

Electronic Supporting Information

Copper-catalyzed *syn*-hydroformylation of alkynes with silanes and *N,N*-dimethylformamide dimethylacetal

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and Chuanzhou Tao^{*a,b}

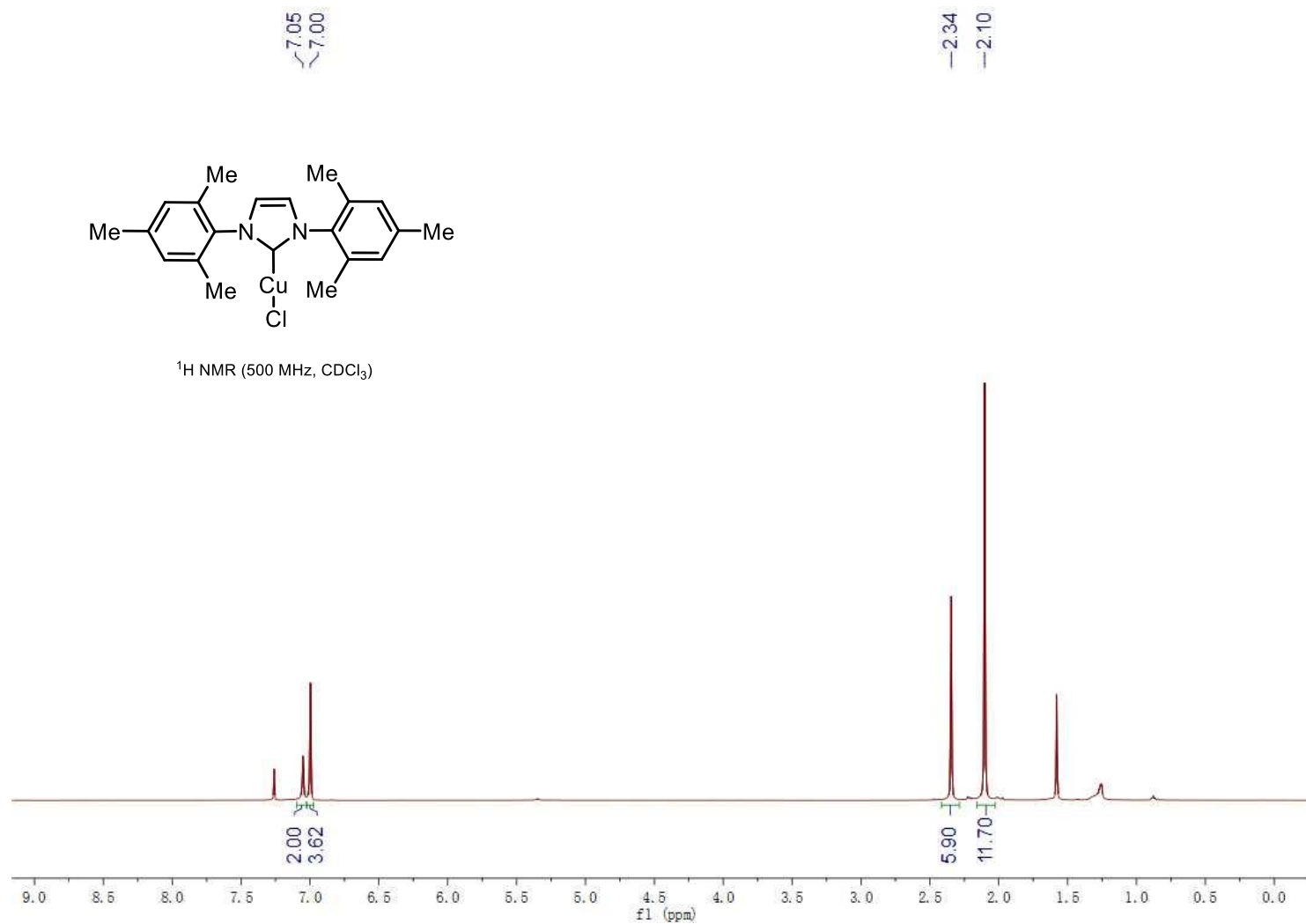
^a School of Environmental and Chemical Engineering, Jiangsu Ocean University, Lianyungang 222005, China.

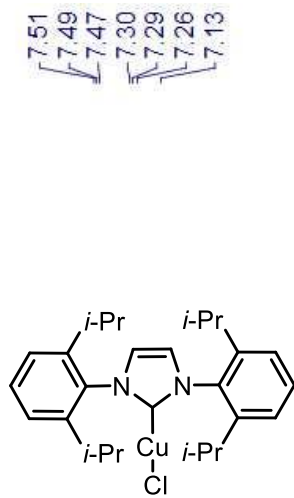
^b Jiangsu Province Engineering Research Center of Visible Light Catalytic Materials, Lianyungang Technical College, Lianyungang 222000, China.

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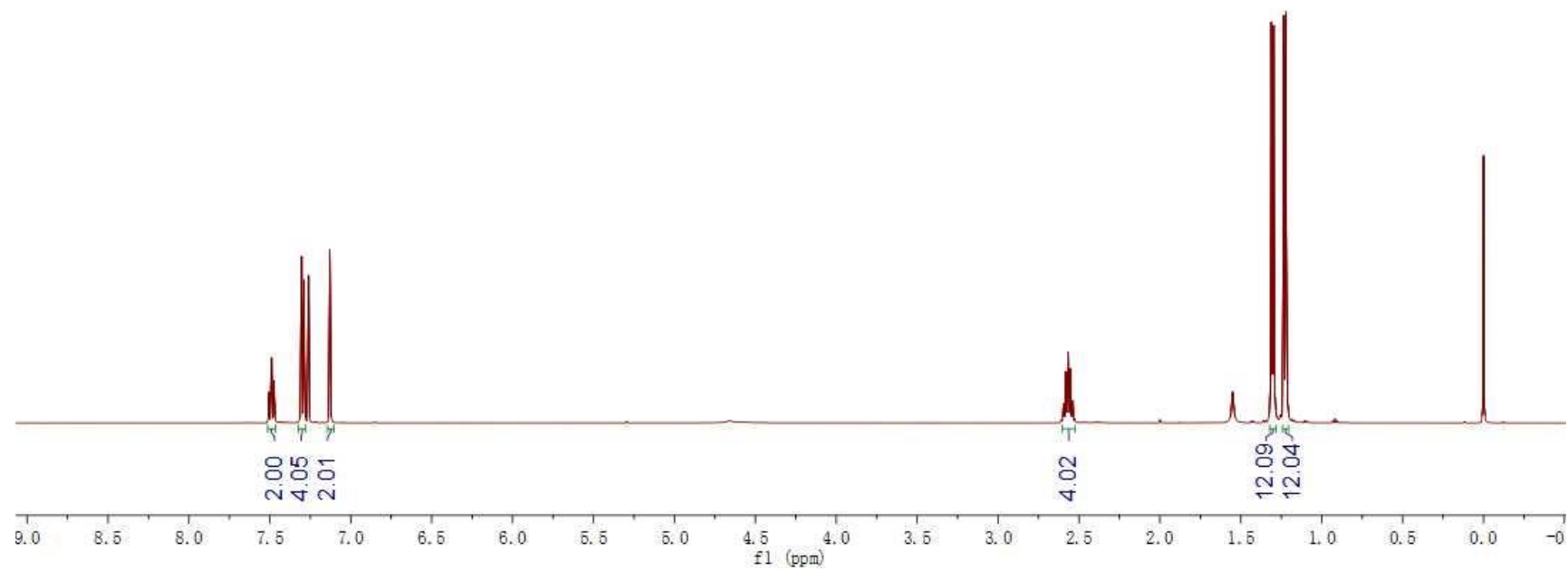
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1. NMR spectra of the catalysts





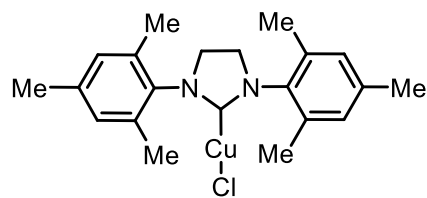
$^1\text{H NMR}$ (500 MHz, CDCl_3)



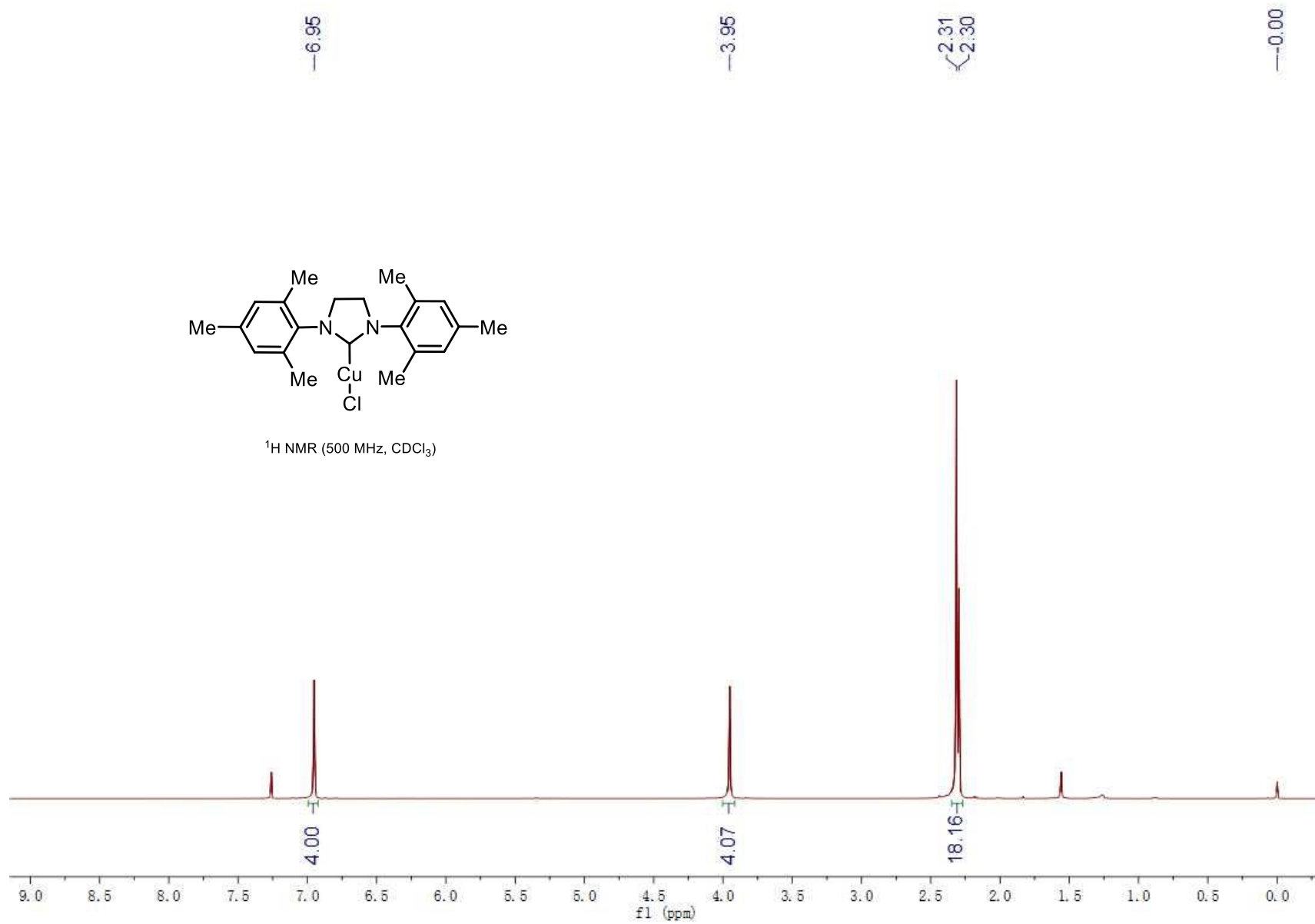
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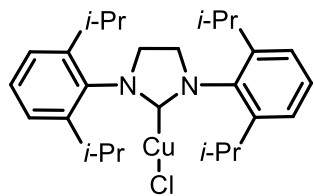
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1.22

-0.00

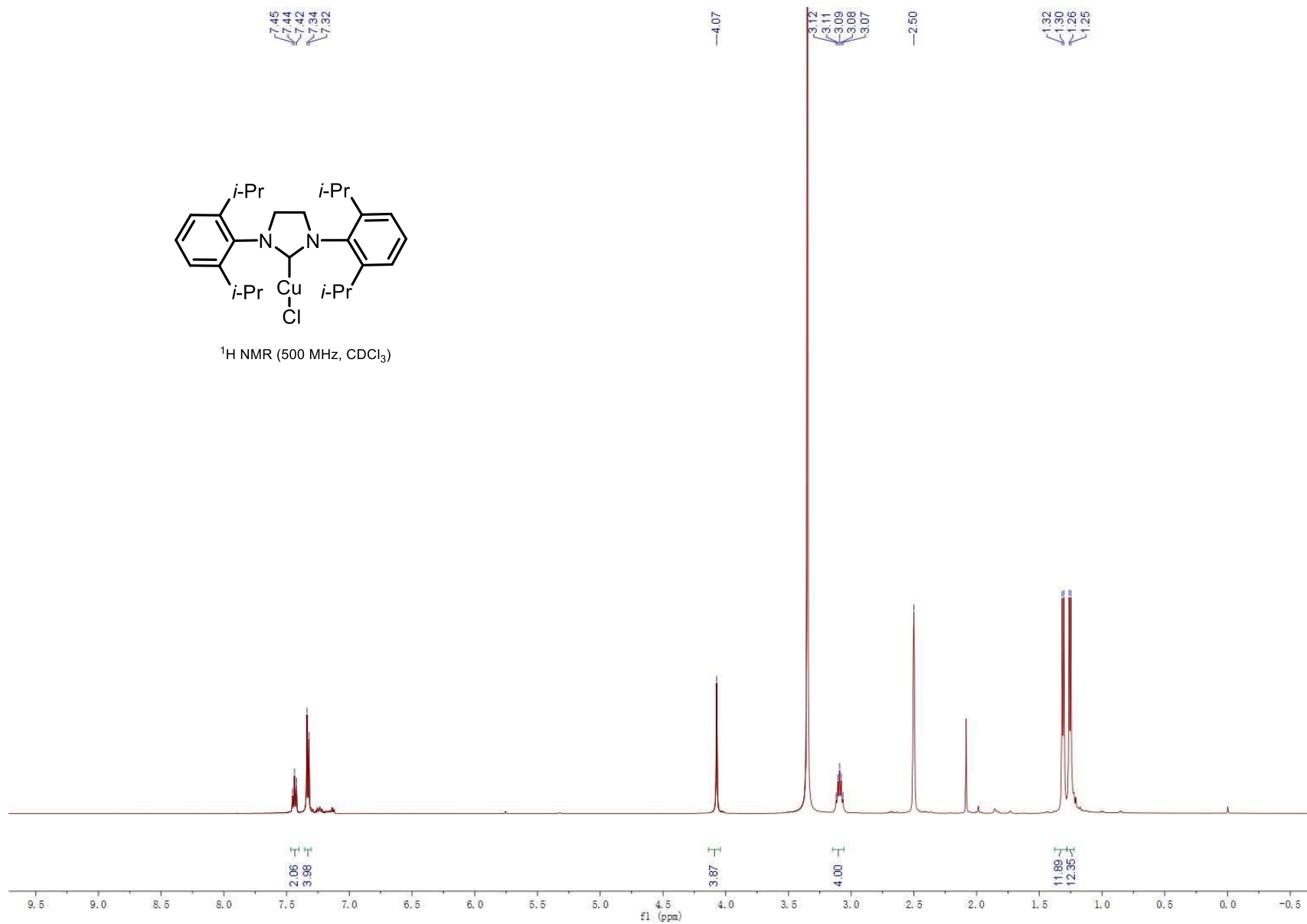


^1H NMR (500 MHz, CDCl_3)

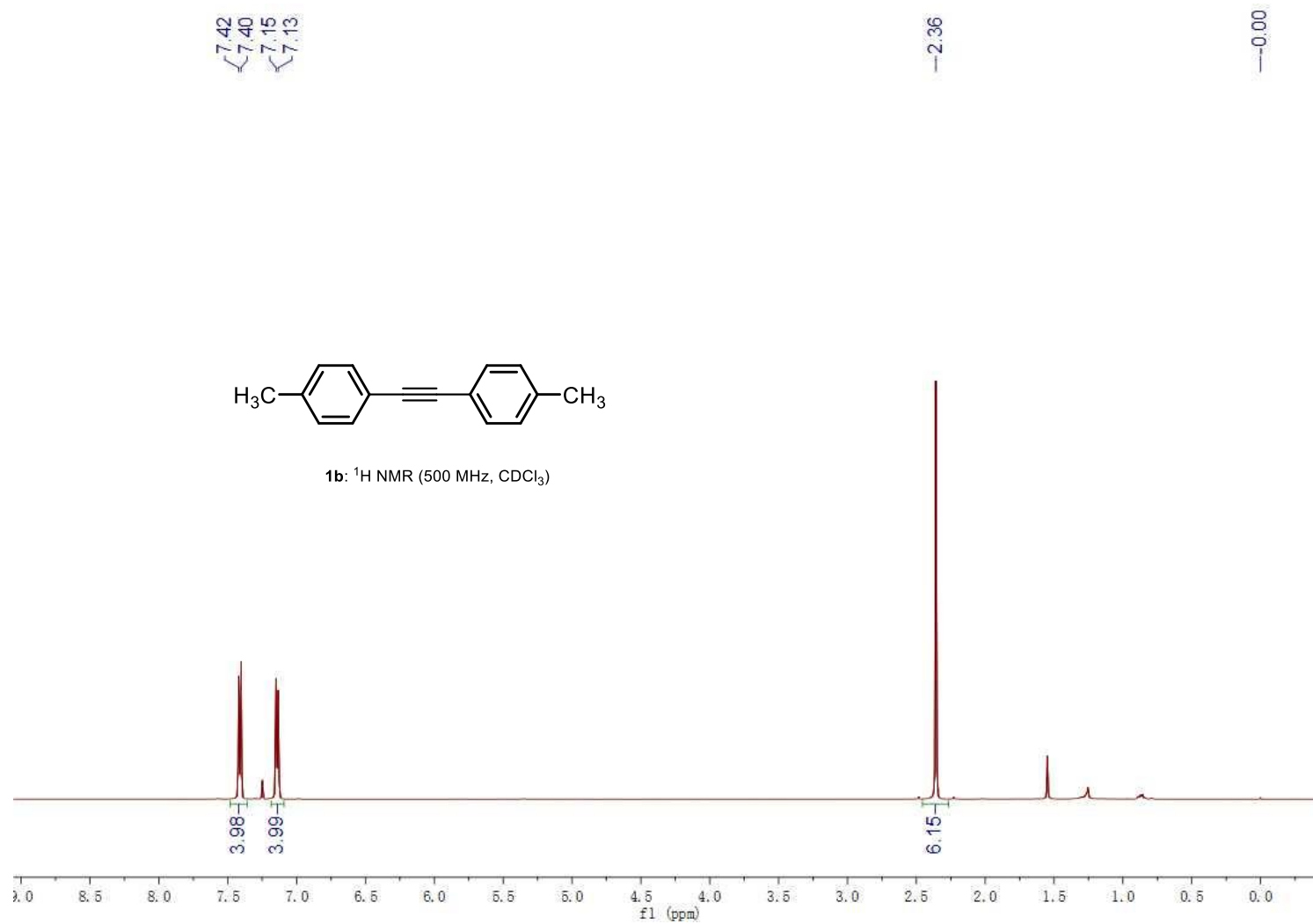




^1H NMR (500 MHz, CDCl_3)

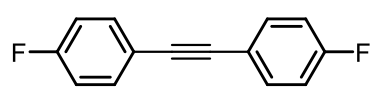


2. NMR spectra of the substrates (1)

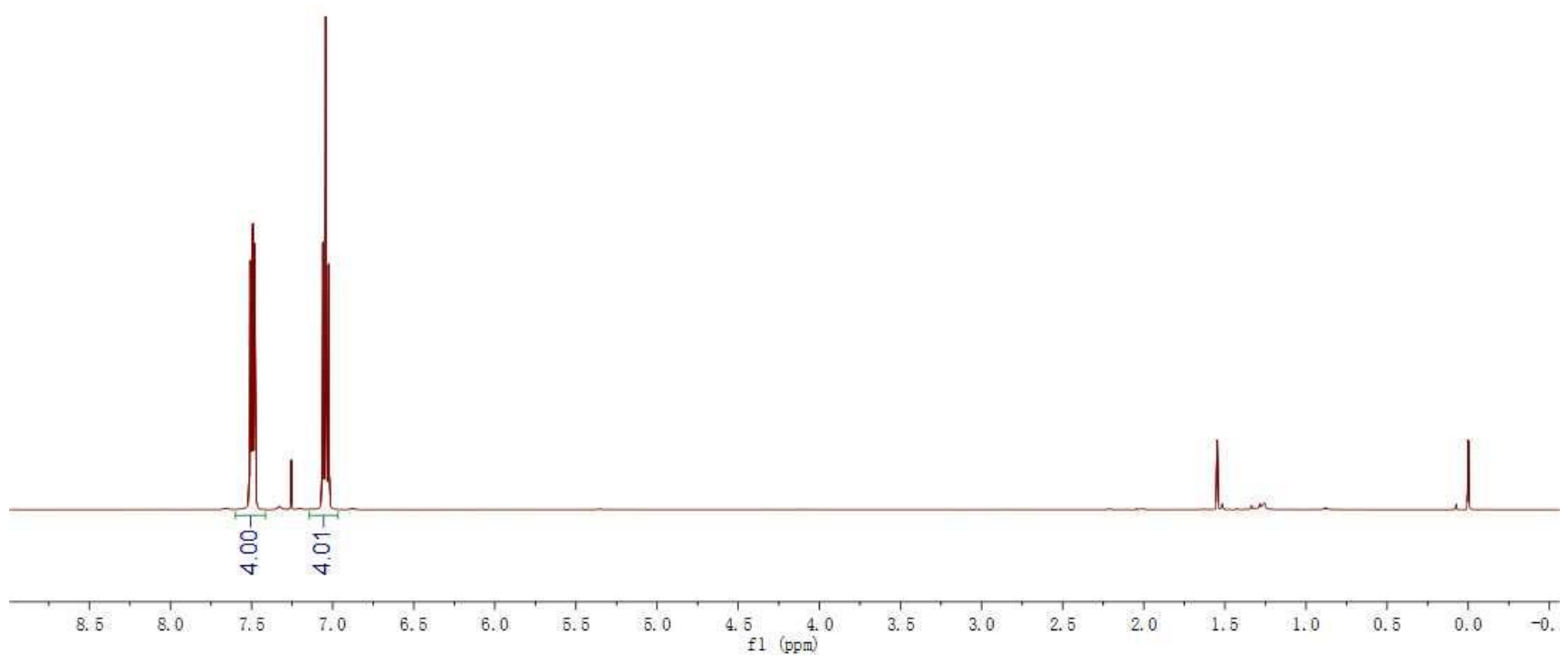


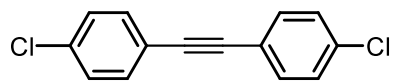
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7.02

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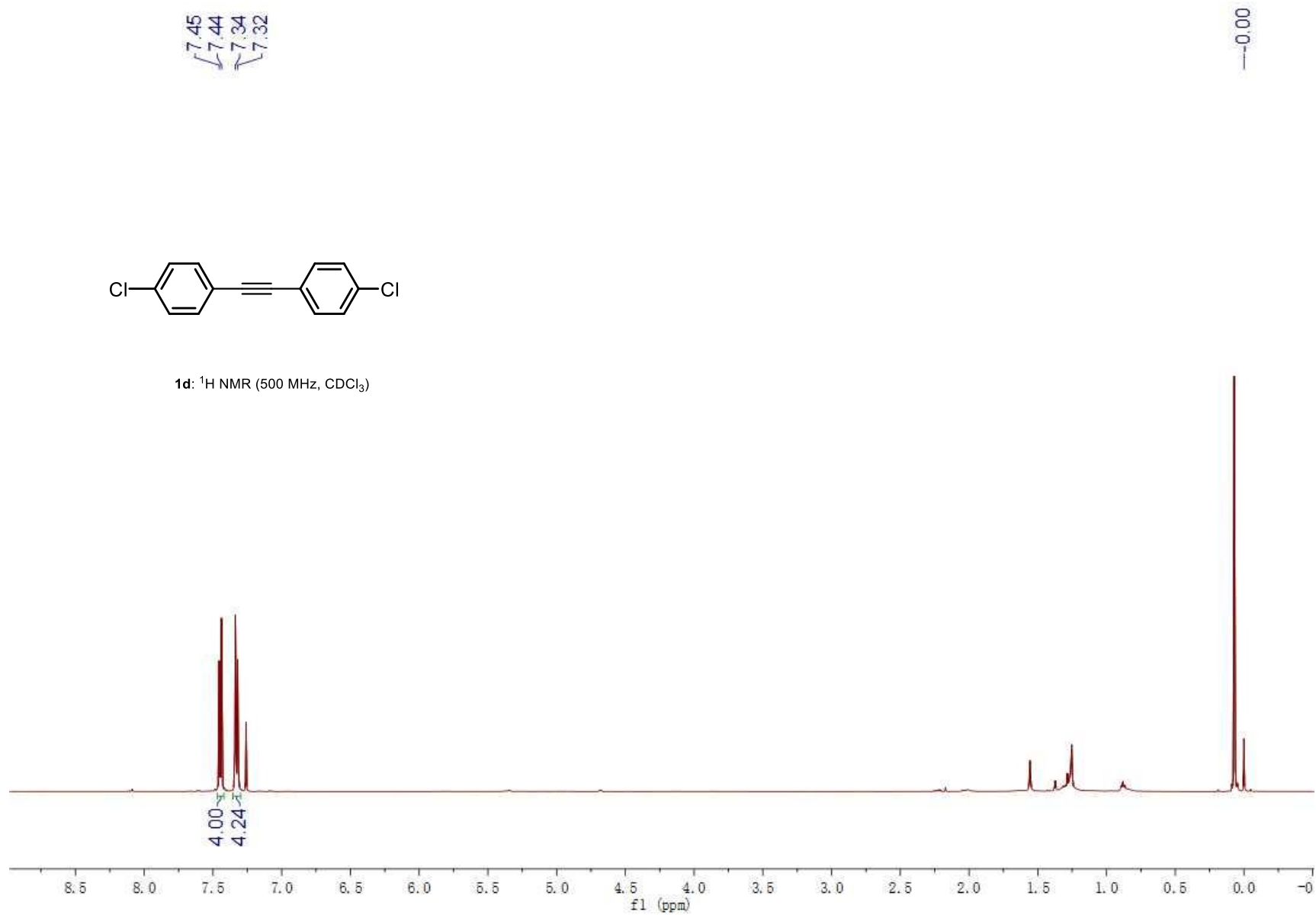


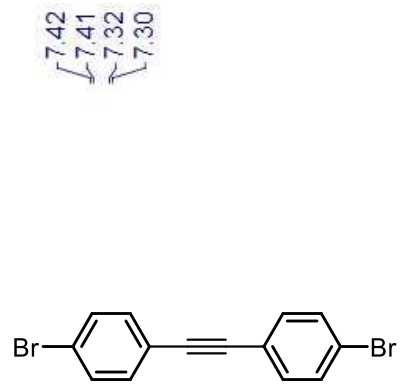
1c: ¹H NMR (500 MHz, CDCl₃)



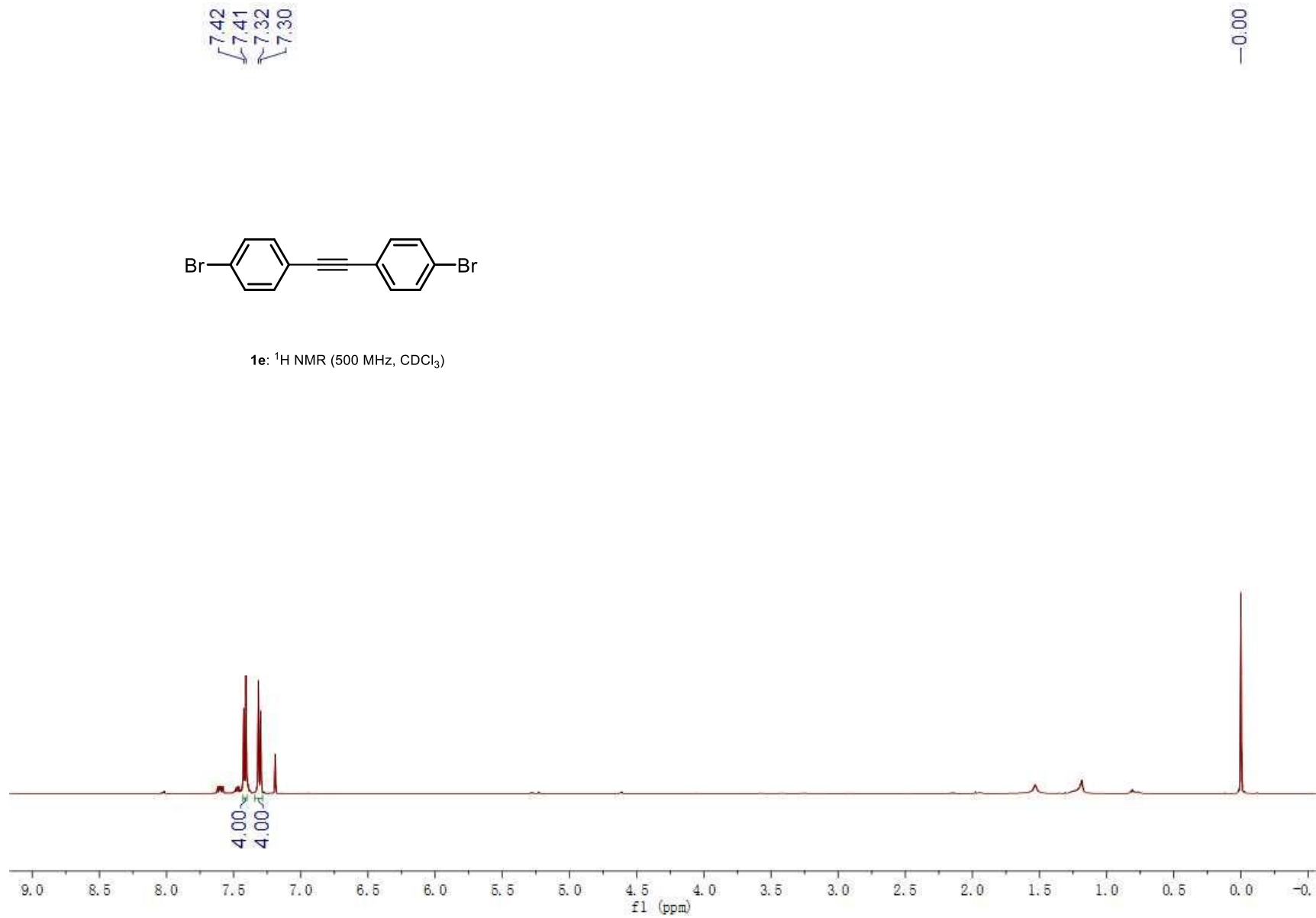


1d: ^1H NMR (500 MHz, CDCl_3)



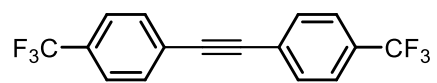


1e: ^1H NMR (500 MHz, CDCl_3)

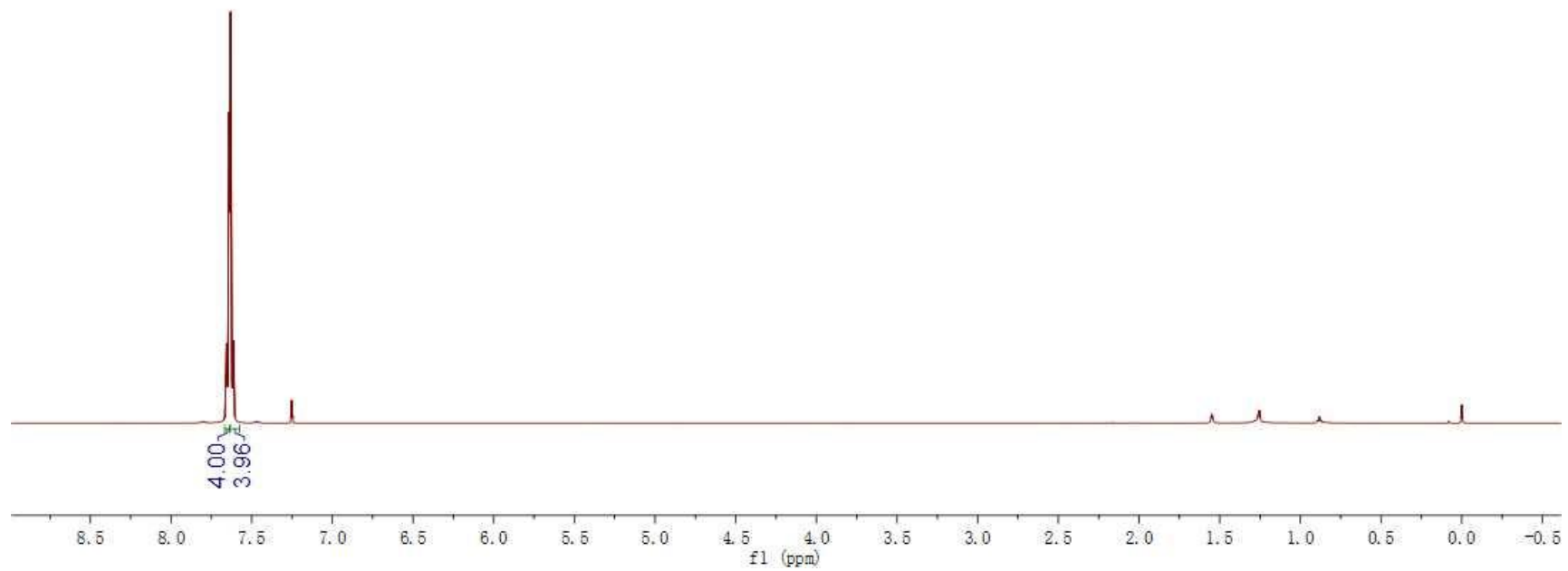


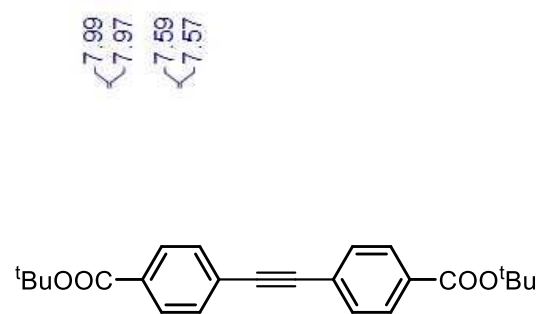
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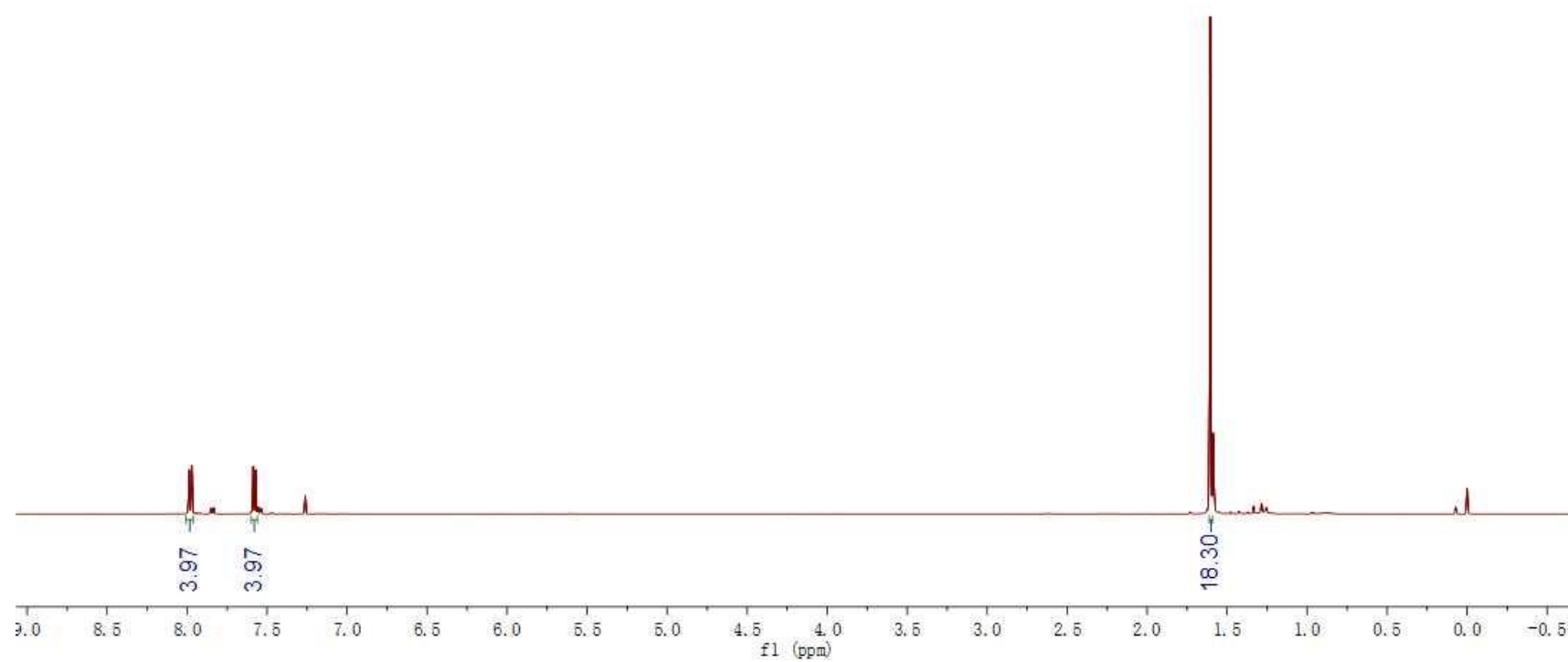


1f: ¹H NMR (500 MHz, CDCl₃)

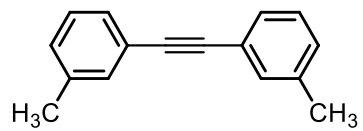




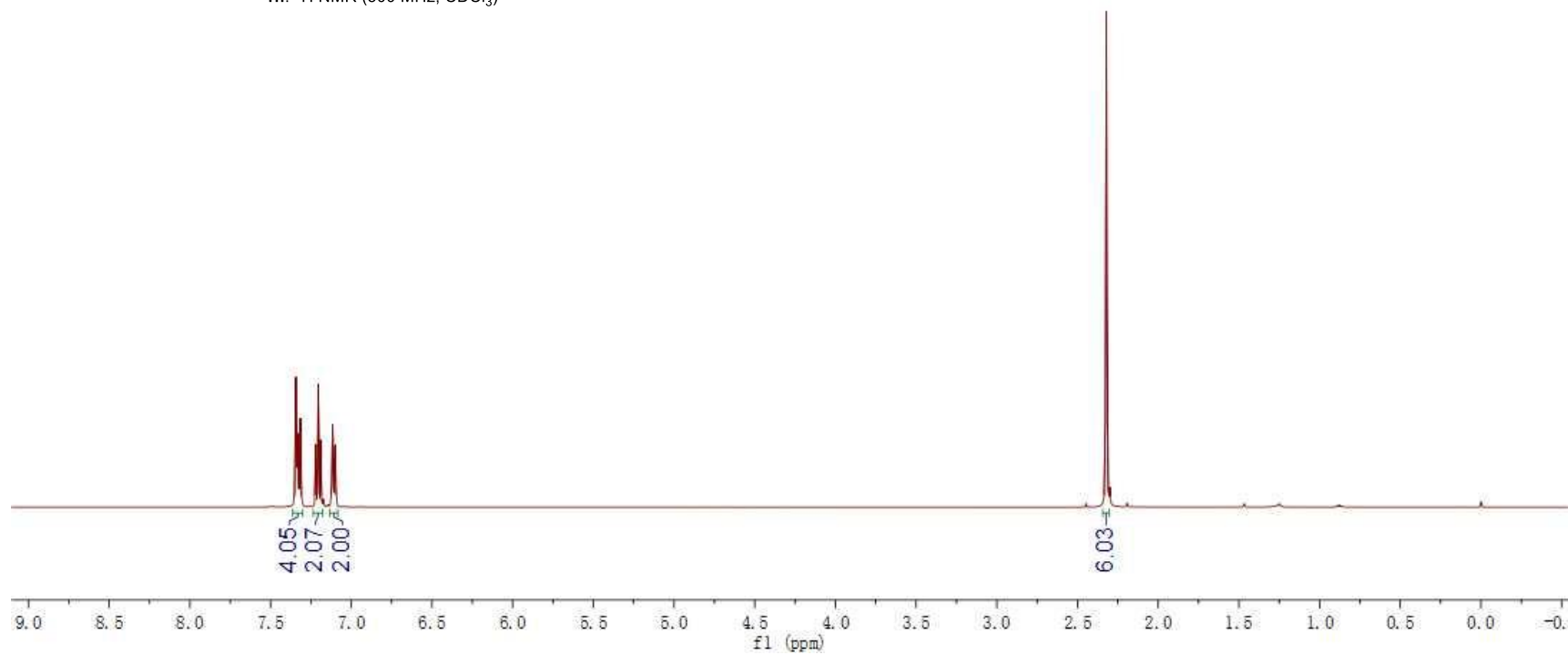
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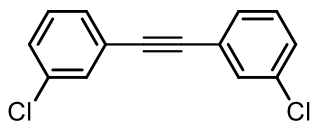
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7.10



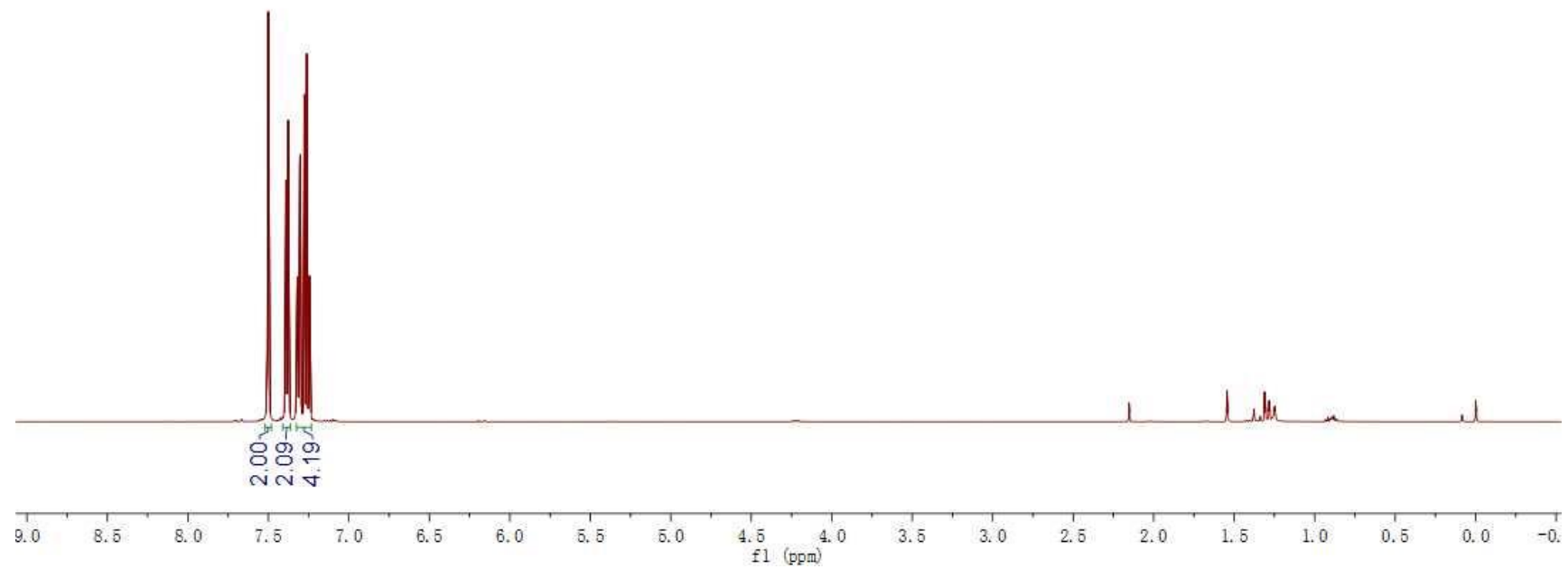
1h: ¹H NMR (500 MHz, CDCl₃)



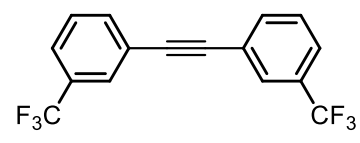
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7.50
7.50
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7.30
7.28
7.26
7.24
7.24



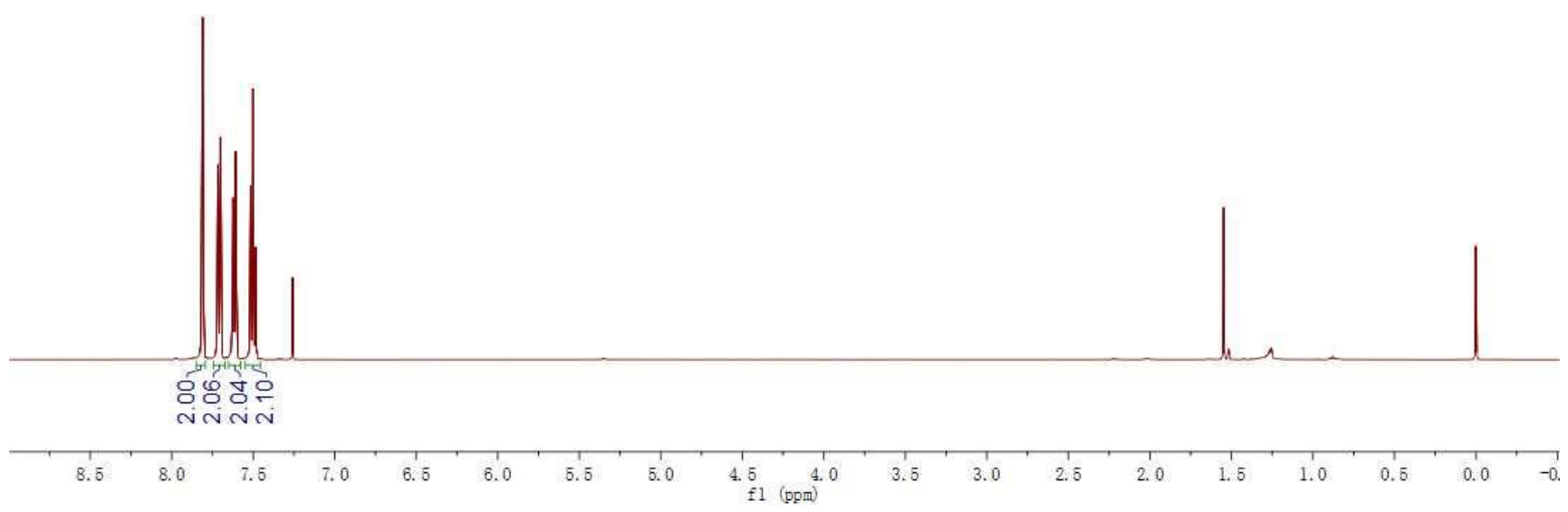
1i: ¹H NMR (500 MHz, CDCl₃)



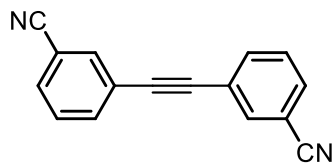
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7.26



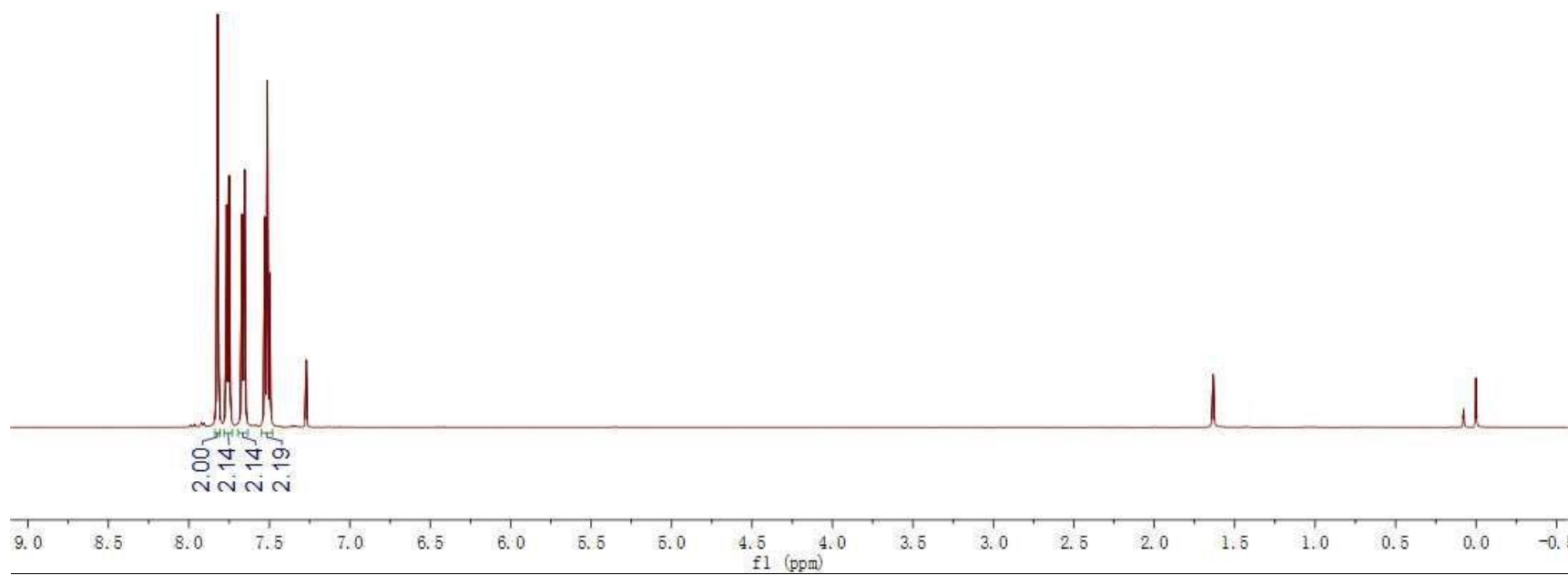
1j: ¹H NMR (500 MHz, CDCl₃)



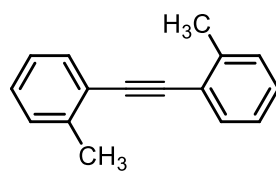
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7.51
7.50



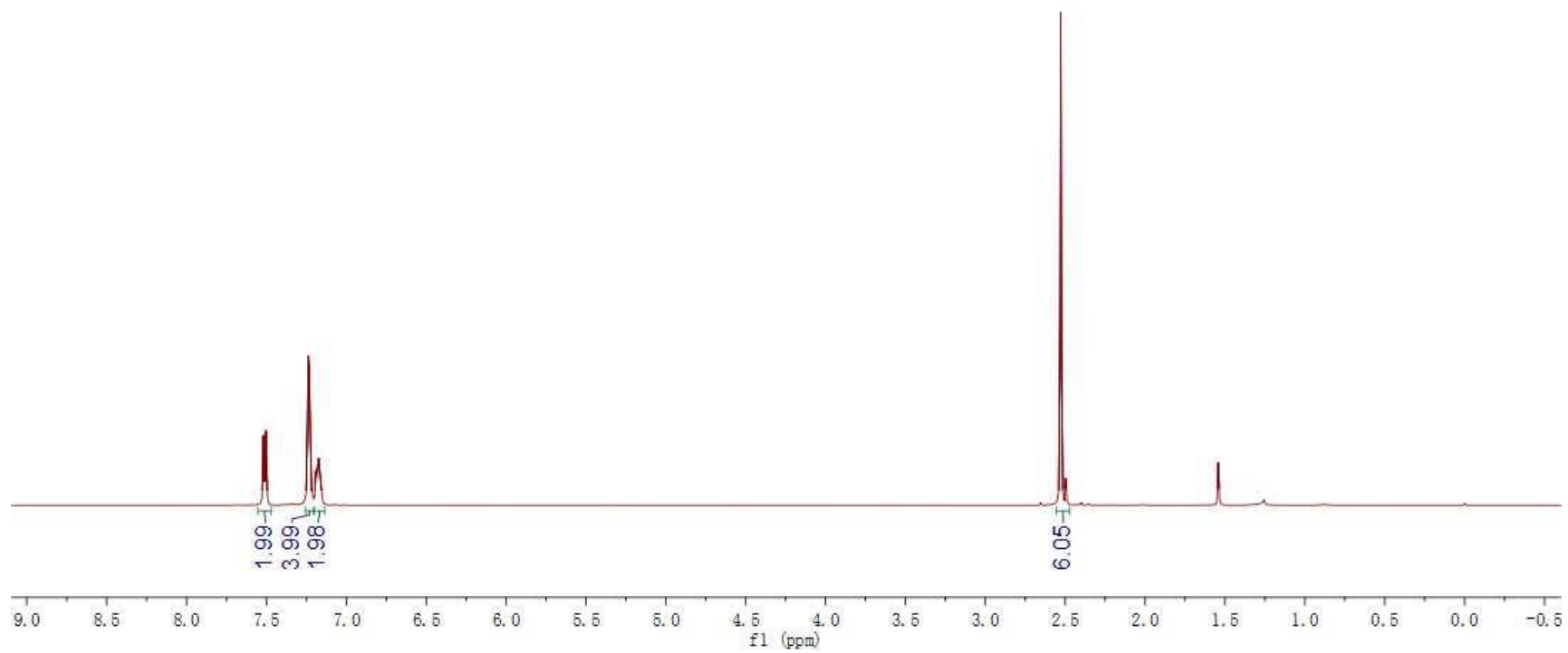
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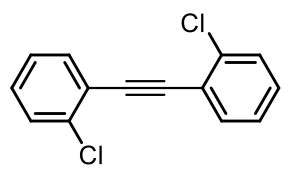
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7.16



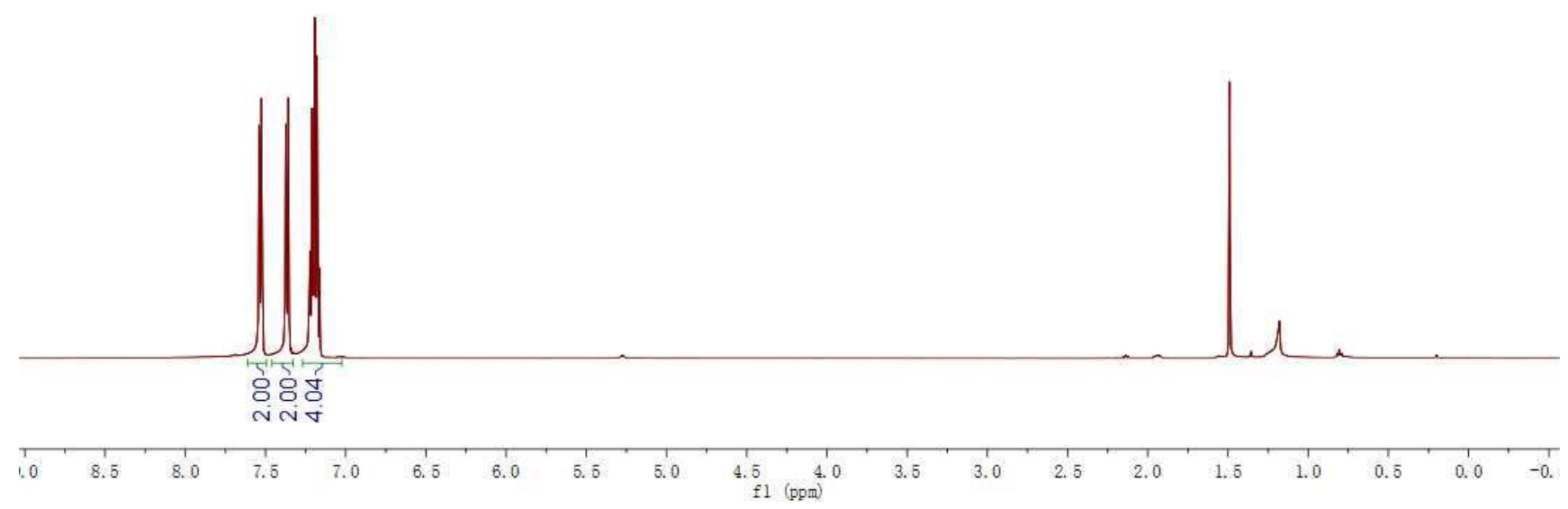
11: ¹H NMR (500 MHz, CDCl₃)



7.54
7.54
7.53
7.52
7.37
7.37
7.36
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7.20
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7.16
7.16

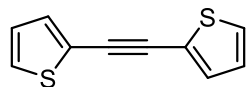


1m: ¹H NMR (500 MHz, CDCl₃)

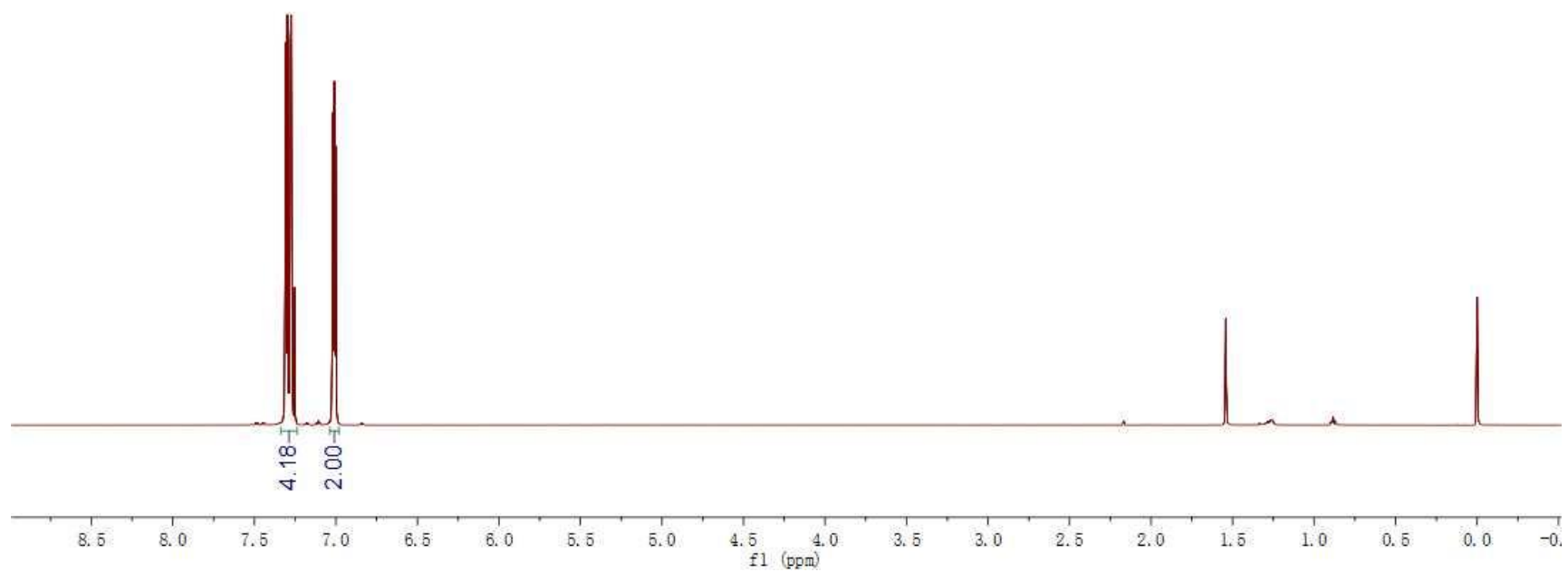


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7.01
7.01
7.00

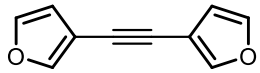
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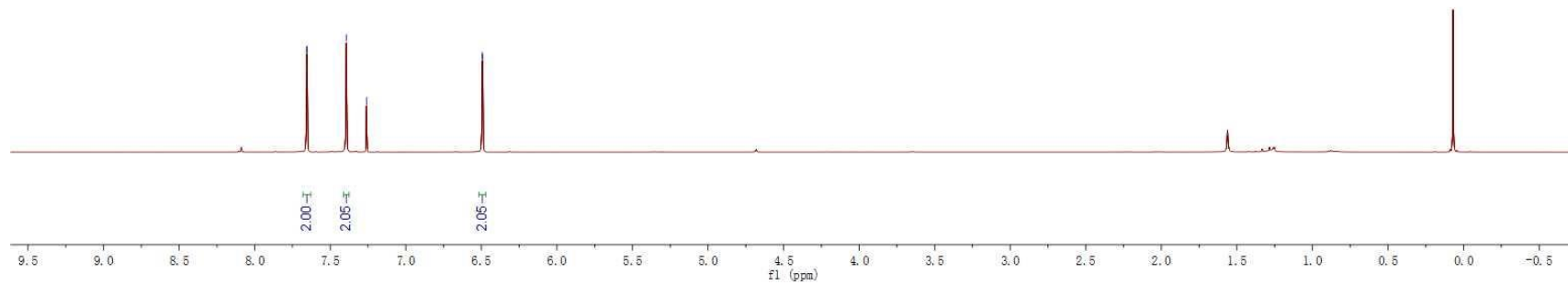
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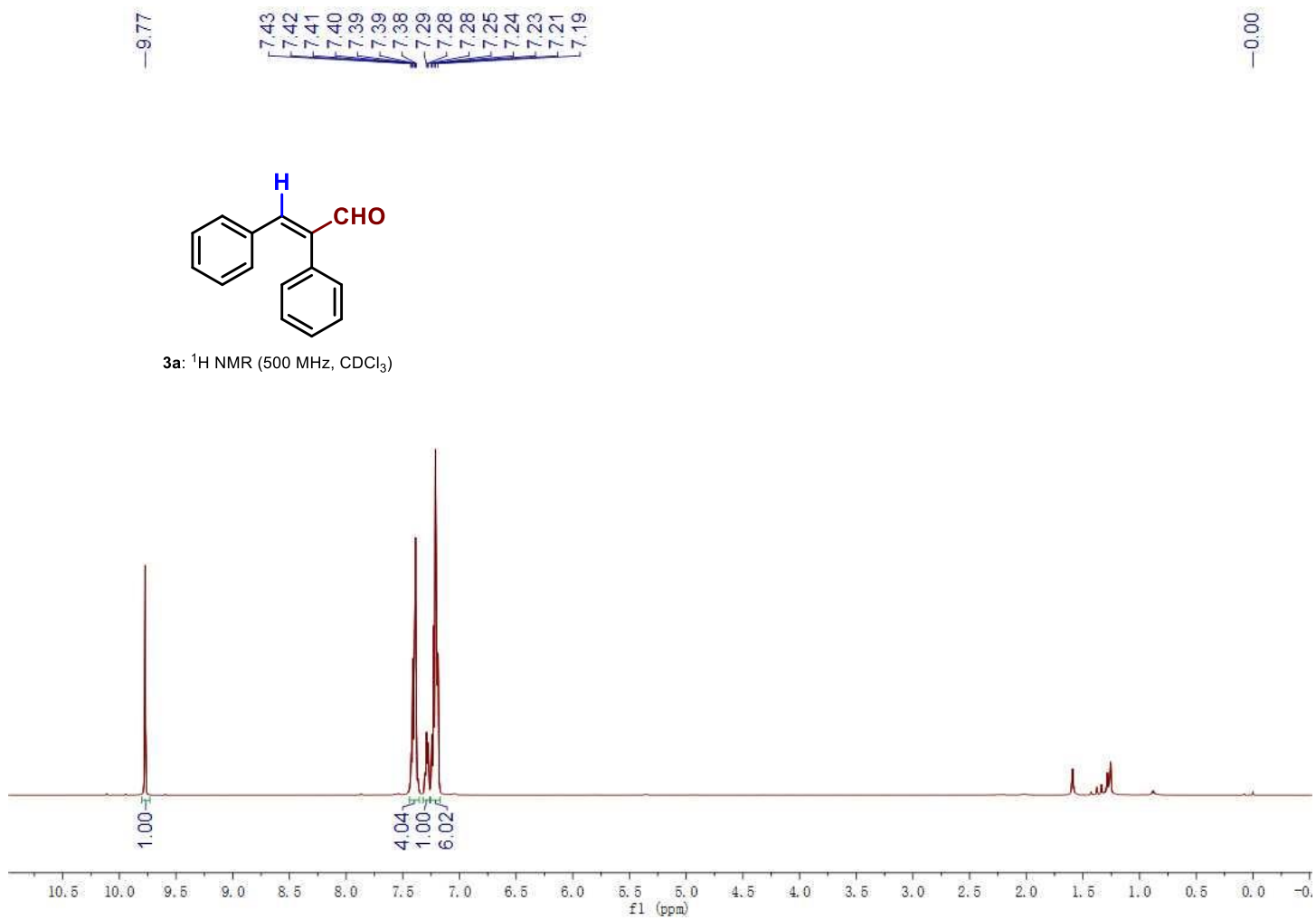
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6.49
6.49

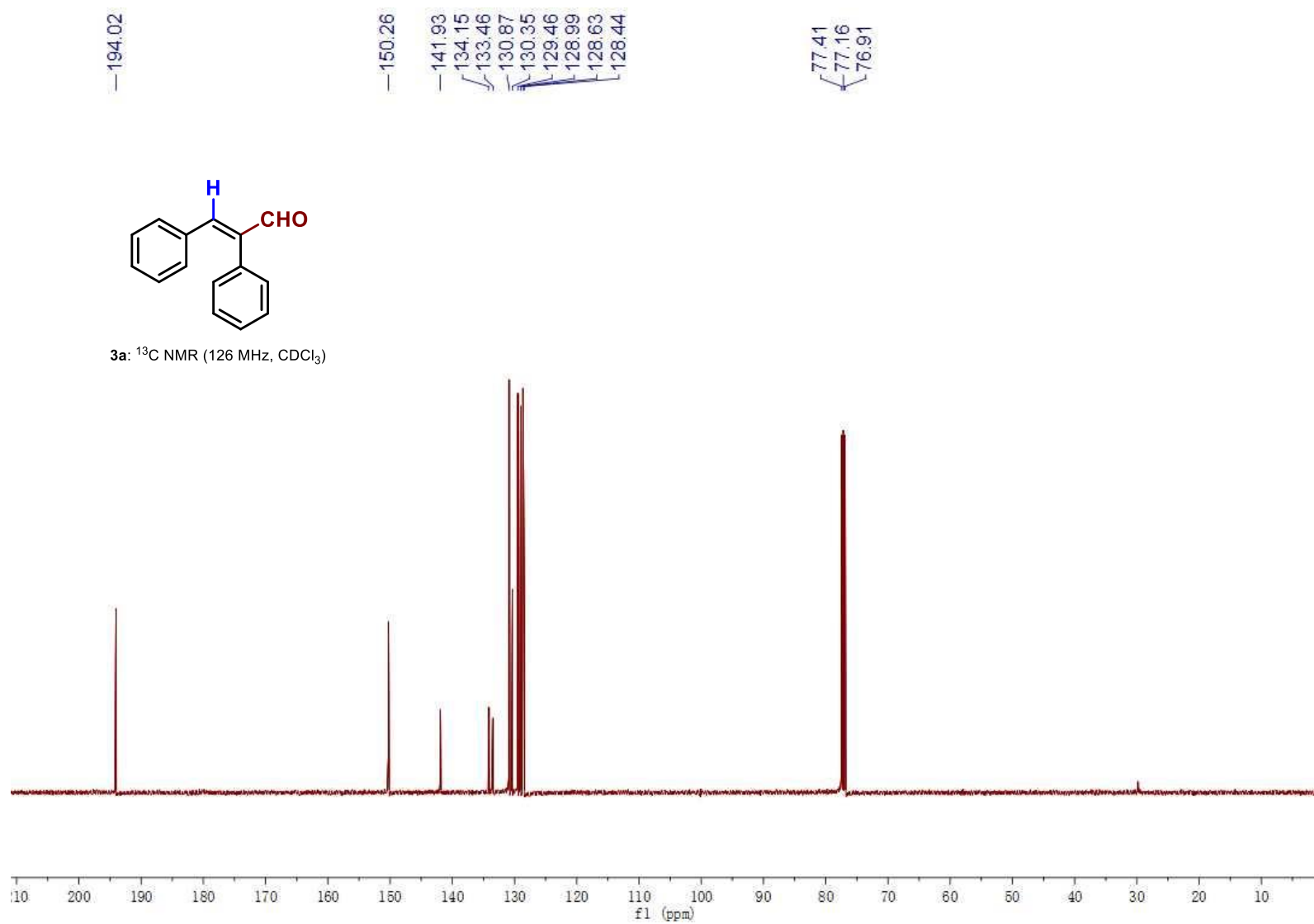


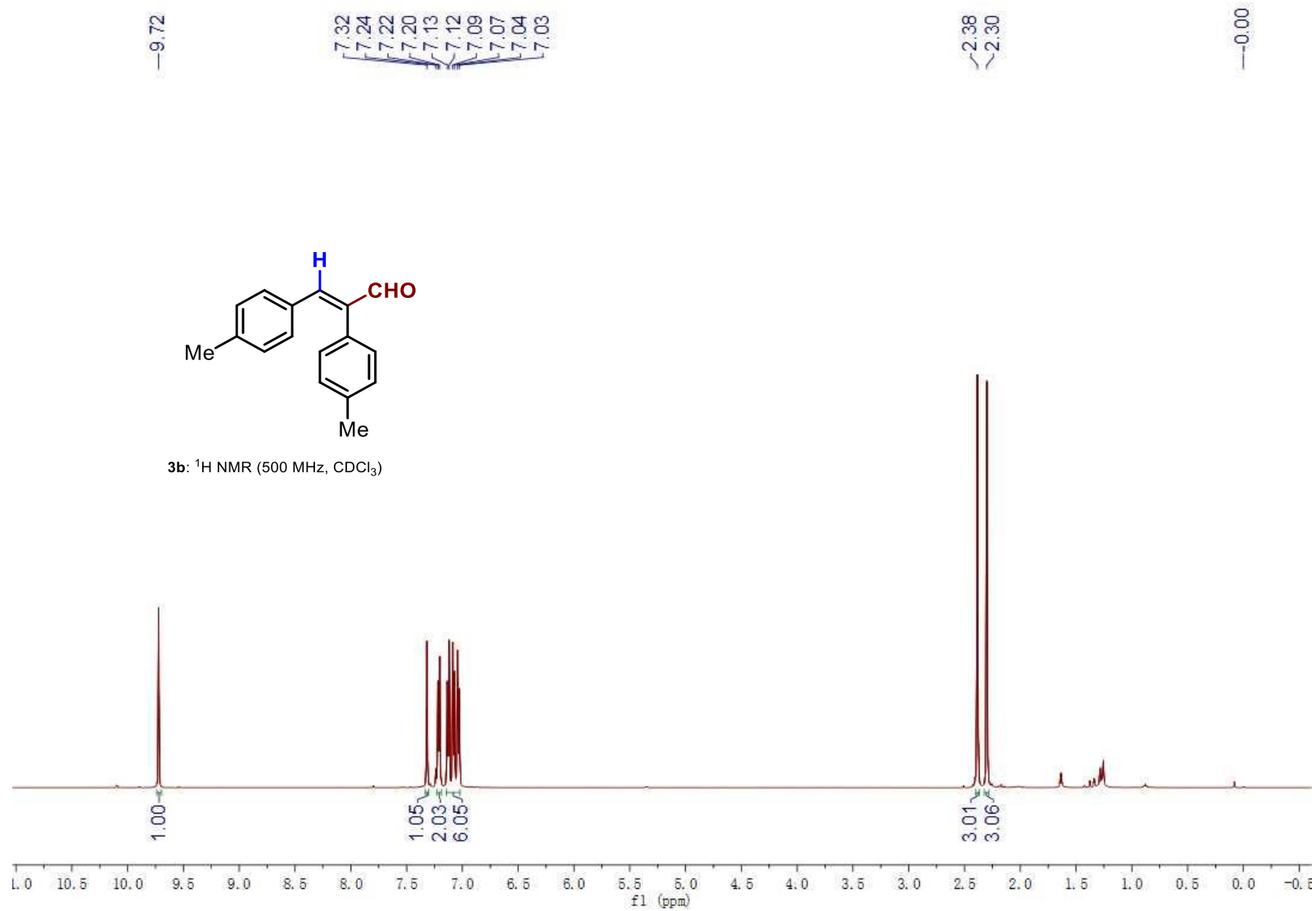
1o: ¹H NMR (500 MHz, CDCl₃)

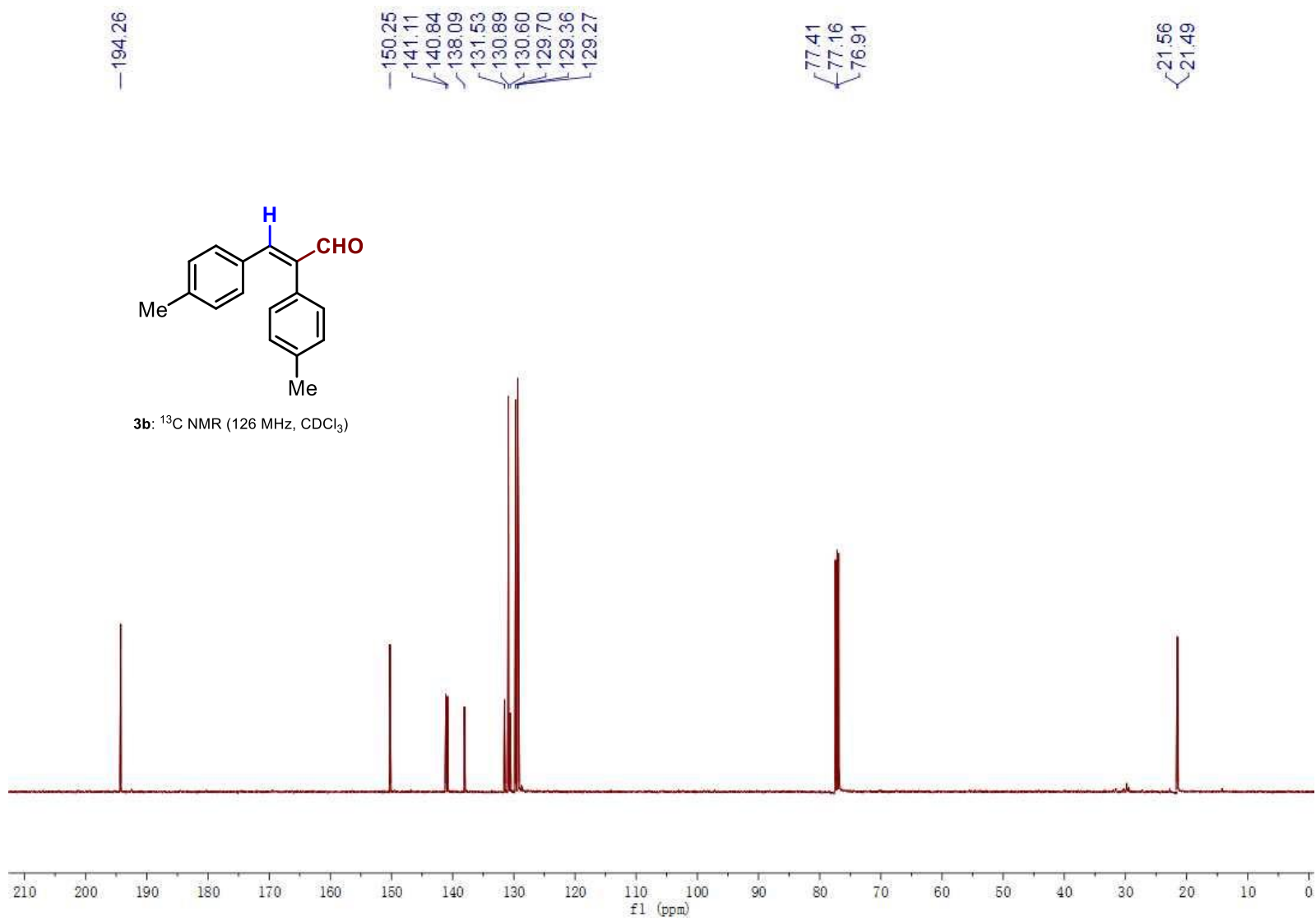


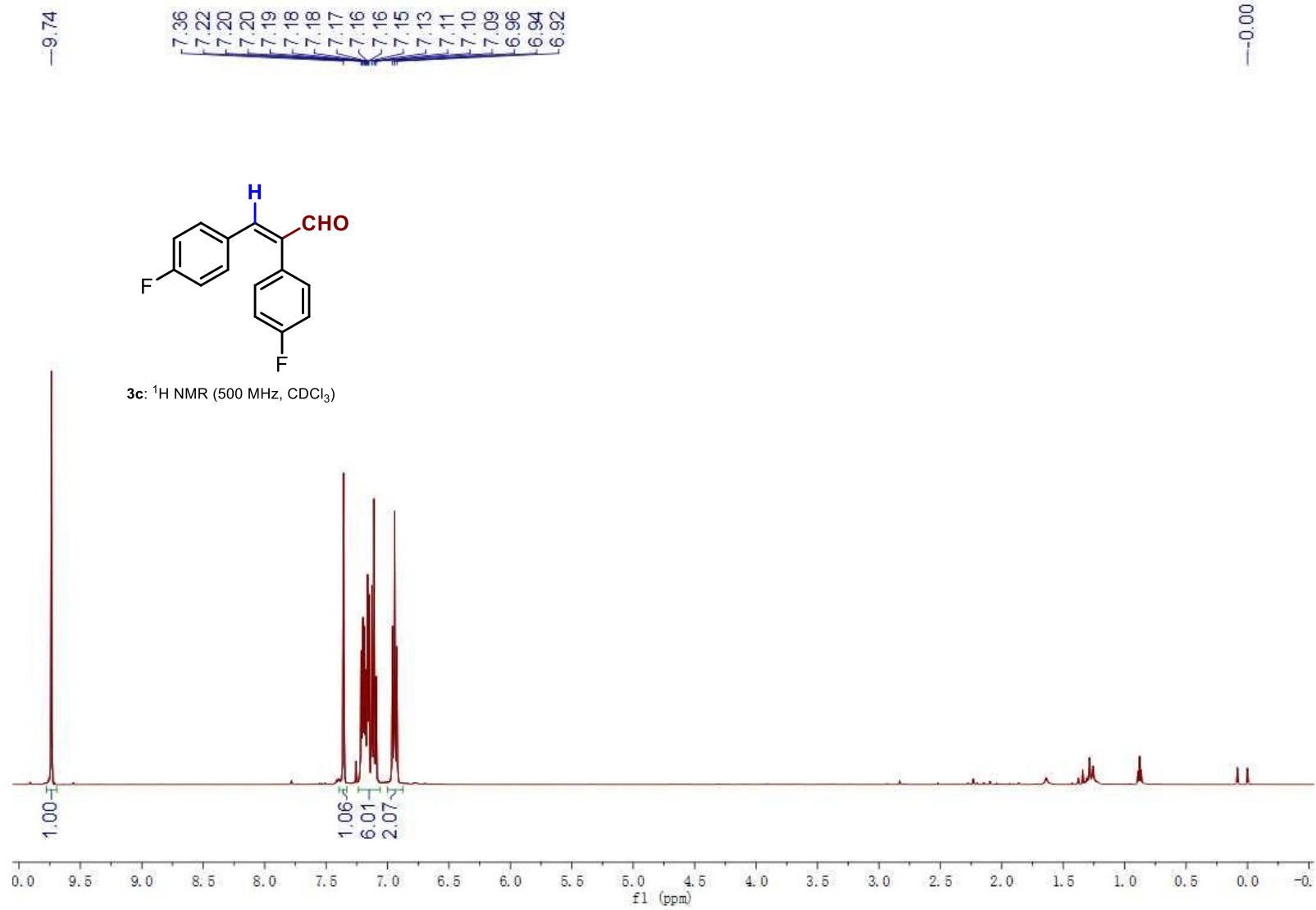
3. NMR spectra of the products (3)

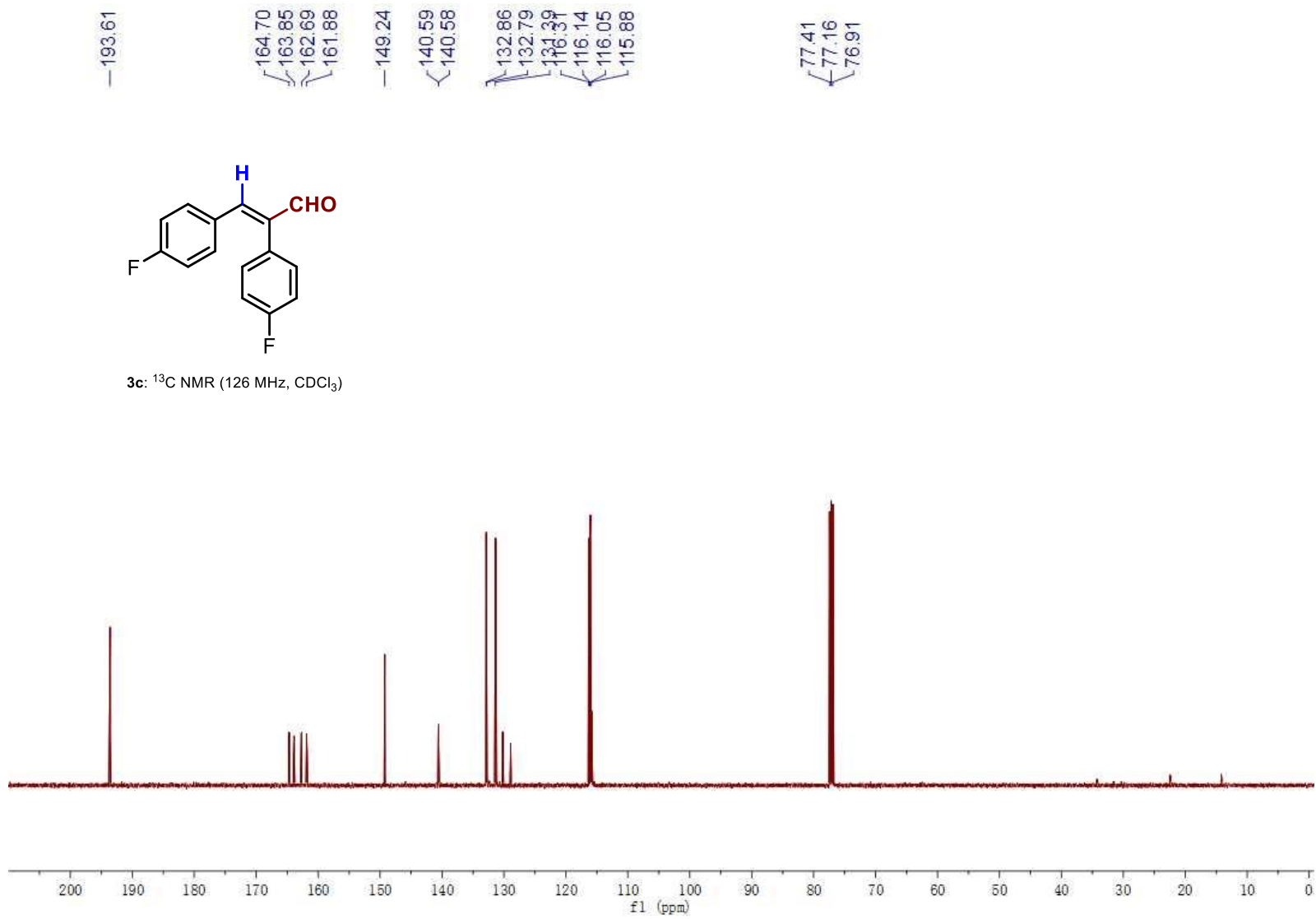


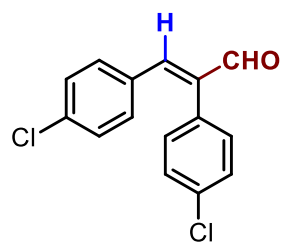




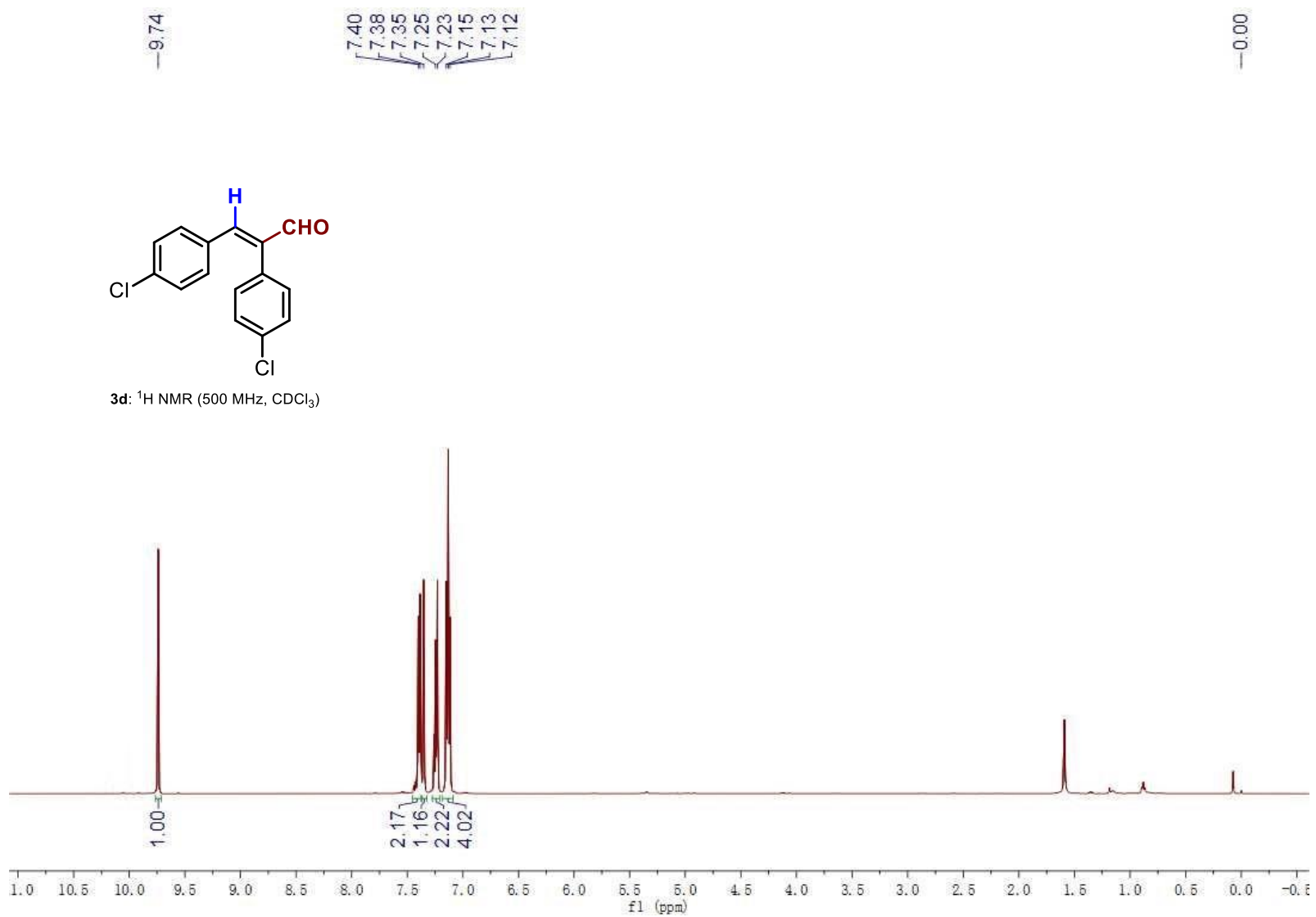


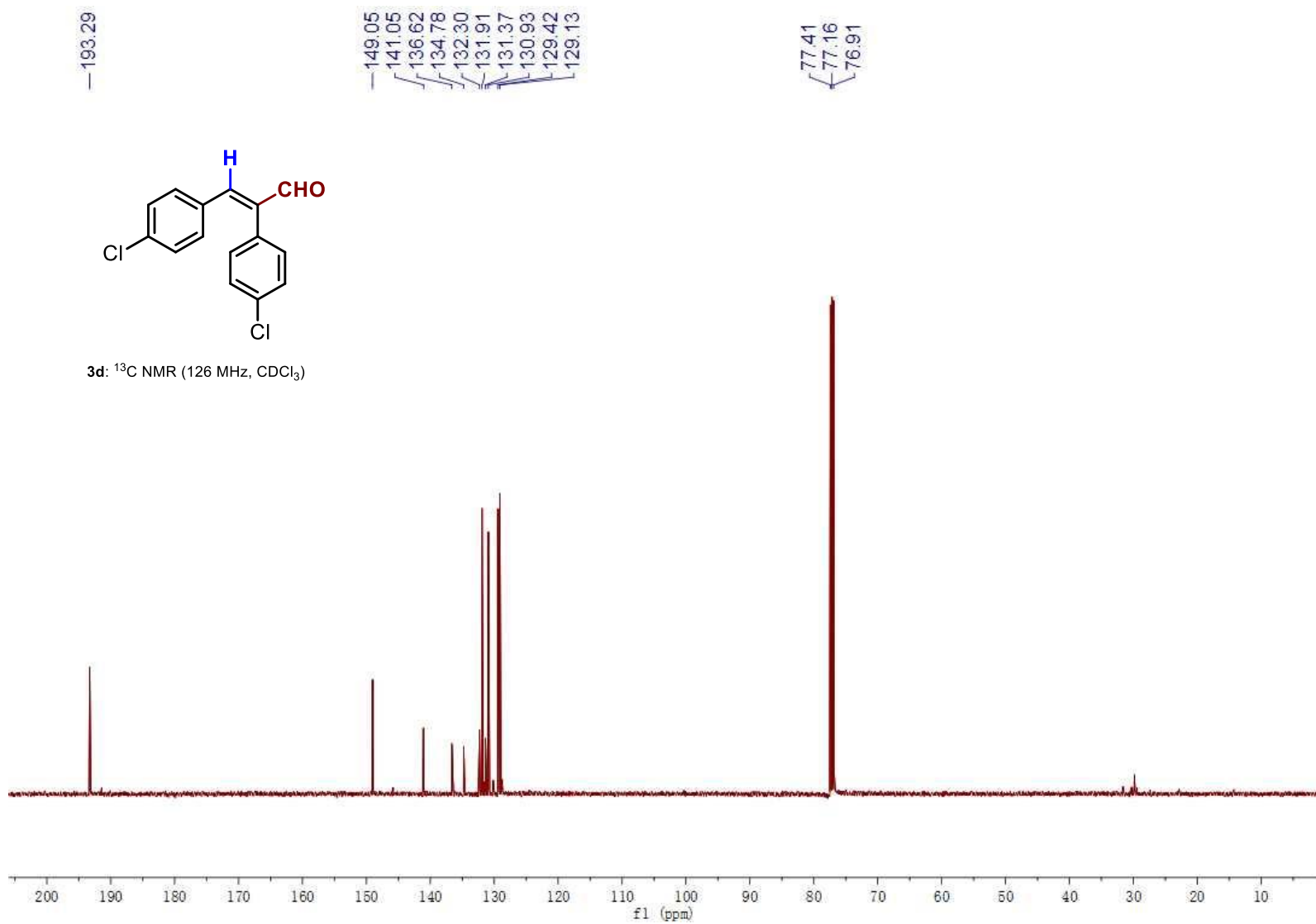


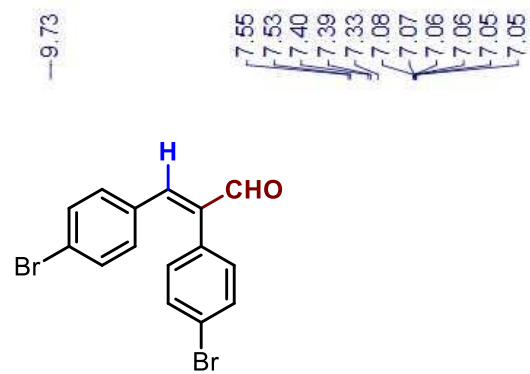




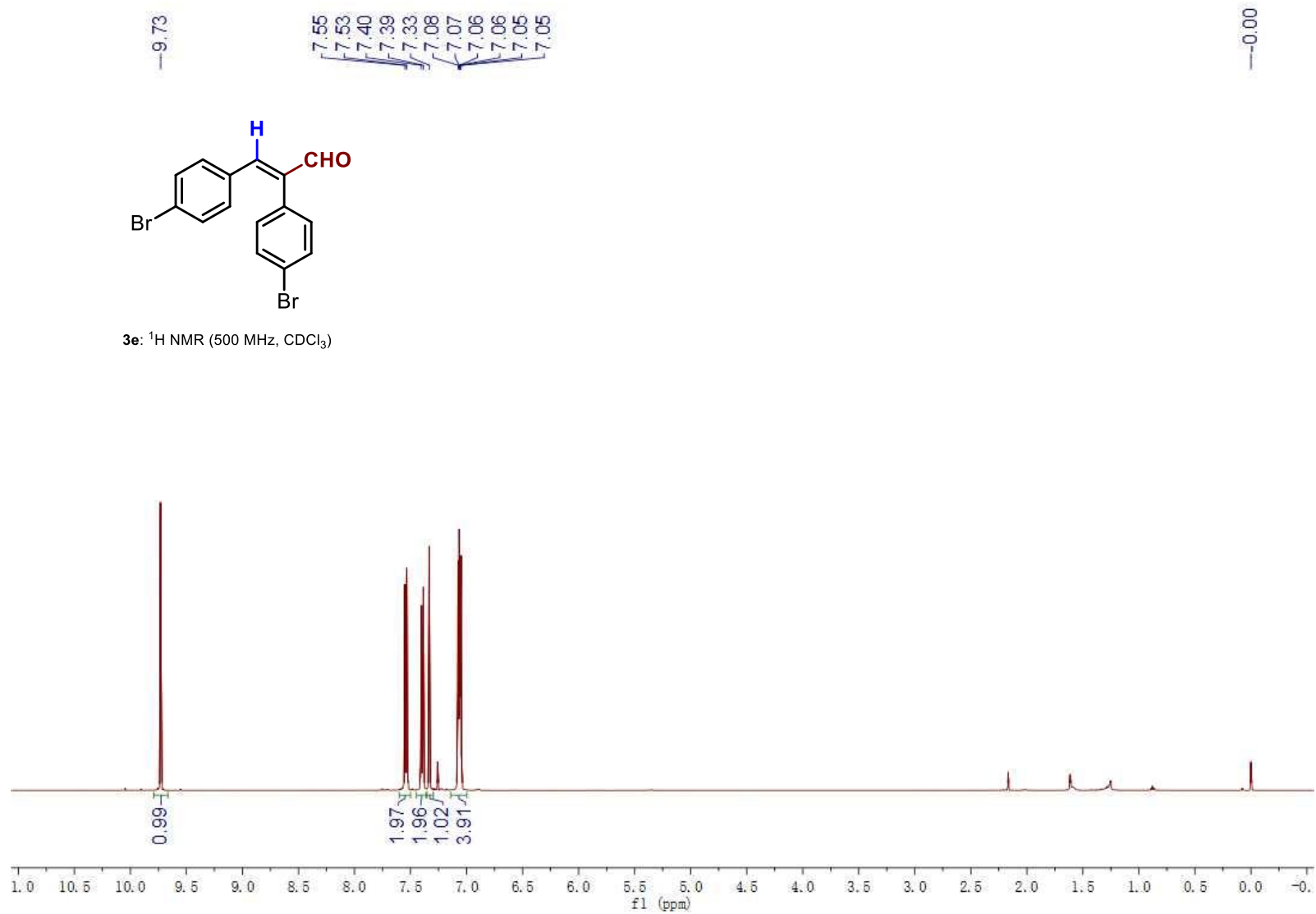
3d: ^1H NMR (500 MHz, CDCl_3)

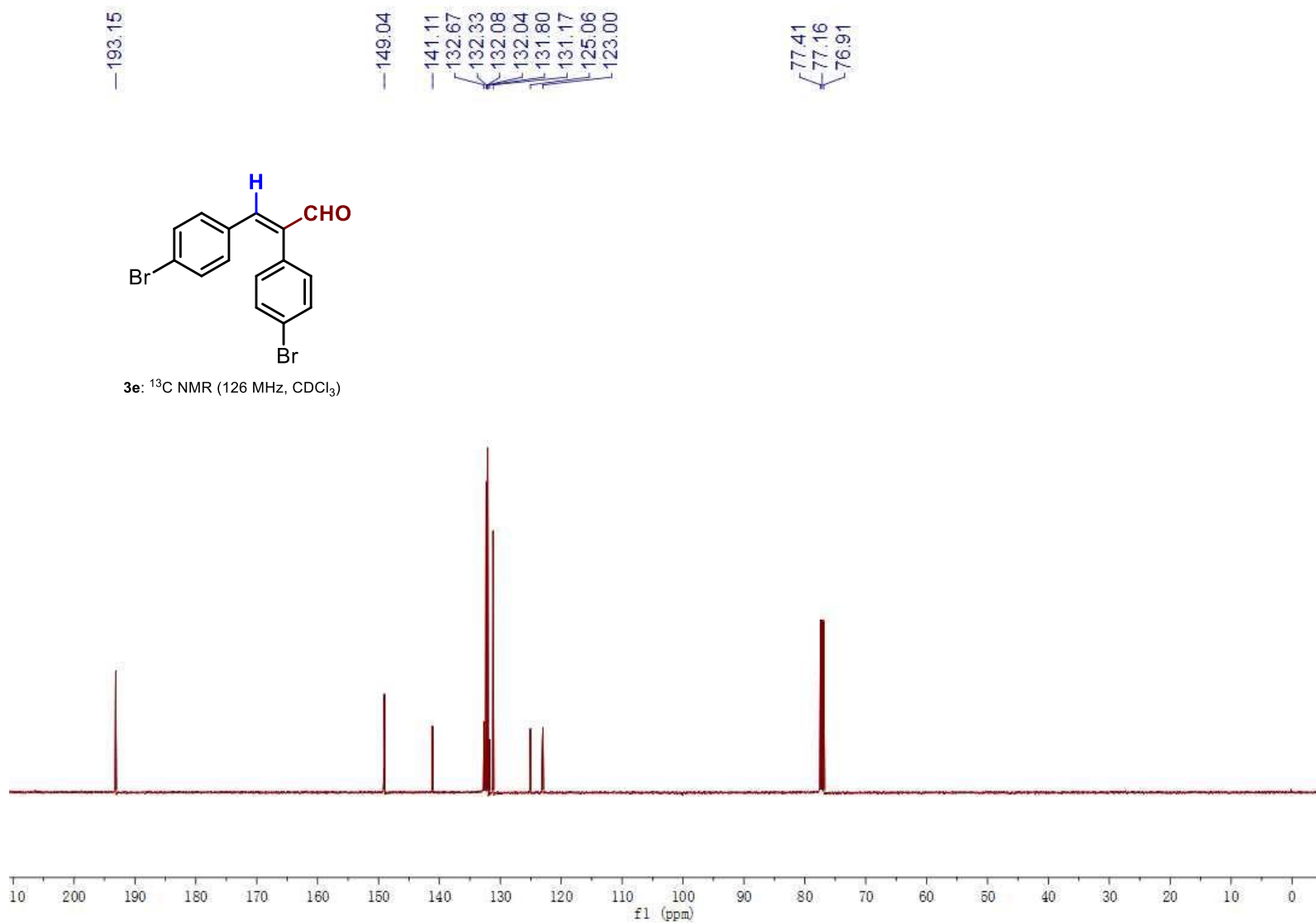


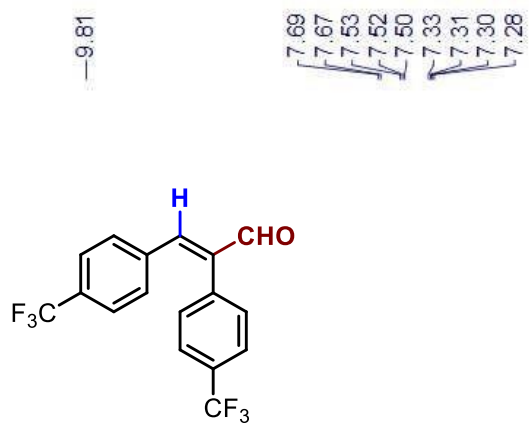




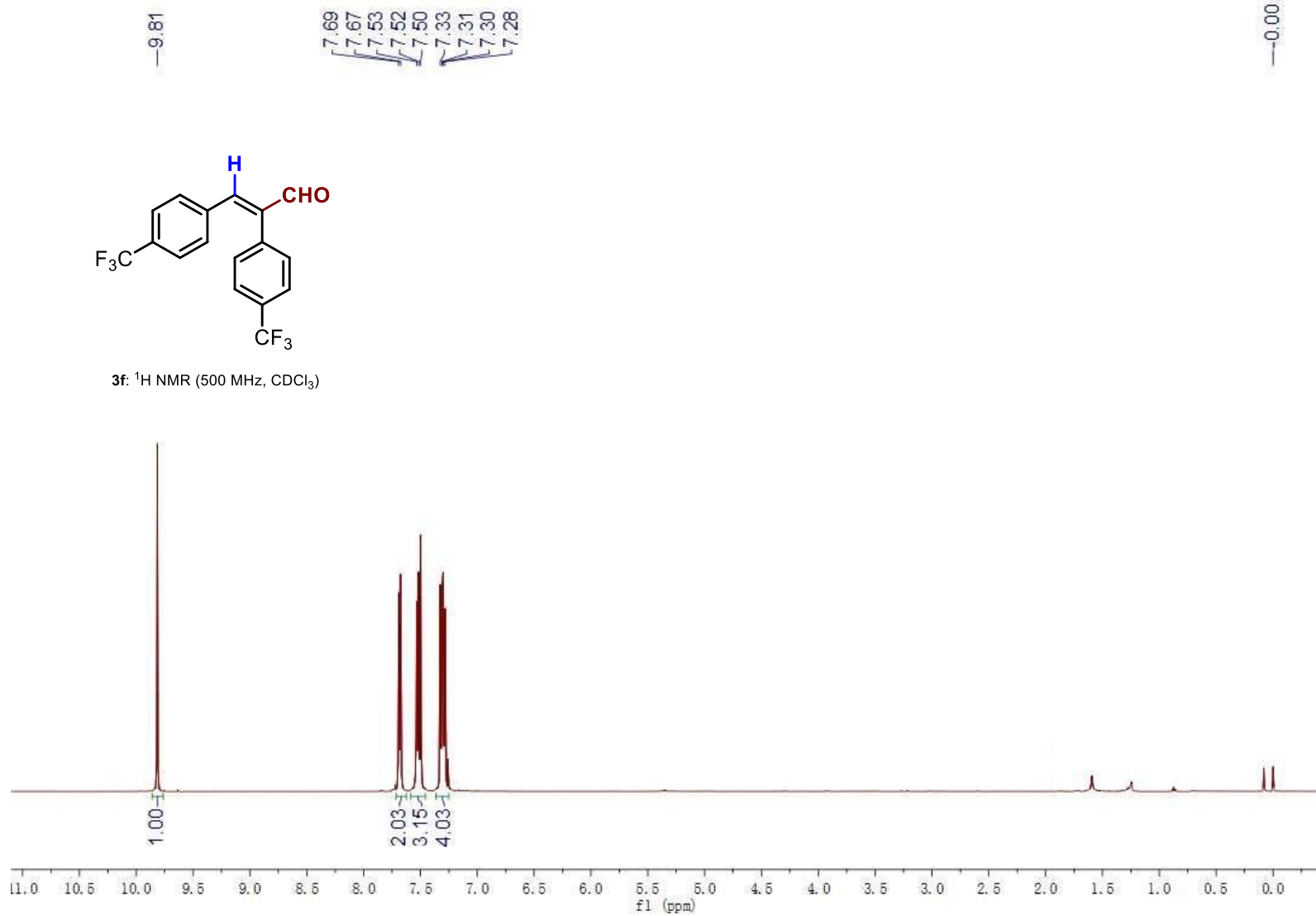
3e: ^1H NMR (500 MHz, CDCl_3)

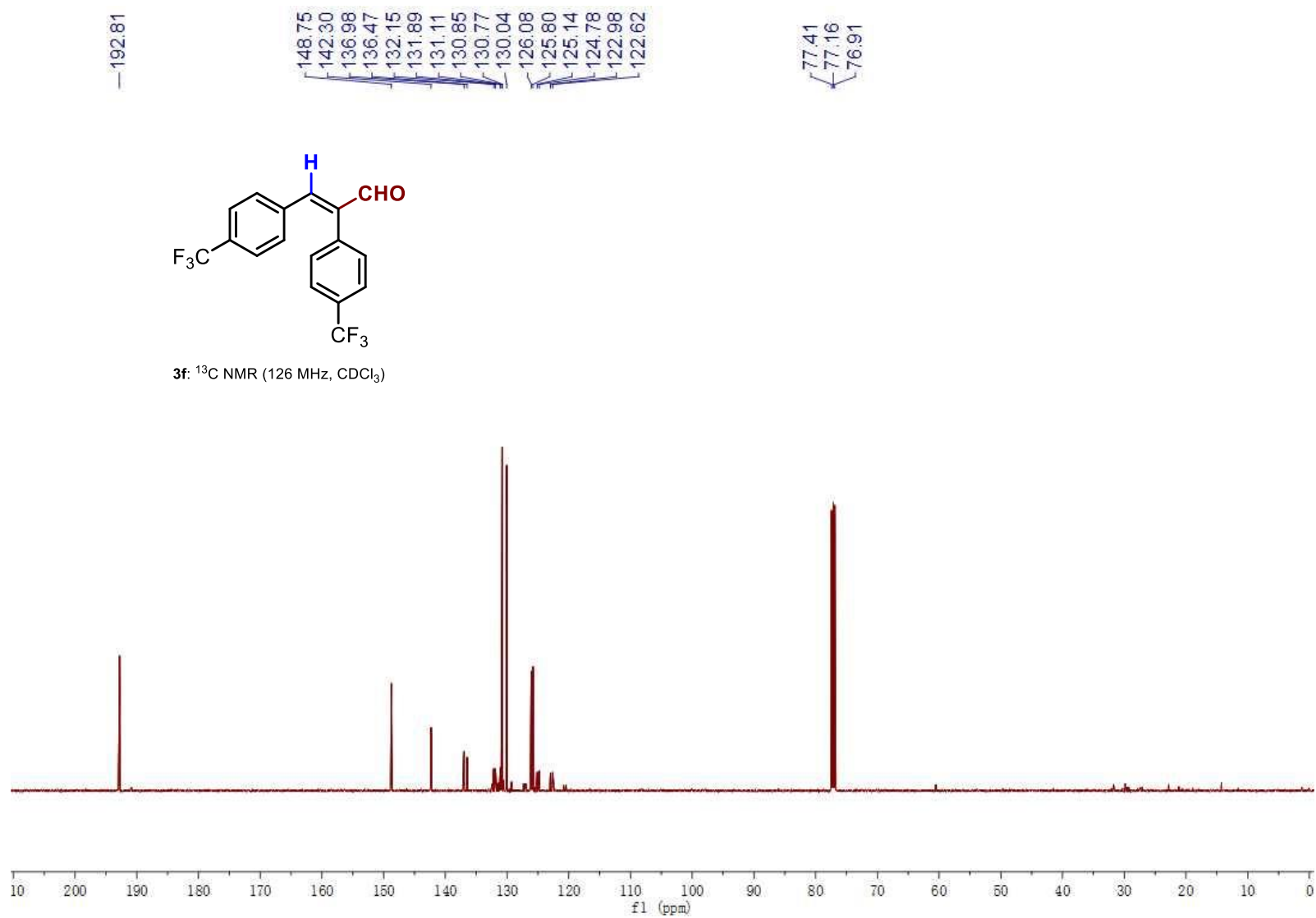


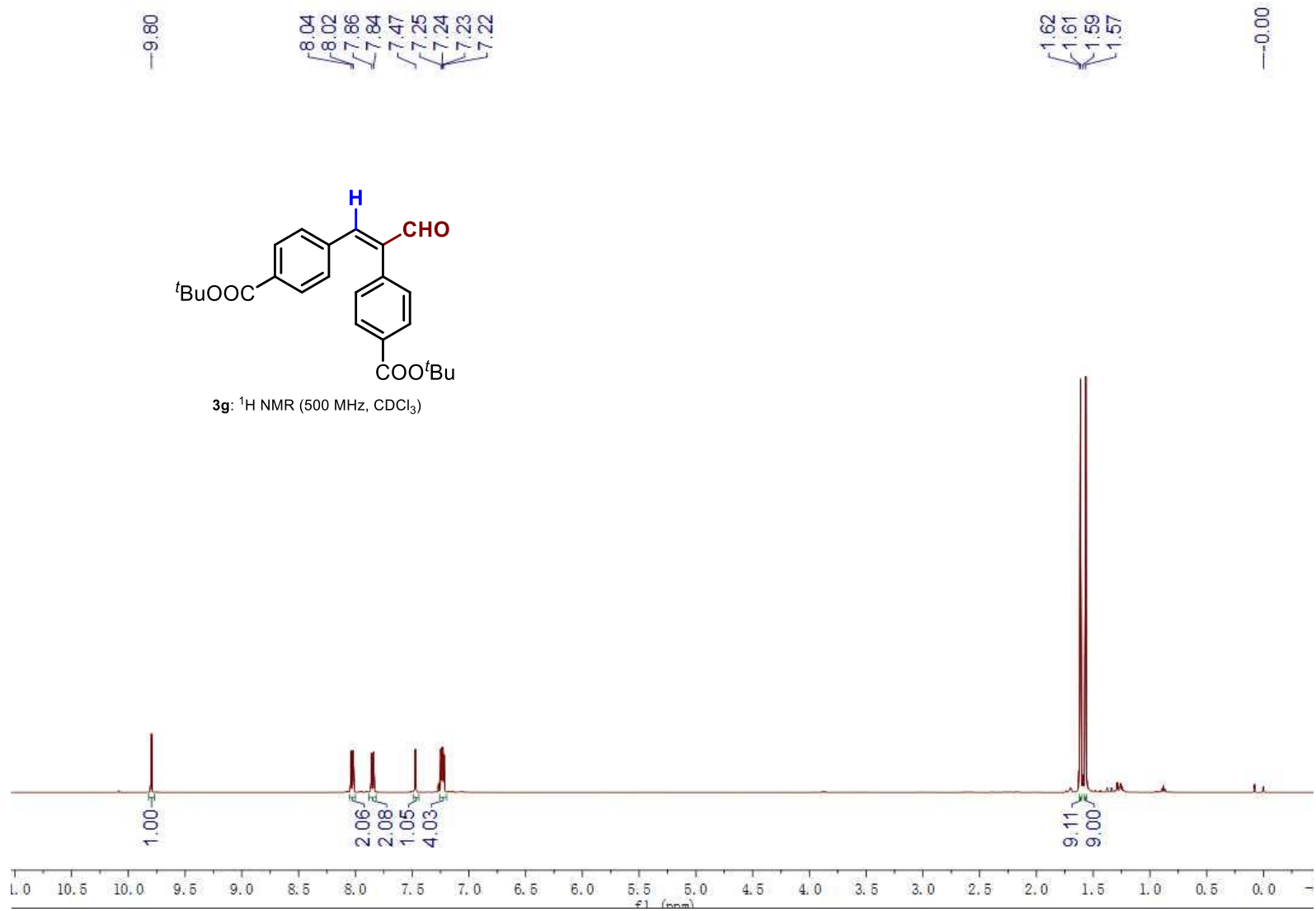


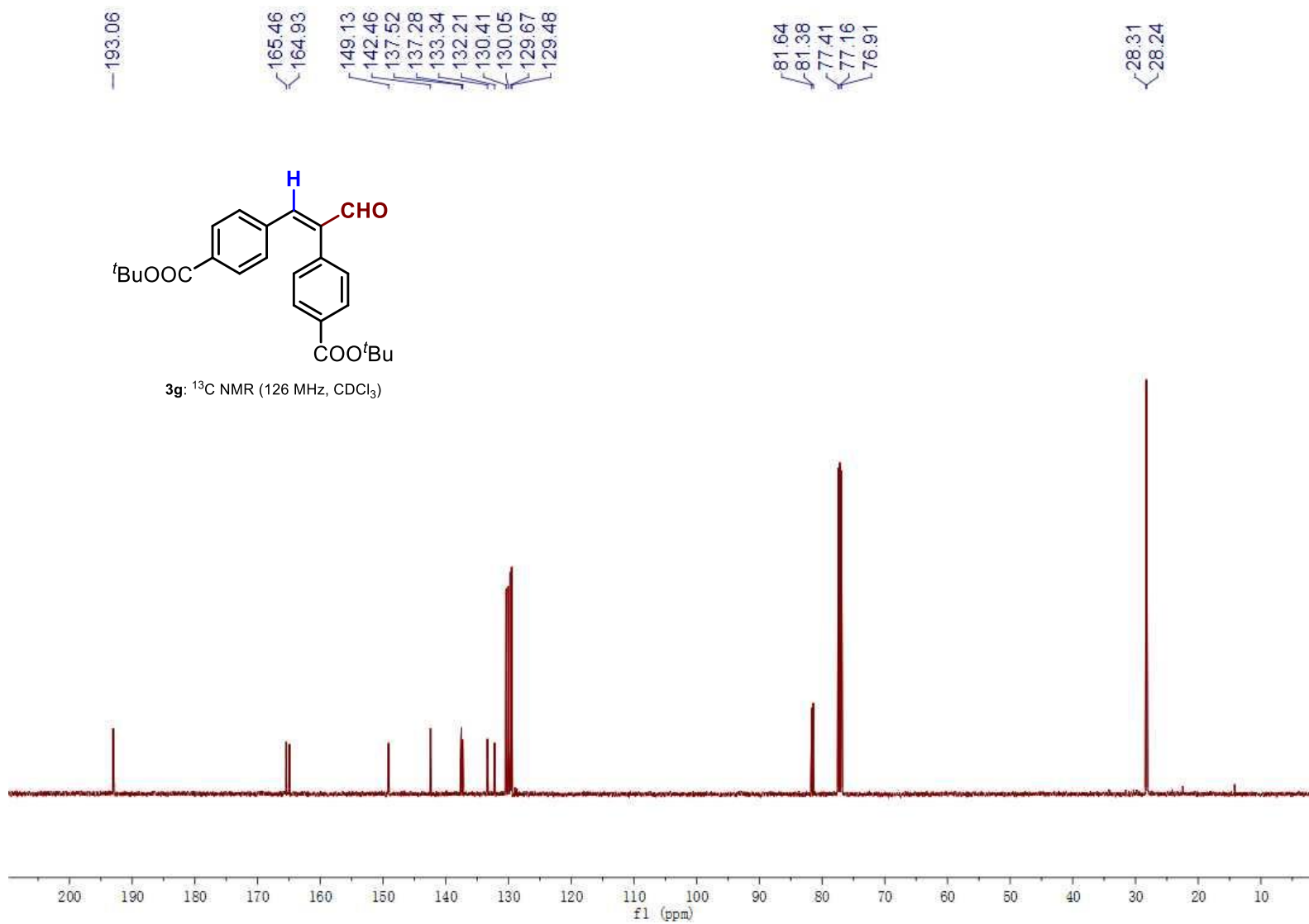


3f: 1H NMR (500 MHz, $CDCl_3$)

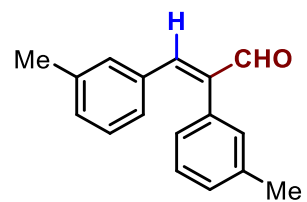




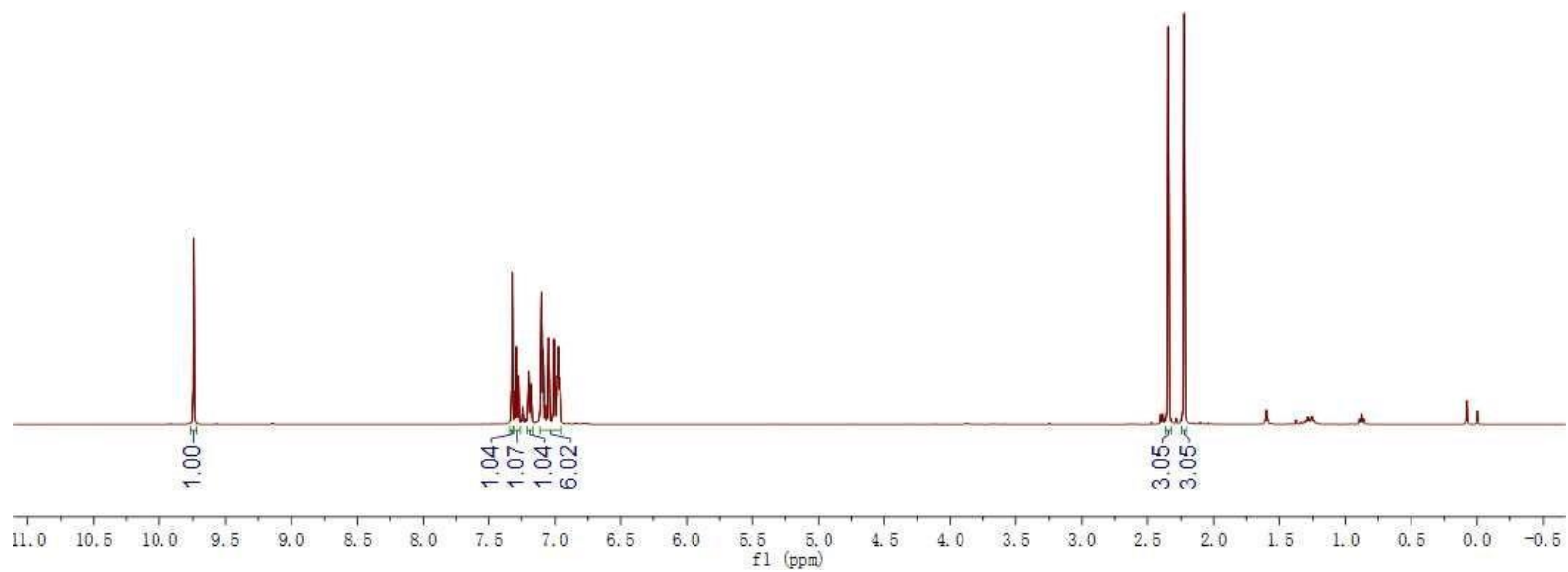


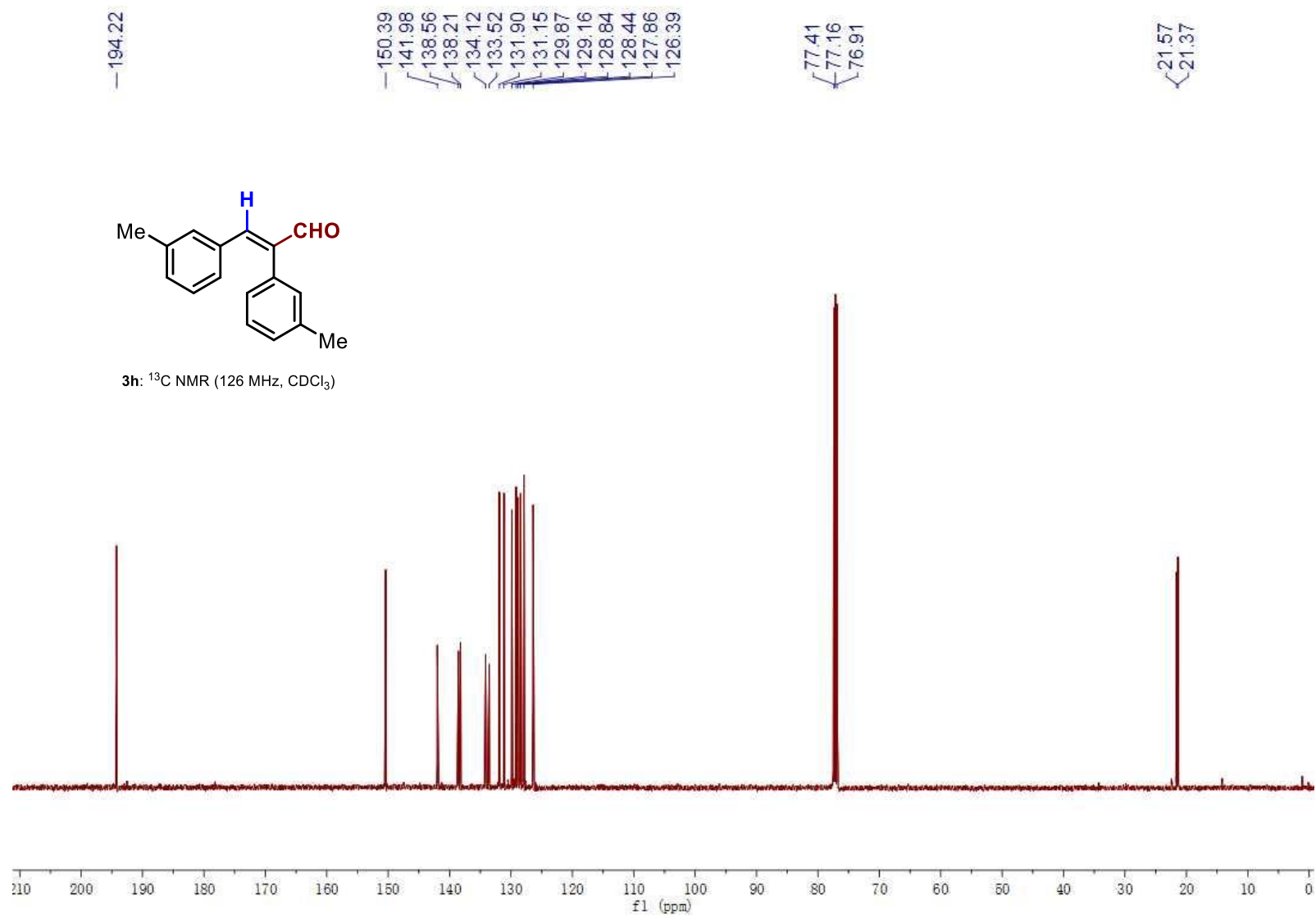


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 7.29
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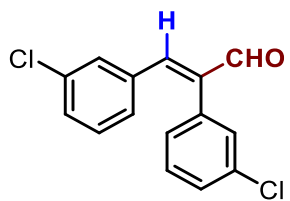


3h: ¹H NMR (500 MHz, CDCl₃)

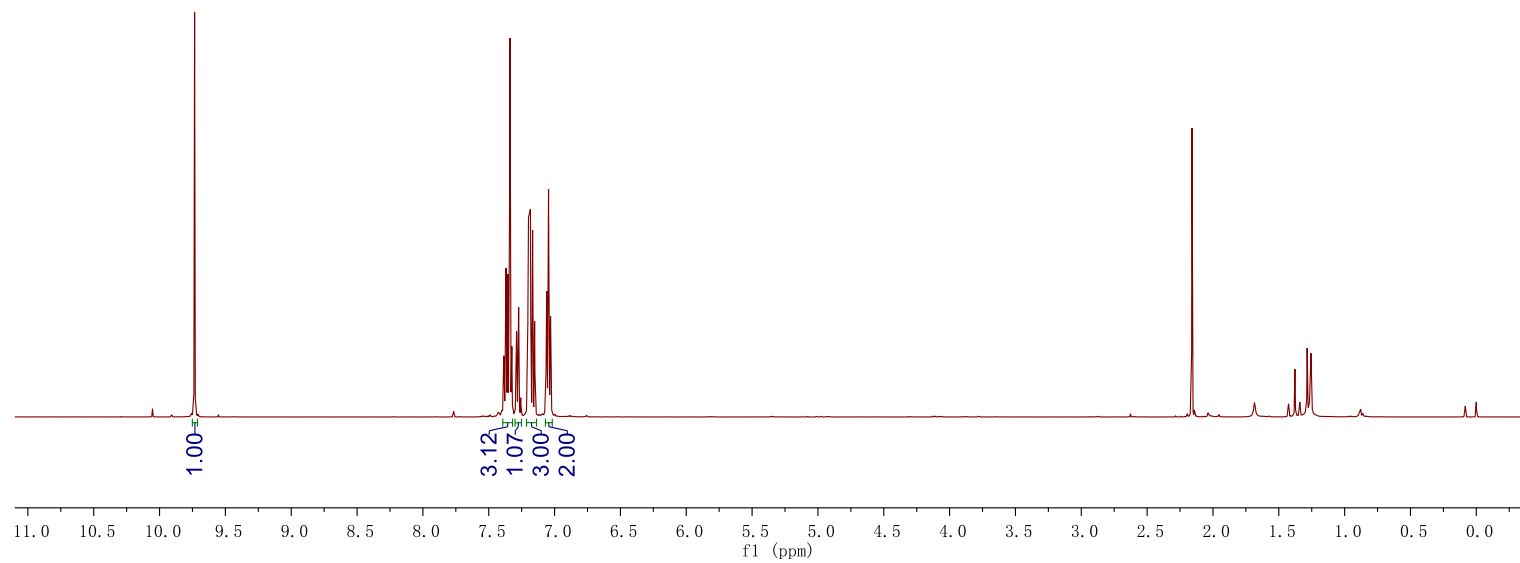


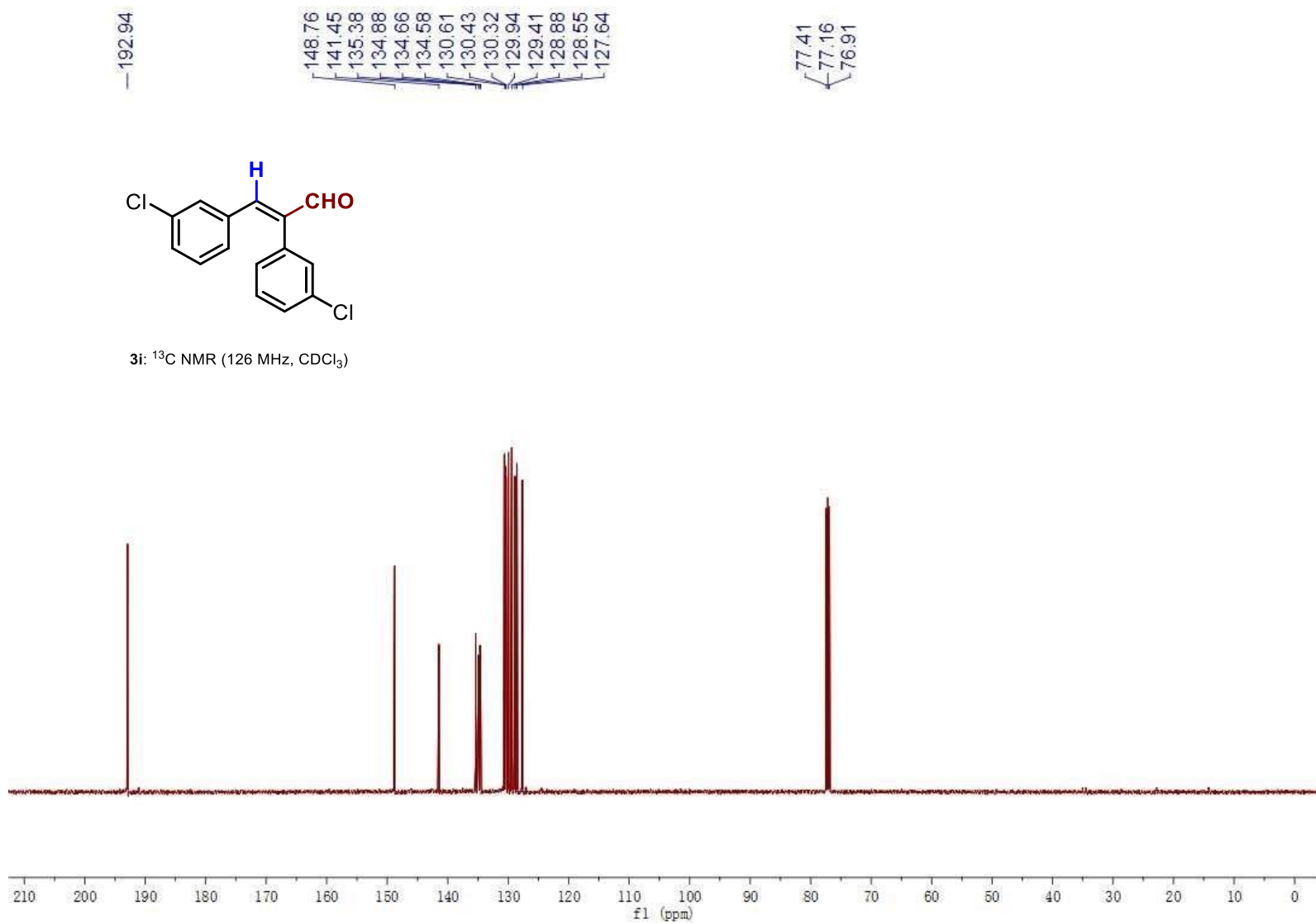


— 9.73
7.37
7.36
7.34
7.32
7.29
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7.20
7.19
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7.17
7.15
7.06
7.05
7.03
— 0.00

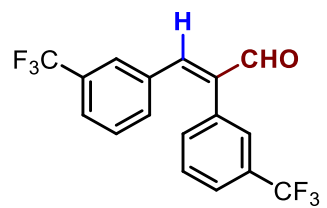


3: ¹H NMR (500 MHz, CDCl₃)

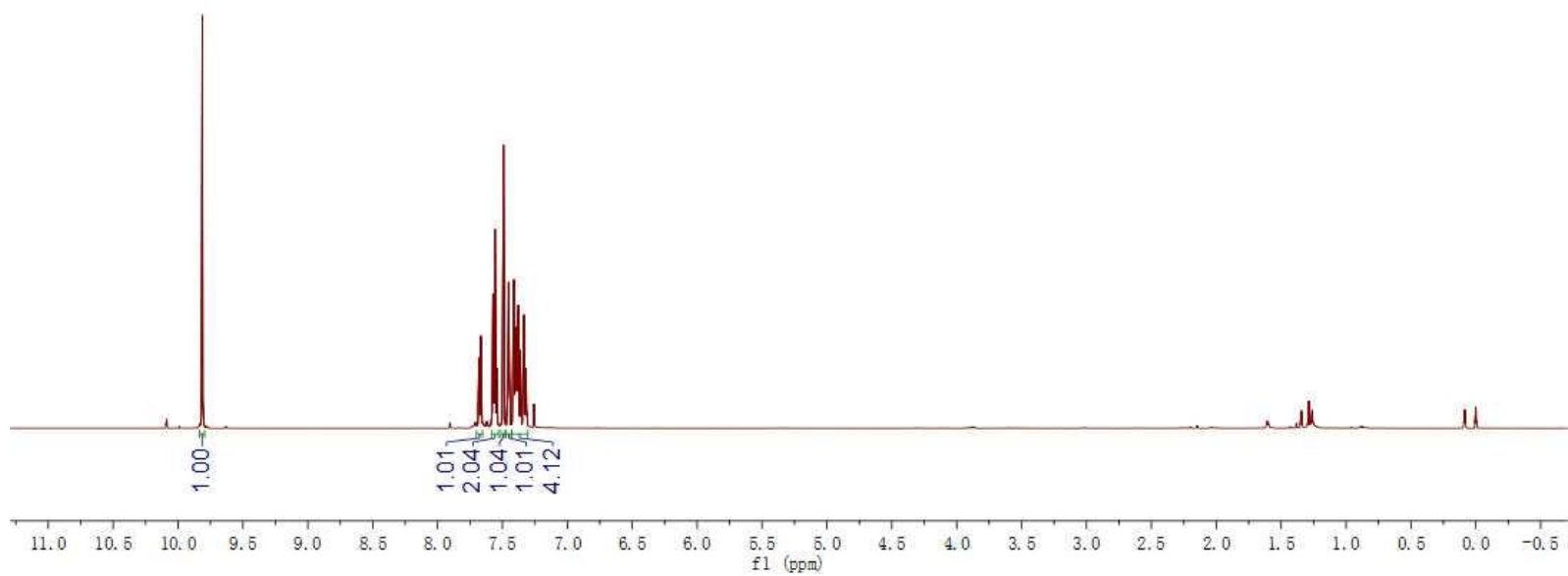


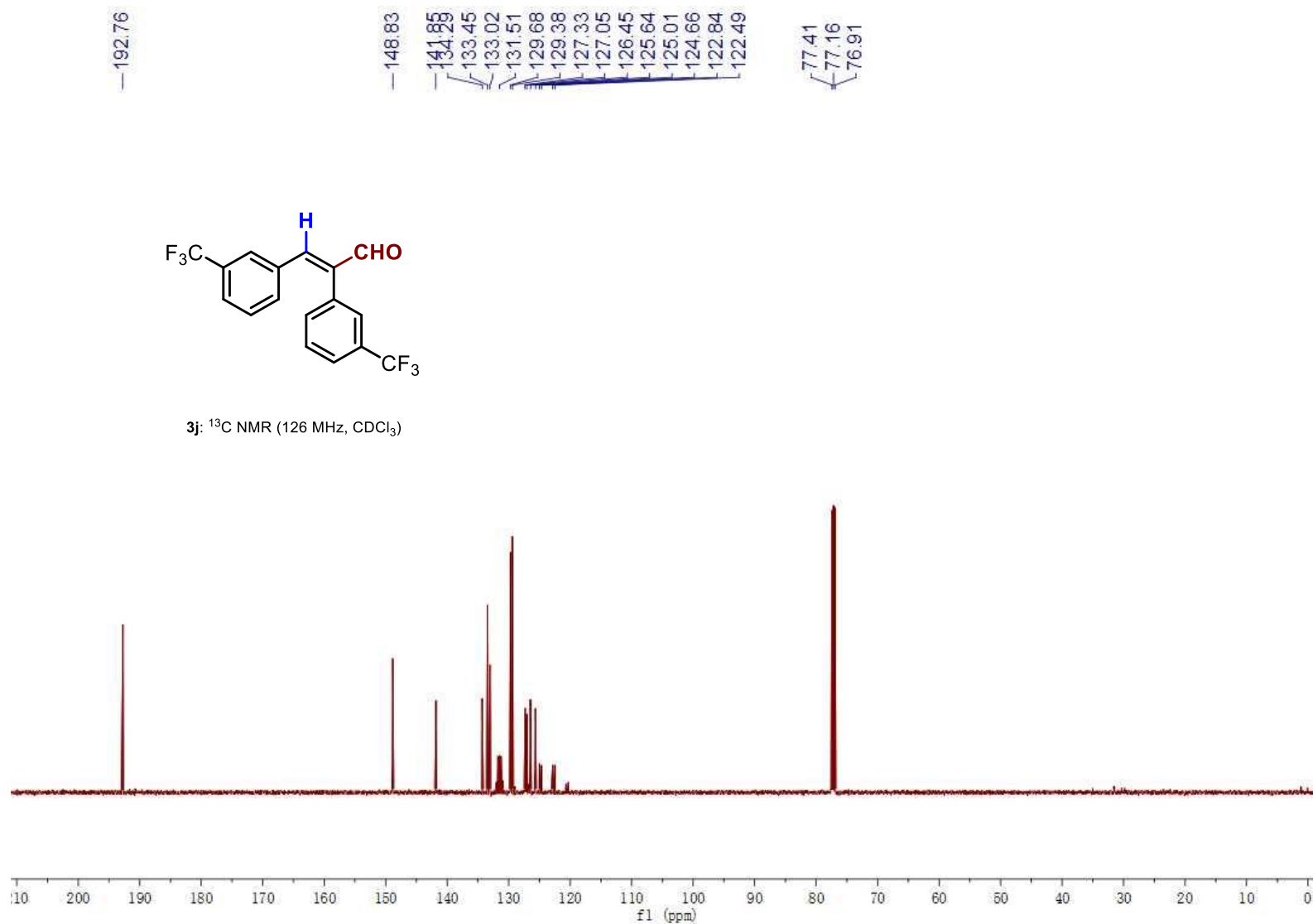


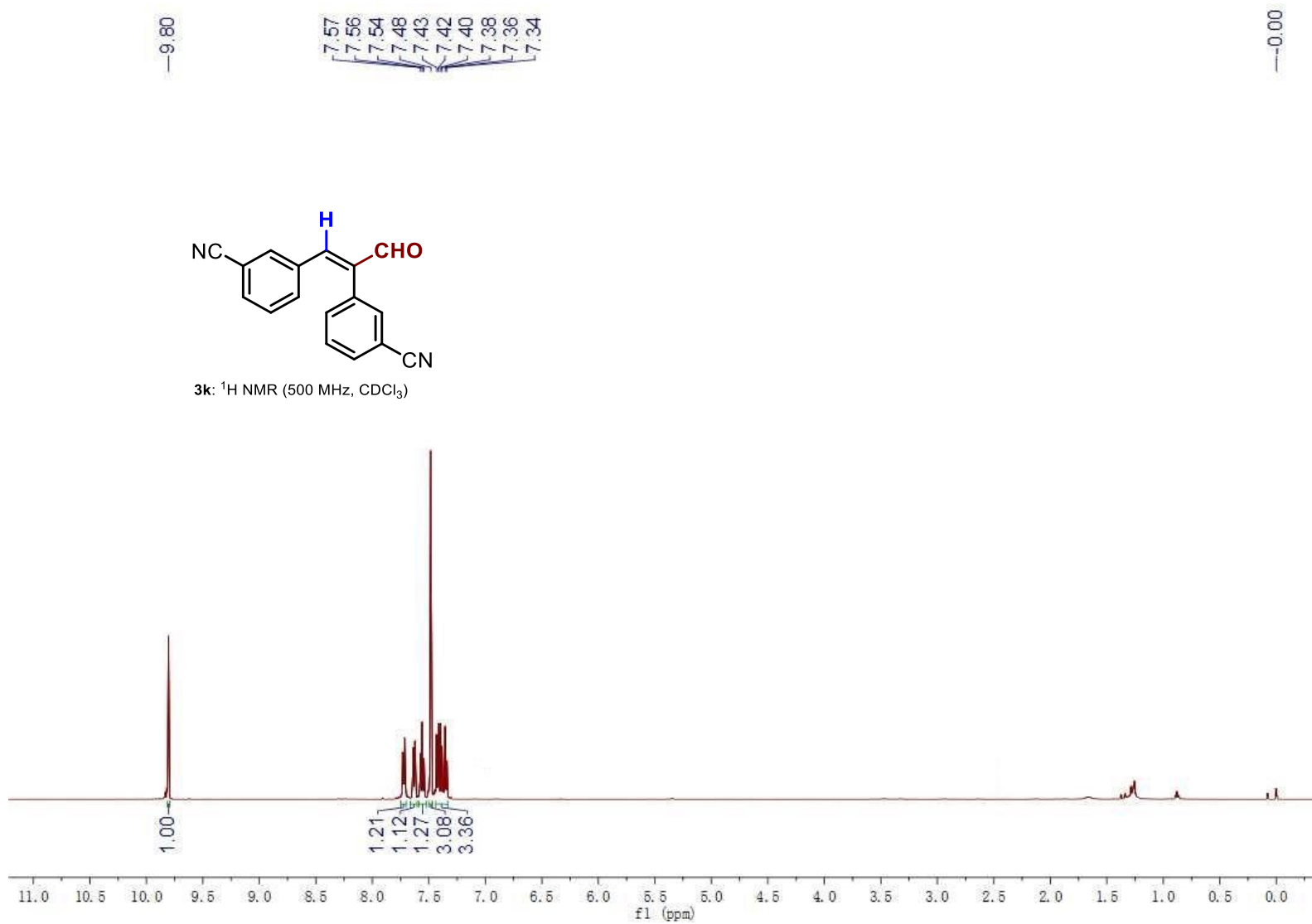
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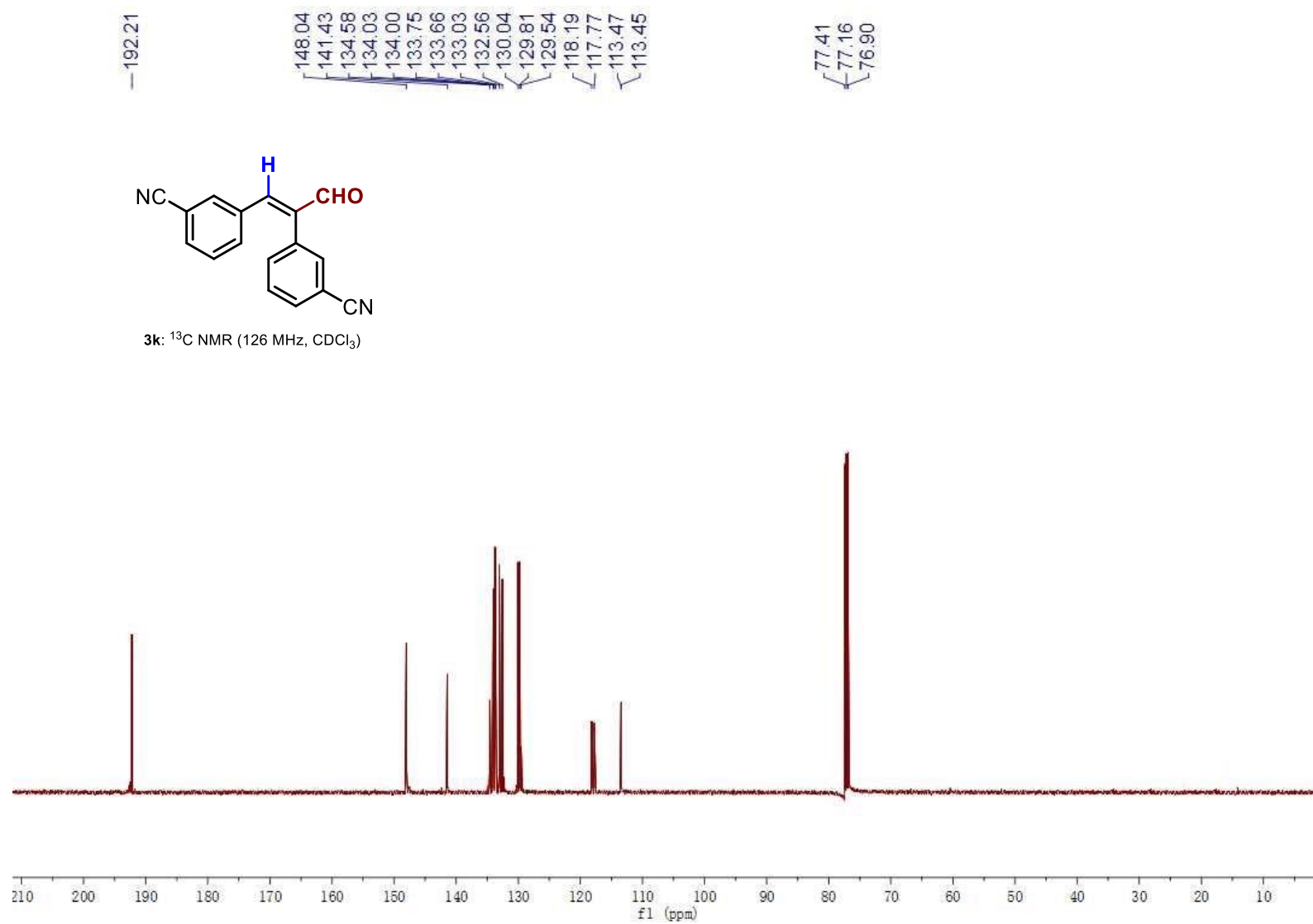


3j: ^1H NMR (500 MHz, CDCl_3)









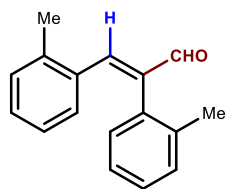
-9.82

-7.72
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-7.24
-7.23
-7.21
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-7.15
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-6.88
-6.87
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-6.77

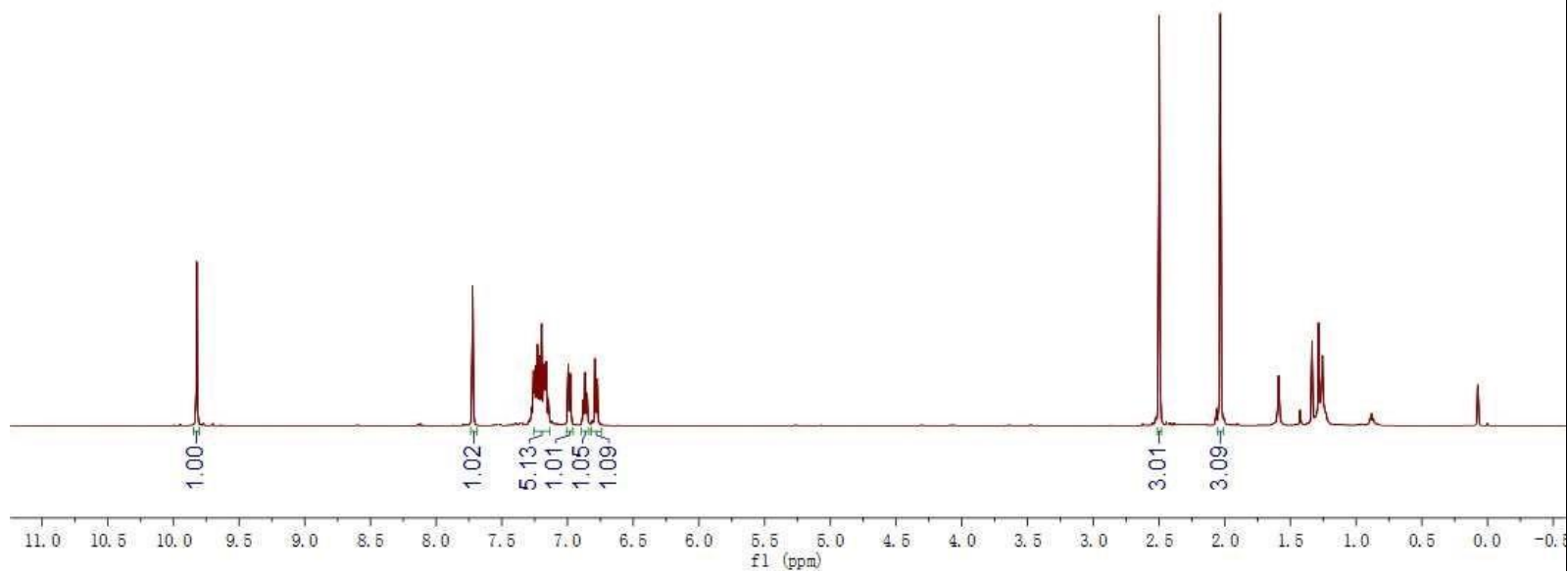
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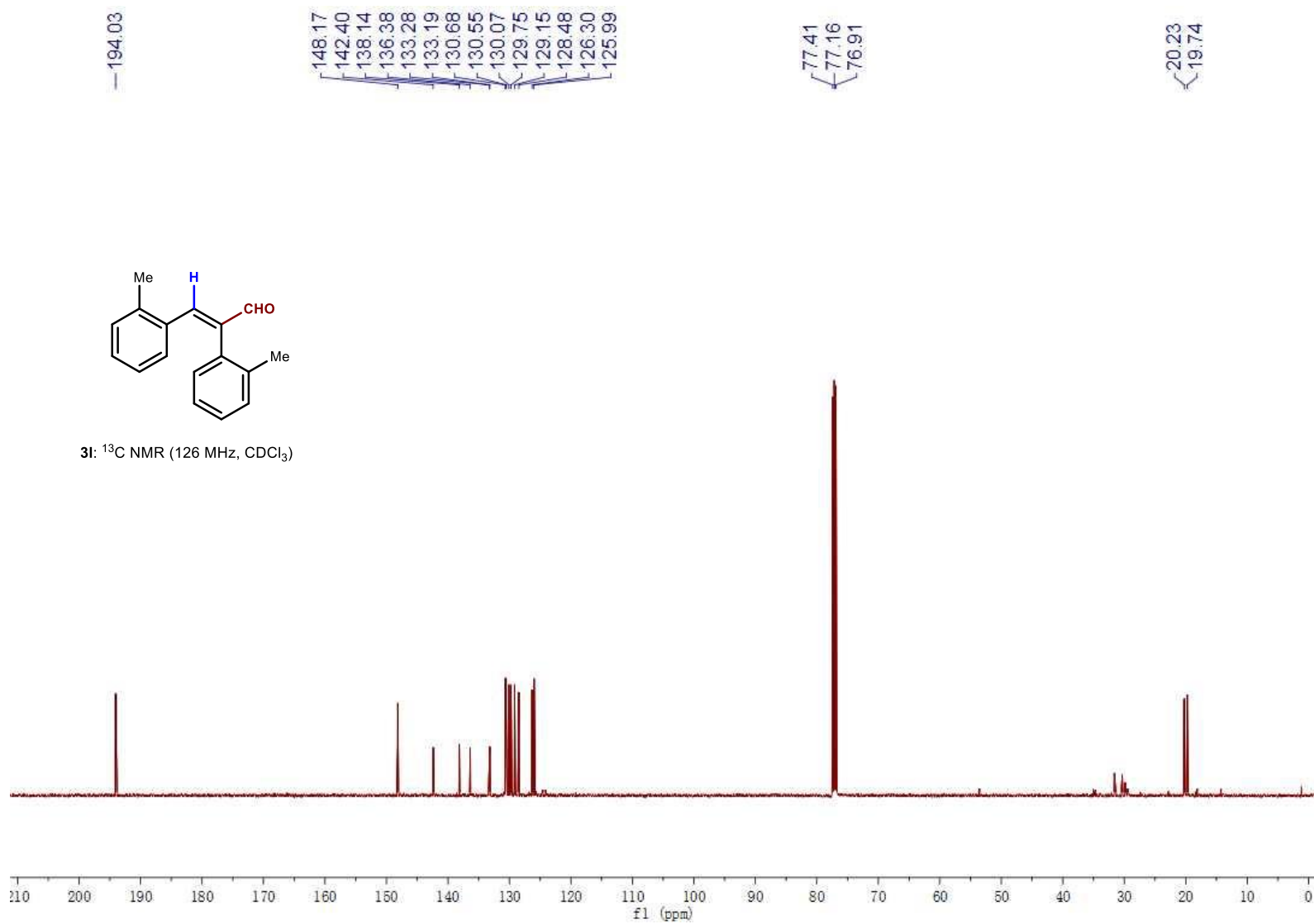
-2.03

-0.00



3i: ¹H NMR (500 MHz, CDCl₃)

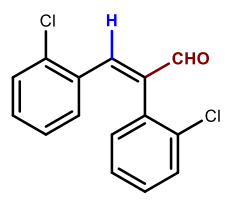




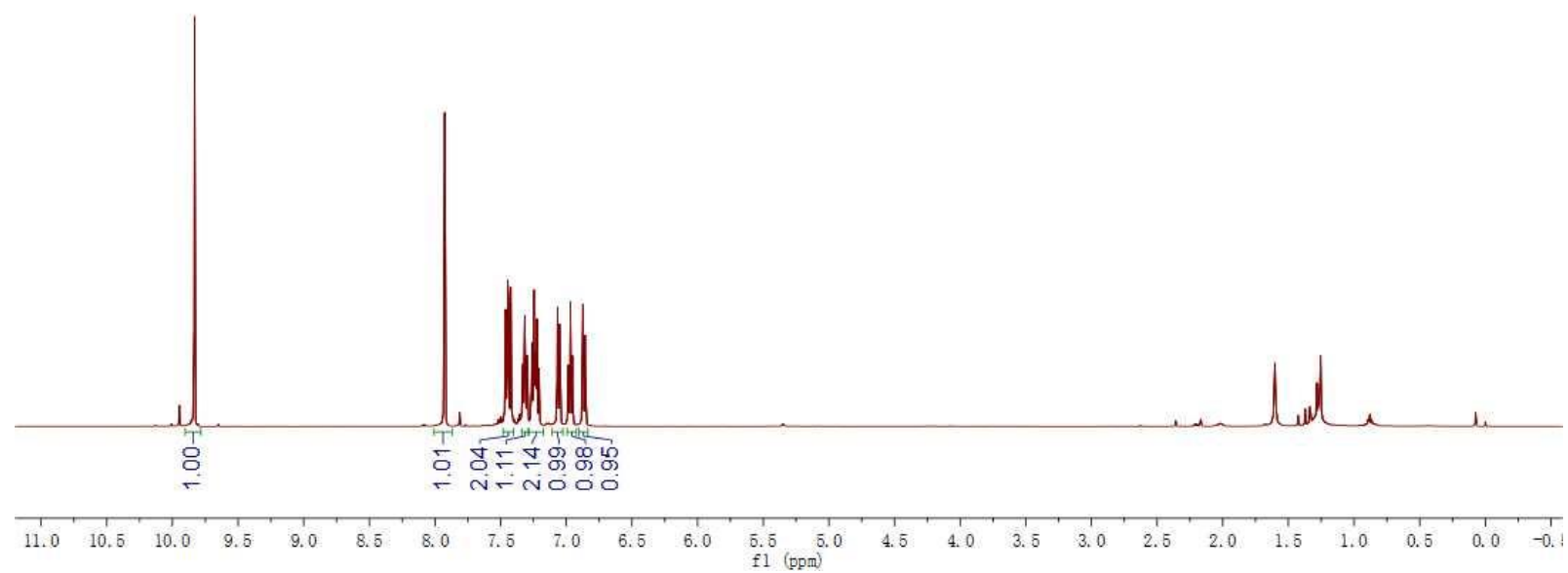
9.83

7.93
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0.00



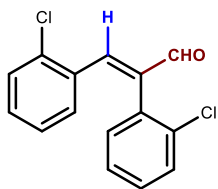
3m: ¹H NMR (500 MHz, CDCl₃)



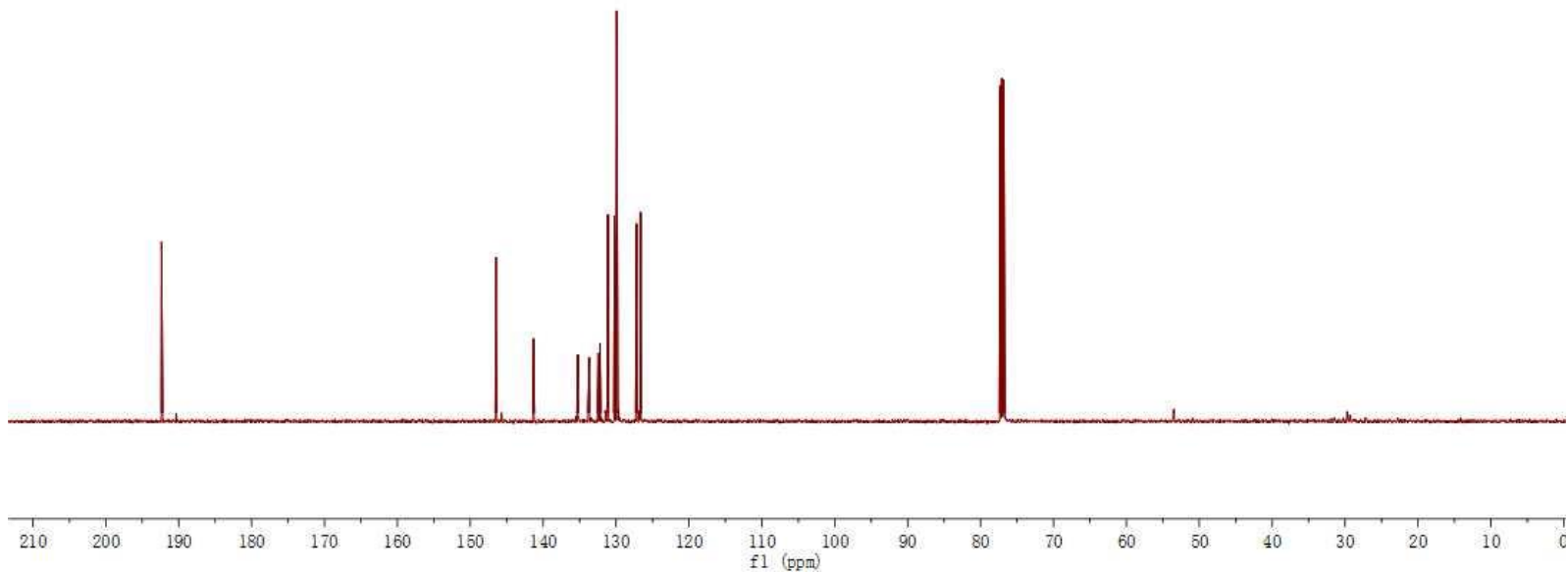
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127.21
126.64

77.31
77.06
76.80



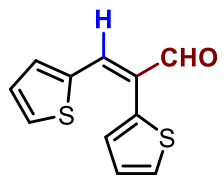
3m: ^{13}C NMR (126 MHz, CDCl_3)



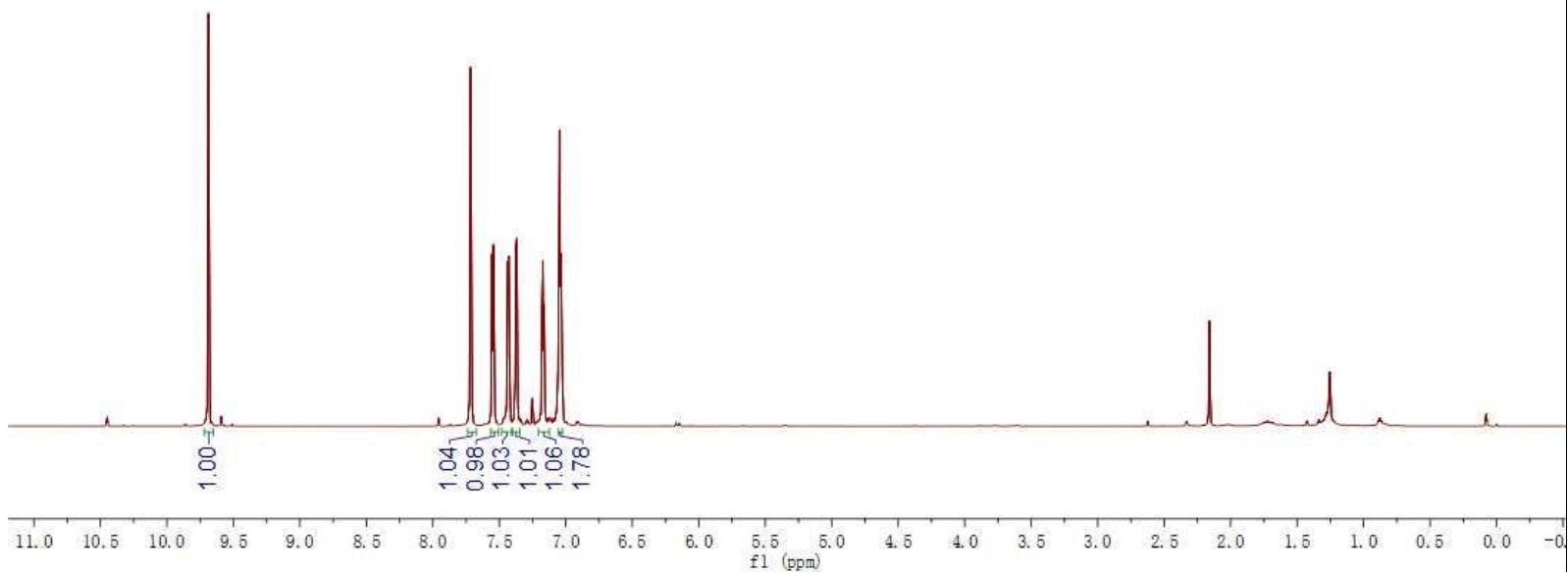
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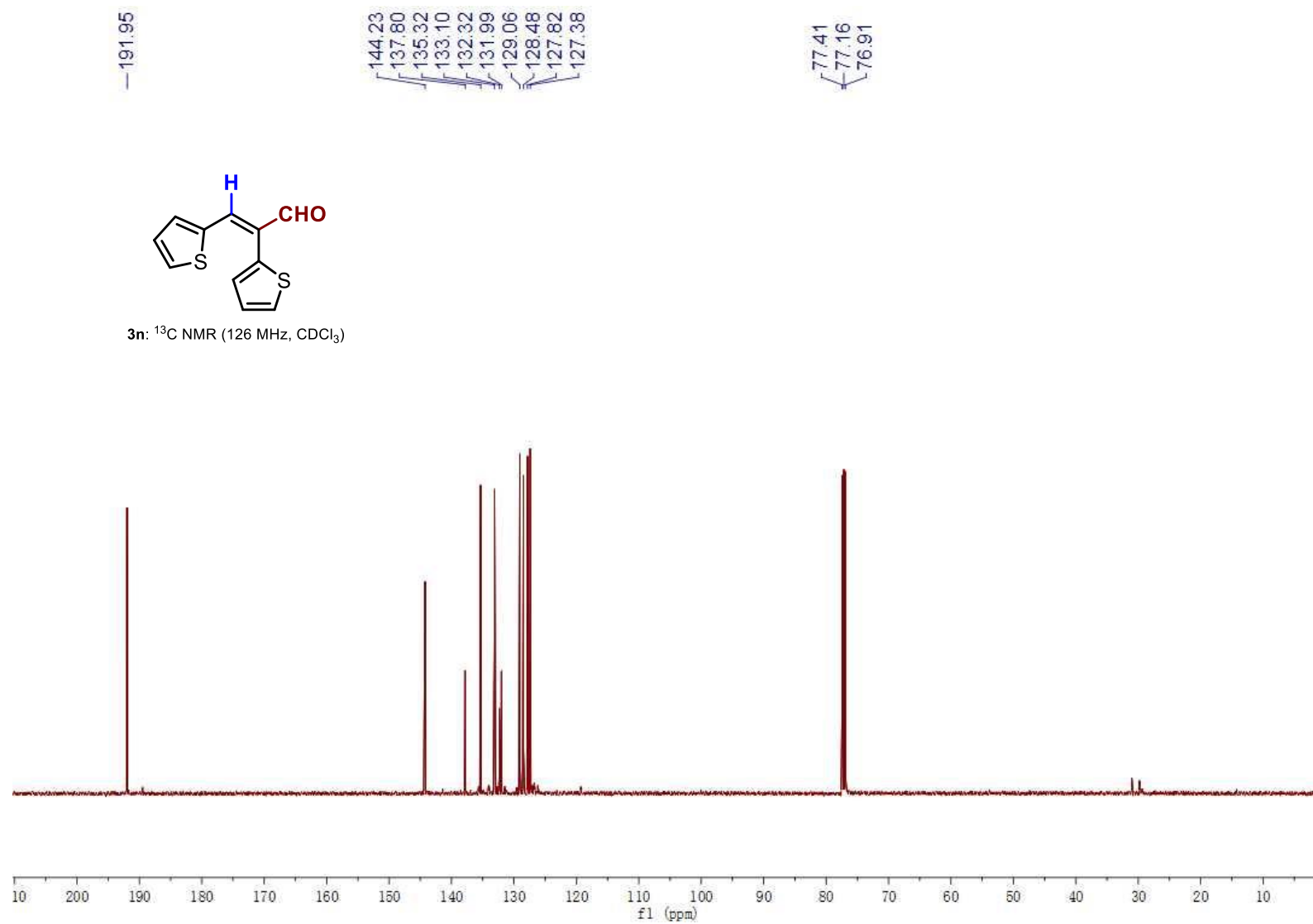
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7.38
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7.16
7.05
7.05
7.04
7.03

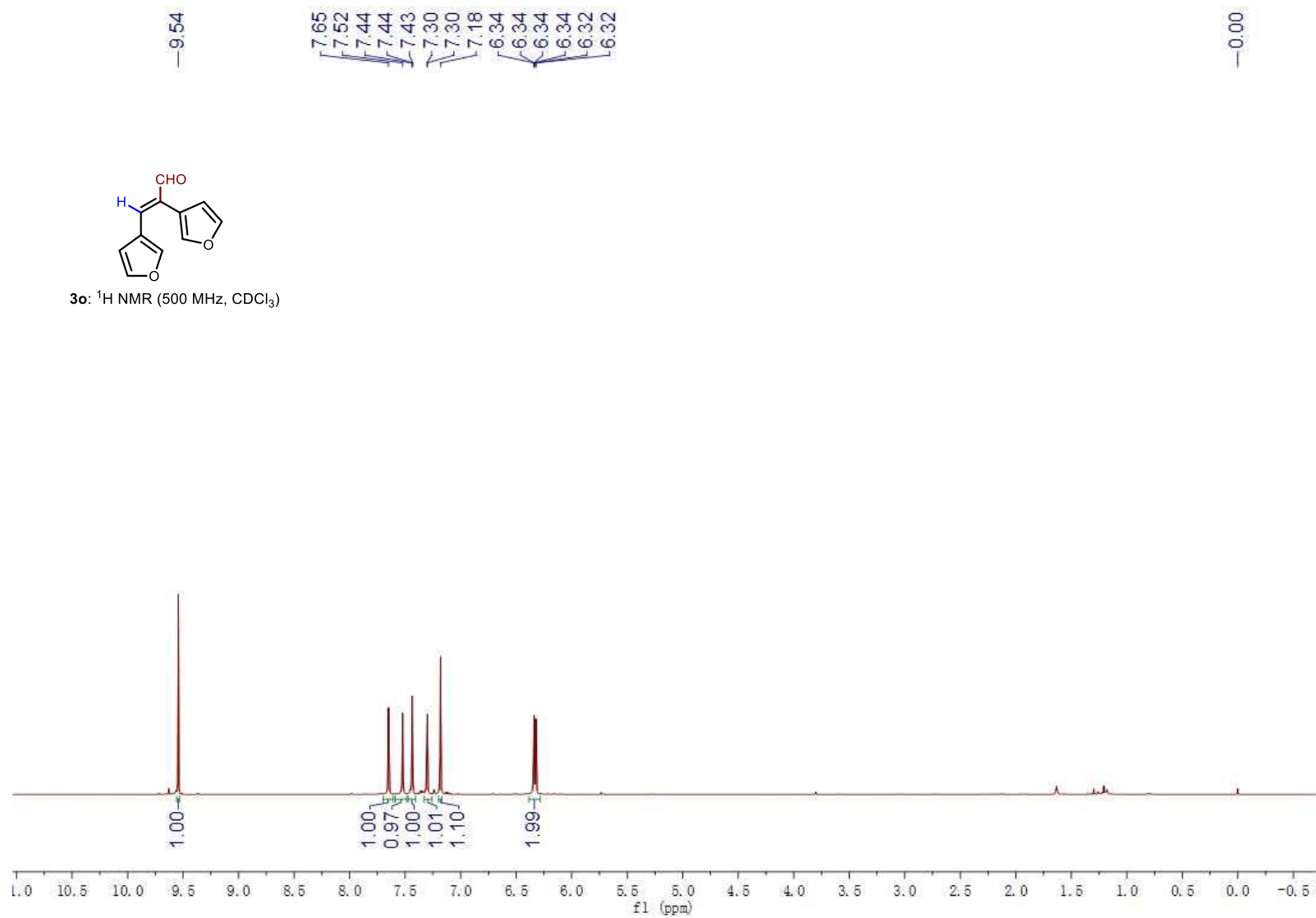
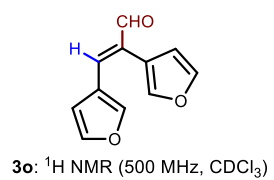
—0.00

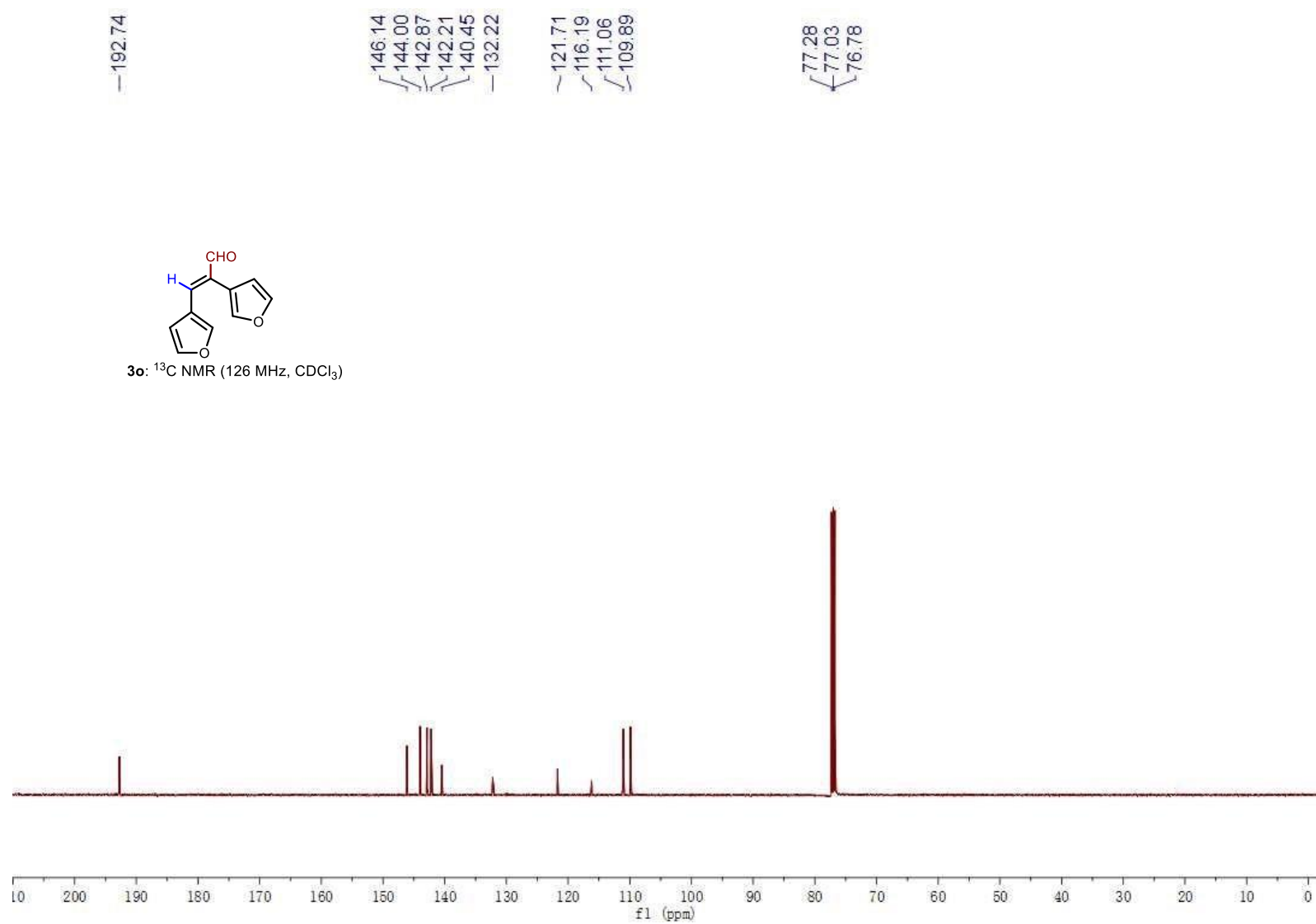


3n: ¹H NMR (500 MHz, CDCl₃)







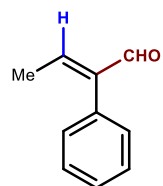


9.62

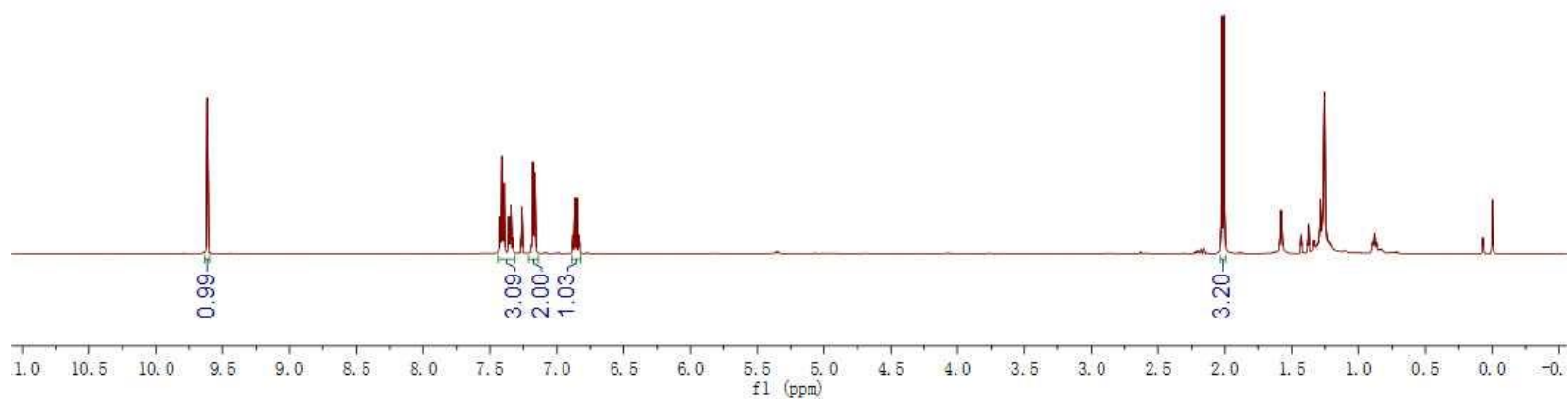
7.43
7.41
7.40
7.36
7.35
7.33
7.18
7.16
6.88
6.86
6.85
6.83

2.02
2.01

0.00



3p: ¹H NMR (500 MHz, CDCl₃)



—193.66

—151.37

—145.16

—132.40

—129.61

—128.37

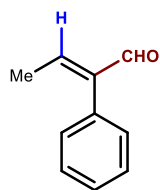
—128.07

—77.41

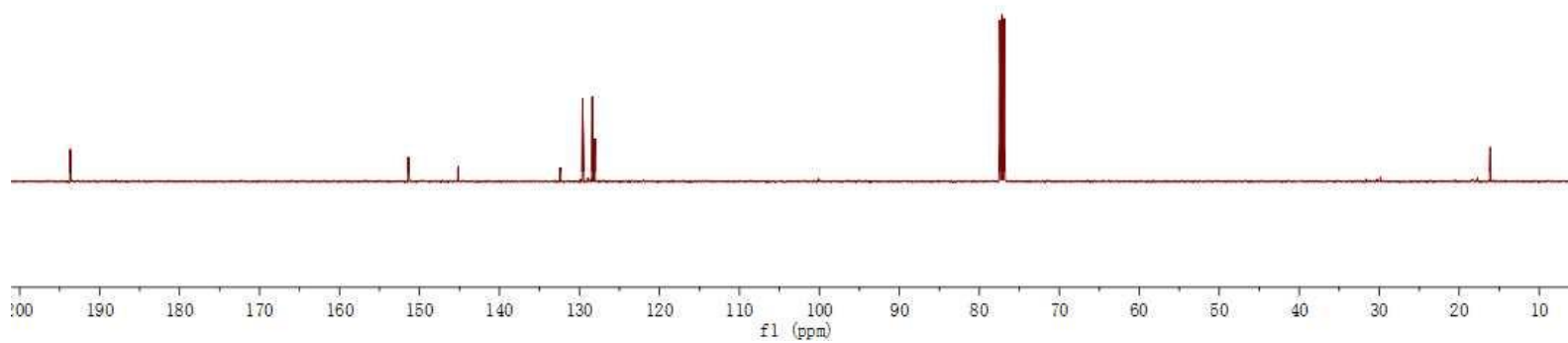
—77.16

—76.91

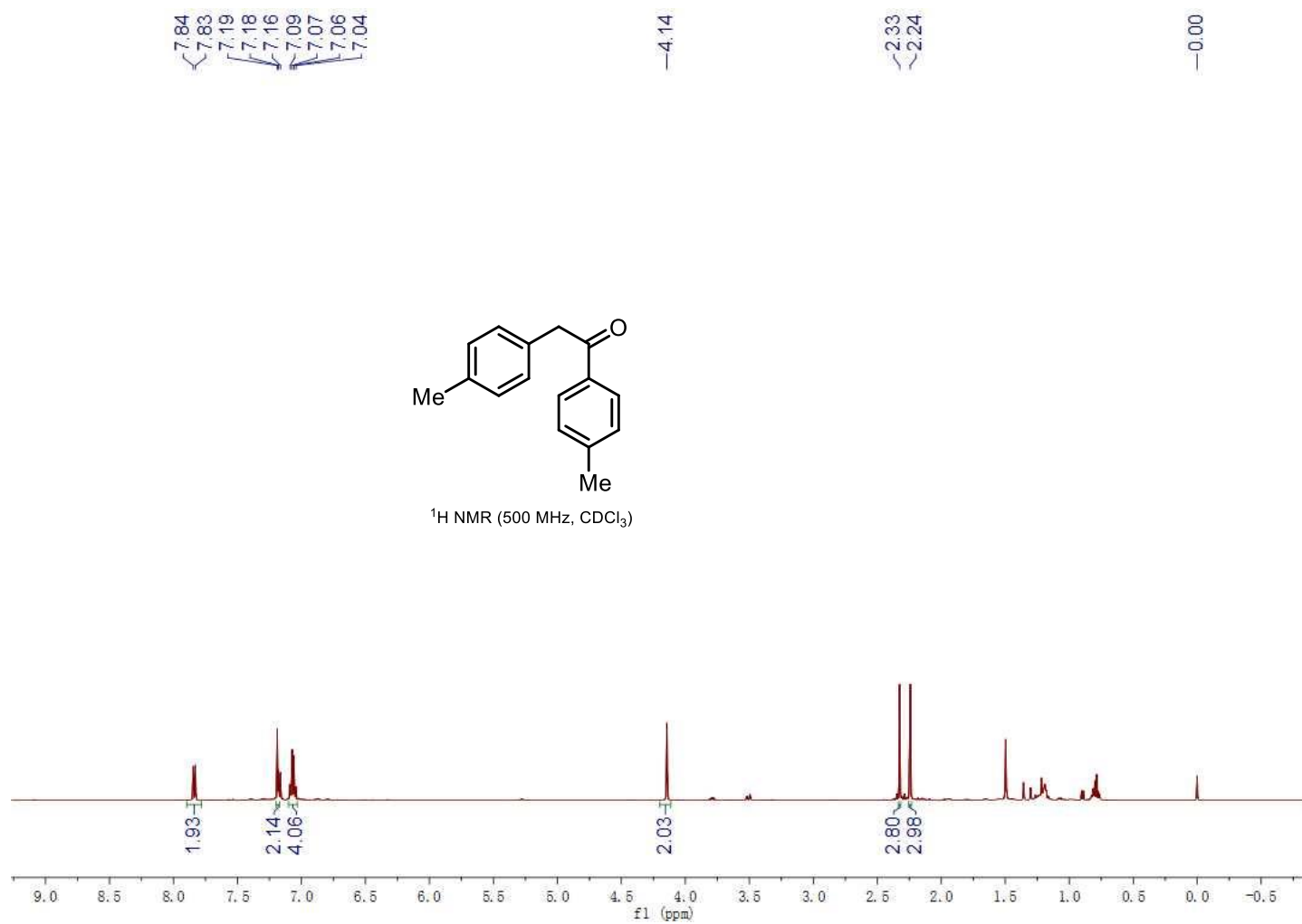
—16.10



3p: ¹³C NMR (126 MHz, CDCl₃)



4. NMR spectra of 1,2-di-p-tolyloethan-1-one



5. NMR spectra of the control experimental

