

## Supporting Information

### Stereoselective Total Synthesis of (+)-Aristolactam G1

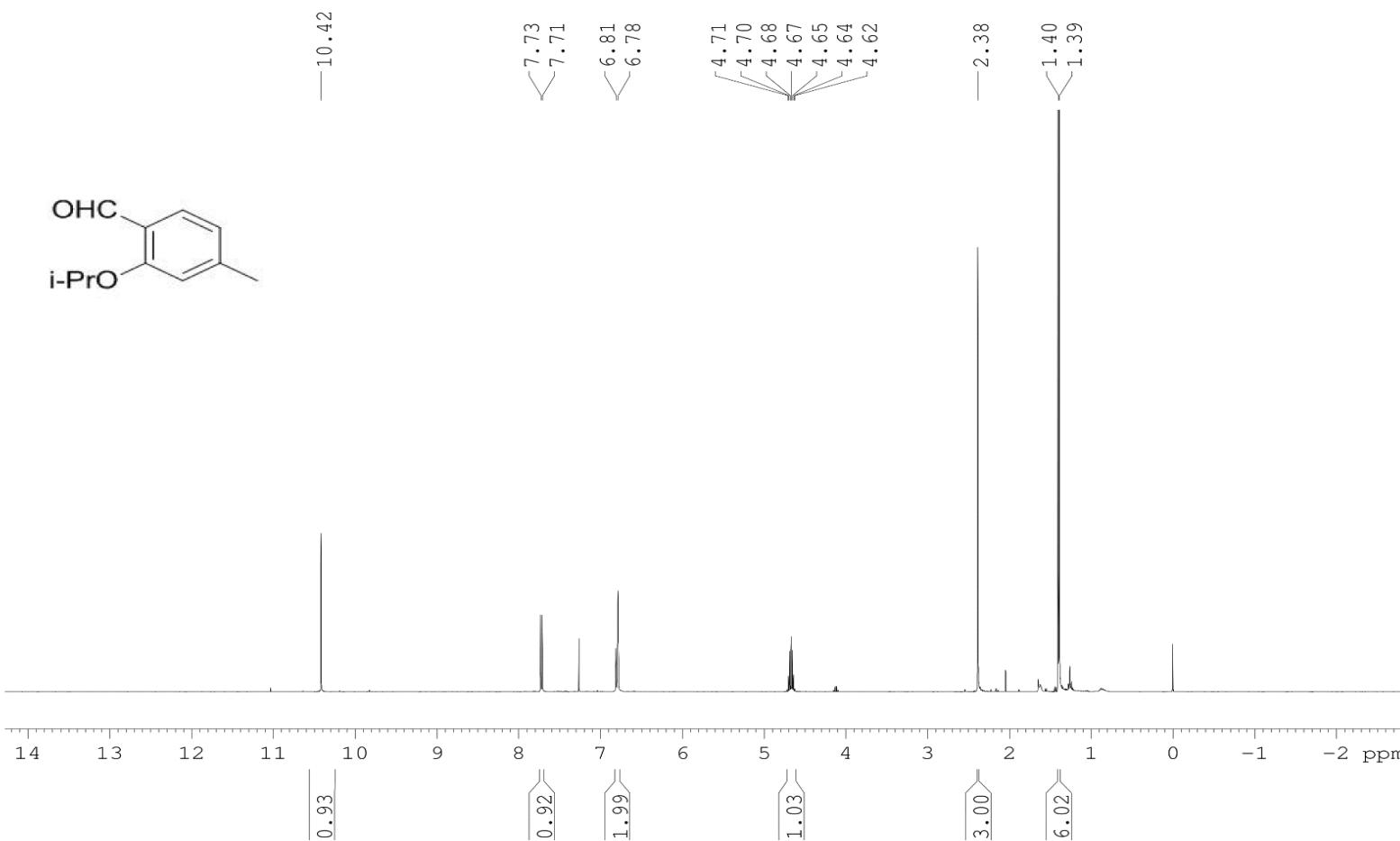
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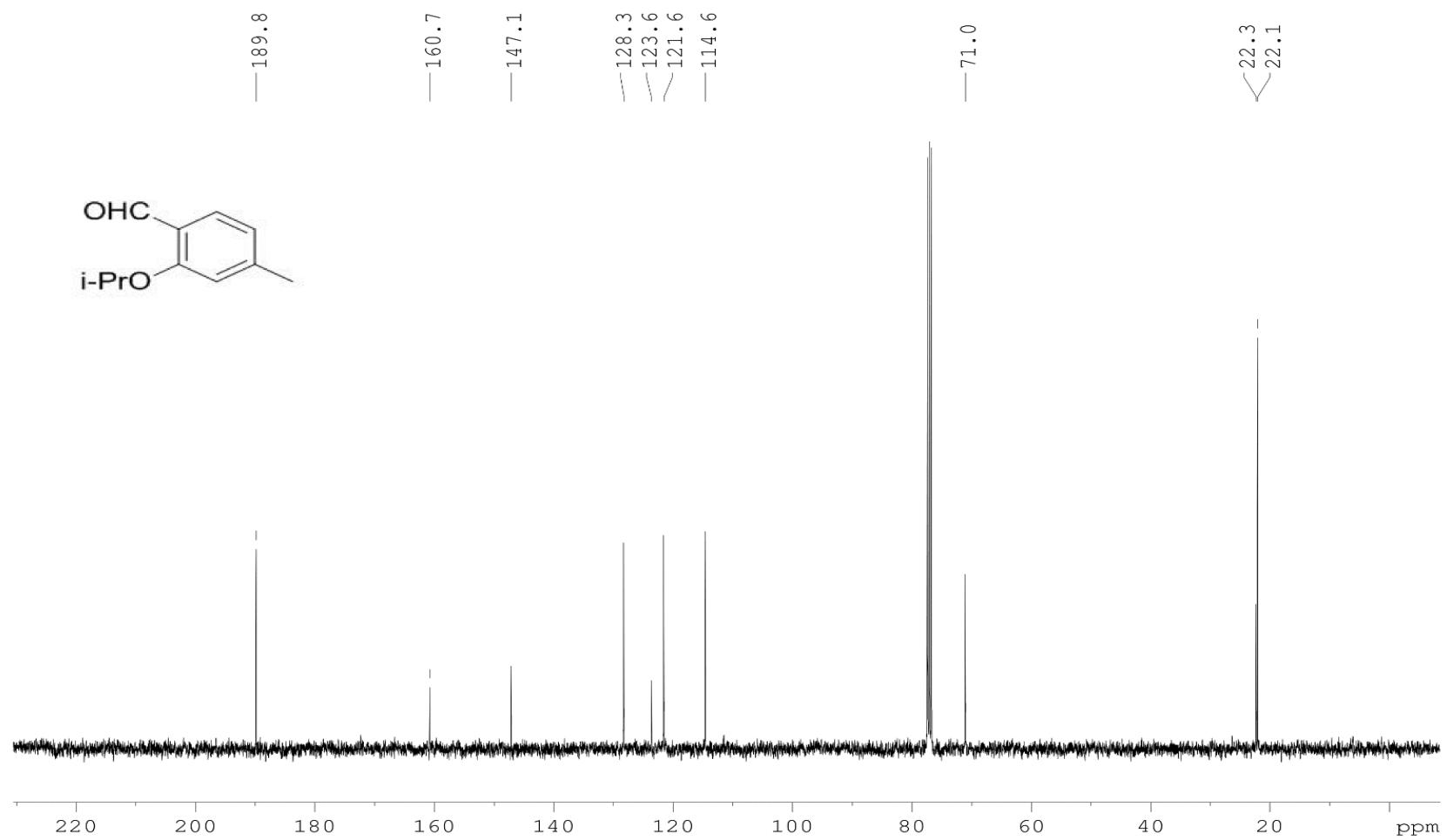
Email address: [lisa.pilkington@auckland.ac.nz](mailto:lisa.pilkington@auckland.ac.nz) and d.barker@auckland.ac.nz

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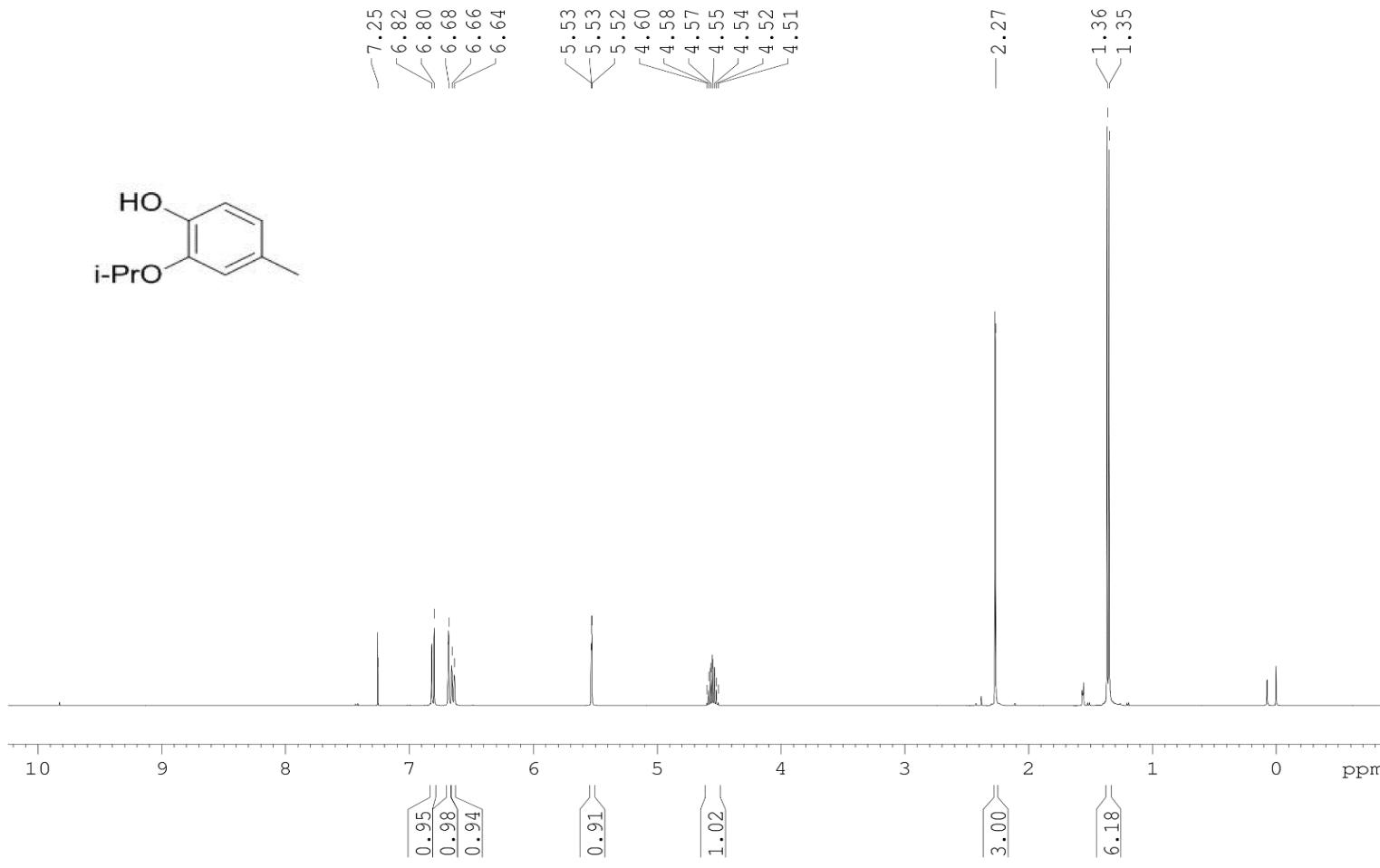
S1: $^1\text{H}$ NMR of <b>11</b>	S22: $^{13}\text{C}$ NMR of <b>20</b>
S2: $^{13}\text{C}$ NMR of <b>11</b>	S23: $^1\text{H}$ NMR of <b>7-bromo-2-(4'-methoxybenzyl)-6-(methoxymethoxy)-3-oxoisoindolin-5-yl methanesulfonate</b>
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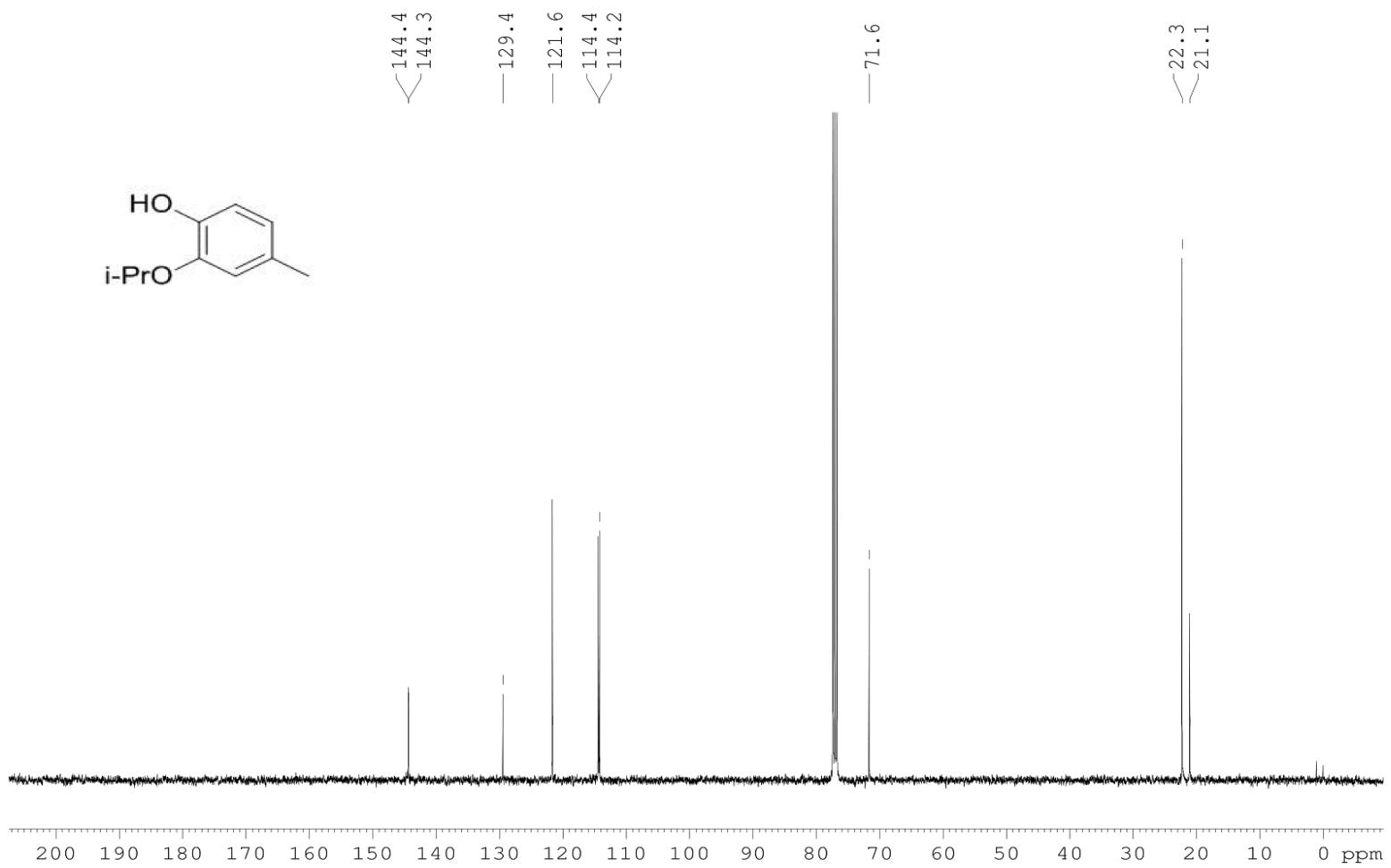
**Figure S1:**  $^1\text{H}$  NMR spectrum of ether 11 (400 MHz,  $\text{CDCl}_3$ ).



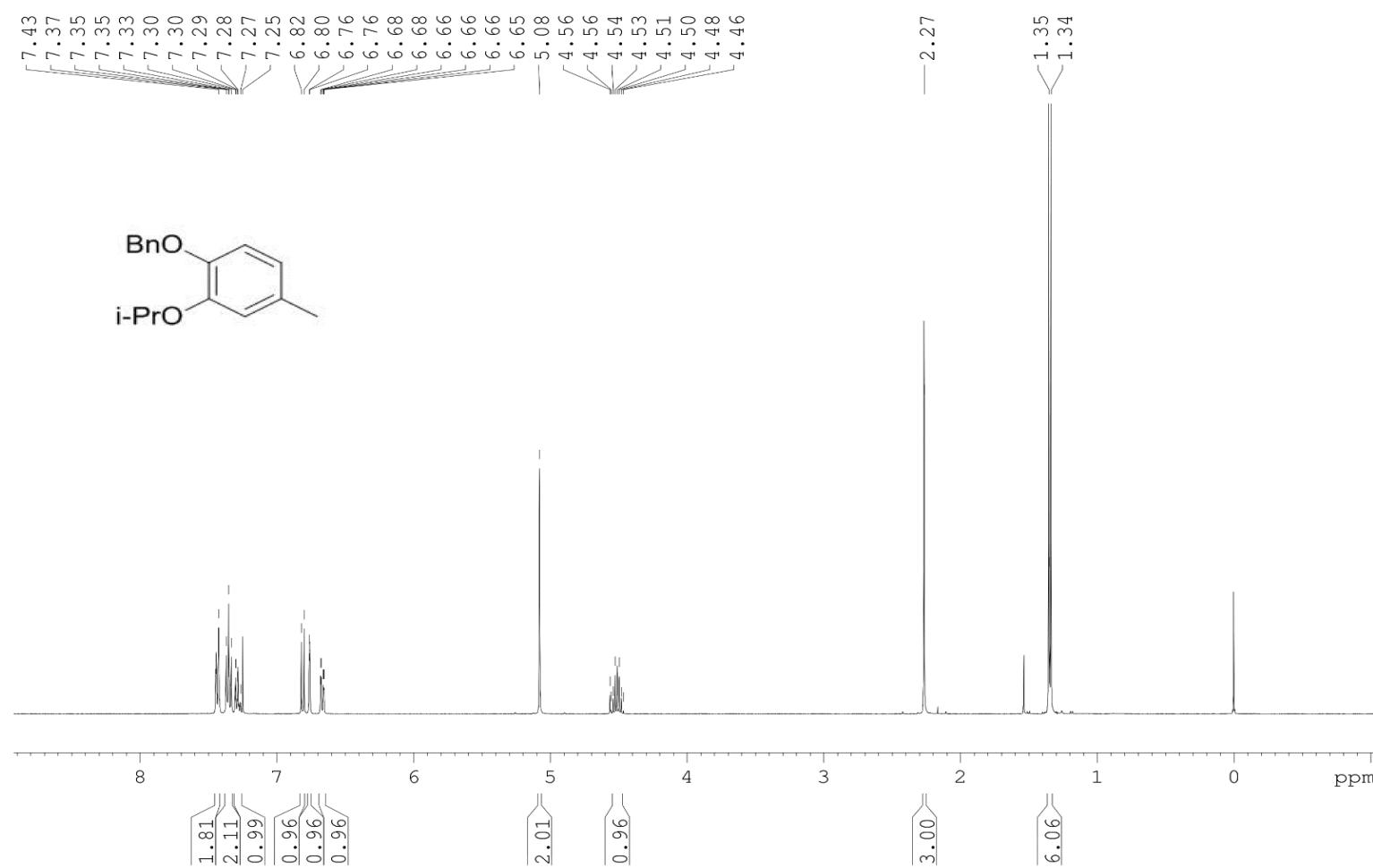
**Figure S2:**  $^{13}\text{C}$  NMR spectrum of ether 11 (100 MHz,  $\text{CDCl}_3$ ).



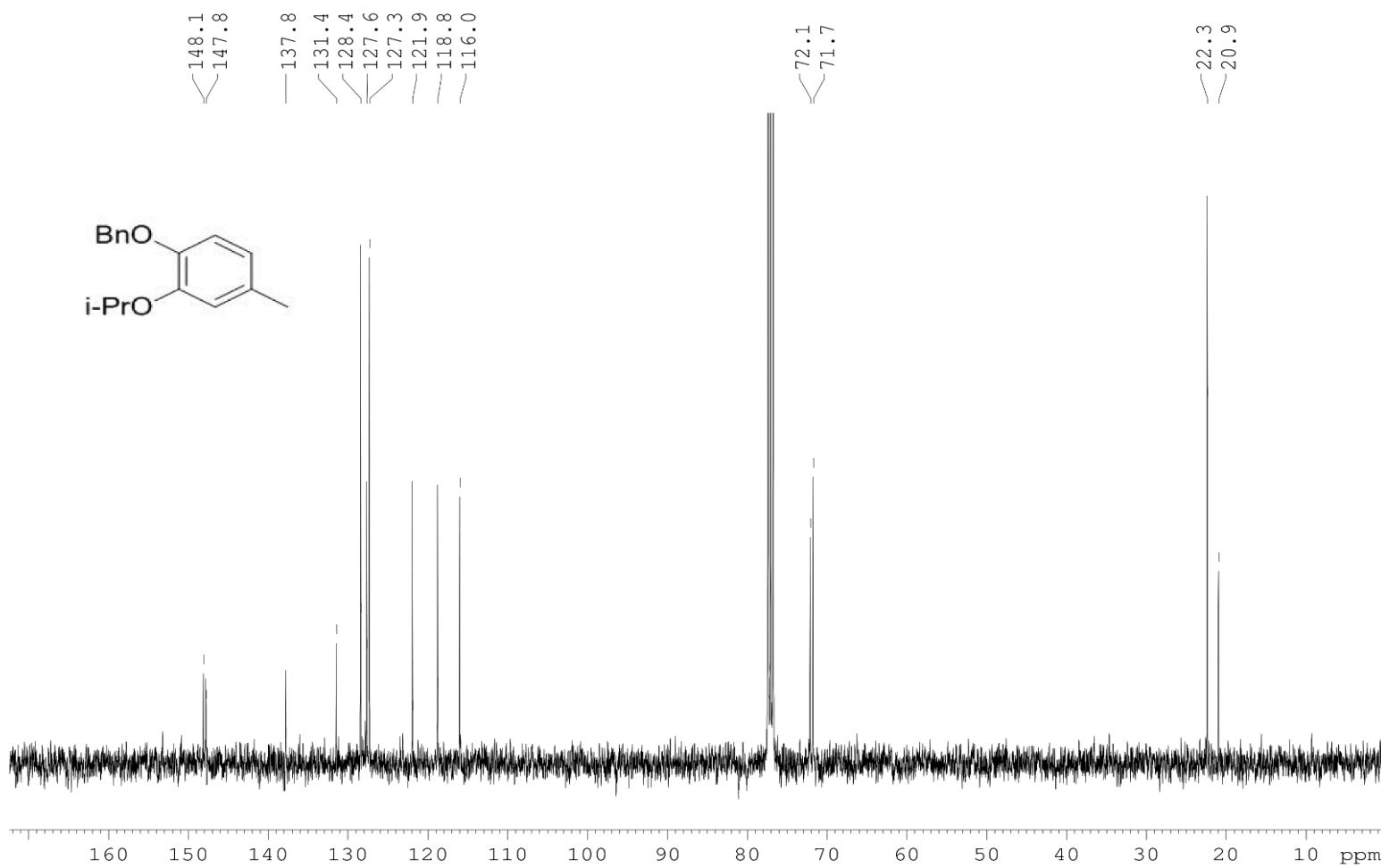
**Figure S3:** <sup>1</sup>H NMR spectrum of phenol 12 (400 MHz, CDCl<sub>3</sub>).



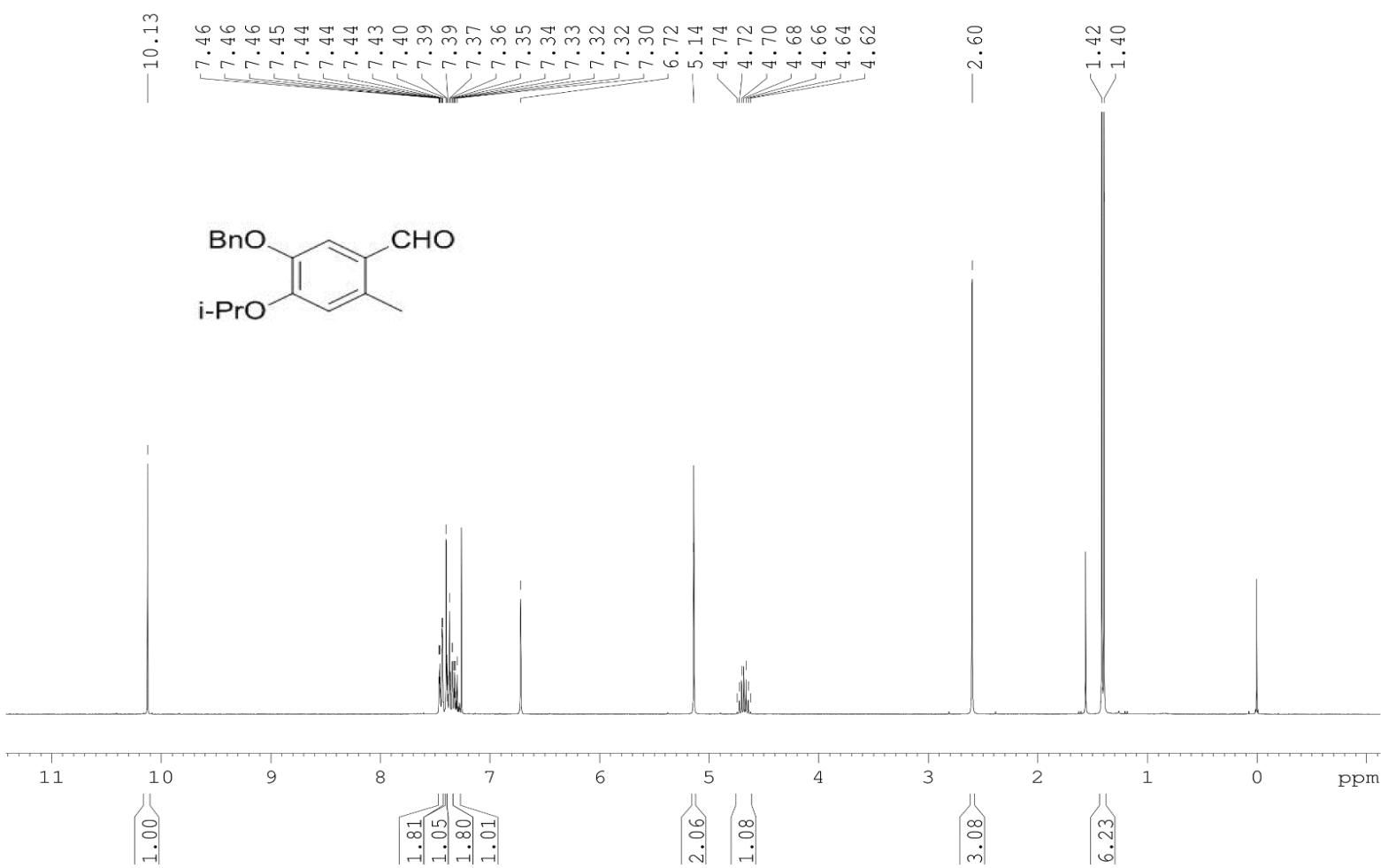
**Figure S4:**  $^{13}\text{C}$  NMR spectrum of phenol 12 (100 MHz,  $\text{CDCl}_3$ ).



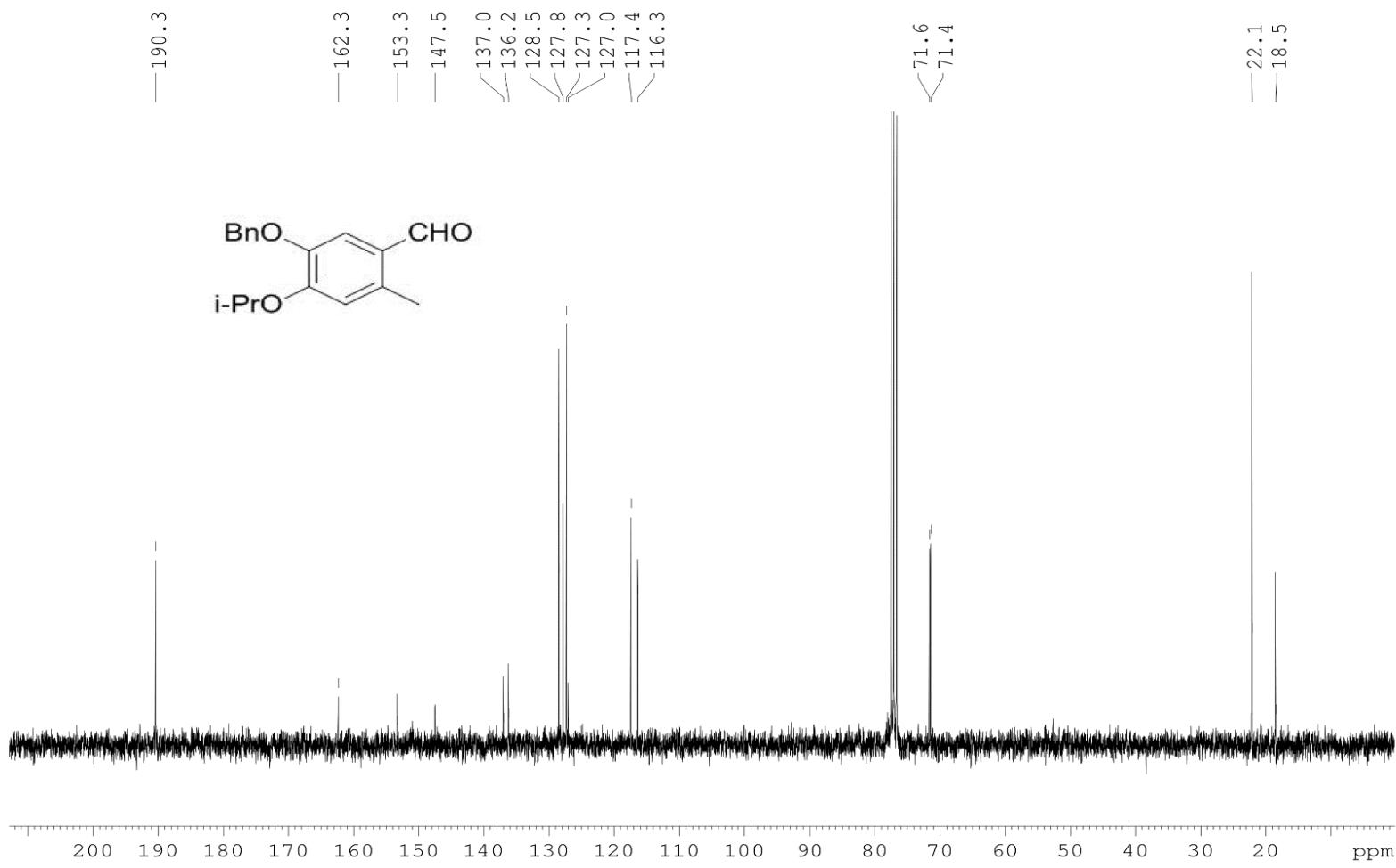
**Figure S5:**  $^1\text{H}$  NMR spectrum of ether 13 (400 MHz,  $\text{CDCl}_3$ ).



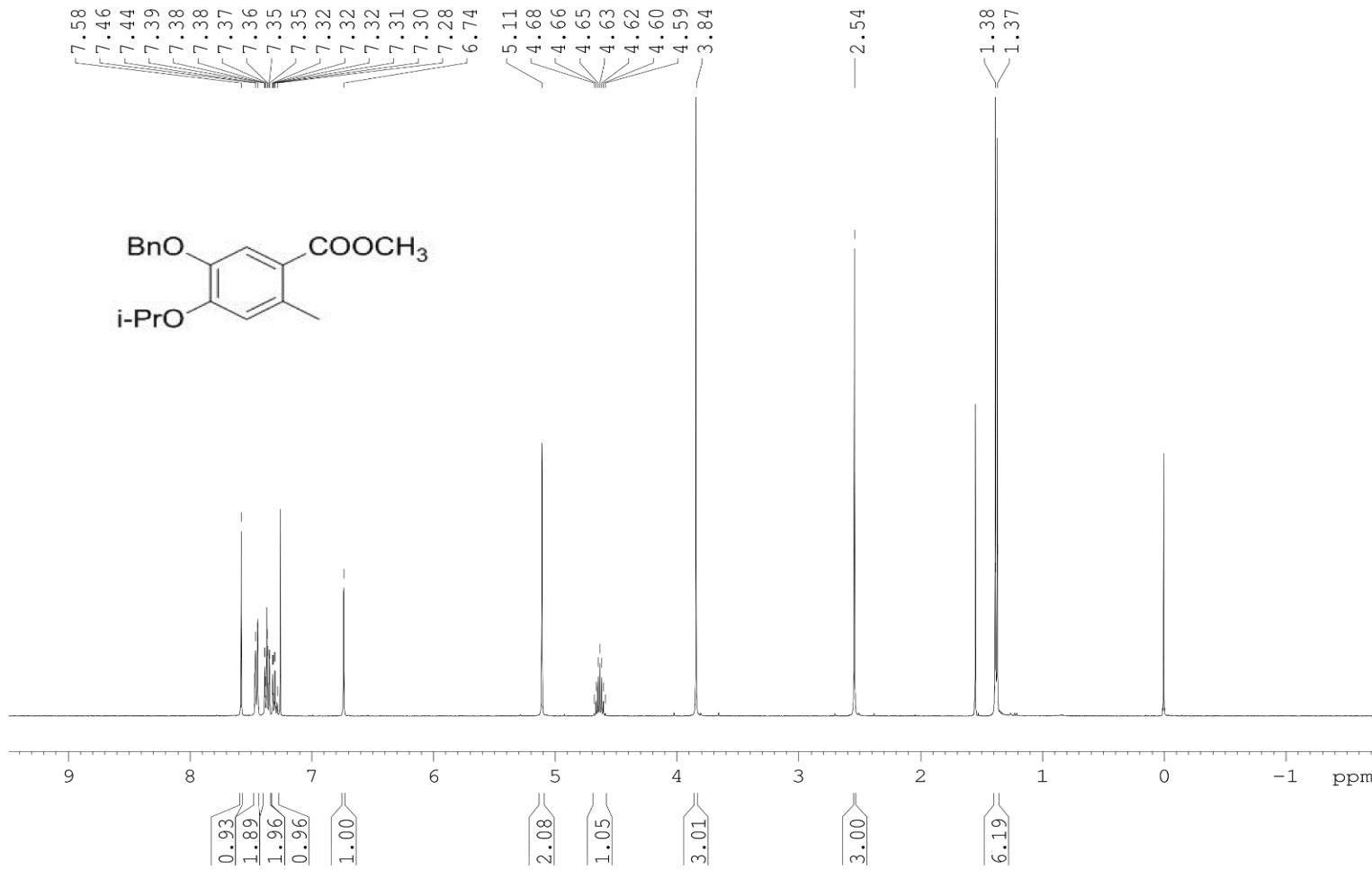
**Figure S6:**  $^{13}\text{C}$  NMR spectrum of ether 13 (100 MHz,  $\text{CDCl}_3$ ).



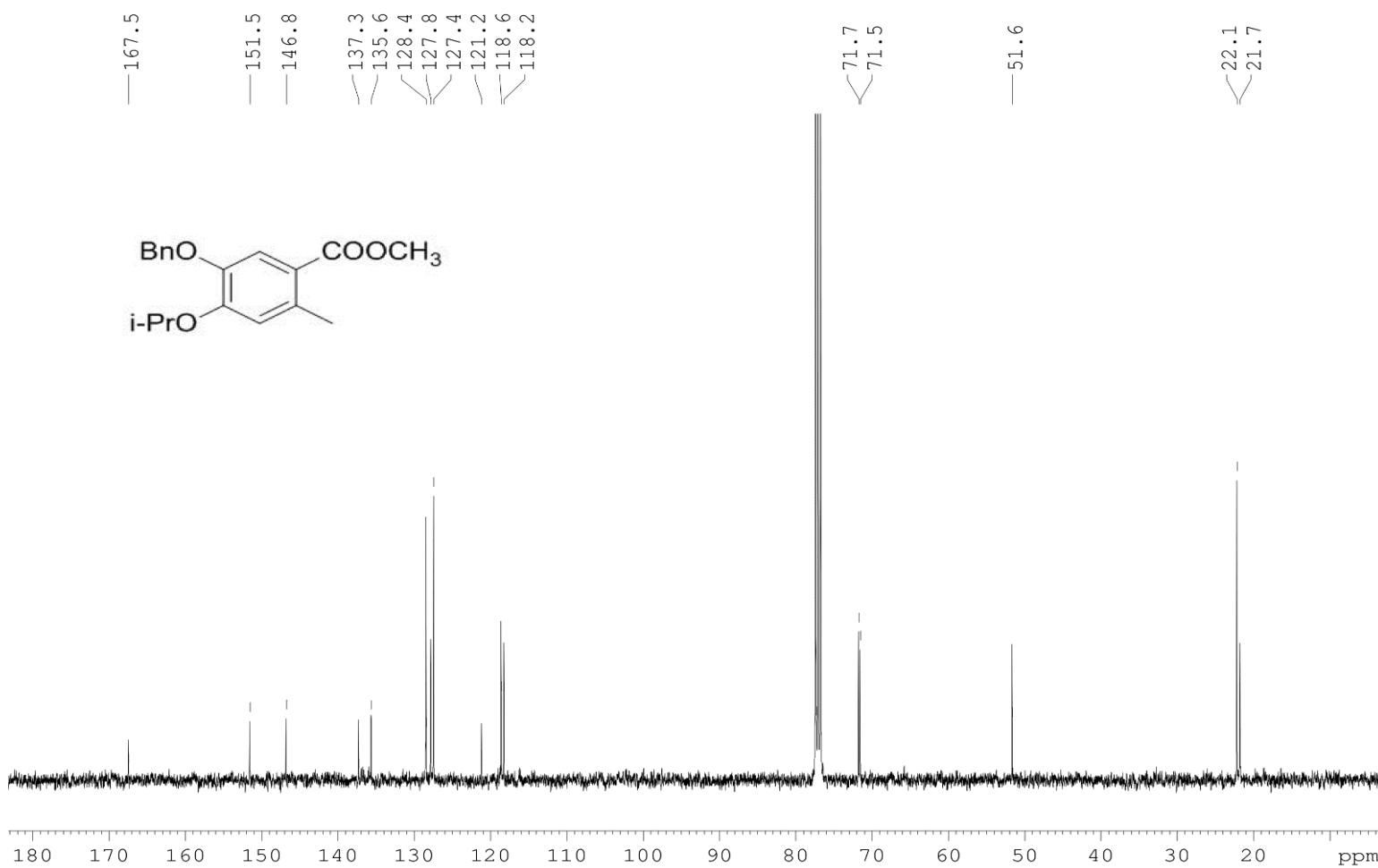
**Figure S7:** <sup>1</sup>H NMR spectrum of benzaldehyde 14 (300 MHz, CDCl<sub>3</sub>).



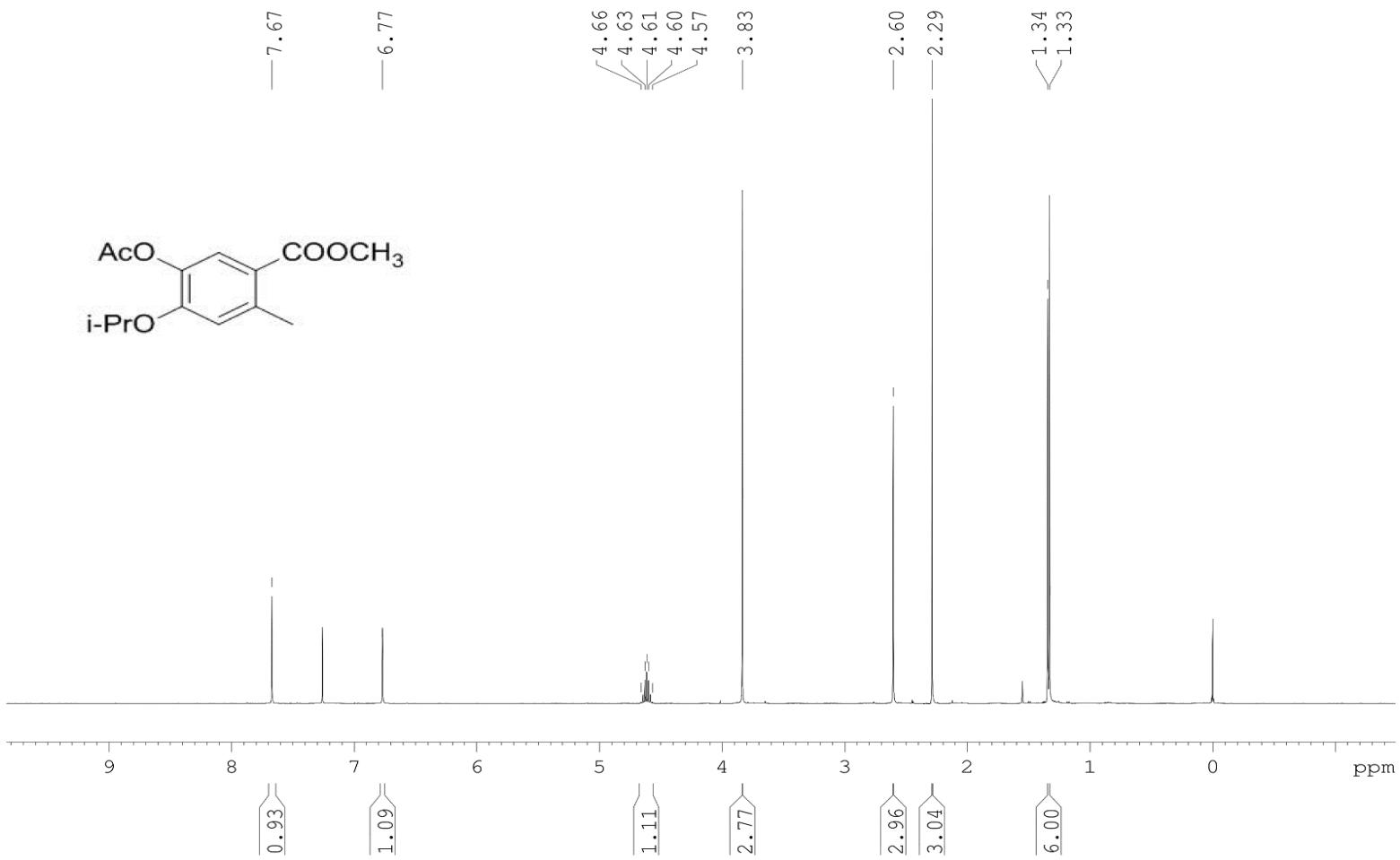
**Figure S8:**  $^{13}\text{C}$  NMR spectrum of benzaldehyde 14 (75 MHz,  $\text{CDCl}_3$ ).



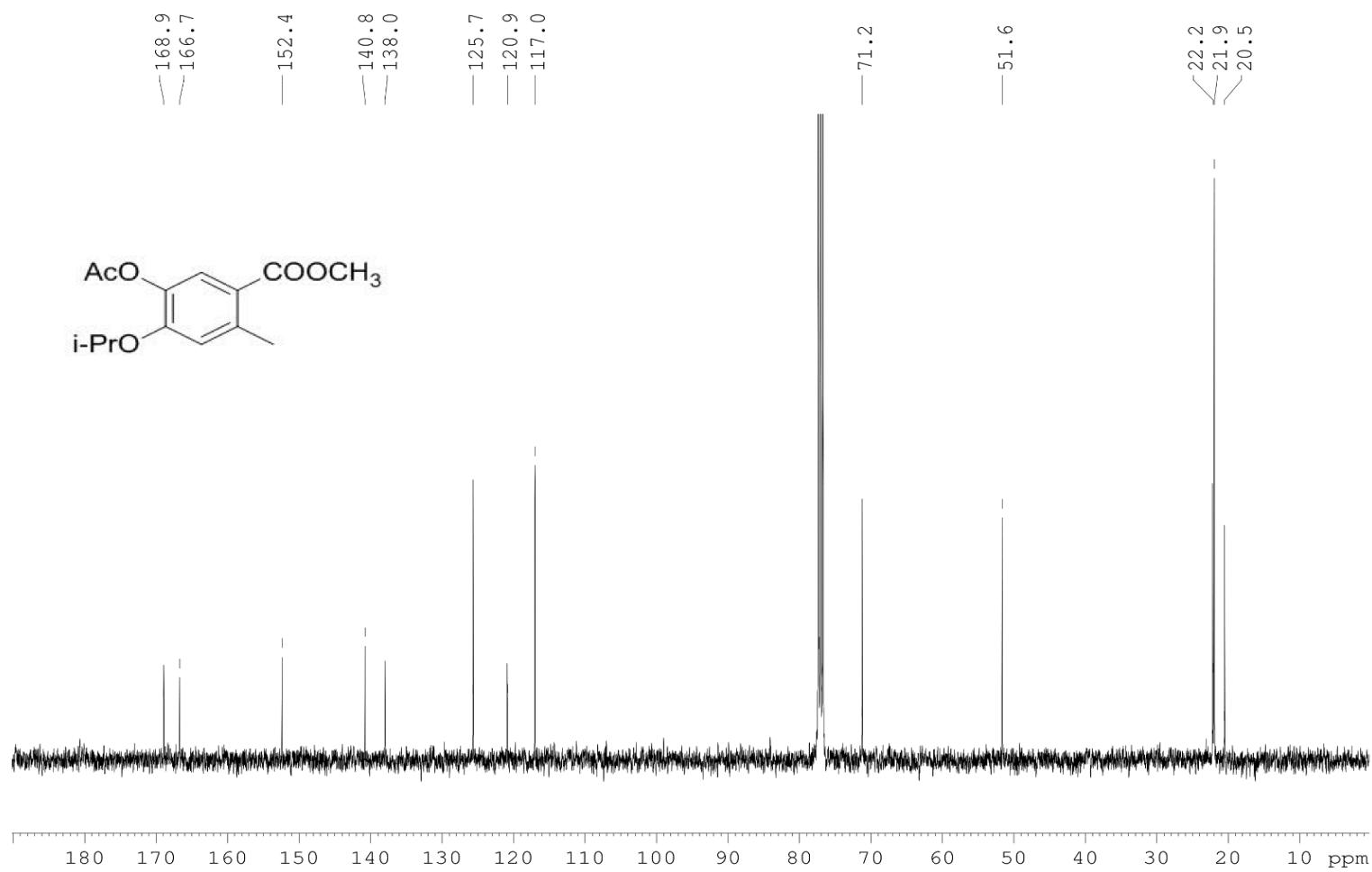
**Figure S9:**  $^1\text{H}$  NMR spectrum of ester 15 (400 MHz,  $\text{CDCl}_3$ ).



**Figure S10:** <sup>13</sup>C NMR spectrum of ester 15 (100 MHz, CDCl<sub>3</sub>).



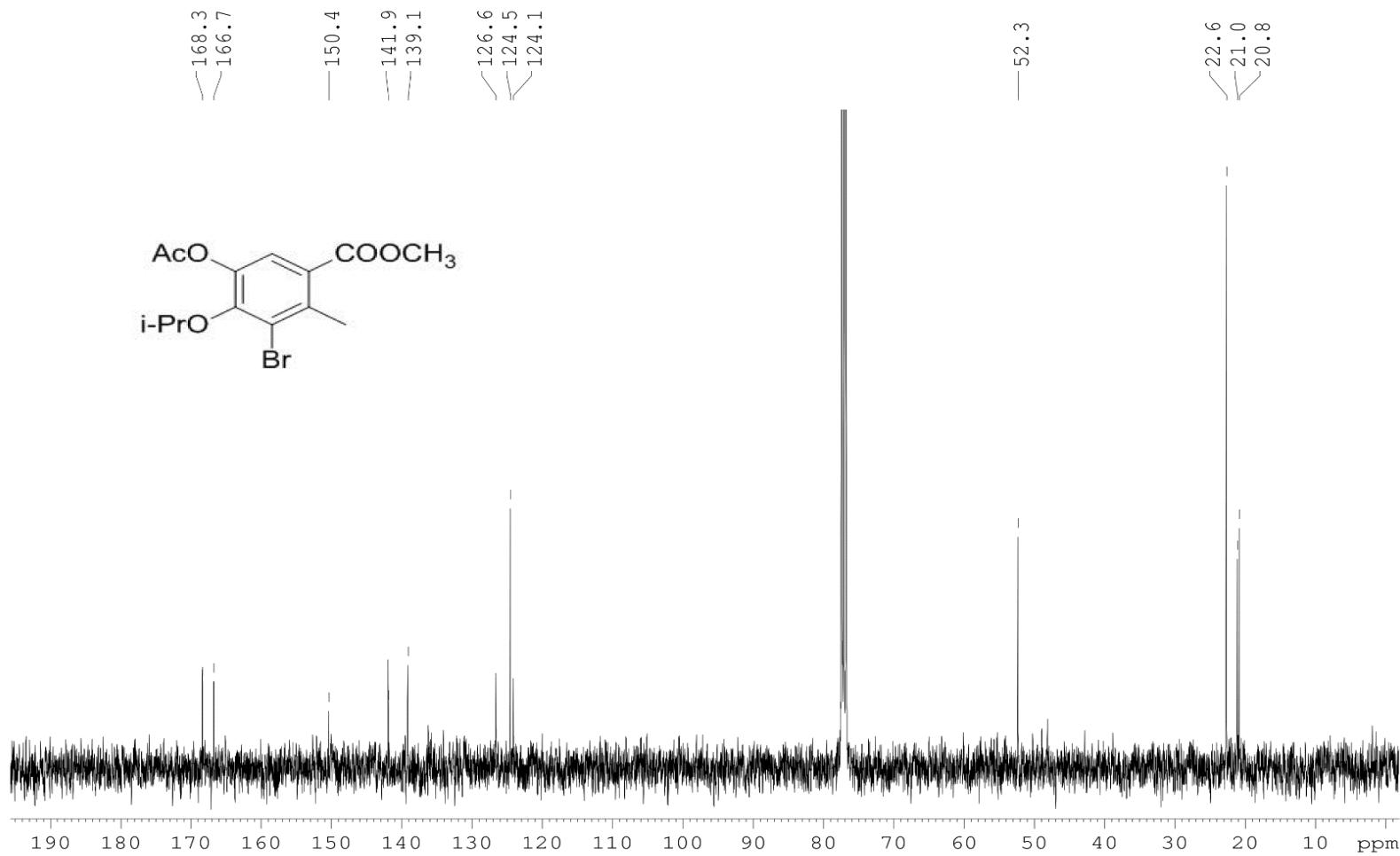
**Figure S11:**  $^1\text{H}$  NMR spectrum of ester 16 (400 MHz,  $\text{CDCl}_3$ ).



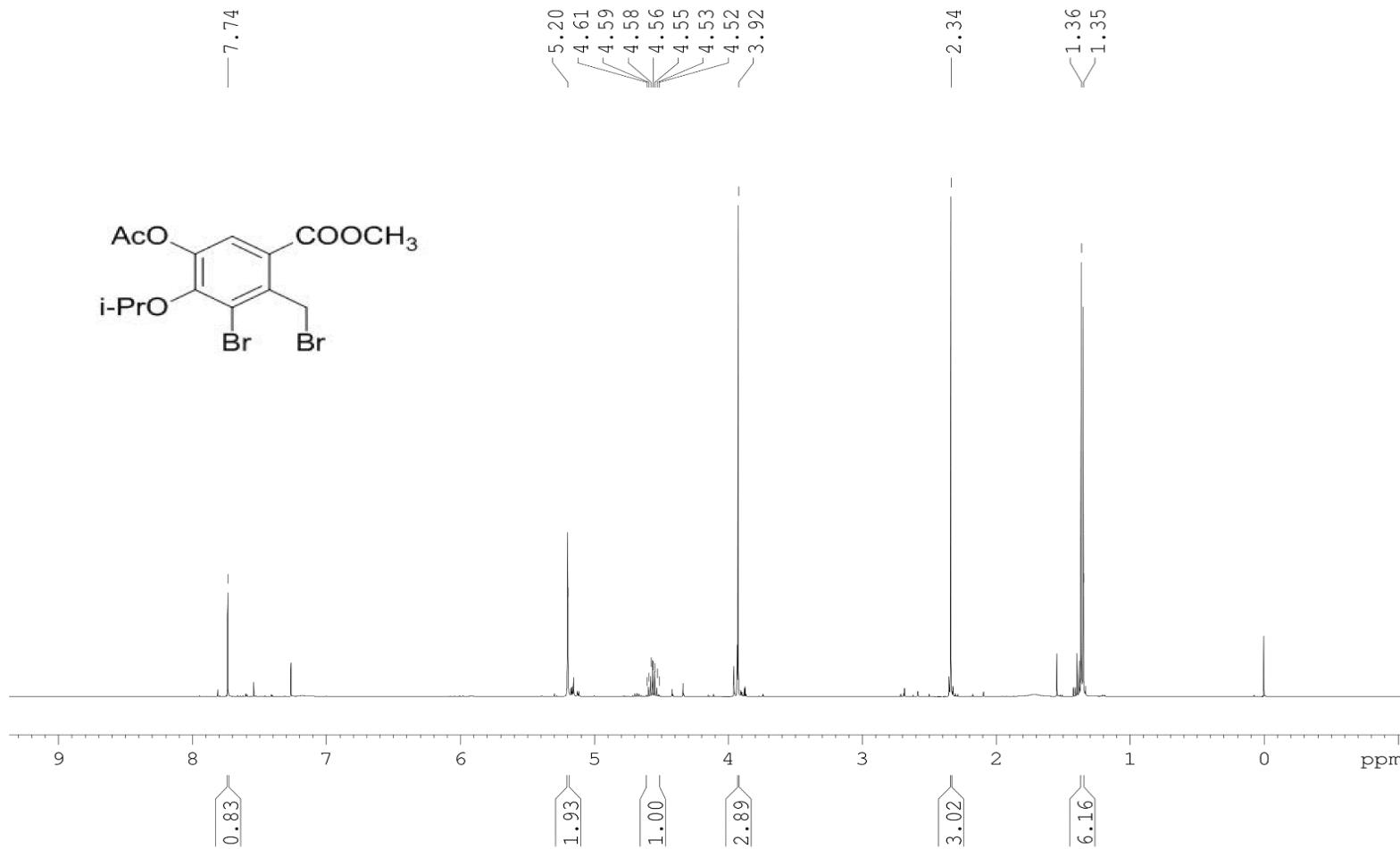
**Figure S12:**  $^{13}\text{C}$  NMR spectrum of ester 16 (100 MHz,  $\text{CDCl}_3$ ).



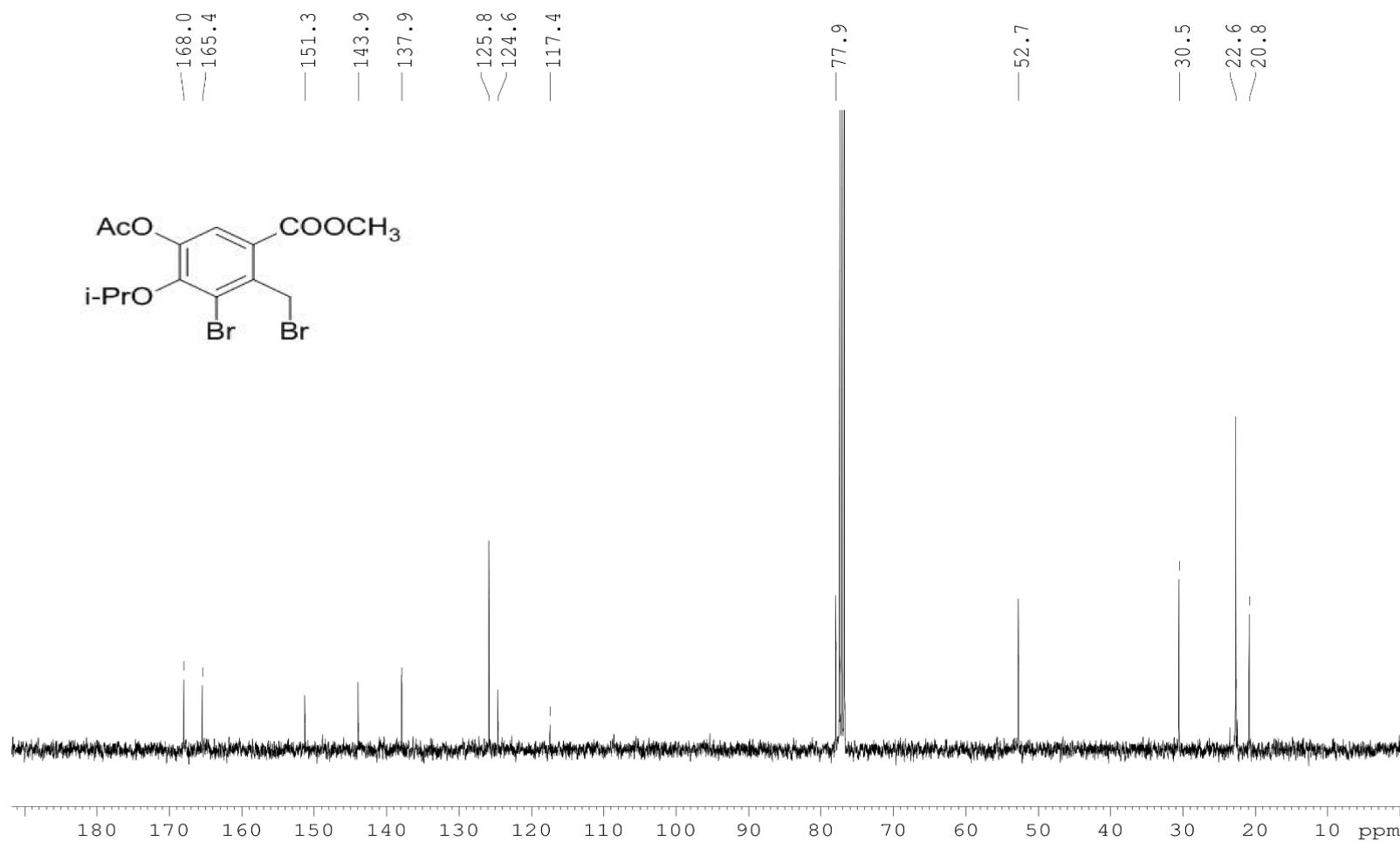
**Figure S13:** <sup>1</sup>H NMR spectrum of bromide 17 (400 MHz, CDCl<sub>3</sub>).



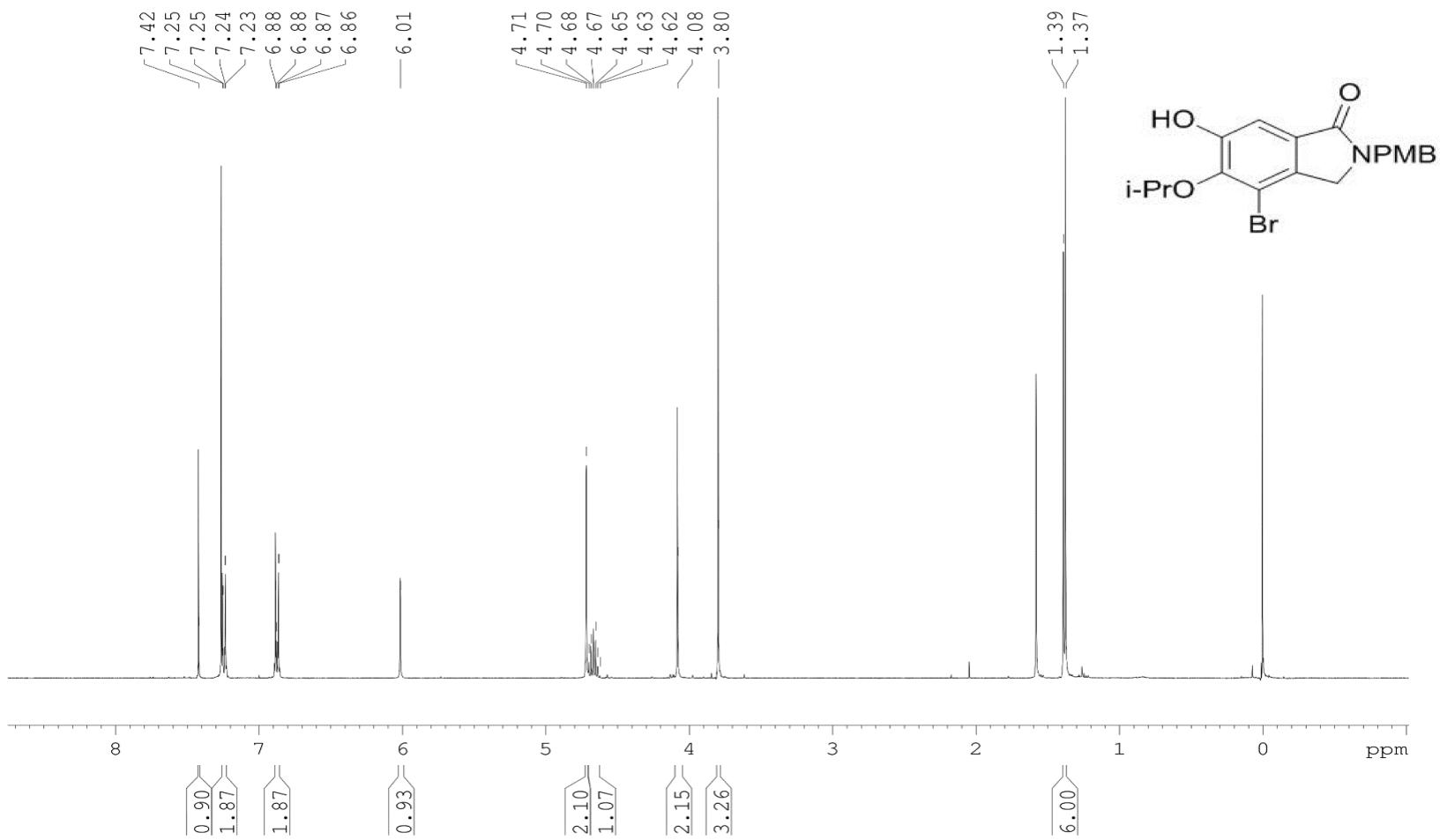
**Figure S14:** <sup>13</sup>C NMR spectrum of bromide 17 (100 MHz, CDCl<sub>3</sub>).



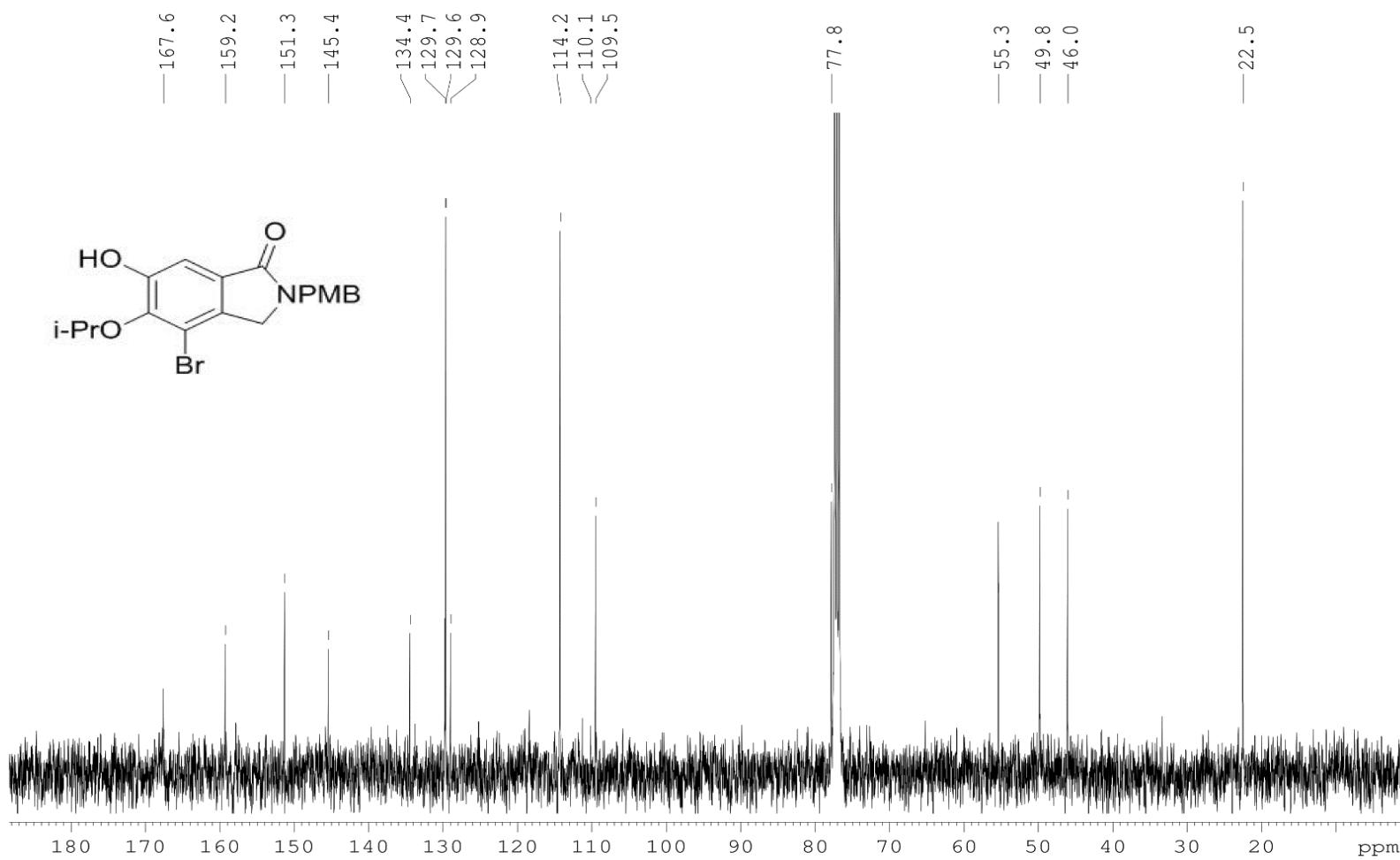
**Figure S15:** <sup>1</sup>H NMR spectrum of benzyl bromide 18 (400 MHz, CDCl<sub>3</sub>).



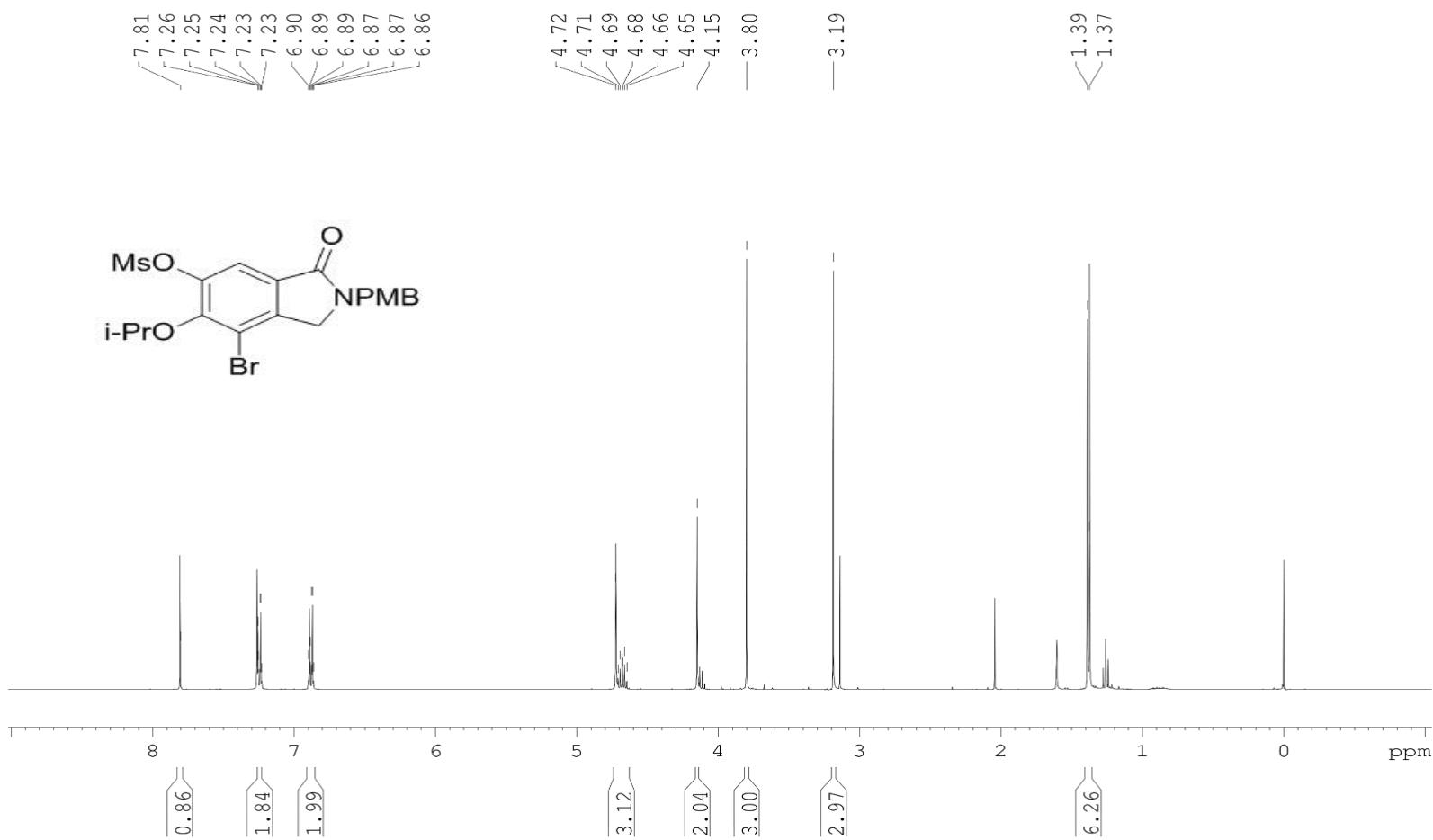
**Figure S16:**  $^{13}\text{C}$  NMR spectrum of benzyl bromide 18 (100 MHz,  $\text{CDCl}_3$ ).



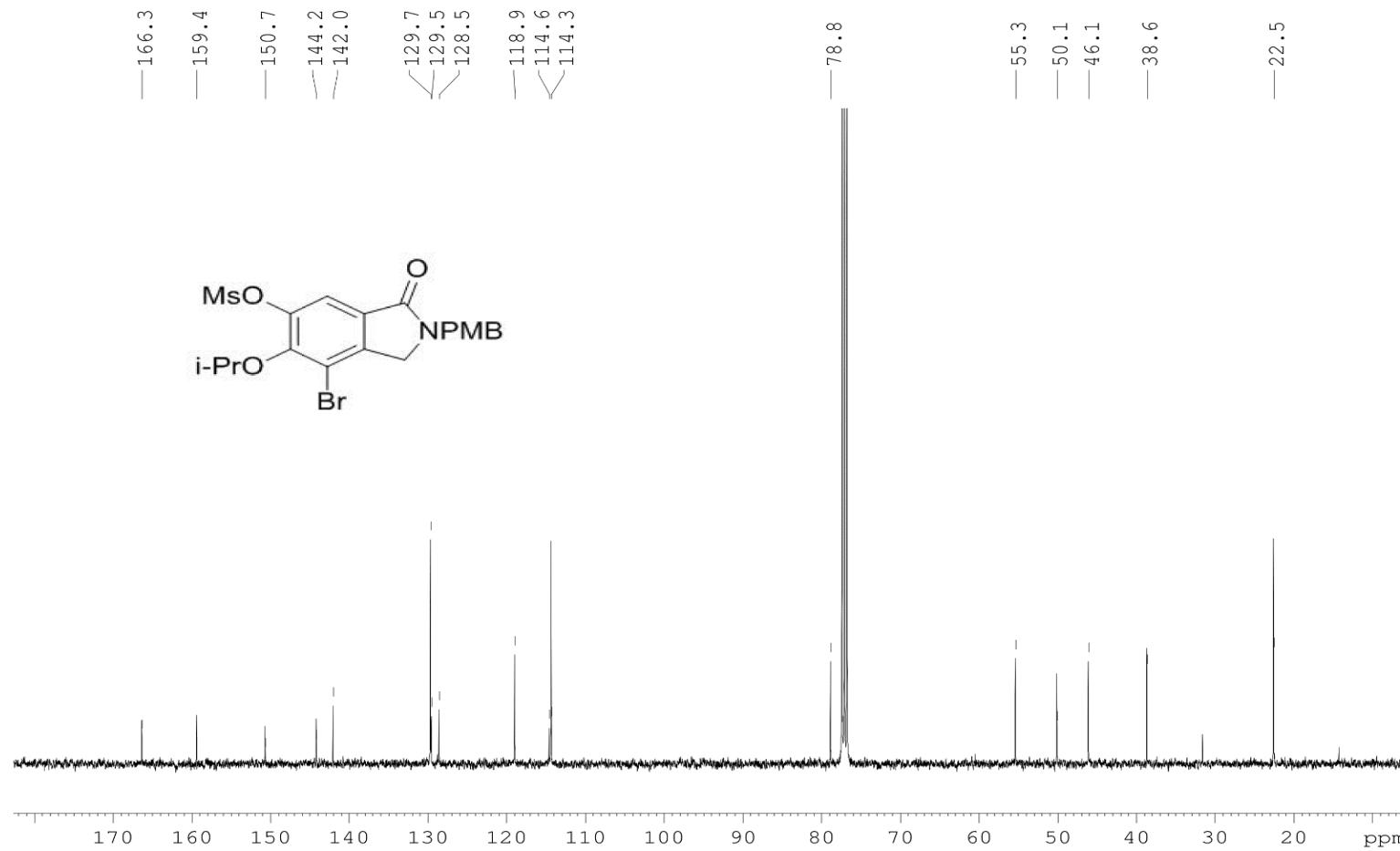
**Figure S17:**  $^1\text{H}$  NMR spectrum of isoindolin-1-one 19 (400 MHz,  $\text{CDCl}_3$ ).



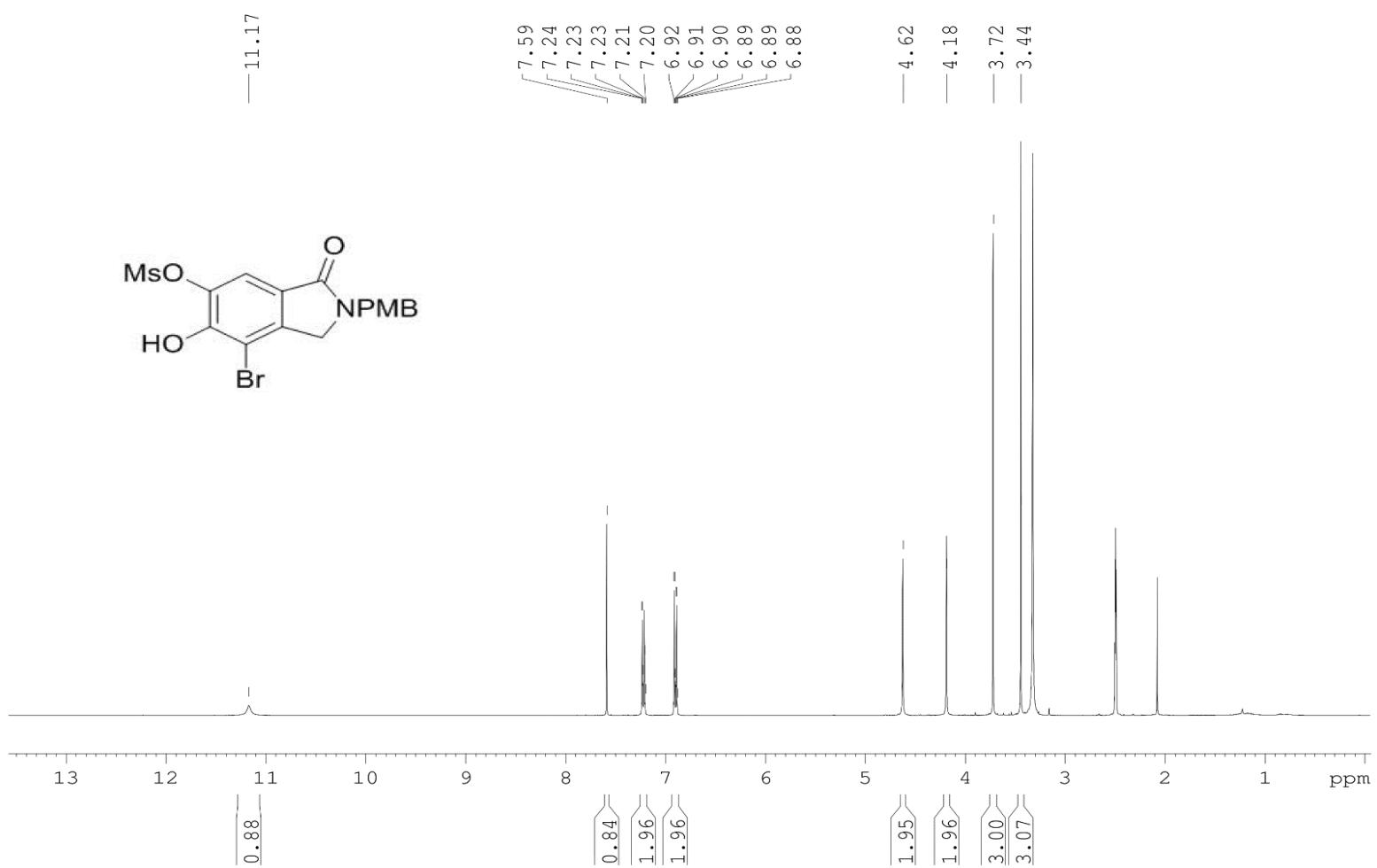
**Figure S18:**  $^{13}\text{C}$  NMR spectrum of isoindolin-1-one 19 (100 MHz,  $\text{CDCl}_3$ ).



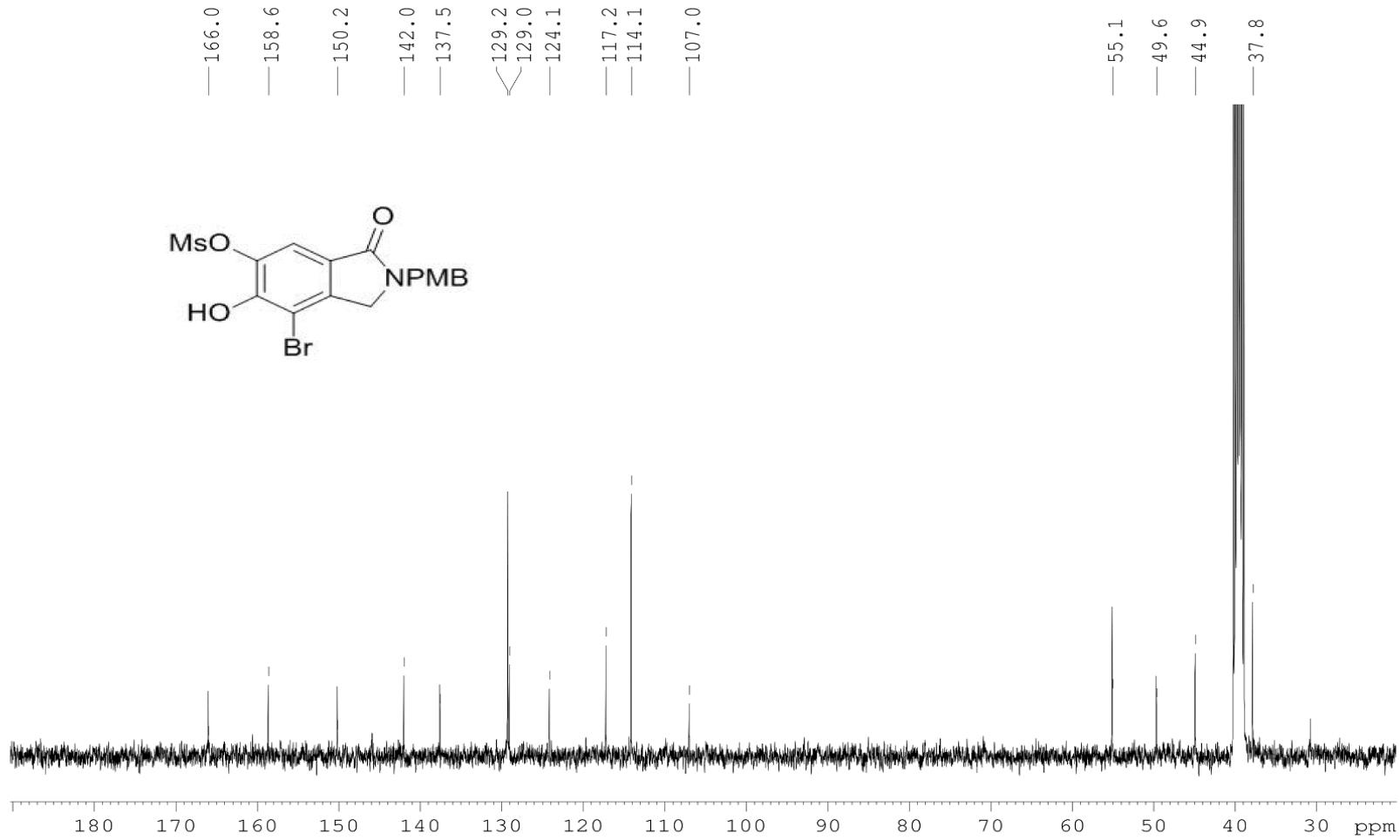
**Figure S19:** <sup>1</sup>H NMR spectrum of 7-bromo-6-isopropoxy-2-(4'-methoxybenzyl)-3-oxoisoindolin-5-yl methanesulfonate (400 MHz, CDCl<sub>3</sub>).



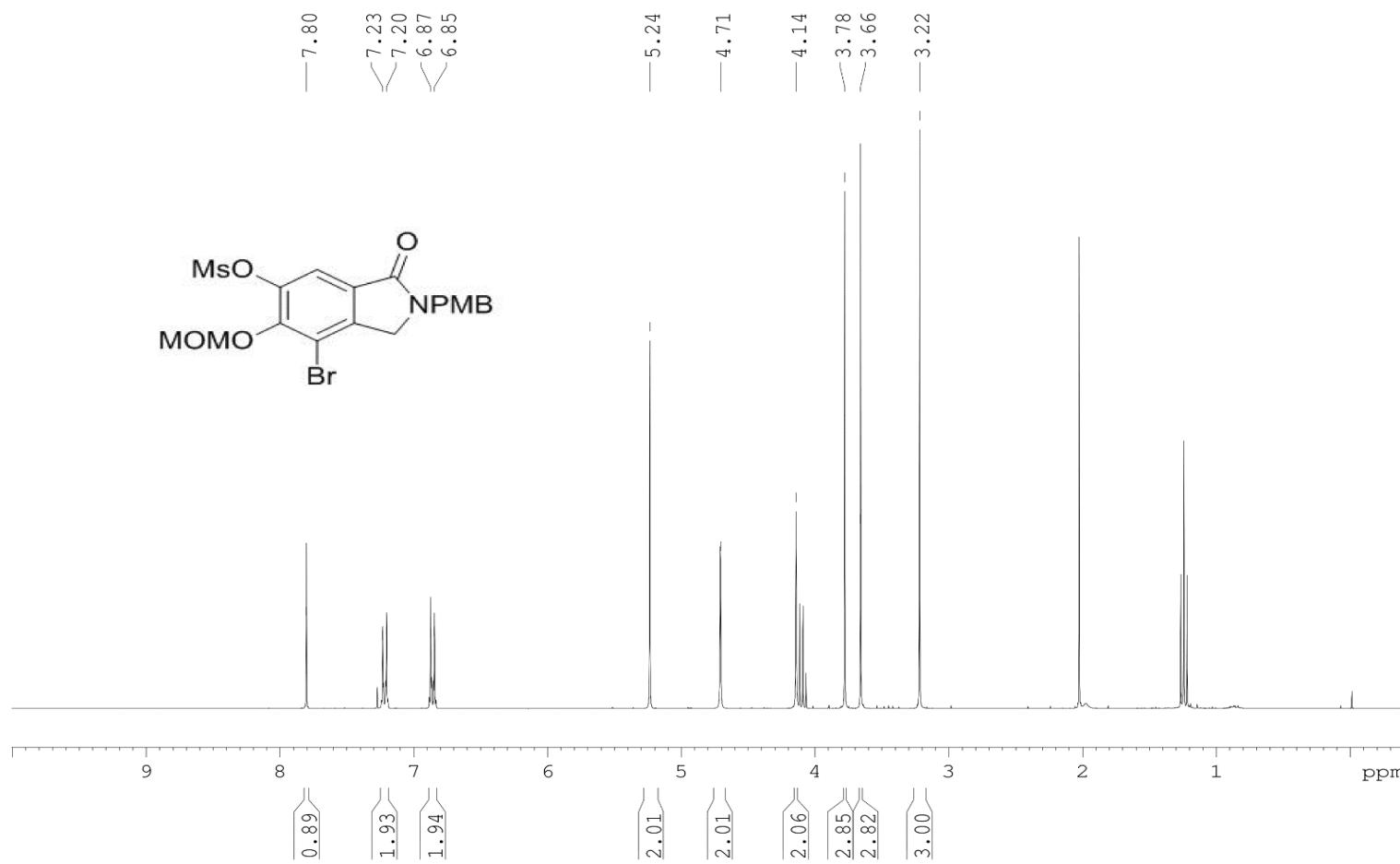
**Figure S20:**  $^{13}\text{C}$  NMR spectrum of 7-bromo-6-isopropoxy-2-(4'-methoxybenzyl)-3-oxoisindolin-5-yl methanesulfonate (100 MHz,  $\text{CDCl}_3$ ).



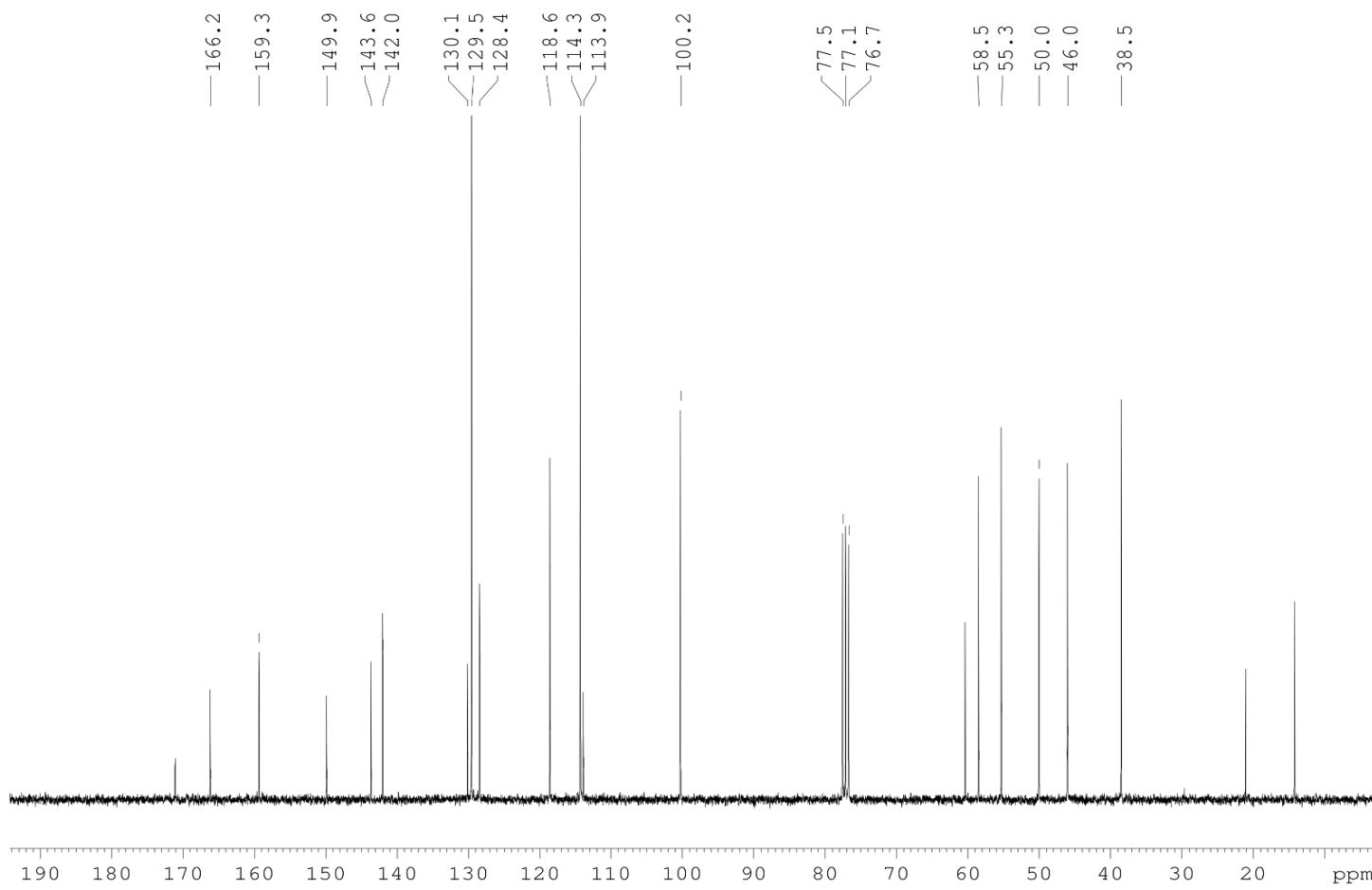
**Figure S21:** <sup>1</sup>H NMR spectrum of phenol 20 (400 MHz, DMSO-*d*<sub>6</sub>).



**Figure S22:**  $^{13}\text{C}$  NMR spectrum of phenol 20 (100 MHz,  $\text{DMSO}-d_6$ ).



**Figure S23:** <sup>1</sup>H NMR spectrum of 7-bromo-2-(4'-methoxybenzyl)-6-(methoxymethoxy)-3-oxoisoindolin-5-yl methanesulfonate (300 MHz, CDCl<sub>3</sub>).



**Figure S24:**  $^{13}\text{C}$  NMR spectrum of 7-bromo-2-(4'-methoxybenzyl)-6-(methoxymethoxy)-3-oxoisindolin-5-yl methanesulfonate (75 MHz,  $\text{CDCl}_3$ ).

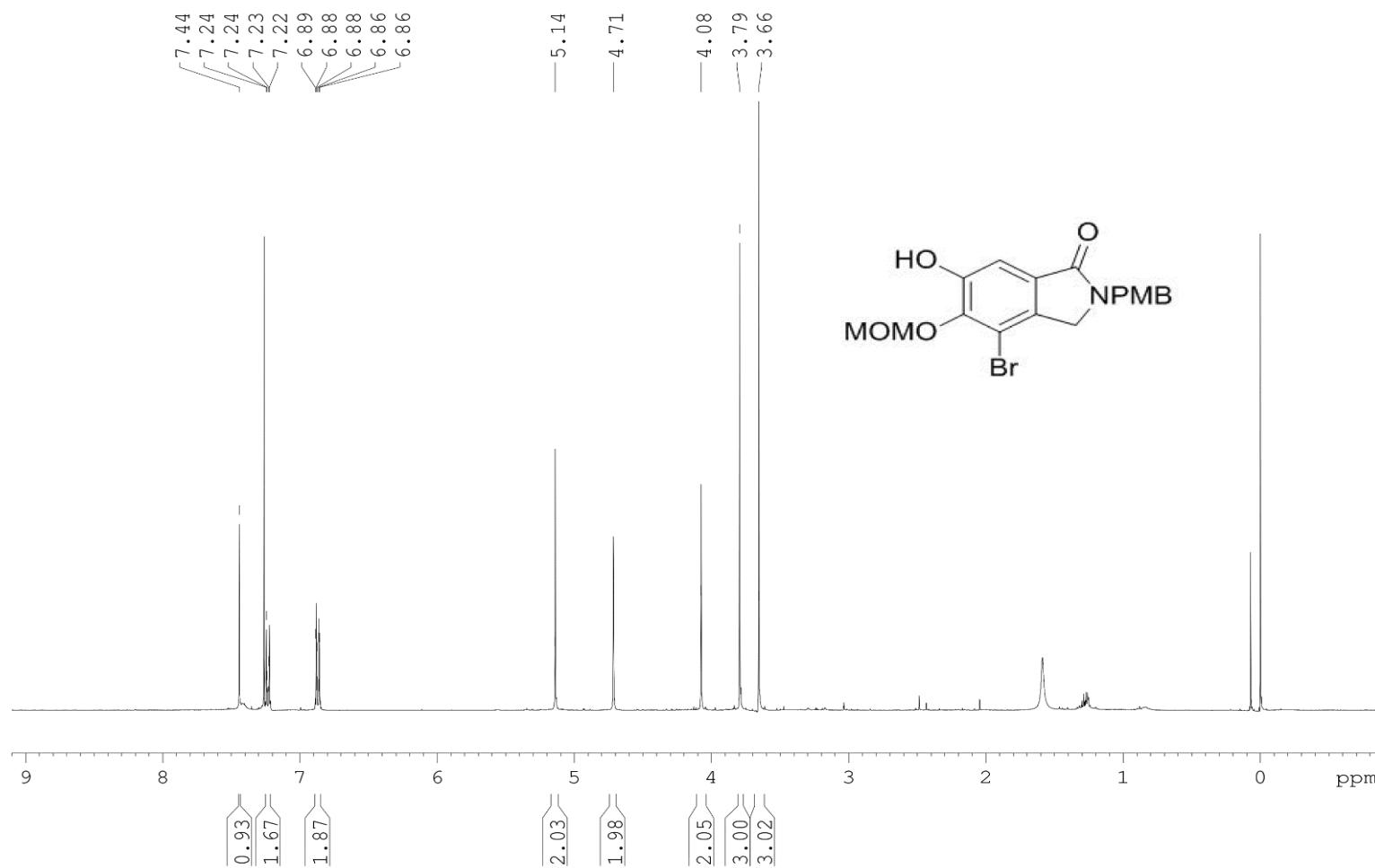
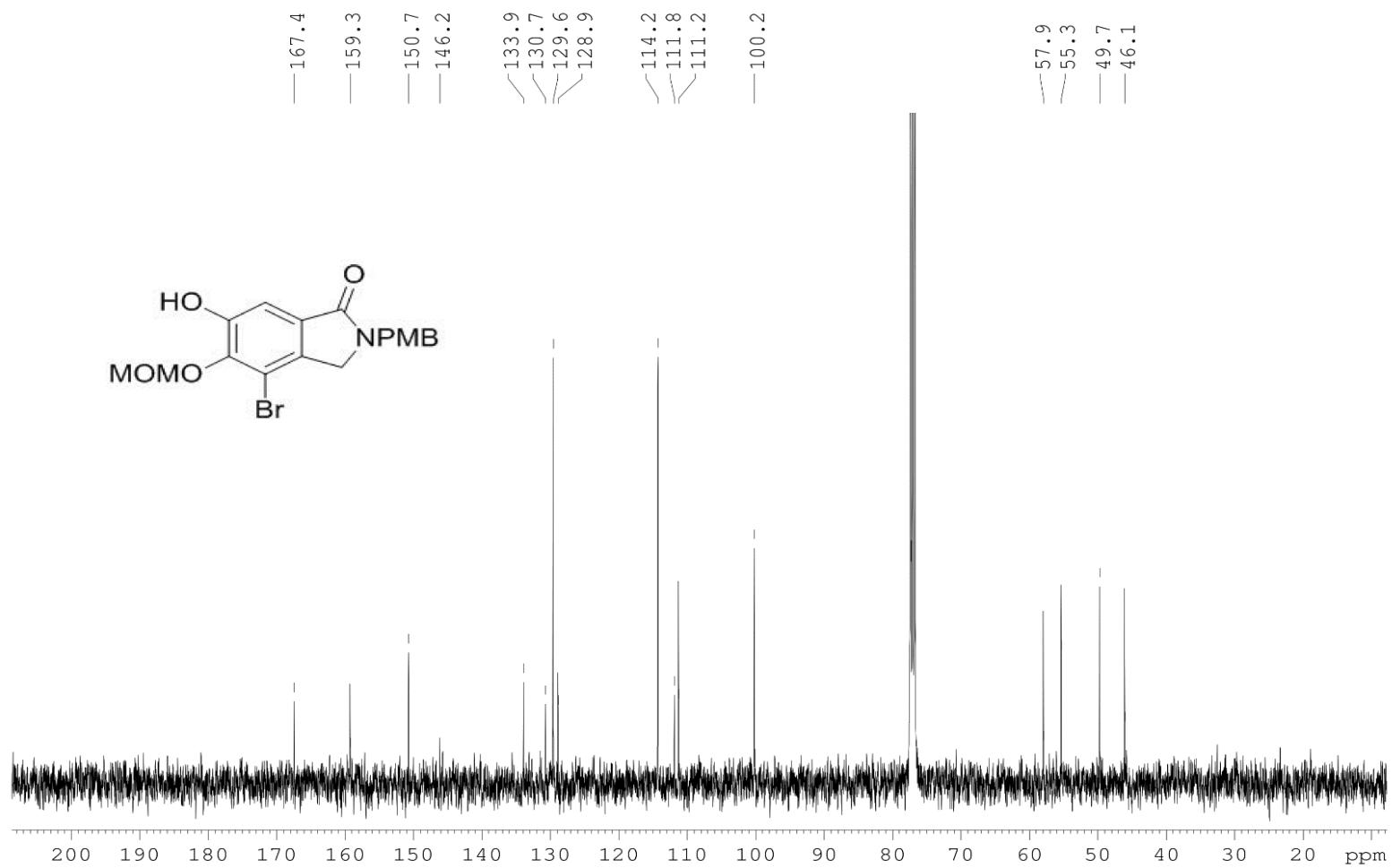
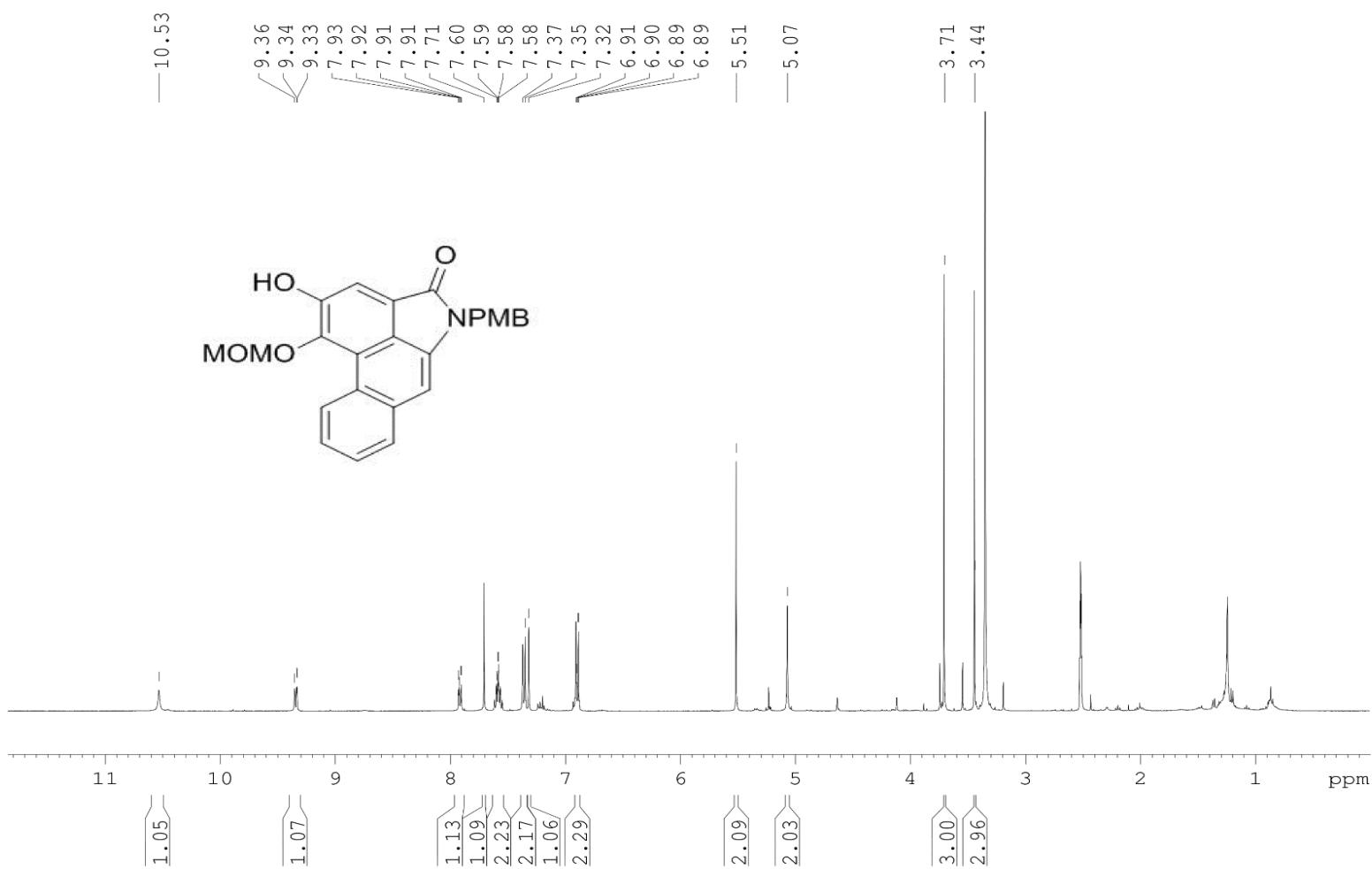


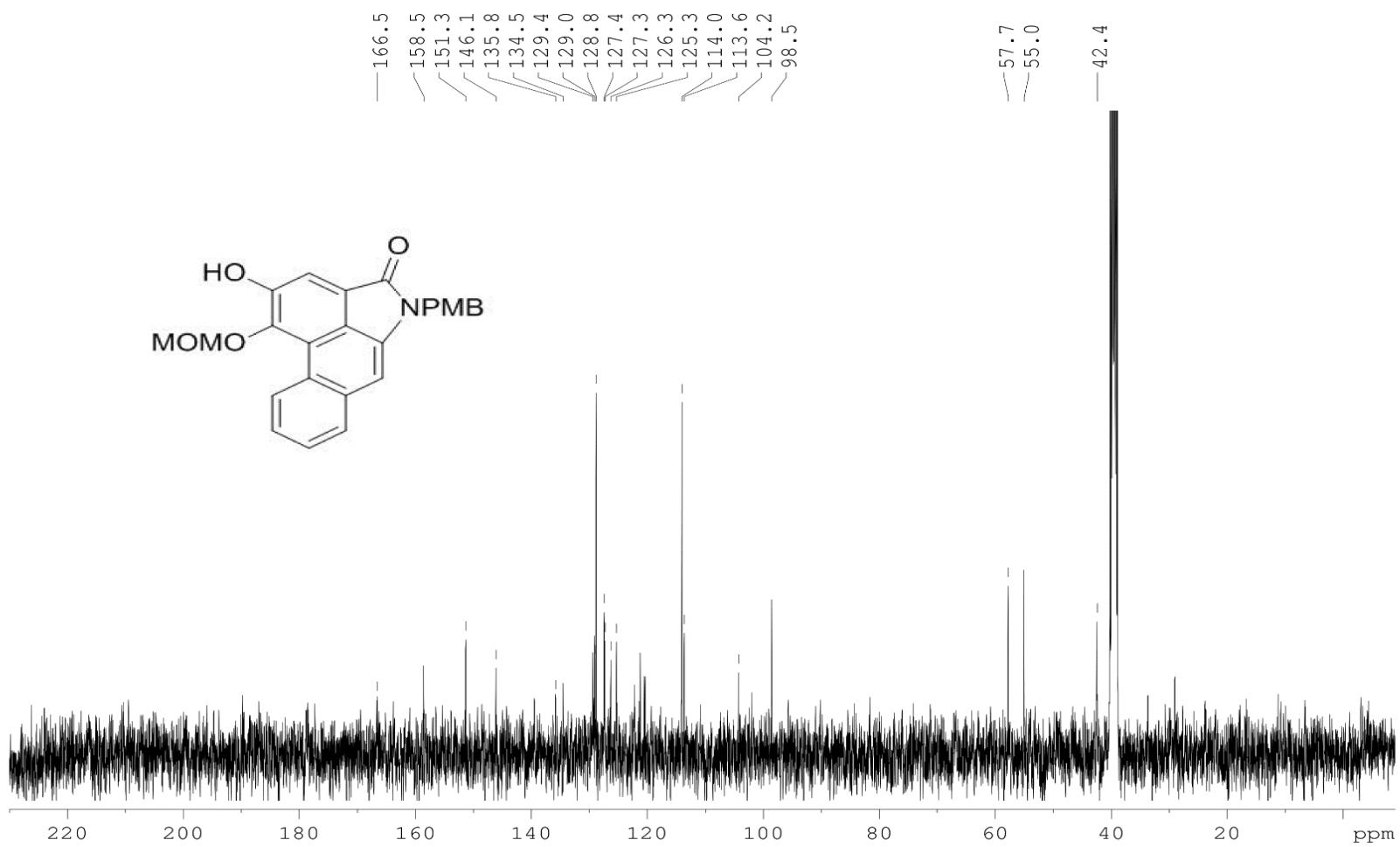
Figure S25:  $^1\text{H}$  NMR spectrum of isoindolin-1-one 21 (400 MHz,  $\text{CDCl}_3$ ).



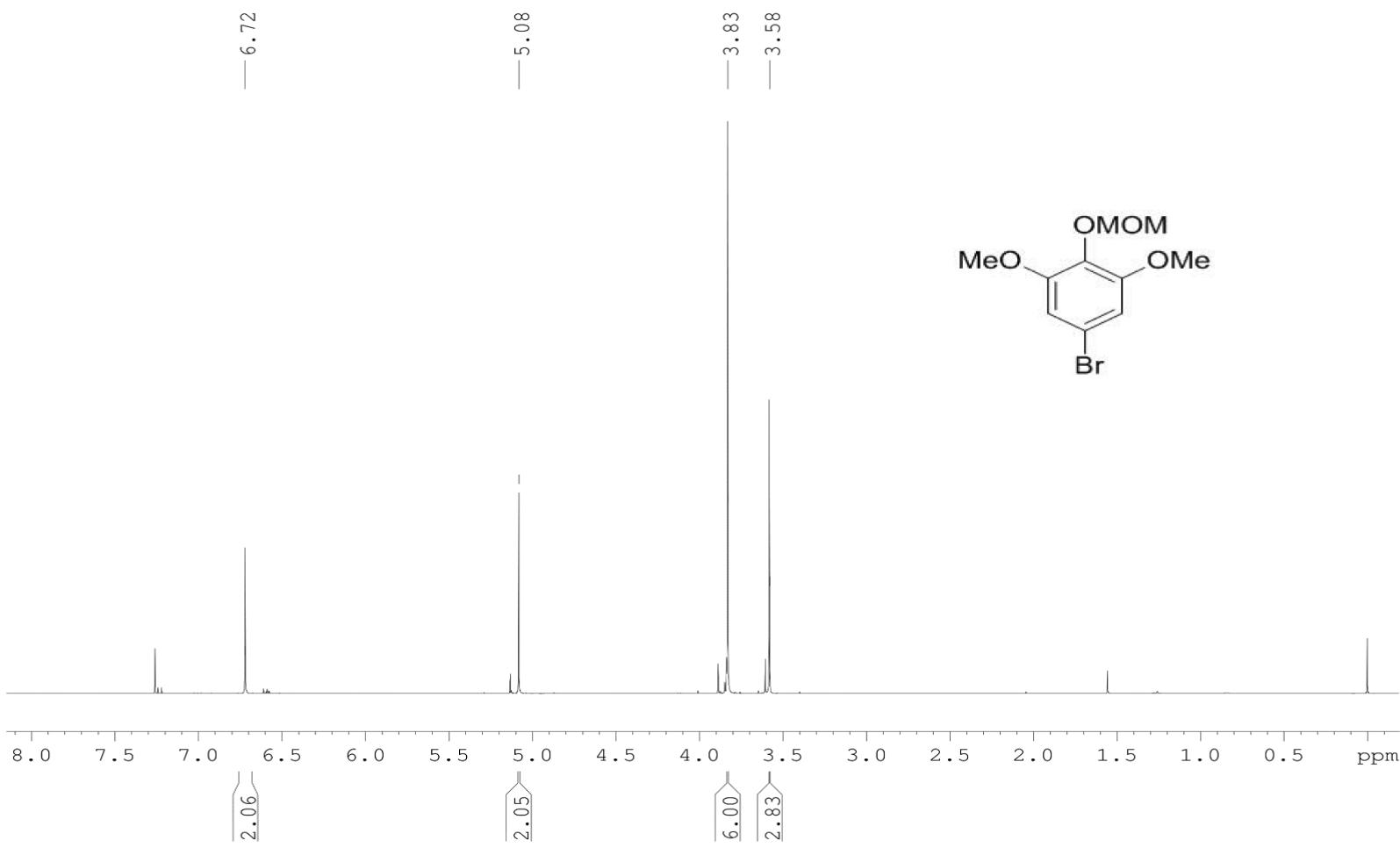
**Figure S26:**  $^{13}\text{C}$  NMR spectrum of isoindolin-1-one 21 (100 MHz,  $\text{CDCl}_3$ ).



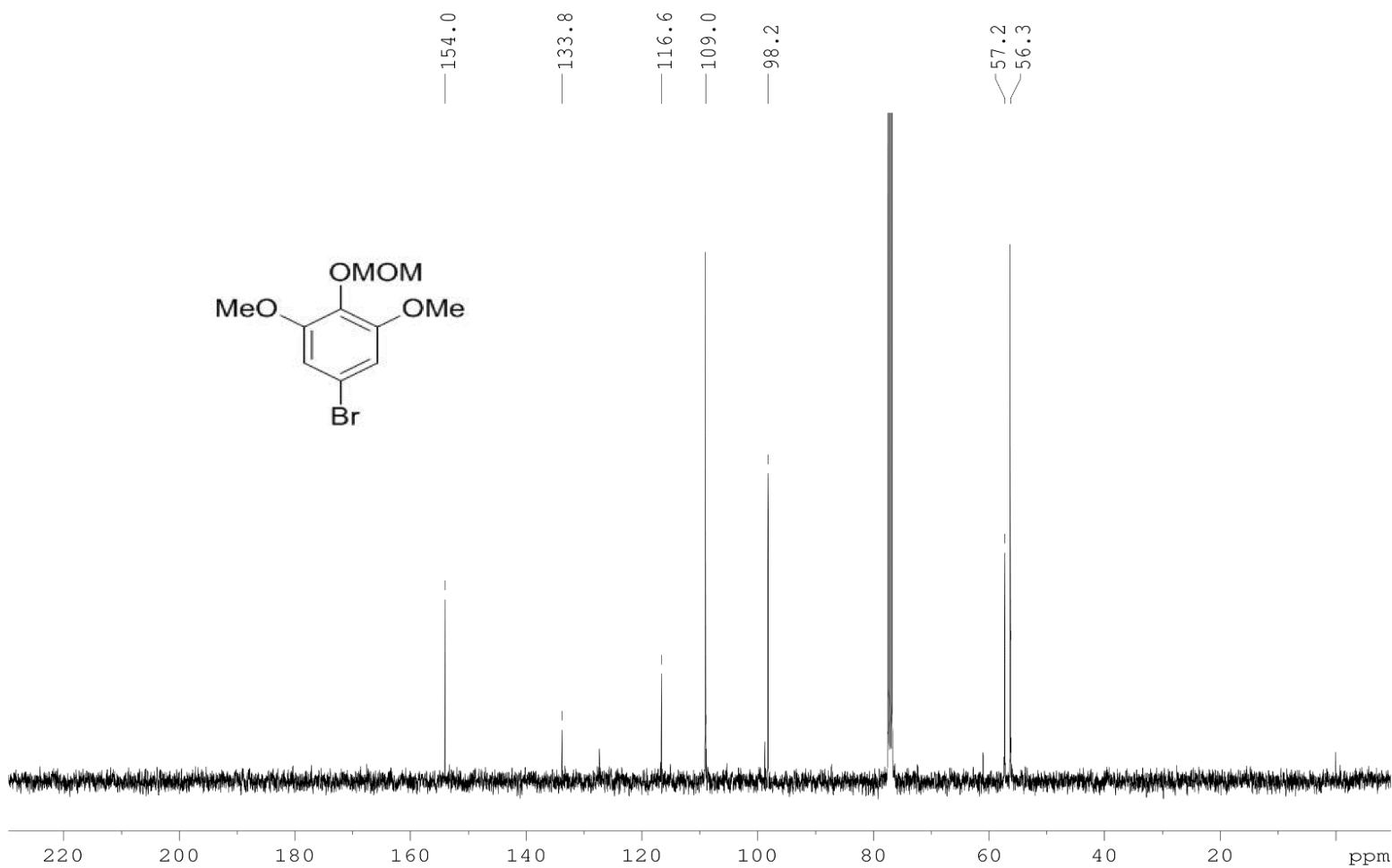
**Figure S27:**  $^1\text{H}$  NMR spectrum of phenanthrene 22 (400 MHz,  $\text{DMSO}-d_6$ ).



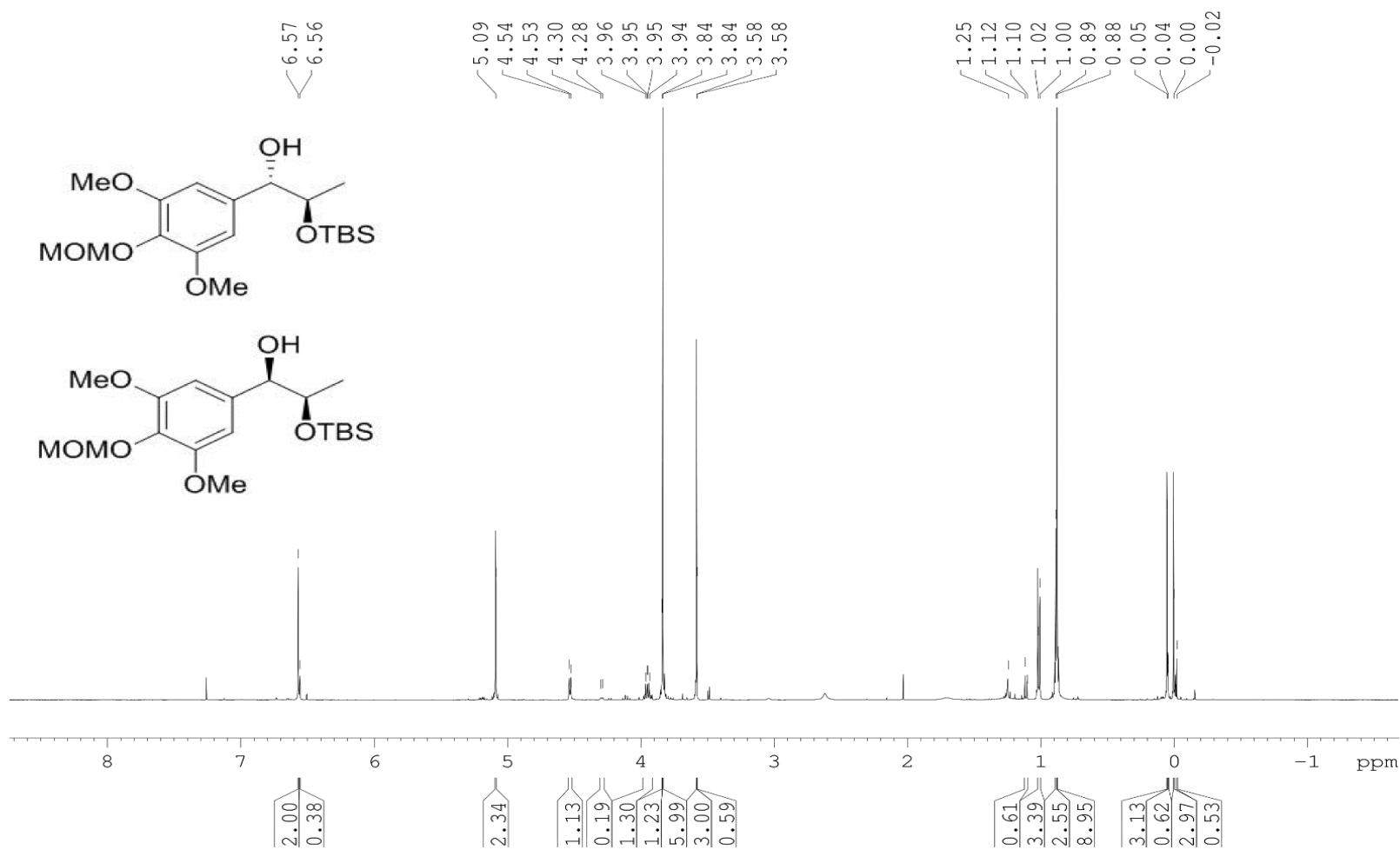
**Figure S28:**  $^{13}\text{C}$  NMR spectrum of phenanthrene 22 (100 MHz, DMSO-*d*<sub>6</sub>).



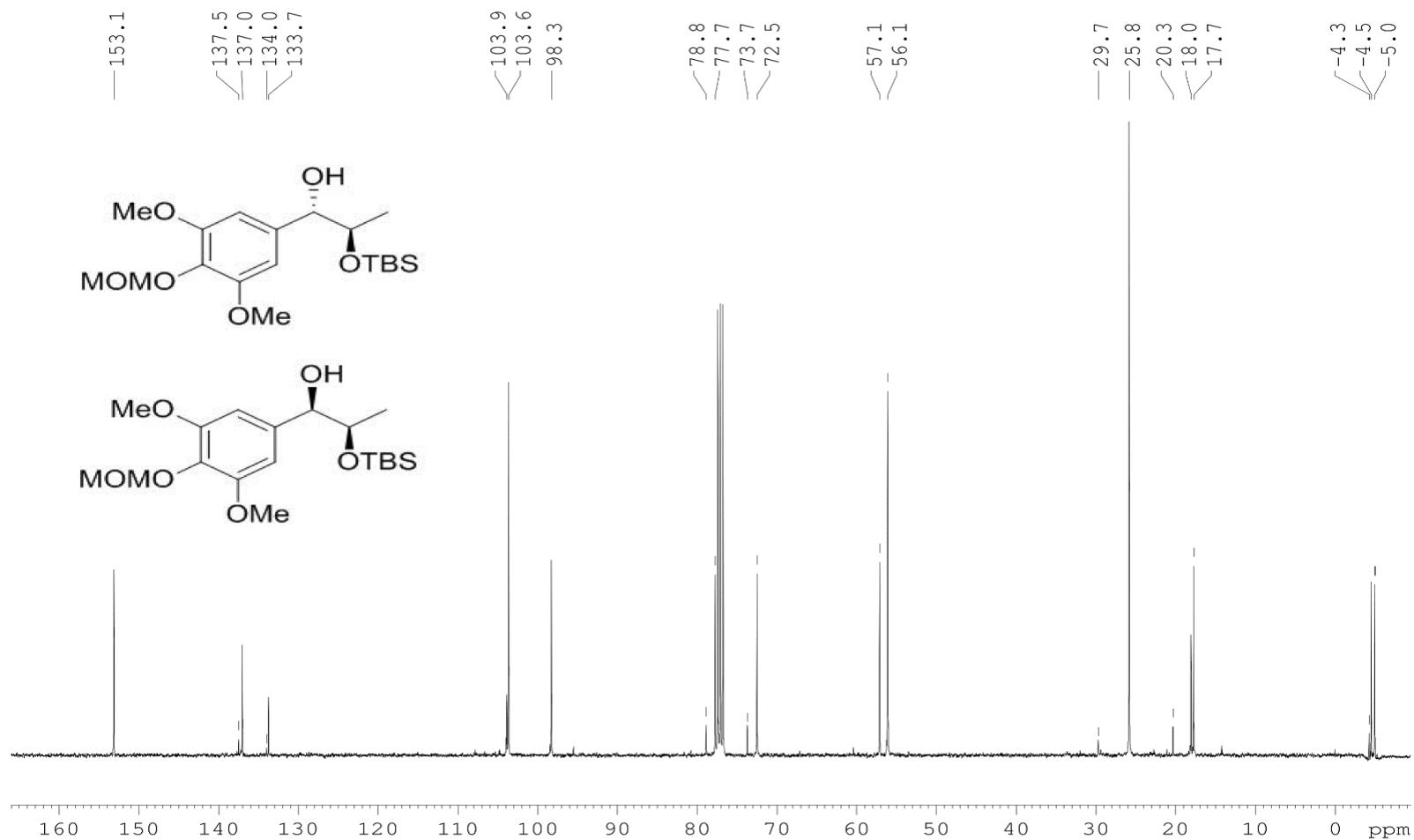
**Figure S29:**  $^1\text{H}$  NMR spectrum of bromide 25 (400 MHz,  $\text{CDCl}_3$ ).



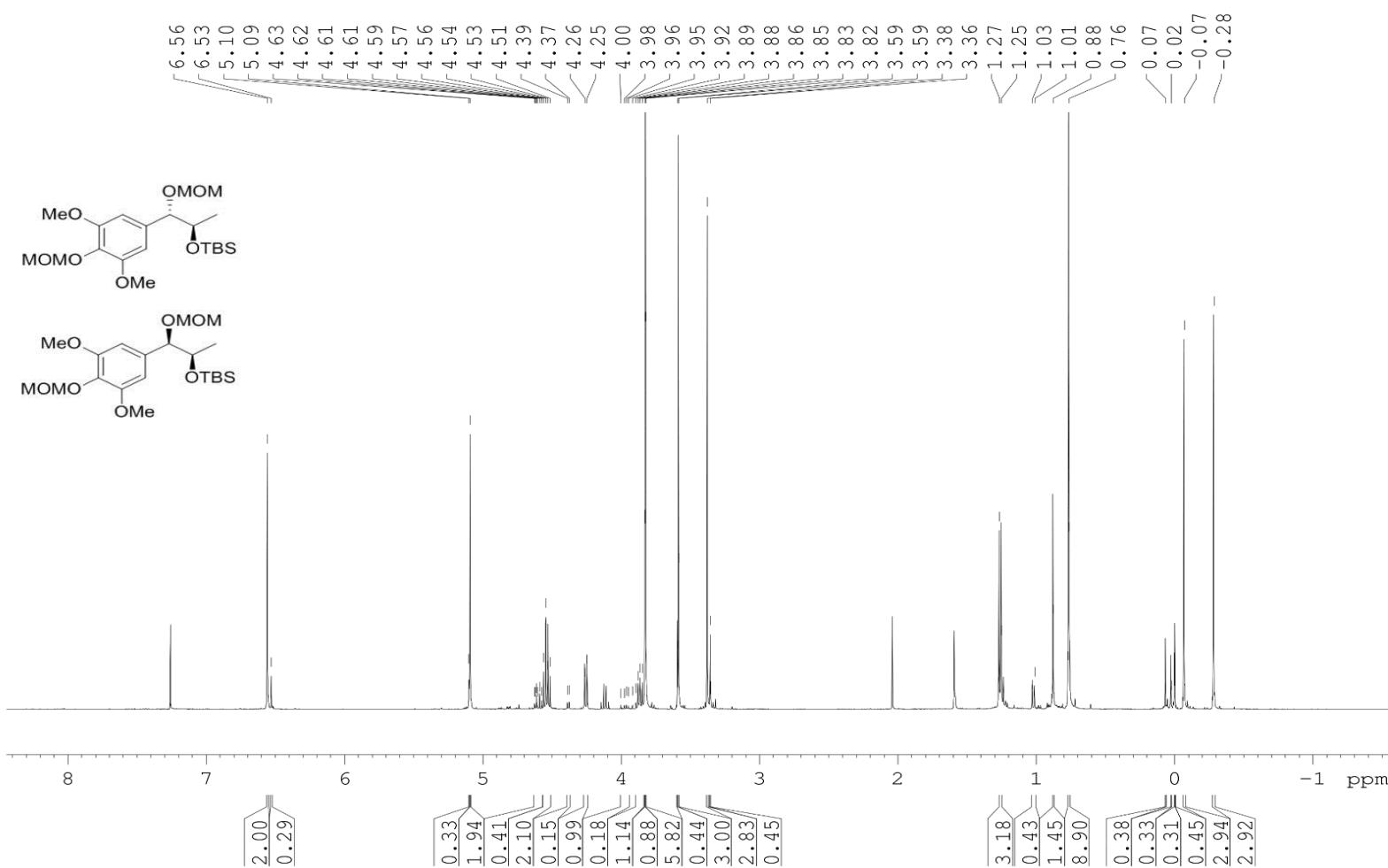
**Figure S30:**  $^{13}\text{C}$  NMR spectrum of bromide 25 (100 MHz,  $\text{CDCl}_3$ ).



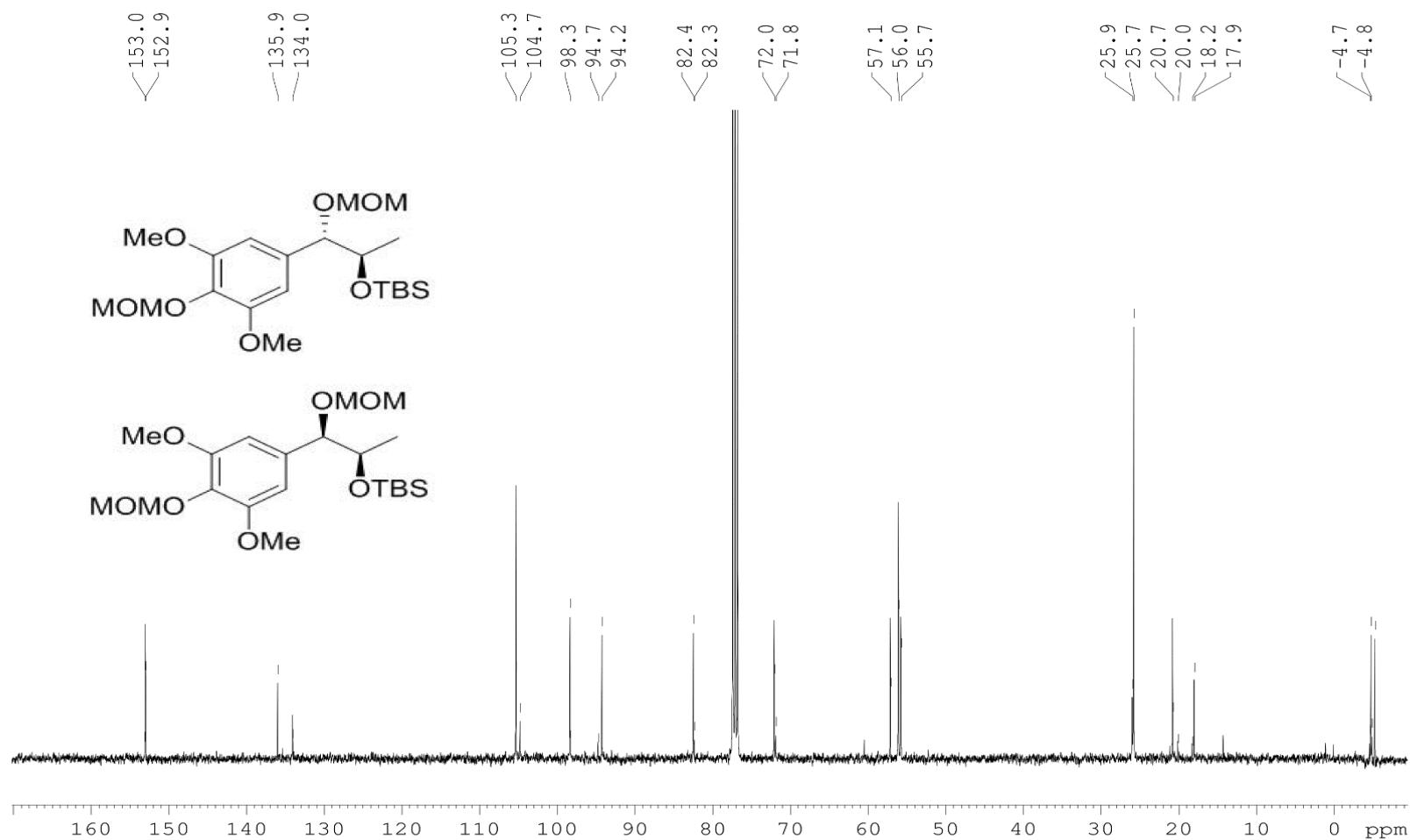
**Figure S31:**  $^1\text{H}$  NMR spectrum of alcohols 28a and 28b (400 MHz,  $\text{CDCl}_3$ ).



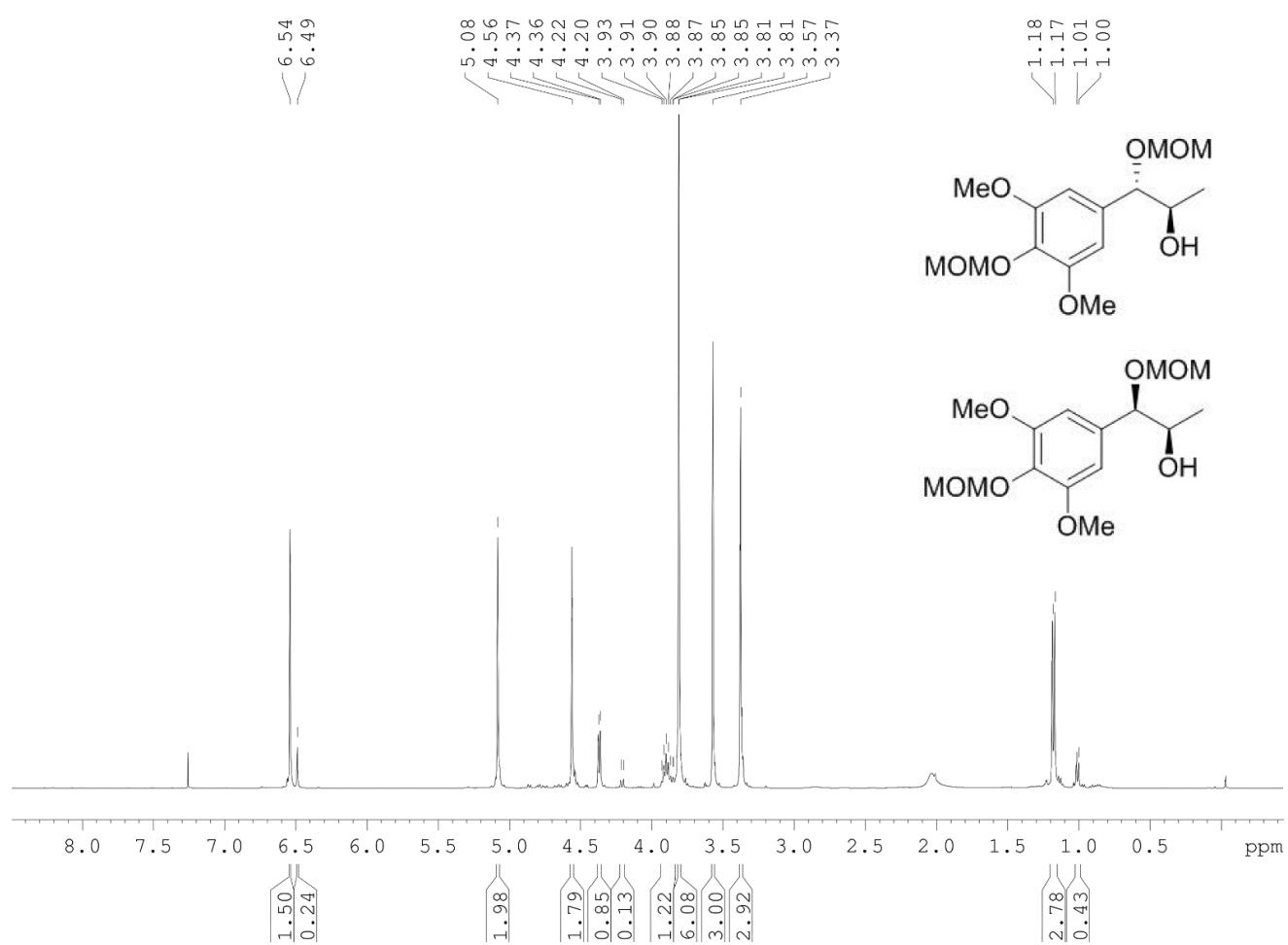
**Figure S32:**  $^{13}\text{C}$  NMR spectrum of alcohols **28a** and **28b** (100 MHz,  $\text{CDCl}_3$ ).



**Figure S33:**  $^1\text{H}$  NMR spectrum of ethers **29a** and **29b** (400 MHz,  $\text{CDCl}_3$ ).



**Figure S34:**  $^{13}\text{C}$  NMR spectrum of ethers **29a** and **29b** (100 MHz,  $\text{CDCl}_3$ ).



**Figure S35:** <sup>1</sup>H NMR spectrum of alcohols 30a and 30b (400 MHz, CDCl<sub>3</sub>).

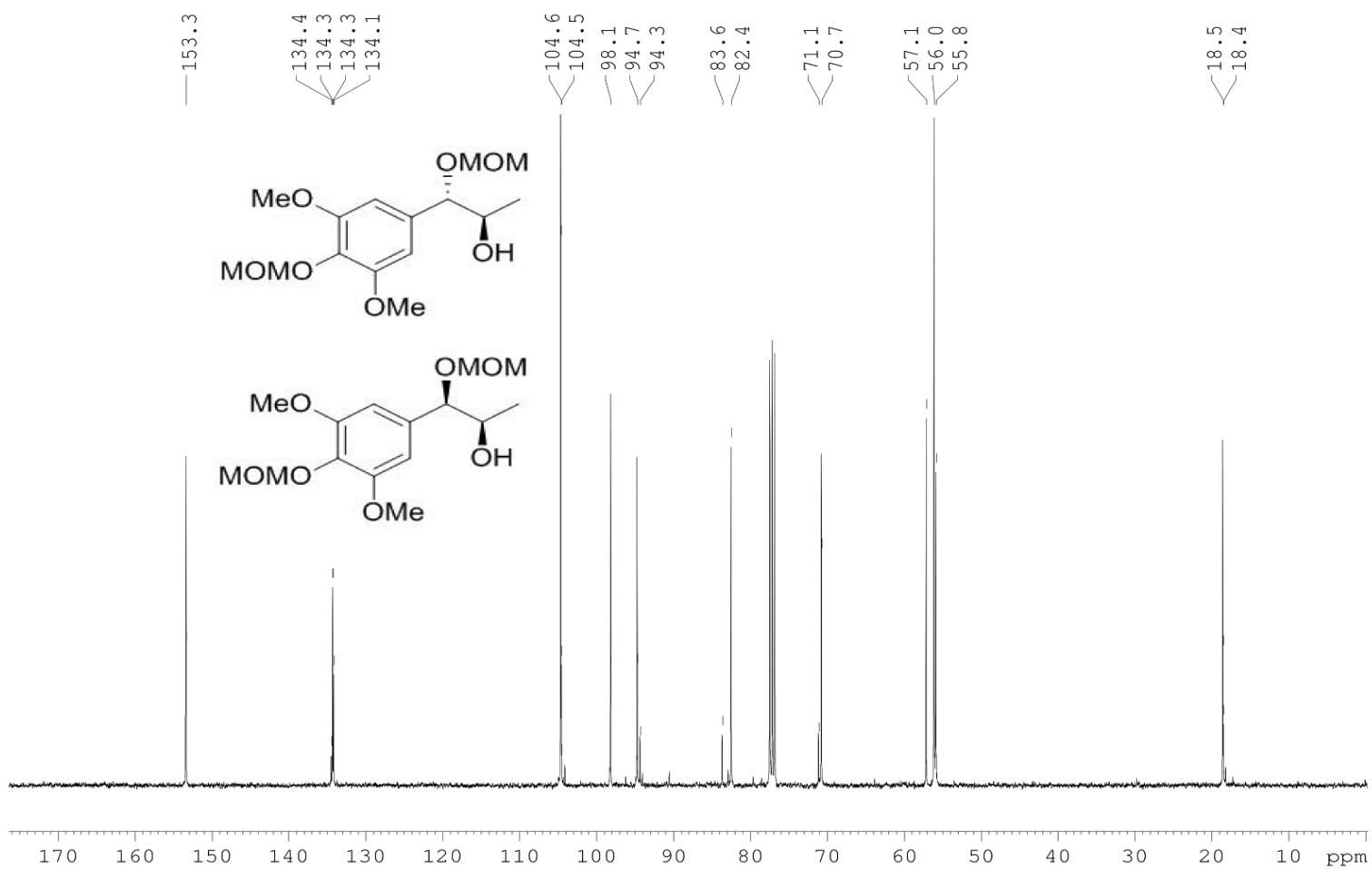
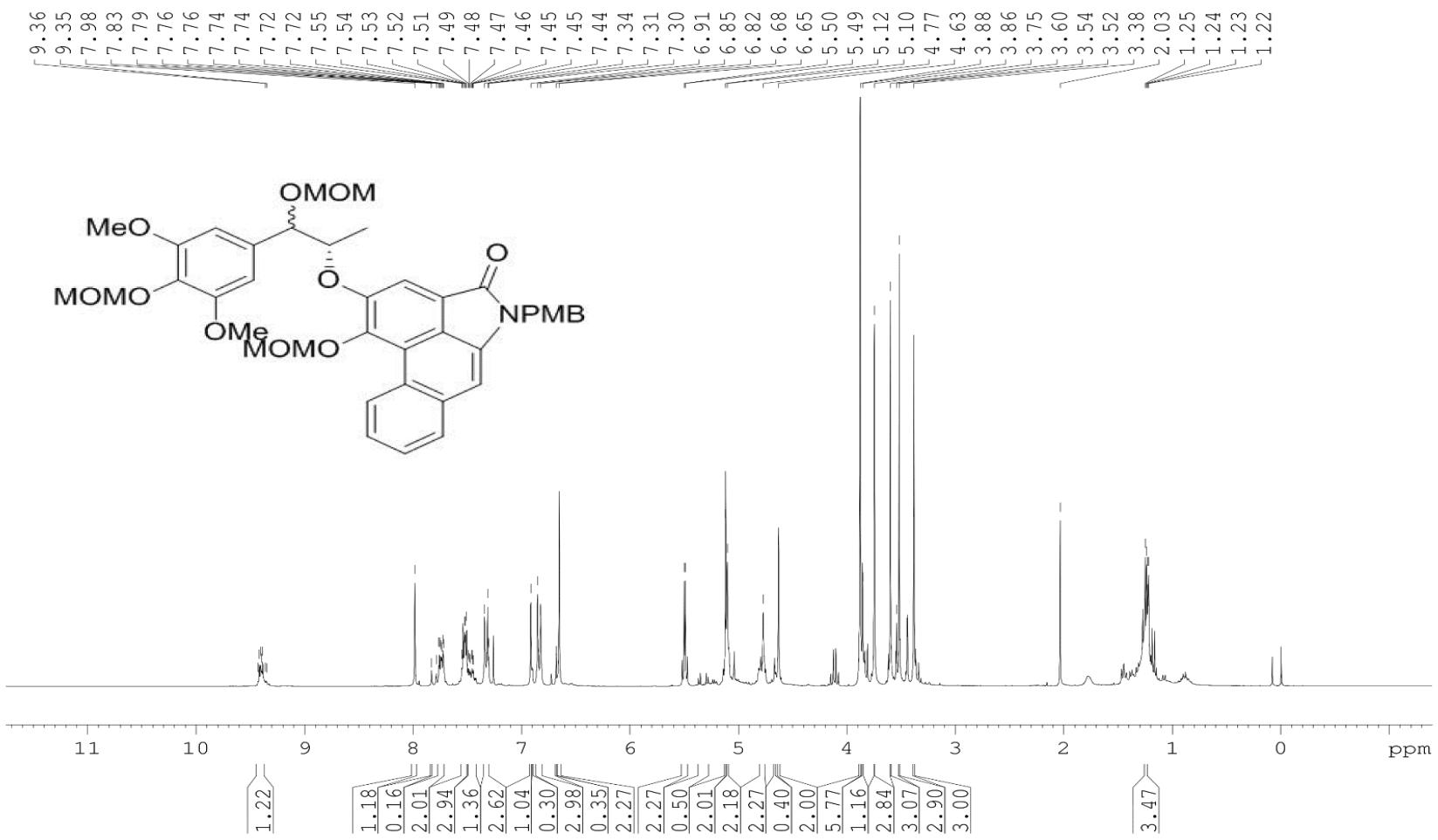
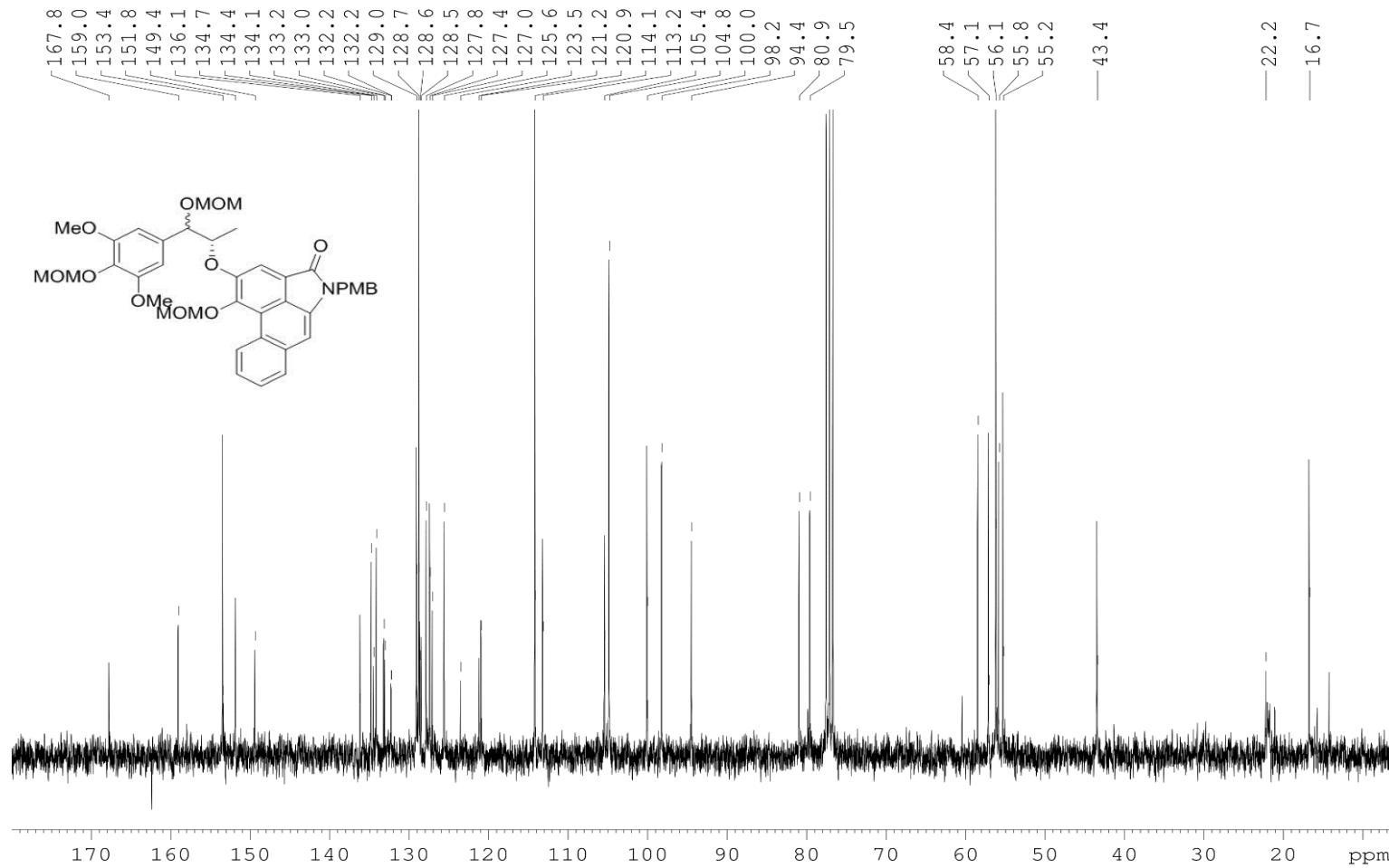


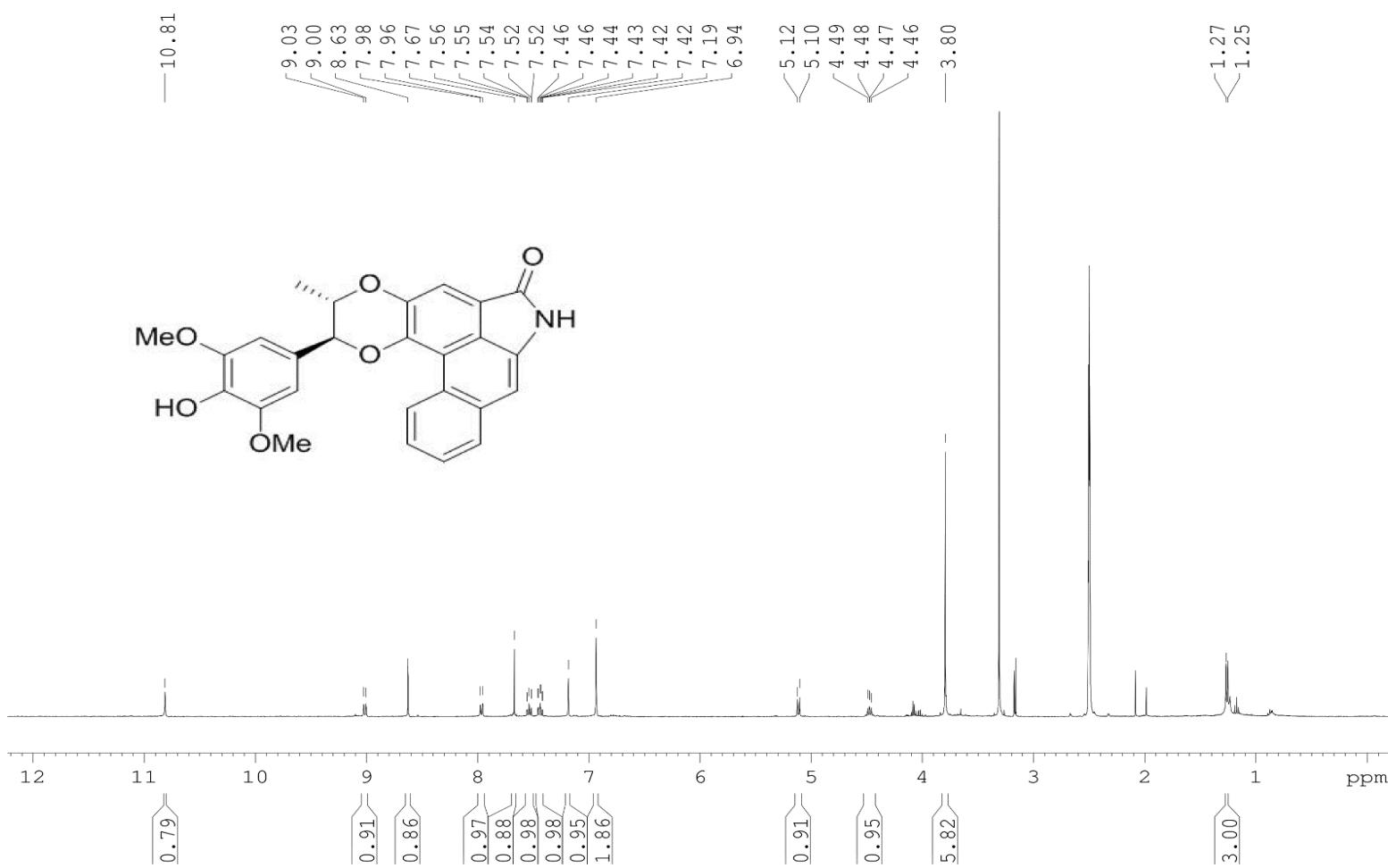
Figure S36:  $^{13}\text{C}$  NMR spectrum of alcohols 30a and 30b (100 MHz,  $\text{CDCl}_3$ ).



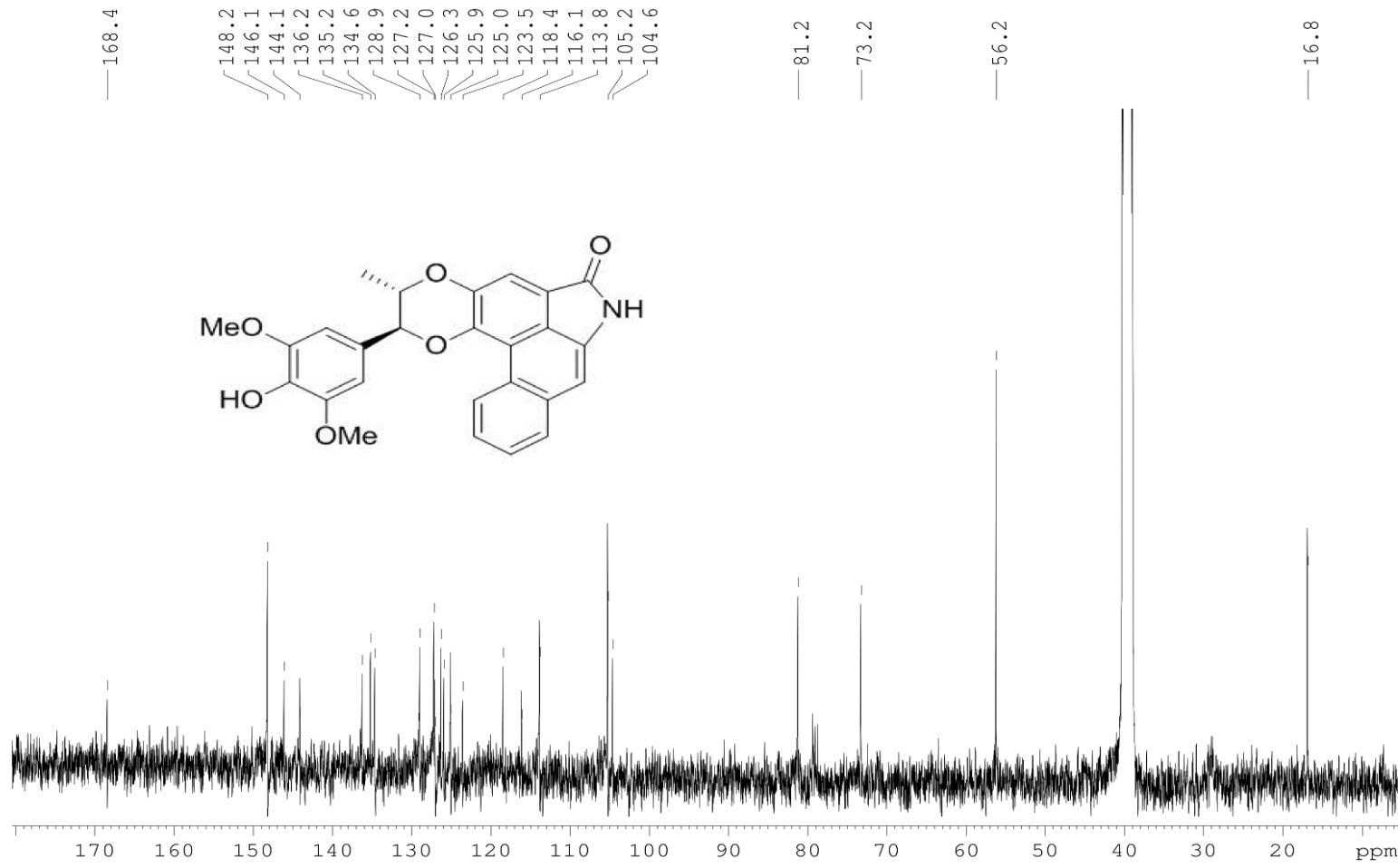
**Figure S37:** <sup>1</sup>H NMR spectrum of ether 31 (300 MHz, CDCl<sub>3</sub>).



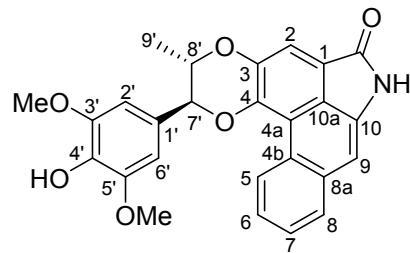
**Figure S38:**  $^{13}\text{C}$  NMR spectrum of ether 31 (75 MHz,  $\text{CDCl}_3$ ).



**Figure S39:**  $^1\text{H}$  NMR spectrum of (+)-aristolactam GI 1 (400 MHz,  $\text{DMSO}-d_6$ ).



**Figure S40:**  $^{13}\text{C}$  NMR spectrum of (+)-aristolactam GI 1 (100 MHz,  $\text{DMSO}-d_6$ ).



Position	Synthetic (+)-aristolactam GI (1)		Natural (+)-aristolactam GI (1)	
	<sup>1</sup> H ( $\delta$ ) (400 MHz, DMSO- <i>d</i> <sub>6</sub> )	<sup>13</sup> C ( $\delta$ ) (100 MHz, DMSO- <i>d</i> <sub>6</sub> )	<sup>1</sup> H ( $\delta$ ) (400 MHz, DMSO- <i>d</i> <sub>6</sub> )	<sup>13</sup> C Chemical shift
C=O	-/-	168.4	-/-	168.4
3' and 5'	-/-	148.2	-/-	148.2
4	-/-	146.1	-/-	146.0
3	-/-	144.1	-/-	144.0
NH	10.81 (1H, s)	-/-	10.83 (1H, s)	-/-
4'	-/-	136.2	-/-	136.2
10	-/-	135.2	-/-	135.1
8a	-/-	134.6	-/-	134.6
5	9.01 (1H, d, <i>J</i> 8.3 Hz)	127.2	9.01 (1H, d, <i>J</i> 8.0 Hz)	127.1
1'	-/-	126.3	-/-	126.2
4b	-/-	125.9	-/-	128.9*
OH	8.63 (1H, s)	-/-	8.65 (1H, s)	-/-
8	7.97 (1H, d, <i>J</i> 7.4 Hz)	128.9	7.97 (1H, d, <i>J</i> 7.6 Hz)	125.9*
2	7.67 (1H, s)	113.8	7.65 (1H, s)	127.0*
7	7.53 (1H, t, <i>J</i> 7.4 Hz)	127.0	7.55 (t-like, <i>J</i> 7.6, 8.0 Hz)	116.0*
6	7.44 (1H, t, <i>J</i> 7.4 Hz)	125.0	7.45 (t-like, <i>J</i> 8.0, 7.6 Hz)	104.5*
10a	-/-	123.5	-/-	123.5
1	-/-	118.4	-/-	118.4
4a	-/-	116.1	-/-	113.8*
9	7.19 (1H, s)	104.6	7.17 (1H, s)	125.0*
2' and 6'	6.94 (2H, s)	105.2	6.93 (2H, s)	105.1
7'	5.11 (1H, d, <i>J</i> 7.9 Hz)	81.2	5.09 (1H, d, <i>J</i> 8.0 Hz)	81.1
8'	4.49-4.45 (1H, m)	73.2	4.47 (1H, m)	73.2
2'-OMe and 6'-OMe	3.80 (6H, s)	56.2	3.80 (6H, s)	56.1
9'	1.26 (3H, d, <i>J</i> 6.4 Hz)	16.8	1.26 (3H, d, <i>J</i> 6.4 Hz)	16.8

\* Assignments for these carbons (C4b, C8, C2, C7, C6, C4a, C9) were corrected to be C8, C4b, C7, C4a, C9, C2, C6 respectively.

**Table S1: Comparison of synthetic and natural (+)-aristolactam GI (1).**