

# Biscembranoids and cembranoids from the South China Sea Soft Coral *Sarcophyton elegans*

Wei Li, Yi-Hong Zou, Man-Xi Ge, Lan-Lan Lou, Yun-Shao Xu, Abrar Ahmed, Yun-Yun Chen, Jun-Sheng Zhang, Gui-Hua Tang, Sheng Yin\*

School of Pharmaceutical Sciences, Sun Yat-sen University, Guangzhou, Guangdong 510006, People's Republic of China

E-mail: yinsh2@mail.sysu.edu.cn; Fax: +86-20-39943090; Tel: +86-20-39943090.

## Contents:

- S1**  $^1\text{H}$  NMR spectrum of **1** in Methanol- $d_4$
- S2**  $^{13}\text{C}$  NMR spectrum of **1** in Methanol- $d_4$
- S3** HSQC spectrum of **1** in Methanol- $d_4$
- S4** HMBC spectrum of **1** in Methanol- $d_4$
- S5**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of **1** in Methanol- $d_4$
- S6** NOESY spectrum of **1** in Methanol- $d_4$
- S7** HRESIMS spectrum of **1**
- S8**  $^1\text{H}$  NMR spectrum of **2** in Methanol- $d_4$
- S9**  $^{13}\text{C}$  NMR spectrum of **2** in Methanol- $d_4$
- S10** HSQC spectrum of **2** in Methanol- $d_4$

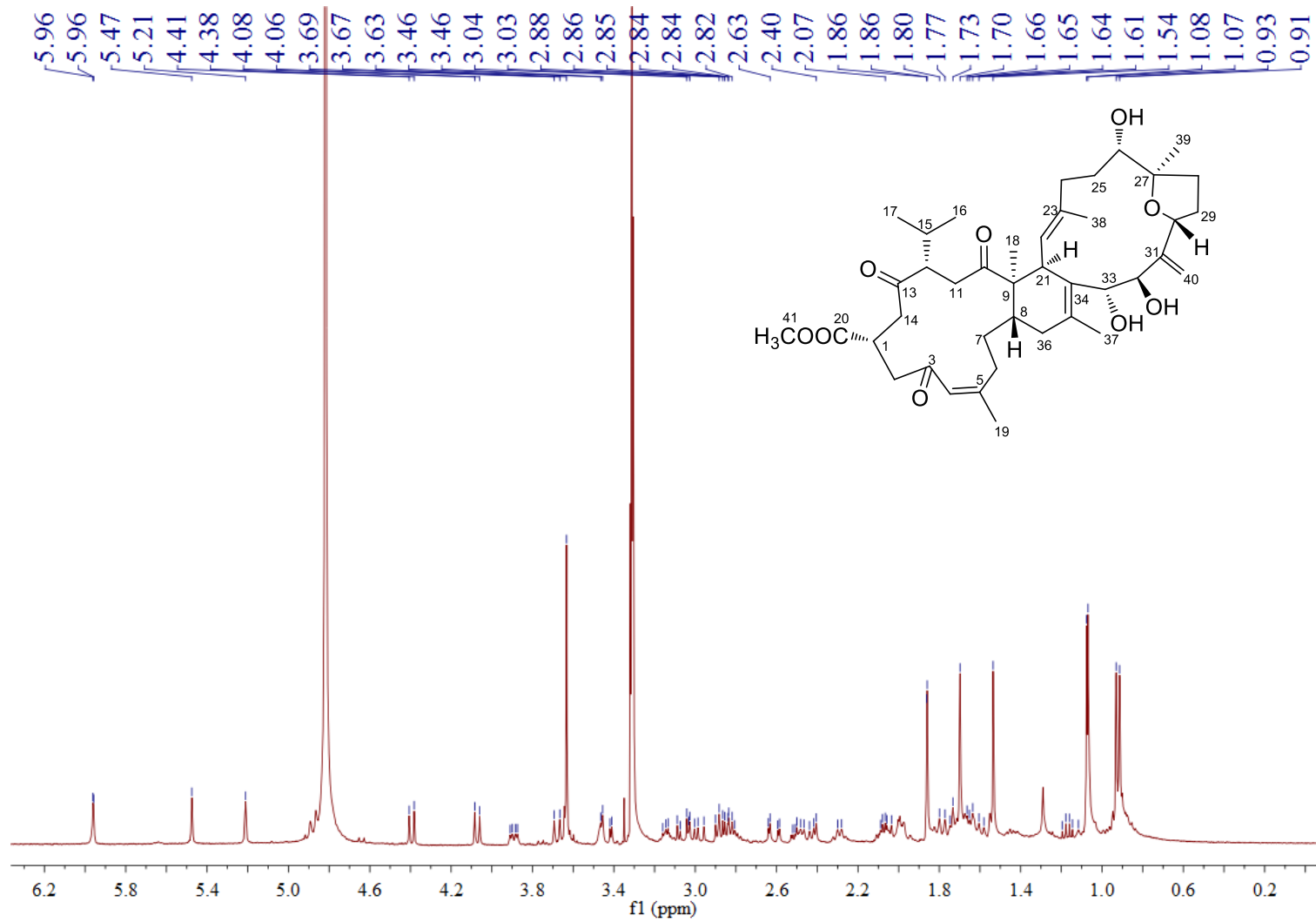
- S11** HMBC spectrum of **2** in Methanol-*d*<sub>4</sub>
- S12** <sup>1</sup>H-<sup>1</sup>H COSY spectrum of **2** in Methanol-*d*<sub>4</sub>
- S13** NOESY spectrum of **2** in Methanol-*d*<sub>4</sub>
- S14** HRESIMS spectrum of **2**
- S15** <sup>1</sup>H NMR spectrum of **3** in Methanol-*d*<sub>4</sub>
- S16** <sup>13</sup>C NMR spectrum of **3** in Methanol-*d*<sub>4</sub>
- S17** HSQC spectrum of **3** in Methanol-*d*<sub>4</sub>
- S18** HMBC spectrum of **3** in Methanol-*d*<sub>4</sub>
- S19** <sup>1</sup>H-<sup>1</sup>H COSY spectrum of **3** in Methanol-*d*<sub>4</sub>
- S20** NOESY spectrum of **3** in Methanol-*d*<sub>4</sub>
- S21** HRESIMS spectrum of **3**
- S22** <sup>1</sup>H NMR spectrum of **4** in Methanol-*d*<sub>4</sub>
- S23** <sup>13</sup>C NMR spectrum of **4** in Methanol-*d*<sub>4</sub>
- S24** HSQC spectrum of **4** in Methanol-*d*<sub>4</sub>
- S25** HMBC spectrum of **4** in Methanol-*d*<sub>4</sub>
- S26** <sup>1</sup>H-<sup>1</sup>H COSY spectrum of **4** in Methanol-*d*<sub>4</sub>
- S27** NOESY spectrum of **4** in Methanol-*d*<sub>4</sub>
- S28** HRESIMS spectrum of **4**

- S29**  $^1\text{H}$  NMR spectrum of **5** in Methanol- $d_4$
- S30**  $^{13}\text{C}$  NMR spectrum of **5** in Methanol- $d_4$
- S31** HSQC spectrum of **5** in Methanol- $d_4$
- S32** HMBC spectrum of **5** in Methanol- $d_4$
- S33**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of **5** in Methanol- $d_4$
- S34** NOESY spectrum of **5** in Methanol- $d_4$
- S35** HRESIMS spectrum of **5**
- S36**  $^1\text{H}$  NMR spectrum of **6** in Methanol- $d_4$
- S37**  $^{13}\text{C}$  NMR spectrum of **6** in Methanol- $d_4$
- S38** HSQC spectrum of **6** in Methanol- $d_4$
- S39** HMBC spectrum of **6** in Methanol- $d_4$
- S40**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of **6** in Methanol- $d_4$
- S41** NOESY spectrum of **6** in Methanol- $d_4$
- S42** HRESIMS spectrum of **6**
- S43**  $^1\text{H}$  NMR spectrum of **7** in  $\text{CDCl}_3$
- S44**  $^{13}\text{C}$  NMR spectrum of **7** in  $\text{CDCl}_3$
- S45** HSQC spectrum of **7** in  $\text{CDCl}_3$
- S46** HMBC spectrum of **7** in  $\text{CDCl}_3$

- S47**  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of **7** in  $\text{CDCl}_3$
- S48** NOESY spectrum of **7** in  $\text{CDCl}_3$
- S49** HRESIMS spectrum of **7**
- S50**  $^1\text{H}$  NMR spectrum of **8** in Methanol- $d_4$
- S51**  $^{13}\text{C}$  NMR spectrum of **8** in Methanol- $d_4$
- S52**  $^1\text{H}$  NMR spectrum of **8** in  $\text{CDCl}_3$
- S53**  $^{13}\text{C}$  NMR spectrum of **8** in  $\text{CDCl}_3$
- S54**  $^1\text{H}$  NMR spectrum of **9** in Methanol- $d_4$
- S55**  $^{13}\text{C}$  NMR spectrum of **9** in Methanol- $d_4$
- S56** Selected NOESY correlations of **2**.

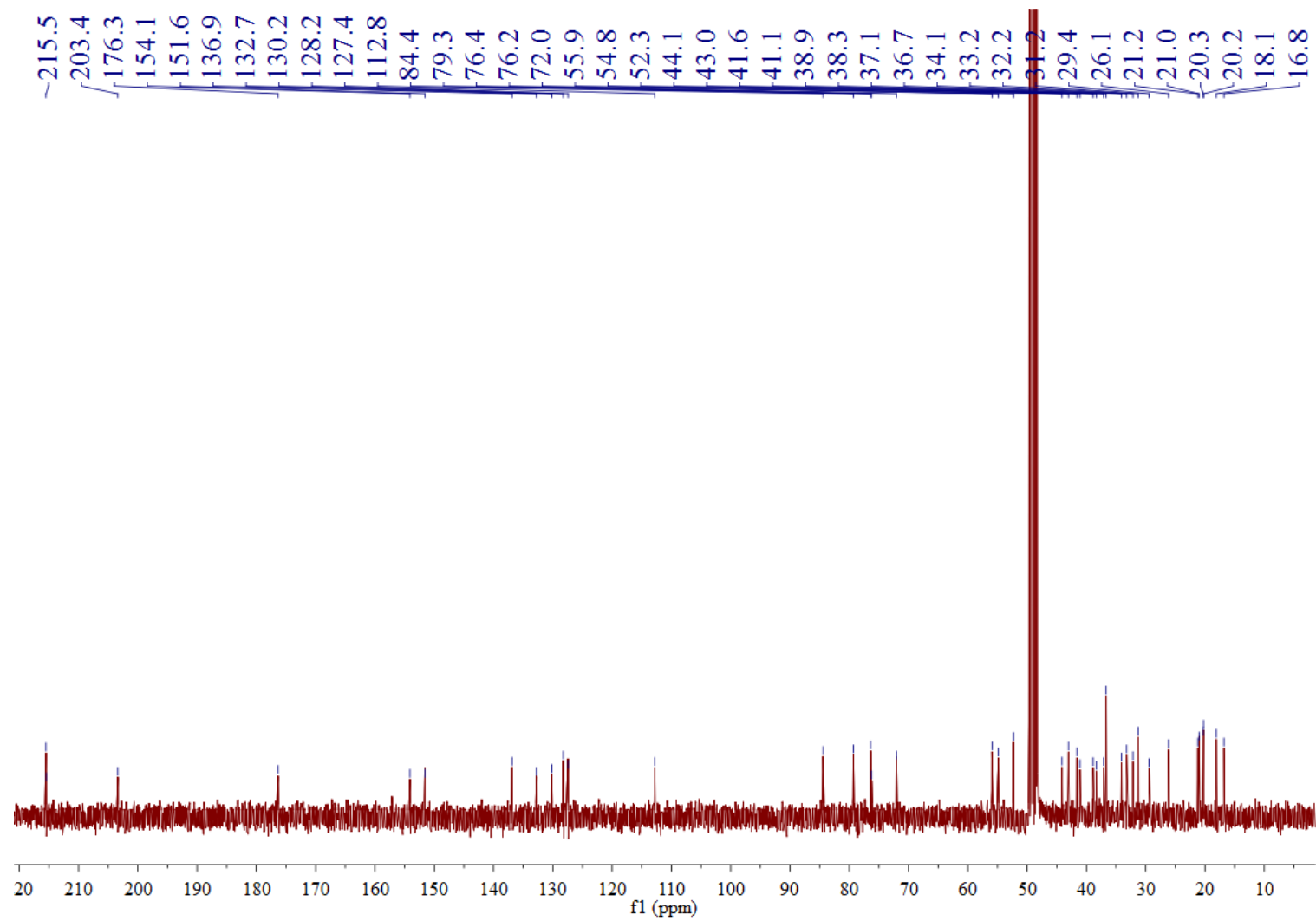
S1

<sup>1</sup>H NMR spectrum of **1** in Methanol-*d*<sub>4</sub>

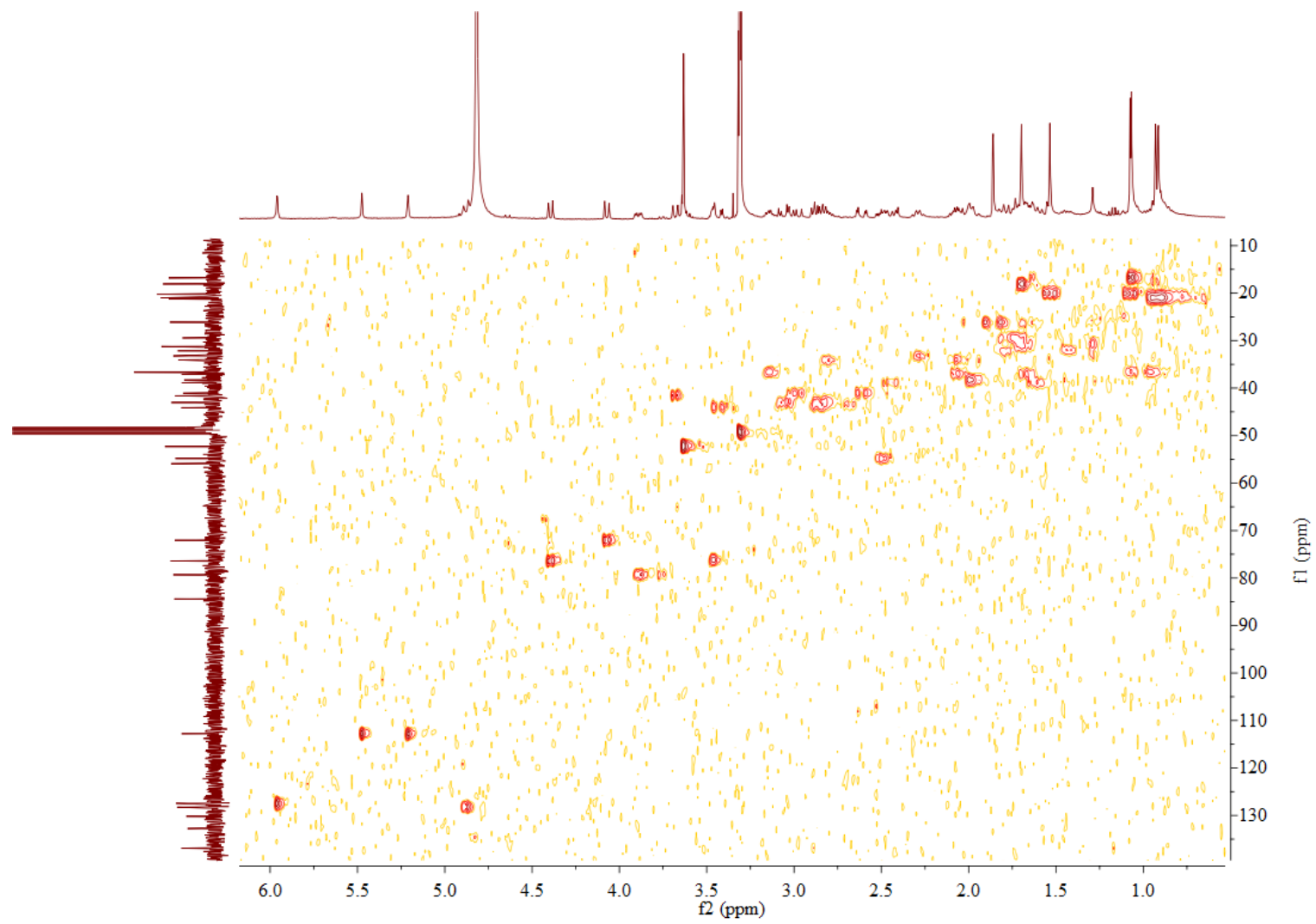


S2

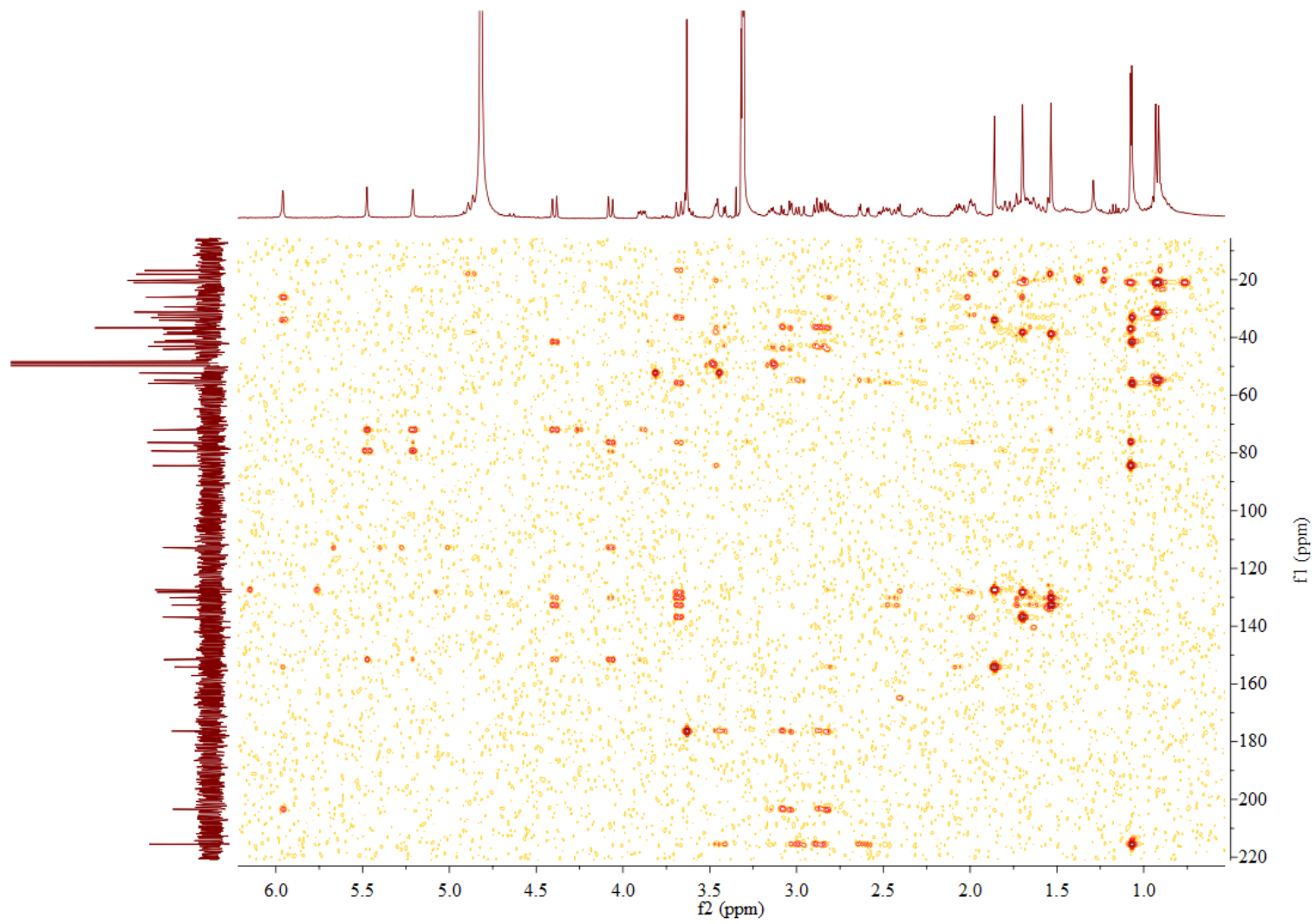
$^{13}\text{C}$  NMR spectrum of **1** in Methanol- $d_4$



S3 HSQC spectrum of **1** in Methanol- $d_4$



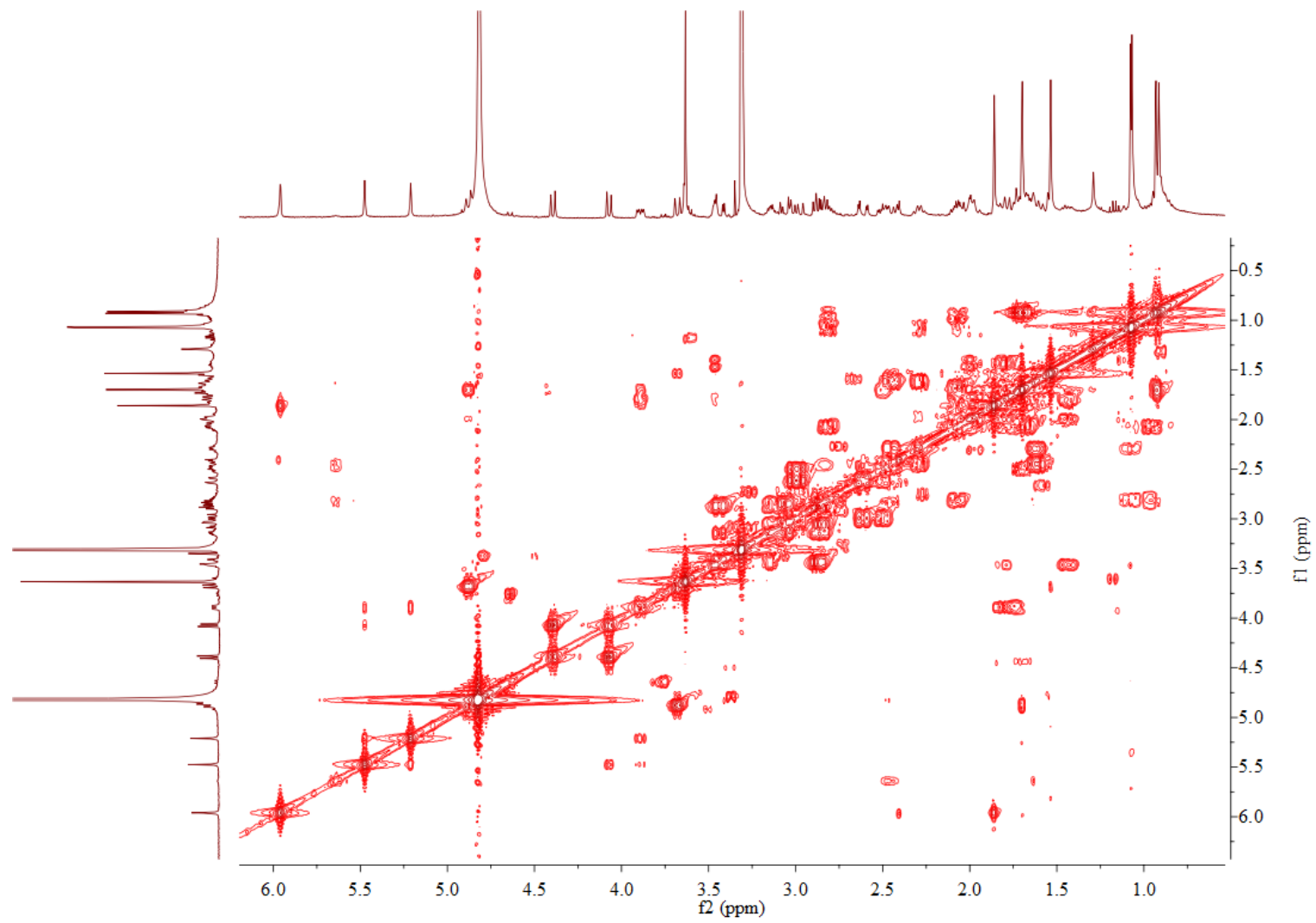
S4 HMBC spectrum of **1** in Methanol- $d_4$



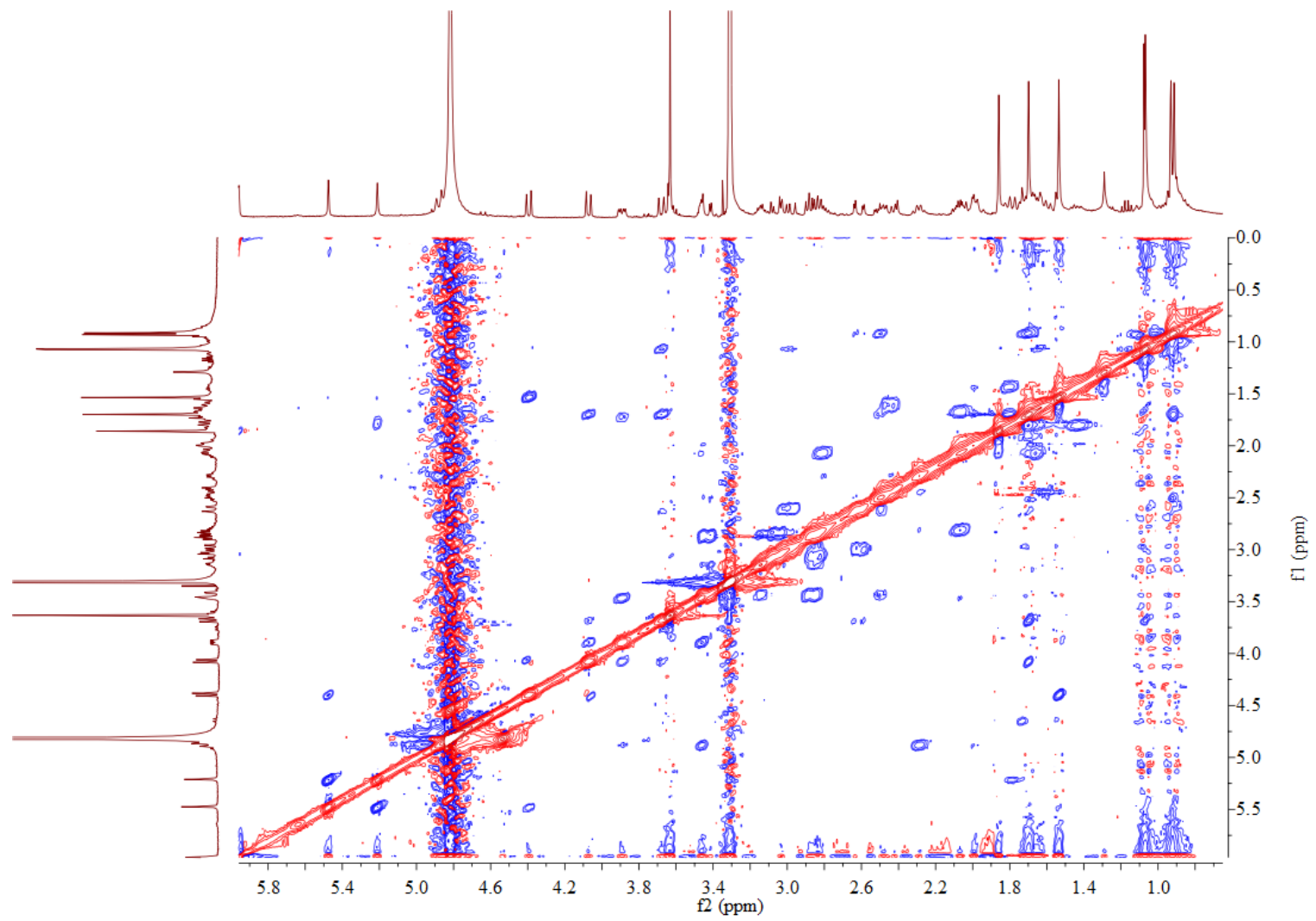


S5

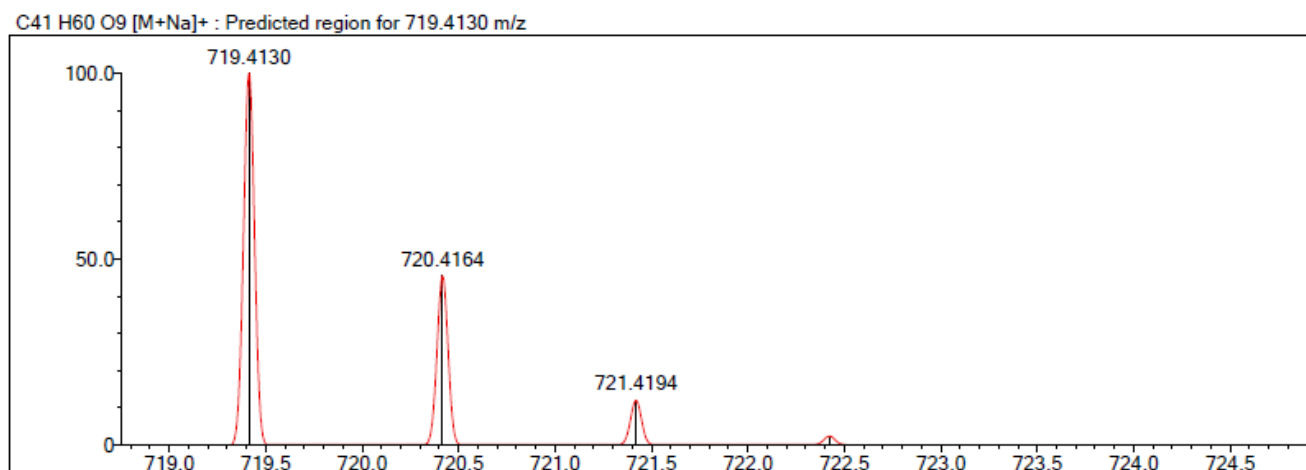
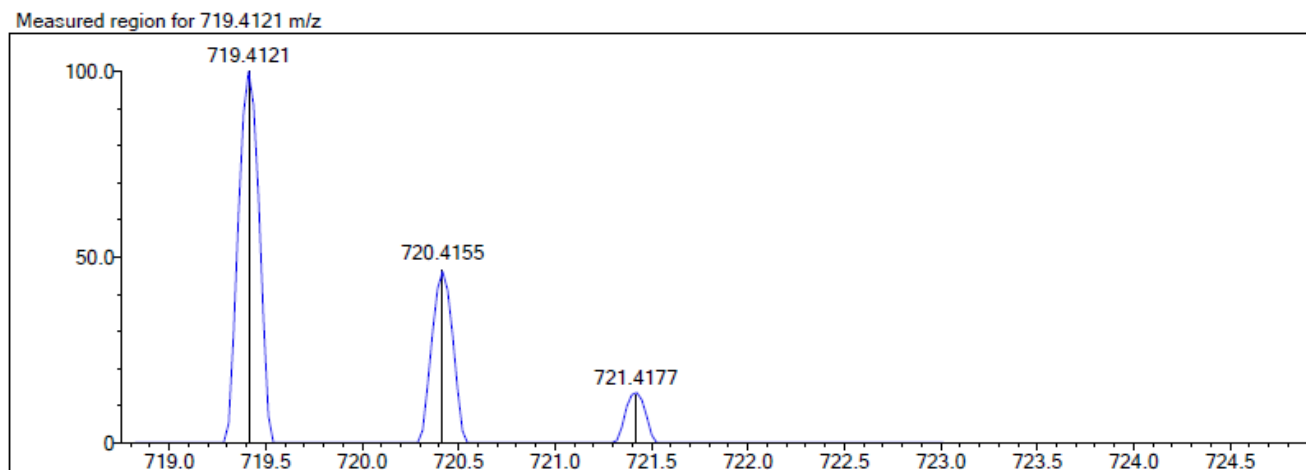
$^1\text{H}$ - $^1\text{H}$  COSY spectrum of **1** in Methanol- $d_4$



S6 NOESY spectrum of **1** in Methanol- $d_4$



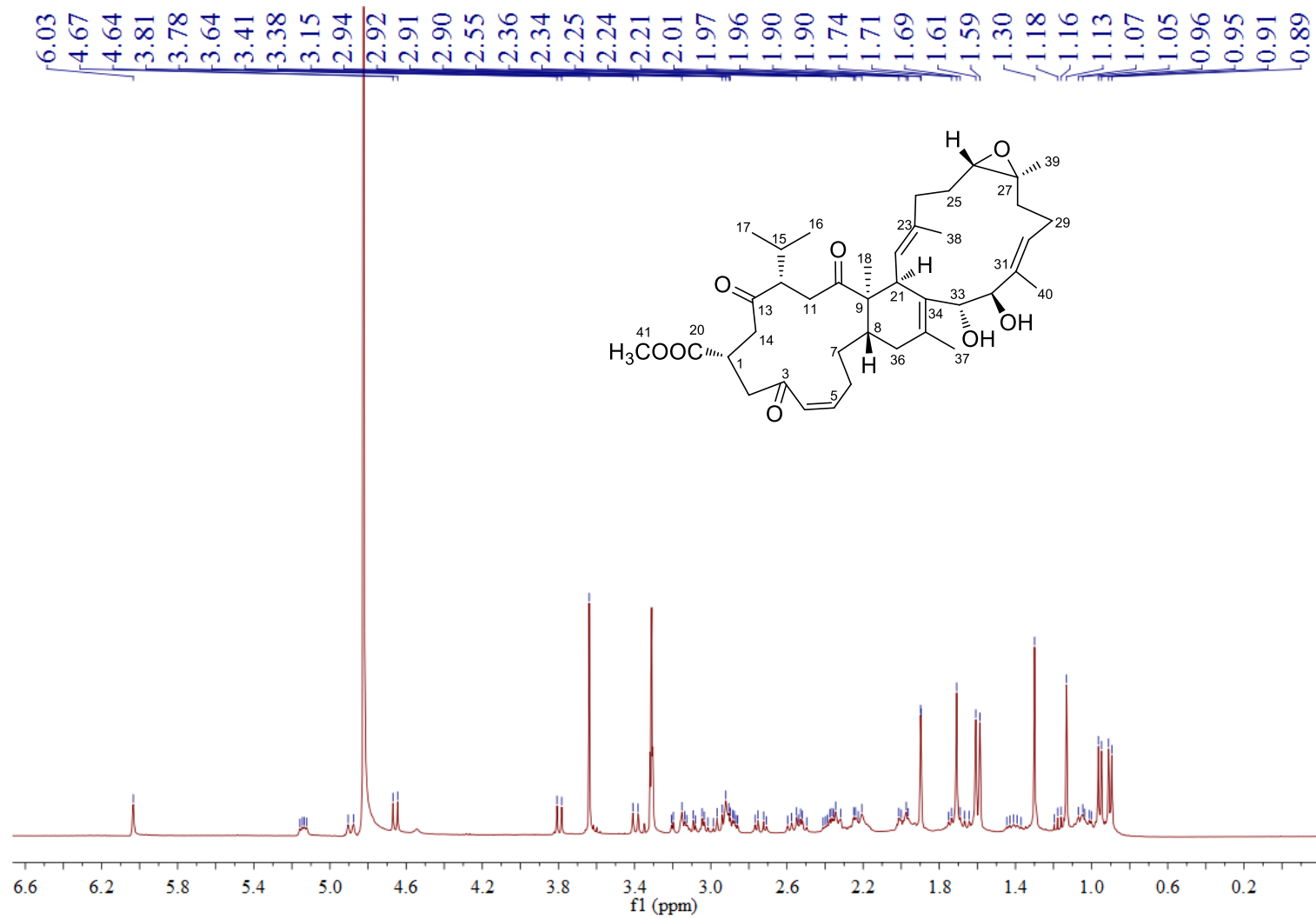
S7 HRESIMS spectrum of **1**



Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	99.38	C41 H60 O9	[M+Na] <sup>+</sup>	719.4121	719.4130	-0.9	-1.25	100.00	12.0

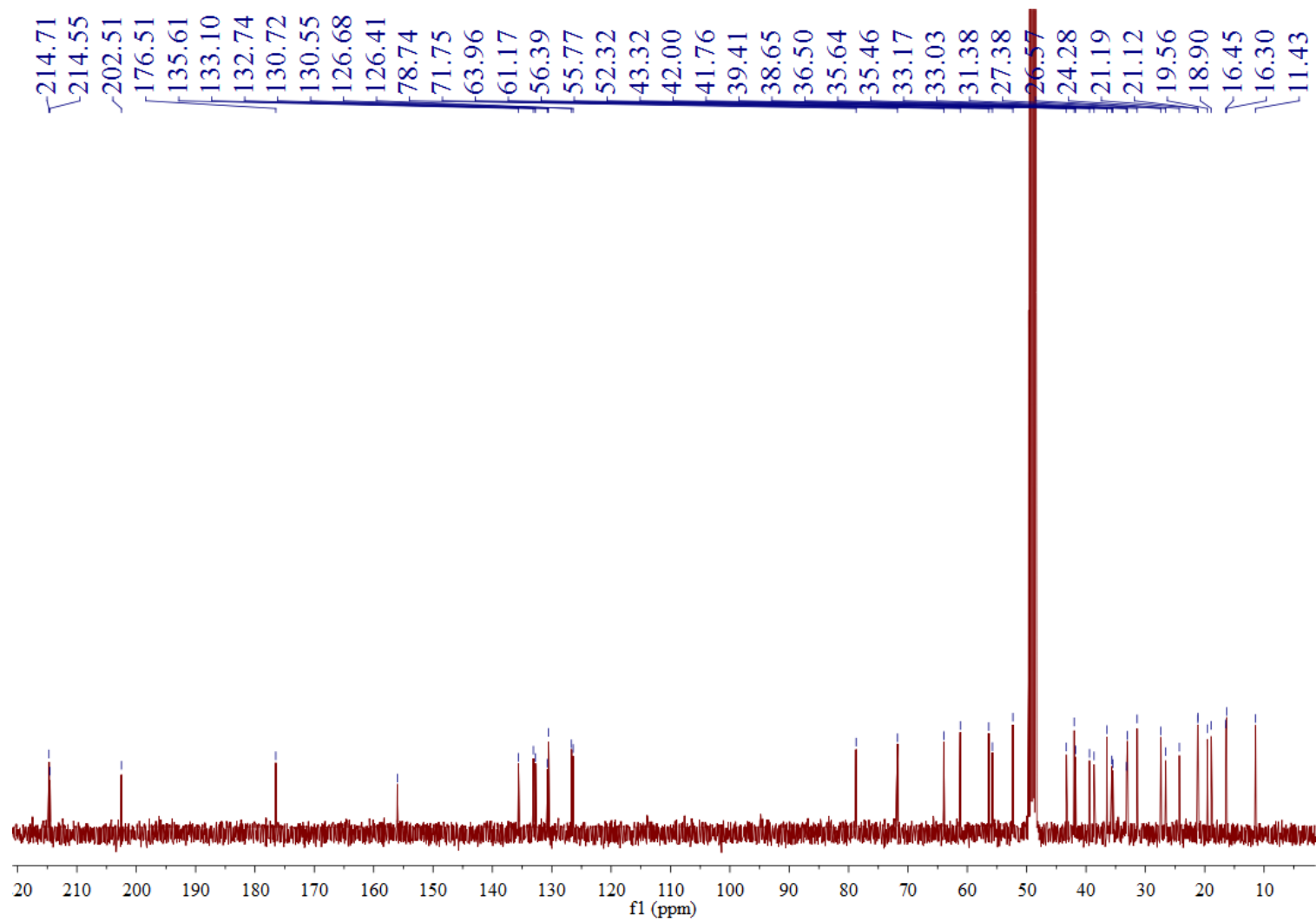
S8

<sup>1</sup>H NMR spectrum of **2** in Methanol-*d*<sub>4</sub>

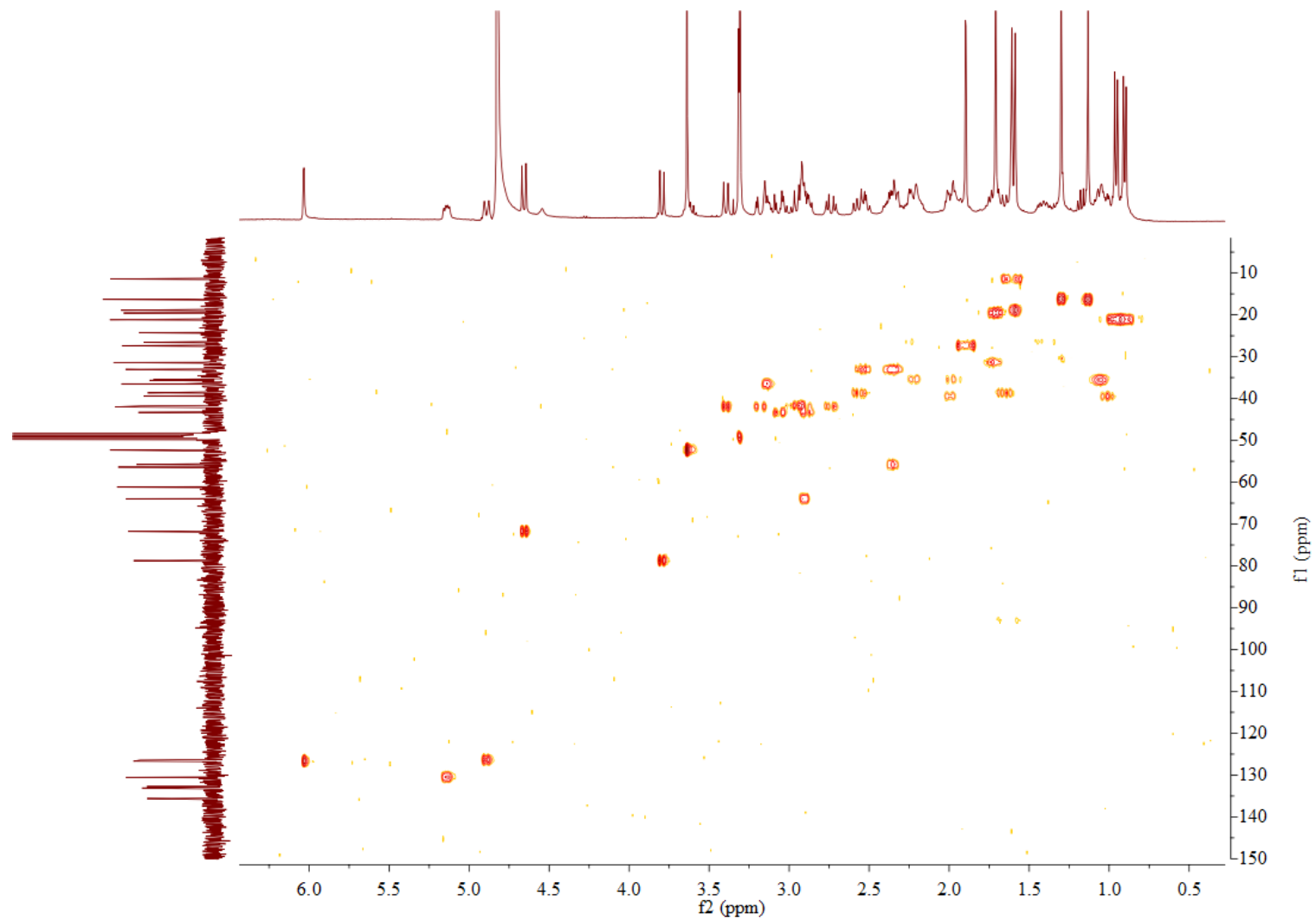


S9

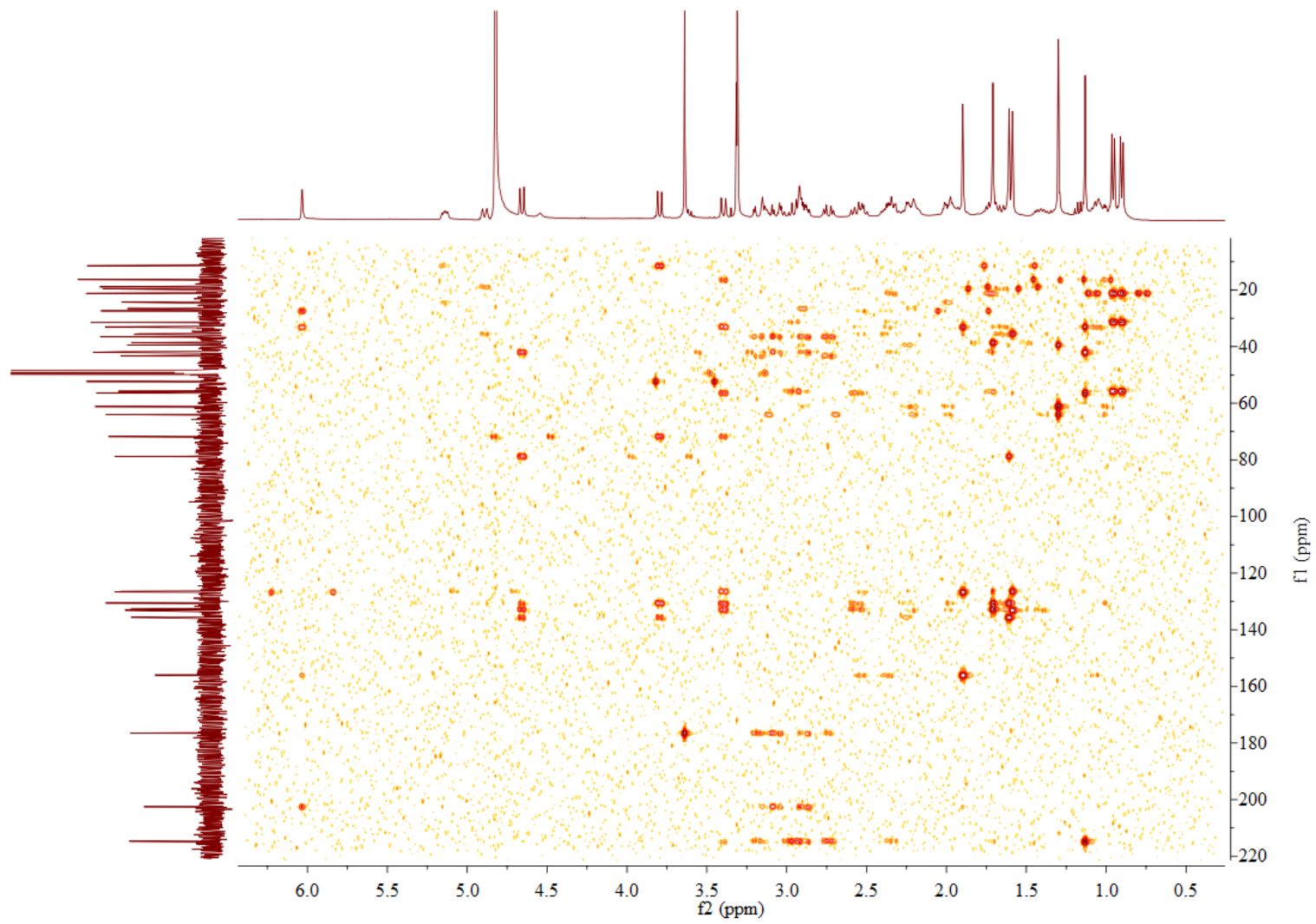
$^{13}\text{C}$  NMR spectrum of **2** in Methanol- $d_4$



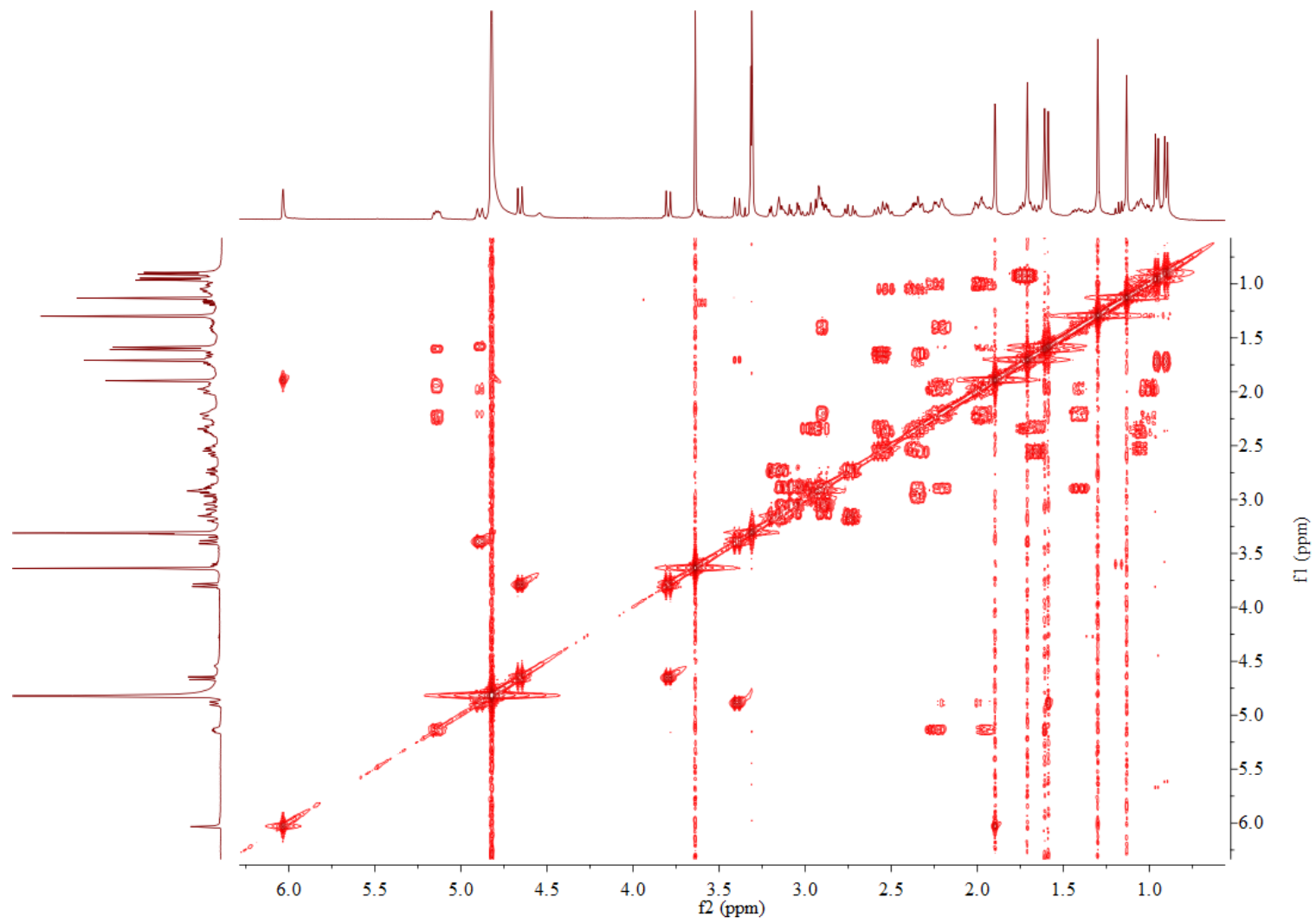
S10 HSQC spectrum of **2** in Methanol- $d_4$



S11 HMBC spectrum of **2** in Methanol- $d_4$

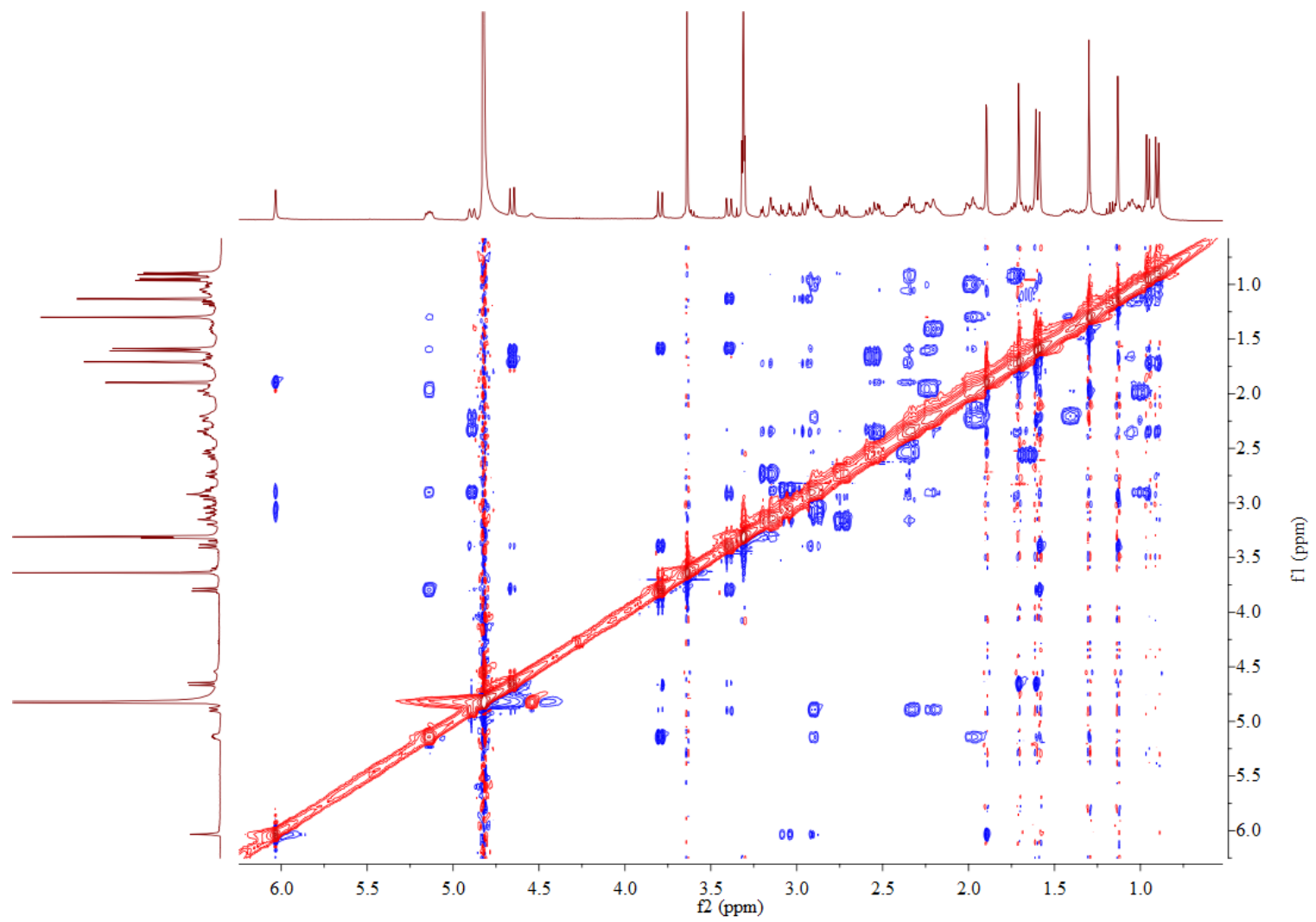


S12  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of **2** in Methanol- $d_4$

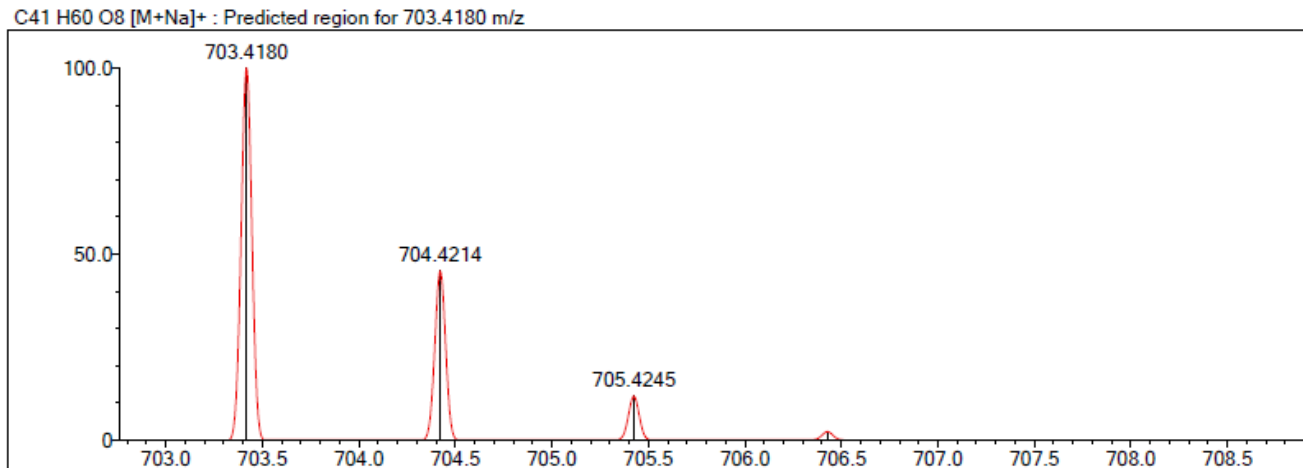
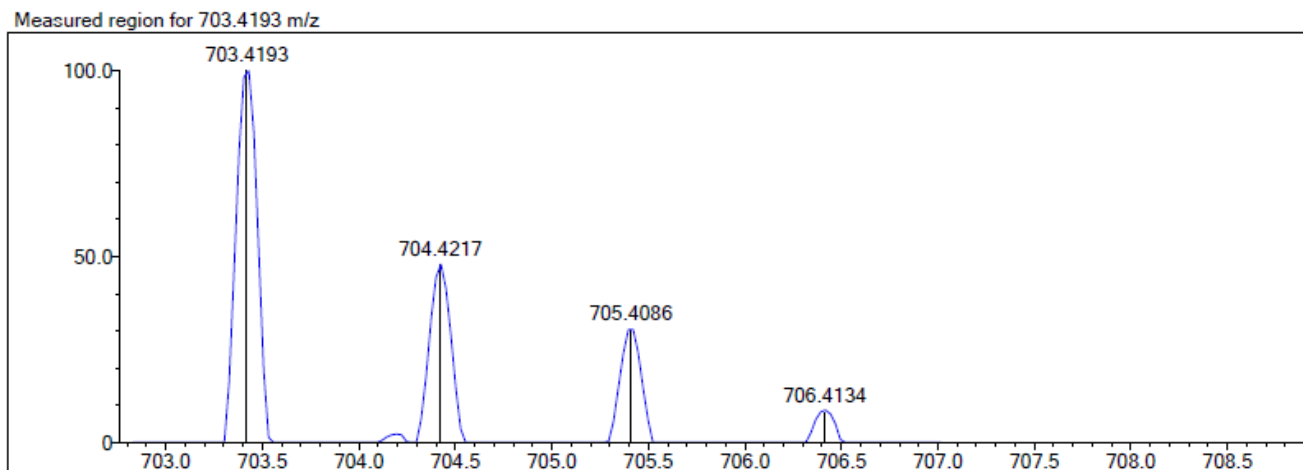




S13 NOESY spectrum of **2** in Methanol- $d_4$

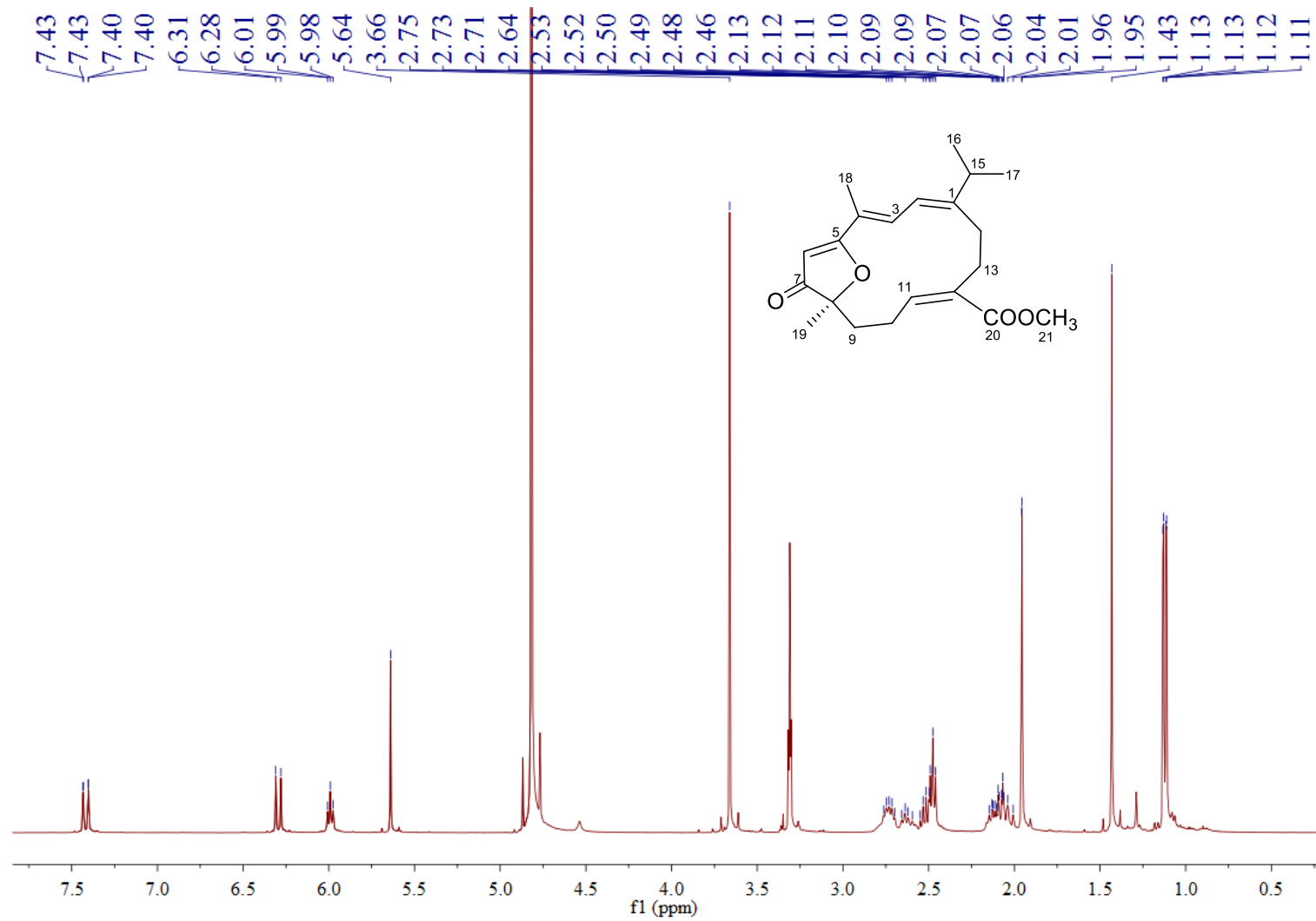


S14 HRESIMS spectrum of 2

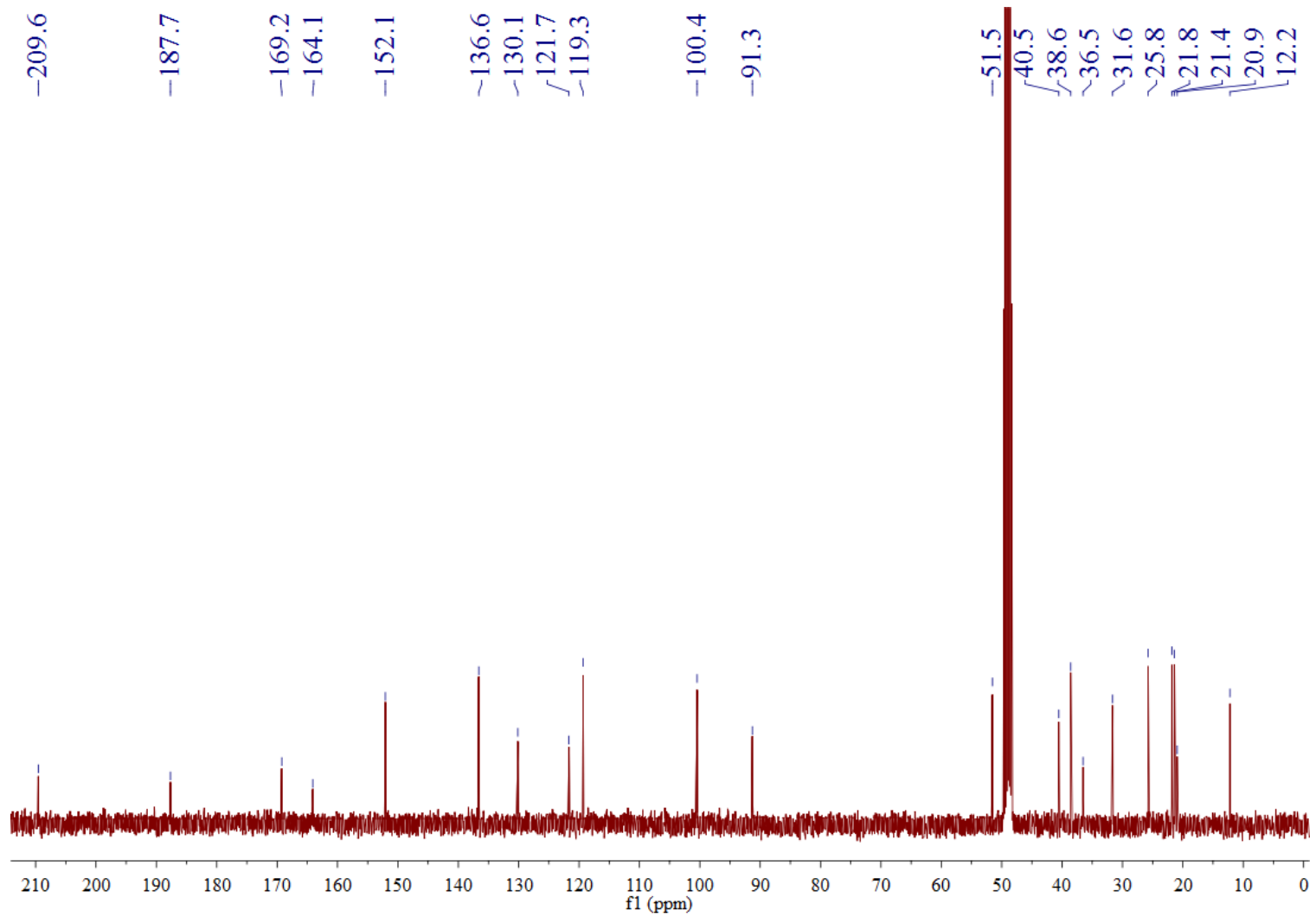


Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	45.26	C41 H60 O8	[M+Na] <sup>+</sup>	703.4193	703.4180	1.3	1.85	46.24	12.0

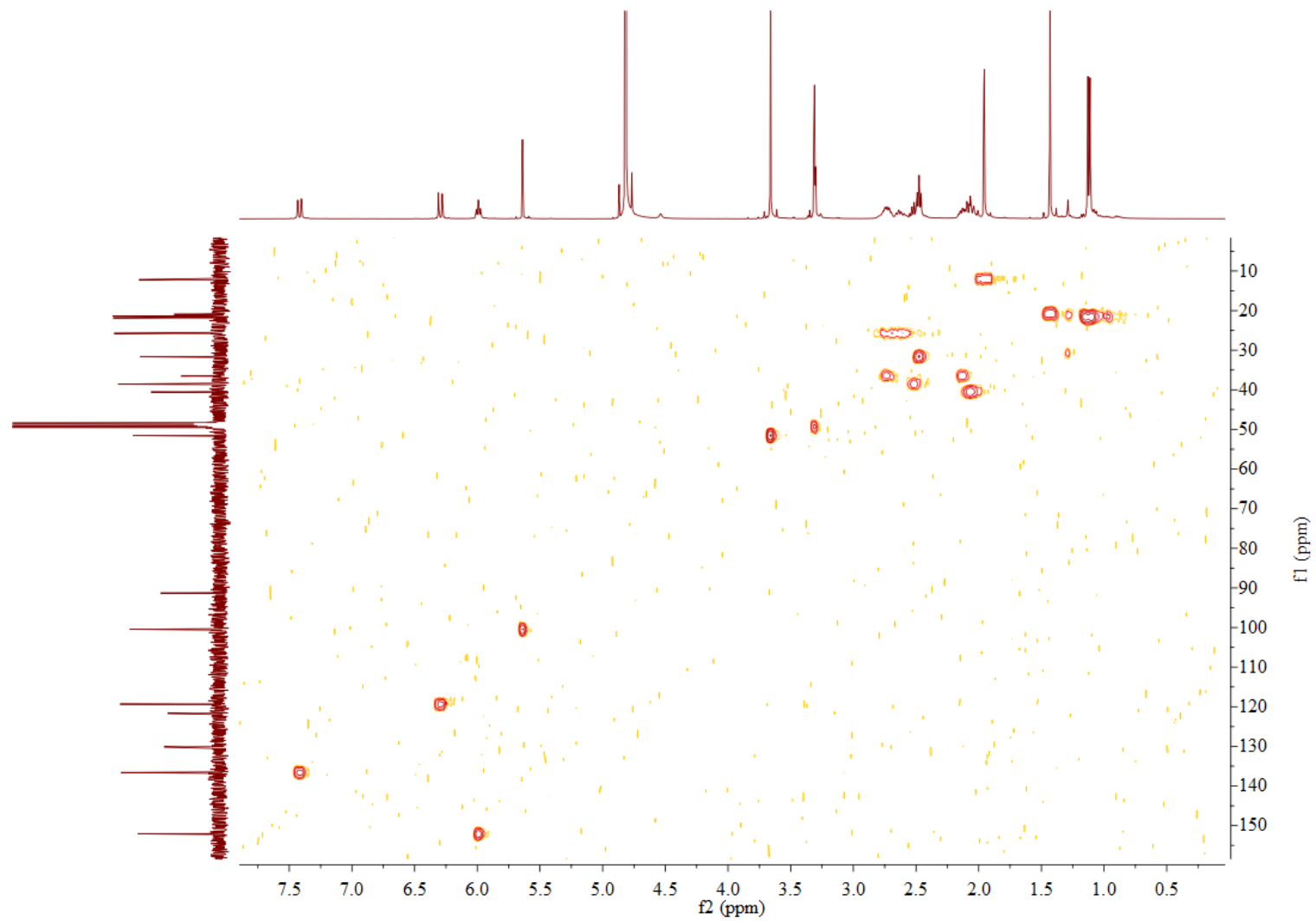
S15 <sup>1</sup>H NMR spectrum of **3** in Methanol-*d*<sub>4</sub>



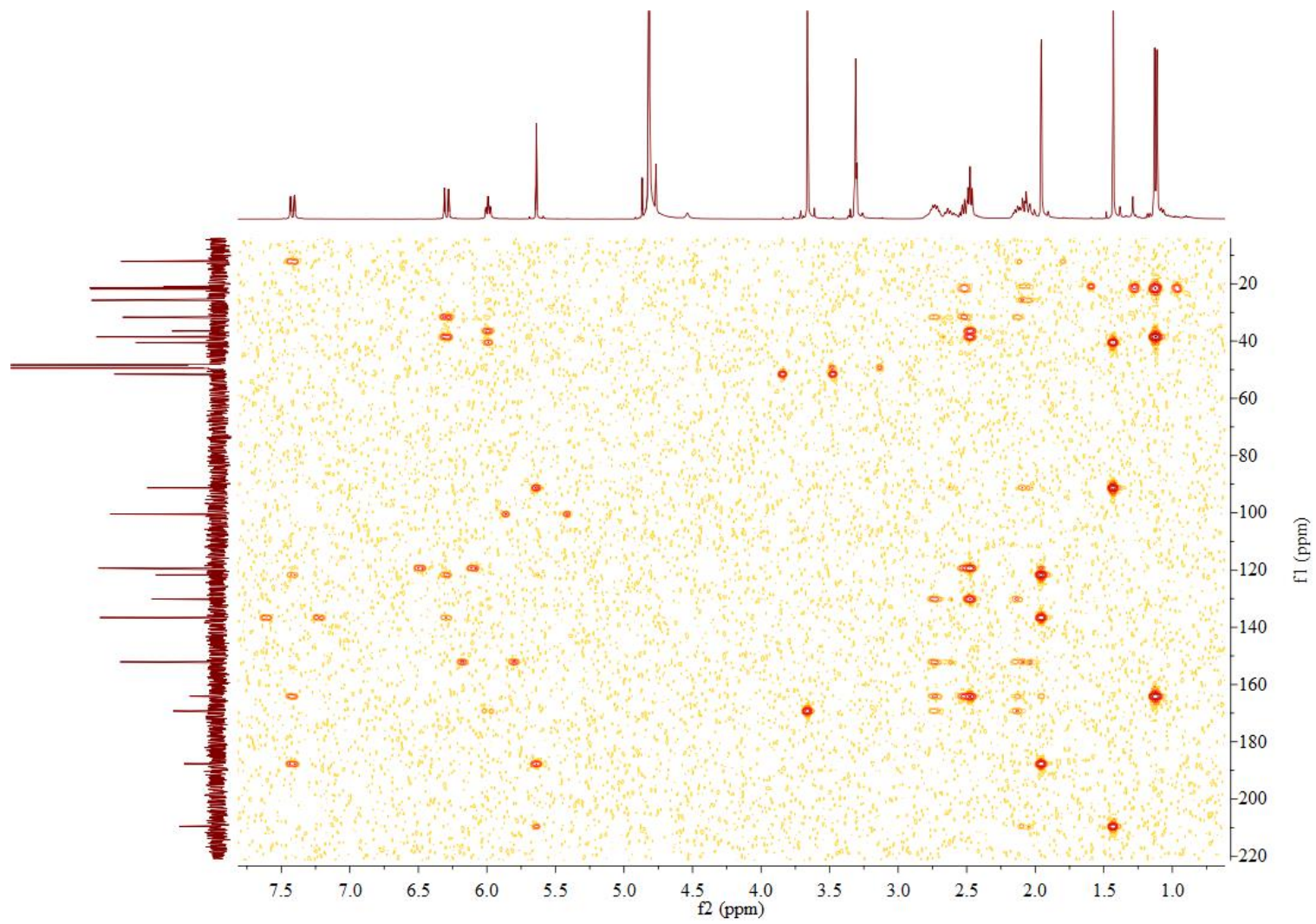
S16  $^{13}\text{C}$  NMR spectrum of **3** in Methanol- $d_4$



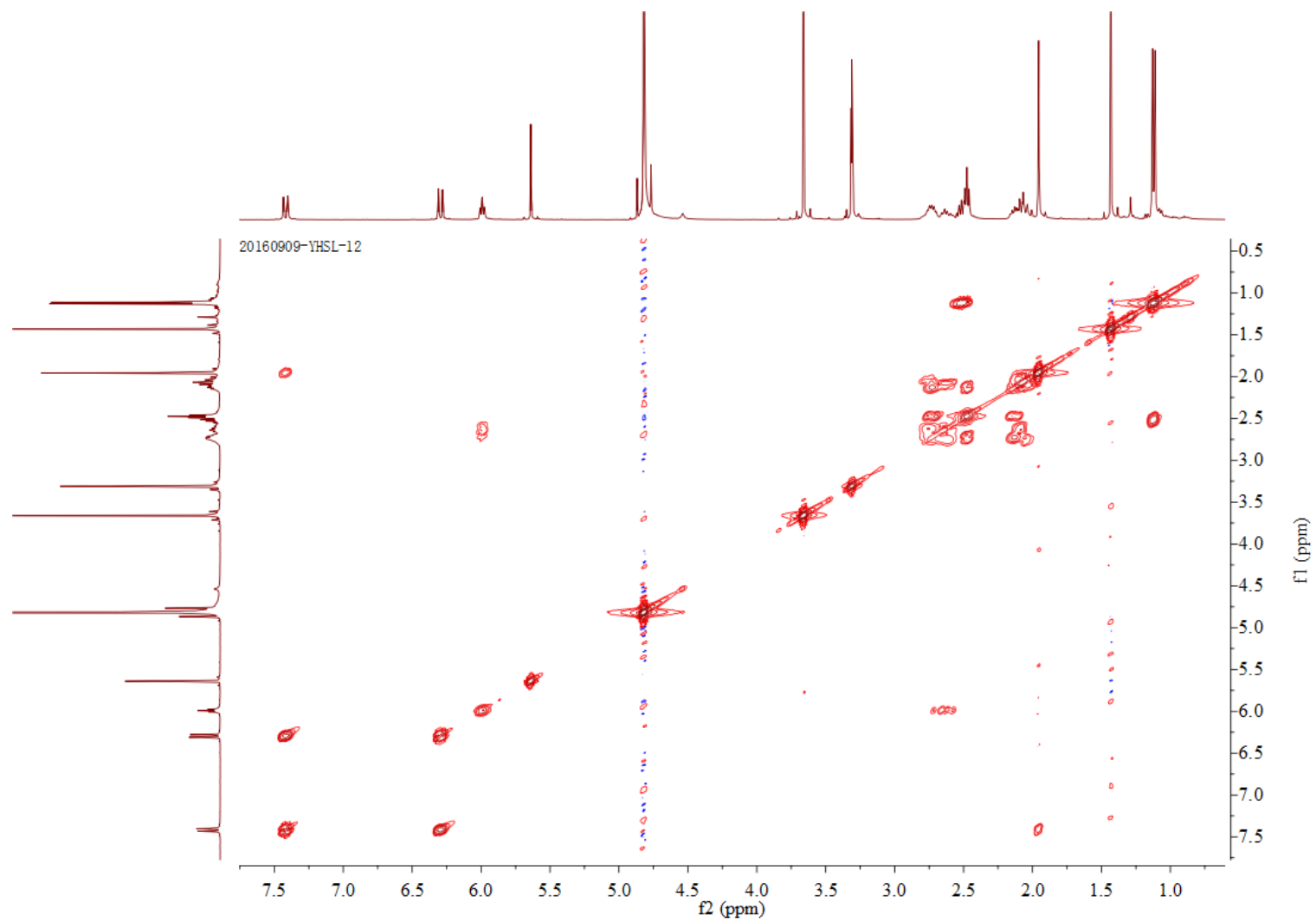
S17 HSQC spectrum of **3** in Methanol- $d_4$



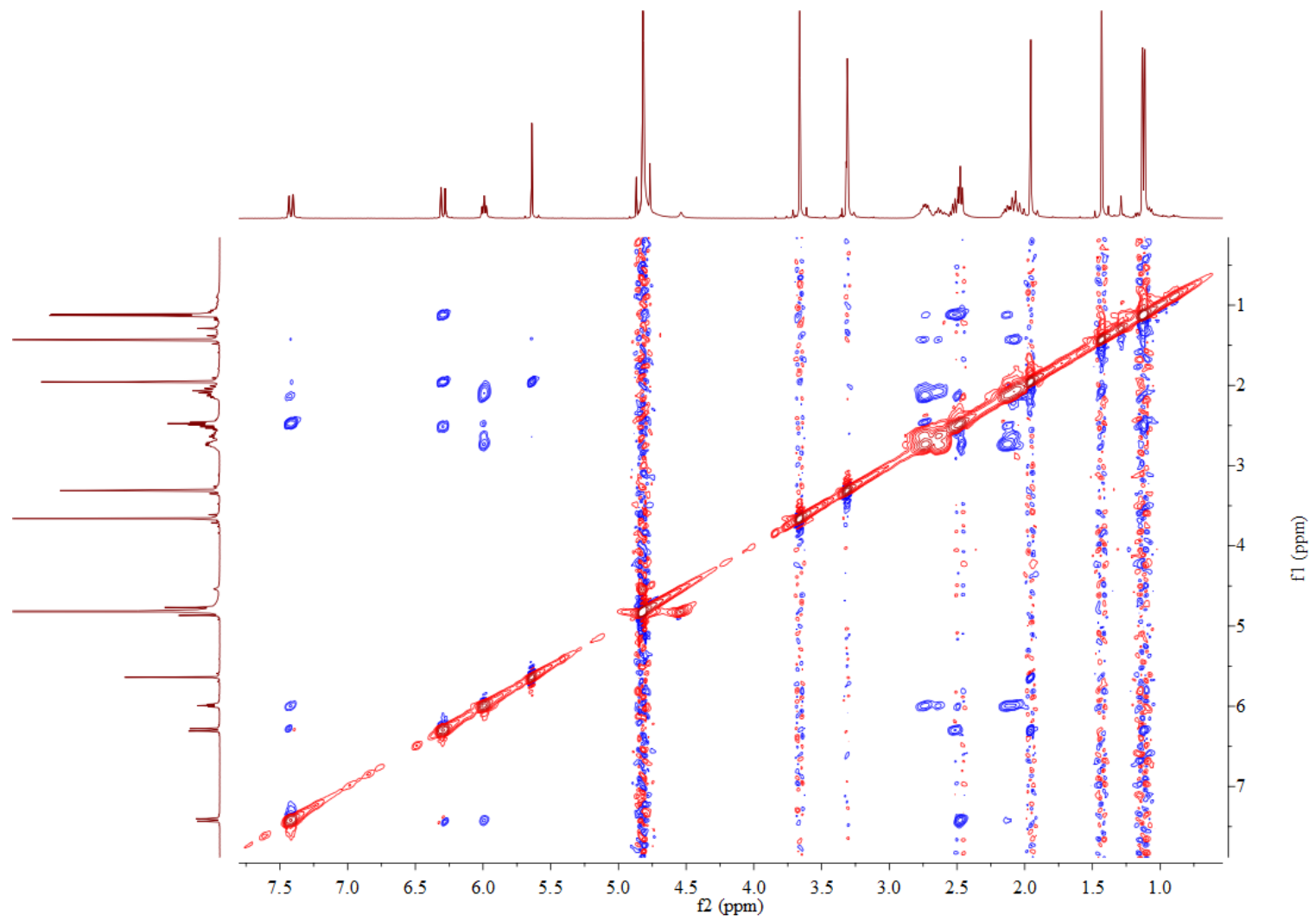
S18 HMBC spectrum of 3 in Methanol- $d_4$



S19  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of **3** in Methanol- $d_4$

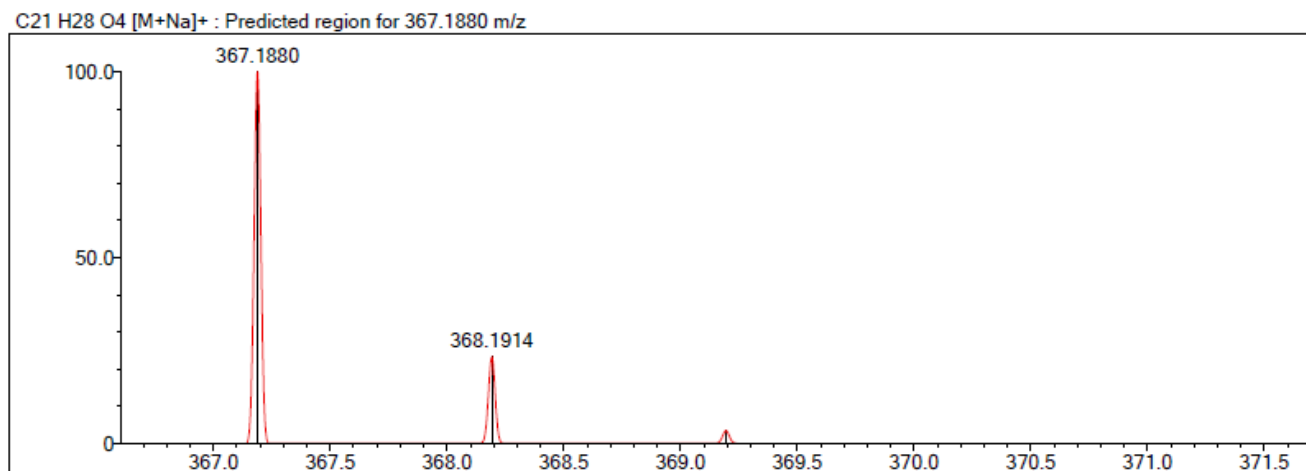
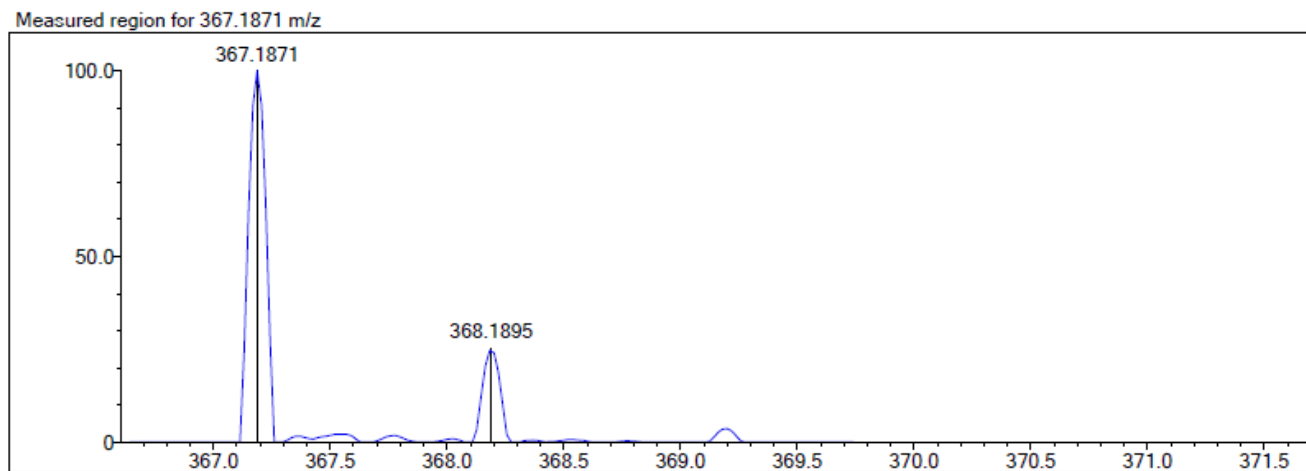


S20 NOESY spectrum of **3** in Methanol- $d_4$



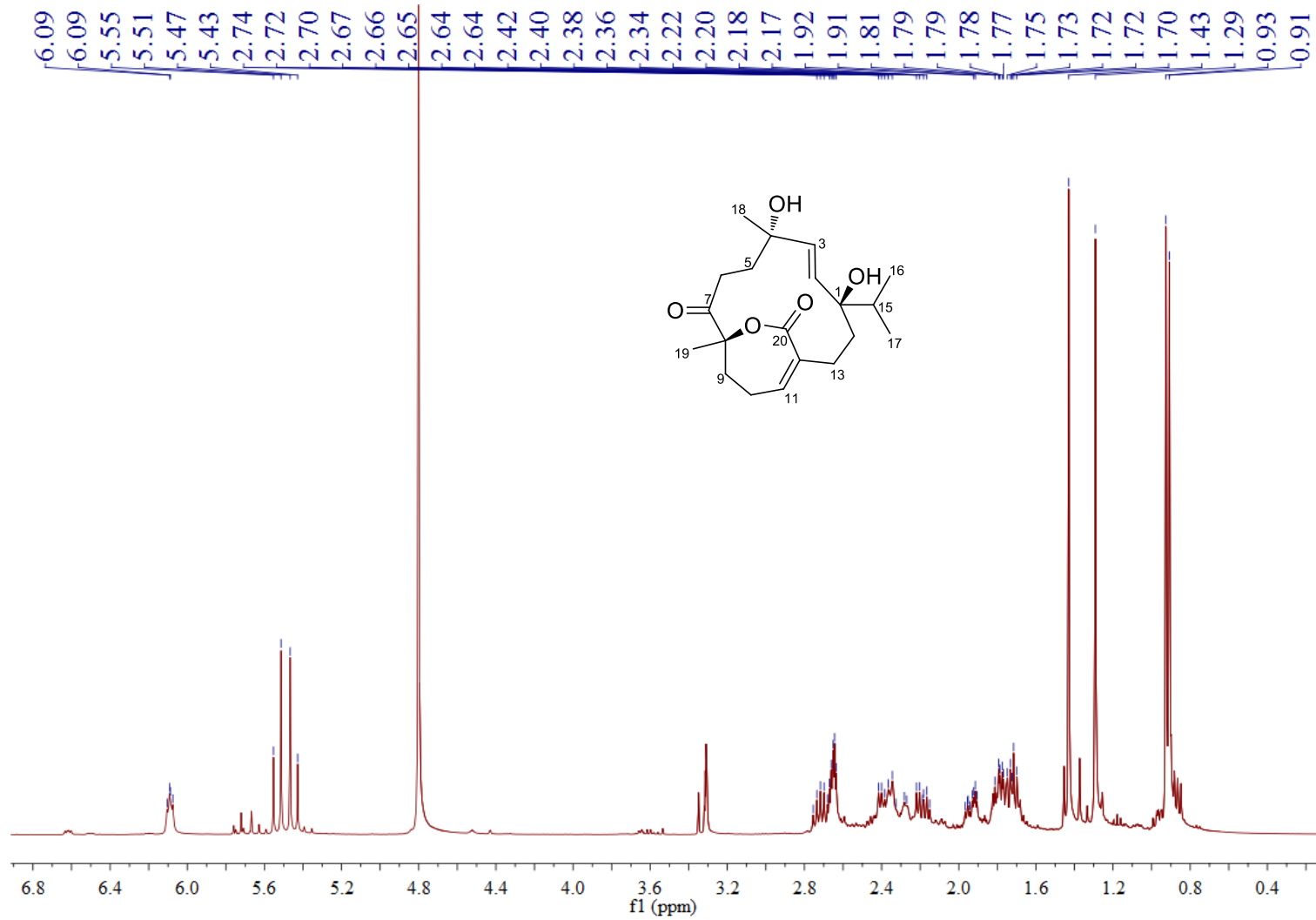


S21 HRESIMS spectrum of **3**

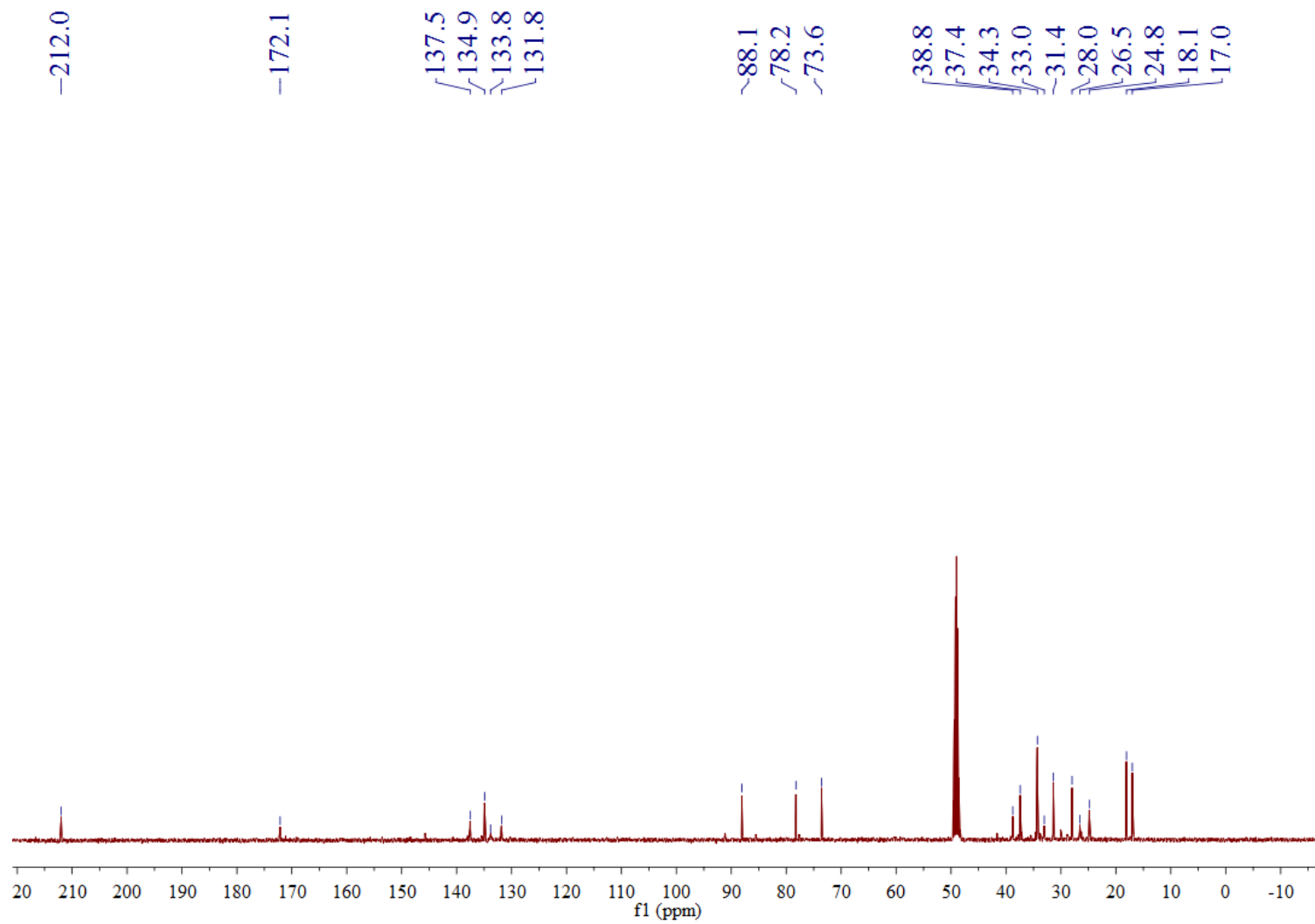


Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	81.94	C21 H28 O4	[M+Na] <sup>+</sup>	367.1871	367.1880	-0.9	-2.45	85.02	8.0

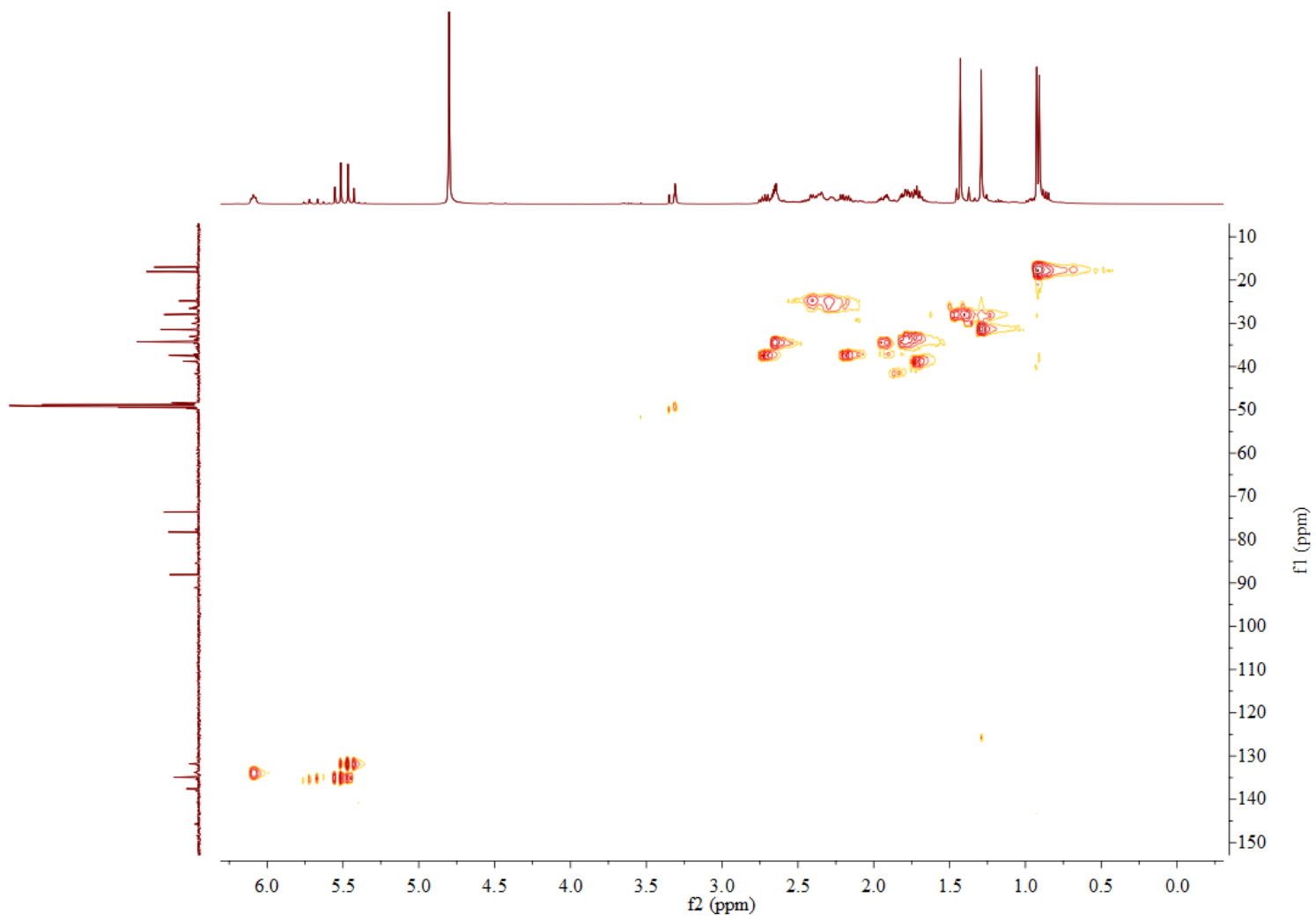
S22 <sup>1</sup>H NMR spectrum of 4 in Methanol-d<sub>4</sub>



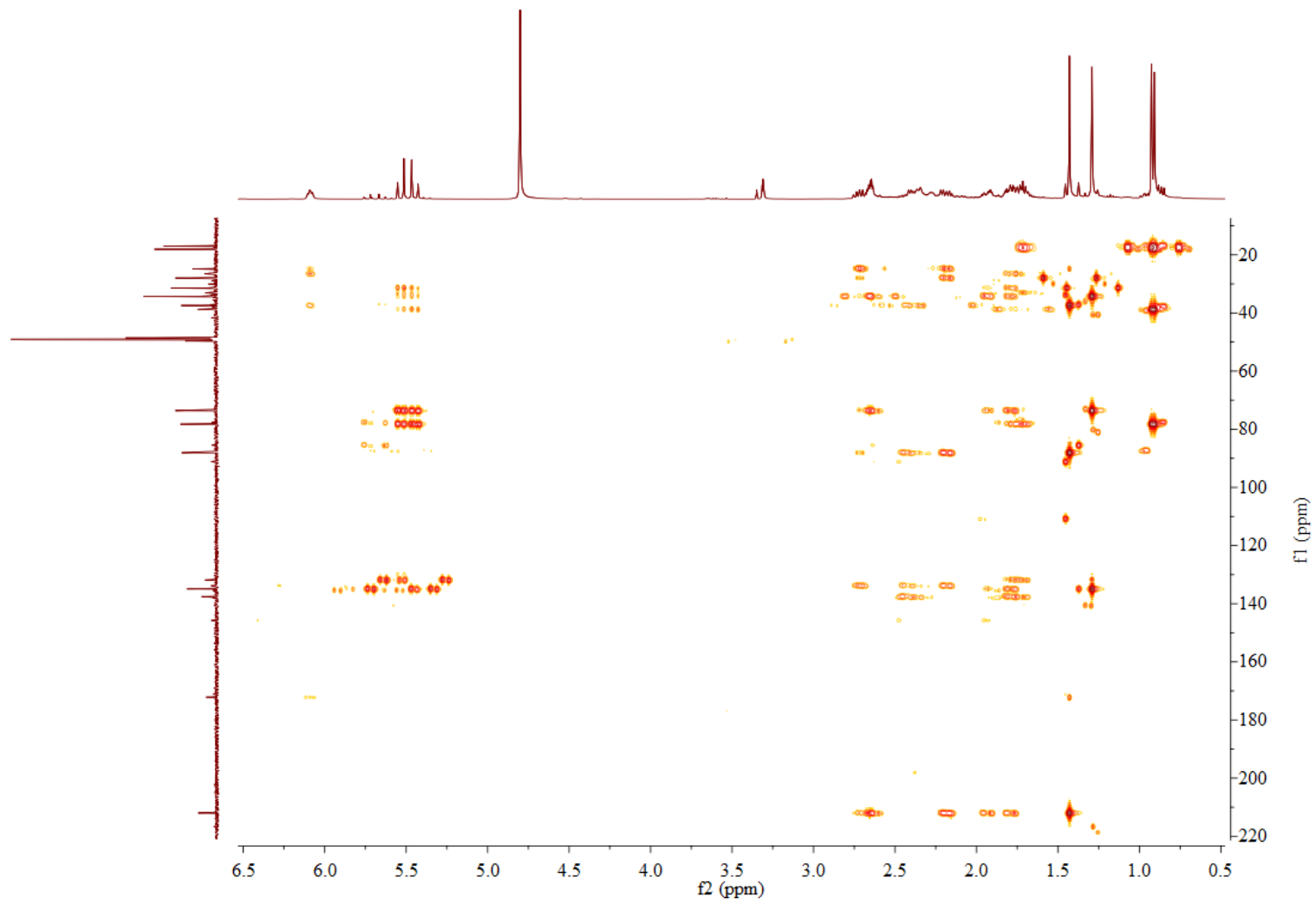
S23  $^{13}\text{C}$  NMR spectrum of **4** in Methanol- $d_4$



S24 HSQC spectrum of **4** in Methanol- $d_4$

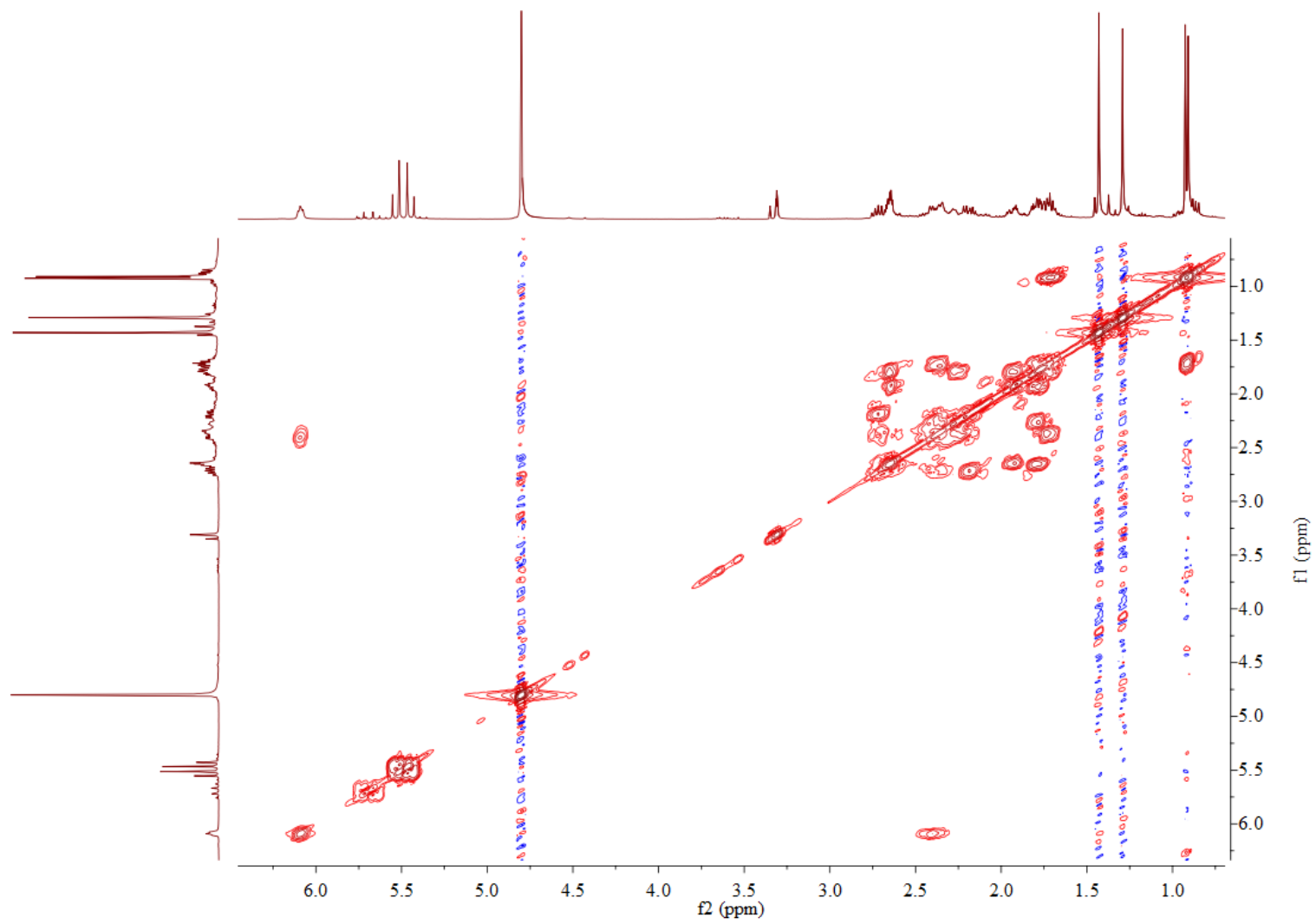


S25 HMBC spectrum of **4** in Methanol- $d_4$

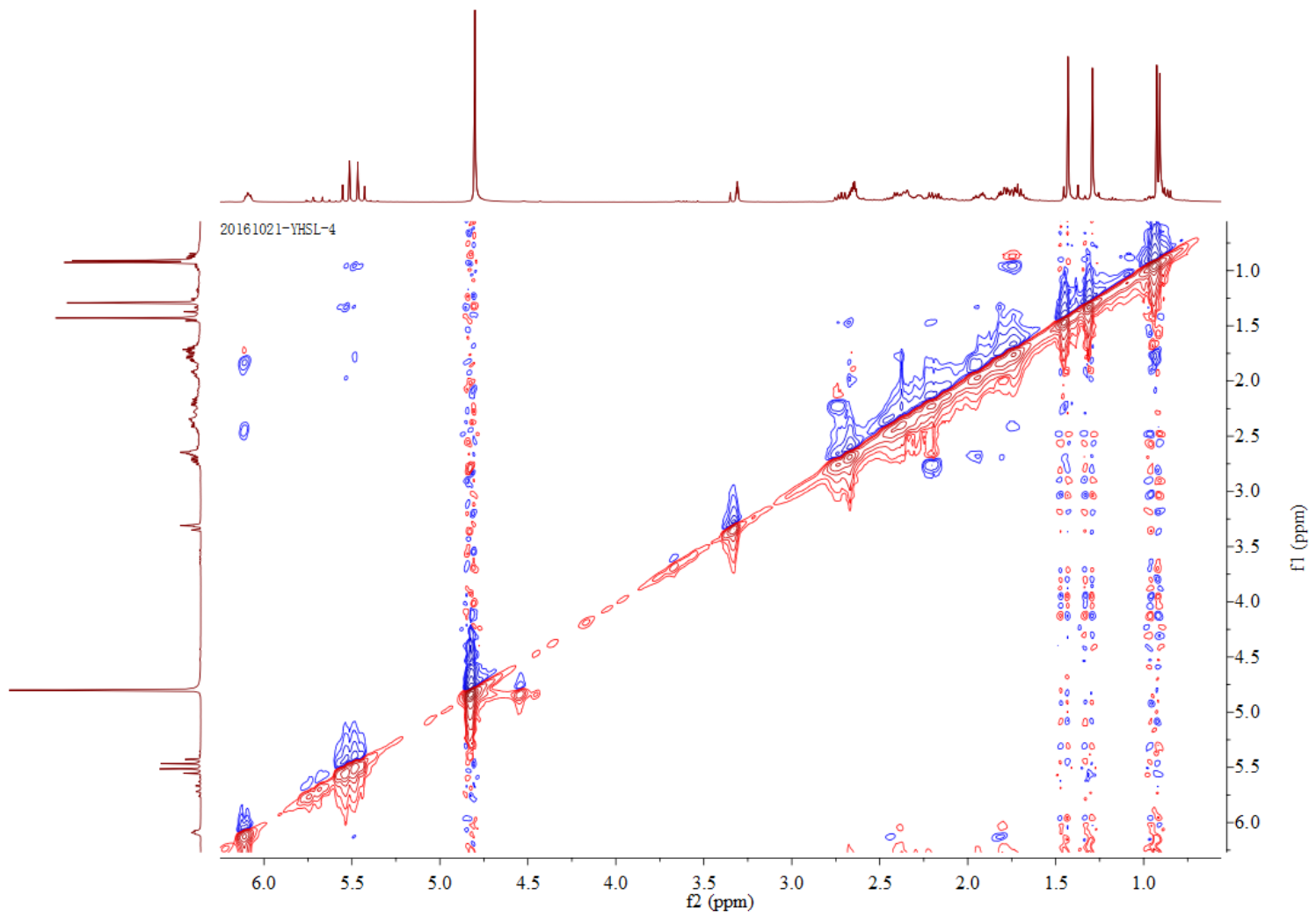


S26

$^1\text{H}$ - $^1\text{H}$  COSY spectrum of **4** in Methanol- $d_4$



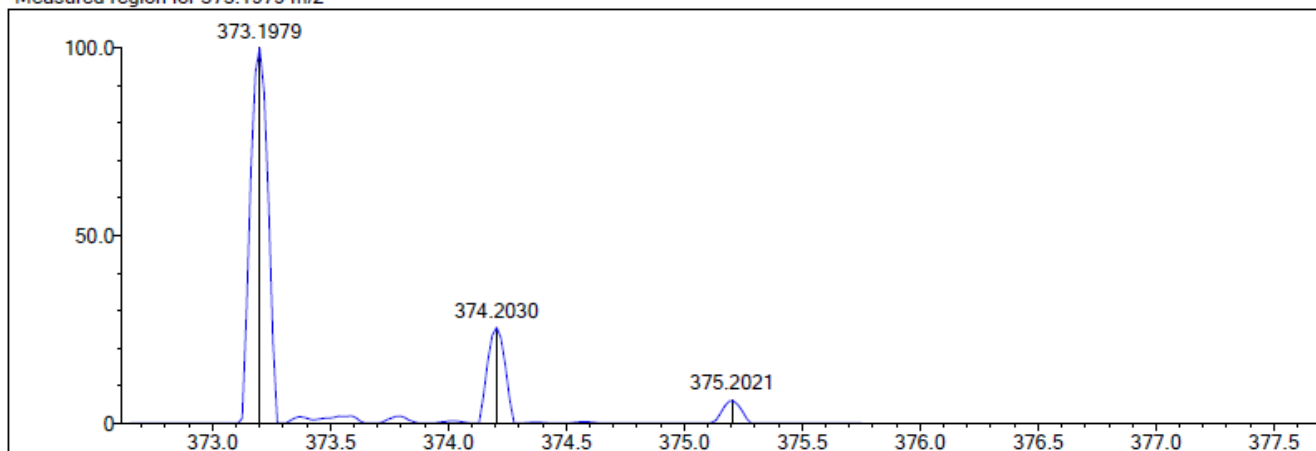
S27 NOESY spectrum of **4** in Methanol- $d_4$



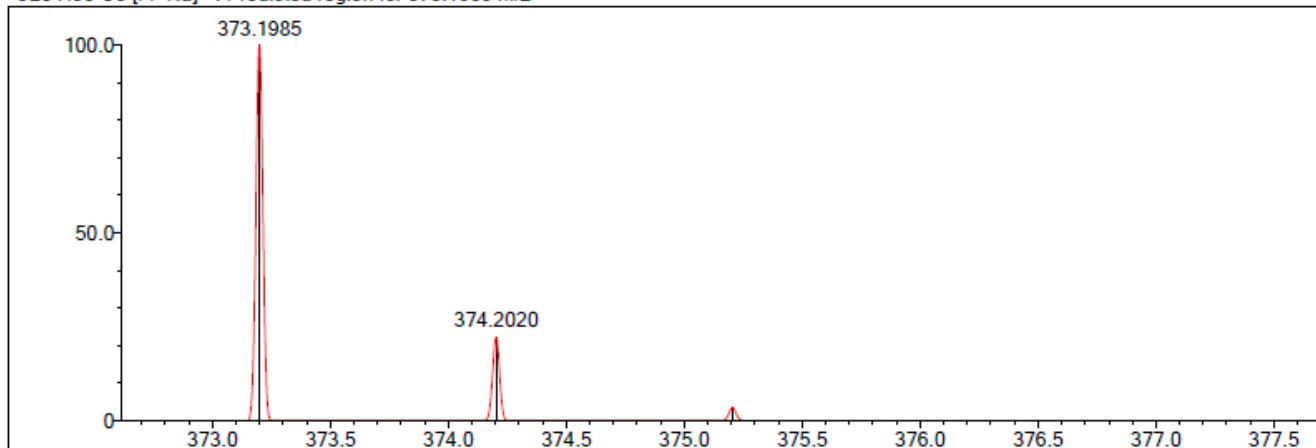
S28

HRESIMS spectrum of **4**

Measured region for 373.1979 m/z



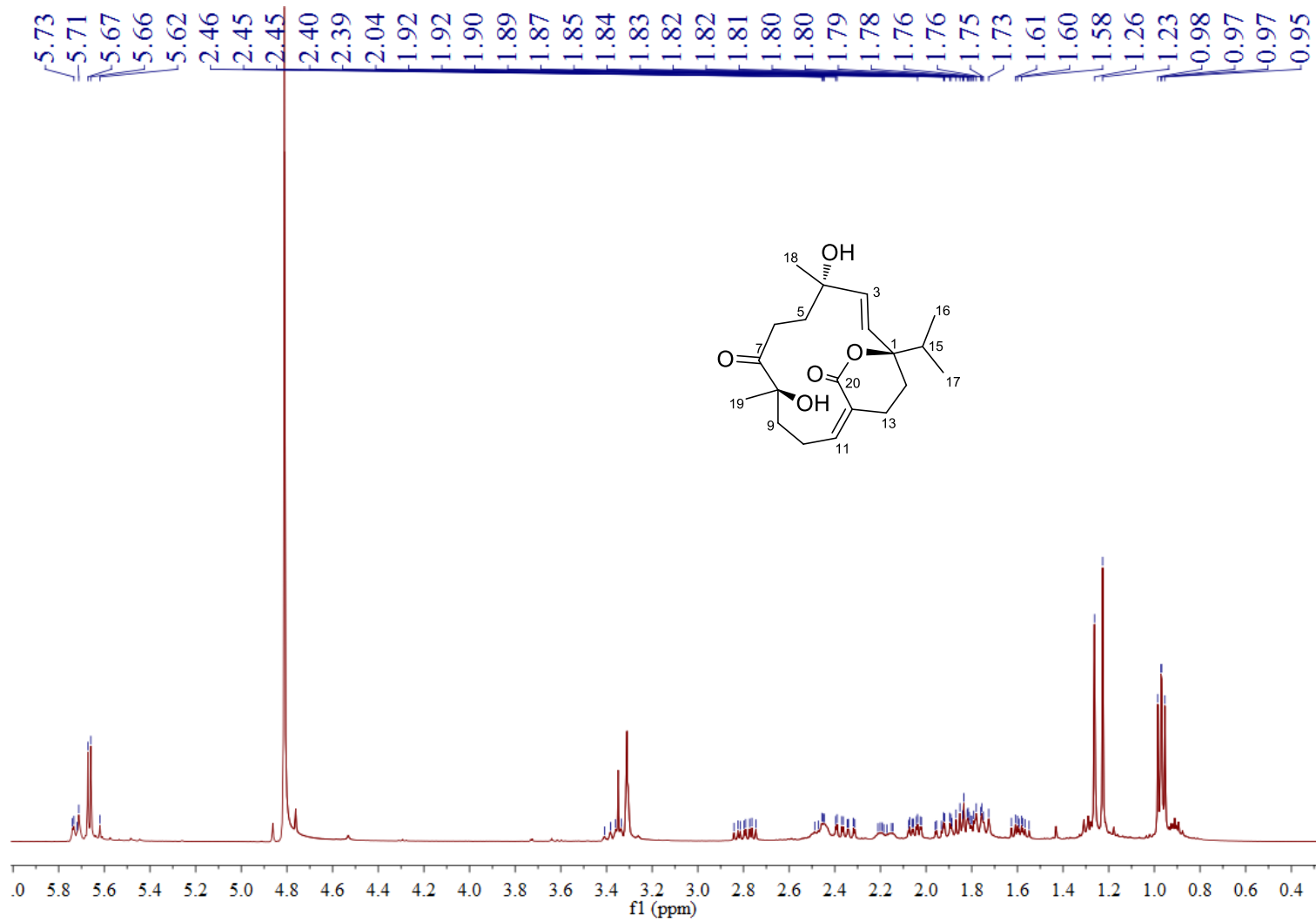
C<sub>20</sub>H<sub>30</sub>O<sub>5</sub> [M+Na]<sup>+</sup>: Predicted region for 373.1985 m/z



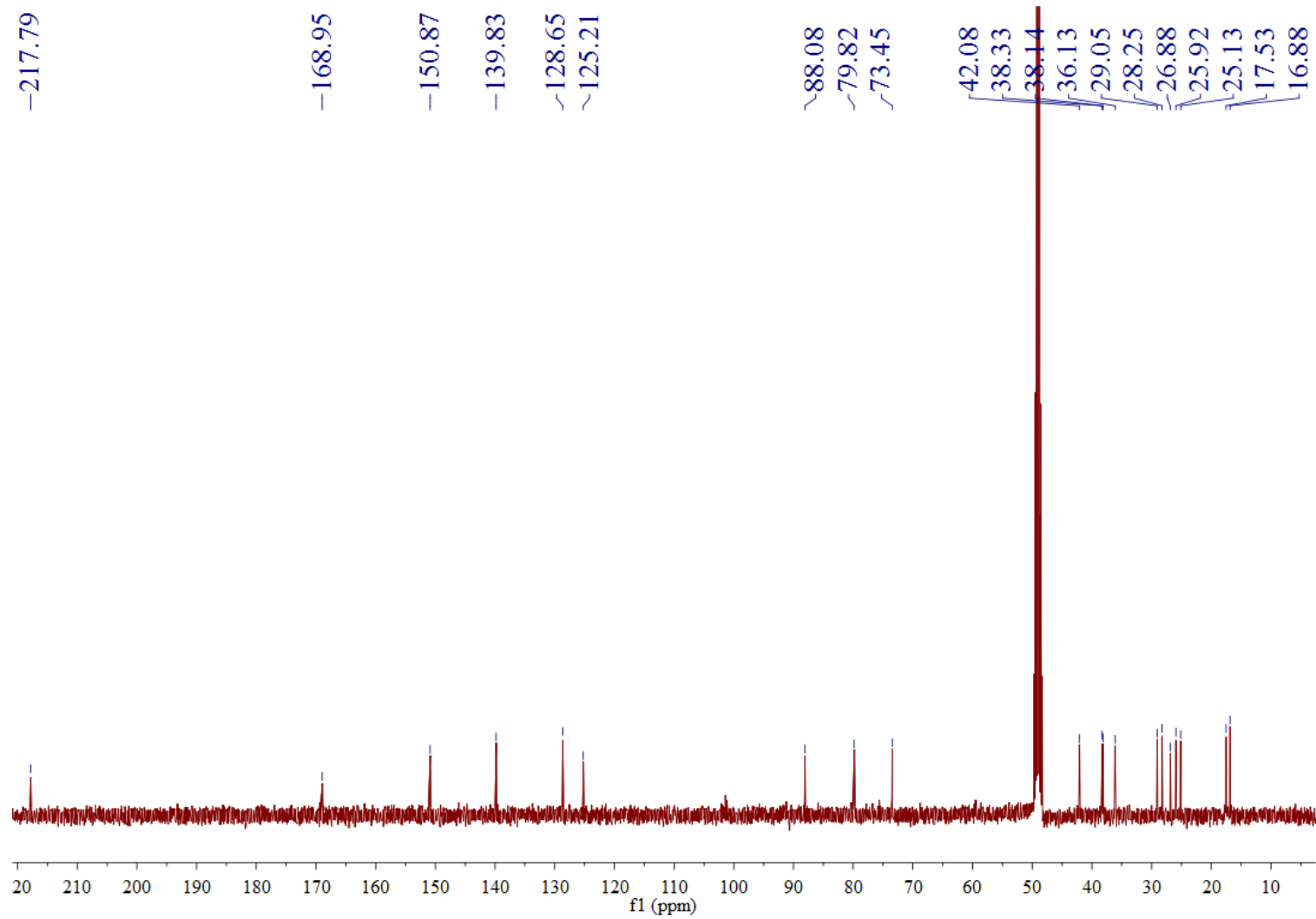
Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	73.21	C <sub>20</sub> H <sub>30</sub> O <sub>5</sub>	[M+Na] <sup>+</sup>	373.1979	373.1985	-0.6	-1.61	74.35	6.0



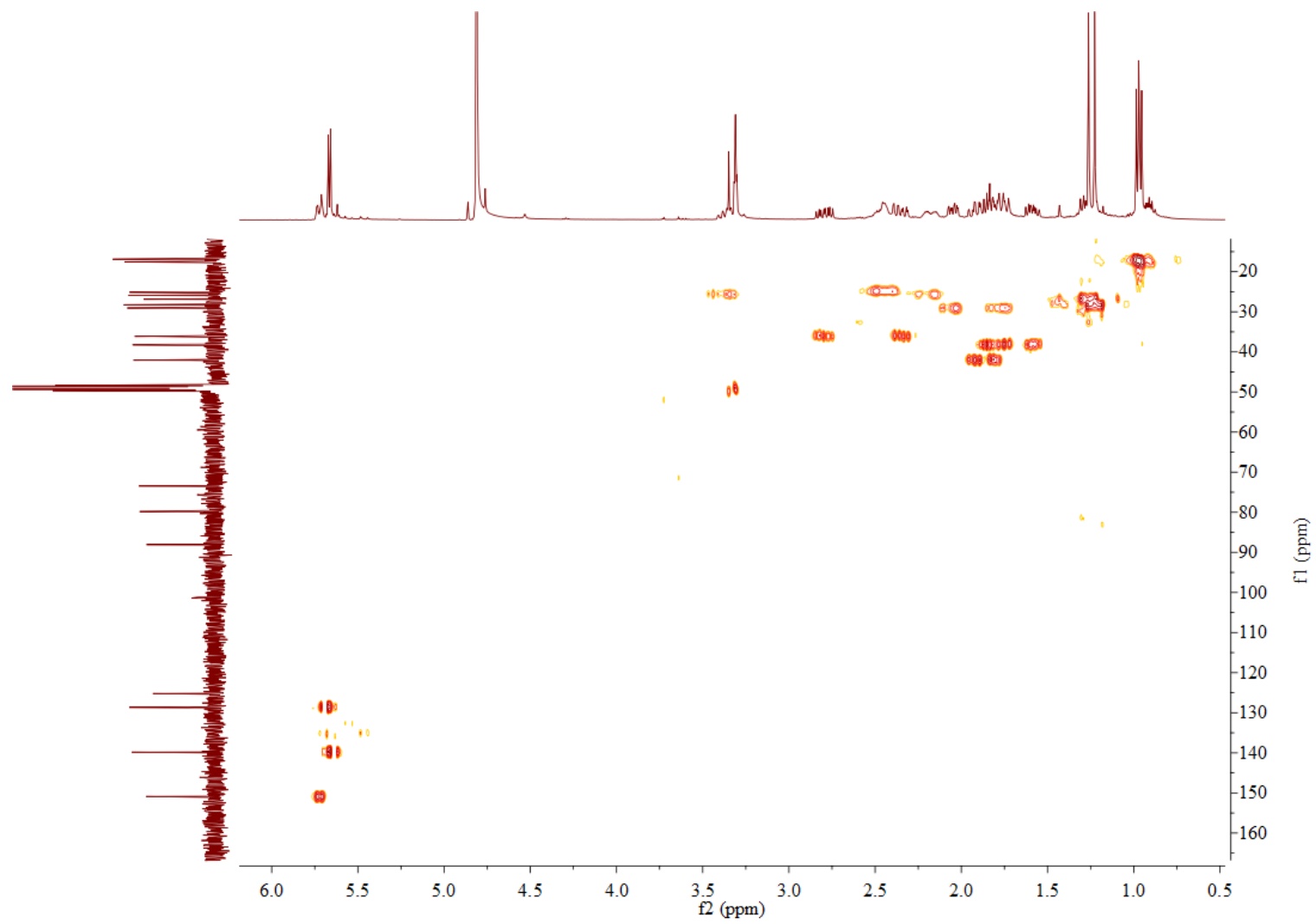
S29 <sup>1</sup>H NMR spectrum of **5** in Methanol-*d*<sub>4</sub>



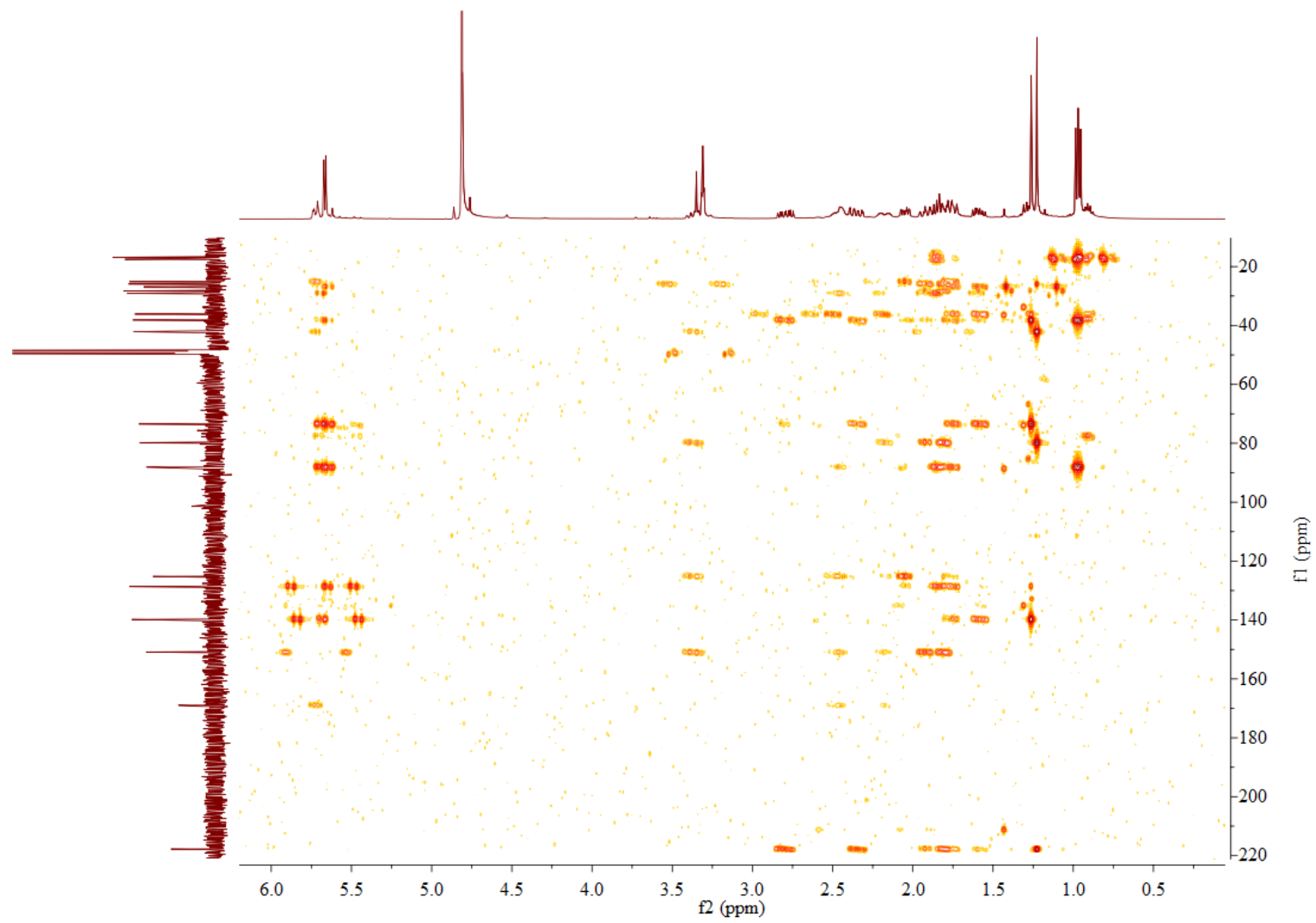
S30  $^{13}\text{C}$  NMR spectrum of **5** in Methanol- $d_4$



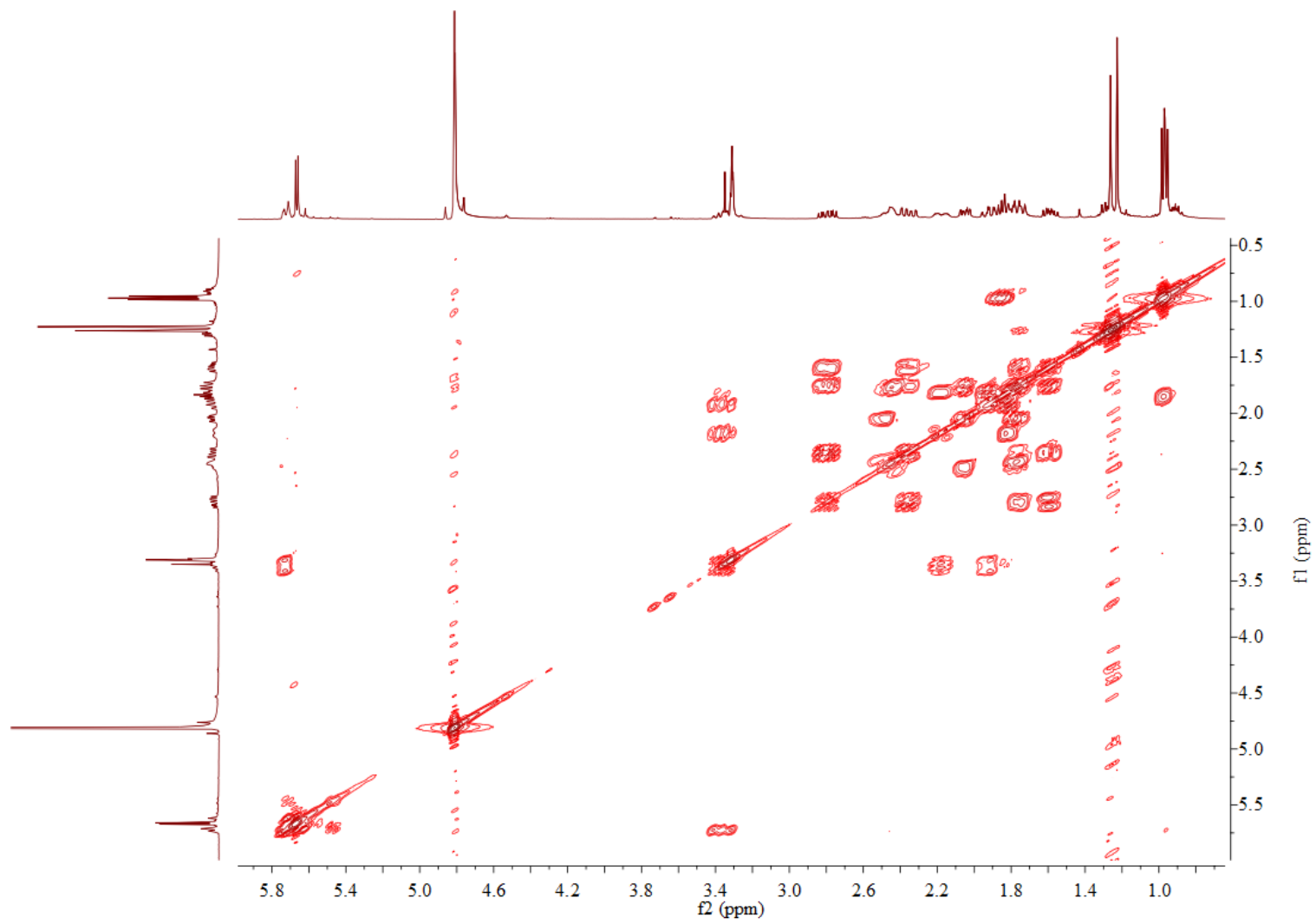
S31 HSQC spectrum of **5** in Methanol- $d_4$



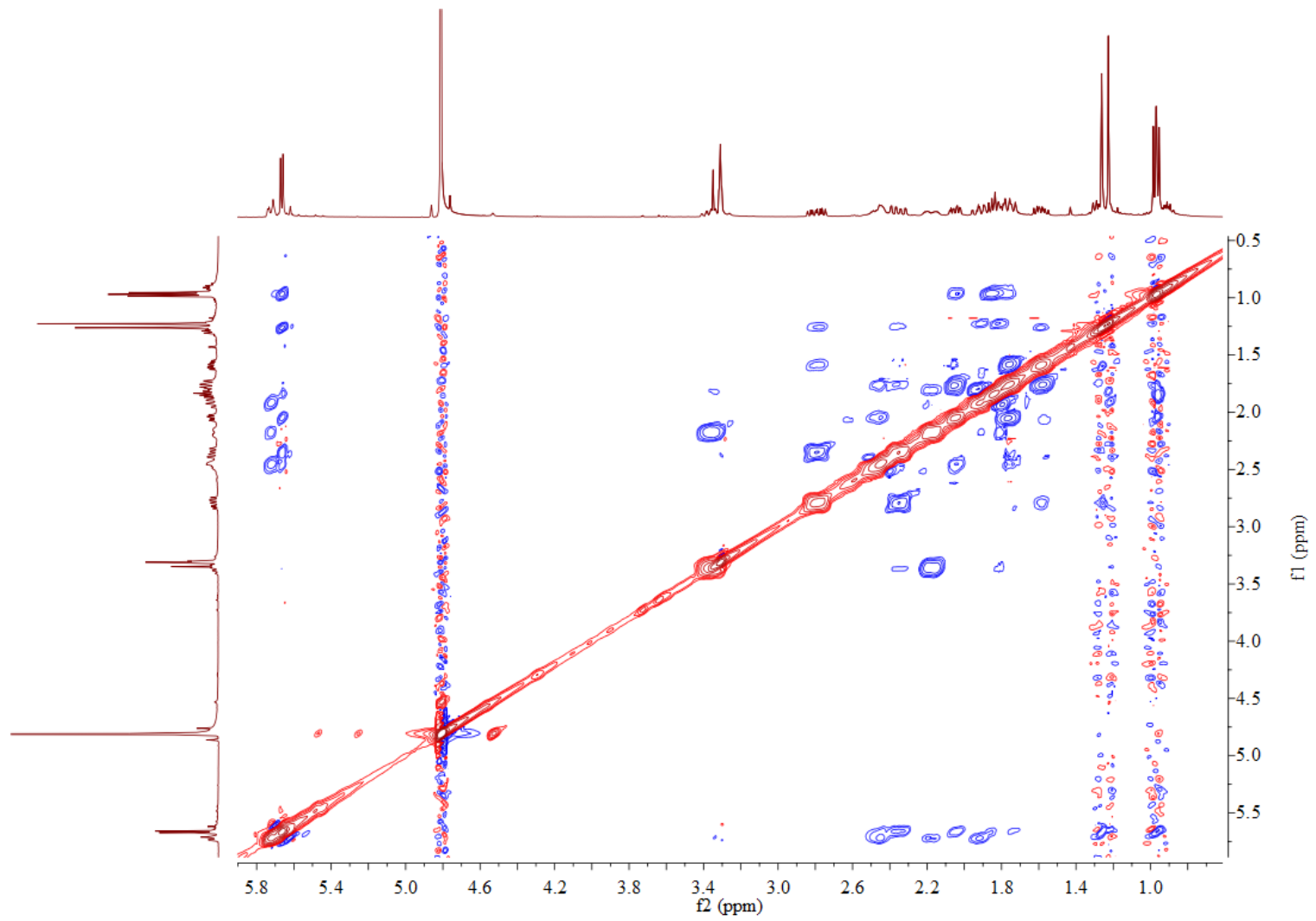
S32 HMBC spectrum of **5** in Methanol- $d_4$



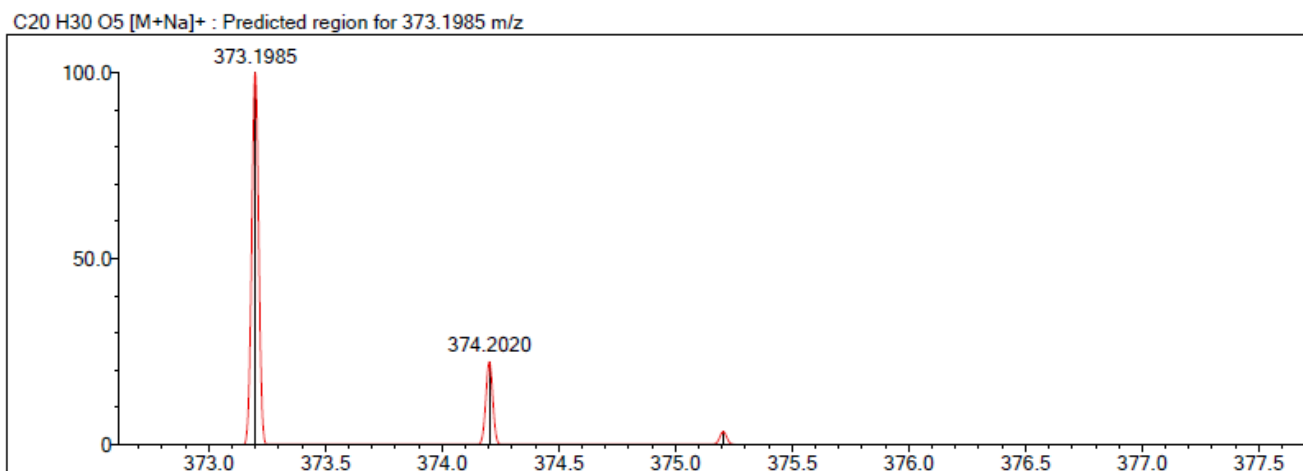
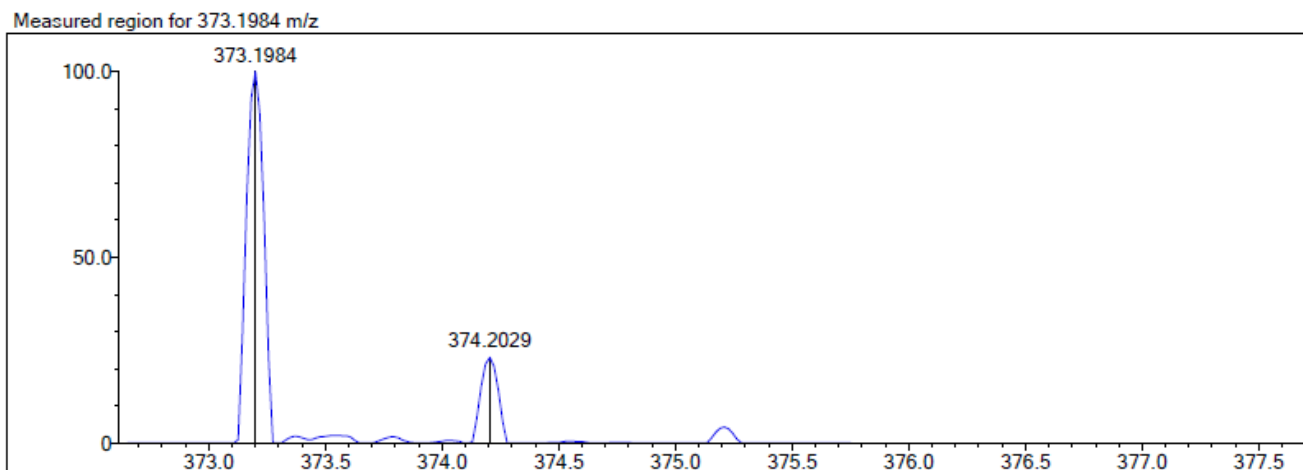
S33  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of **5** in Methanol- $d_4$



S34 NOESY spectrum of **5** in Methanol- $d_4$

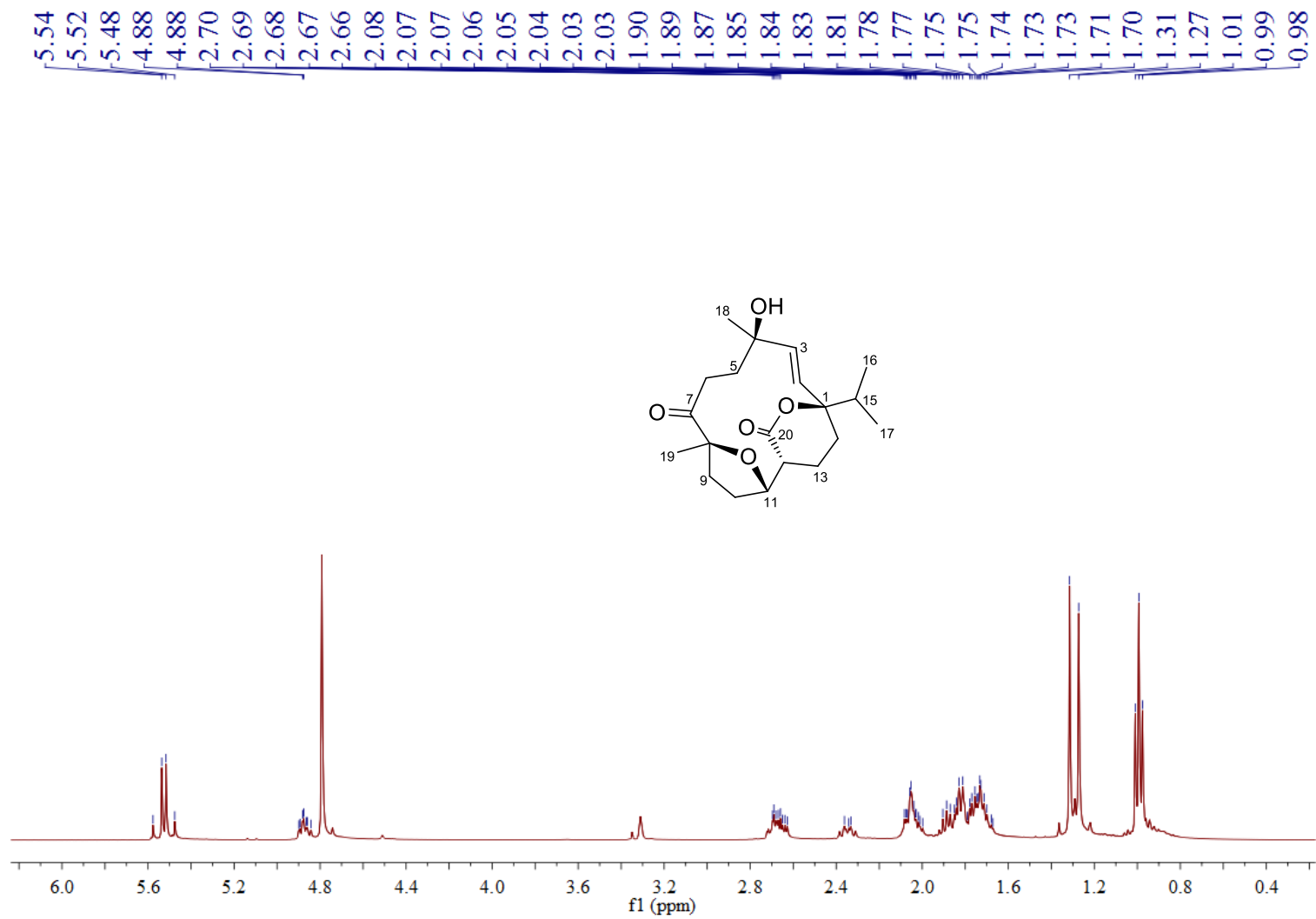


S35 HRESIMS spectrum of **5**



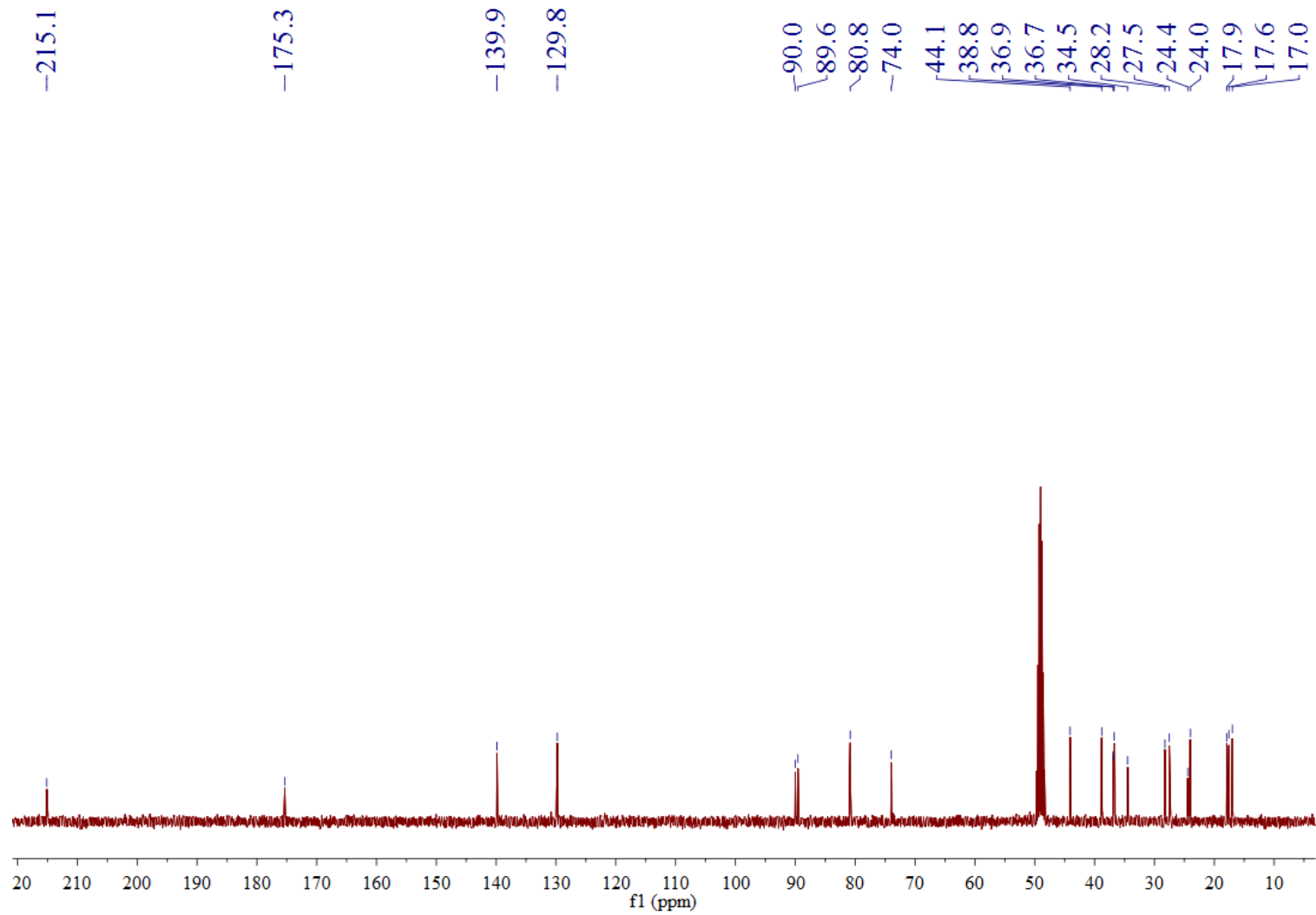
Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	87.48	C <sub>20</sub> H <sub>30</sub> O <sub>5</sub>	[M+Na] <sup>+</sup>	373.1984	373.1985	-0.1	-0.27	87.48	6.0

S36 <sup>1</sup>H NMR spectrum of **6** in Methanol-*d*<sub>4</sub>

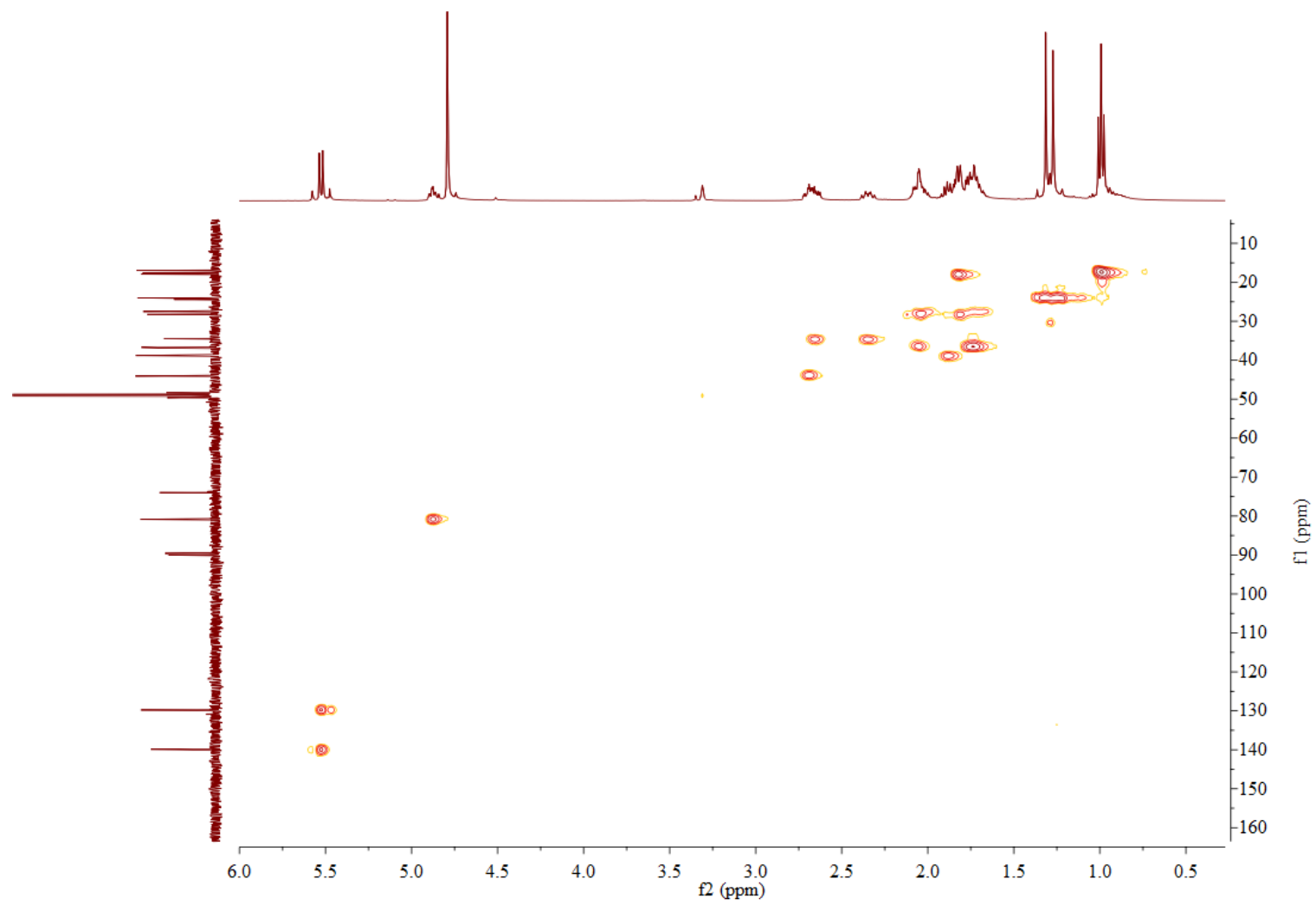




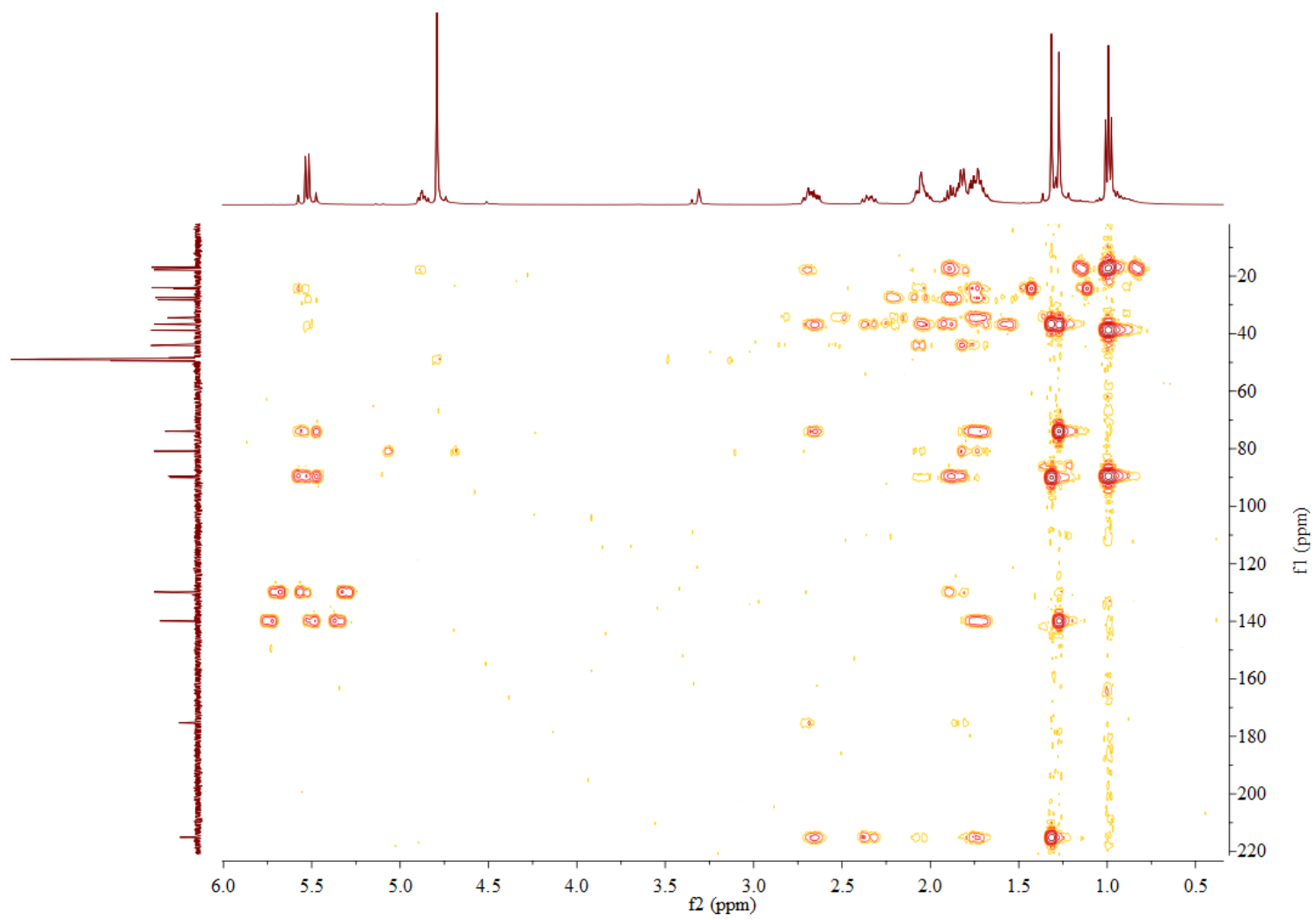
S37  $^{13}\text{C}$  NMR spectrum of **6** in Methanol- $d_4$



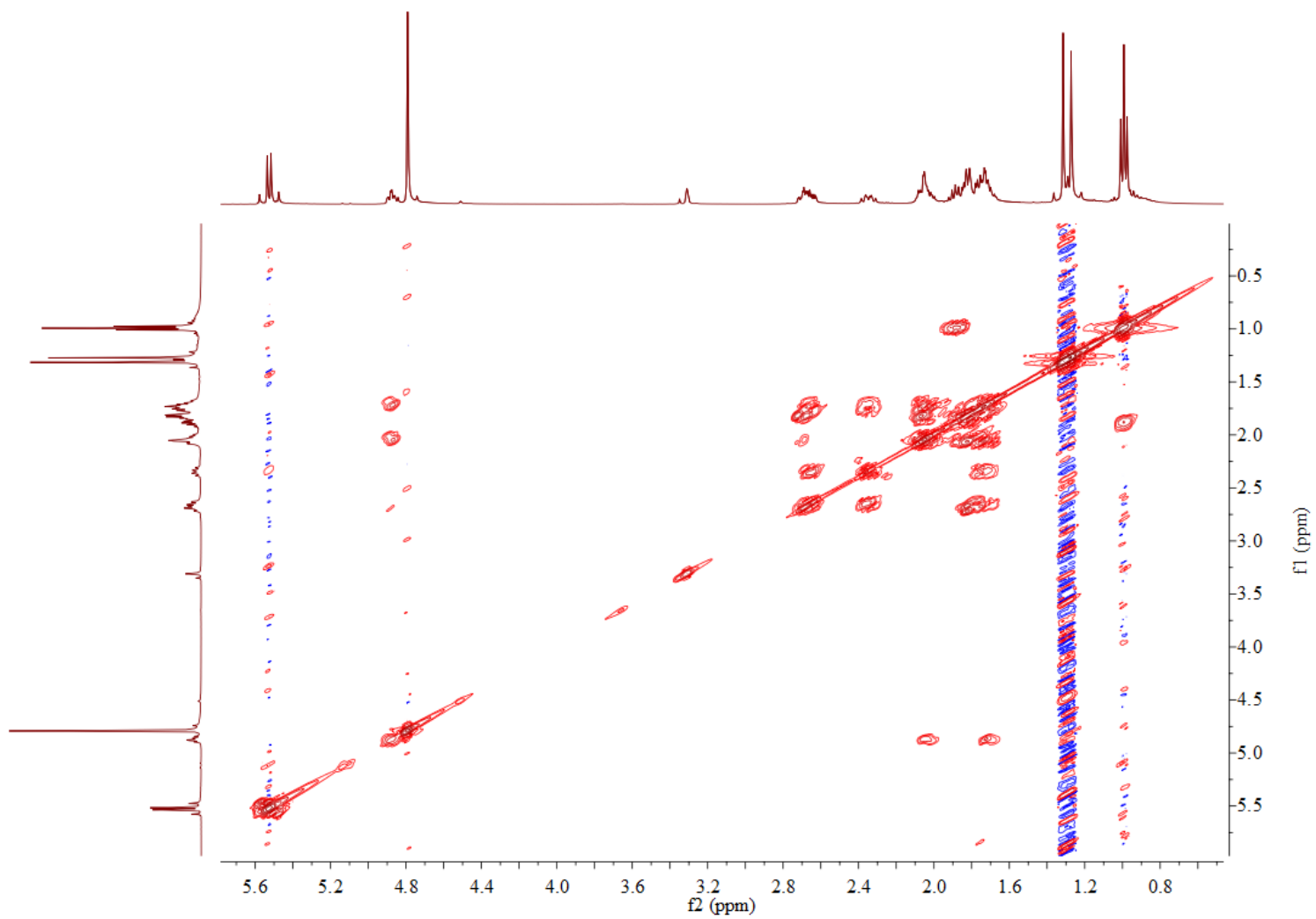
S38 HSQC spectrum of **6** in Methanol- $d_4$



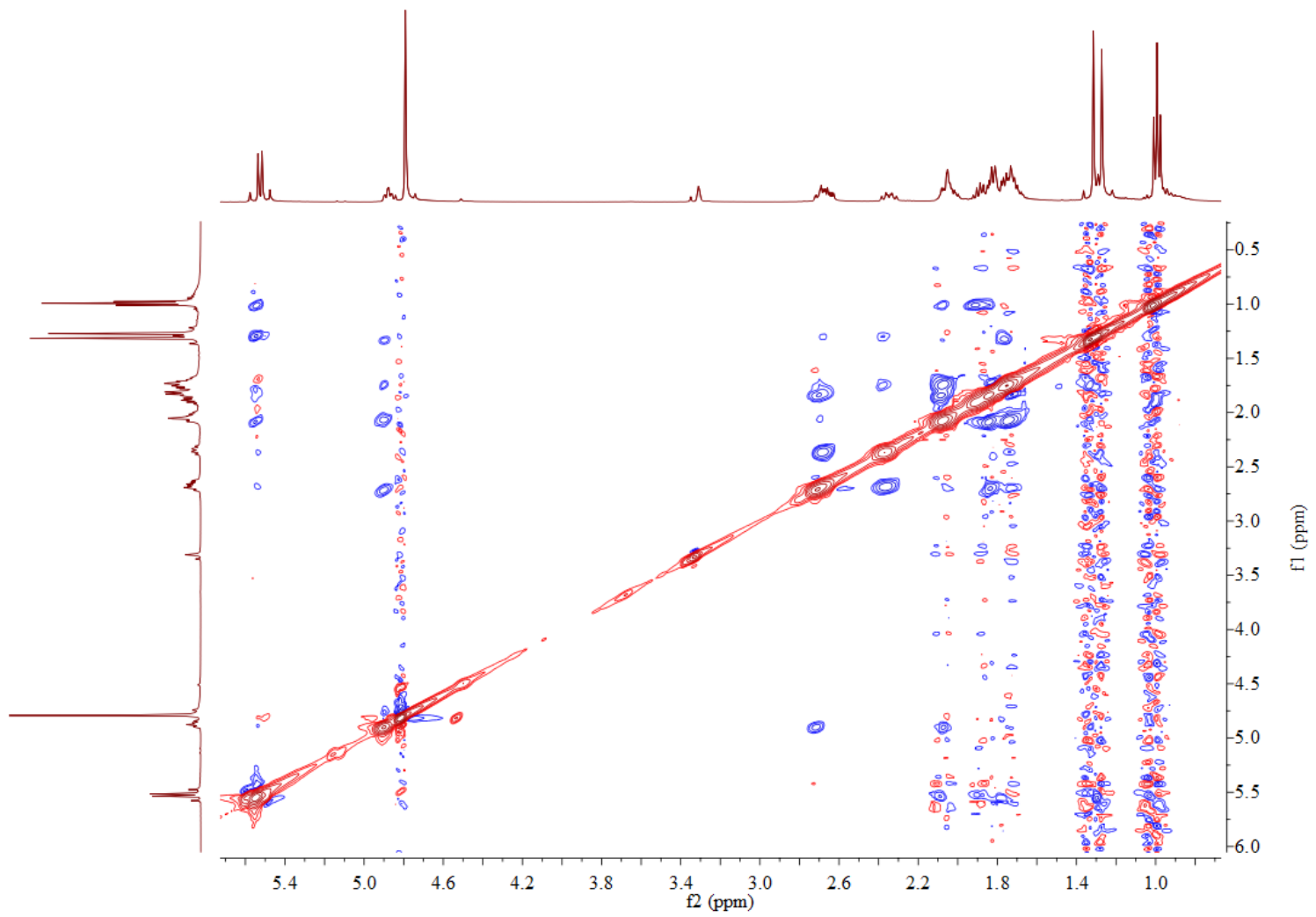
S39 HMBC spectrum of **6** in Methanol- $d_4$



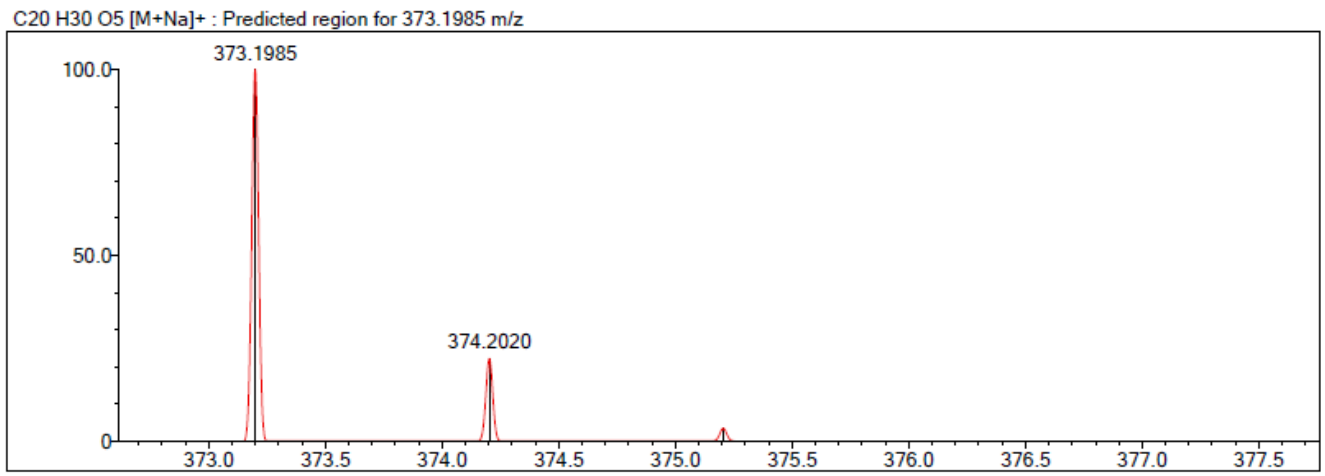
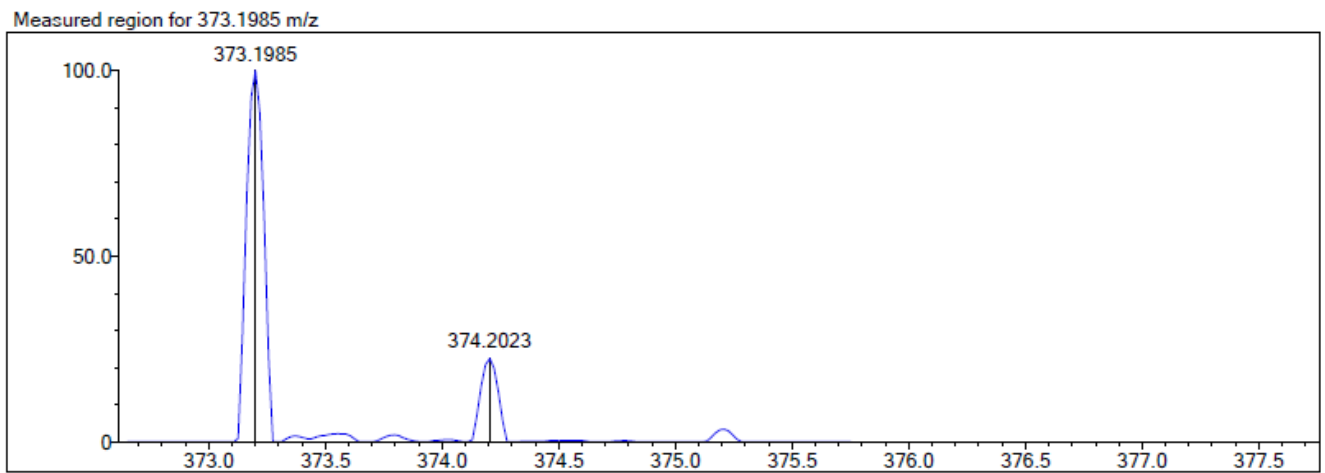
S40  $^1\text{H}$ - $^1\text{H}$  COSY spectrum of **6** in Methanol- $d_4$



S41 NOESY spectrum of **6** in Methanol- $d_4$

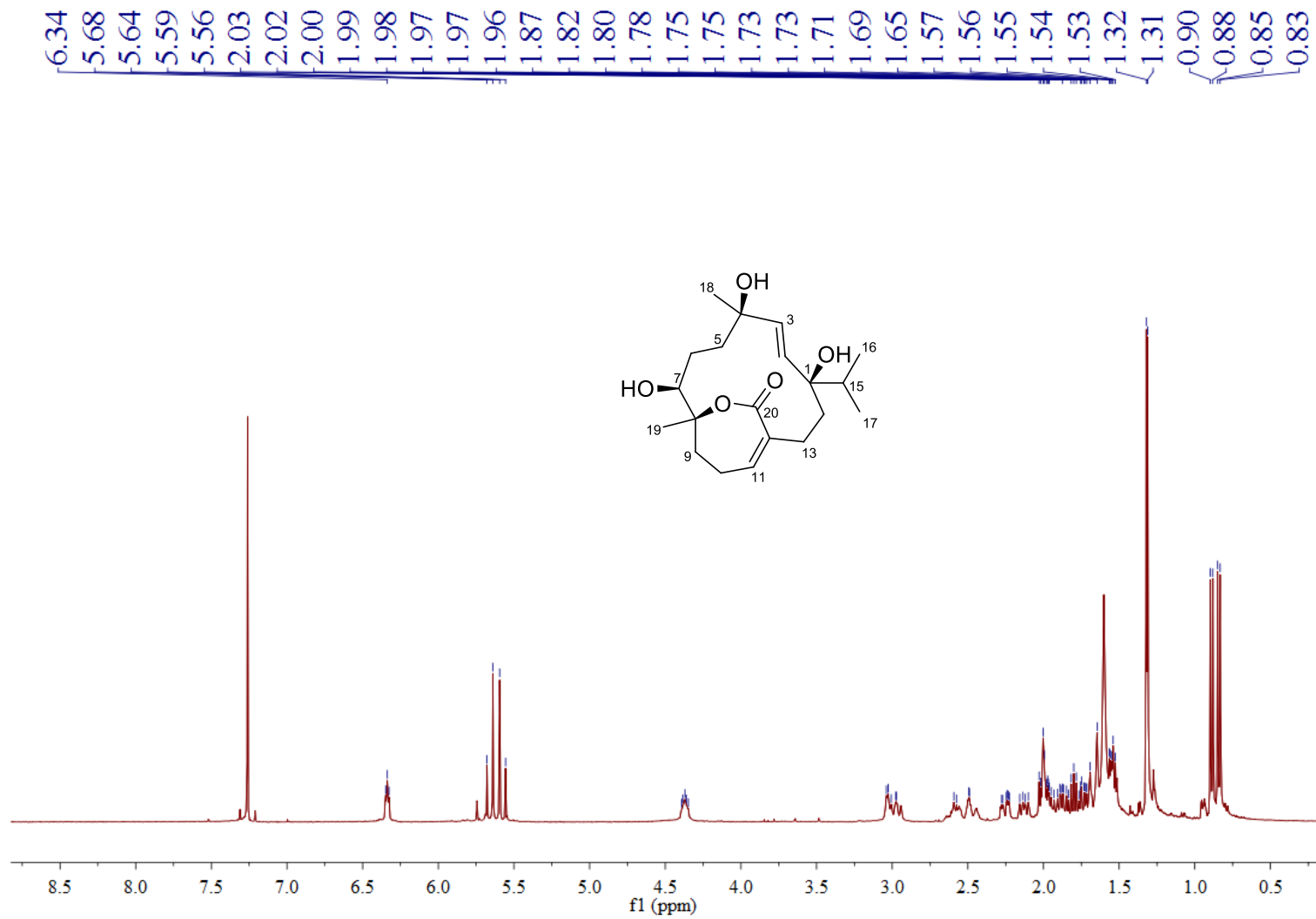


S42 HRESIMS spectrum of **6**

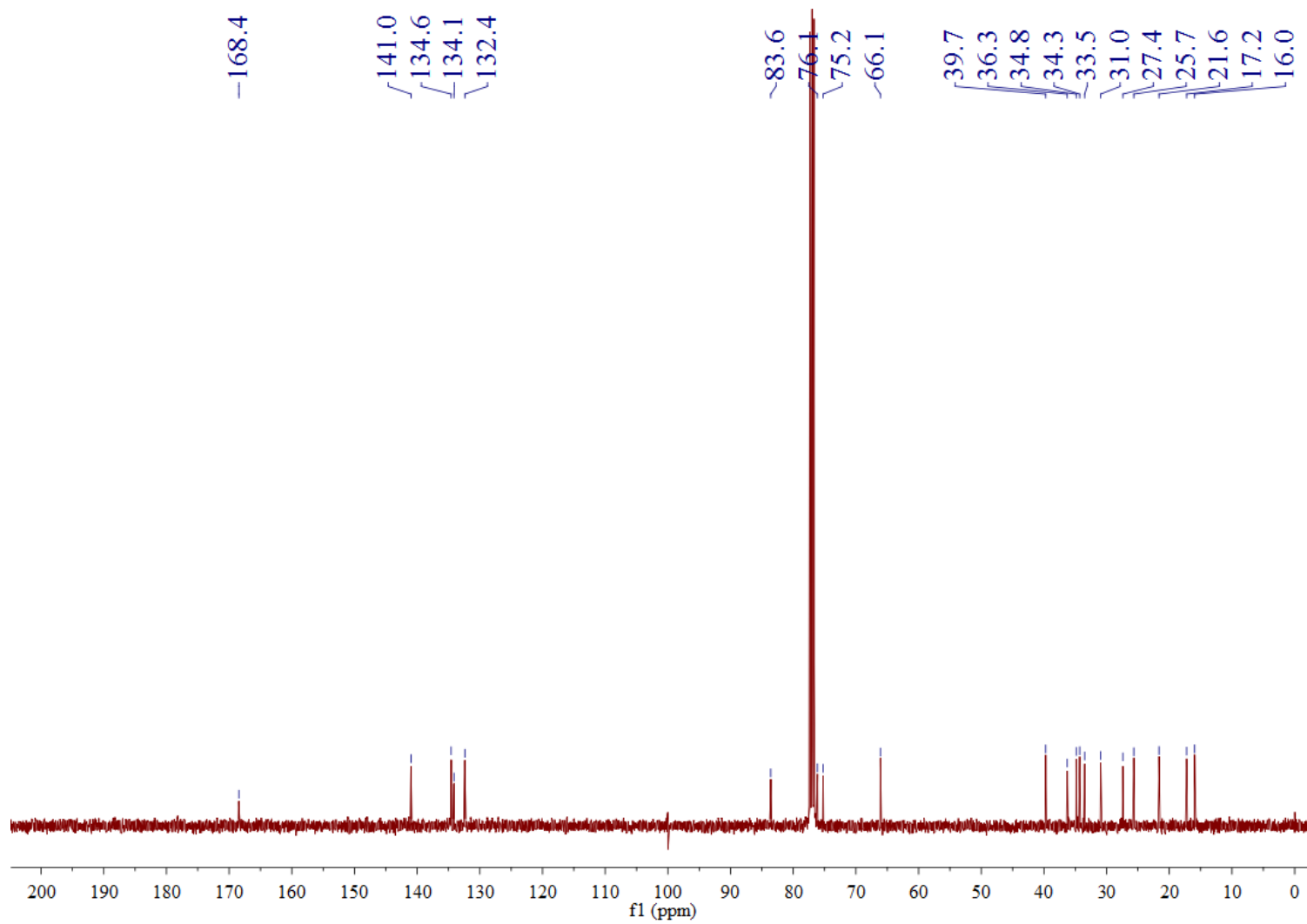


Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	88.02	C <sub>20</sub> H <sub>30</sub> O <sub>5</sub>	[M+Na] <sup>+</sup>	373.1985	373.1985	-0.0	0.00	88.02	6.0

S43 <sup>1</sup>H NMR spectrum of **7** in CDCl<sub>3</sub>

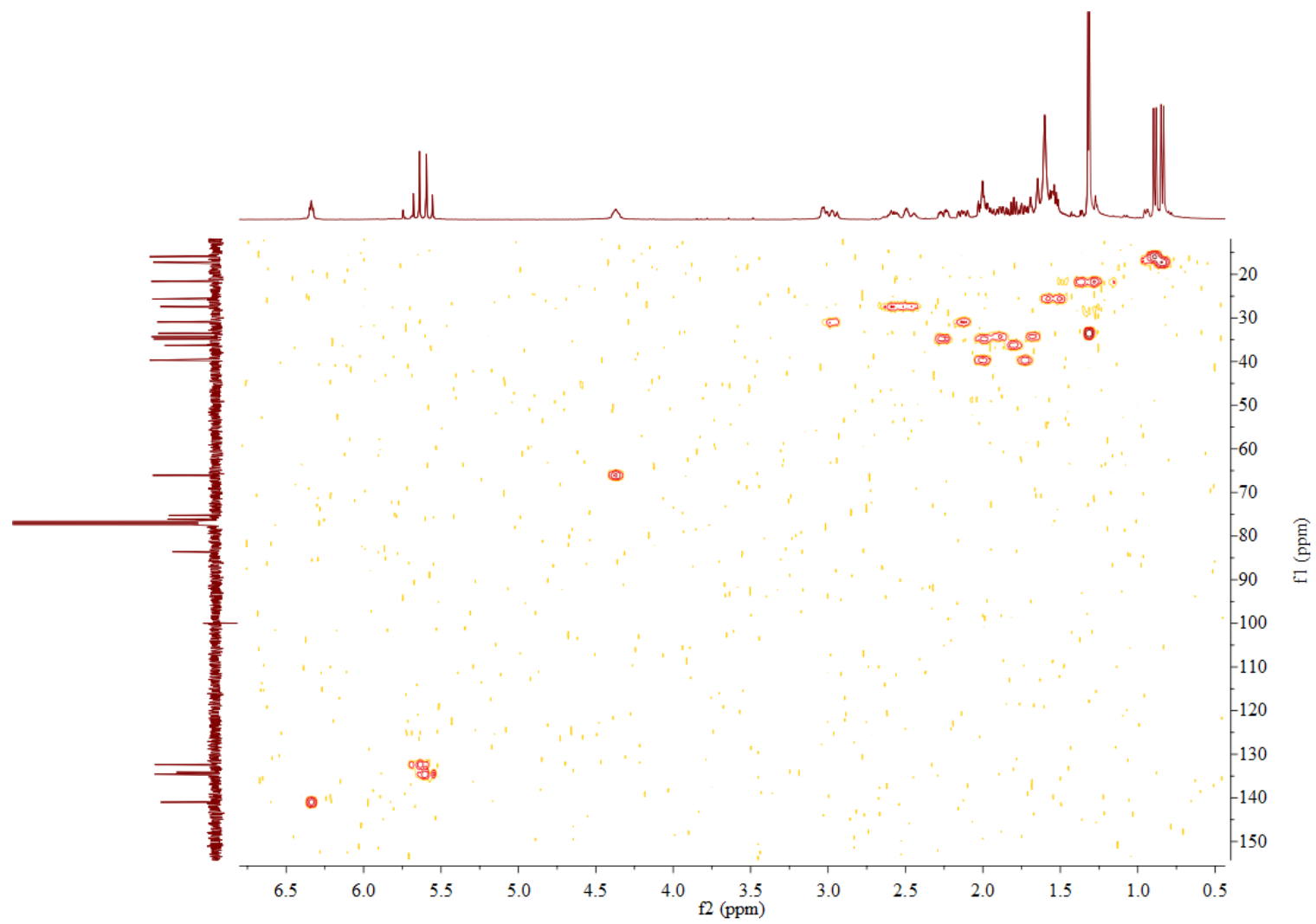


S44  $^{13}\text{C}$  NMR spectrum of **7** in  $\text{CDCl}_3$

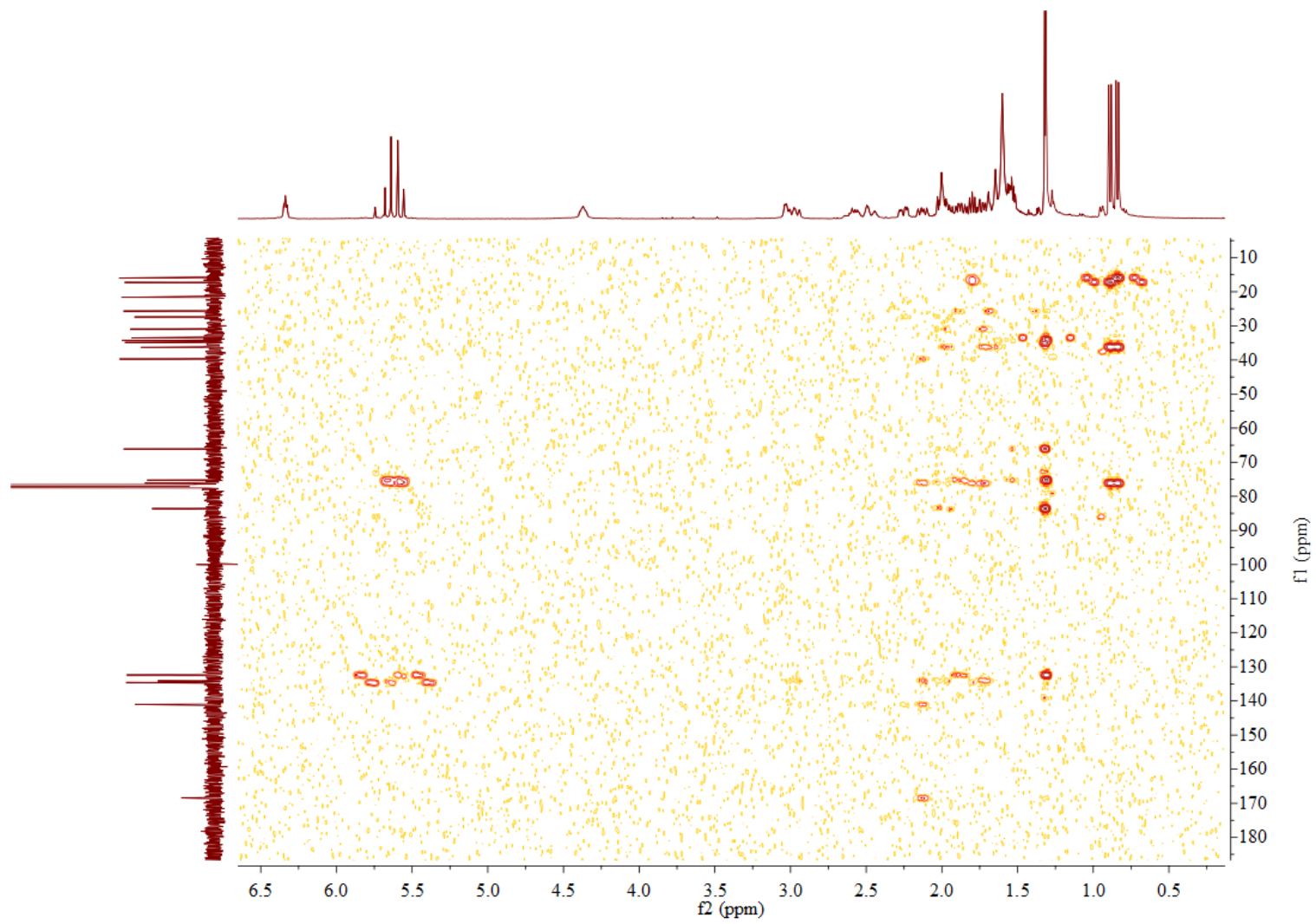




S45 HSQC spectrum of **7** in CDCl<sub>3</sub>

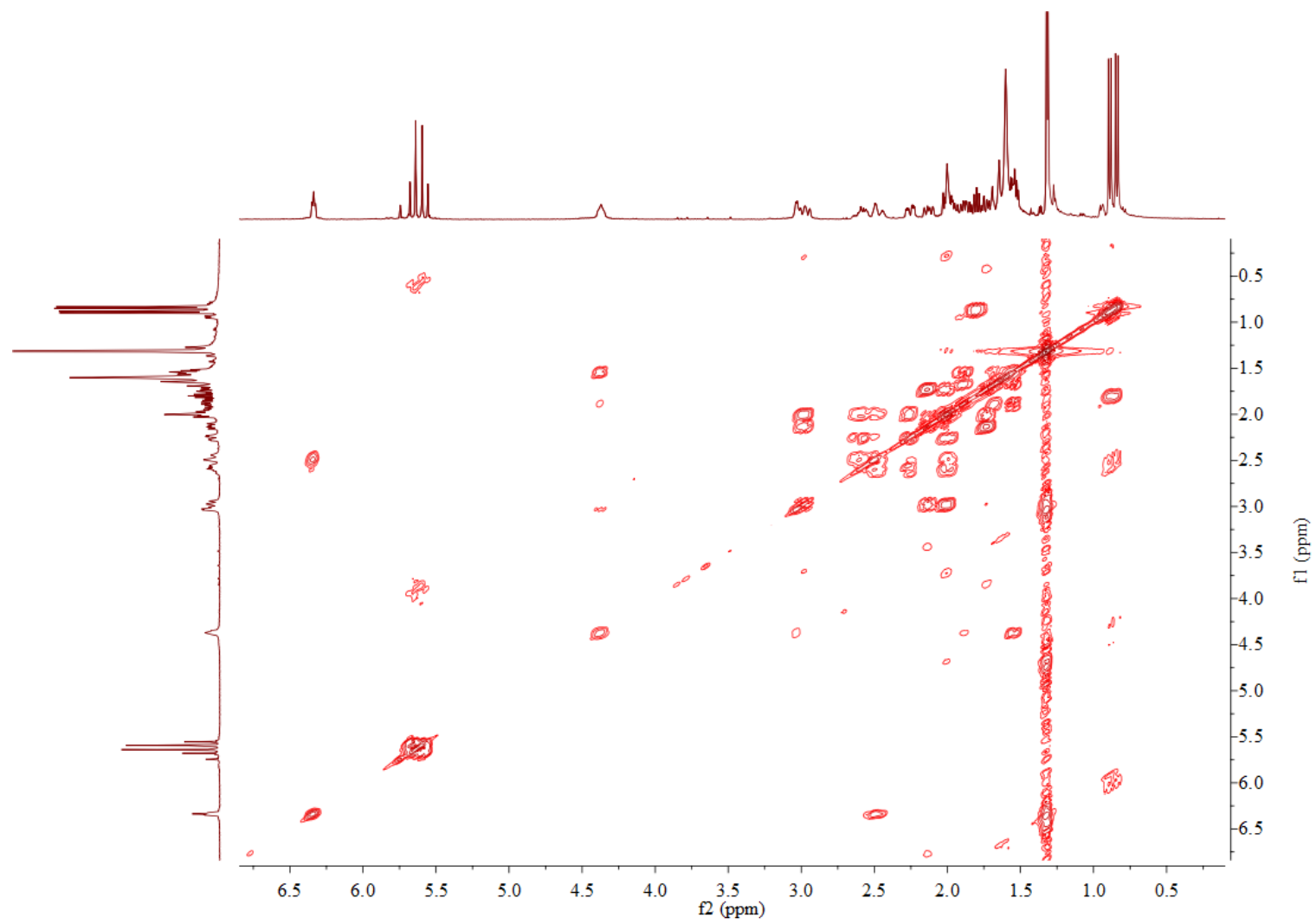


S46 HMBC spectrum of **7** in CDCl<sub>3</sub>

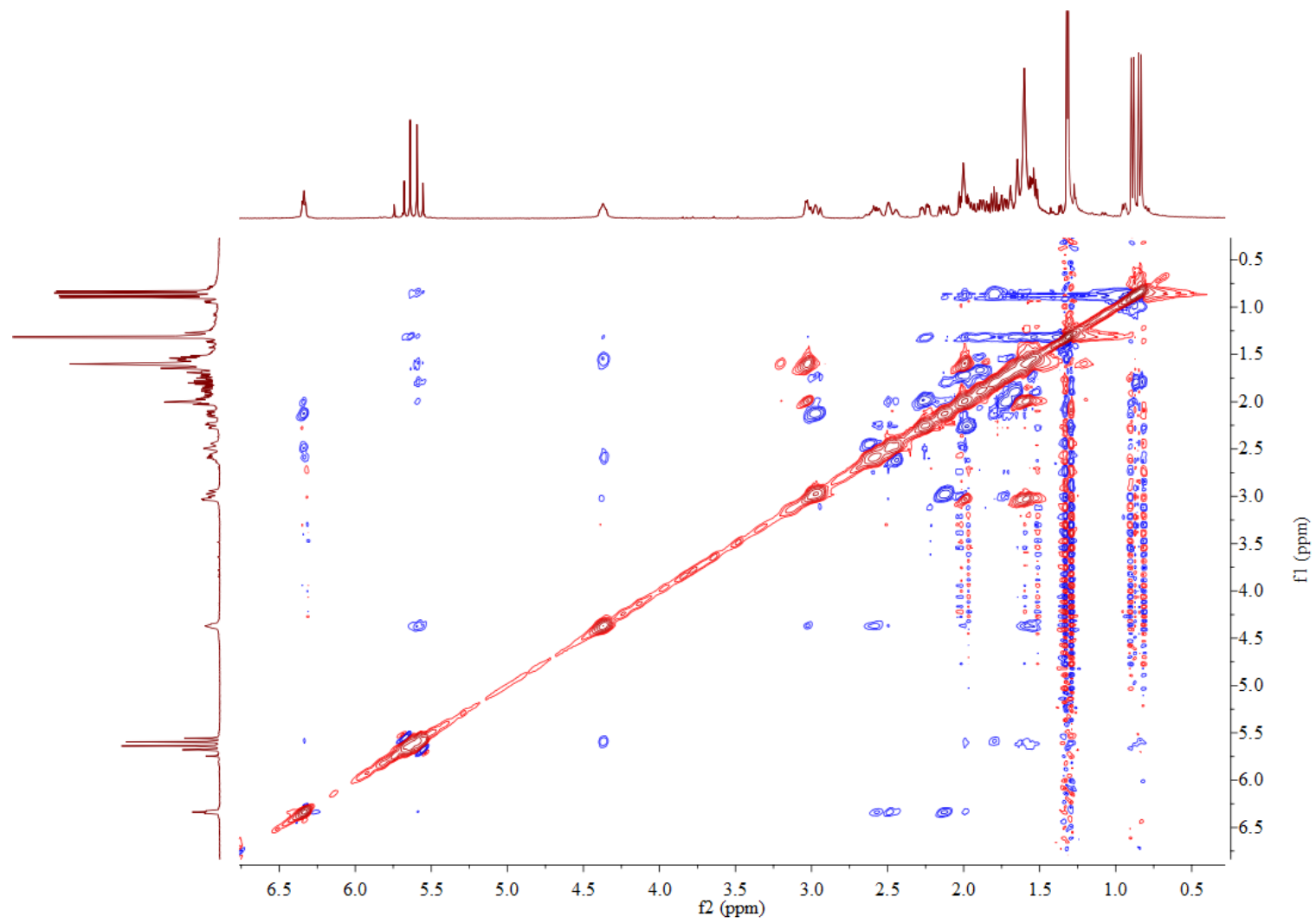


S47

$^1\text{H}$ - $^1\text{H}$  COSY spectrum of **7** in  $\text{CDCl}_3$

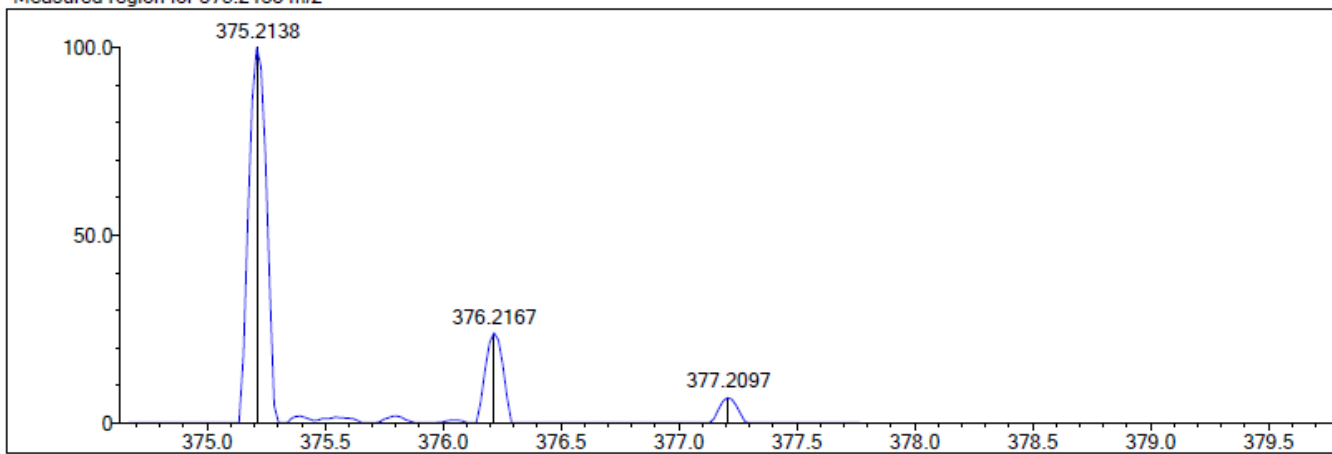


S48 NOESY spectrum of **7** in CDCl<sub>3</sub>

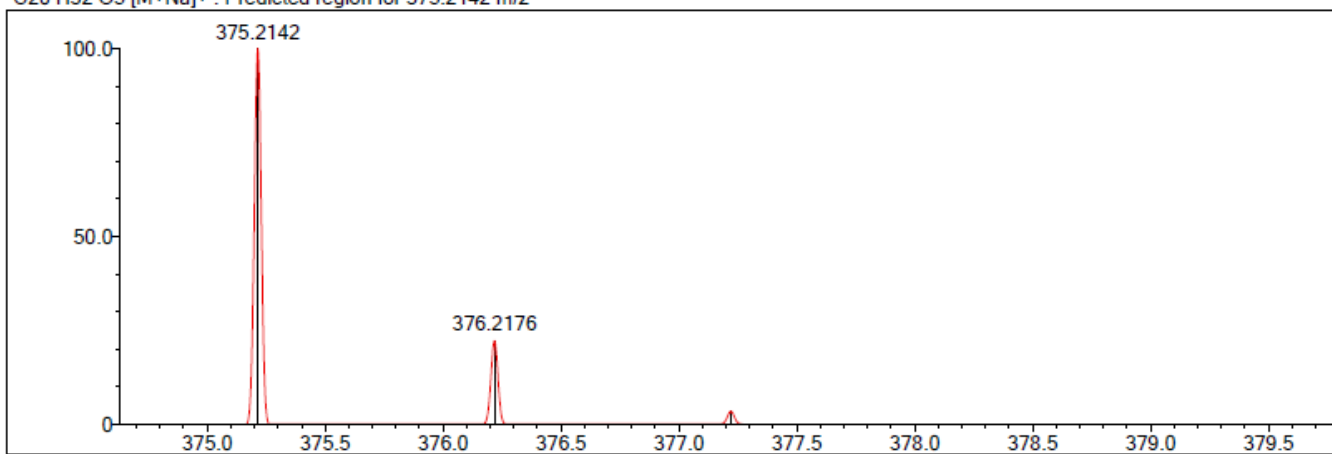


S49 HRESIMS spectrum of 7

Measured region for 375.2138 m/z

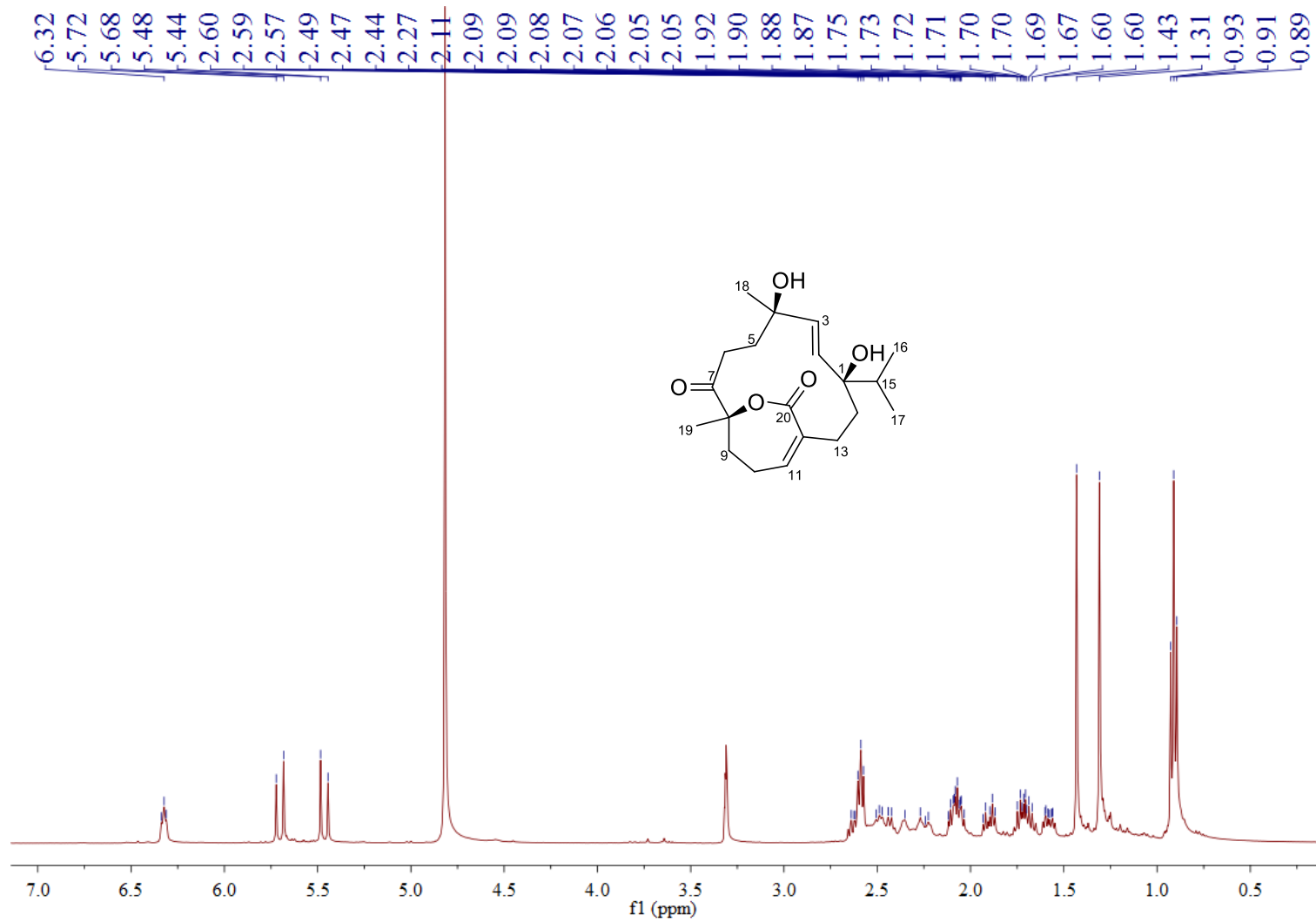


C20 H32 O5 [M+Na]+ : Predicted region for 375.2142 m/z

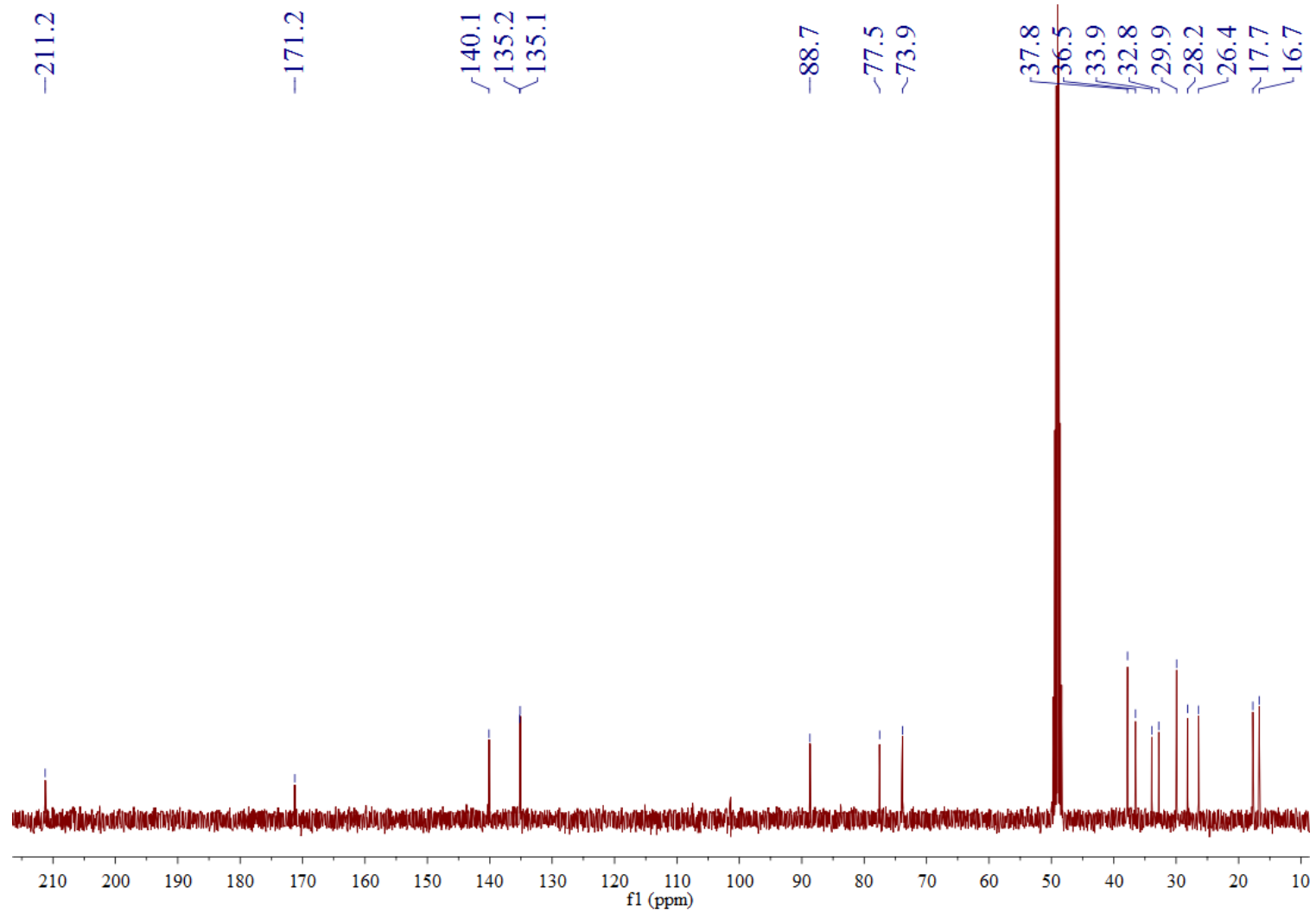


Rank	Score	Formula (M)	Ion	Meas. m/z	Pred. m/z	Df. (mDa)	Df. (ppm)	Iso	DBE
1	67.27	C20 H32 O5	[M+Na]+	375.2138	375.2142	-0.4	-1.07	67.38	5.0

S50  $^1\text{H}$  NMR spectrum of **8** in Methanol- $d_4$

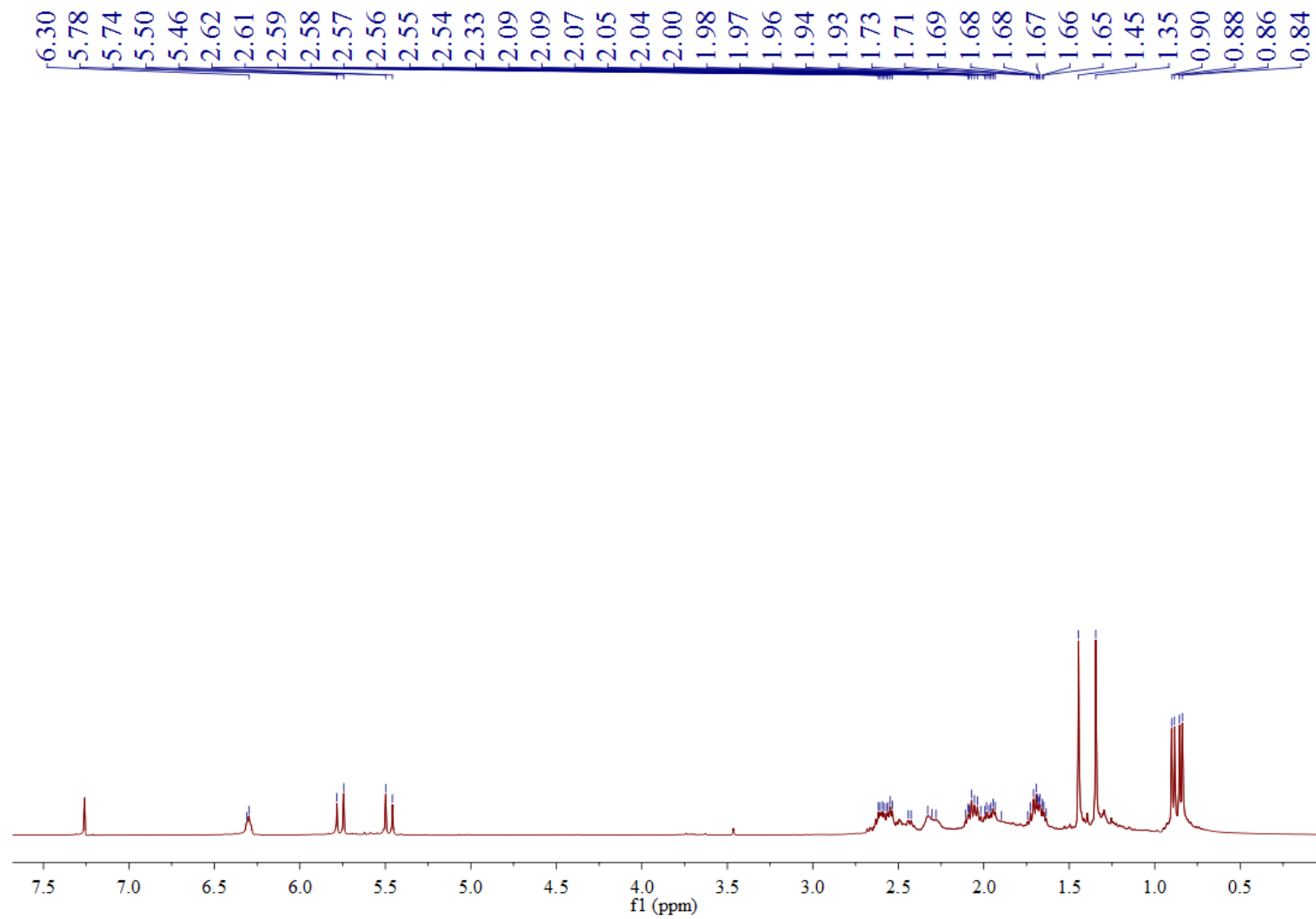


S51  $^{13}\text{C}$  NMR spectrum of **8** in Methanol- $d_4$



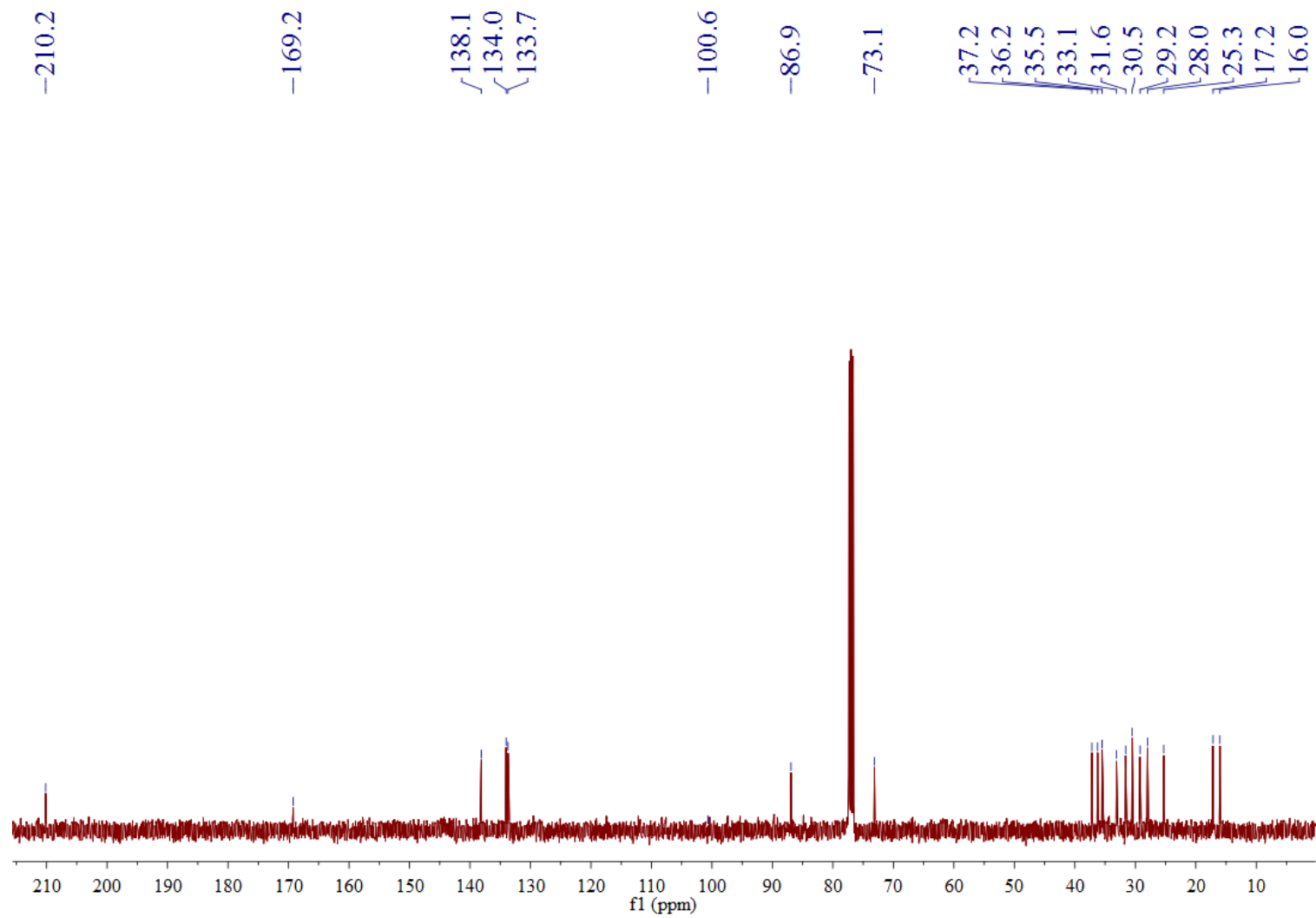
S52

$^1\text{H}$  NMR spectrum of **8** in  $\text{CDCl}_3$

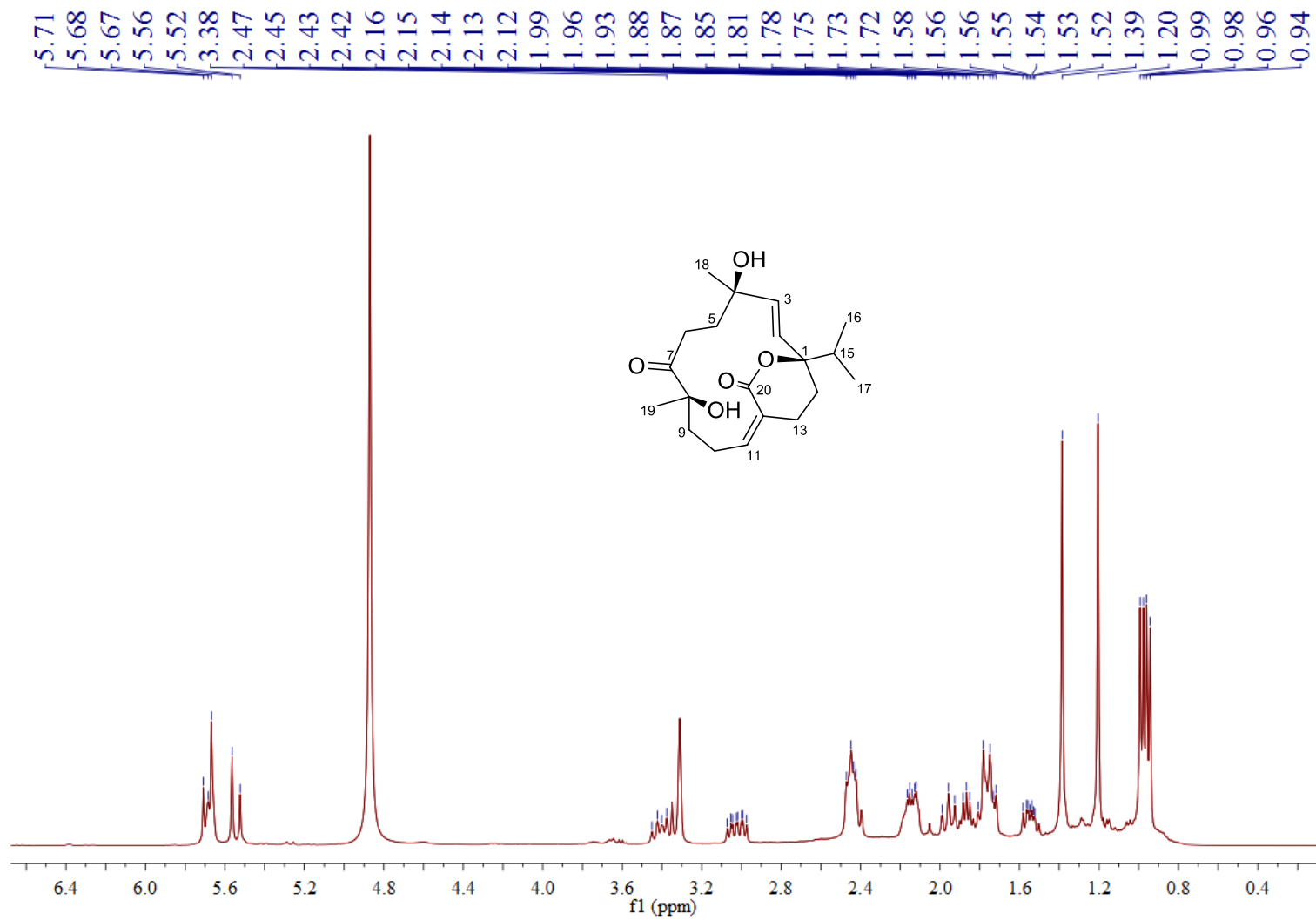




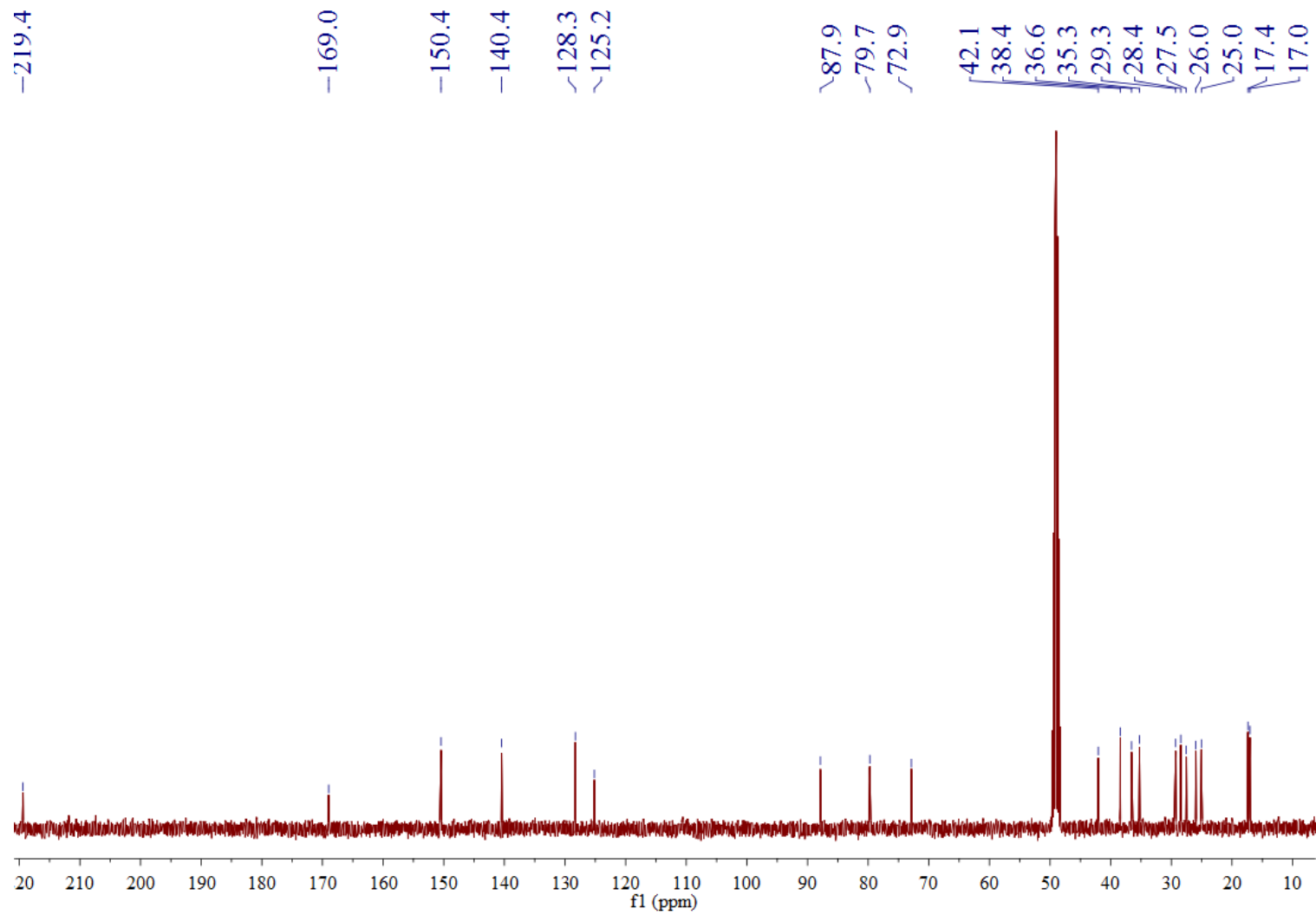
S53  $^{13}\text{C}$  NMR spectrum of **8** in  $\text{CDCl}_3$



S54 <sup>1</sup>H NMR spectrum of **9** in Methanol-*d*<sub>4</sub>



S55  $^{13}\text{C}$  NMR spectrum of **9** in Methanol- $d_4$



S56 Selected NOESY (↔) correlations of **2**.

