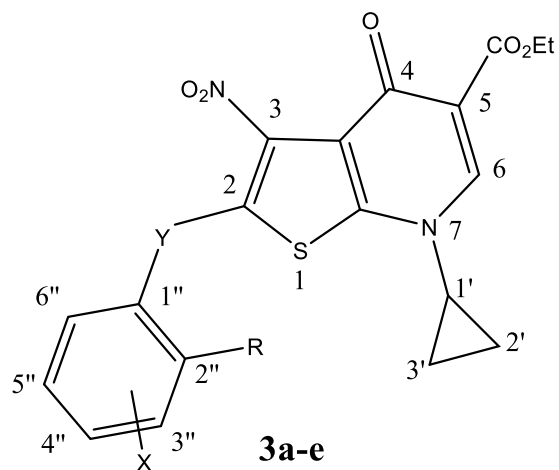
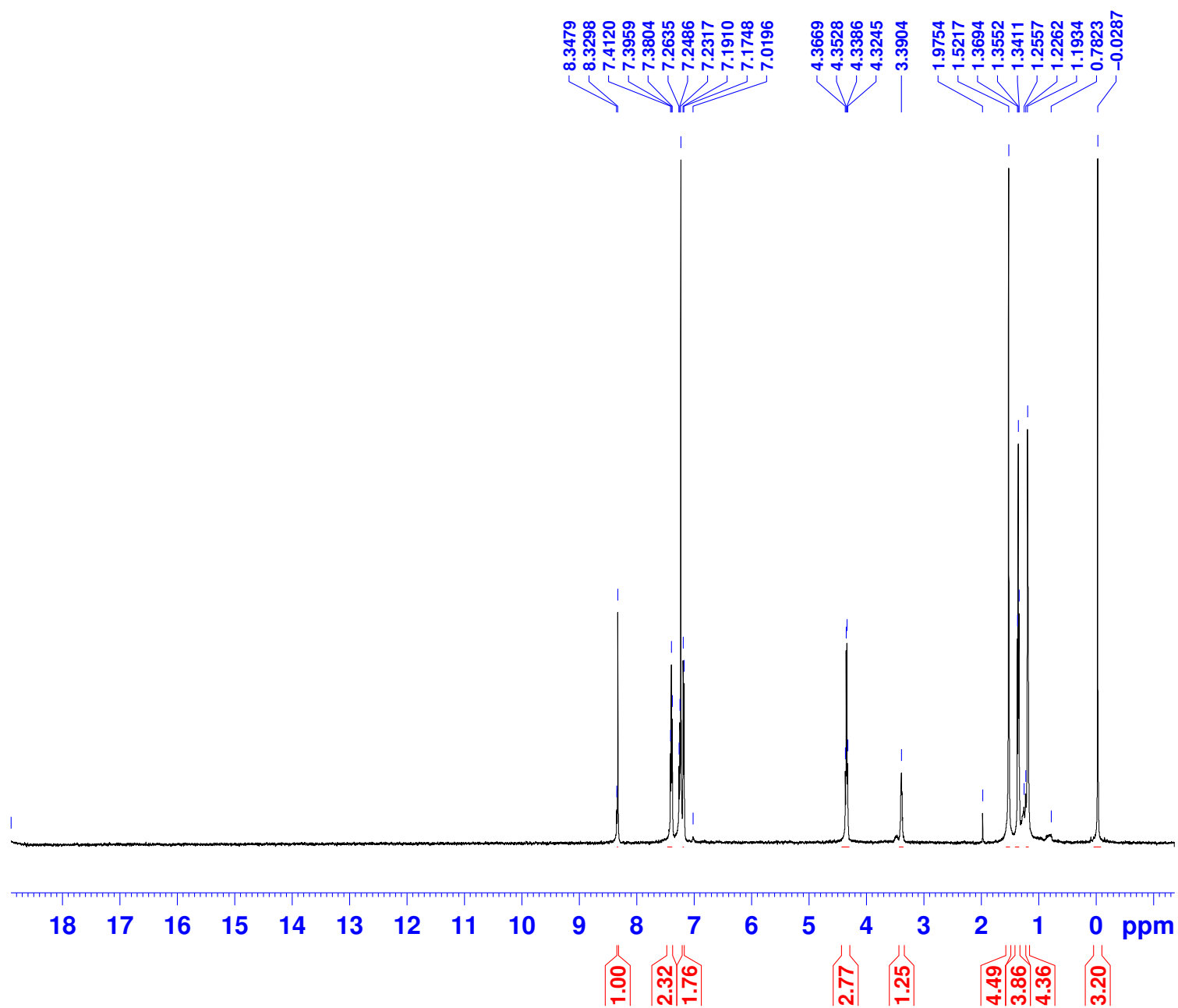


Supplementary Data (¹H, ¹³C, DEPT, 2D NMR and HRMS spectroscopy)

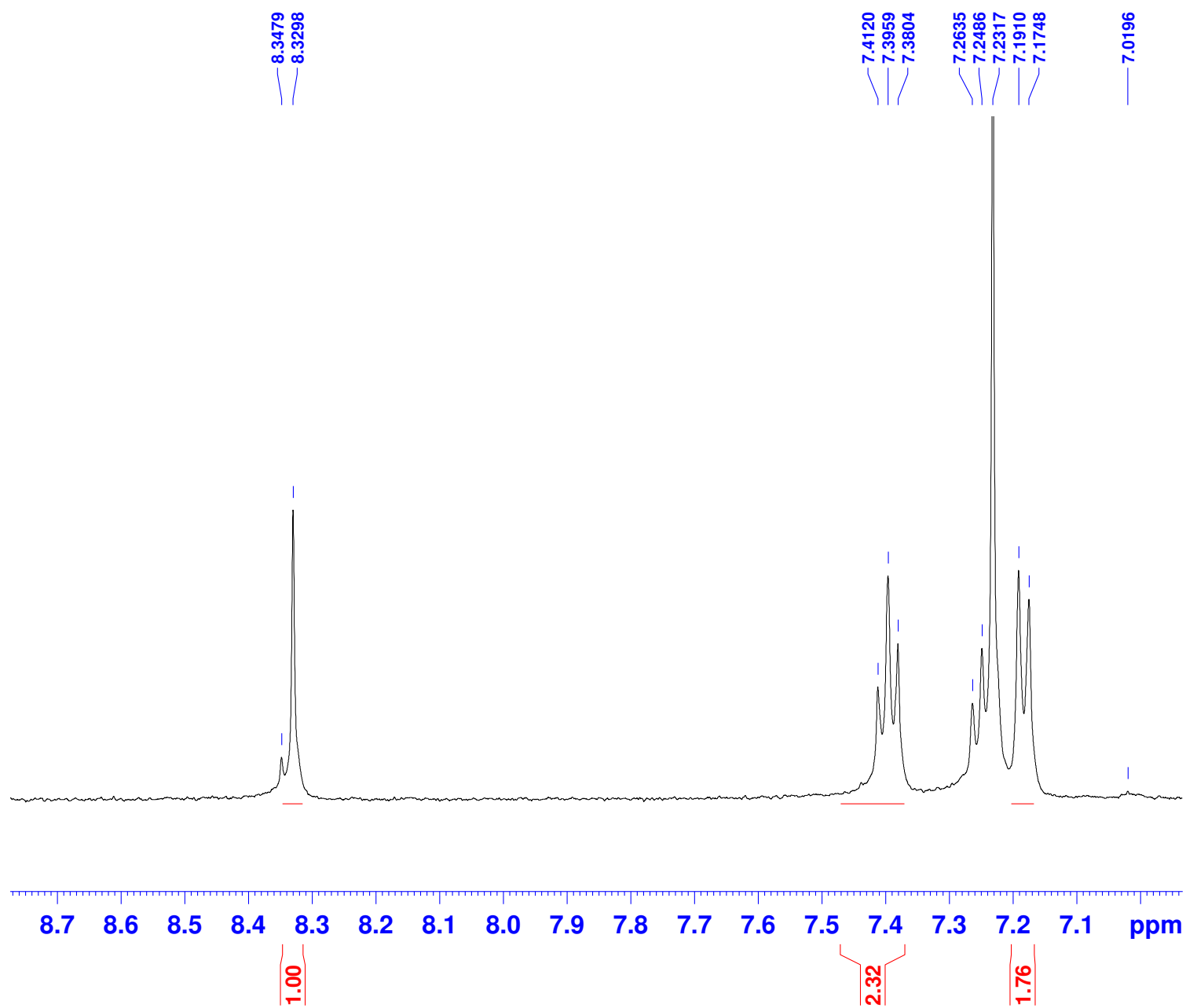


entry	a	b	c	d	e
NMR code	MP	MA	MB	MD	MT1
R	H	CHO	CHO	CHO	H
X	H	H	4''-Me	4''-Cl	H
Y	O	O	O	O	S

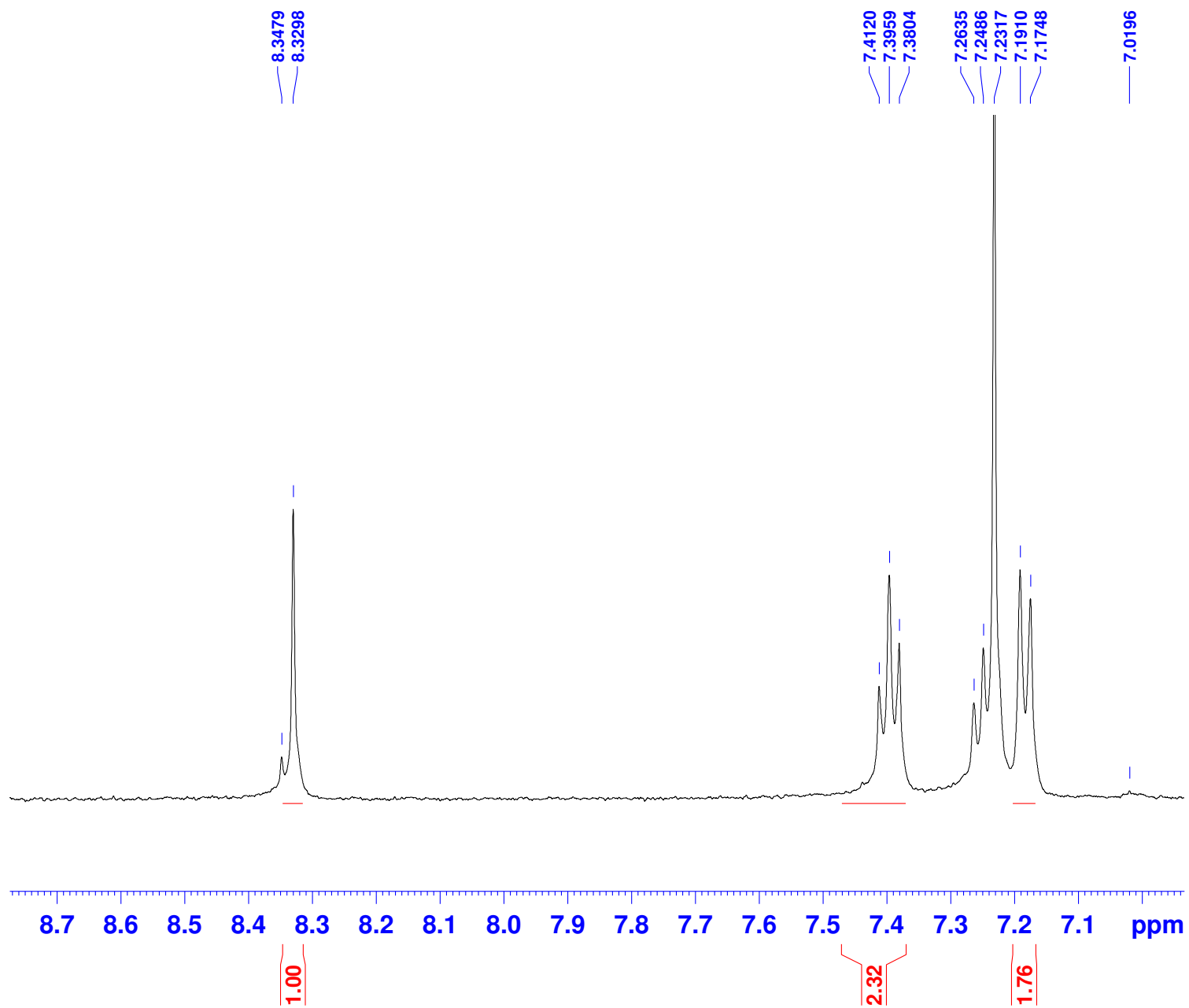
MP
H NMR



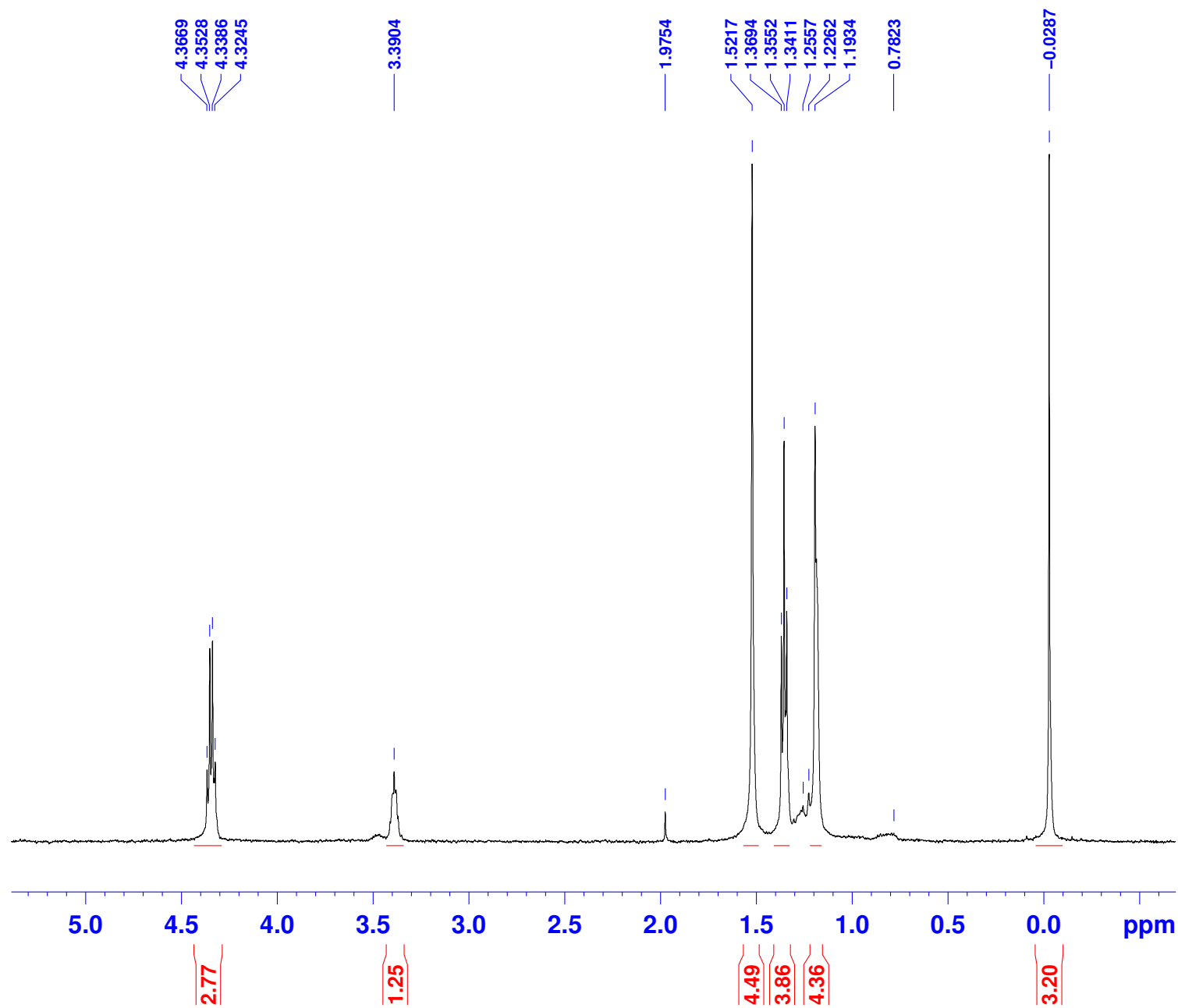
MP
H NMR



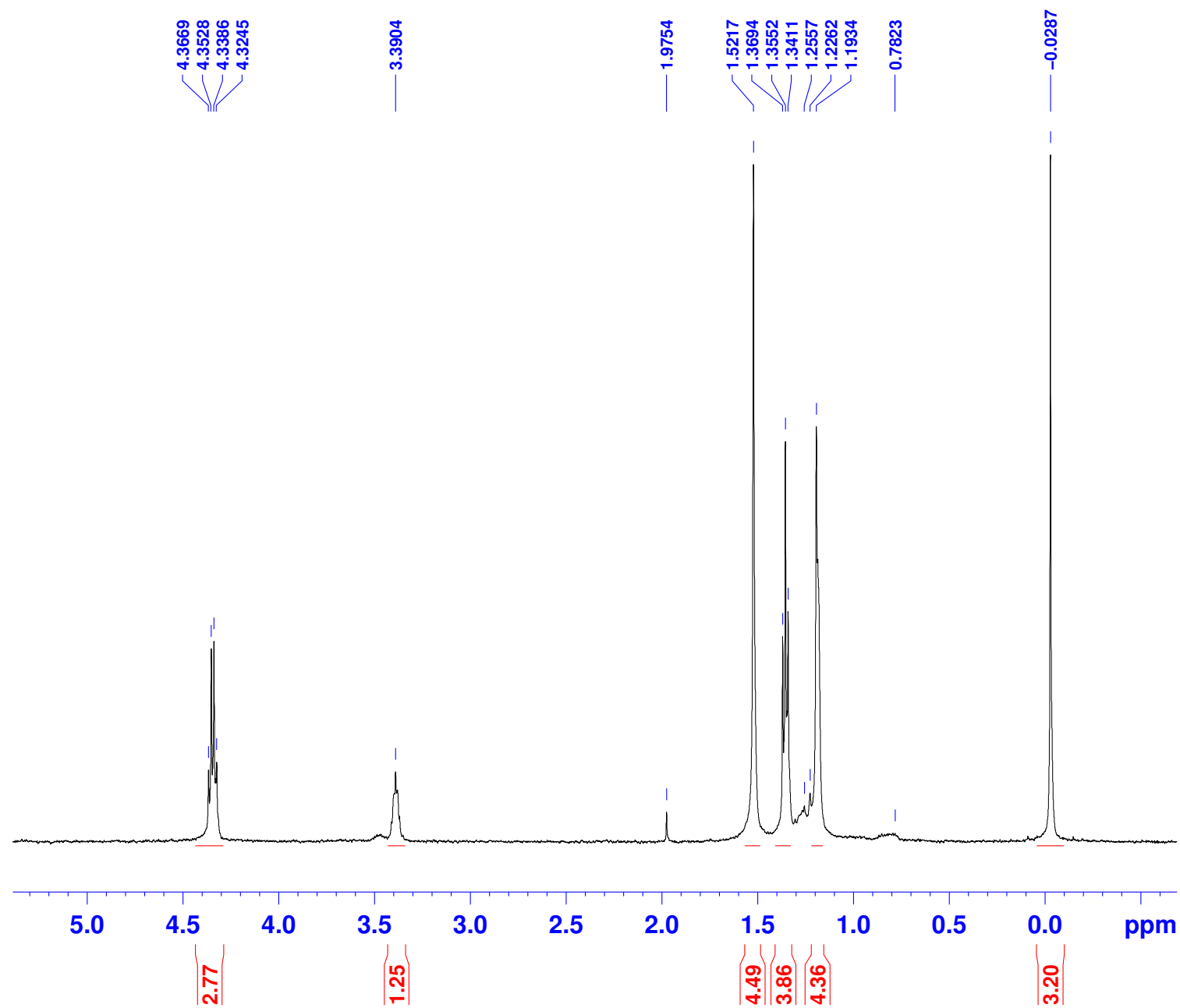
MP
H NMR



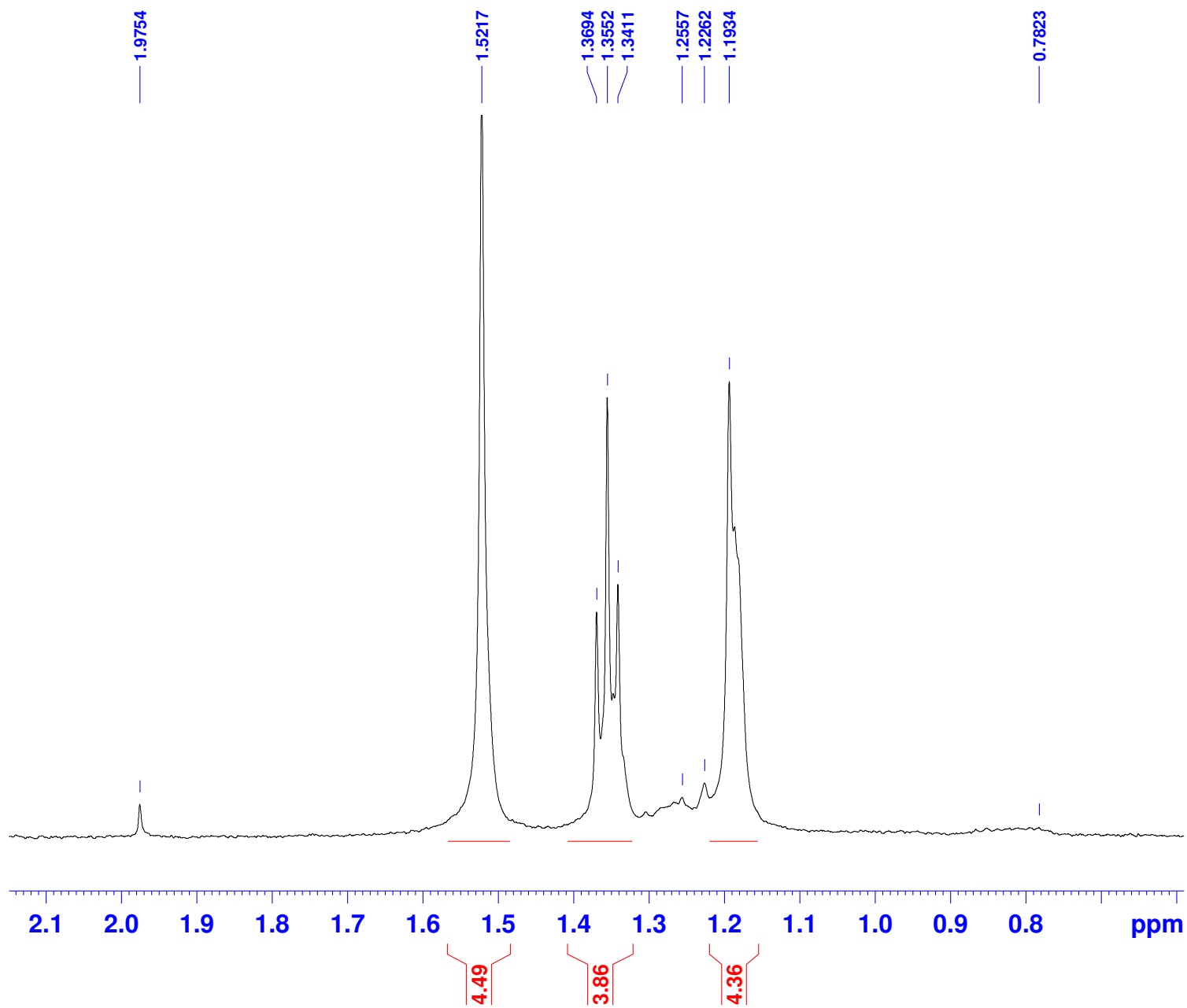
MP
H NMR



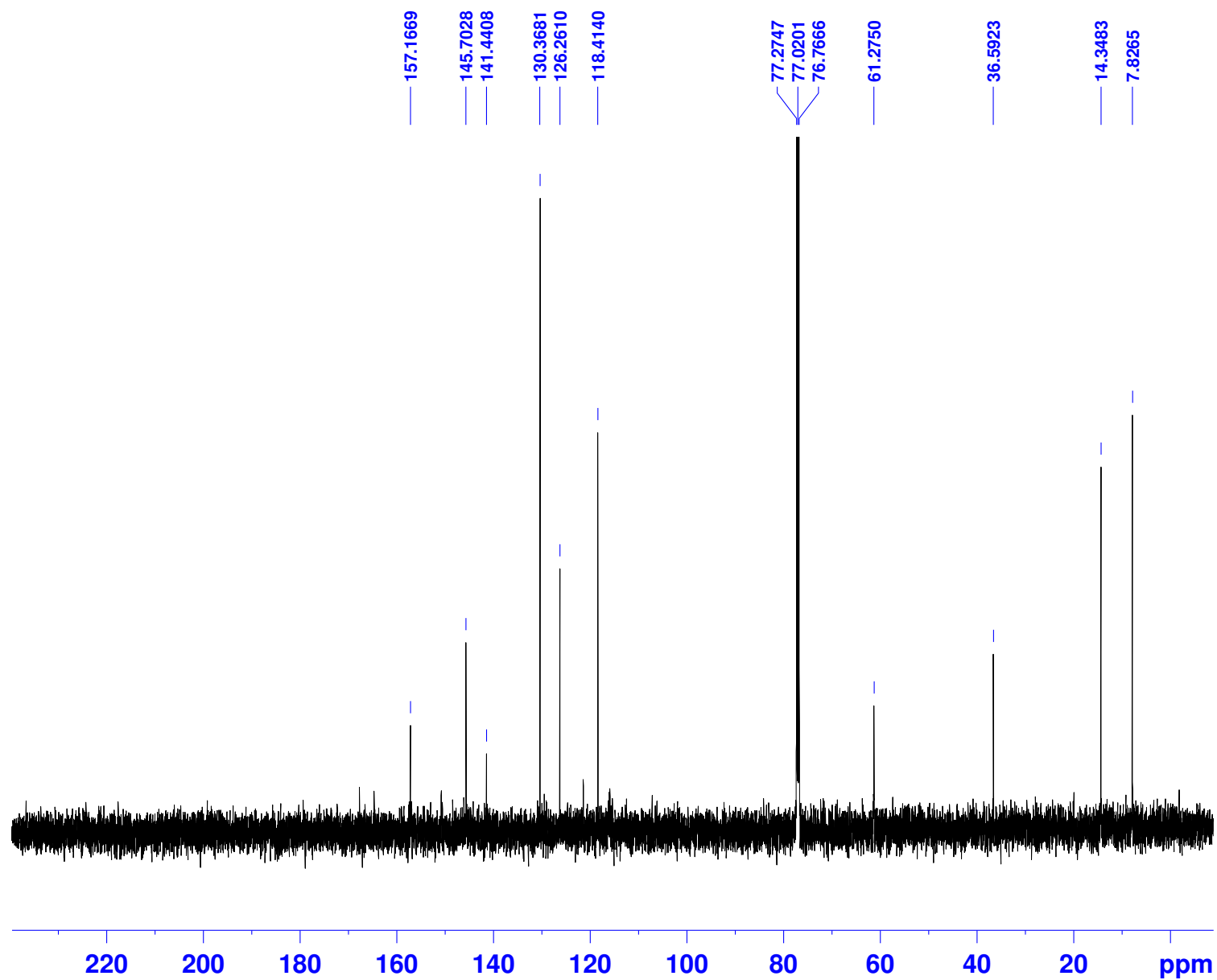
MP
H NMR



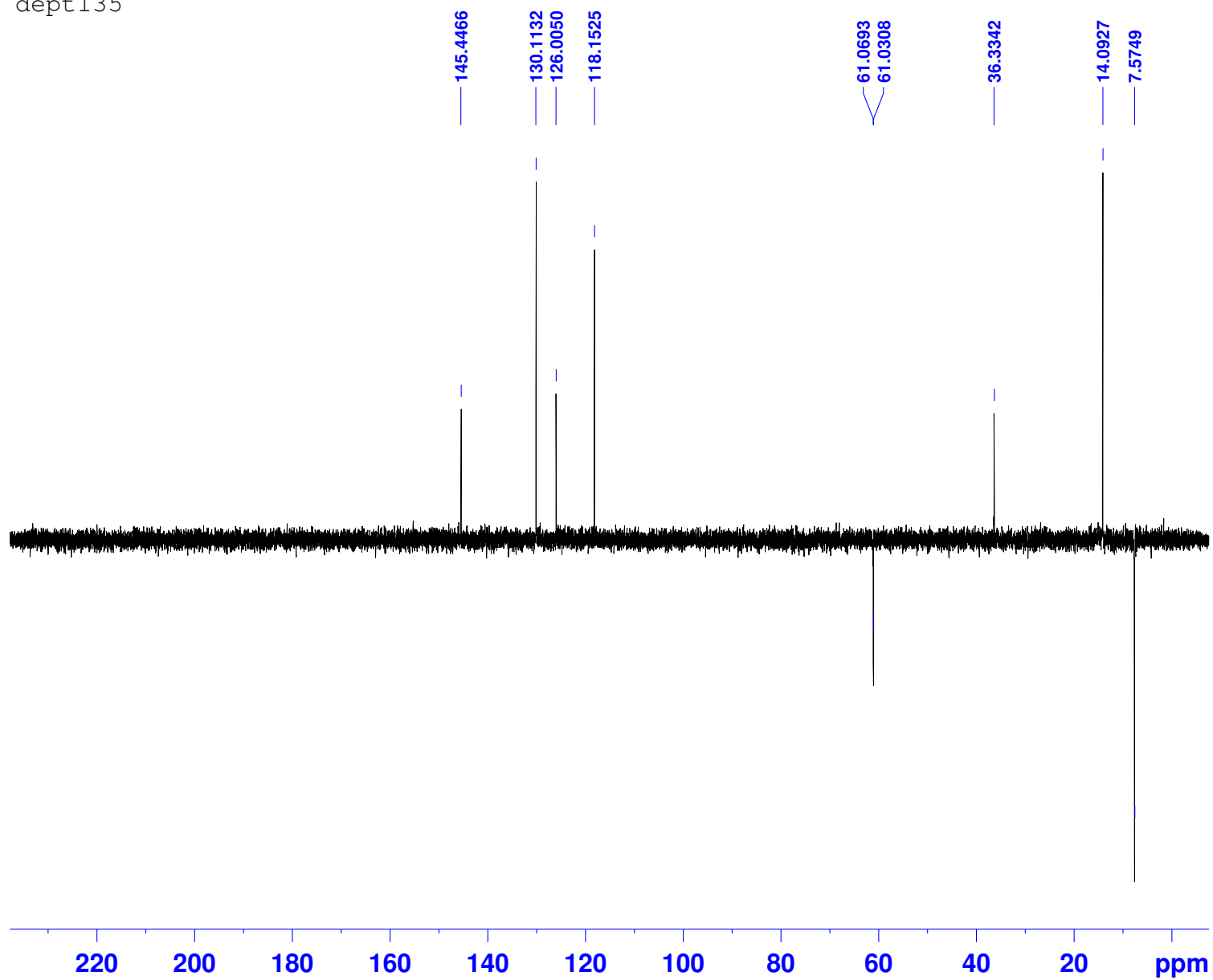
MP
H NMR



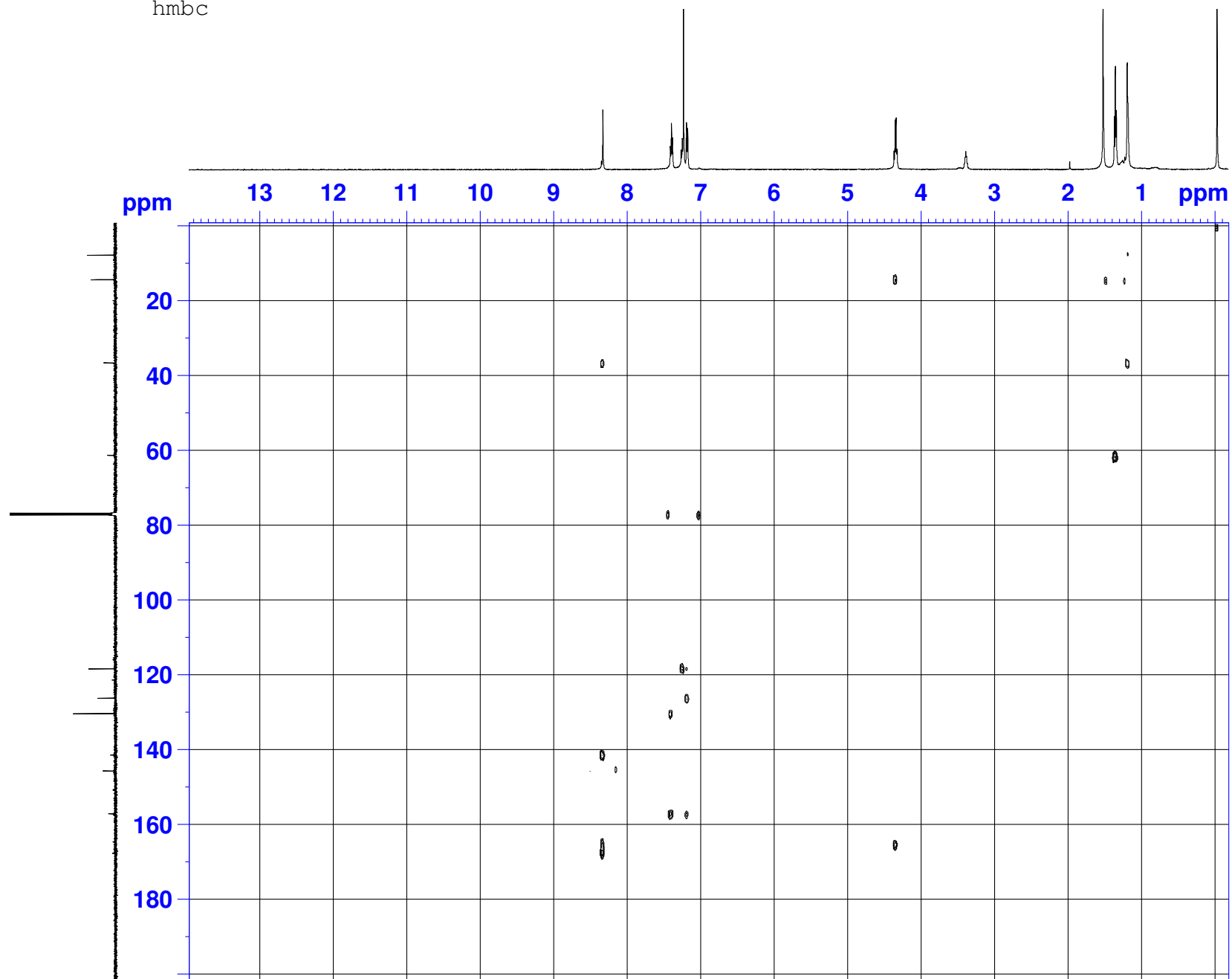
MP
c13



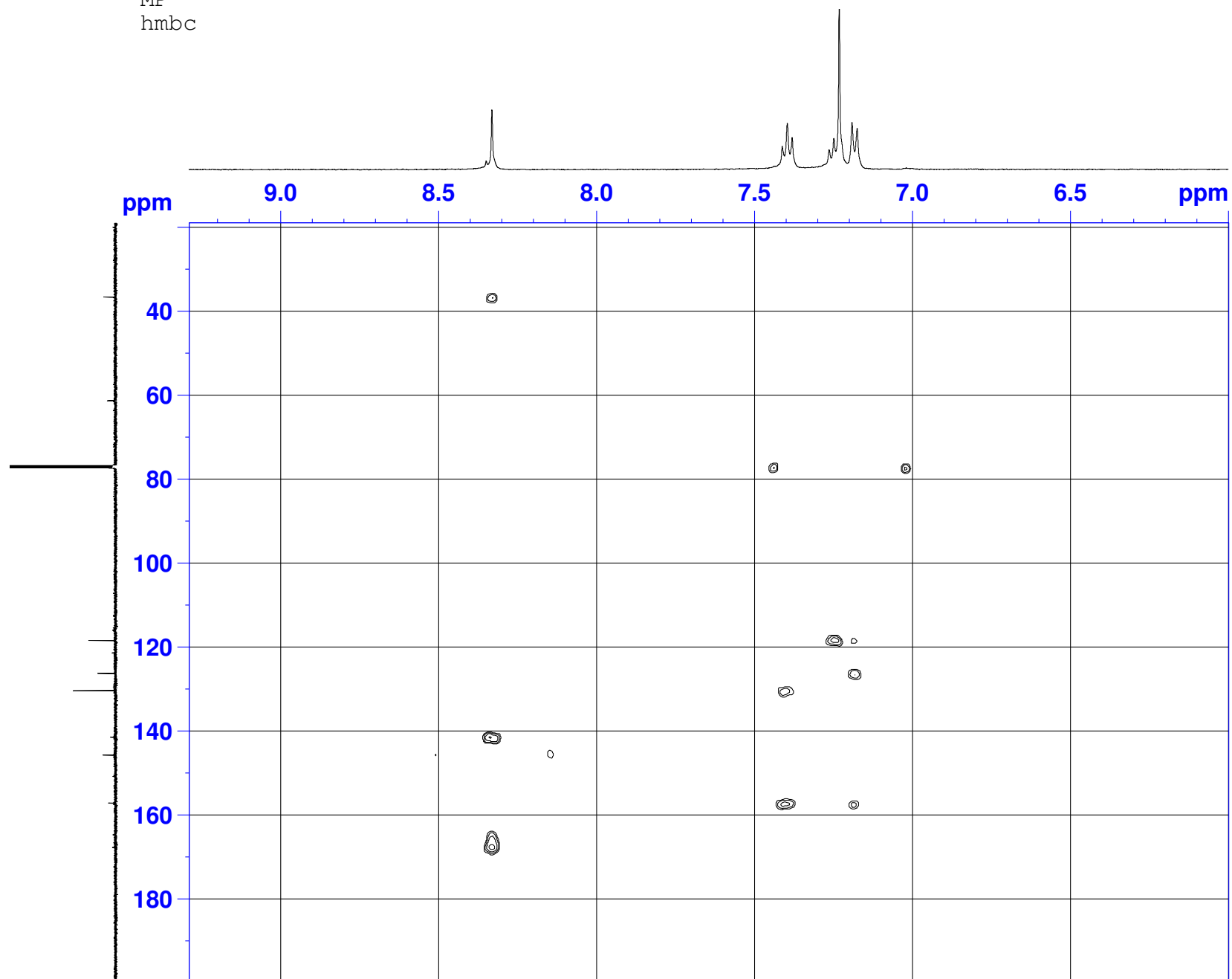
MP
dept135



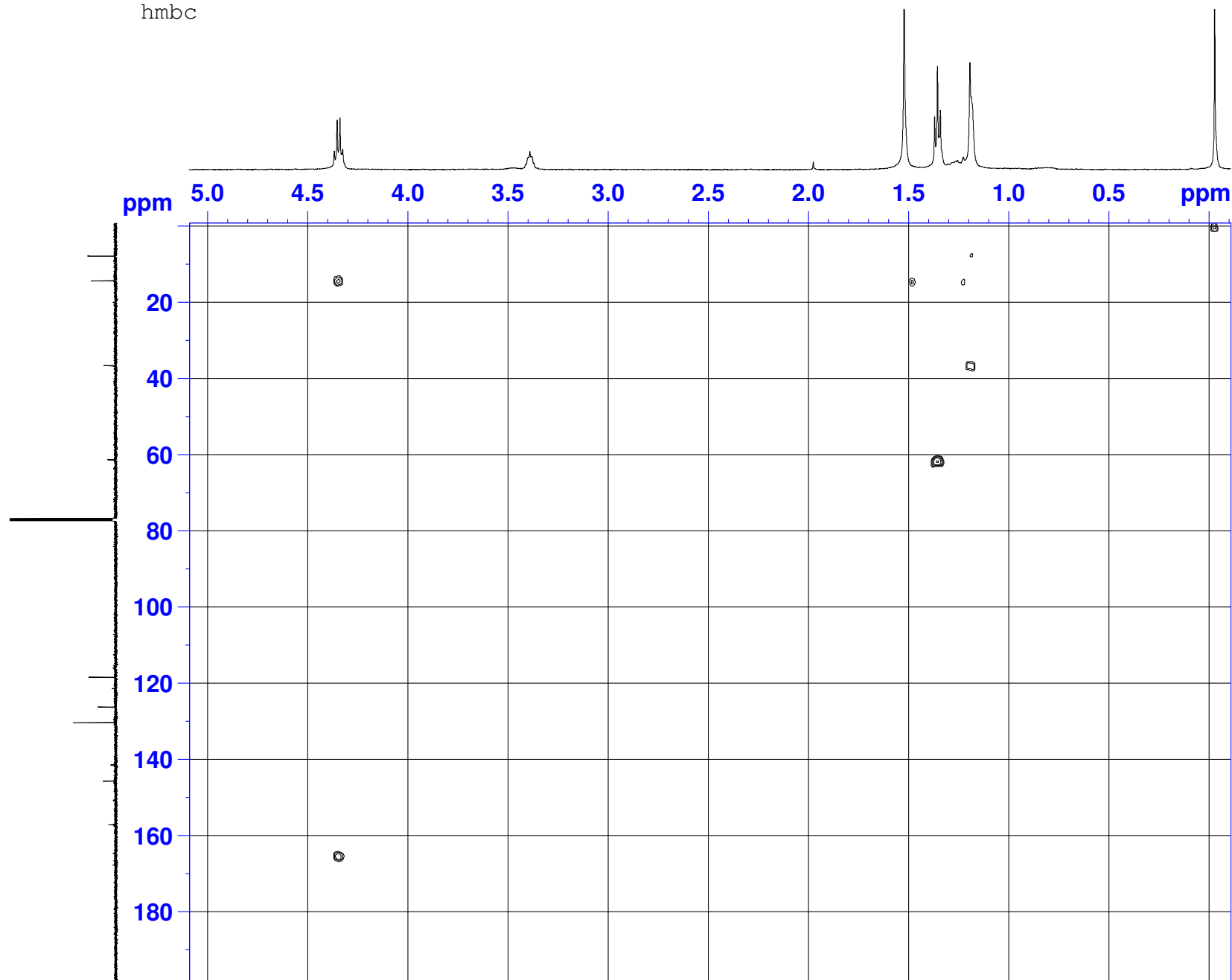
MP
hmbc



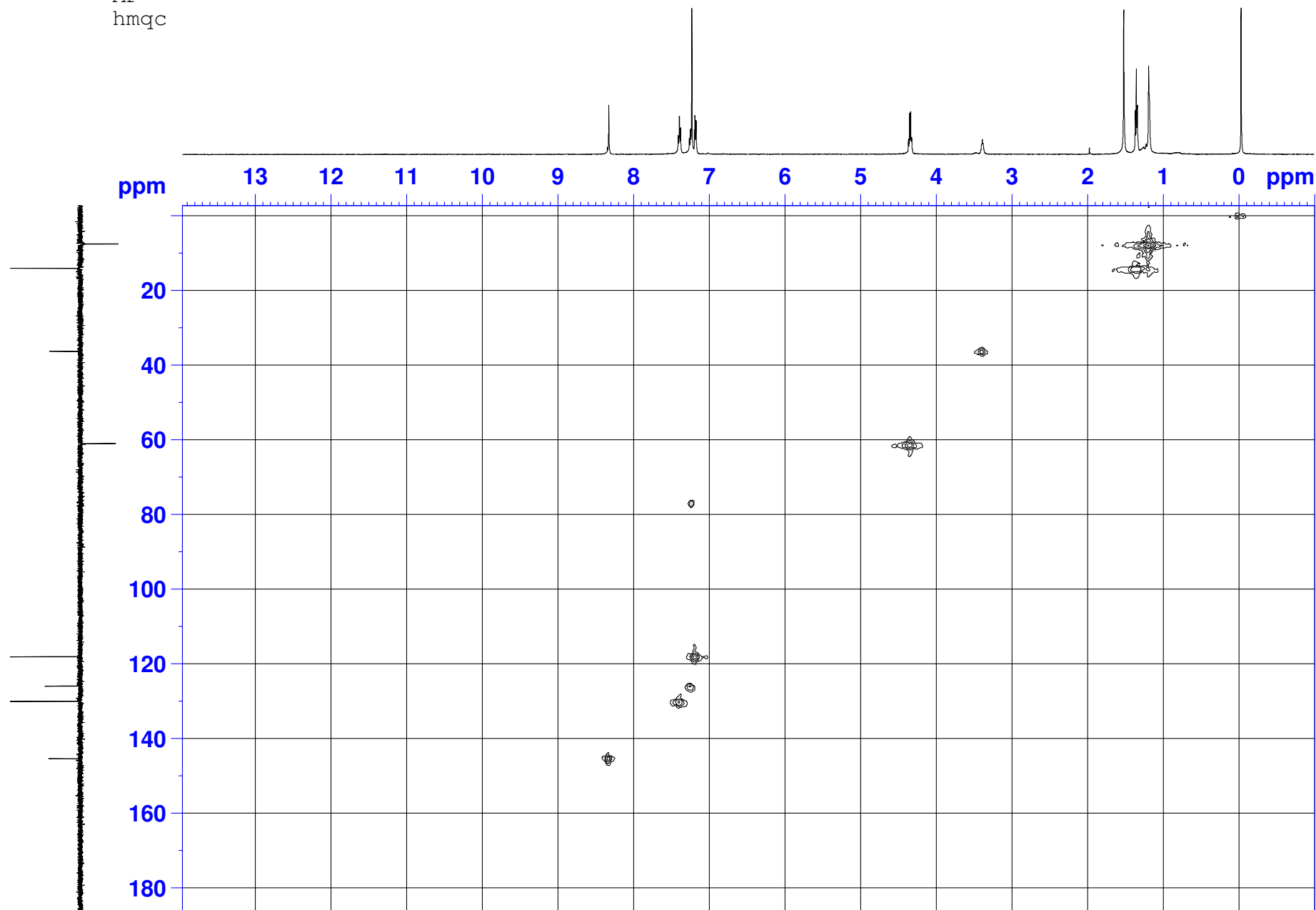
MP
hmbc



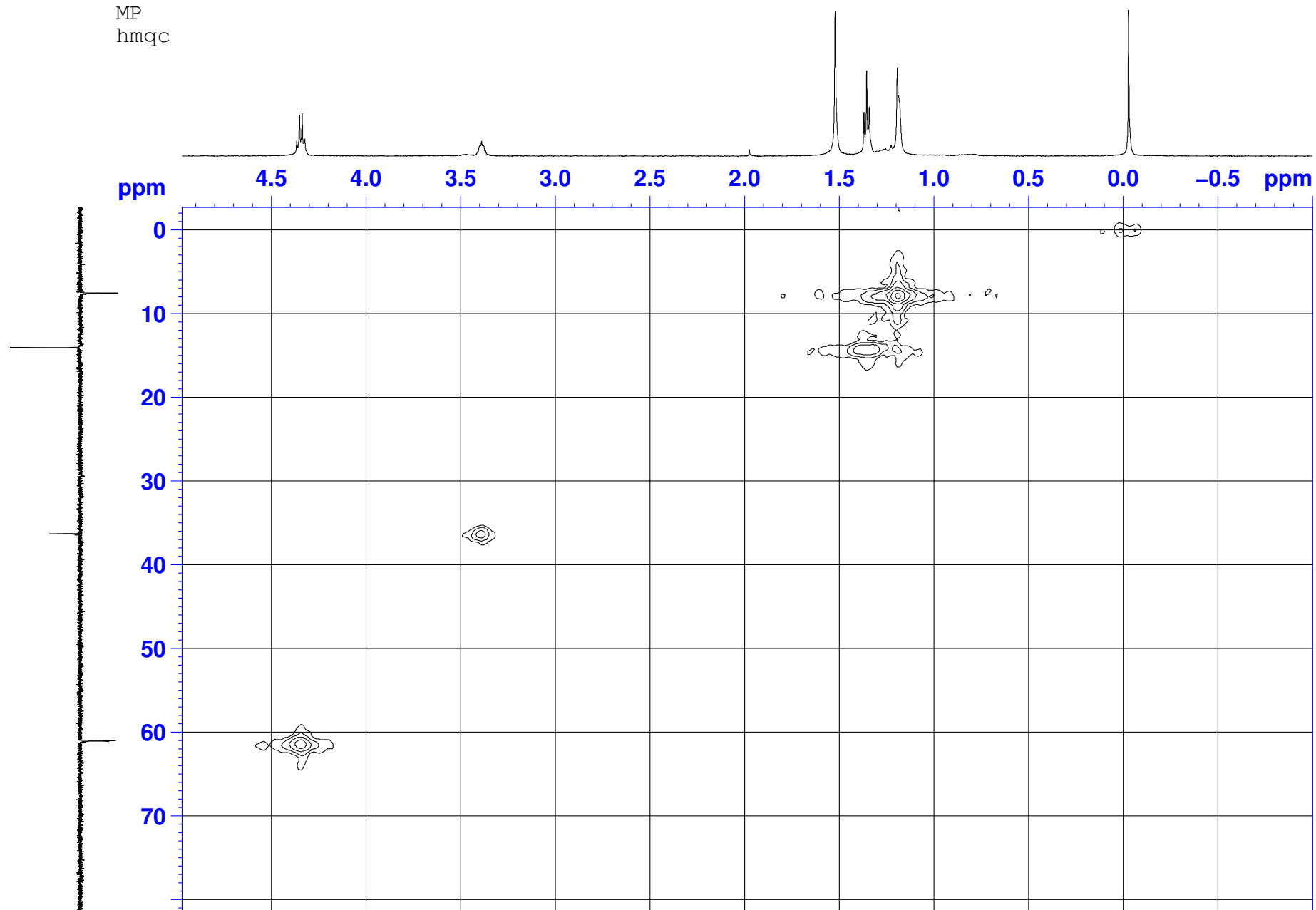
MP
hmbc



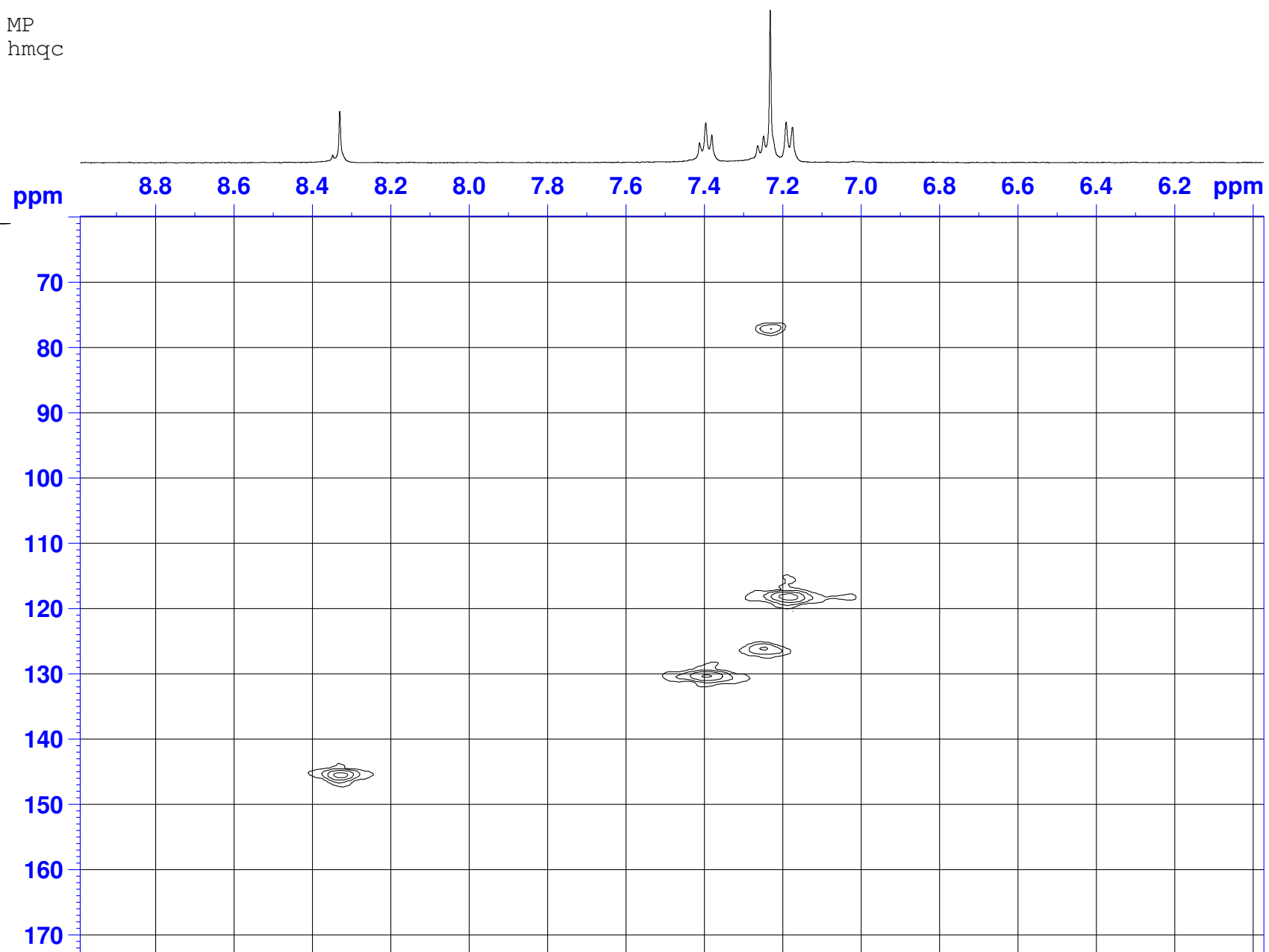
MP
hmqc



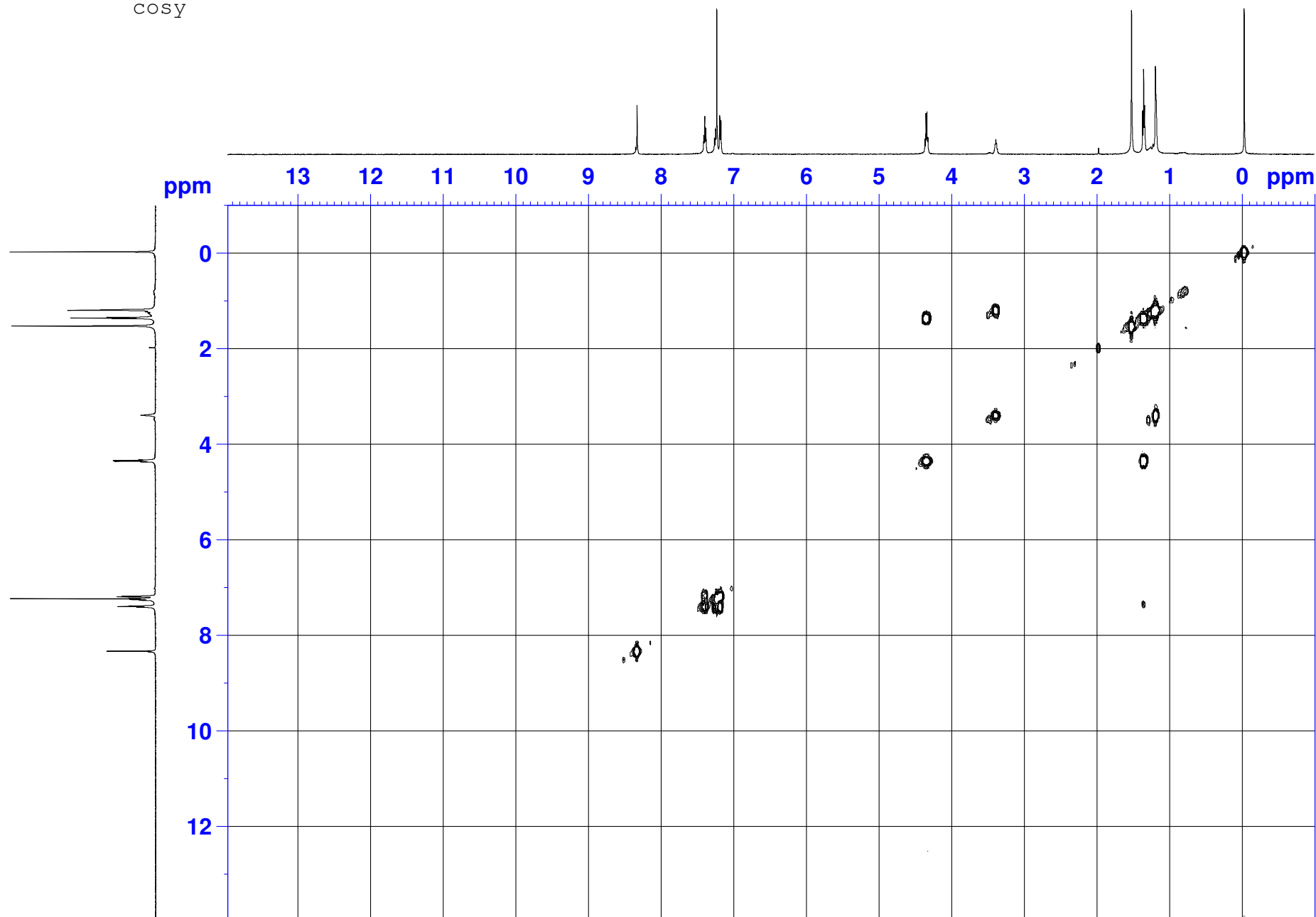
MP
hmqc



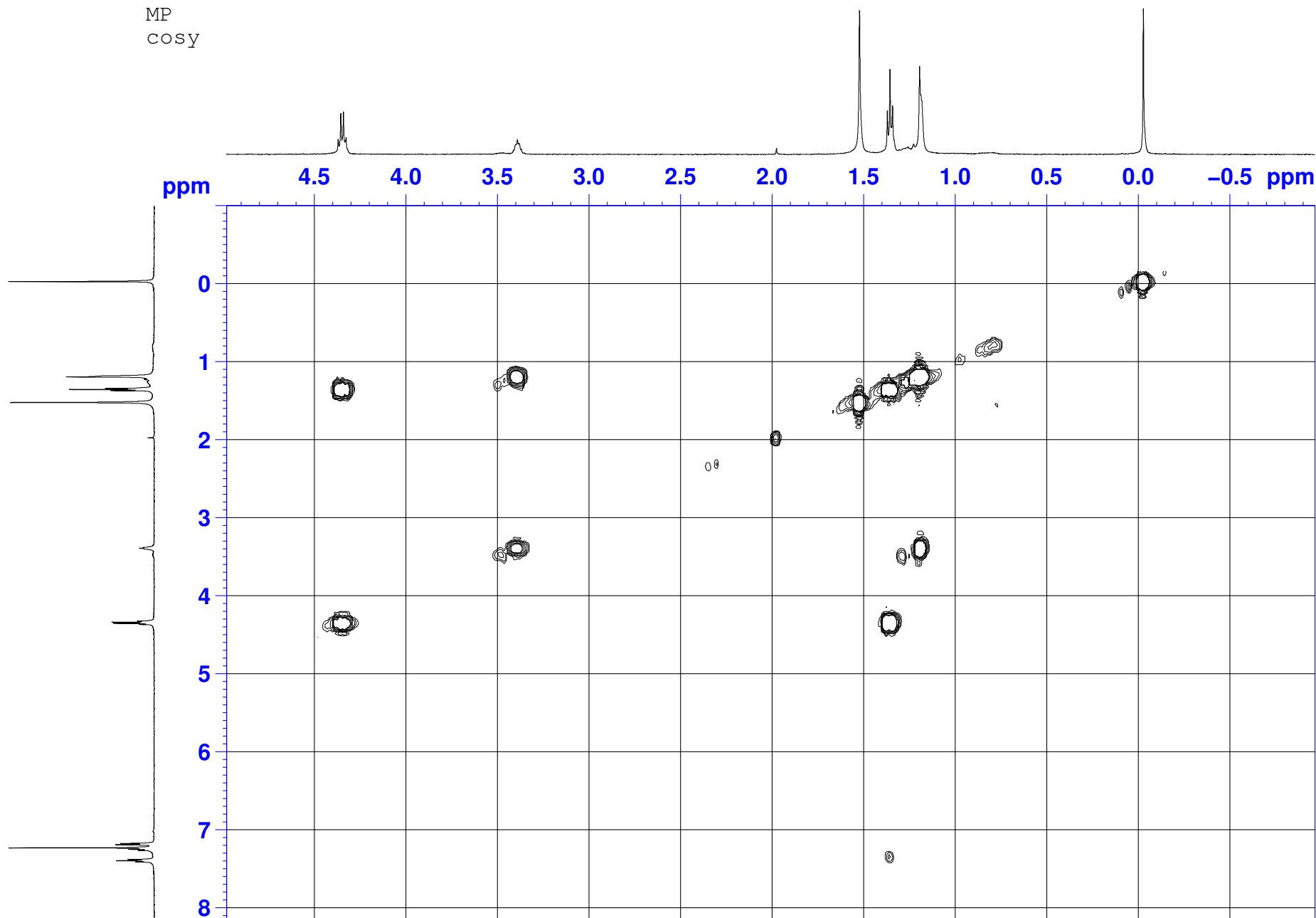
MP
hmqc



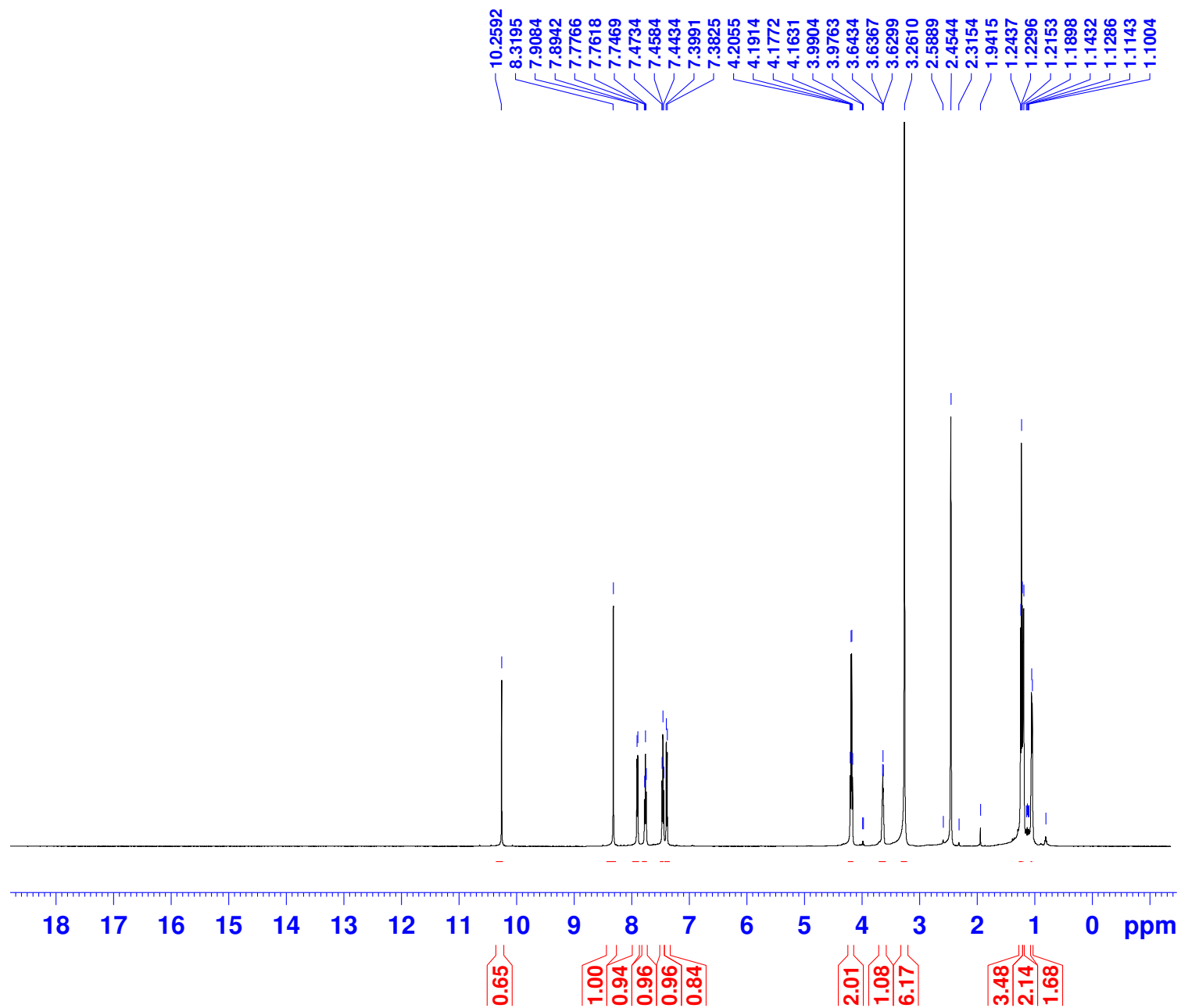
MP
cosy



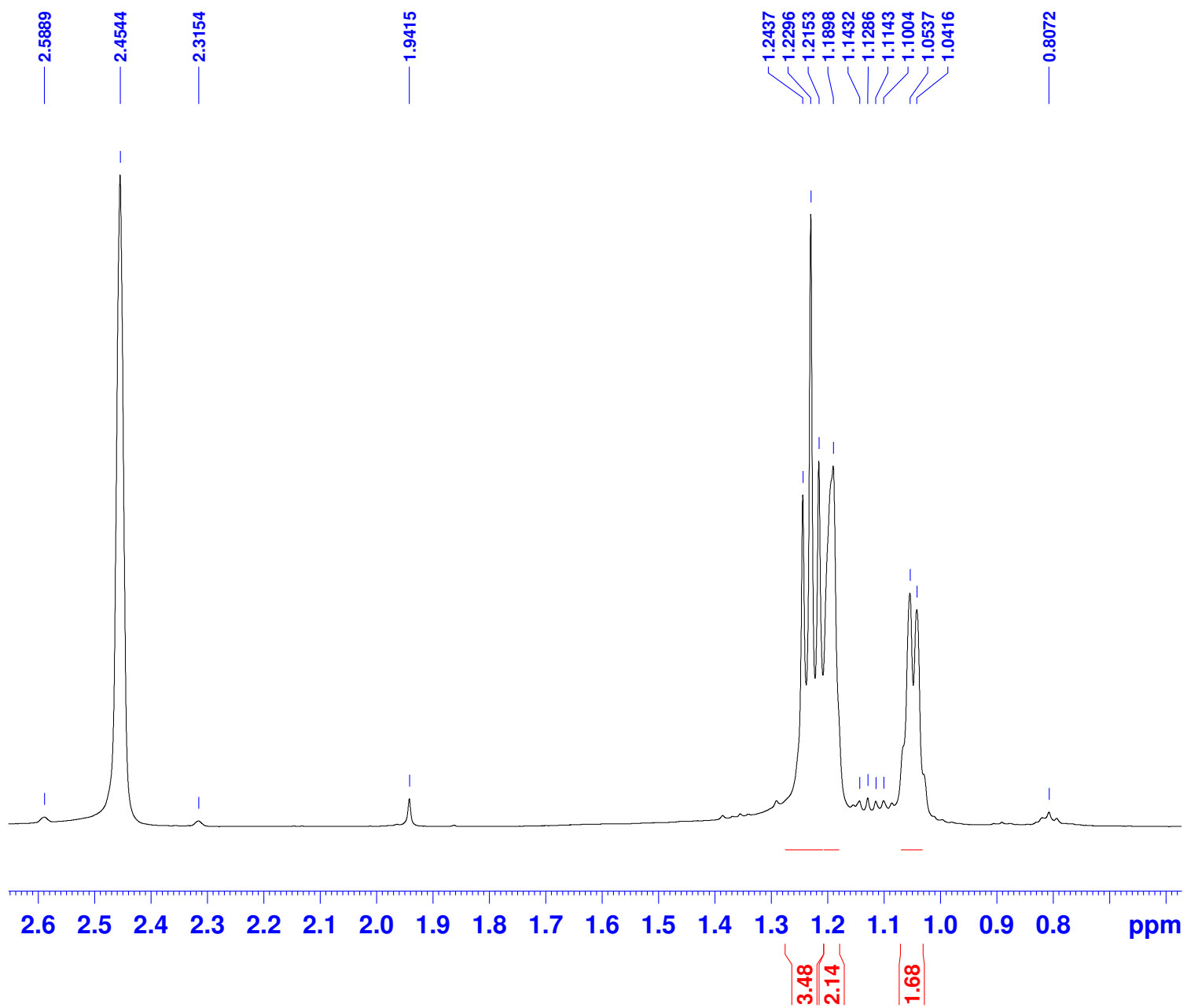
MP
cosy



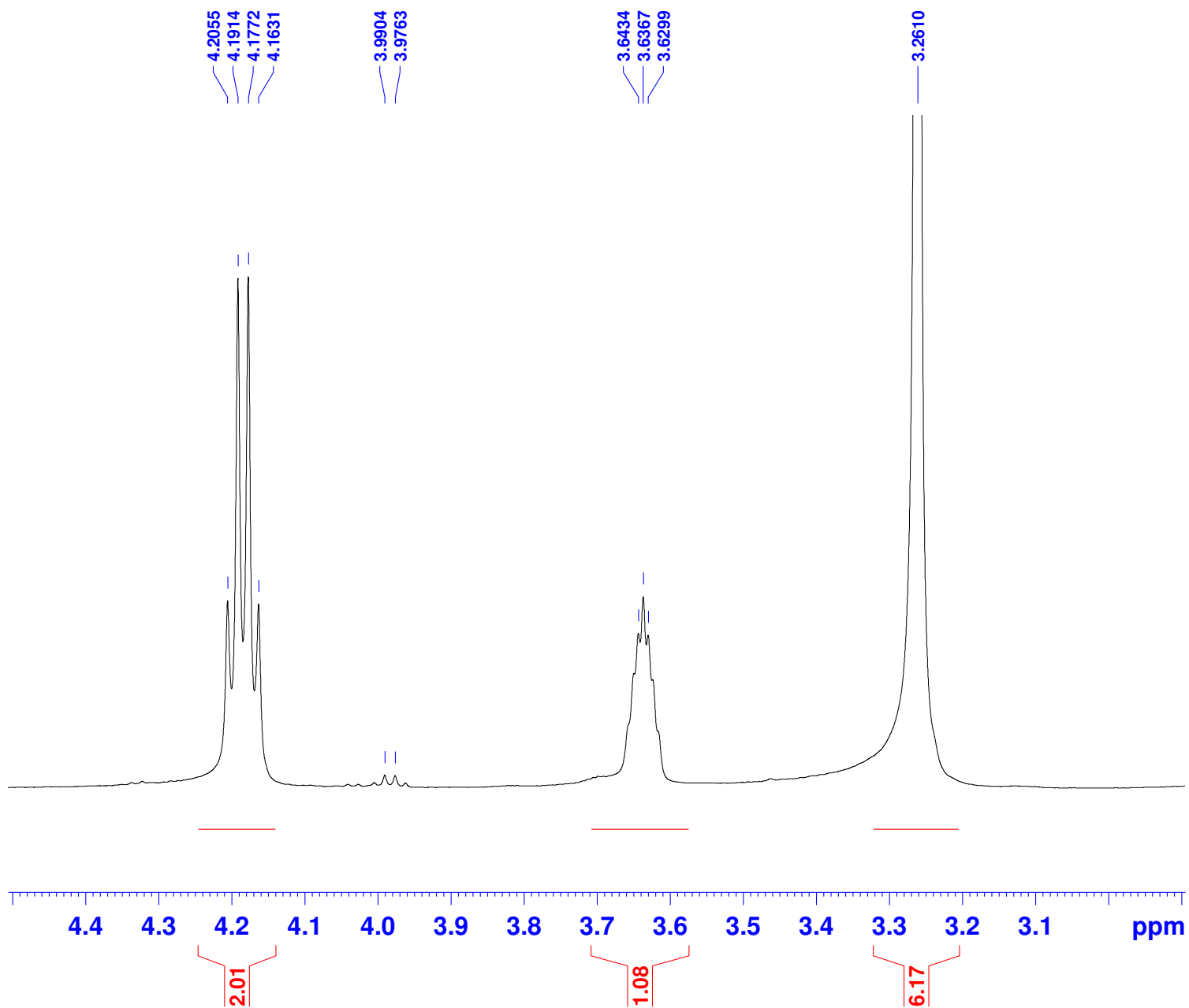
MA
H NMR



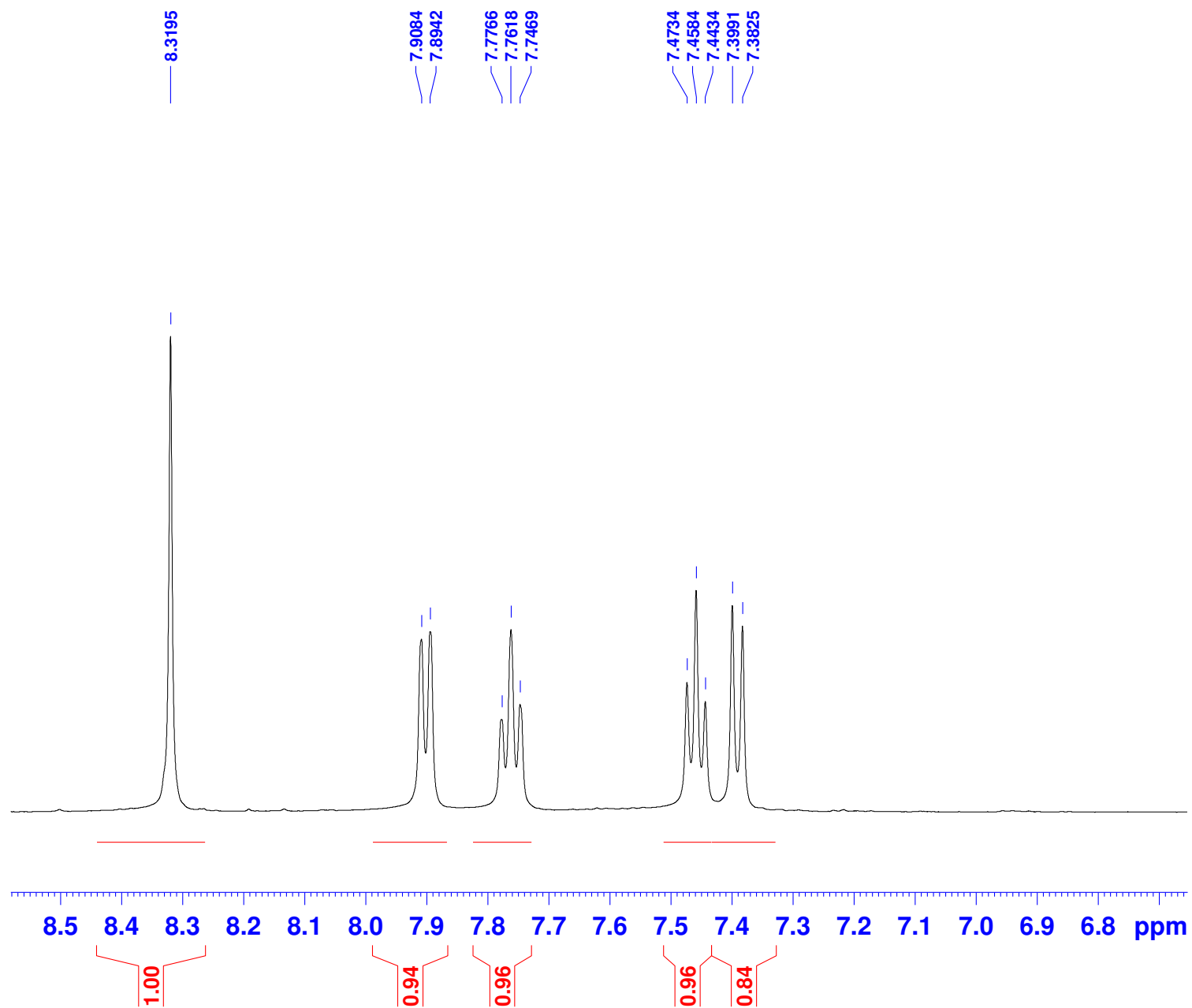
MA
H NMR



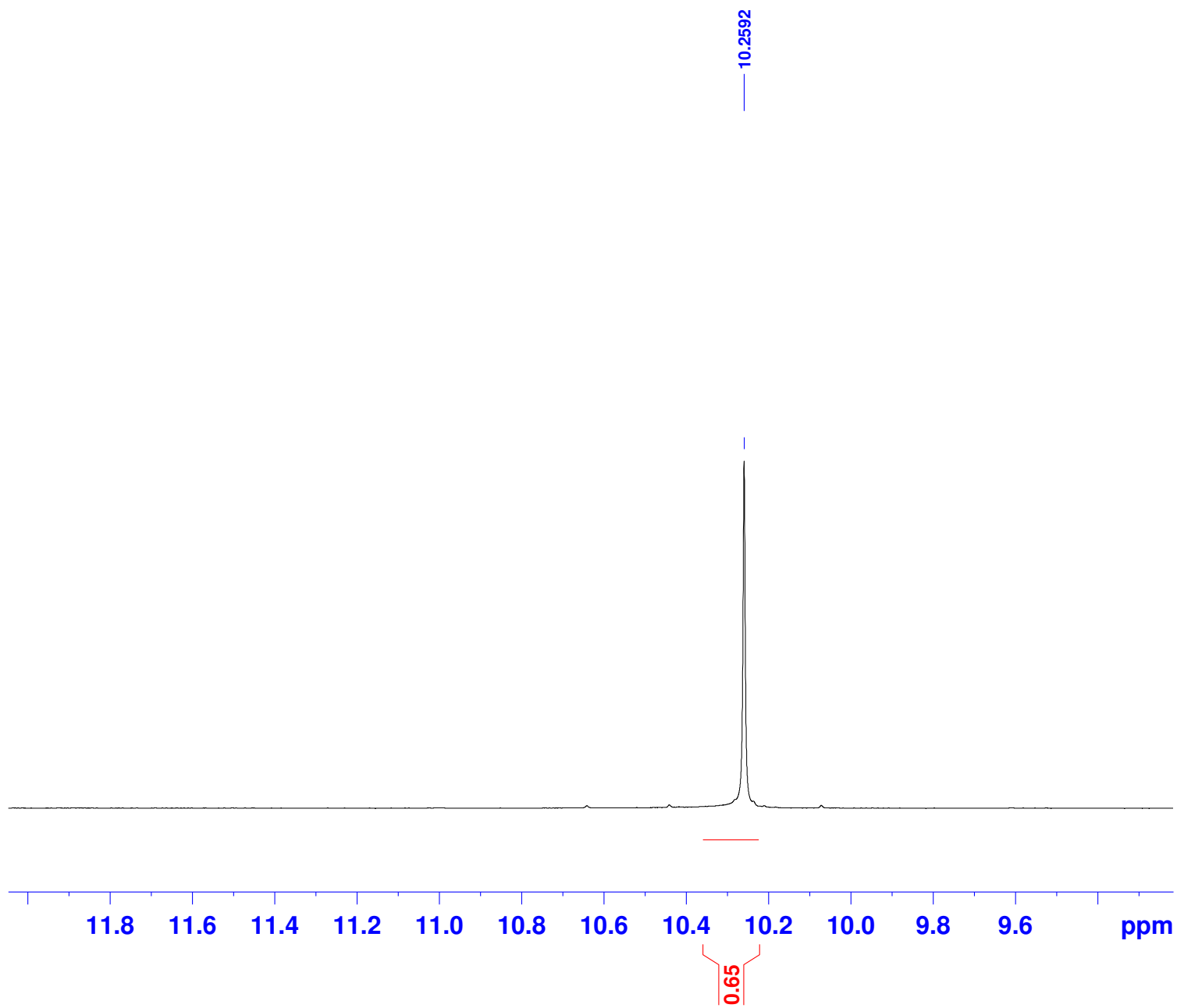
MA
H NMR



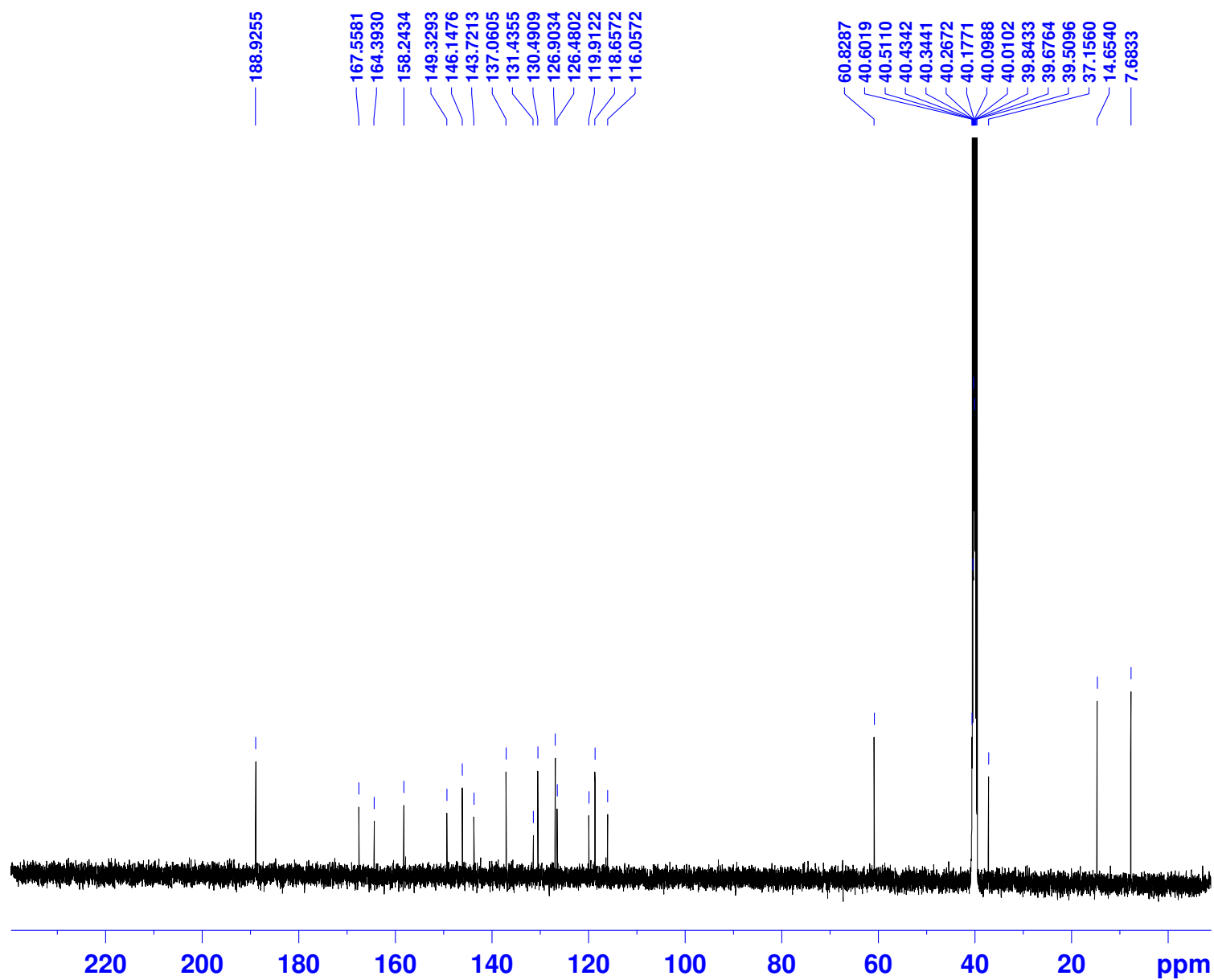
MA
H NMR



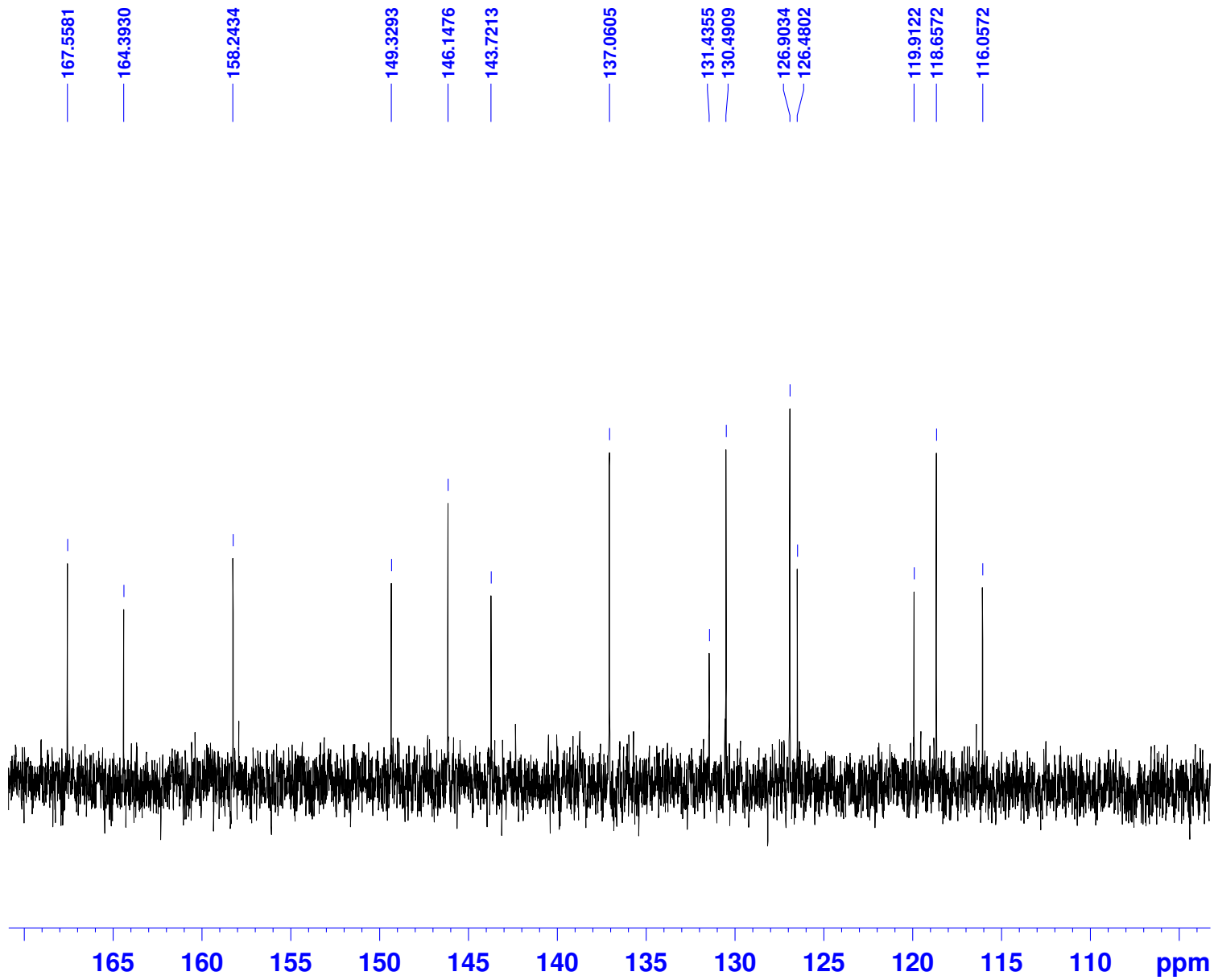
MA
H NMR



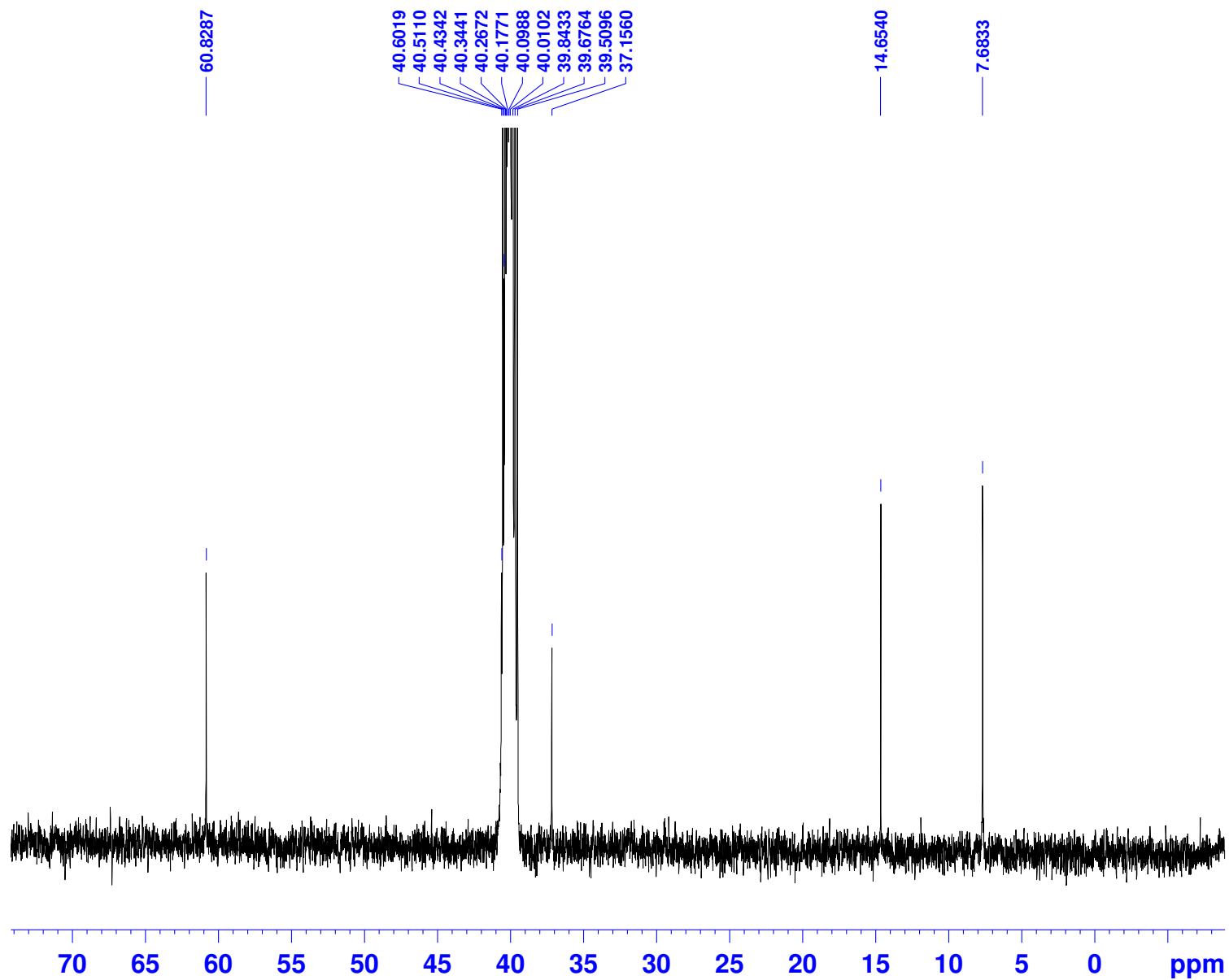
MA
c13



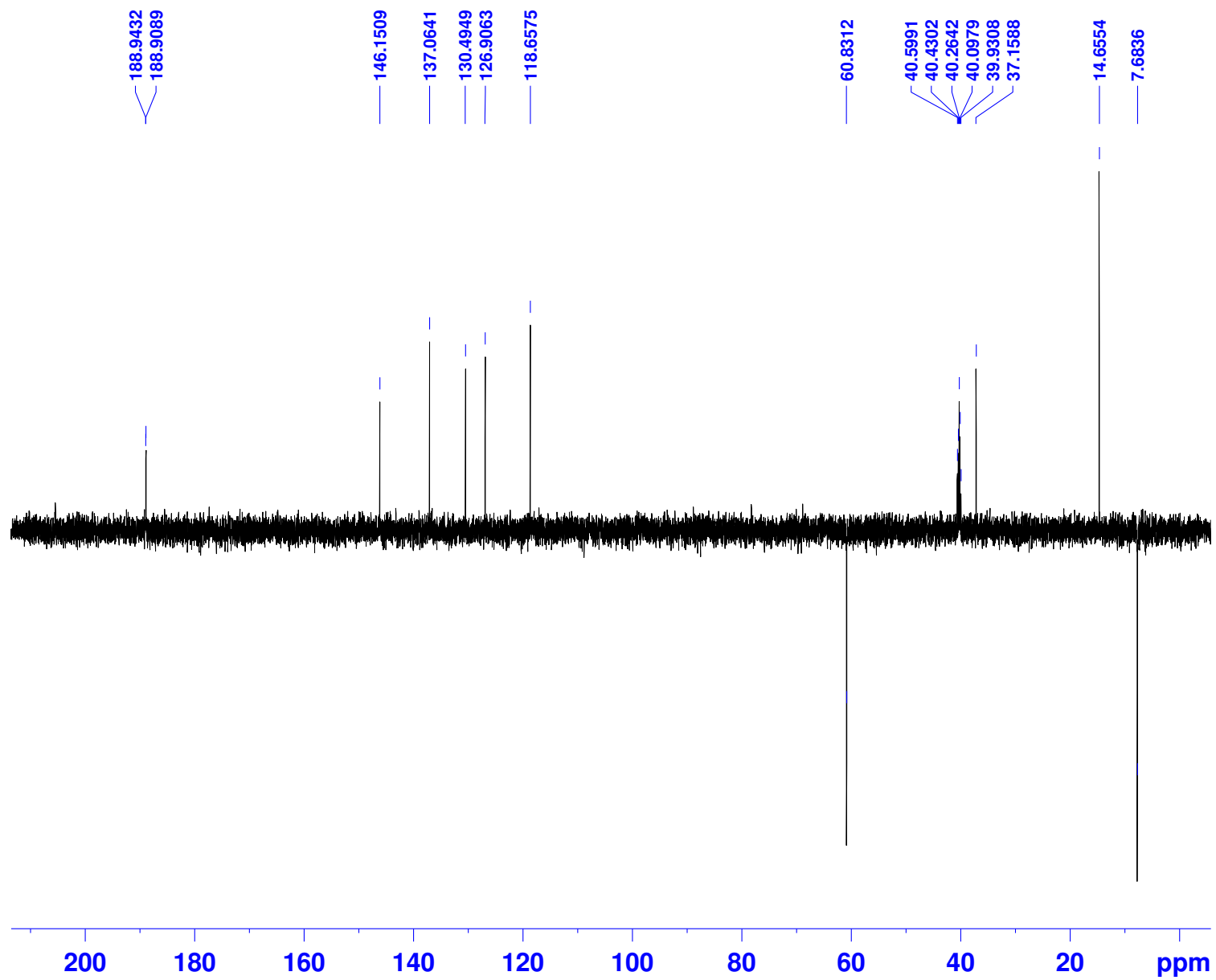
MA
c13



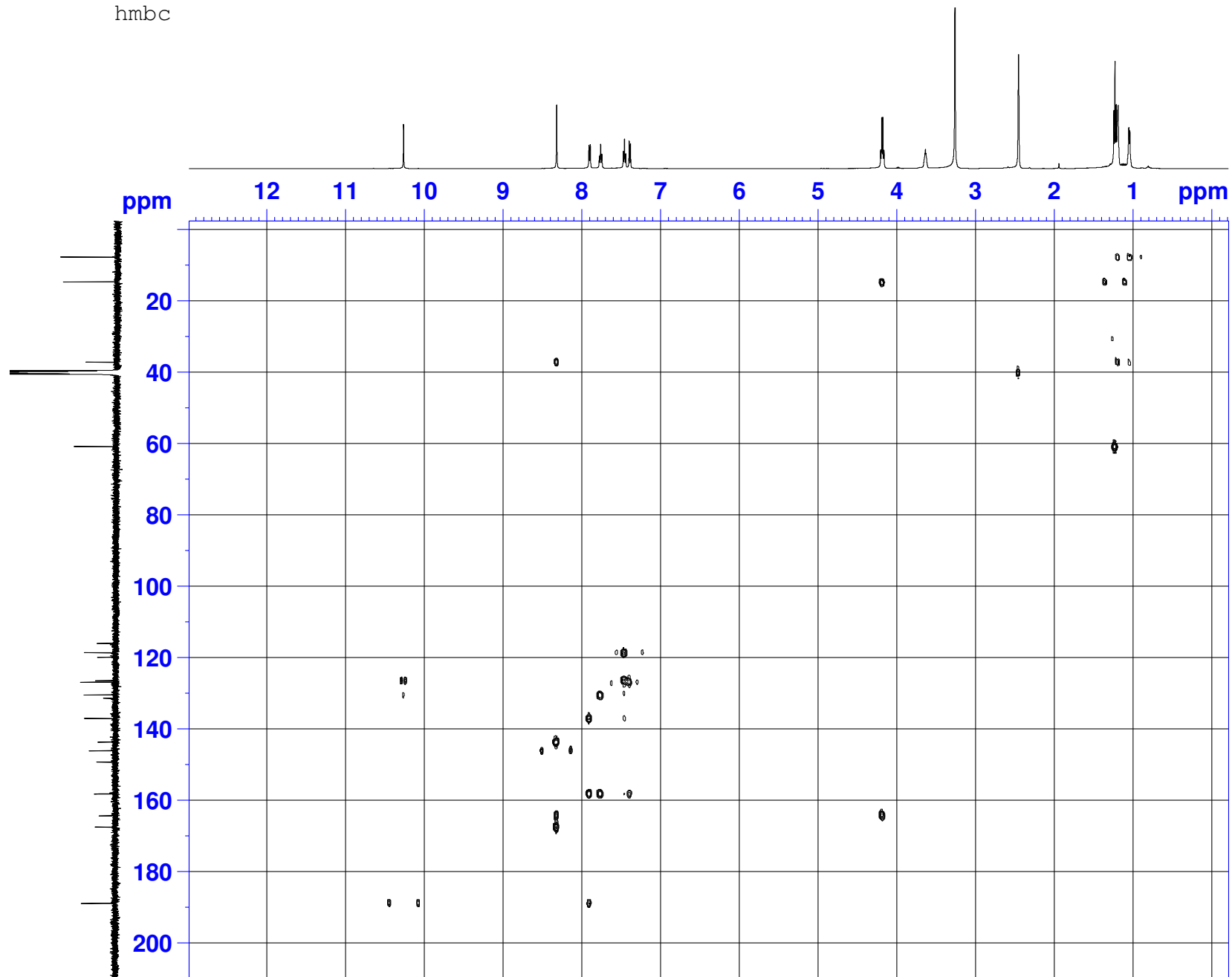
MA
c13



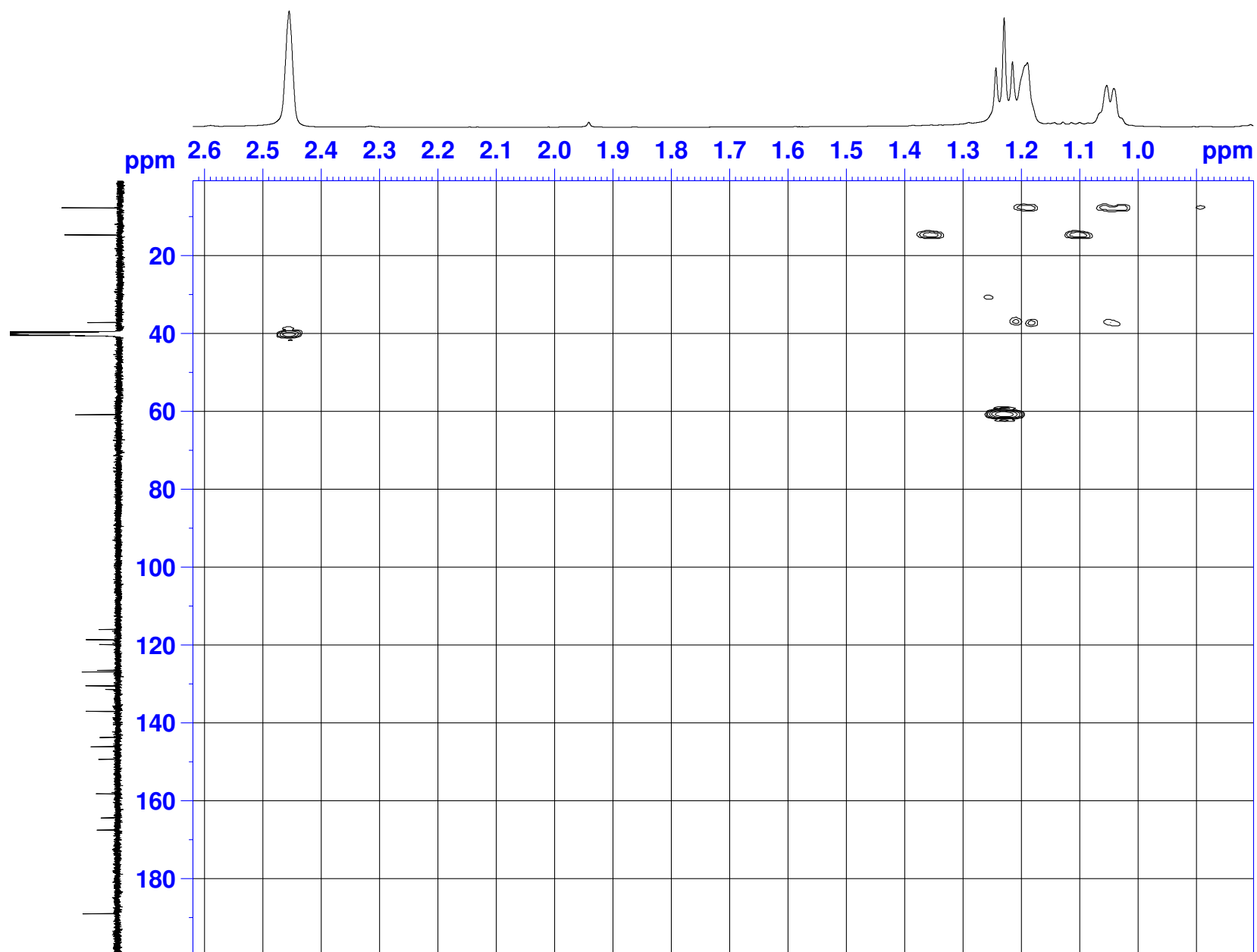
MA
dept135



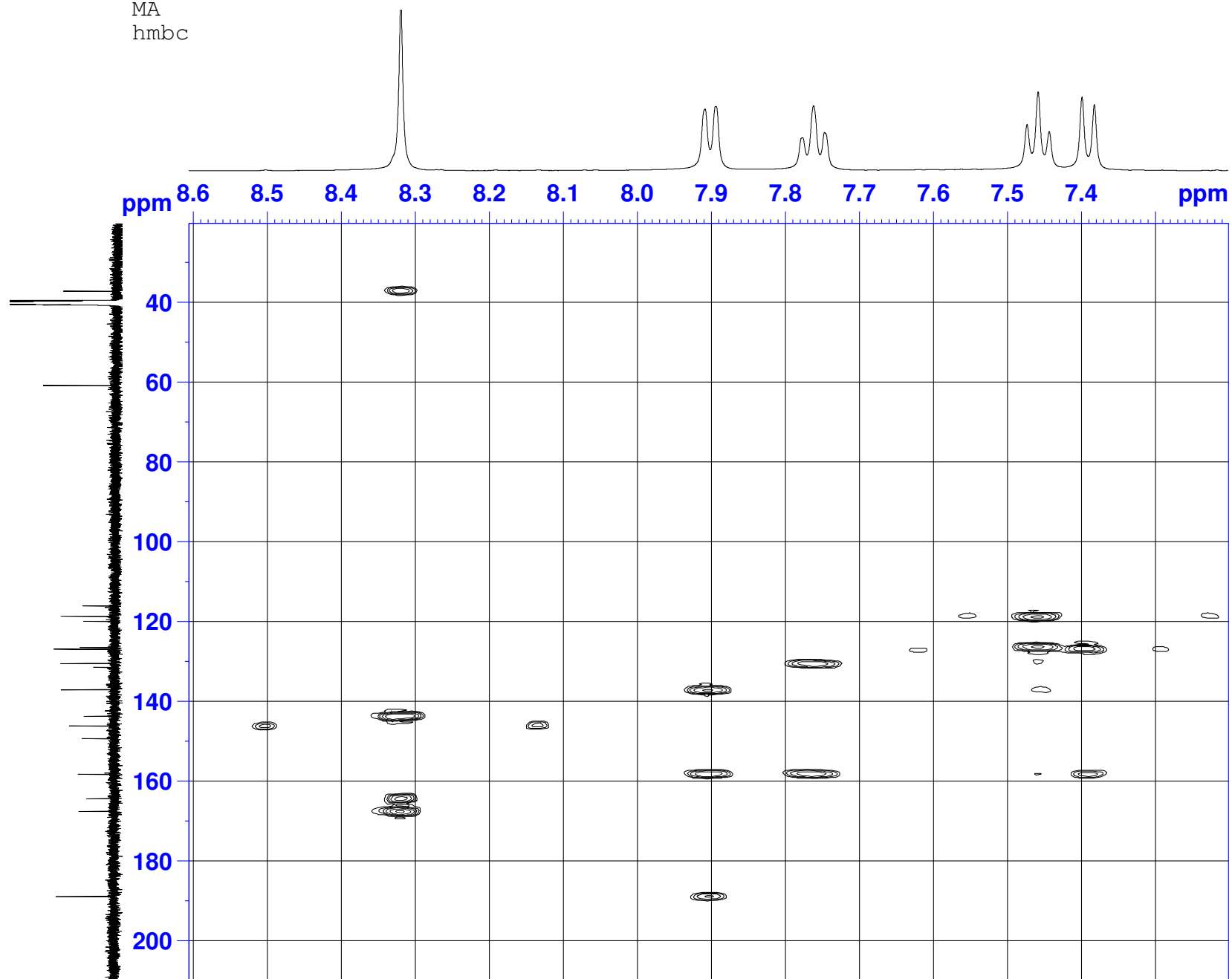
MA
hmbc



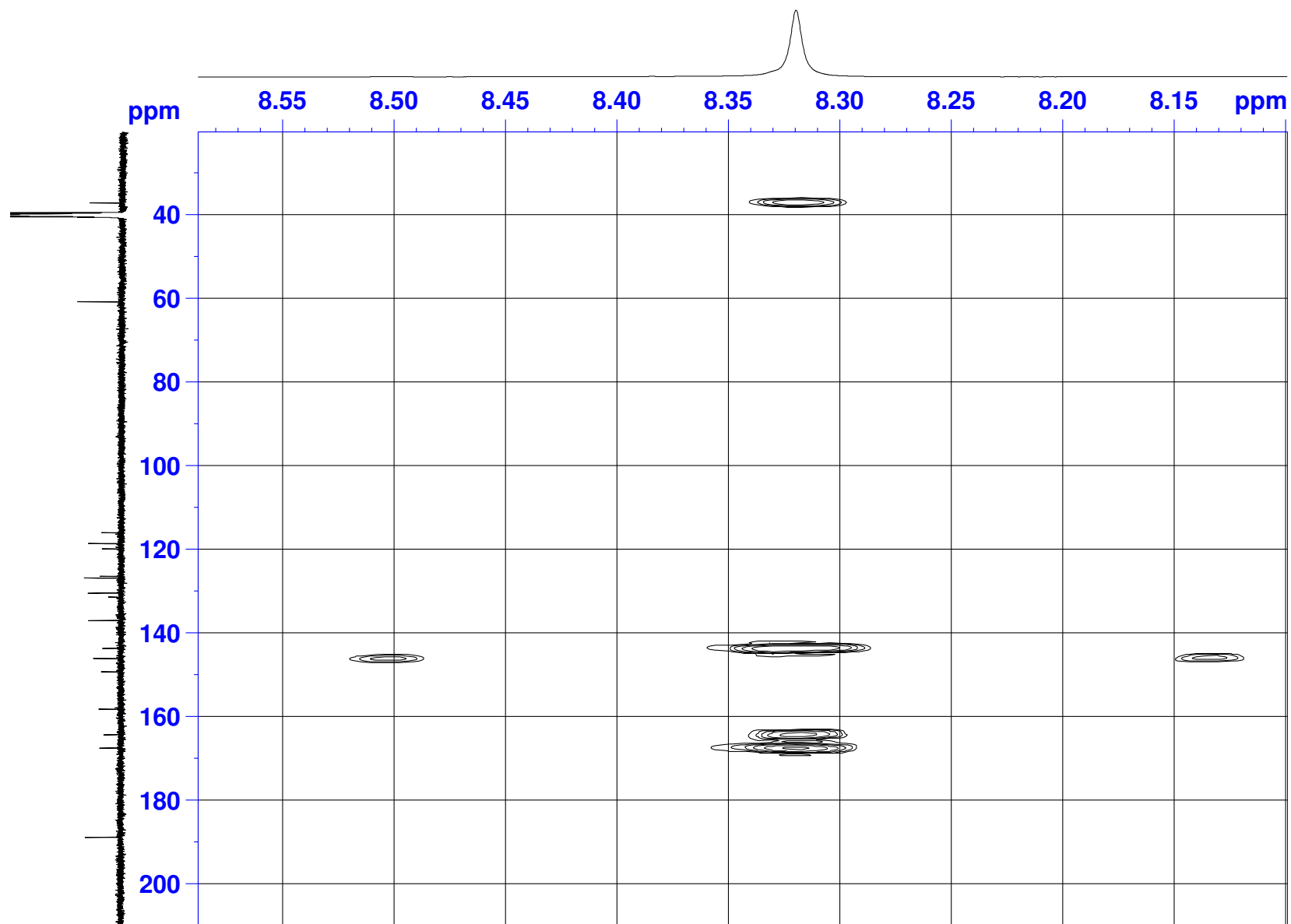
MA
hmbc



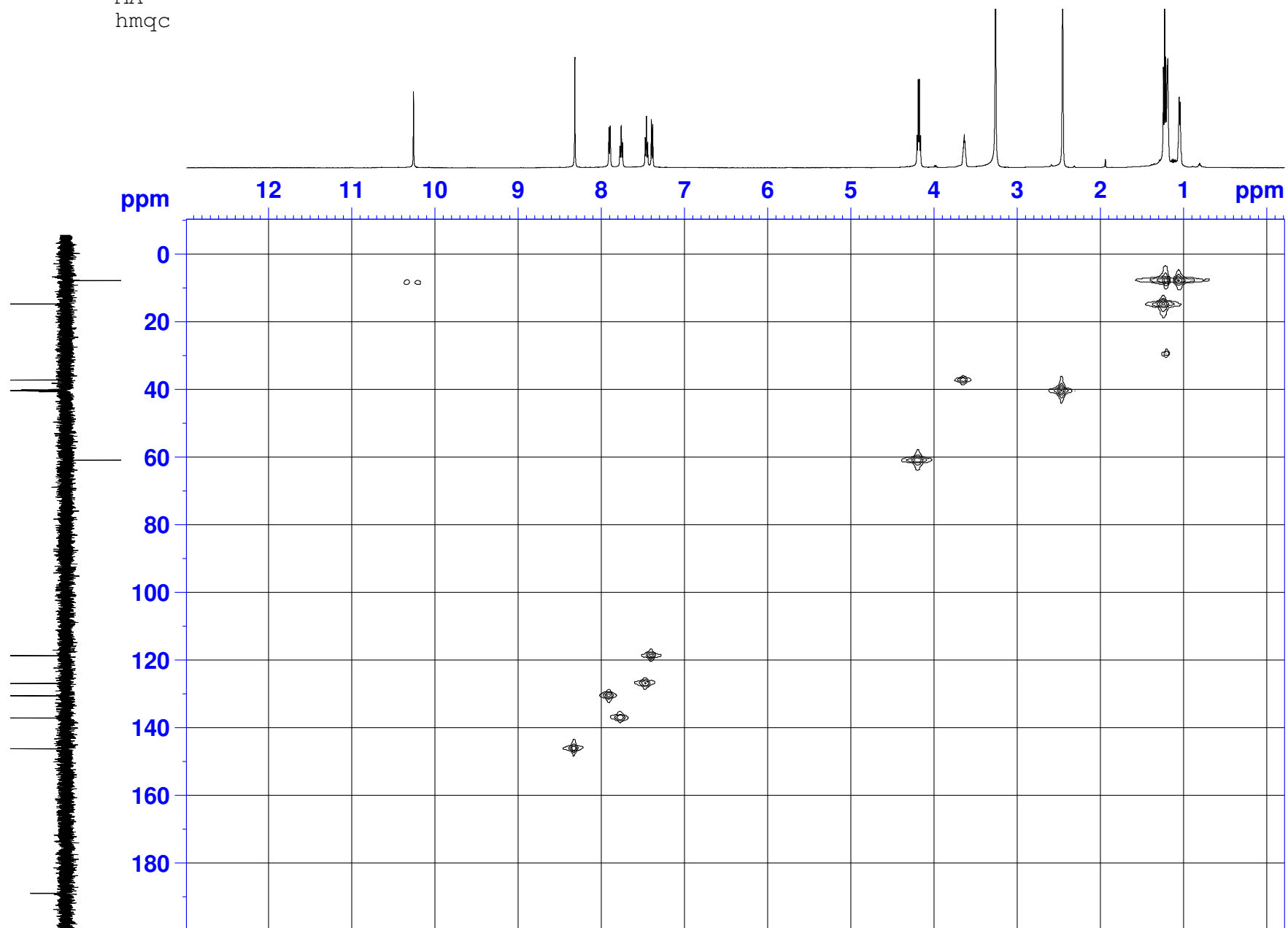
MA
hmbc



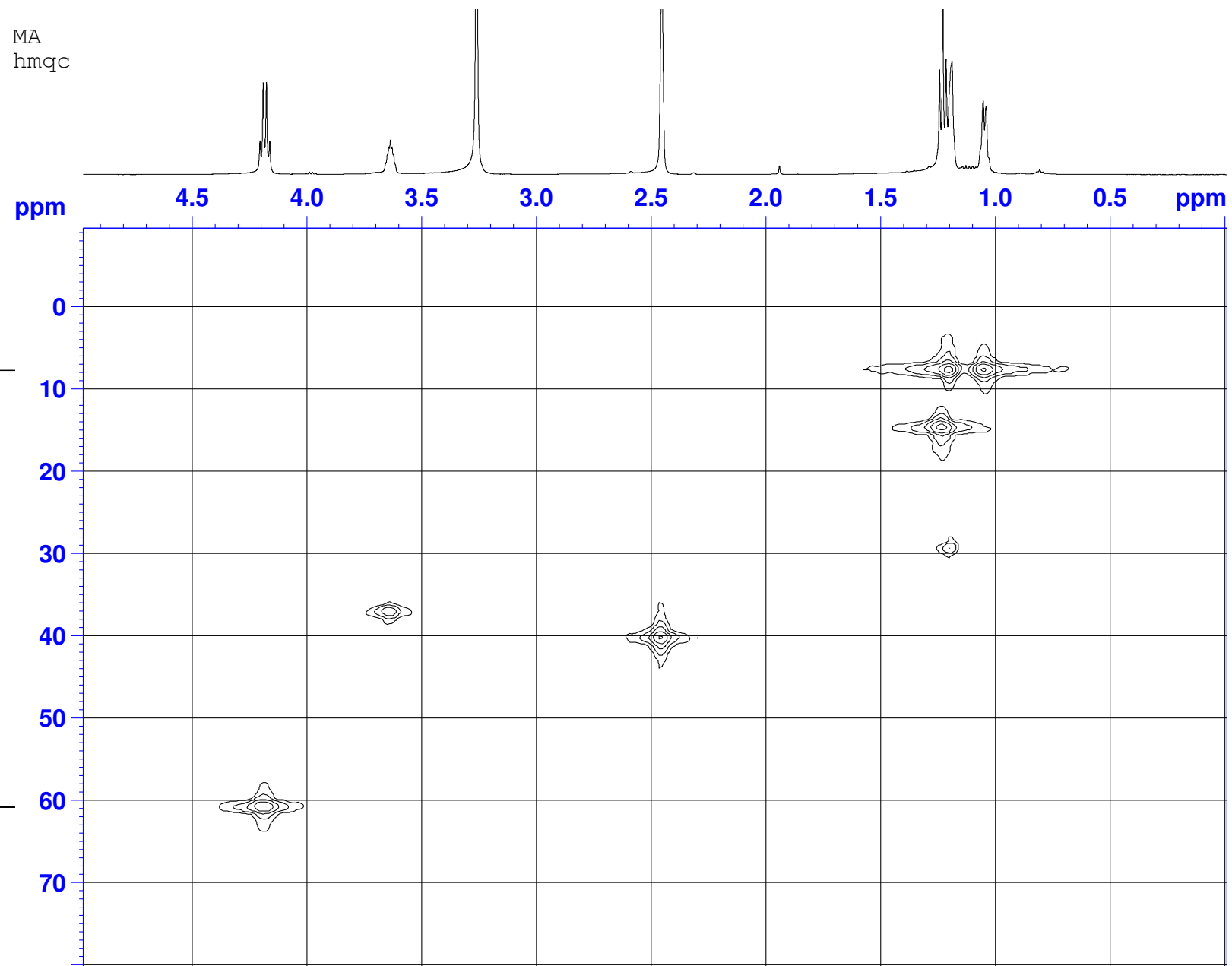
MA
hmbc



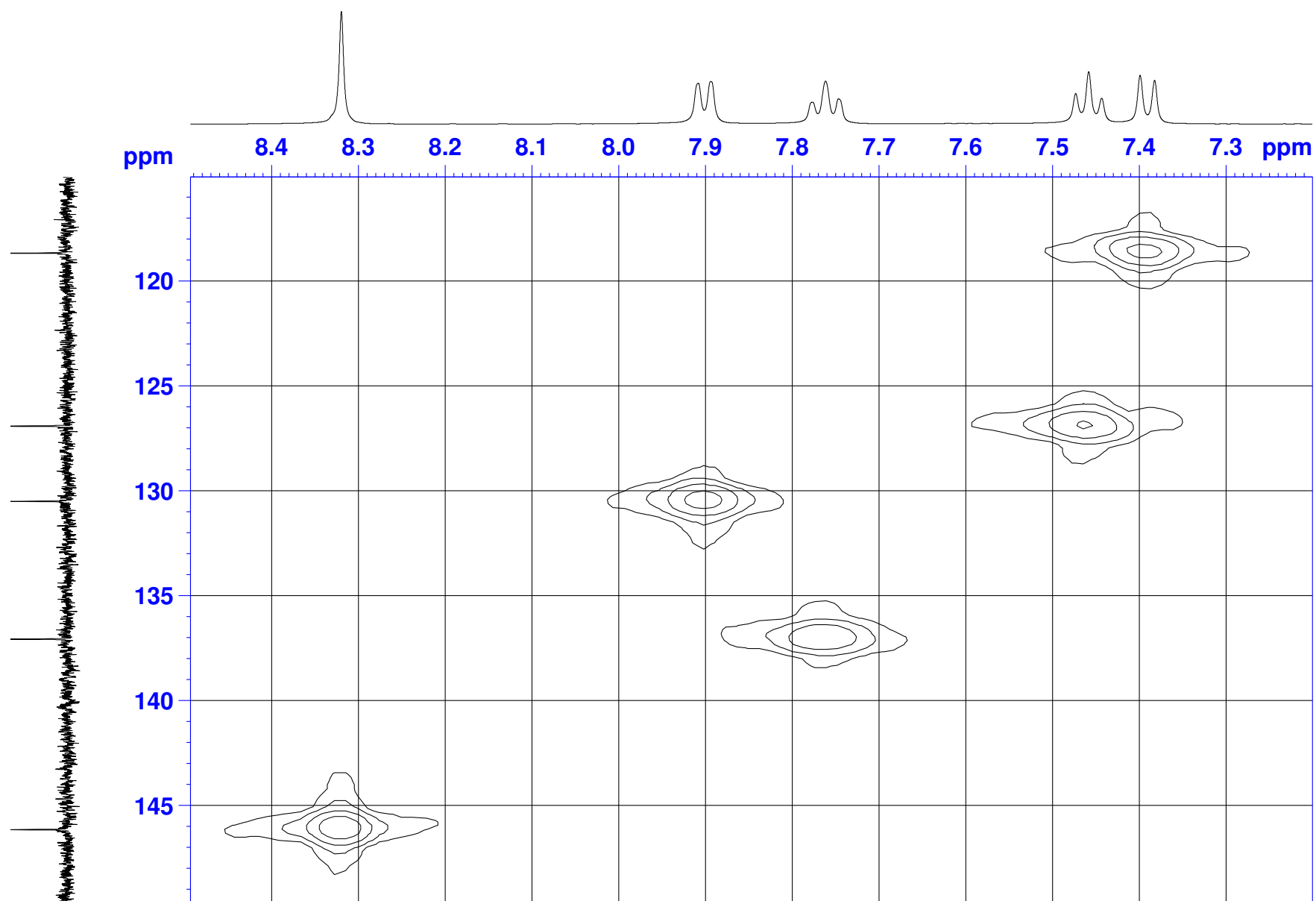
MA
hmqc



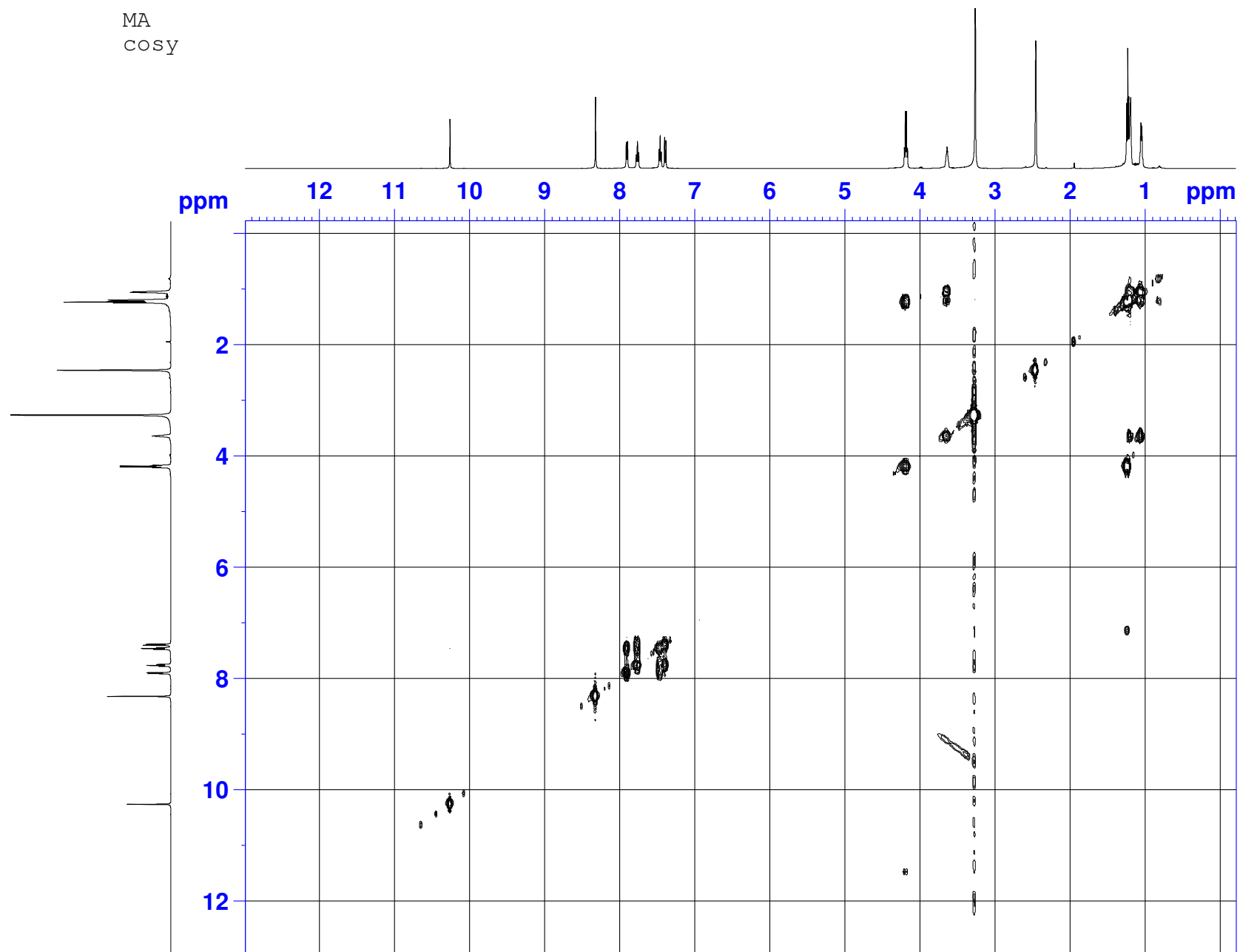
MA
hmqc



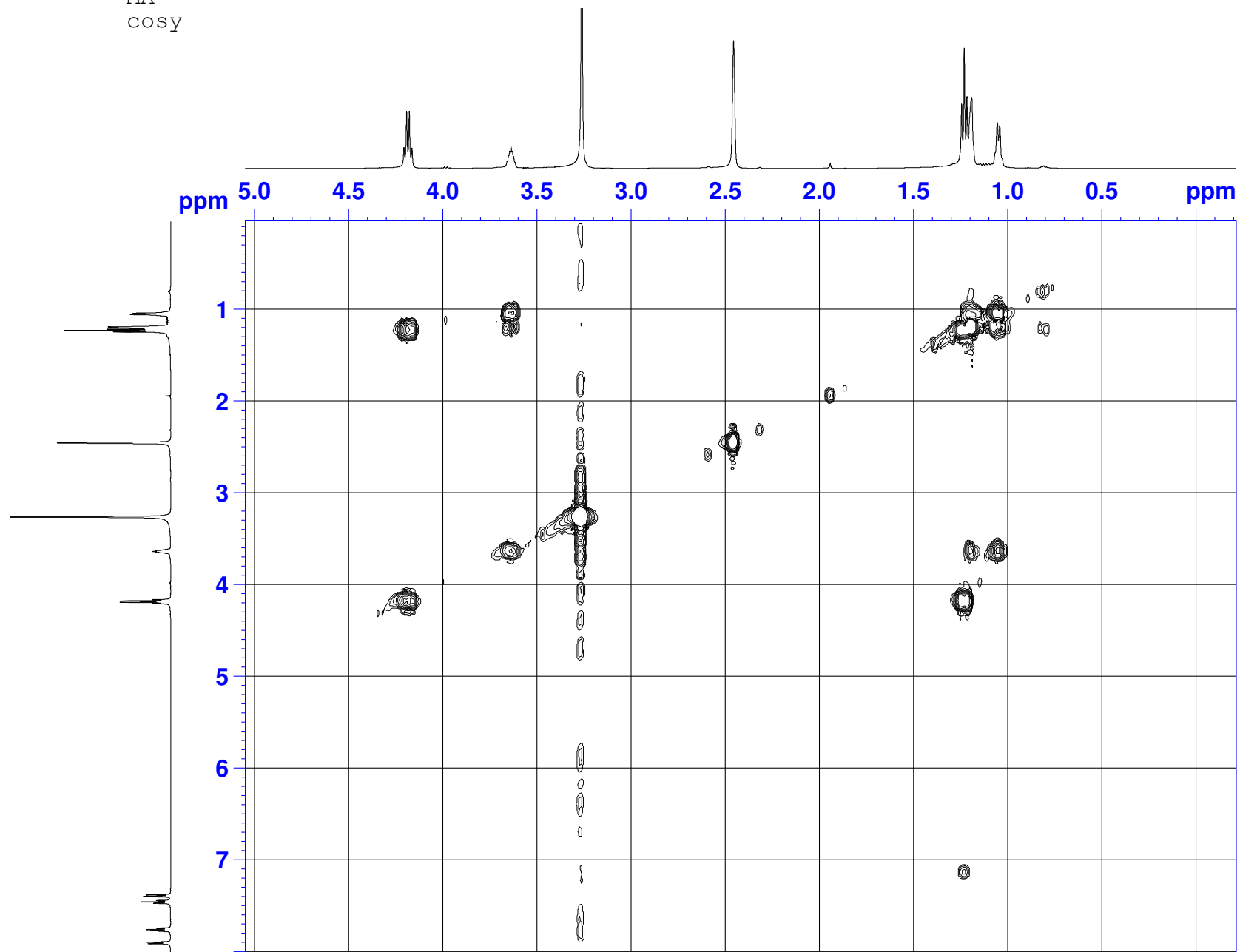
MA
hmqc



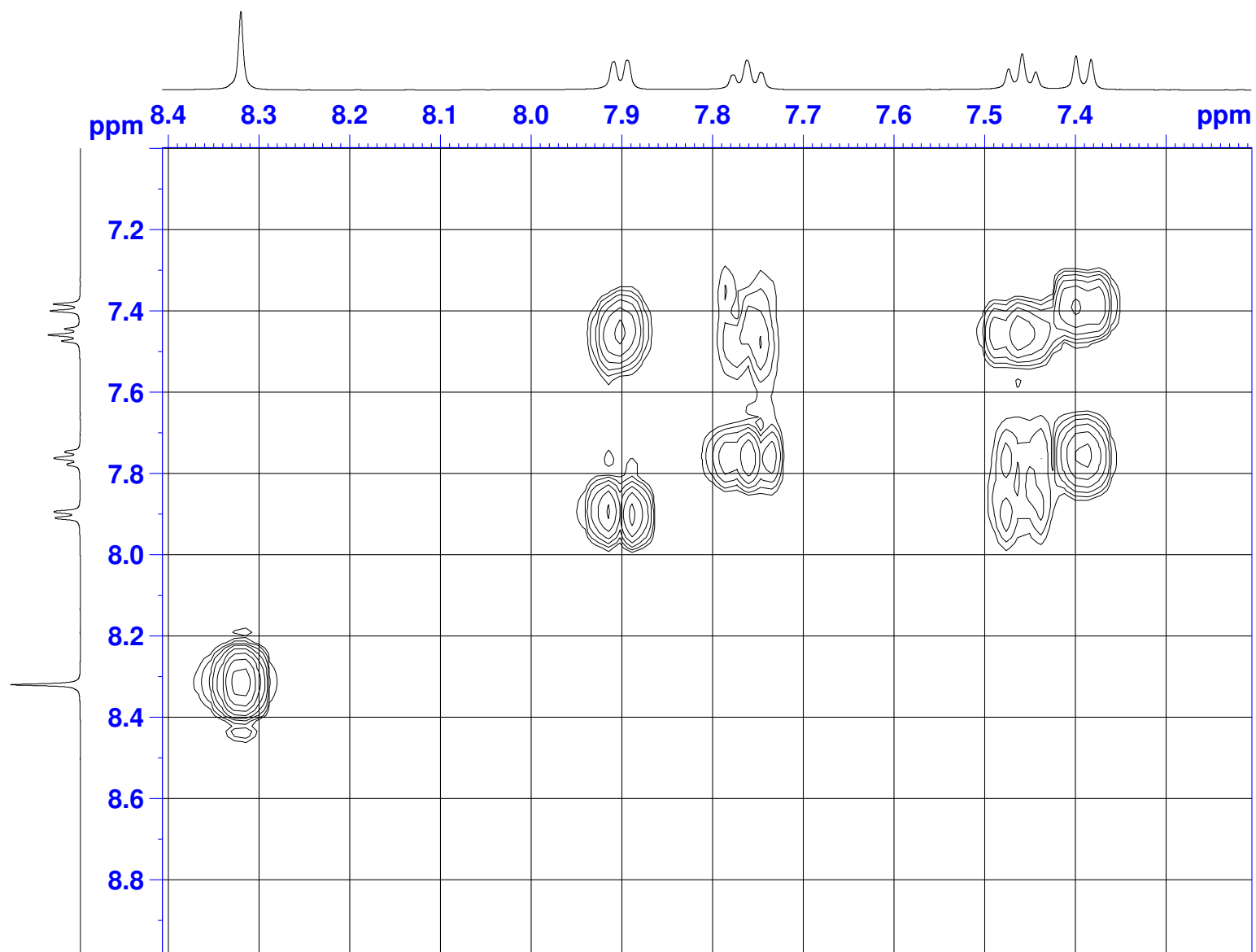
MA
cosy



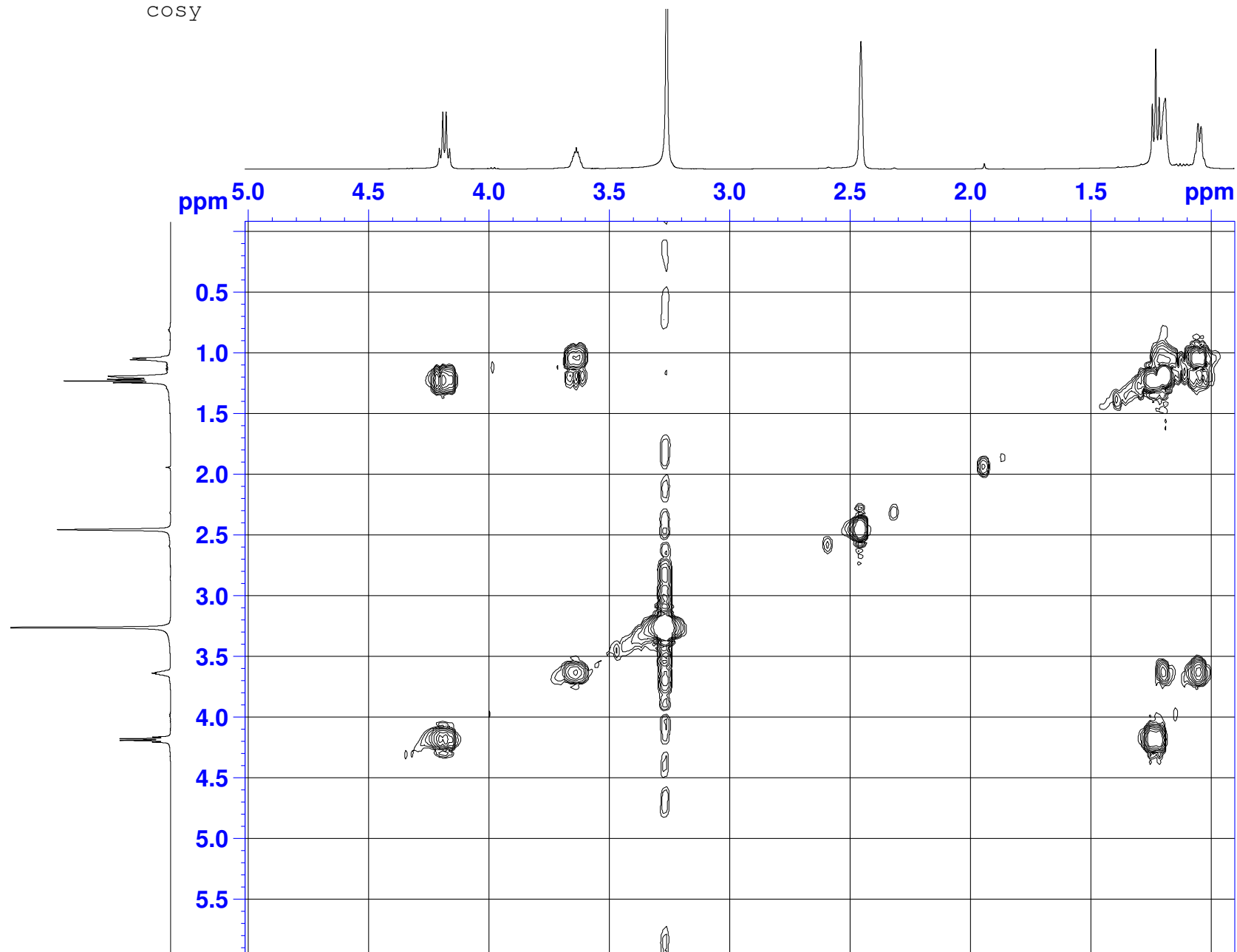
MA
cosy



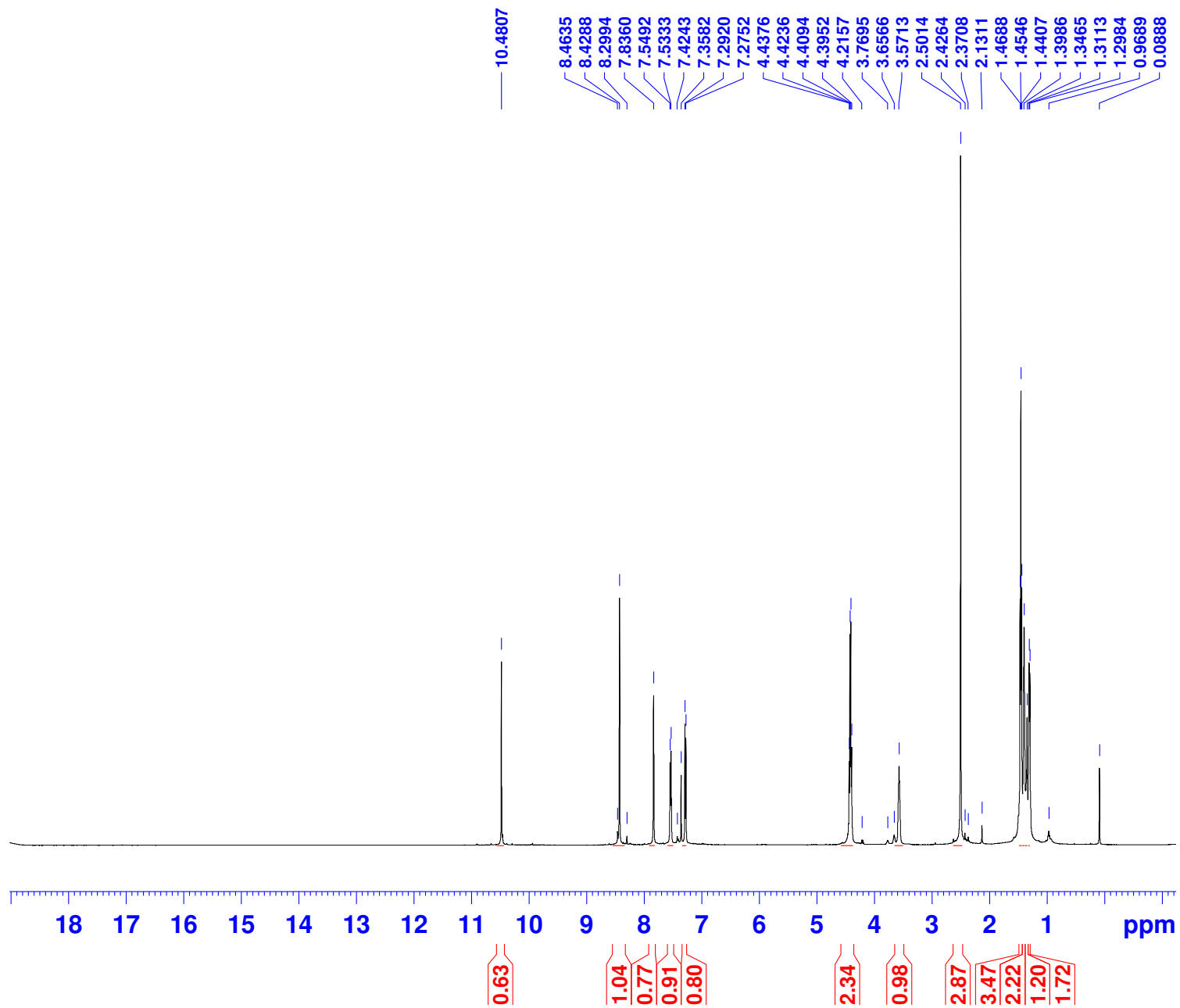
MA
cosy



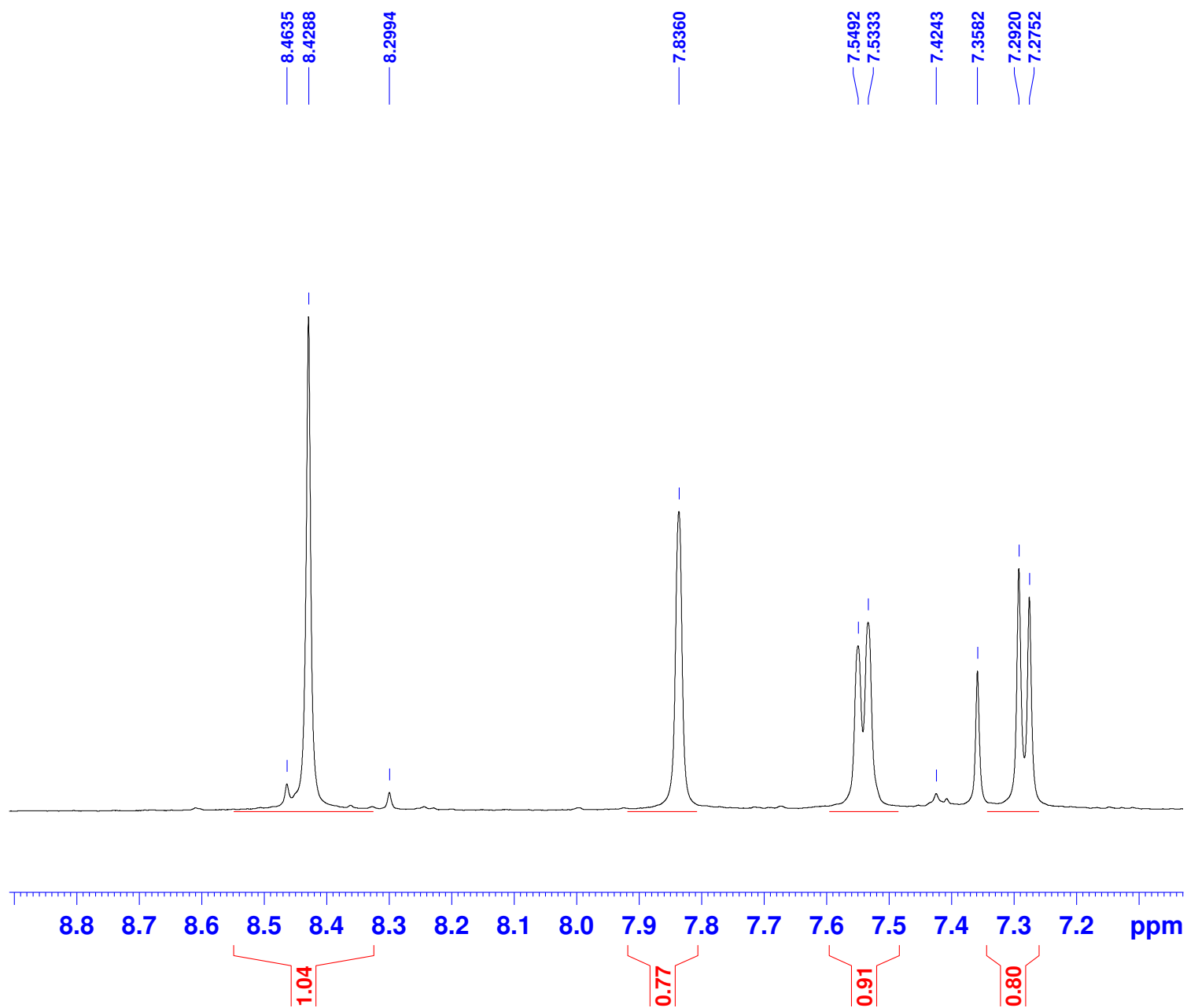
MA
cosy



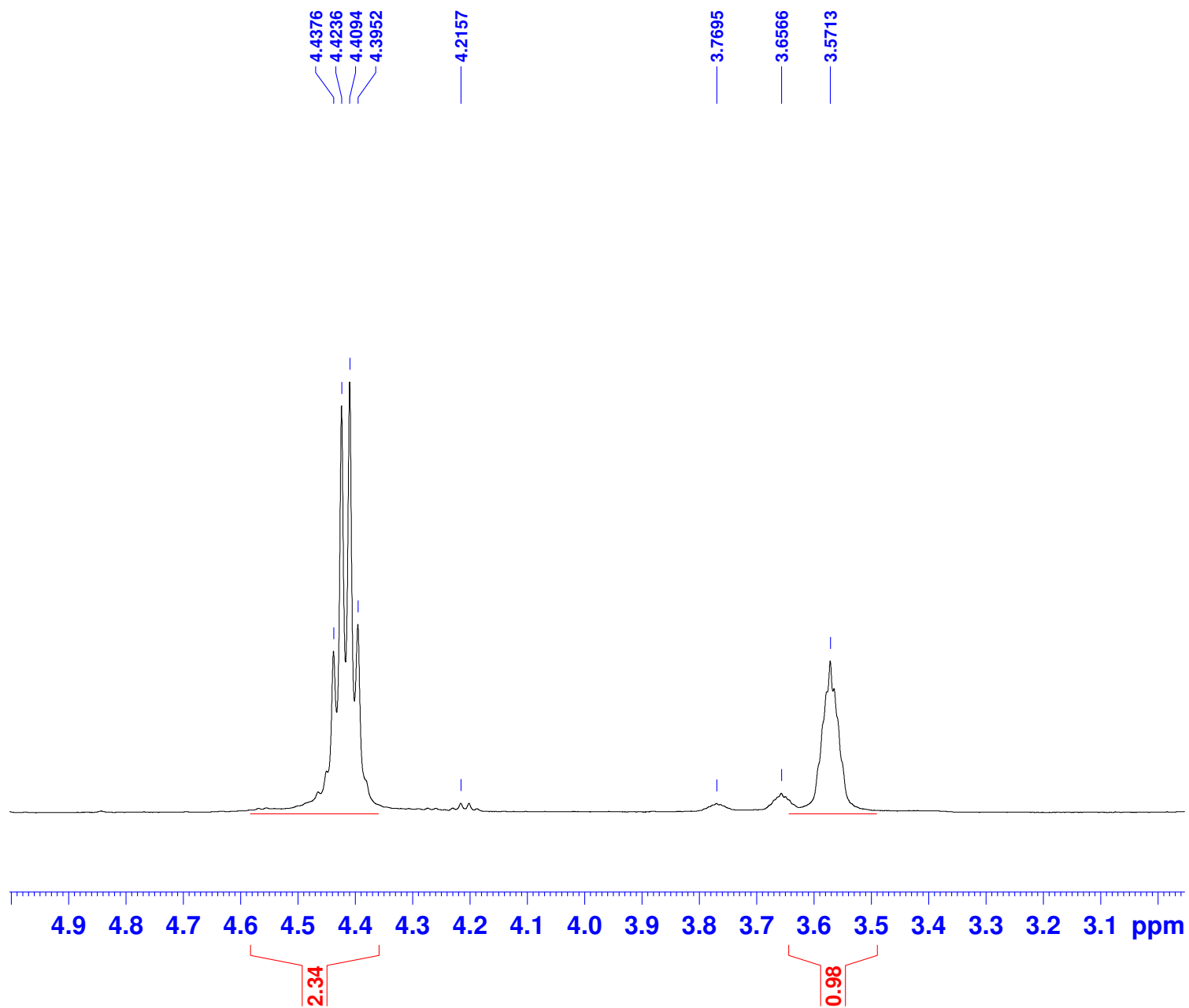
MB
H NMR



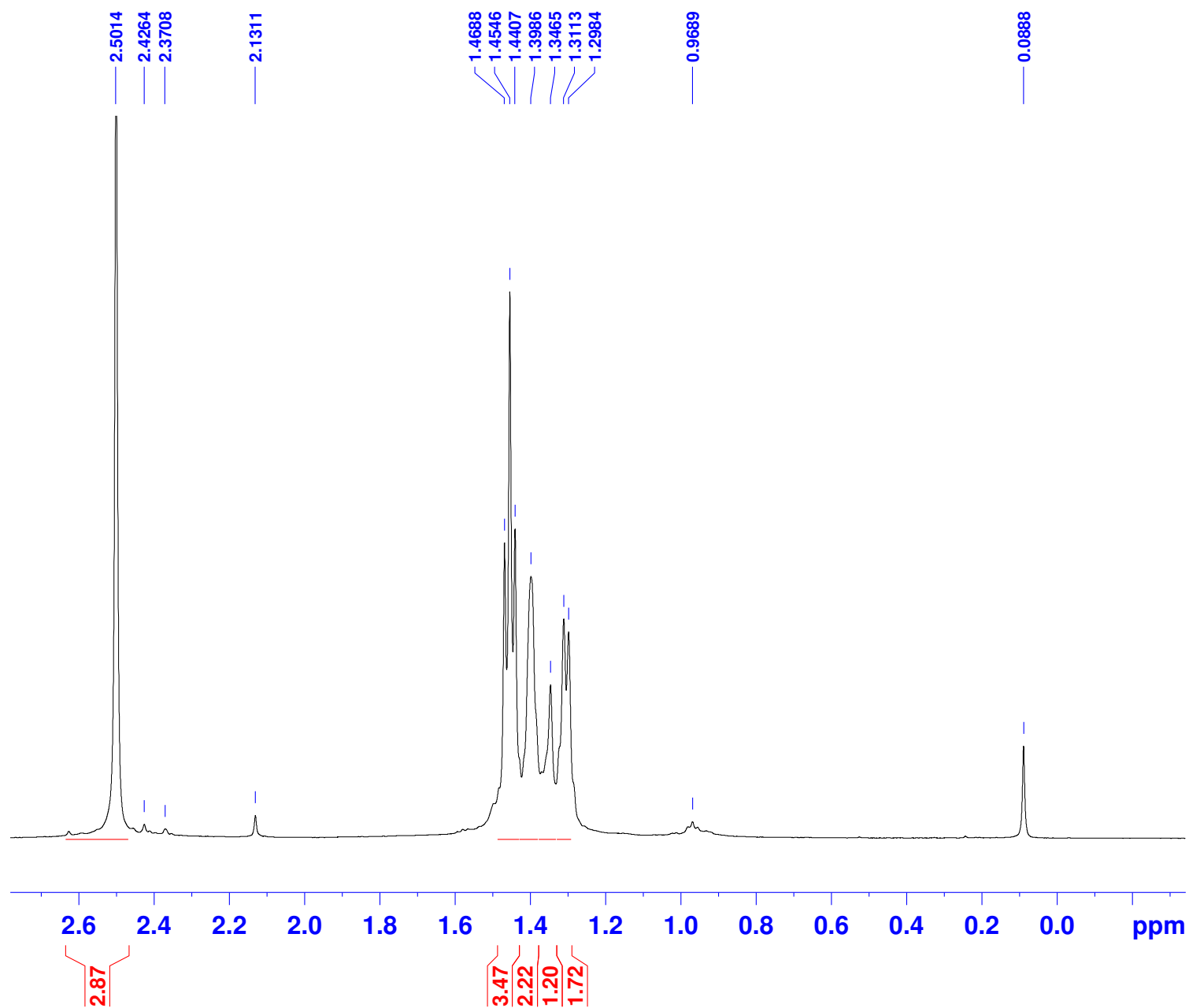
MB
H NMR



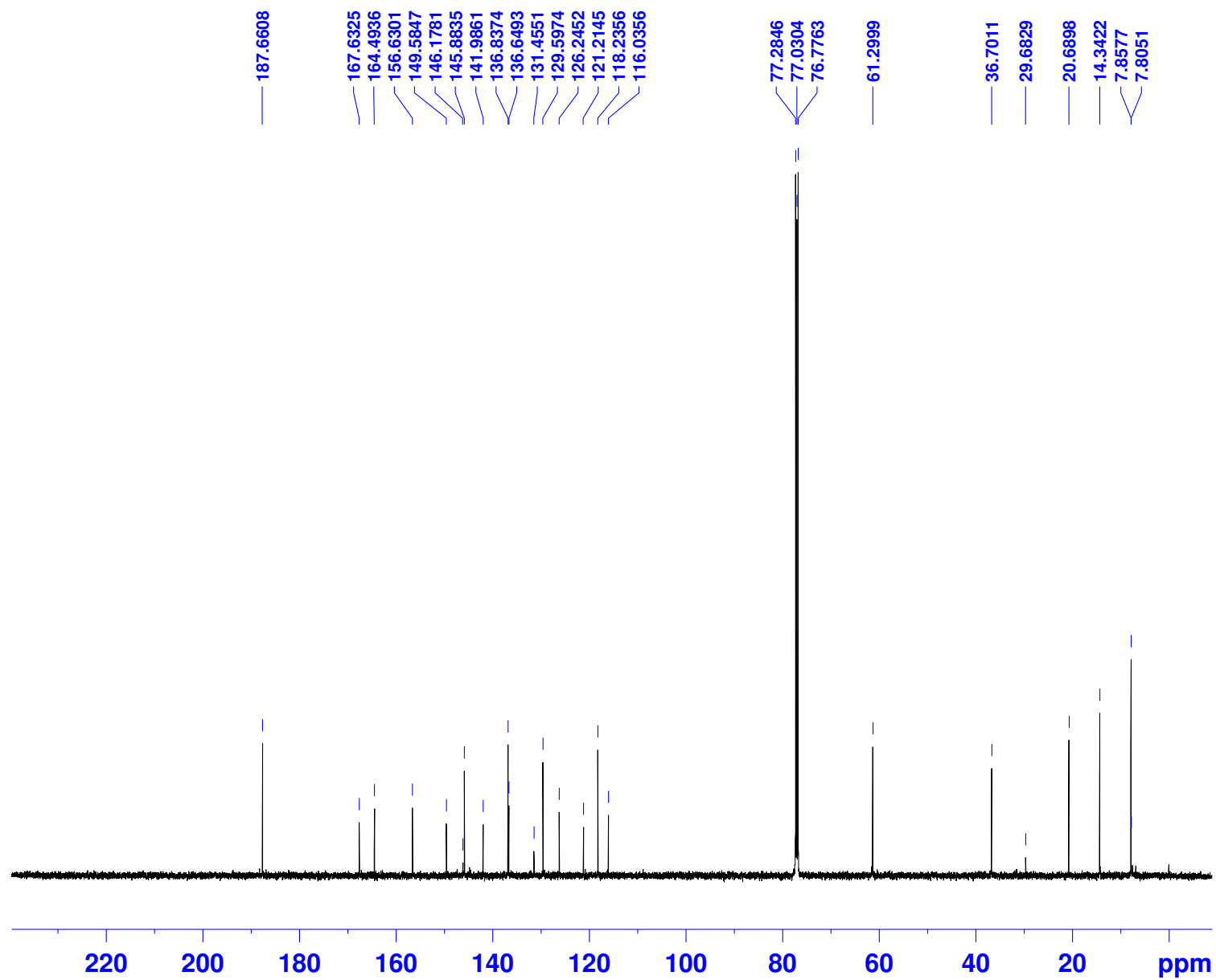
MB
H NMR



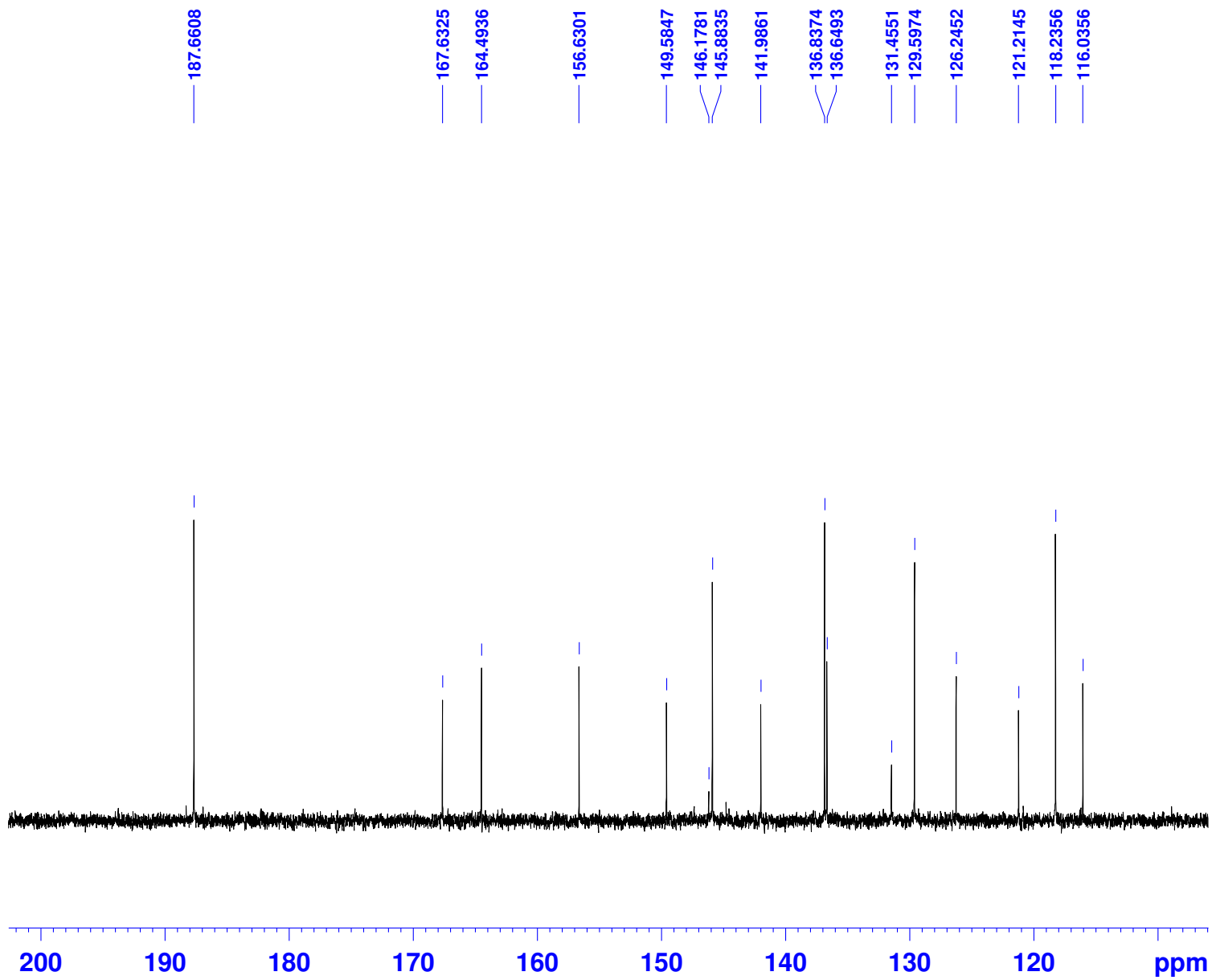
MB
H NMR



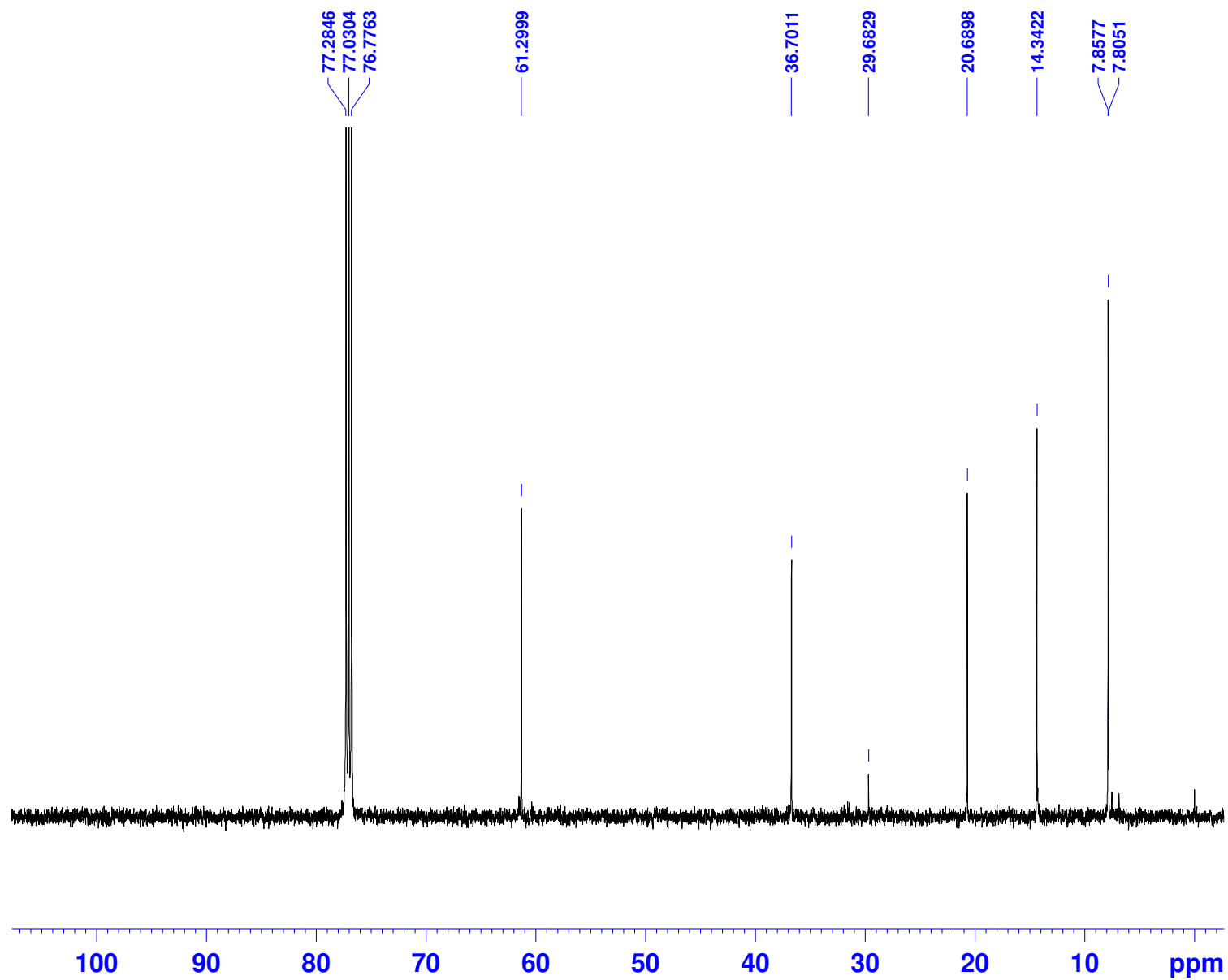
MB
c13



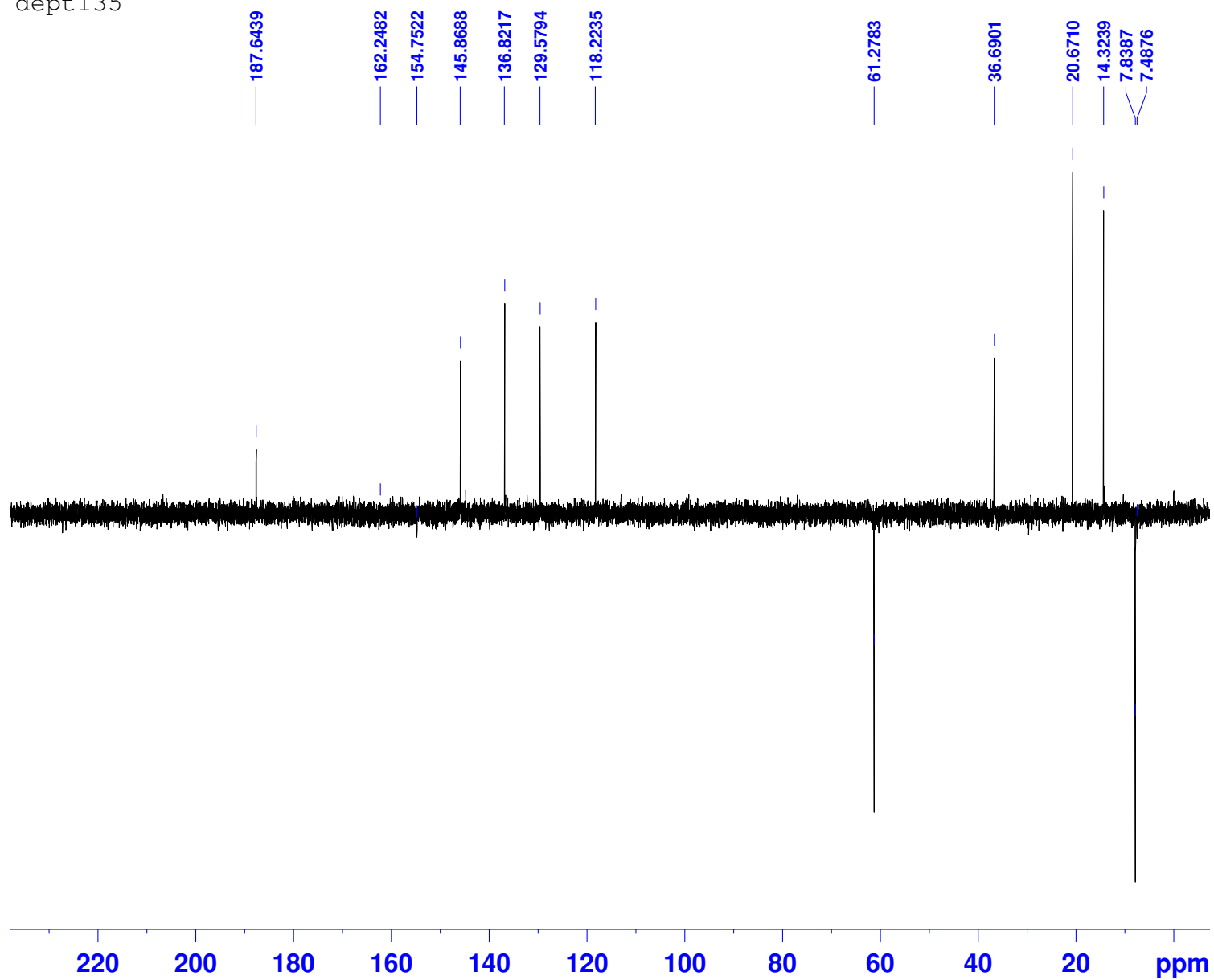
MB
c13



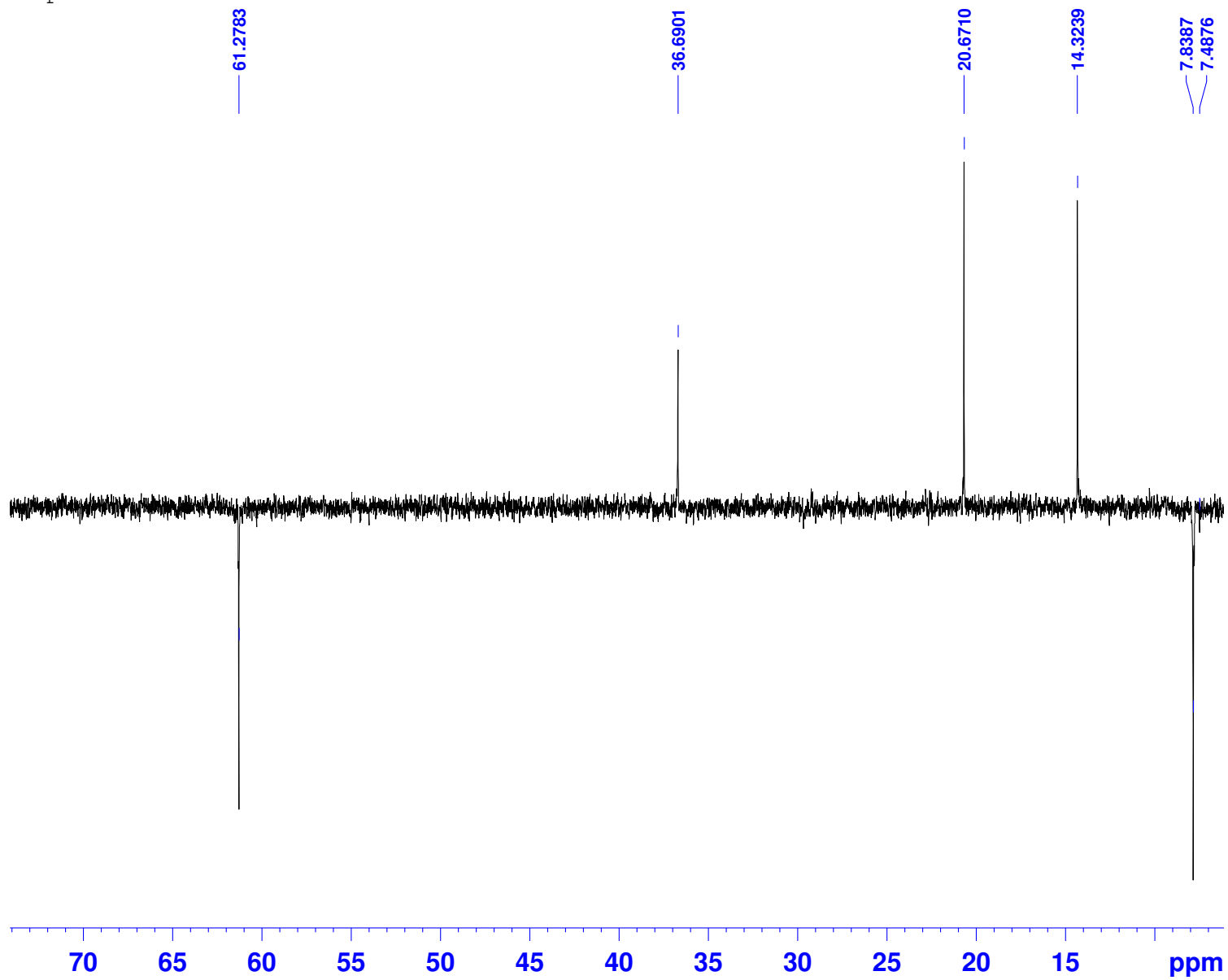
MB
c13



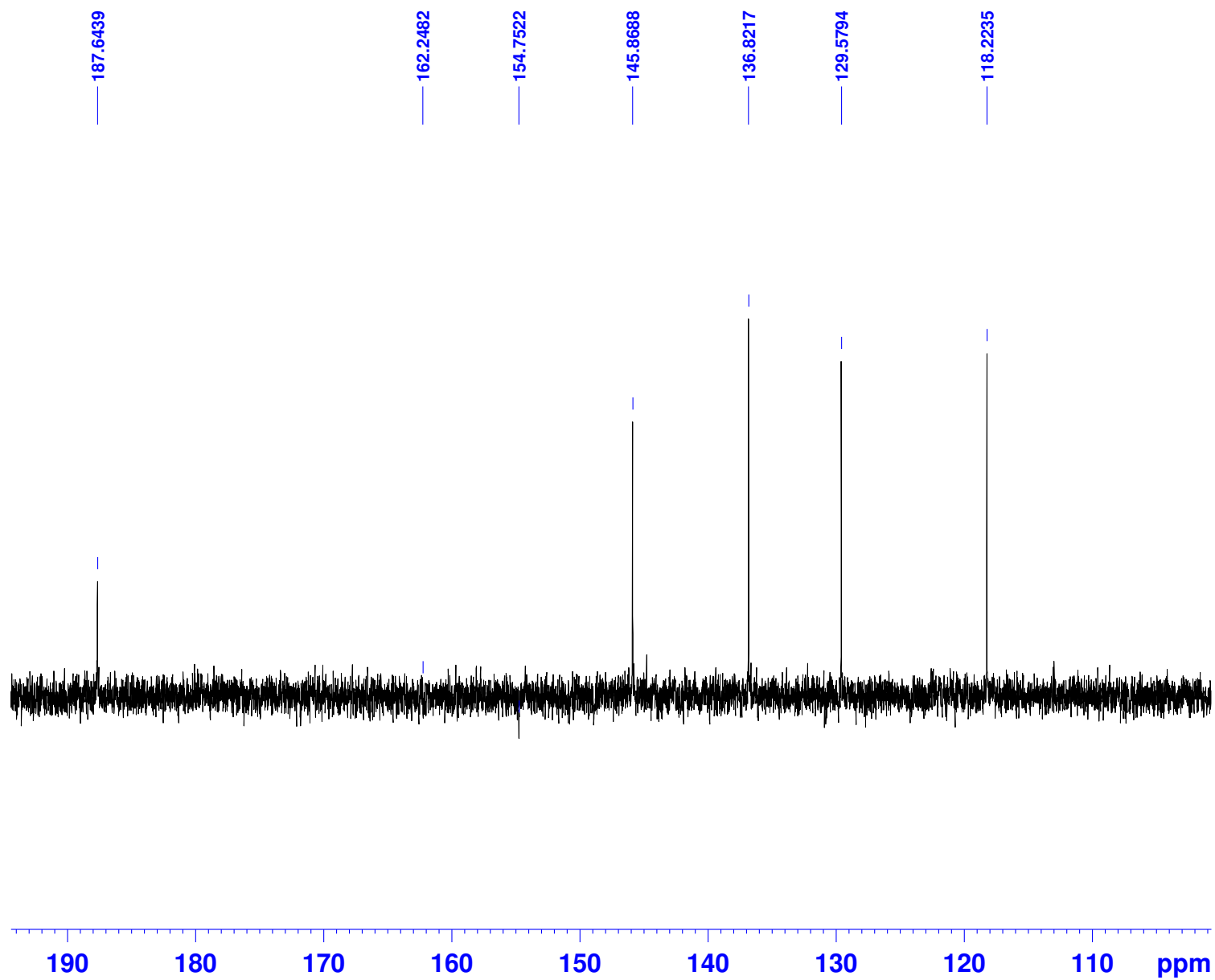
MB
dept135



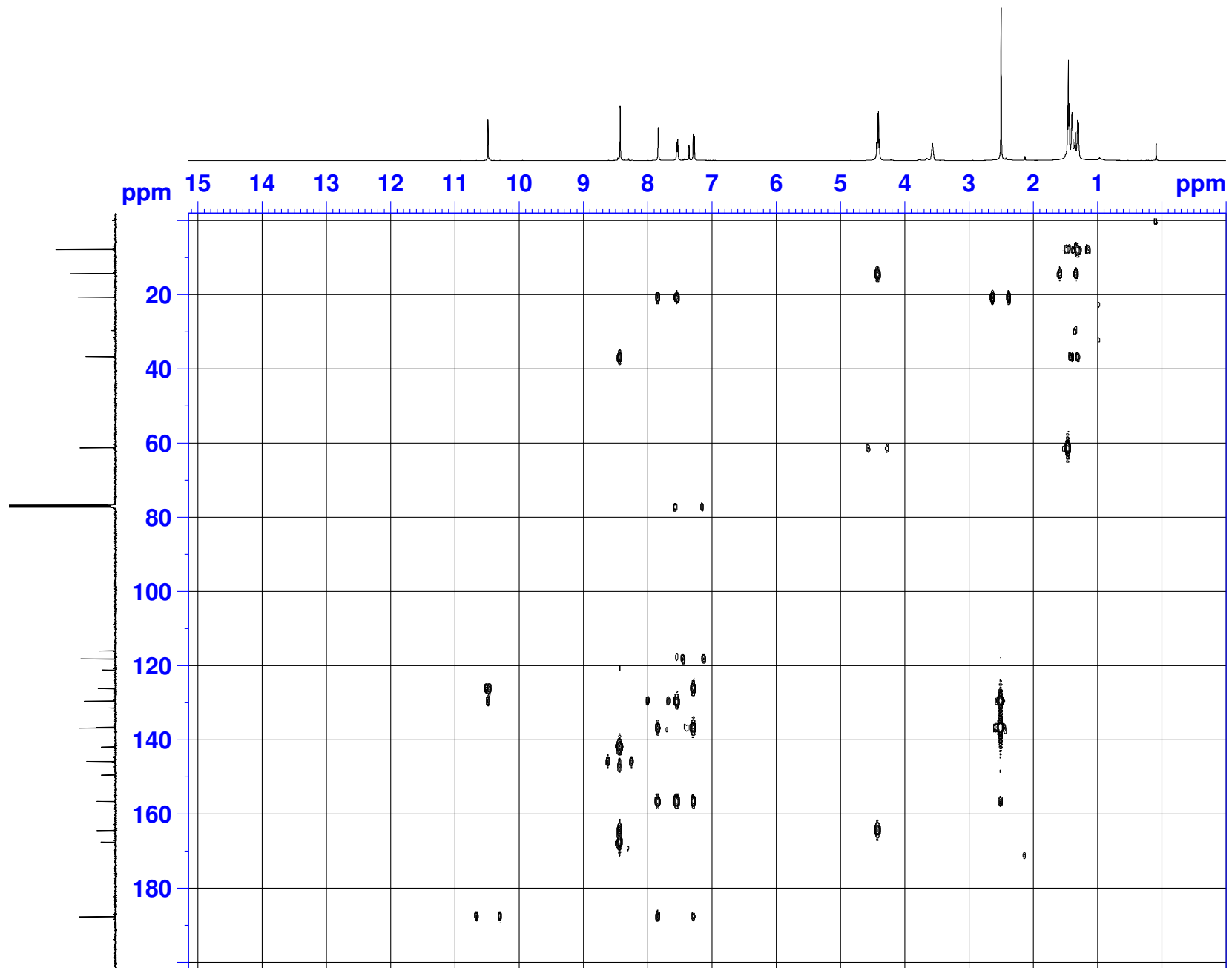
MB
dept135



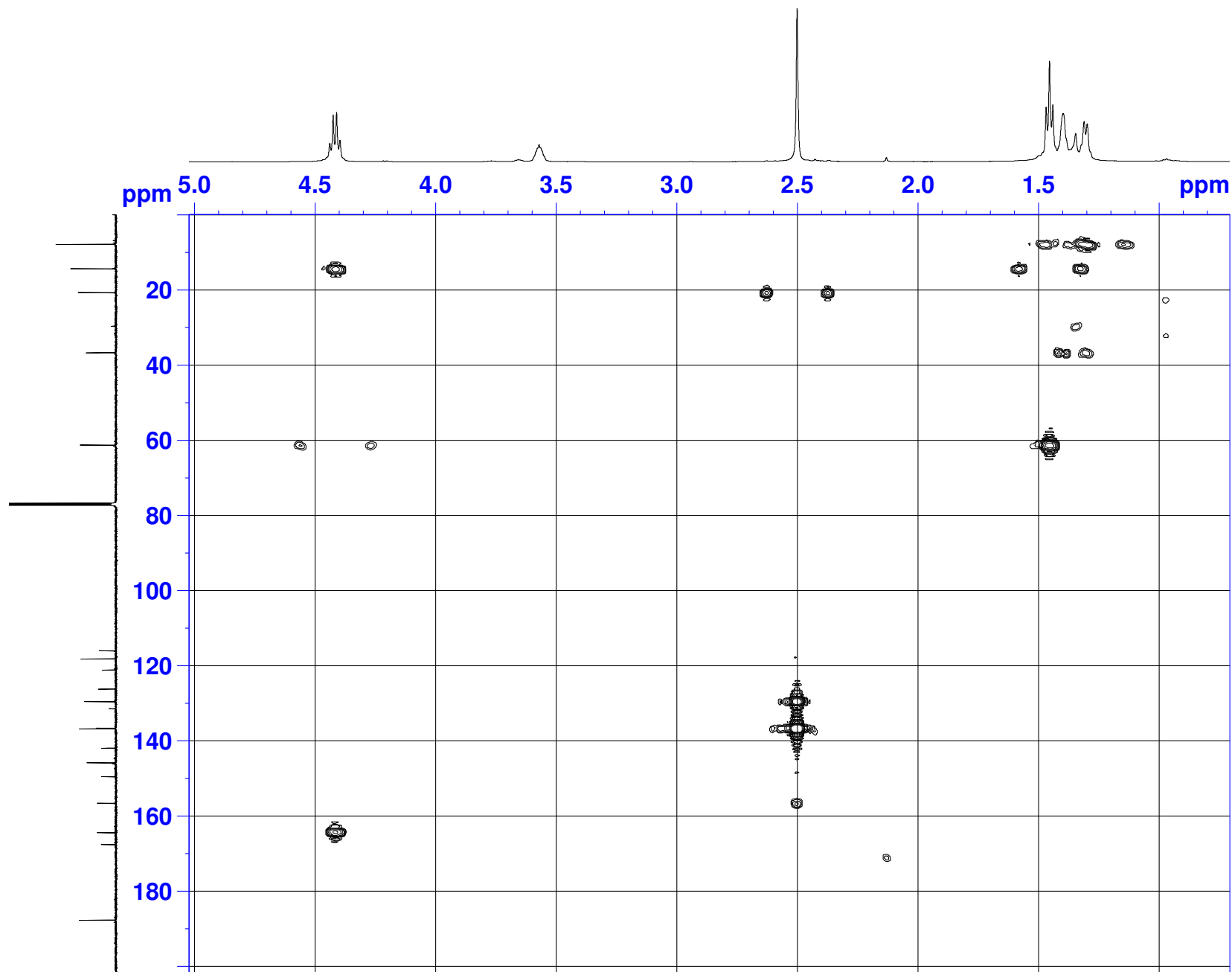
MB
dept135



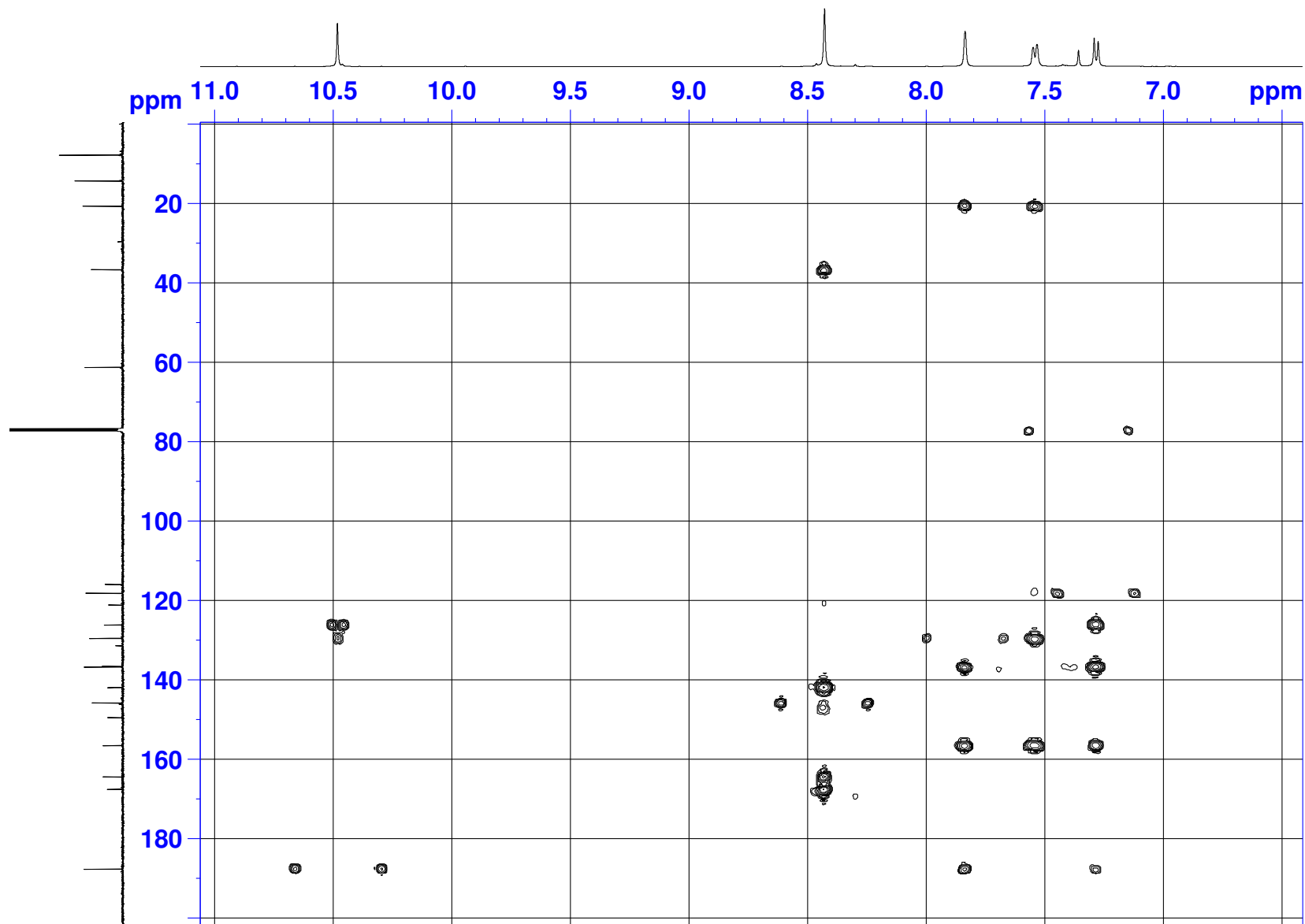
MB
hmbc



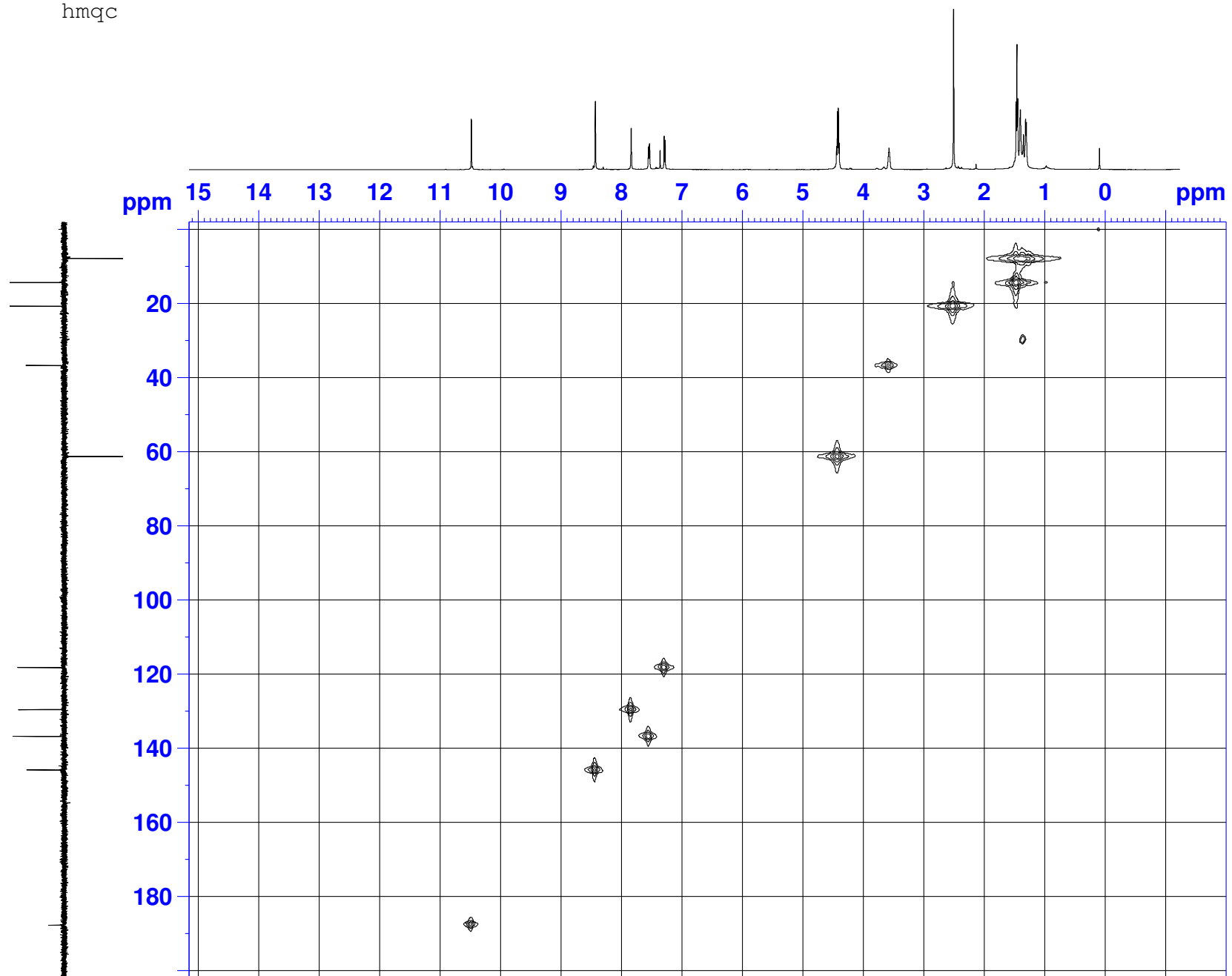
MB
hmbc



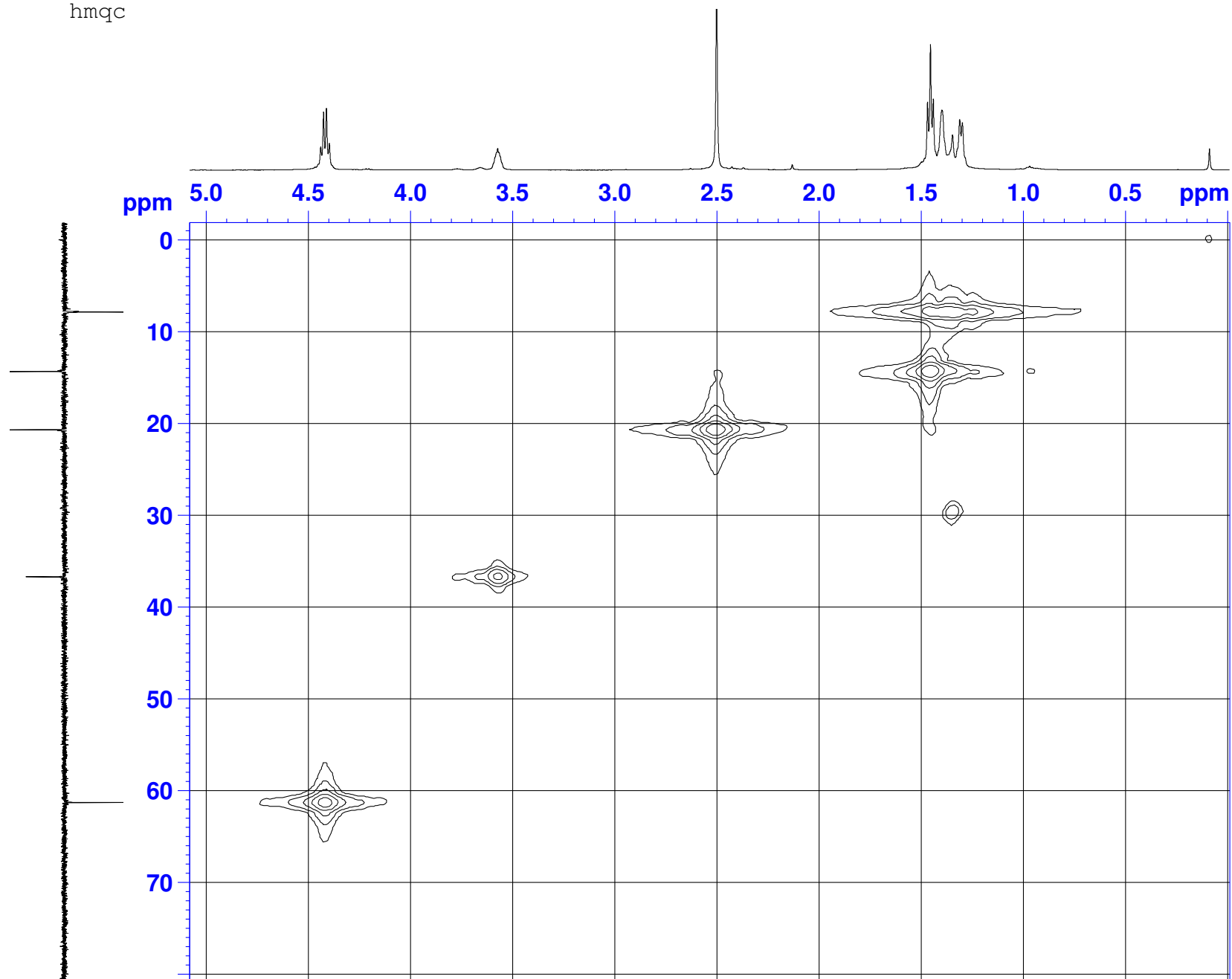
MB
hmbc



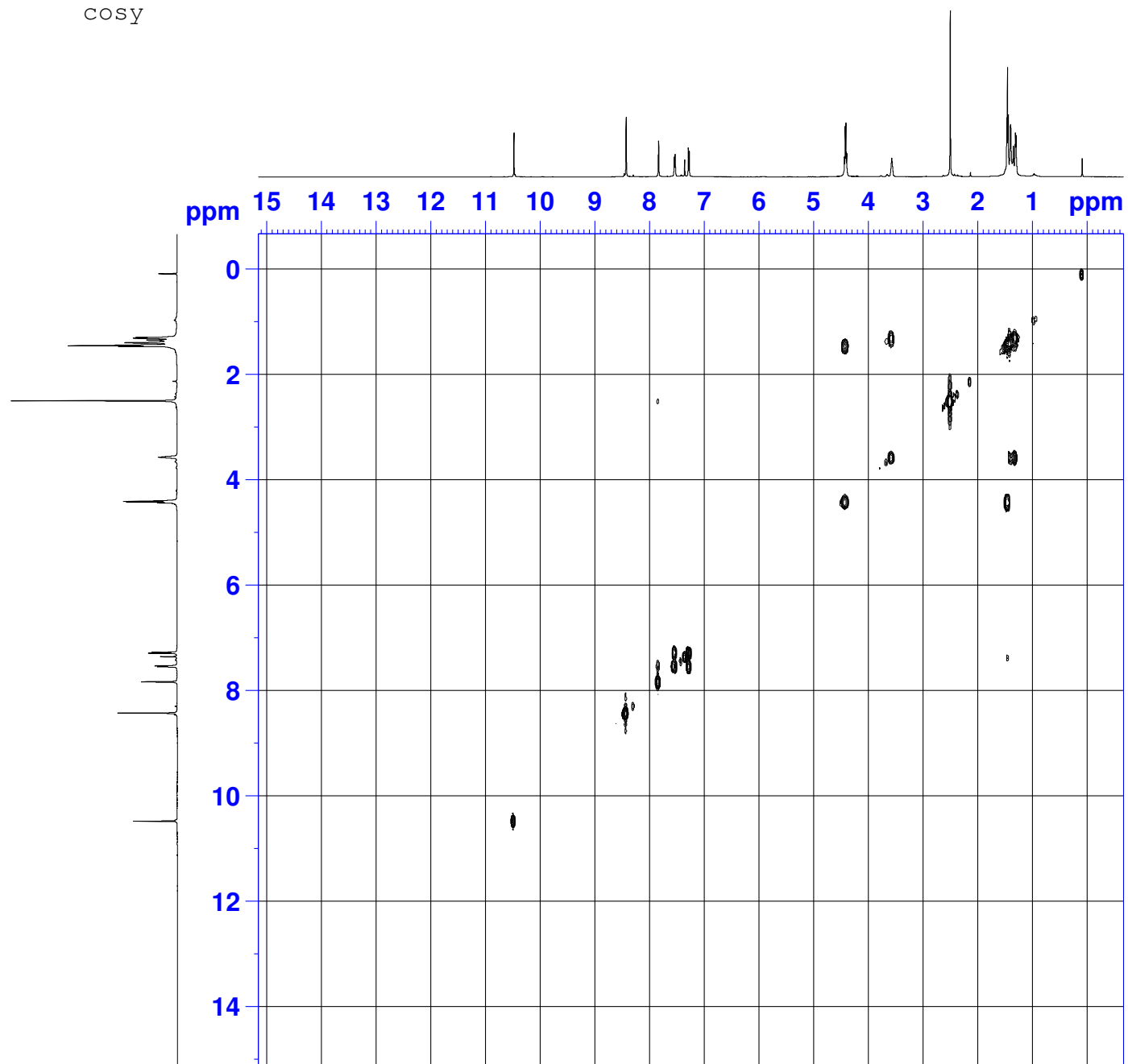
MB
hmqc



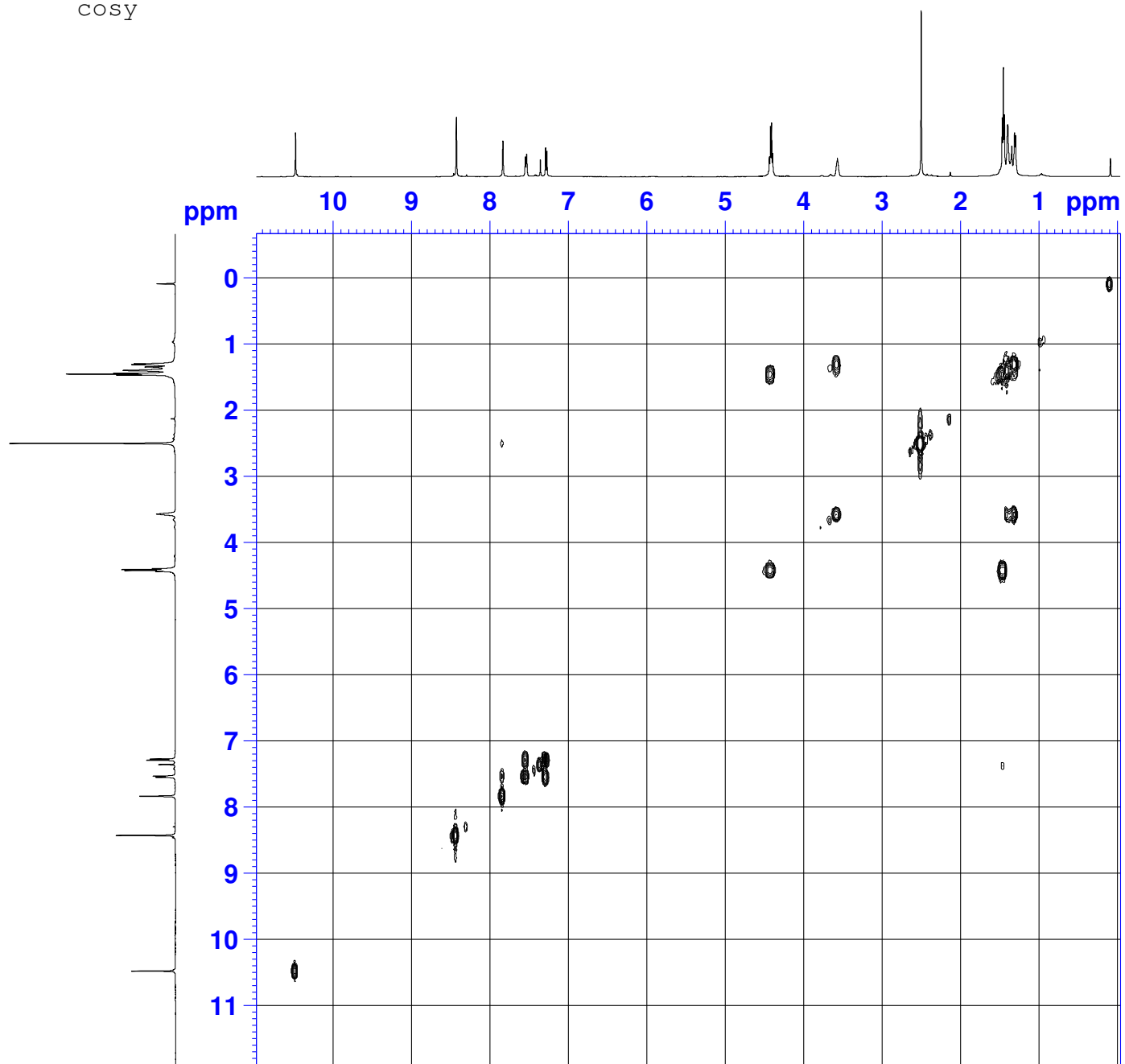
MB
hmqc



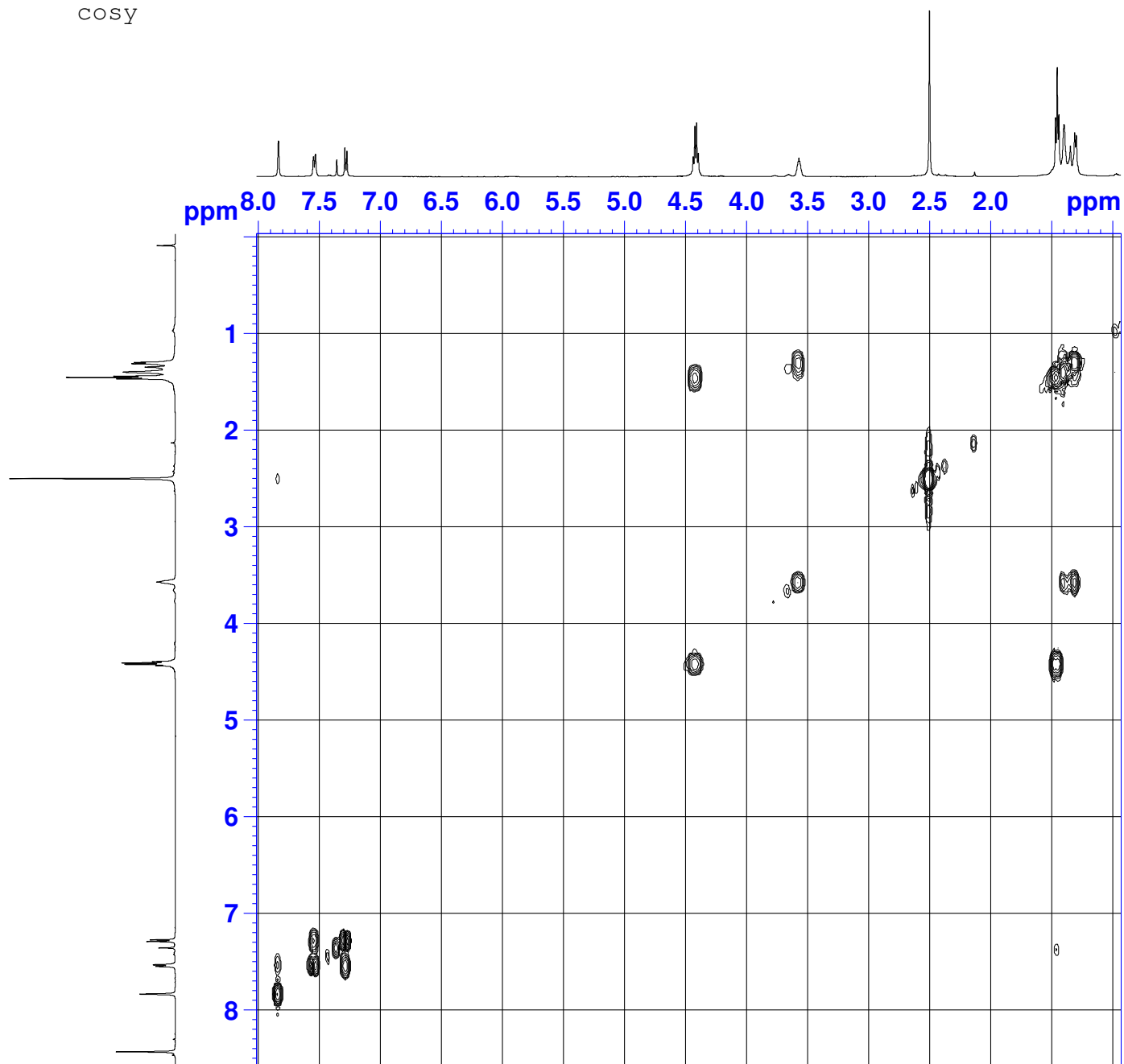
MB
cosy



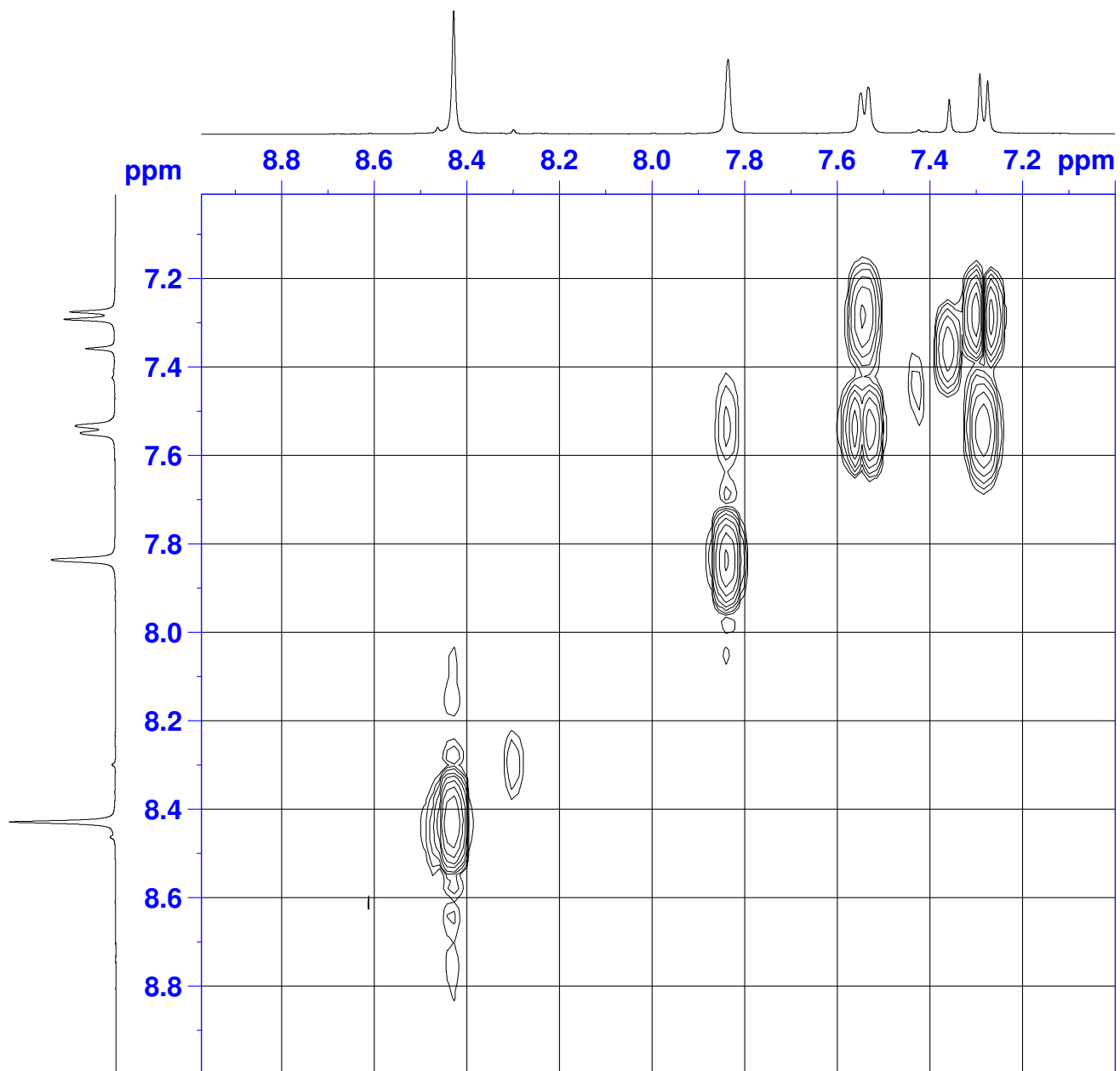
MB
cosy



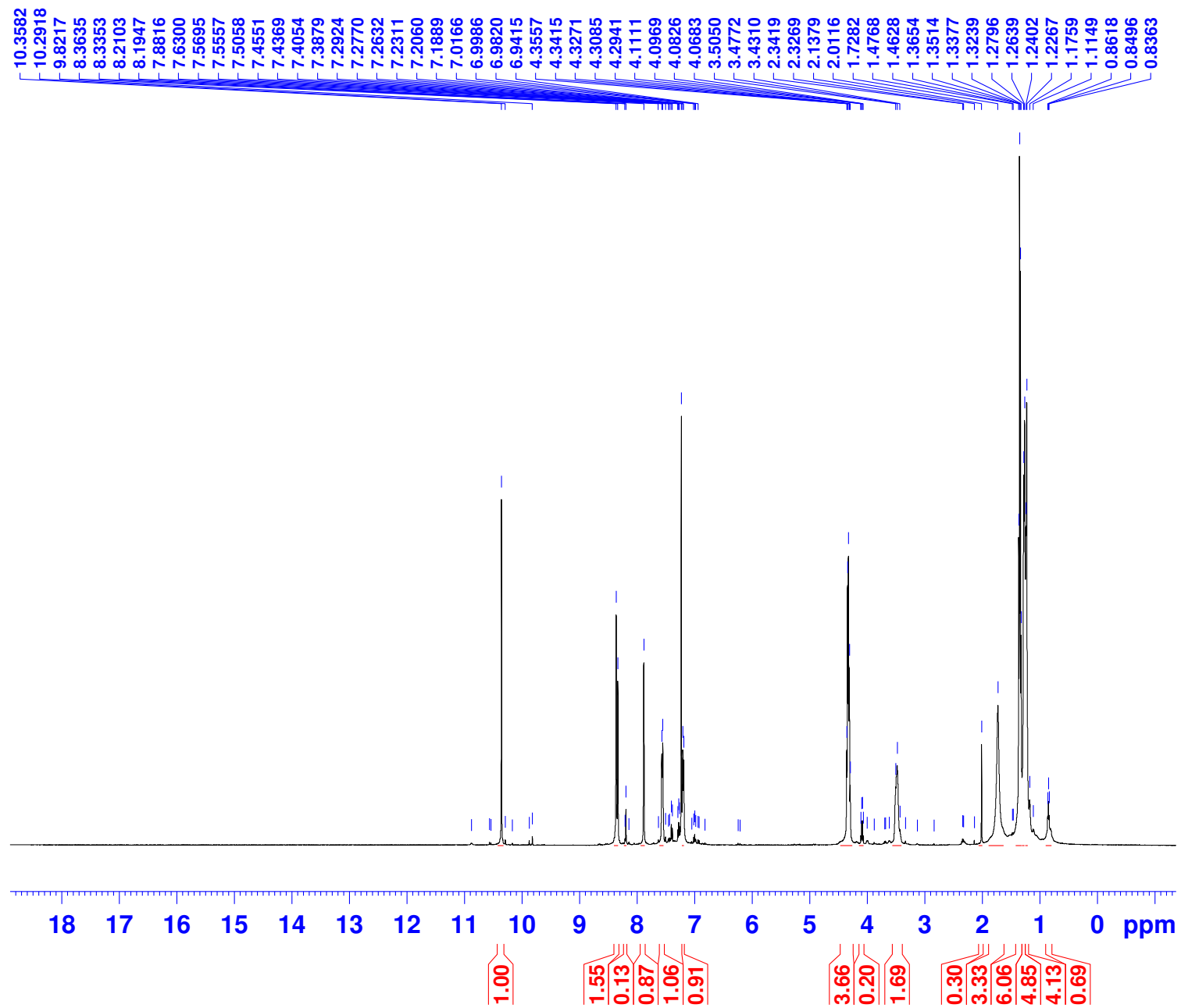
MB
cosy



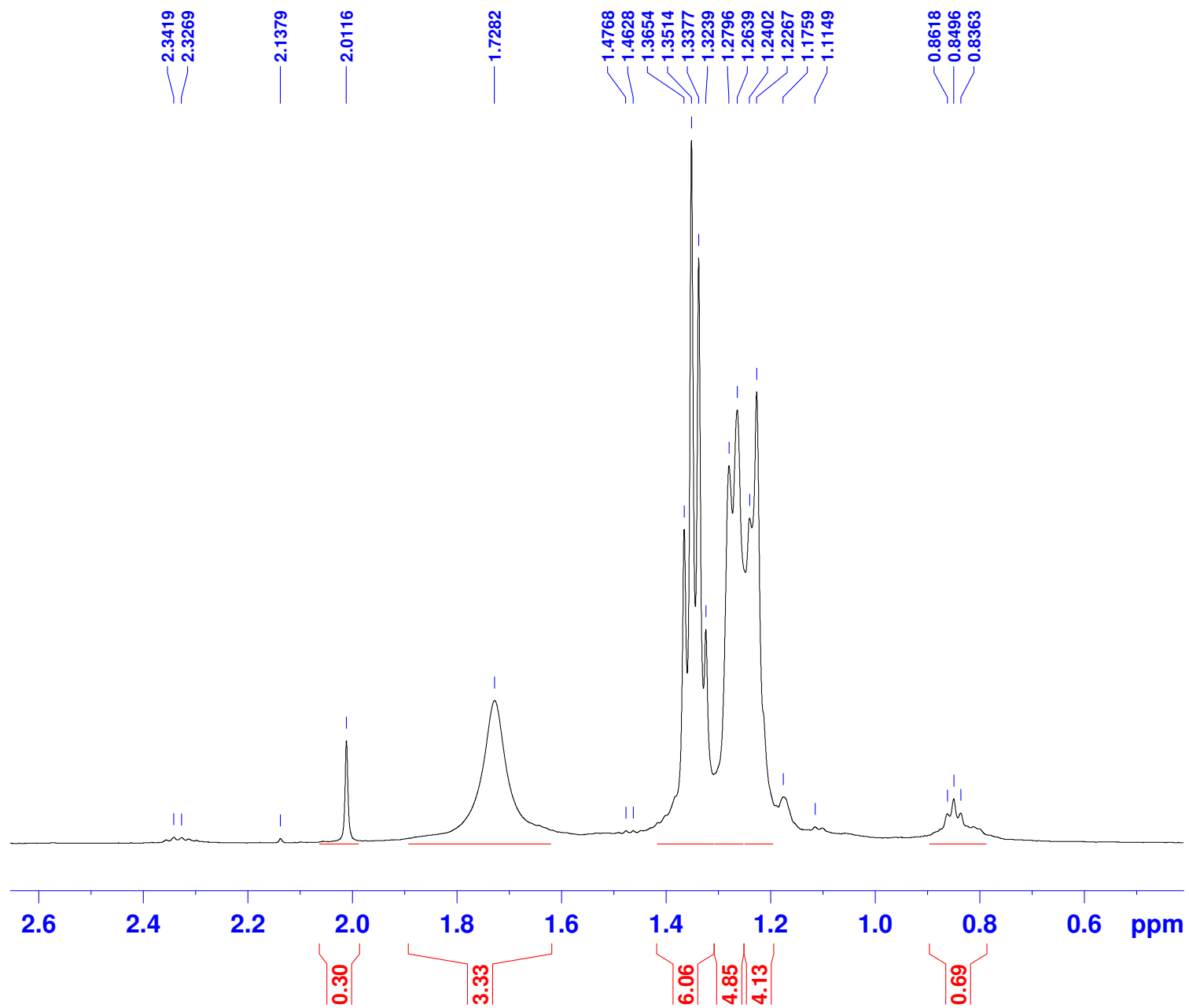
MB
cosy



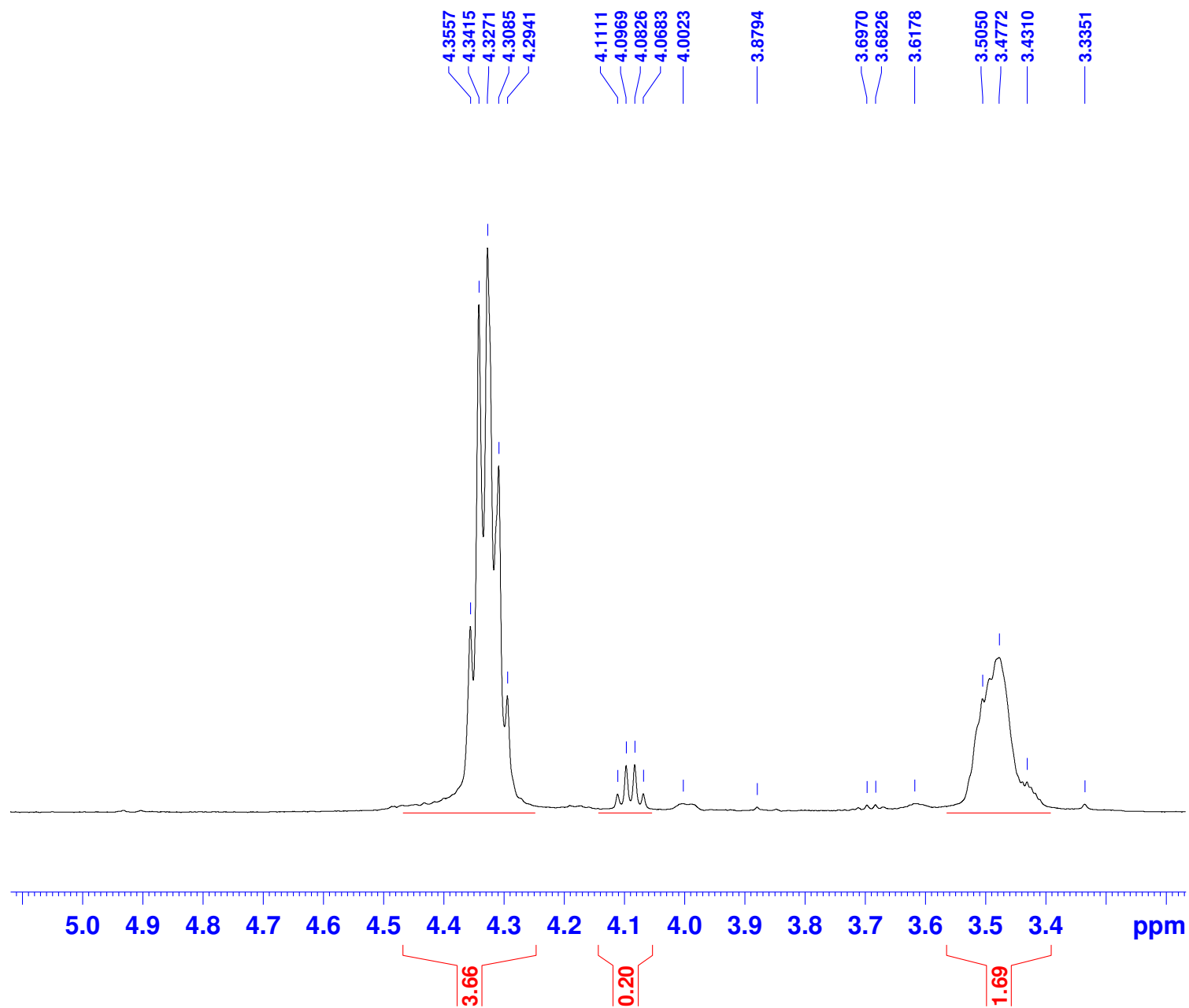
MD
H NMR



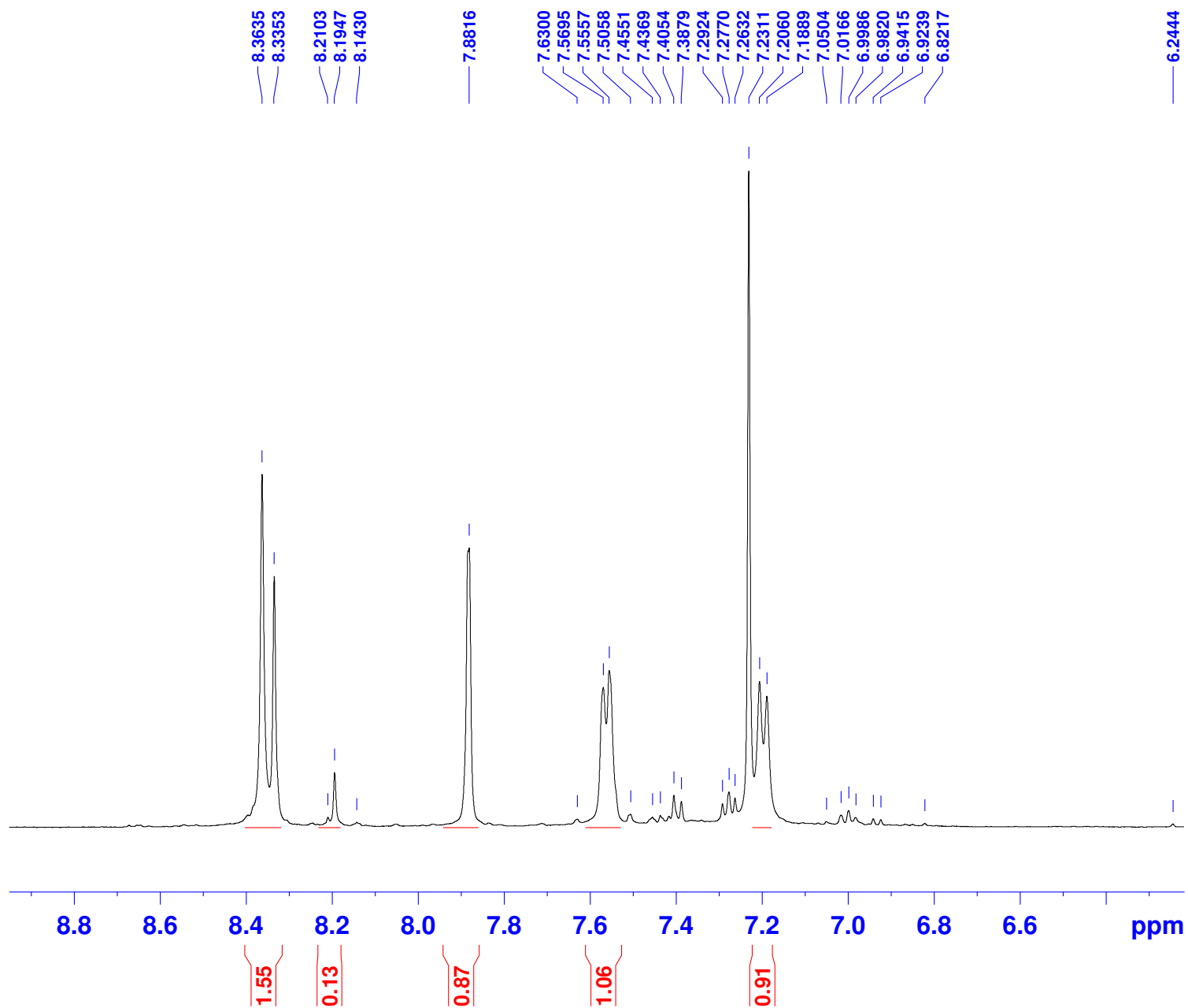
MD
H NMR



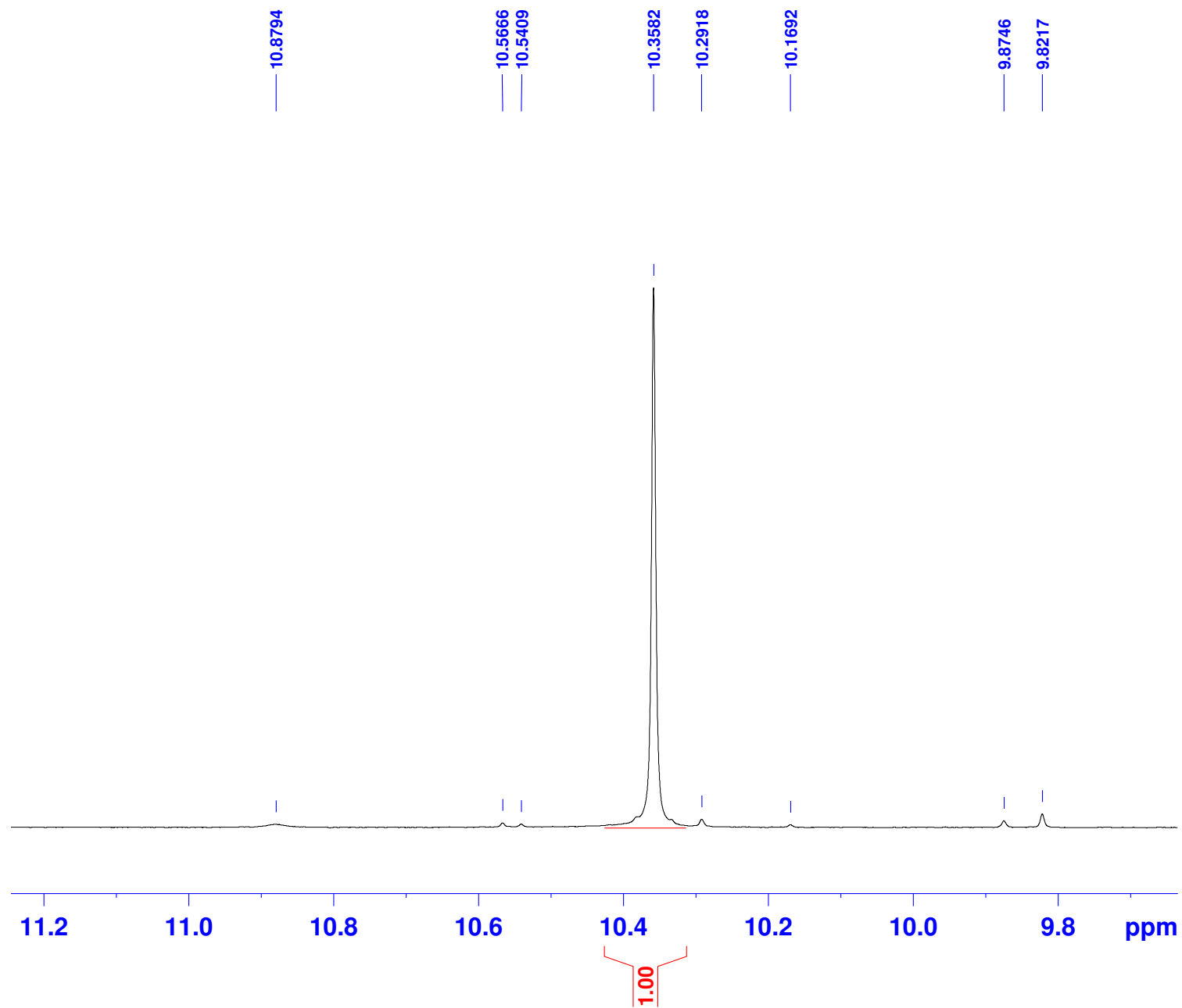
MD
H NMR



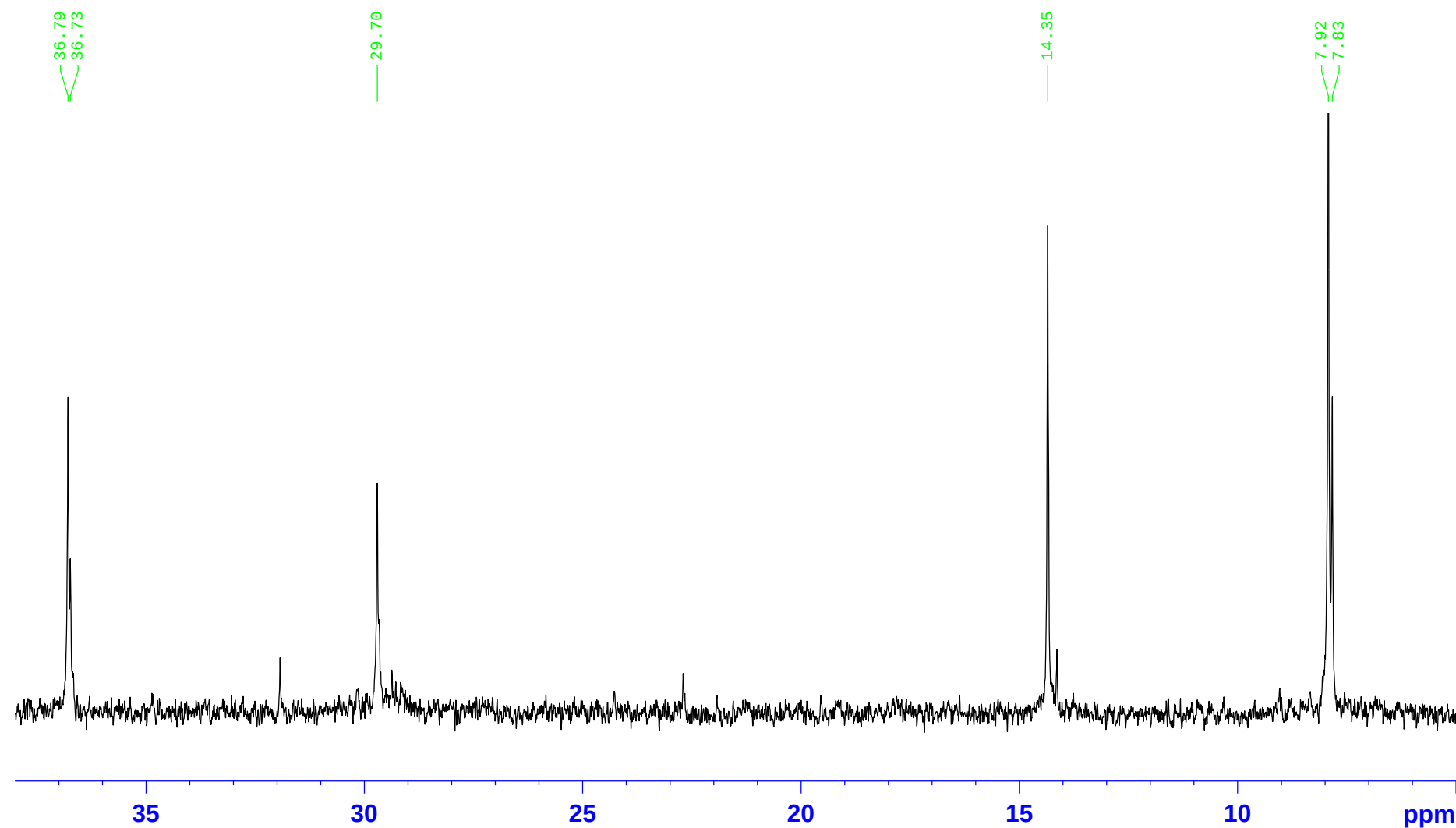
MD
H NMR



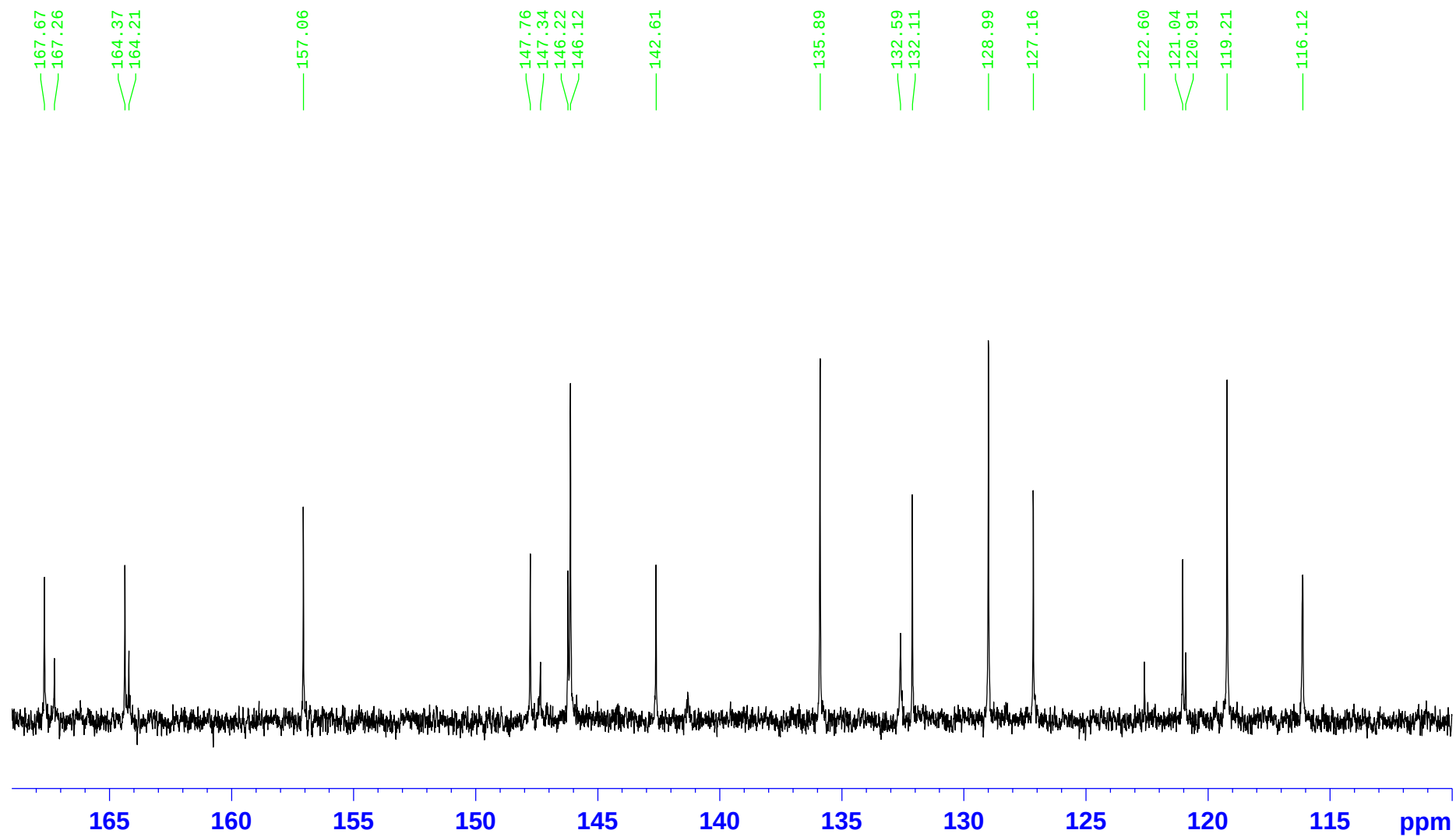
MD
H NMR



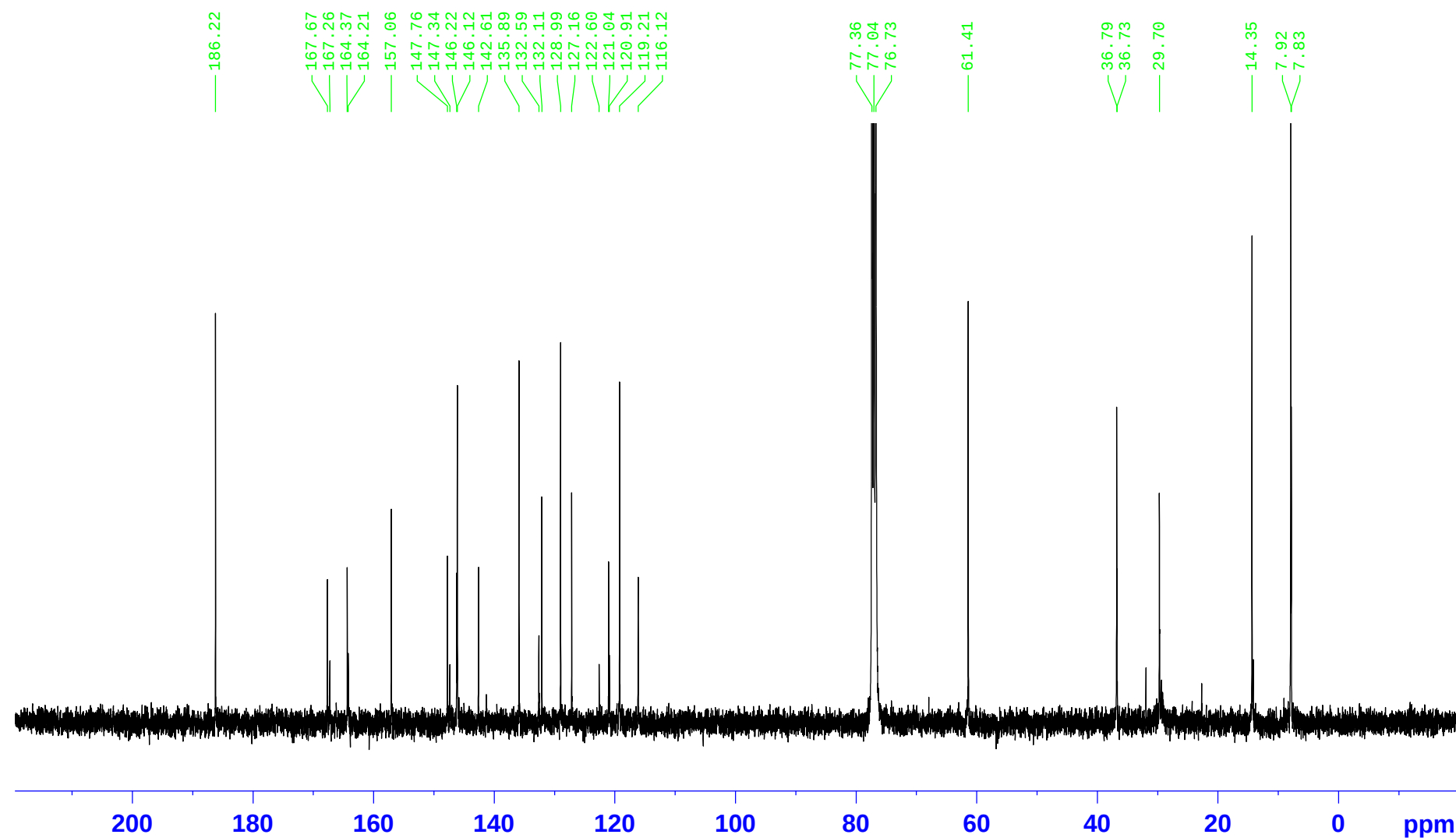
MD
c13



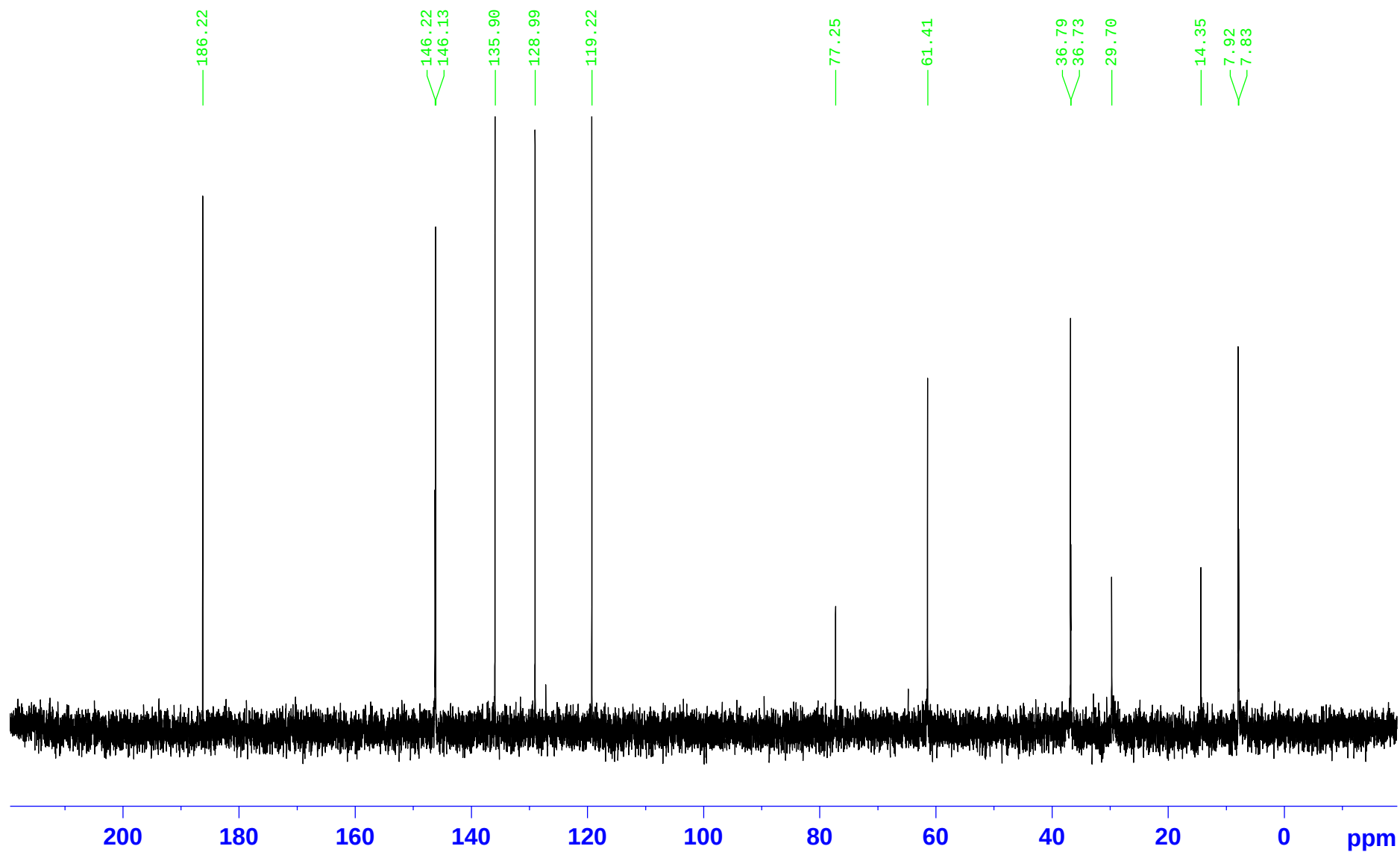
MD
c13



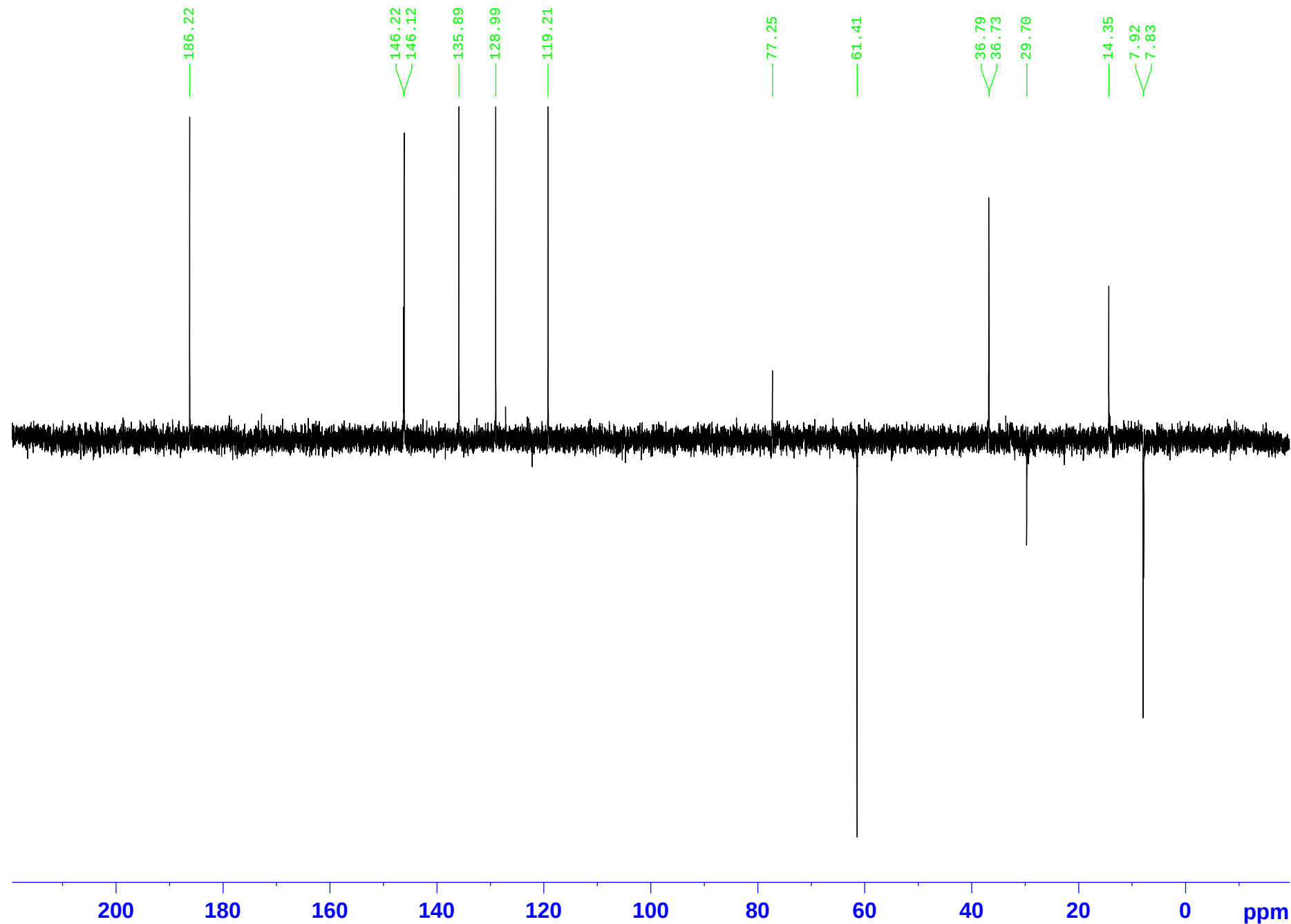
MD
c13



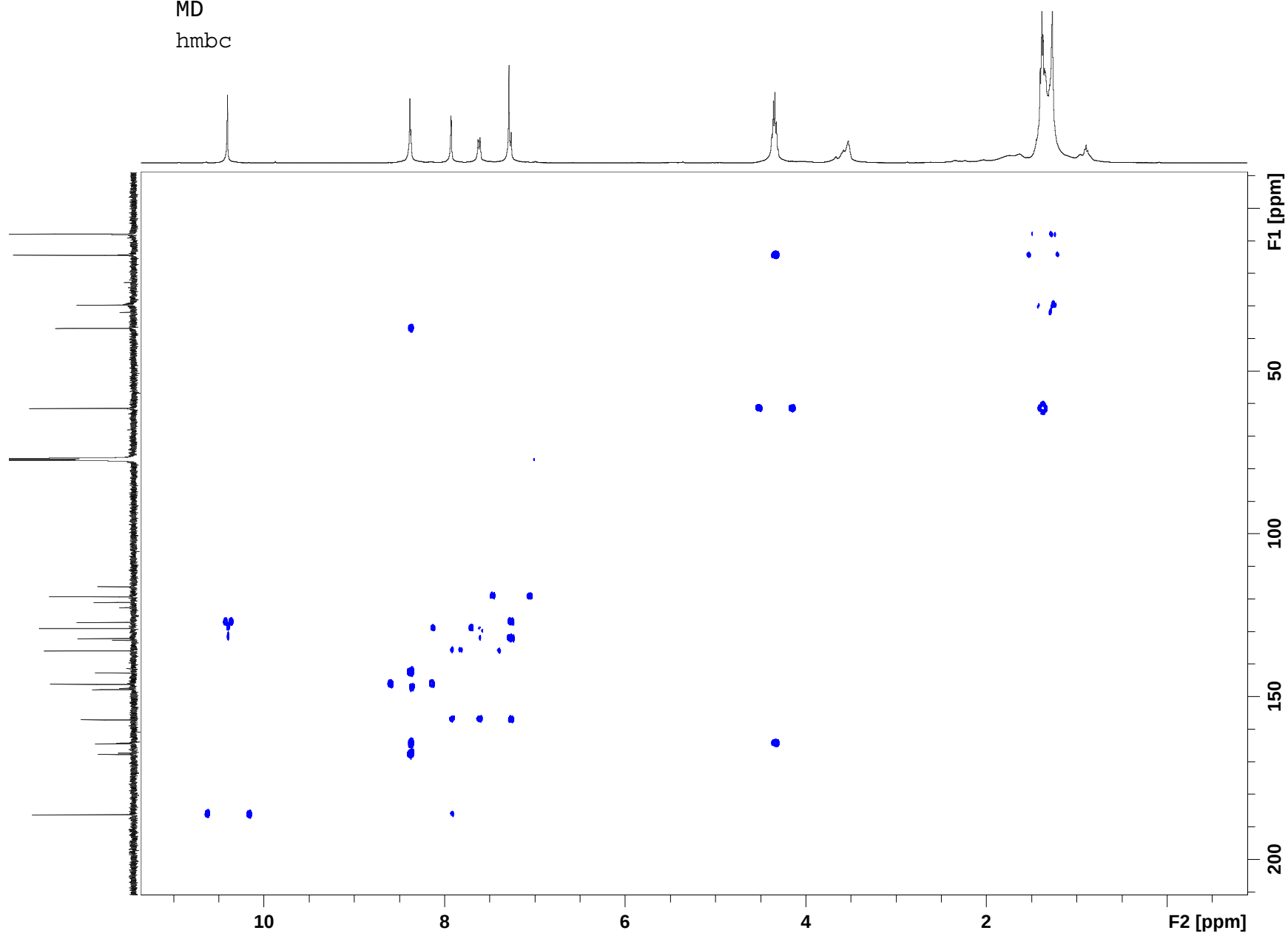
MD
dept90



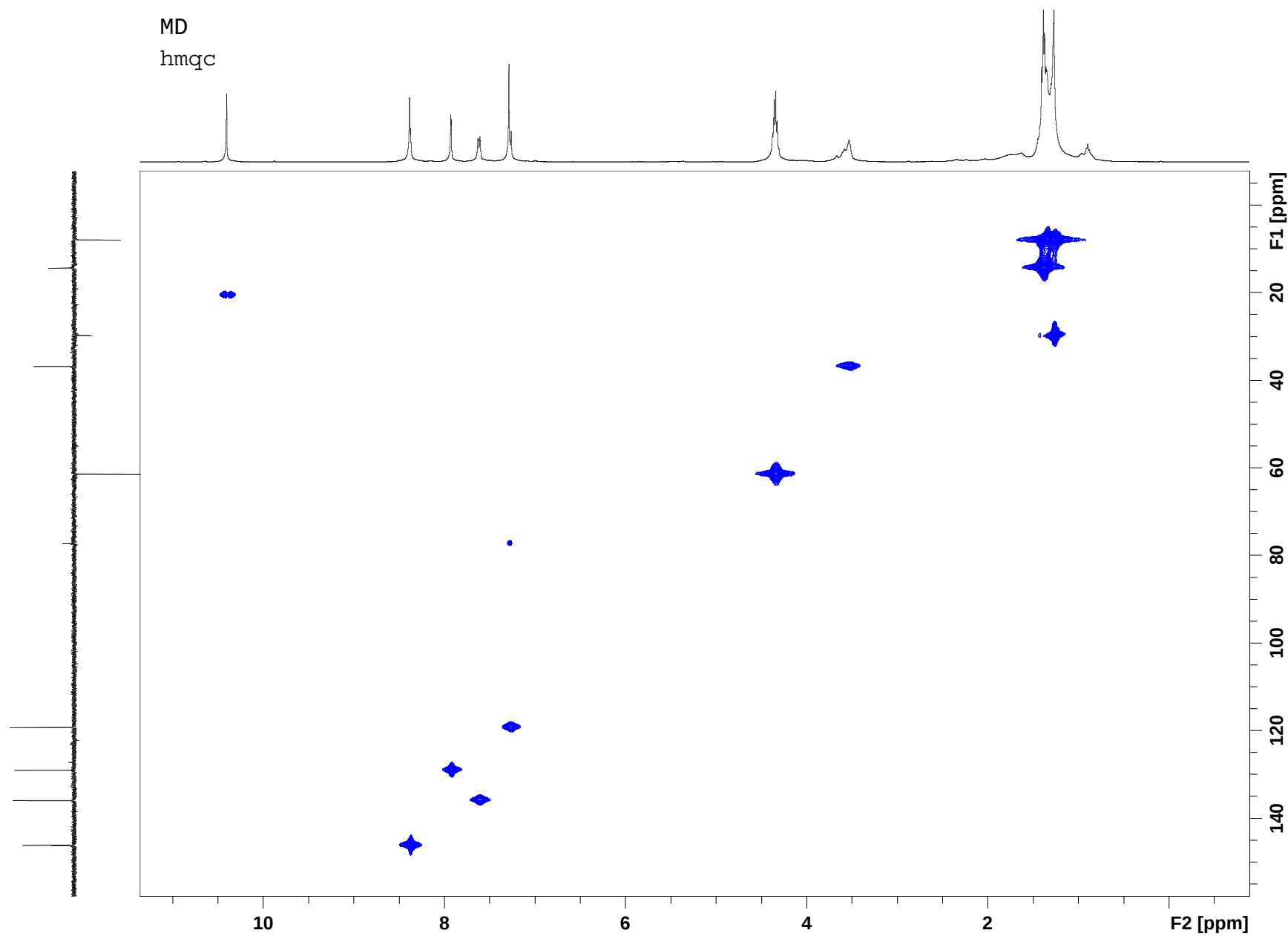
MD
dept135



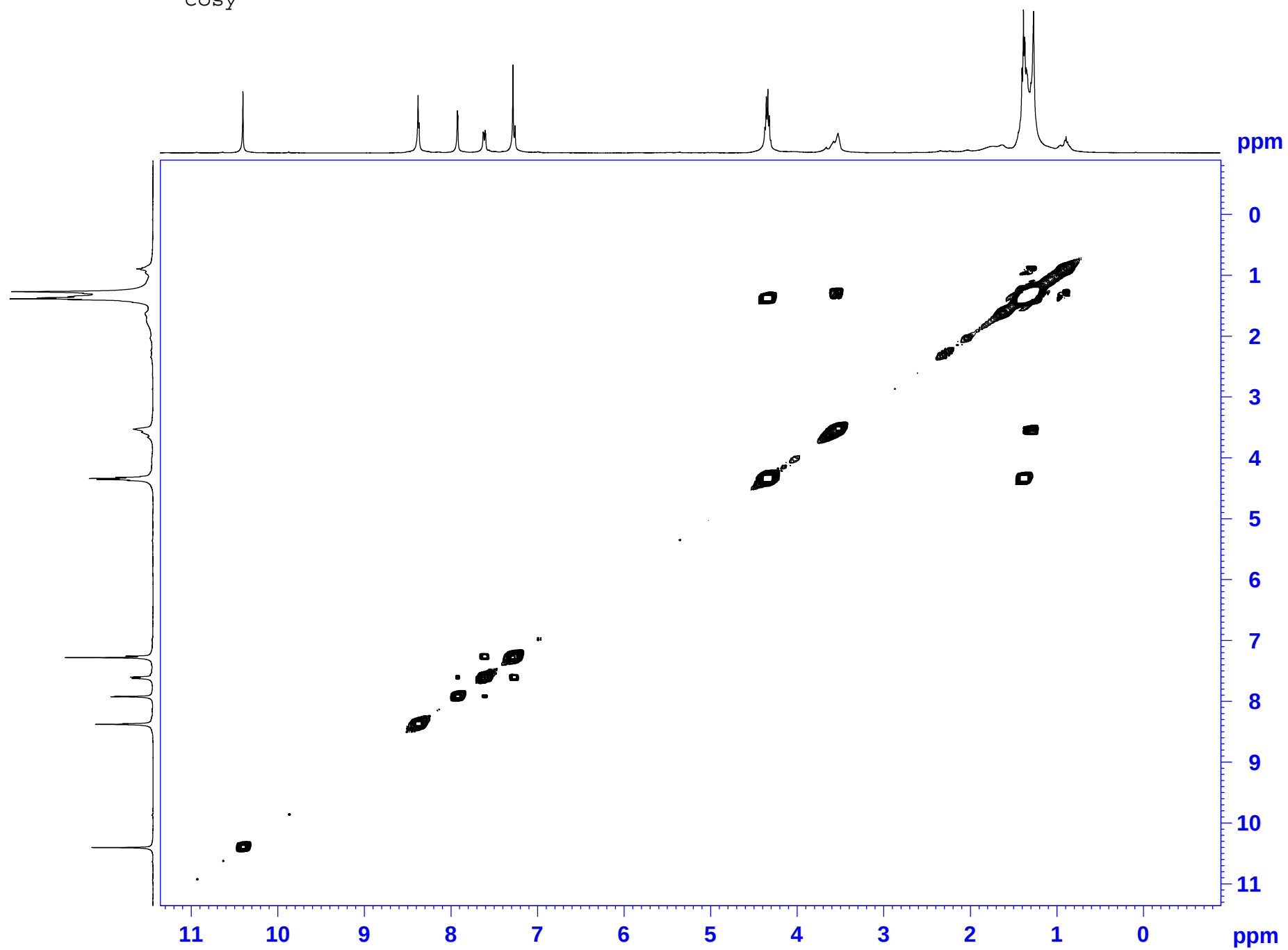
MD
hmbc



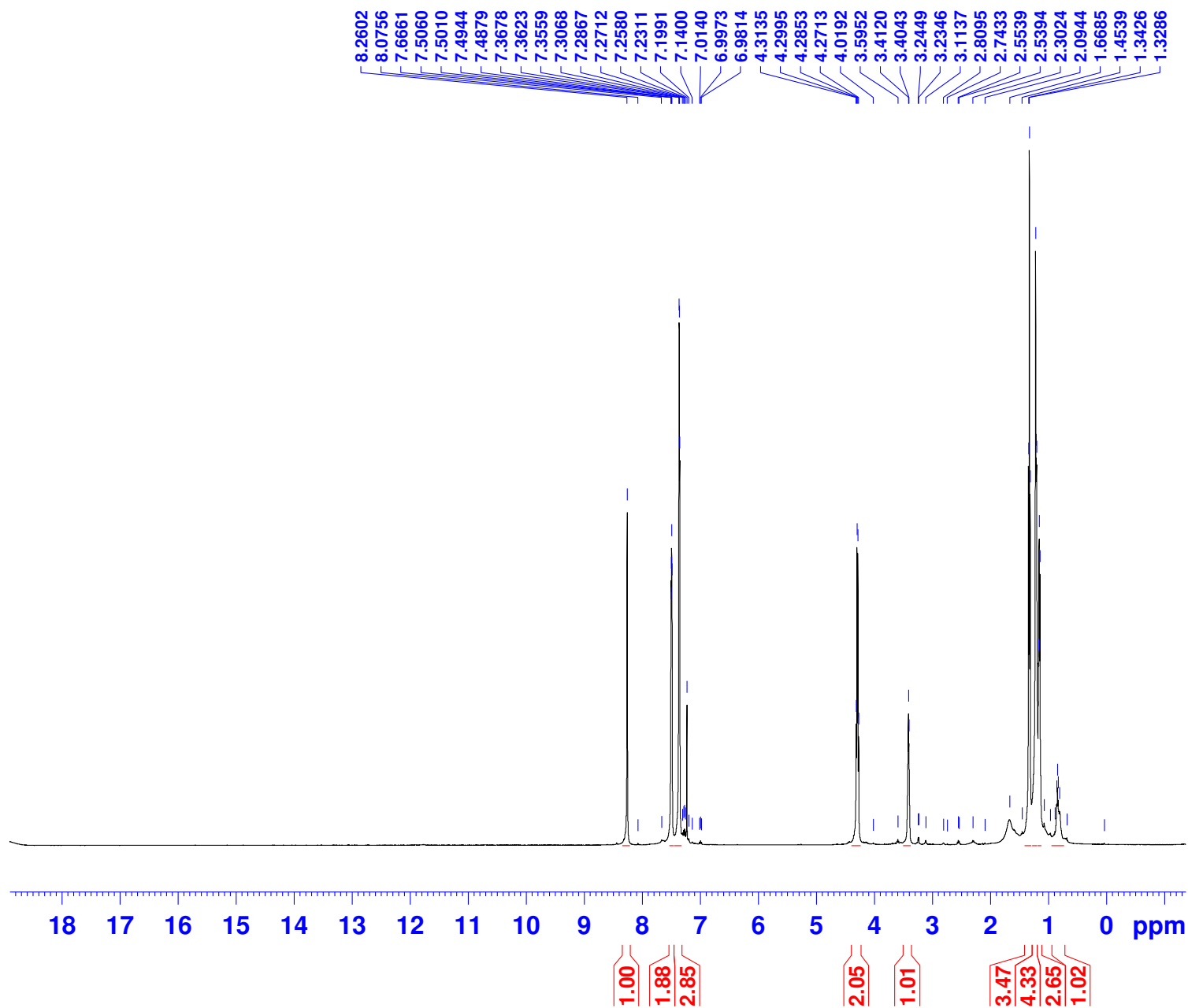
MD
hmqc



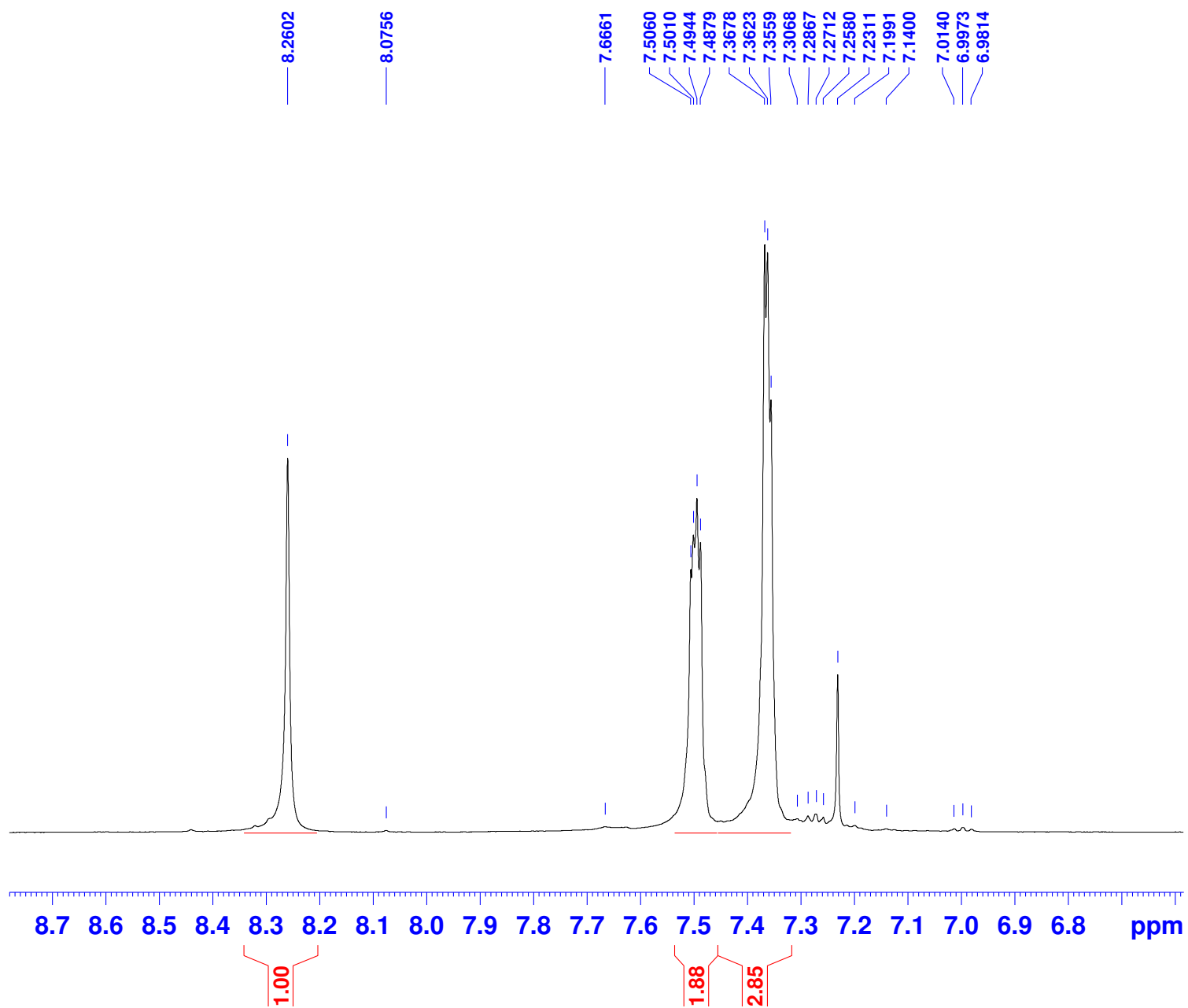
MD
cosy



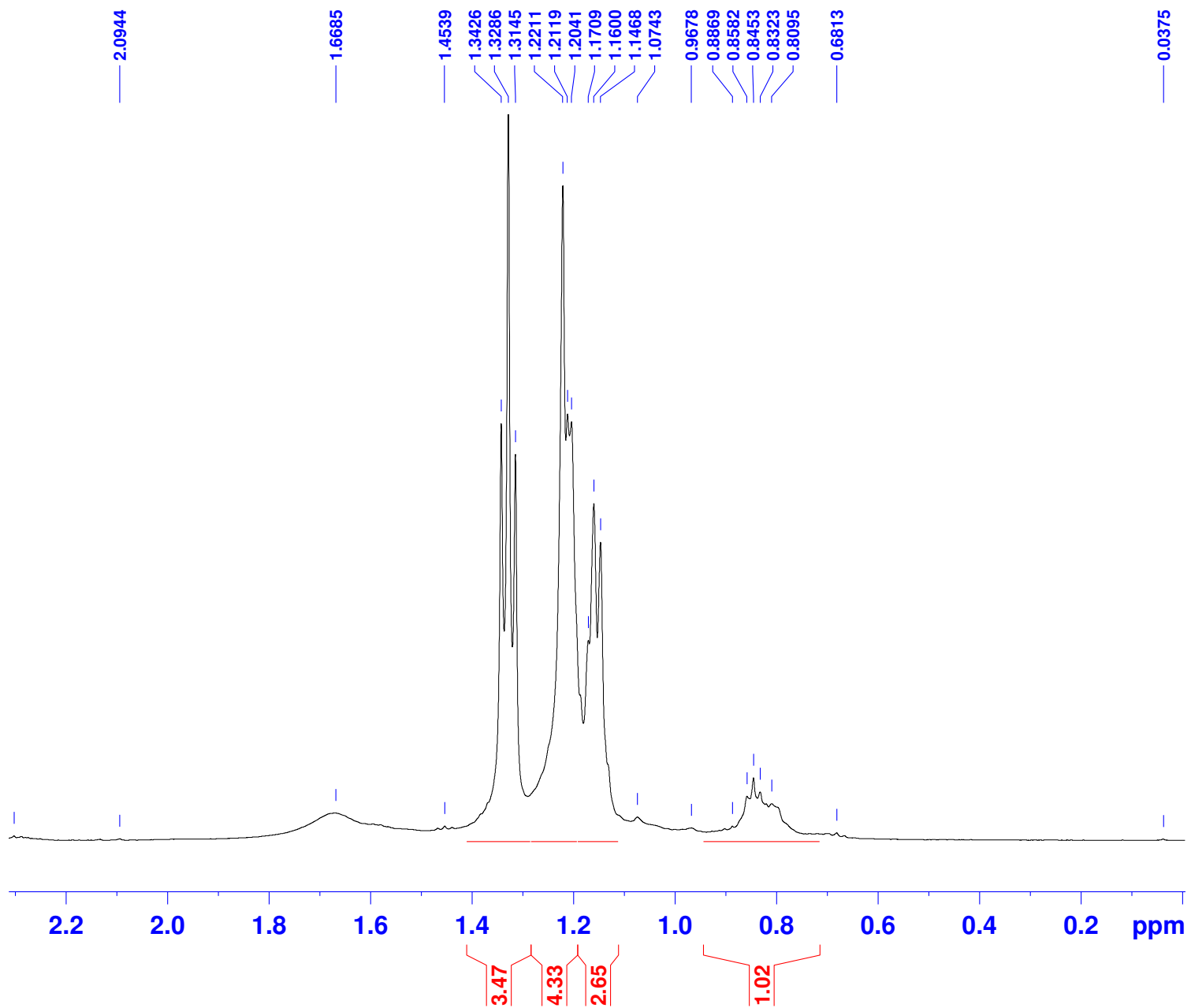
MT1
H NMR



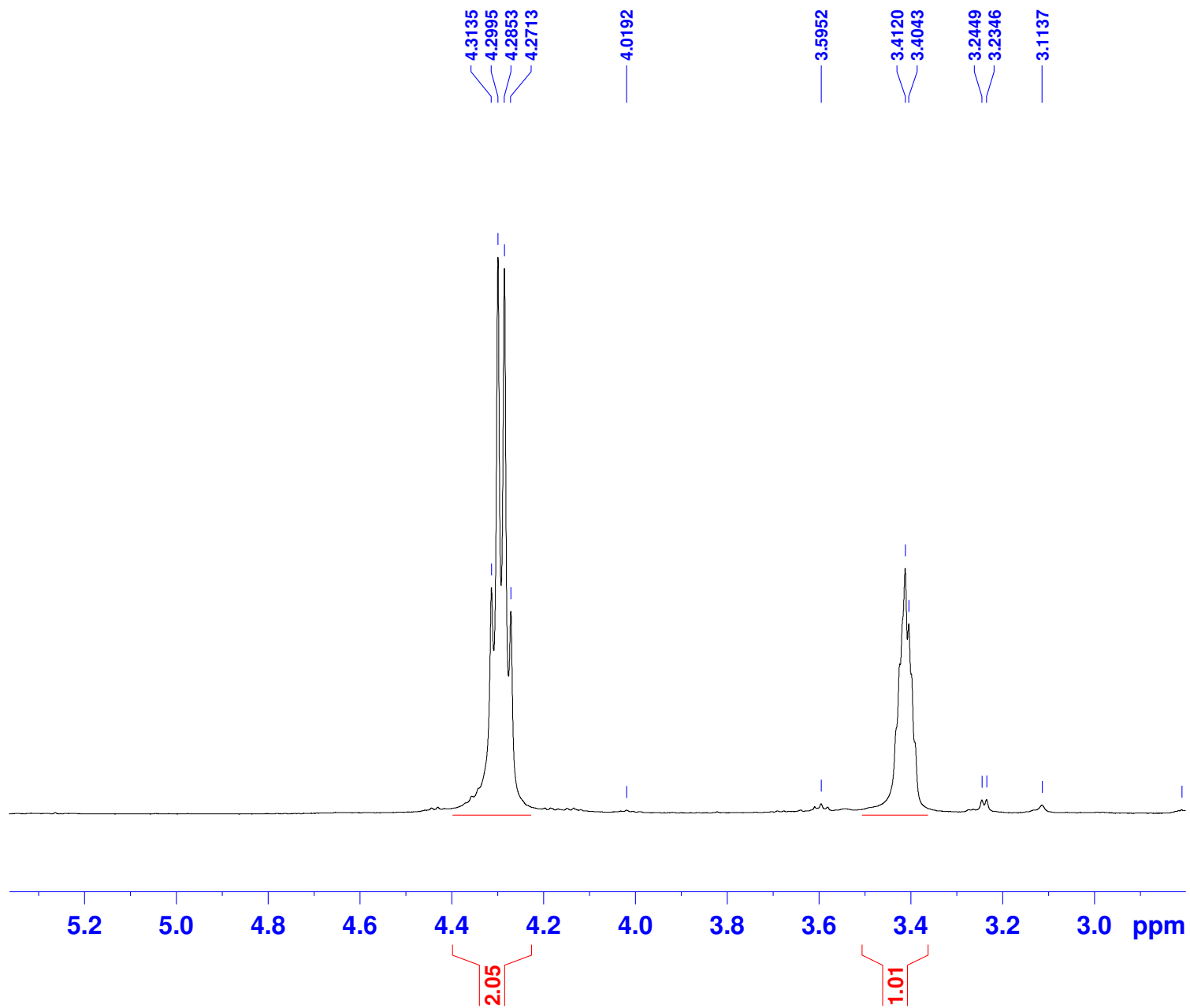
MT1
H NMR



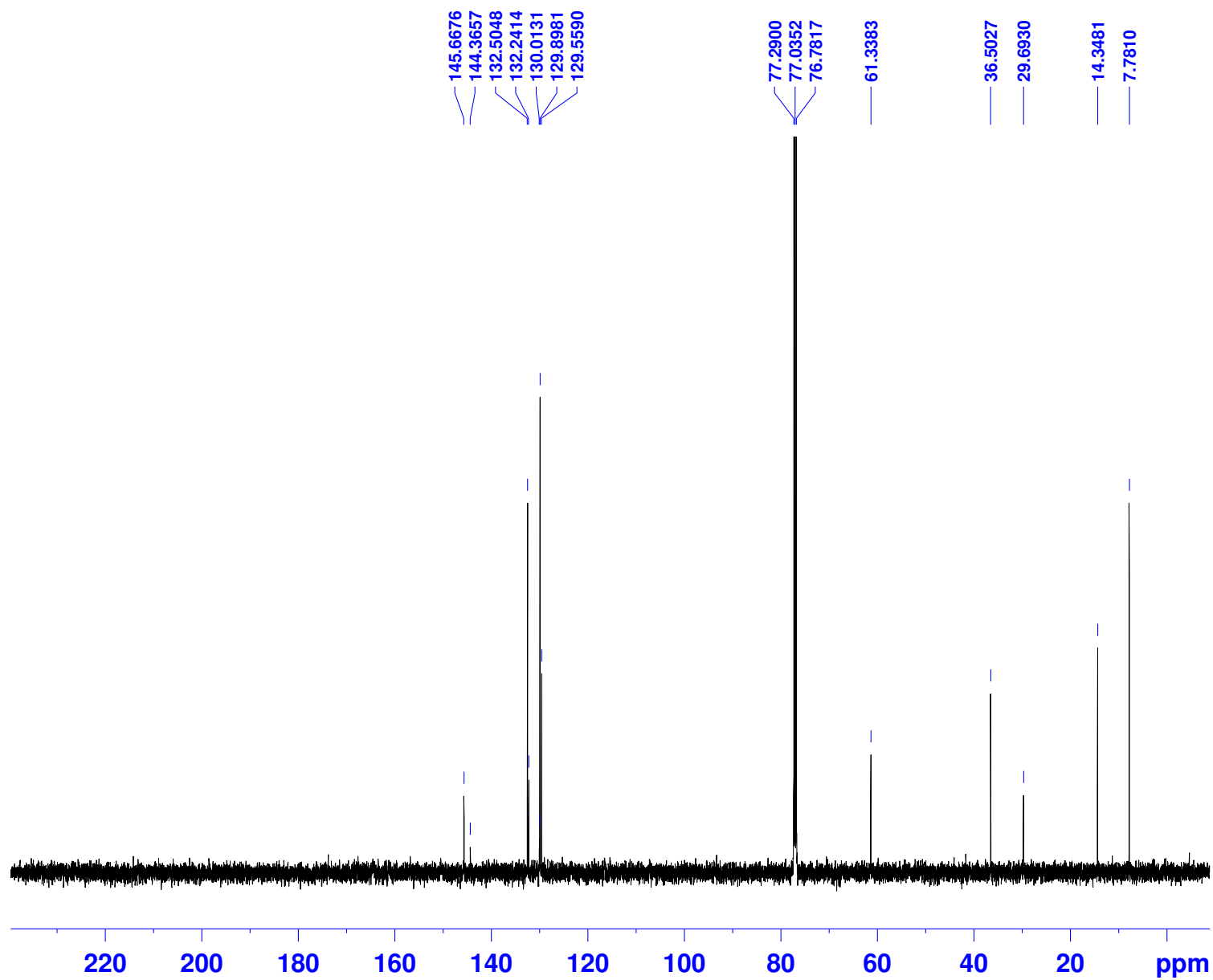
MT1
H NMR



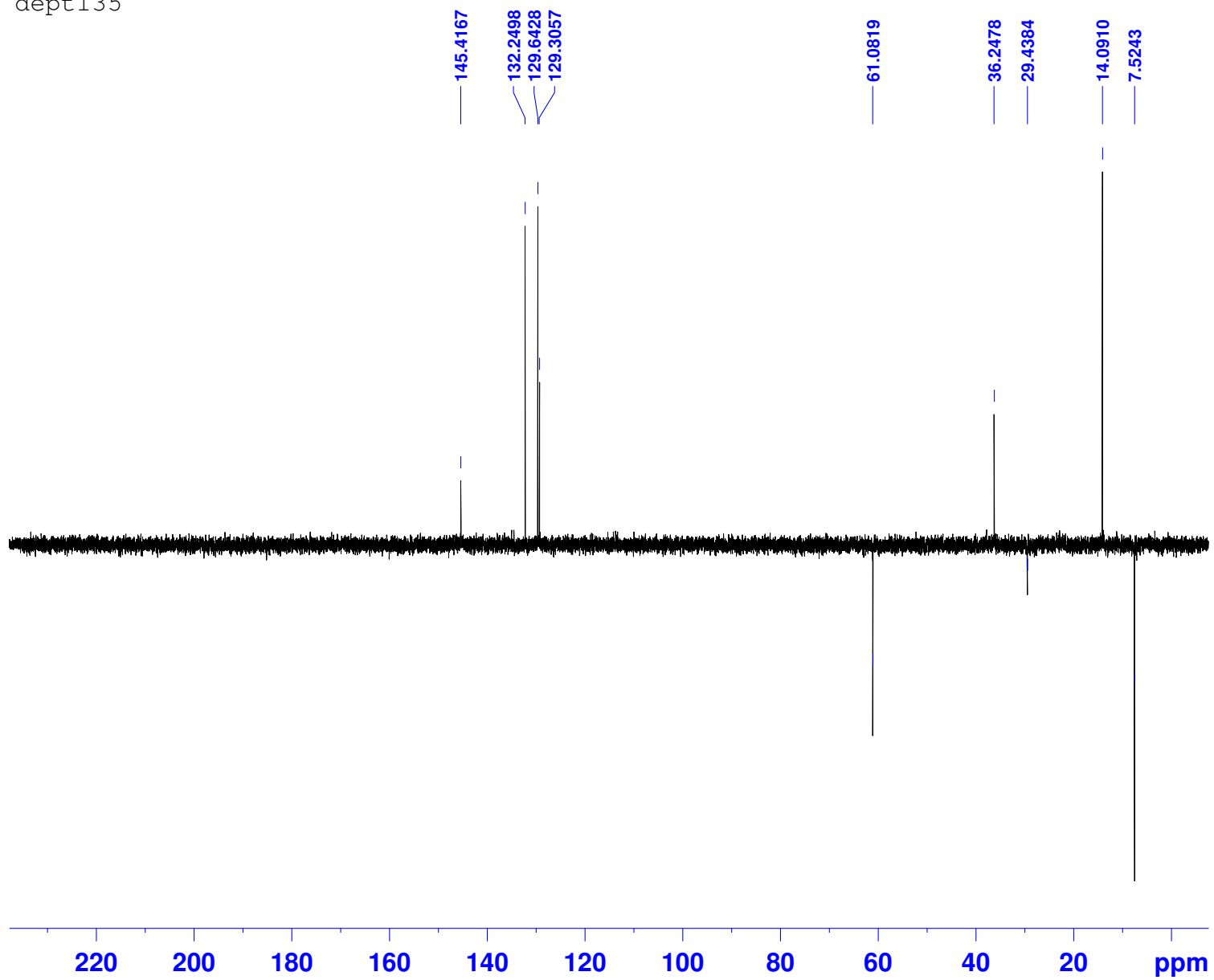
MT1
H NMR



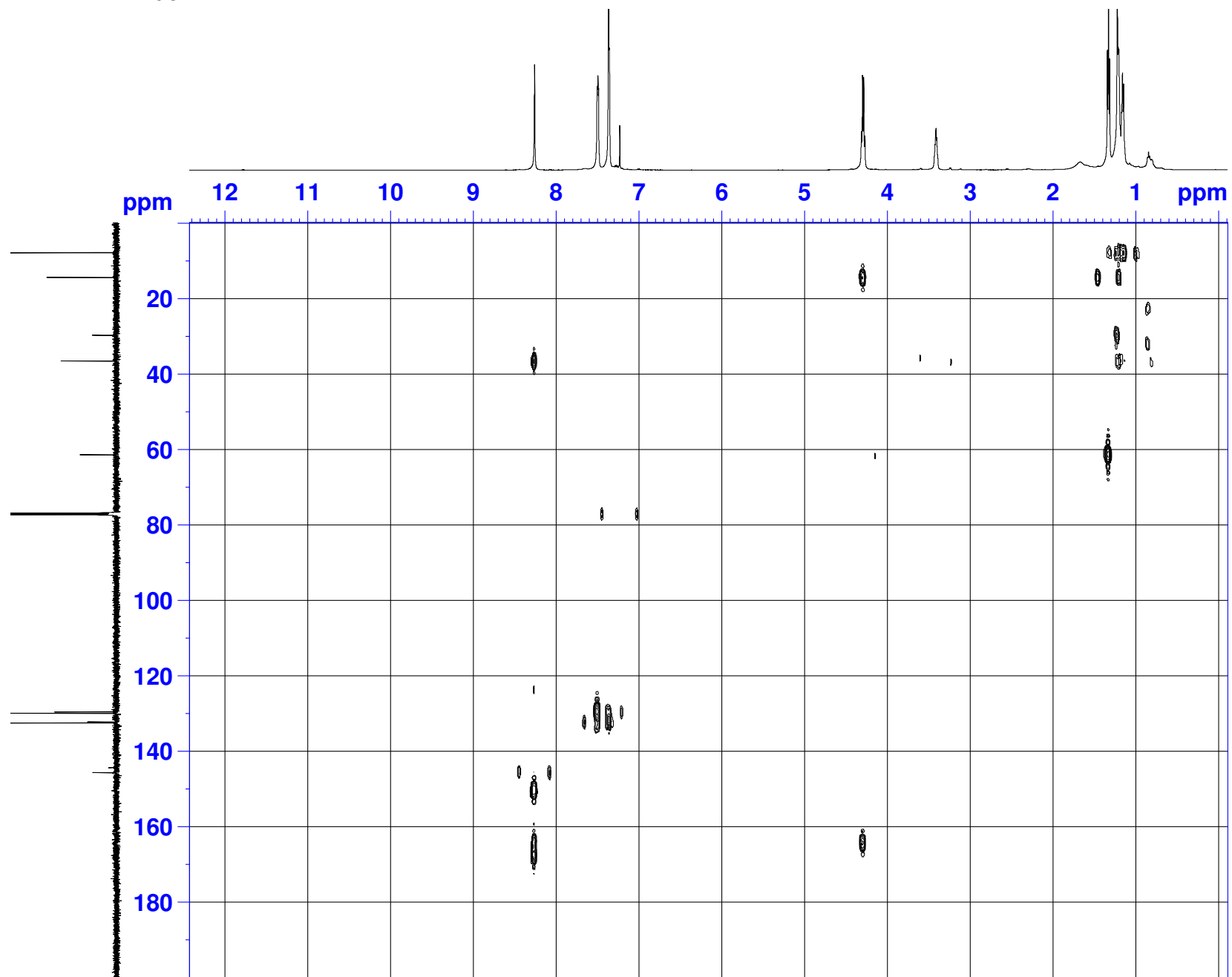
MT1
c13



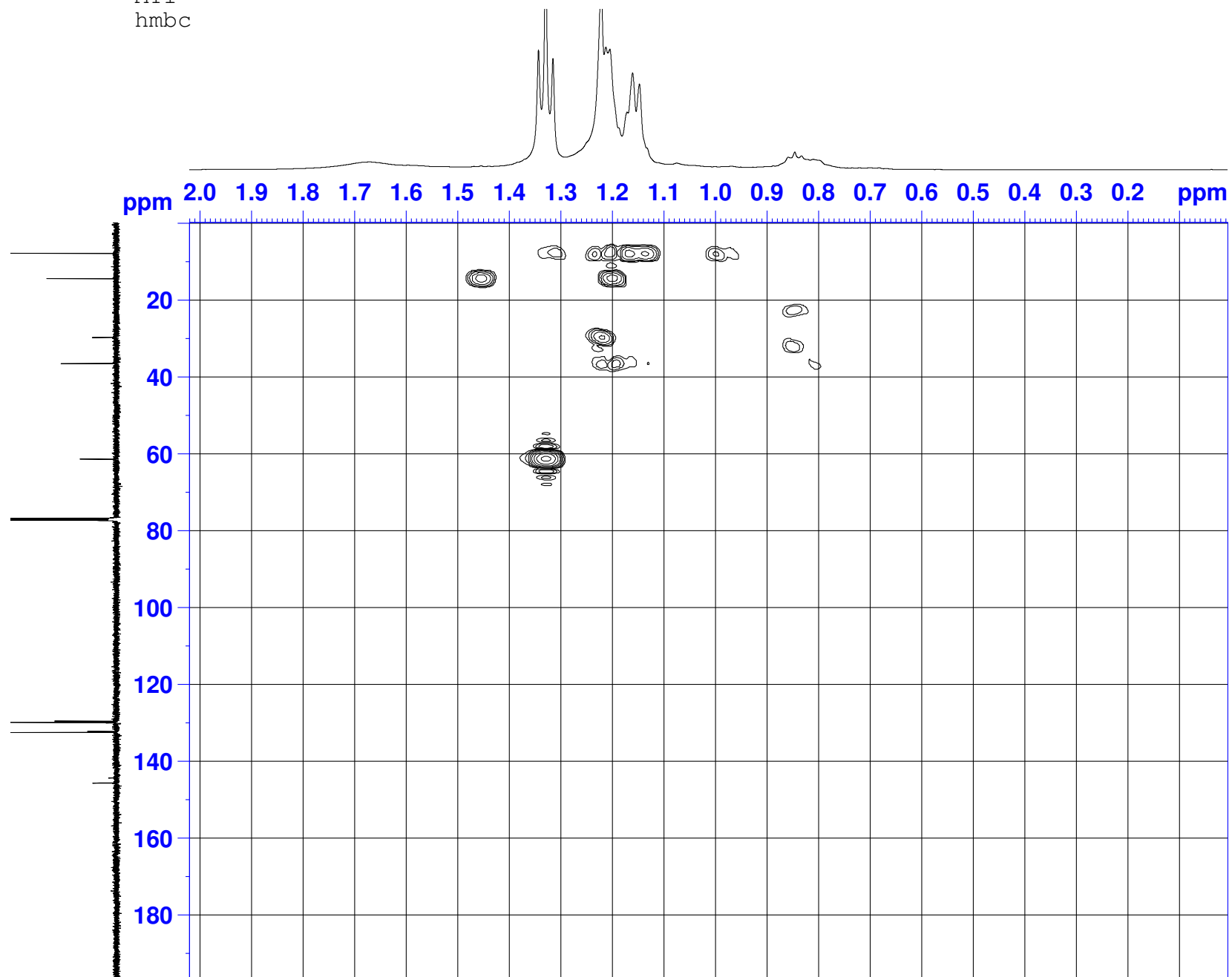
MT1
dept135



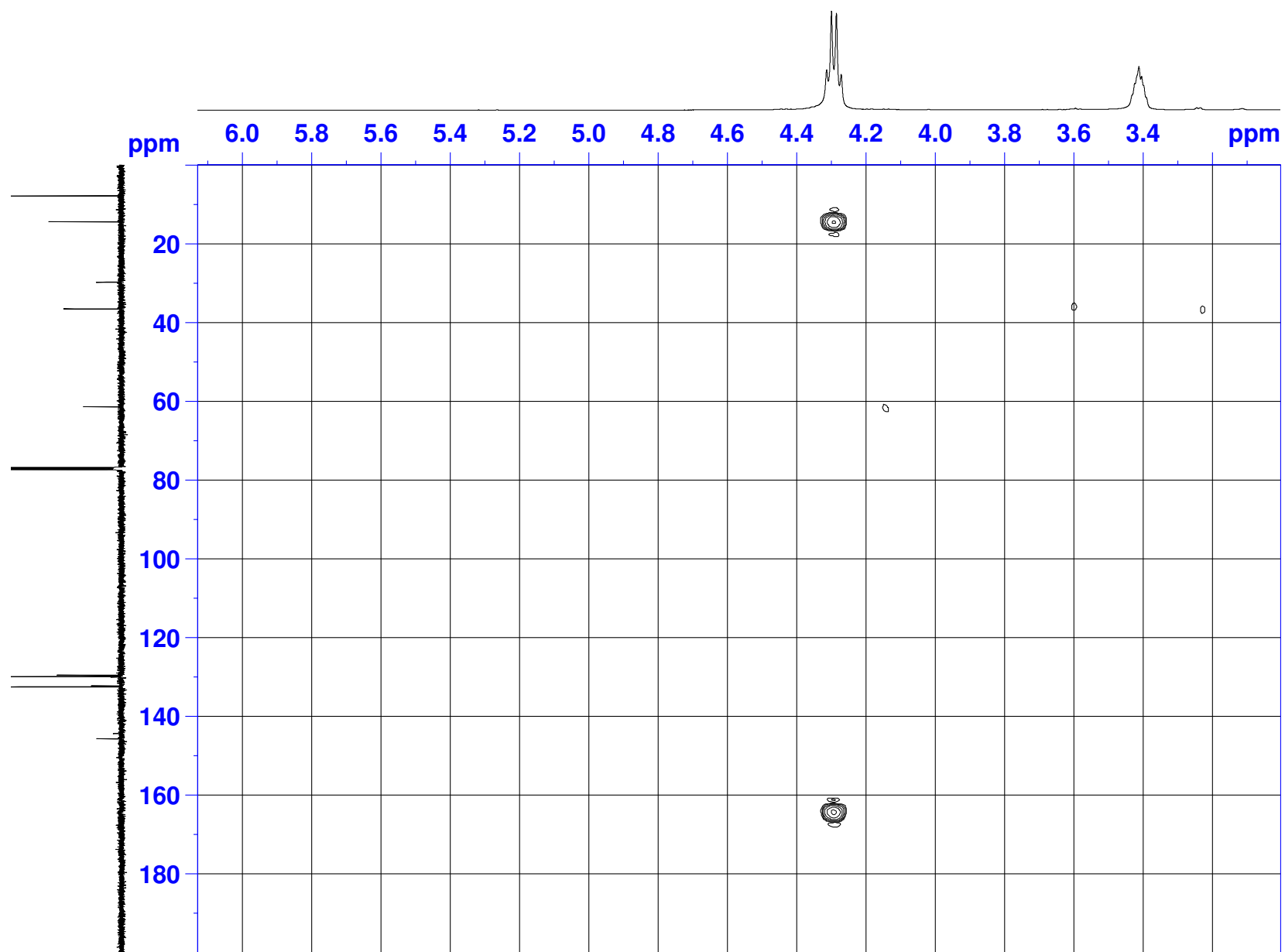
MT1
hmbc



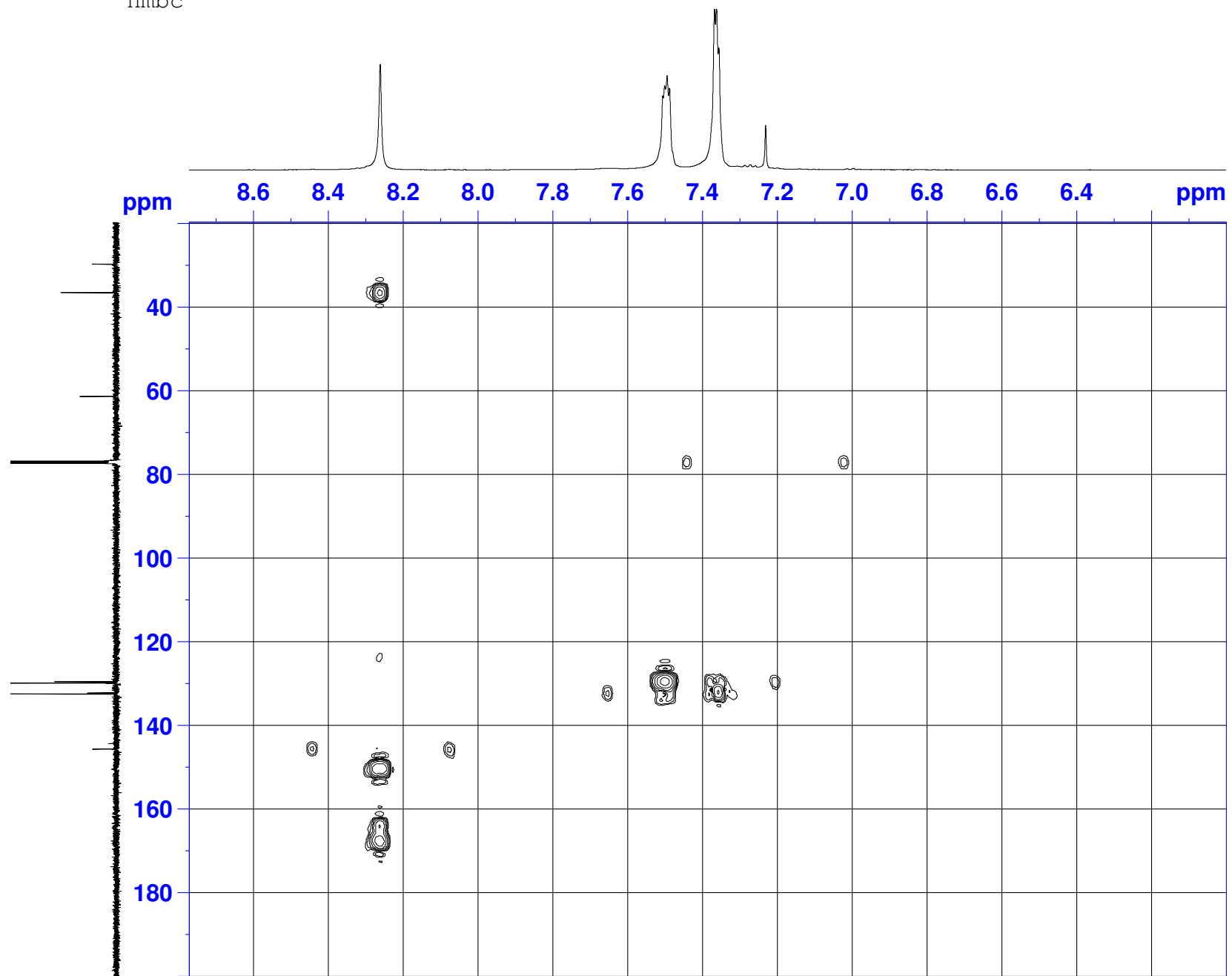
MT1
hmbc



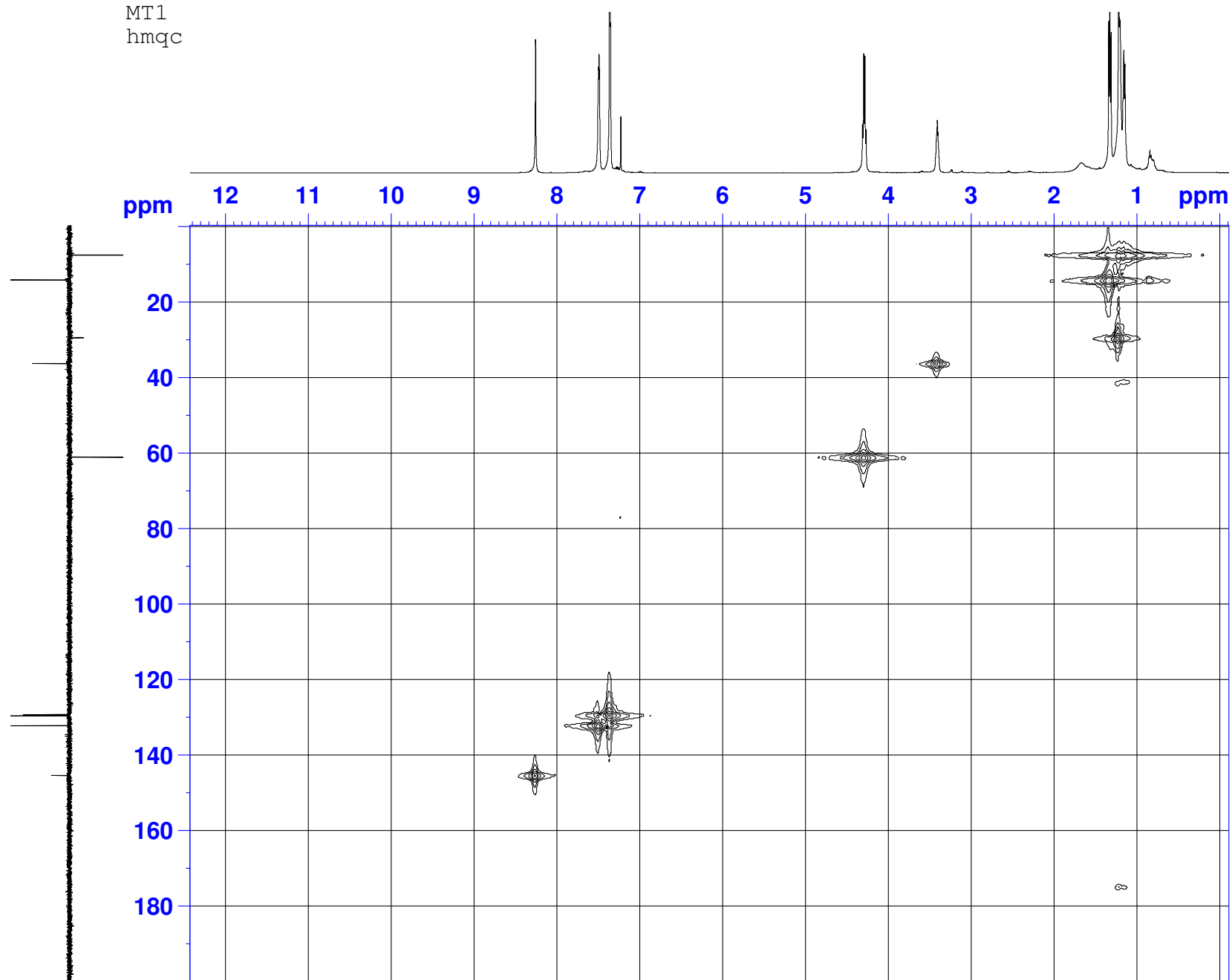
MT1
hmbc



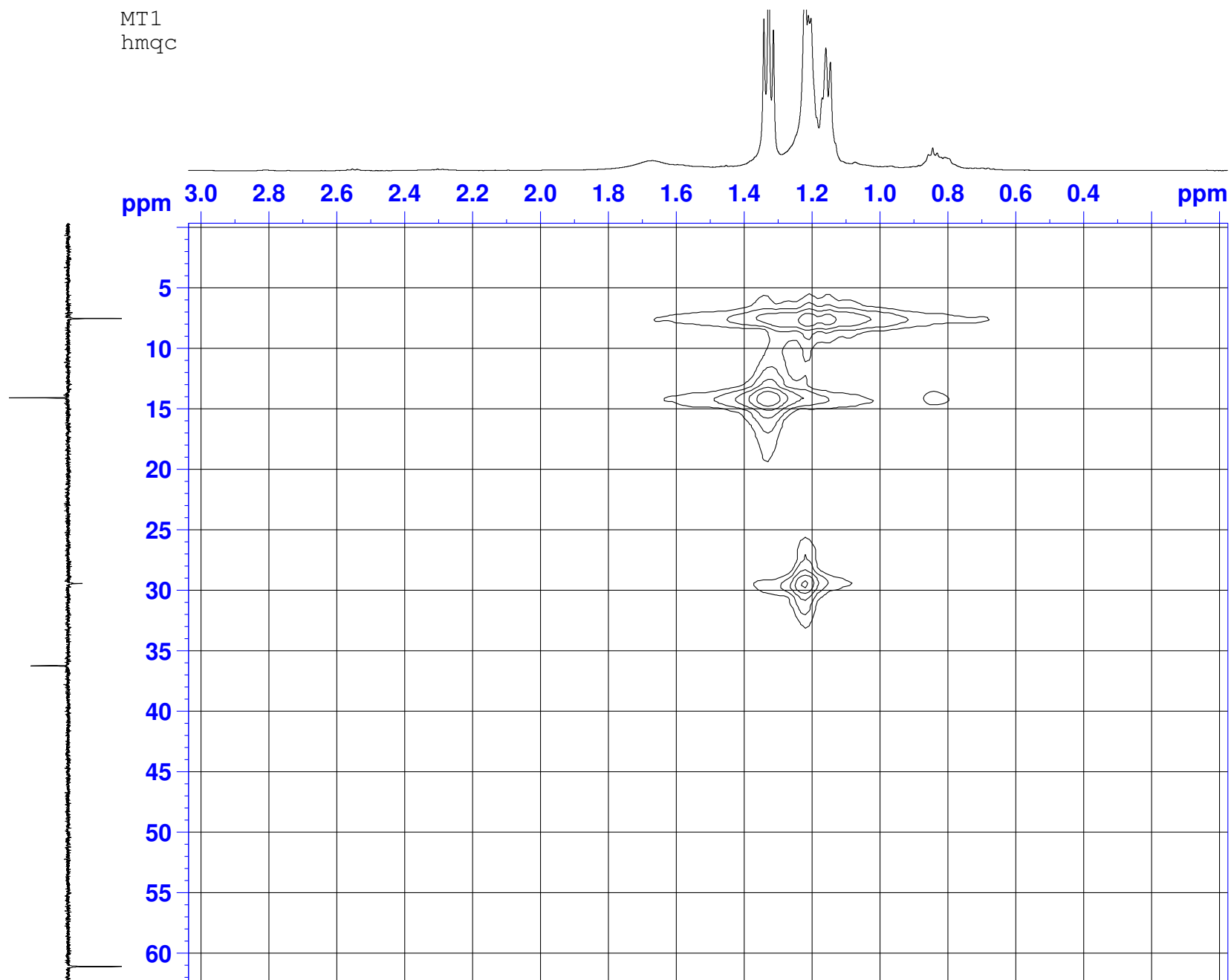
MT1
hmbc



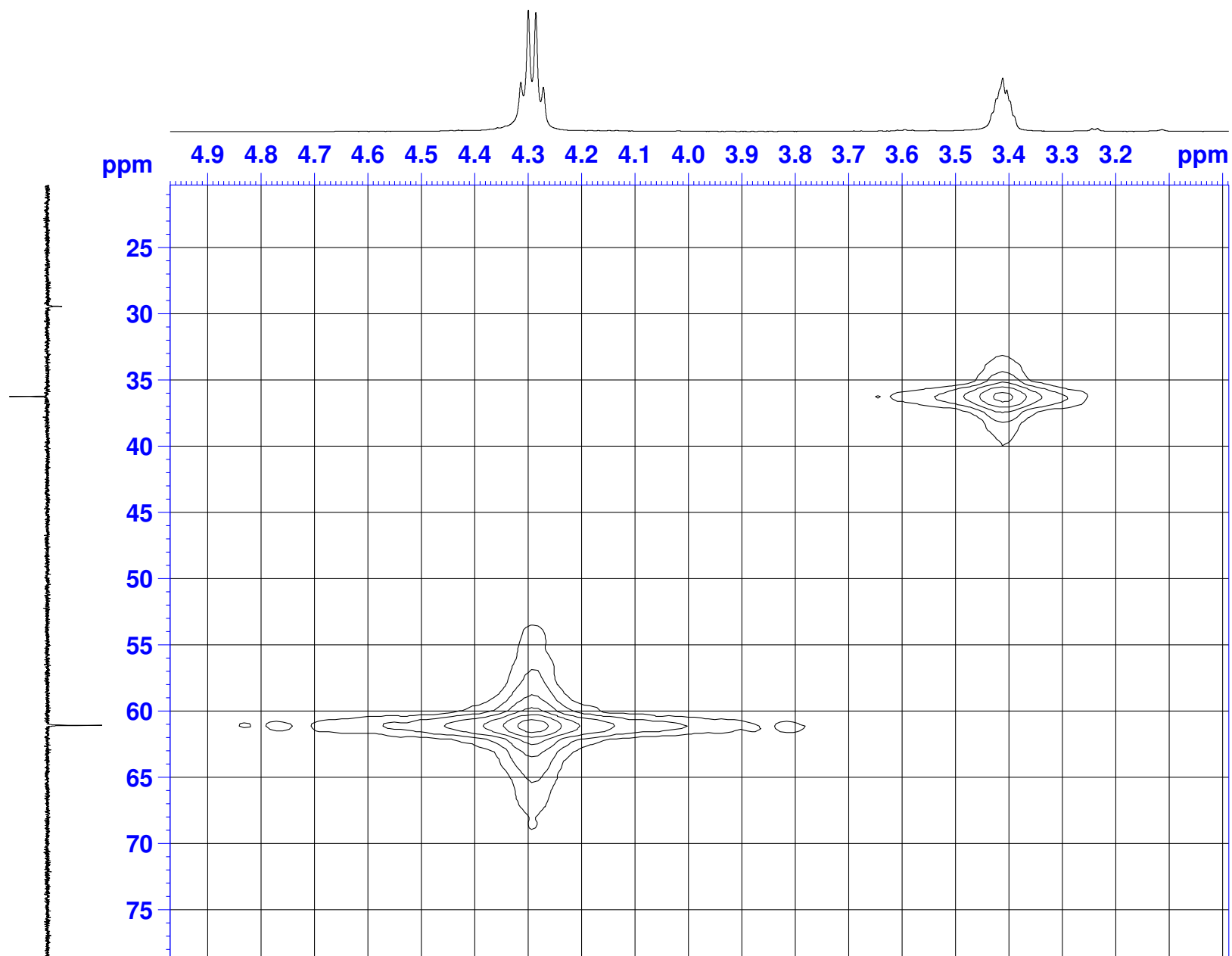
MT1
hmqc



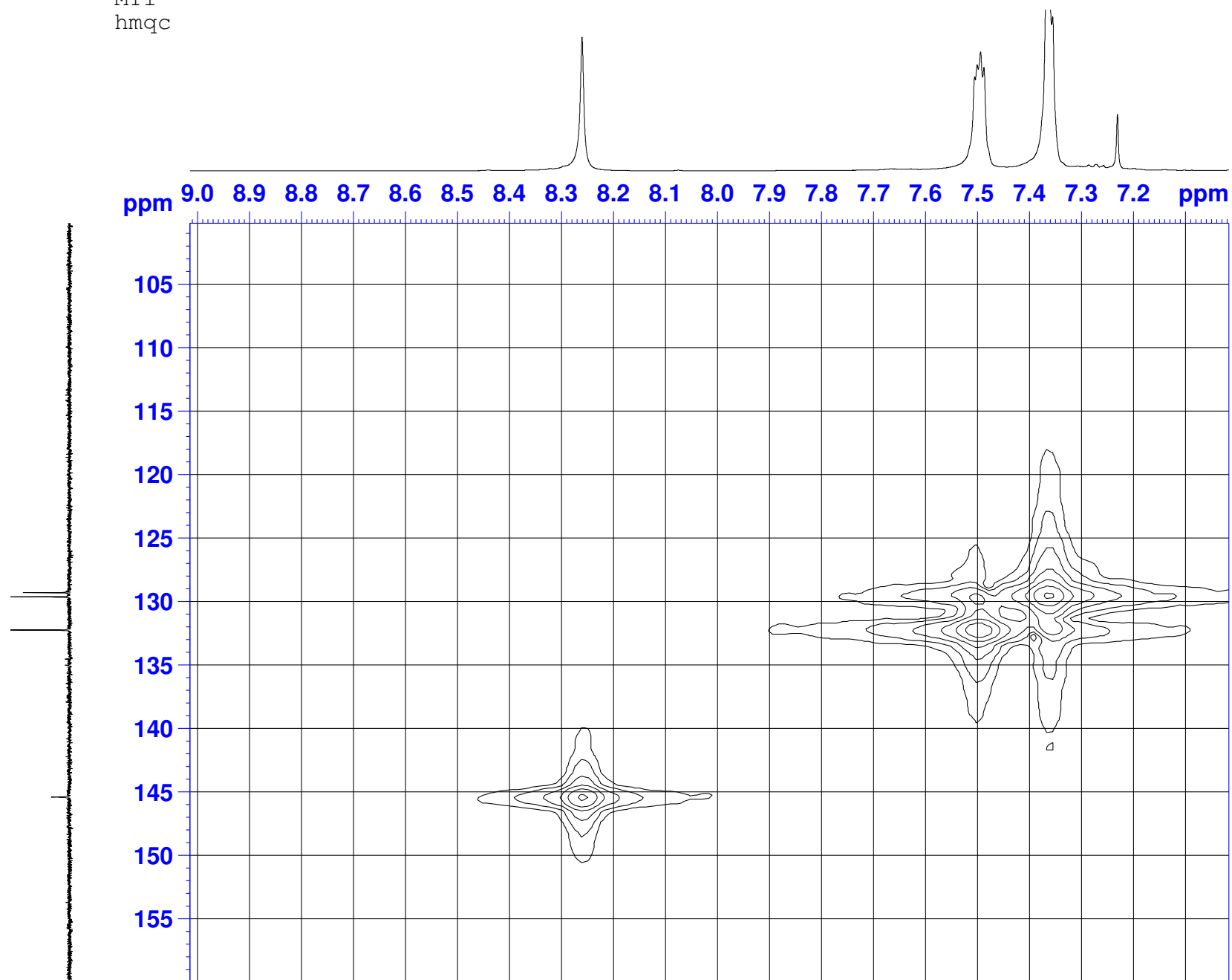
MT1
hmqc



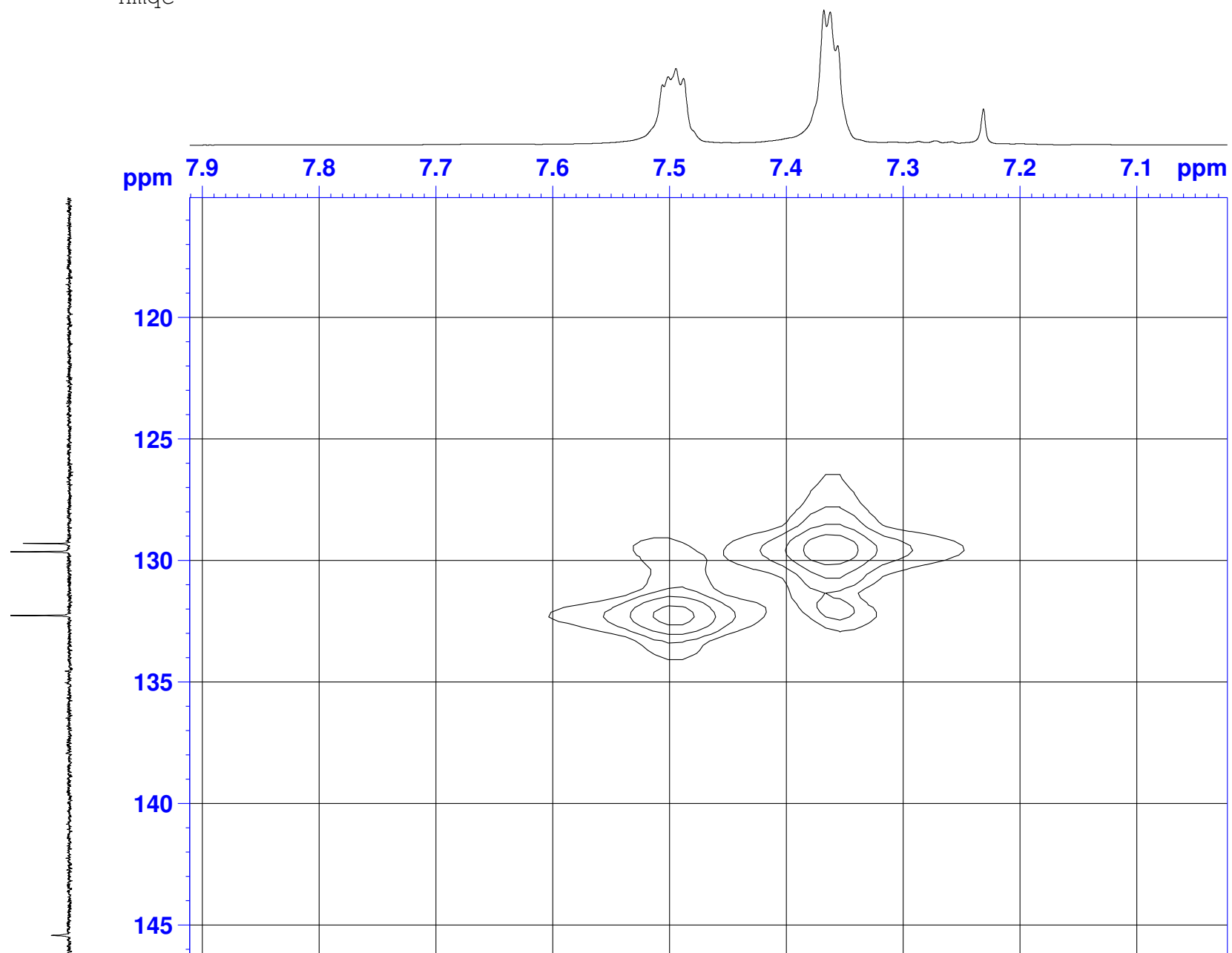
MT1
hmqc



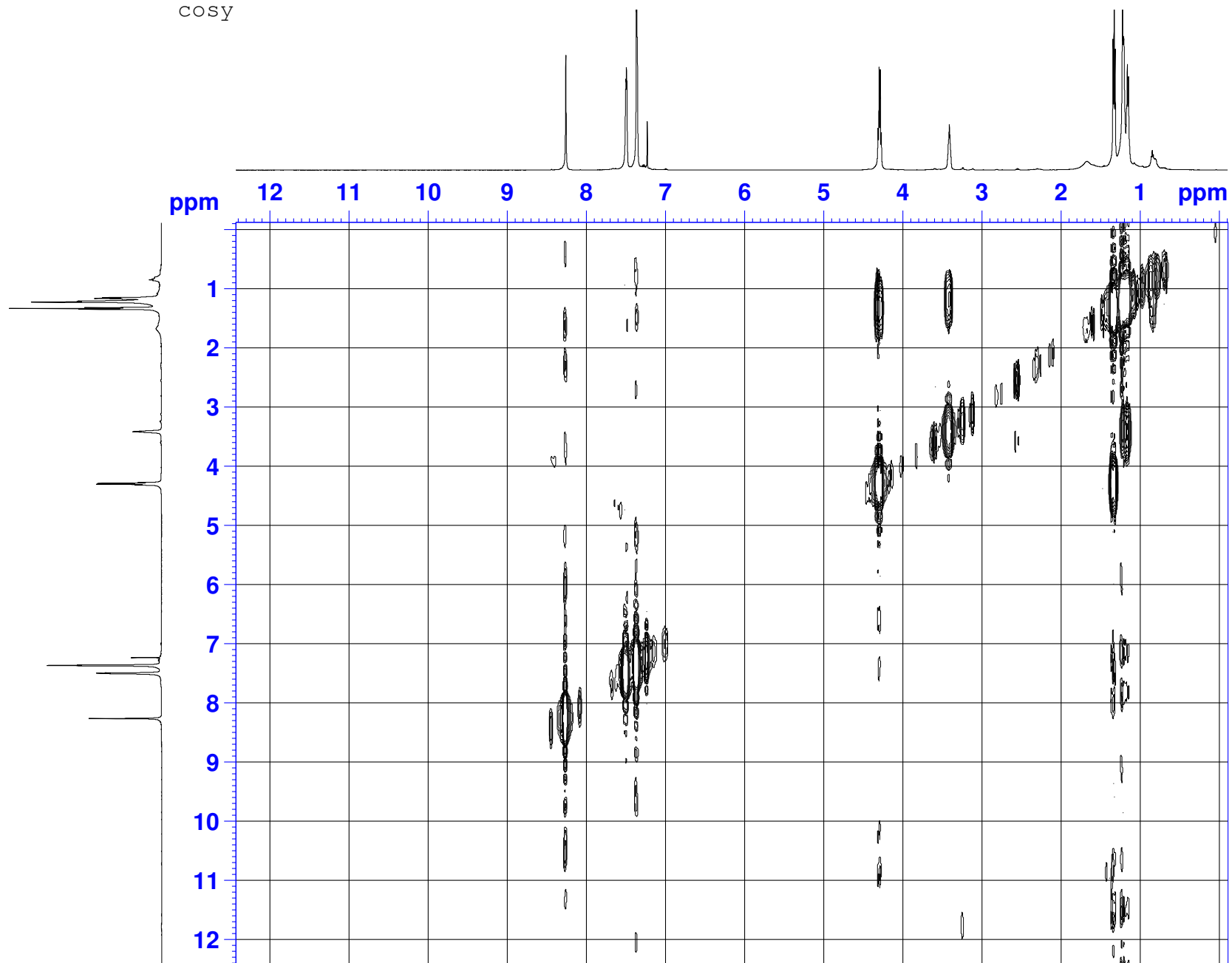
MT1
hmqc

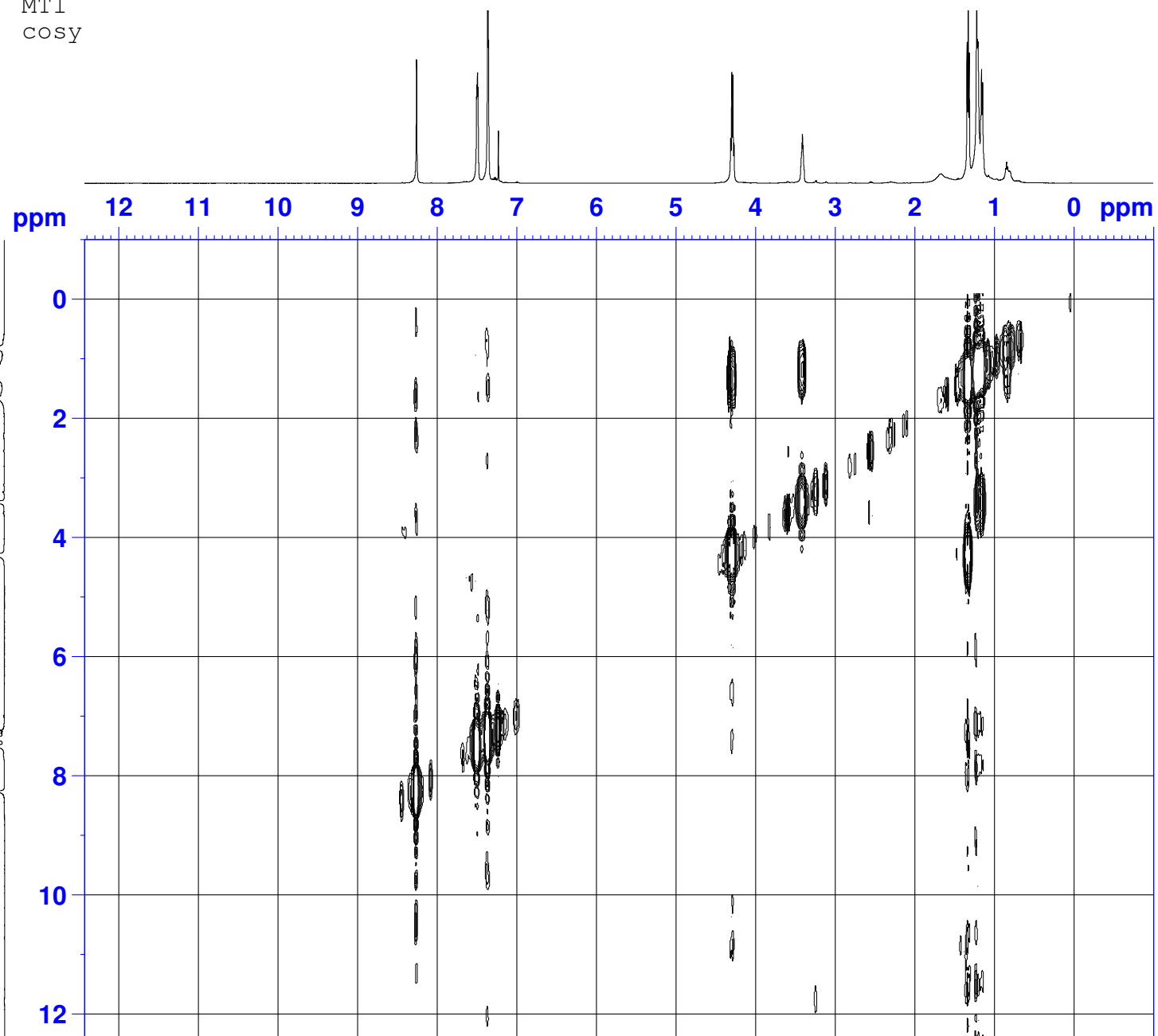


MT1
hmqc

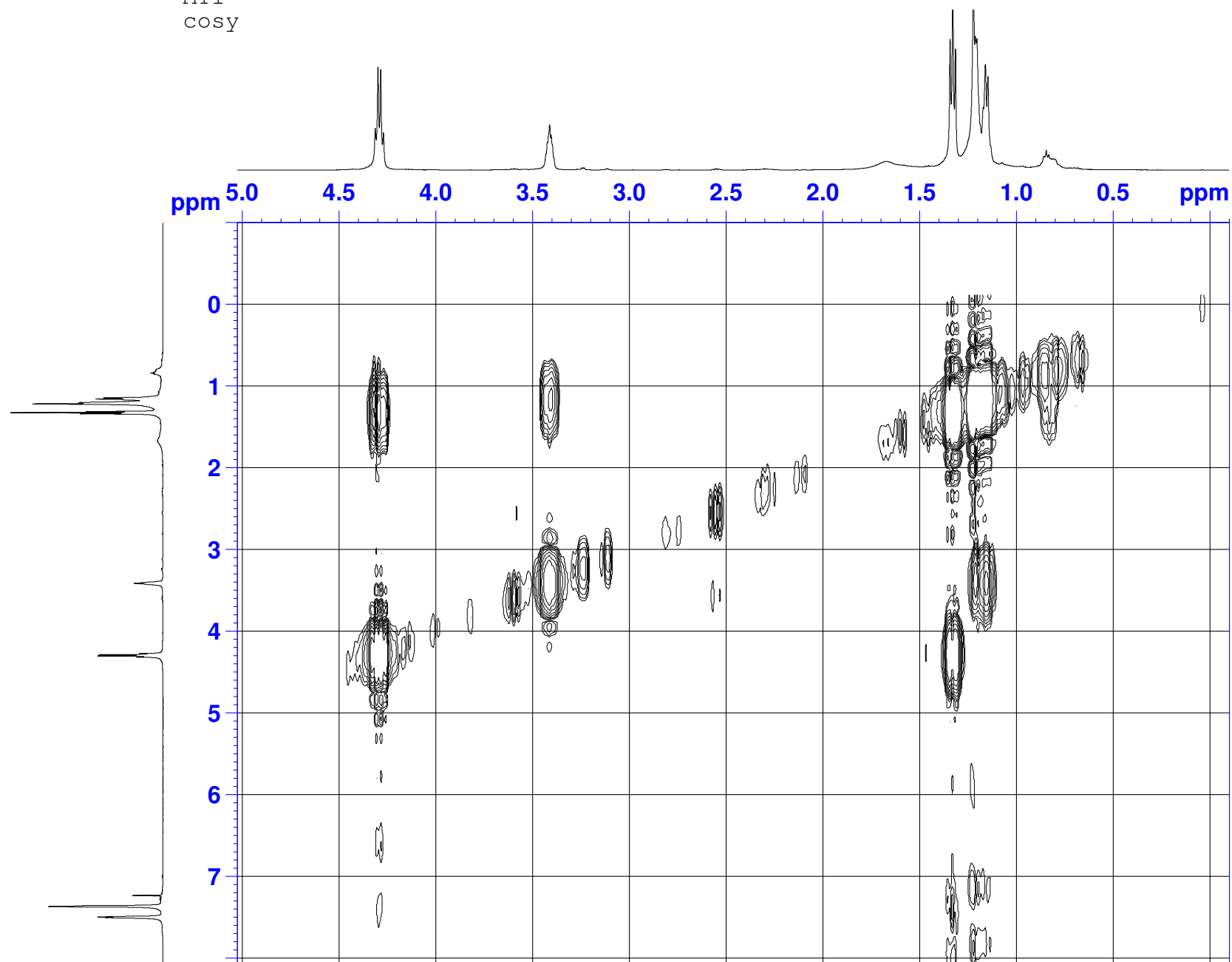


MT1
cosy

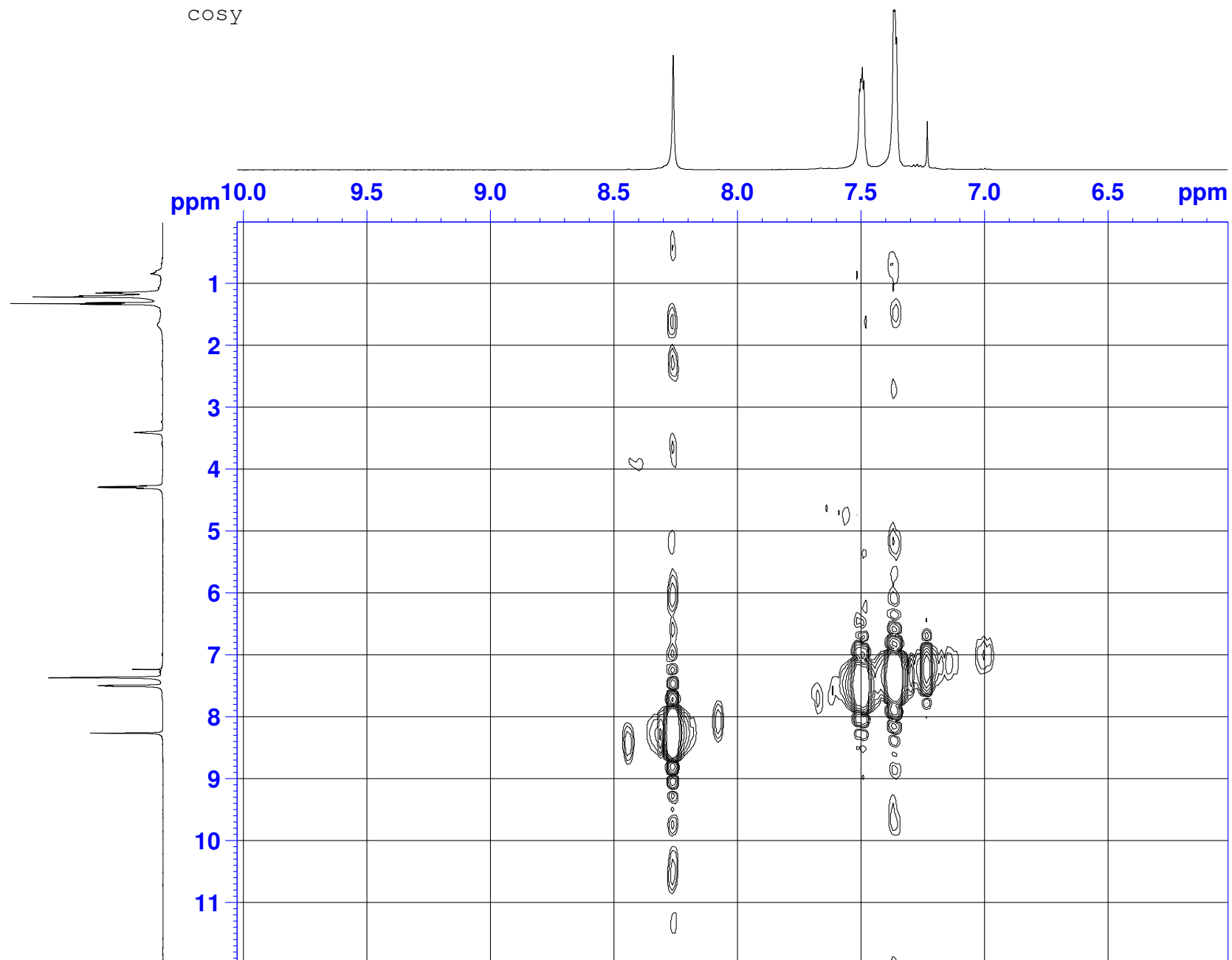




MT1
cosy

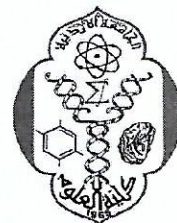


MT1
cosy





The University of Jordan
Faculty of science
Department of Chemistry



Mass Spectrum Molecular Formula Report

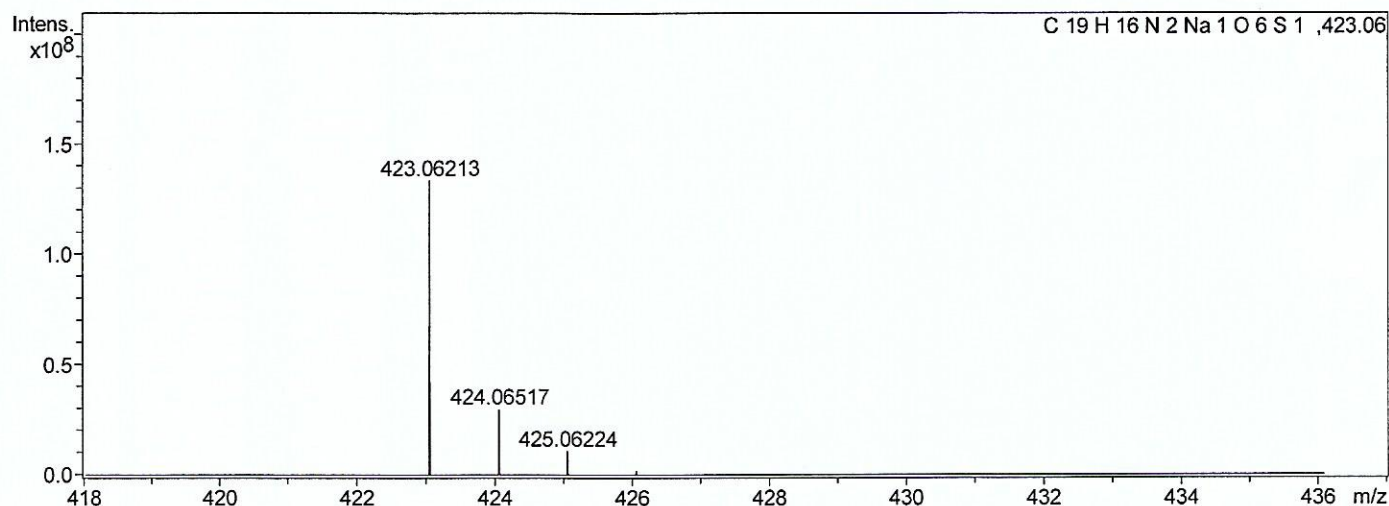
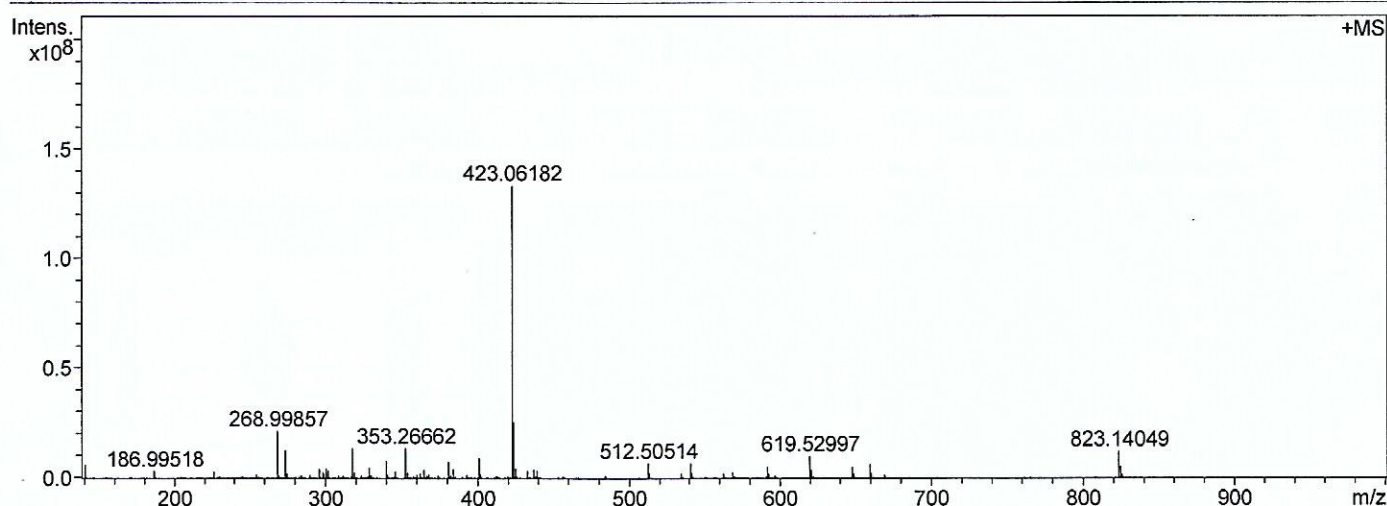
Analysis Info

Analysis Name F:\Data\2017AUG14\AREEJ_000049.d
Method ESI-POS-2017
Sample Name MP
Comment CHCL3+ACN

Acquisition Date 8/22/2017 9:08:07 AM

Operator Bruker_PC
Instrument apex-IV

Acquisition Parameter



Sum Formula	Sigma	m/z	Err [ppm]	Mean Err [ppm]	Err [mDa]	rdb	N Rule	e ⁻
C 19 H 16 N 2 Na 1 O 6 S 1	0.029	423.06213	0.73	1.29	0.31	12.50	ok	even

Mass Spectrum List Report

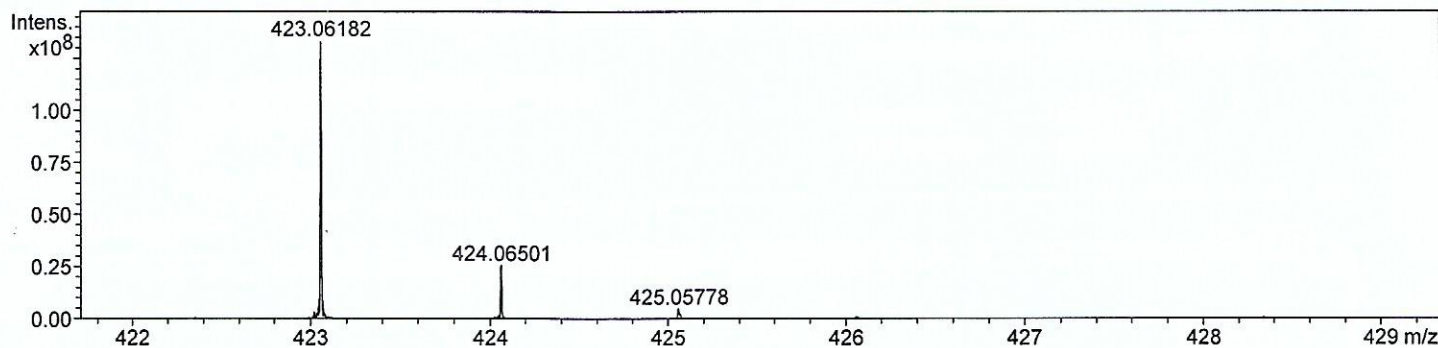
Analysis Info

Analysis Name F:\Data\2017AUG14\AREEJ_000049.d
Method ESI-POS-2017
Sample Name MP
Comment CHCL3+ACN

Acquisition Date 8/22/2017 9:08:07 AM

Operator Bruker_PC
Instrument apex-IV

Acquisition Parameter

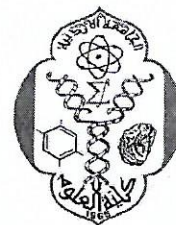


AREEJ_000049.d: +MS

#	m/z	I	I %
1	268.99857	21503523	16.1
2	274.27423	12903754	9.7
3	296.25627	4285055	3.2
4	301.21174	4400995	3.3
5	302.30571	3535539	2.7
6	318.30058	13566484	10.2
7	329.24313	4789774	3.6
8	340.28263	7808634	5.9
9	353.26662	13755618	10.3
10	364.99754	3885577	2.9
11	381.29806	7393416	5.6
12	384.30900	4180190	3.1
13	401.08063	9191360	6.9
14	423.04693	5582804	4.2
15	423.05253	9889620	7.4
16	423.06182	133192788	100.0
17	423.07118	9228628	6.9
18	423.07621	3934676	3.0
19	424.06501	25497180	19.1
20	425.05778	4591971	3.4
21	437.19363	3800823	2.9
22	512.50514	6906553	5.2
23	540.53673	6696379	5.0
24	591.49806	5390844	4.0
25	619.52997	10229742	7.7
26	620.53314	3991917	3.0
27	647.56176	4955631	3.7
28	659.29018	6702491	5.0
29	823.14049	12181426	9.1
30	824.14431	5311413	4.0



The University of Jordan
Faculty of science
Department of Chemistry



Mass Spectrum Molecular Formula Report

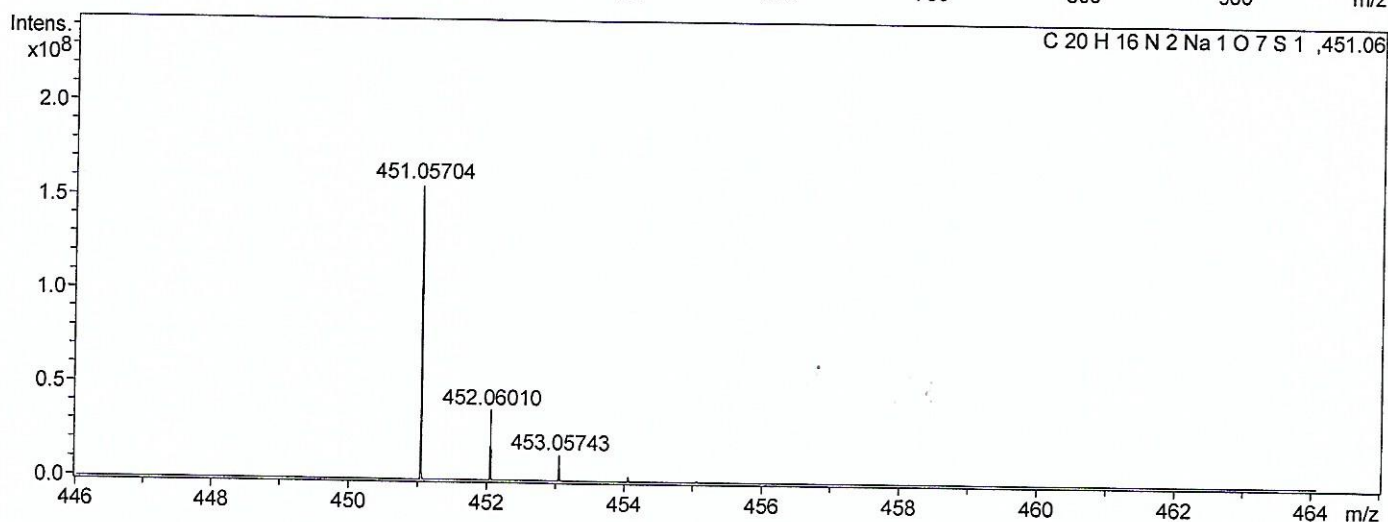
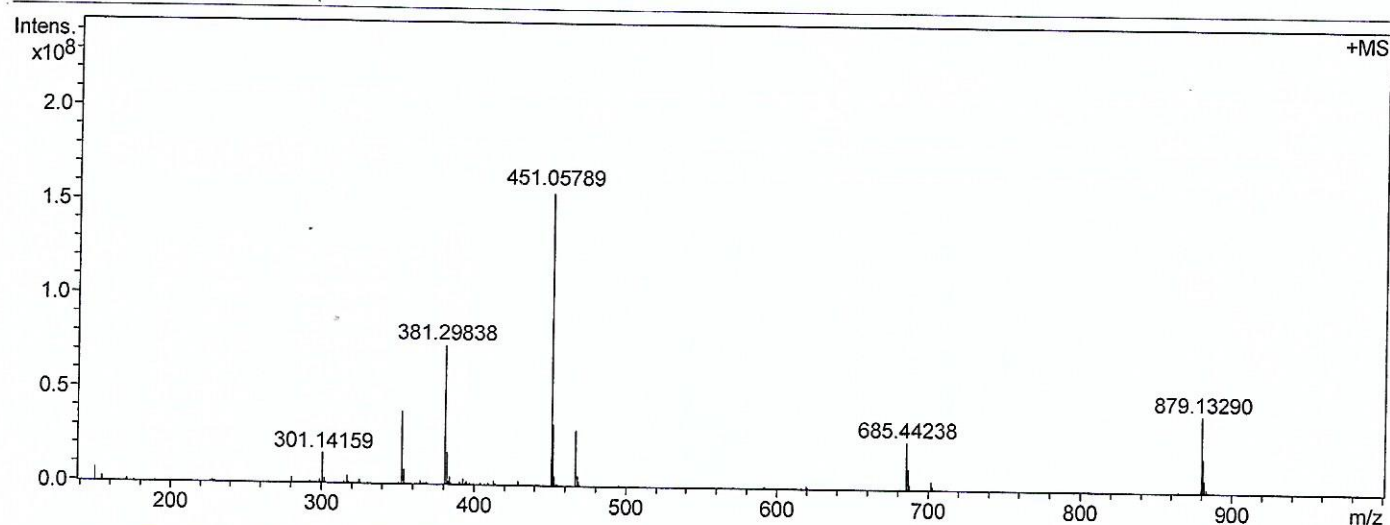
Analysis Info

Analysis Name F:\Data\2017MAY03\AREEJ_000034.d
Method ESI-POS-2017
Sample Name MA
Comment MEOH

Acquisition Date 5/8/2017 9:58:13 AM

Operator Bruker_PC
Instrument apex-IV

Acquisition Parameter



Sum Formula	Sigma	m/z	Err [ppm]	Mean Err [ppm]	Err [mDa]	rdB	N Rule	e ⁻
C 20 H 16 N 2 Na 1 O 7 S 1	0.030	451.05704	-1.88	-1.24	-0.85	13.50	ok	even

Mass Spectrum List Report

Analysis Info

Analysis Name F:\Data\2017MAY03\AREEJ_000034.d
Method ESI-POS-2017
Sample Name MA
Comment MEOH

Acquisition Date 5/8/2017 9:58:13 AM

Operator Bruker_PC
Instrument apex-IV

Acquisition Parameter



AREEJ_000034.d: +MS

#	m/z	I	I%
1	155.31080	2941137	1.9
2	301.14159	16034155	10.2
3	317.11564	4244057	2.7
4	353.26702	38848434	24.8
5	354.27058	7884919	5.0
6	381.29080	5024420	3.2
7	381.29838	73946532	47.1
8	381.30600	5133860	3.3
9	382.30197	17282025	11.0
10	384.19470	4310579	2.7
11	393.29888	2952603	1.9
12	451.01454	3301682	2.1
13	451.03179	2810258	1.8
14	451.04108	6410450	4.1
15	451.04728	11306450	7.2
16	451.05789	156956114	100.0
17	451.06851	11234514	7.2
18	451.07418	4411986	2.8
19	451.07983	3298642	2.1
20	452.06103	32582738	20.8
21	453.05371	5307458	3.4
22	453.06387	3397002	2.2
23	467.03182	29554196	18.8
24	468.03594	5523243	3.5
25	685.44238	25306102	16.1
26	686.44570	11189435	7.1
27	701.41626	4659595	3.0
28	879.13290	40616527	25.9
29	880.13797	17866433	11.4
30	881.13781	6588466	4.2



The University of Jordan
Faculty of science
Department of Chemistry



Mass Spectrum Molecular Formula Report

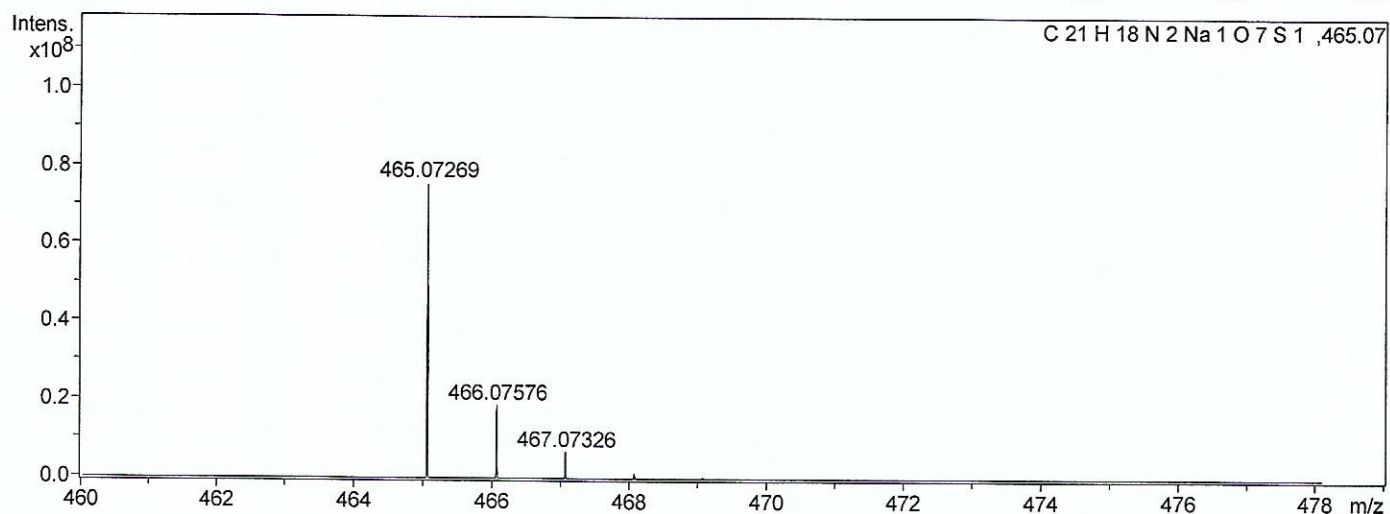
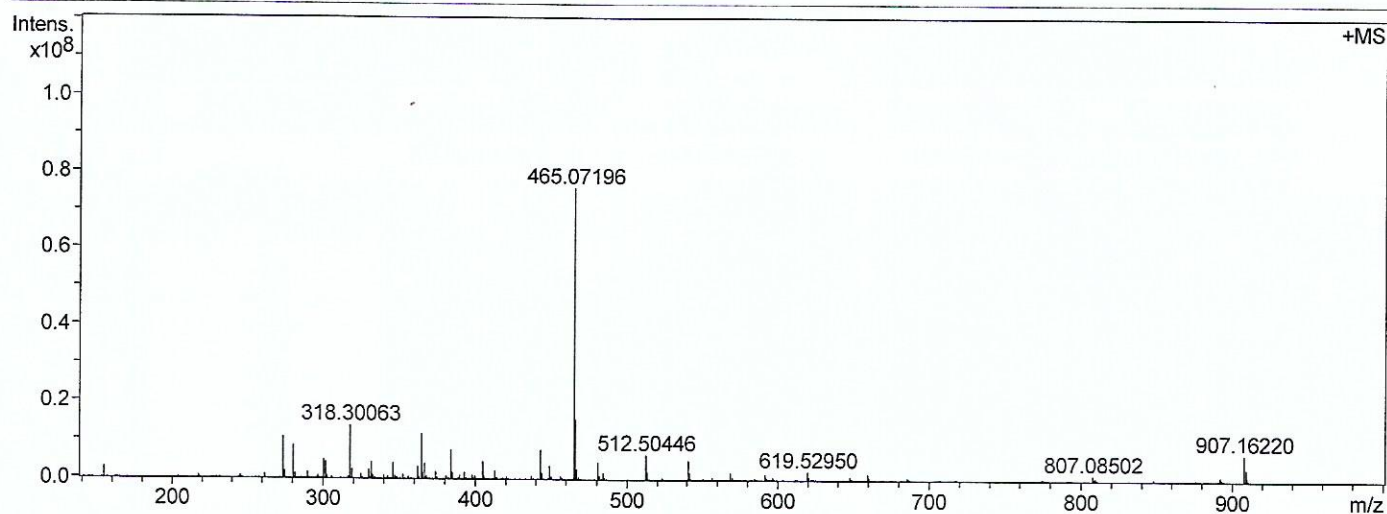
Analysis Info

Analysis Name F:\Data\2017JUL30\AREEJ_000015.d
Method ESI-POS-2017
Sample Name MB
Comment CHCL3-ACN

Acquisition Date 7/31/2017 8:49:44 AM

Operator Bruker_PC
Instrument apex-IV

Acquisition Parameter



Sum Formula	Sigma	m/z	Err [ppm]	Mean Err [ppm]	Err [mDa]	rdb	N Rule	e ⁻
C 21 H 18 N 2 Na 1 O 7 S 1	0.034	465.07269	1.58	2.03	0.74	13.50	ok	even

Mass Spectrum List Report

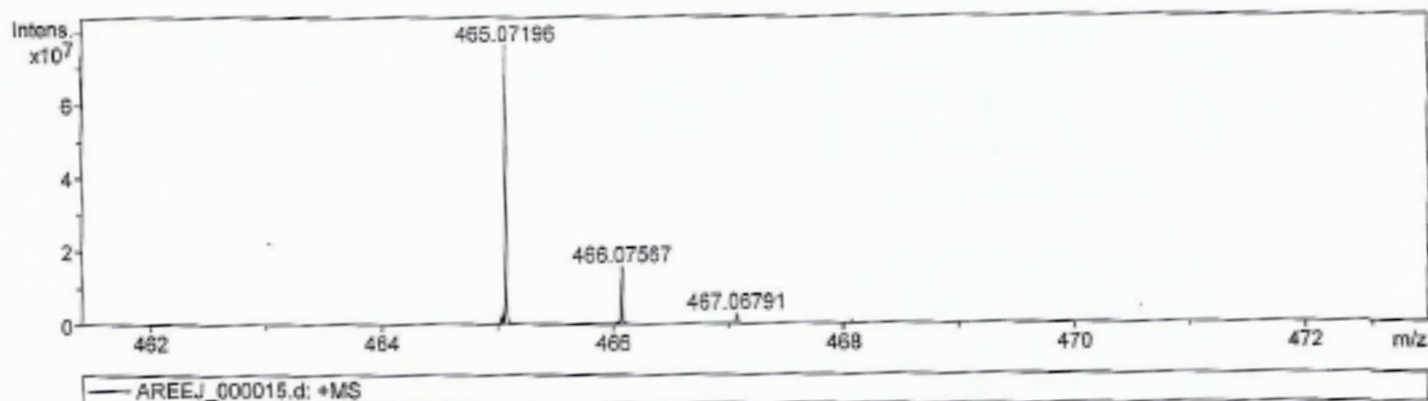
Analysis Info

Analysis Name F:\Data\2017JUL30\AREEJ_000015.d
Method ESI-POS-2017
Sample Name MB
Comment CHCL3-ACN

Acquisition Date 7/31/2017 8:49:44 AM

Operator Bruker_PC
Instrument apex-IV

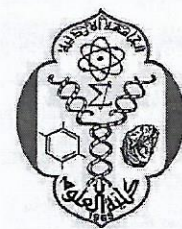
Acquisition Parameter



#	m/z	I
1	274.27428	10938105
2	281.17255	8712968
3	301.14137	4948894
4	302.30570	4374962
5	318.30063	13811079
6	319.30404	2652503
7	330.33706	2414891
8	332.03158	4446106
9	346.33201	4077935
10	362.32707	3193987
11	364.99745	11741090
12	366.99447	4050349
13	384.19411	7678125
14	405.10610	4624008
15	413.26704	2238625
16	443.09137	7713855
17	449.08370	2739874
18	449.09910	3561679
19	465.05401	3010465
20	465.06073	5157409
21	465.07196	75721889
22	465.08323	5069729
23	466.07567	15598560
24	467.06791	2687248
25	481.04656	4440110
26	512.50446	6492758
27	513.50801	2220952
28	540.53609	5127483
29	907.16220	6742821
30	908.16516	3236624



The University of Jordan
Faculty of science
Department of Chemistry



Mass Spectrum Molecular Formula Report

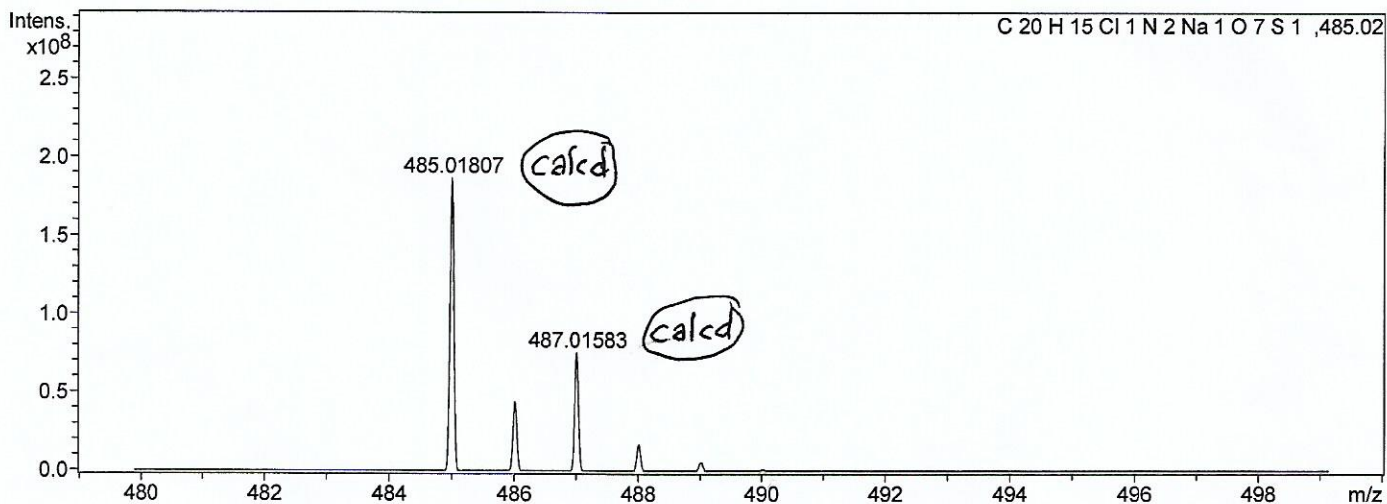
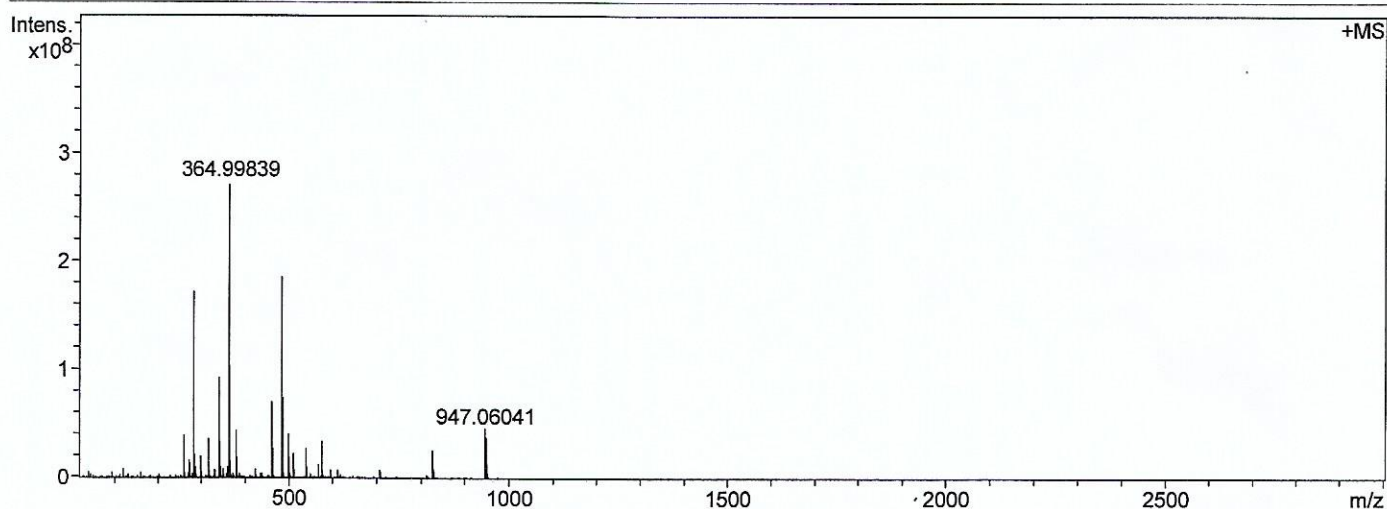
Analysis Info

Analysis Name F:\Data\2019may21\AREEJ_000035.d
Method ESI_pos_20181024
Sample Name MD
Comment ACN+CHCL3

Acquisition Date 5/23/2019 8:49:06 AM

Operator Bruker_PC
Instrument apex-IV

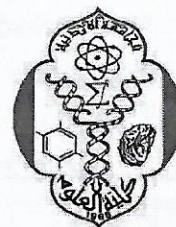
Acquisition Parameter



Sum Formula	Sigma	m/z	Err [ppm]	Mean Err [ppm]	Err [mDa]	rdB	N Rule	e ⁻
C 20 H 15 Cl 1 N 2 Na 1 O 7 S 1	0.005	485.01807	-3.69	-3.87	-1.79	13.50	ok	even



The University of Jordan
Faculty of science
Department of Chemistry



Mass Spectrum Molecular Formula Report

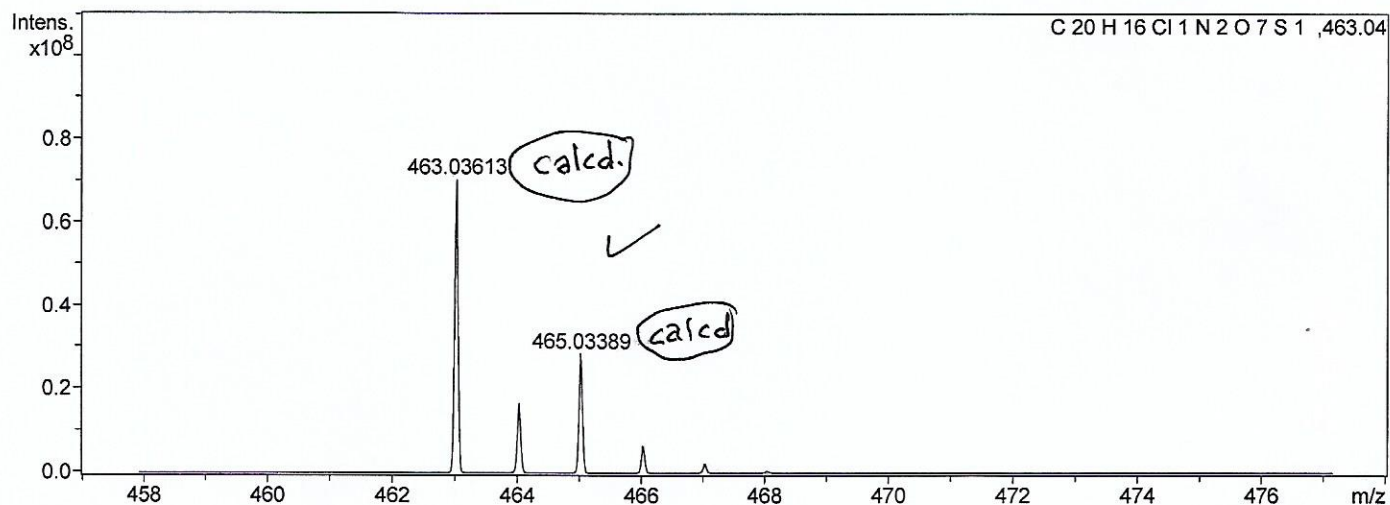
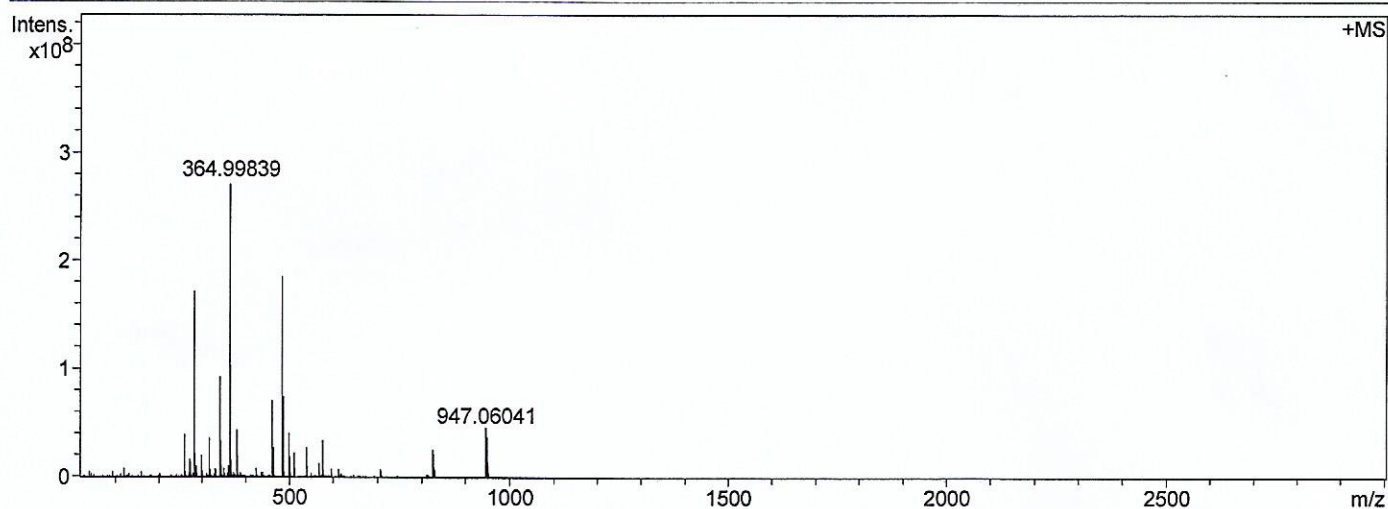
Analysis Info

Analysis Name F:\Data\2019may21\AREEJ_000035.d
Method ESI_pos_20181024
Sample Name MD
Comment ACN+CHCL3

Acquisition Date 5/23/2019 8:49:06 AM

Operator Bruker_PC
Instrument apex-IV

Acquisition Parameter



Sum Formula	Sigma	m/z	Err [ppm]	Mean Err [ppm]	Err [mDa]	rdB	N Rule	e ⁻
C ₂₀ H ₁₆ Cl ₁ N ₂ O ₇ S ₁	0.010	463.03613	-3.57	-3.45	-1.65	13.50	ok	even

Mass Spectrum List Report

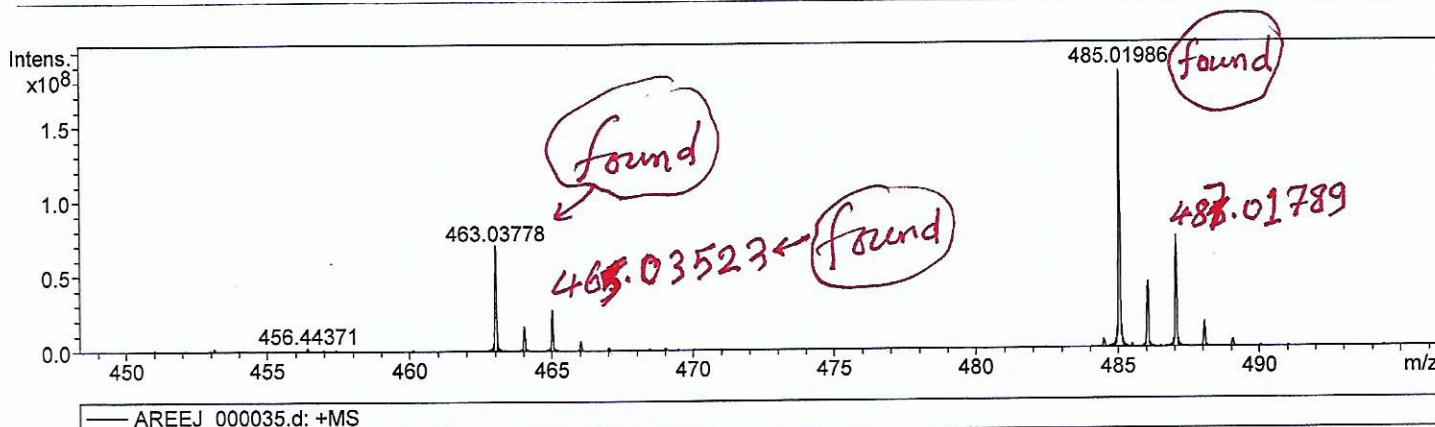
Analysis Info

Analysis Name F:\Data\2019may21\AREEJ_000035.d
Method ESI_pos_20181024
Sample Name MD
Comment ACN+CHCL3

Acquisition Date 5/23/2019 8:49:06 AM

Operator Bruker_PC
Instrument apex-IV

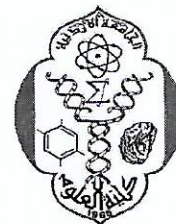
Acquisition Parameter



#	m/z	I	I %
1	262.13149	39697162	14.5
2	284.11328	171487803	62.8
3	285.11731	22157636	8.1
4	300.08770	19970848	7.3
5	318.30208	36075282	13.2
6	343.01662	92263786	33.8
7	345.01364	33617367	12.3
8	364.95335	19587739	7.2
9	364.99839	273012382	100.0
10	365.04347	19488417	7.1
11	366.00207	43472609	15.9
12	366.99576	103129892	37.8
13	380.97255	43699959	16.0
14	382.97062	19299976	7.1
15	463.03778	70211829	25.7
16	465.03523	26996602	9.9
17	485.01986	186466356	68.3
18	486.02295	43374187	15.9
19	487.01789	74111648	27.1
20	500.99451	40282949	14.8
21	502.99241	18550553	6.8
22	512.50595	22451965	8.2
23	540.53797	27053117	9.9
24	577.17396	33899447	12.4
25	827.03225	25407427	9.3
26	829.03009	21015035	7.7
27	947.06041	45853265	16.8
28	948.06047	21338932	7.8
29	949.05421	37620248	13.8
30	950.05821	16768762	6.1



The University of Jordan
Faculty of science
Department of Chemistry



Mass Spectrum Molecular Formula Report

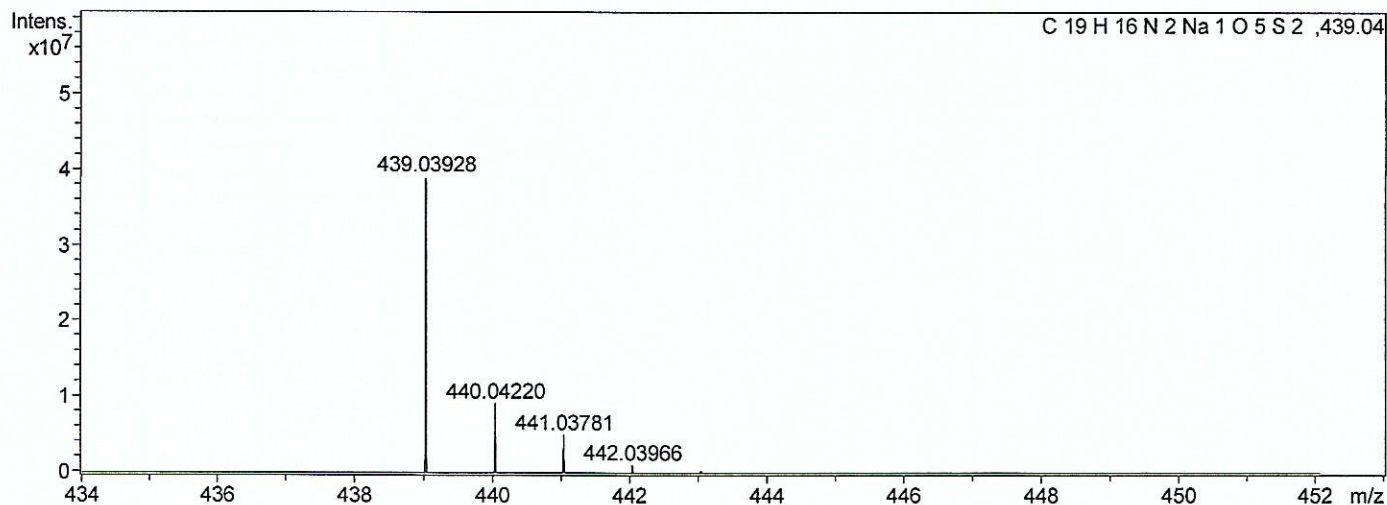
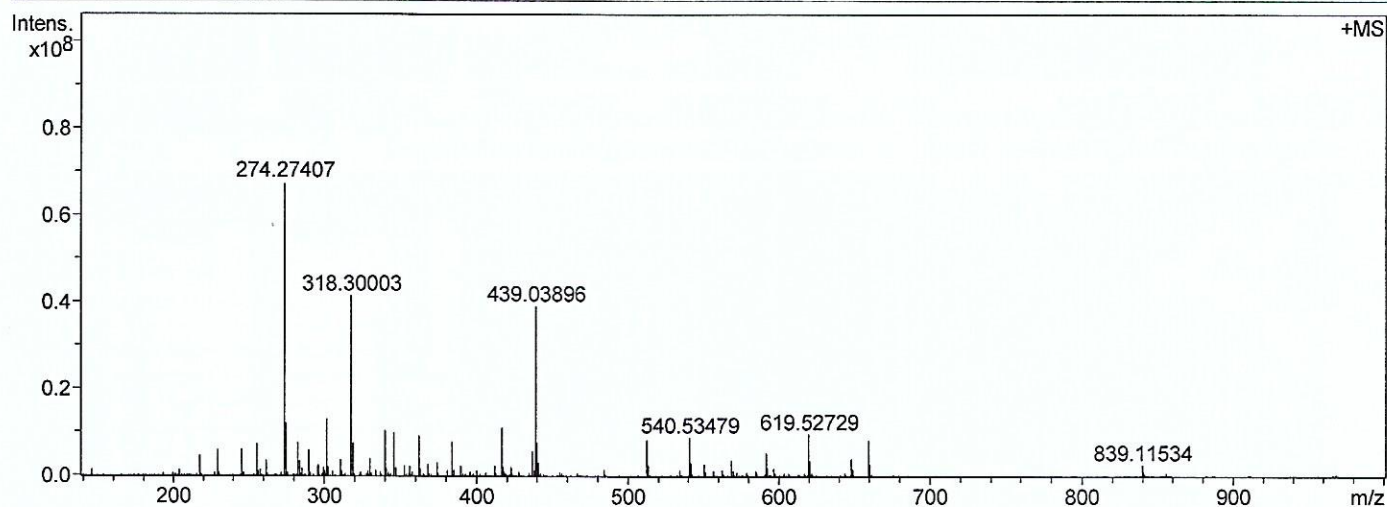
Analysis Info

Analysis Name F:\Data\2017AUG14\AREEJ_000033.d
Method ESI-POS-2017
Sample Name MT1
Comment CHCL3+ACN

Acquisition Date 8/17/2017 1:36:12 PM

Operator Bruker_PC
Instrument apex-IV

Acquisition Parameter



Sum Formula	Sigma	m/z	Err [ppm]	Mean Err [ppm]	Err [mDa]	rdB	N Rule	e ⁻
C 19 H 16 N 2 Na 1 O 5 S 2	0.030	439.03928	0.74	0.99	0.32	12.50	ok	even

Mass Spectrum List Report

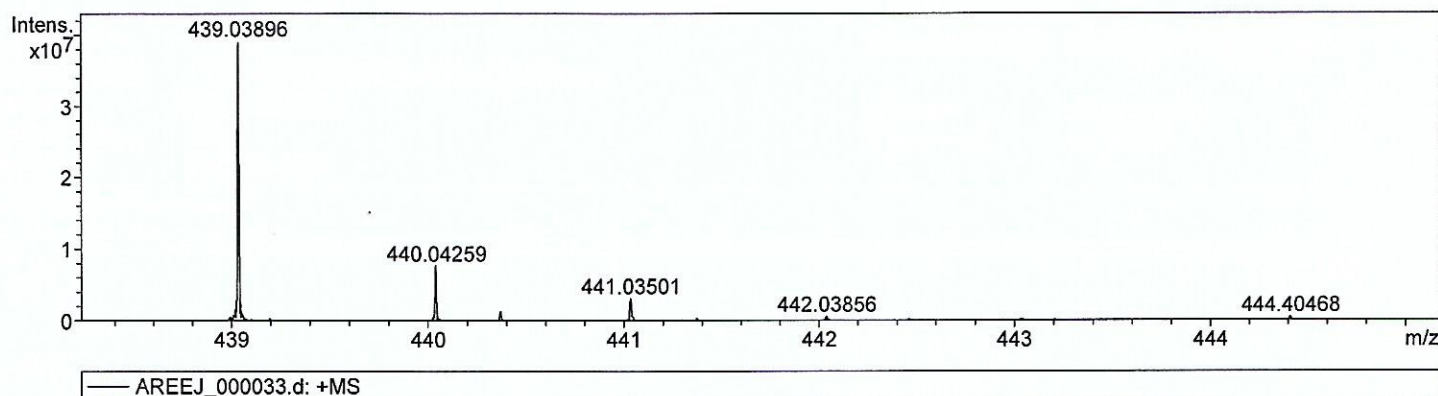
Analysis Info

Analysis Name F:\Data\2017AUG14\AREEJ_000033.d
Method ESI-POS-2017
Sample Name MT1
Comment CHCL3+ACN

Acquisition Date 8/17/2017 1:36:12 PM

Operator Bruker_PC
Instrument apex-IV

Acquisition Parameter



#	m/z	I	I %
1	218.21151	4803742	7.1
2	230.24793	6014885	8.9
3	246.24292	6165638	9.1
4	256.26366	7464882	11.1
5	274.27016	4194694	6.2
6	274.27407	67553926	100.0
7	274.27800	4891526	7.2
8	275.27759	12264147	18.2
9	283.26327	7651654	11.3
10	290.26914	5997371	8.9
11	302.30523	13011384	19.3
12	311.29472	3740974	5.5
13	318.30003	41528970	61.5
14	319.30372	7657909	11.3
15	330.33678	4020857	6.0
16	340.28223	10448332	15.5
17	346.33156	9924613	14.7
18	362.32635	9382231	13.9
19	384.30832	7965724	11.8
20	417.05715	11167354	16.5
21	437.19343	5883603	8.7
22	439.03896	39044866	57.8
23	440.04259	7632490	11.3
24	512.50342	8388894	12.4
25	540.53479	9053957	13.4
26	568.56641	3766145	5.6
27	591.49559	5395933	8.0
28	619.52729	9717408	14.4
29	647.55865	4143094	6.1
30	659.28671	8391587	12.4