Supplementary Materials: Synthesis and Biotransformation of Bicyclic Unsaturated Lactones with Three or Four Methyl Groups

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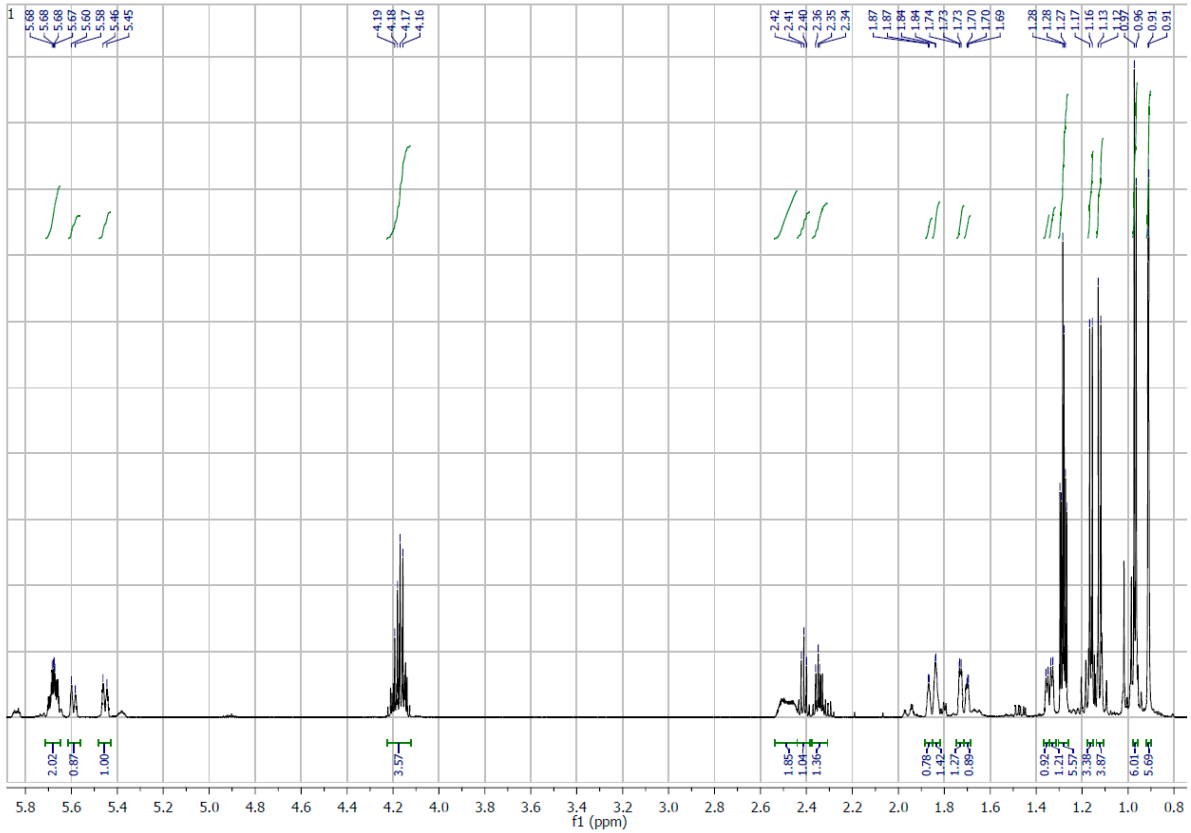


Figure S1. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of ester **2a**.

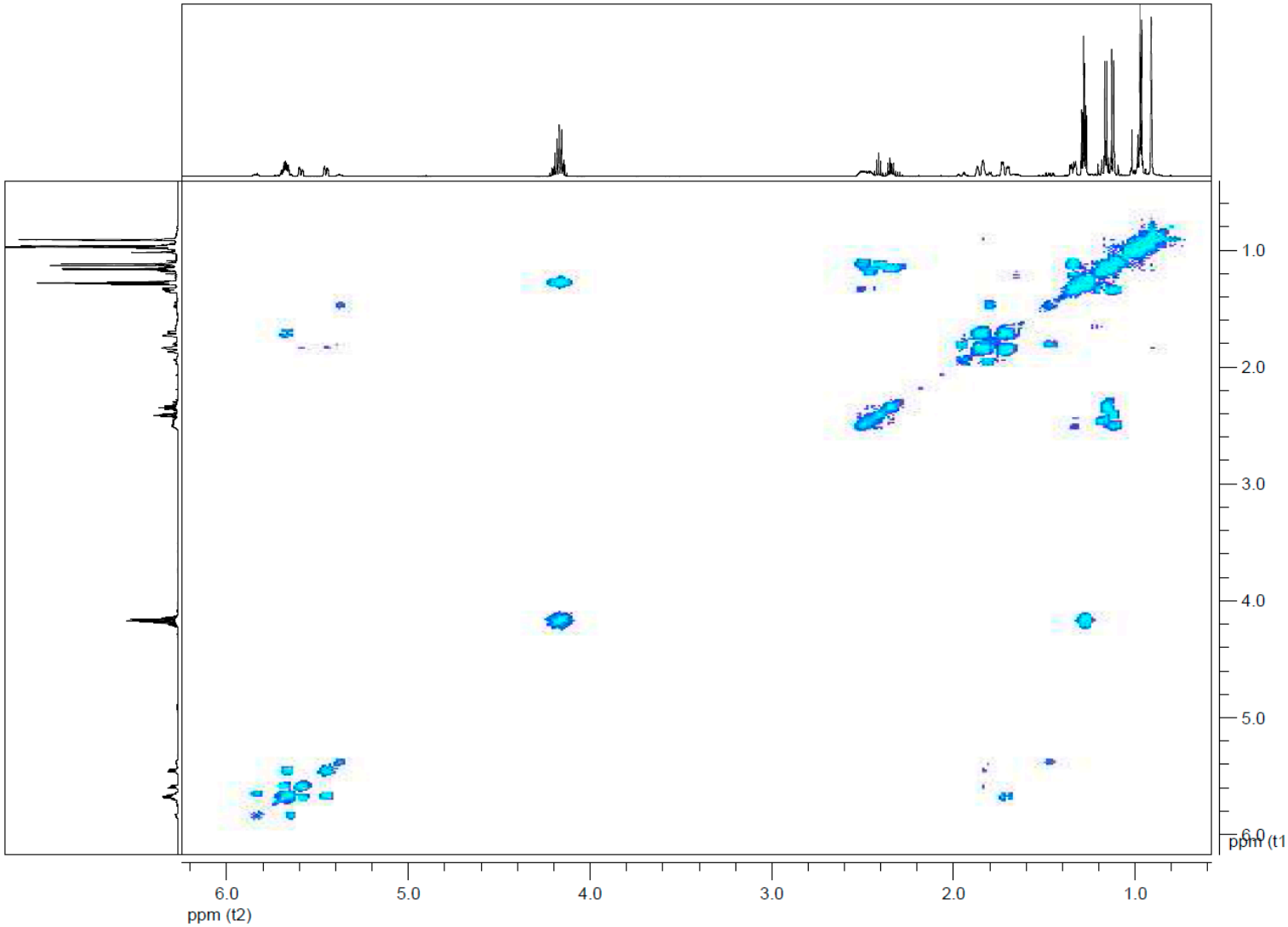


Figure S2. COSY (151 MHz, $CDCl_3$) spectrum of ester **2a**.

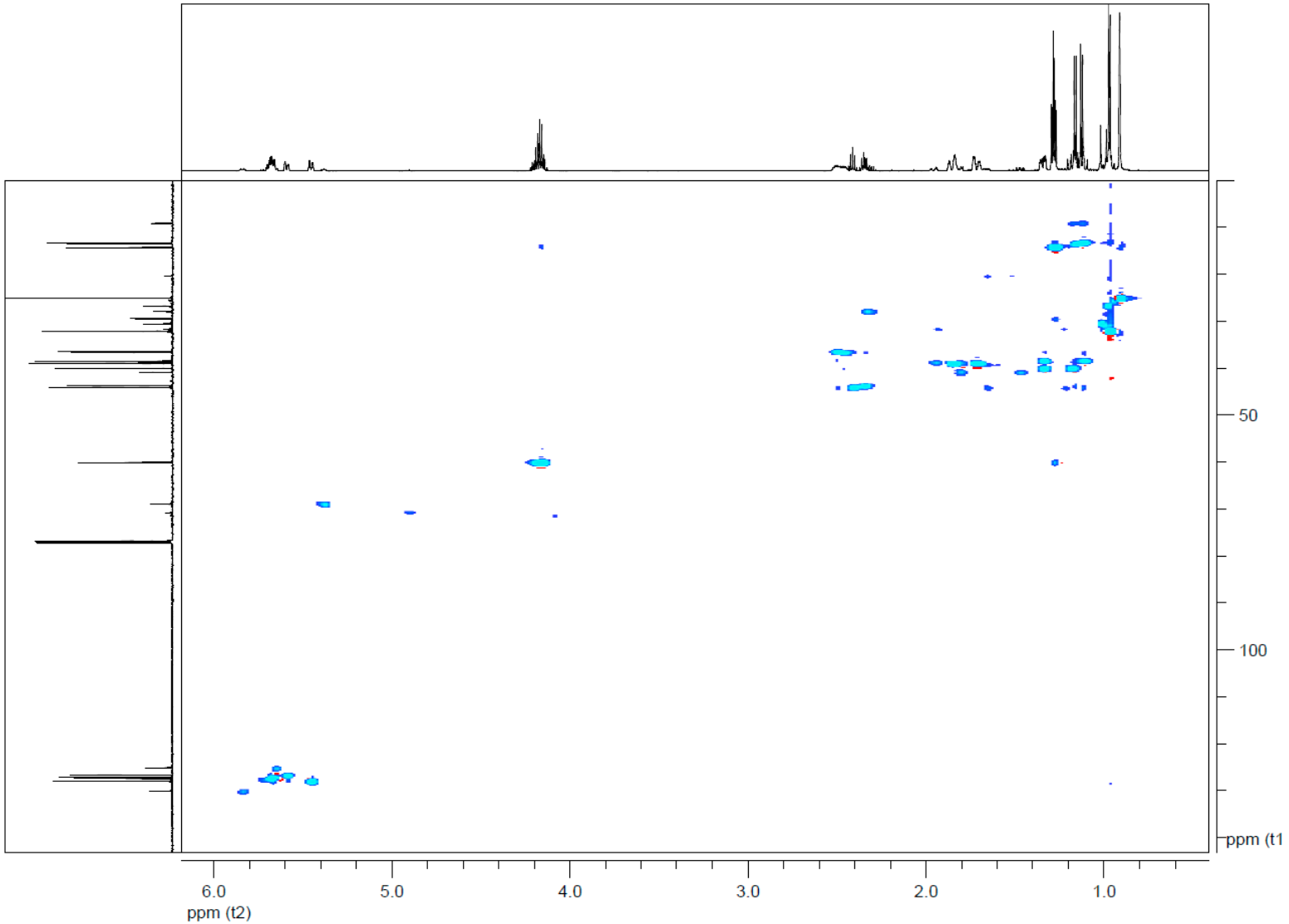


Figure S3. HMQC (151 MHz, $CDCl_3$) spectrum of ester **2a**.

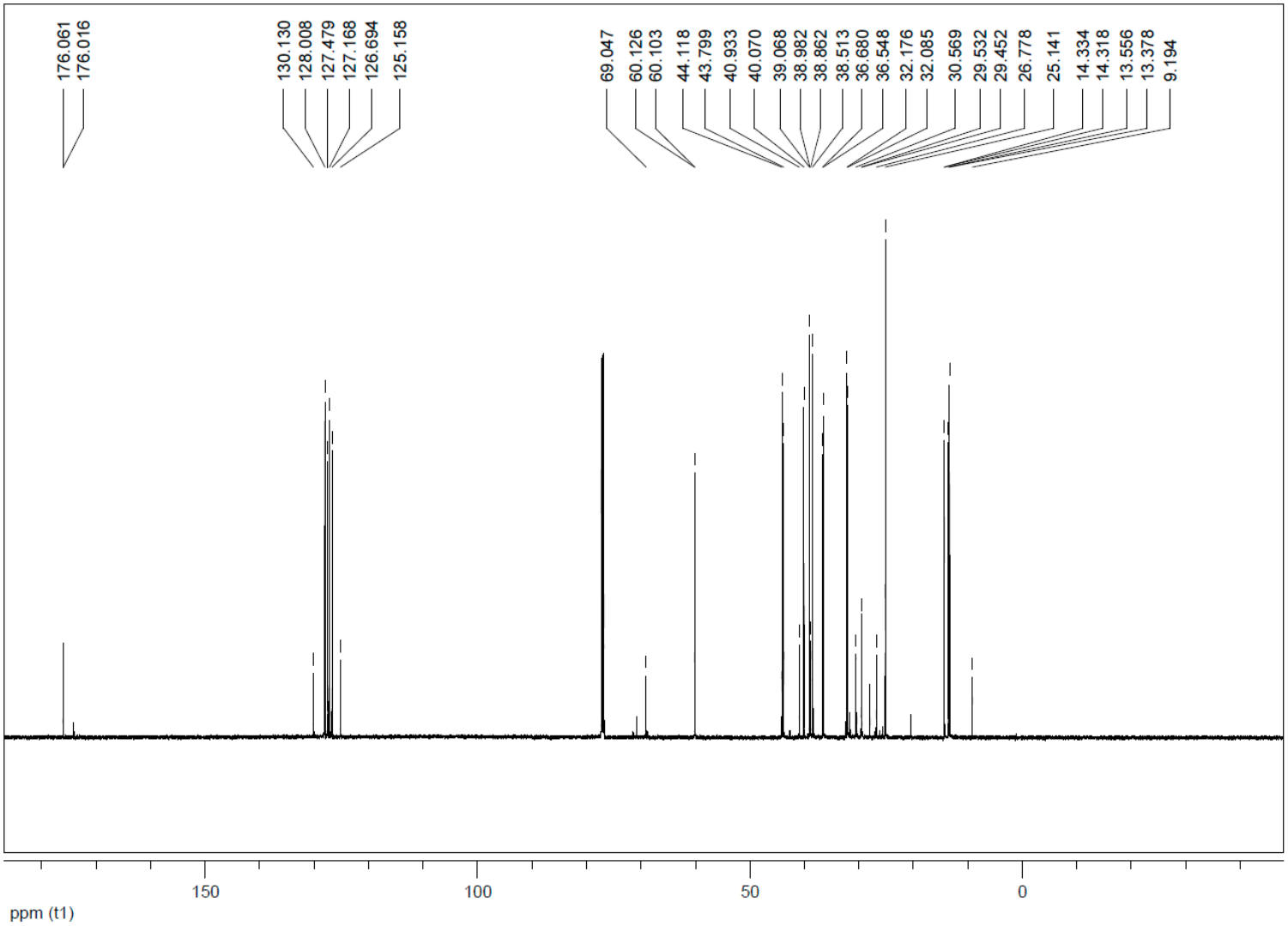


Figure S4. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of ester **2a**.

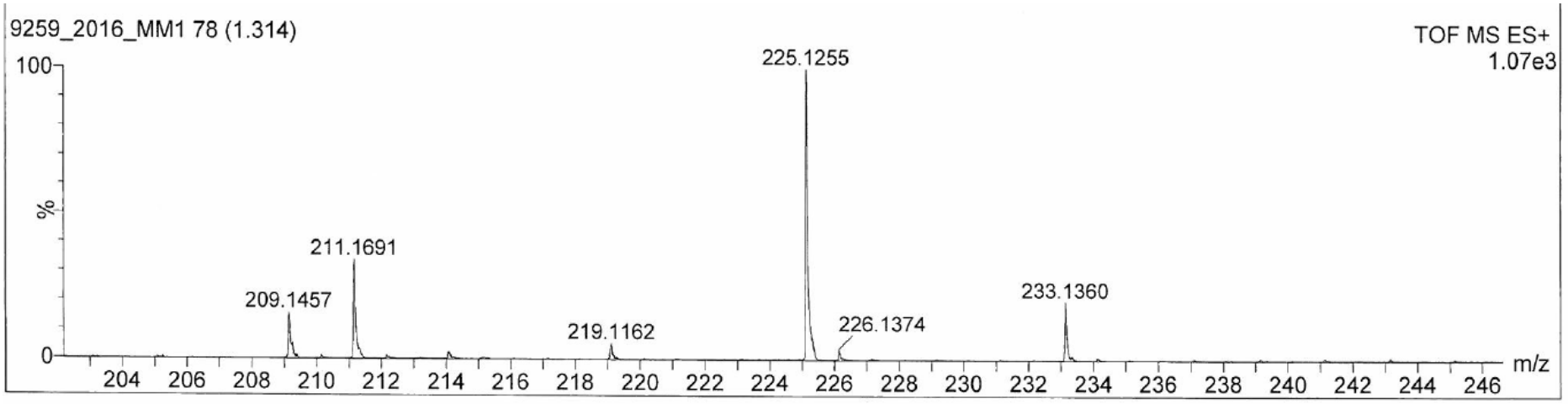


Figure S5. HRMS spectrum of ester **2a**.

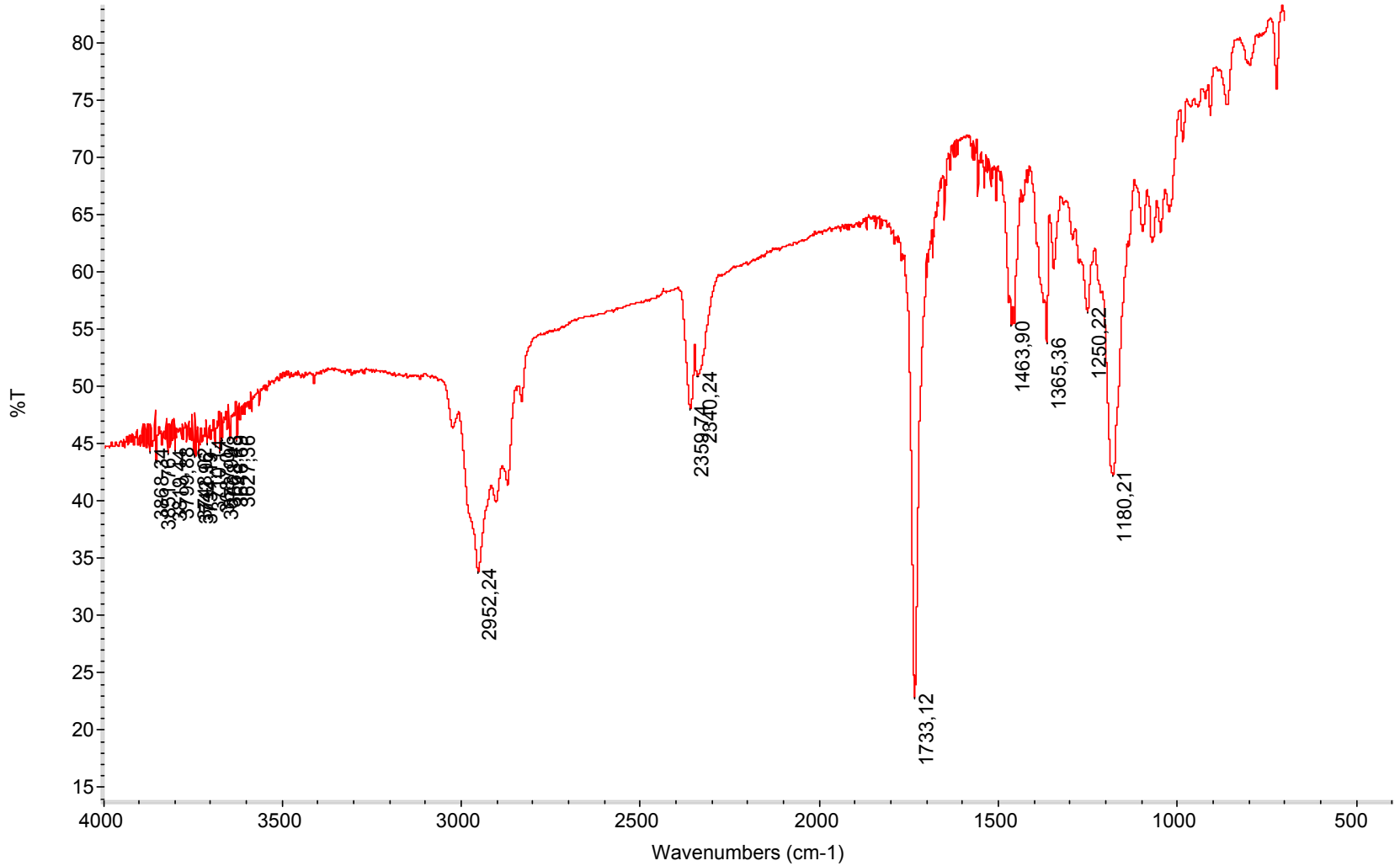


Figure S6. IR spectrum of ester **2a**.

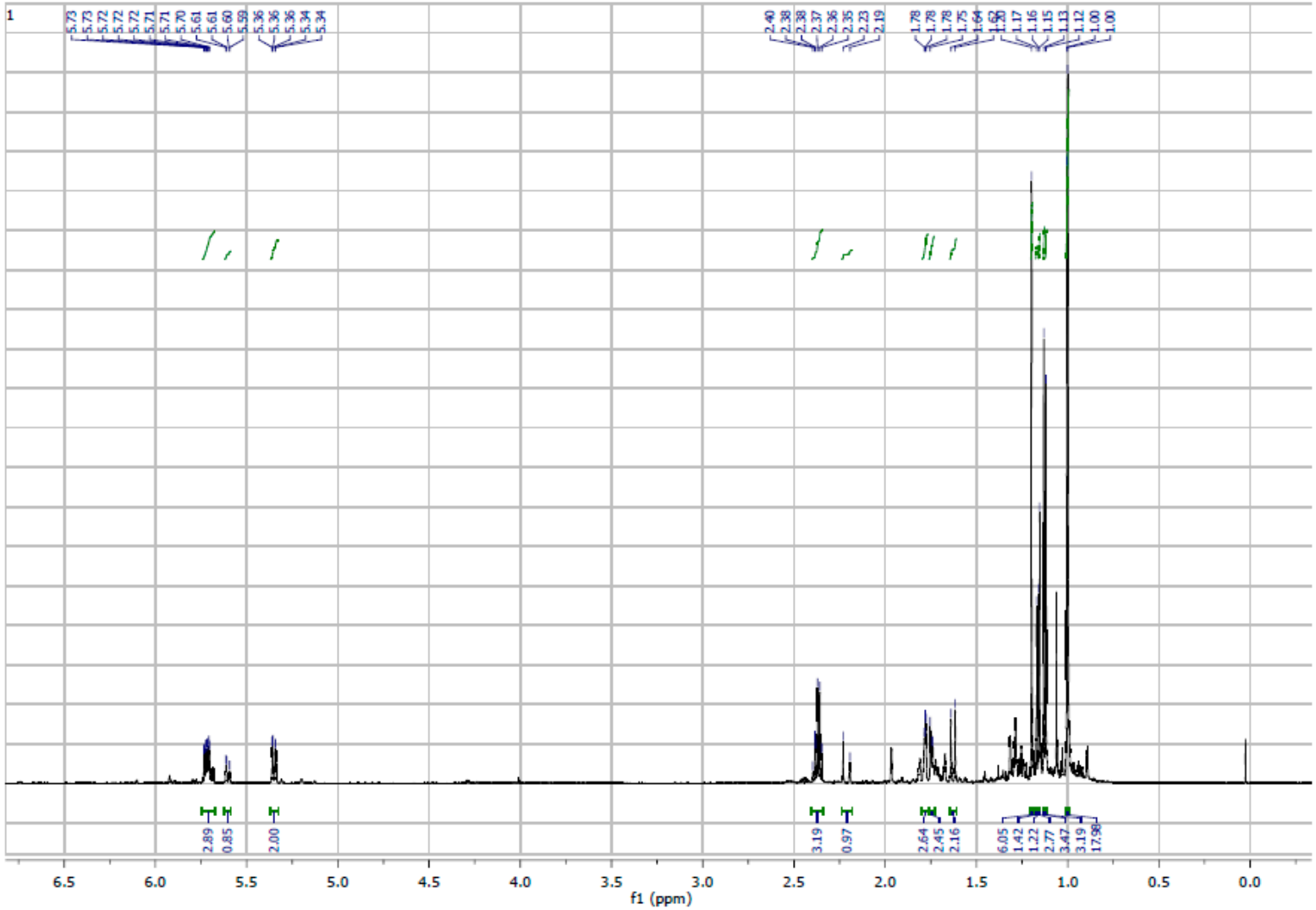


Figure S7. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of acid **3a**.

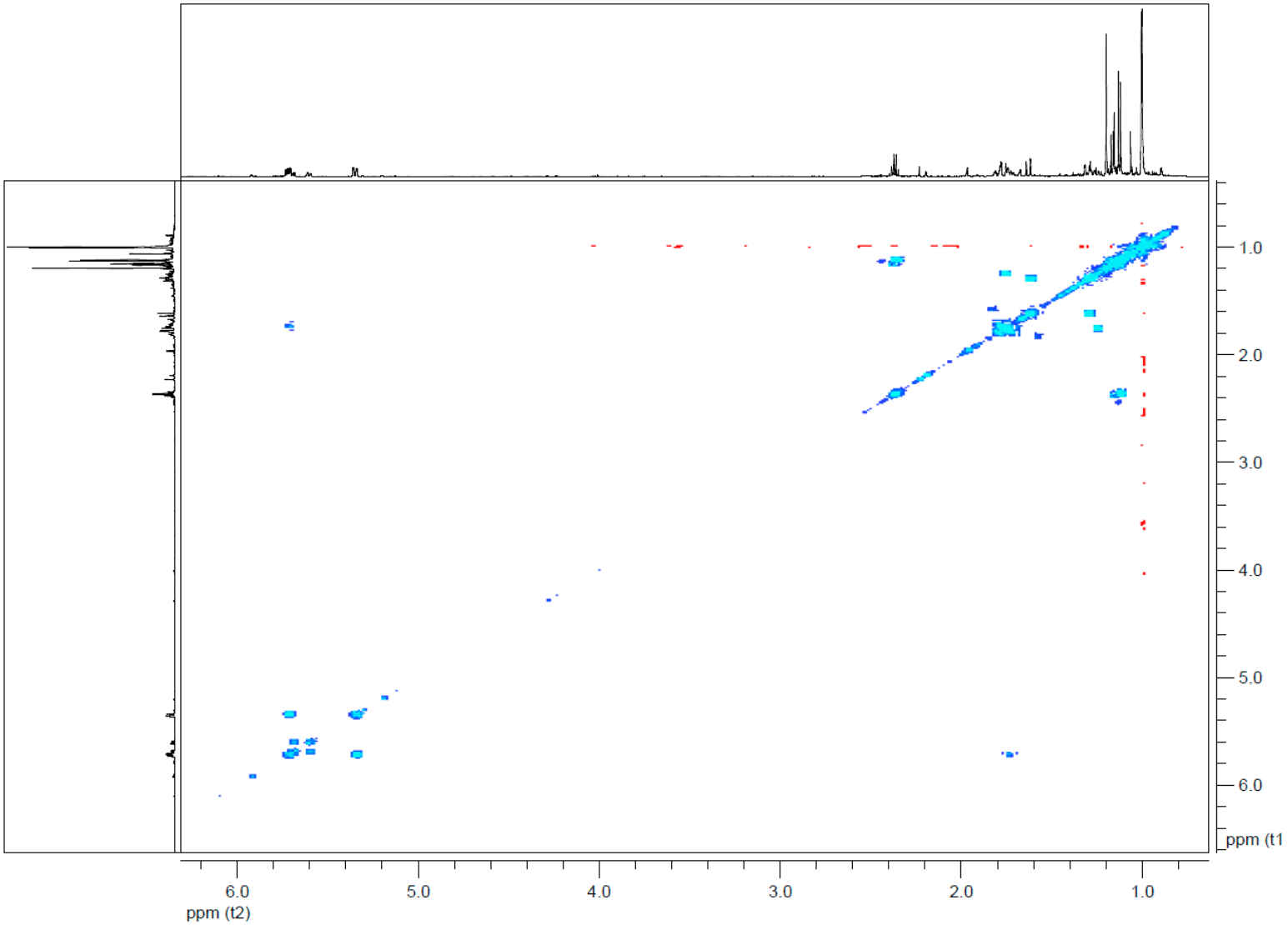


Figure S8. COSY (151 MHz, $CDCl_3$) spectrum of acid **3a**.

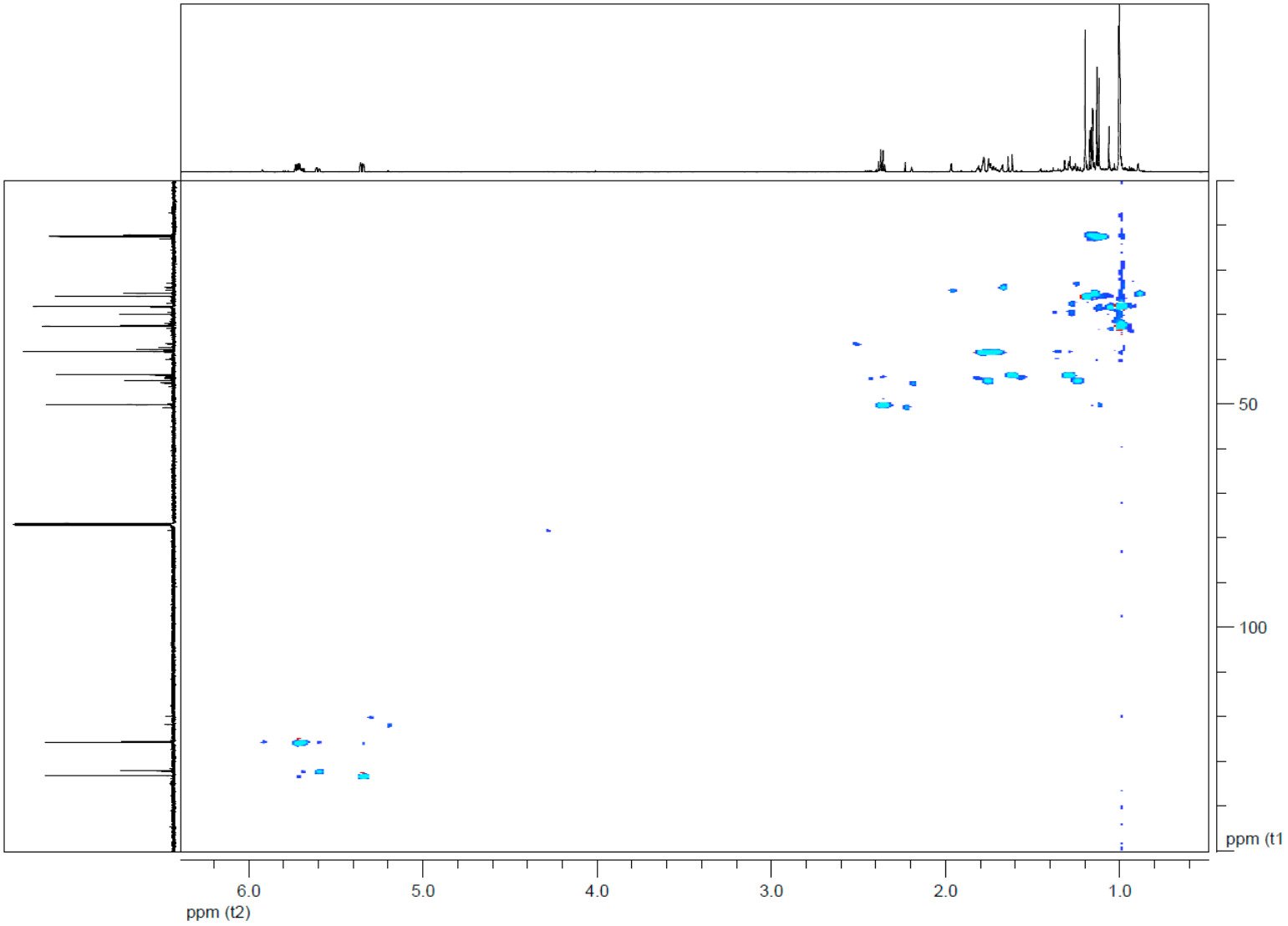


Figure S9. HMQC (151 MHz, $CDCl_3$) spectrum of acid **3a**.

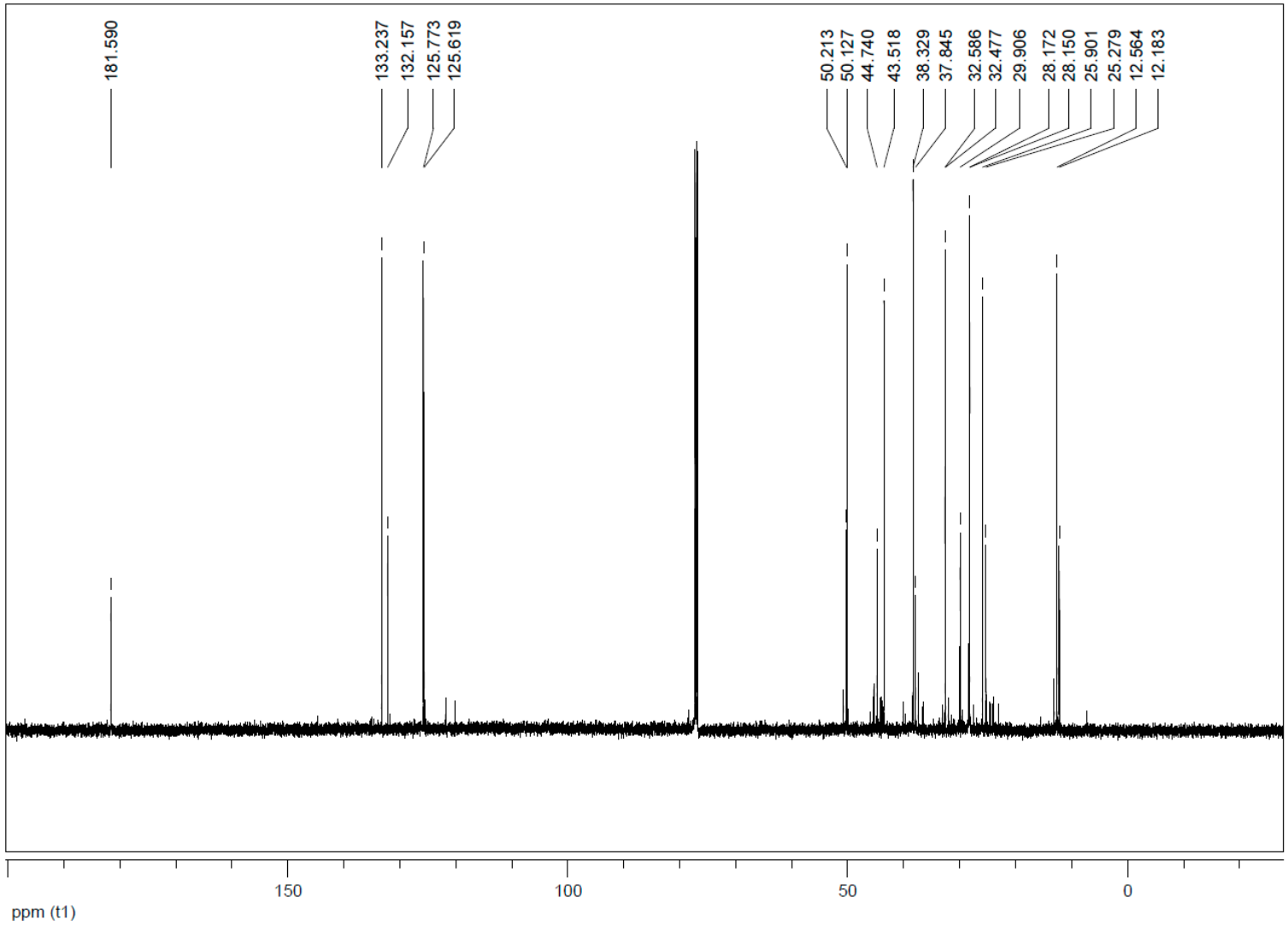


Figure S10. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of acid **3a**.

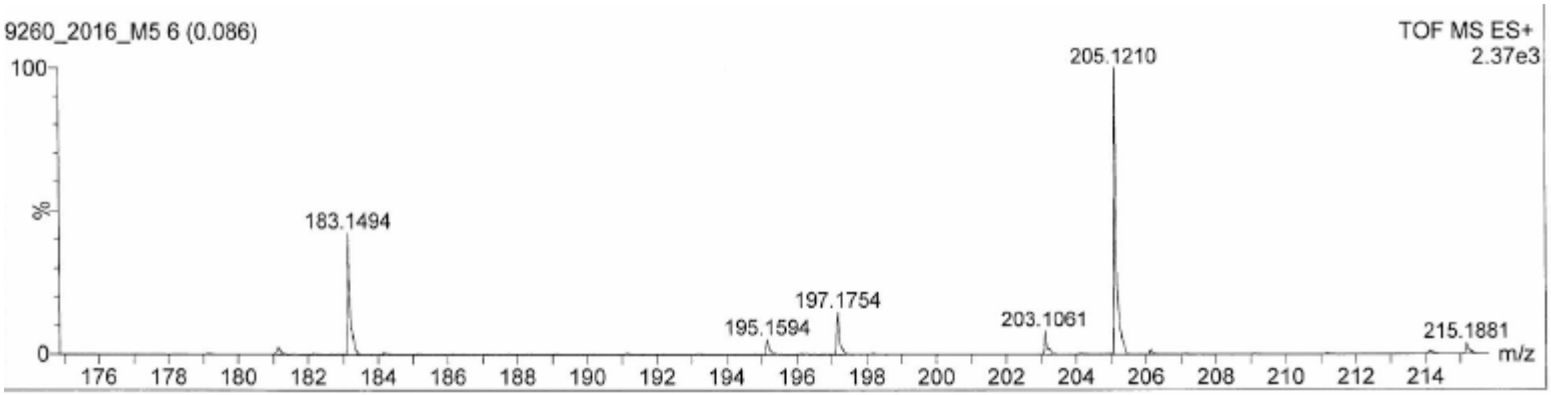


Figure S11. HRMS spectrum of acid **3a**.

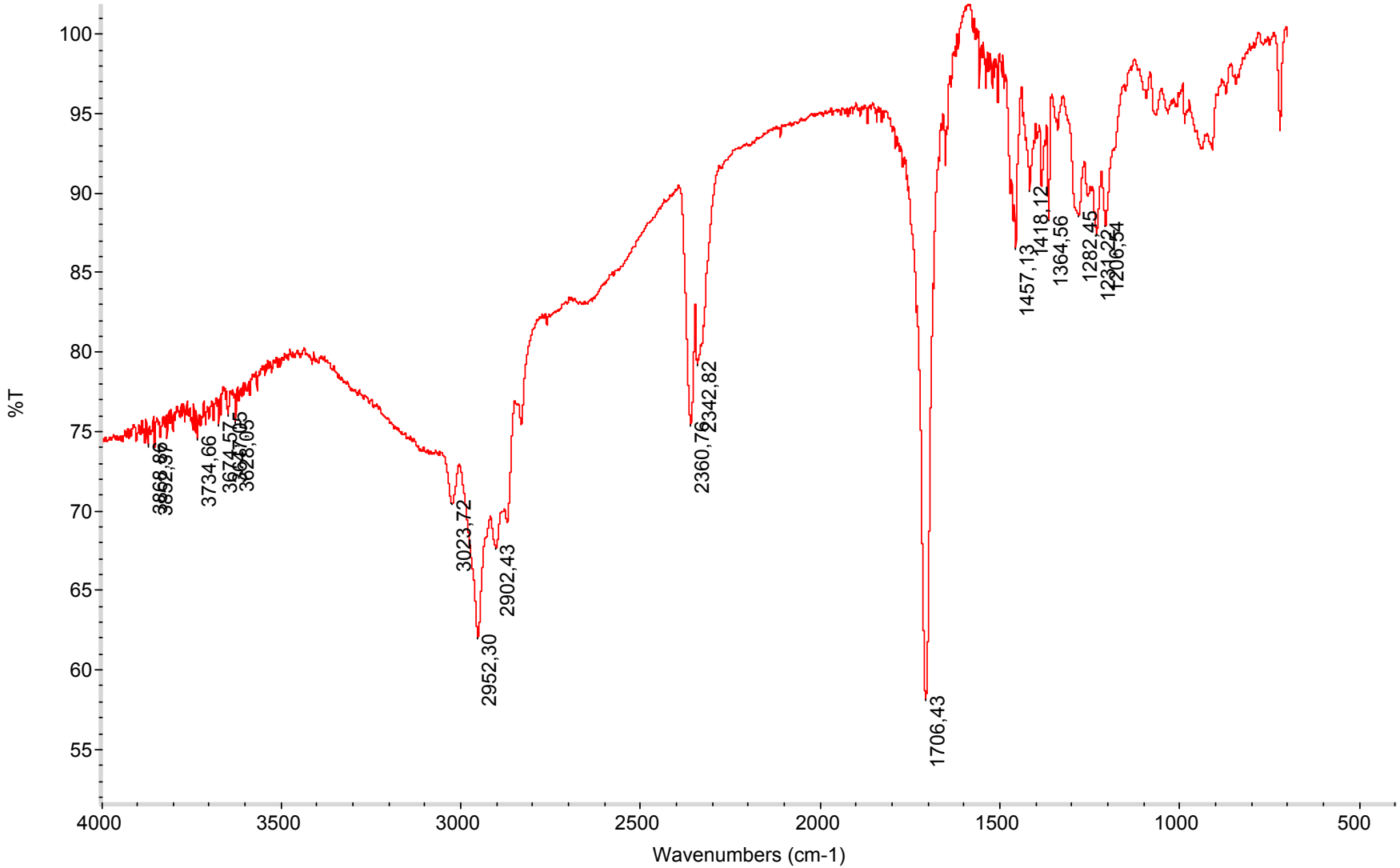


Figure S12. IR spectrum of acid **3a**.

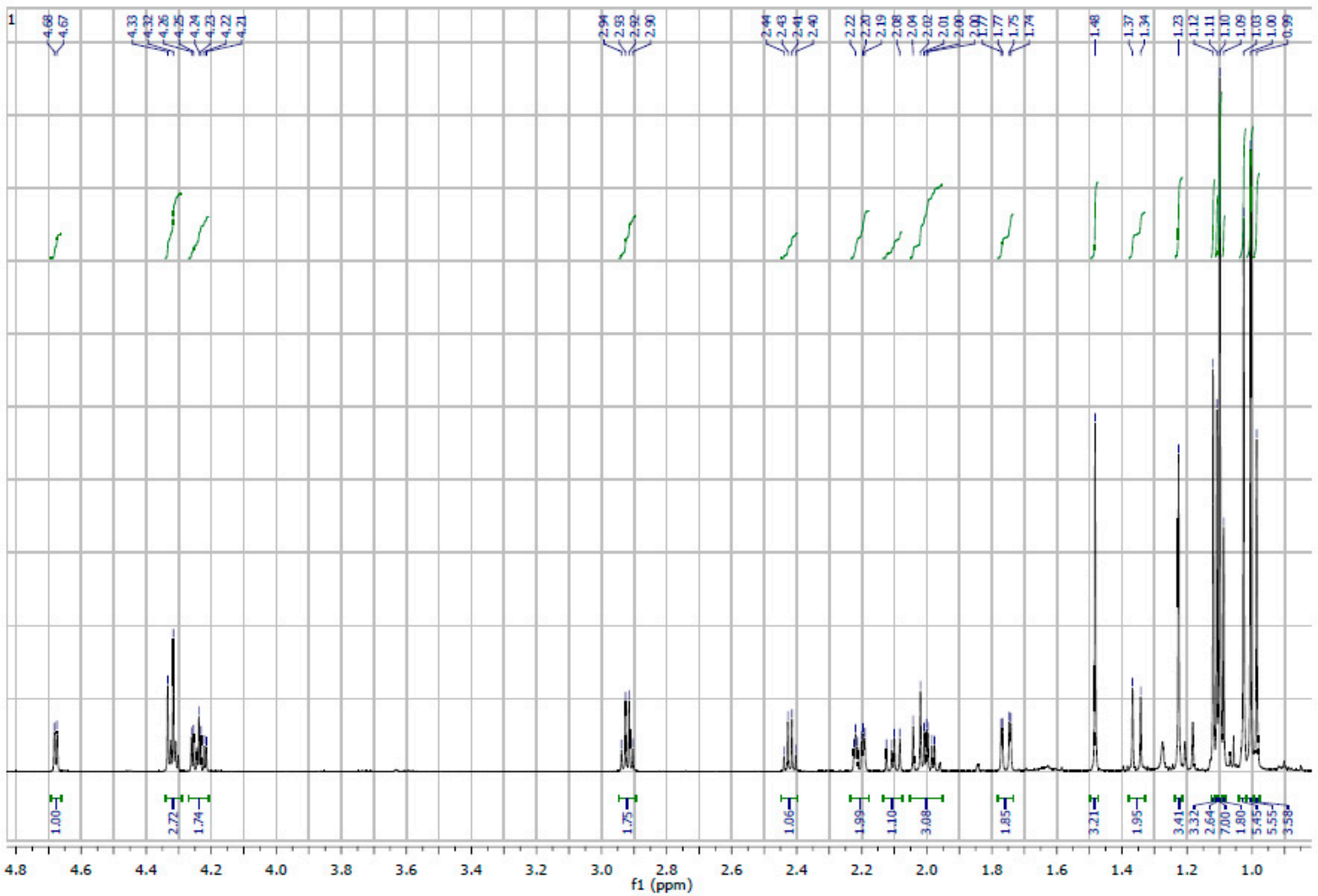


Figure S13. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of iodolactone **4a**.

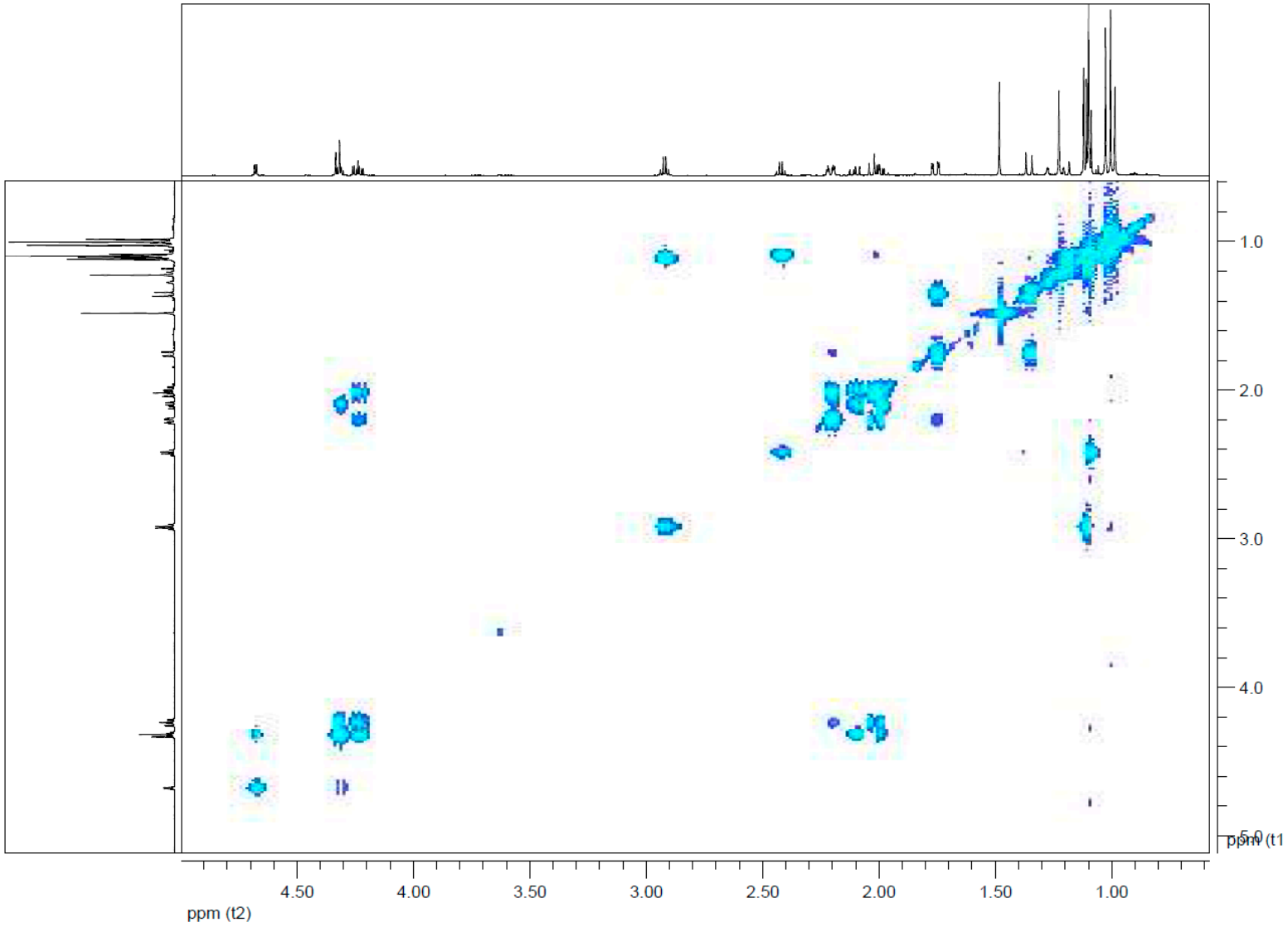


Figure S14. COSY (151 MHz, $CDCl_3$) spectrum of iodolactone **4a**.

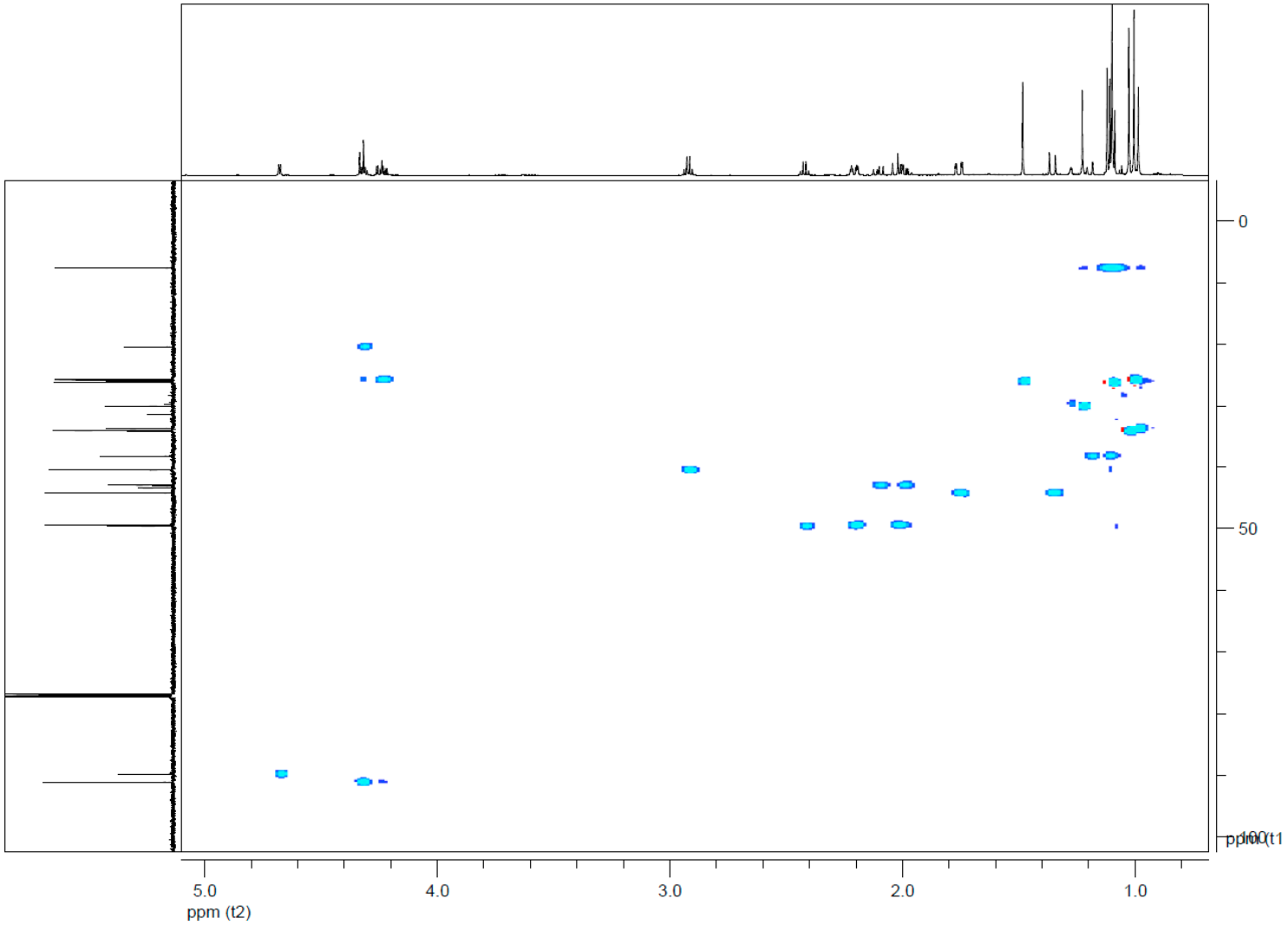


Figure S15. HMQC (151 MHz, $CDCl_3$) spectrum of iodolactone **4a**.

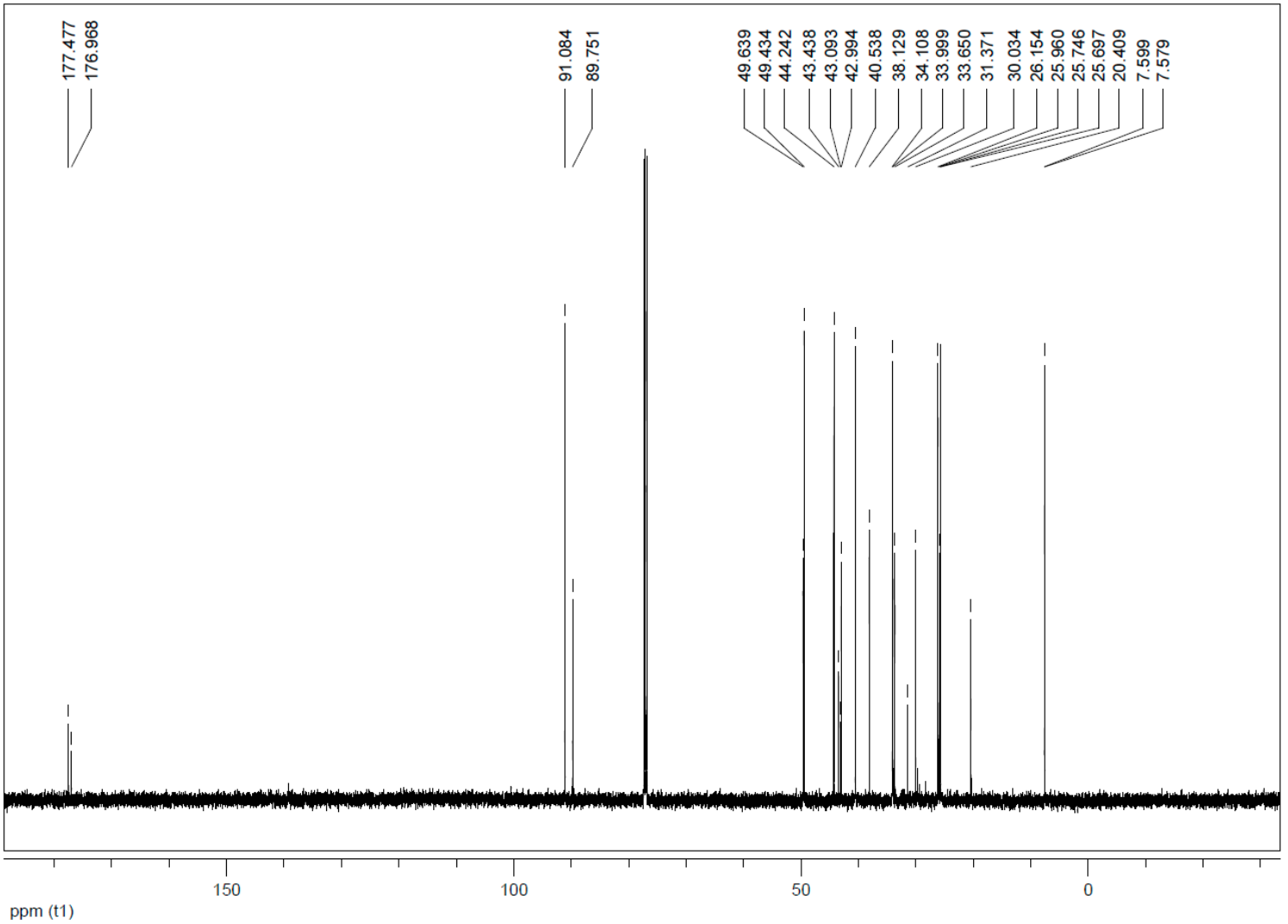


Figure S16. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of iodolactone **4a**.

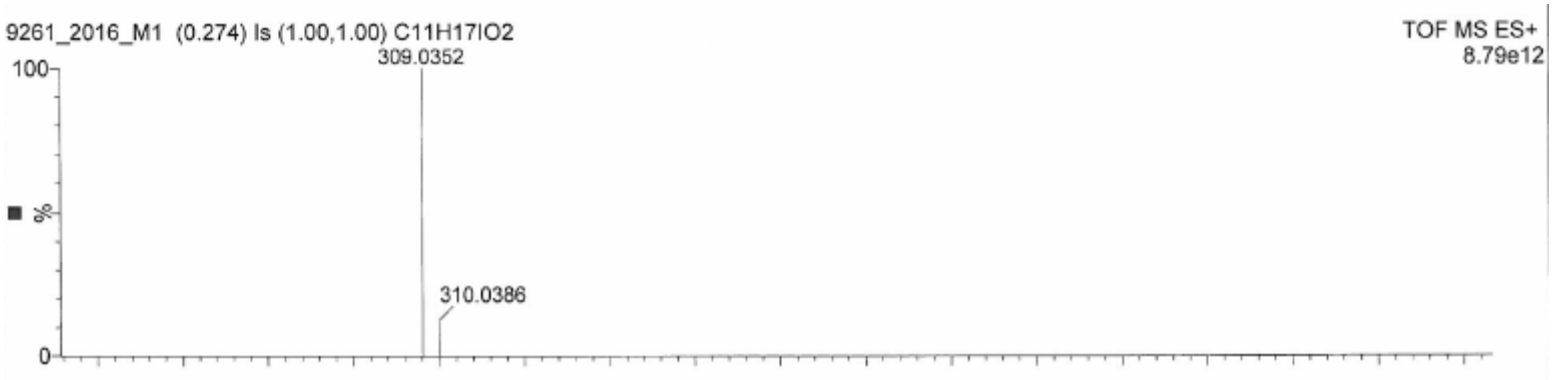


Figure S17. HRMS spectrum of iodolactone **4a**.

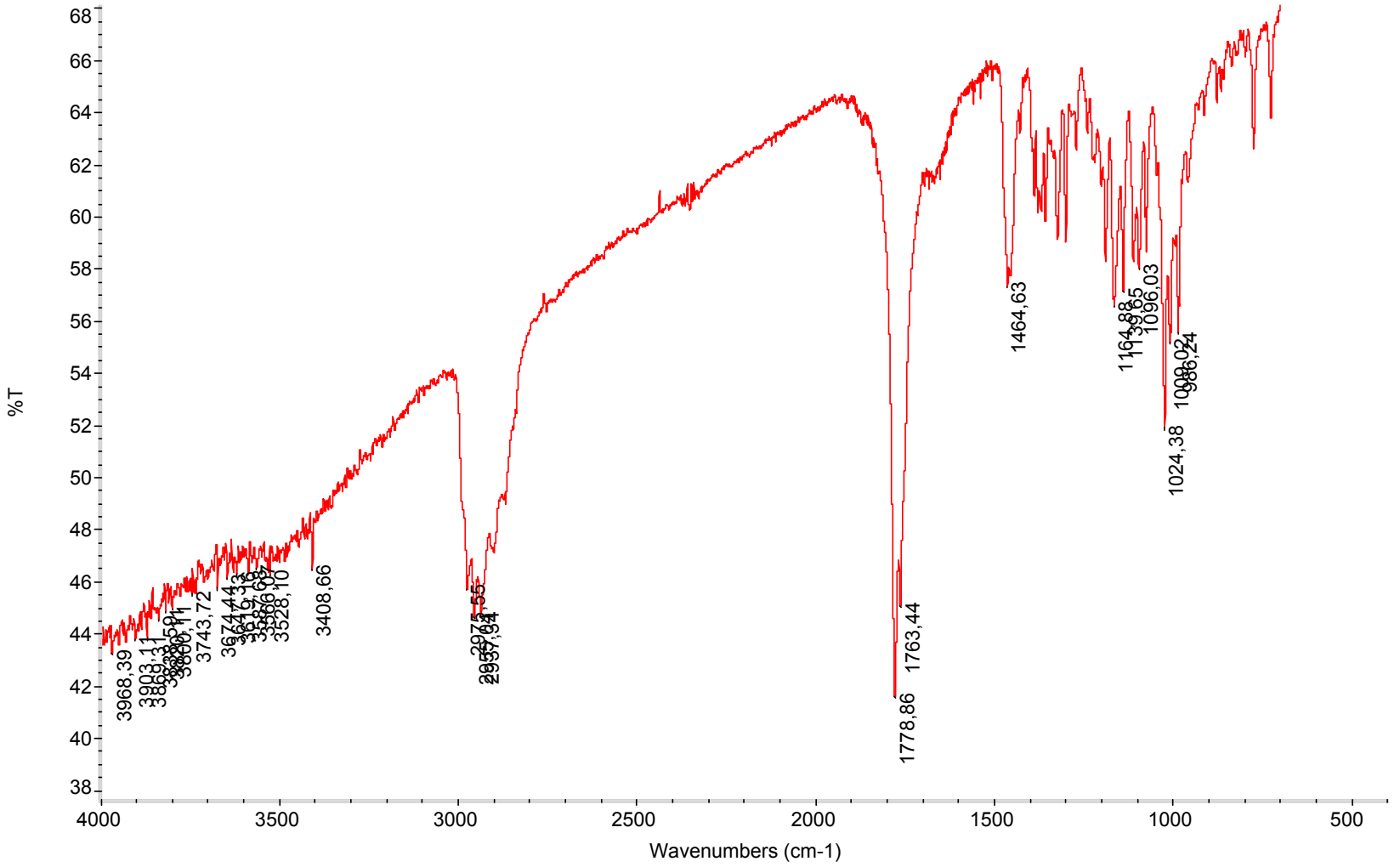


Figure S18. IR spectrum of iodolactone **4a**.

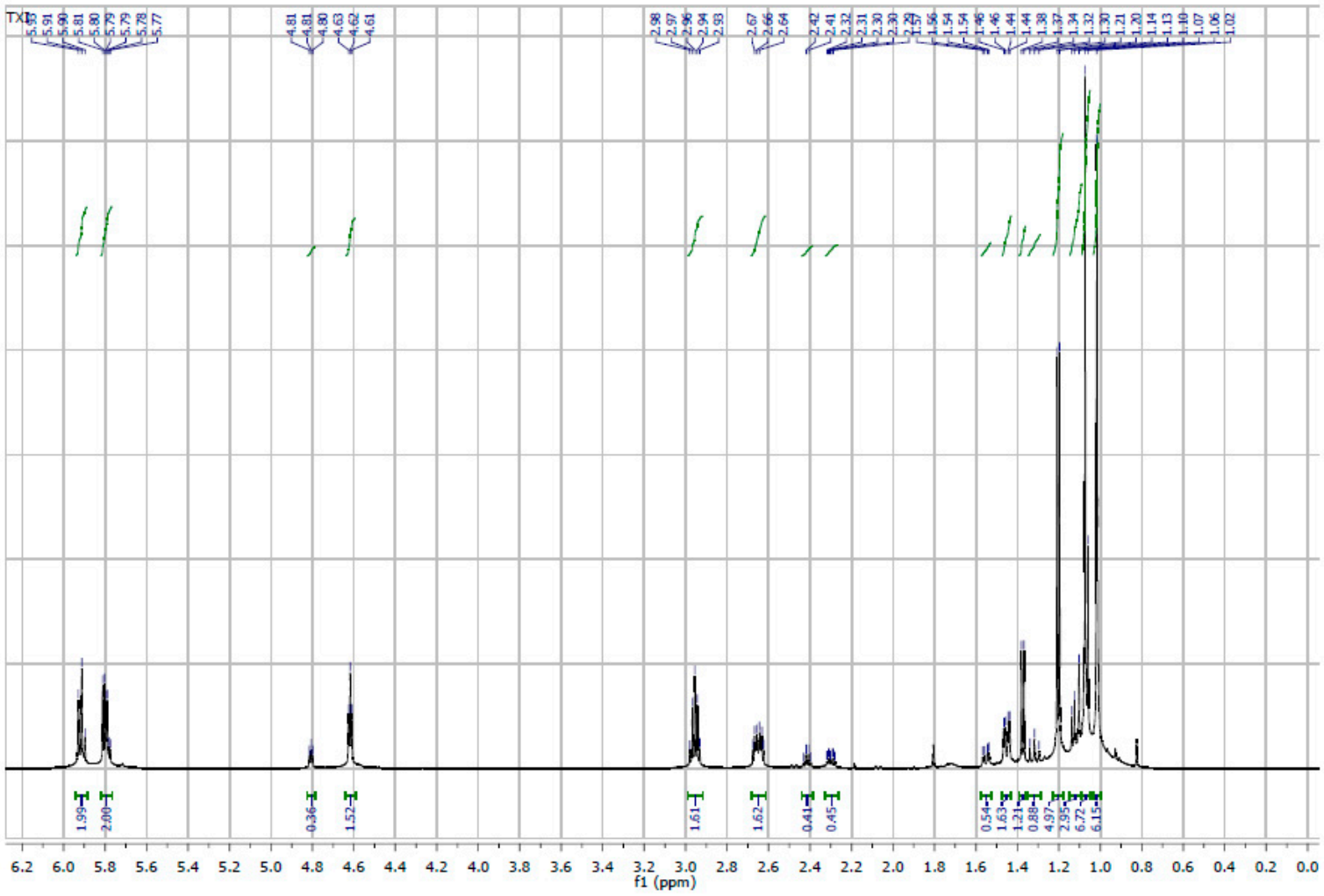


Figure S19. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of unsaturated lactone **5a**.

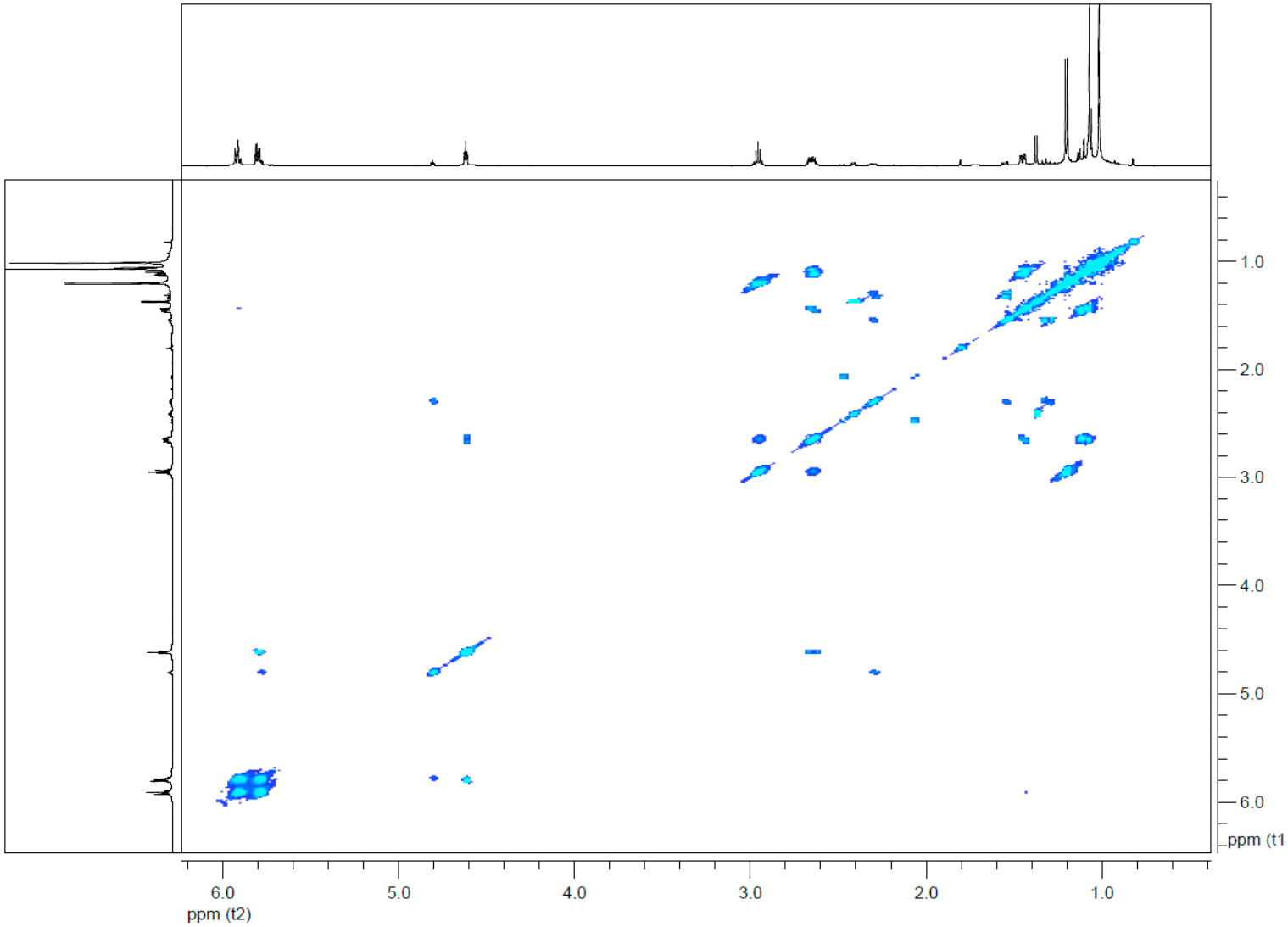


Figure S20. COSY (151 MHz, $CDCl_3$) spectrum of unsaturated lactone **5a**.

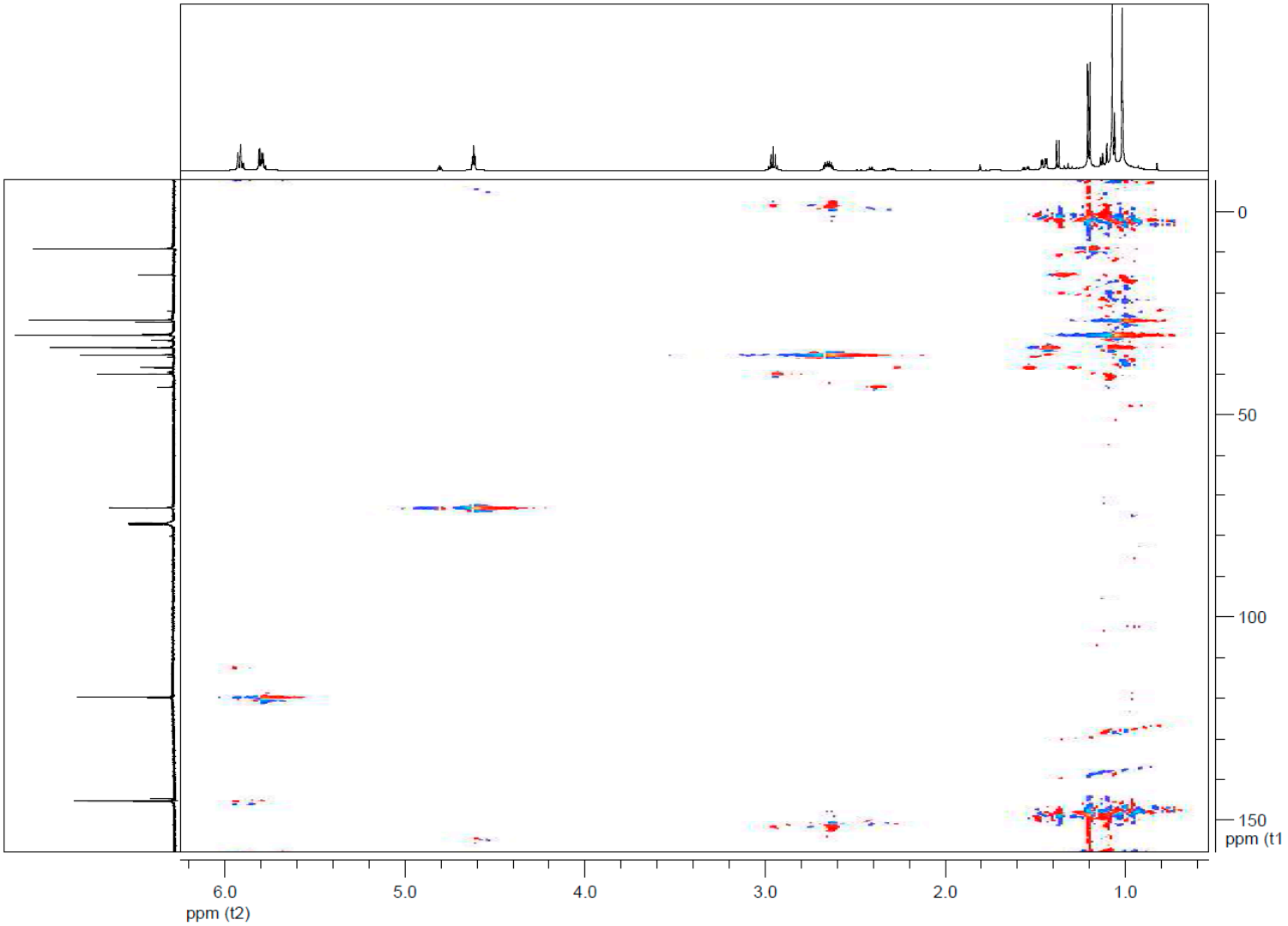


Figure S21. HMQC (151 MHz, $CDCl_3$) spectrum of unsaturated lactone **5a**.

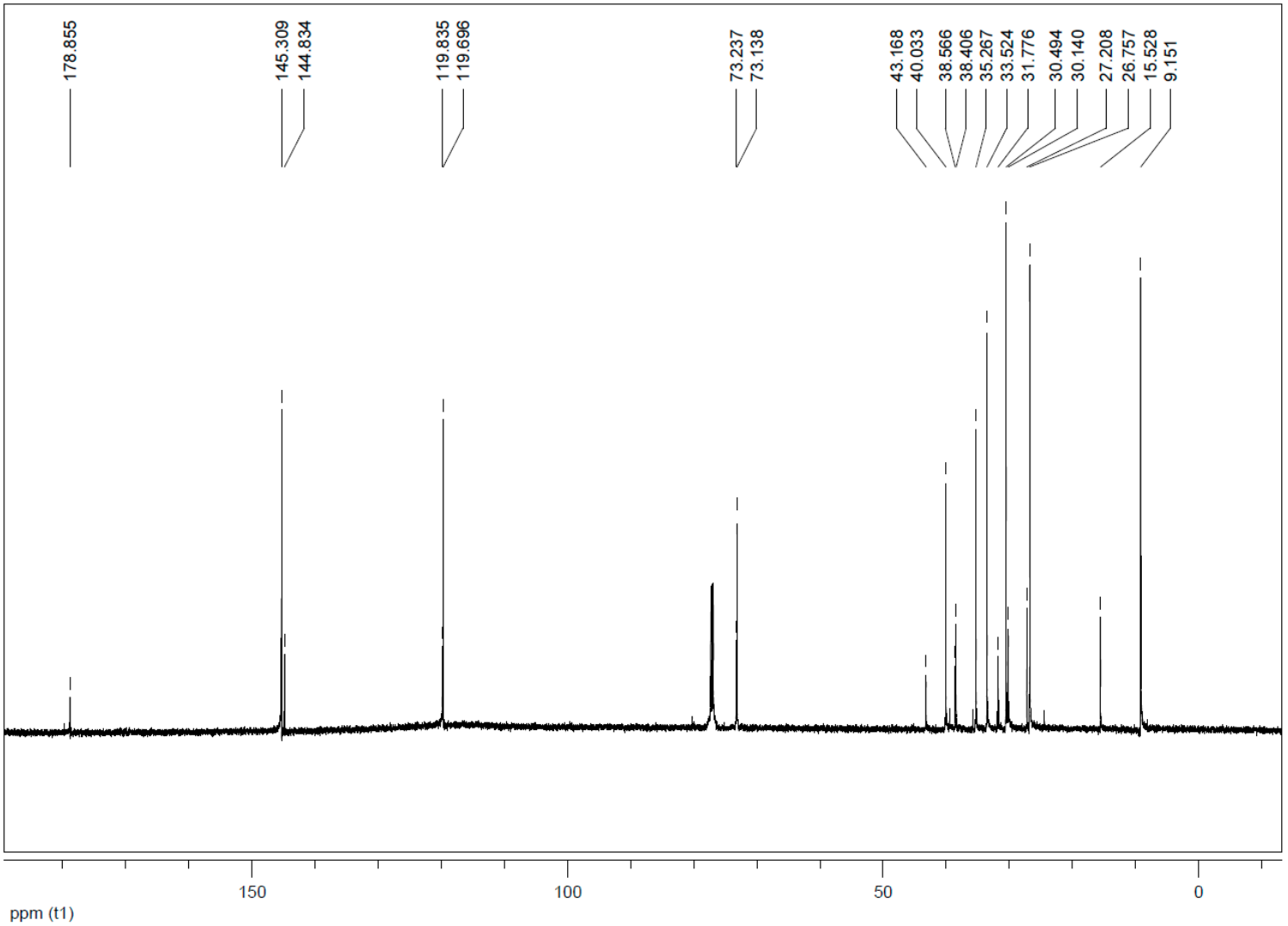


Figure S22. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of unsaturated lactone **5a**.

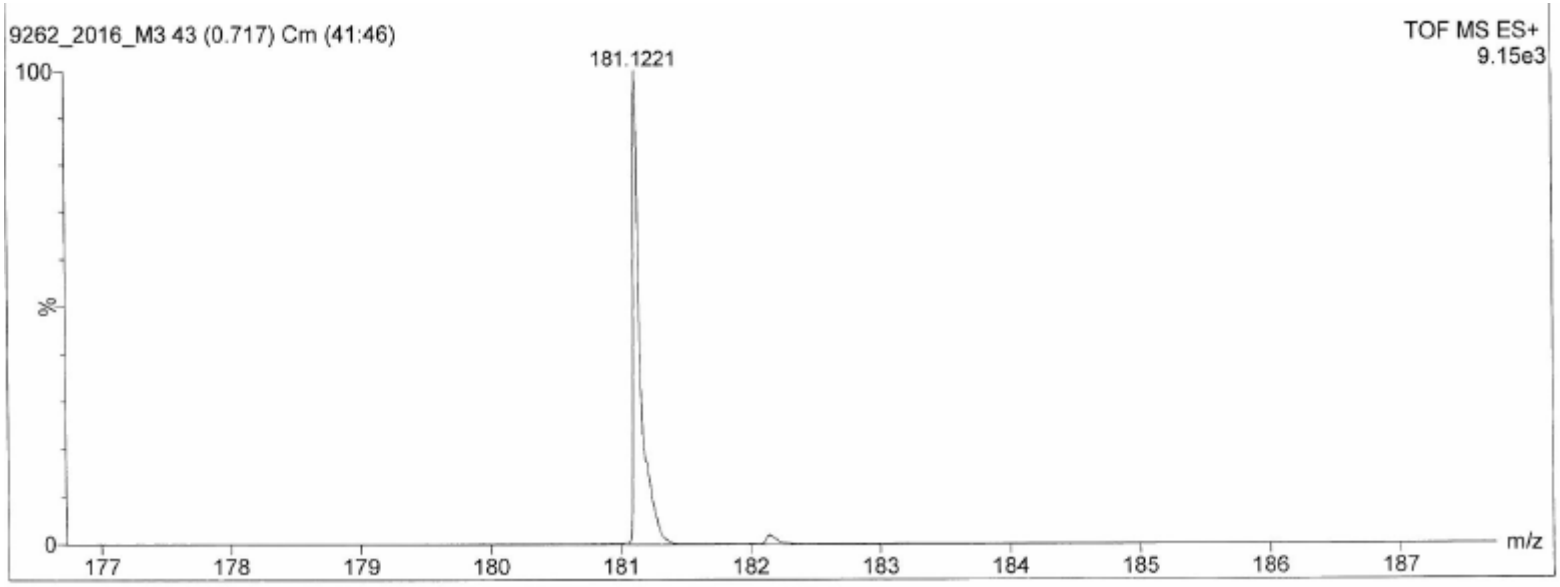


Figure S23. HRMS spectrum of unsaturated lactone **5a**.

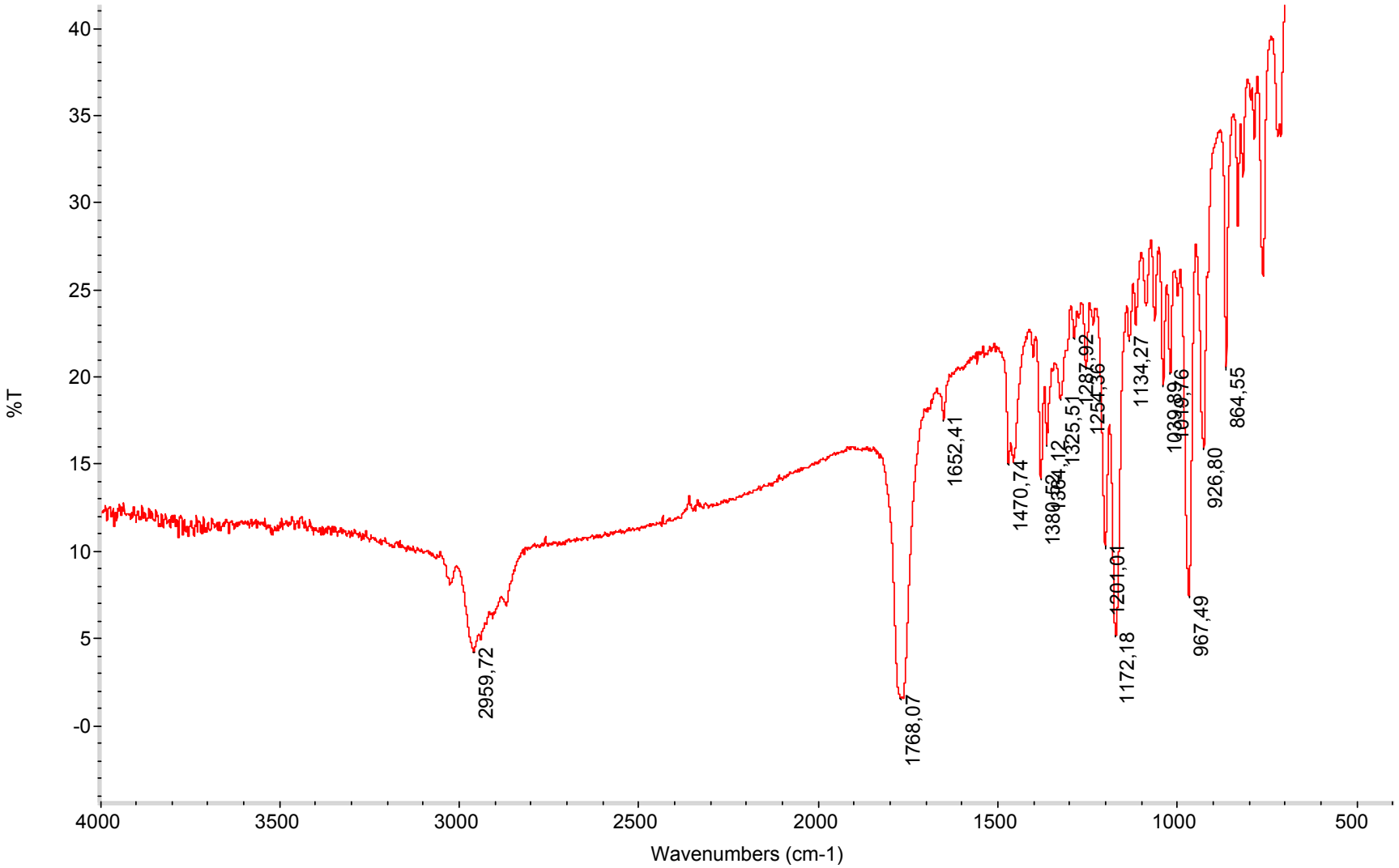


Figure S24. IR spectrum of unsaturated lactone **5a**.

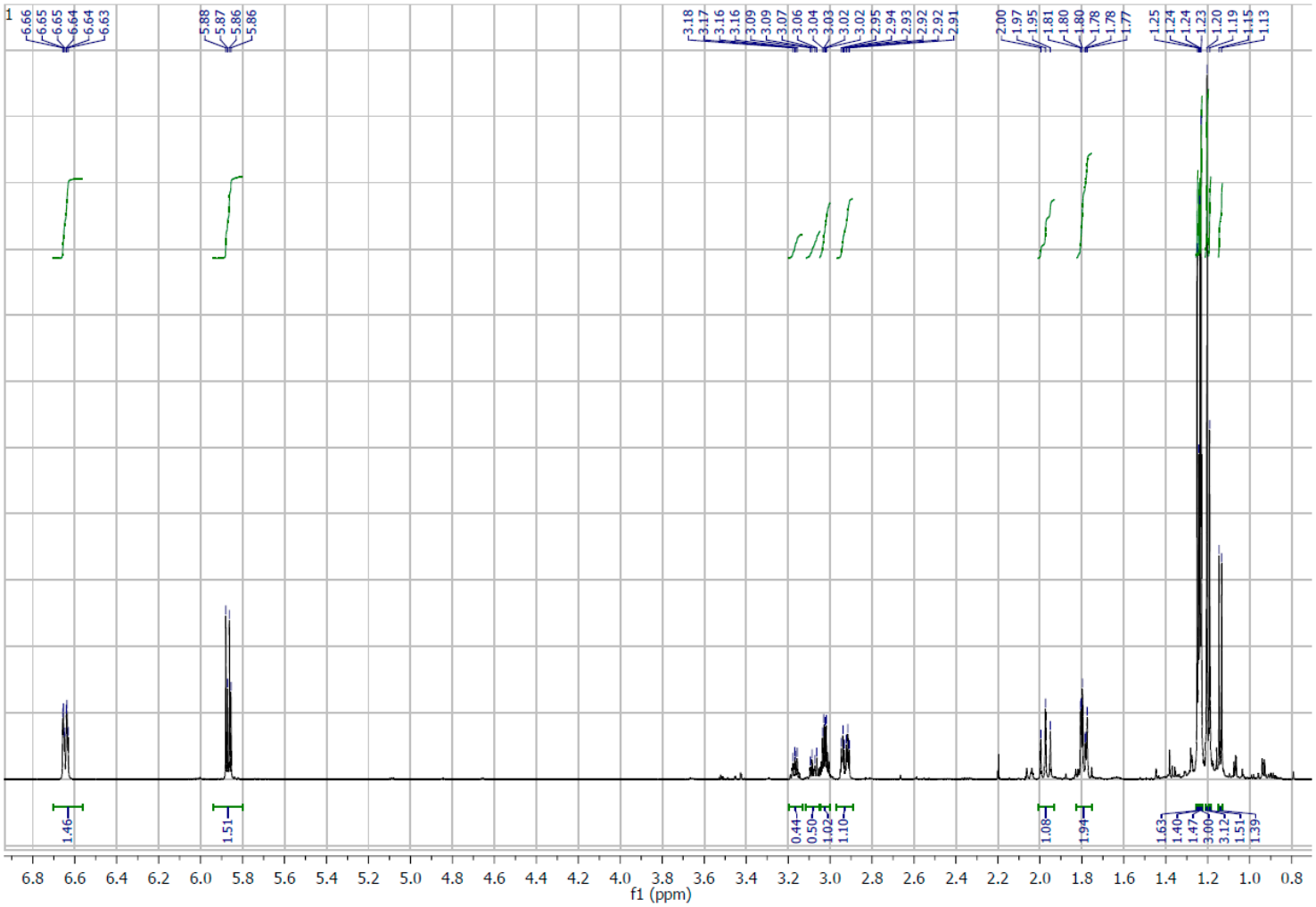


Figure S25. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of hydroxylactone **6a**.

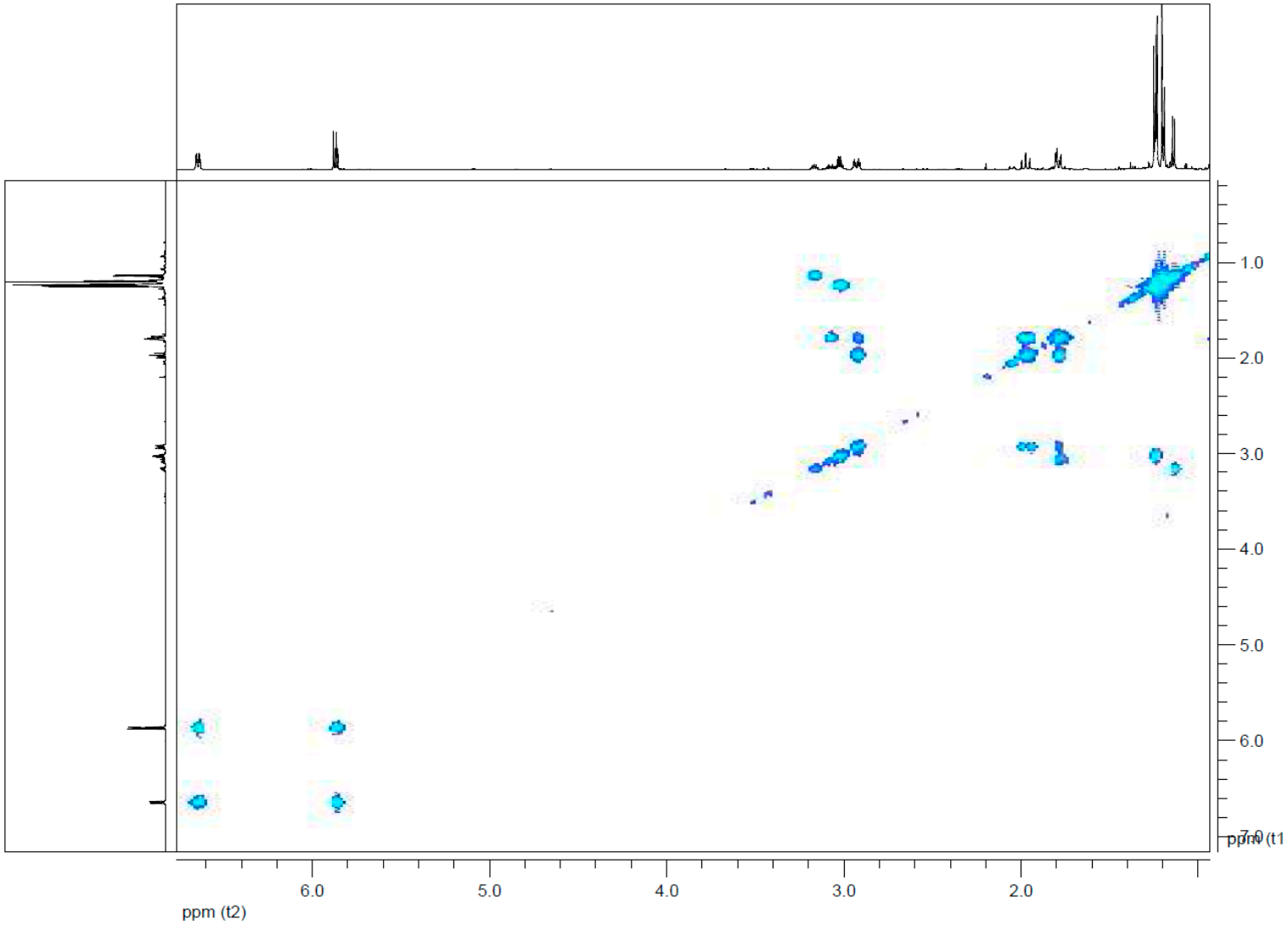


Figure S26. COSY (151 MHz, $CDCl_3$) spectrum of hydroxylactone **6a**.

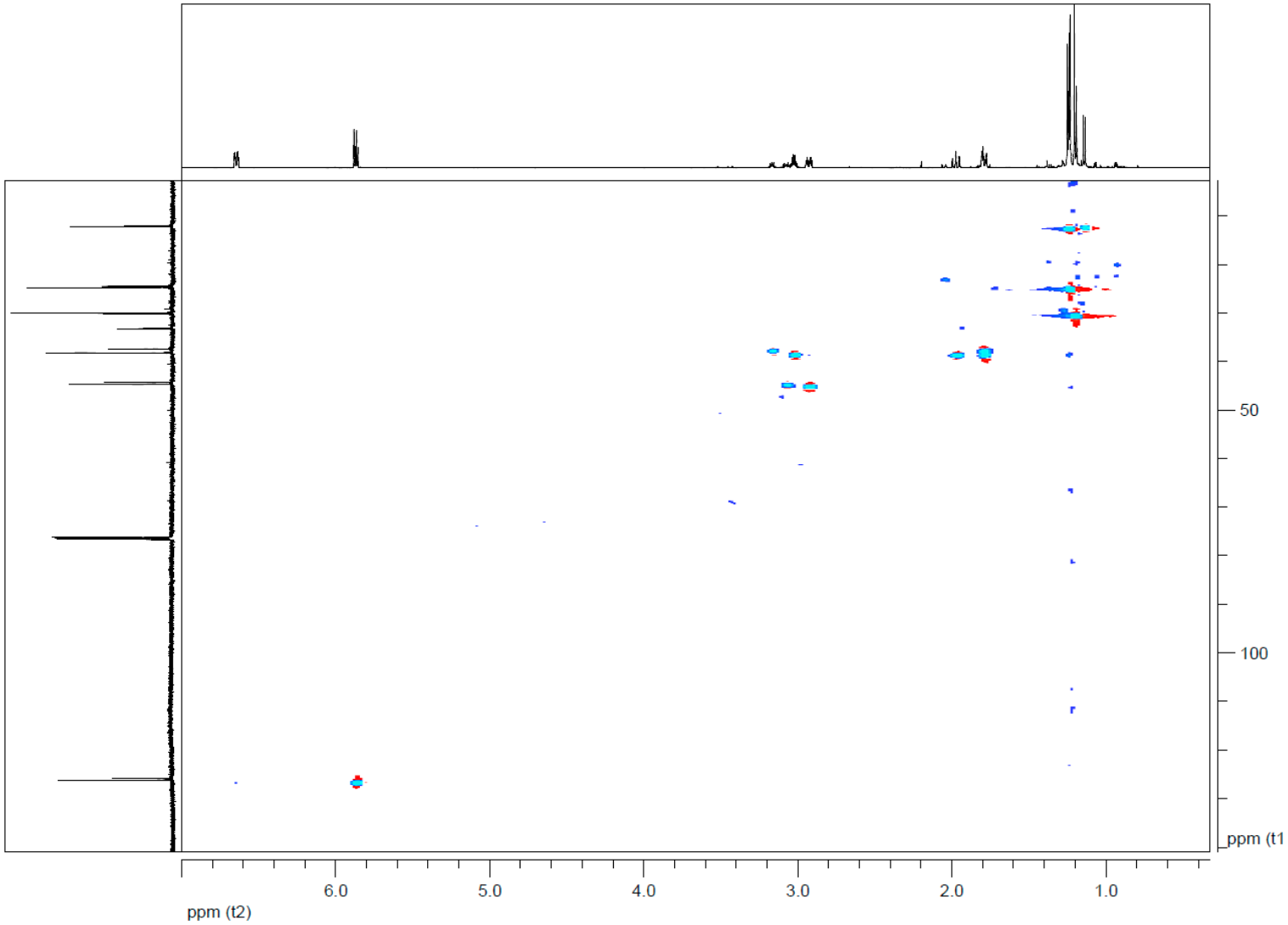


Figure S27. HMQC (151 MHz, $CDCl_3$) spectrum of hydroxylactone **6a**.

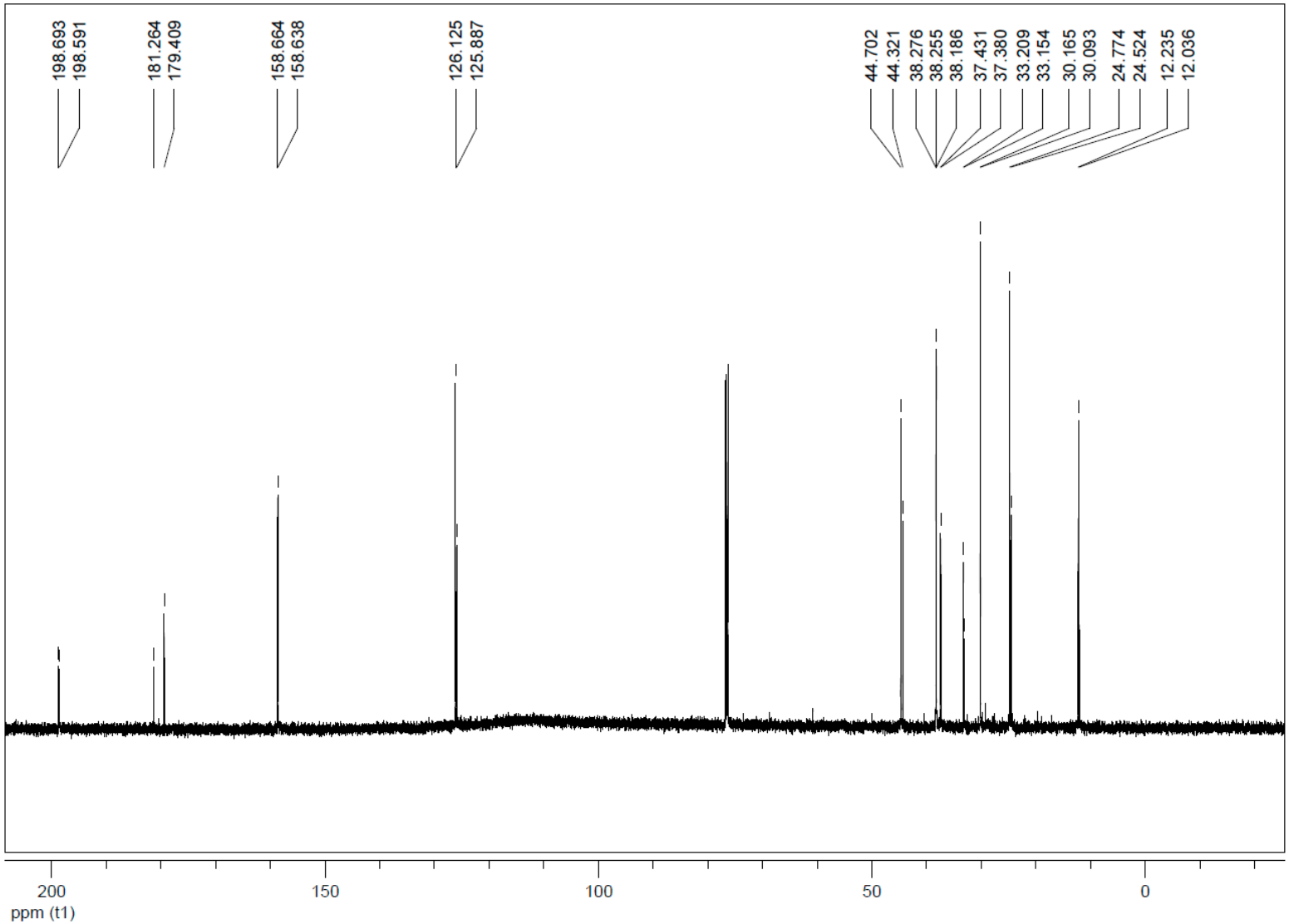


Figure S28. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of hydroxylactone **6a**.

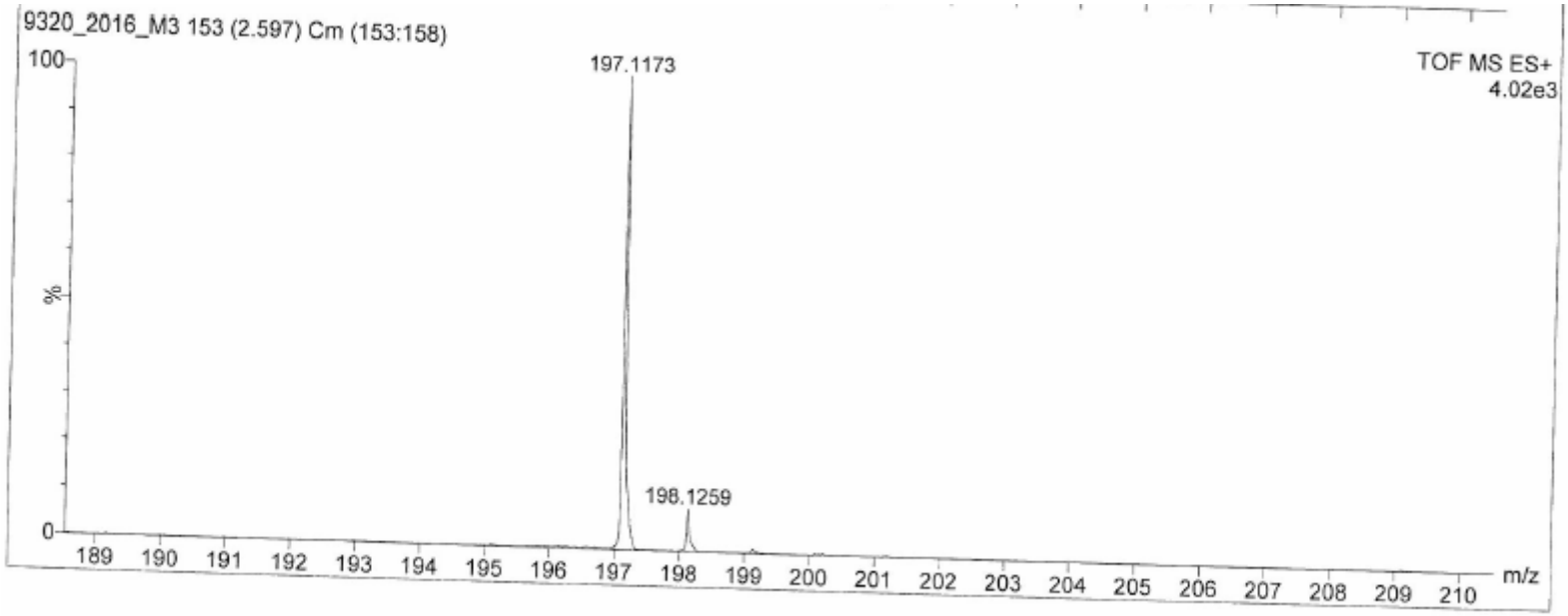


Figure S29. HRMS spectrum of hydroxylactone **6a**.

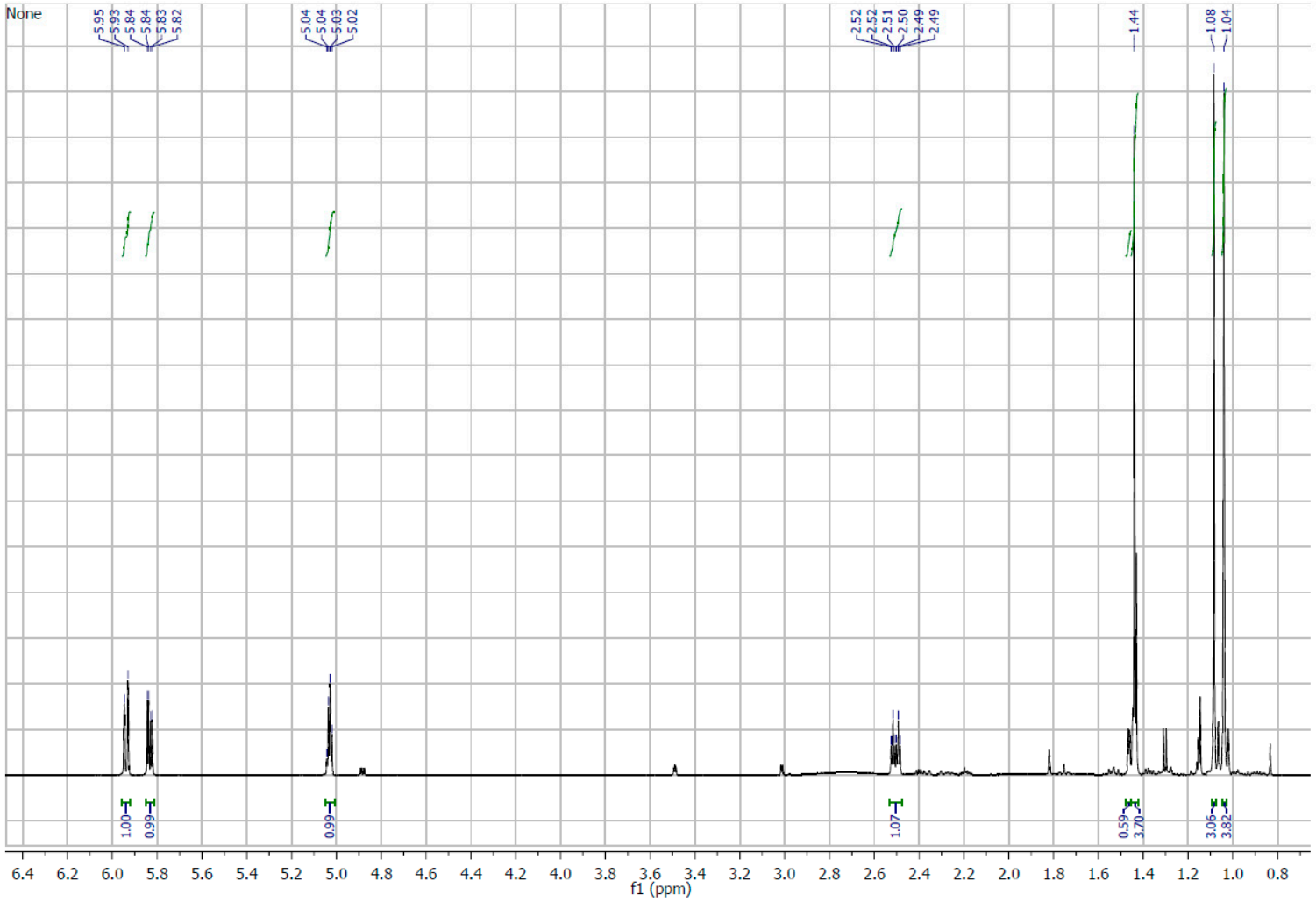


Figure S30. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of hydroxylactone **7a**.

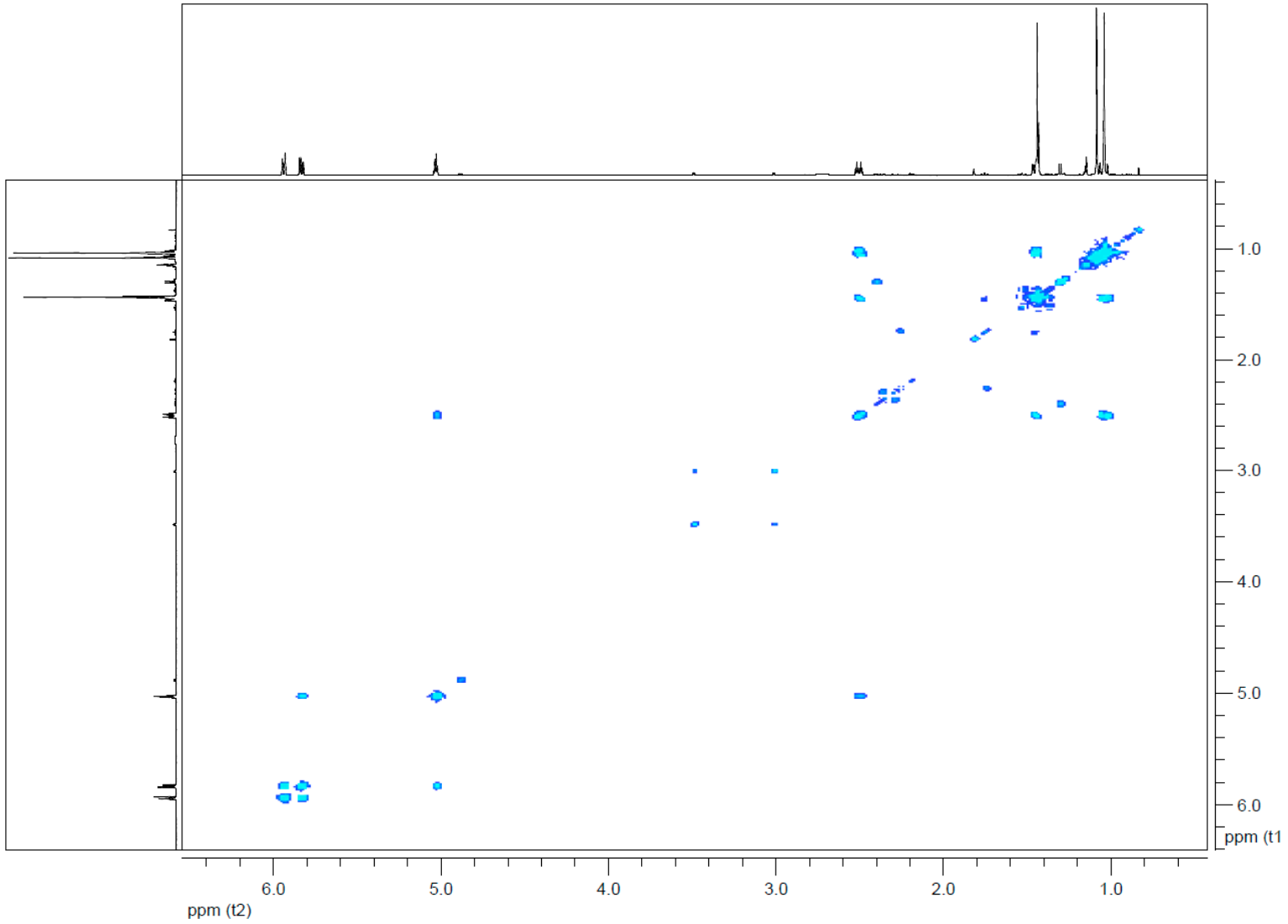


Figure S31. COSY (151 MHz, $CDCl_3$) spectrum of hydroxylactone **7a**.

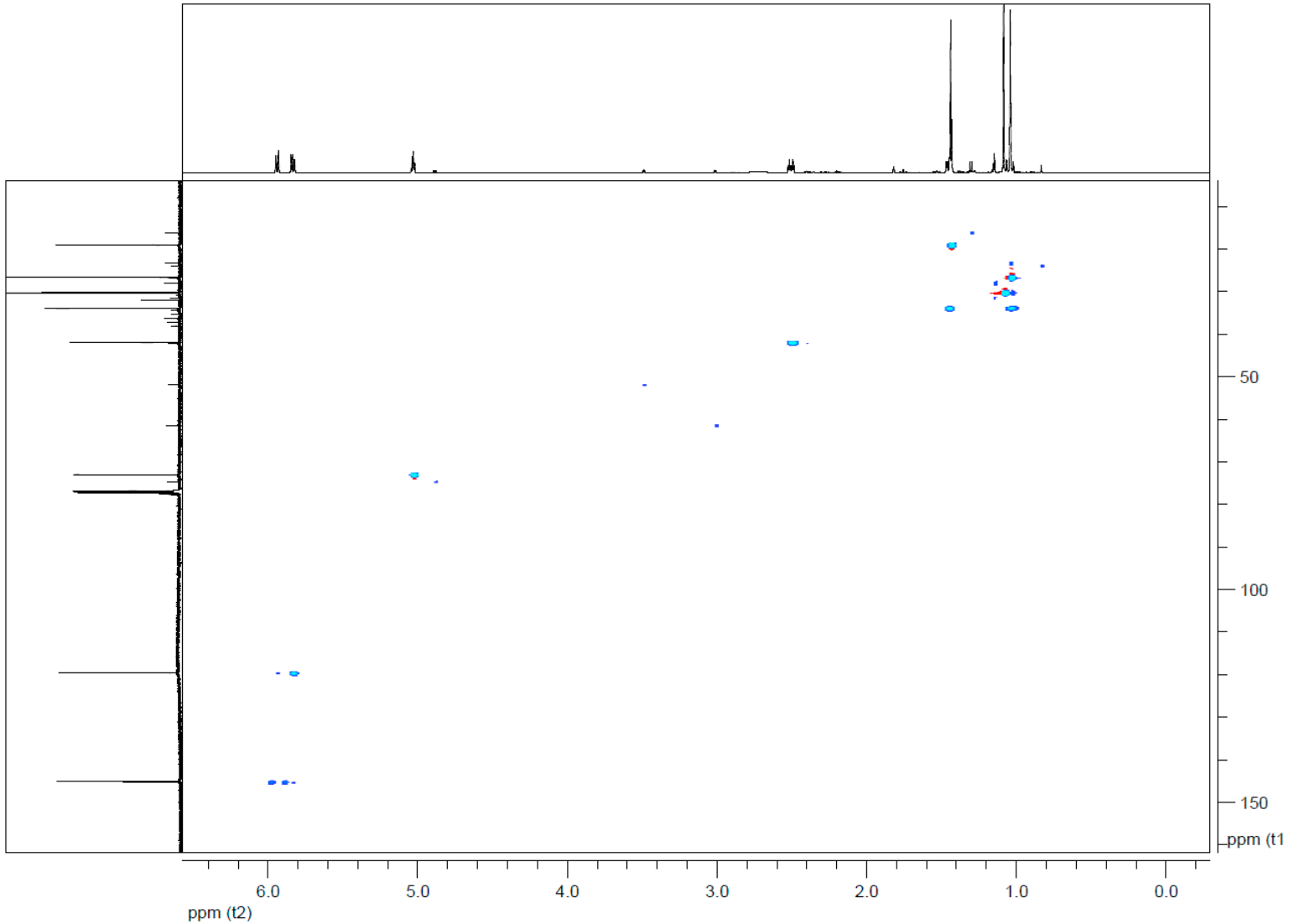


Figure S32. HMQC (151 MHz, $CDCl_3$) spectrum of hydroxylactone **7a**.

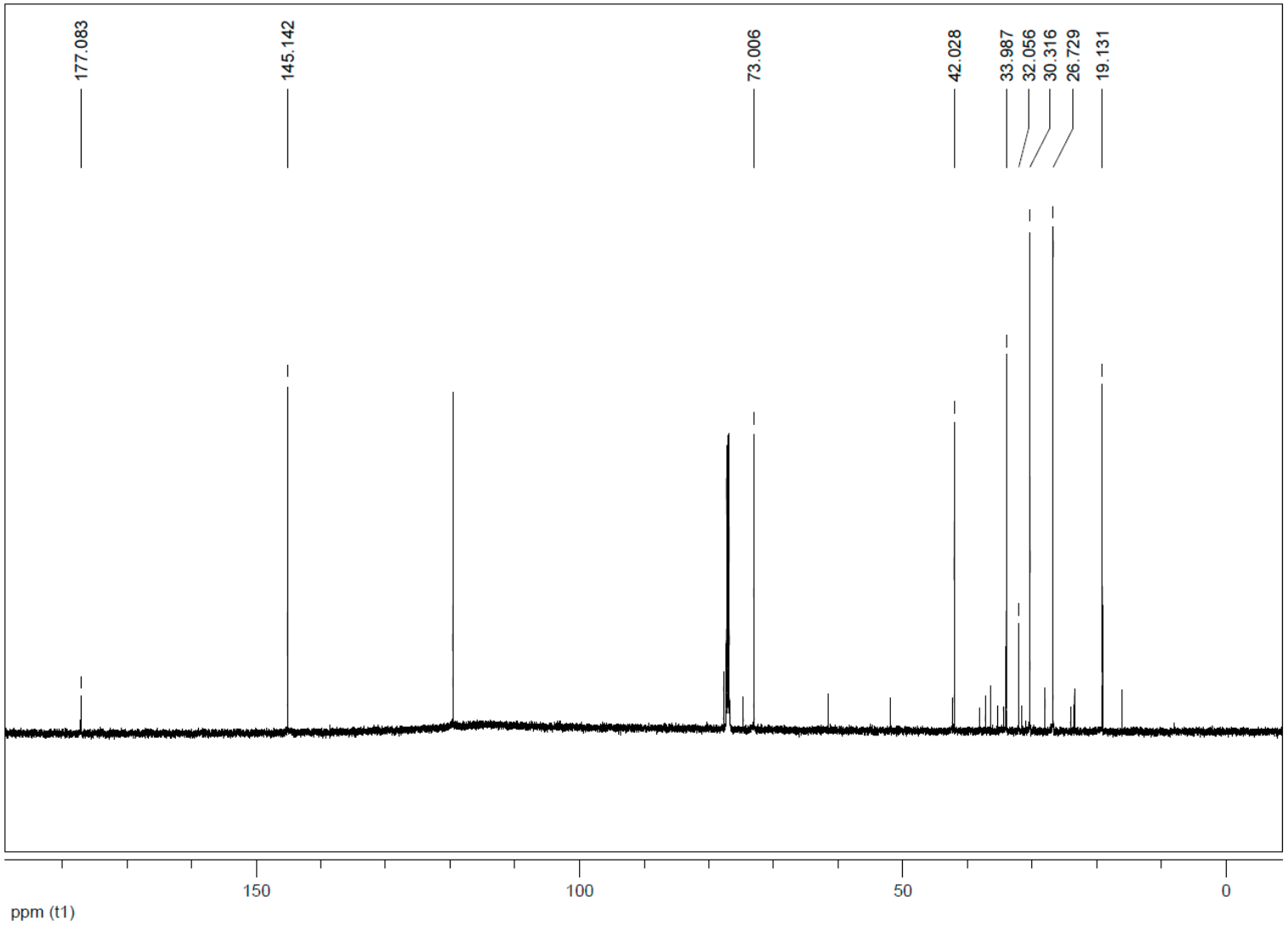


Figure S33. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of hydroxylactone **7a**.

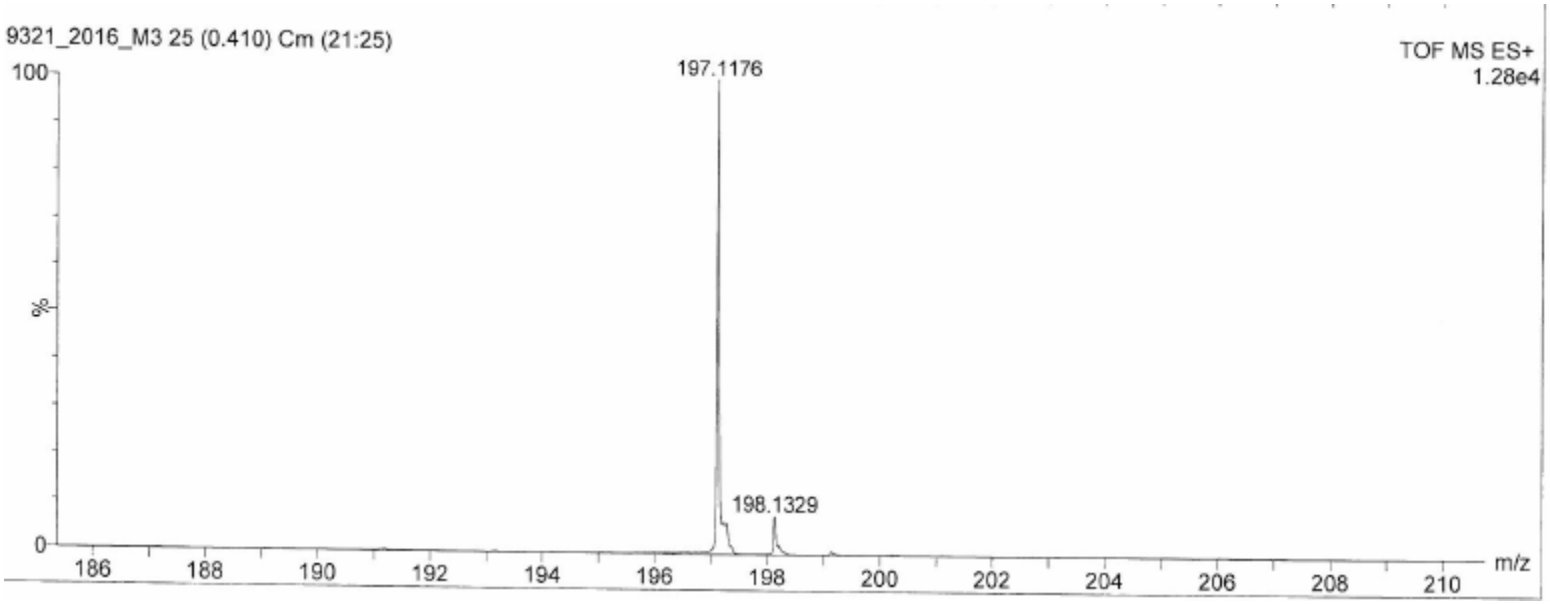


Figure S34. HRMS spectrum of hydroxylactone **7a**.

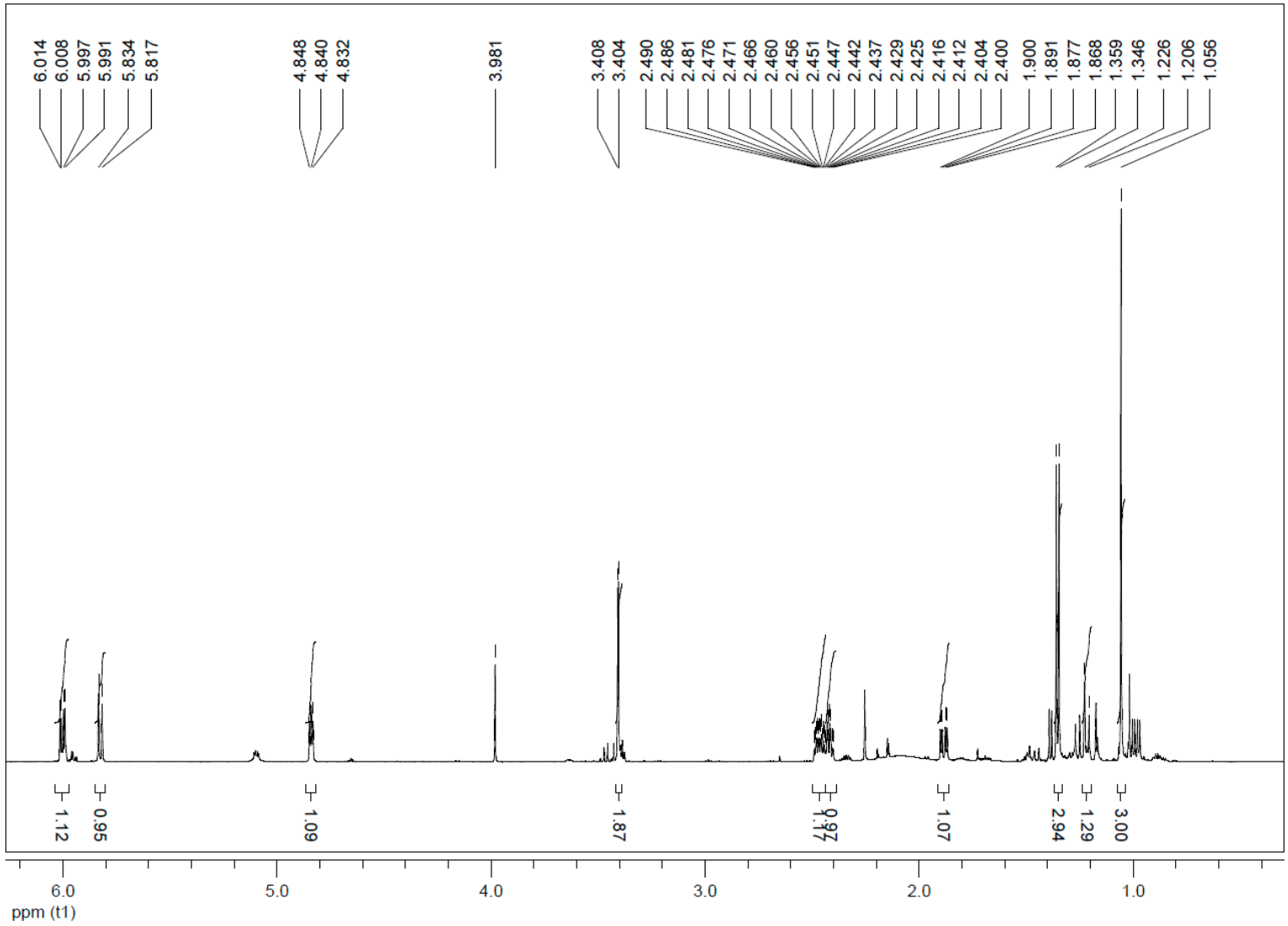


Figure S35. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of hydroxylactone **8a**.

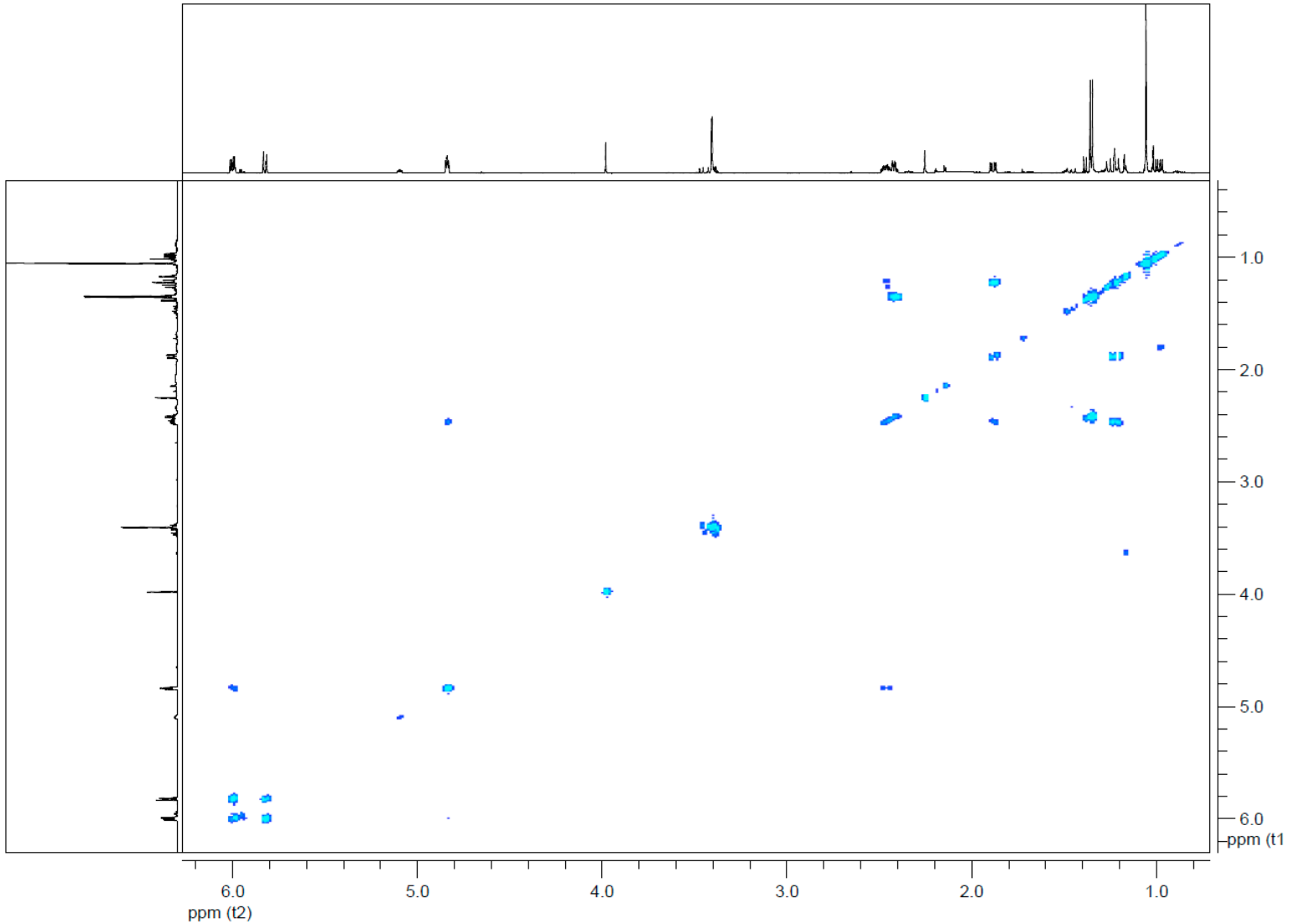


Figure S36. COSY (151 MHz, $CDCl_3$) spectrum of hydroxylactone **8a**.

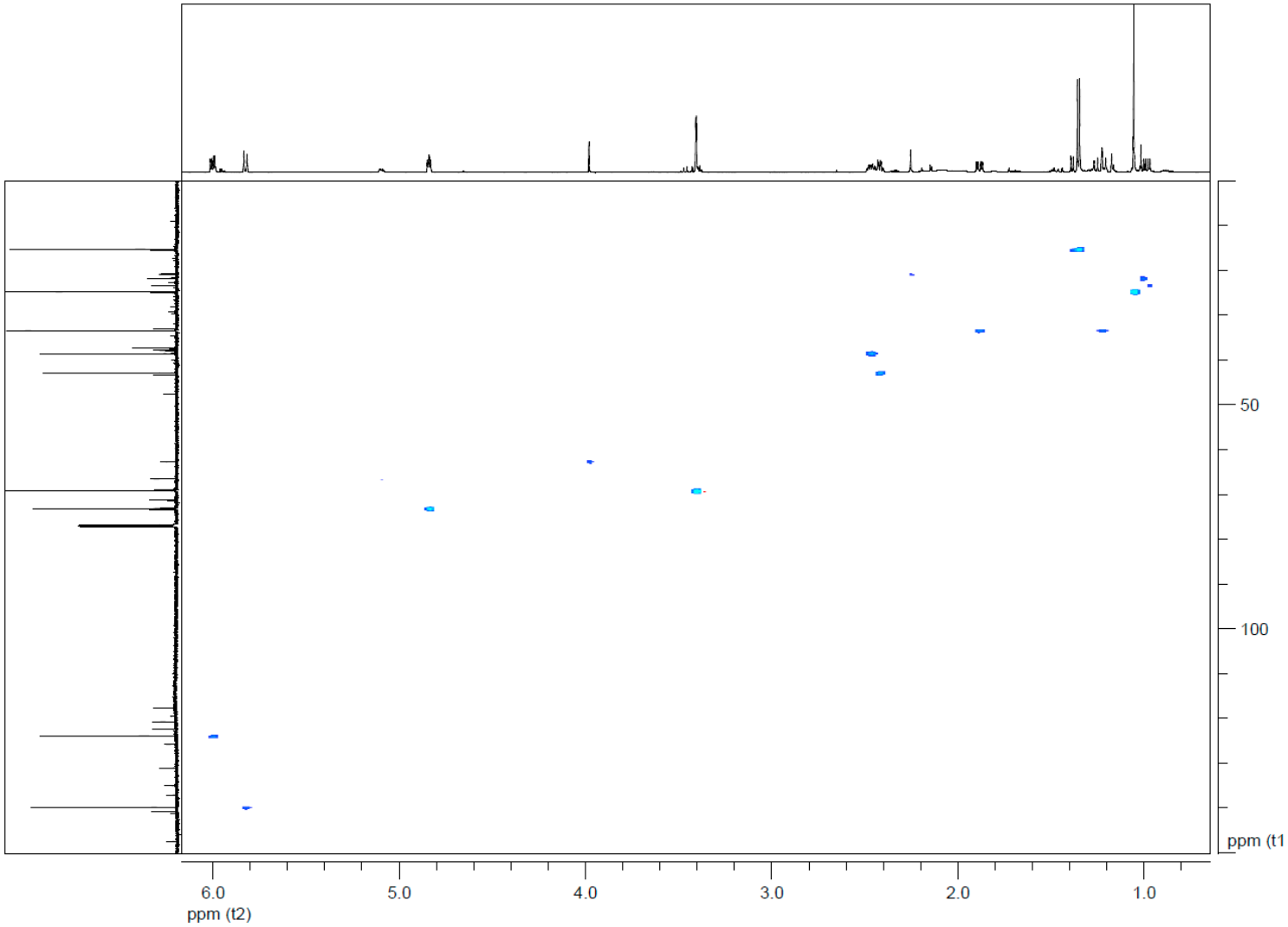


Figure S37. HMQC (151 MHz, $CDCl_3$) spectrum of hydroxylactone **8a**.

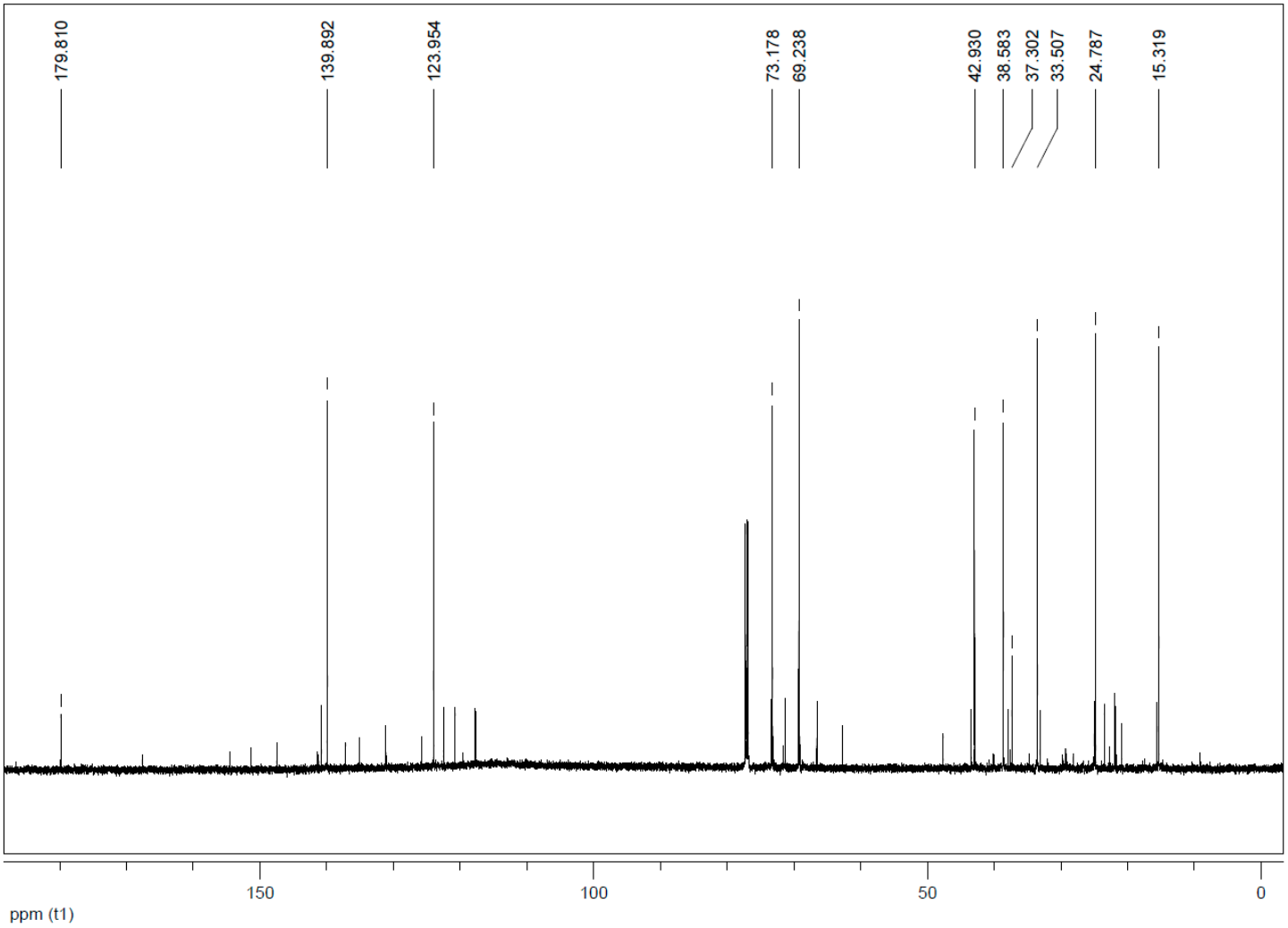


Figure S38. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of hydroxylactone **8a**.

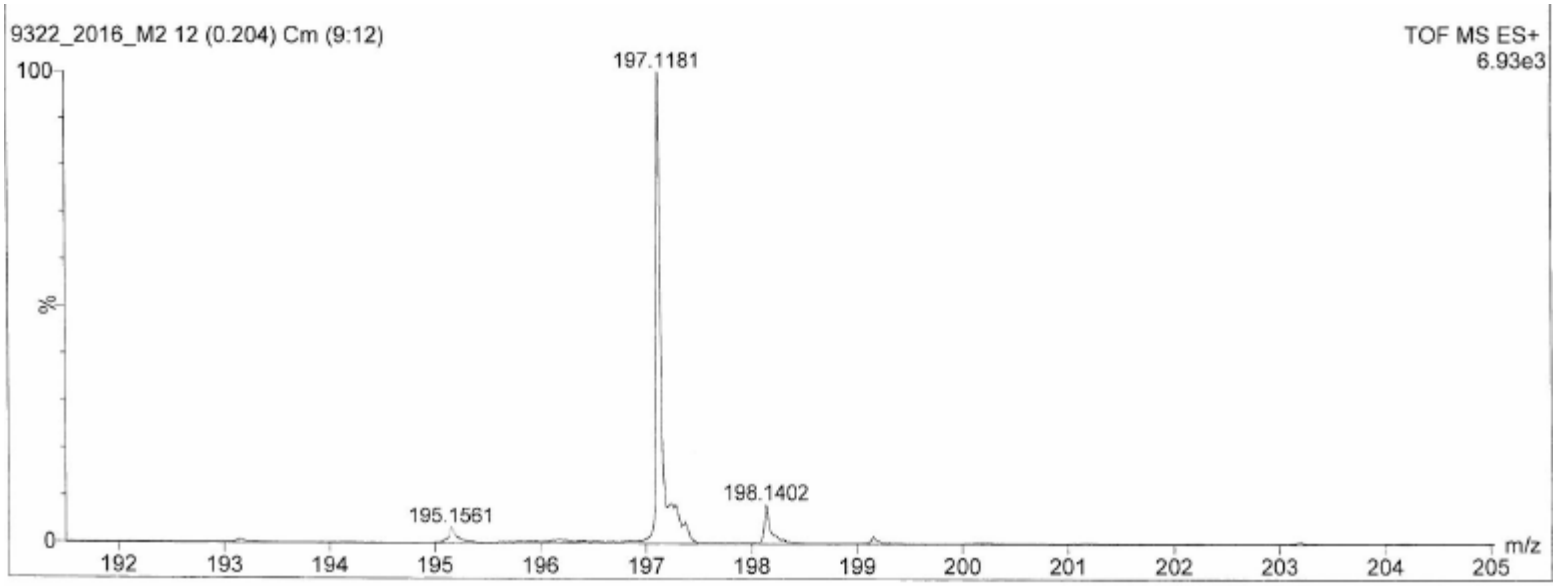


Figure S39. HRMS spectrum of hydroxylactone **8a**.

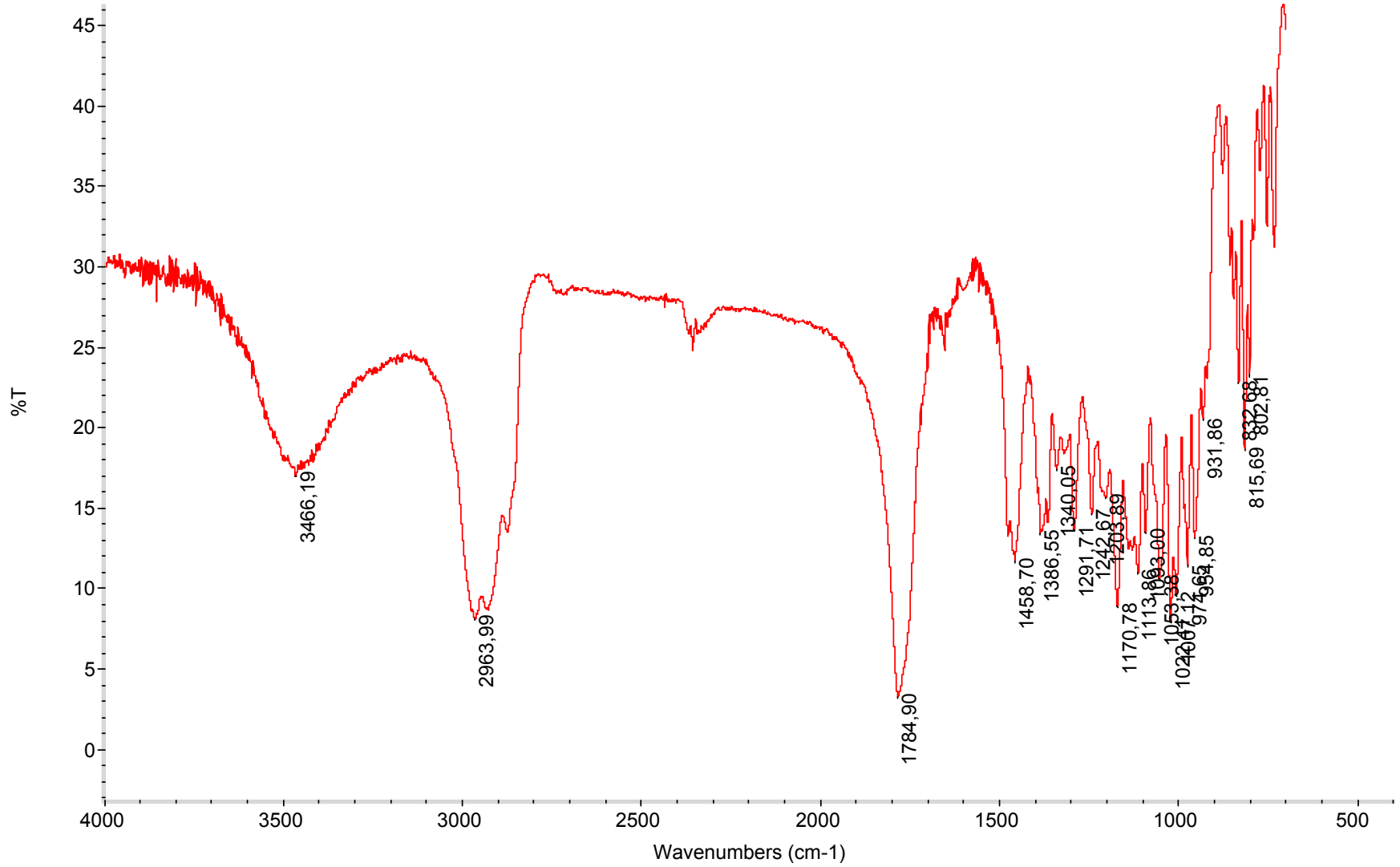


Figure S40. IR spectrum of hydroxylactone **8a**.

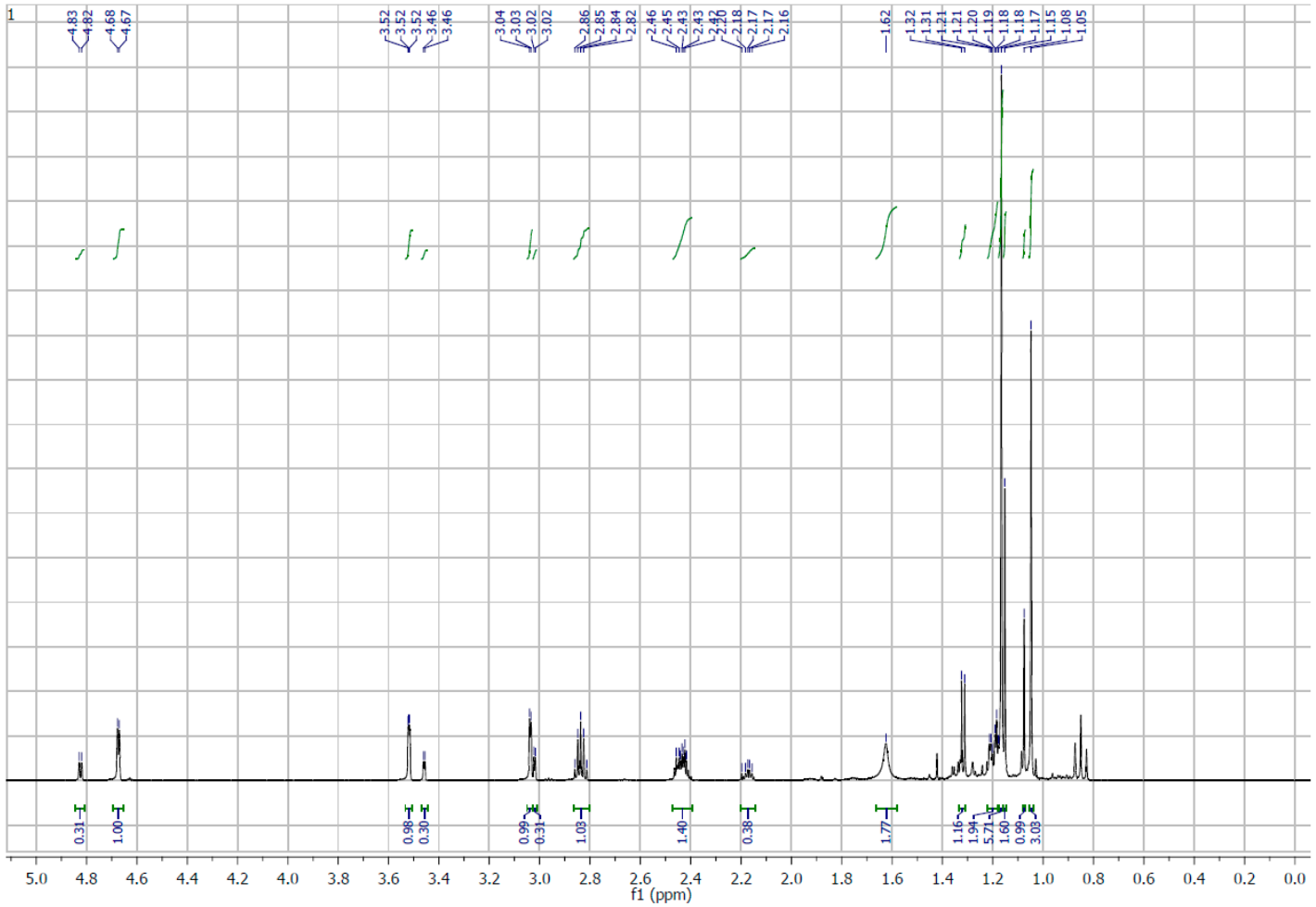


Figure S41. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of epoxylactone **9a**.

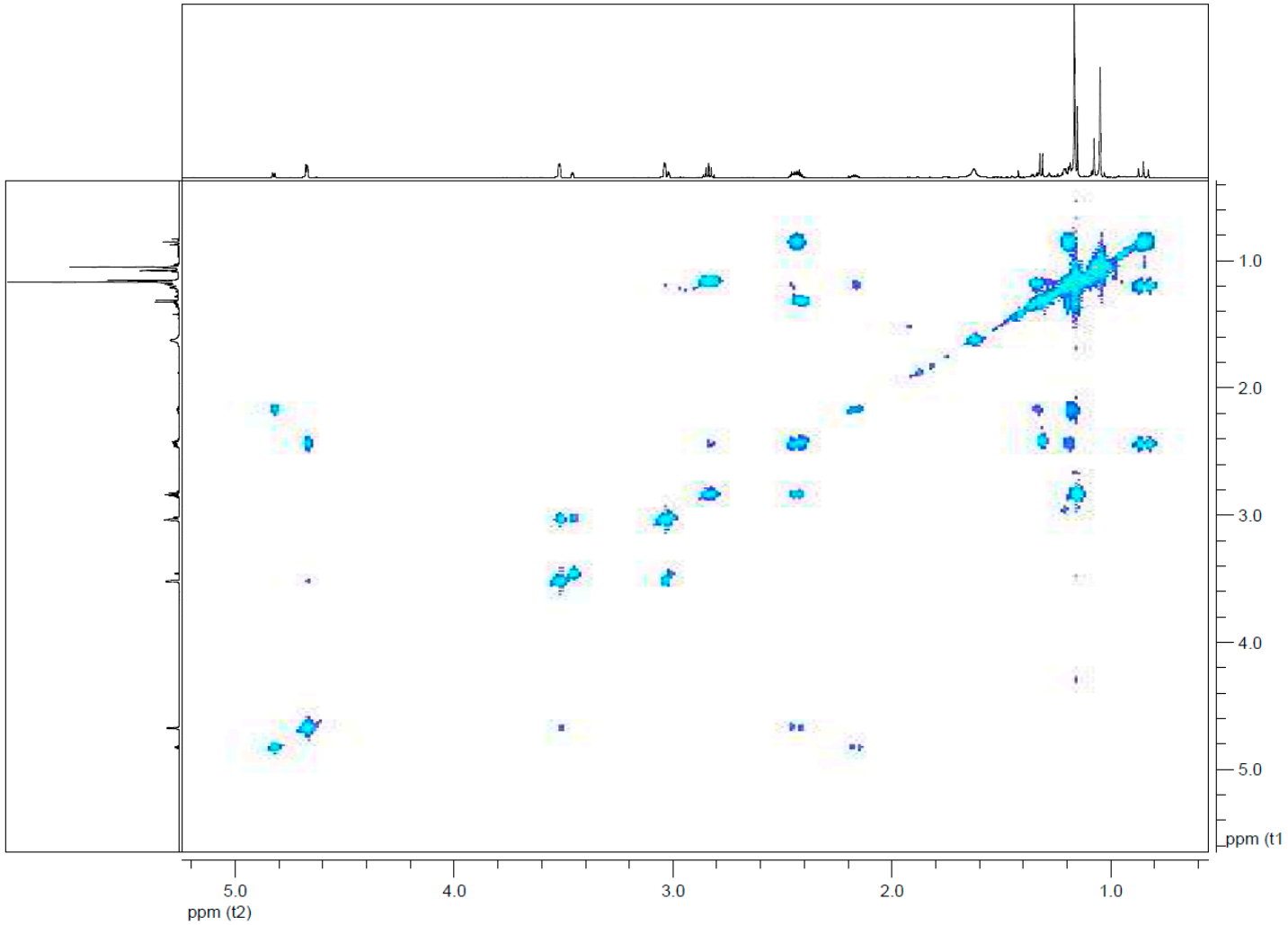


Figure S42. COSY (151 MHz, $CDCl_3$) spectrum of epoxylactone **9a**.

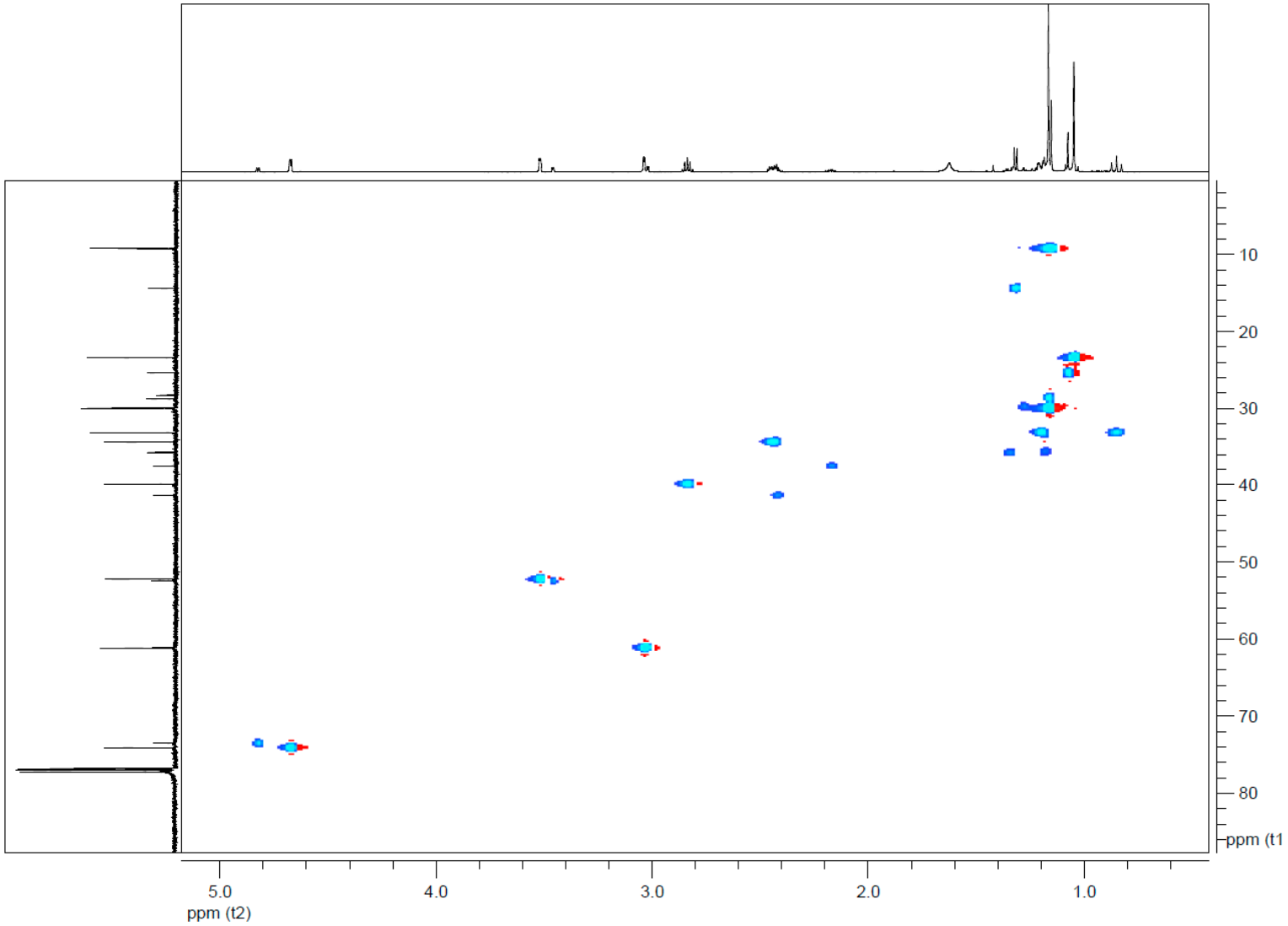


Figure S43. HMQC (151 MHz, $CDCl_3$) spectrum of epoxylactone **9a**.

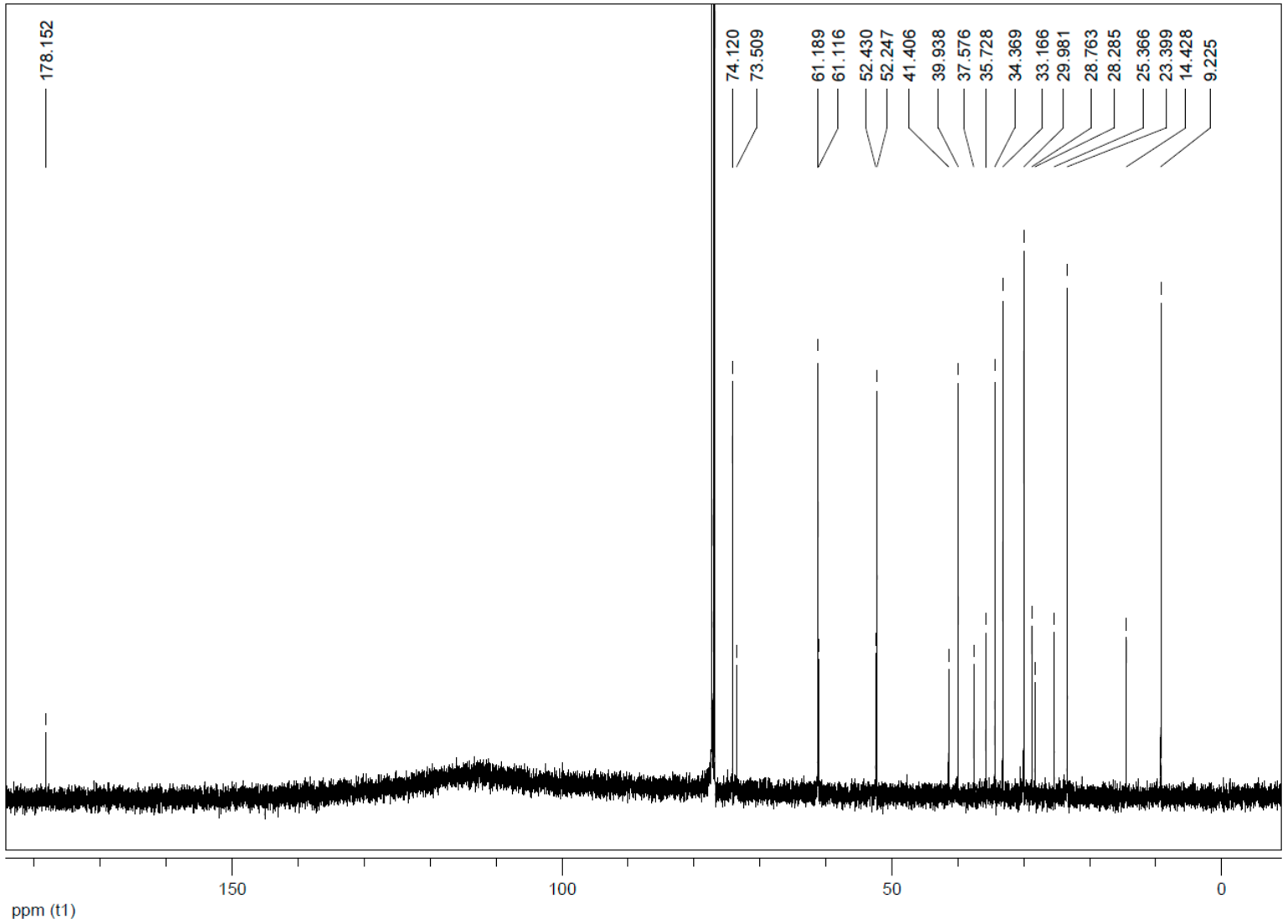


Figure S44. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of epoxylactone **9a**.

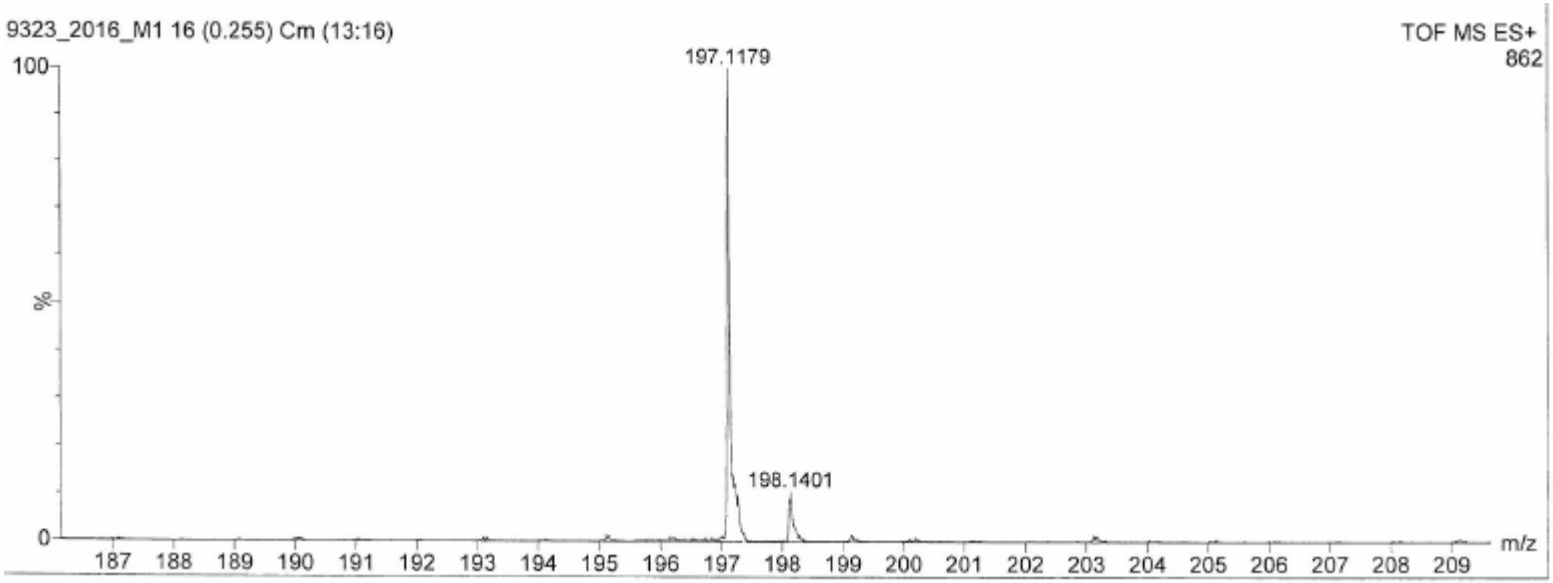


Figure S45. HRMS spectrum of epoxylactone **9a**.

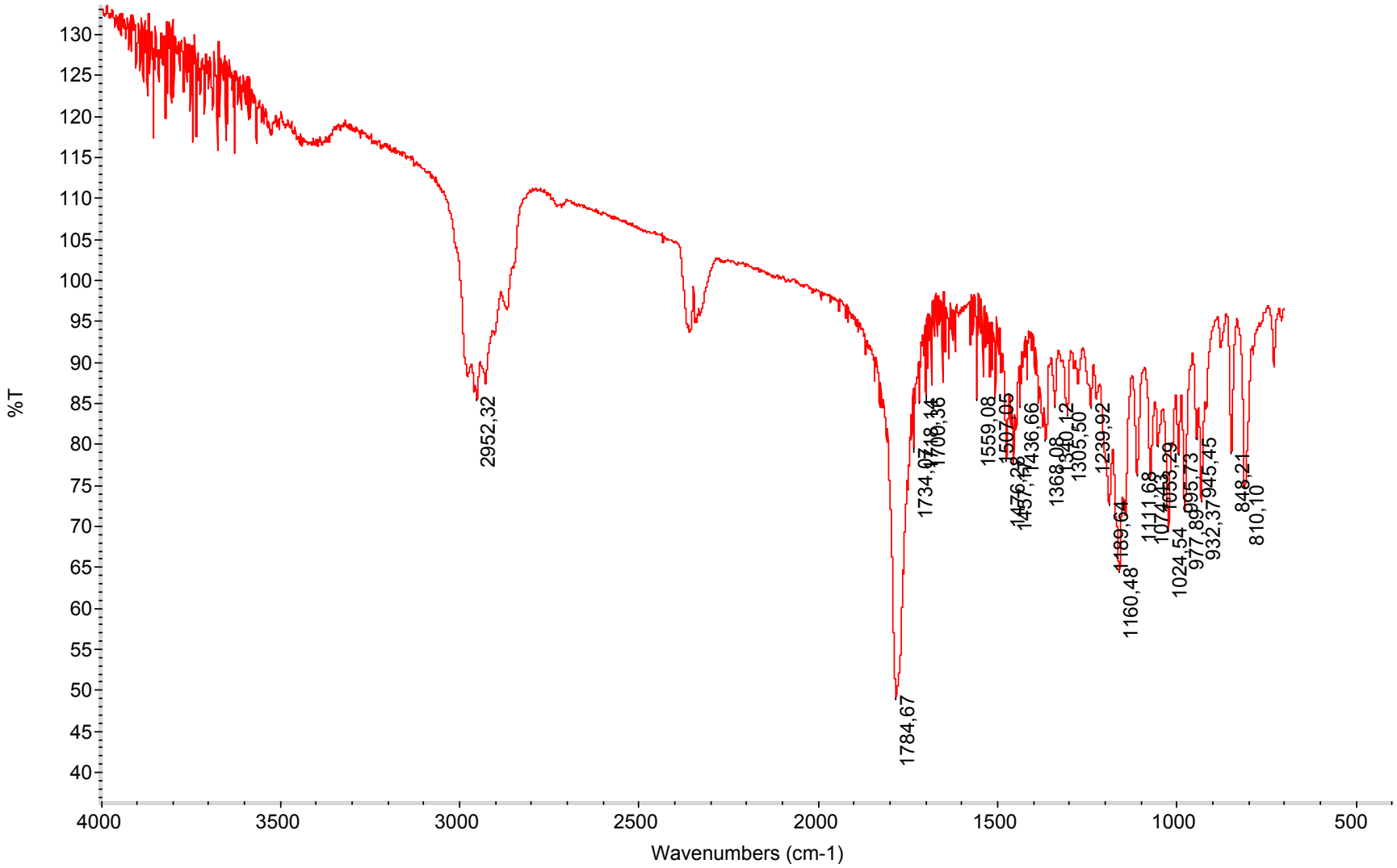


Figure S46. IR spectrum of epoxylactone **9a**.

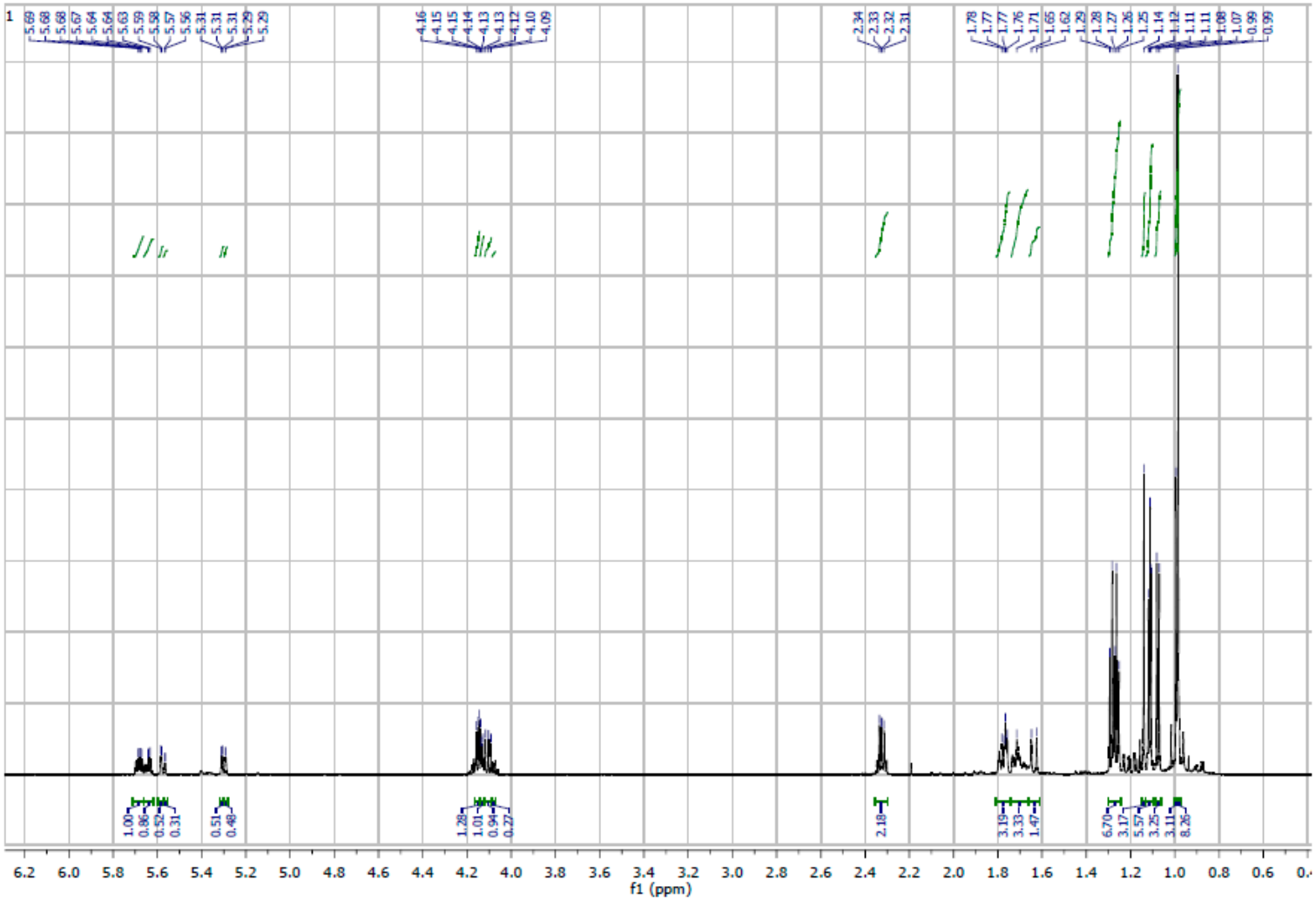


Figure S47. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of ester **2b**.

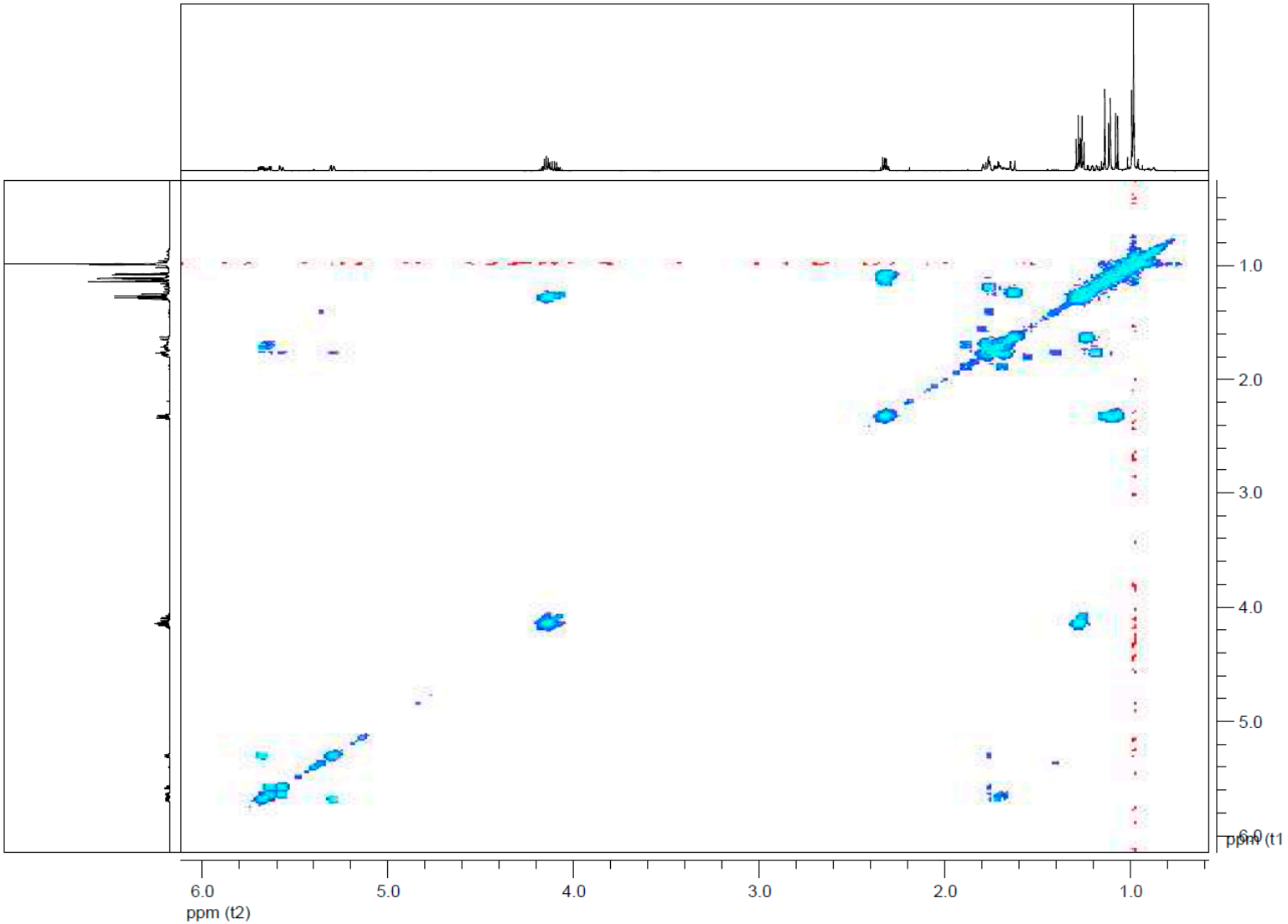


Figure S48. COSY (151 MHz, $CDCl_3$) spectrum of ester **2b**.

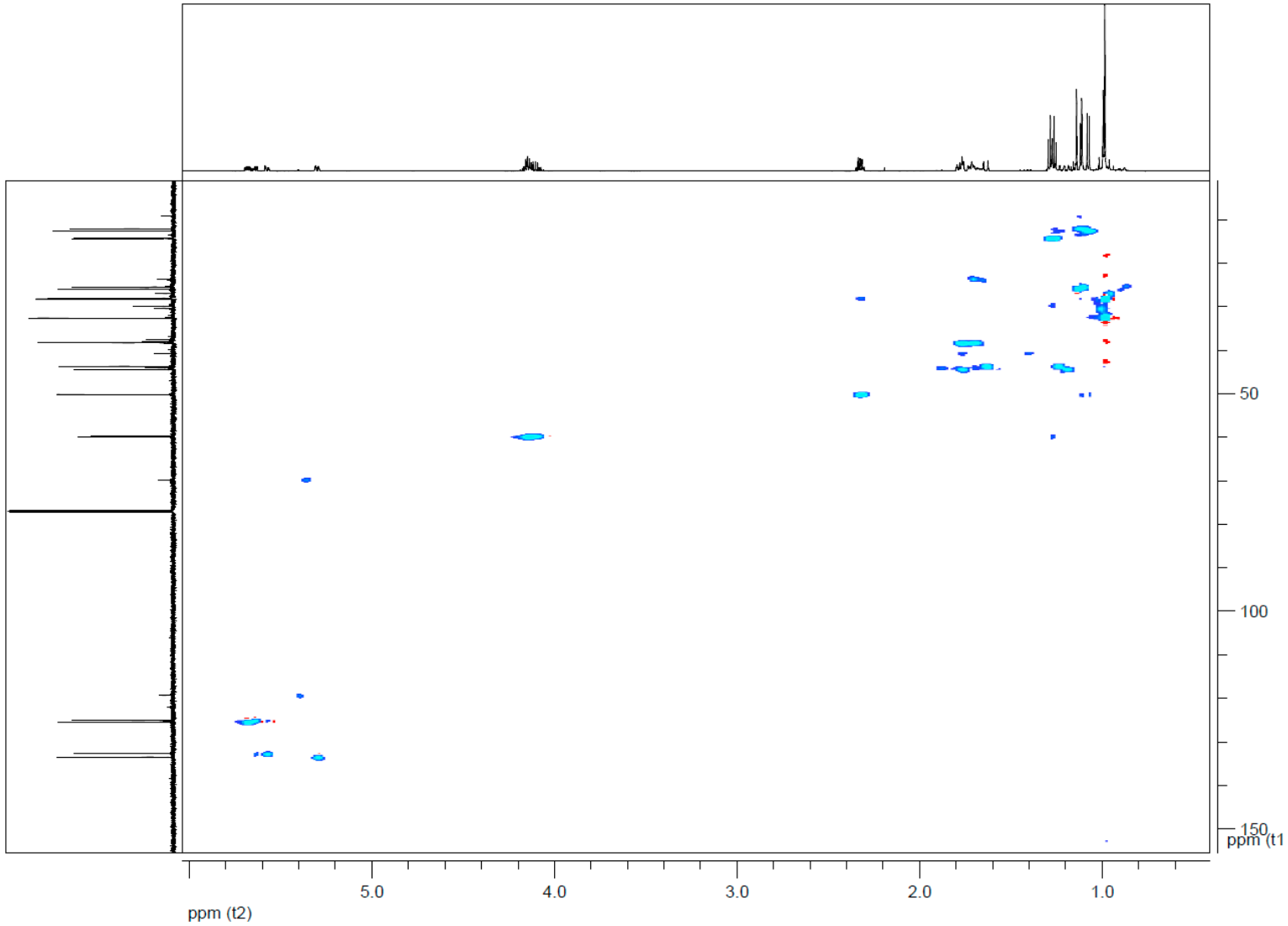


Figure S49. HMQC (151 MHz, $CDCl_3$) spectrum of ester **2b**.

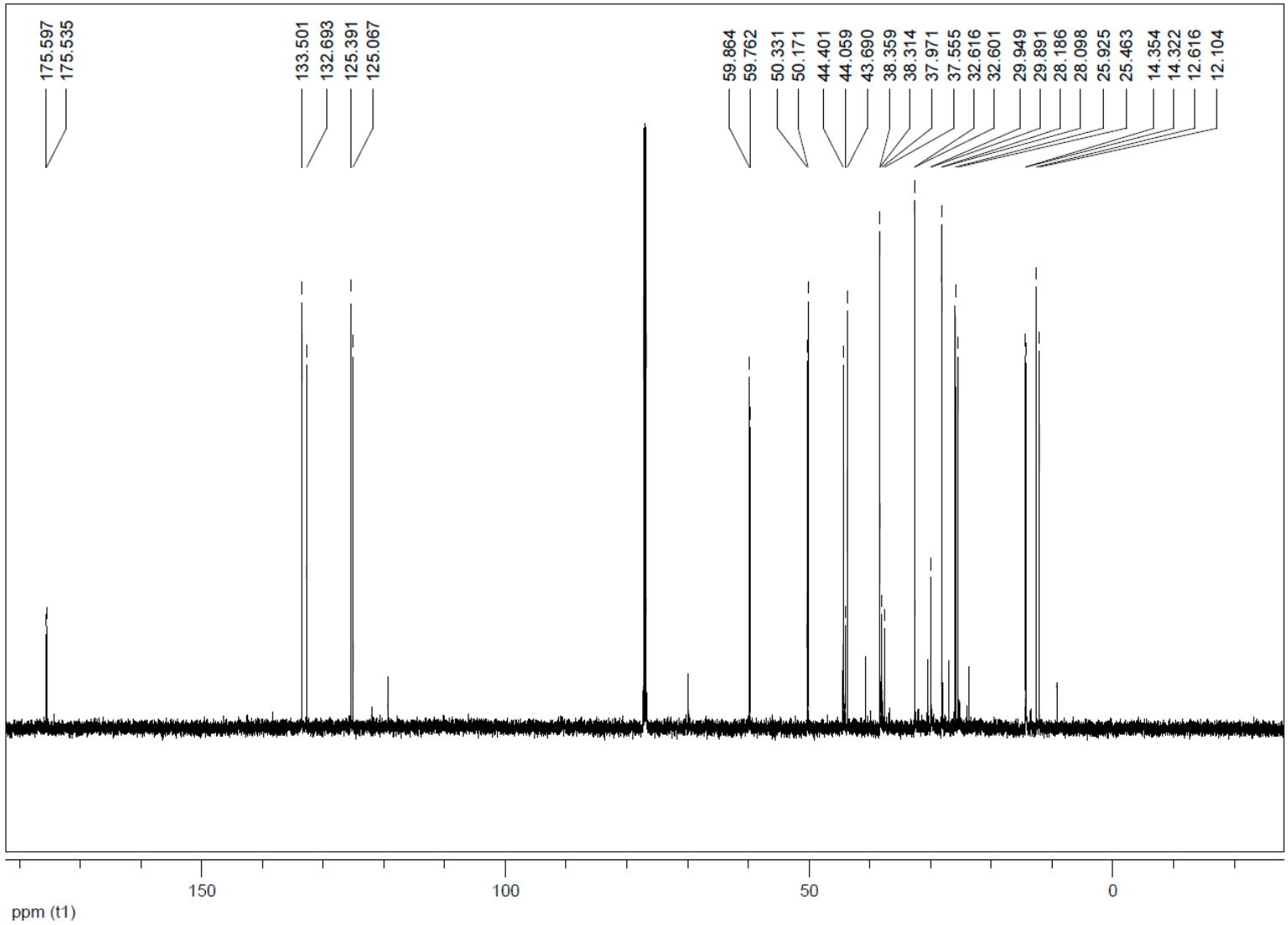


Figure S50. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of ester **2b**.

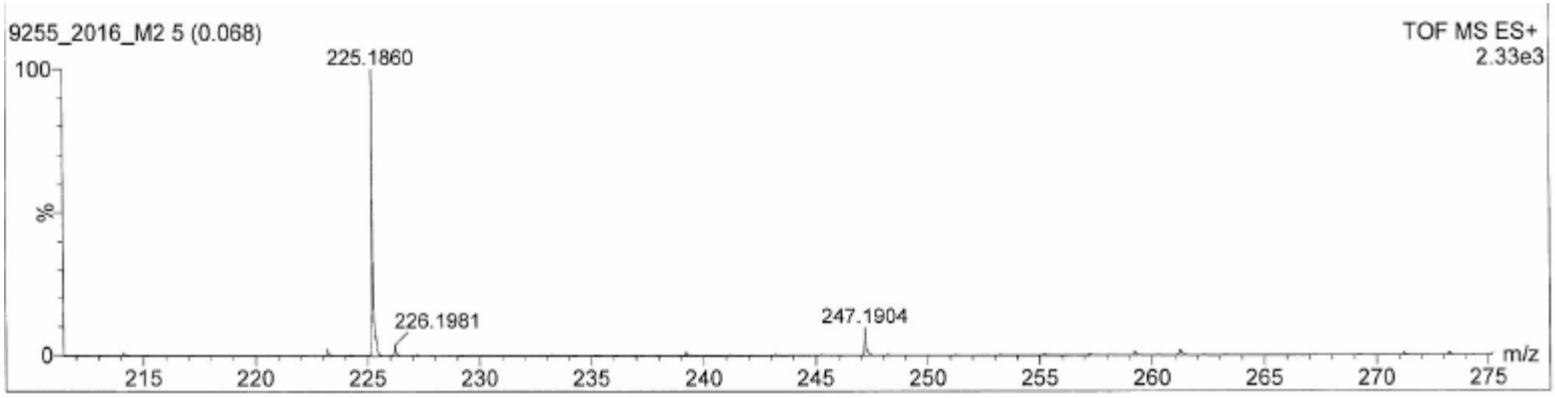


Figure S51. HRMS spectrum of ester **2b**.

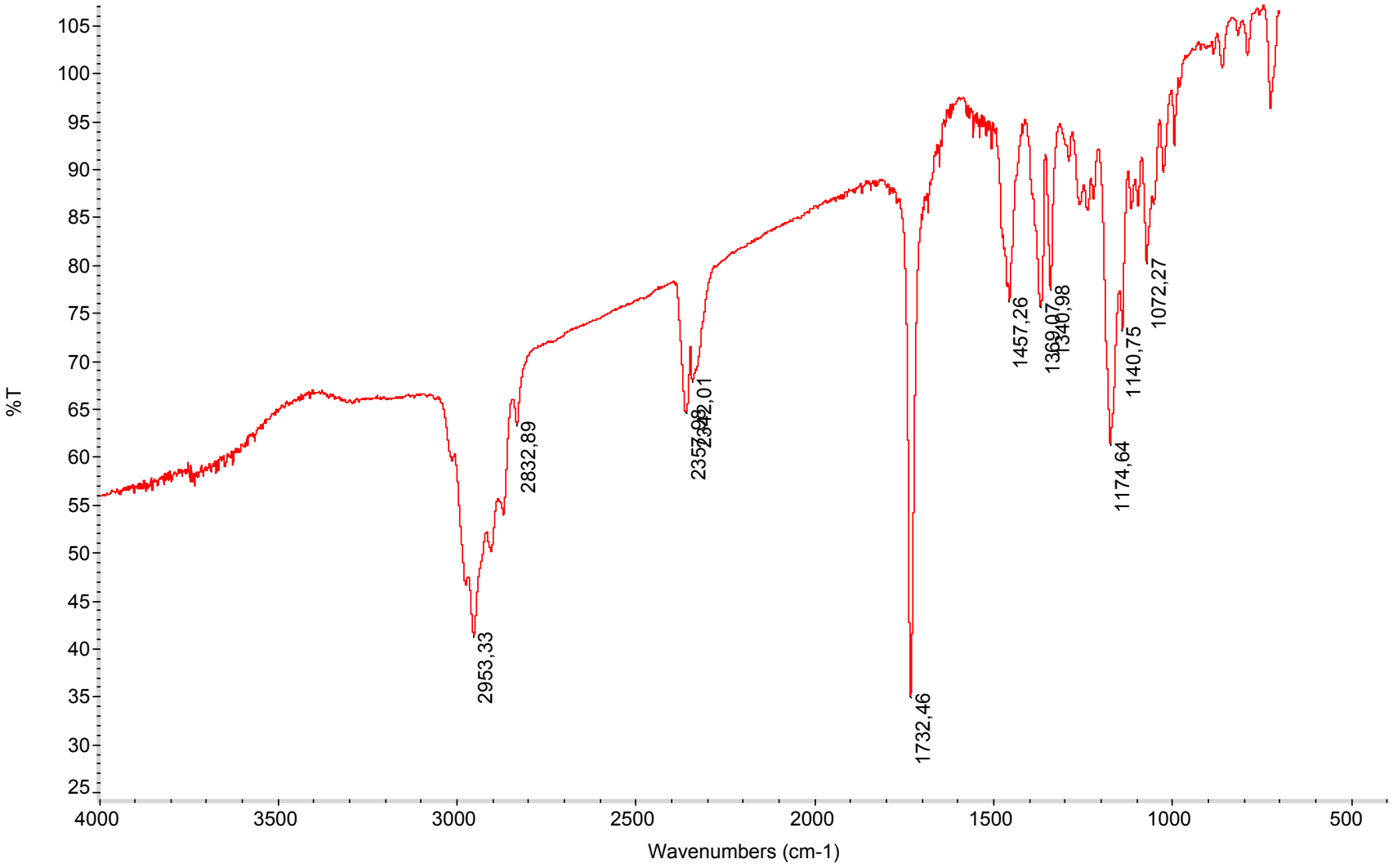


Figure S52. IR spectrum of ester **2b**.

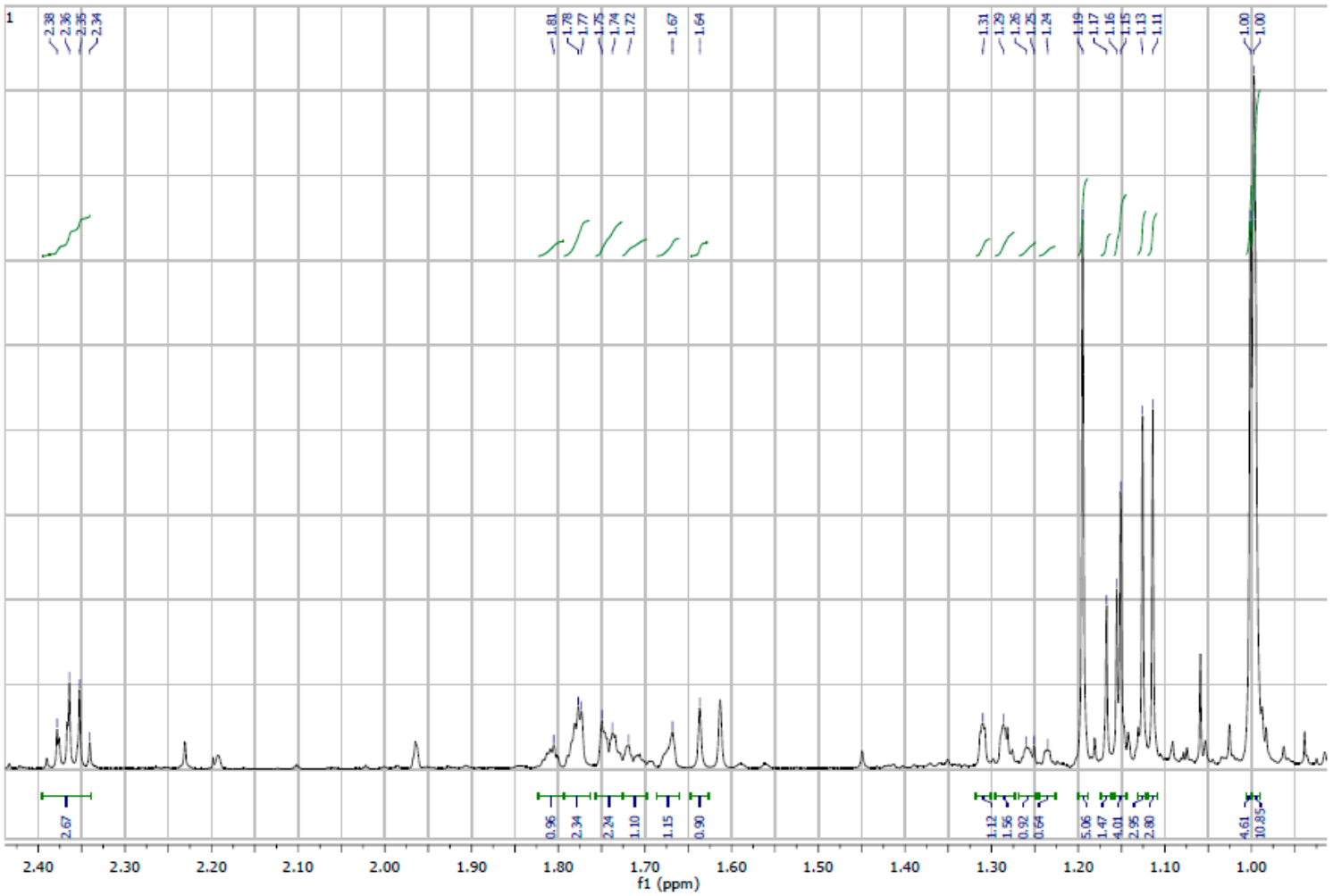


Figure S53. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of acid **3b**.

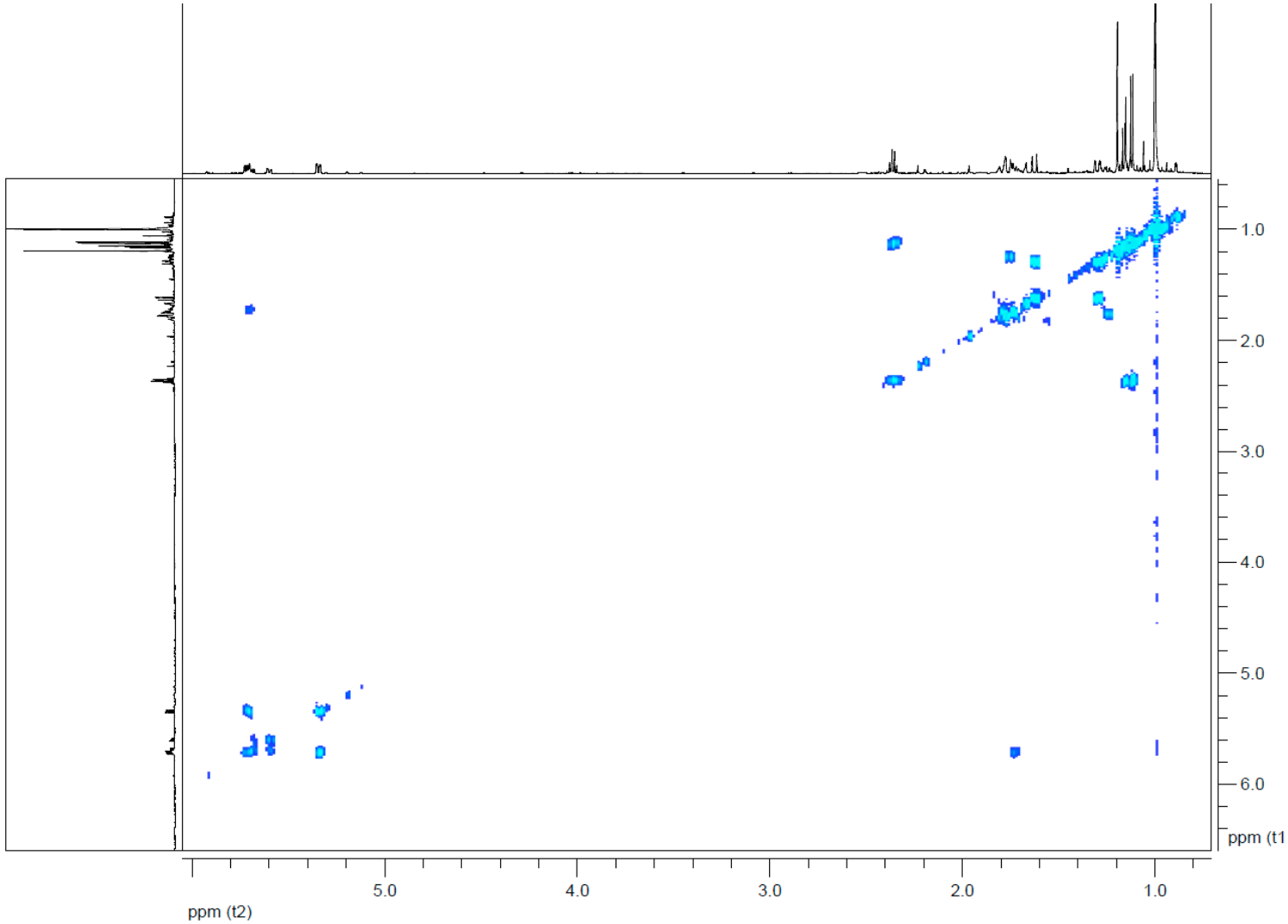


Figure S54. COSY (151 MHz, $CDCl_3$) spectrum of acid **3b**.

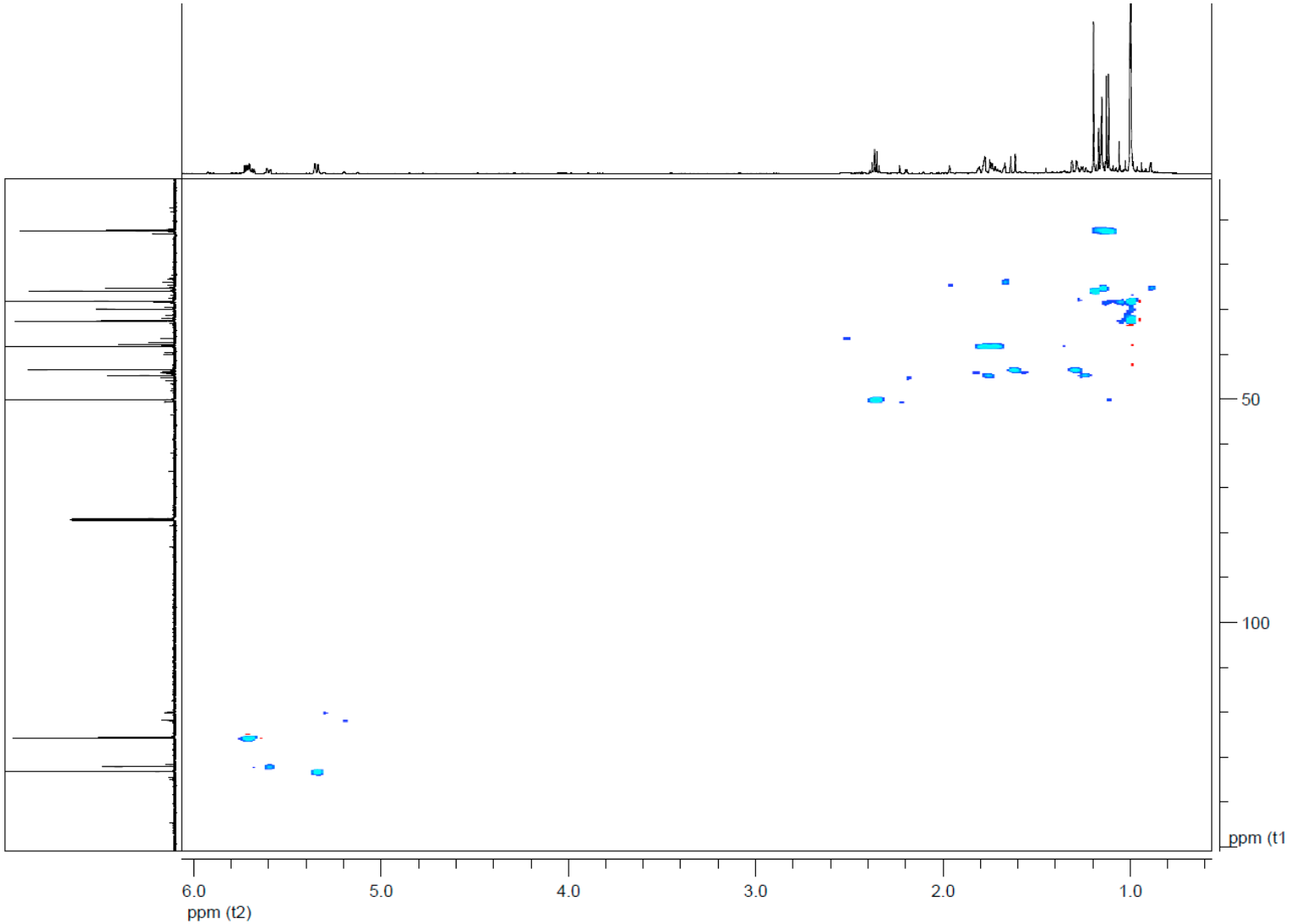


Figure S55. HMQC (151 MHz, $CDCl_3$) spectrum of acid **3b**.

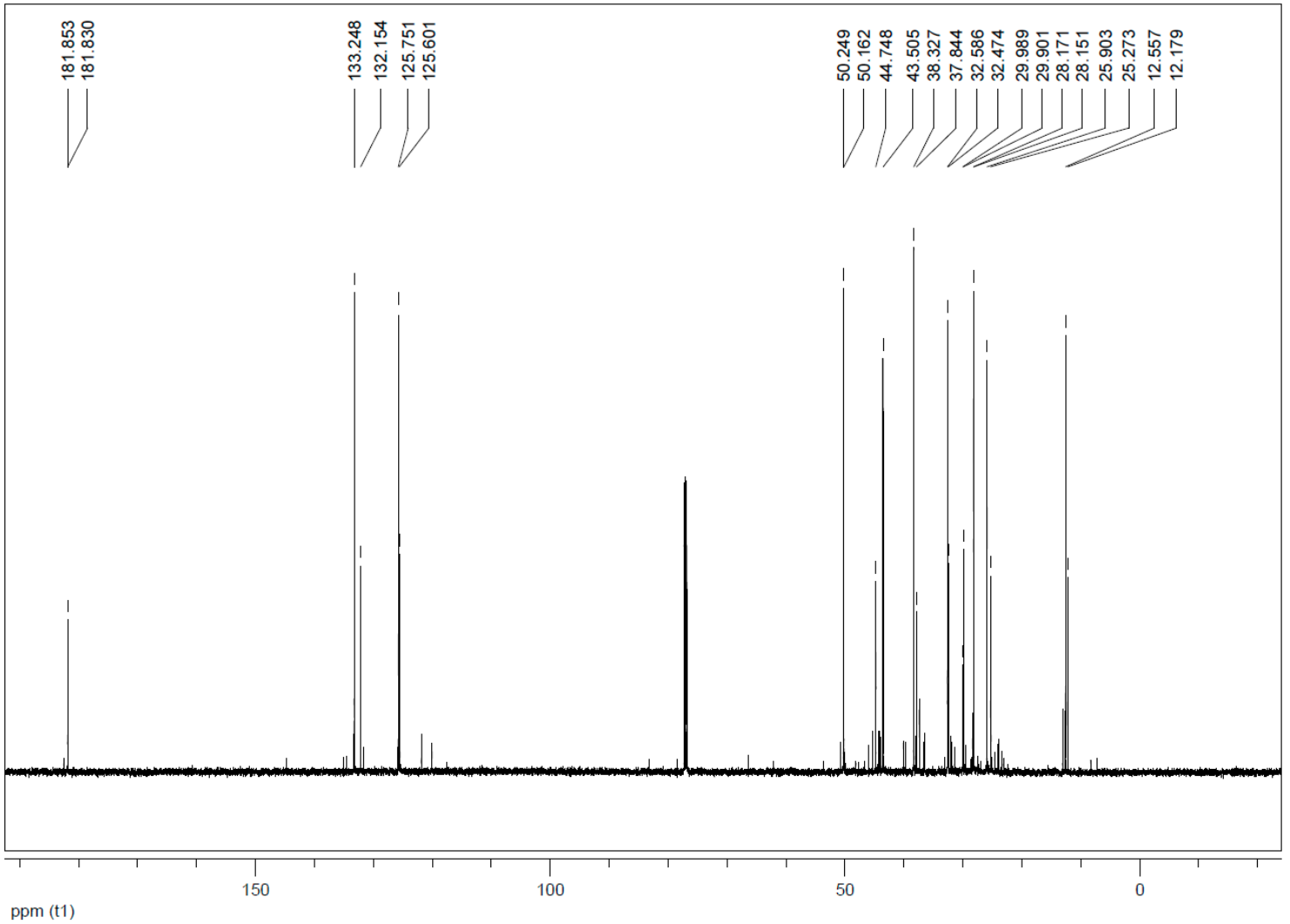


Figure S56. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of acid **3b**.

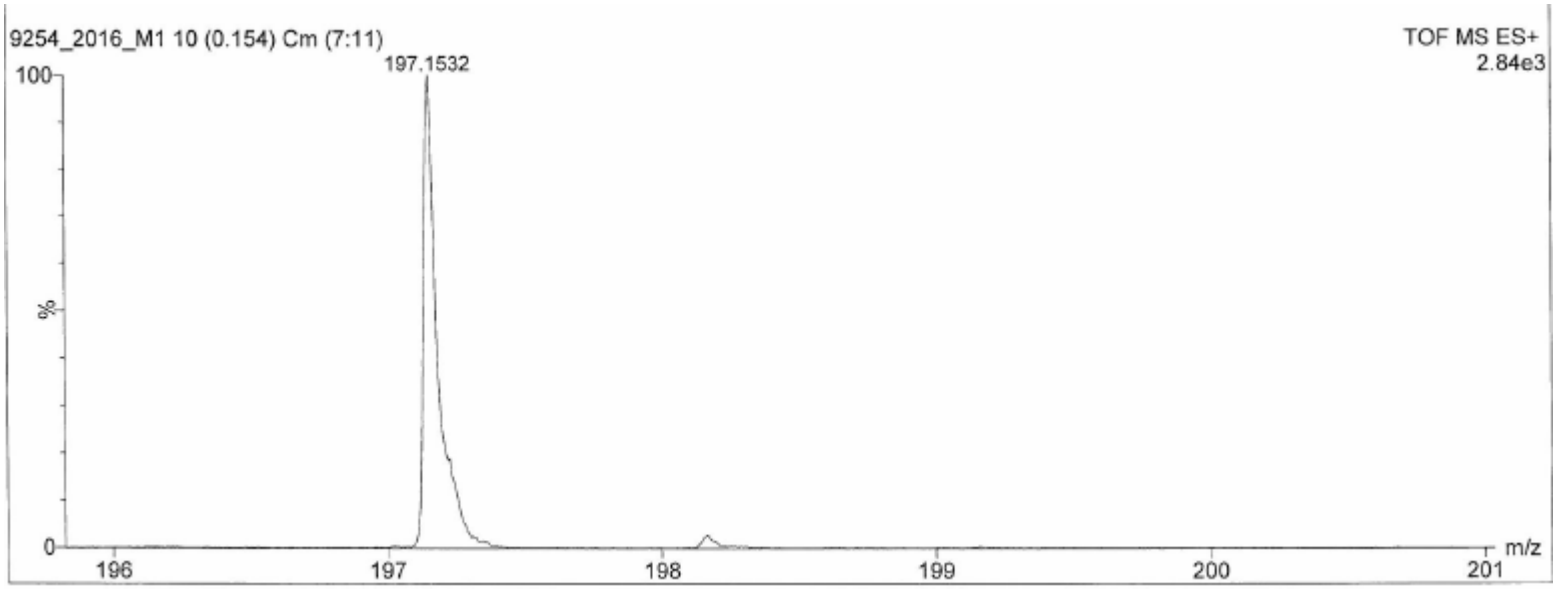


Figure S57. HRMS spectrum of acid **3b**.

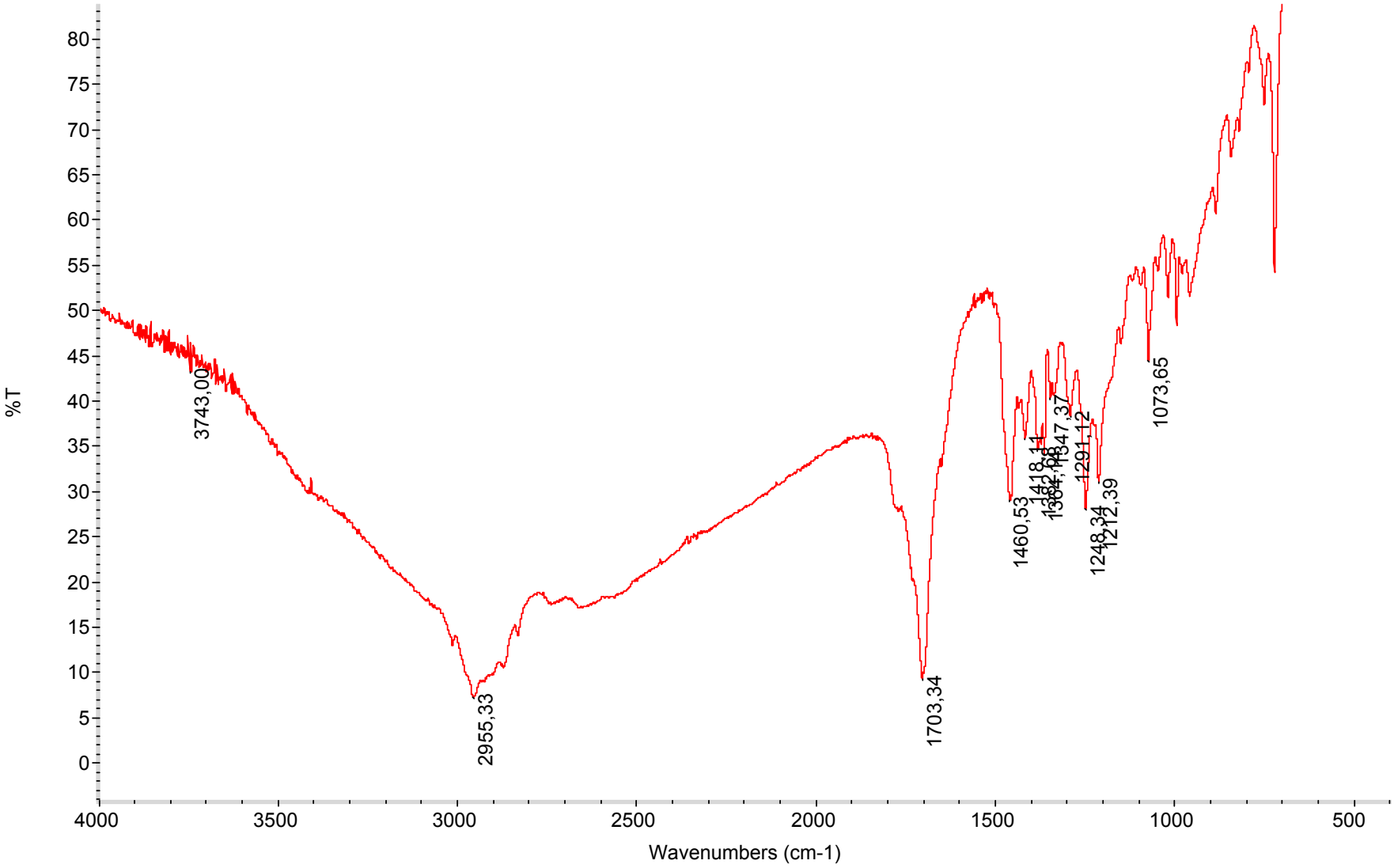


Figure S58. IR spectrum of acid **3b**.

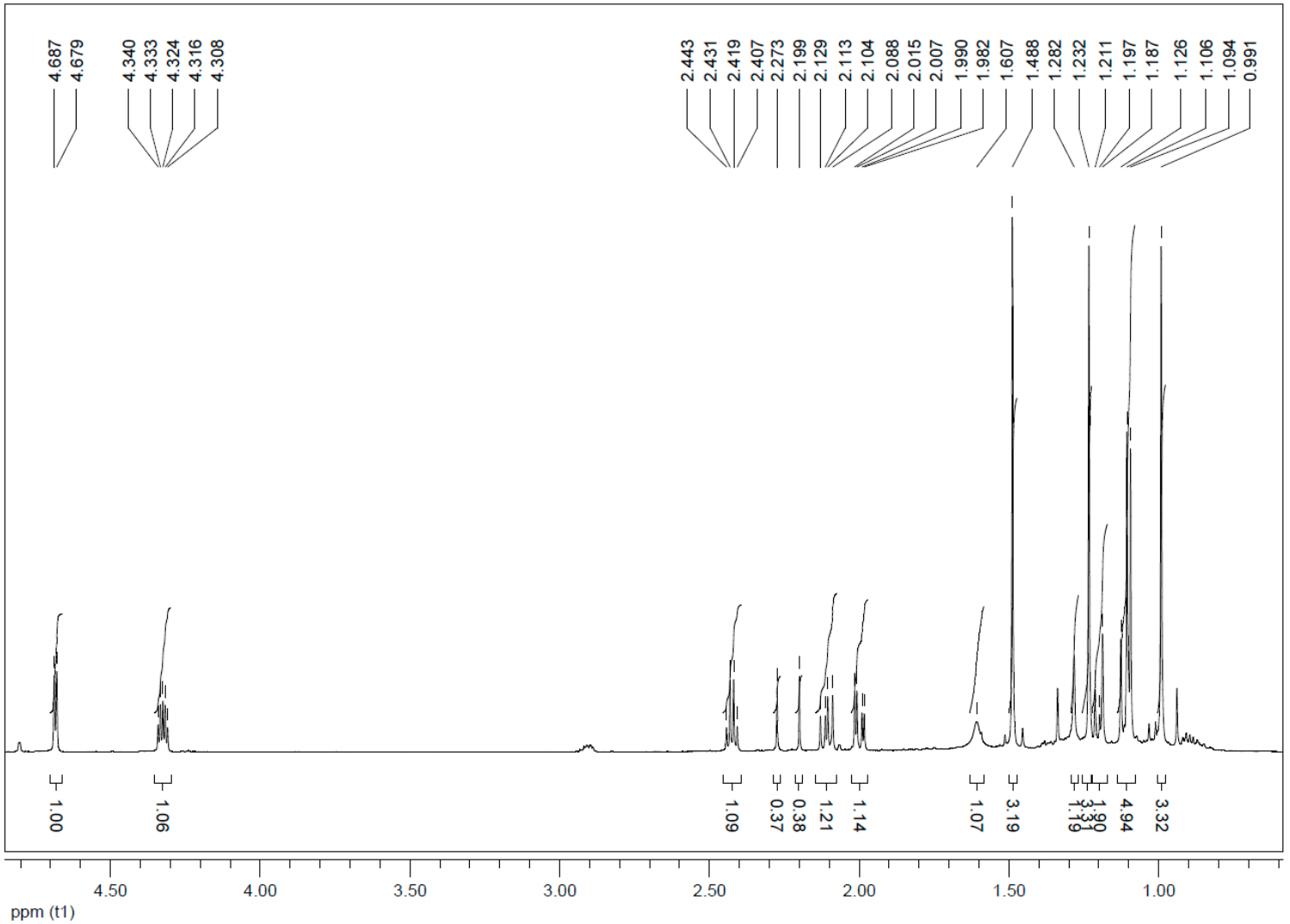


Figure S59. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of iodolactone **4b-A**.

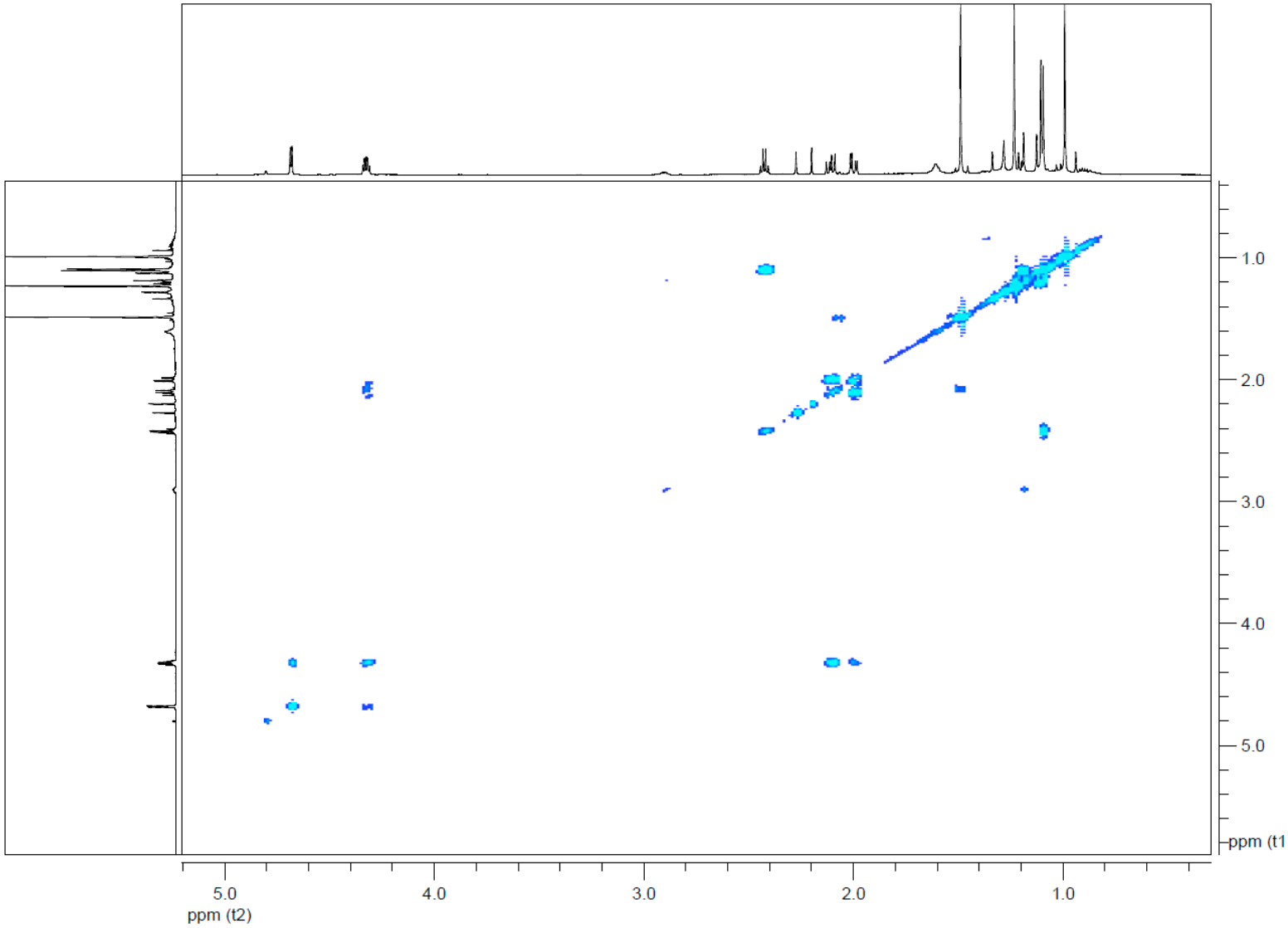


Figure S60. COSY (151 MHz, $CDCl_3$) spectrum of iodolactone **4b-A**.

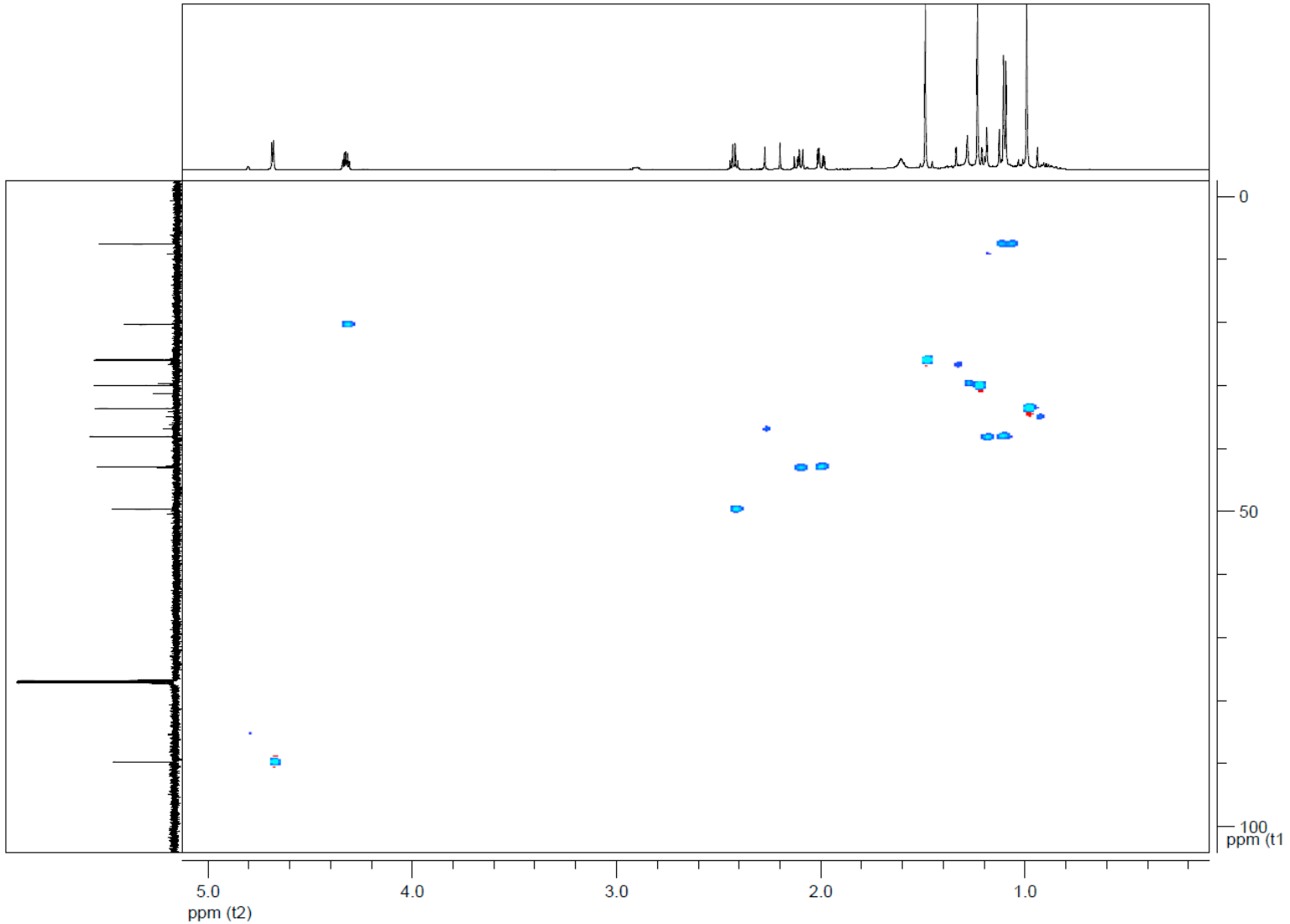


Figure S61. HMQC (151 MHz, $CDCl_3$) spectrum of iodolactone **4b-A**.

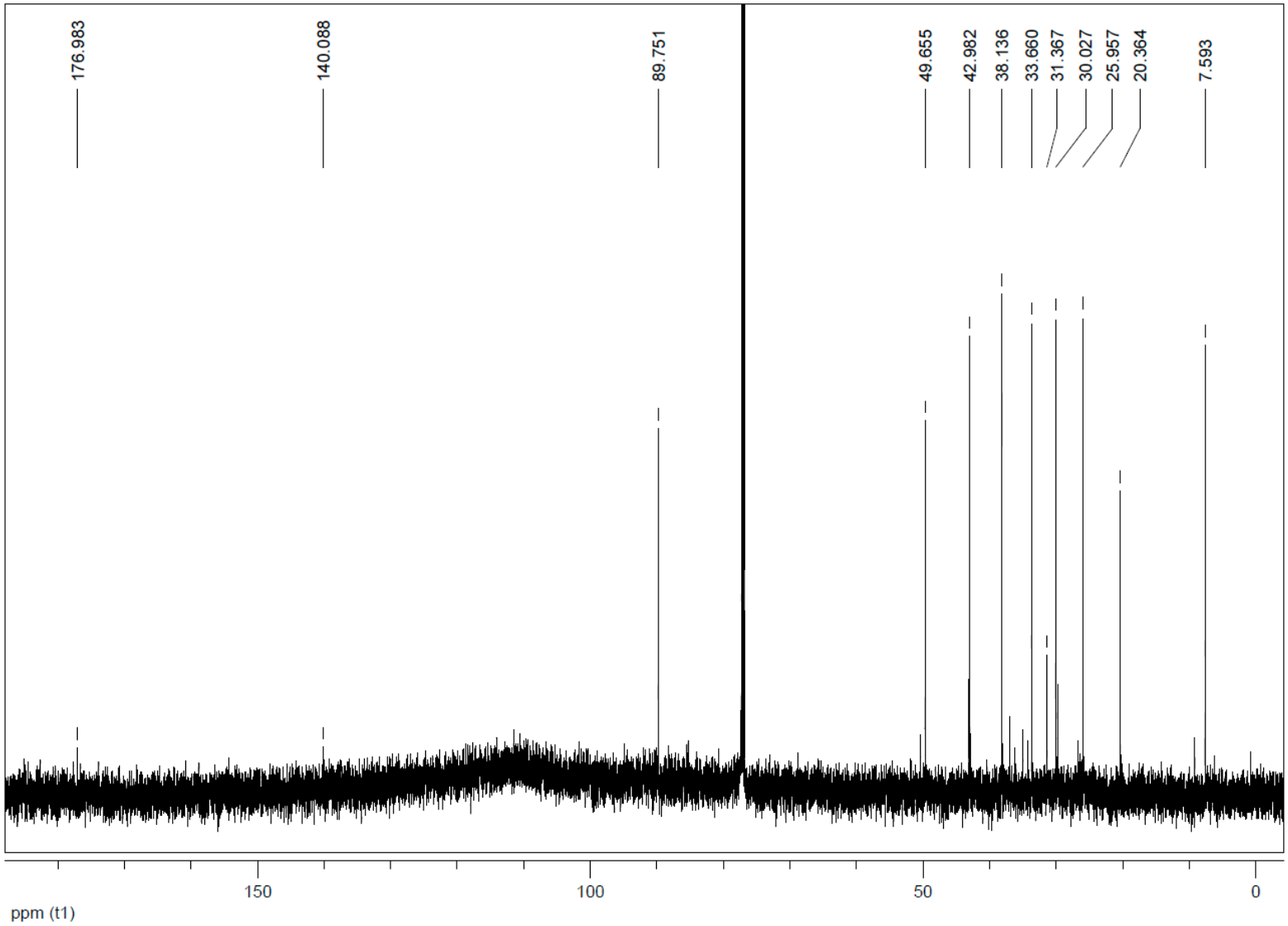


Figure S62. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of iodolactone **4b-A**.

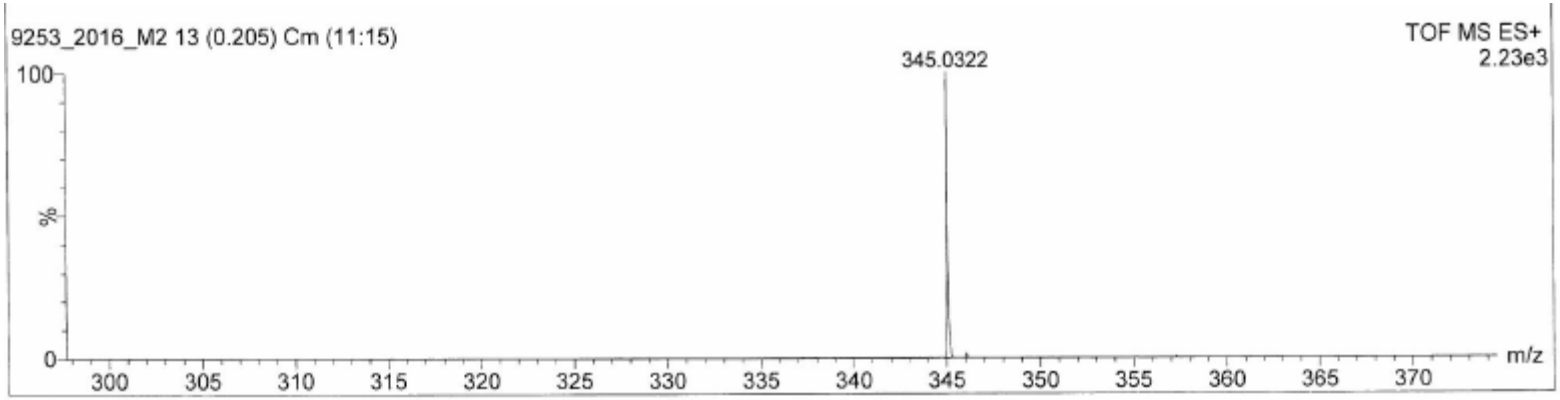


Figure S63. HRMS spectrum of iodolactone **4b-A**.

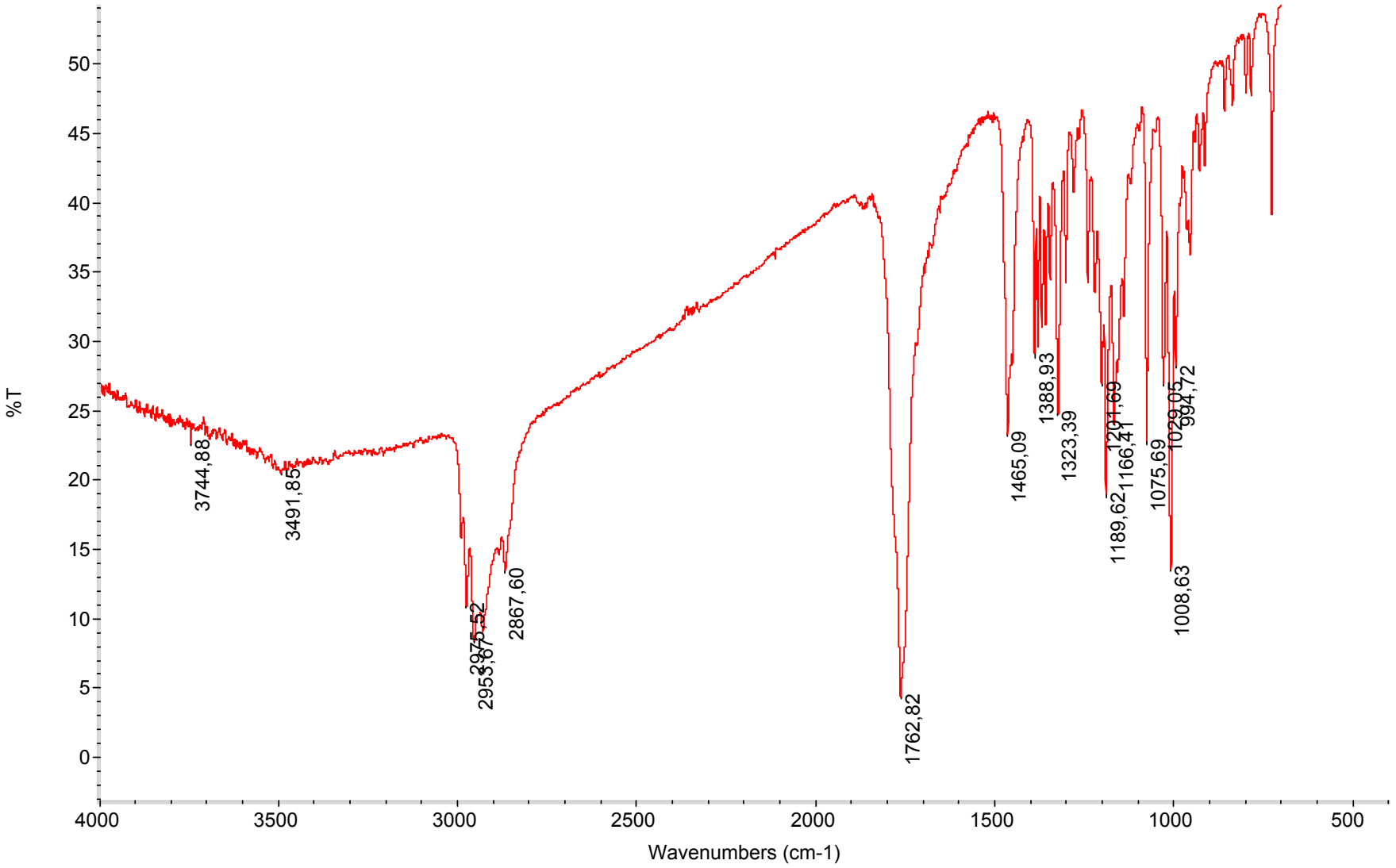


Figure S64. IR spectrum of iodolactone **4b-A**.

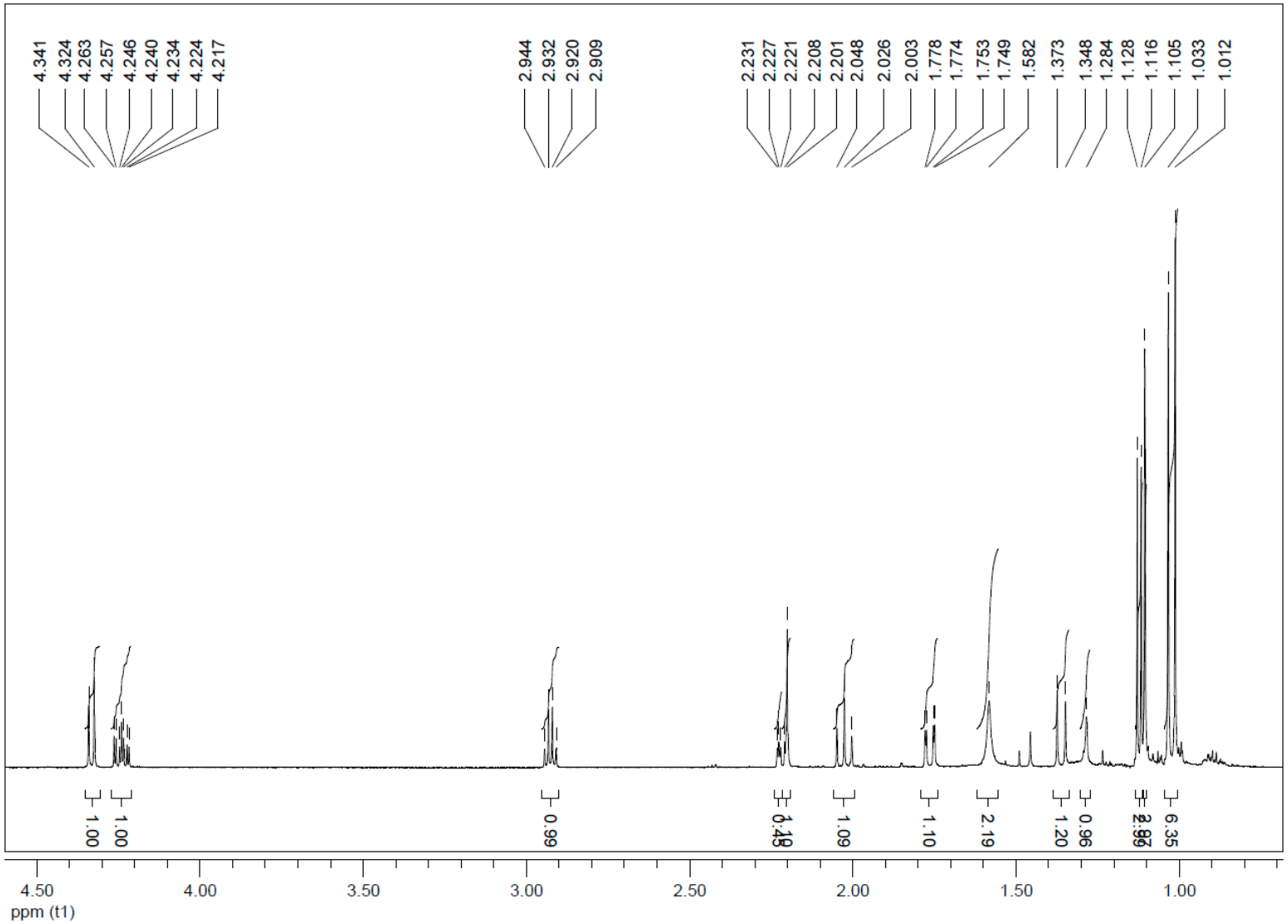


Figure S65. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of iodolactone **4b-B**.

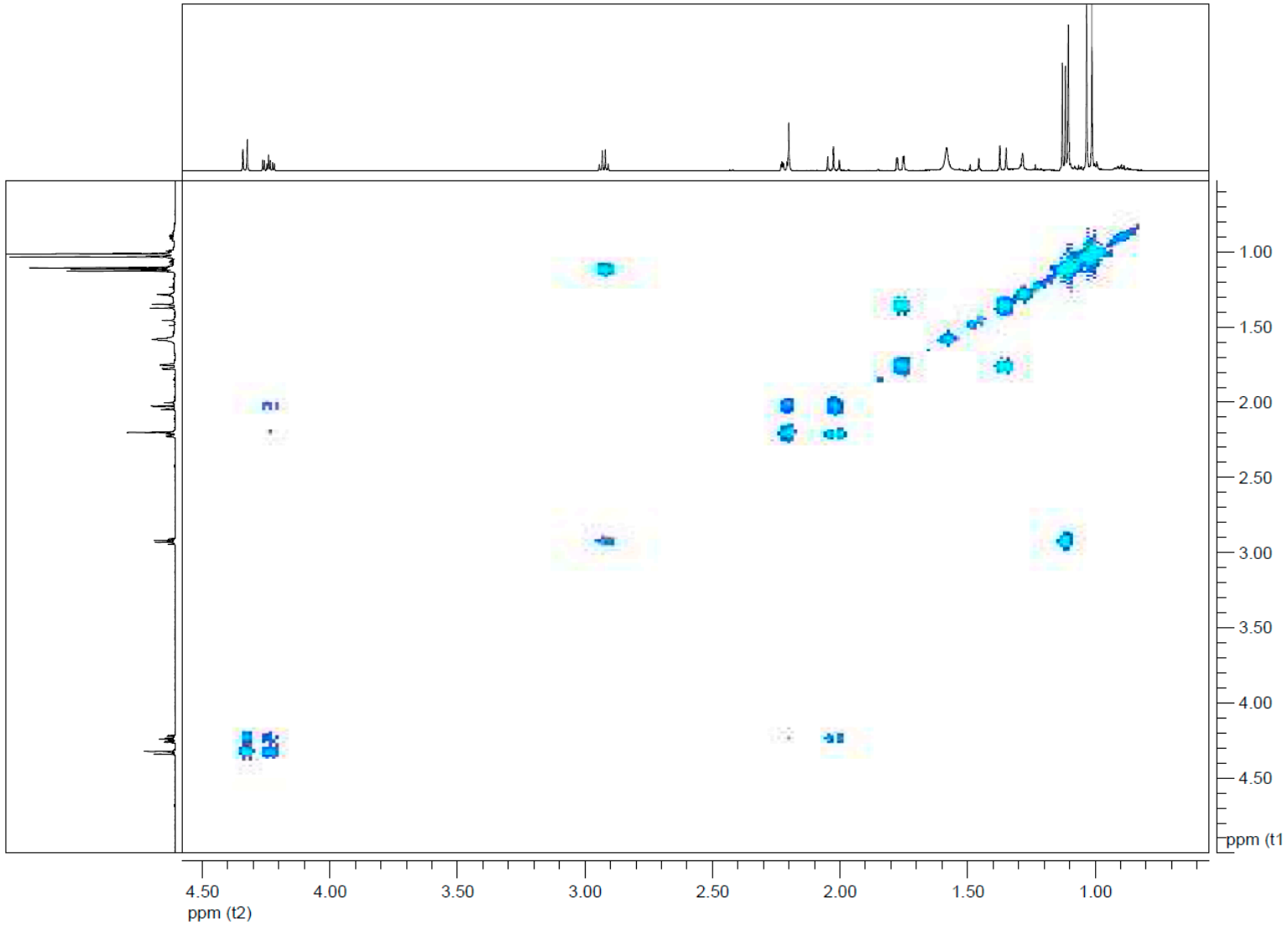


Figure S66. COSY (151 MHz, $CDCl_3$) spectrum of iodolactone **4b-B**.

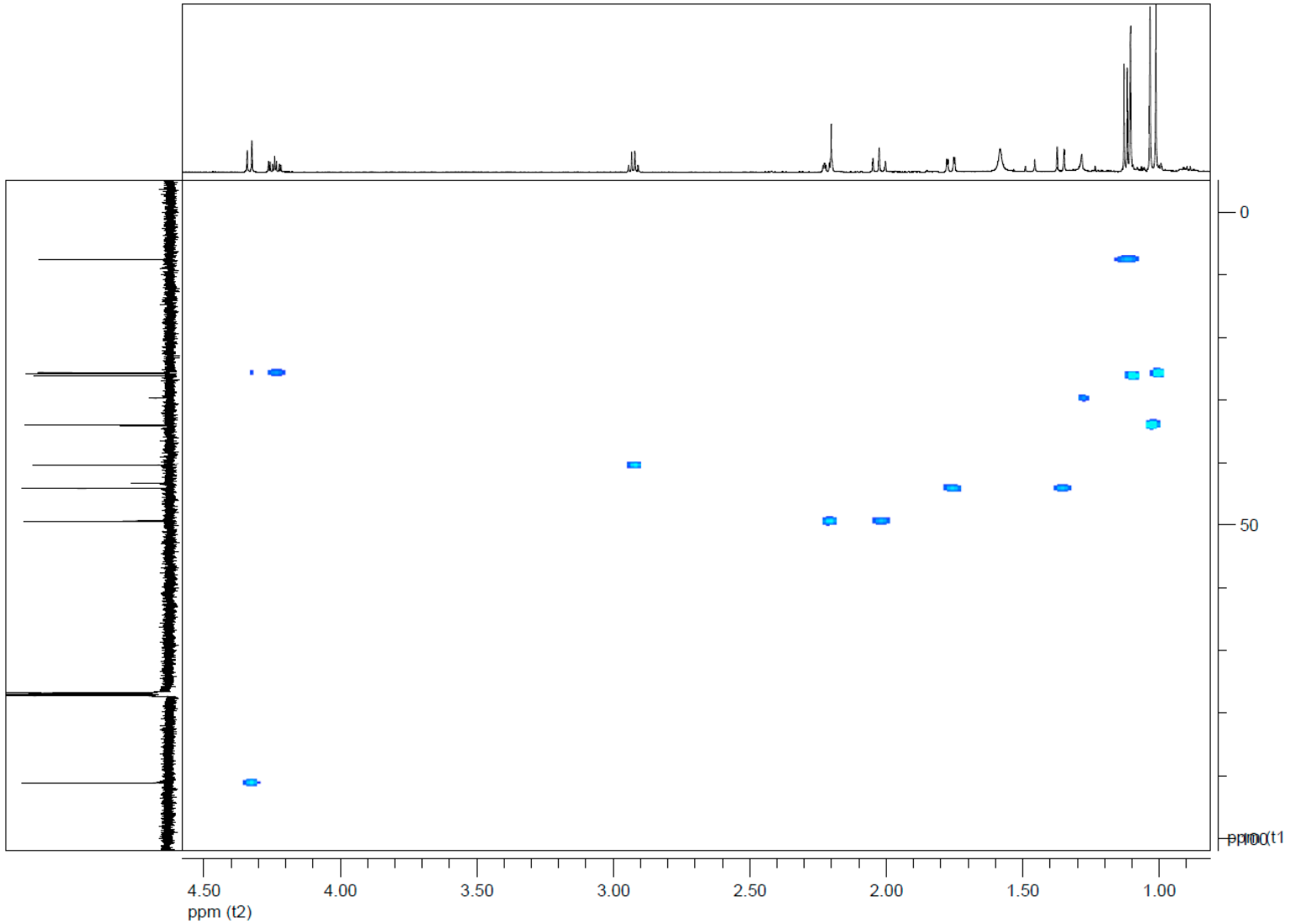


Figure S67. HMQC (151 MHz, $CDCl_3$) spectrum of iodolactone **4b-B**.

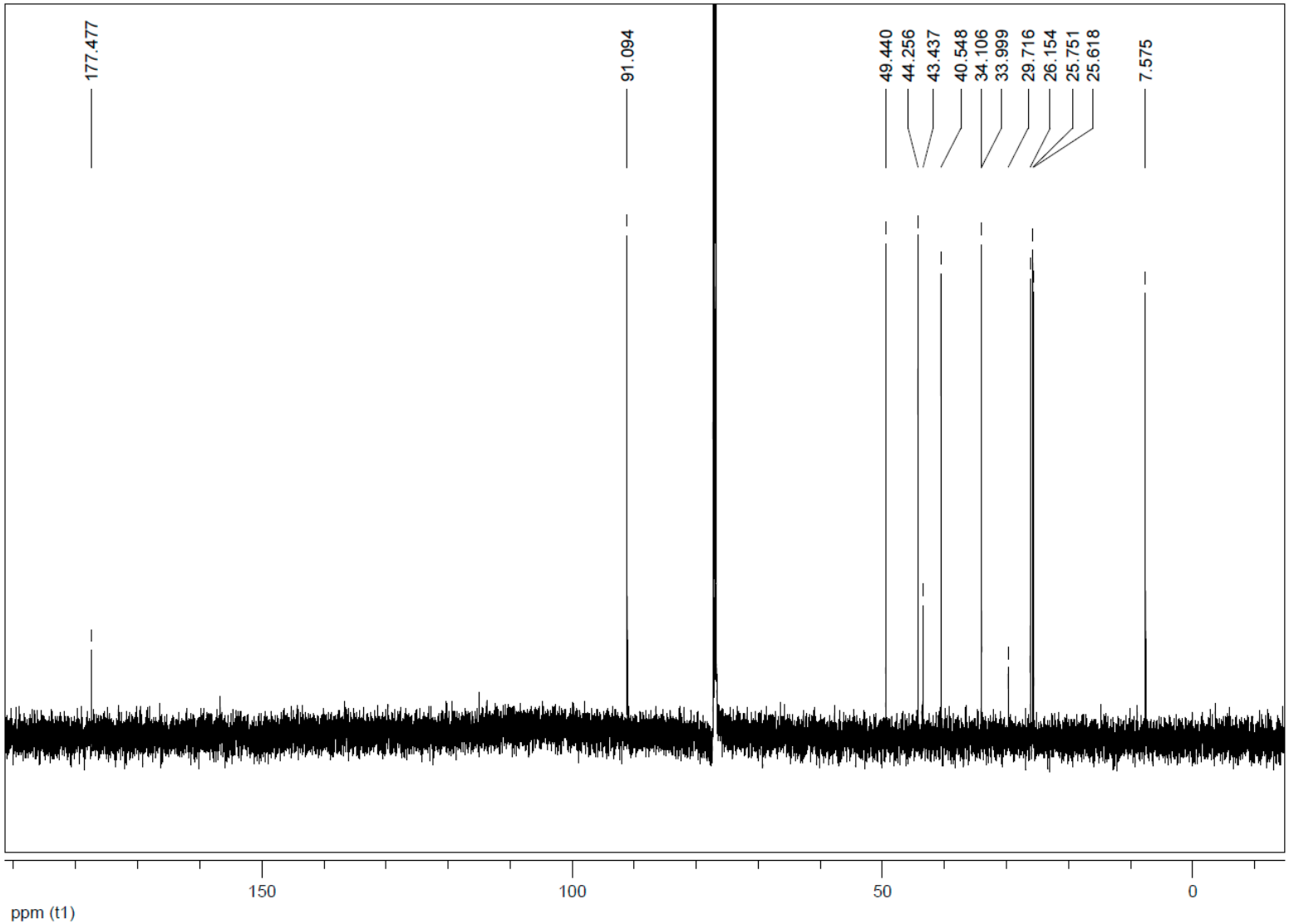


Figure S68. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of iodolactone **4b-B**.

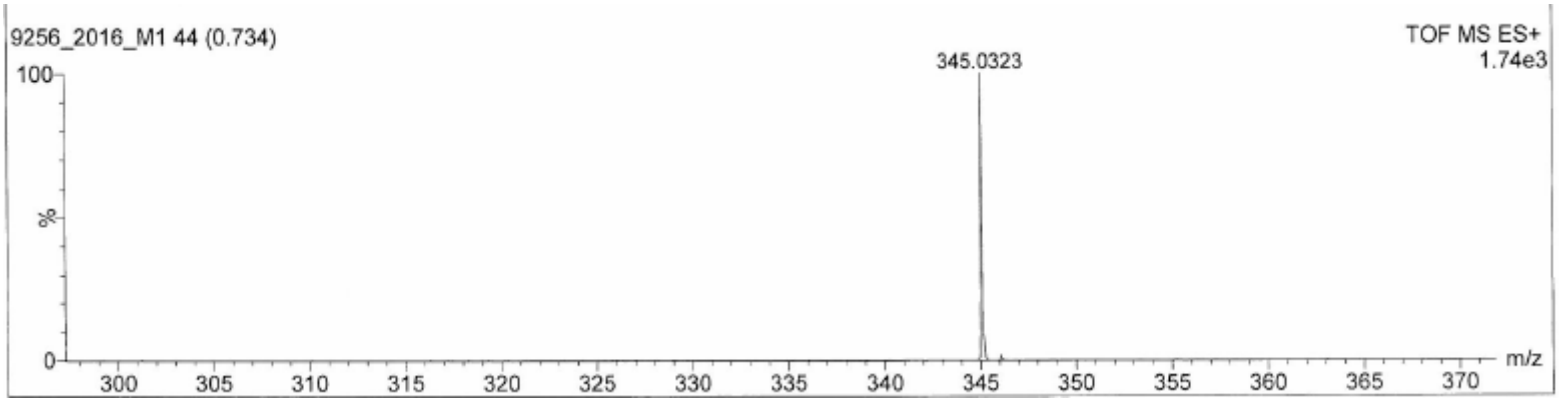


Figure S69. HRMS spectrum of iodolactone **4b-B**.

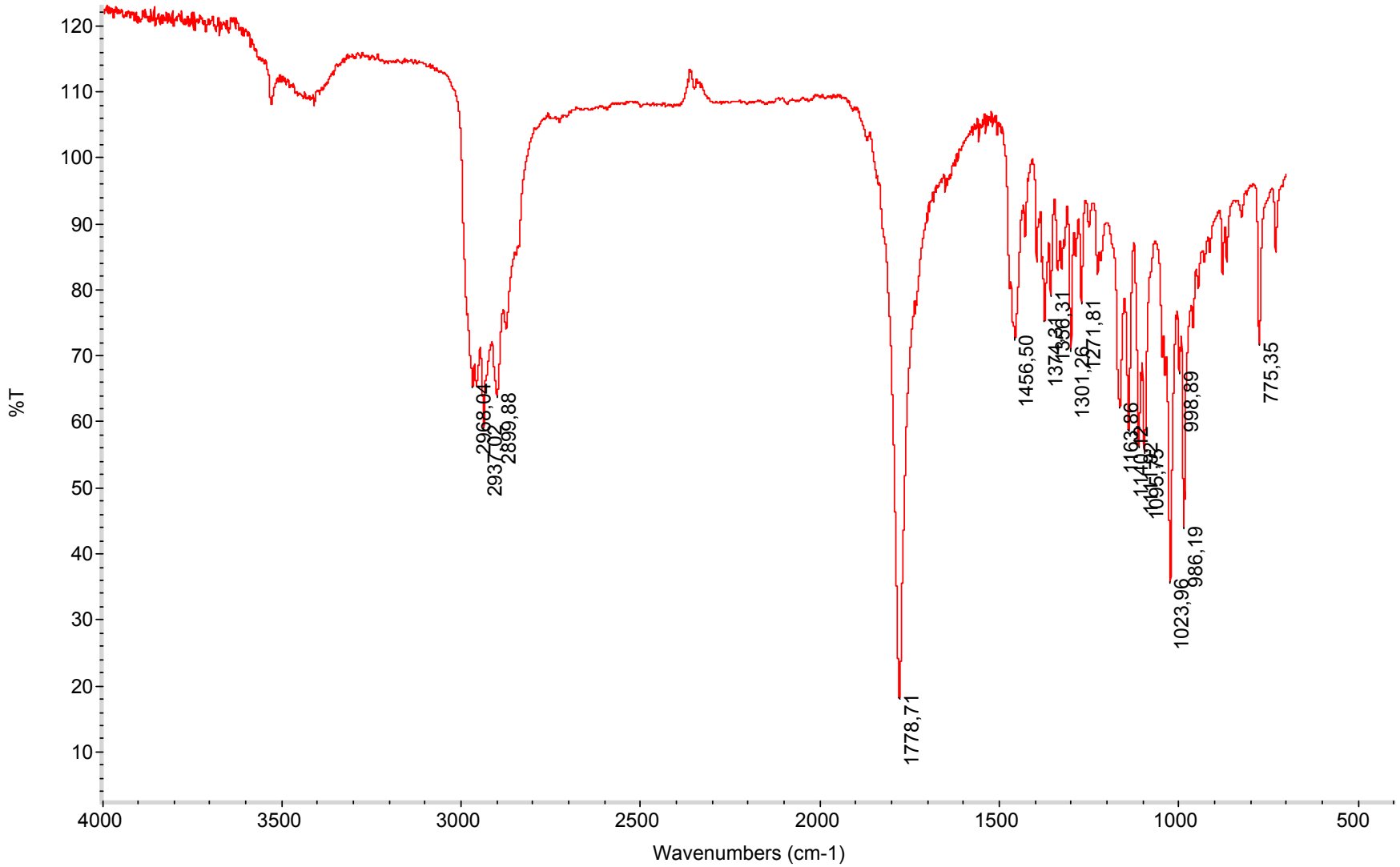


Figure S70. IR spectrum of iodolactone **4b-B**.

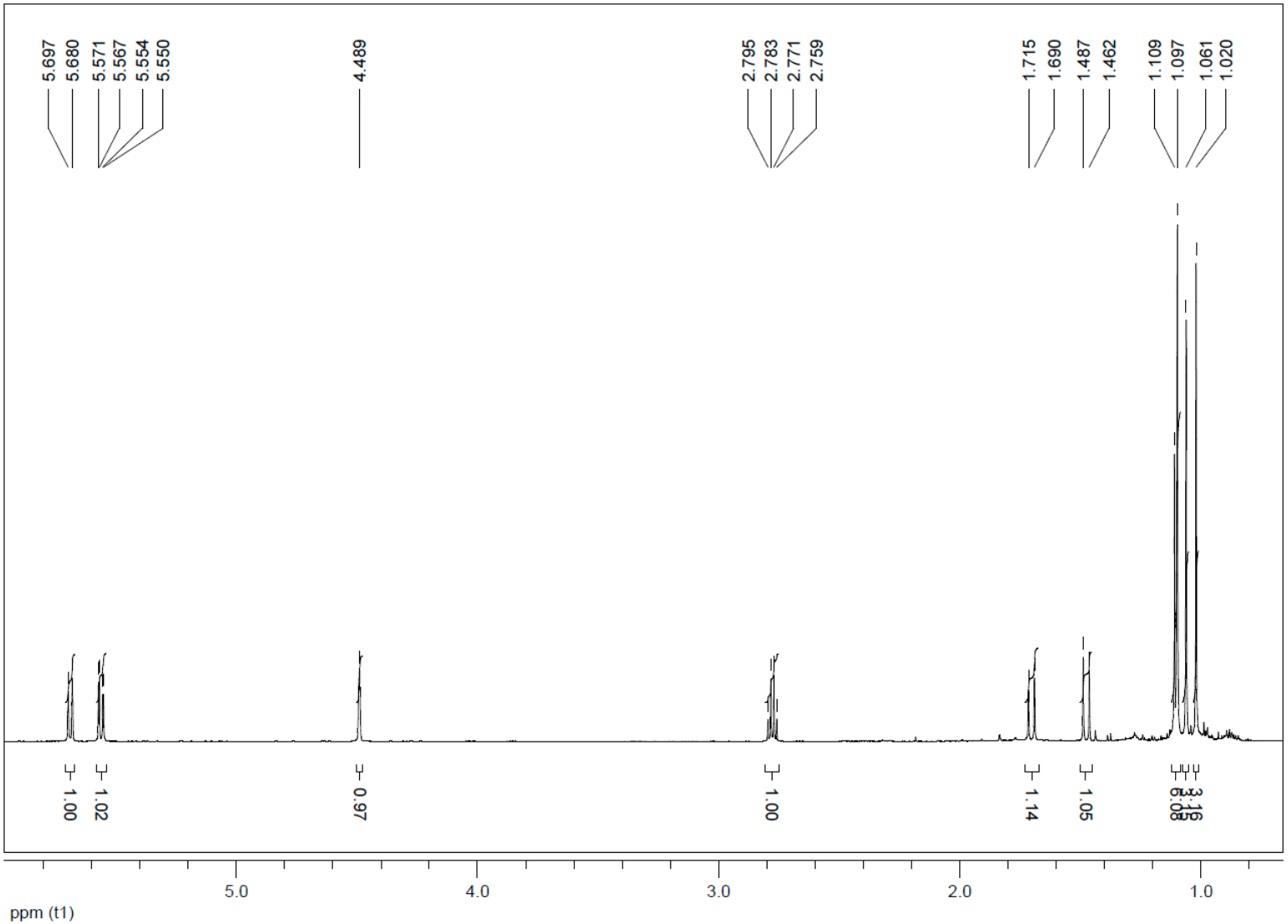


Figure S71. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of unsaturated lactone **5b-A**.

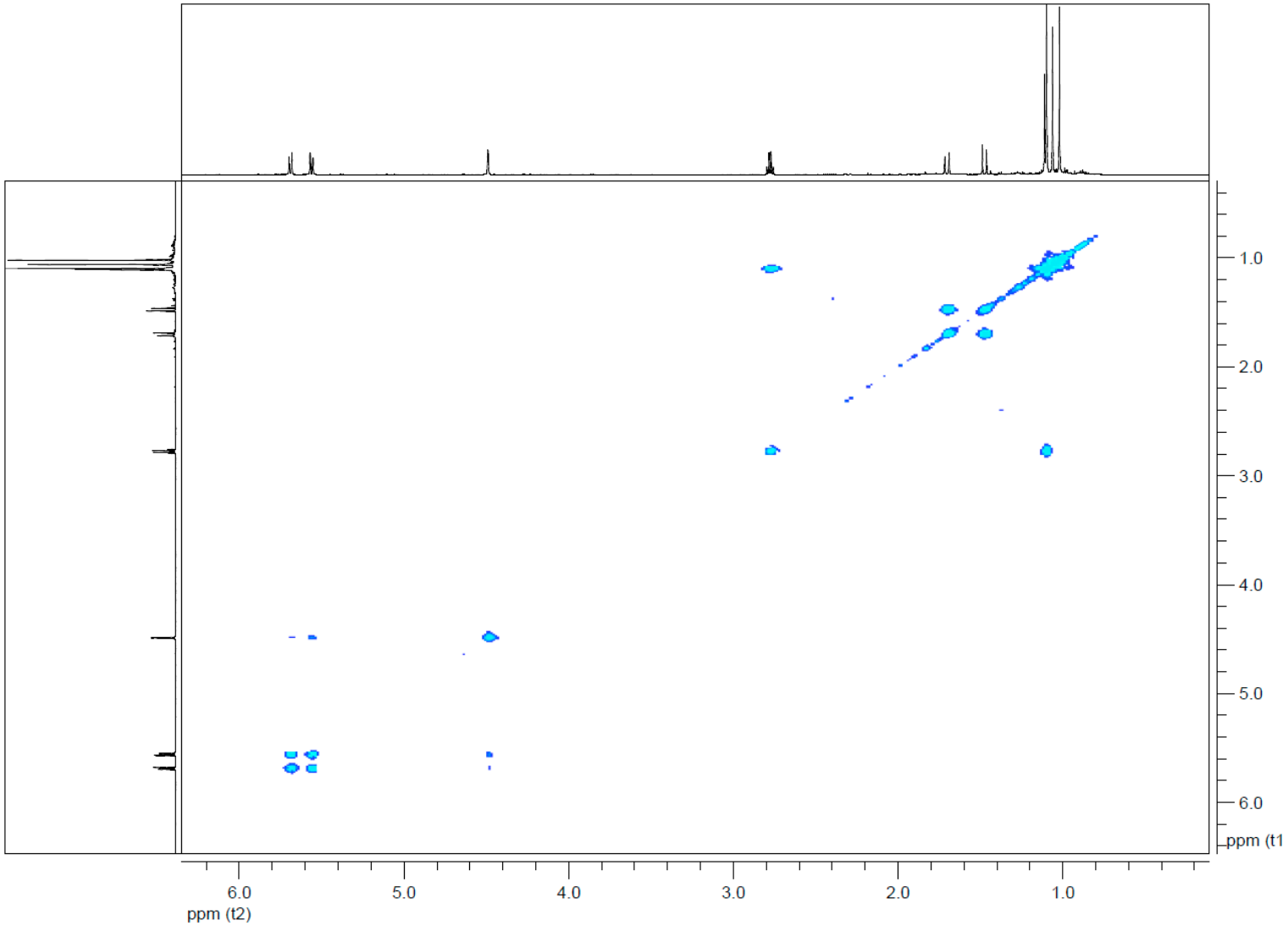


Figure S72. COSY (151 MHz, $CDCl_3$) spectrum of unsaturated lactone **5b-A**.

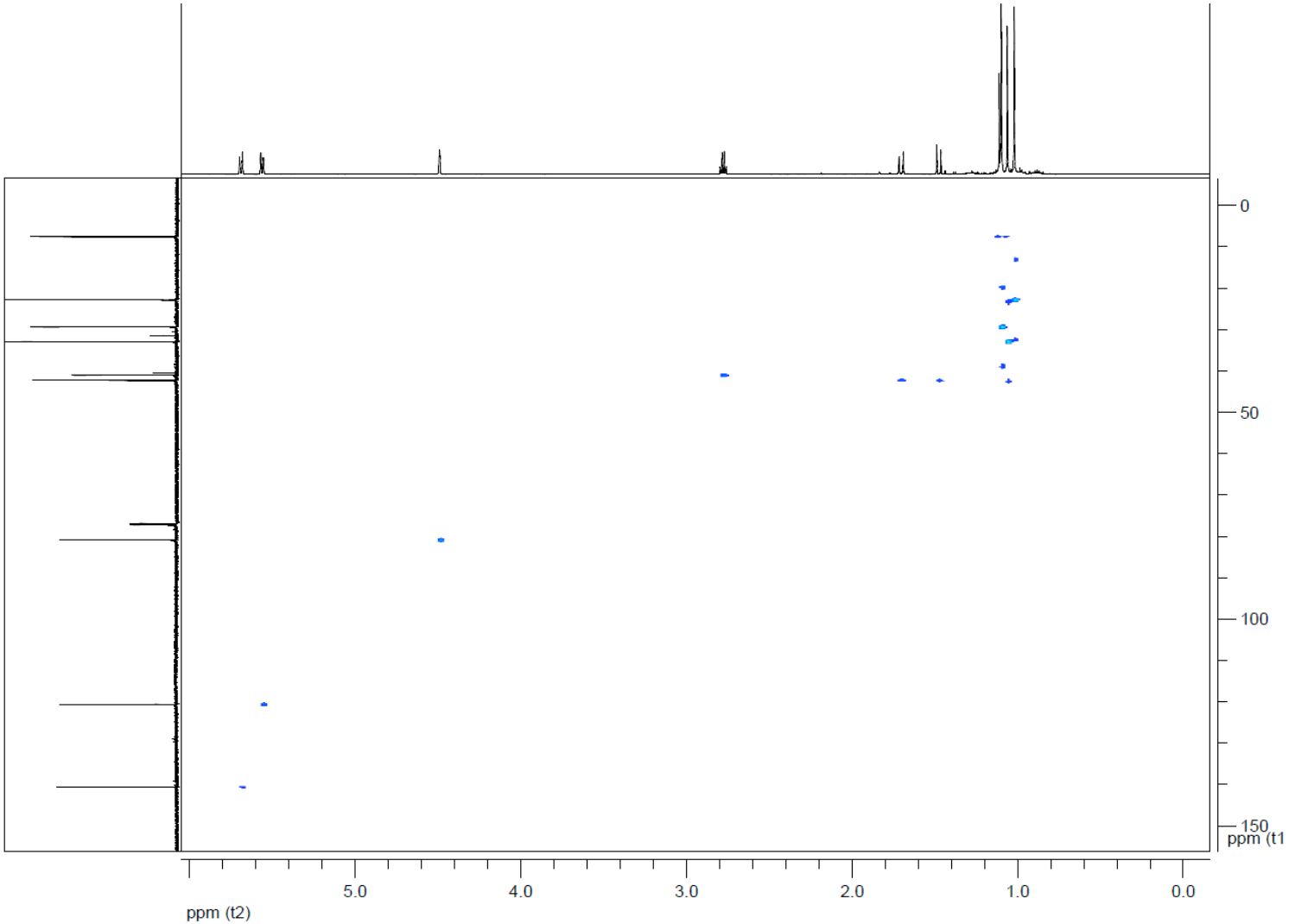


Figure S73. HMQC (151 MHz, $CDCl_3$) spectrum of unsaturated lactone **5b-A**.

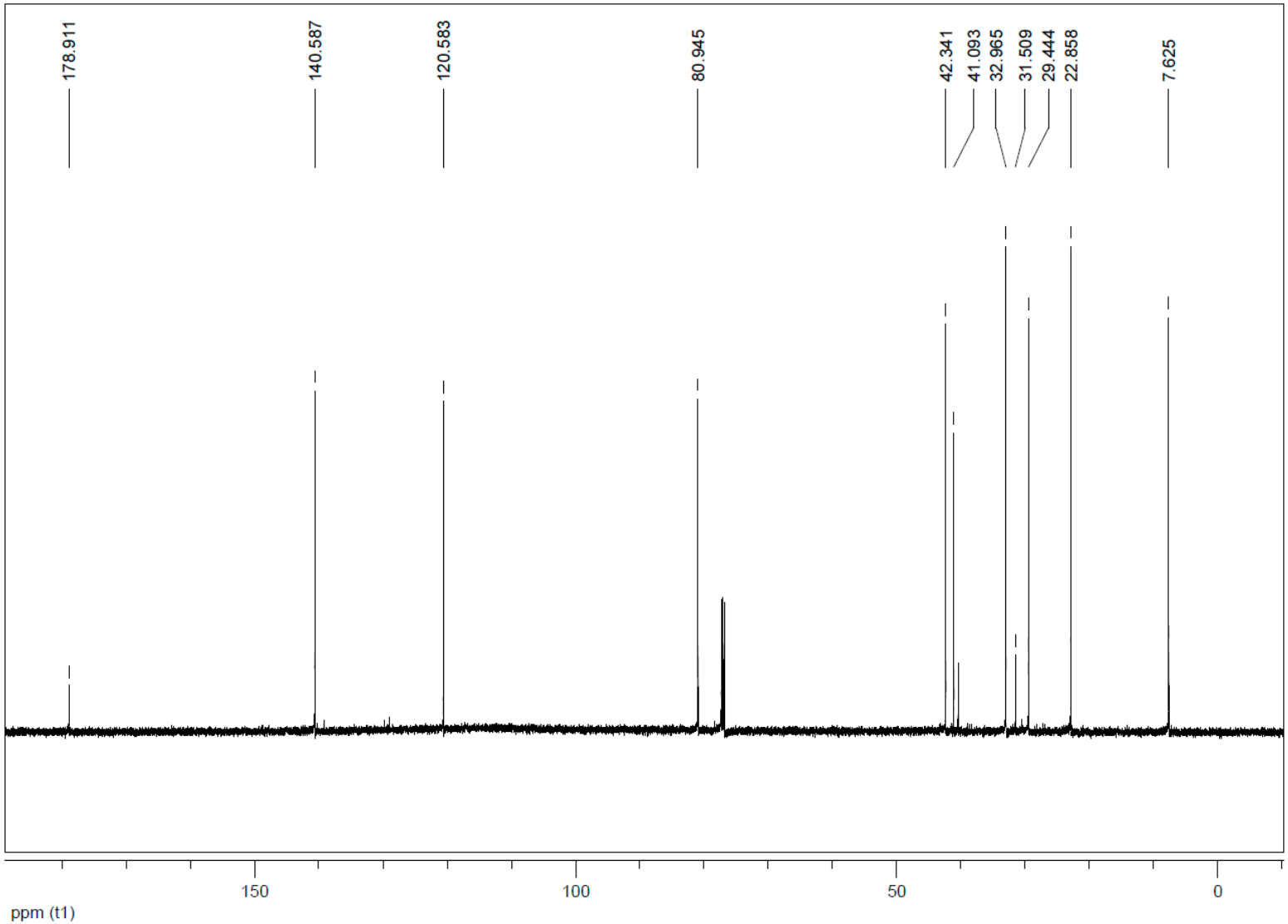


Figure S74. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of unsaturated lactone **5b-A**.

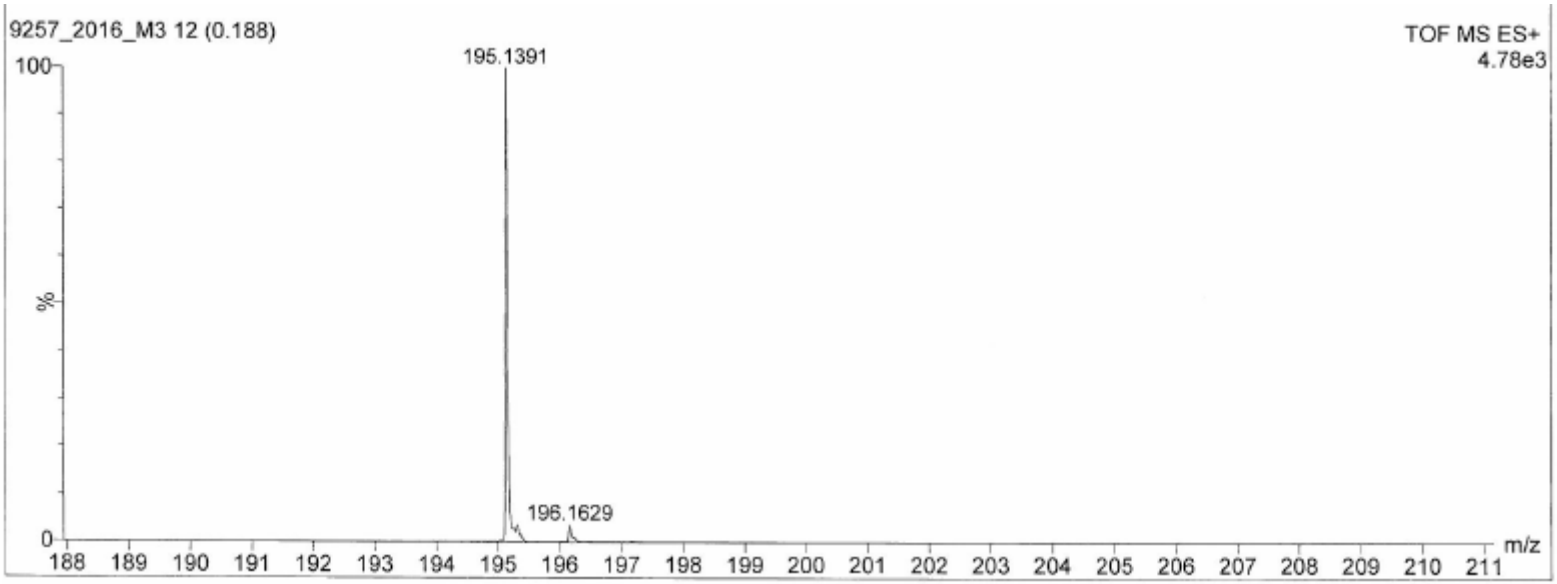


Figure S75. HRMS spectrum of unsaturated lactone **5b-A**.

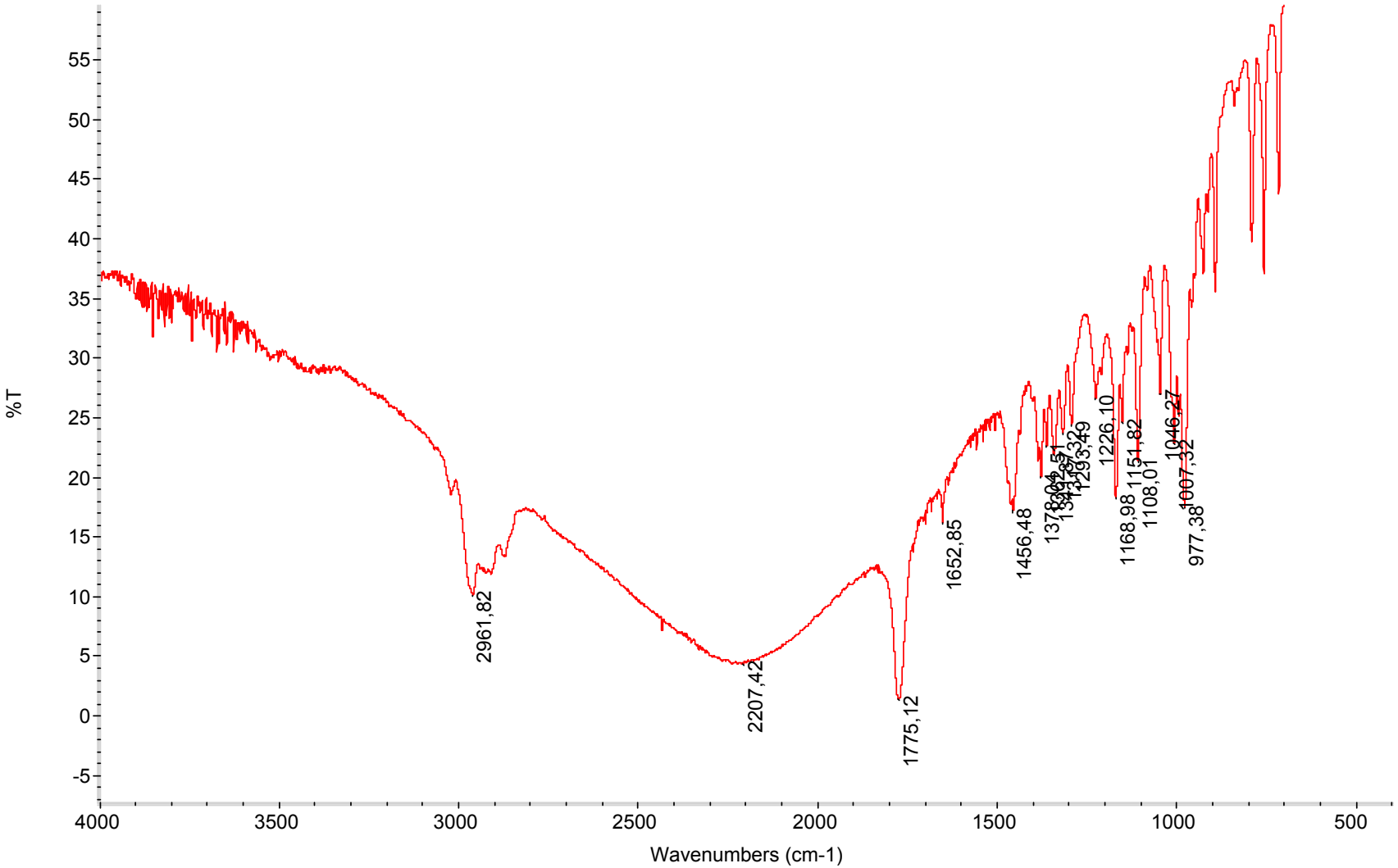


Figure S76. IR spectrum of unsaturated lactone **5b-A**.

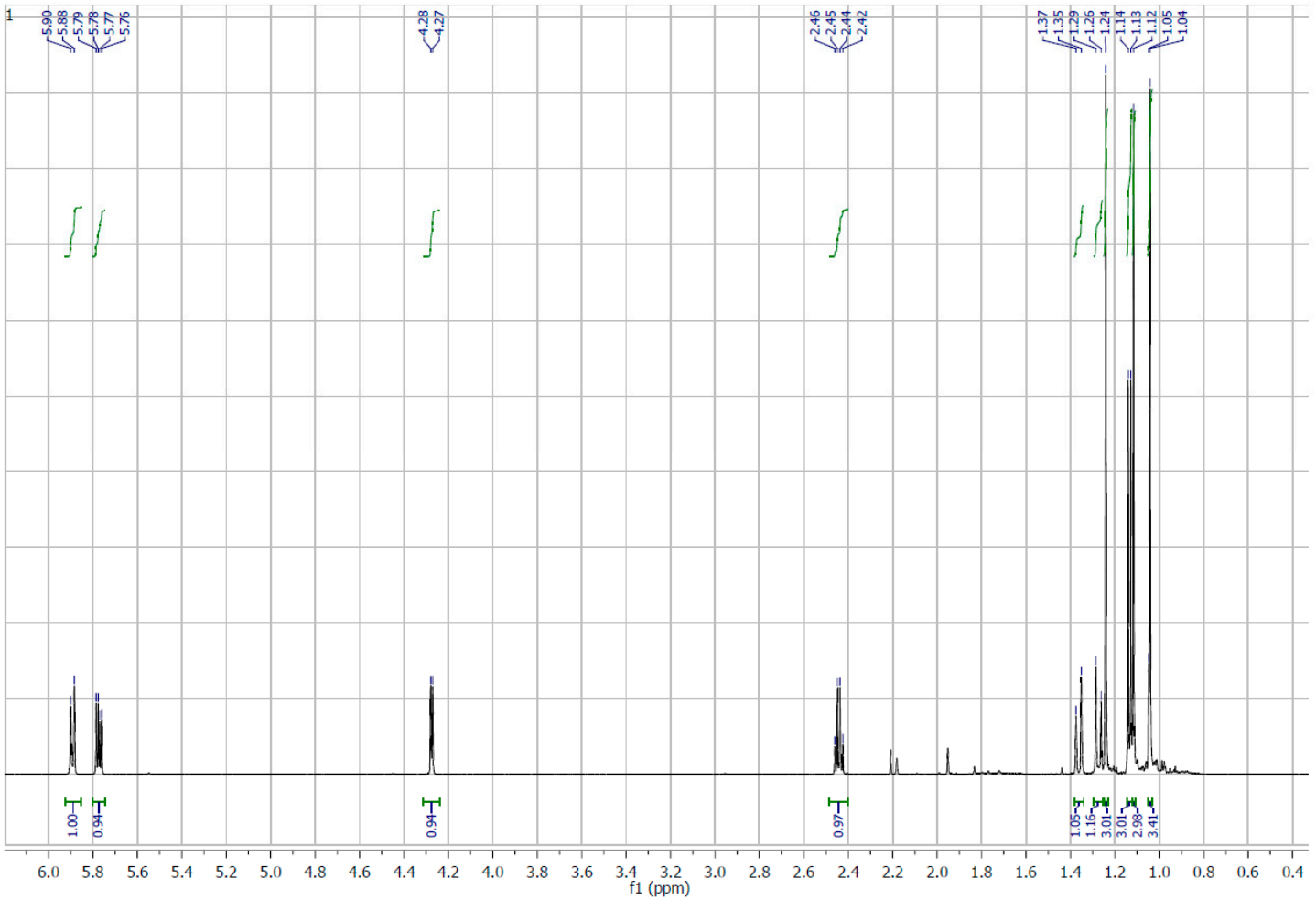


Figure S77. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of unsaturated lactone **5b-B**.

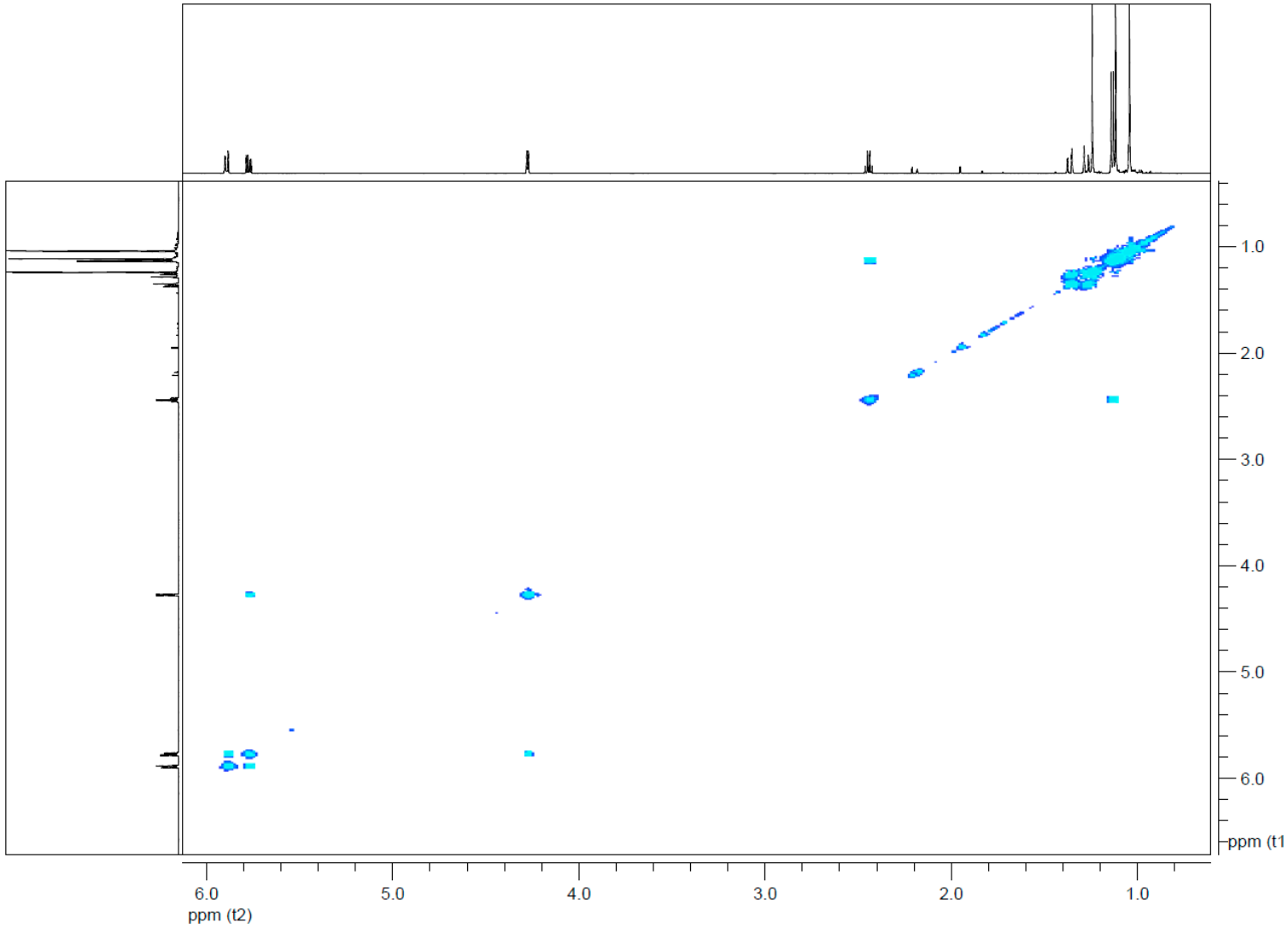


Figure S78. COSY (151 MHz, $CDCl_3$) spectrum of unsaturated lactone **5b-B**.

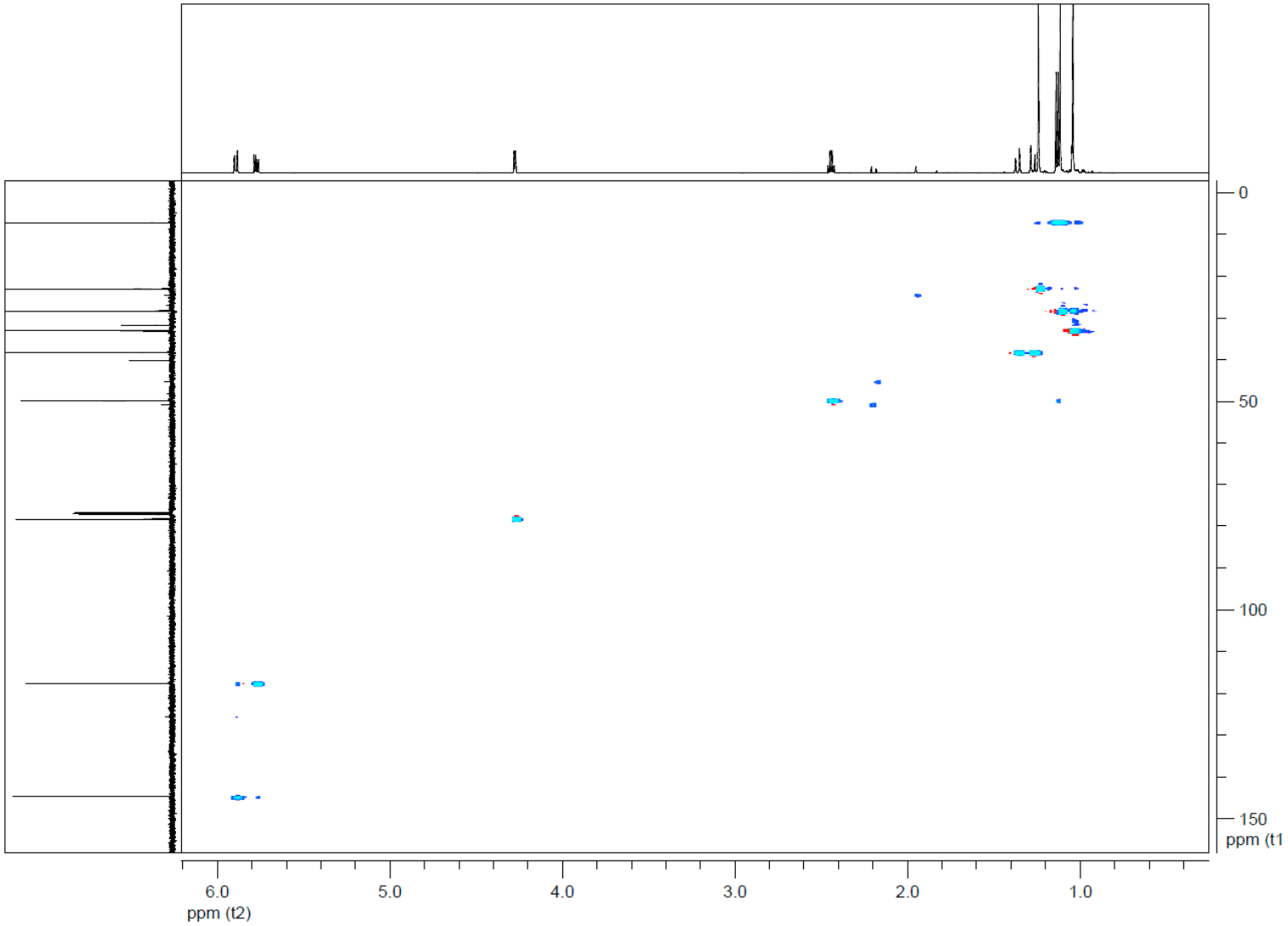


Figure S79. HMQC (151 MHz, $CDCl_3$) spectrum of unsaturated lactone **5b-B**.

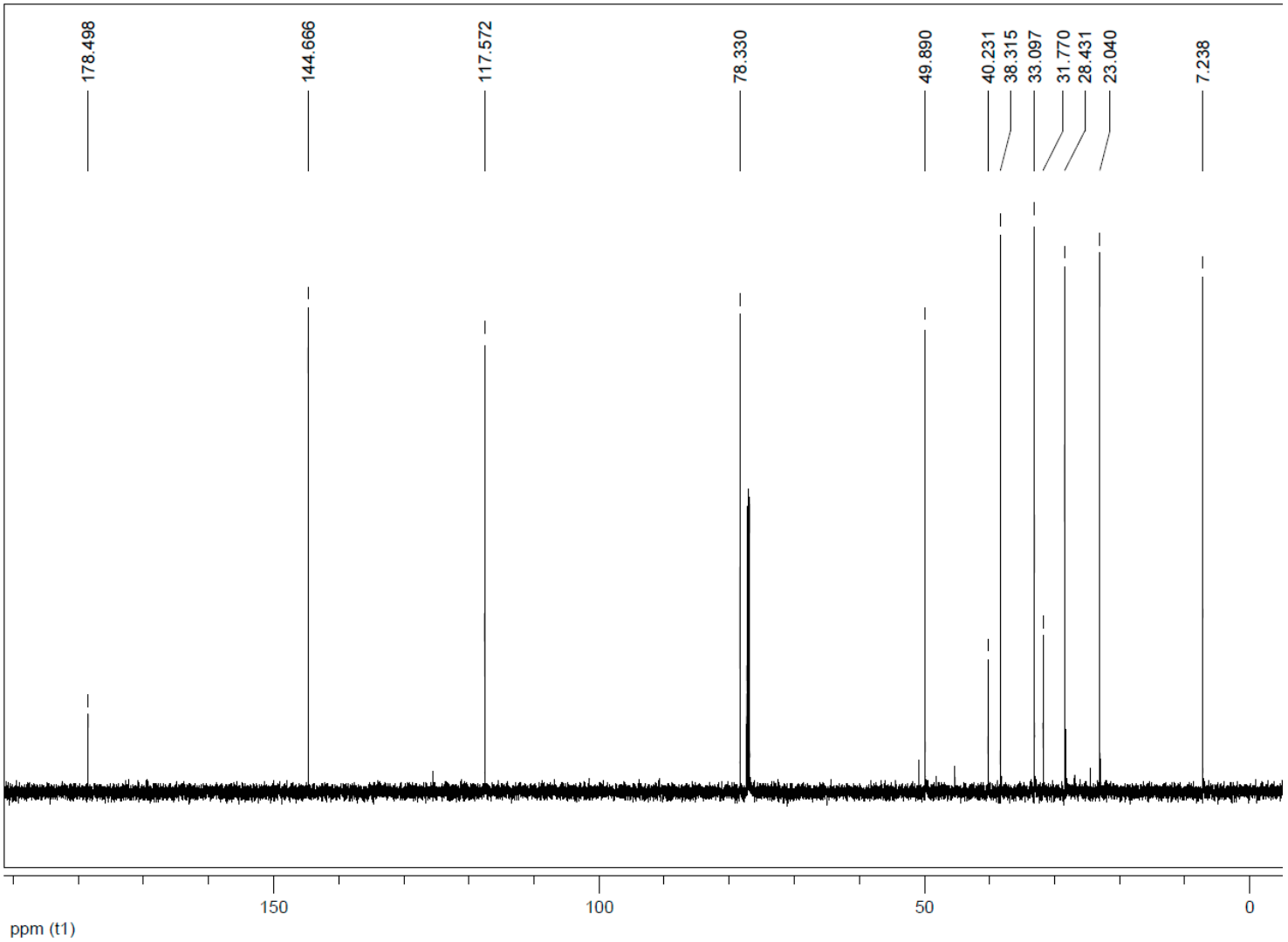


Figure S80. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of unsaturated lactone **5b-B**.

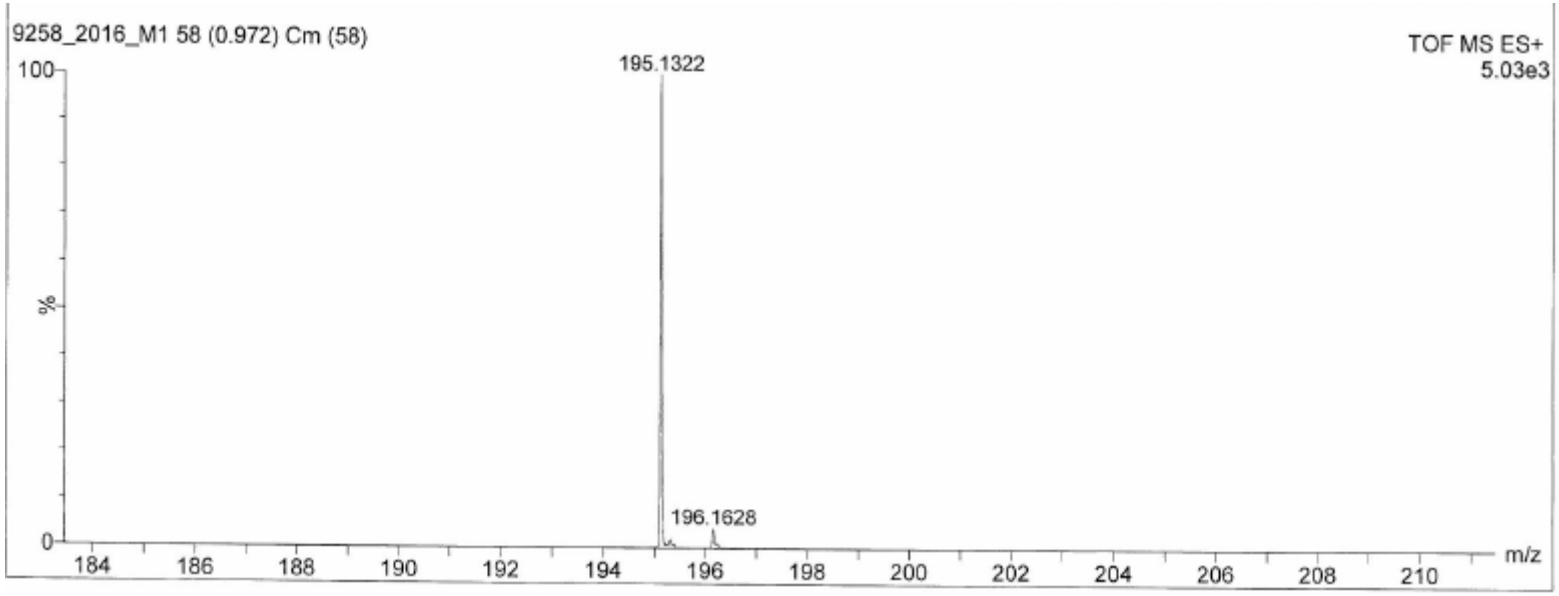


Figure S81. HRMS spectrum of unsaturated lactone **5b-B**.

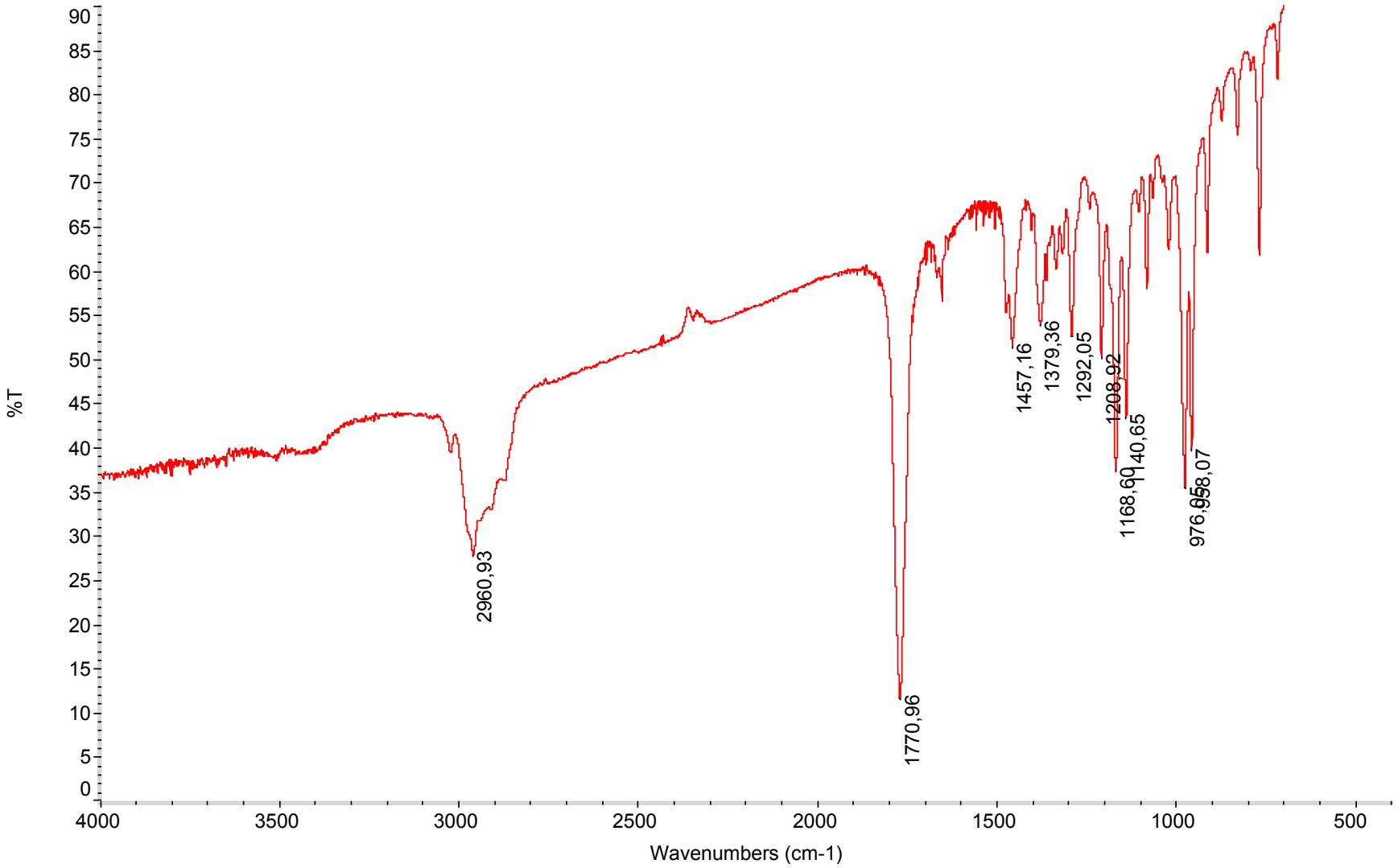


Figure S82. IR spectrum of unsaturated lactone **5b-B**.

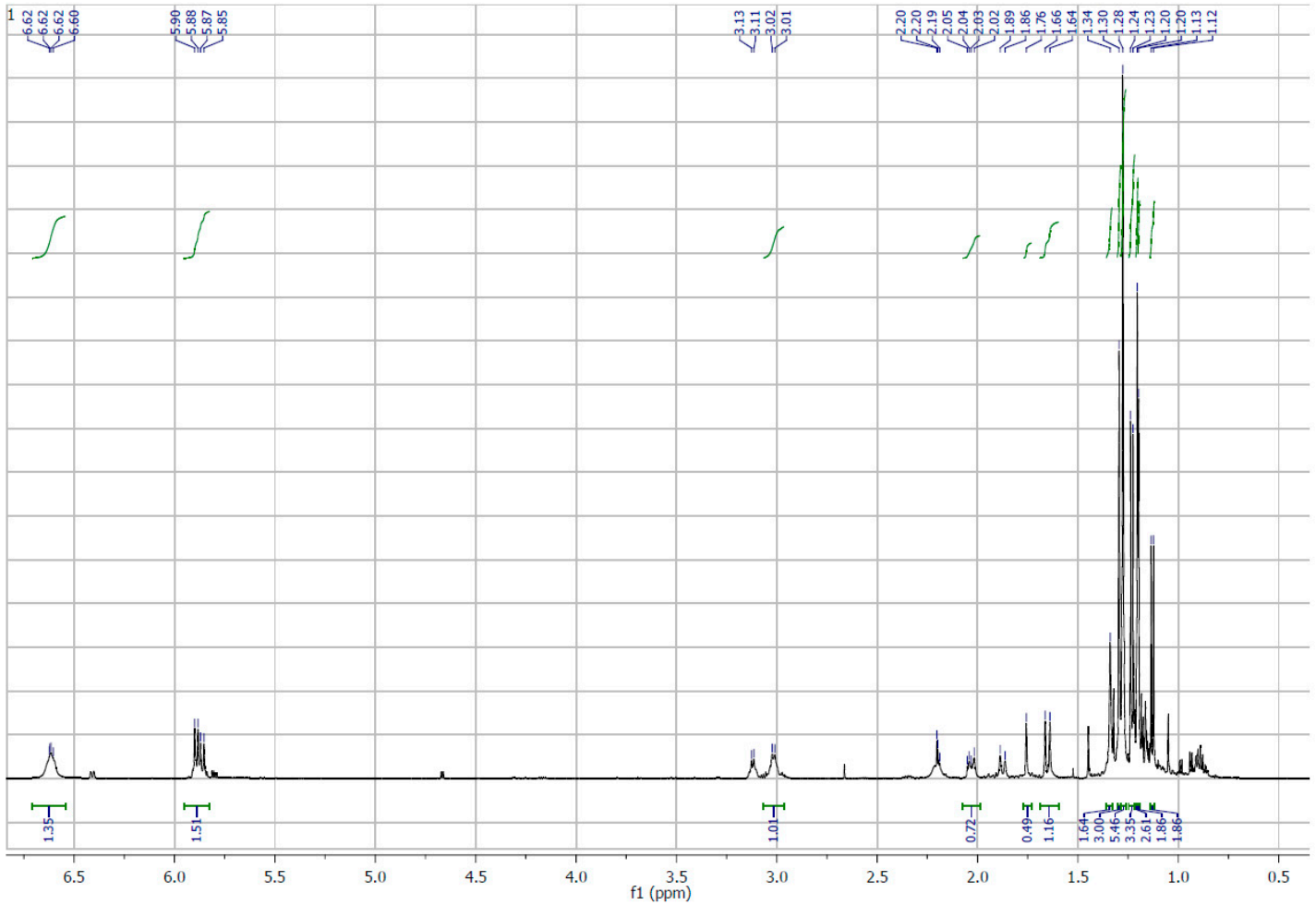


Figure S83. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of hydroxylactone **6b**.

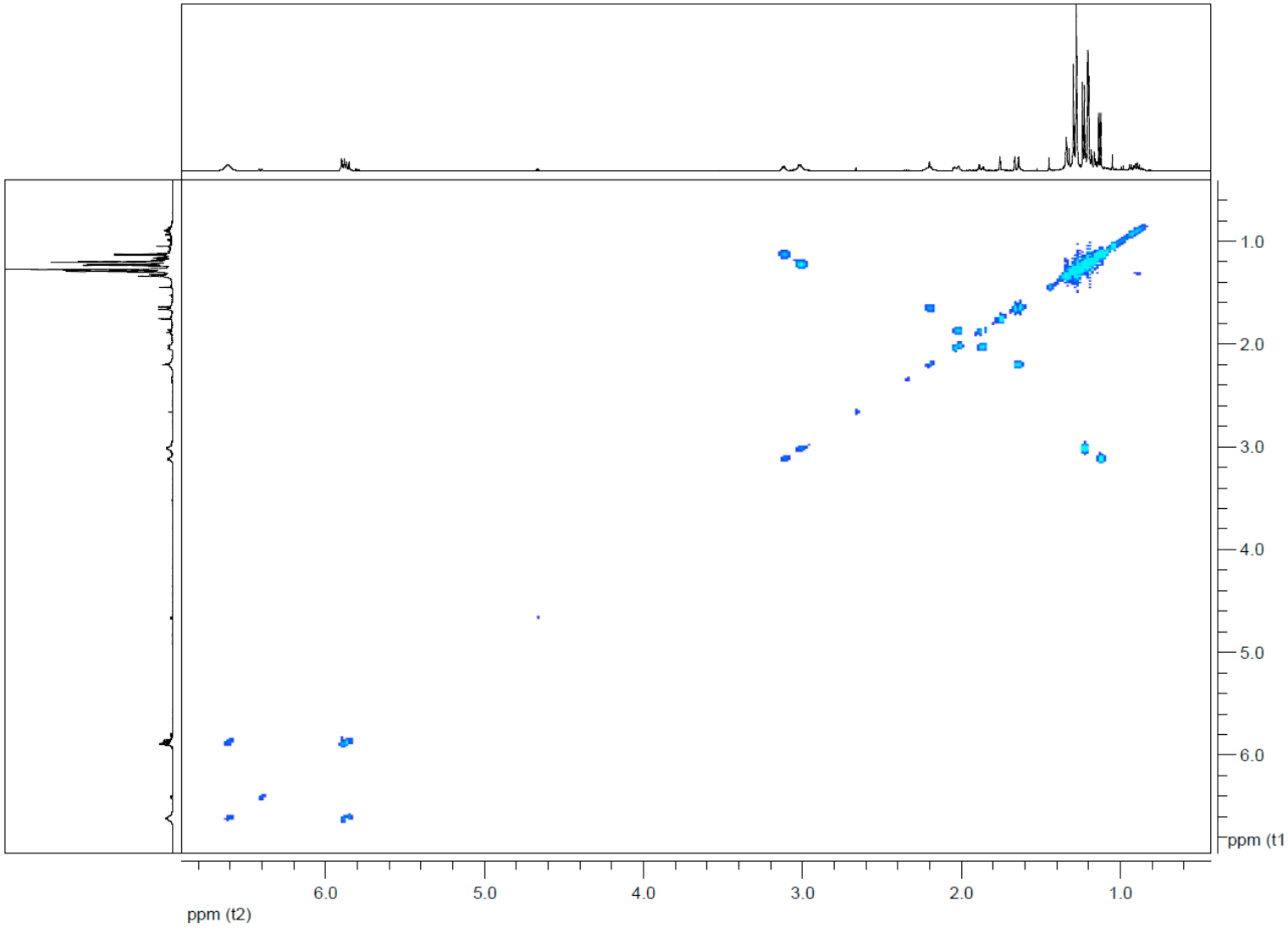


Figure S84. COSY (151 MHz, $CDCl_3$) spectrum of hydroxylactone **6b**.

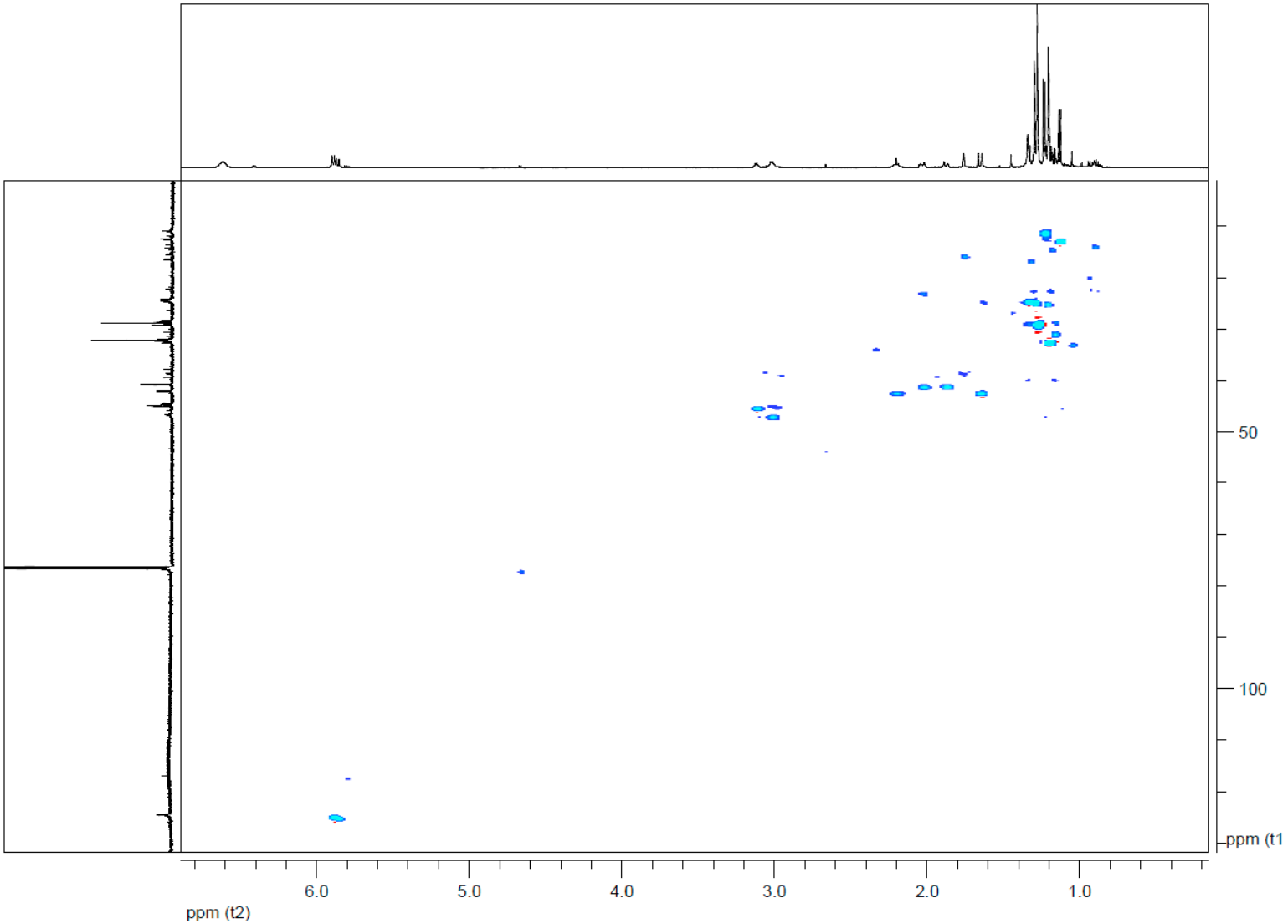


Figure S85. HMQC (151 MHz, $CDCl_3$) spectrum of hydroxylactone **6b**.

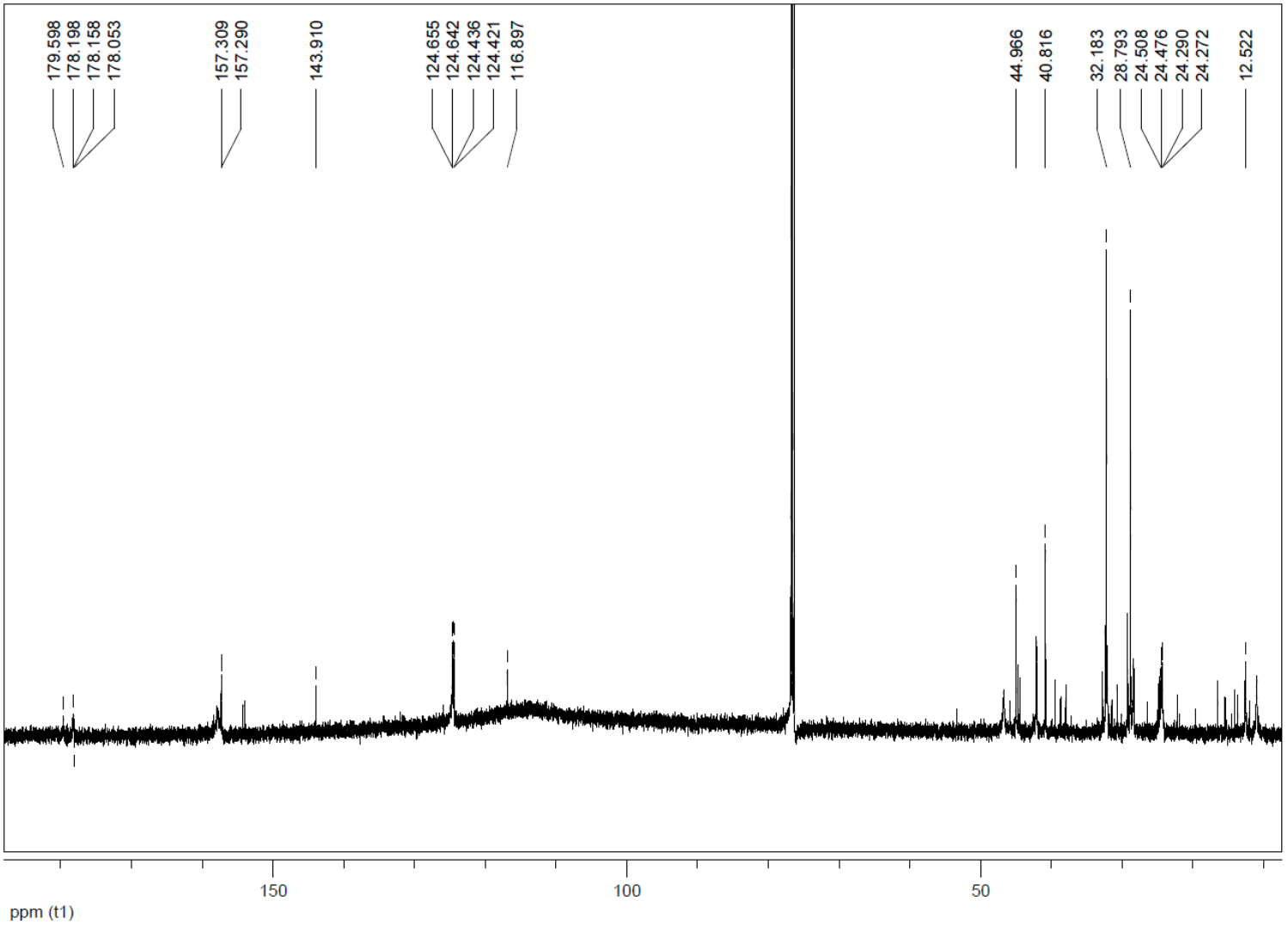


Figure S86. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of hydroxylactone **6b**.

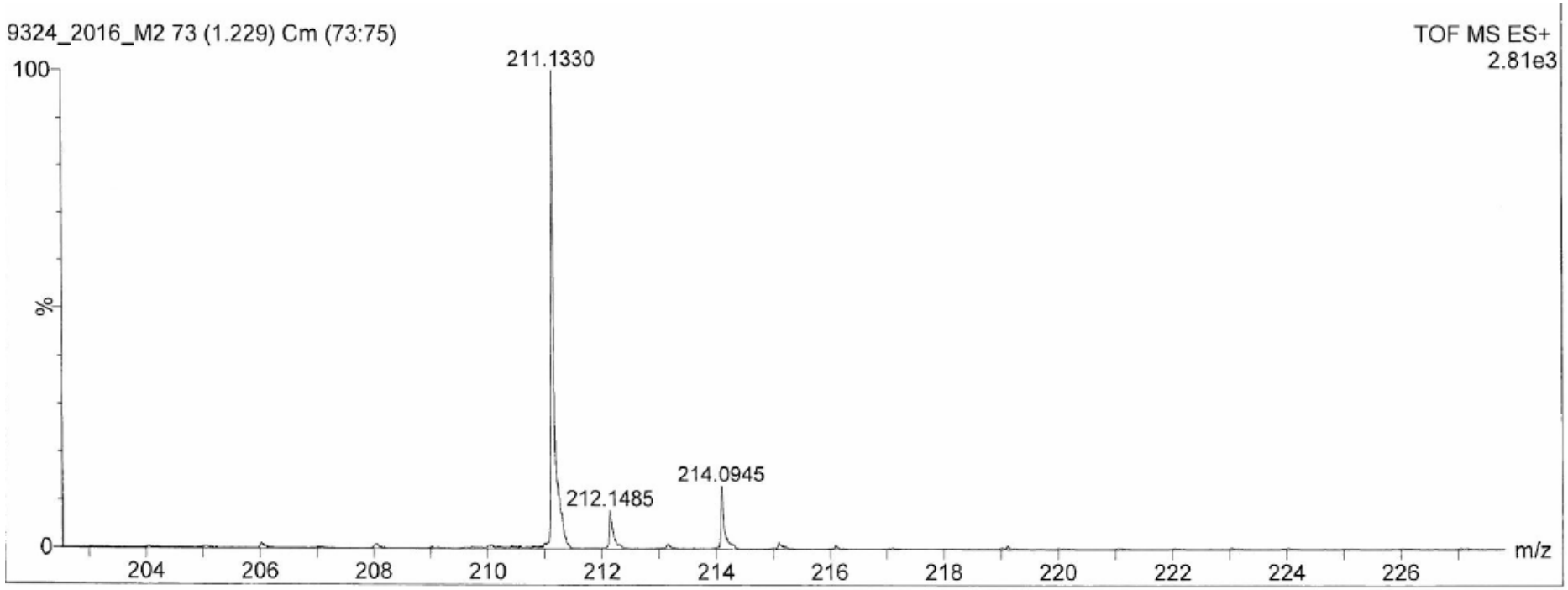


Figure S87. HRMS spectrum of hydroxylactone **6b**.

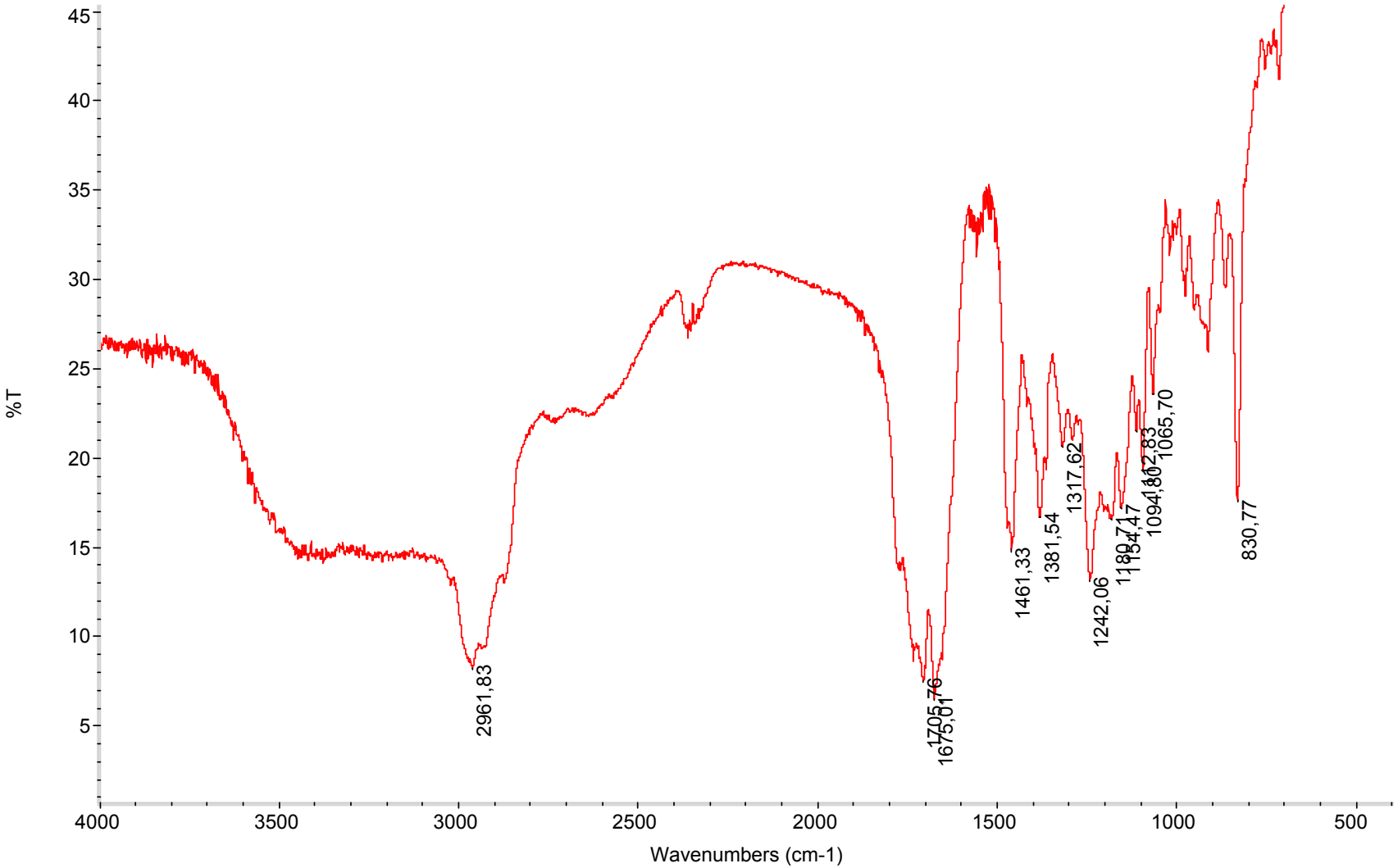


Figure S88. IR spectrum of hydroxylactone **6b**.

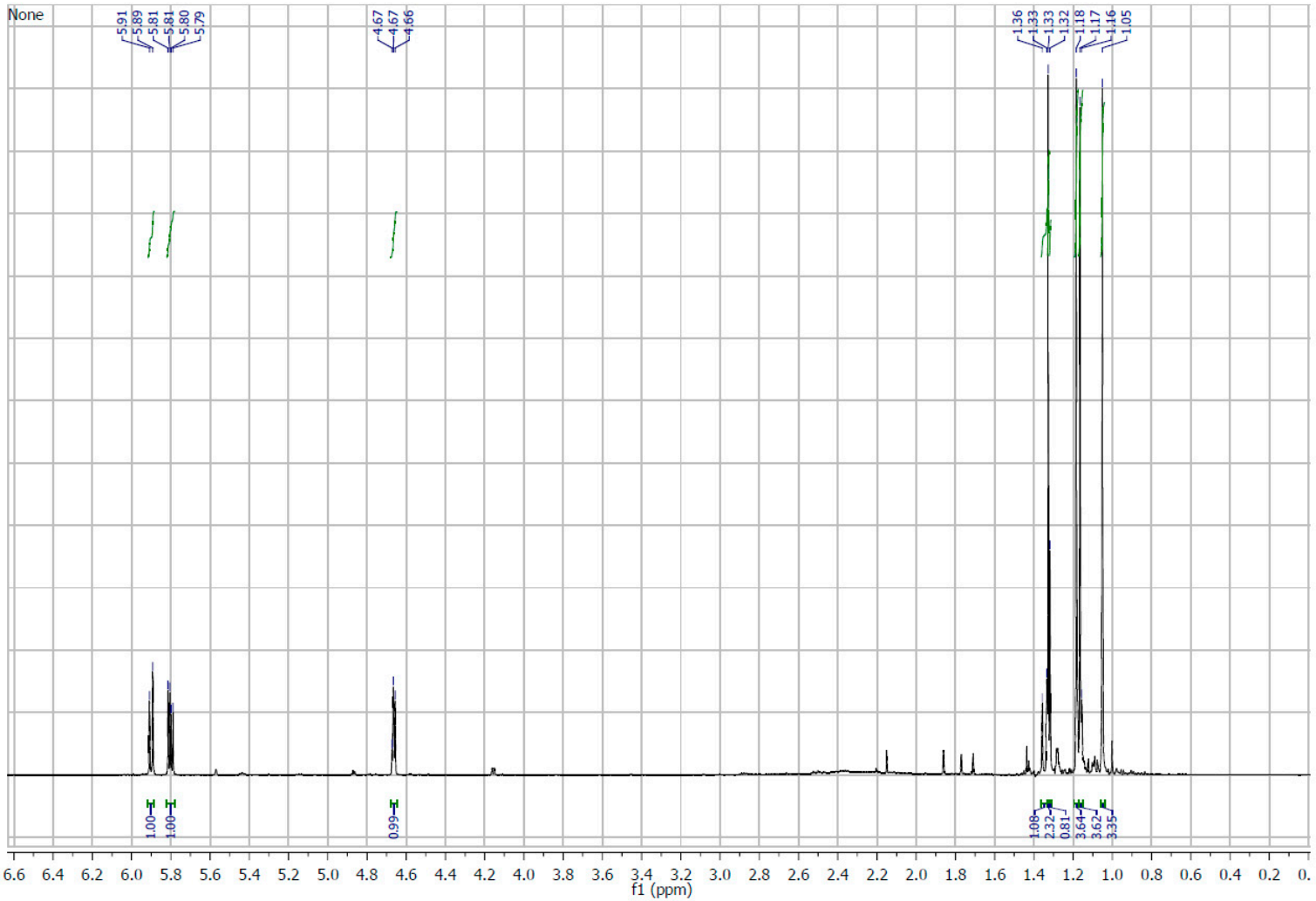


Figure S89. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of hydroxylactone **7b**.

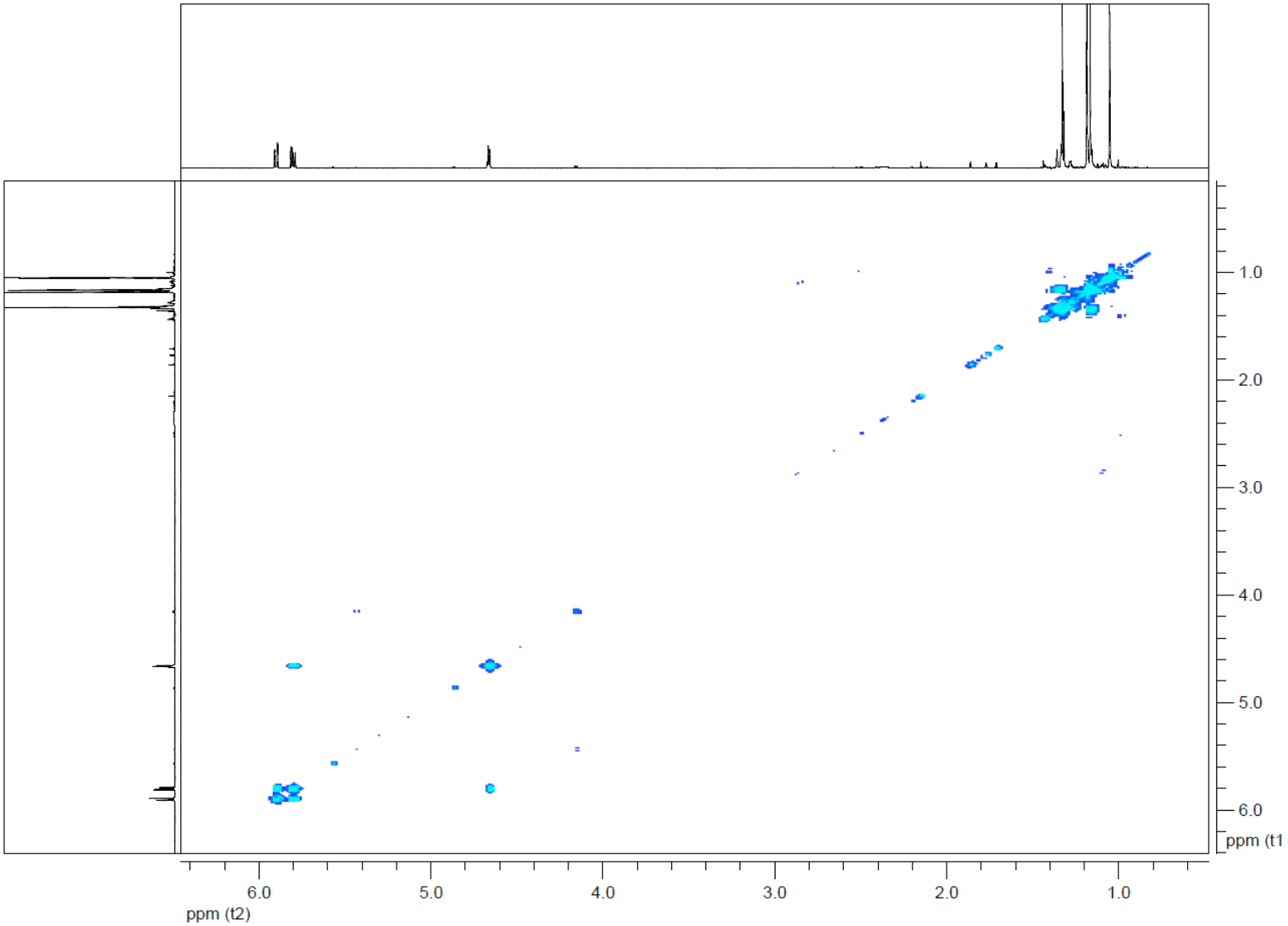


Figure S90. COSY (151 MHz, $CDCl_3$) spectrum of hydroxylactone **7b**.

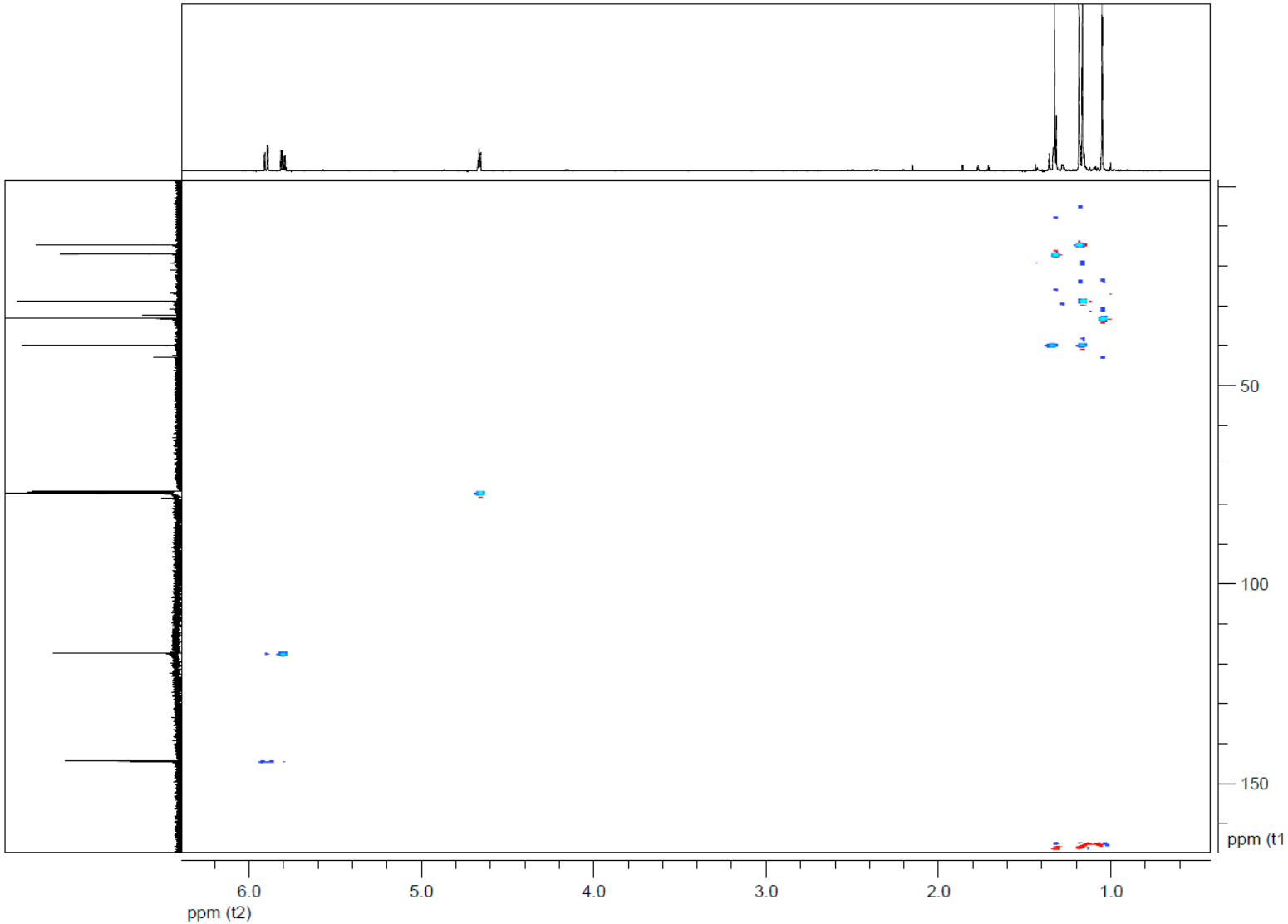


Figure S91. HMQC (151 MHz, $CDCl_3$) spectrum of hydroxylactone **7b**.

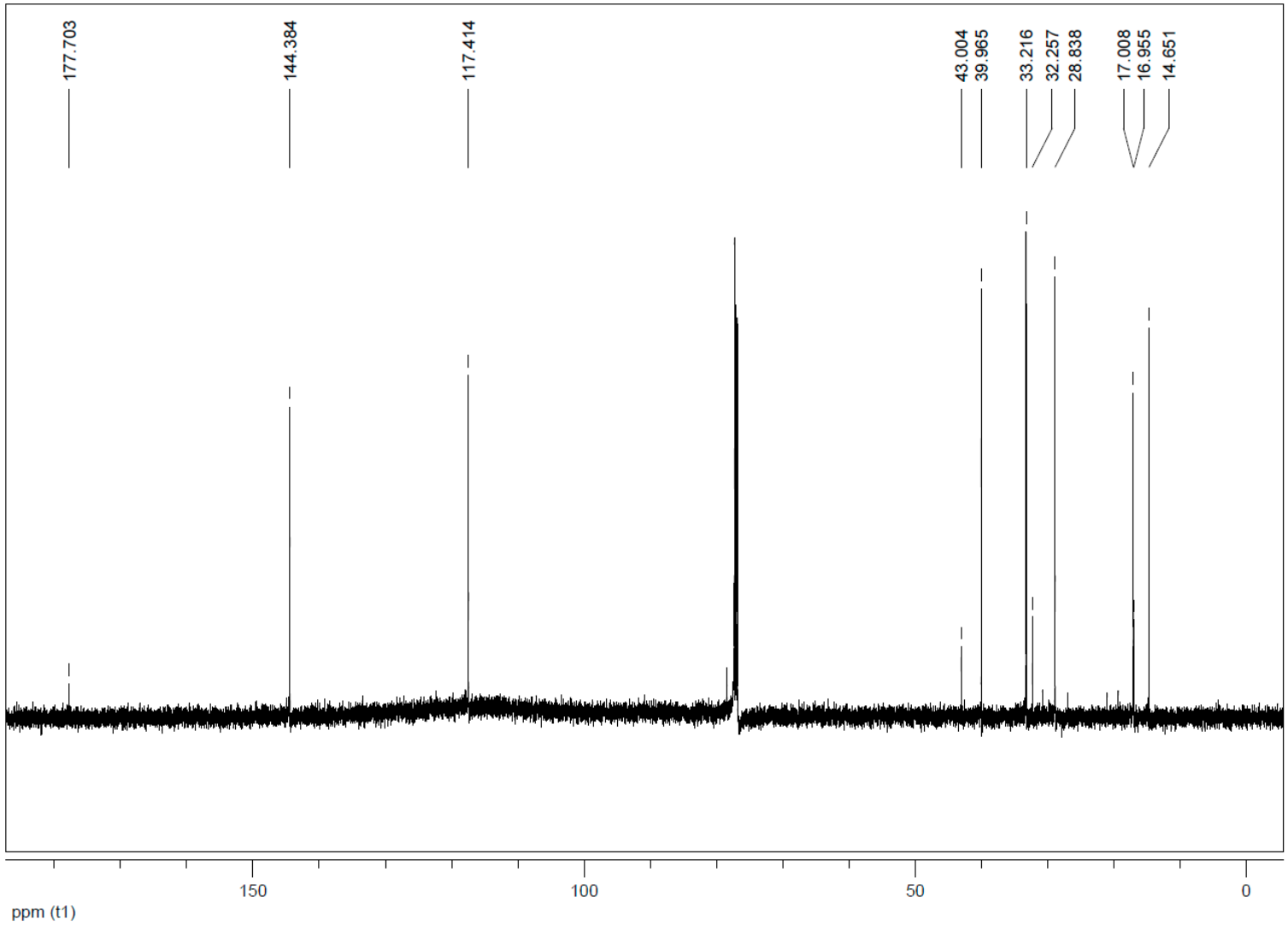


Figure S92. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of hydroxylactone **7b**.

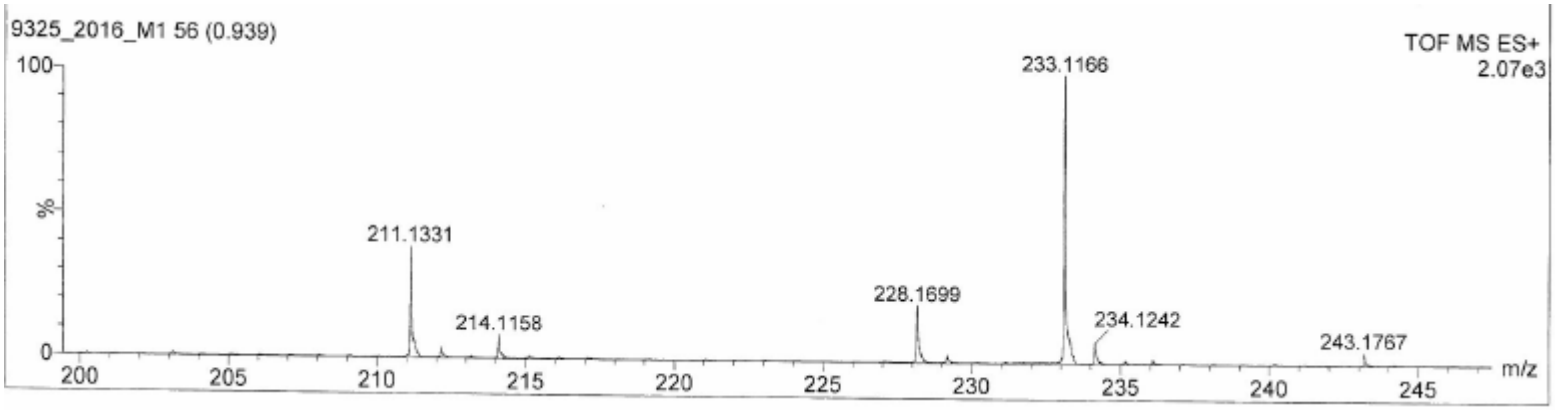


Figure S93. HRMS spectrum of hydroxylactone **7b**.

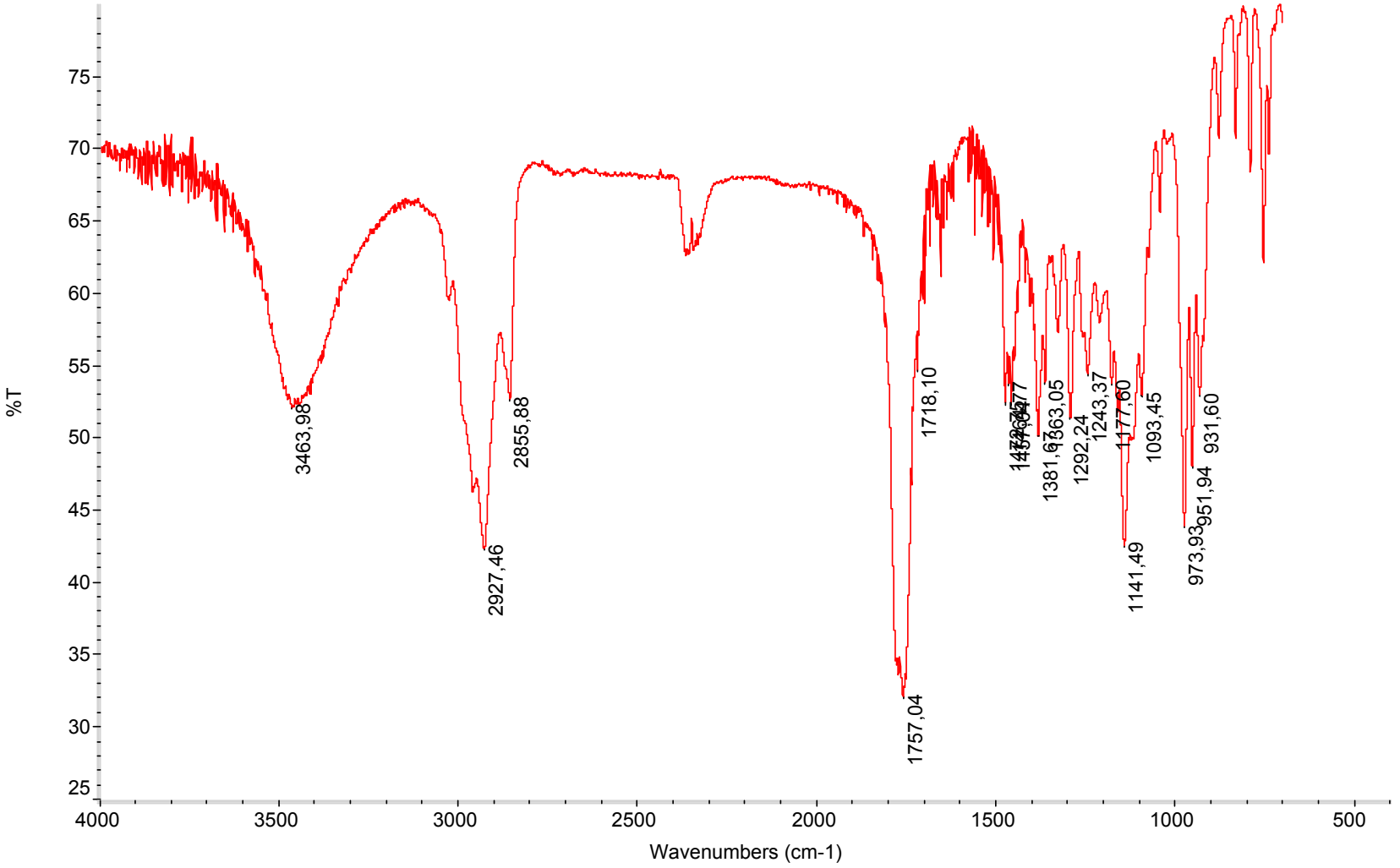


Figure S94. IR spectrum of hydroxylactone **7b**.

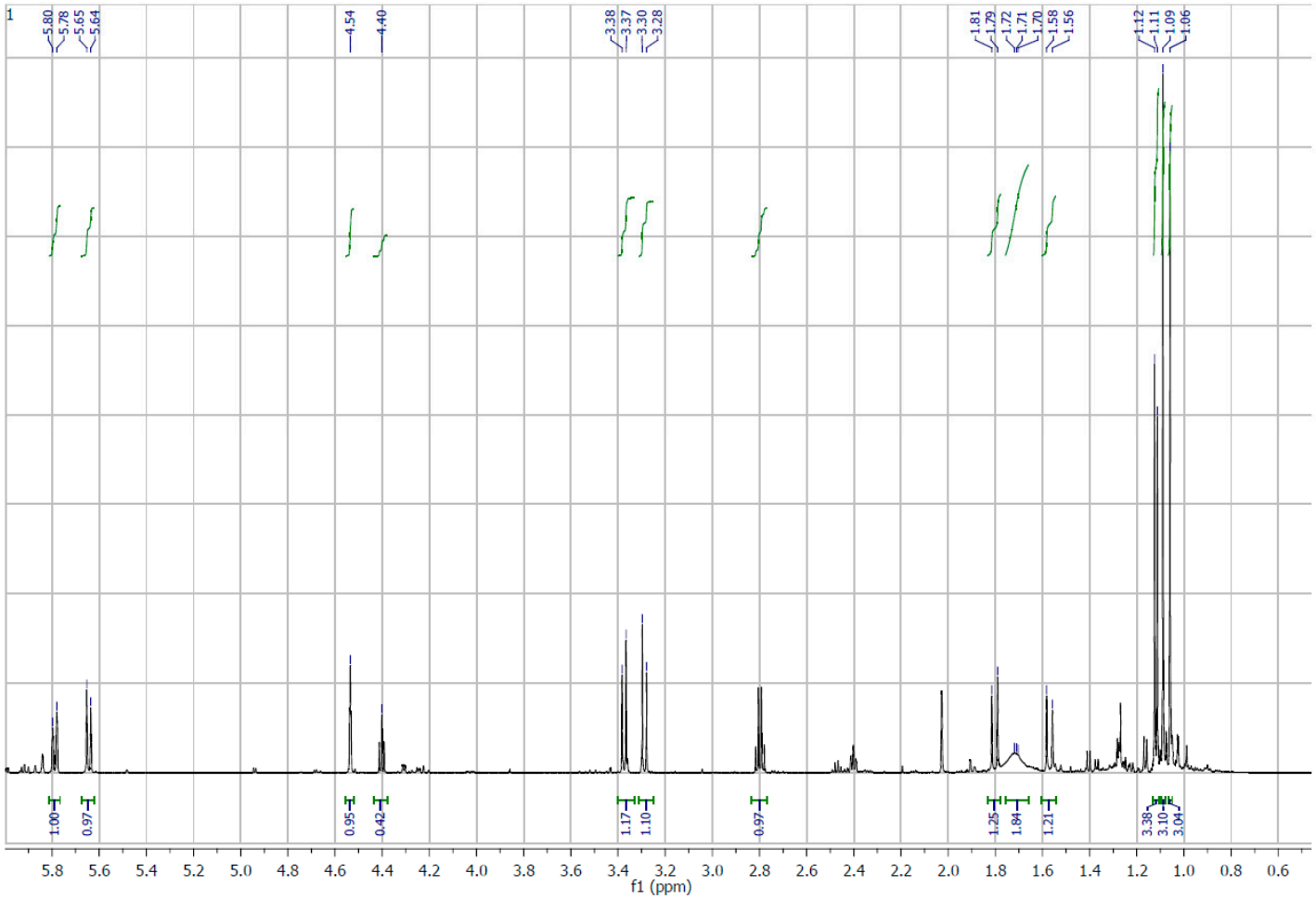


Figure S95. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of hydroxylactone **8b**.

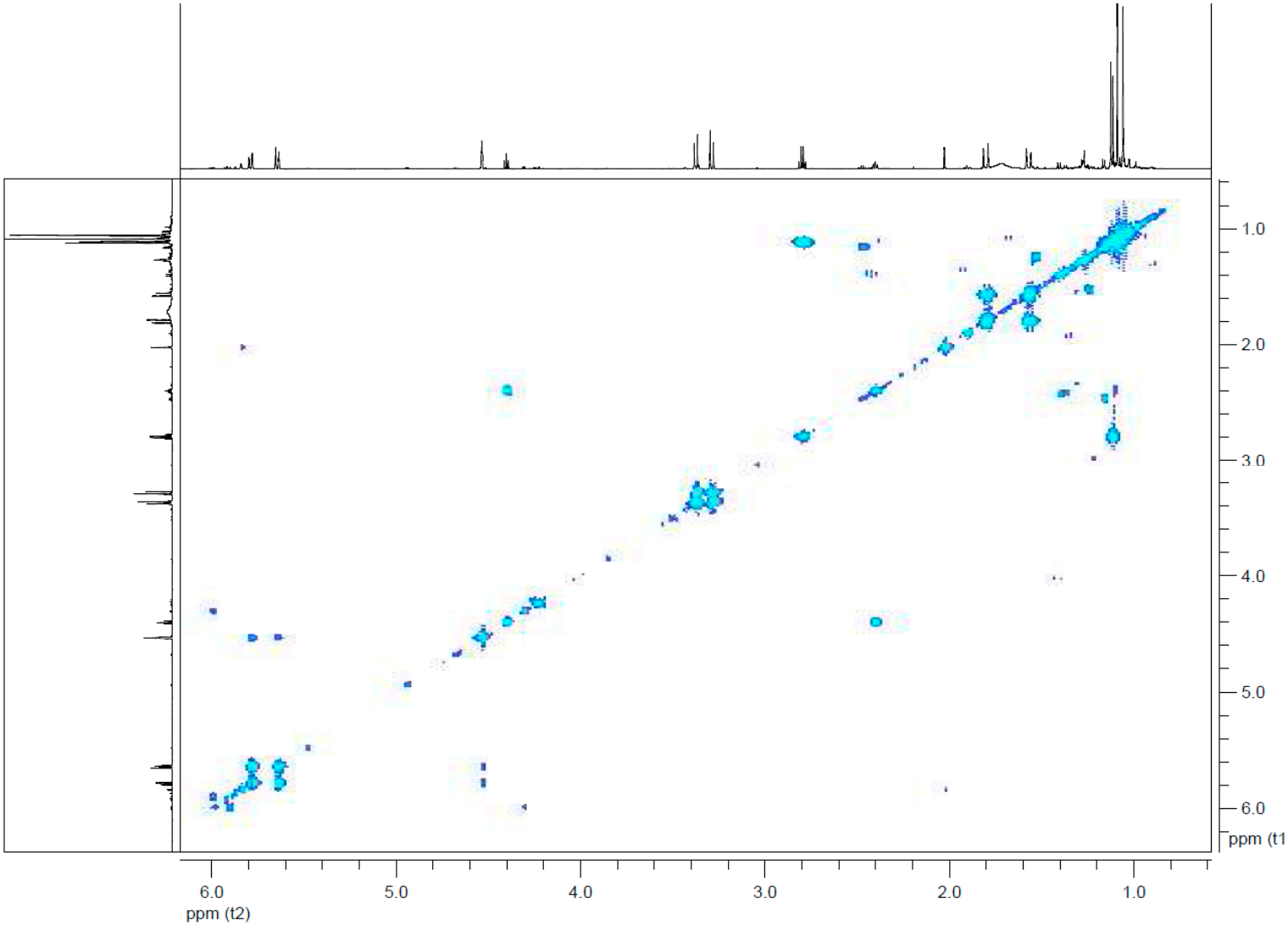


Figure S96. COSY (151 MHz, $CDCl_3$) spectrum of hydroxylactone **8b**.

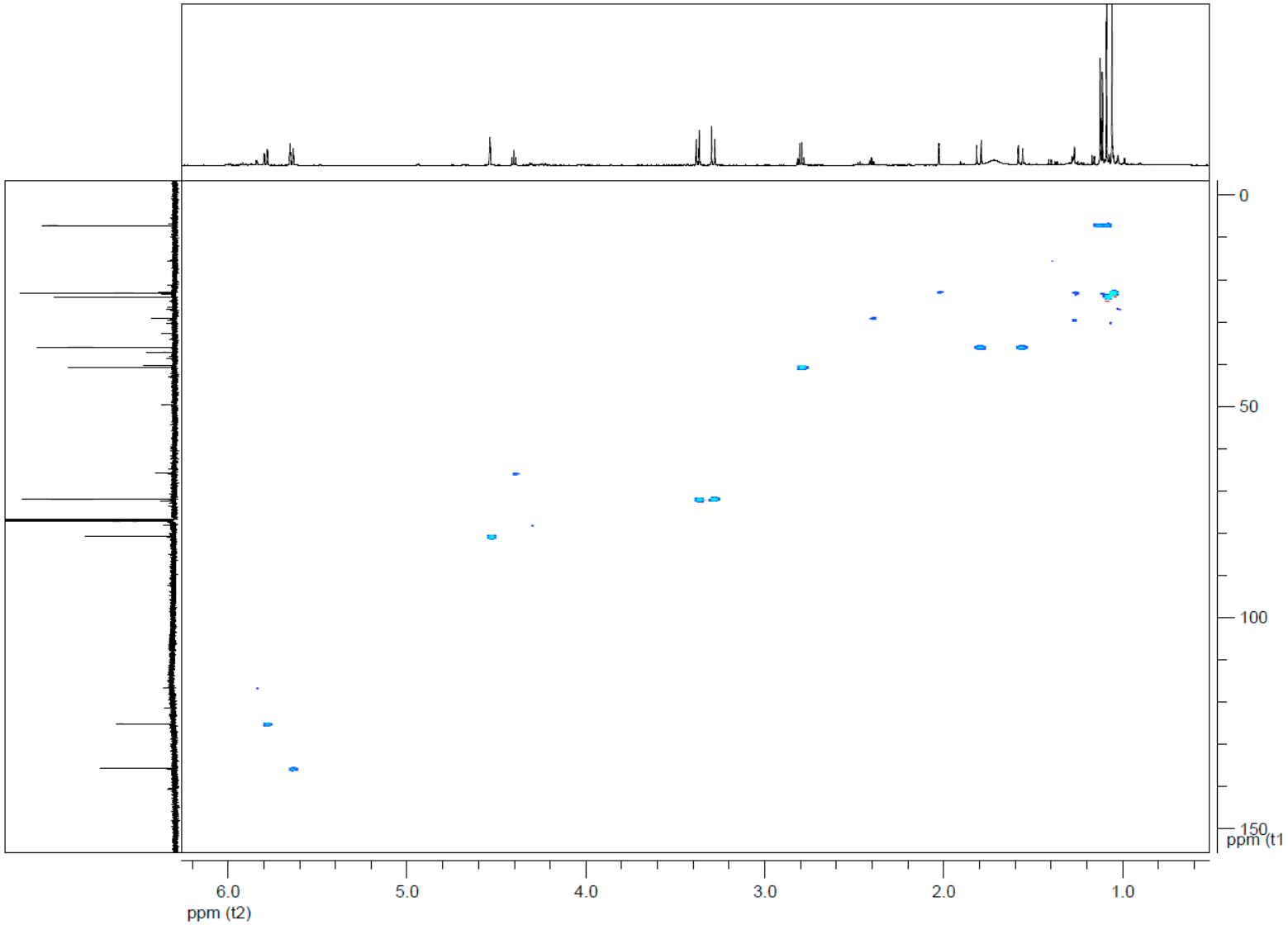


Figure S97. HMQC (151 MHz, $CDCl_3$) spectrum of hydroxylactone **8b**.

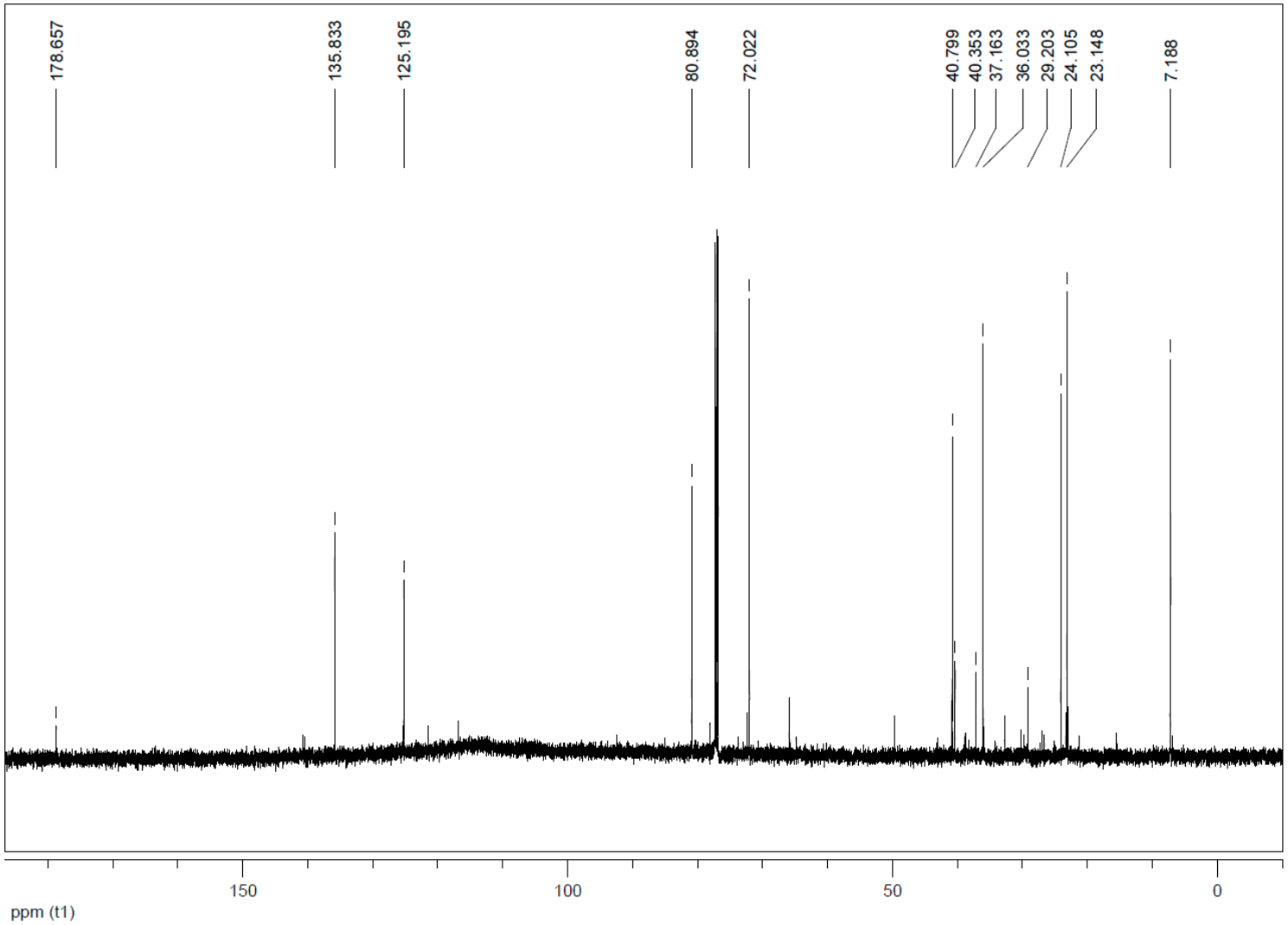


Figure S98. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of hydroxylactone **8b**.

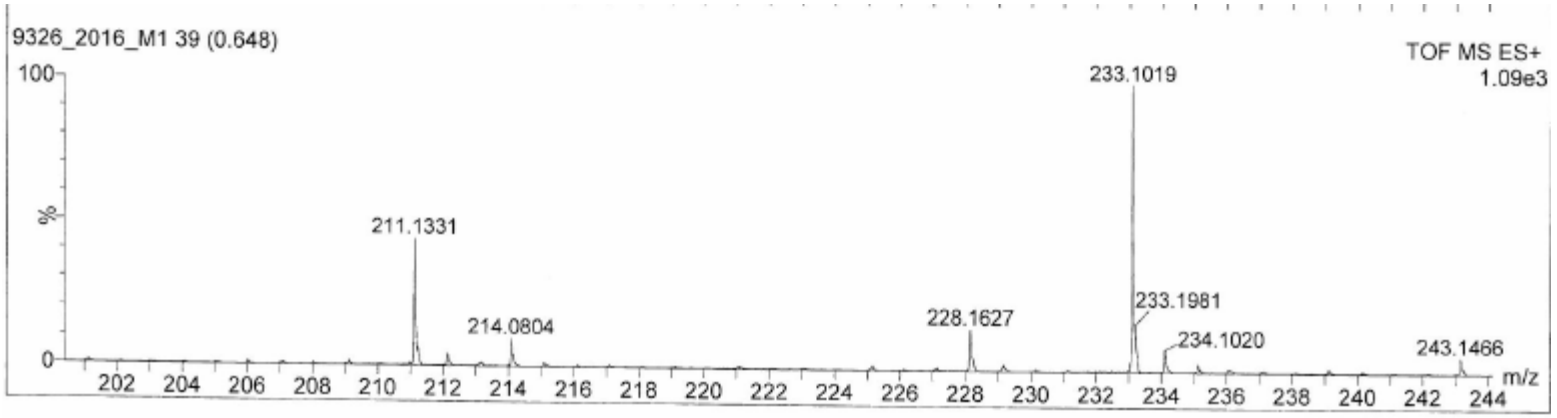


Figure S99. HRMS spectrum of hydroxylactone **8b**.

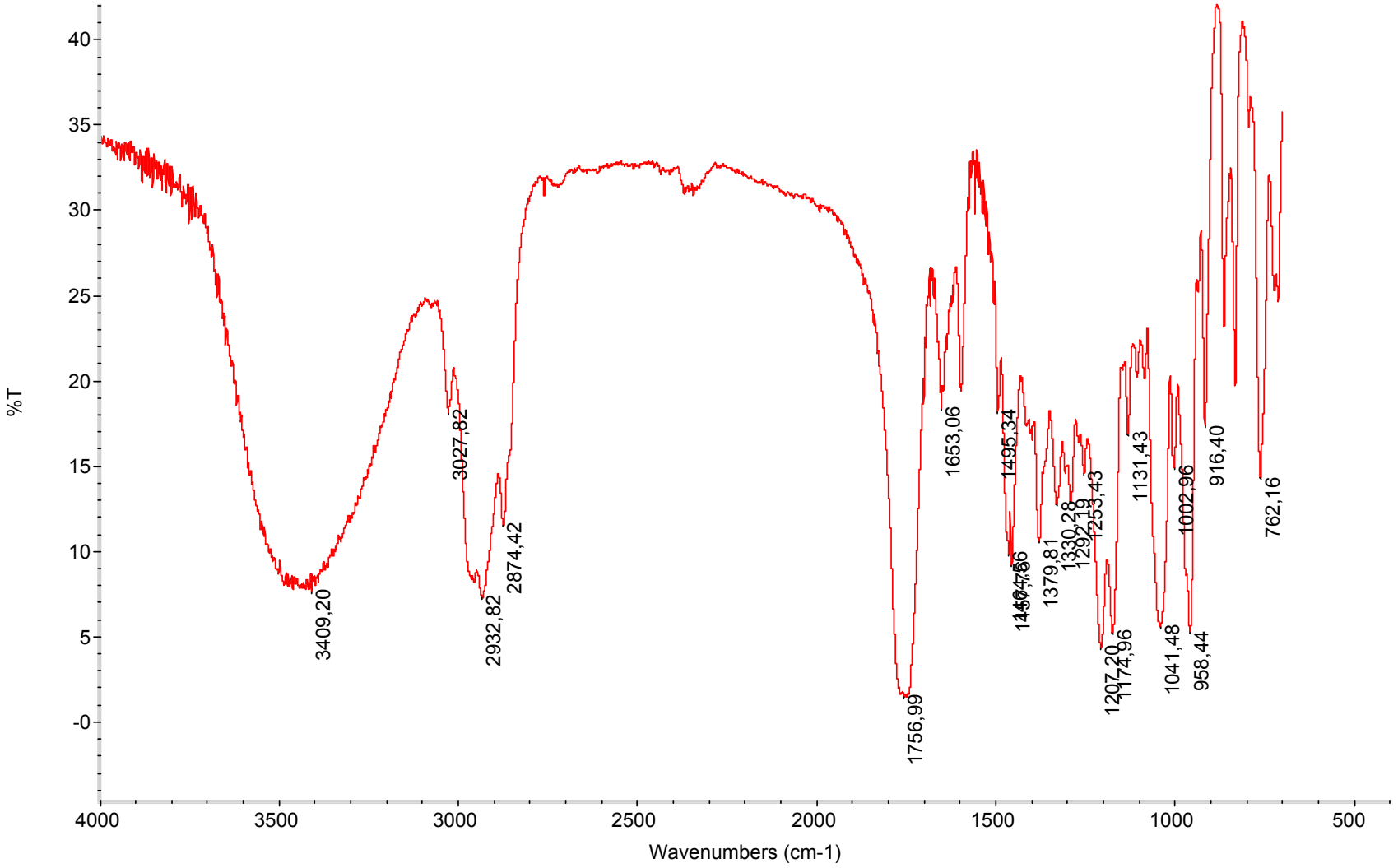


Figure S100. IR spectrum of hydroxylactone **8b**.

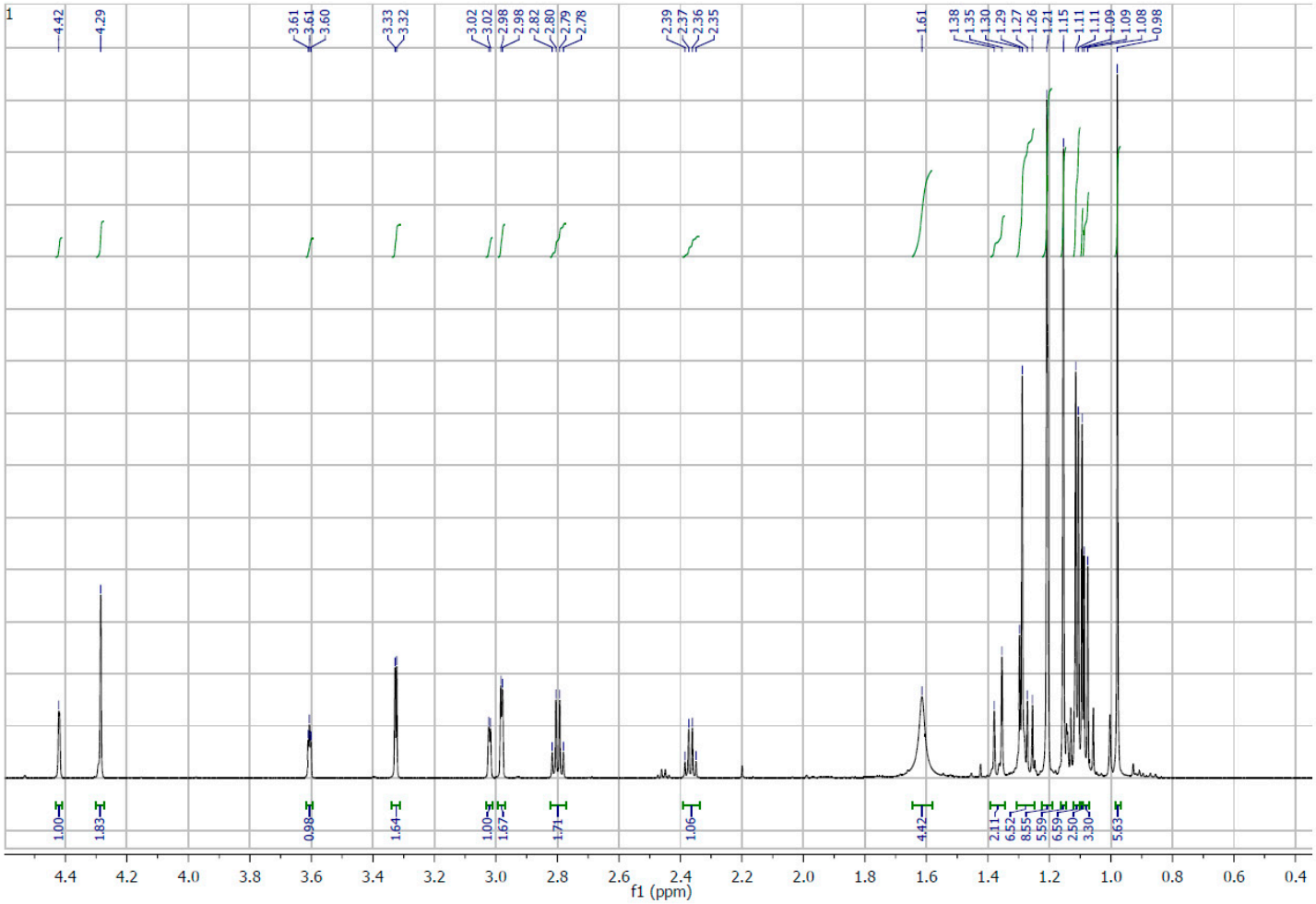


Figure S101. ^{1}H-NMR (600 MHz, $CDCl_3$) spectrum of epoxylactone **9b**.

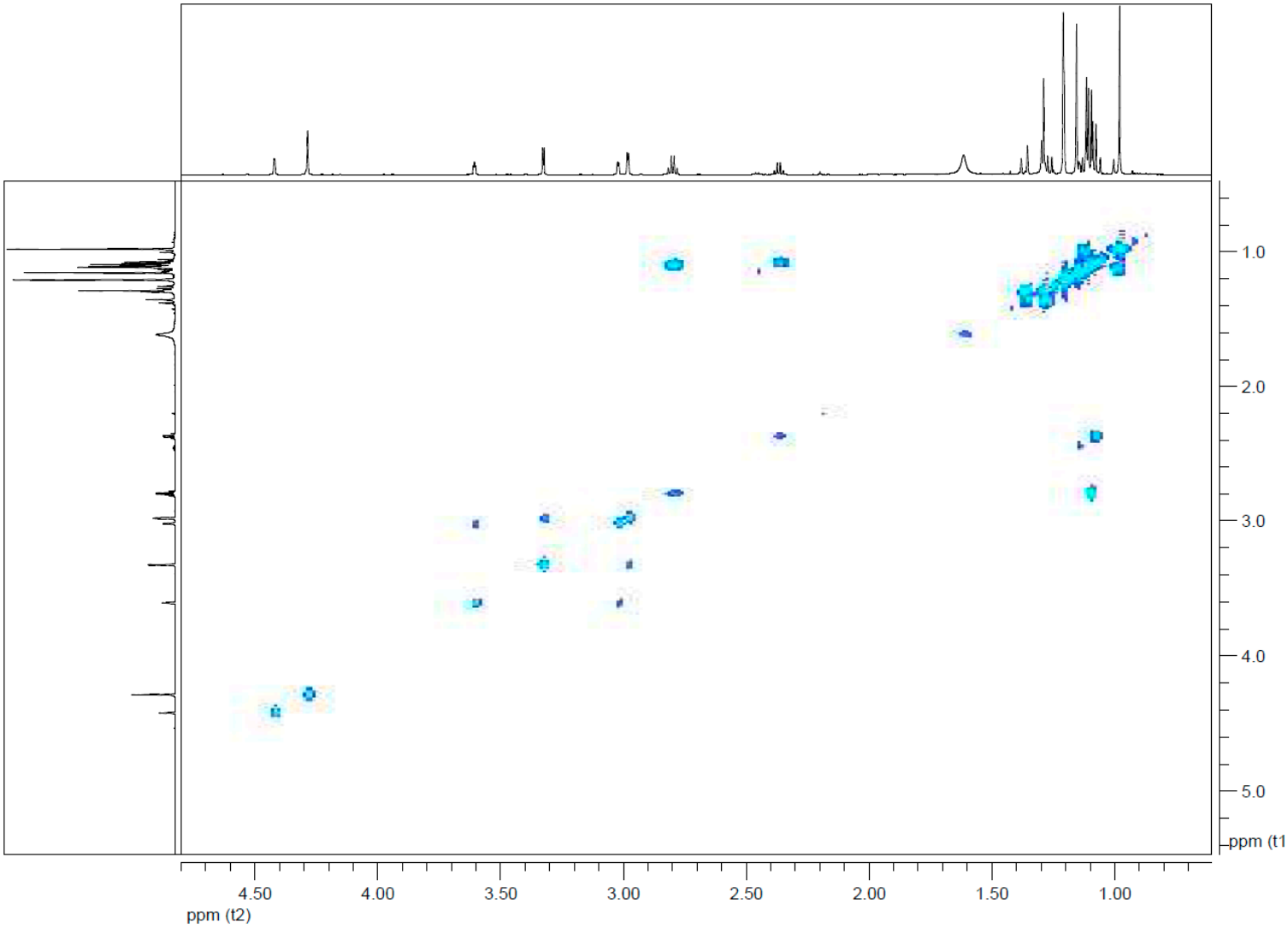


Figure S102. COSY (151 MHz, $CDCl_3$) spectrum of epoxylactone **9b**.

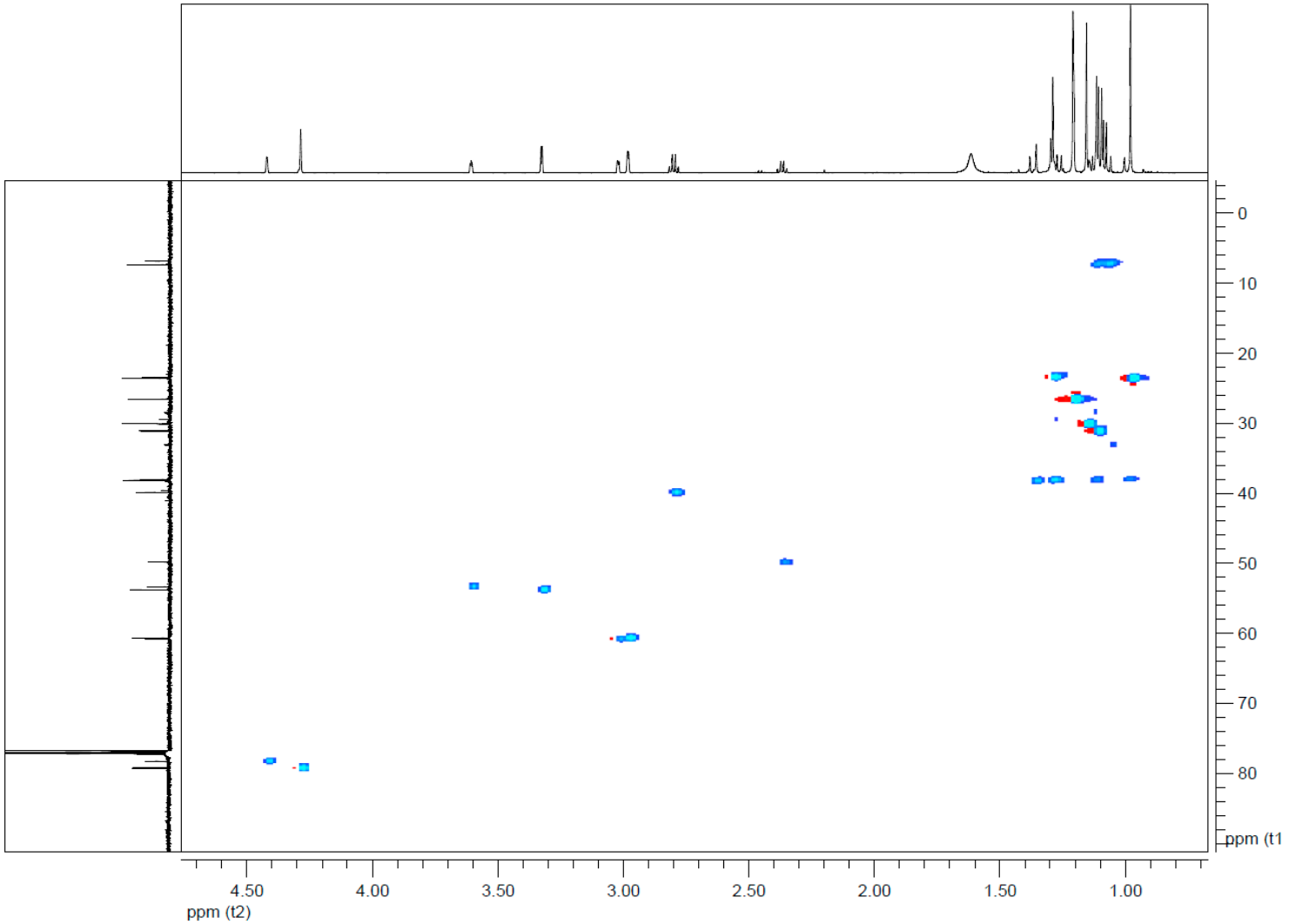


Figure S103. HMQC (151 MHz, $CDCl_3$) spectrum of epoxylactone **9b**.

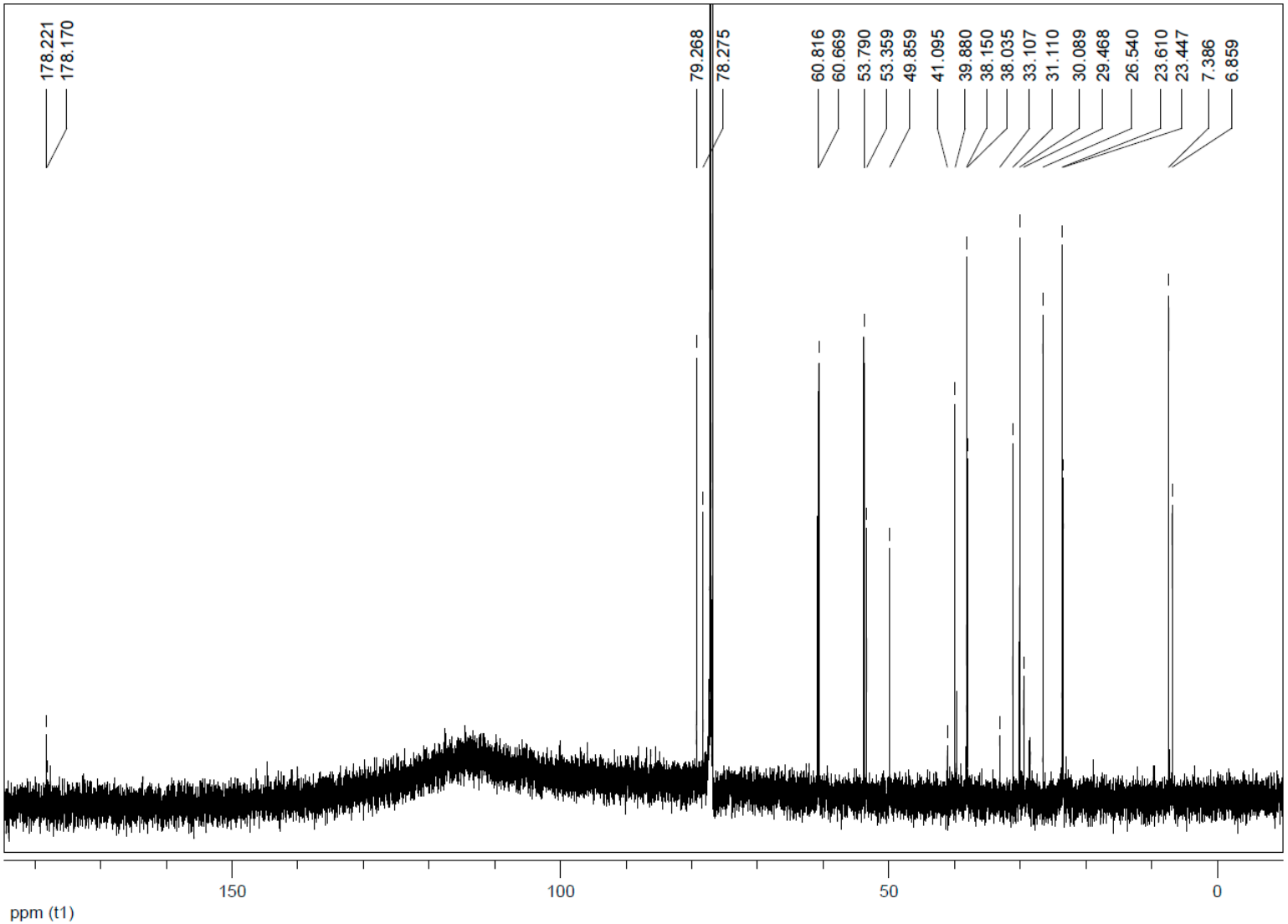


Figure S104. ^{13}C-NMR (151 MHz, $CDCl_3$) spectrum of epoxylactone **9b**.

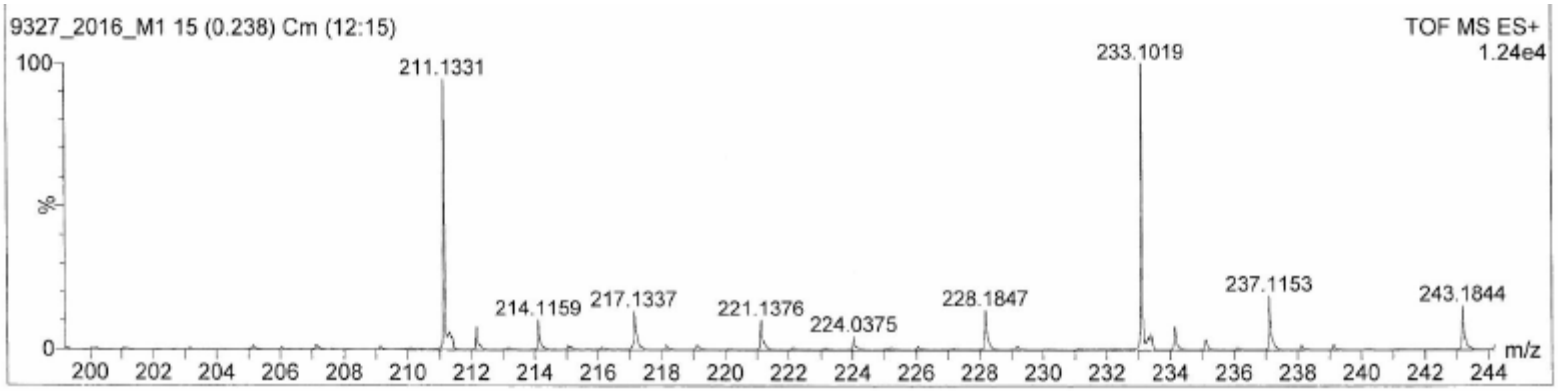


Figure S105. HRMS spectrum of epoxylactone **9b**.

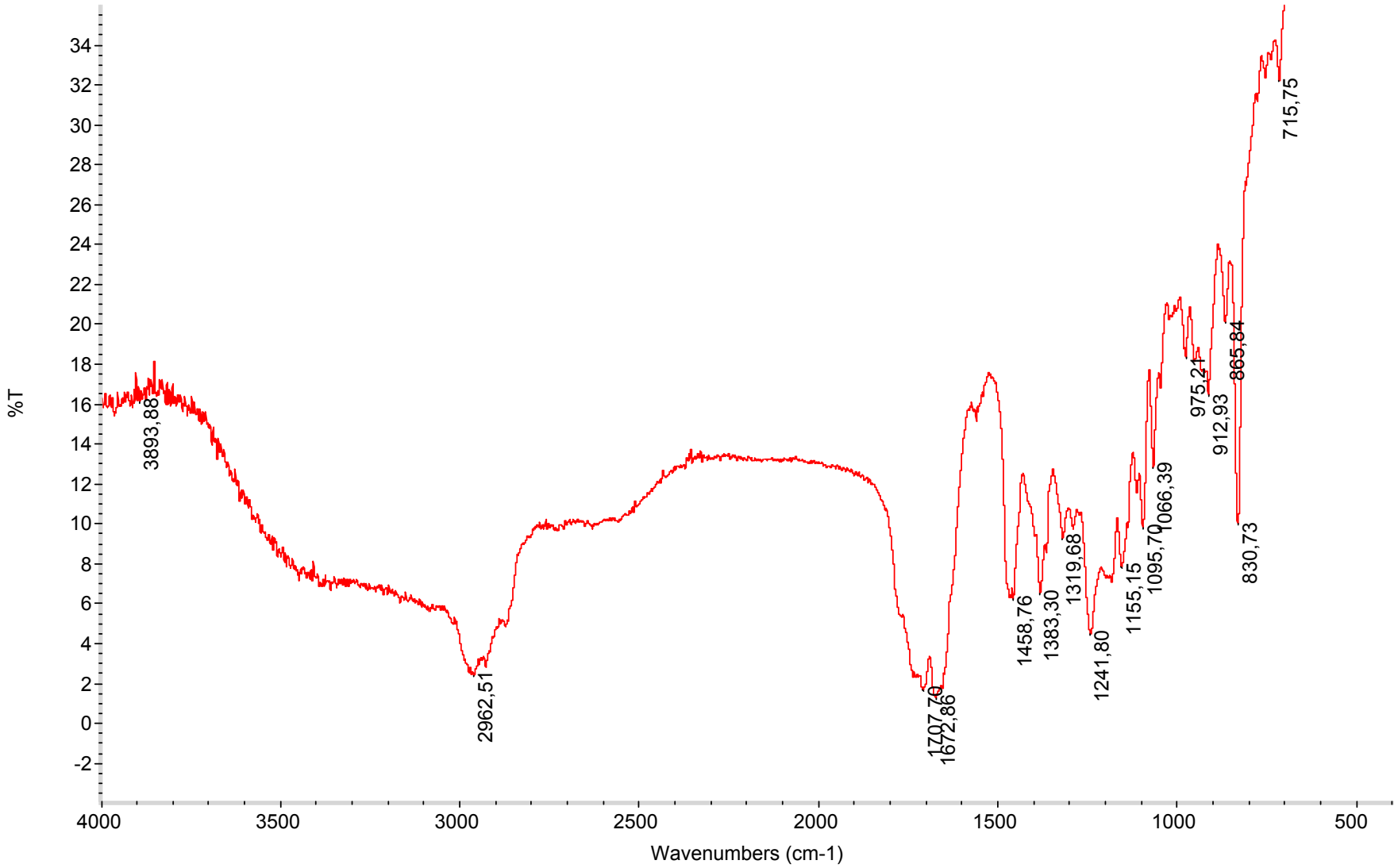
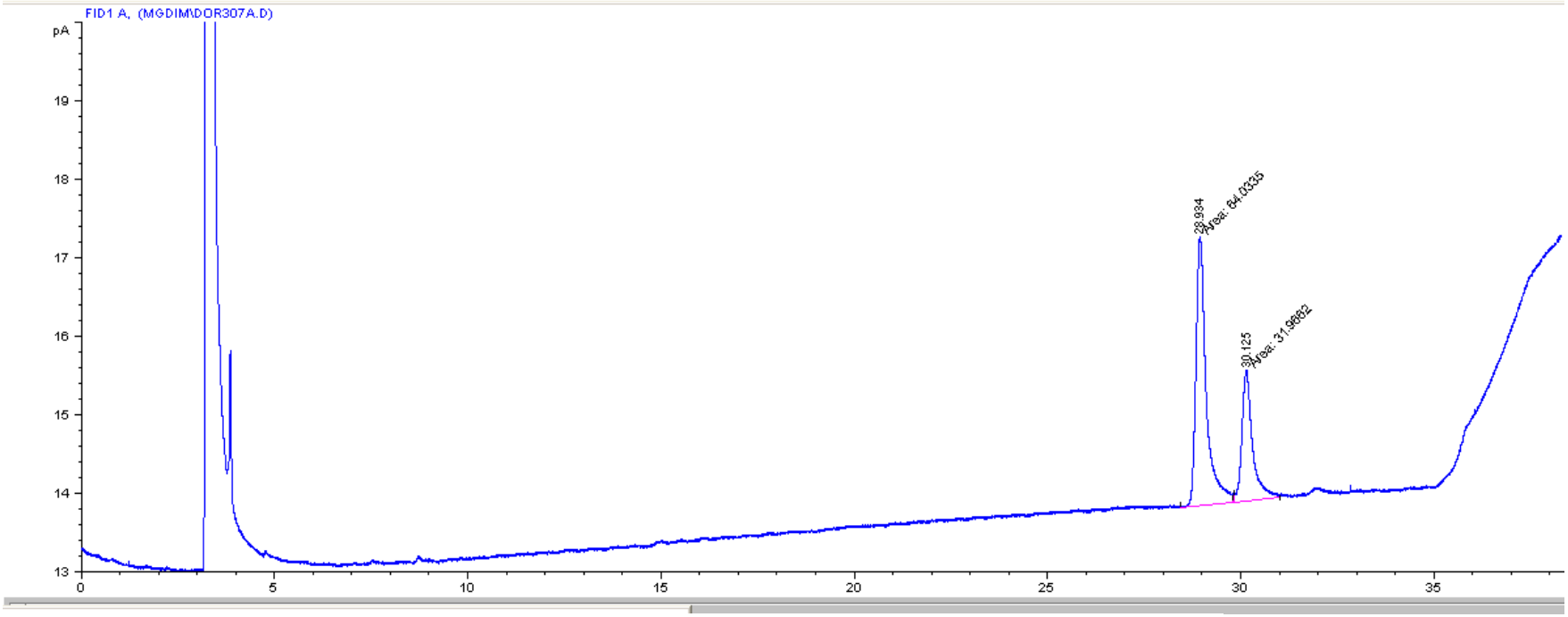
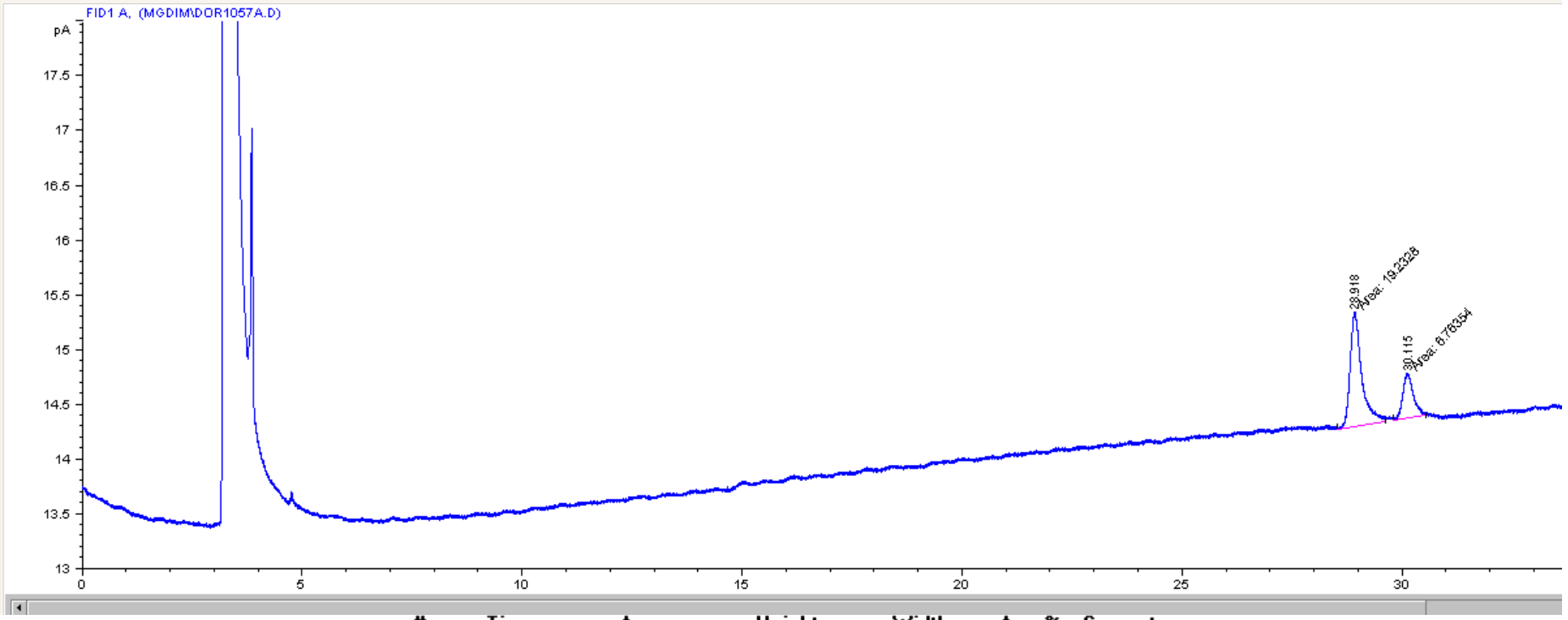


Figure S106. IR spectrum of epoxylactone **9b**.



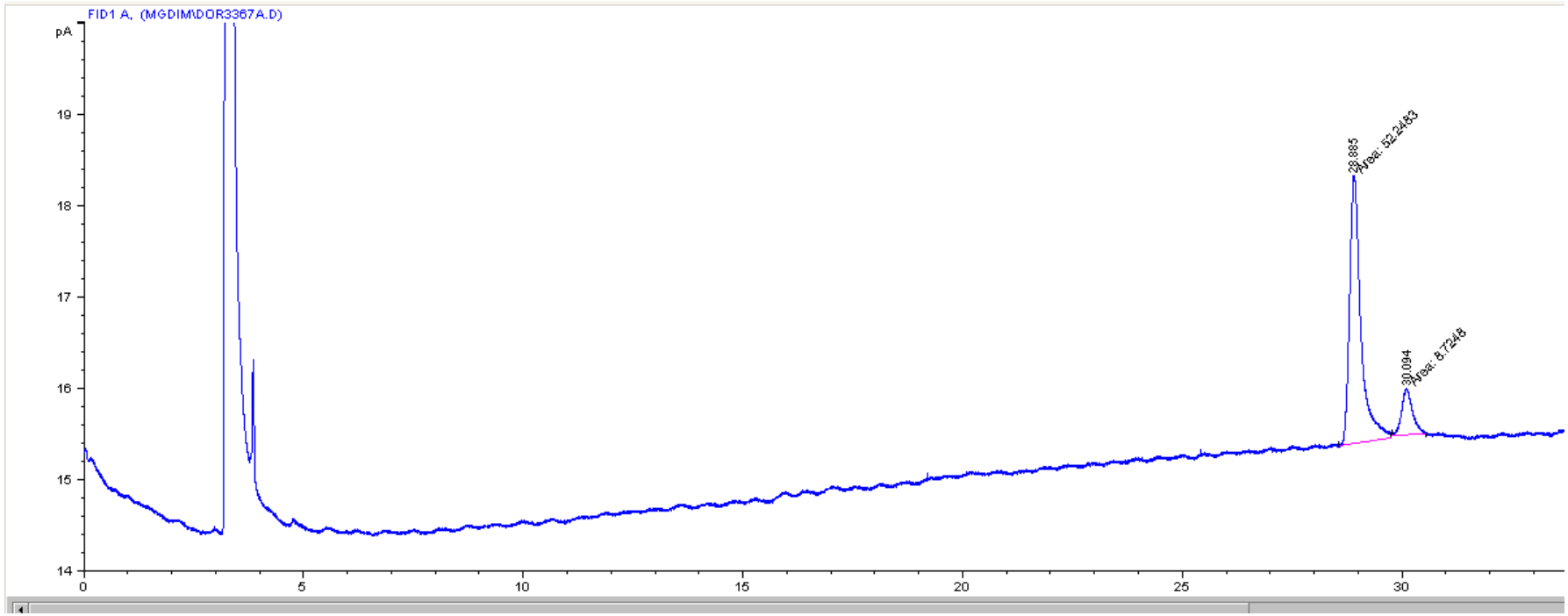
#	Time	Area	Height	Width	Area%	Symmetry
1	28.934	64	3.4	0.311	66.702	0.622
2	30.125	32	1.7	0.3188	33.298	0.608

Figure S107. Chiral chromatogram of lactone **7a** (*P. vermiculatum* AM30).



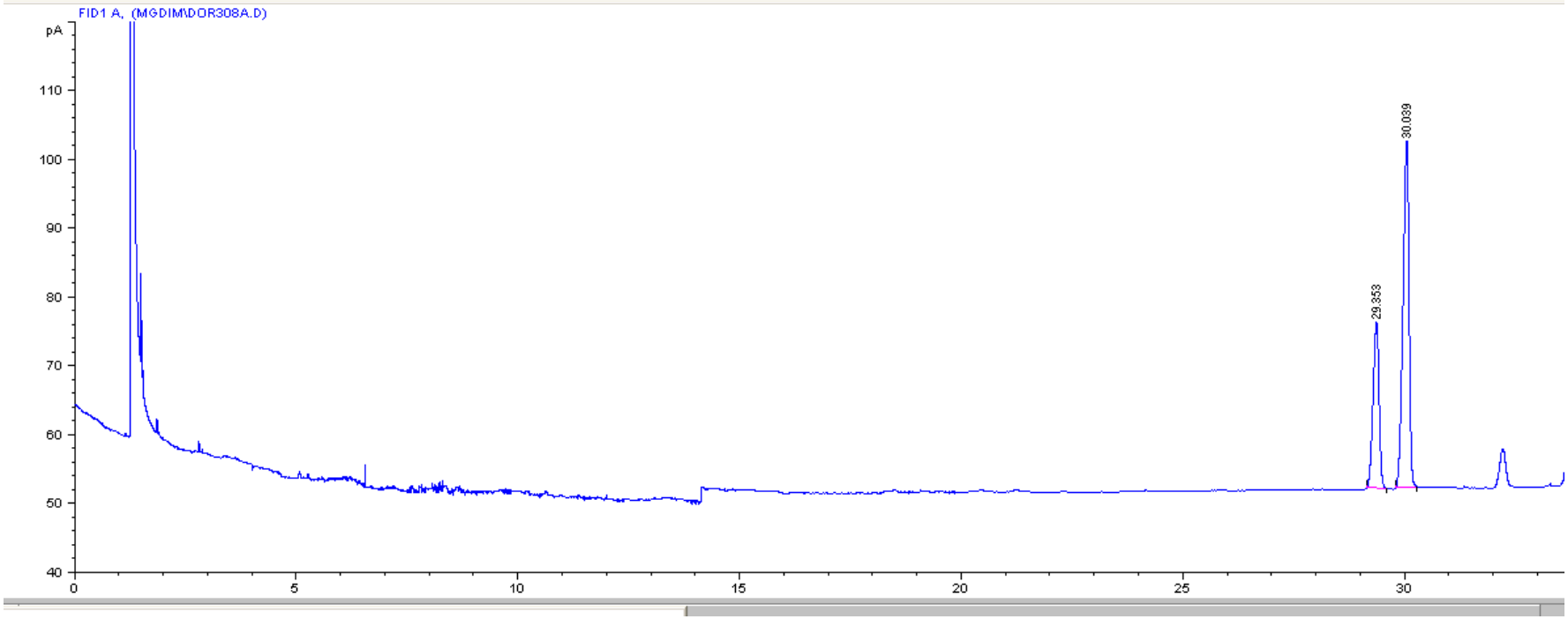
#	Time	Area	Height	Width	Area%	Symmetry
1	28.918	19.2	1	0.3066	73.983	0.679
2	30.115	6.8	4.1E-1	0.2731	26.017	0.814

Figure S108. Chiral chromatogram of lactone **7a** (*S. racemosum* AM105).



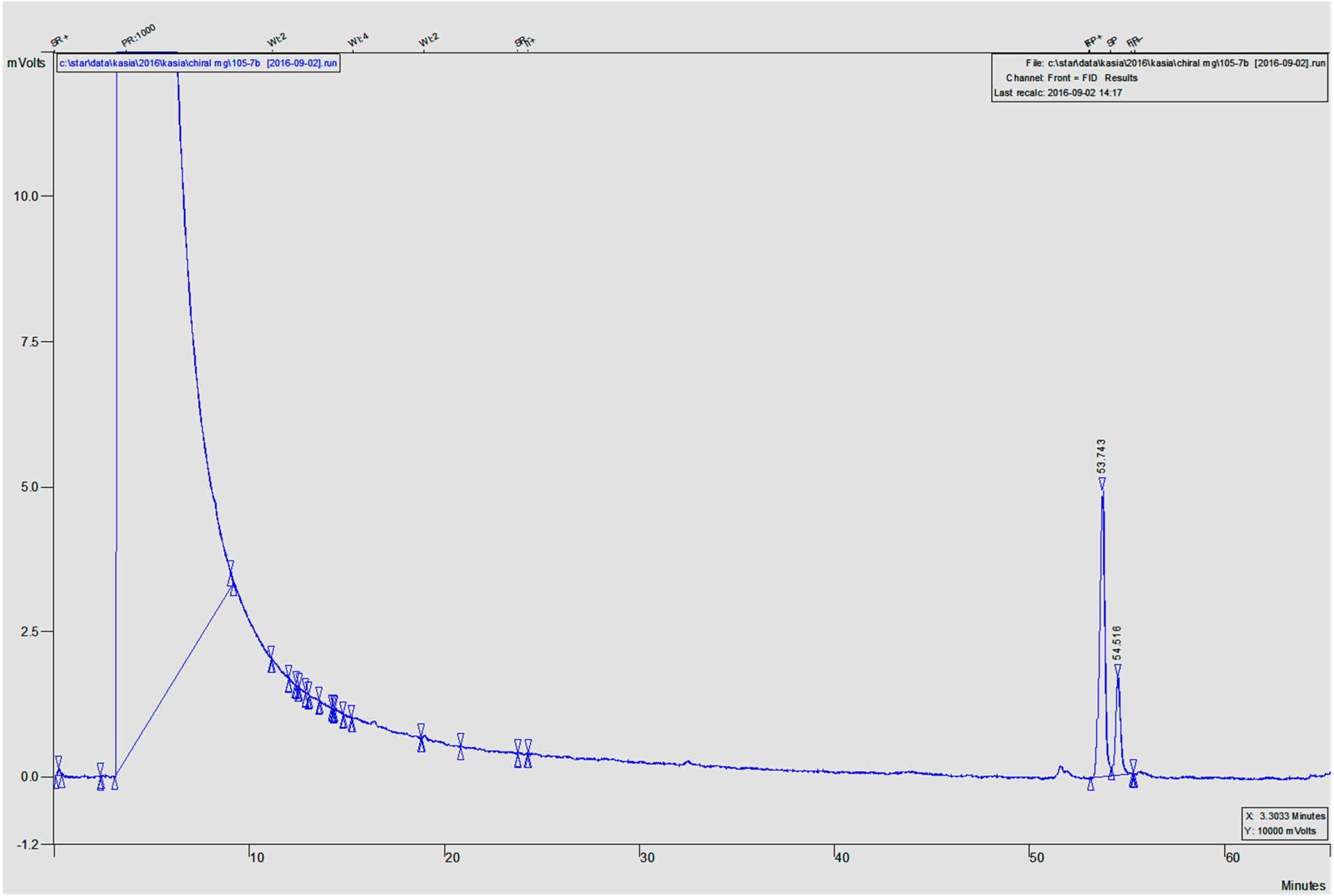
#	Time	Area	Height	Width	Area%	Symmetry
1	28.885	52.2	2.9	0.2971	85.691	0.541
2	30.094	8.7	5.1E-1	0.284	14.309	0.838

Figure S109. Chiral chromatogram of lactone **7a** (*A. cylindrospora* AM336).



#	Time	Area	Height	Width	Area%	Symmetry
1	29.353	228	24.1	0.1293	32.450	1.242
2	30.039	474.5	50.3	0.1276	67.550	1.613

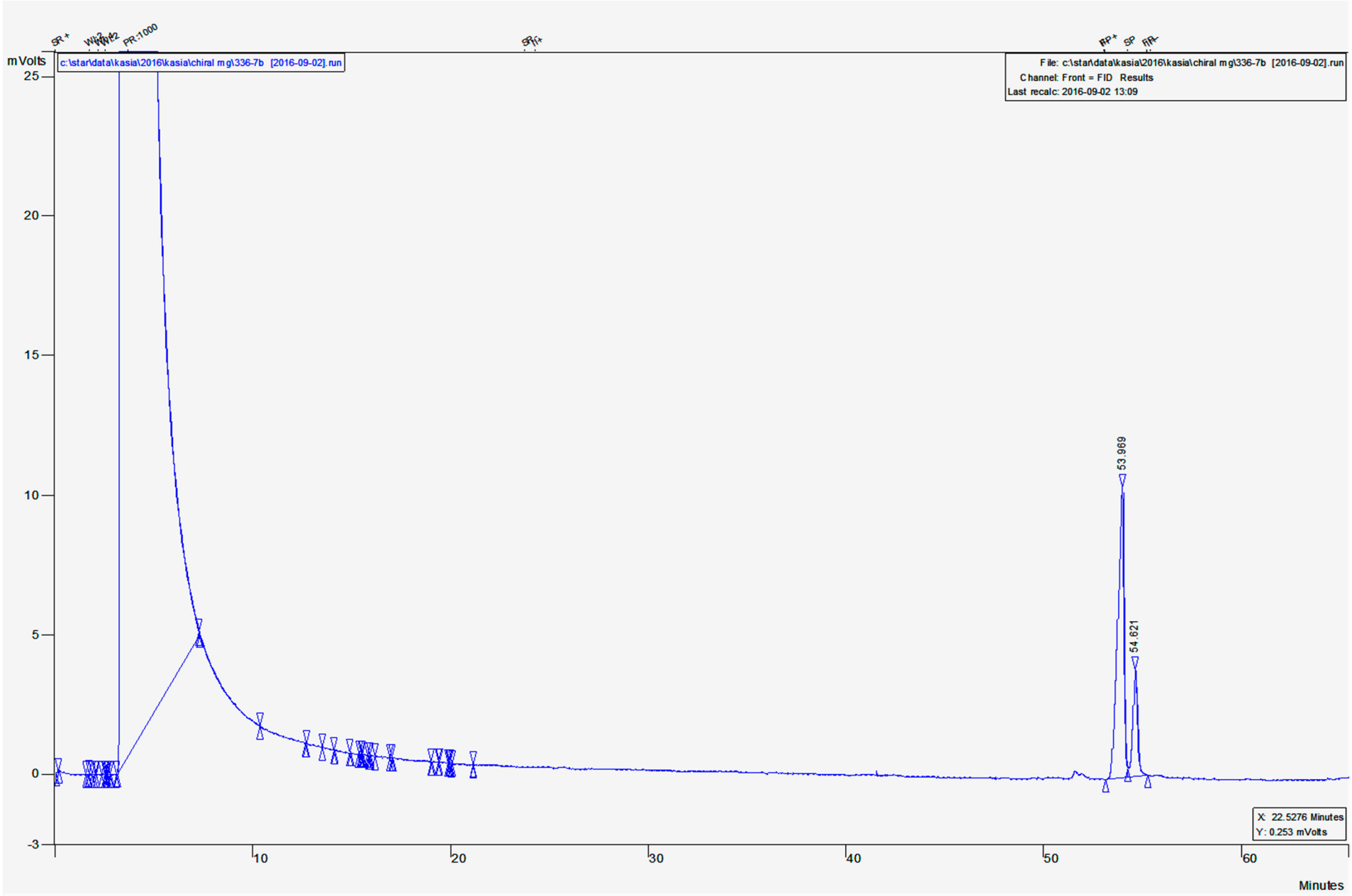
Figure S110. Chiral chromatogram of lactone **8a** (*P. vermiculatum* AM30).

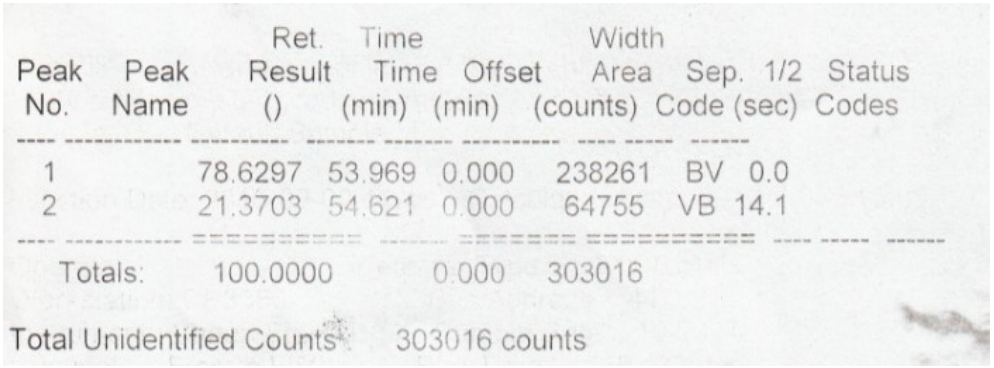

SR+
PR:1000
Wt:2
Wt:4
Wt:2
SR+
FP+
SP
FP-
mVolts
c:\star\data\kasia\2016\kasia\chiral mg\105-7b [2016-09-02].run
File: c:\star\data\kasia\2016\kasia\chiral mg\105-7b [2016-09-02].run
Channel: Front = FID Results
Last recalc: 2016-09-02 14:17
10.0
7.5
5.0
2.5
0.0
-1.2
53.743
54.516
X: 3.3033 Minutes
Y: 10000 mVolts
10
20
30
40
50
60
Minutes

Peak No.	Peak Name	Ret. Time Result ()	Time (min)	Offset (min)	Width Area (counts)	Sep. Code	1/2 (sec)	Status Codes
1		75.4178	53.743	0.000	93428	BV	0.0	
2		24.5822	54.516	0.000	30452	VB	14.7	
Totals:		100.0000		0.000	123880			

Total Unidentified Counts : 123880 counts

Figure S111. Chiral chromatogram of lactone **7b** (*S. racemosum* AM105).


mVolts
25
20
15
10
5
0
-3
c:\star\data\kasia\2016\kasia\chiral mg\336-7b [2016-09-02].run
File: c:\star\data\kasia\2016\kasia\chiral mg\336-7b [2016-09-02].run
Channel: Front = FID Results
Last recalc: 2016-09-02 13:09
53.969
54.621
X: 22.5276 Minutes
Y: 0.253 mVolts
10
20
30
40
50
60
Minutes



Peak No.	Peak Name	Ret. Time Result ()	Time (min)	Offset (min)	Area (counts)	Width Sep. Code	1/2 (sec)	Status Codes
1		78.6297	53.969	0.000	238261	BV	0.0	
2		21.3703	54.621	0.000	64755	VB	14.1	
Totals:		100.0000		0.000	303016			

Total Unidentified Counts: 303016 counts

Figure S112. Chiral chromatogram of lactone **7b** (*A. cylindrospora* AM336).

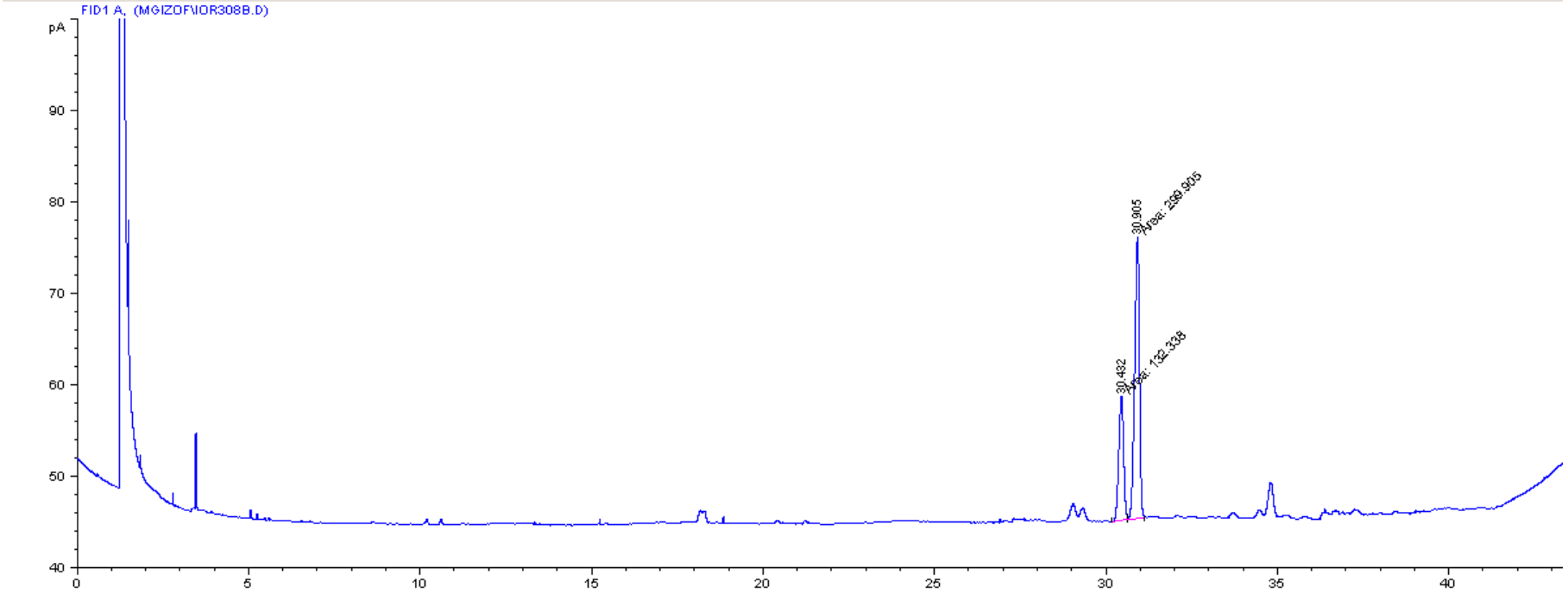


Figure S113. Chiral chromatogram of lactone **8b** (*P. vermiculatum* AM30).