

Supporting Information

Ionic liquid catalyzed per-o-acetylation and benzyldene ring opening reaction

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^bShu Guang Girl's Senior High School, Hsinchu, 300, Taiwan

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Hsinchu 30013, Taiwan

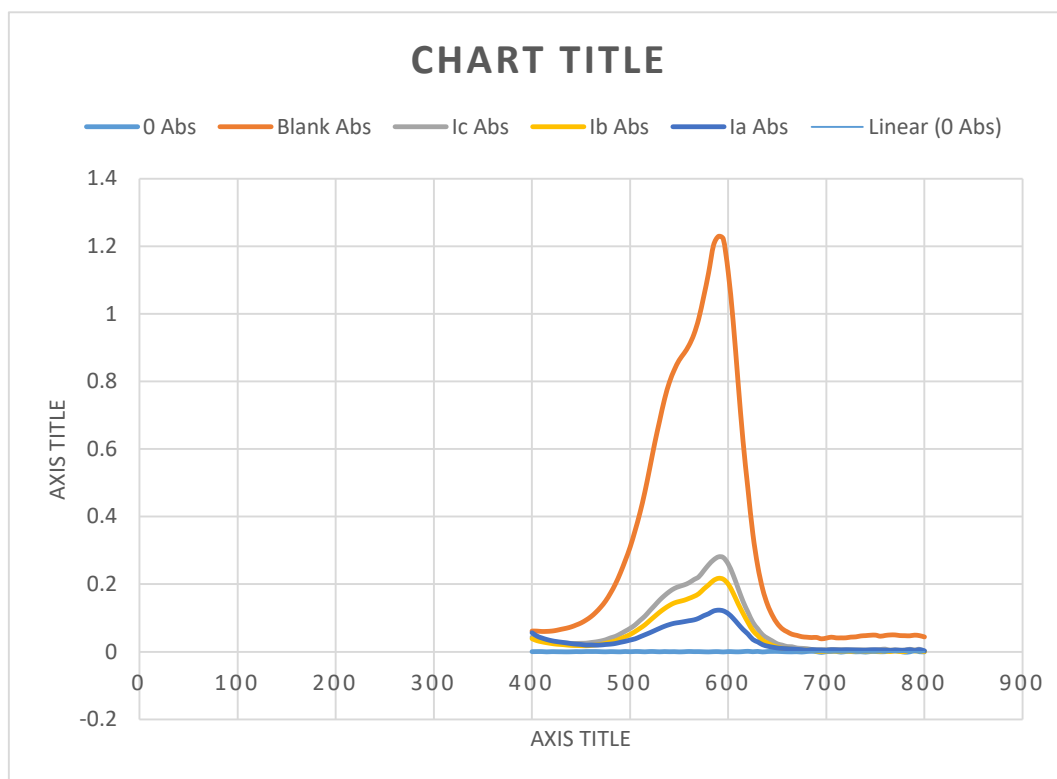
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Acidity of ionic liquids

Figure S1. Acidity of ionic liquids



Hammett acidity functions:

$$H_0 = \text{p}K(\text{I})_{\text{aq}} + \log([\text{I}]/[\text{IH}^+])$$

Table S1. For Calculation and comparison of different ionic liquids **Ia-Ic**

Compound	A_{max}	[I](%)	[IH ⁺](%)	H_0
Blank	1.2280	100	0	-
Ic	0.2812	22.90	77.10	0.27
Ib	0.2176	17.72	82.28	0.13
Ia	0.1235	10.06	89.94	-0.15

A_{max} : the maximum absorption, [I]: the concentration of indicator, [IH⁺]: the concentration of protonated indicator, H_0 : Brønsted acidity

Figure S2. Acidity of ionic liquids

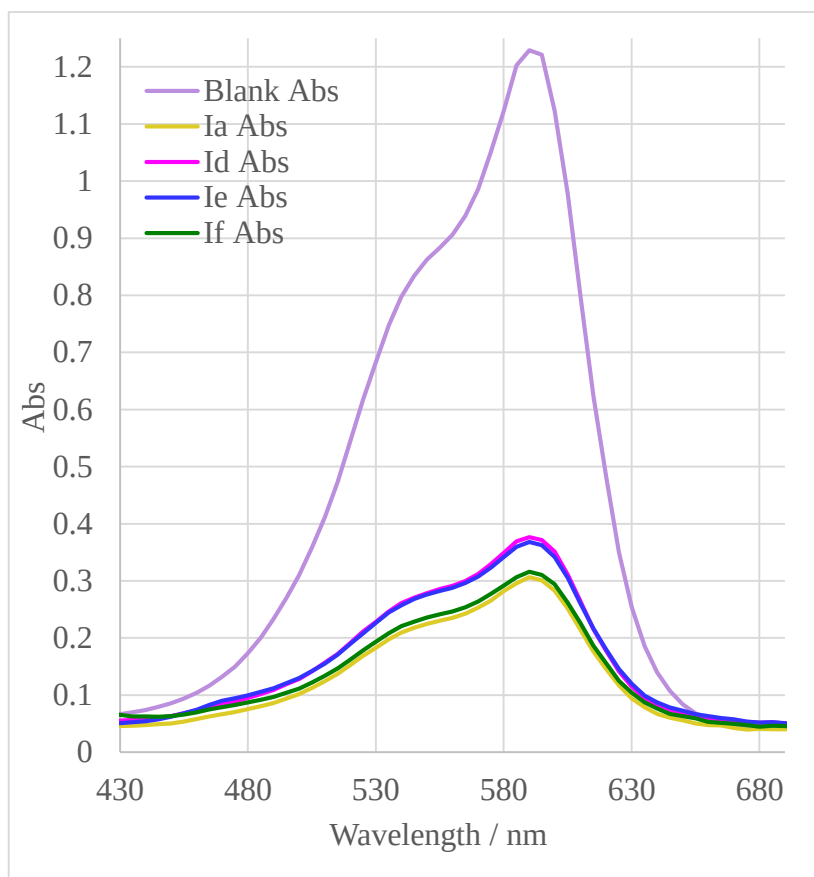


Table S2. For Calculation and comparison of different ionic liquids **Ia**, **Id-If**

Compound	$A_{\max}$	[I] (%)	[IH ⁺] (%)	H_0
Blank	1.2290	100	0	-
Ia	0.3064	24.93	75.07	0.32
Id	0.3765	30.63	69.37	0.45
Ie	0.3681	29.95	70.05	0.43
If	0.3159	25.70	74.30	0.34

$A_{\max}$: the maximum absorption, [I]: the concentration of indicator, [IH⁺]: the concentration of protonated indicator, H_0 : Brønsted acidity

Figure S1 and Figure S2 shows the acidity of ionic liquids with different concentrations.

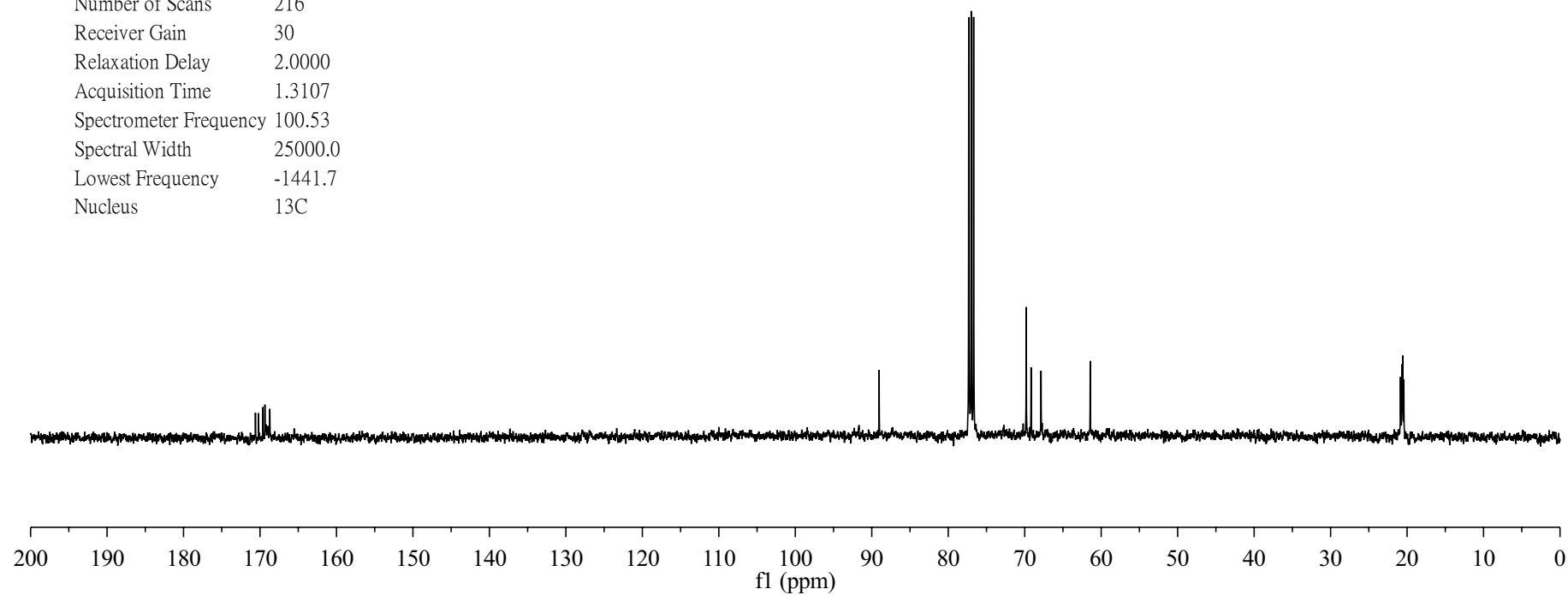
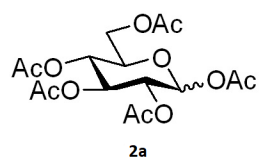
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169.618
169.356
168.715

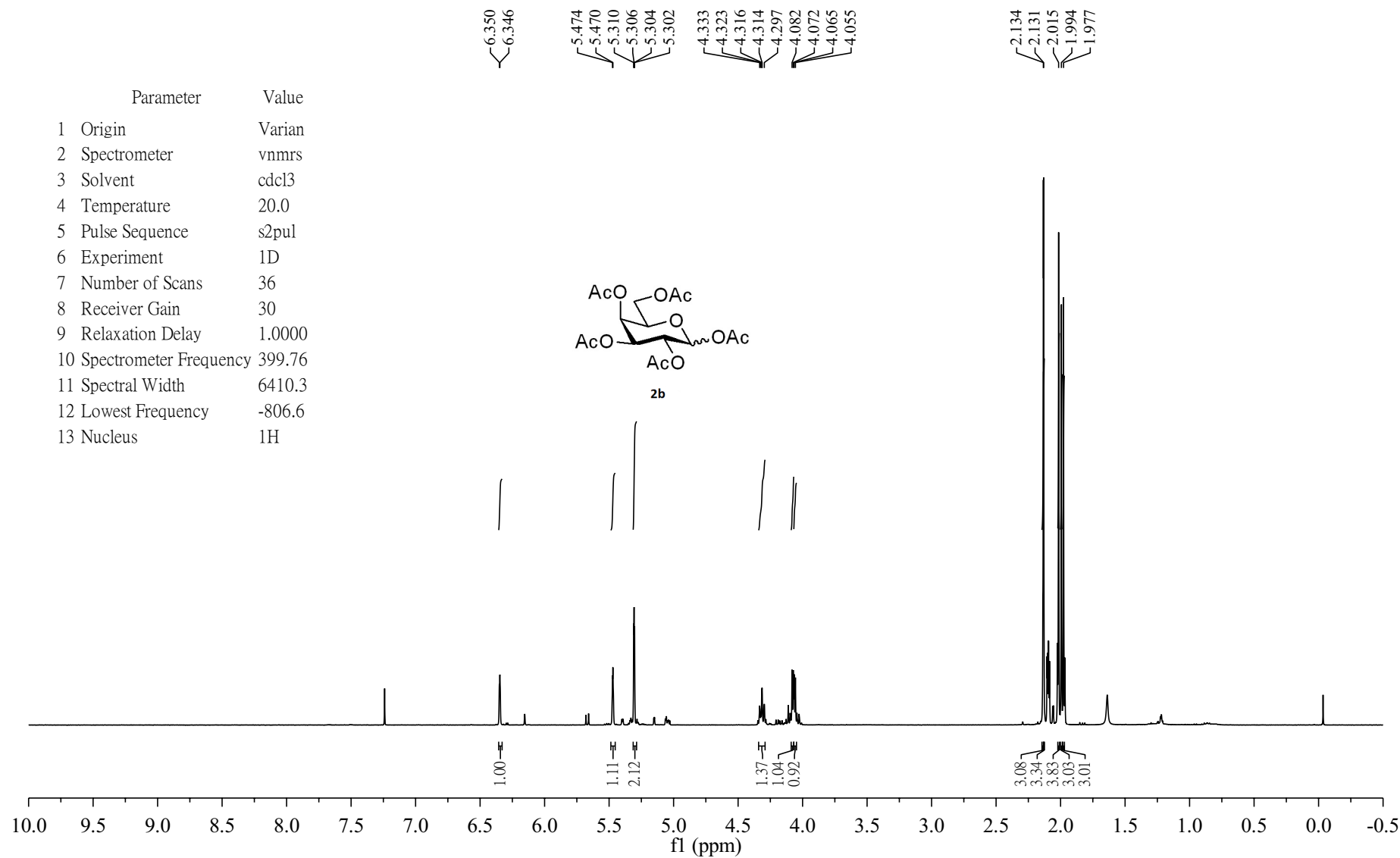
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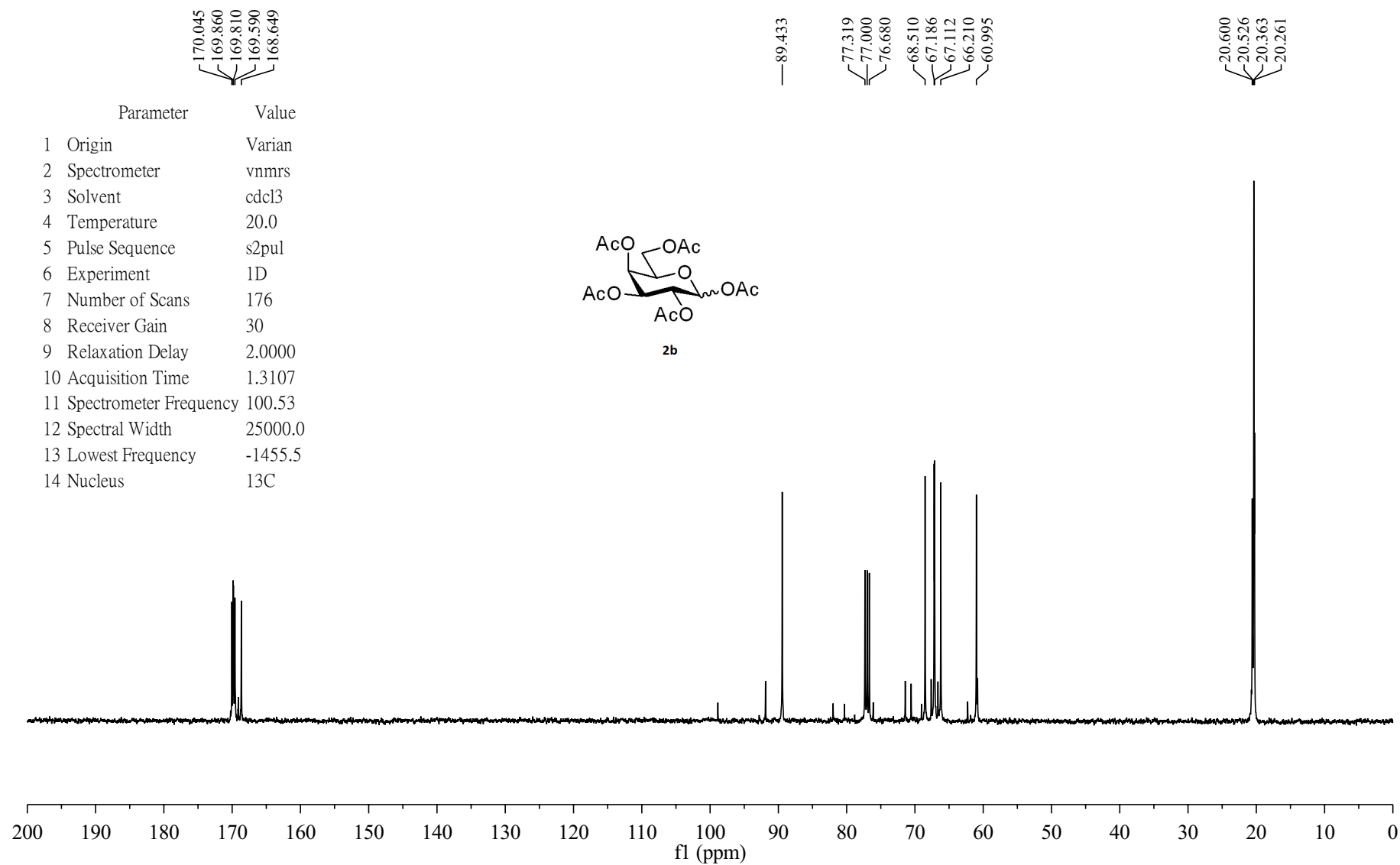
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77.000
76.682
69.801
69.166
67.865
61.431

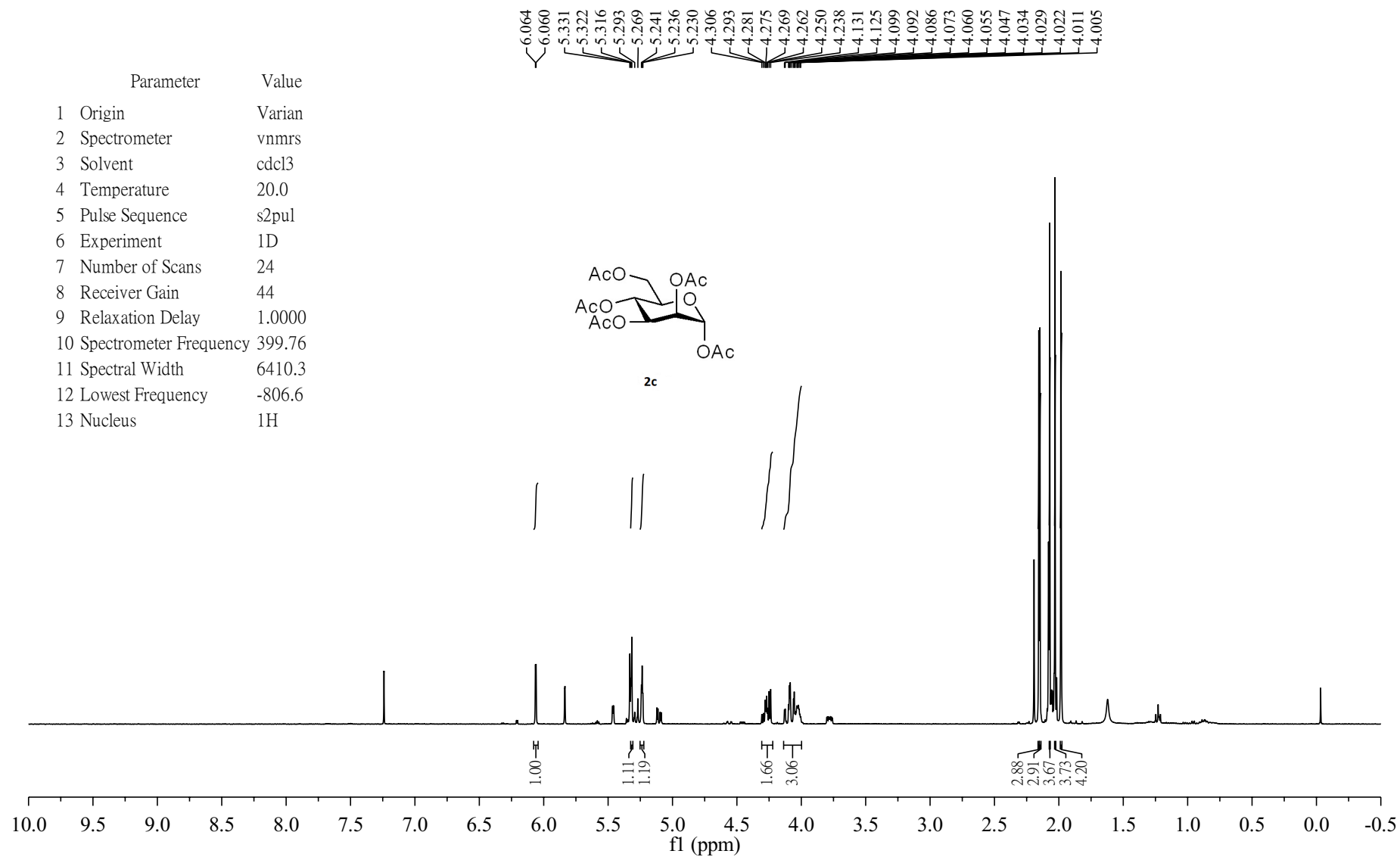
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20.542
20.423

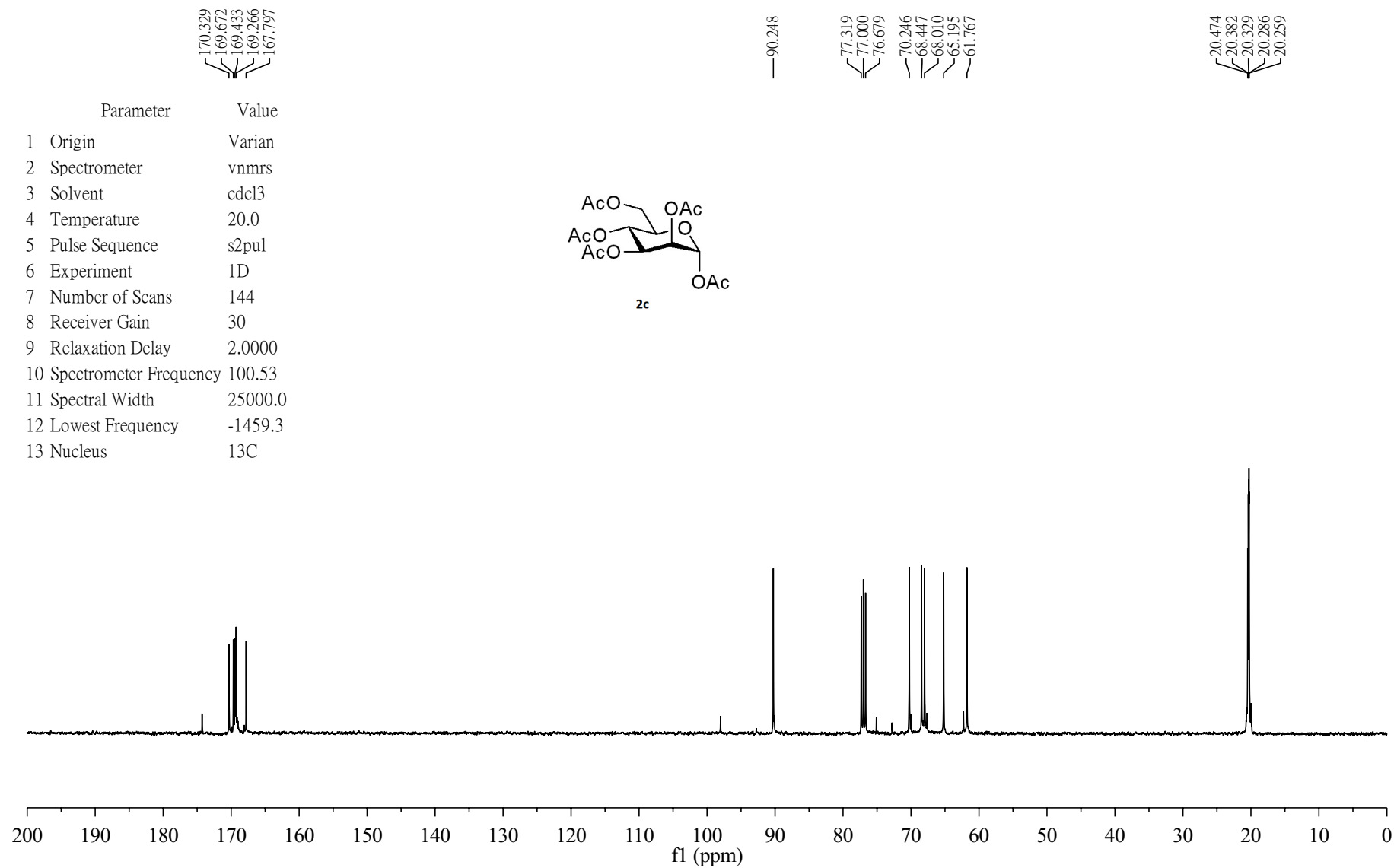
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Lowest Frequency	-1441.7
Nucleus	¹³ C

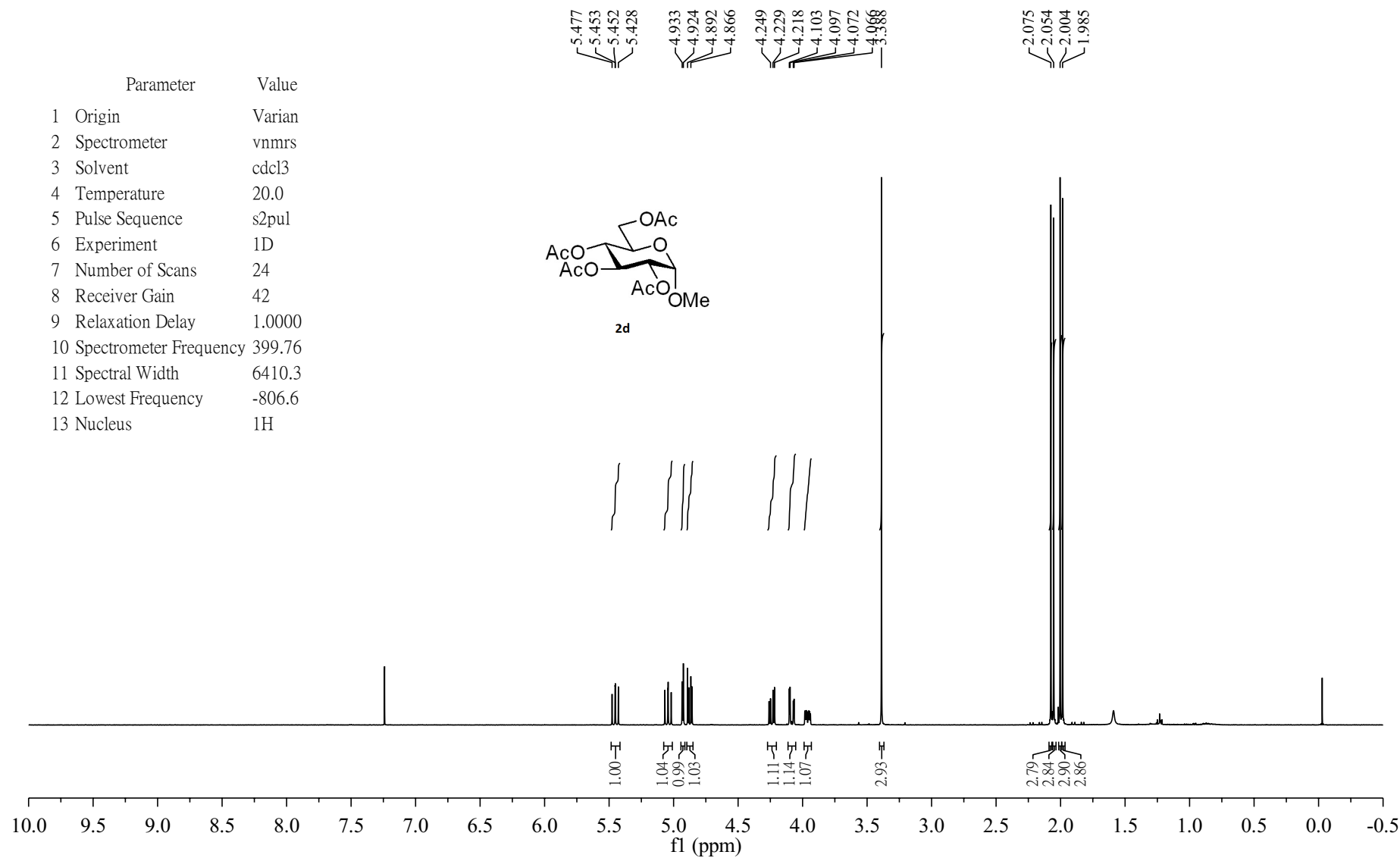


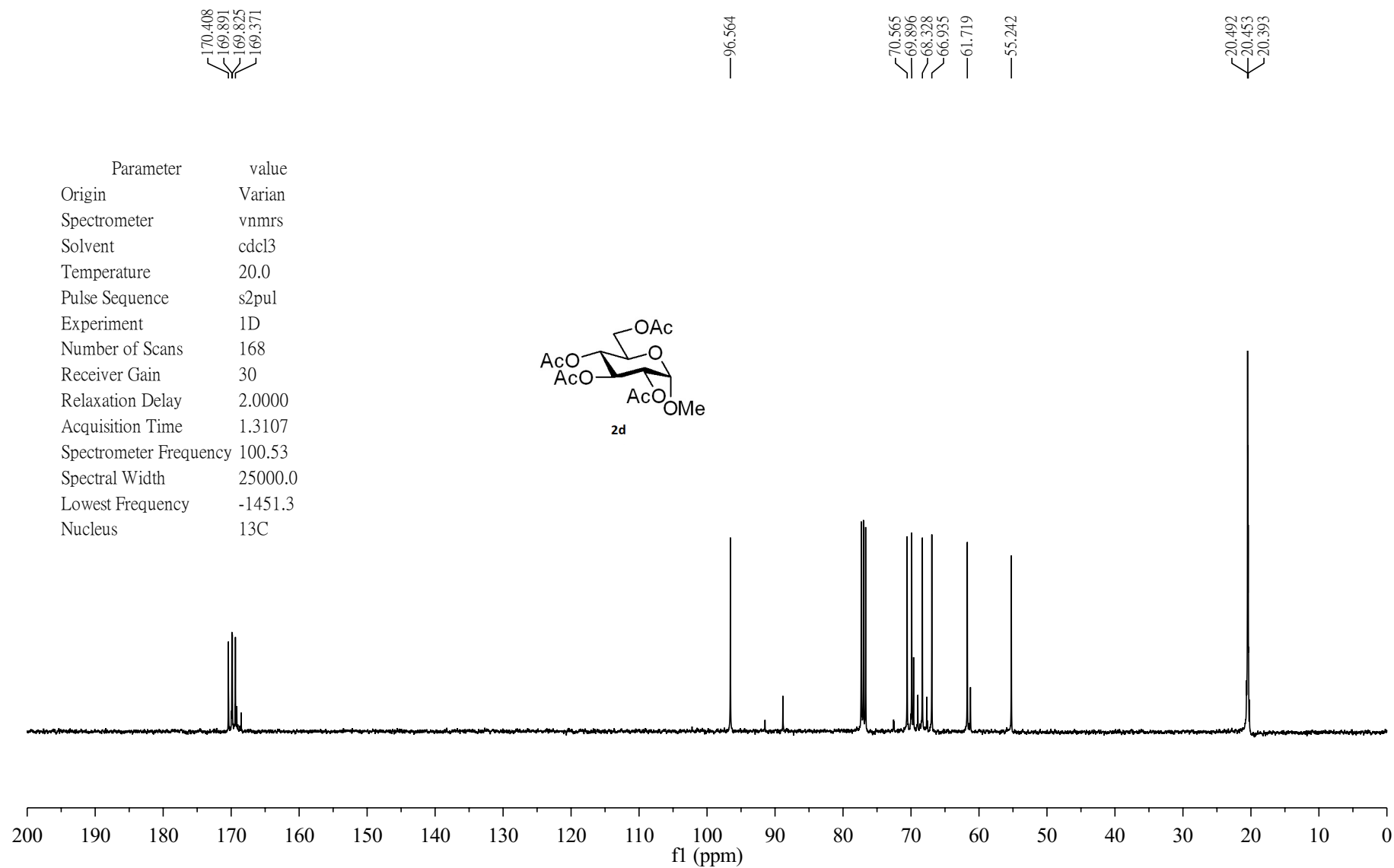


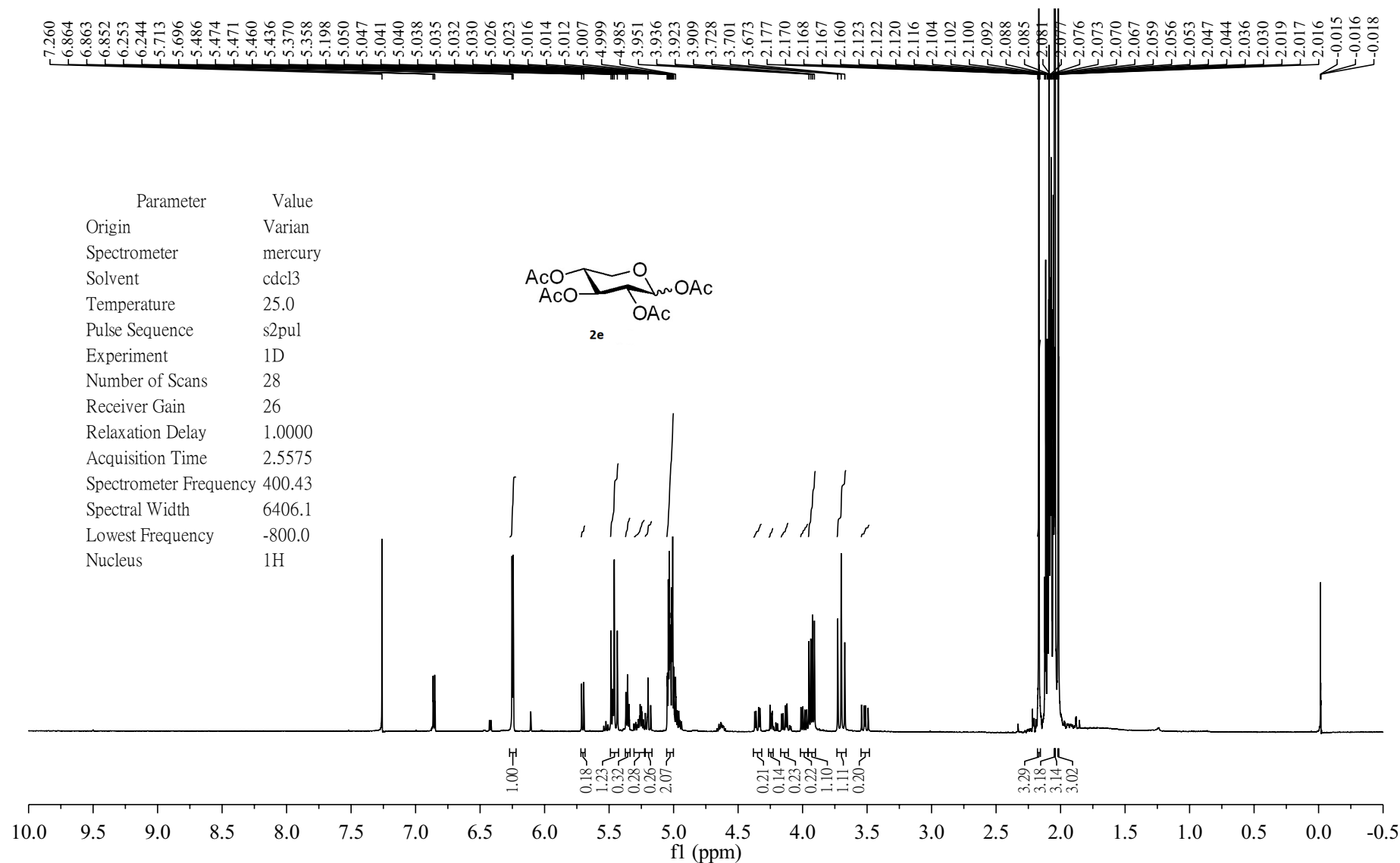


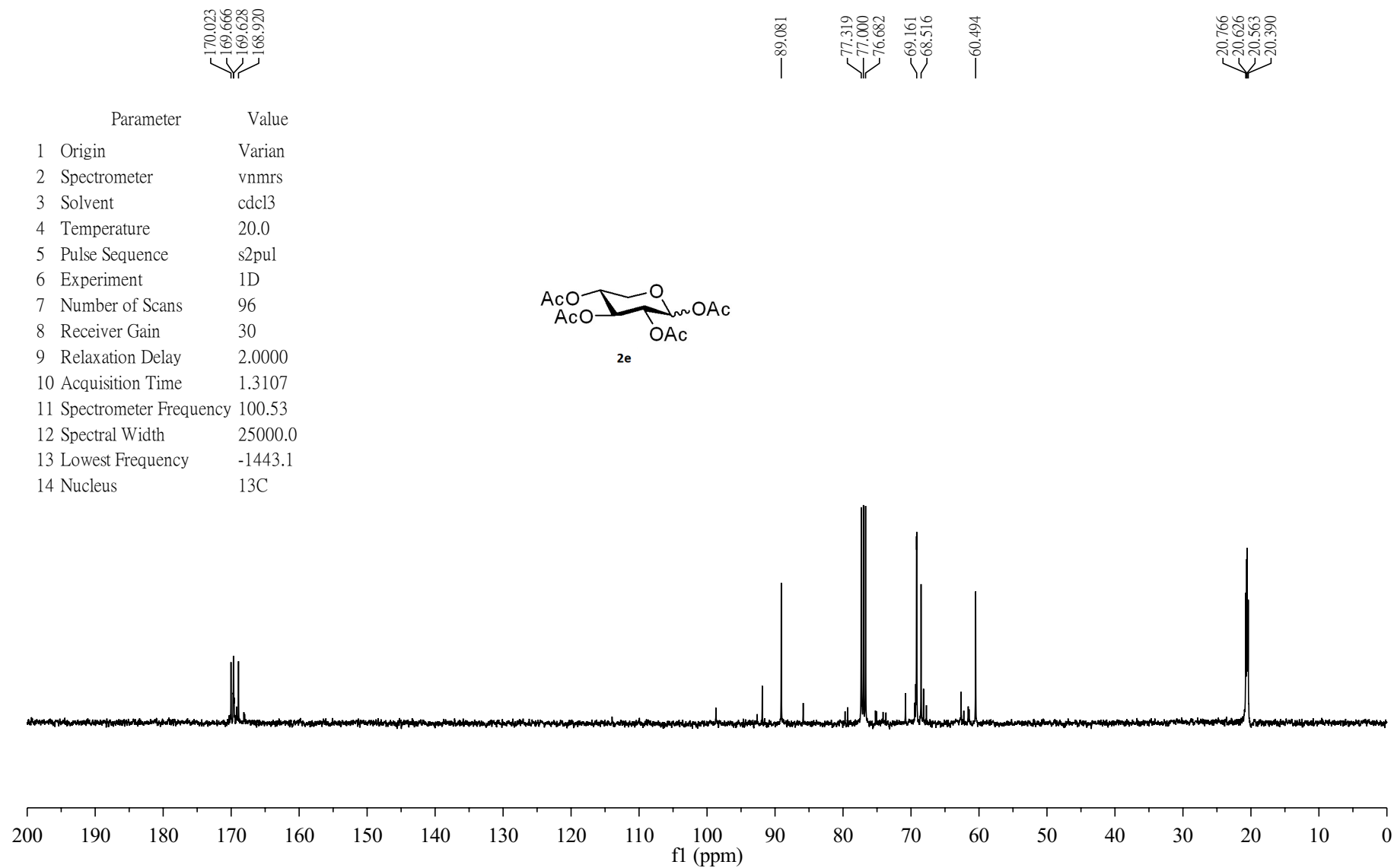


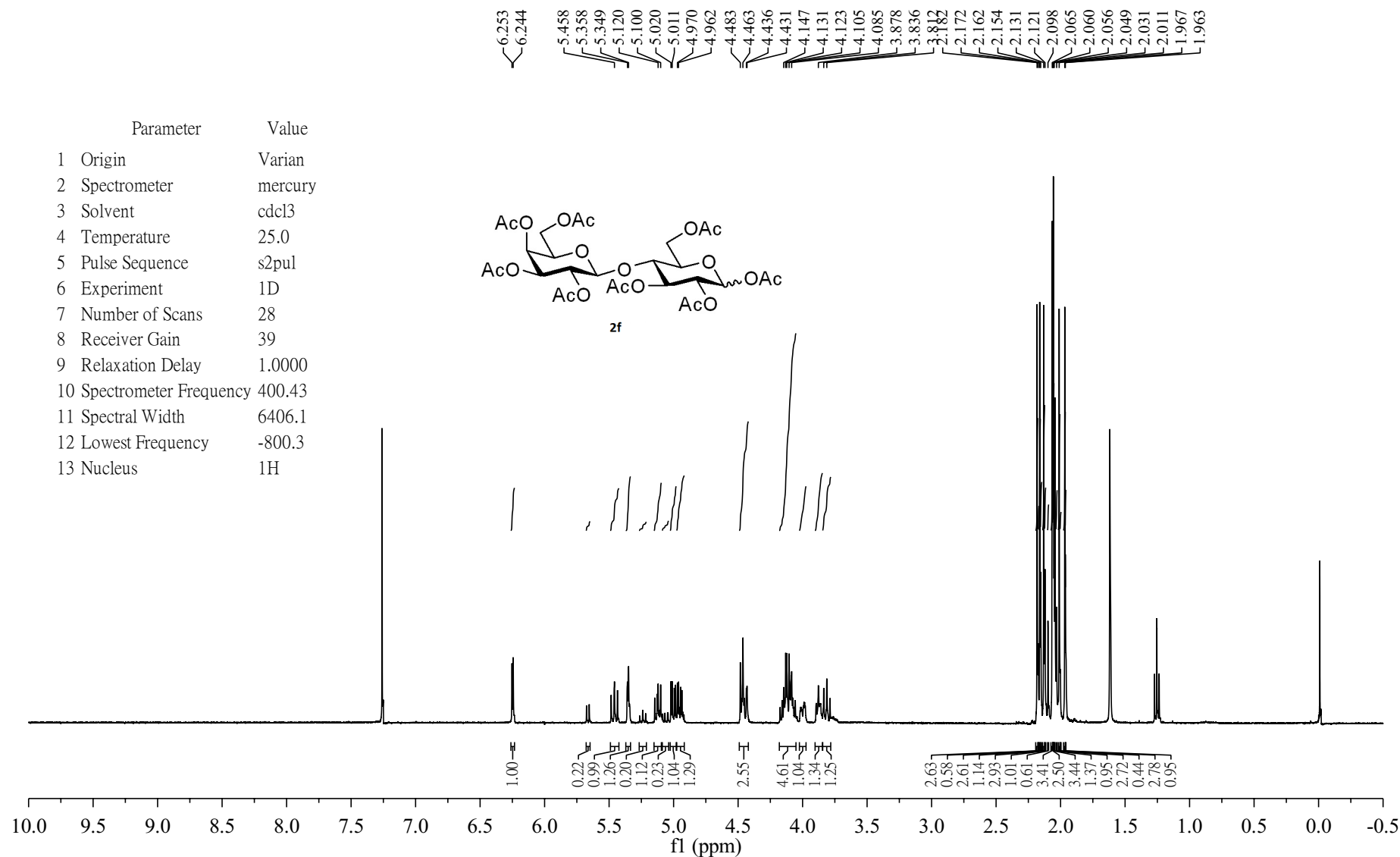












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101.137

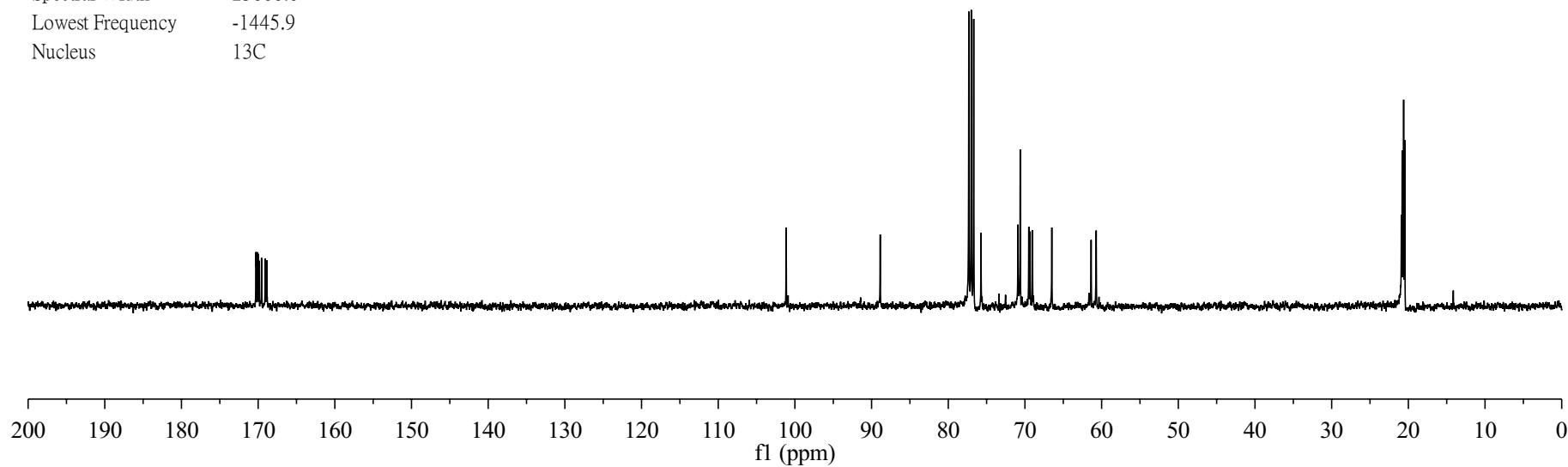
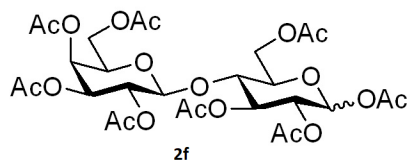
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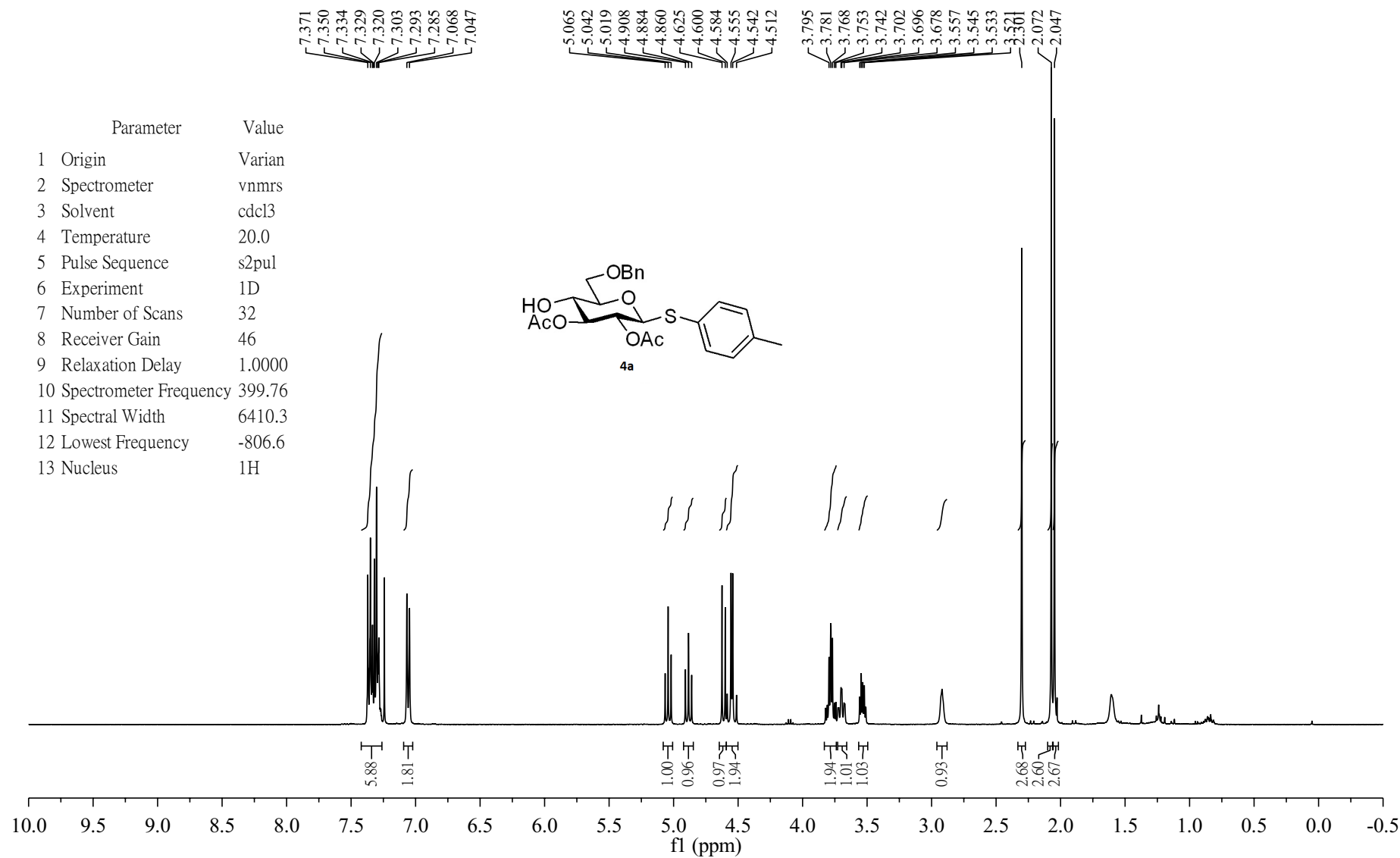
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75.730

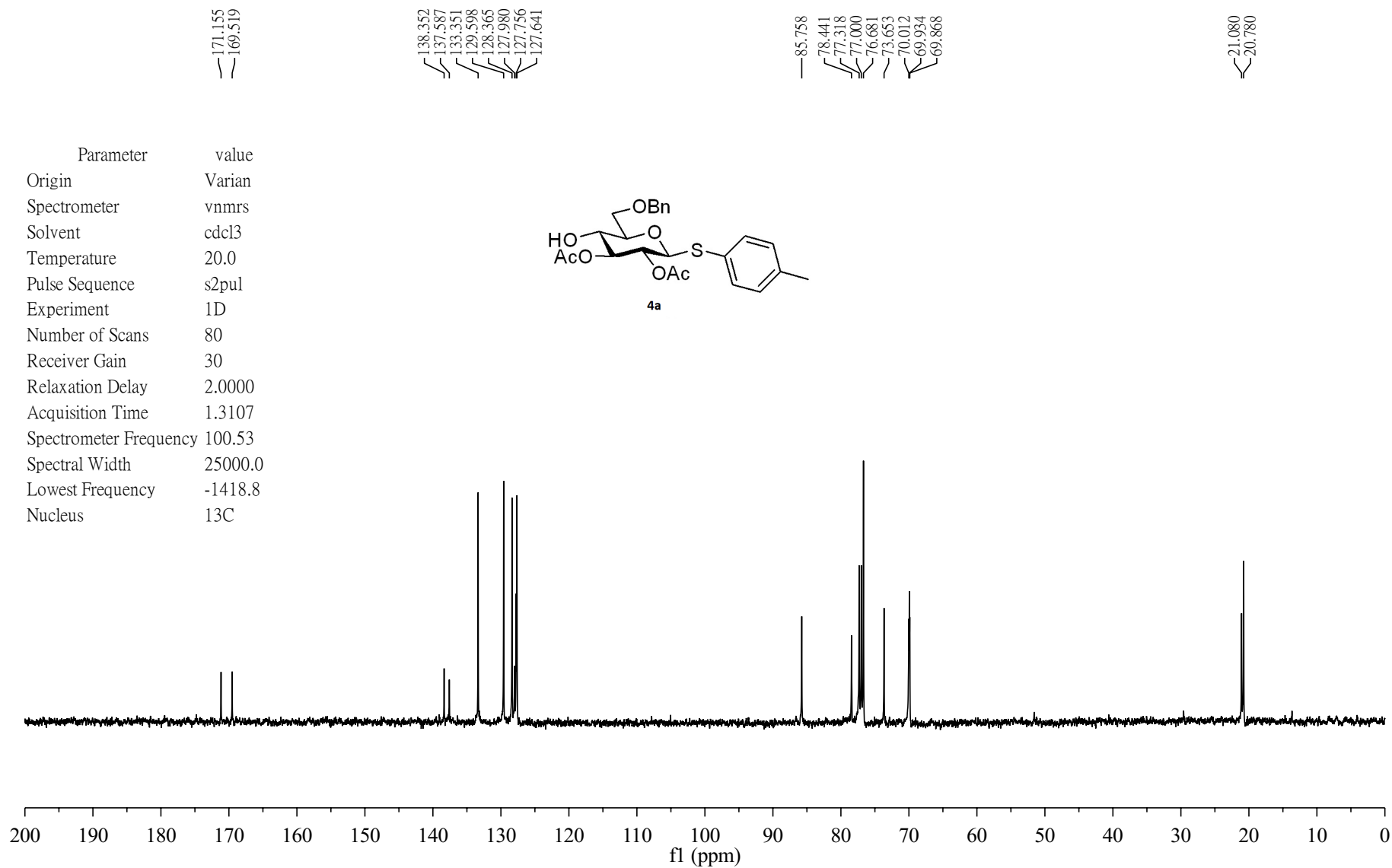
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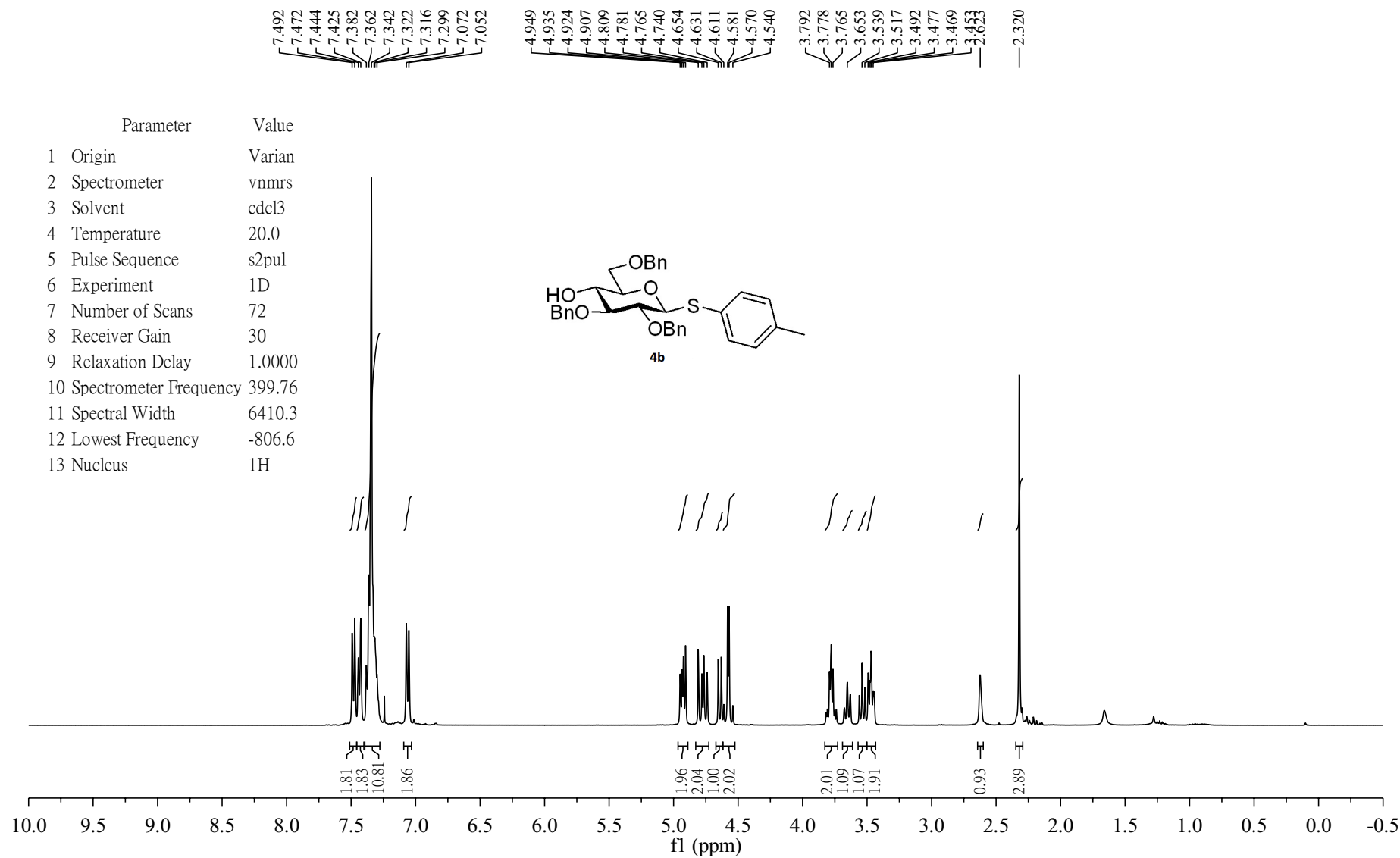
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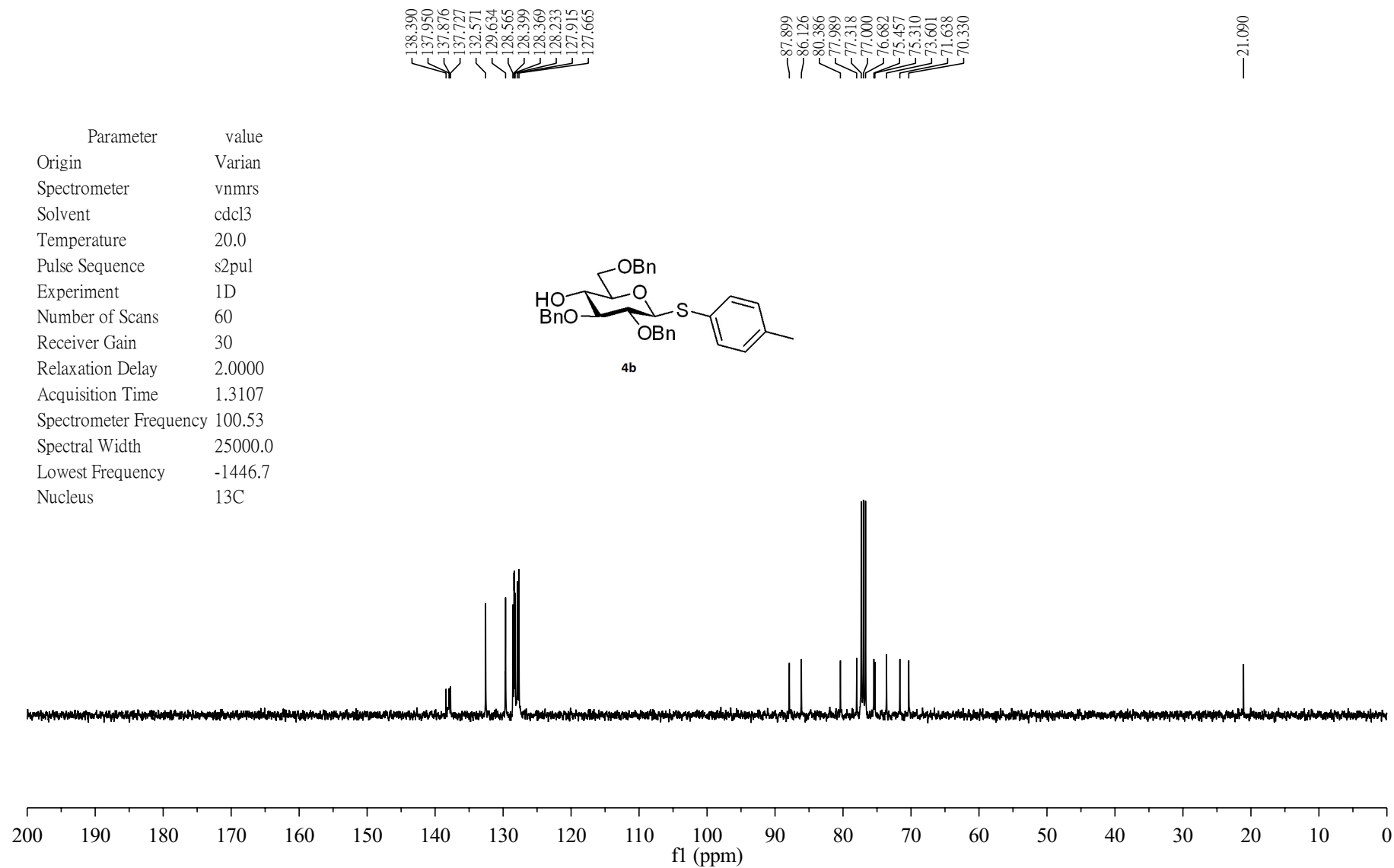
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Pulse Sequence	s2pul
Experiment	1D
Number of Scans	248
Receiver Gain	30
Relaxation Delay	2.0000
Acquisition Time	1.3107
Spectrometer Frequency	100.53
Spectral Width	25000.0
Lowest Frequency	-1445.9
Nucleus	¹³ C

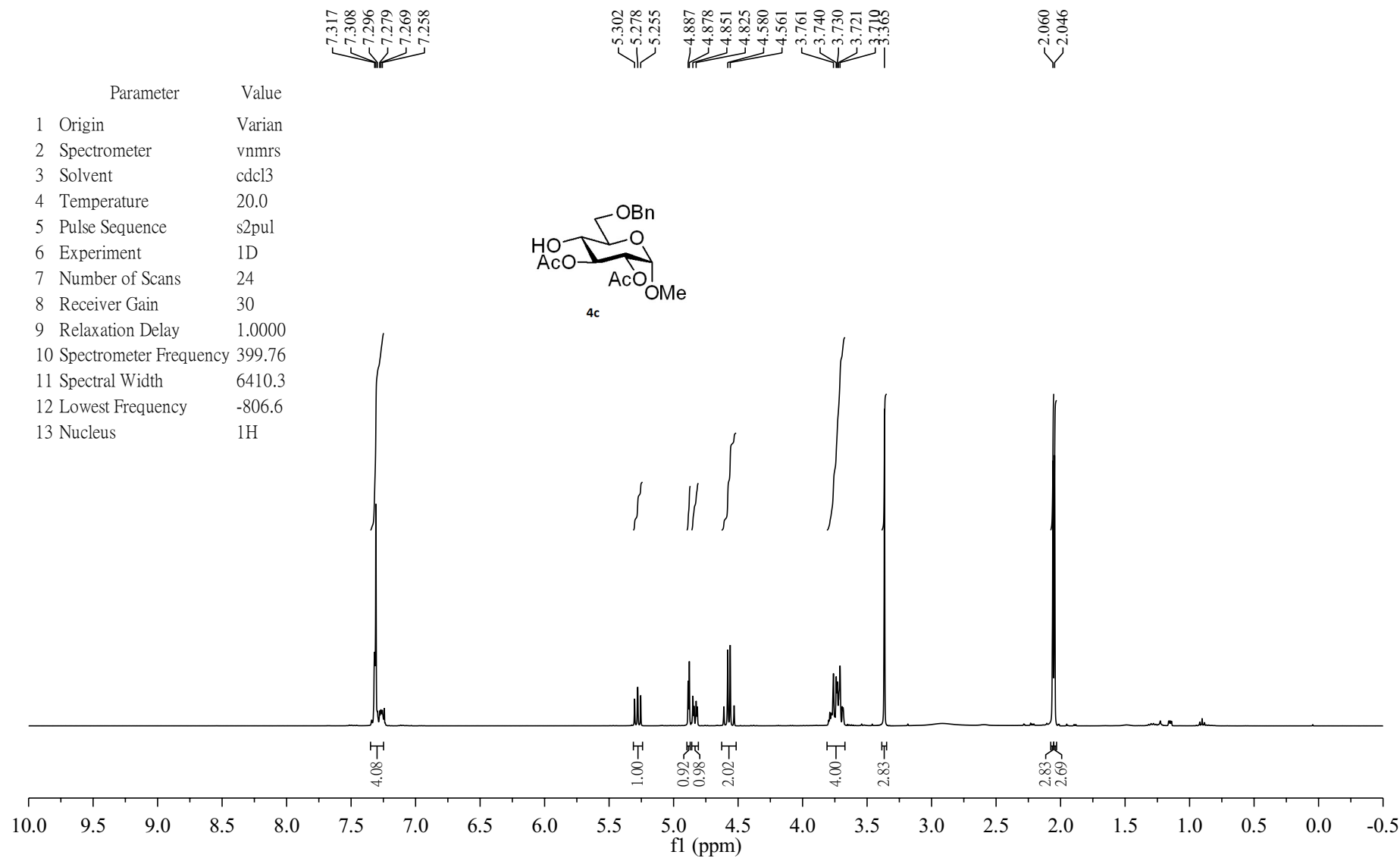


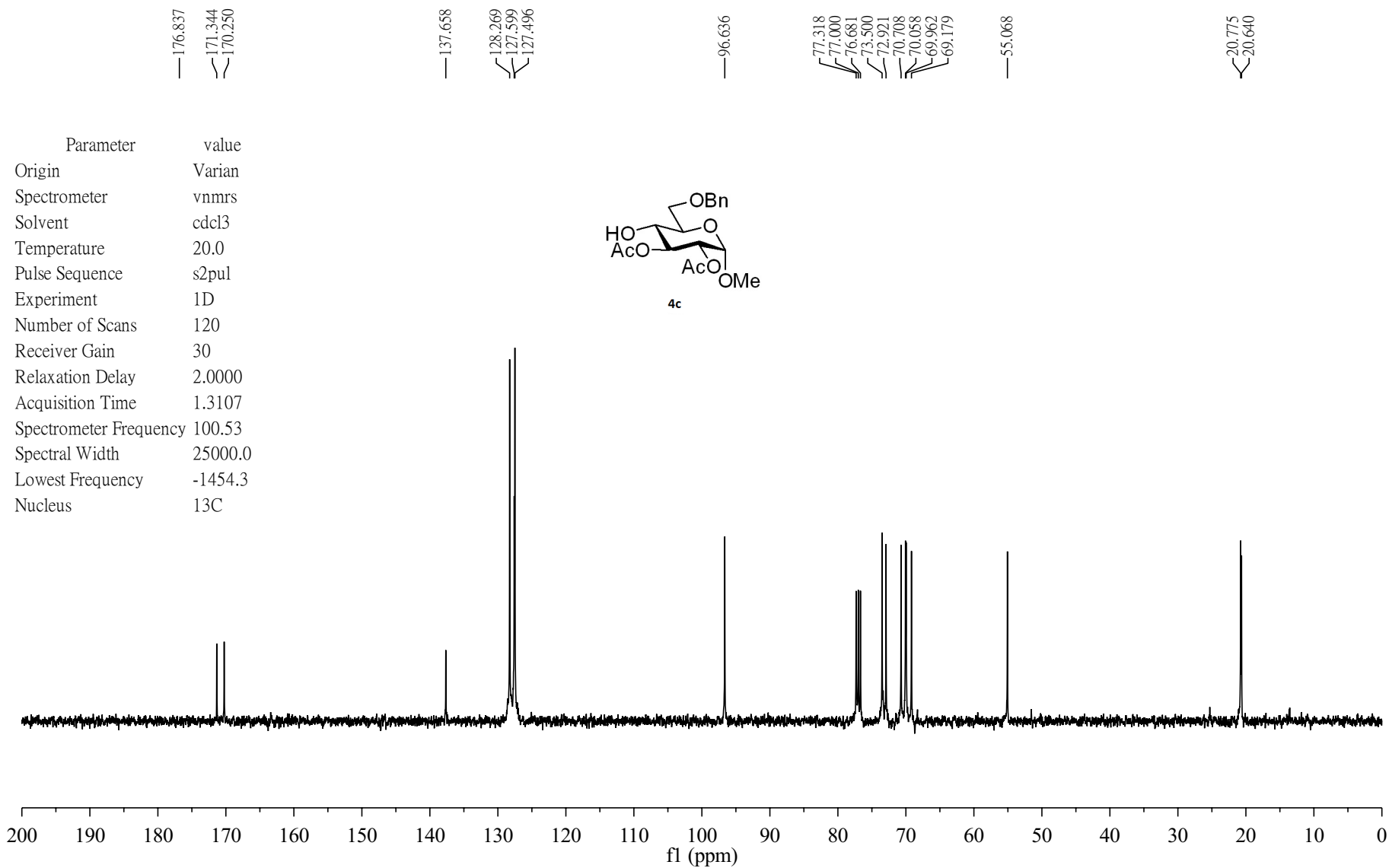


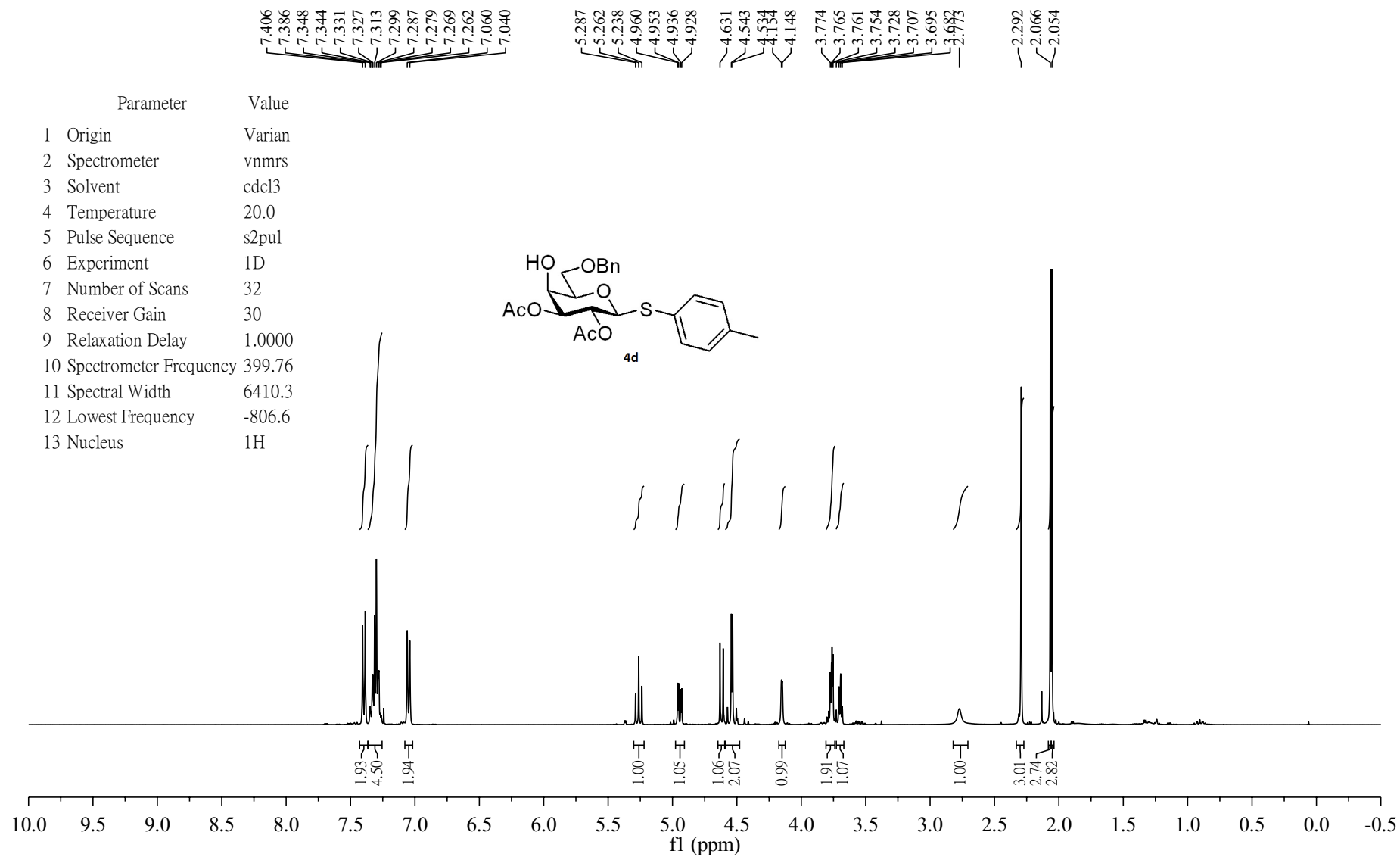


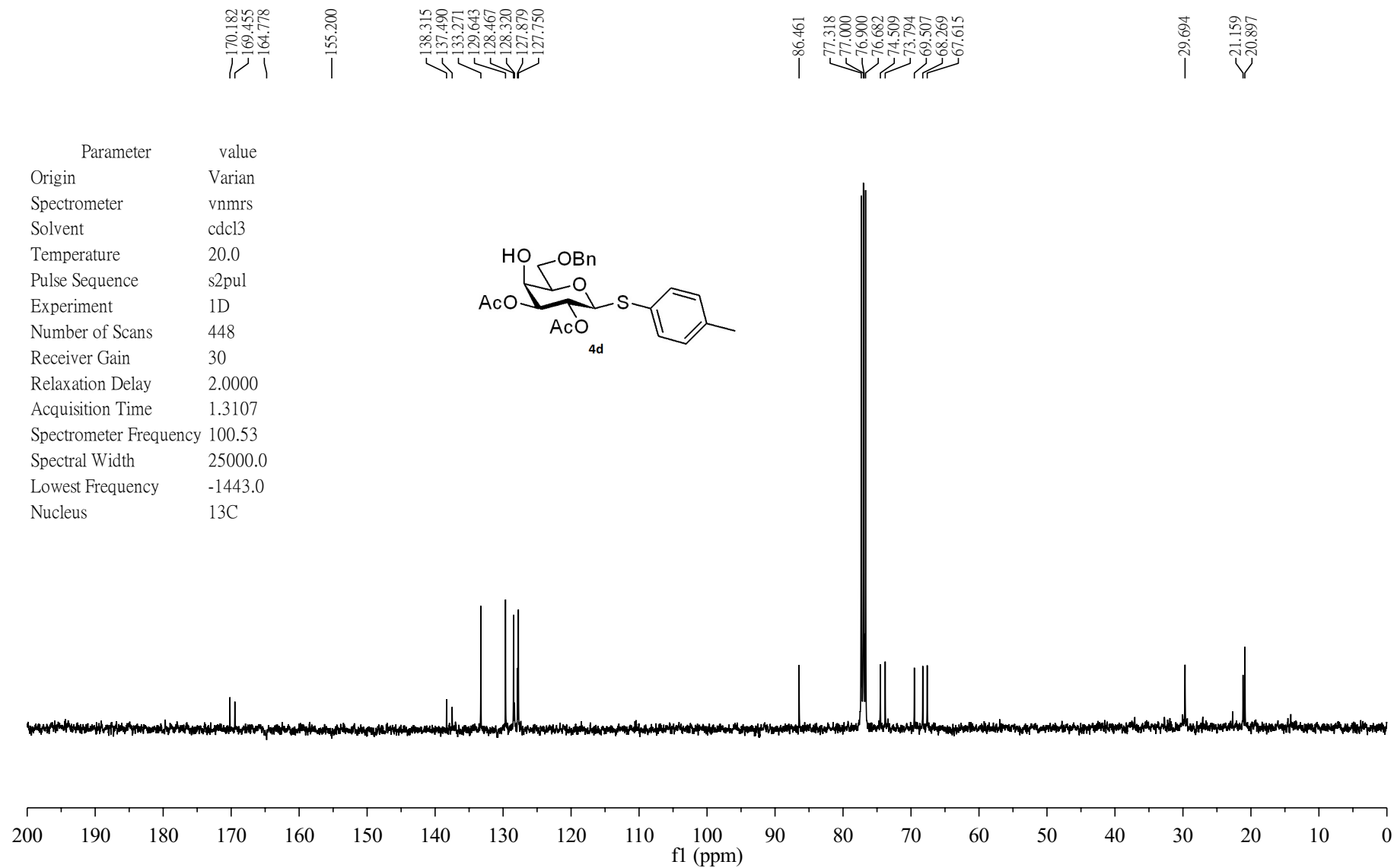


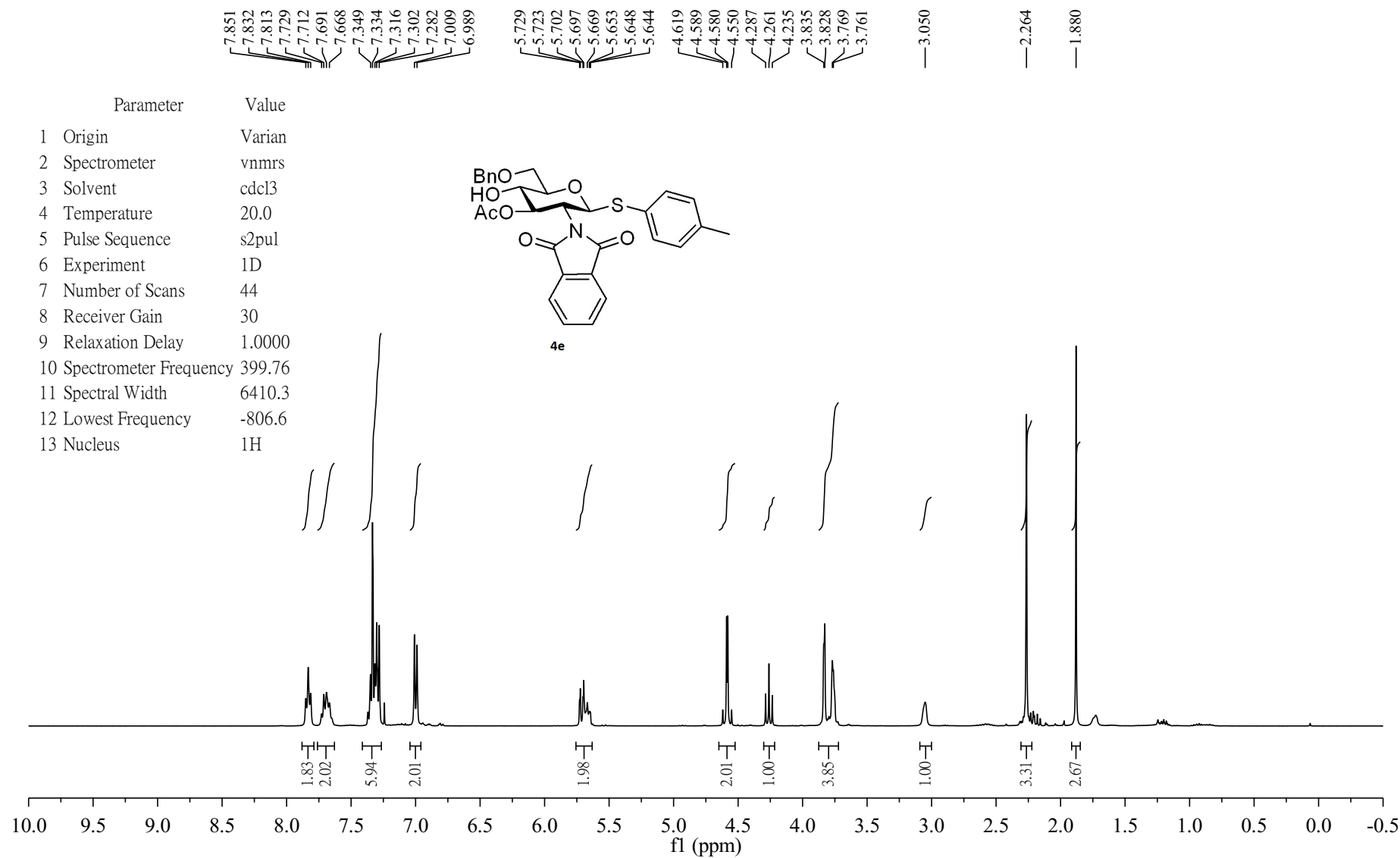


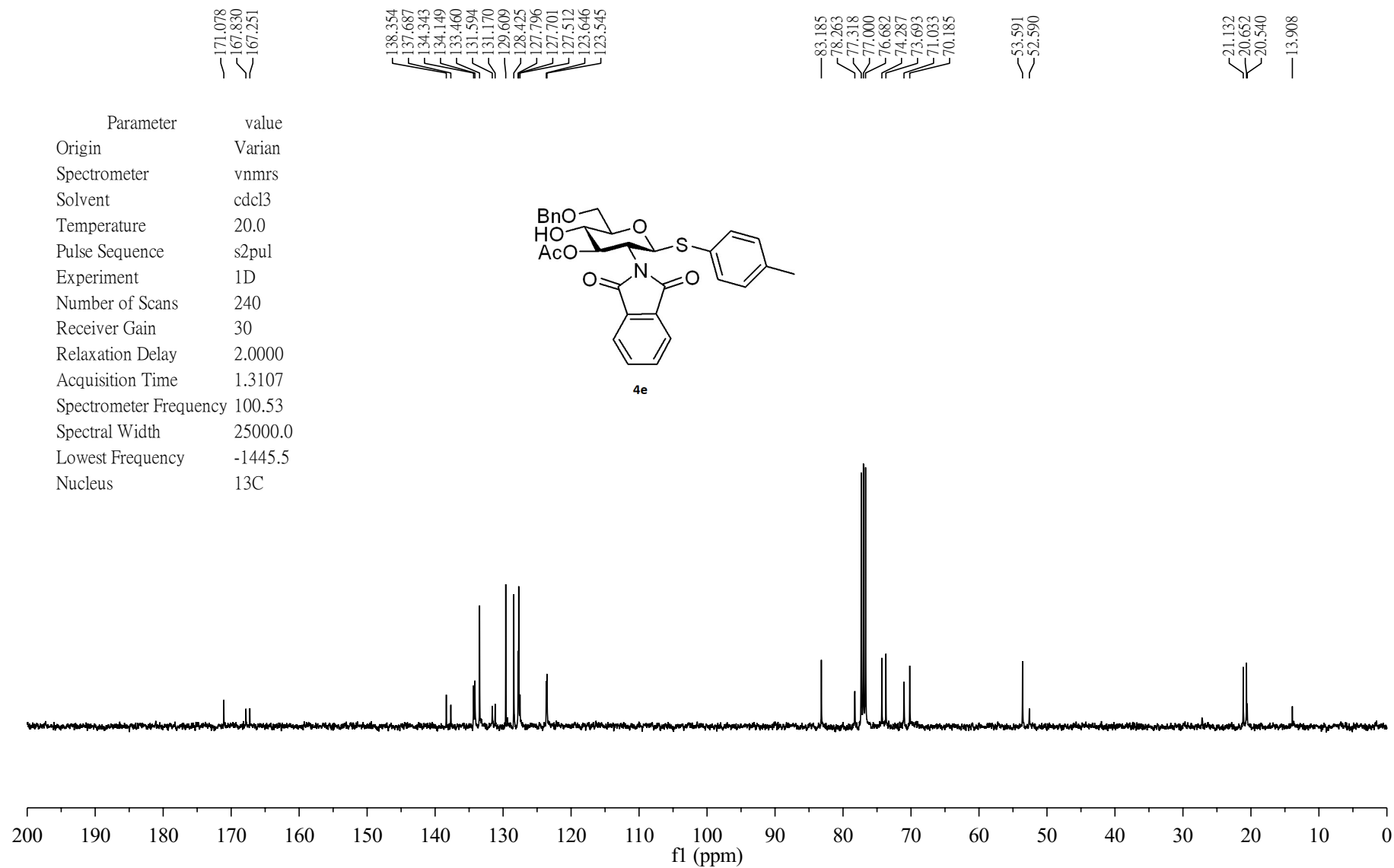


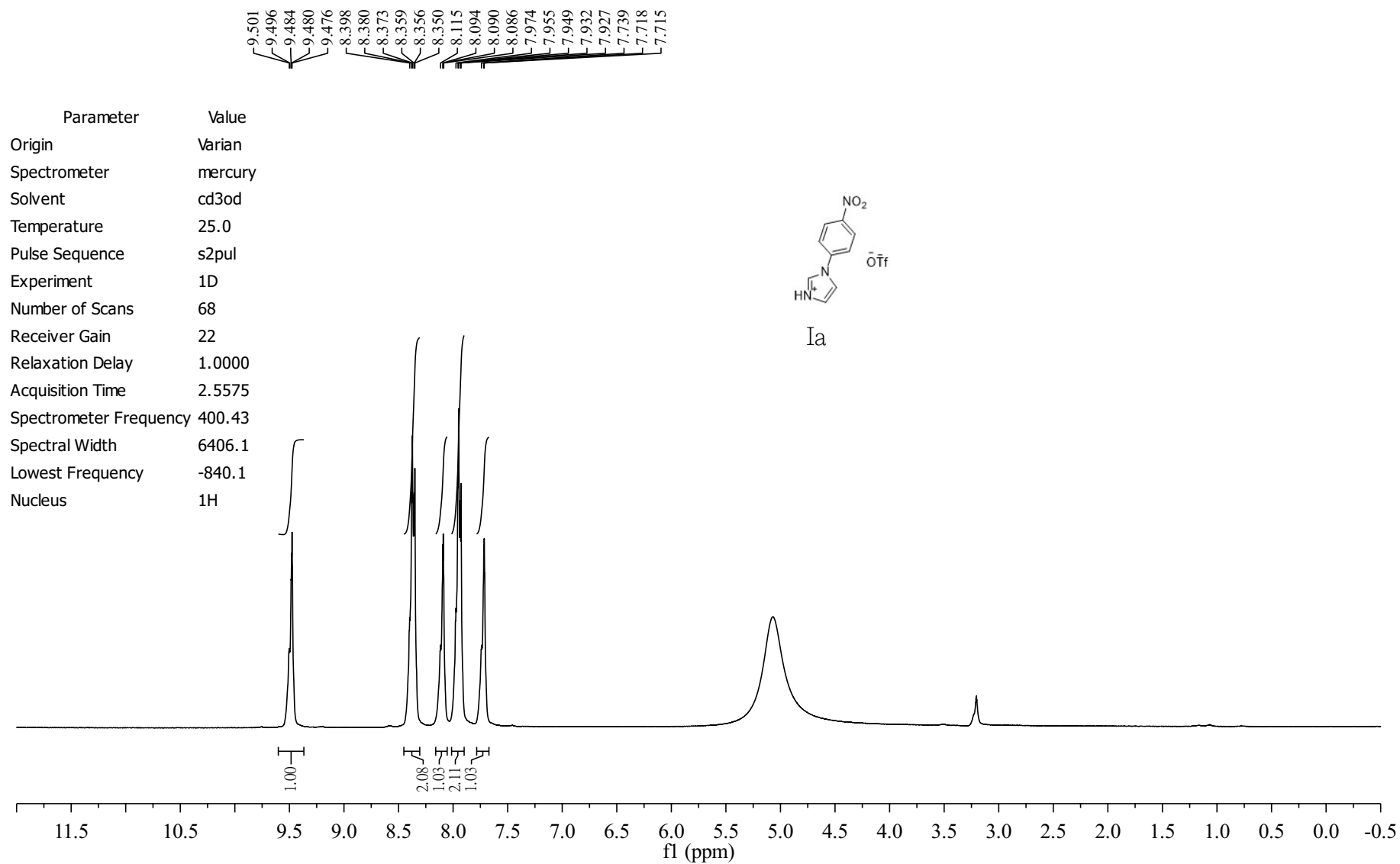


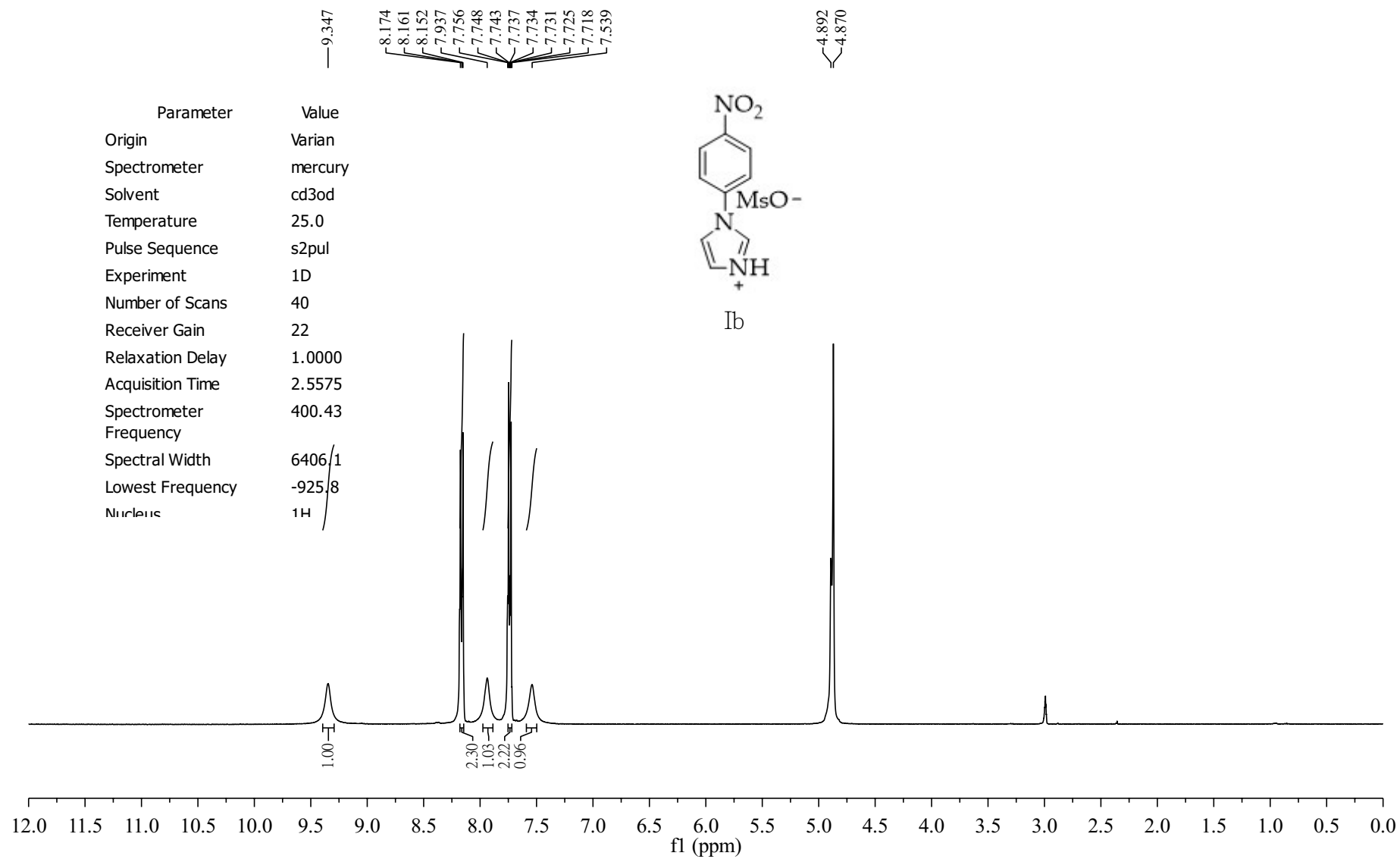


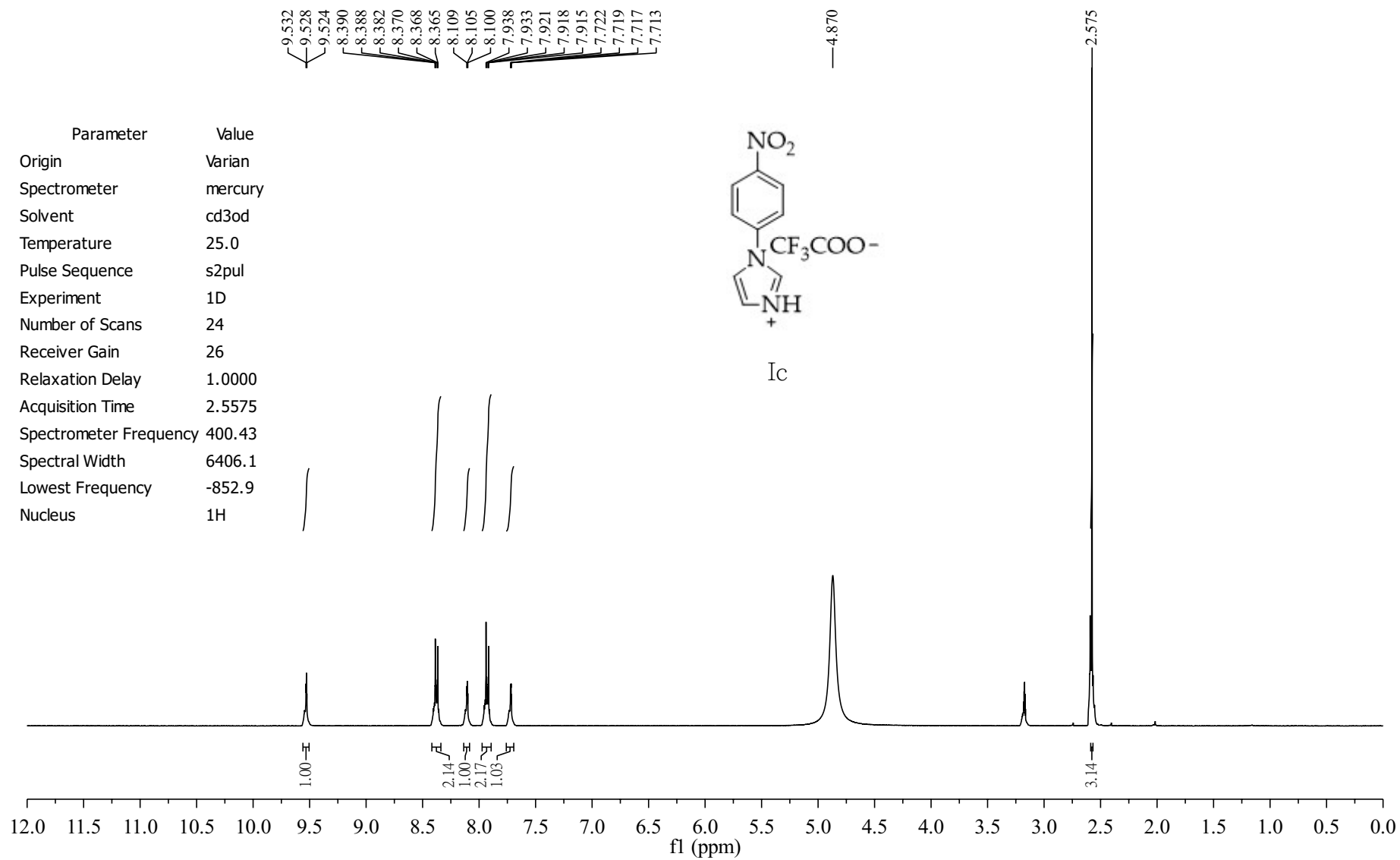


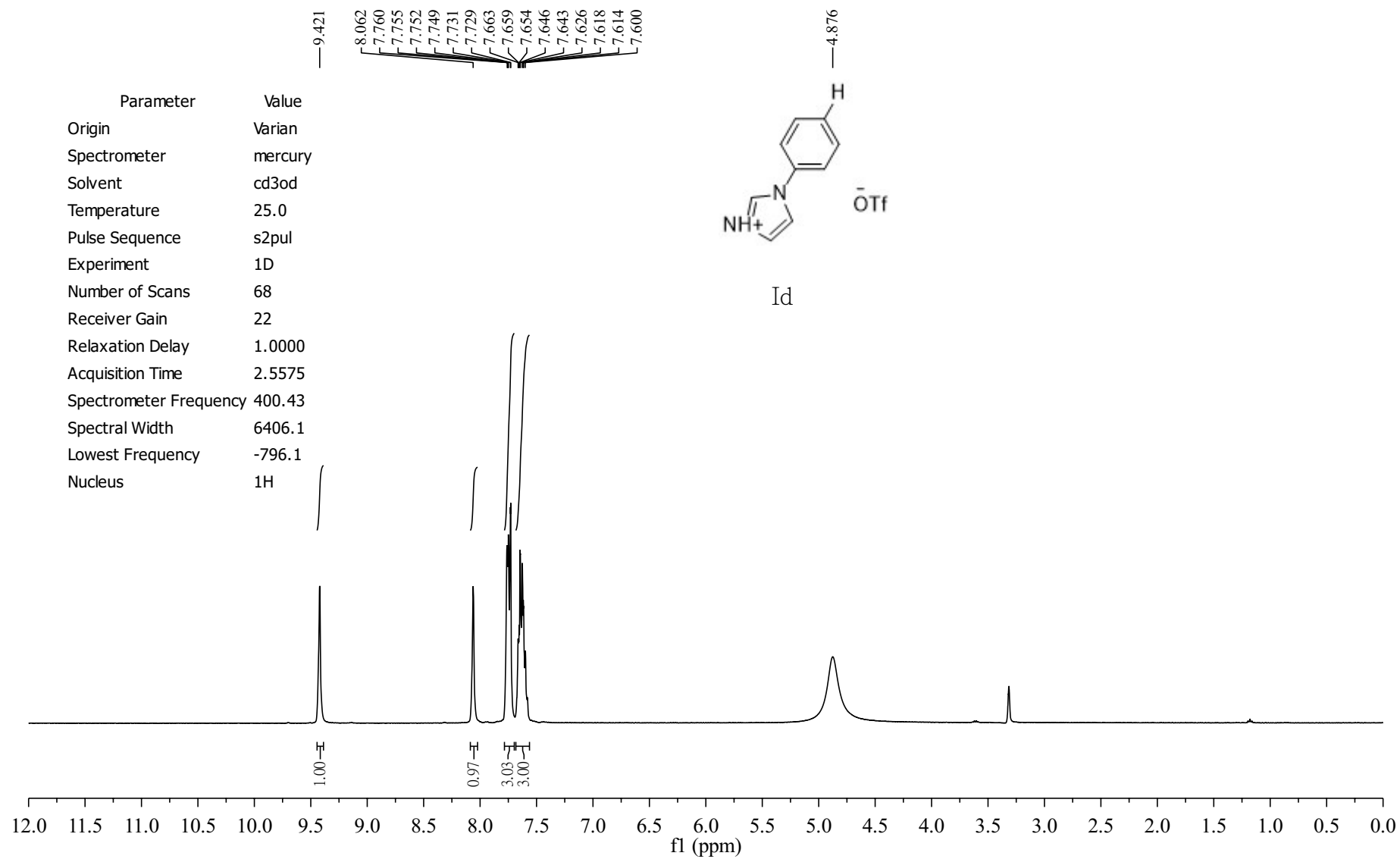


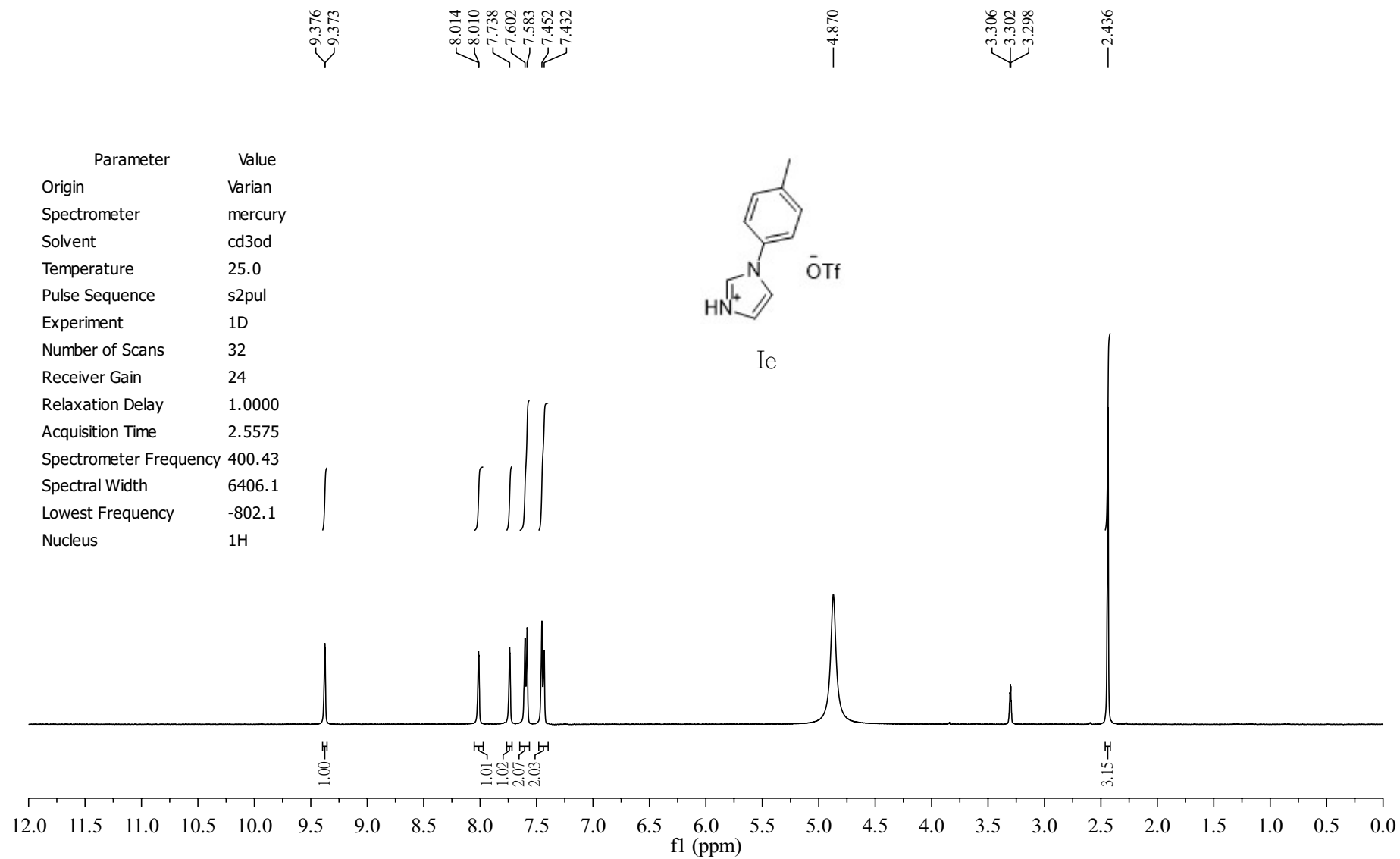


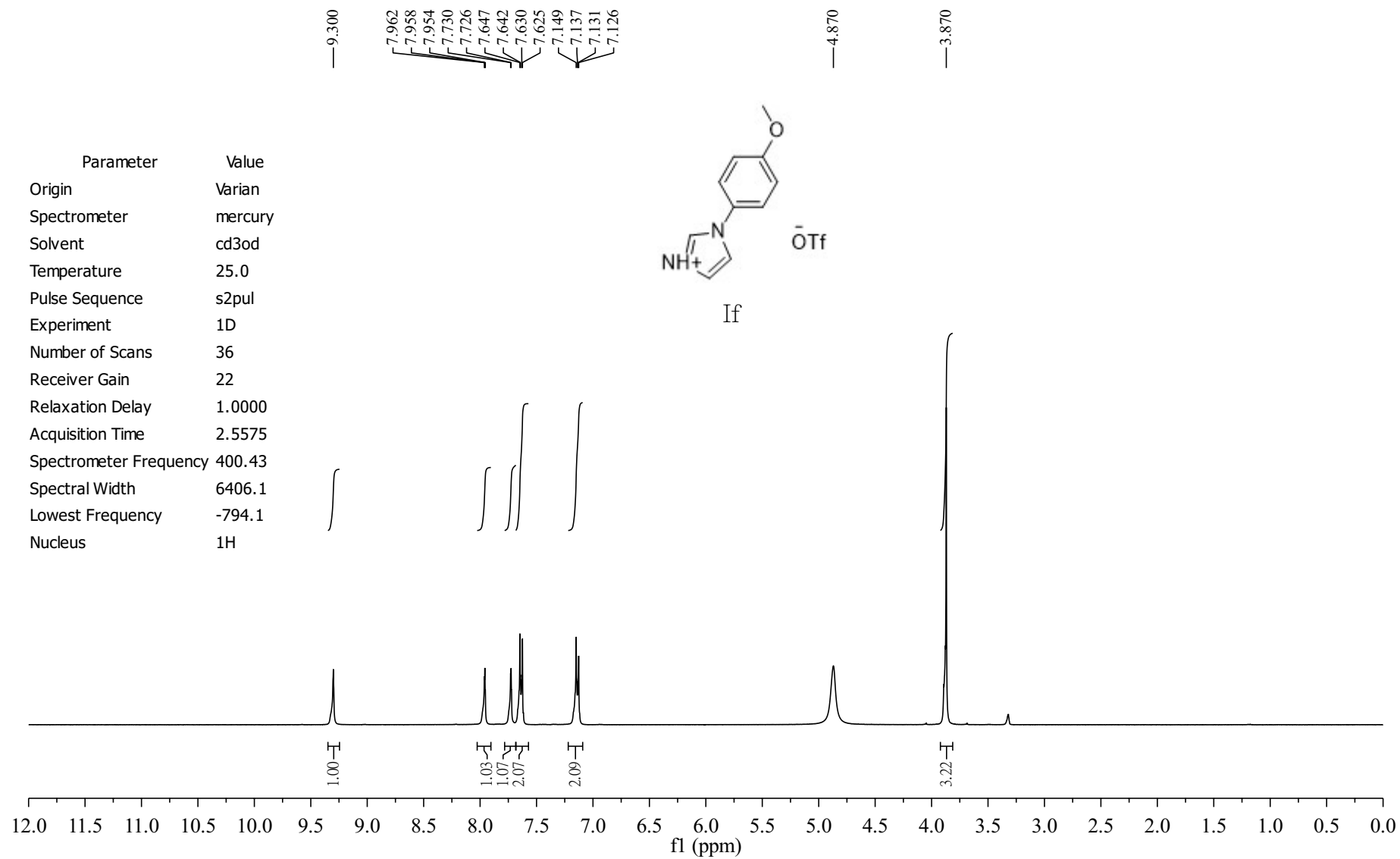


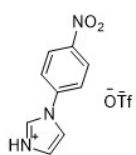




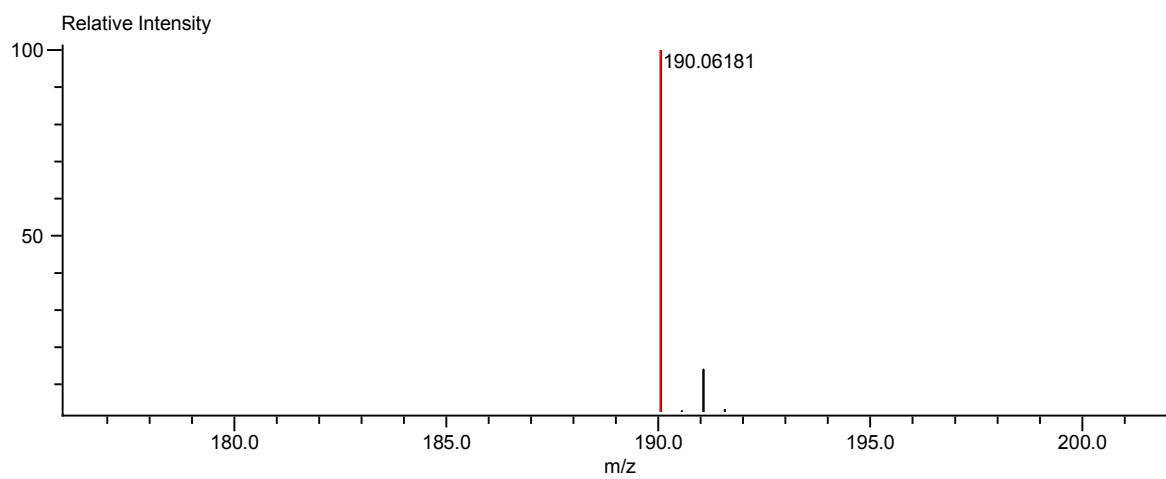


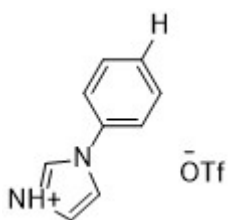




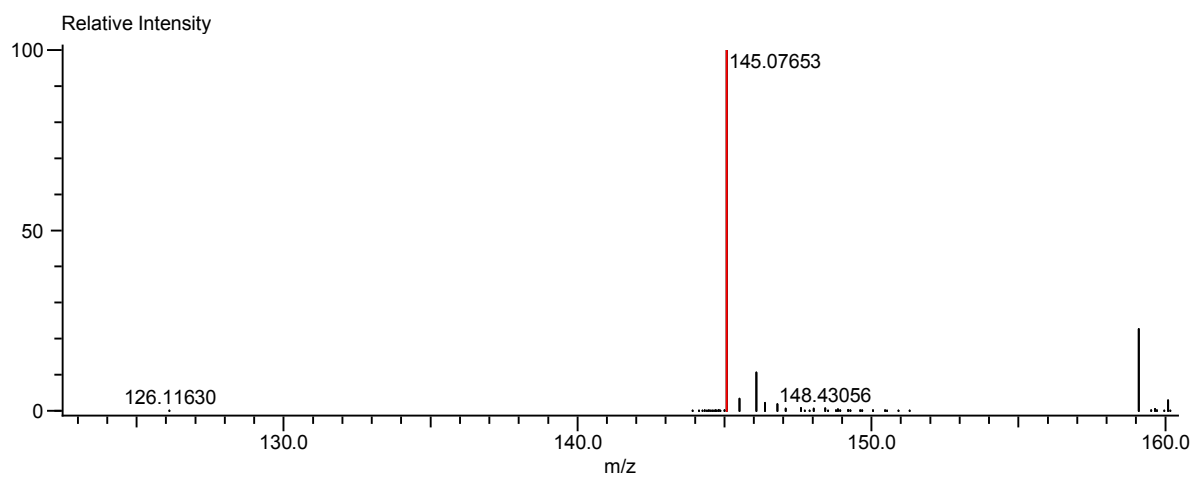


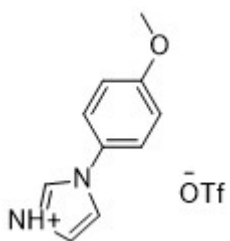
Ia



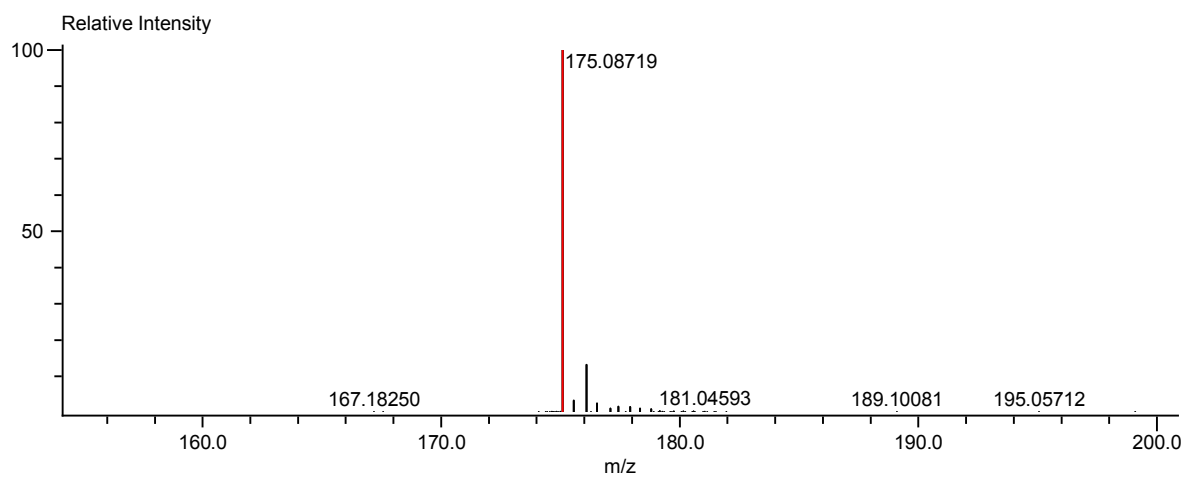


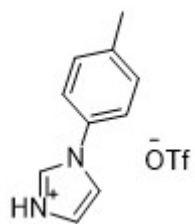
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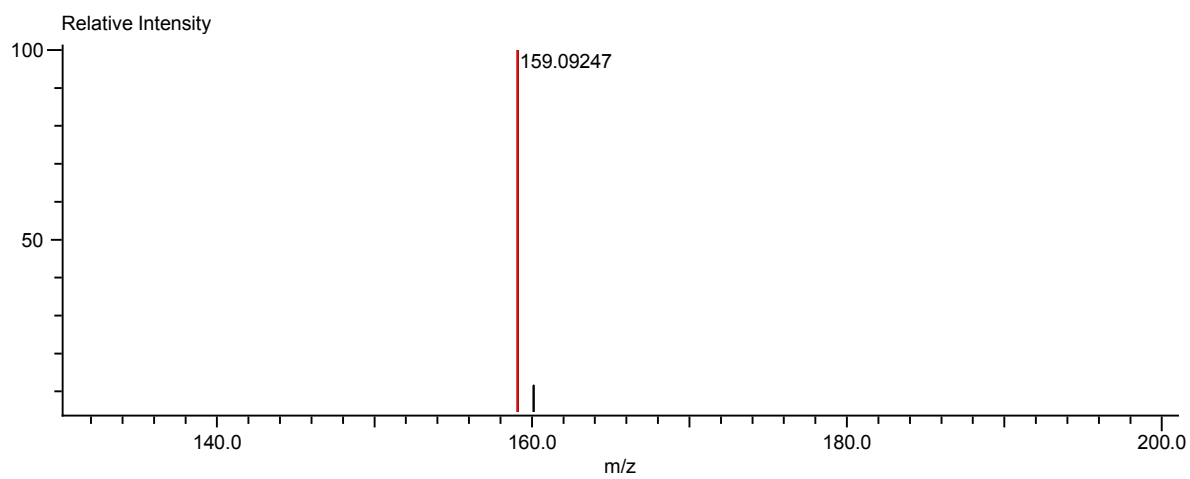


If

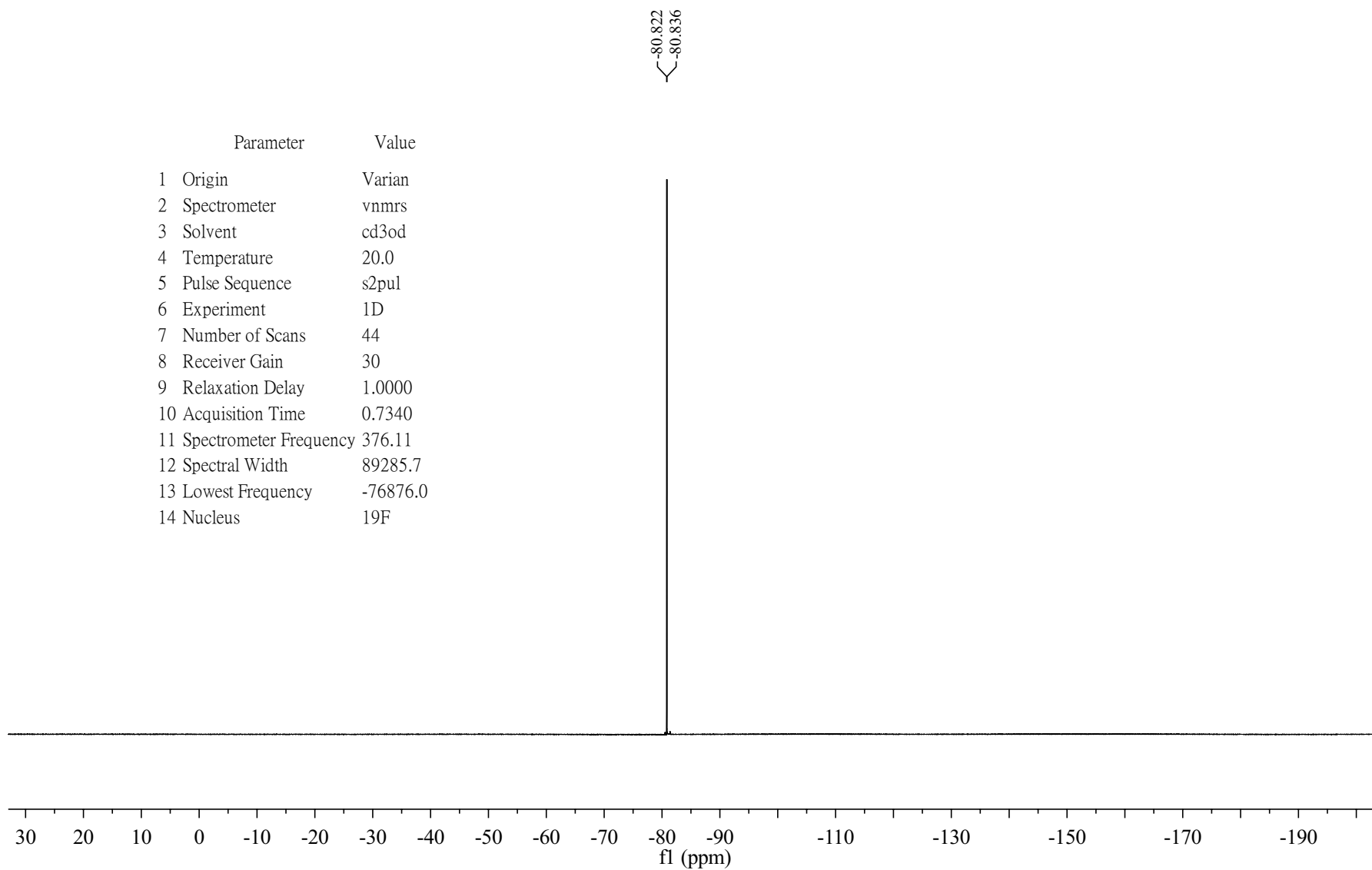




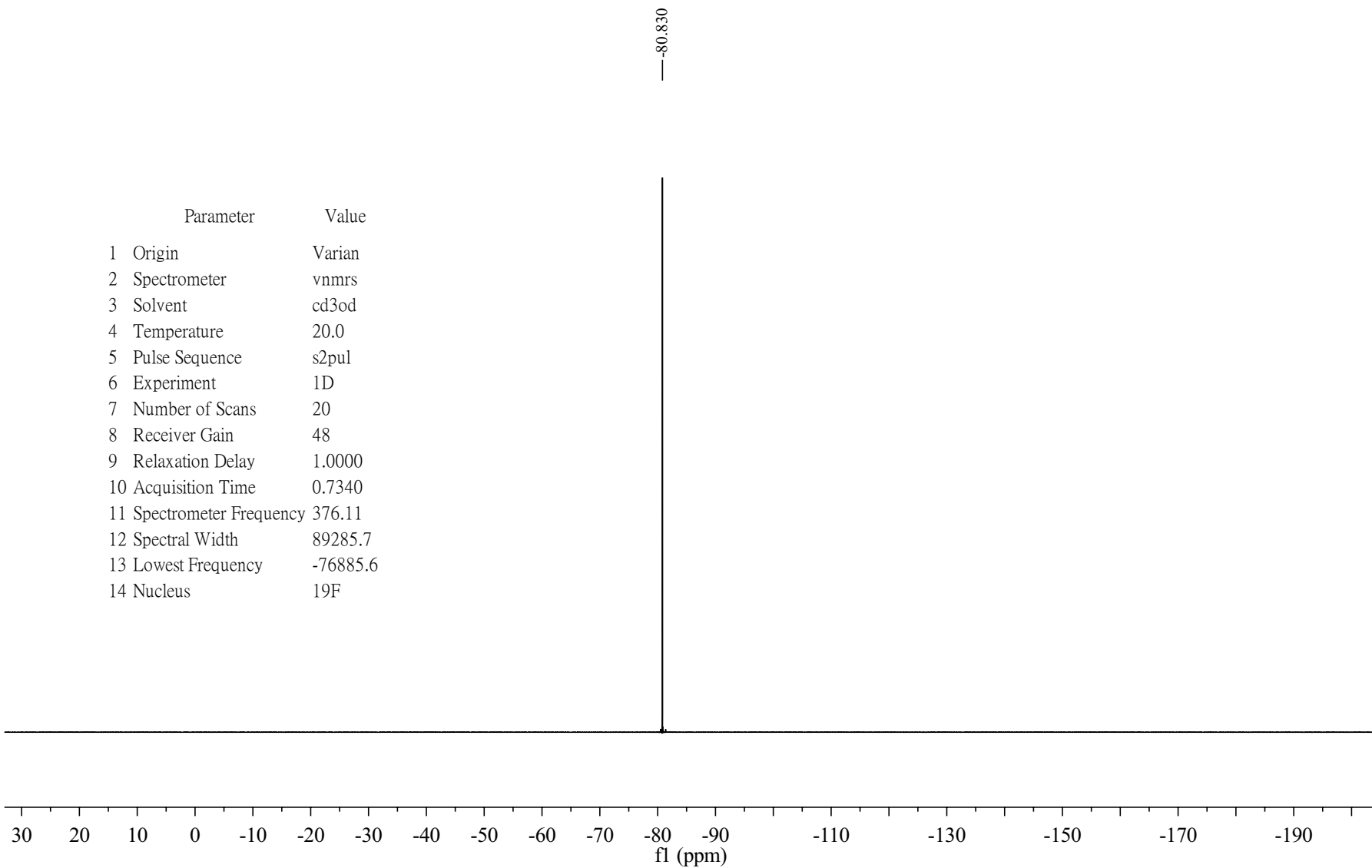
Ie



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5 Pulse Sequence	s2pul
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9 Relaxation Delay	1.0000
10 Acquisition Time	0.7340
11 Spectrometer Frequency	376.11
12 Spectral Width	89285.7
13 Lowest Frequency	-76876.0
14 Nucleus	¹⁹ F



¹⁹F NMR of Ia



19F NMR after reuse

References

1. Yang, C.H.; Chang, J.C.; Wu, T.Y.; Sun, I.W.; Wu, J.H.; Ho W.Y. Novel aryl-imidazolium ionic liquids with dual Brønsted/Lewis acidity as both solvents and catalysts for Friedel–Crafts alkylation. *Appl. Sci.* 2019, 9, 4743.
2. Chang, J. C.; Yang, C. H.; Sun, I. W.; Ho, W. Y.; Wu, T.-Y. Synthesis and properties of magnetic aryl-imidazolium ionic liquids with dual Brønsted/Lewis acidity, *Materials*, **2018**, *11*, 2539.