

## Electronic Supporting Informations

### Synthesis and self-assembly of novel benzimidazole-carbazole-*N*-glycosylamines into nanofibers

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## S.I.1: Experimental Procedure

### S.I. 1.1: General procedure for gelation

The gelation studies were carried as per reported procedures.<sup>1</sup> A definite amount of benzimidazole-carbazole-*N*-glycosylamine gelator **14-19** was added to 1 ml of a required solvent in a glass vial and warmed gently until clear solution was obtained. After allowing it to cool at ambient temperature, the vessel was turned upside down to verify the gel formation. The reversibility of the gelation was confirmed by repeated heating and cooling. The critical gelator concentration (CGC) of benzimidazole- carbazole-*N*-glcosylamine **14-19** was determined from the minimum amount of gelator required for the gel formation at room temperature.

### S.I. 1.2: Scanning electron microscopy (SEM)

Scanning electron microscopic studies were performed by using Hitachi Scanning Electron Microscope SU3500. The samples were prepared by drop casting of gel of benzimidazole-carbazole-*N*-glycosylamines **18** on aluminium studs at its CGC in ethanol at ambient conditions. SEM images were obtained after drying the sample at ambient temperature.

### S.I. 1.3: High resolution-Transmission electron microscopy (HR-TEM)

High resolution-Transmission electron microscopic studies were performed by using FEI TECNAI G2 model T-30 at accelerating voltage of 250 kV. The samples were prepared by drop casting of solution, dispersed with gel of benzimidazole-carbazole-*N*-glycosylamine **18** in ethanol on to carbon coated copper grids (400 mesh) at the concentration of  $1 \times 10^{-4}$  M at ambient conditions. TEM images were obtained after drying the sample and without staining in vaccum.

### S.I. 1.4: XRD analysis

PXRD patterns are recorded by X-ray diffractometer with  $\text{CuK}\alpha$  radiation source. The scan rate was  $0.5^\circ/\text{min}$ . The xerogel was prepared by evaporating gel prepared in ethanol at room temperature.

### S.I.1.5: Rheological studies

Rheological measurements were carried out with Anton Paar-Rheoplus instrument. Oscillatory experiments were performed in a 0.001–100 Hz frequency range with 0.1 % constant strain on 0.3 % gel of **18** in ethanol at  $25^\circ\text{C}$ .

### S.I. 1.5: Dropping ball method

Gel to solution transition temperature ( $T_{\text{gel}}$ ) of gelators **18** was determined by a ‘dropping-ball method’. A small tin ball of approximate weight 100 mg was placed on top of the gel in a capped vial of diameter 1.0 cm, which was slowly warmed in a silicon oil bath. The temperature in which the tin ball reaches the bottom of the vial is assigned as  $T_{\text{gel}}$ . The experiment is duplicated one to obtain the reproducibility within  $\pm 2^\circ\text{C}$ . The same condition was repeated in different solvents and increased concentrations.<sup>2</sup>

## Reference

1. H. Svobodová, Nonappa, M. Lahtinen, Z. Wimmer and E. Kolehmainen, *Soft Matter*, 2012, **8**, 7840.
2. (a) D. J. Abdallah and R. G. Weiss, *Langmuir*, 2000, **16**, 352; (b) Y. Yu and Y. Ma, *Soft Matter*, 2011, **7**, 884.

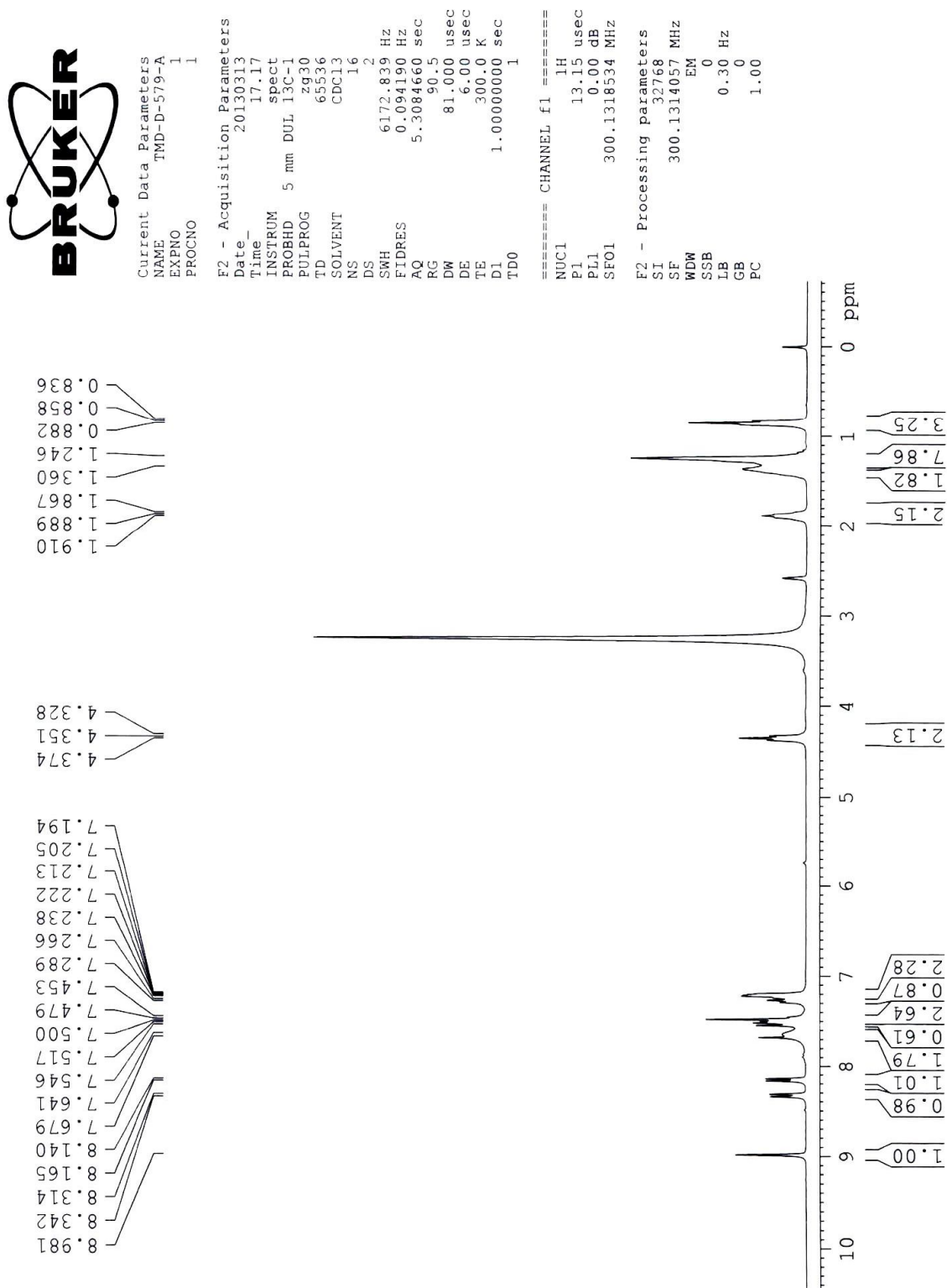


Figure S.I. 1:  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3+\text{DMSO-D}_6$ ) Spectrum of Compound **4**.



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PROCNO 1

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PULPROG zgpg30  
TD 65536  
SOLVENT CDCl3  
NS 107  
DS 4  
SWH 17985.611 Hz  
FIDRES 0.274439 Hz  
AQ 1.8219508 sec  
RG 2298.8  
DW 27.800 usec  
DE 6.00 usec  
TE 300.0 K  
D1 2.00000000 sec  
d11 0.03000000 sec  
DELTA 1.89999998 sec  
TD0 1

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P1 9.30 usec  
PL1 0.00 dB  
SFO1 75.4752953 MHz

===== CHANNEL f2 =====  
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NUC2 1H  
PCPD2 80.00 usec  
PL2 0.00 dB  
PL12 15.68 dB  
PL13 16.00 dB  
SFO2 300.1312005 MHz

F2 - Processing parameters  
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SF 75.4681785 MHz  
EM 0  
WDW 0  
SSB 1.00 Hz  
LB 0  
GB 0  
PC 1.40

42.25  
30.73  
28.31  
28.13  
27.97  
26.24  
21.56  
13.11

152.33  
140.34  
139.96  
125.24  
123.79  
122.07  
121.85  
120.99  
120.13  
119.58  
118.46  
118.37  
108.17  
108.04

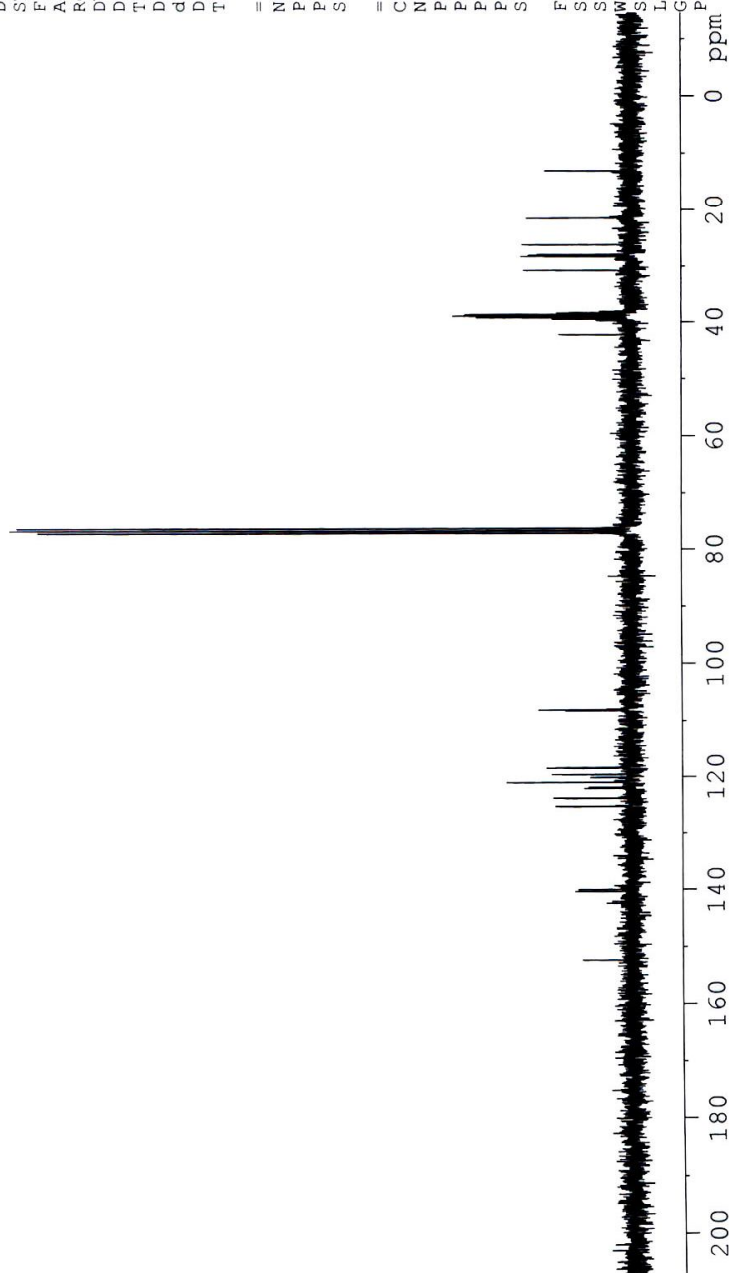


Figure S.I. 2:  $^{13}\text{C}$  NMR (300 MHz,  $\text{CDCl}_3 + \text{DMSO-}D_6$ ) Spectrum of Compound 4.

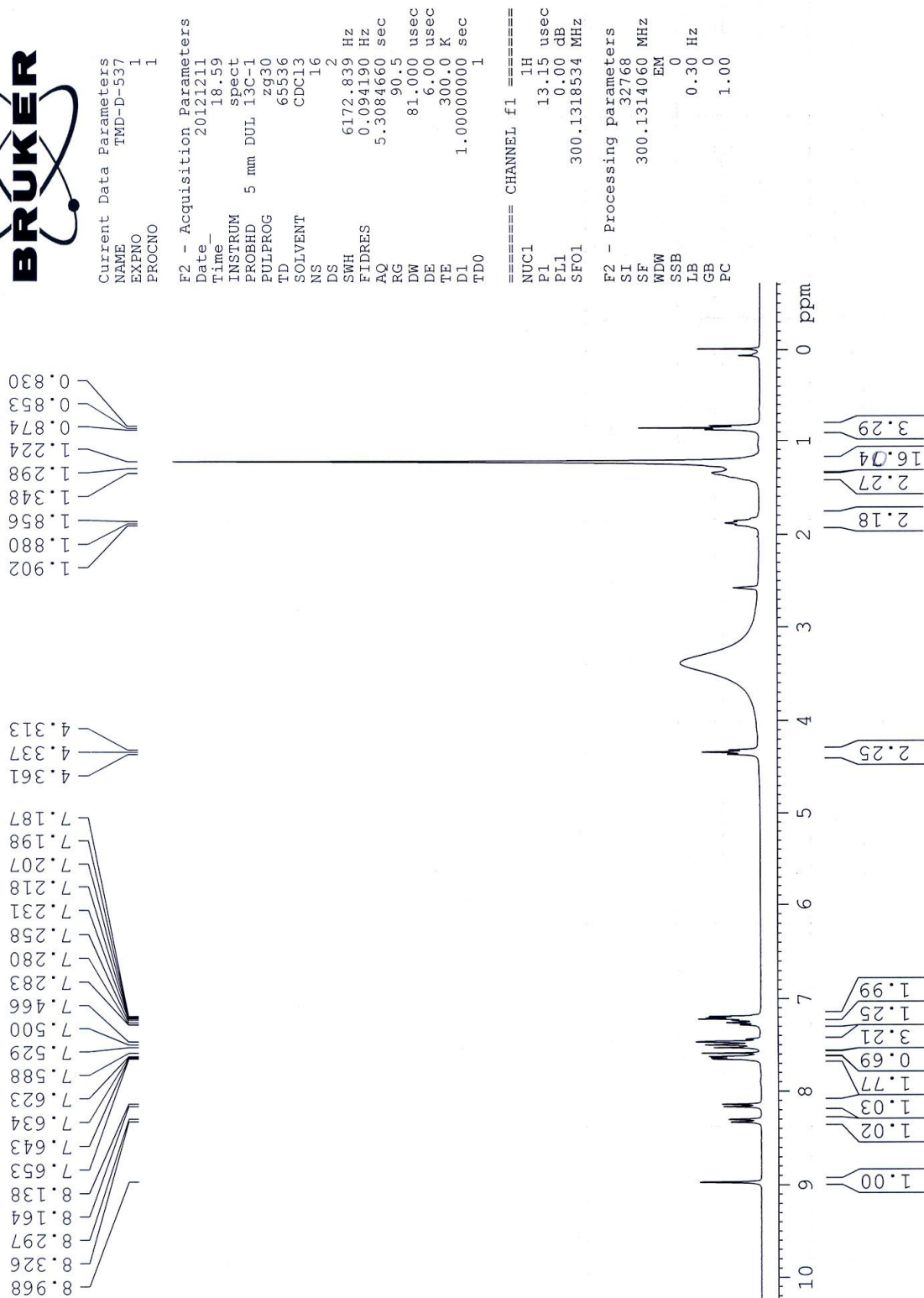


Figure S.I. 3:  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3+\text{DMSO-}D_6$ ) Spectrum of Compound **5**.

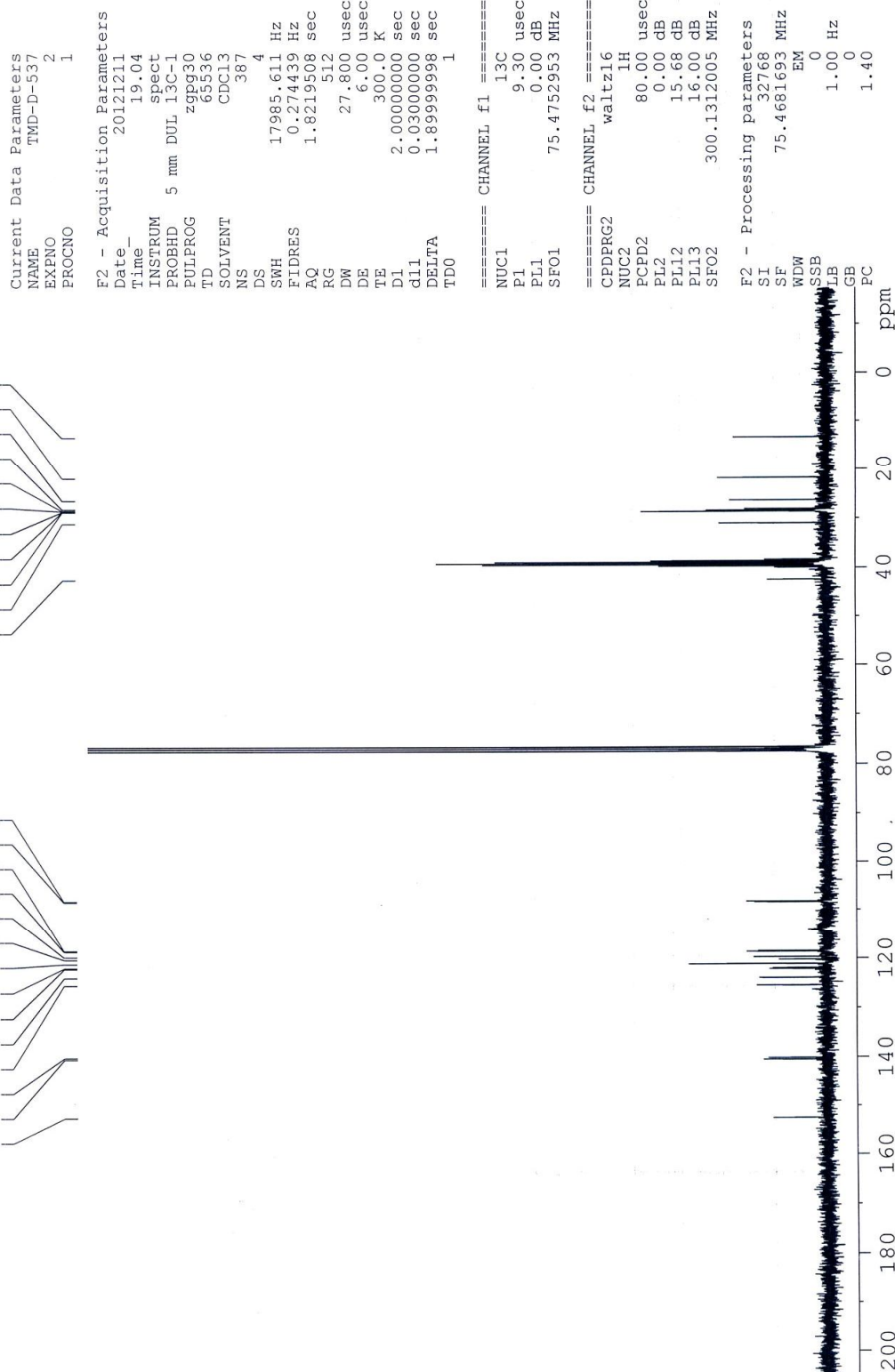


Figure S.I. 4:  $^{13}\text{C}$  NMR (300 MHz,  $\text{CDCl}_3 + \text{DMSO-D}_6$ ) Spectrum of Compound **5**.

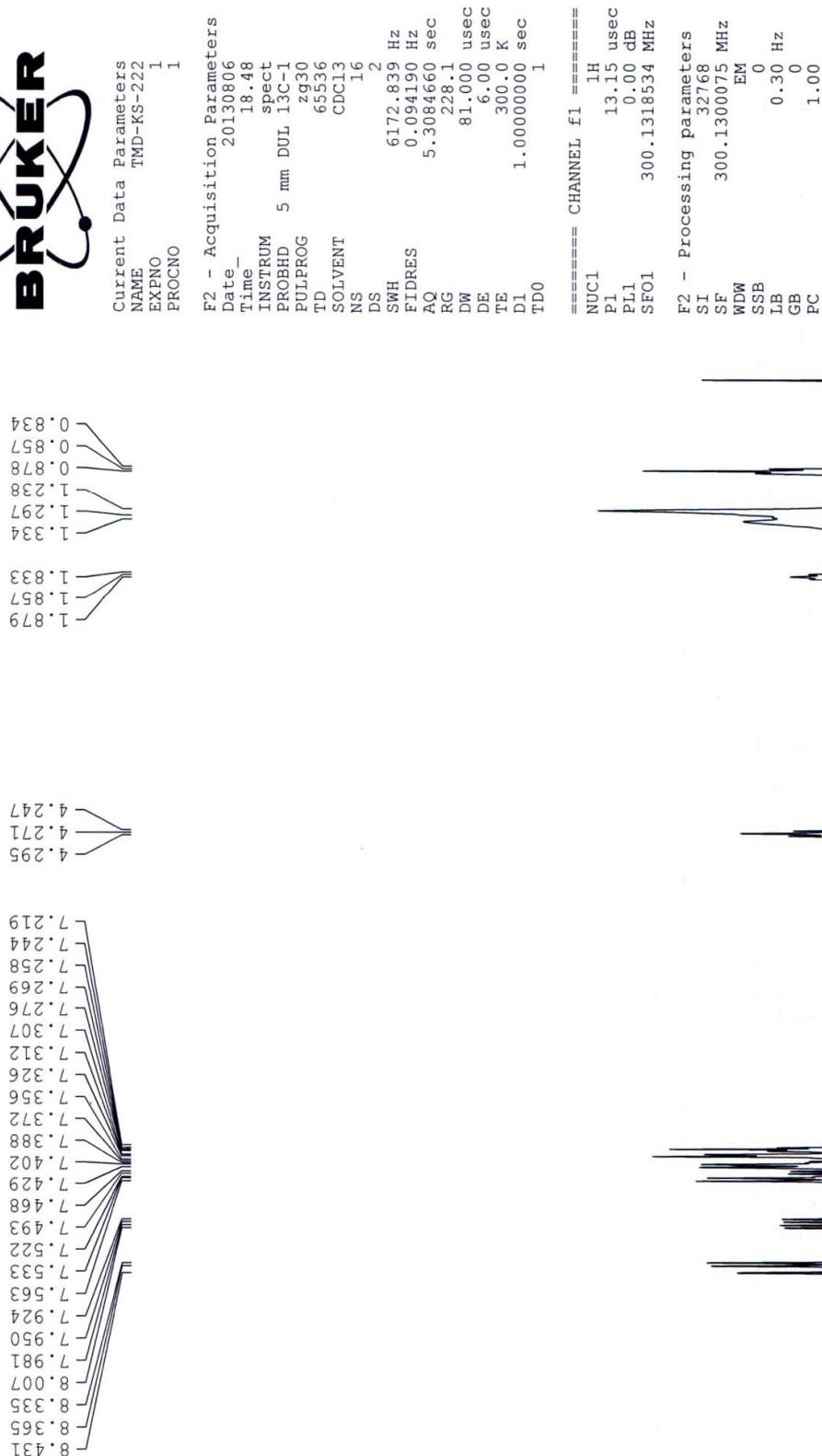


Figure S.I. 5:  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound 7.



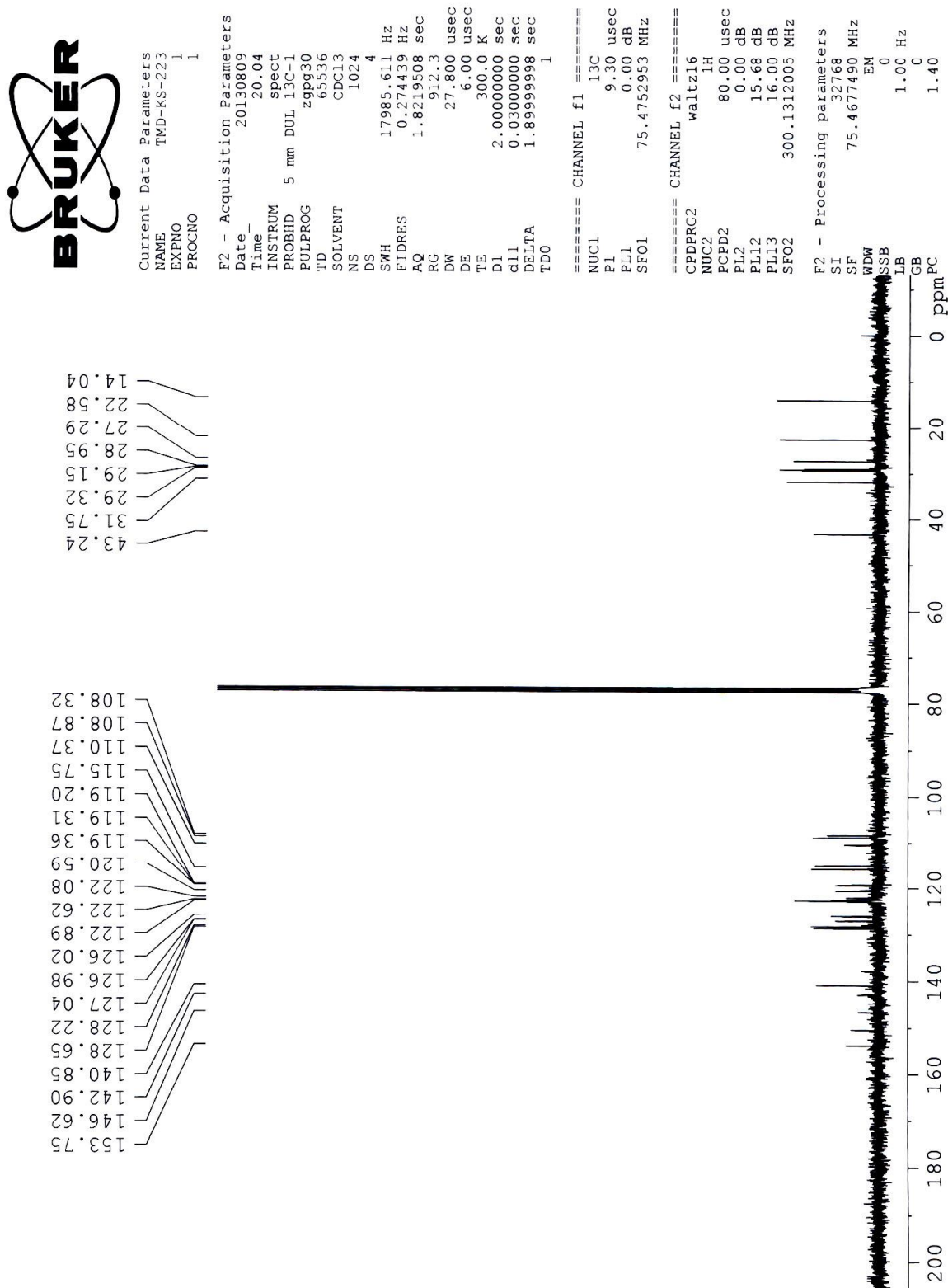


Figure S.I. 6:  $^{13}\text{C}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound 7.

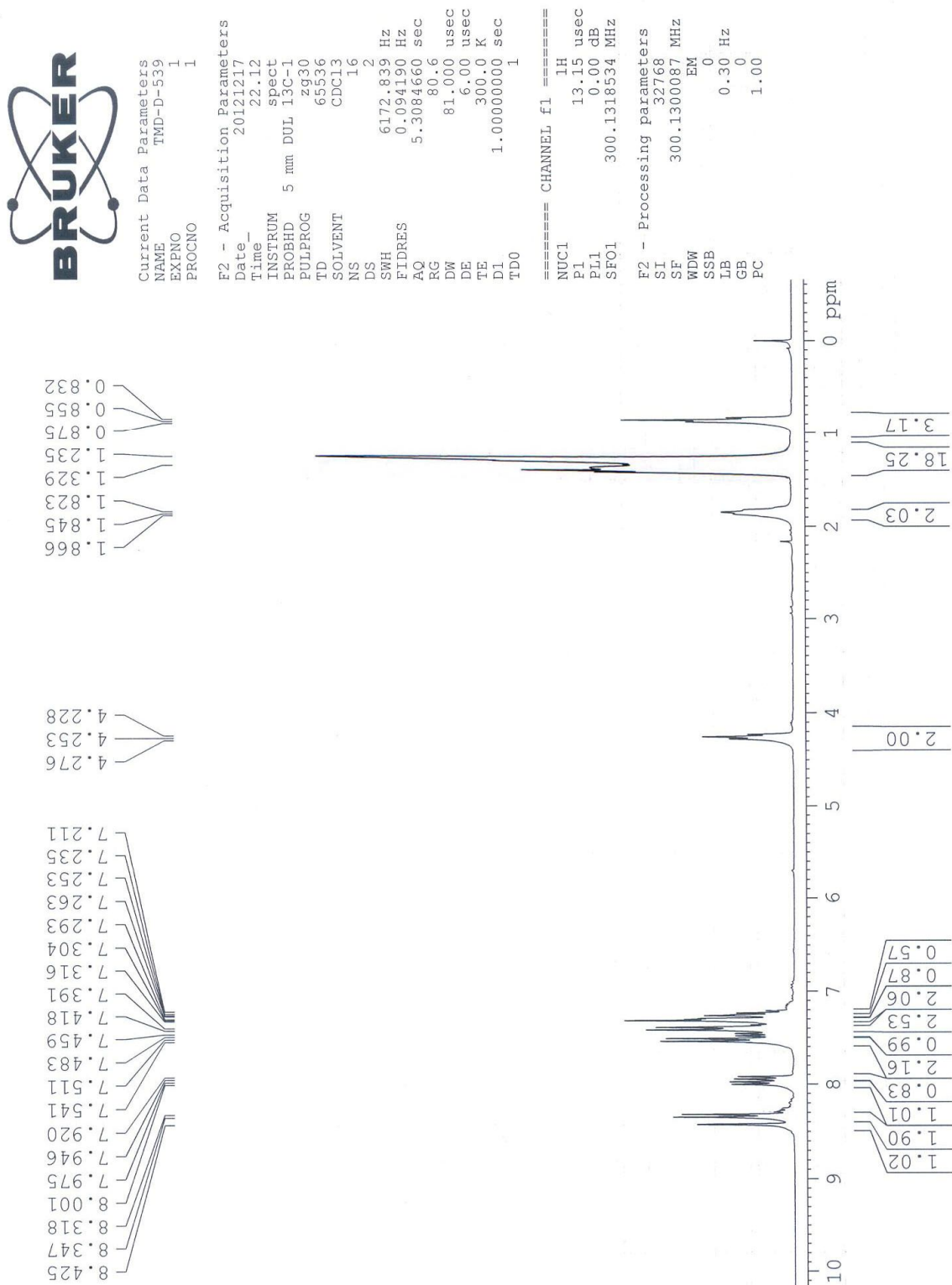


Figure S.I. 7:  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **8**.

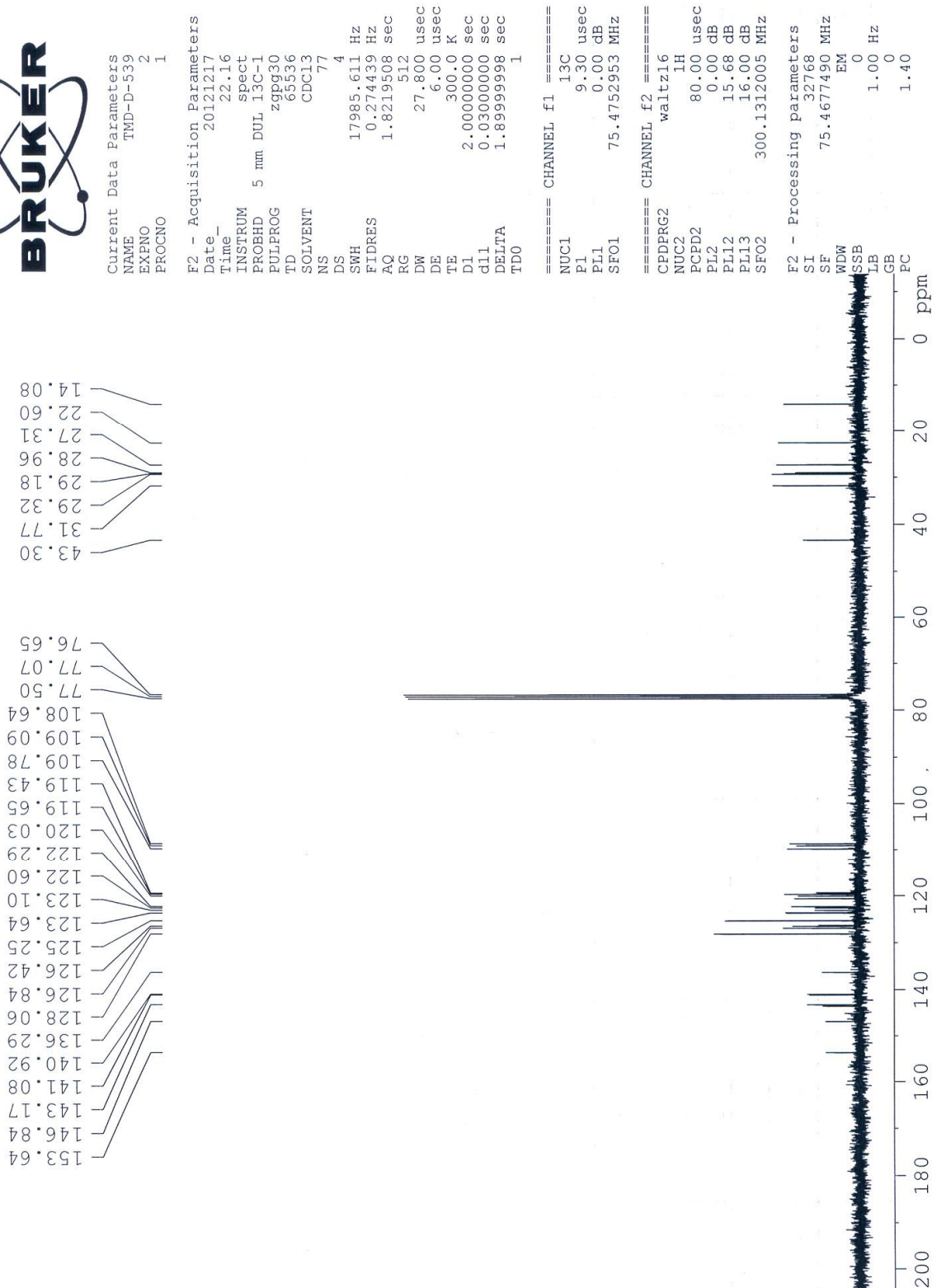


Figure S.I. 8:  $^{13}\text{C}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound 8.



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PROCNO 1

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Time\_ 11.17  
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PULPROG zg30  
TD 65536  
SOLVENT CDCl3  
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DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 287.4  
DW 81.000 usec  
DE 6.00 usec  
TE 300.0 K  
D1 1.0000000 sec  
TD0 1

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LB 0.30 Hz  
GB 0  
PC 1.00

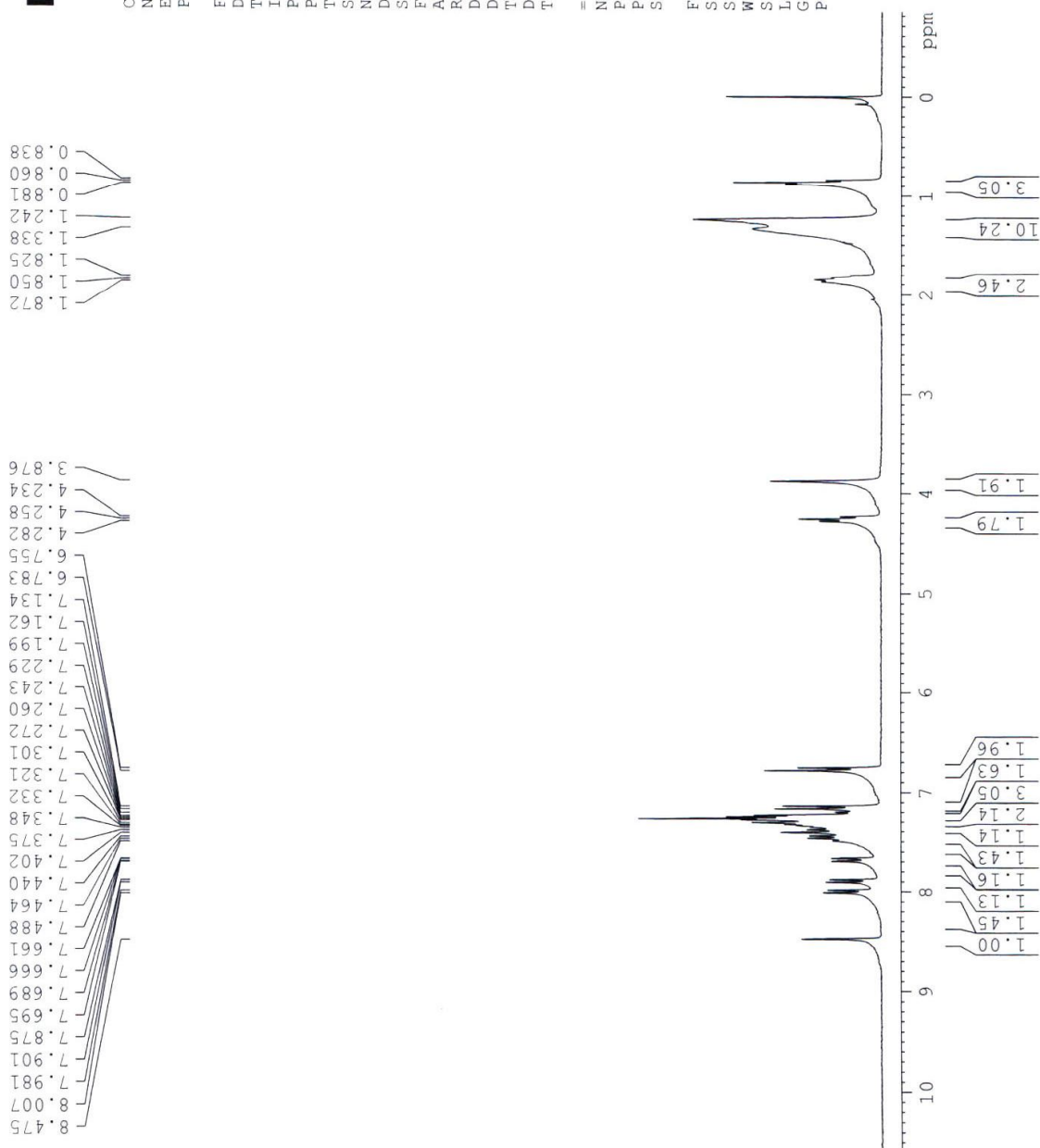


Figure S.I. 9:  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **9**.



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 PROCNO 1

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 Time\_ 18.49  
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 PULPROG zgpg30  
 TD 65536  
 SOLVENT CDCl3  
 NS 229  
 DS 4  
 SWH 17985.611 Hz  
 FIDRES 0.274439 Hz  
 AQ 1.8219508 sec  
 RG 2048  
 DW 27.800 usec  
 DE 6.00 usec  
 TE 300.0 K  
 D1 2.0000000 sec  
 d11 0.0300000 sec  
 DELTA 1.89999998 sec  
 TD0 1

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 P1 9.30 usec  
 PL1 0.00 dB  
 SFO1 75.4752953 MHz

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 NUC2 1H  
 PCPD2 80.00 usec  
 PL2 0.00 dB  
 PL12 15.68 dB  
 PL13 16.00 dB  
 SFO2 300.1312005 MHz

F2 - Processing parameters  
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 LB 1.00 Hz  
 GB 0  
 PC 1.40

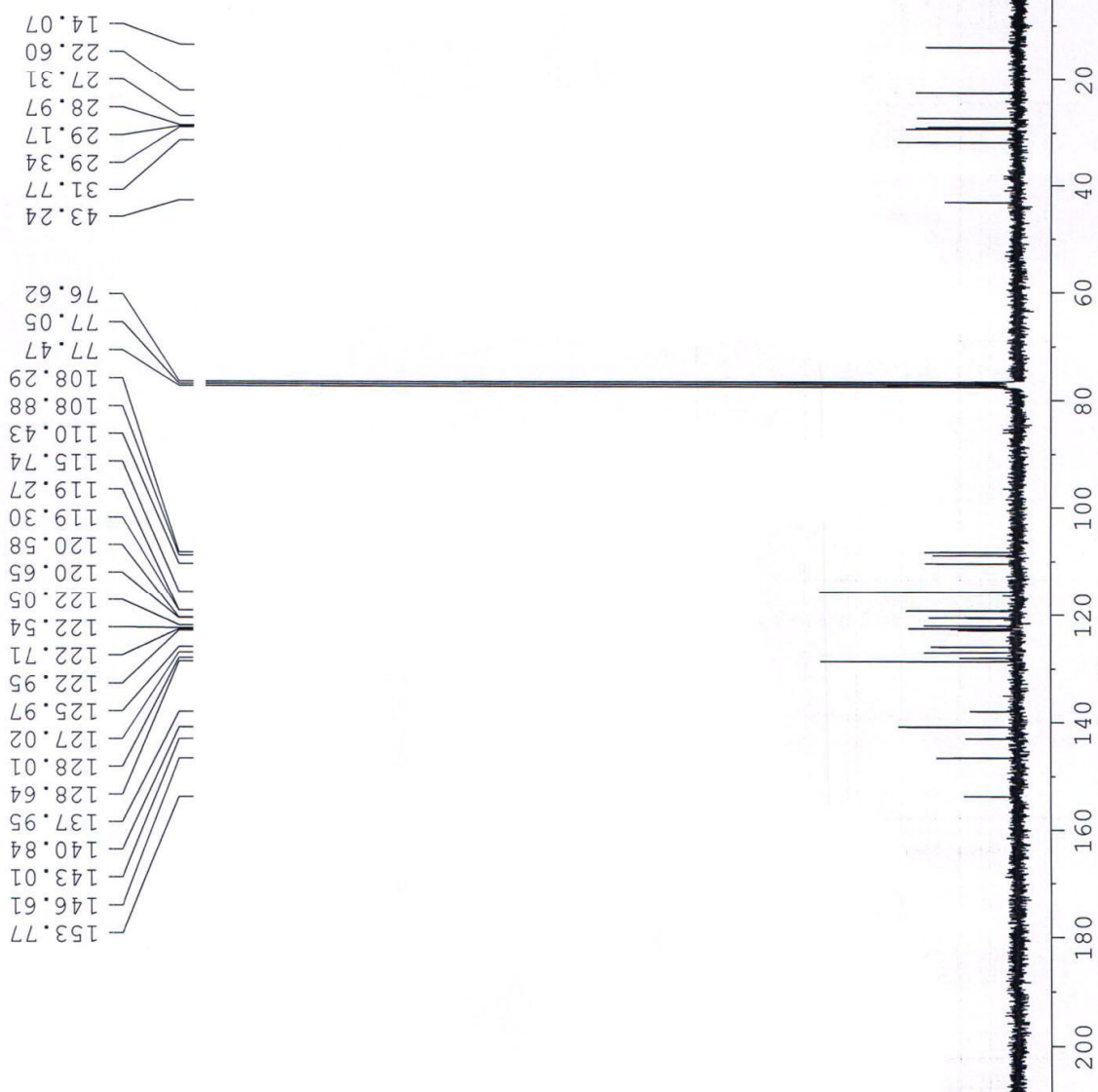


Figure S.I. 10:  $^{13}\text{C}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **9**.



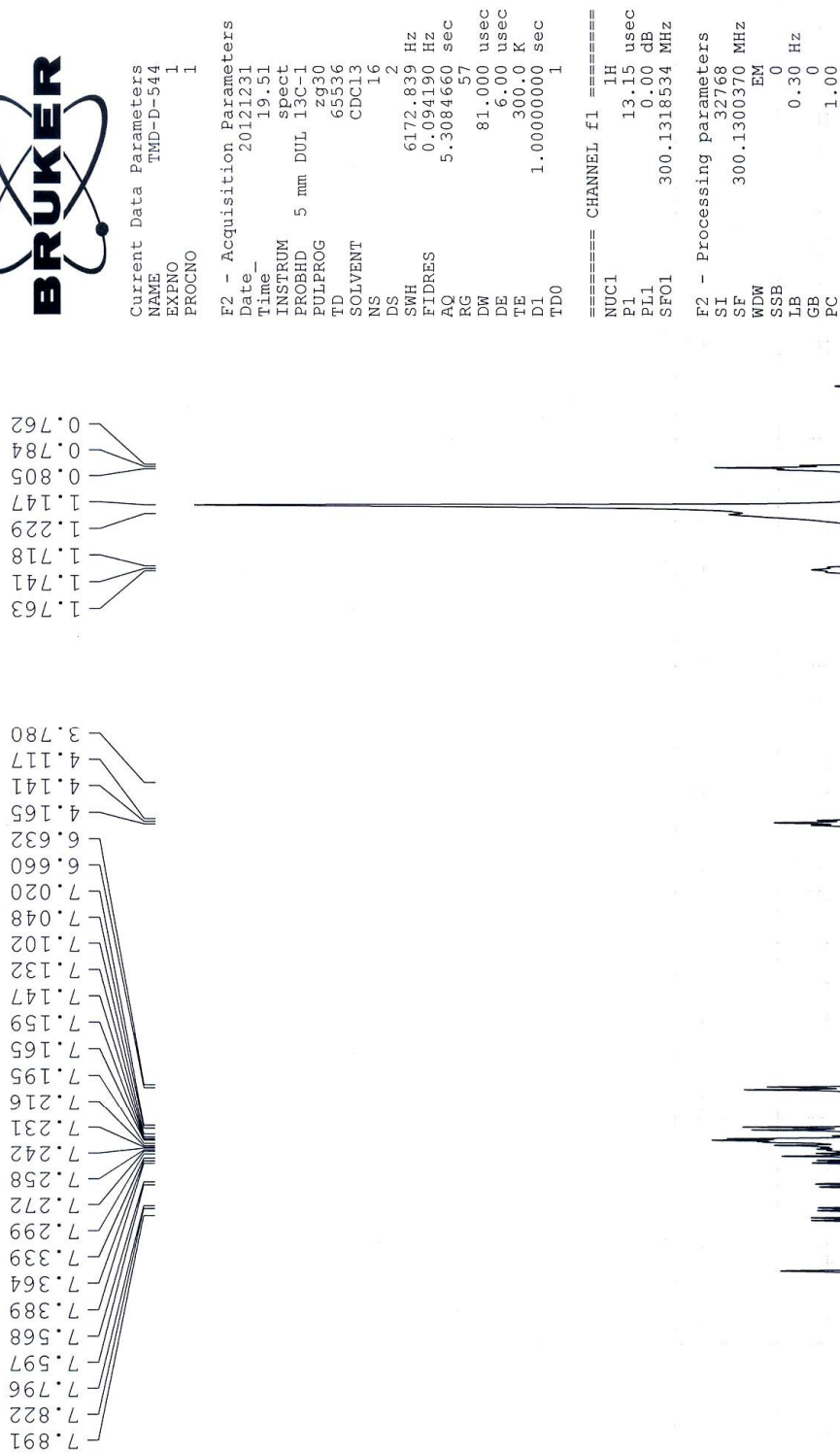


Figure S.I. 11:  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **10**.

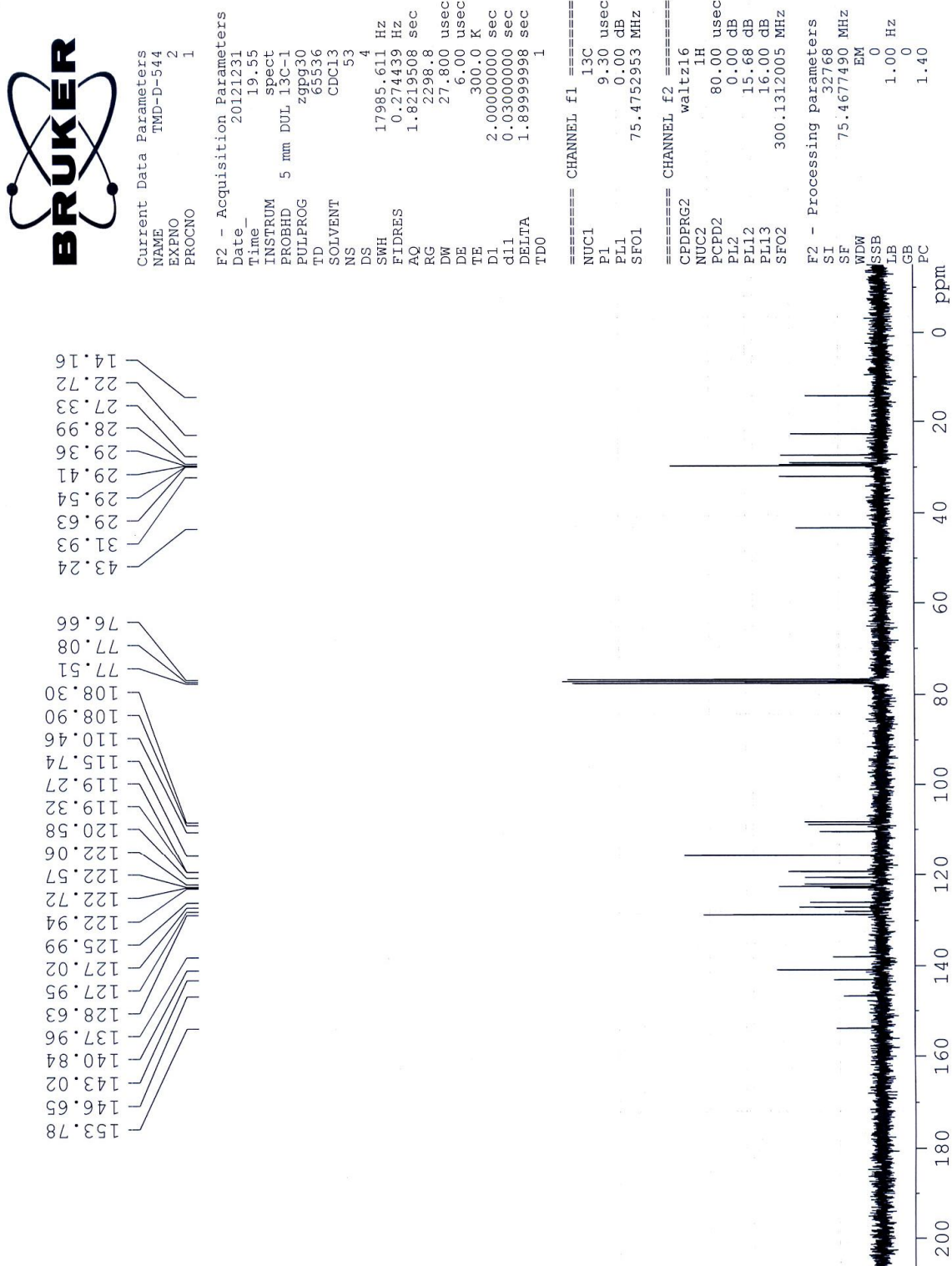
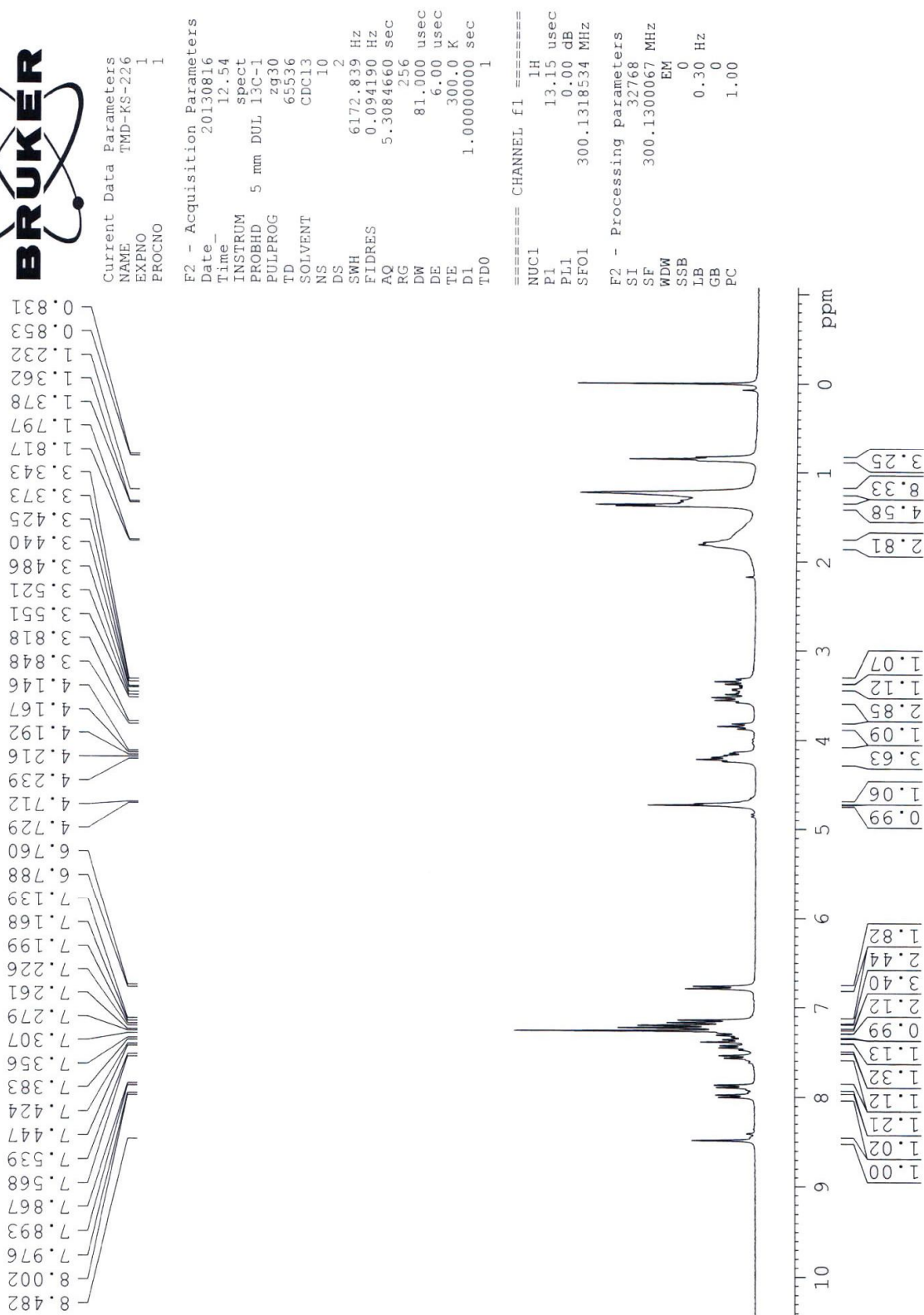


Figure S.I. 12:  $^{13}\text{C}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound 10.





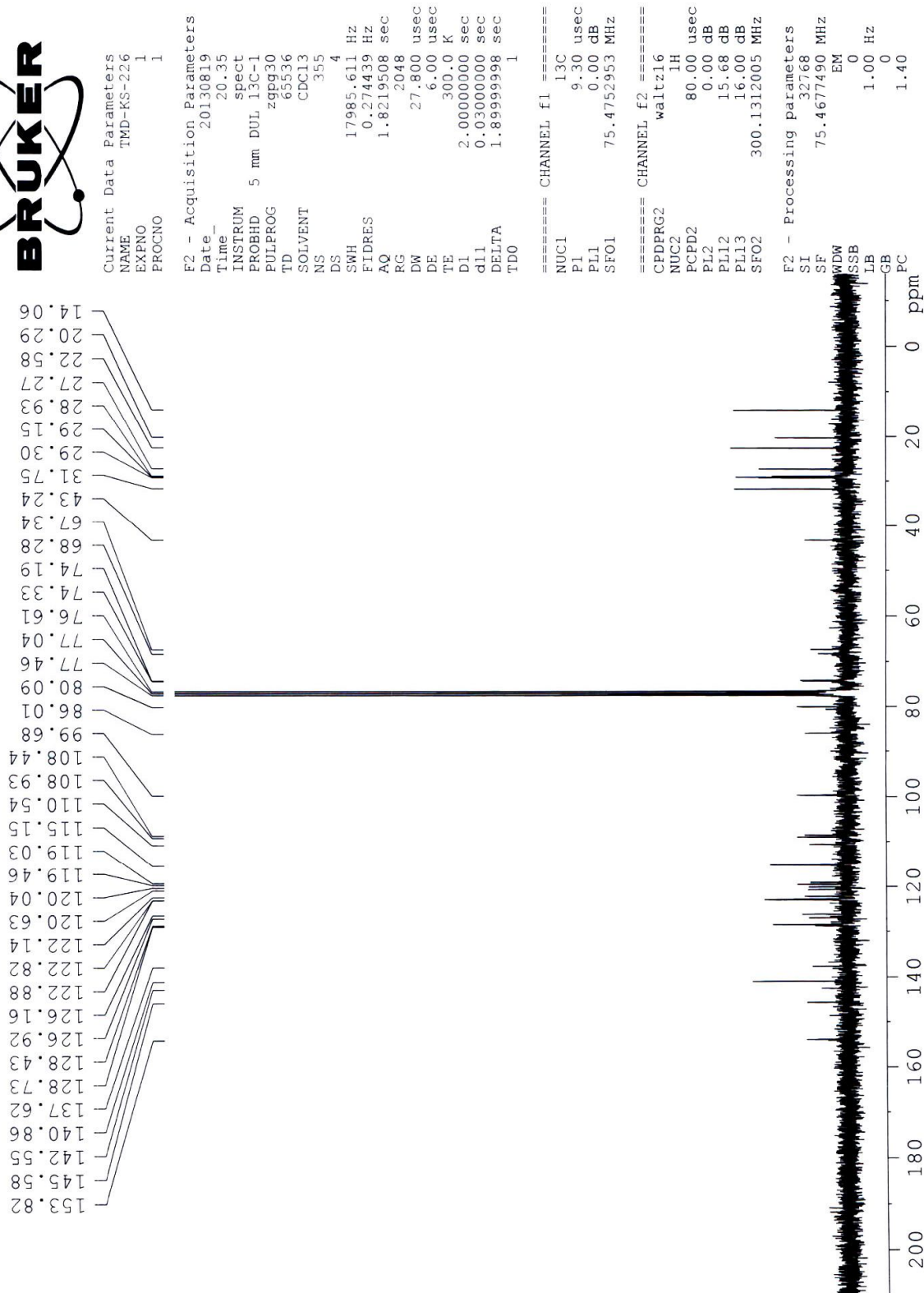


Figure S.I. 14:  $^{13}\text{C}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound 14.

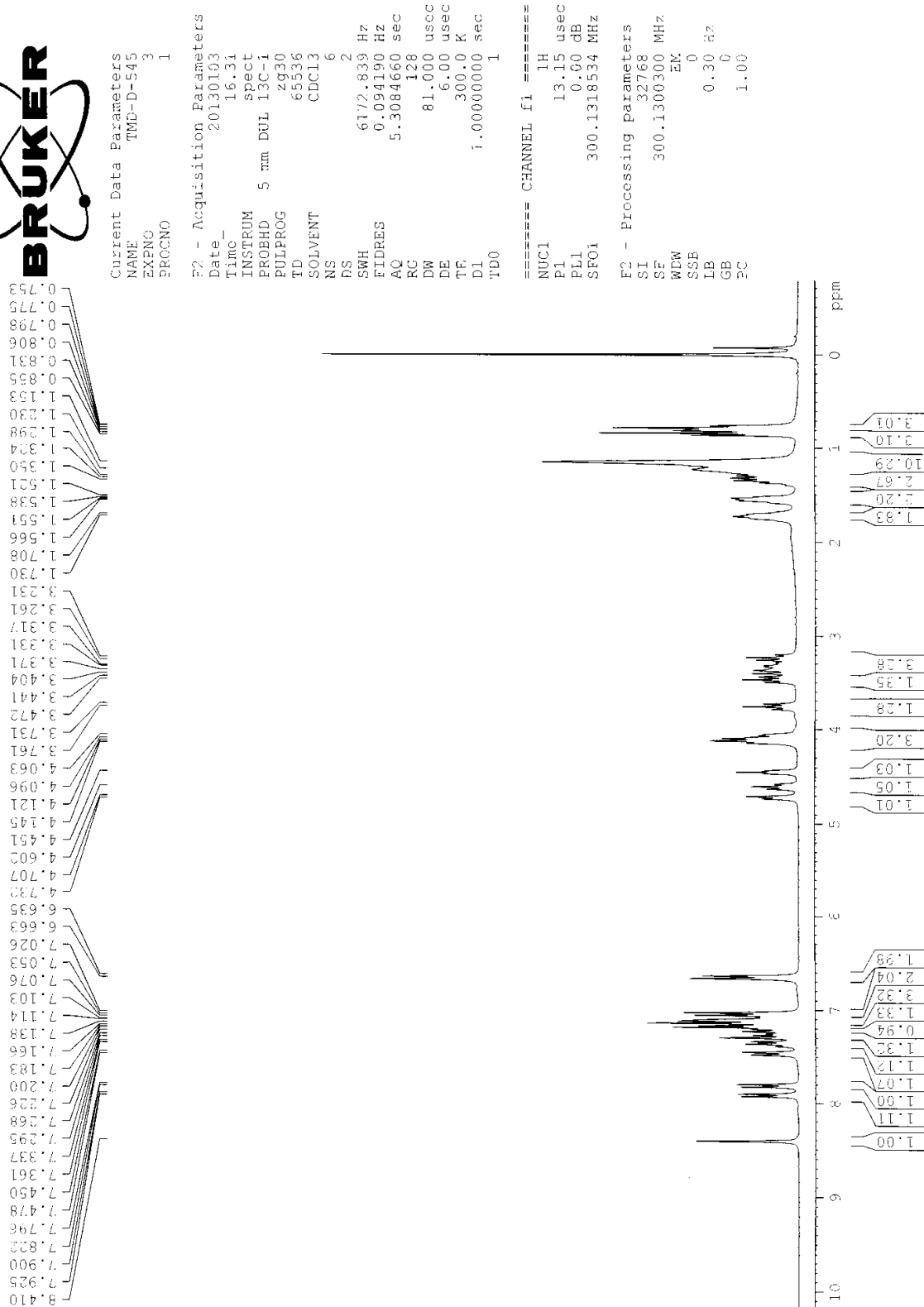


Figure S.I. 15:  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **15**.



Current Data Parameters  
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 PROCNO 1

F2 - Acquisition Parameters

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 PULPROG zgpg30  
 TD 65536  
 SOLVENT CDCl3  
 NS 777  
 DS 4  
 SWH 17985.611 Hz  
 FIDRES 0.274439 Hz  
 AQ 1.8219508 sec  
 RG 2048  
 DW 27.800 usec  
 DE 6.00 usec  
 TE 300.0 K  
 D1 2.00000000 sec  
 d11 0.03000000 sec  
 DELTA 1.89999998 sec  
 TDO 1

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 PL1 0.00 dB  
 SFO1 75.4752953 MHz

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 NUC2 1H  
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 PL13 16.00 dB  
 SFO2 300.1312005 MHz

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 LB 1.00 Hz  
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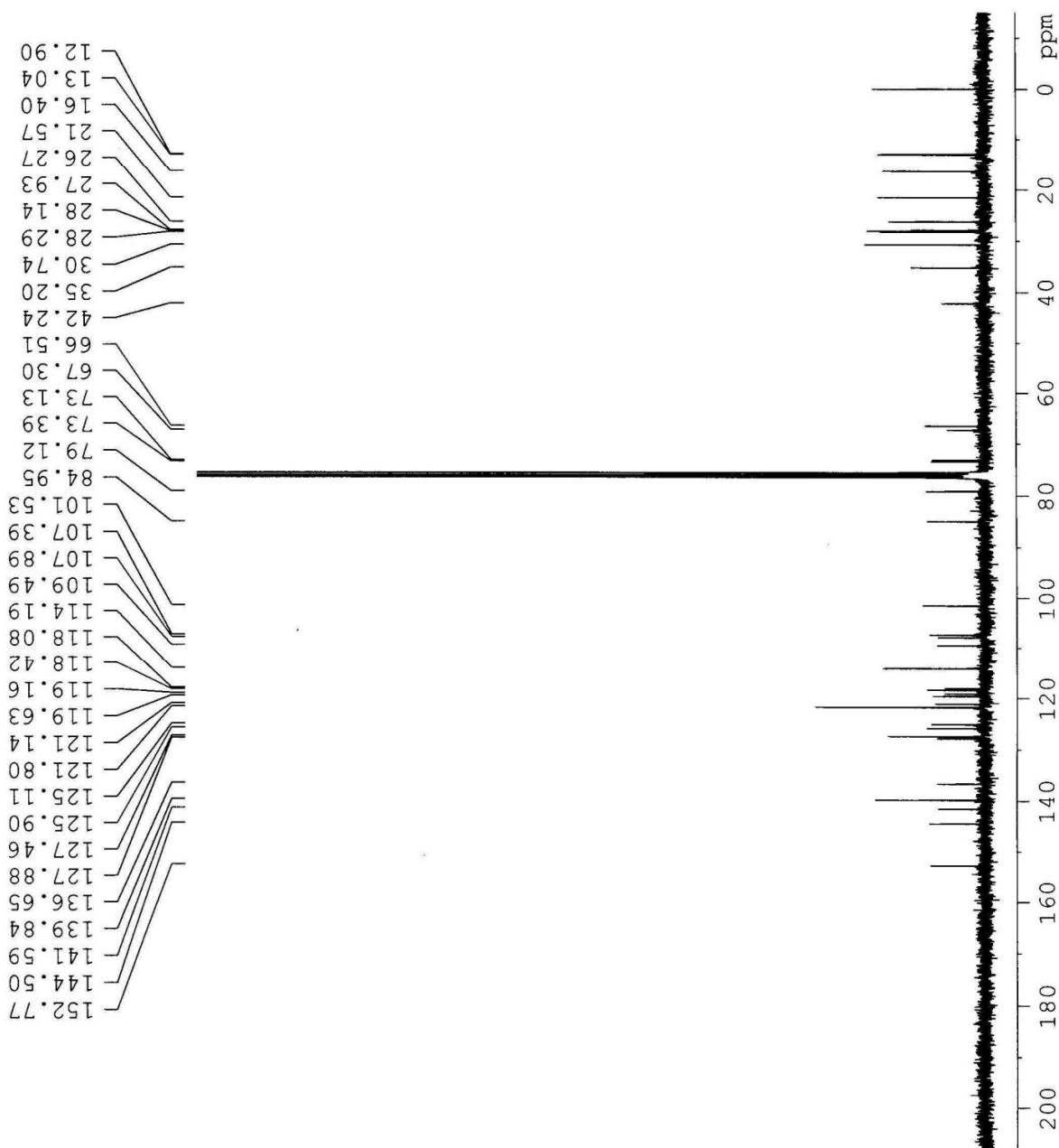


Figure S.I. 16:  $^{13}\text{C}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **15**.

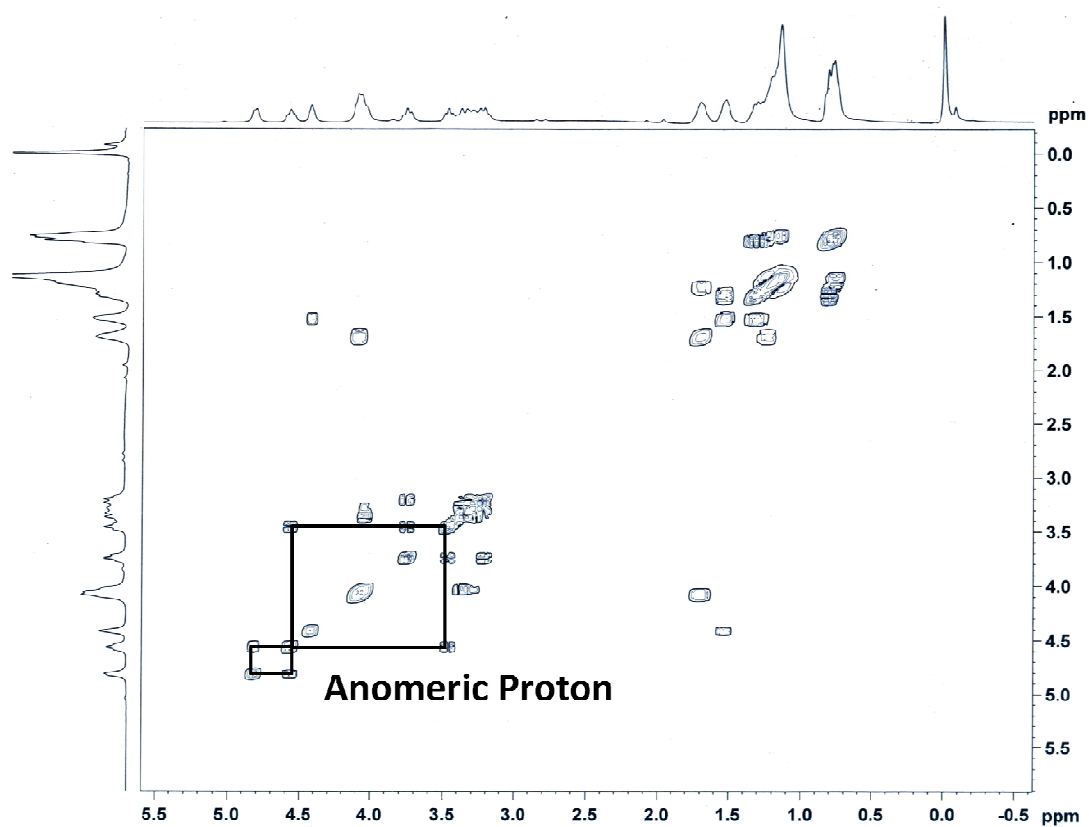


Figure S.I. 17:  $^1\text{H}$ - $^1\text{H}$  COSY NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **15**.

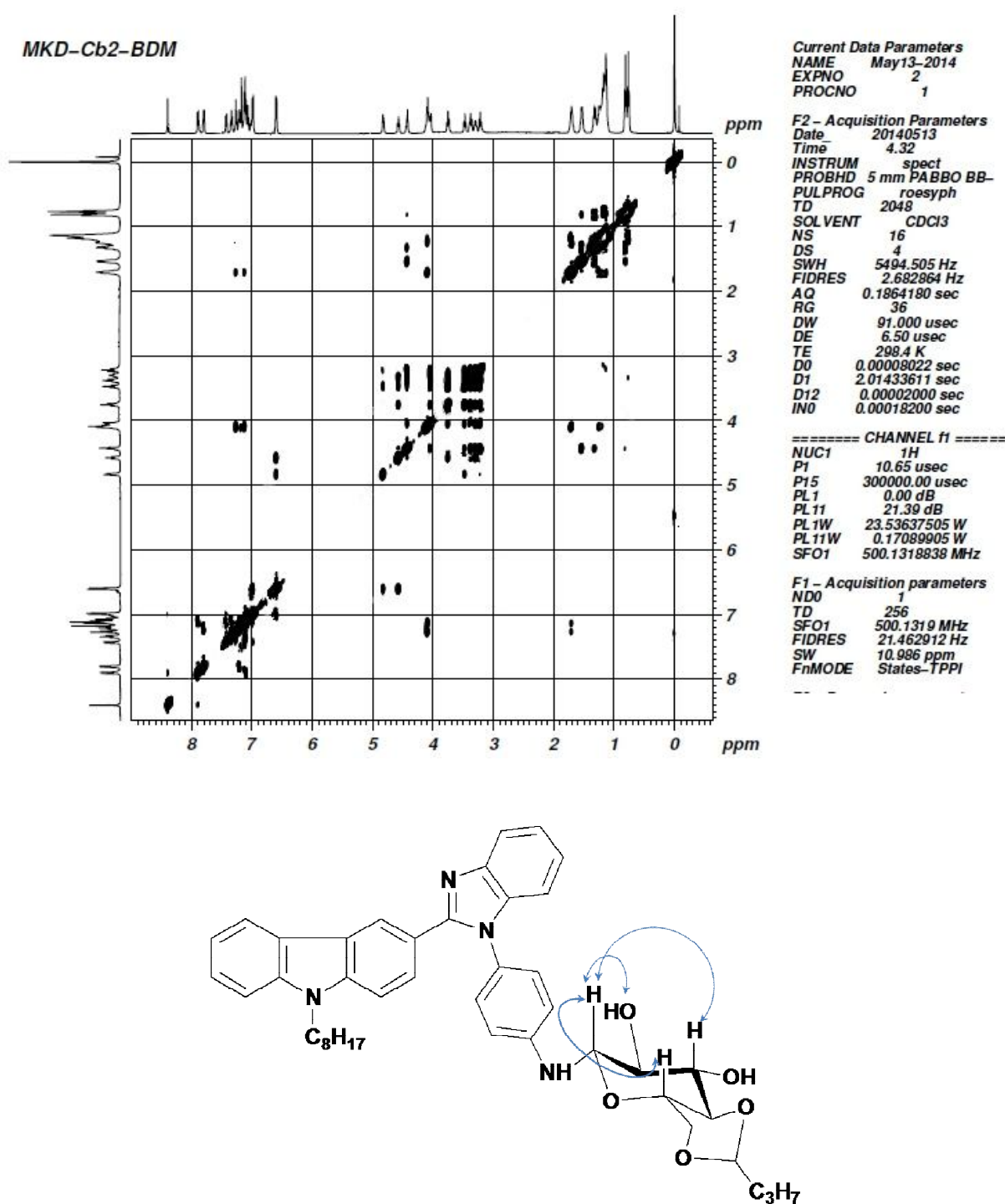


Figure S.I. 18: 2D-REOSY (500 MHz, CDCl<sub>3</sub>) NMR Spectrum and 2D NOE correlation of Compound 15.

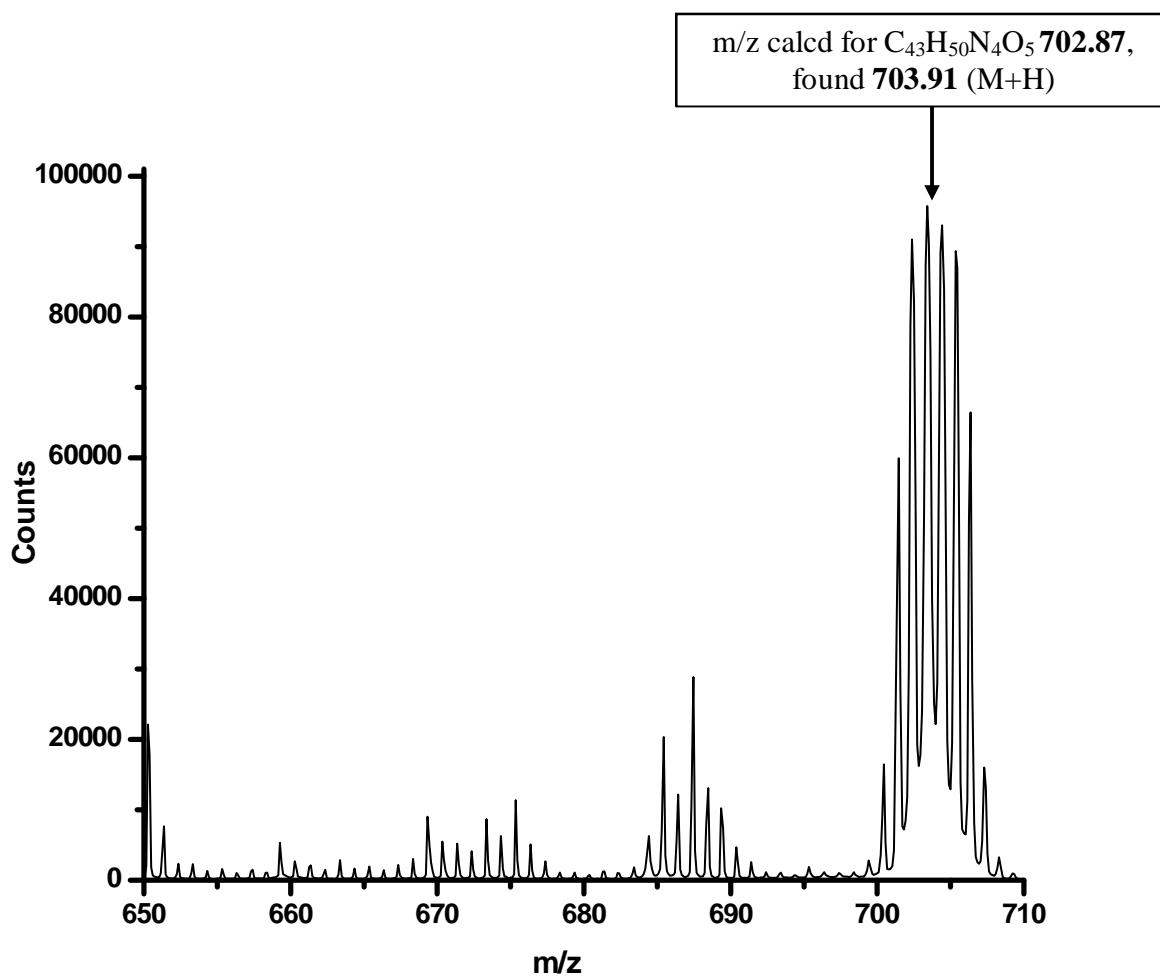


Figure S.I. 19: MALDI-TOF mass spectrum of compound **15**.

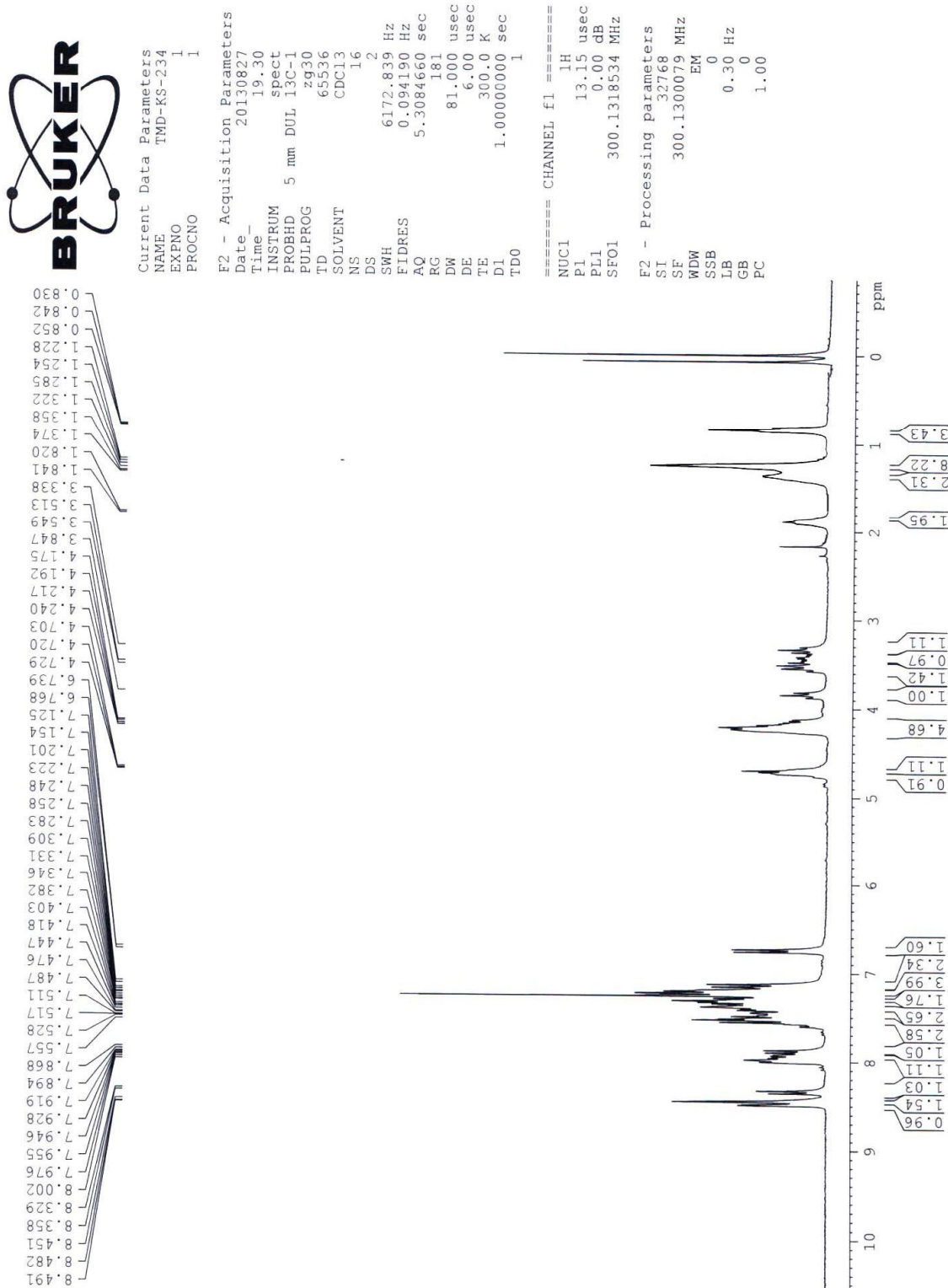


Figure S.I. 20:  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **16**.



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 PROCNO 1

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 NS 302  
 DS 4  
 SWH 17985.611 Hz  
 FIDRES 0.274439 Hz  
 AQ 1.8219508 sec  
 RG 1024  
 DW 27.800 usec  
 DE 6.00 usec  
 TE 300.0 K  
 D1 2.00000000 sec  
 d11 0.03000000 sec  
 DELTA 1.89999998 sec  
 TDO 1

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 P1 9.30 usec  
 PL1 0.00 dB  
 SFO1 75.4752953 MHz

===== CHANNEL f2 =====  
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 NUC2 1H  
 PCPD2 80.00 usec  
 PL2 0.00 dB  
 PL12 15.68 dB  
 PL13 16.00 dB  
 SFO2 300.1312005 MHz

F2 - Processing parameters  
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 1.40

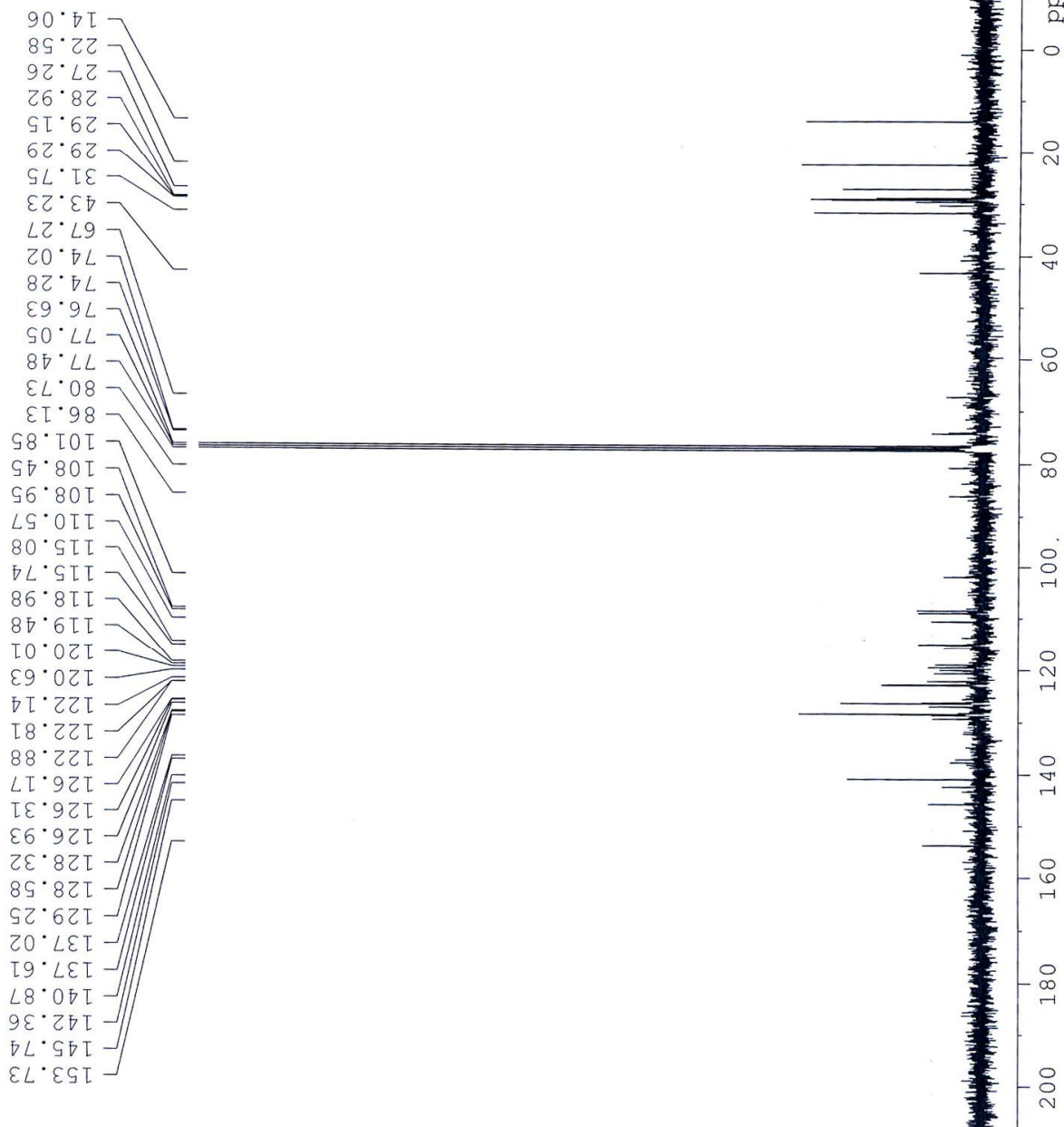


Figure S.I. 21:  $^{13}\text{C}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound 16.



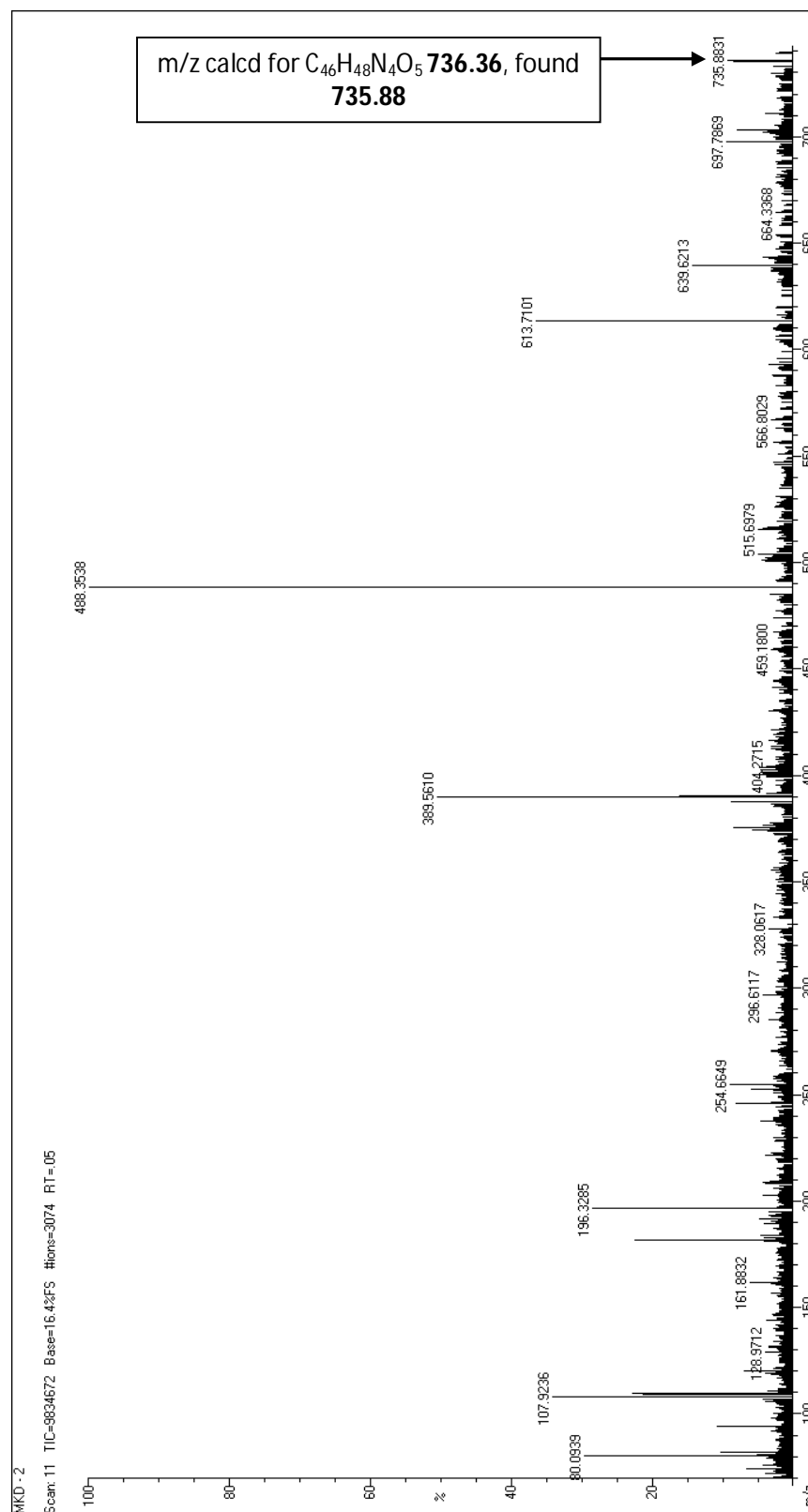


Figure S.I. 22: EI-Mass spectrum of Compound 16.

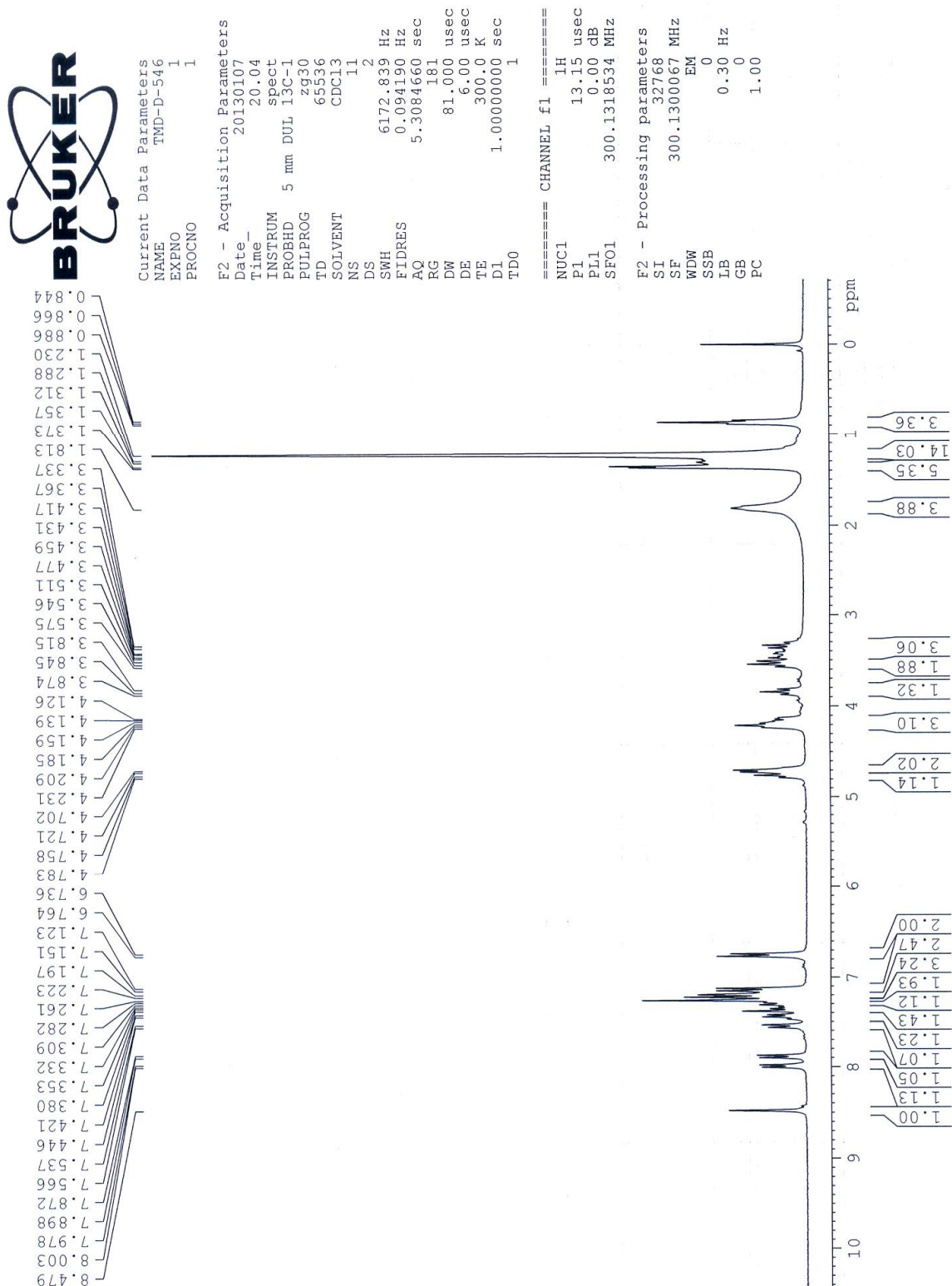


Figure S.I. 23:  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **17**.

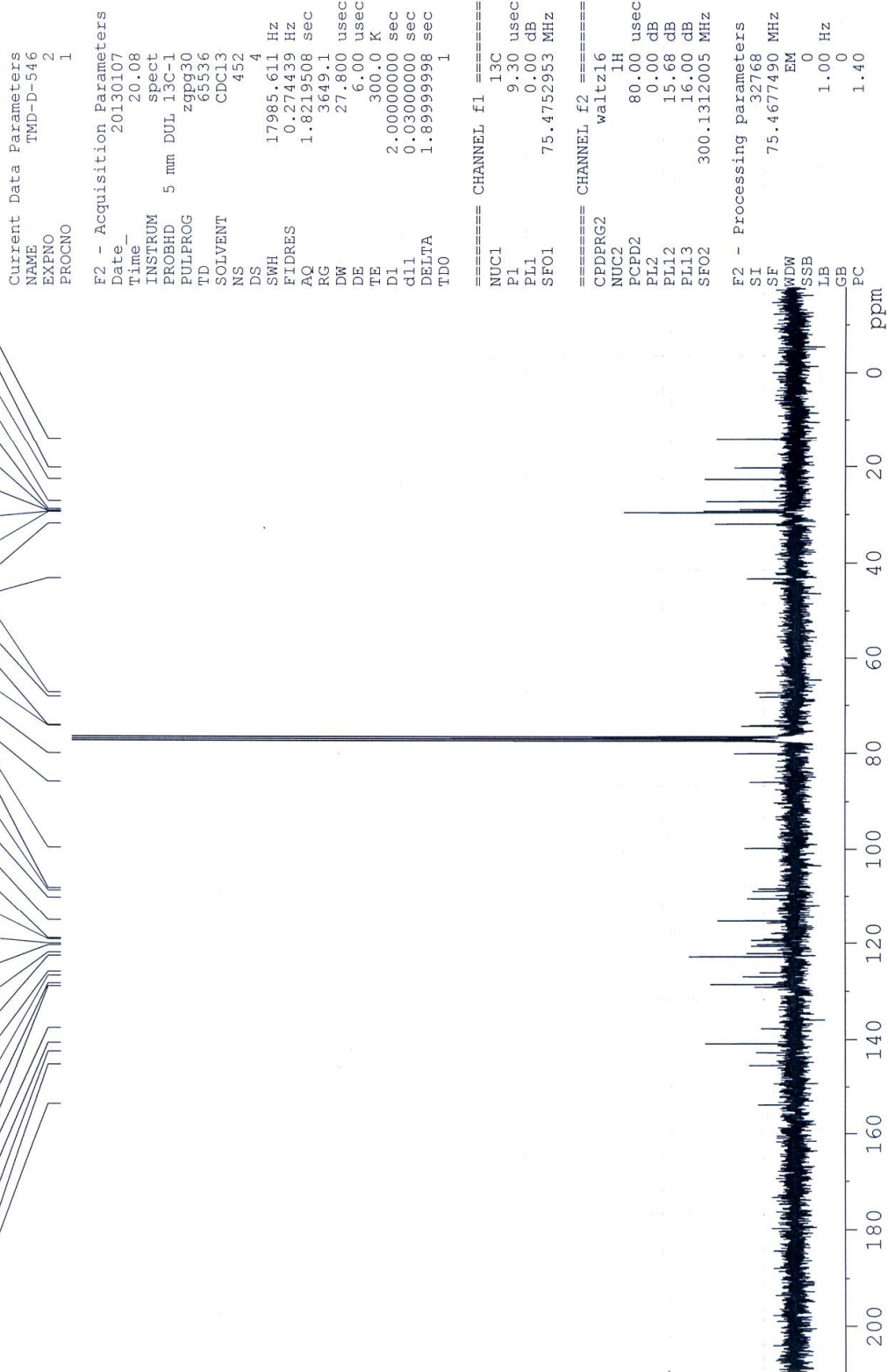


Figure S.I. 24:  $^{13}\text{C}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound 17.



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 PROCNO 1

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 PULPROG zg30  
 TD 65536  
 SOLVENT CDCl3  
 NS 16  
 DS 2  
 SWH 6172.839 Hz  
 FIDRES 0.094190 Hz  
 AQ 5.3084660 sec  
 RG 114  
 DW 81.000 usec  
 DE 6.00 usec  
 TE 300.0 K  
 D1 1.00000000 sec  
 TD0 1

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 PL1 0.00 dB  
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 GB 0  
 PC 1.00

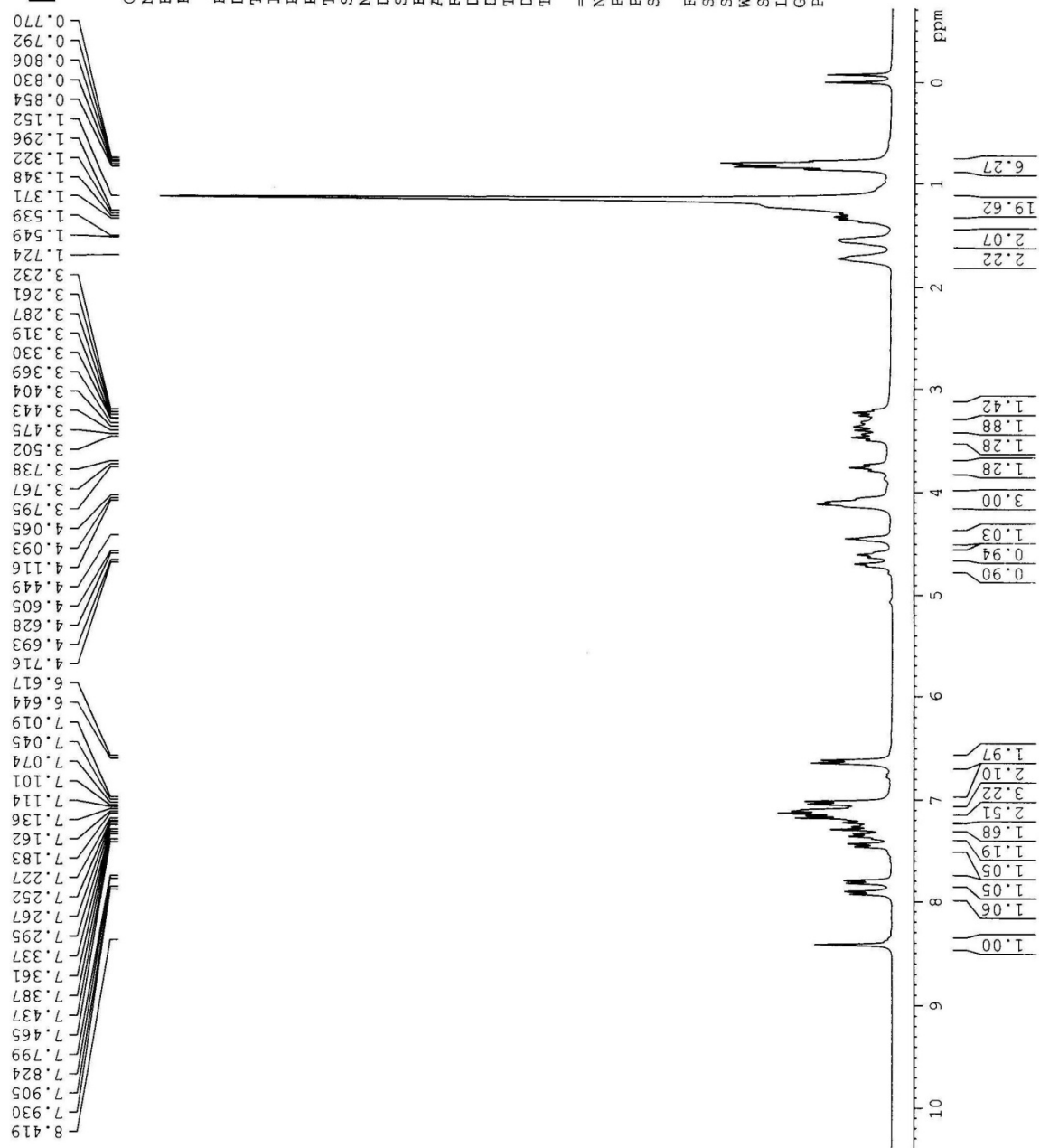


Figure S.I. 25:  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **18**.

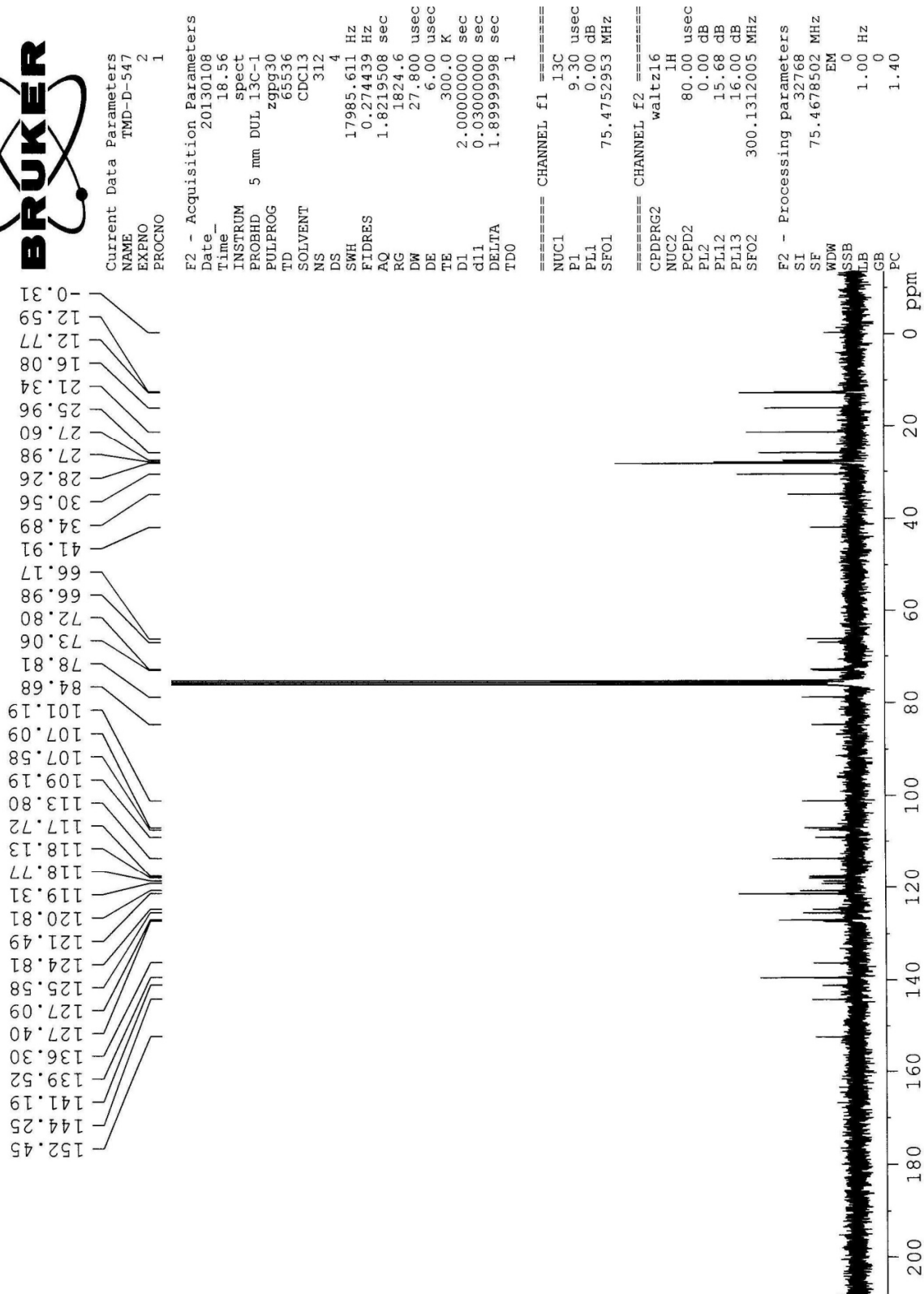


Figure S.I. 26:  $^{13}\text{C}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **18**.

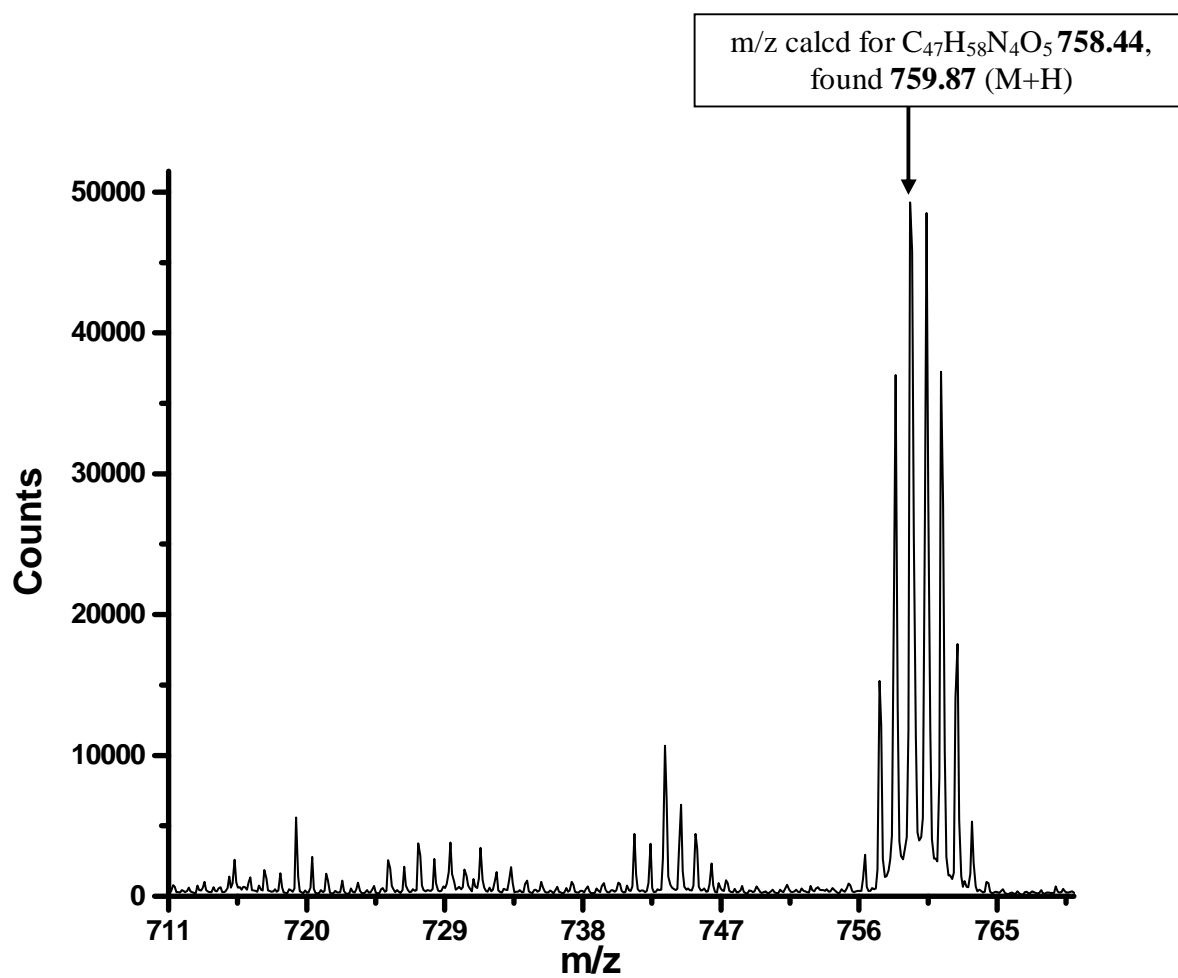


Figure S.I. 27: MALDI-TOF mass spectrum of compound **18**.



Current Data Parameters  
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EXENC 1  
PROCNO 1

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TD 65536  
SOLVENT CDCl3  
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DS 2  
SWH 6172.839 Hz  
FIDRES 0.094190 Hz  
AQ 5.3084660 sec  
RG 101.6  
DW 81.000 usec  
DE 6.00 usec  
TE 300.0 K  
D1 1.00000000 sec  
TD0 1

===== CHANNEL f1 =====  
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P1 13.15 usec  
PL1 0.00 dB  
SFO1 300.1318534 MHz

F2 - Processing parameters

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SF 300.1300323 MHz  
WDW EM  
SSB 0  
LB 0.30 Hz  
GB 0  
PC 1.00

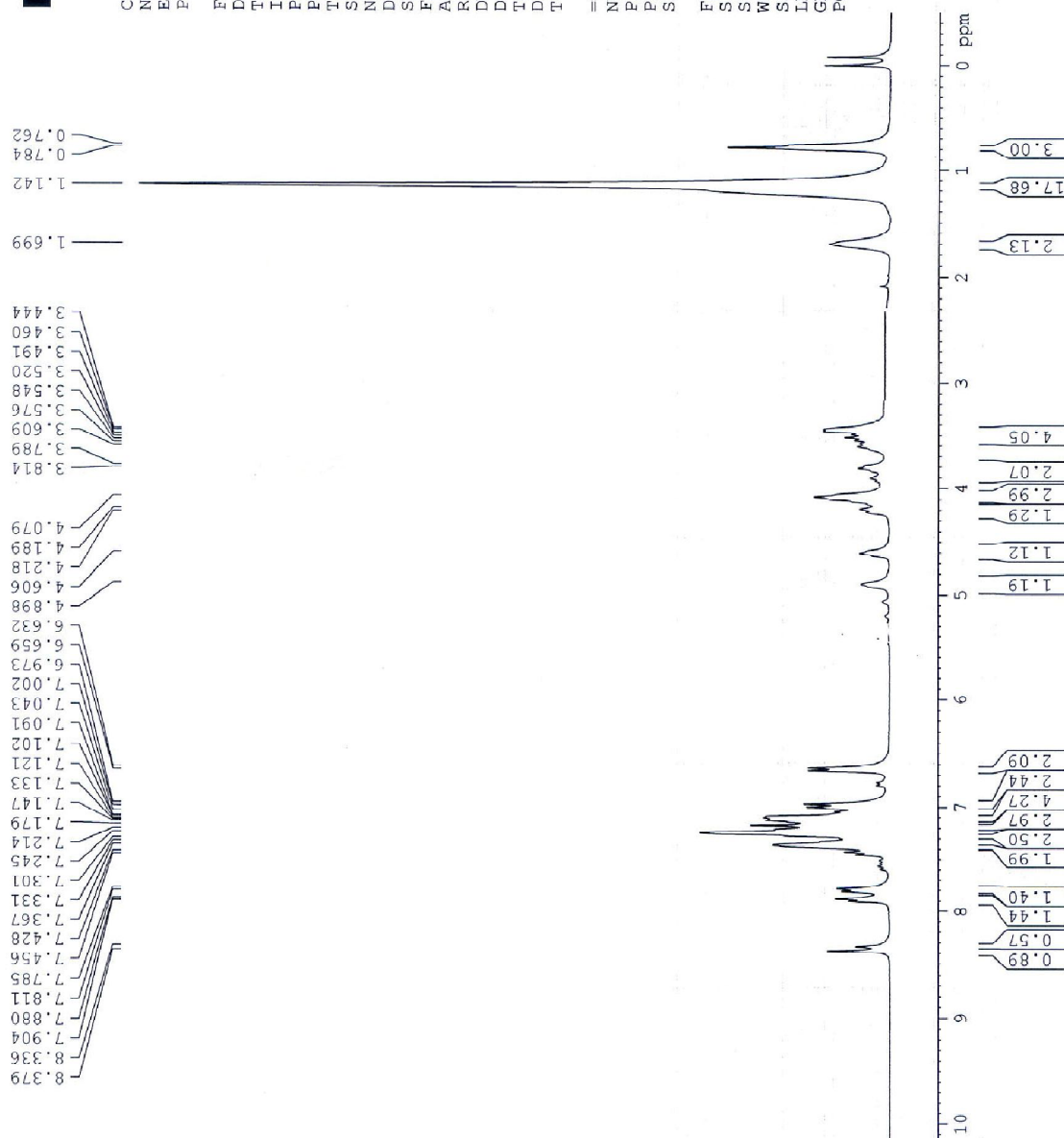


Figure S.I. 28:  $^1\text{H}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **19**.

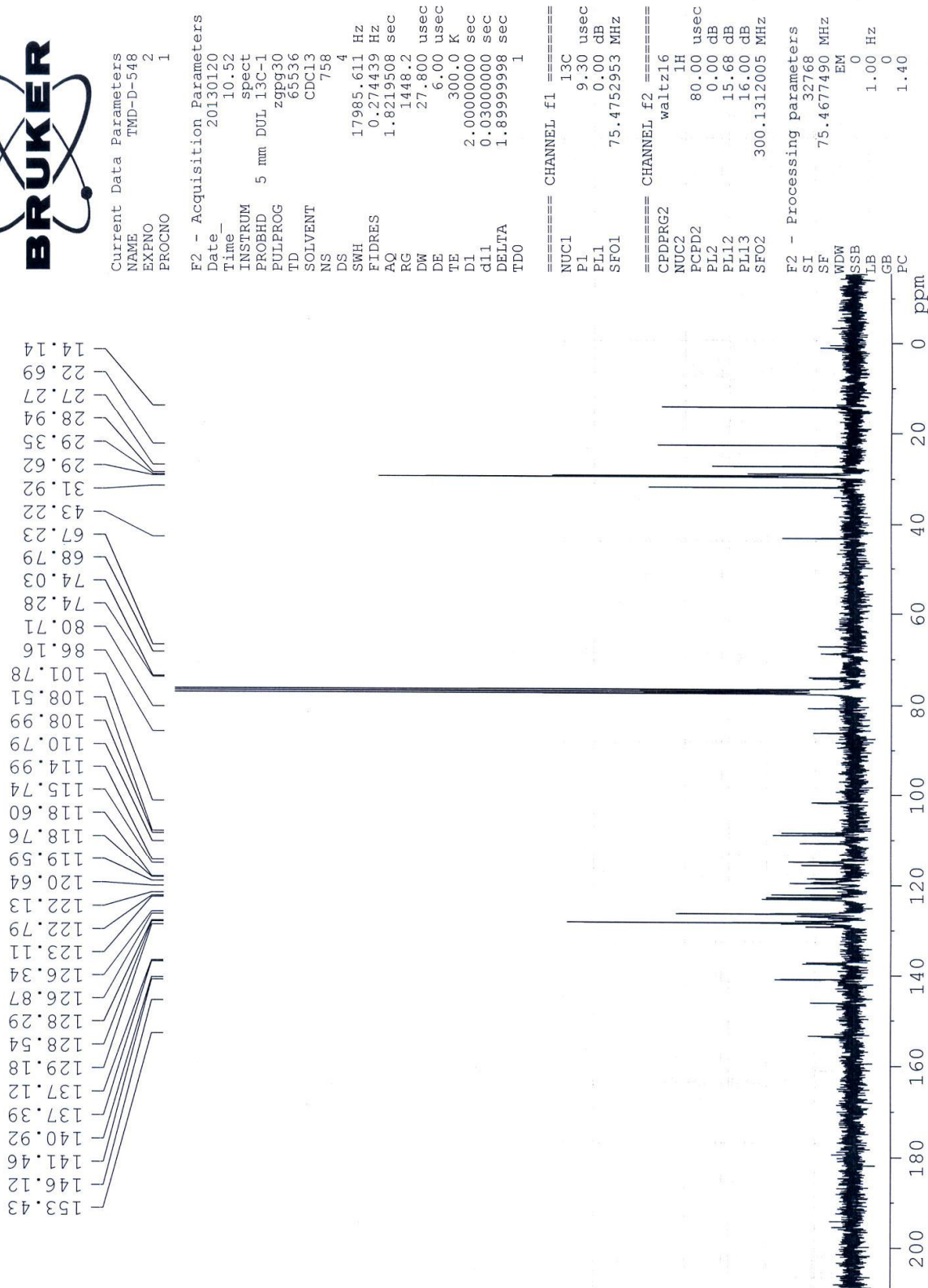


Figure S.I. 29:  $^{13}\text{C}$  NMR (300 MHz,  $\text{CDCl}_3$ ) Spectrum of Compound **19**.



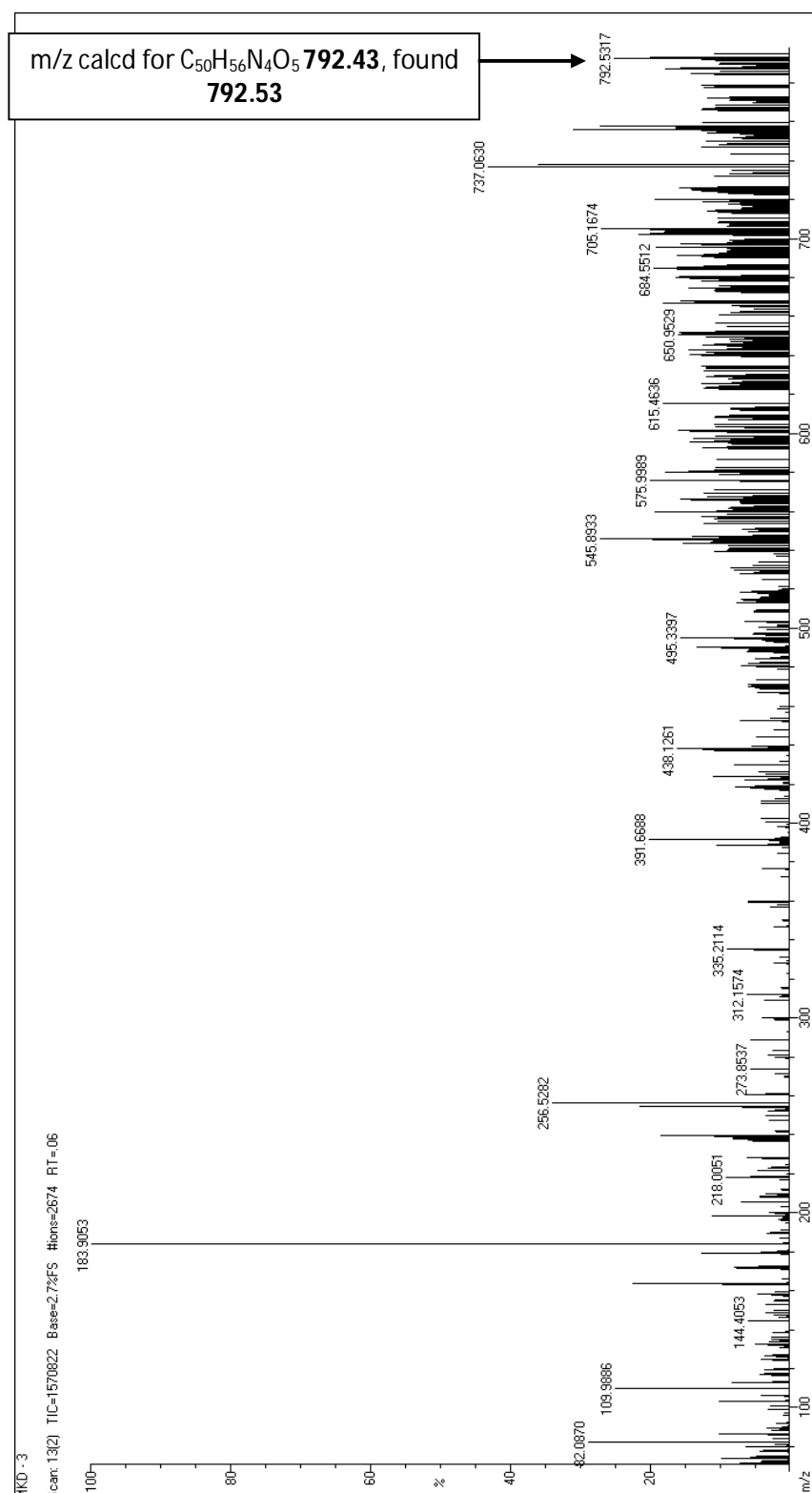


Figure S.I. 30: EI-Mass spectrum of Compound **19**.