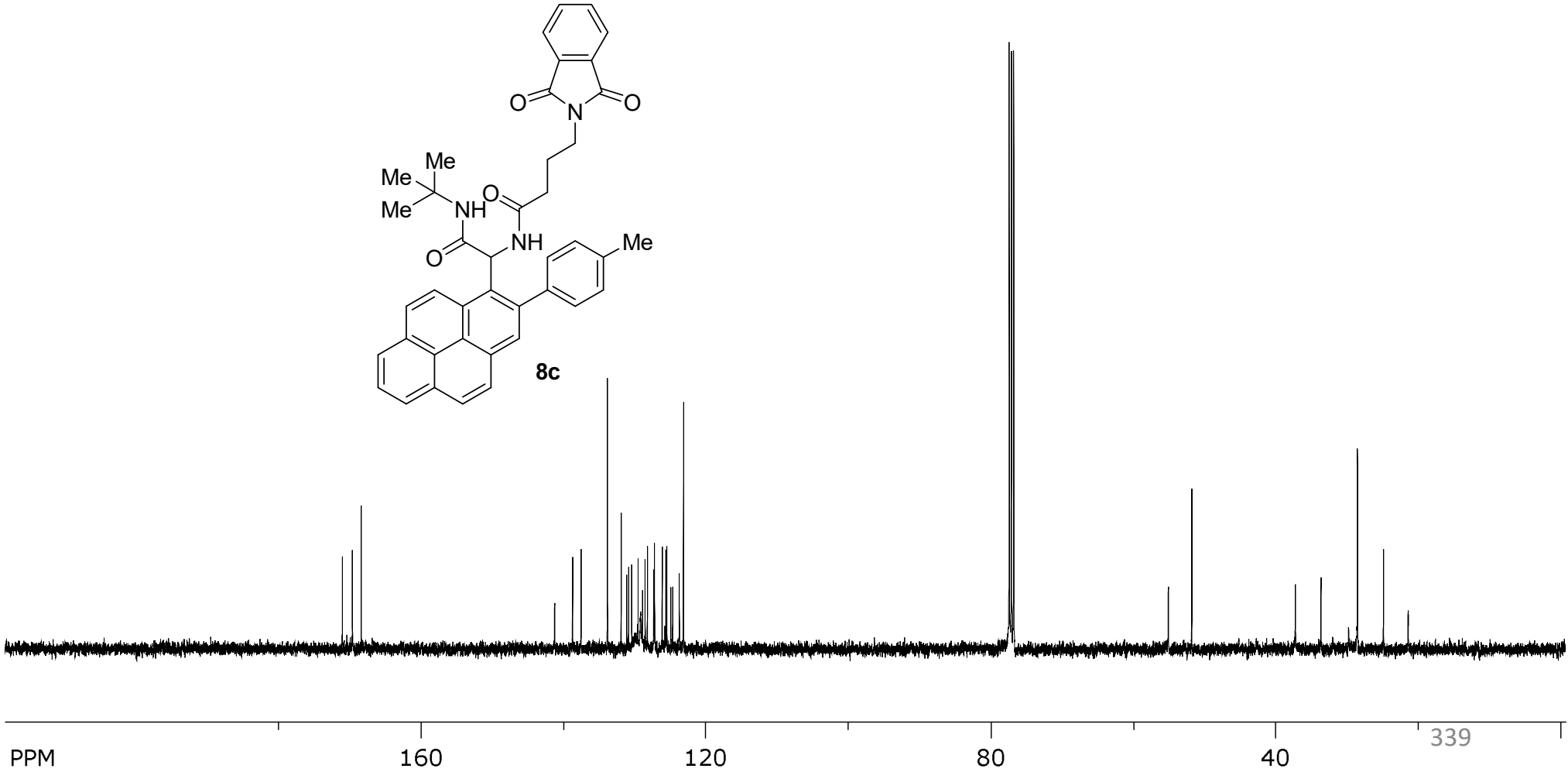
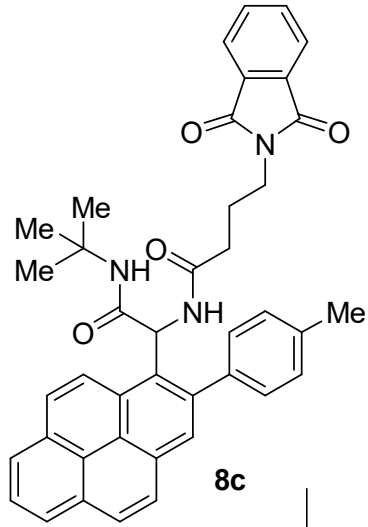
168.4369  
169.6728  
171.0838

123.1591  
123.7513  
124.6895  
124.9537  
125.5076  
125.6451  
126.1555  
130.4309  
130.8793  
131.1325  
131.9237  
133.8414  
137.5458  
138.7485  
141.2654

76.7656  
77.0836  
77.4012

51.7571  
55.0523

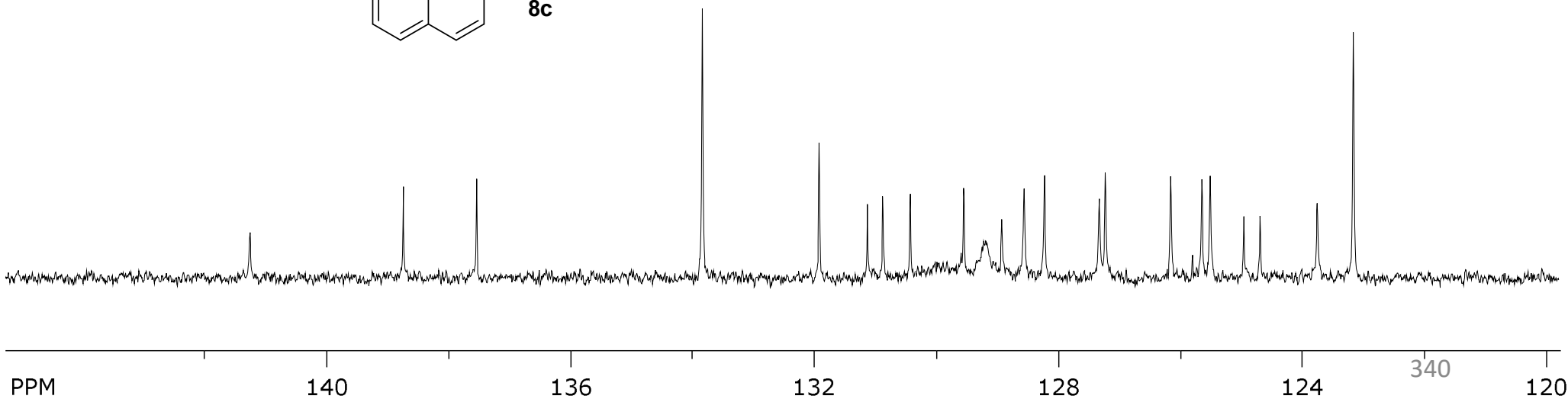
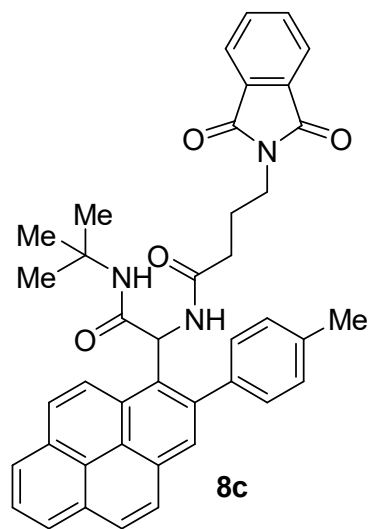
21.3736  
24.8166  
28.4748  
33.6092  
37.2016



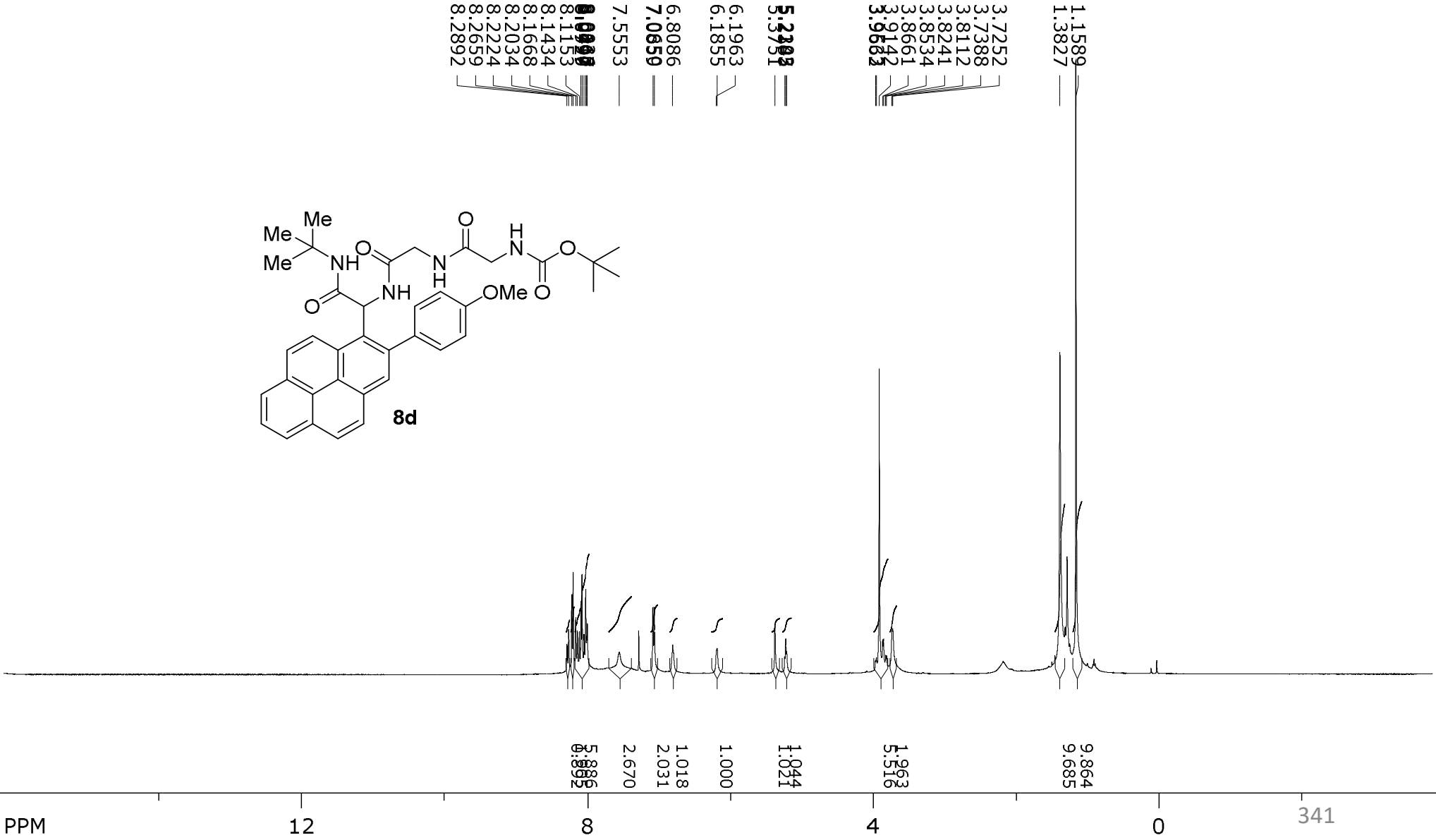
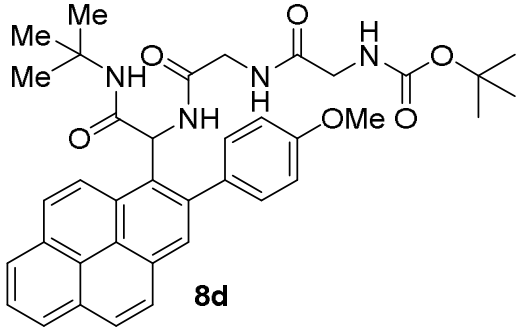
SpinWorks 4: AD 1982

C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu

141.2654 —  
138.7485 —  
137.5458 —  
133.8414 —  
131.9237 —  
130.4309 —  
130.8793 —  
131.1325 —  
129.5517 —  
129.2244 —  
129.1688 —  
128.9269 —  
128.5635 —  
128.2279 —  
127.3294 —  
126.1555 —  
125.6451 —  
125.5076 —  
124.9537 —  
124.6895 —  
123.7513 —  
123.1591 —



SpinWorks 4: AD 2195 B  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 58



SpinWorks 4: AD 2195 B  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 58

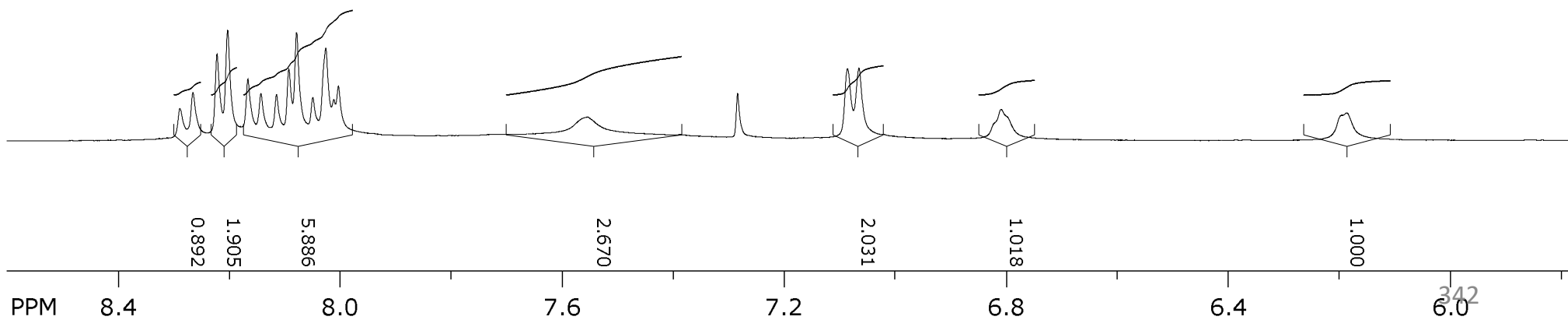
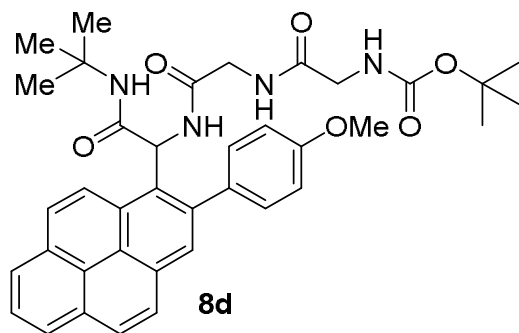
8.0036  
8.0117  
8.0263  
8.0497  
8.0790  
8.0929  
8.1153  
8.1434  
8.1668  
8.2034  
8.2224  
8.2659  
8.2892

7.5553

7.0650  
7.0859

6.8086

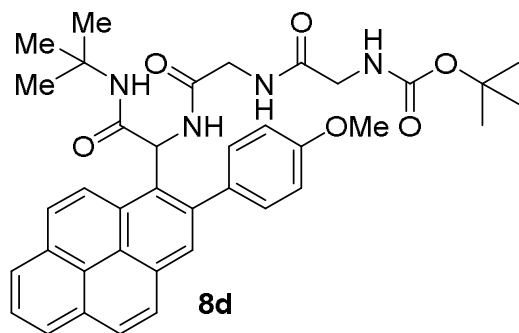
6.1963  
6.1855



SpinWorks 4: AD 2195 B  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 58

5.3751  
5.2103  
5.2242  
5.2385

3.7252  
3.7388  
3.8112  
3.8241  
3.8534  
3.8661  
3.9142  
3.9533  
3.9662

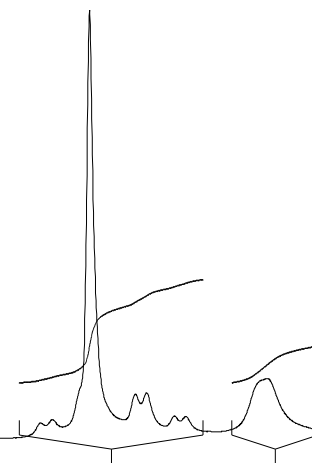


8d



1.021

1.044



5.516

1.963

343  
3.6

PPM

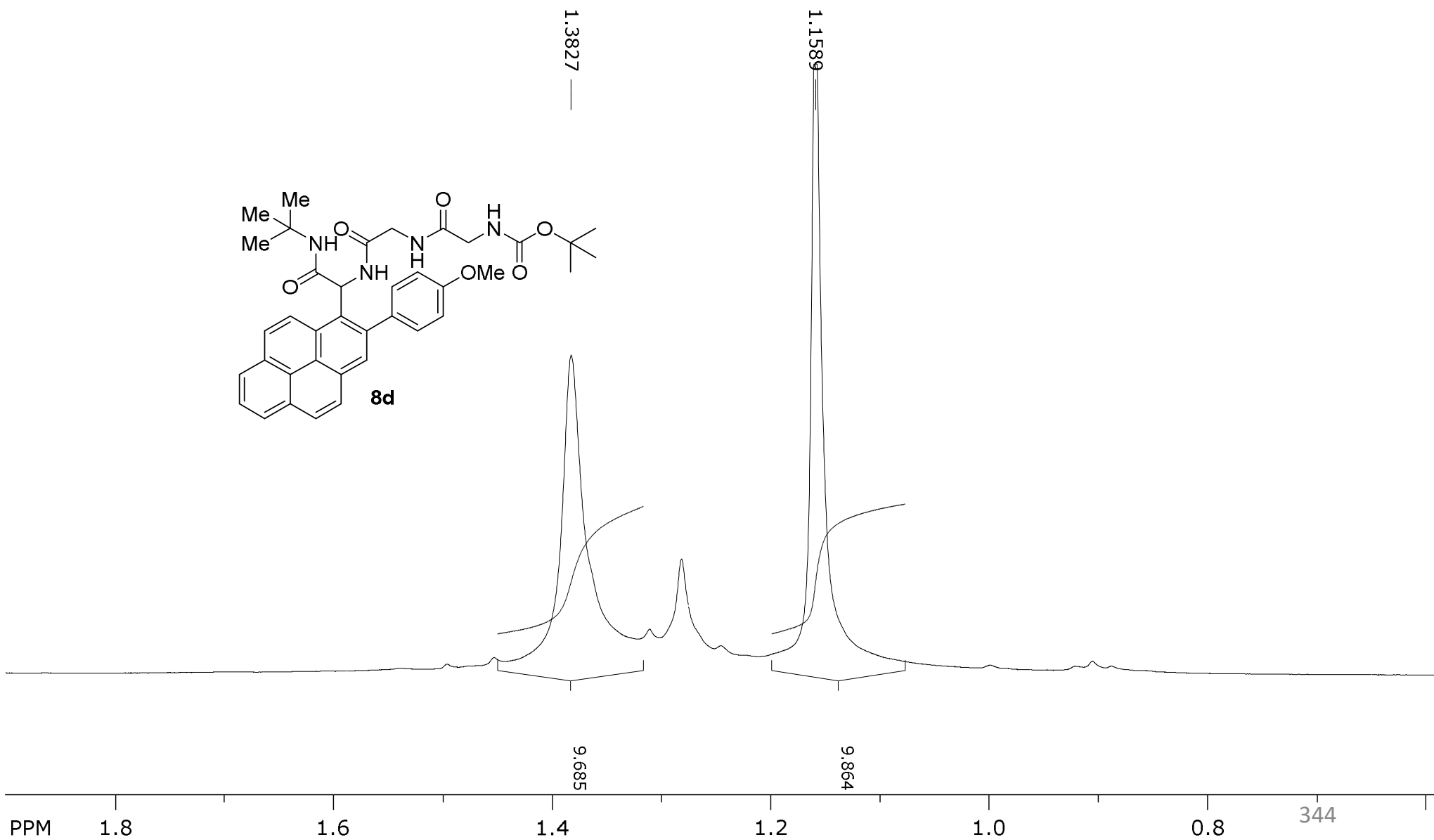
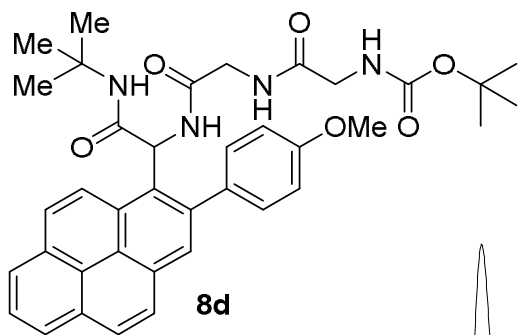
5.2

4.8

4.4

4.0

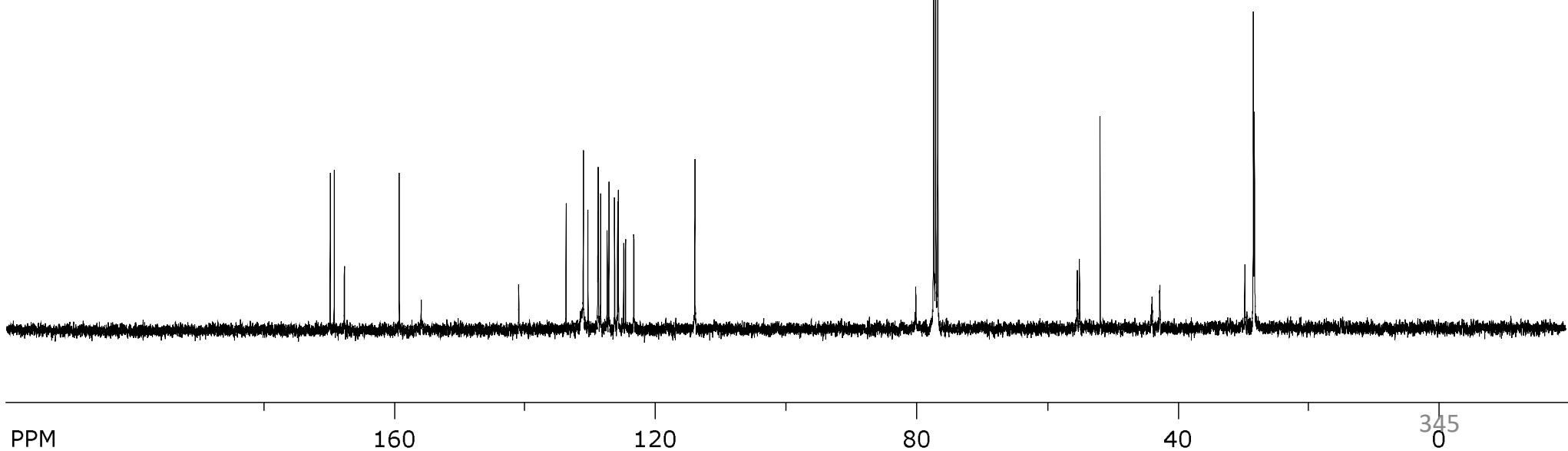
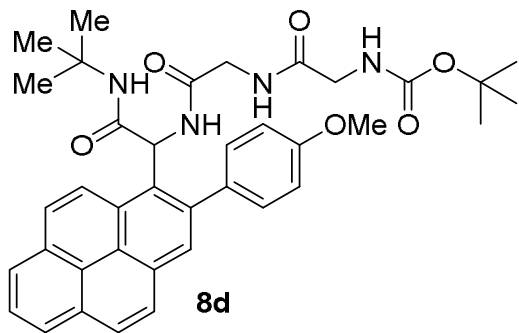
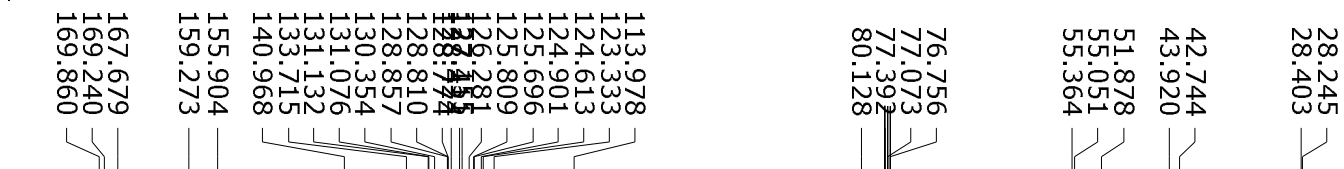
SpinWorks 4: AD 2195 B  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 58





SpinWorks 4: AD 2195 B

C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 58



SpinWorks 4: AD 2195 B  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 58

167.679 —  
169.240 —  
169.860 —

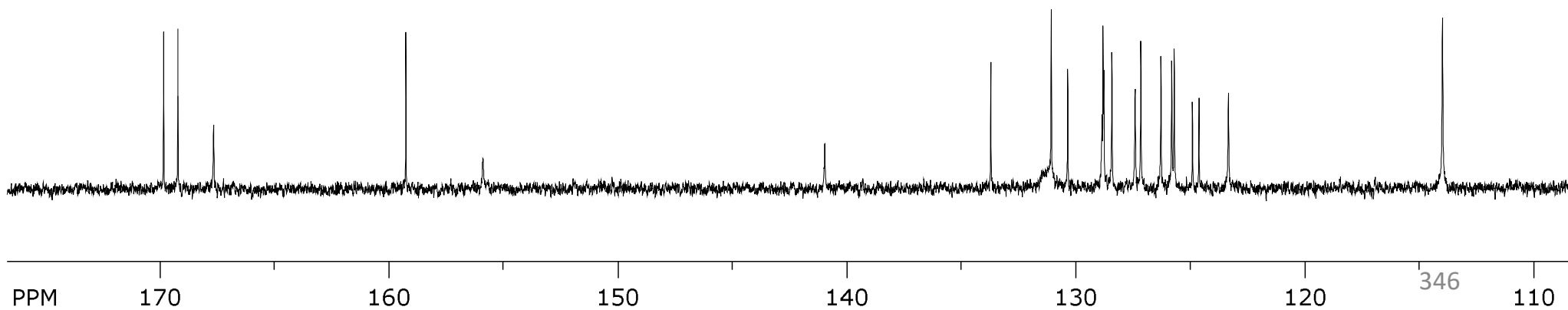
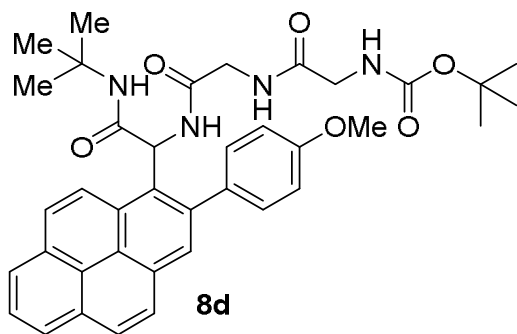
159.273 —

155.904 —

140.968 —

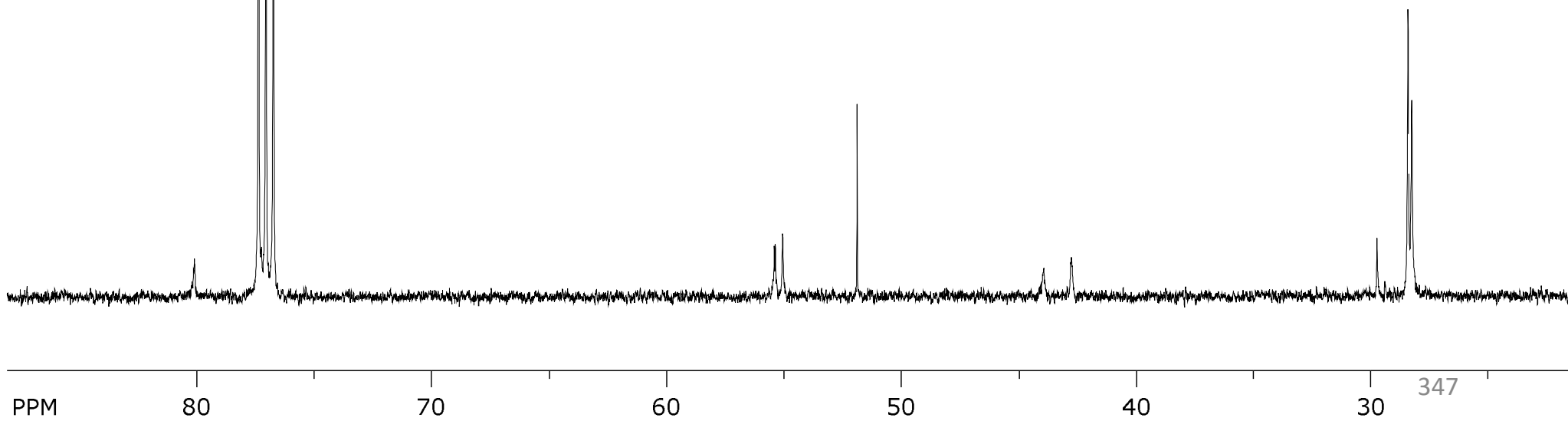
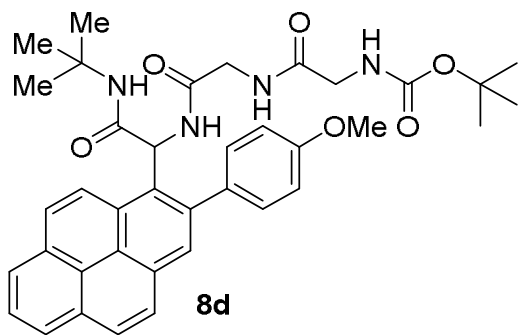
123.333 —  
124.613 —  
124.901 —  
125.696 —  
125.809 —  
126.281 —  
127.155 —  
127.411 —  
128.424 —  
128.774 —  
128.810 —  
128.857 —  
130.354 —  
131.076 —  
131.132 —  
133.715 —

113.978 —

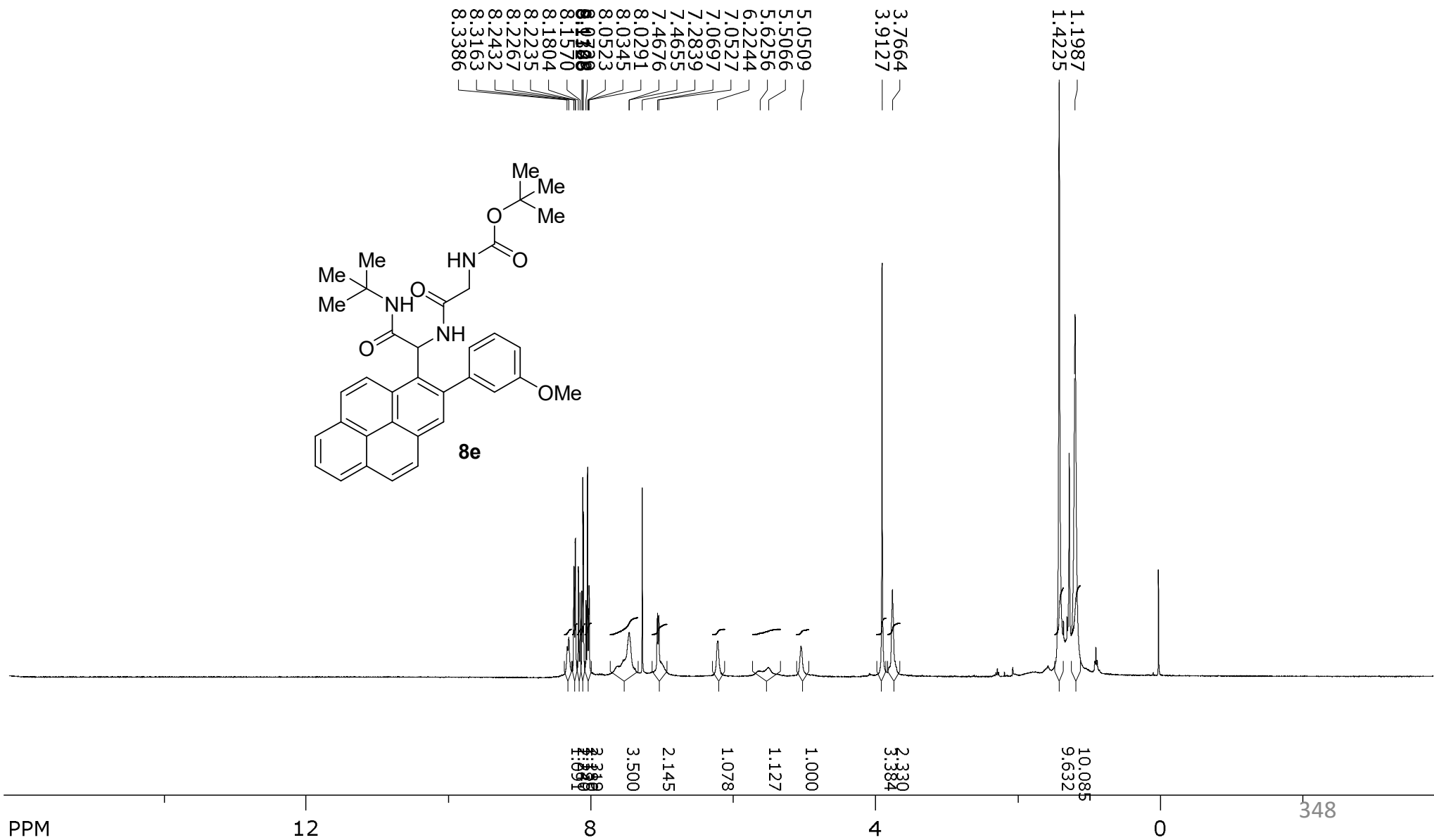
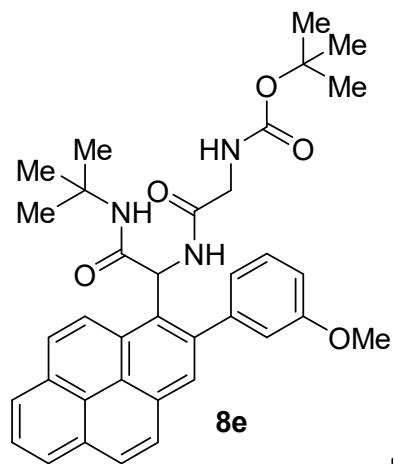


SpinWorks 4: AD 2195 B  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 58

80.128 —  
77.392 —  
77.073 —  
76.756 —  
55.051 —  
55.364 —  
51.878 —  
43.920 —  
42.744 —  
28.245 —  
28.403 —



SpinWorks 4: SUB 216 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 52



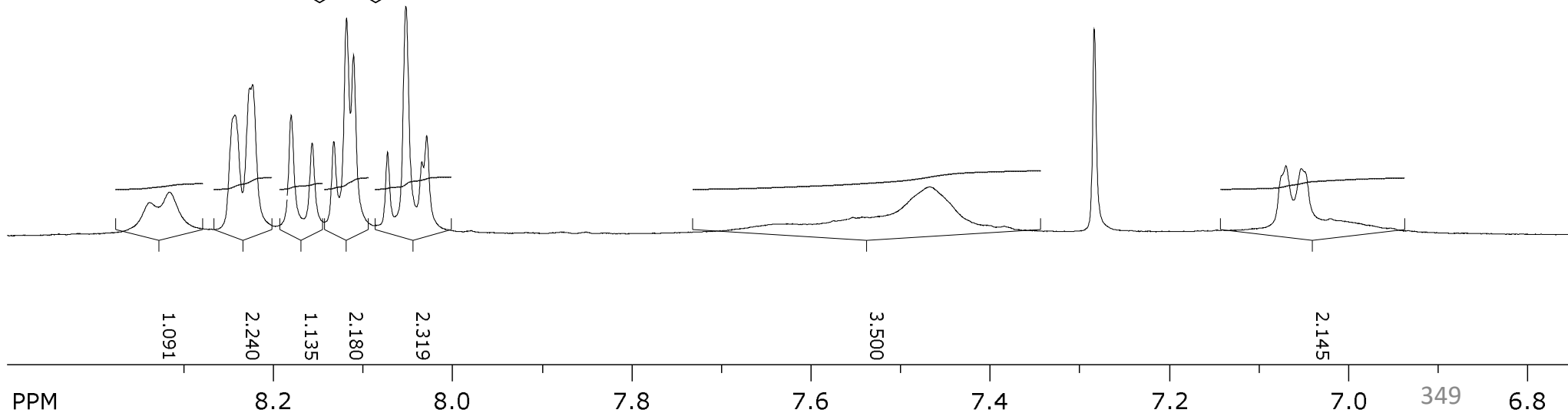
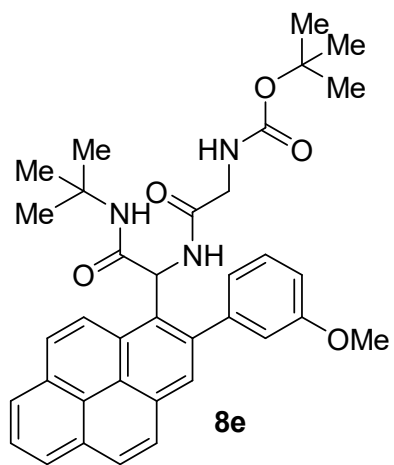
SpinWorks 4: SUB 216 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 52

8.0291  
8.0345  
8.0523  
8.0729  
8.1108  
8.1186  
8.1328  
8.1570  
8.1804  
8.2235  
8.2267  
8.2432  
8.3163  
8.3386

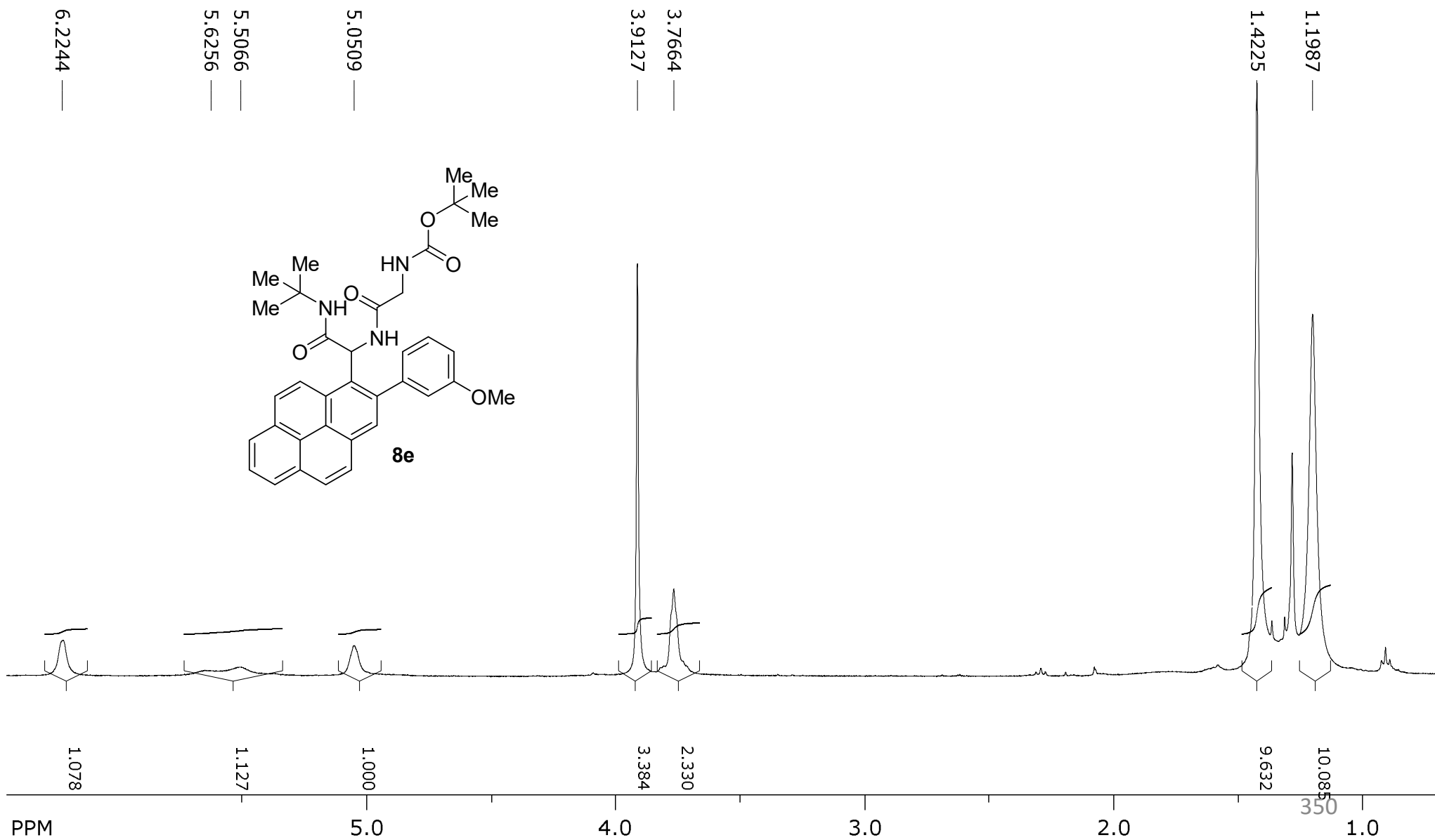
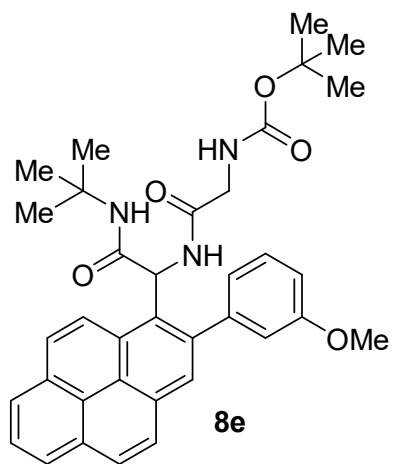
7.4655  
7.4676

7.2839

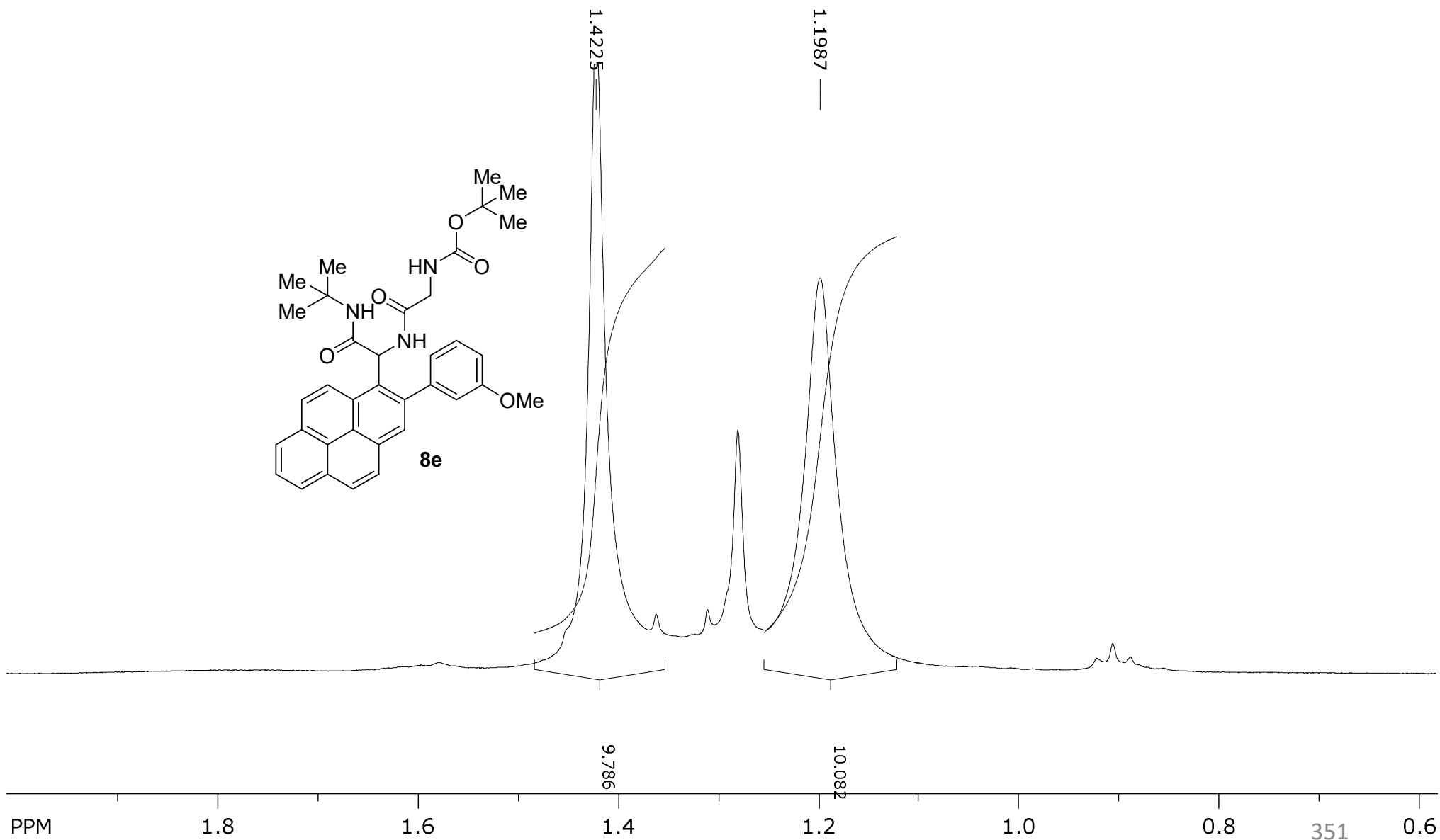
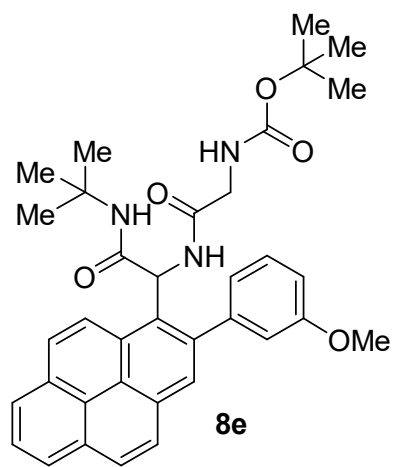
7.0527  
7.0697



SpinWorks 4: SUB 216 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 52

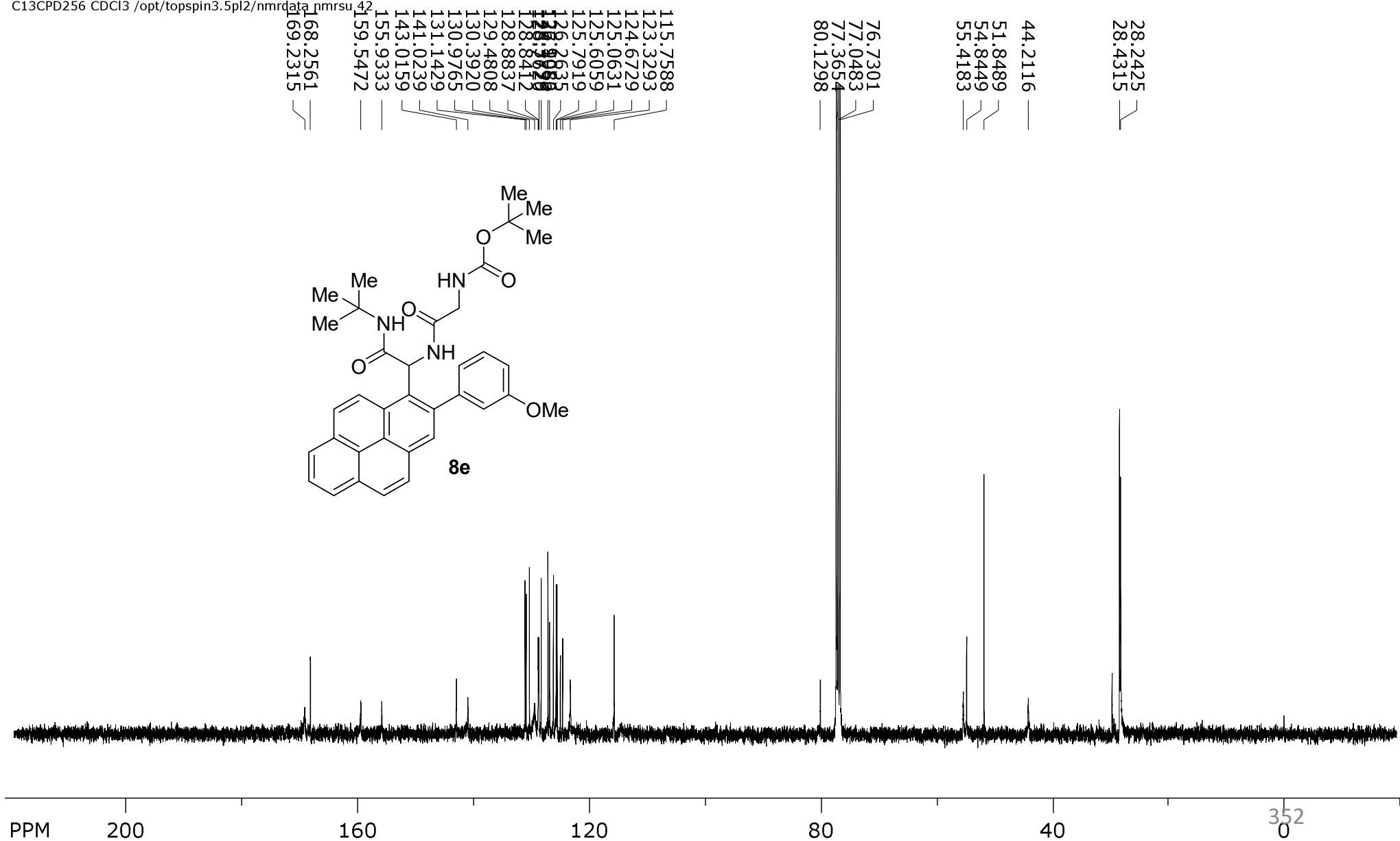


SpinWorks 4: SUB 216 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 52



SpinWorks 4: SUB-216R

C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata\_nmrstu\_42





SpinWorks 4: SUB-216R  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 42

159.5472

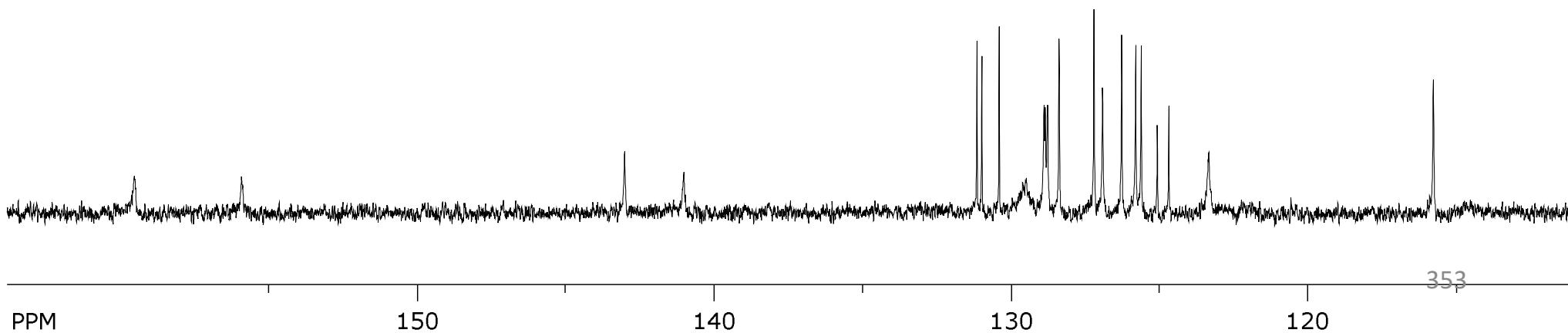
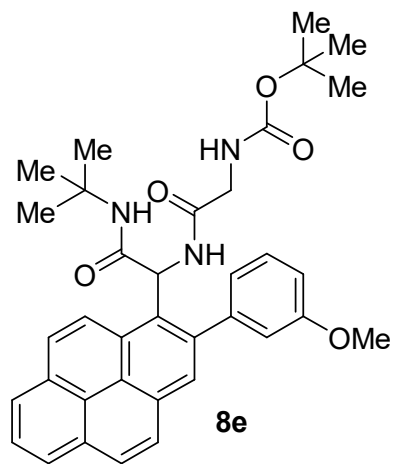
155.9333

143.0159

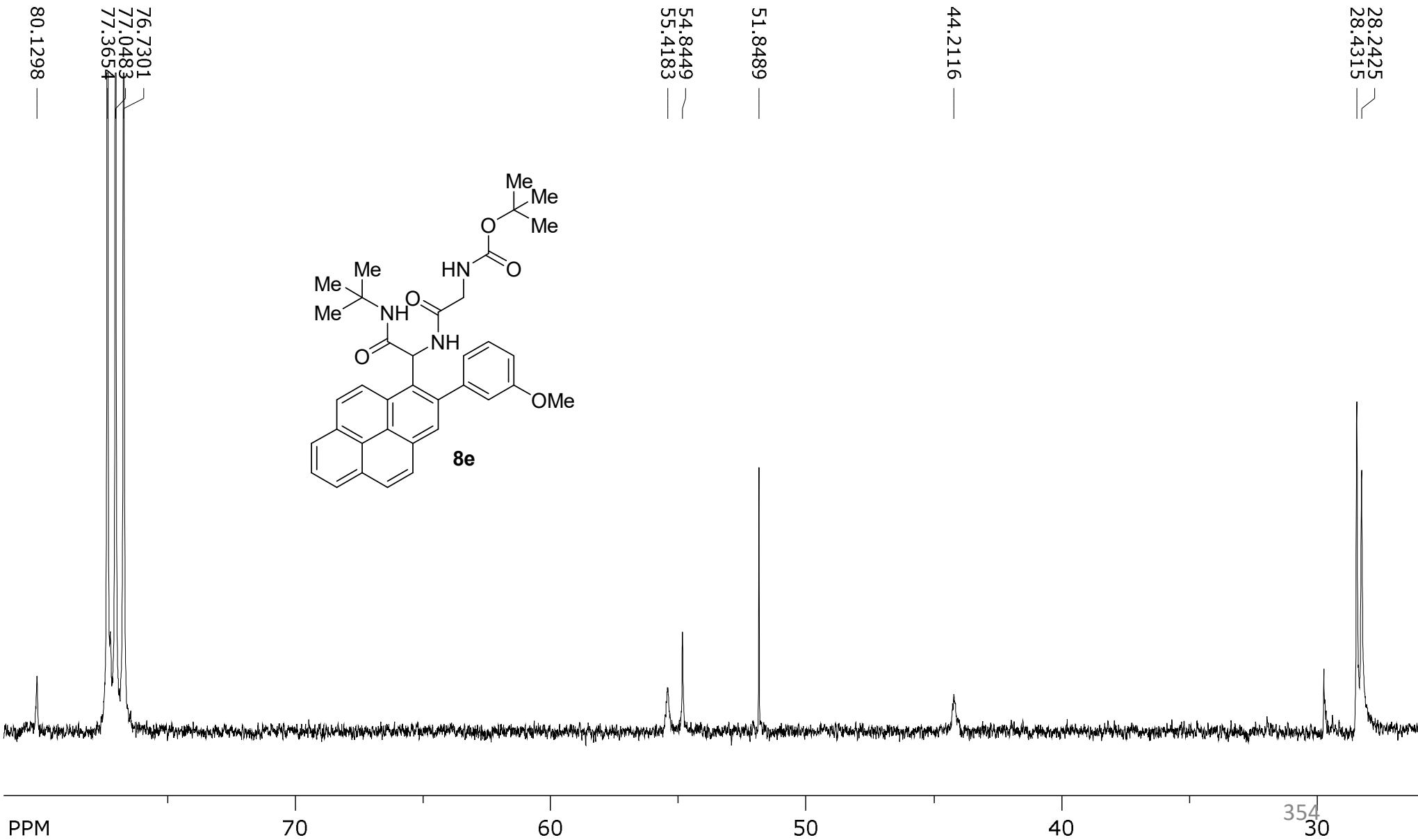
141.0239

123.3293  
124.6729  
125.0631  
125.6059  
125.7919  
126.2635  
126.9086  
127.1962  
128.3729  
128.7620  
128.8412  
128.8837  
129.4808  
130.3920  
130.9765  
131.1429

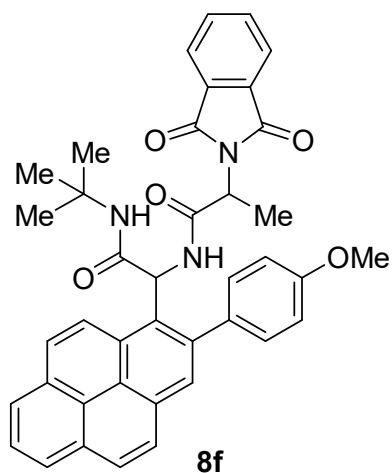
115.7588



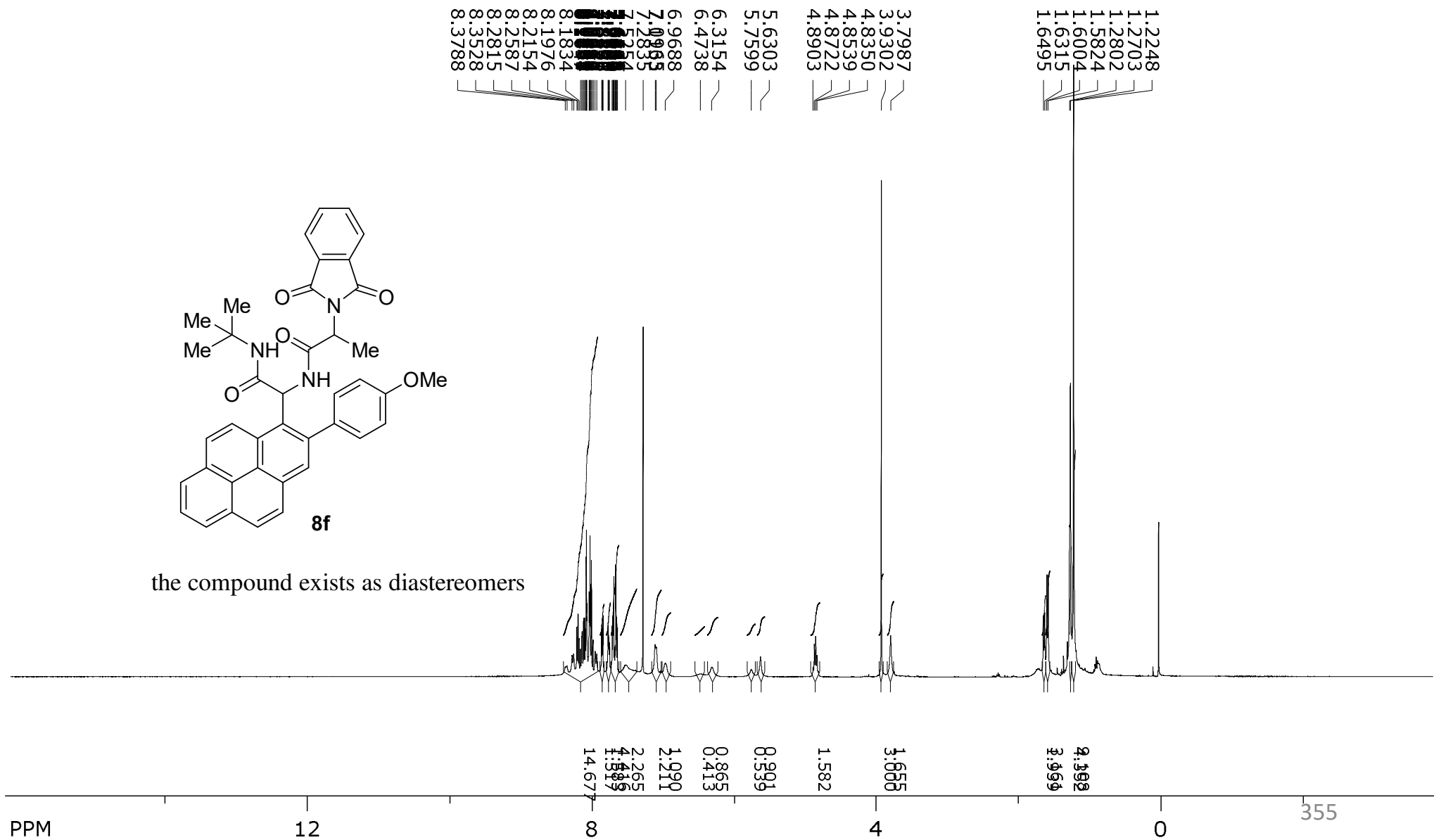
SpinWorks 4: SUB-216R  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 42



SpinWorks 4: AD-2074REP  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 39

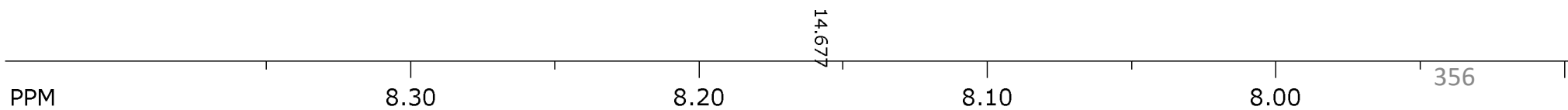
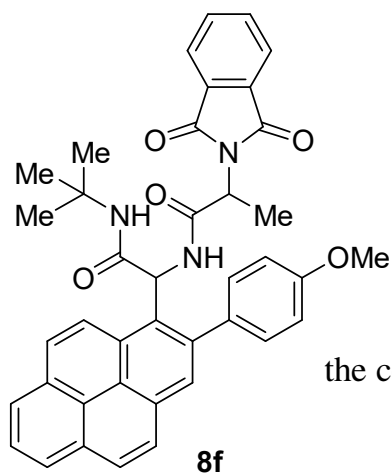


the compound exists as diastereomers



SpinWorks 4: AD-2074REP  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 39

8.3788 —  
8.3528 —  
8.2815 —  
8.2587 —  
8.2154 —  
8.1976 —  
8.1834 —  
8.1647 —  
8.1395 —  
8.1454 —  
8.1201 —  
8.1063 —  
8.0950 —  
8.0729 —  
8.0791 —  
8.0837 —  
8.0418 —  
8.0229 —  
8.0295 —  
8.0349 —  
8.0098 —  
7.9871 —  
7.9913 —  
7.9575 —  
7.9340 —



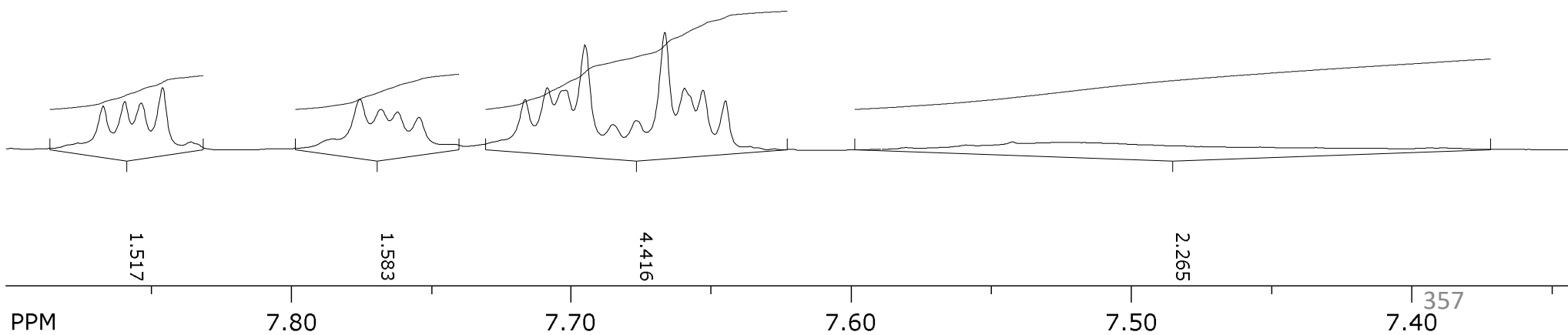
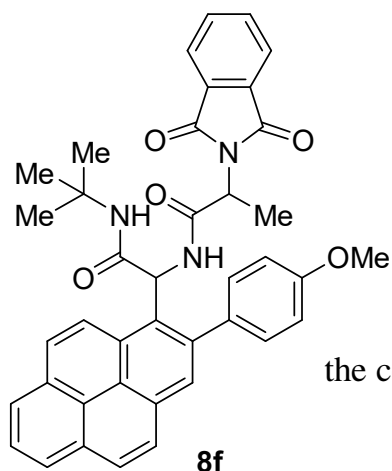
SpinWorks 4: AD-2074REP  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 39

7.8460  
7.8537  
7.8596  
7.8673

7.7545  
7.7621  
7.7681  
7.7756

7.6449  
7.6530  
7.6596  
7.6666  
7.6768  
7.6852  
7.6951  
7.7020  
7.7031  
7.7086  
7.7166

7.5254



SpinWorks 4: AD-2074REP  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 39

7.0965  
7.1133

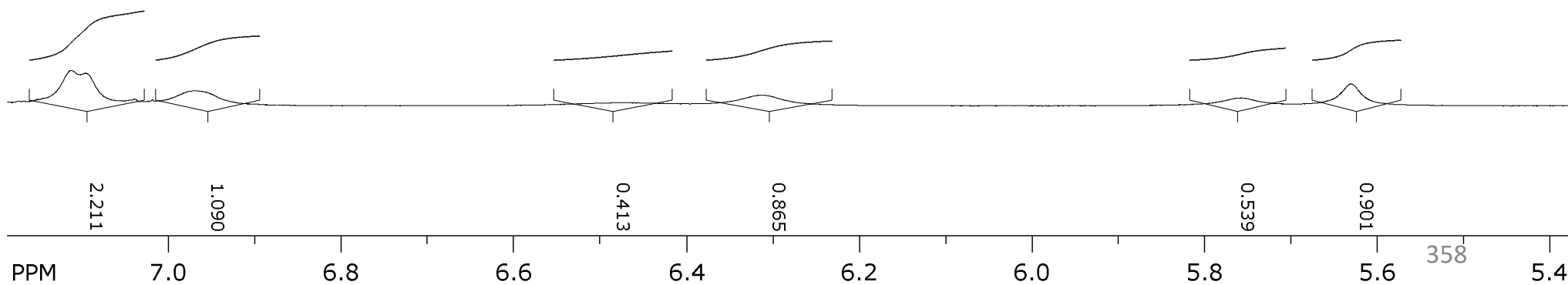
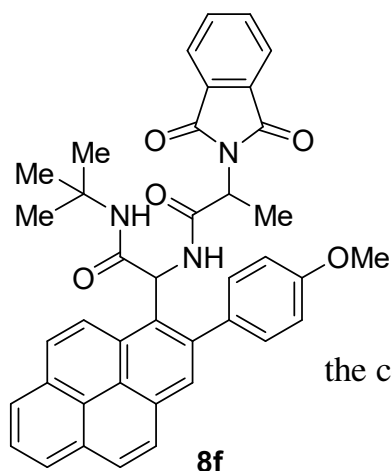
6.9688

6.4738

6.3154

5.7599

5.6303

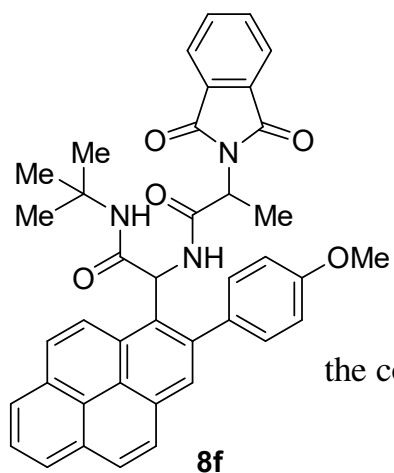


SpinWorks 4: AD-2074REP  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 39

4.8350  
4.8539  
4.8722  
4.8903

3.9302

3.7987



the compound exists as diastereomers

1.582

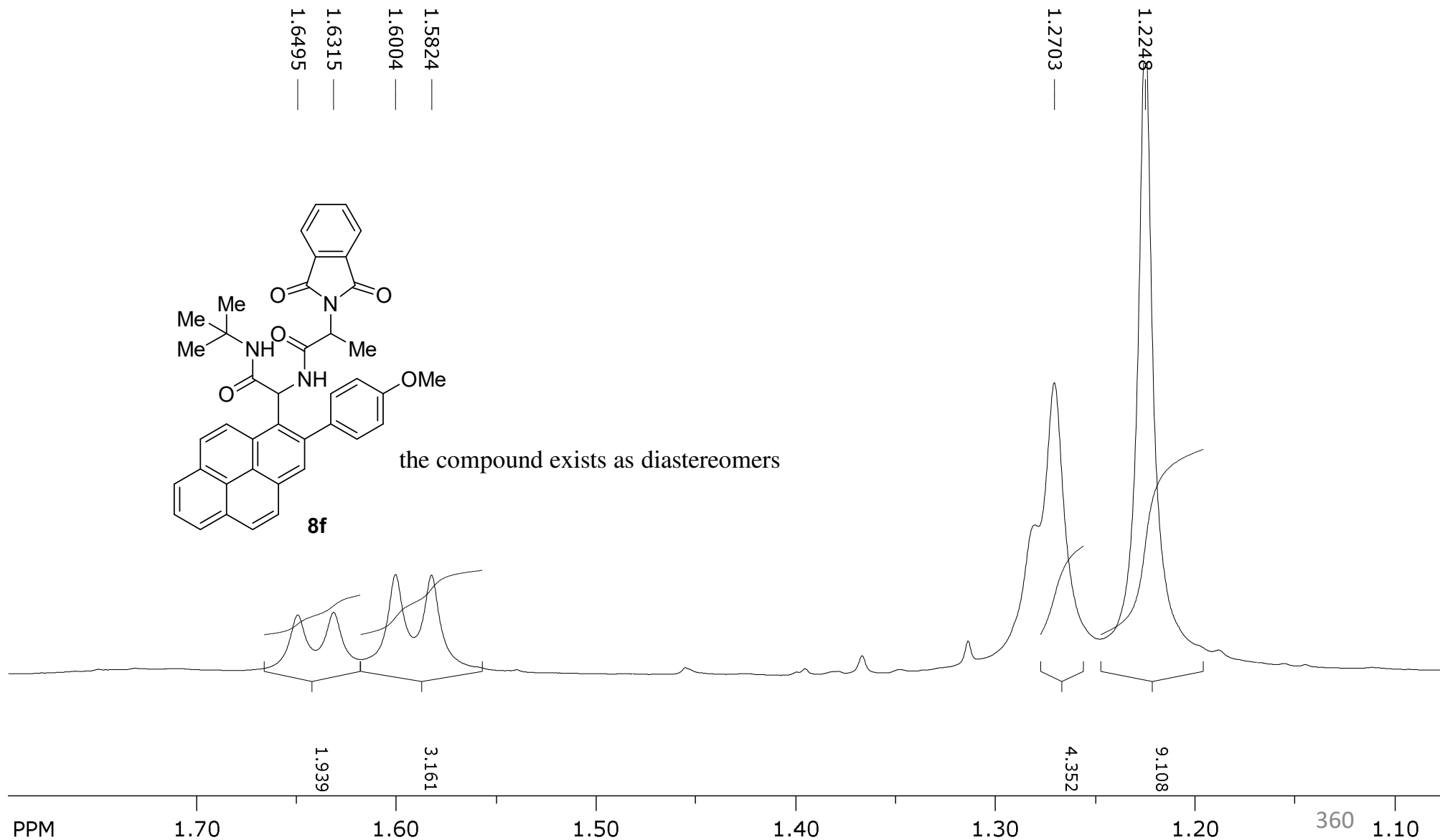
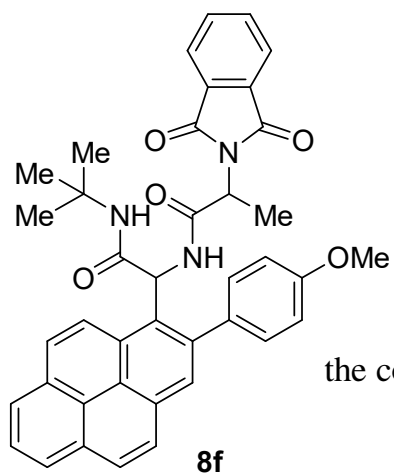
3.000

1.655

PPM 5.0 4.8 4.6 4.4 4.2 4.0 3.8 3.6

SpinWorks 4: AD-2074REP  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 39

1.5824  
1.6004  
1.6495  
1.6315



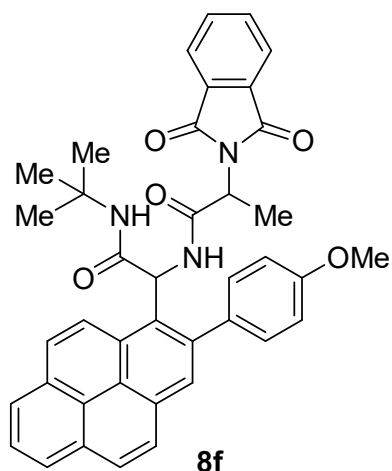




SpinWorks 4: AD-2074REP  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 39

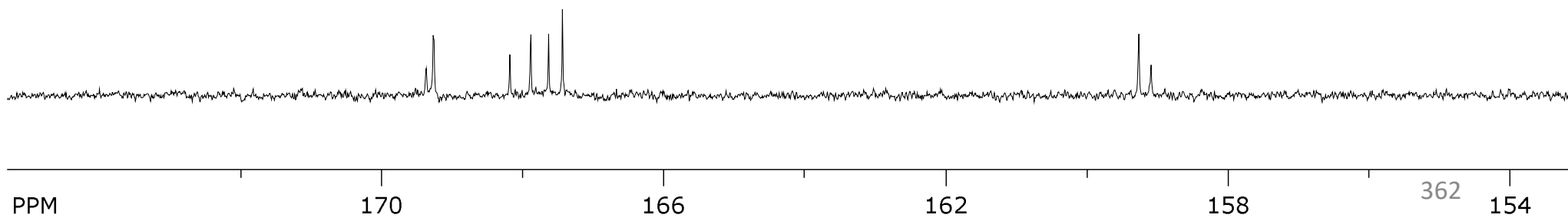
169.267  
169.374  
167.439  
167.637  
167.887  
168.183

159.093  
159.266

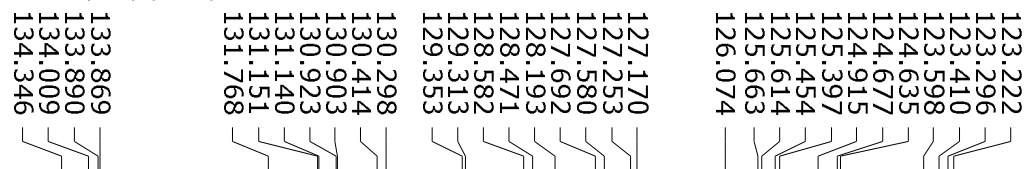


**8f**

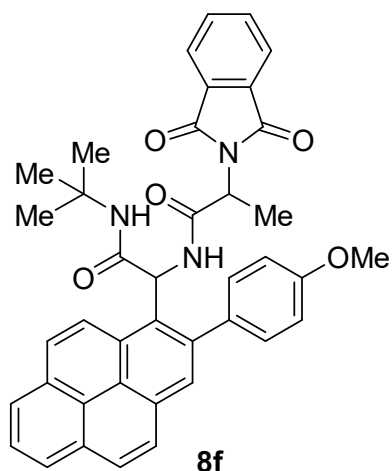
the compound exists as diastereomers



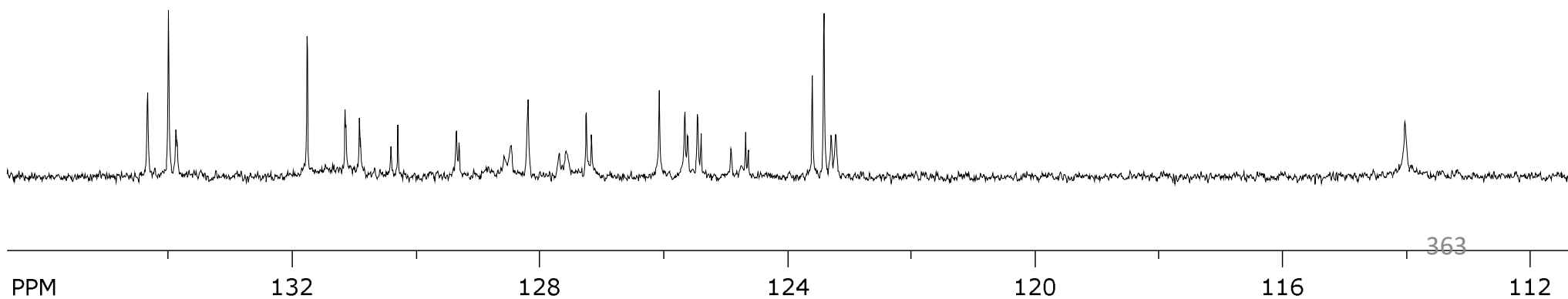
SpinWorks 4: AD-2074REP  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 39



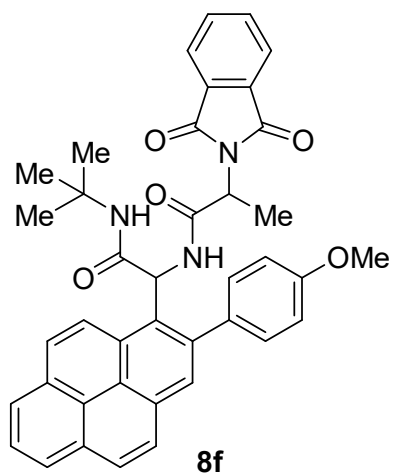
114.015



the compound exists as diastereomers

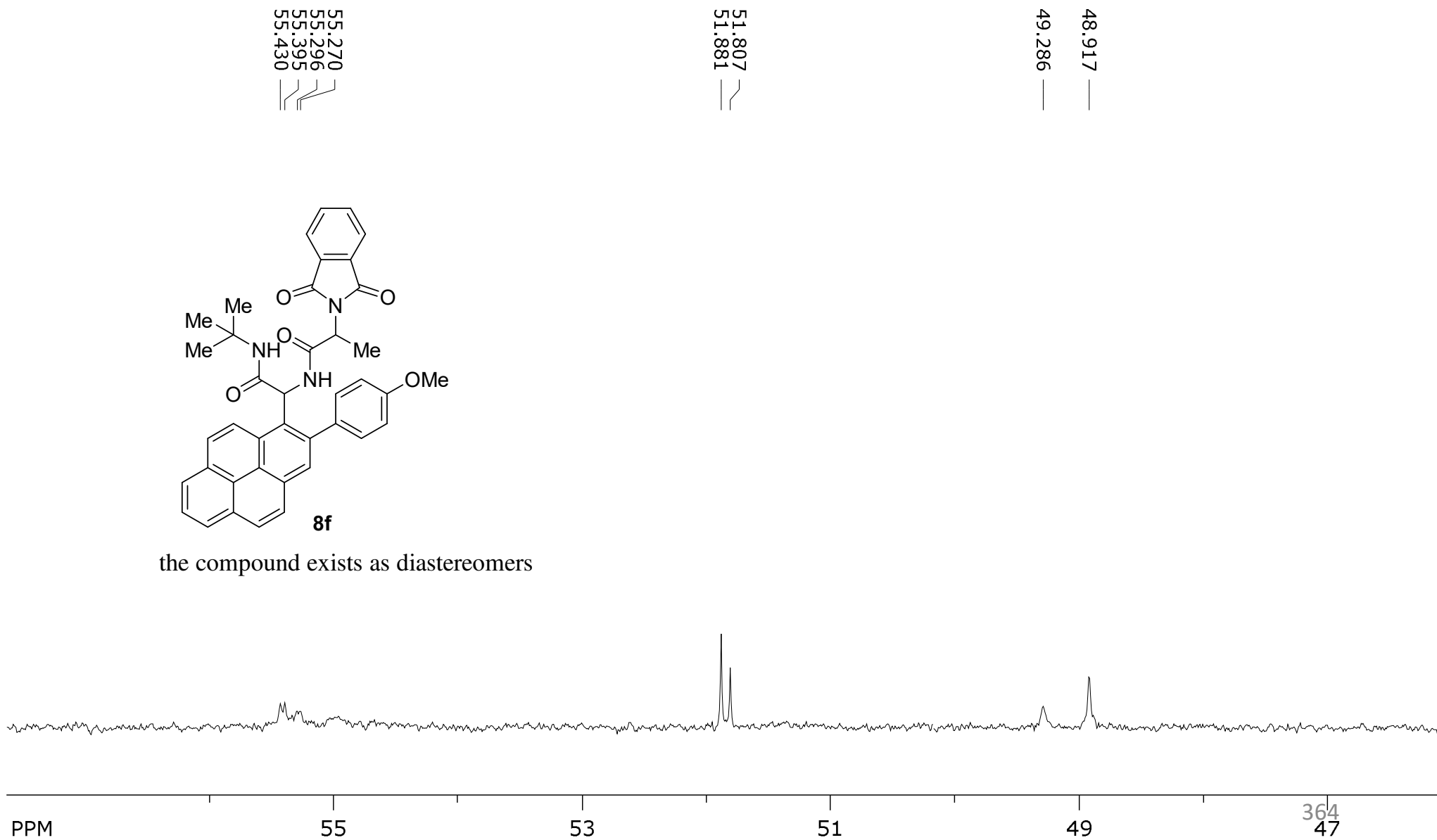


SpinWorks 4: AD-2074REP  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 39



**8f**

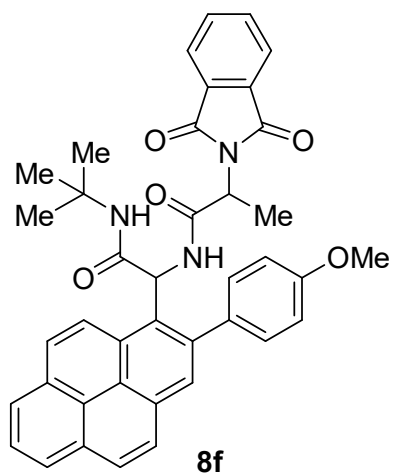
the compound exists as diastereomers



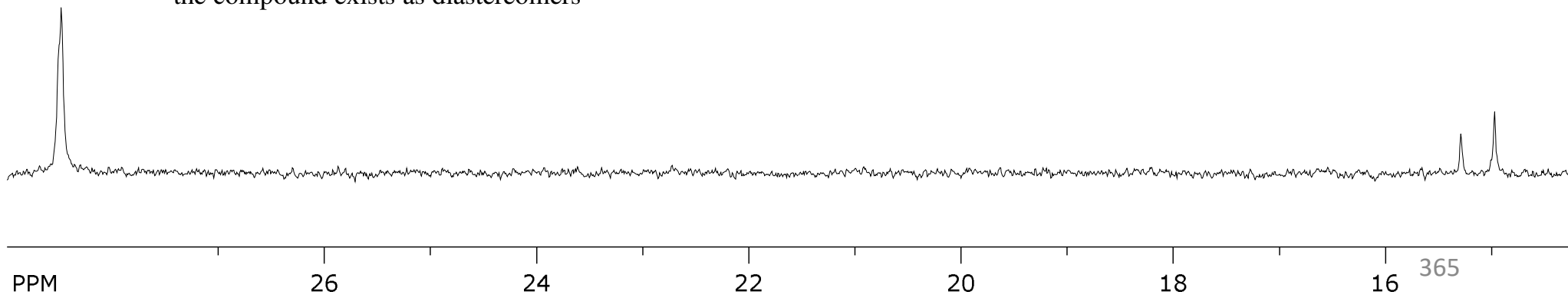
SpinWorks 4: AD-2074REP  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 39

28.482  
28.505

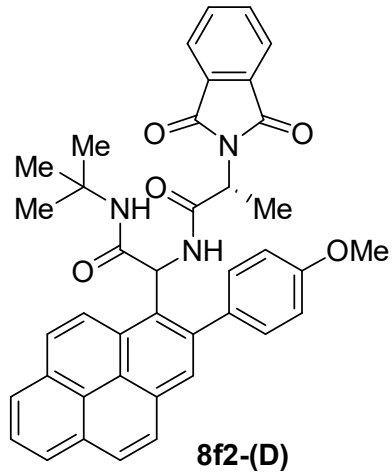
14.966  
15.283



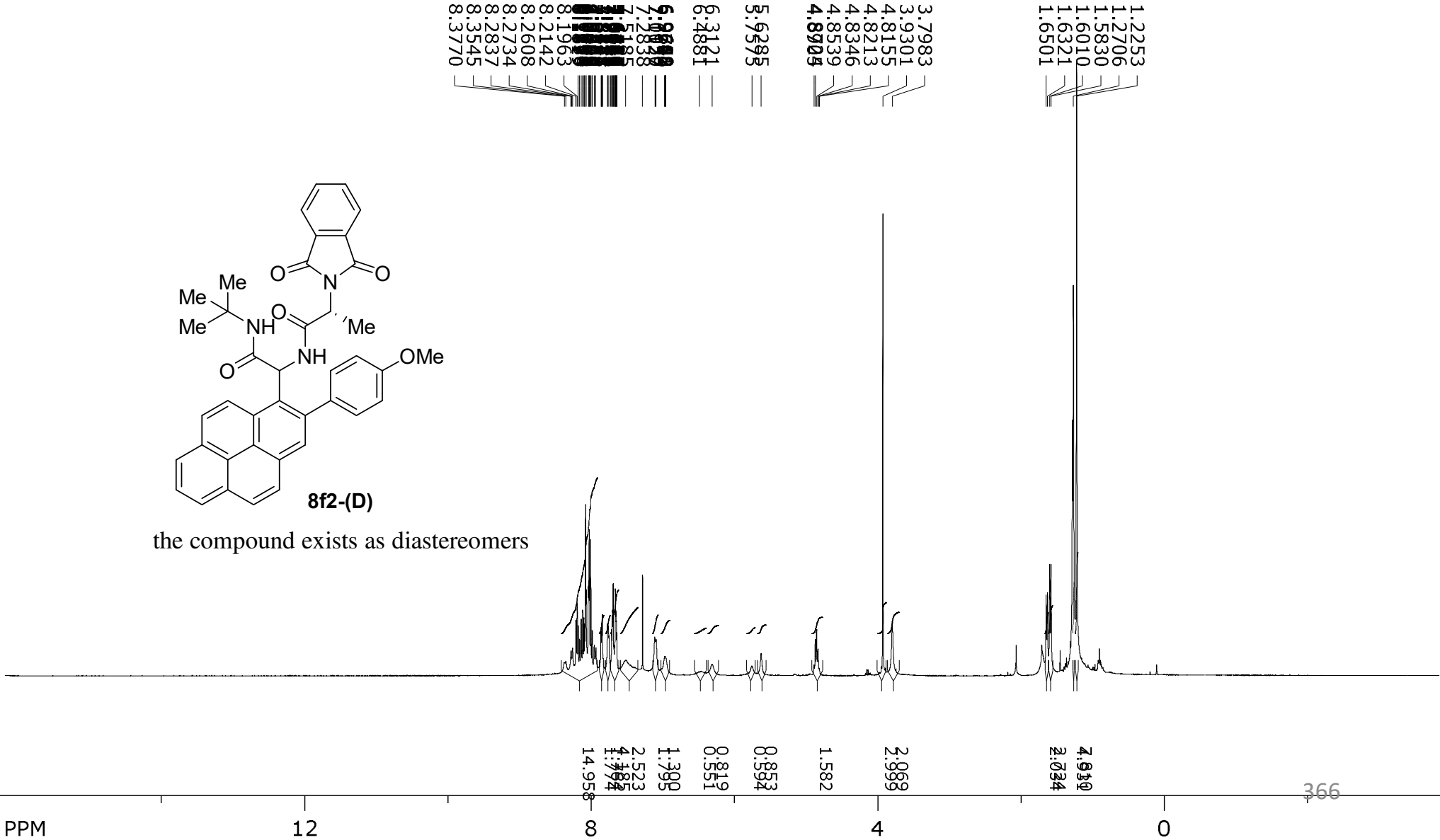
the compound exists as diastereomers



SpinWorks 4: AD 2083  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 42

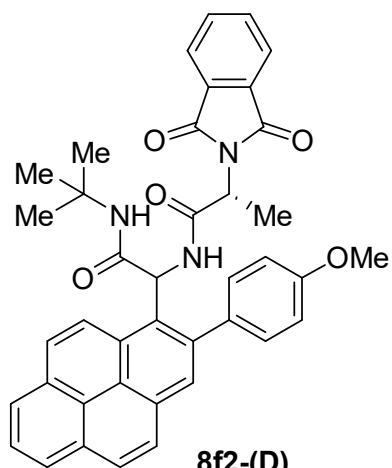


the compound exists as diastereomers

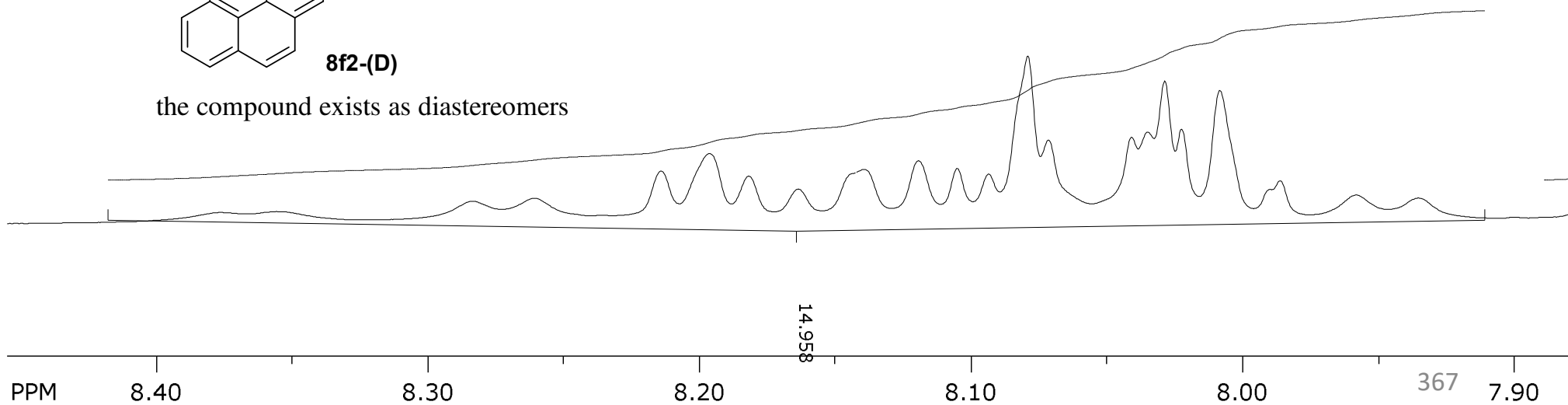


SpinWorks 4: AD 2083  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 42

8.3770 —  
8.3545 —  
8.2837 —  
8.2734 —  
8.2608 —  
8.2142 —  
8.1963 —  
8.1819 —  
8.1636 —  
8.1395 —  
8.1194 —  
8.1050 —  
8.0934 —  
8.0715 —  
8.0791 —  
8.0408 —  
8.0225 —  
8.0286 —  
8.0349 —  
8.0083 —  
7.9862 —  
7.9899 —  
7.9580 —  
7.9352 —

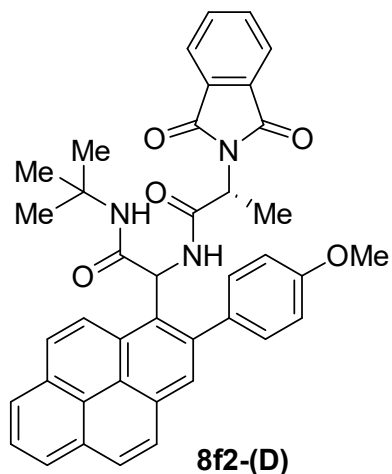


the compound exists as diastereomers

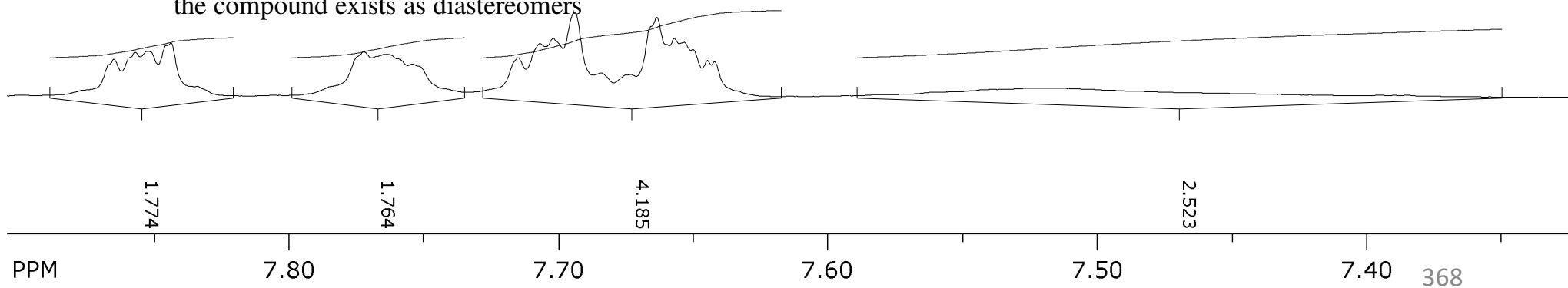


SpinWorks 4: AD 2083  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 42

7.8441  
7.8457  
7.8528  
7.8573  
7.8651  
  
7.7543  
7.7643  
7.7724  
  
7.7309  
7.7151  
7.7069  
7.7021  
7.6941  
7.6843  
7.6749  
7.6732  
7.6635  
7.6599  
7.6570  
7.6533  
7.6502  
7.6447  
7.6421  
  
7.5185



the compound exists as diastereomers

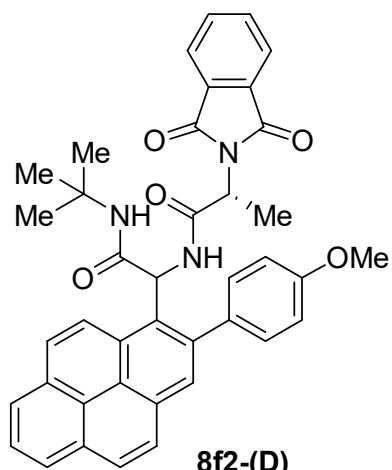




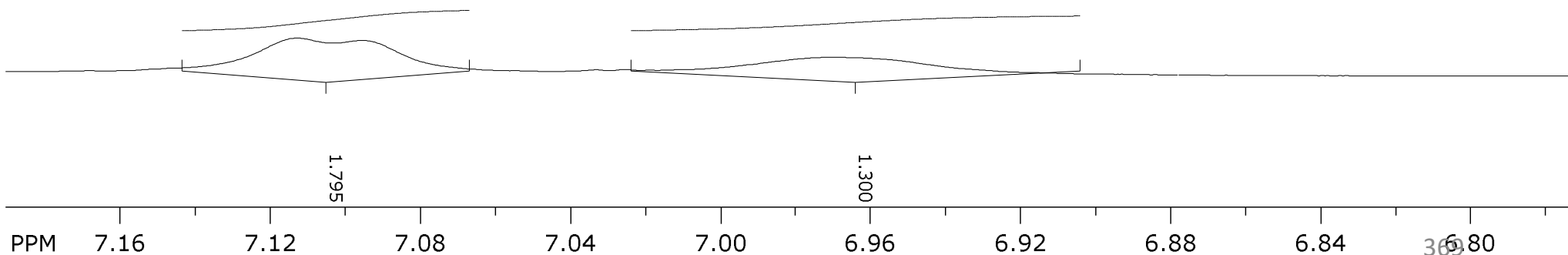
SpinWorks 4: AD 2083  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 42

7.0950  
7.1029  
7.1127

6.9610  
6.9642  
6.9658  
6.9680  
6.9698  
6.9711  
6.9728  
6.9752



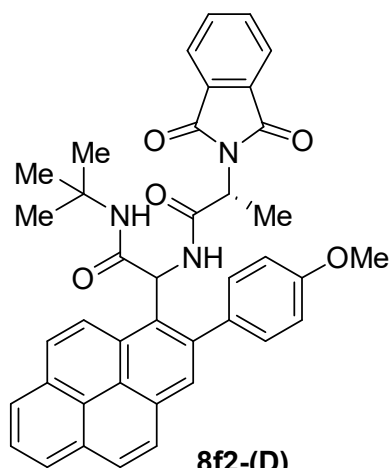
the compound exists as diastereomers



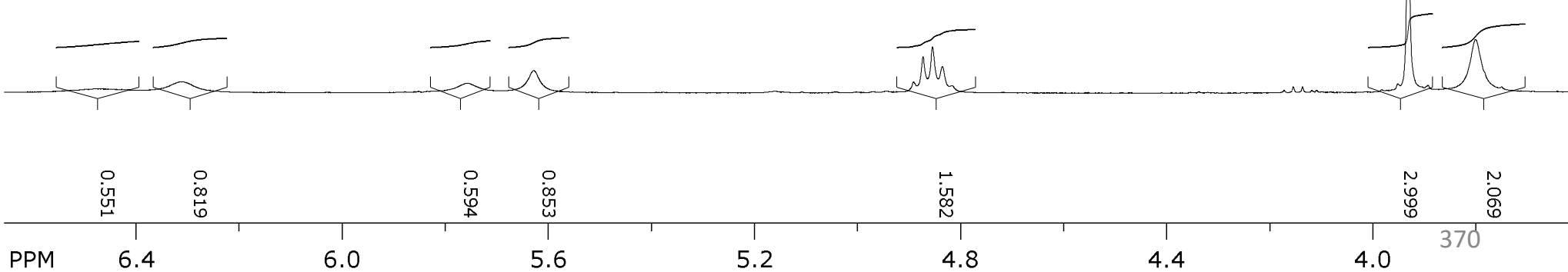
PPM 7.16 7.12 7.08 7.04 7.00 6.96 6.92 6.88 6.84 6.80

SpinWorks 4: AD 2083  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 42

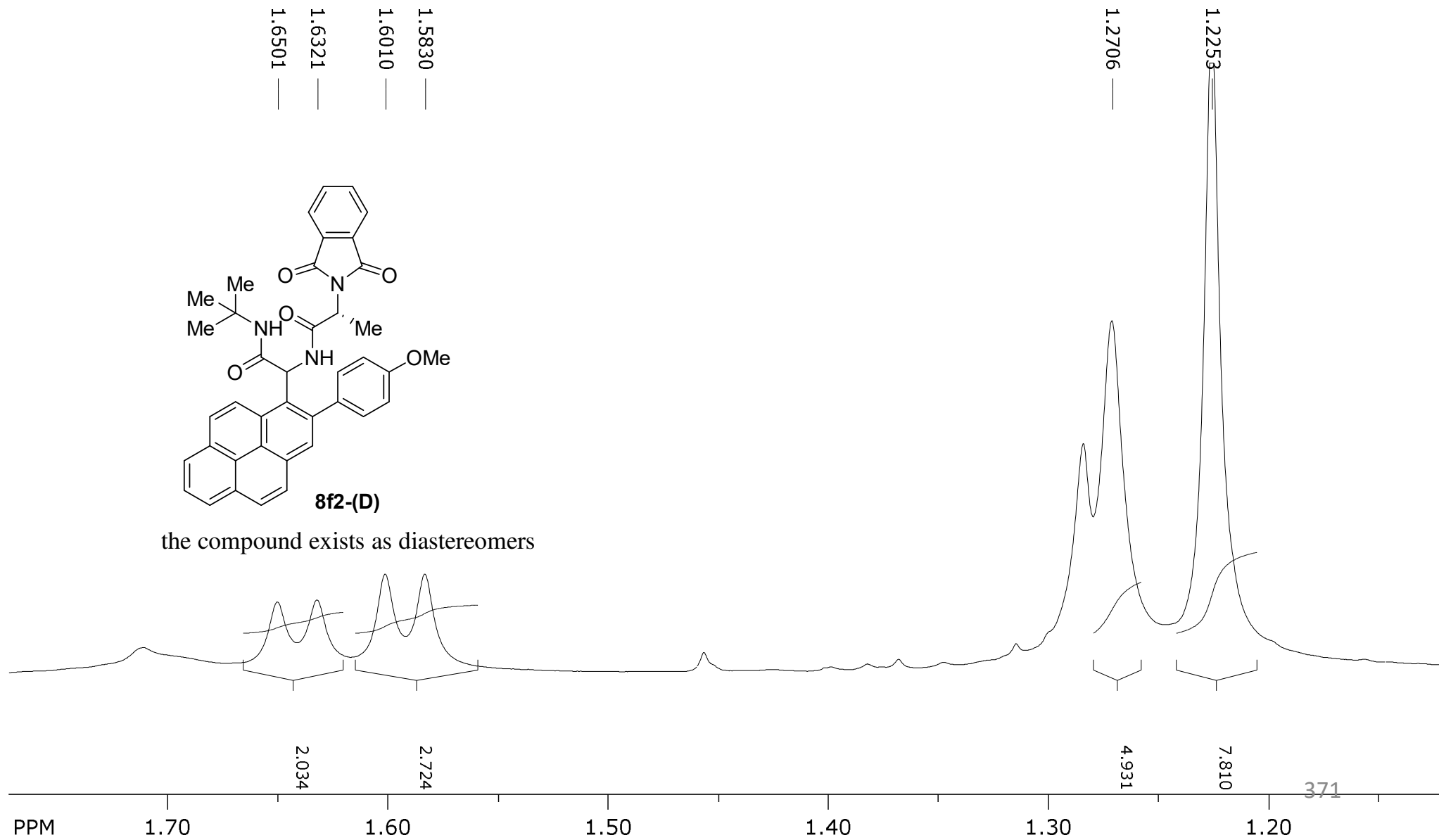
6.4881 —  
6.3121 —  
5.7575 —  
5.6285 —  
4.8155 —  
4.8213 —  
4.8346 —  
4.8539 —  
4.8724 —  
4.8905 —  
3.9301 —  
3.7983 —



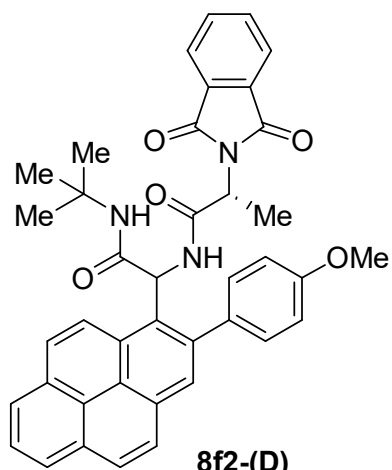
the compound exists as diastereomers



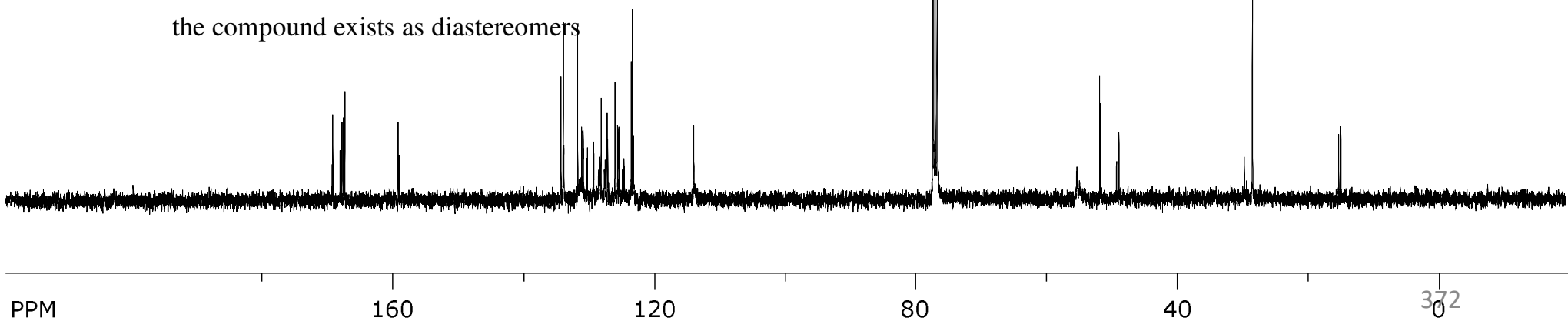
SpinWorks 4: AD 2083  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 42



SpinWorks 4: AD 2083  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 42



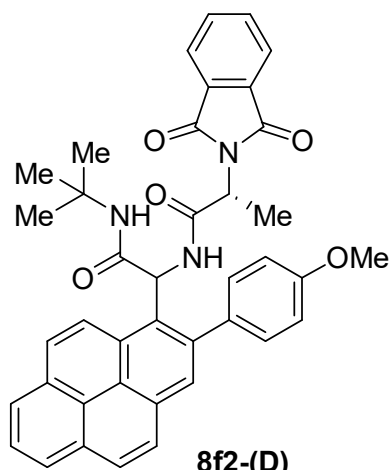
the compound exists as diastereomers



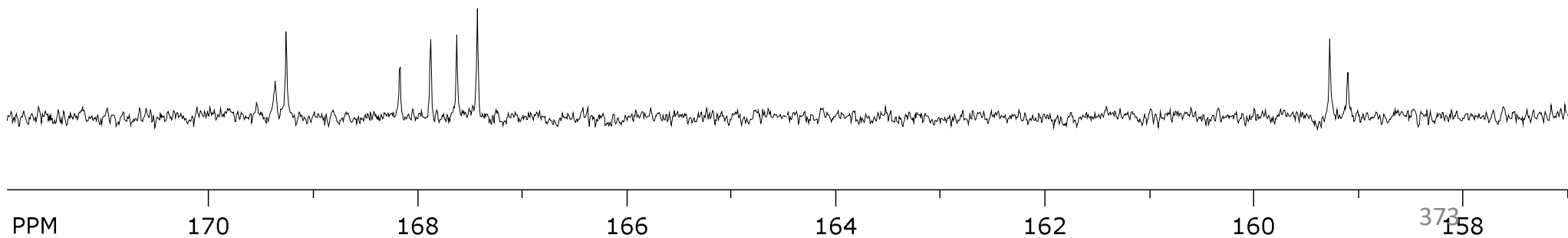
SpinWorks 4: AD 2083  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 42

169.262  
169.365  
167.432  
167.628  
167.878  
168.172

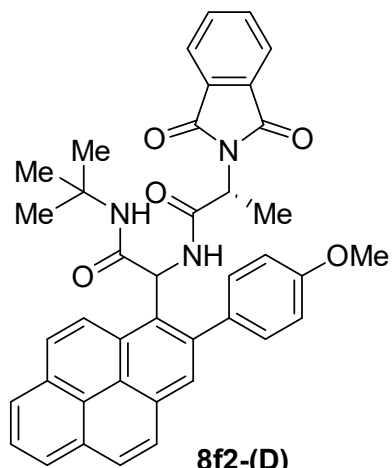
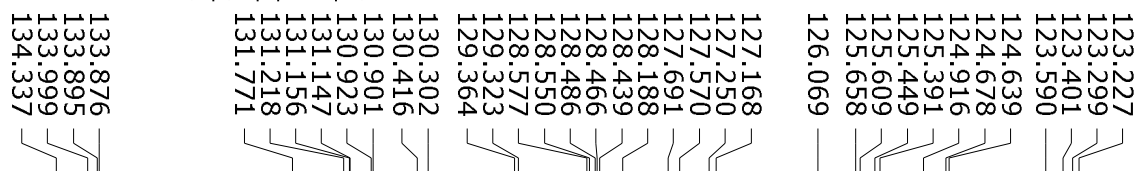
159.099  
159.272



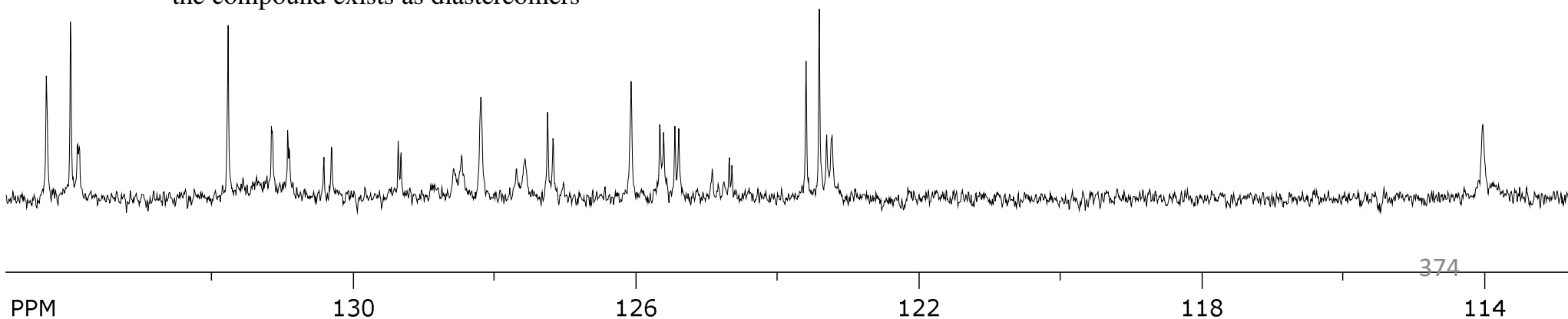
the compound exists as diastereomers



SpinWorks 4: AD 2083  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 42



the compound exists as diastereomers

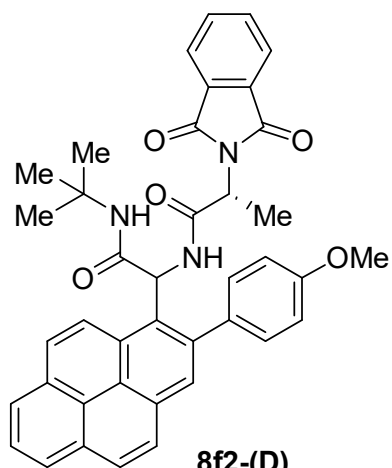


SpinWorks 4: AD 2083  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 42

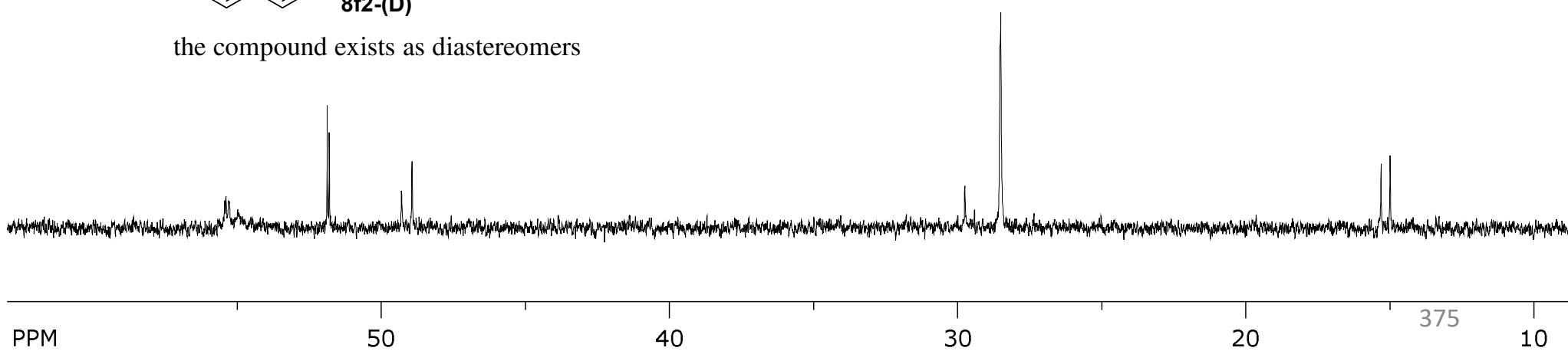
48.927  
49.291  
51.800  
51.873  
55.273  
55.290  
55.387  
55.429

28.484  
28.501

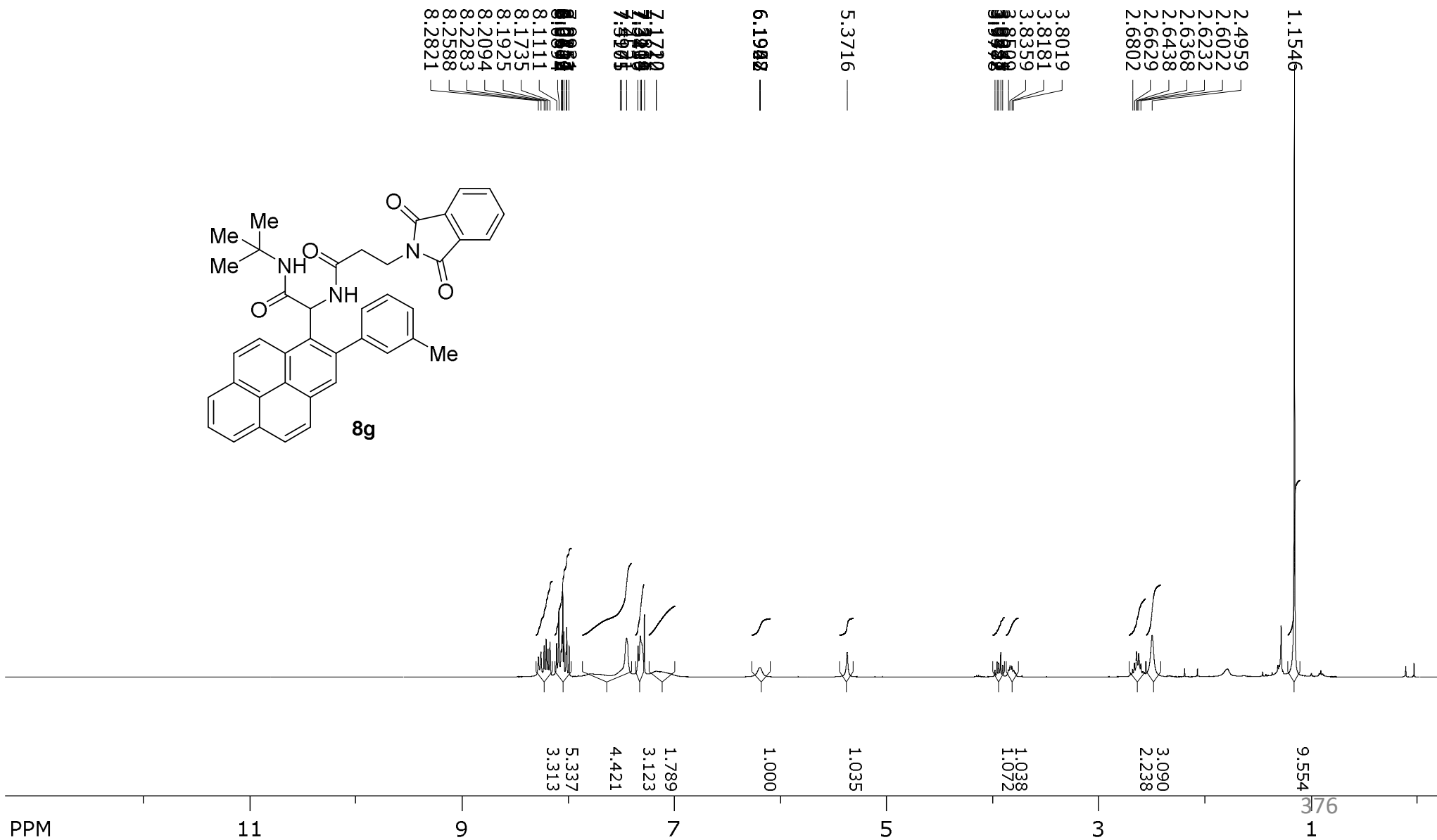
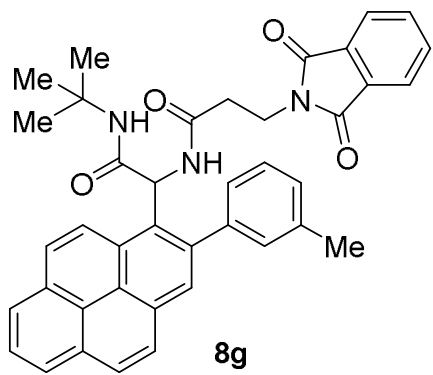
14.964  
15.278



the compound exists as diastereomers



SpinWorks 4: AD-2180  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 30





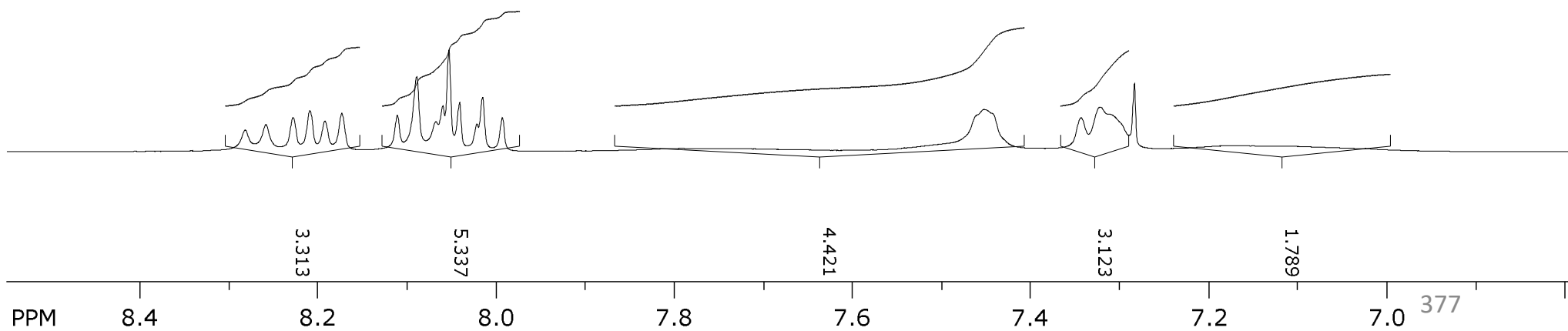
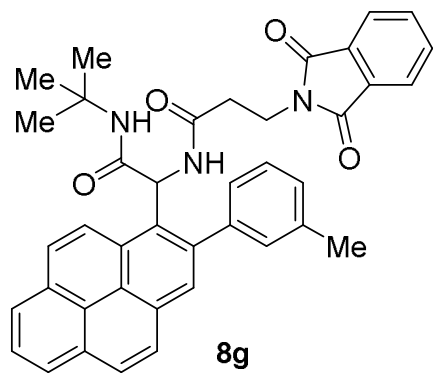
SpinWorks 4: AD-2180  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 30

7.9931  
8.0154  
8.0217  
8.0412  
8.0532  
8.0600  
8.0679  
8.0894  
8.1111  
8.1111  
8.1735  
8.1925  
8.2094  
8.2283  
8.2588  
8.2821

7.4521  
7.4971  
7.5105

7.2831  
7.3109  
7.3114  
7.3215  
7.3430

7.1710  
7.1722

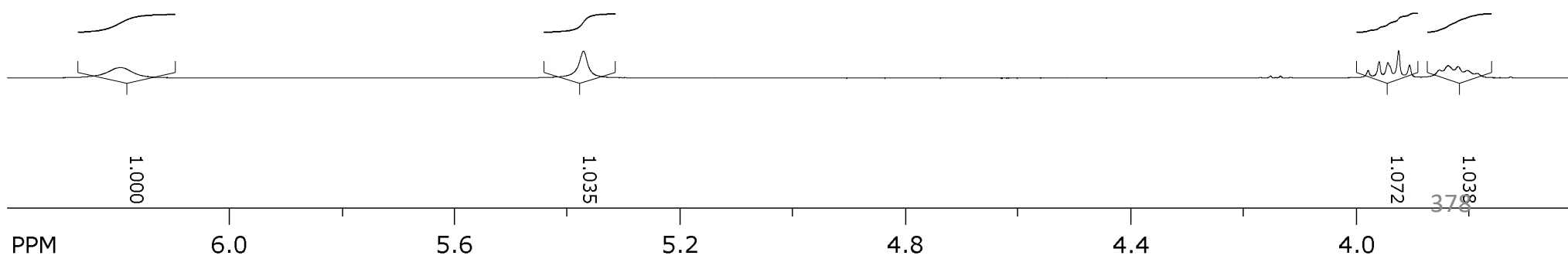
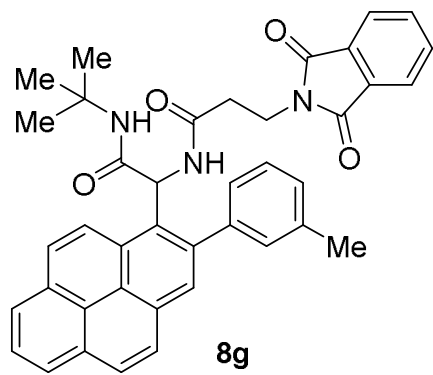


SpinWorks 4: AD-2180  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 30

3.8019  
3.8181  
3.8359  
3.8509  
3.9041  
3.9235  
3.9427  
3.9582  
3.9778

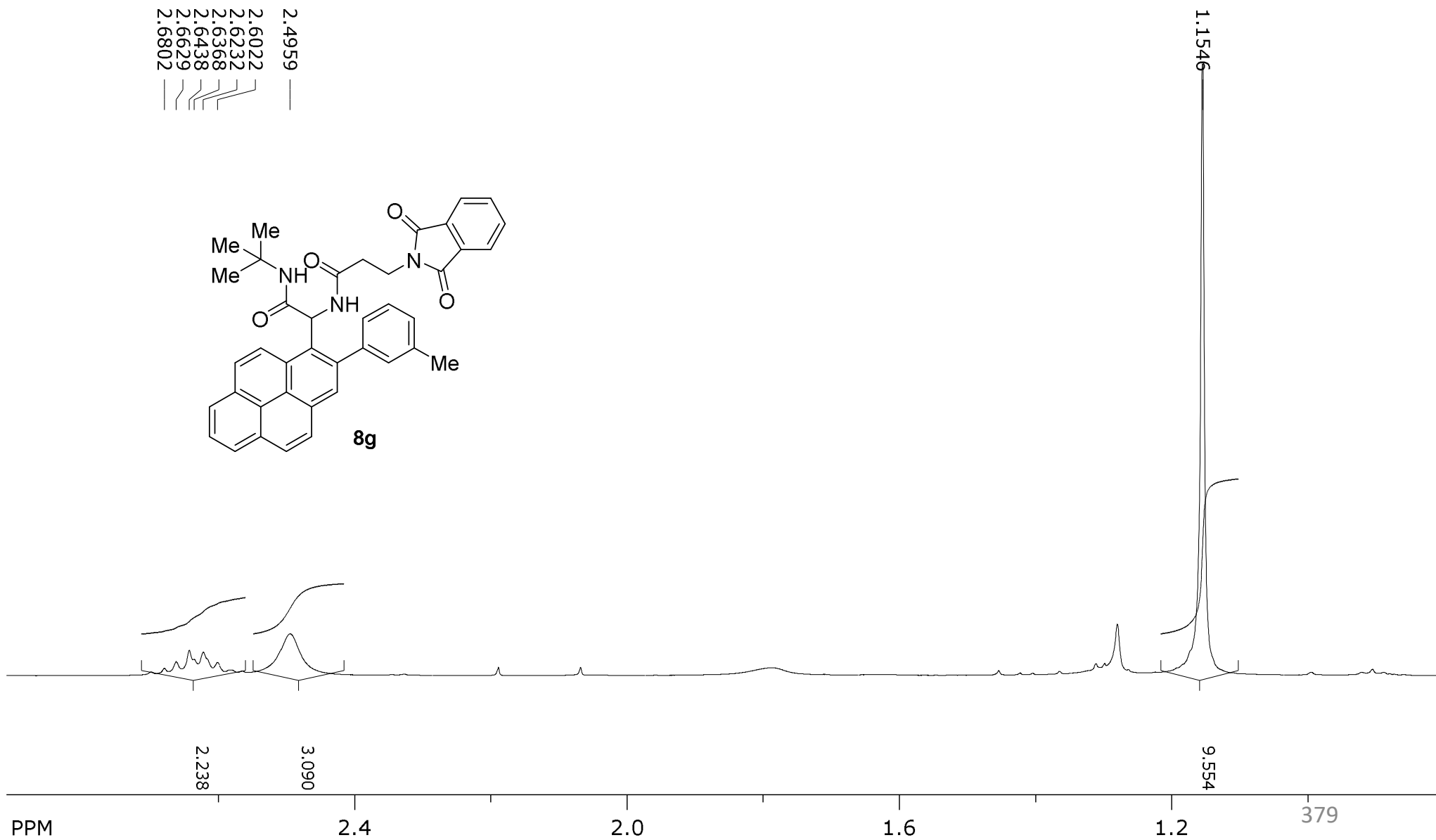
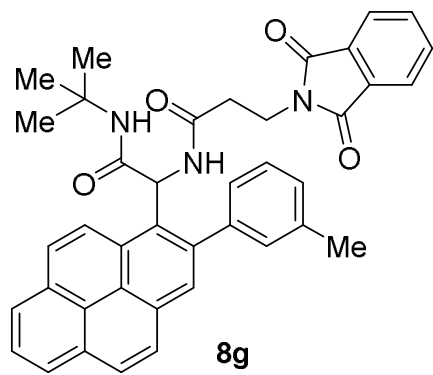
5.3716

6.1908  
~~6.1902~~  
6.1982

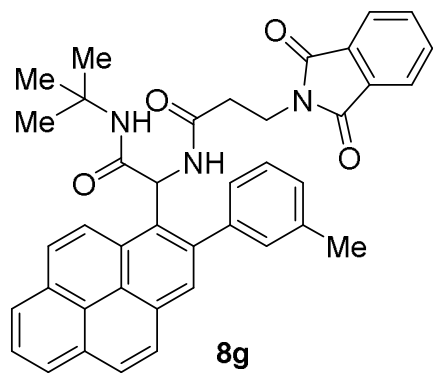


SpinWorks 4: AD-2180  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 30

2.4959  
2.6022  
2.6232  
2.6368  
2.6438  
2.6629  
2.6802



SpinWorks 4: AD-2180  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 30



167.827  
168.861  
169.415  
122.698  
123.313  
124.642  
124.821  
125.594  
126.156  
129.094  
129.094  
129.183  
130.349  
130.775  
131.138  
131.465  
133.355  
141.219  
141.530

76.754  
77.072  
77.389

51.725  
54.757

34.426  
34.762

21.593

PPM

160

120

80

40

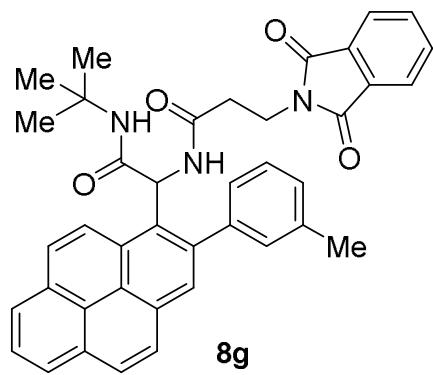
380

0

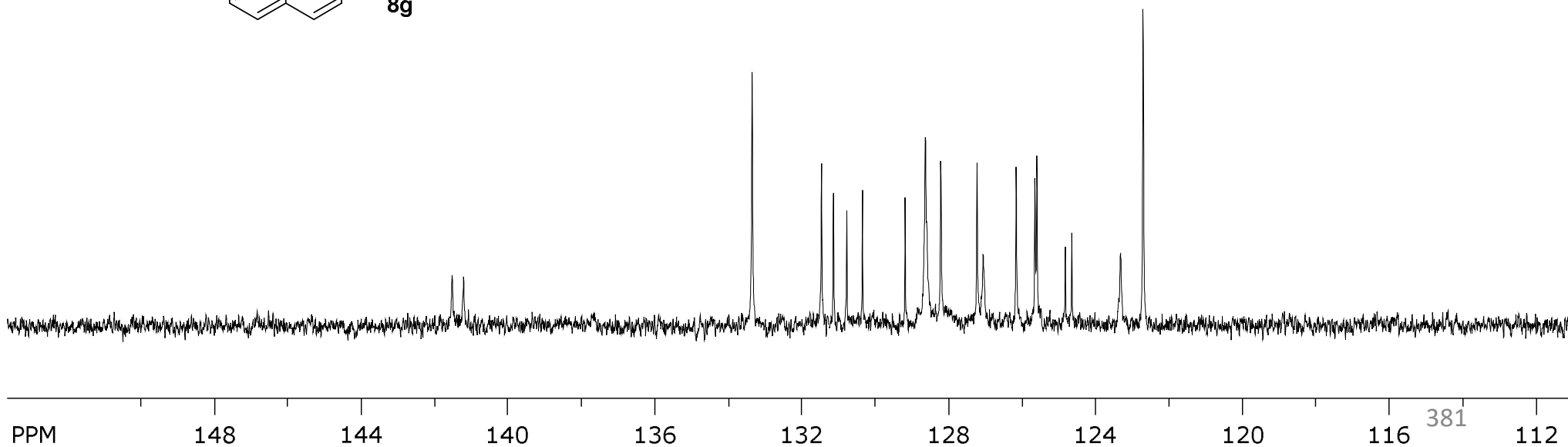
SpinWorks 4: AD-2180  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 30

141.219  
141.530

133.355  
131.465  
131.138  
130.775  
130.349  
129.183  
128.632  
128.601  
128.211  
128.211  
127.224  
127.057  
126.156  
125.646  
125.594  
124.821  
124.642  
123.313  
122.698

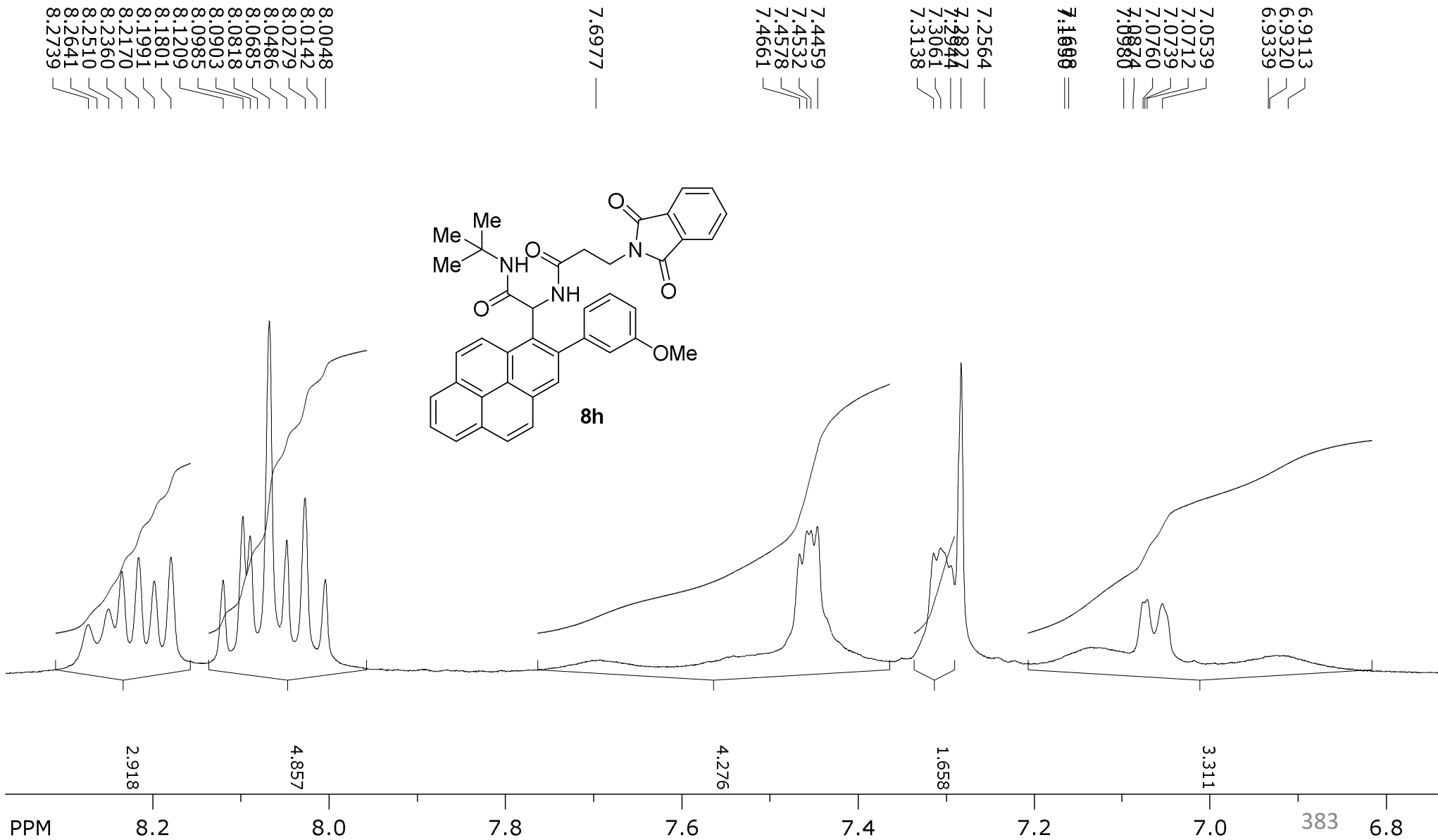


8g





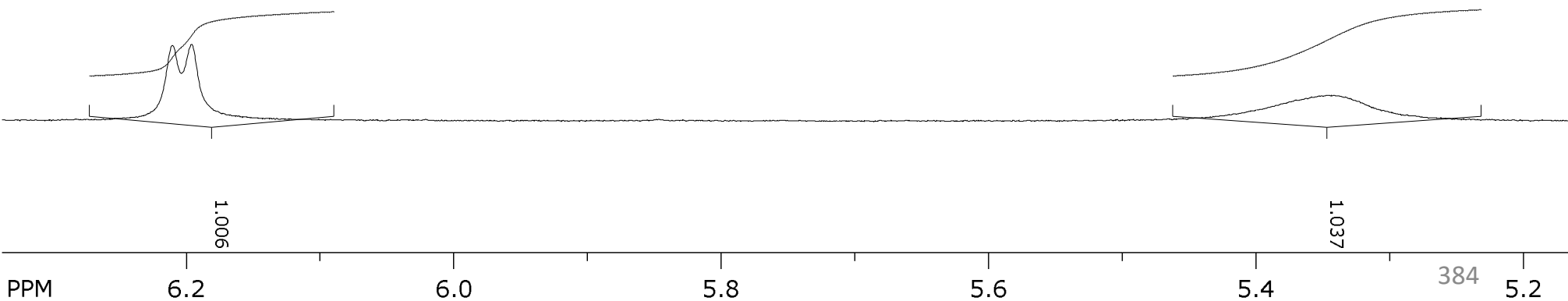
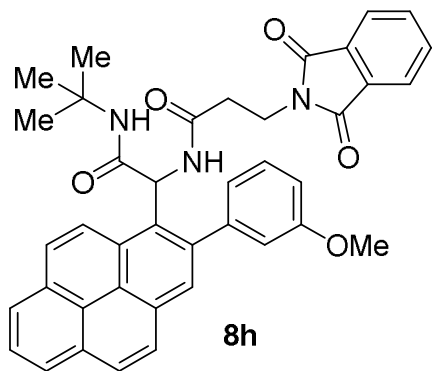
SpinWorks 4: AD 2192 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54



SpinWorks 4: AD 2192 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

6.1961  
6.2106

5.3235  
5.3289  
5.3458  
5.3694  
5.3719

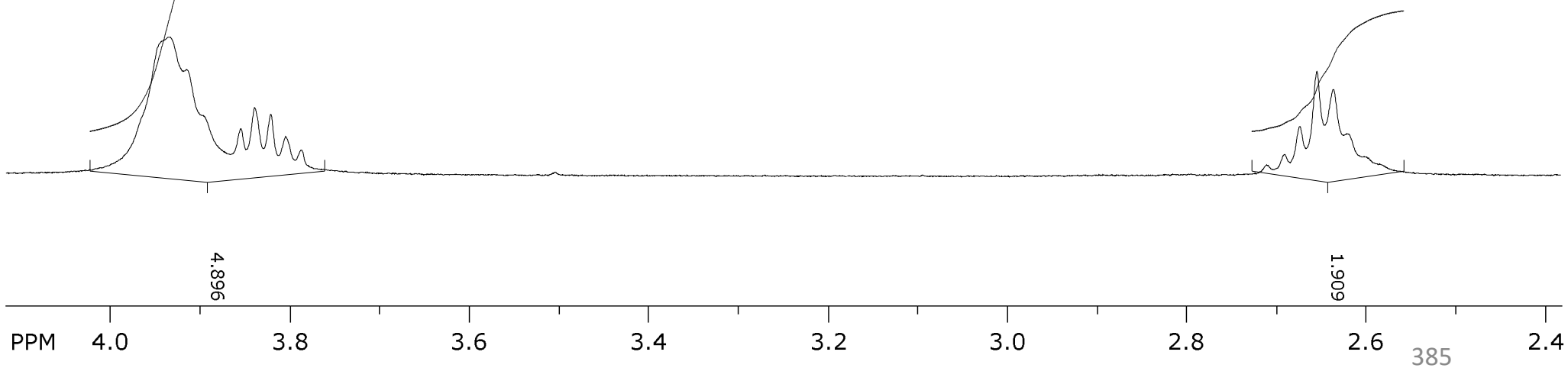
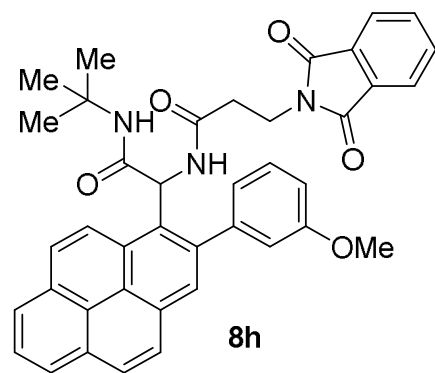




SpinWorks 4: AD 2192 RE  
PROTON CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 54

3.7874  
3.7878  
3.8051  
3.8123  
3.8217  
3.8396  
3.8551  
3.8972  
3.9154  
3.9342  
3.9358

2.6057  
2.6254  
2.6361  
2.6545  
2.6739  
2.6919



SpinWorks 4: AD-2192  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 43

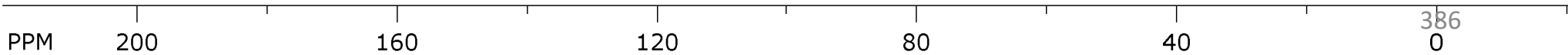
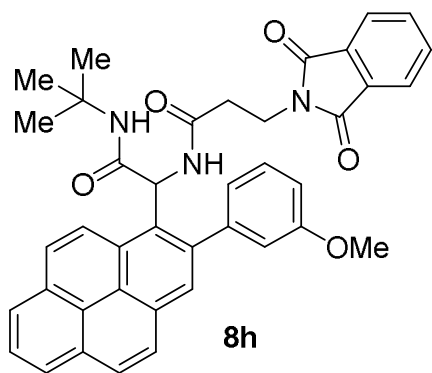
167.815  
168.867  
169.341

142.959  
140.925  
133.341  
131.471  
131.157  
130.792  
130.362  
129.217  
129.000  
128.888  
125.648  
125.607  
124.924  
124.646  
123.340  
122.685  
115.581

77.356  
77.038  
76.721

55.460  
54.759  
51.752

34.769  
34.446  
28.391



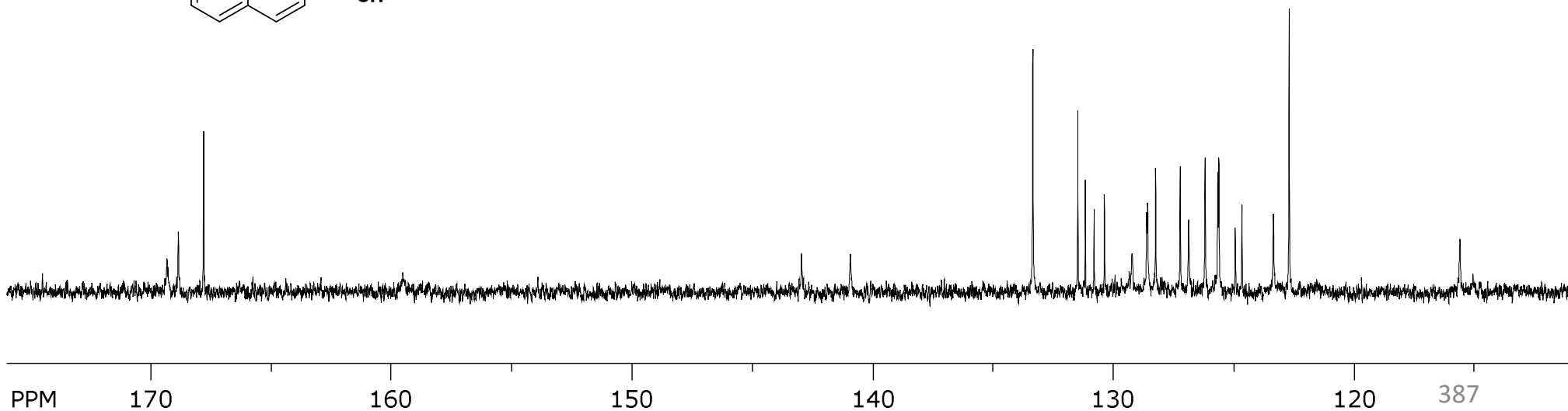
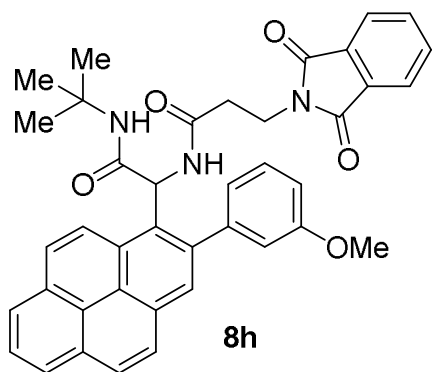
SpinWorks 4: AD-2192  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 43

167.815  
168.867  
169.341

140.925  
142.959

122.685  
123.340  
124.646  
124.924  
125.607  
125.648  
126.178  
126.864  
127.210  
128.233  
128.570  
128.607  
129.217  
130.362  
130.792  
131.157  
131.471  
133.341

115.581



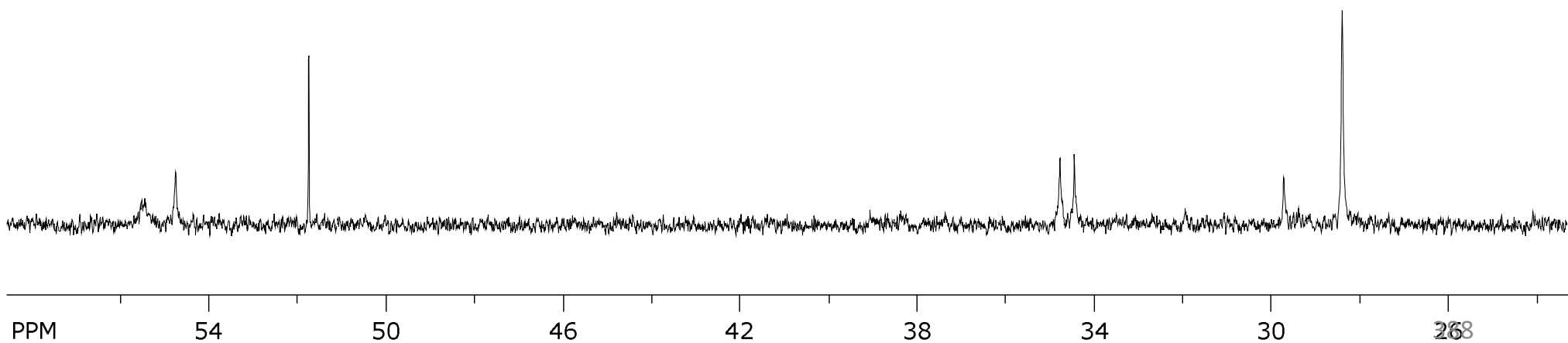
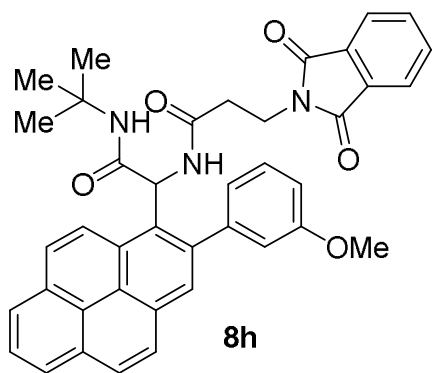
SpinWorks 4: AD-2192  
C13CPD256 CDCl3 /opt/topspin3.5pl2/nmrdata nmrsu 43

55.460 —  
54.759 —

51.752 —

34.446 —  
34.769 —

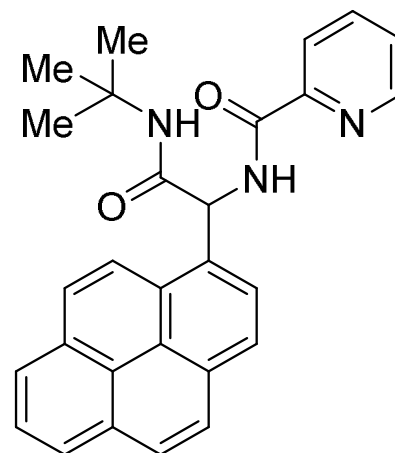
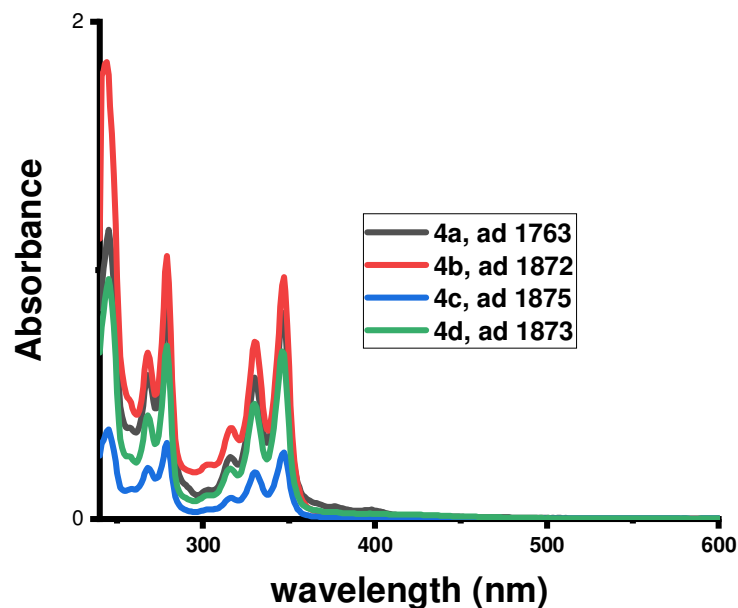
28.391 —



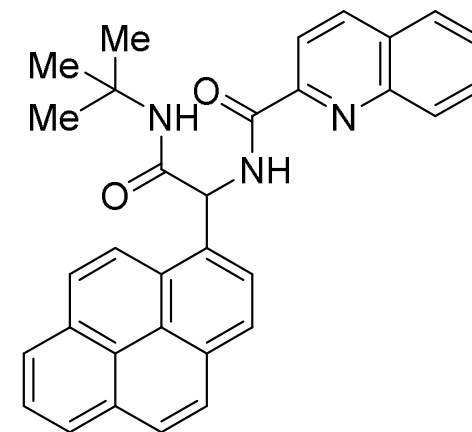
## The absorption spectra and $\lambda_{\max}$ of compounds 4a-d

(concentration = 0.02 g/100 mL in  $\text{CHCl}_3$ )

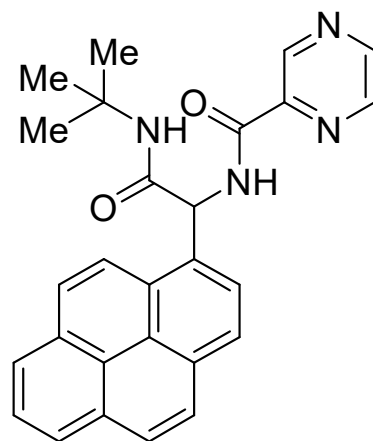
$\lambda_{\max}$  (absorption) (the absorption band appearing at the longest wavelength) of compounds



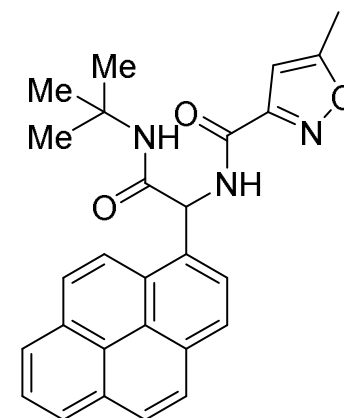
4a :  $\lambda_{\max} = 347$  nm



4b :  $\lambda_{\max} = 347$  nm



4c :  $\lambda_{\max} = 347$  nm

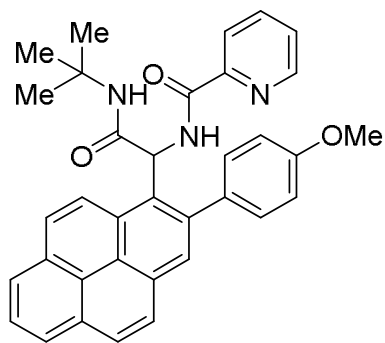
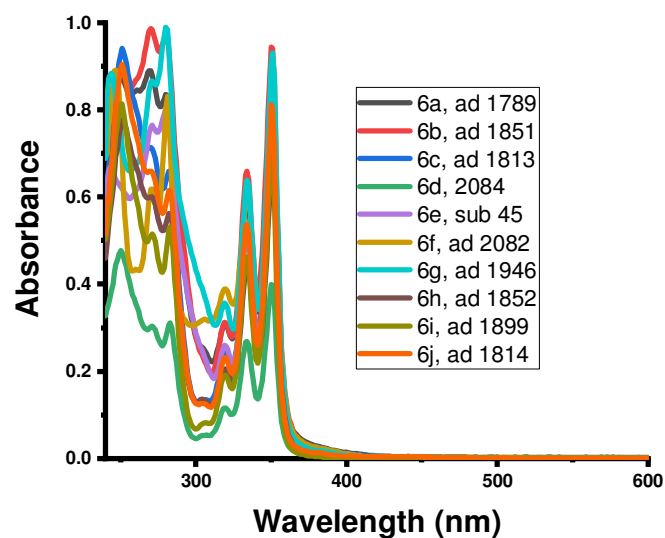


4d :  $\lambda_{\max} = 347$  nm

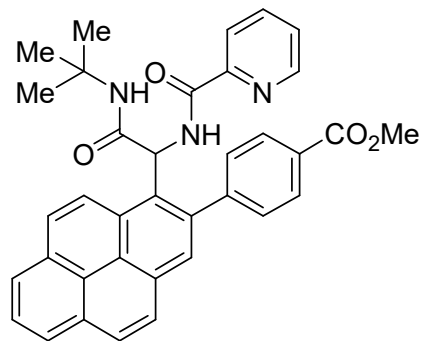
## The absorption spectra and $\lambda_{\max}$ of compounds 6a-j

(concentration = 0.02 g/100 mL in  $\text{CHCl}_3$ )

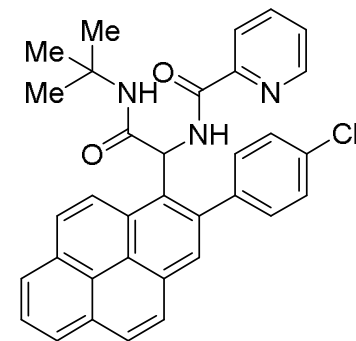
$\lambda_{\max}$  (absorption) (the absorption band appearing at the longest wavelength) of compounds



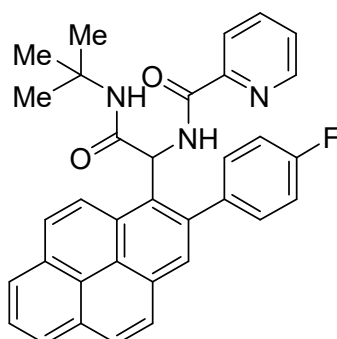
6a :  $\lambda_{\max}$  = 351 nm



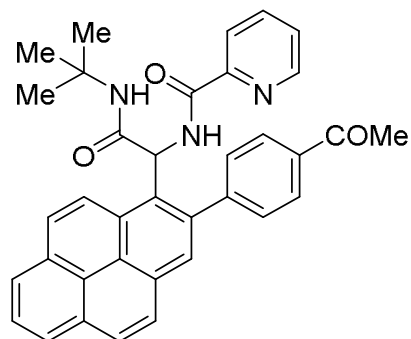
6b :  $\lambda_{\max}$  = 350 nm



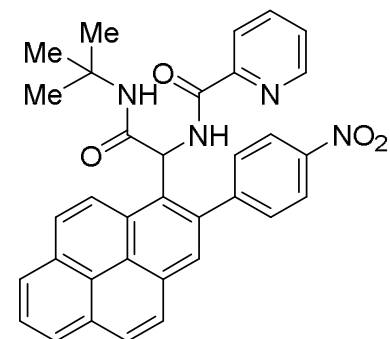
6c :  $\lambda_{\max}$  = 351 nm



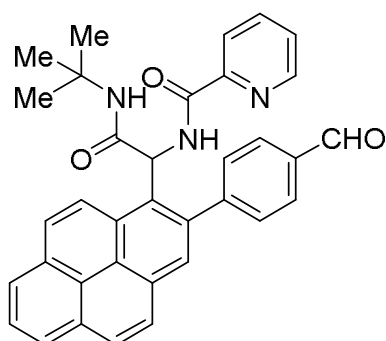
6d :  $\lambda_{\max}$  = 350 nm



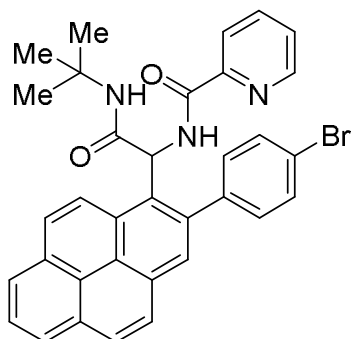
6e :  $\lambda_{\max}$  = 351 nm



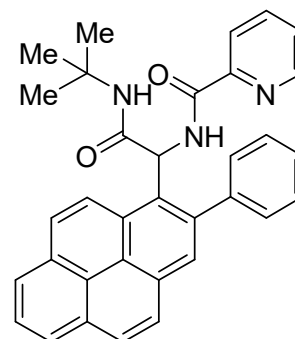
6f :  $\lambda_{\max}$  = 351 nm



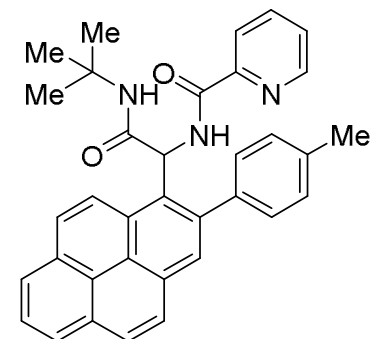
6g :  $\lambda_{\max}$  = 351 nm



6h :  $\lambda_{\max}$  = 351 nm



6i :  $\lambda_{\max}$  = 350 nm

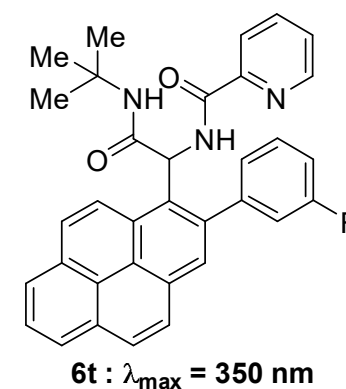
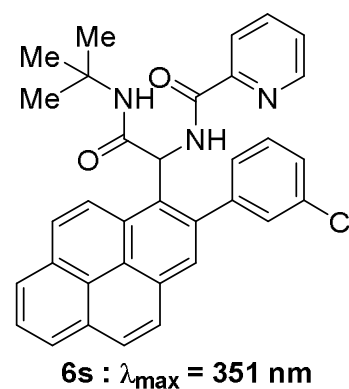
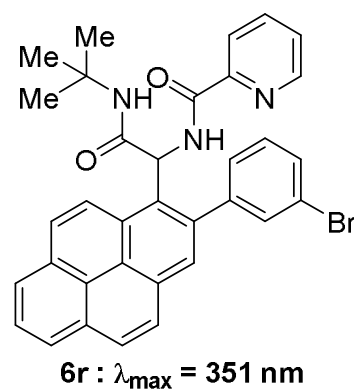
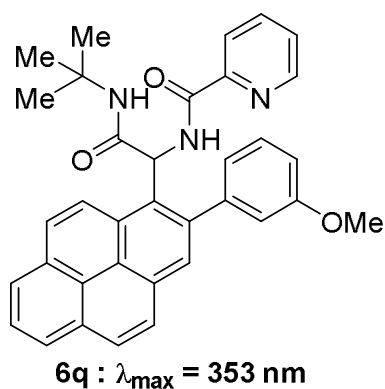
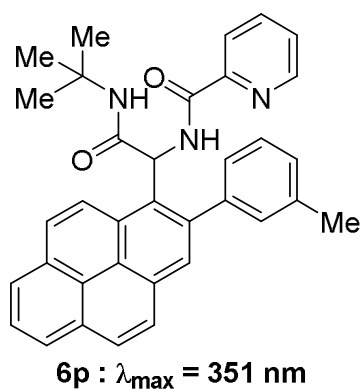
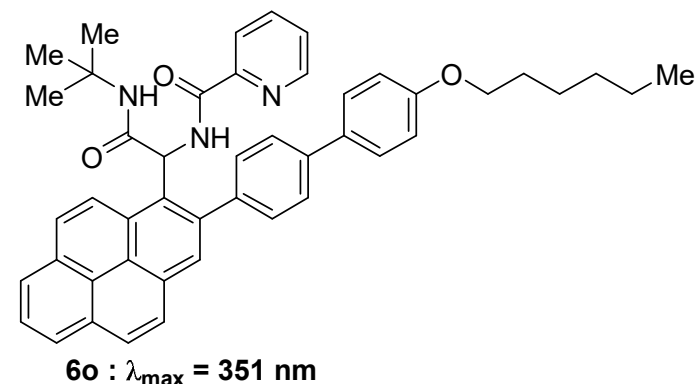
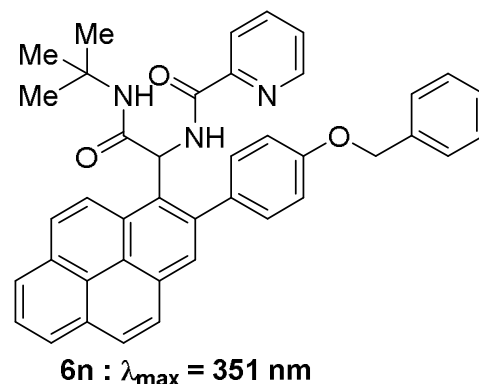
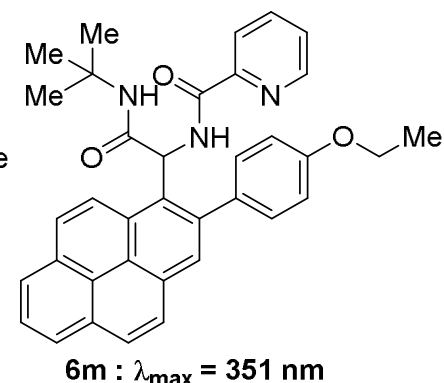
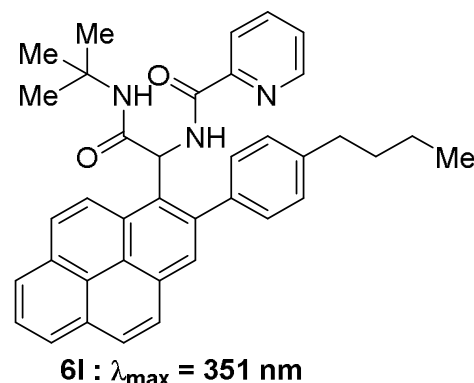
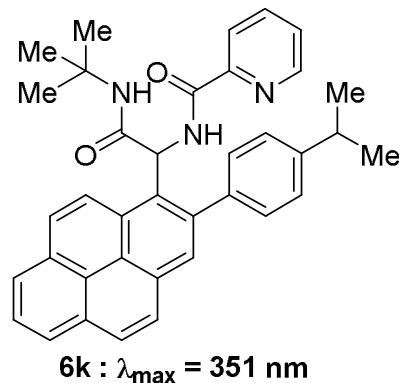
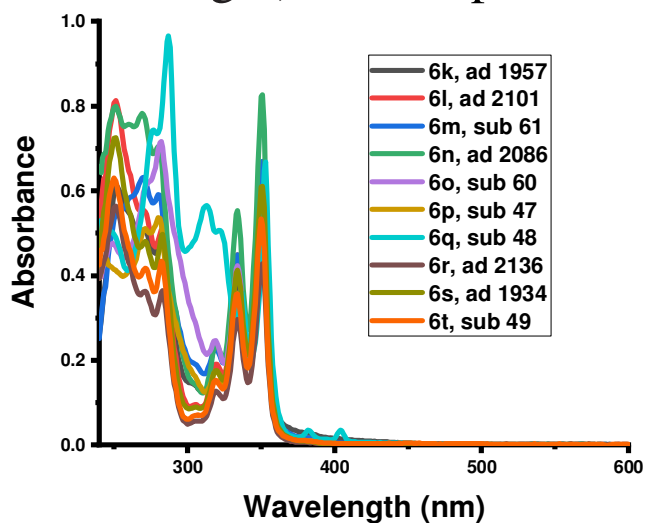


6j :  $\lambda_{\max}$  = 350 nm

**The absorption spectra and  $\lambda_{\max}$  of compounds 6k-t**

(concentration = 0.02 g/100 mL in  $\text{CHCl}_3$ )

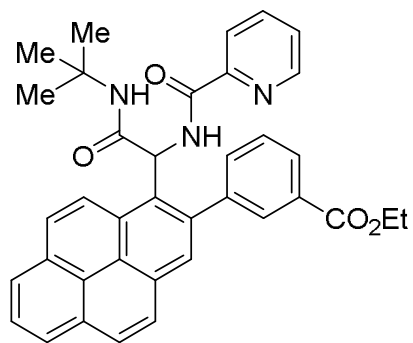
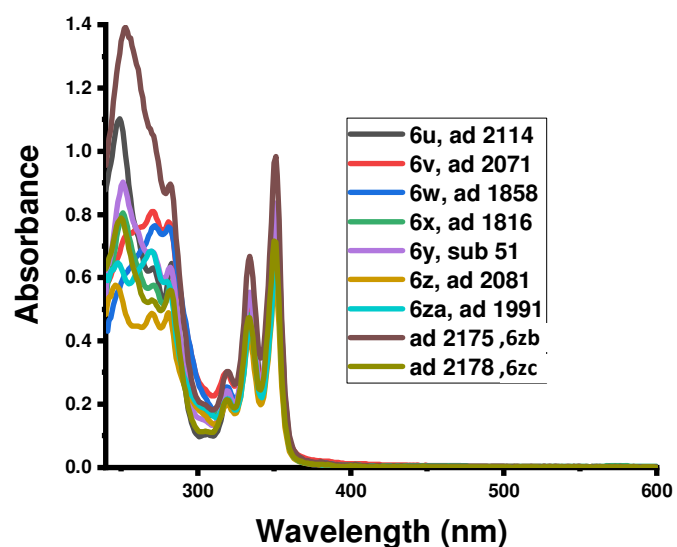
$\lambda_{\max}$  (absorption) (the absorption band appearing at the longest wavelength) of compounds



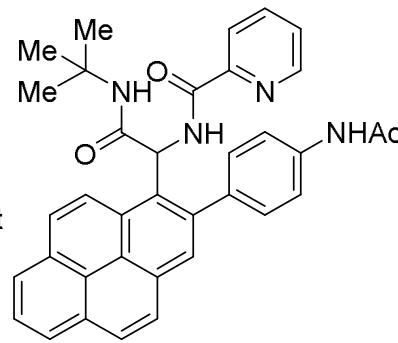
**The absorption spectra and  $\lambda_{\max}$  of compounds 6u-z, 6za, 6zb, 6zc**

(concentration = 0.02 g/100 mL in  $\text{CHCl}_3$ )

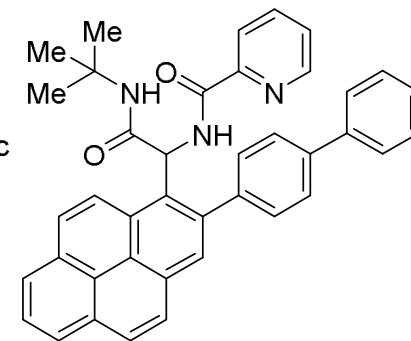
$\lambda_{\max}$  (absorption) (the absorption band appearing at the longest wavelength) of compounds



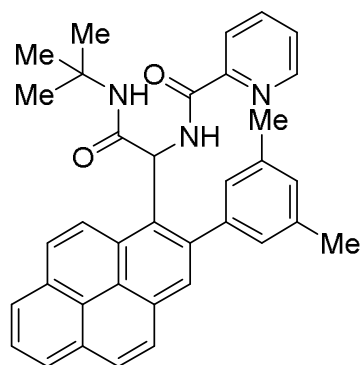
6u :  $\lambda_{\max} = 351 \text{ nm}$



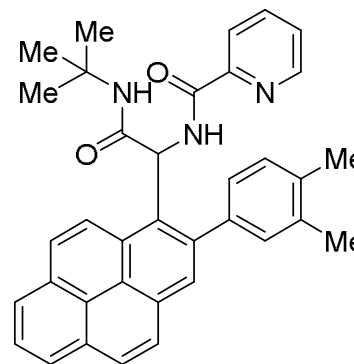
6v :  $\lambda_{\max} = 351 \text{ nm}$



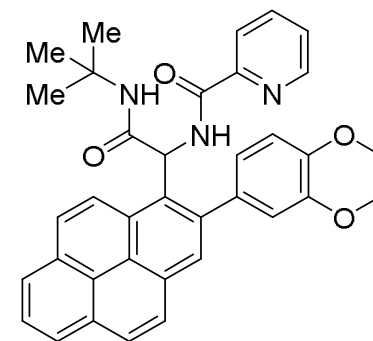
6w :  $\lambda_{\max} = 351 \text{ nm}$



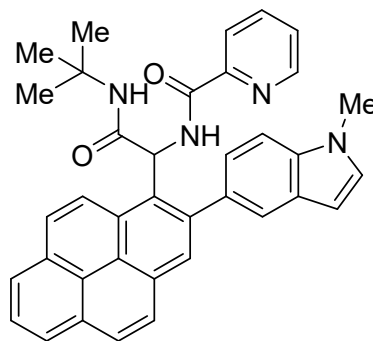
6x :  $\lambda_{\max} = 351 \text{ nm}$



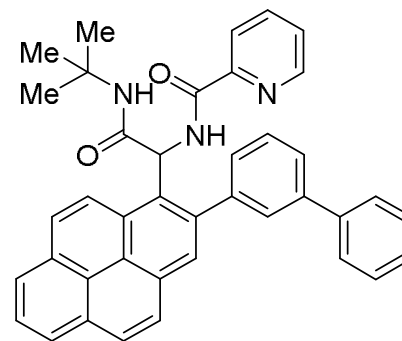
6y :  $\lambda_{\max} = 350 \text{ nm}$



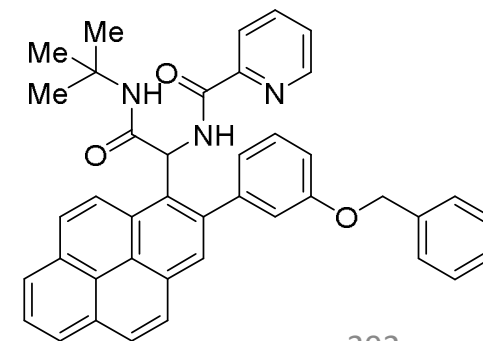
6z :  $\lambda_{\max} = 351 \text{ nm}$



6za :  $\lambda_{\max} = 351 \text{ nm}$



6zb :  $\lambda_{\max} = 351 \text{ nm}$



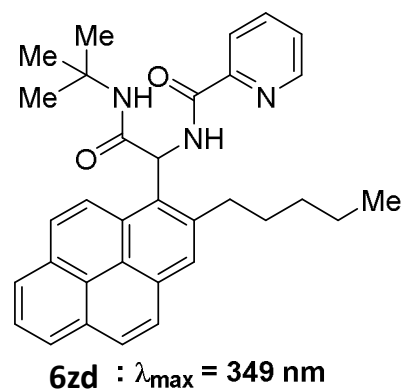
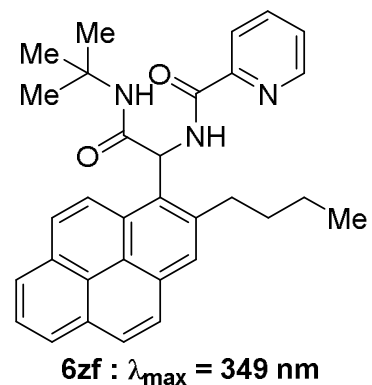
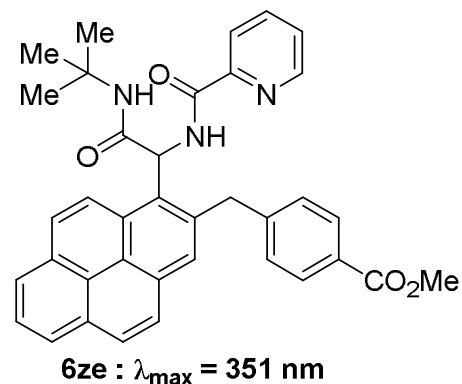
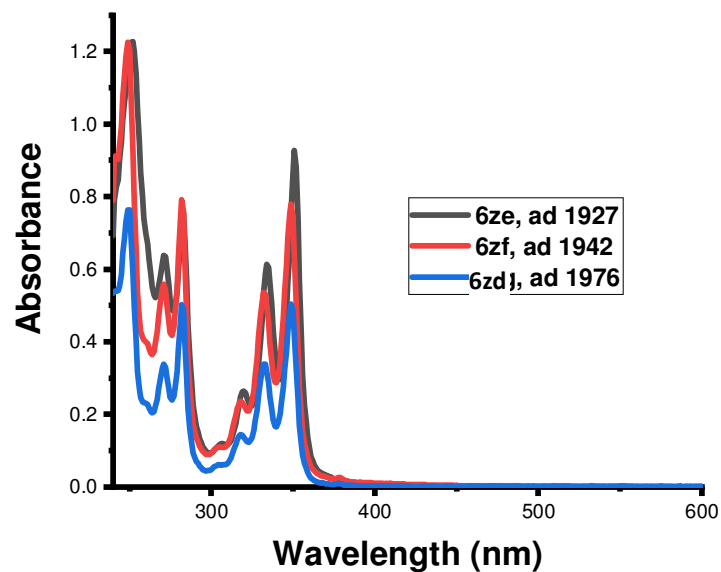
6zc :  $\lambda_{\max} = 350 \text{ nm}$ <sup>392</sup>



**The absorption spectra and  $\lambda_{\max}$  of compounds 6ze, 6zf, 6zg**

(concentration = 0.02 g/100 mL in  $\text{CHCl}_3$ )

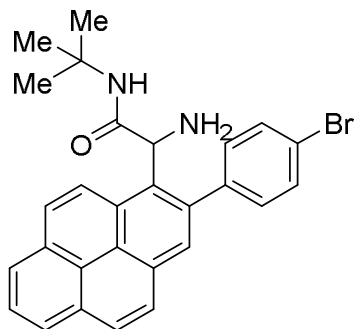
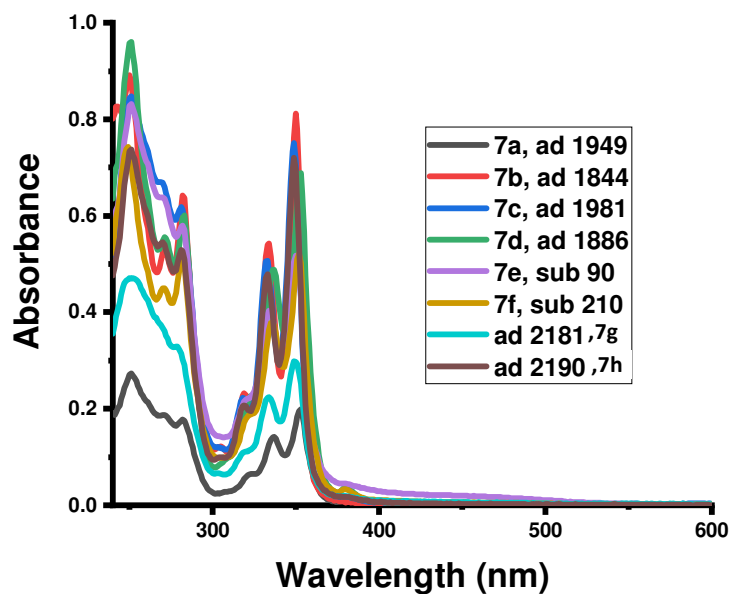
$\lambda_{\max}$  (absorption) (the absorption band appearing at the longest wavelength) of compounds



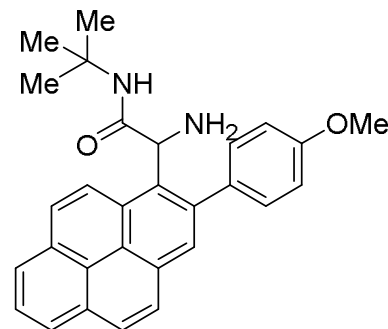
## The absorption spectra and $\lambda_{\max}$ of compounds 7a-h

(concentration = 0.02 g/100 mL in  $\text{CHCl}_3$ )

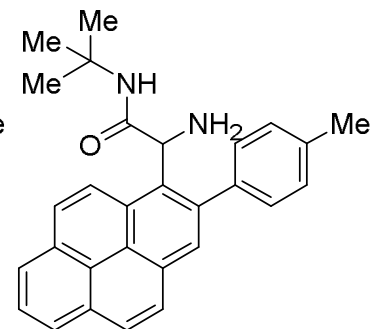
$\lambda_{\max}$  (absorption) (the absorption band appearing at the longest wavelength) of compounds



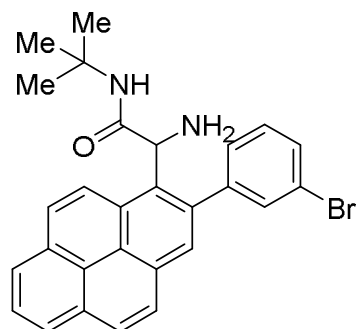
7a :  $\lambda_{\max} = 353$  nm



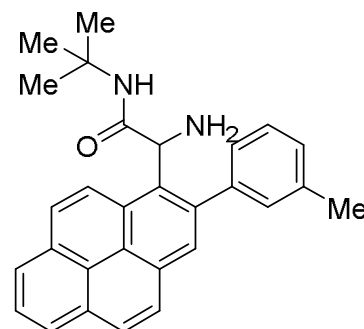
7b :  $\lambda_{\max} = 350$  nm



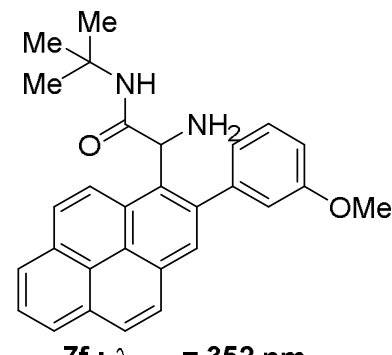
7c :  $\lambda_{\max} = 349$  nm



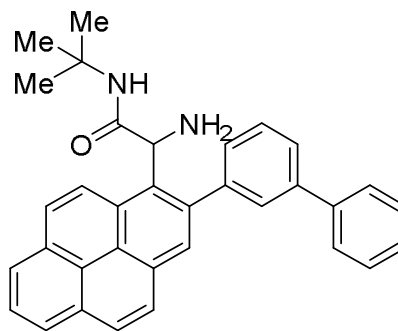
7d :  $\lambda_{\max} = 353$  nm



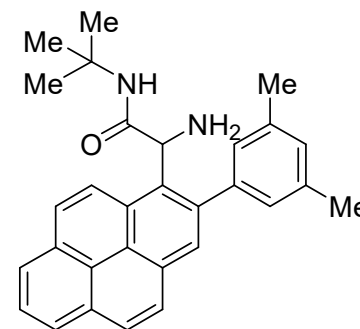
7e :  $\lambda_{\max} = 350$  nm



7f :  $\lambda_{\max} = 352$  nm



7g  $\lambda_{\max} = 349$  nm

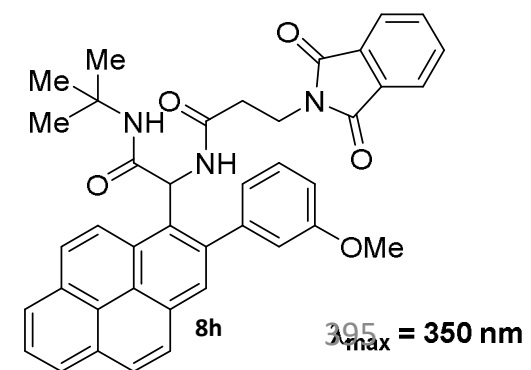
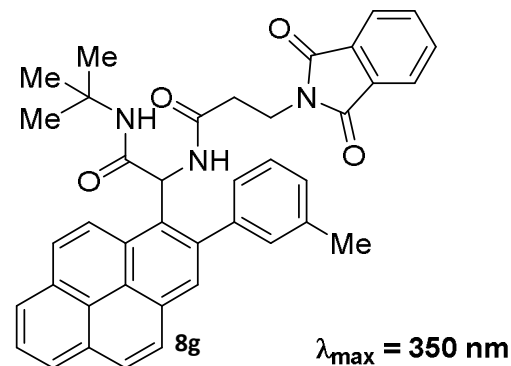
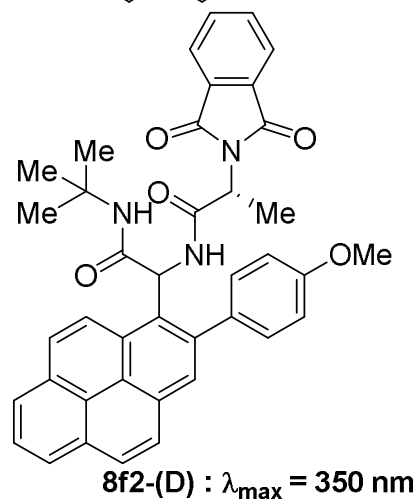
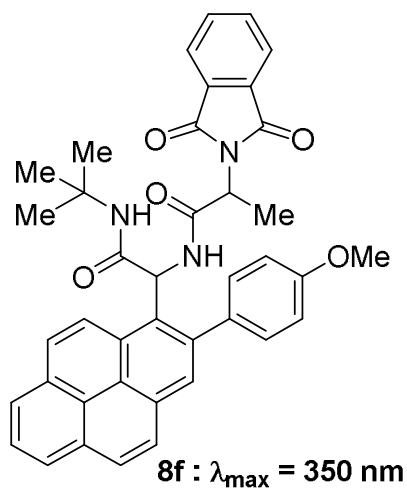
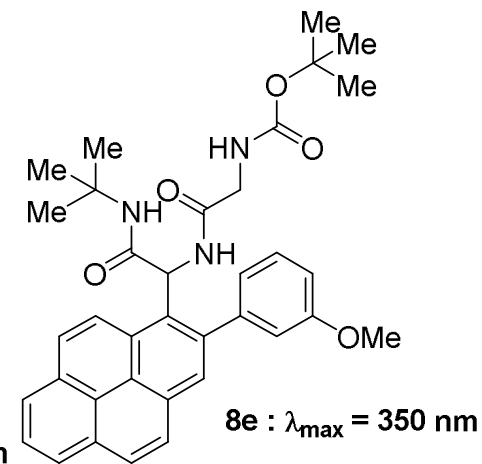
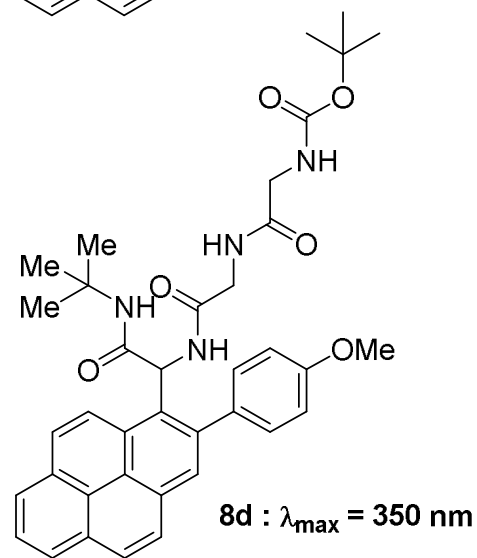
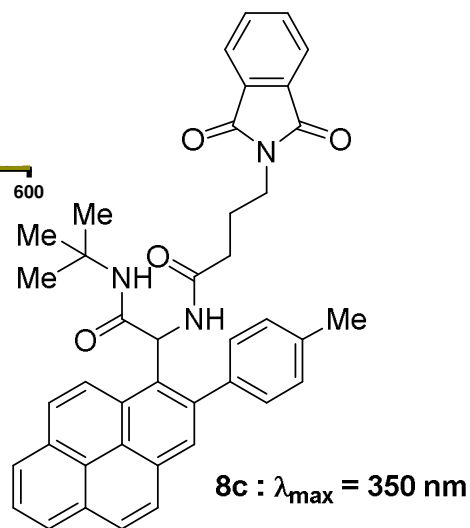
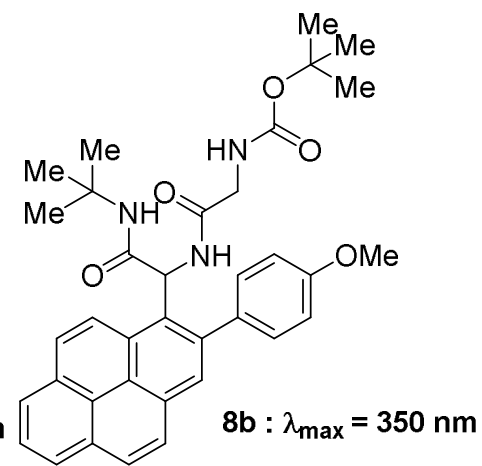
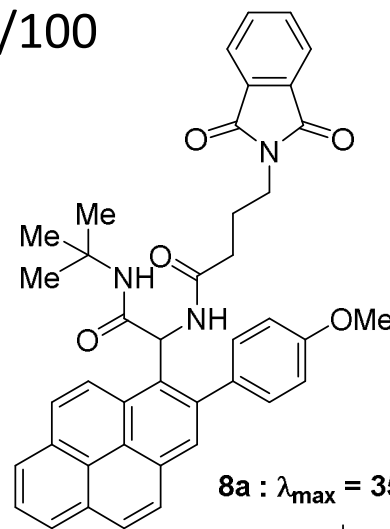
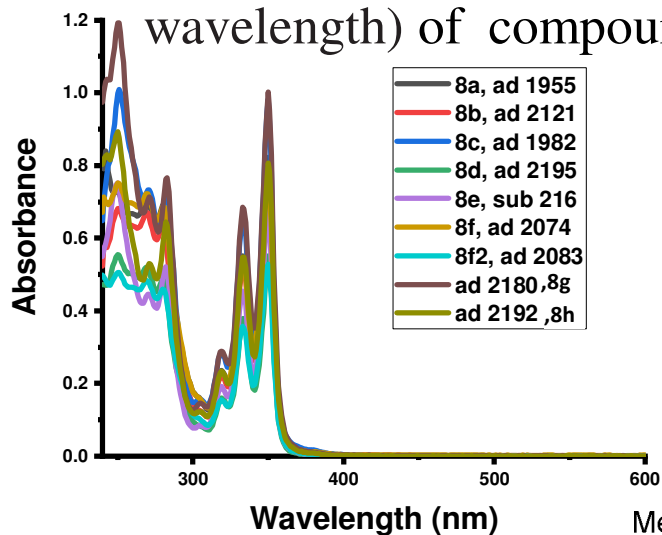


7h  $\lambda_{\max} = 349$  nm 394

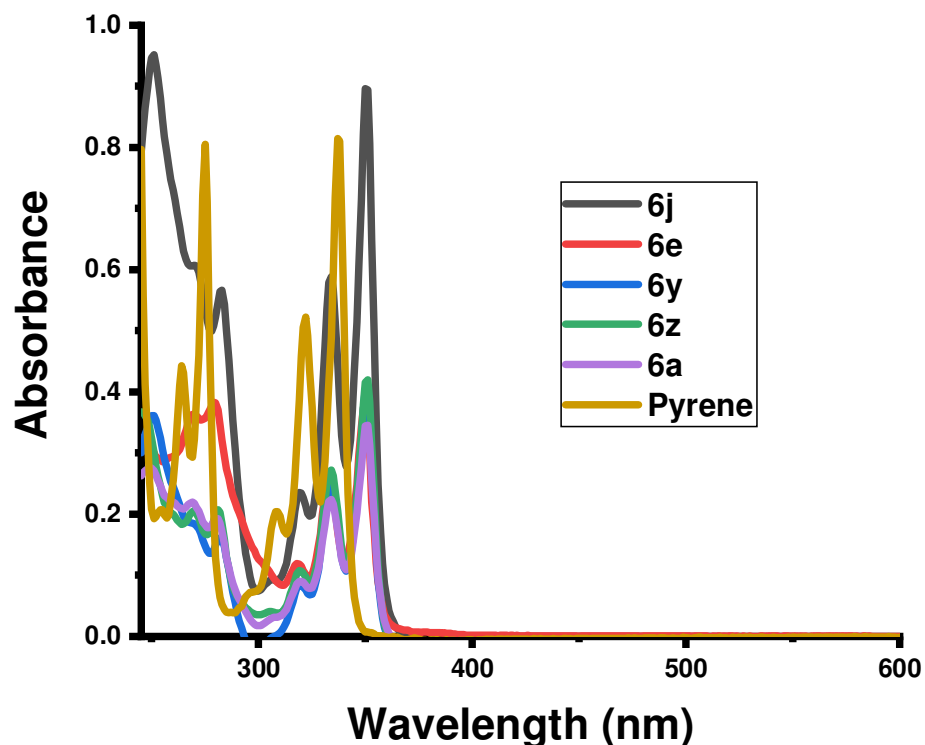
**The absorption spectra and  $\lambda_{\max}$  of compounds 8a-h, 8f2-(D)**

(concentration = 0.02 g/100 mL in  $\text{CHCl}_3$ )

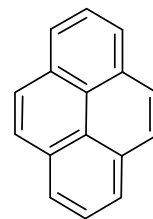
$\lambda_{\max}$  (absorption) (the absorption band appearing at the longest wavelength) of compounds



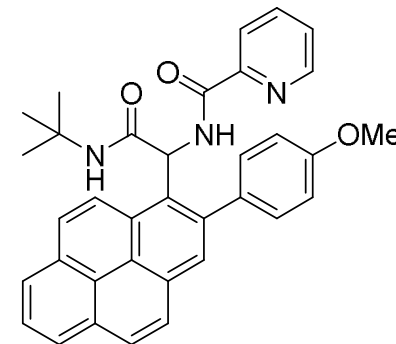
The absorption spectra (using UV-Vis spectroscopy, concentration = 0.02 g/100 mL in CHCl<sub>3</sub>) were recorded in CHCl<sub>3</sub> and  $\lambda_{\max}$  (absorption) (the absorption band appearing at the longest wavelength) of compounds **6a**, **6j**, **6z**, **6e**, **6y**



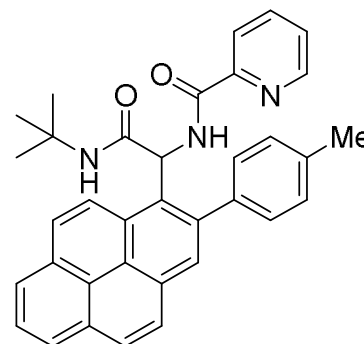
$\lambda_{\max}$  (absorption) (nm) = Pyrene: 337, **6a**: 349, **6j**: 349, **6z**: 349, **6e**: 349, **6y**: 350.



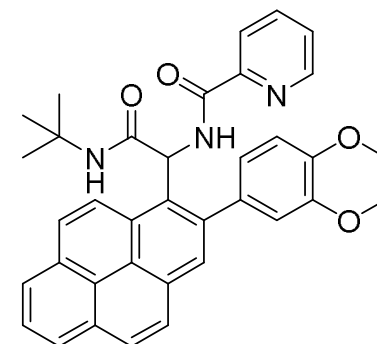
Pyrene:  $\lambda_{\max}$  = 337 nm



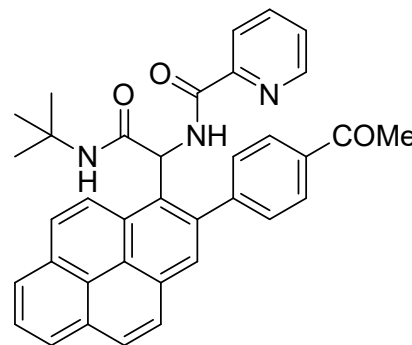
**6a**:  $\lambda_{\max}$  = 349 nm



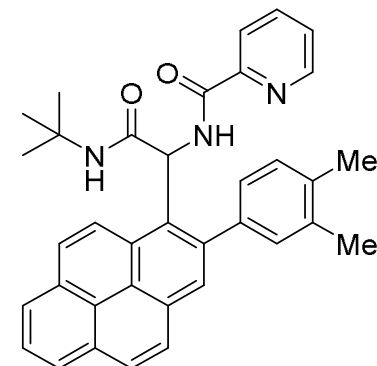
**6j**:  $\lambda_{\max}$  = 349 nm



**6z**:  $\lambda_{\max}$  = 349 nm

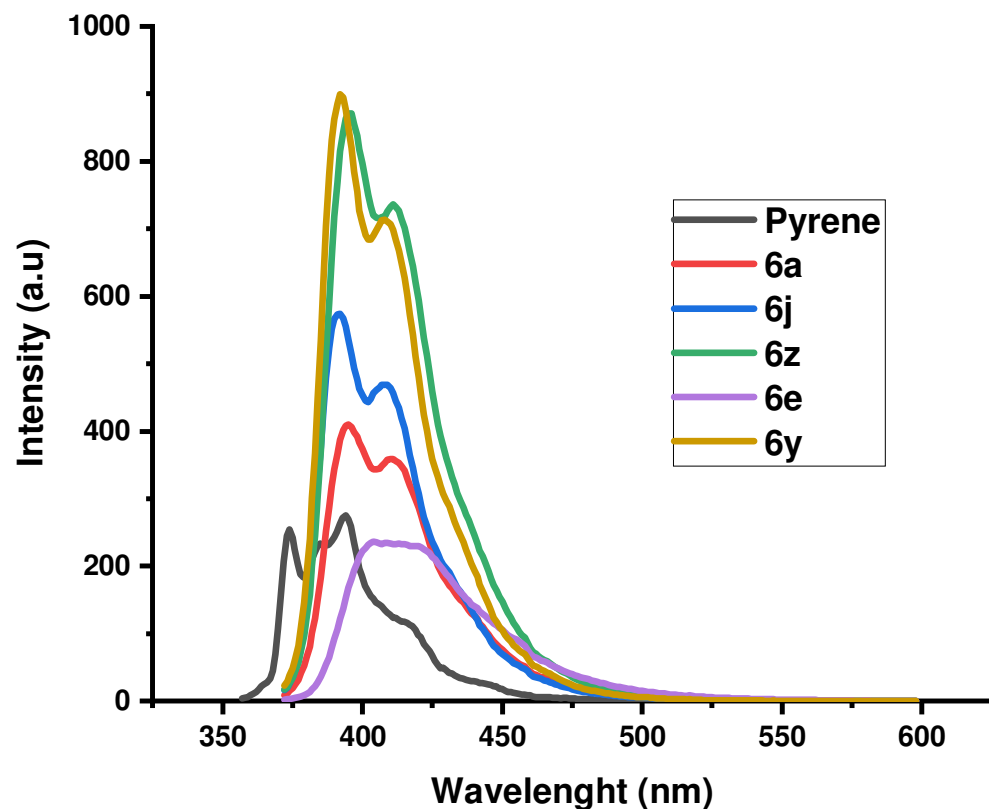


**6e**:  $\lambda_{\max}$  = 349 nm

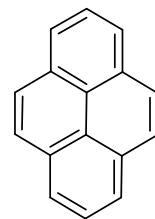


**6y**:  $\lambda_{\max}$  = 349 nm

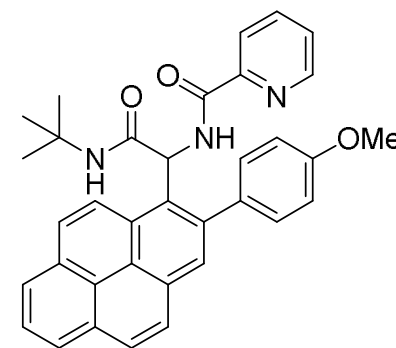
Preliminary analysis: Emission spectra of compounds **6a**, **6j**, **6z**, **6e** and **6y** in CHCl<sub>3</sub> (concentration = 3.8 μM) at the excitation wavelength of 350 nm.



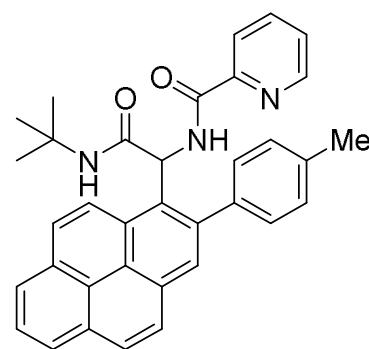
$\lambda_{\text{max (emission)}}$  (nm) at the excitation wavelength of 350 nm =  
 Pyrene: 393, **6a**: 395, **6j**: 390, **6z**: 396, **6e**: 404, **6y**: 392.



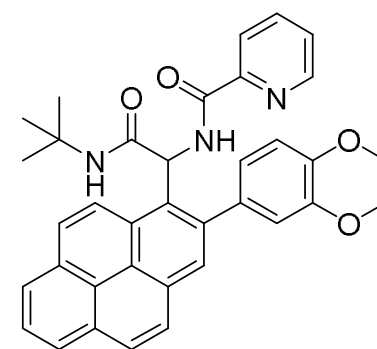
Pyrene



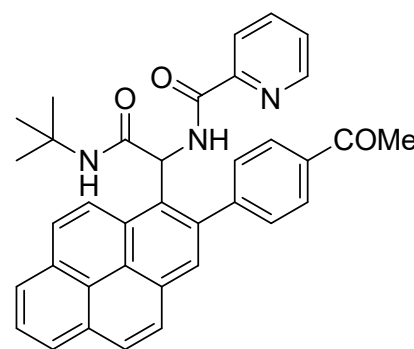
**6a**



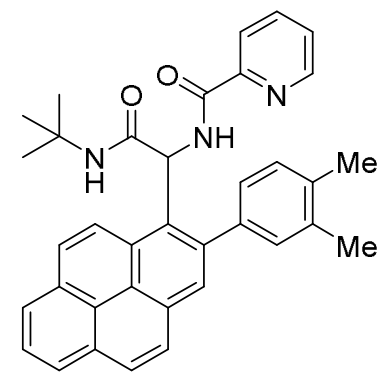
**6j**



**6z**

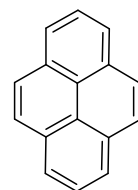
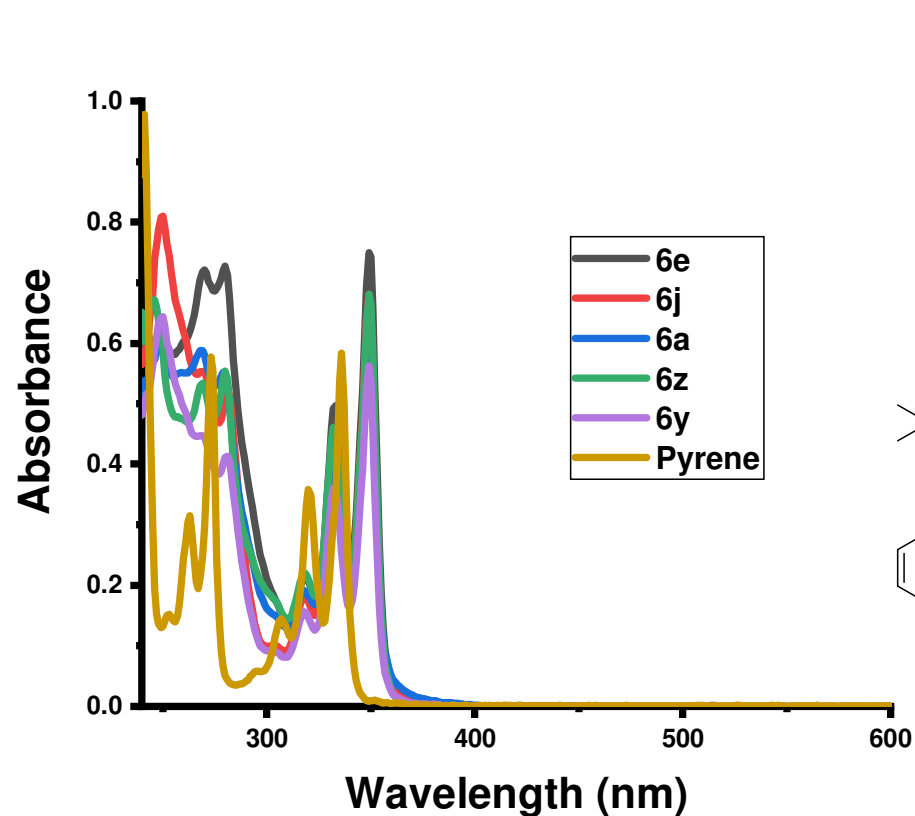


**6e**

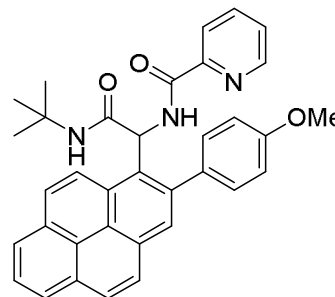


**6y**

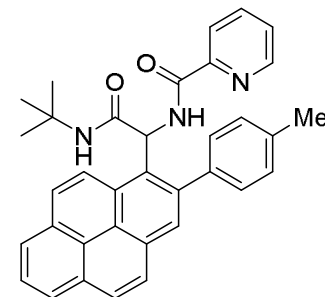
The absorption spectra (using UV-Vis spectroscopy, concentration = 0.02 g/100 mL in THF) were recorded in THF and  $\lambda_{\text{max (absorption)}}$  (the absorption band appearing at the longest wavelength) of compounds **6a**, **6j**, **6z**, **6e**, **6y**



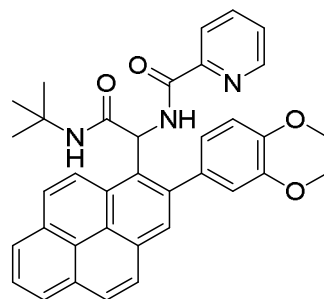
Pyrene



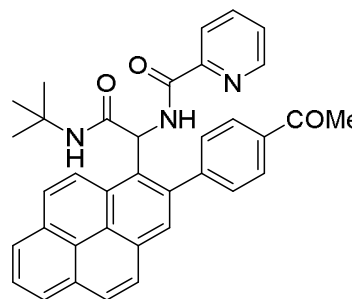
**6a**



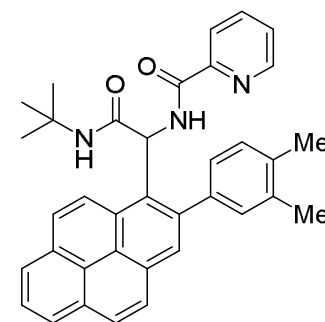
**6j**



**6z**



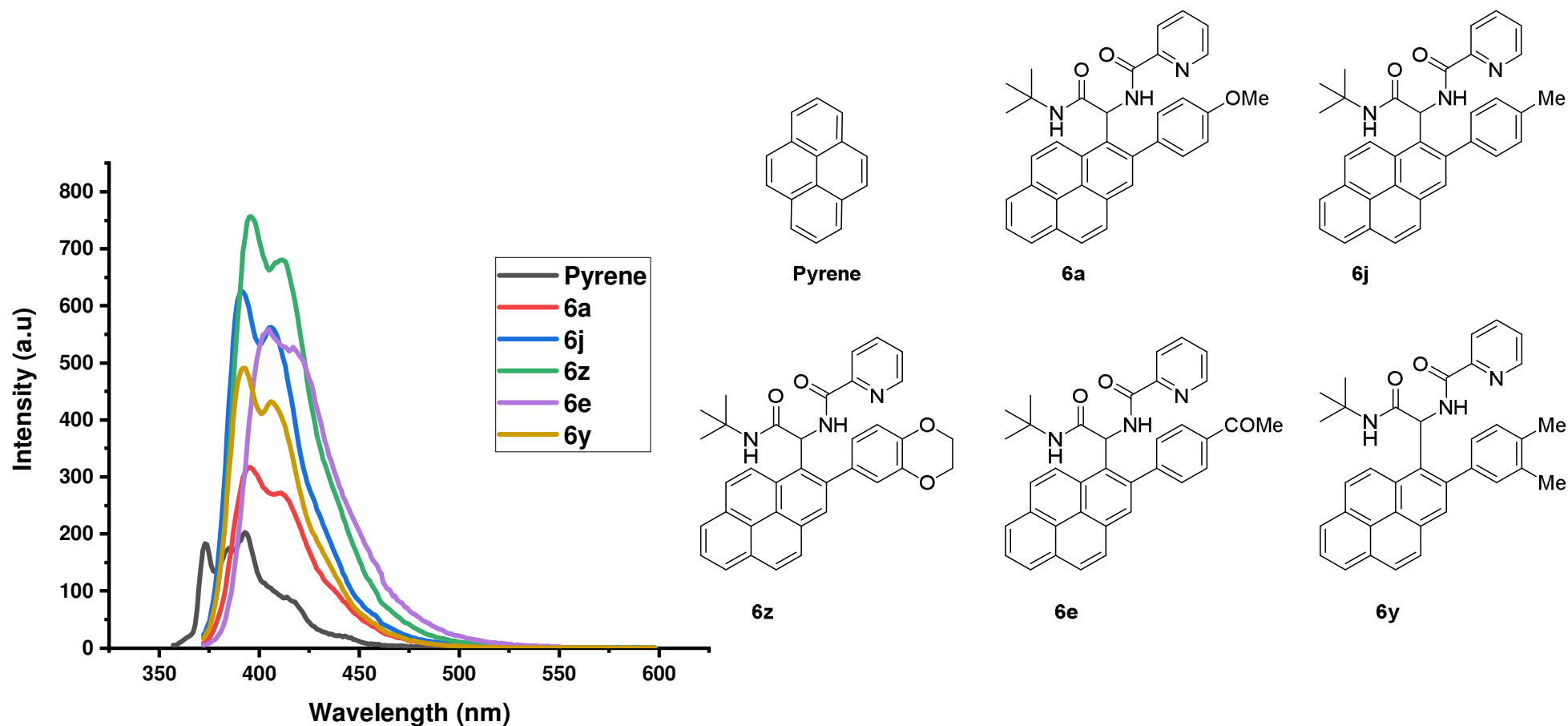
**6e**



**6y**

$\lambda_{\text{max (absorption)}}$  (nm) = Pyrene: 336, **6a**: 349,  
**6j**: 349, **6z**: 350, **6e**: 349, **6y**: 349.

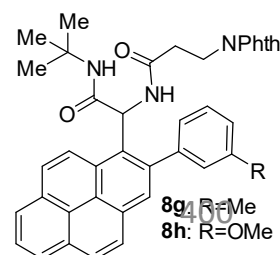
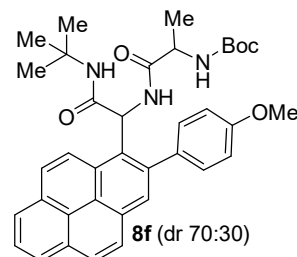
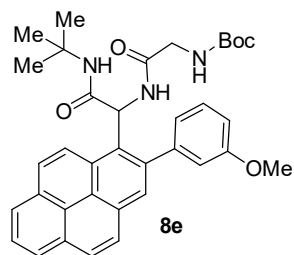
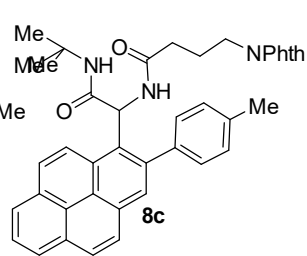
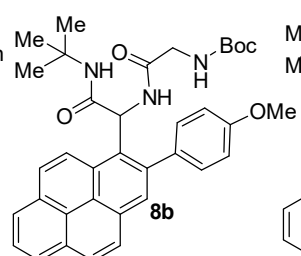
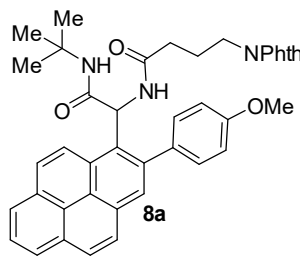
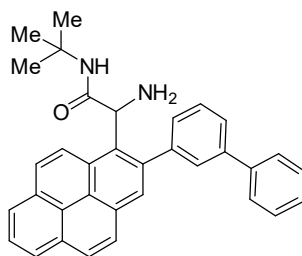
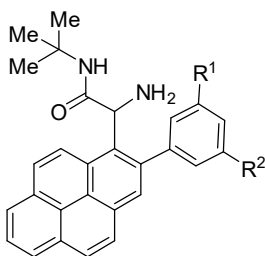
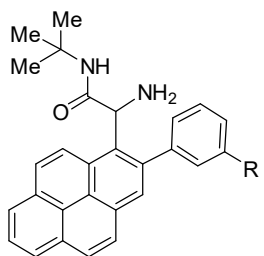
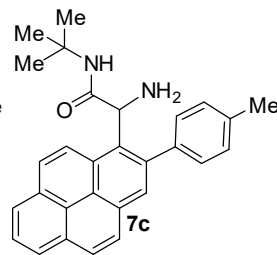
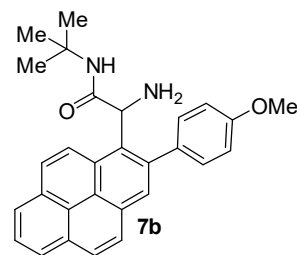
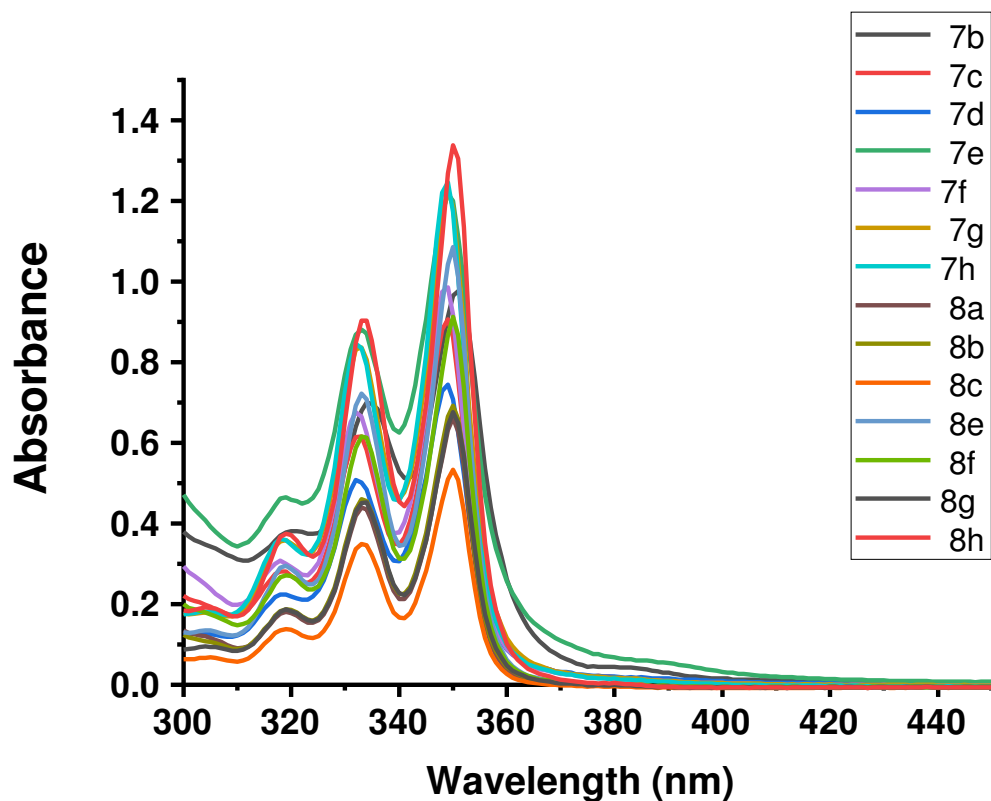
Preliminary analysis: Emission spectra of compounds **6a**, **6j**, **6z**, **6e** and **6y** in THF (concentration = 3.8  $\mu$ M) at the excitation wavelength of 350 nm.



$\lambda_{\text{max (emission)}}$  (nm) at the excitation wavelength of 350 nm =  
 Pyrene: 392, **6a**: 395, **6j**: 391, **6z**: 396, **6e**: 405, **6y**: 392.

The absorption spectra (using UV-Vis spectroscopy, concentration = 0.01 g/100 mL in CHCl<sub>3</sub>) were recorded in CHCl<sub>3</sub> and  $\lambda_{\text{max}}$  (absorption) (the absorption band appearing at the longest wavelength) of compounds **7b**, **7c**, **7d**, **7e**, **7f**, **7g**, **7h**, **8a**, **8b**, **8c**, **8e**, **8f**, **8g**, **8h**.

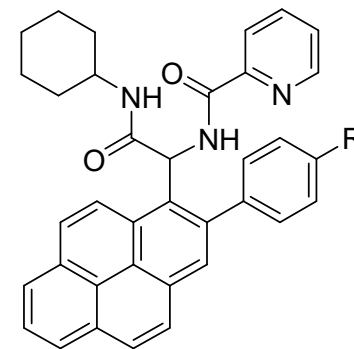
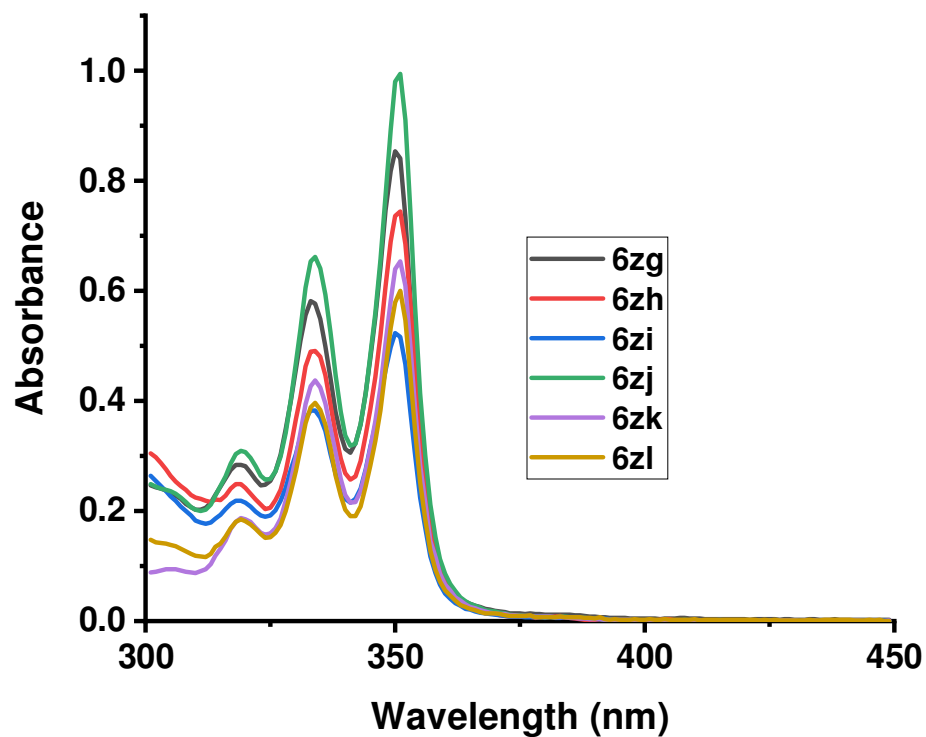
For all the compounds  $\lambda_{\text{max}} = 350$  nm.





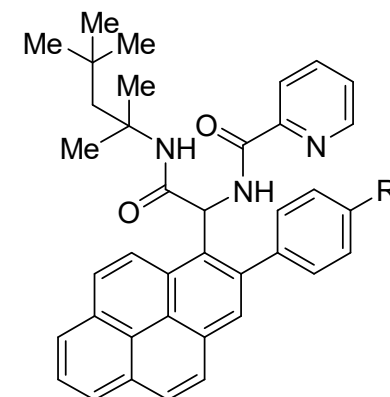
The absorption spectra (using UV-Vis spectroscopy, concentration = 0.01 g/100 mL in CHCl<sub>3</sub>) were recorded in CHCl<sub>3</sub> and  $\lambda_{\text{max}}$  (absorption) (the absorption band appearing at the longest wavelength) of compounds **6zg**, **6zh**, **6zi**, **6zj**, **6zk**, **6zl**.

For all the compounds  $\lambda_{\text{max}} = 350$  nm.



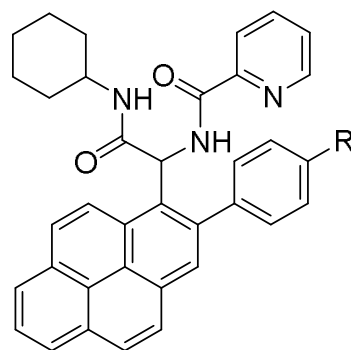
**6zh**: R = Me

**6zi**: R = Ac

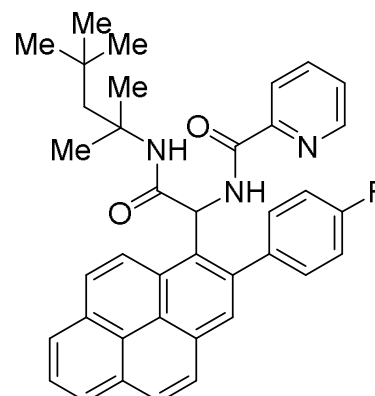


**6zk**: R = Cl

**6zl**: R = OEt

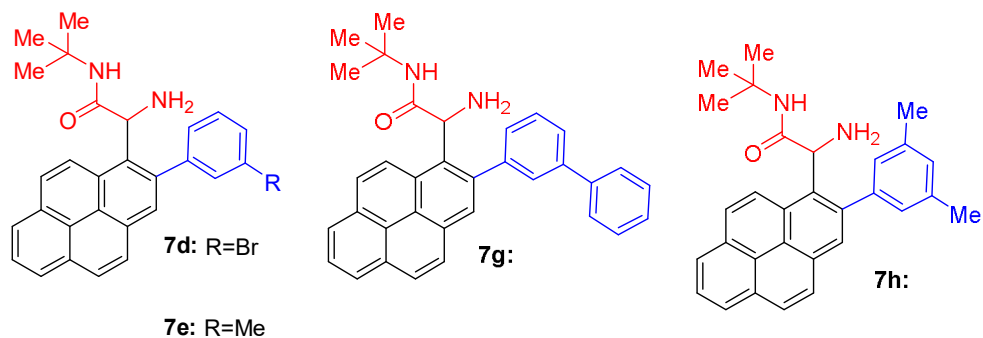
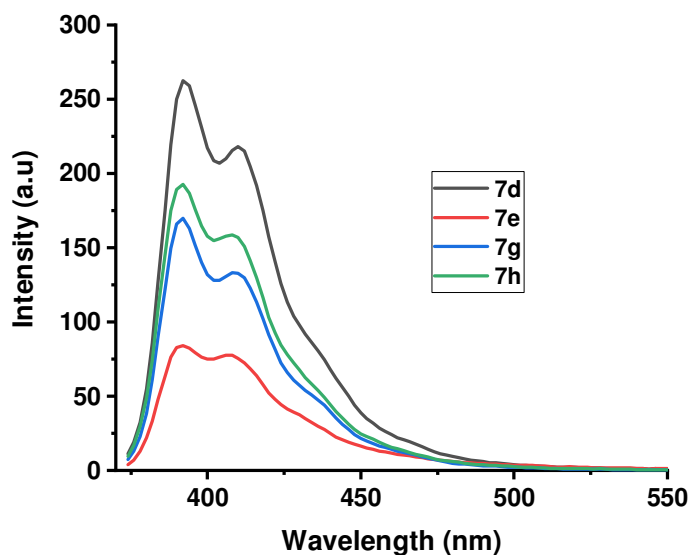


**6zg**: R = OMe

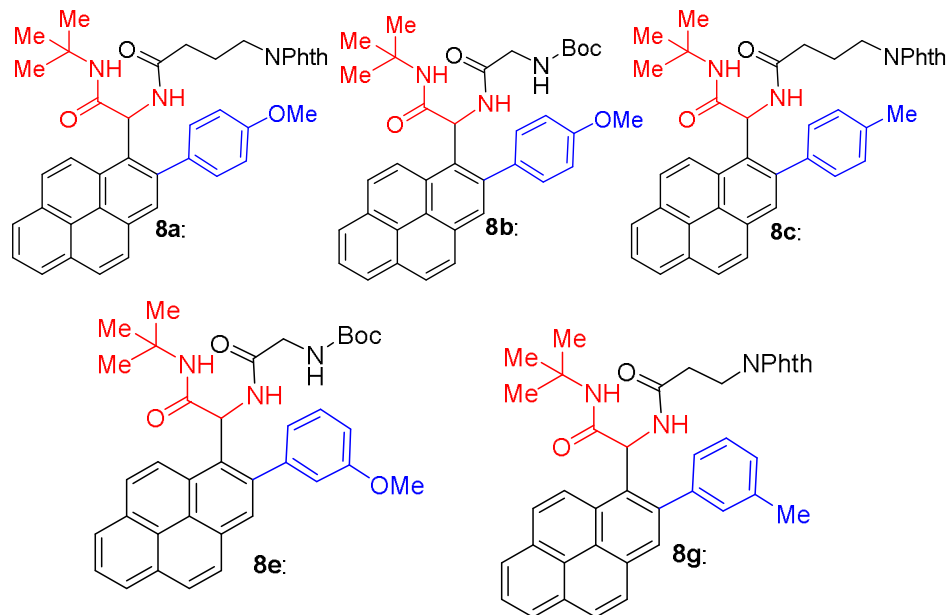
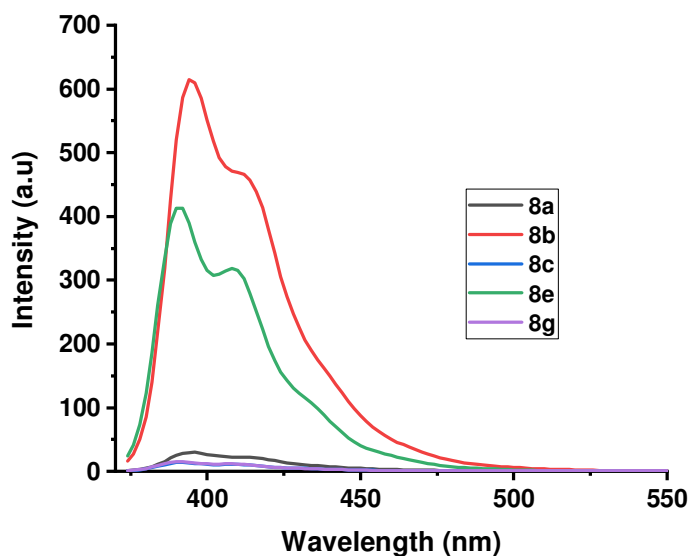


**6zj**: R = OMe

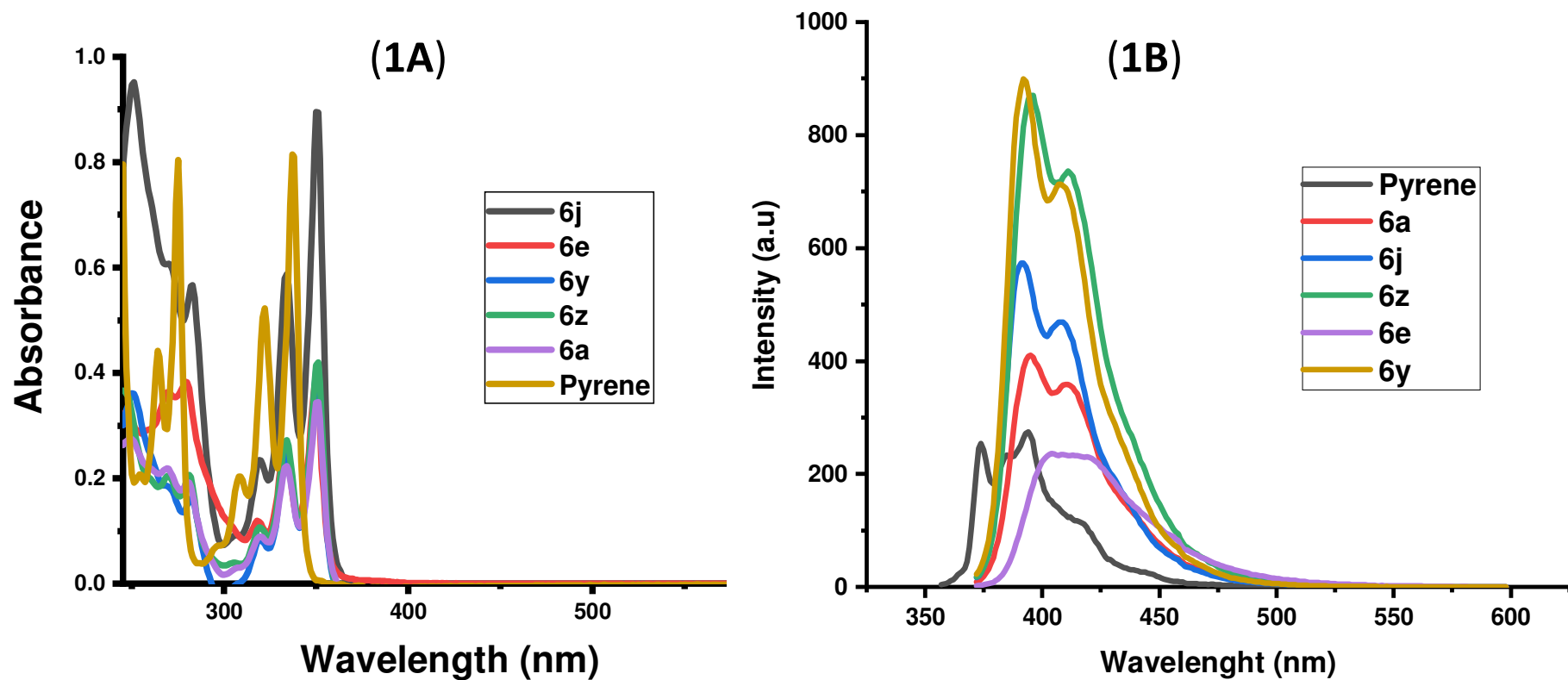
Preliminary analysis: emission spectra of **7d**, **7e**, **7g**, **7h**, **8a**, **8b**, **8c**, **8e**, **8g** in CHCl<sub>3</sub> at 350 nm. The concentration of all the sample solutions is 6.06 μM.



$\lambda_{\text{max}}$  (emission) (nm) at the excitation wavelength of 350 nm = **7d**: 392, **7e**: 392, **7g**: 392, **7h**: 392.

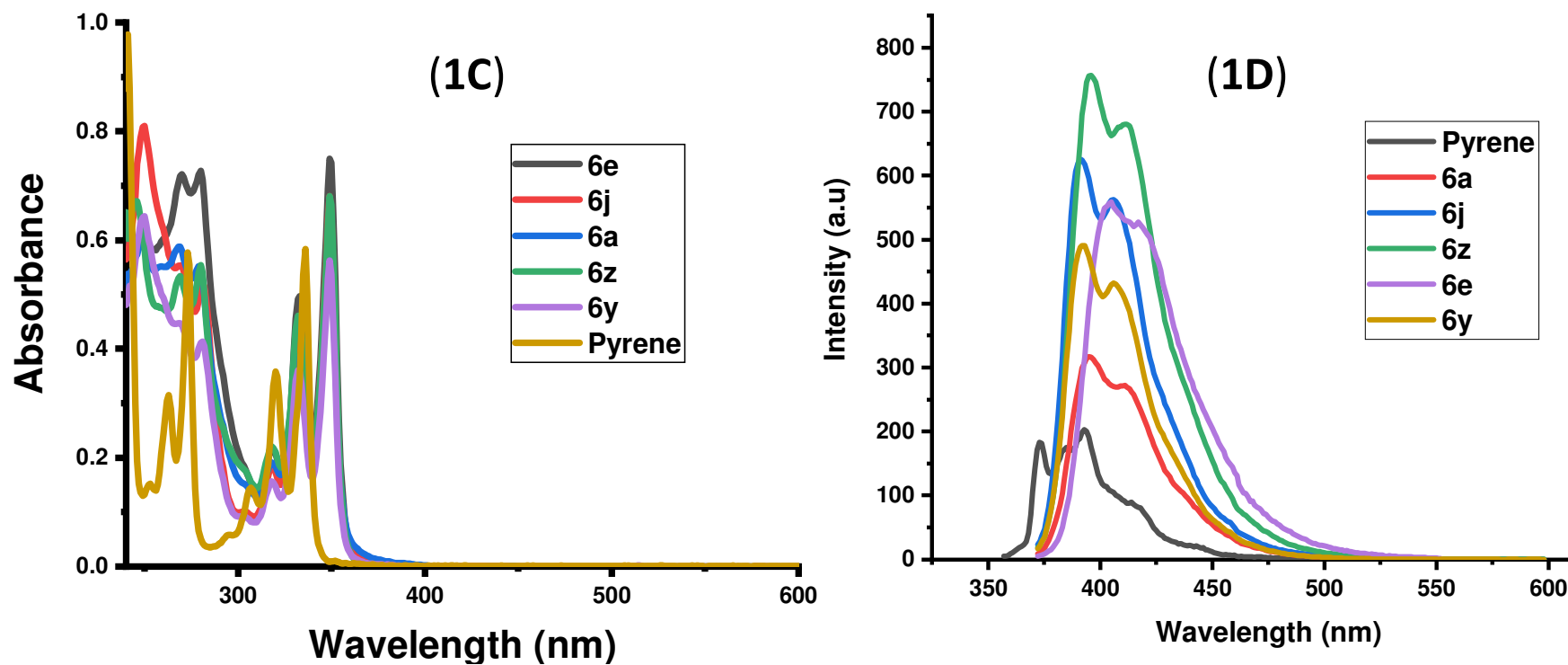


$\lambda_{\text{max}}$  (emission) (nm) at the excitation wavelength of 350 nm = **8a**: 396, **8b**: 396, **8c**: 390, **8e**: 390, **8g**: 390.



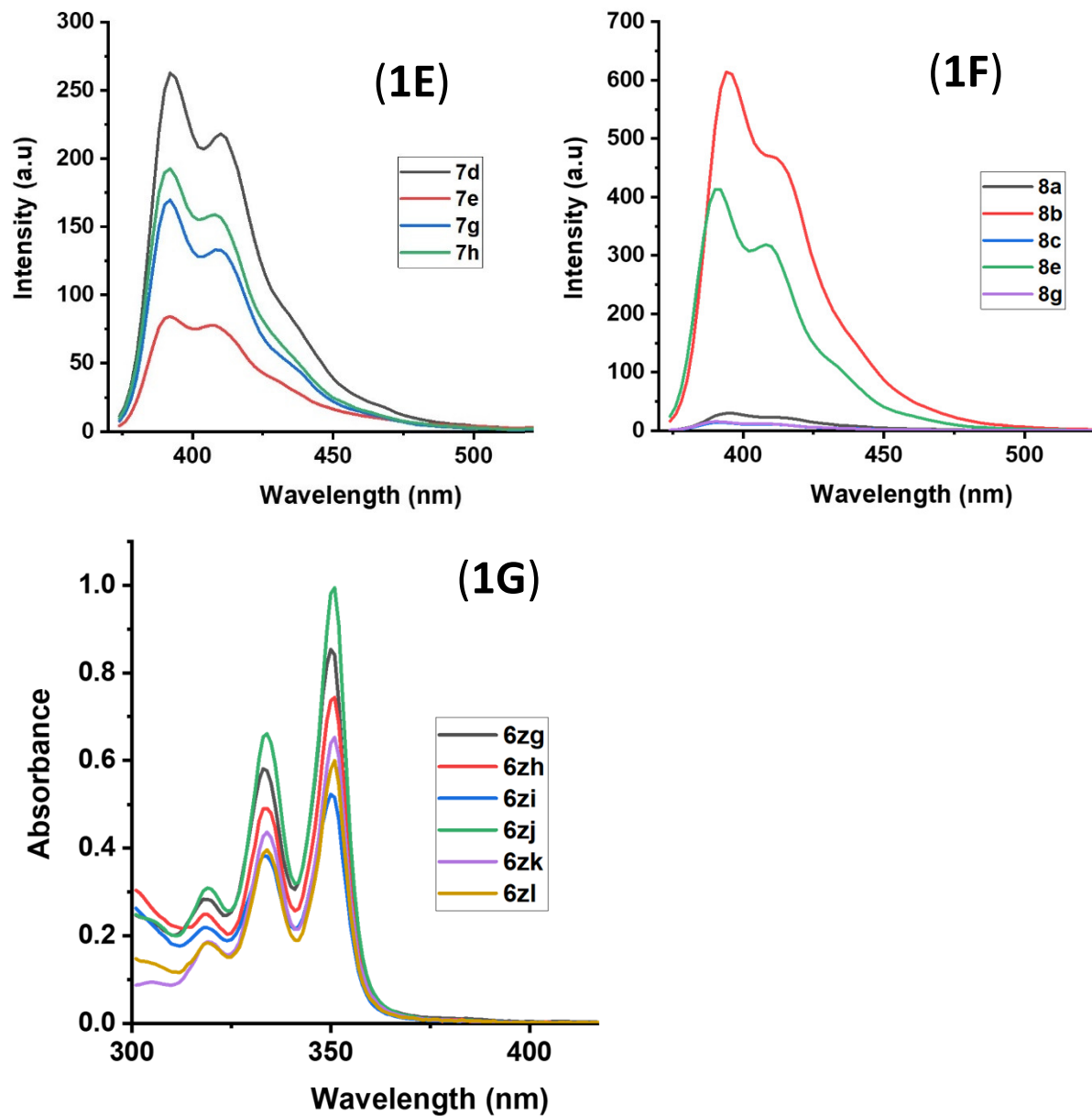
Optical absorption (**1A**) and emission (**1B**) spectra of representative compounds. (**1A**): The absorption spectra of **6a**, **6j**, **6z**, **6e** and **6y** (concentration = 0.02 g/100 mL in  $\text{CHCl}_3$ ) in  $\text{CHCl}_3$ ,  $\lambda_{\text{max}}(\text{absorption})$  (nm) = Pyrene: 337, **6a**: 349, **6j**: 349, **6z**: 349, **6e**: 349, **6y**: 350. (**1B**): Emission spectra of **6a**, **6j**, **6z**, **6e** and **6y** in  $\text{CHCl}_3$  (concentration = 3.8  $\mu\text{M}$ ) at the excitation wavelength of 350 nm  $\lambda_{\text{max}}(\text{emission})$  (nm) = Pyrene: 393, **6a**: 395, **6j**: 390, **6z**: 396, **6e**: 404, **6y**: 392.

Figure 1 (in the manuscript)



Optical absorption (1C) and emission (1D) spectra of representative compounds. (1C): The absorption spectra of **6a**, **6j**, **6z**, **6e** and **6y** (concentration = 0.02 g/100 mL in THF),  $\lambda_{\max(\text{absorption})}$  (nm) = Pyrene: 336, **6a**: 349, **6j**: 349, **6z**: 350, **6e**: 349, **6y**: 349. (1D): Emission spectra of **6a**, **6j**, **6z**, **6e** and **6y** (concentration = 3.8  $\mu\text{M}$  in THF) at the excitation wavelength of 350 nm  $\lambda_{\max(\text{emission})}$  (nm) = Pyrene: 392, **6a**: 395, **6j**: 391, **6z**: 396, **6e**: 405, **6y**: 392.

Figure 1 (in the manuscript)



Optical absorption (1G) and emission (1E), (1F) spectra of representative compounds. (1G): The absorption spectra of **6zg**, **6zh**, **6zi**, **6zj**, **6zk** and **6zl** (concentration = 0.01 g/100 mL in  $\text{CHCl}_3$ ),  $\lambda_{\text{max (absorption)}} (\text{nm}) = \mathbf{6zg, 6zh, 6zi, 6zj, 6zk}$  and **6zl** = 350 nm. (1E) and (1F): Emission spectra of **7d**, **7e**, **7g**, **7h**, **8a**, **8b**, **8c**, **8e** and **8g** (concentration = 6.06  $\mu\text{M}$  in  $\text{CHCl}_3$ ) at the excitation wavelength of 350 nm  $\lambda_{\text{max (emission)}} (\text{nm}) = \mathbf{7d: 392, 7e: 392, 7g: 392, 7h: 392, 8a: 396, 8b: 396, 8c: 390, 8e: 390, 8g: 390}$ .

Figure 1 (in the manuscript)

### Fluorescence Quantum yield ( $\Phi$ ) calculation.

The quantum yield of **6j**, **6y**, **6z**, **7h**, **8a** was calculated using anthracene ( $\Phi = 0.27$ ) as reference (ref. A. Srivastava, S. Grewal, S. Singh, Rajani and S. Venkataramani, *ChemPhotoChem*, 2023, 7, e202300029). For the calculation of quantum yield different concentration of each compound were made in ethanol ( $\eta = 1.36$ ) with the absorbance less than 0.1 nm at 355nm. Fluorescence spectra were recorded for all the solutions at same of excited  $\lambda_{max}$ . Then by comparing the integrated photoluminescence intensity and absorbency values of all the sample solutions with the reference anthracene quantum yields were calculated. The quantum yield was calculated following the given equation below.

$$\Phi_X = \Phi_{ST} (m_X / m_{ST}) (\eta^2_X / \eta^2_{ST})$$

Where  $\Phi$  is the quantum yield,  $\eta$  is the refractive index of solvent,  $m$  is slope,  $X$  is the sample and  $ST$  is the standard.

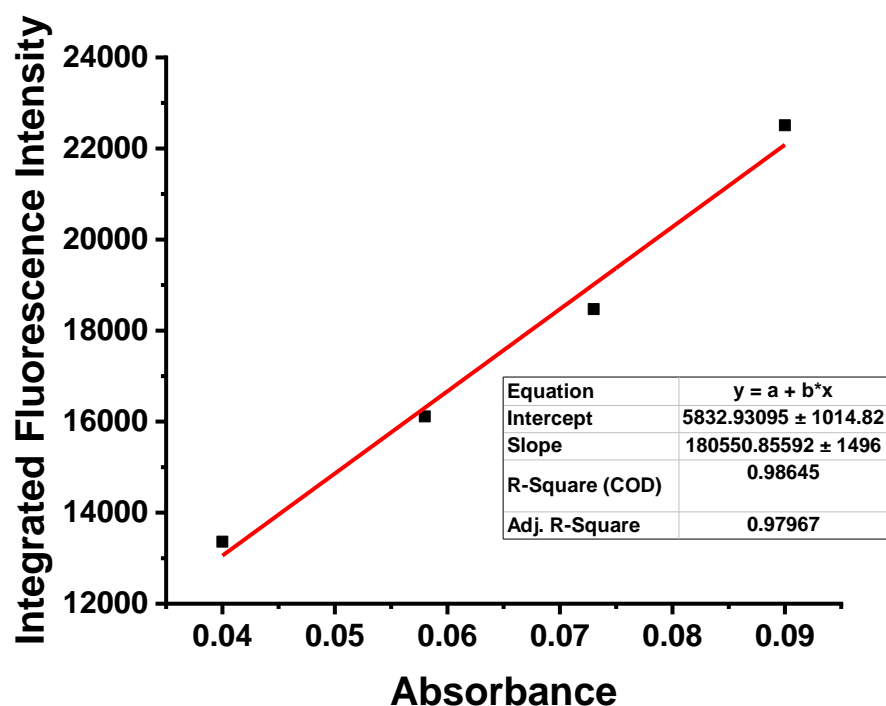


Figure S1. Integrated Fluorescence Intensity vs Absorbance plot for the anthracene.

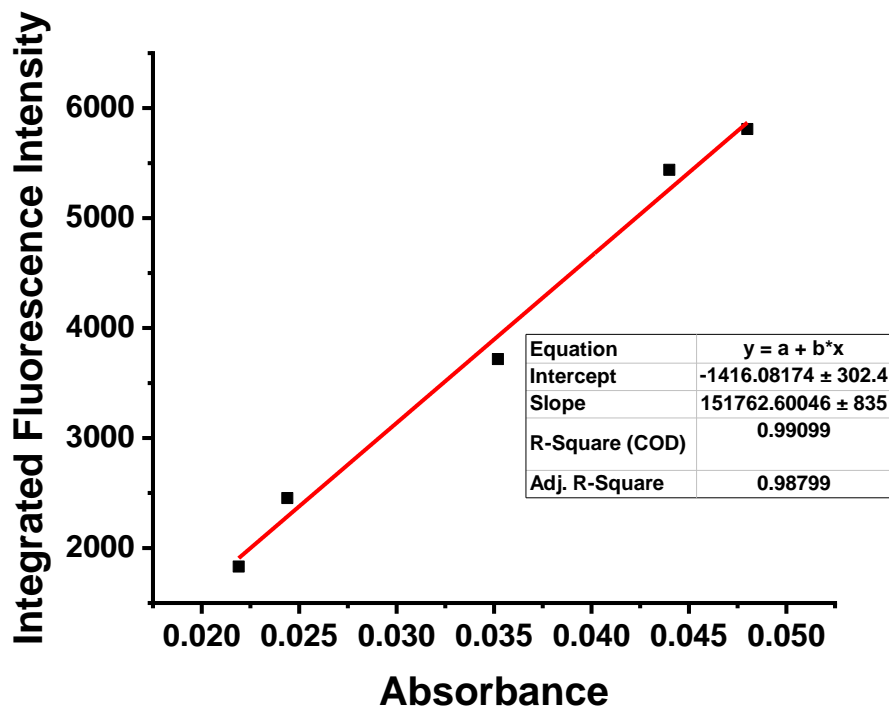


Figure S2. Integrated Fluorescence Intensity vs Absorbance plot for the compound **6y**.

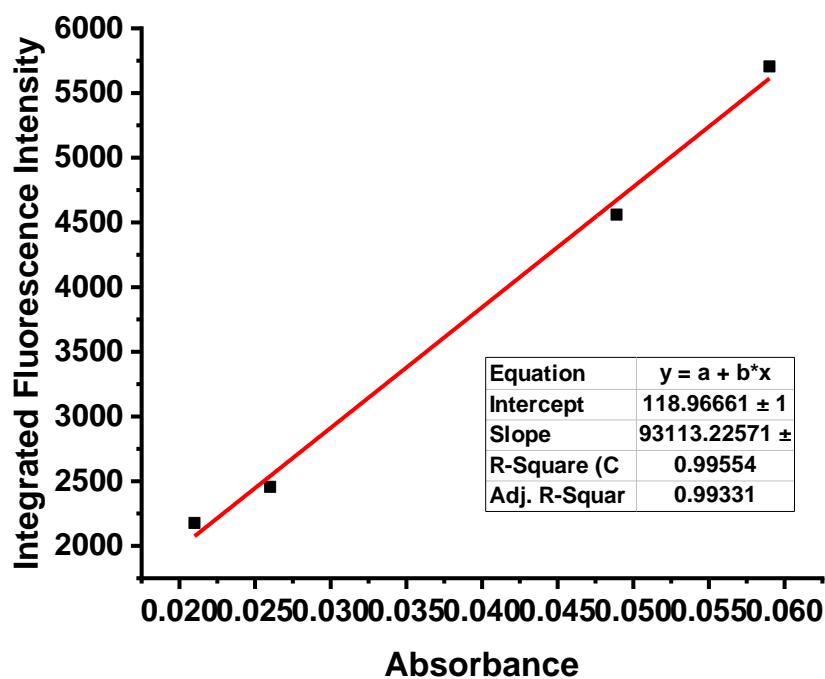


Figure S3. Integrated Fluorescence Intensity vs Absorbance plot for the compound **6a**.

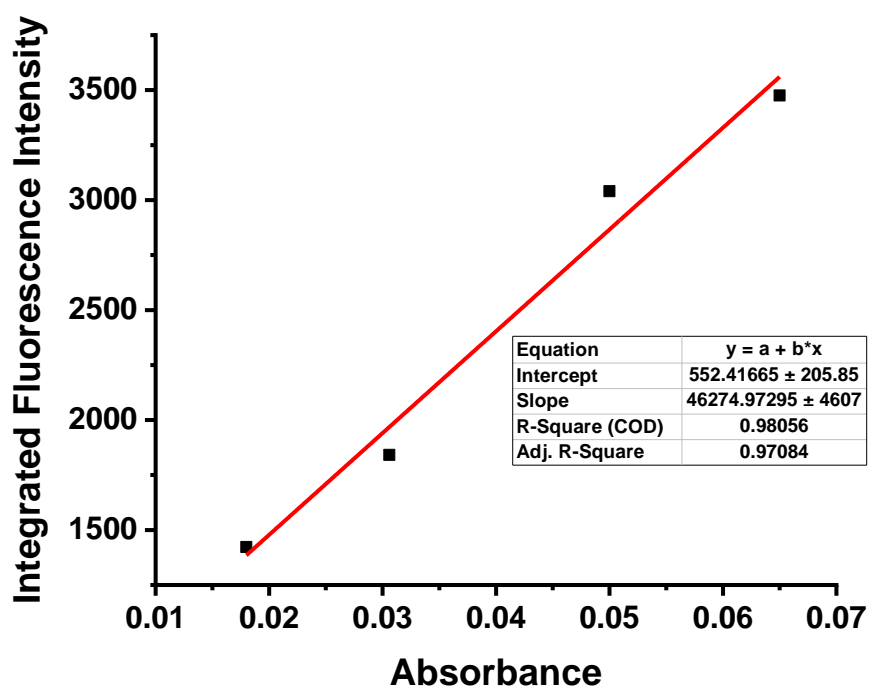


Figure S4. Integrated Fluorescence Intensity vs Absorbance plot for the compound **6j**.

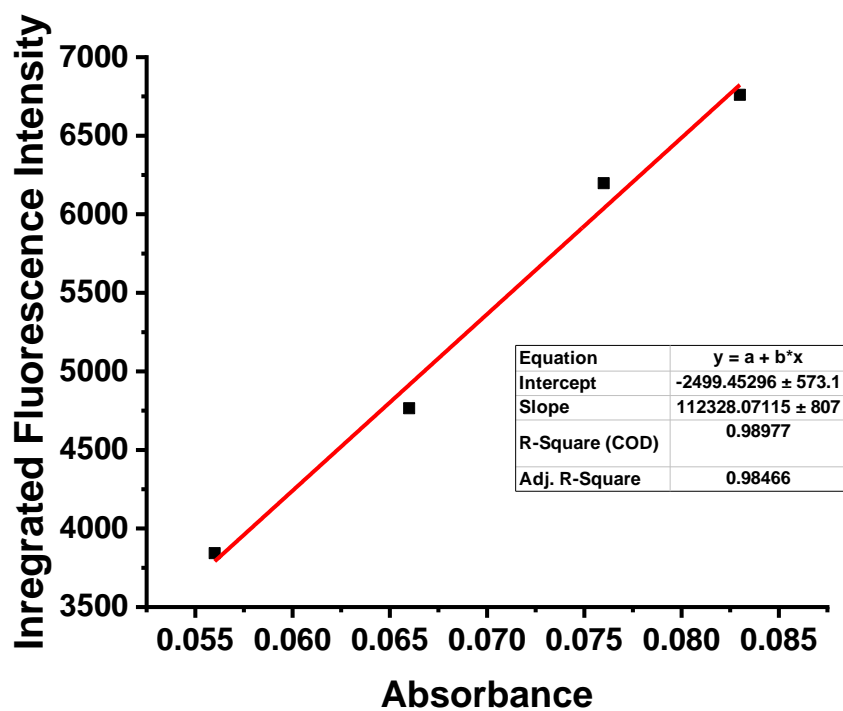


Figure S5. Integrated Fluorescence Intensity vs Absorbance plot for the compound **6z**.



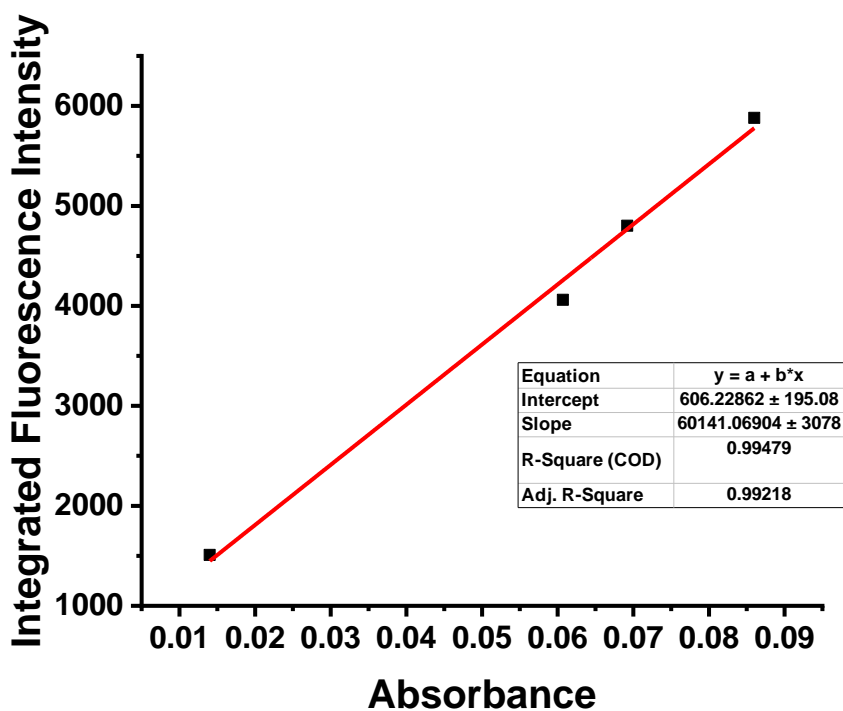


Figure S6. Integrated Fluorescence Intensity vs Absorbance plot for the compound **7h**.

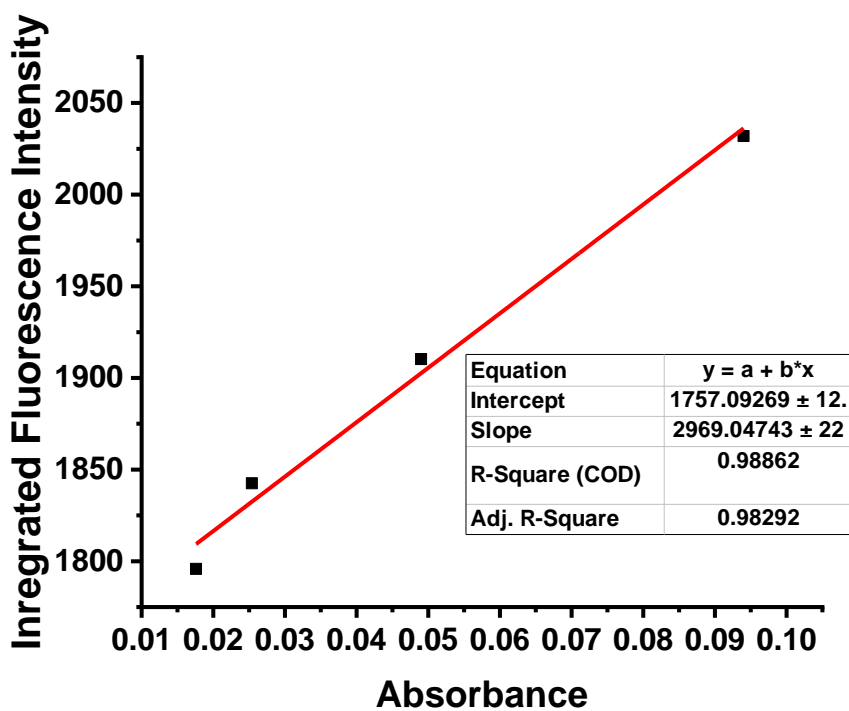


Figure S7. Integrated Fluorescence Intensity vs Absorbance plot for the compound **8a**.

**Table S1.** Quantum yield of **6y**, **6a**, **6j**, **6z**, **7h**, **8a**.

Compound	slope ( $m_x$ )	quantum yield ( $\Phi$ )
<b>6y</b>	151762.60046	0.226
<b>6a</b>	93113.22571	0.139
<b>6j</b>	46274.97295	0.069
<b>6z</b>	112328.07115	0.169
<b>7h</b>	60141.06904	0.089
<b>8a</b>	2969.97295	0.004

## Experimental

### General

$^1\text{H}$  and  $^{13}\text{C}\{1\text{H}\}$  NMR spectra of compounds were recorded (using TMS as an internal standard) in 400 and  $\sim$ 101 MHz spectrometers, respectively. The HRMS analysis data of samples were obtained from the QTOF mass analyzer using the electrospray ionization (ESI) method. FT-IR spectra of samples were recorded as neat or thin films. Column chromatography purification of crude reaction mixtures was carried out on silica gel (100–200 mesh). Reactions were conducted in anhydrous solvents under a nitrogen atm wherever required. Organic layers obtained after the workup were dried using anhydrous  $\text{Na}_2\text{SO}_4$ . Thin layer chromatography (TLC) analyses were performed on silica gel or alumina plates and components were visualized by UV light or under iodine vapor. Isolated yields of all the products are reported and yields were not optimized.

**General procedure for the synthesis of compounds 4a-h:** A solution of aromatic aldehyde (1 equiv), carboxylic acid (1 equiv), ammonia solution (7 N in methanol, 25-50 equiv), and isocyanide (1 equiv) in TFE (2 mL) was stirred at room temperature for 24 h. The reaction mixture was diluted with  $\text{CH}_2\text{Cl}_2$  and washed with water and brine. The organic extracts were combined, and dried over anhydrous  $\text{Na}_2\text{SO}_4$  and the solvent was evaporated. The crude mixture was subjected to column chromatography to afford the compound **4a-h** (Procedure adapted from ref. L. A. Polindara-García et al *Eur. J. Org. Chem.*, 2022, e202101517).

**General procedure for the synthesis of compounds 6a-z, 6za-6zc, 6zg-6zn:** A solution of pyrenylglycinamide **4a** (1 equiv), aryl iodide (4 equiv), KOAc (5 equiv),  $\text{Pd}(\text{OAc})_2$  (10 mol%), and  $\text{CuBr}_2$  (10 mol%) in dry toluene (1.5 mL) was heated in a sealed tube vial under conventional heating (oil bath) at 130 °C for 48 h. The tube was flashed with nitrogen before heating. The reaction mixture was concentrated under reduced pressure. The crude mixture was subjected to column chromatography to afford the corresponding C-H arylated pyrenylglycine.

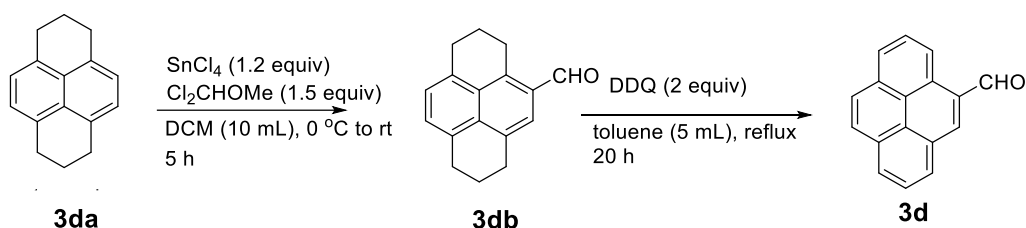
**General procedure for the synthesis of compounds 6ze:** A solution of pyrenylglycinamide **4a** (1 equiv), methyl 4-(bromomethyl)benzoate (4 equiv),  $\text{Pd}(\text{OAc})_2$  (10 mol%),  $\text{K}_2\text{CO}_3$  (2 equiv), NaOTf (3 equiv) in *tert*-amylOH (1.5 mL) was heated in a sealed tube vial under conventional heating (oil bath) at 120 °C for 48 h. The tube was flashed with nitrogen before heating. The reaction mixture was concentrated under reduced pressure. The crude mixture was subjected to column chromatography to afford the compound **6ze**.

**General procedure for the synthesis of compounds 6zf:** A solution of pyrenylglycinamide **4a** (1 equiv), 1-iodobutane (4 equiv),  $\text{Pd}(\text{OAc})_2$  (10 mol%),  $\text{Ag}_2\text{CO}_3$  (2 equiv),  $(\text{BnO})_2\text{PO}_2\text{H}$  (0.3 equiv) in *tert*-amylOH (1.5 mL) was heated in a sealed tube vial under conventional heating (oil bath) at 120 °C for 48 h. The tube was flashed with nitrogen before heating. The reaction mixture was concentrated under reduced pressure. The crude mixture was subjected to column chromatography to afford the compounds **6zf**.

**General procedure for the synthesis of compounds 6zd:** A solution of pyrenylglycinamide **4a** (1 equiv), 1-iodopentane (4.0 equiv),  $\text{Pd}(\text{OAc})_2$  (10 mol%), KOAc (2.0 equiv) in dry 1,4-dioxane (1.5 mL) was heated in a sealed tube vial under conventional heating (oil bath) at 130 °C for 48 h. The tube was flashed with nitrogen before heating. The reaction mixture was concentrated under reduced pressure. The crude mixture was subjected to column chromatography to afford the compound **6zd**.

**General procedure for the synthesis of compounds 7a-h:** To an appropriate arylated compound **6** (1 equiv) dissolved in H<sub>2</sub>O/THF (1:1, 2-4 mL), 12 N HCl (0.33-0.5 mL) was added. The mixture was stirred at rt for 15 min. Zinc dust (15 equiv) was then added in three portions and the mixture was stirred at rt for 18-36 h. The mixture was transferred to a separating funnel with 2 N NaOH (20 mL) and extracted with ethyl acetate. The reaction mixture was concentrated under reduced pressure. The crude mixture was subjected to column chromatography to afford compound **7a-h** (the plicolinamide directing group removal procedure was carried out using the standard reported procedure).

**General procedure for the synthesis of compounds 8a-h and 8f2-(D):** An appropriate amount of *N*-protected amino acid (1 equiv), *N*-(3-dimethylaminopropyl)-*N'*-ethylcarbodiimide hydrochloride (1.1 equiv), 1-hydroxybenzotriazole hydrate (1.1 equiv) in dry DCM (5 mL) was stirred for 1 h at 0 °C under a nitrogen atmosphere. Then, an appropriate amount of amine compound **7** (1 equiv) was added to the above mixture and stirred for 24-25 h at room temperature. The resulting solution was then subjected to aqueous workup and washed with aqueous NaHCO<sub>3</sub> solution (two times). The resulting solution mixture was concentrated and purified on silica gel column chromatography (EtOAc/hexane) to give the corresponding pyrene-based peptides.



**General procedure for the synthesis of pyrene-4-carbaldehyde (3d):** To a solution of 1,2,3,6,7,8-hexahydropyrene (**3da**, 208 mg, 1 mmol) in CH<sub>2</sub>Cl<sub>2</sub> (10 mL) was added stannic chloride (140 μL, 1.2 mmol), and the mixture was cooled to 0 °C under a nitrogen atmosphere. Then, 1,1'-dichlorodimethyl ether (136 μL, 1.5 mmol) was added by a syringe, and the mixture was stirred at 0 °C for 5 h. The reaction was monitored by TLC. After completion, the reaction mixture was gradually warmed to rt and then quenched with ice water, acidified by dilute hydrochloric acid, and extracted with DCM. The organic phase was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub>, filtrated, and then concentrated to get the crude product **3db** which is used for the next step without purification. To a solution of 1,2,3,6,7,8-hexahydropyrene-4-carbaldehyde (**3db**, 1 mmol) in dry toluene (5 mL) was added DDQ (2 equiv) and the reaction mixture was heated at 100 °C for 20 h. The reaction was monitored by TLC. The reaction mixture was concentrated under reduced pressure. The crude mixture was subjected to column chromatography to afford the compound **3d** (86% yield). (The preparation of **3d** was carried out using the reported procedure: (a) P.-F. Li and C.-F. Chen, *J. Org. Chem.*, 2012, **77**, 9250. (b) K. W. Bair, C. W. Andrews, R. L. Tuttle, V. C. Knick, M. Cory and D. D. McKee, *J. Med. Chem.*, 1991, **34**, 1983).