

# An Anti-inflammatory 2,4-Cyclized-3,4-Secospongian Diterpenoid and Furanoterpene-related Metabolites of a Marine Sponge *Spongia* sp. from the Red Sea

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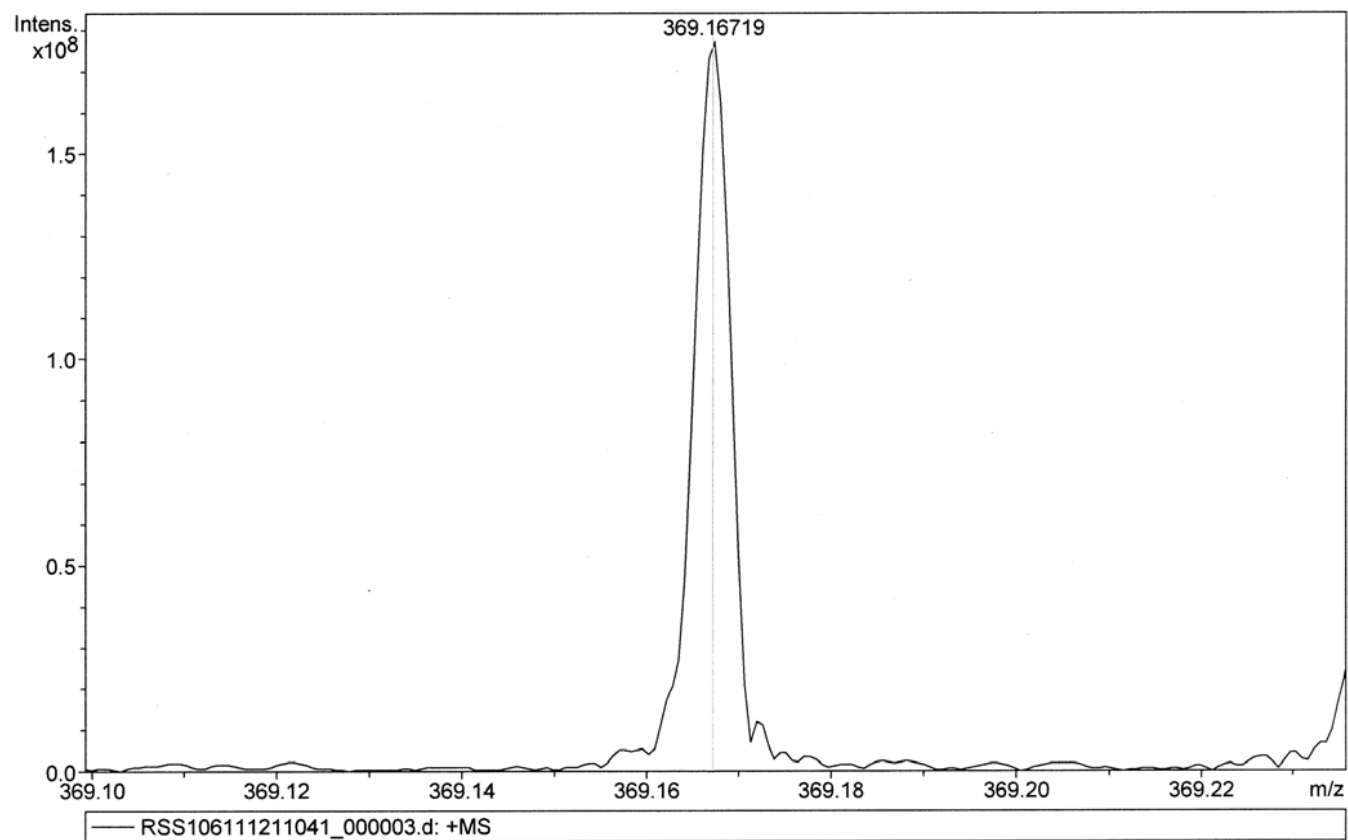
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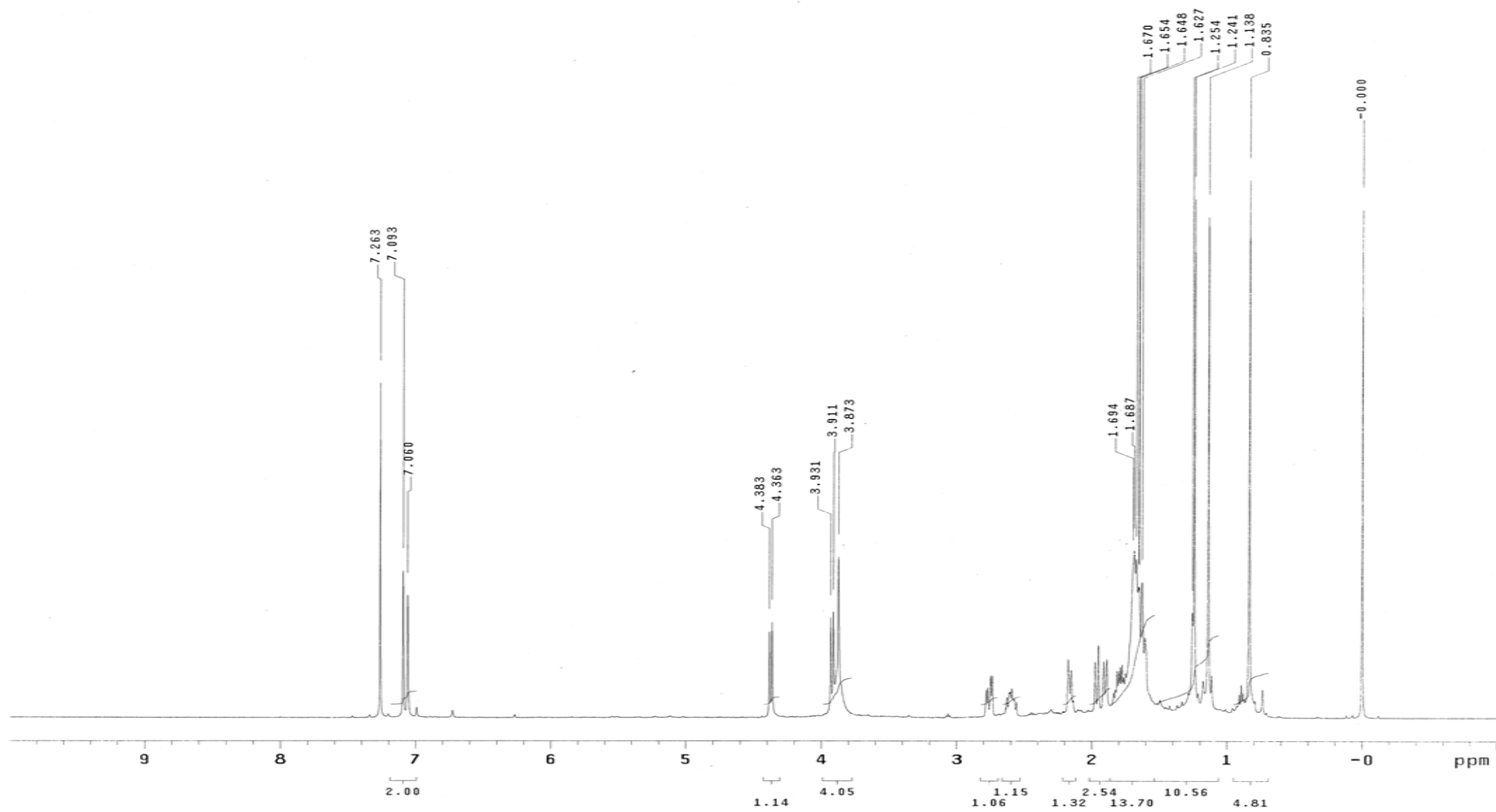
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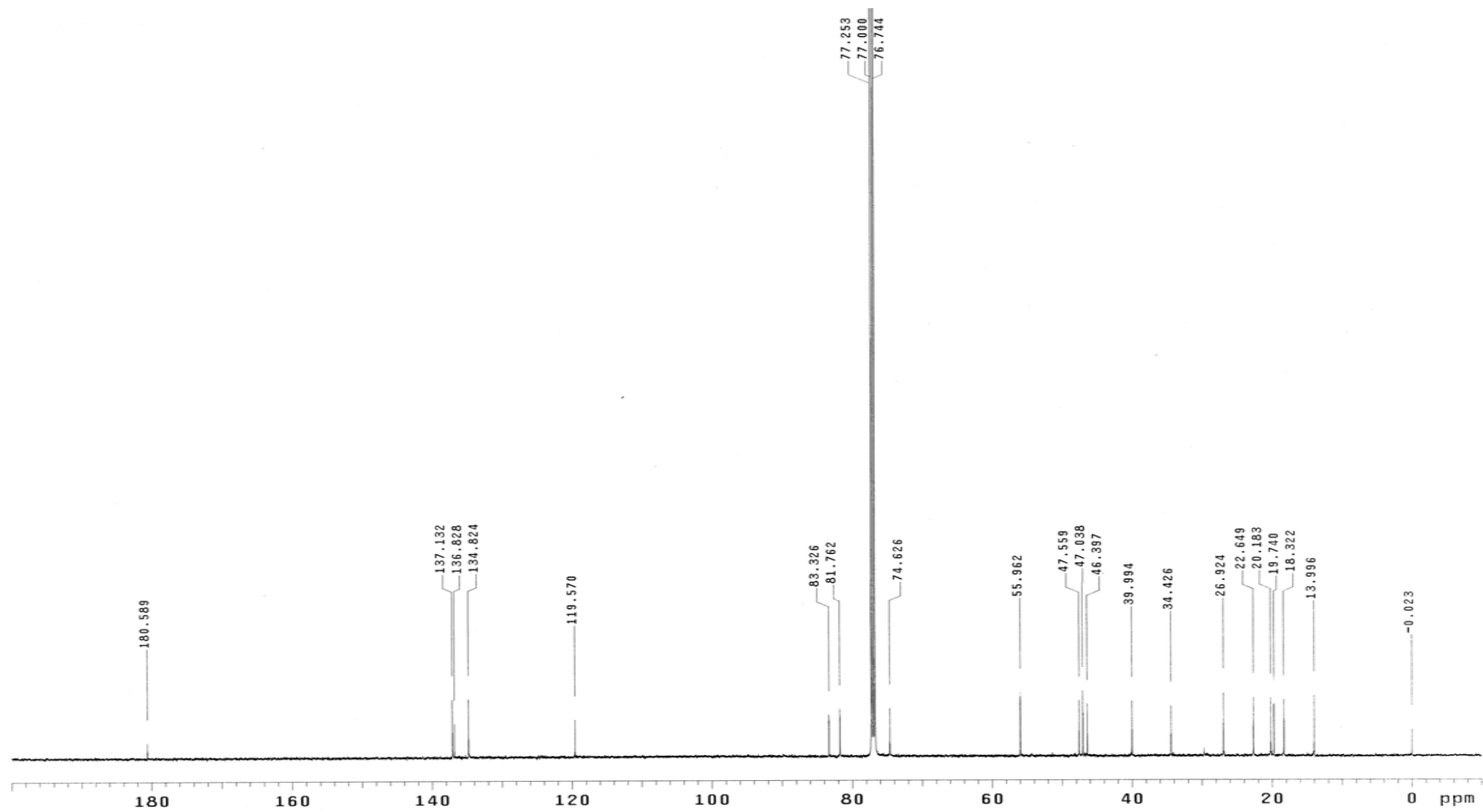


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369.16719	1	C <sub>20</sub> H <sub>26</sub> NaO <sub>5</sub>	100.00	369.16725	0.06	0.15	18.8	7.5	even	ok

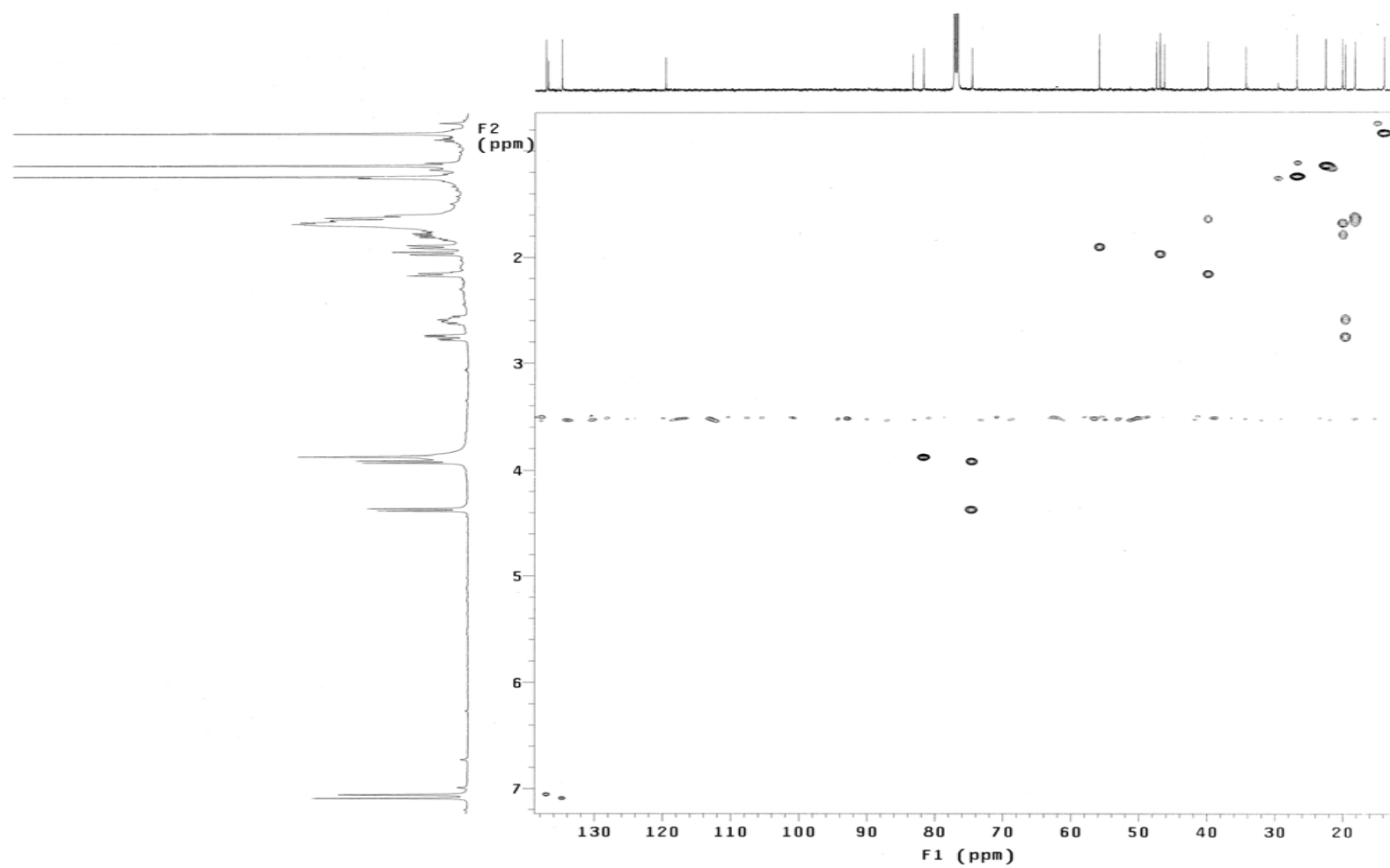
**Figure S1.** HRESIMS spectrum of compound 1.



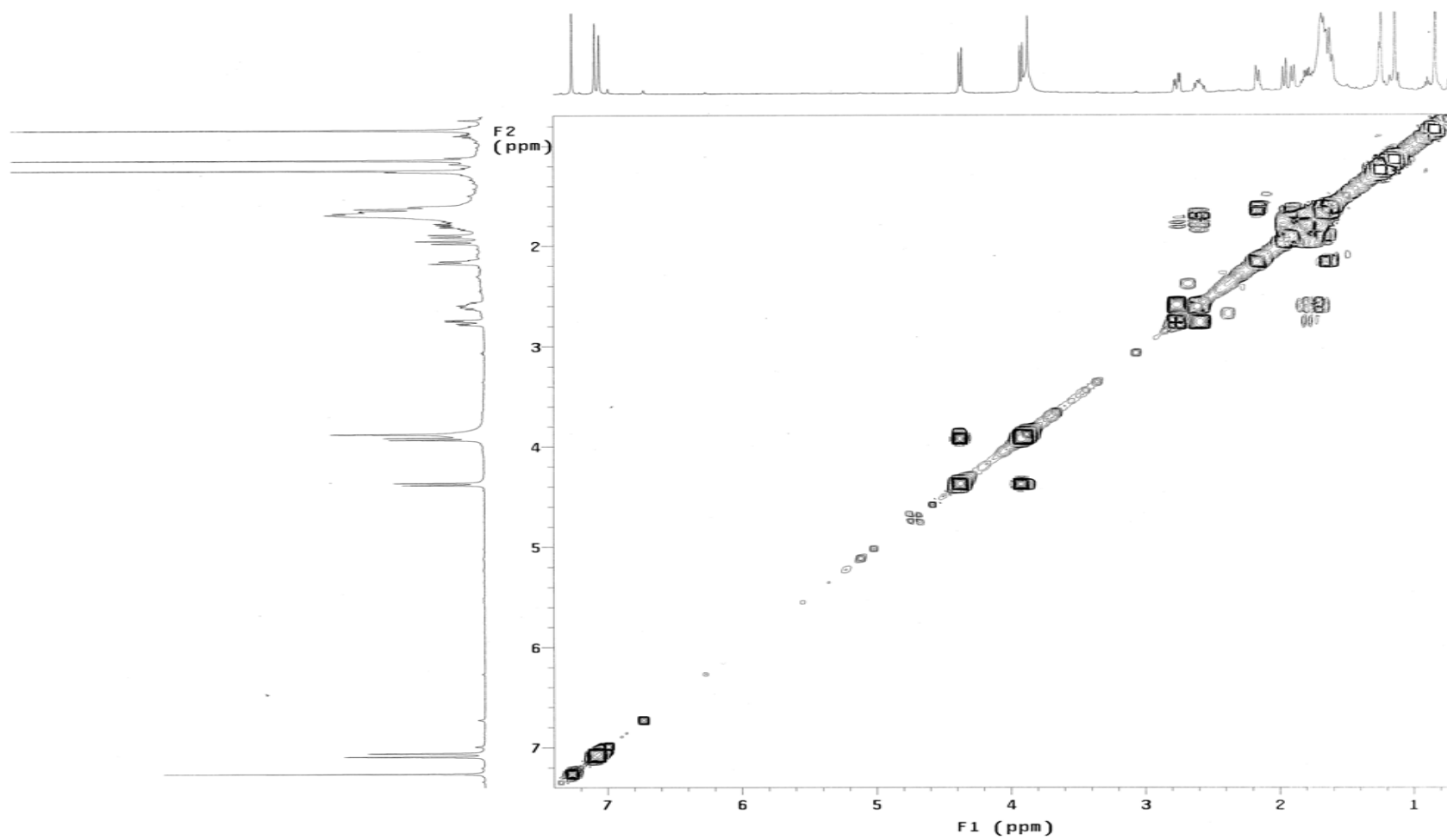
**Figure S2.**  $^1\text{H}$  NMR spectrum (500 MHz) of compound **1** in  $\text{CDCl}_3$ .



**Figure S3.**  $^{13}\text{C}$  NMR spectrum (125 MHz) of compound **1** in  $\text{CDCl}_3$ .

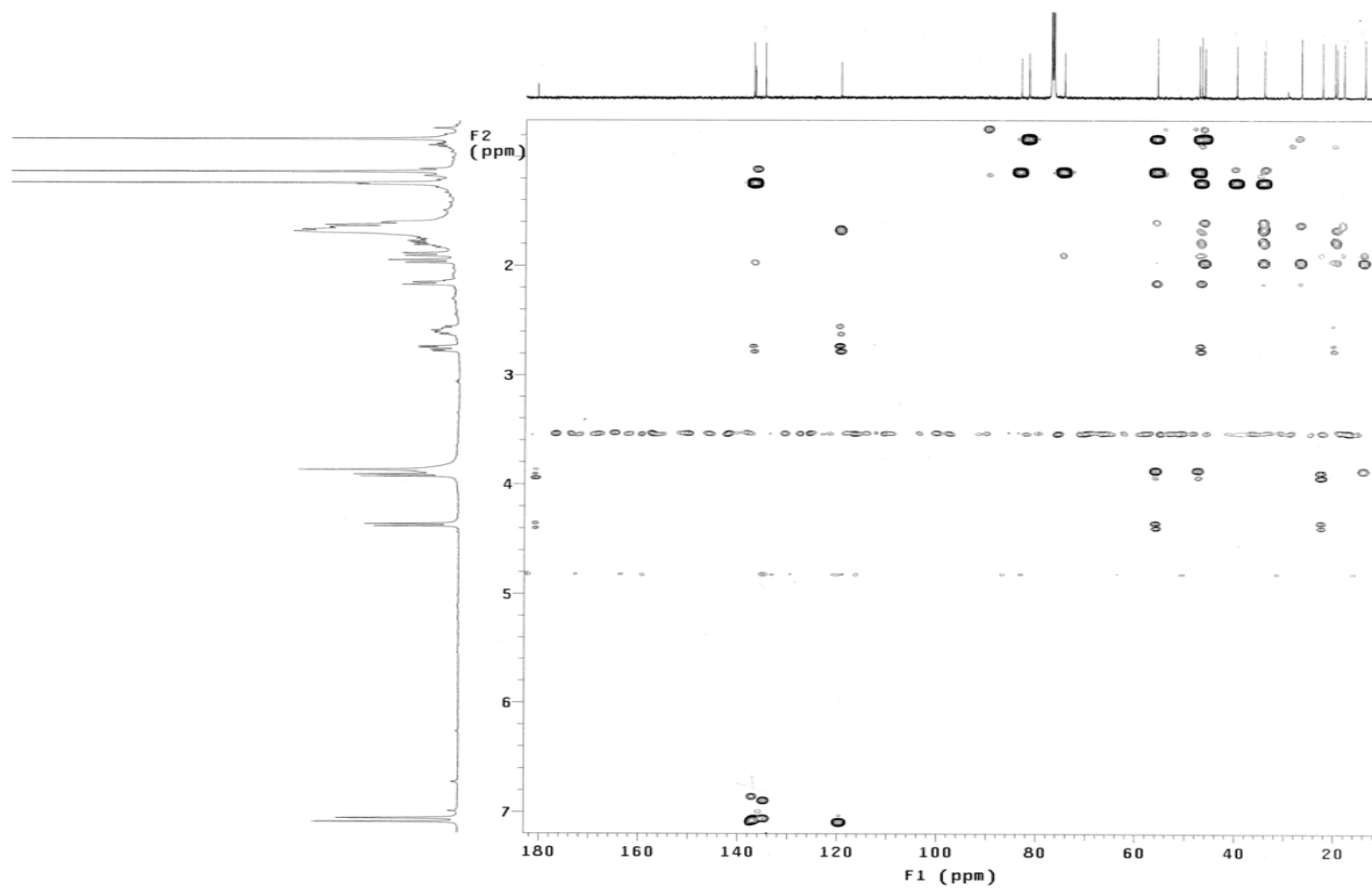


**Figure S4.** HSQC spectrum of 1 in CDCl<sub>3</sub>.



**Figure S5.**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of **1** in  $\text{CDCl}_3$ .





**Figure S6.** HMBC spectrum of **1** in CDCl<sub>3</sub>.

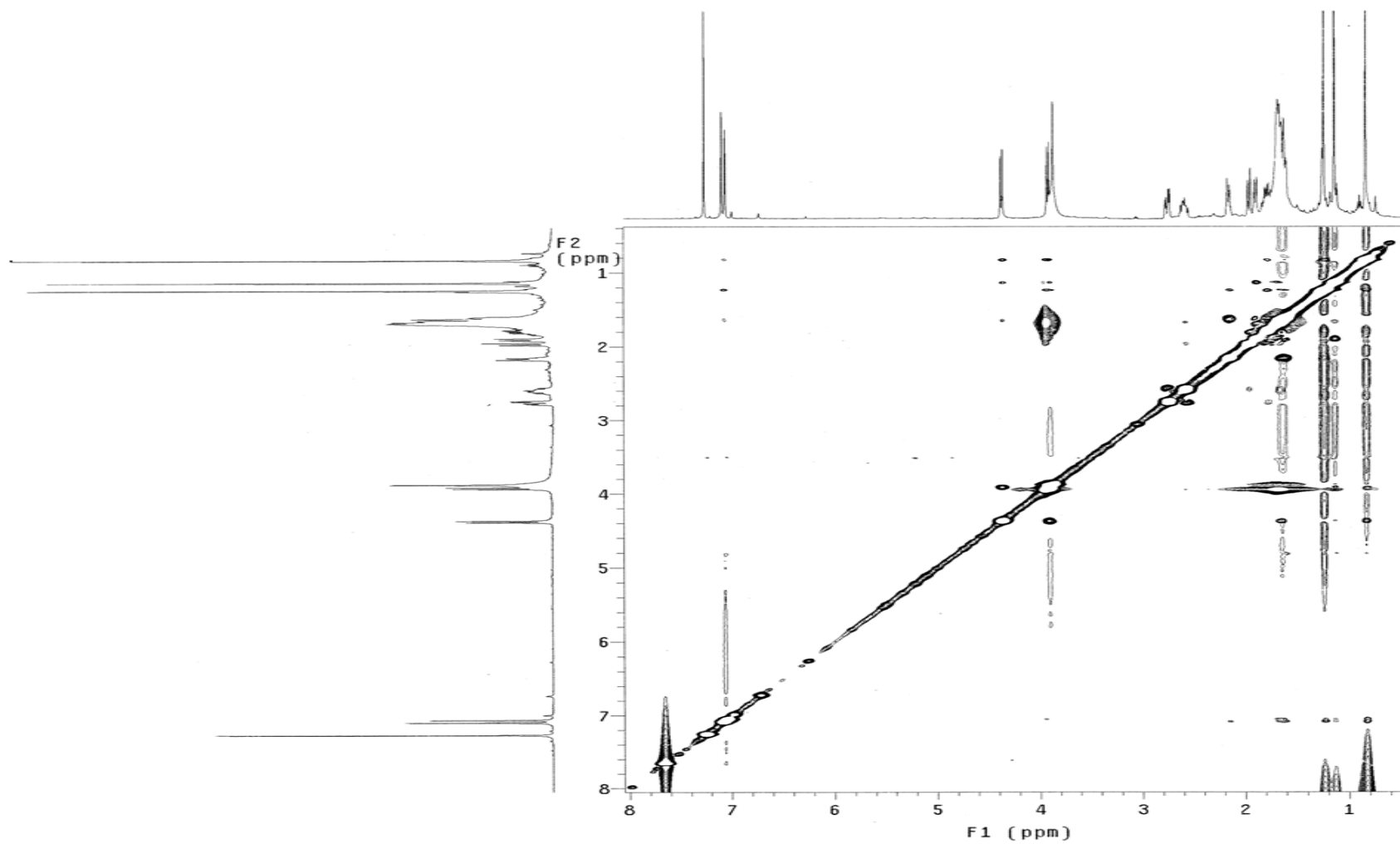
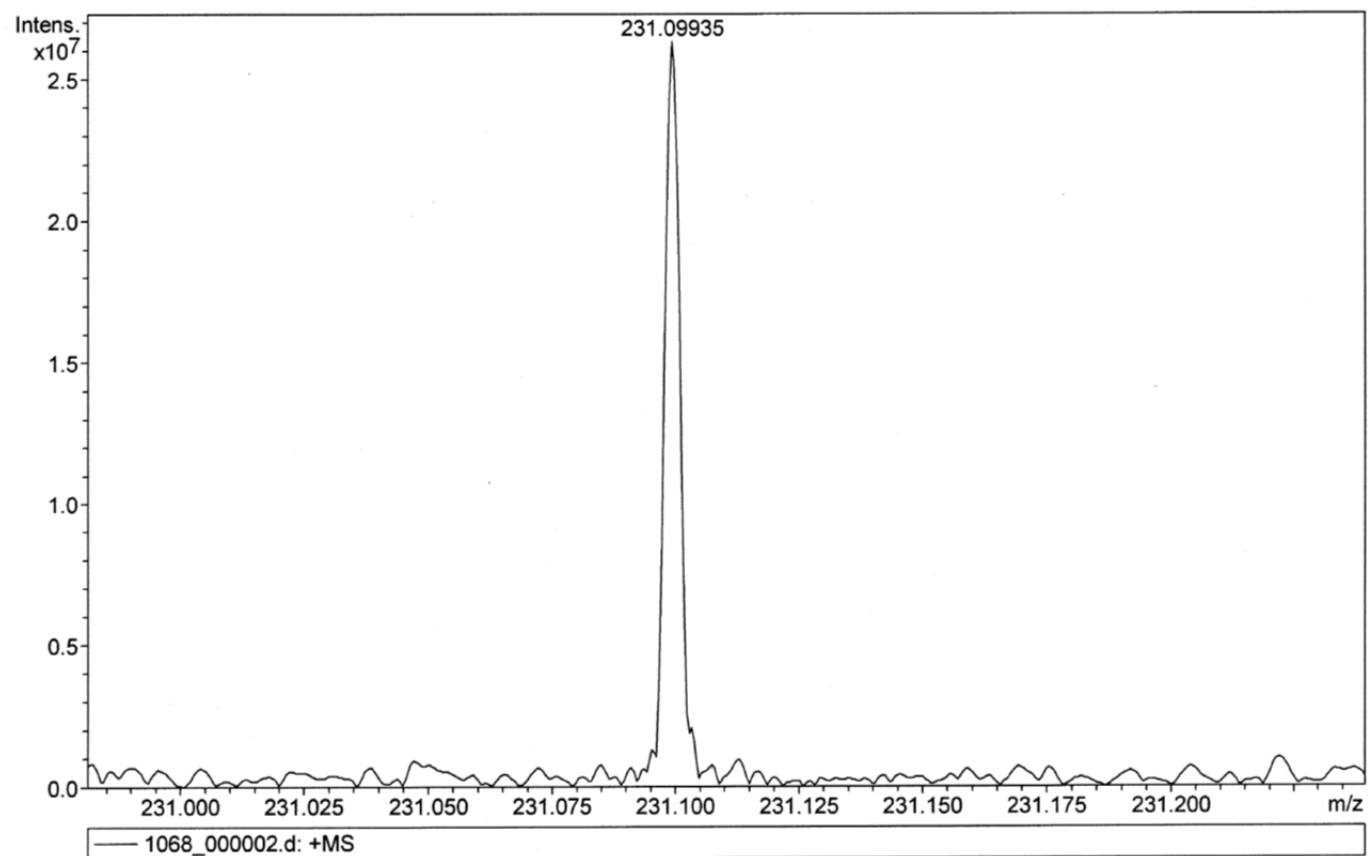
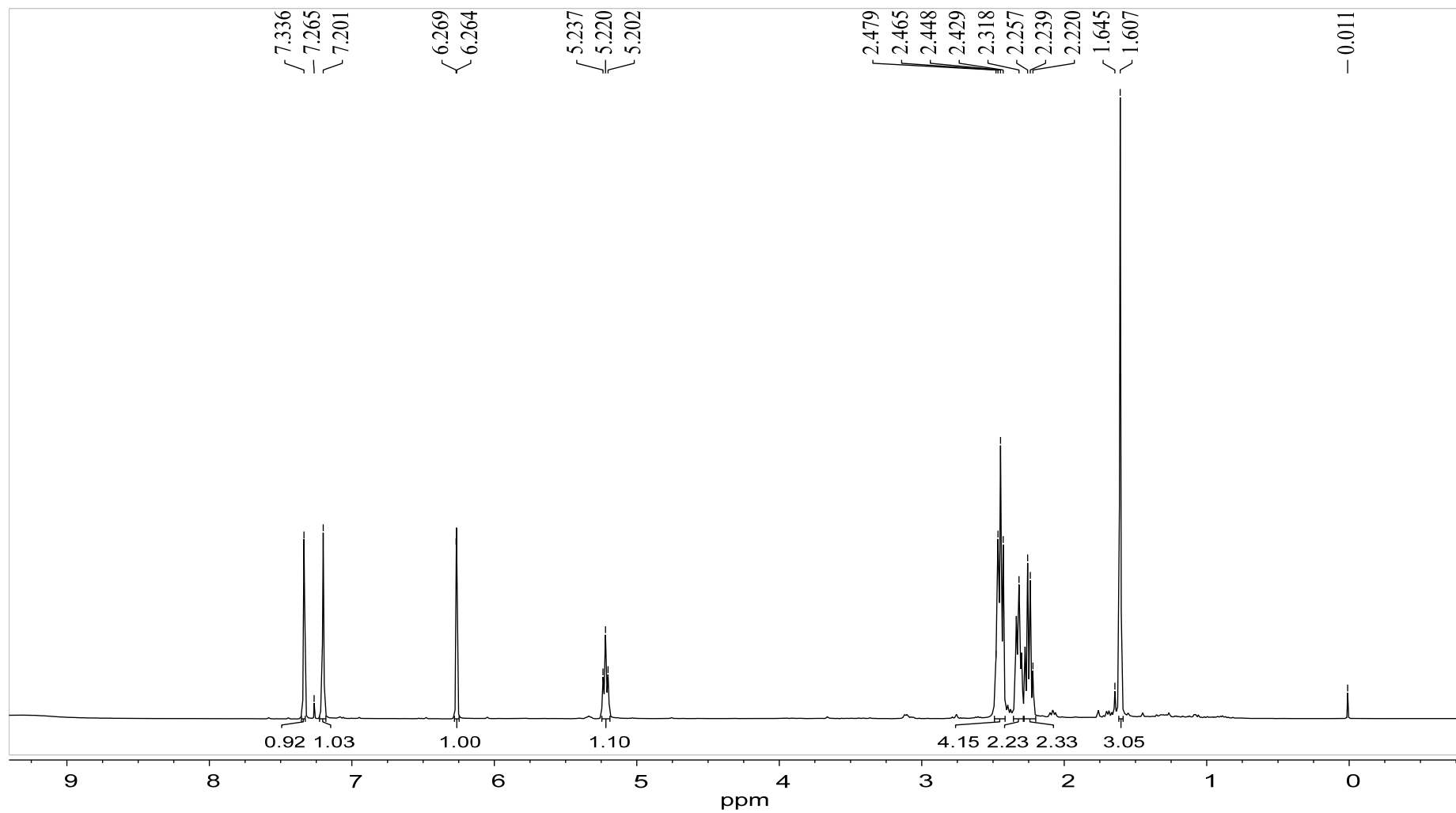


Figure S7. NOESY spectrum of **1** in  $\text{CDCl}_3$ .

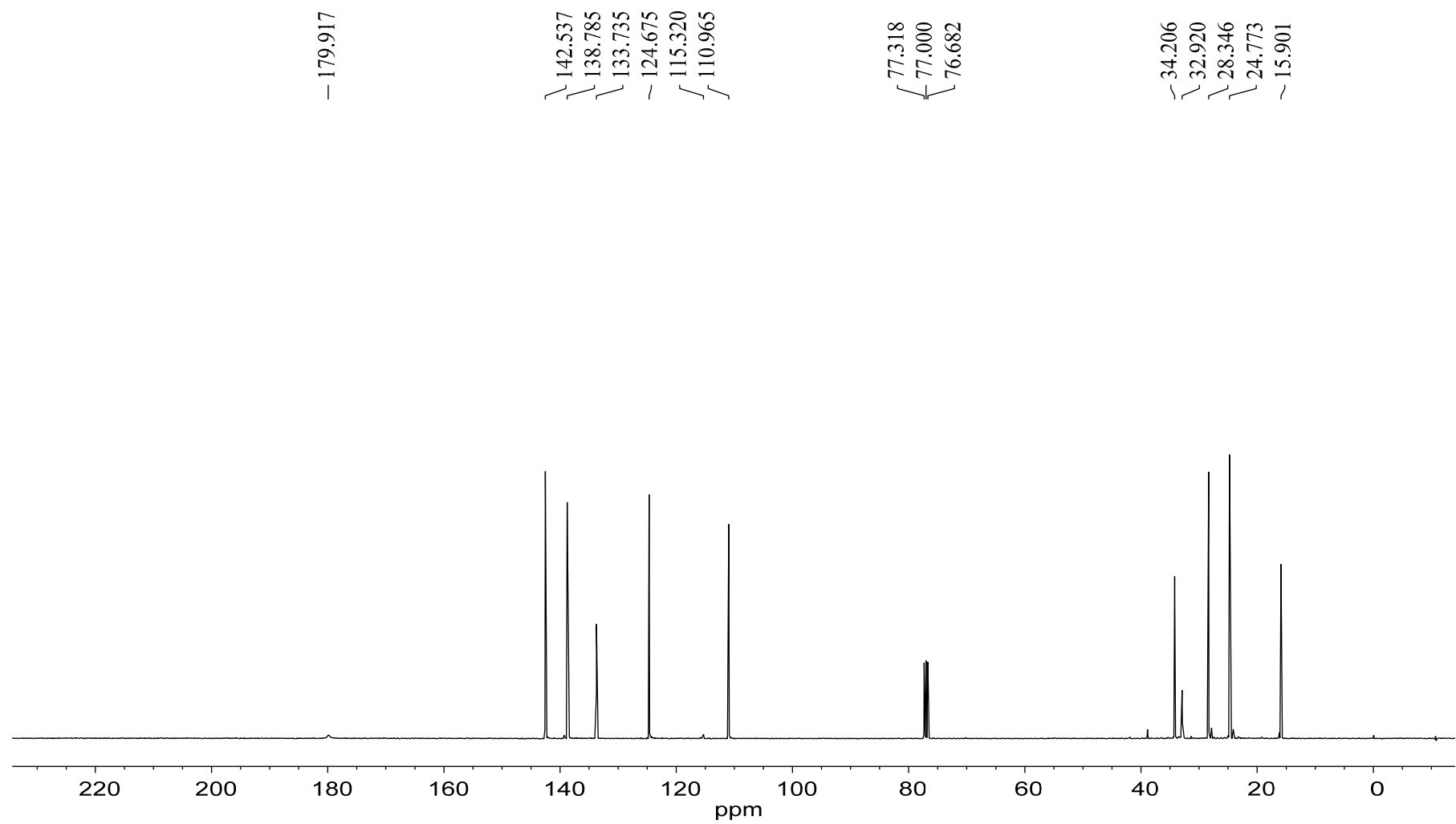


Meas. m/z	#	Formula	Score	m/z	err [mDa]	err [ppm]	mSigma	rdb	e <sup>-</sup> Conf	N-Rule
231.09935	1	C <sub>12</sub> H <sub>16</sub> NaO <sub>3</sub>	100.00	231.09917	-0.18	-0.80	9.1	4.5	even	ok

Figure S8. HRESIMS spectrum of 2.



**Figure S9.**  $^1\text{H}$  NMR spectrum (400 MHz) of compound 2 in  $\text{CDCl}_3$ .



**Figure S10.**  $^{13}\text{C}$  NMR spectrum (100 MHz) of compound **2** in  $\text{CDCl}_3$ .

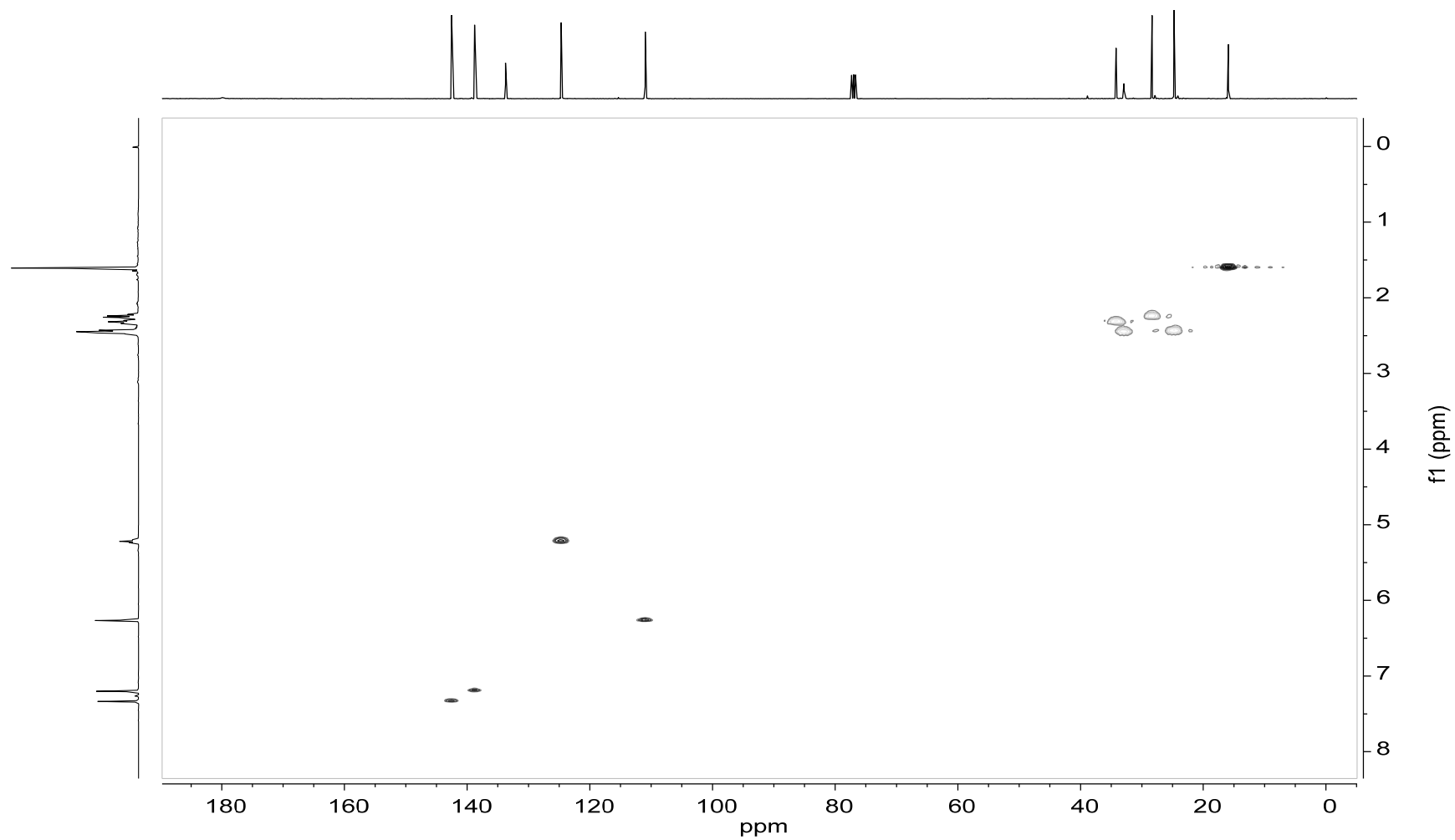
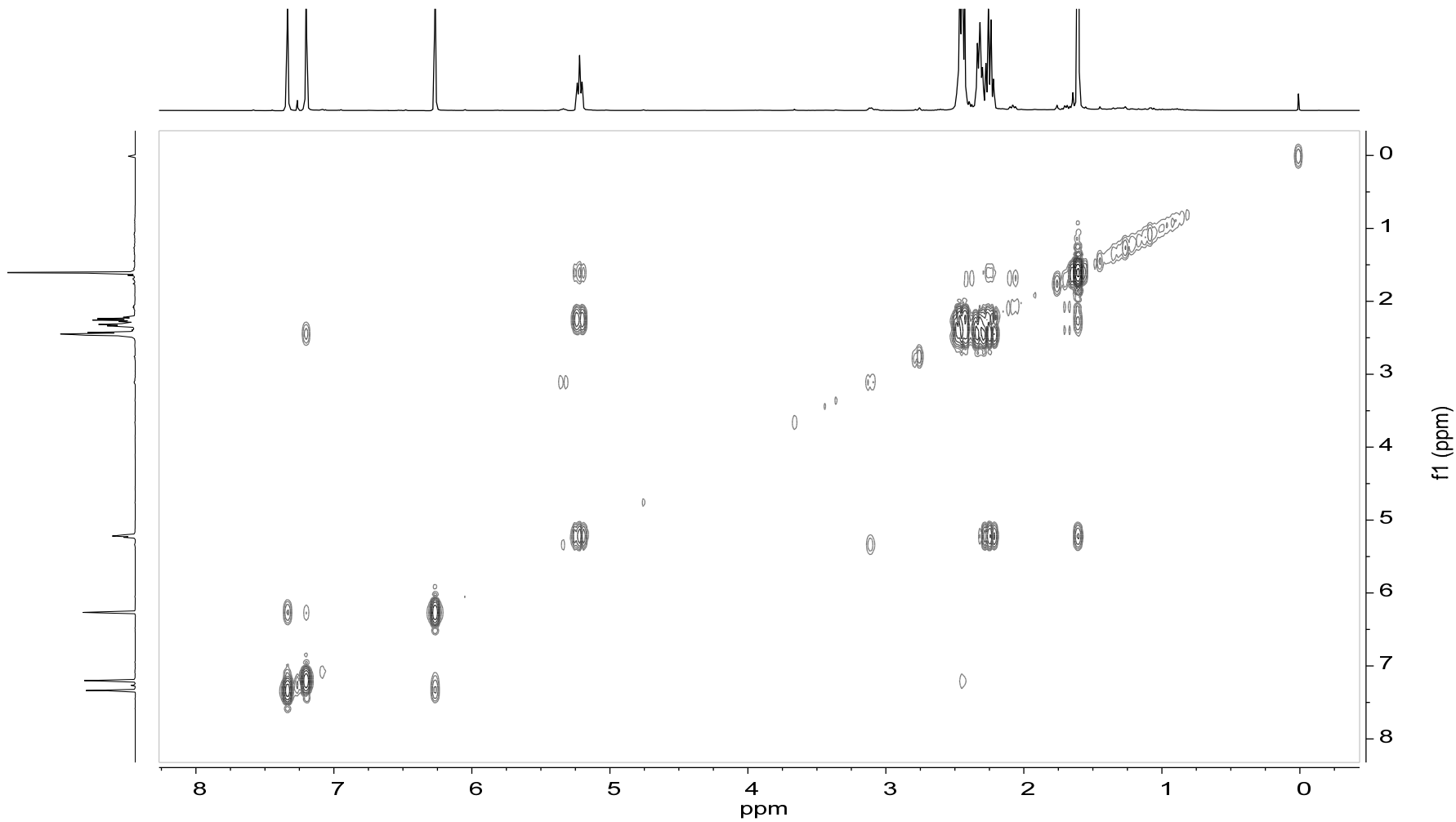


Figure S11. HSQC spectrum of 2 in CDCl<sub>3</sub>.



**Figure S12.**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of **2** in  $\text{CDCl}_3$ .

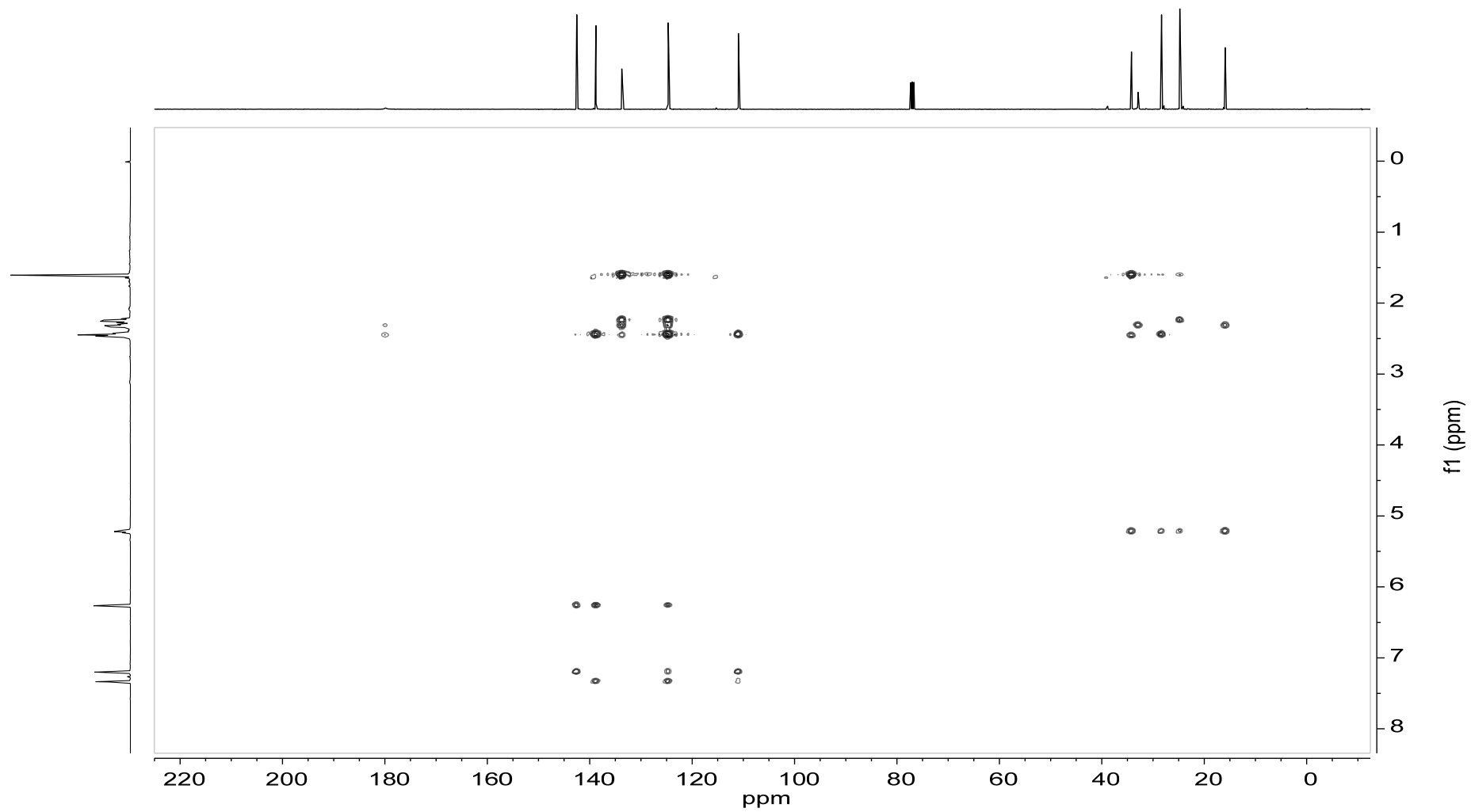


Figure S13. HMBC spectrum of 2 in CDCl<sub>3</sub>.



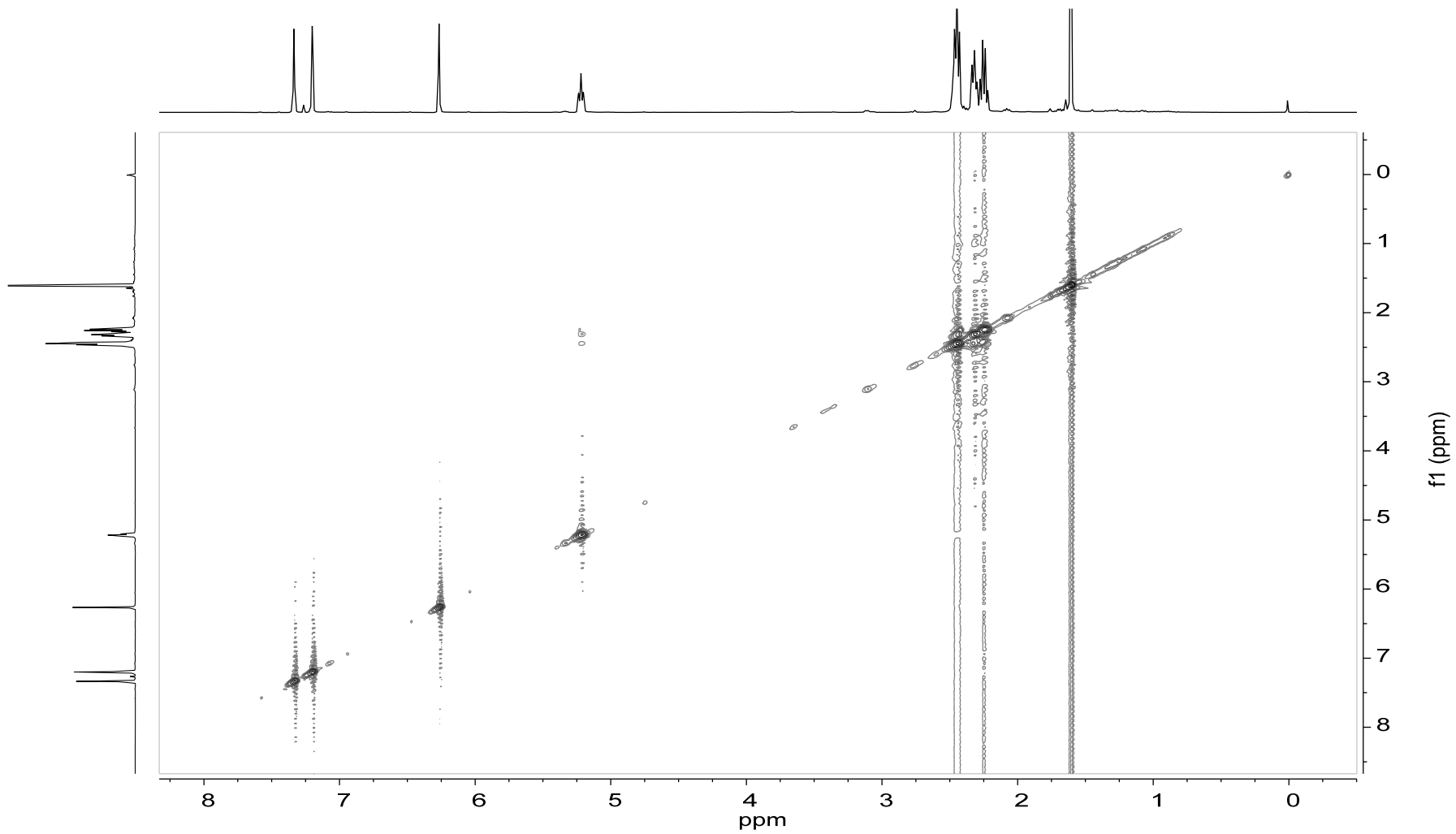
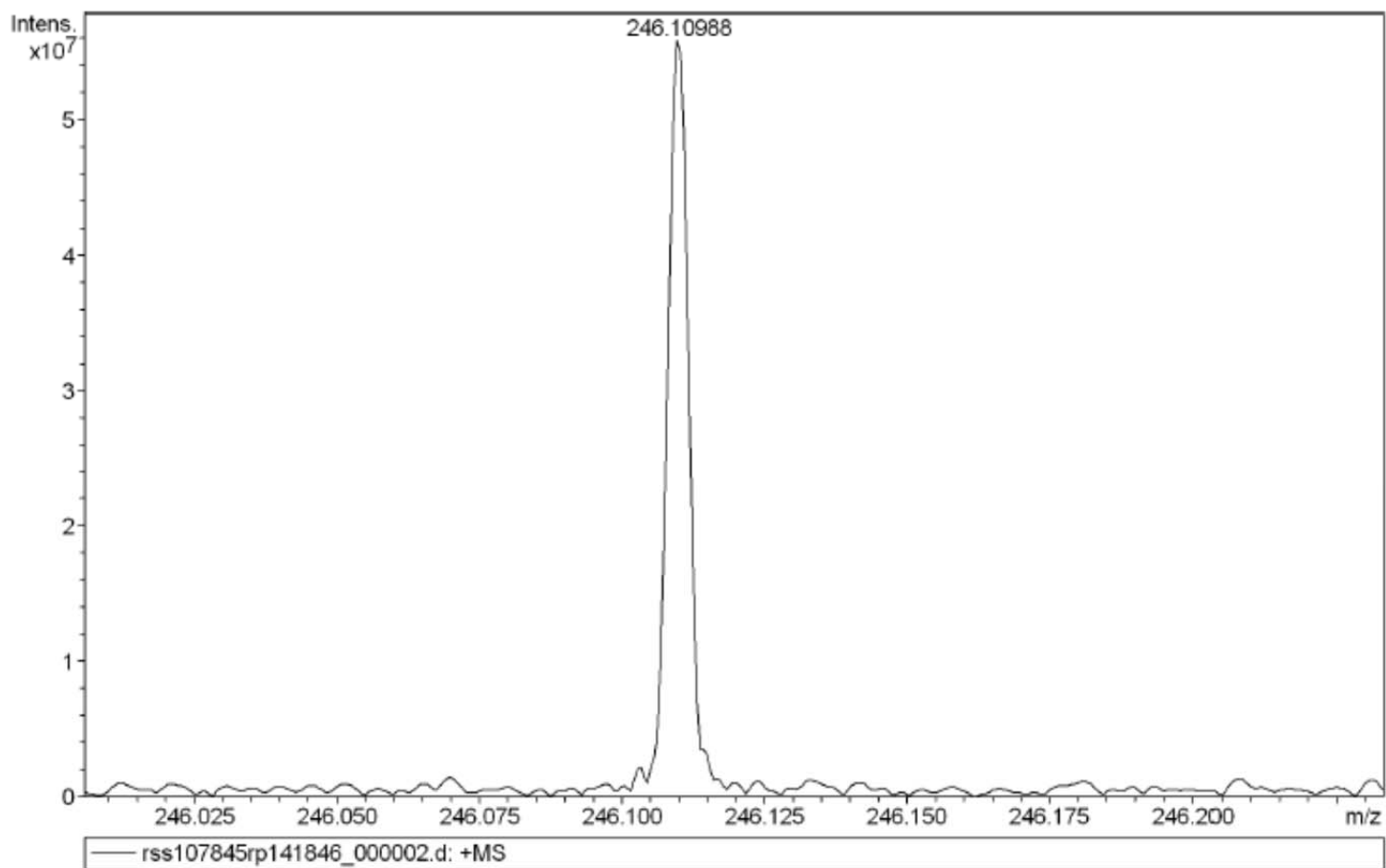
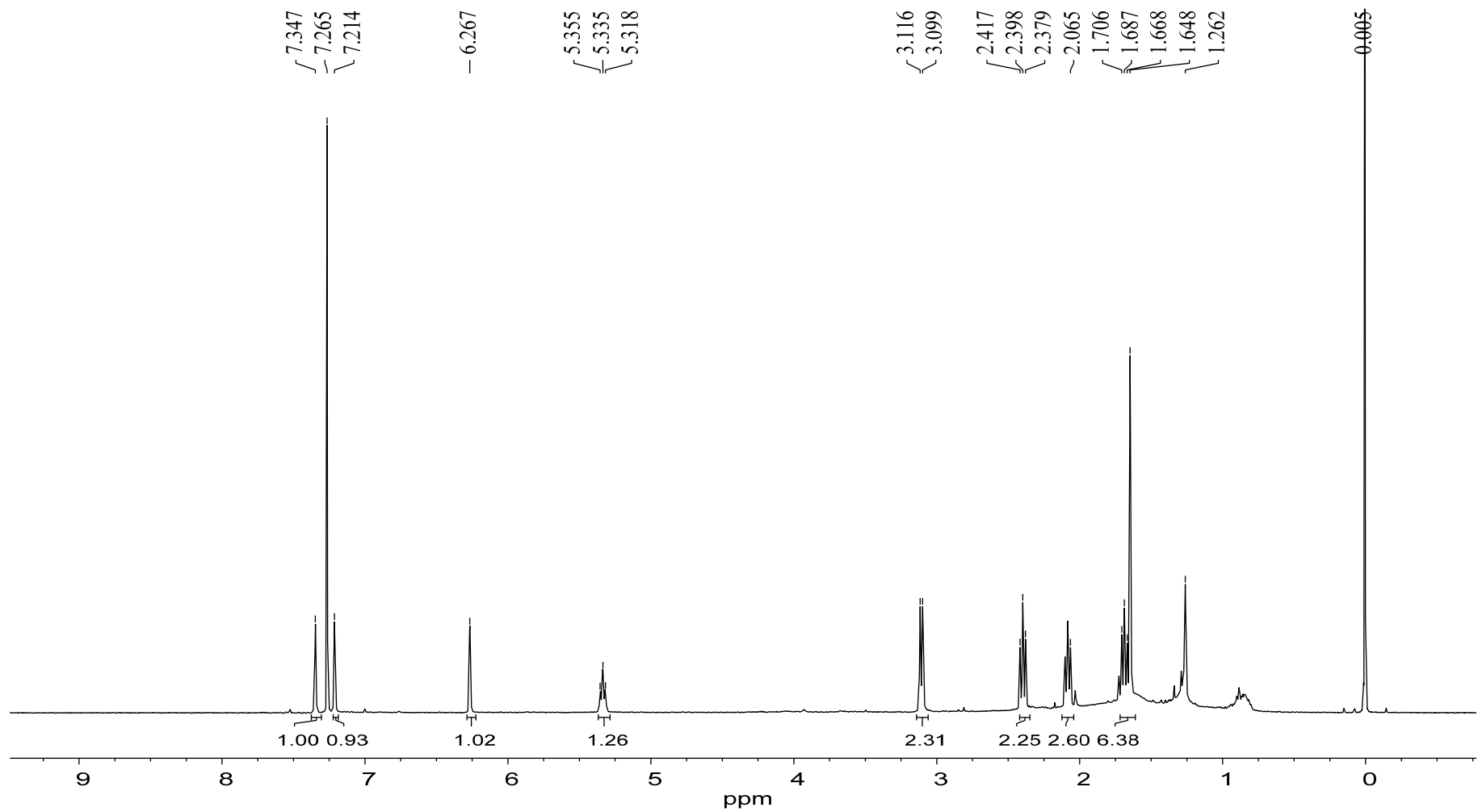


Figure S14. NOESY spectrum of 2 in CDCl<sub>3</sub>.



Meas. m/z	#	Formula	Score	m/z	err [mDa]	err [ppm]	mSigma	rdb	e <sup>-</sup>	Conf	N-Rule
246.10988	1	C <sub>12</sub> H <sub>17</sub> NNaO <sub>3</sub>	100.00	246.11006	0.18	0.74	12.1	4.5	even		ok

**Figure S15.** HRESIMS spectrum of compound 3.



**Figure S16.**  $^1\text{H}$  NMR spectrum (400 MHz) of compound **3** in  $\text{CDCl}_3$ .

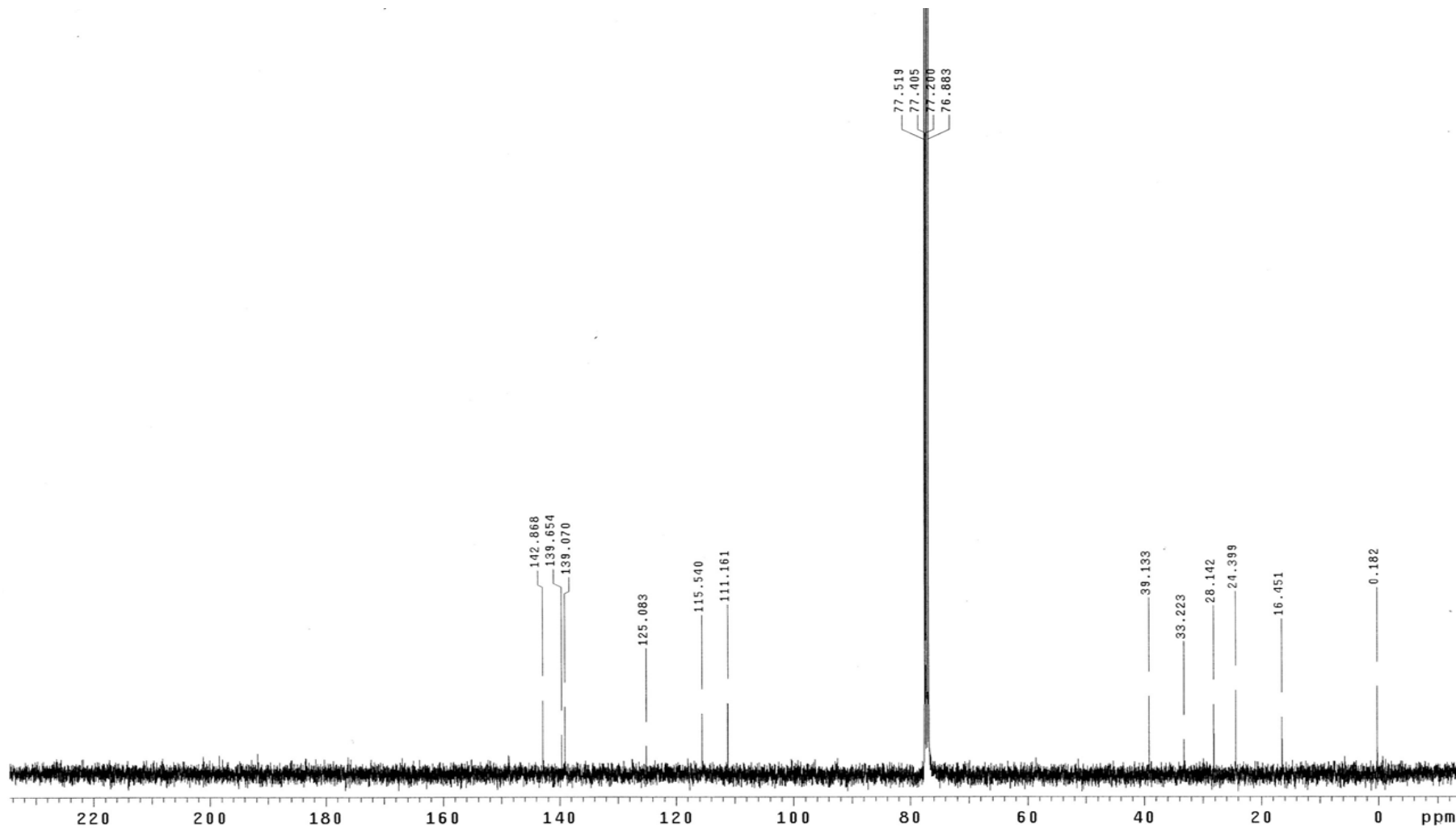


Figure S17.  $^{13}\text{C}$  NMR spectrum (100 MHz) of compound 3 in  $\text{CDCl}_3$ .

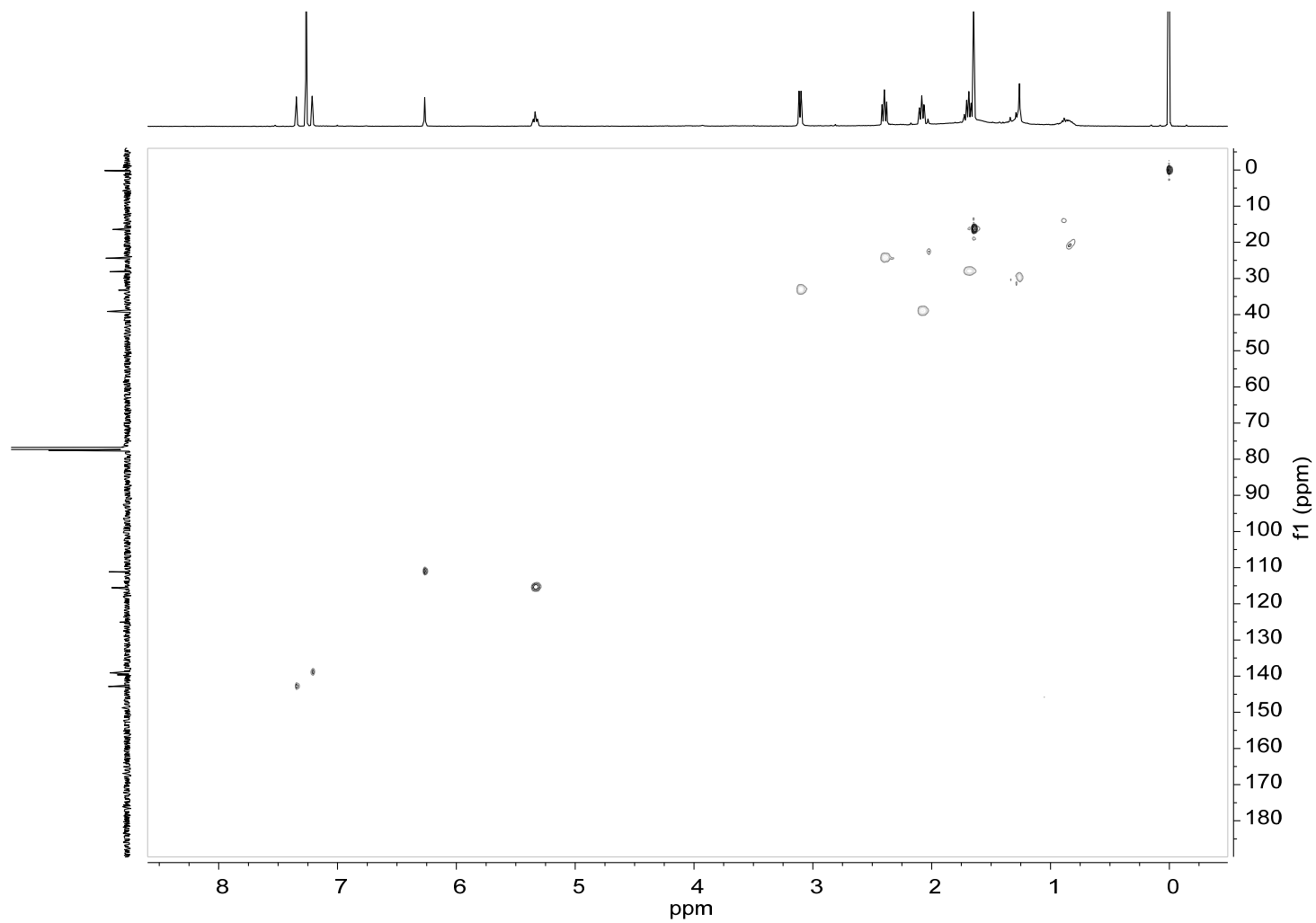
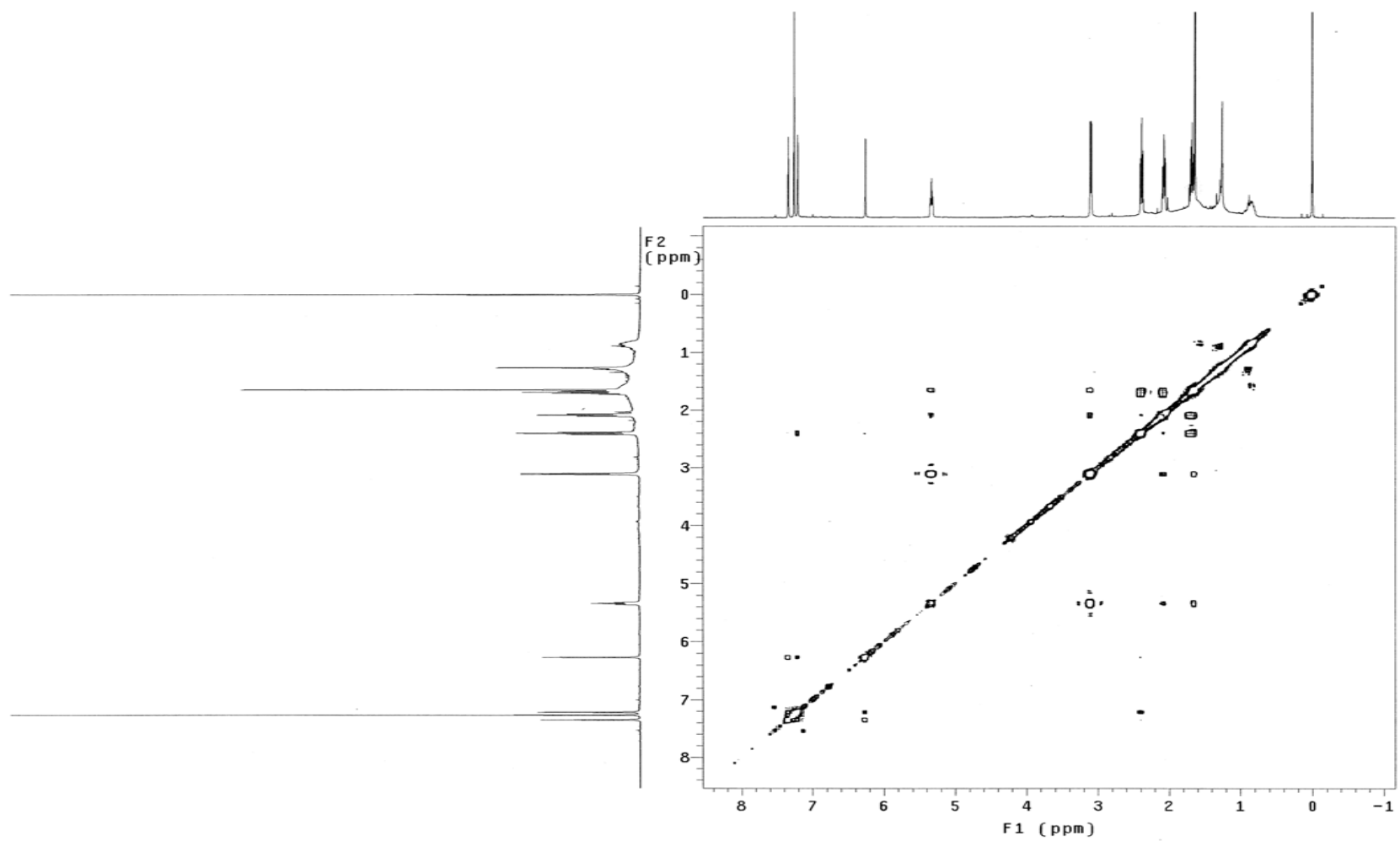


Figure S18. HSQC spectrum of 3 in CDCl<sub>3</sub>.



**Figure S19.**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of 3 in  $\text{CDCl}_3$ .

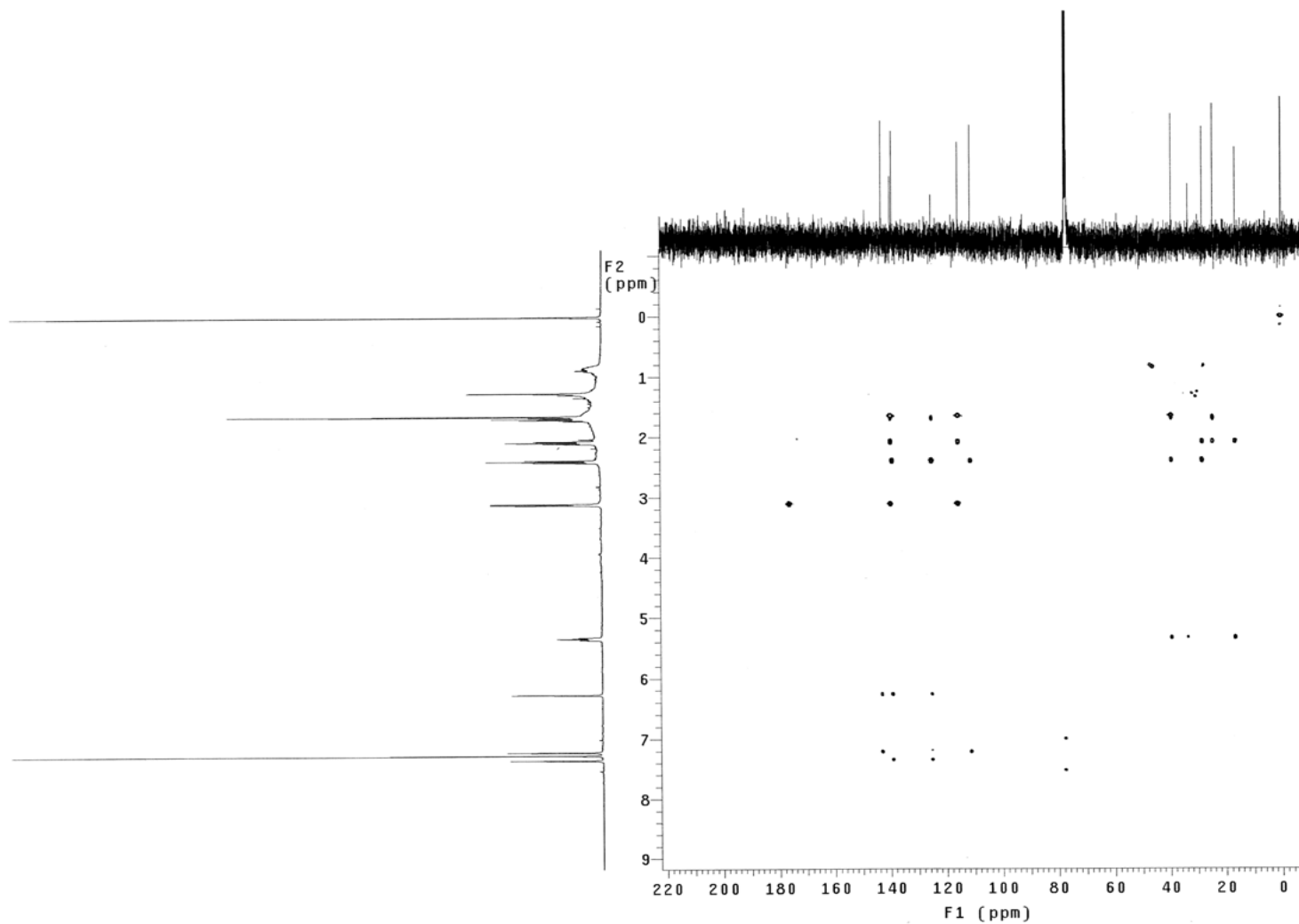
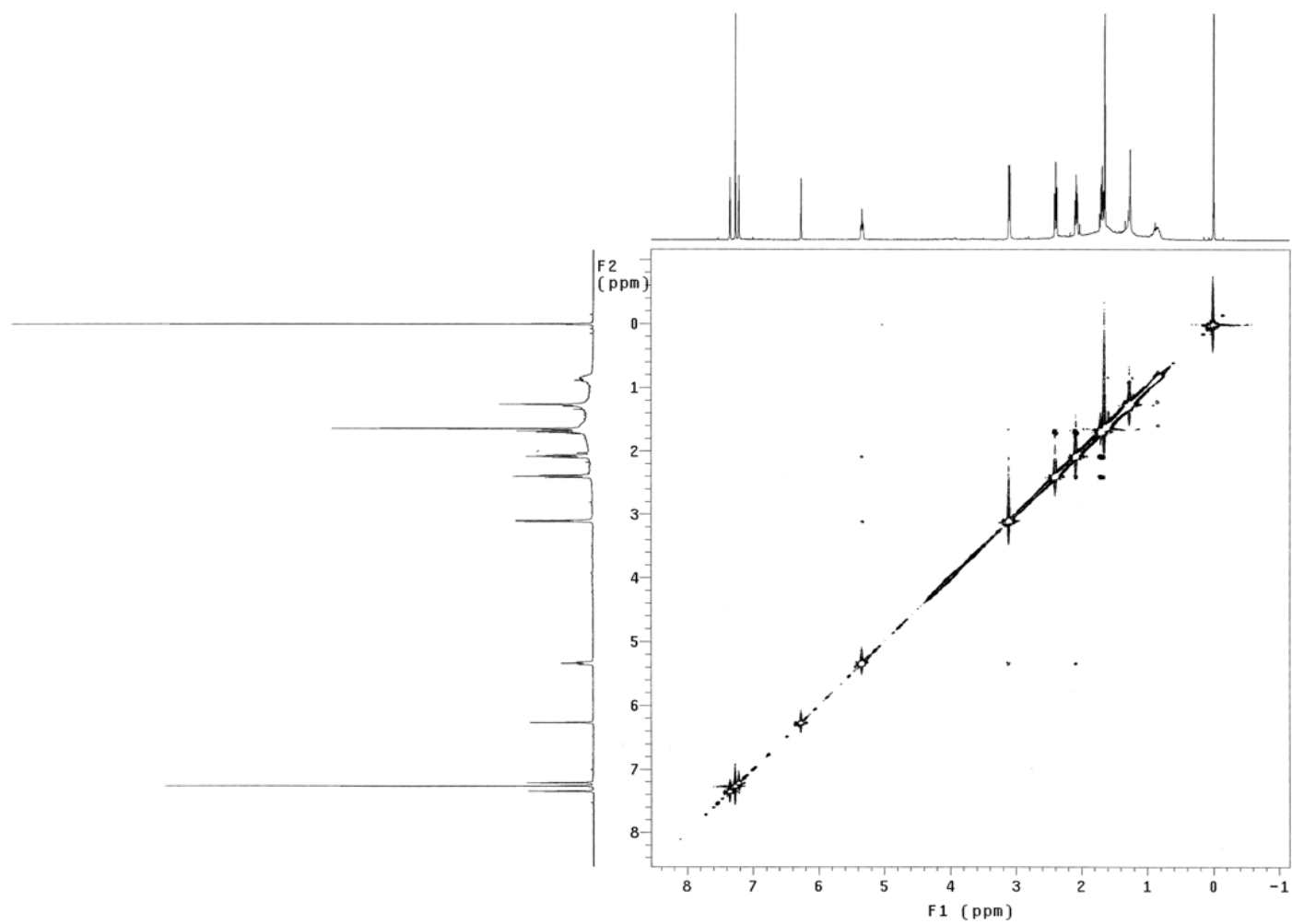
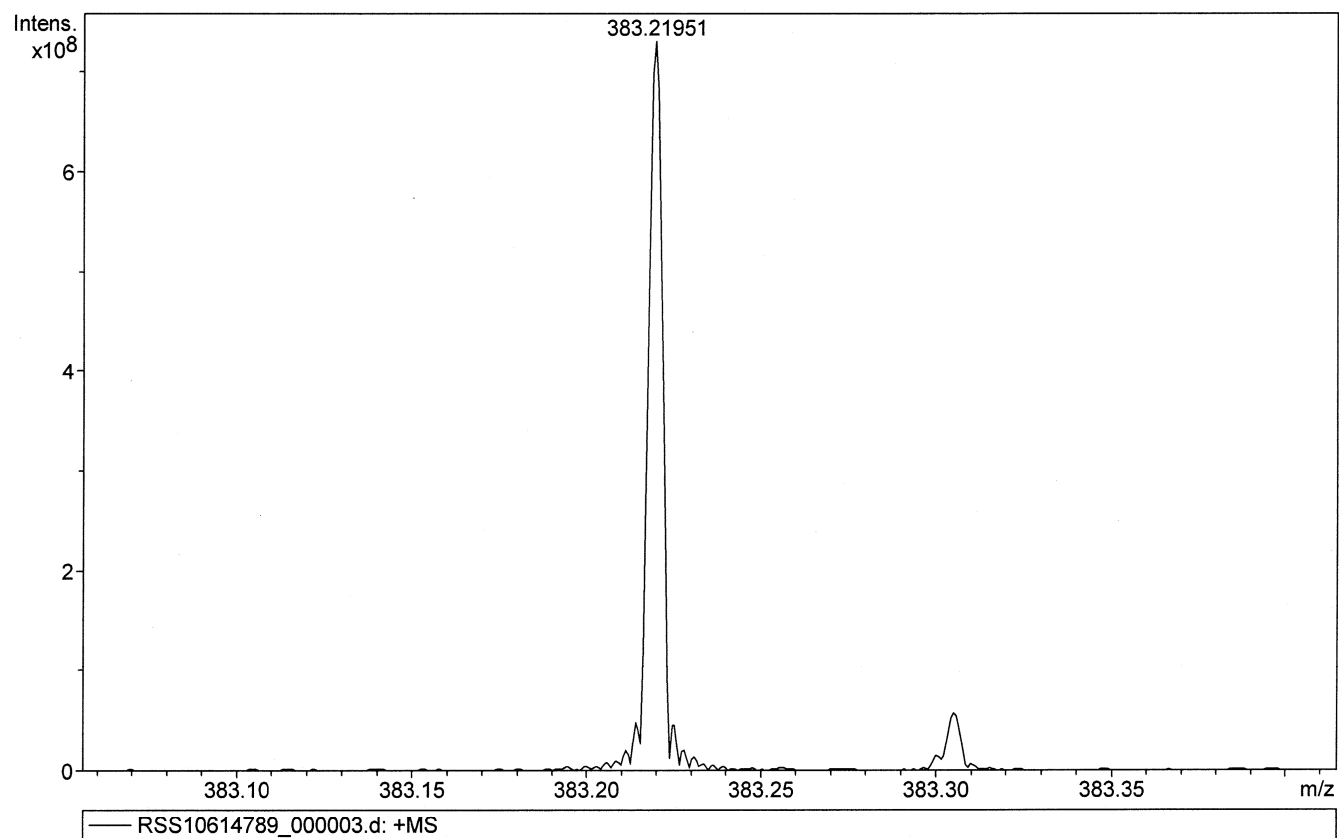


Figure S20. HMBC spectrum of **3** in CDCl<sub>3</sub>.



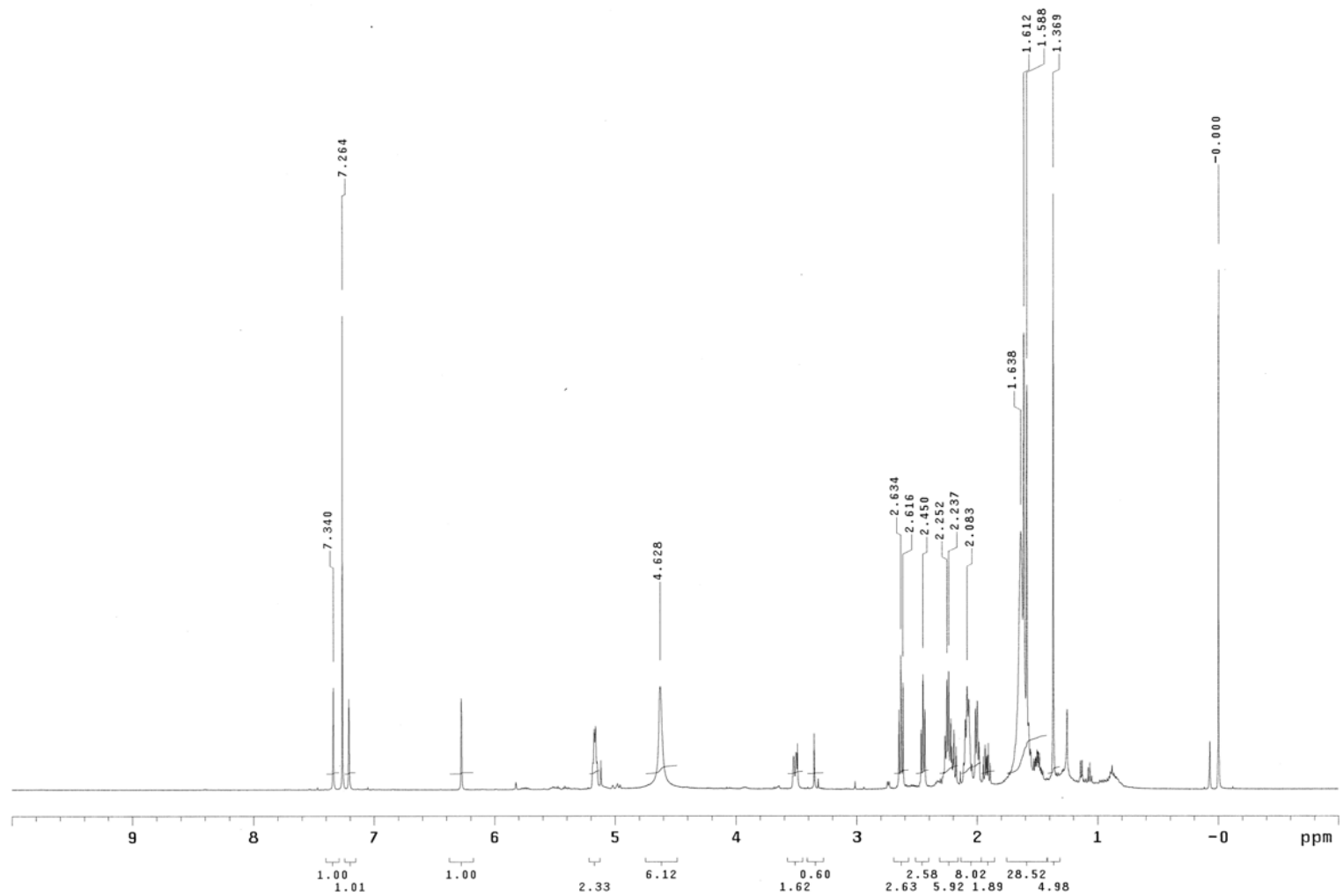
**Figure S21.**NOESY spectrum of **3** in CDCl<sub>3</sub>.





Meas. m/z	#	Formula	Score	m/z	err [mDa]	err [ppm]	mSigma	rdb	e <sup>-</sup> Conf	N-Rule
383.21951	1	C <sub>22</sub> H <sub>32</sub> NaO <sub>4</sub>	100.00	383.21928	-0.23	-0.61	8.9	6.5	even	ok

**Figure S22.** HRESIMS spectrum of compound 4.



**Figure S23.**  $^1\text{H}$  NMR spectrum (500 MHz) of compound 4 in  $\text{CDCl}_3$ .

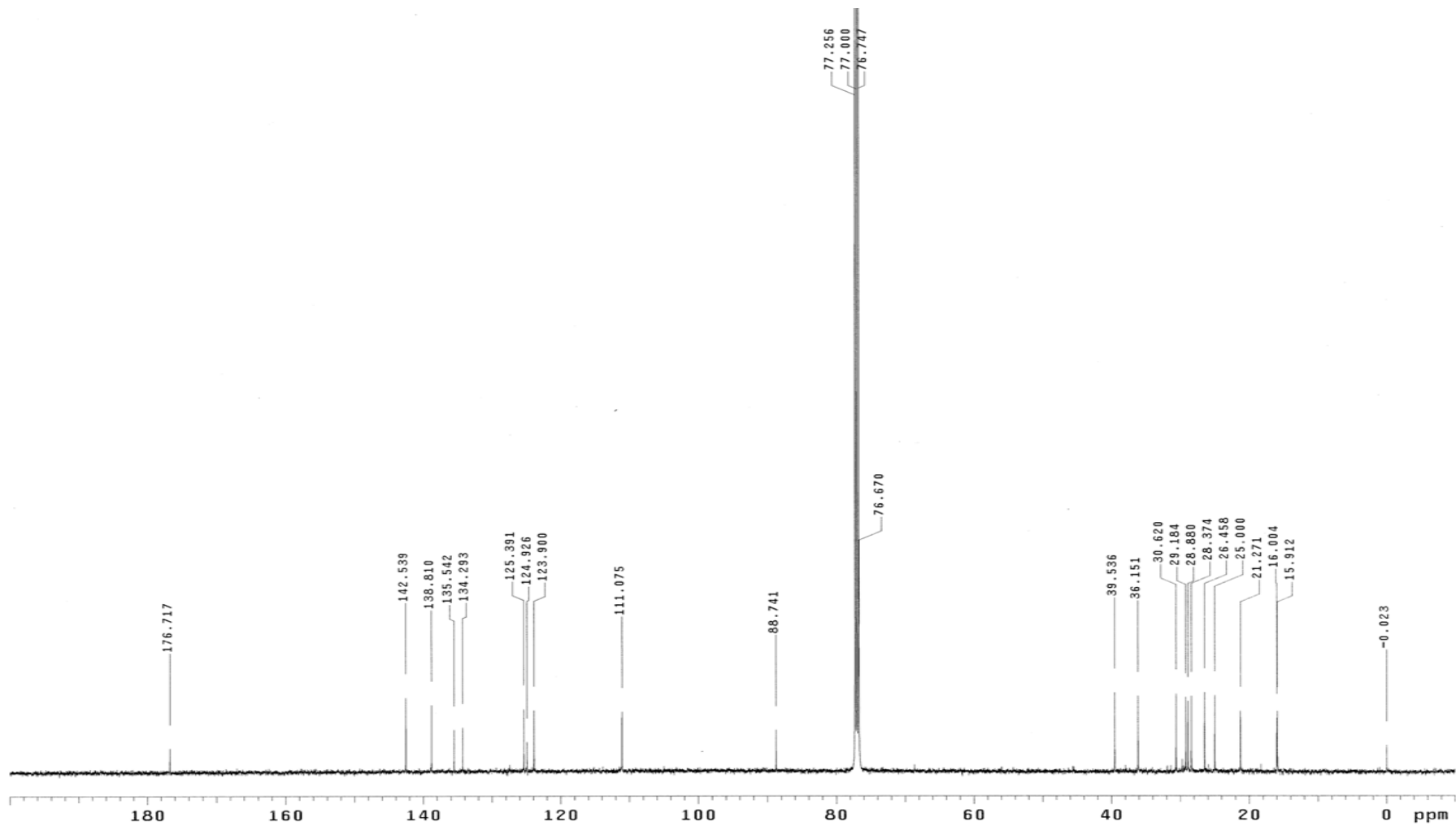
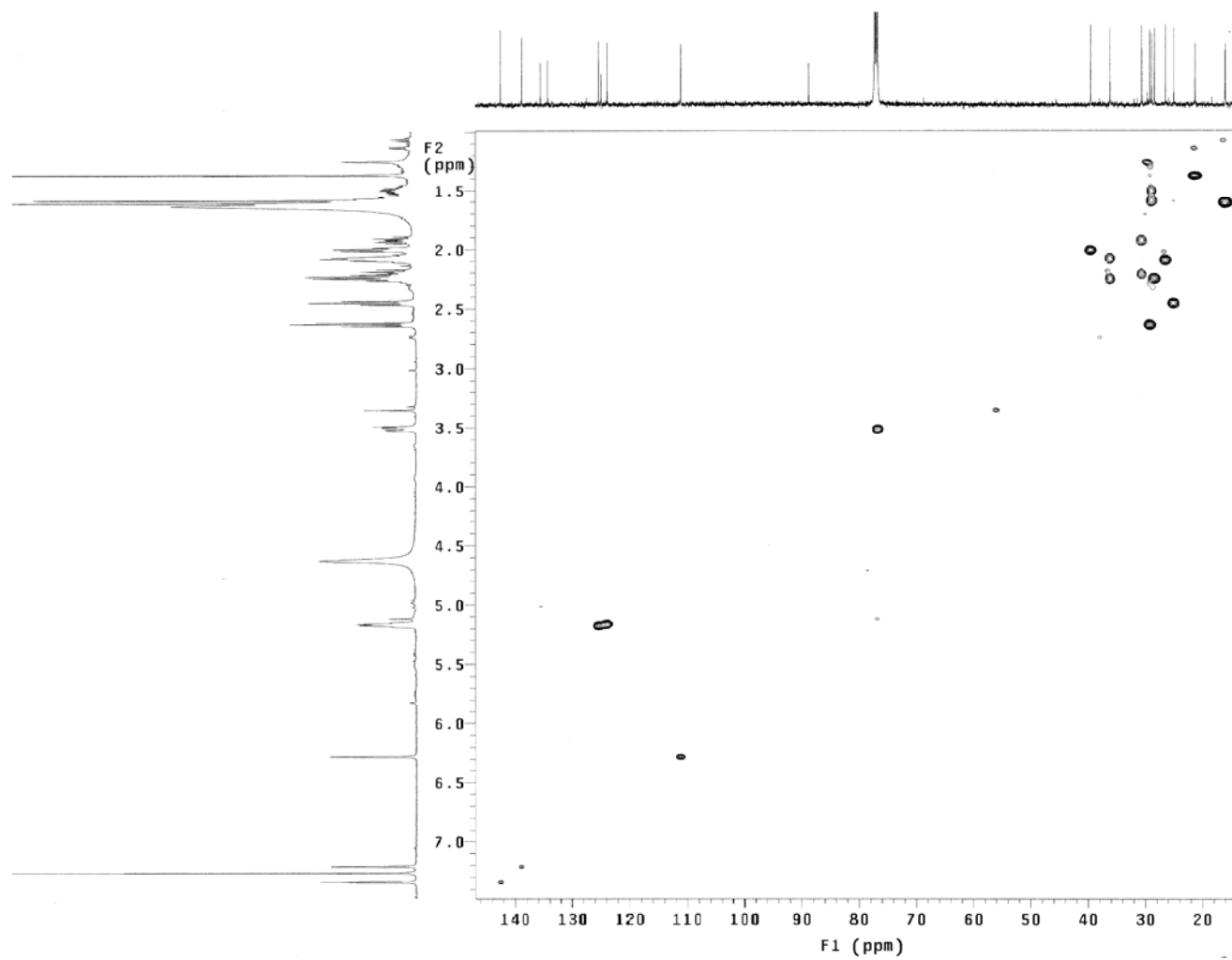


Figure S24.  $^{13}\text{C}$  NMR spectrum (125 MHz) of compound **4** in  $\text{CDCl}_3$ .



**Figure S25.** HSQC spectrum of **4** in  $\text{CDCl}_3$ .

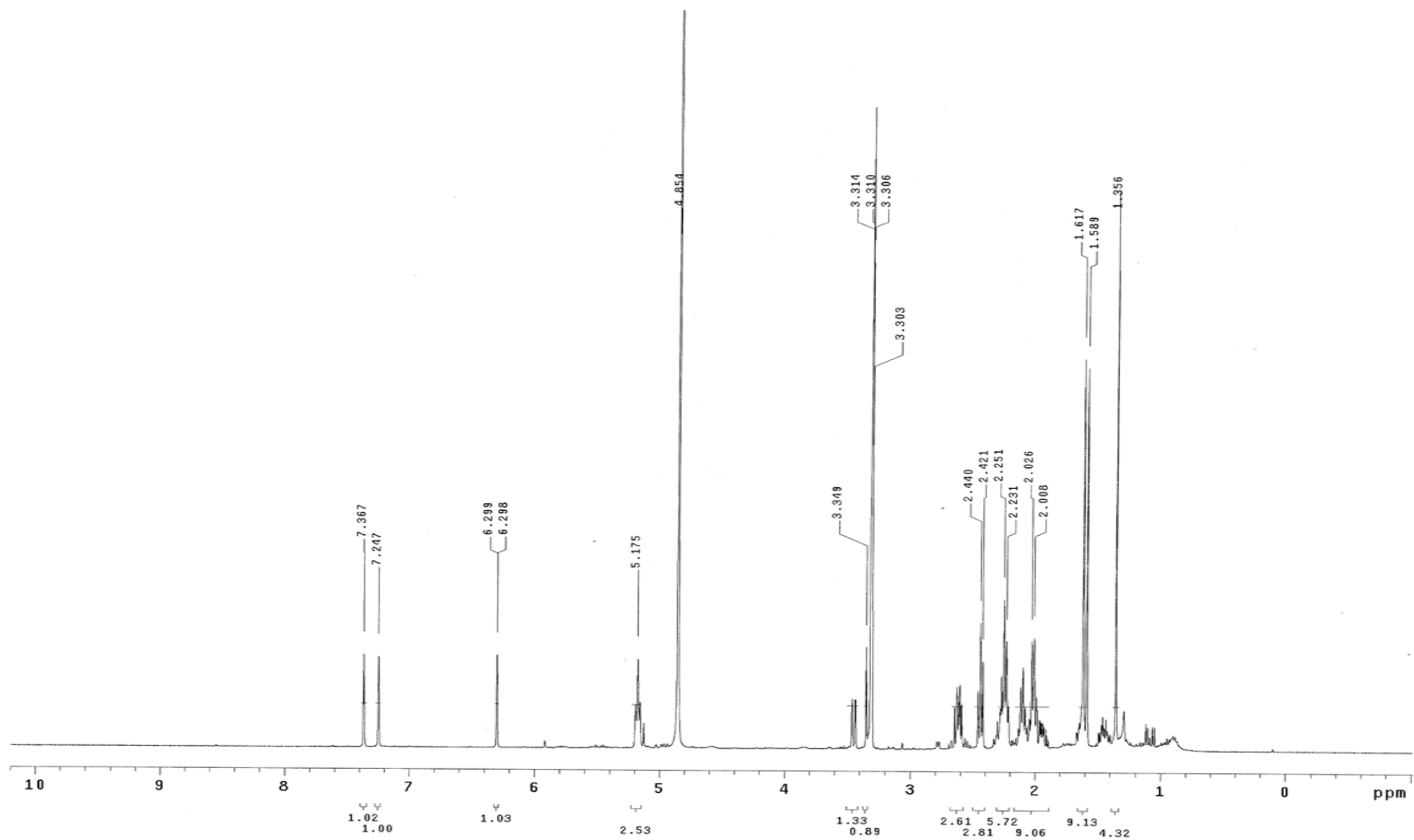


Figure S26.  $^1\text{H}$  NMR spectrum (400 MHz) of compound **4** in  $\text{CD}_3\text{OD}$ .

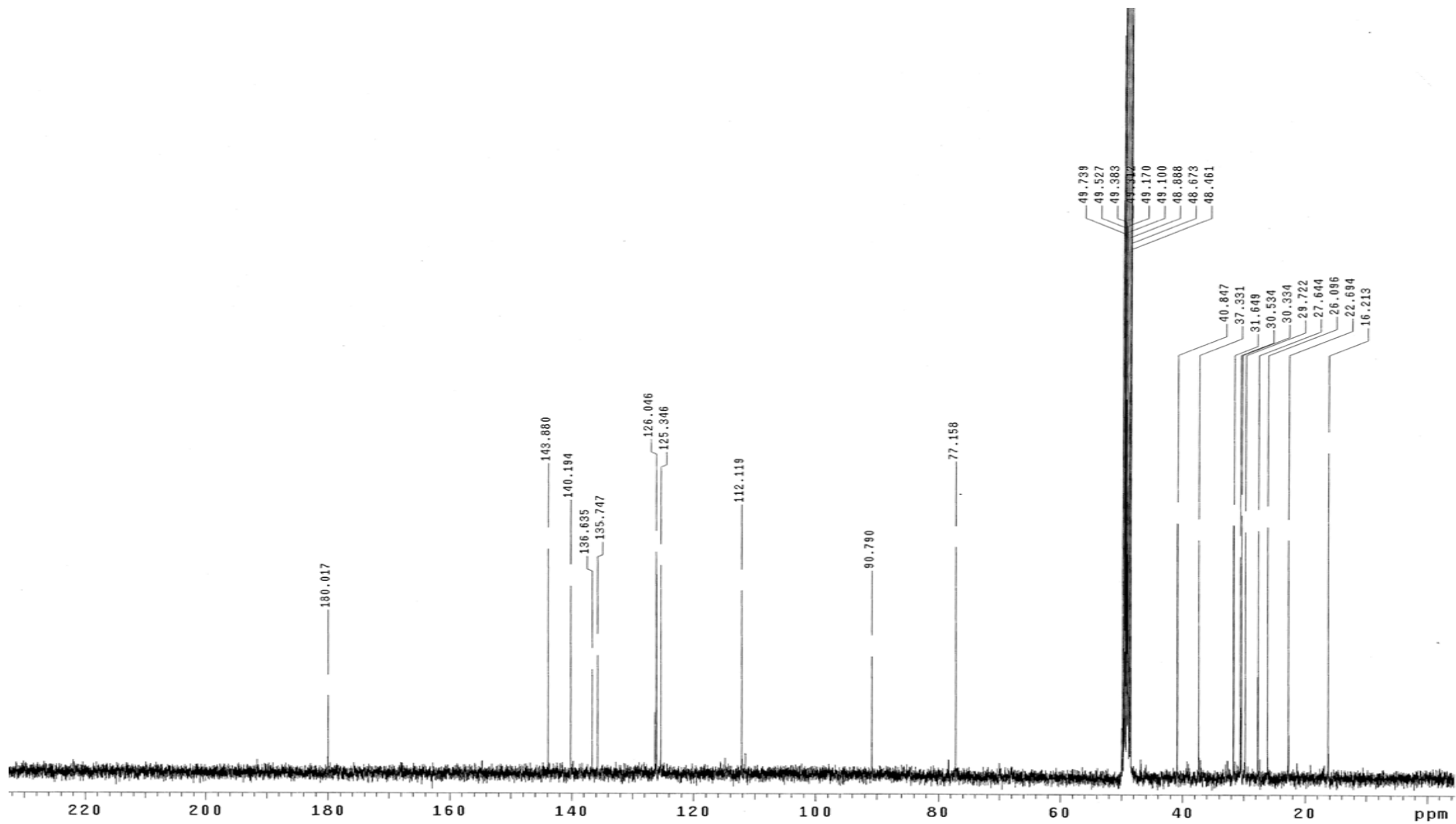


Figure S27. <sup>13</sup>C NMR spectrum (100 MHz) of compound 4 in CD<sub>3</sub>OD.

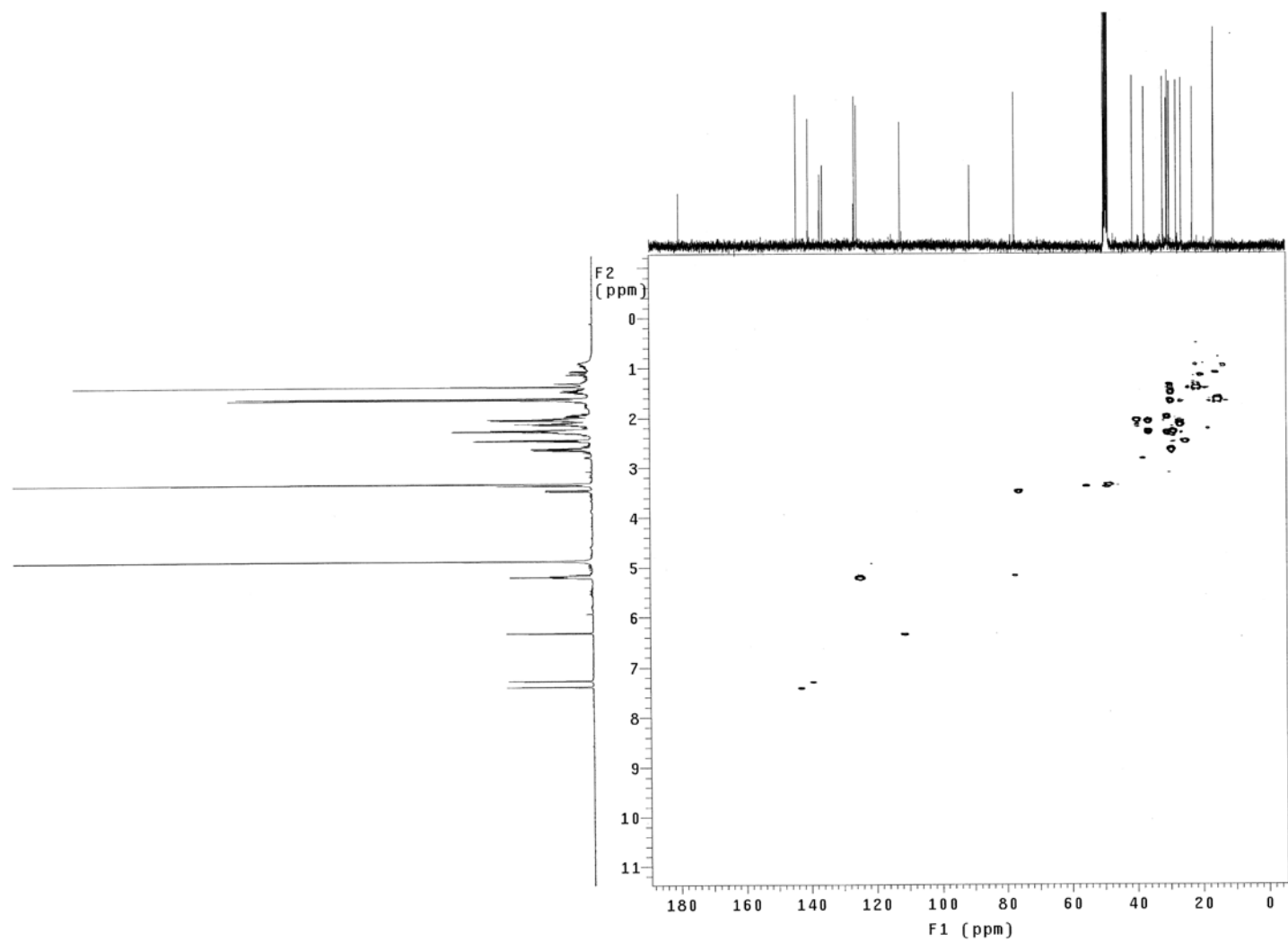
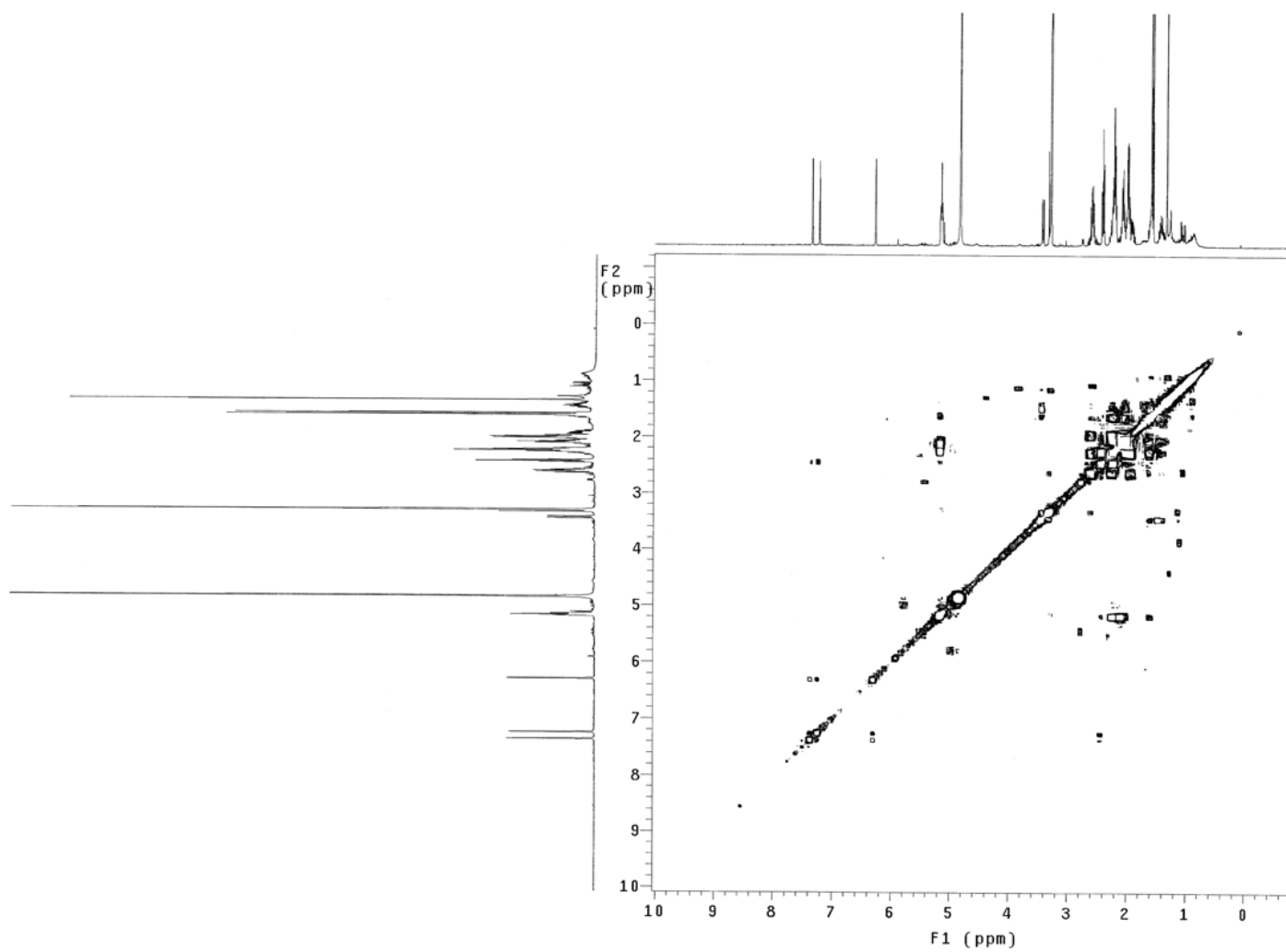
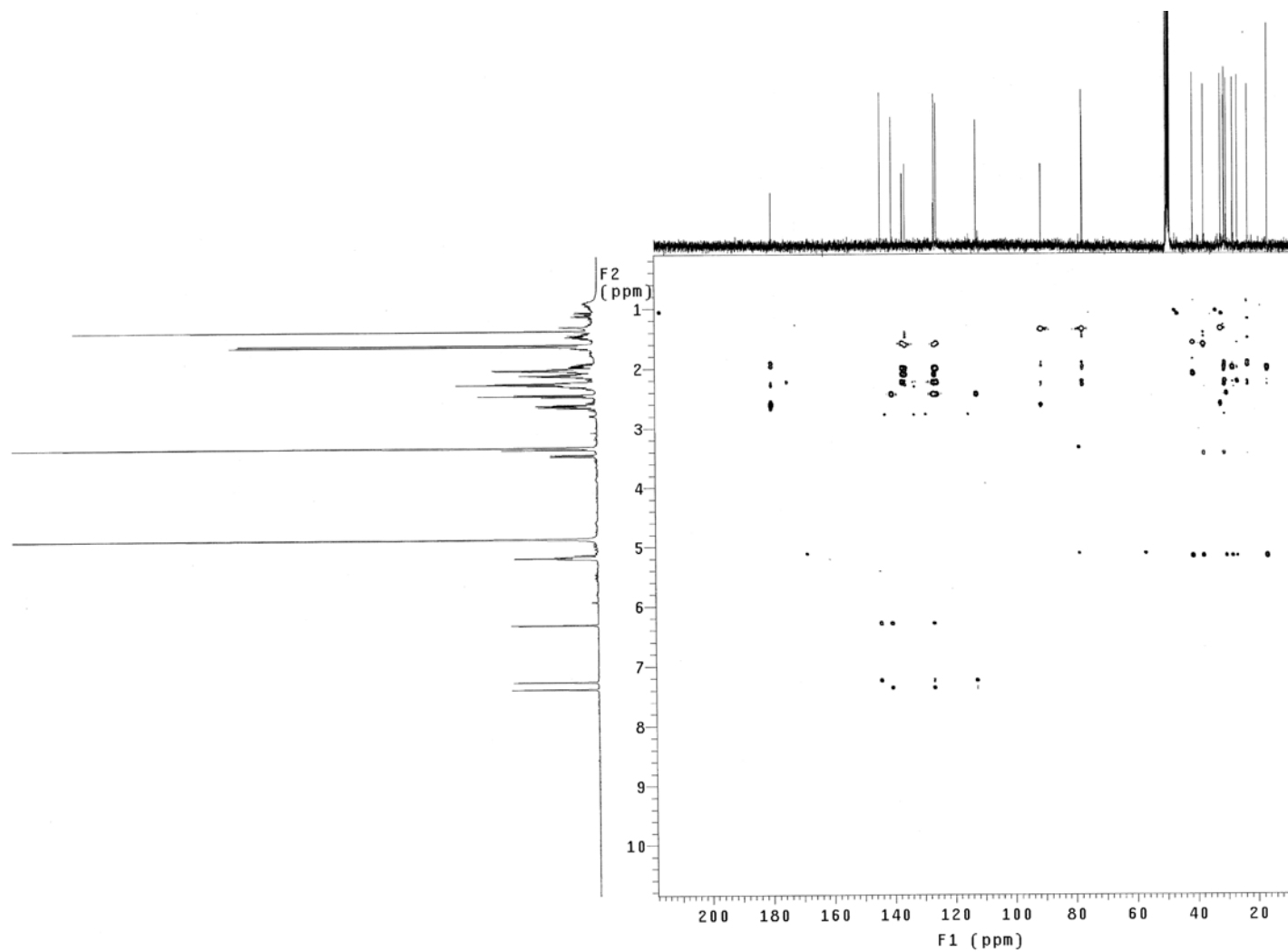


Figure S28. HSQC spectrum of **4** in  $\text{CD}_3\text{OD}$ .



**Figure S29.**  $^1\text{H}$  -  $^1\text{H}$  COSY spectrum of **4** in  $\text{CD}_3\text{OD}$ .





**Figure S30.** HMBC spectrum of **4** in  $\text{CD}_3\text{OD}$ .

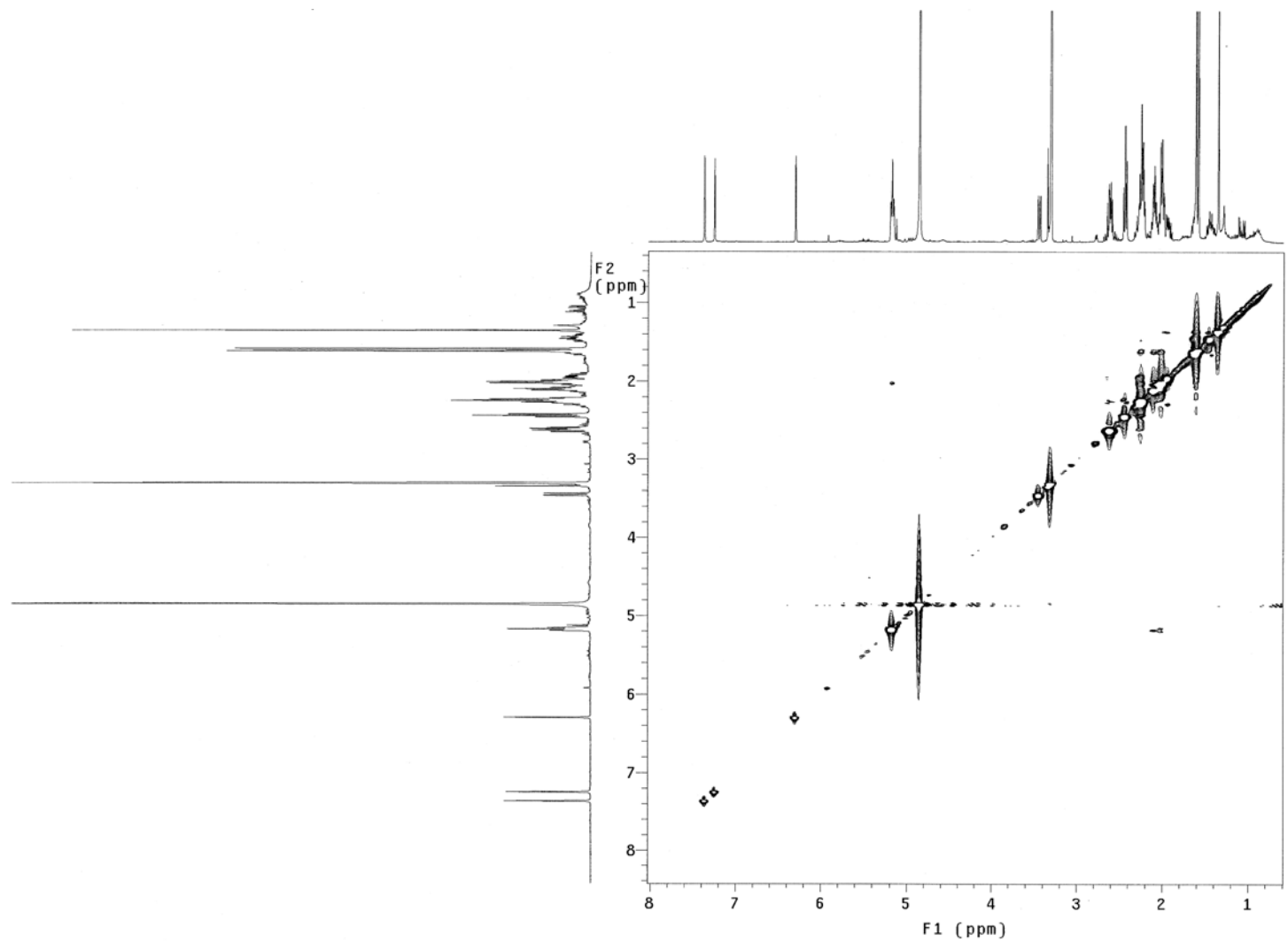
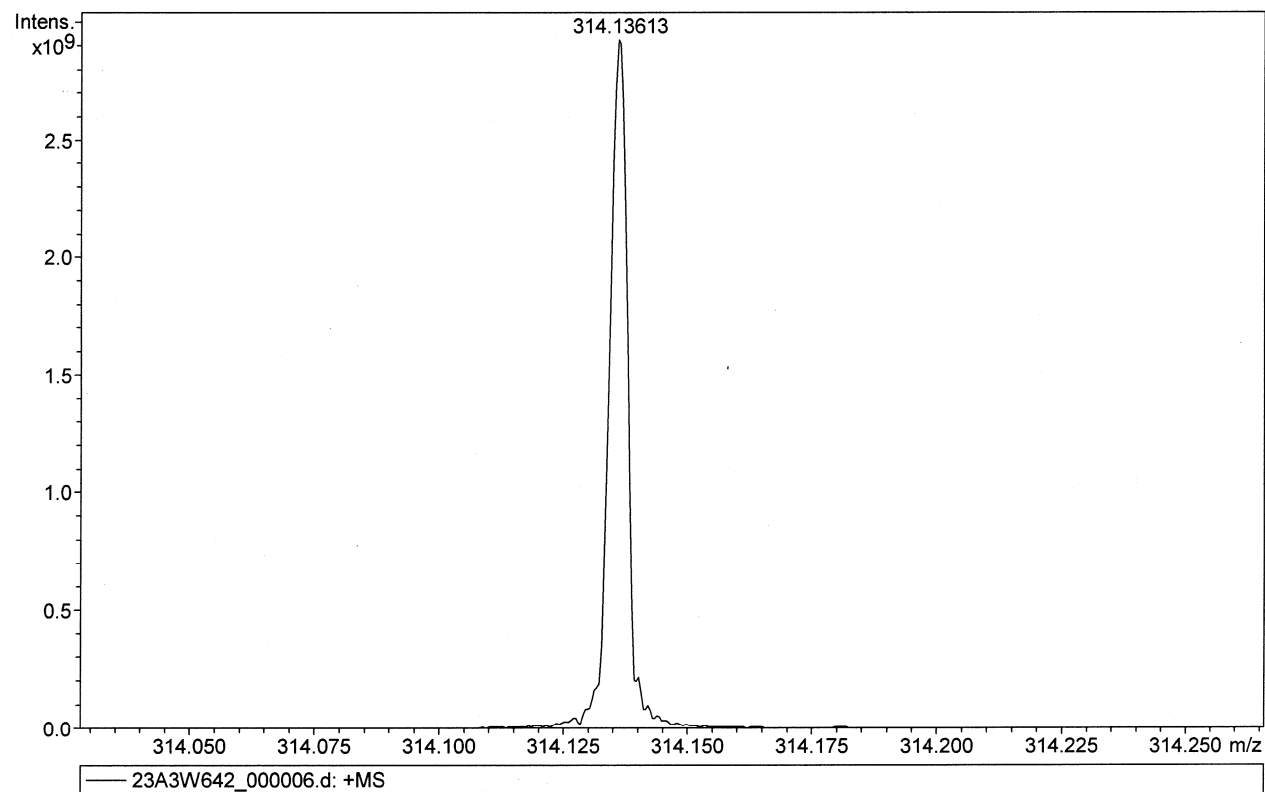


Figure S31. NOESY spectrum of **4** in in CD<sub>3</sub>OD.



Meas. m/z	#	Formula	Score	m/z	err [mDa]	err [ppm]	mSigma	rdb	e <sup>-</sup> Conf	N-Rule
314.13613	1	C <sub>16</sub> H <sub>21</sub> NNaO <sub>4</sub>	100.00	314.13628	0.15	0.46	13.0	6.5	even	ok

**Figure S32.** HRESIMS spectrum of **5**.

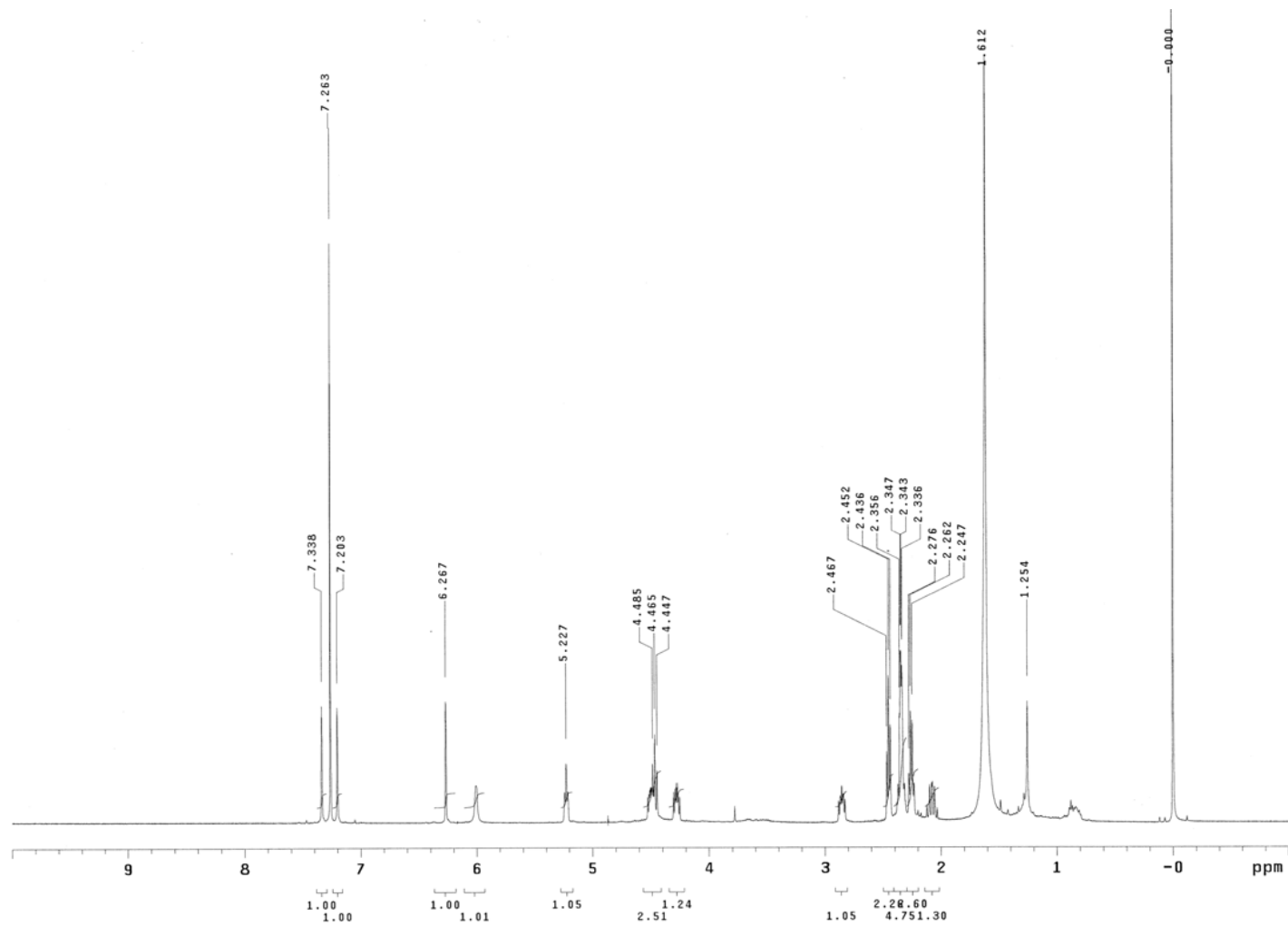
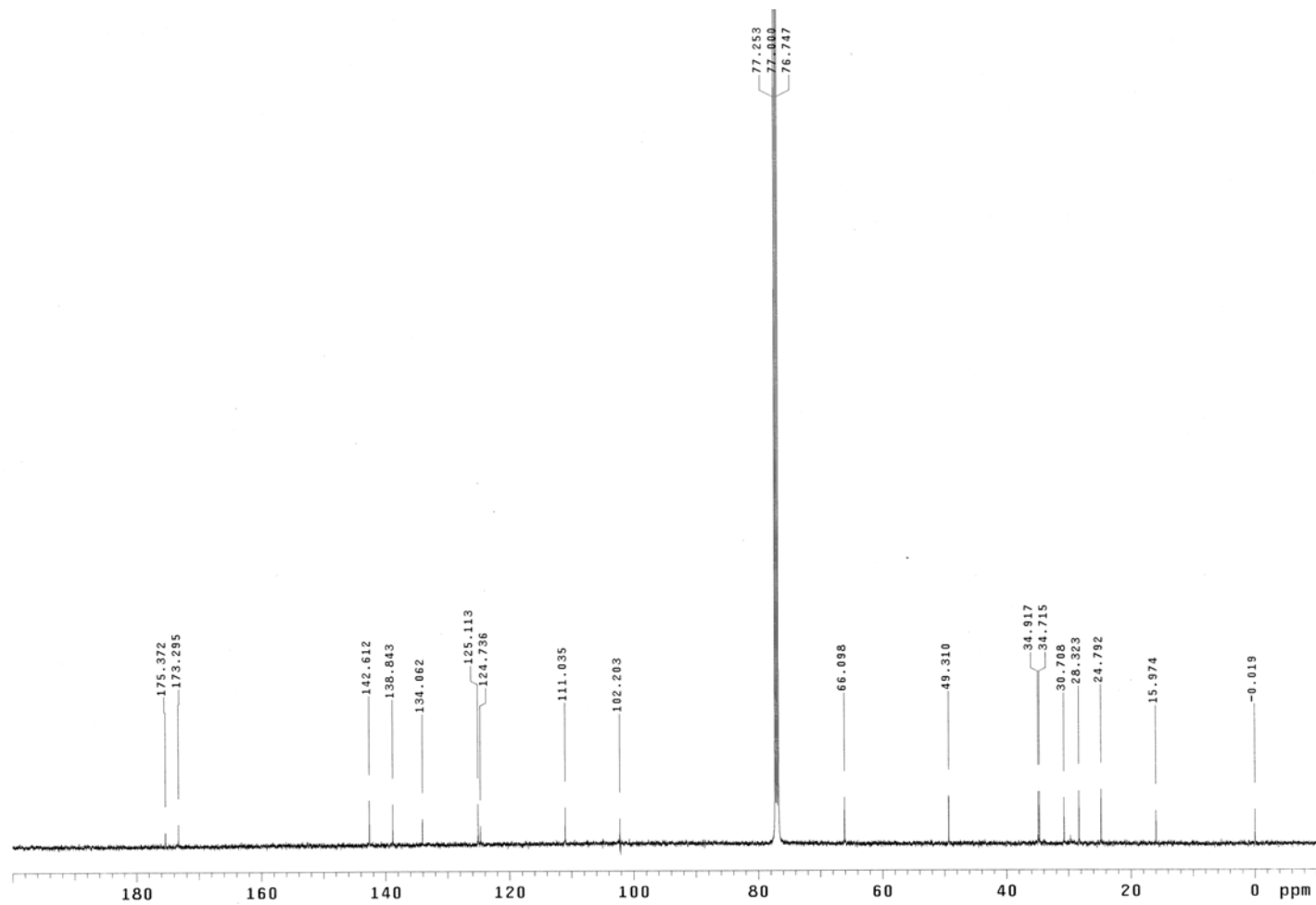


Figure S33.  $^1\text{H}$  NMR spectrum of **5** in  $\text{CDCl}_3$  at 500 MHz.



**Figure S34.** <sup>13</sup>C NMR spectrum of **5** in CDCl<sub>3</sub> at 125 MHz.

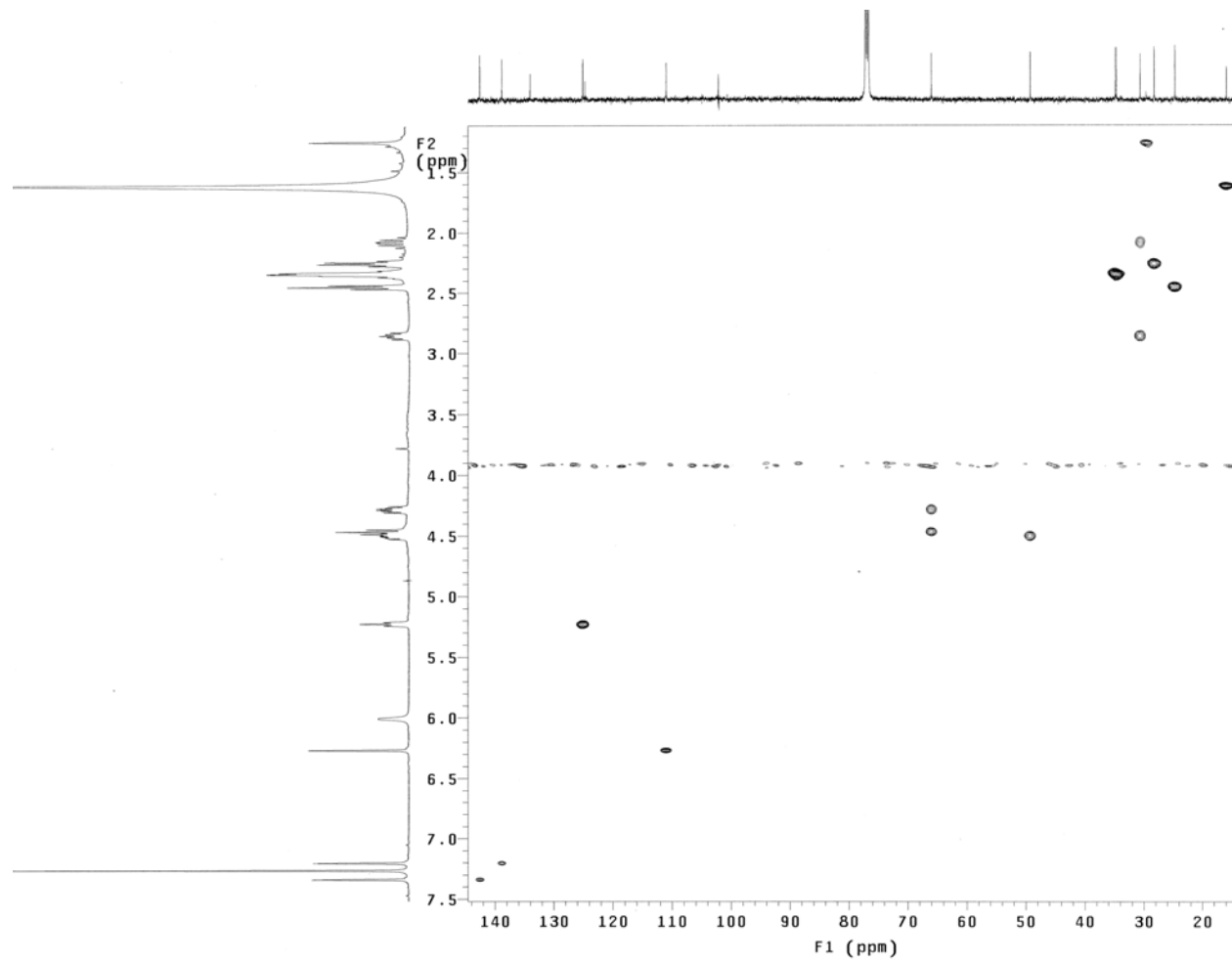


Figure S35. HSQC spectrum of 5 in  $\text{CDCl}_3$ .