

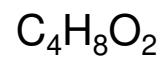


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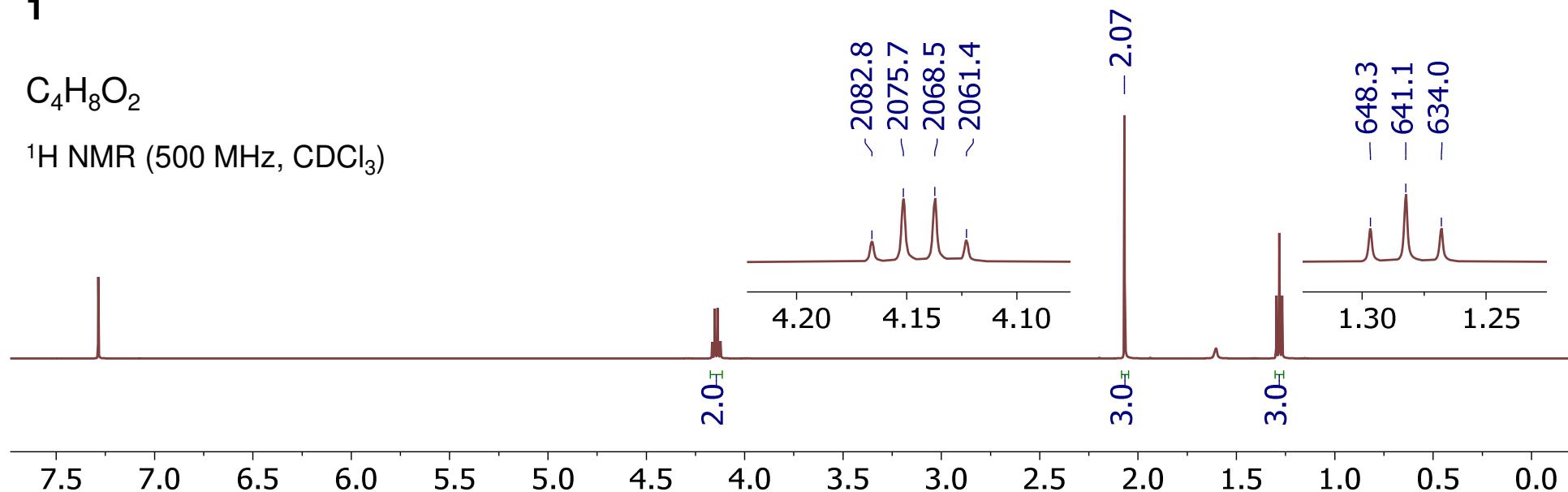
1D NMR spectroscopy problems



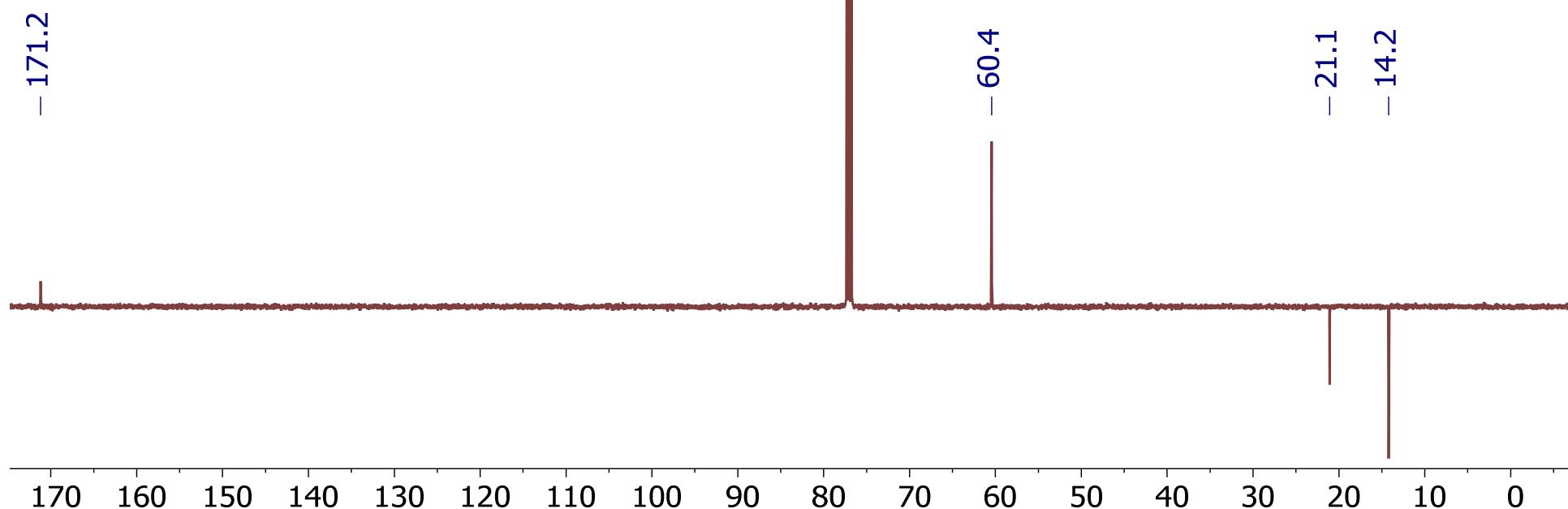
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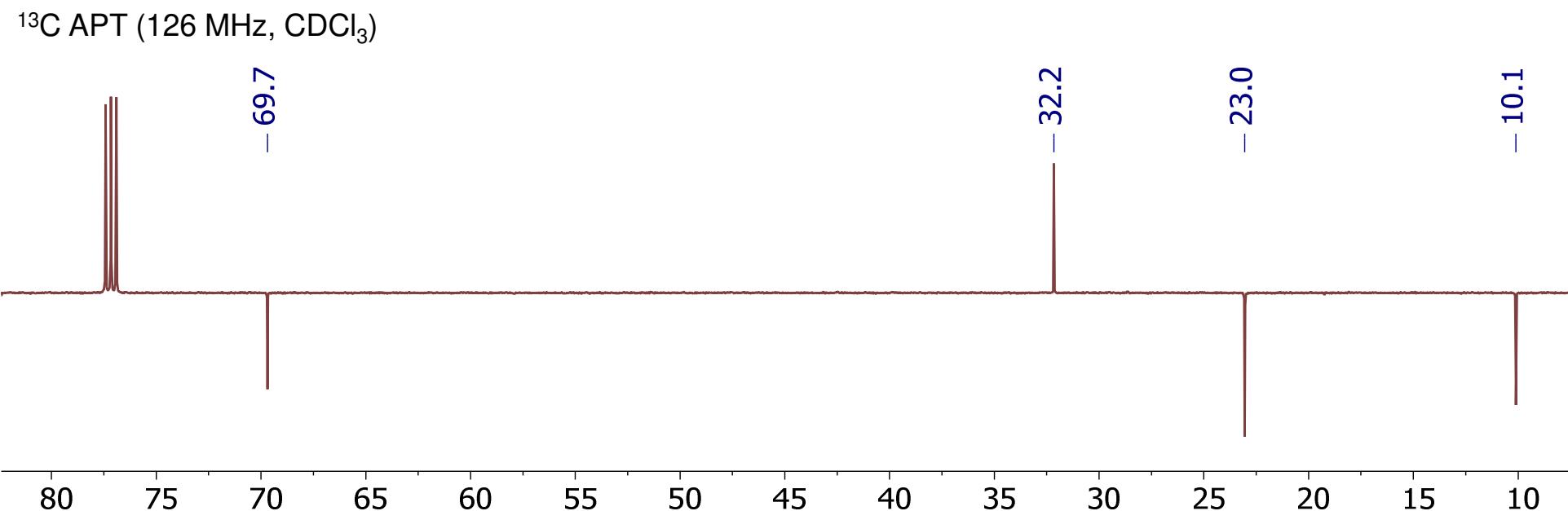
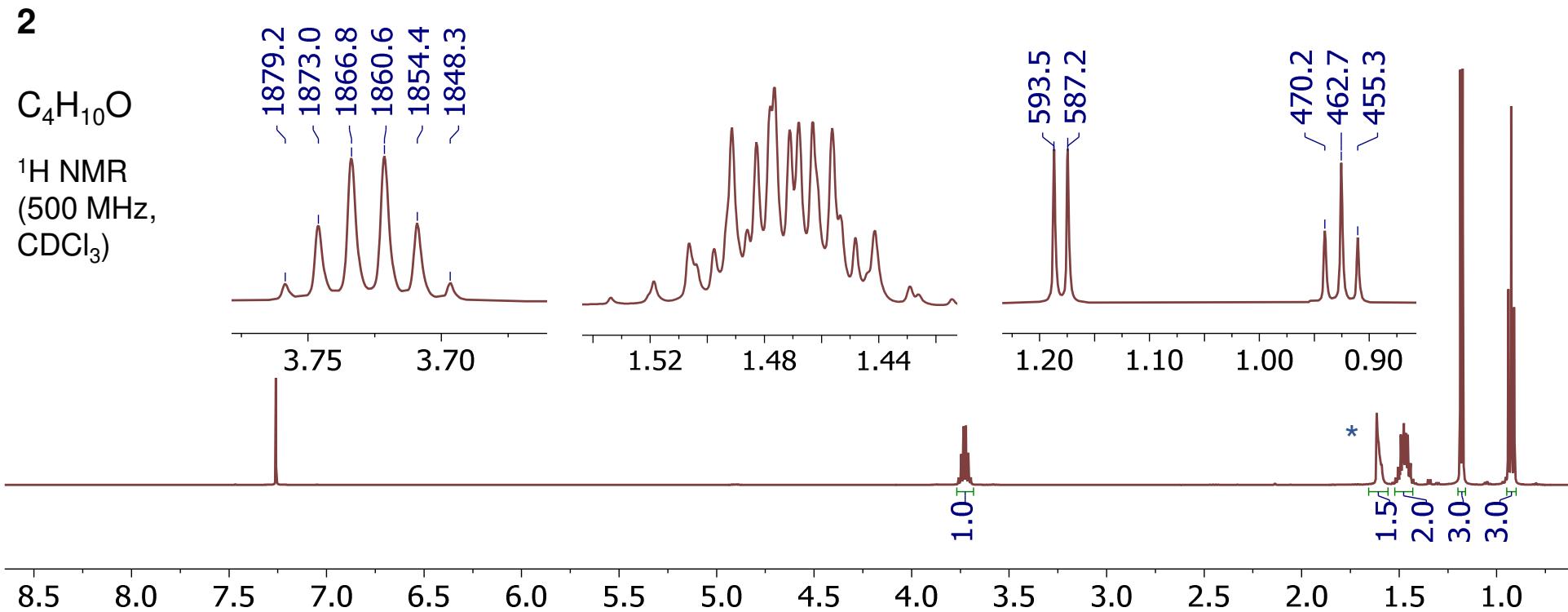


^1H NMR (500 MHz, CDCl_3)



^{13}C APT (126 MHz, CDCl_3)

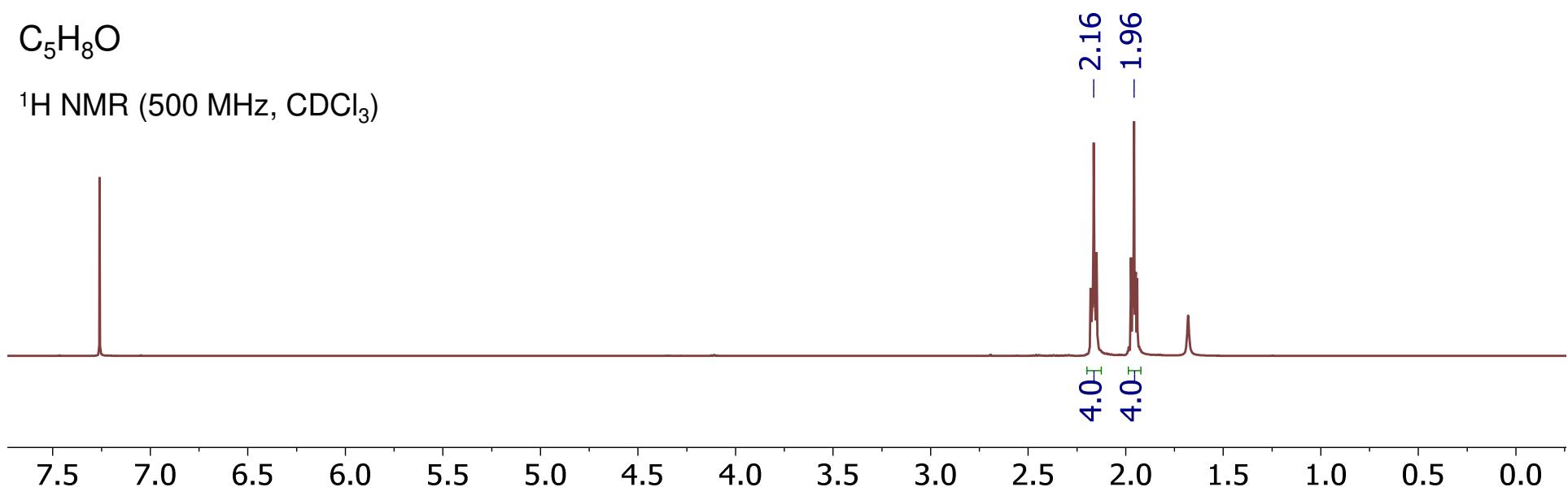




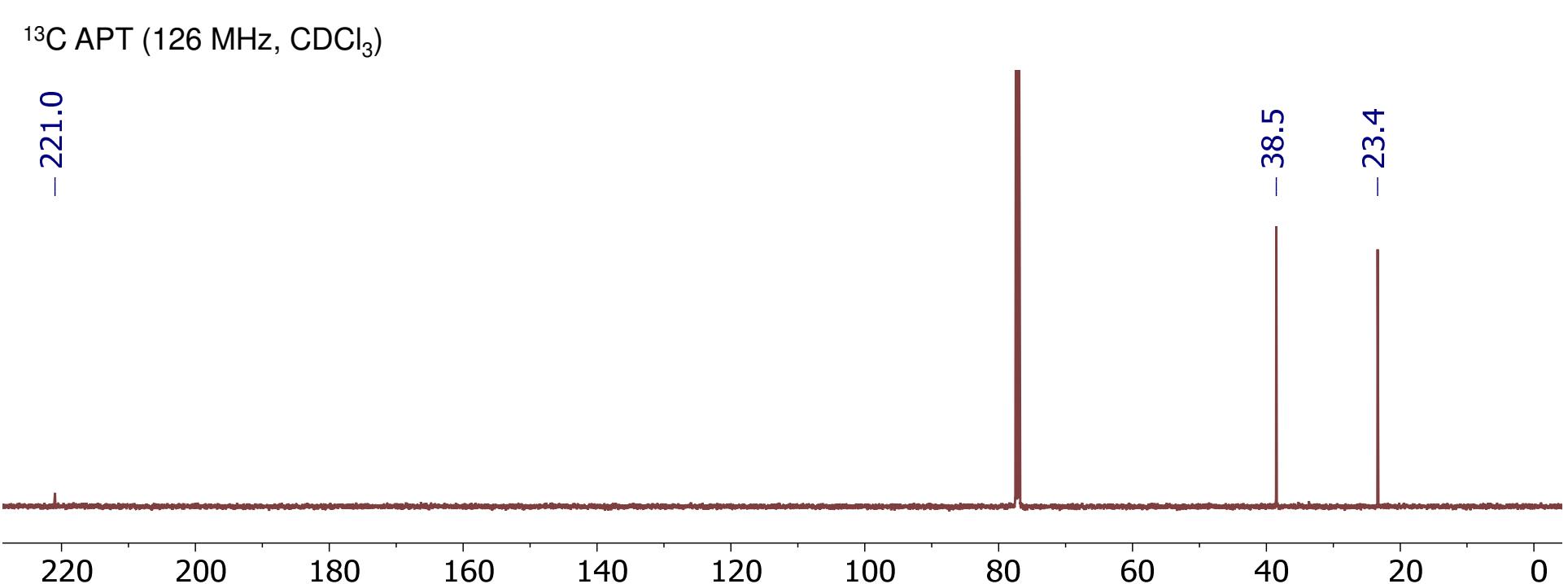
3

C₅H₈O

¹H NMR (500 MHz, CDCl₃)



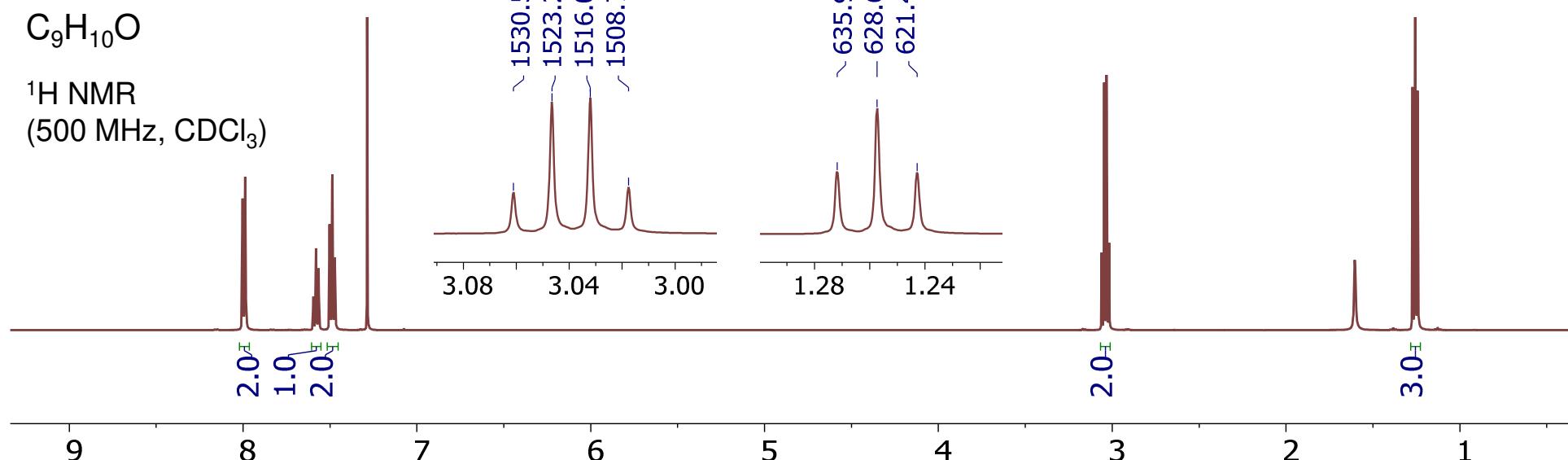
¹³C APT (126 MHz, CDCl₃)



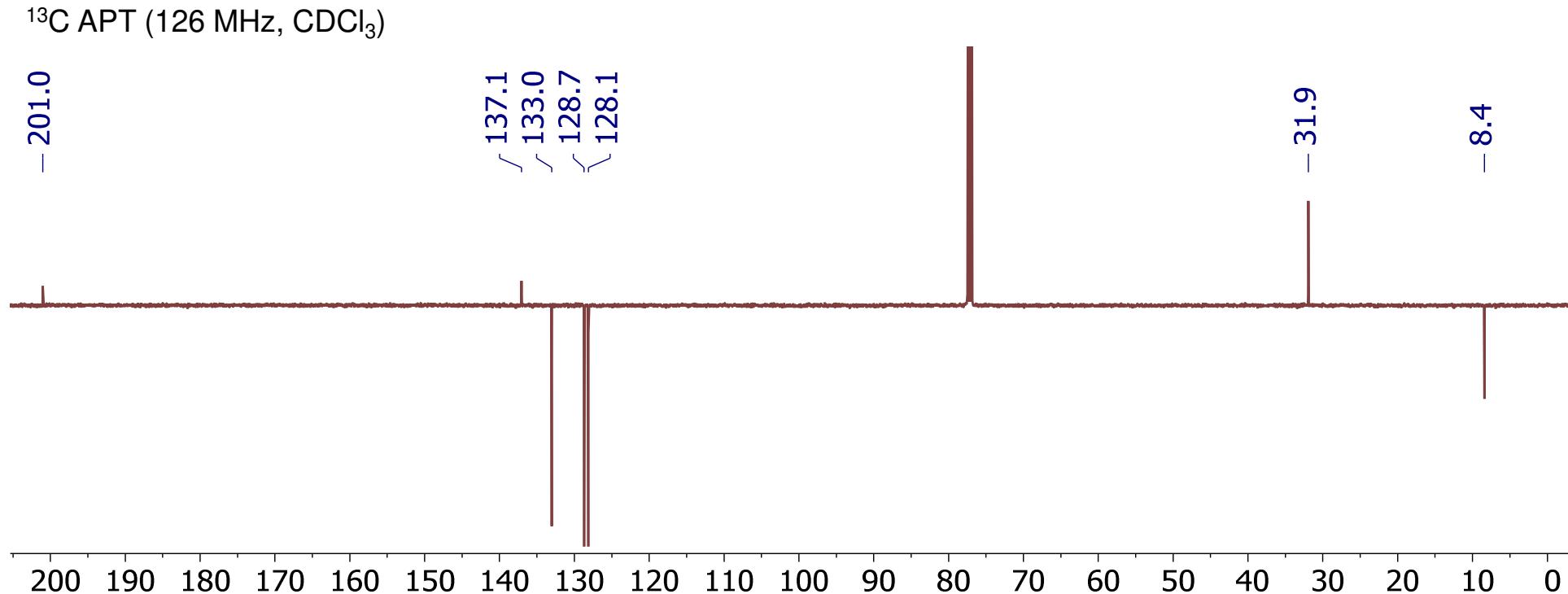
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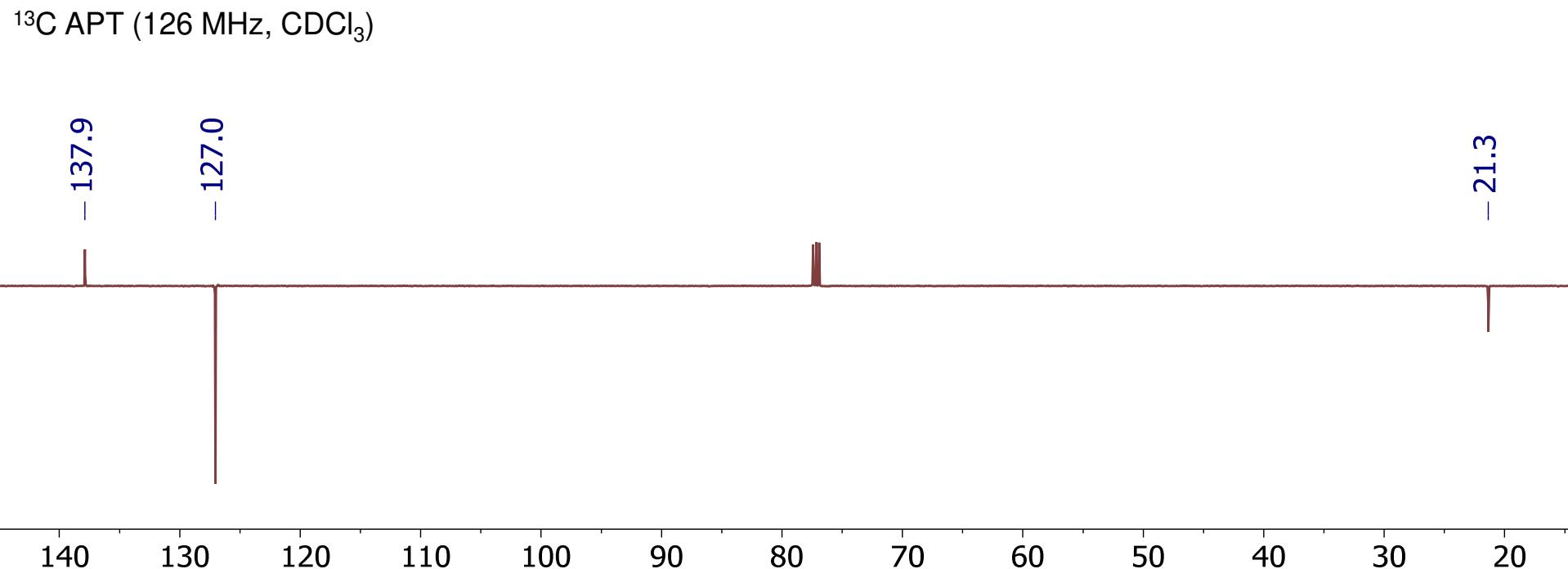
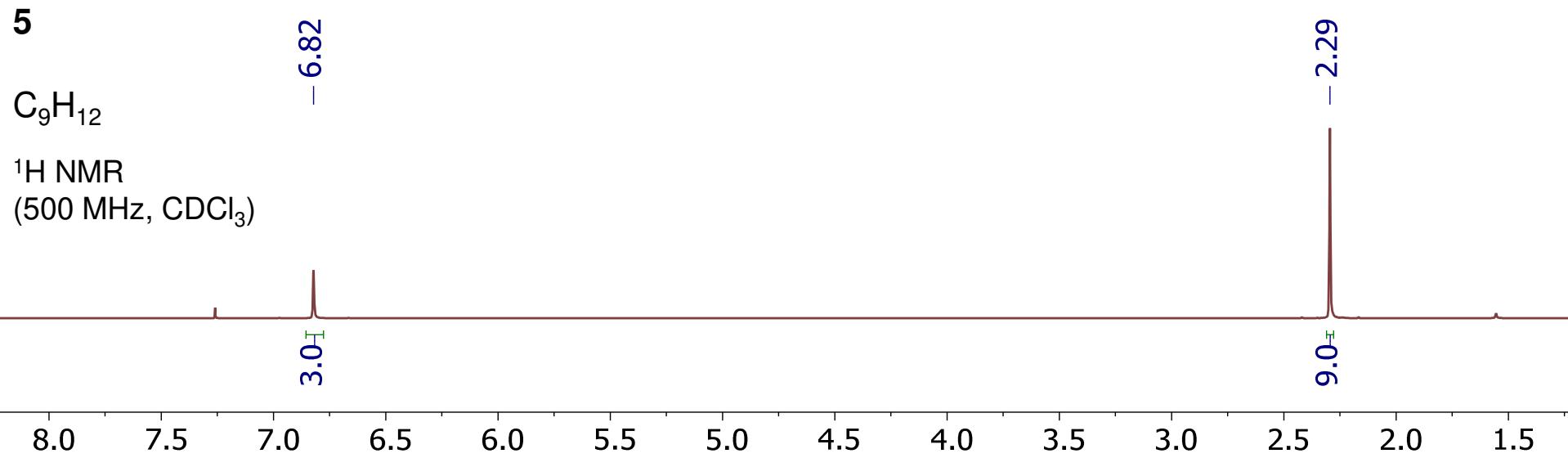
C₉H₁₀O

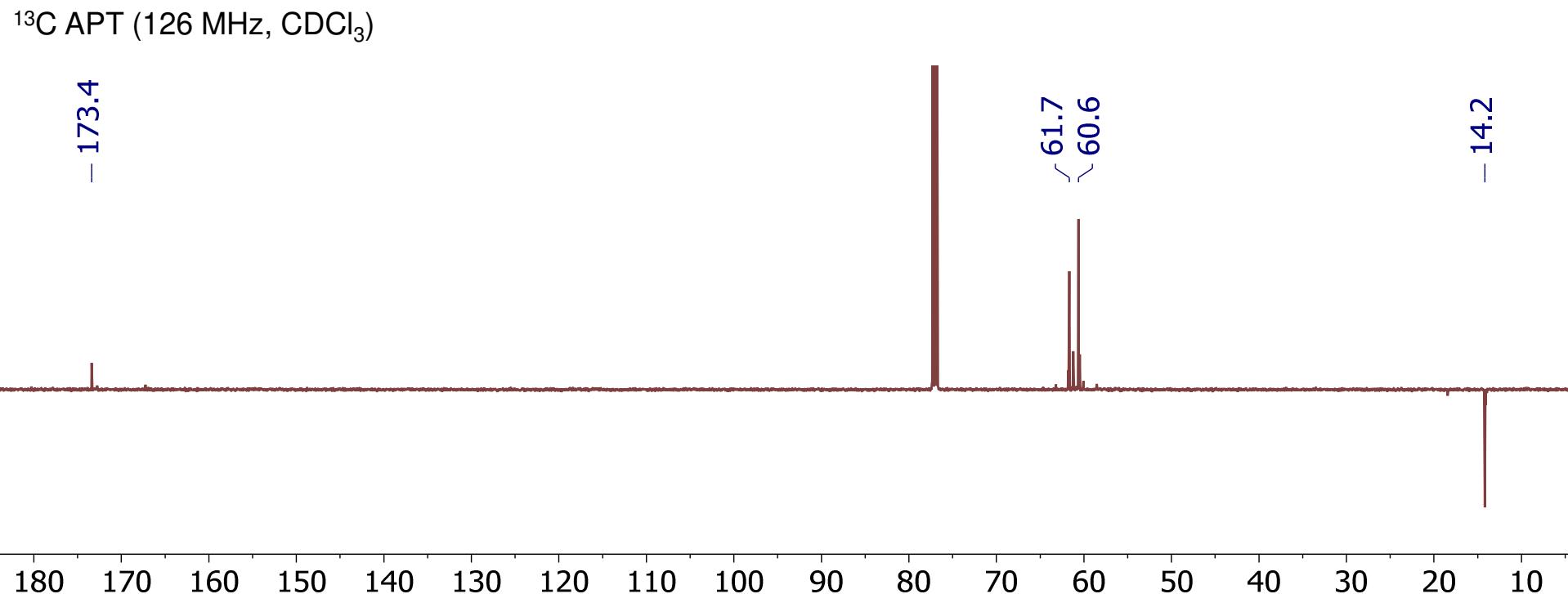
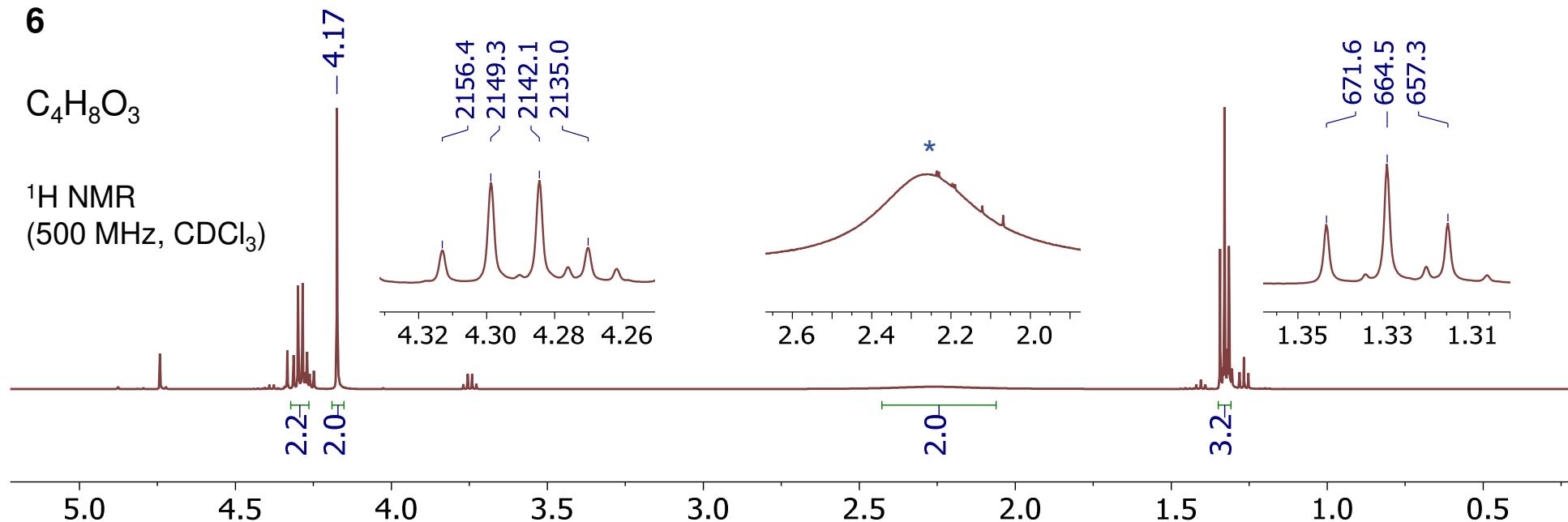
¹H NMR
(500 MHz, CDCl₃)



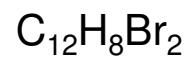
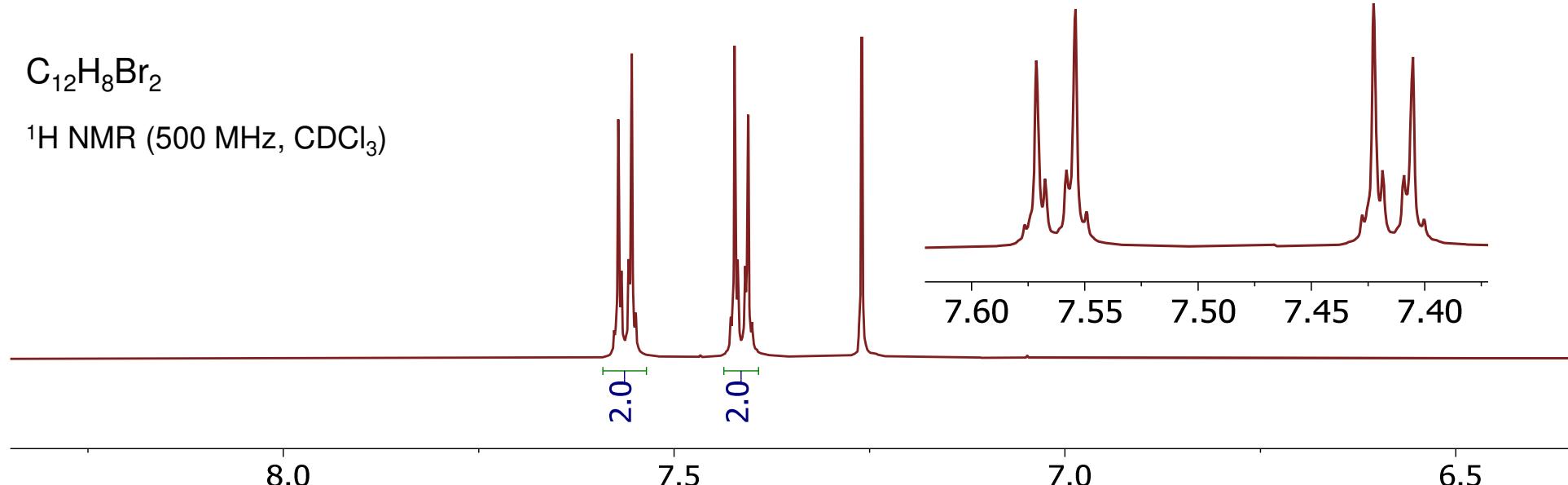
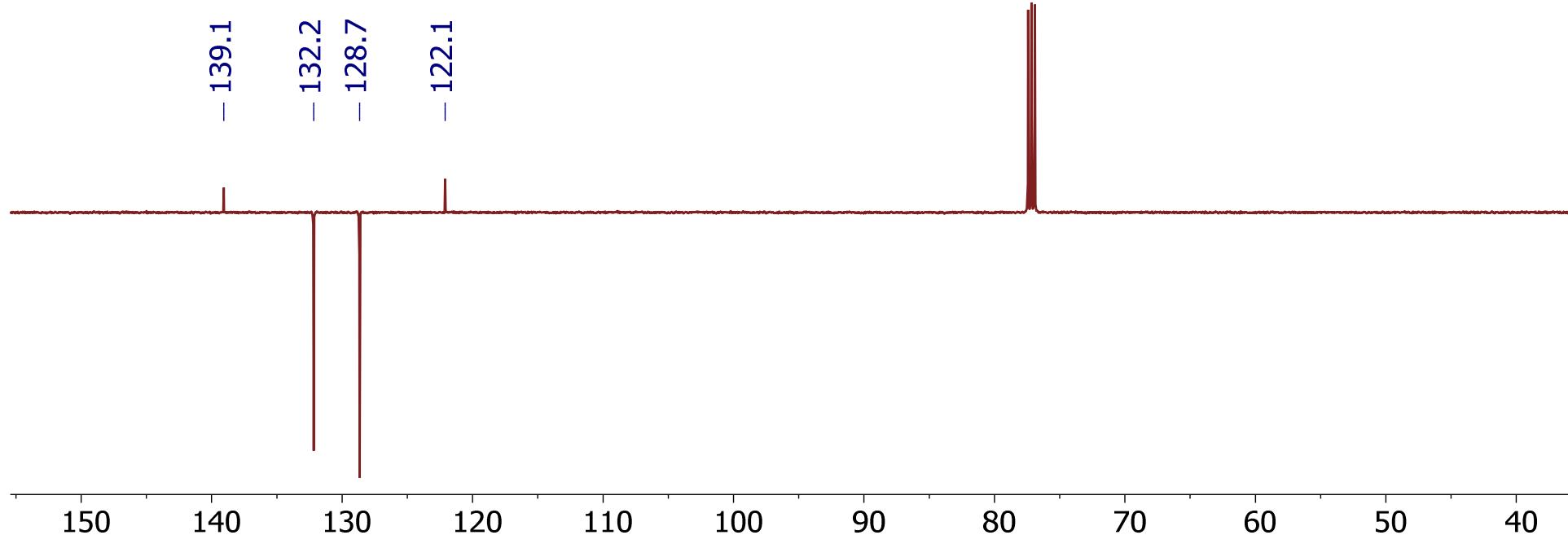
¹³C APT (126 MHz, CDCl₃)



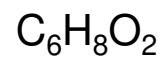




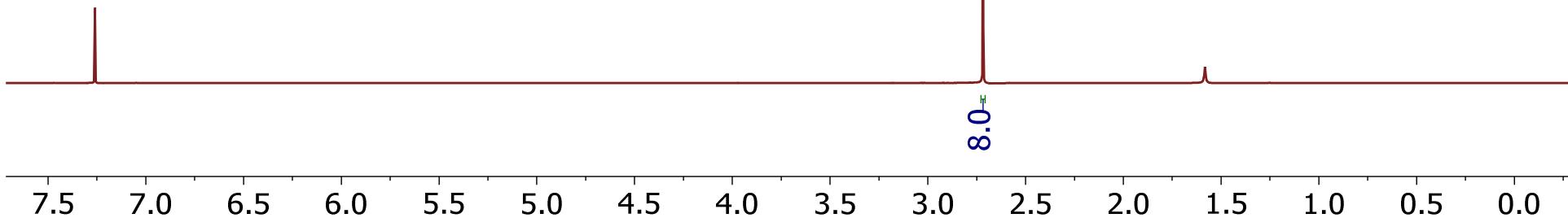
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 ^1H NMR (500 MHz, CDCl_3) ^{13}C APT (126 MHz, CDCl_3)

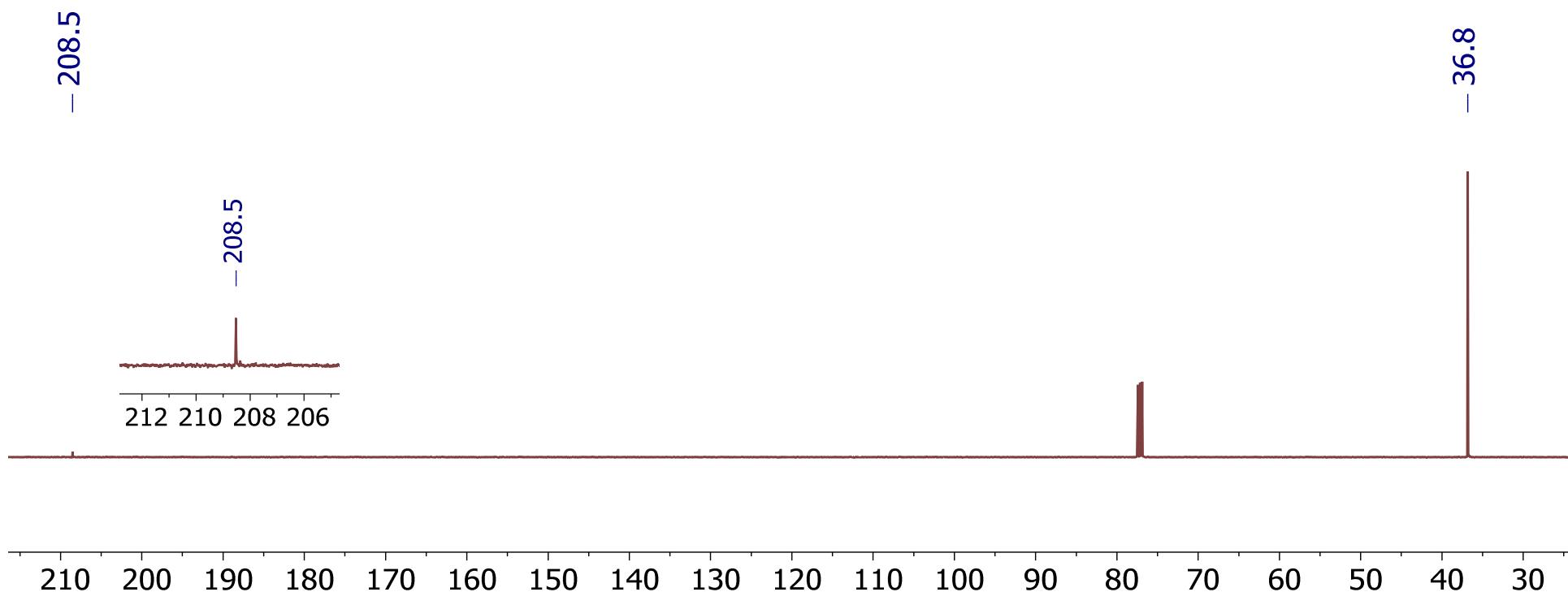
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^1H NMR (500 MHz, CDCl_3)



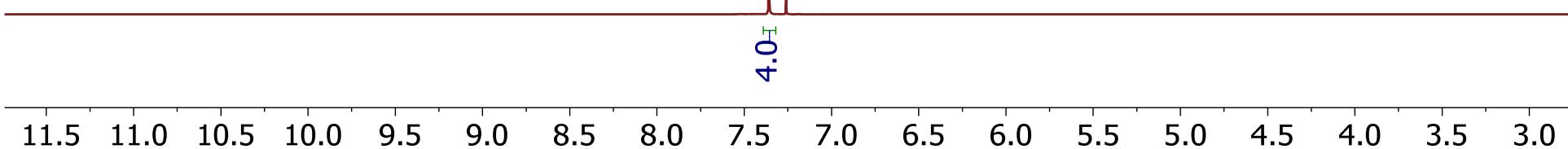
^{13}C APT (126 MHz, CDCl_3)



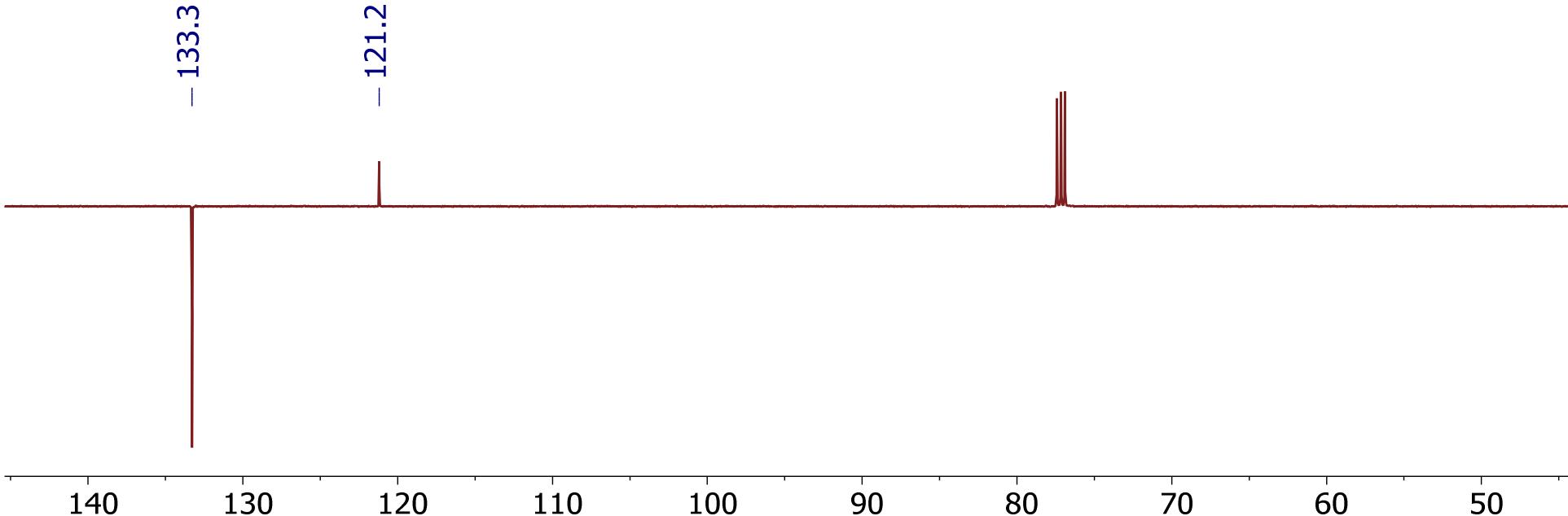
9



^1H NMR (500 MHz, CDCl_3)



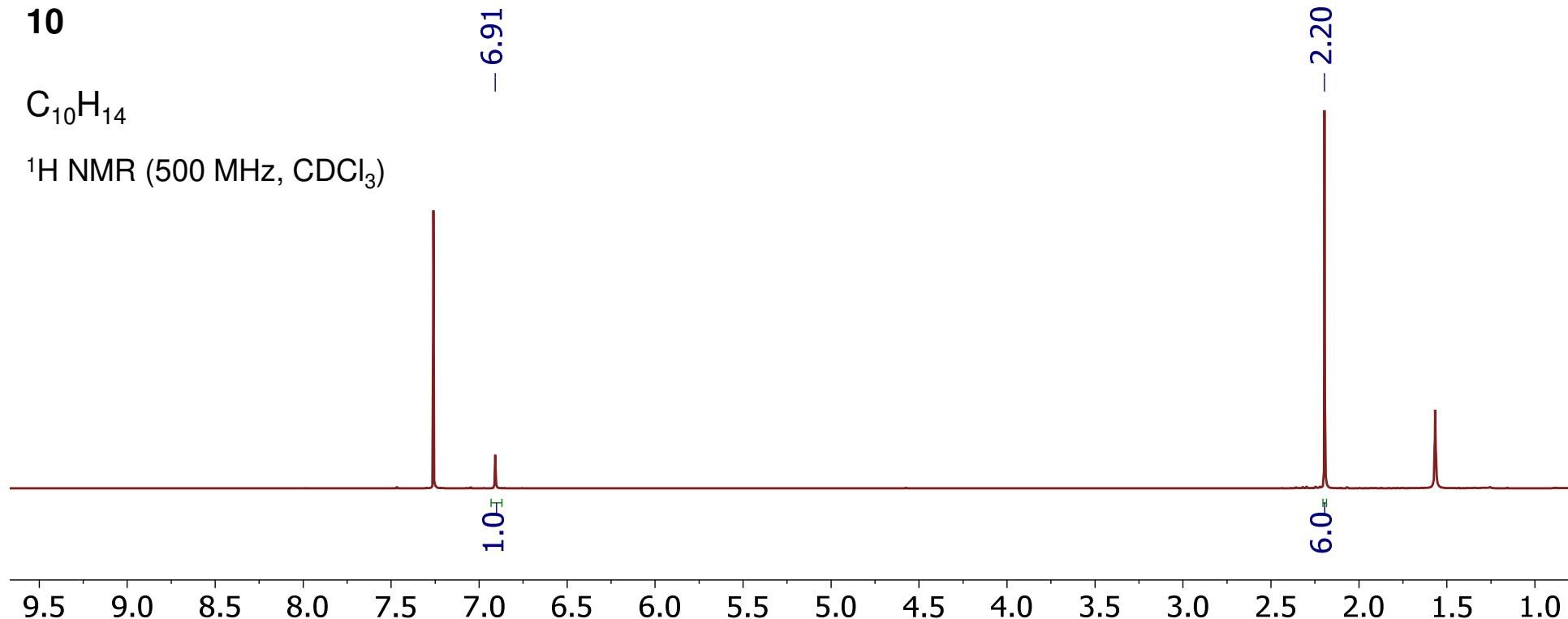
^{13}C APT (126 MHz, CDCl_3)



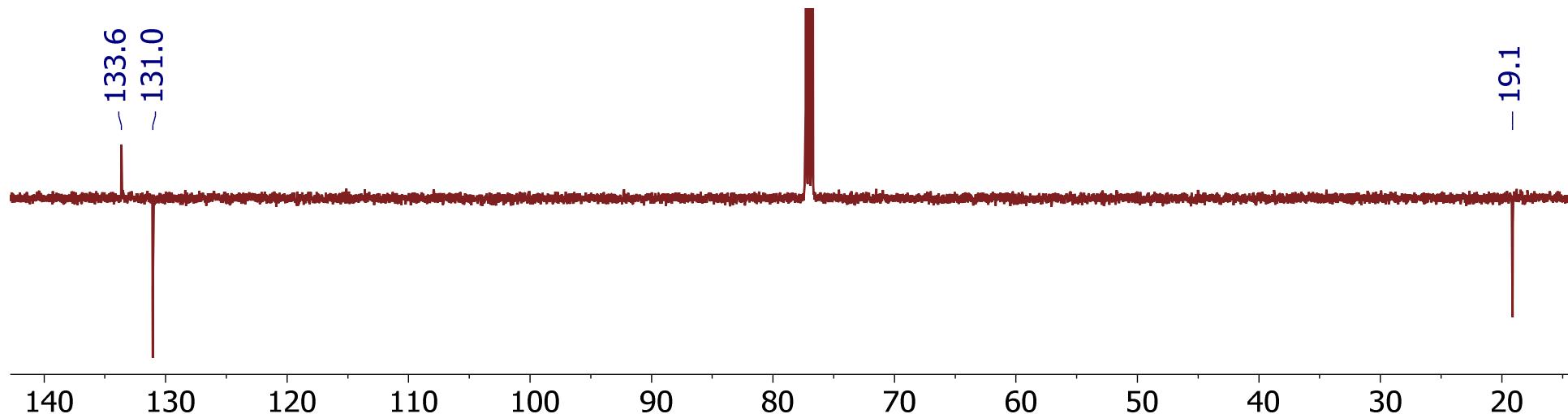
10

$C_{10}H_{14}$

1H NMR (500 MHz, $CDCl_3$)



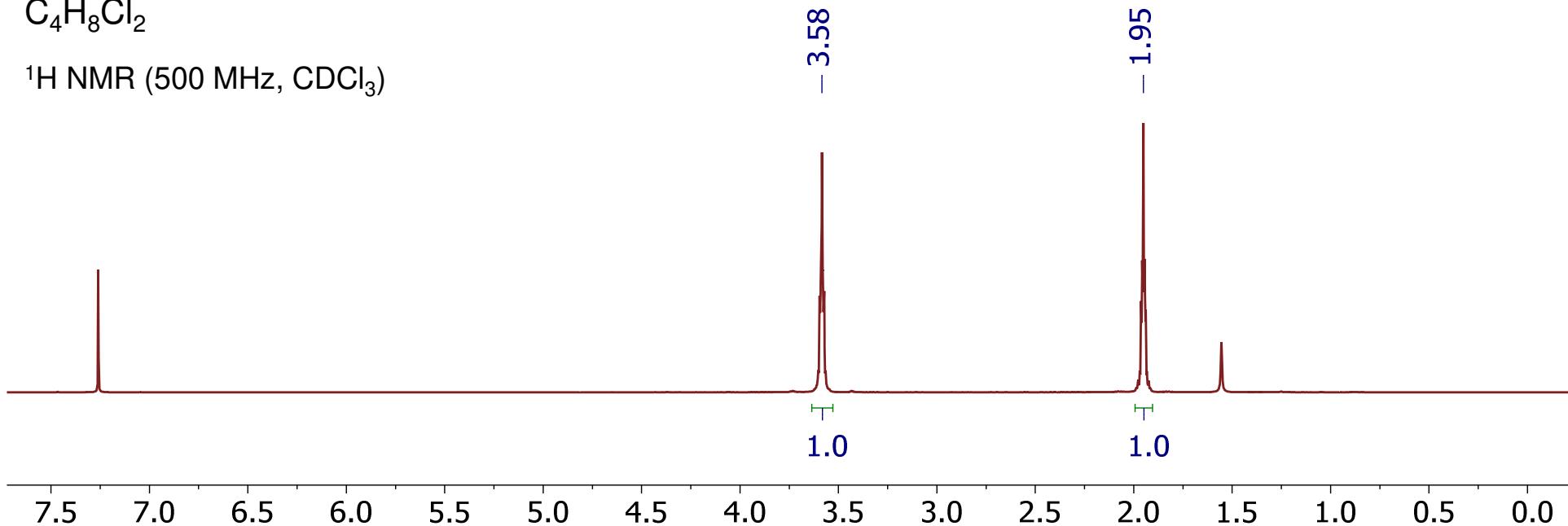
^{13}C APT (126 MHz, $CDCl_3$)



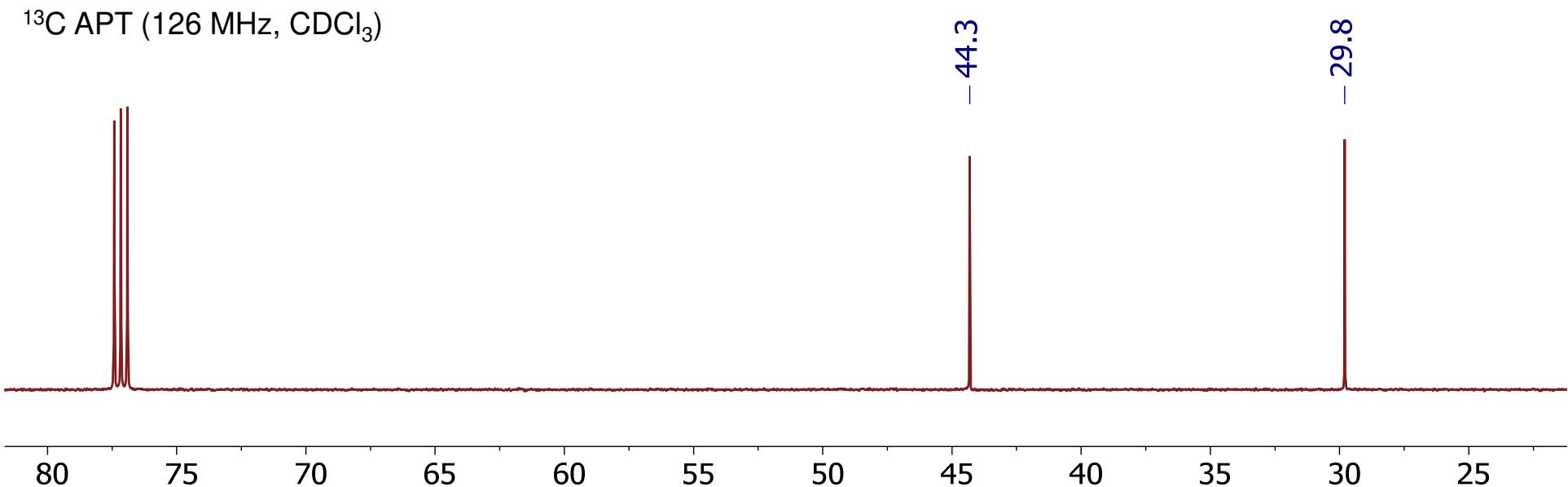
11



^1H NMR (500 MHz, CDCl_3)



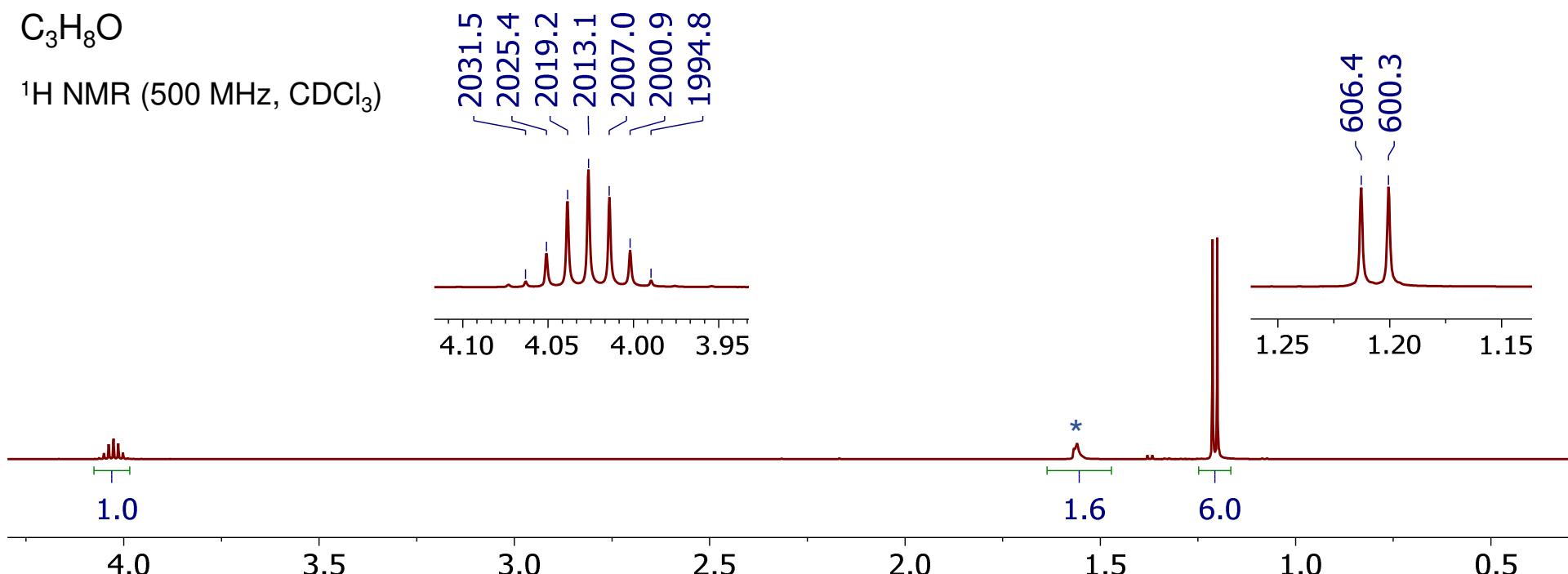
^{13}C APT (126 MHz, CDCl_3)



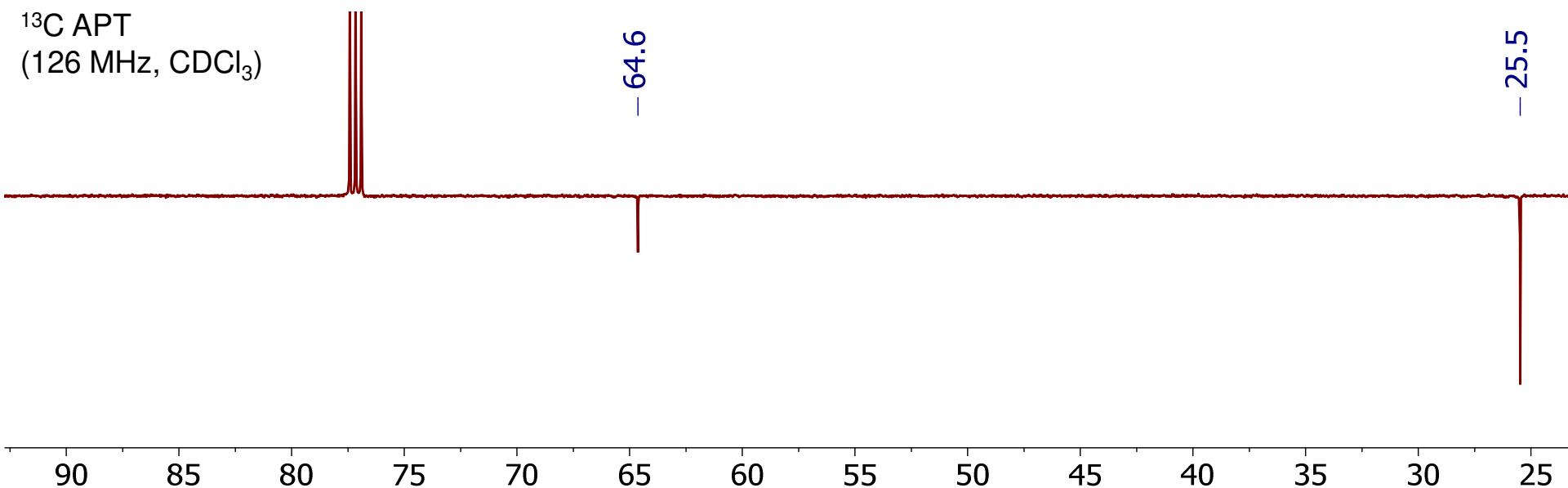
12

C₃H₈O

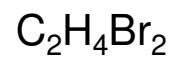
¹H NMR (500 MHz, CDCl₃)



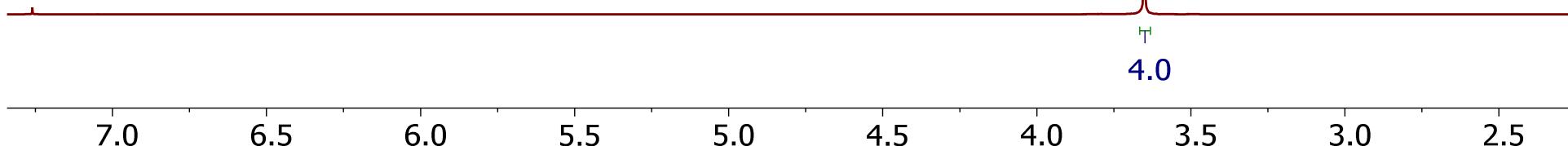
¹³C APT
(126 MHz, CDCl₃)



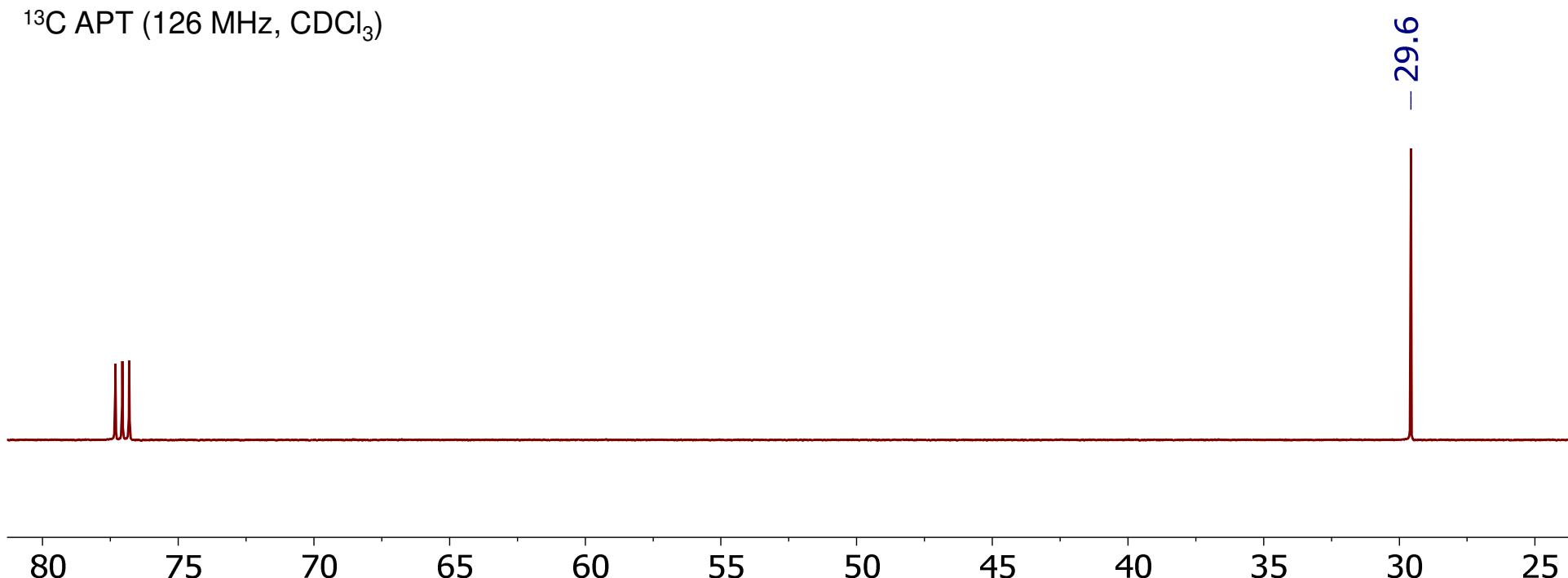
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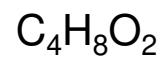
^1H NMR (500 MHz, CDCl_3)



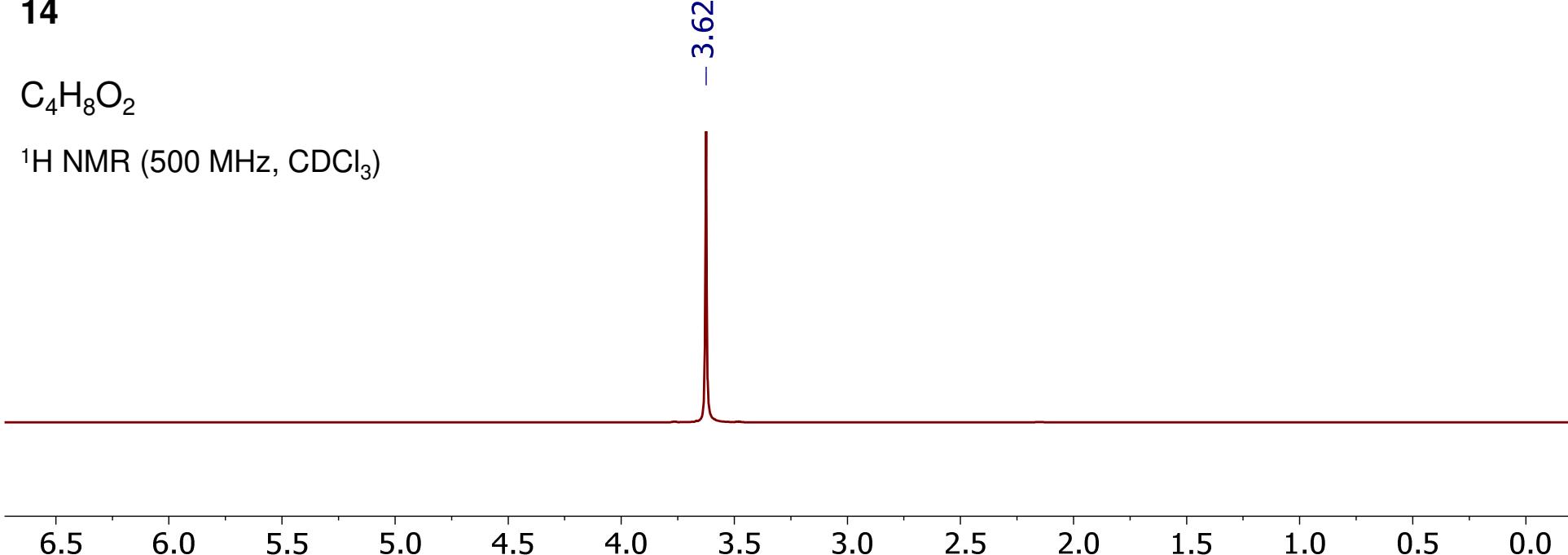
^{13}C APT (126 MHz, CDCl_3)



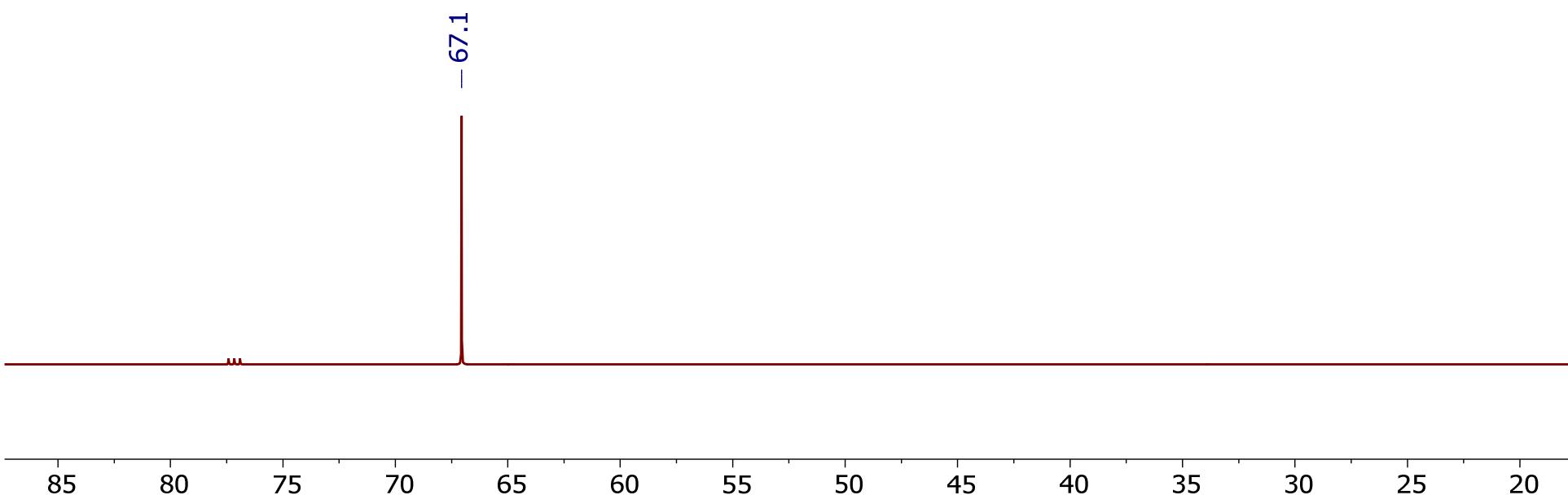
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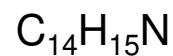
^1H NMR (500 MHz, CDCl_3)



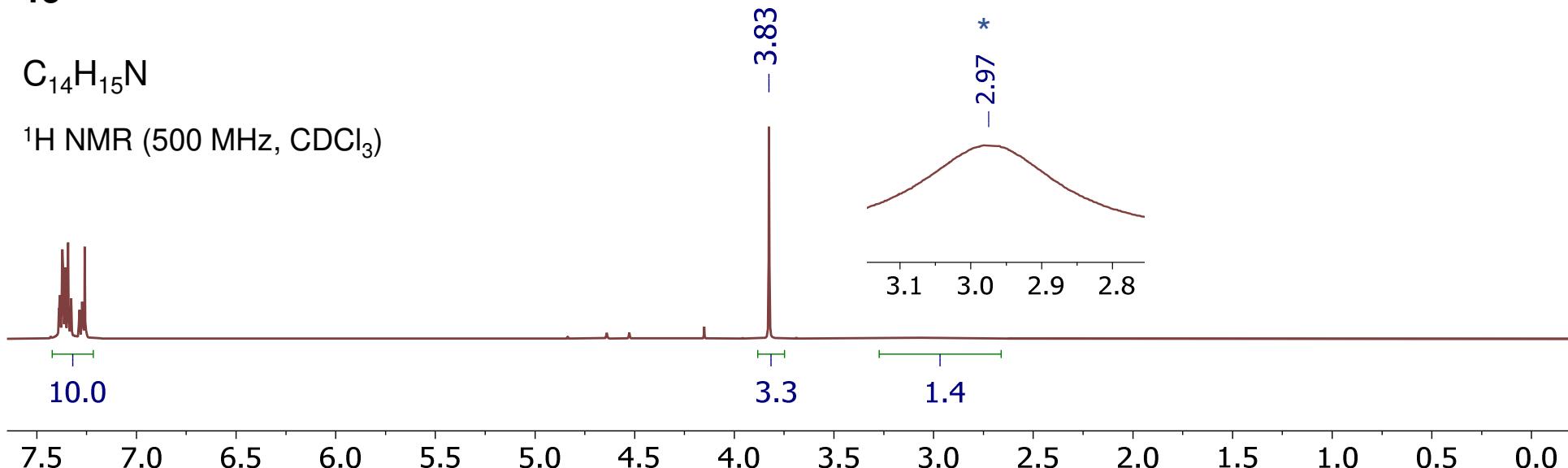
^{13}C APT (126 MHz, CDCl_3)



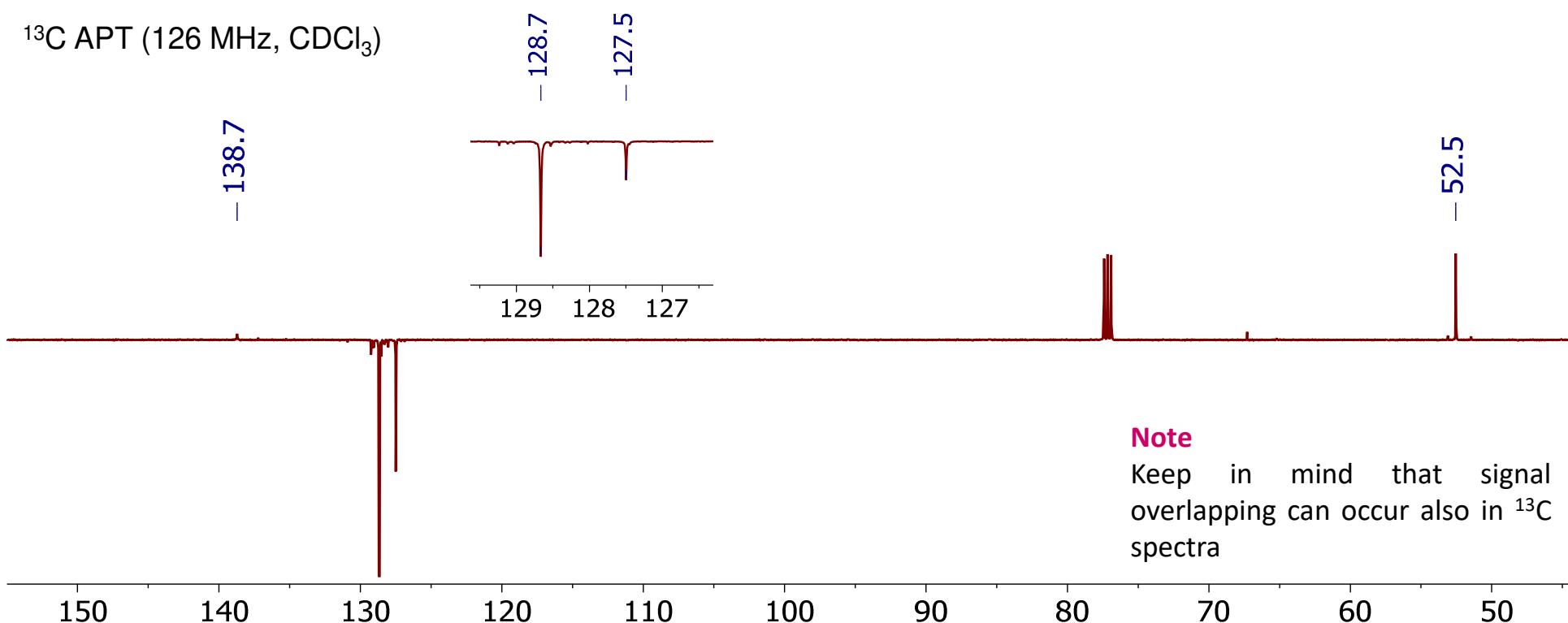
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1H NMR (500 MHz, $CDCl_3$)



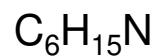
^{13}C APT (126 MHz, $CDCl_3$)



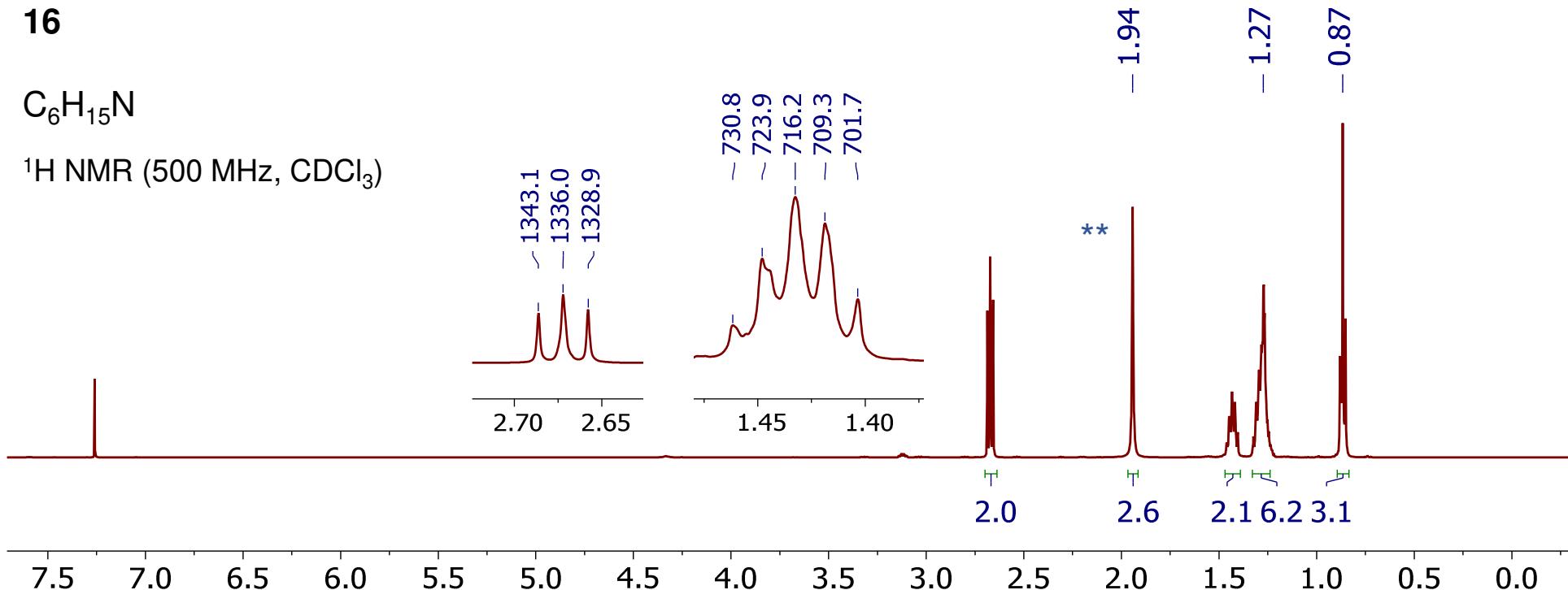
Note

Keep in mind that signal overlapping can occur also in ^{13}C spectra

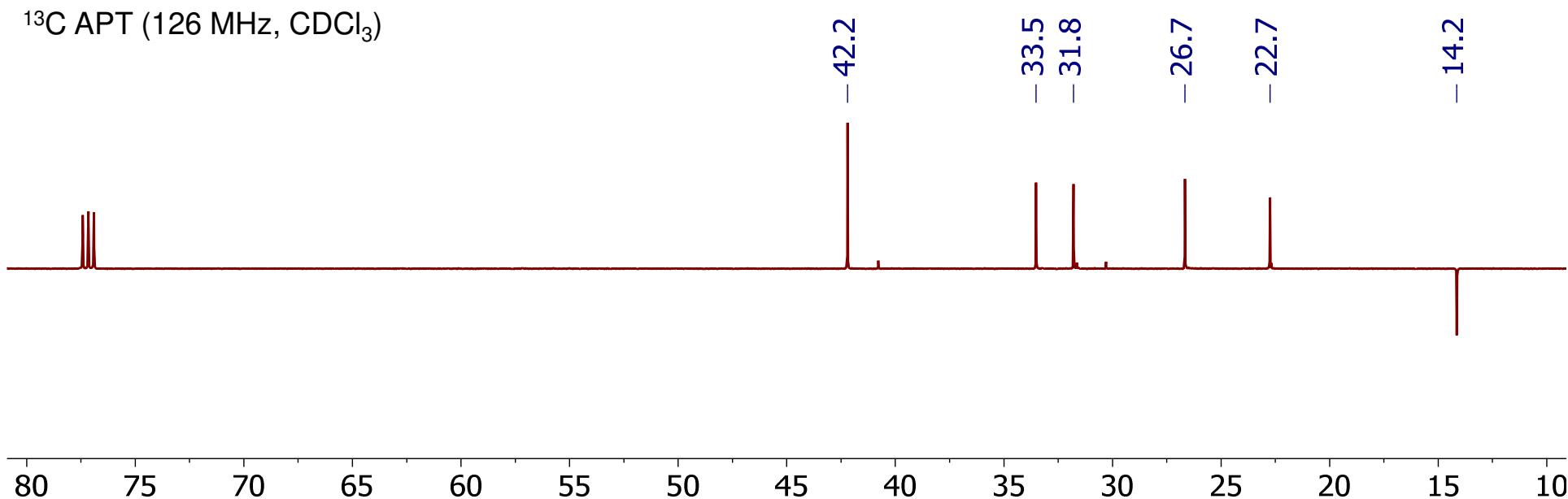
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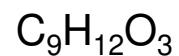
¹H NMR (500 MHz, CDCl₃)



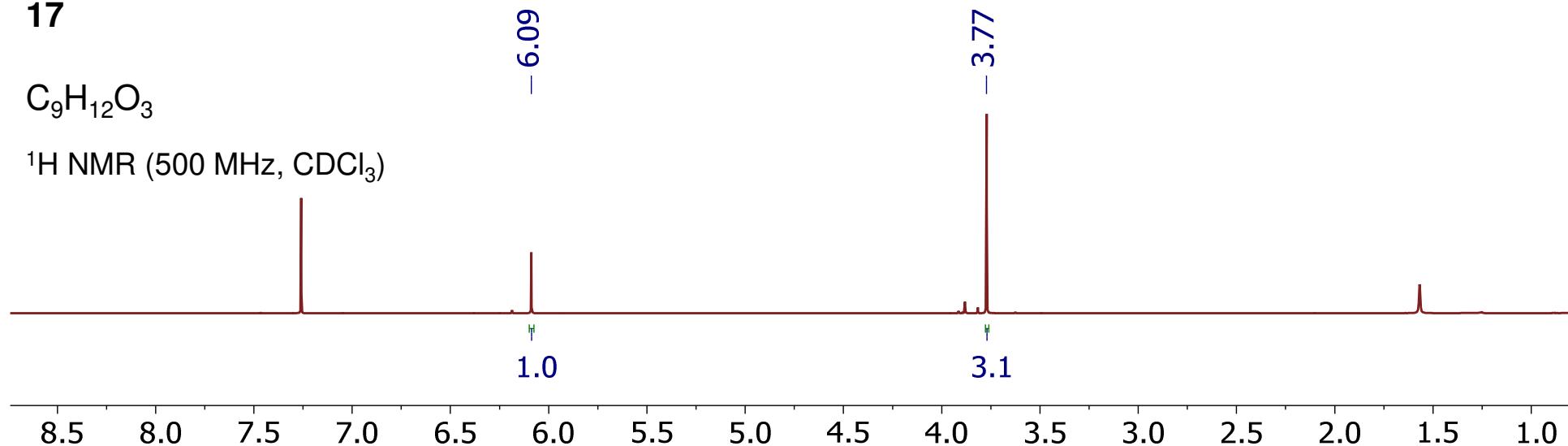
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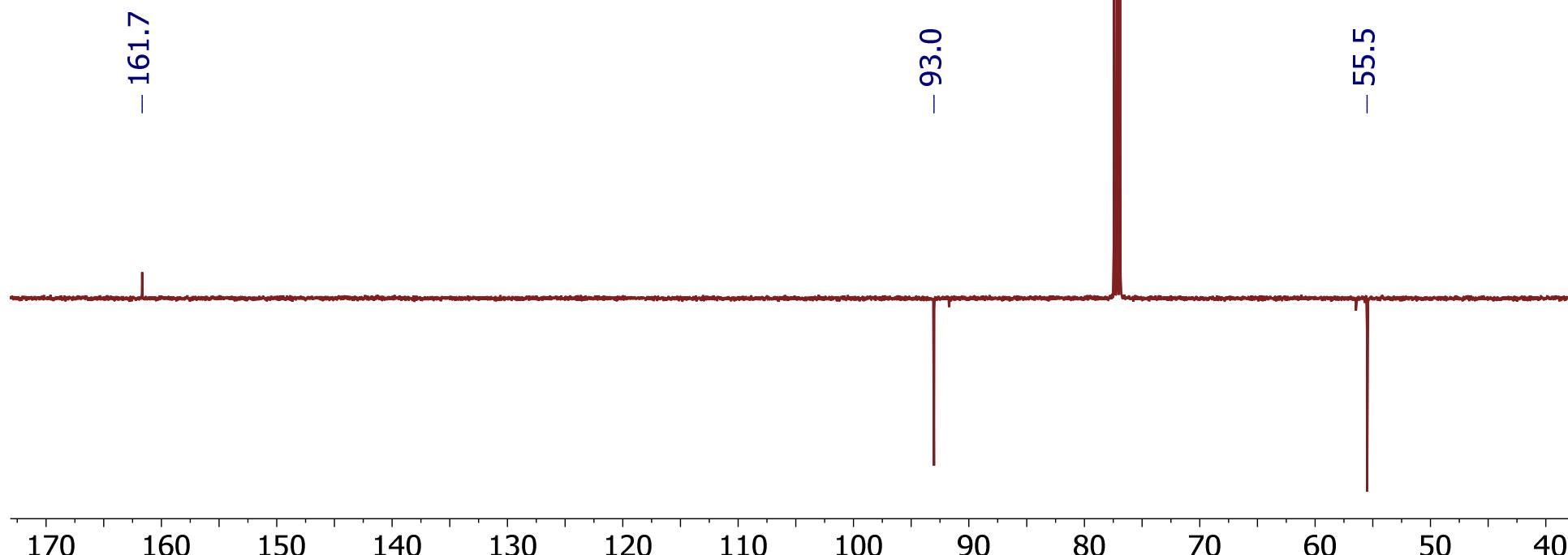
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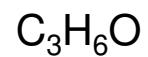
¹H NMR (500 MHz, CDCl₃)



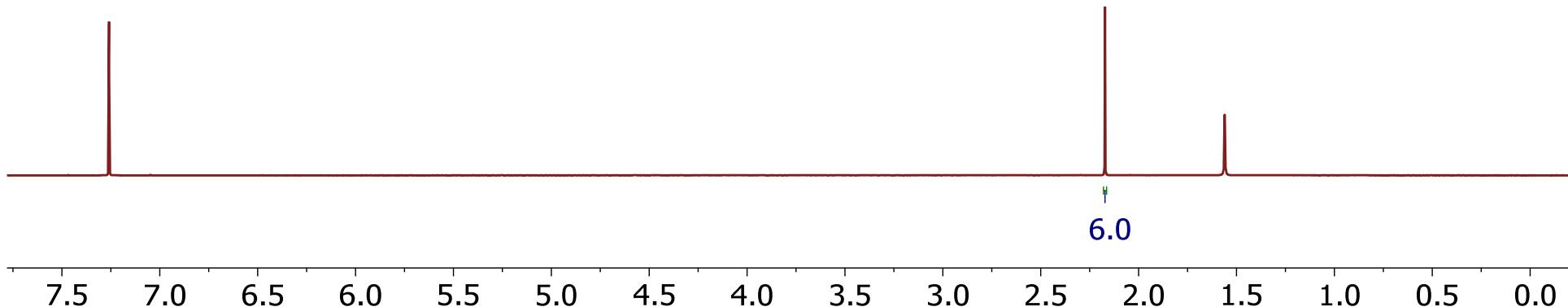
¹³C APT (126 MHz, CDCl₃)



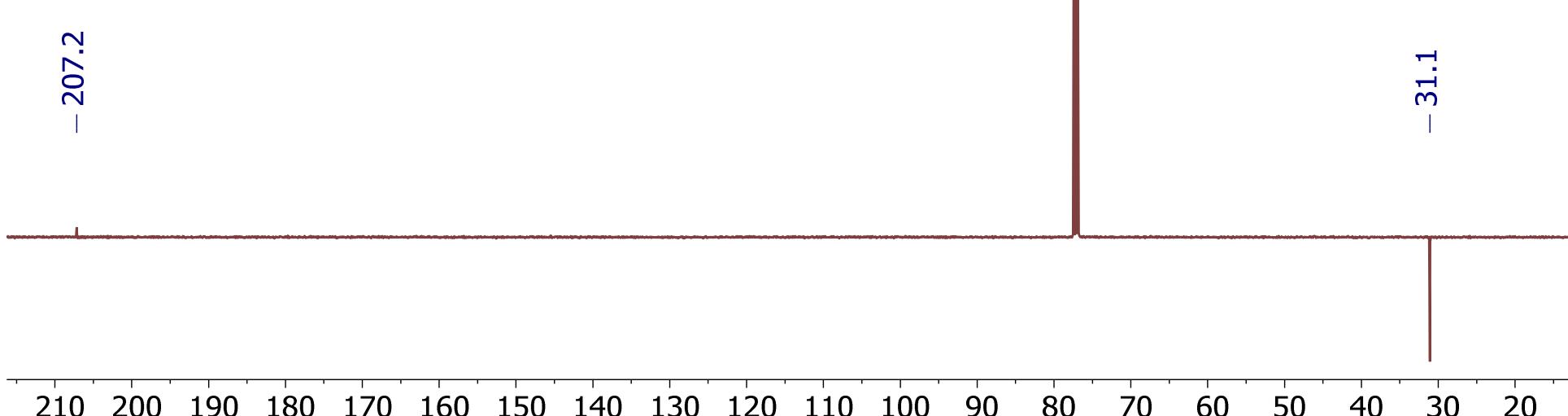
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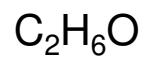
¹H NMR (500 MHz, CDCl₃)



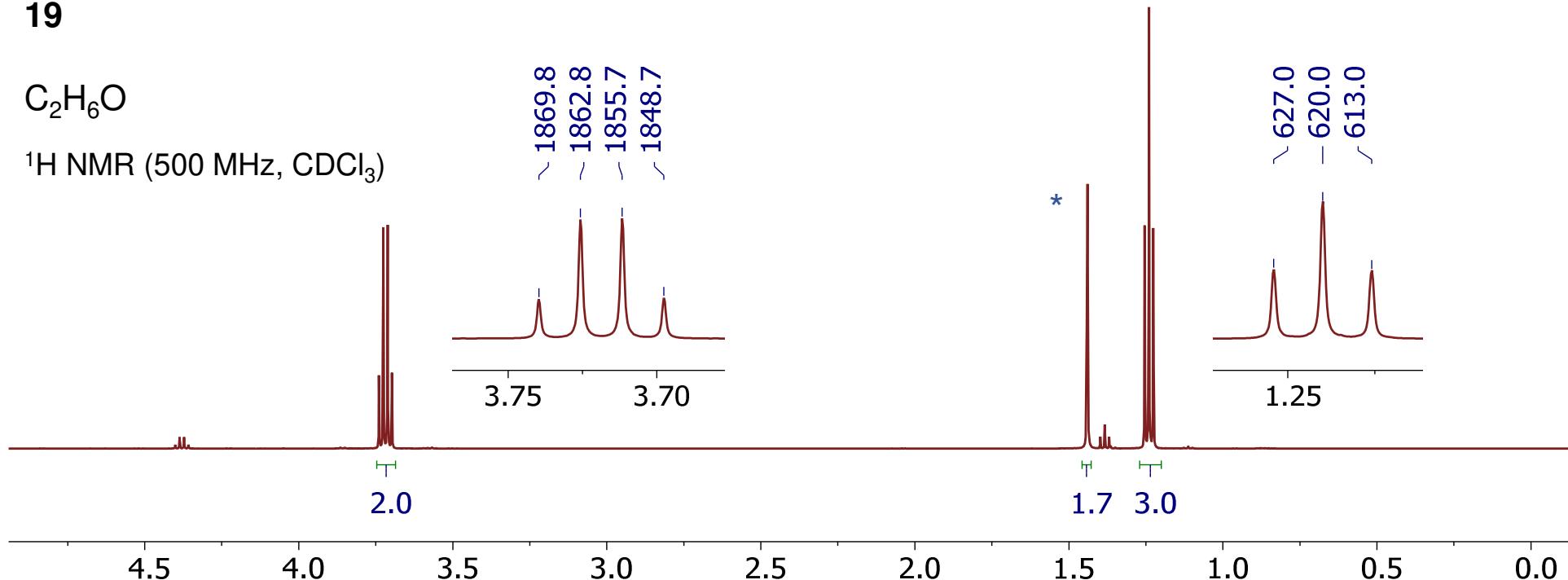
¹³C APT (126 MHz, CDCl₃)



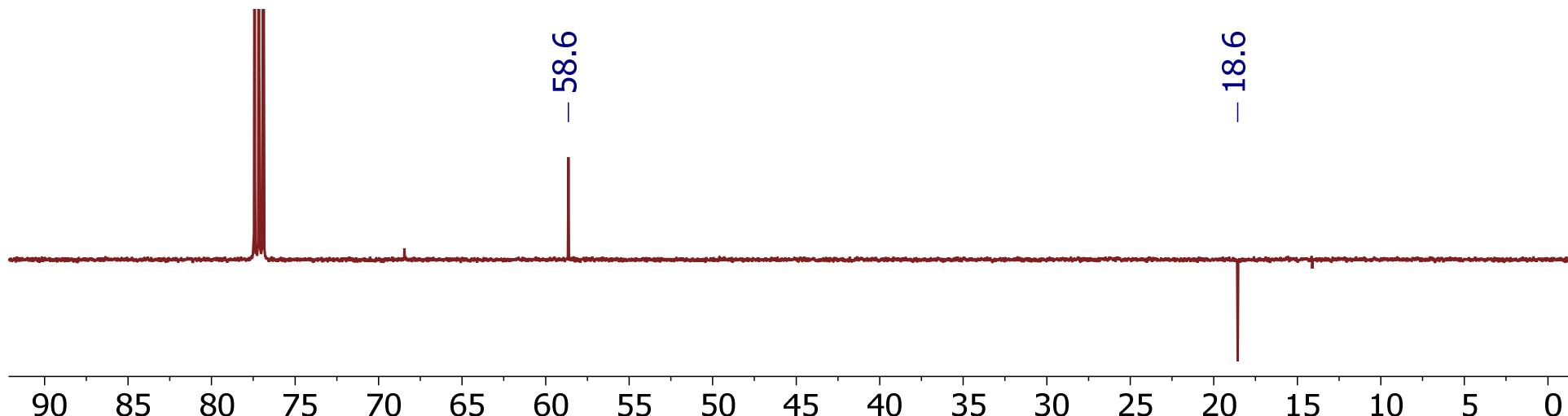
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¹H NMR (500 MHz, CDCl₃)



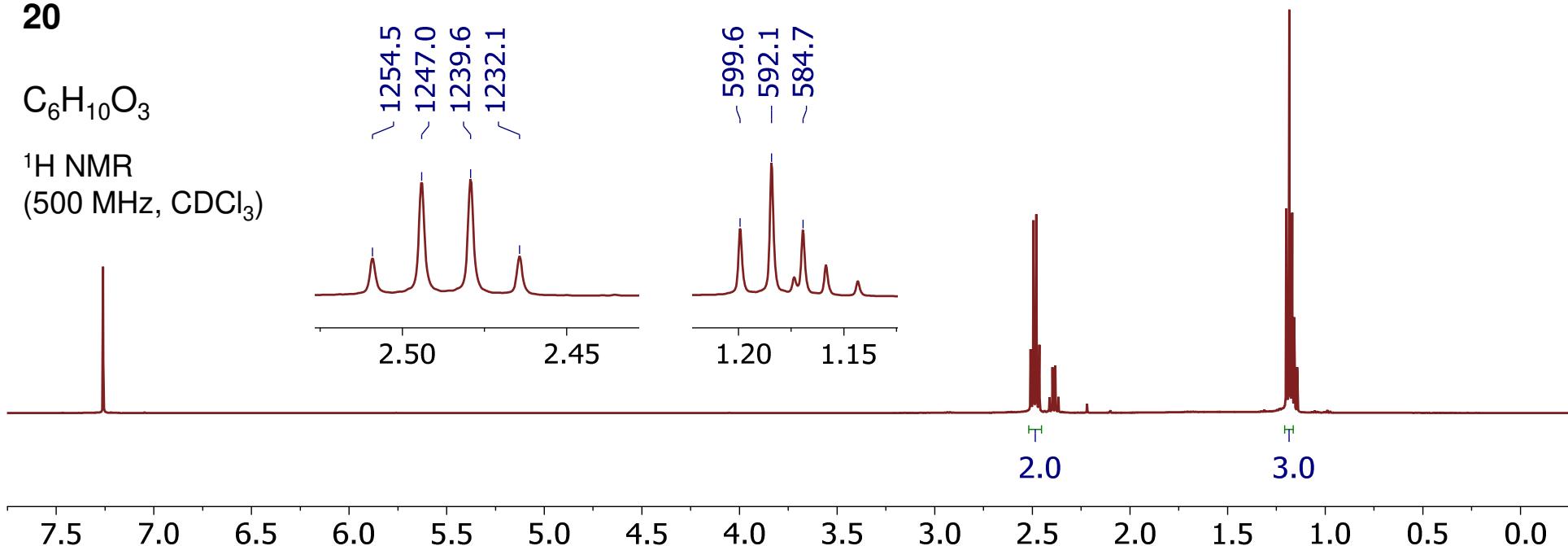
¹³C APT (126 MHz, CDCl₃)



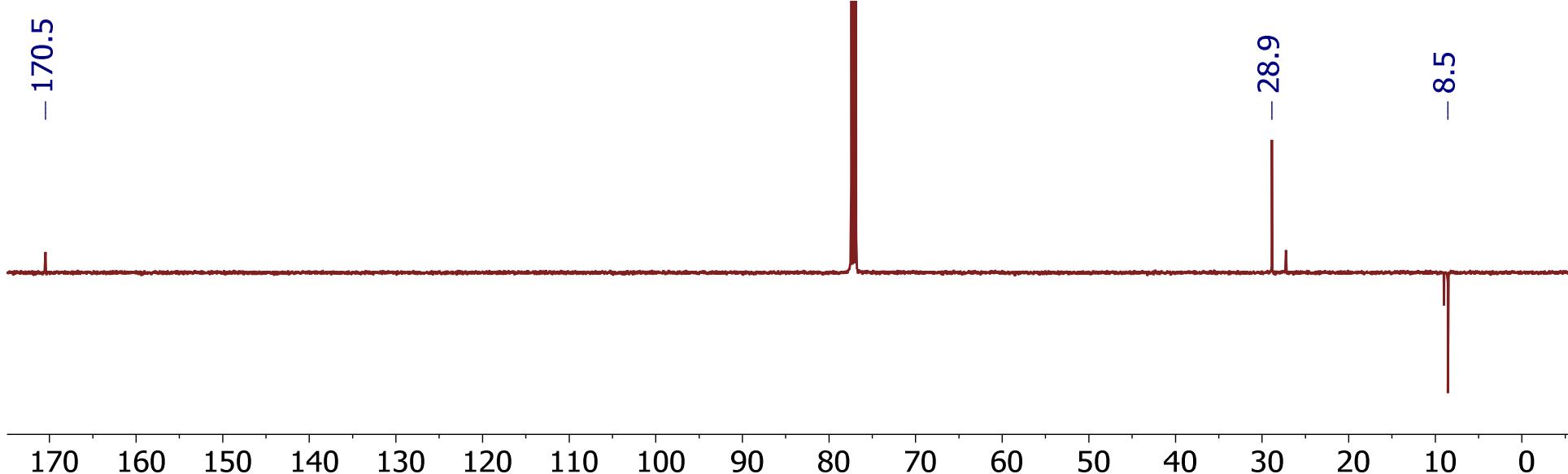
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C₆H₁₀O₃

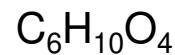
¹H NMR
(500 MHz, CDCl₃)



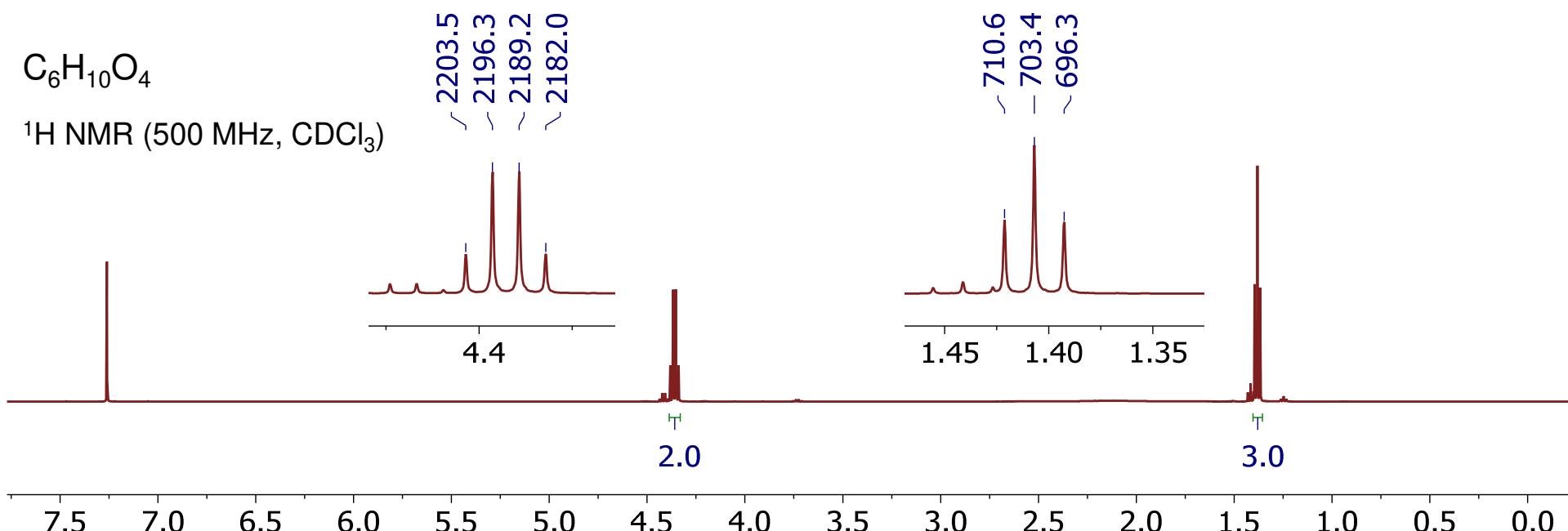
¹³C APT (126 MHz, CDCl₃)



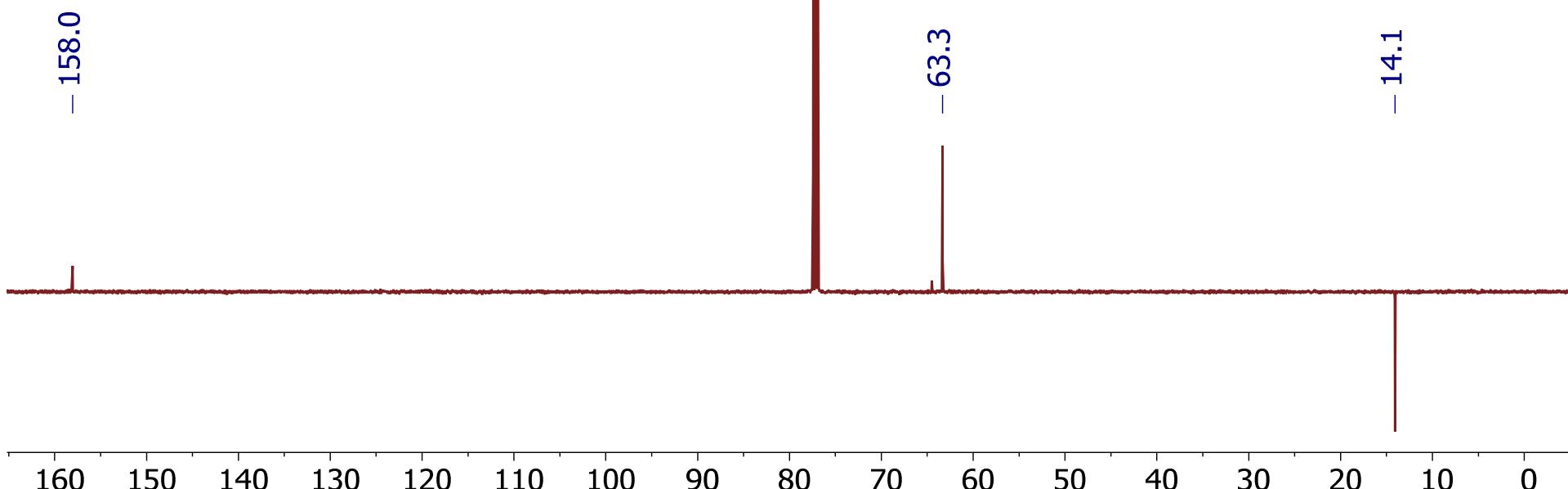
21



^1H NMR (500 MHz, CDCl_3)



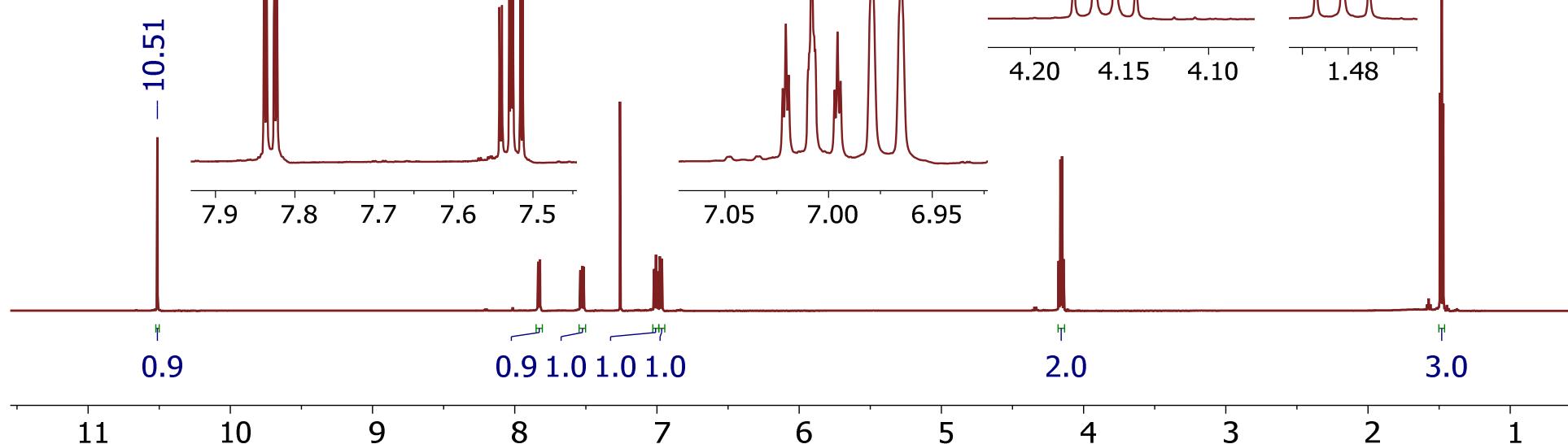
^{13}C APT (126 MHz, CDCl_3)



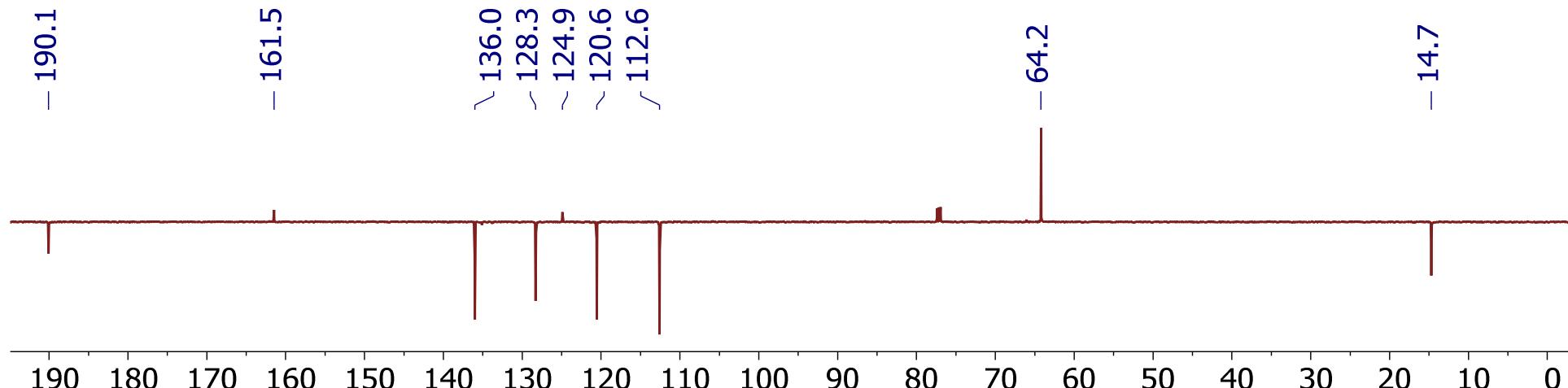
22

C₉H₁₀O₂

¹H NMR (600 MHz, CDCl₃)



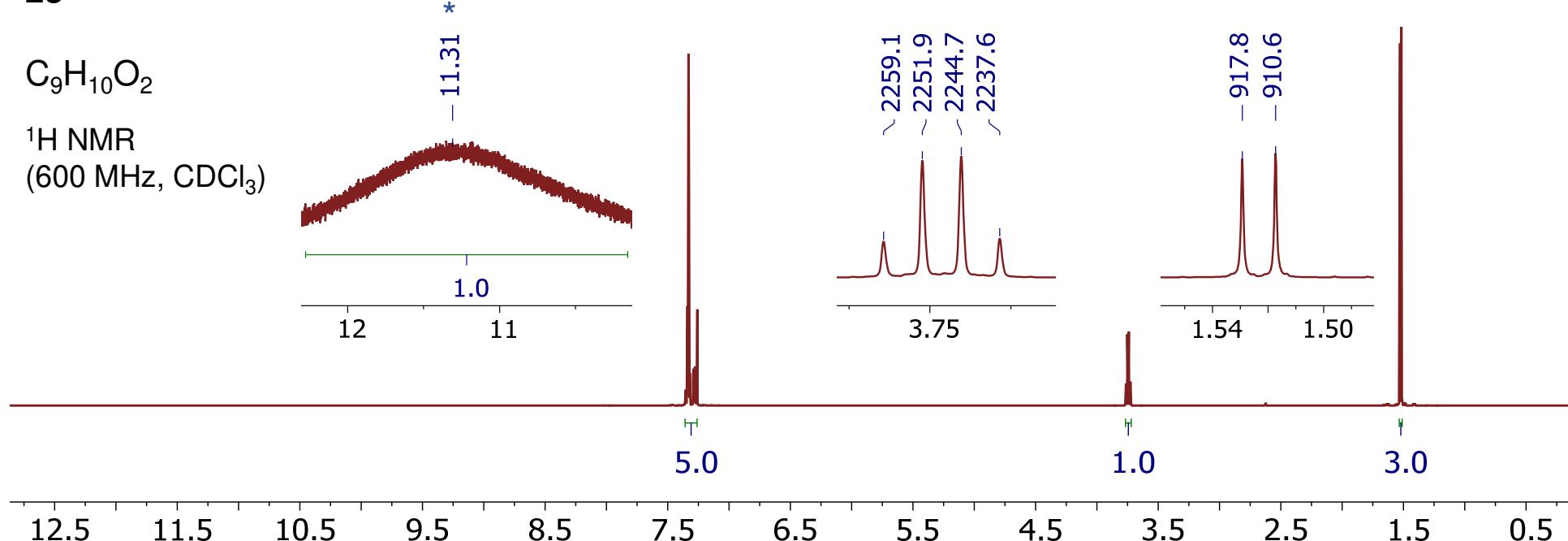
¹³C APT (151 MHz, CDCl₃)



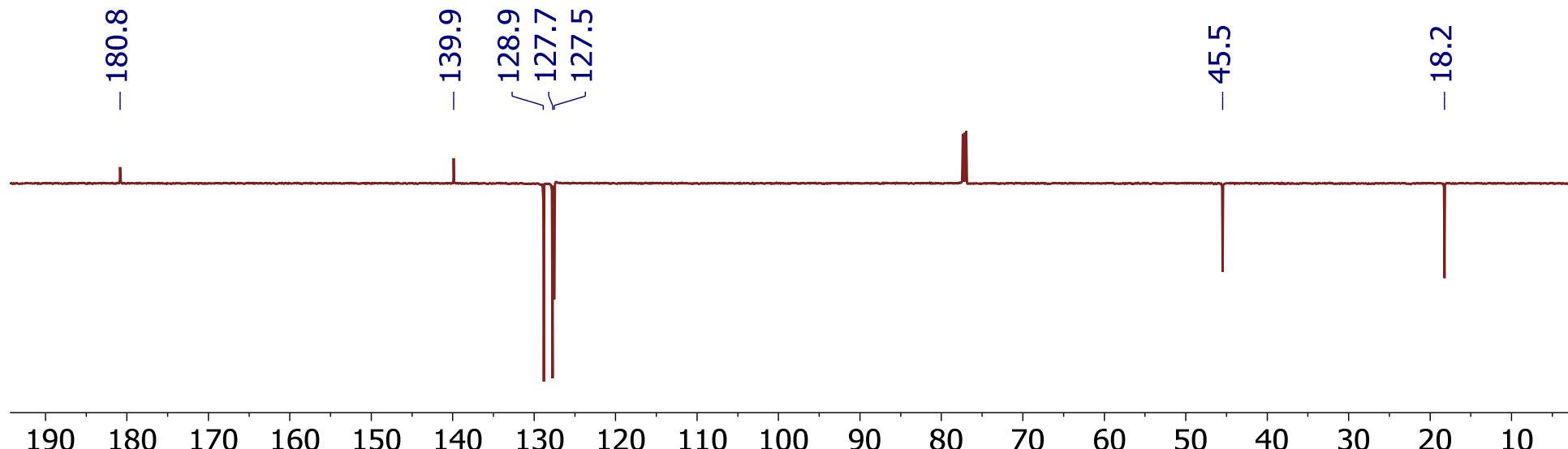
23

C₉H₁₀O₂

¹H NMR
(600 MHz, CDCl₃)



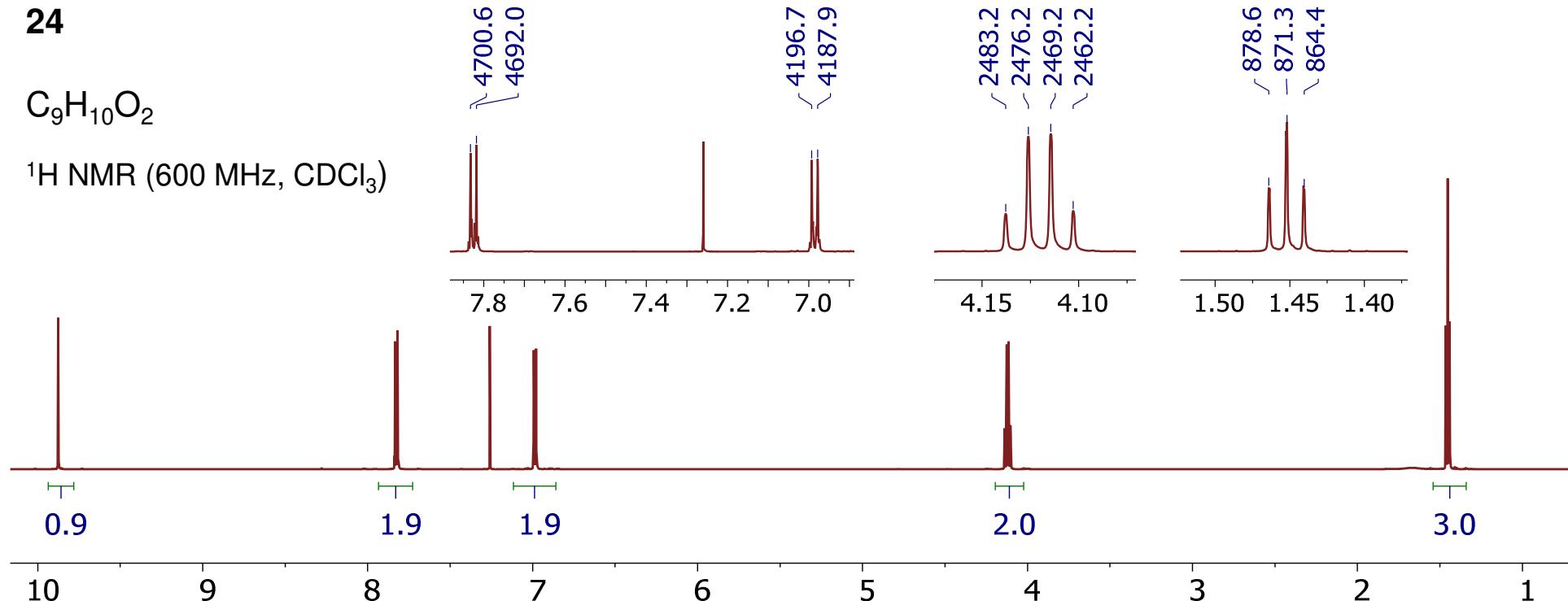
¹³C APT (151 MHz, CDCl₃)



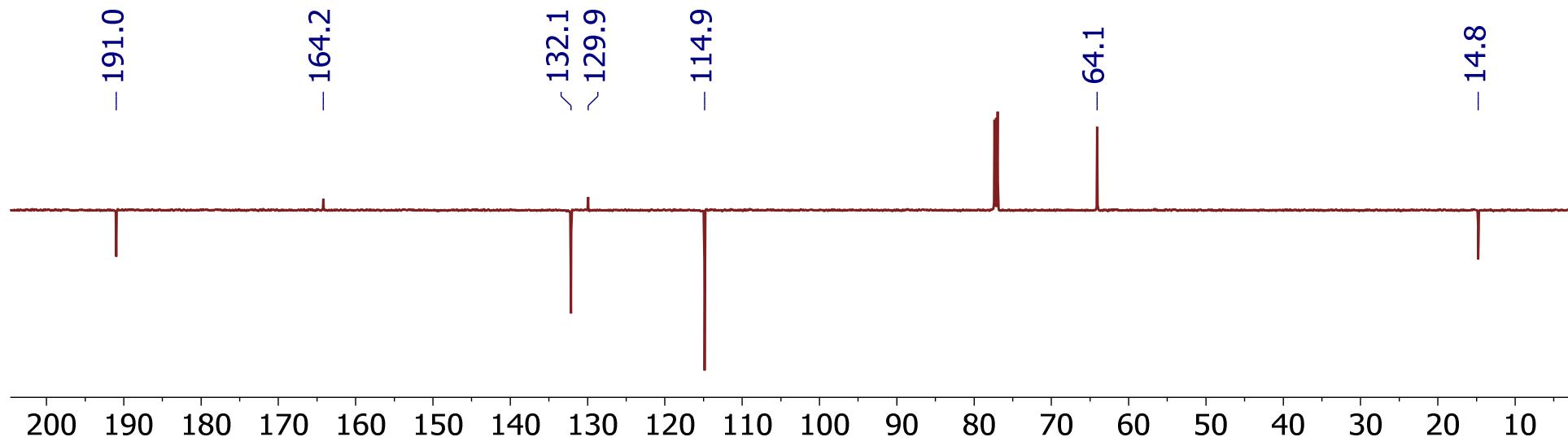
24

C₉H₁₀O₂

¹H NMR (600 MHz, CDCl₃)



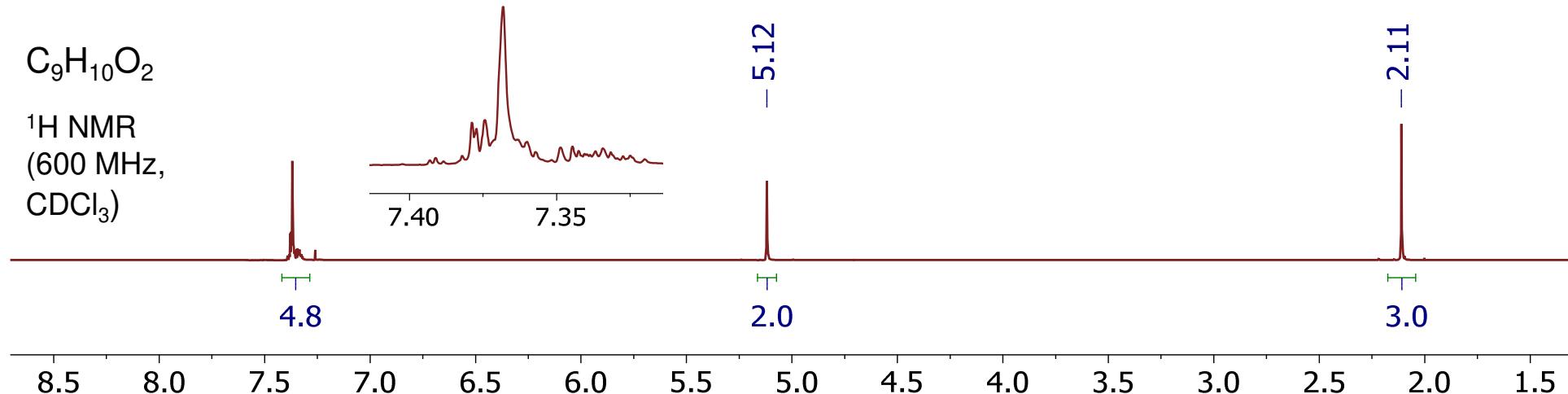
¹³C APT (151 MHz, CDCl₃)



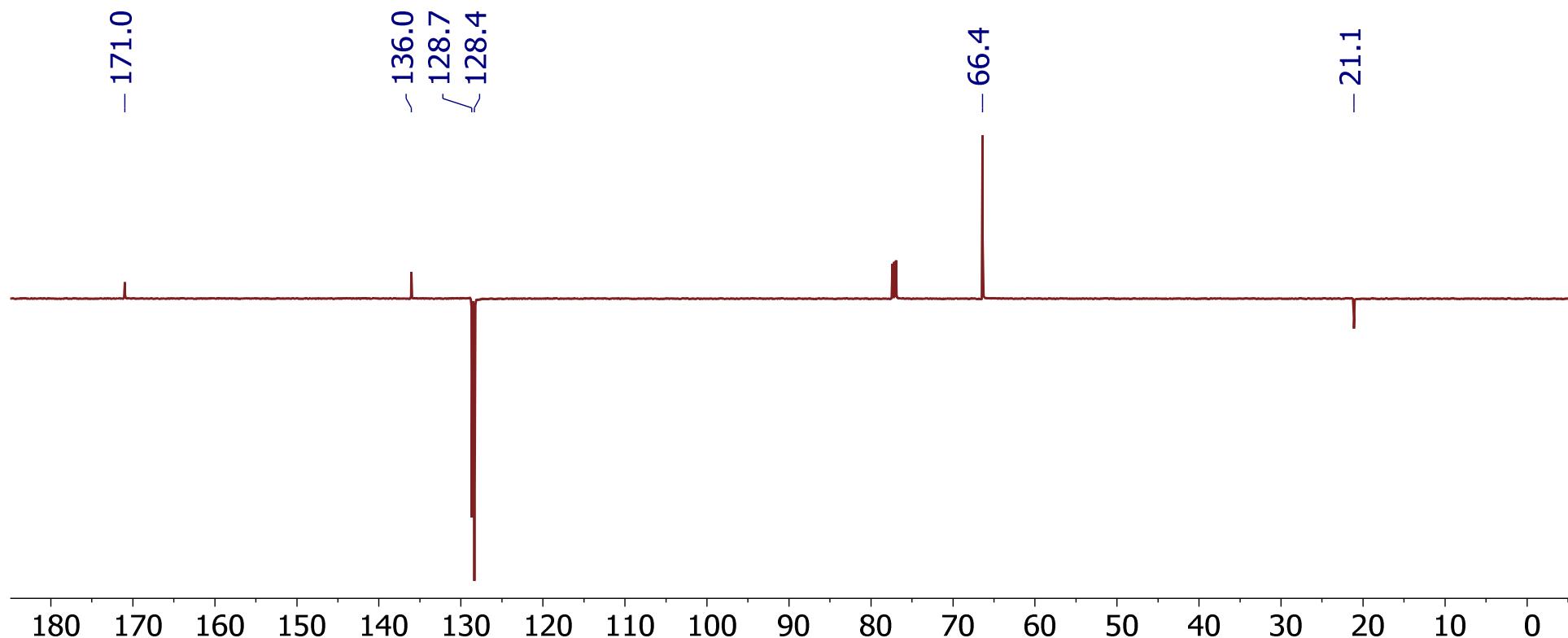
25

C₉H₁₀O₂

¹H NMR
(600 MHz,
CDCl₃)



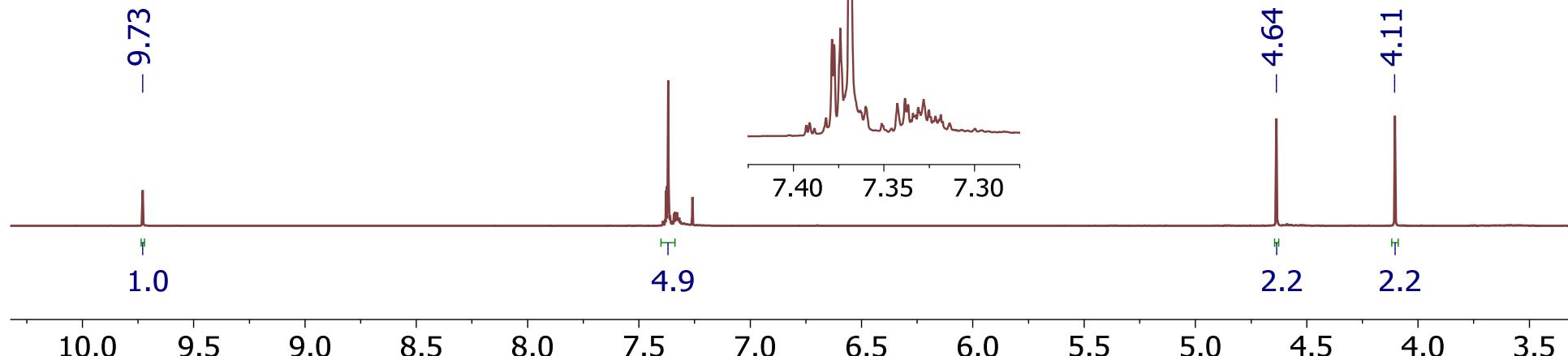
¹³C APT (151 MHz, CDCl₃)



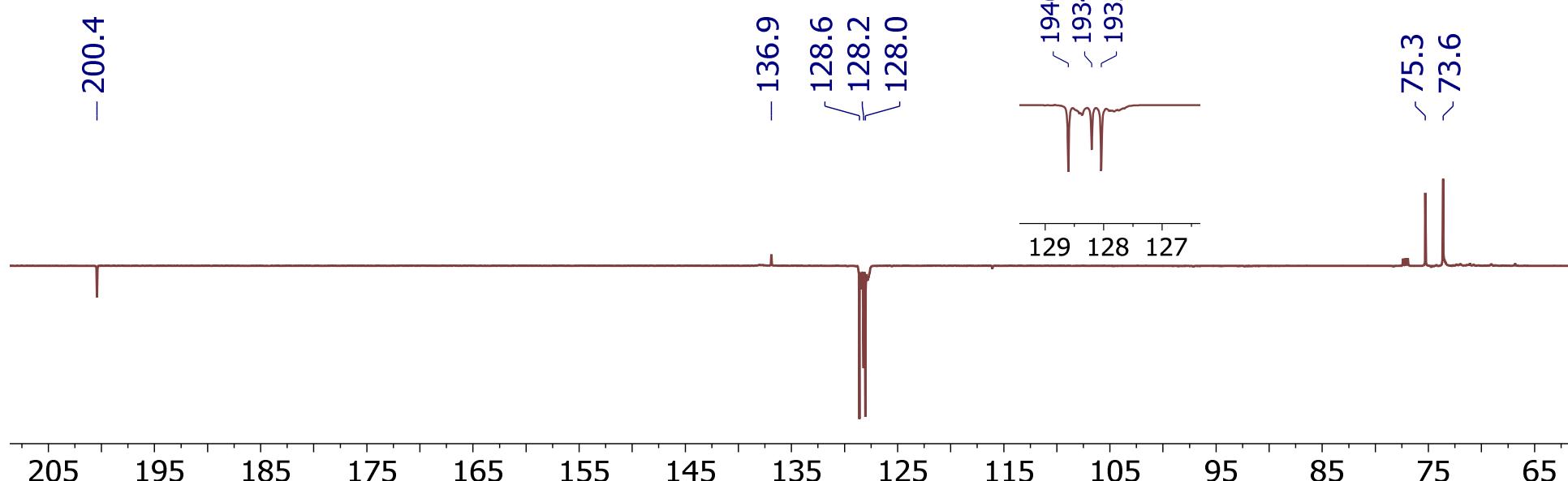
26

C₉H₁₀O₂

¹H NMR (600 MHz, CDCl₃)



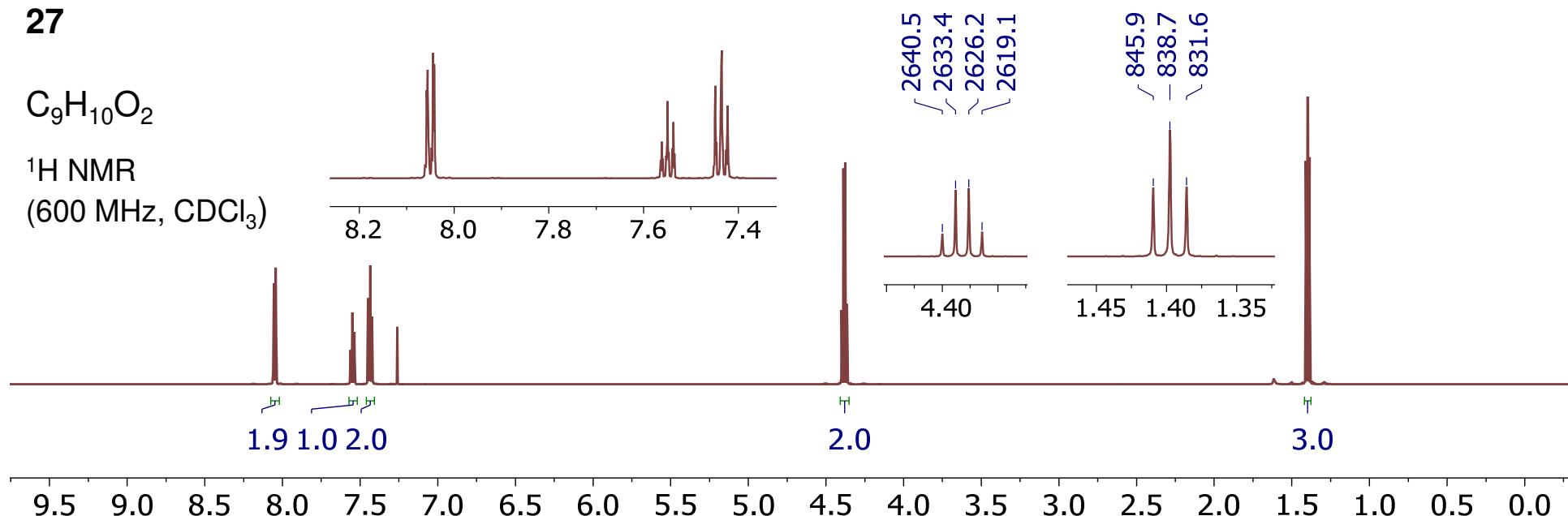
¹³C APT (151 MHz, CDCl₃)



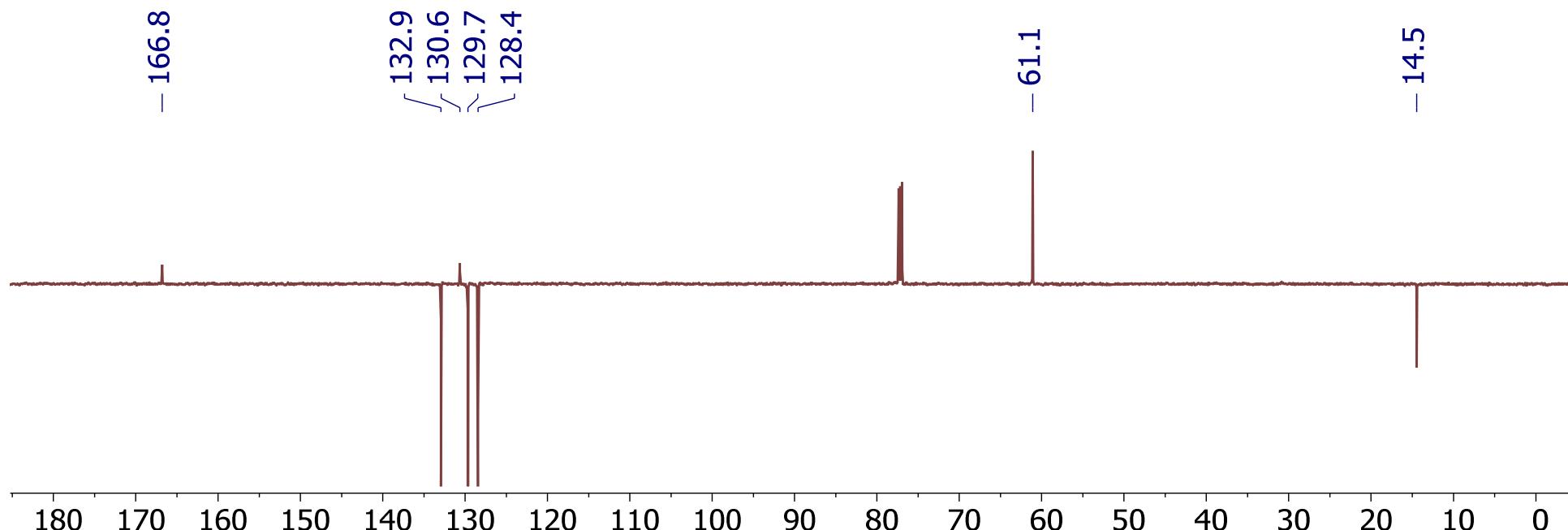
27

C₉H₁₀O₂

¹H NMR
(600 MHz, CDCl₃)



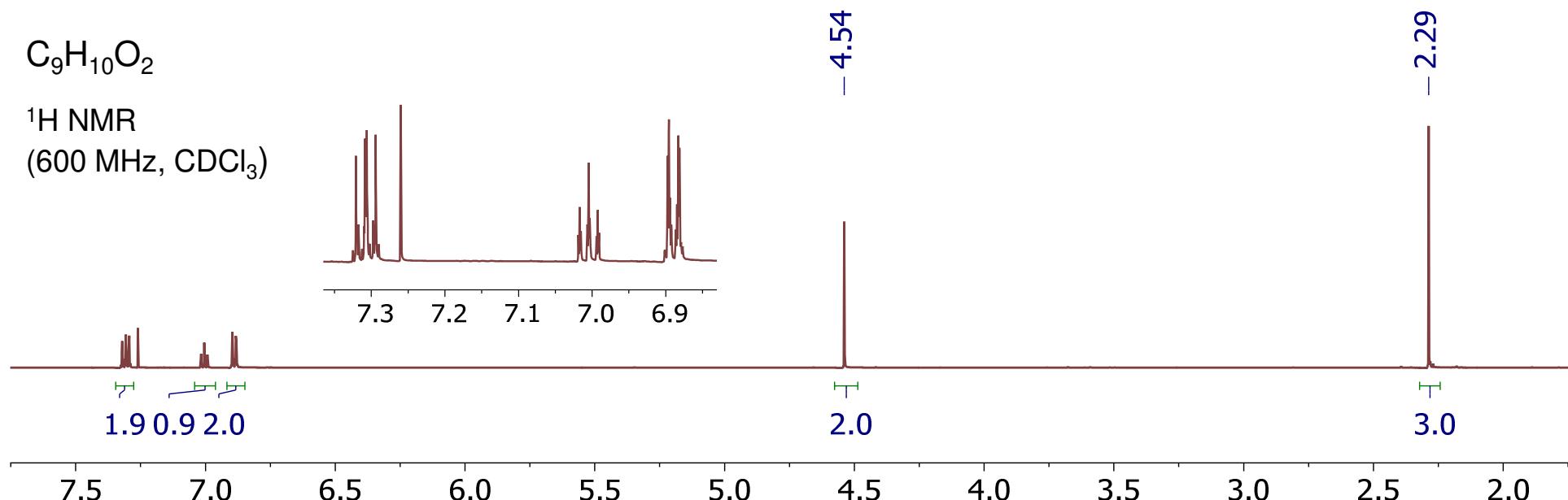
¹³C APT (151 MHz, CDCl₃)



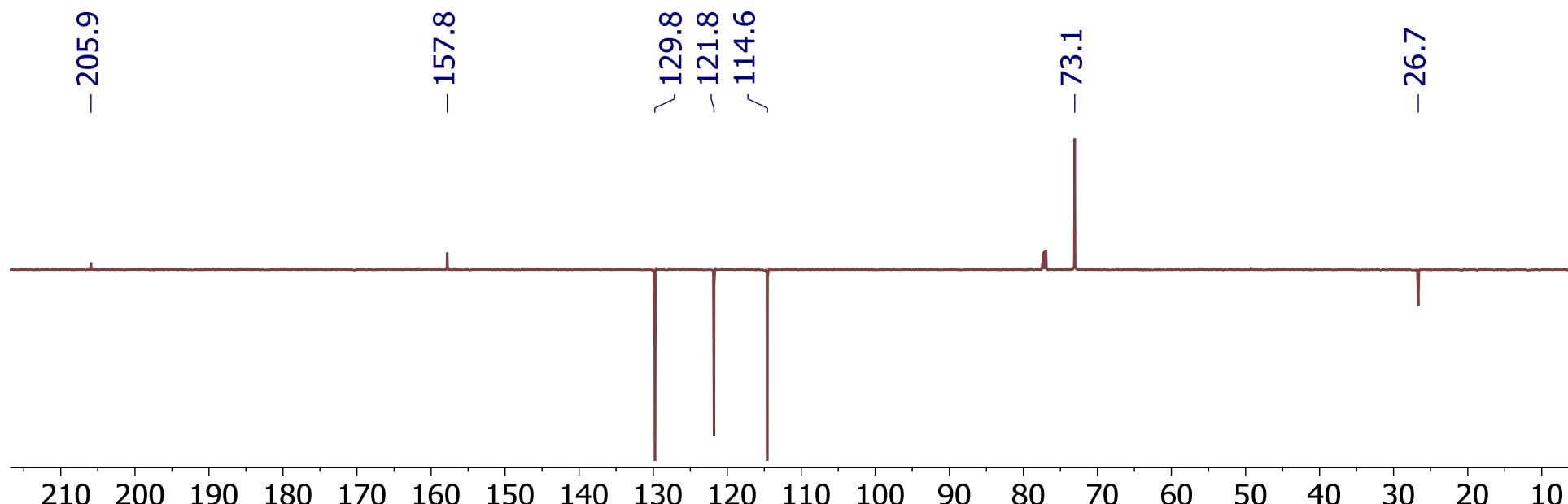
28

C₉H₁₀O₂

¹H NMR
(600 MHz, CDCl₃)



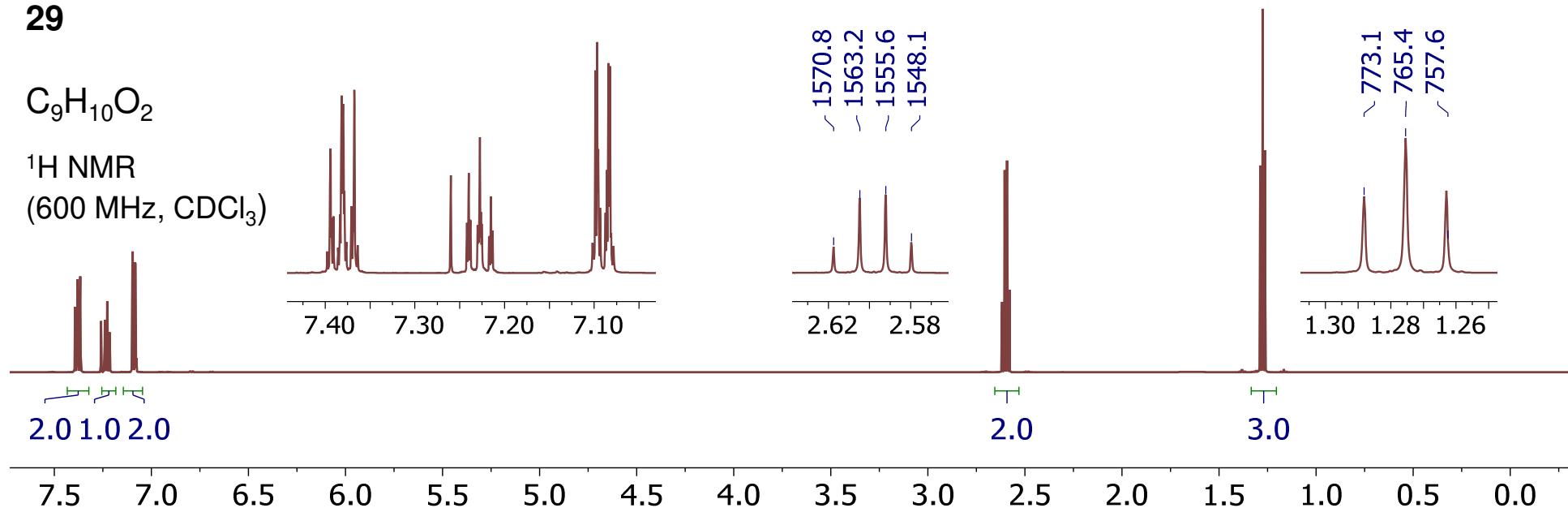
¹³C APT (151 MHz, CDCl₃)



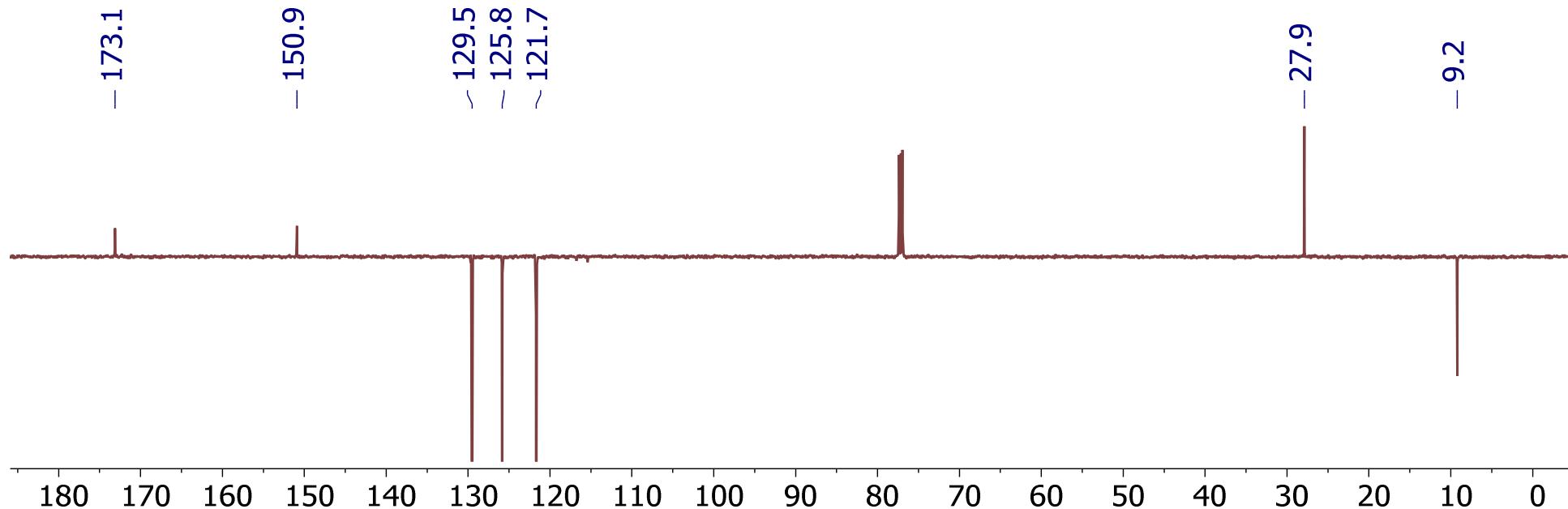
29

C₉H₁₀O₂

¹H NMR
(600 MHz, CDCl₃)



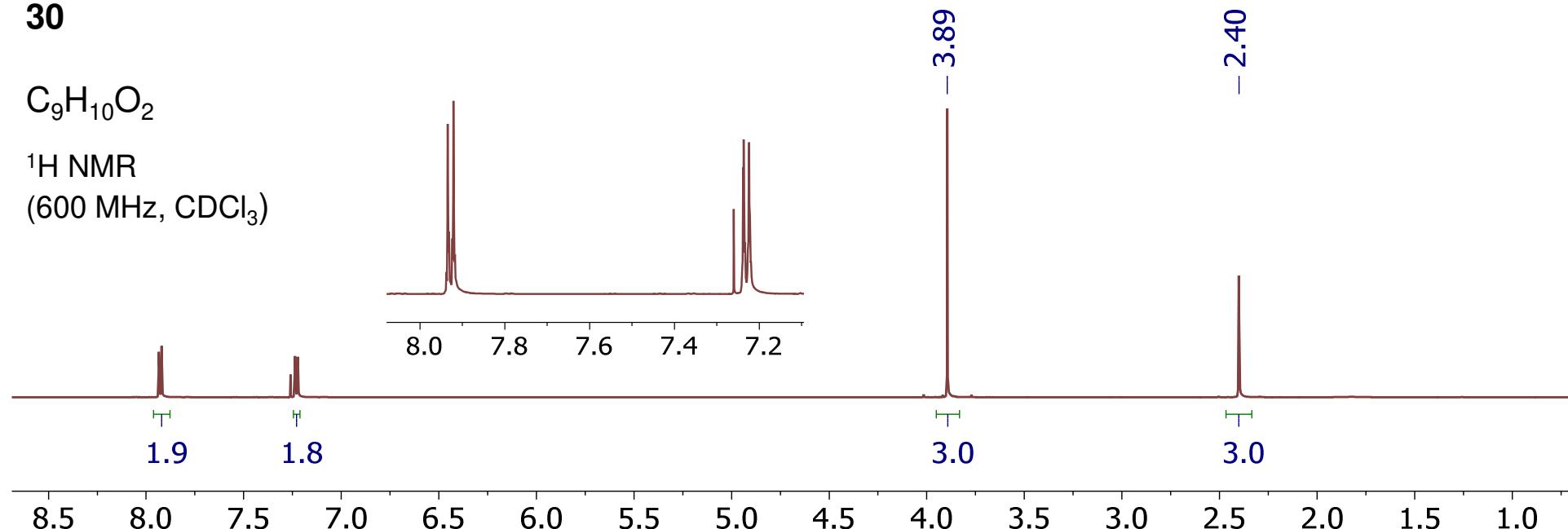
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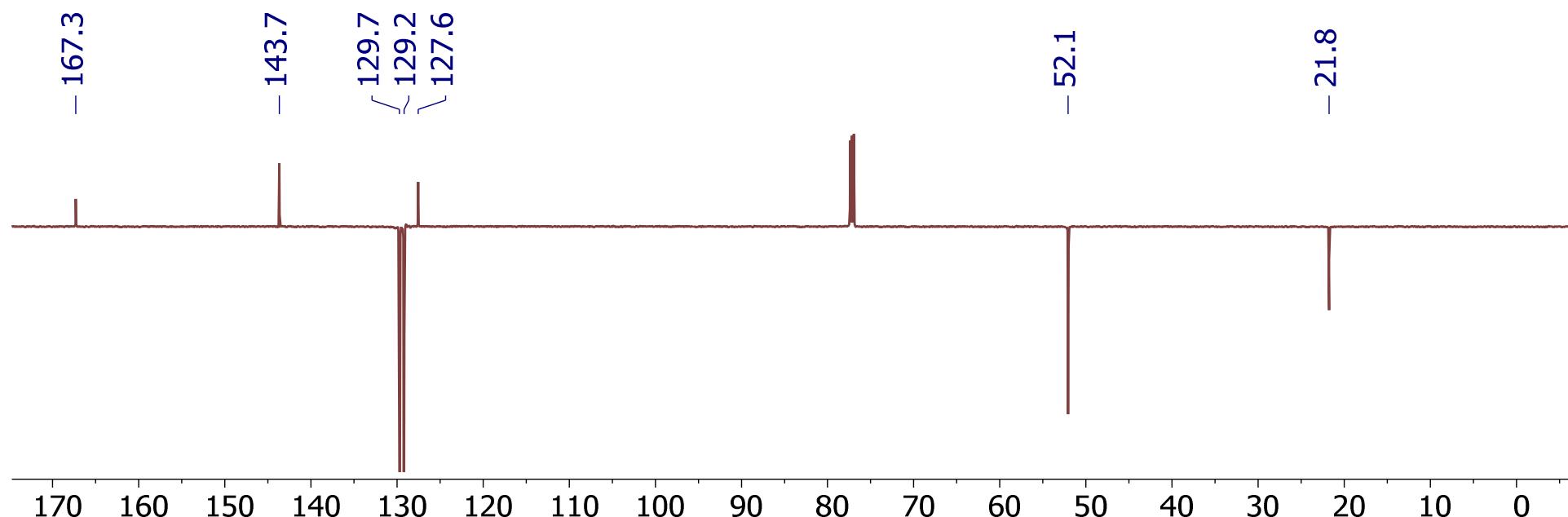
30

C₉H₁₀O₂

¹H NMR
(600 MHz, CDCl₃)



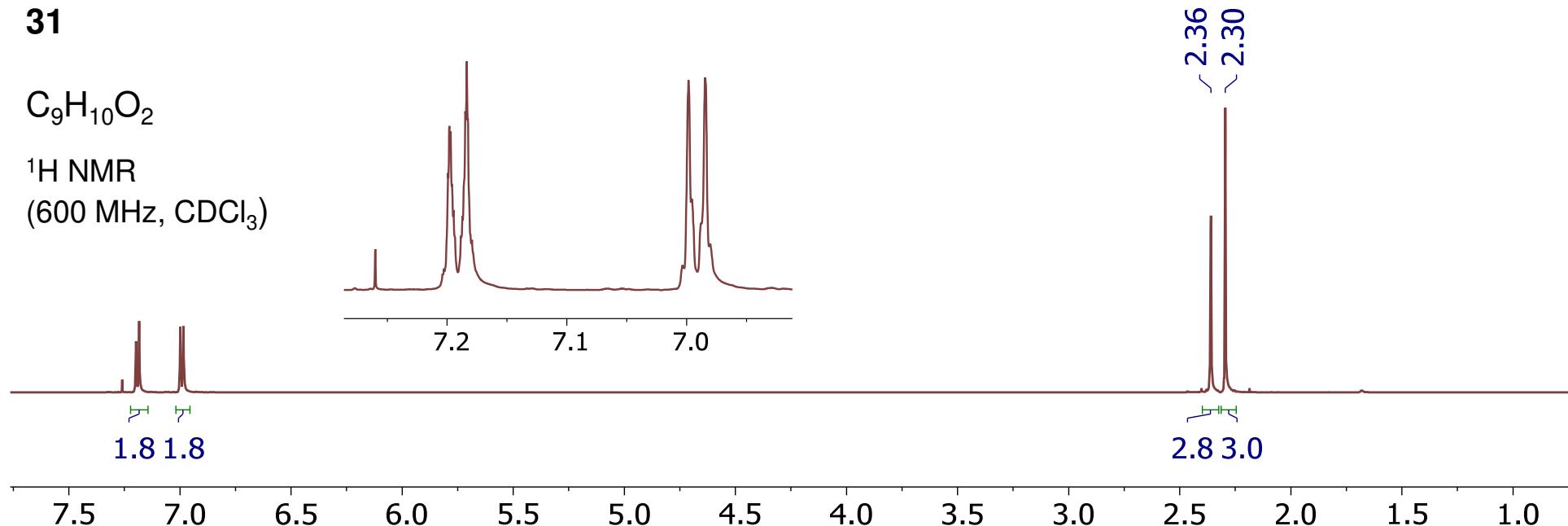
¹³C APT (151 MHz, CDCl₃)



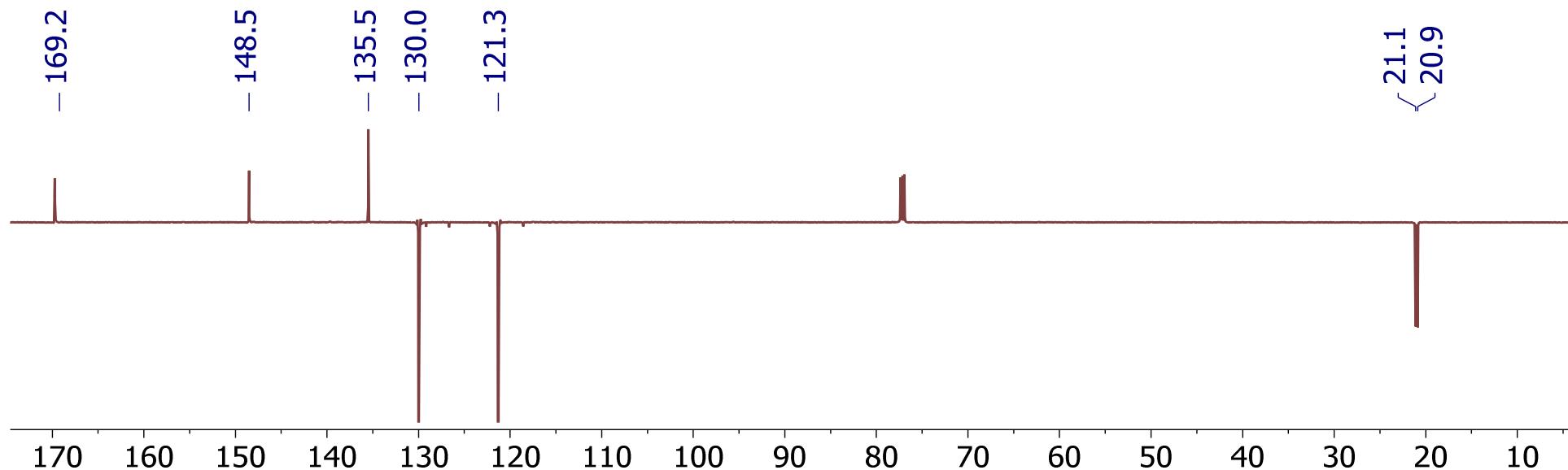
31

C₉H₁₀O₂

¹H NMR
(600 MHz, CDCl₃)



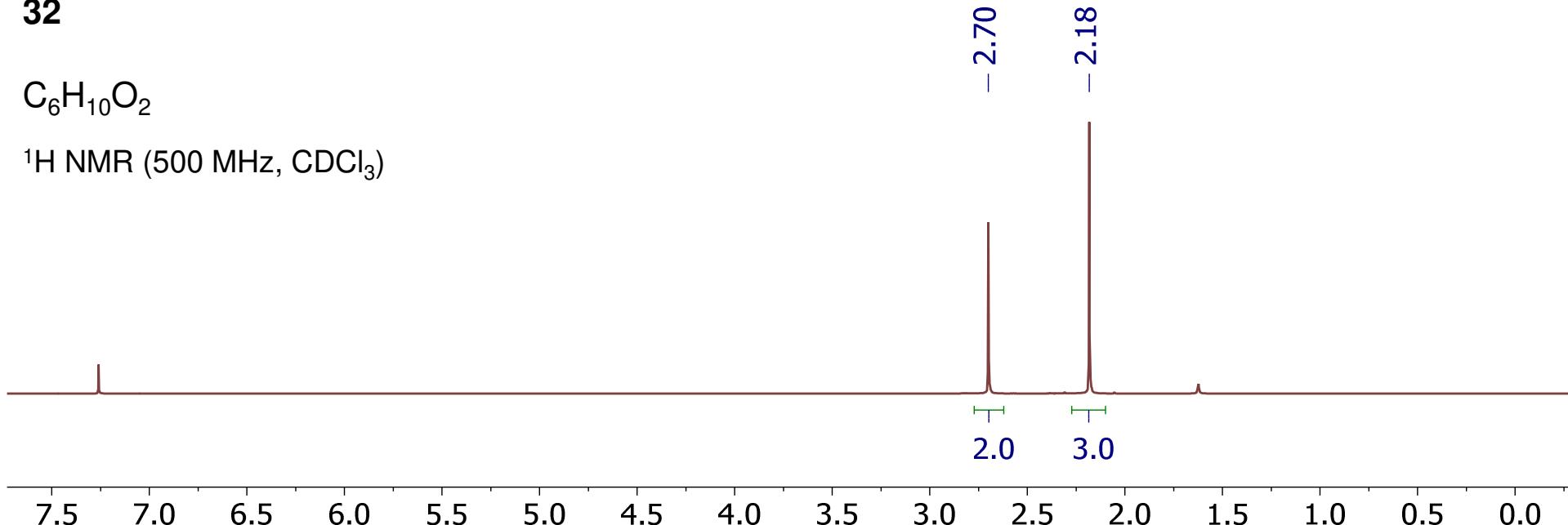
¹³C APT (151 MHz, CDCl₃)



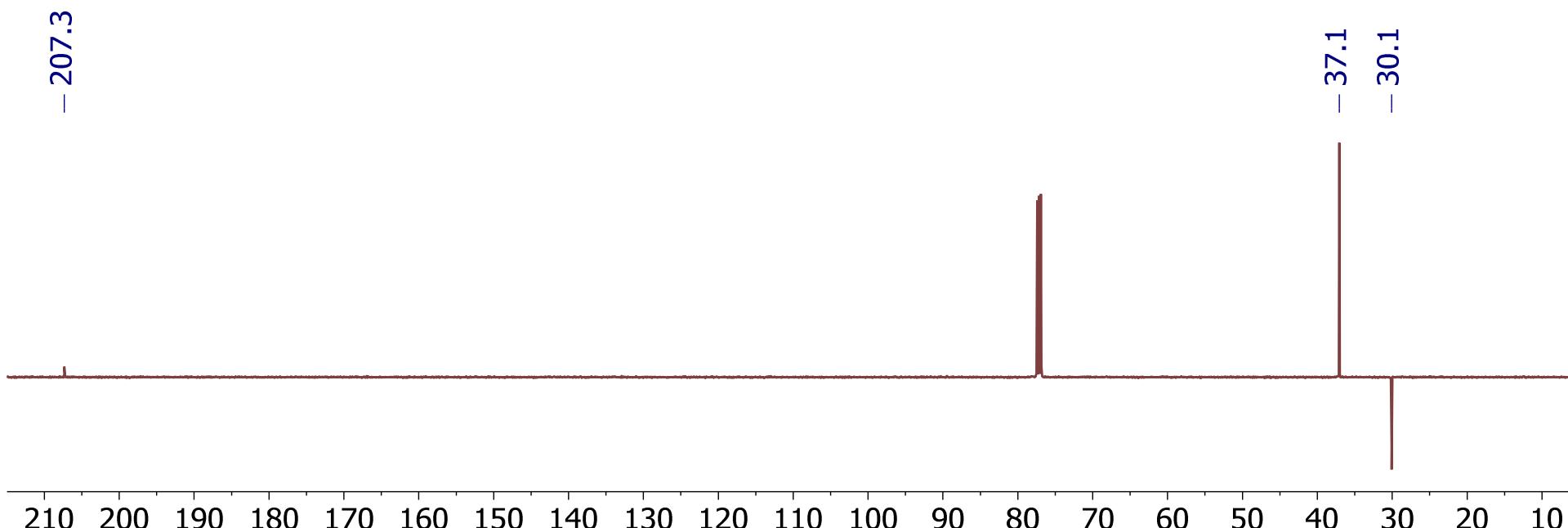
32

C₆H₁₀O₂

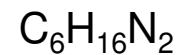
¹H NMR (500 MHz, CDCl₃)



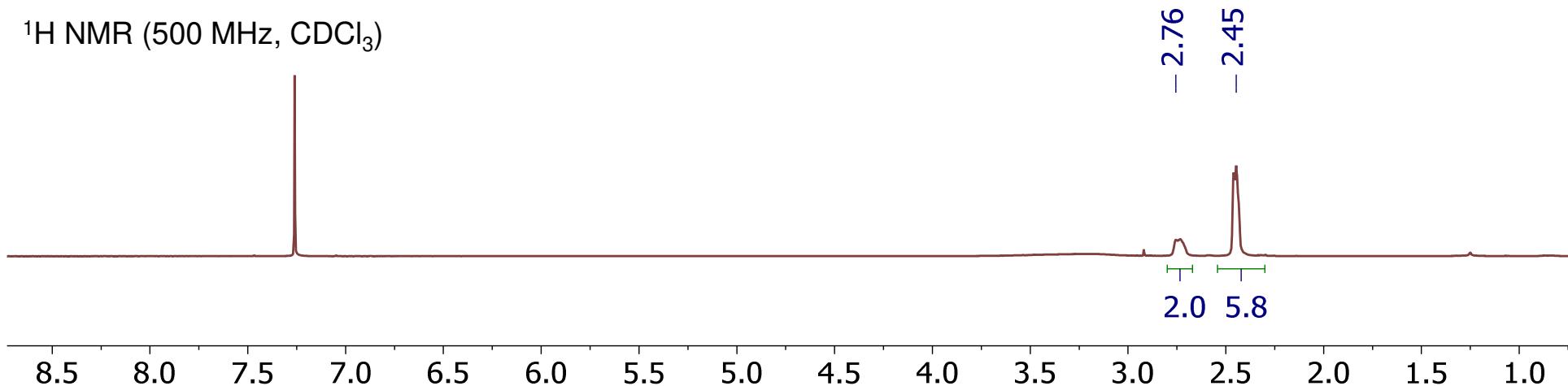
¹³C APT (126 MHz, CDCl₃)



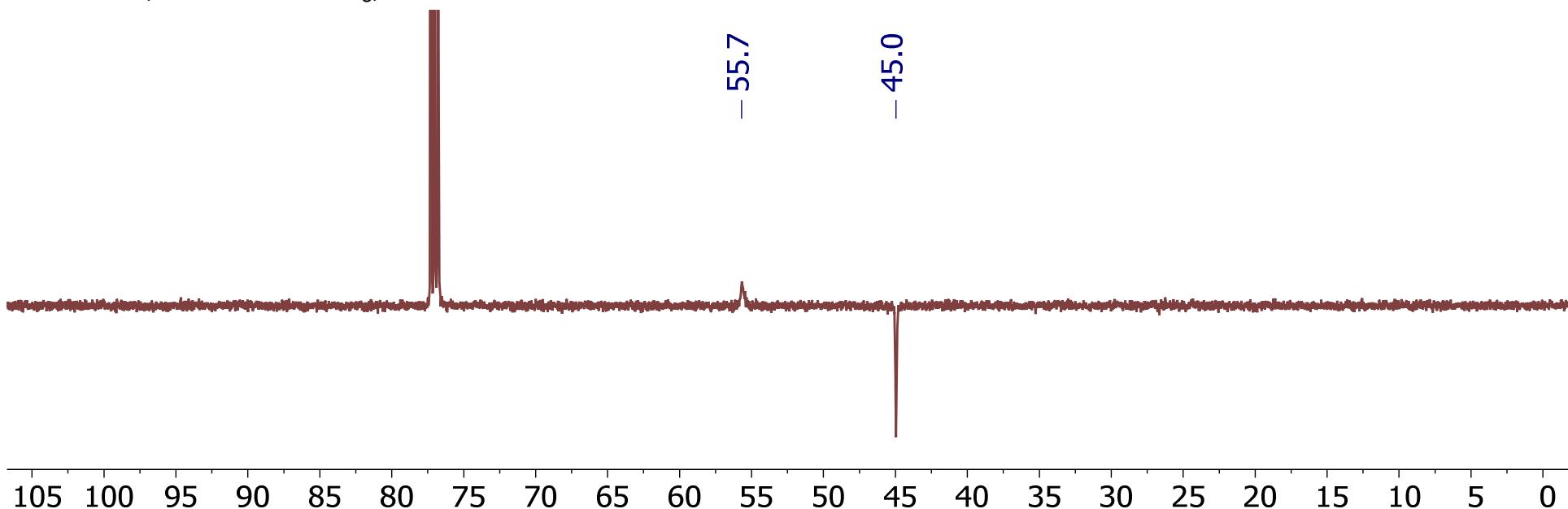
33



^1H NMR (500 MHz, CDCl_3)



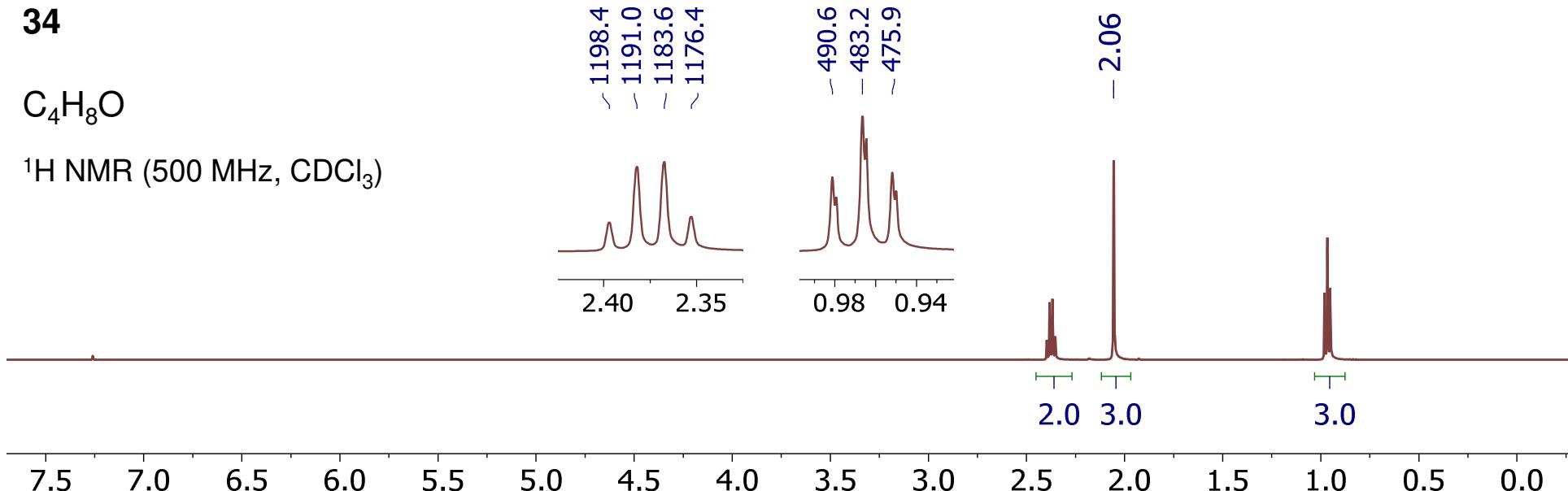
^{13}C APT (126 MHz, CDCl_3)



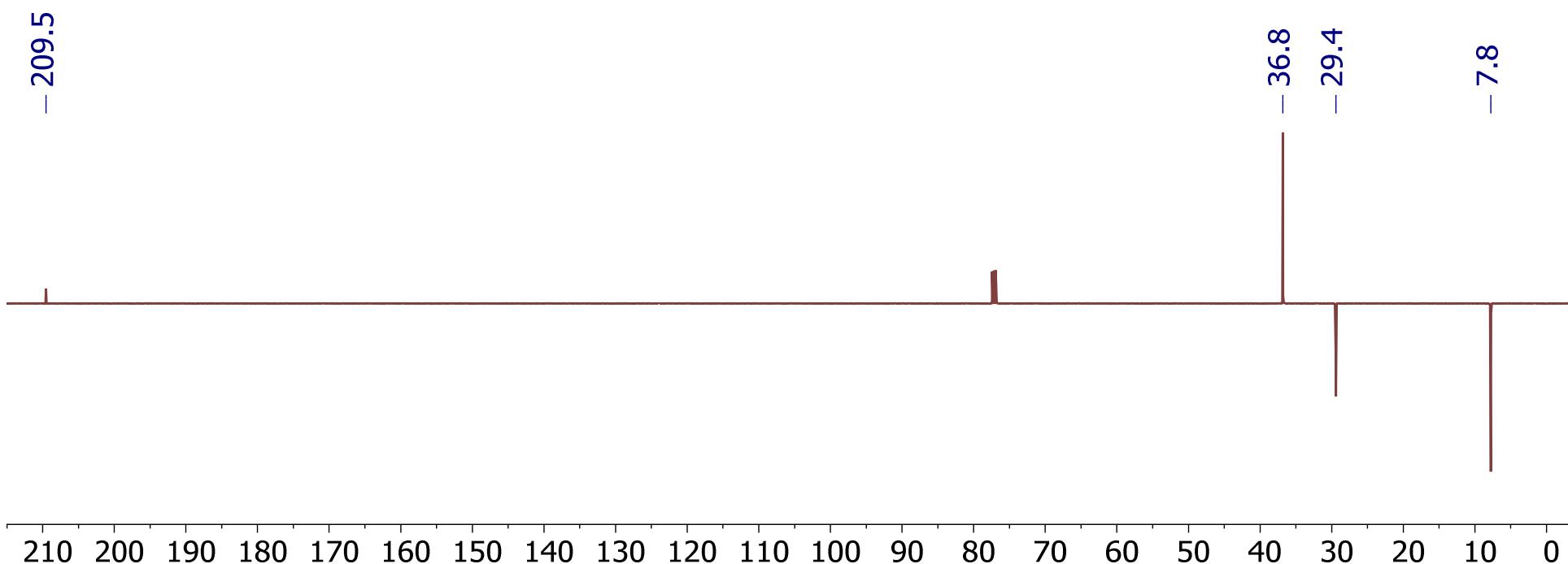
34

C₄H₈O

¹H NMR (500 MHz, CDCl₃)



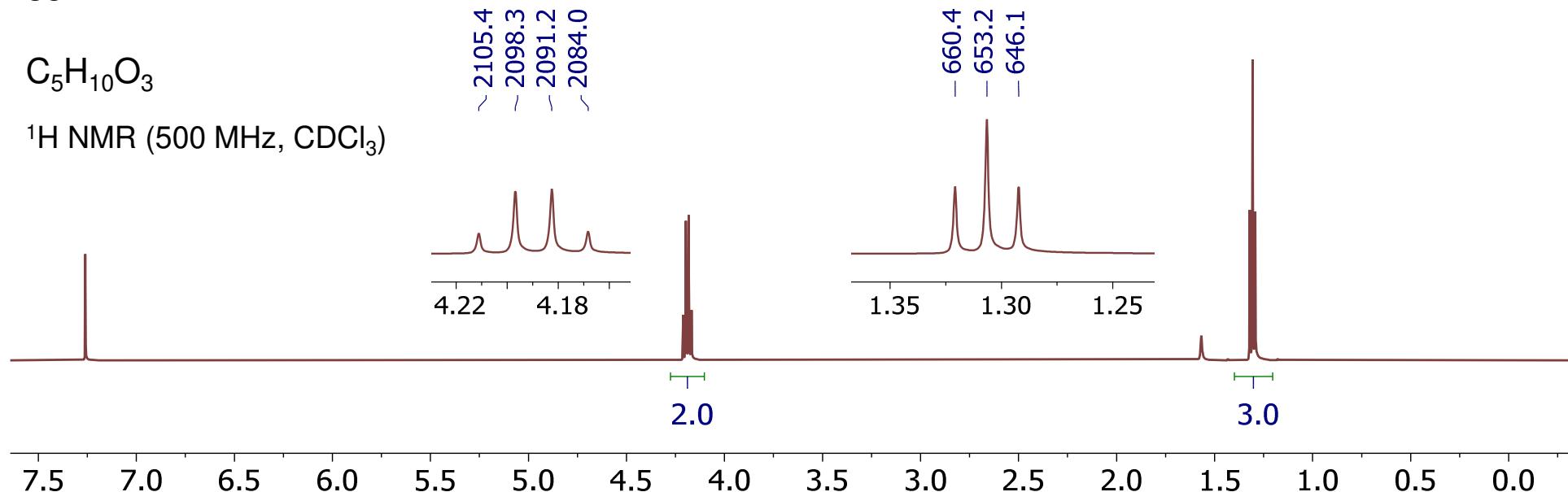
¹³C APT (126 MHz, CDCl₃)



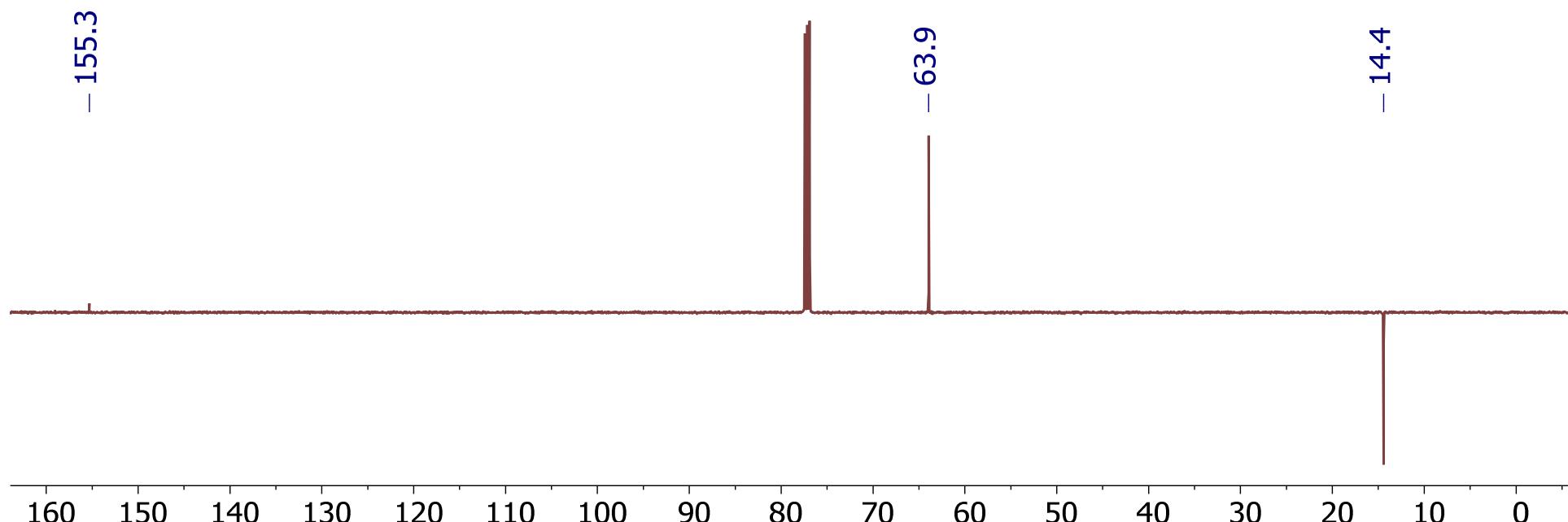
35

C₅H₁₀O₃

¹H NMR (500 MHz, CDCl₃)



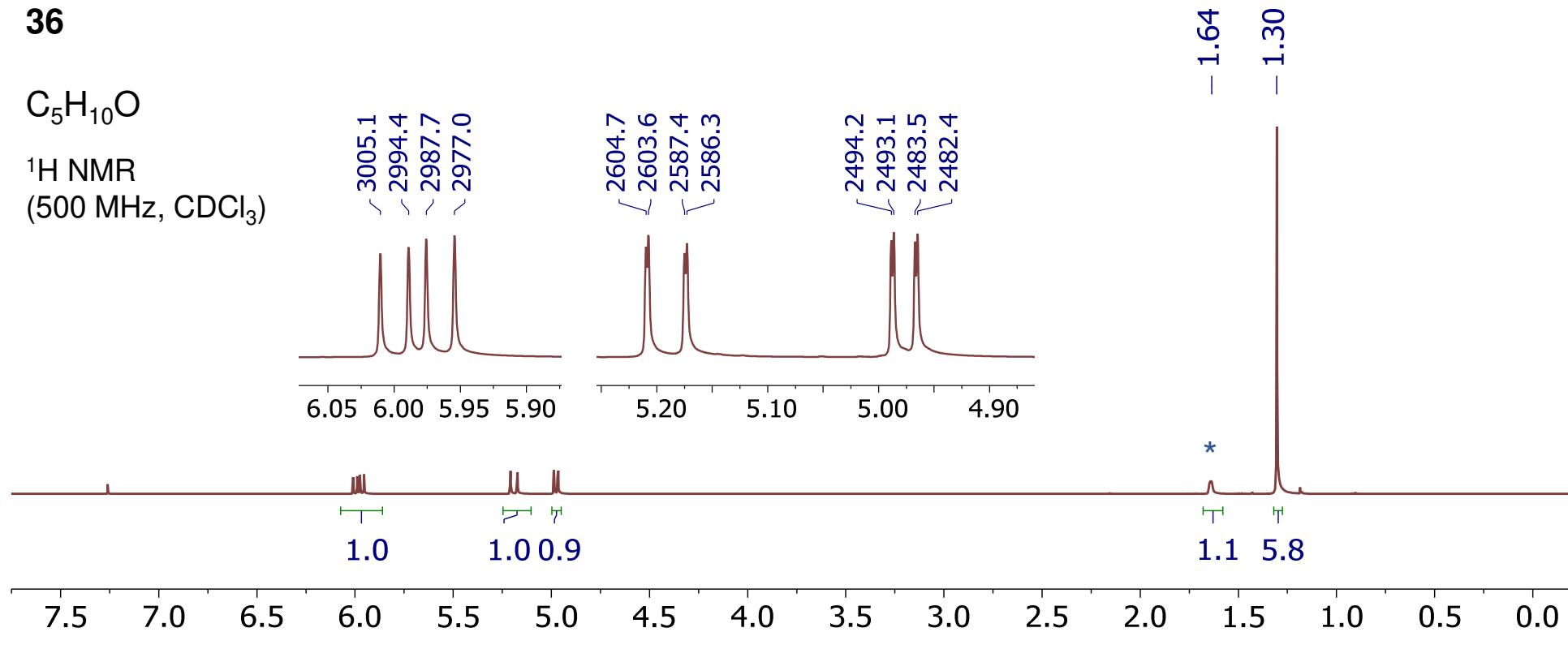
¹³C APT (126 MHz, CDCl₃)



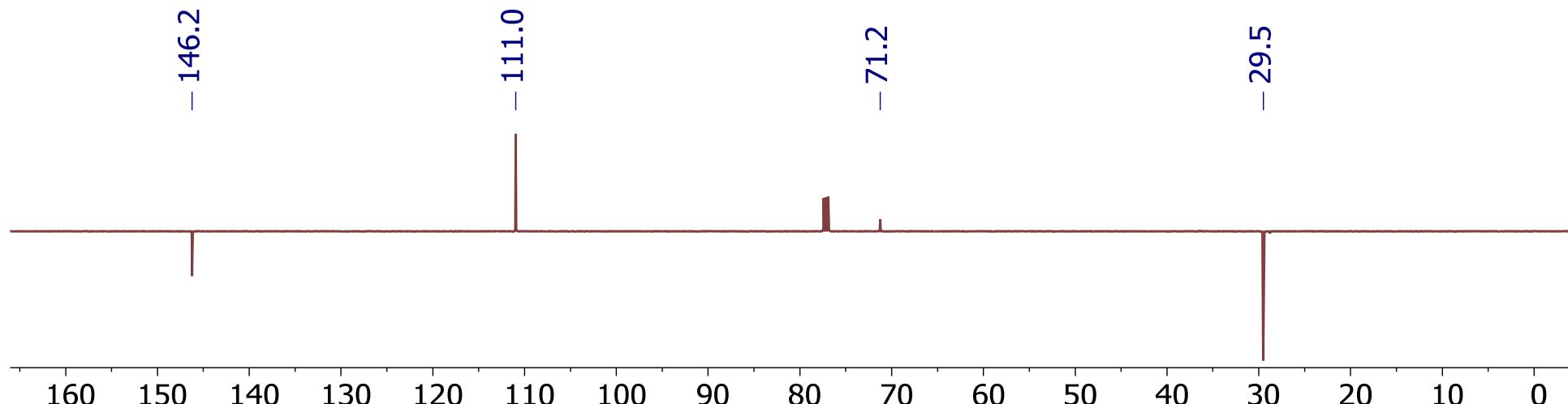
36

C₅H₁₀O

¹H NMR
(500 MHz, CDCl₃)



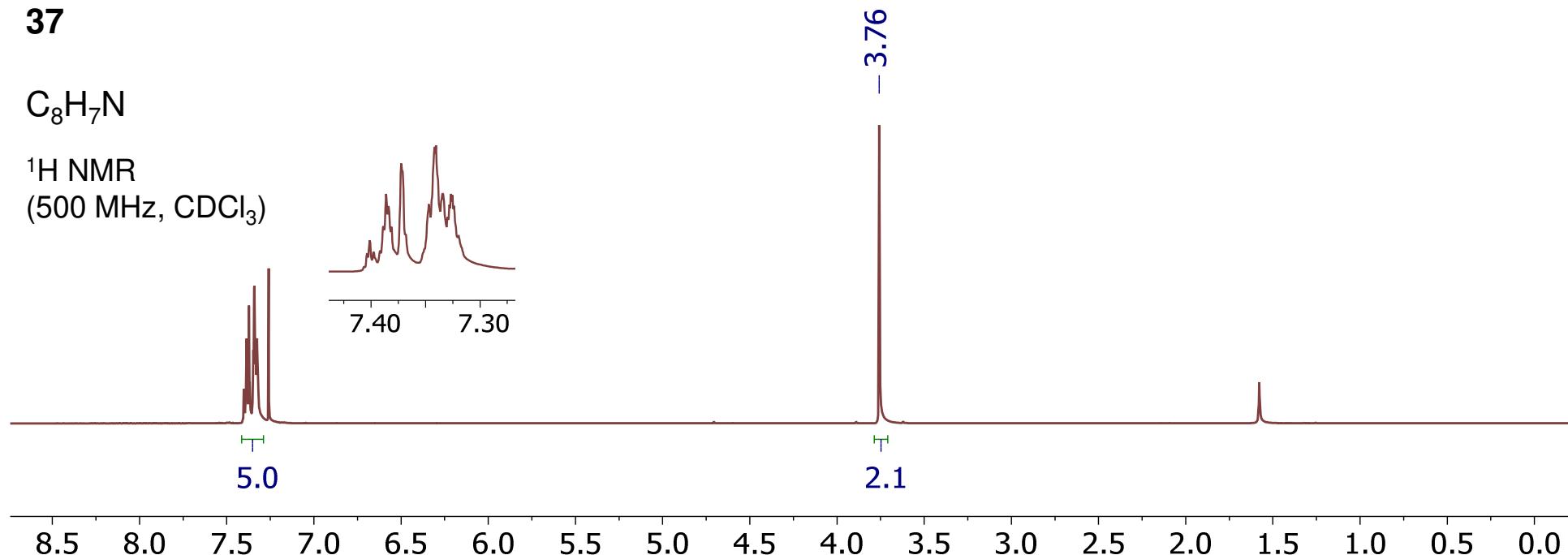
¹³C APT (126 MHz, CDCl₃)



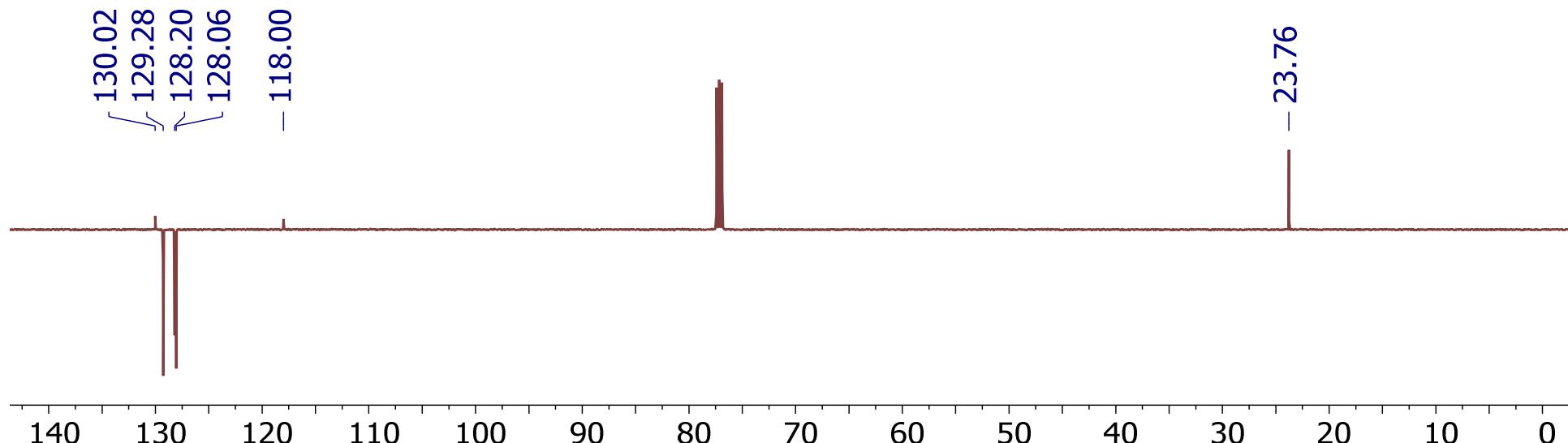
37

C₈H₇N

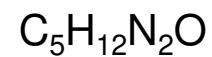
¹H NMR
(500 MHz, CDCl₃)



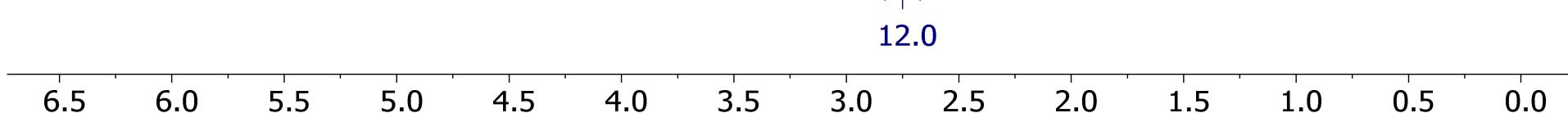
¹³C APT (126 MHz, CDCl₃)



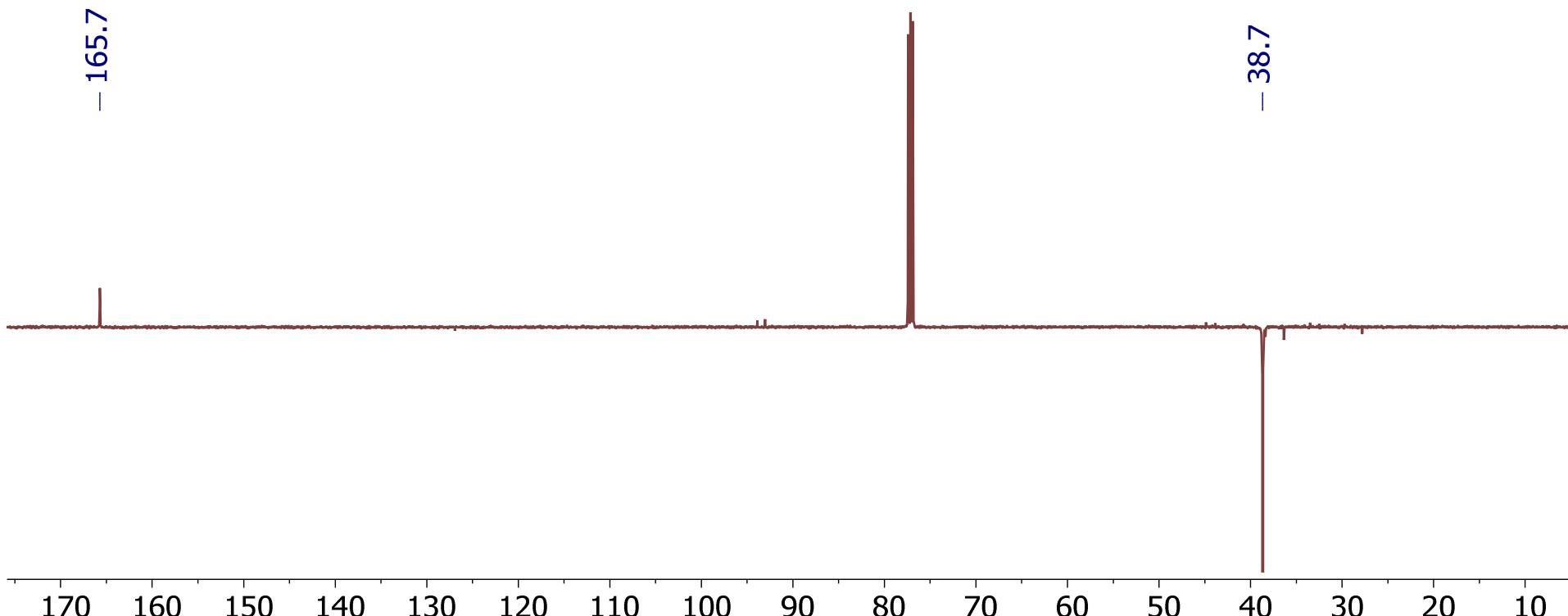
38



^1H NMR (500 MHz, CDCl_3)



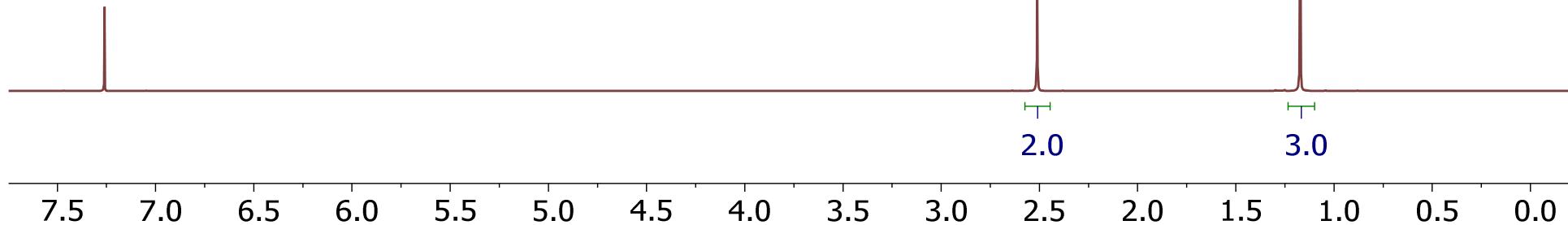
^{13}C NMR (126 MHz, CDCl_3)



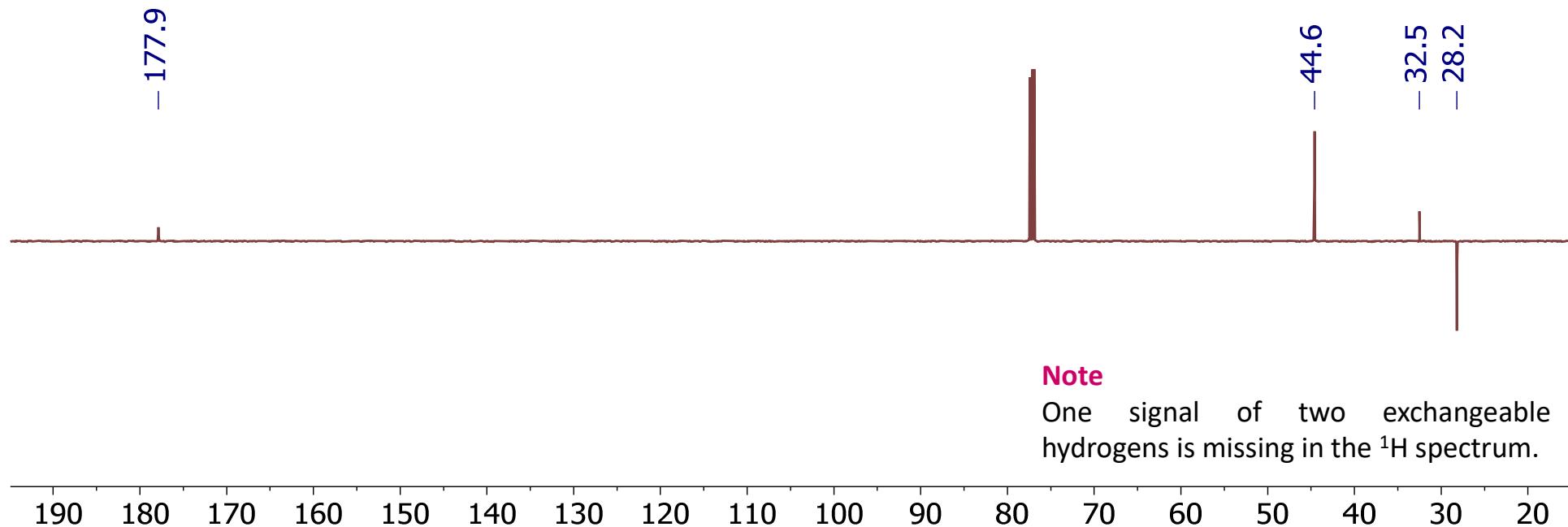
39

C₇H₁₂O₄**

¹H NMR (500 MHz, CDCl₃)



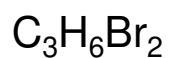
¹³C APT (126 MHz, CDCl₃)



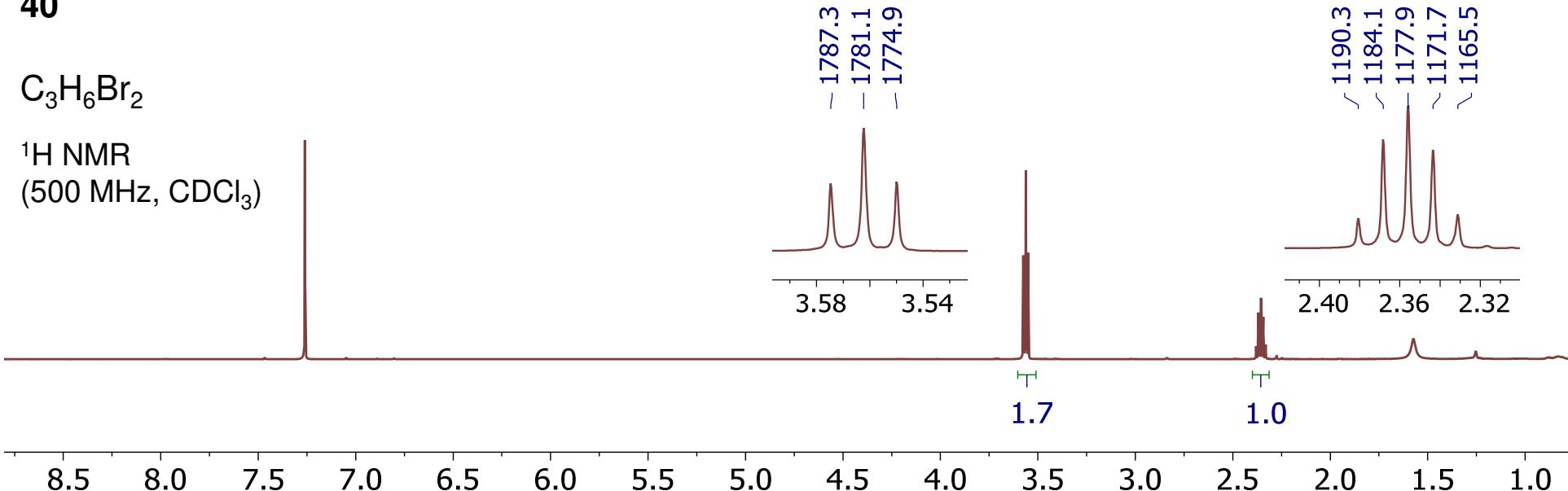
Note

One signal of two exchangeable hydrogens is missing in the ¹H spectrum.

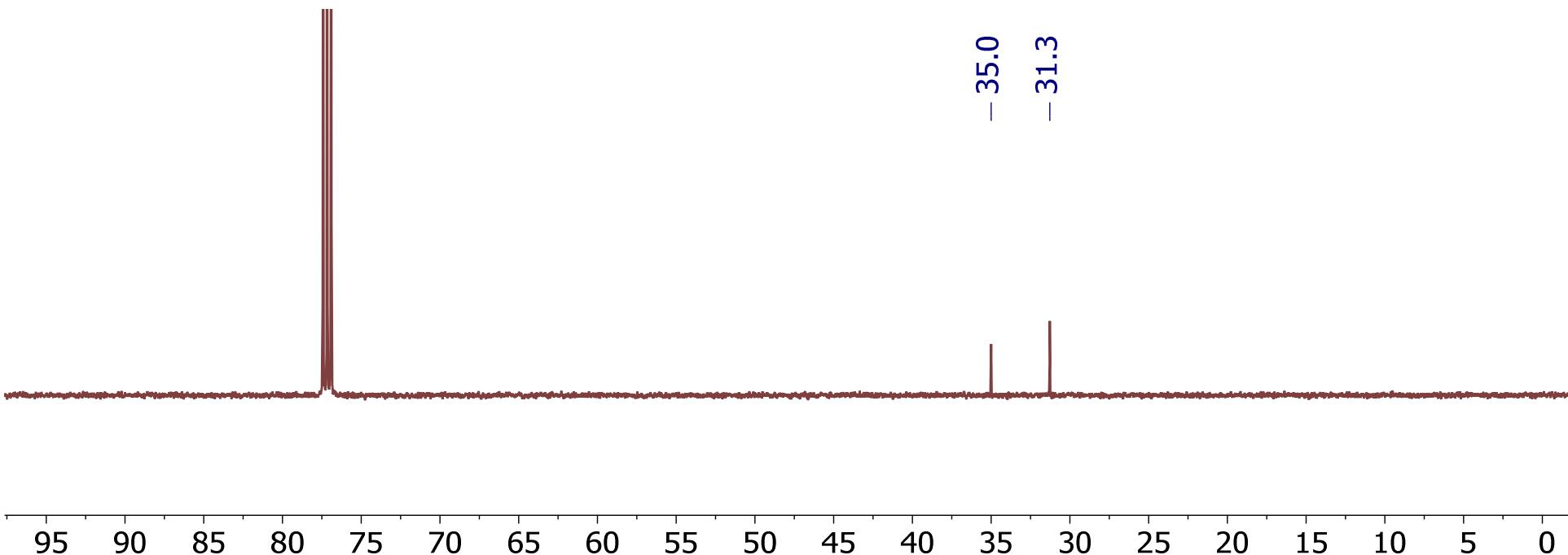
40



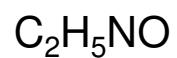
^1H NMR
(500 MHz, CDCl_3)



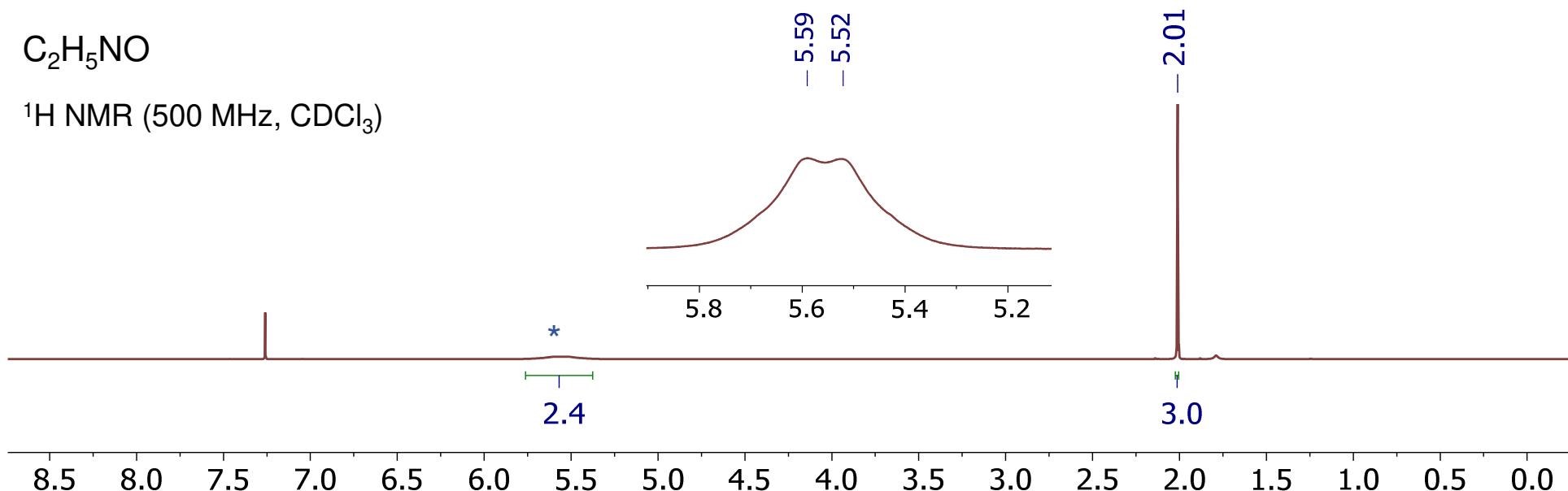
^{13}C APT (126 MHz, CDCl_3)



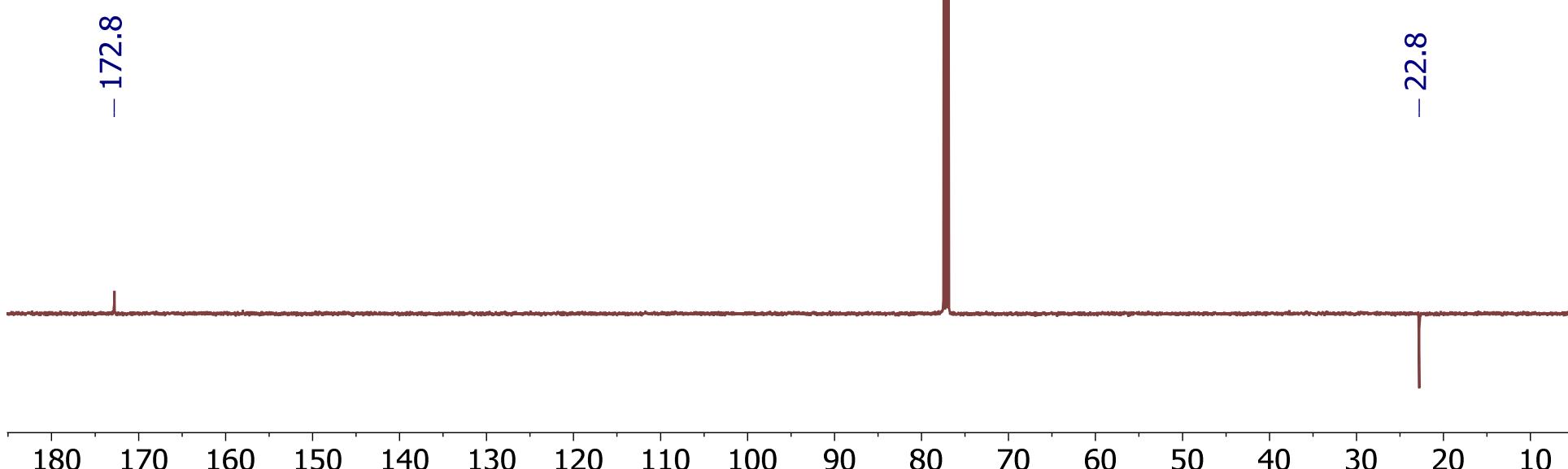
41



¹H NMR (500 MHz, CDCl₃)



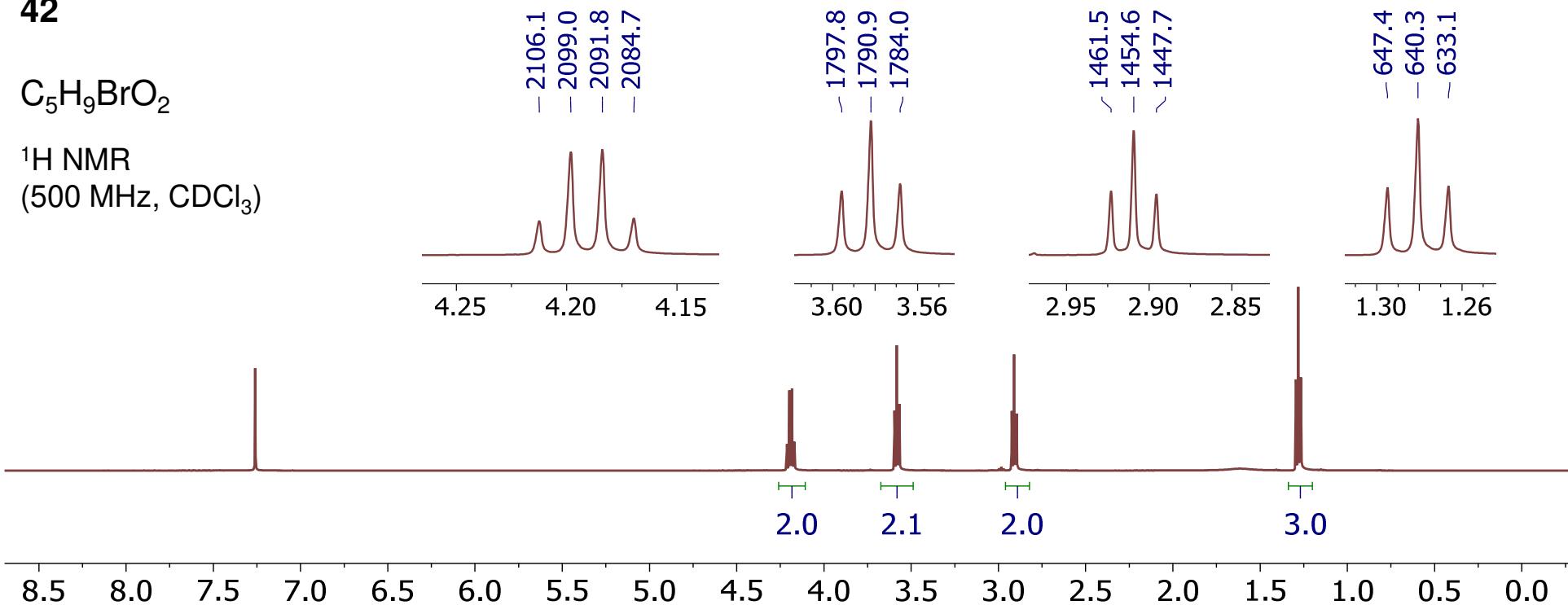
¹³C APT (126 MHz, CDCl₃)



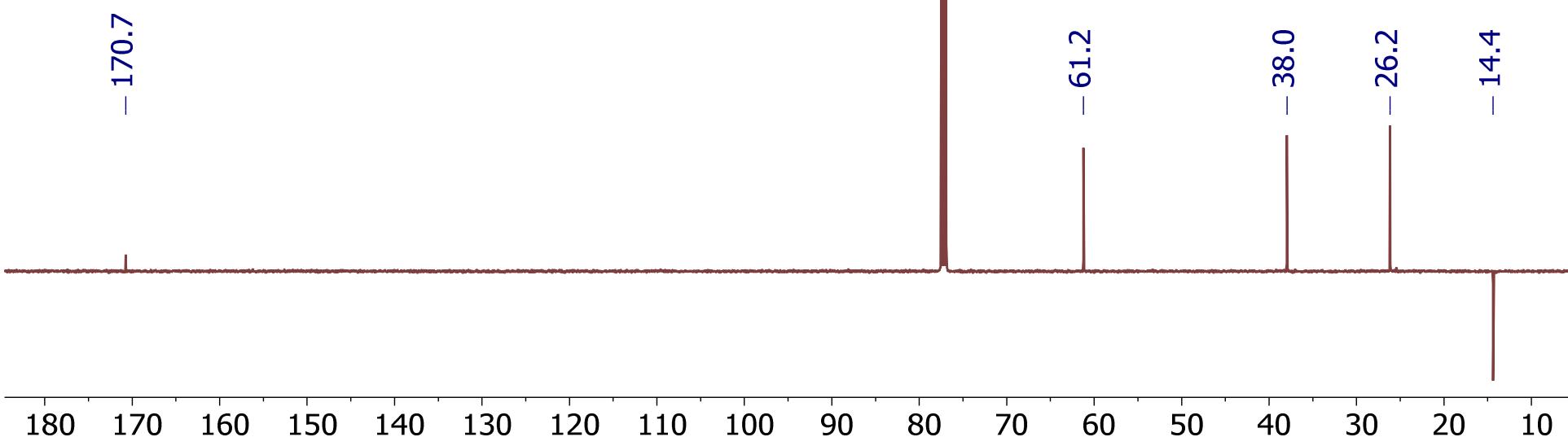
42



¹H NMR
(500 MHz, CDCl₃)



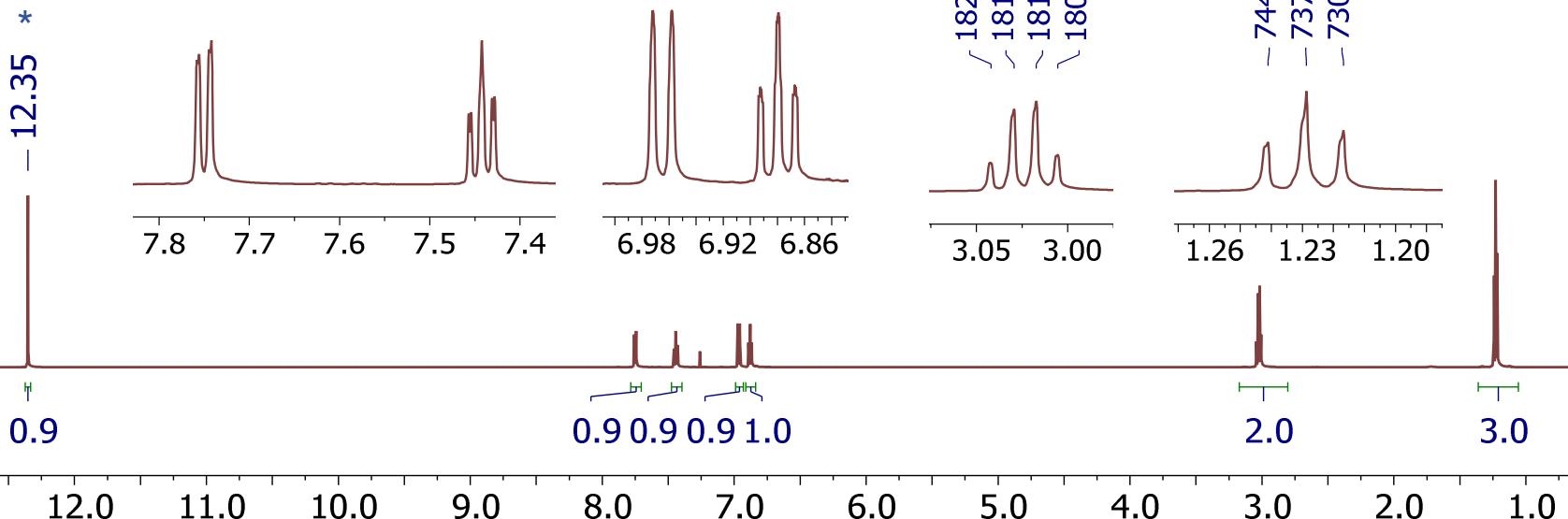
¹³C APT (126 MHz, CDCl₃)



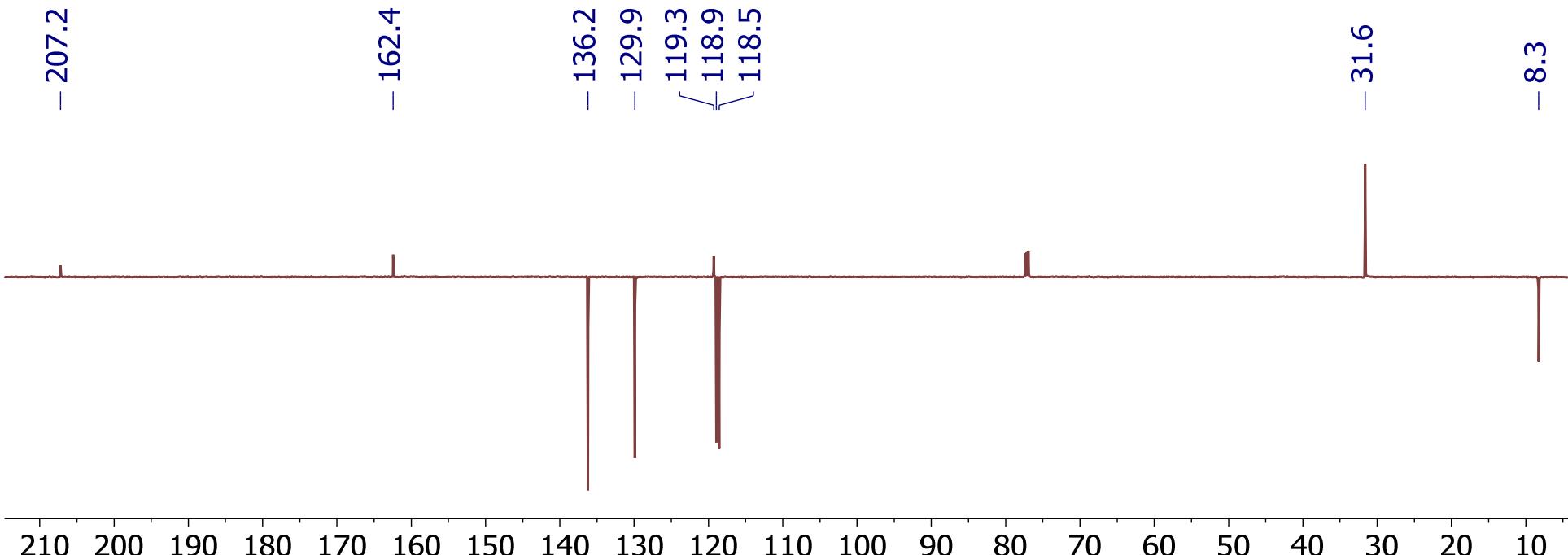
43

$C_9H_{10}O_2$

1H NMR
(500 MHz,
 $CDCl_3$)



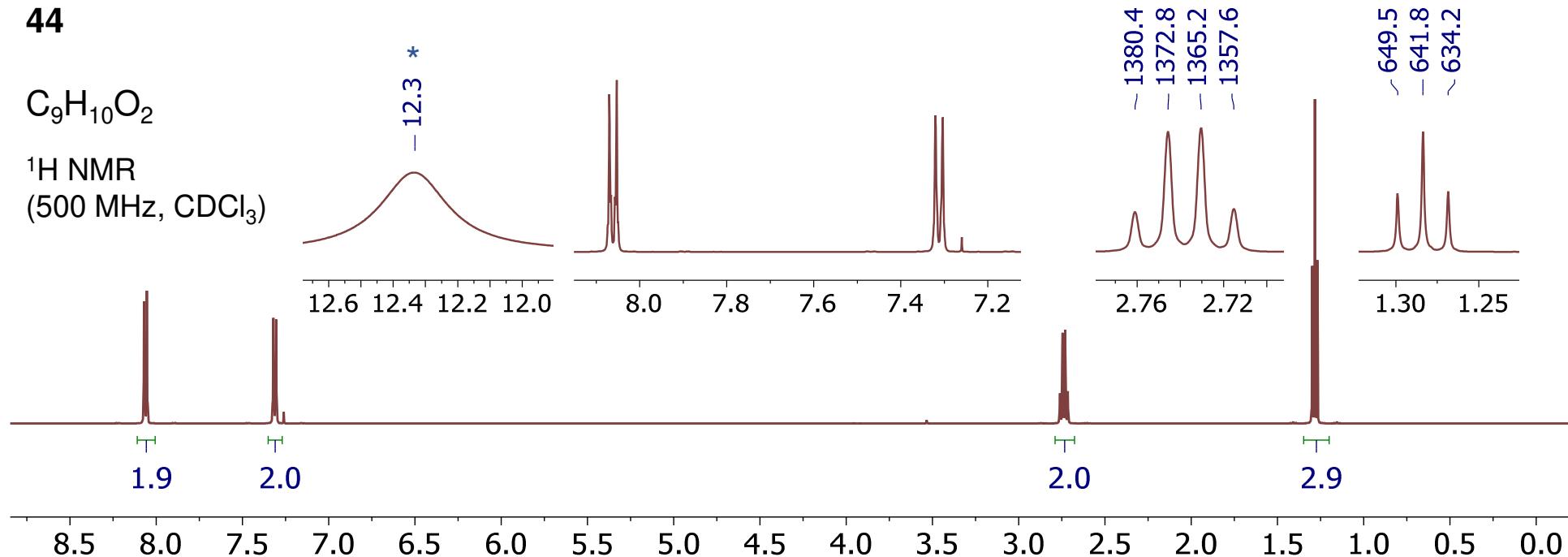
^{13}C APT (126 MHz, $CDCl_3$)



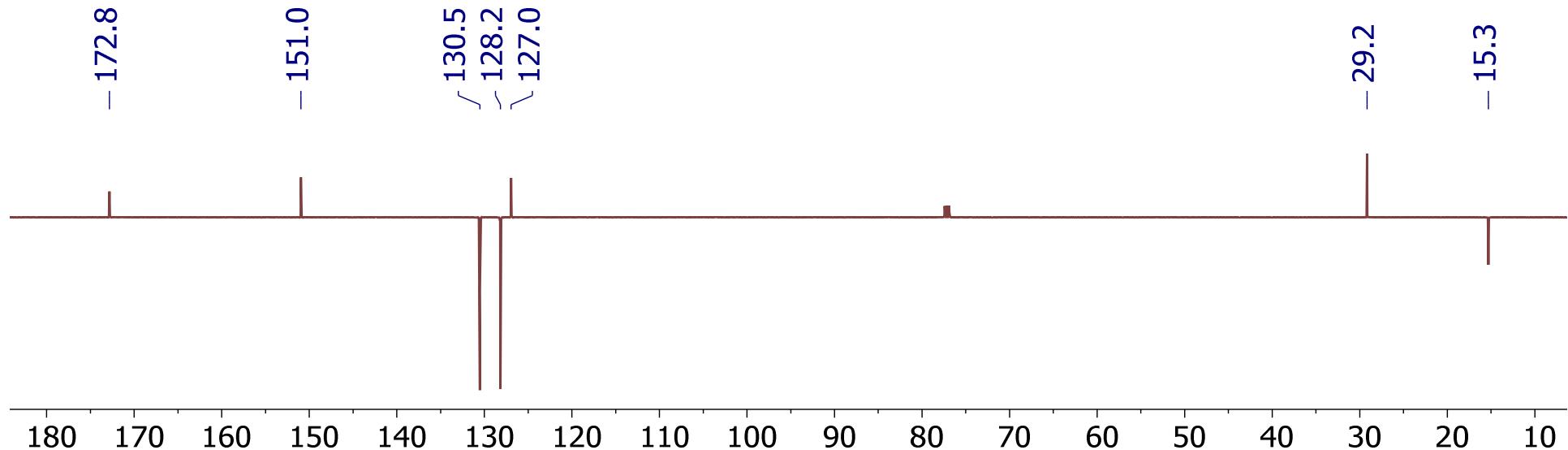
44

C₉H₁₀O₂

¹H NMR
(500 MHz, CDCl₃)



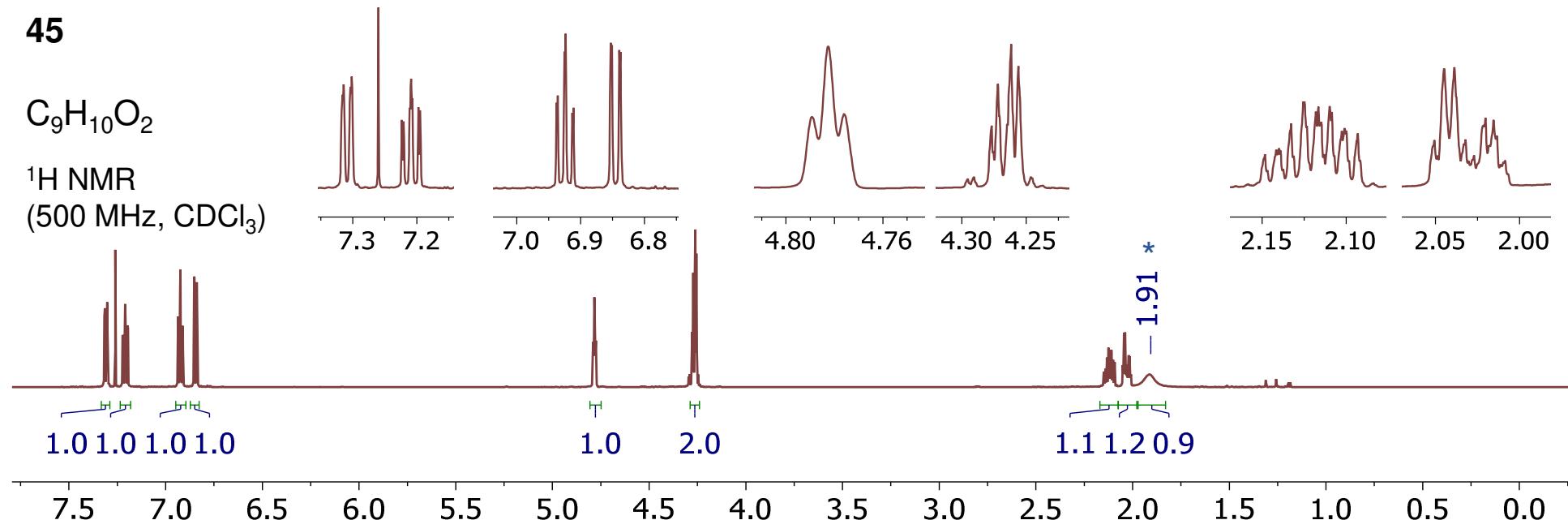
¹³C APT (126 MHz, CDCl₃)



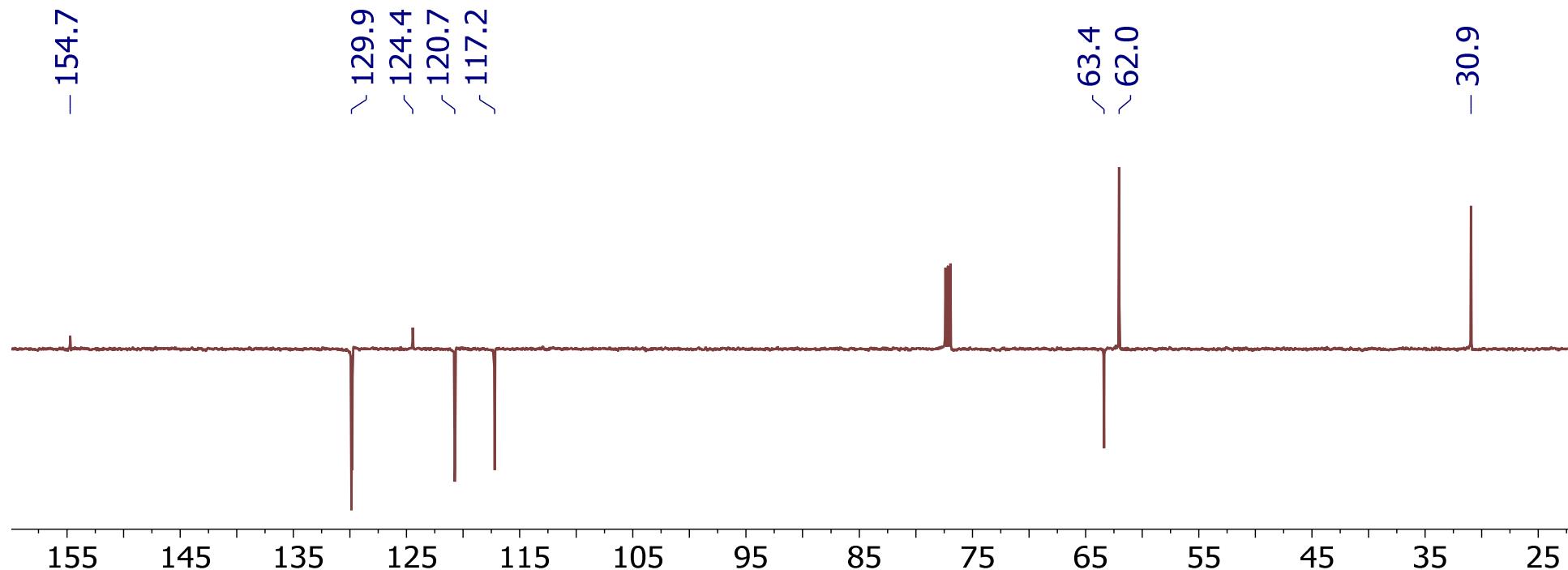
45

$C_9H_{10}O_2$

1H NMR
(500 MHz, $CDCl_3$)



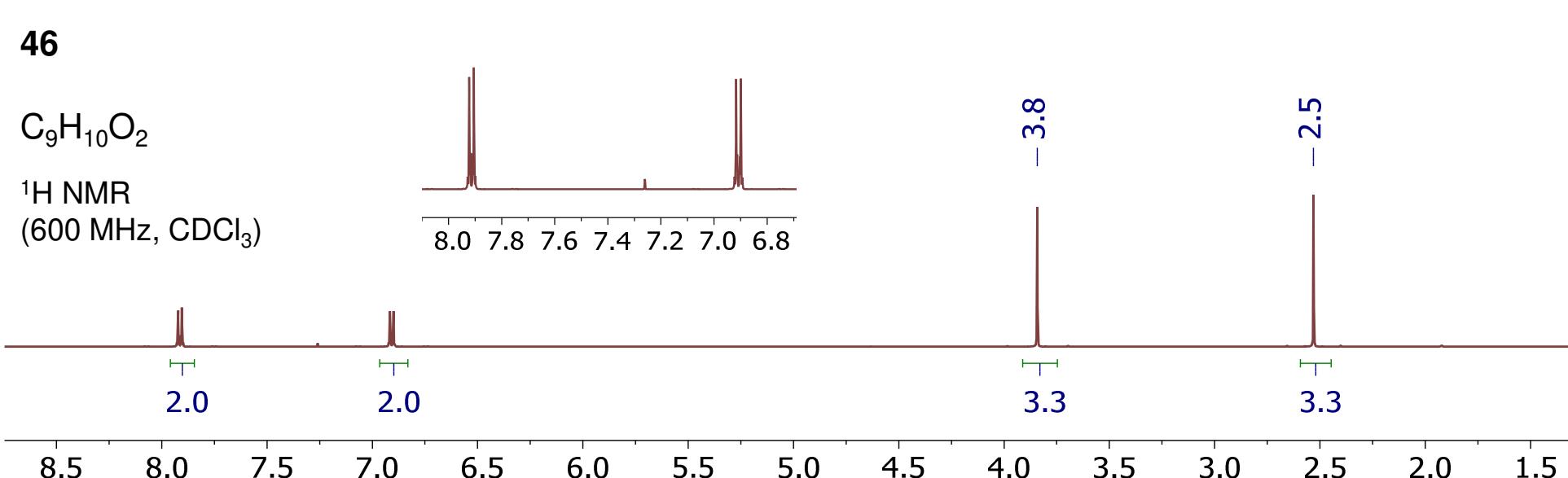
^{13}C APT (126 MHz, $CDCl_3$)



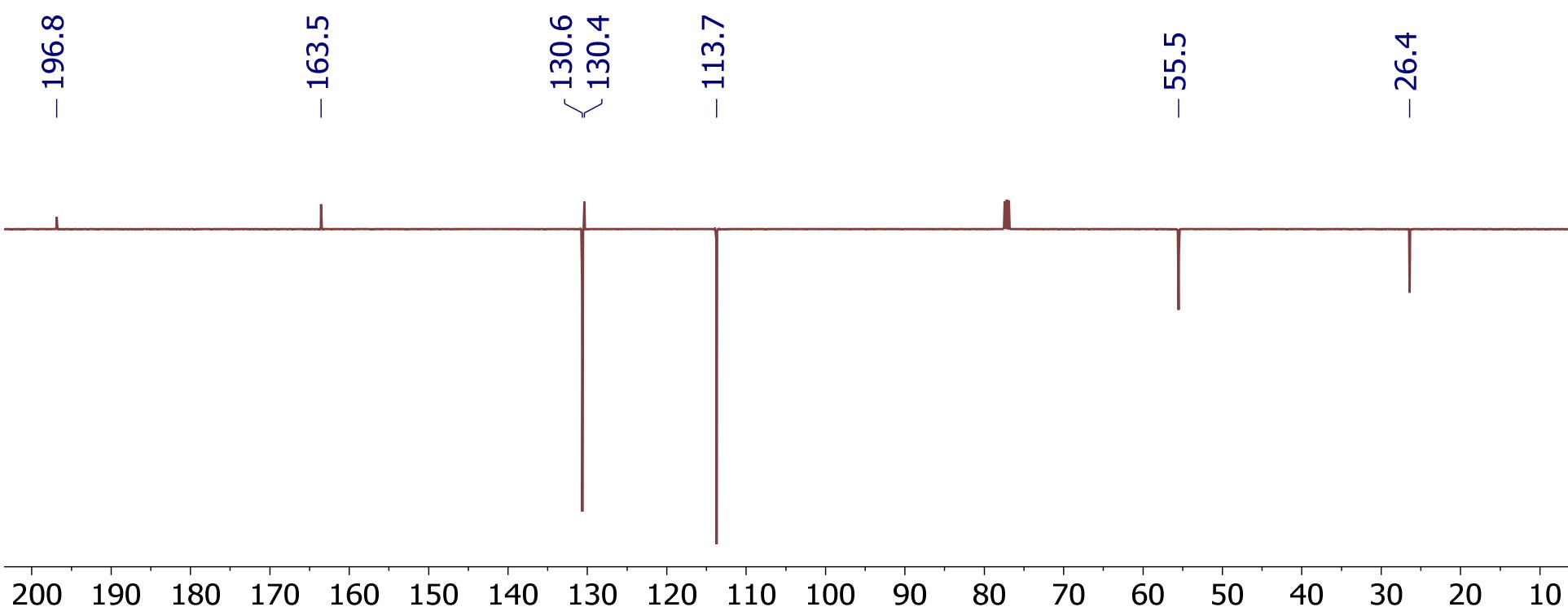
46

C₉H₁₀O₂

¹H NMR
(600 MHz, CDCl₃)



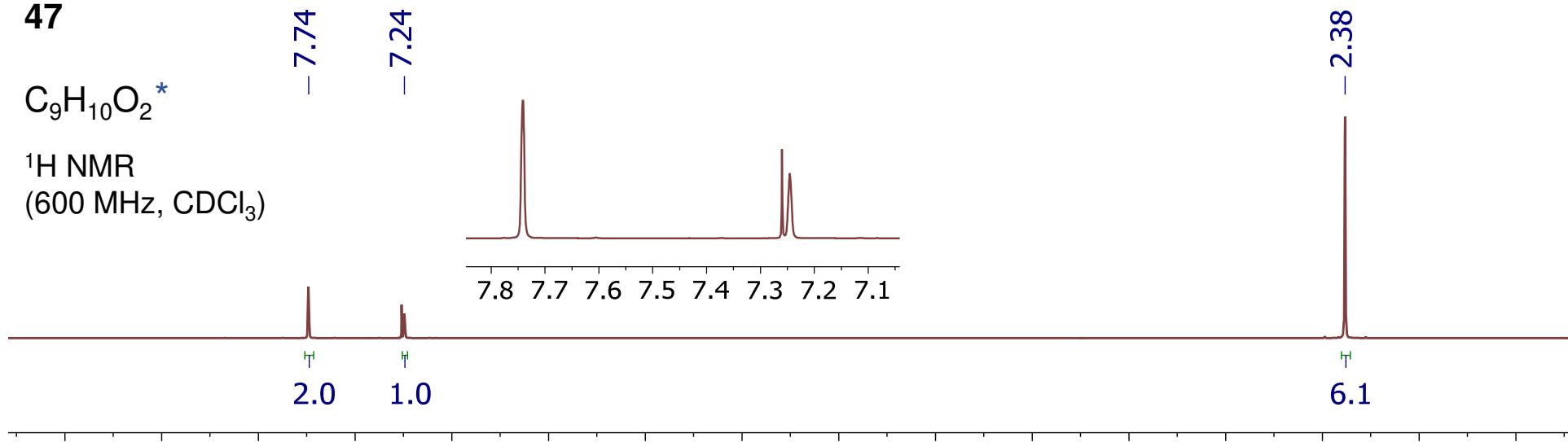
¹³C APT (151 MHz, CDCl₃)



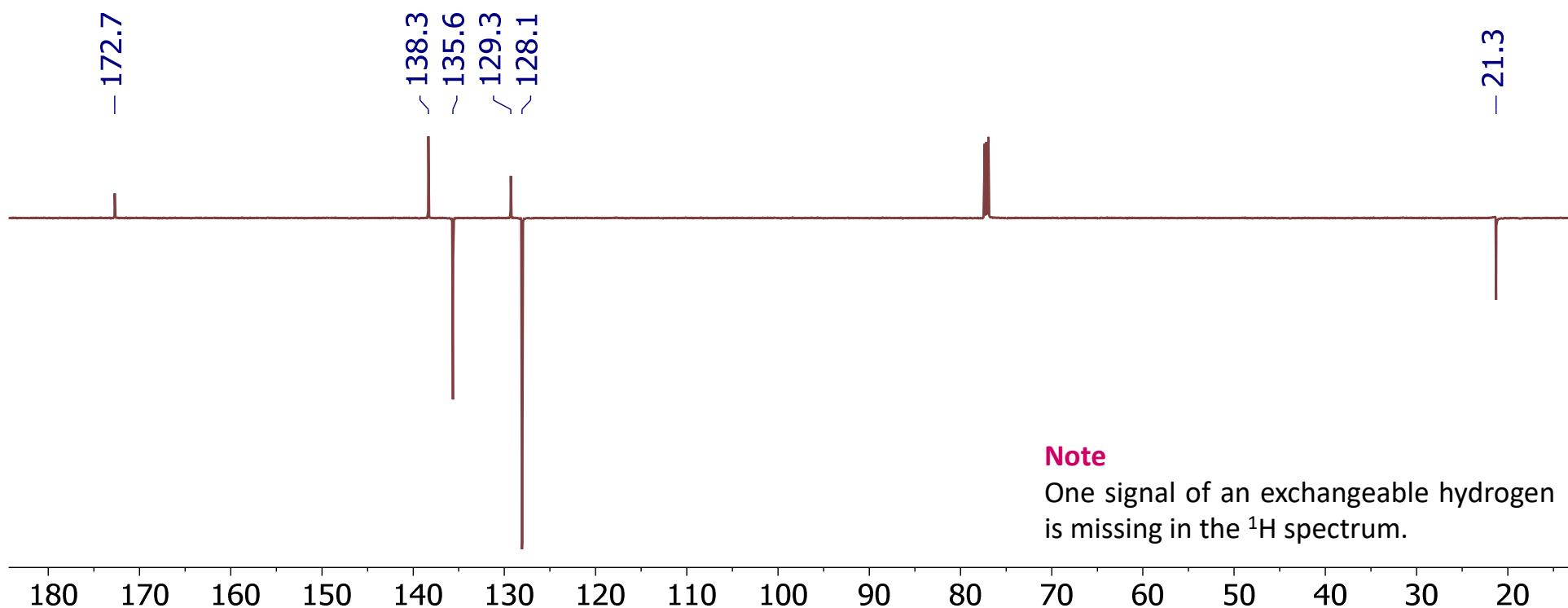
47

C₉H₁₀O₂*

¹H NMR
(600 MHz, CDCl₃)



¹³C APT (151 MHz, CDCl₃)



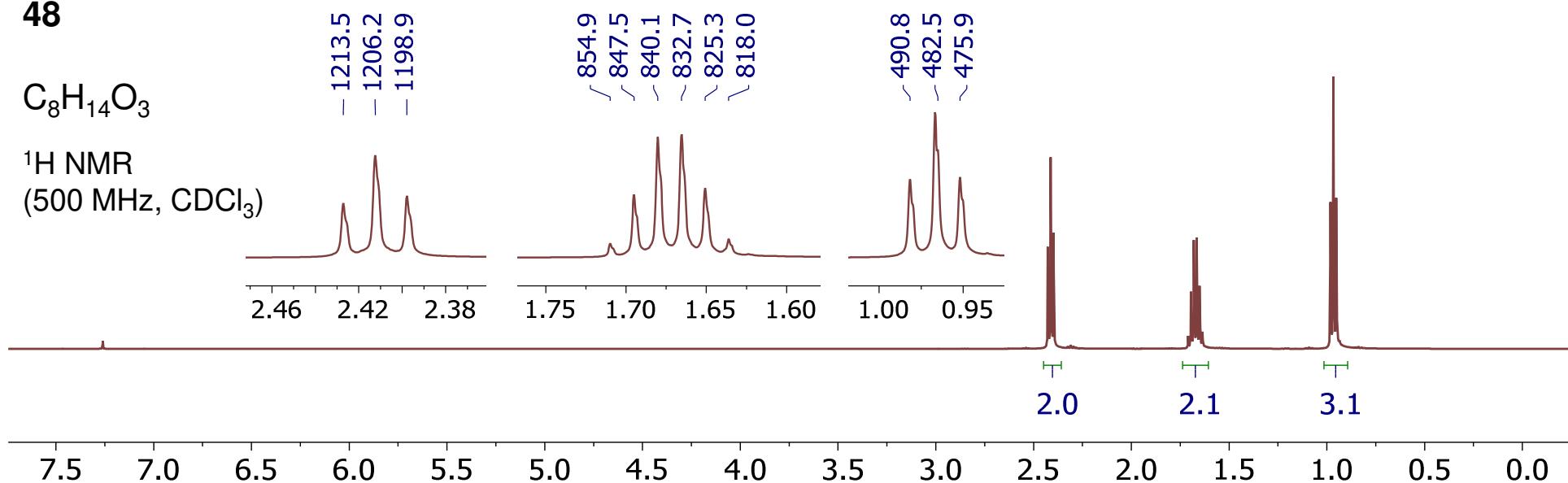
Note

One signal of an exchangeable hydrogen is missing in the ¹H spectrum.

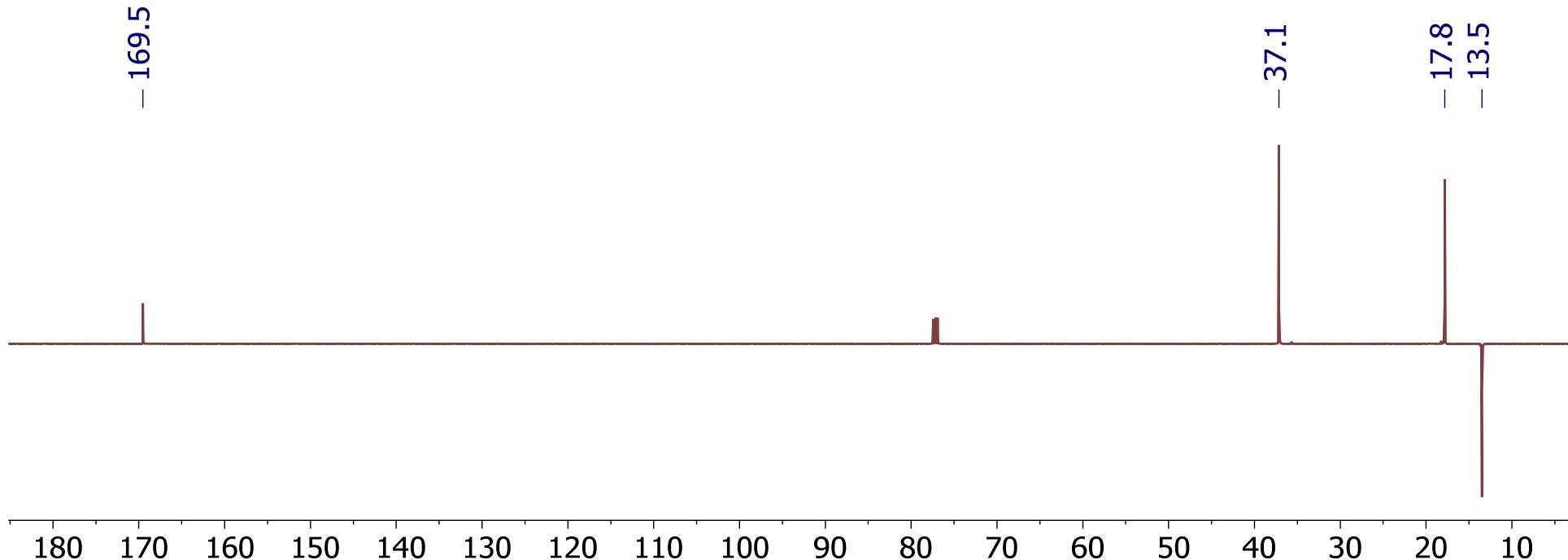
48

C₈H₁₄O₃

¹H NMR
(500 MHz, CDCl₃)



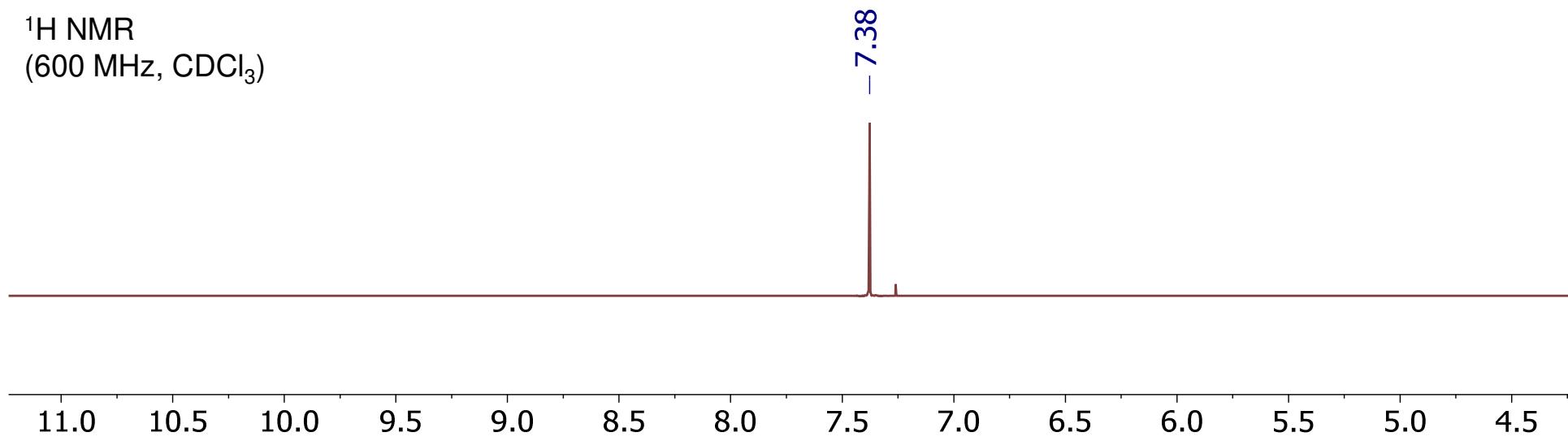
¹³C APT (126 MHz, CDCl₃)



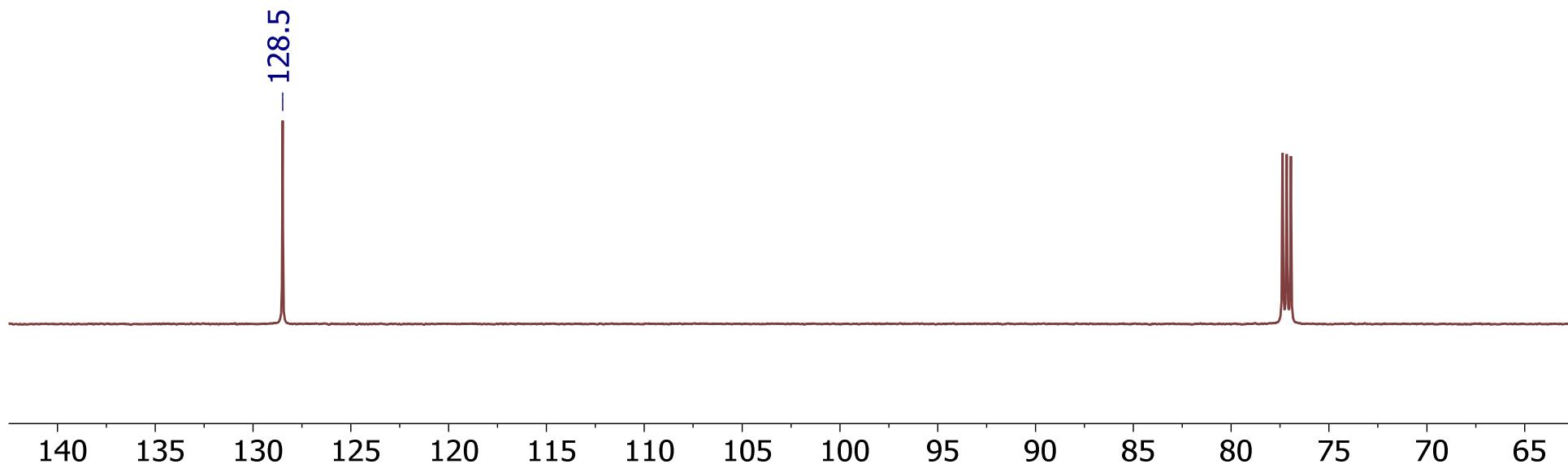
49

C₆H₆

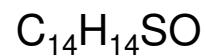
¹H NMR
(600 MHz, CDCl₃)



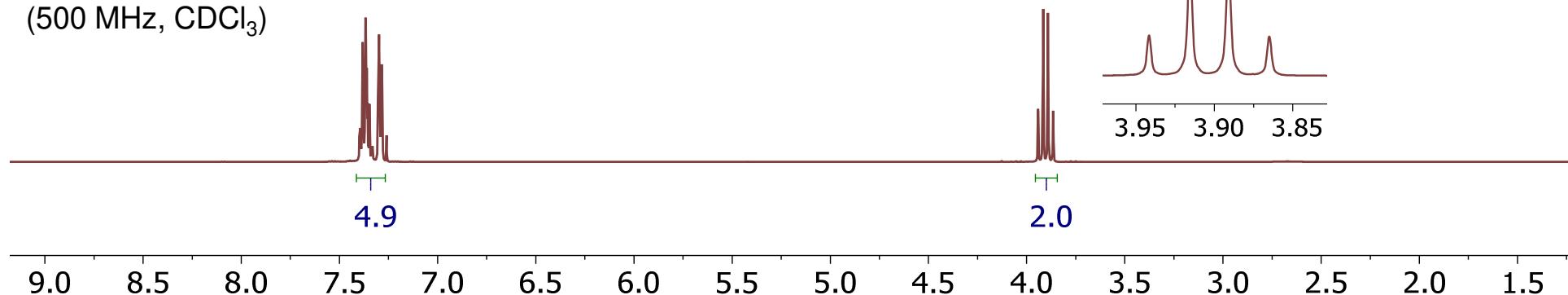
¹³C NMR (151 MHz, CDCl₃)



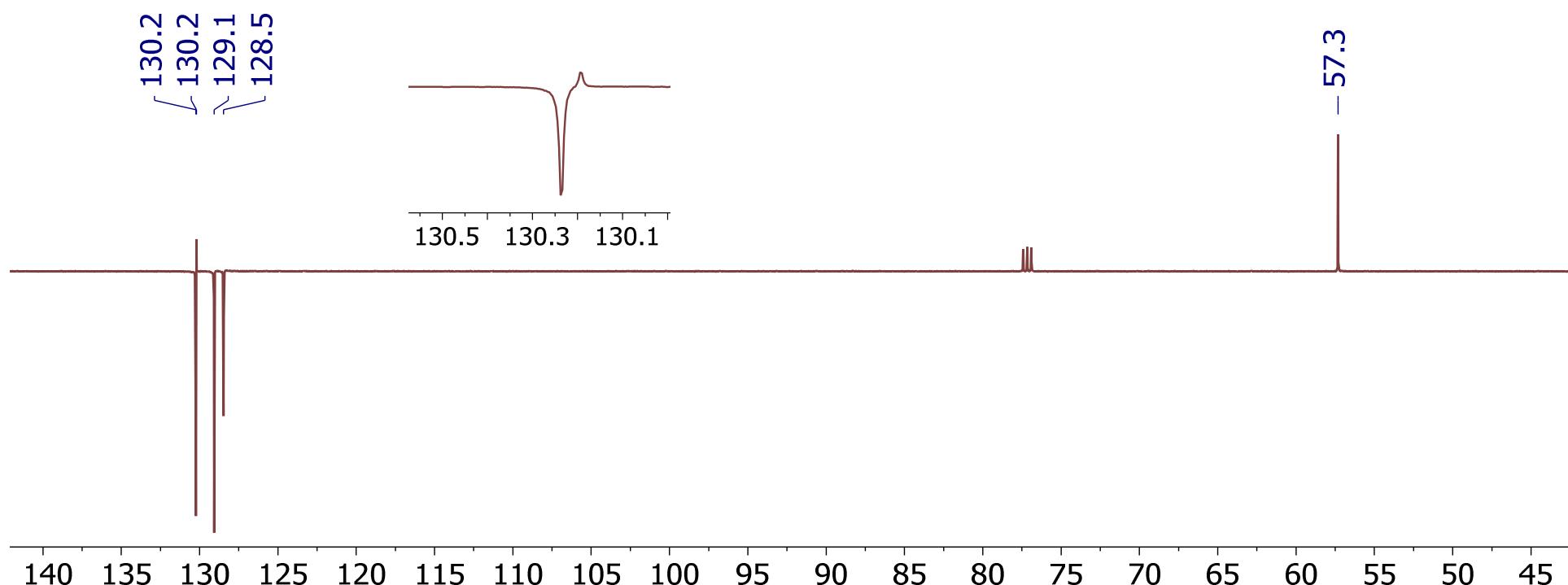
50



¹H NMR
(500 MHz, CDCl₃)



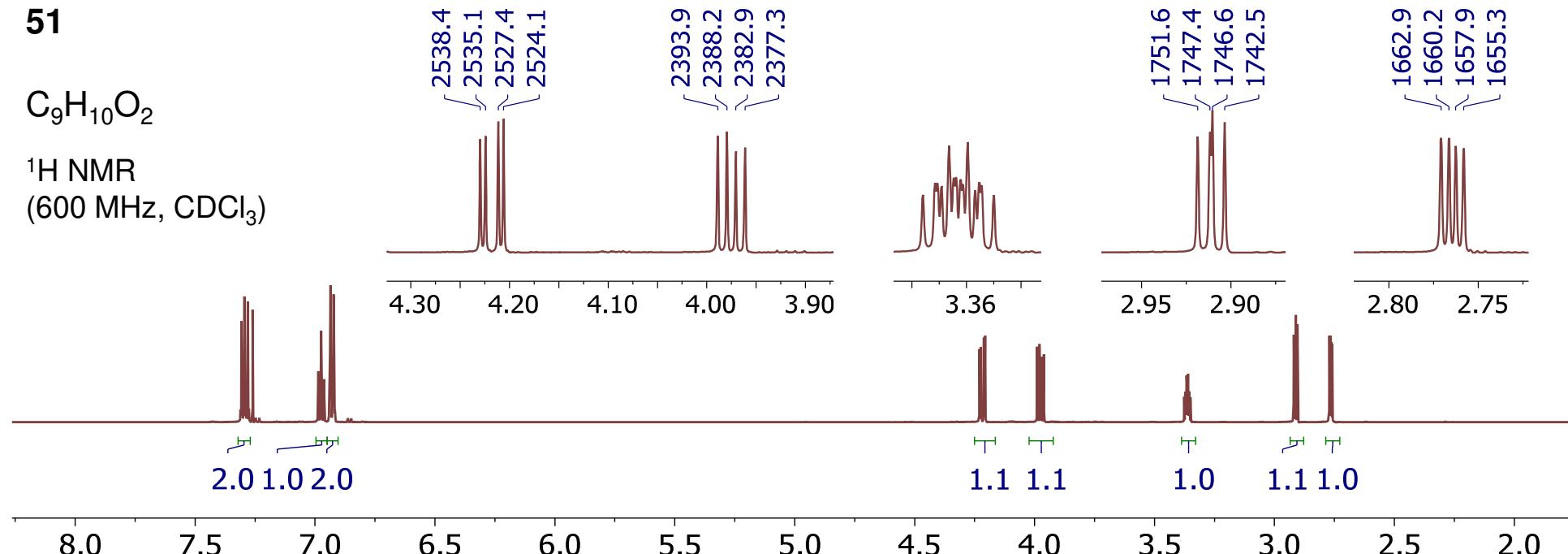
¹³C APT (126 MHz, CDCl₃)



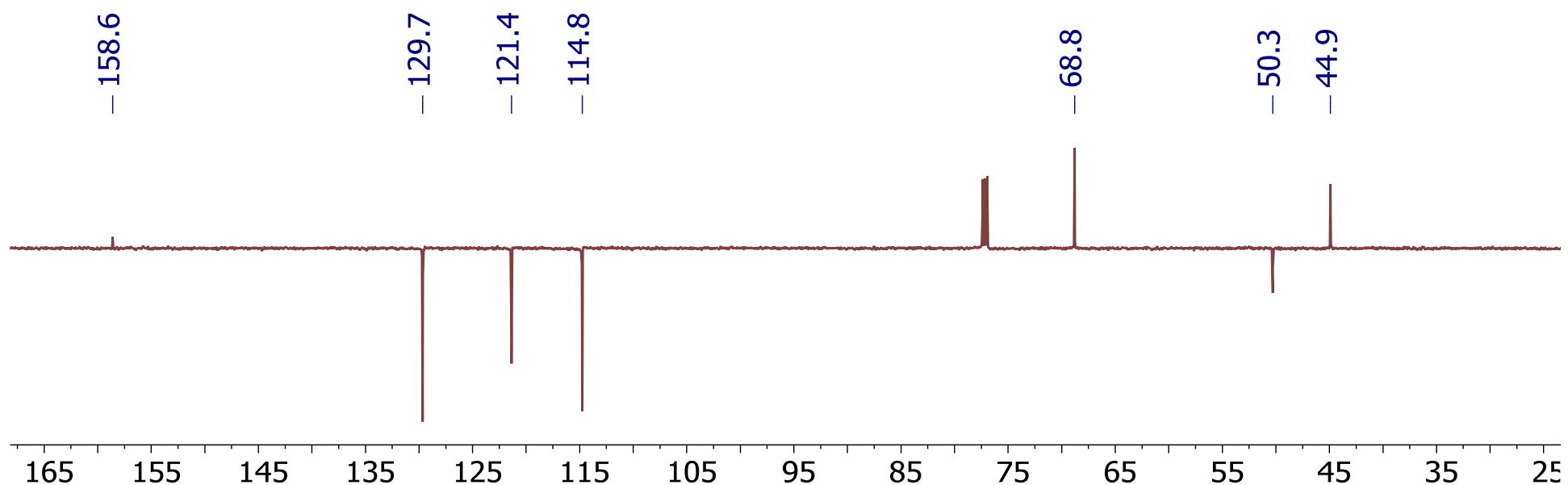
51

C₉H₁₀O₂

¹H NMR
(600 MHz, CDCl₃)



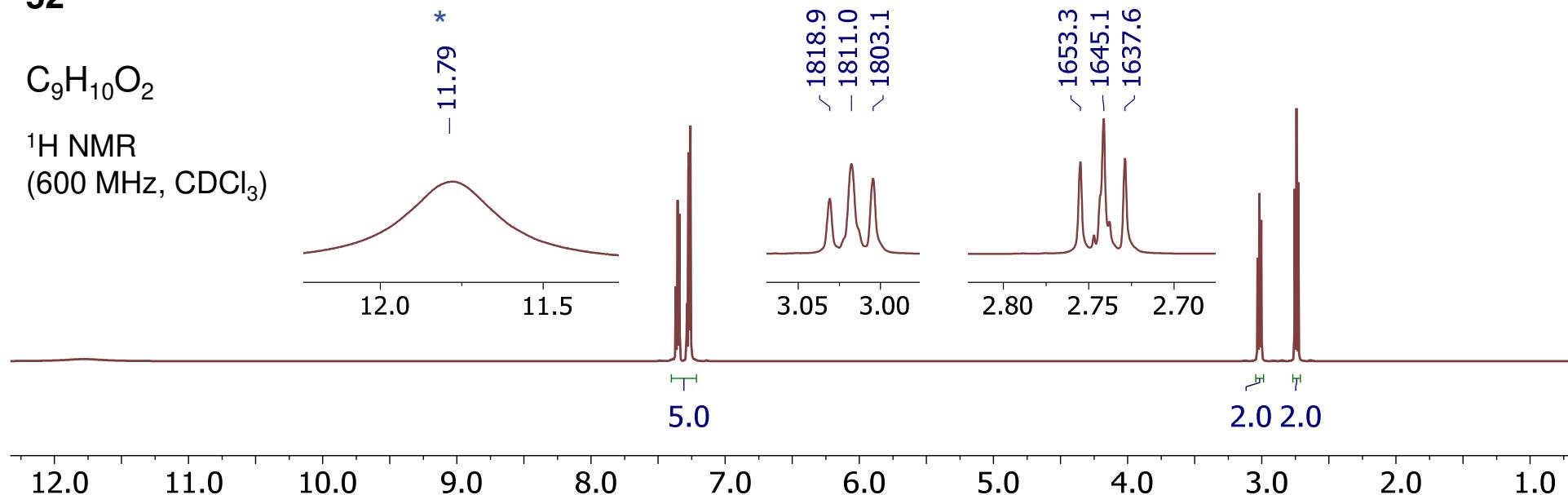
¹³C APT (151 MHz, CDCl₃)



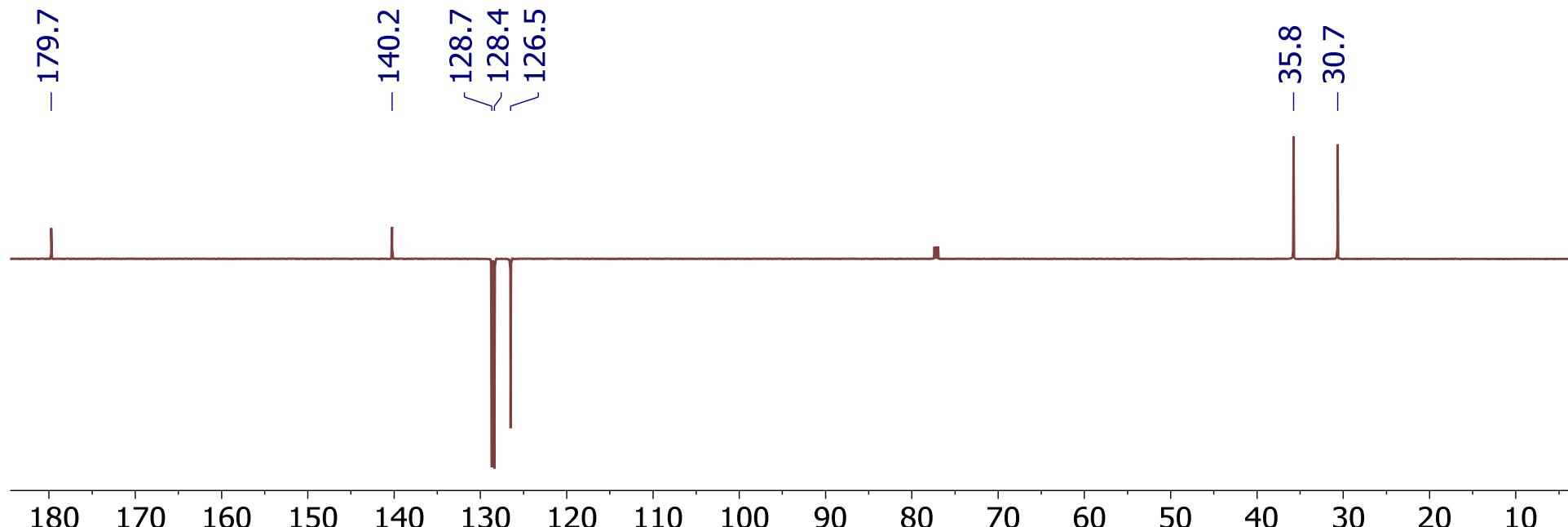
52

C₉H₁₀O₂

¹H NMR
(600 MHz, CDCl₃)



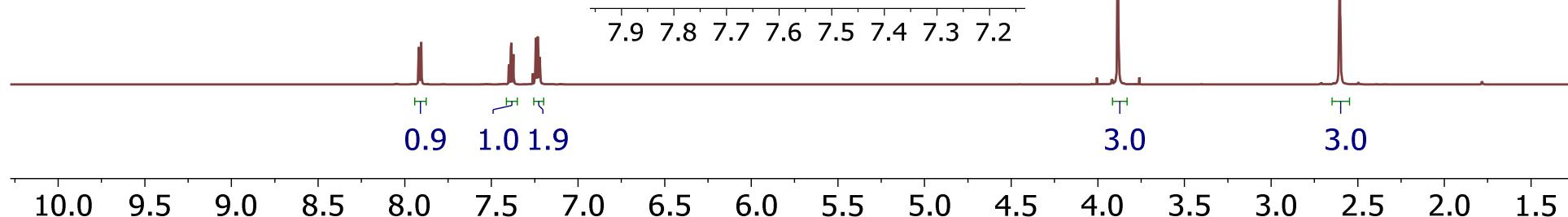
¹³C APT (151 MHz, CDCl₃)



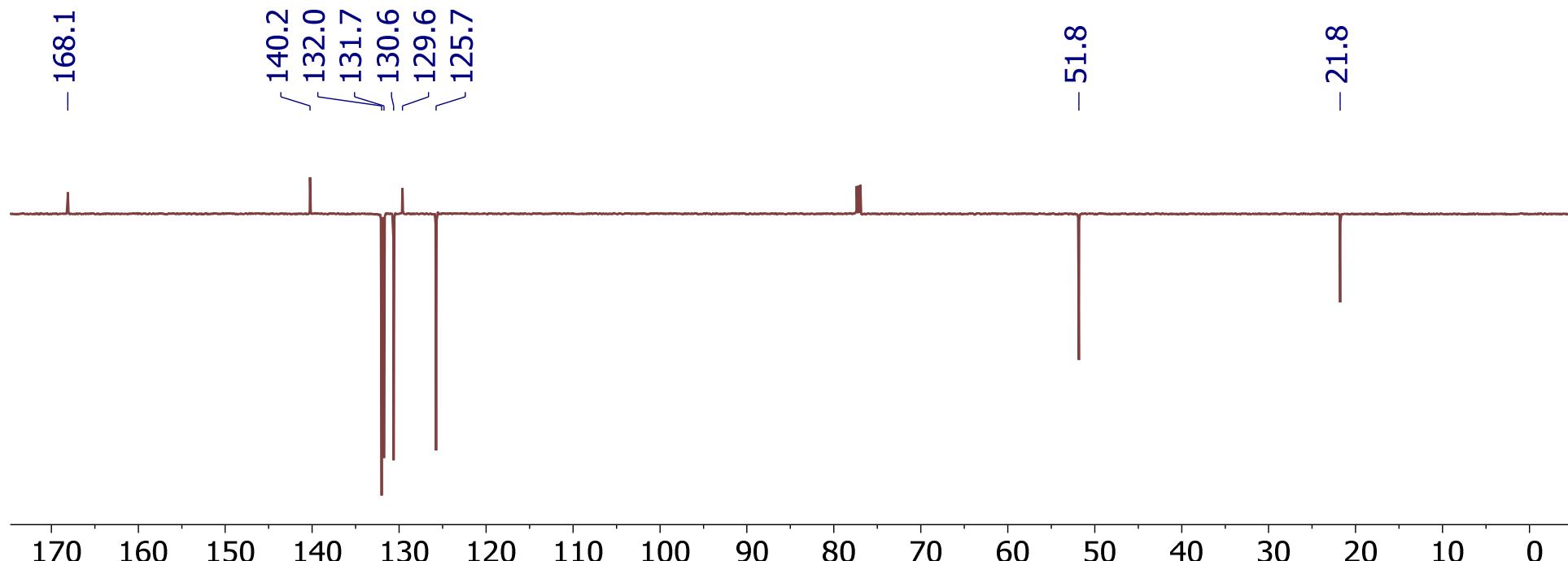
53

C₉H₁₀O₂

¹H NMR
(600 MHz, CDCl₃)



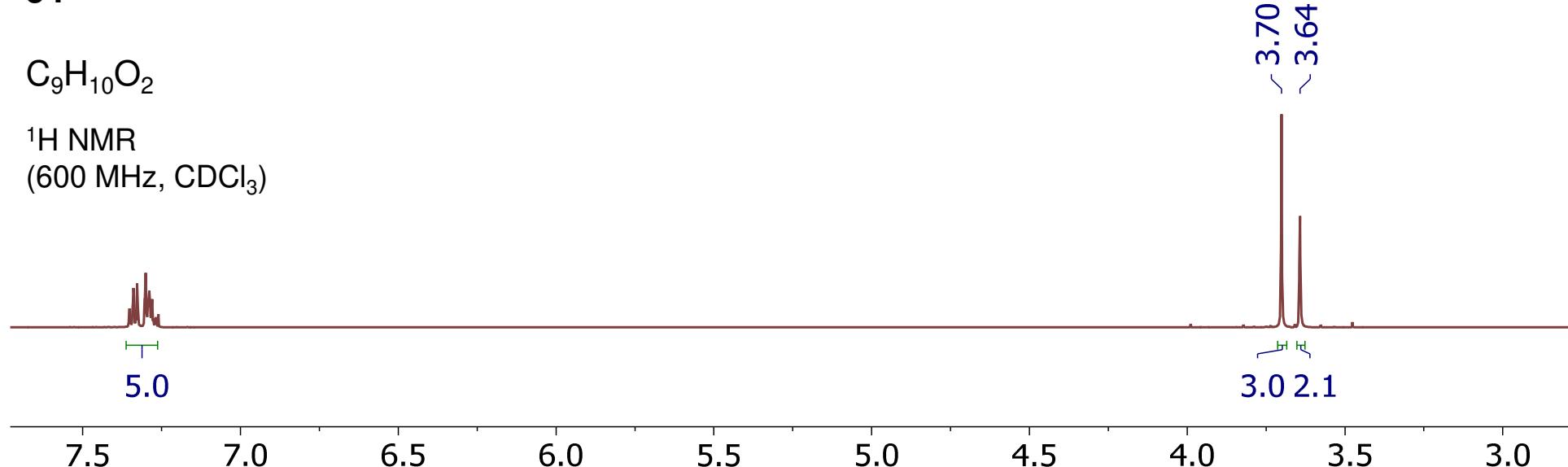
¹³C APT (151 MHz, CDCl₃)



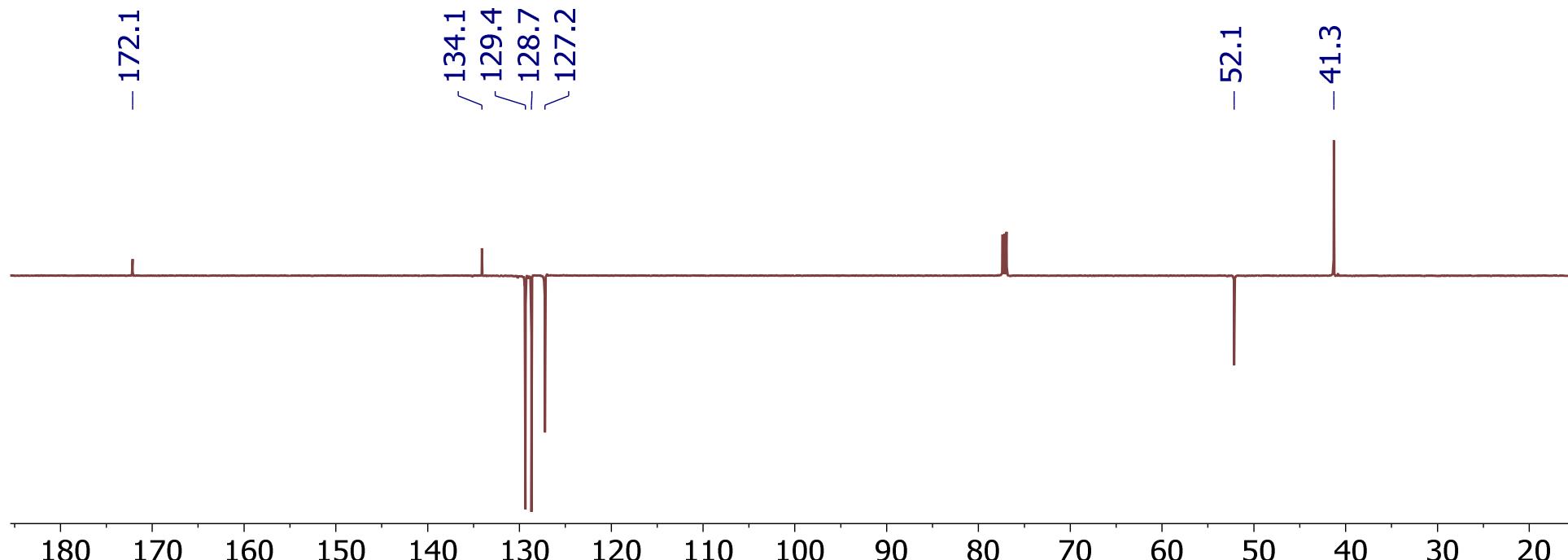
54

C₉H₁₀O₂

¹H NMR
(600 MHz, CDCl₃)



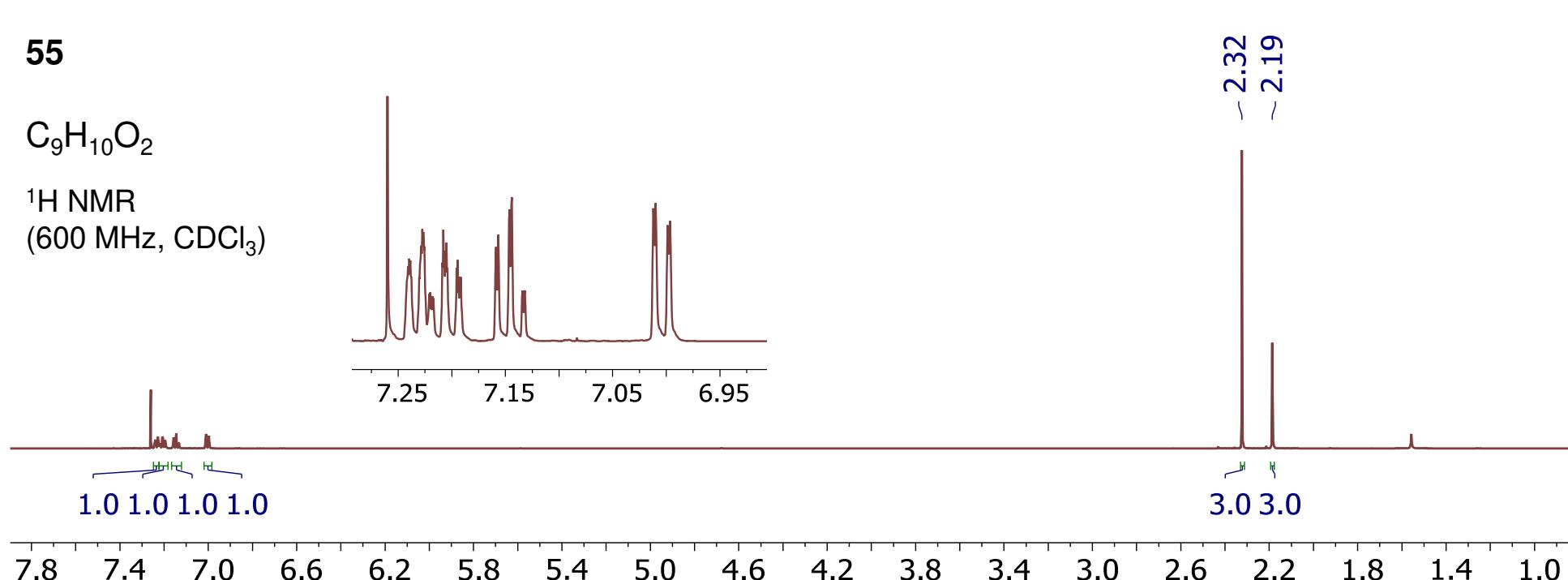
¹³C APT (151 MHz, CDCl₃)



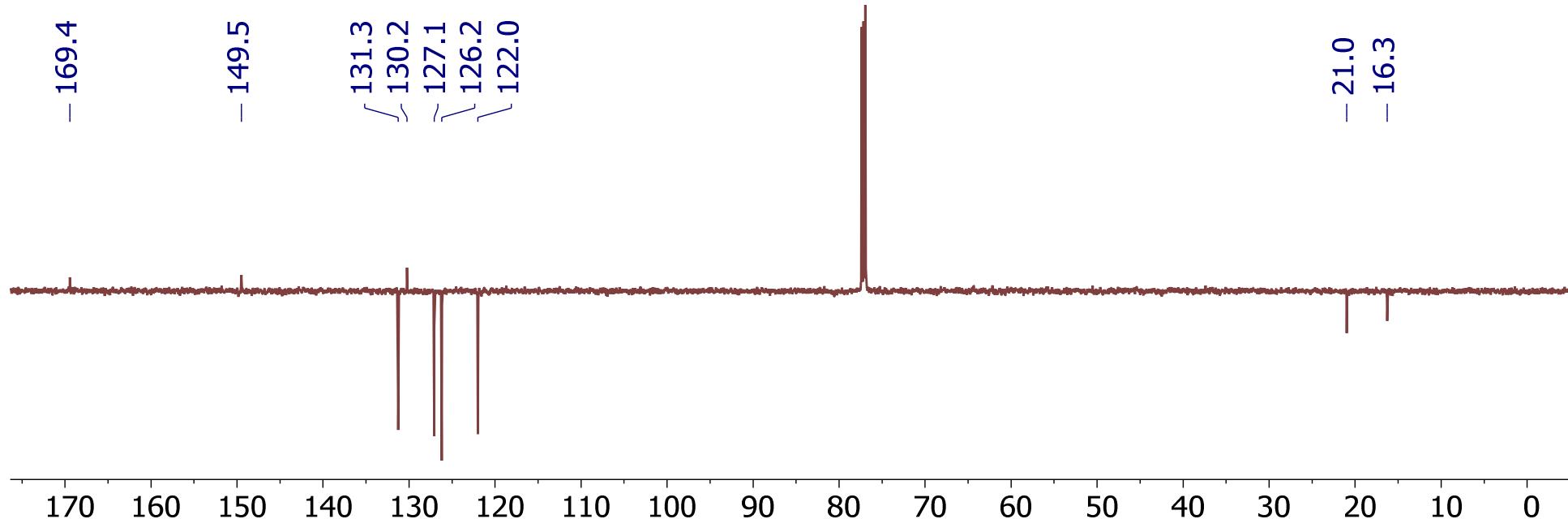
55

C₉H₁₀O₂

¹H NMR
(600 MHz, CDCl₃)



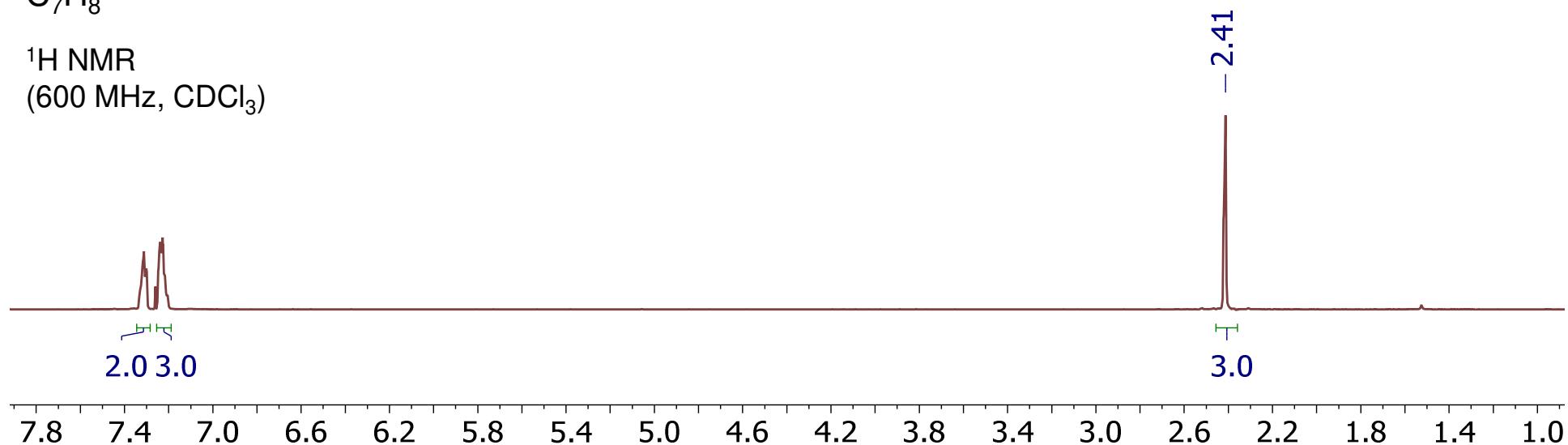
¹³C APT (151 MHz, CDCl₃)



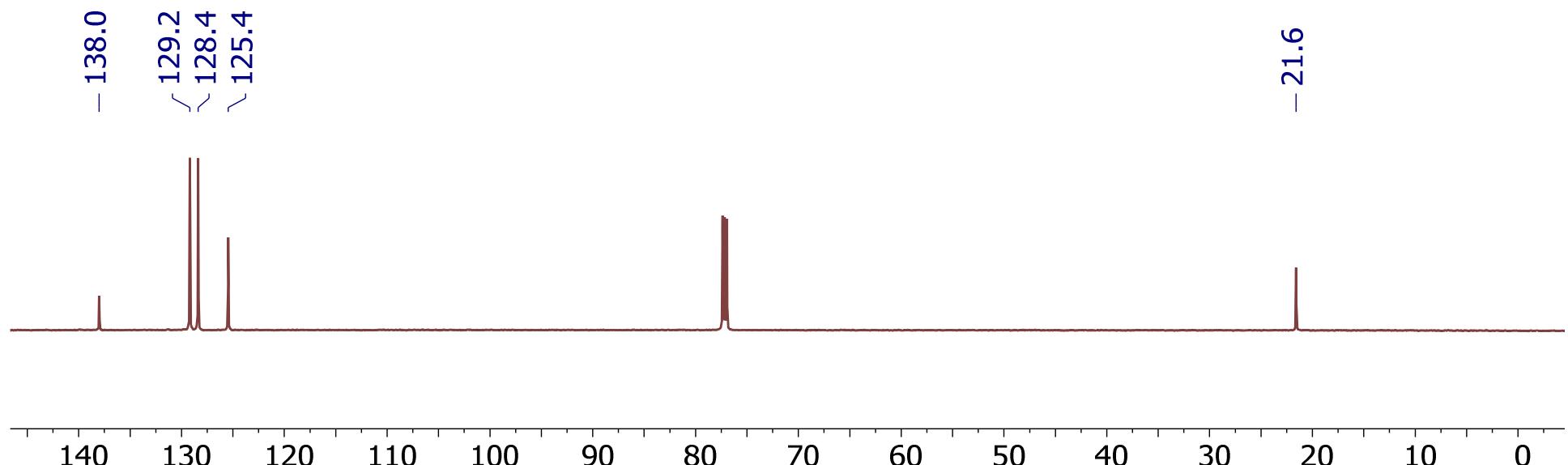
56

C₇H₈

¹H NMR
(600 MHz, CDCl₃)



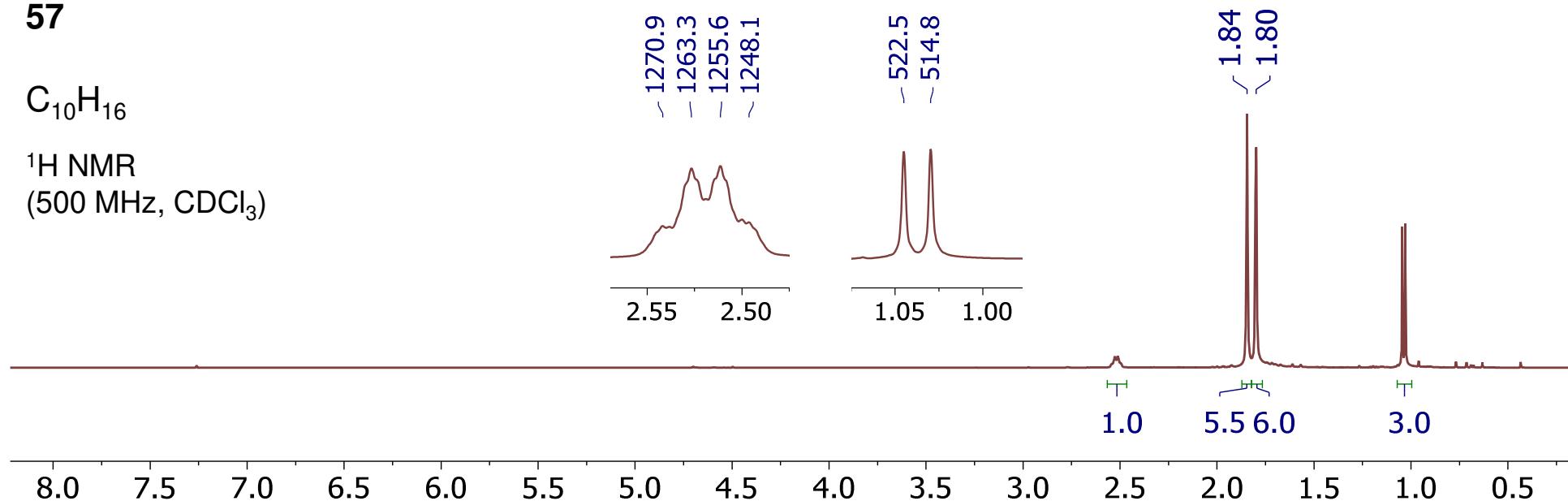
¹³C NMR (151 MHz, CDCl₃)



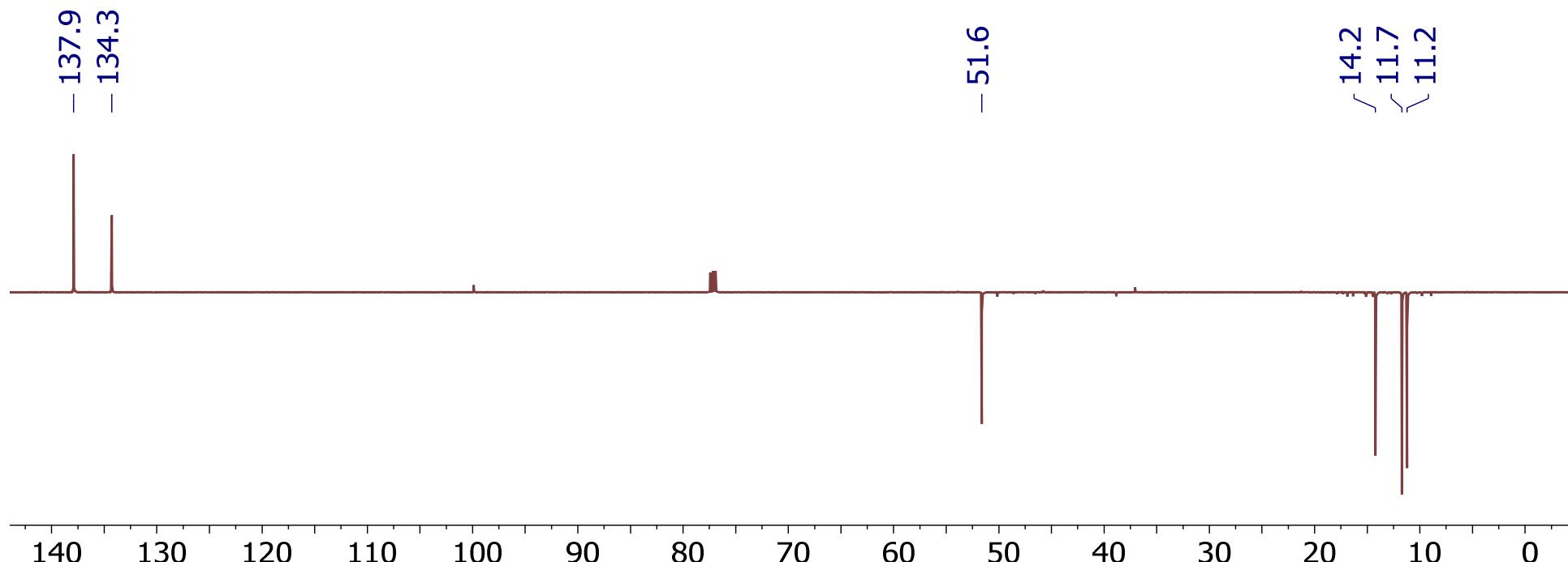
57

C₁₀H₁₆

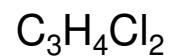
¹H NMR
(500 MHz, CDCl₃)



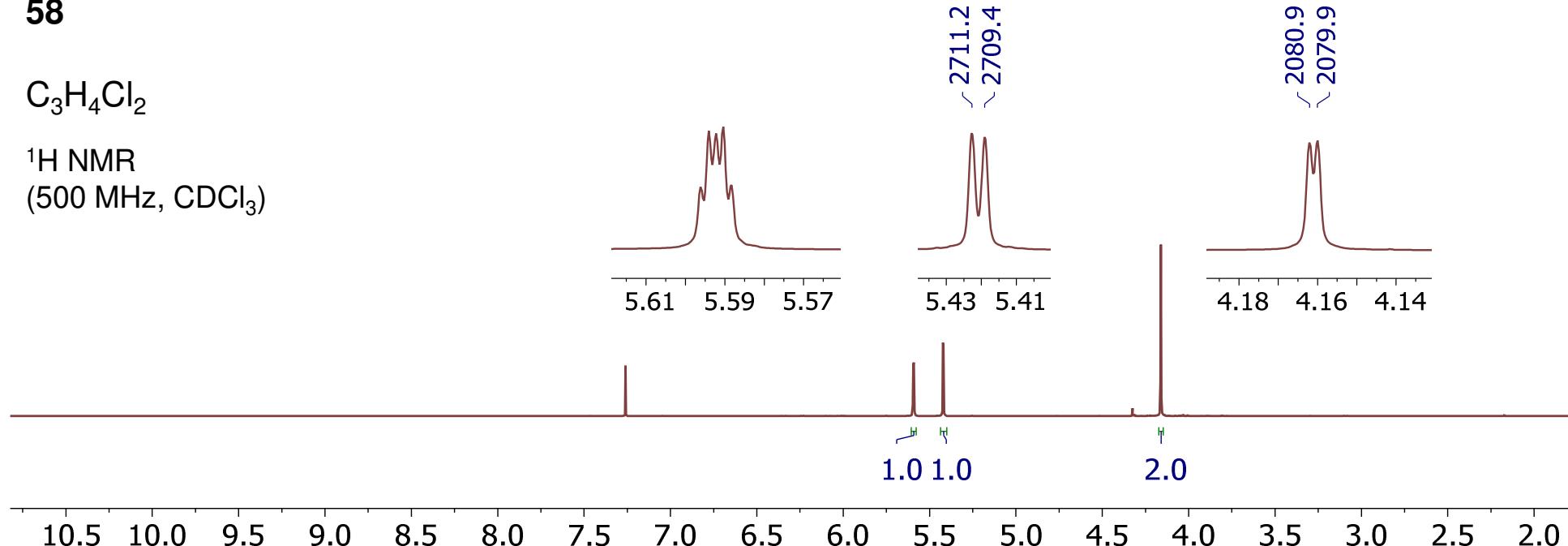
¹³C APT (126 MHz, CDCl₃)



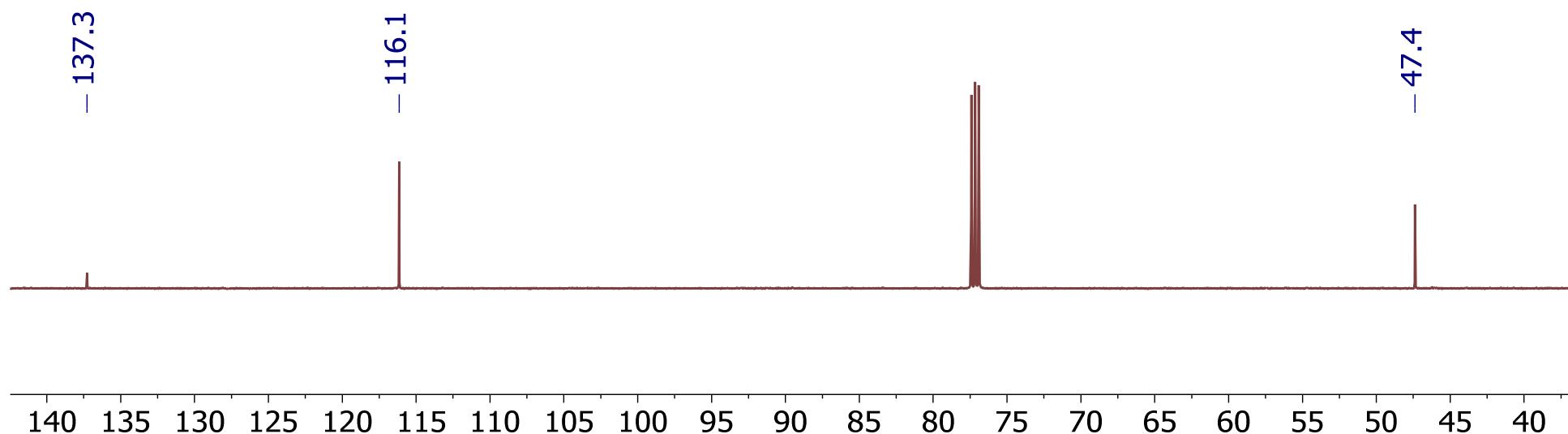
58



^1H NMR
(500 MHz, CDCl_3)



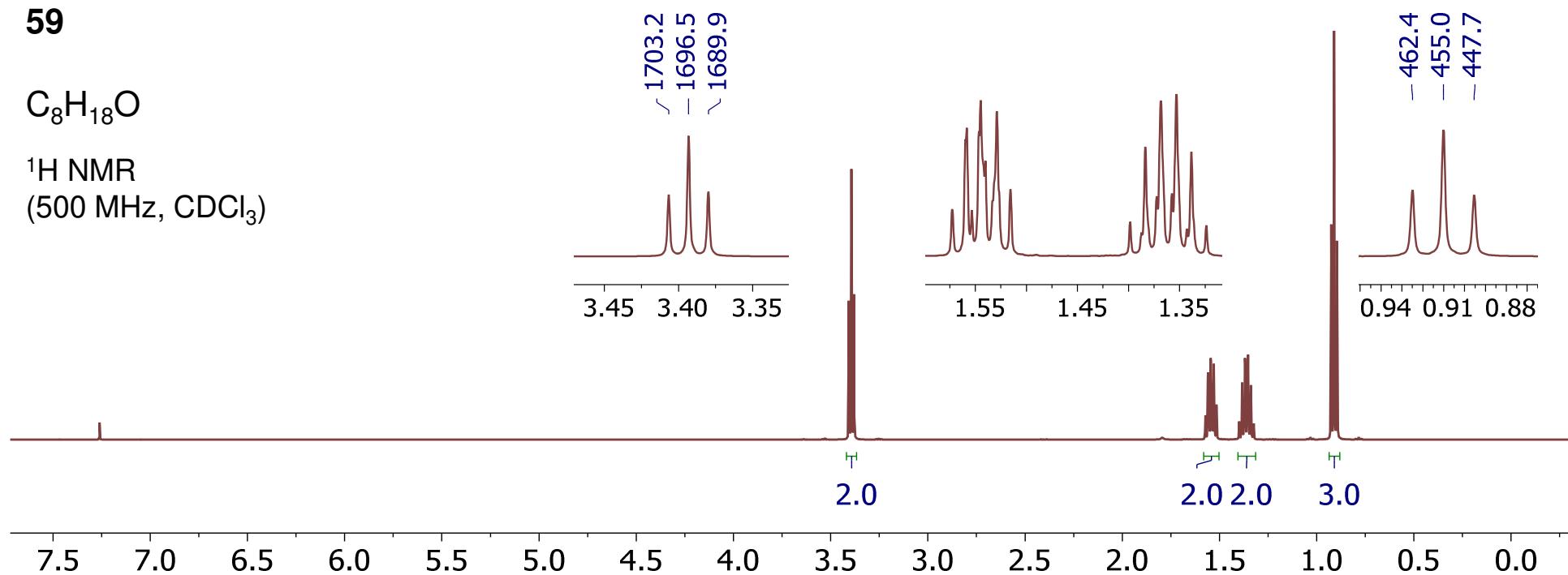
^{13}C APT (126 MHz, CDCl_3)



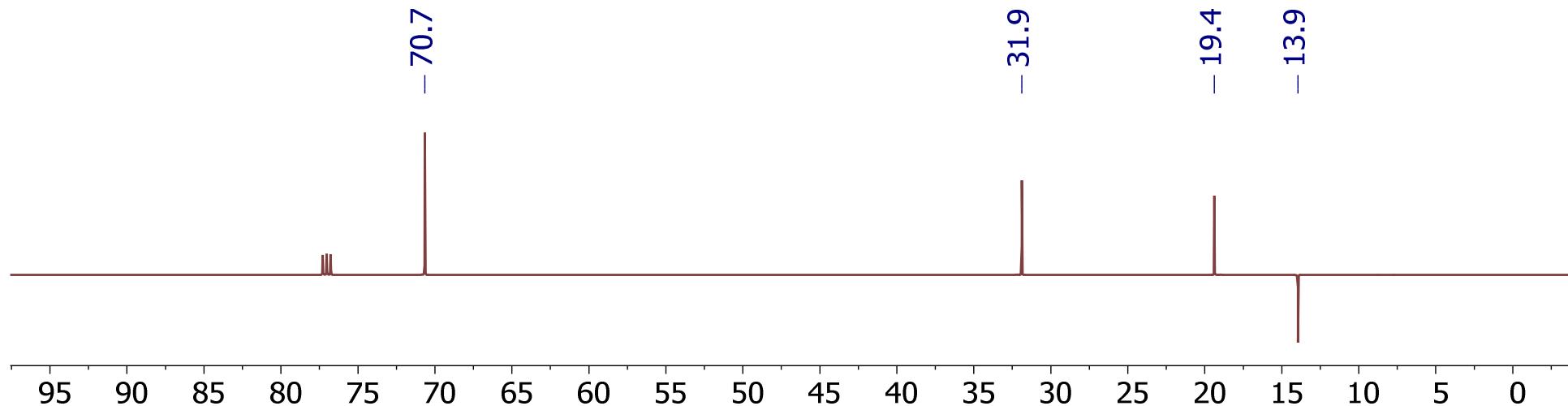
59

C₈H₁₈O

¹H NMR
(500 MHz, CDCl₃)



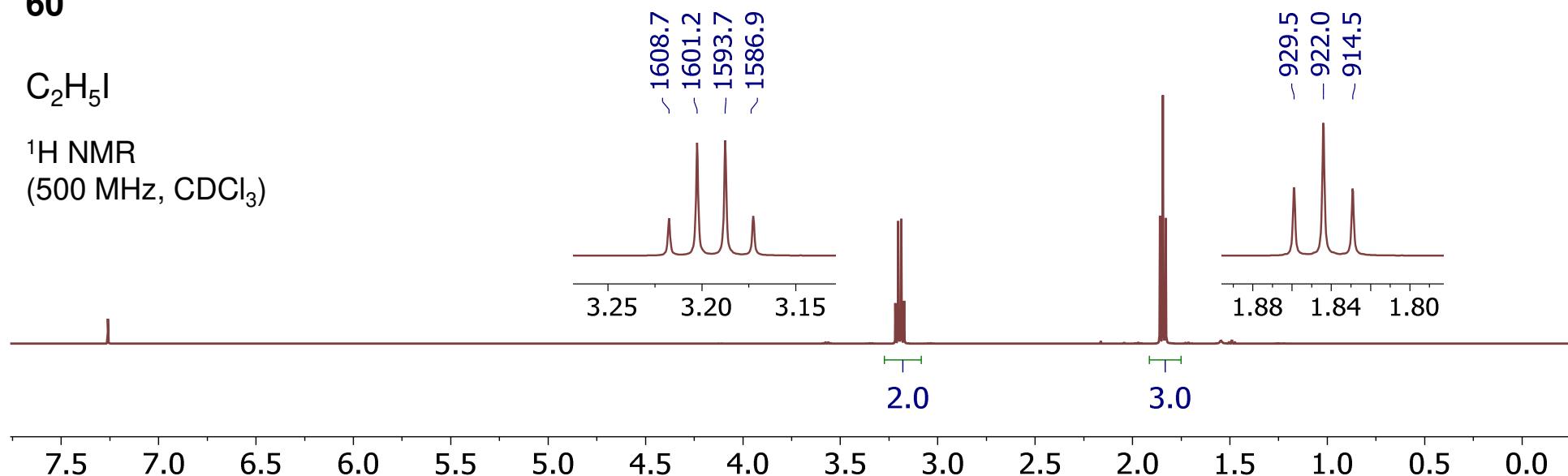
¹³C APT (126 MHz, CDCl₃)



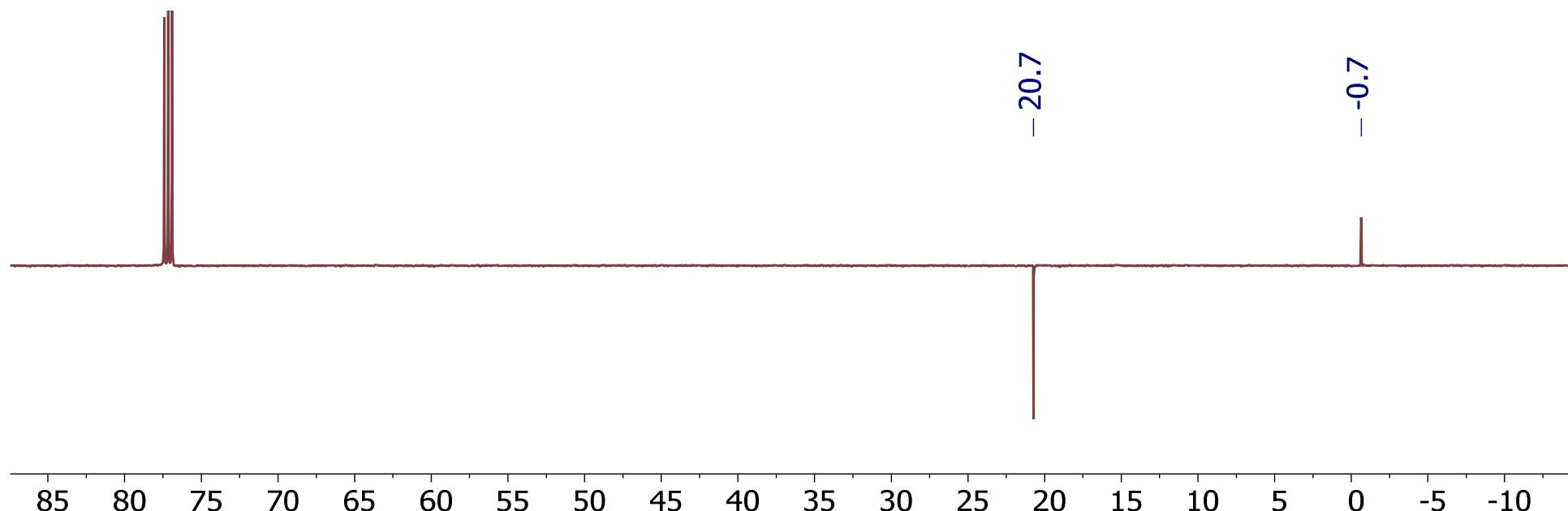
60

C₂H₅I

¹H NMR
(500 MHz, CDCl₃)



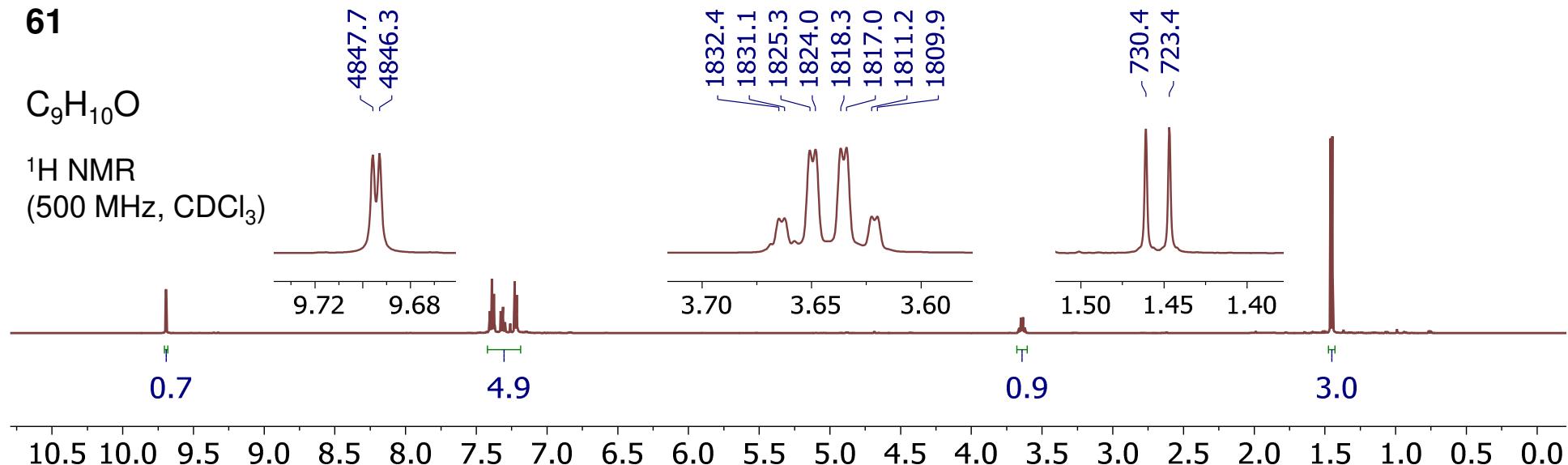
¹³C APT (126 MHz, CDCl₃)



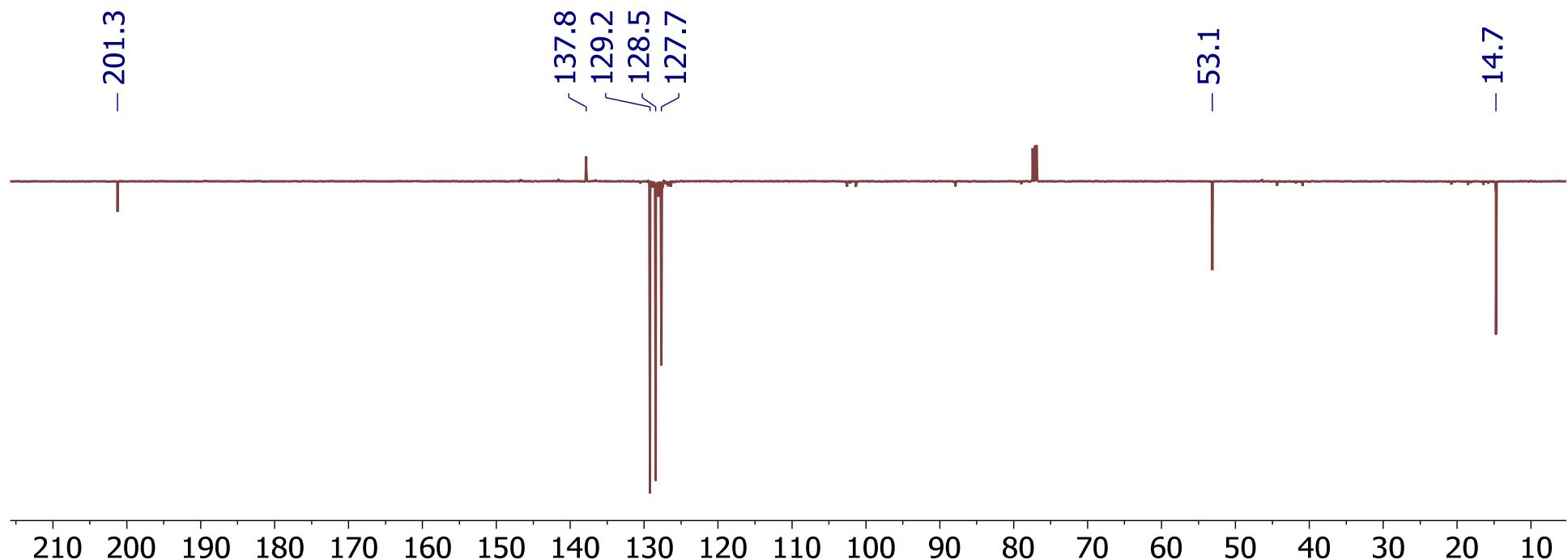
61

C₉H₁₀O

¹H NMR
(500 MHz, CDCl₃)



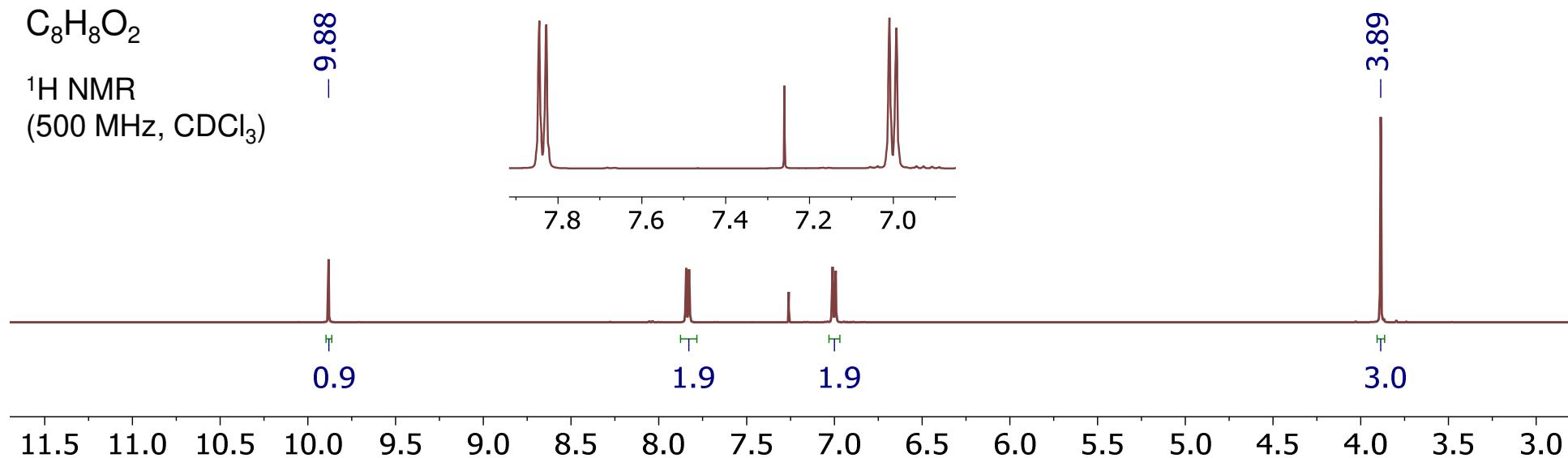
¹³C APT (126 MHz, CDCl₃)



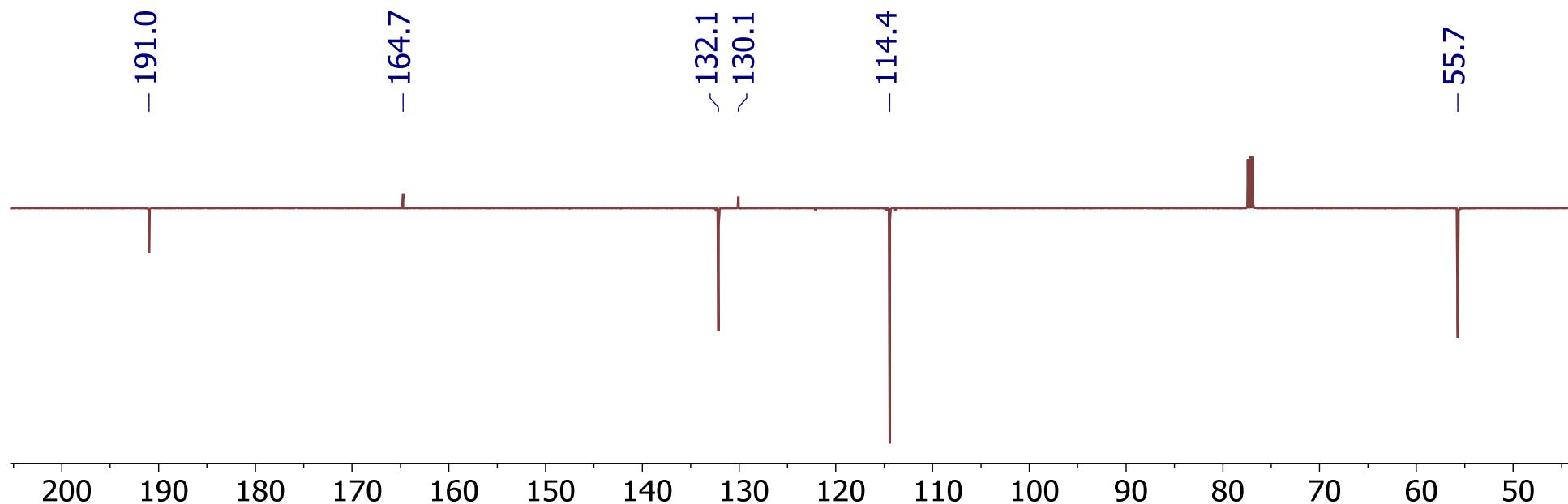
62

C₈H₈O₂

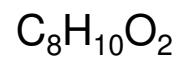
¹H NMR
(500 MHz, CDCl₃)



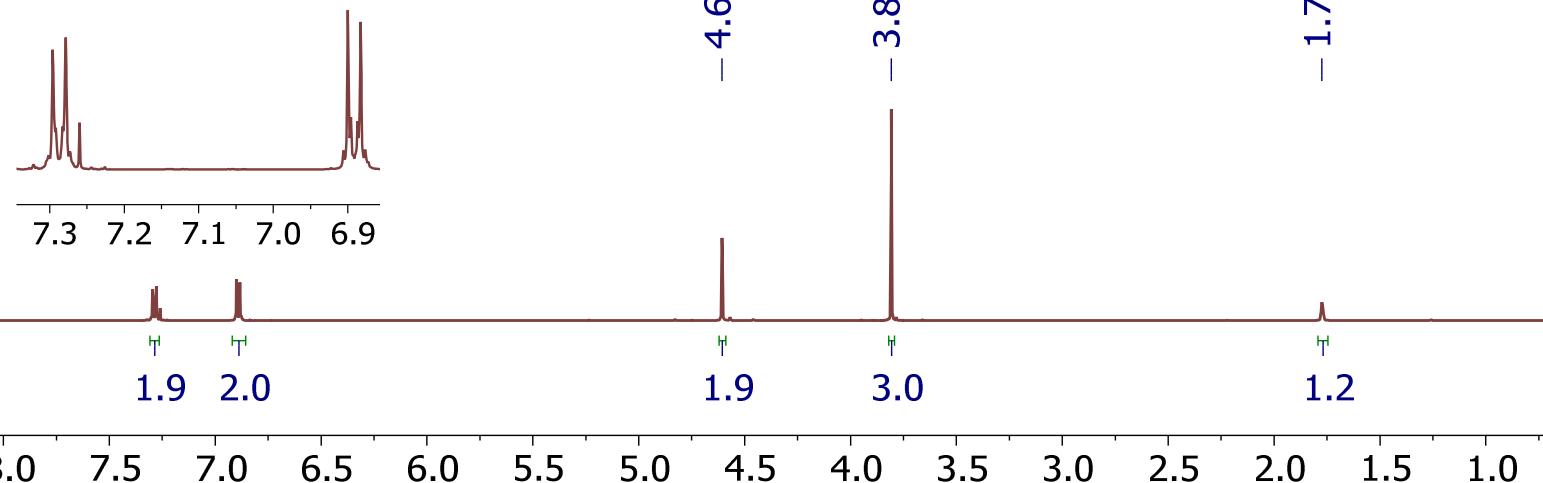
¹³C APT (126 MHz, CDCl₃)



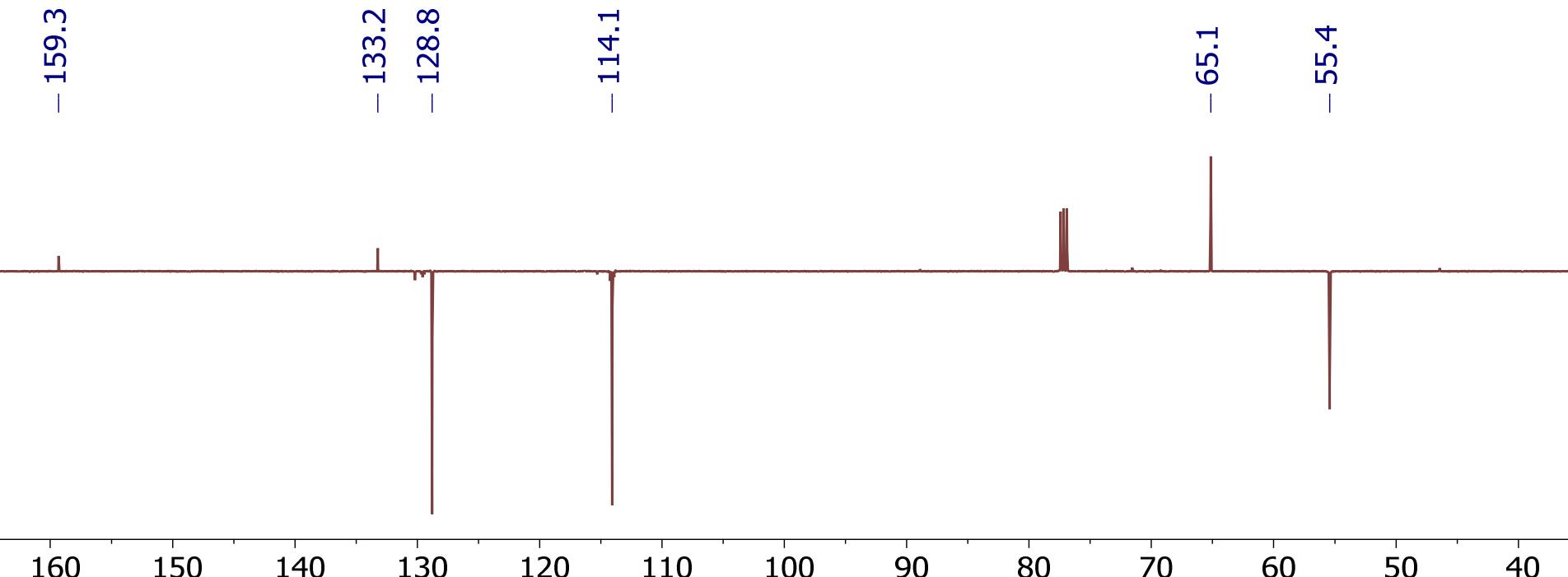
63



¹H NMR
(500 MHz, CDCl₃)



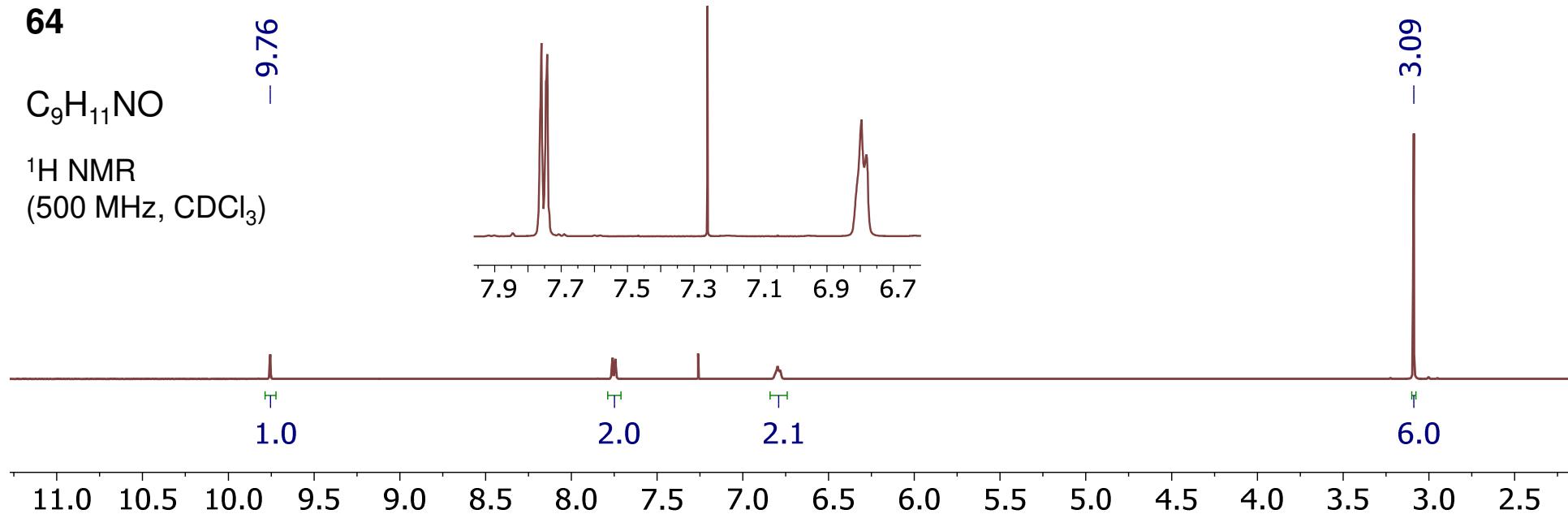
¹³C APT (126 MHz, CDCl₃)



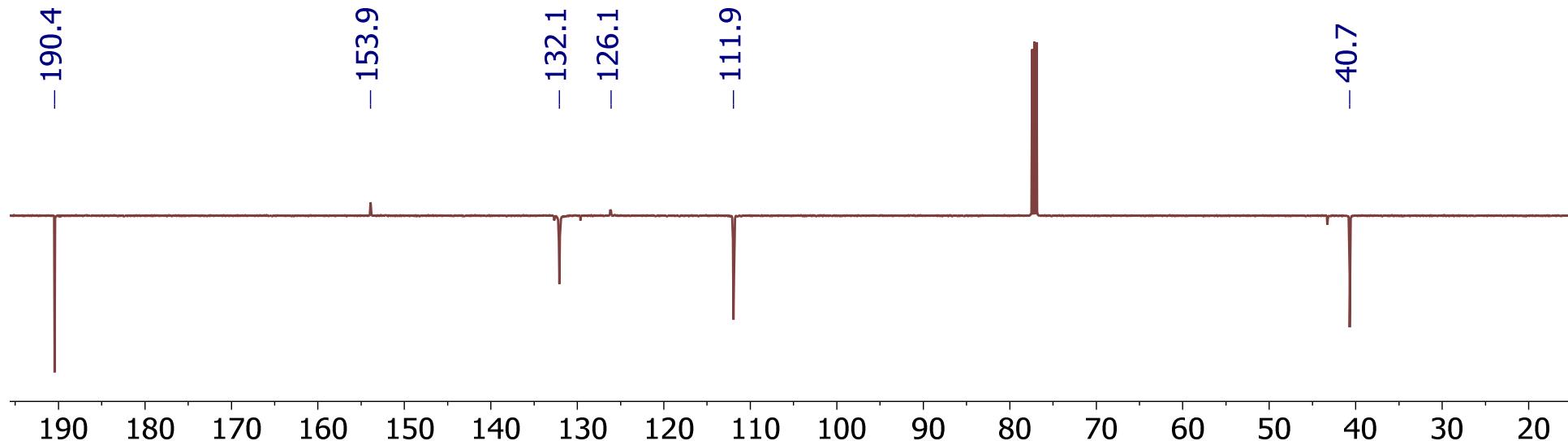
64

C₉H₁₁NO

¹H NMR
(500 MHz, CDCl₃)



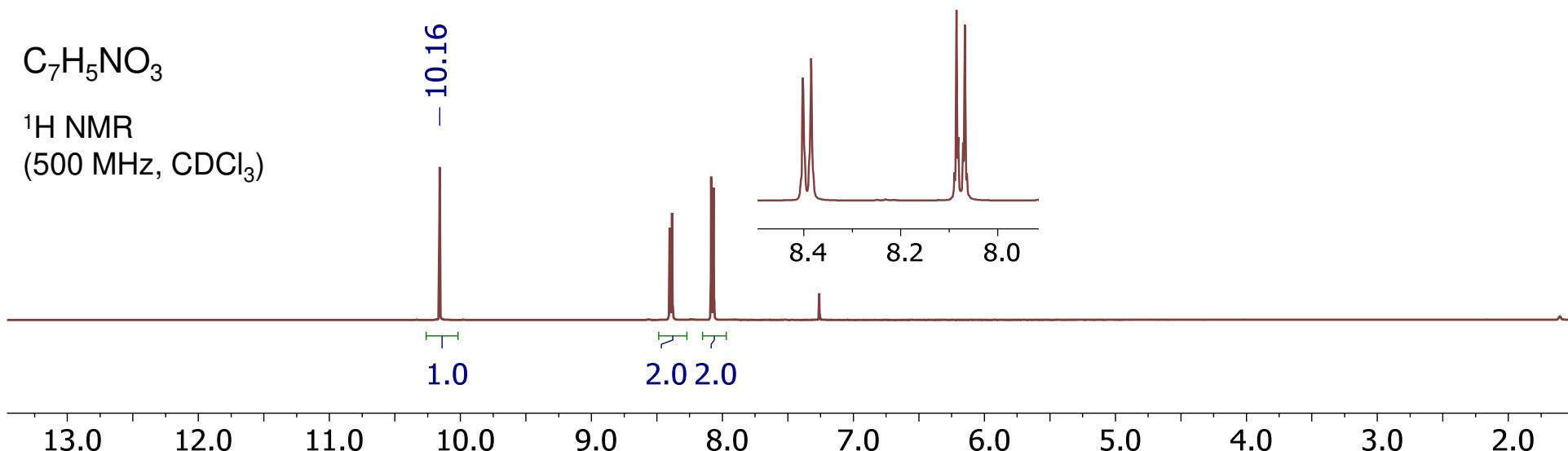
¹³C APT (126 MHz, CDCl₃)



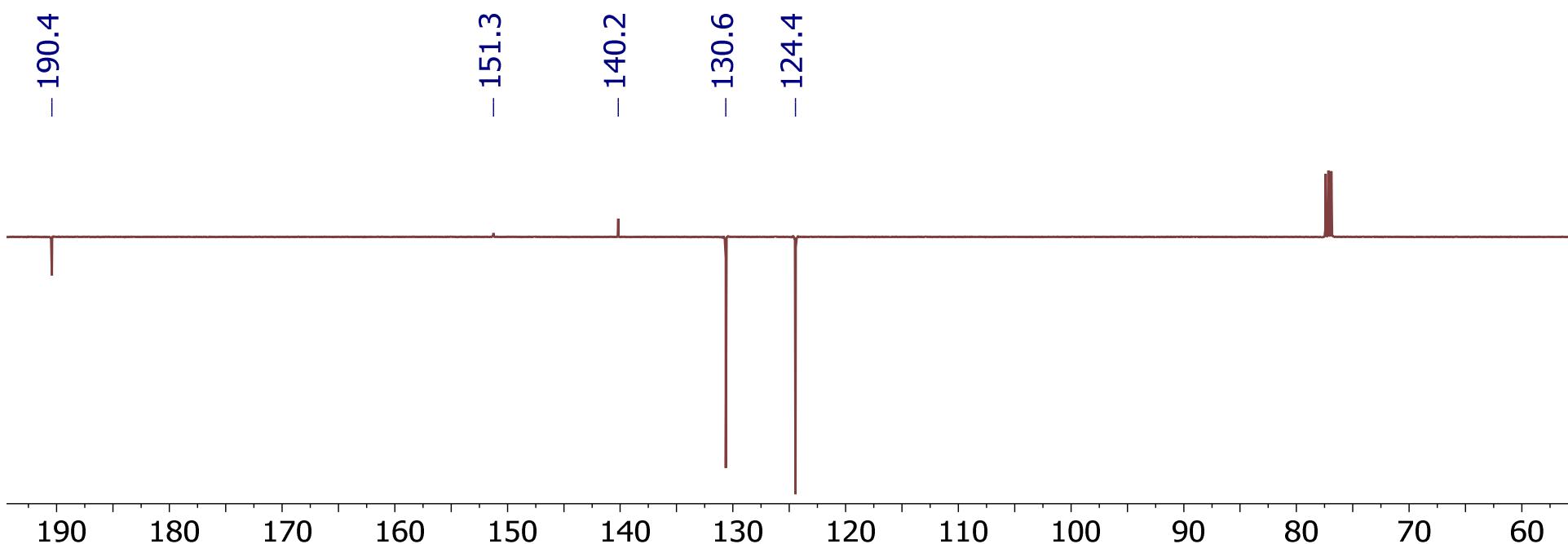
65



¹H NMR
(500 MHz, CDCl₃)



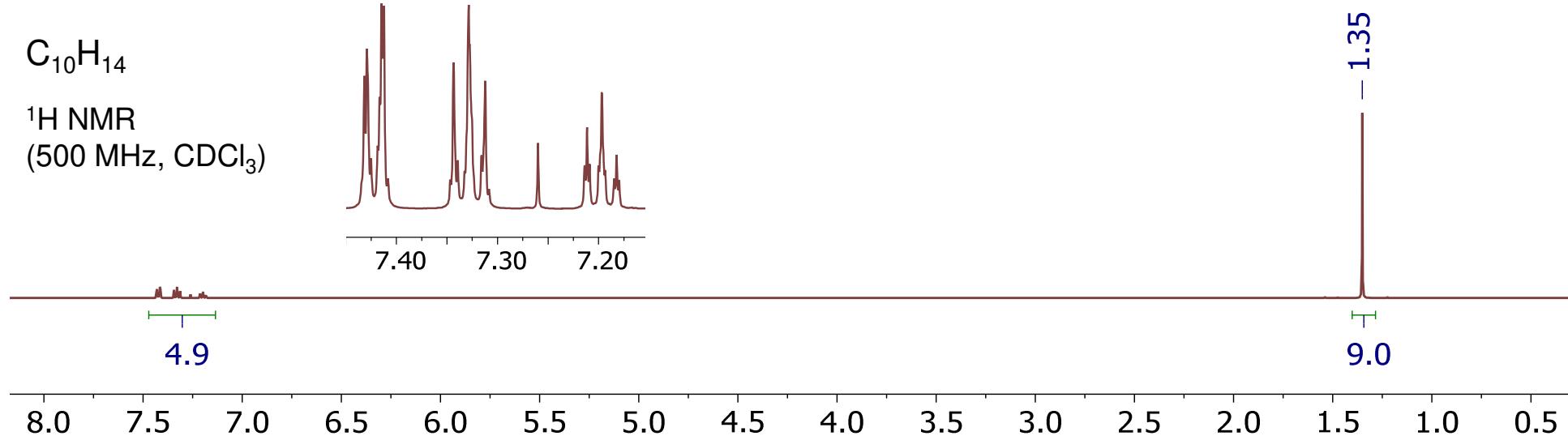
¹³C APT (126 MHz, CDCl₃)



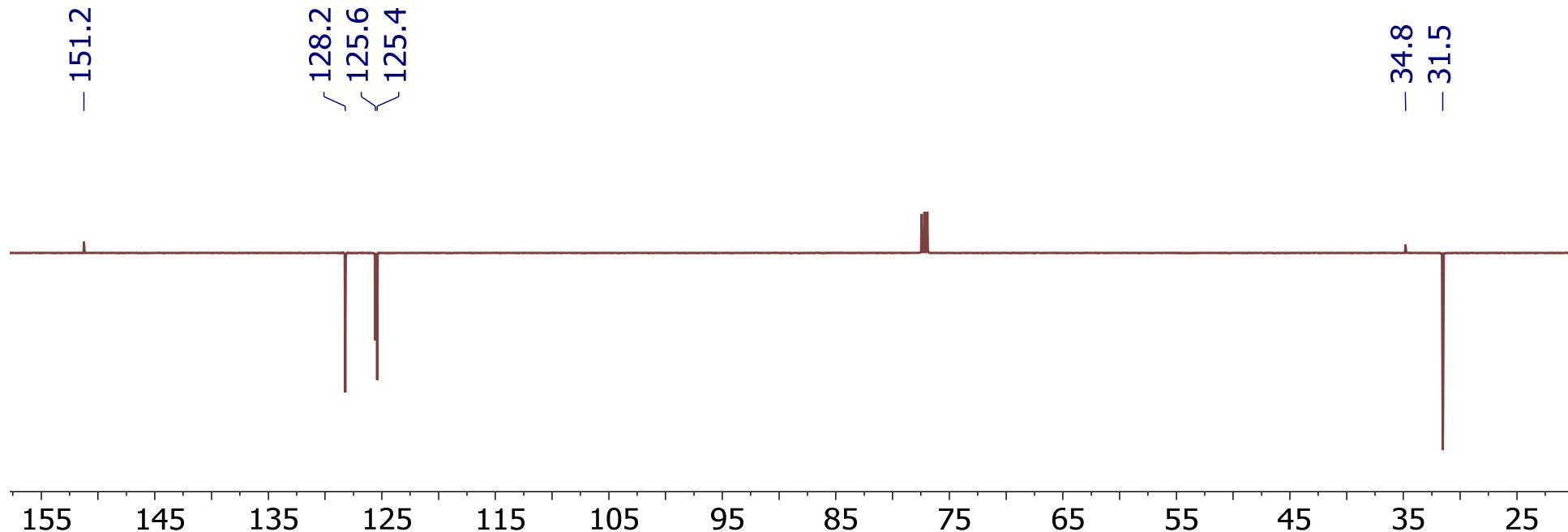
66

$C_{10}H_{14}$

1H NMR
(500 MHz, $CDCl_3$)



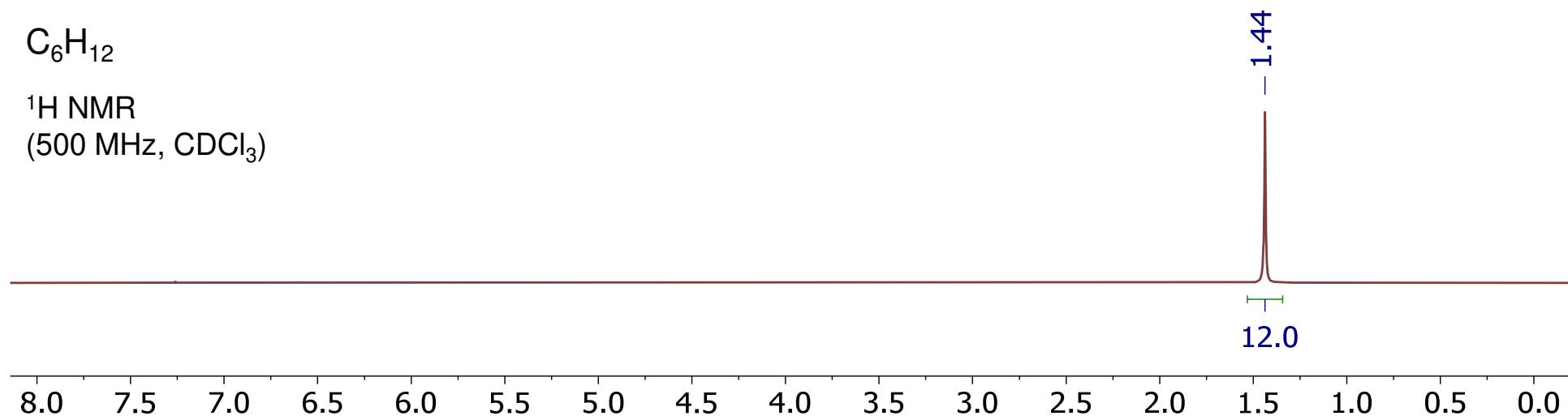
^{13}C APT (126 MHz, $CDCl_3$)



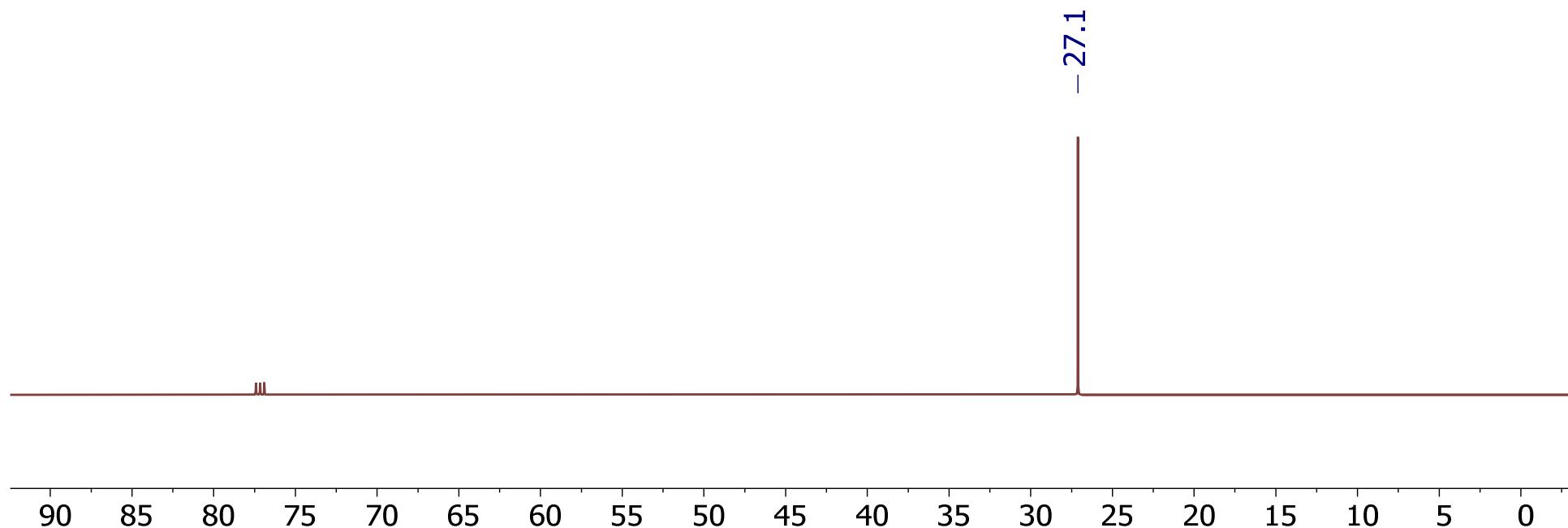
67

C₆H₁₂

¹H NMR
(500 MHz, CDCl₃)



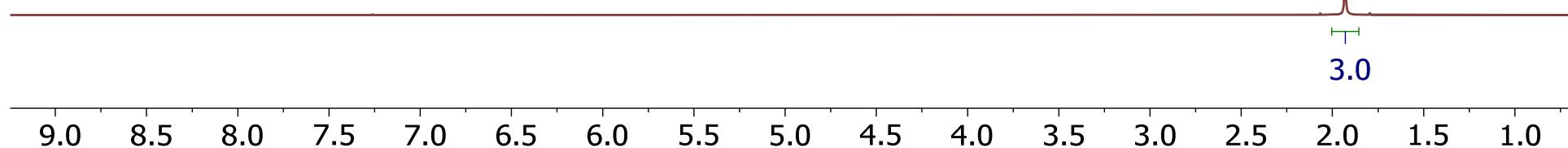
¹³C APT (126 MHz, CDCl₃)



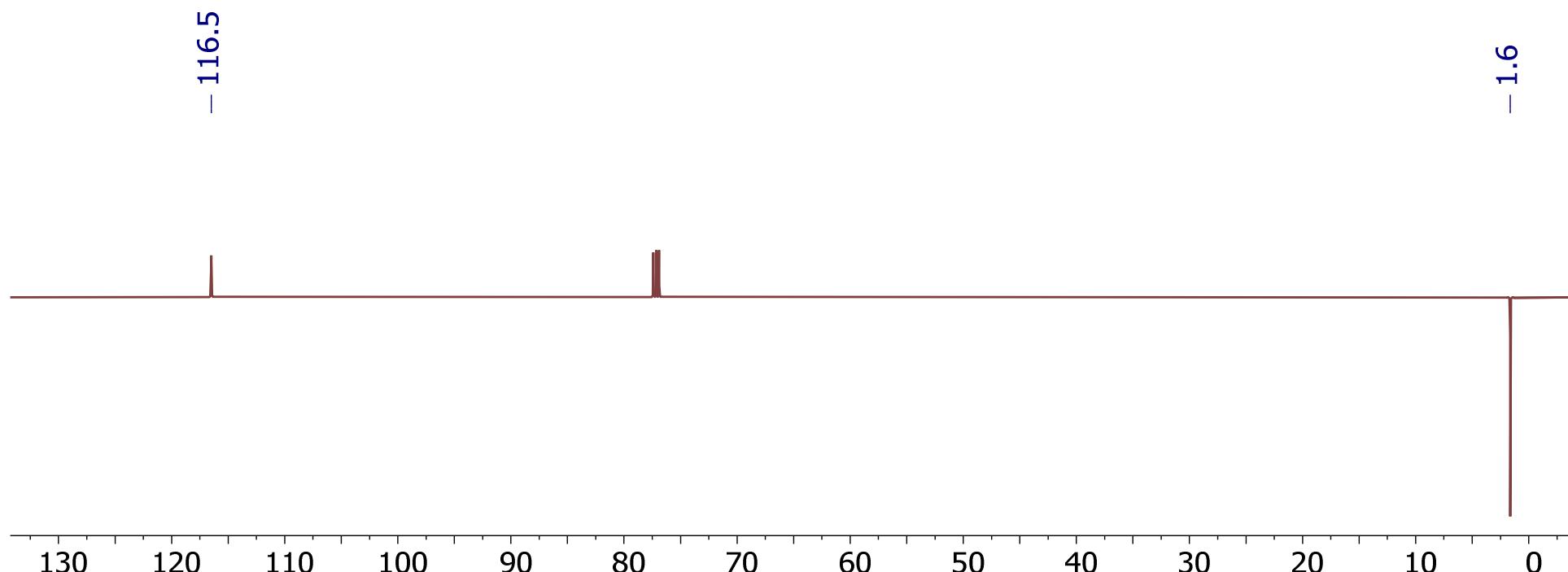
68

C₂H₃N

¹H NMR
(500 MHz, CDCl₃)



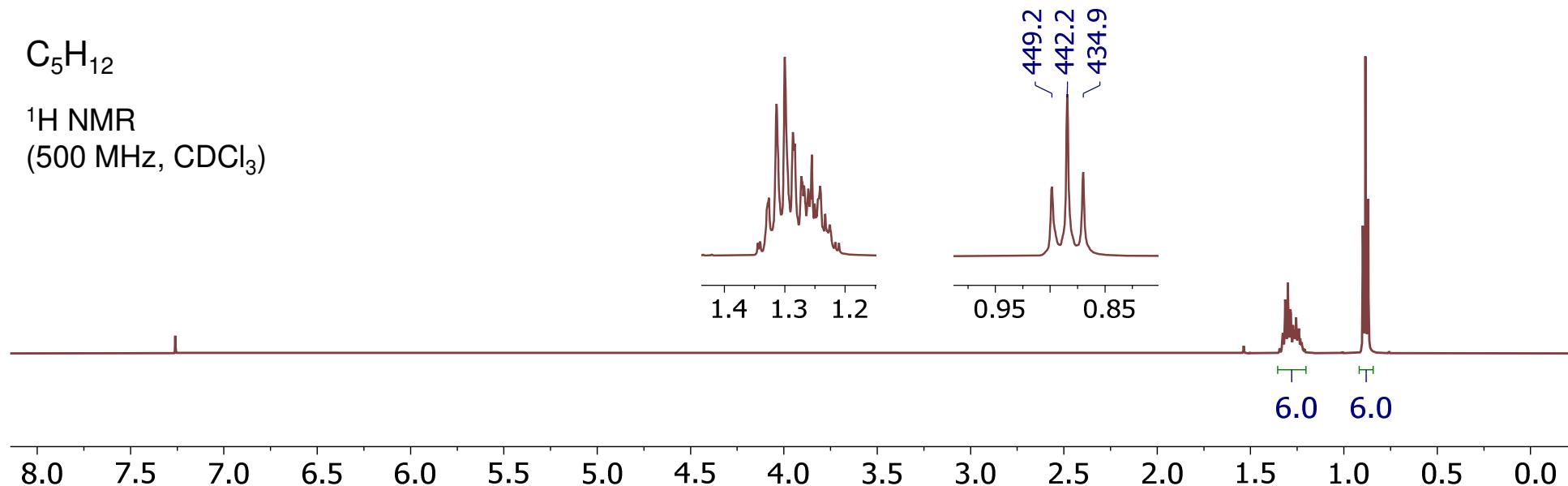
¹³C APT (126 MHz, CDCl₃)



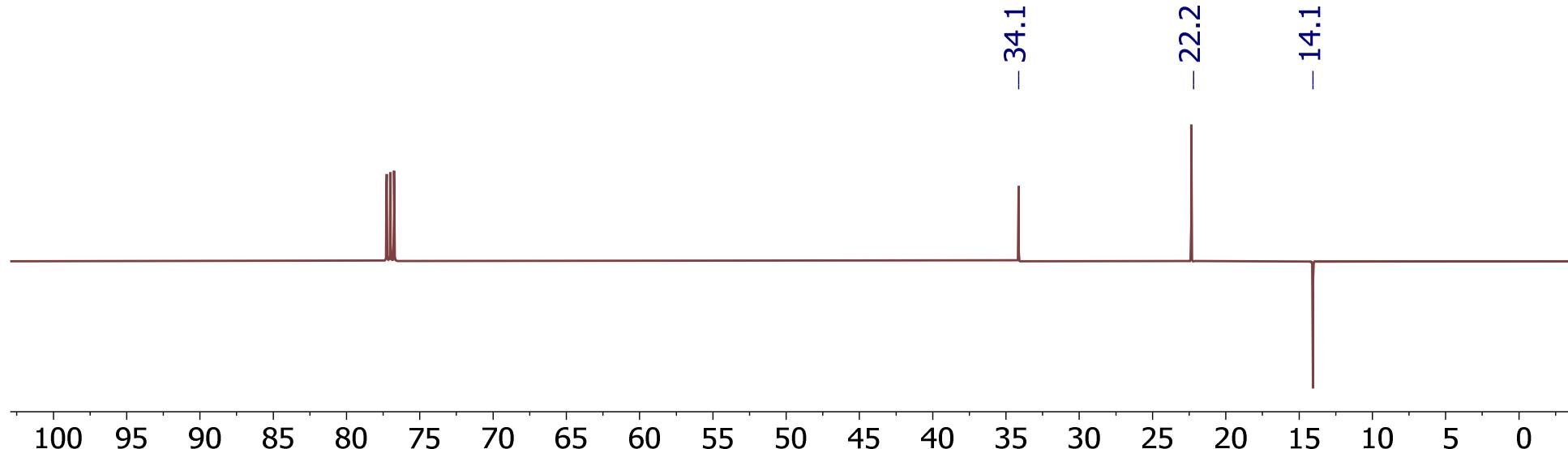
69

C₅H₁₂

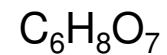
¹H NMR
(500 MHz, CDCl₃)



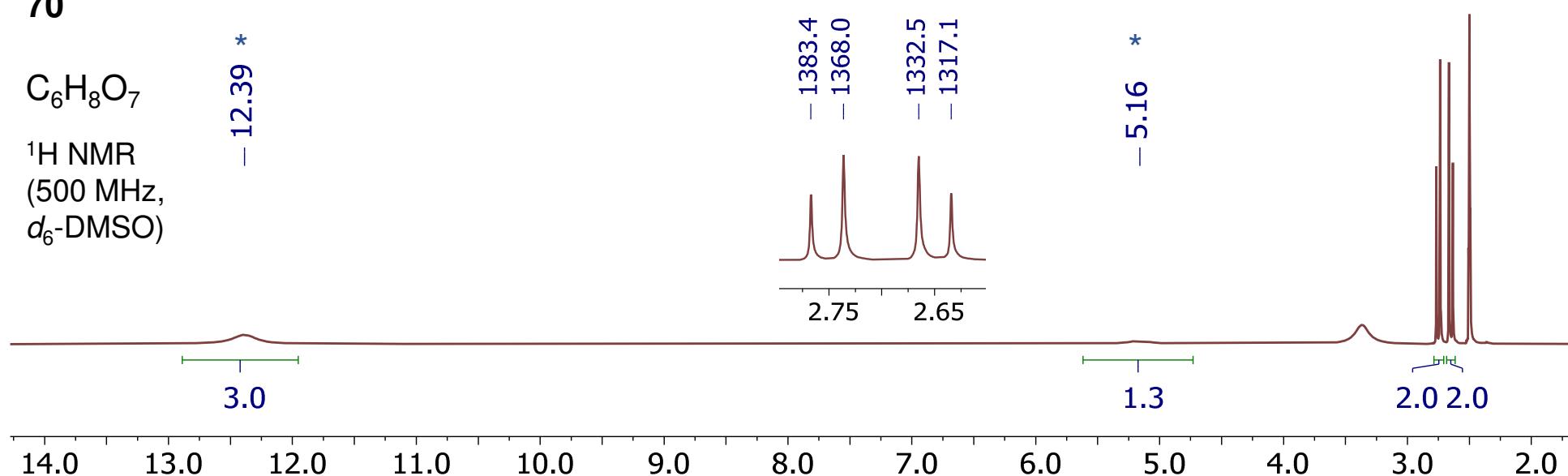
¹³C APT (126 MHz, CDCl₃)



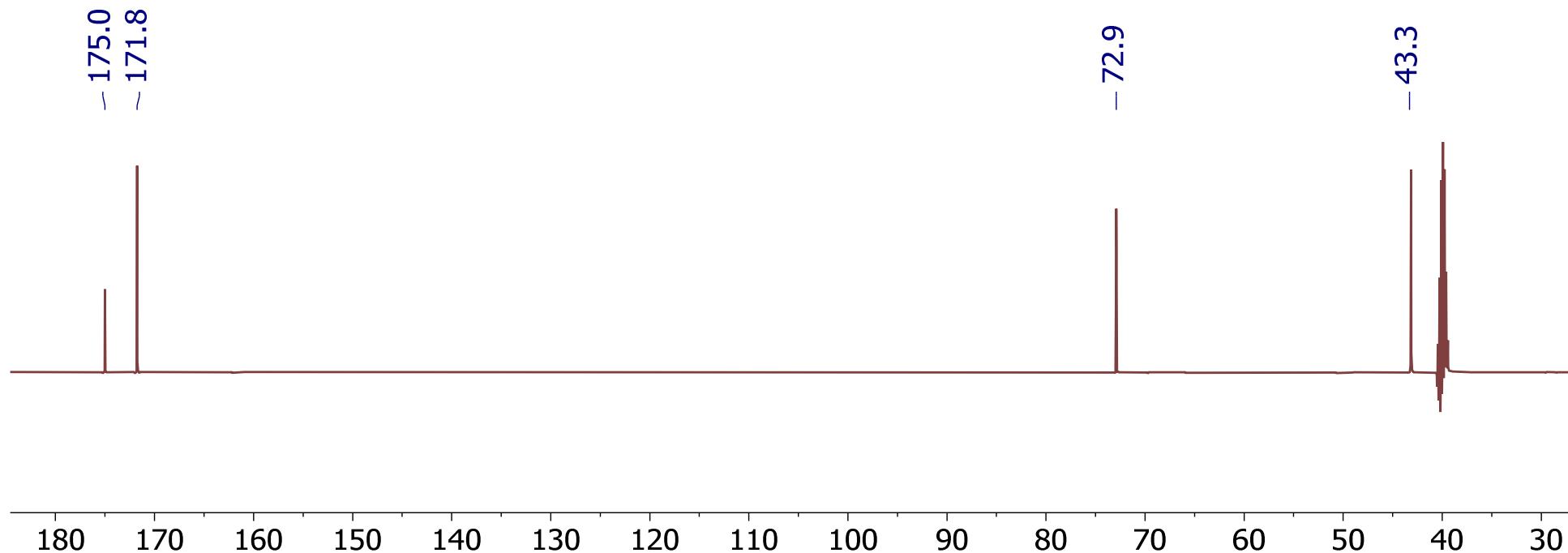
70



^1H NMR
(500 MHz,
 d_6 -DMSO)



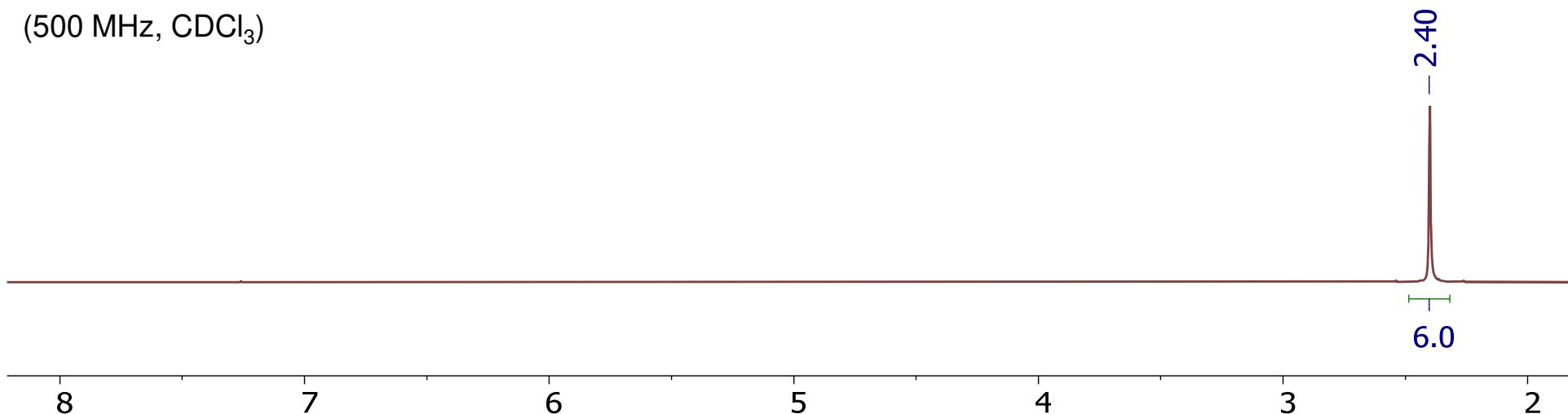
^{13}C APT (126 MHz, DMSO)



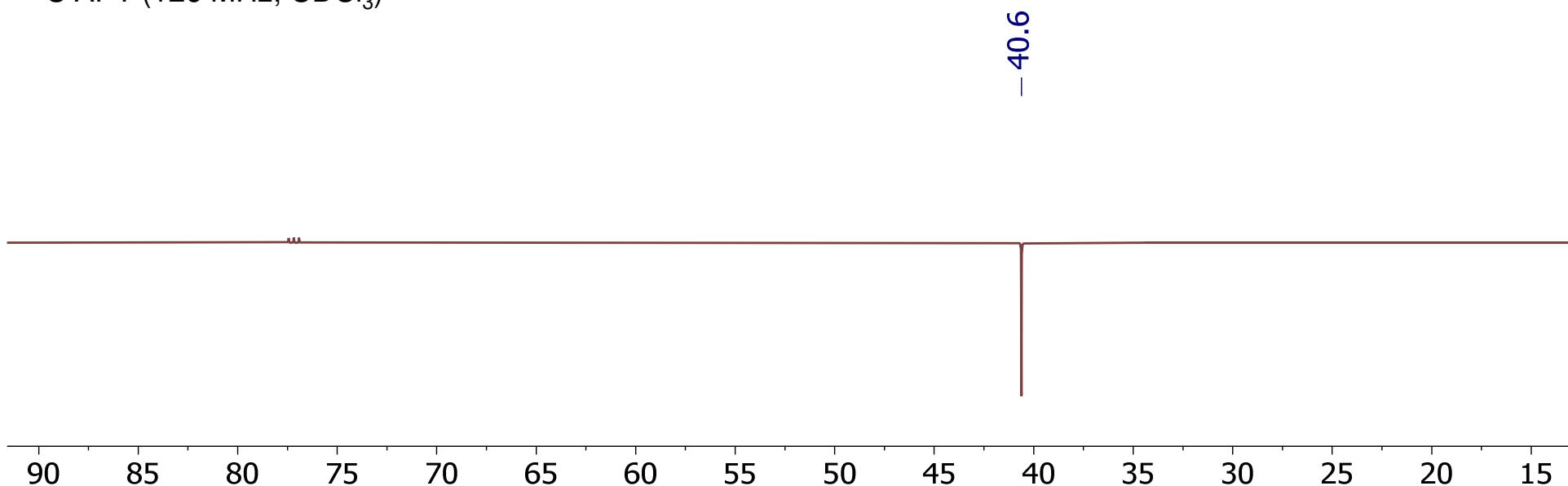
71



¹H NMR
(500 MHz, CDCl₃)



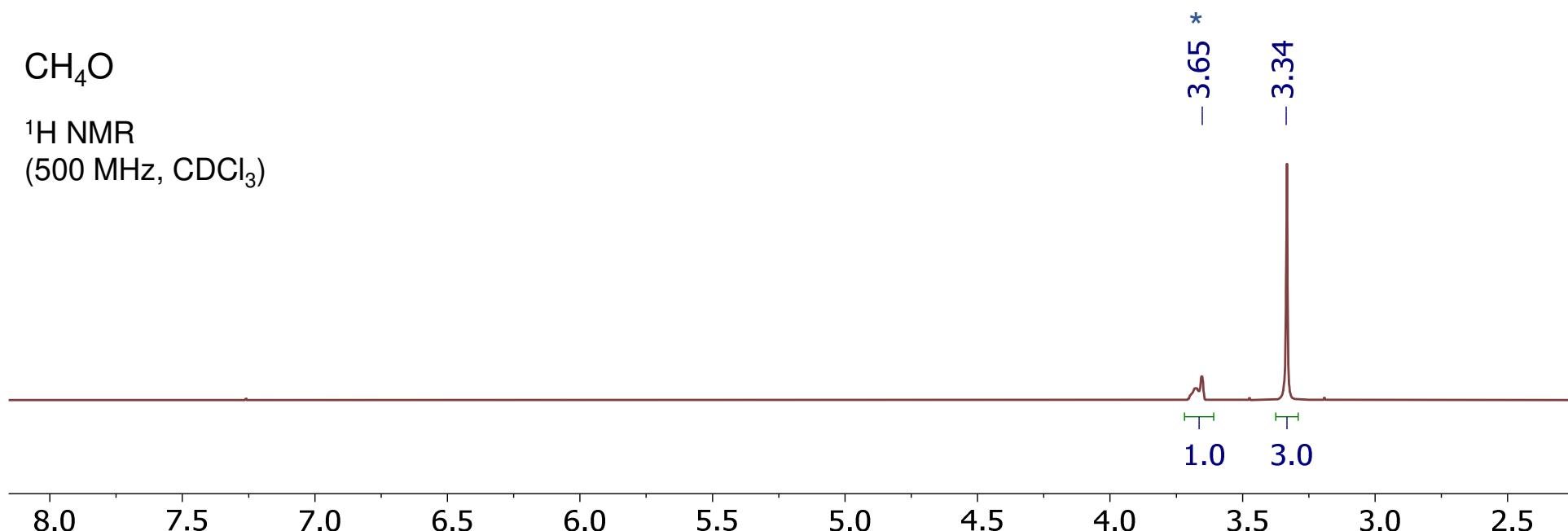
¹³C APT (126 MHz, CDCl₃)



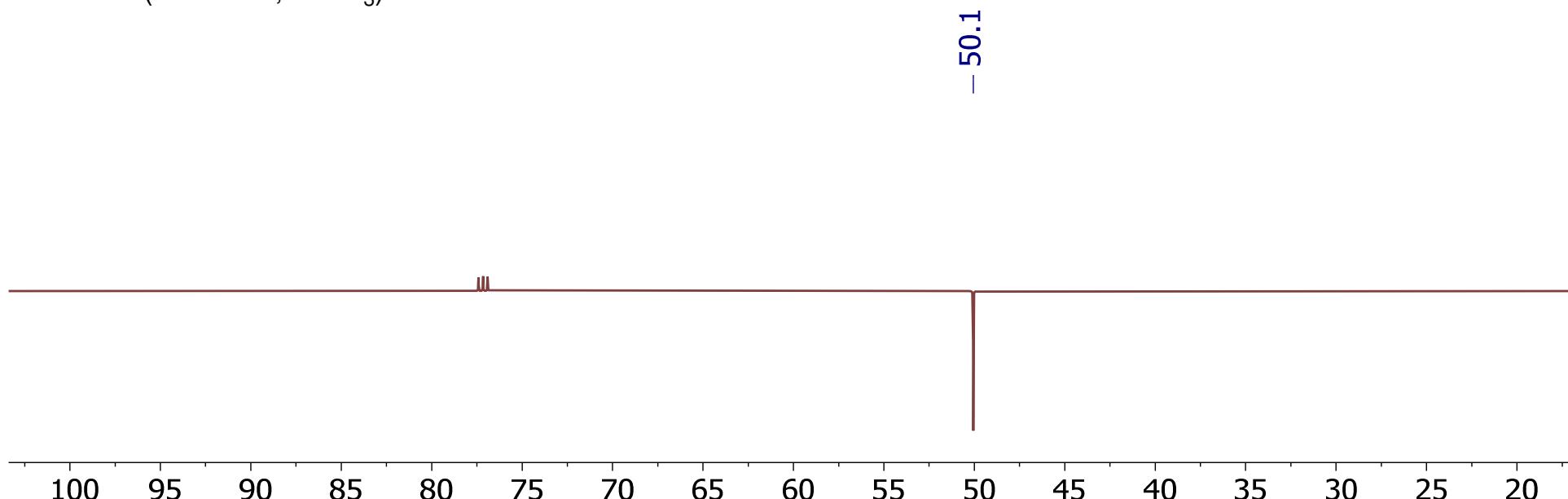
72

CH_4O

^1H NMR
(500 MHz, CDCl_3)



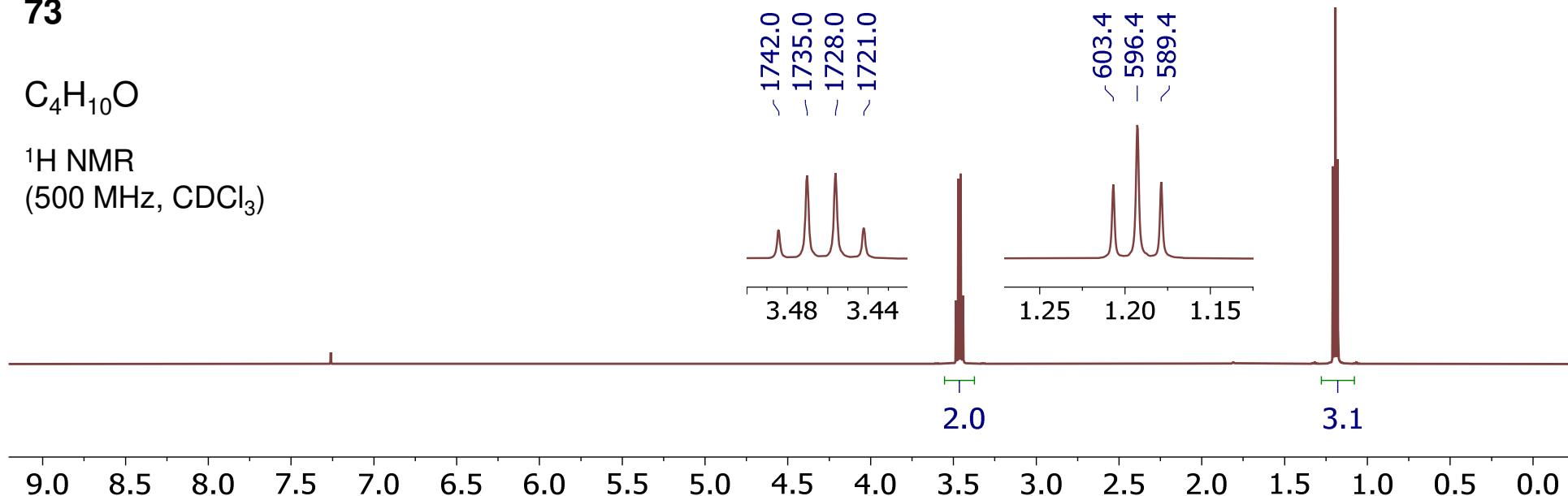
^{13}C APT (126 MHz, CDCl_3)



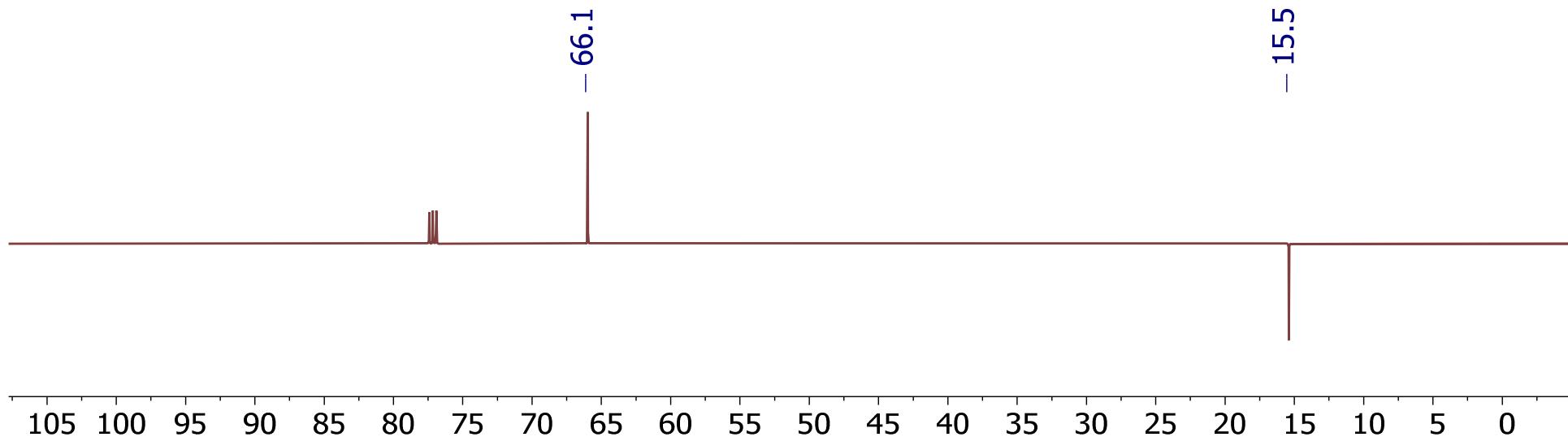
73

C₄H₁₀O

¹H NMR
(500 MHz, CDCl₃)



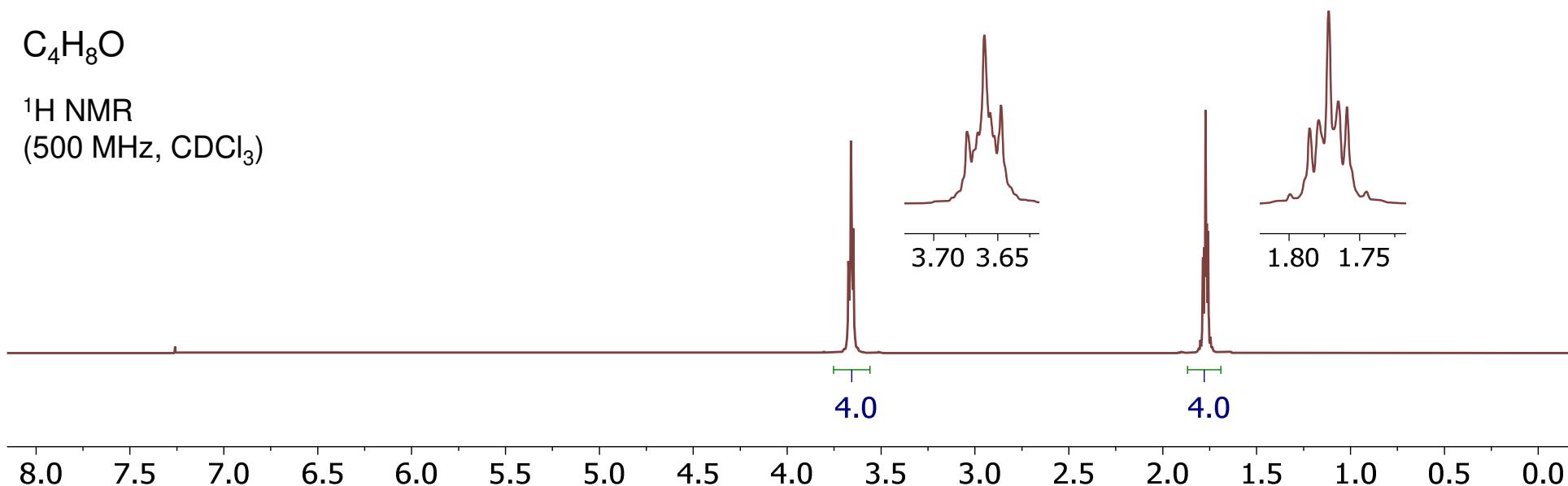
¹³C APT (126 MHz, CDCl₃)



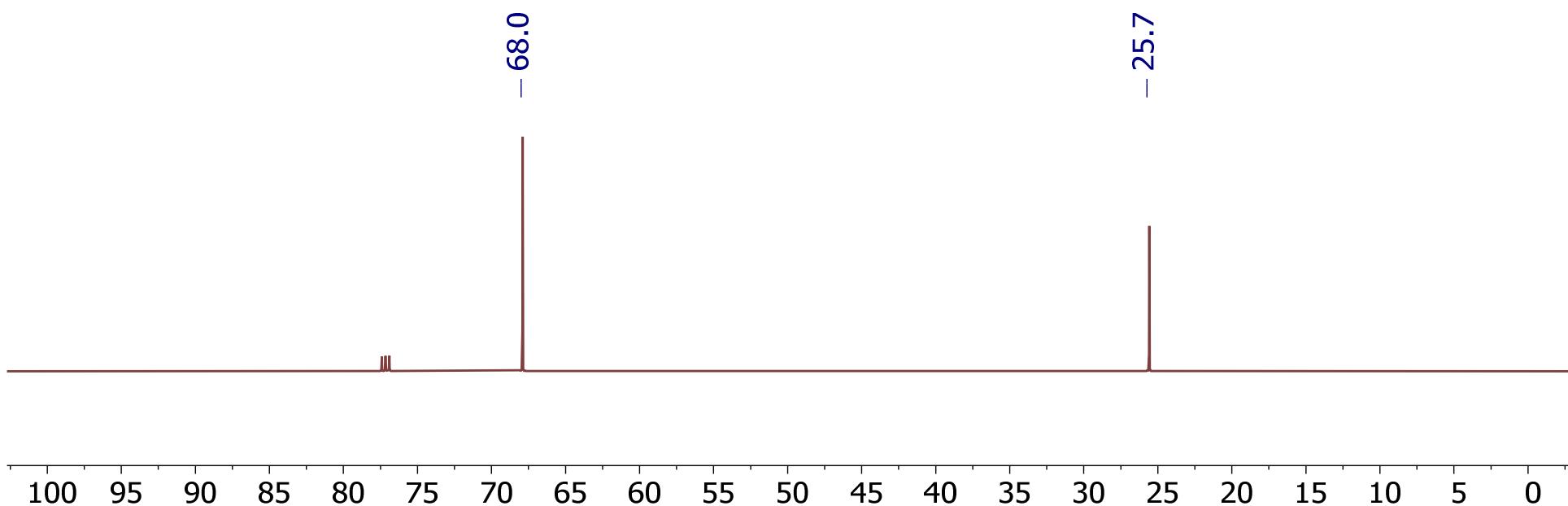
74

C₄H₈O

¹H NMR
(500 MHz, CDCl₃)



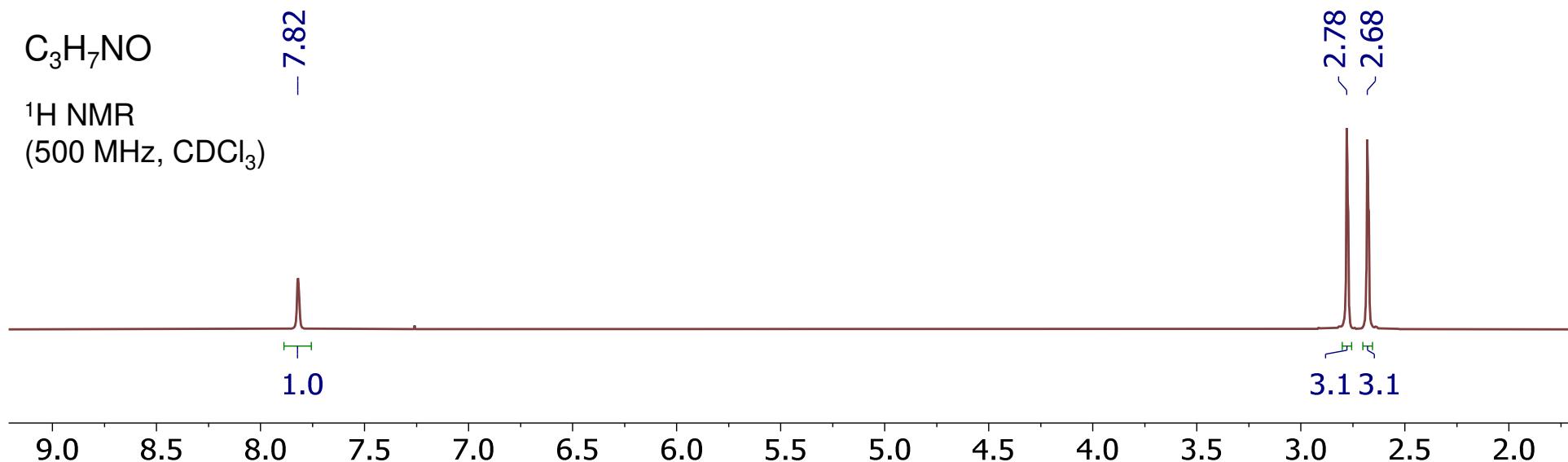
¹³C APT (126 MHz, CDCl₃)



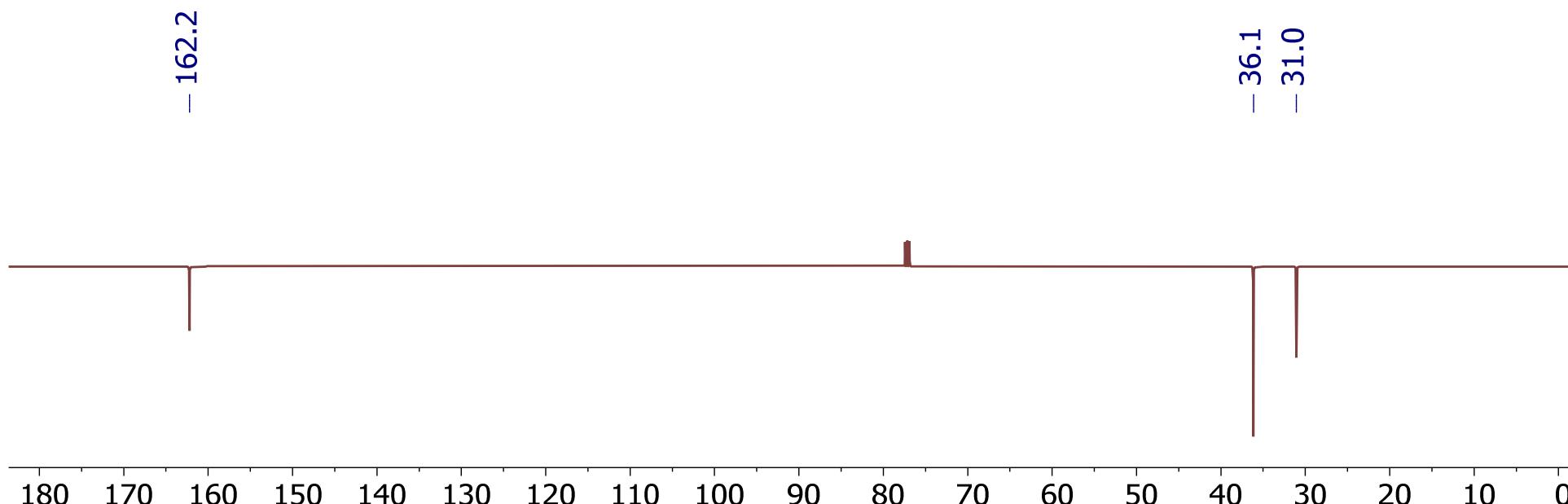
75

C₃H₇NO

¹H NMR
(500 MHz, CDCl₃)



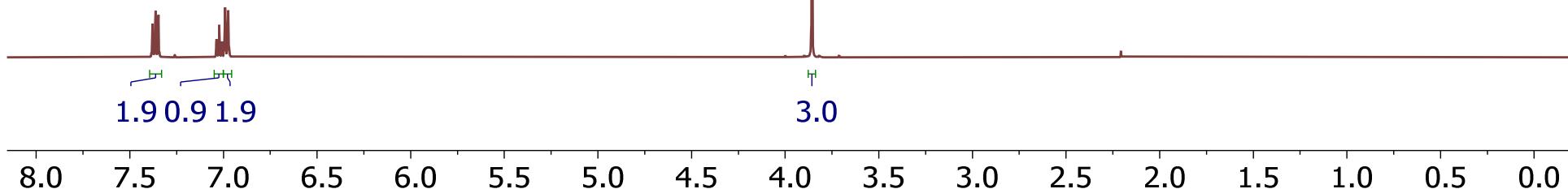
¹³C APT (126 MHz, CDCl₃)



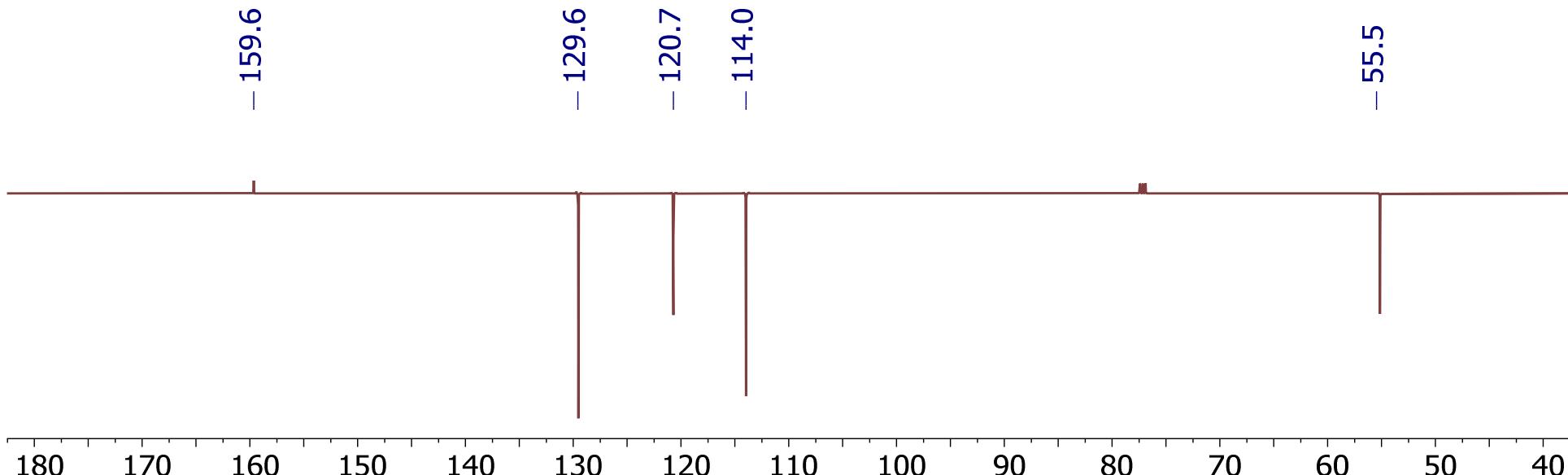
76

C₇H₈O

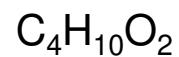
¹H NMR
(500 MHz, CDCl₃)



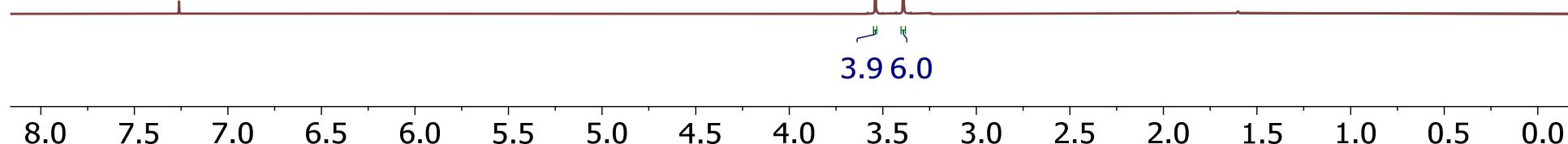
¹³C APT (126 MHz, CDCl₃)



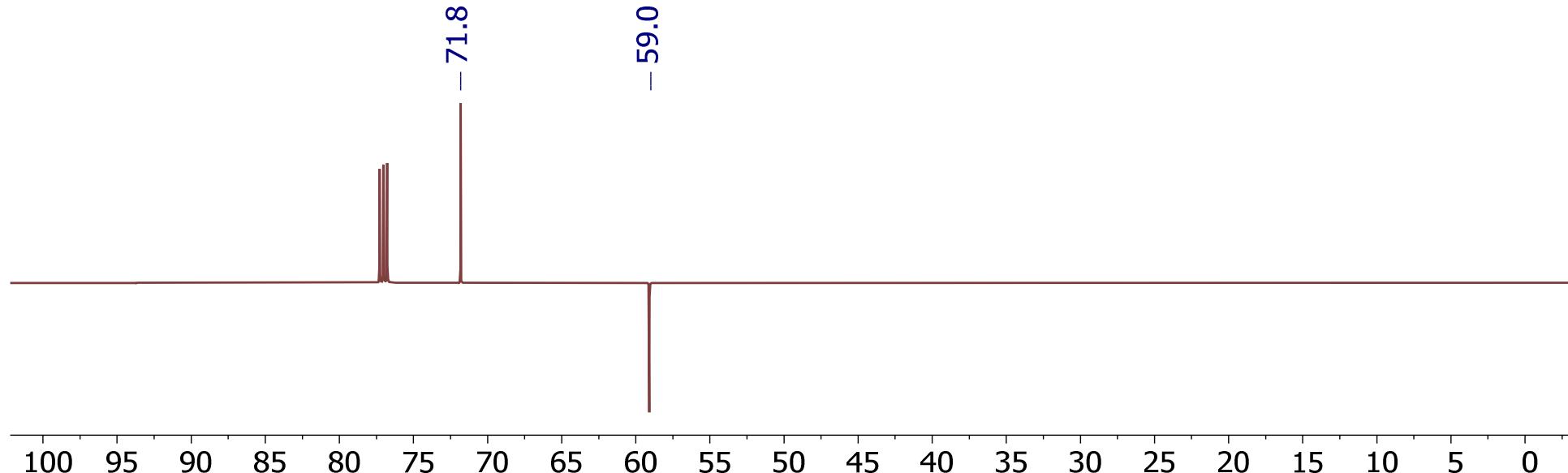
77



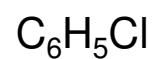
^1H NMR
(500 MHz, CDCl_3)



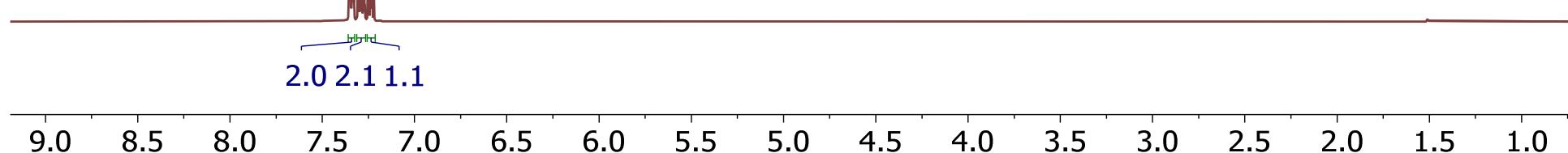
^{13}C APT (126 MHz, CDCl_3)



78

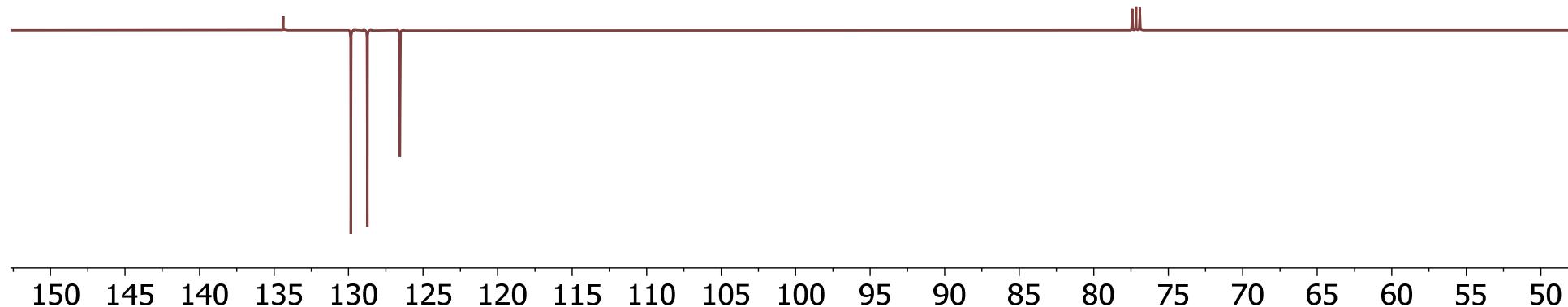


¹H NMR
(500 MHz, CDCl₃)

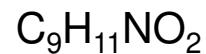


¹³C APT (126 MHz, CDCl₃)

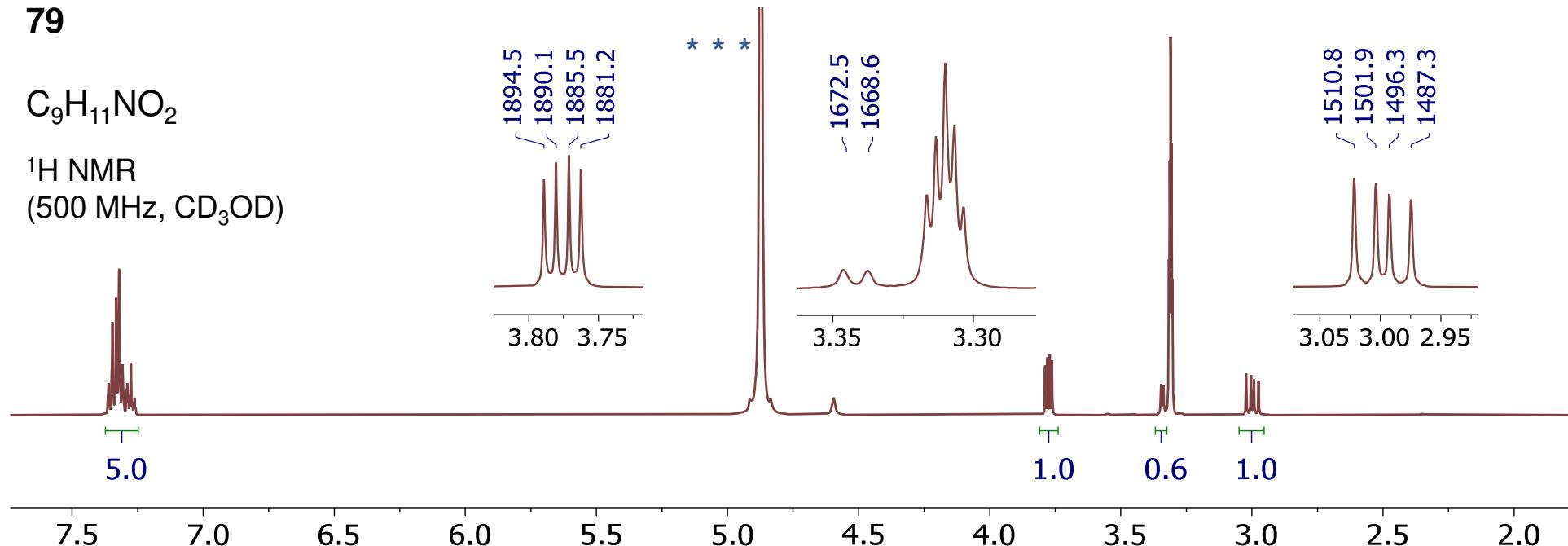
-134.4
-129.8
-128.7
-126.6



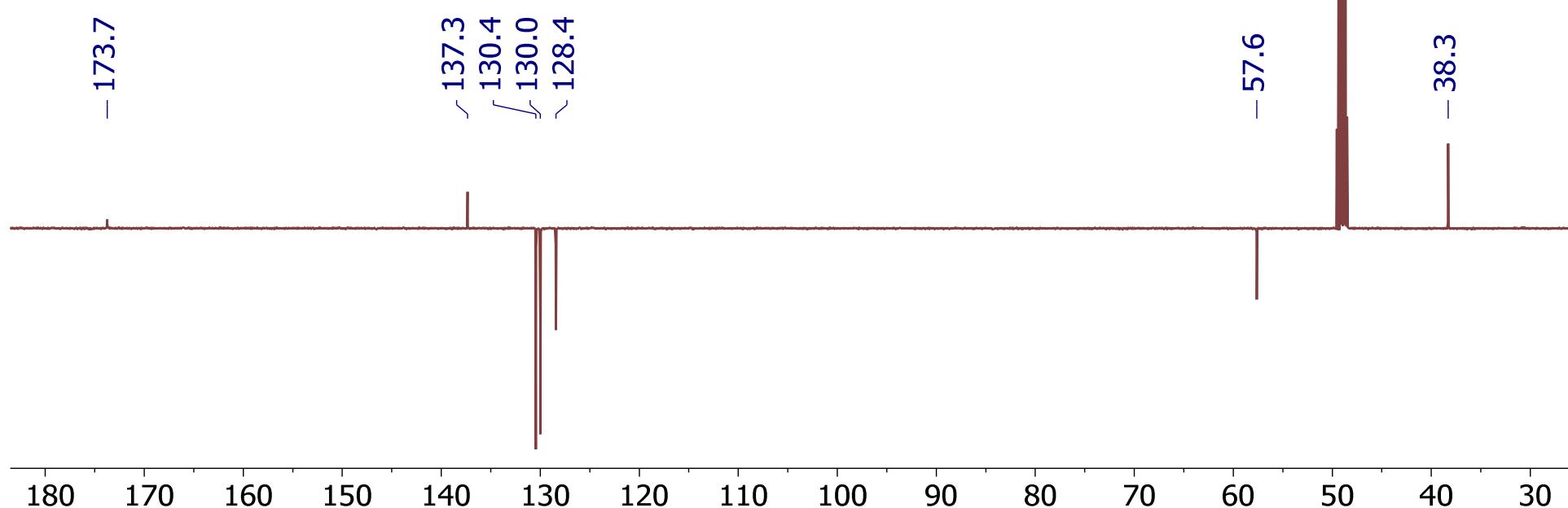
79



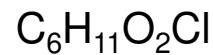
¹H NMR
(500 MHz, CD₃OD)



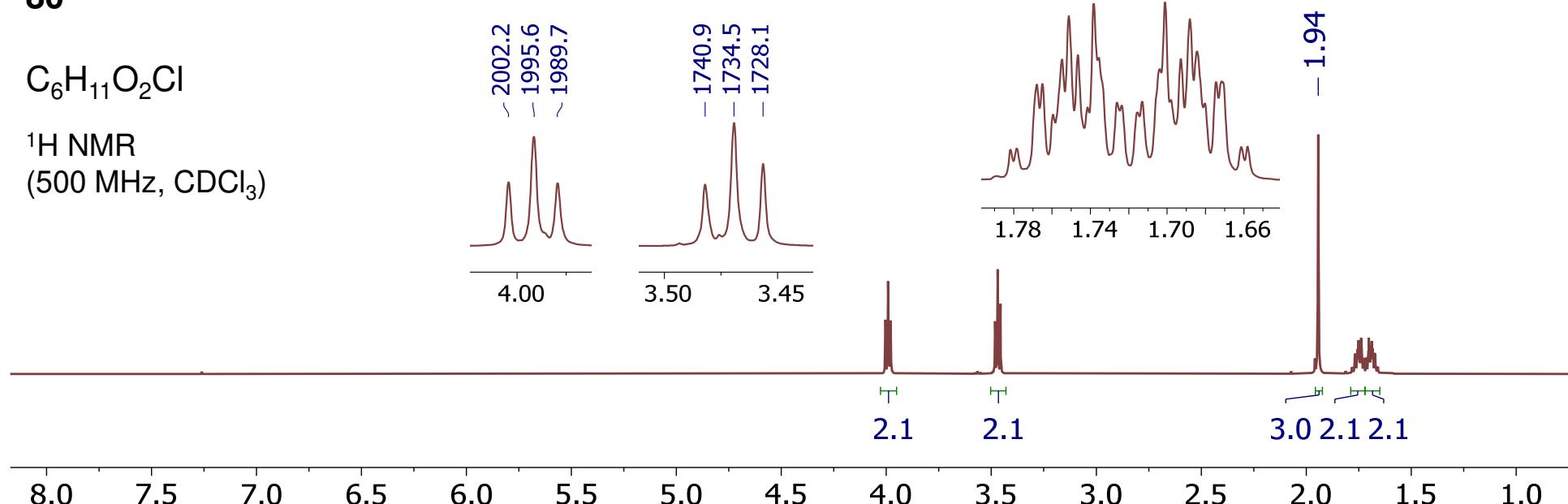
¹³C APT (126 MHz, CDCl₃)



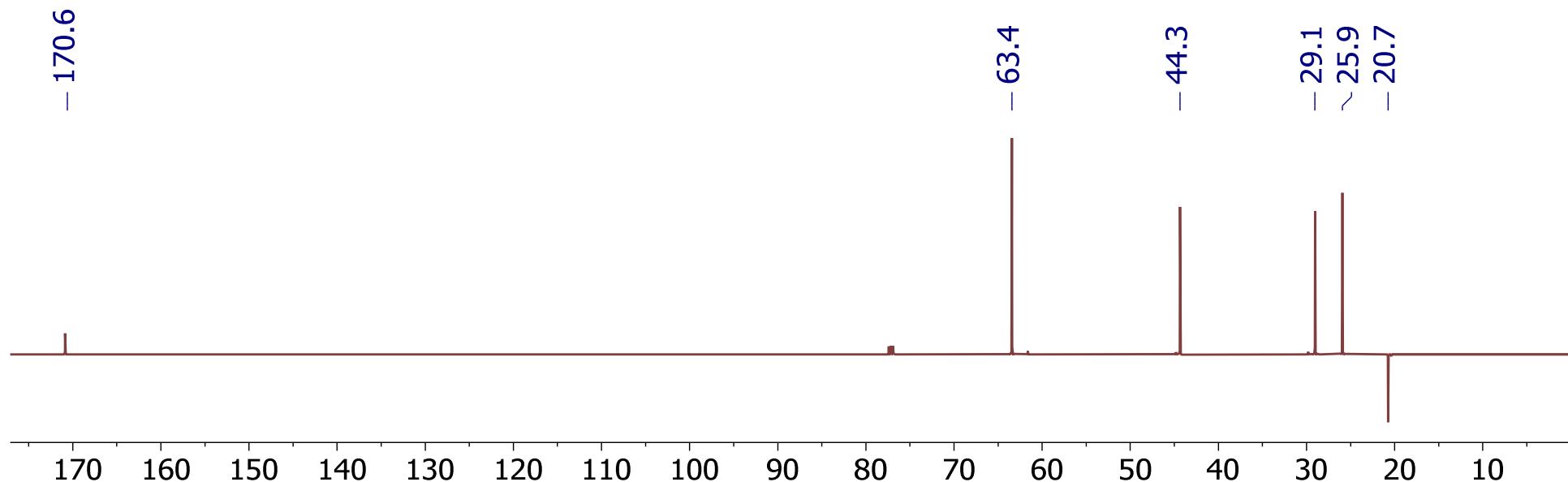
80



^1H NMR
(500 MHz, CDCl_3)



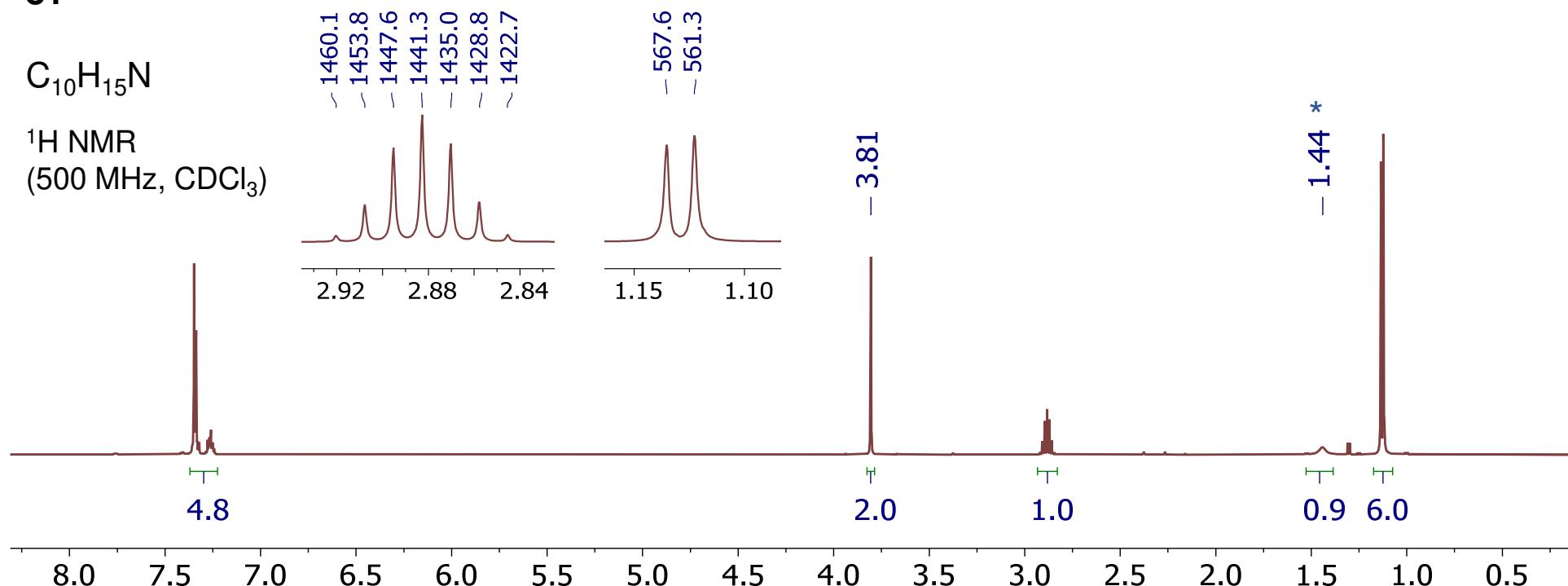
^{13}C APT (126 MHz, CDCl_3)



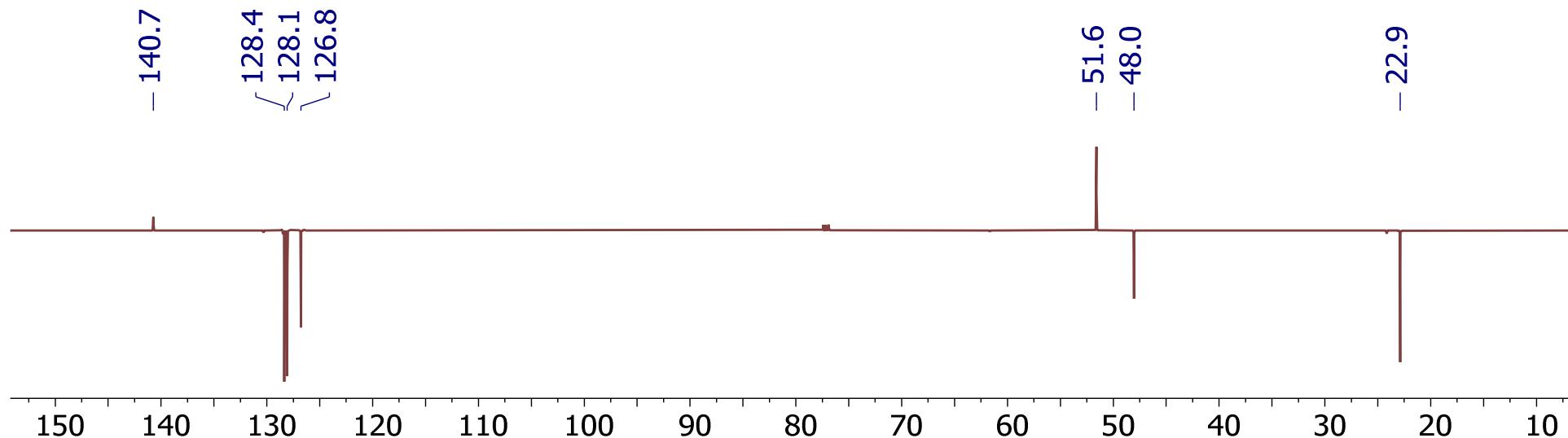
81

$C_{10}H_{15}N$

1H NMR
(500 MHz, $CDCl_3$)



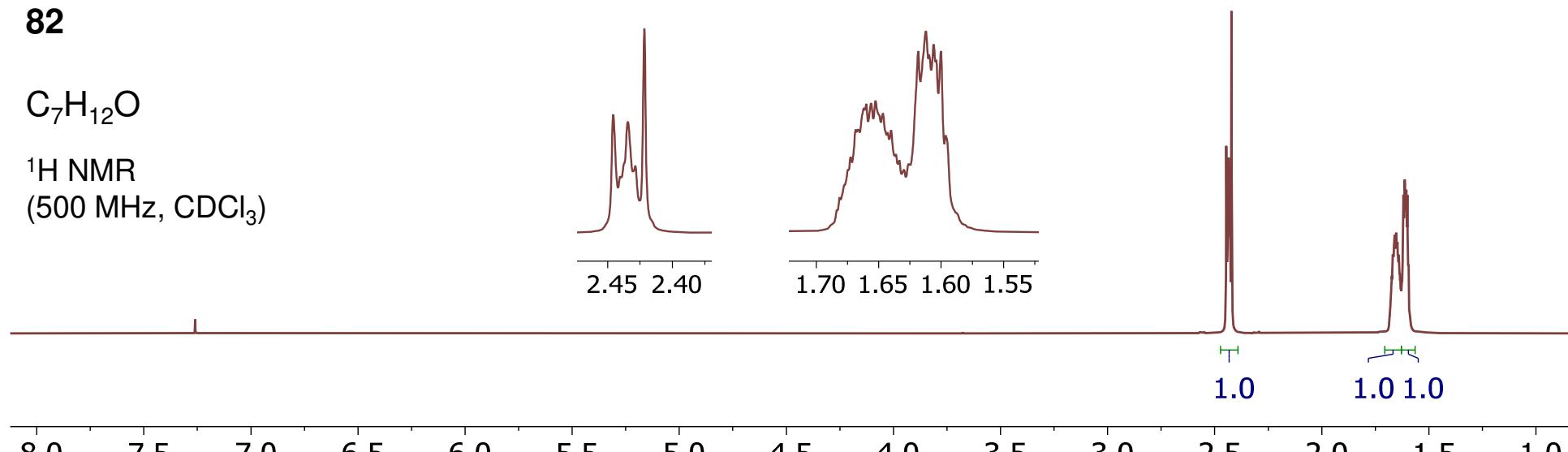
^{13}C APT (126 MHz, $CDCl_3$)



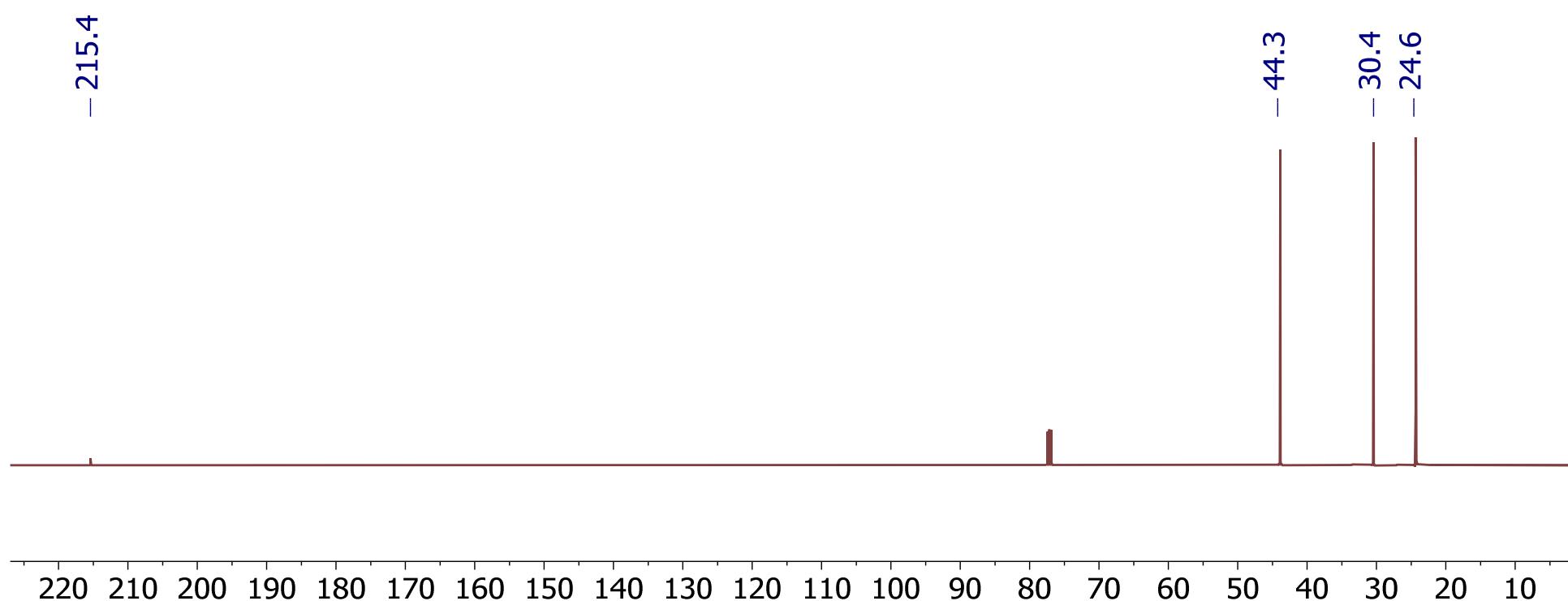
82

C₇H₁₂O

¹H NMR
(500 MHz, CDCl₃)



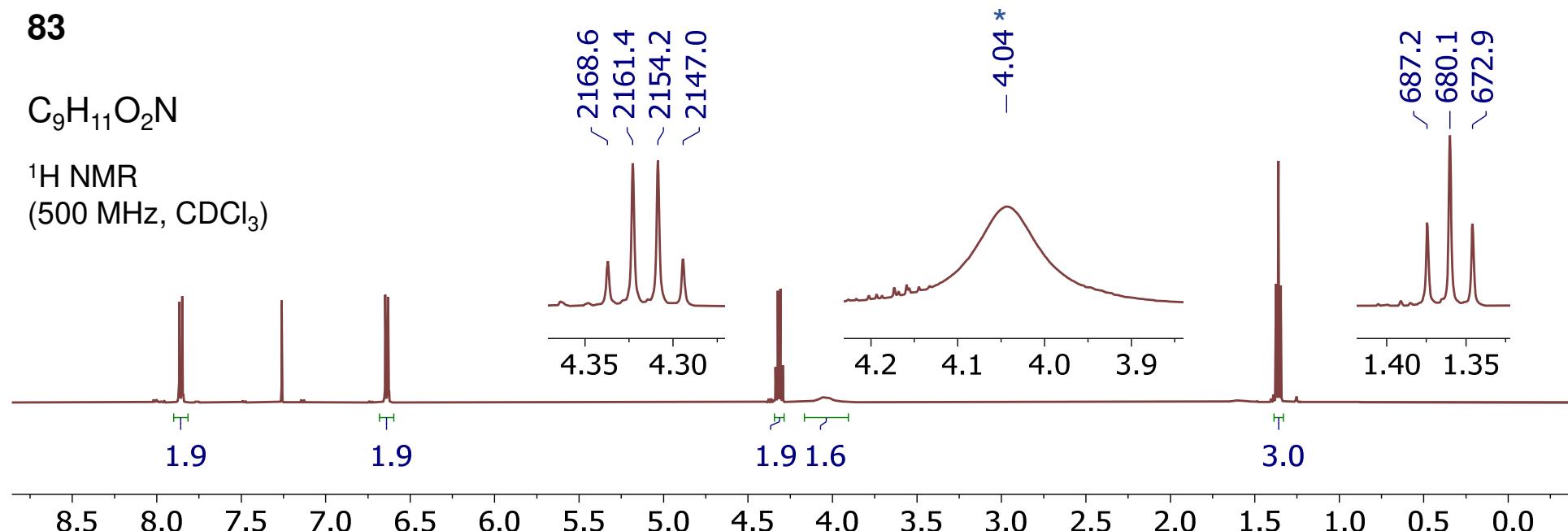
¹³C APT (126 MHz, CDCl₃)



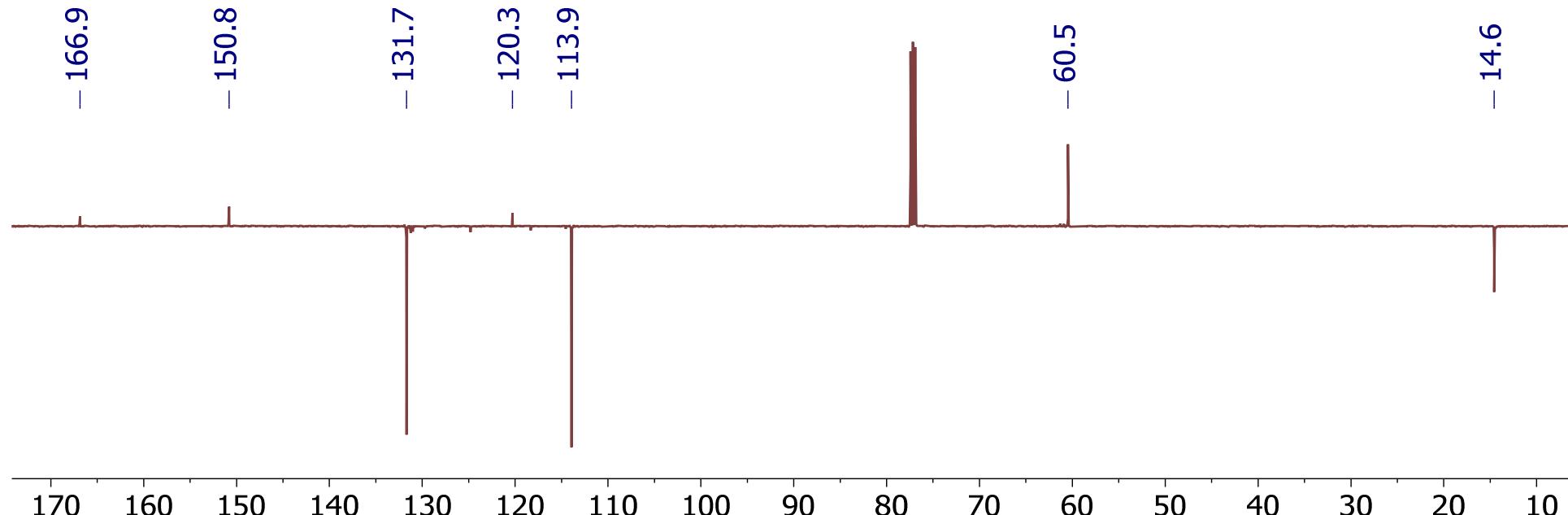
83

C₉H₁₁O₂N

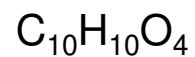
¹H NMR
(500 MHz, CDCl₃)



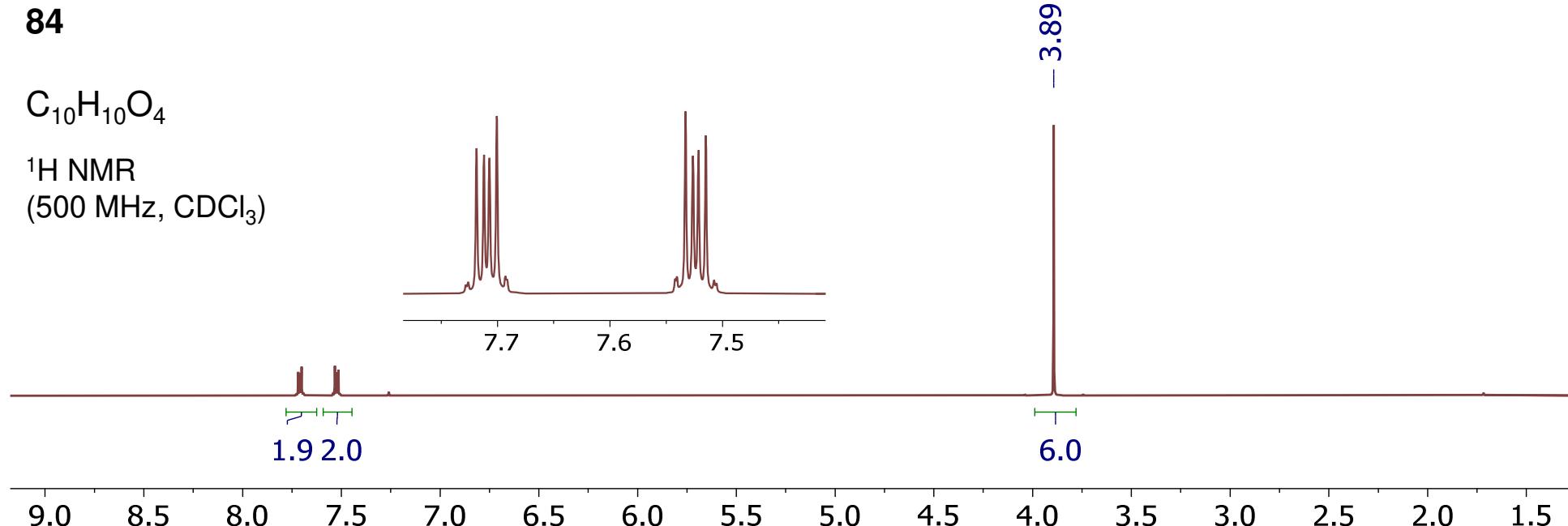
¹³C APT (126 MHz, CDCl₃)



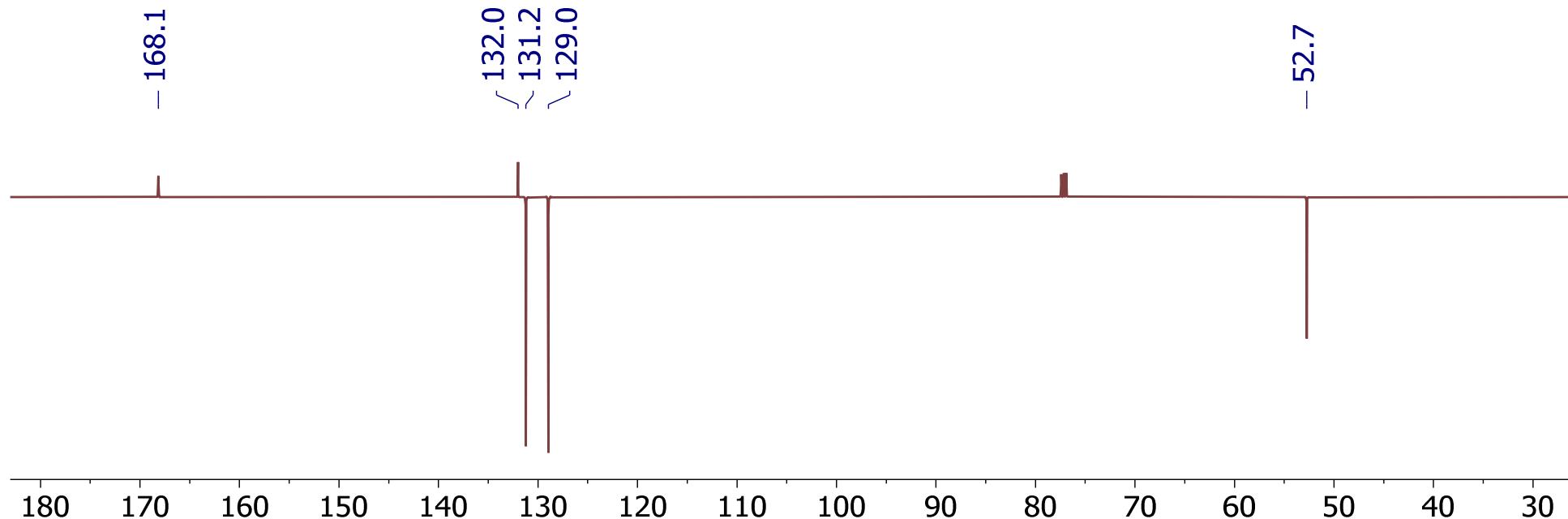
84



^1H NMR
(500 MHz, CDCl_3)



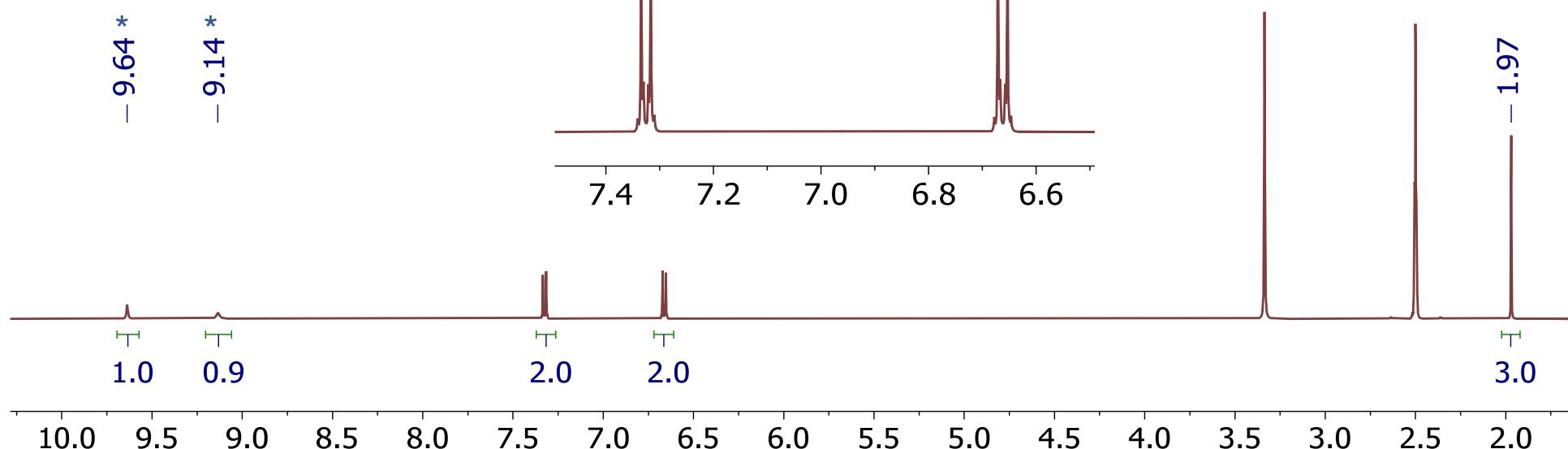
^{13}C APT (126 MHz, CDCl_3)



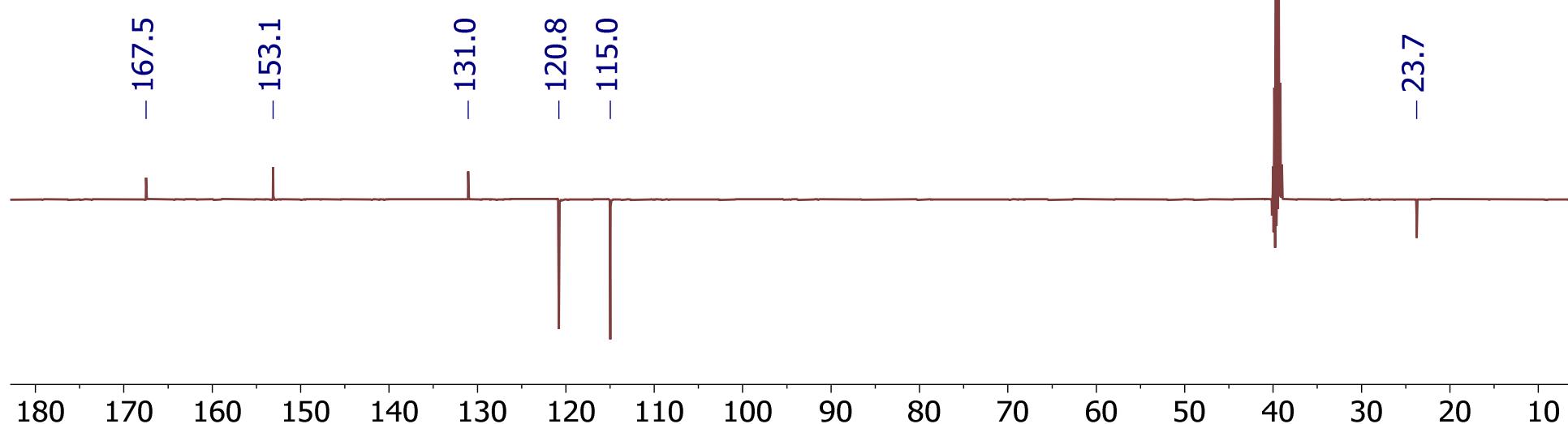
85



¹H NMR (500 MHz, d₆-DMSO)



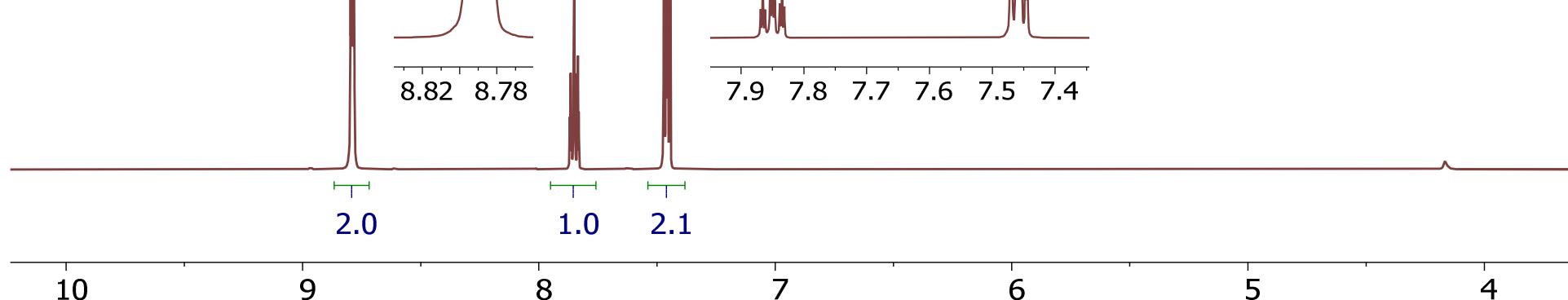
¹³C APT (126 MHz, CDCl₃)



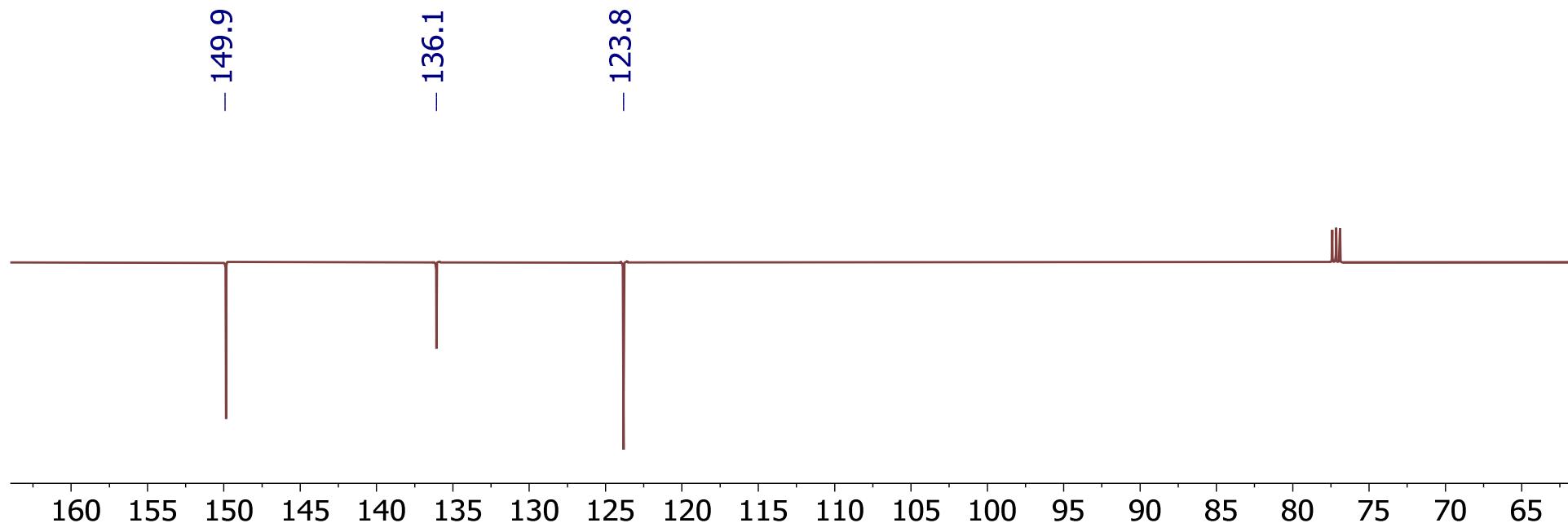
86

C₅H₅N

¹H NMR
(500 MHz, CDCl₃)



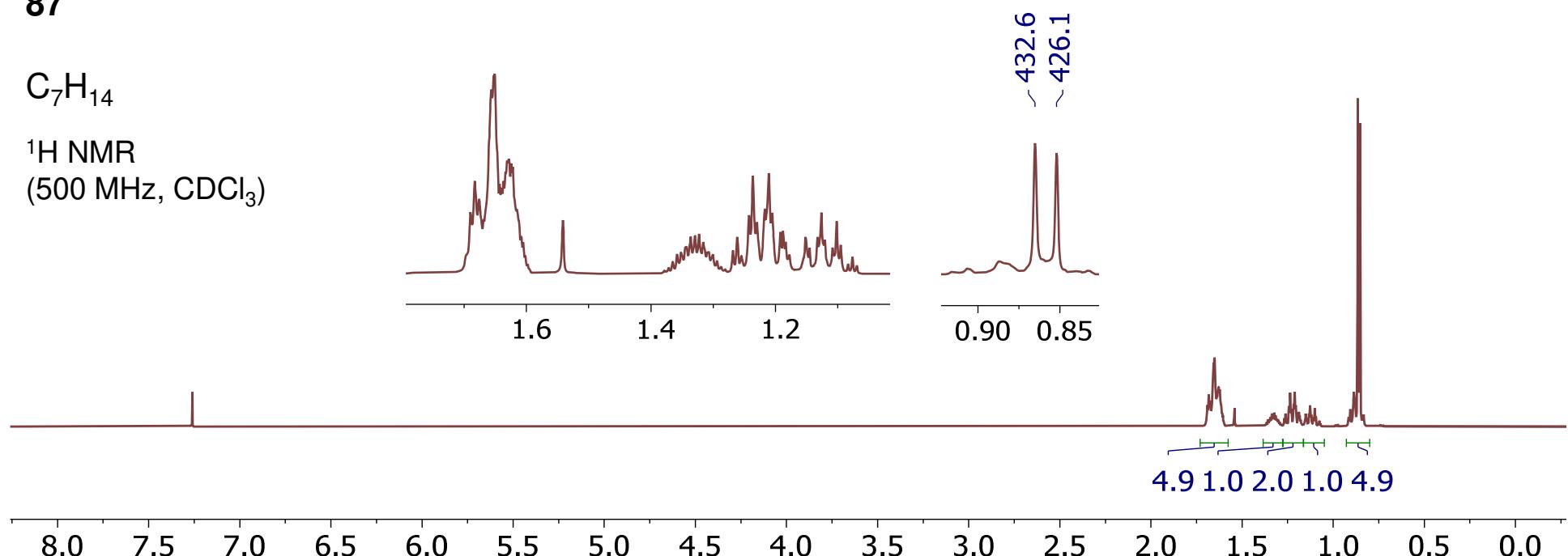
¹³C APT (126 MHz, CDCl₃)



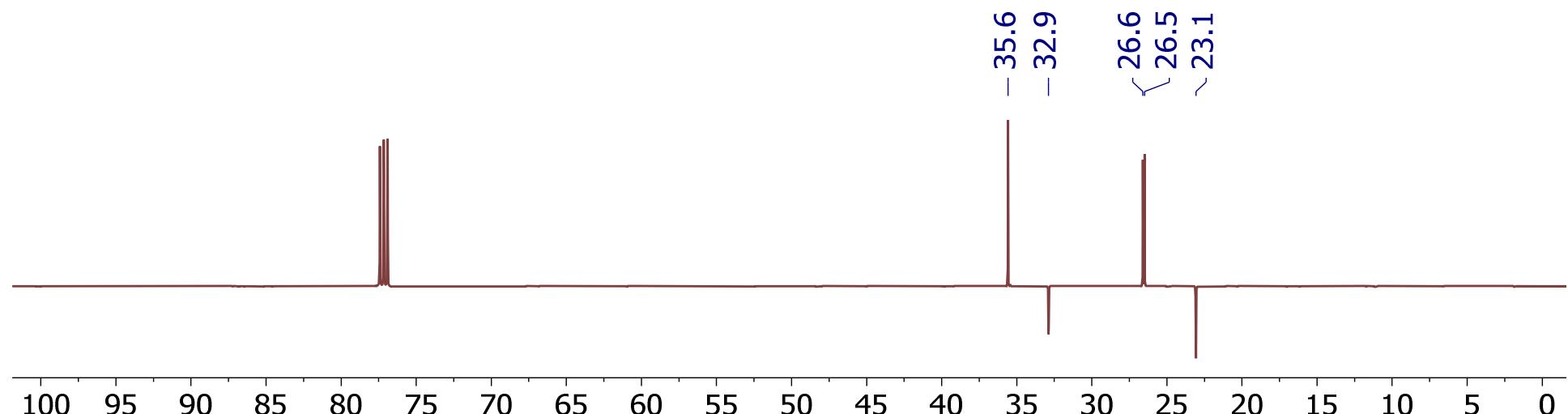
87

C₇H₁₄

¹H NMR
(500 MHz, CDCl₃)



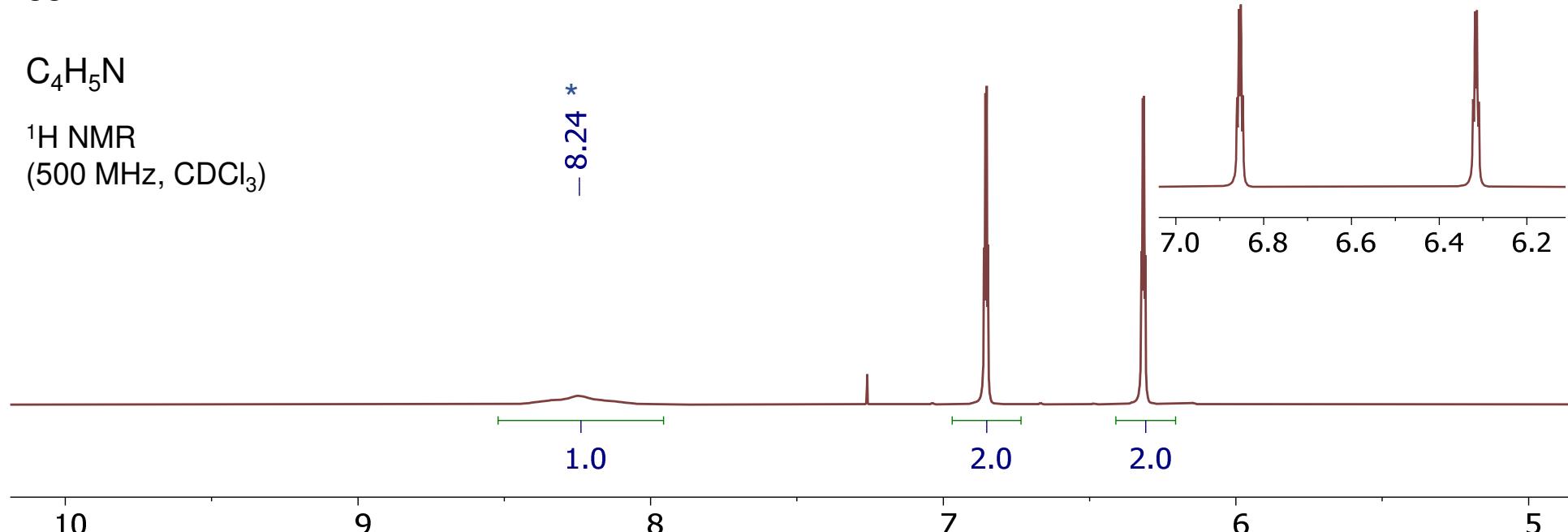
¹³C APT (126 MHz, CDCl₃)



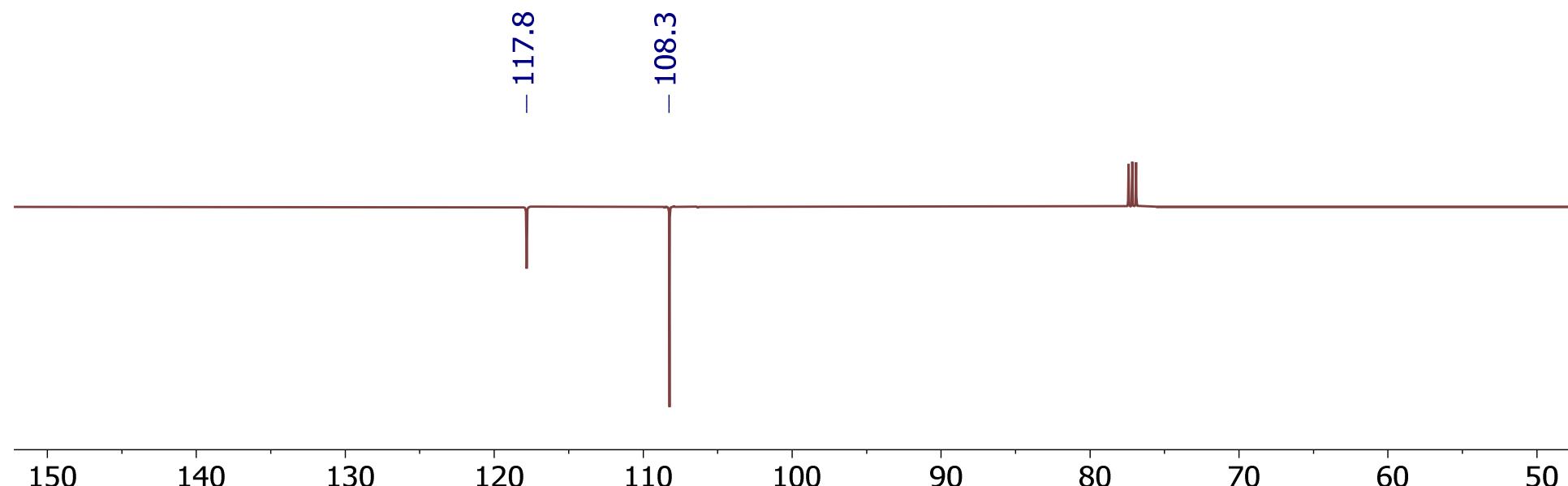
88

C₄H₅N

¹H NMR
(500 MHz, CDCl₃)



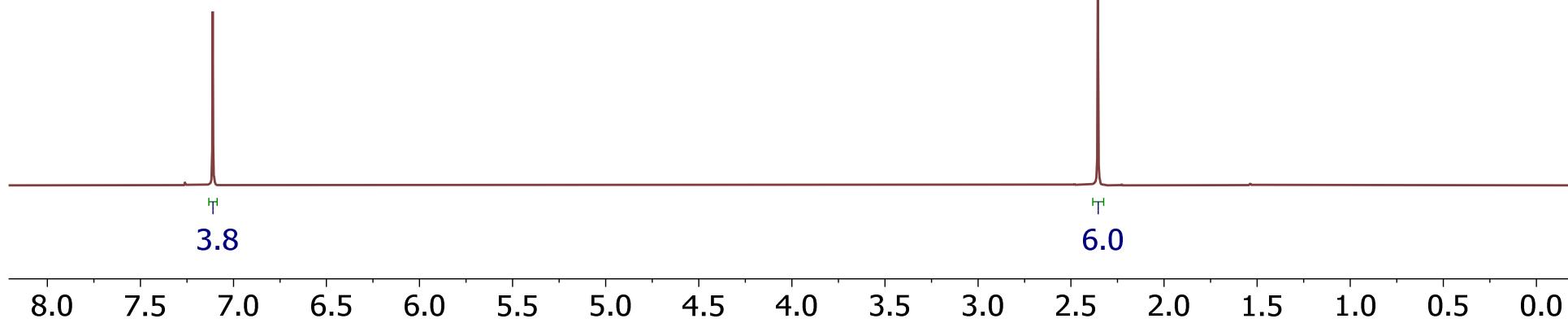
¹³C APT (126 MHz, CDCl₃)



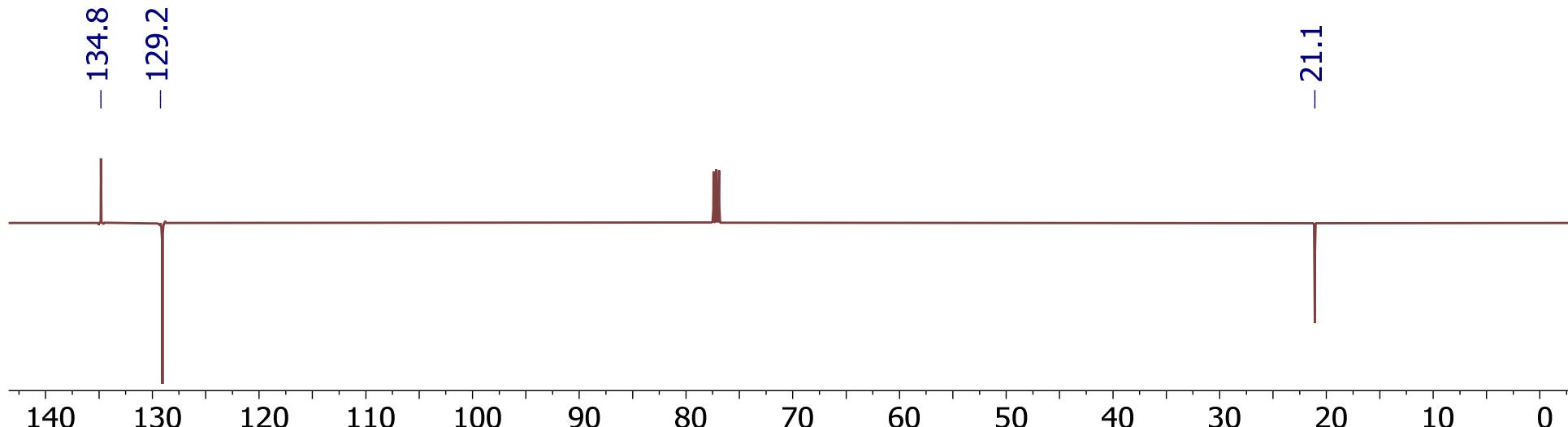
89

C₈H₁₀

¹H NMR
(500 MHz, CDCl₃)



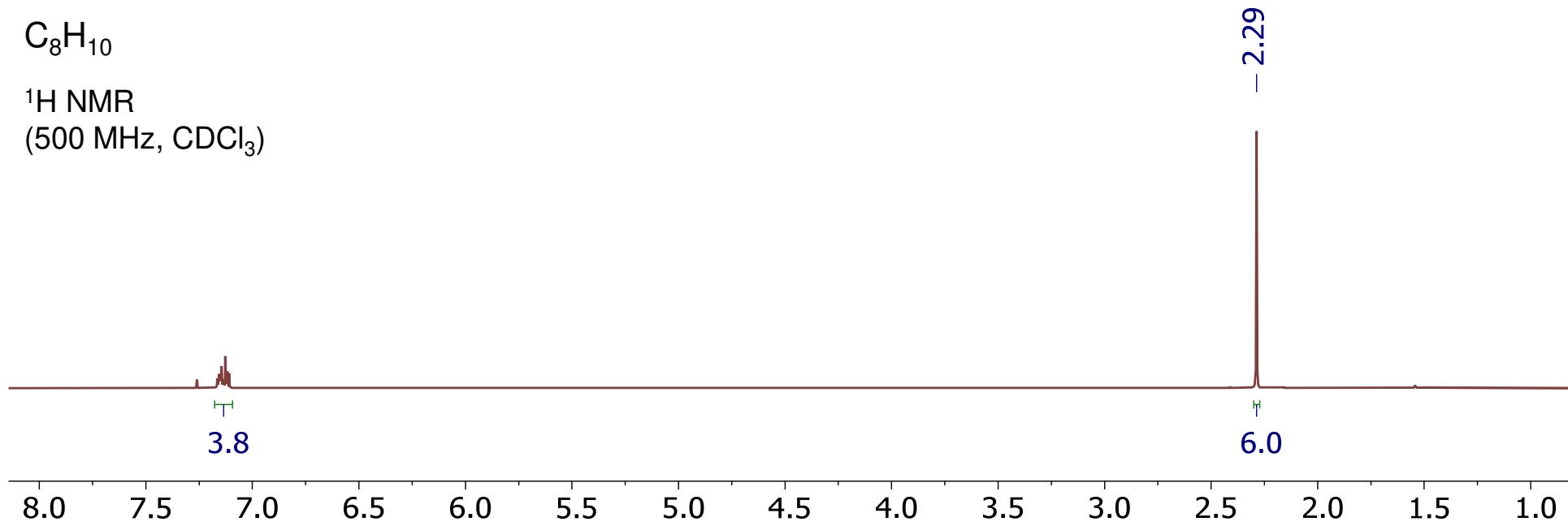
¹³C APT (126 MHz, CDCl₃)



90

C₈H₁₀

¹H NMR
(500 MHz, CDCl₃)



¹³C APT (126 MHz, CDCl₃)

