

Supporting Information

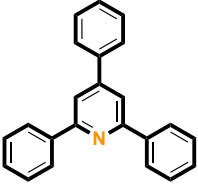
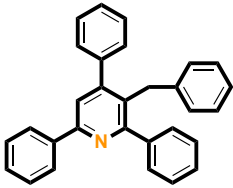
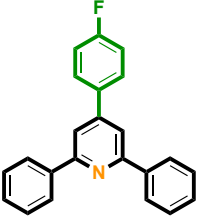
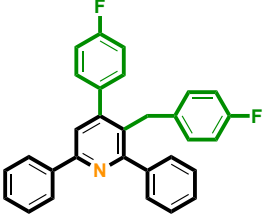
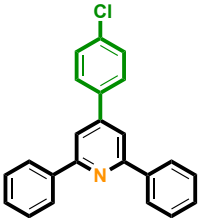
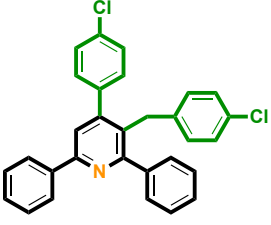
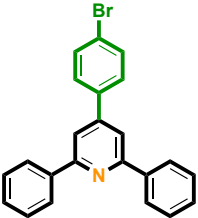
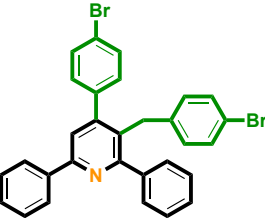
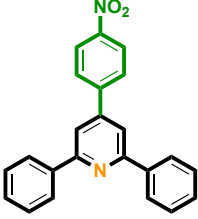
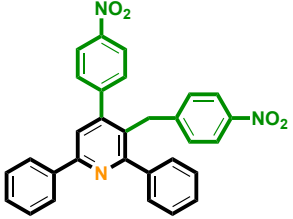
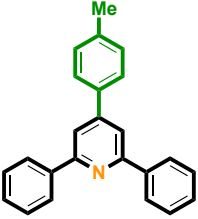
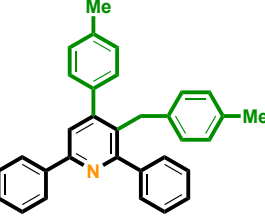
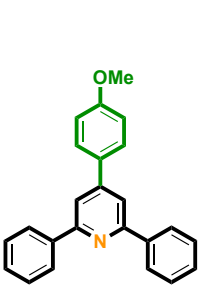
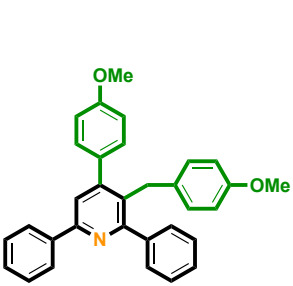
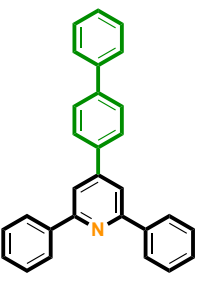
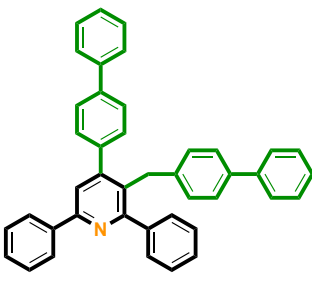
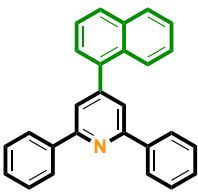
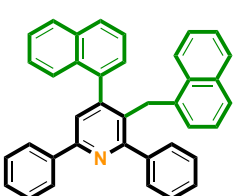
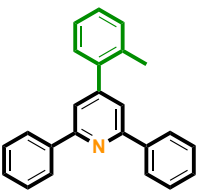
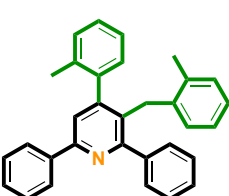
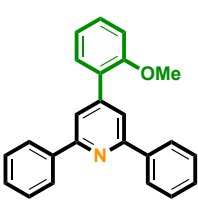
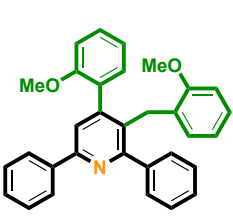
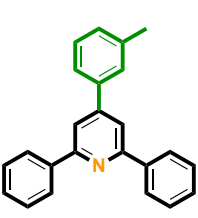
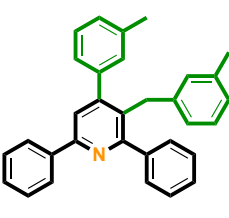
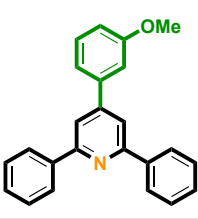
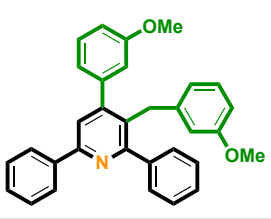
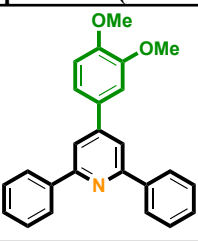
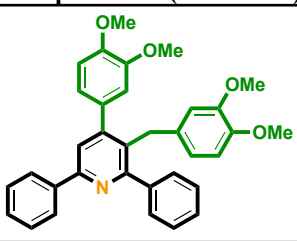
TMSOTf-mediated Kröhnke Pyridines Synthesis Using HMDS as Nitrogen Source under Microwave Irradiation

Chieh-Kai Chan,* Yi-Hsiu Chung and Cheng-Chung Wang*

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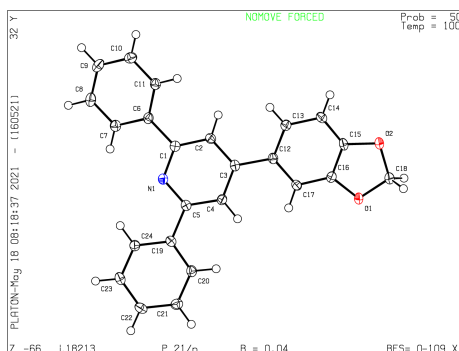
E-mail: ckc@gate.sinica.edu.tw and wangcc7280@gate.sinica.edu.tw

I. Table of Compound Structures and Corresponding Page Numbers.....	S-2~S-3
II. Crystal Data for Compounds 2q and 4	S-4~S-5
III. Scanned Photocopies of ¹ H and ¹³ C NMR Spectra for Compounds 2a-2ab , 3a-3n , 3r-3aa and 4	S-6~S-109

Compound 2a (S-6~S-7)	Compound 3a (S-8~S-9)	Compound 2b (S-10~S-11)	Compound 3b (S-12~S-13)
			
Compound 2c (S-14~S-15)	Compound 3c (S-16~S-17)	Compound 2d (S-18~S-19)	Compound 3d (S-20~S-21)
			
Compound 2e (S-22~S-23)	Compound 3e (S-24~S-25)	Compound 2f (S-26~S-27)	Compound 3f (S-28~S-29)
			
Compound 2g (S-30~S-31)	Compound 3g (S-32~S-33)	Compound 2h (S-34~S-35)	Compound 3h (S-36~S-37)
			
Compound 2i (S-38~S-39)	Compound 3i (S-40~S-41)	Compound 2j (S-42~S-43)	Compound 3j (S-44~S-45)
			
Compound 2k (S-46~S-47)	Compound 3k (S-48~S-49)	Compound 2l (S-50~S-51)	Compound 3l (S-52~S-53)
			
Compound 2m (S-54~S-55)	Compound 3m (S-56~S-57)	Compound 2n (S-58~S-59)	Compound 3n (S-60~S-61)
			

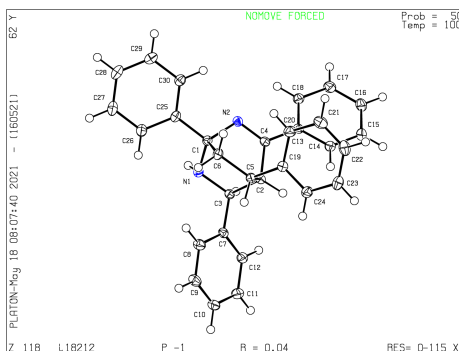
Compound 2o (S-62~S-63) 	Compound 2p (S-64~S-65) 	Compound 2q (S-66~S-67) 	Compound 2r (S-68~S-69)
Compound 3r (S-70~S-71) 	Compound 2s (S-72~S-73) 	Compound 3s (S-74~S-75) 	Compound 2t (S-76~S-77)
Compound 3t (S-78~S-79) 	Compound 2u (S-80~S-81) 	Compound 3u (S-82~S-83) 	Compound 2v (S-84~S-85)
Compound 3v (S-86~S-87) 	Compound 2w (S-88~S-89) 	Compound 3w (S-90~S-91) 	Compound 2x (S-92~S-93)
Compound 3x (S-94~S-95) 	Compound 2y (S-96~S-97) 	Compound 3y (S-98~S-99) 	Compound 2z (S-100~S-101)
Compound 3z (S-102~S-103) 	Compound 2aa (S-104~S-105) 	Compound 3aa (S-106~S-107) 	Compound 2ab (S-108~S-109)
Compound 4 (S-110~S-111) 			

Crystal data and structure refinement for compound **2q**
(the thermal ellipsoid was drawn at the 50% probability level)



Identification code	i18213	
Empirical formula	C ₂₄ H ₁₇ N O ₂	
Formula weight	351.38	
Temperature	100.0(2) K	
Wavelength	0.71073 Å	
Crystal system	Monoclinic	
Space group	P 2 ₁ /n	
Unit cell dimensions	a = 6.4058(2) Å	a = 90°.
	b = 12.1092(3) Å	b = 92.2490(10)°.
	c = 21.6453(7) Å	g = 90°.
Volume	1677.71(9) Å ³	
Z, Density (calculated)	4, 1.391 Mg/m ³	
Absorption coefficient	0.089 mm ⁻¹	
F(000)	736	
Crystal size	0.362 x 0.284 x 0.090 mm ³	
Theta range for data collection	1.927 to 27.102°.	
Index ranges	-8<=h<=8, -15<=k<=15, -27<=l<=27	
Reflections collected	50975	
Independent reflections	3704 [R(int) = 0.0627]	
Completeness to theta = 25.242°	99.7 %	
Absorption correction	Numerical	
Max. and min. transmission	1 and 0.888	
Refinement method	Full-matrix least-squares on F ²	
Data / restraints / parameters	3704 / 0 / 245	
Goodness-of-fit on F ²	1.029	
Final R indices [I>2sigma(I)]	R1 = 0.0354, wR2 = 0.0912	
R indices (all data)	R1 = 0.0412, wR2 = 0.0956	
Extinction coefficient	0.016(3)	
Largest diff. peak and hole	0.301 and -0.182 e.Å ⁻³	

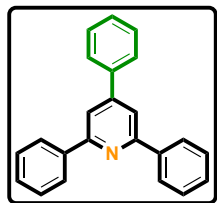
Crystal data and structure refinement for compound **4**
(the thermal ellipsoid was drawn at the 50% probability level)



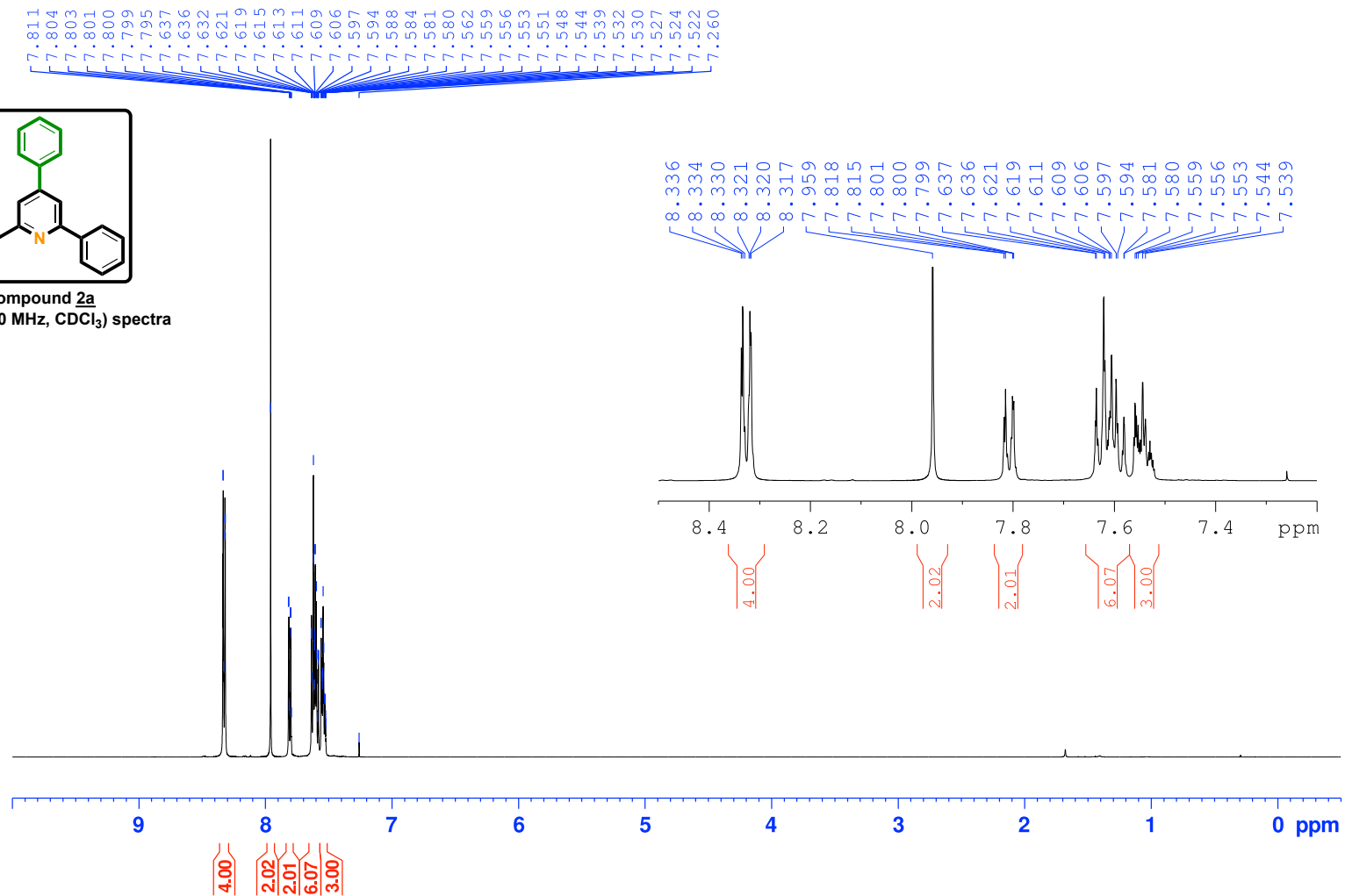
Identification code	i18212	
Empirical formula	C ₃₀ H ₂₆ N ₂	
Formula weight	414.53	
Temperature	100.0(2) K	
Wavelength	0.71073 Å	
Crystal system	Triclinic	
Space group	P -1	
Unit cell dimensions	a = 9.8179(3) Å	a = 76.3210(10)°.
	b = 10.4973(3) Å	b = 87.7270(10)°.
	c = 11.9206(3) Å	g = 66.7560(10)°.
Volume	1094.83(5) Å ³	
Z, Density (calculated)	2, 1.257 Mg/m ³	
Absorption coefficient	0.073 mm ⁻¹	
F(000)	440	
Crystal size	0.369 x 0.277 x 0.214 mm ³	
Theta range for data collection	1.761 to 30.034°.	
Index ranges	-13<=h<=13, -14<=k<=14, -16<=l<=16	
Reflections collected	54798	
Independent reflections	6393 [R(int) = 0.0439]	
Completeness to theta = 25.242°	99.6 %	
Absorption correction	Numerical	
Max. and min. transmission	1 and 0.9701	
Refinement method	Full-matrix least-squares on F ²	
Data / restraints / parameters	6393 / 0 / 293	
Goodness-of-fit on F ²	1.032	
Final R indices [I>2sigma(I)]	R1 = 0.0423, wR2 = 0.1058	
R indices (all data)	R1 = 0.0529, wR2 = 0.1131	
Extinction coefficient	n/a	
Largest diff. peak and hole	0.392 and -0.233 e.Å ⁻³	

Compound 2a

1H YHC-301 sep 28-30 (from406-2) Ph-Ph 0412

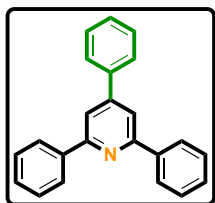


Compound 2a
¹H NMR (500 MHz, CDCl₃) spectra

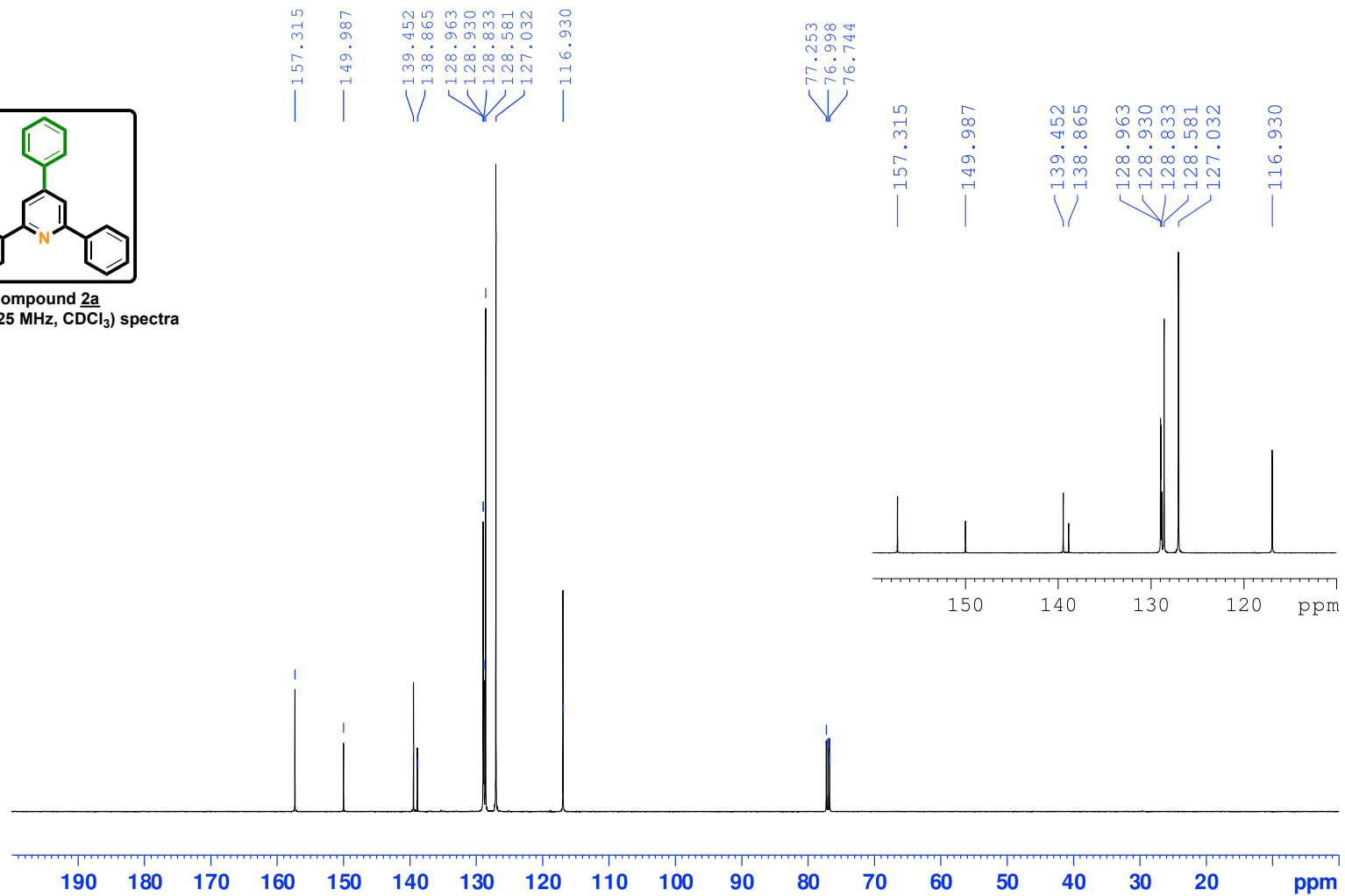


Compound 2a

13C YHC-301 sep 28-30 (from406-2) Ph-Ph 0412

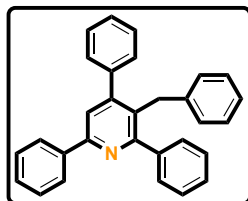


Compound 2a
¹³C NMR (125 MHz, CDCl₃) spectra

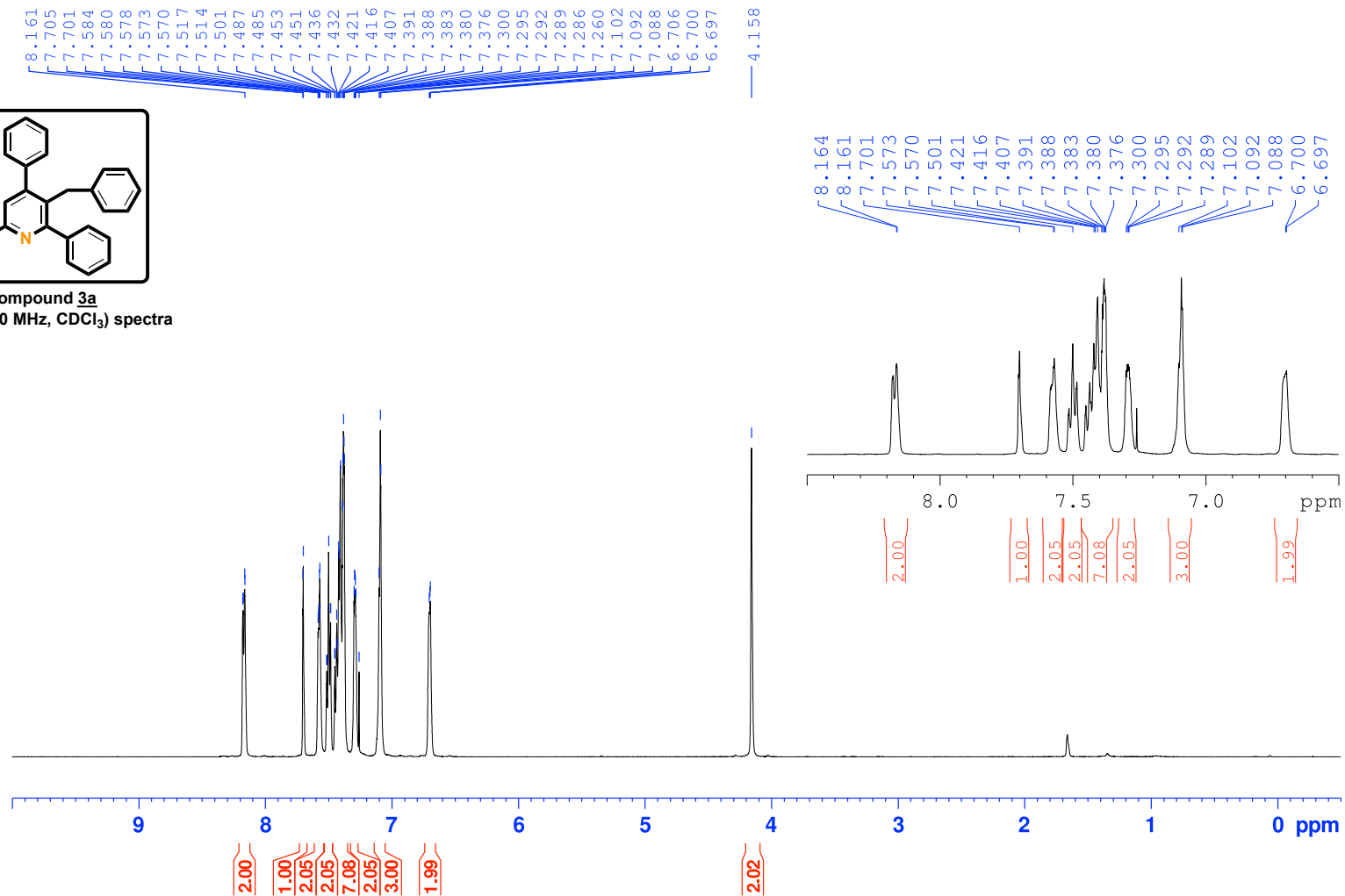


Compound 3a

1H YHC-406-2 down 39-41 0412

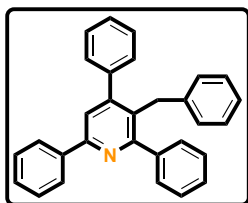


Compound 3a
¹H NMR (500 MHz, CDCl₃) spectra

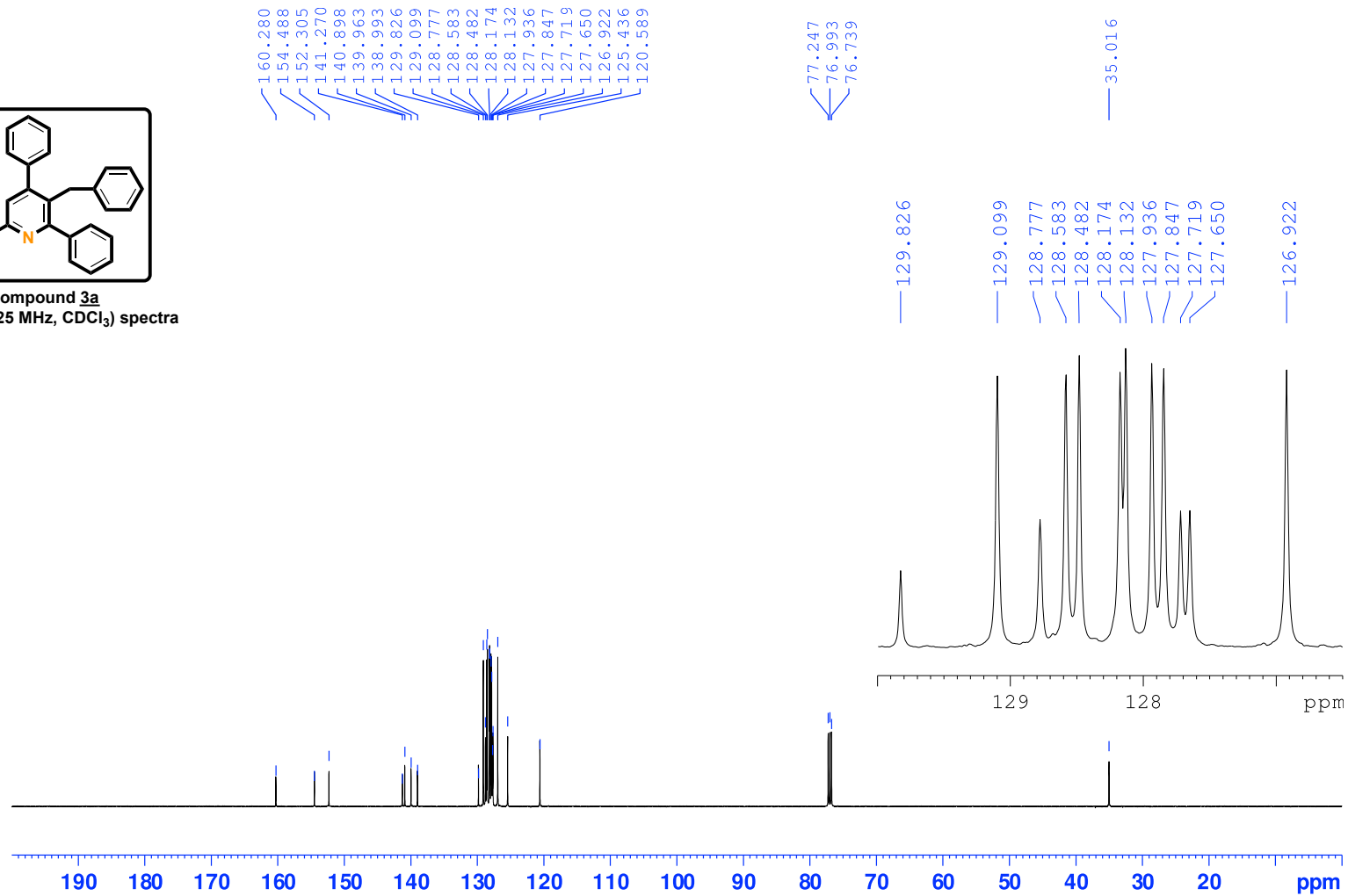


Compound 3a

13C YHC-406-2 down 39-41 0412

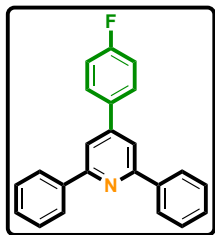


Compound 3a
¹³C NMR (125 MHz, CDCl₃) spectra

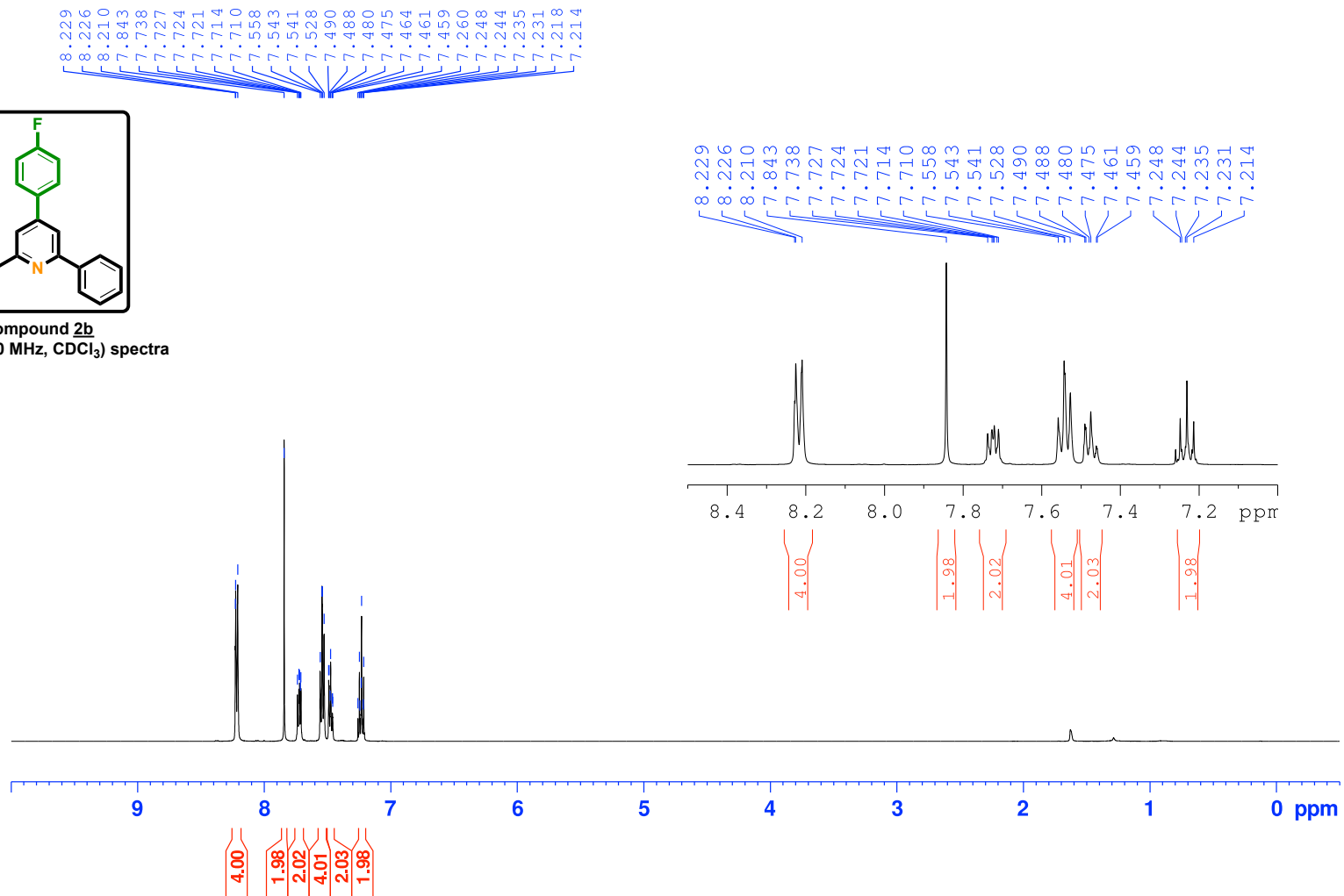


Compound 2b

1H YHC-432 sep 3334 0518

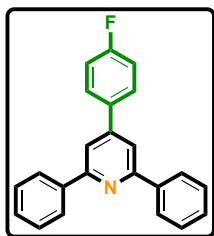


Compound 2b
¹H NMR (500 MHz, CDCl₃) spectra

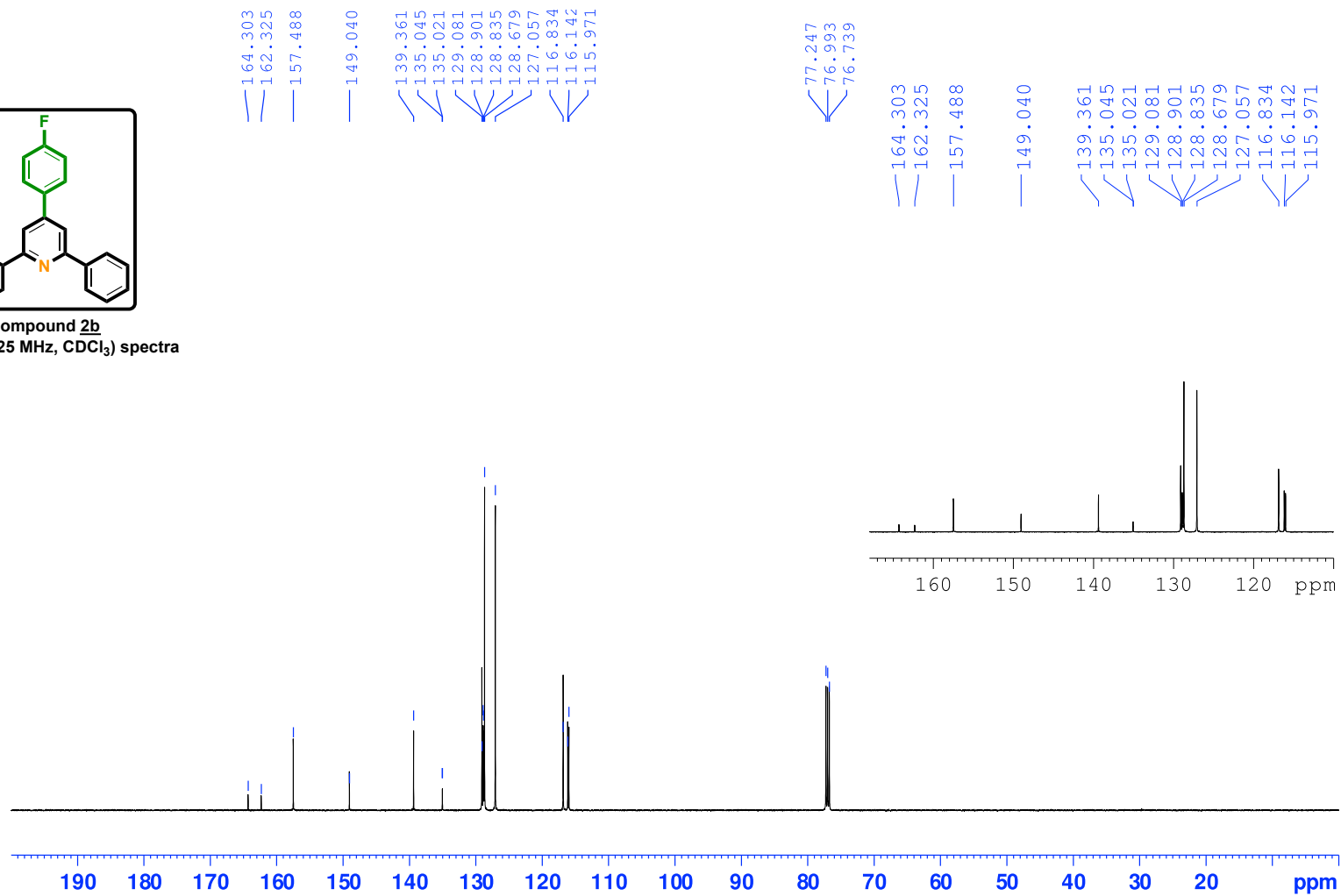


Compound 2b

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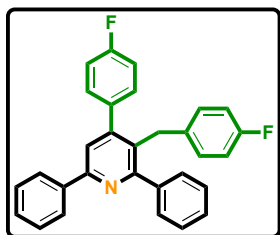


Compound 2b
¹³C NMR (125 MHz, CDCl₃) spectra

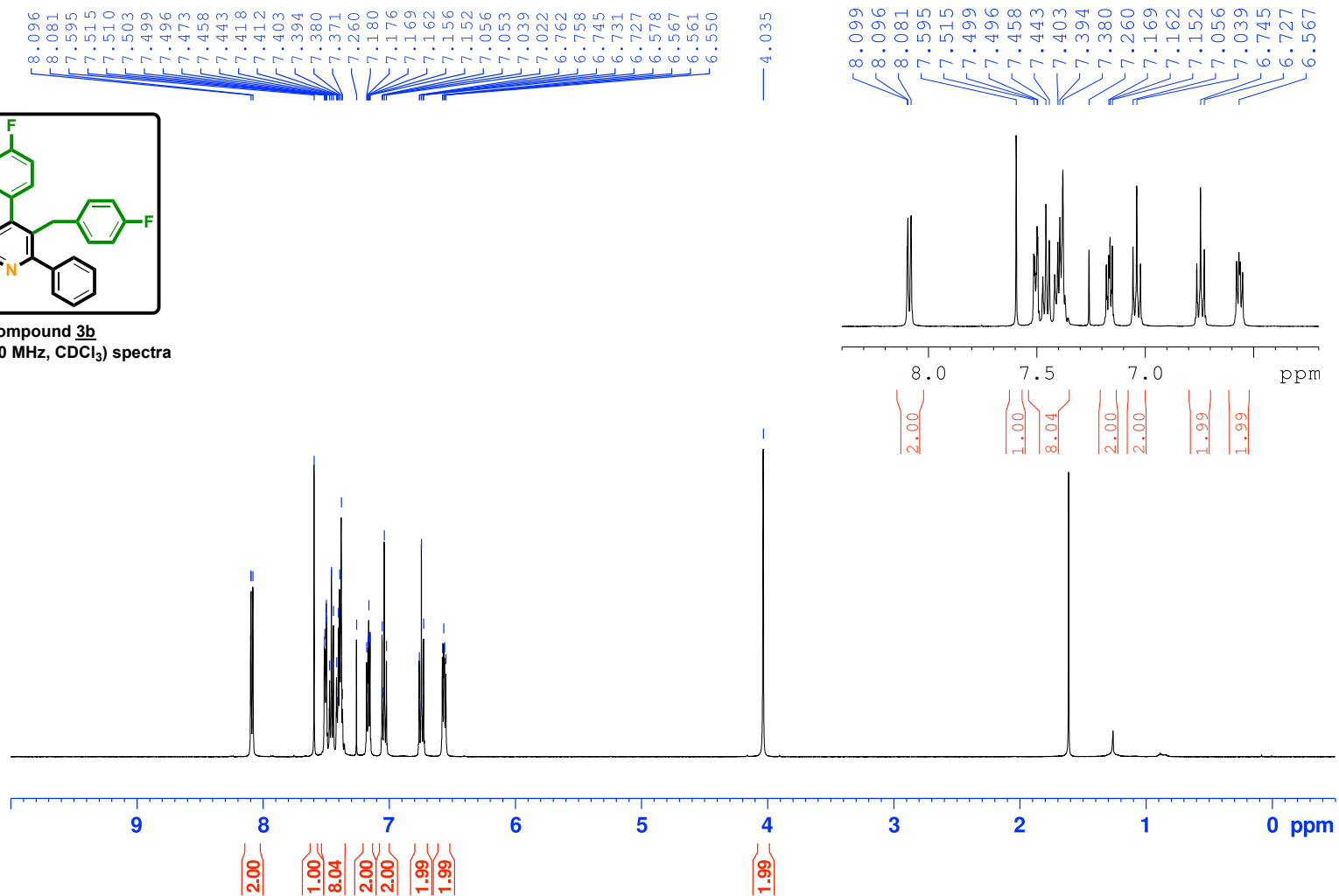


Compound 3b

1H YHC-432 sep 5455 0518

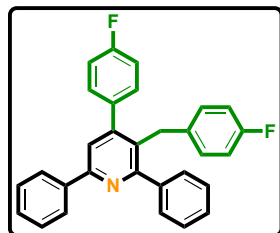


Compound 3b
¹H NMR (500 MHz, CDCl₃) spectra

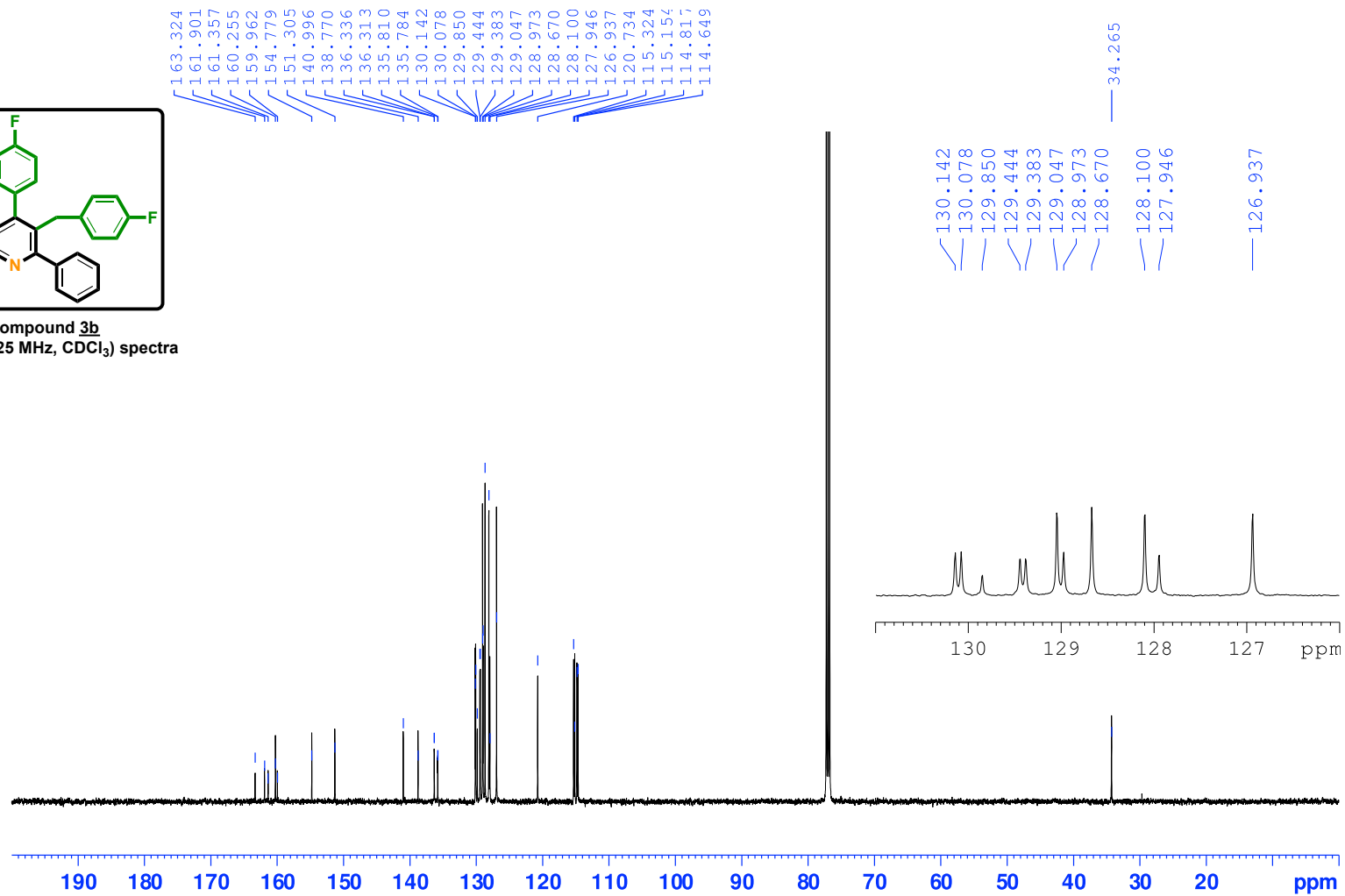


Compound 3b

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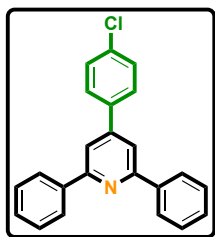


Compound 3b
¹³C NMR (125 MHz, CDCl₃) spectra

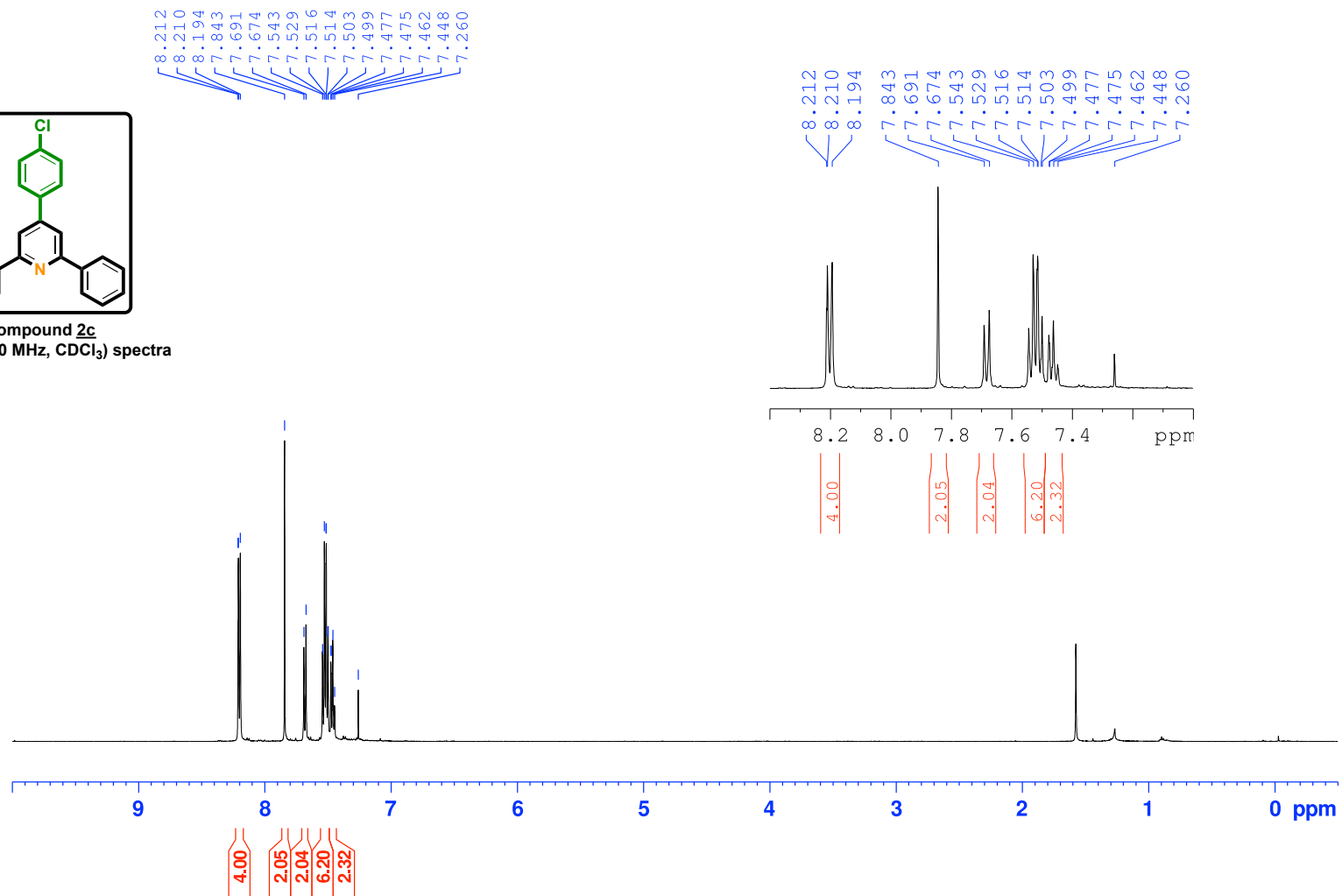


Compound 2c

1H YHC-438-3 sep 6566 top 1103

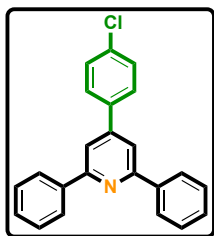


Compound 2c
¹H NMR (500 MHz, CDCl₃) spectra



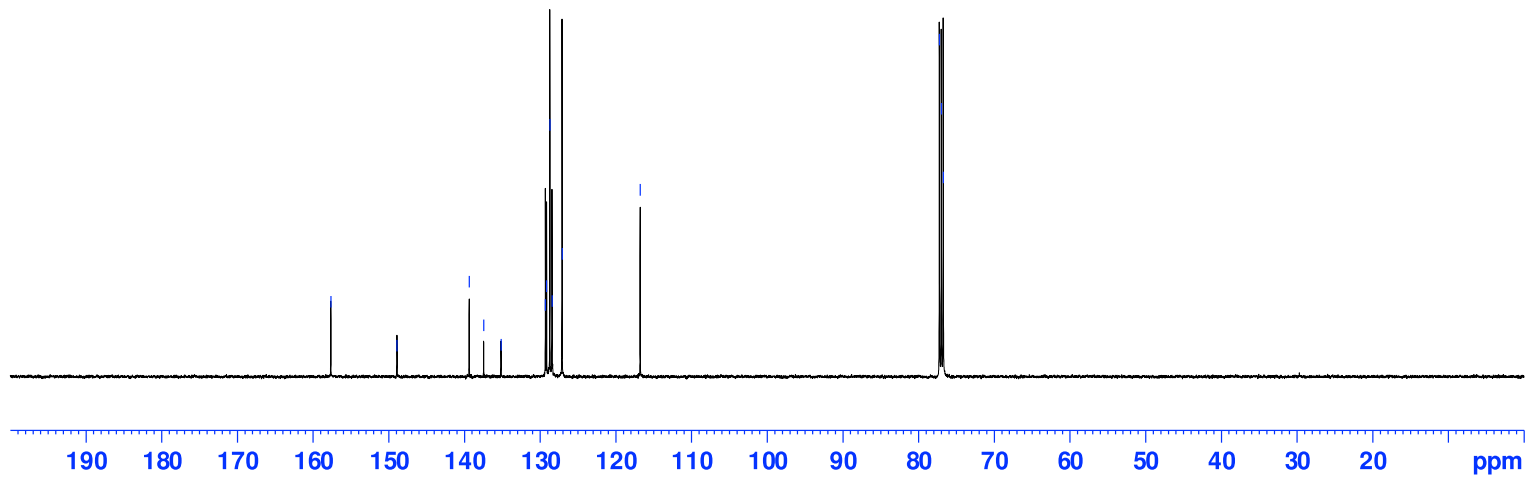
Compound 2c

13C YHC-438-3 sep 6566 top 1103



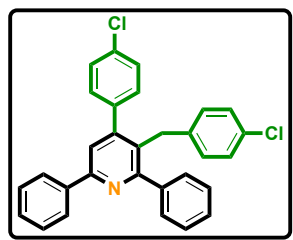
Compound 2c
¹³C NMR (125 MHz, CDCl₃) spectra

157.657
148.915
139.376
137.460
135.173
129.309
129.148
128.720
128.434
127.104
116.785
77.254
77.000
76.746

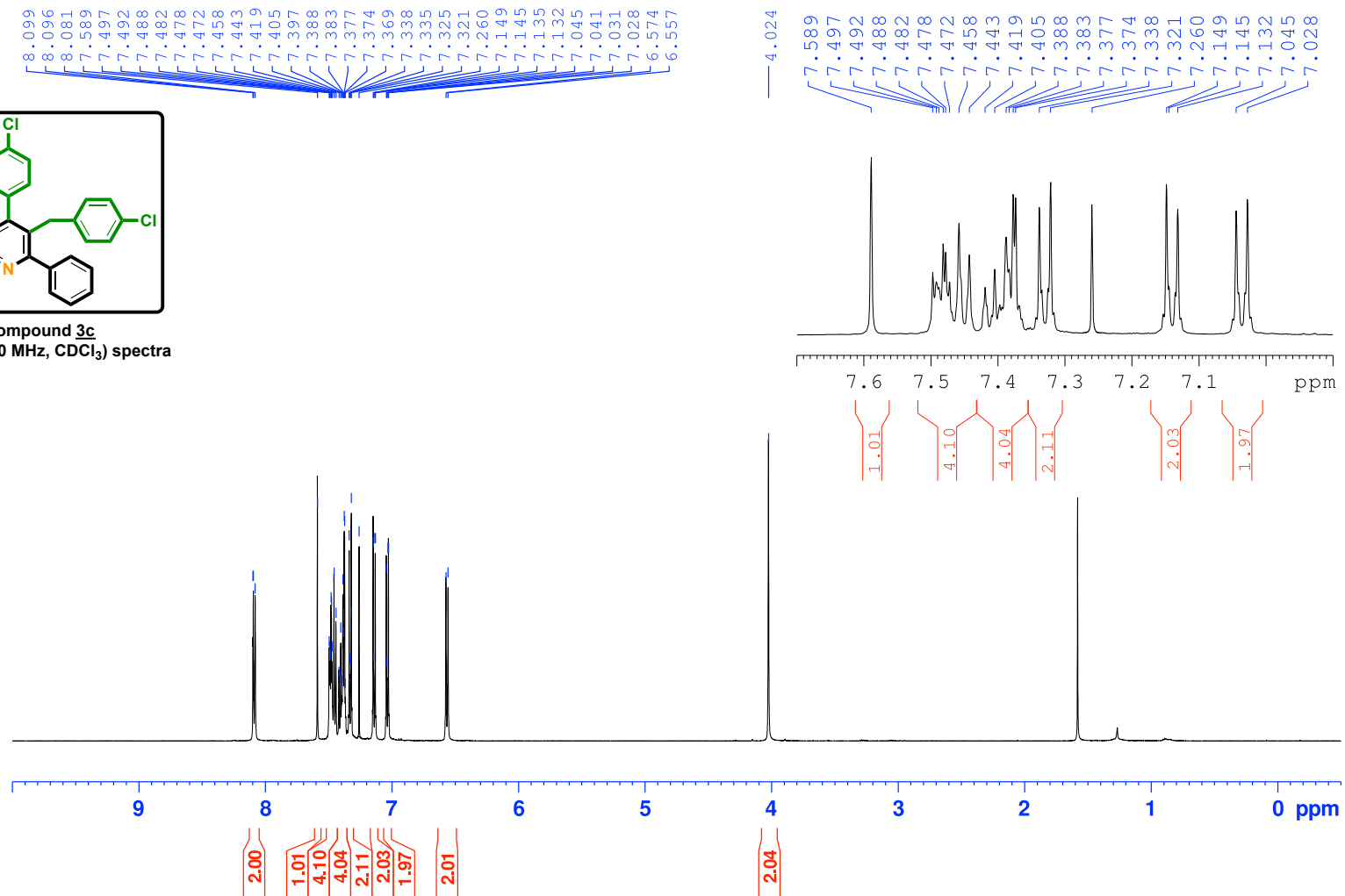


Compound 3c

1H YHC-438-3 sep 7374 down 1103

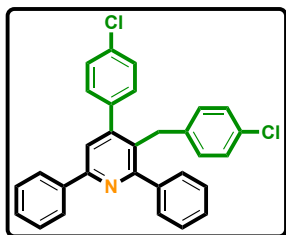


Compound 3c
¹H NMR (500 MHz, CDCl₃) spectra

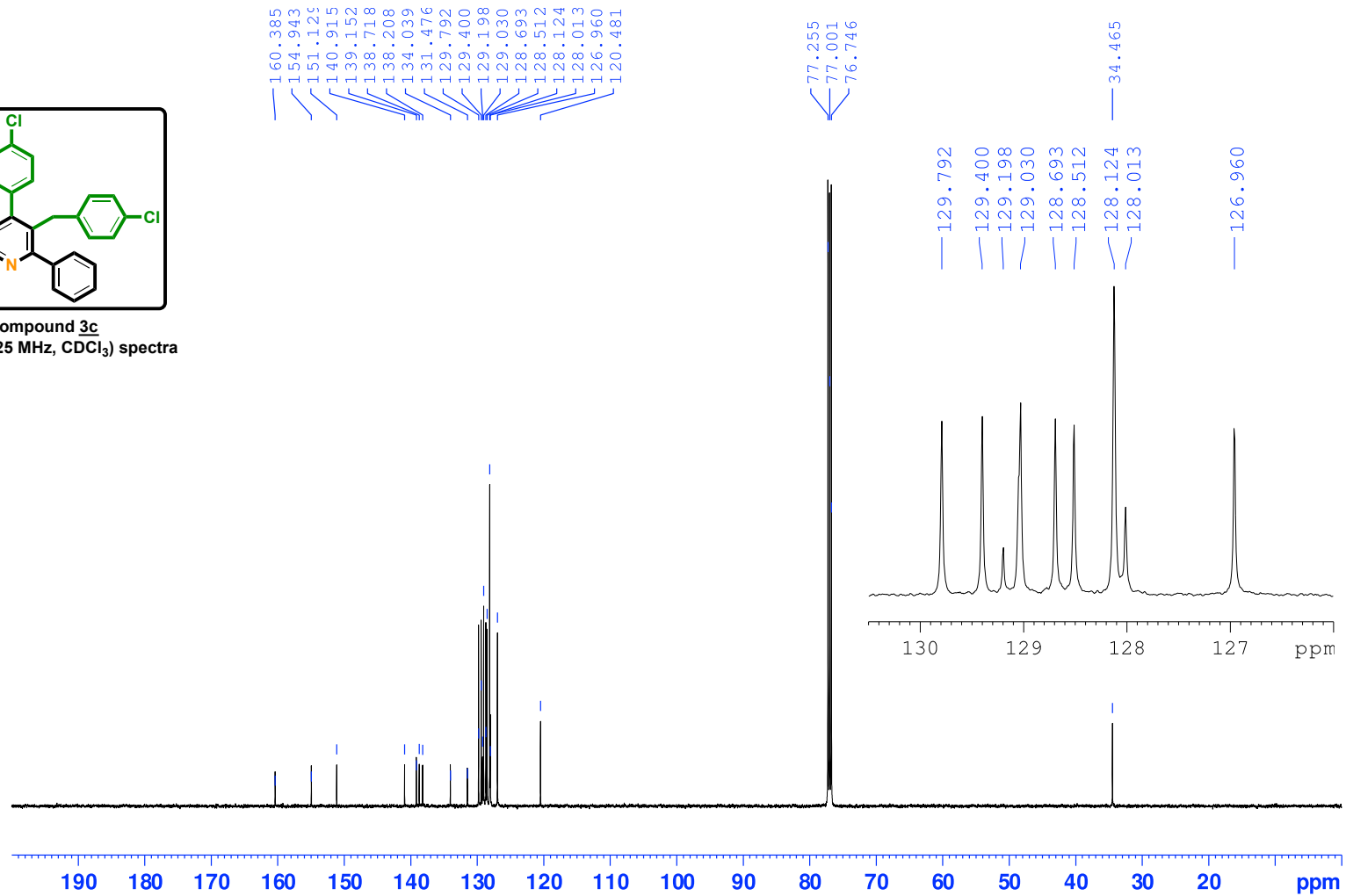


Compound 3c

13C YHC-438-3 sep 7374 down 1103

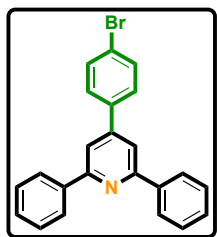


Compound 3c
¹³C NMR (125 MHz, CDCl₃) spectra

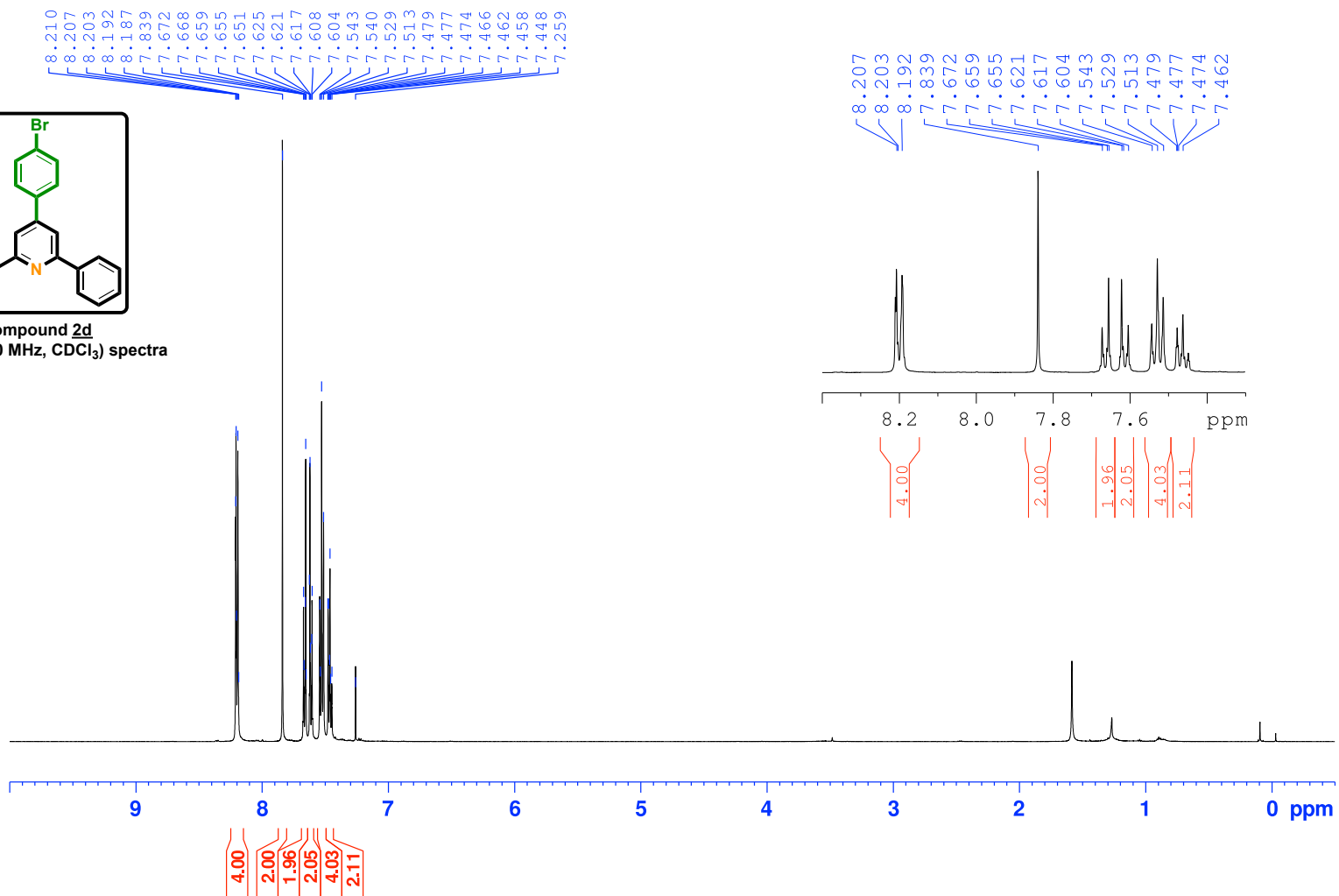


Compound 2d

1H YHC-439 sep 29-31 top 0708

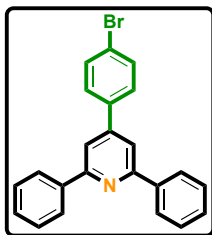


Compound 2d
¹H NMR (500 MHz, CDCl₃) spectra

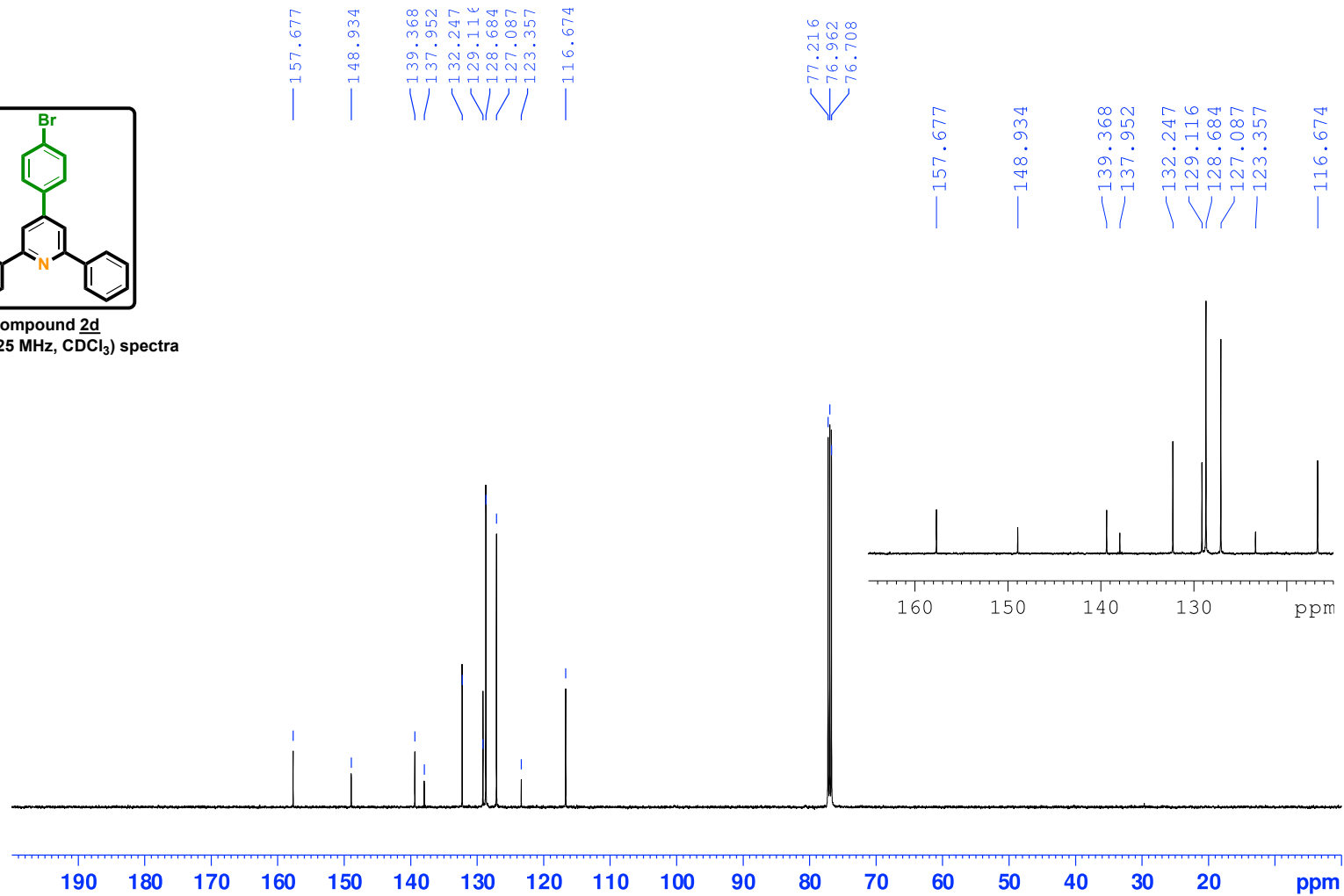


Compound 2d

13C YHC-439 sep 29-31 top 0708

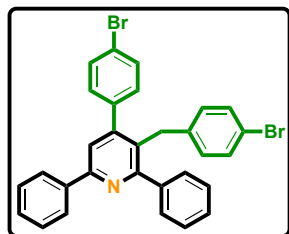


Compound 2d
¹³C NMR (125 MHz, CDCl₃) spectra

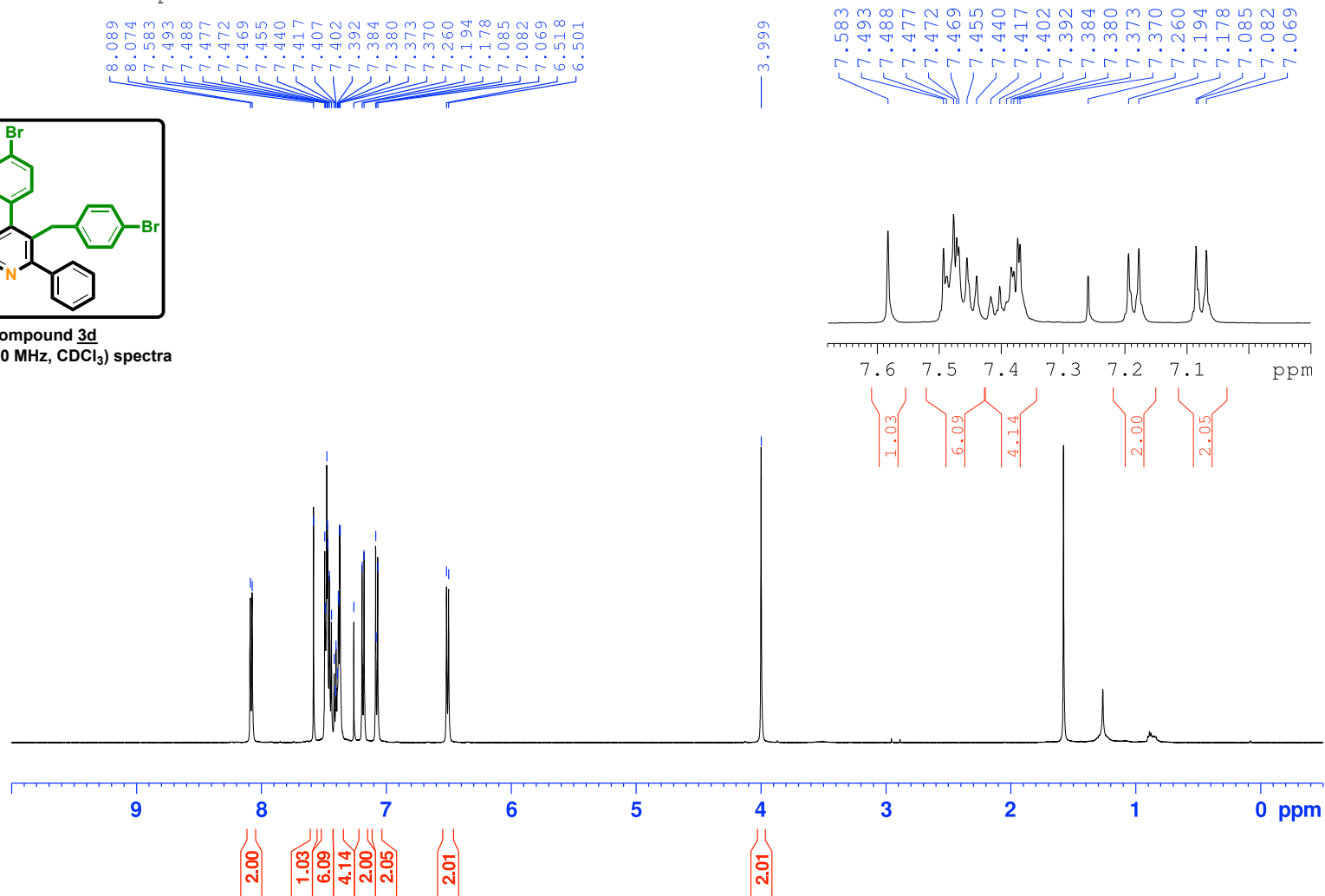


Compound 3d

1H YHC-439 sep 48-50 down 0708

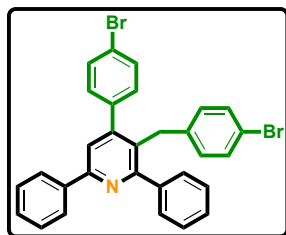


Compound 3d
¹H NMR (500 MHz, CDCl₃) spectra

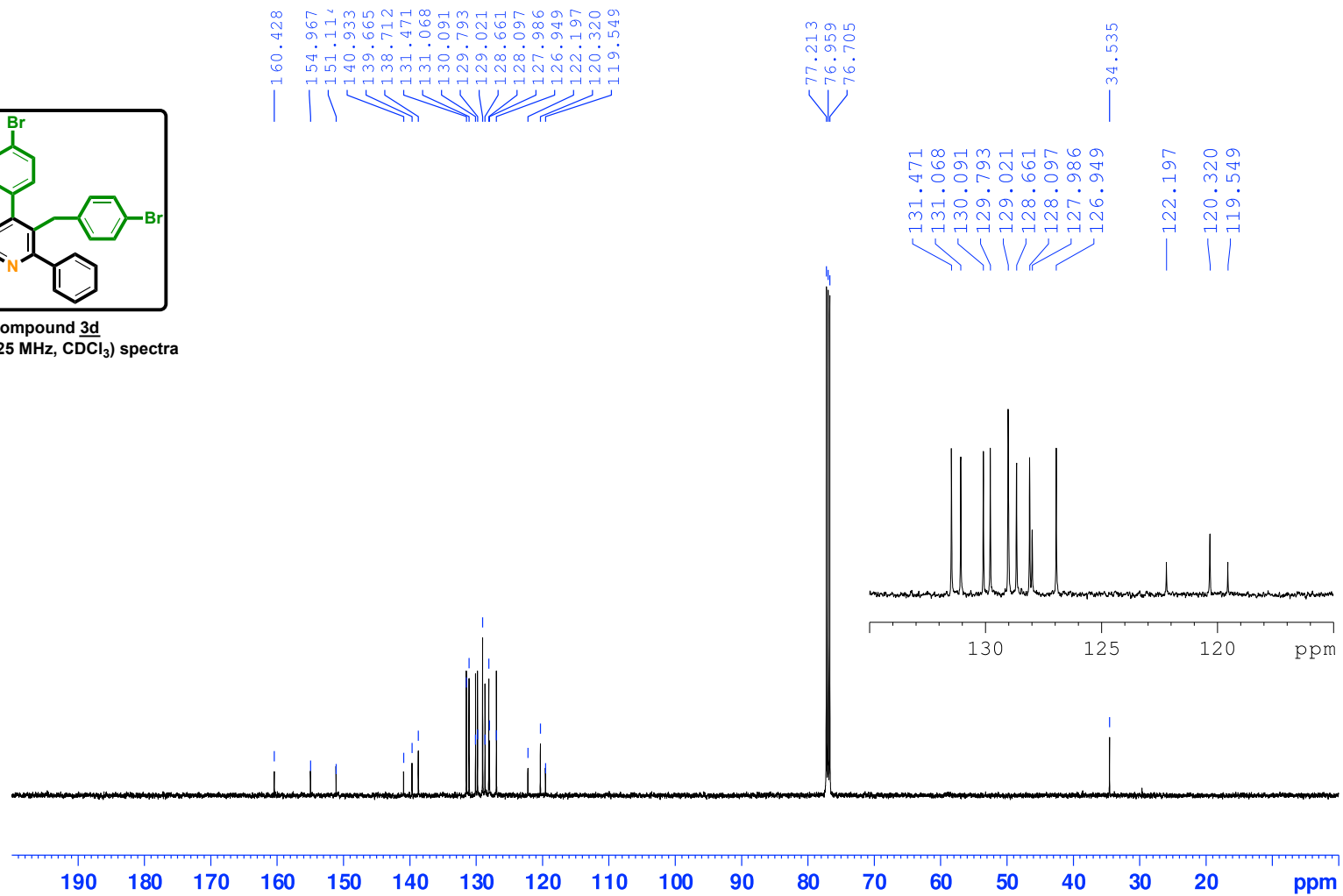


Compound 3d

13C YHC-439 sep 48-50 down 0708

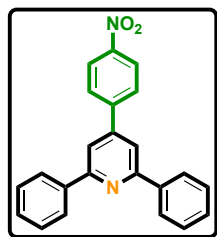


Compound 3d
¹³C NMR (125 MHz, CDCl₃) spectra

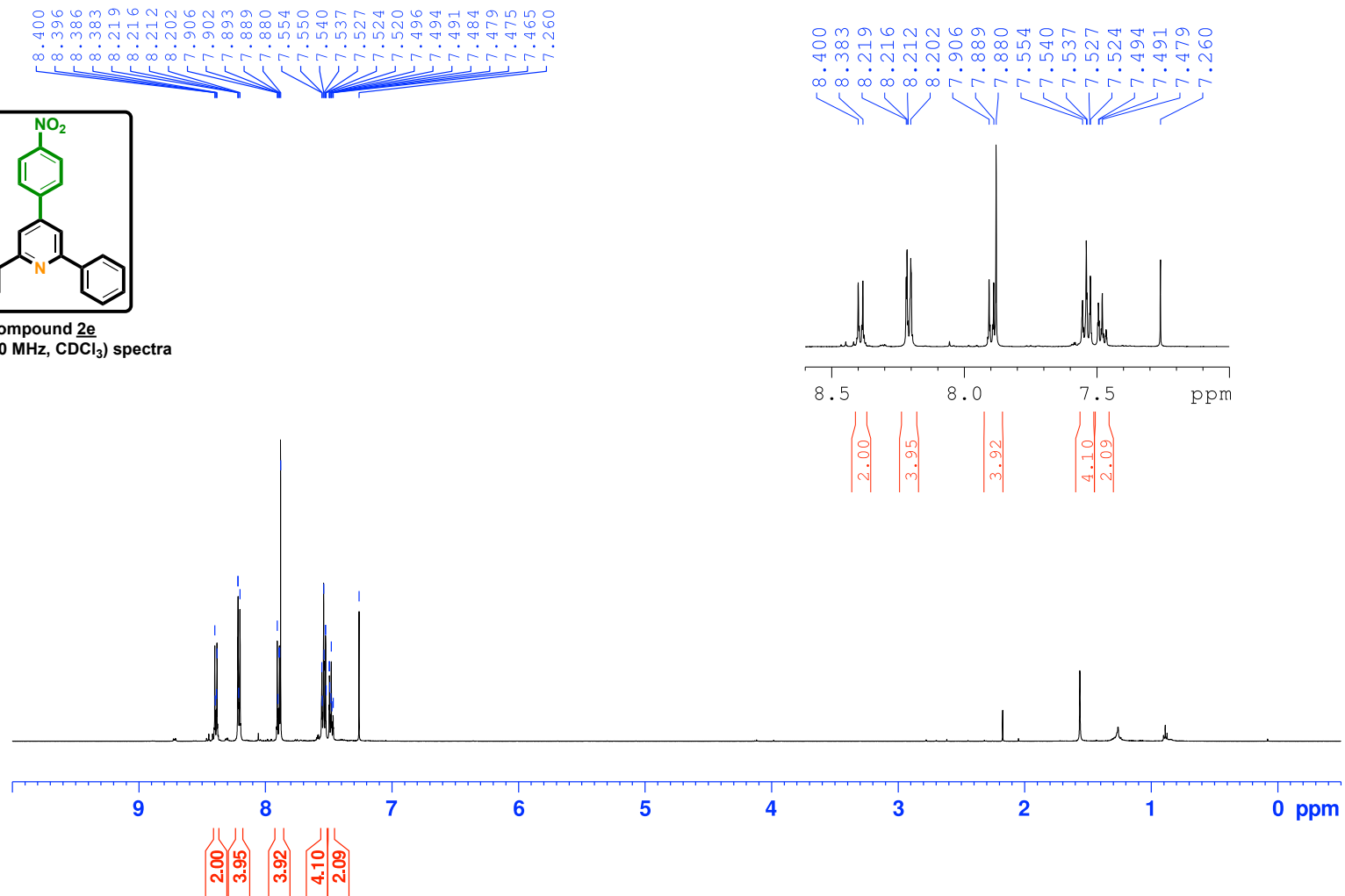


Compound 2e

1H YHC-053 sep43-44 0119

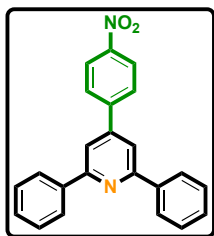


Compound 2e
¹H NMR (500 MHz, CDCl₃) spectra

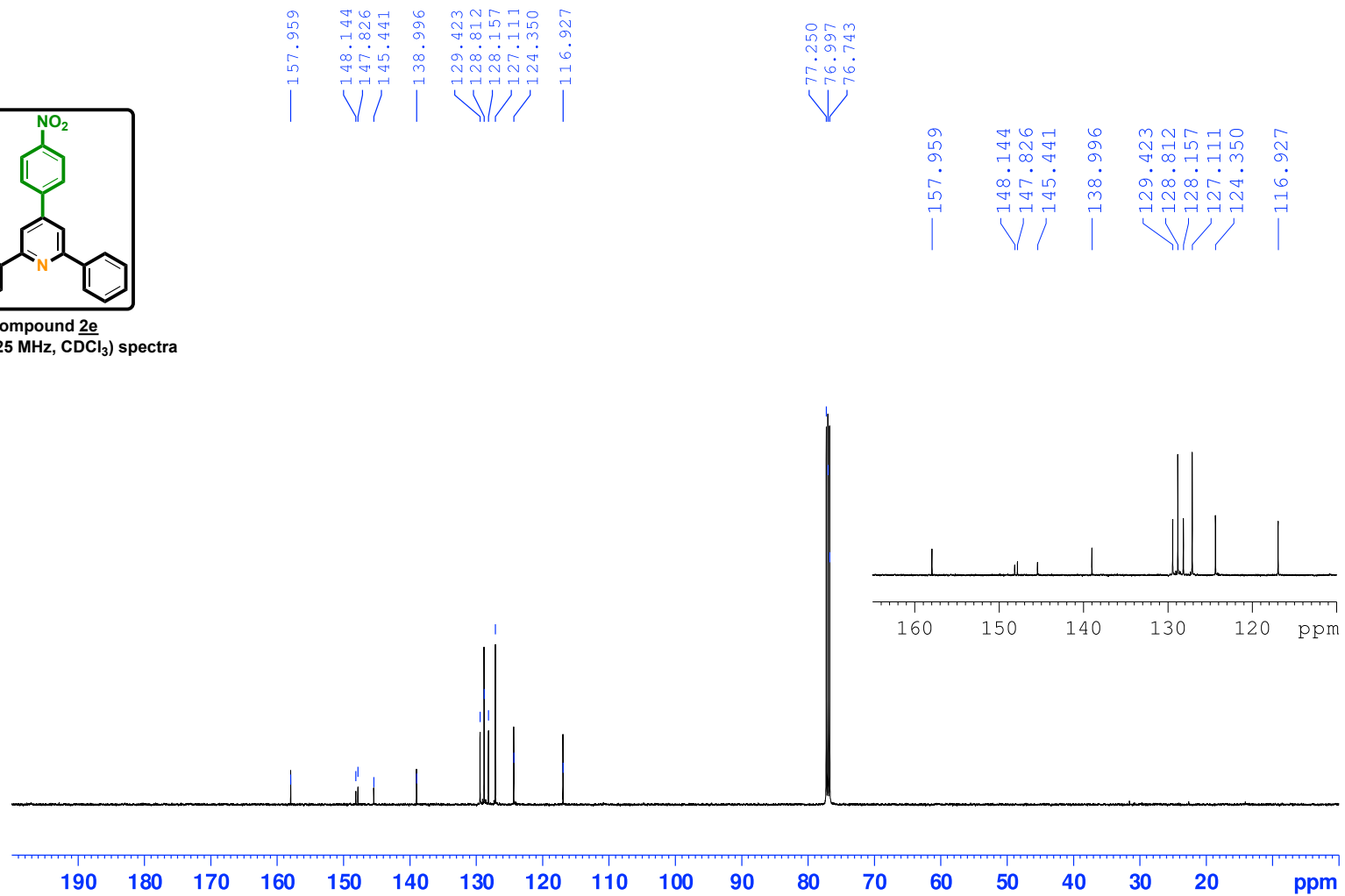


Compound 2e

13C YHC-053 sep43-44 0119

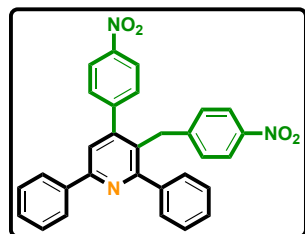


Compound 2e
¹³C NMR (125 MHz, CDCl₃) spectra

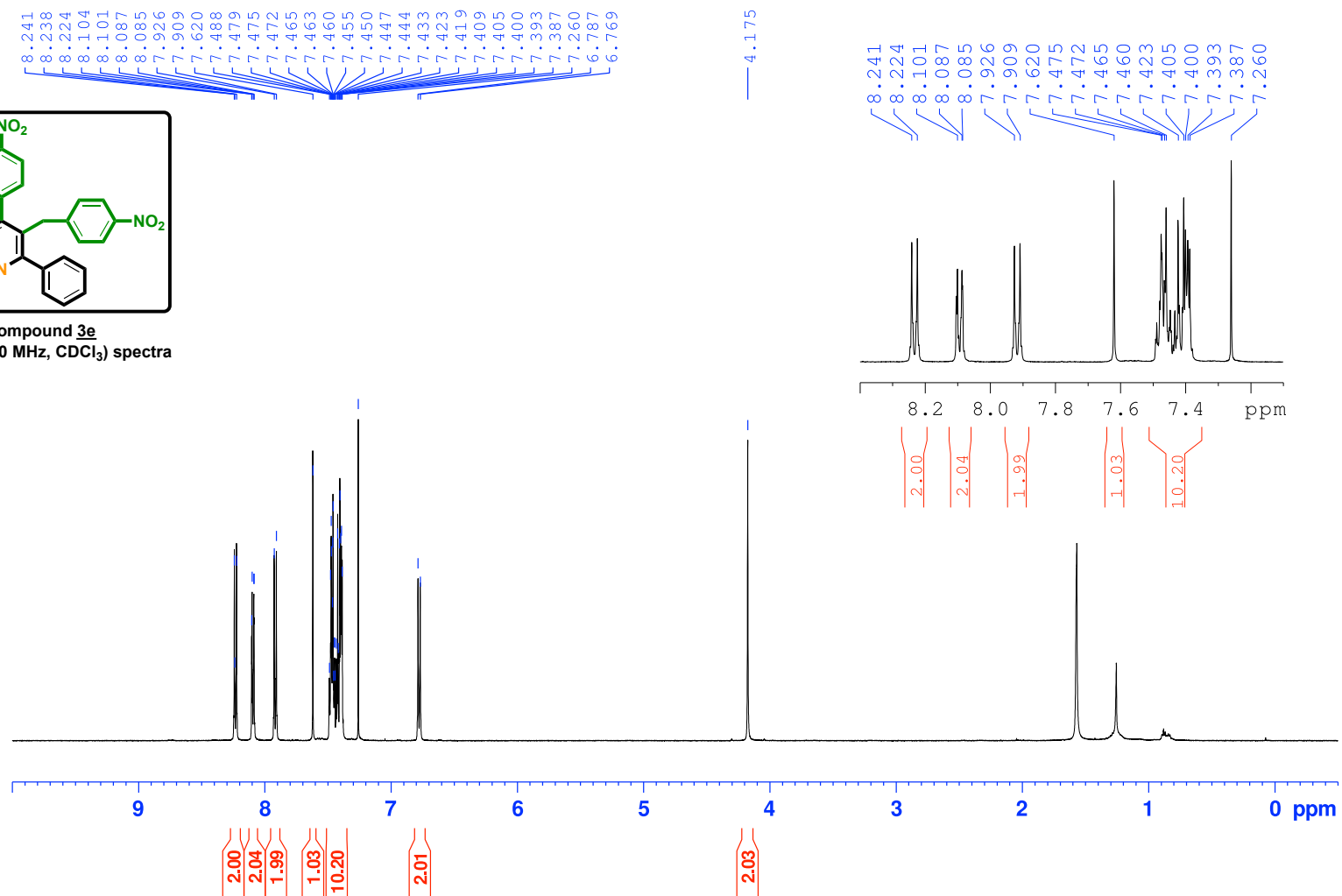


Compound 3e

1H YHC-440 sep 8788 down 0823

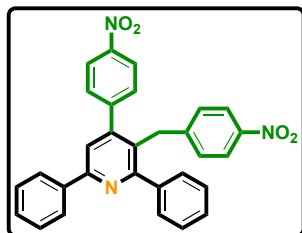


Compound 3e
¹H NMR (500 MHz, CDCl₃) spectra

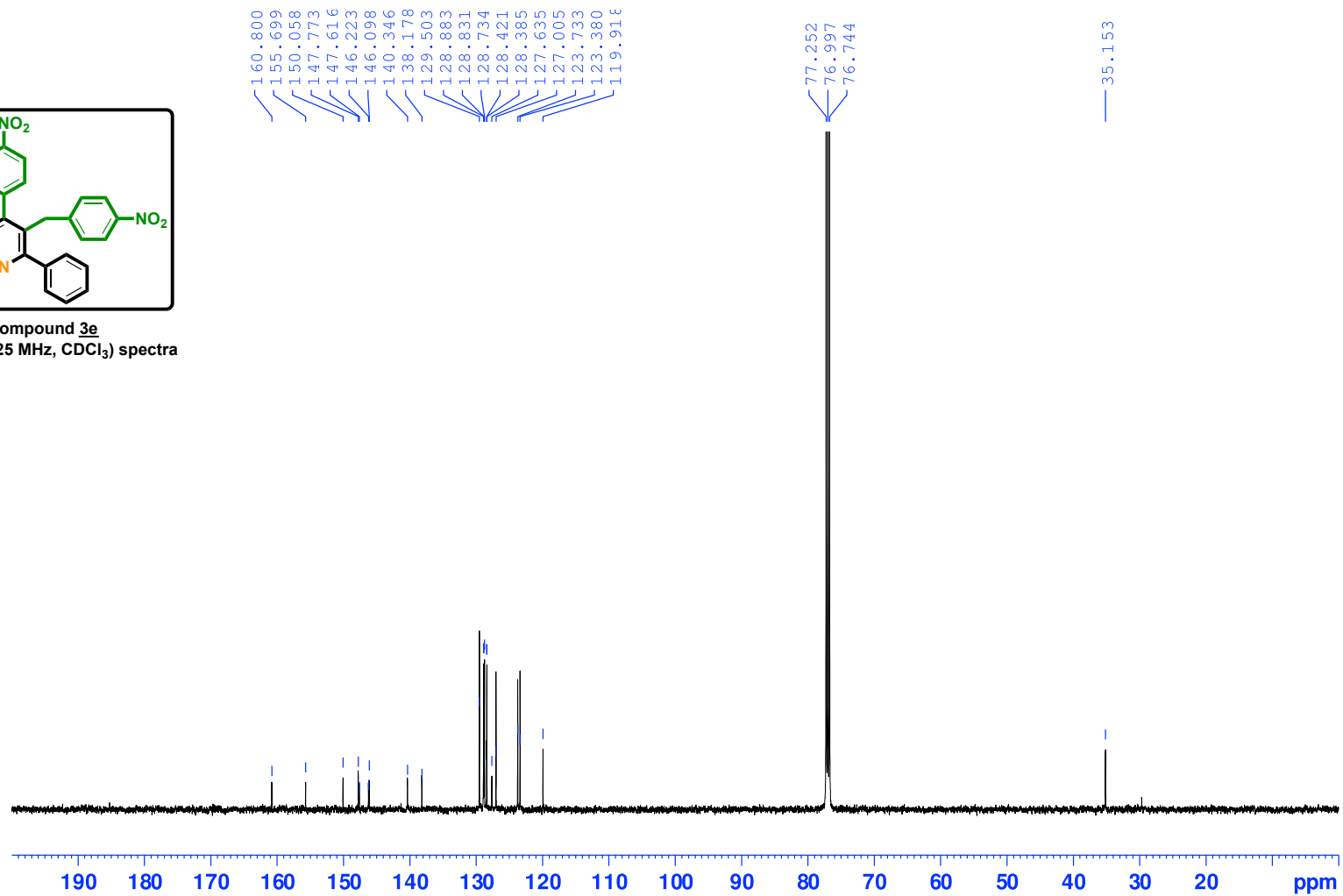


Compound 3e

13C YHC-440 sep 8788 down 0823

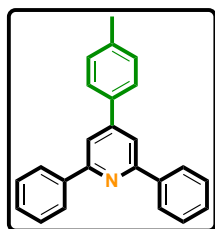


Compound 3e
¹³C NMR (125 MHz, CDCl₃) spectra



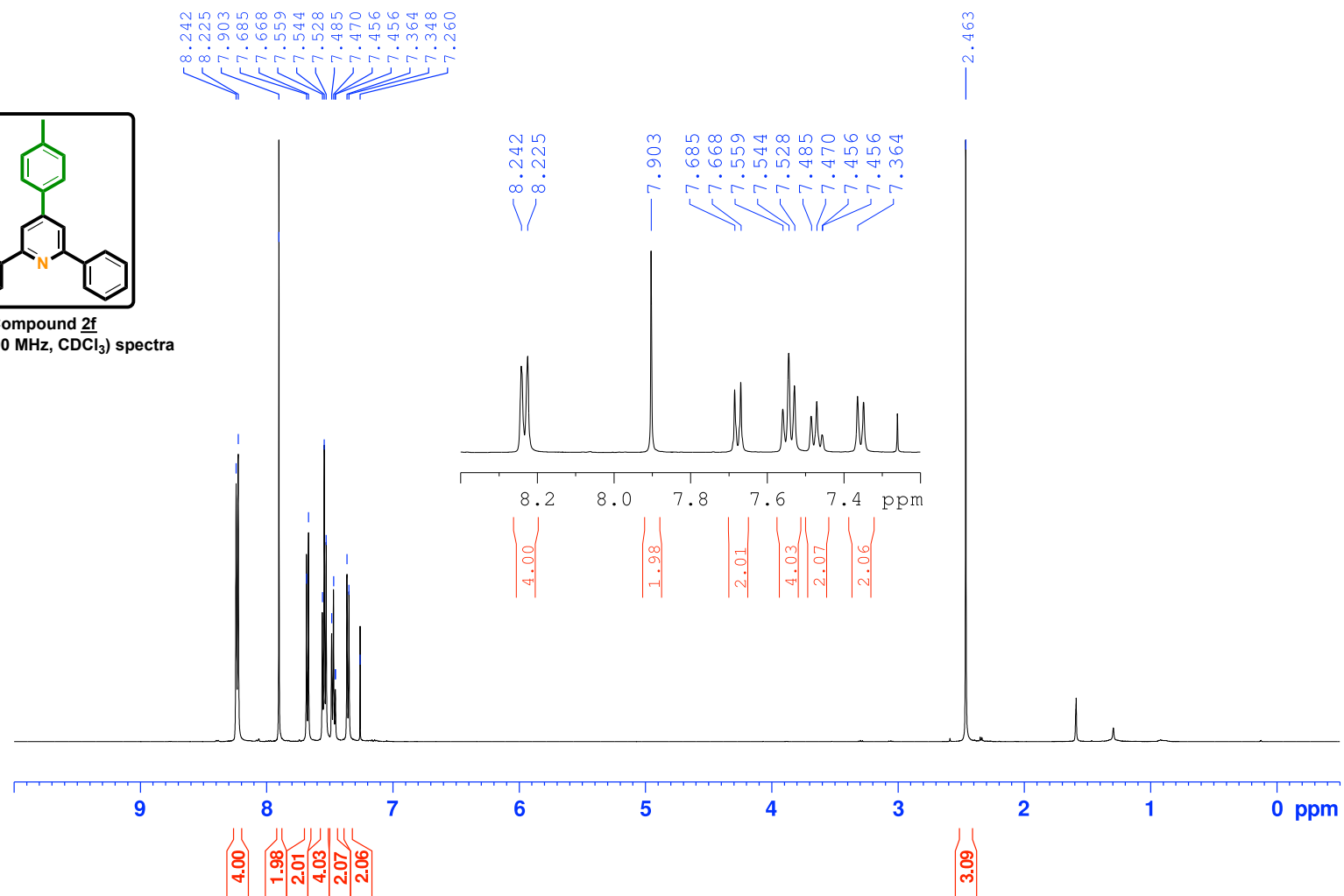
Compound 2f

1H YHC-433 sep 2930 up 0618



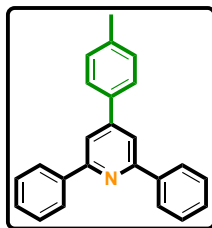
Compound 2f

¹H NMR (500 MHz, CDCl₃) spectra



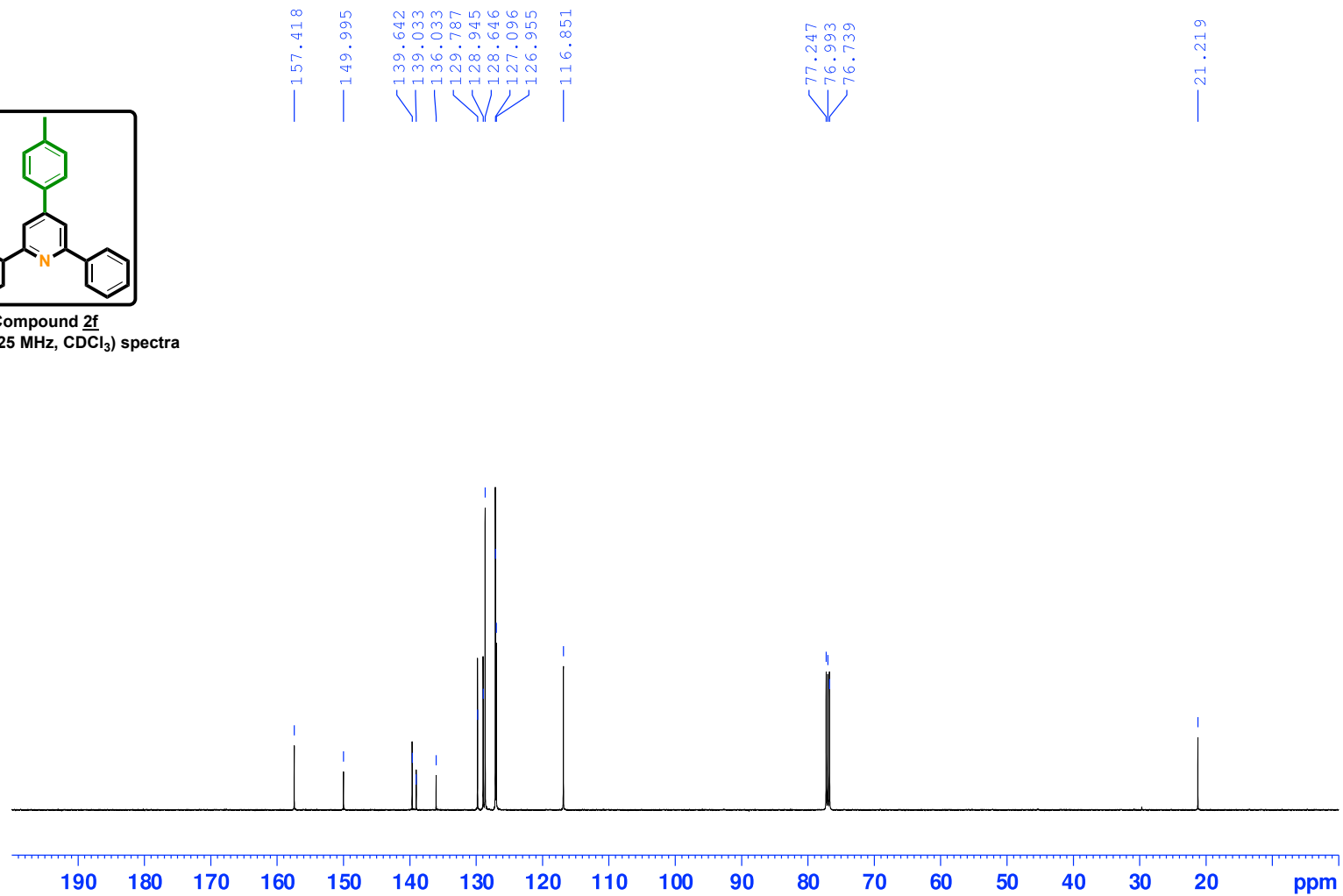
Compound 2f

13C YHC-433 sep 2930 up 0618



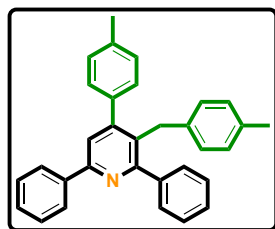
Compound **2f**

¹³C NMR (125 MHz, CDCl₃) spectra

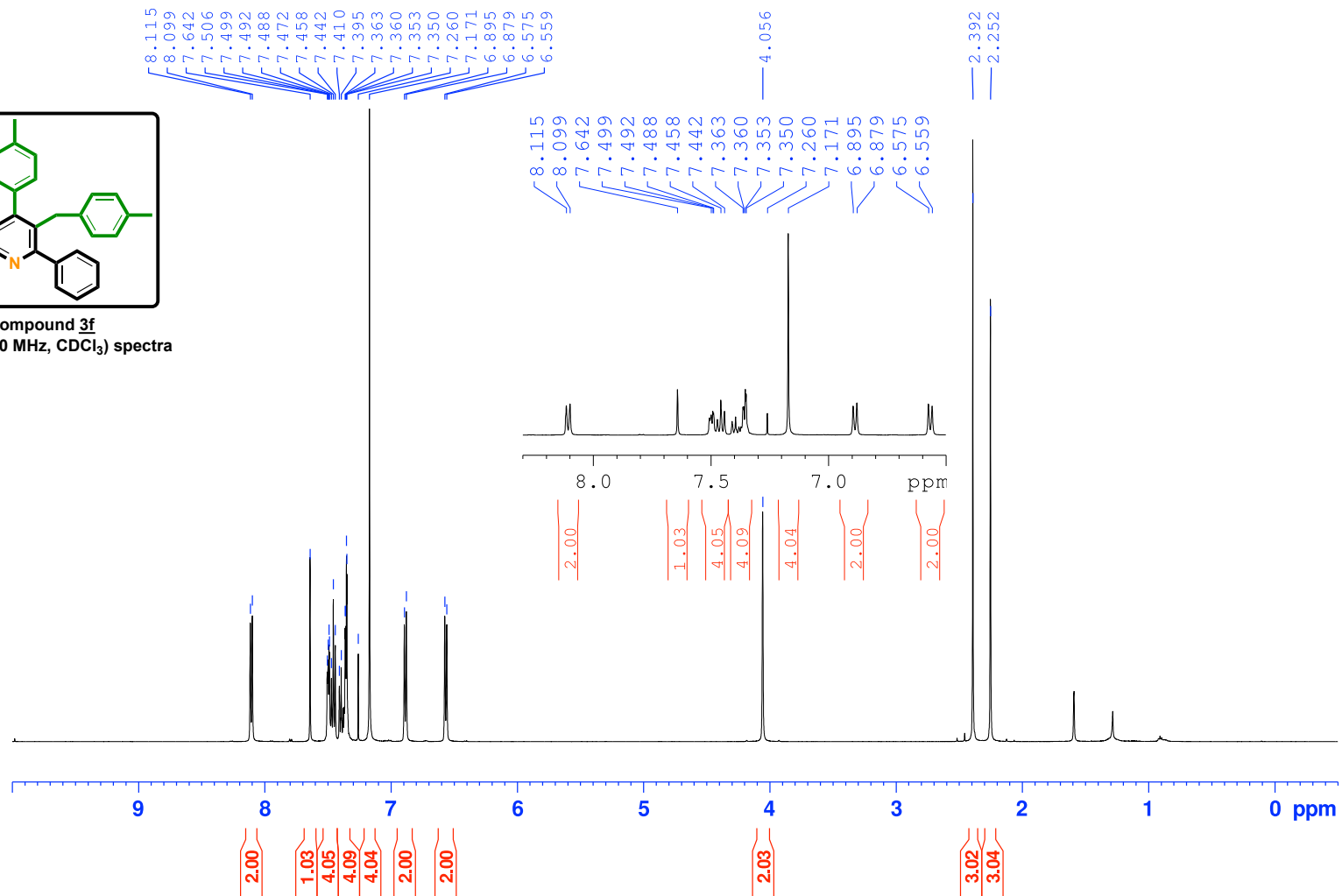


Compound 3f

1H YHC-433 sep 4142 down 0618

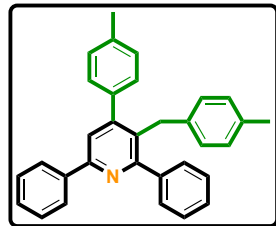


Compound 3f
¹H NMR (500 MHz, CDCl₃) spectra

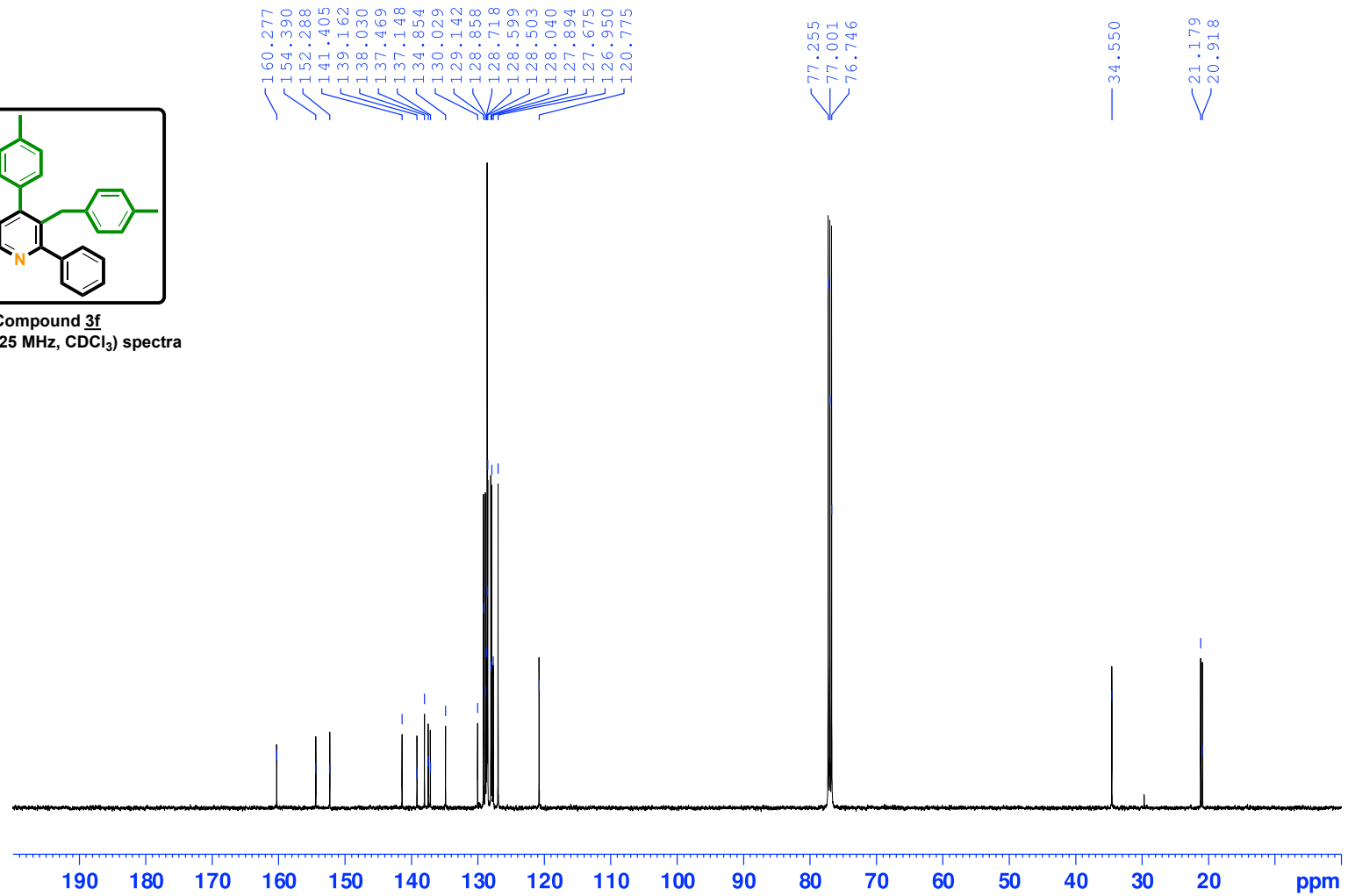


Compound 3f

13C YHC-433 sep 4142 down 0618

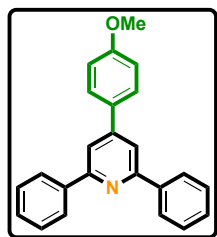


Compound 3f
¹³C NMR (125 MHz, CDCl₃) spectra

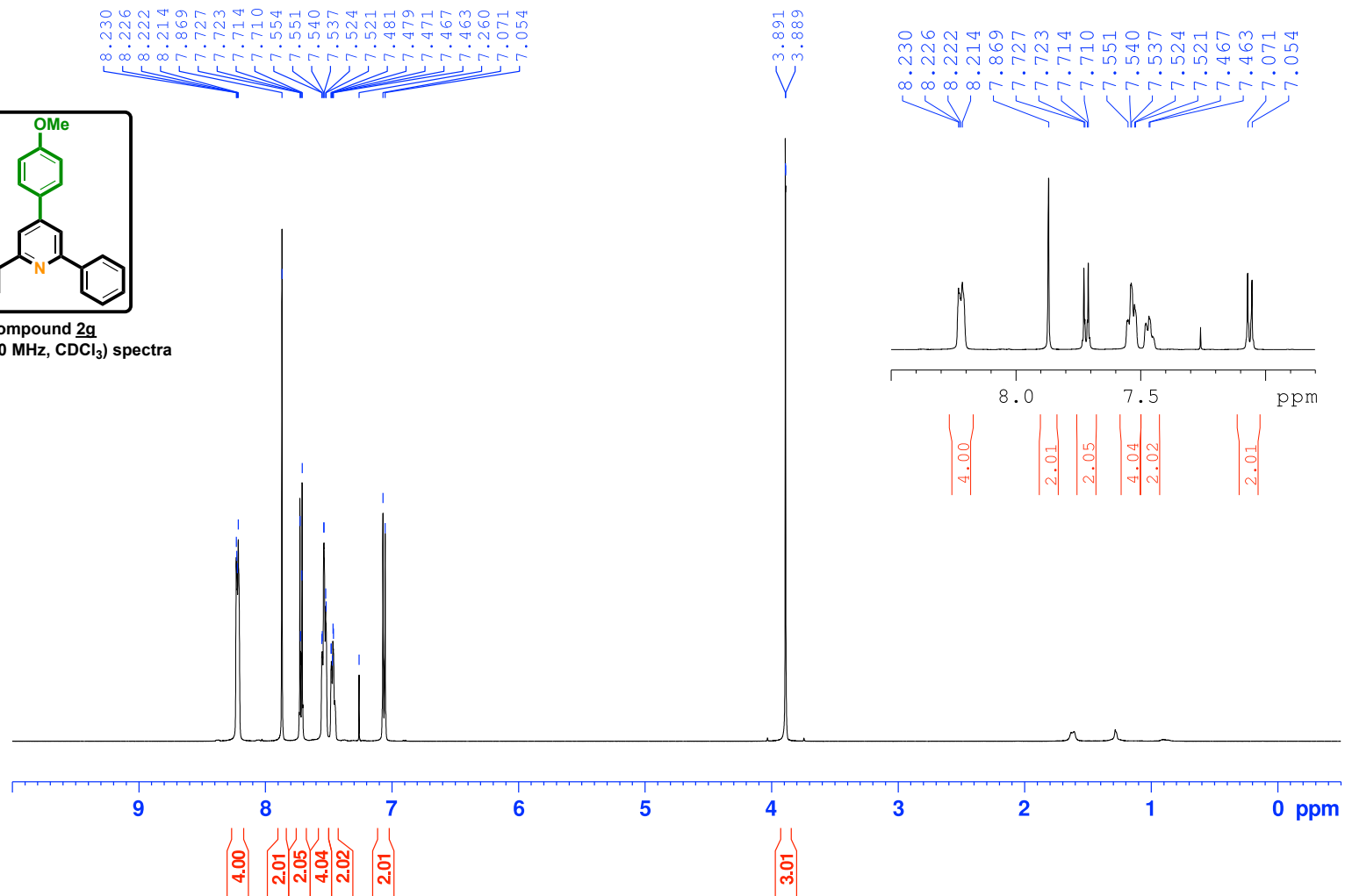


Compound 2g

1H YHC-431 sep 5455 0517

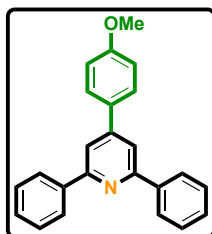


Compound 2g
¹H NMR (500 MHz, CDCl₃) spectra

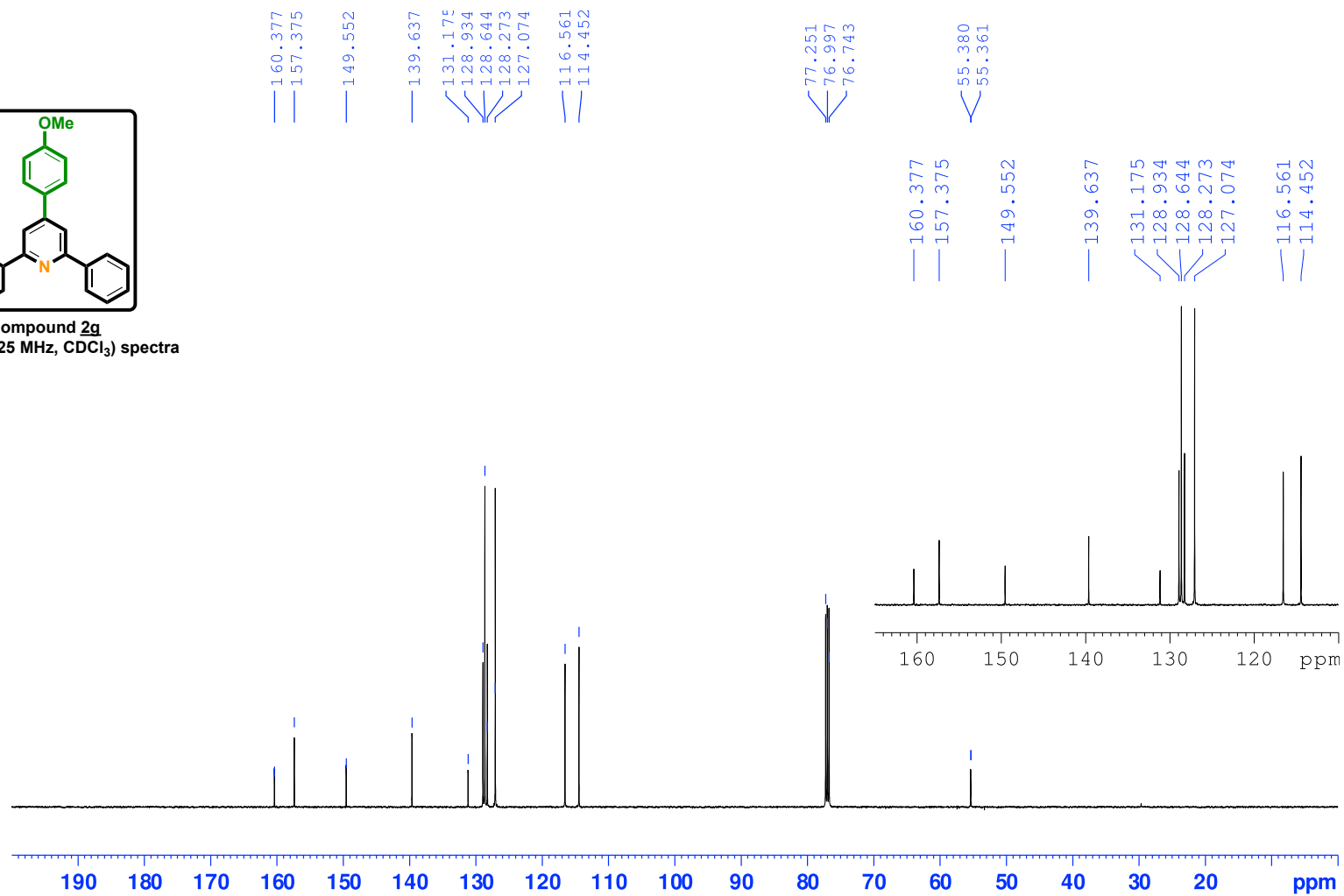


Compound 2g

13C YHC-431 sep 5455 0517

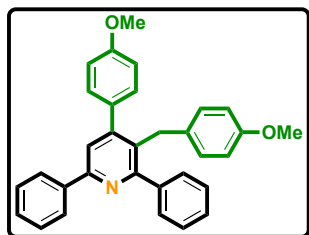


Compound 2g
¹³C NMR (125 MHz, CDCl₃) spectra

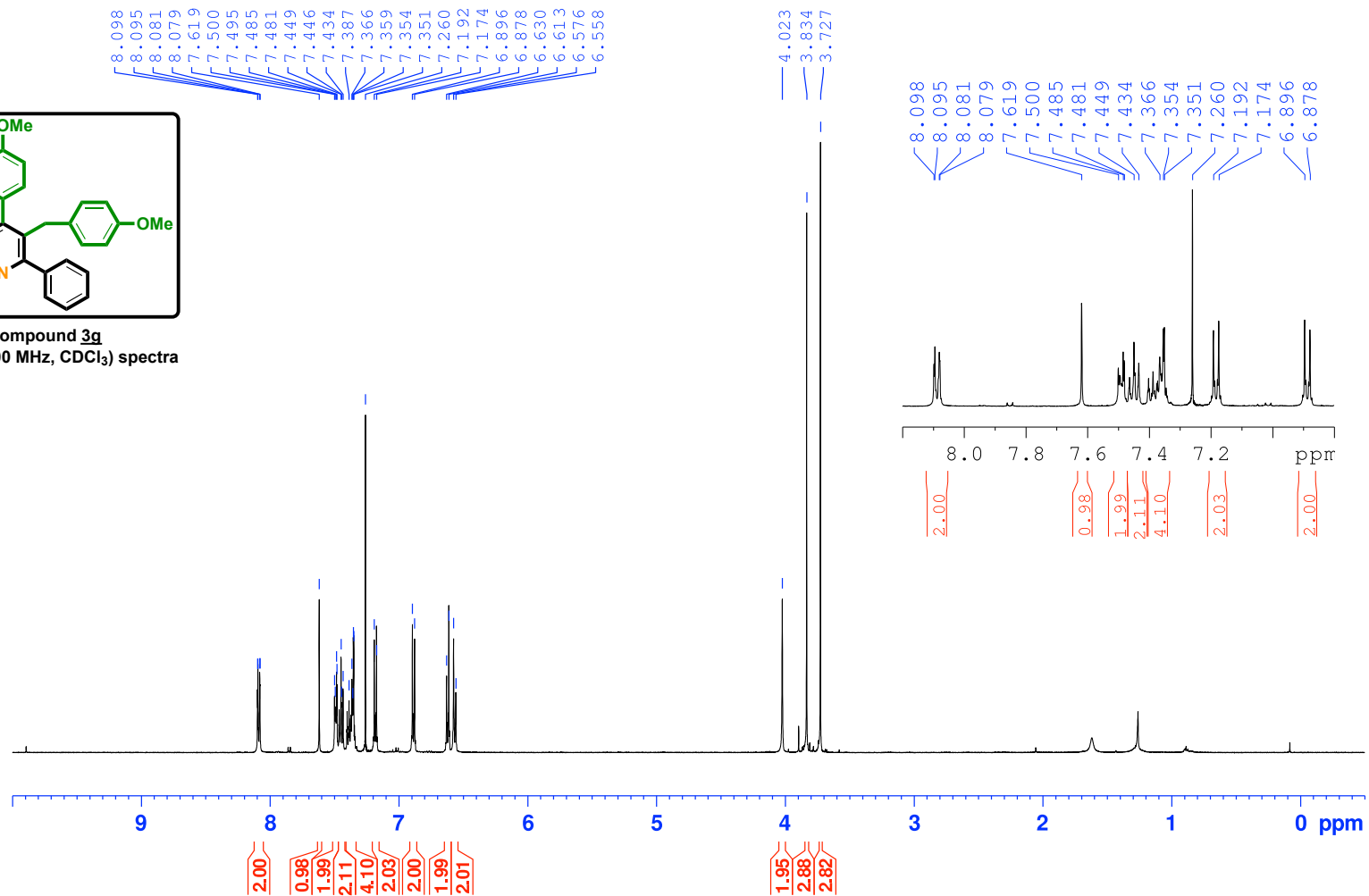


Compound 3g

1H YHC-431 sep 9899 0517

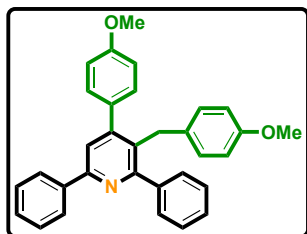


Compound 3g
¹H NMR (500 MHz, CDCl₃) spectra

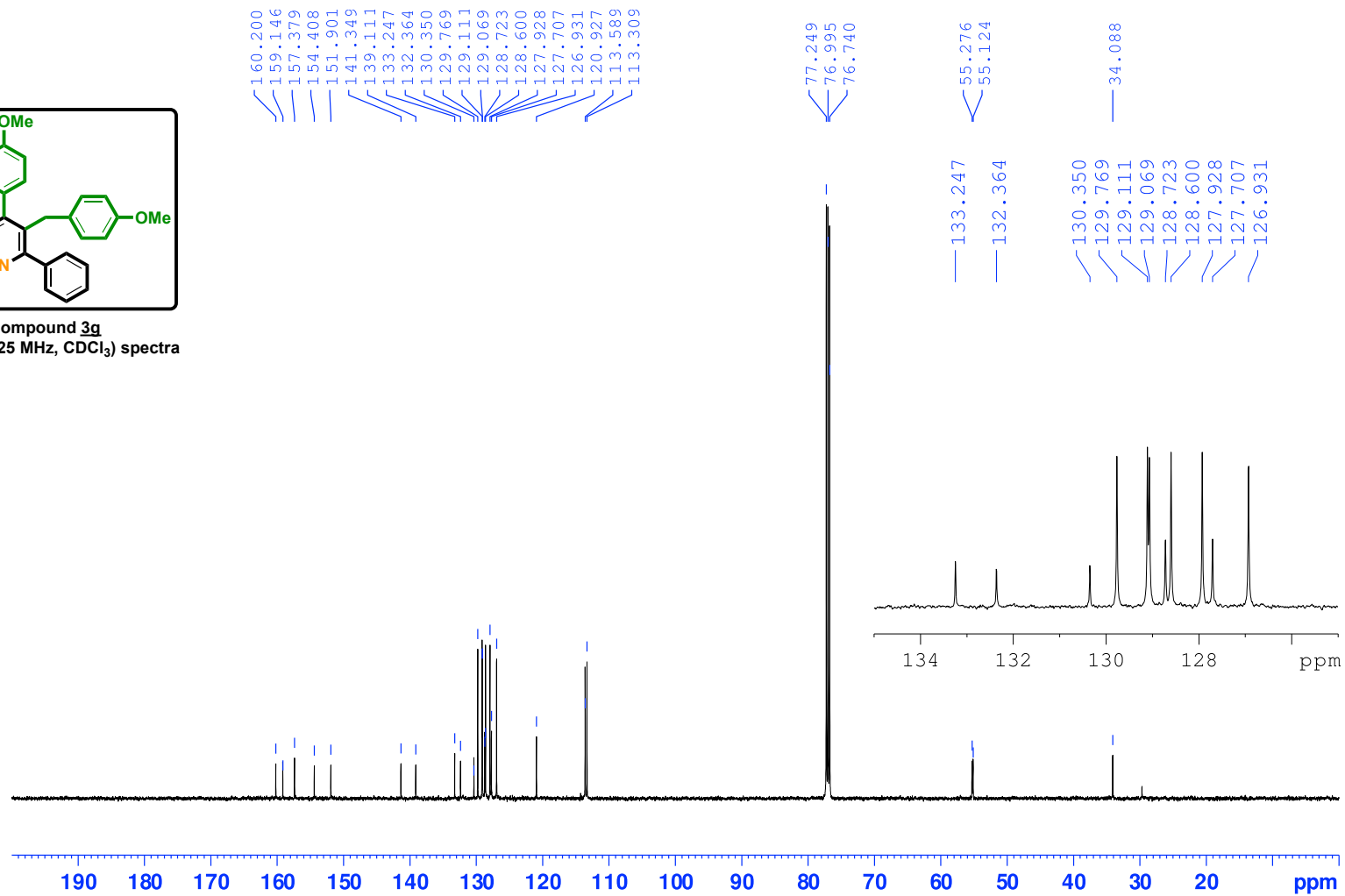


Compound 3g

13C YHC-431 sep 9899 0517

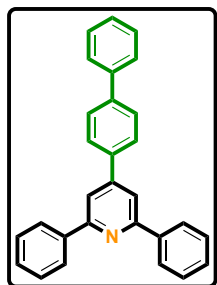


Compound 3g
¹³C NMR (125 MHz, CDCl₃) spectra

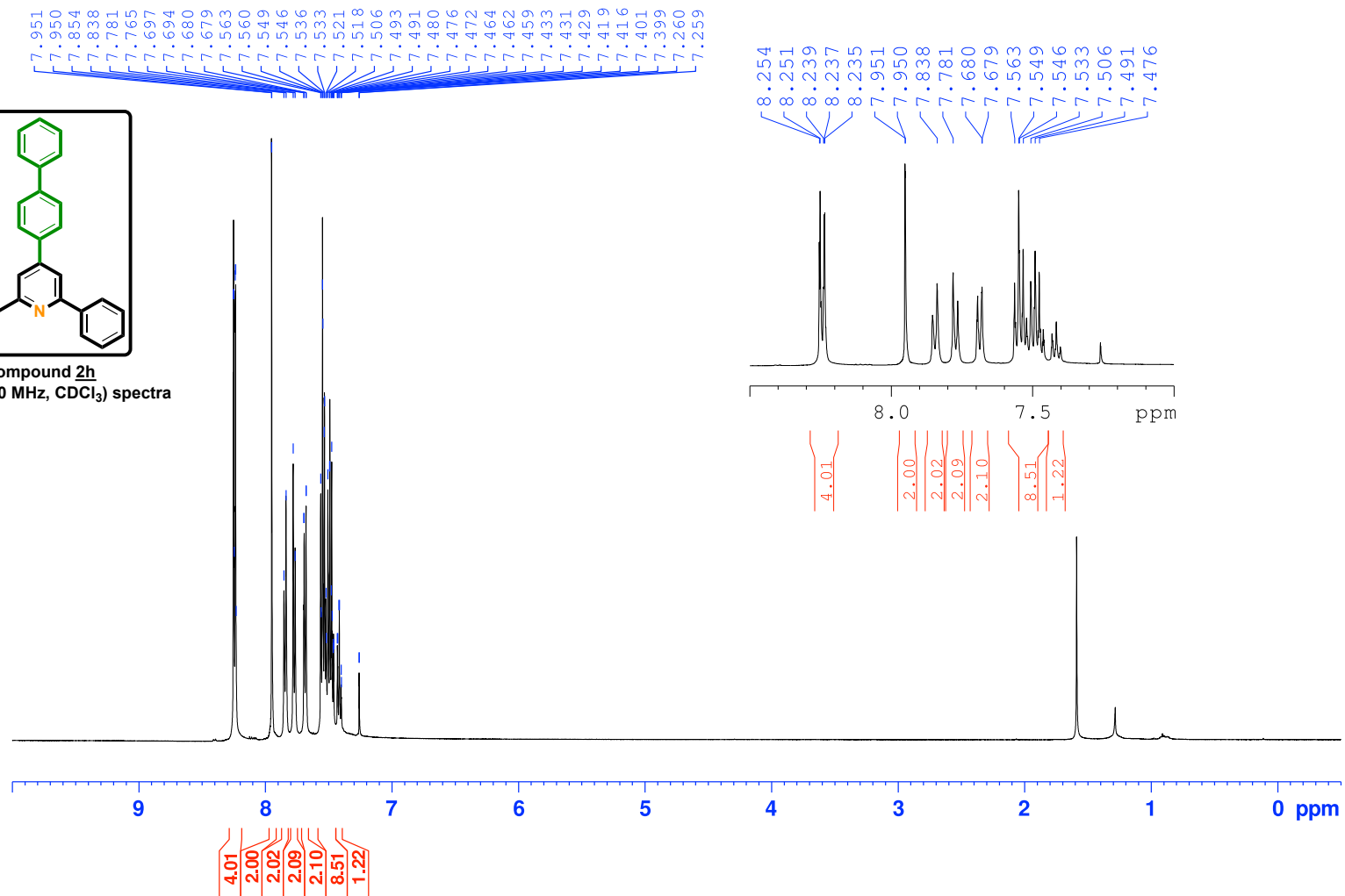


Compound 2h

1H YHC-434 sep 2526 0624

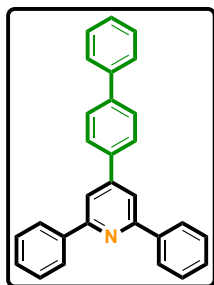


Compound 2h
¹H NMR (500 MHz, CDCl₃) spectra

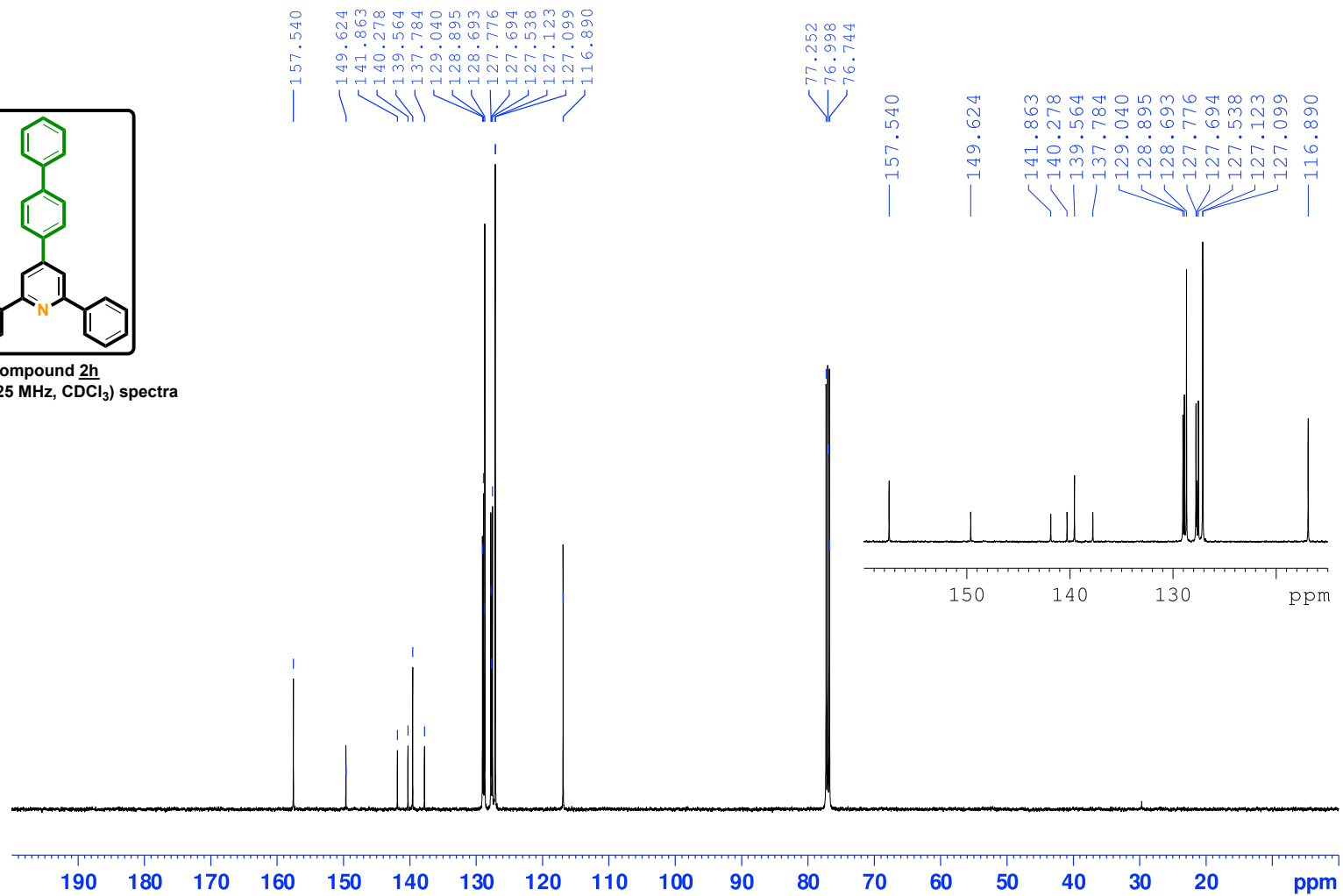


Compound 2h

13C YHC-434 sep 2526 0624

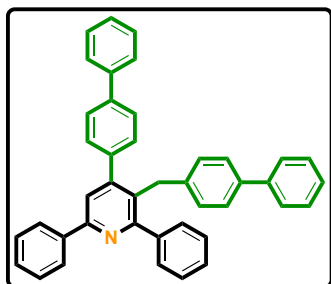


Compound 2h
¹³C NMR (125 MHz, CDCl₃) spectra

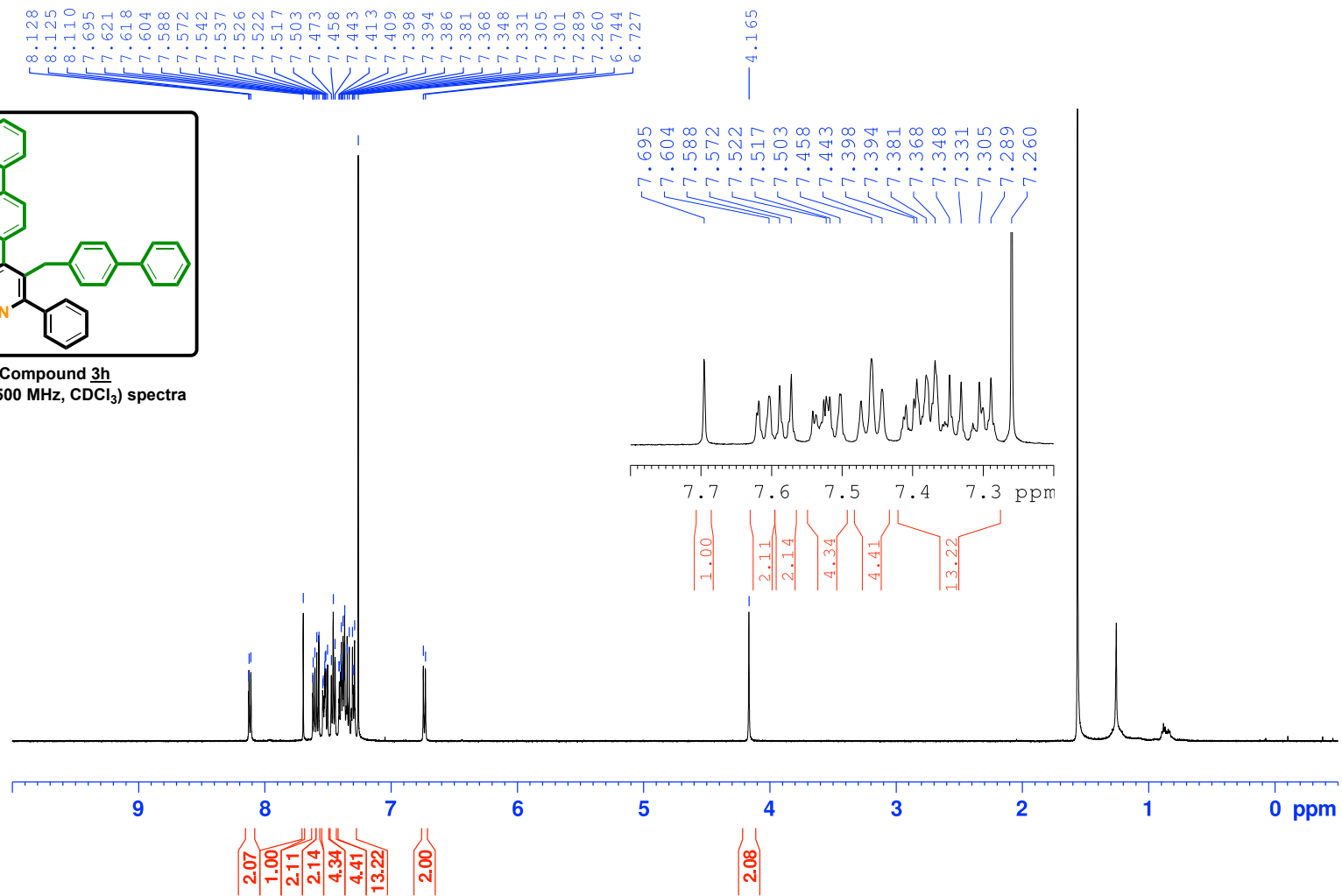


Compound 3h

1H YHC-434 sep 6667 0624

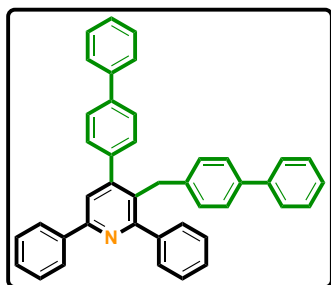


Compound 3h
¹H NMR (500 MHz, CDCl₃) spectra

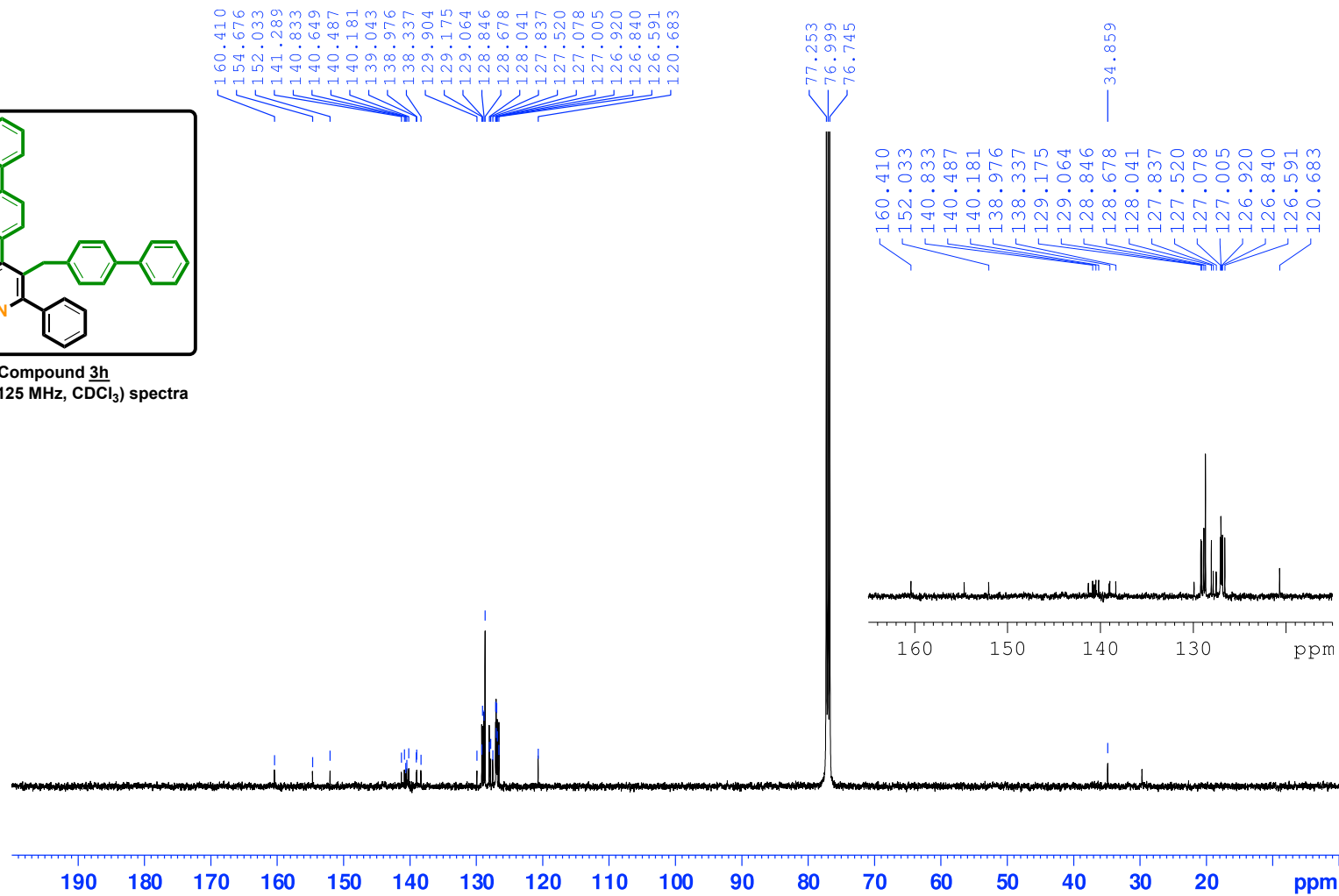


Compound 3h

13C YHC-434 sep 6667 0624

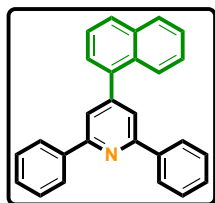


Compound 3h
¹³C NMR (125 MHz, CDCl₃) spectra

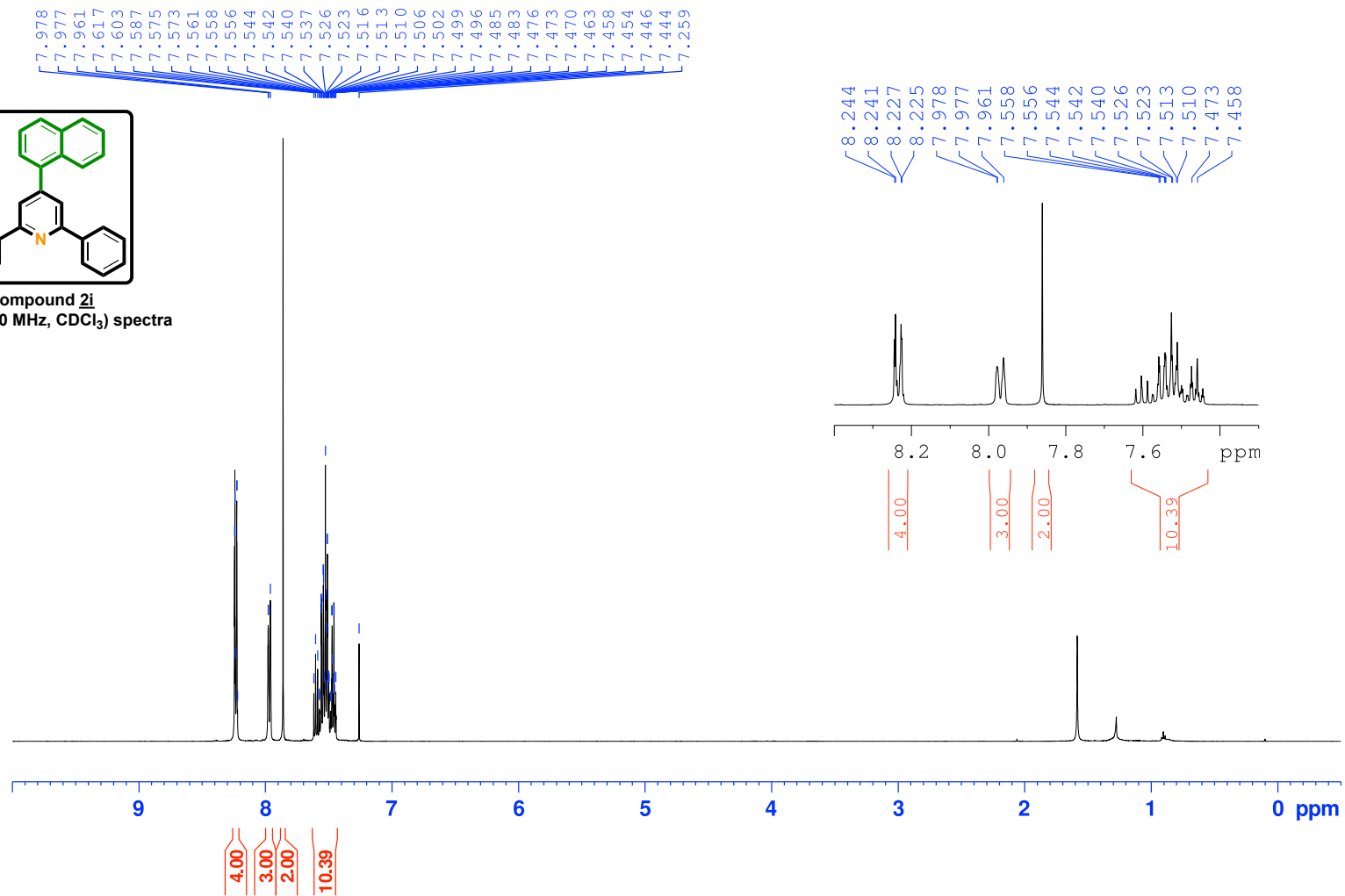


Compound 2i

1H YHC-435 sep 18-20 top 0625

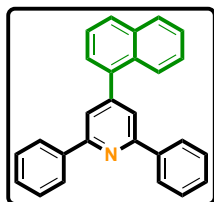


Compound 2i
¹H NMR (500 MHz, CDCl₃) spectra

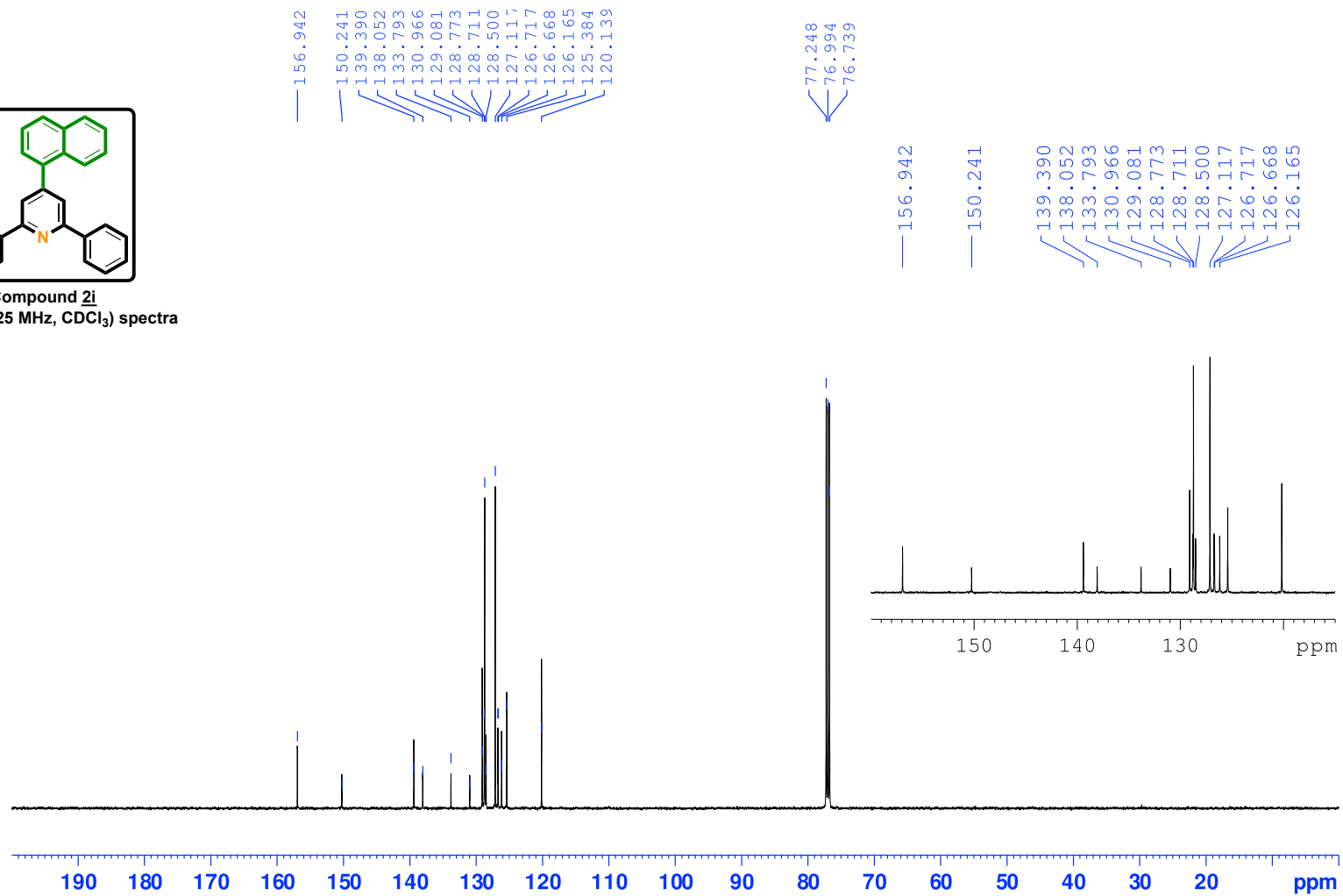


Compound 2i

13C YHC-435 sep 18-20 top 0625

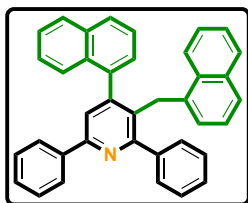


Compound 2i
¹³C NMR (125 MHz, CDCl₃) spectra

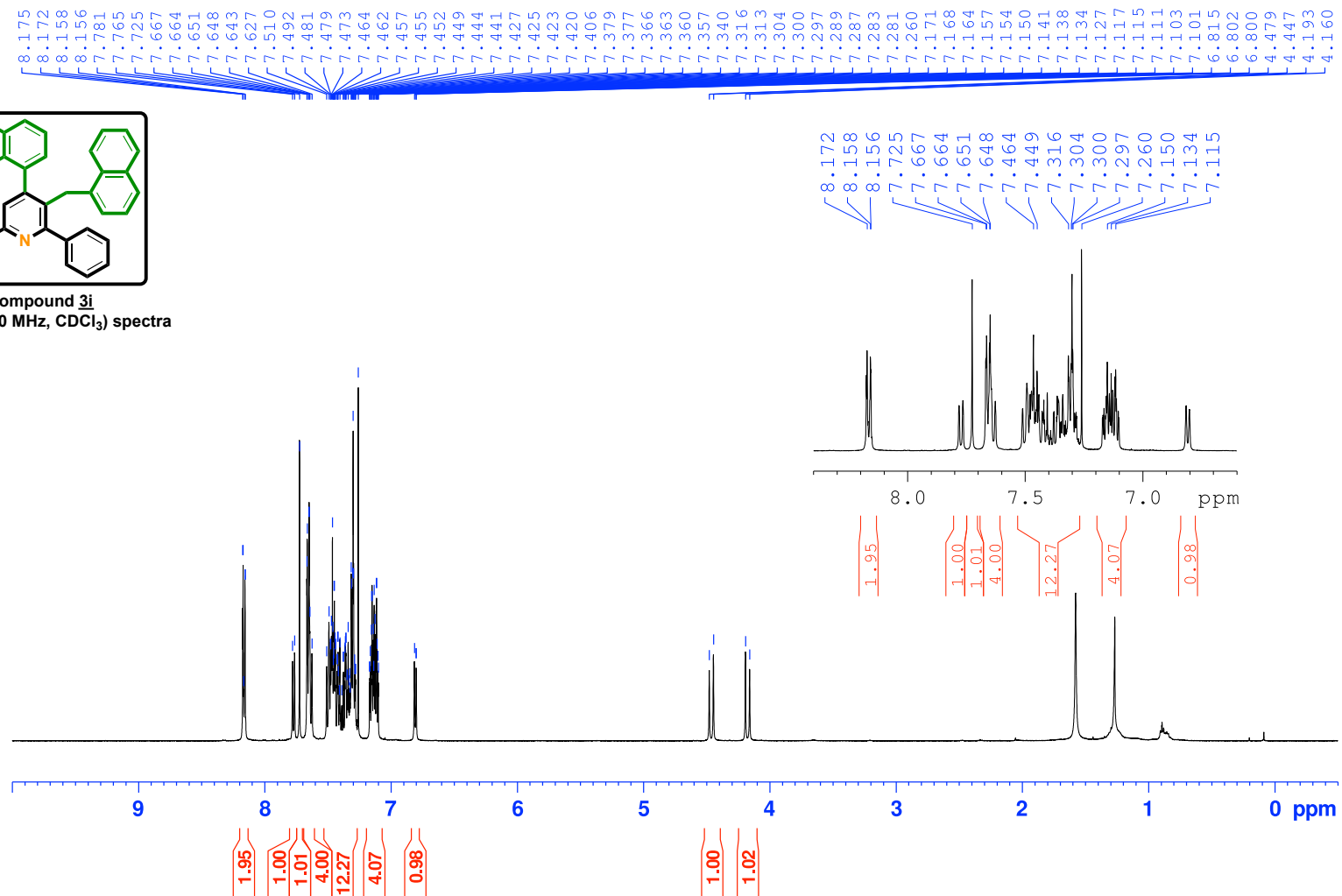


Compound 3i

1H YHC-435 sep 51-54 down 0625

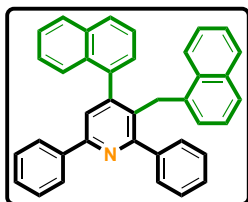


Compound 3i
¹H NMR (500 MHz, CDCl₃) spectra

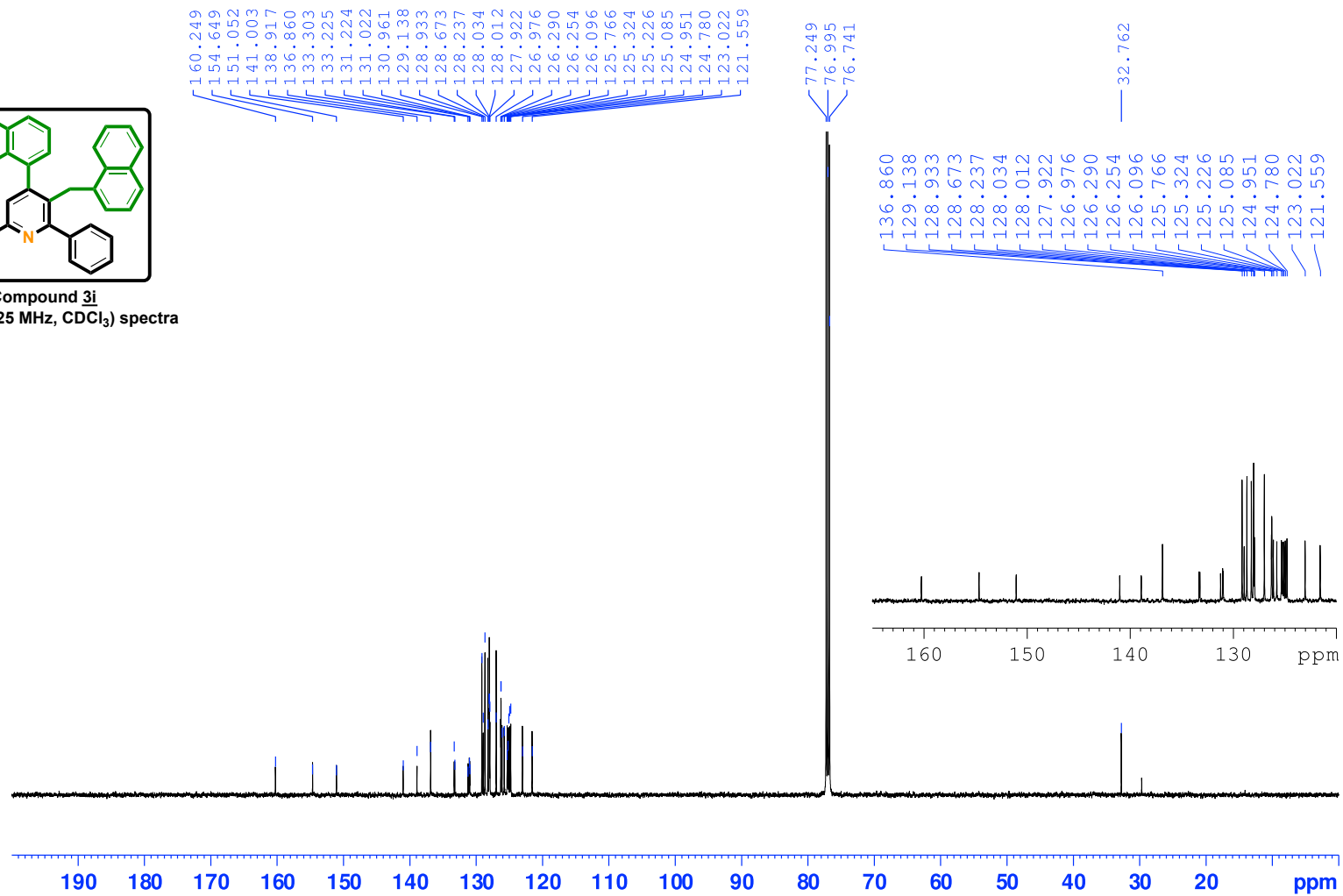


Compound 3i

13C YHC-435 sep 51-54 down 0625

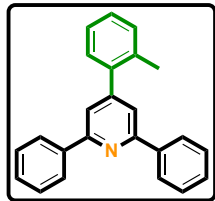


Compound 3i
¹³C NMR (125 MHz, CDCl₃) spectra

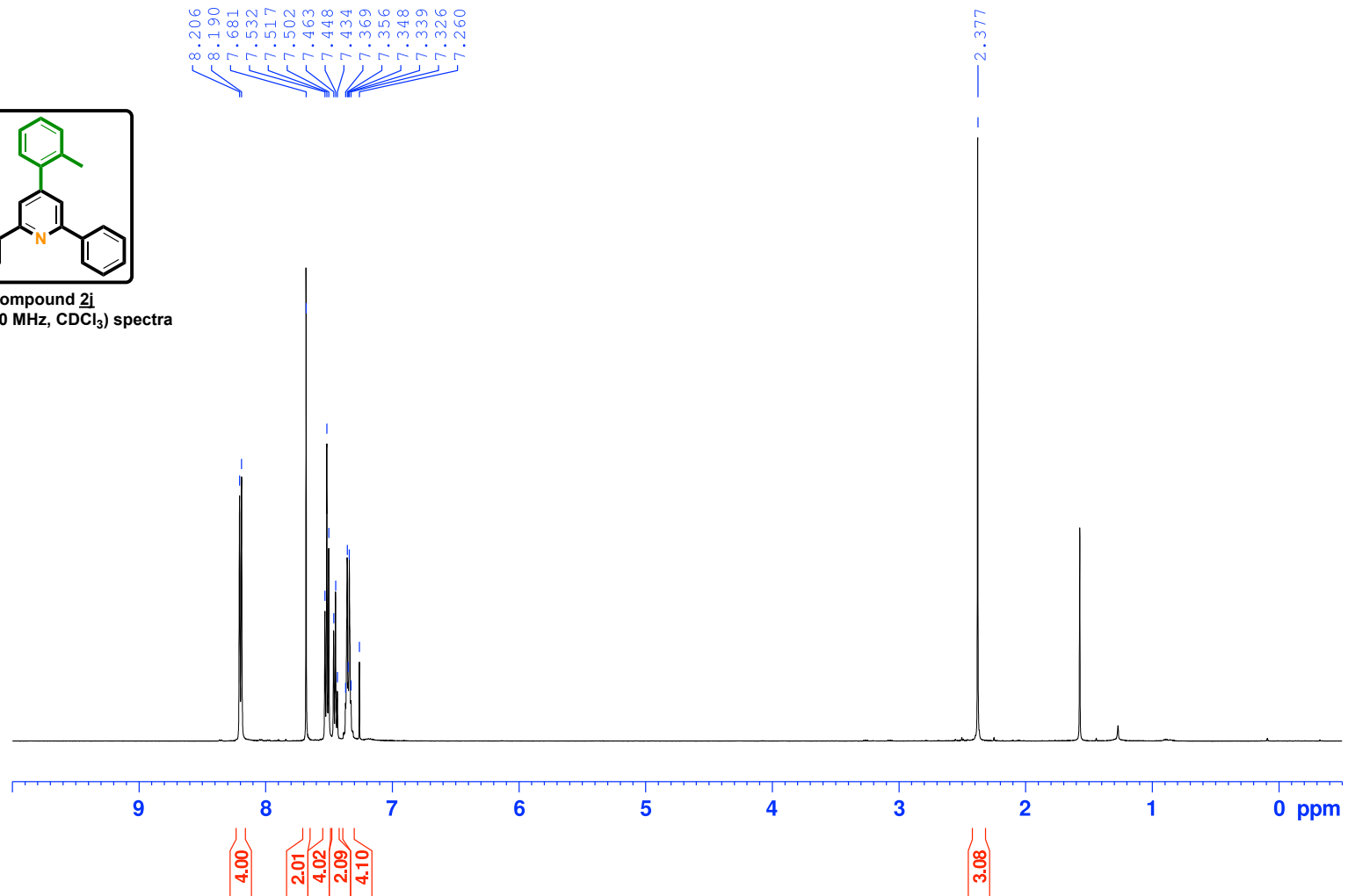


Compound 2j

1H YHC-444 sep48 top 0830

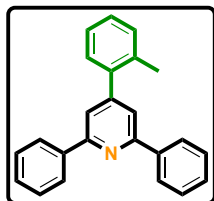


Compound 2j
¹H NMR (500 MHz, CDCl₃) spectra

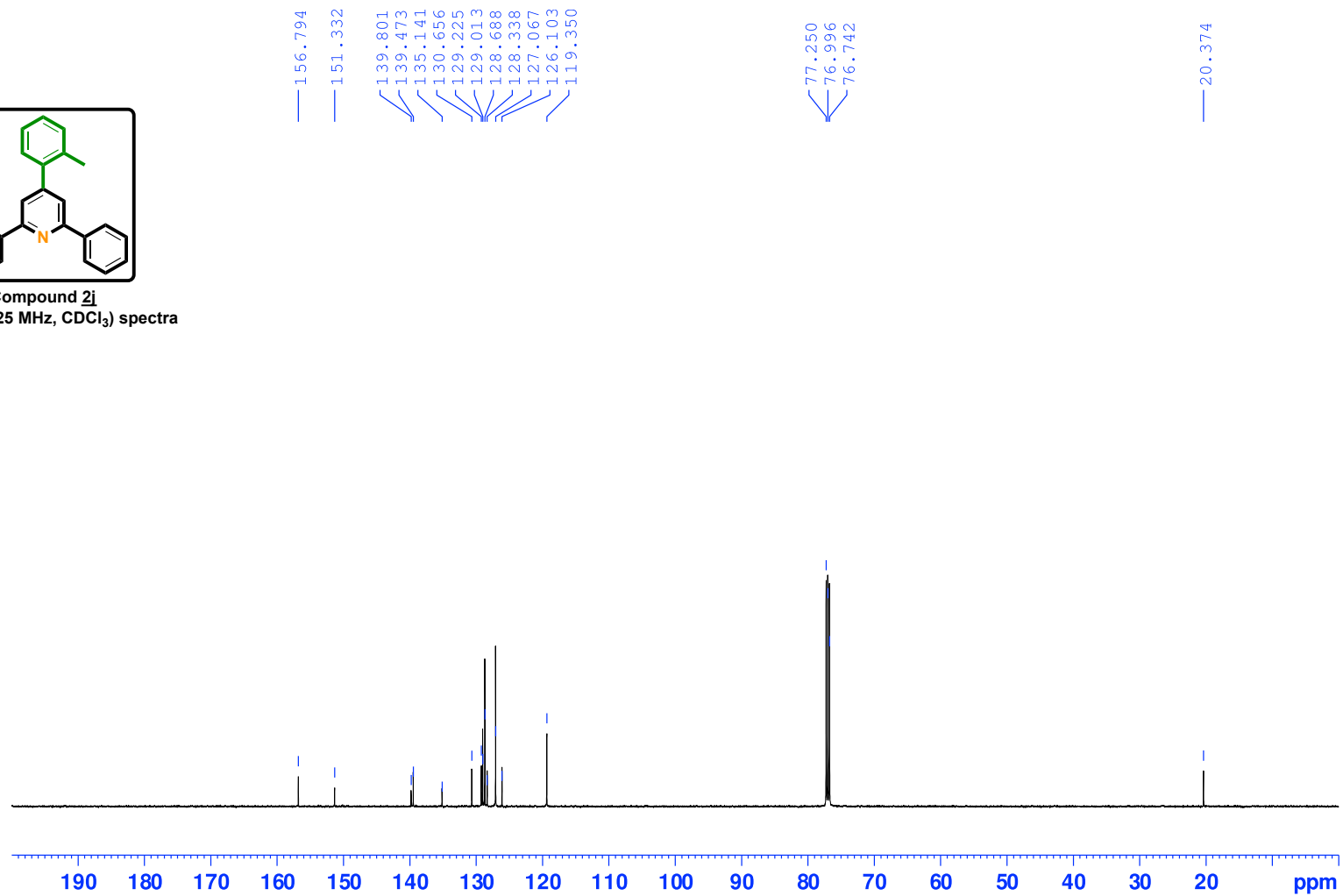


Compound 2j

13C YHC-444 sep48 top 0830

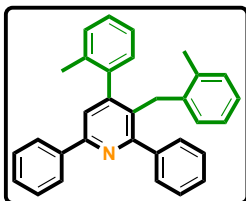


Compound 2j
¹³C NMR (125 MHz, CDCl₃) spectra



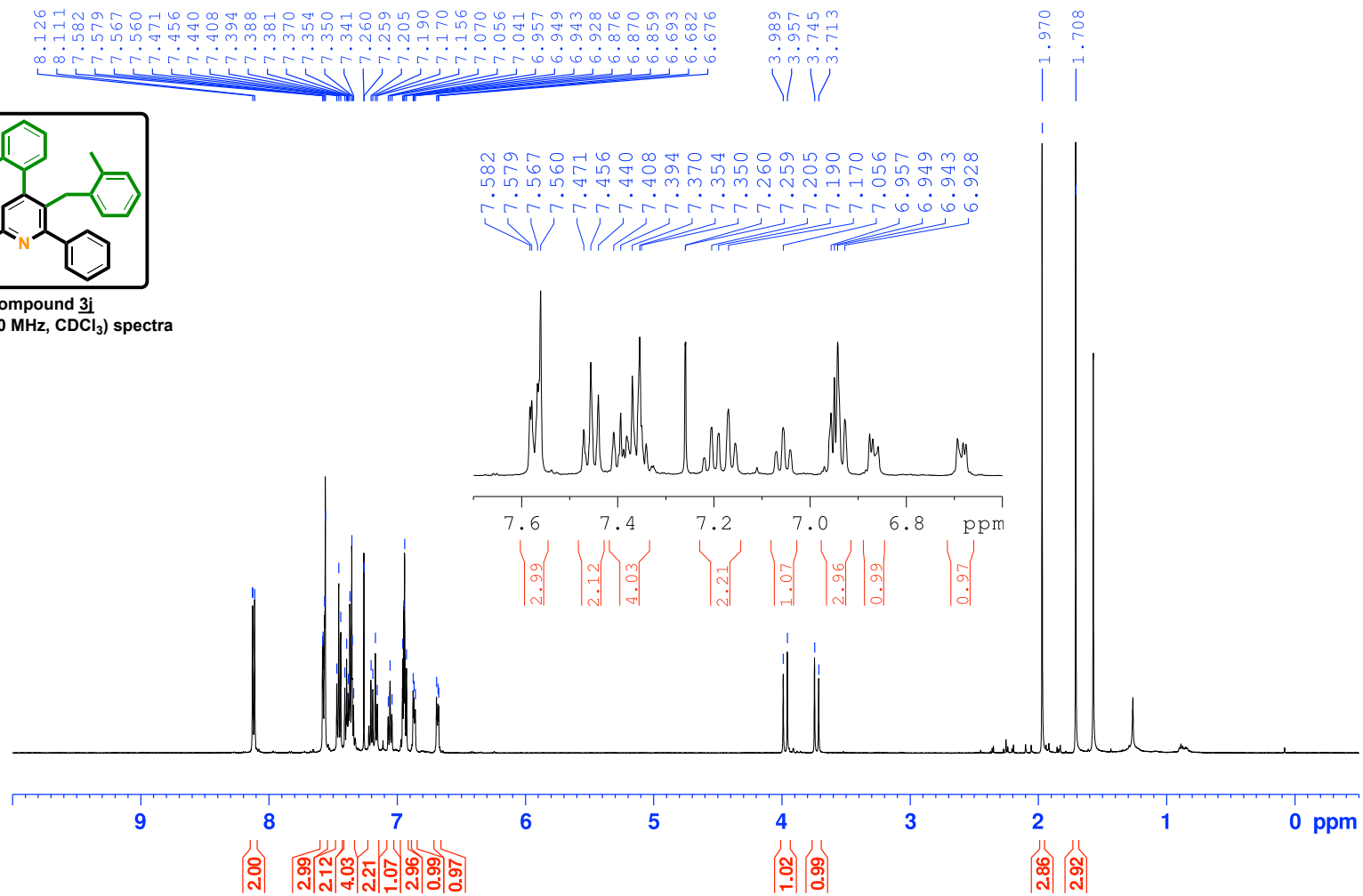
Compound 3j

1H YHC-444 sep53-55 down 0830



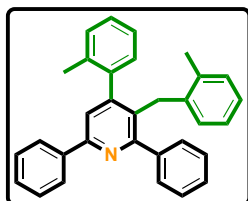
Compound 3j

¹H NMR (500 MHz, CDCl₃) spectra

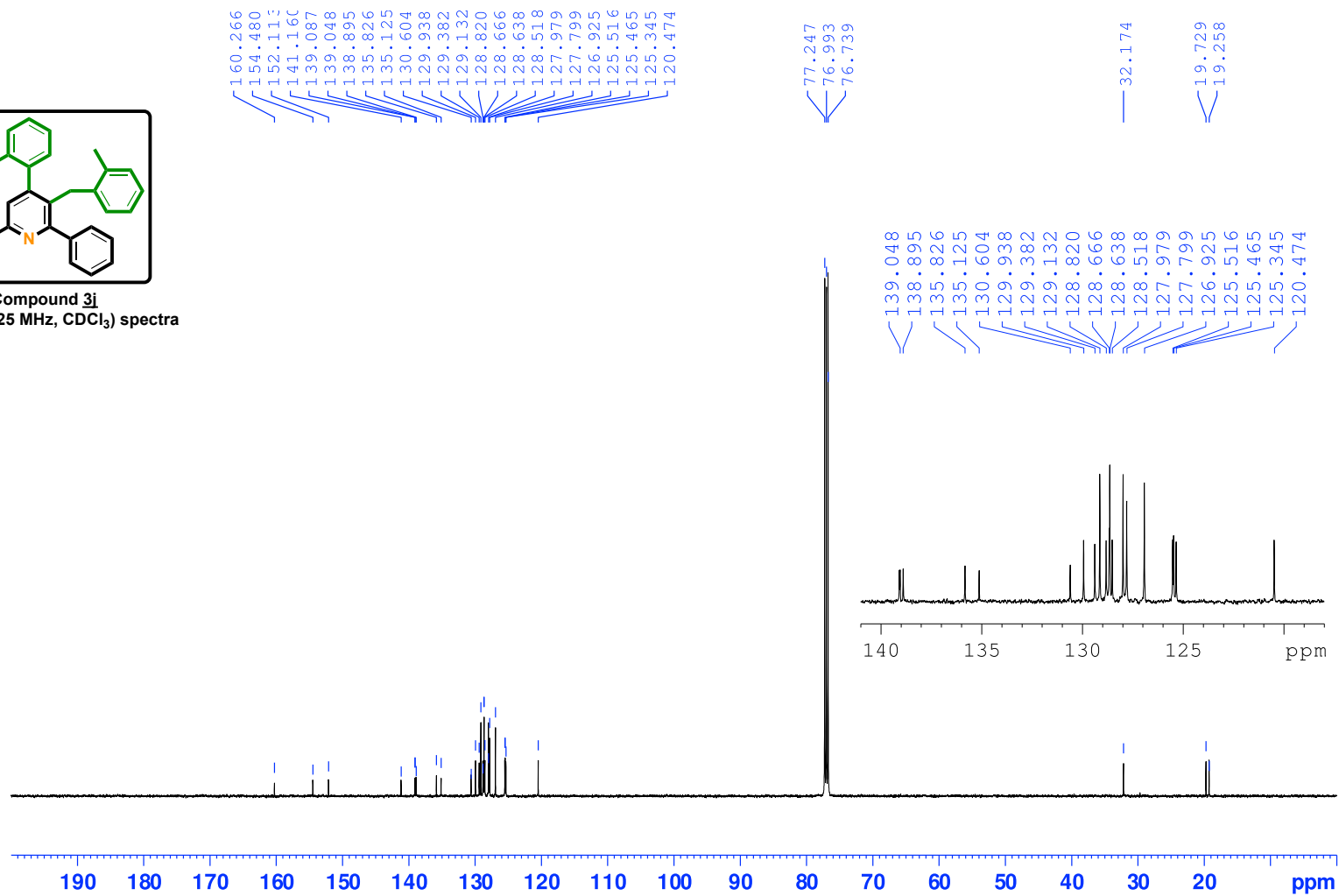


Compound 3j

13C YHC-444 sep53-55 down 0830

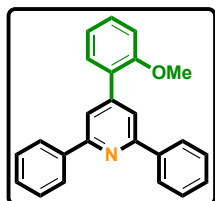


Compound 3j
¹³C NMR (125 MHz, CDCl₃) spectra

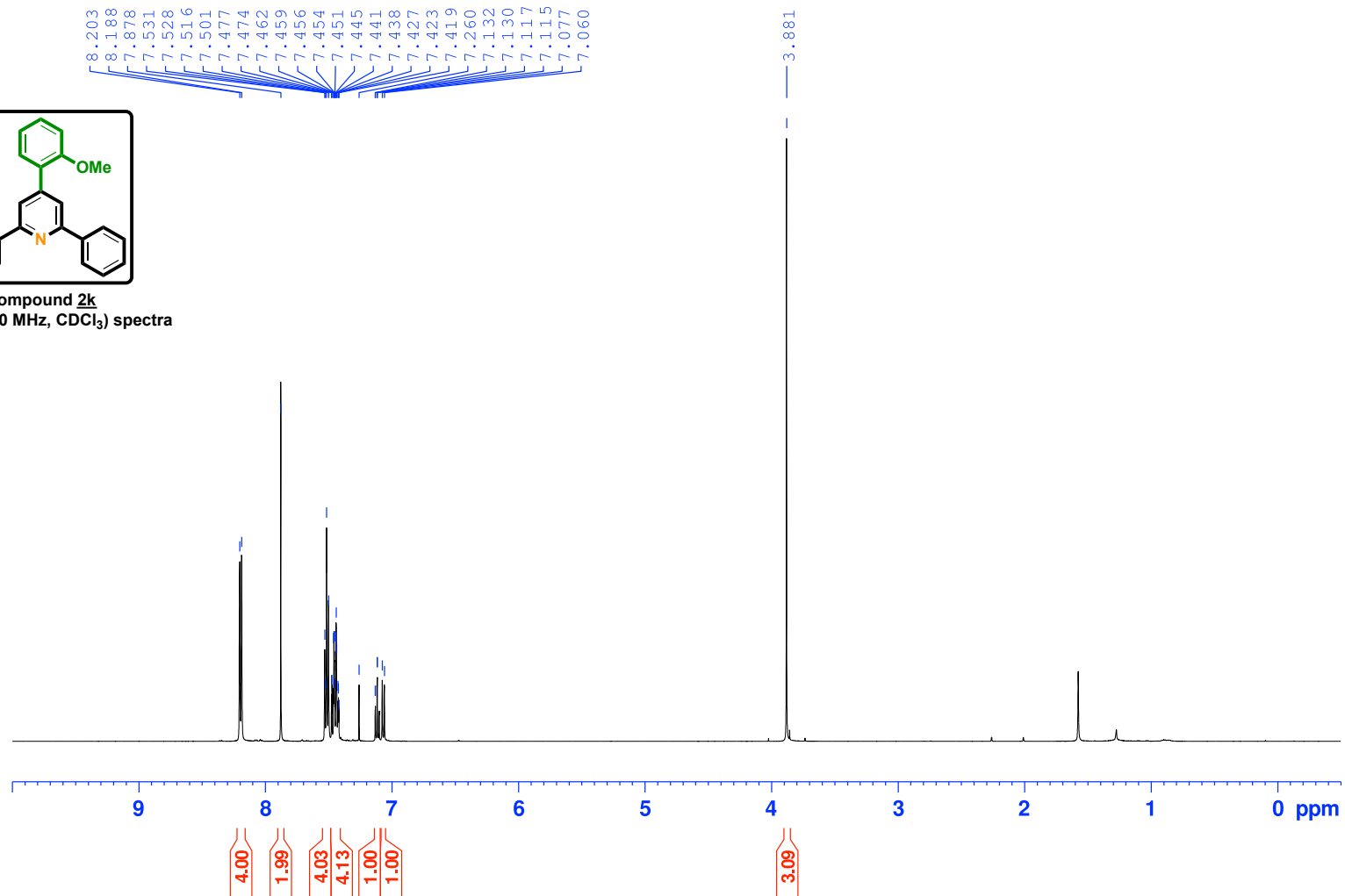


Compound 2k

1H YHC-442 sep 4243 top 0826

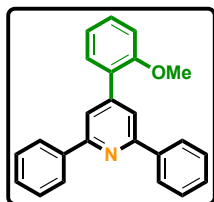


Compound 2k
¹H NMR (500 MHz, CDCl₃) spectra

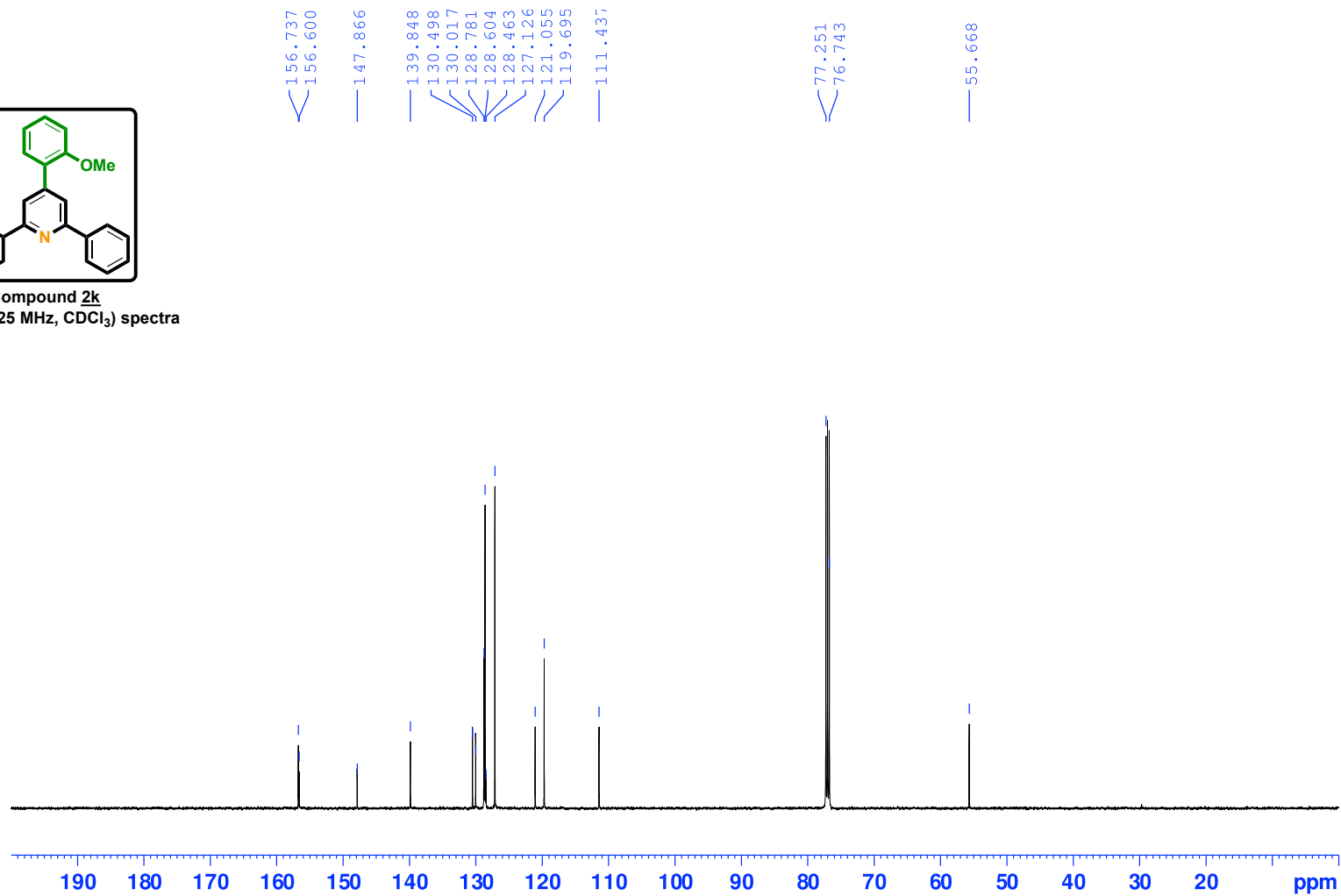


Compound 2k

13C YHC-442 sep 4243 top 0826

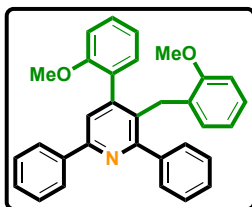


Compound 2k
¹³C NMR (125 MHz, CDCl₃) spectra

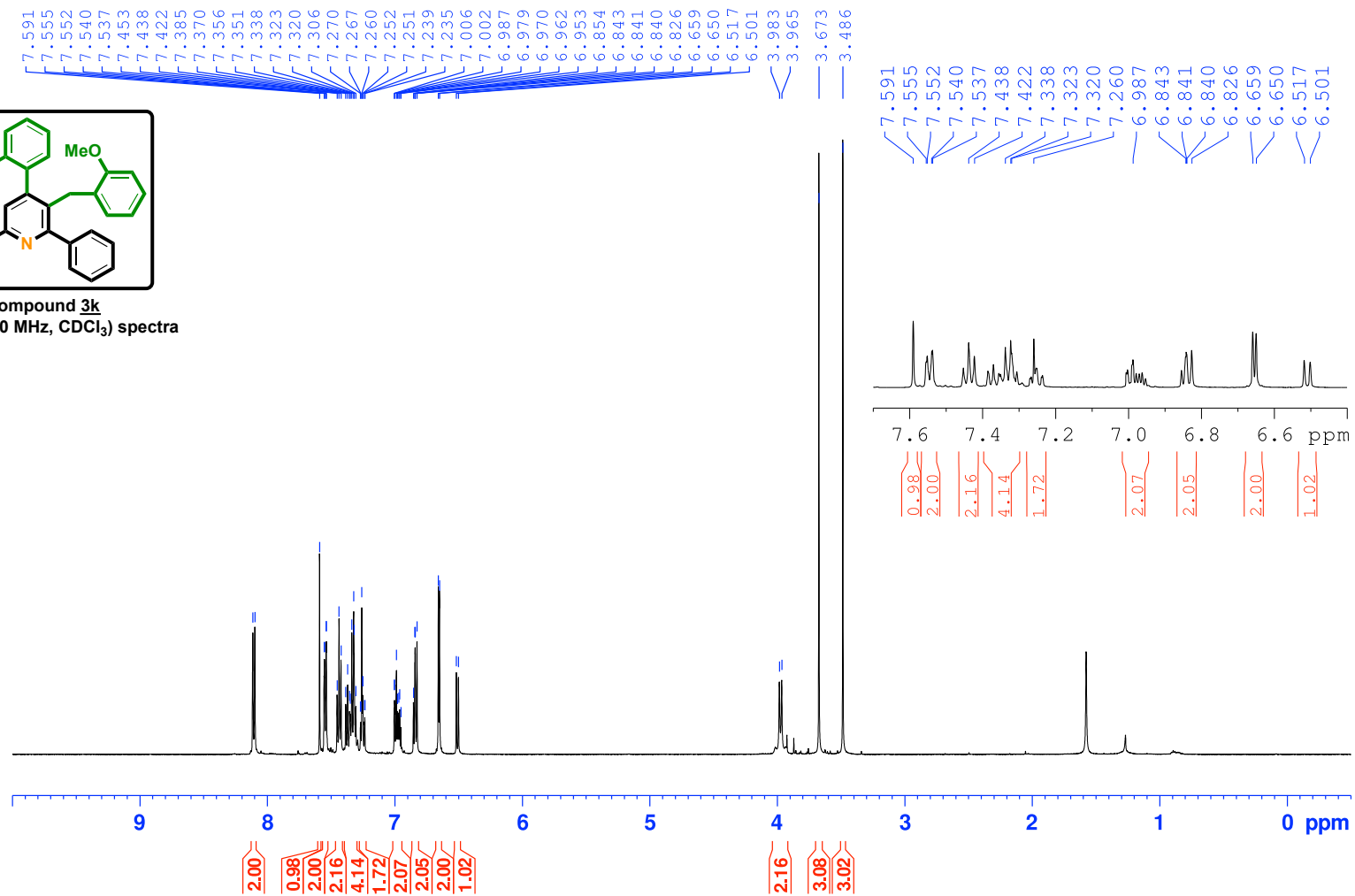


Compound 3k

1H YHC-442-3 sep 6869 down 1028

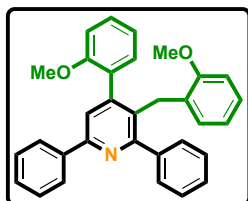


Compound 3k
¹H NMR (500 MHz, CDCl₃) spectra

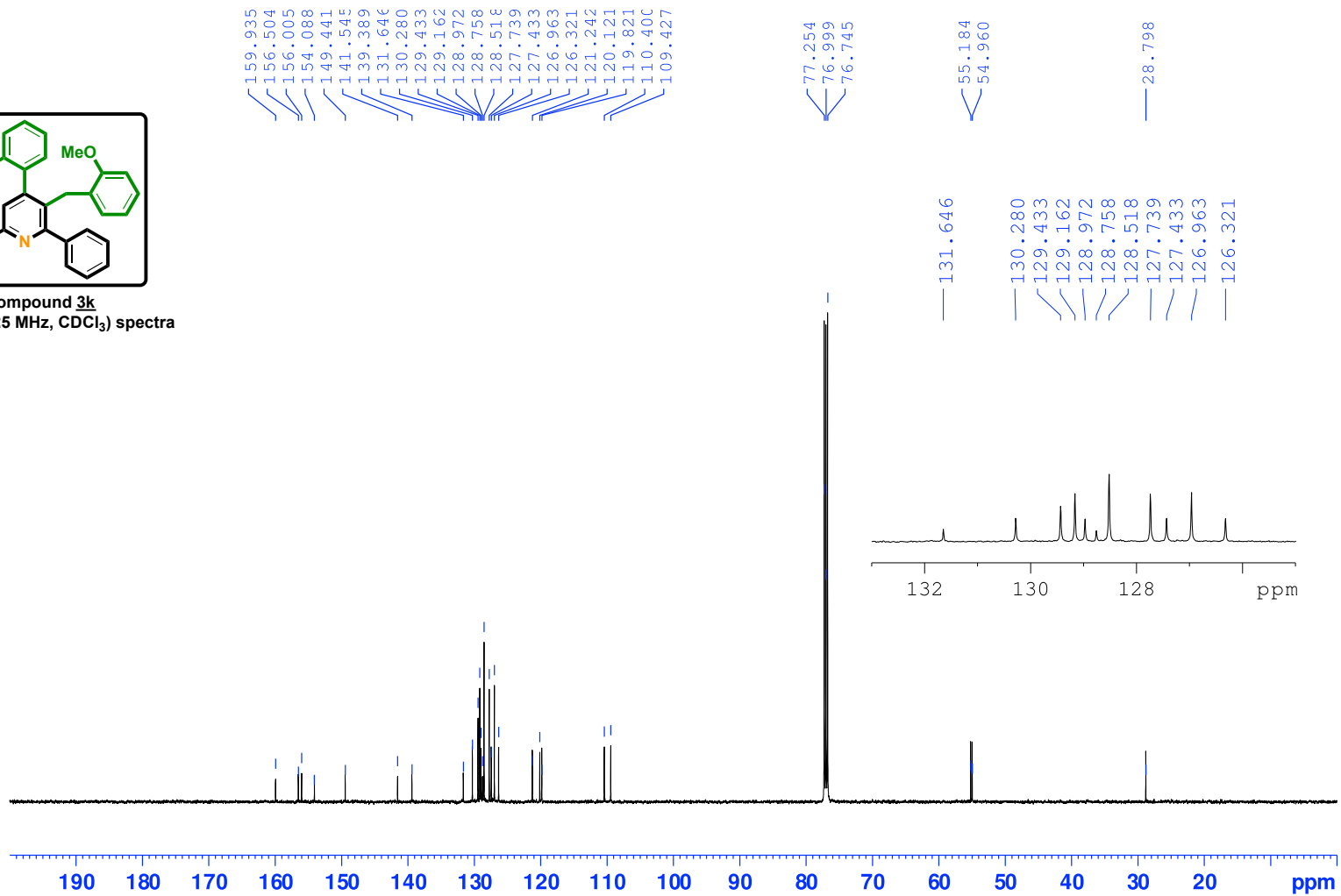


Compound 3k

13C YHC-442-3 sep 6869 down 1028

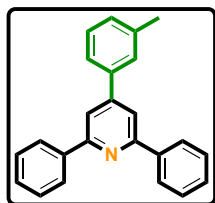


Compound 3k
¹³C NMR (125 MHz, CDCl₃) spectra

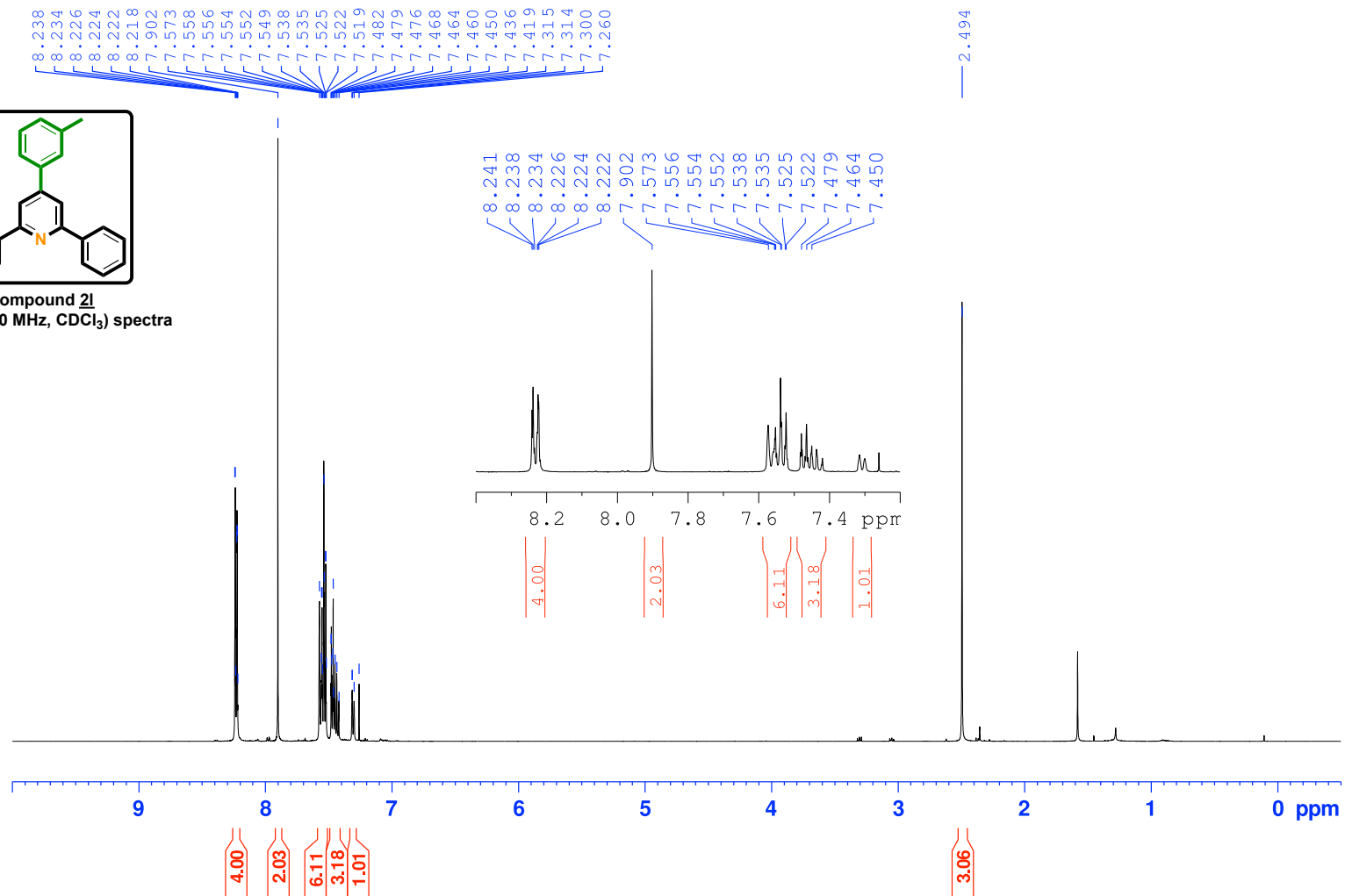


Compound 2l

1H YHC-445 sep42 top 0903

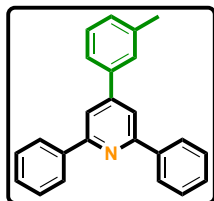


Compound 2l
¹H NMR (500 MHz, CDCl₃) spectra

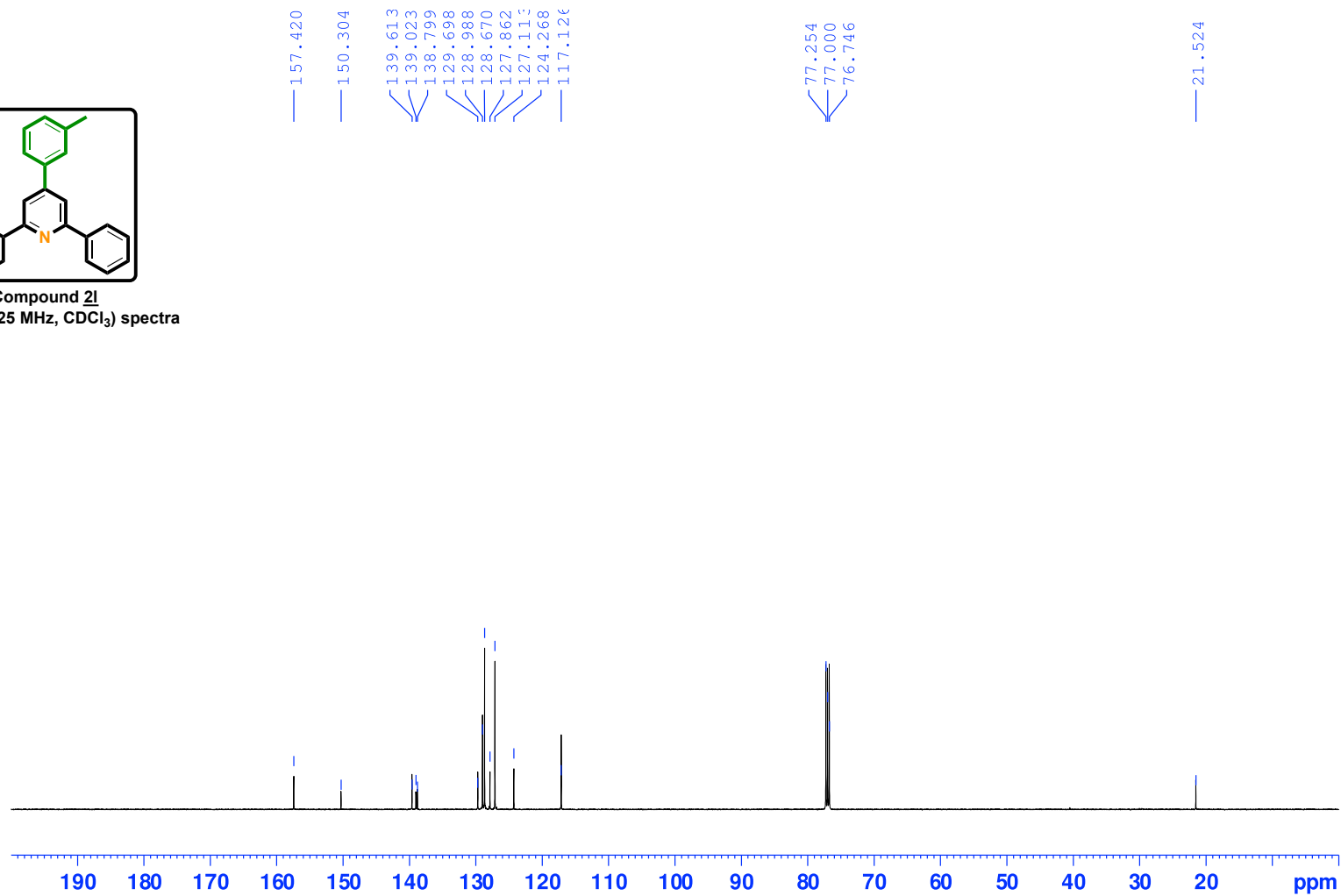


Compound 2l

13C YHC-445 sep42 top 0903

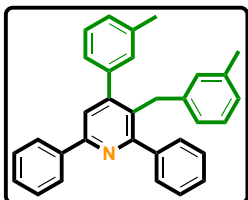


Compound 2l
¹³C NMR (125 MHz, CDCl₃) spectra

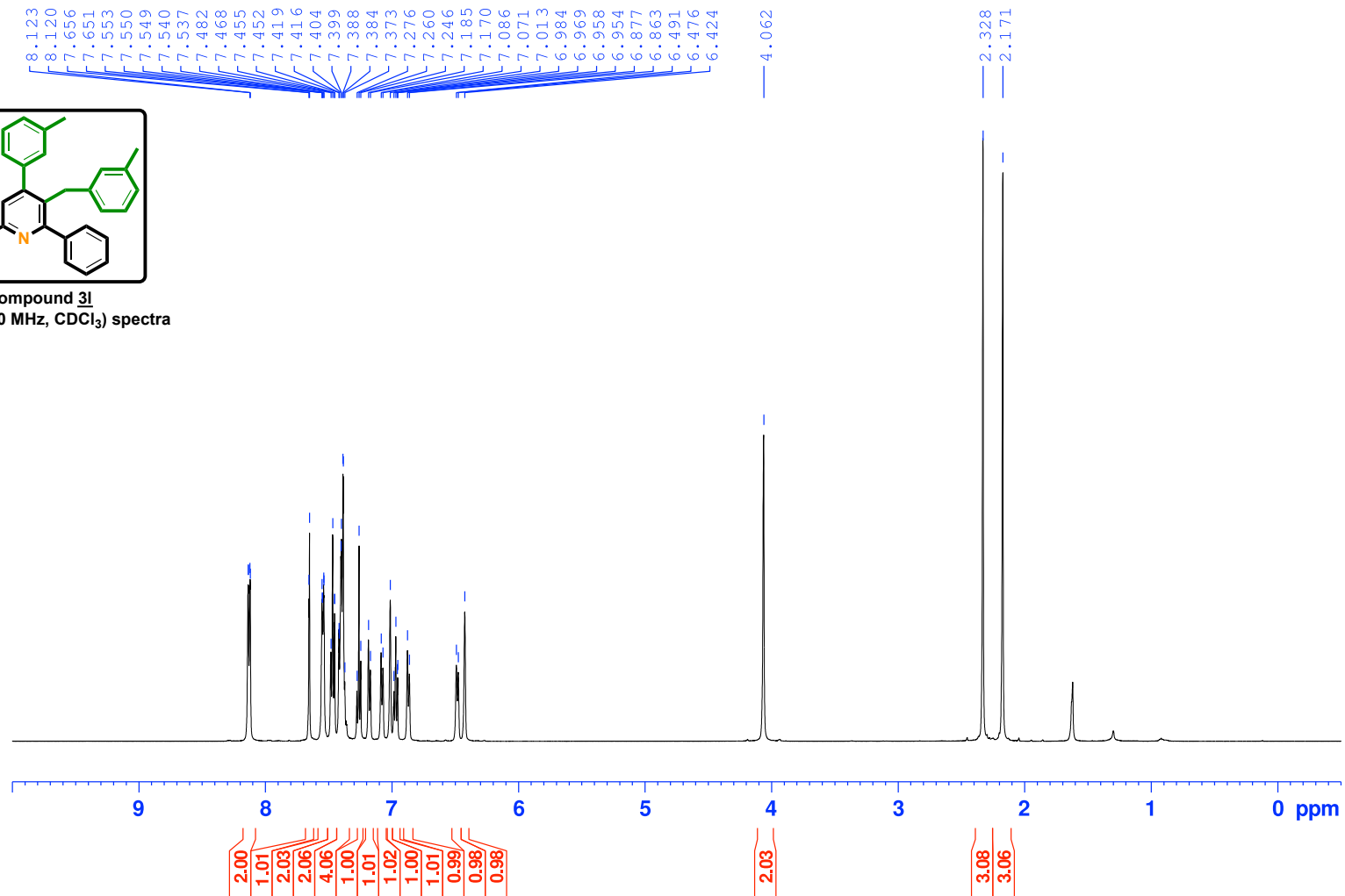


Compound 3l

1H YHC-445 sep5354 down 0901

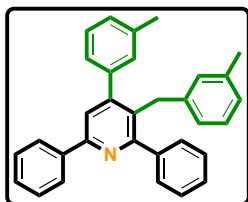


Compound 3l
¹H NMR (500 MHz, CDCl₃) spectra

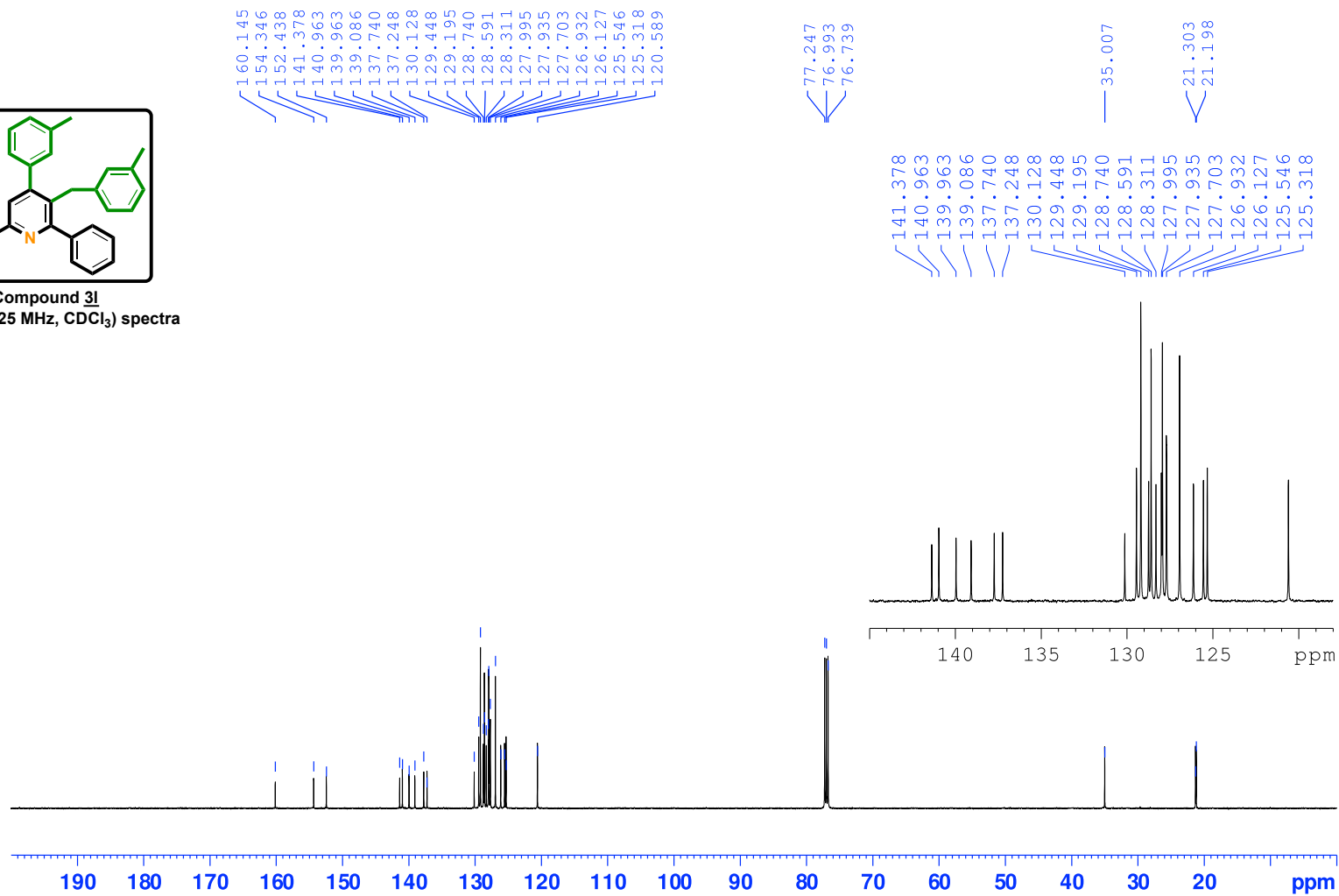


Compound 3l

13C YHC-445 sep5354 down 0901

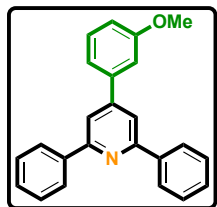


Compound 3l
¹³C NMR (125 MHz, CDCl₃) spectra

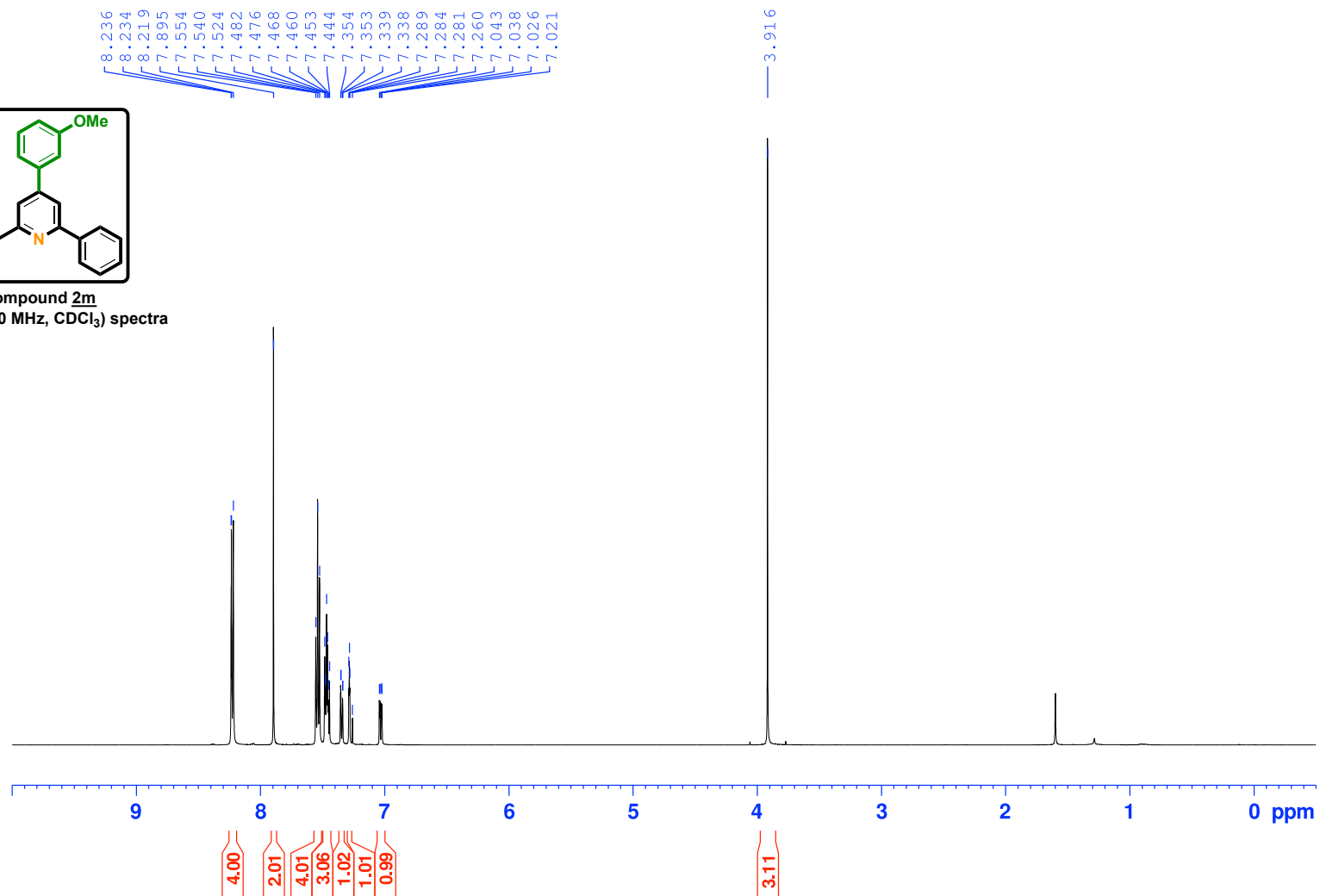


Compound 2m

1H YHC-443 sep 4243 top 0830

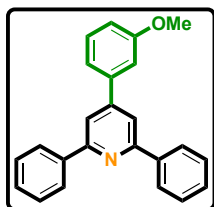


Compound 2m
¹H NMR (500 MHz, CDCl₃) spectra



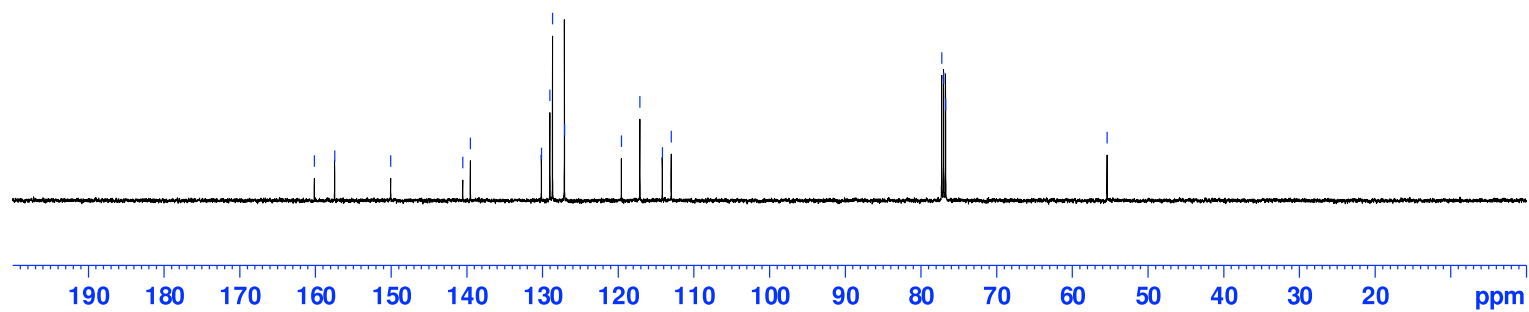
Compound 2m

13C YHC-443 sep 4243 top 0830



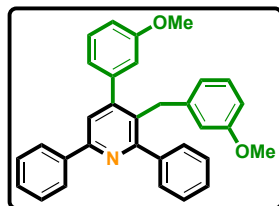
Compound 2m
¹³C NMR (125 MHz, CDCl₃) spectra

160.143
157.462
150.055
140.534
139.530
130.141
129.022
128.674
127.104
119.574
117.130
114.167
112.989
77.251
76.997
76.743
55.400

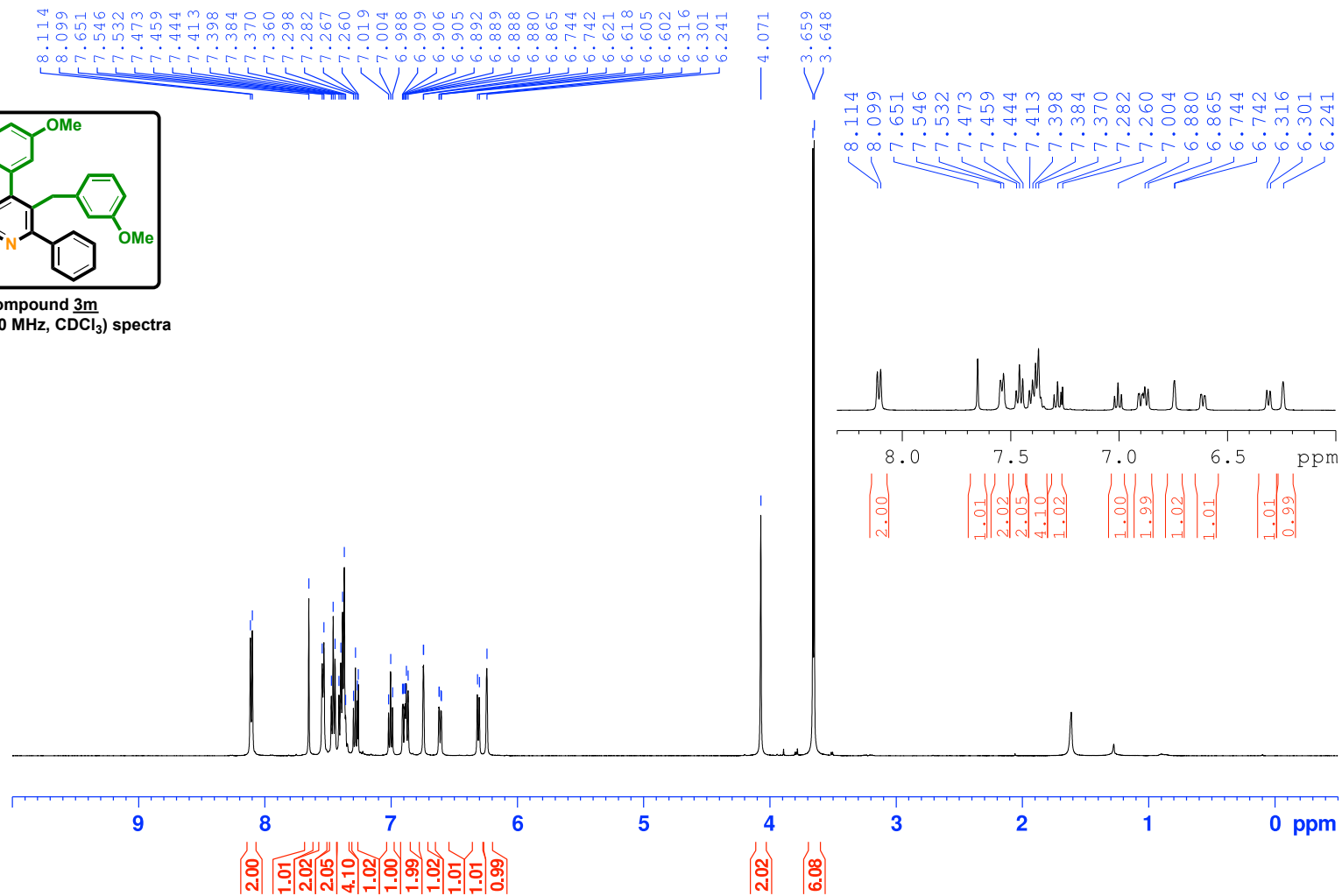


Compound 3m

1H YHC-443 sep 8889 down 0830

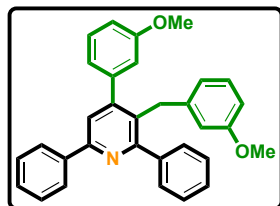


Compound 3m
¹H NMR (500 MHz, CDCl₃) spectra



Compound 3m

13C YHC-443 sep 8889 down 0830



Compound 3m
¹³C NMR (125 MHz, CDCl₃) spectra

160.221
159.296
159.229
154.590
152.200
142.827
141.275
139.017
129.562
129.281
129.169
128.865
128.821
128.622
127.989
127.793
126.965
120.915
120.812
120.516
113.898
113.785
111.185

77.250
76.743

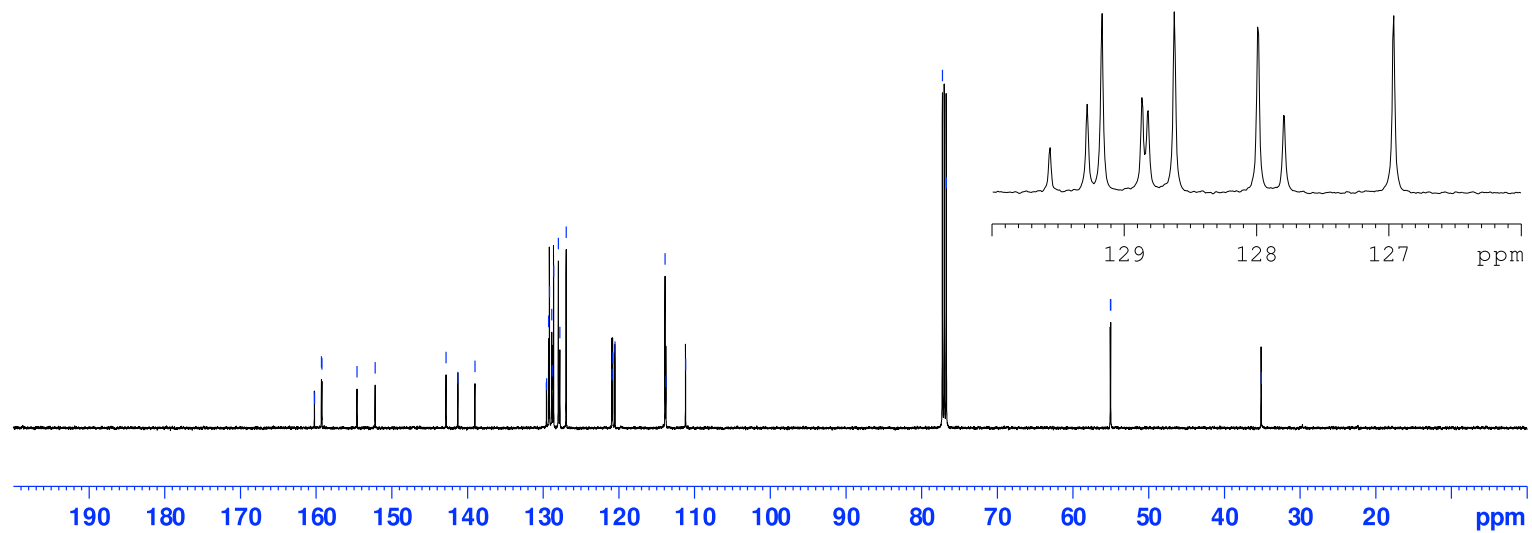
55.063
55.017

35.142

129.562
129.281
129.169
128.865
128.821
128.622

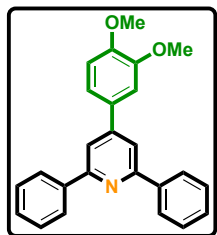
127.989
127.793

126.965

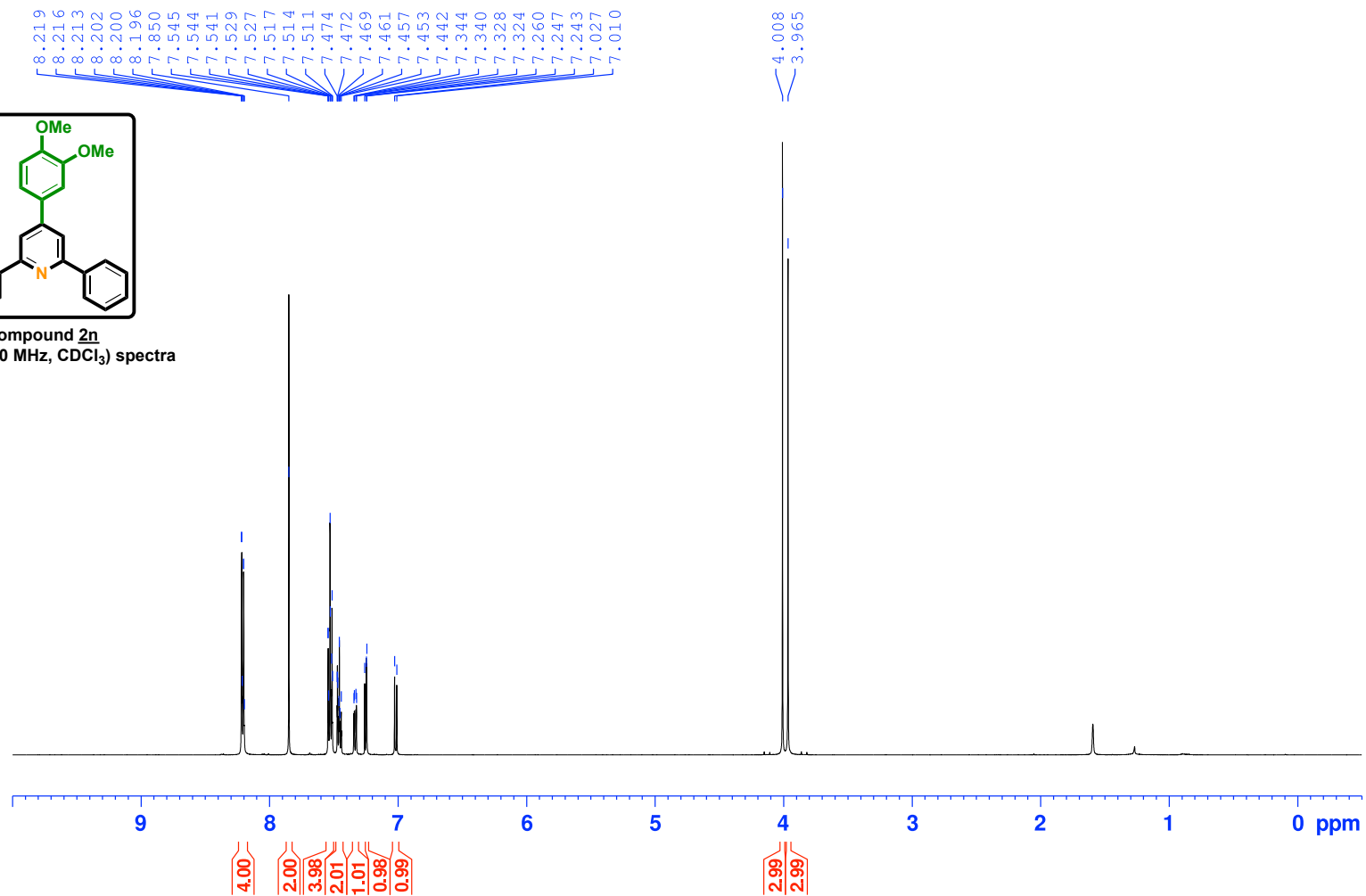


Compound 2n

1H YHC-446 sep103 104 top 0903

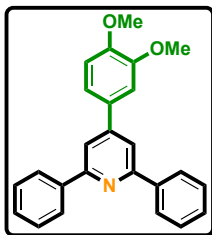


Compound 2n
¹H NMR (500 MHz, CDCl₃) spectra



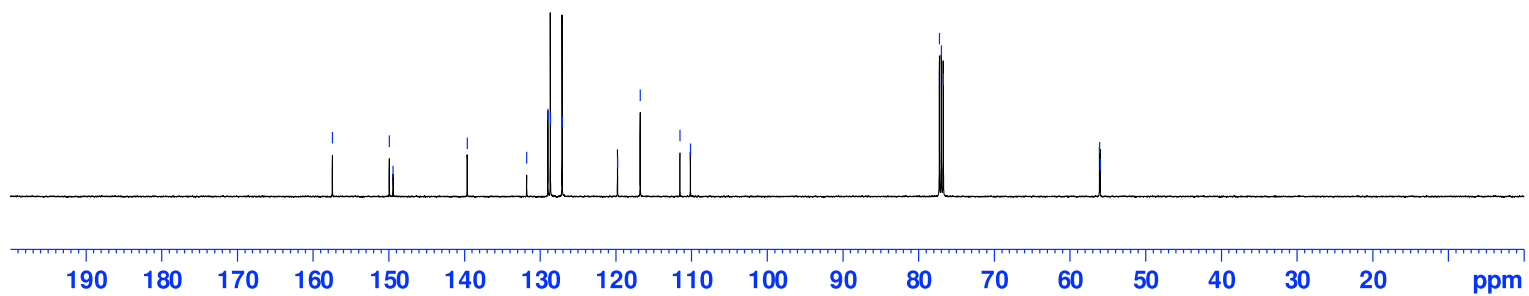
Compound 2n

13C YHC-446 sep103 104 top 0903



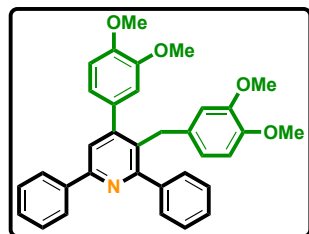
Compound 2n
¹³C NMR (125 MHz, CDCl₃) spectra

157.455
149.935
149.434
139.638
131.778
128.979
128.658
127.104
119.781
116.785
111.536
110.145
77.249
76.995
76.741
56.095
56.008

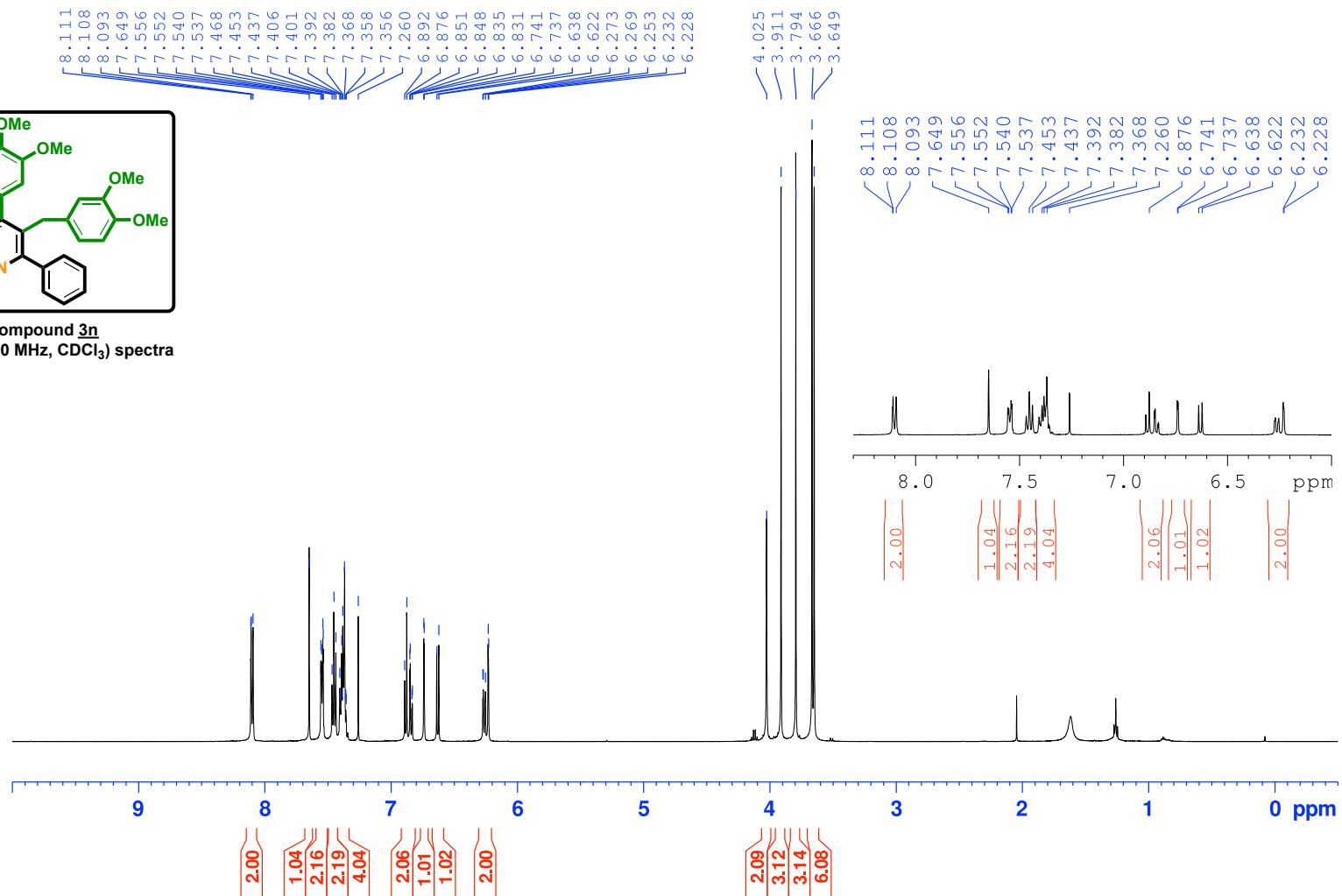


Compound 3n

1H YHC-446 sep211 212 down 0906

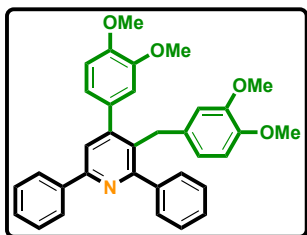


Compound 3n
¹H NMR (500 MHz, CDCl₃) spectra

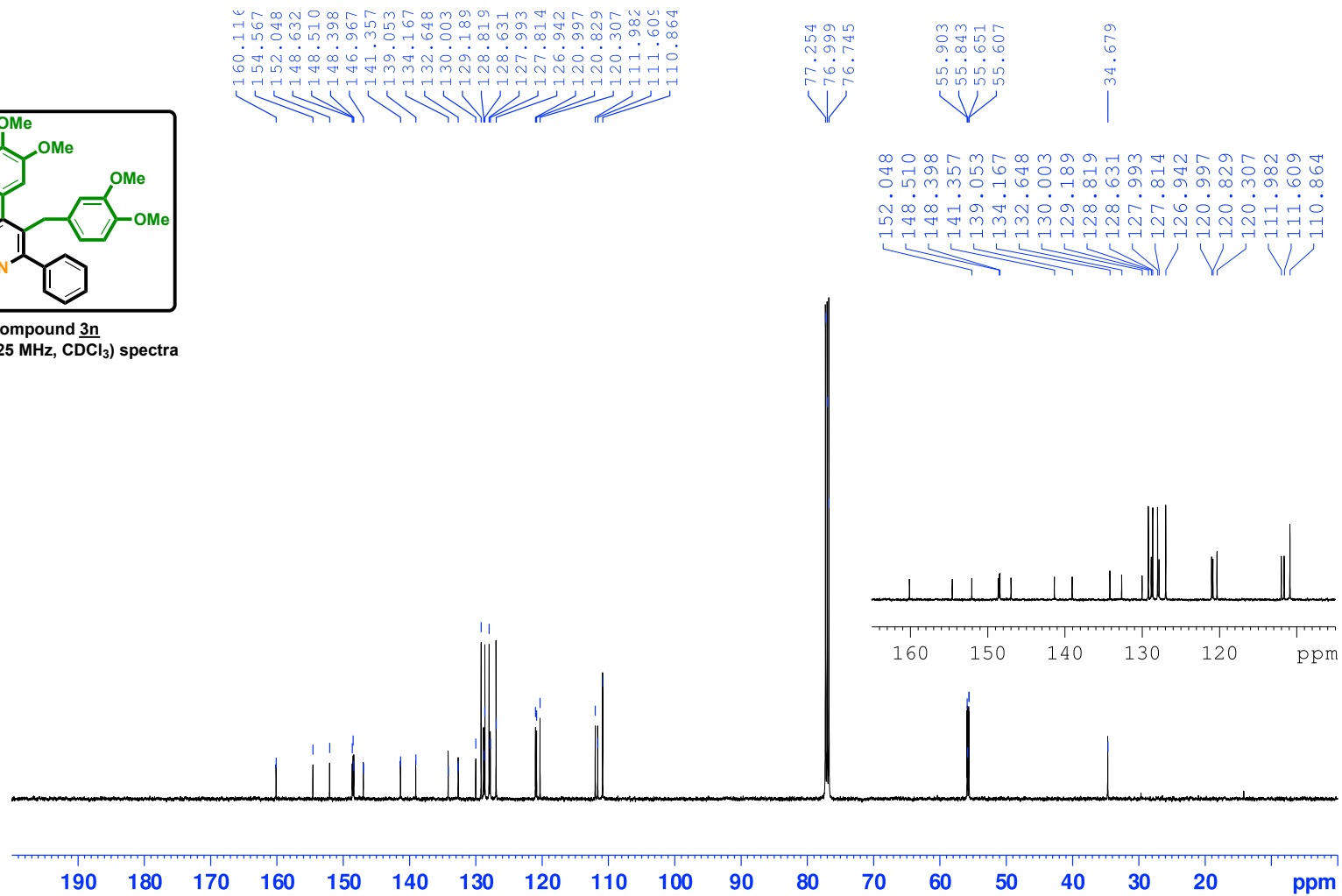


Compound 3n

13C YHC-446 sep211 212 down 0906

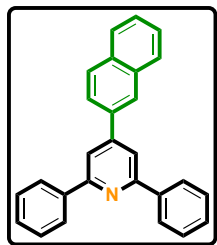


Compound 3n
¹³C NMR (125 MHz, CDCl₃) spectra

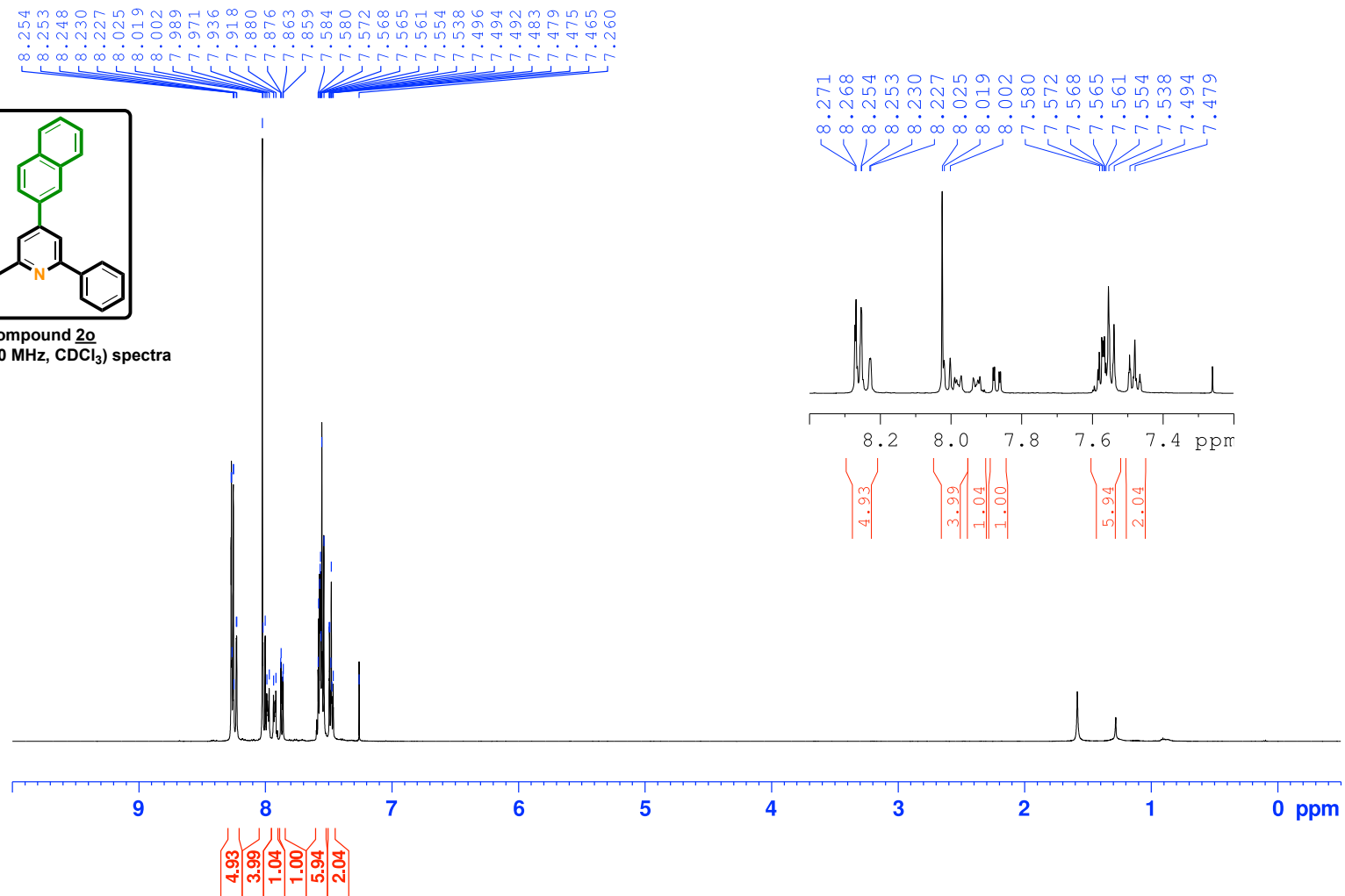


Compound 2o

1H YHC-436 sep 16-18 top 0626

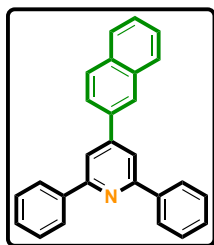


Compound 2o
¹H NMR (500 MHz, CDCl₃) spectra



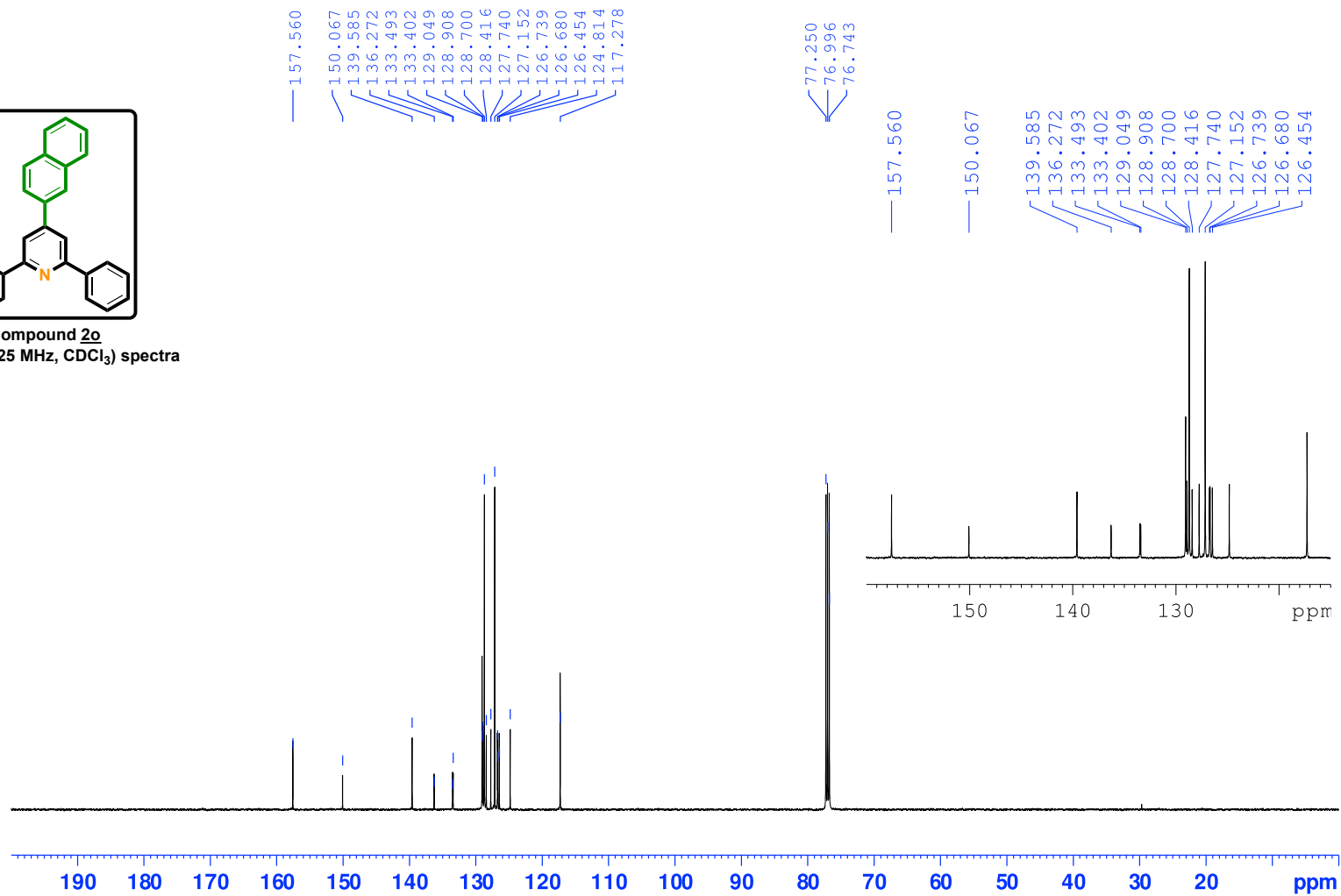
Compound 2o

13C YHC-436 sep 16-18 top 0626



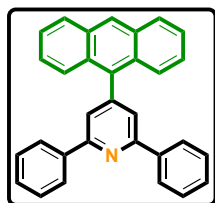
Compound 2o

¹³C NMR (125 MHz, CDCl₃) spectra

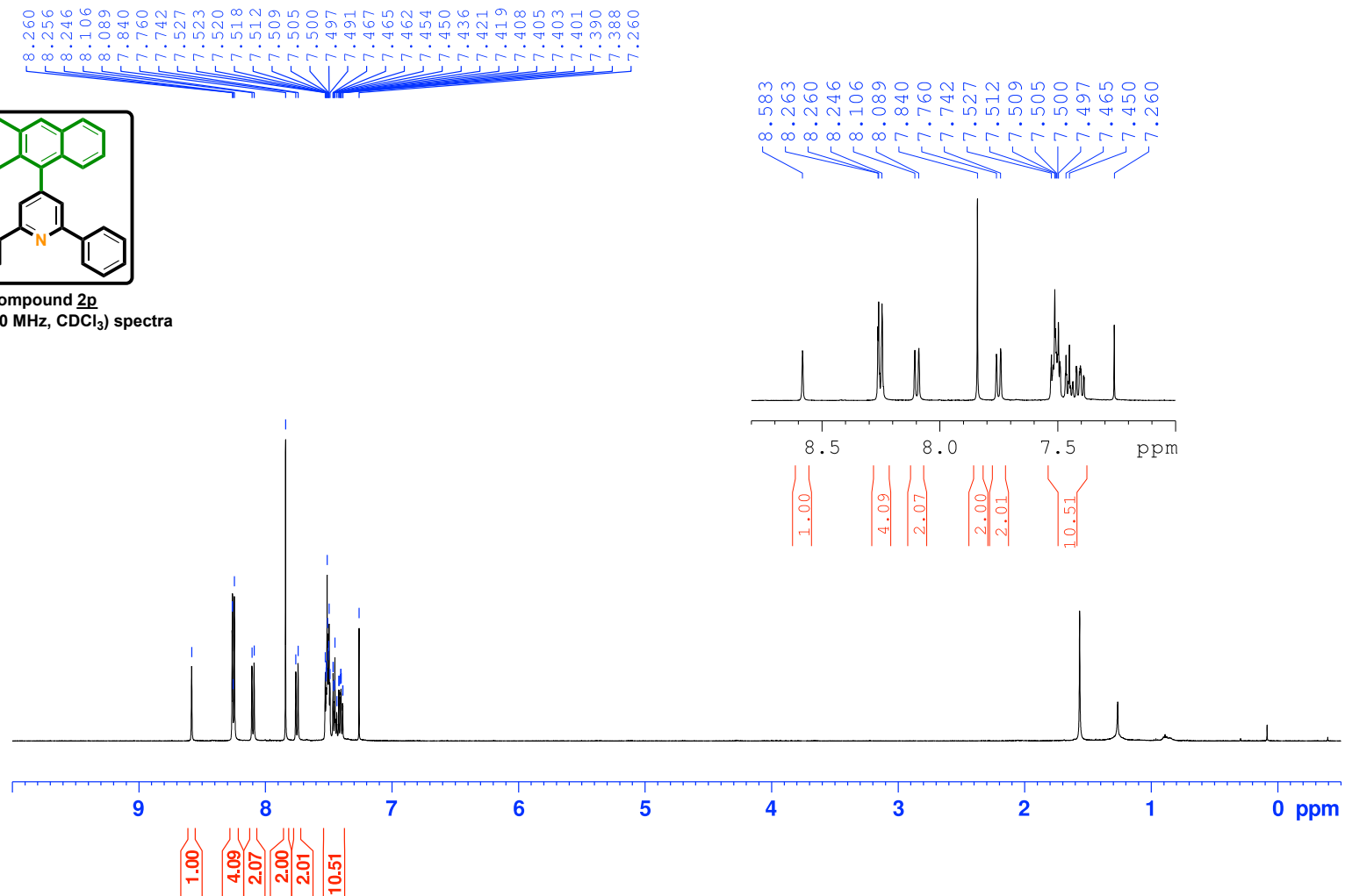


Compound 2p

1H YHC-437 sep 18-20 top 0706

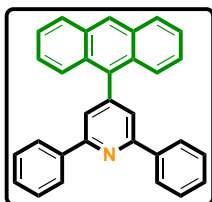


Compound 2p
¹H NMR (500 MHz, CDCl₃) spectra

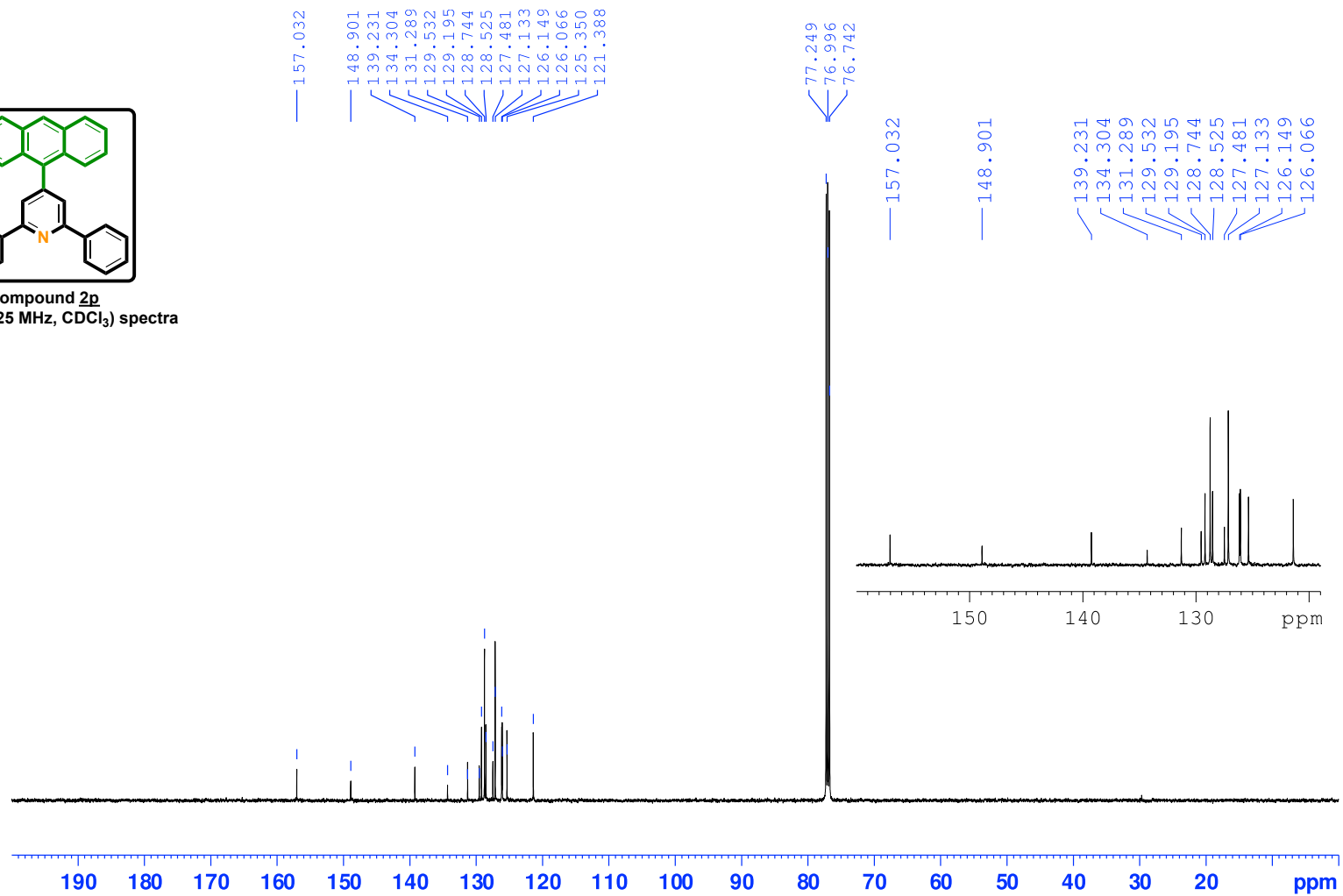


Compound 2p

13C YHC-437 sep 18-20 top 0706

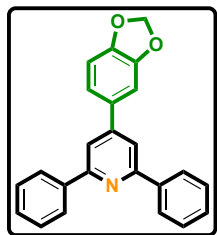


Compound 2p
¹³C NMR (125 MHz, CDCl₃) spectra



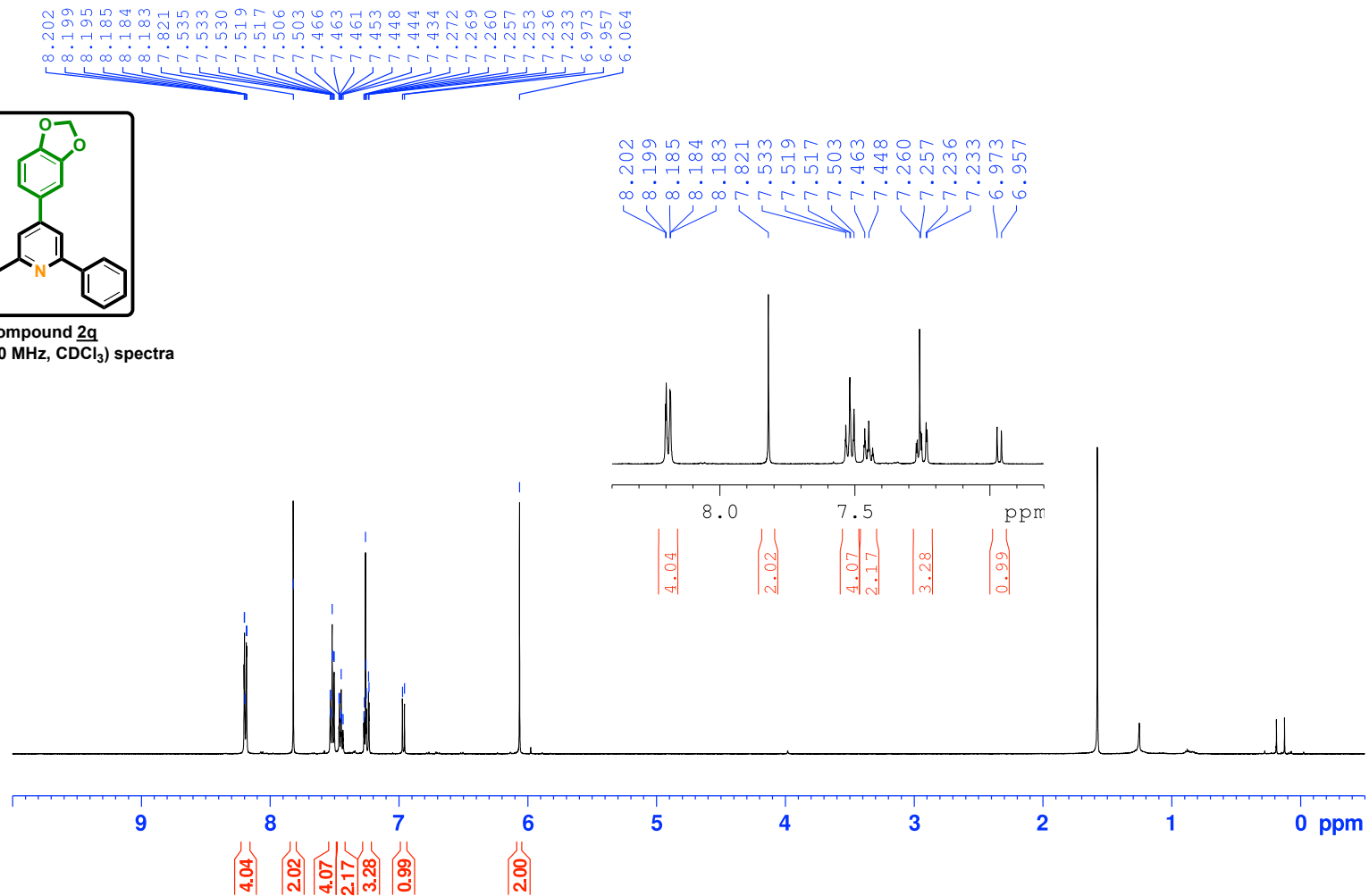
Compound 2q

1H YHC-430-2 sep 3334 0513



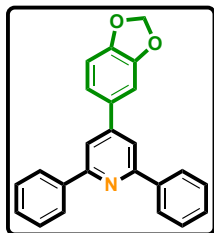
Compound 2q

¹H NMR (500 MHz, CDCl₃) spectra

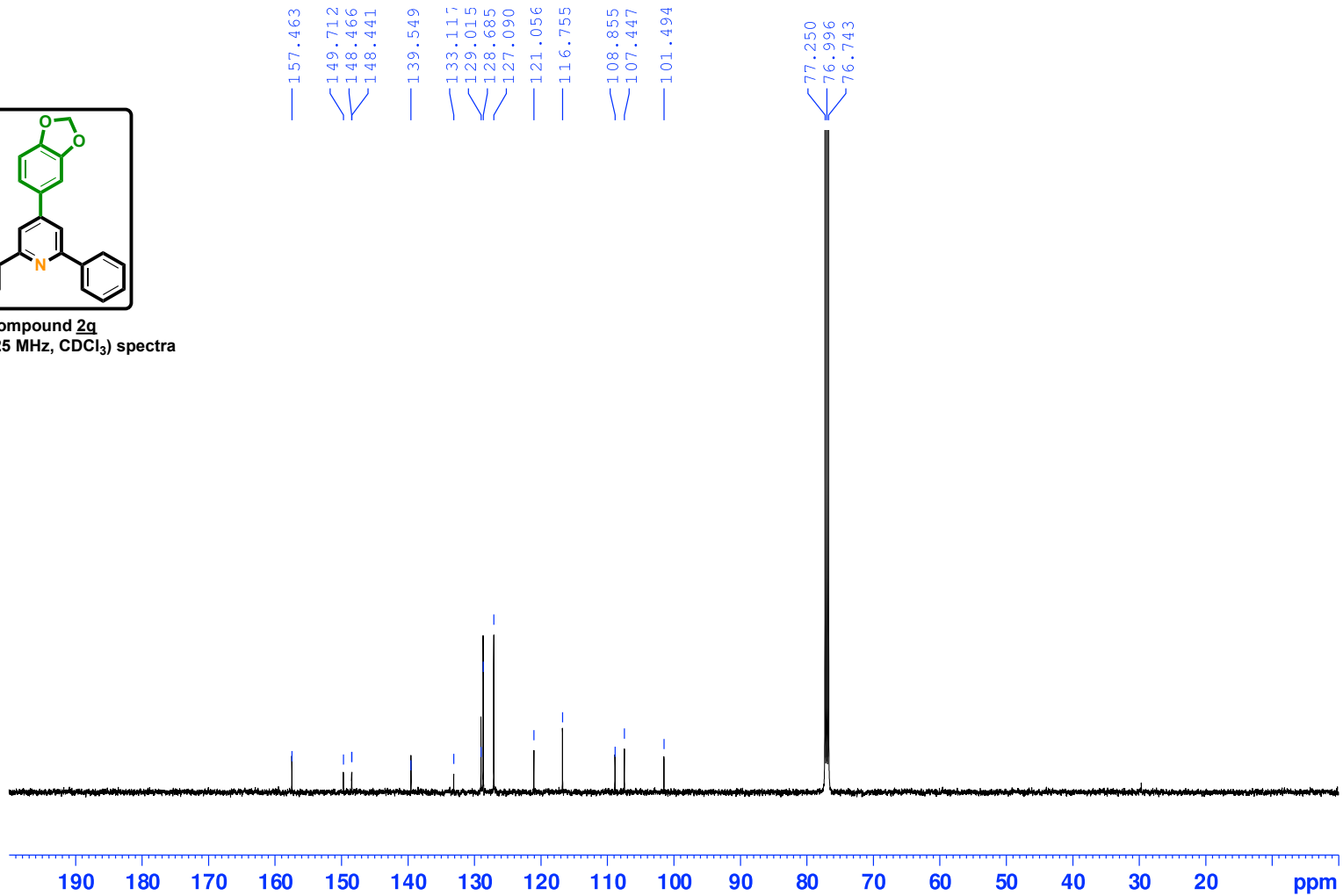


Compound 2q

13C YHC-430-2 sep 3334 0513



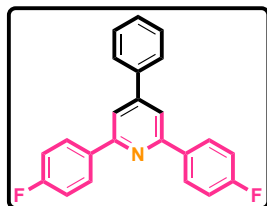
Compound 2q
¹³C NMR (125 MHz, CDCl₃) spectra



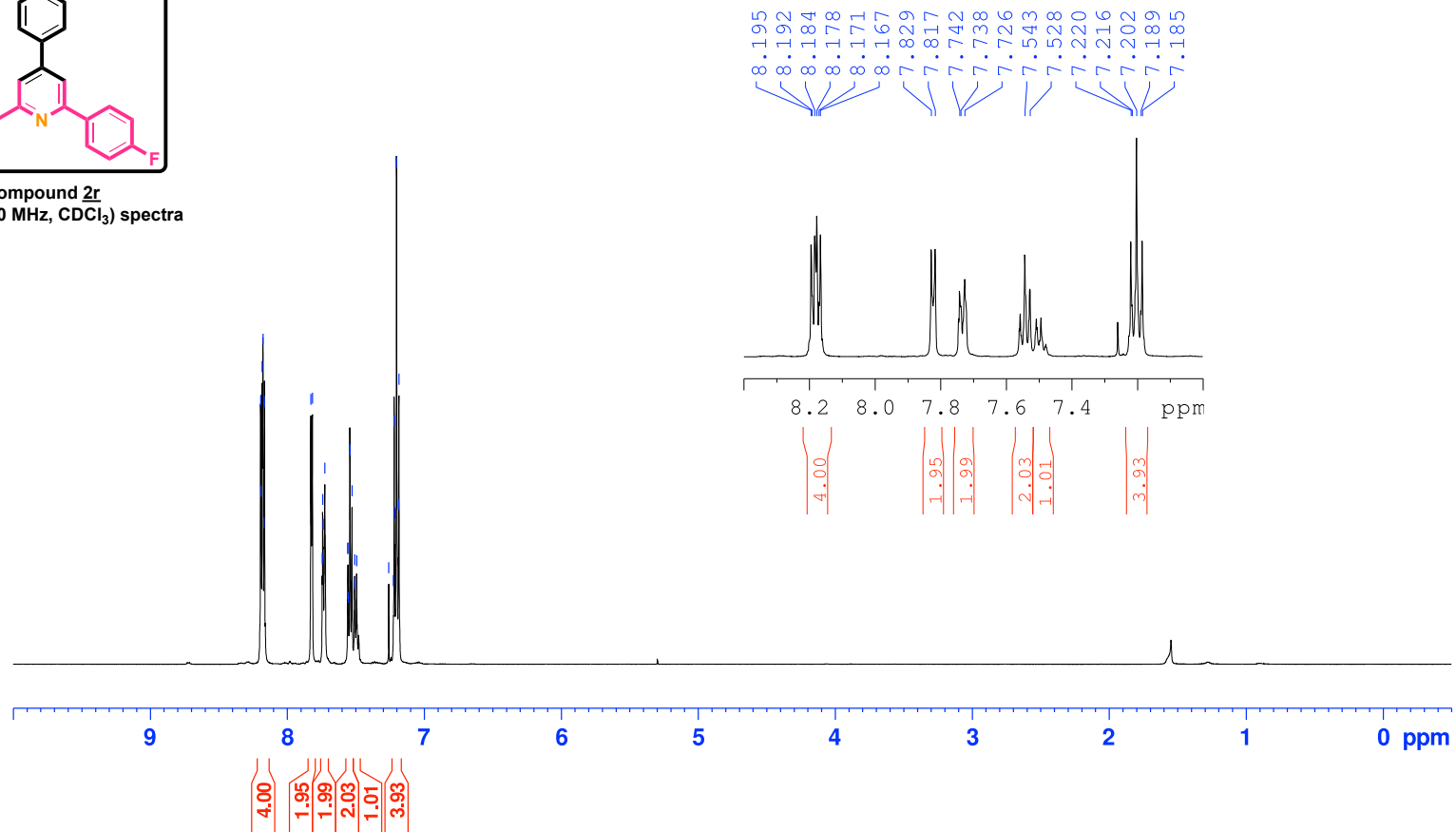
Compound 2r

1H YHC-303 tmsotf data 0329

8.195
8.192
8.184
8.178
8.171
8.167
7.829
7.817
7.745
7.742
7.738
7.726
7.560
7.557
7.554
7.543
7.528
7.508
7.506
7.494
7.260
7.226
7.220
7.216
7.202
7.189
7.185

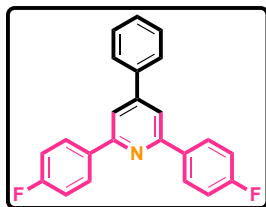


Compound 2r
¹H NMR (500 MHz, CDCl₃) spectra



Compound 2r

13C YHC-303 tmsotf data 0329



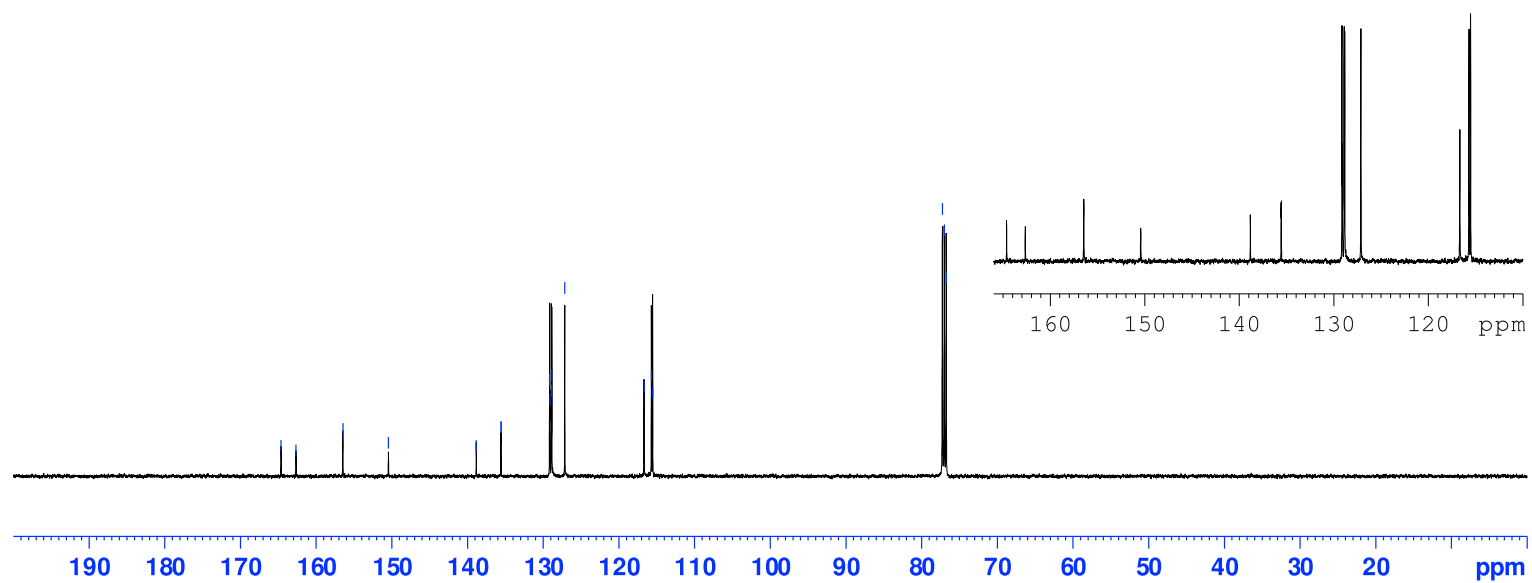
Compound 2r
¹³C NMR (125 MHz, CDCl₃) spectra

164.630
162.653
156.463
150.436
138.836
135.581
135.559
129.149
129.109
128.917
128.852
127.143
116.670
115.703
115.532

77.250
76.996
76.742

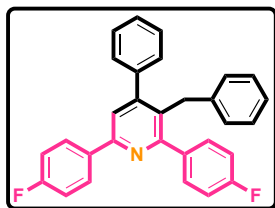
162.653
156.463
150.436

138.836
135.581
135.559
129.149
129.109
128.917
128.852
127.143
116.670
115.703
115.532

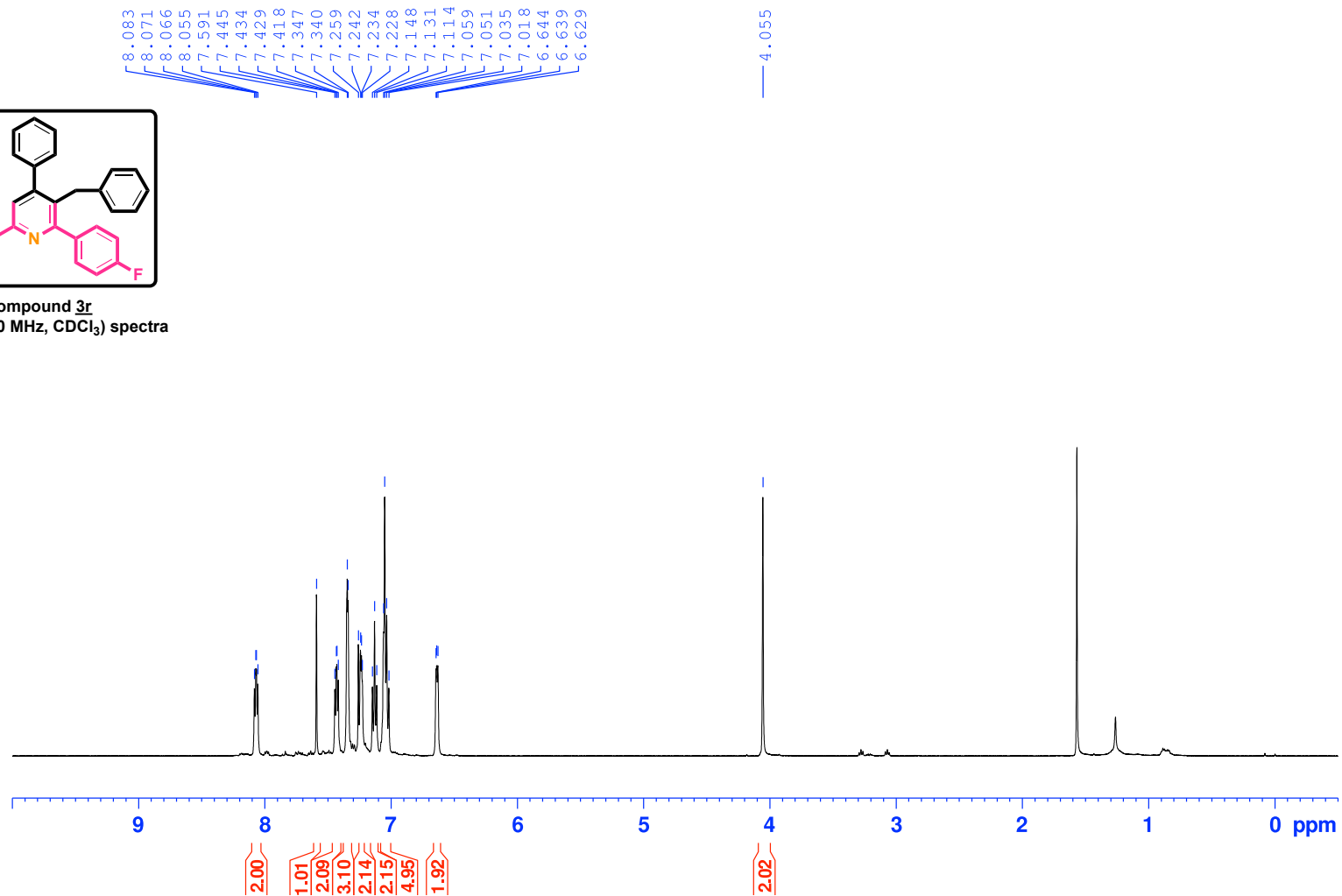


Compound 3r

1H YHC-454 sep 4546 down 1008

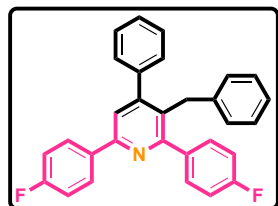


Compound 3r
¹H NMR (500 MHz, CDCl₃) spectra

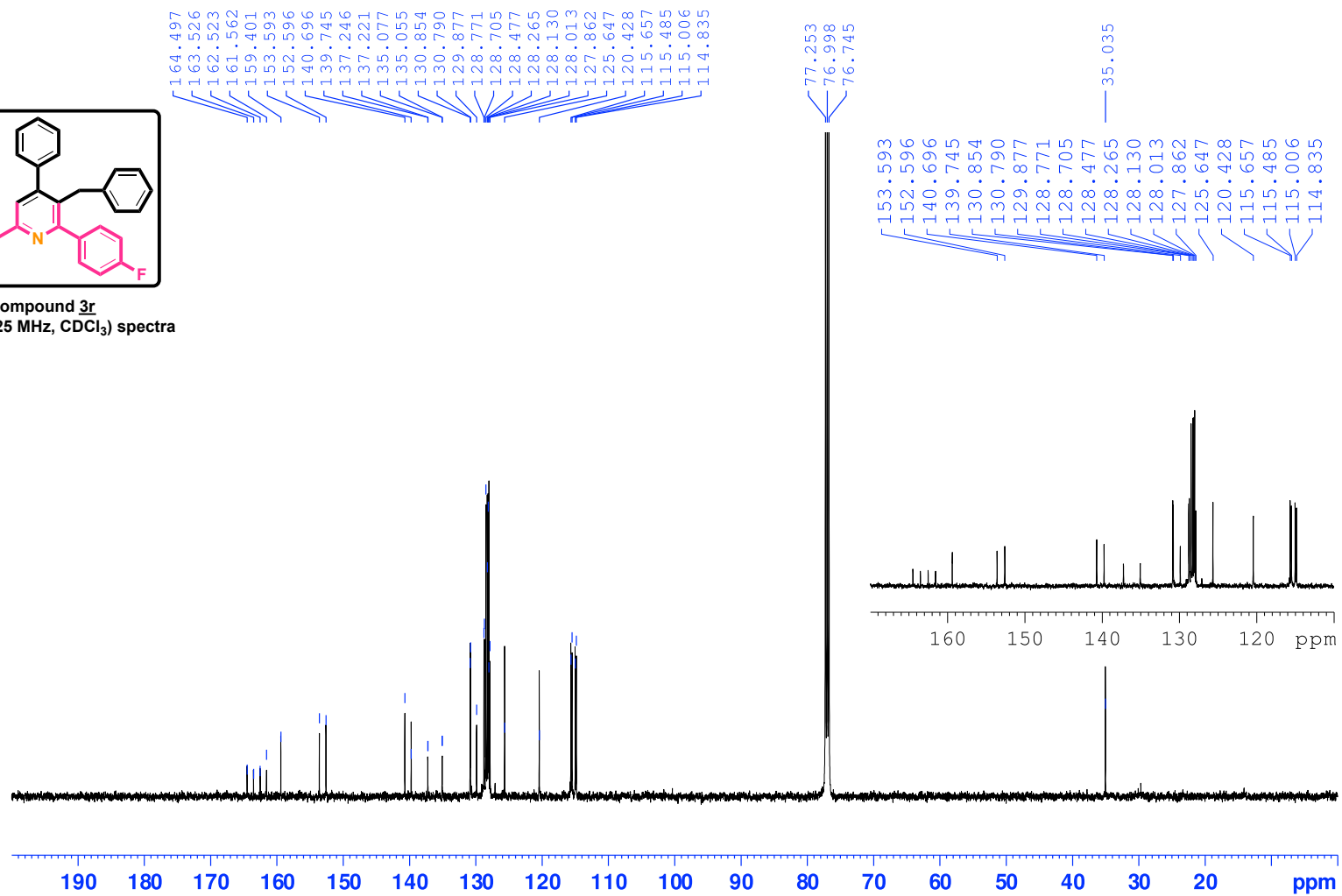


Compound 3r

13C YHC-454 sep 4546 down 1008

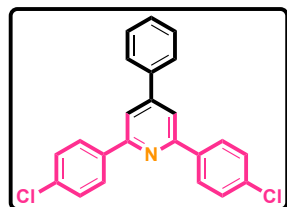


Compound 3r
¹³C NMR (125 MHz, CDCl₃) spectra

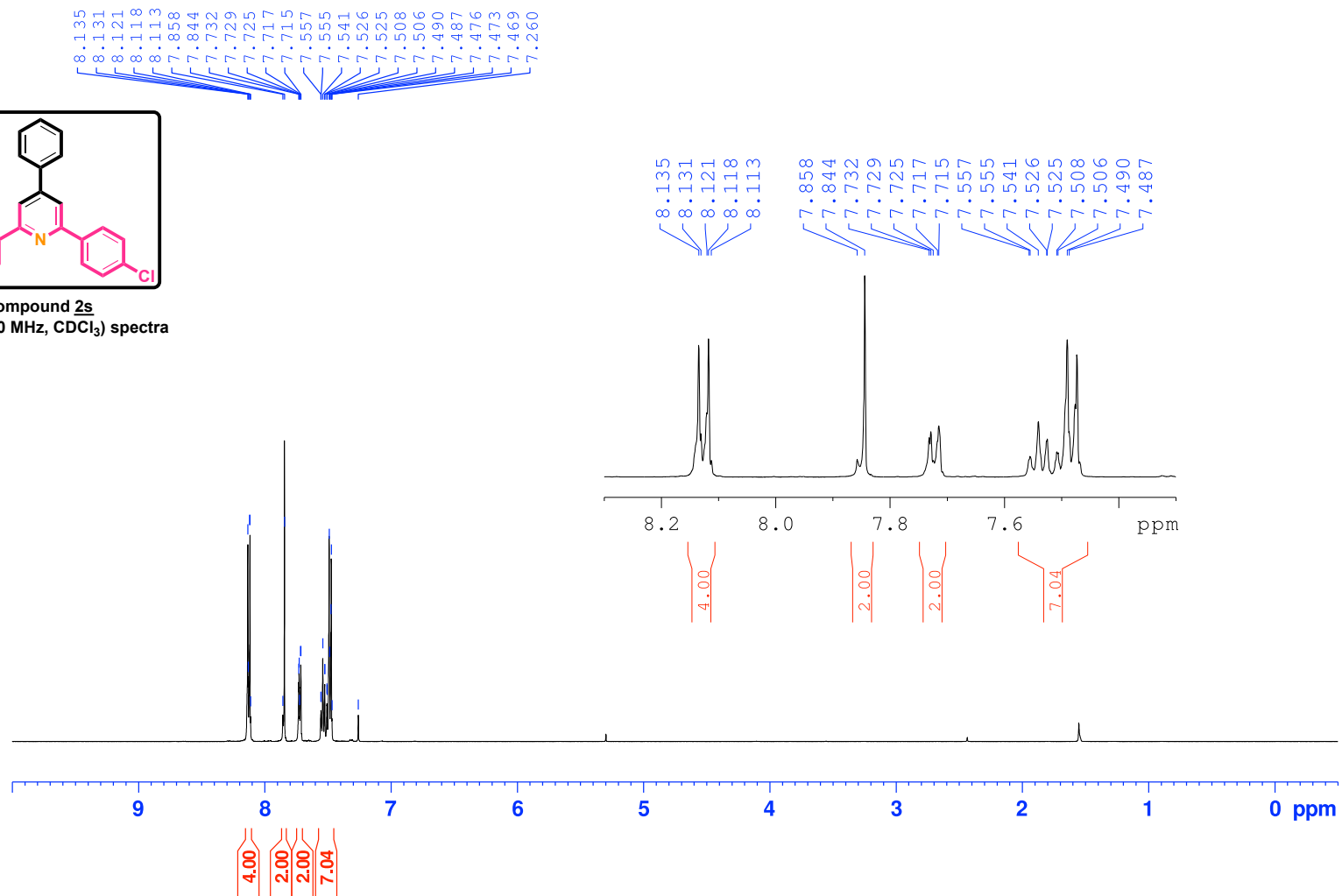


Compound 2s

1H YHC-304 tmsotf recrystal 0325

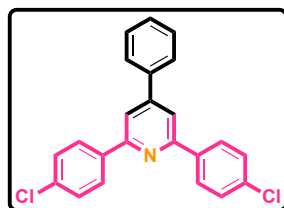


Compound 2s
¹H NMR (500 MHz, CDCl₃) spectra



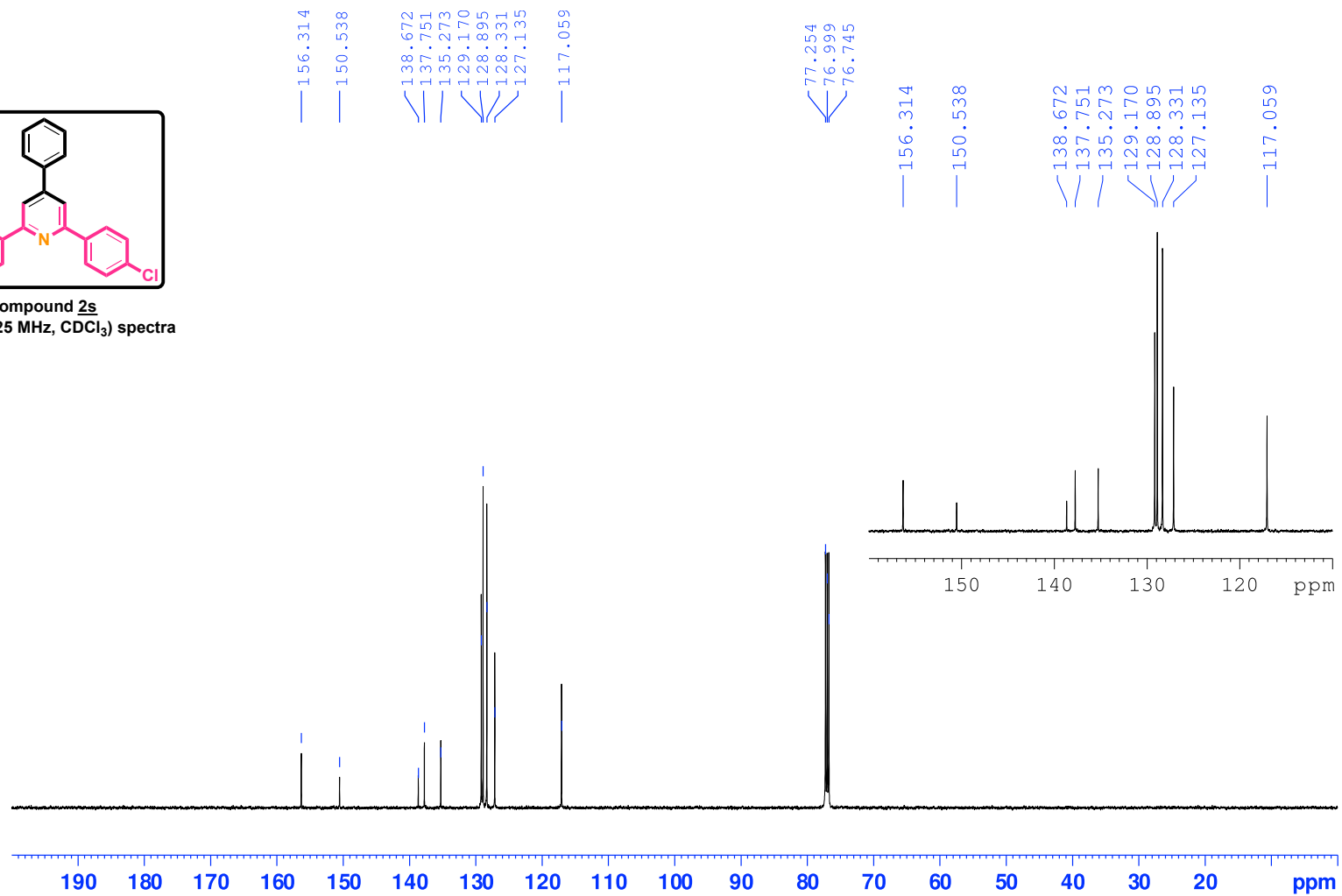
Compound 2s

13C YHC-304 tmsotf recrystal 0325



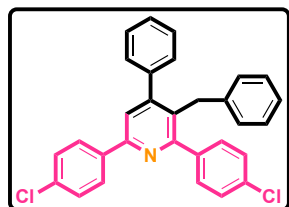
Compound 2s

¹³C NMR (125 MHz, CDCl₃) spectra



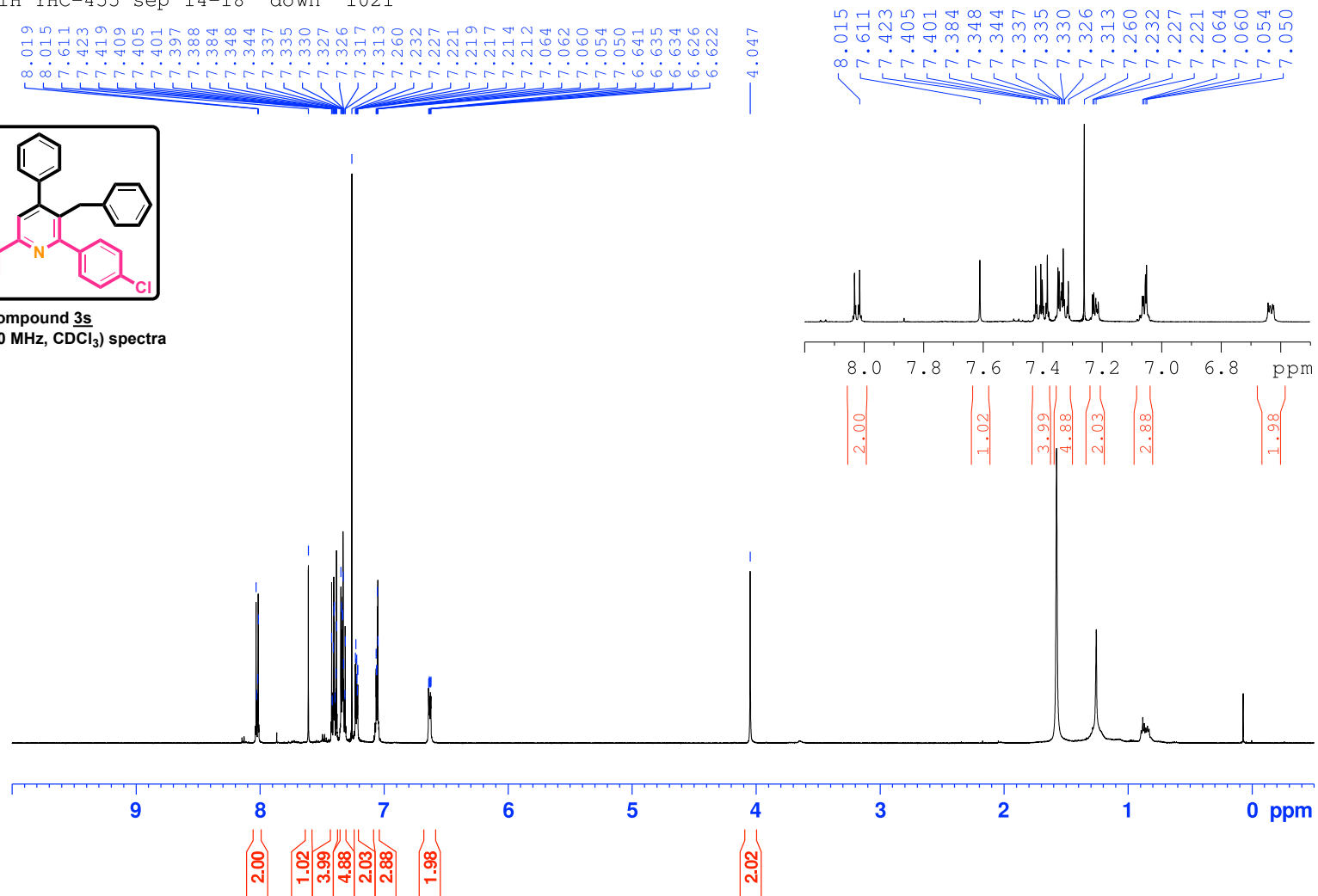
Compound 3s

1H YHC-455 sep 14-18 down 1021



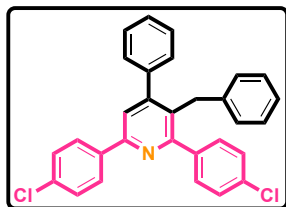
Compound 3s

¹H NMR (500 MHz, CDCl₃) spectra



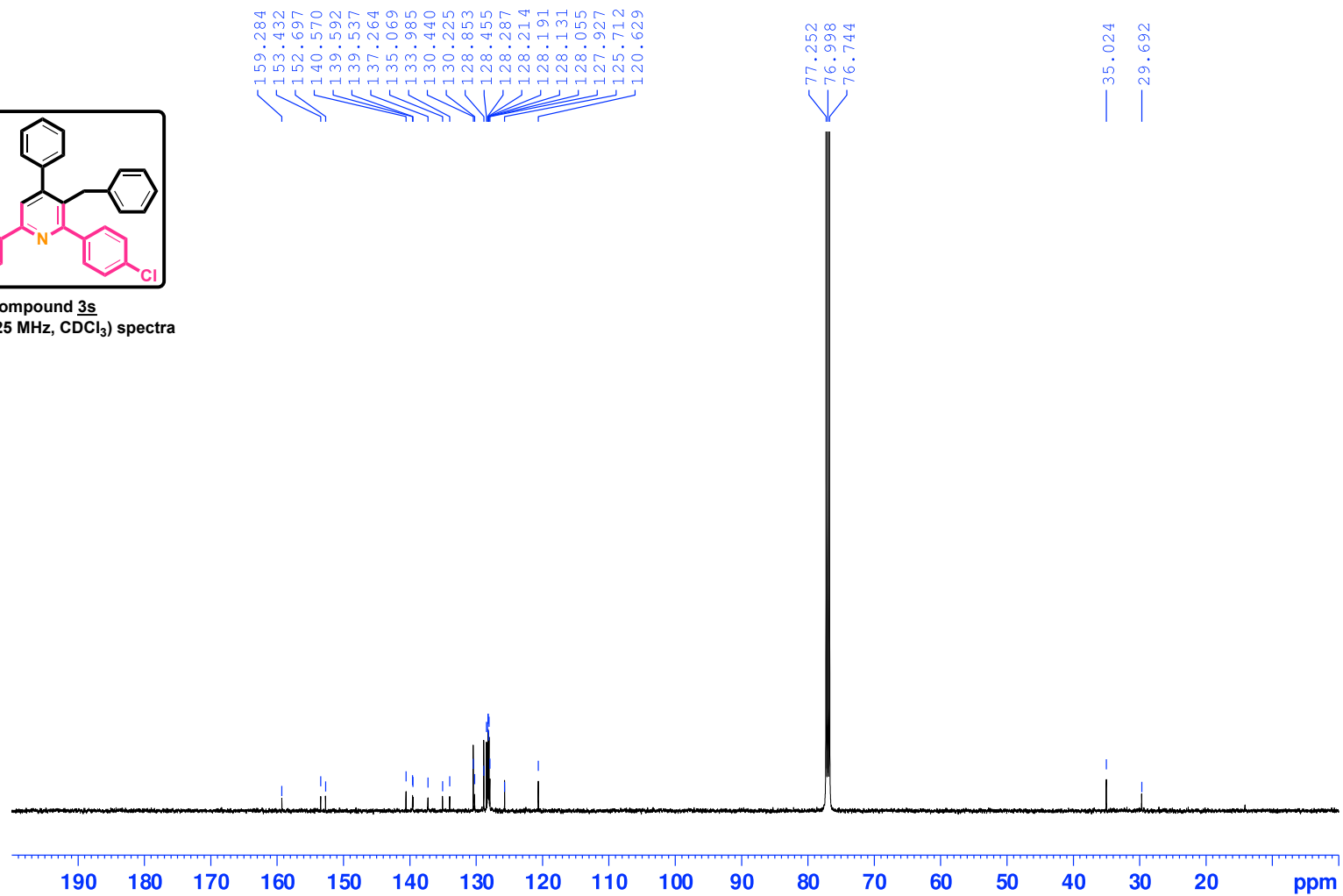
Compound 3s

13C YHC-455 sep 14-18 down 1021



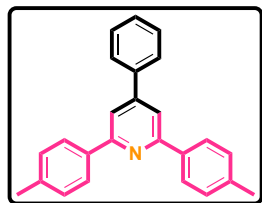
Compound 3s

¹³C NMR (125 MHz, CDCl₃) spectra

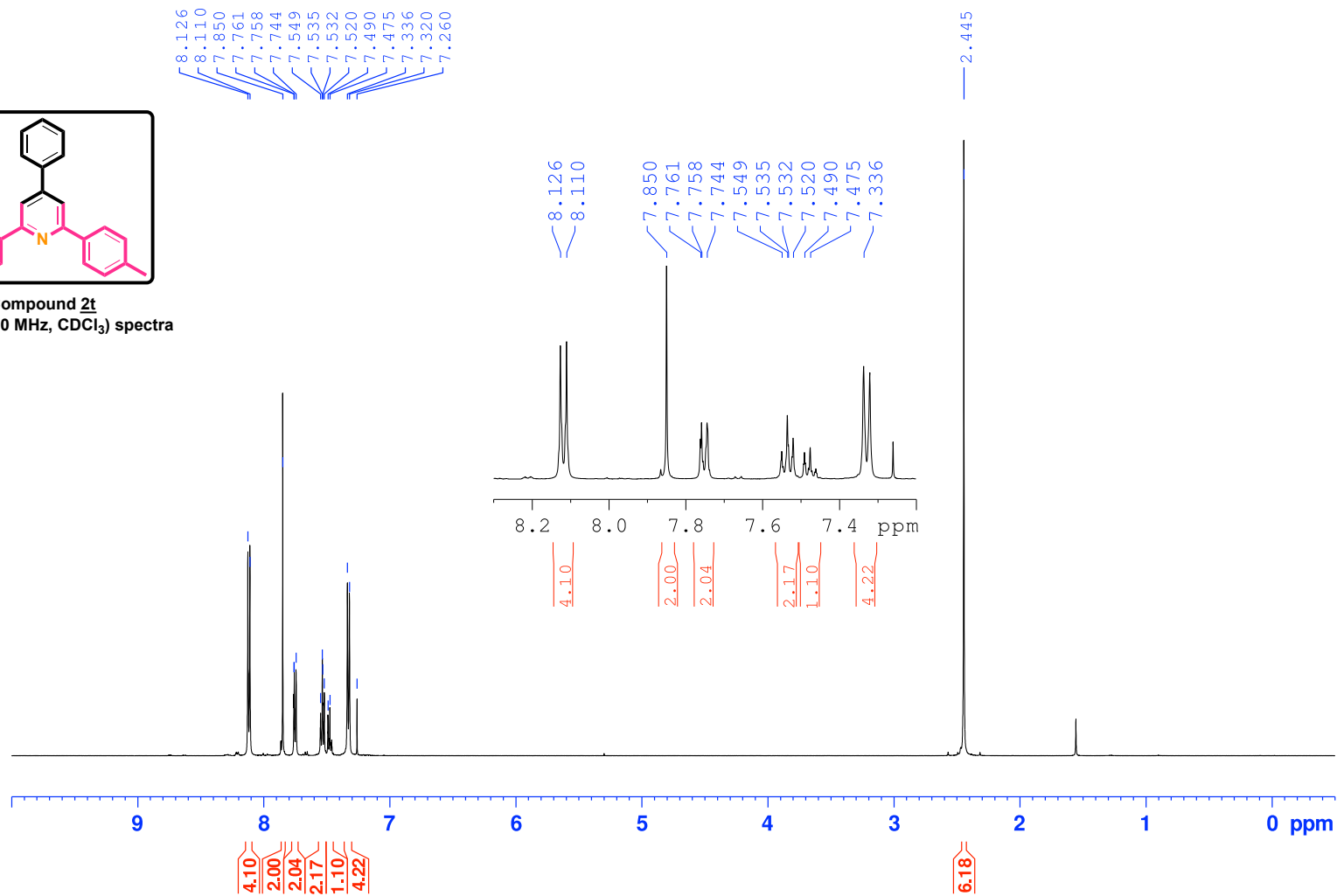


Compound 2t

1H YHC-302 tmsotf data 0325

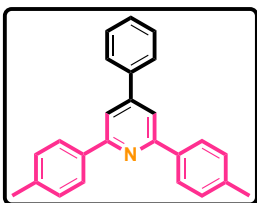


Compound 2t
¹H NMR (500 MHz, CDCl₃) spectra

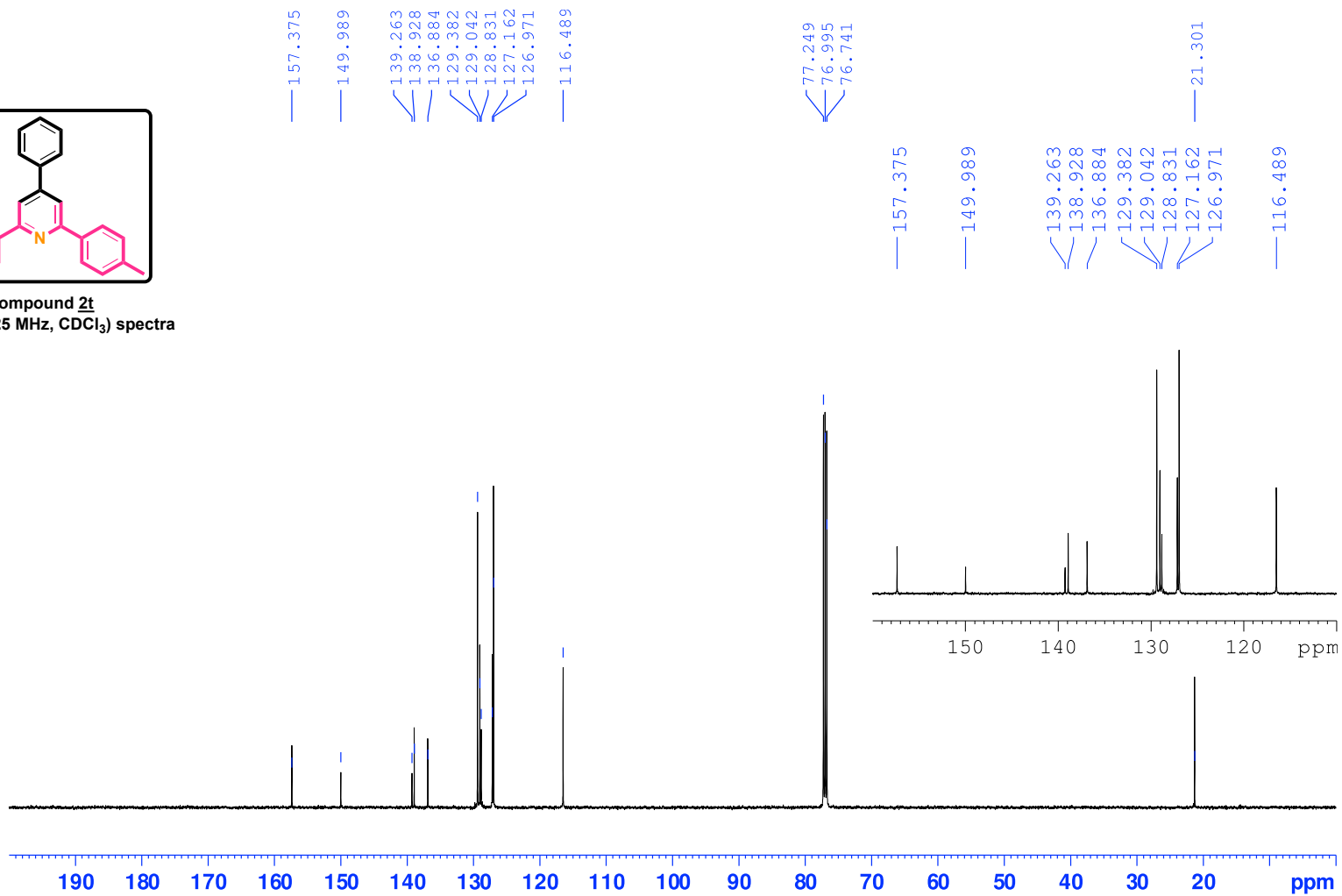


Compound 2t

¹³C YHC-302 tmsotf data 0325

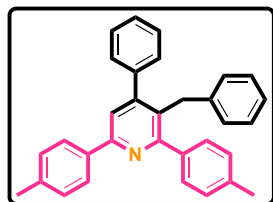


Compound 2t
¹³C NMR (125 MHz, CDCl₃) spectra

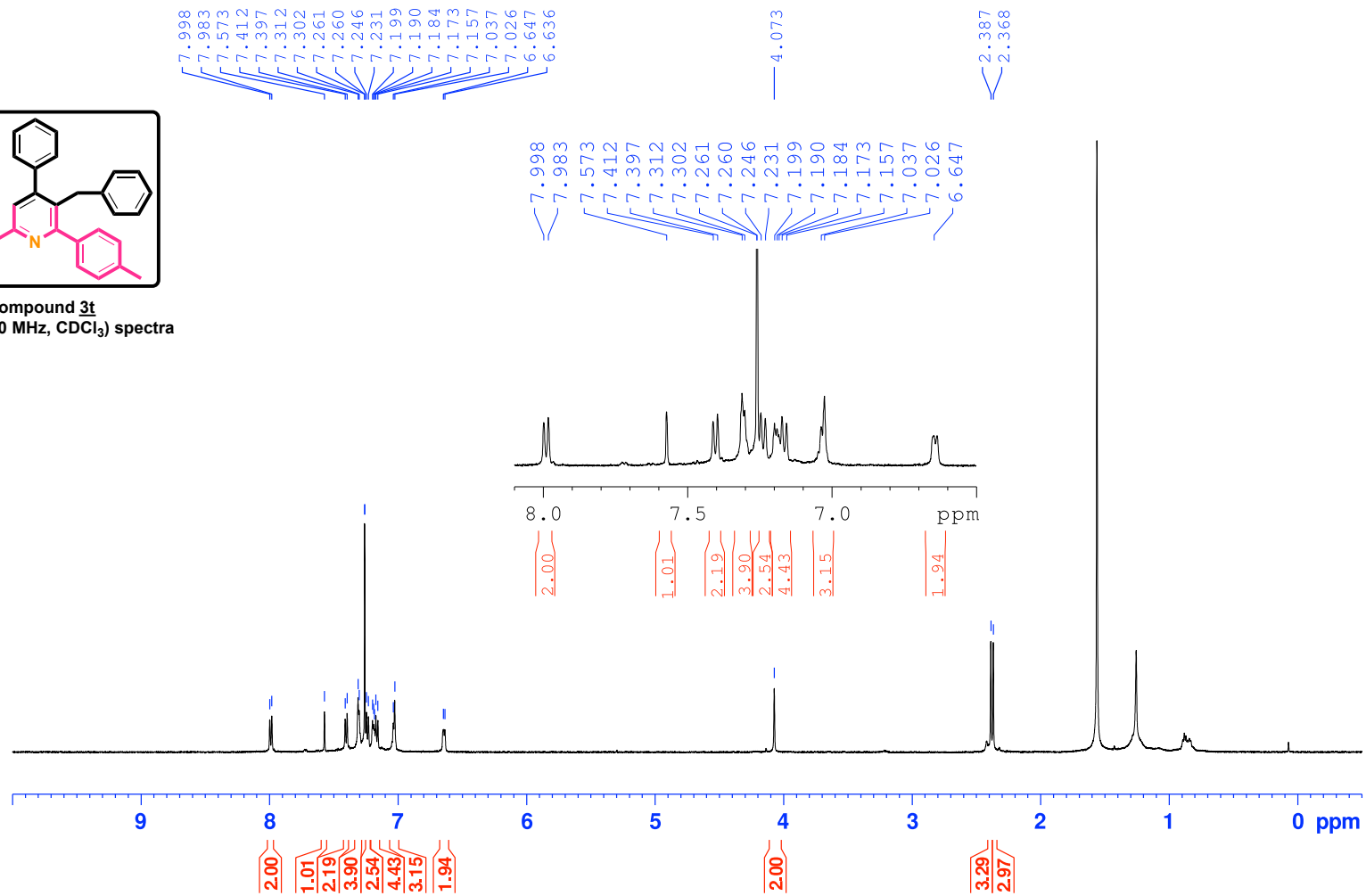


Compound 3t

1H YHC-452-2 sep 73-75 down 1026

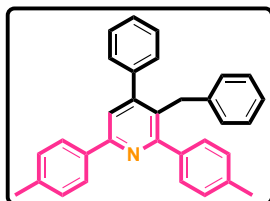


Compound 3t
¹H NMR (500 MHz, CDCl₃) spectra

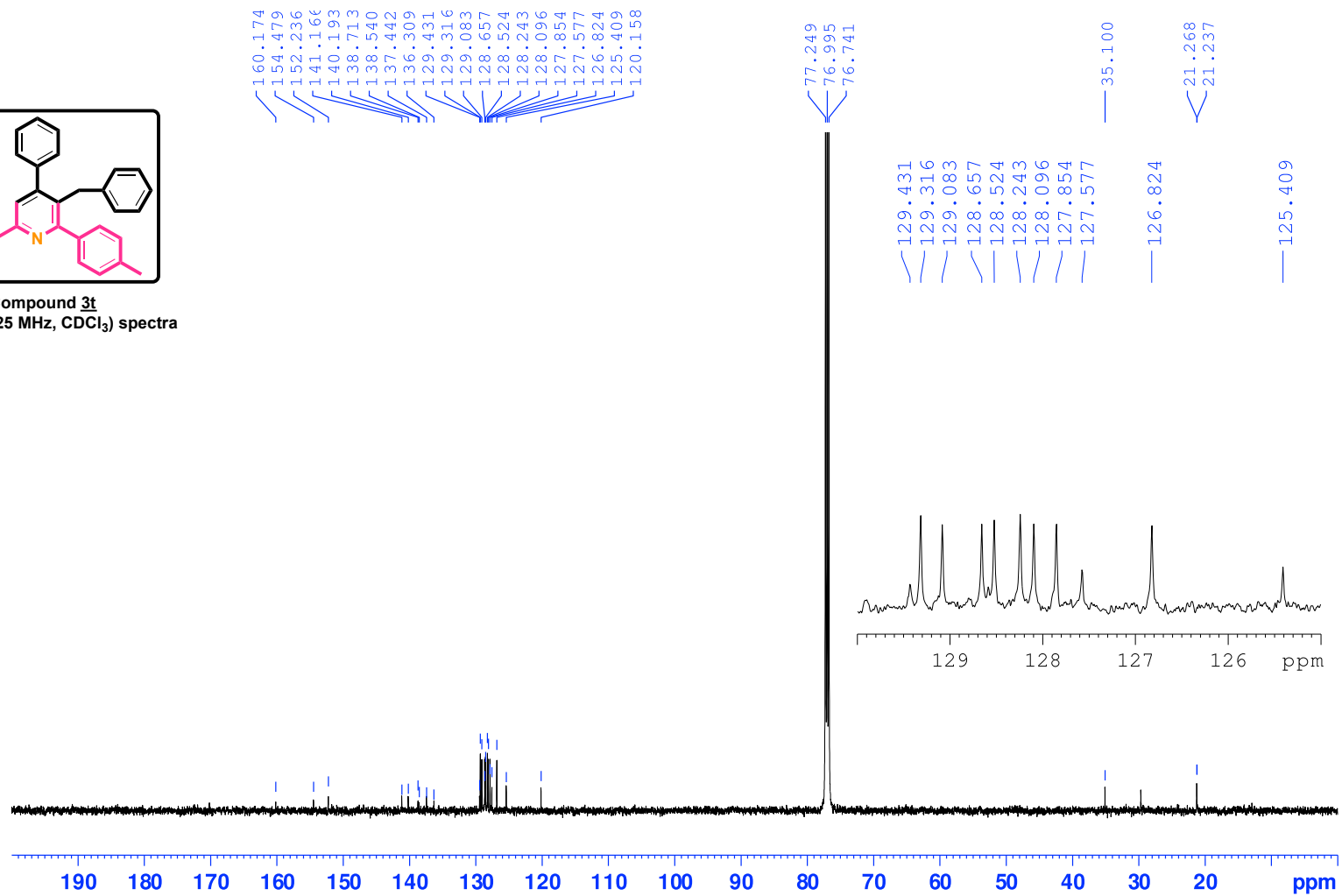


Compound 3t

13C YHC-452-2 sep 73-75 down 1026

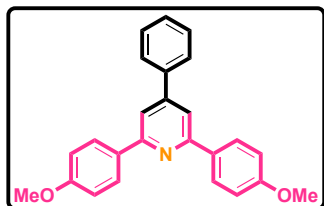


Compound 3t
¹³C NMR (125 MHz, CDCl₃) spectra

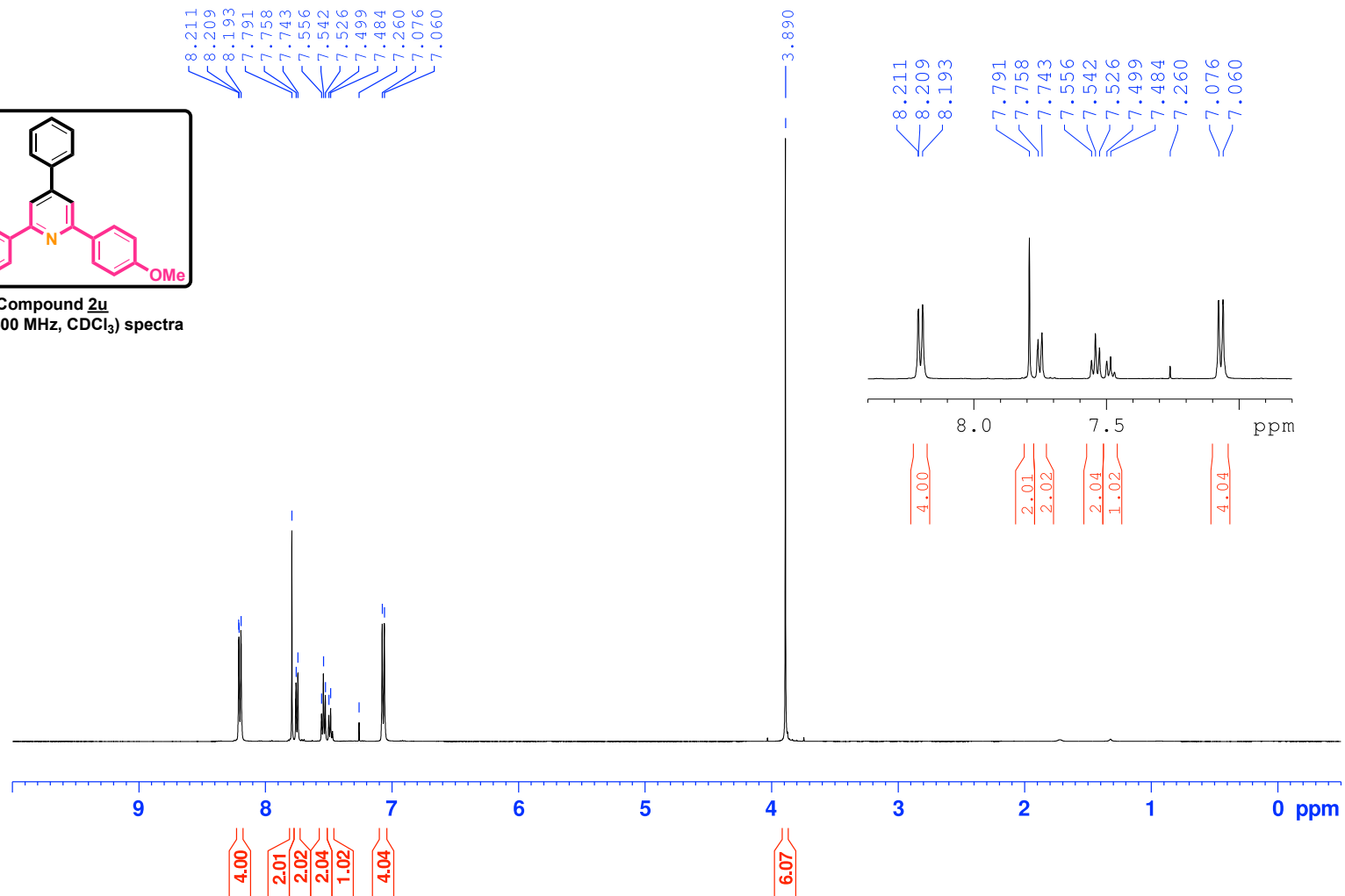


Compound 2u

1H YHC-086 sep36-38 0126

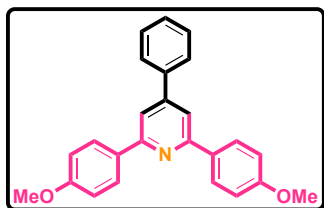


Compound 2u
1H NMR (500 MHz, CDCl₃) spectra

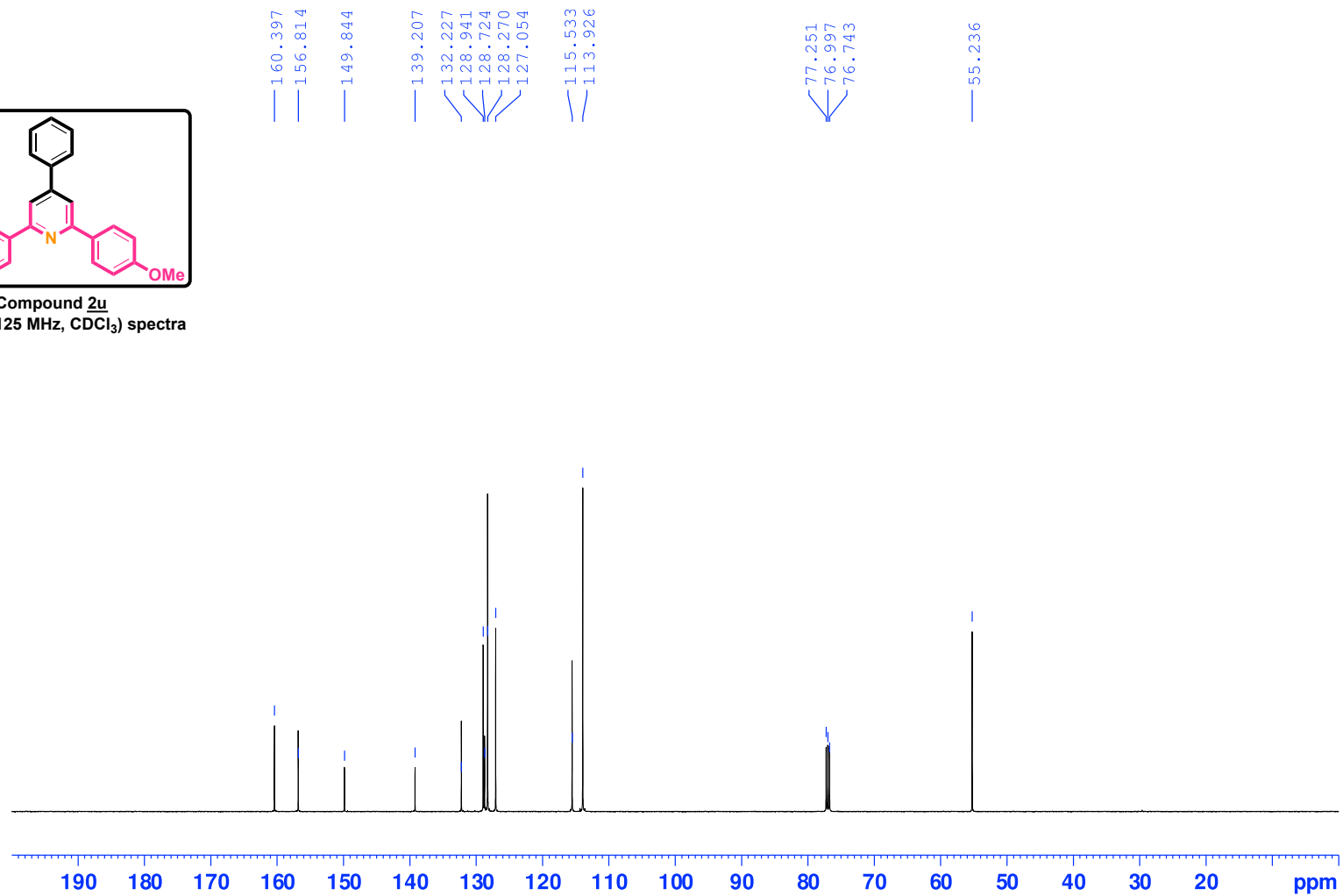


Compound 2u

13C YHC-086 sep36-38 0126

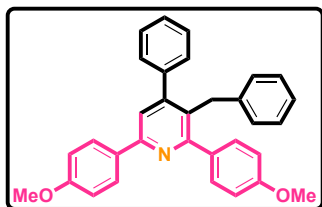


Compound 2u
¹³C NMR (125 MHz, CDCl₃) spectra

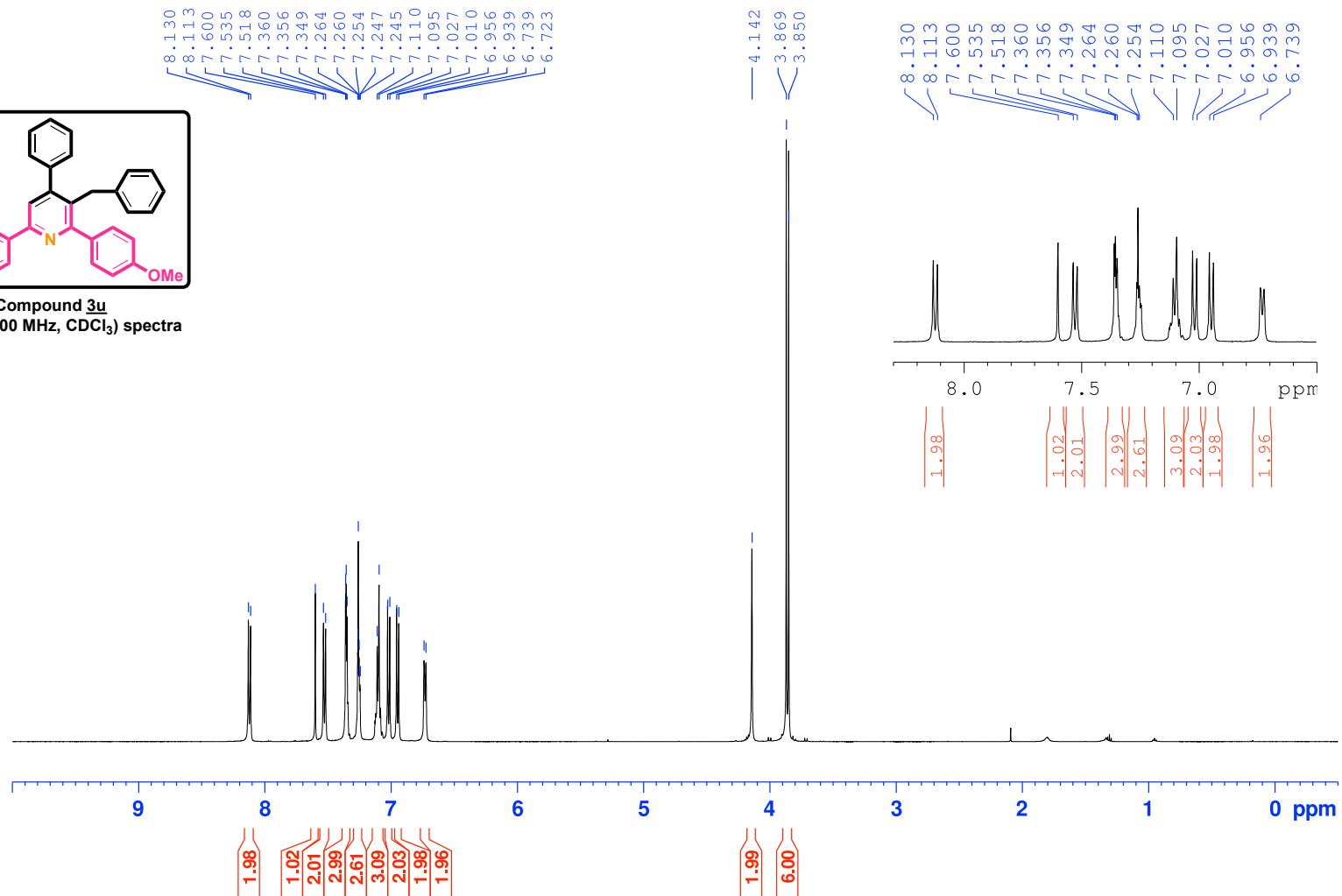


Compound 3u

1H YHC-087 sep46-48 down 0128

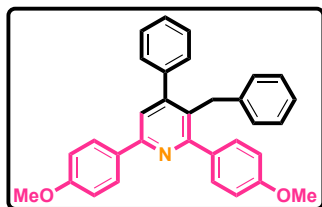


Compound 3u
1H NMR (500 MHz, CDCl₃) spectra

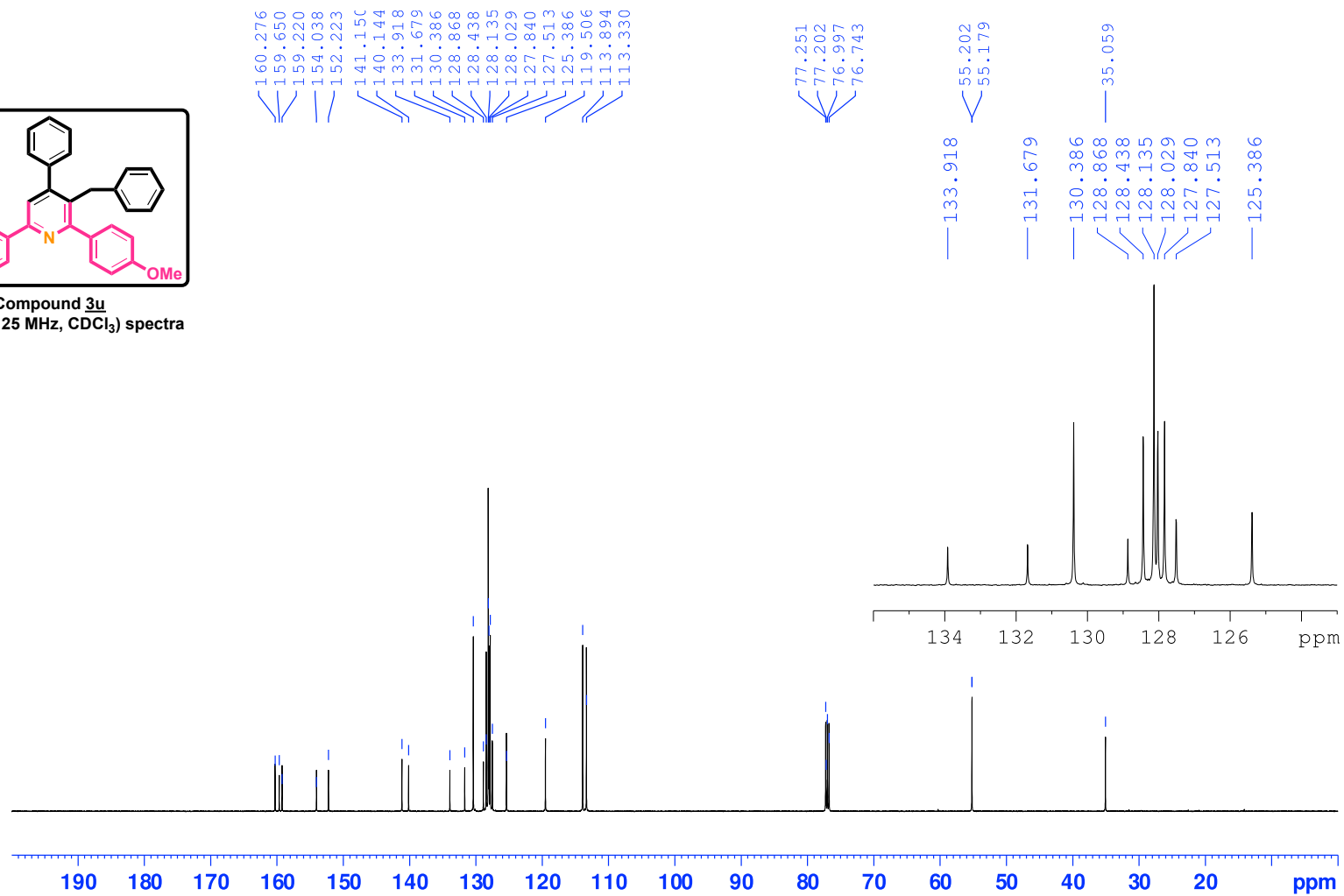


Compound 3u

13C YHC-087 sep46-48 down 0128

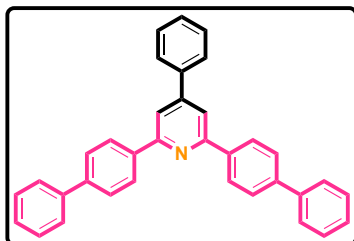


Compound 3u
¹³C NMR (125 MHz, CDCl₃) spectra

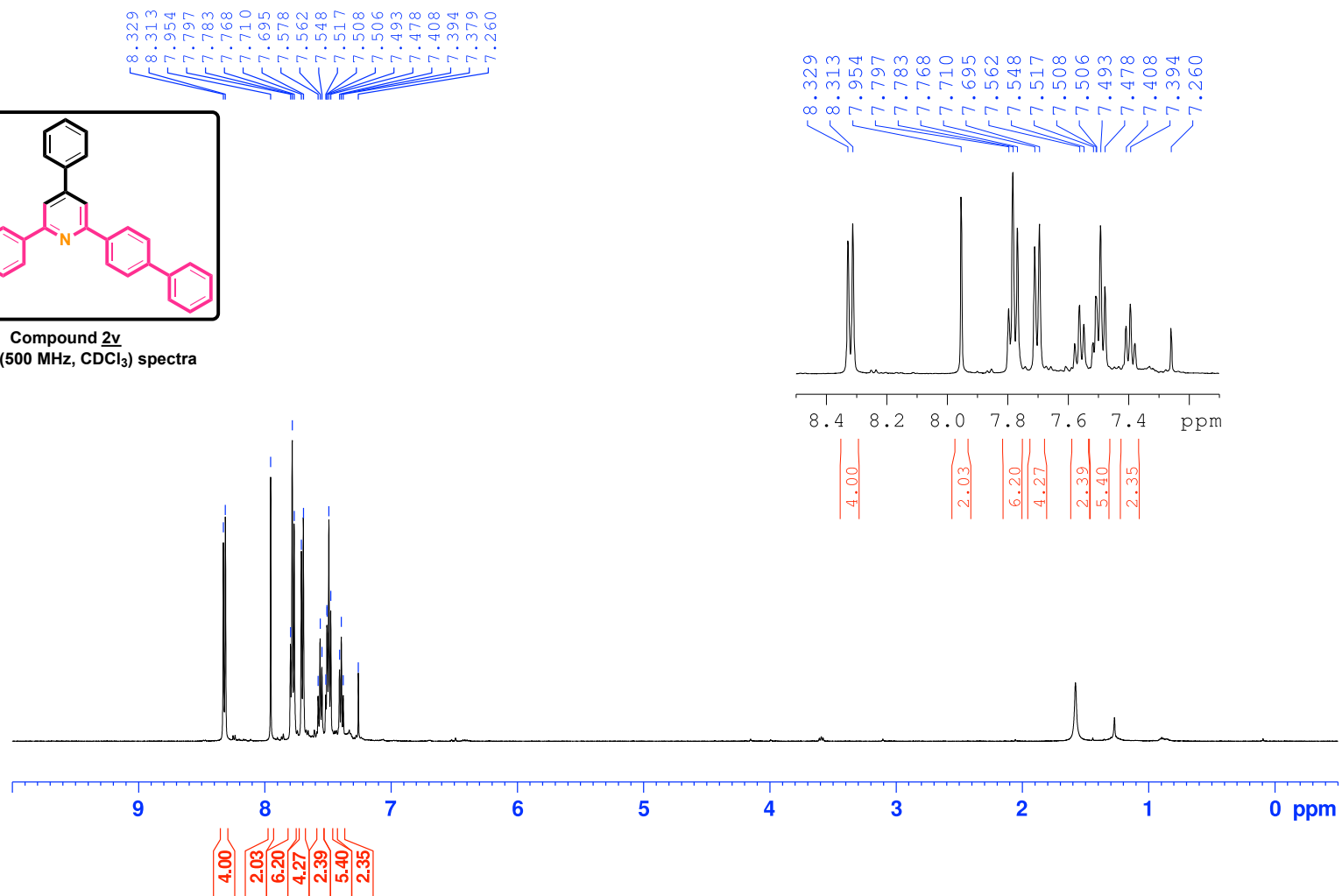


Compound 2v

1H YHC-453-2 sep 5657 top 1101

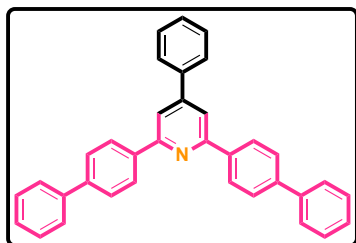


Compound 2v
¹H NMR (500 MHz, CDCl₃) spectra



Compound 2v

13C YHC-453-2 sep 5657 top 1101



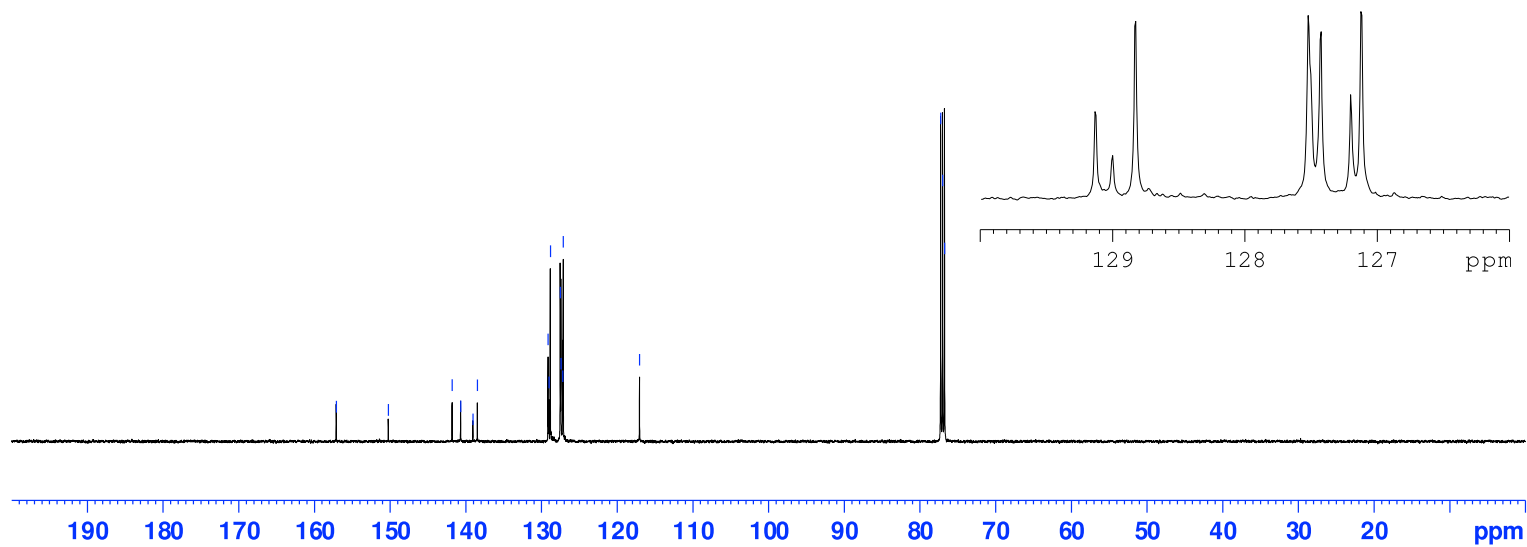
Compound 2v
¹³C NMR (125 MHz, CDCl₃) spectra

157.115
150.232
141.806
140.681
139.061
138.468
129.130
129.002
128.828
127.521
127.428
127.200
127.121
117.040

77.253
76.999
76.745

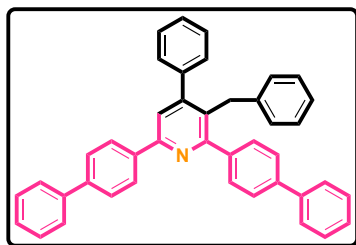
129.130
129.002
128.828

127.521
127.428
127.200
127.121

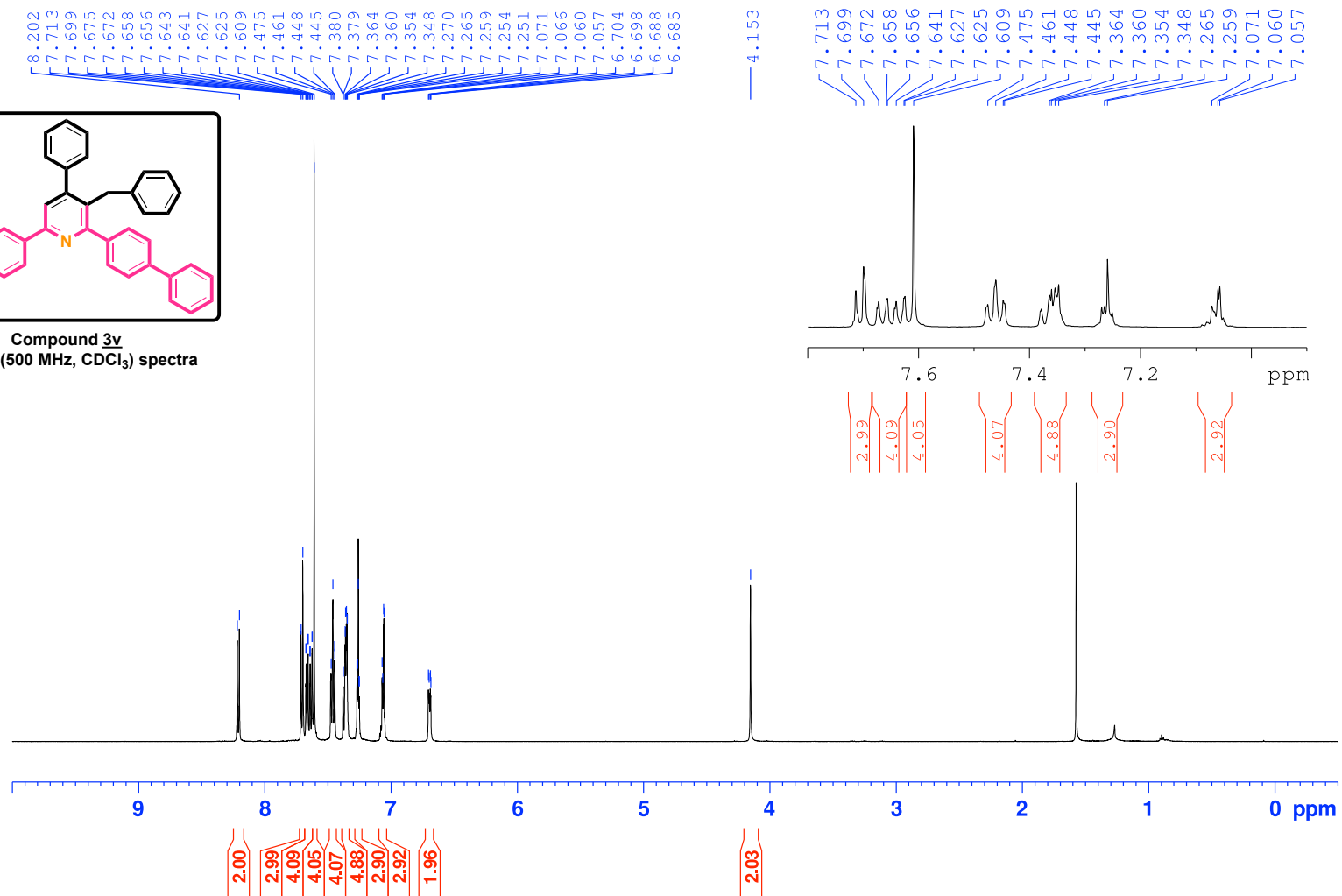


Compound 3v

1H YHC-453-2 sep 6566 down 1103

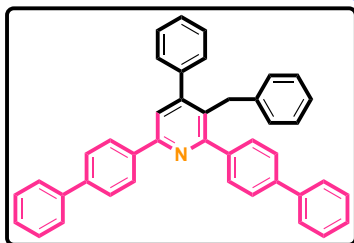


Compound 3v
¹H NMR (500 MHz, CDCl₃) spectra

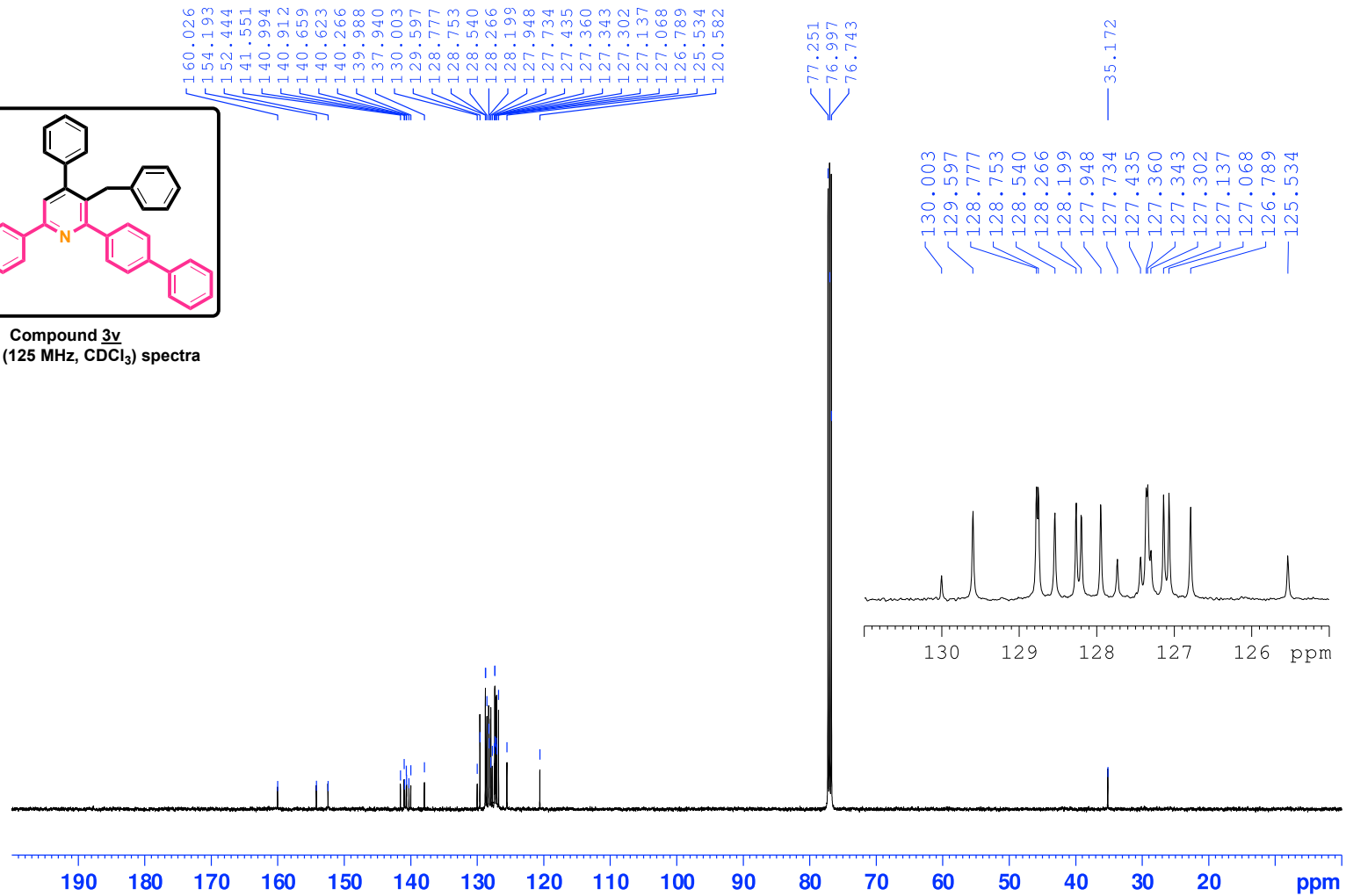


Compound 3v

13C YHC-453-2 sep 6566 down 1103

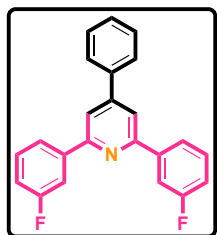


Compound 3v
¹³C NMR (125 MHz, CDCl₃) spectra

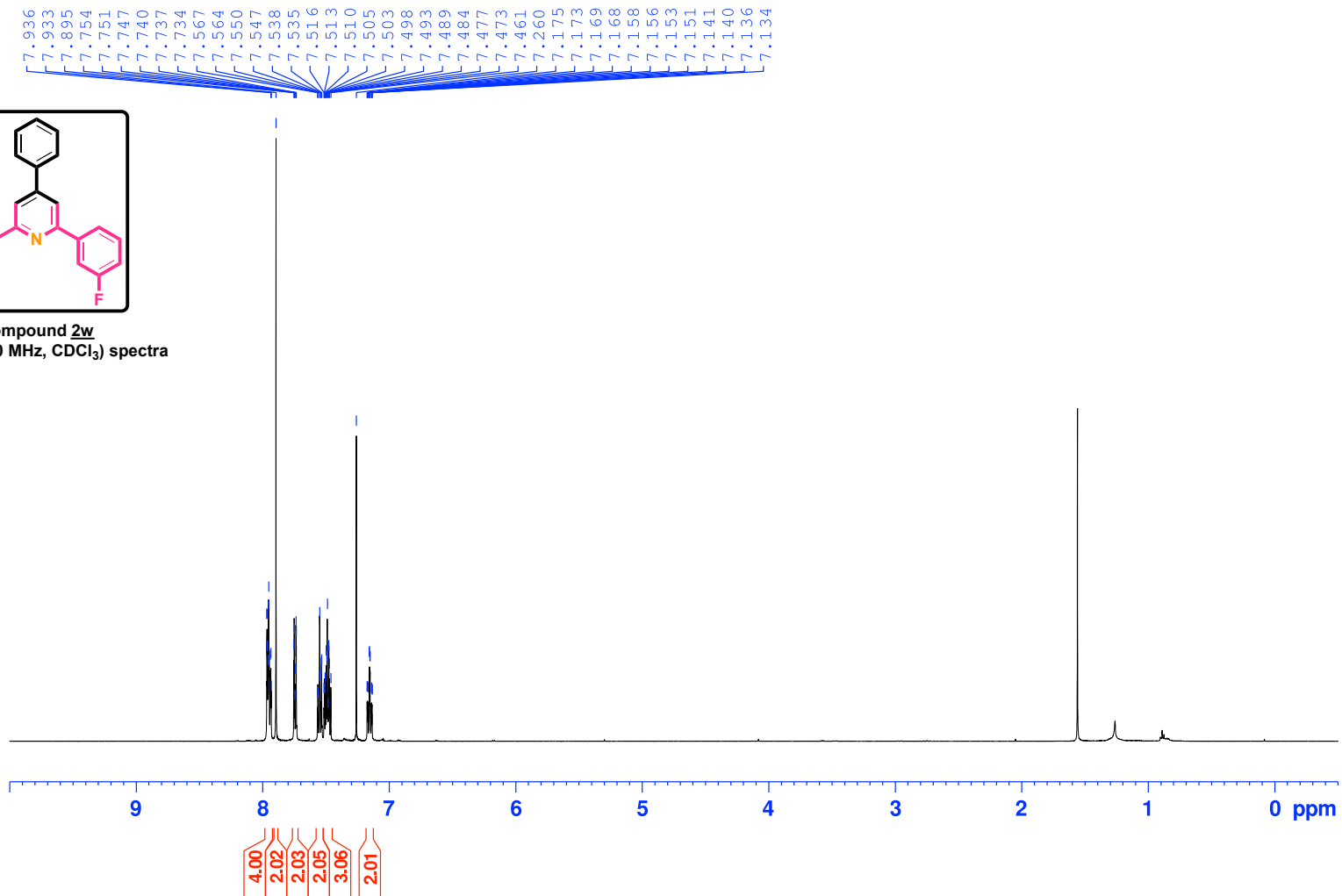


Compound 2w

1H YHC-456 sep 2425 top 1014

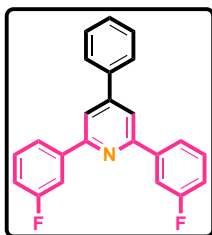


Compound 2w
¹H NMR (500 MHz, CDCl₃) spectra



Compound 2w

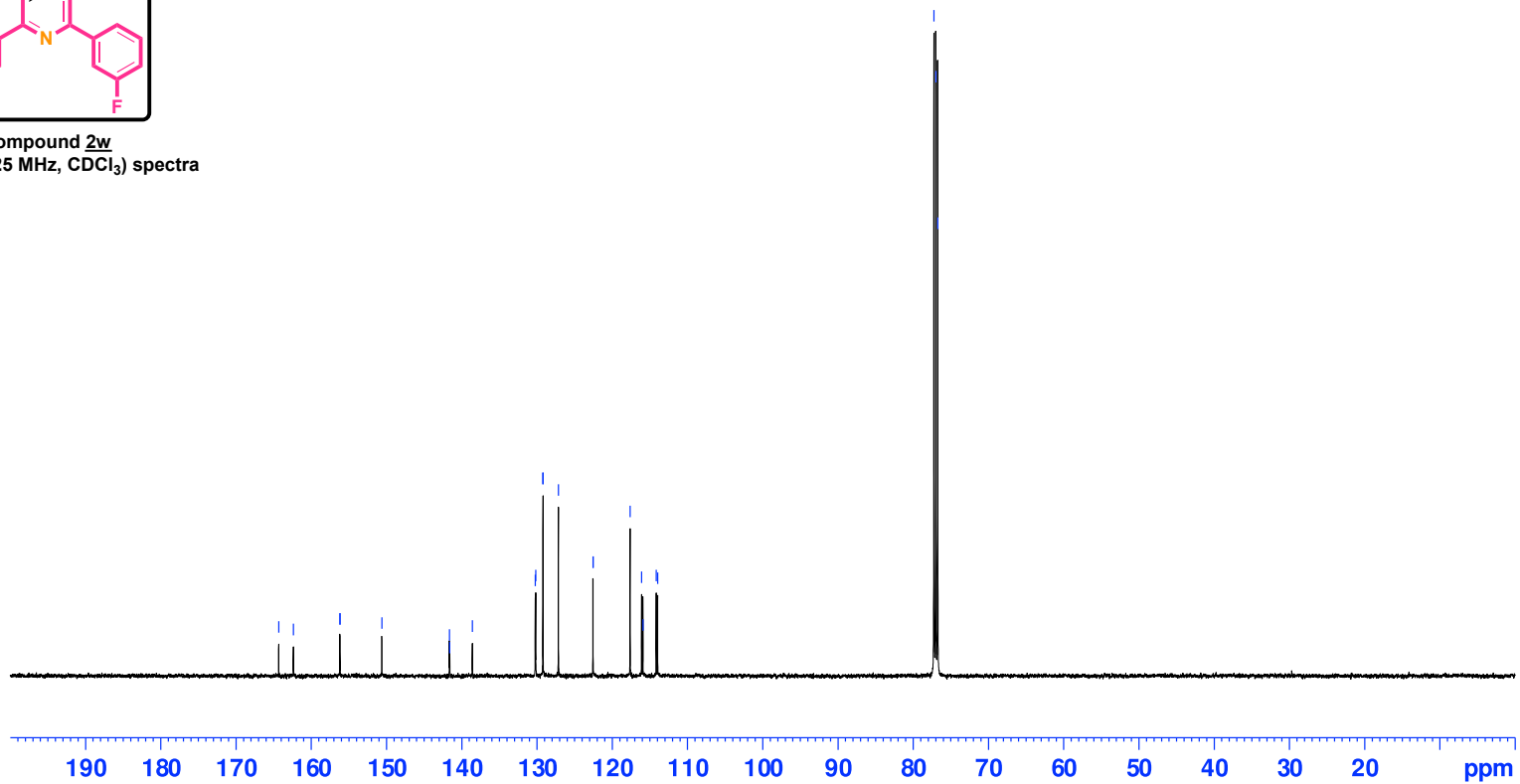
13C YHC-456 sep 2425 top 1014



Compound 2w
¹³C NMR (125 MHz, CDCl₃) spectra

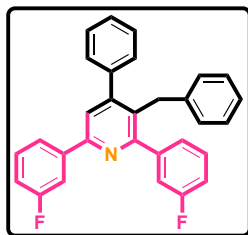
164.324
162.374
156.195
156.177
150.621
141.649
141.590
138.587
130.228
130.163
129.223
129.197
127.153
122.566
122.547
117.622
116.092
115.923
114.147
113.965

77.249
76.995
76.741

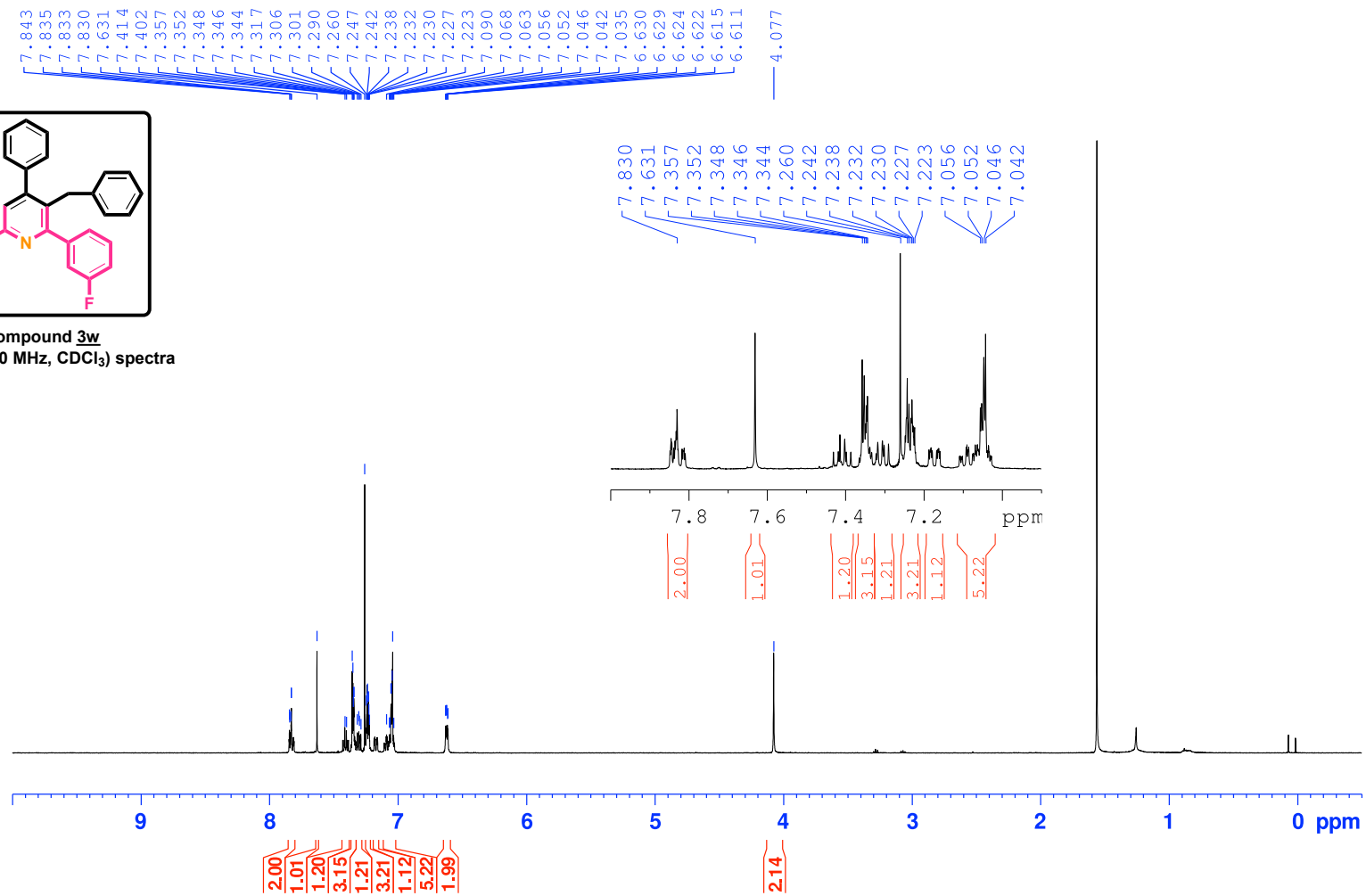


Compound 3w

1H YHC-456 sep 6566 down 1014

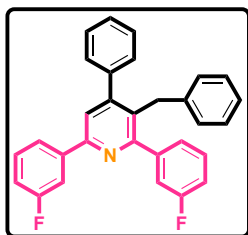


Compound 3w
¹H NMR (500 MHz, CDCl₃) spectra

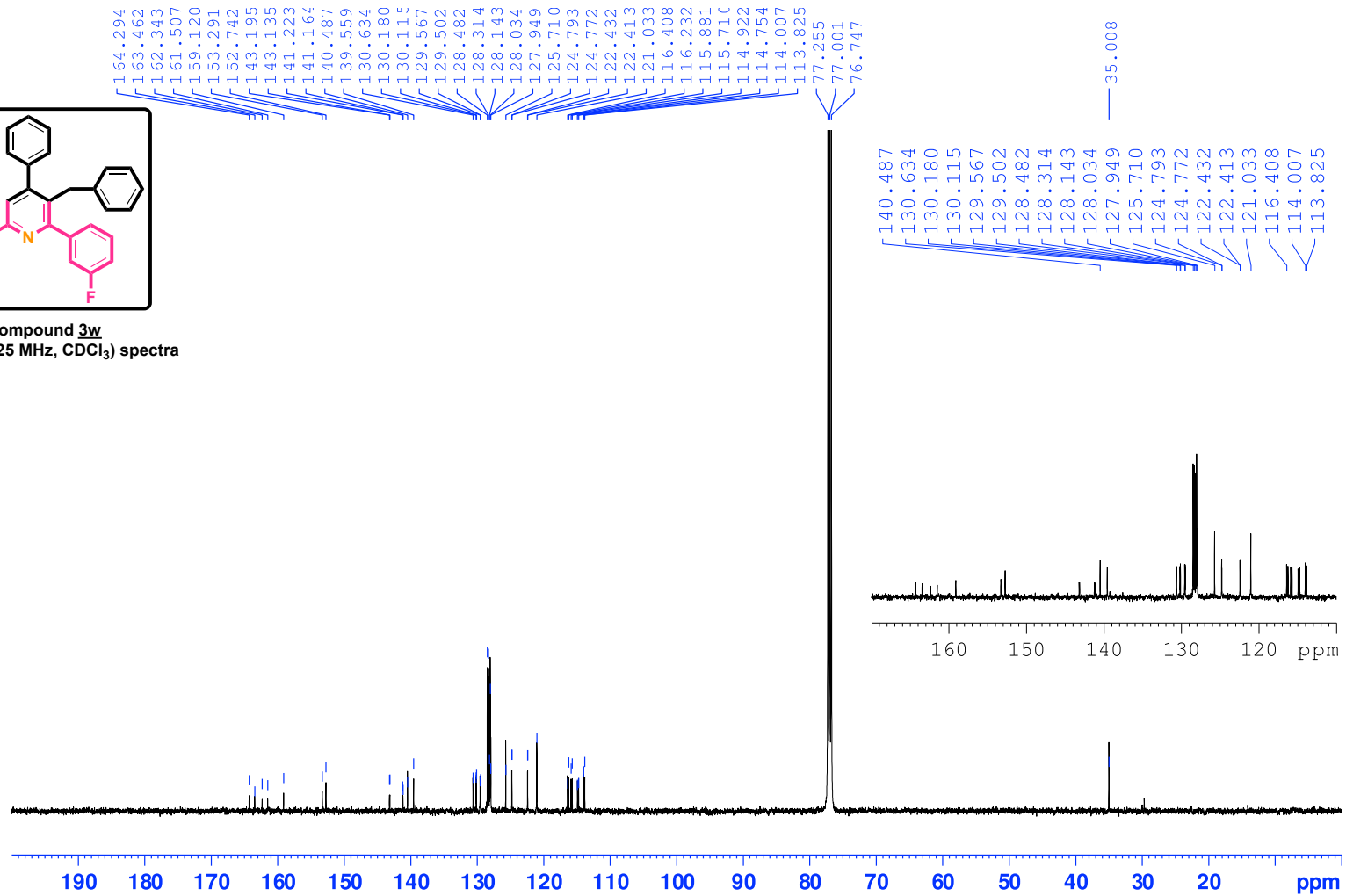


Compound 3w

13C YHC-456 sep 6566 down 1014

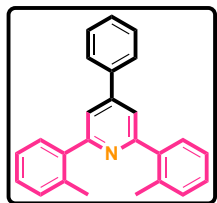


Compound 3w
¹³C NMR (125 MHz, CDCl₃) spectra

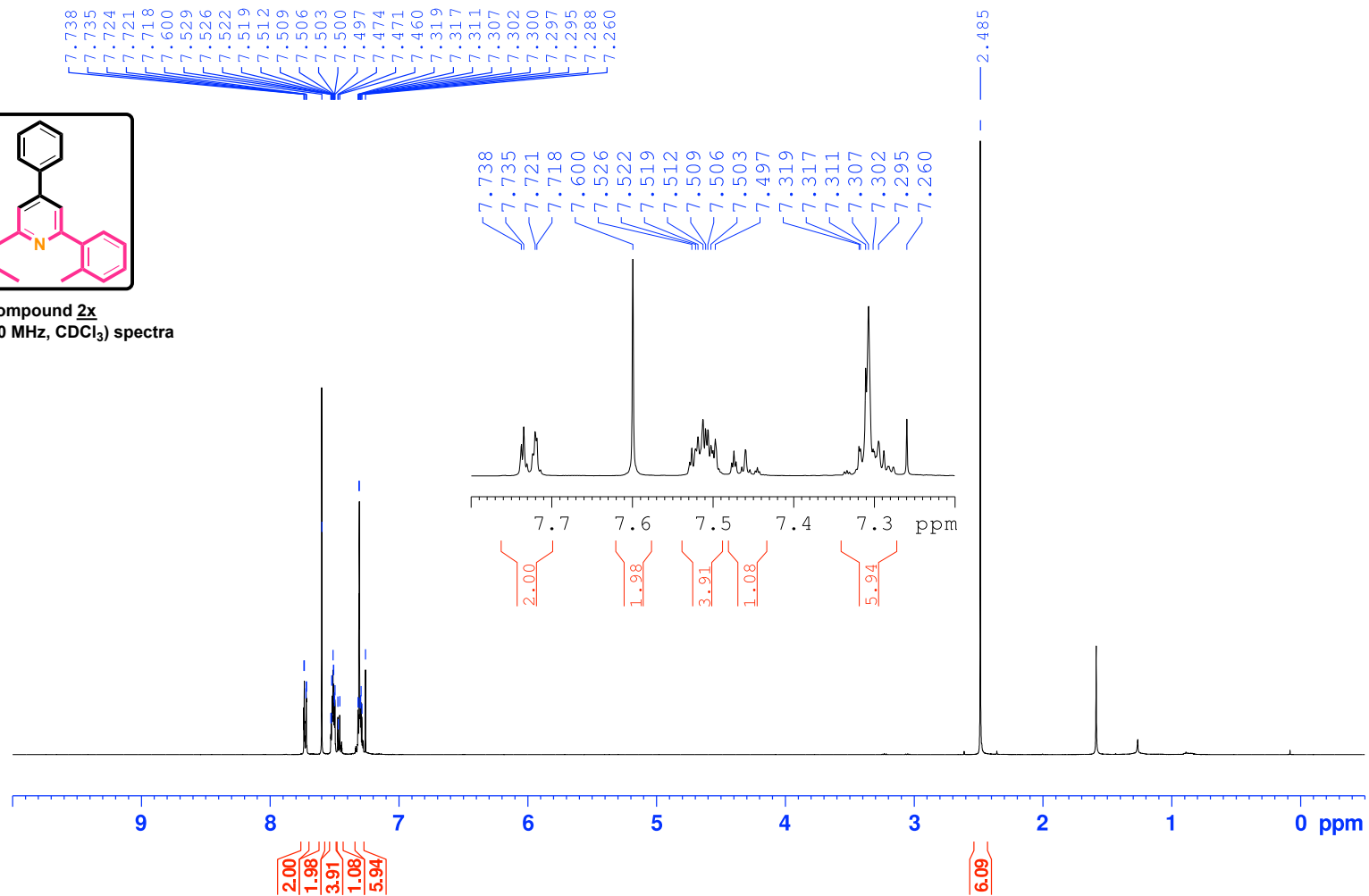


Compound 2x

1H YHC-459 sep 78-80 top 1013

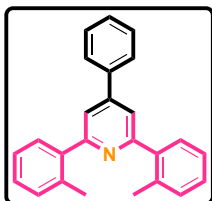


Compound 2x
¹H NMR (500 MHz, CDCl₃) spectra

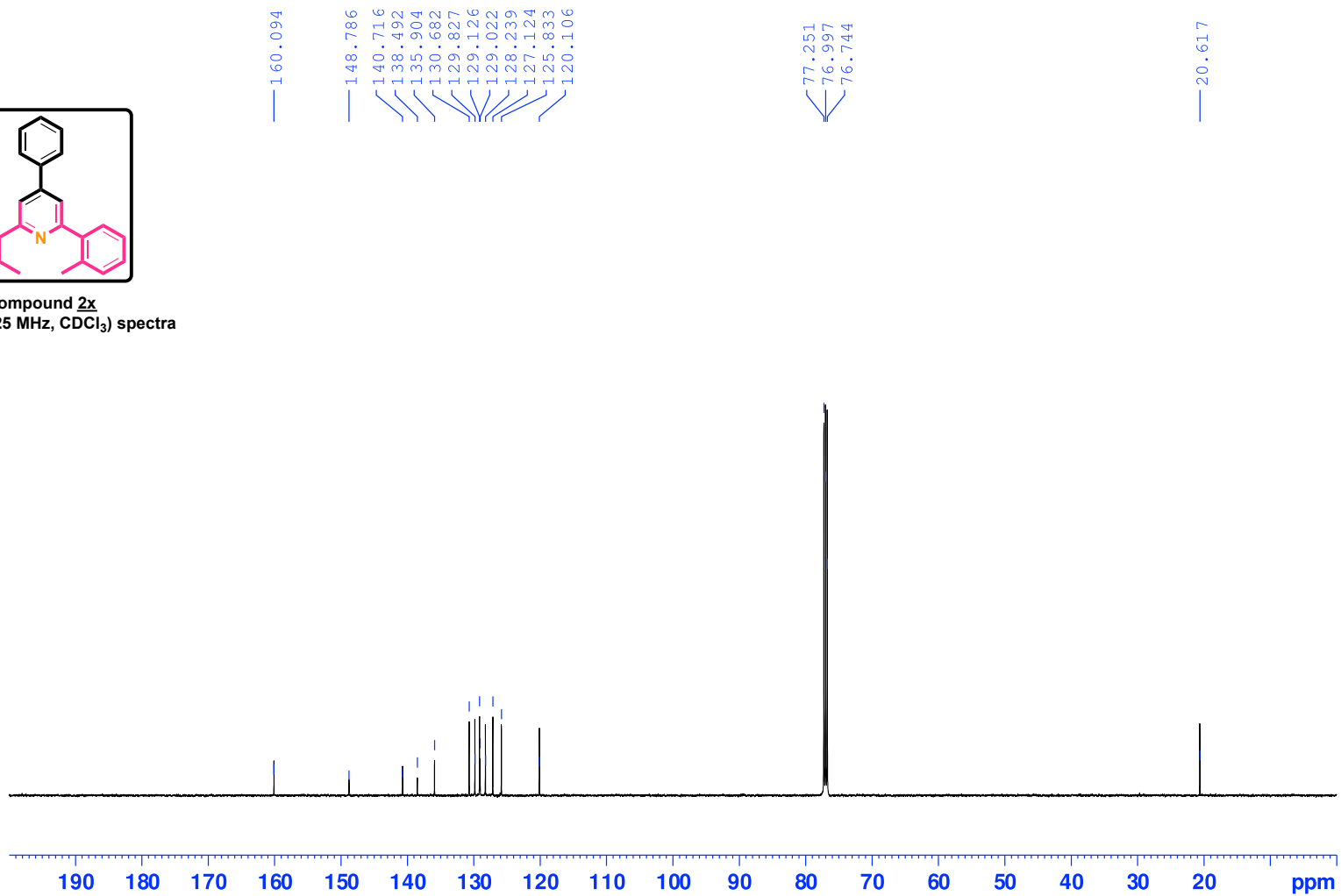


Compound 2x

13C YHC-459 sep 78-80 top 1013

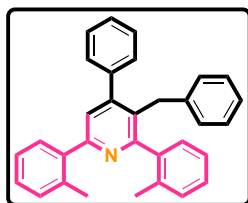


Compound 2x
¹³C NMR (125 MHz, CDCl₃) spectra

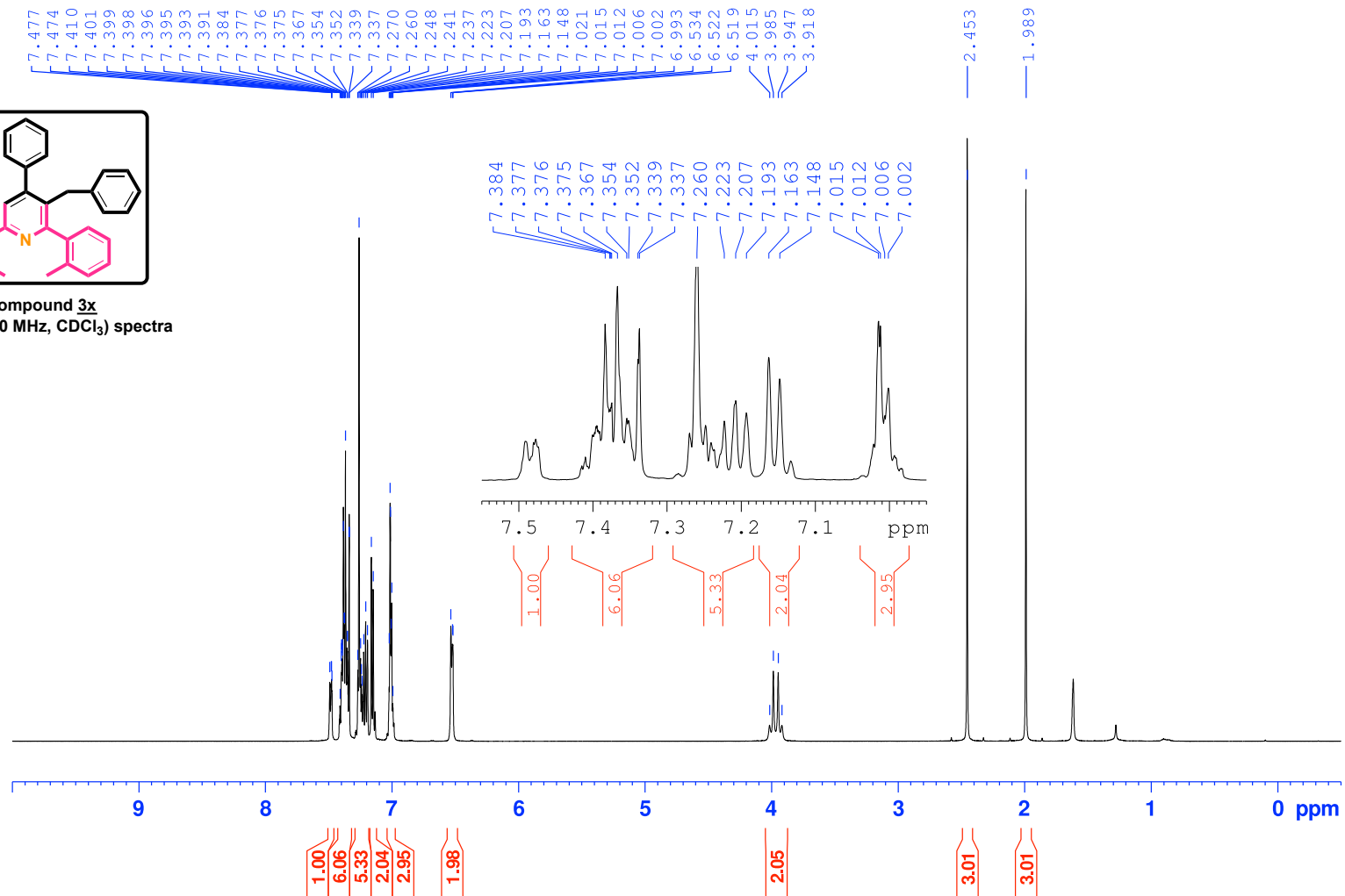


Compound 3x

1H YHC-459 sep 121122 down 1013

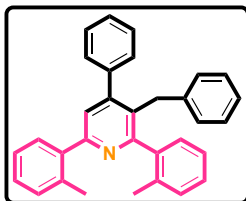


Compound 3x
¹H NMR (500 MHz, CDCl₃) spectra

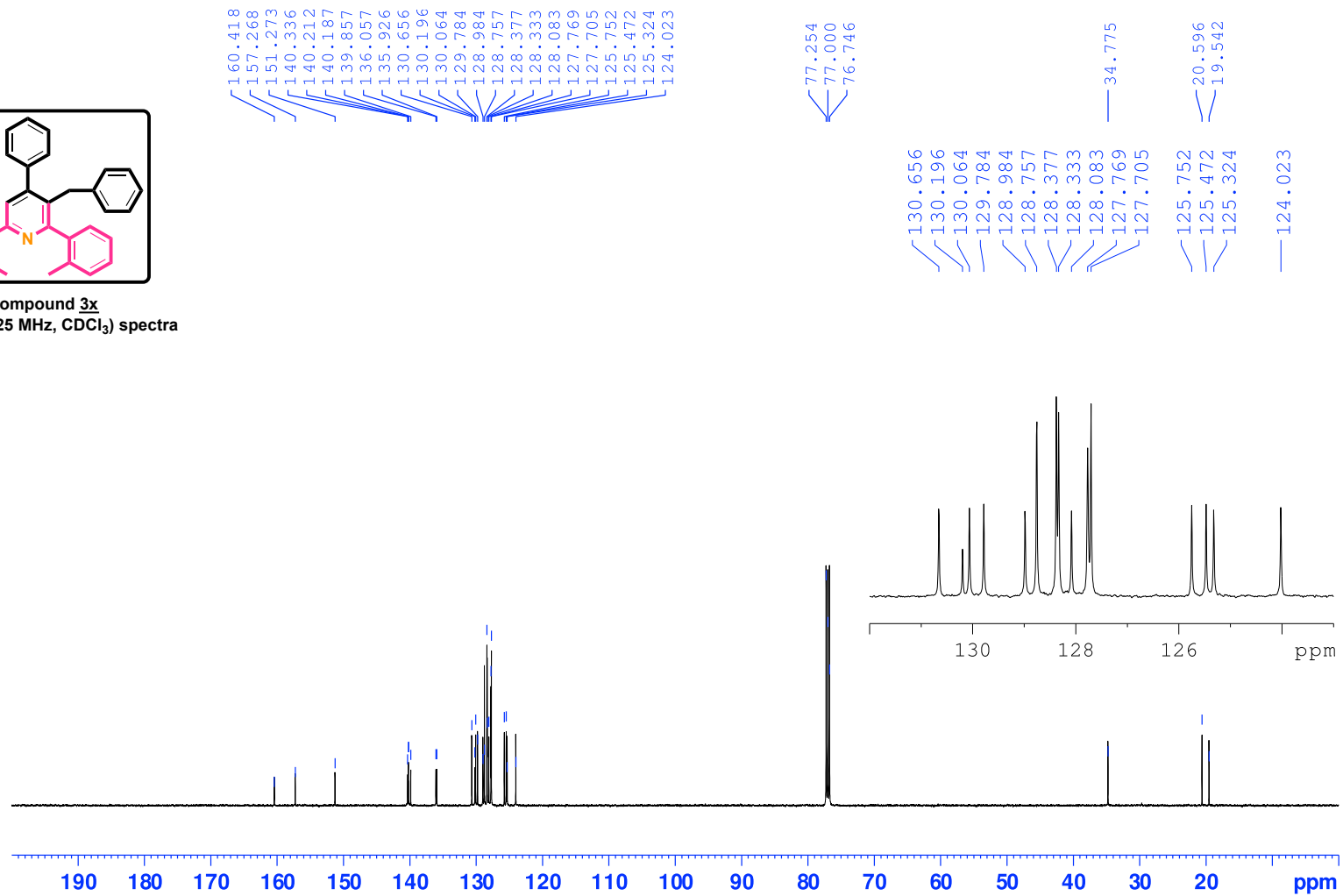


Compound 3x

13C YHC-459 sep 121122 down 1013

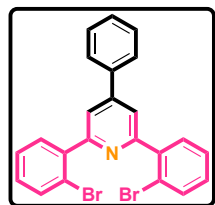


Compound 3x
¹³C NMR (125 MHz, CDCl₃) spectra

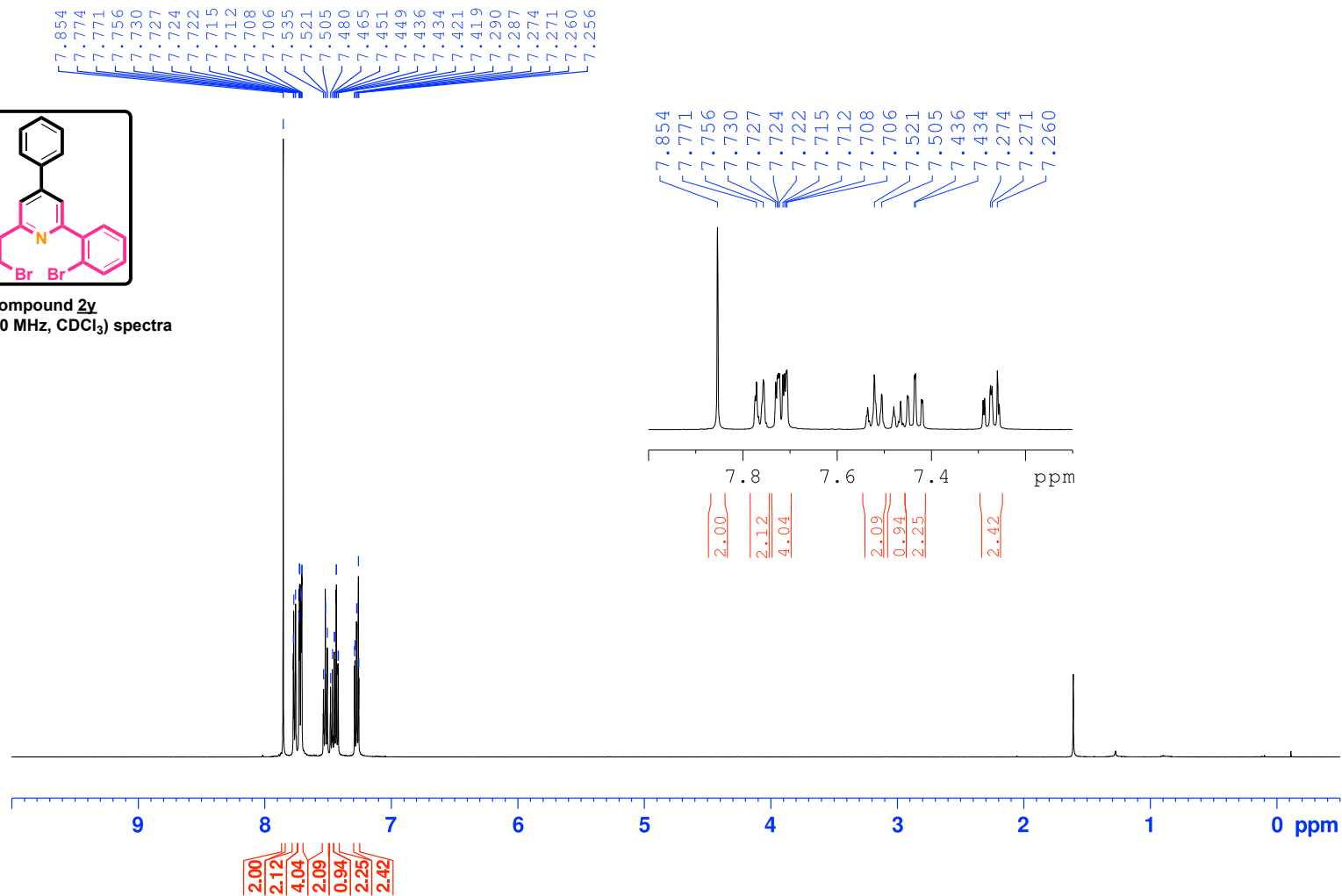


Compound 2y

1H YHC-462 sep 5859 top 1027

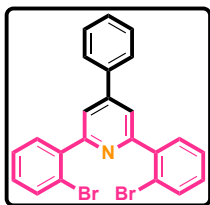


Compound 2y
¹H NMR (500 MHz, CDCl₃) spectra

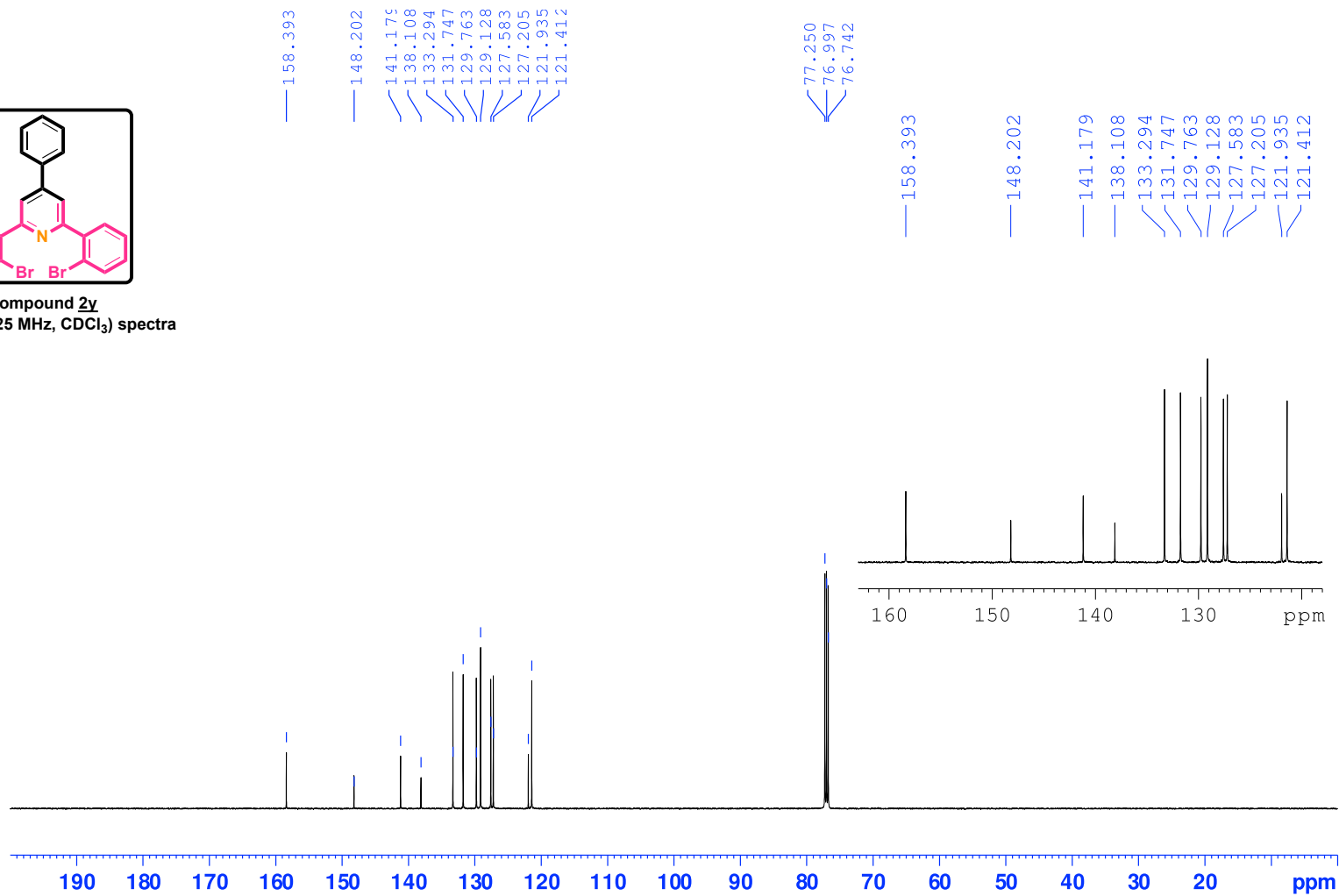


Compound 2y

13C YHC-462 sep 5859 top 1027

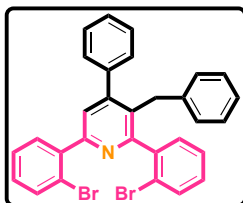


Compound 2y
¹³C NMR (125 MHz, CDCl₃) spectra

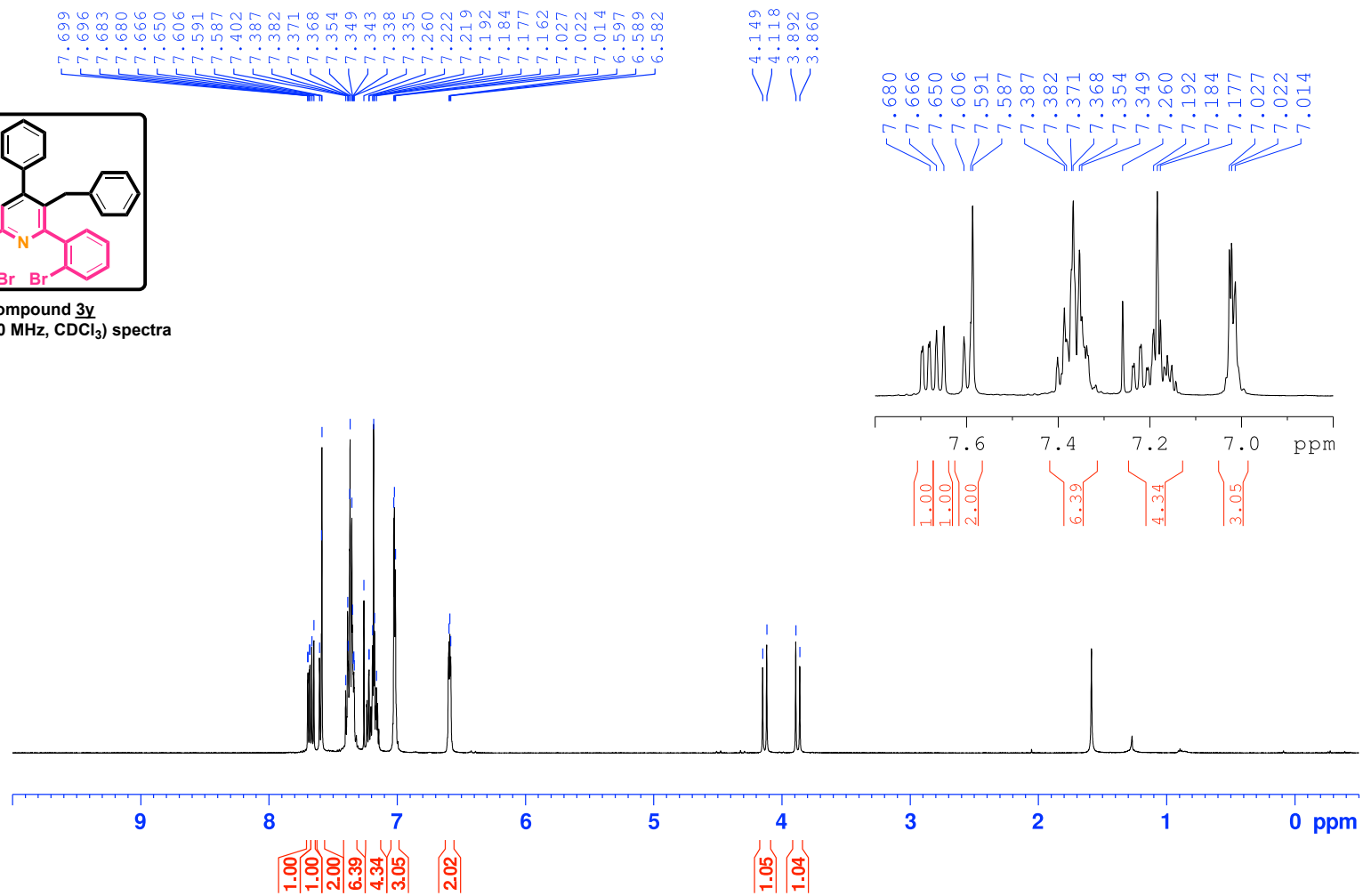


Compound 3y

1H YHC-462 sep 7071 down 1027

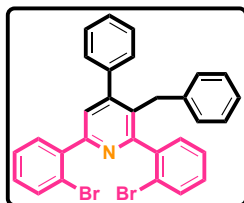


Compound 3y
¹H NMR (500 MHz, CDCl₃) spectra

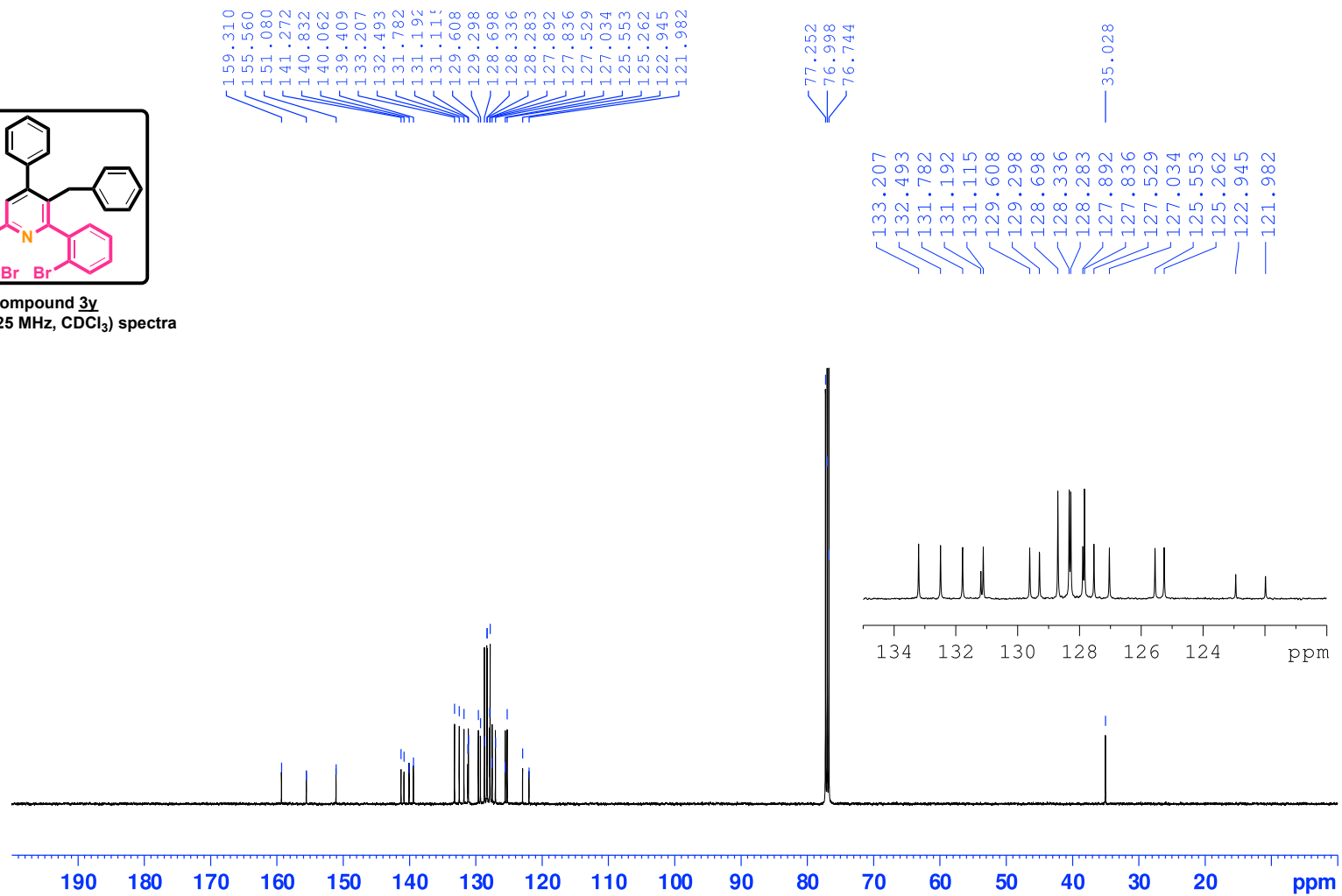


Compound 3y

13C YHC-462 sep 7071 down 1027

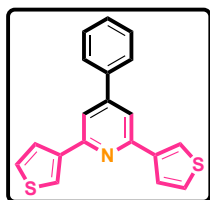


Compound 3y
¹³C NMR (125 MHz, CDCl₃) spectra

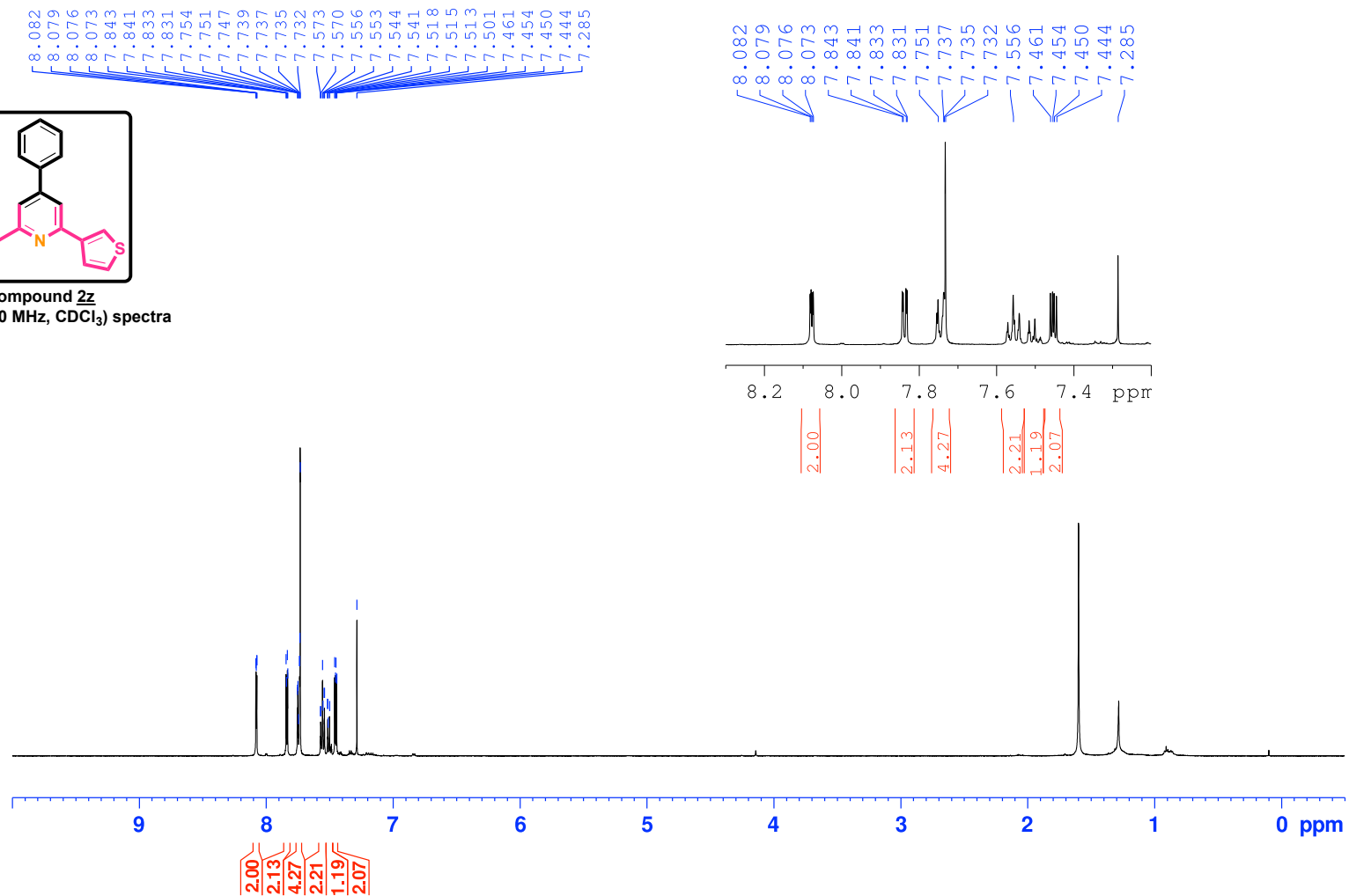


Compound 2z

1H YHC-460 sep 15-17 top 0628

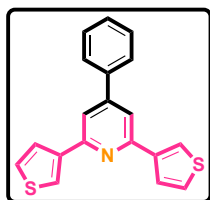


Compound 2z
¹H NMR (500 MHz, CDCl₃) spectra

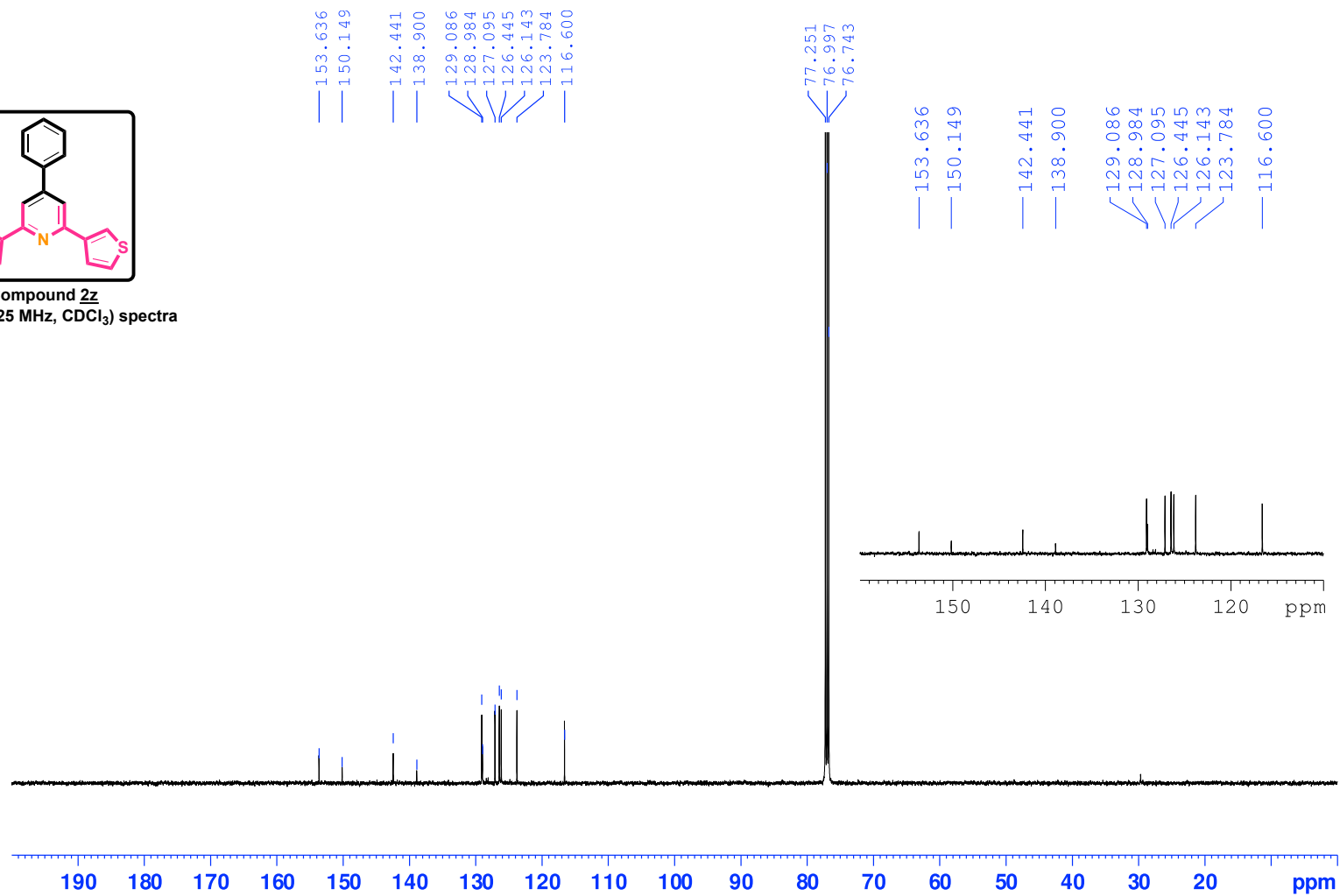


Compound 2z

13C YHC-460 sep 15-17 top 0628

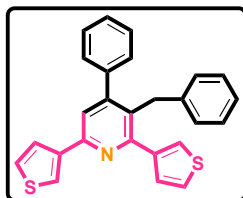


Compound 2z
¹³C NMR (125 MHz, CDCl₃) spectra



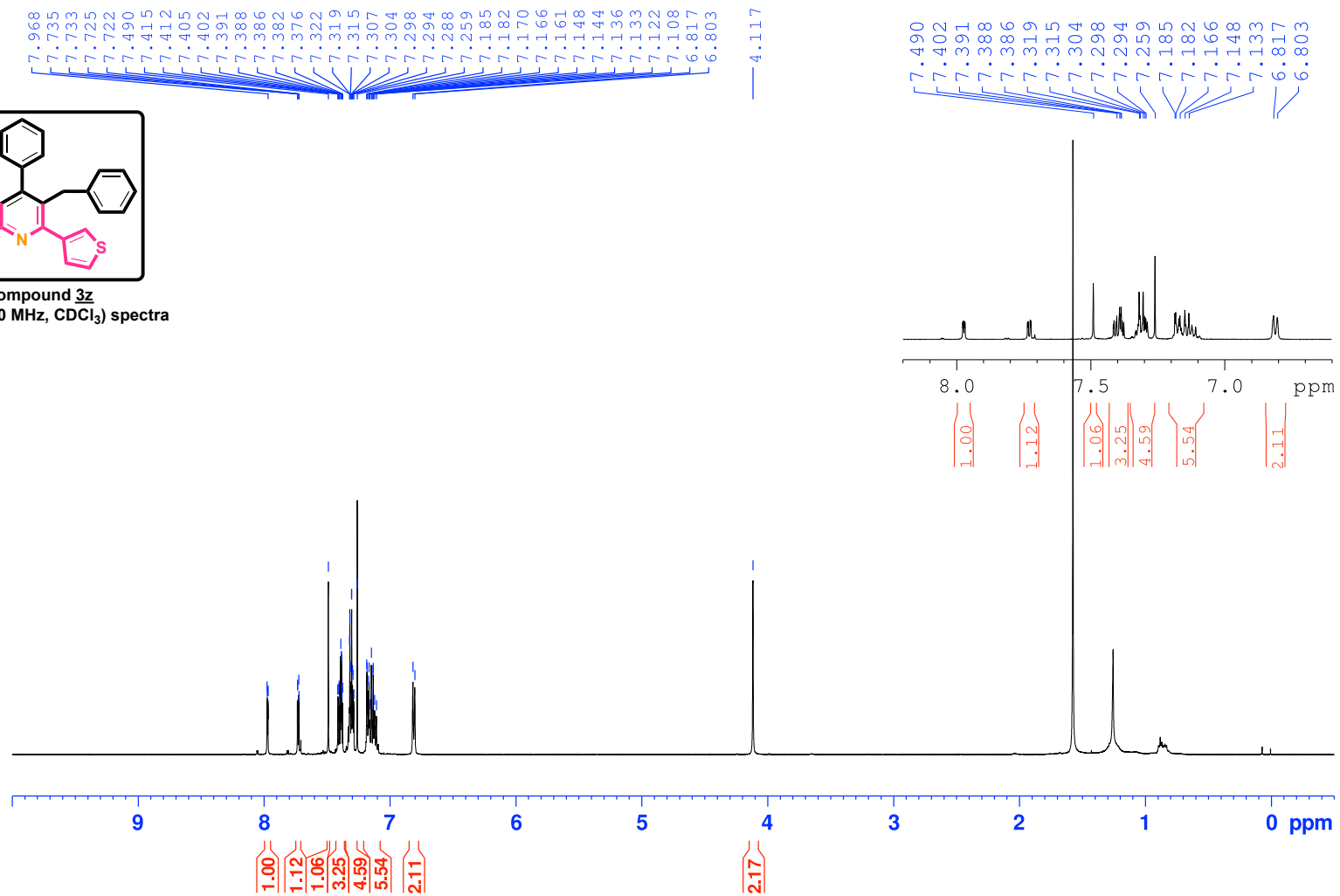
Compound 3z

1H YHC-460 sep 35-37 down 0628



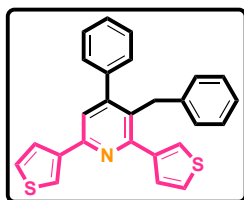
Compound 3z

¹H NMR (500 MHz, CDCl₃) spectra

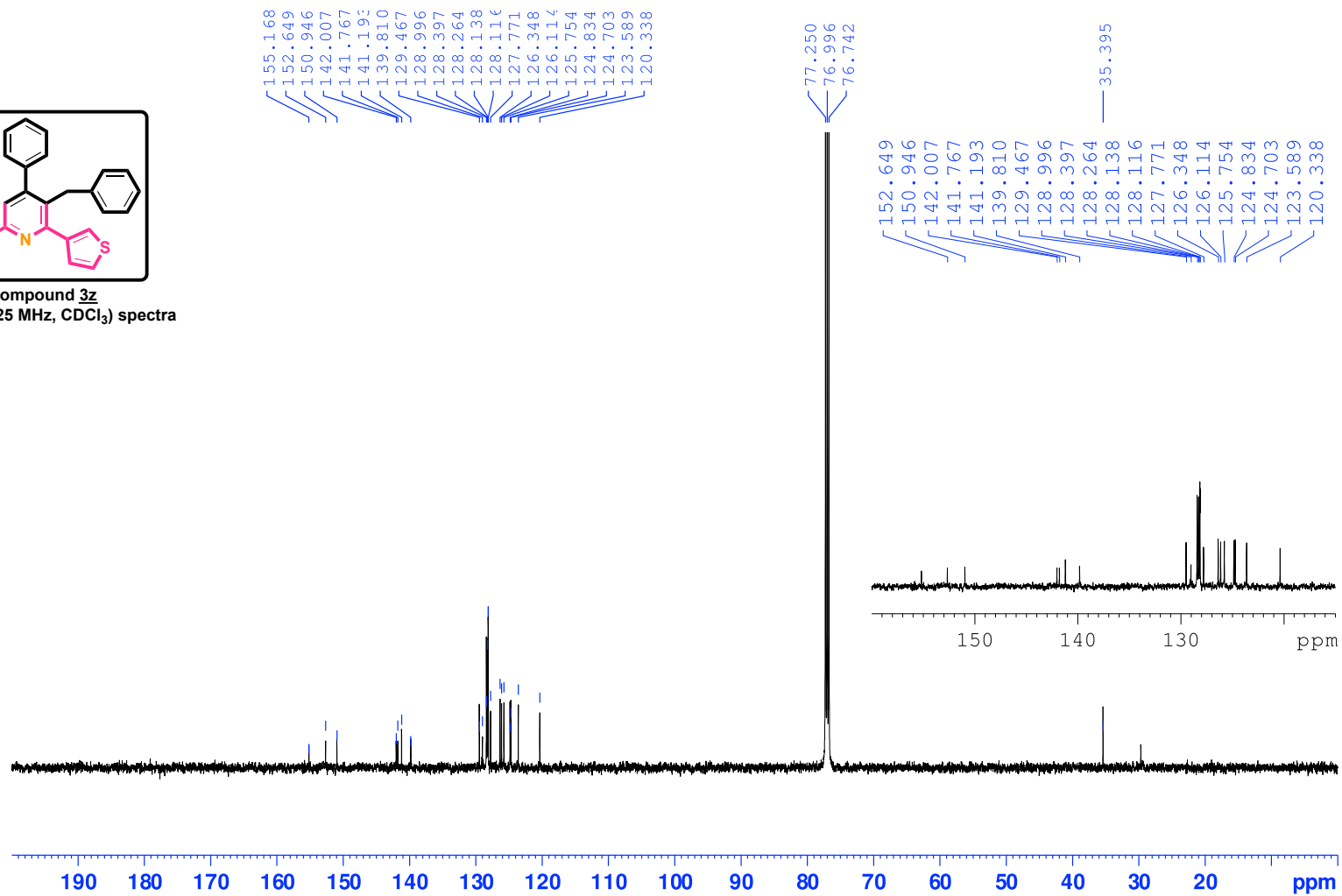


Compound 3z

13C YHC-460 sep 35-37 down 0628

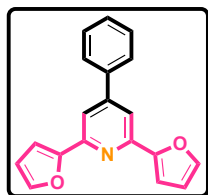


Compound 3z
¹³C NMR (125 MHz, CDCl₃) spectra



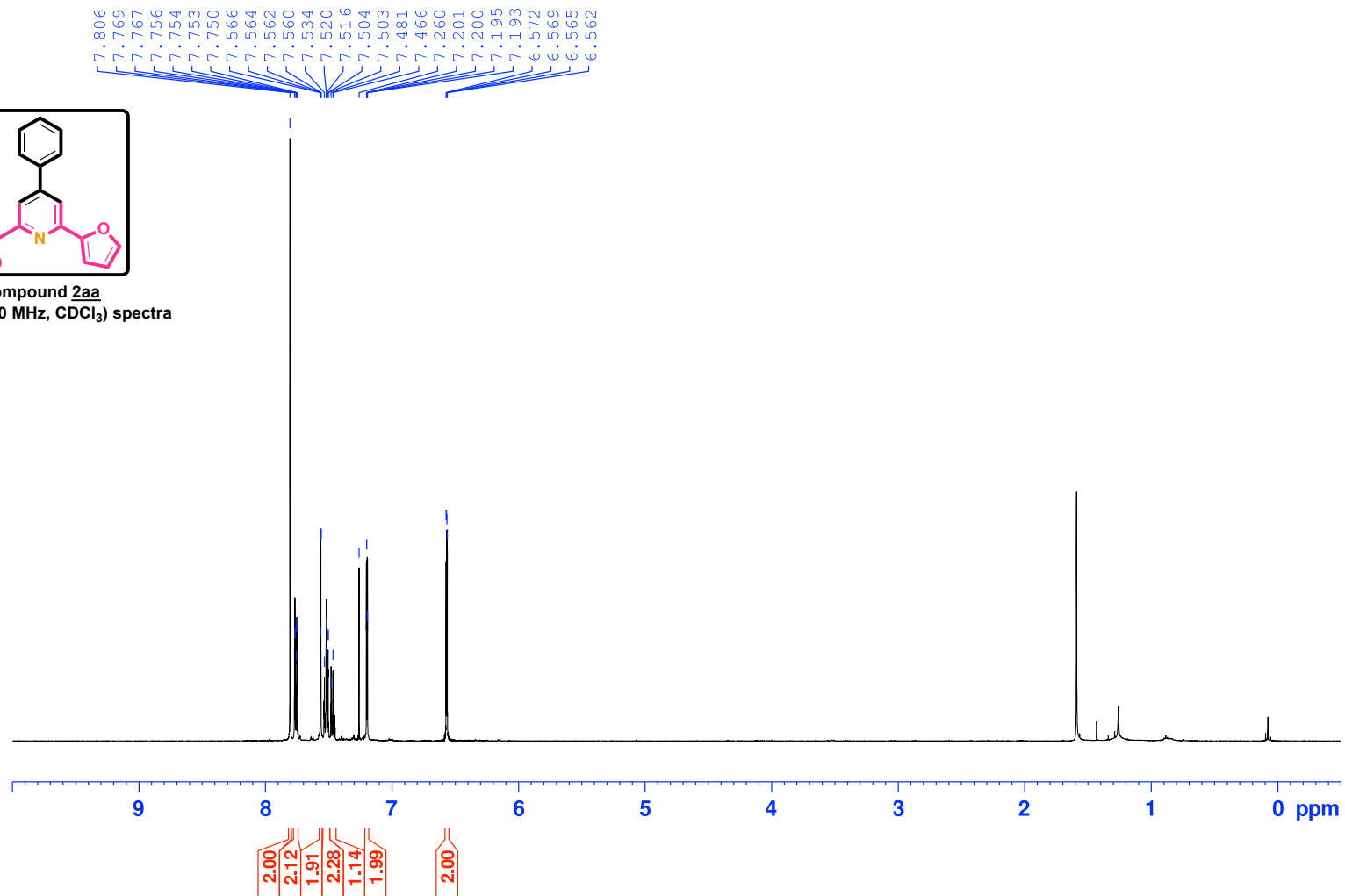
Compound 2aa

1H YHC-461-2 sep 49-51 top 1022



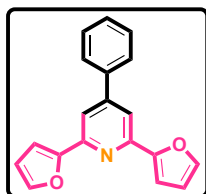
Compound 2aa

¹H NMR (500 MHz, CDCl₃) spectra



Compound 2aa

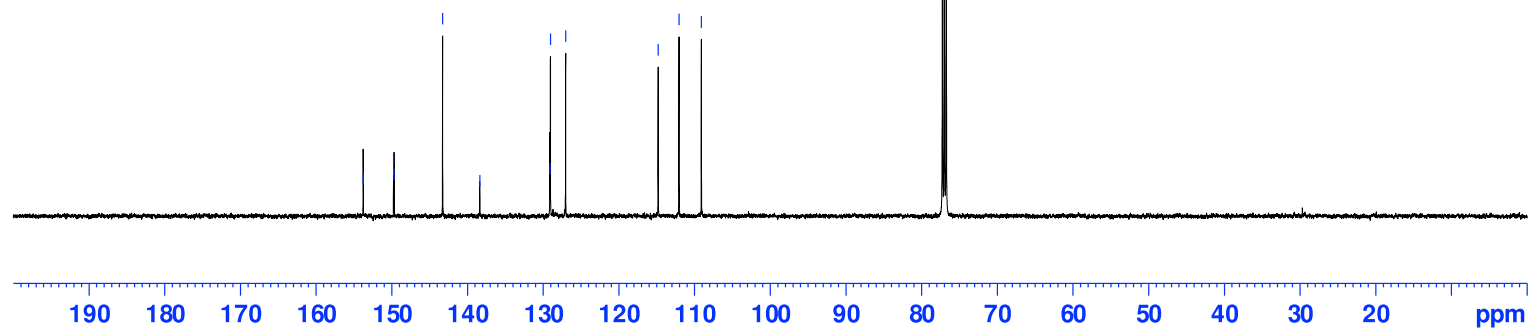
13C YHC-461-2 sep 49-51 top 1022



Compound 2aa

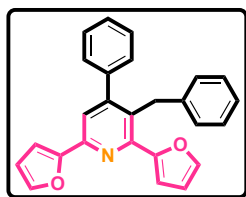
¹³C NMR (125 MHz, CDCl₃) spectra

153.774
149.771
149.692
143.282
138.375
129.114
129.039
127.029
114.801
112.046
109.093
77.248
76.993
76.739



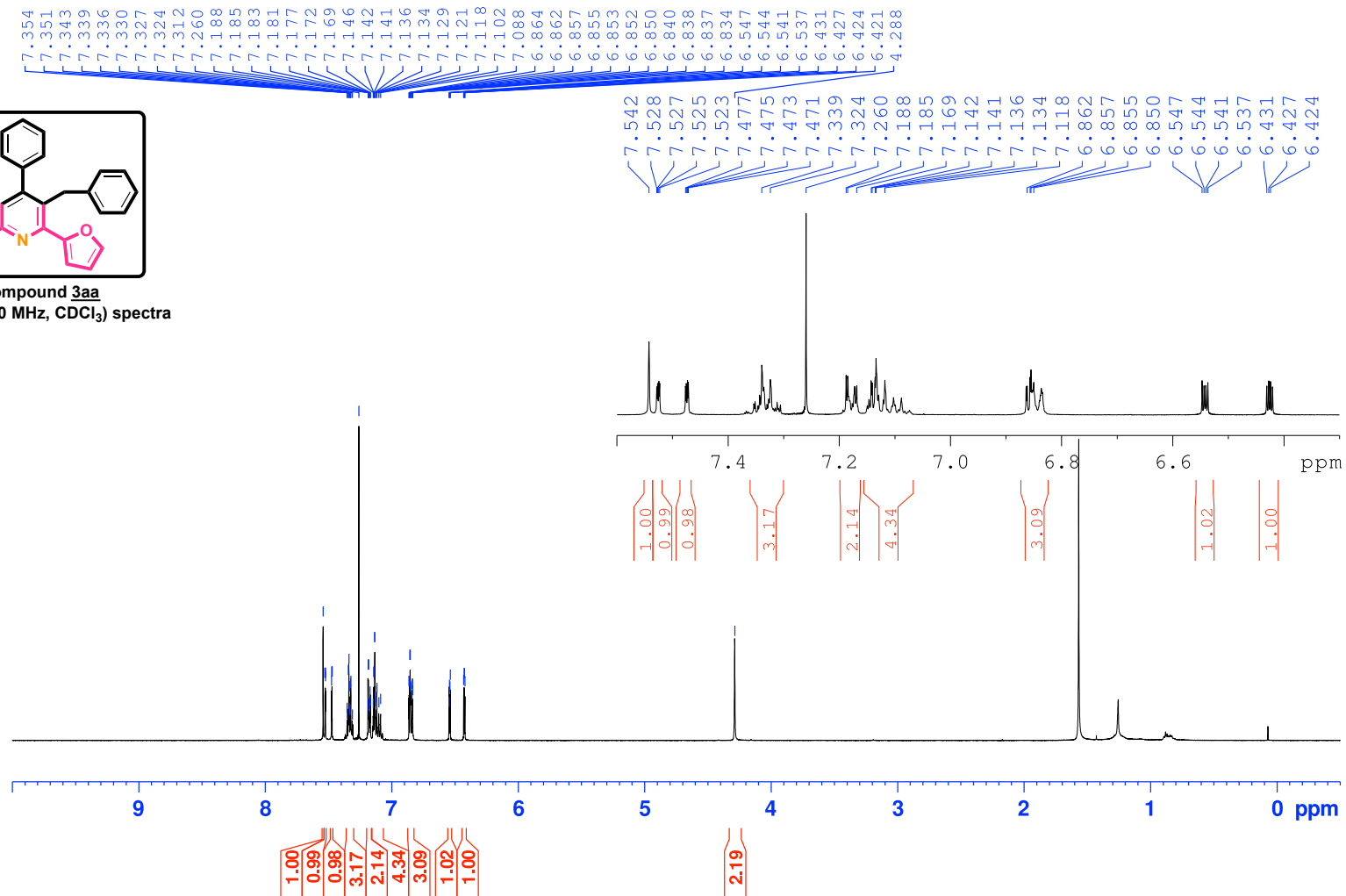
Compound 3aa

1H YHC-461-2 sep 59-62 middle 1022



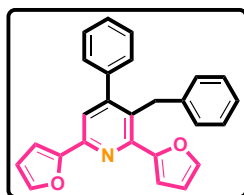
Compound 3aa

¹H NMR (500 MHz, CDCl₃) spectra



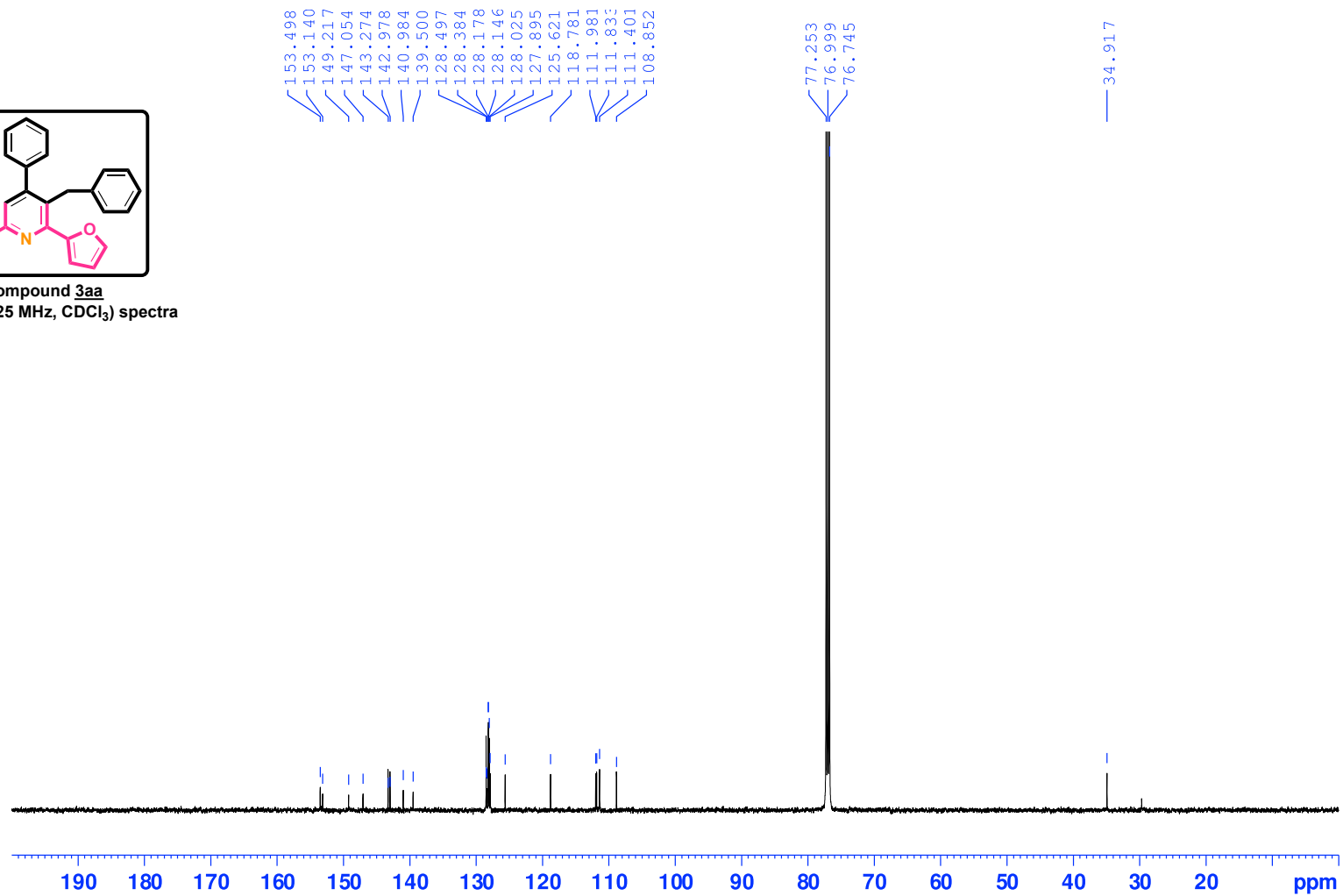
Compound 3aa

13C YHC-461-2 sep 59-62 middle 1022



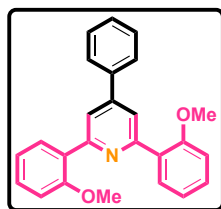
Compound 3aa

¹³C NMR (125 MHz, CDCl₃) spectra



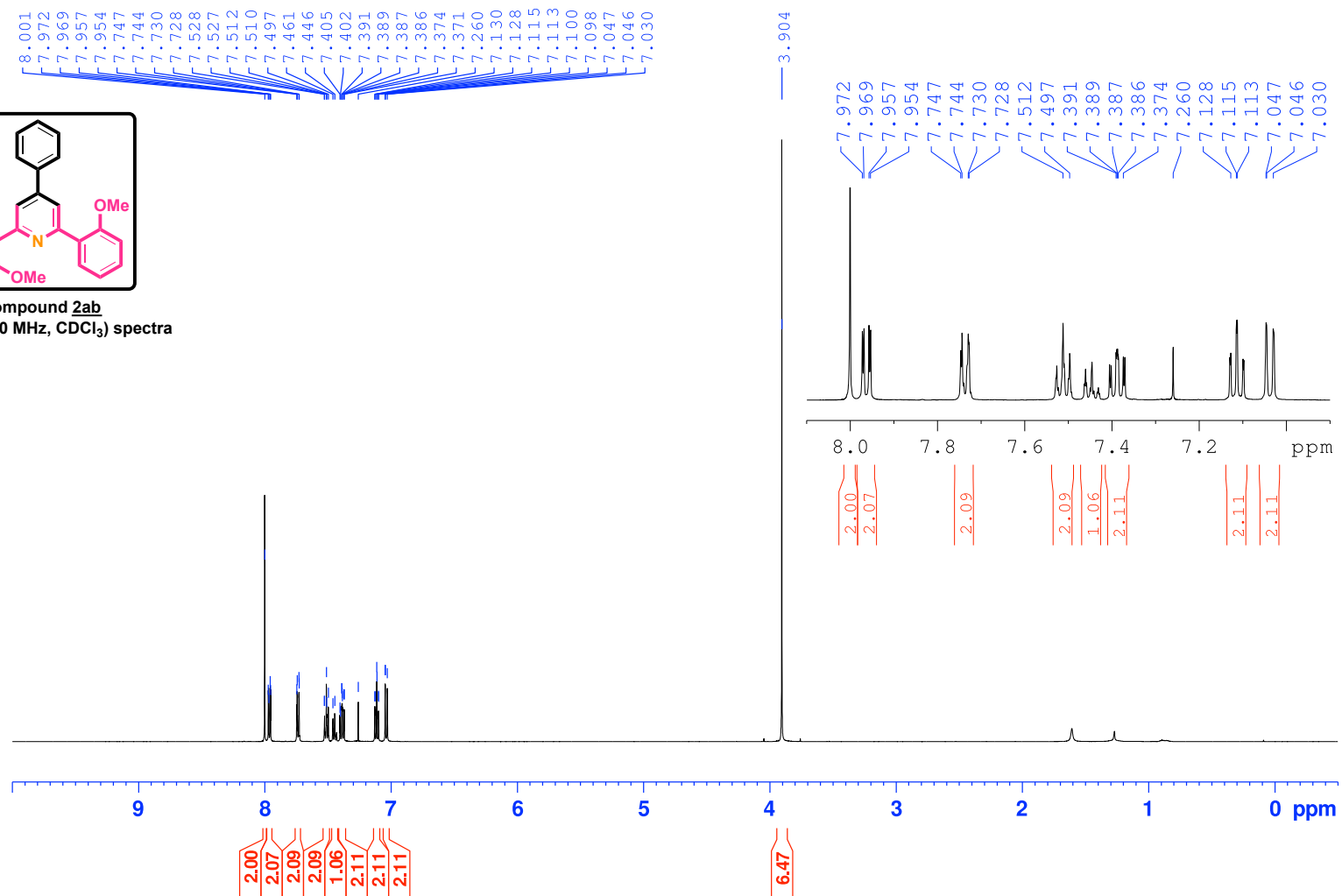
Compound 2ab

1H YHC-458 sep 74-76 top 1020



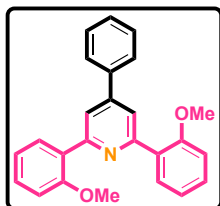
Compound 2ab

¹H NMR (500 MHz, CDCl₃) spectra



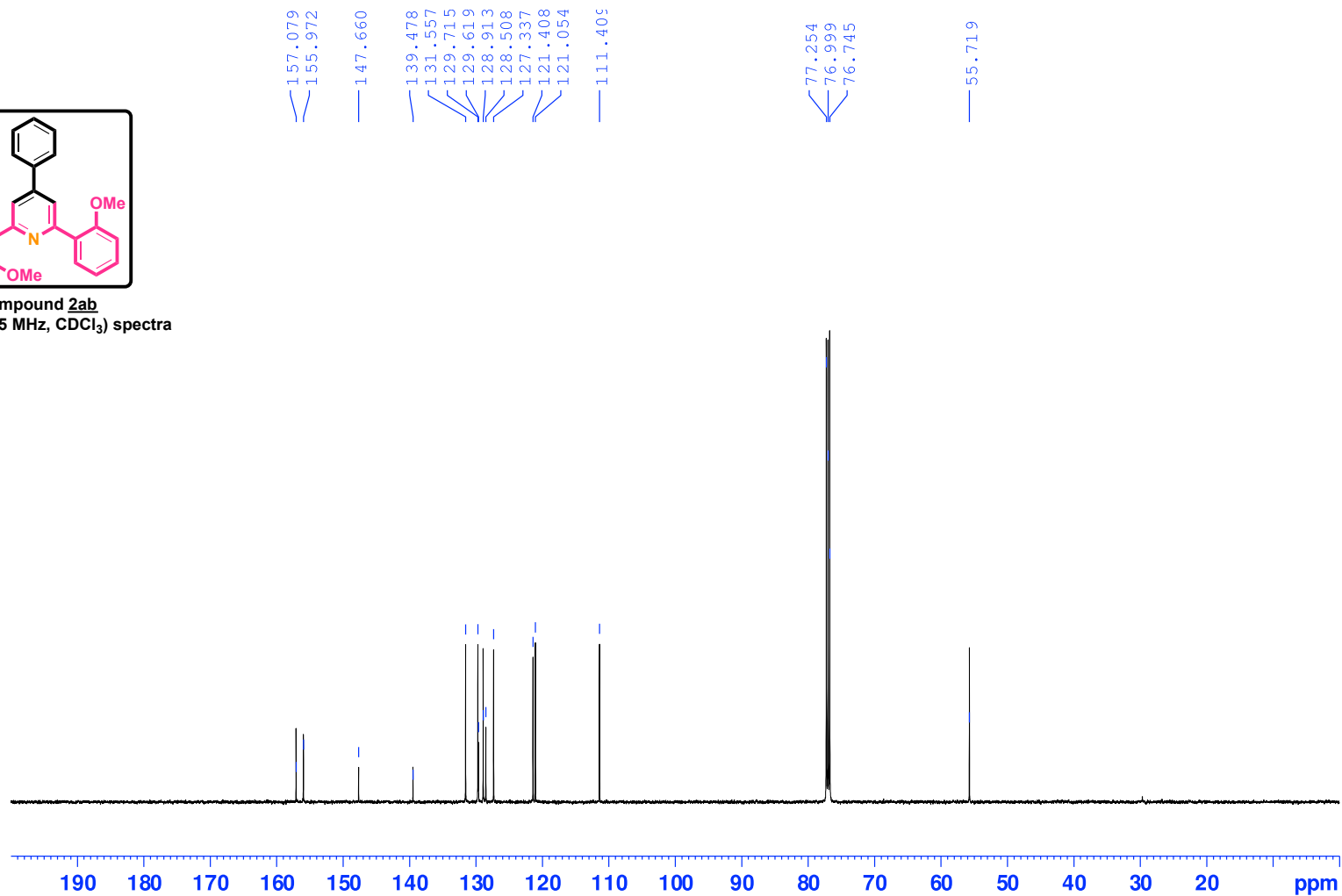
Compound 2ab

13C YHC-458 sep 74-76 top 1020



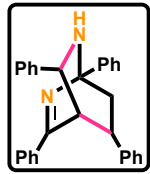
Compound 2ab

¹³C NMR (125 MHz, CDCl₃) spectra

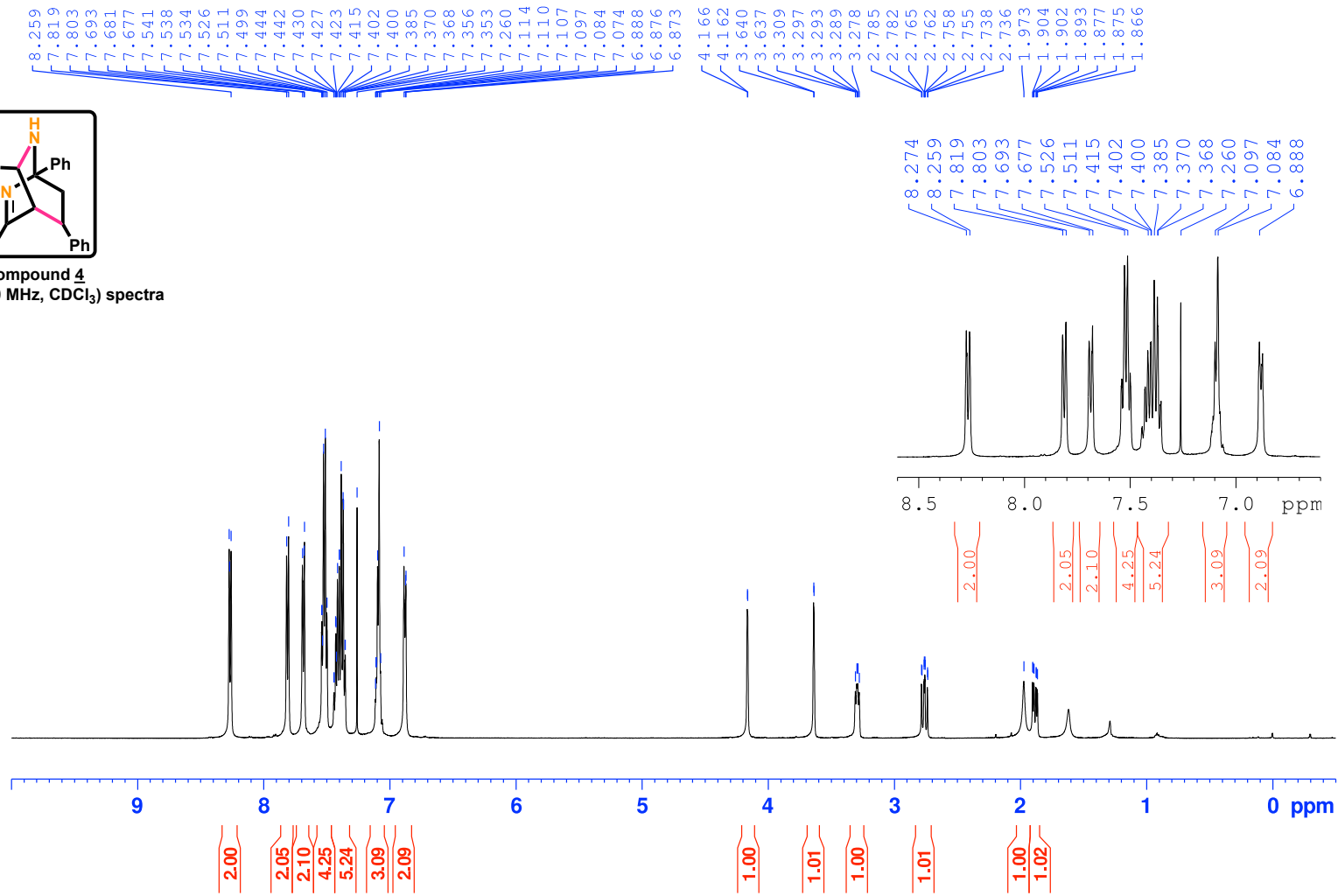


Compound 4

1H YHC-418 sep 2728 0506

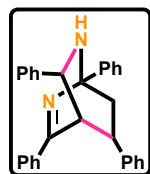


Compound 4
¹H NMR (500 MHz, CDCl₃) spectra



Compound 4

13C YHC-418 sep 2728 0506



Compound 4

¹³C NMR (125 MHz, CDCl₃) spectra

