Short Asymmetric Synthesis of Phenantroindolizidines through Chiral Homoallylic sulfinamines.

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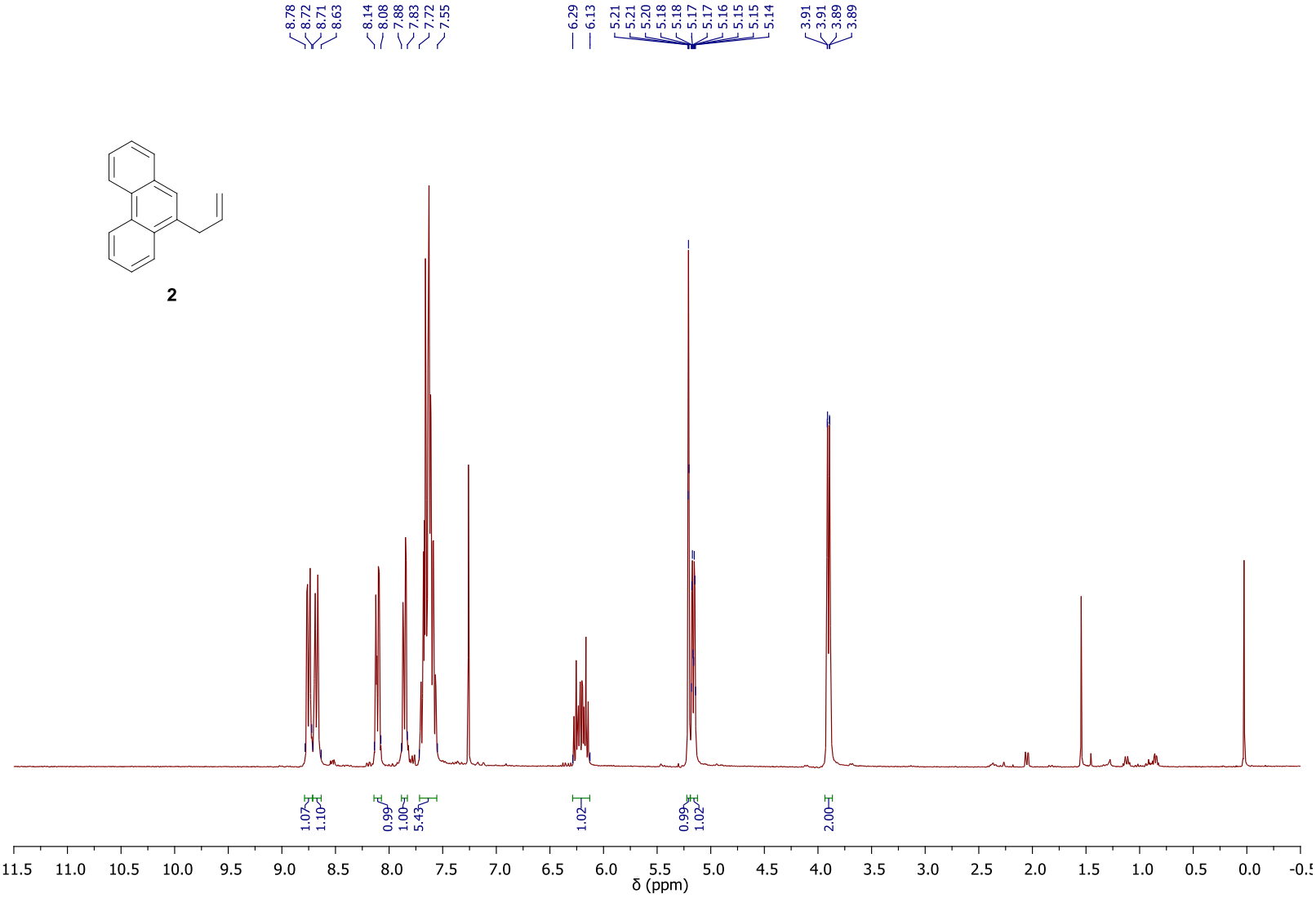
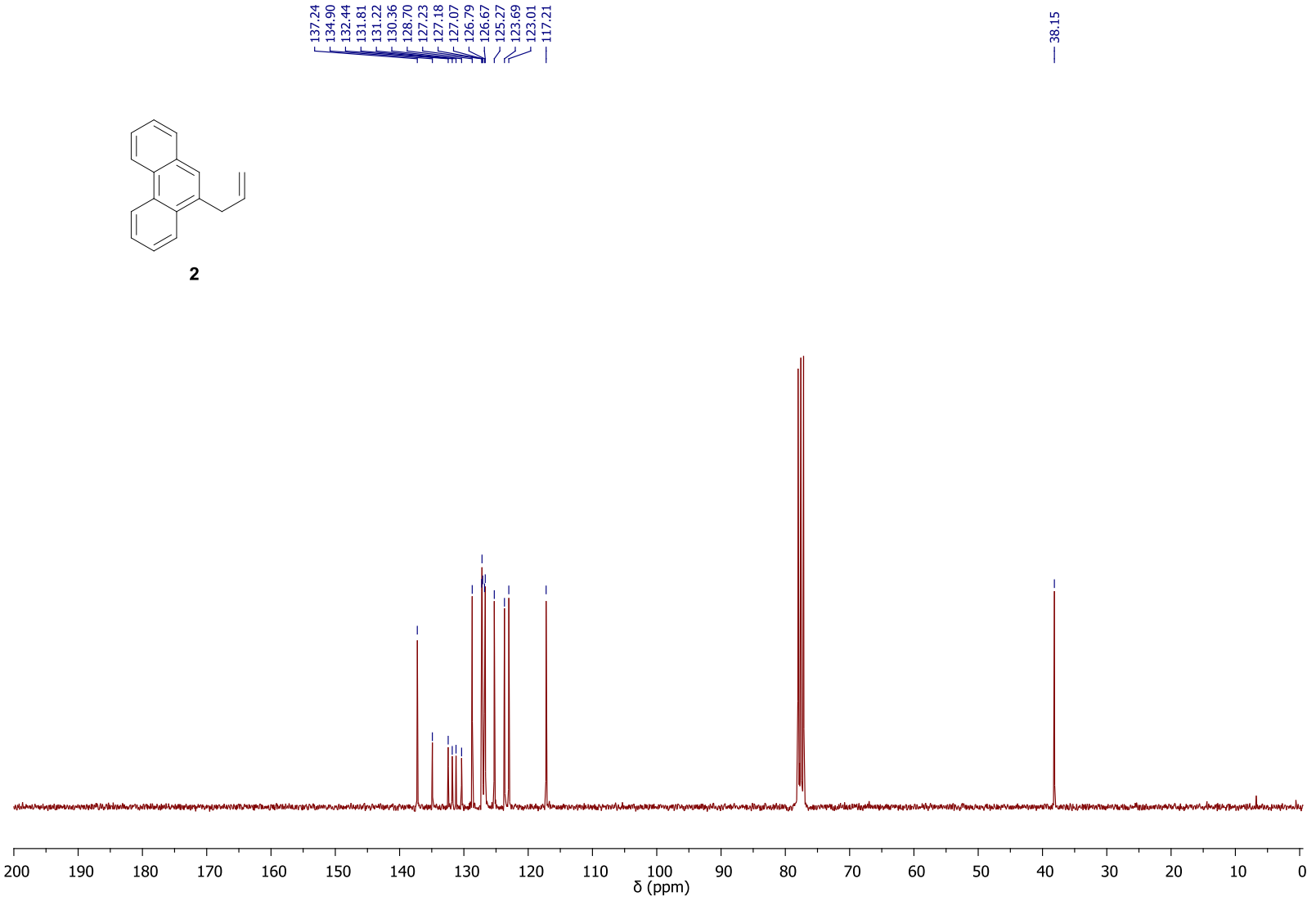
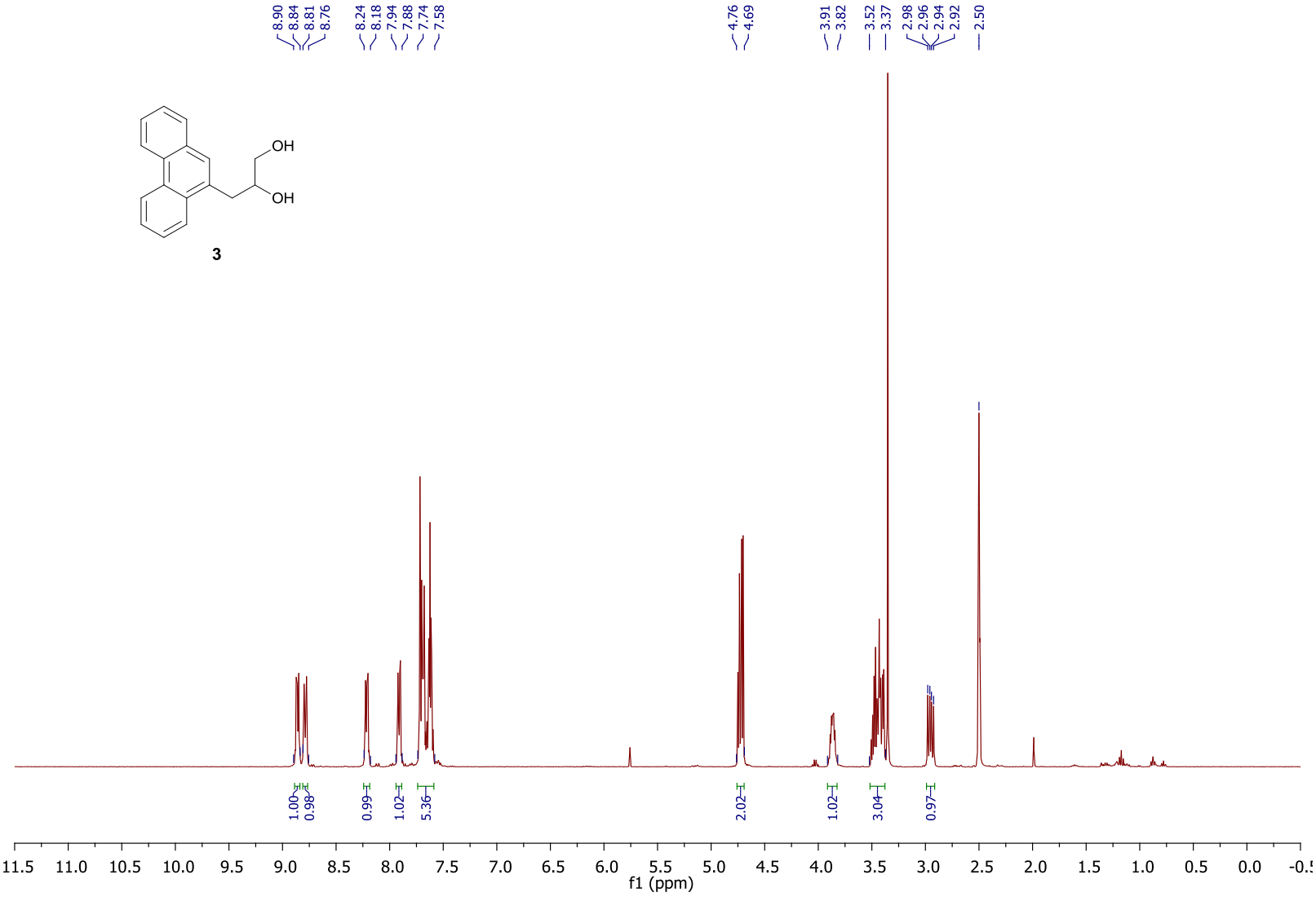
^{1}H NMR (300 MHz, $CDCl_3$)

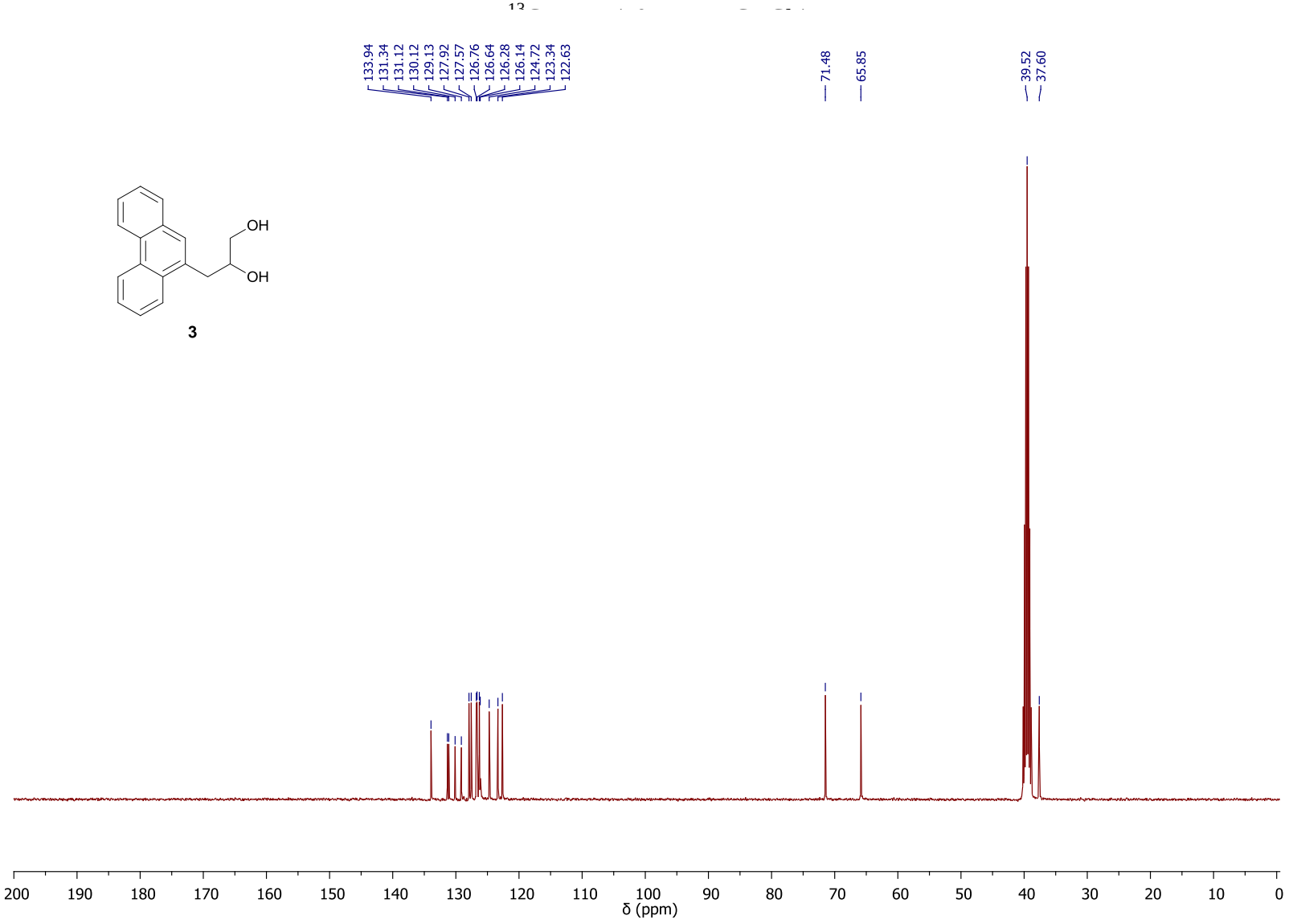


^{13}C NMR (75 MHz, $CDCl_3$)

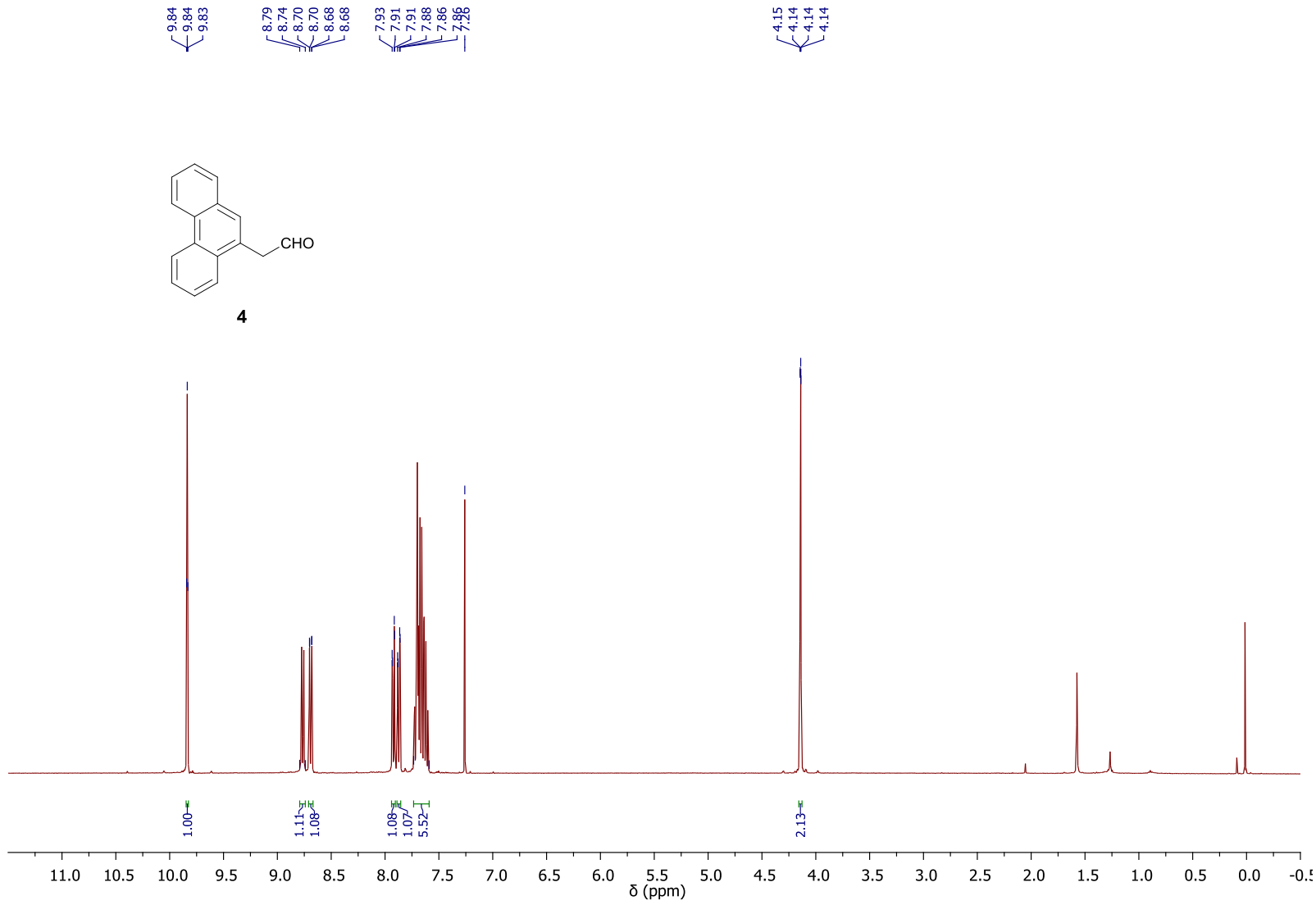


^{1}H NMR (400 MHz, $CDCl_3$)

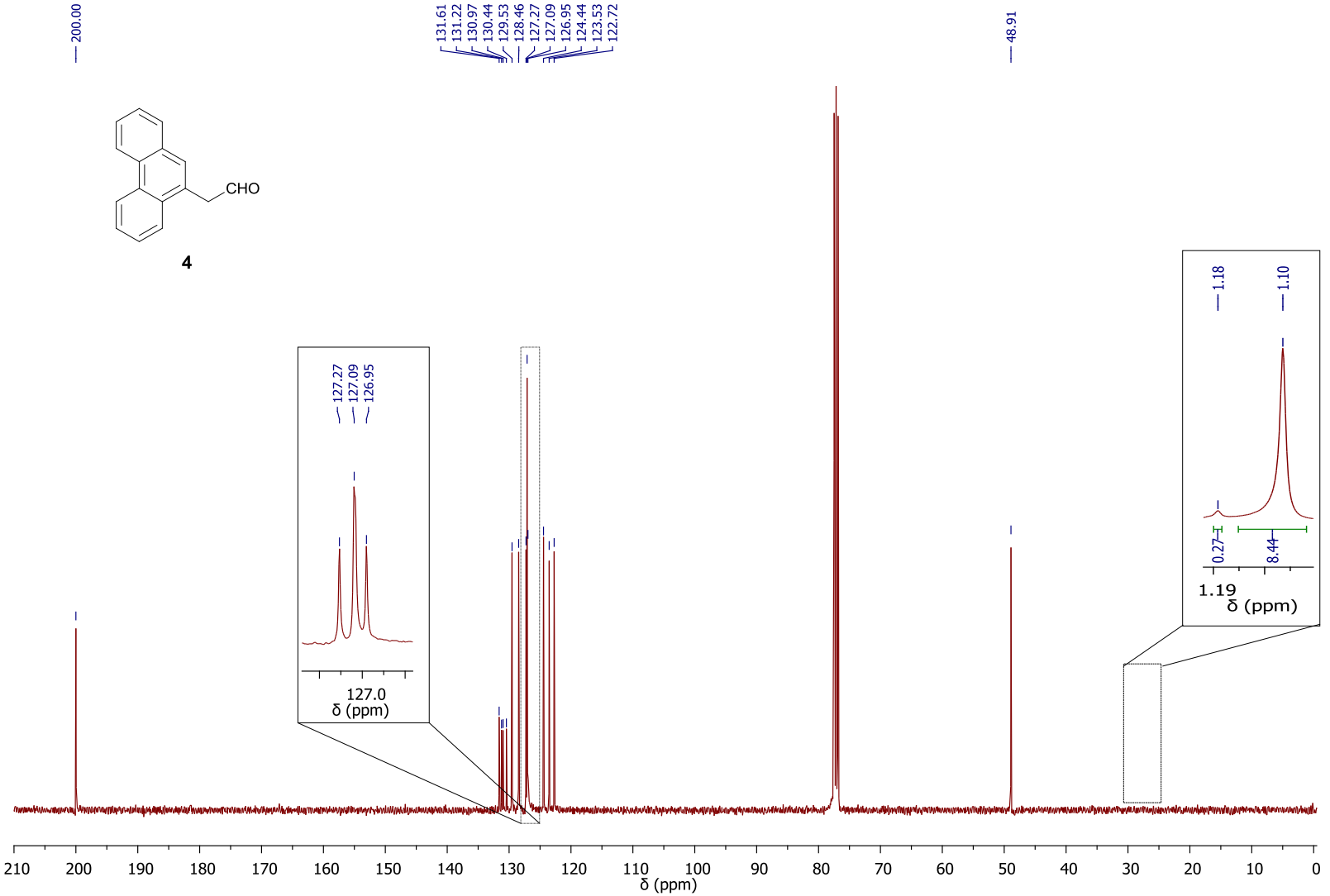


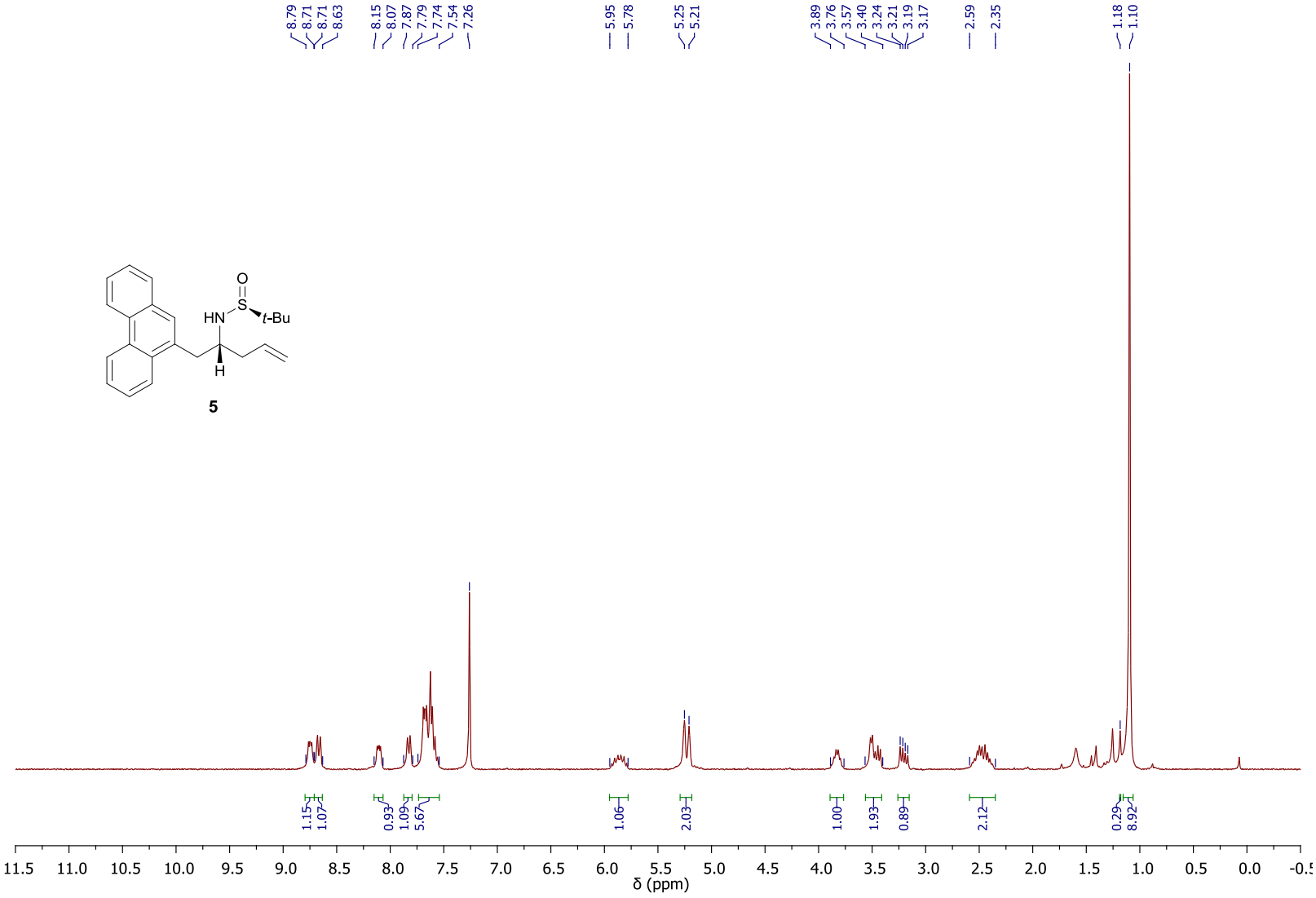

133.94
131.34
131.12
130.12
129.13
127.92
127.57
126.76
126.64
126.28
126.14
124.72
123.34
122.63
71.48
65.85
39.52
37.60
OH
OH
3
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
δ (ppm)

^{1}H NMR (400 MHz, $CDCl_3$)

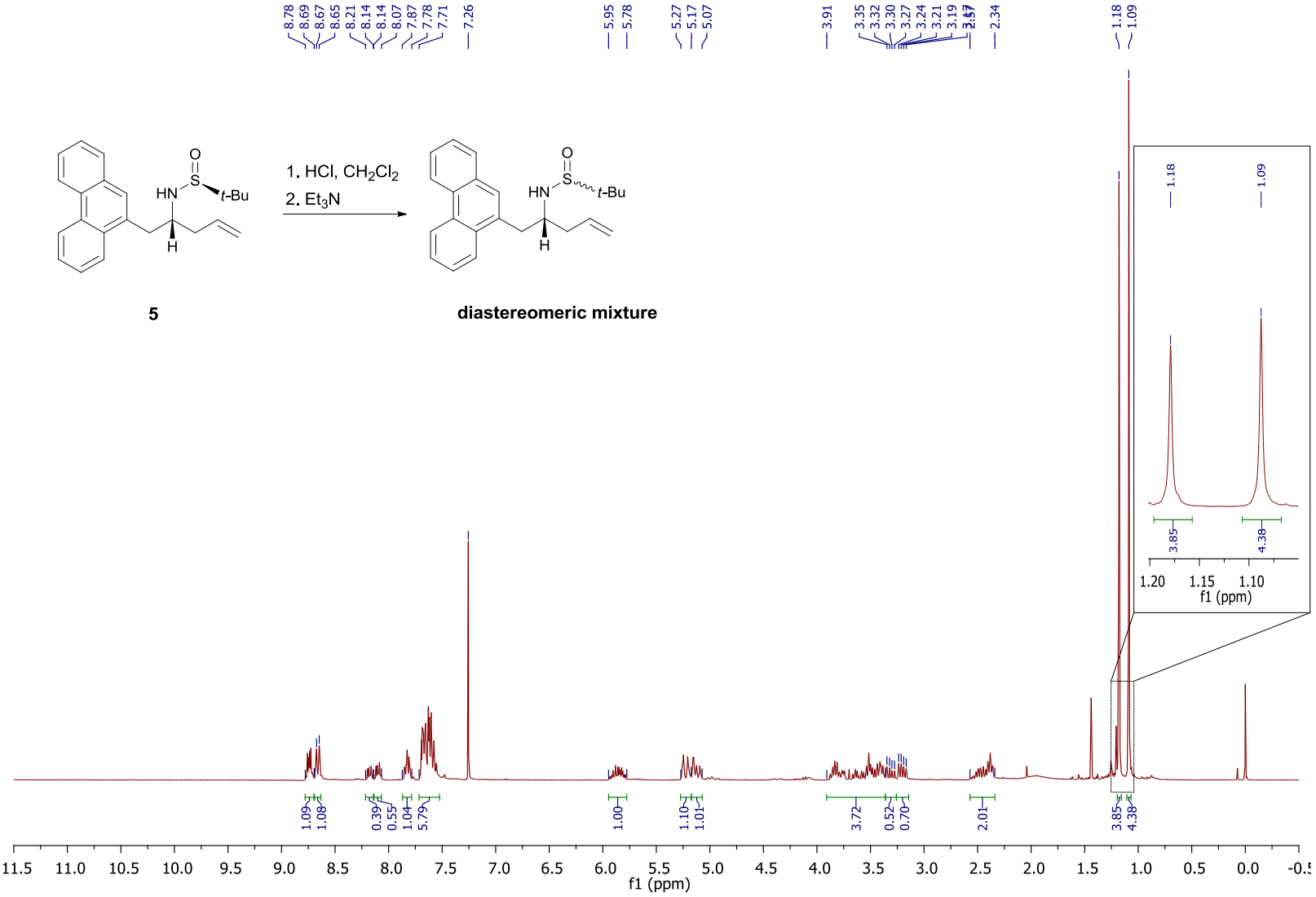


^{1}H NMR (300 MHz, $CDCl_3$)

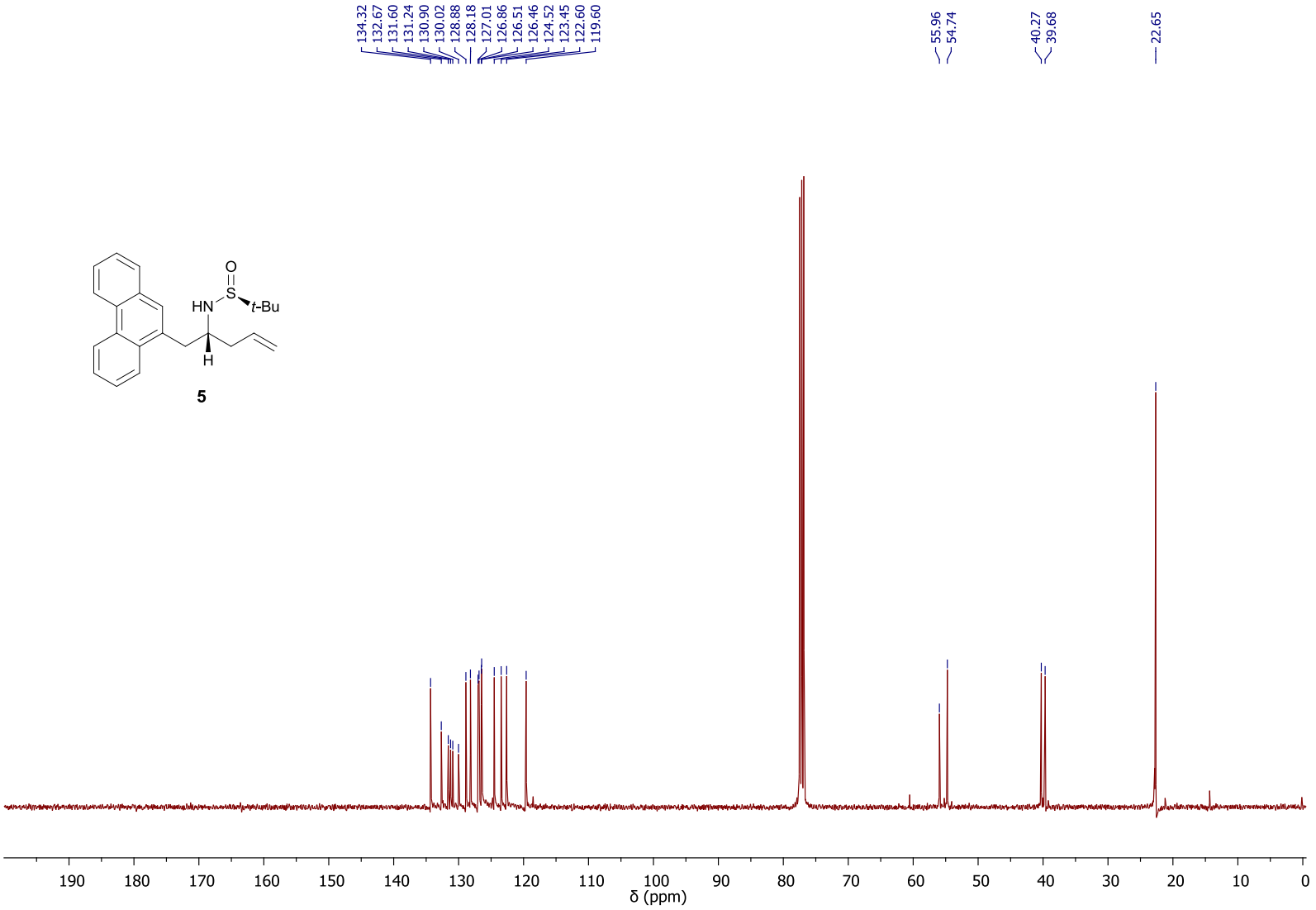



8.79
8.71
8.71
8.63
8.15
8.07
7.87
7.79
7.74
7.54
7.26
5.95
5.78
5.25
5.21
3.89
3.76
3.57
3.40
3.24
3.21
3.19
3.17
2.59
2.35
1.18
1.10
HN
S
O
t-Bu
H
5
1.15
1.07
0.93
1.09
5.67
1.06
2.03
1.00
1.93
0.89
2.12
0.29
8.92
11.5 11.0 10.5 10.0 9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 0.0
δ (ppm)

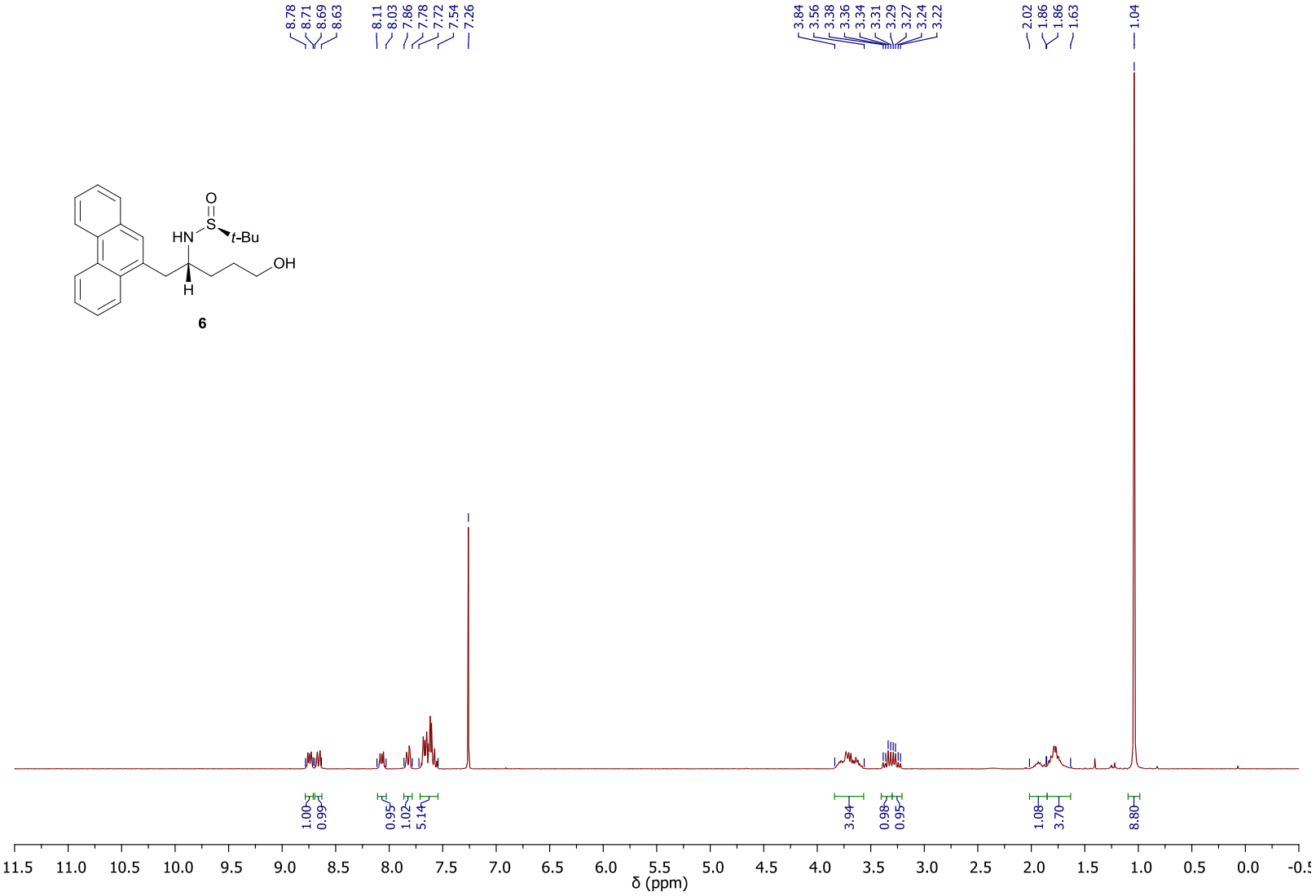
^{1}H NMR (300 MHz, $CDCl_3$)

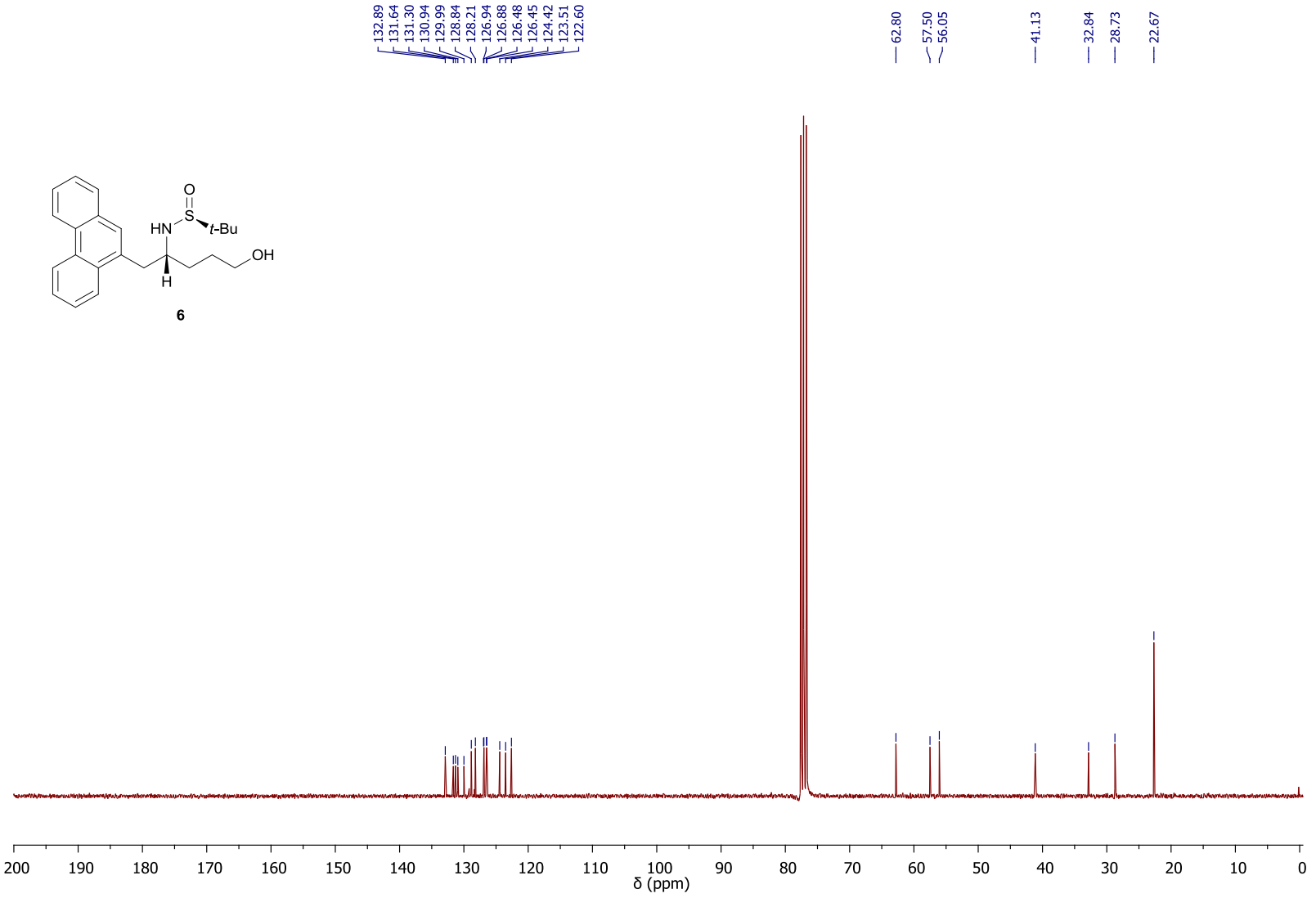


^{13}C NMR (101 MHz, $CDCl_3$)

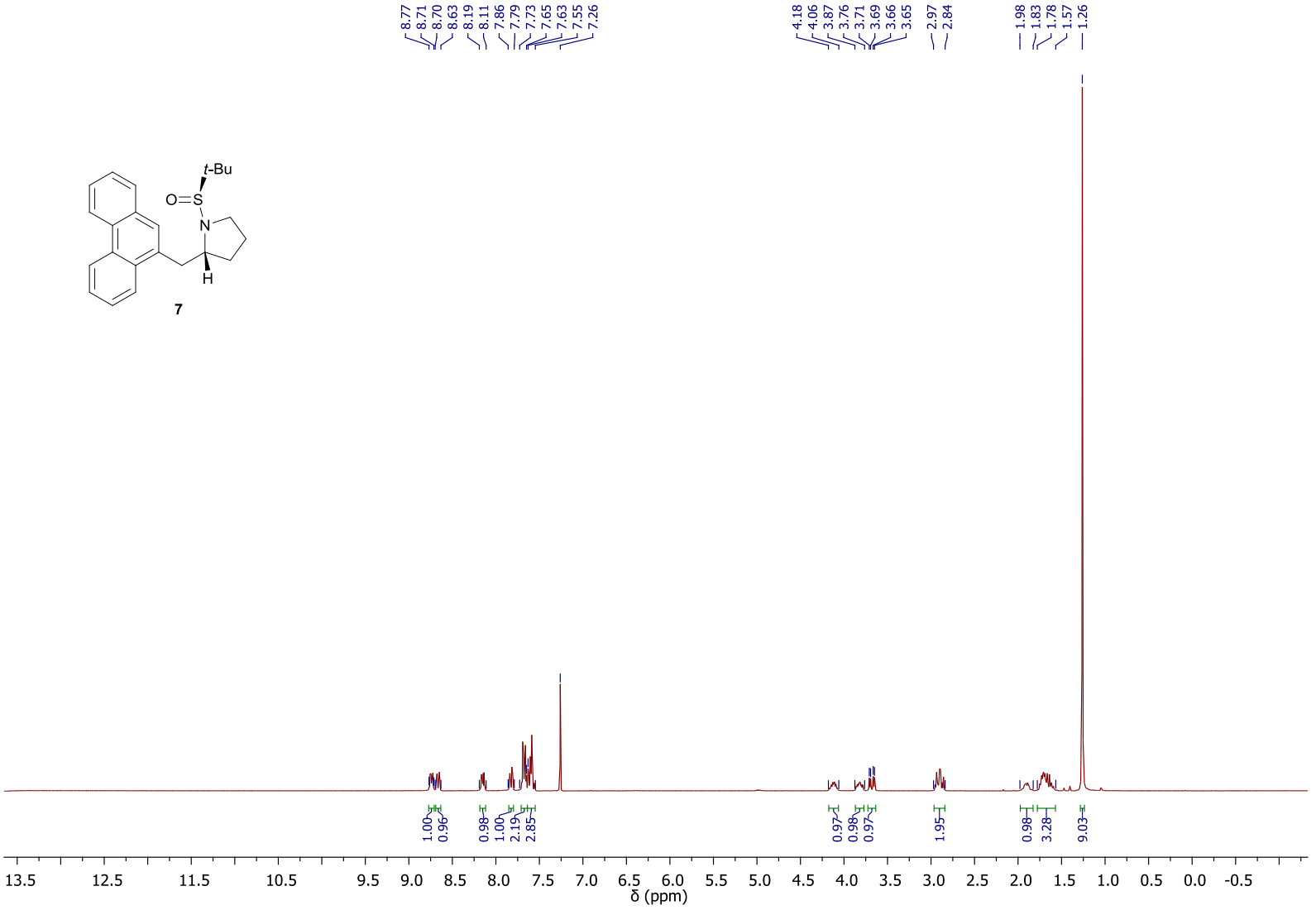


^{13}C NMR (75 MHz, $CDCl_3$)

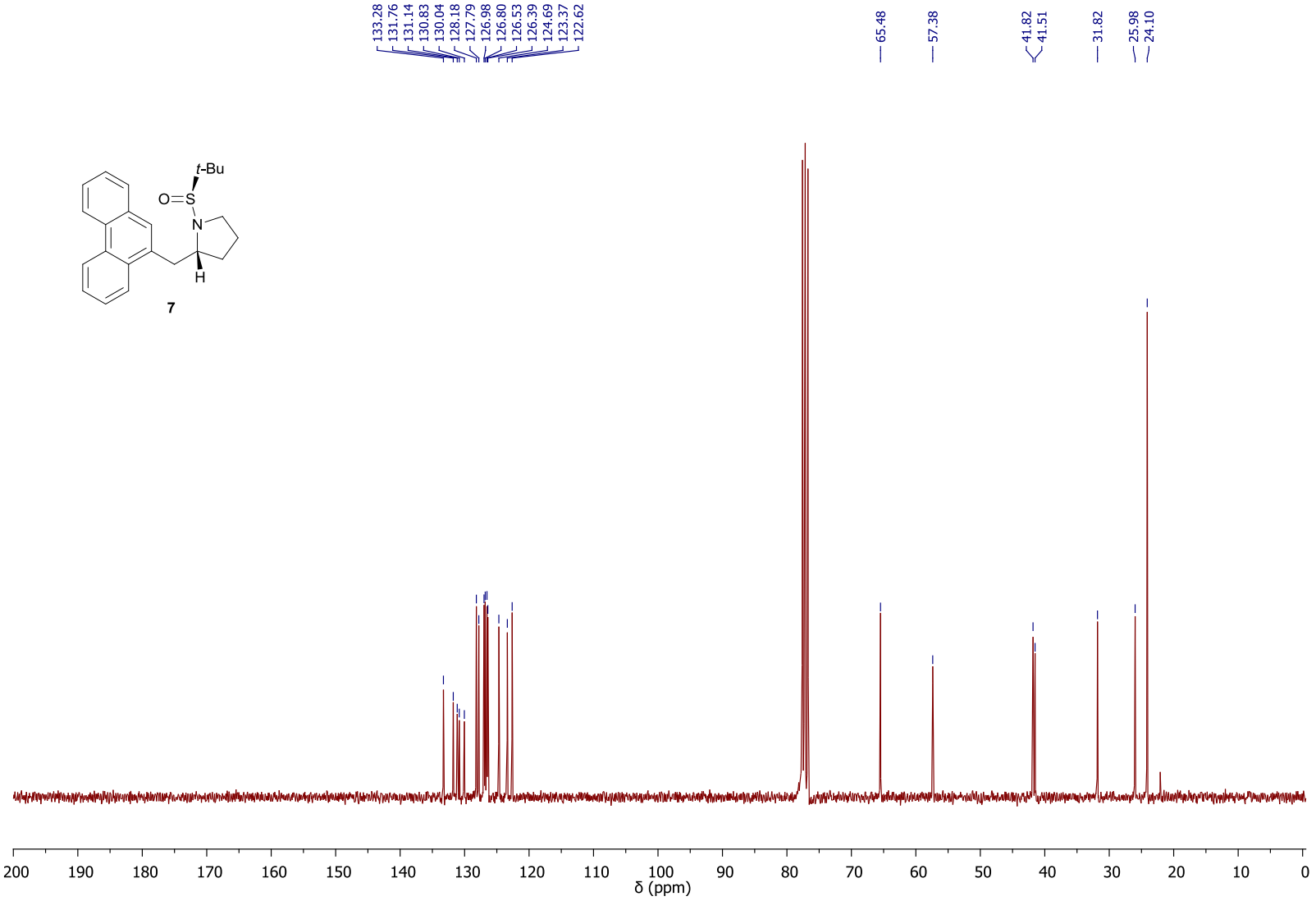



132.89
131.64
131.30
130.94
129.99
128.84
128.21
126.94
126.88
126.48
126.45
124.42
123.51
122.60
62.80
57.50
56.05
41.13
32.84
28.73
22.67
O
S
HN
t-Bu
OH
H
6
200
190
180
170
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
δ (ppm)

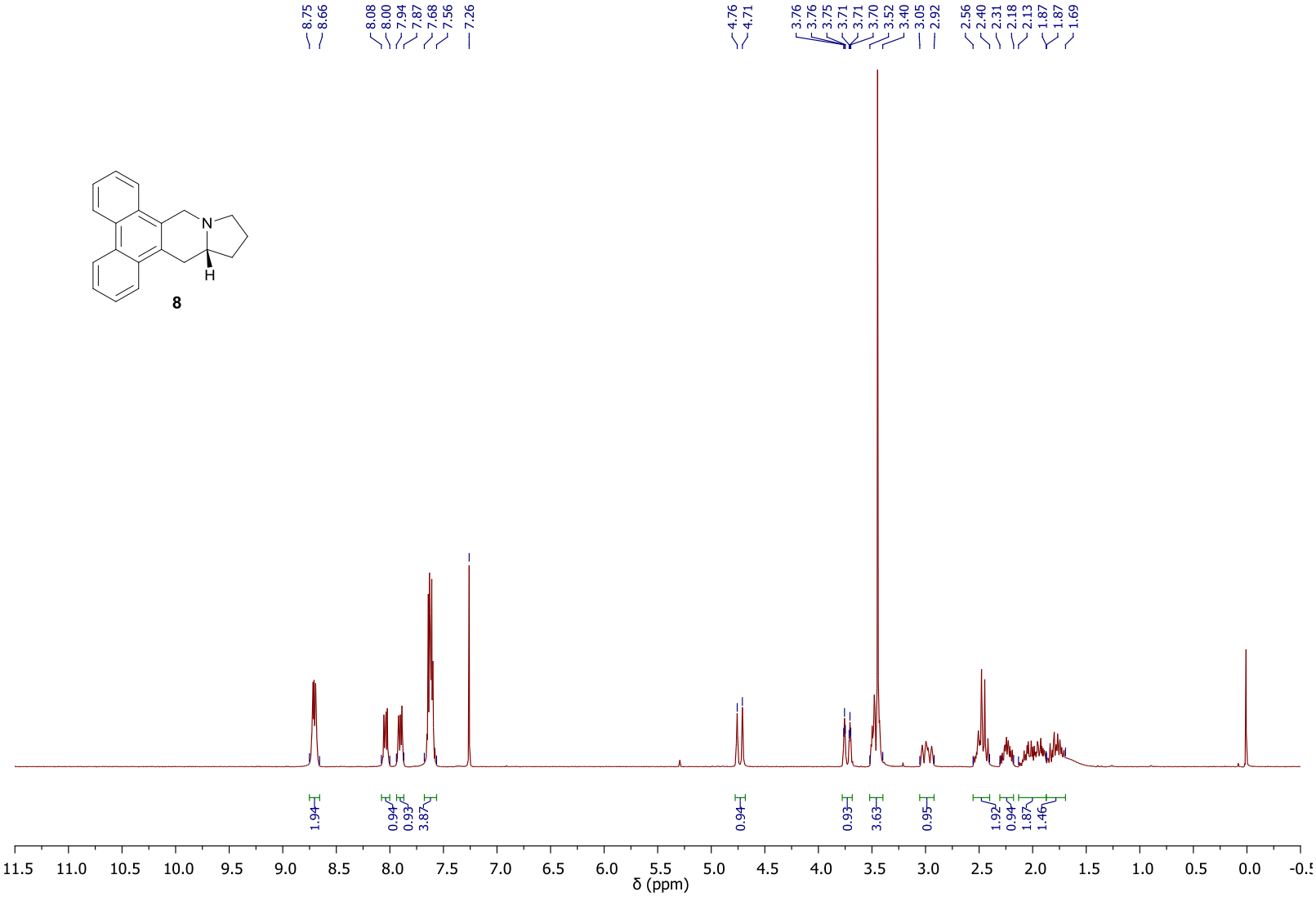
^{1}H NMR (300 MHz, $CDCl_3$)



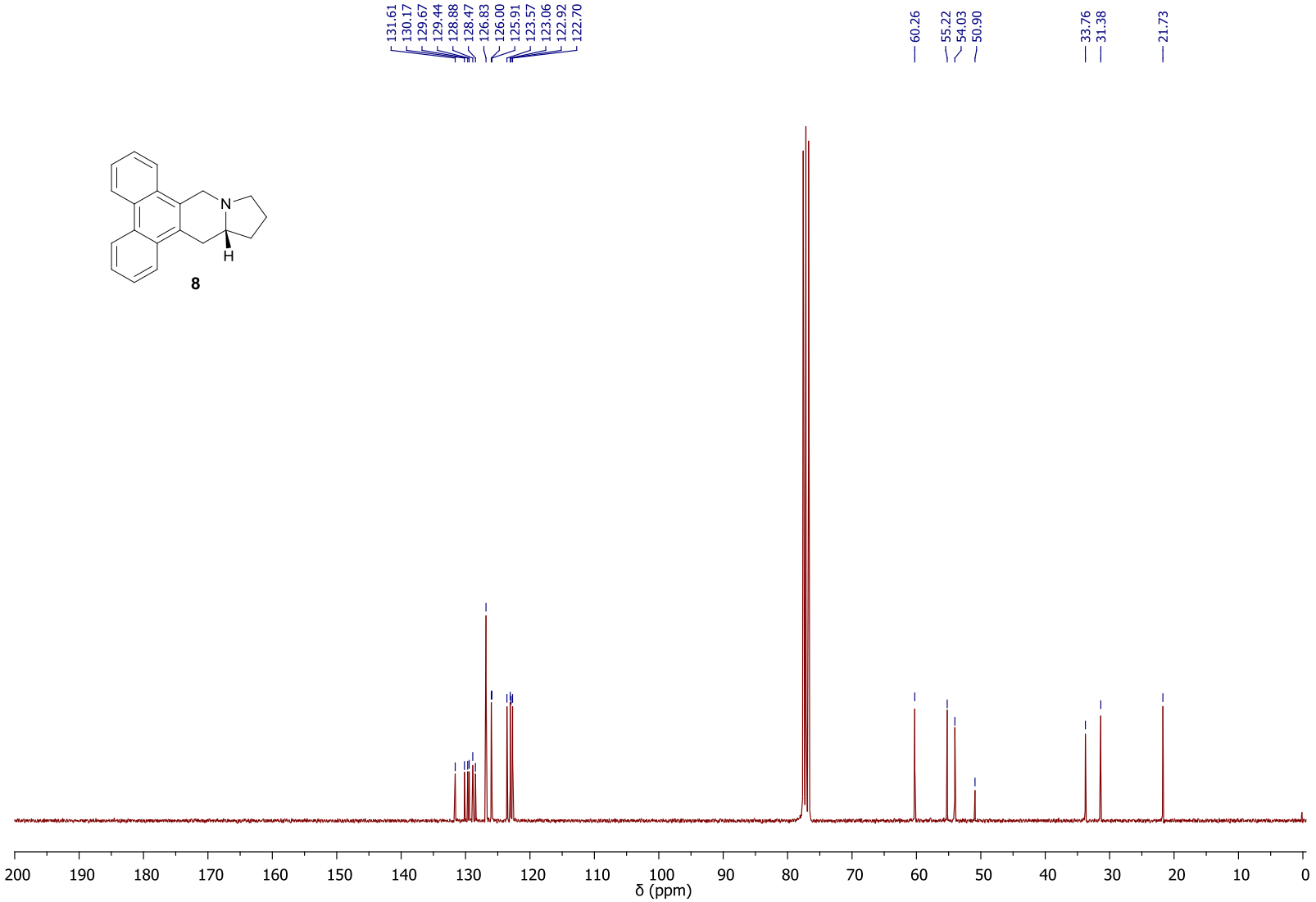
^{13}C NMR (75 MHz, $CDCl_3$)



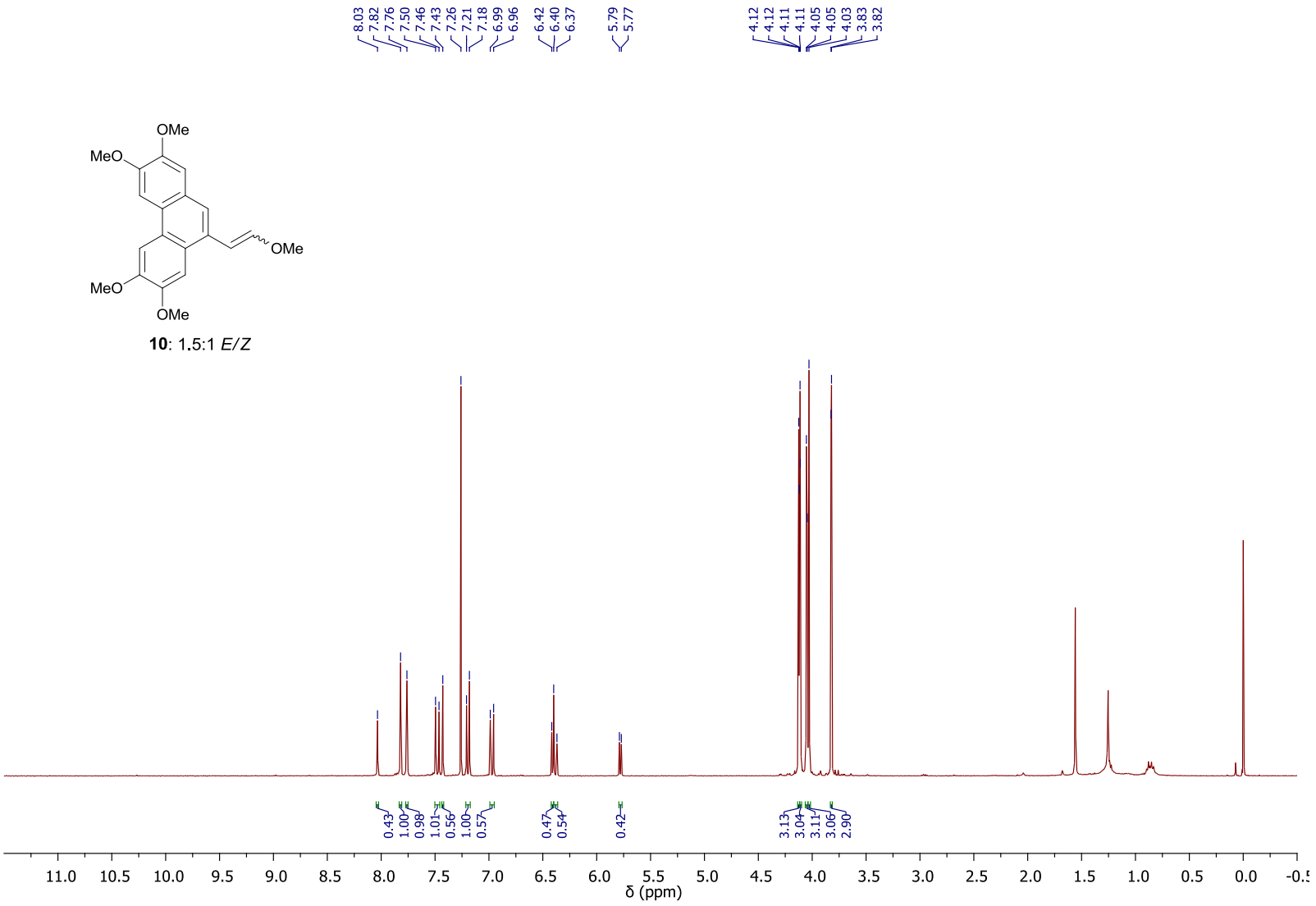
^{1}H NMR (300 MHz, $CDCl_3$)



^{13}C NMR (75 MHz, $CDCl_3$)

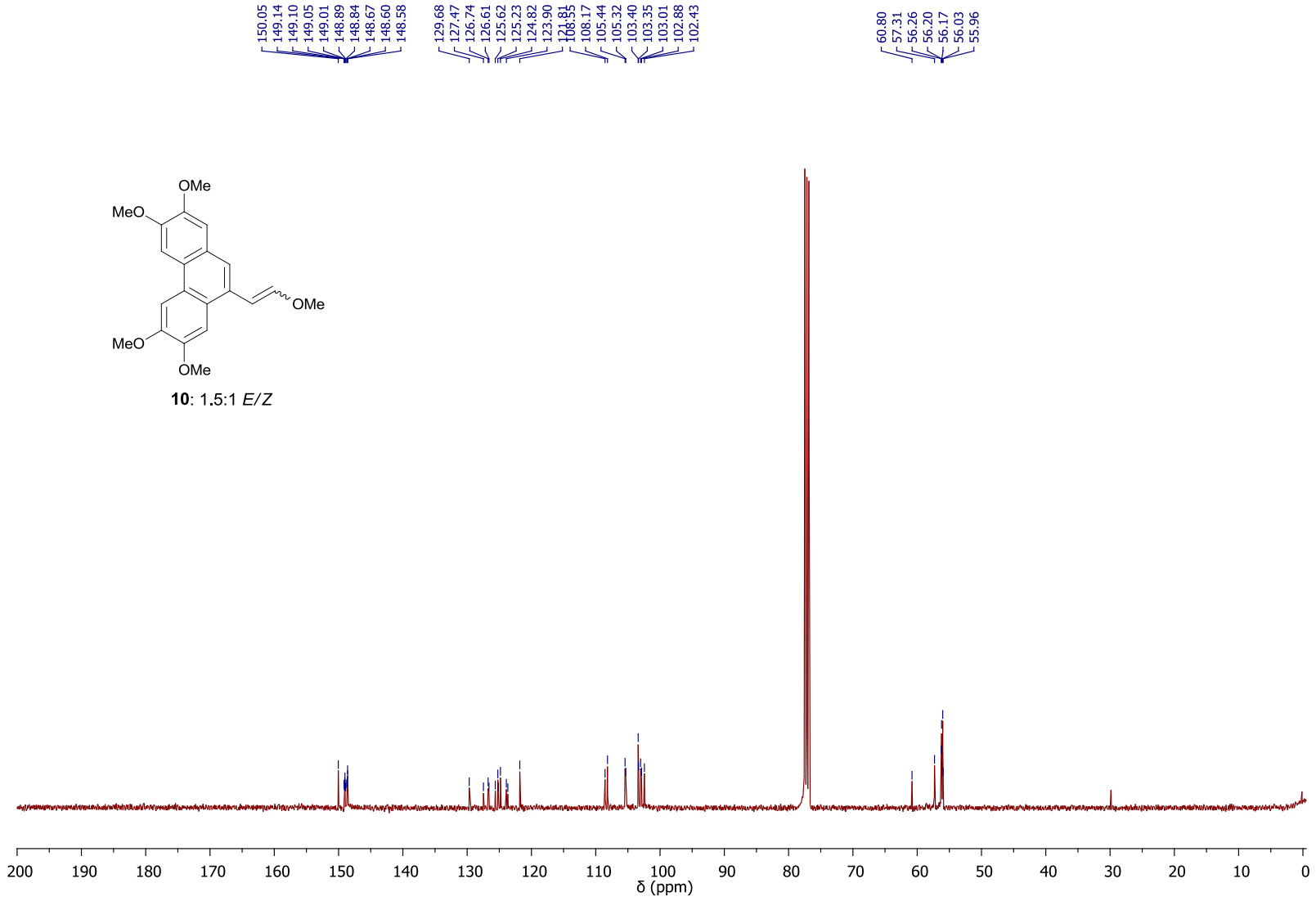


^{1}H NMR (400 MHz, $CDCl_3$)



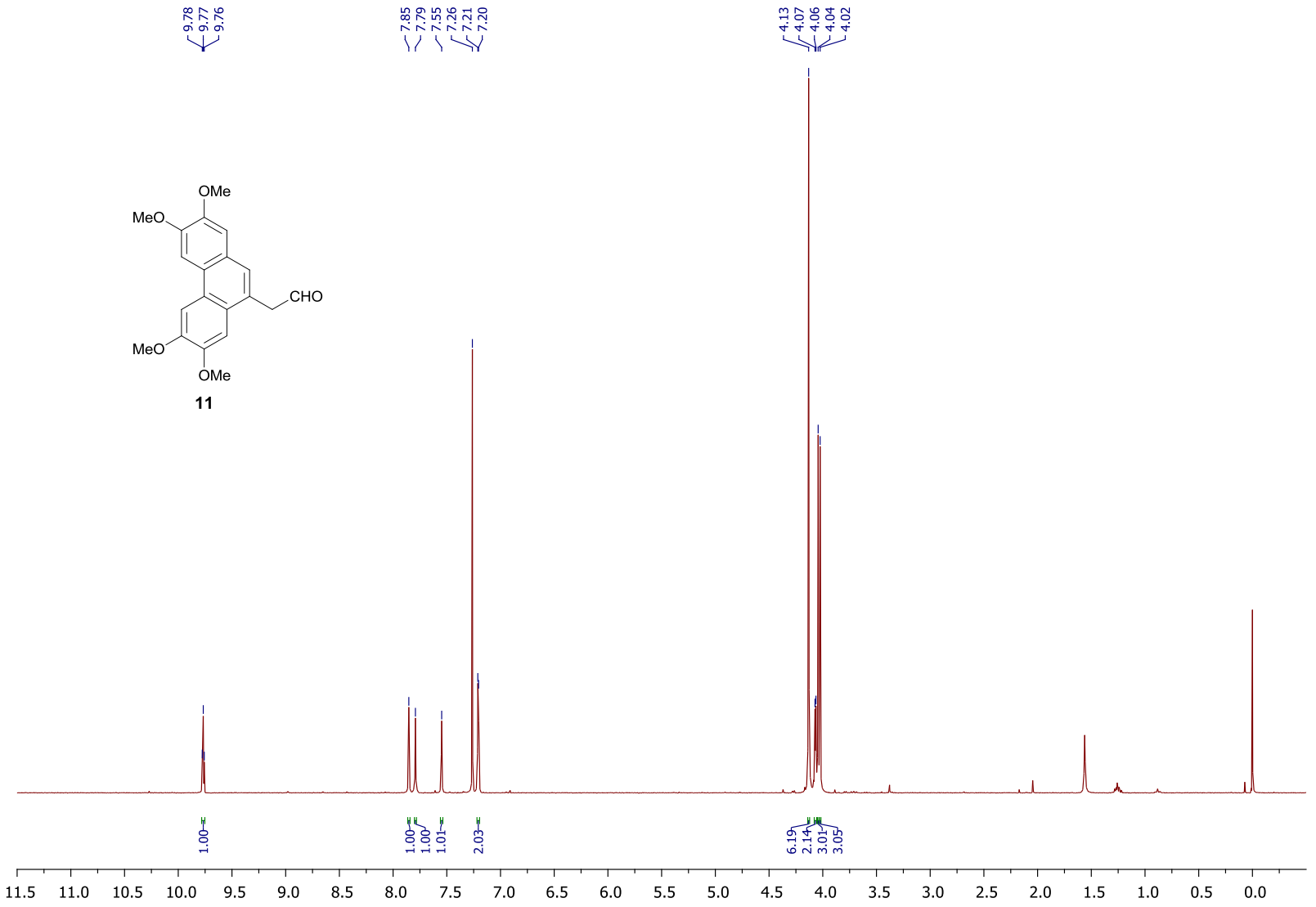
10: 1.5:1 *E*/*Z*

^{13}C NMR (101 MHz, $CDCl_3$)

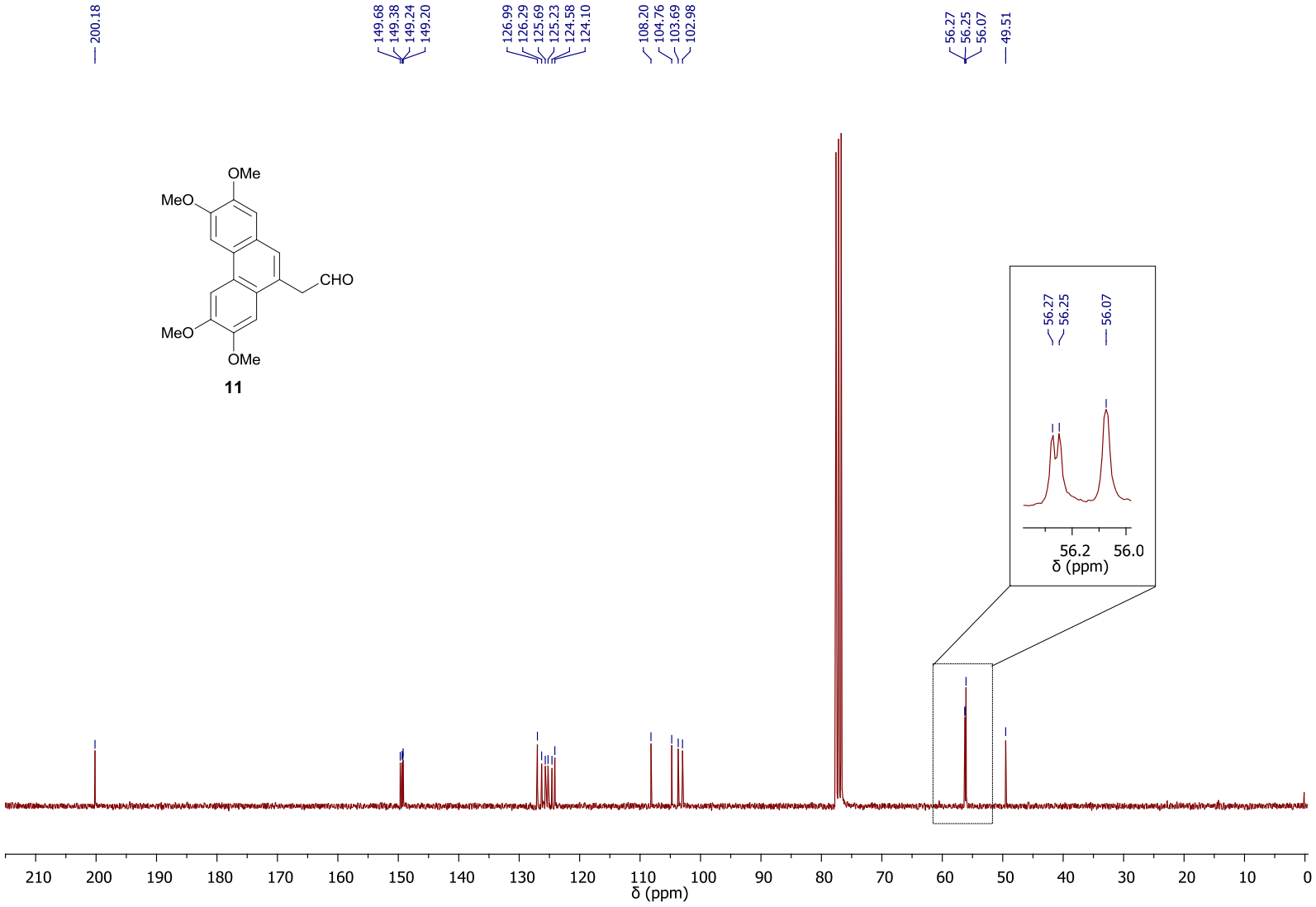


10: 1.5:1 *E/Z*

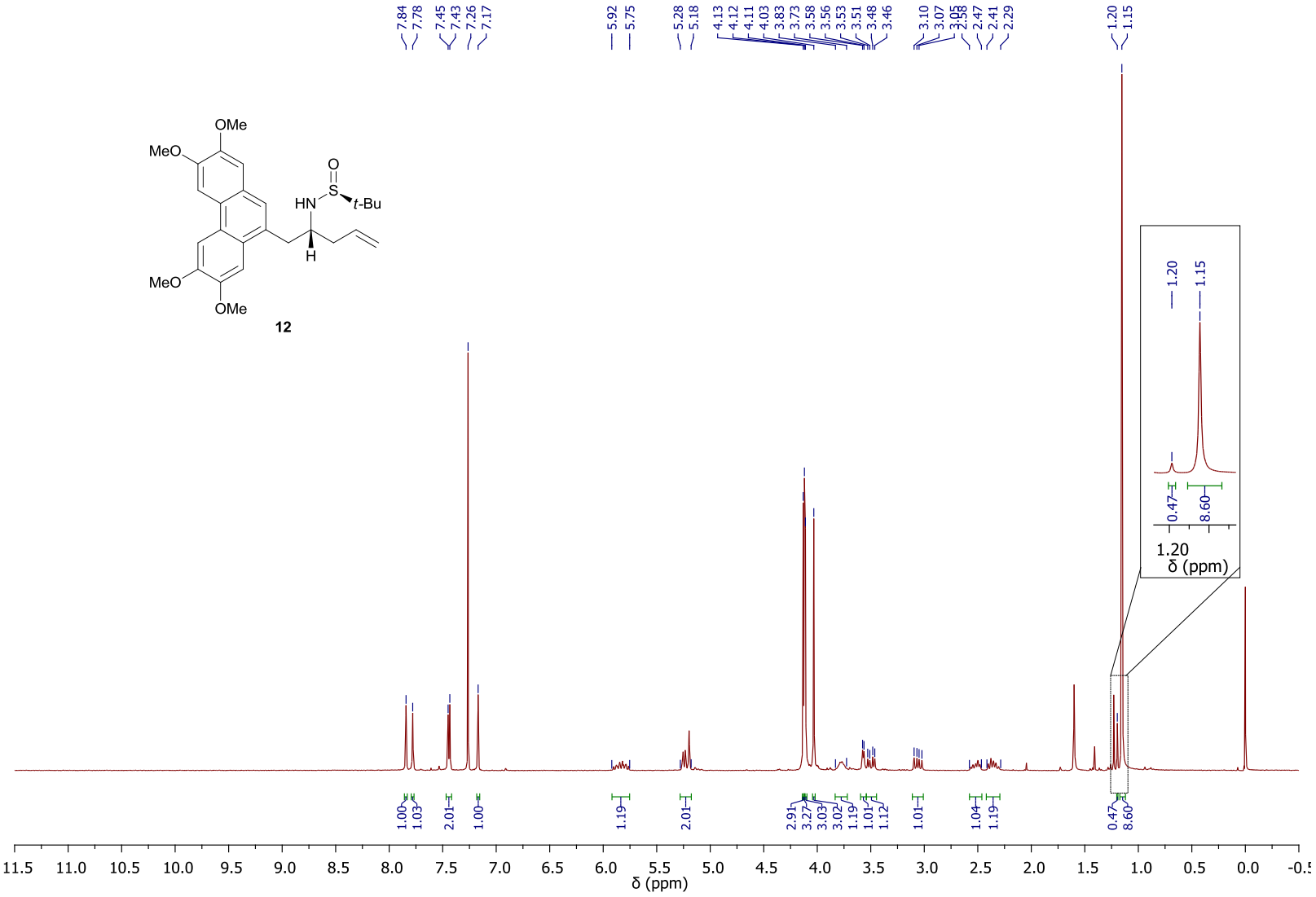
^{1}H NMR (300 MHz, $CDCl_3$)



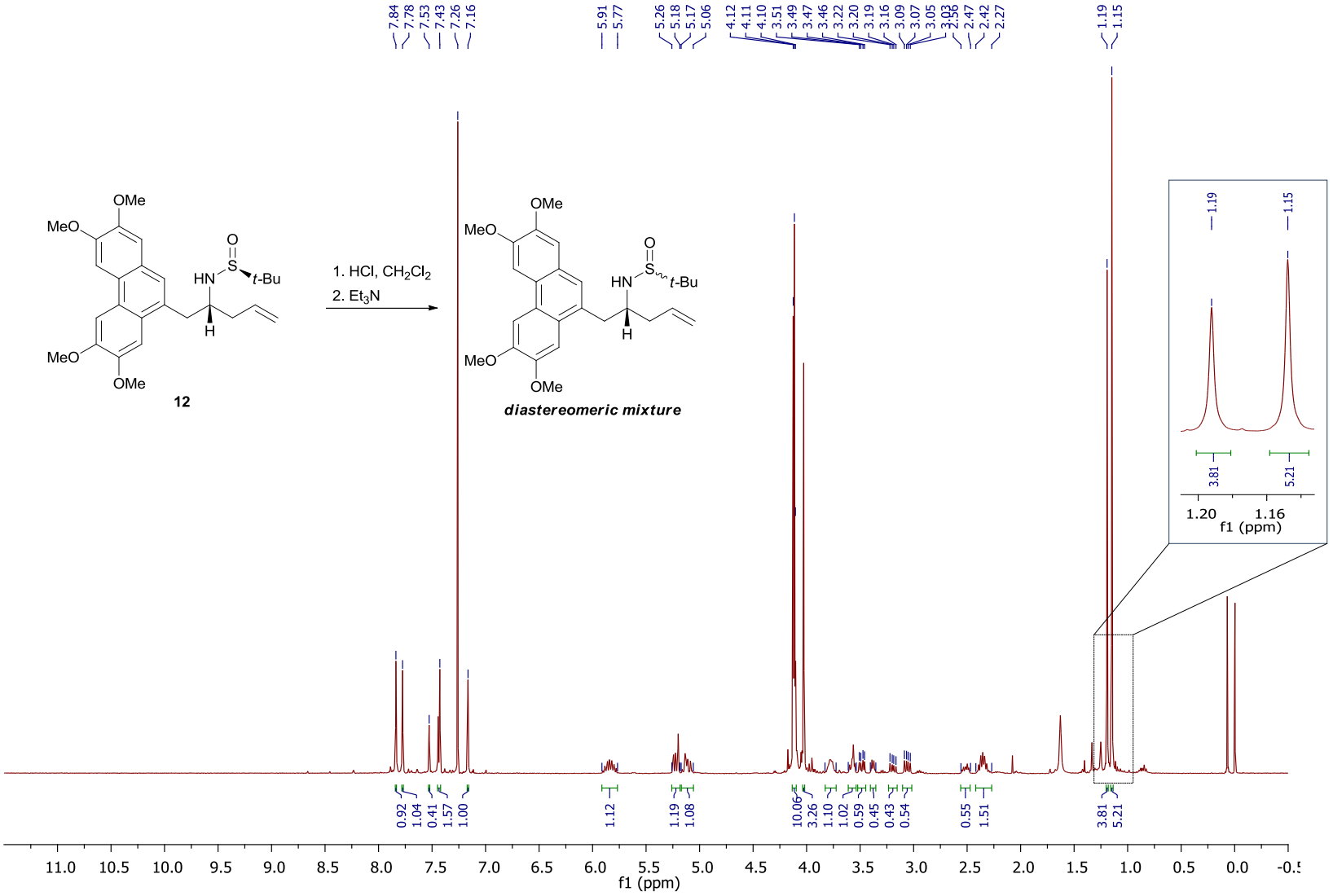
^{13}C NMR (75 MHz, $CDCl_3$)



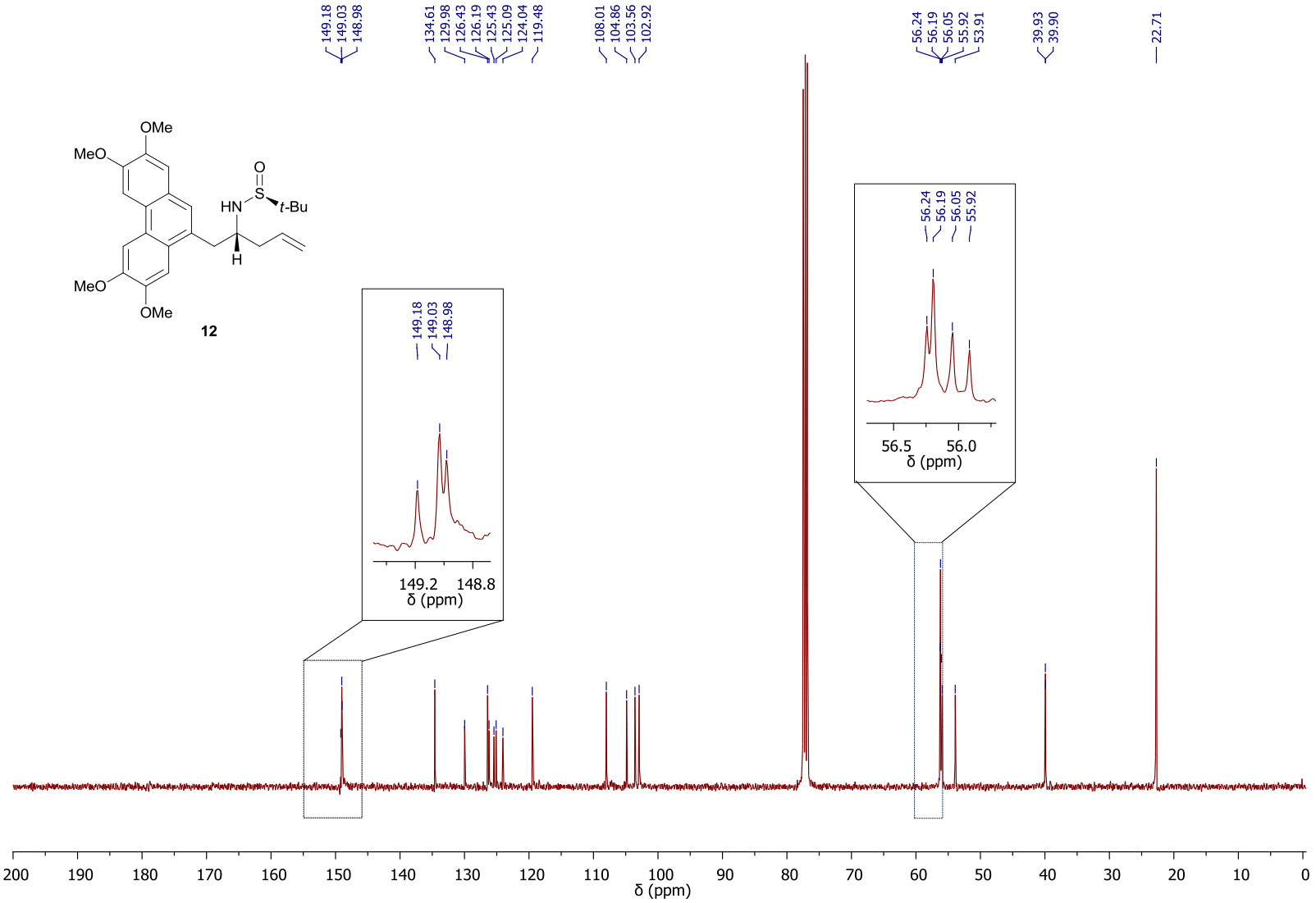
^{1}H NMR (300 MHz, $CDCl_3$)



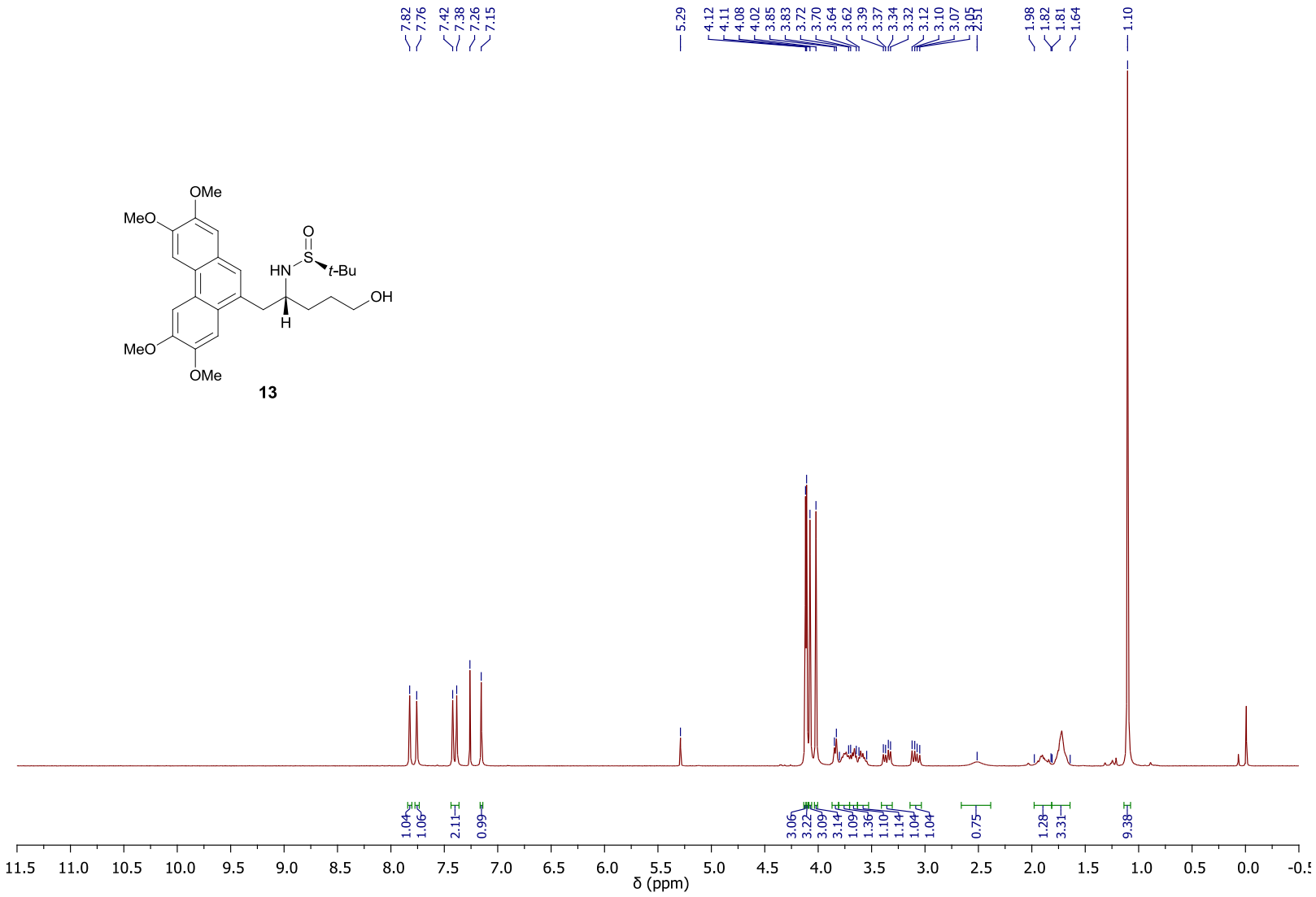
^{1}H NMR (400 MHz, $CDCl_3$)



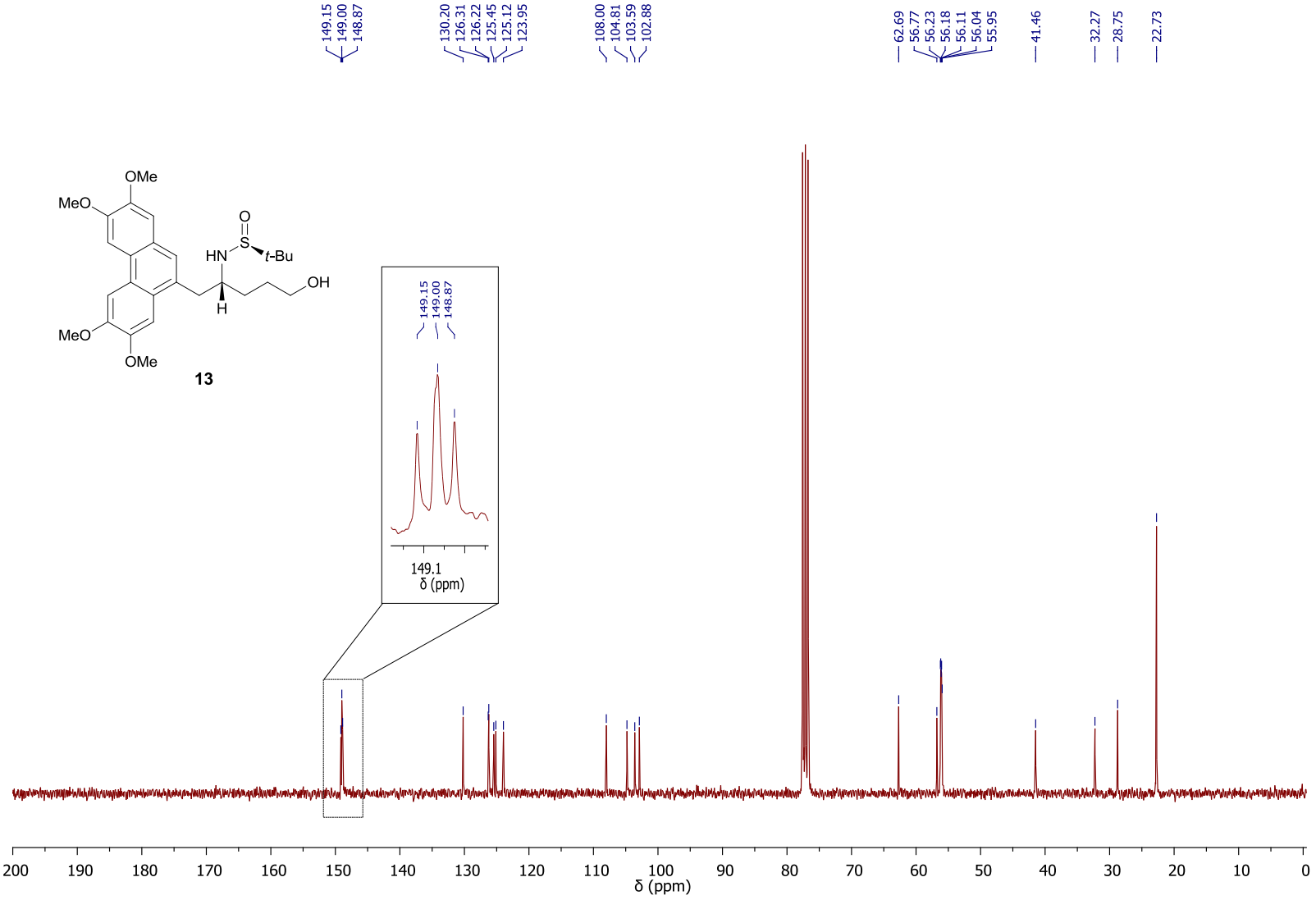
^{13}C NMR (101 MHz, $CDCl_3$)



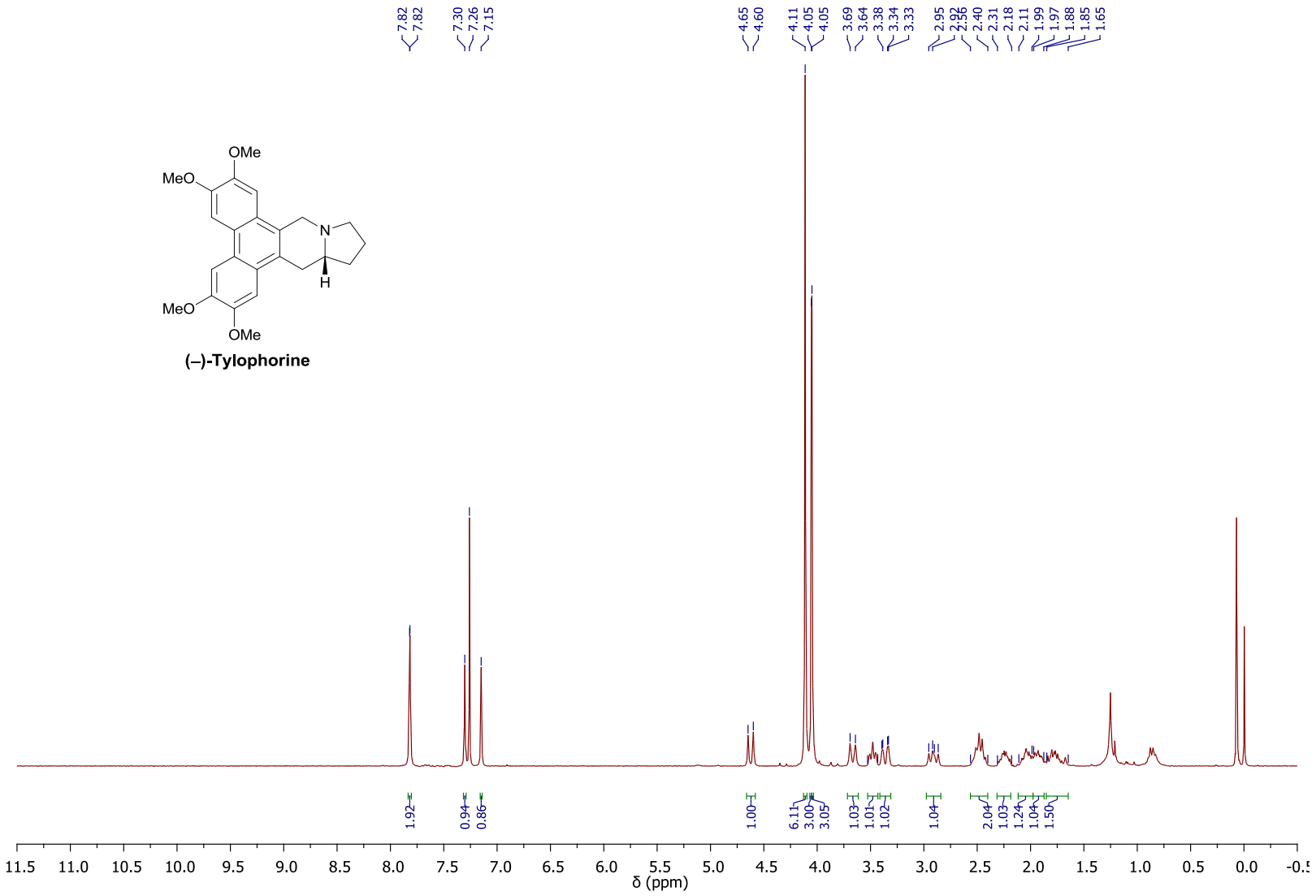
^{1}H NMR (300 MHz, $CDCl_3$)



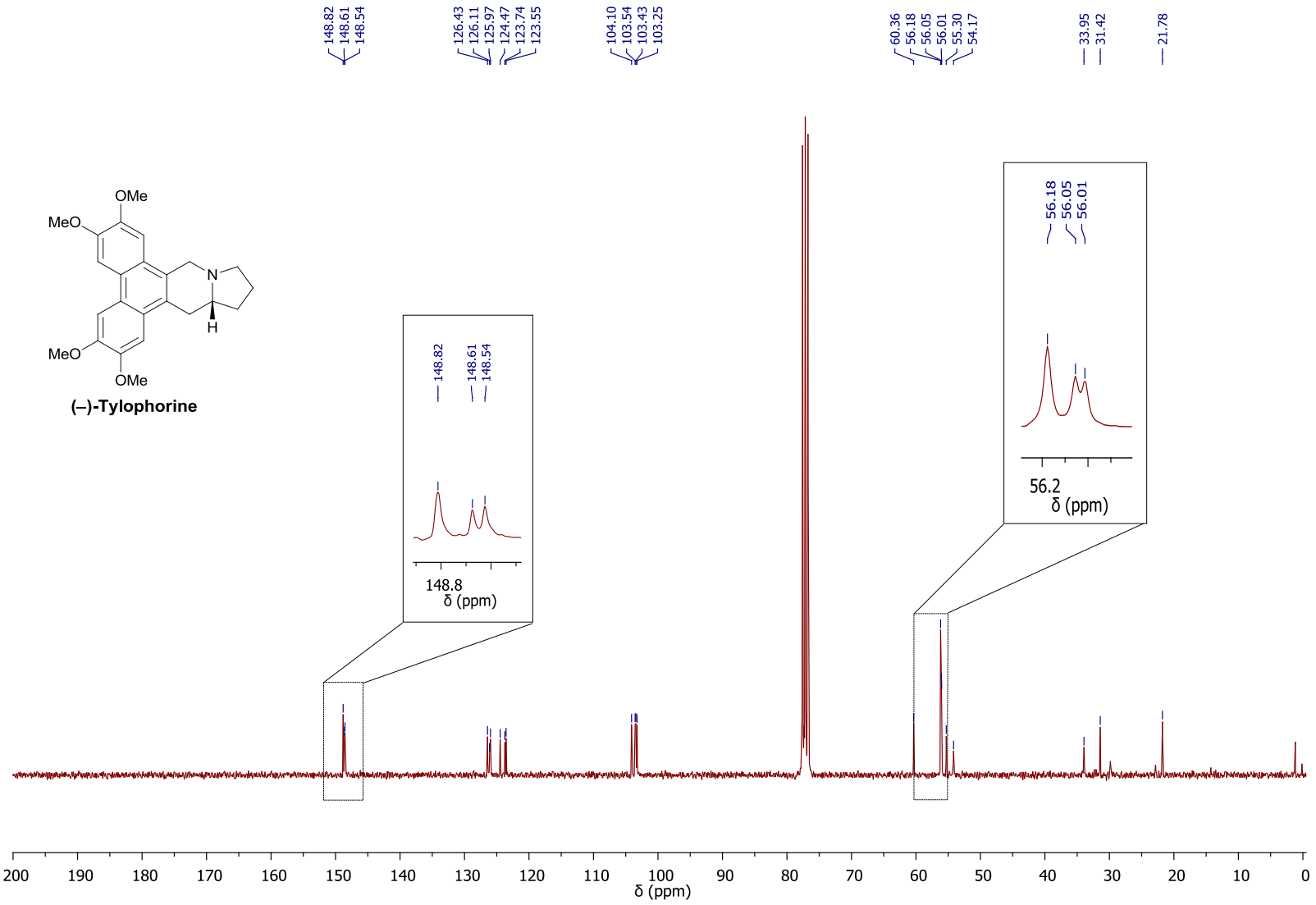
^{13}C NMR (75 MHz, $CDCl_3$)



^{1}H NMR (300 MHz, $CDCl_3$)

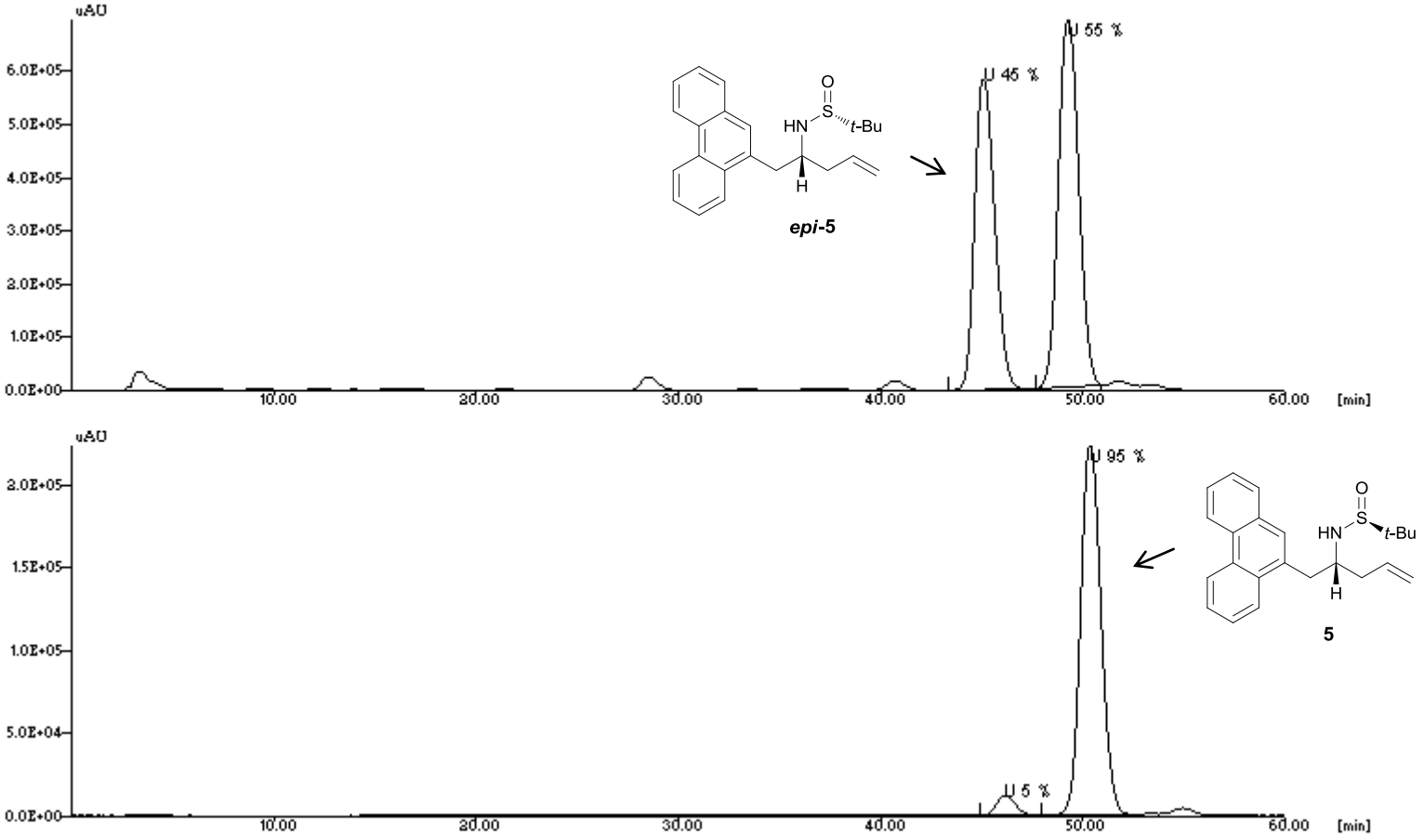


^{13}C NMR (75 MHz, $CDCl_3$)



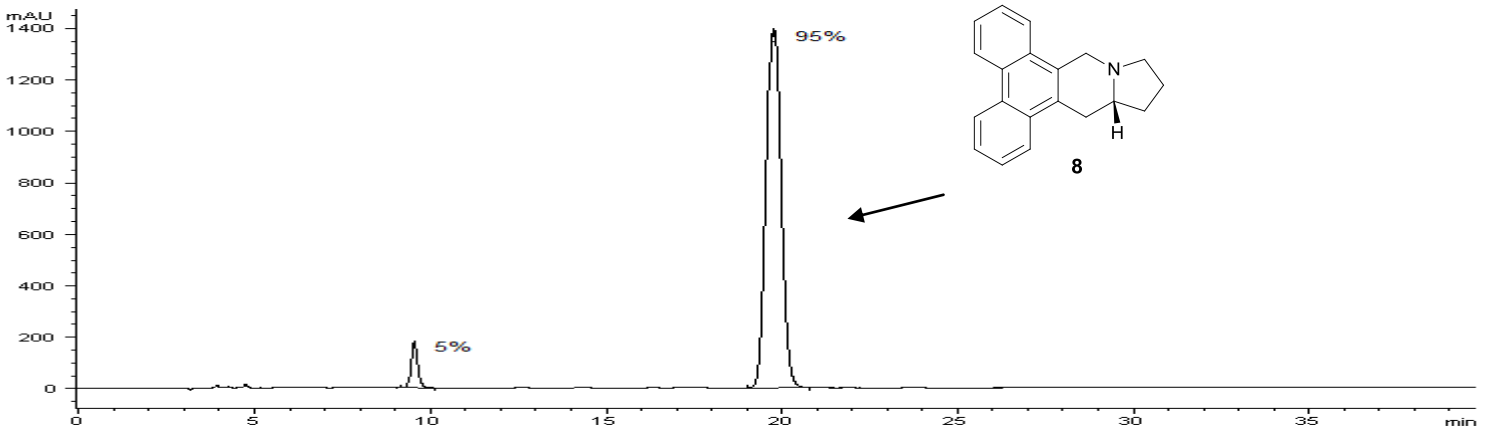
HPLC traces of: compound **5**/epimeric mixture of compound **5**.

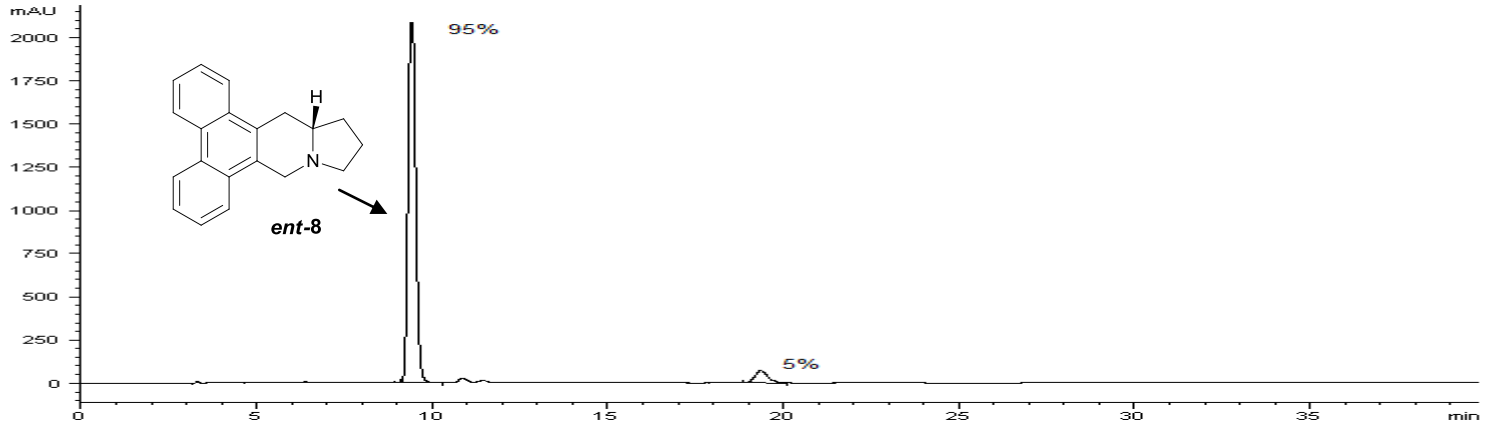
Conditions: Tracer Excel 120 column 15 cm x 0.46 cm, isocratic elution with 99:1 *n*-hexane/*i*-PrOH, 1.0 mL/min, UV detection at 254 nm.



HPLC traces of: compounds **8**/***ent-8***

Conditions: AD-H column 25 cm x 0.46 cm, isocratic elution with 75:25:0.1 *n*-hexane/*i*-PrOH/Et_3N, 1.0 mL/min, UV detection at 254 nm.





HPLC traces of: compound **12**/epimeric mixture of compound **12**.

Conditions: Tracer Excel 120 column 15 cm x 0.46 cm , isocratic elution with 95:5 n-hexane/i-PrOH, 1.0 mL/min, UV detection at 254 nm.