

# Supporting Information

## Copper-Catalyzed Oxidative Direct Cyclization of *N*-Methylanilines with Electron-Deficient Alkenes using Molecular Oxygen

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### Instrumentation and Chemicals

<sup>1</sup>H and <sup>13</sup>C NMR spectra were recorded at 400 MHz and 100 MHz, respectively, for CDCl<sub>3</sub> solutions. MS data were obtained by EI. GC analysis was carried out using a silicon OV-17 column (i. d. 2.6 mm x 1.5 m) or a CBP-1 capillary column (i. d. 0.5 mm x 25 m). TLC analyses were performed on commercial glass plates bearing 0.25-mm layer of Merck Silica gel 60F<sub>254</sub>. Silica gel (Wakogel 200 mesh) was used for column chromatography.

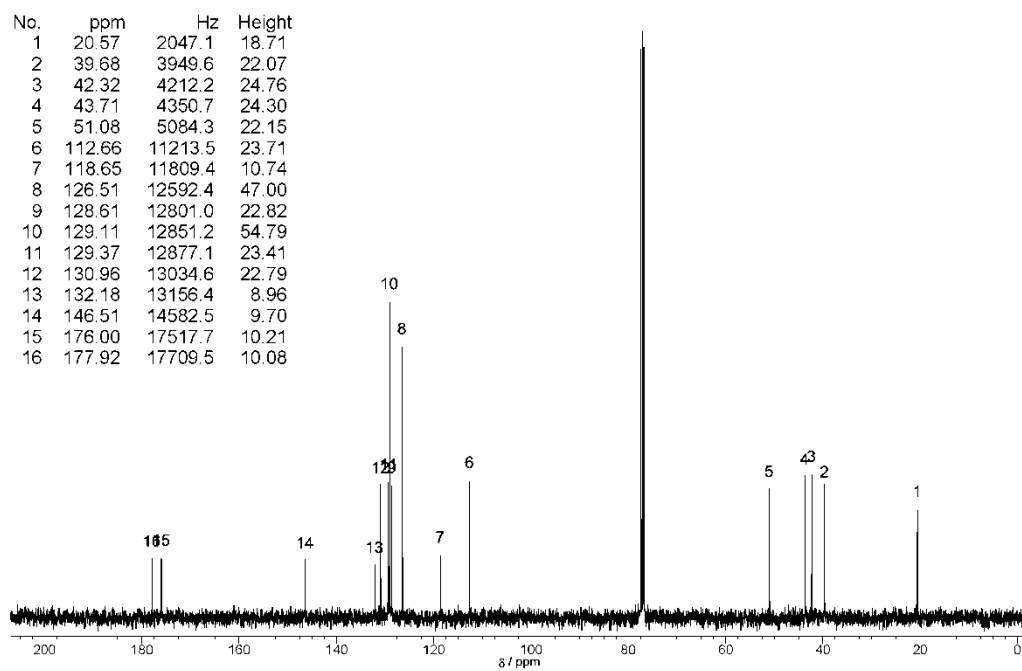
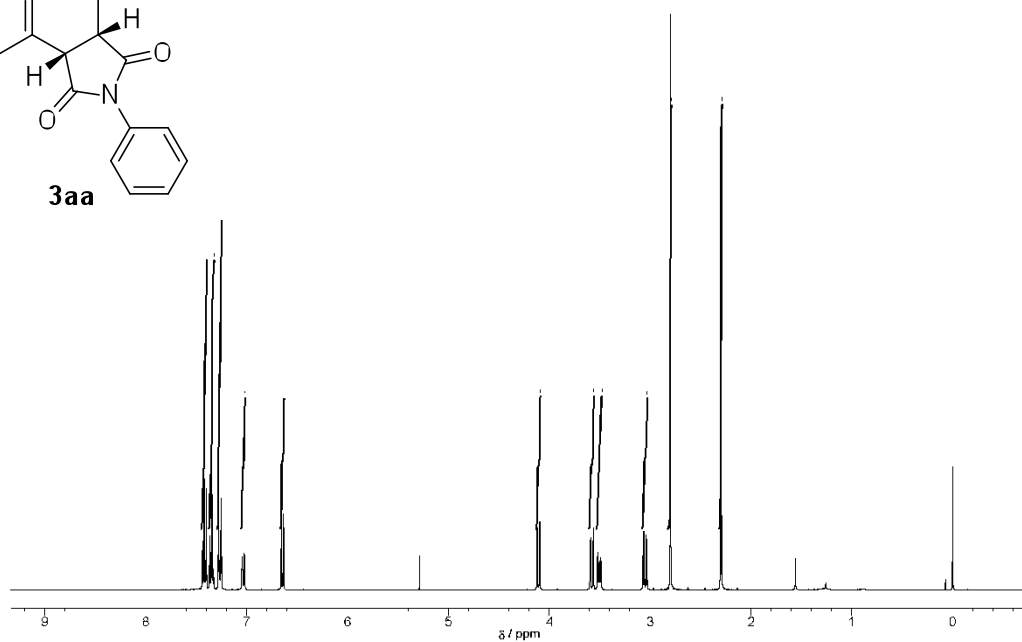
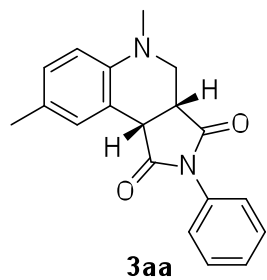
Unless otherwise noted, materials obtained from commercial suppliers were used without further purification. MeCN and EtCN were freshly distilled from CaH<sub>2</sub> prior to use. *N*-Methylanilines **3** were synthesized by the methylation of the corresponding anilines with trimethyl phosphate.<sup>1</sup> Noncommercially available maleimides were prepared from maleic anhydride and parent anilines.<sup>2</sup>

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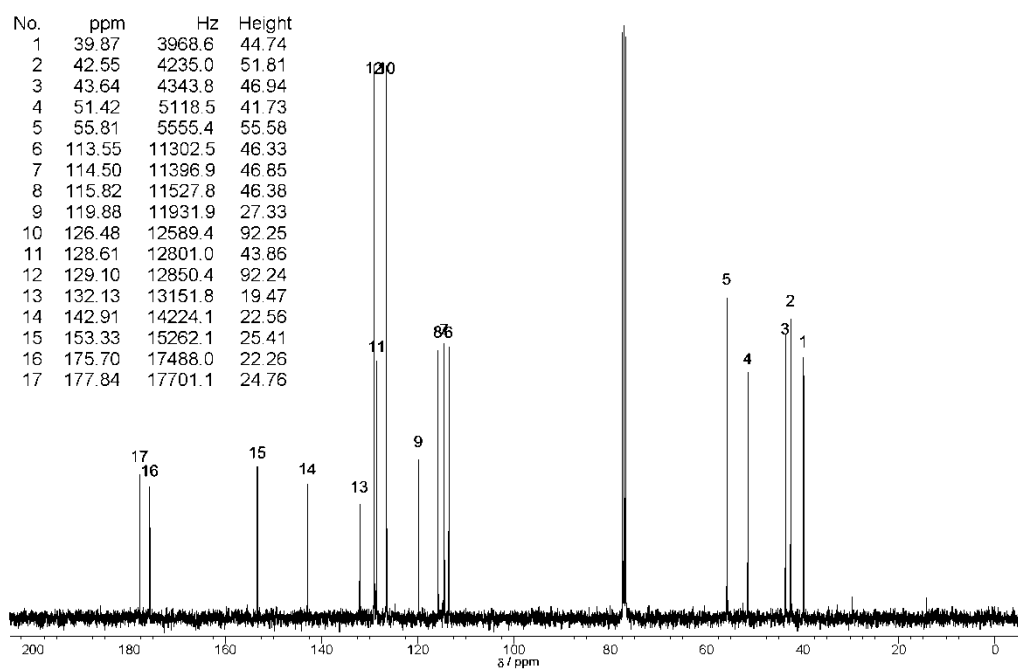
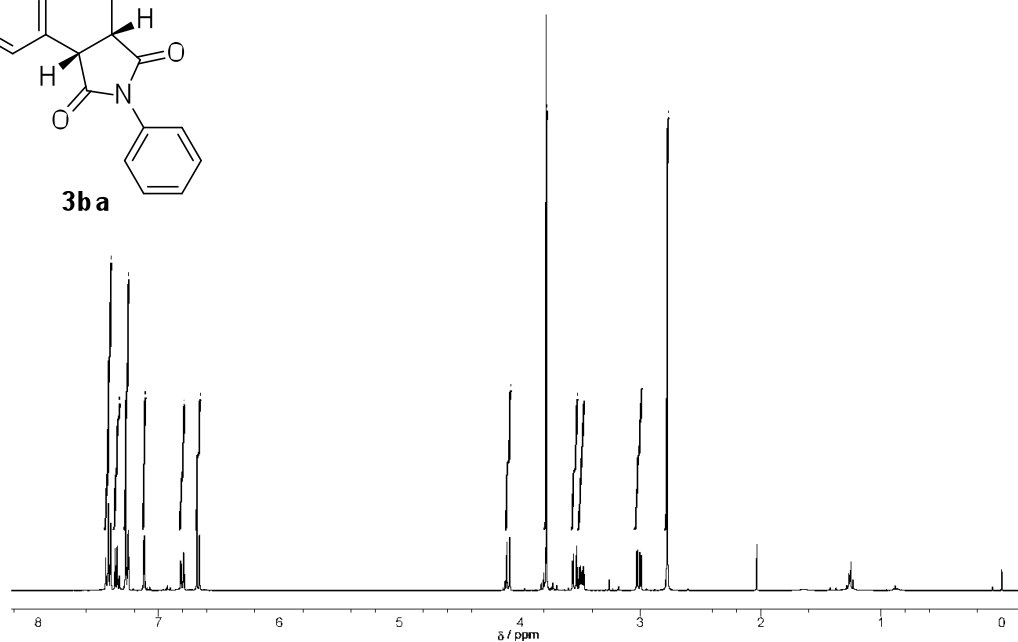
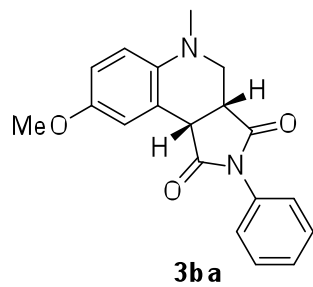
<sup>1</sup> Huang, L.; Zhang, X.; Zhang, Y. *Org. Lett.* **2009**, *11*, 3730.

<sup>2</sup> Matuszak, N.; Muccioli, G. G.; Labar, G.; Lambert, D. M. *J. Med. Chem.* **2009**, *52*, 7410.

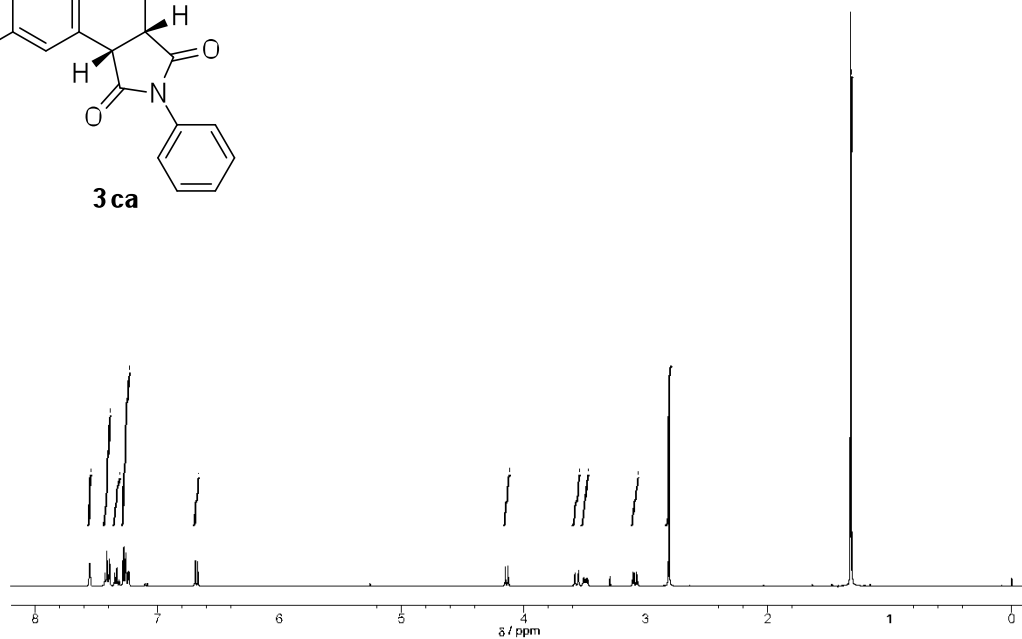
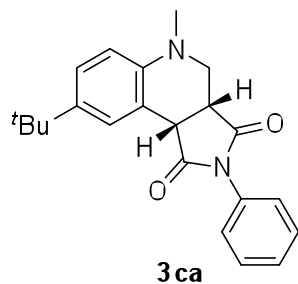
[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **3aa**]



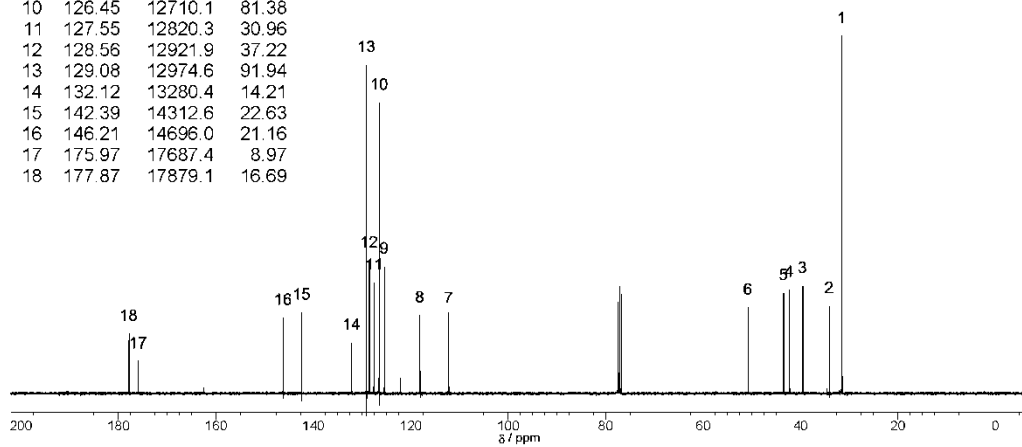
[ $^1\text{H}$  and  $^{13}\text{C}$  NMR Spectra of **3ba**]



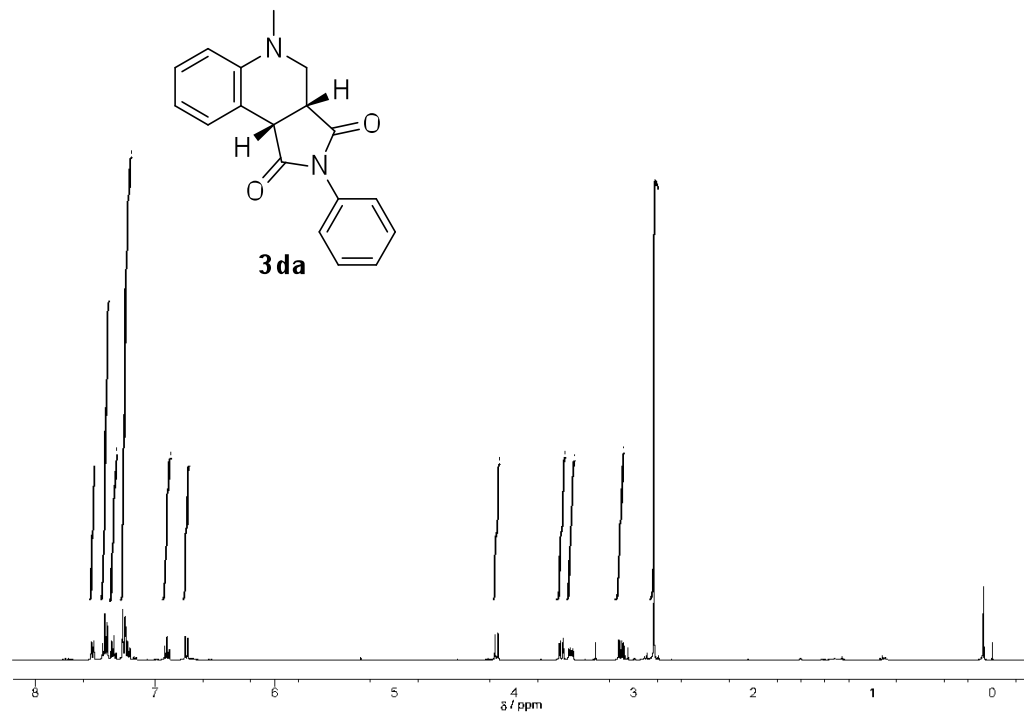
[ $^1\text{H}$  and  $^{13}\text{C}$  NMR Spectra of **3ca**]



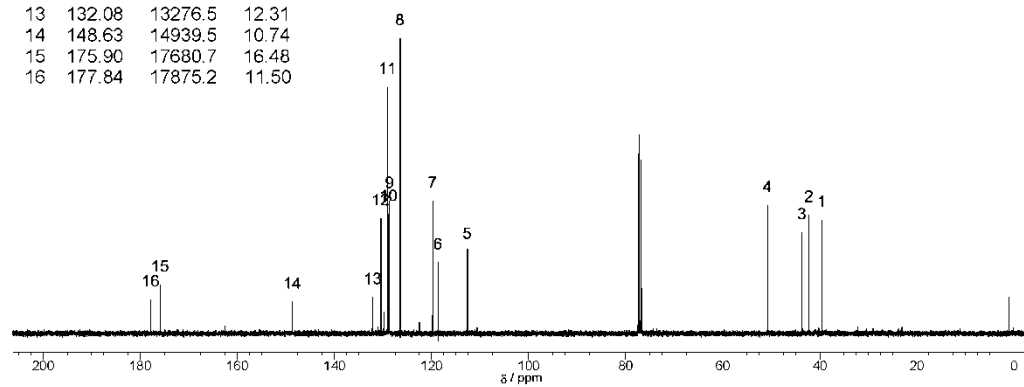
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2	34.10	3427.3	24.44
3	39.58	3978.4	30.10
4	42.28	4249.7	28.96
5	43.52	4374.3	28.09
6	50.78	5104.6	24.02
7	112.20	11278.1	21.63
8	118.12	11872.4	21.81
9	125.47	12611.3	35.49
10	126.45	12710.1	81.38
11	127.55	12820.3	30.96
12	128.56	12921.9	37.22
13	129.08	12974.6	91.94
14	132.12	13280.4	14.21
15	142.39	14312.6	22.63
16	146.21	14696.0	21.16
17	175.97	17687.4	8.97
18	177.87	17879.1	16.69



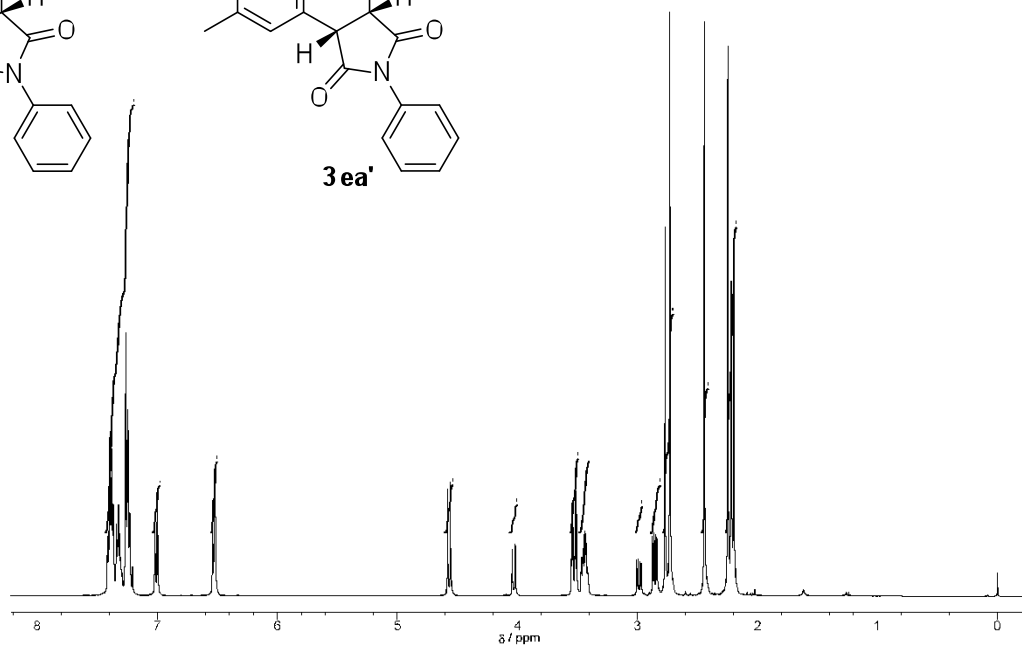
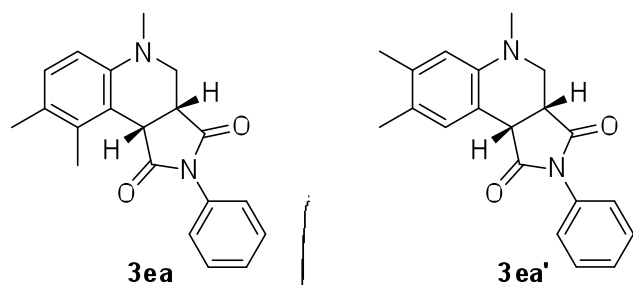
[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **3da**]



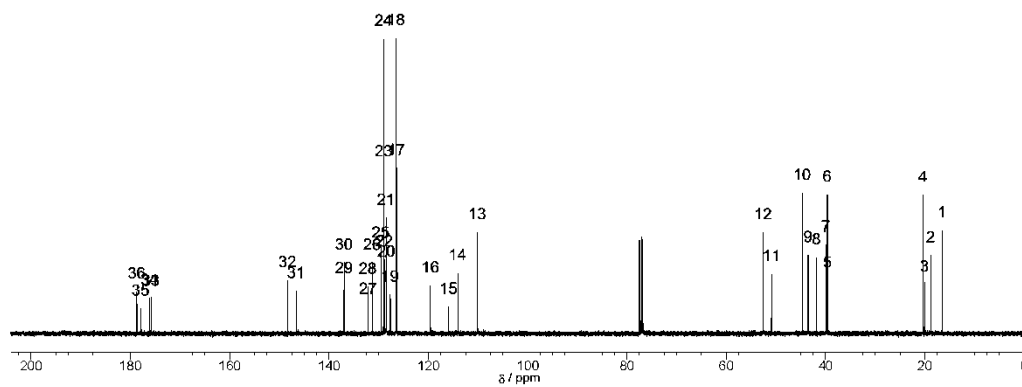
No.	ppm	Hz	Height
1	39.55	3975.6	38.52
2	42.22	4243.9	40.11
3	43.67	4389.6	34.25
4	50.76	5101.8	43.43
5	112.65	11323.2	27.66
6	118.66	11927.0	24.02
7	119.77	12039.1	44.89
8	126.47	12712.0	100
9	128.62	12928.6	44.78
10	128.79	12945.9	40.40
11	129.12	12978.4	83.47
12	130.44	13111.7	38.99
13	132.08	13276.5	12.31
14	148.63	14939.5	10.74
15	175.90	17680.7	16.48
16	177.84	17875.2	11.50



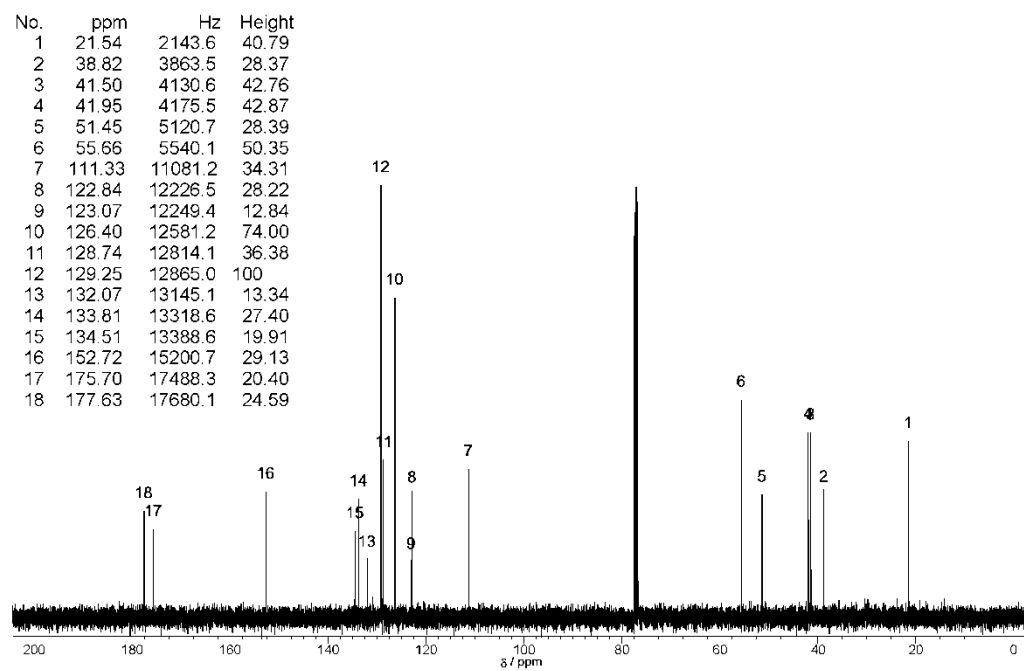
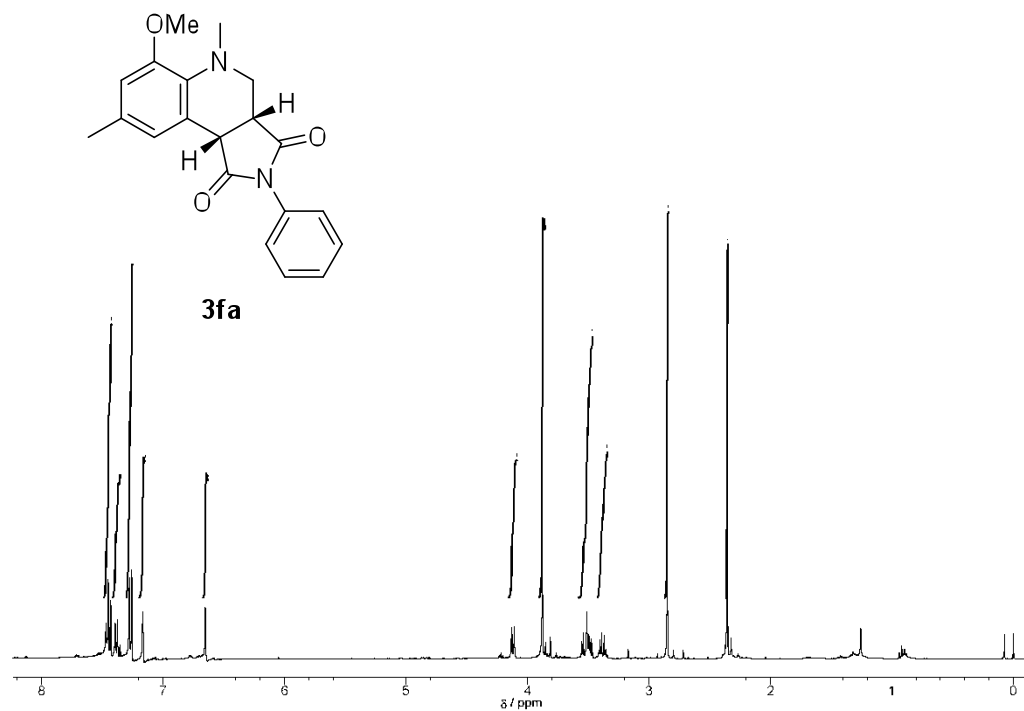
[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **3ea** and **3ea'**]



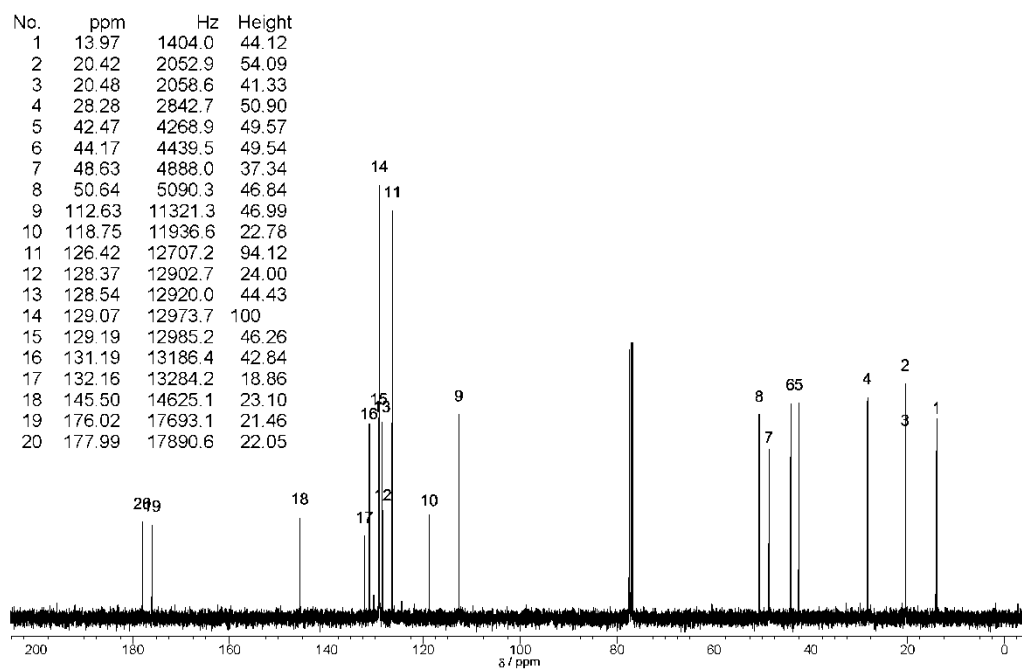
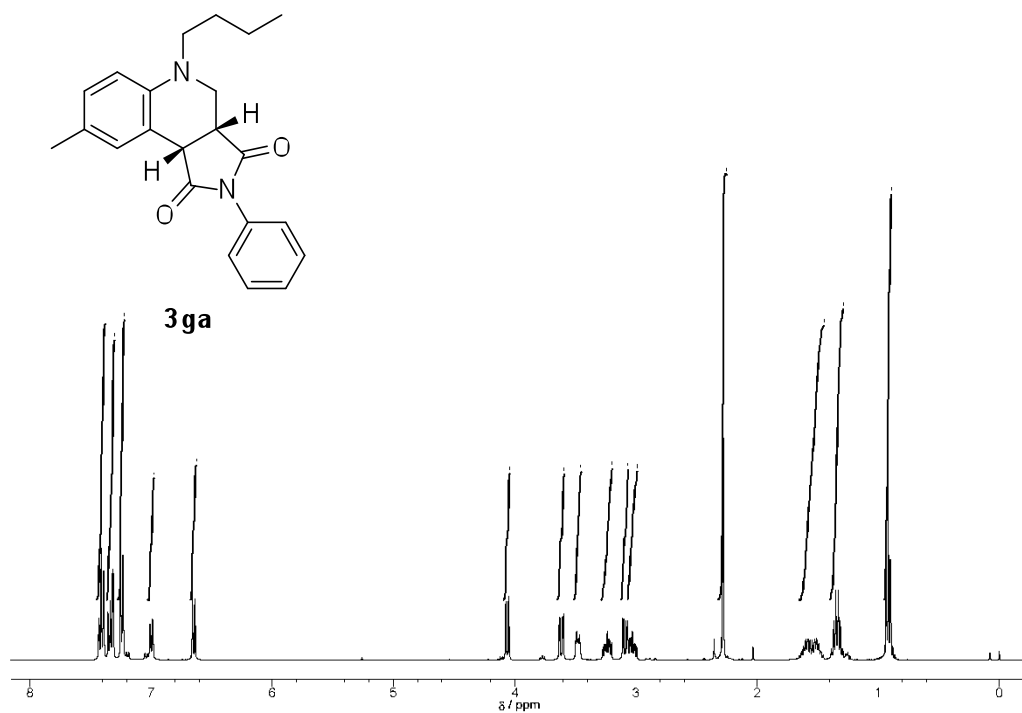
No.	ppm	Hz	Height	No.	ppm	Hz	Height	No.	ppm	Hz	Height
1	16.53	1645.1	34.84	13	110.11	10960.2	34.29	25	129.57	12896.3	28.00
2	18.82	1873.4	26.40	14	114.08	11355.2	20.37	26	131.28	13066.7	23.90
3	20.04	1995.2	16.55	15	115.95	11540.8	8.96	27	132.13	13151.2	8.93
4	20.37	2027.9	46.85	16	119.59	11903.1	16.20	28	132.18	13156.5	15.74
5	39.59	3940.4	17.88	17	126.42	12582.7	55.98	29	136.95	13631.4	15.98
6	39.66	3947.2	46.98	18	126.48	12589.6	100	30	136.97	13633.7	23.96
7	39.90	3971.6	30.02	19	127.69	12709.8	13.12	31	146.62	14594.1	14.37
8	41.83	4163.4	25.75	20	128.45	12785.1	21.56	32	148.34	14764.6	18.02
9	43.54	4333.8	26.54	21	128.51	12791.2	39.12	33	175.85	17503.6	11.72
10	44.72	4451.0	47.57	22	128.88	12827.8	25.11	34	176.11	17528.7	12.01
11	50.95	5071.3	20.13	23	128.98	12837.7	55.56	35	177.92	17709.0	8.39
12	52.59	5234.9	34.16	24	129.01	12840.7	99.77	36	178.69	17785.9	14.20



[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **3fa**]

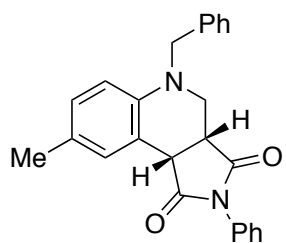


[ $^1\text{H}$  and  $^{13}\text{C}$  NMR Spectra of **3ga**]

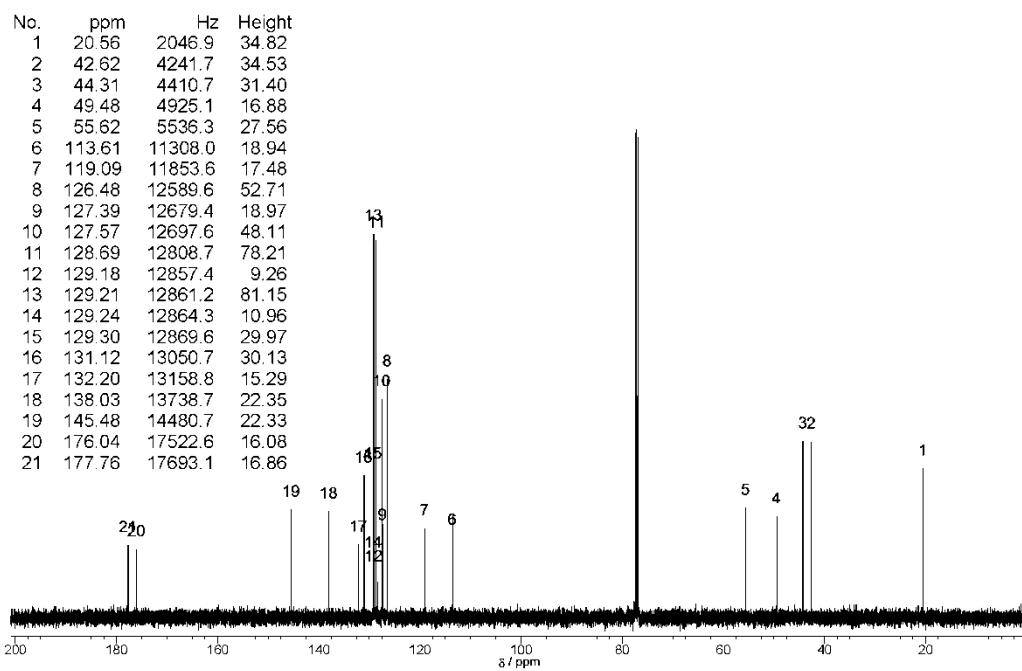
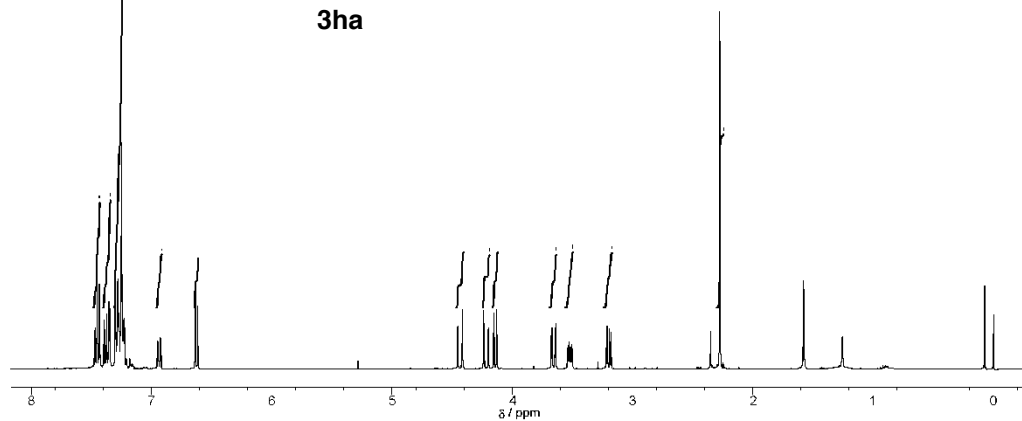




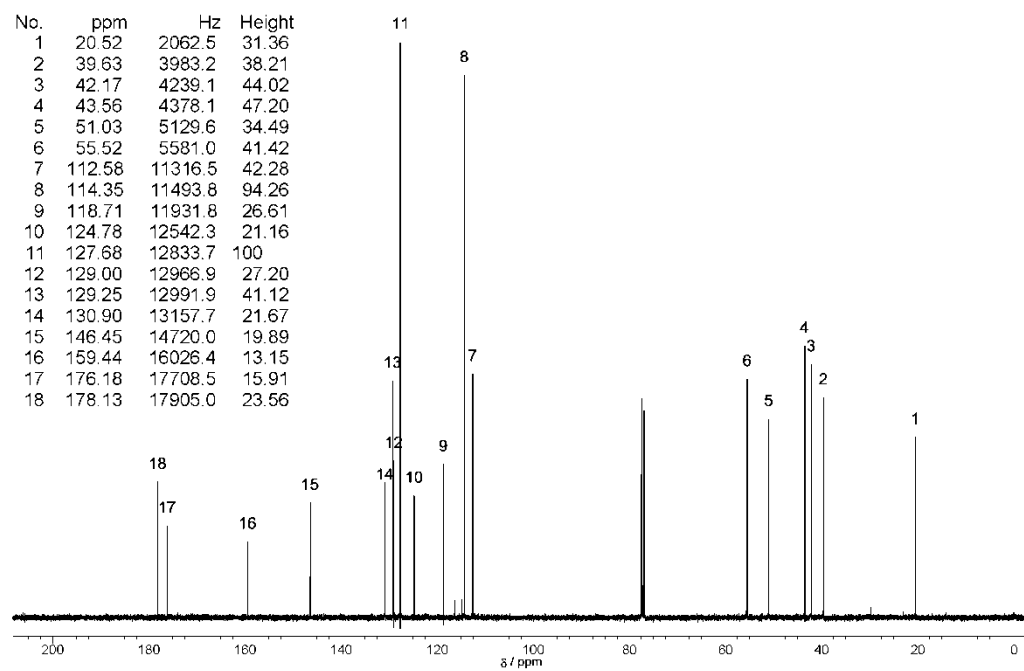
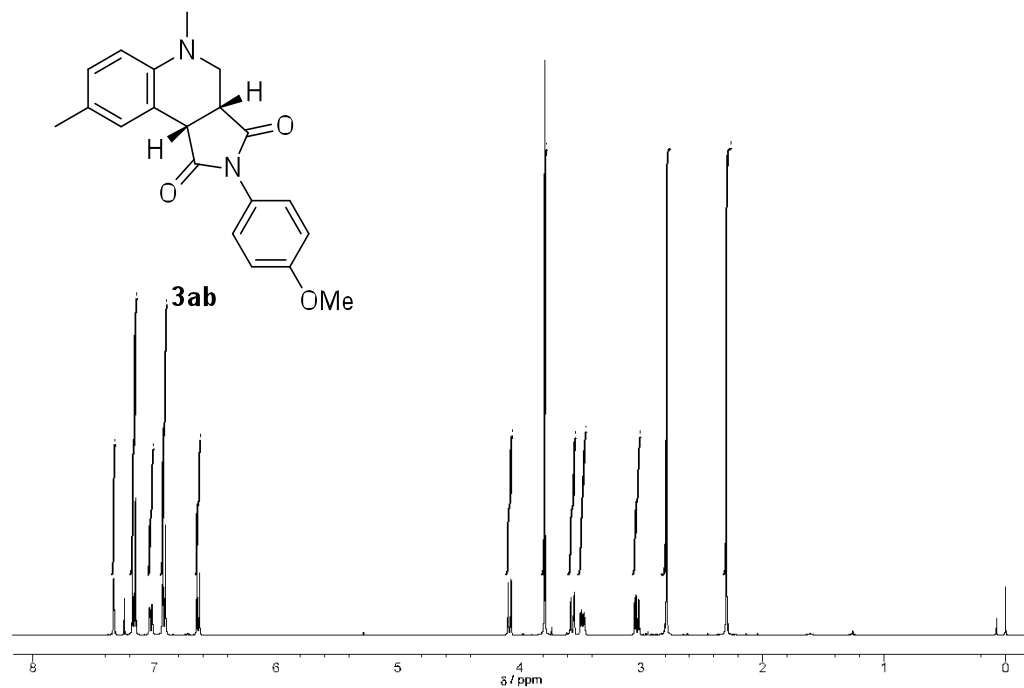
[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **3ha**]



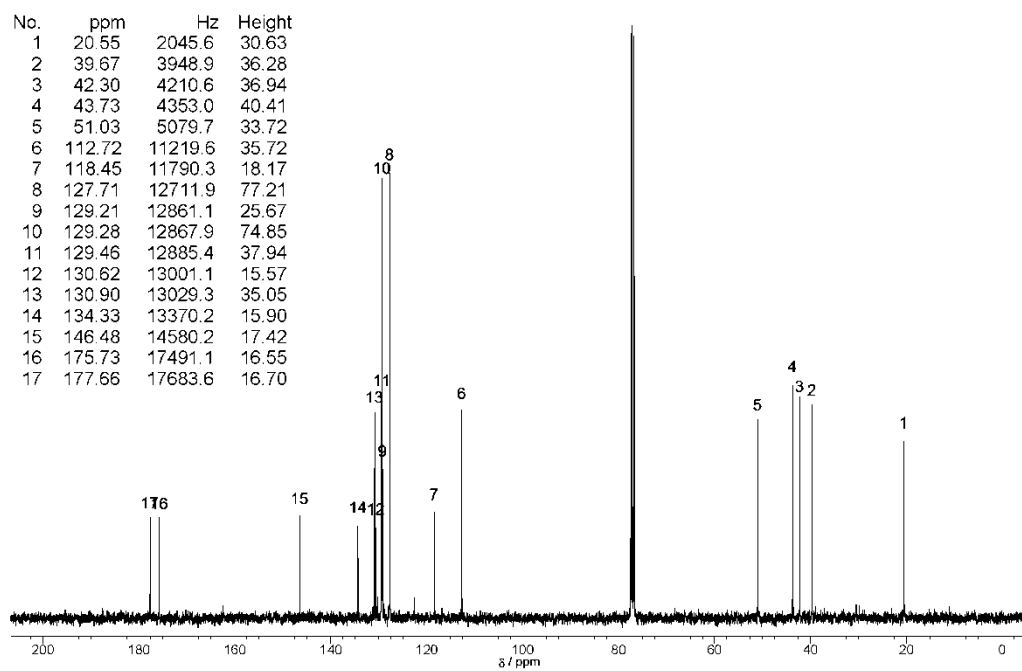
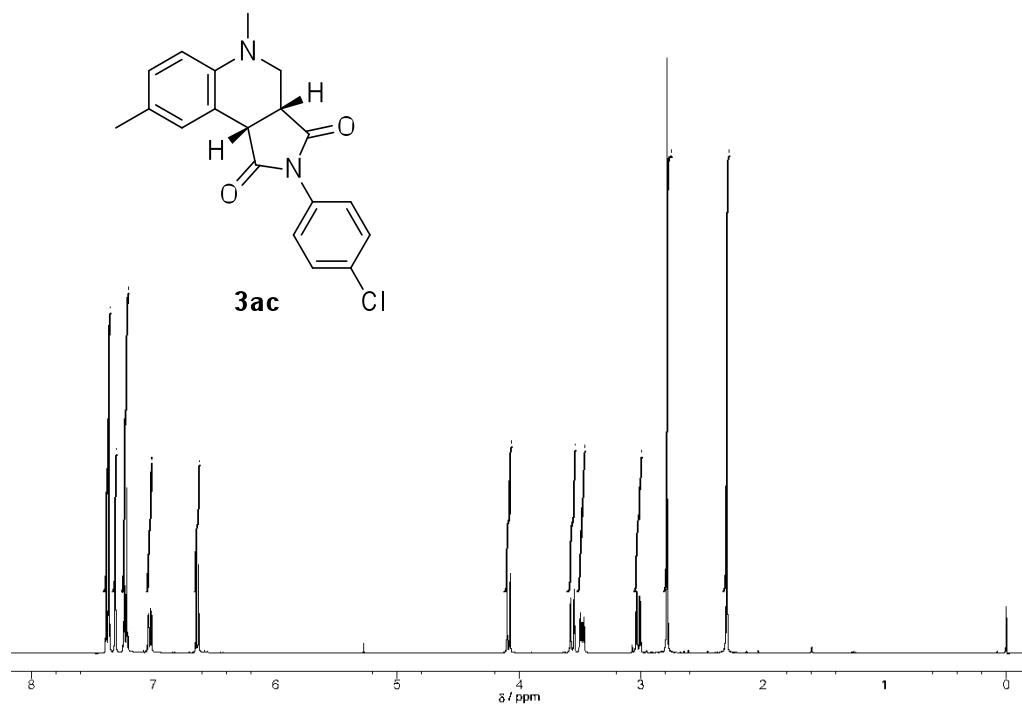
**3ha**



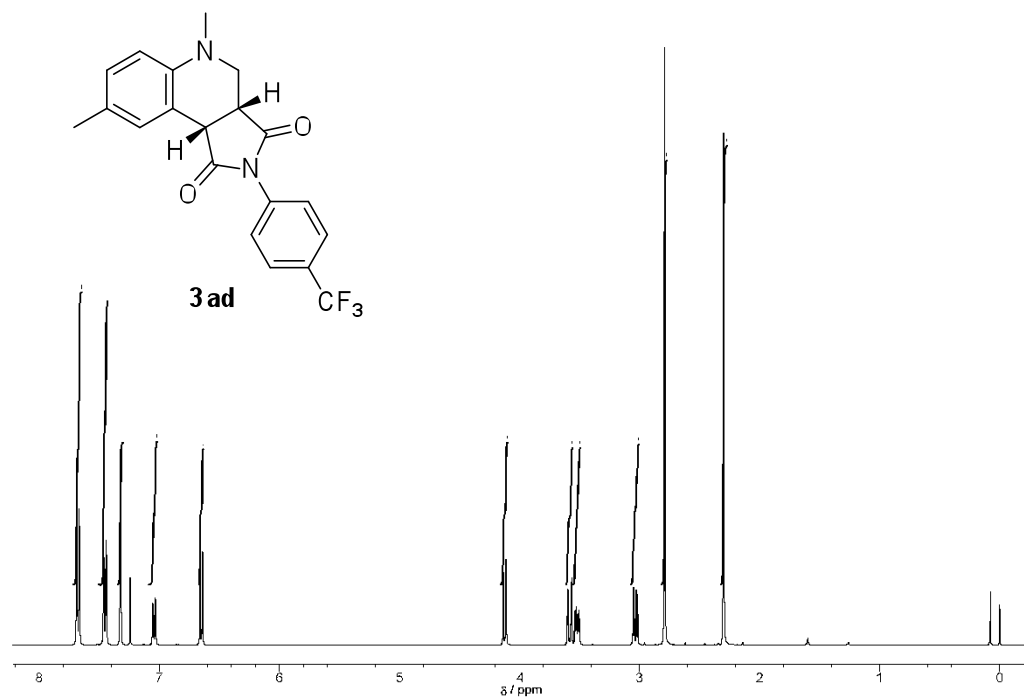
[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **3ab**]



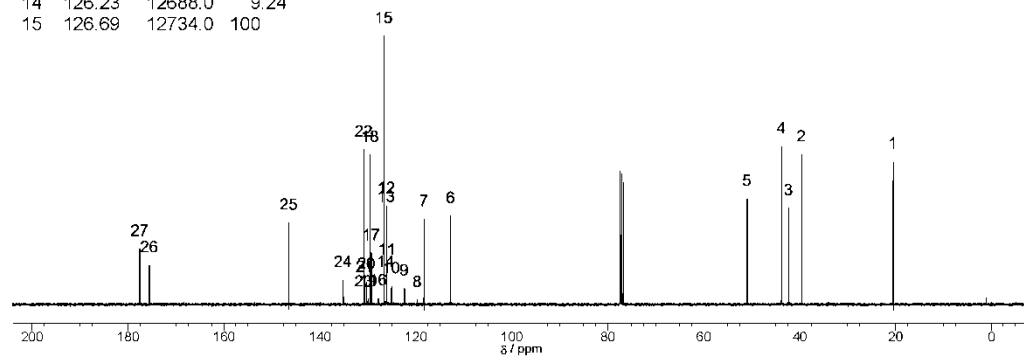
[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **3ac**]



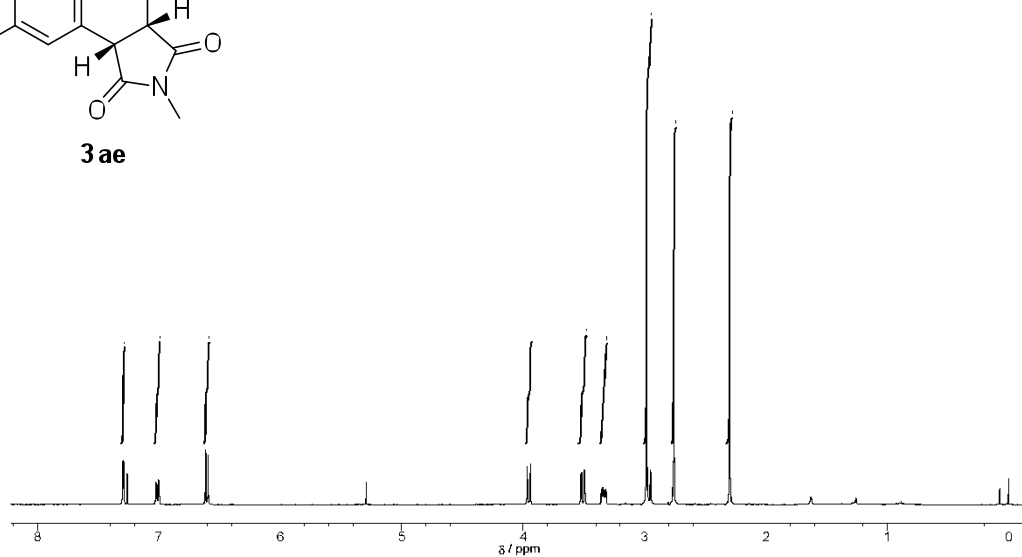
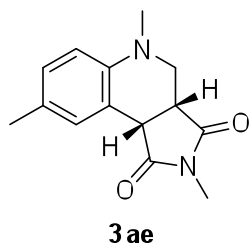
[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **3ad**]



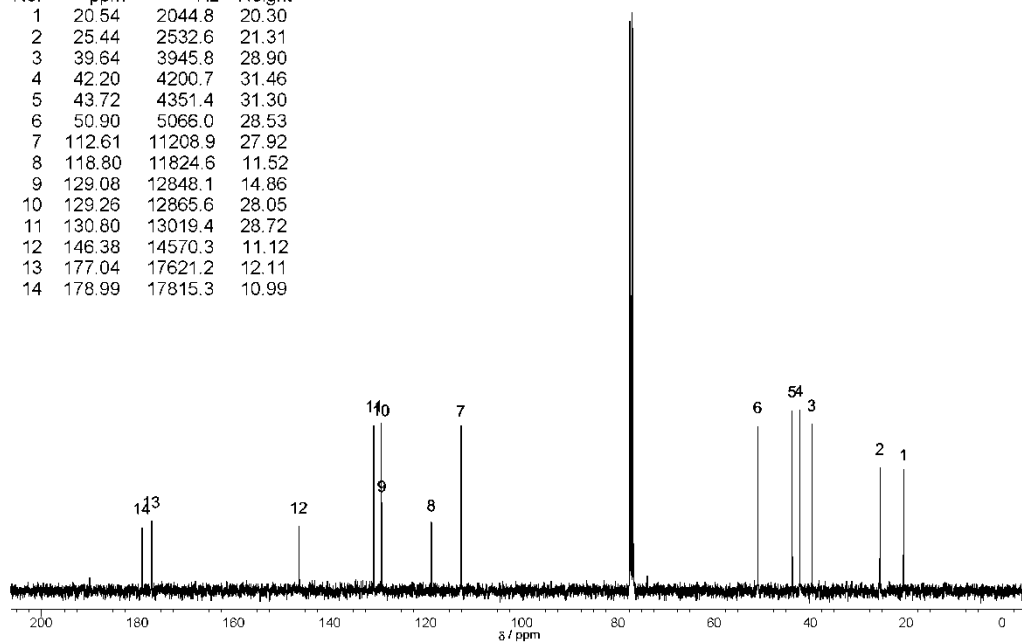
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2	39.66	3986.1	55.83	17	129.29	12995.7	19.06
3	42.33	4254.5	35.83	18	129.53	13019.7	55.73
4	43.80	4402.1	58.81	19	129.94	13060.9	1.97
5	50.99	5125.7	39.34	20	130.26	13093.5	8.40
6	112.78	11335.6	32.92	21	130.59	13126.0	7.26
7	118.32	11893.5	31.80	22	130.87	13154.8	57.69
8	119.73	12034.4	1.64	23	130.91	13158.6	1.77
9	122.43	12306.6	5.96	24	135.19	13589.0	9.04
10	125.14	12578.8	6.80	25	146.50	14725.7	30.43
11	126.12	12676.5	13.66	26	175.59	17649.0	14.58
12	126.15	12680.4	36.55	27	177.54	17845.5	20.71
13	126.19	12684.2	33.36				
14	126.23	12688.0	9.24				
15	126.69	12734.0	100				



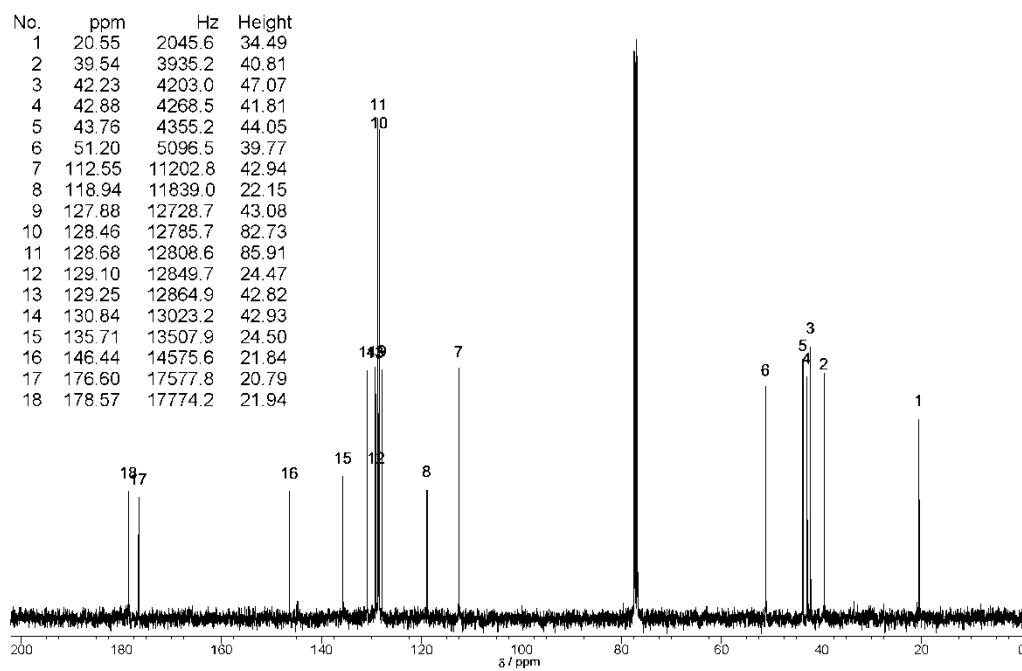
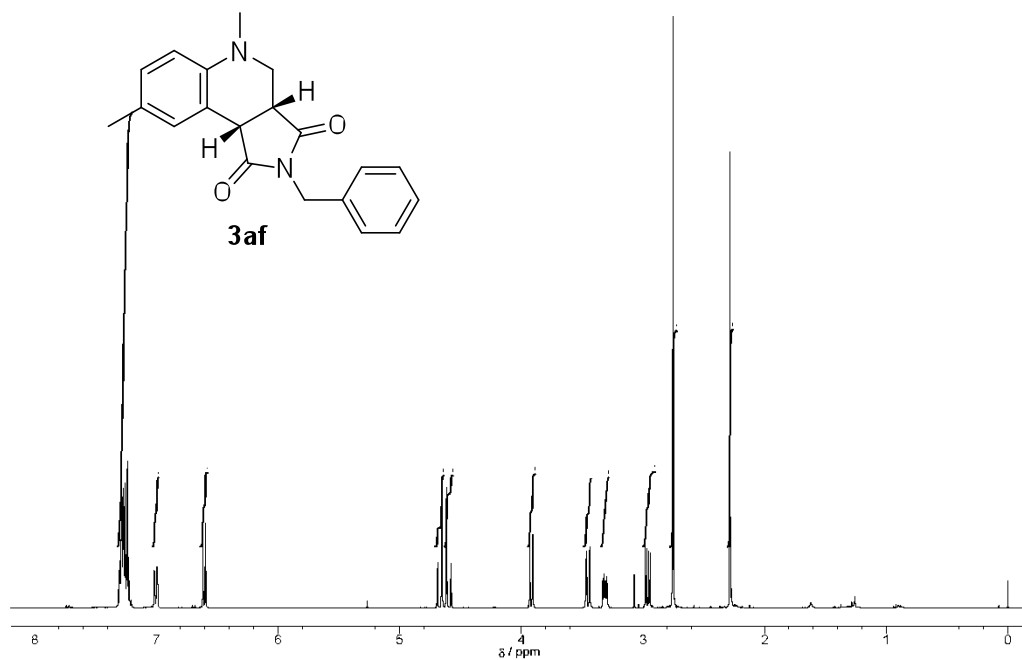
[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **3ae**]



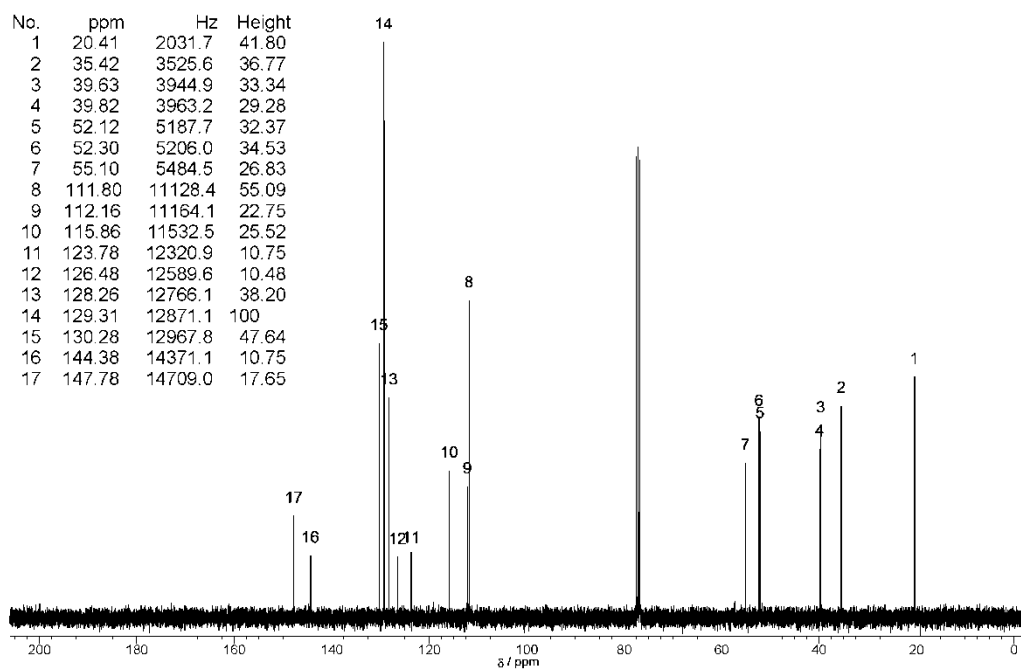
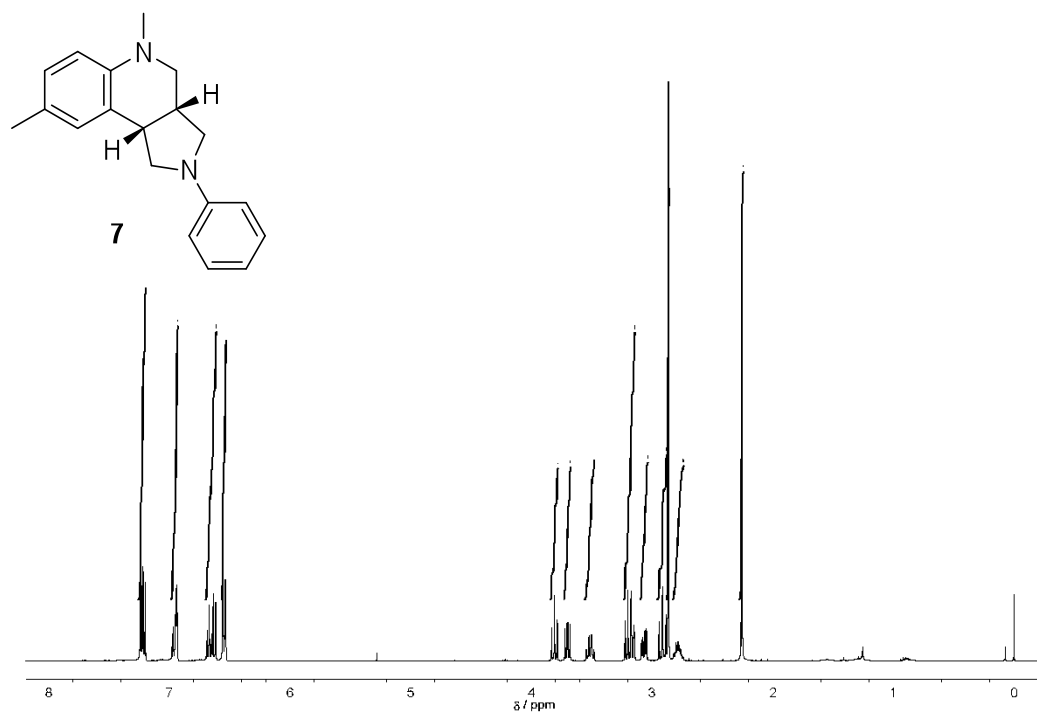
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1	20.54	2044.8	20.30
2	25.44	2532.6	21.31
3	39.64	3945.8	28.90
4	42.20	4200.7	31.46
5	43.72	4351.4	31.30
6	50.90	5066.0	28.53
7	112.61	11208.9	27.92
8	118.80	11824.6	11.52
9	129.08	12848.1	14.86
10	129.26	12865.6	28.05
11	130.80	13019.4	28.72
12	146.38	14570.3	11.12
13	177.04	17621.2	12.11
14	178.99	17815.3	10.99



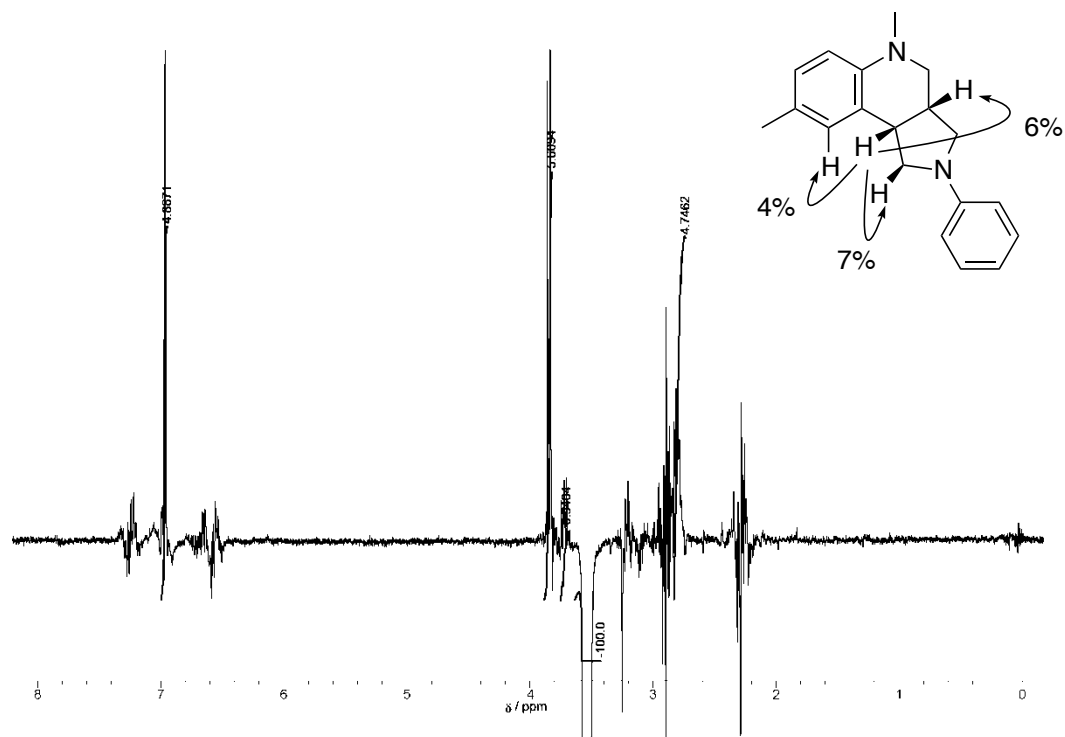
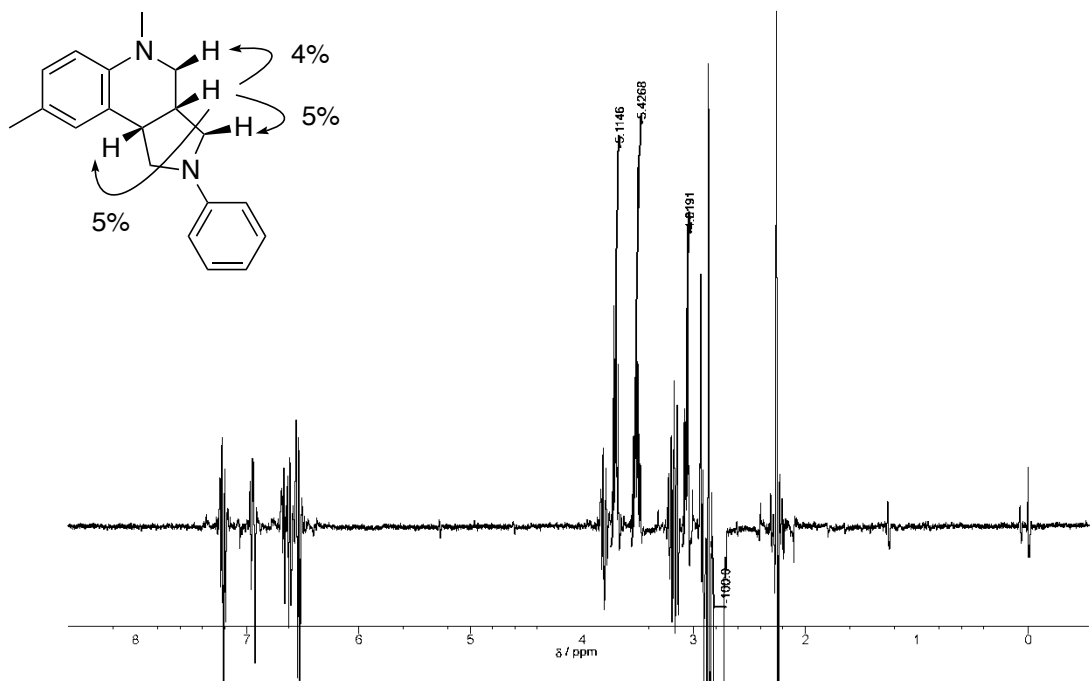
[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **3af**]



[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **7**]

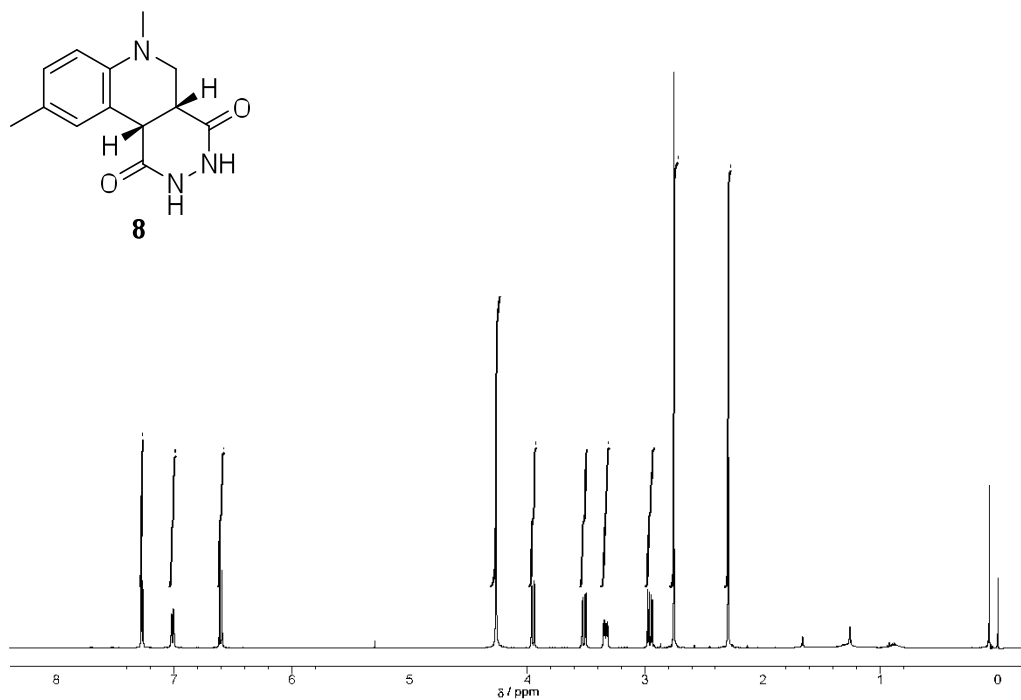


[NOE analysis of 7]

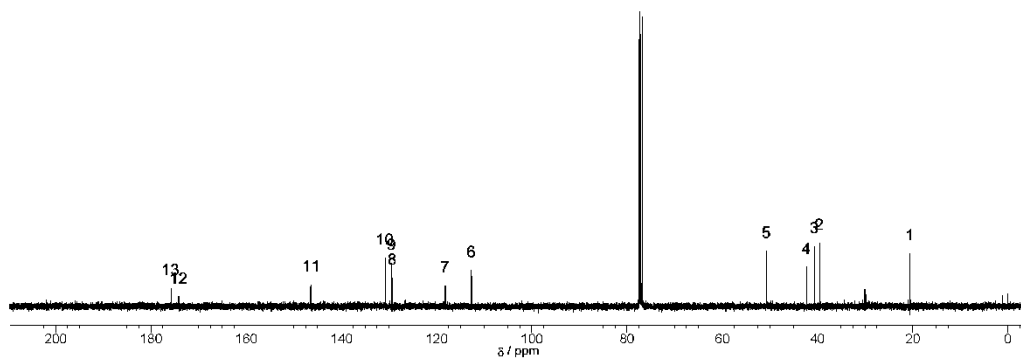




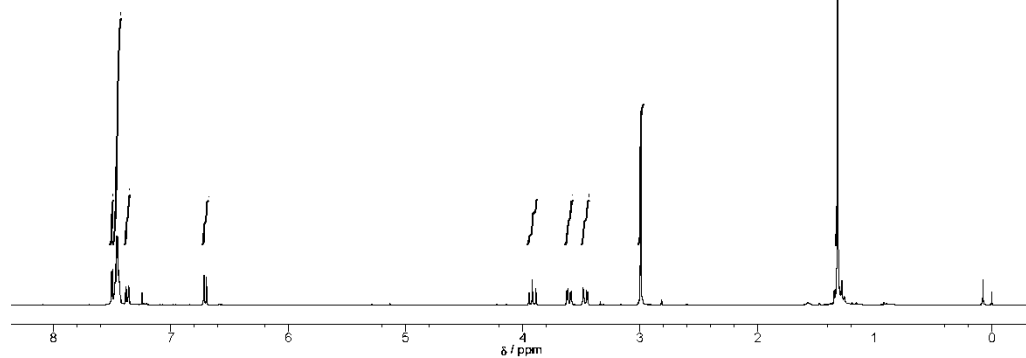
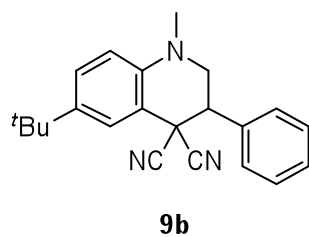
[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **8**]



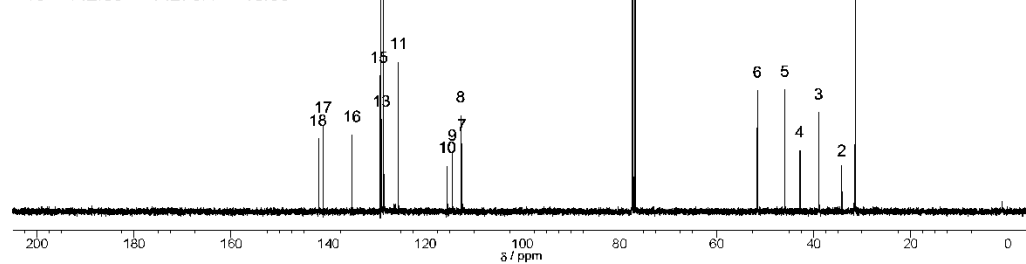
No.	ppm	Hz	Height
1	20.56	2066.3	17.93
2	39.61	3981.3	21.48
3	40.67	4087.7	20.37
4	42.30	4251.6	13.20
5	50.76	5101.8	18.78
6	112.71	11328.9	12.26
7	118.25	11885.8	7.05
8	129.29	12995.7	9.70
9	129.47	13013.9	14.68
10	130.84	13151.0	16.44
11	146.41	14716.1	7.41
12	174.17	17506.2	3.21
13	175.85	17675.9	6.24



[ $^1\text{H}$  and  $^{13}\text{C}$  NMR Spectra of **9b**]



No.	ppm	Hz	Height
1	31.47	3162.8	100
2	34.15	3433.1	8.10
3	38.95	3915.2	18.89
4	42.84	4306.2	11.65
5	45.97	4620.6	23.27
6	51.60	5186.1	23.13
7	112.42	11300.2	12.98
8	112.71	11328.9	18.33
9	114.41	11499.5	11.03
10	115.45	11605.0	8.67
11	125.58	12622.9	28.58
12	128.62	12928.6	55.39
13	129.00	12966.9	17.55
14	129.29	12995.7	59.89
15	129.48	13014.9	25.93
16	135.06	13575.6	14.59
17	141.02	14174.6	16.35
18	142.05	14278.1	13.88



[<sup>1</sup>H and <sup>13</sup>C NMR Spectra of **9c**]

