

# Supplementary Materials

## New Bifunctional Bis(azairidacycle) with Axial Chirality via Double Cyclometalation of 2,2'-Bis(aminomethyl)-1,1'-binaphthyl

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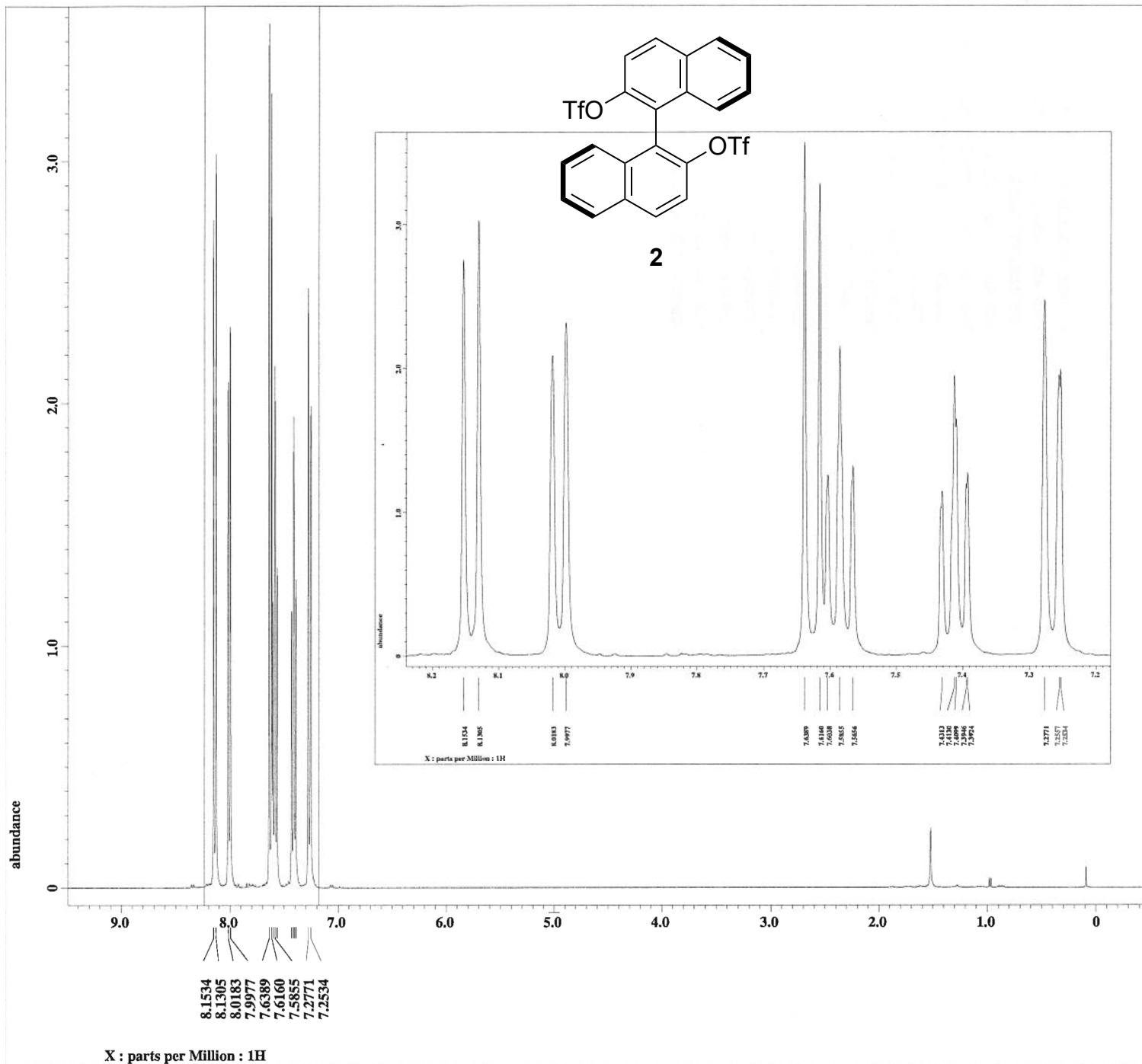
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---- PROCESSING PARAMETERS ----
dc_balance : 0 : FALSE
sexp : 0.2[Hz] : 0.0[s]
trapezoid3 : 0[%] : 80[%] : 100[%]
zerofill : 1
fft : 1 : TRUE : TRUE
machinephase
ppm

```

Derived from: BINOL-Triflate-2.jdf

```

Filename      = BINOL-Triflate-4.jdf
Author       = delta
Experiment    = single_pulse.ex2
Sample_id    = 1
Solvent      = CHLOROFORM-D
Creation_time = 7-FEB-2012 06:37:14
Revision_time = 7-FEB-2012 06:41:40
Current_time  = 7-FEB-2012 06:43:20

```

```

Comment      = single_pulse
Data_format  = 1D COMPLEX
Dim_size     = 26214
Dim_title    = 1H
Dim_units    = [ppm]
Dimensions   = X
Site         = ECX 400P
Spectrometer = DELTA2_NMR

```

```

Field_strength = 9.389766[T] (400[MHz])
X_acq_duration = 3.2768[s]
X_domain       = 1H
X_freq         = 399.78219838[MHz]
X_offset      = 5[ppm]
X_points       = 32768
X_prescans    = 0
X_resolution   = 0.30517578[Hz]
X_sweep       = 10[kHz]
Irr_domain    = 1H
Irr_freq      = 399.78219838[MHz]
Irr_offset    = 5[ppm]
Tri_domain    = 1H
Tri_freq      = 399.78219838[MHz]
Tri_offset    = 5[ppm]
Clipped       = FALSE
Mod_return    = 1
Scans         = 16
Total_scans   = 16

```

```

X_90_width   = 13.2[us]
X_acq_time    = 3.2768[s]
X_angle       = 45[deg]
X_atn         = 2.1[dB]
X_pulse       = 6.6[us]
Irr_mode      = Off
Tri_mode      = Off
Dante_preset = FALSE
Initial_wait  = 1[s]
Recvr_gain    = 40
Relaxation_delay = 2[s]
Repetition_time = 5.2768[s]
Temp_get      = 25[dc]

```

Figure S1. <sup>1</sup>H NMR Spectrum of **2**.

---- PROCESSING PARAMETERS ----  
 dc\_balance : 0 : FALSE  
 sexp : 2.0[Hz] : 0.0[s]  
 trapezoid3 : 0[%] : 80[%] : 100[%]  
 zerofill : 1  
 fft : 1 : TRUE : TRUE  
 machinephase  
 ppm

Derived from: BINOL-Triflate-13C-2.jdf

Filename = BINOL-Triflate-13C-4.  
 Author = delta  
 Experiment = single\_pulse\_dec  
 Sample\_id = 1  
 Solvent = CHLOROFORM-D  
 Creation\_time = 7-FEB-2012 06:20:36  
 Revision\_time = 7-FEB-2012 06:25:20  
 Current\_time = 7-FEB-2012 06:28:30

Comment = single pulse decouple  
 Data\_format = 1D COMPLEX  
 Dim\_size = 26214  
 Dim\_title = 13C  
 Dim\_units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2\_NMR

Field\_strength = 9.389766[T] (400[MHz])  
 X\_acq\_duration = 1.04333312[s]  
 X\_domain = 13C  
 X\_freq = 100.52530333[MHz]  
 X\_offset = 100[ppm]  
 X\_points = 32768  
 X\_prescans = 2  
 X\_resolution = 0.95846665[Hz]  
 X\_sweep = 31.40703518[kHz]  
 Irr\_domain = 1H  
 Irr\_freq = 399.78219838[MHz]  
 Irr\_offset = 5[ppm]  
 Clipped = FALSE  
 Mod\_return = 1  
 Scans = 115.0  
 Total\_scans = 115.0

X\_90\_width = 8.5[us]  
 X\_acq\_time = 1.04333312[s]  
 X\_angle = 30[deg]  
 X\_atn = 3.6[dB]  
 X\_pulse = 2.83333333[us]  
 Irr\_atn\_dec = 20.356[dB]  
 Irr\_atn\_noe = 20.356[dB]  
 Irr\_noise = WALTZ  
 Decoupling = TRUE  
 Initial\_wait = 1[s]  
 Noe = TRUE  
 Noe\_time = 3[s]  
 Recvr\_gain = 46  
 Relaxation\_delay = 3[s]  
 Repetition\_time = 4.04333312[s]  
 Temp\_get = 25[dc]

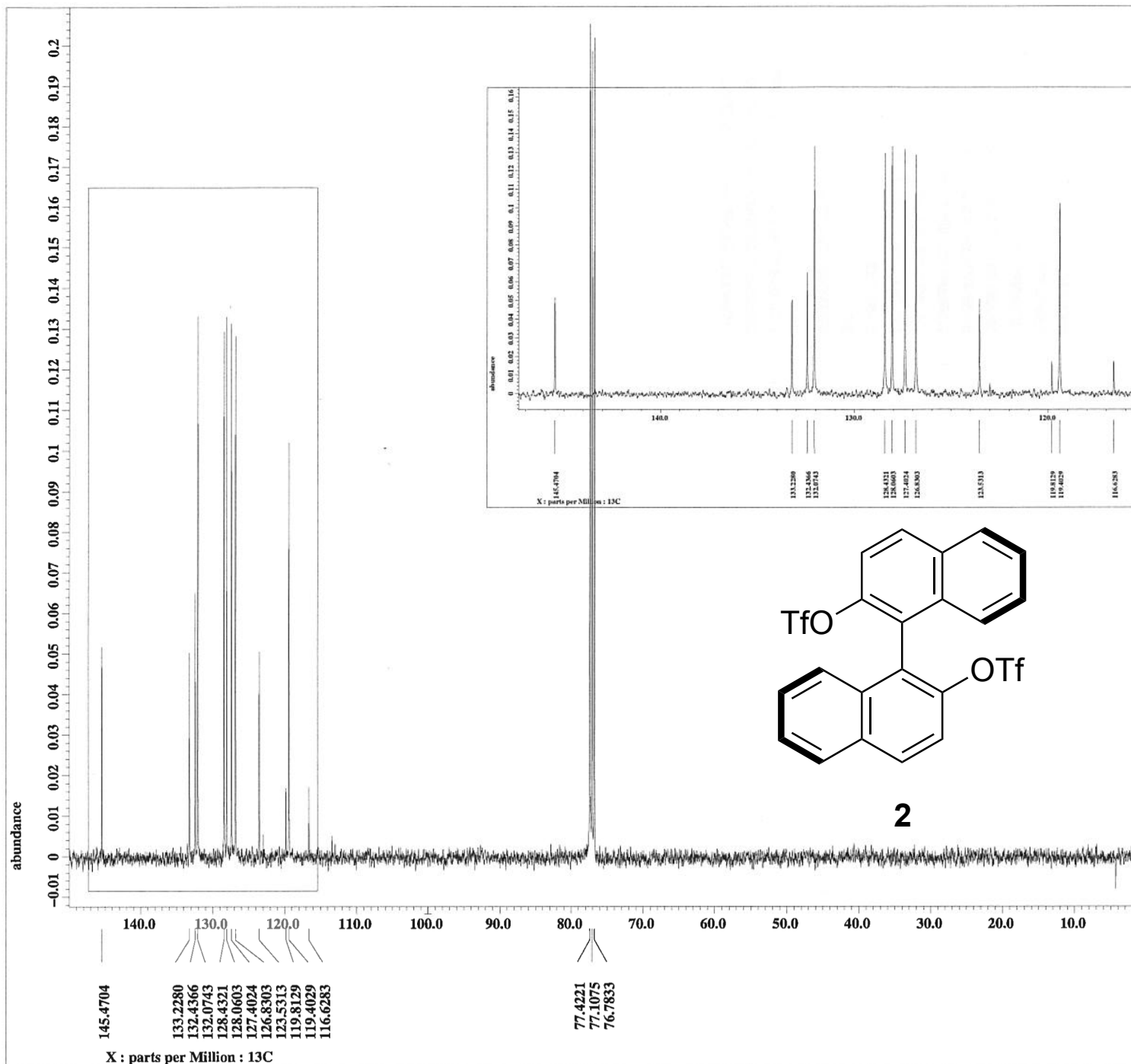


Figure S2.  $^{13}\text{C}\{^1\text{H}\}$  NMR Spectrum of **2**.

----- PROCESSING PARAMETERS -----  
 dc\_balance : 0 : FALSE  
 secp : 0.2[Hz] : 0.0[s]  
 trapezoid3 : 0[%] : 80[%] : 100[%]  
 zerofill : 1  
 fft : 1 : TRUE : TRUE  
 machinephase  
 ppm

Derived from: 82-01205-273-1.jdf

Filename = 82-01205-273-5.jdf  
 Author = delta  
 Experiment = single\_pulse.ex2  
 Sample\_id = 1  
 Solvent = CHLOROFORM-D  
 Creation\_time = 8-DEC-2010 23:01:04  
 Revision\_time = 8-DEC-2010 23:14:24  
 Current\_time = 8-DEC-2010 23:16:05

Comment = single\_pulse  
 Data\_format = 1D COMPLEX  
 Dim\_size = 26214  
 Dim\_title = 1H  
 Dim\_units = [ppm]  
 Dimensions = X  
 Site = ECX 400P  
 Spectrometer = DELTA2 NMR

Field\_strength = 9.389766[T] (400[MHz])  
 X\_acq\_duration = 3.2768[s]  
 X\_domain = 1H  
 X\_freq = 399.78219838[MHz]  
 X\_offset = 5[ppm]  
 X\_points = 32768  
 X\_prescans = 0  
 X\_resolution = 0.30517578[Hz]  
 X\_sweep = 10[kHz]  
 Irr\_domain = 1H  
 Irr\_freq = 399.78219838[MHz]  
 Irr\_offset = 5[ppm]  
 Tri\_domain = 1H  
 Tri\_freq = 399.78219838[MHz]  
 Tri\_offset = 5[ppm]  
 Clipped = FALSE  
 Mod\_return = 1  
 Scans = 16  
 Total\_scans = 16

X\_90\_width = 12.8[us]  
 X\_acq\_time = 3.2768[s]  
 X\_angle = 45[deg]  
 X\_atn = 2.1[db]  
 X\_pulse = 6.4[us]  
 Irr\_mode = Off  
 Tri\_mode = Off  
 Dante\_presat = FALSE  
 Initial\_wait = 1[s]  
 Recvr\_gain = 52  
 Relaxation\_delay = 2[s]  
 Repetition\_time = 5.2768[s]  
 Temp\_get = 25.8[dc]

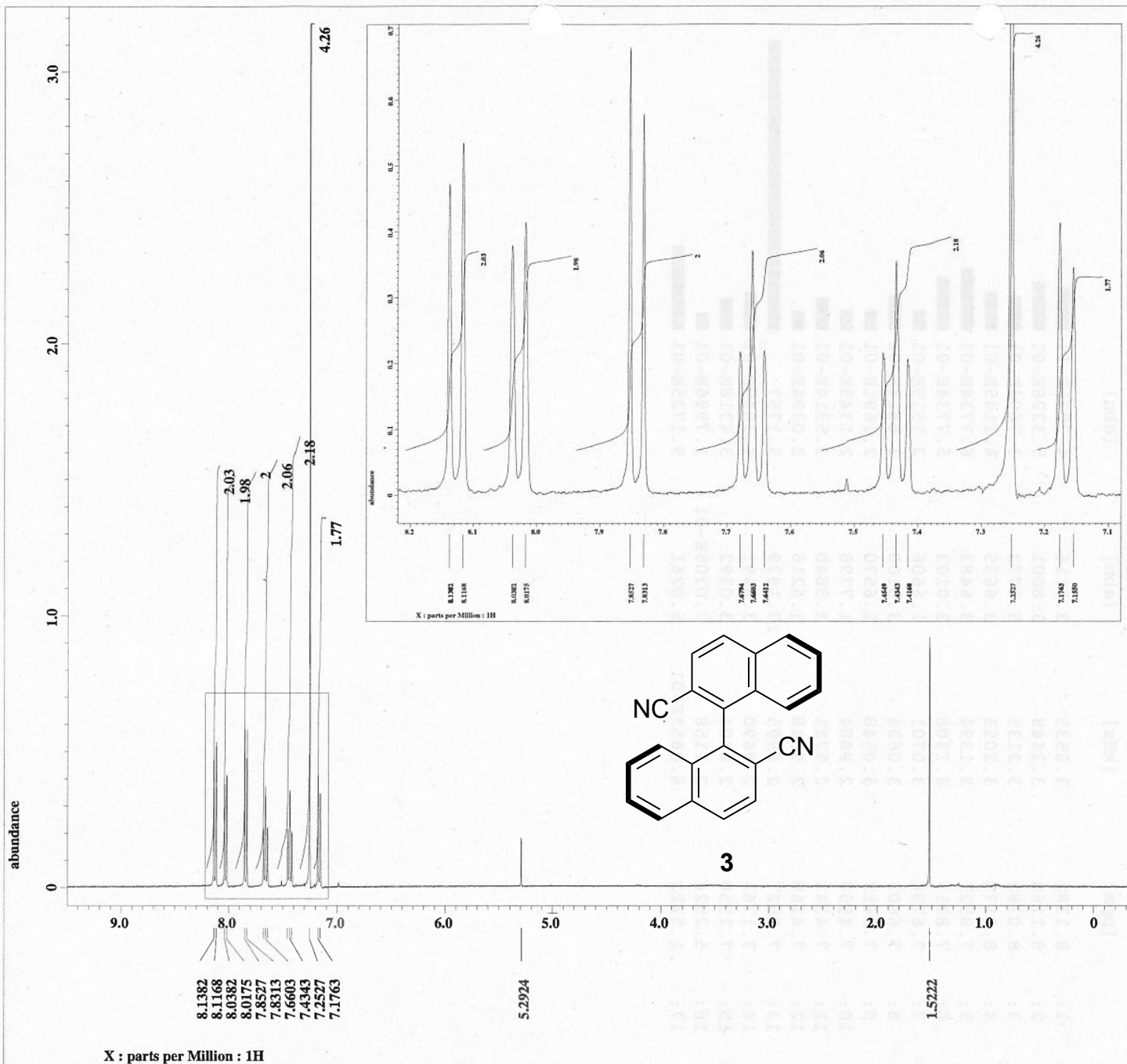


Figure S3. <sup>1</sup>H NMR Spectrum of 3.



```

---- PROCESSING PARAMETERS ----
dc_balance : 0 : FALSE
sexp : 0.2[Hz] : 0.0[s]
trapezoid3 : 0[%] : 80[%] : 100[%]
zerofill : 1
fft : 1 : TRUE : TRUE
machinephase
ppm
Derived from: 82-11010-001-2.jdf

```

```

Filename      = 82-11010-001-4.jdf
Author       = delta
Experiment   = single_pulse.ex2
Sample_id    = 1
Solvent      = CHLOROFORM-D
Creation_time = 13-OCT-2011 22:12:04
Revision_time = 13-OCT-2011 22:16:44
Current_time = 13-OCT-2011 22:19:47

```

```

Comment      = single_pulse
Data_format  = 1D COMPLEX
Dim_size     = 26214
Dim_title    = 1H
Dim_units    = [ppm]
Dimensions   = X
Site         = ECX 400P
Spectrometer = DELTA2_NMR

```

```

Field_strength = 9.389766[T] (400[MHz])
X_acq_duration = 3.2768[s]
X_domain       = 1H
X_freq         = 399.78219838[MHz]
X_offset       = 5[ppm]
X_points       = 32768
X_prescans     = 0
X_resolution   = 0.30517578[Hz]
X_sweep        = 10[kHz]
Irr_domain     = 1H
Irr_freq       = 399.78219838[MHz]
Irr_offset     = 5[ppm]
Tri_domain     = 1H
Tri_freq       = 399.78219838[MHz]
Tri_offset     = 5[ppm]
Clipped        = FALSE
Mod_return     = 1
Scans          = 16
Total_scans    = 16

```

```

X_90_width    = 13.2[us]
X_acq_time     = 3.2768[s]
X_angle        = 45[deg]
X_atn          = 2.1[dB]
X_pulse        = 6.6[us]
Irr_mode       = Off
Tri_mode       = Off
Dante_presat   = FALSE
Initial_wait   = 1[s]
Recvr_gain     = 26
Relaxation_delay = 2[s]
Repetition_time = 5.2768[s]
Temp_get       = 25.8[degC]

```

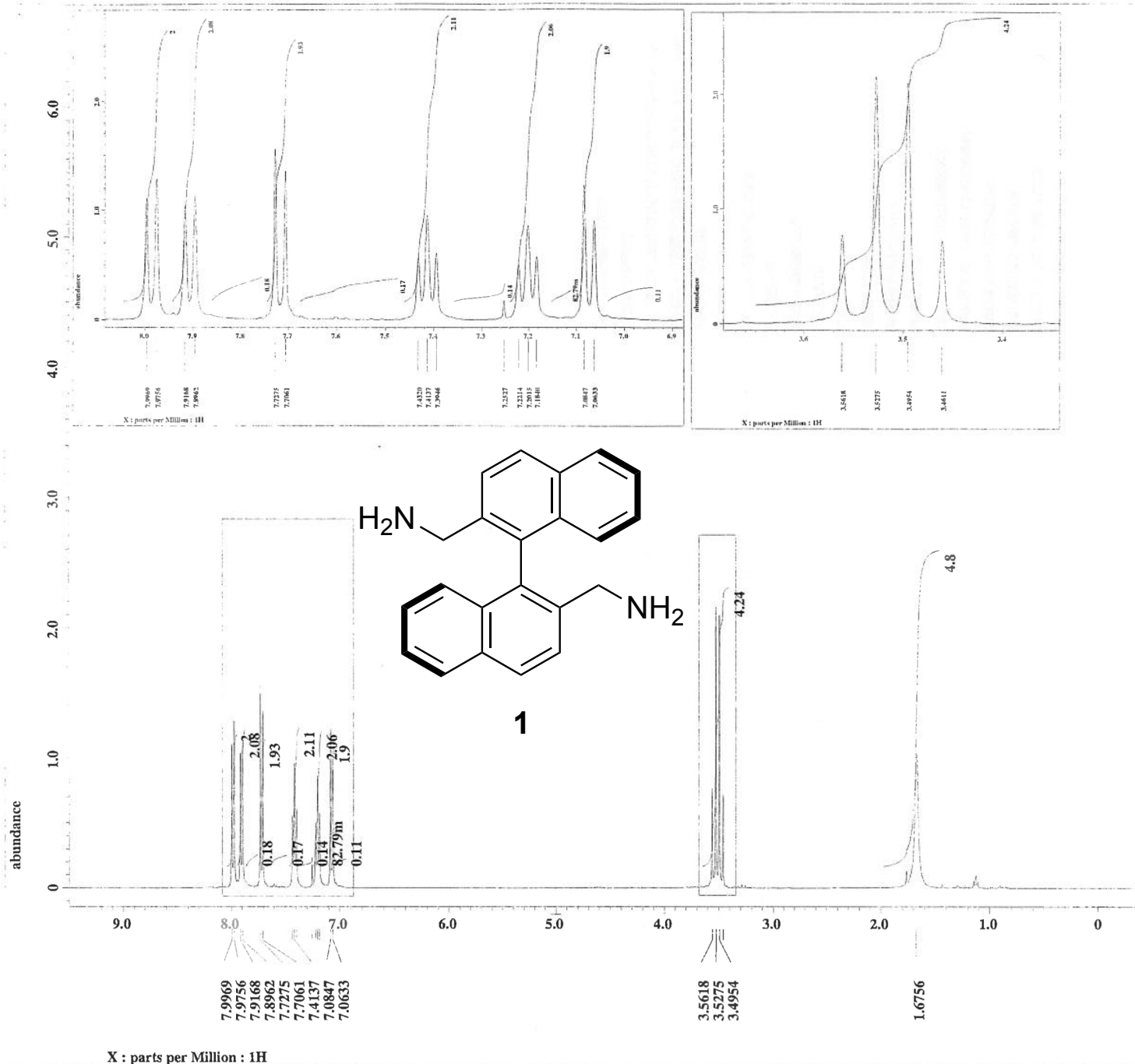


Figure S4. <sup>1</sup>H NMR Spectrum of 1.

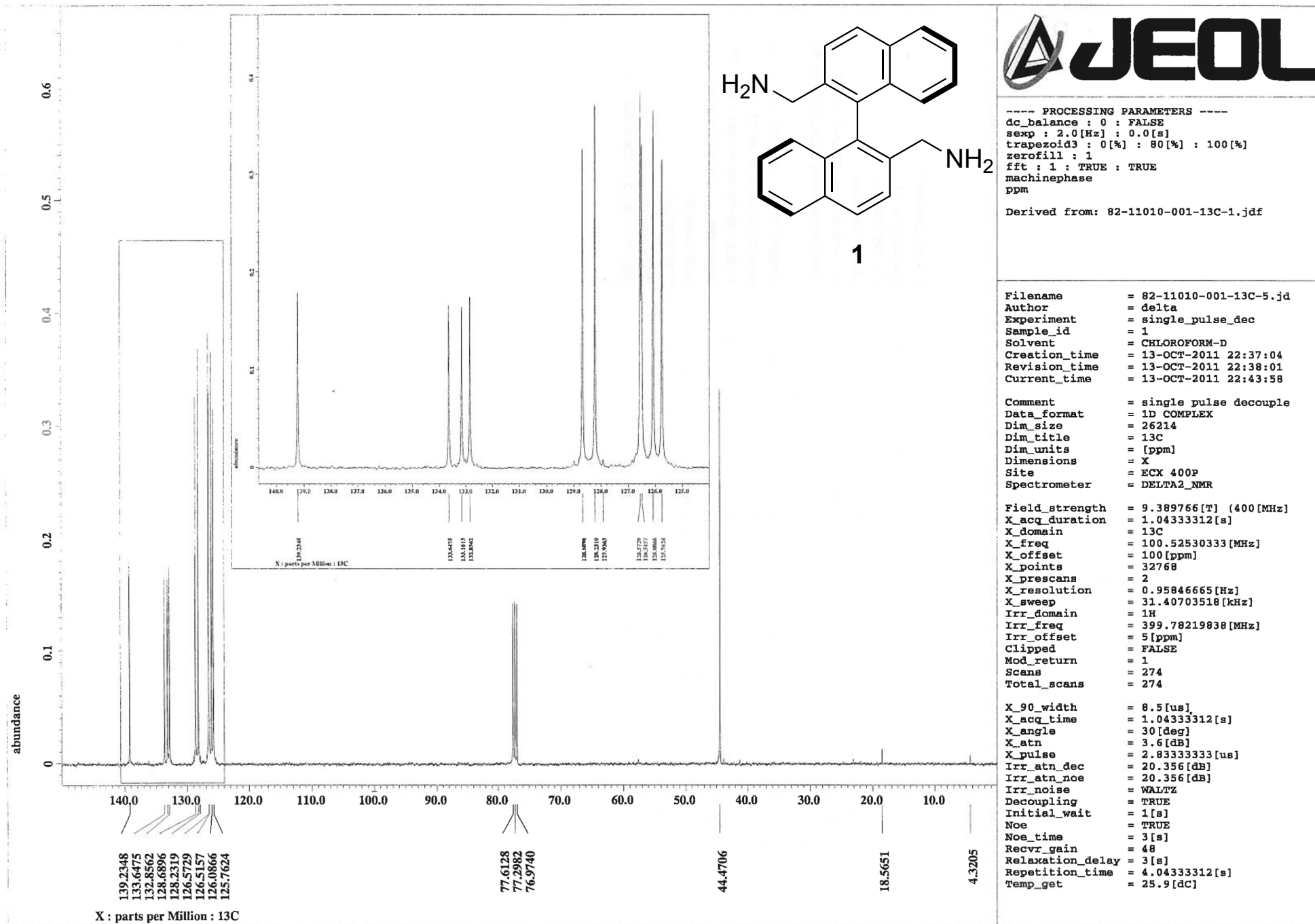


Figure S5.  $^{13}\text{C}\{^1\text{H}\}$  NMR Spectrum of 1.

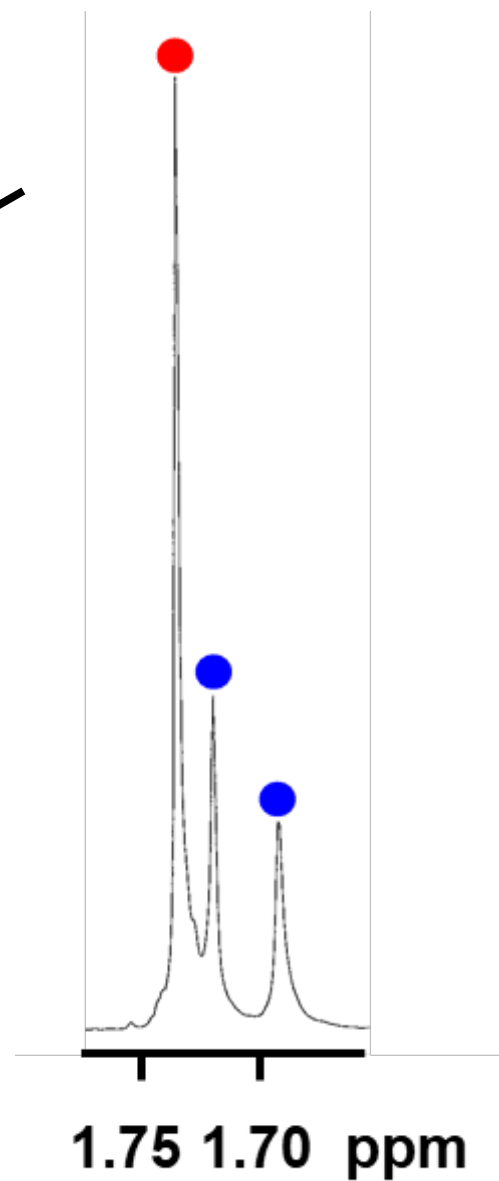
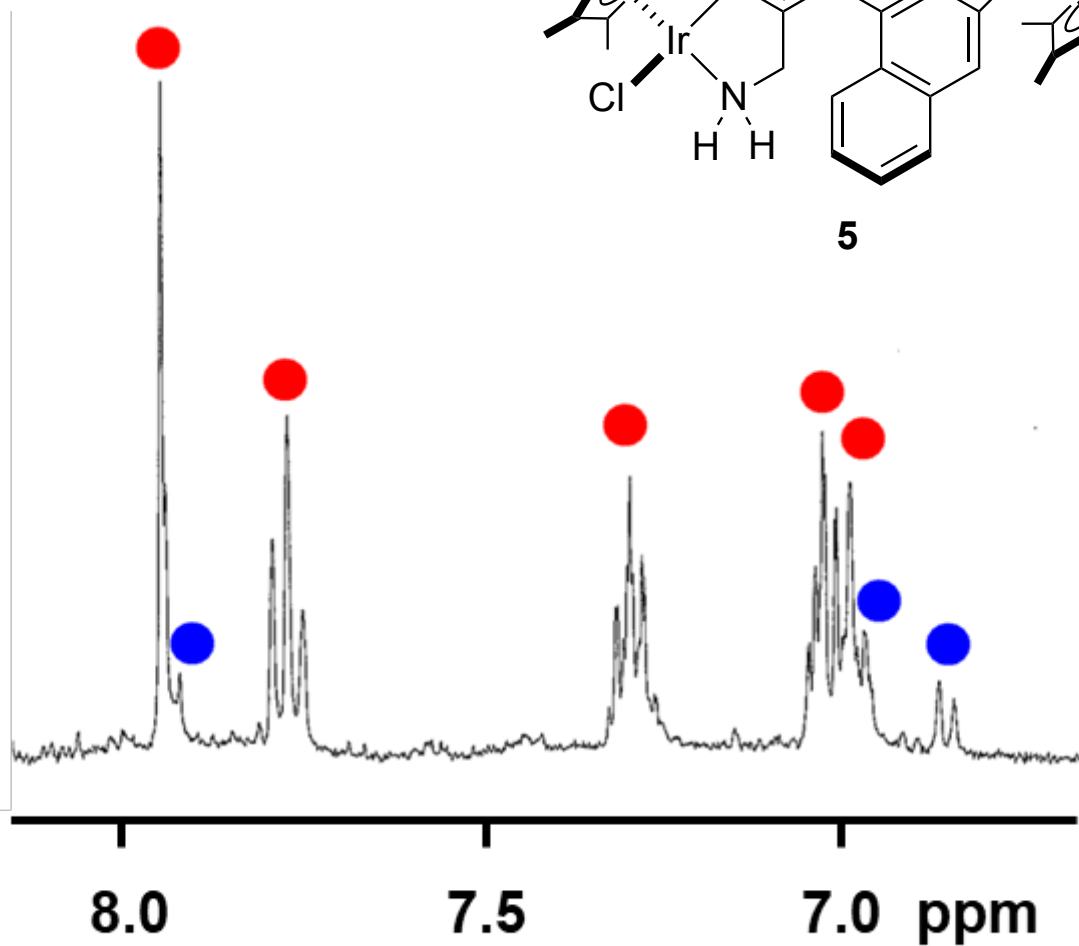
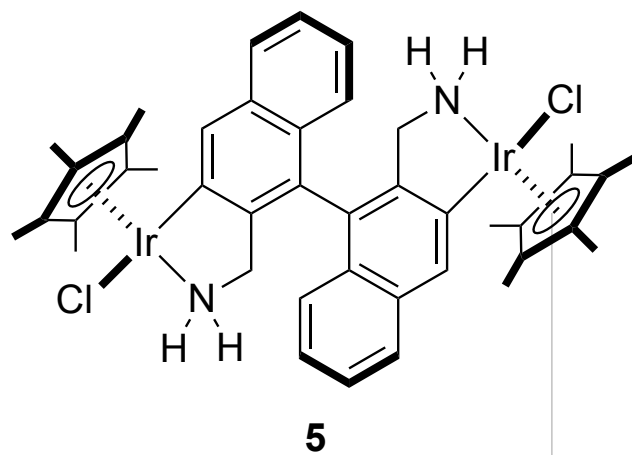


Figure S6. Selected  $^1\text{H}$  NMR Spectrum of **6**. -S7-