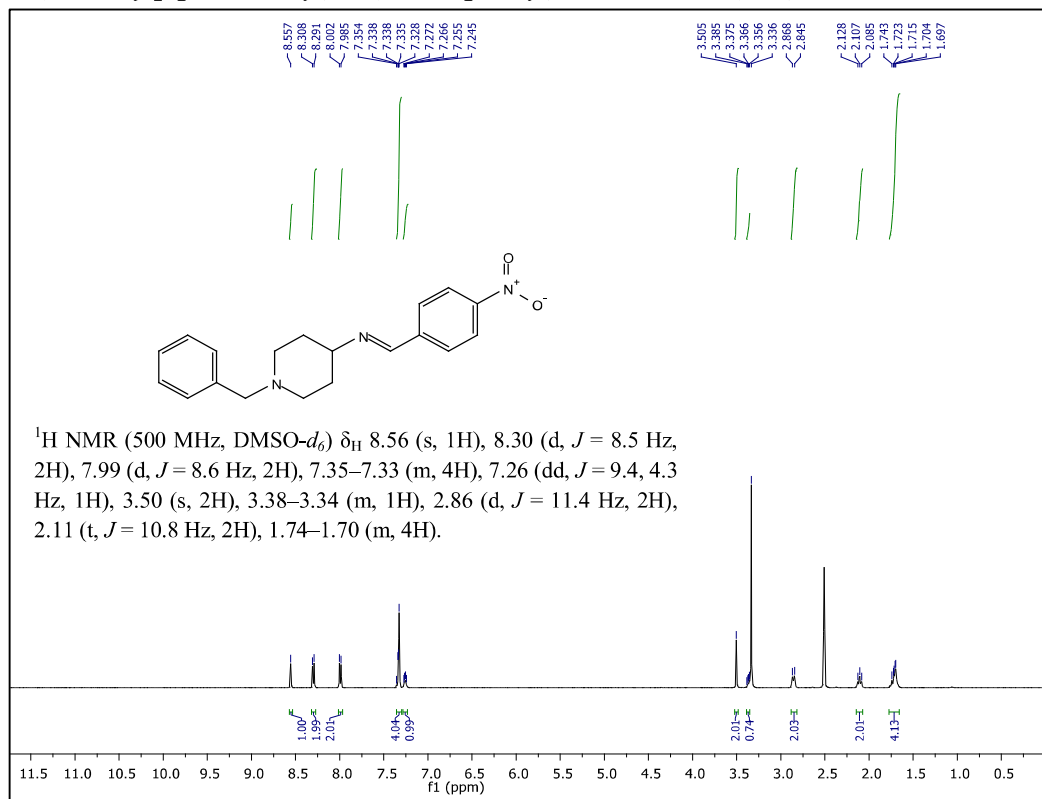
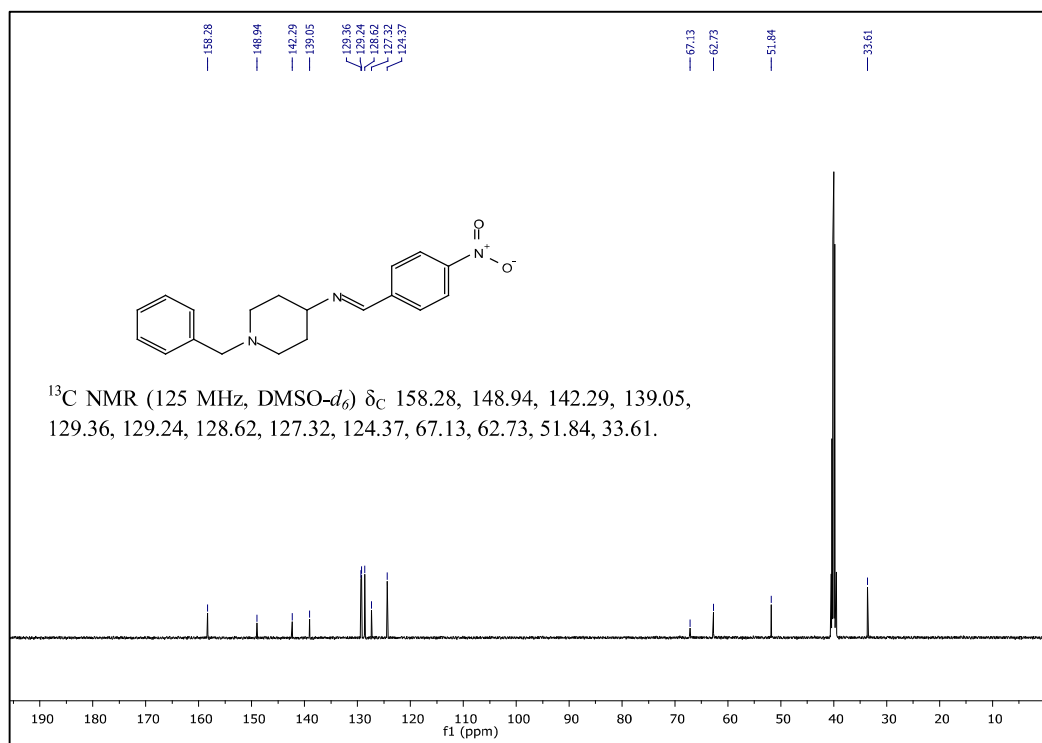
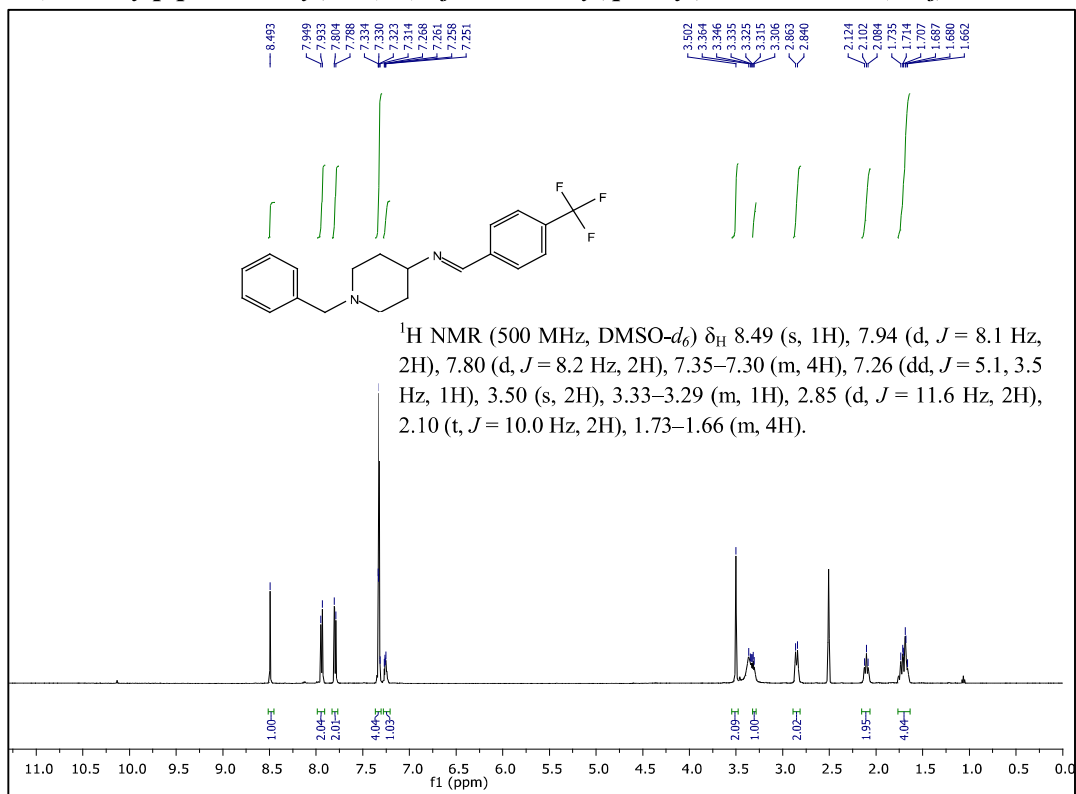
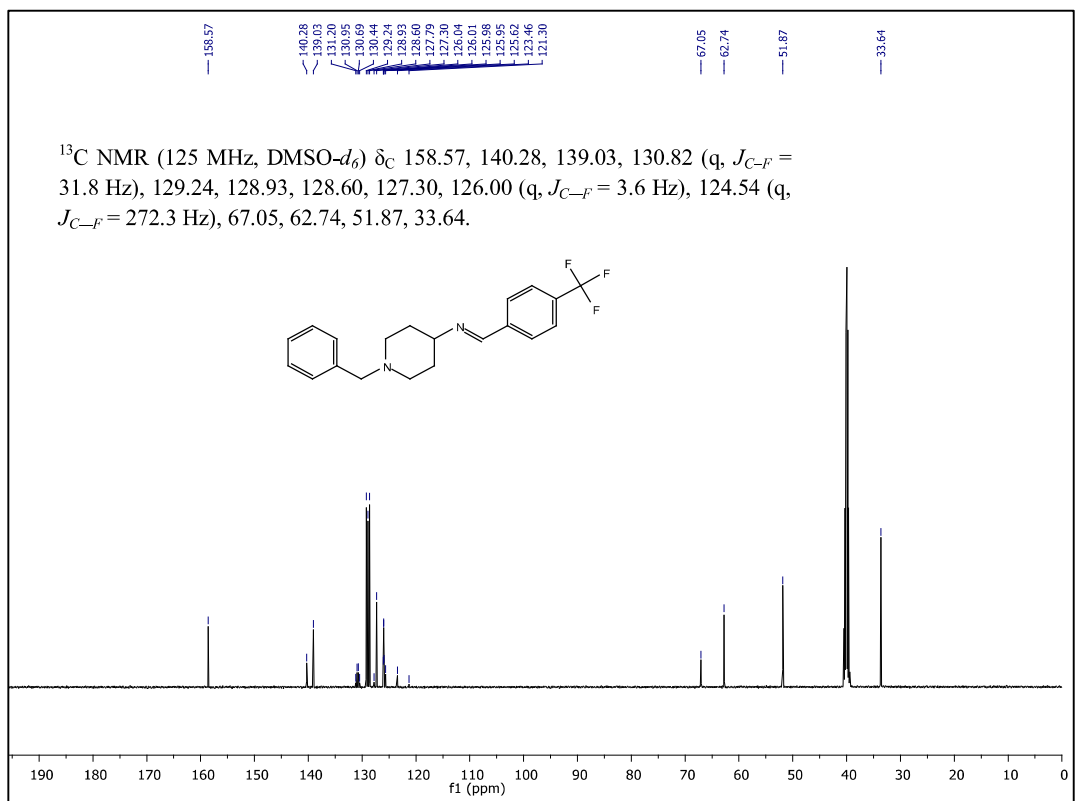
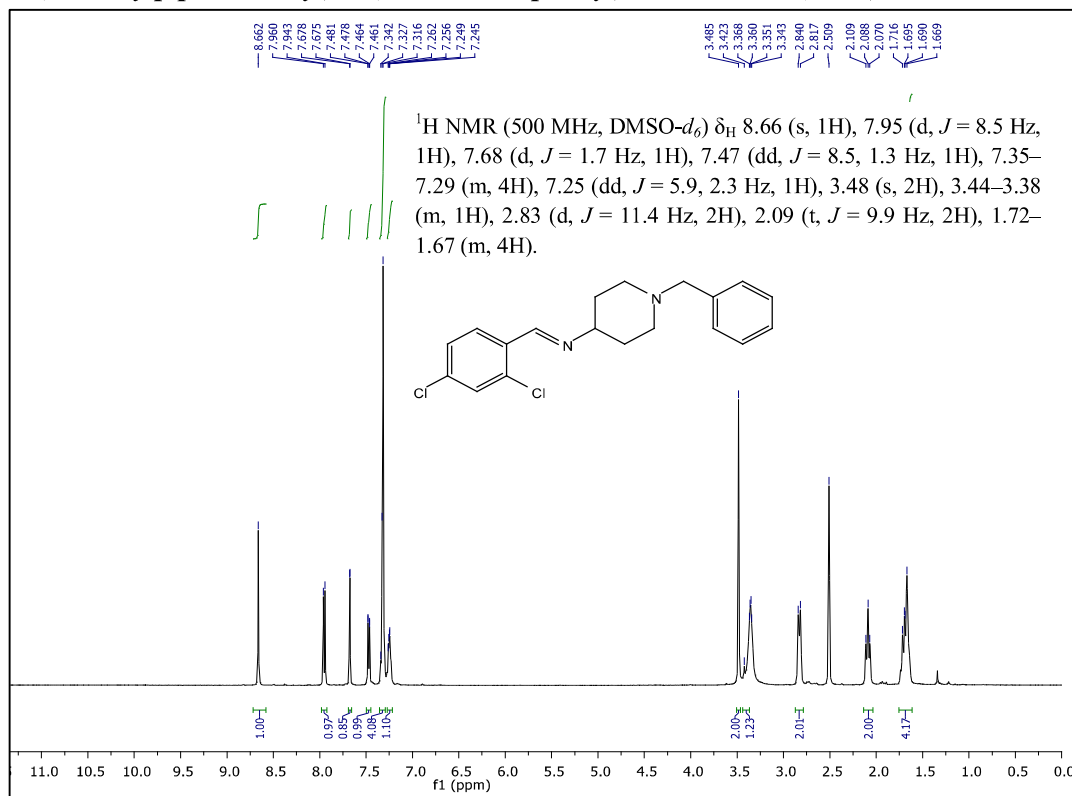
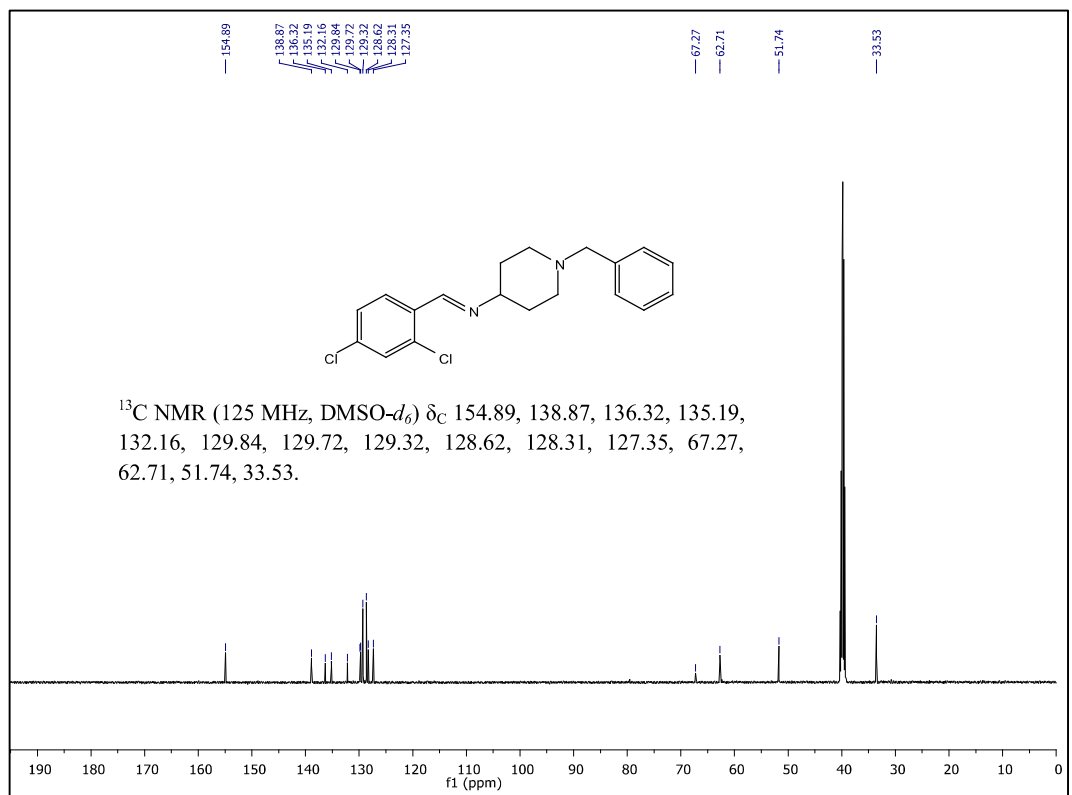
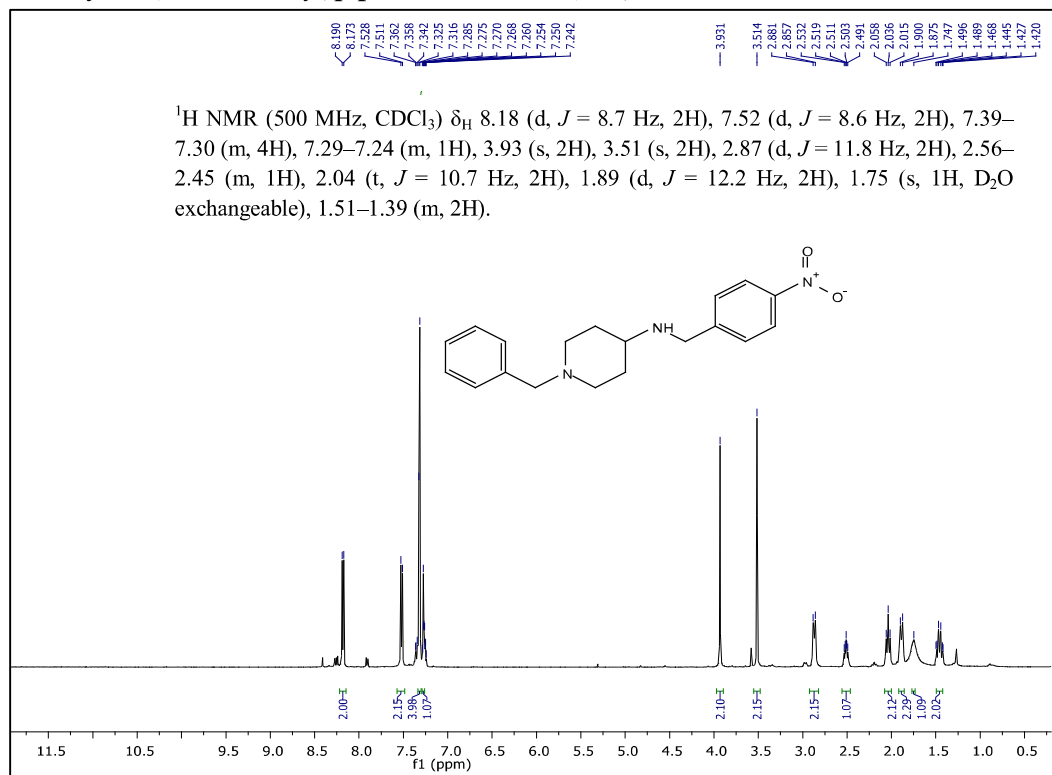
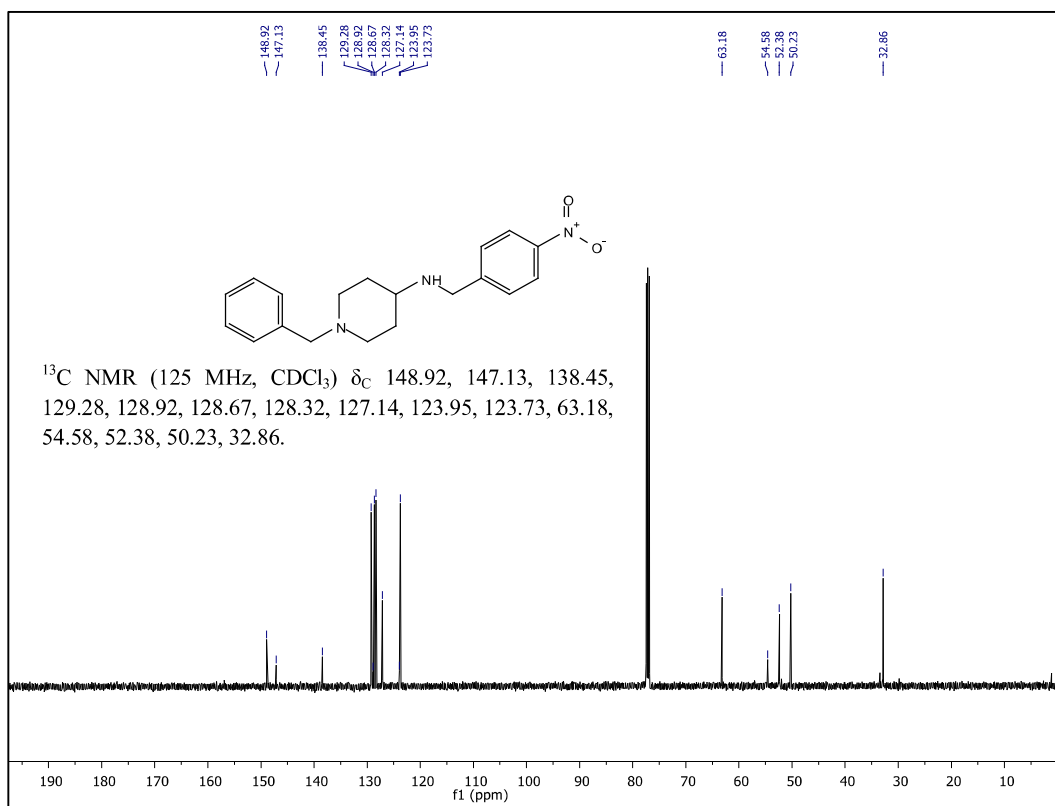


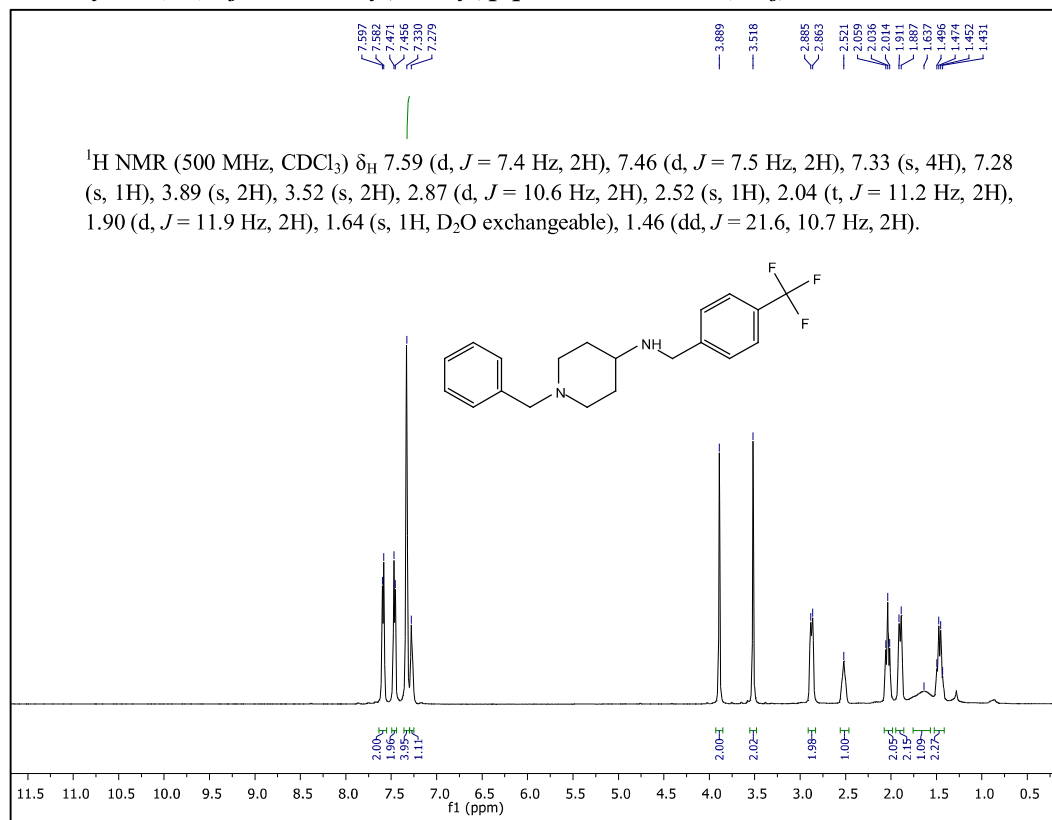
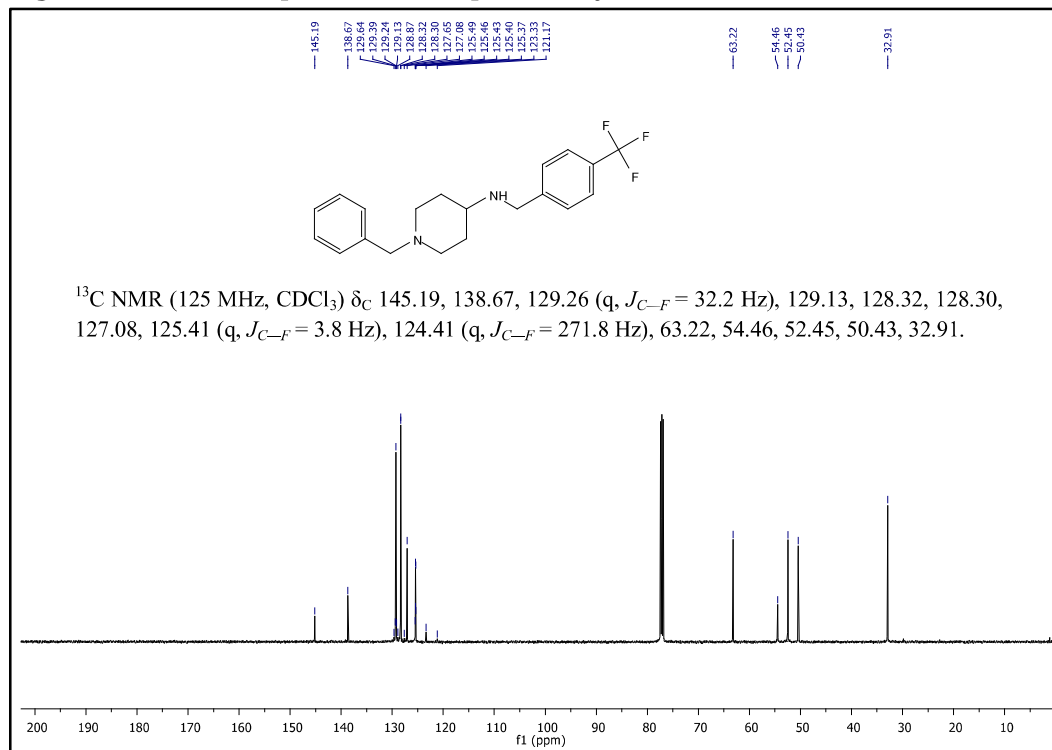
Chapter 8
(Appendix)

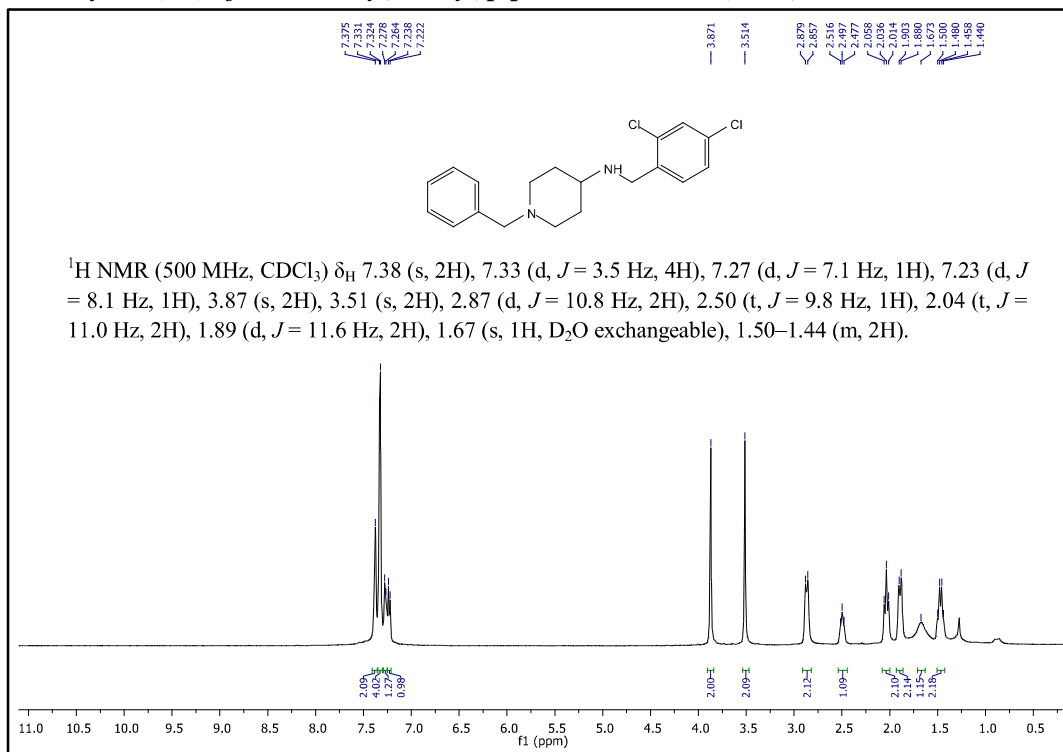
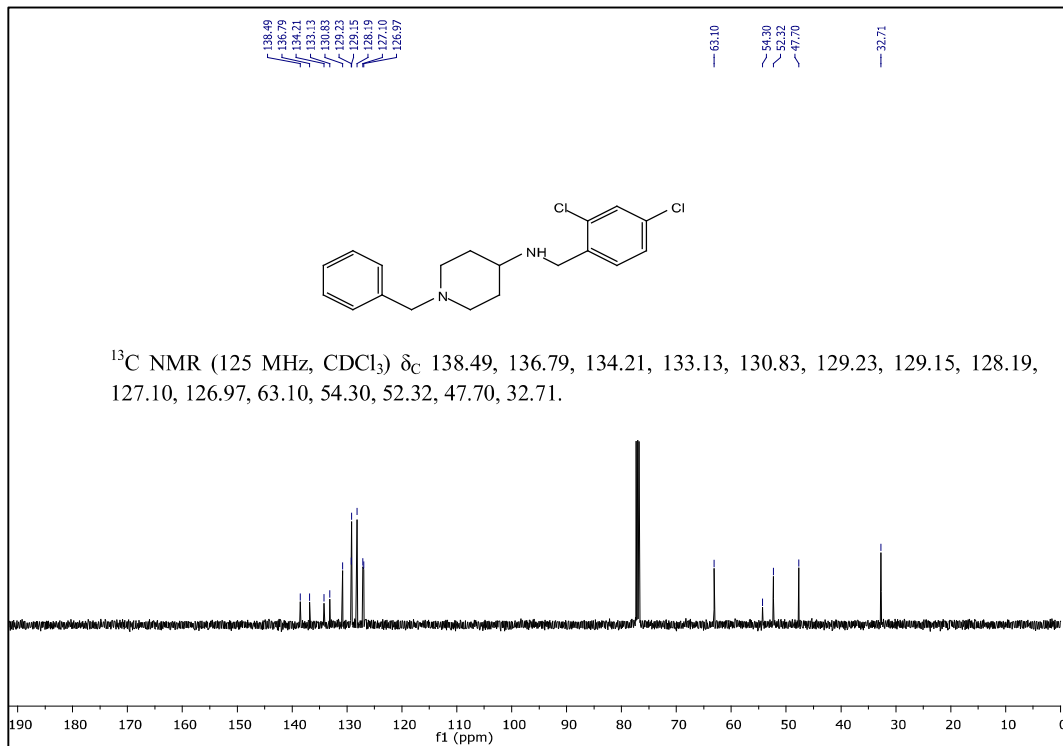
8.1. ^1H and ^{13}C NMR spectra of representative synthesized compounds*N*-(1-Benzylpiperidin-4-yl)-1-(4-nitrophenyl)methanimine (*S*_{13i})Figure 8.1. ^1H NMR spectrum of compound *S*_{13i}Figure 8.2. ^{13}C NMR spectrum of compound *S*_{13i}

N-(1-Benzylpiperidin-4-yl)-1-(4-(trifluoromethyl)phenyl)methanimine (*S*_{13j})Figure 8.3. ¹H NMR spectrum of compound *S*_{13j}Figure 8.4. ¹³C NMR spectrum of compound *S*_{13j}

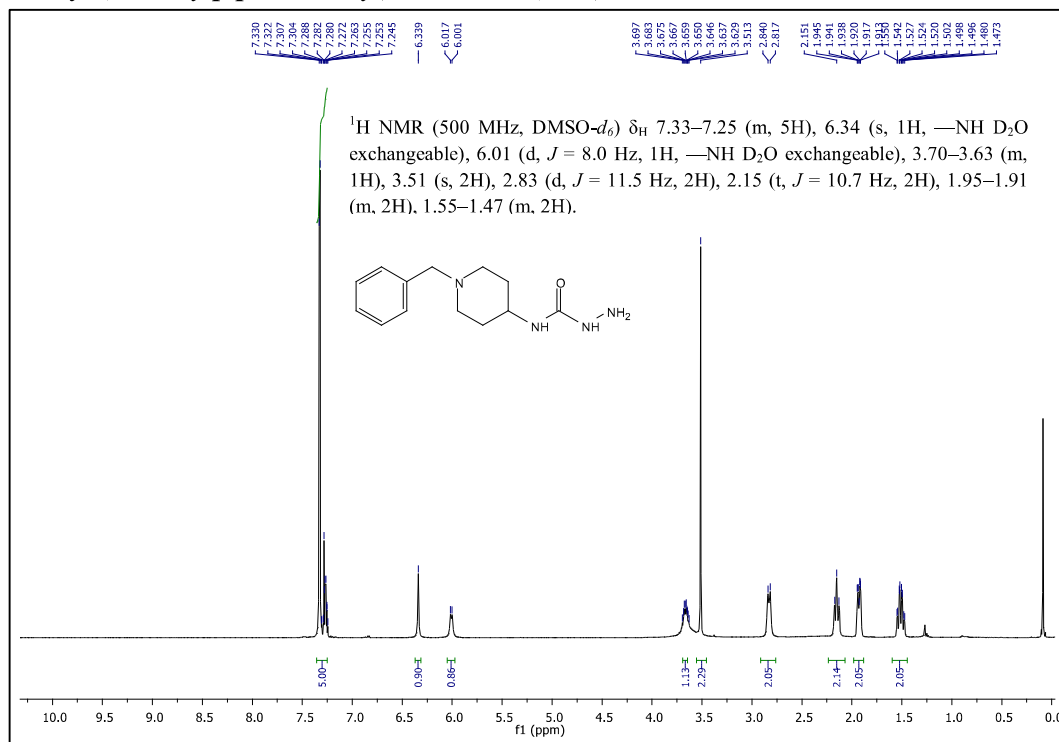
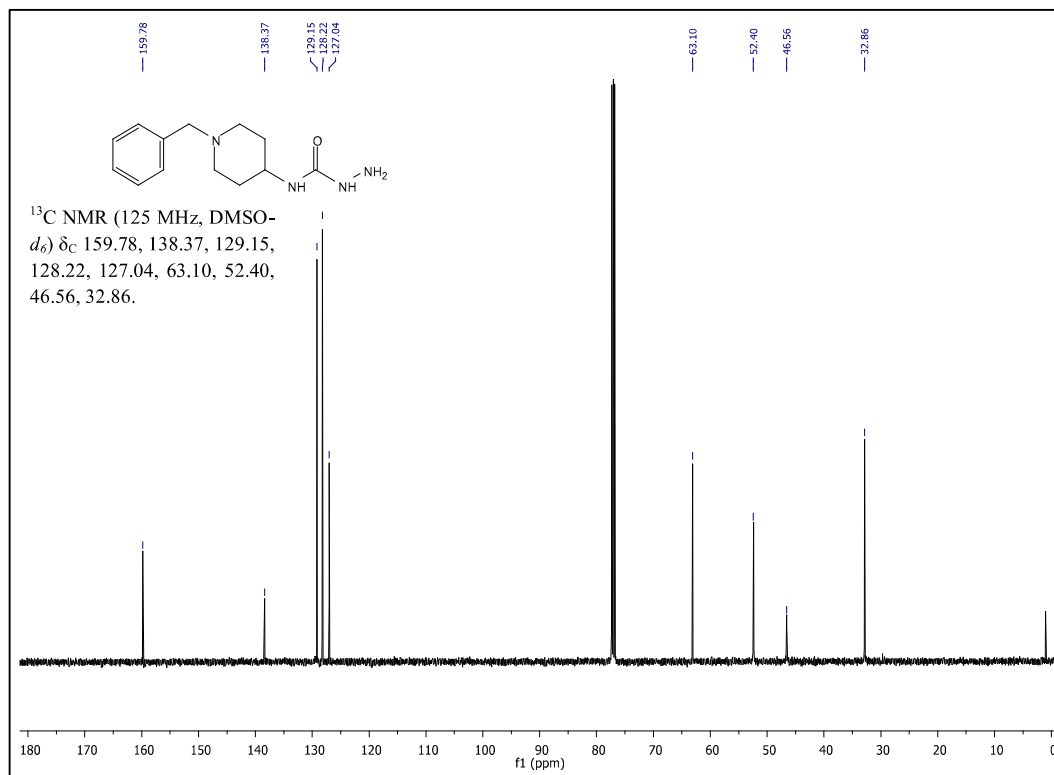
N-(1-Benzylpiperidin-4-yl)-1-(2,4-dichlorophenyl)methanimine (*S*₁*3m*)Figure 8.5. ¹H NMR spectrum of compound *S*₁*3m*Figure 8.6. ¹³C NMR spectrum of compound *S*₁*3m*

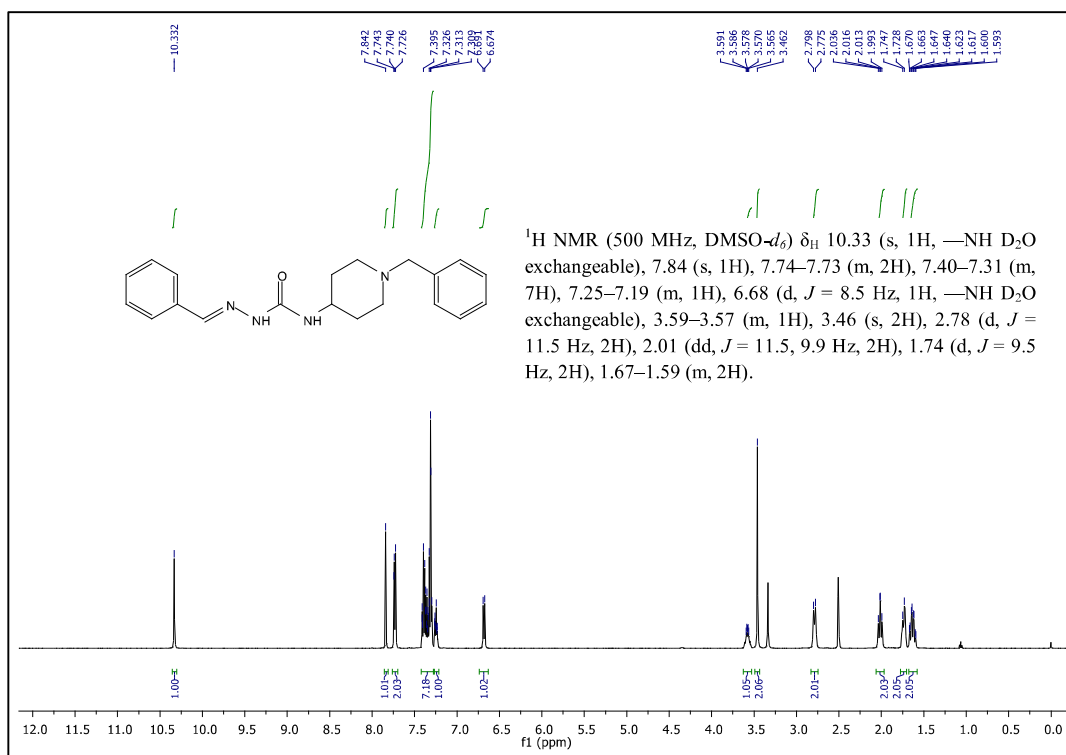
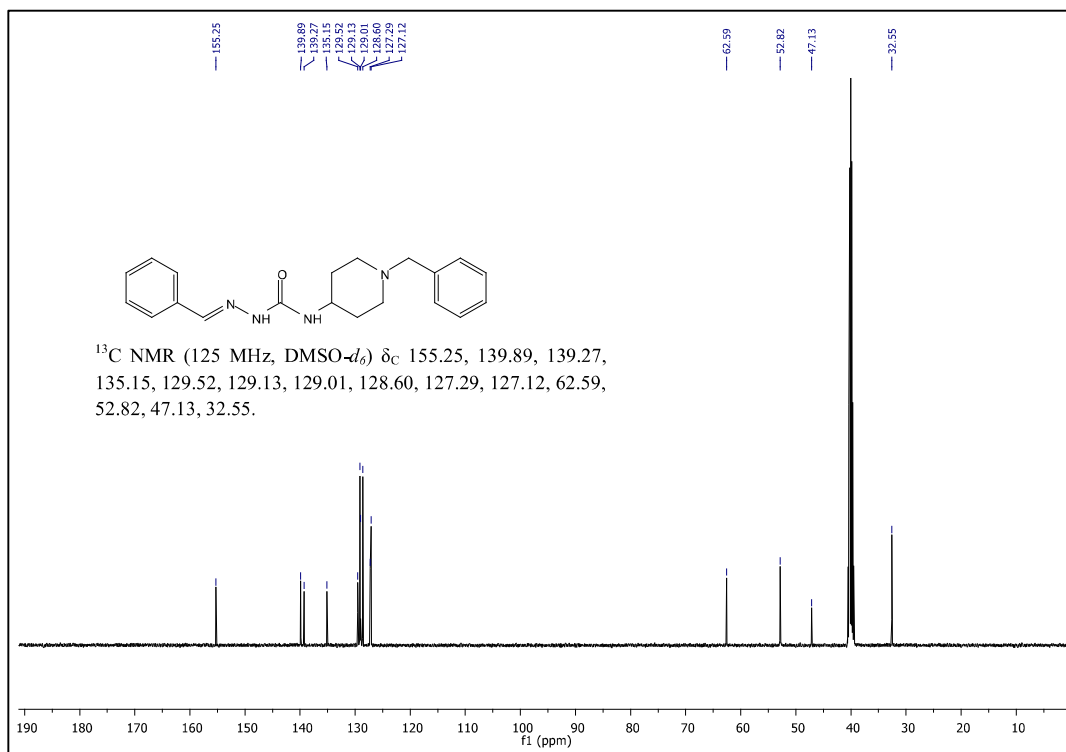
1-Benzyl-N-(4-nitrobenzyl)piperidin-4-amine (S_{14i})Figure 8.7. ¹H NMR spectrum of compound S_{14i}Figure 8.8. ¹³C NMR spectrum of compound S_{14i}

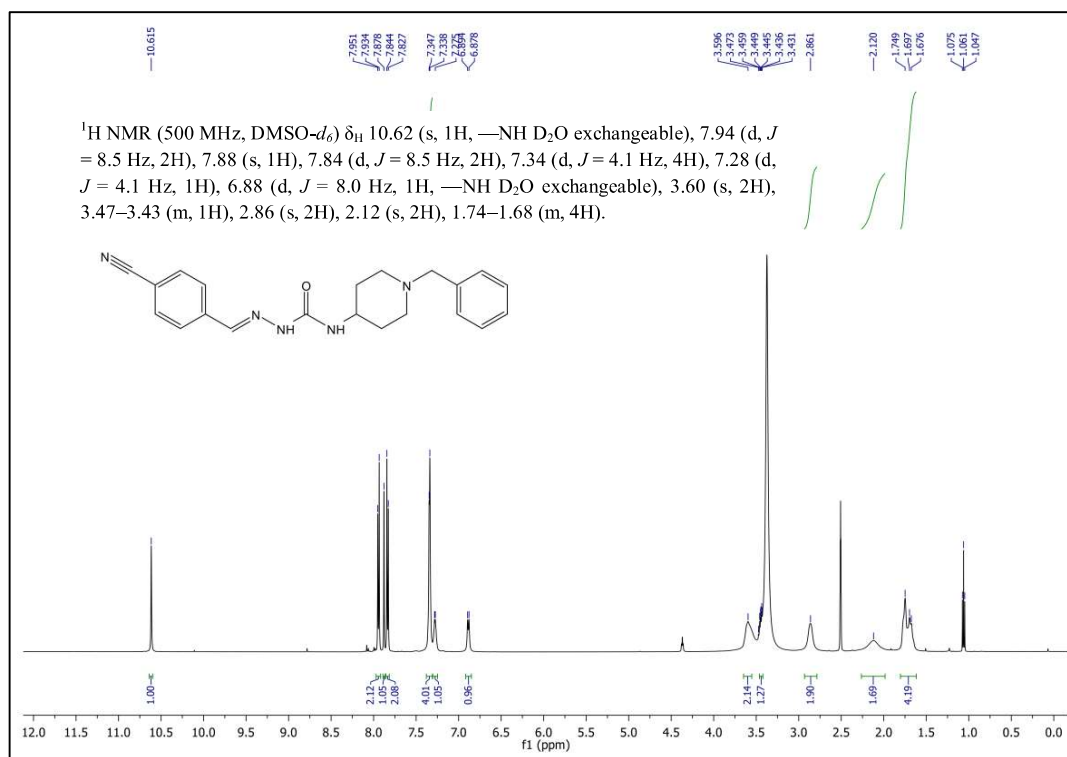
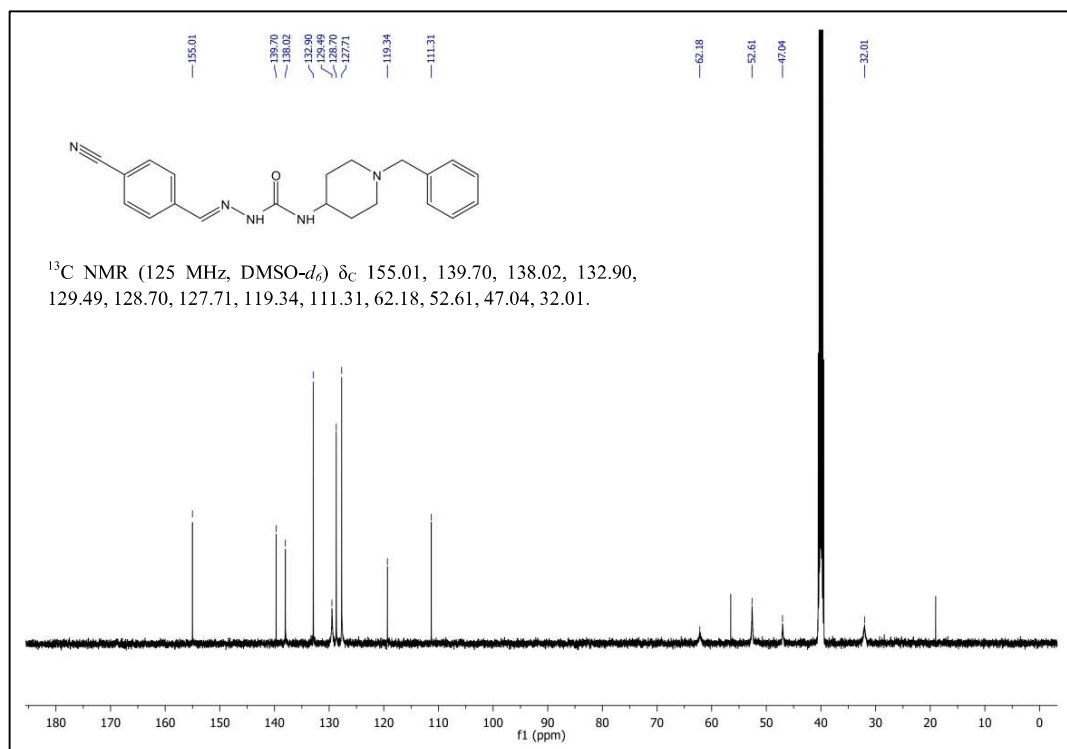
1-Benzyl-N-(4-(trifluoromethyl)benzyl)piperidin-4-amine (S_{14j})**Figure 8.9.** ¹H NMR spectrum of compound S_{14j}**Figure 8.10.** ¹³C NMR spectrum of compound S_{14j}

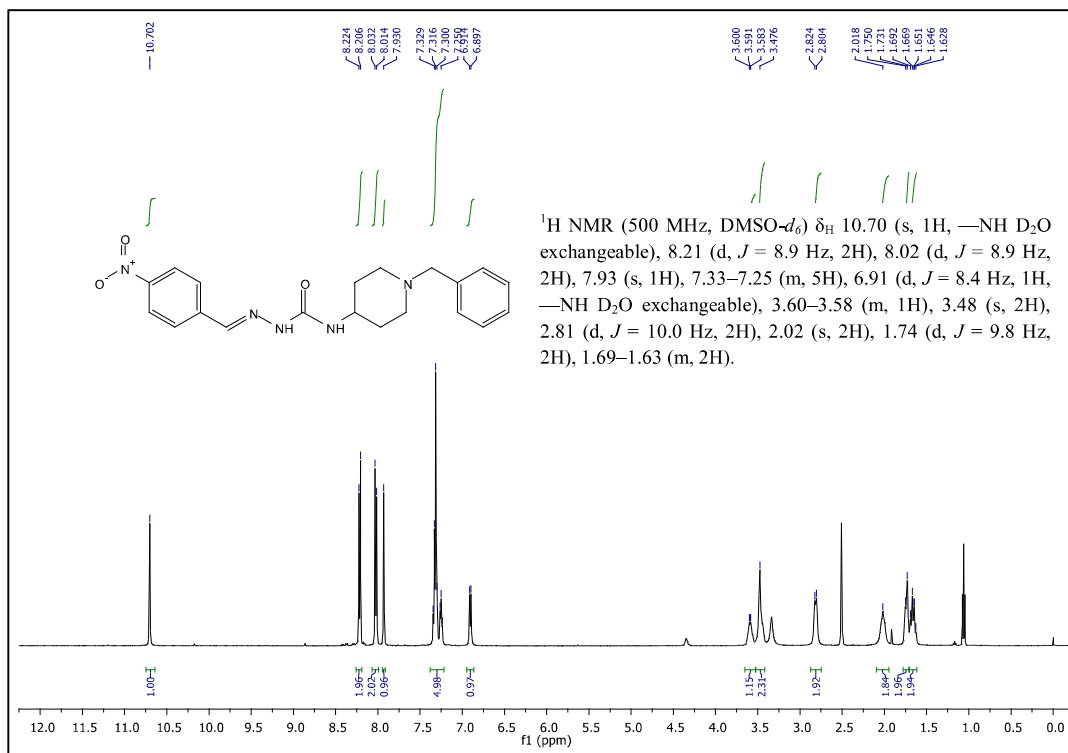
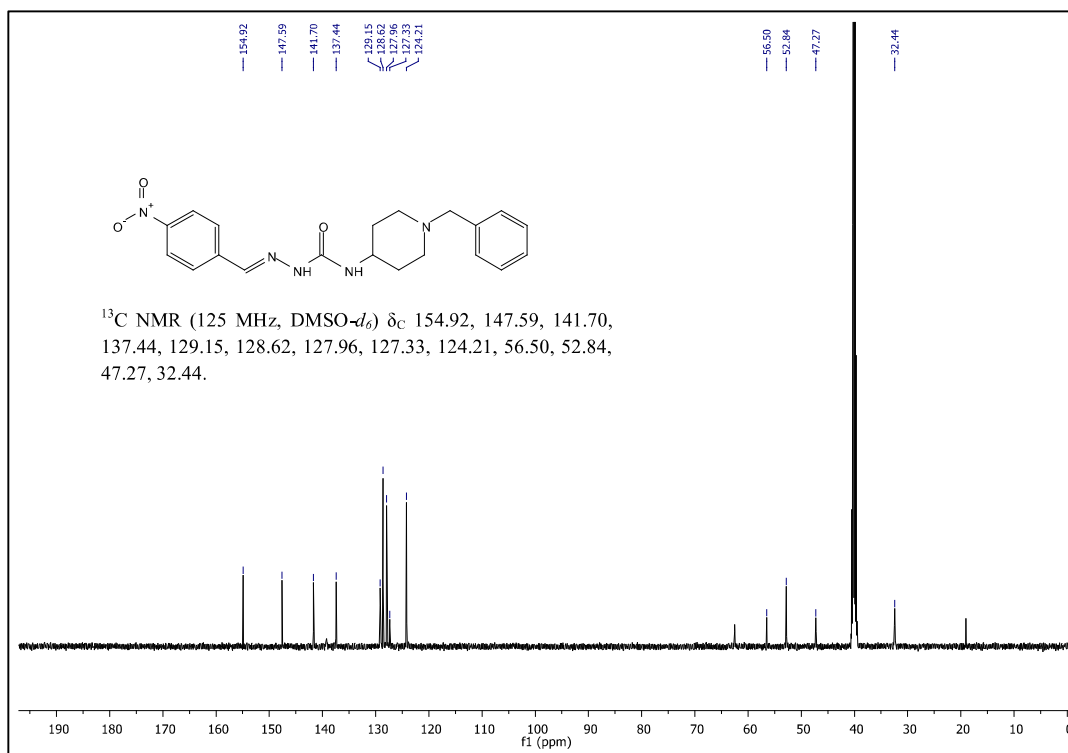
1-Benzyl-N-(4-(trifluoromethyl)benzyl)piperidin-4-amine (S₁₄m)Figure 8.11. ¹H NMR spectrum of compound S₁₄mFigure 8.12. ¹³C NMR spectrum of compound S₁₄m

Phenyl (1-benzylpiperidin-4-yl)carbamate (SII8)

Figure 8.13. ¹H NMR spectrum of compound SII8Figure 8.14. ¹³C NMR spectrum of compound SII8

2-Benzylidene-N-(1-benzylpiperidin-4-yl)hydrazine-1-carboxamide (*S₁₁9a*)Figure 8.15. ¹H NMR spectrum of compound *S₁₁9a*Figure 8.16. ¹³C NMR spectrum of compound *S₁₁9a*

N-(1-Benzylpiperidin-4-yl)-2-(4-cyanobenzylidene)hydrazine-1-carboxamide (*S*₁₁9b)Figure 8.17. ¹H NMR spectrum of compound *S*₁₁9bFigure 8.18. ¹³C NMR spectrum of compound *S*₁₁9b

N-(1-Benzylpiperidin-4-yl)-2-(4-nitrobenzylidene)hydrazine-1-carboxamide (*S*_{II}9c)Figure 8.19. ¹H NMR spectrum of compound *S*_{II}9cFigure 8.20. ¹³C NMR spectrum of compound *S*_{II}9c

N-(1-Benzylpiperidin-4-yl)-2-(2,4-difluorobenzylidene)hydrazine-1-carboxamide
(S_{II}9d)

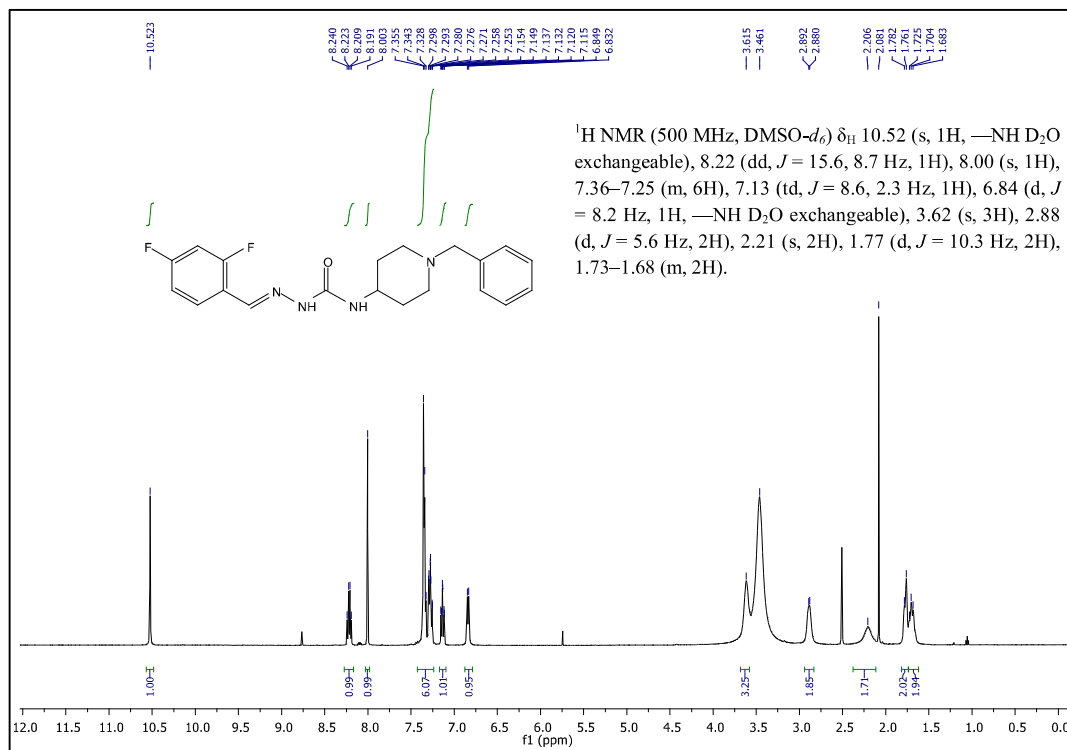


Figure 8.21. ¹H NMR spectrum of compound S_{II}9d

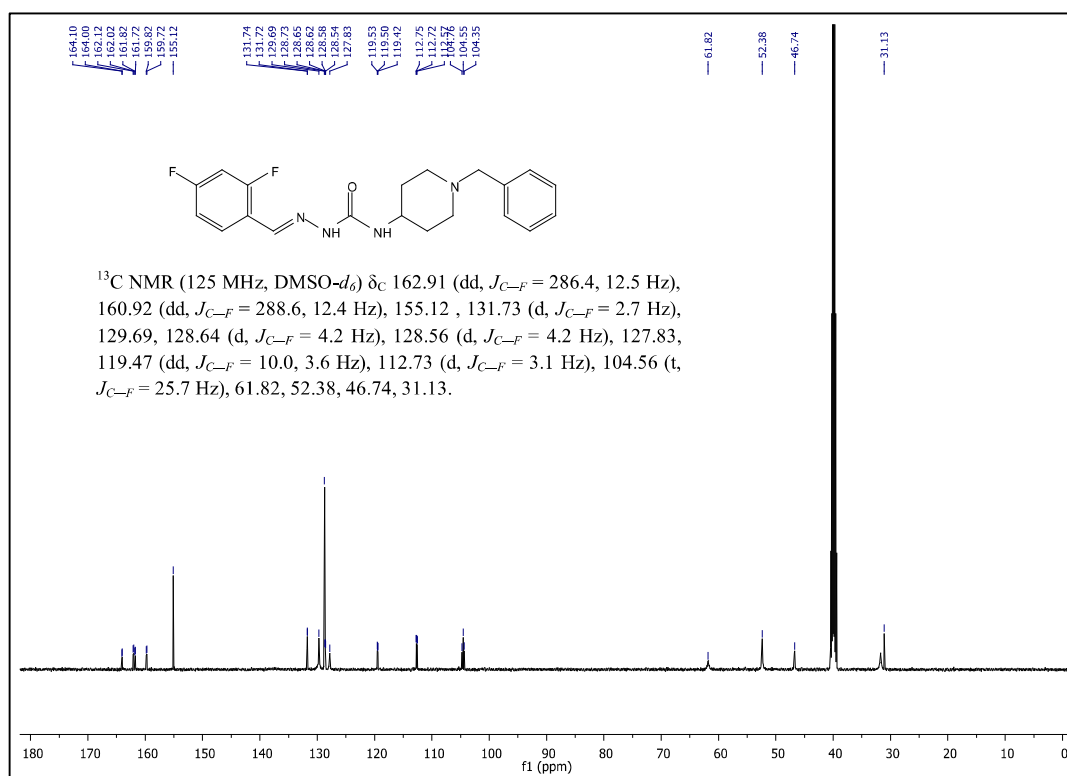
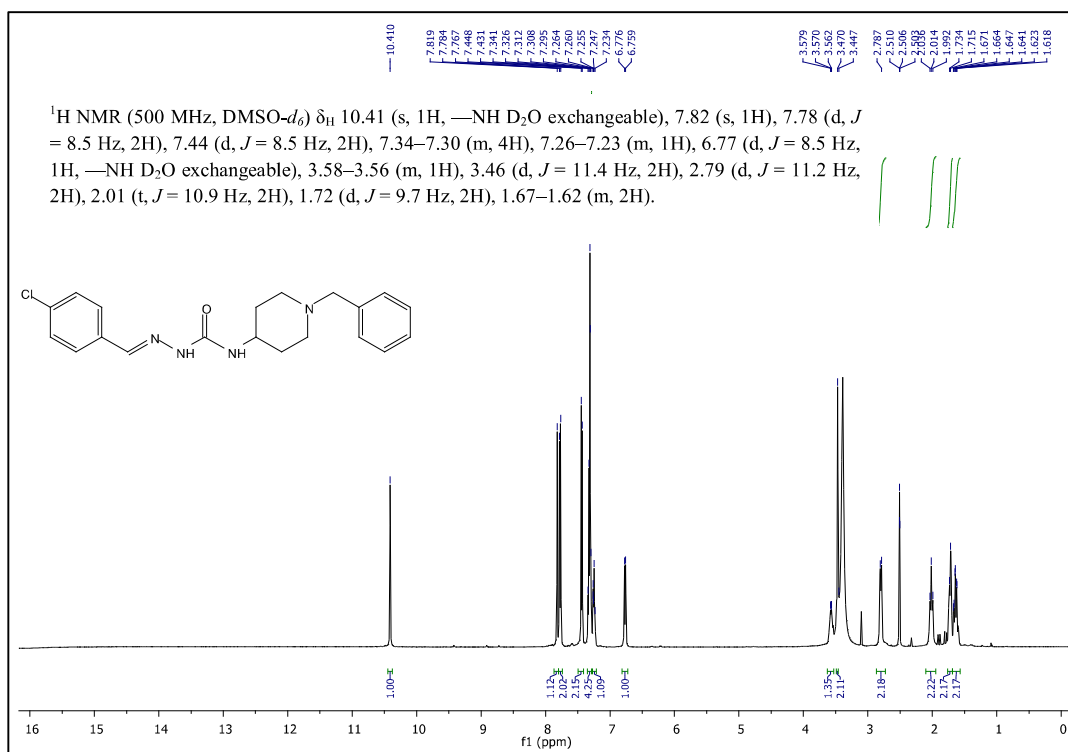
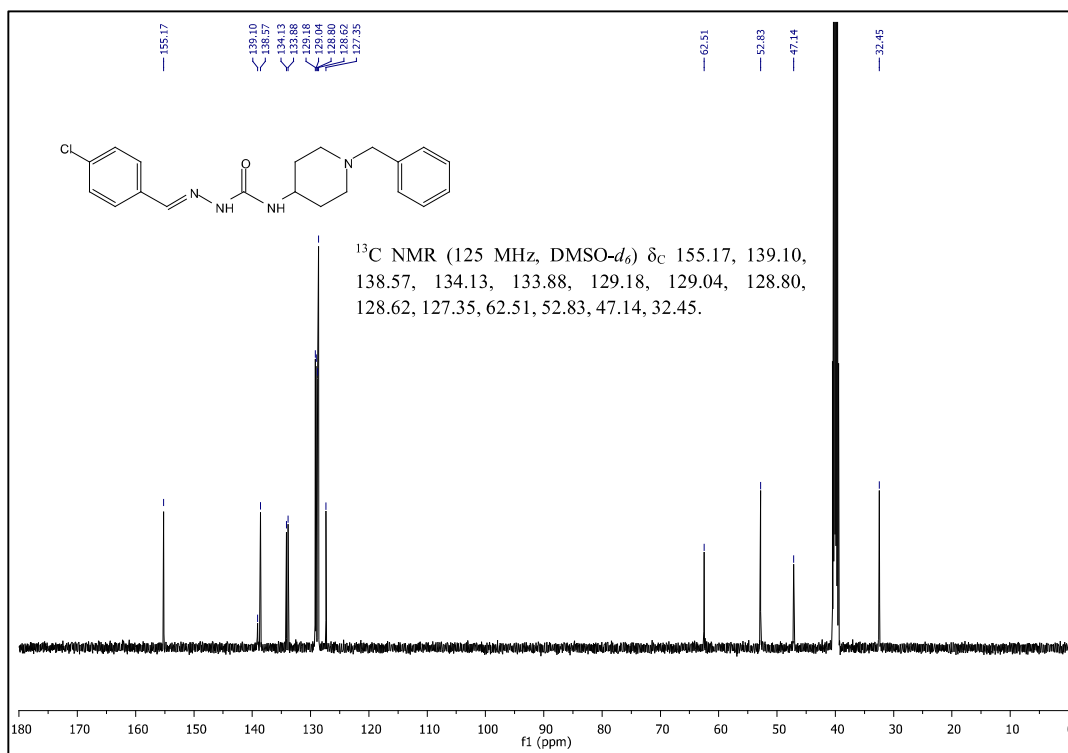


Figure 8.22. ¹³C NMR spectrum of compound S_{II}9d

N-(1-Benzylpiperidin-4-yl)-2-(4-chlorobenzylidene)hydrazine-1-carboxamide (*S*_{II}9e)Figure 8.23. ¹H NMR spectrum of compound *S*_{II}9eFigure 8.24. ¹³C NMR spectrum of compound *S*_{II}9e

N-(1-Benzylpiperidin-4-yl)-2-(2,4-dichlorobenzylidene)hydrazine-1-carboxamide (**S_{II}9f**)

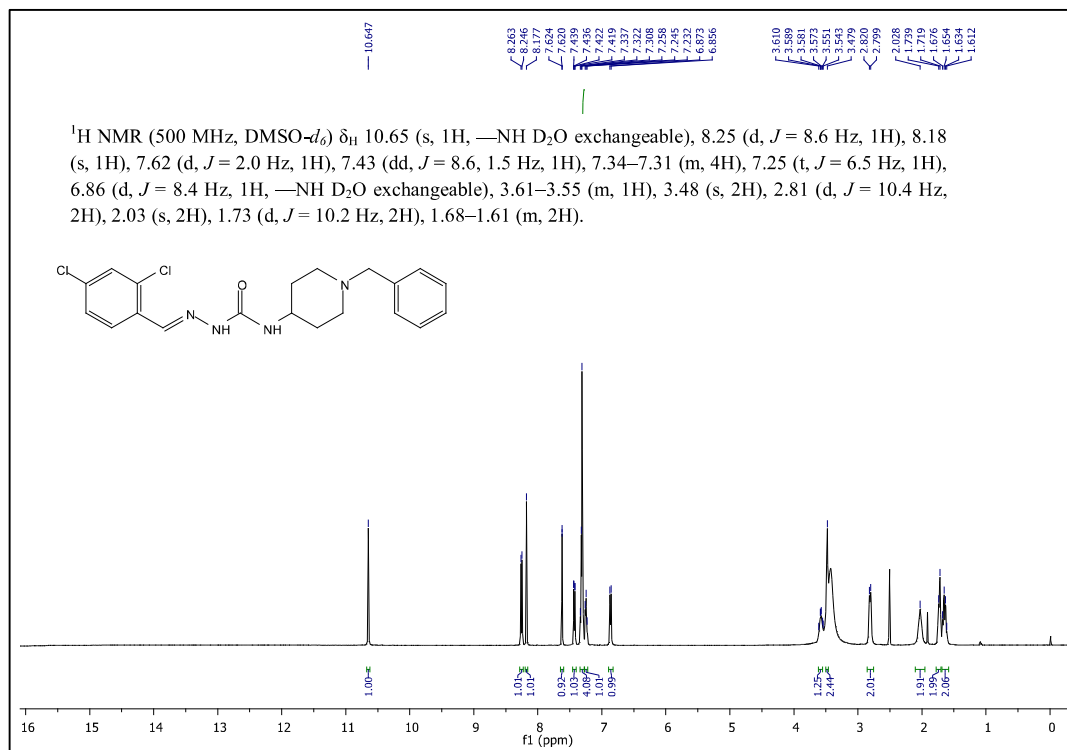


Figure 8.25. ¹H NMR spectrum of compound **S_{II}9f**

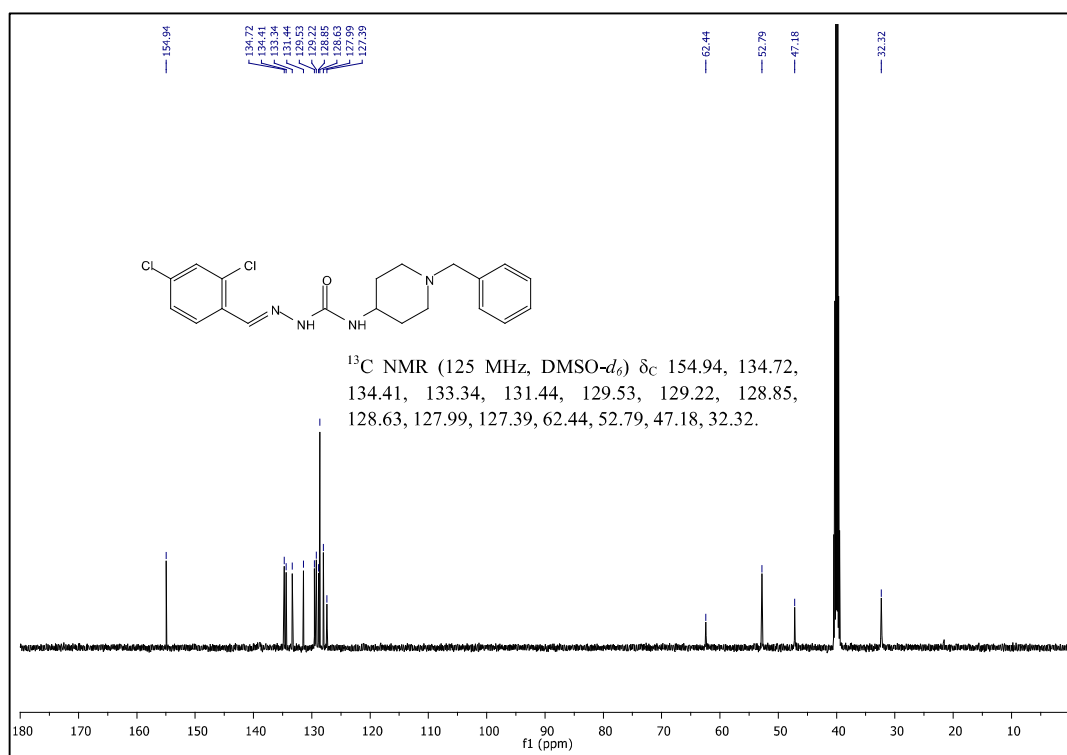


Figure 8.26. ¹³C NMR spectrum of compound **S_{II}9f**

N-(1-Benzylpiperidin-4-yl)-2-(4-(trifluoromethyl)benzylidene)hydrazine-1-carboxamide (**S_{II}9g**)

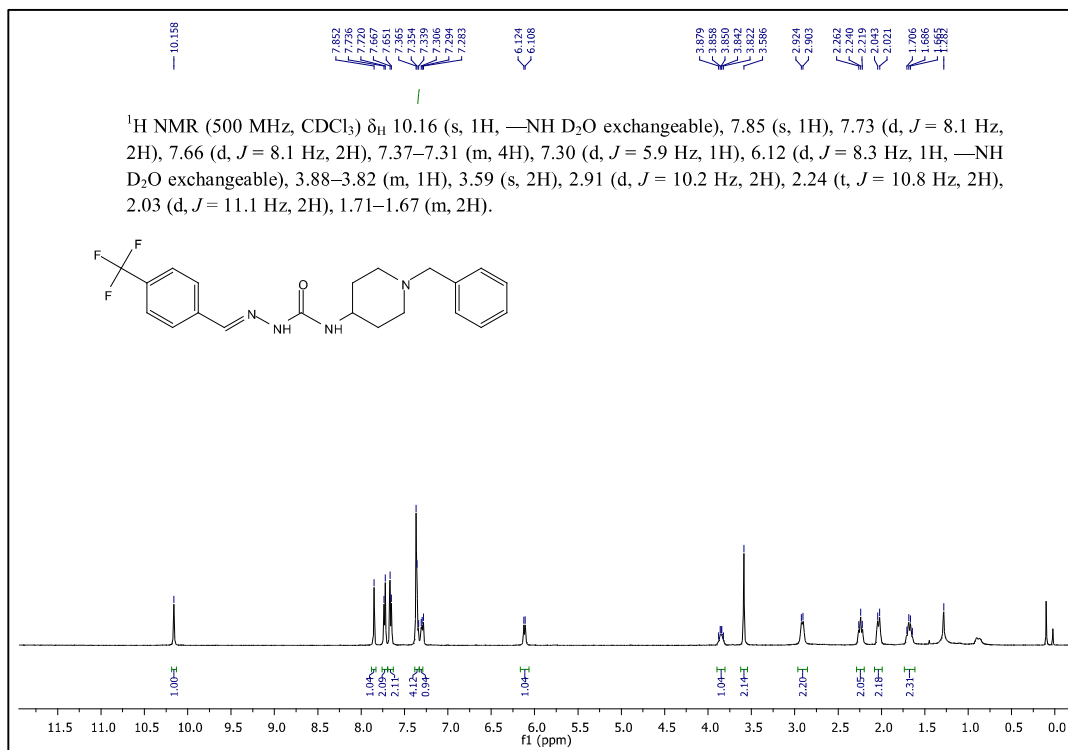


Figure 8.27. ¹H NMR spectrum of compound **S_{II}9g**

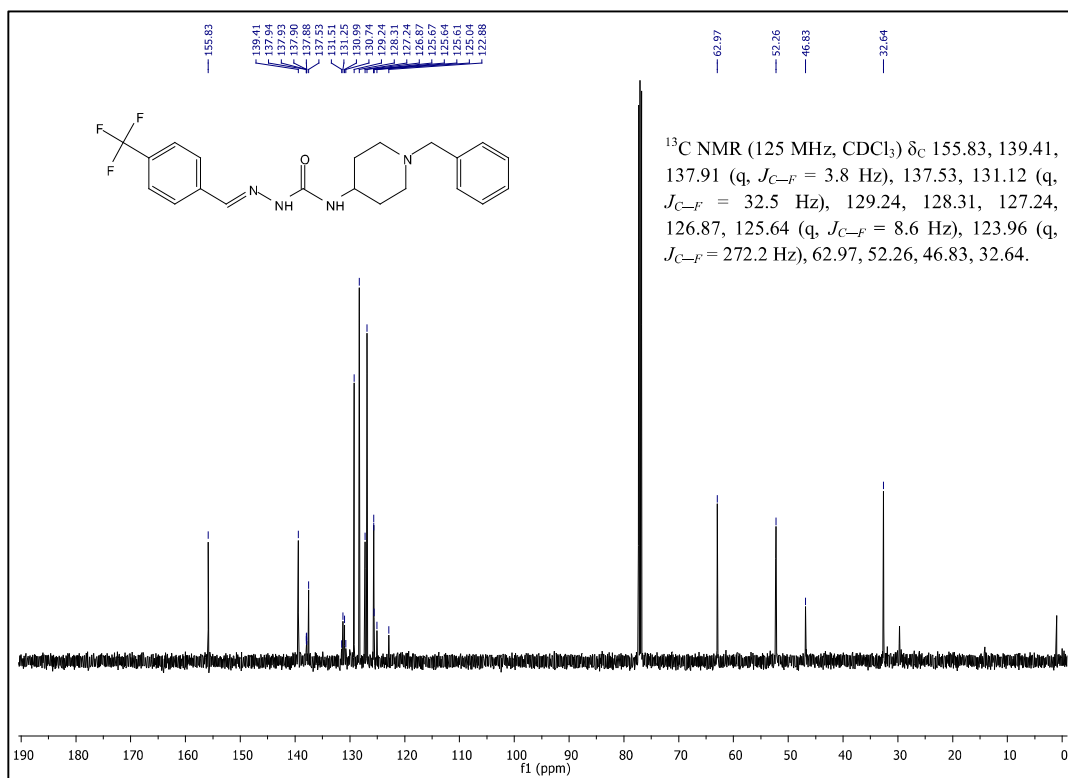
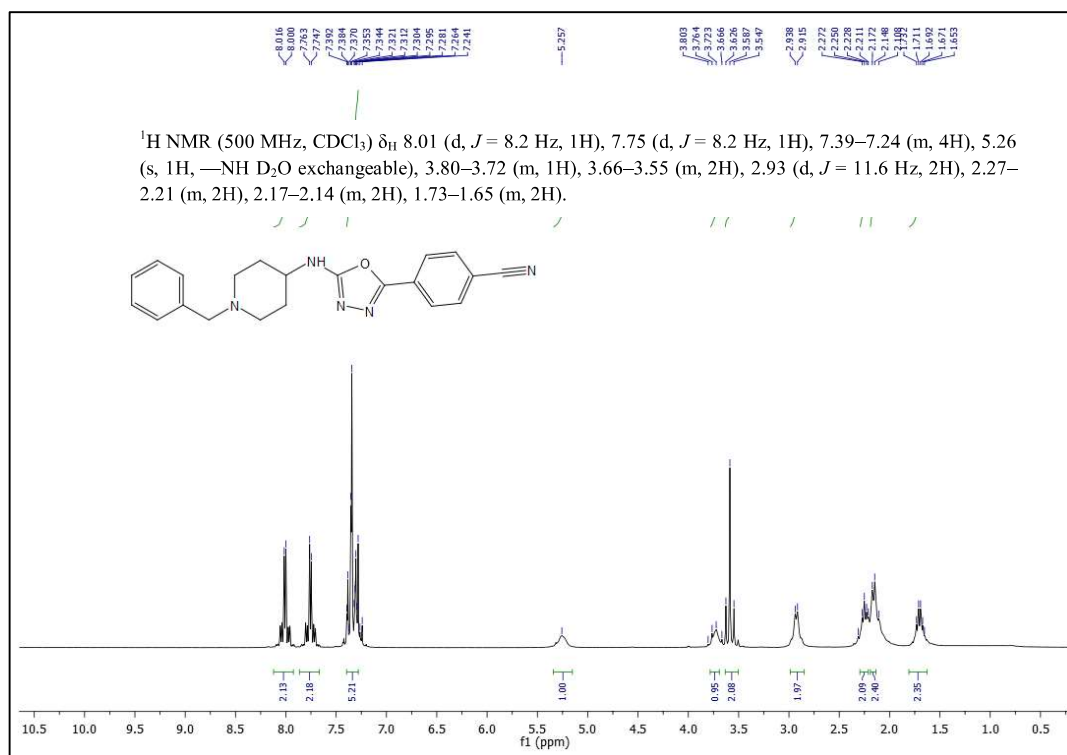
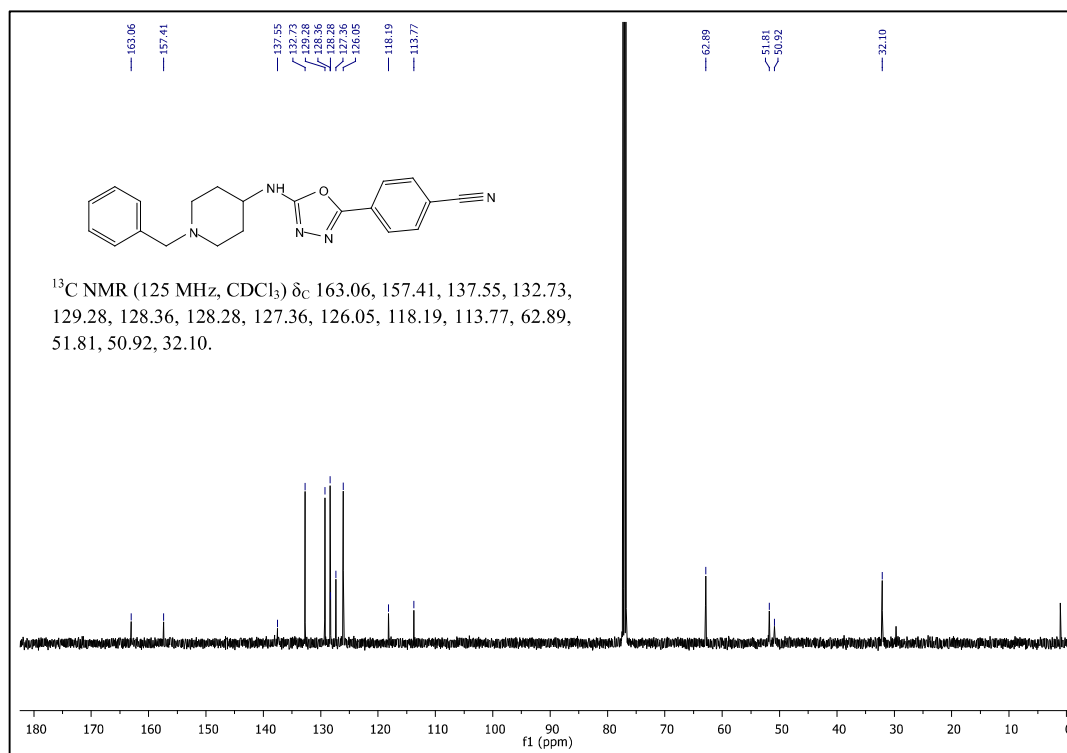


Figure 8.28. ¹³C NMR spectrum of compound **S_{II}9g**

4-(5-((1-Benzylpiperidin-4-yl)amino)-1,3,4-oxadiazol-2-yl)benzonitrile (*S_{III}10b*)Figure 8.29. ¹H NMR spectrum of compound *S_{III}10b*Figure 8.30. ¹³C NMR spectrum of compound *S_{III}10b*

N-(1-Benzylpiperidin-4-yl)-5-(4-(trifluoromethyl)phenyl)-1,3,4-oxadiazol-2-amine
(*S*_{III}10g)

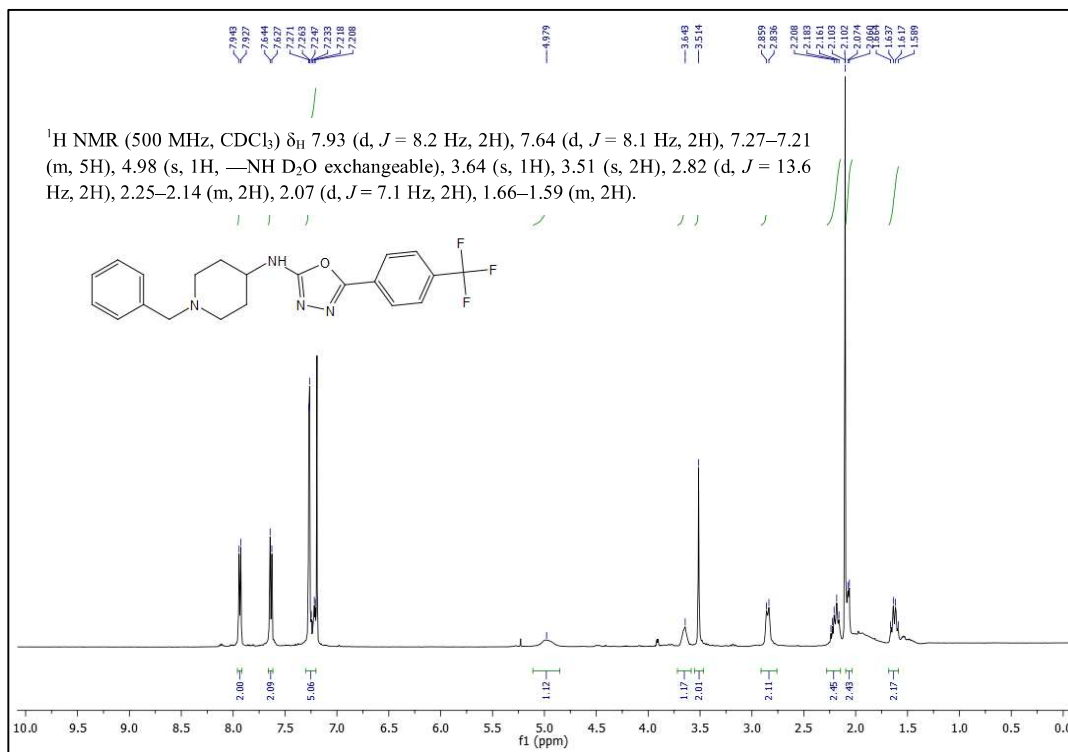


Figure 8.31. ¹H NMR spectrum of compound *S*_{III}10g

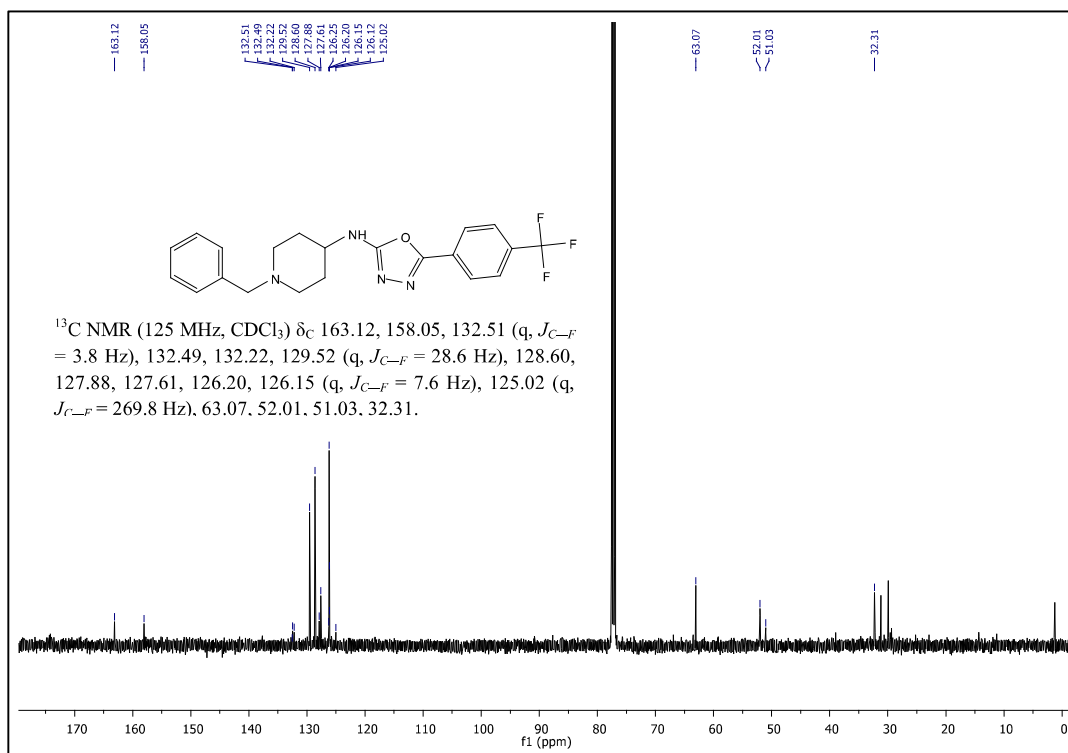
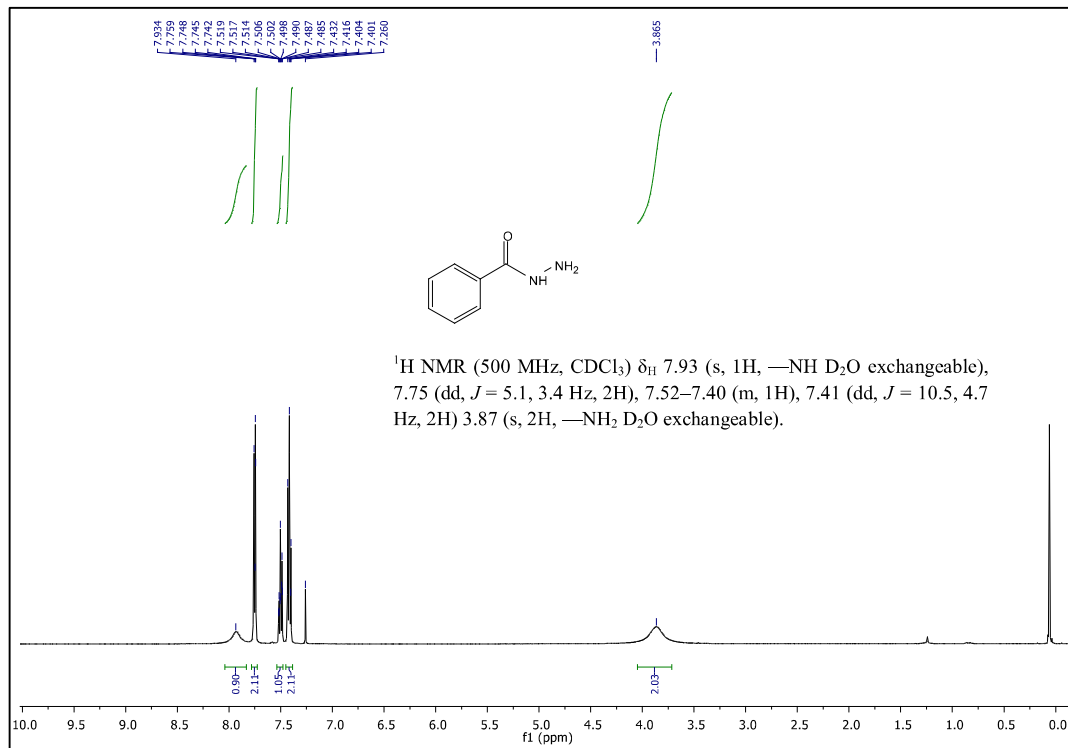
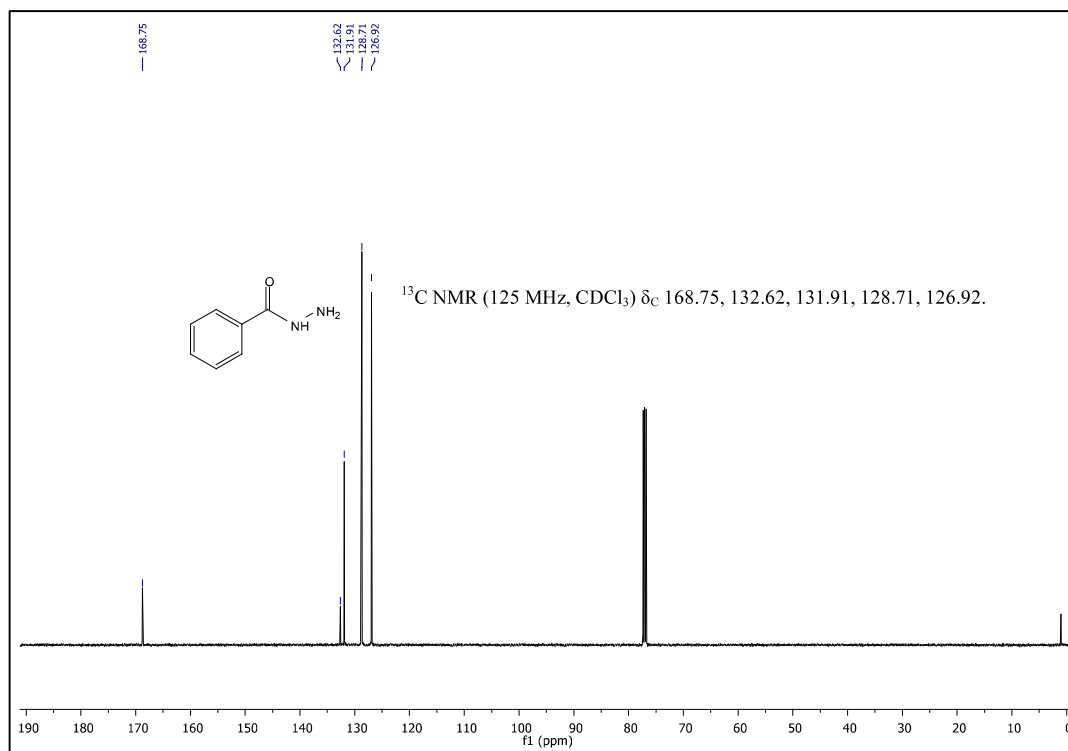
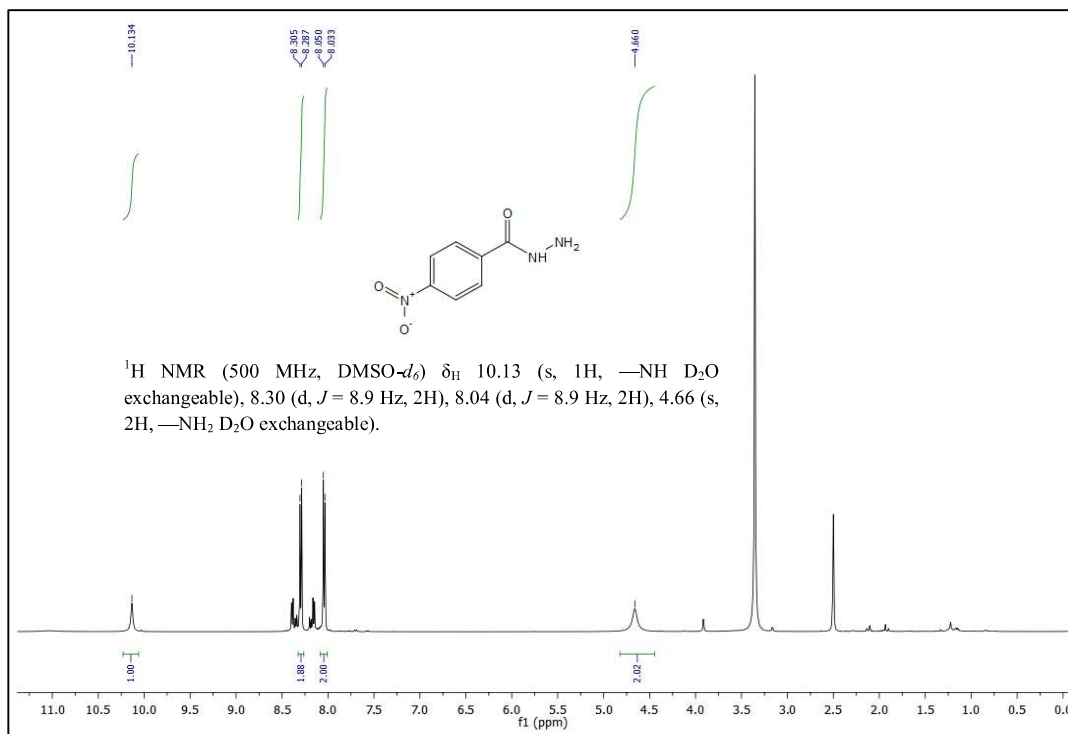
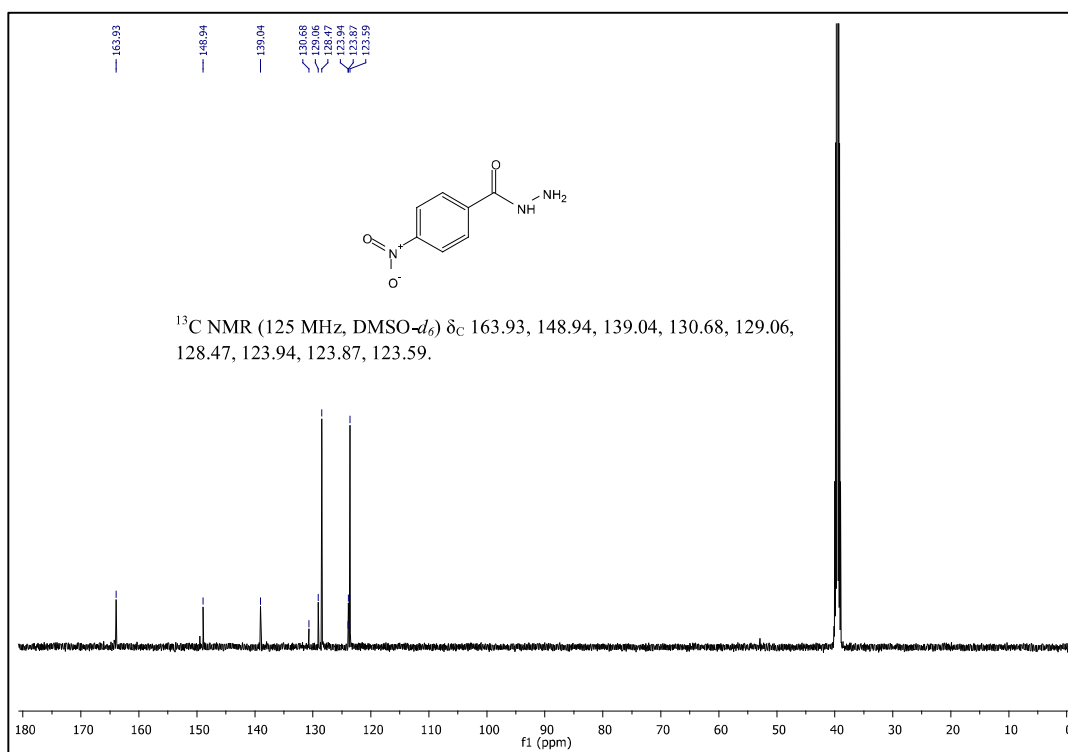
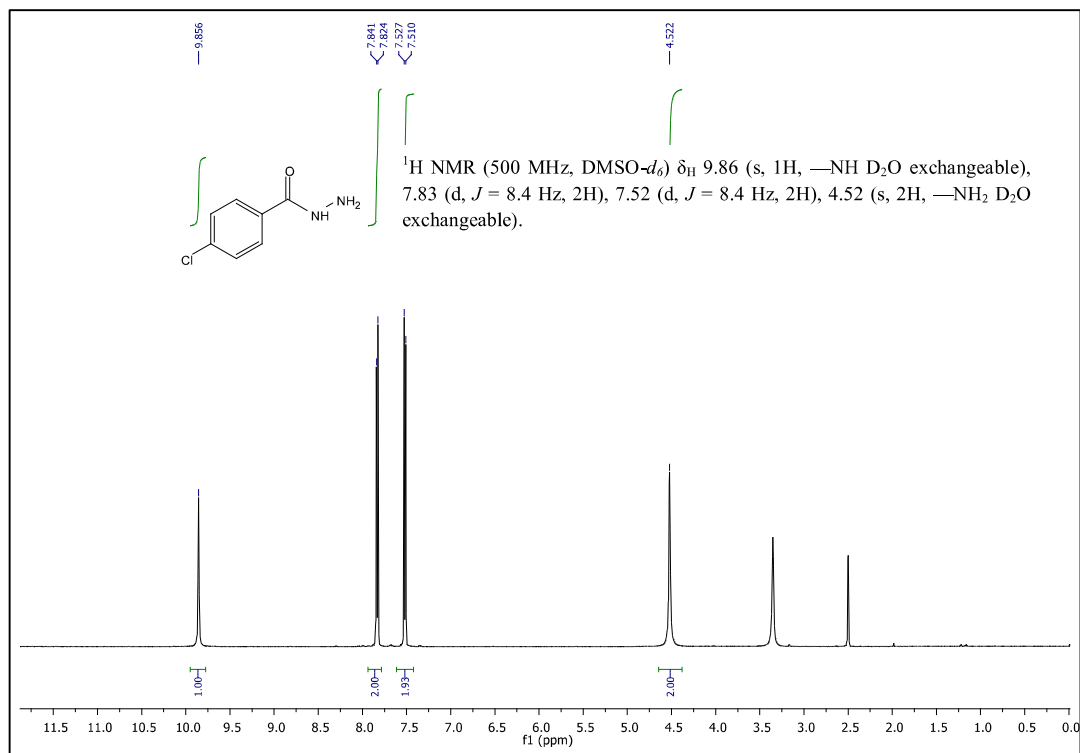
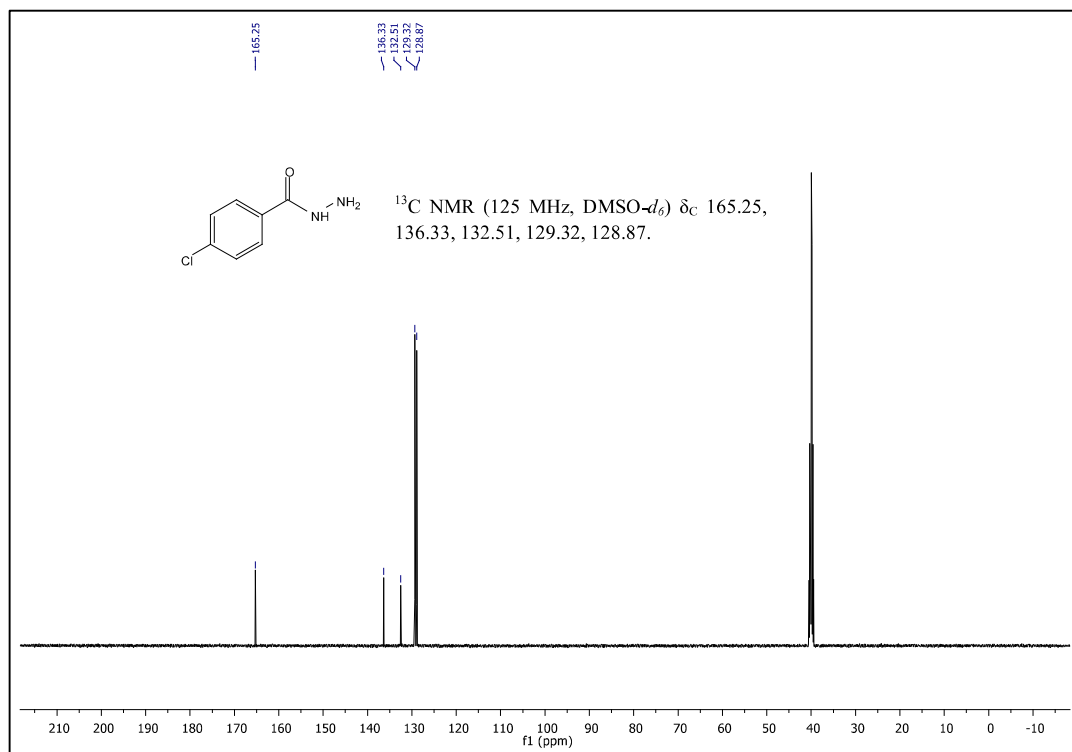
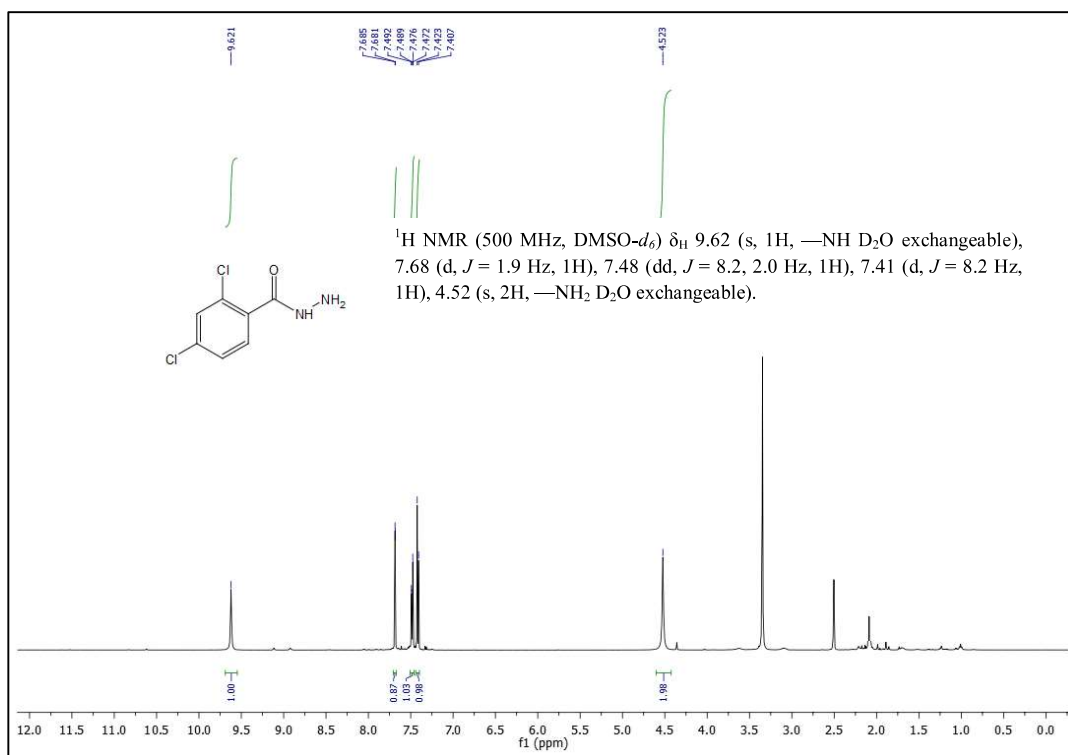
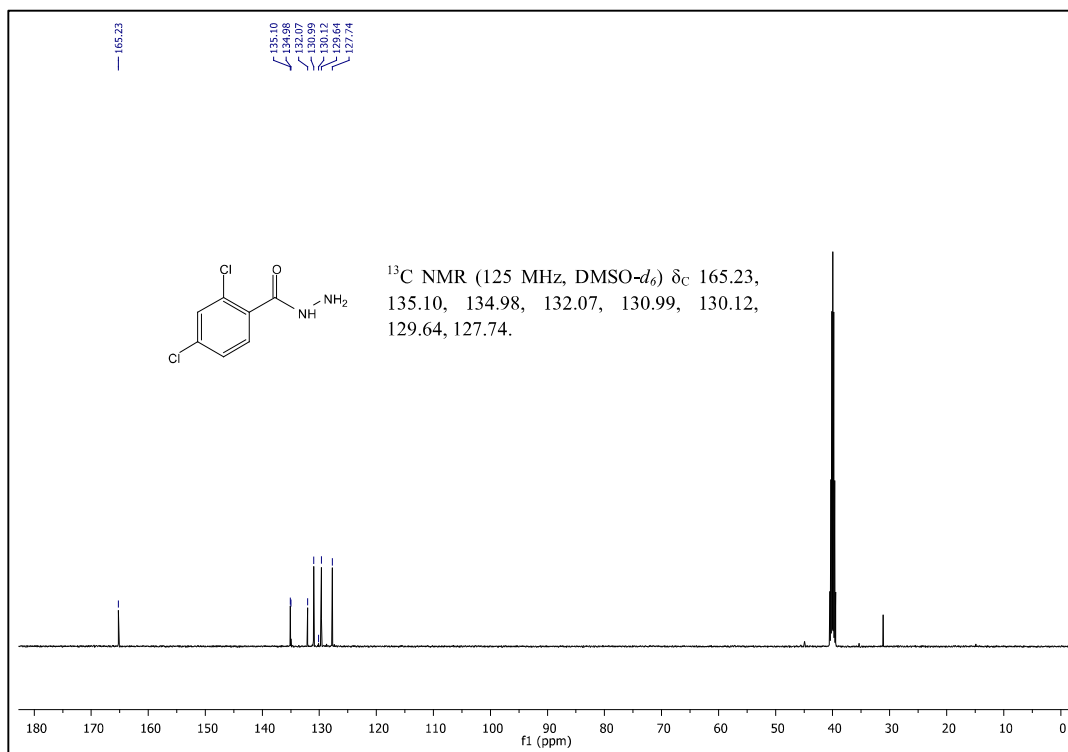


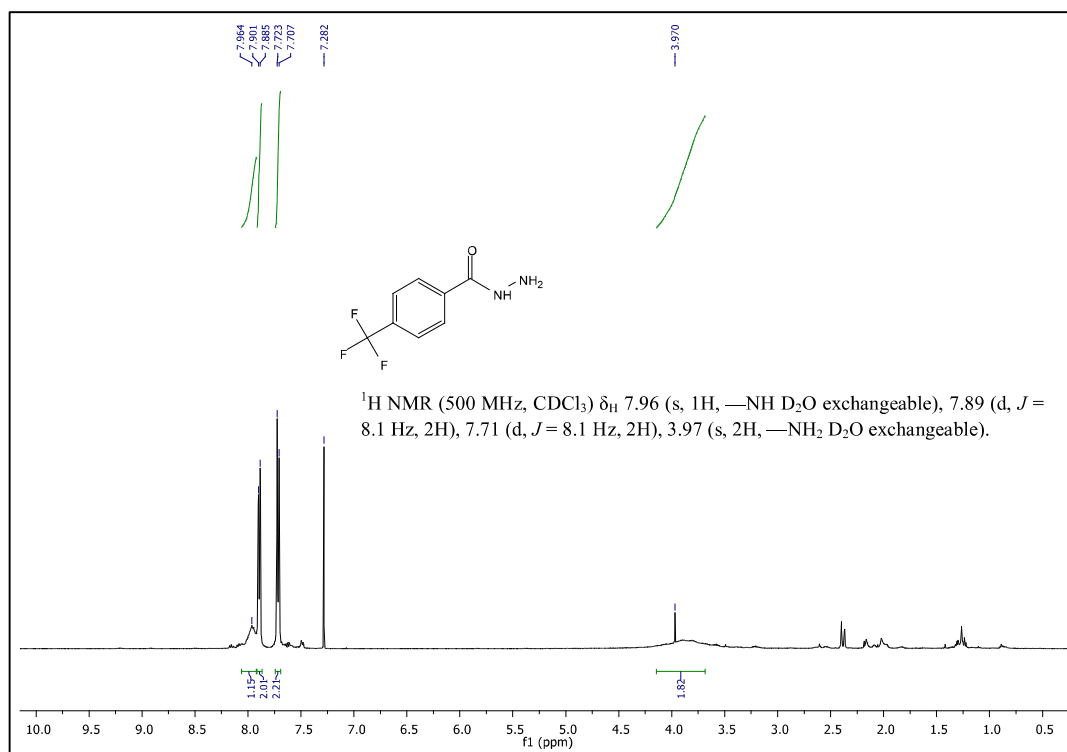
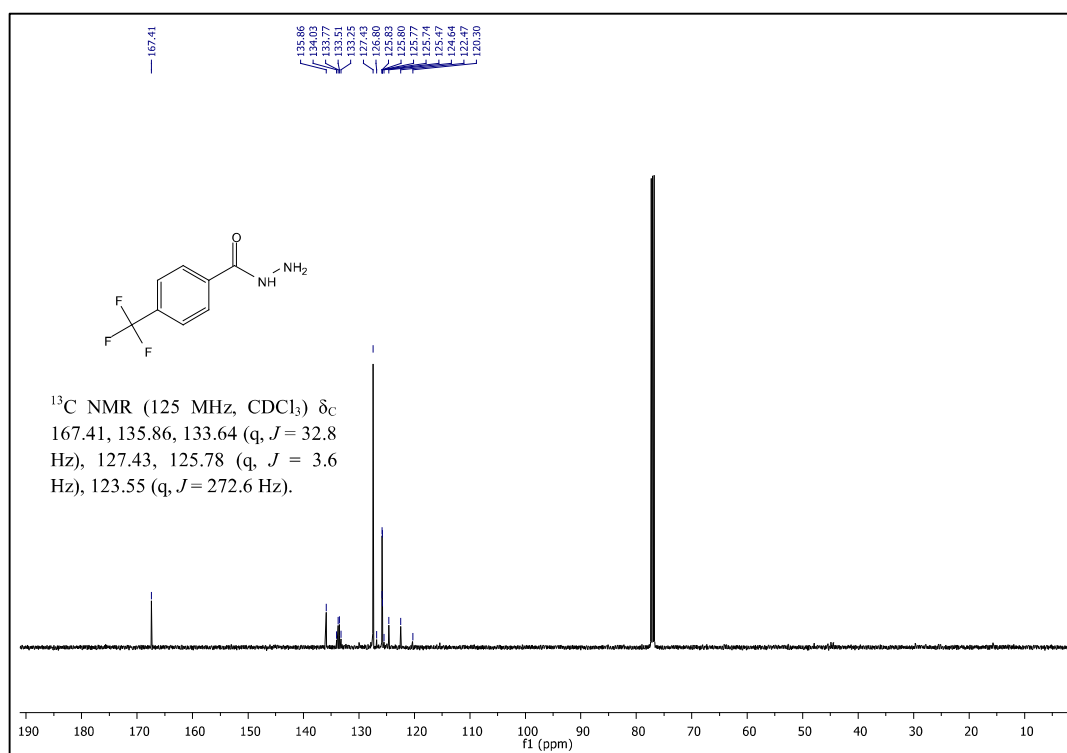
Figure 8.32. ¹³C NMR spectrum of compound *S*_{III}10g

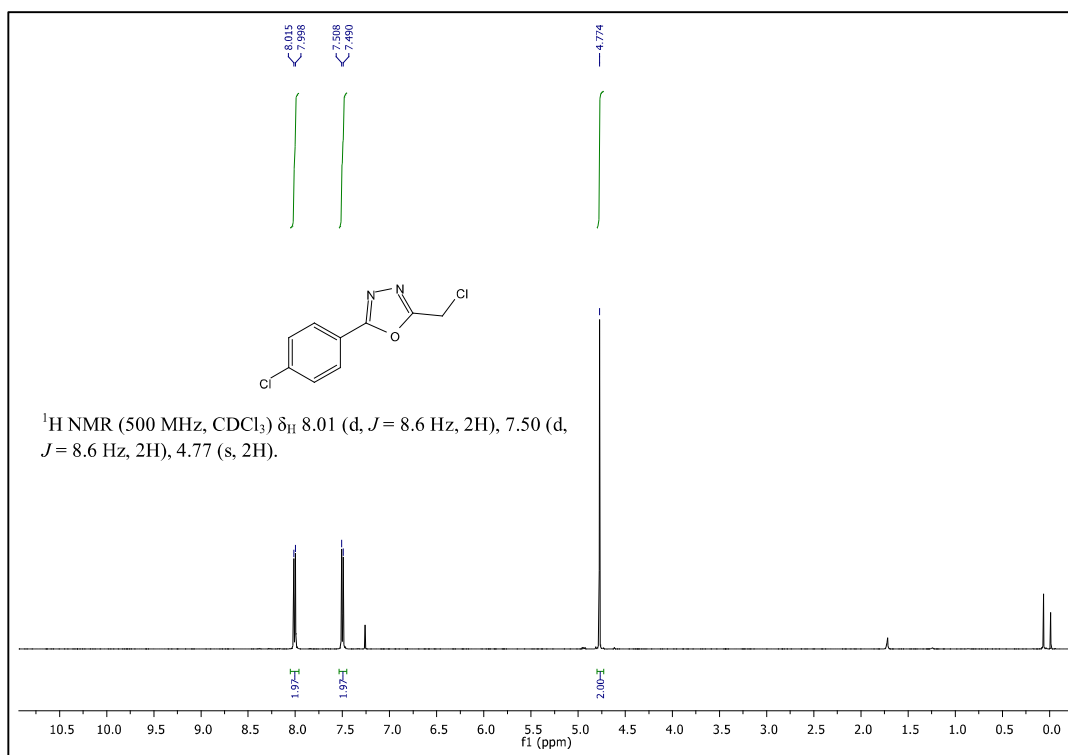
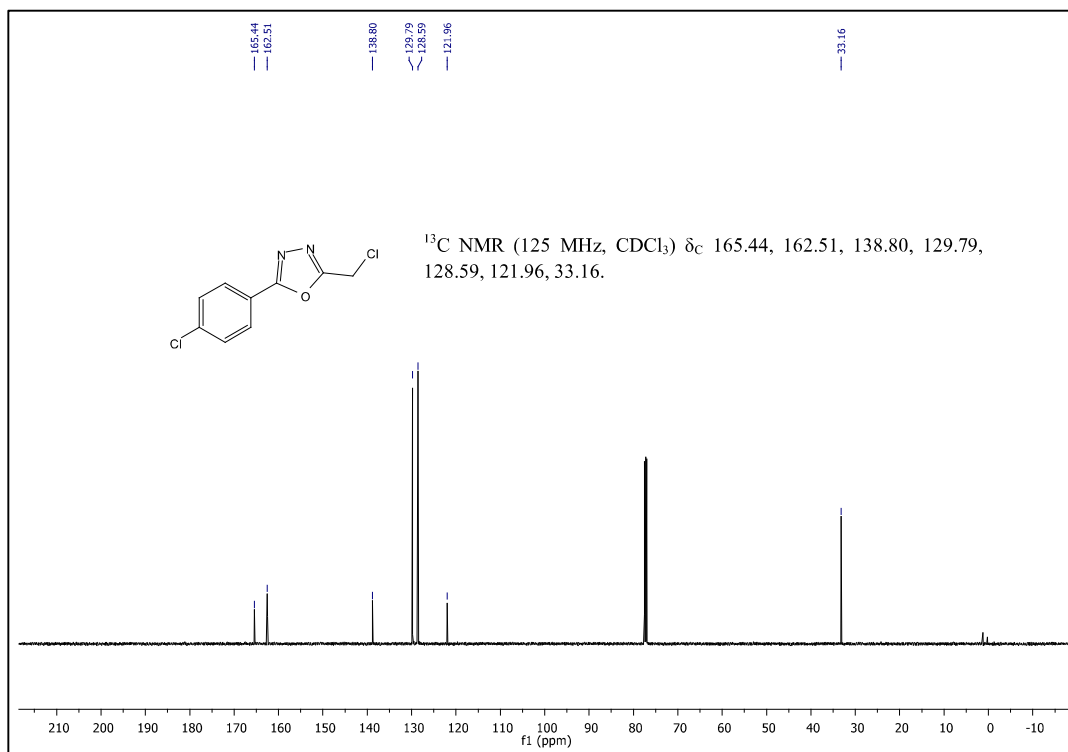
Benzohydrazide (*S_{IV}12a*)Figure 8.33. $^1\text{H NMR}$ spectrum of compound *S_{IV}12a*Figure 8.34. $^{13}\text{C NMR}$ spectrum of compound *S_{IV}12a*

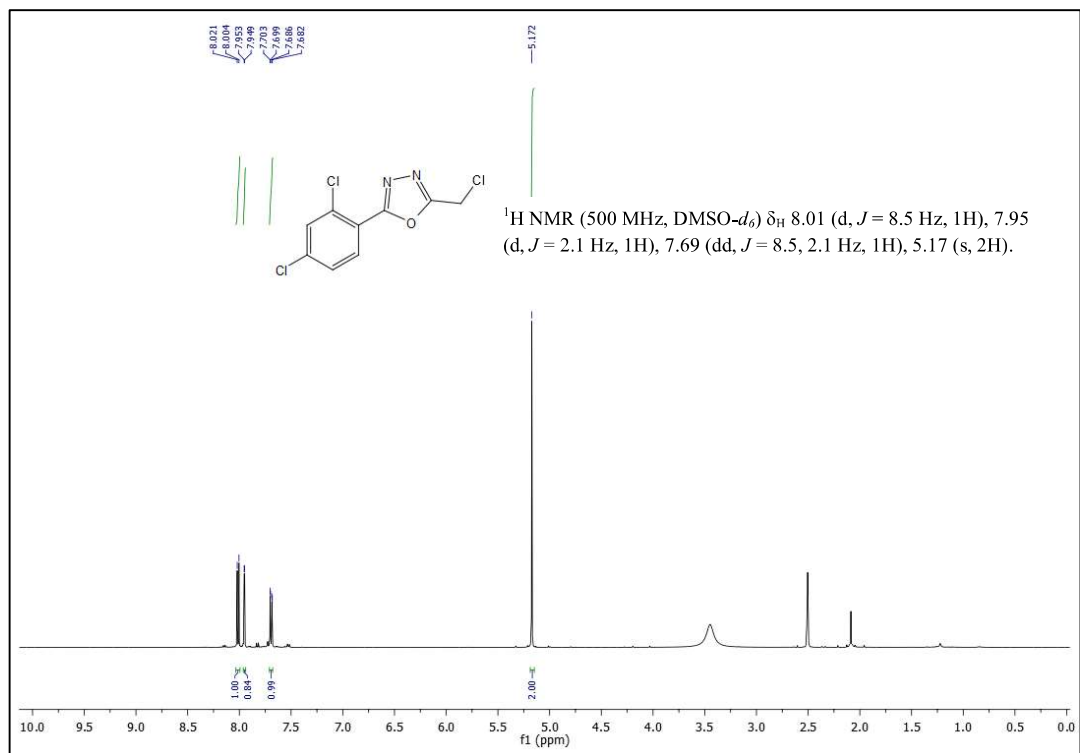
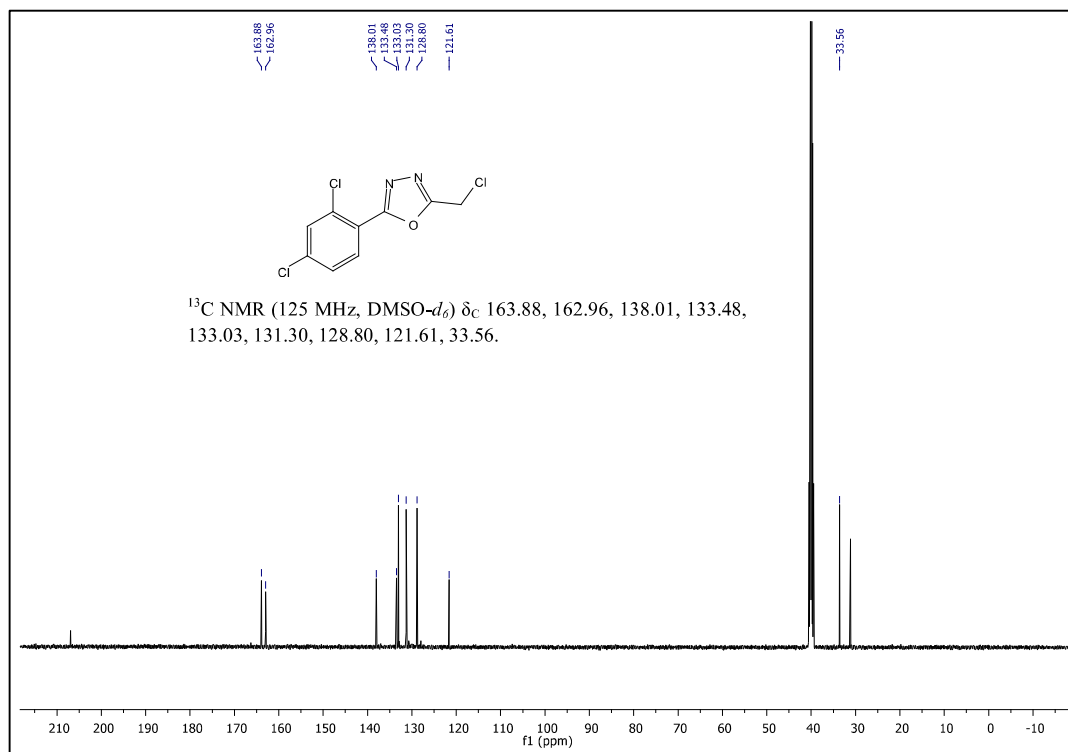
4-Nitrobenzohydrazide (*S_{IV}12c*)Figure 8.35. ¹H NMR spectrum of compound *S_{IV}12c*Figure 8.36. ¹³C NMR spectrum of compound *S_{IV}12c*

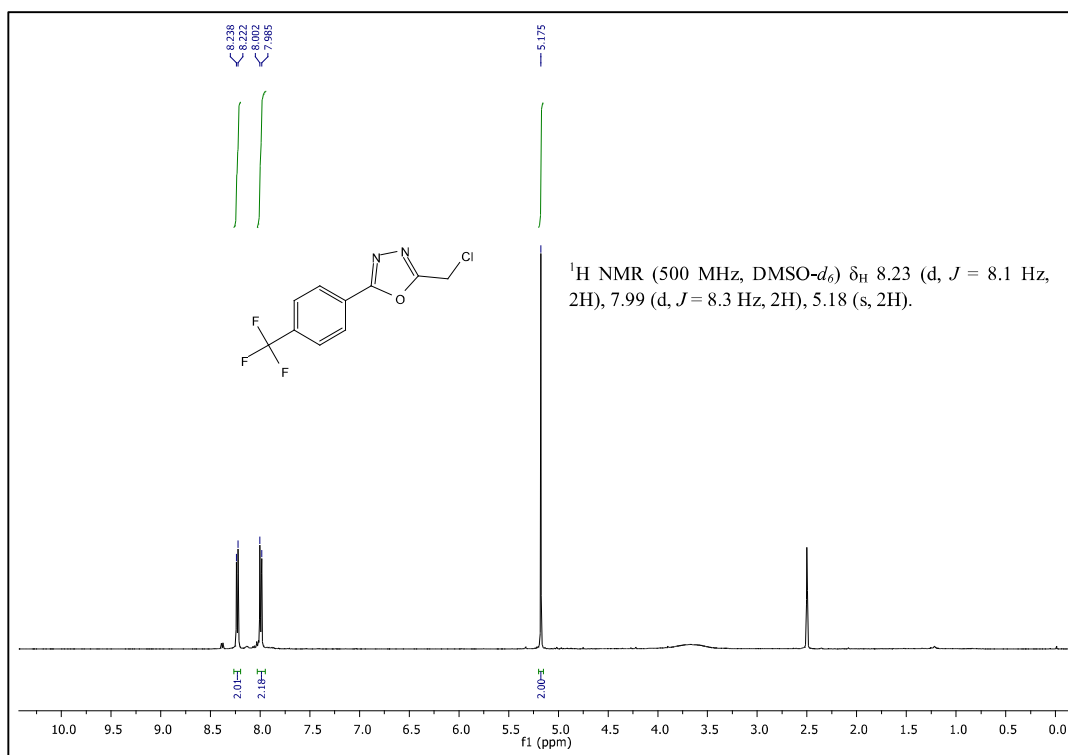
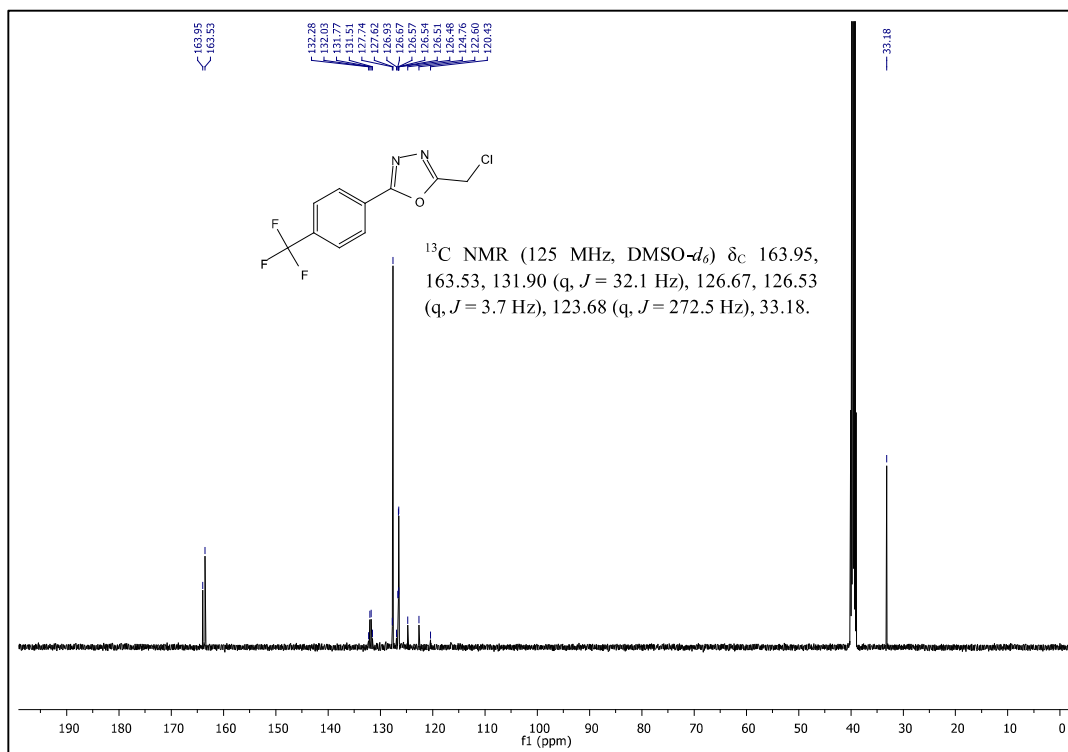
4-Chlorobenzohydrazide (S_{IV}12e)**Figure 8.37.** ¹H NMR spectrum of compound S_{IV}12e**Figure 8.38.** ¹³C NMR spectrum of compound S_{IV}12e

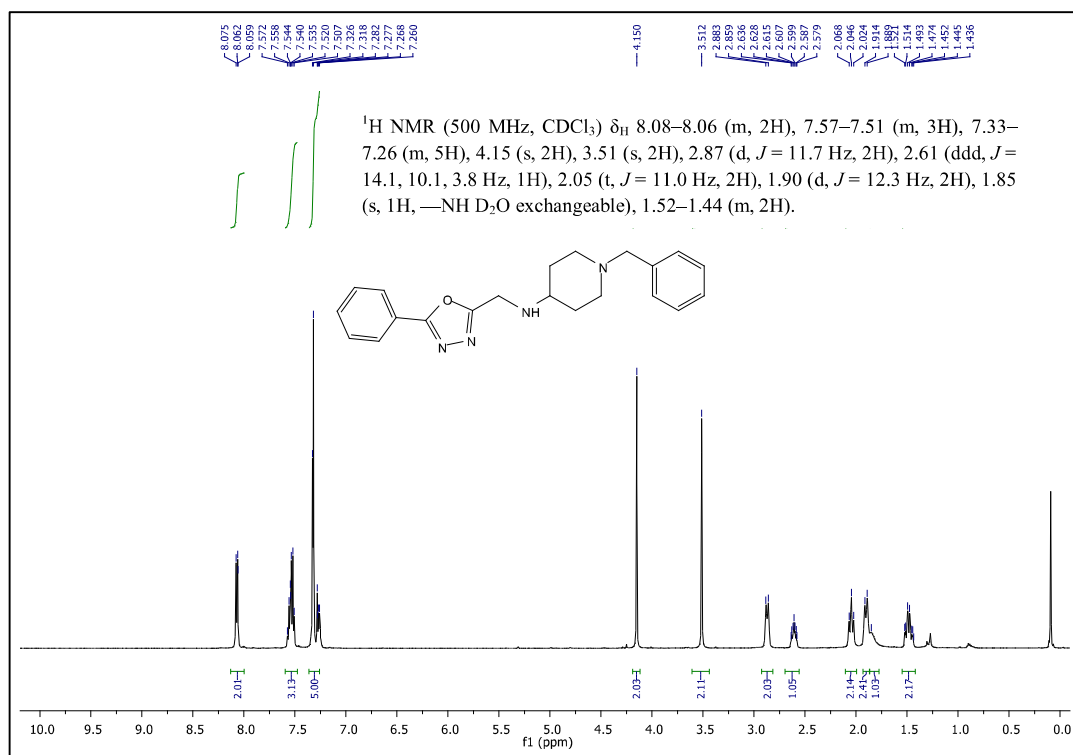
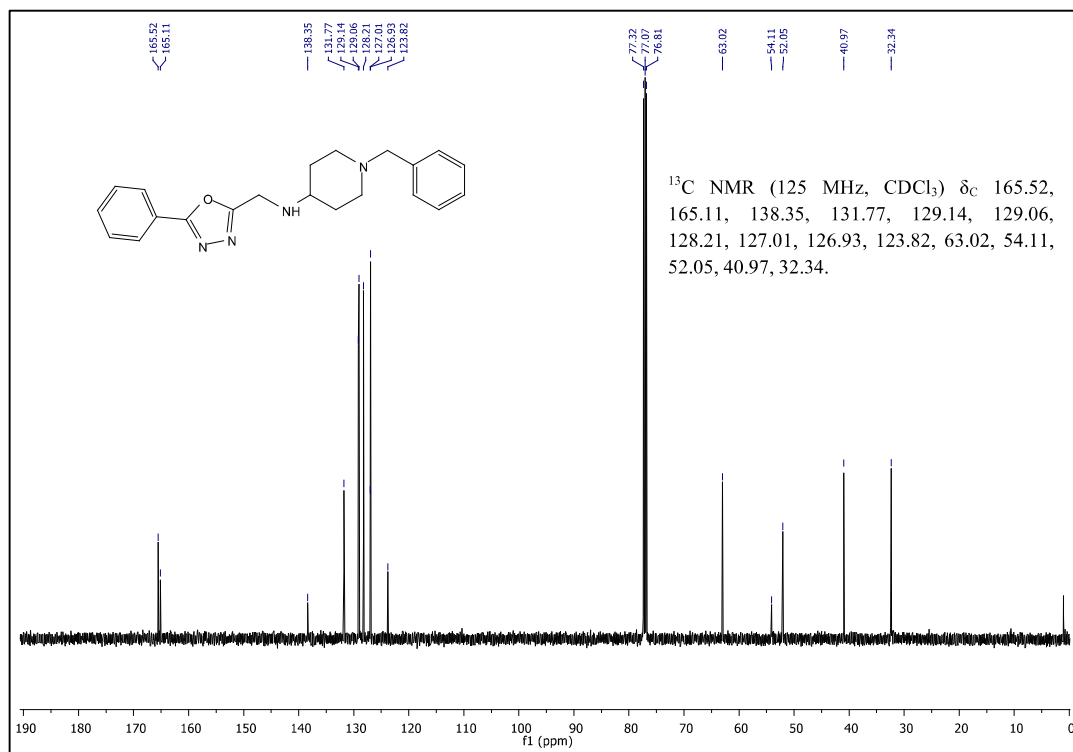
2,4-Dichlorobenzohydrazide (*S_{IV}12f*)Figure 8.39. ¹H NMR spectrum of compound *S_{IV}12f*Figure 8.40. ¹³C NMR spectrum of compound *S_{IV}12f*

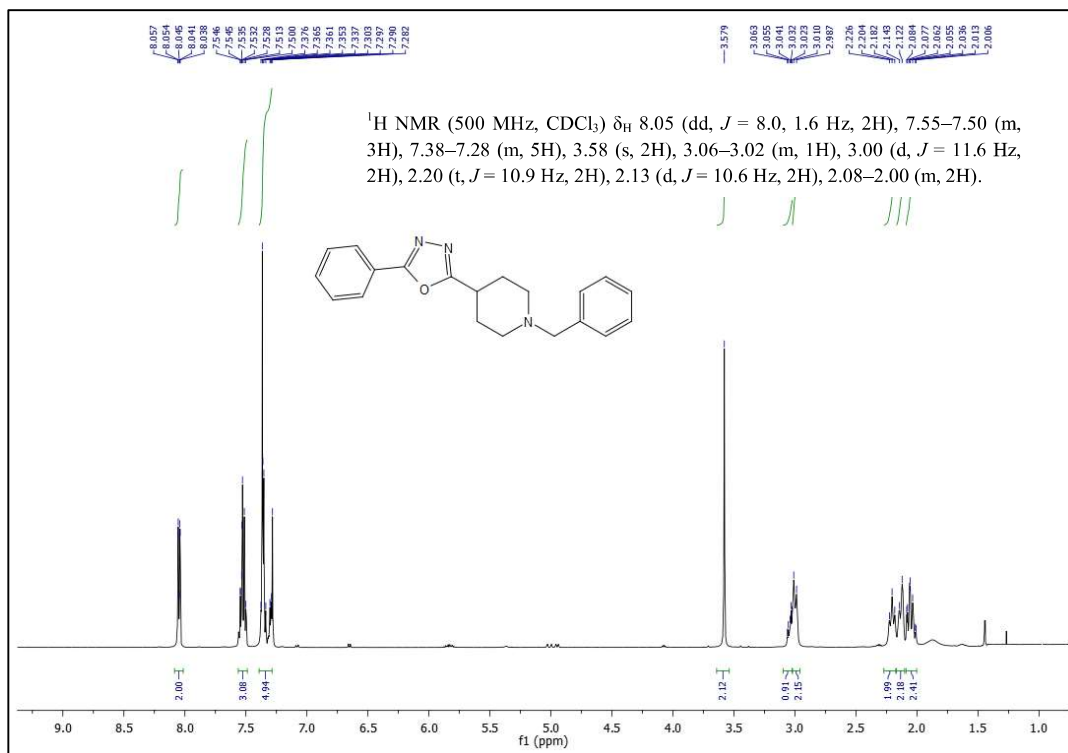
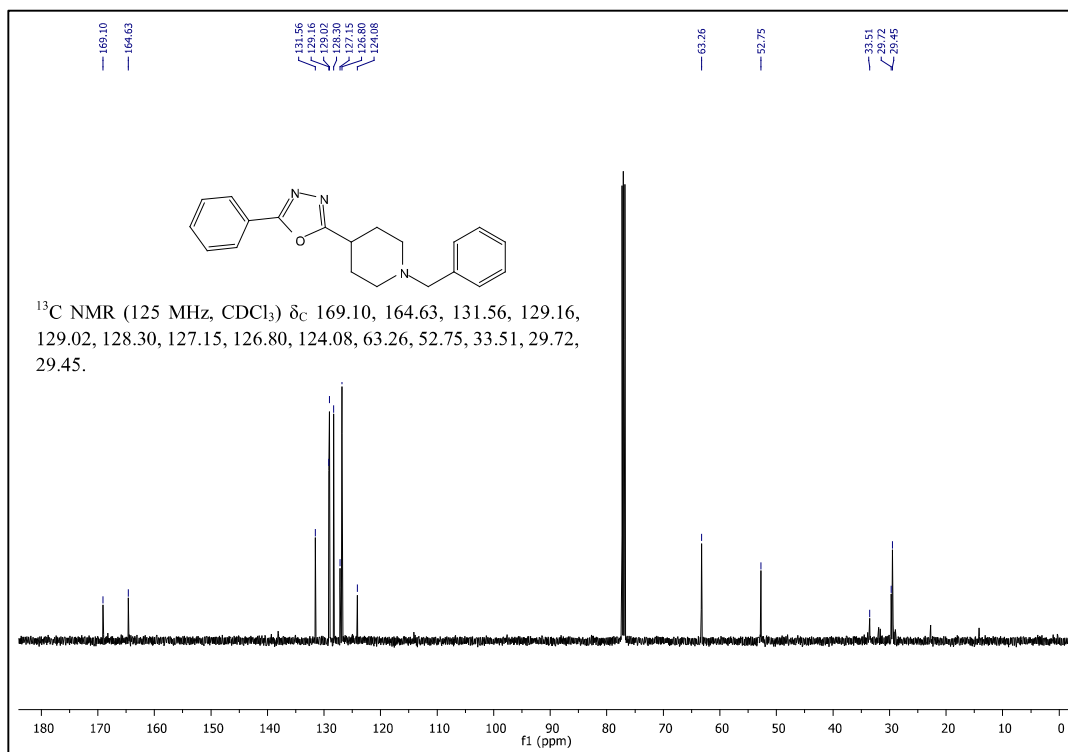
4-(Trifluoromethyl)benzohydrazide (*S_{IV}12g*)Figure 8.41. ¹H NMR spectrum of compound *S_{IV}12g*Figure 8.42. ¹³C NMR spectrum of compound *S_{IV}12g*

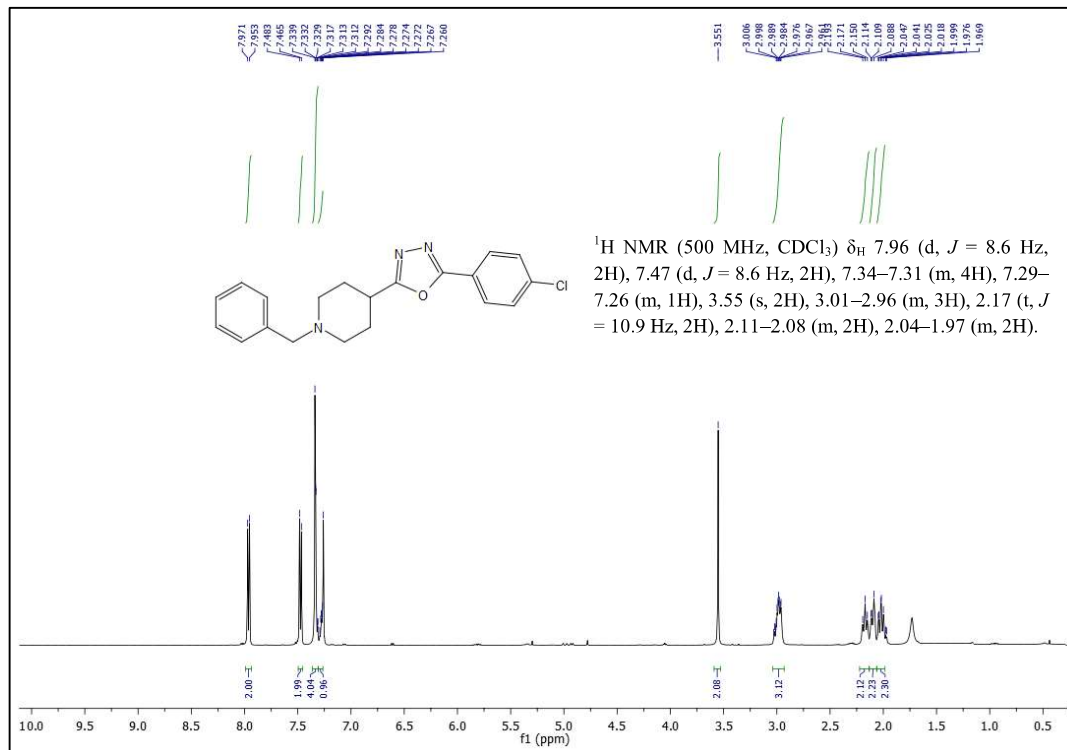
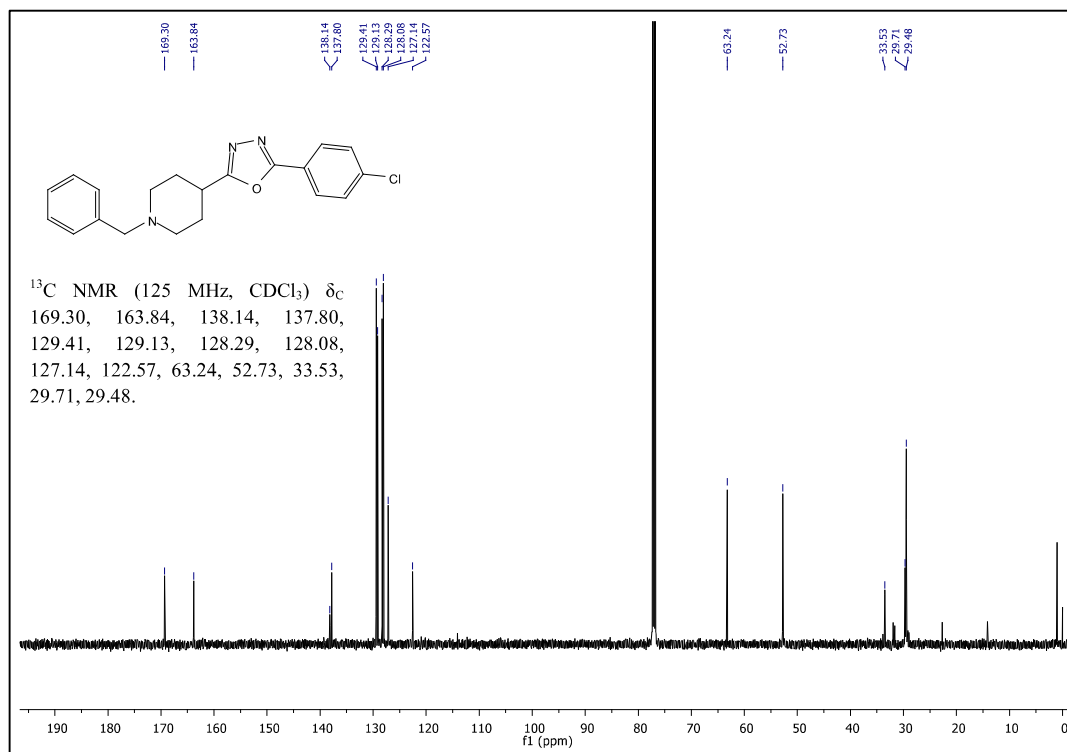
2-(Chloromethyl)-5-(4-chlorophenyl)-1,3,4-oxadiazole (S_{IV}13e)**Figure 8.43.** ¹H NMR spectrum of compound S_{IV}13e**Figure 8.44.** ¹³C NMR spectrum of compound S_{IV}13e

2-(Chloromethyl)-5-(2,4-dichlorophenyl)-1,3,4-oxadiazole (S_{IV}13f)**Figure 8.45.** ¹H NMR spectrum of compound S_{IV}13f**Figure 8.46.** ¹³C NMR spectrum of compound S_{IV}13f

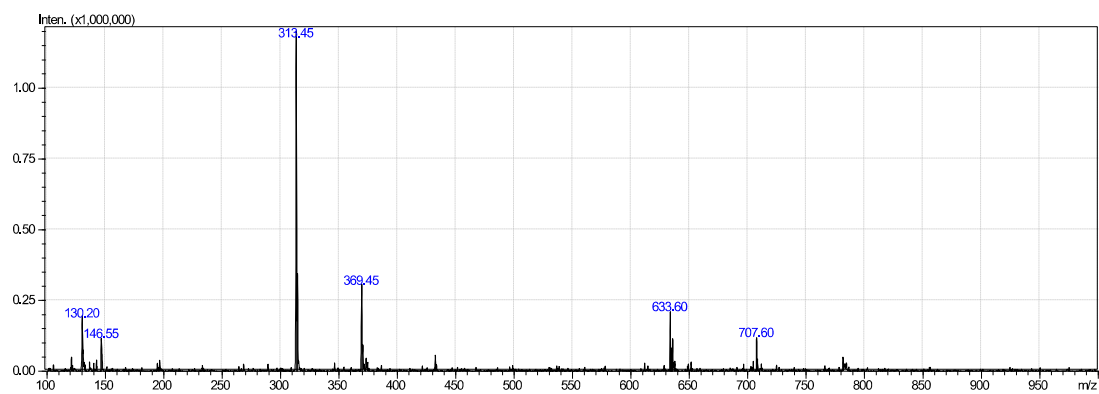
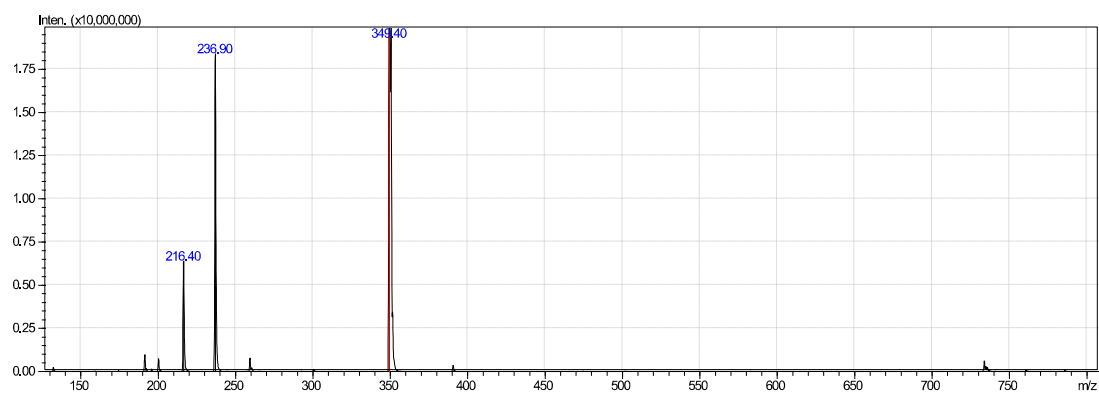
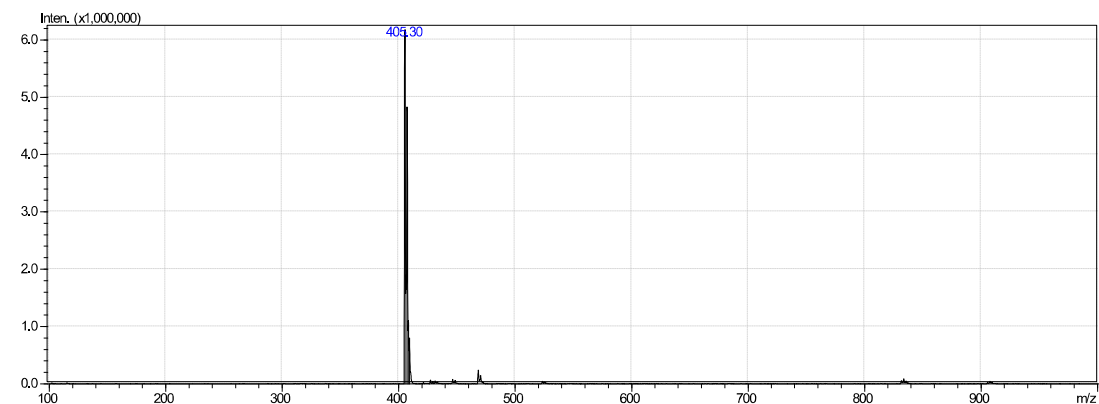
2-(Chloromethyl)-5-(4-(trifluoromethyl)phenyl)-1,3,4-oxadiazole (S_{IV}13g)Figure 8.47. ¹H NMR spectrum of compound S_{IV}13gFigure 8.48. ¹³C NMR spectrum of compound S_{IV}13g

1-Benzyl-N-((5-phenyl-1,3,4-oxadiazol-2-yl)methyl)piperidin-4-amine (*S_{IV}14a*)Figure 8.49. ¹H NMR spectrum of compound *S_{IV}14a*Figure 8.50. ¹³C NMR spectrum of compound *S_{IV}14a*

2-(1-Benzylpiperidin-4-yl)-5-phenyl-1,3,4-oxadiazole (S_V17a)Figure 8.51. ¹H NMR spectrum of compound S_V17aFigure 8.52. ¹³C NMR spectrum of compound S_V17a

2-(1-Benzylpiperidin-4-yl)-5-(4-chlorophenyl)-1,3,4-oxadiazole (*S_V17e*)Figure 8.53. ¹H NMR spectrum of compound *S_V17e*Figure 8.54. ¹³C NMR spectrum of compound *S_V17e*

8.2. Mass spectra of representative synthesized compounds

Figure 8.55. Mass Spectrum of compound S_{13j}.Figure 8.56. Mass Spectrum of compound S_{14j}.Figure 8.57. Mass spectrum of compound S_{119f}

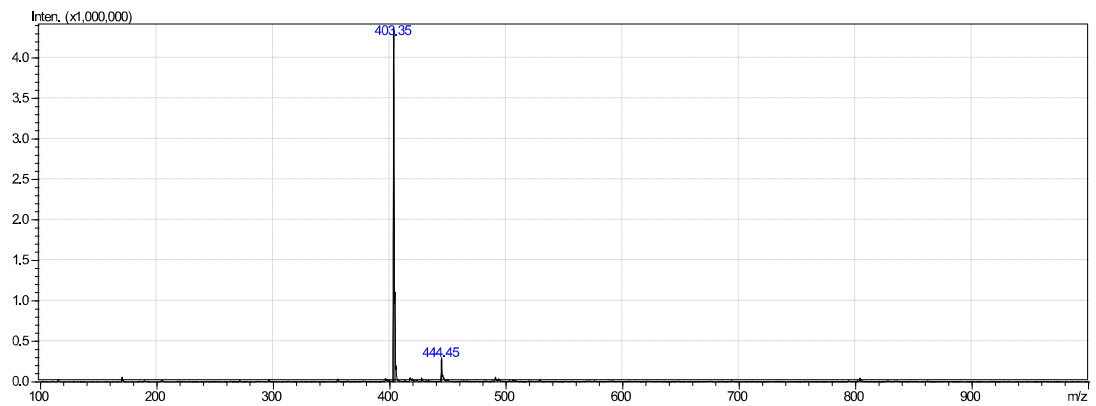


Figure 8.58. Mass spectrum of compound S_{III}10g.

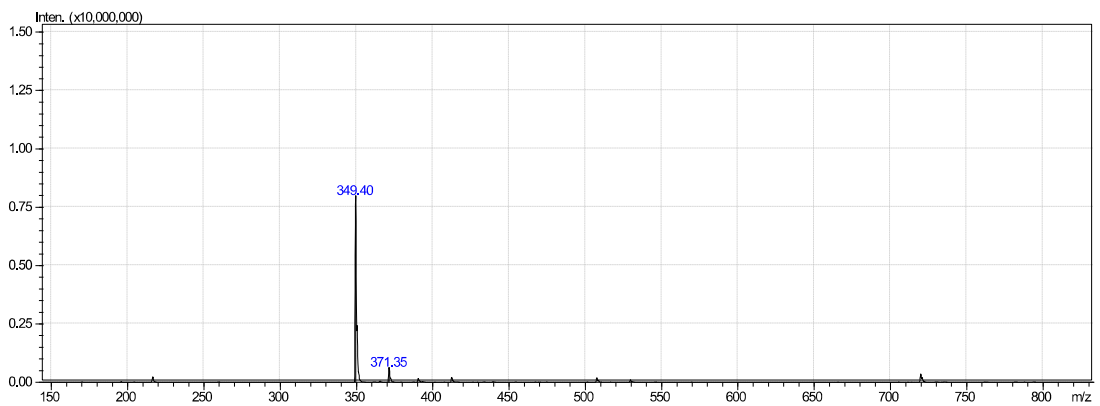


Figure 8.59. Mass spectrum of compound S_{IV}14a.

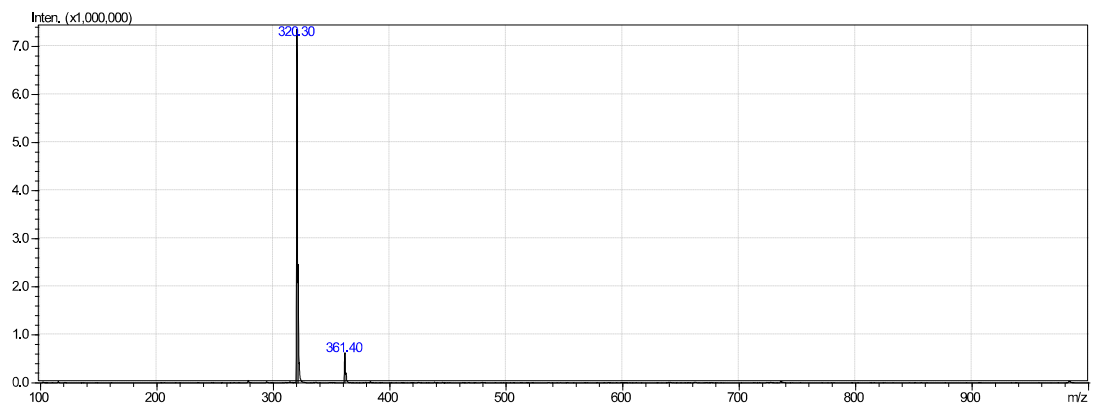
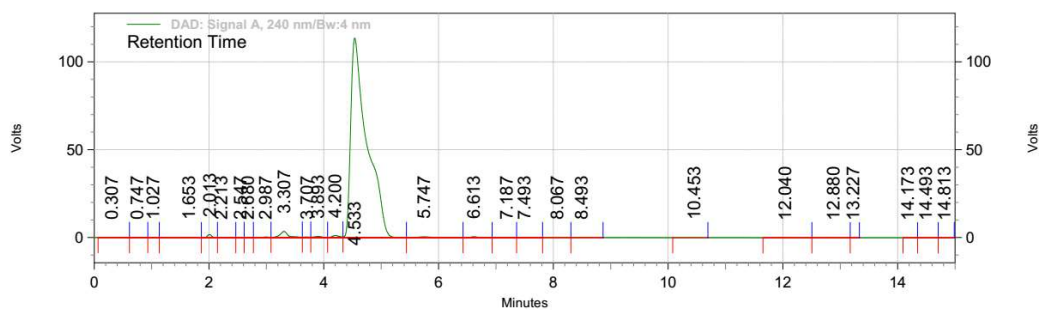


Figure 8.60. Mass spectrum of compound S_V17a.

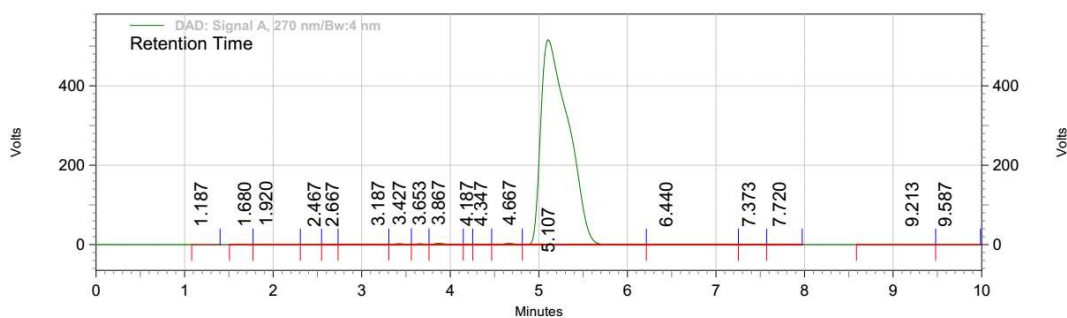
8.3 HPLC chromatograms of representative synthesized compounds



**DAD: Signal F,
270 nm/Bw:4 nm
Results**

Retention Time	Area	Area %	Height	Height %
0.307	794	0.01	41	0.01
1.653	880	0.01	106	0.02
2.013	11860	0.09	2176	0.31
2.227	3246	0.02	194	0.03
2.547	4366	0.03	406	0.06
3.000	16577	0.12	1968	0.28
3.307	128121	0.97	14451	2.09
3.707	9954	0.08	1254	0.18
3.907	41601	0.31	4532	0.65
4.200	29541	0.22	3370	0.49
4.533	12942979	97.57	658628	95.18
5.760	47290	0.36	2191	0.32
6.613	20076	0.15	2129	0.31
7.213	1463	0.01	61	0.01
7.520	654	0.00	49	0.01
8.480	742	0.01	74	0.01
8.640	646	0.00	62	0.01
10.427	415	0.00	46	0.01
12.027	1766	0.01	87	0.01
12.347	205	0.00	28	0.00
12.893	710	0.01	51	0.01
13.093	203	0.00	18	0.00
14.467	330	0.00	31	0.00
14.813	305	0.00	31	0.00
Totals	13264724	100.00	691984	100.00

Figure 8.61. HPLC chromatogram and report of compound **S_{13i}**.

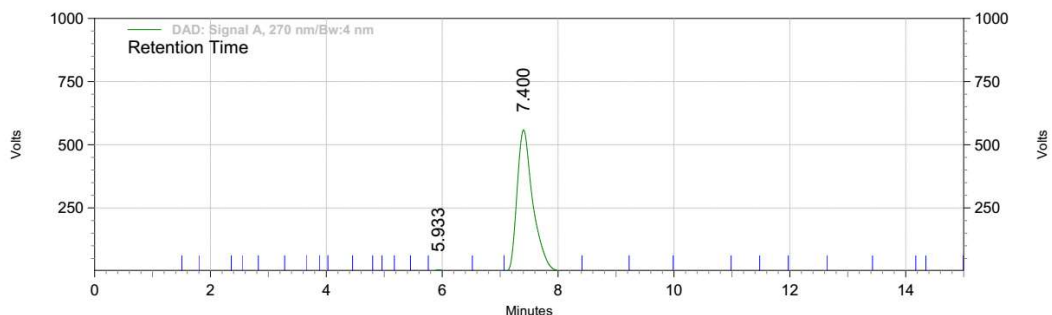


**DAD: Signal A,
270 nm/Bw:4 nm
Results**

Retention Time	Area	Area %	Height	Height %
1.187	418	0.00	36	0.00
1.680	1149	0.00	132	0.01
1.920	9792	0.04	1385	0.12
2.467	1851	0.01	330	0.03
2.667	1431	0.01	159	0.01
3.187	26096	0.11	2183	0.20
3.427	42494	0.18	5305	0.48
3.653	35135	0.15	4949	0.44
3.867	66488	0.28	7117	0.64
4.187	3729	0.02	596	0.05
4.347	8188	0.03	778	0.07
4.667	60537	0.26	6873	0.62
5.107	23224818	98.79	1082934	97.22
6.440	17807	0.08	587	0.05
7.373	1275	0.01	85	0.01
7.720	1457	0.01	120	0.01
9.213	4730	0.02	133	0.01
9.587	2230	0.01	142	0.01

Totals	23509625	100.00	1113844	100.00
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Figure 8.62. HPLC chromatogram and report of compound **S_{13j}**.



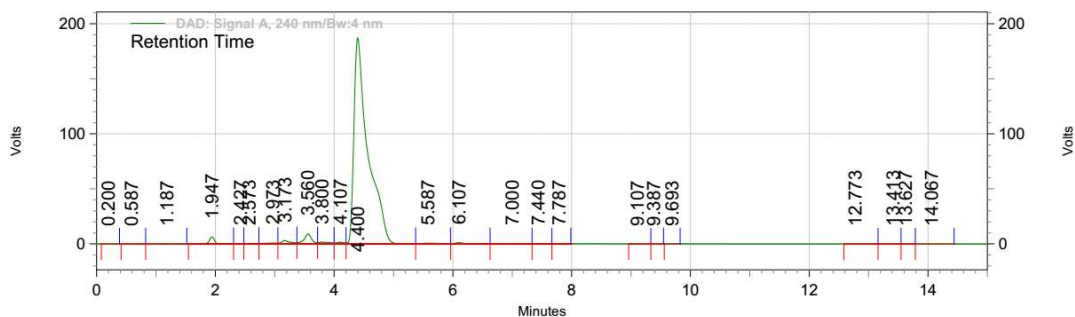
**DAD: Signal A,
270 nm/Bw:4 nm**

Results

Retention Time	Area	Area %	Height	Height %
1.427	4979	0.02	301	0.02
1.693	6846	0.03	525	0.04
1.947	24434	0.11	1636	0.13
2.467	7846	0.03	1146	0.09
2.720	9507	0.04	694	0.06
3.200	20435	0.09	1146	0.09
3.493	33858	0.15	2617	0.21
3.760	41176	0.18	5666	0.47
3.960	13455	0.06	1672	0.14
4.280	46925	0.21	2773	0.23
4.587	37097	0.16	3798	0.31
4.867	5351	0.02	581	0.05
5.080	7677	0.03	683	0.06
5.347	10162	0.04	665	0.05
5.613	17828	0.08	1354	0.11
5.933	154125	0.68	10404	0.85
6.867	26051	0.11	1516	0.12
7.400	22090493	97.20	1172862	96.31
8.760	100058	0.44	4952	0.41
9.840	21760	0.10	577	0.05
10.267	41402	0.18	1966	0.16
11.067	2373	0.01	110	0.01
11.667	731	0.00	43	0.00
12.453	171	0.00	21	0.00
13.107	701	0.00	42	0.00
13.827	1532	0.01	73	0.01
14.200	94	0.00	12	0.00
14.773	158	0.00	17	0.00

Totals	22727225	100.00	1217852	100.00
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Figure 8.63. HPLC chromatogram and report of compound **S₁₃m**.

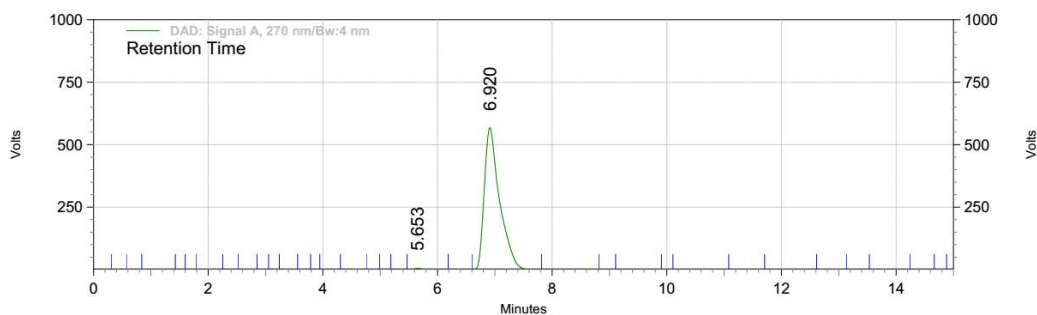


**DAD: Signal F,
270 nm/Bw:4 nm
Results**

Retention Time	Area	Area %	Height	Height %
0.227	514	0.00	49	0.00
0.587	490	0.00	39	0.00
1.227	1016	0.00	42	0.00
1.933	17706	0.09	2306	0.18
2.200	8684	0.04	617	0.05
2.427	5797	0.03	630	0.05
2.960	55378	0.27	3558	0.28
3.173	133677	0.66	16426	1.31
3.907	127170	0.62	7877	0.63
4.107	41175	0.20	4666	0.37
4.400	19836892	97.29	1209505	96.31
5.587	70544	0.35	3793	0.30
6.107	51302	0.25	4727	0.38
7.000	32843	0.16	1187	0.09
7.760	1131	0.01	92	0.01
8.493	1884	0.01	56	0.00
9.693	149	0.00	25	0.00
9.880	136	0.00	15	0.00
10.853	141	0.00	17	0.00
11.533	224	0.00	20	0.00
12.227	346	0.00	25	0.00
12.773	838	0.00	55	0.00
13.373	341	0.00	27	0.00
14.053	850	0.00	37	0.00
14.587	210	0.00	22	0.00
14.853	90	0.00	14	0.00

Totals	20389528	100.00	1255827	100.00
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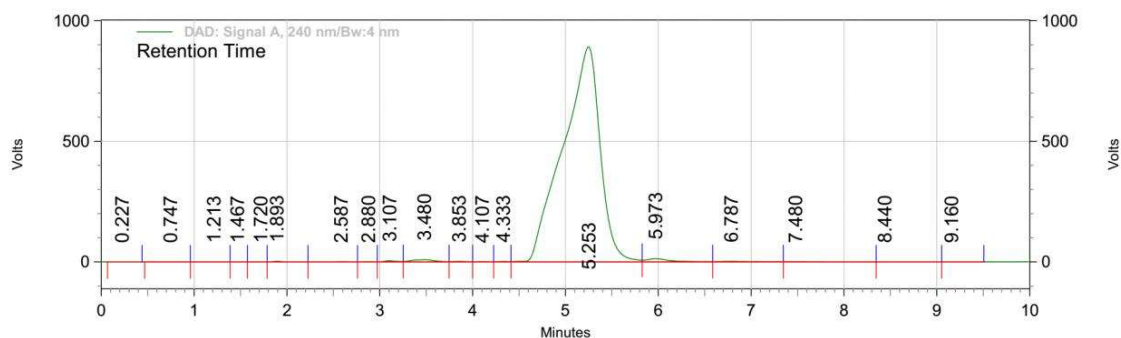
Figure 8.64. HPLC chromatogram and report of compound **S₁₄i**.



**DAD: Signal A,
270 nm/Bw:4 nm
Results**

Retention Time	Area	Area %	Height	Height %
0.187	292	0.00	36	0.00
0.480	232	0.00	23	0.00
0.667	209	0.00	23	0.00
1.187	10228	0.05	428	0.03
1.507	4438	0.02	560	0.05
1.680	3468	0.02	354	0.03
1.933	16977	0.08	1492	0.12
2.440	4931	0.02	480	0.04
2.720	9156	0.04	613	0.05
3.000	6362	0.03	626	0.05
3.160	9150	0.04	1033	0.08
3.427	29076	0.13	2555	0.21
3.667	39955	0.18	5571	0.45
3.880	13912	0.06	1649	0.13
4.147	40113	0.18	2796	0.23
4.427	37398	0.17	3829	0.31
4.880	6151	0.03	513	0.04
5.093	5639	0.02	514	0.04
5.347	13609	0.06	1190	0.10
5.653	148301	0.66	9968	0.81
6.427	19888	0.09	1436	0.12
6.920	22056743	97.51	1188024	96.51
8.120	102175	0.45	4878	0.40
8.987	3446	0.02	237	0.02
9.360	31167	0.14	1771	0.14
9.947	270	0.00	31	0.00
10.867	1413	0.01	83	0.01
11.240	2327	0.01	110	0.01
12.213	836	0.00	42	0.00
12.800	372	0.00	29	0.00
13.360	241	0.00	22	0.00
14.013	801	0.00	54	0.00
14.427	615	0.00	42	0.00
14.773	56	0.00	9	0.00
Totals	22619947	100.00	1231021	100.00

Figure 8.65. HPLC chromatogram and report of compound S_{14m}.

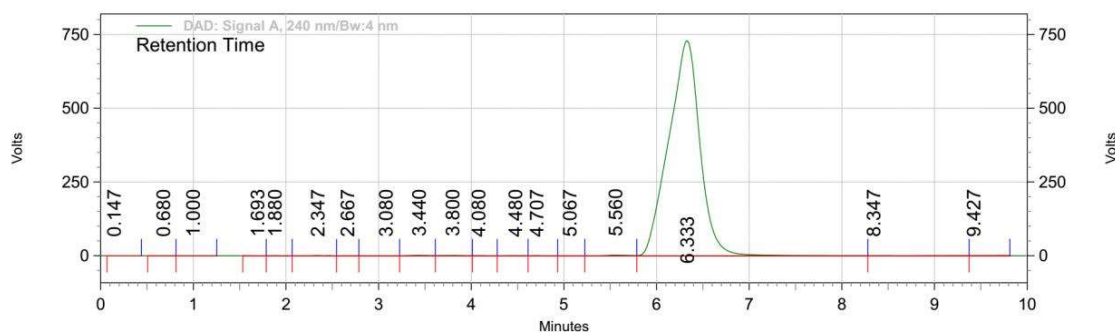


**Spectrum Max
Plot Results**

Retention Time	Area	Area %	Height	Height %
0.307	41932	0.02	4561	0.07
1.907	324275	0.15	37068	0.53
3.467	2004956	0.93	72445	1.04
5.253	212410935	98.84	6827289	98.27
8.840	111941	0.05	5842	0.08

Totals	214894039	100.00	6947205	100.00
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Figure 8.66. HPLC chromatogram and report of compound S_{III}10g.

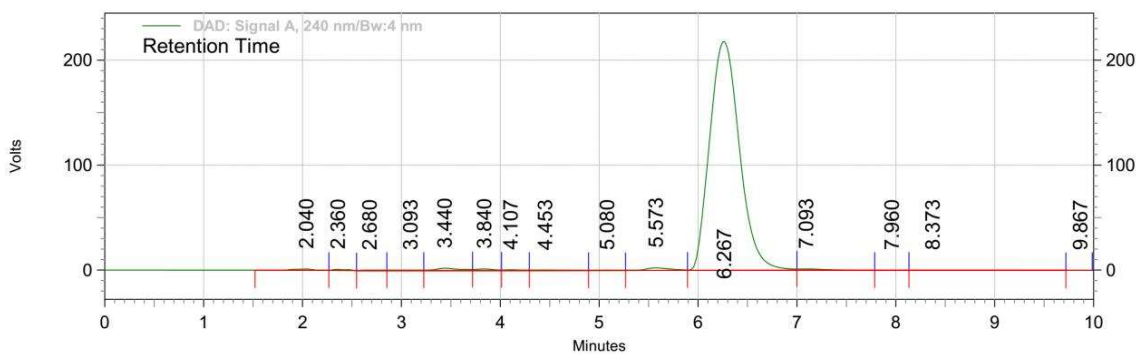


**Spectrum Max
Plot Results**

Retention Time	Area	Area %	Height	Height %
0.307	48000	0.07	2981	0.10
2.480	462838	0.67	37729	1.29
3.413	746427	1.09	21783	0.74
6.333	67316001	98.10	2866396	97.79
8.987	48935	0.07	2204	0.08

Totals	68622201	100.00	2931093	100.00
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Figure 8.67. HPLC chromatogram and report of compound S_{III}10h.

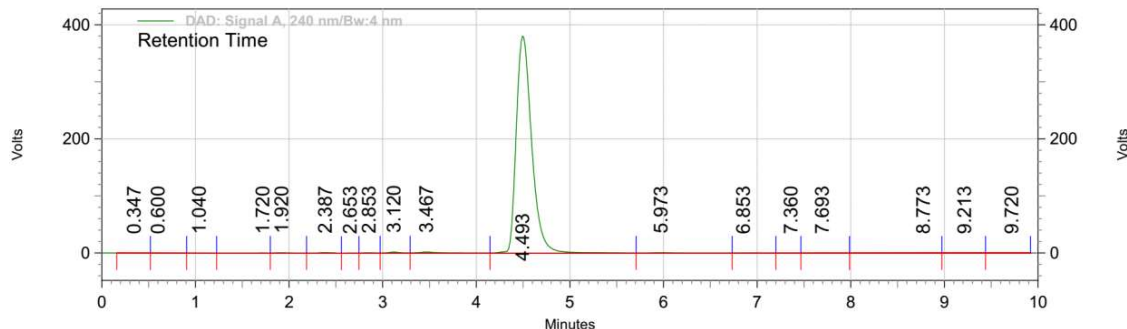


**Spectrum Max
Plot Results**

Retention Time	Area	Area %	Height	Height %
3.427	671586	3.38	22594	2.52
6.267	18882778	95.17	869560	96.97
8.093	286610	1.44	4576	0.51

Totals	19840974	100.00	896730	100.00
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Figure 8.68. HPLC chromatogram and report of compound S_{IV}14f.



**Spectrum Max
Plot Results**

Retention Time	Area	Area %	Height	Height %
2.480	631476	1.10	41403	0.85
3.467	553429	0.97	25258	0.52
4.493	55983775	97.76	4818815	98.48
7.787	63537	0.11	4793	0.10
8.853	32829	0.06	2936	0.06

Totals	57265046	100.00	4893205	100.00
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Figure 8.69. HPLC chromatogram and report of compound S_{IV}14g.