

Supporting Online Material for

**Copper-catalyzed three-component reaction to synthesize
polysubstituted imidazo[1,2-*a*]pyridines**

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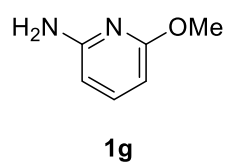
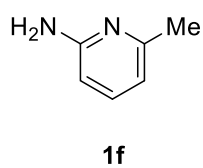
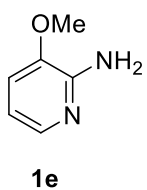
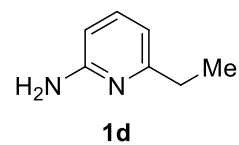
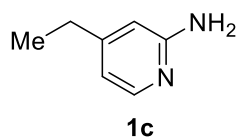
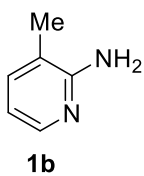
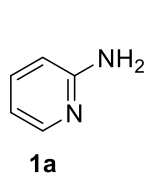
Email: luohui@gdmu.edu.cn; cuiliao@163.com, 09ywg@163.com

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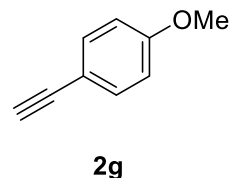
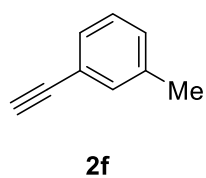
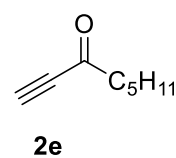
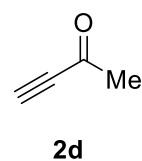
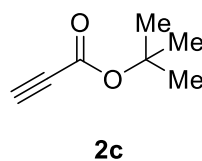
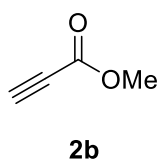
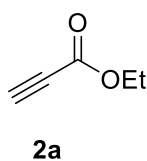
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1. The structures of starting materials.

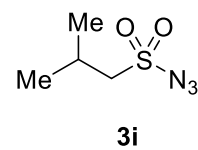
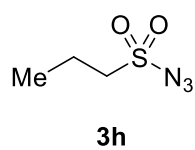
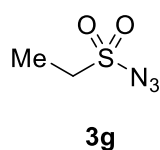
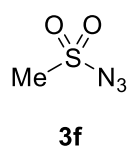
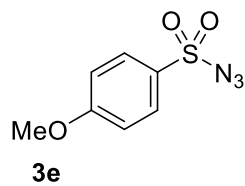
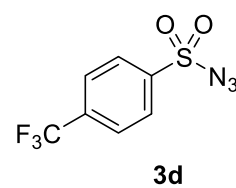
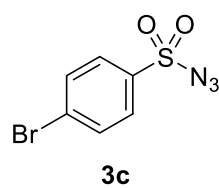
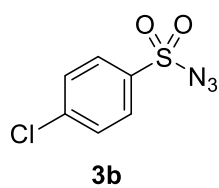
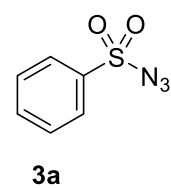
The structures of starting materials **1a-1g**.



The structures of starting materials **2a-2g**.



The structures of starting materials **3a-3i**.



2. General Information

^1H and $^{13}\text{C}\{^1\text{H}\}$ NMR spectra were recorded at ambient temperatures on a 400 MHz Bruker spectrometer using CDCl_3 or $\text{DMSO}-d_6$ as solvent and tetramethylsilane (TMS) as the internal standard. Chemical shifts are presented as δ values relative to TMS and ^1H - ^1H coupling constants (J values) are given in Hz. IR spectra were recorded as KBr pellets on a Nicolet FT-IR 5DX spectrometer while HRMS measurements were carried out on a Bruker micrOTOF-Q II spectrometer. Melting points were determined on a Yanaco melting point apparatus and are uncorrected.

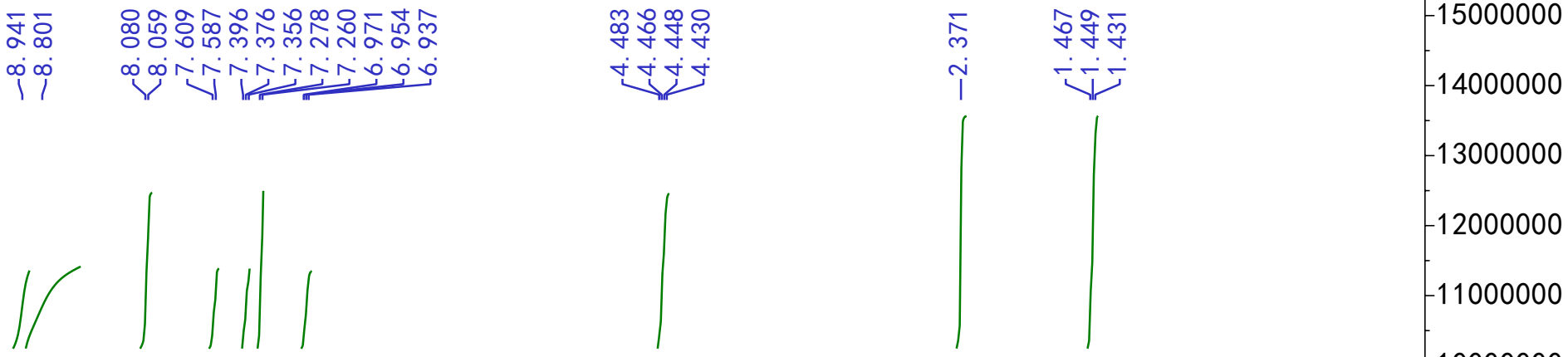


Figure S1. 400 MHz ^1H NMR spectrum of compound 4a (recorded in CDCl_3).

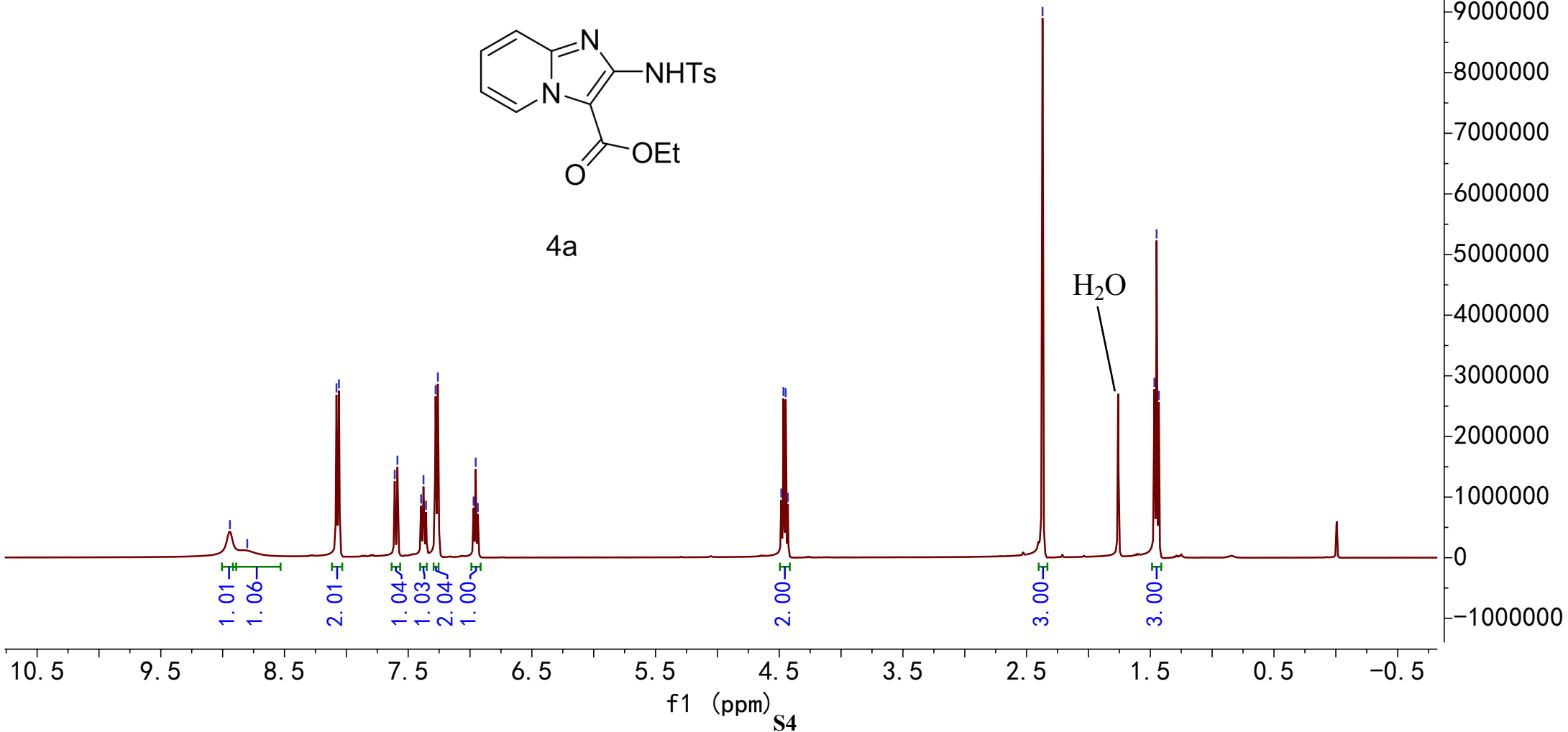
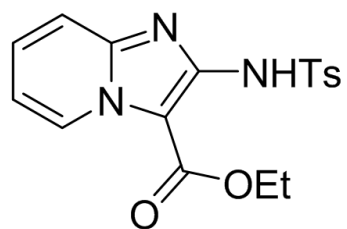
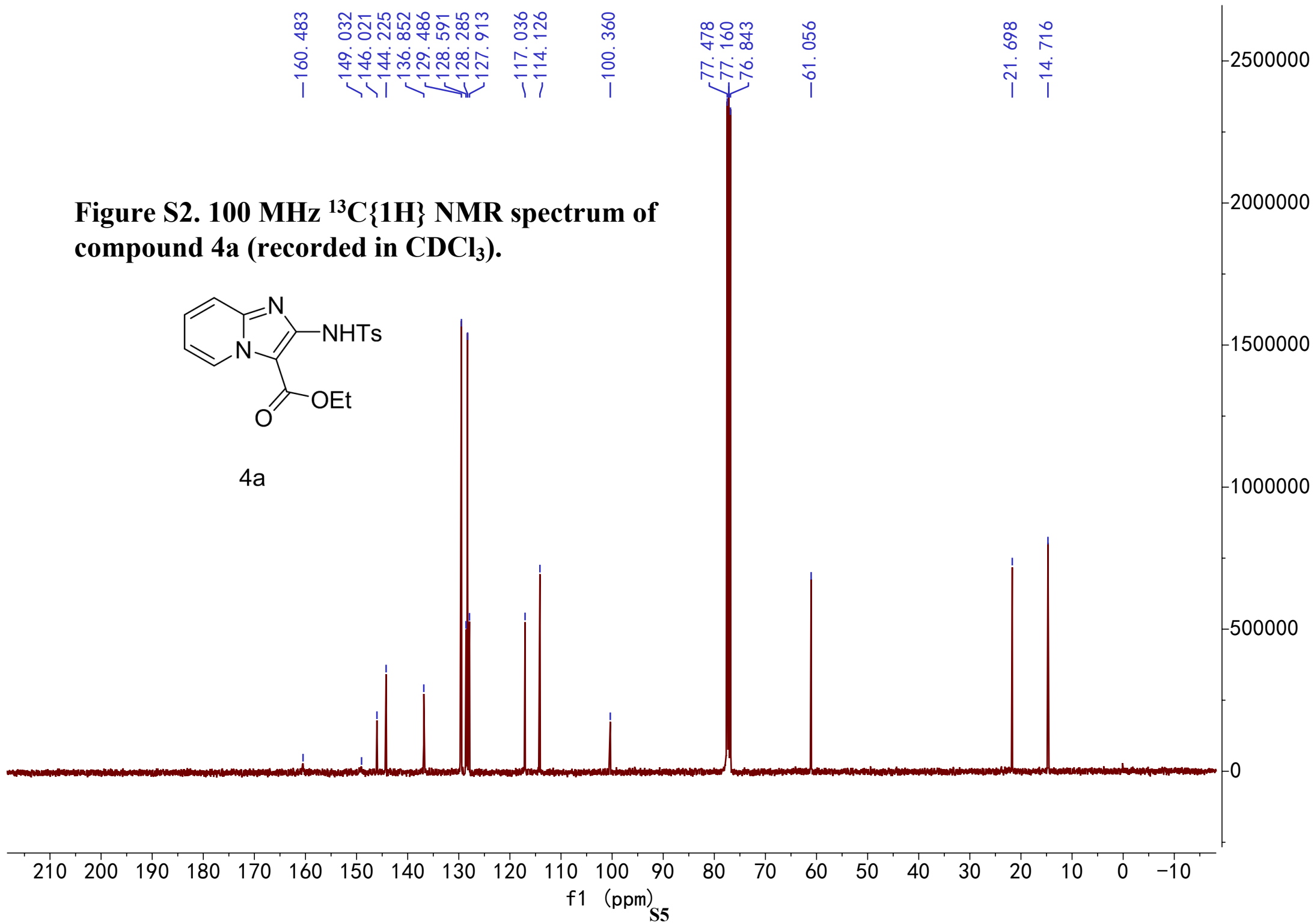


Figure S2. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4a (recorded in CDCl_3).



4a



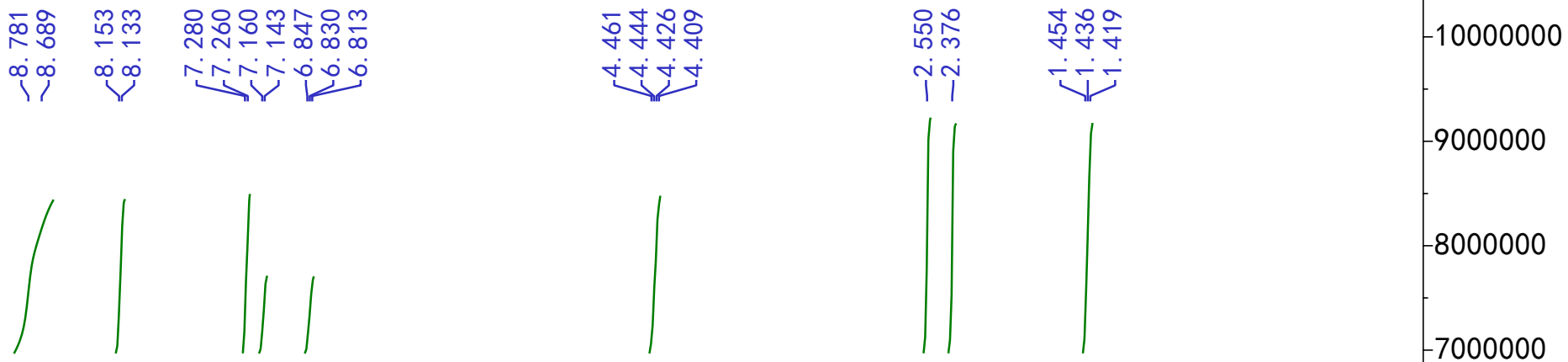


Figure S3. 400 MHz ¹H NMR spectrum of compound 4b (recorded in CDCl₃).

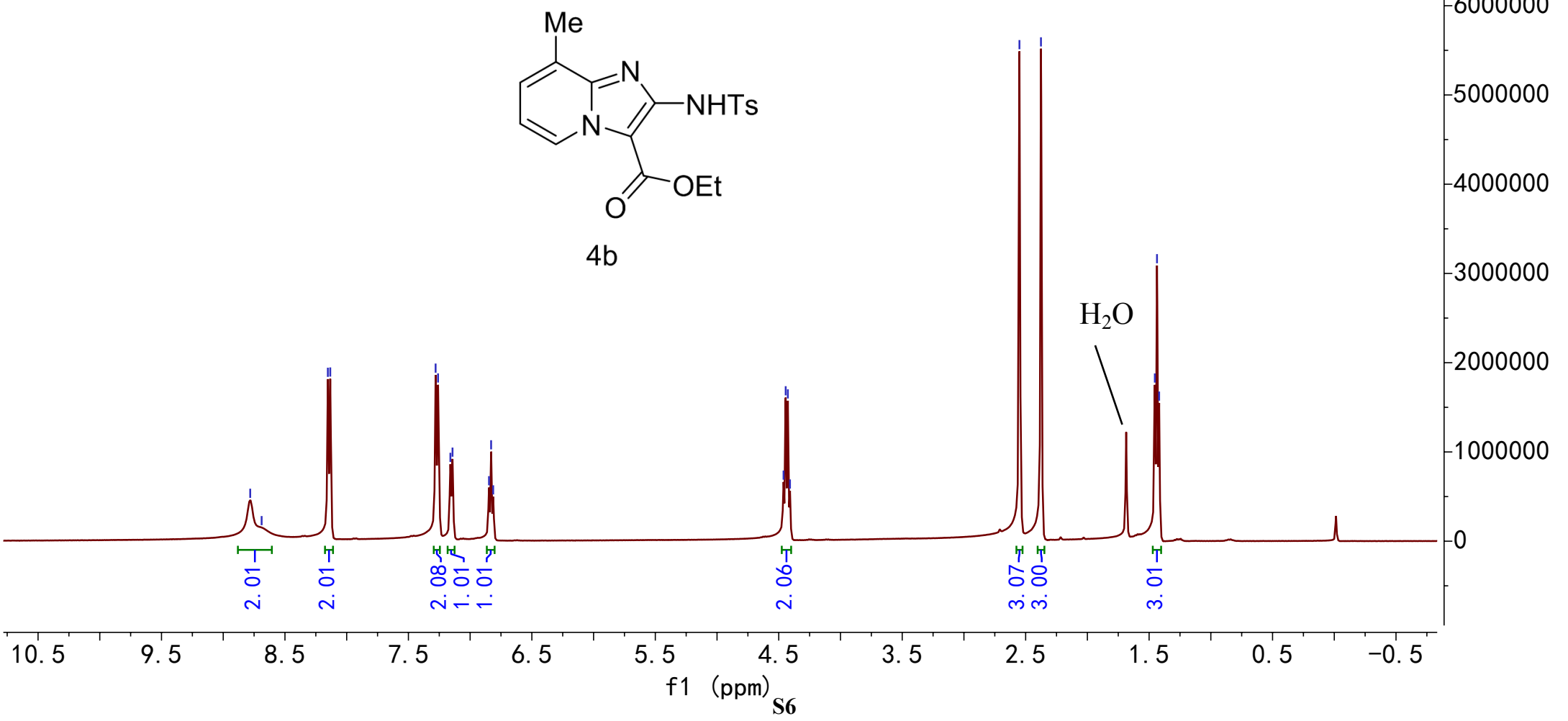
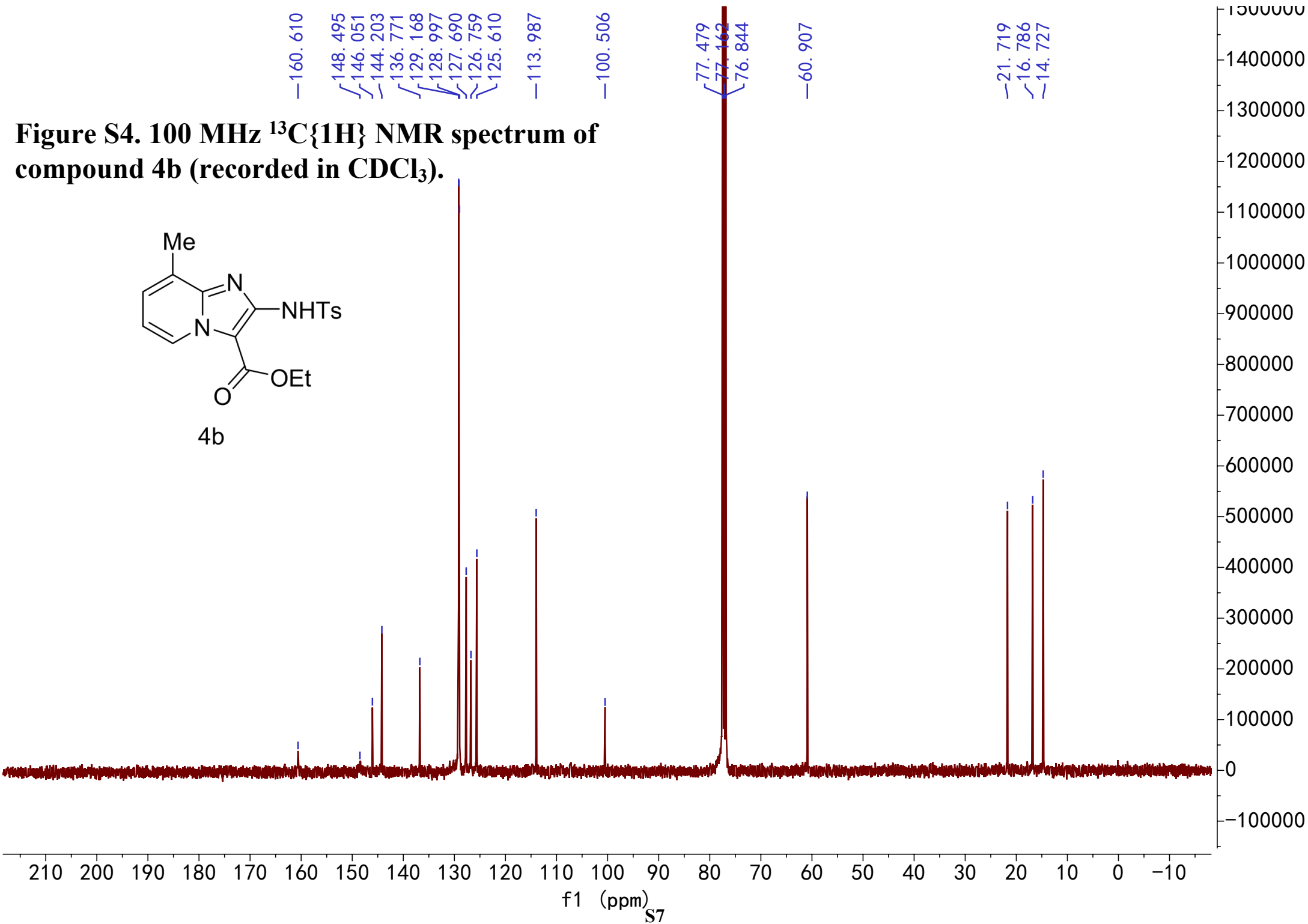
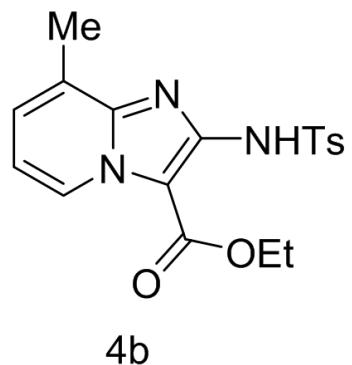


Figure S4. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4b (recorded in CDCl_3).



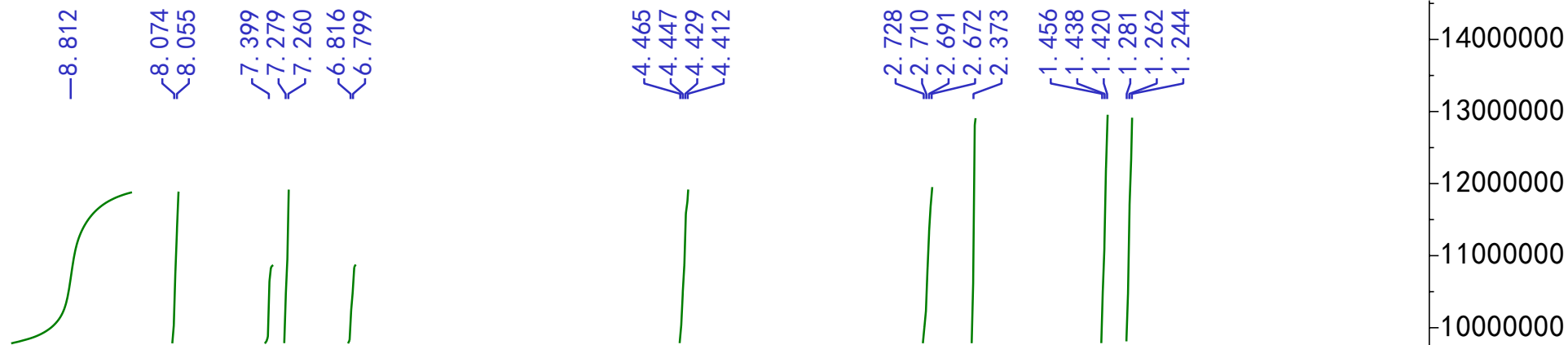


Figure S5. 400 MHz ^1H NMR spectrum of compound 4c (recorded in CDCl_3).

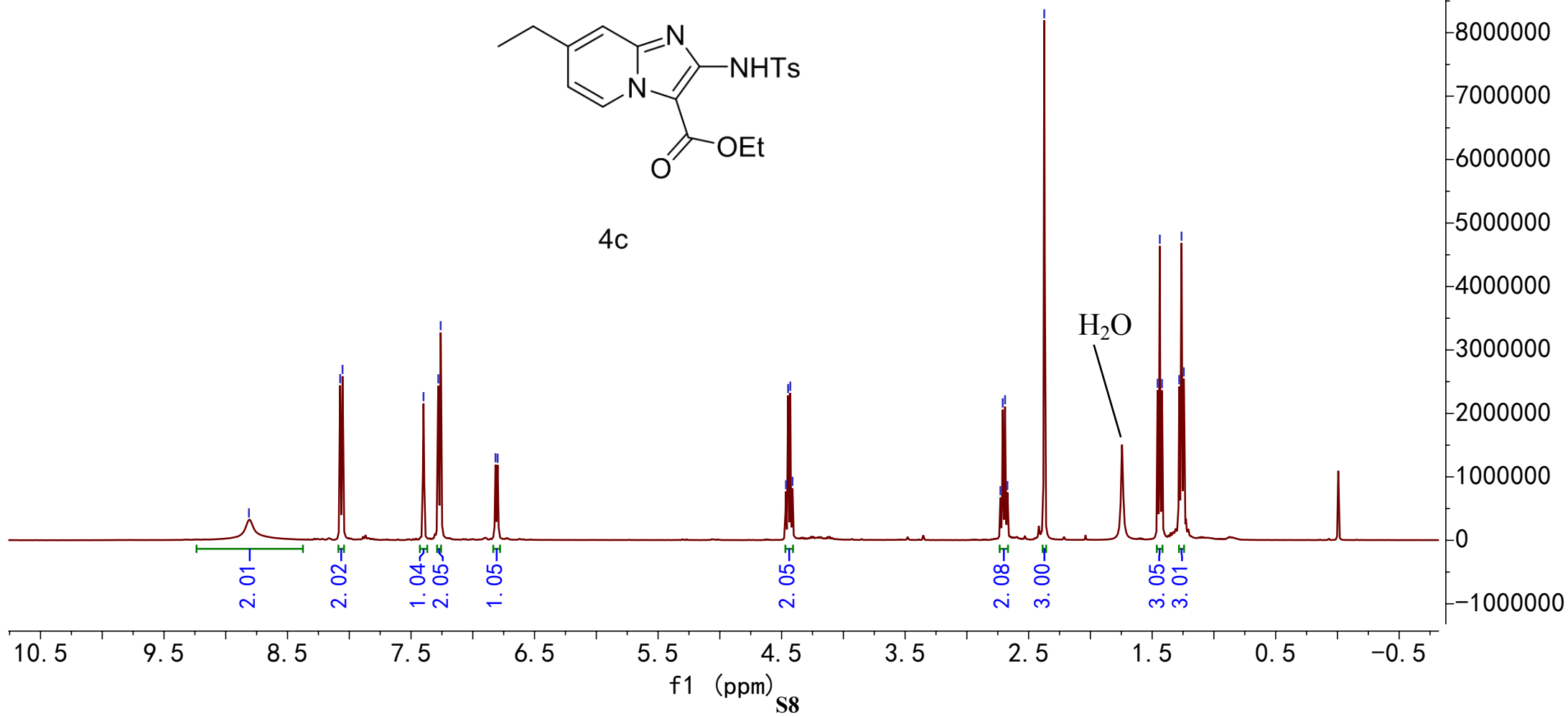
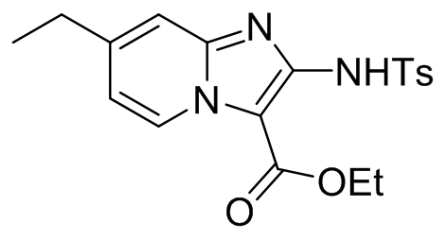
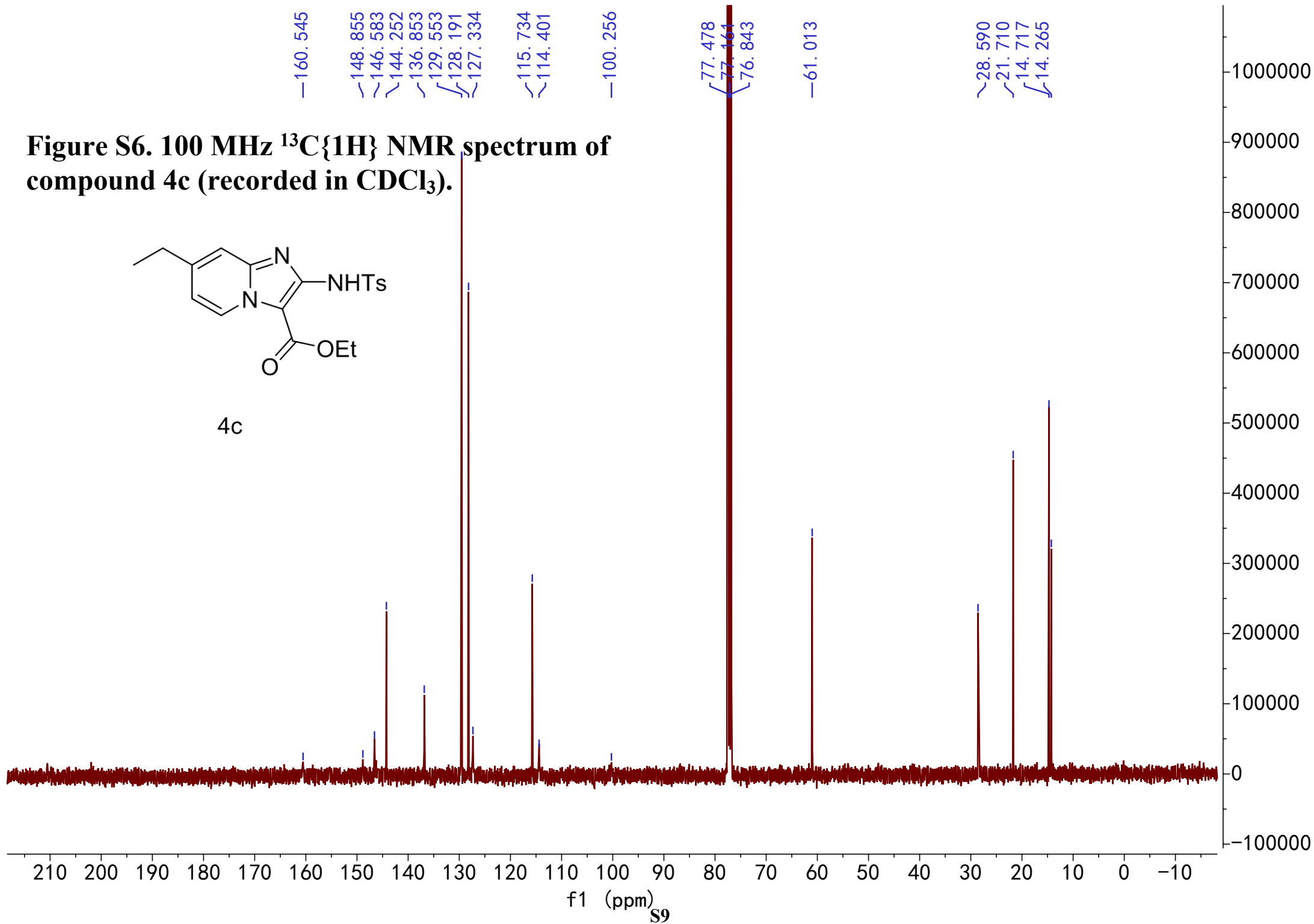


Figure S6. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4c (recorded in CDCl_3).



4c



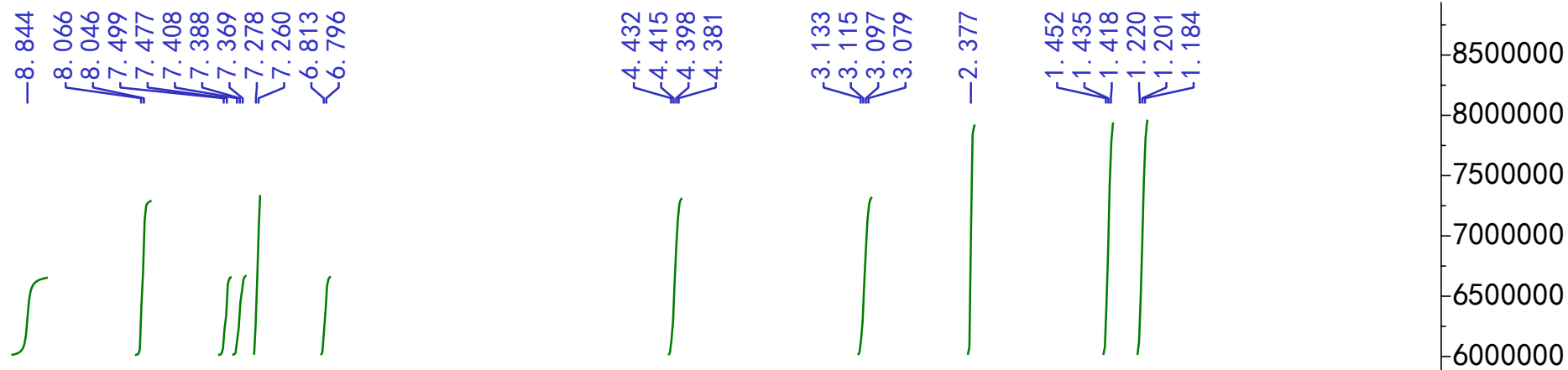
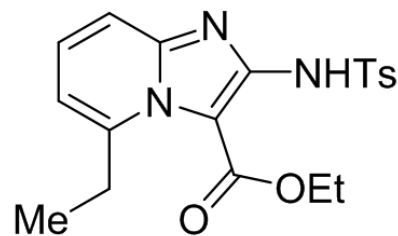


Figure S7. 400 MHz ^1H NMR spectrum of compound 4d (recorded in CDCl_3).



4d

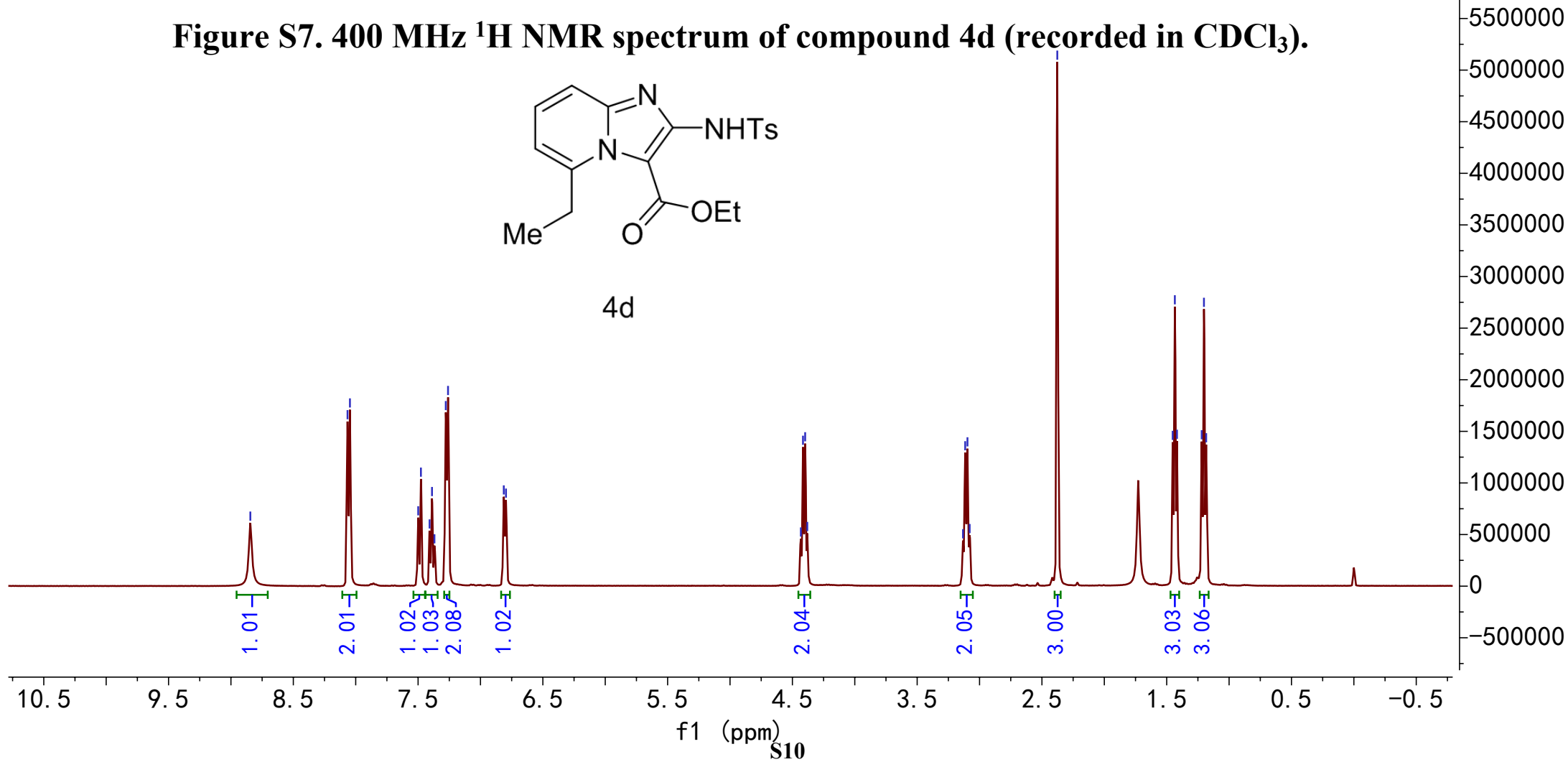
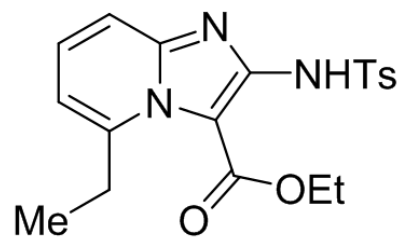
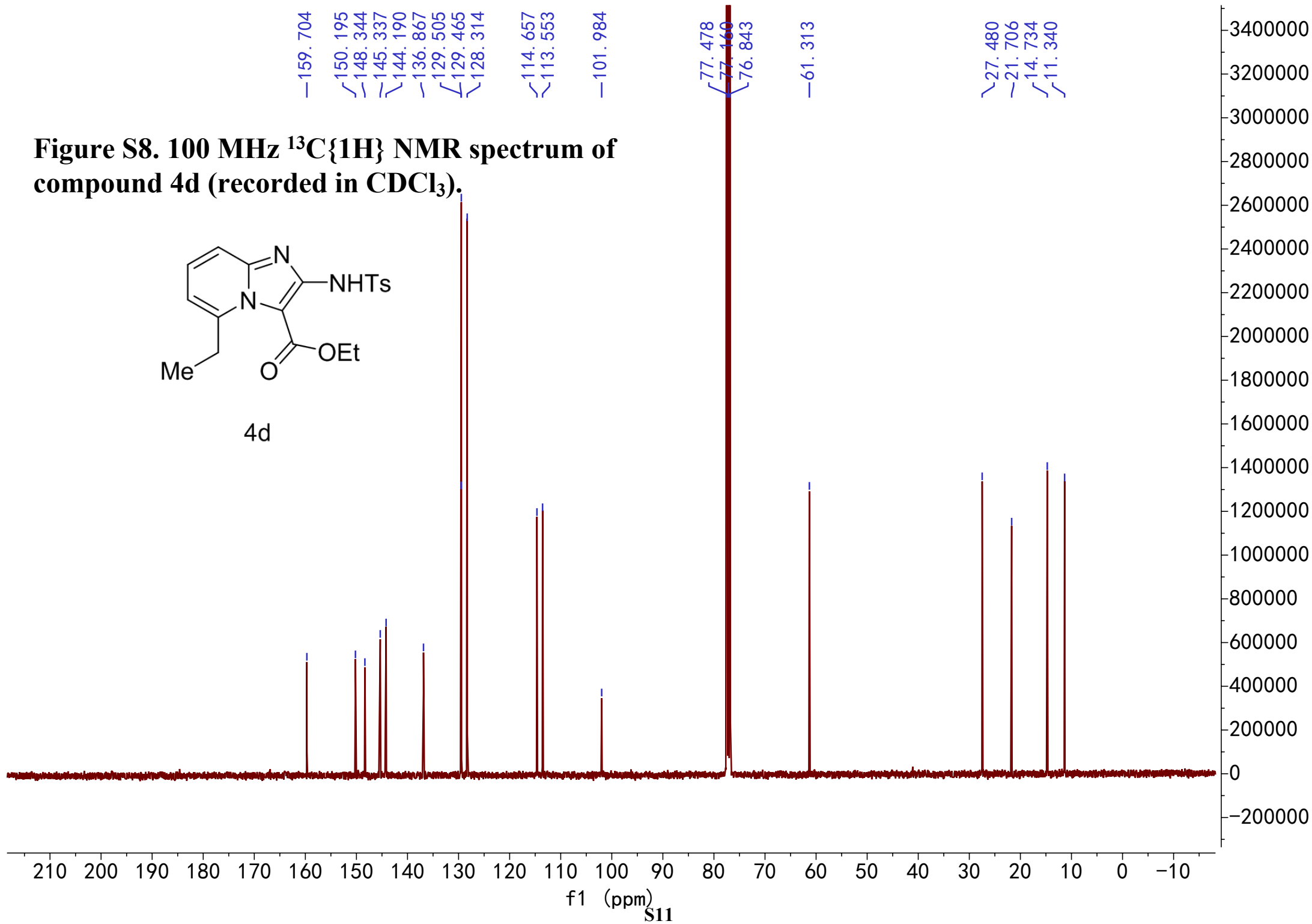


Figure S8. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4d (recorded in CDCl_3).



4d



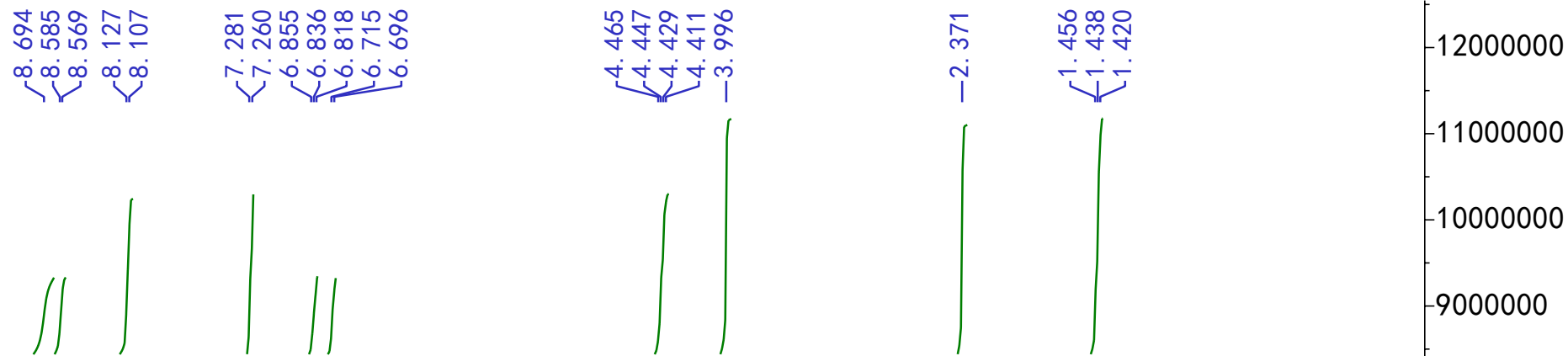


Figure S9. 400 MHz ^1H NMR spectrum of compound 4e (recorded in CDCl_3).

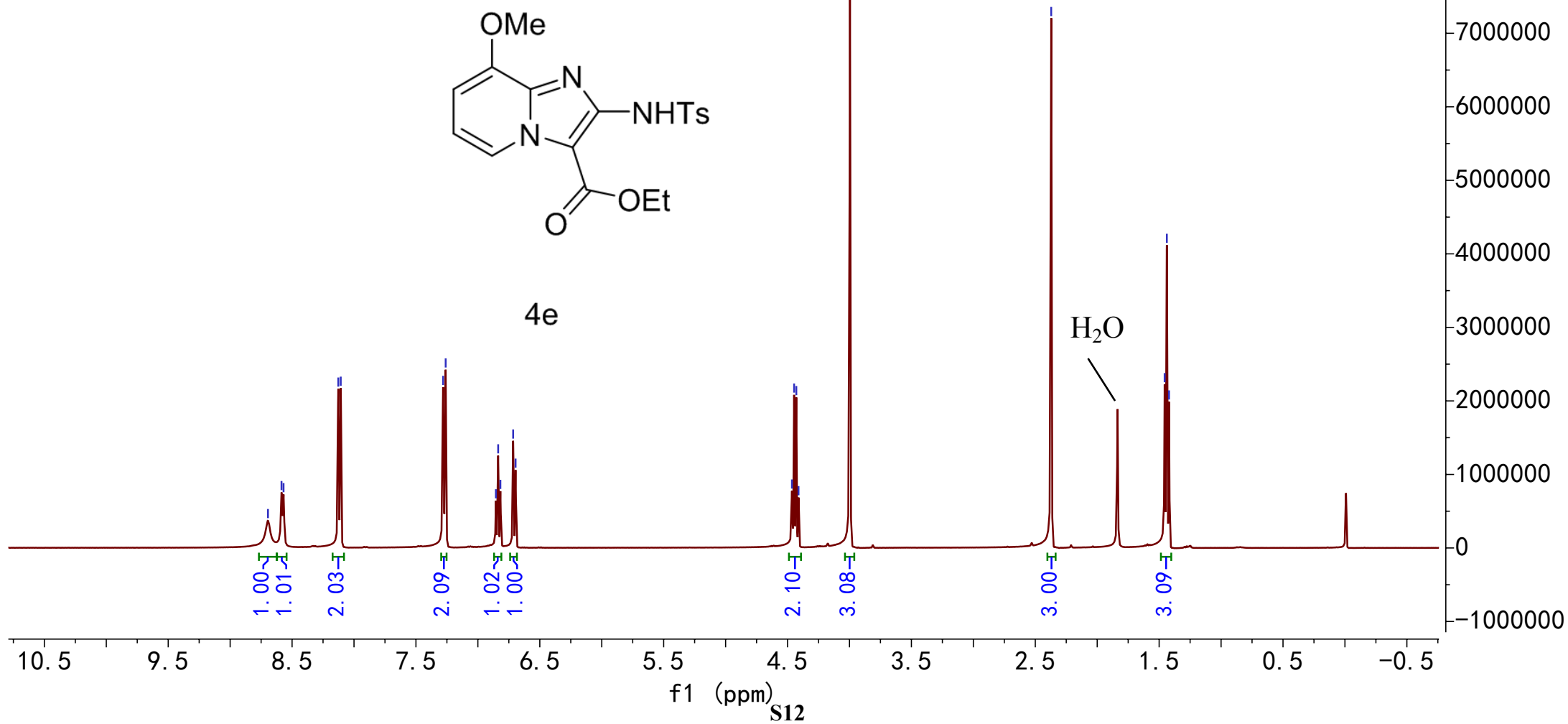
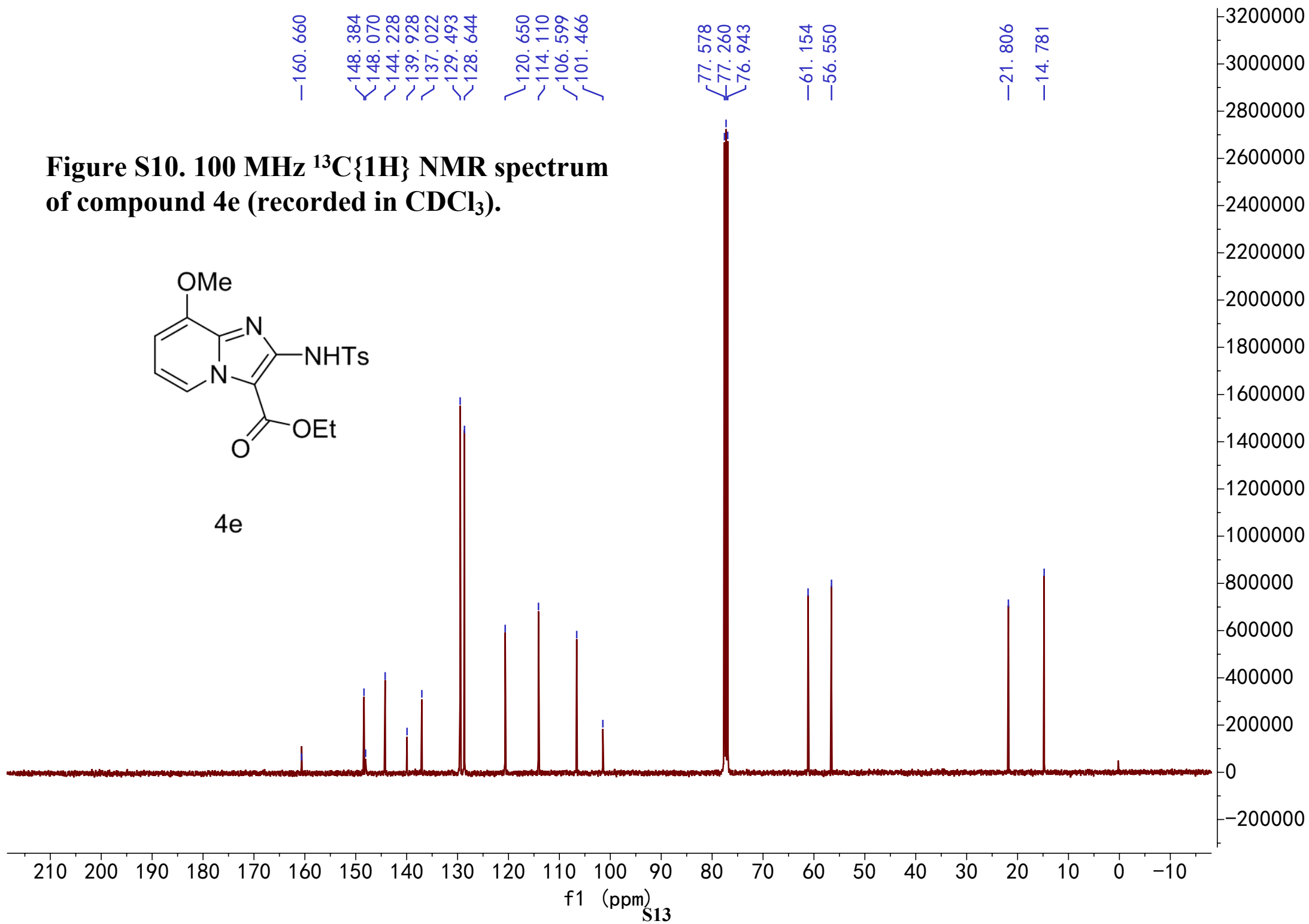
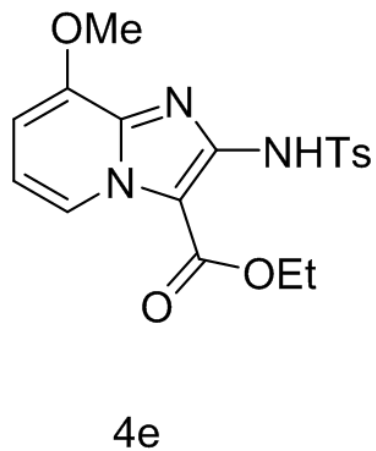


Figure S10. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4e (recorded in CDCl_3).



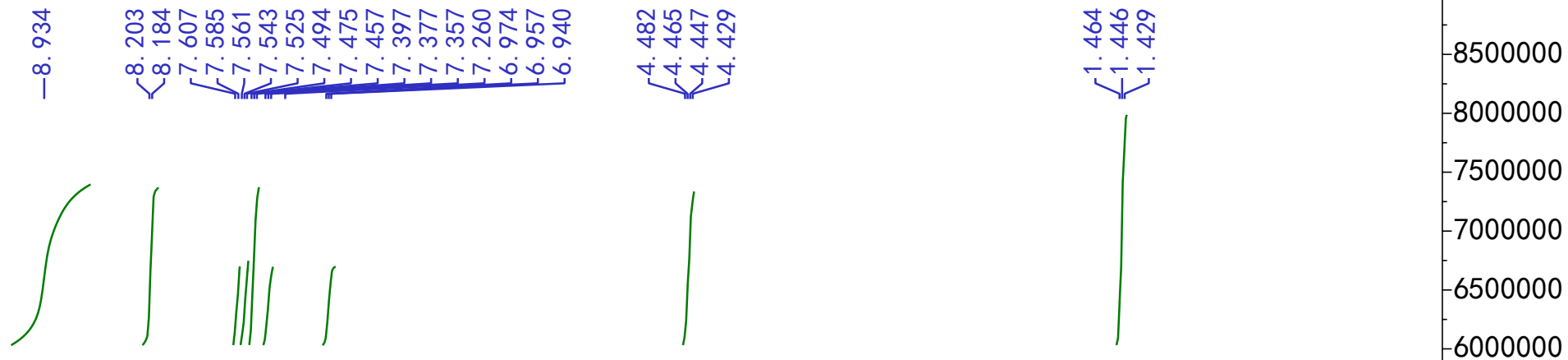


Figure S11. 400 MHz ^1H NMR spectrum of compound 4f (recorded in CDCl_3).

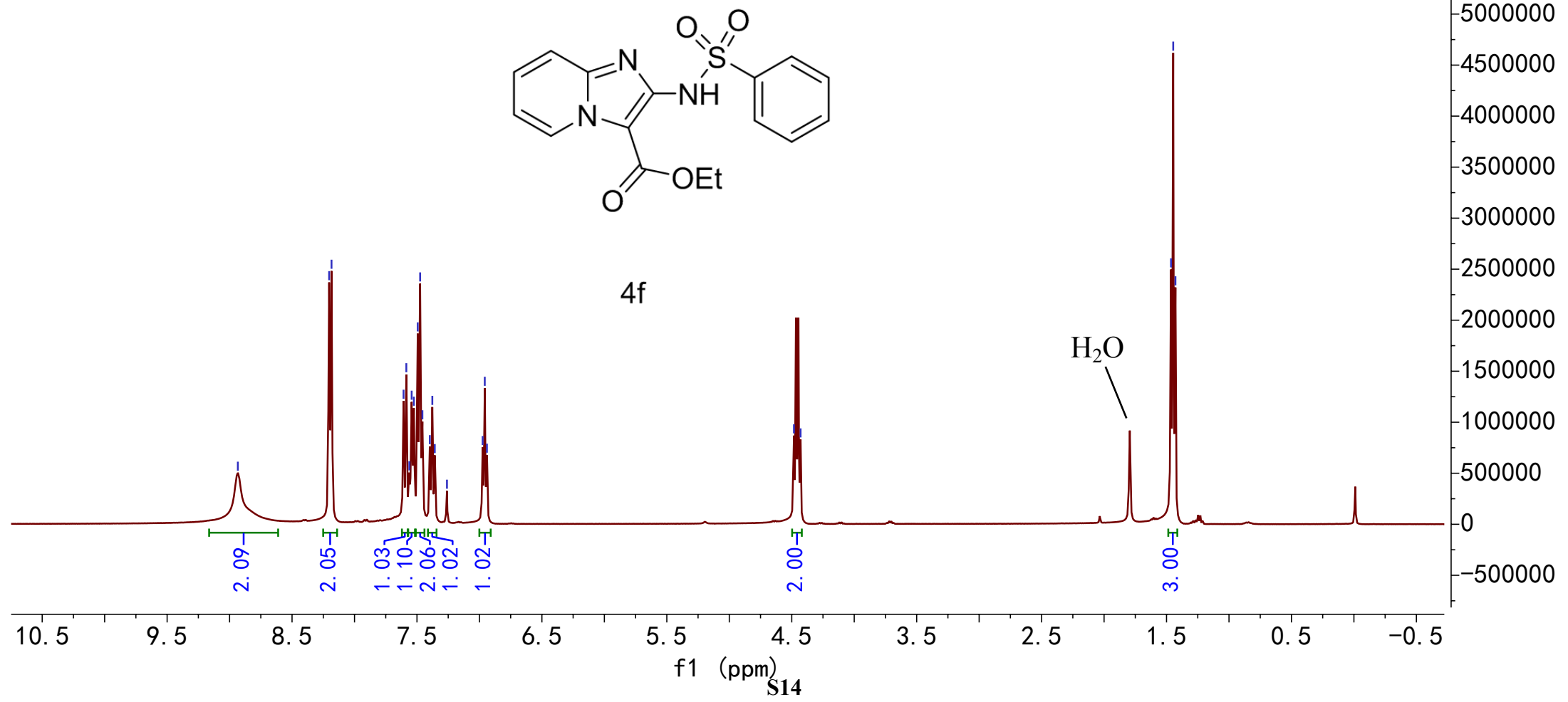
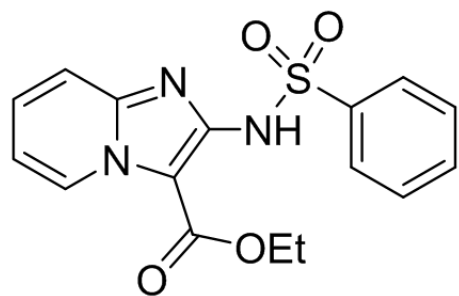
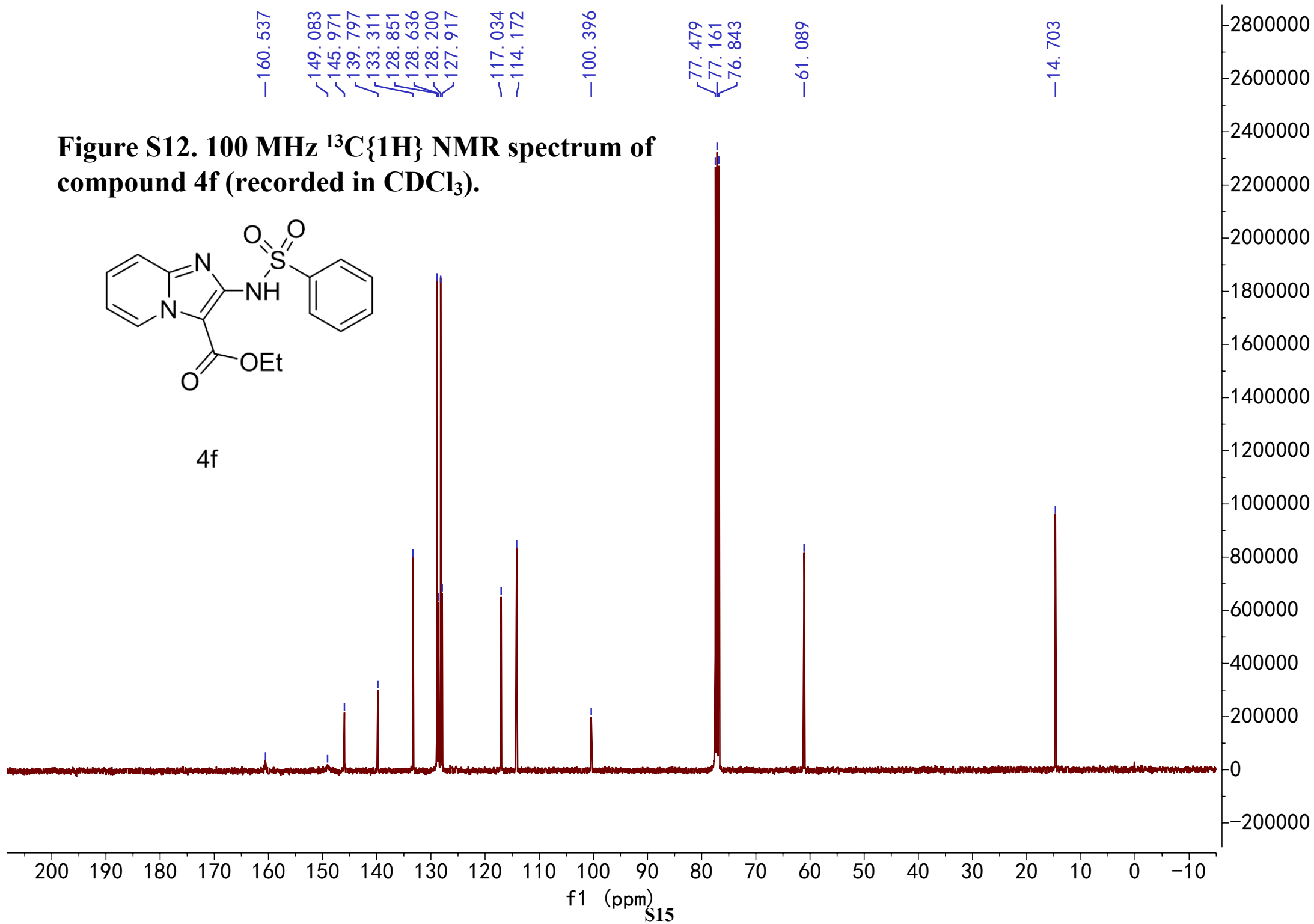


Figure S12. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4f (recorded in CDCl_3).



4f



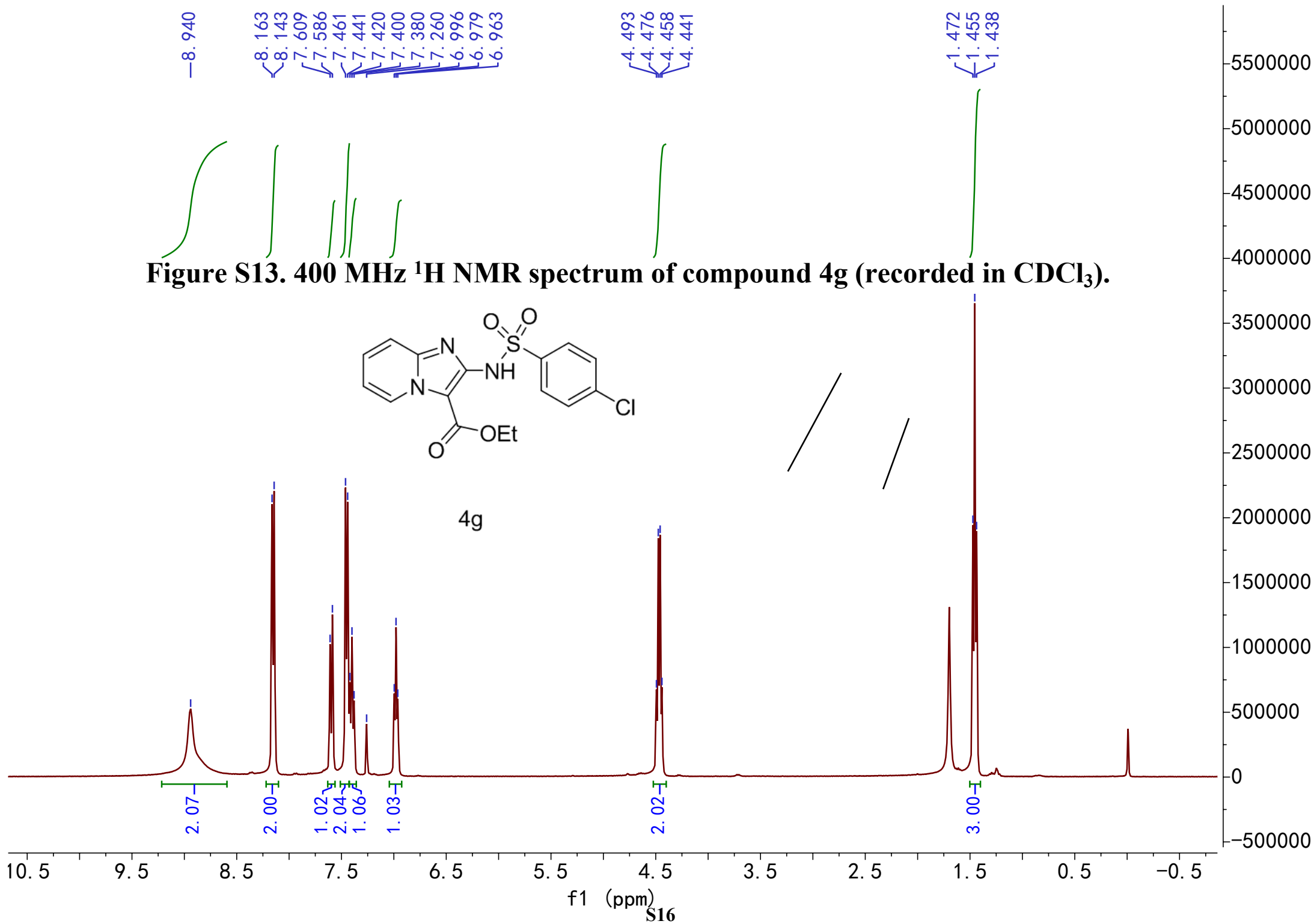
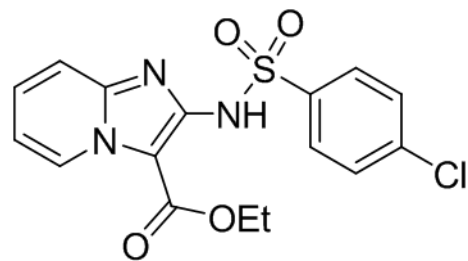
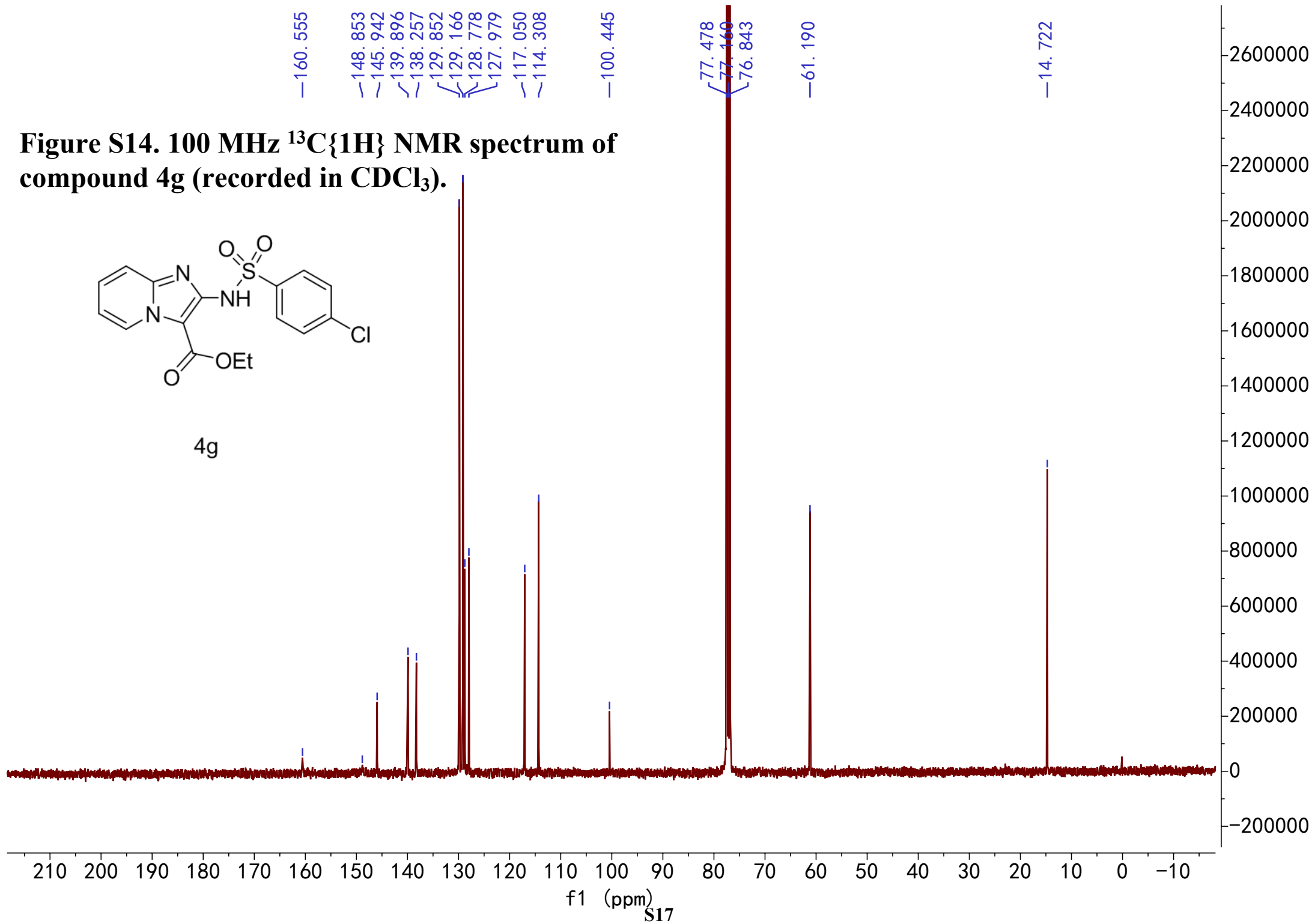


Figure S14. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4g (recorded in CDCl_3).



4g



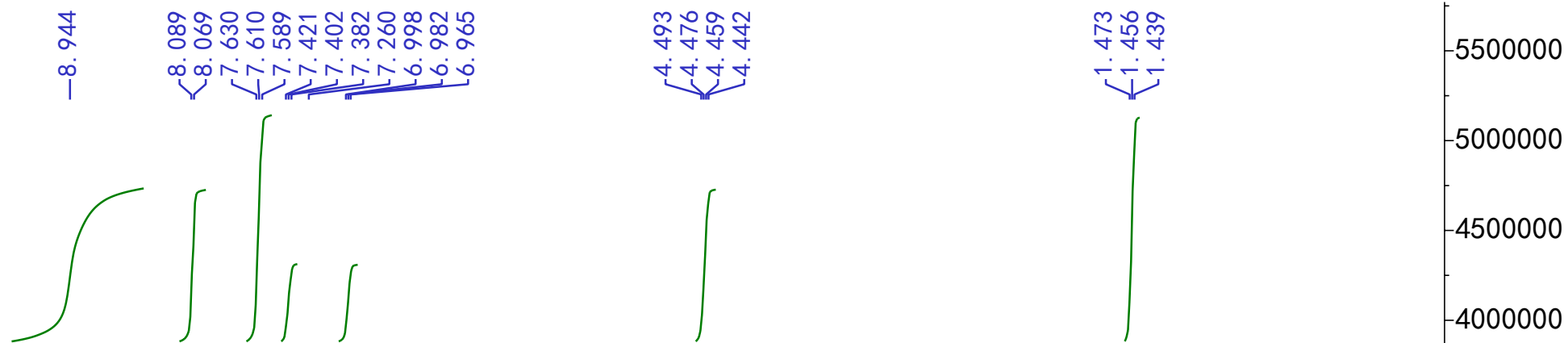


Figure S15. 400 MHz ^1H NMR spectrum of compound 4h (recorded in CDCl_3).

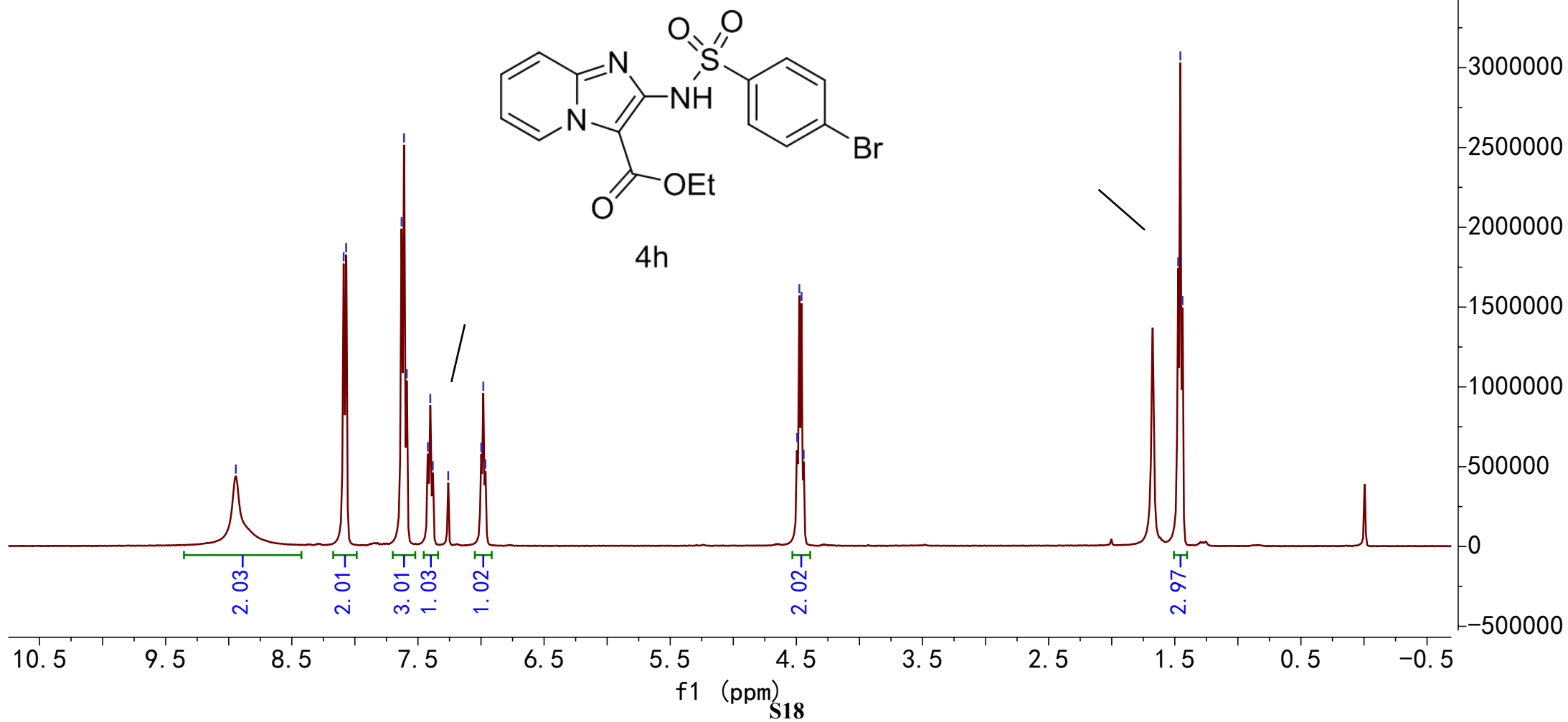
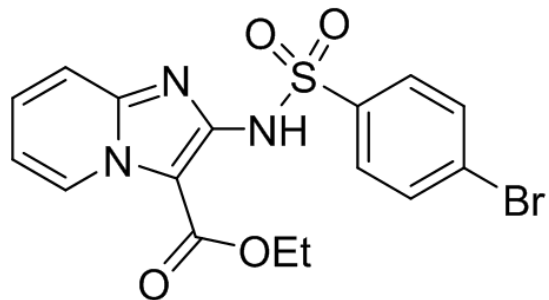
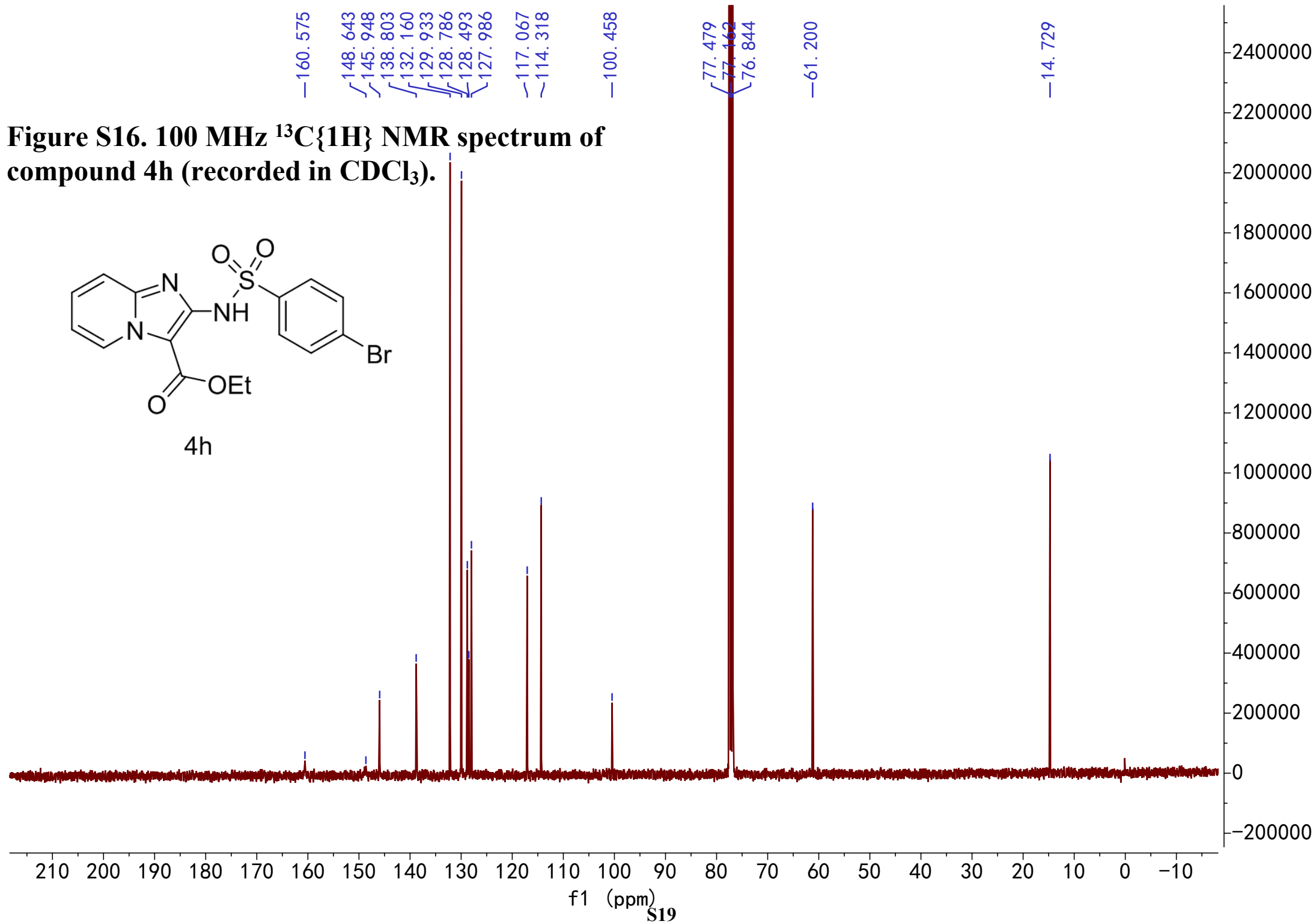


Figure S16. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4h (recorded in CDCl_3).



4h



8.953
8.937
8.358
8.338
7.766
7.746
7.623
7.601
7.441
7.421
7.402
7.260
7.018
7.002
6.985

4.501
4.485
4.467
4.450

1.477
1.460
1.442

Figure S17. 400 MHz ¹H NMR spectrum of compound 4i (recorded in CDCl₃).

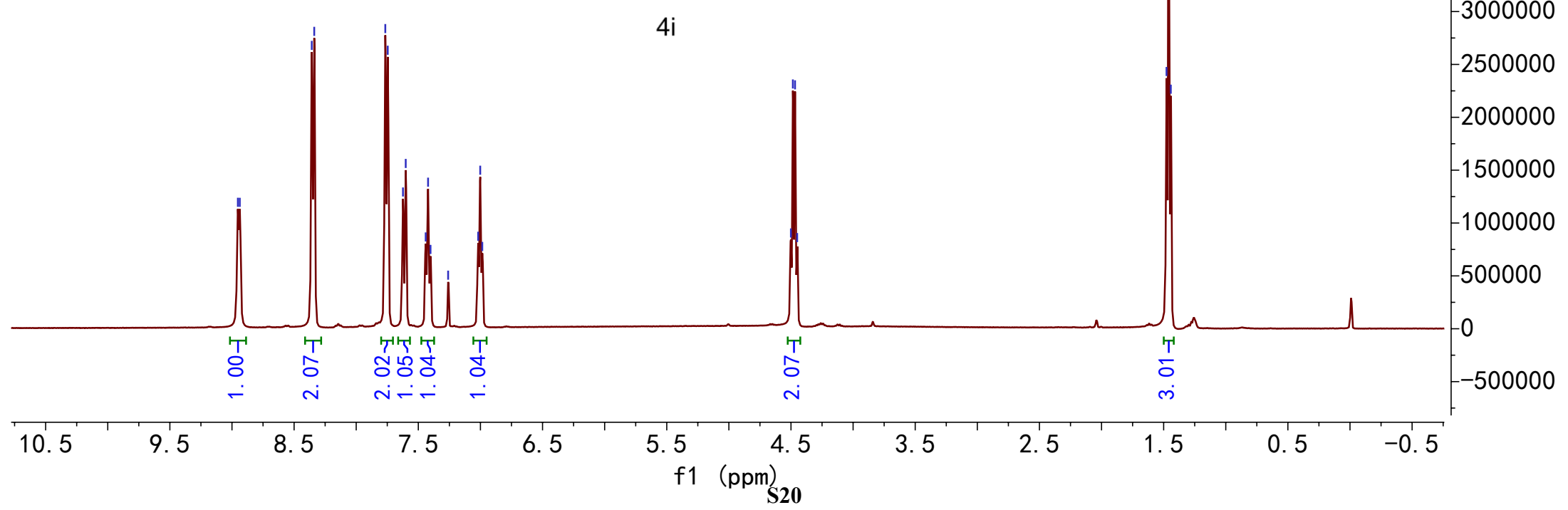
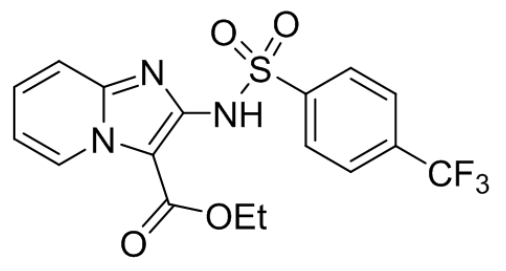
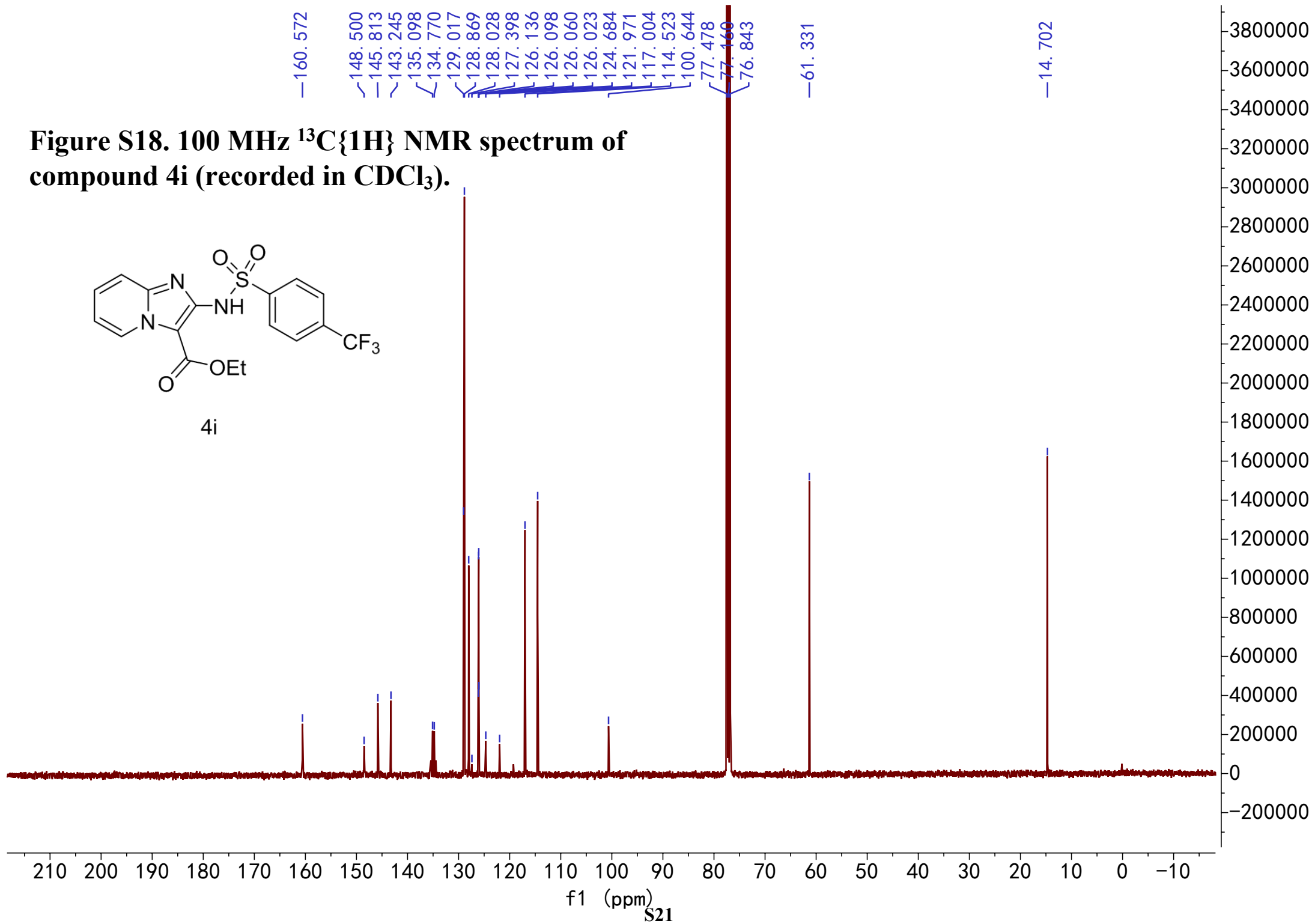
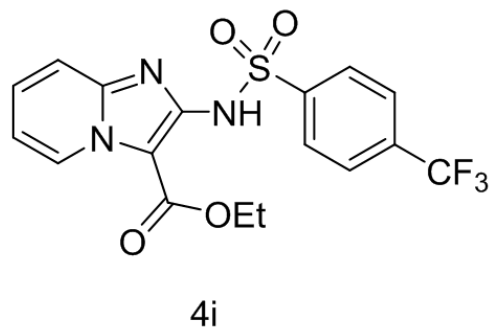


Figure S18. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4i (recorded in CDCl_3).



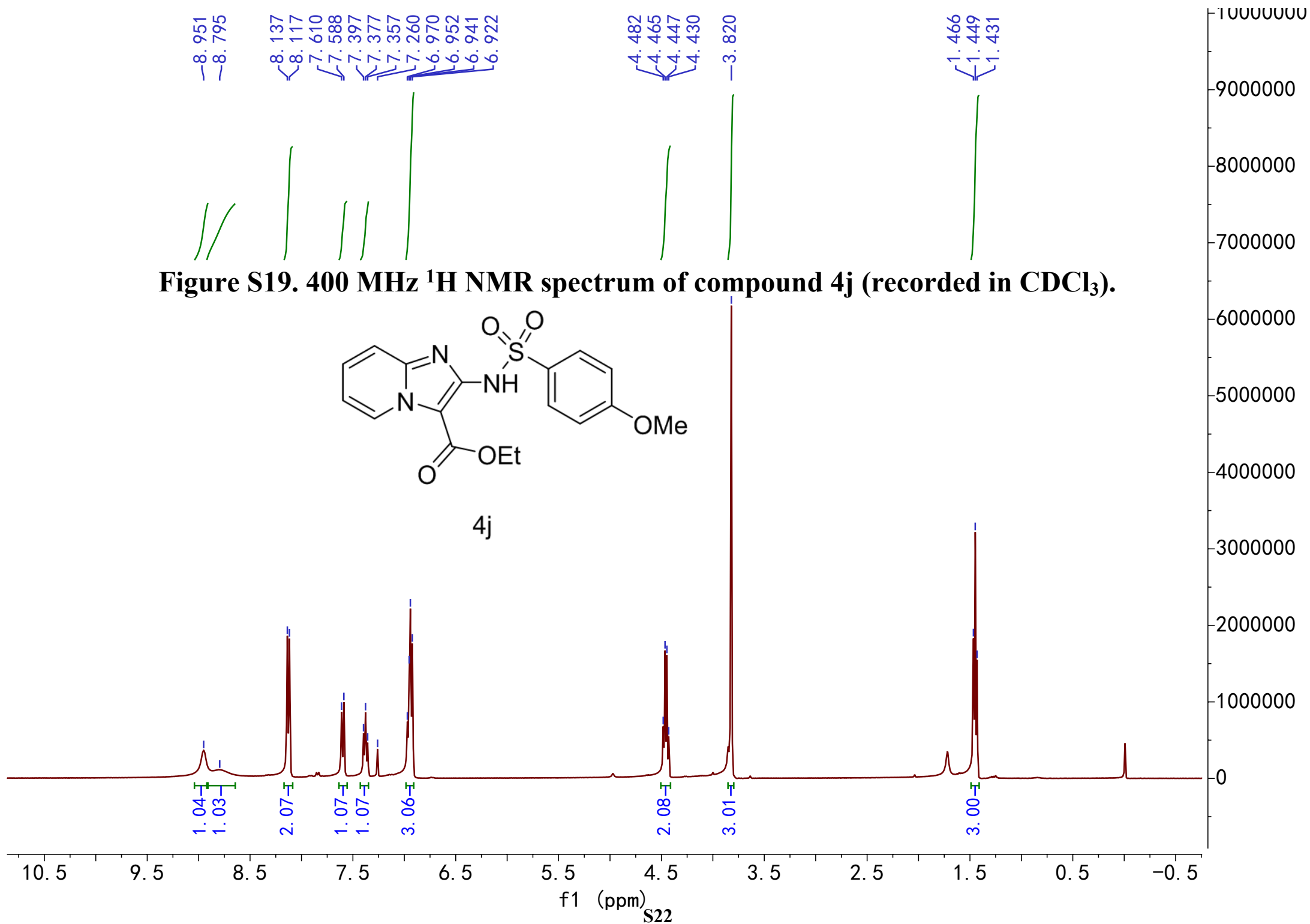
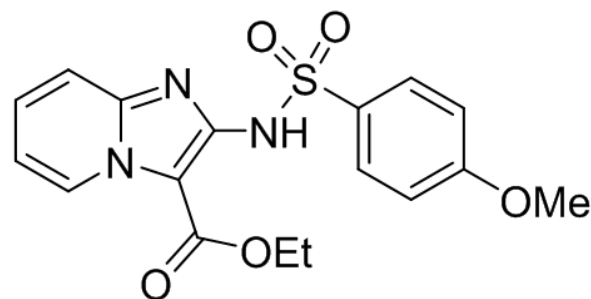
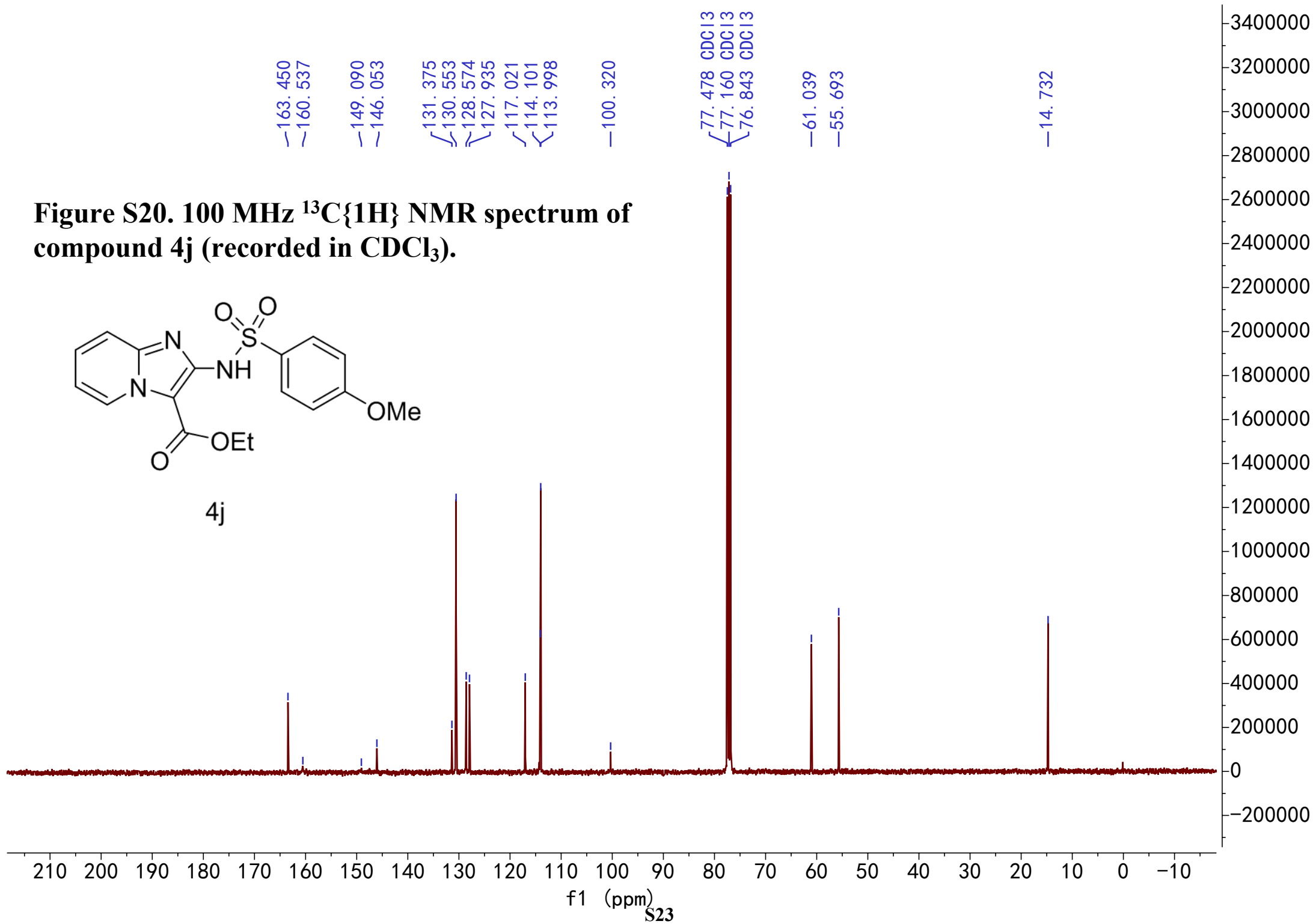


Figure S20. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4j (recorded in CDCl_3).



4j



9.059
8.494
7.654
7.632
7.466
7.446
7.426
7.260
7.047
7.029
7.012

4.508
4.490
4.472
4.455

3.515

1.480
1.462
1.445

Figure S21. 400 MHz ¹H NMR spectrum of compound 4k (recorded in CDCl₃).

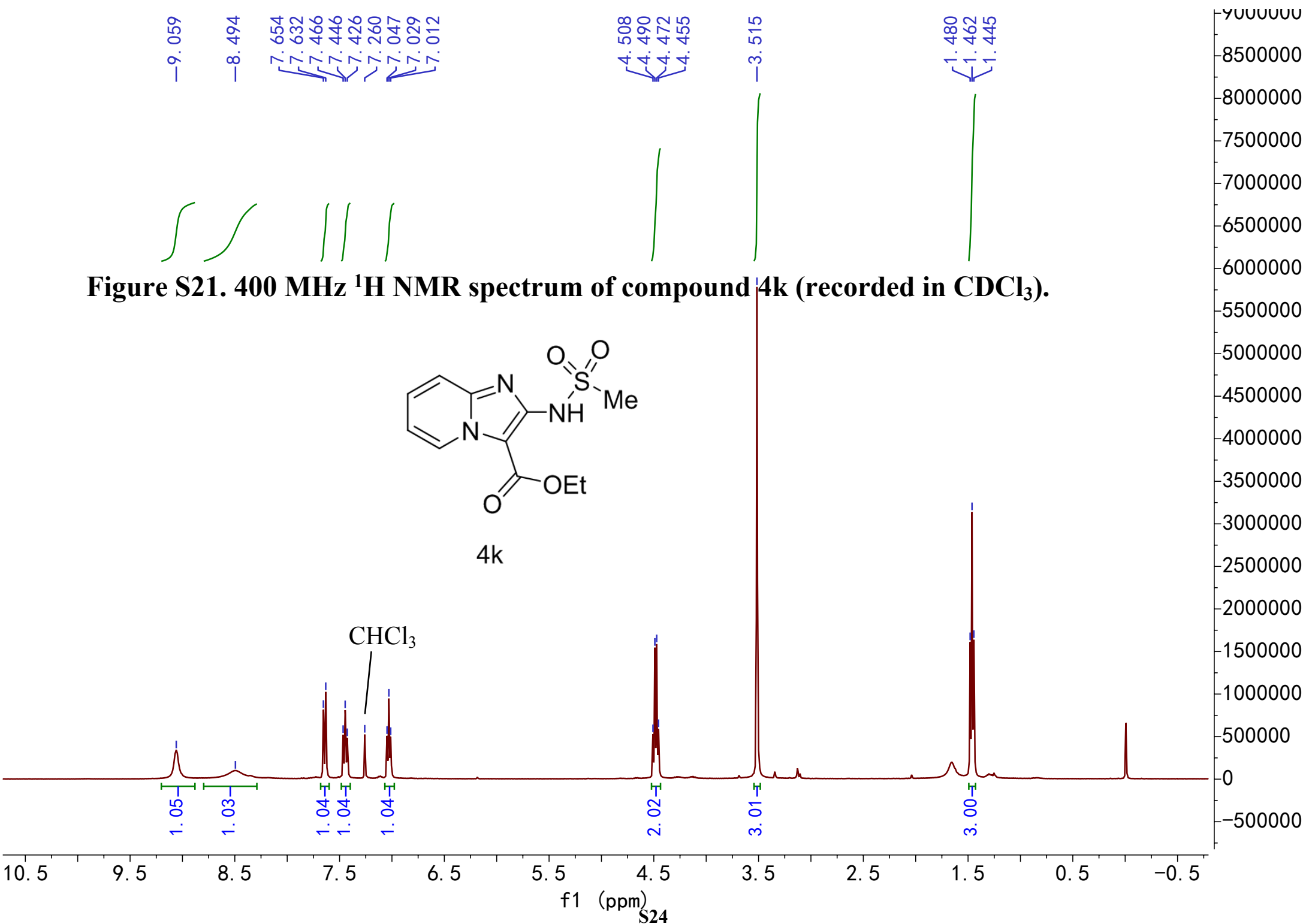
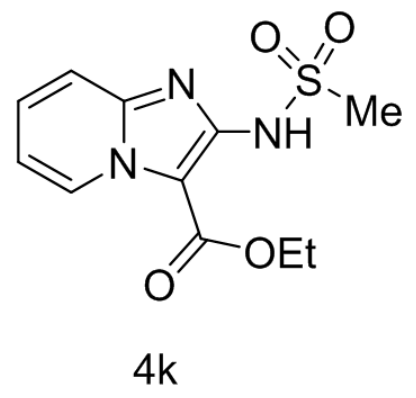
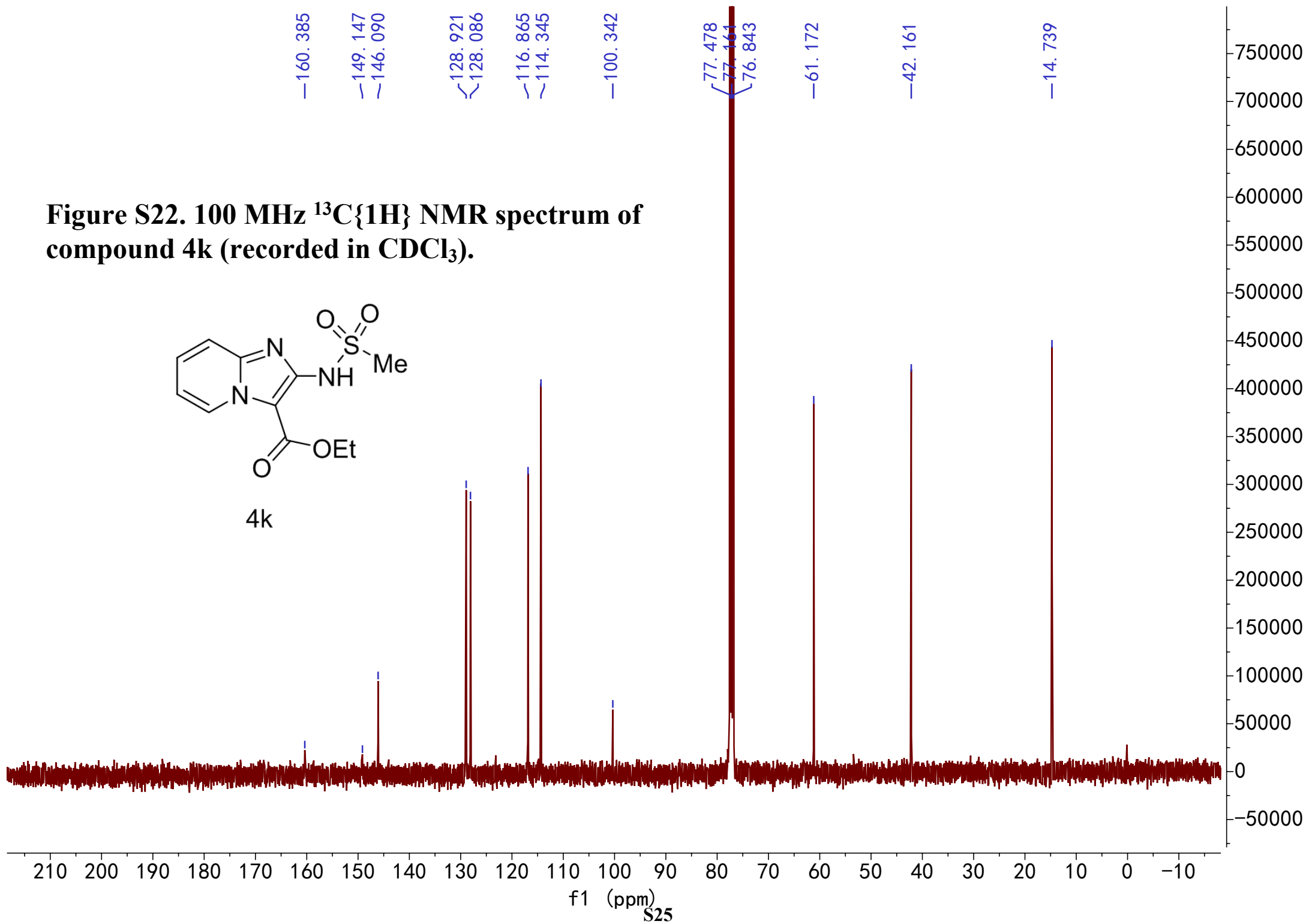
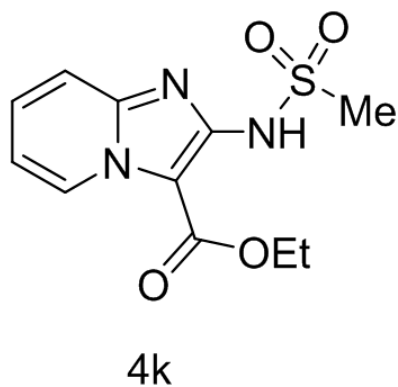


Figure S22. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4k (recorded in CDCl_3).



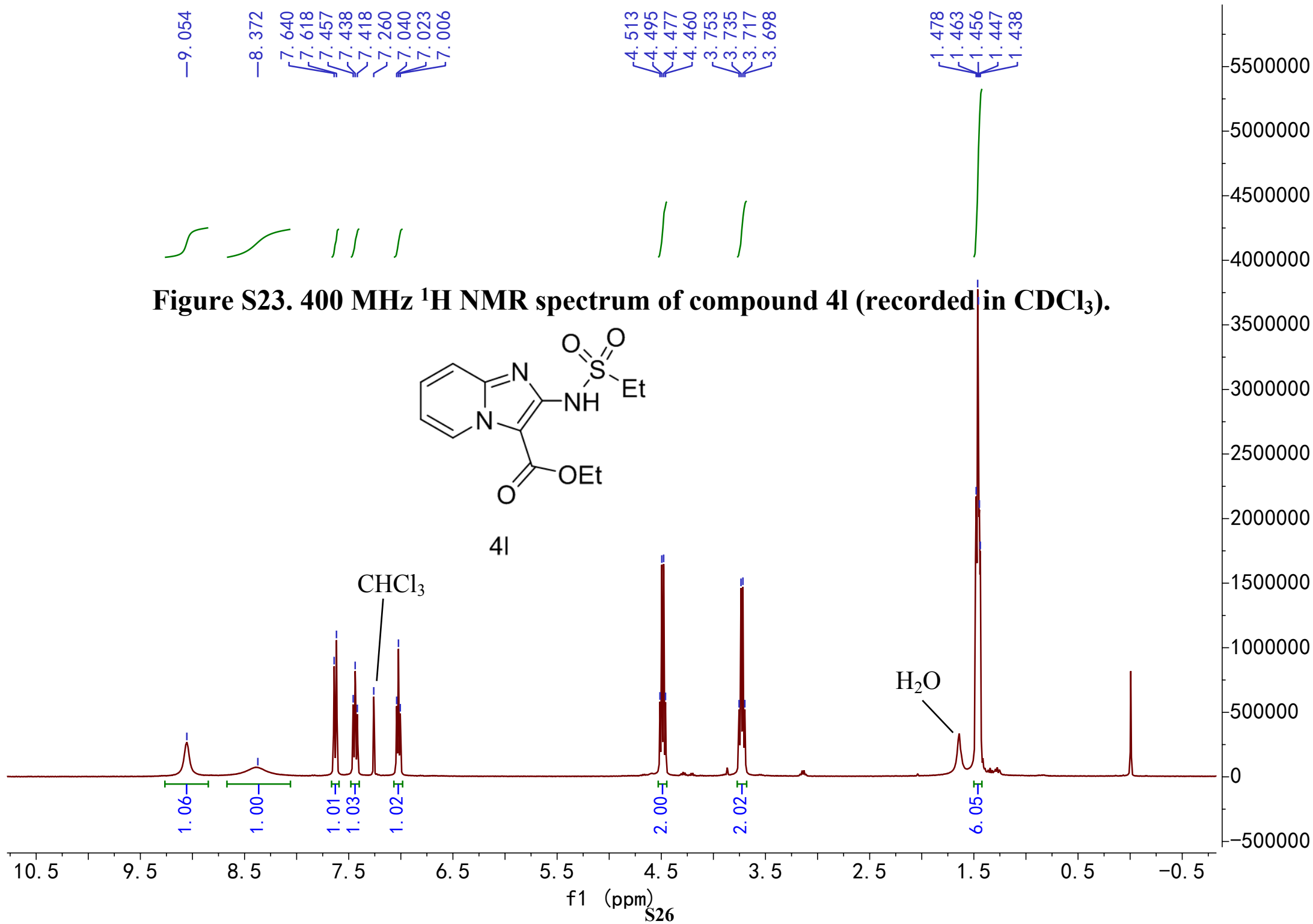
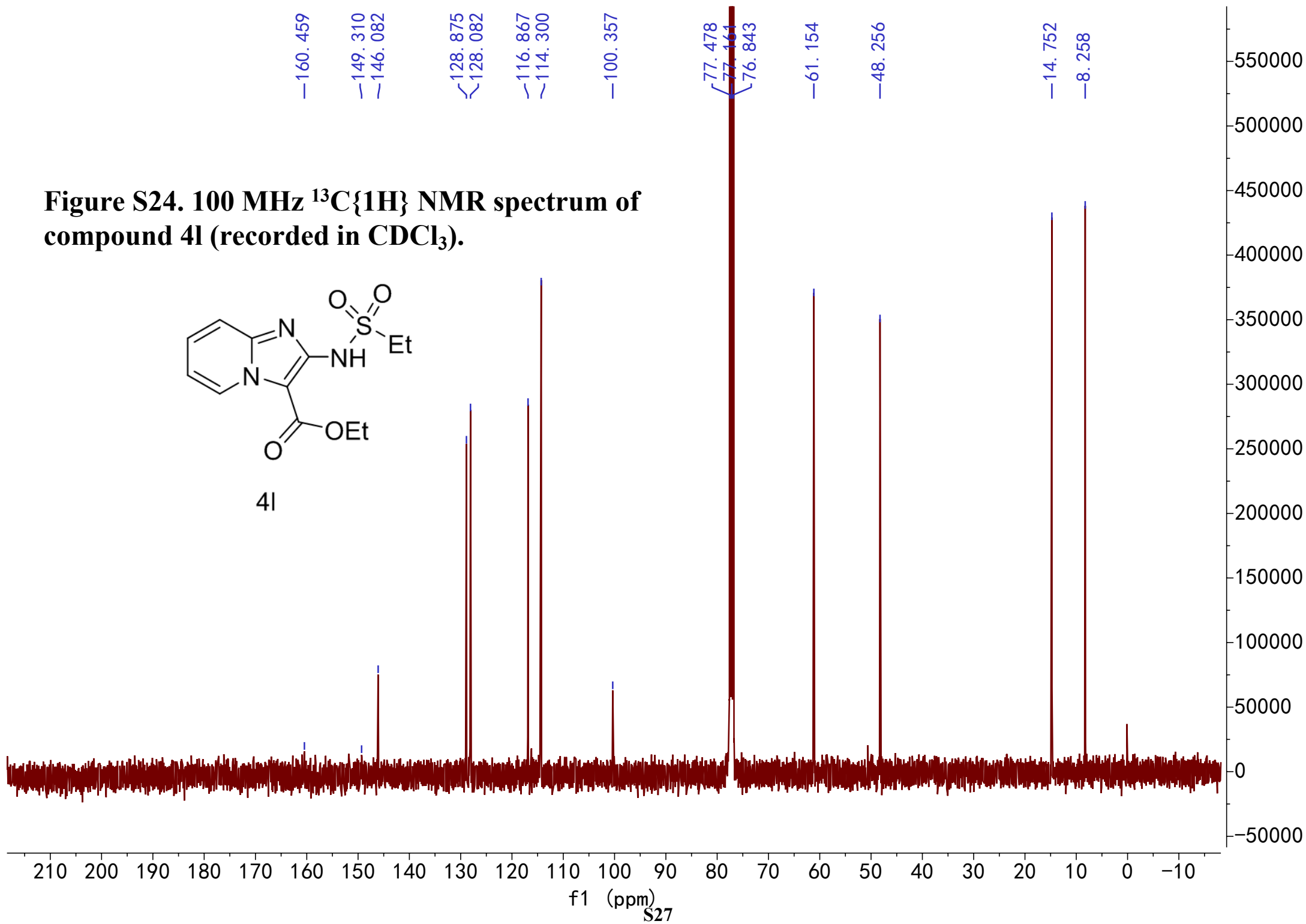
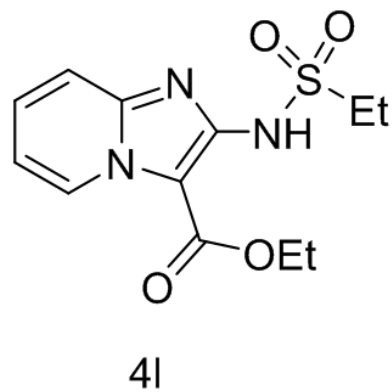


Figure S24. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4l (recorded in CDCl_3).



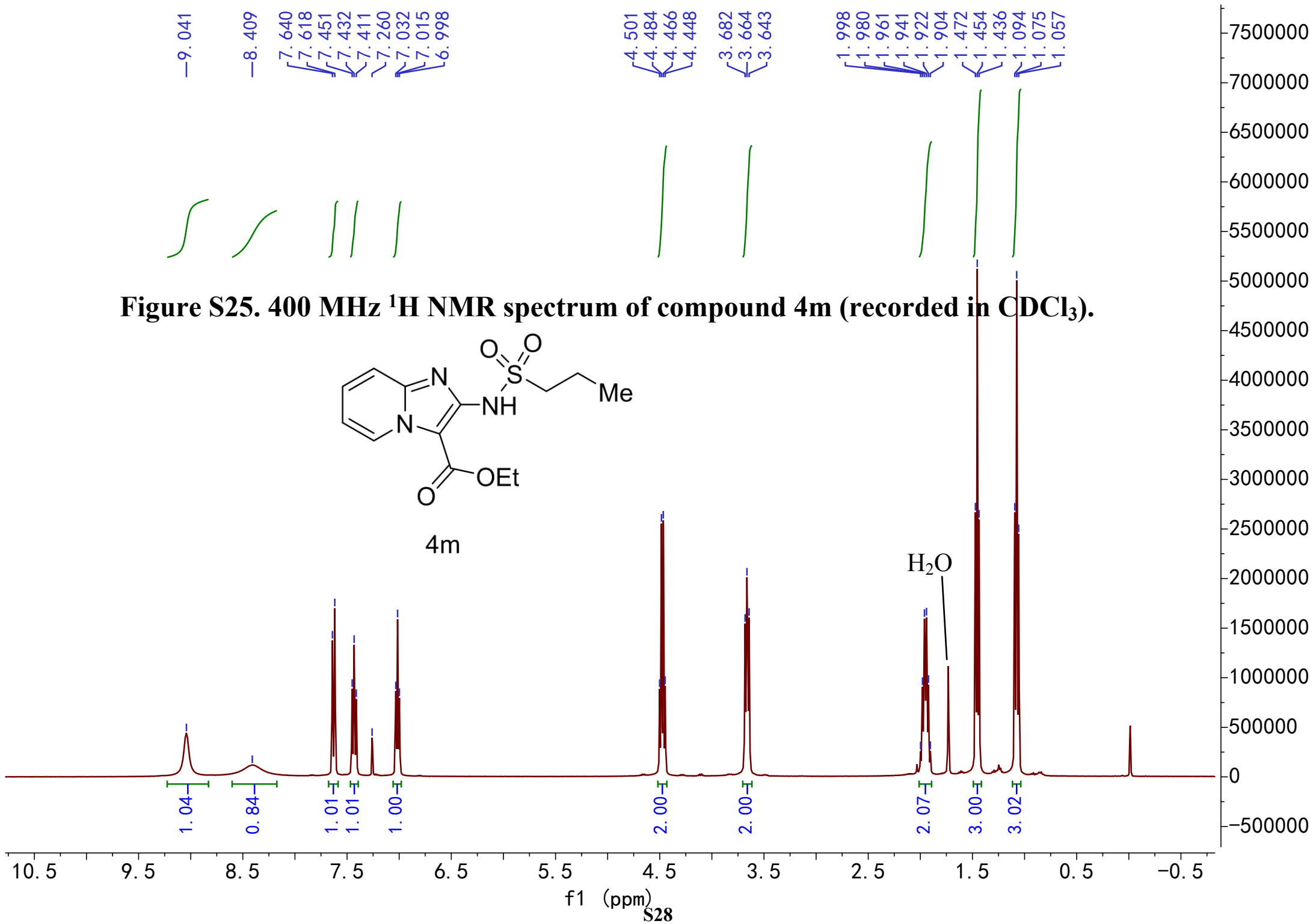
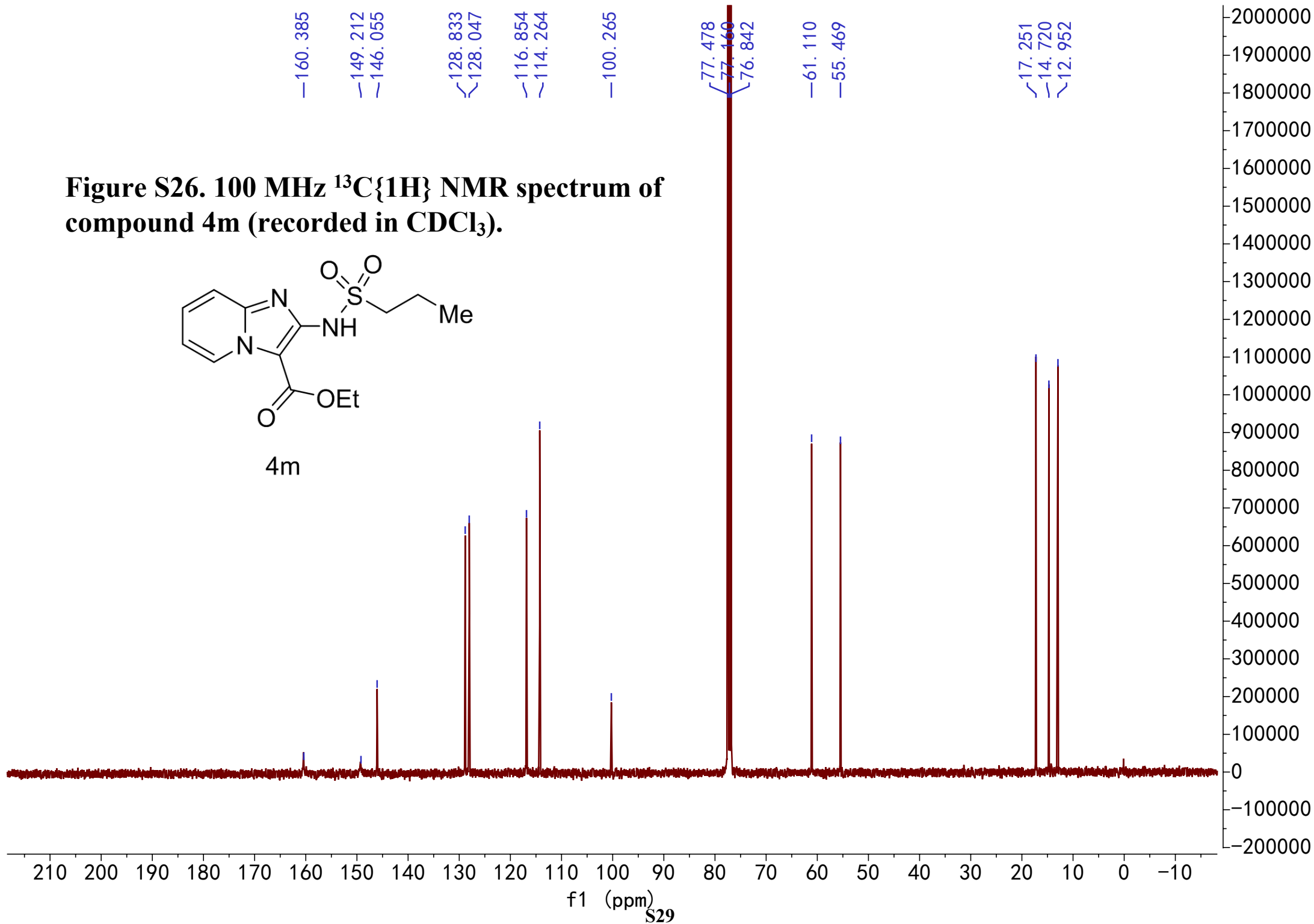
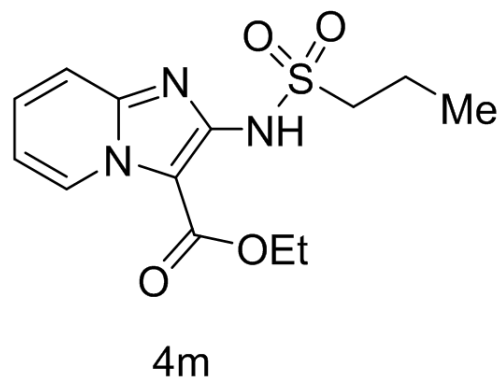


Figure S26. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4m (recorded in CDCl_3).



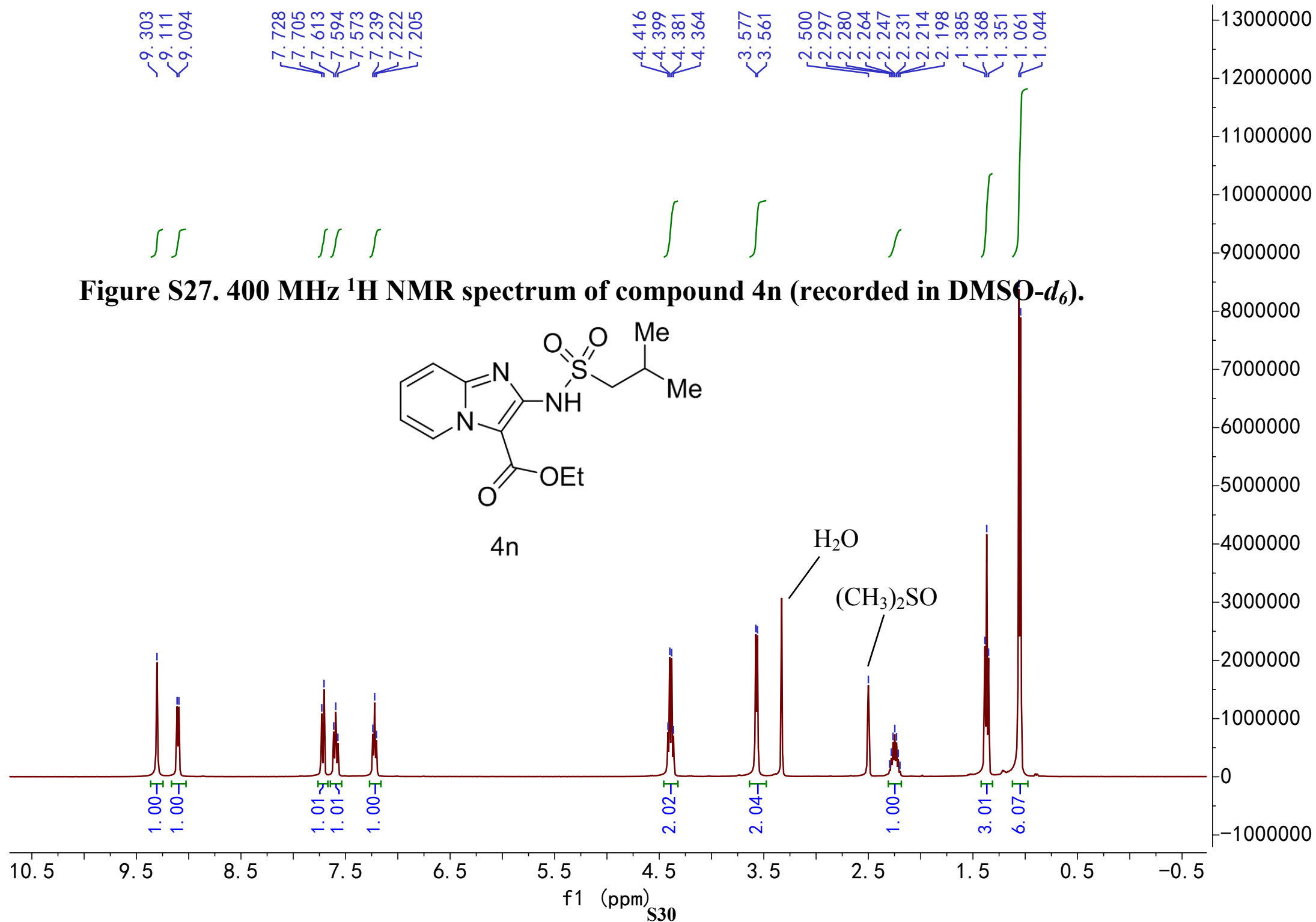
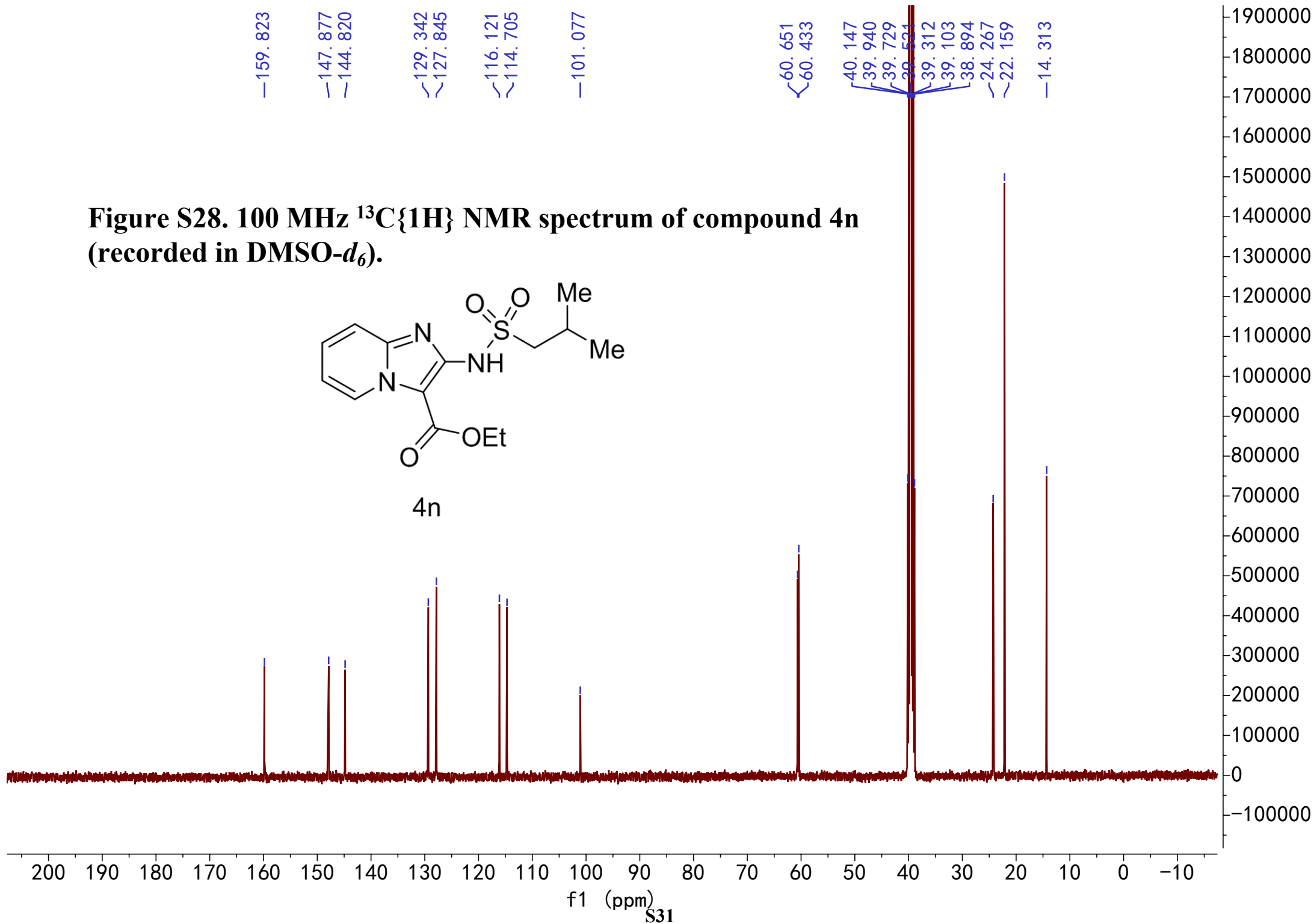
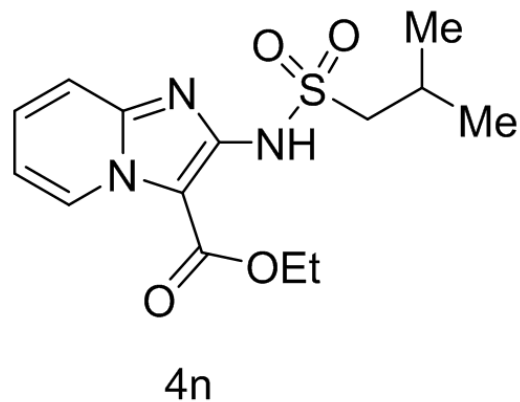


Figure S28. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4n (recorded in DMSO- d_6).



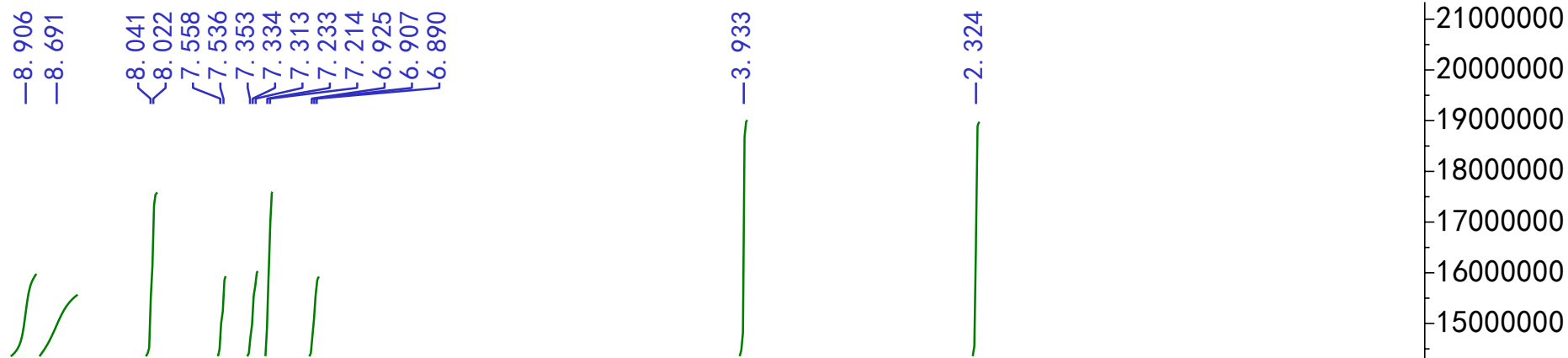


Figure S29. 400 MHz ¹H NMR spectrum of compound 4o (recorded in CDCl₃).

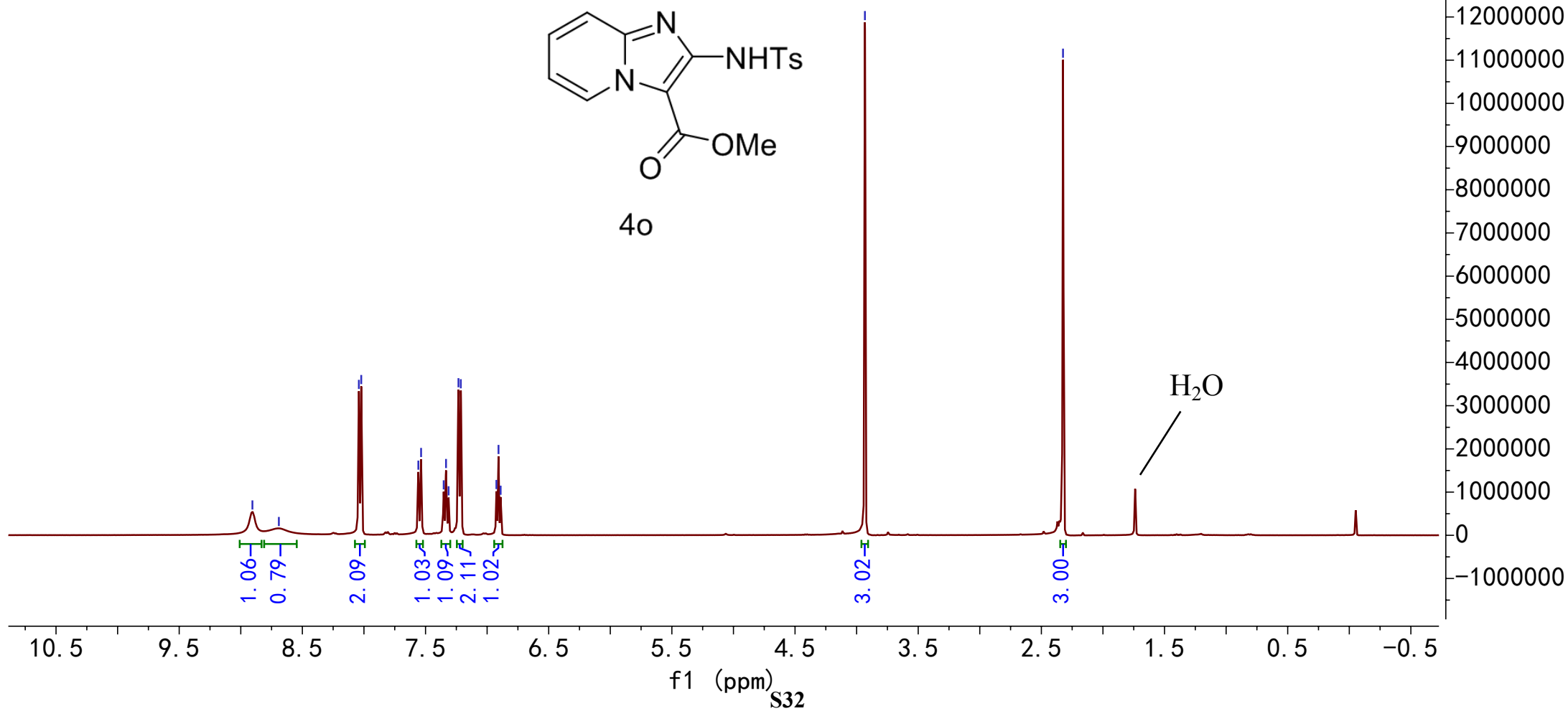
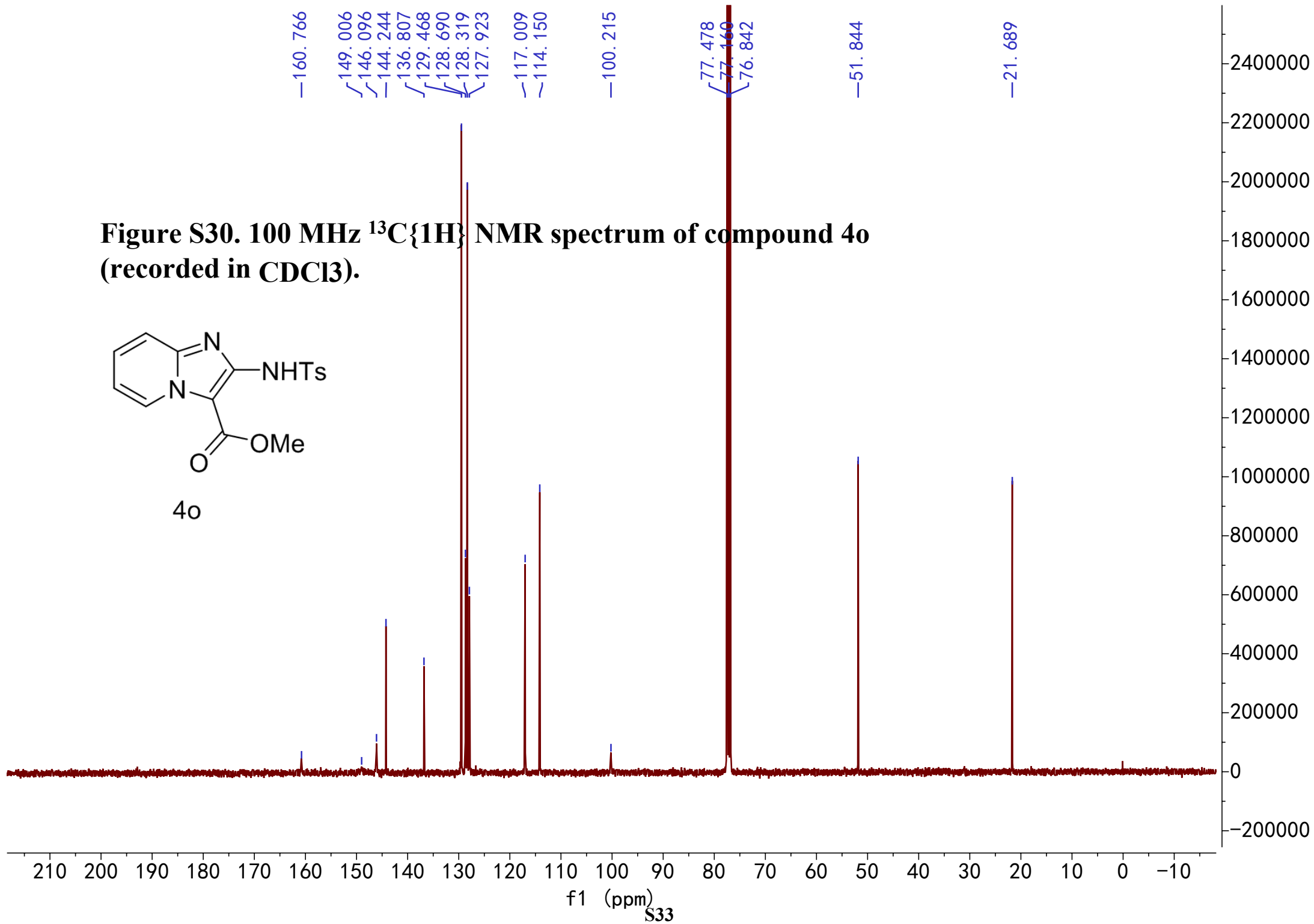
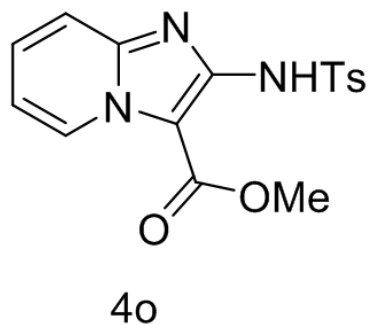


Figure S30. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4o (recorded in CDCl_3).



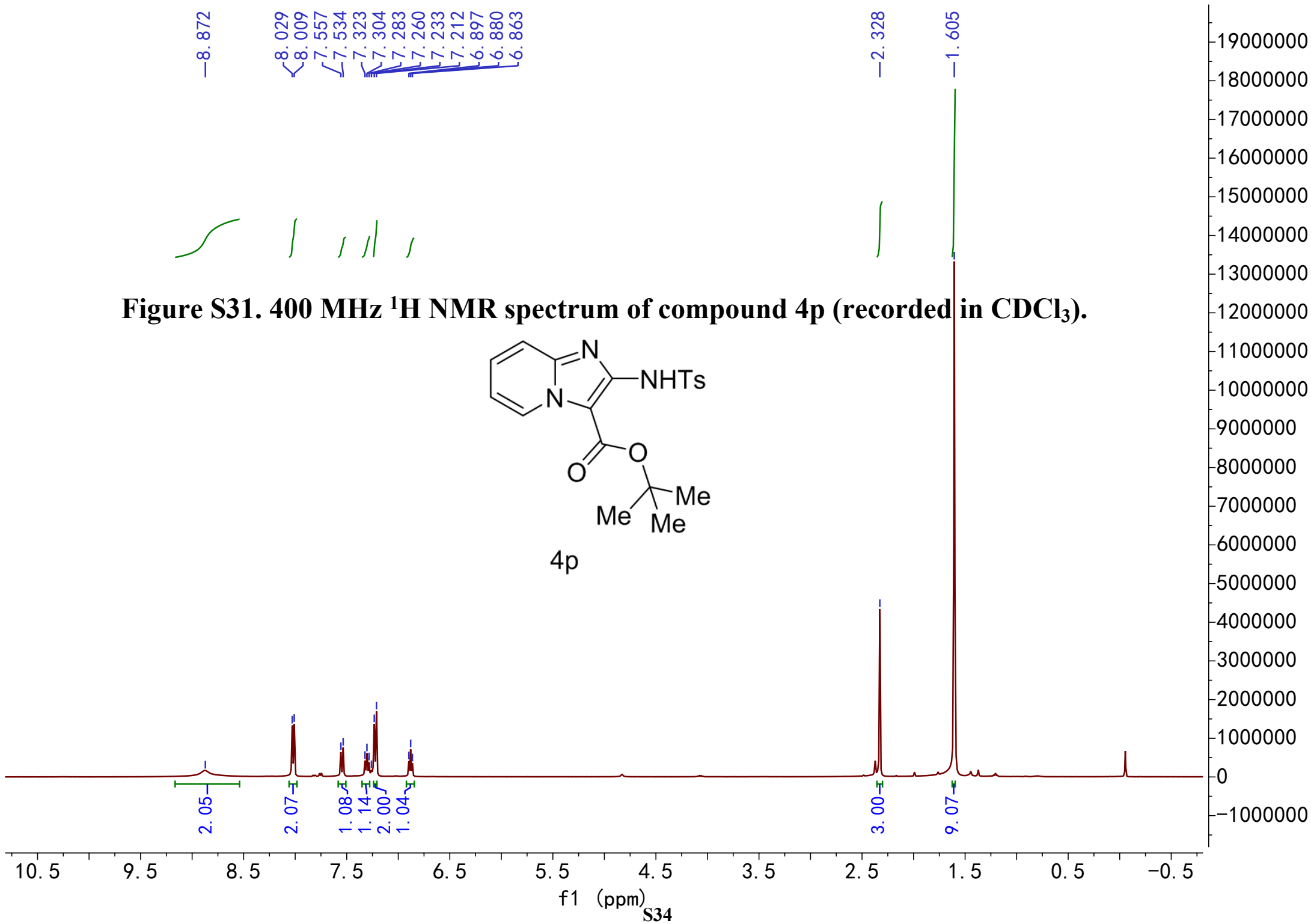
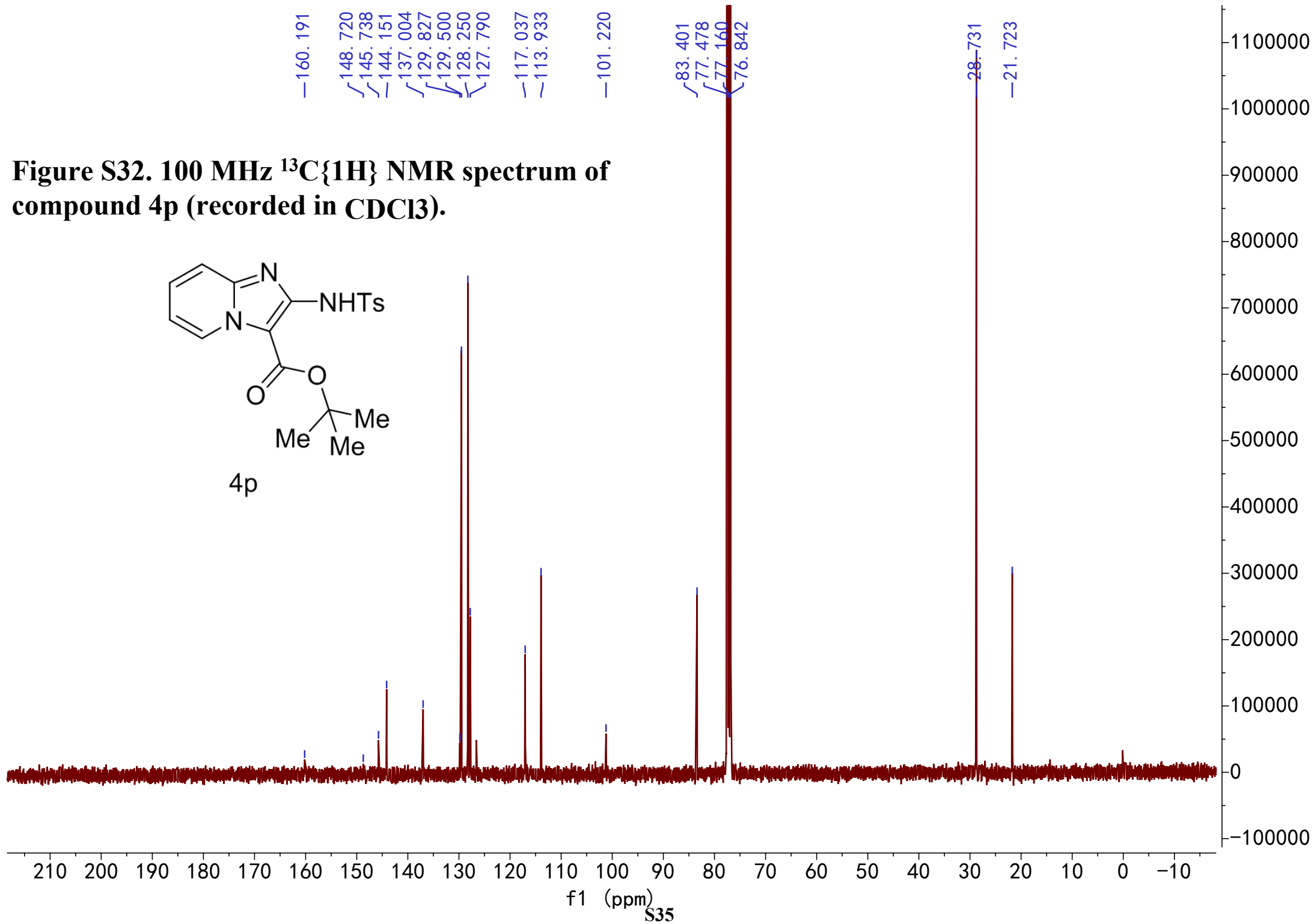
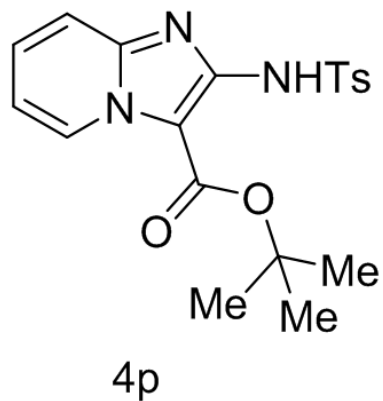
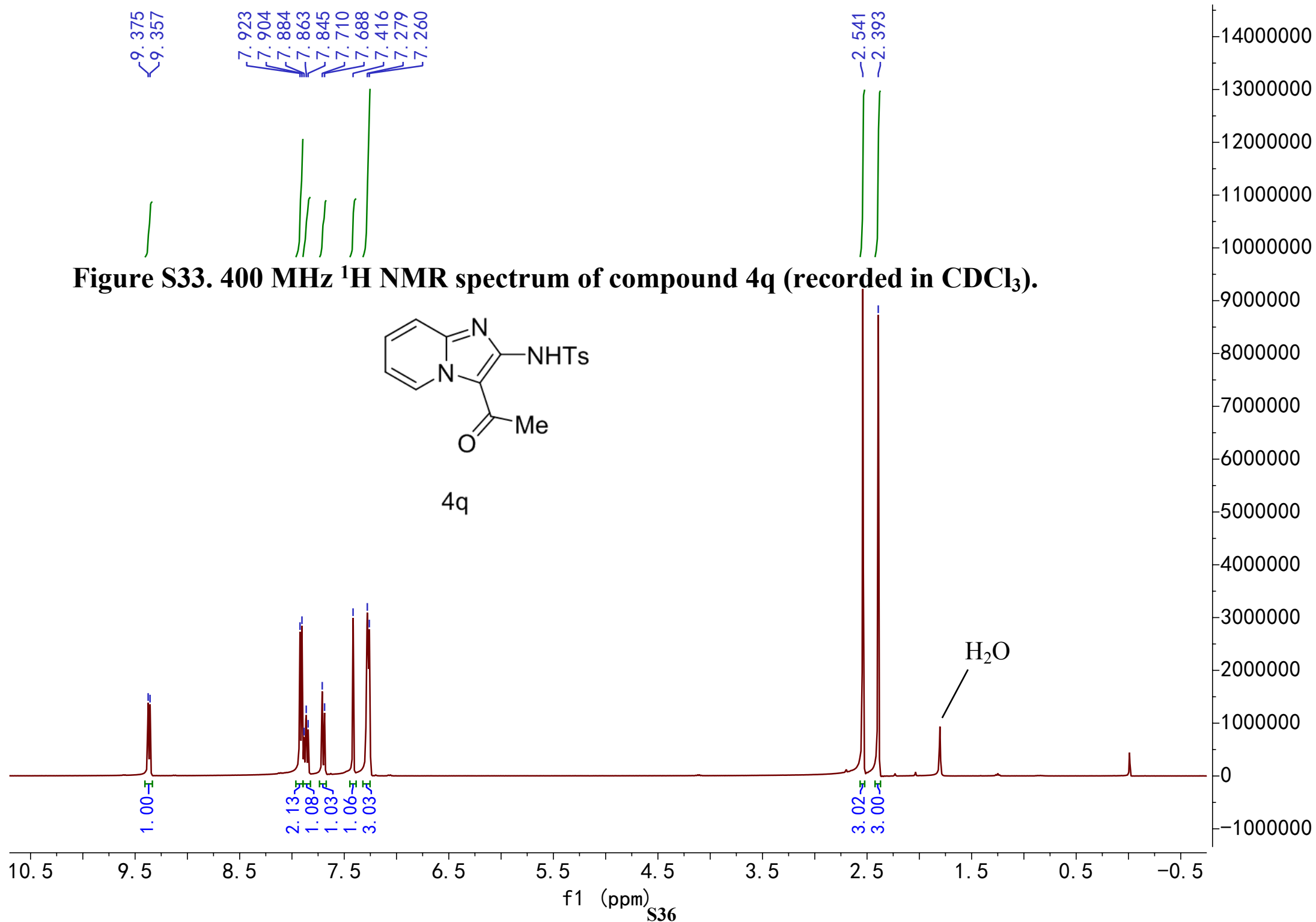
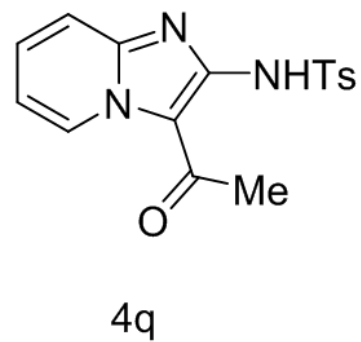


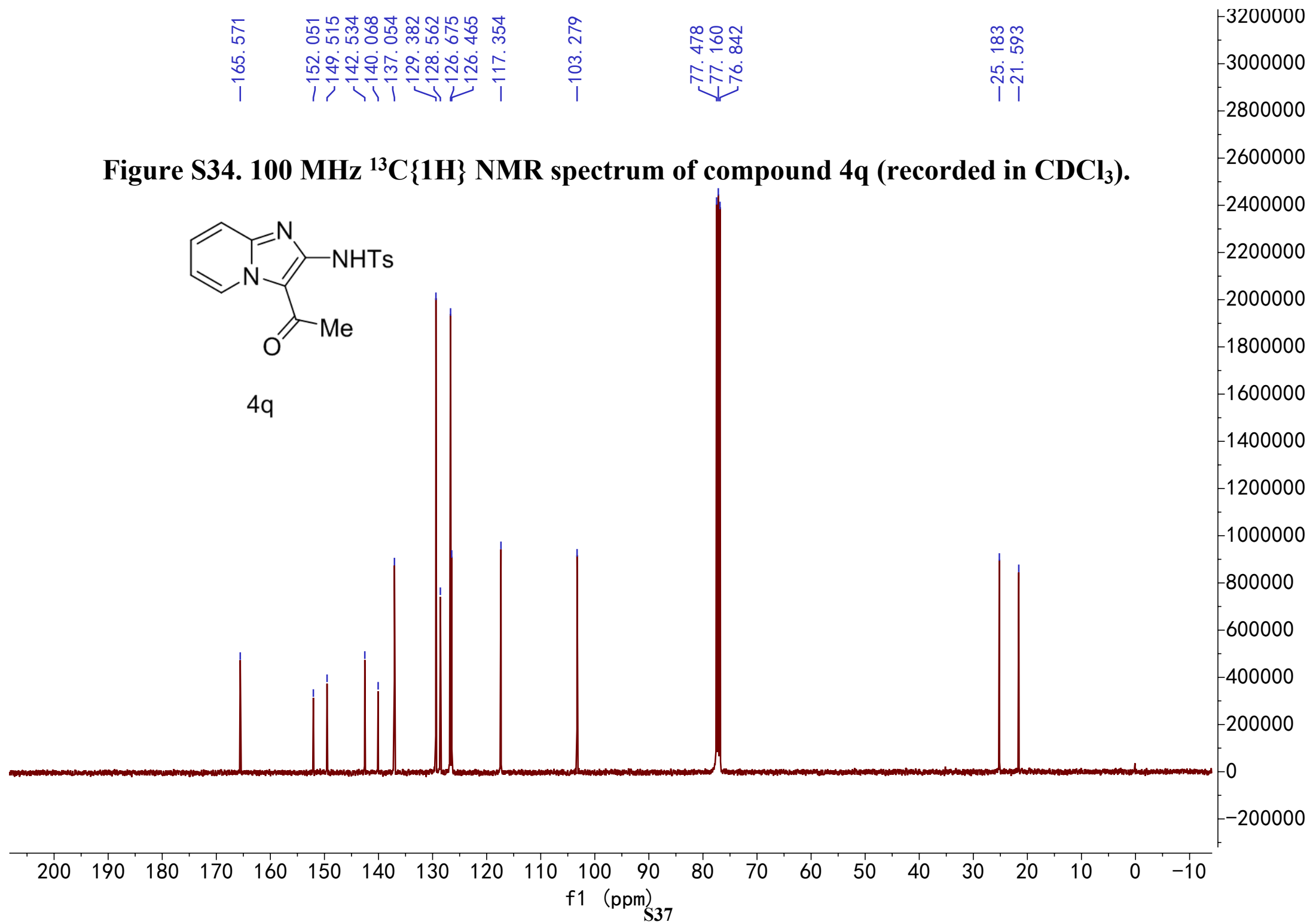
Figure S32. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4p (recorded in CDCl_3).







— 165.571
— 152.051
— 149.515
— 142.534
— 140.068
— 137.054
— 129.382
— 128.562
— 126.675
— 126.465
— 117.354
— 103.279
— 77.478
— 77.160
— 76.842
— 25.183
— 21.593



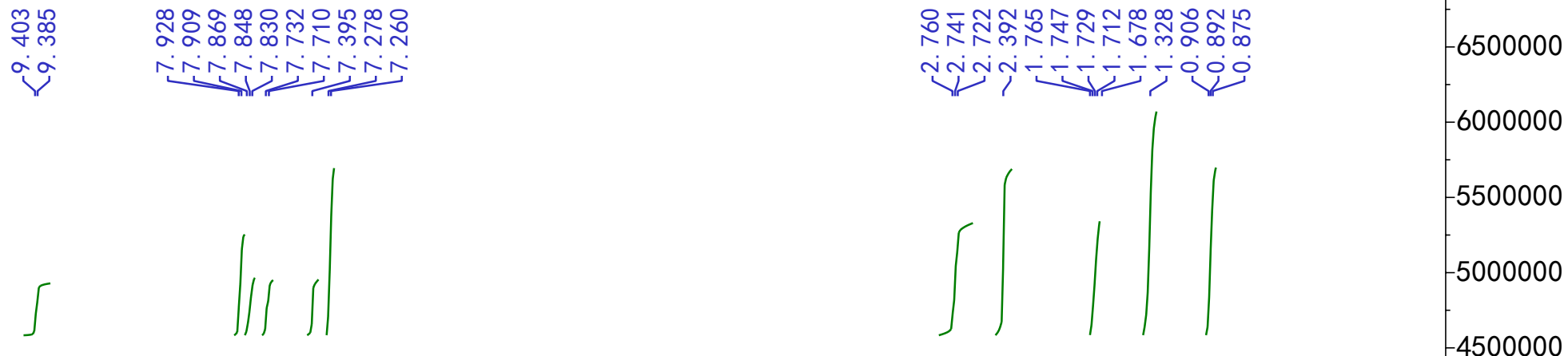
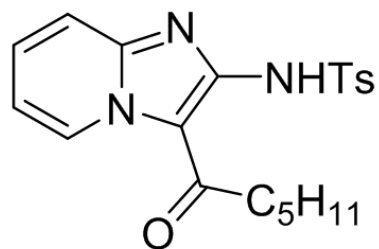
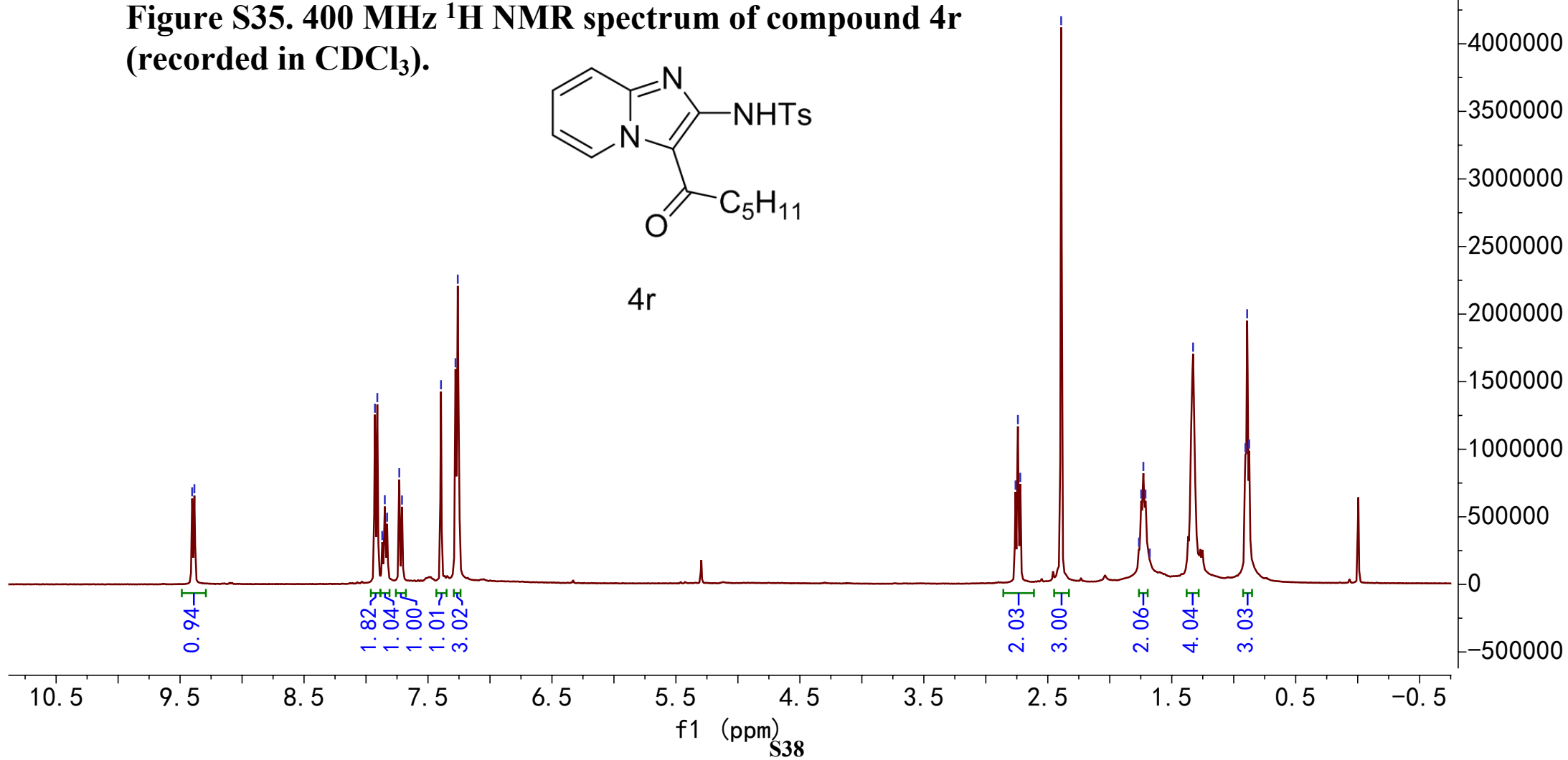


Figure S35. 400 MHz ^1H NMR spectrum of compound 4r (recorded in CDCl_3).

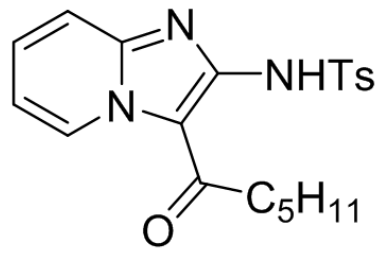


4r

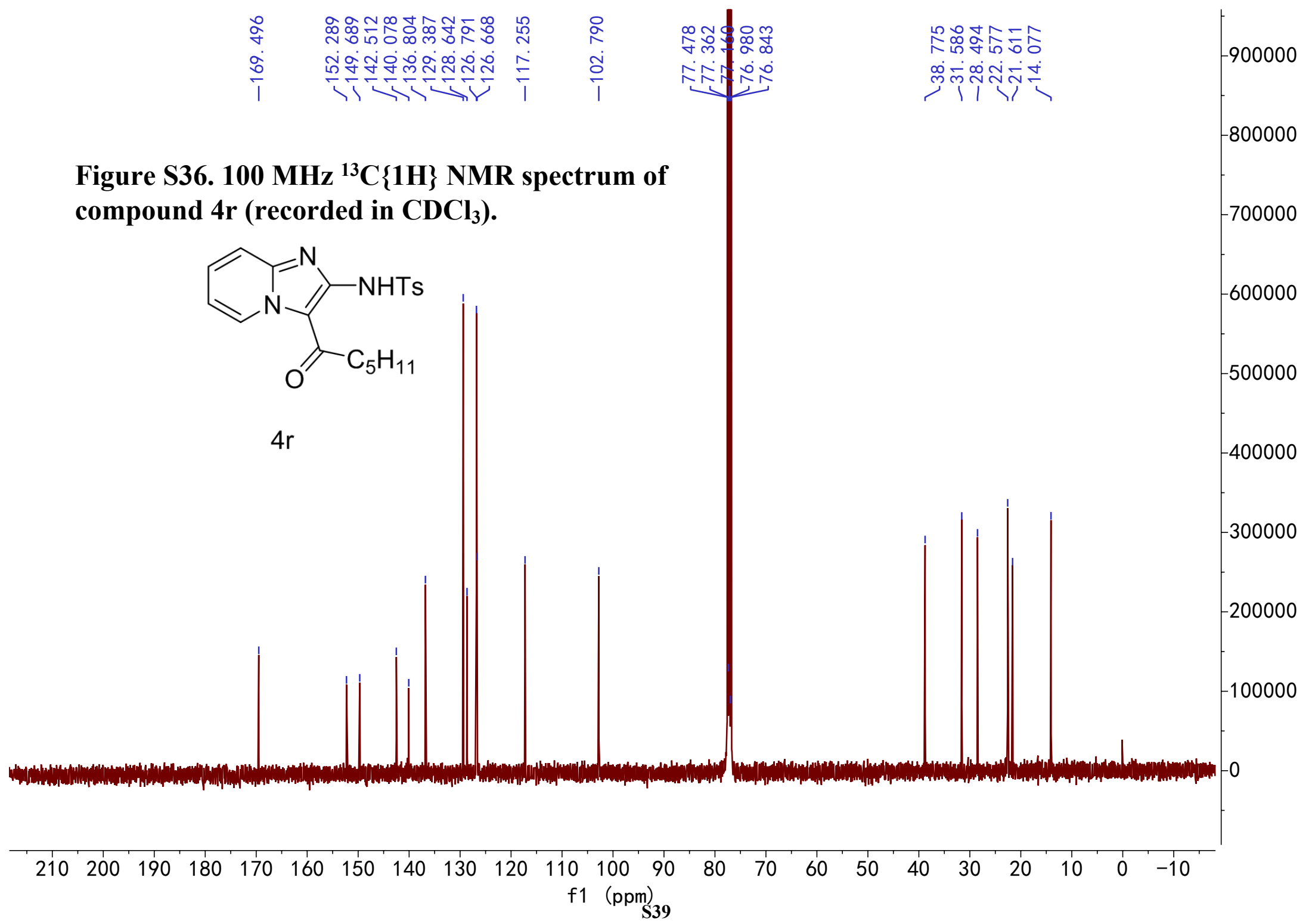


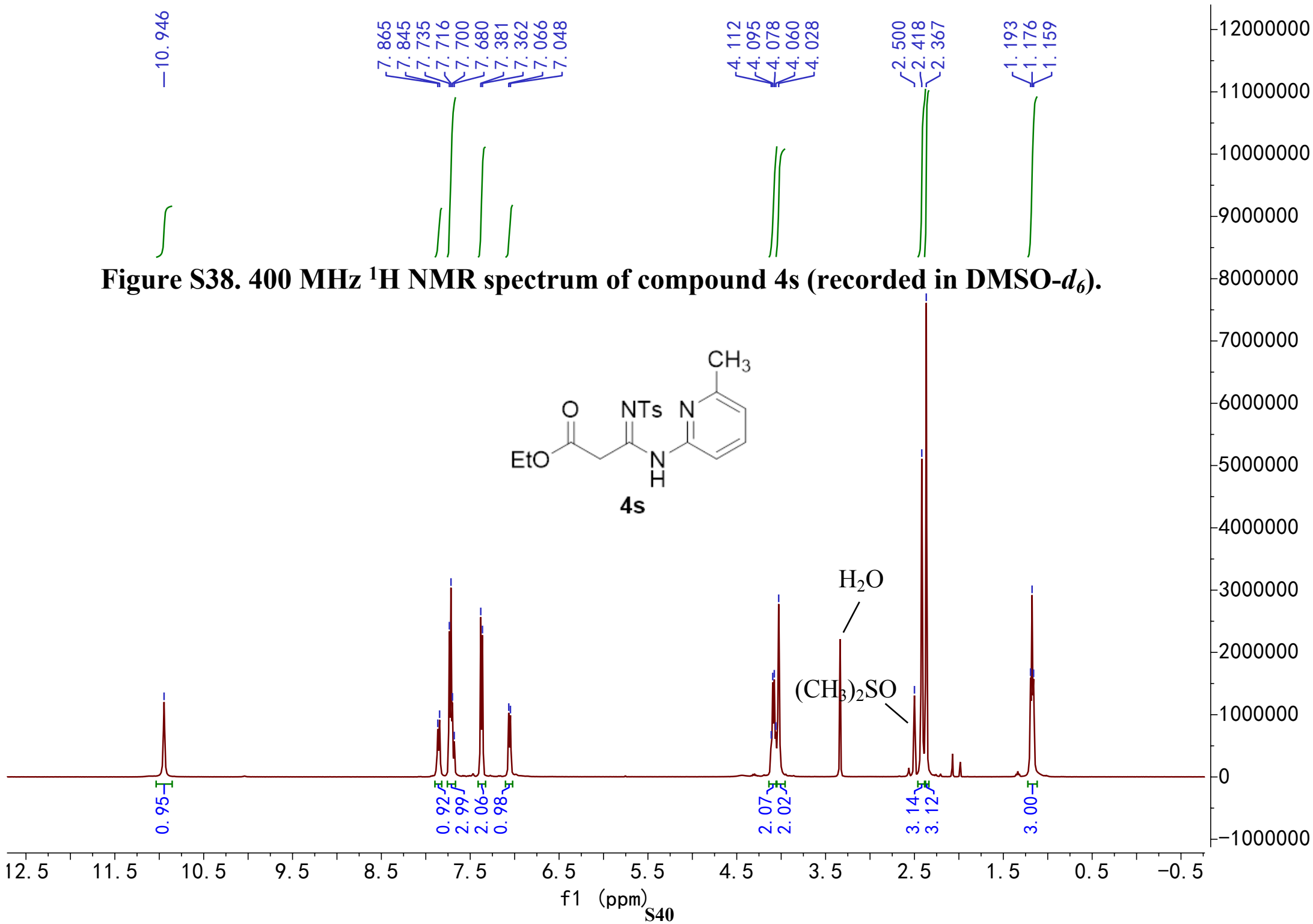
—169.496
 —152.289
 —149.689
 —142.512
 —140.078
 —136.804
 —129.387
 —128.642
 —126.791
 —126.668
 —117.255
 —102.790
 —77.478
 —77.362
 —77.160
 —76.980
 —76.843
 —38.775
 —31.586
 —28.494
 —22.577
 —21.611
 —14.077

Figure S36. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4r (recorded in CDCl_3).



4r

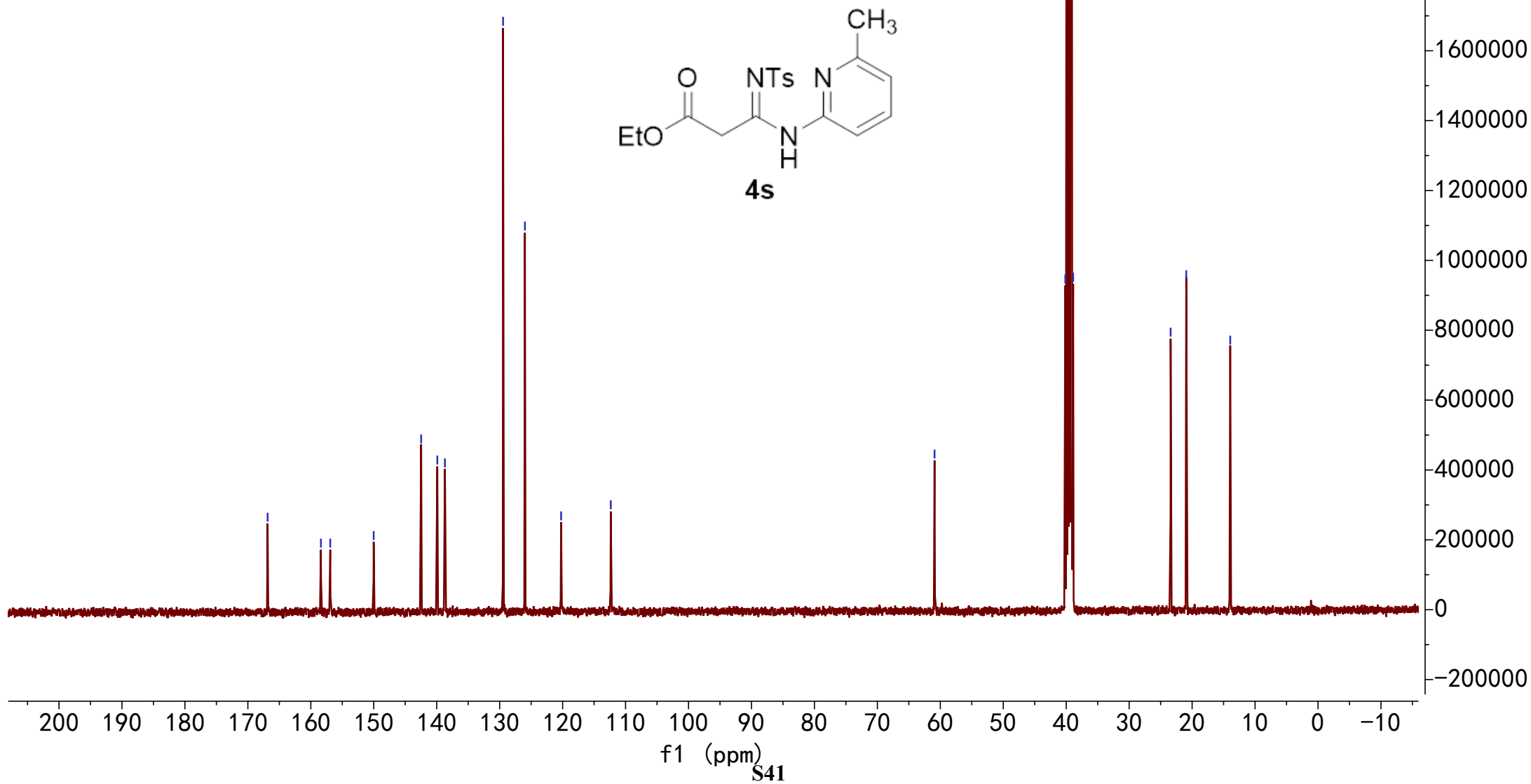




— 166.864
~ 158.399
~ 156.913
~ 150.013
~ 142.472
~ 139.905
~ 138.697
~ 129.459
~ 125.989
~ 120.239
— 112.348

— 60.917
~ 40.147
~ 39.938
~ 39.729
~ 39.520
~ 39.311
~ 39.104
~ 38.894
~ 23.412
~ 20.936
~ 13.943

Figure S37. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4s (recorded in DMSO- d_6).



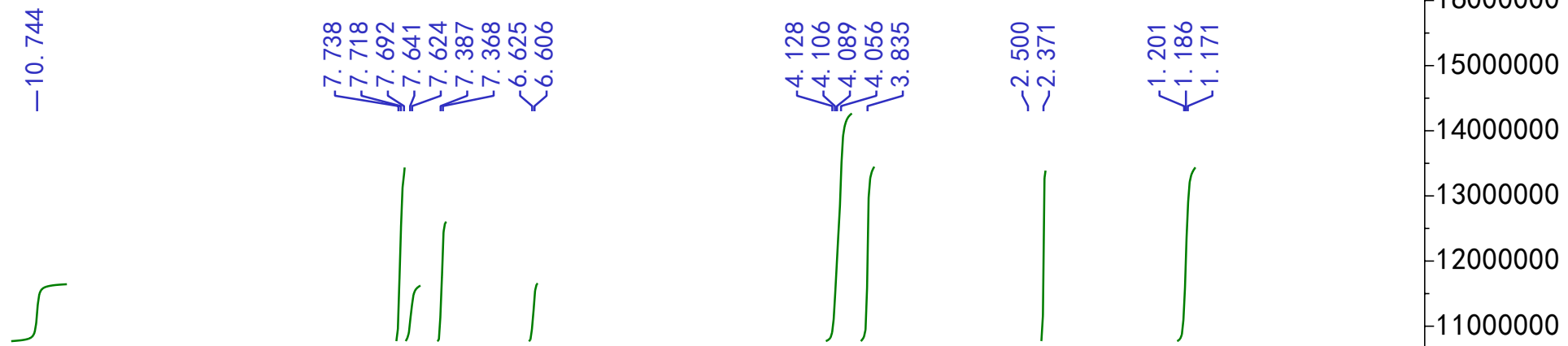
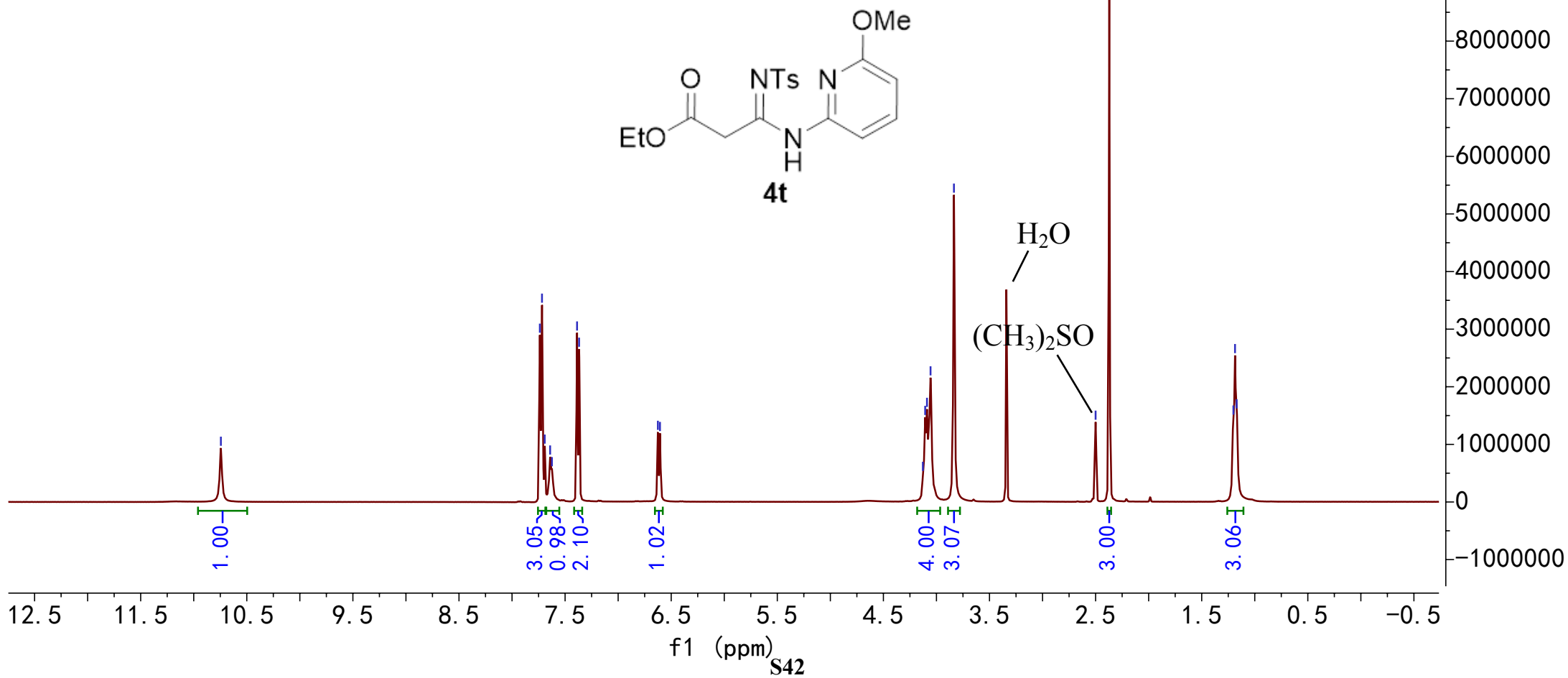
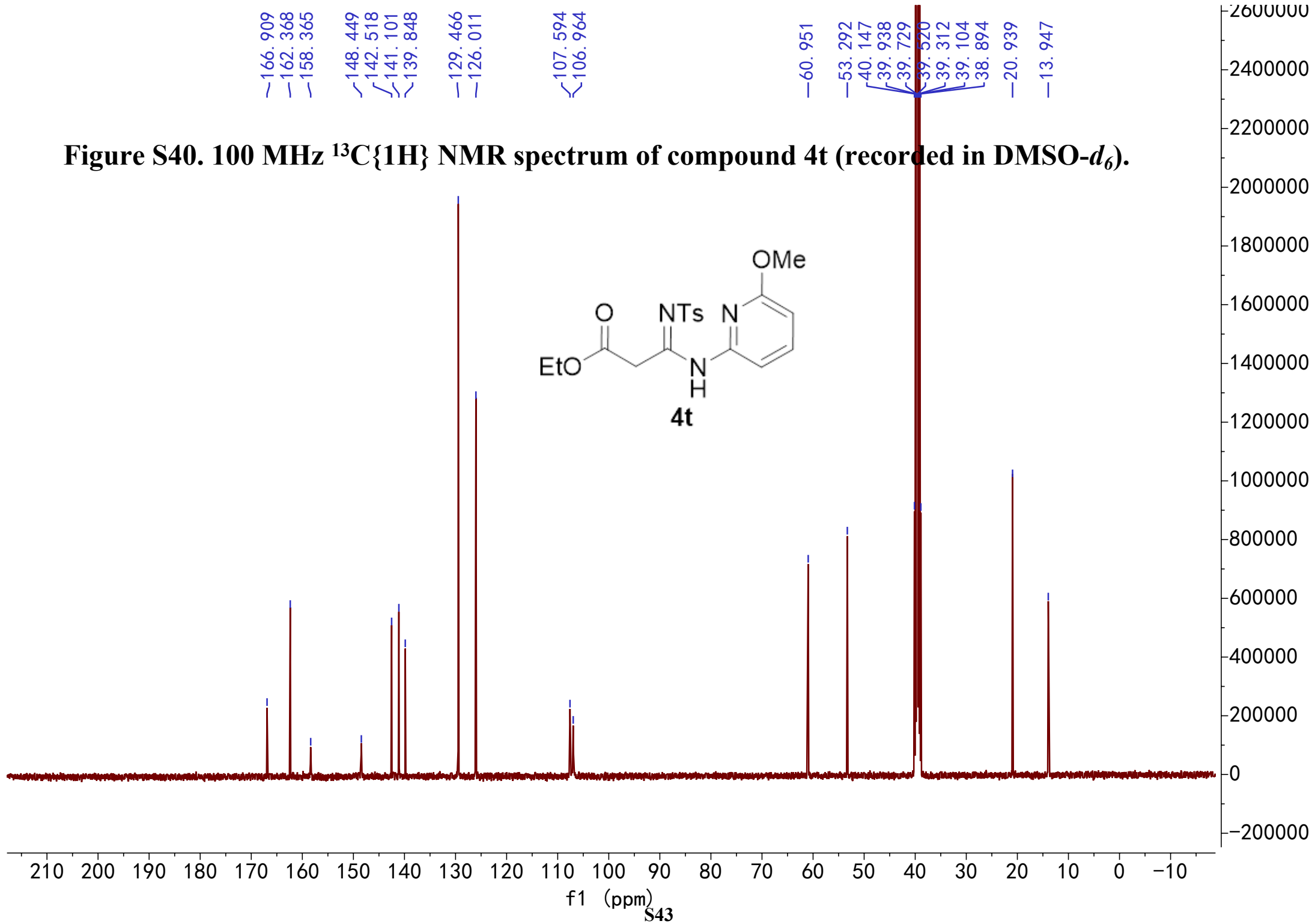


Figure S39. 400 MHz ^1H NMR spectrum of compound 4t (recorded in $\text{DMSO-}d_6$).



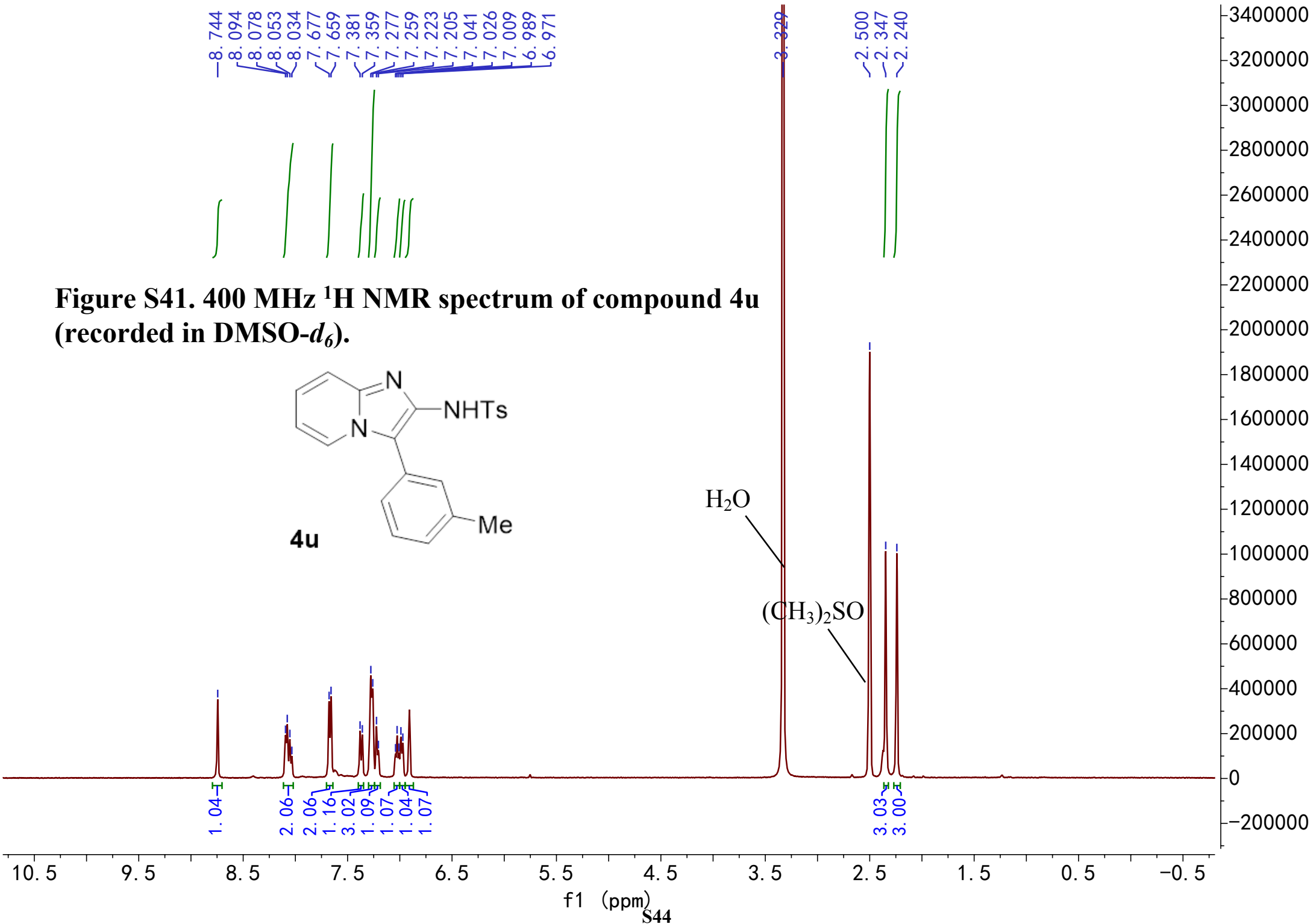
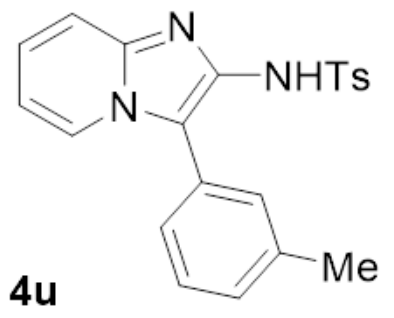
166.909
 162.368
 158.365
 148.449
 142.518
 141.101
 139.848
 129.466
 126.011
 107.594
 106.964
 60.951
 53.292
 40.147
 39.938
 39.729
 39.520
 39.312
 39.104
 38.894
 20.939
 13.947

Figure S40. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4t (recorded in $\text{DMSO-}d_6$).



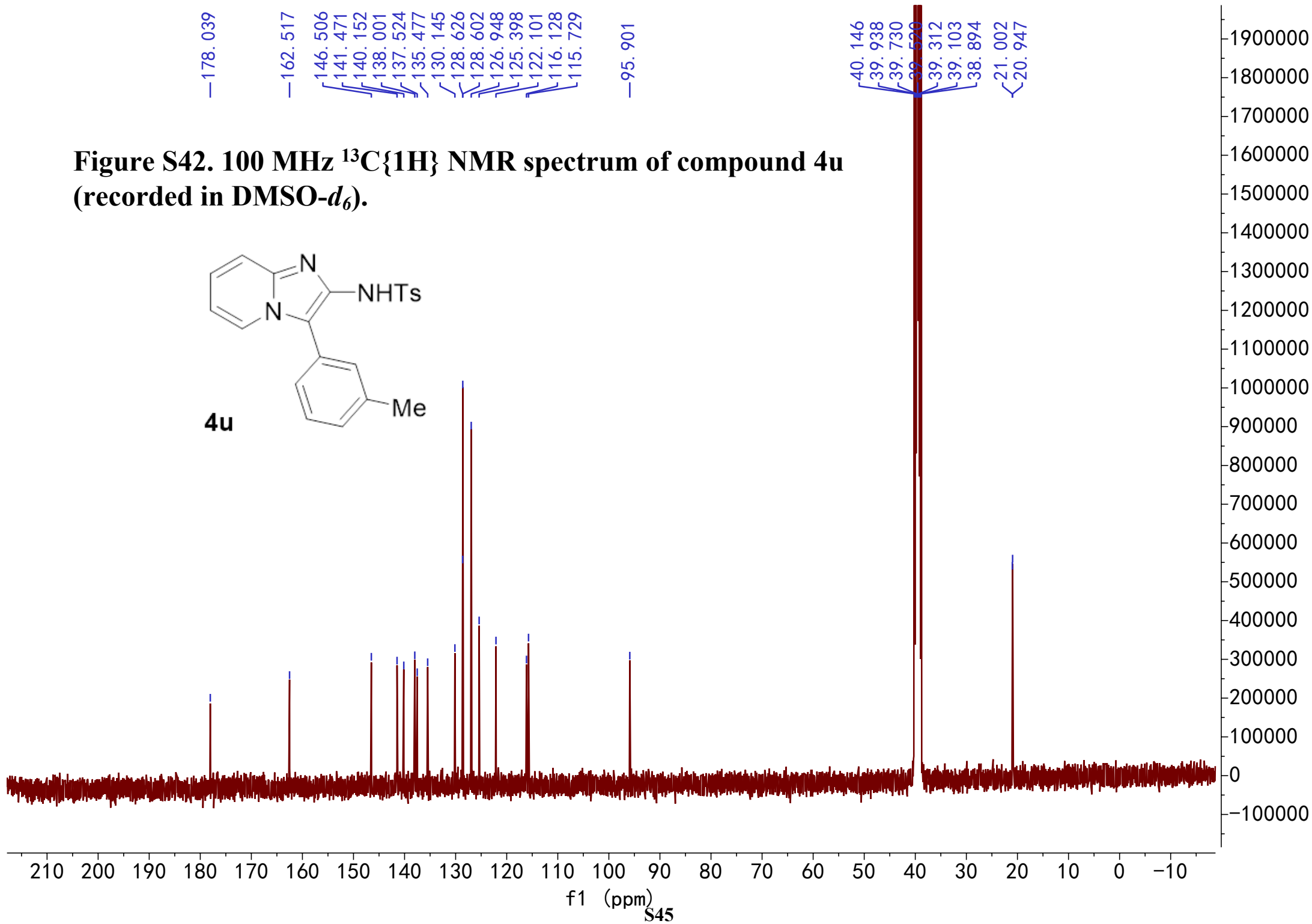
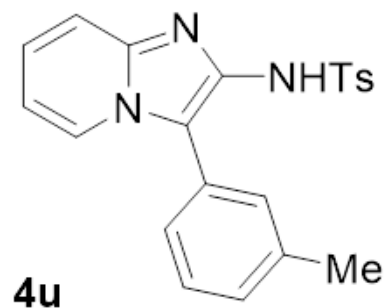
8.744
8.094
8.078
8.053
8.034
7.677
7.659
7.381
7.359
7.277
7.259
7.223
7.205
7.041
7.026
7.009
6.989
6.971

Figure S41. 400 MHz ¹H NMR spectrum of compound 4u (recorded in DMSO-d₆).



—178.039
 —162.517
 146.506
 141.471
 140.152
 138.001
 137.524
 135.477
 130.145
 128.626
 128.602
 126.948
 125.398
 122.101
 116.128
 115.729
 —95.901
 40.146
 39.938
 39.730
 39.520
 39.312
 39.103
 38.894
 21.002
 20.947

Figure S42. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4u (recorded in DMSO- d_6).

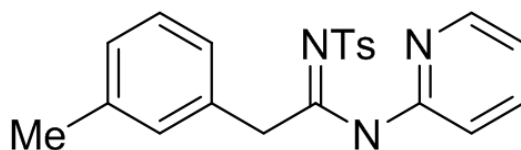


8.151
7.909
7.890
7.614
7.595
7.576
7.320
7.301
7.260
7.158
7.085
6.998

-4.423

-2.431
-2.329

Figure S43. 400 MHz ^1H NMR spectrum of compound 4v (recorded in CDCl_3).



4v

10.5 9.5 8.5 7.5 6.5 5.5 4.5 3.5 2.5 1.5 0.5 -0.5

f1 (ppm)

S46

1.99

2.00

2.03

3.00

4.00

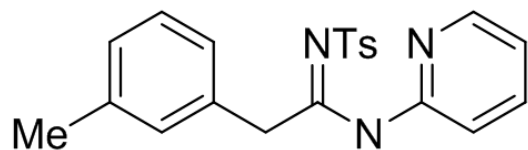
2.04

3.02

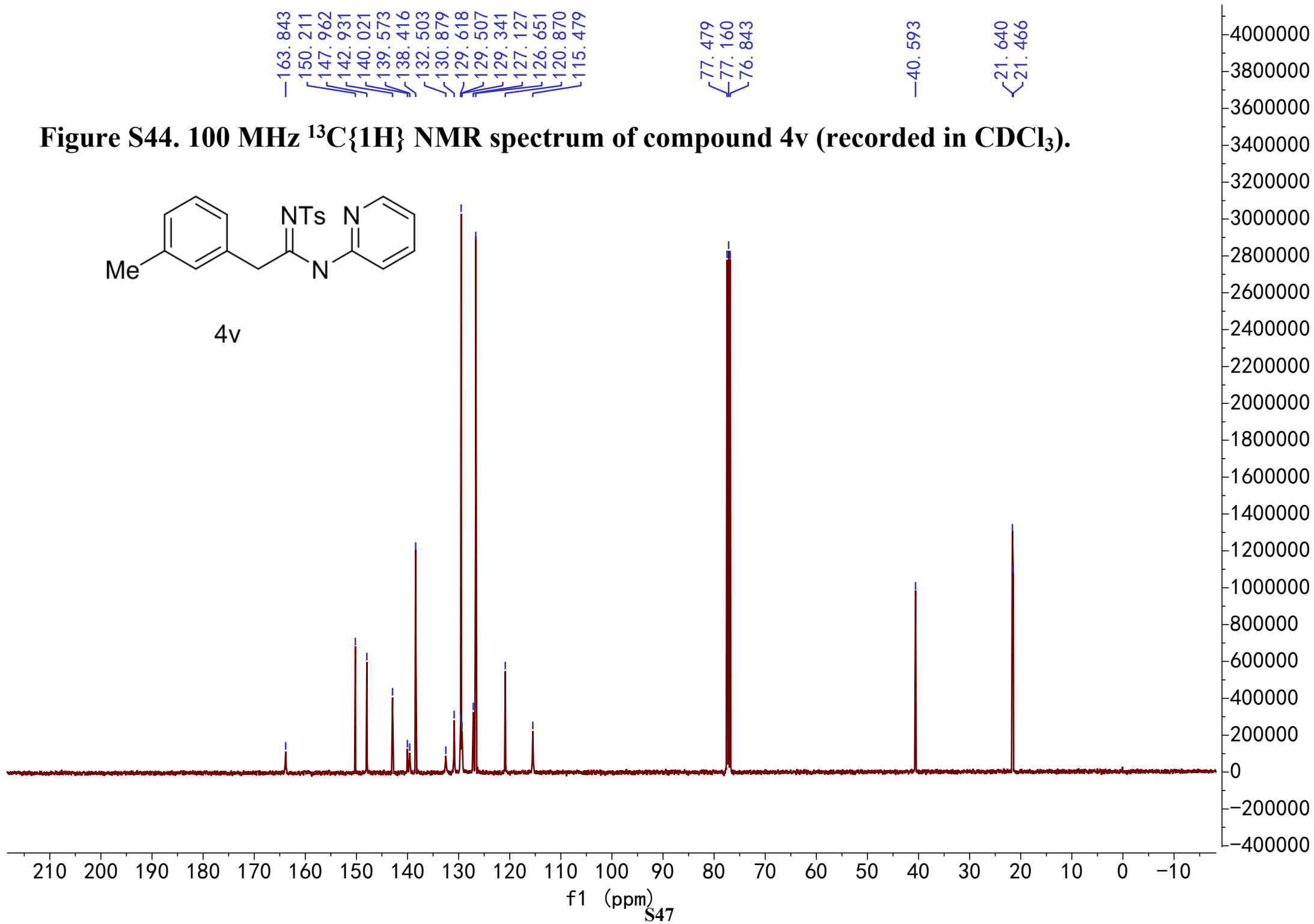
2.96

1000000
900000
800000
700000
600000
500000
400000
300000
200000
100000
0

Figure S44. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4v (recorded in CDCl_3).



4v



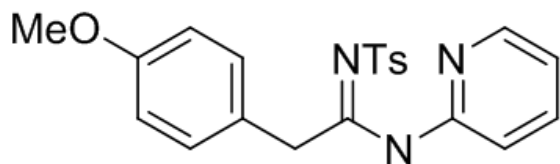
8.178
8.113
7.916
7.897
7.622
7.602
7.582
7.508
7.332
7.313
7.260
7.242
7.225
7.024
7.010
6.995
6.947
6.930

-4.422

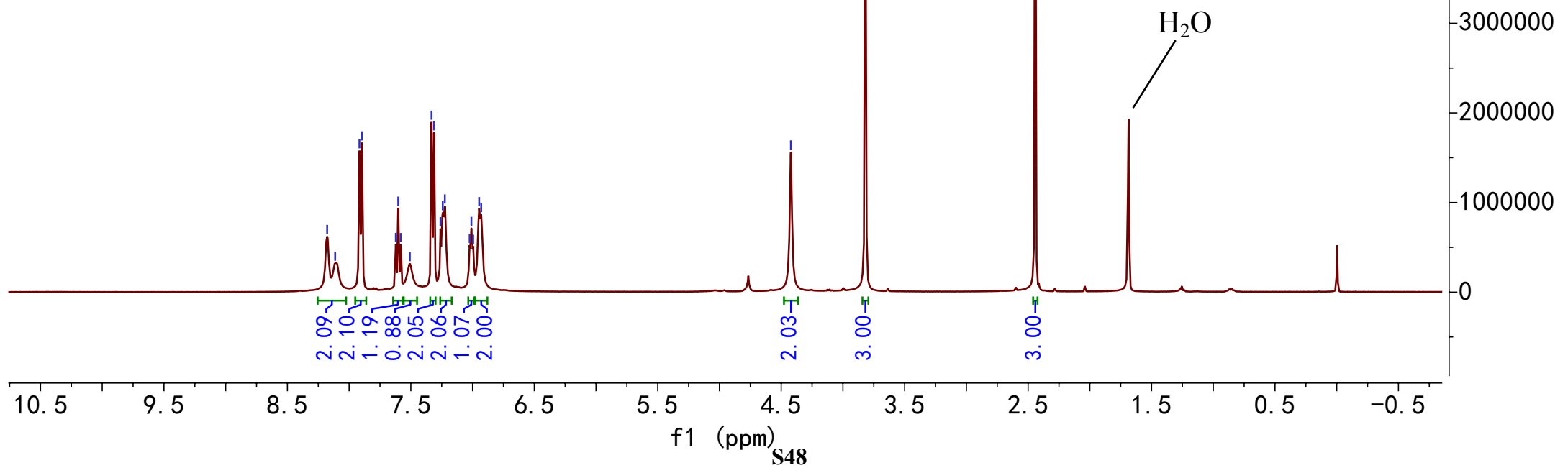
-3.819

-2.443

Figure S45. 400 MHz ^1H NMR spectrum of compound 4x (recorded in CDCl_3).



4x



— 164.206
— 159.765
/ 150.210
/ 148.032
/ 142.952
/ 140.082
/ 138.461
/ 131.502
/ 129.538
/ 126.664
/ 124.235
/ 120.911
/ 115.397
/ 115.264

{ 77.479
{ 77.161
{ 76.843
— 55.428
— 39.941
— 21.681

Figure S46. 100 MHz $^{13}\text{C}\{^1\text{H}\}$ NMR spectrum of compound 4x (recorded in CDCl_3).

