

Supplementary information

Triarylmethane Fluorophores Resistant to Oxidative Photobleaching

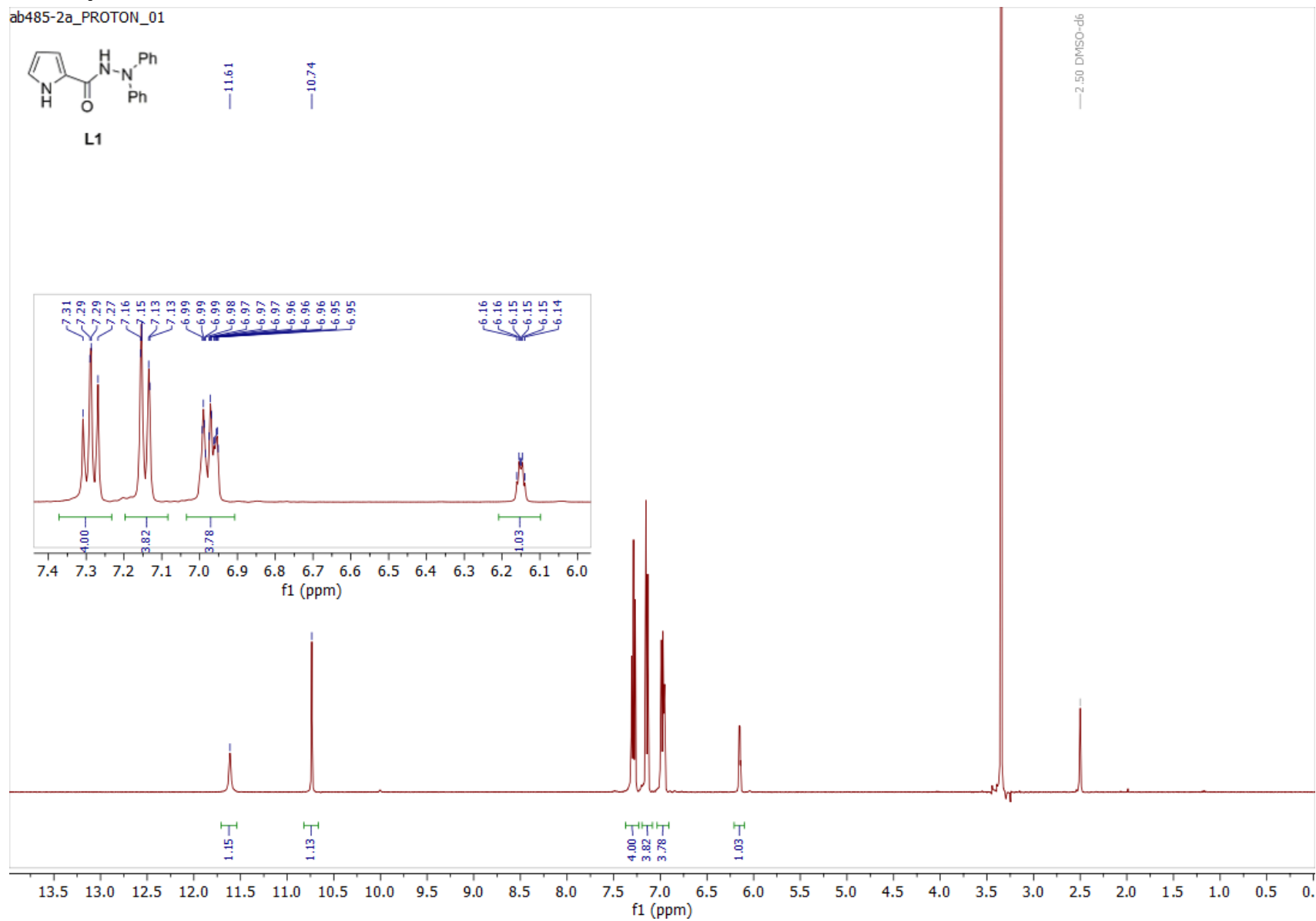
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Am Fassberg 11, 37077 Göttingen, Germany

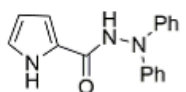
^b Max Planck Institute for Medical Research, Department of Optical Nanoscopy
Jahnstrasse 29, 69120 Heidelberg, Germany

*Corresponding authors' e-mails: alexey.butkevich@mpibpc.mpg.de and
stefan.hell@mpibpc.mpg.de

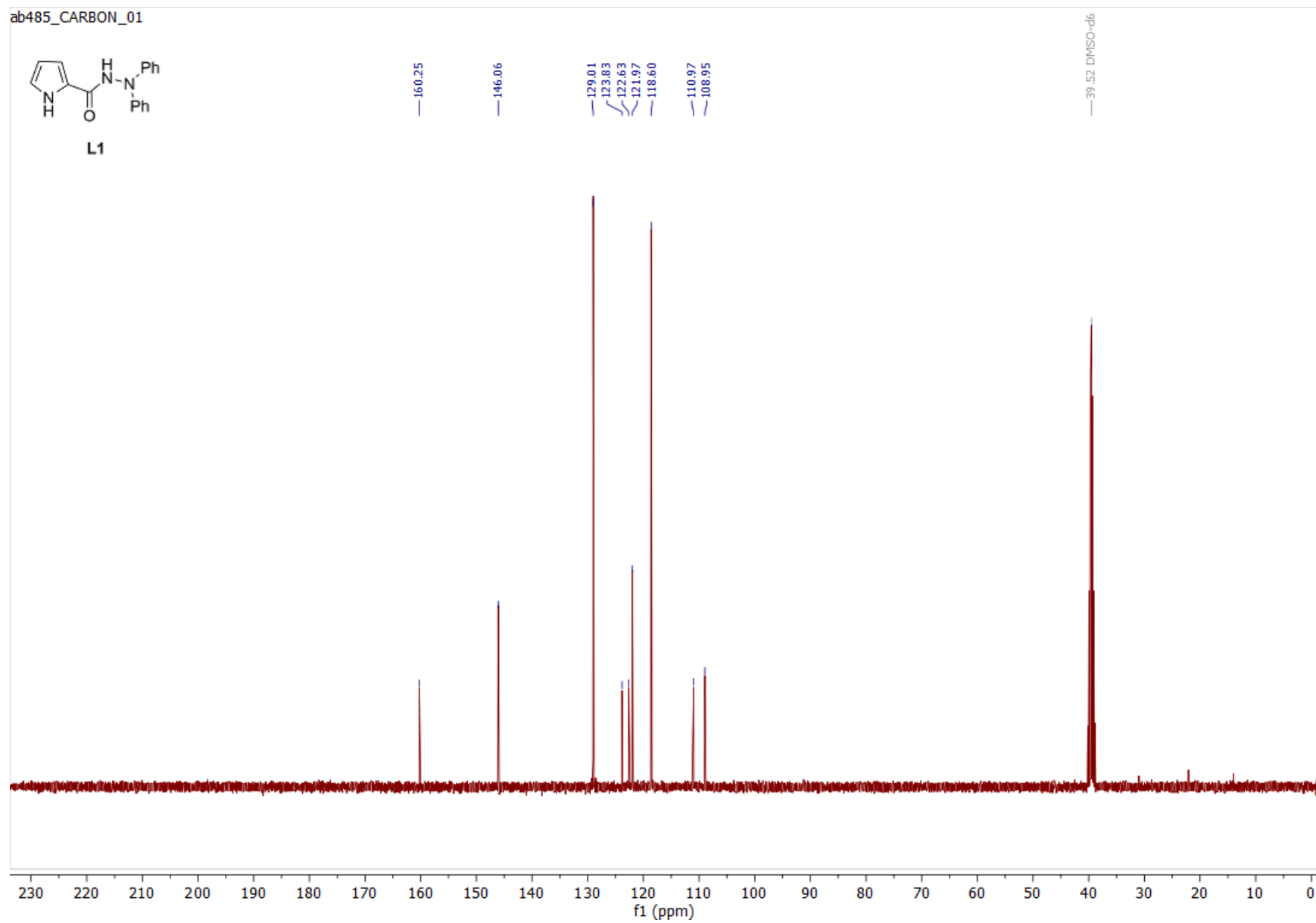
NMR spectra



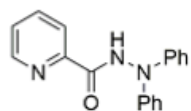
ab485_CARBON_01



L1



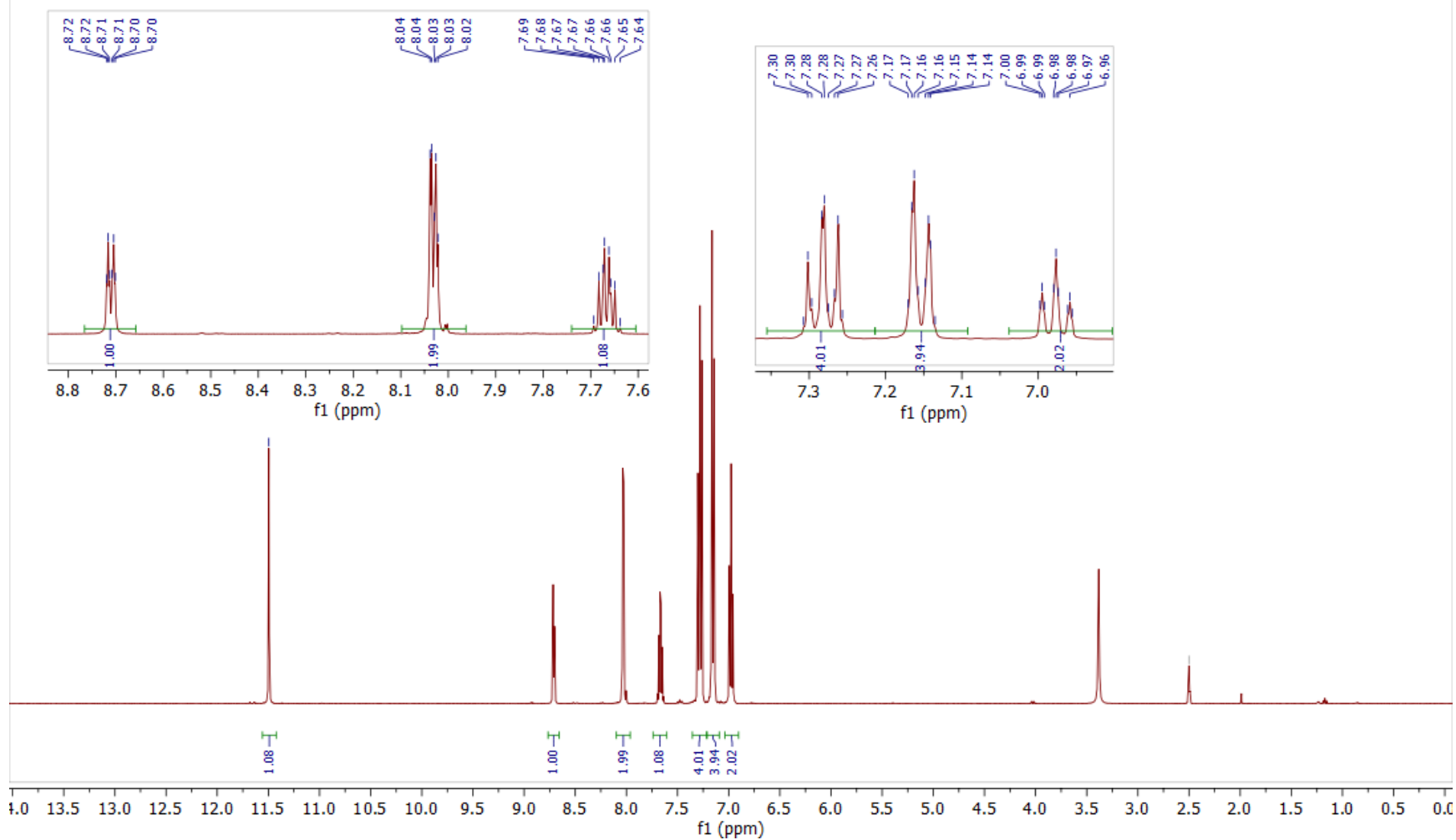
ab491_PROTON_01



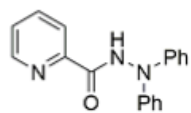
L2

— 11.50

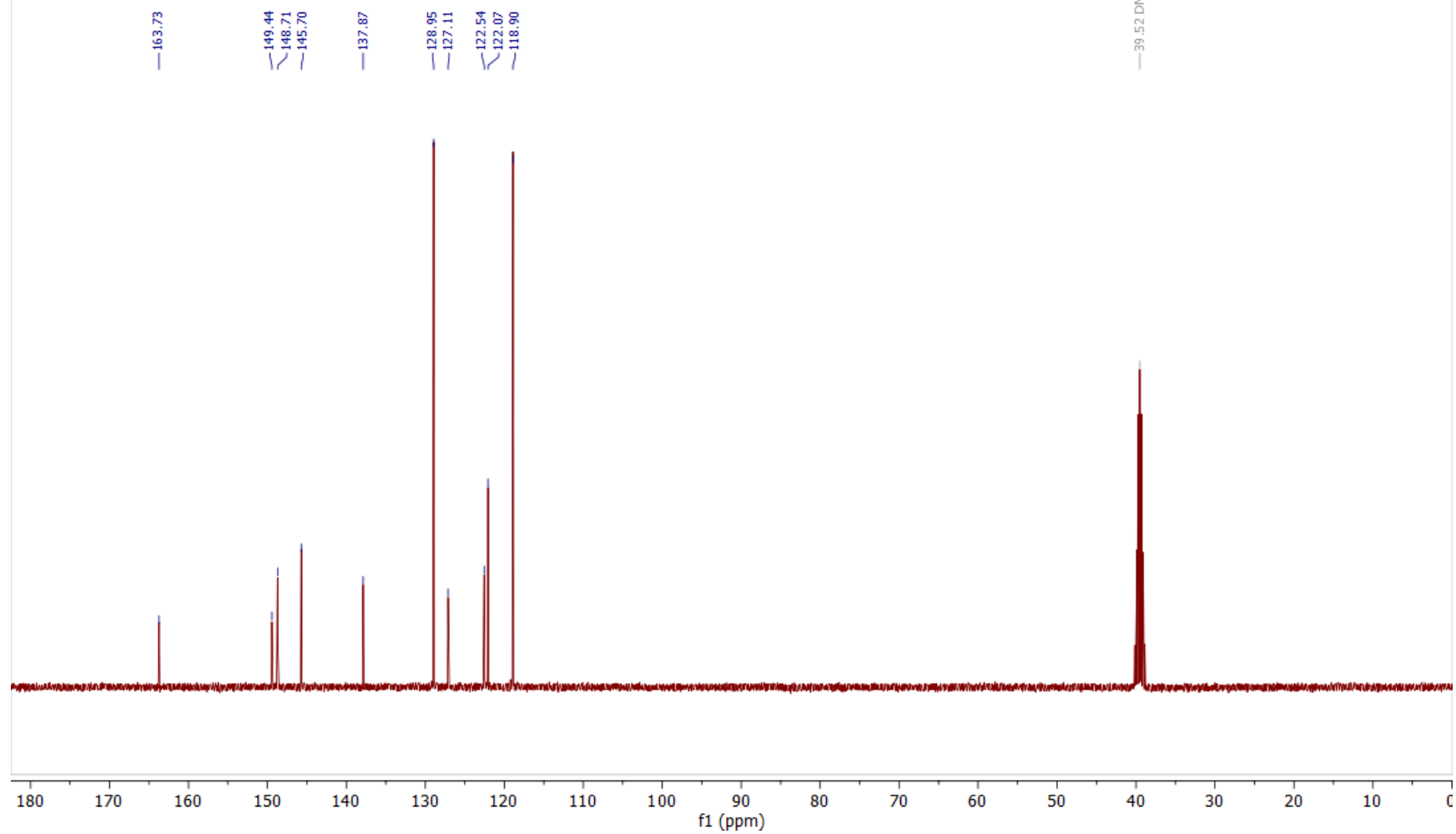
— 2.50 DMSO-d6



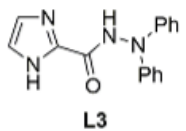
ab491_CARBON_01



L2

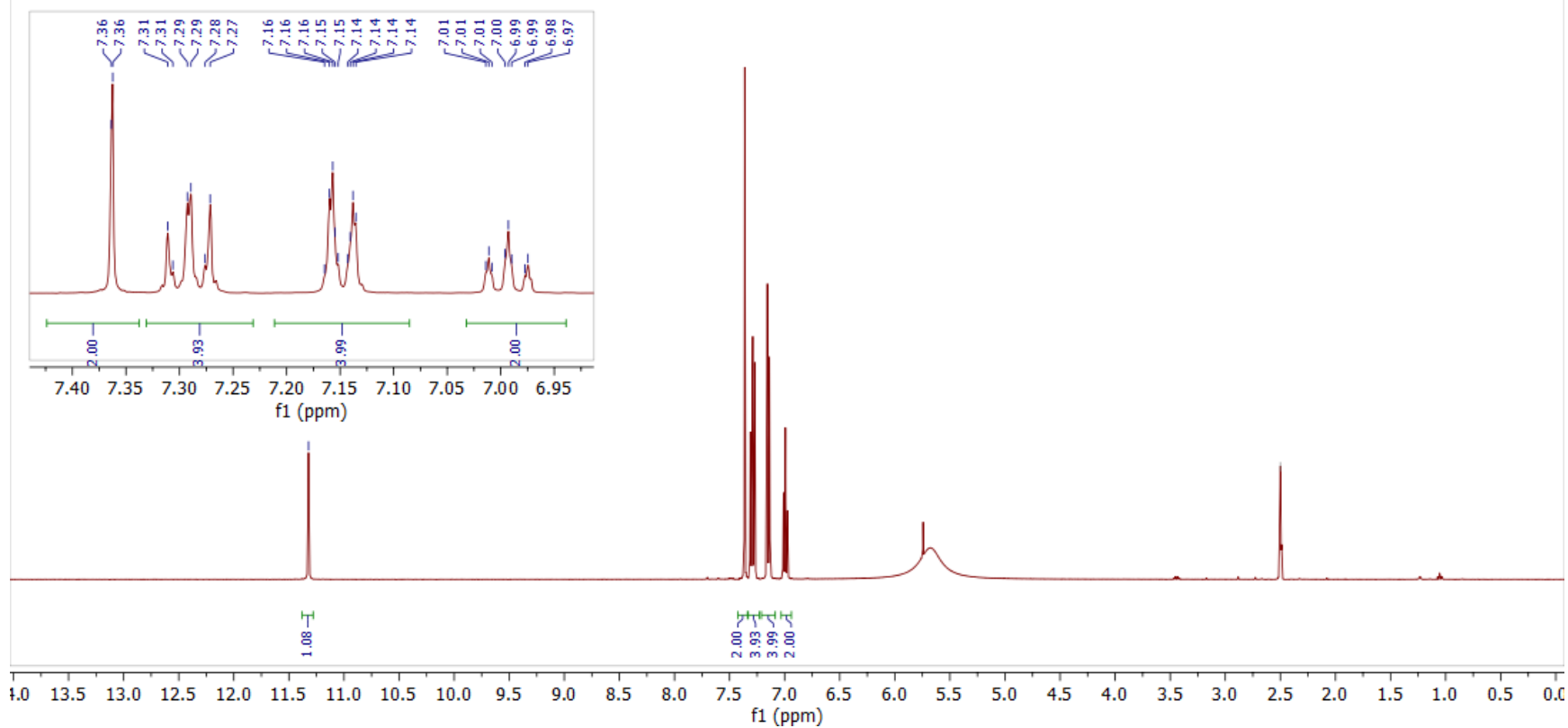


ab492-2b_PROTON_01

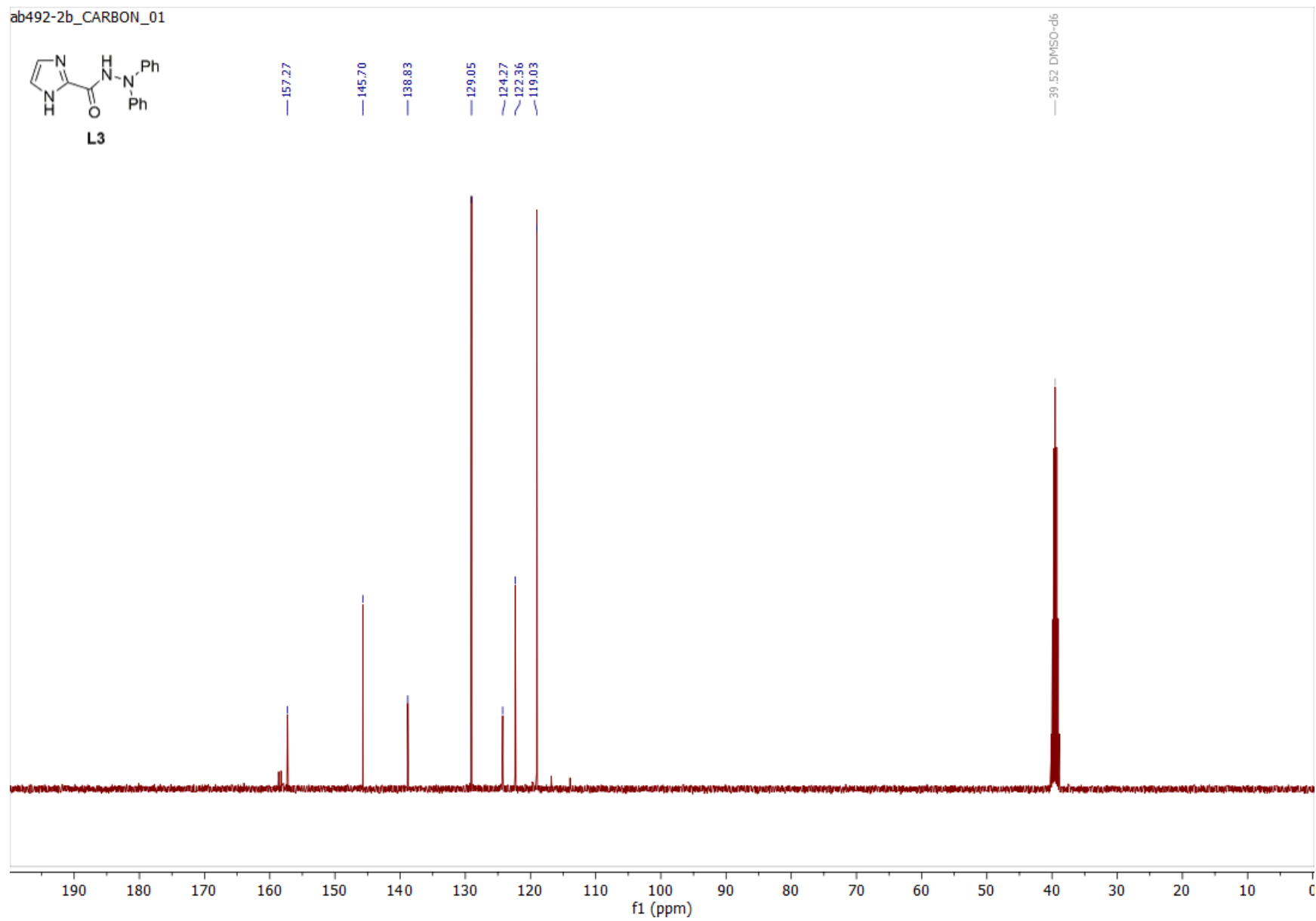
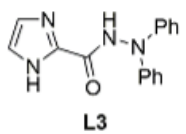


— 11.32

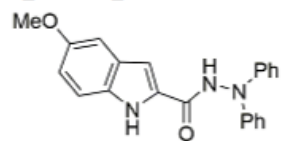
— 2.50 DMSO-d6



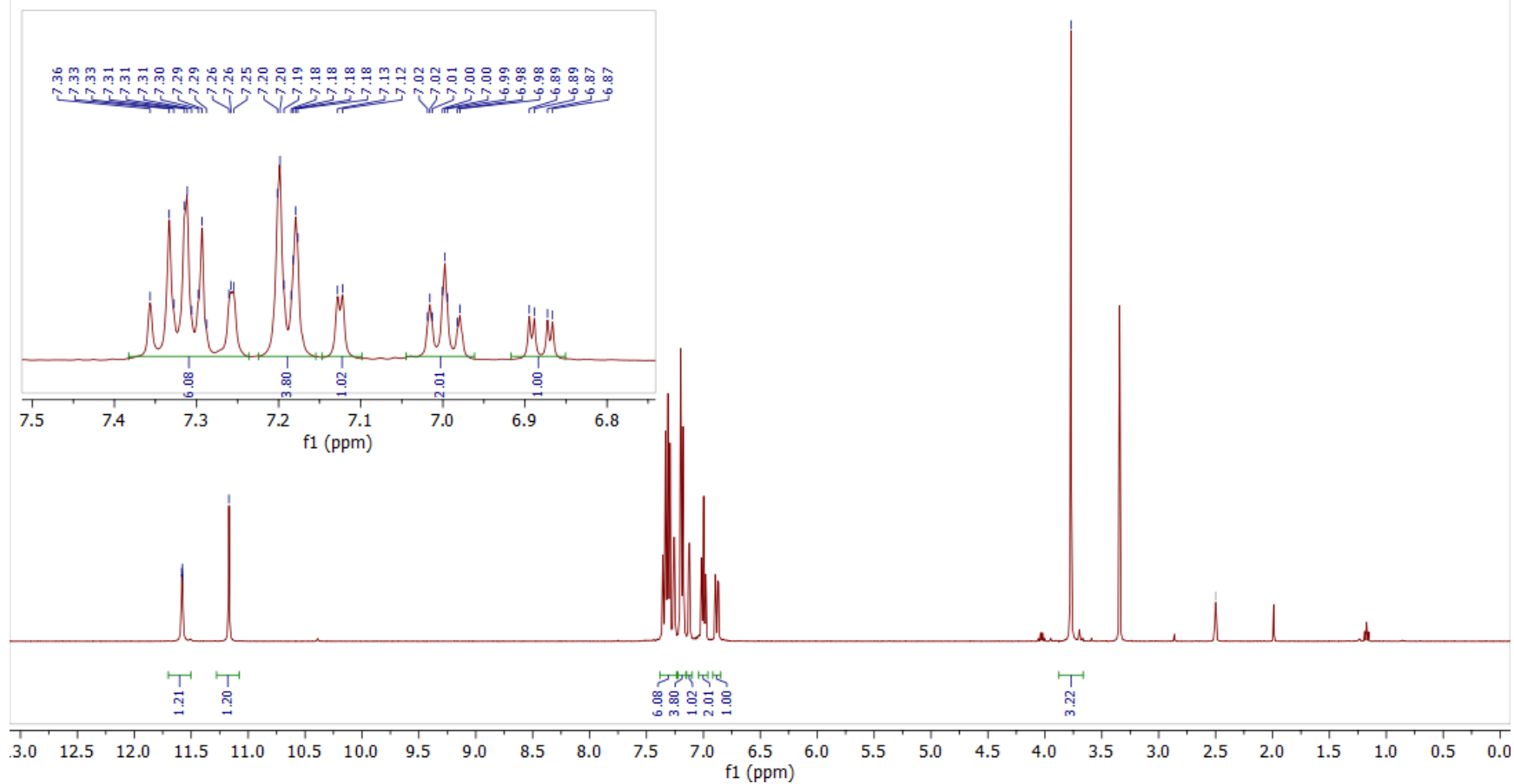
ab492-2b_CARBON_01



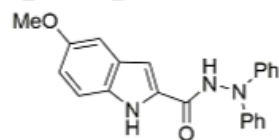
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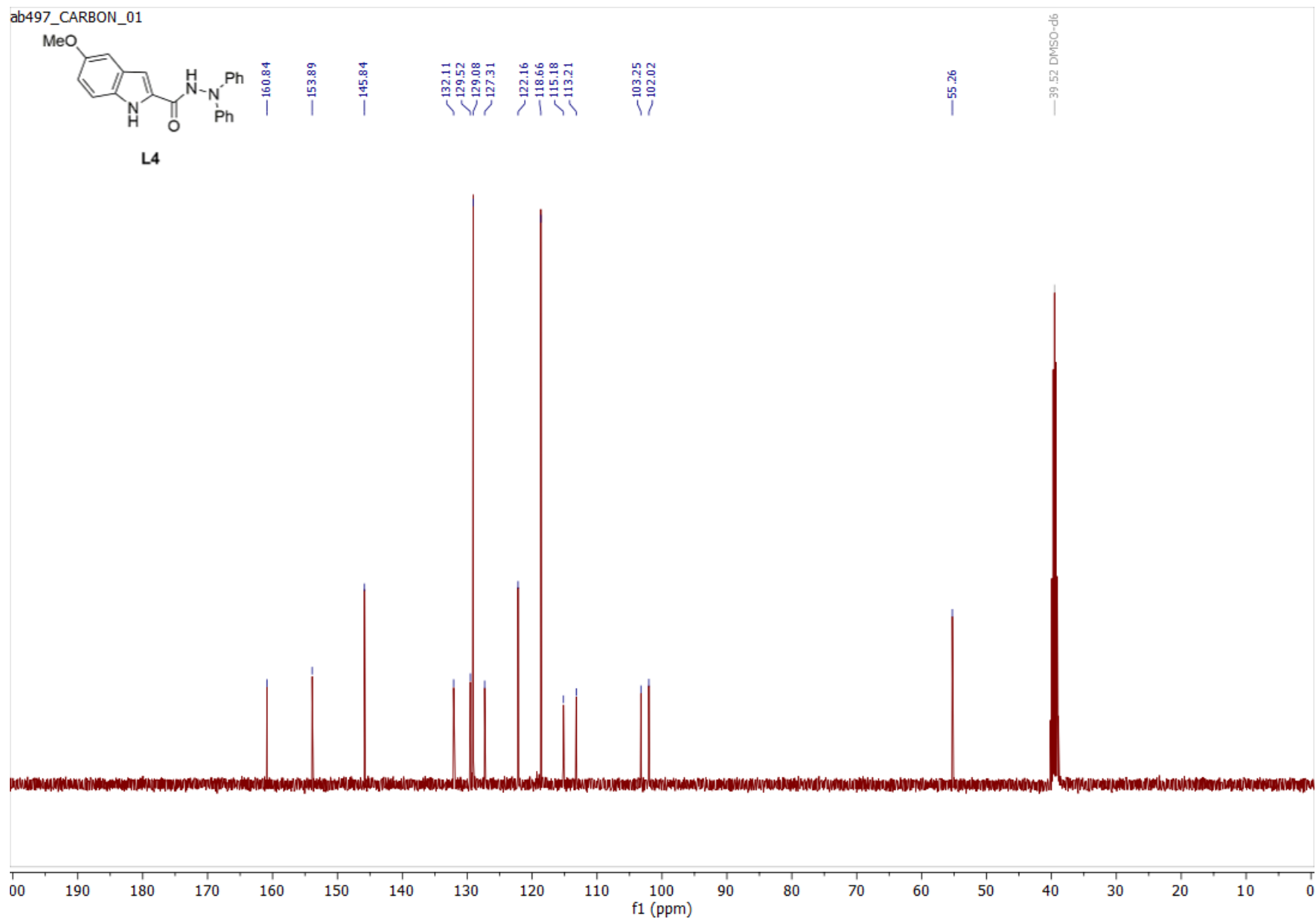
4
11.58
11.58
11.17



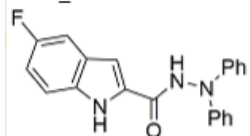
ab497_CARBON_01



L4



ab509_5h.1.fid

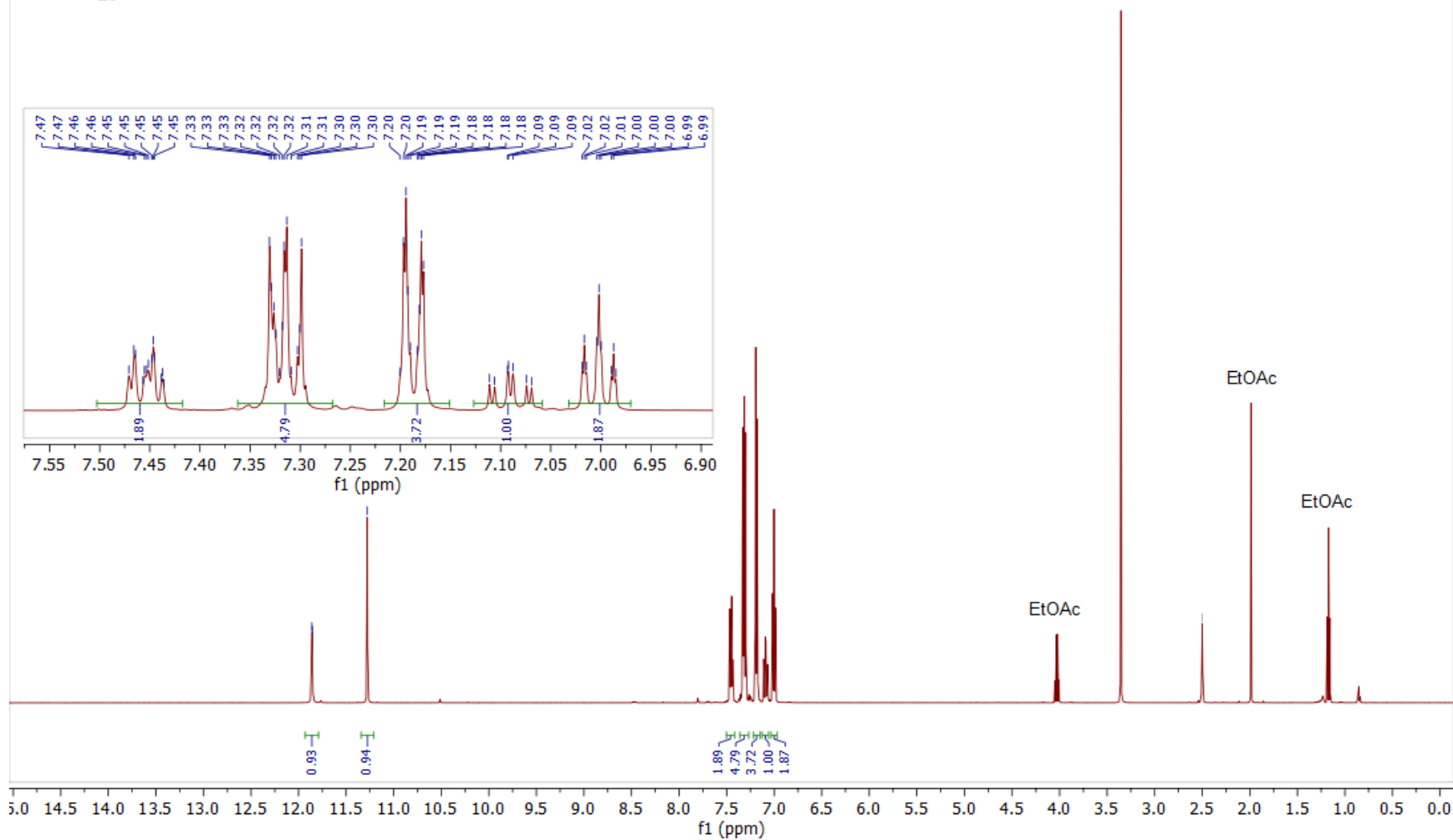


L5

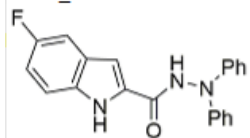
11.86
11.86

11.28

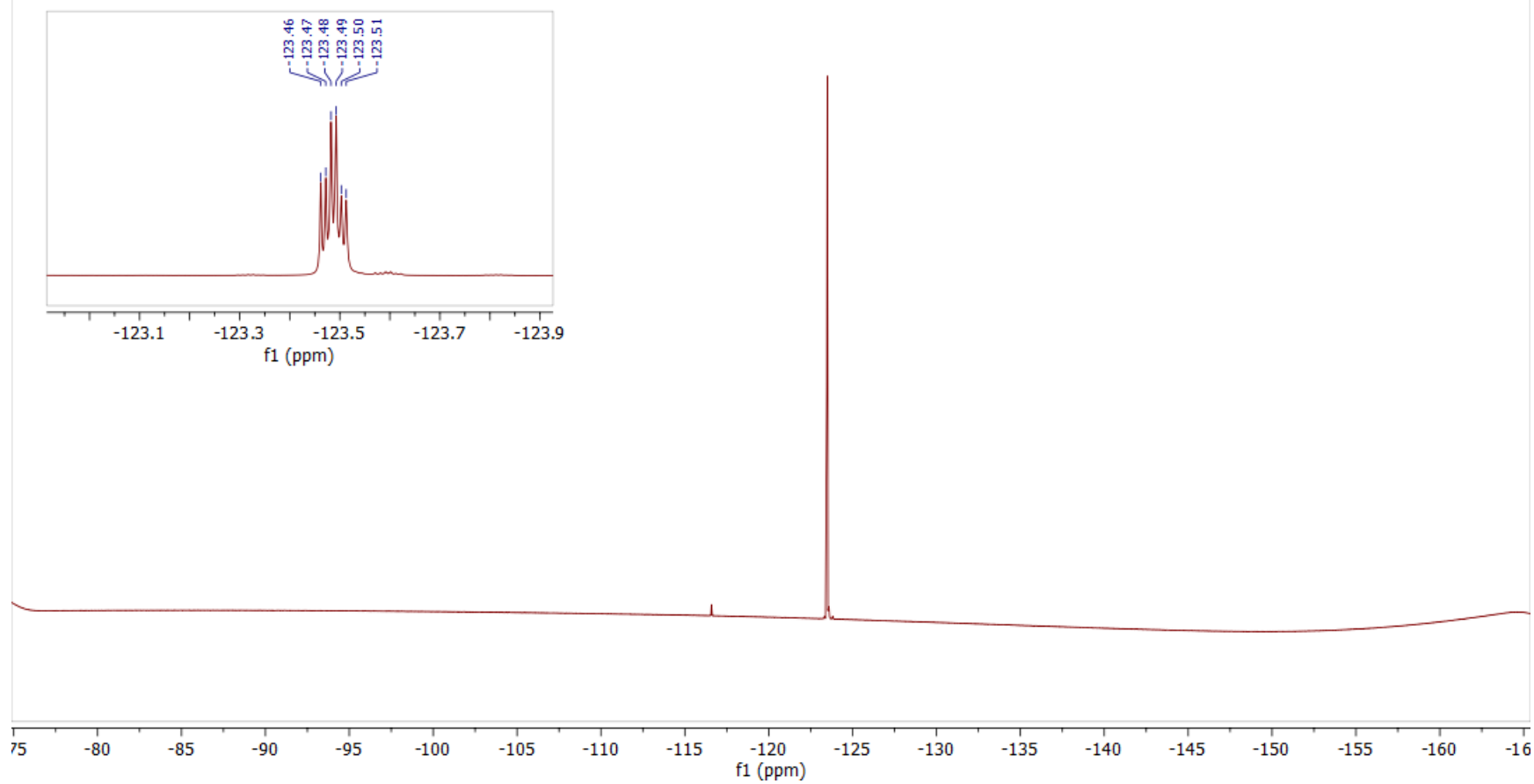
2.50 DMSO-d6



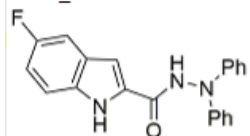
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L5



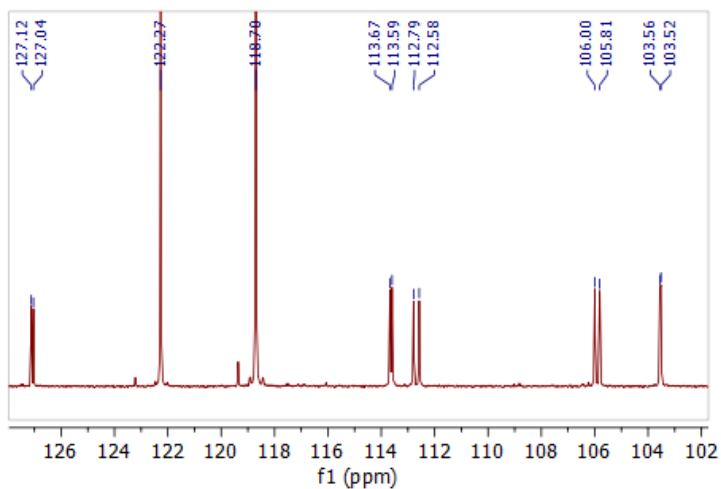
ab509_5c.1.fid



L5

160.61
158.18
156.33
145.77
133.55
130.99
129.14
127.12
127.04
122.27
118.70
113.67
113.59
112.79
112.58
106.00
105.81
103.56
103.52

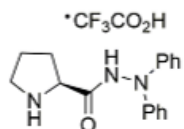
39.52 DMSO-d6



30 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

f1 (ppm)

ab503a_PROTON_01



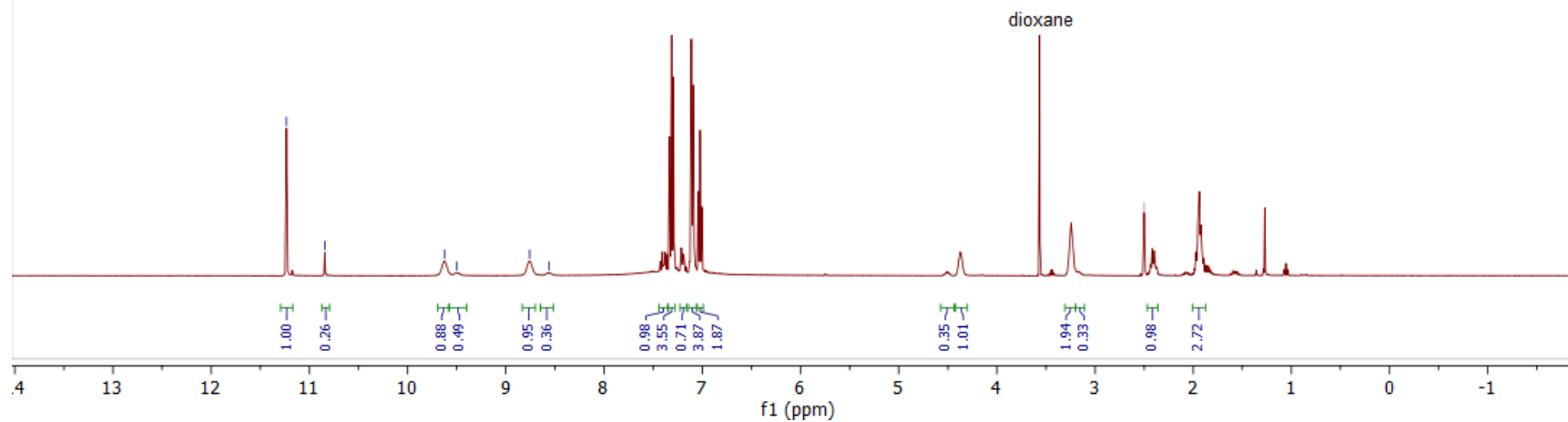
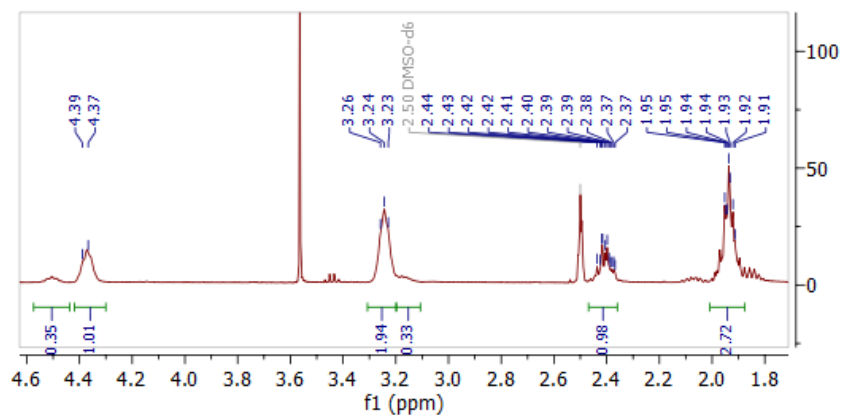
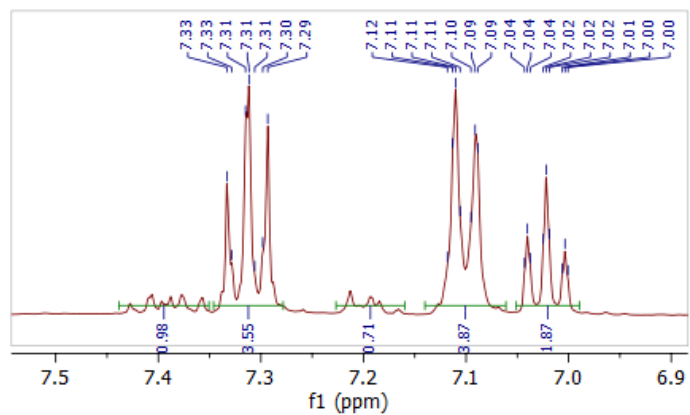
$\cdot\text{CF}_3\text{CO}_2\text{H}$

— 11.23
— 10.84

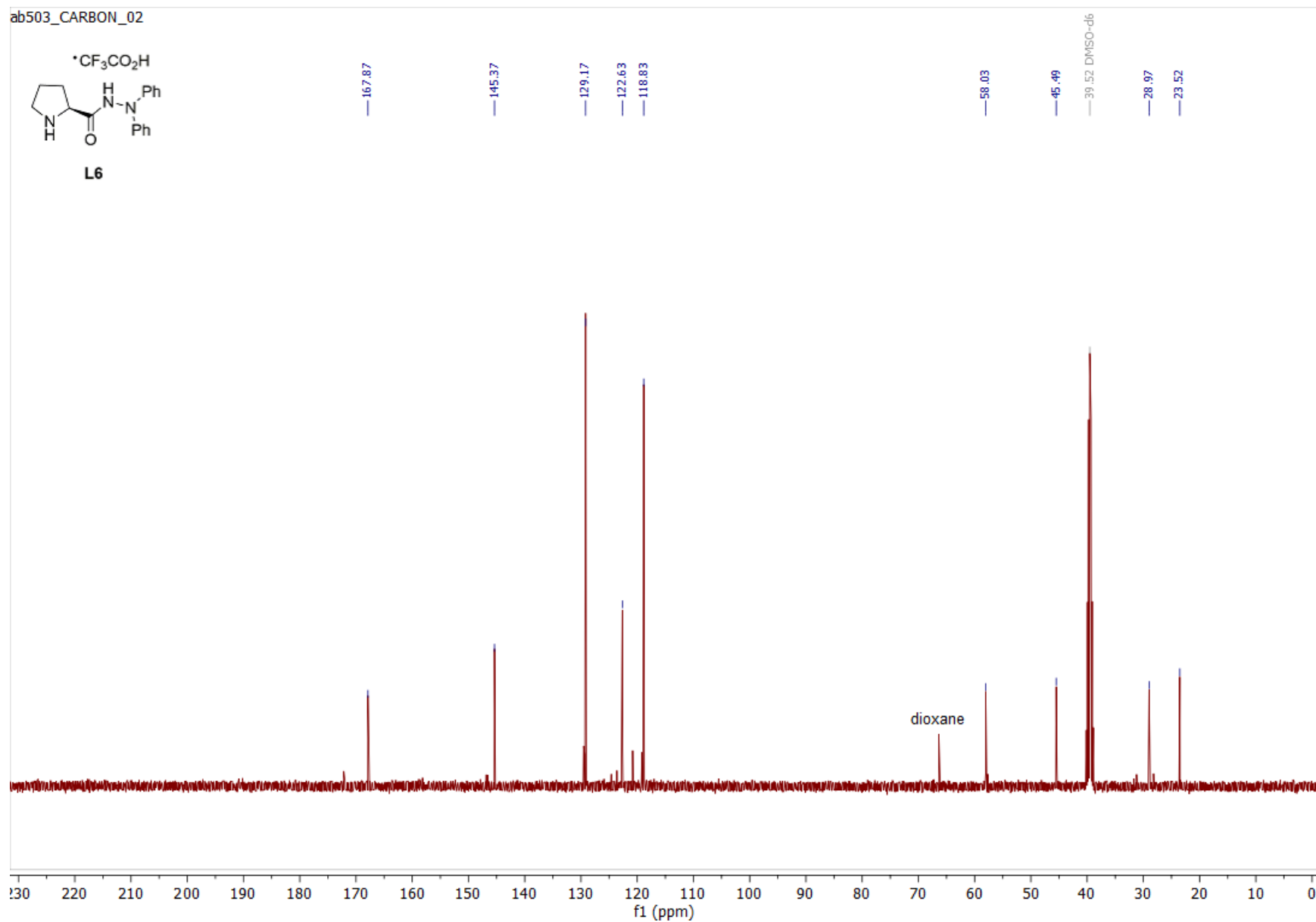
9.62
9.50

8.76
8.56

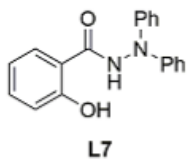
— 2.50 DMSO-d6



ab503_CARBON_02

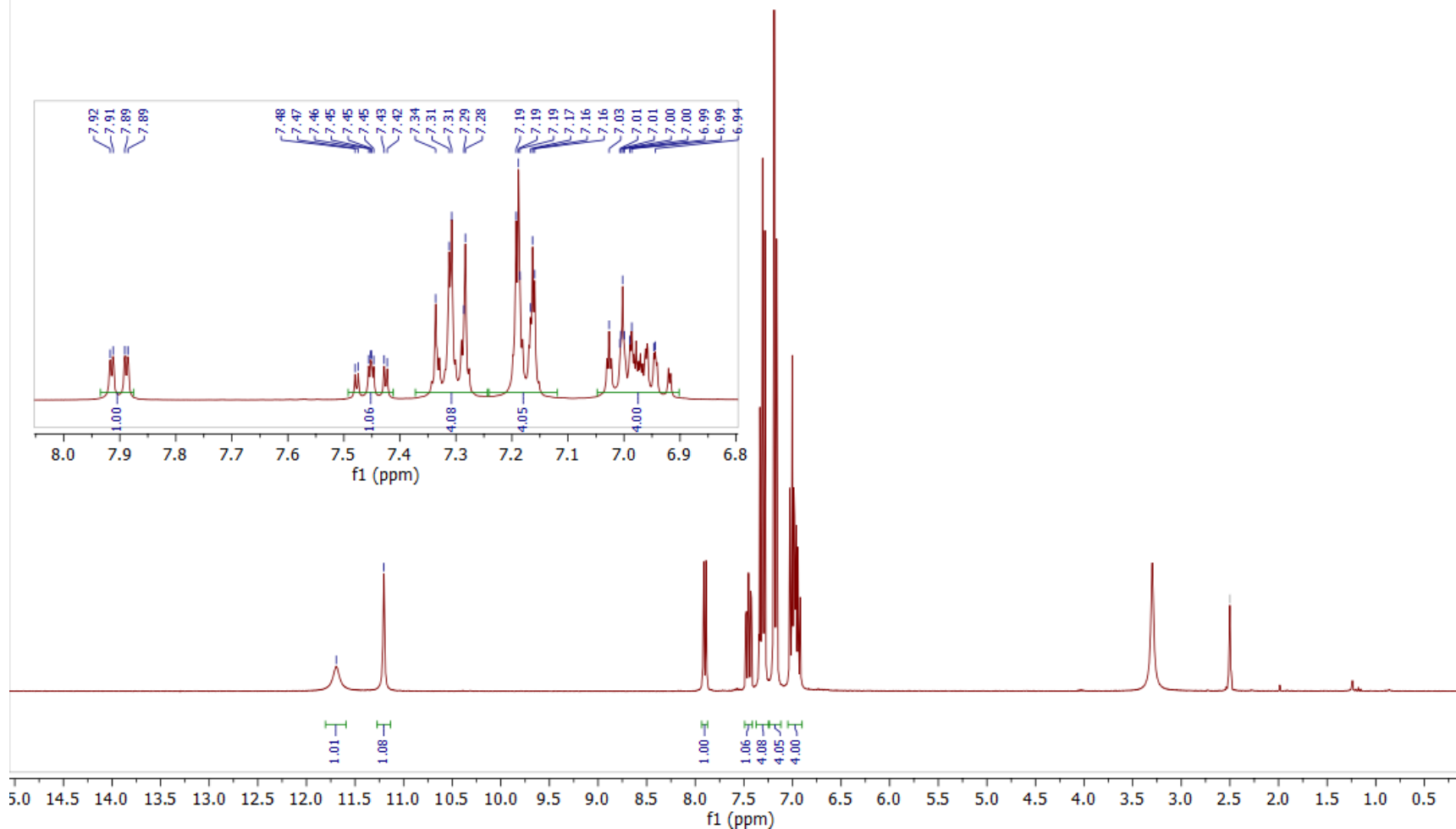


ab510_3h

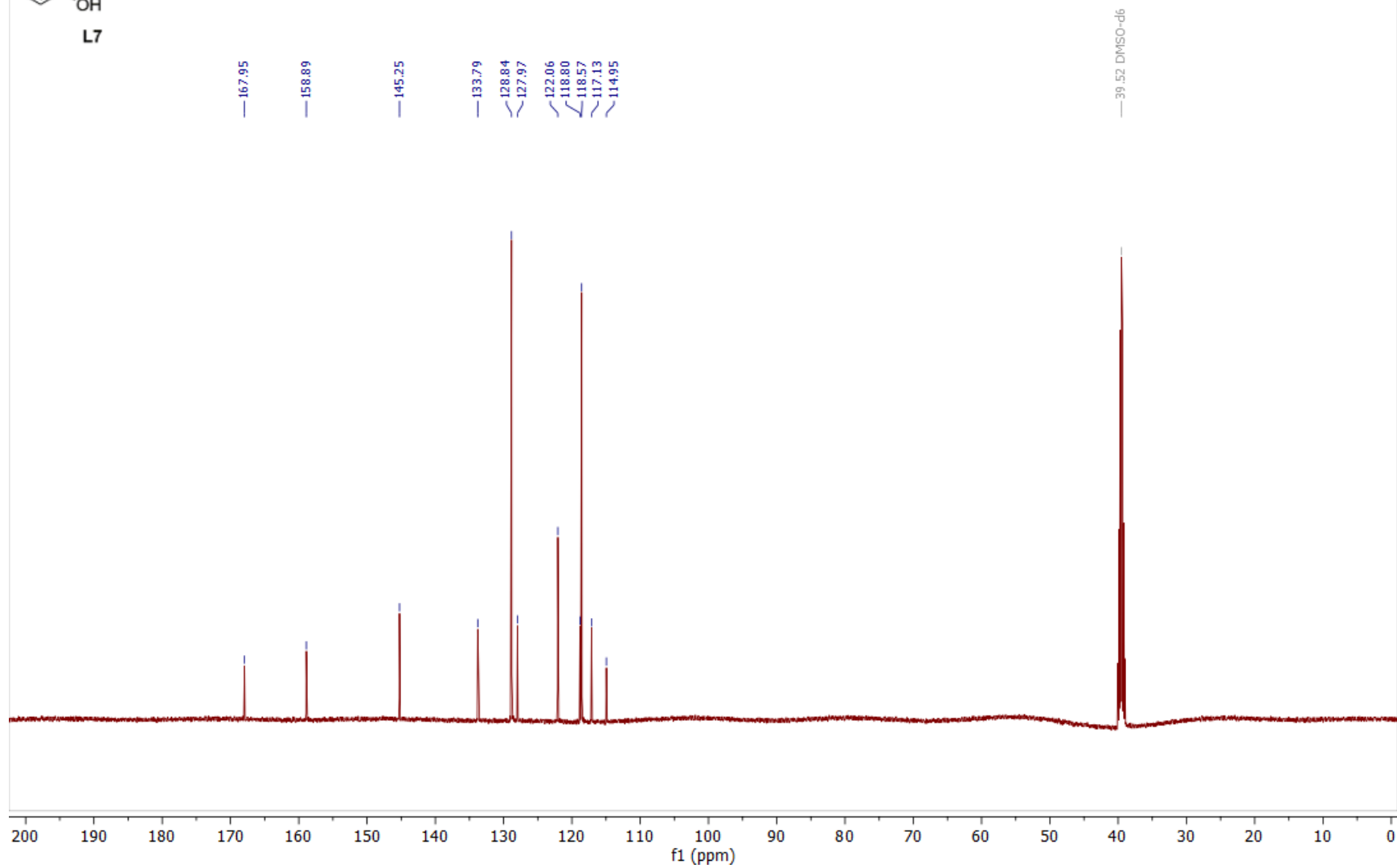
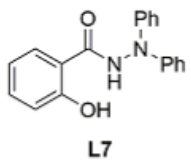


11.69
11.20

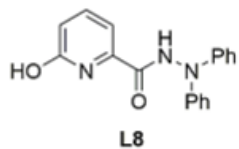
2.50 DMSO-d6



ab510_5c

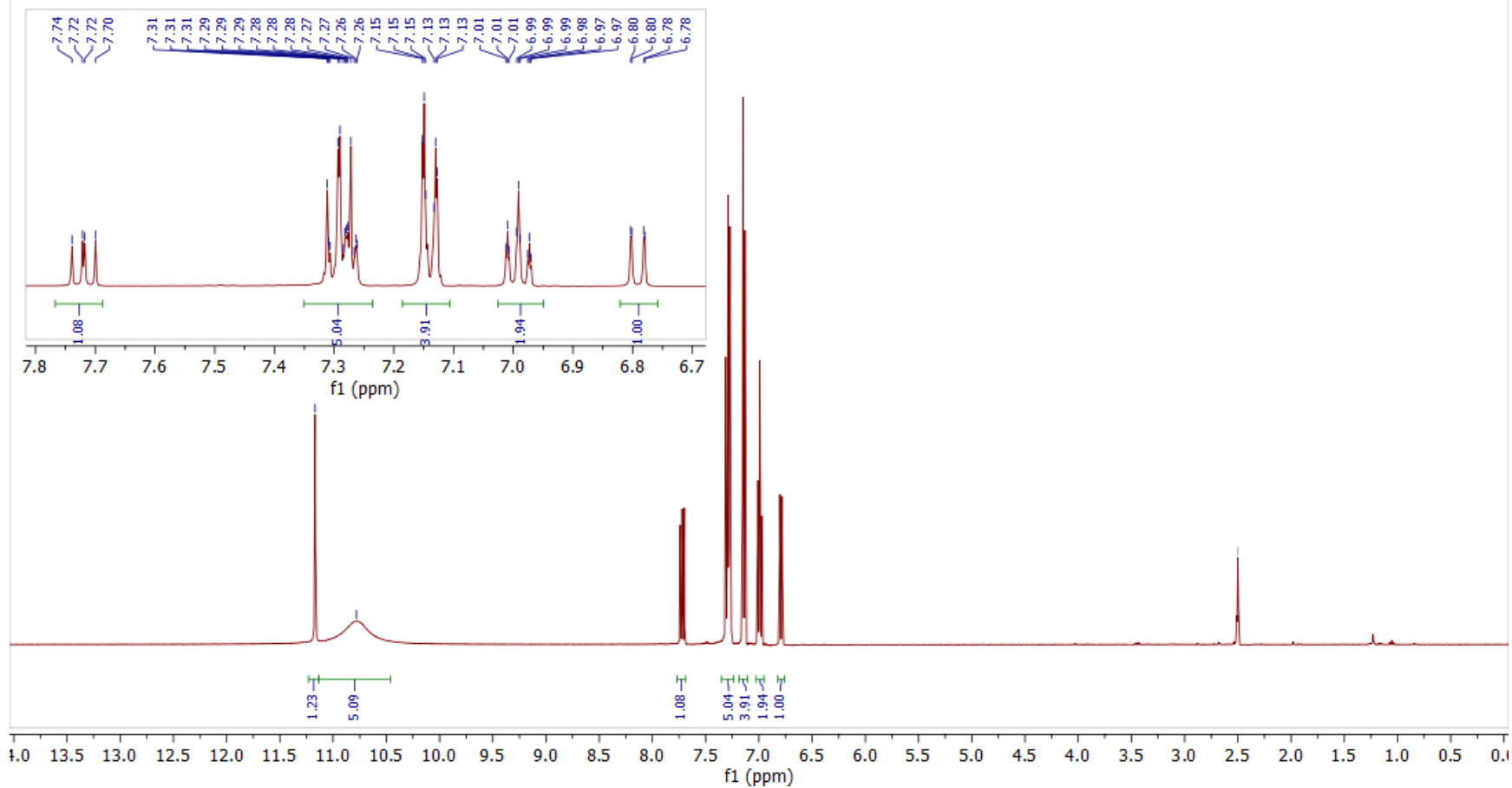


ab519a_PROTON_01

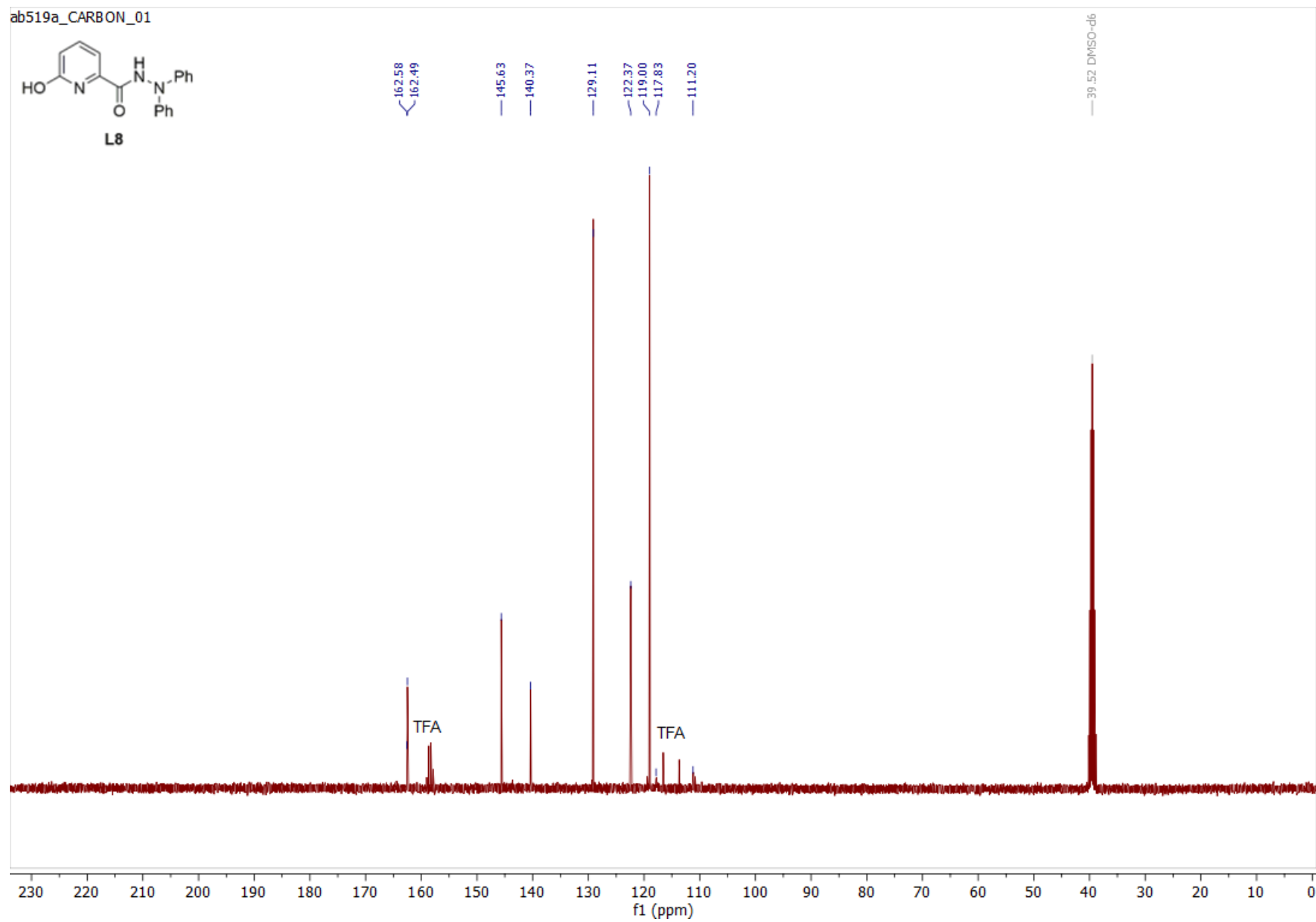
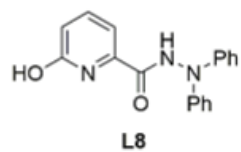


—11.17
—10.78

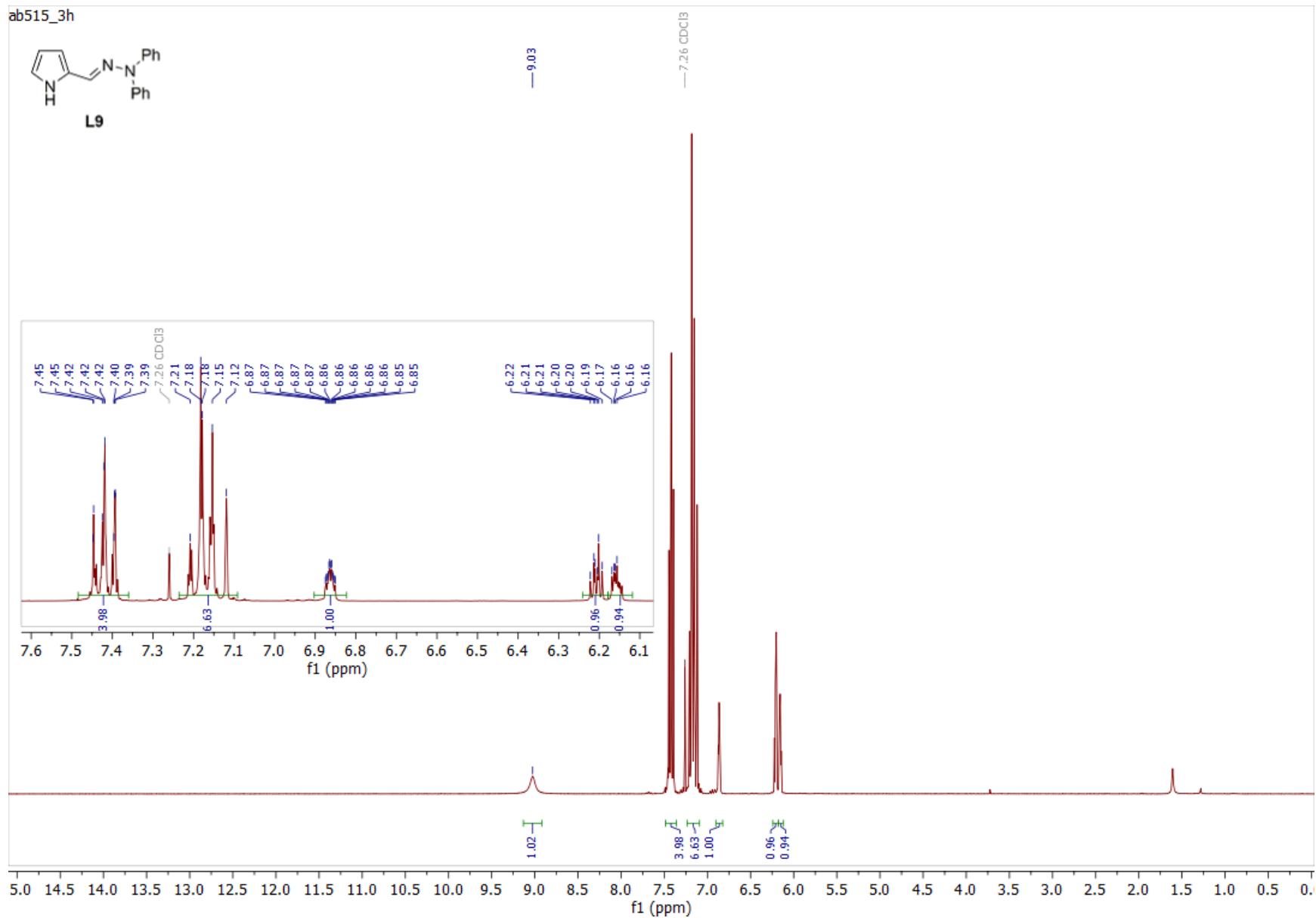
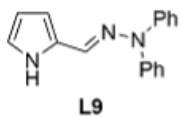
—2.50 DMSO-d6



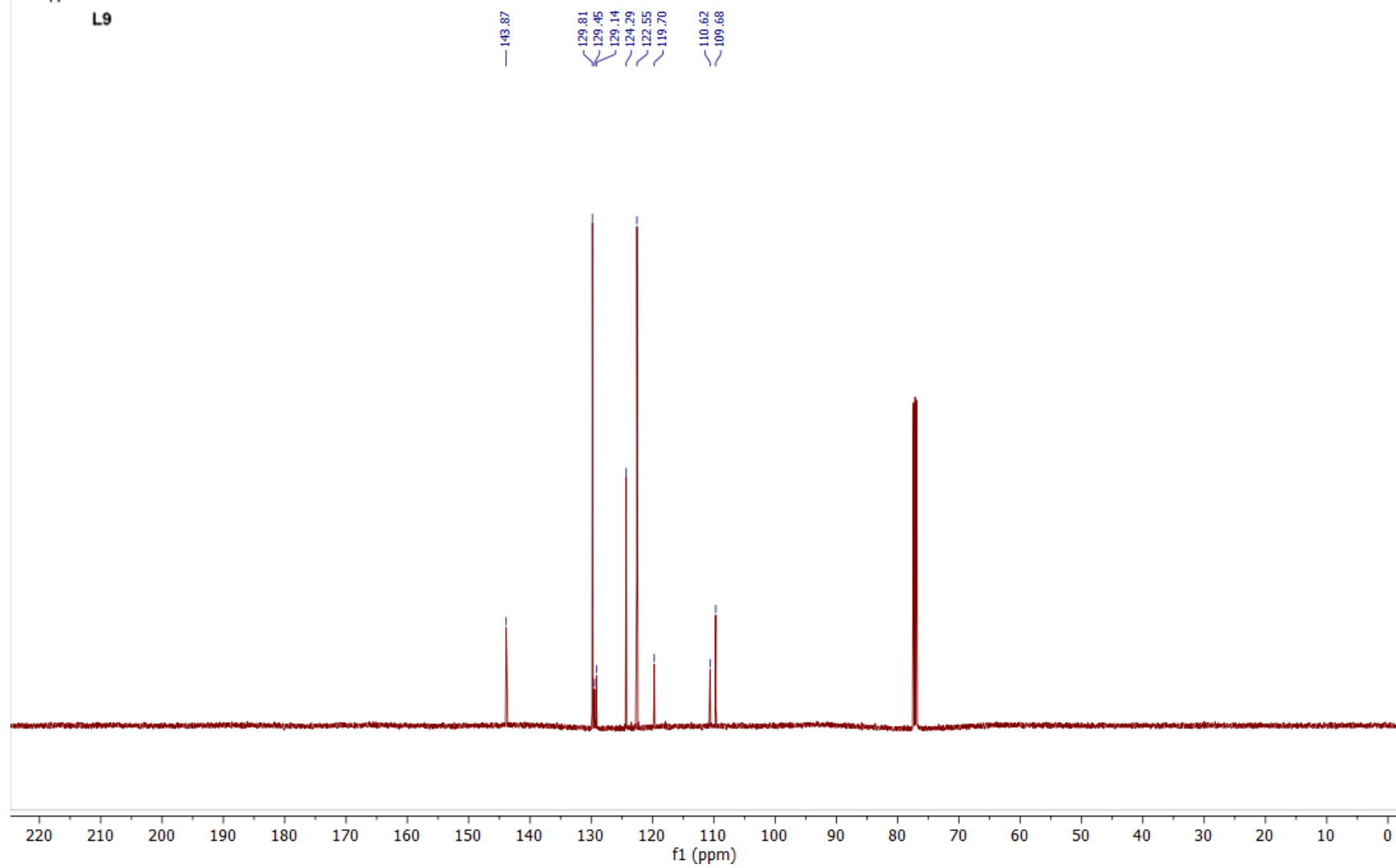
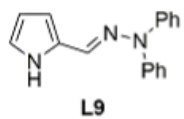
ab519a_CARBON_01



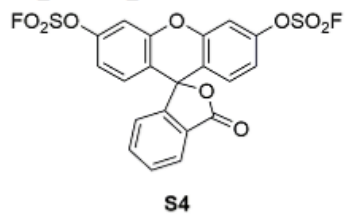
ab515_3h



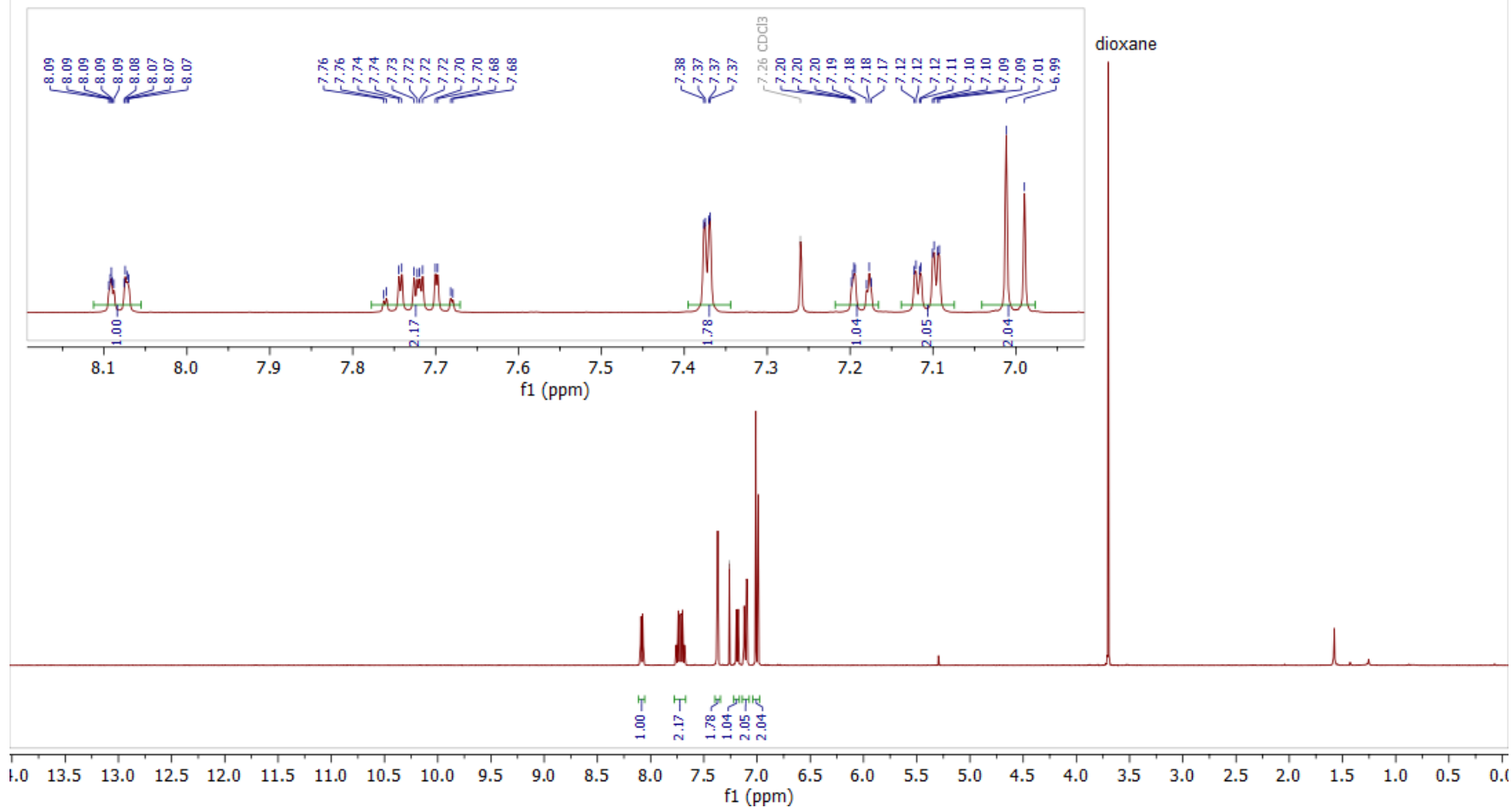
ab515_5c



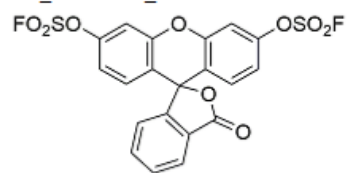
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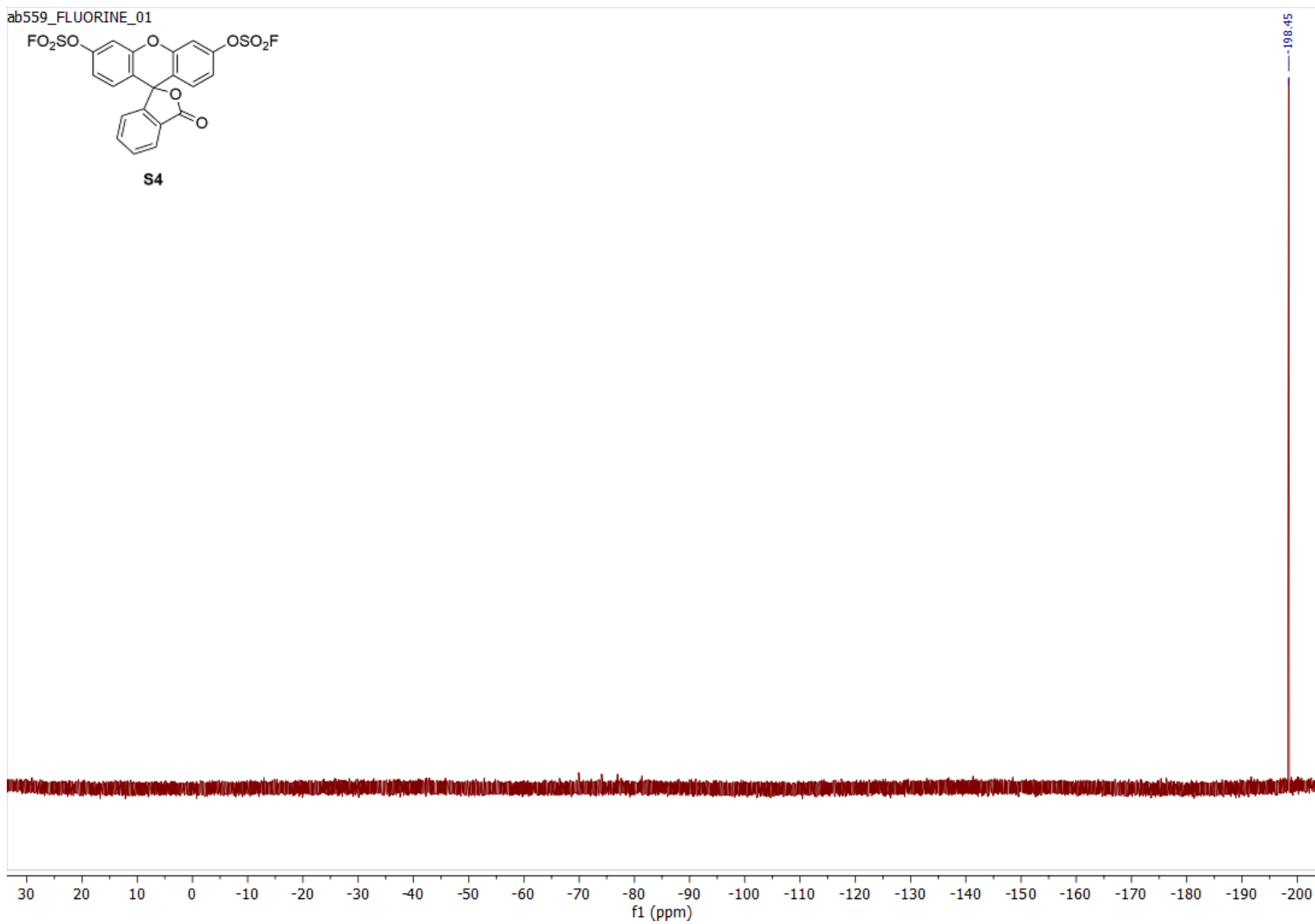
—7.26 CDCl₃



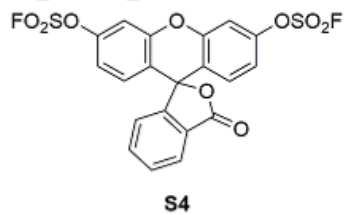
ab559_FLUORINE_01



S4



ab559_CARBON_01

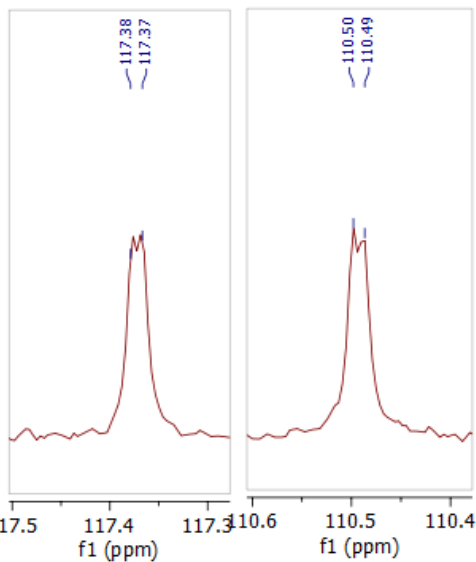


168.56

152.34
151.50
150.72

135.98
130.87
130.32
125.90
123.87
119.77
117.38
117.37
110.50
110.49

80.09
77.16 CDCl₃

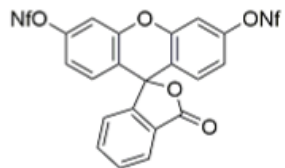


dioxane

230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

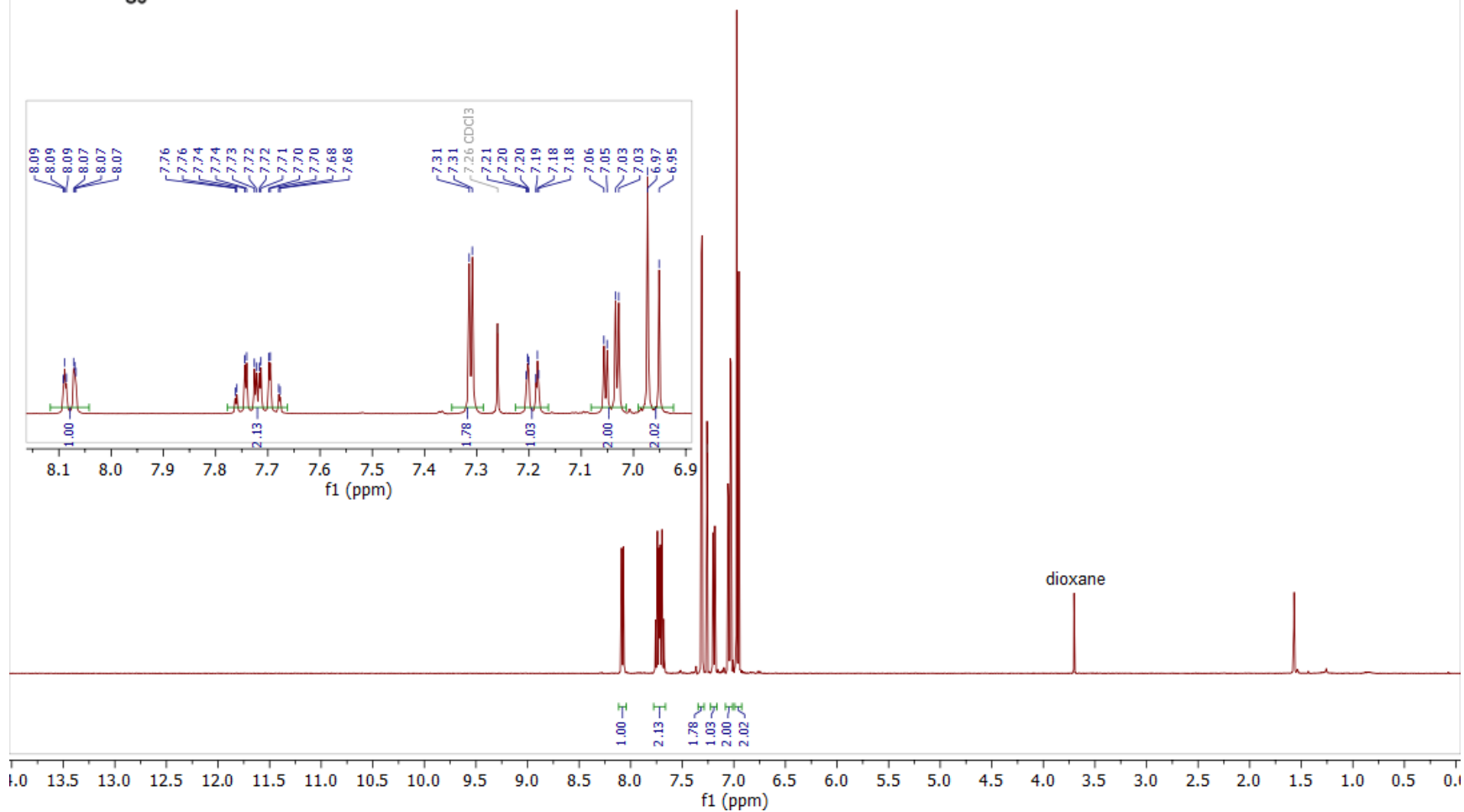
f1 (ppm)

ab610_PROTON_01

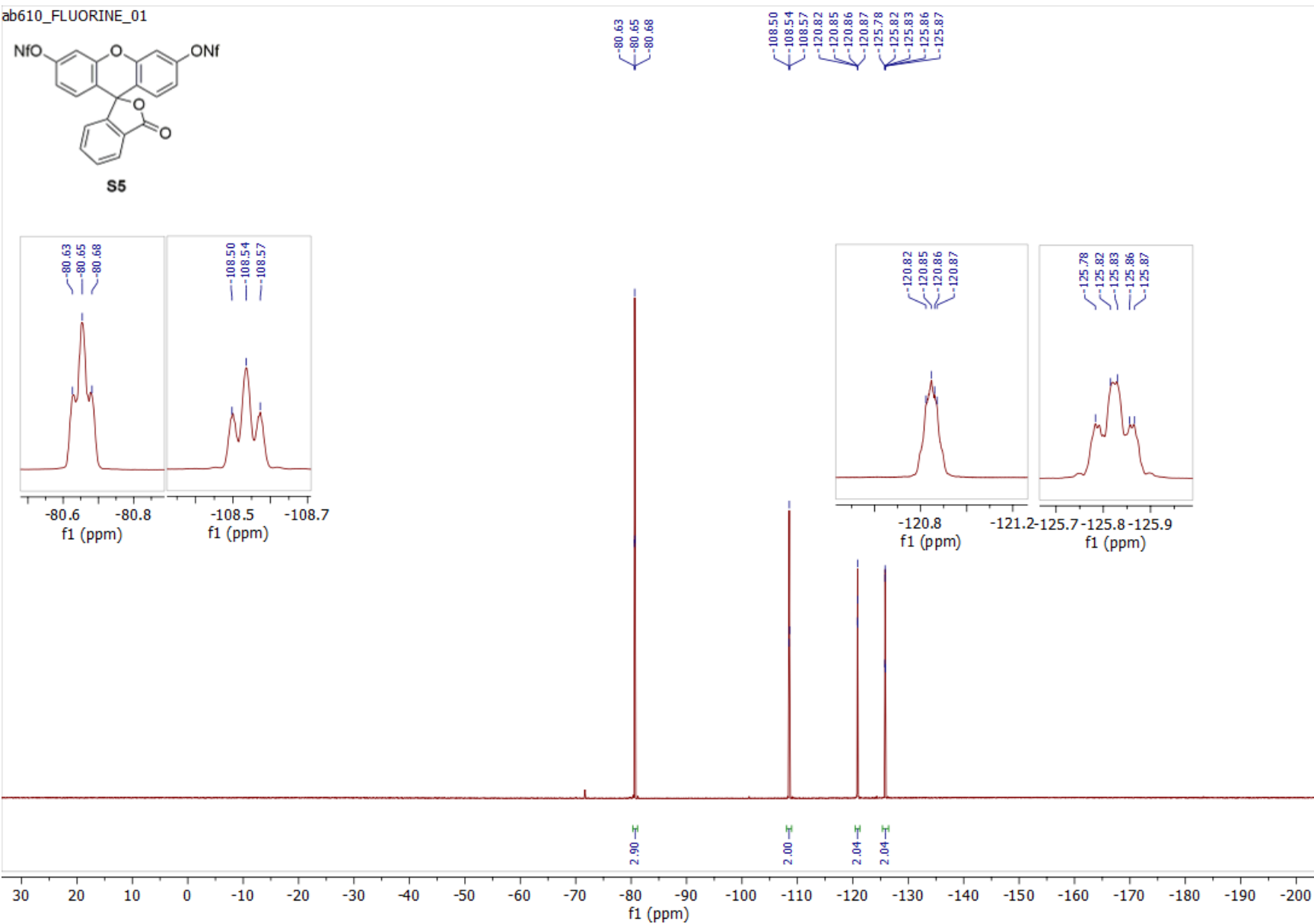
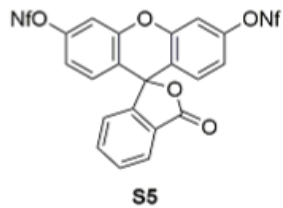


S5

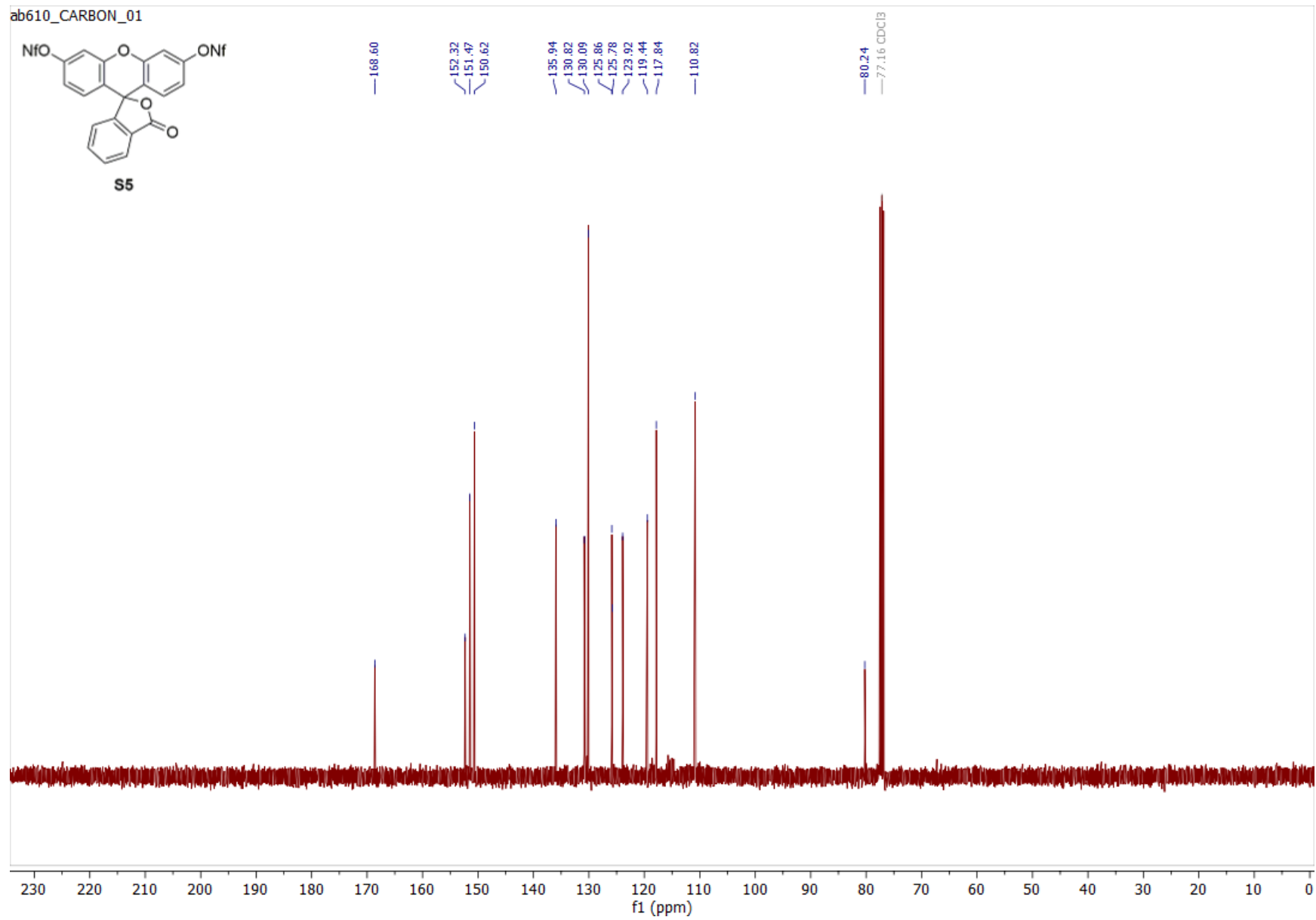
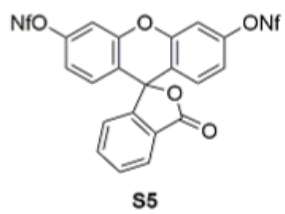
—7.26 CDCl3



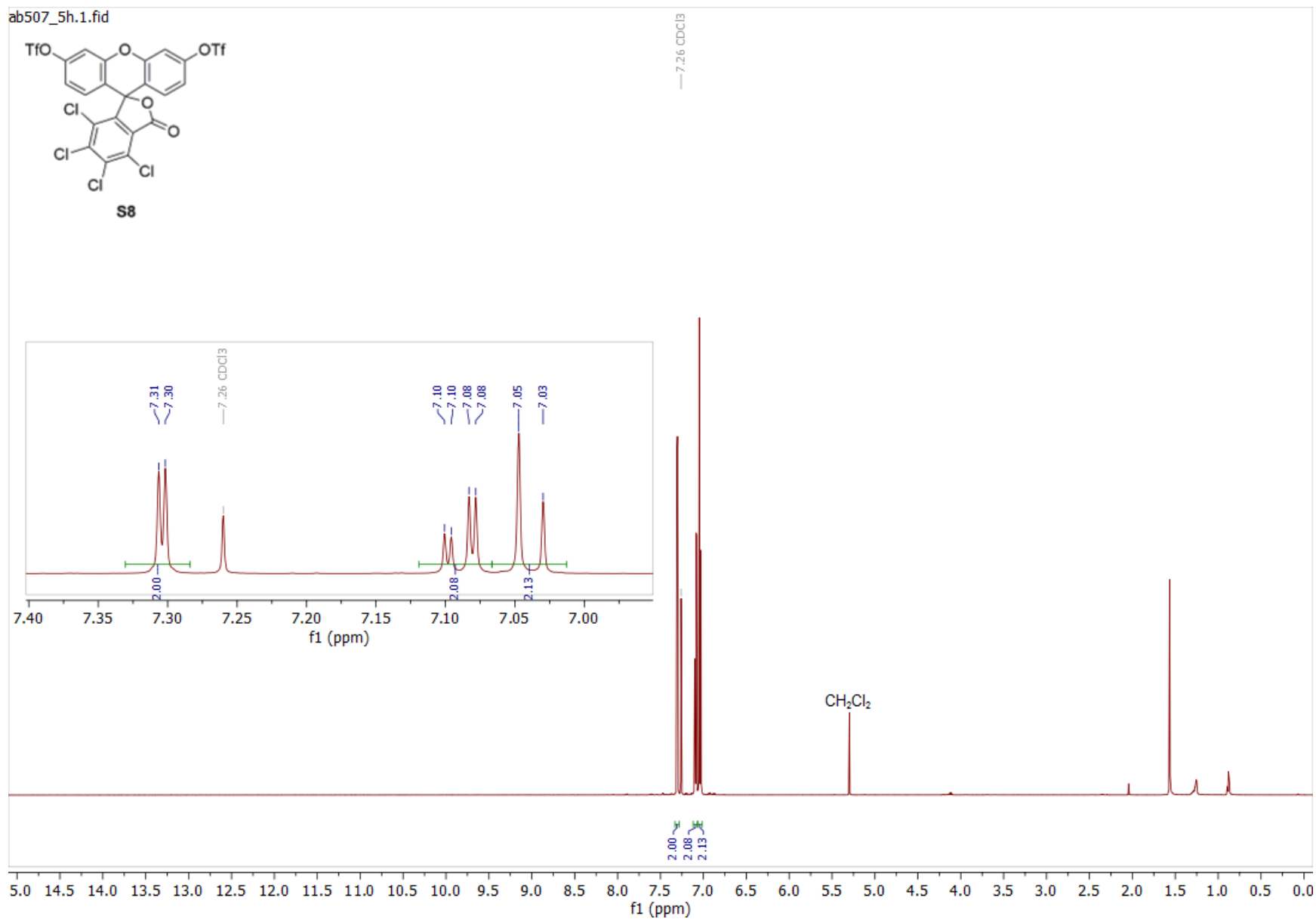
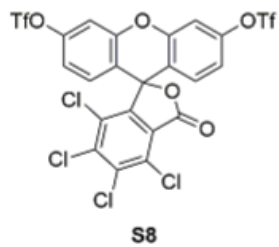
ab610_FLUORINE_01



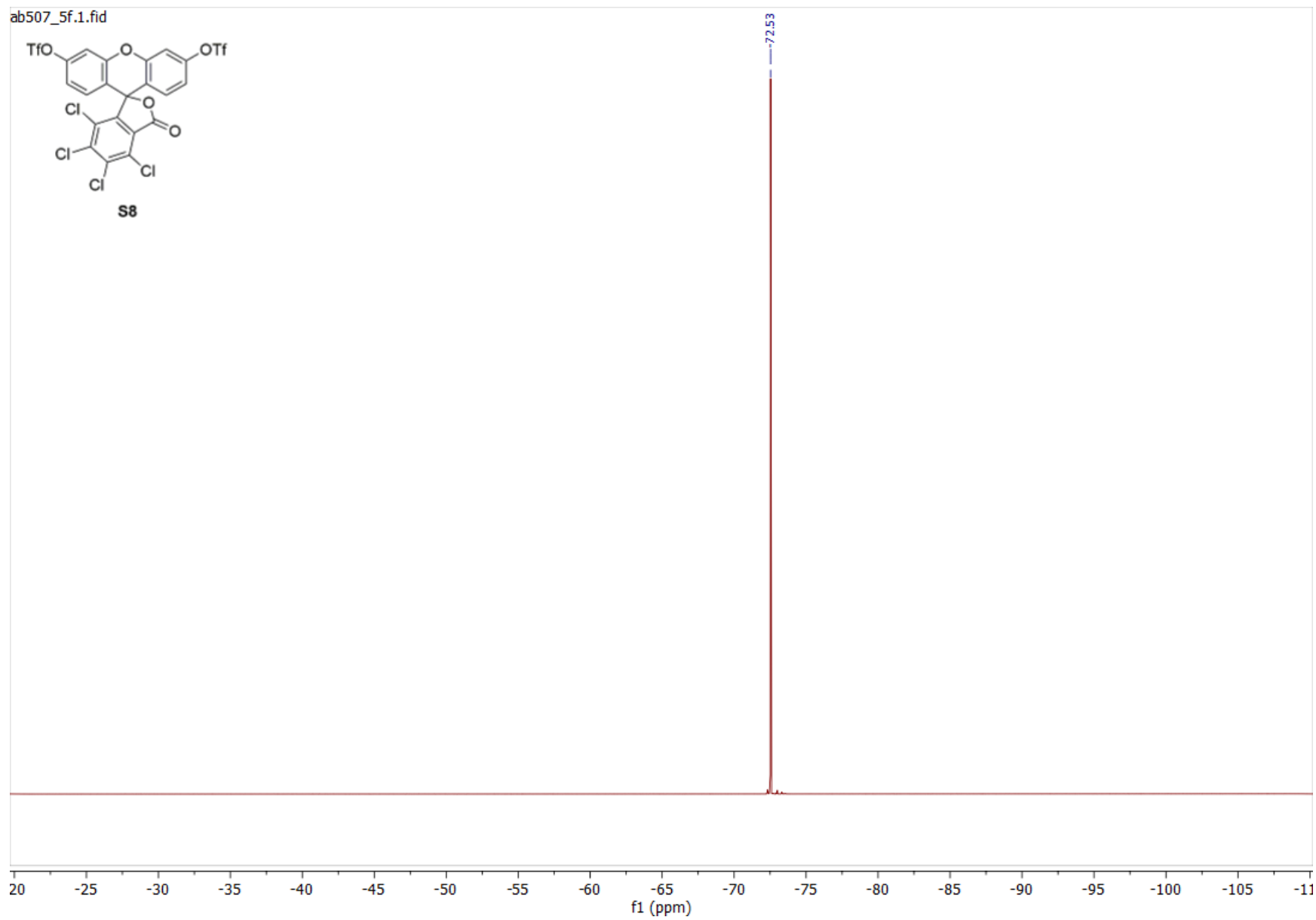
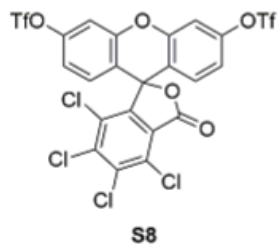
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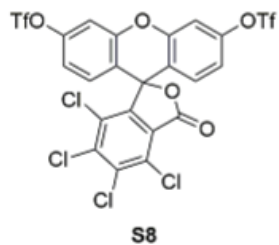
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ab507_5f.1.fid

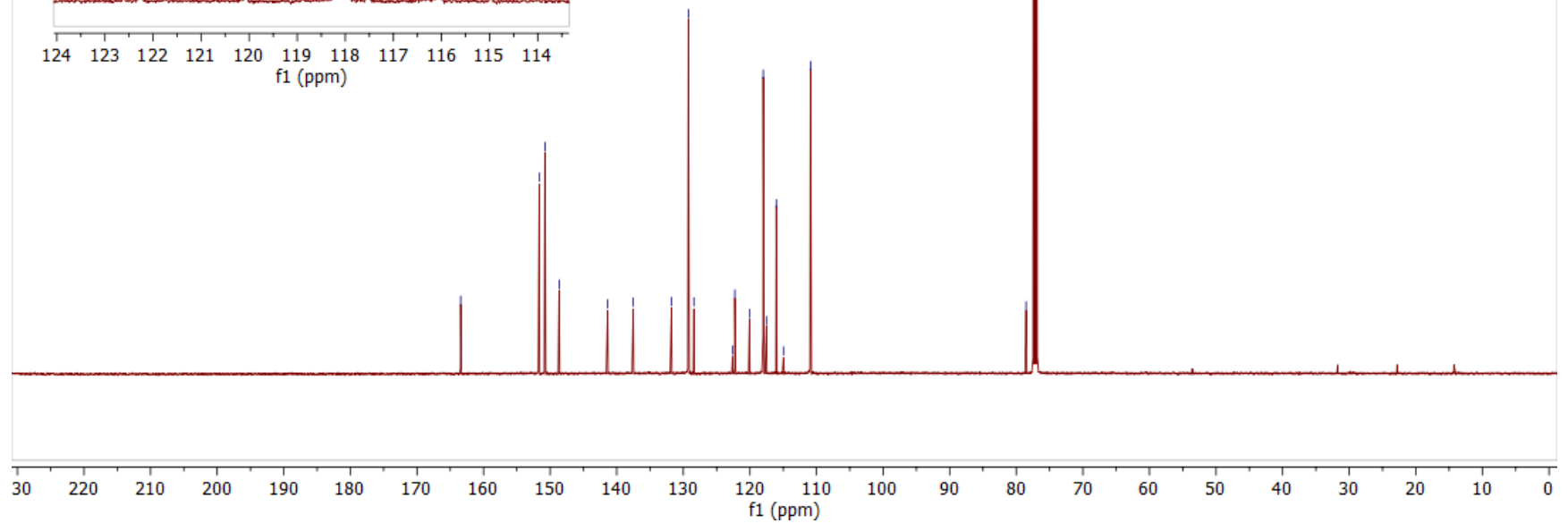
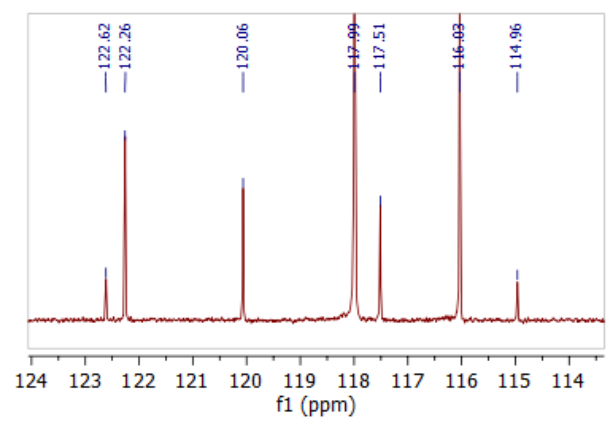


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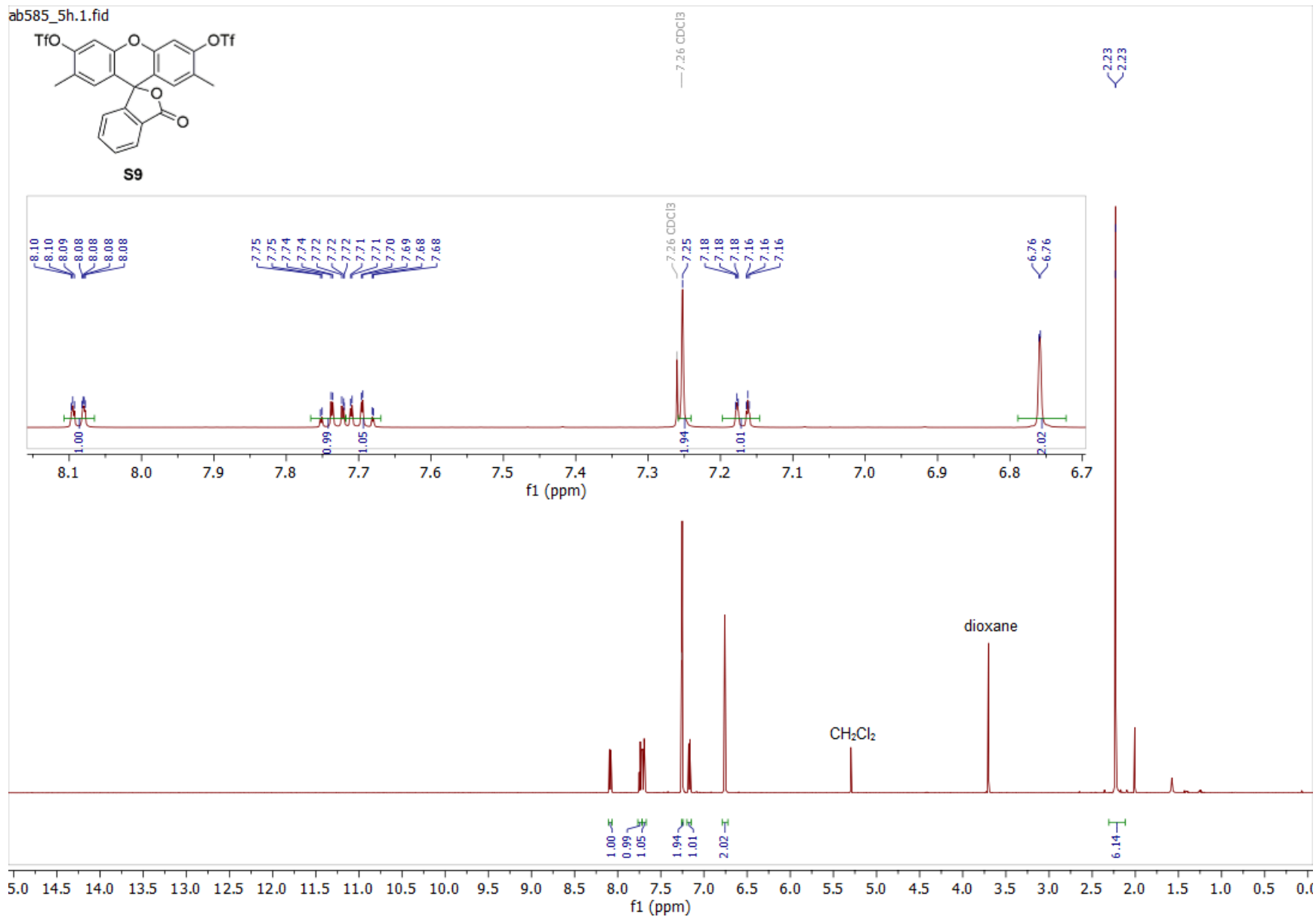
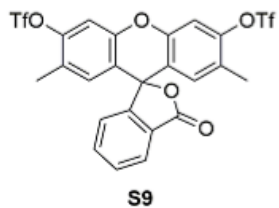


- 163.43
- 151.63
- 150.78
- 148.65
- 141.37
- 137.52
- 131.77
- 129.24
- 128.41
- 122.62
- 122.26
- 120.06
- 117.99
- 117.51
- 116.03
- 114.96
- 110.90

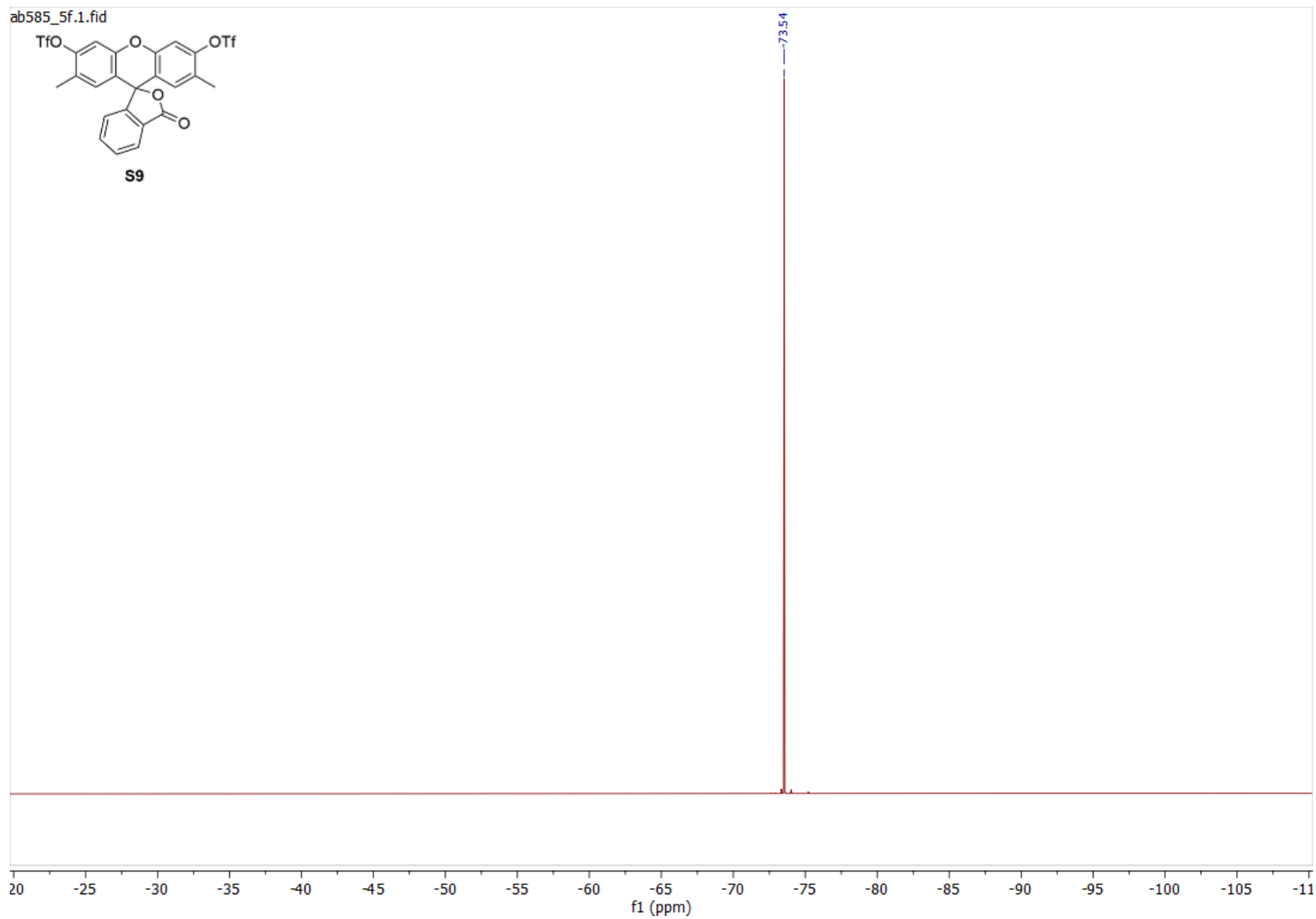
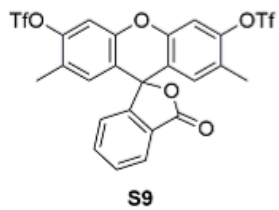
- 78.52
- 77.16 CDCl3



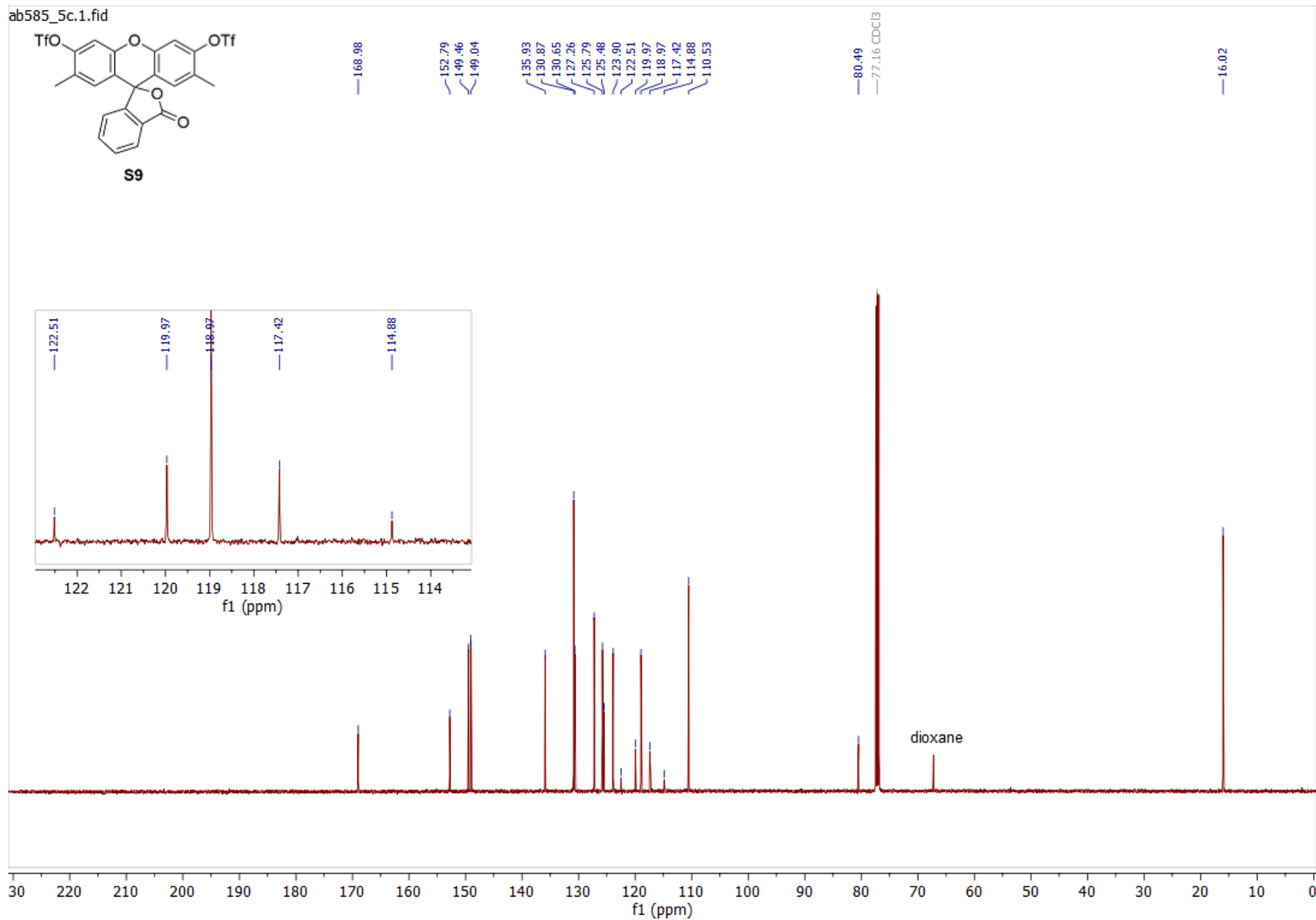
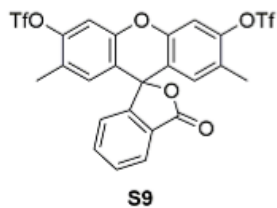
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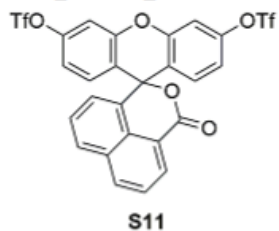
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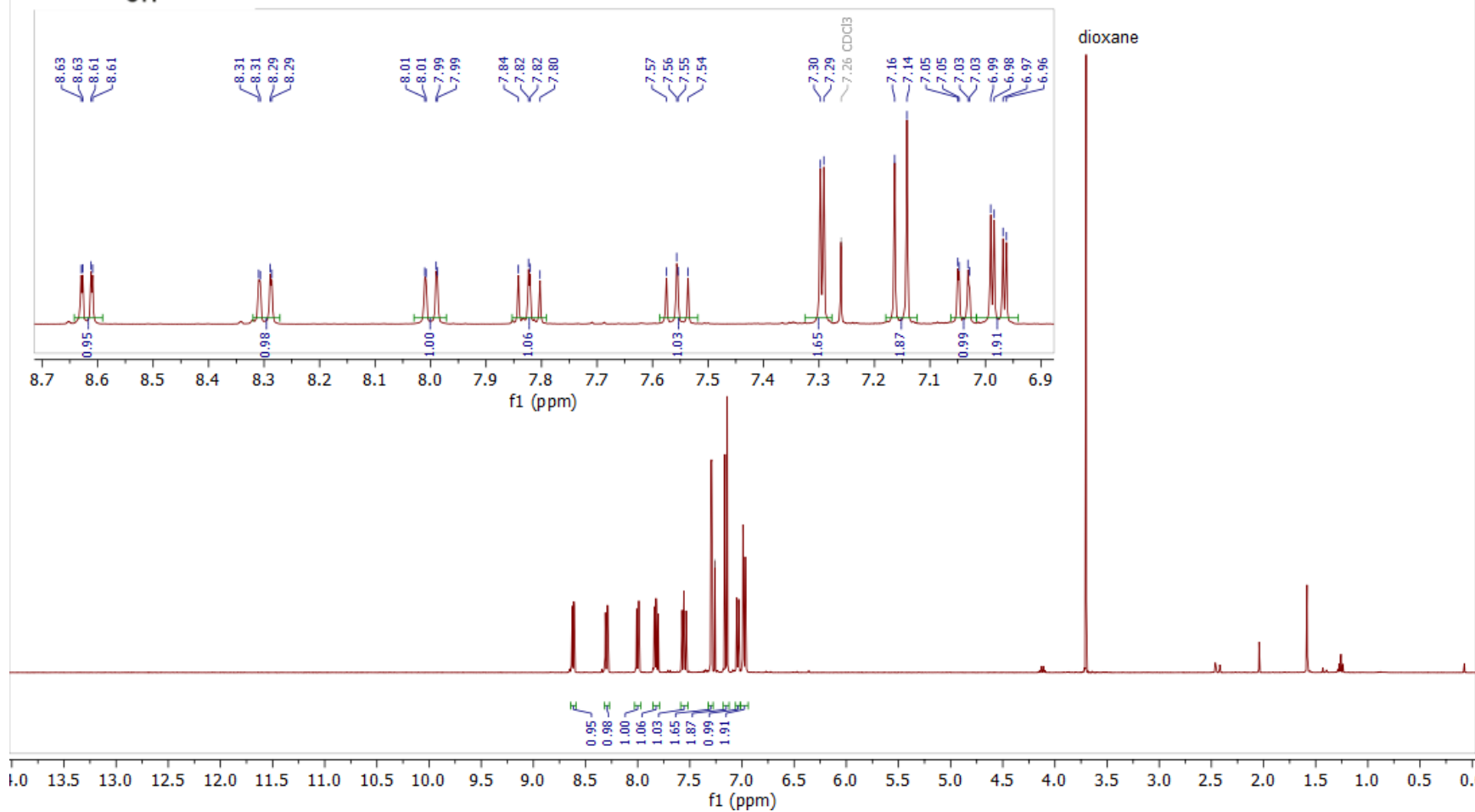
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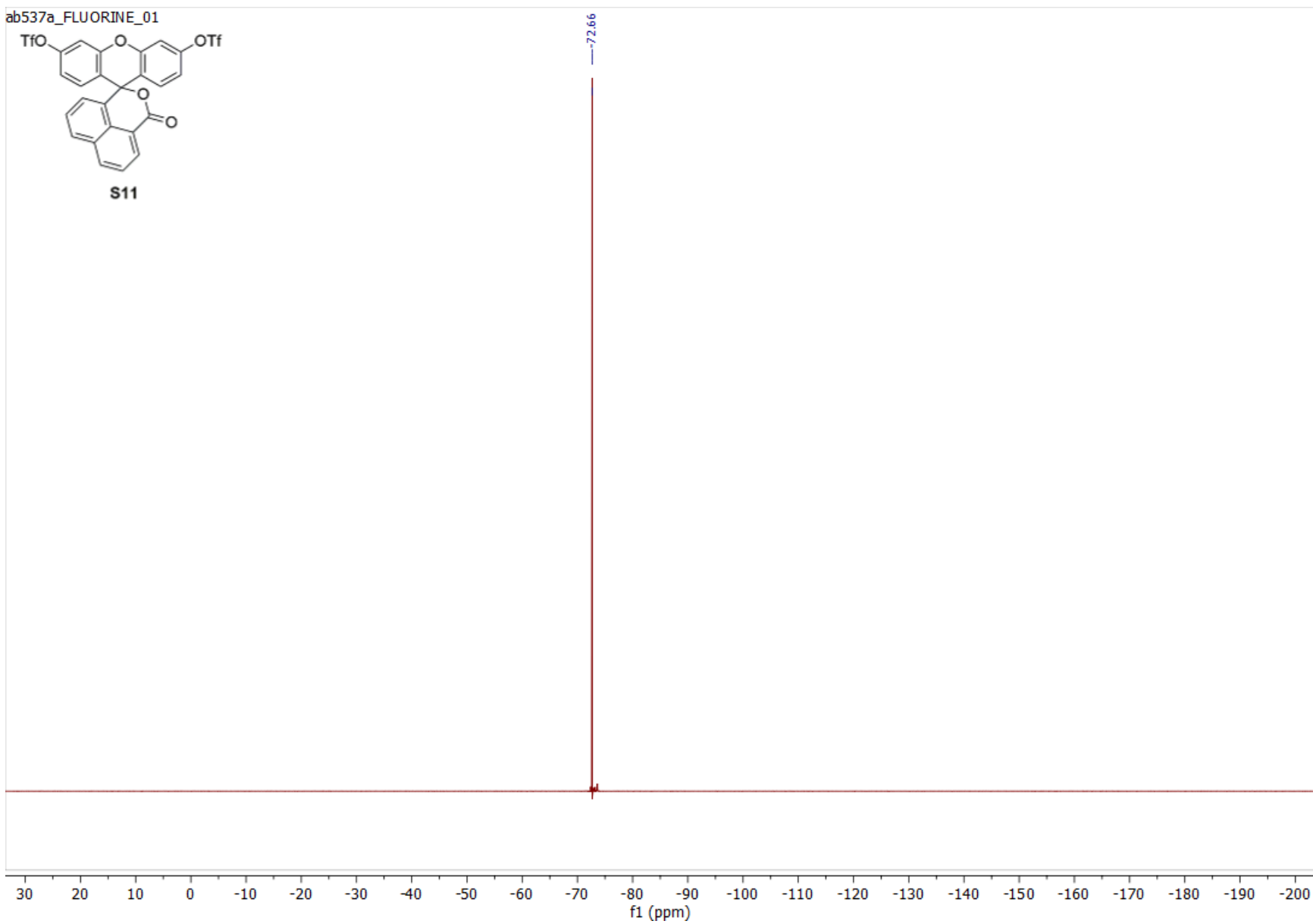
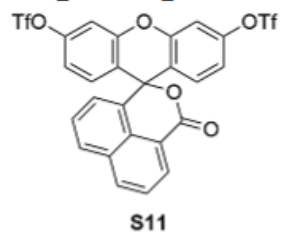
ab537a_PROTON_01



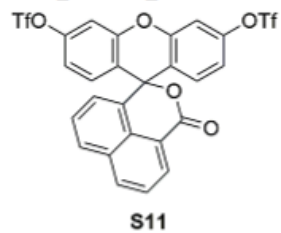
—7.26 CDCl₃



ab537a_FLUORINE_01

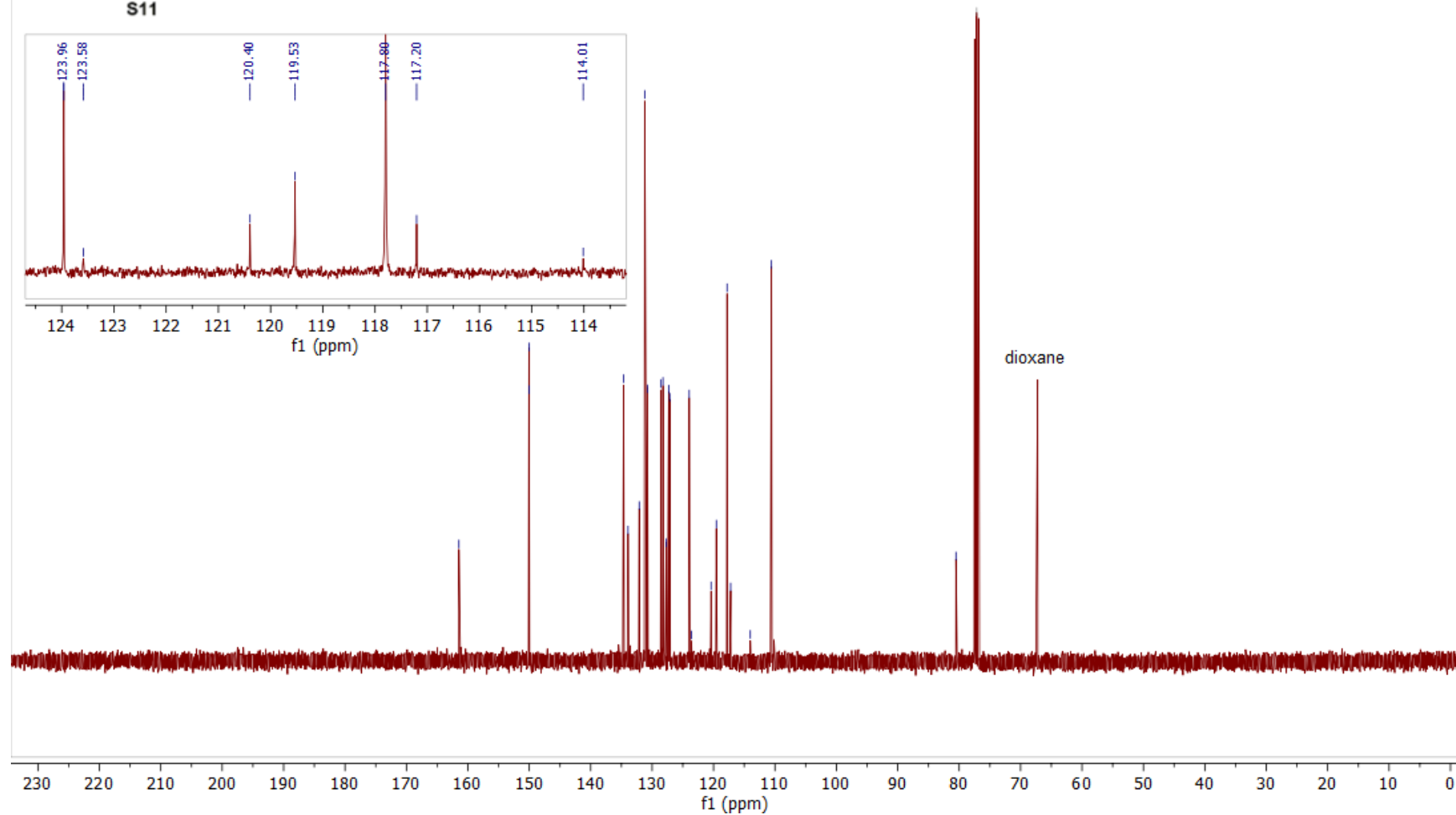
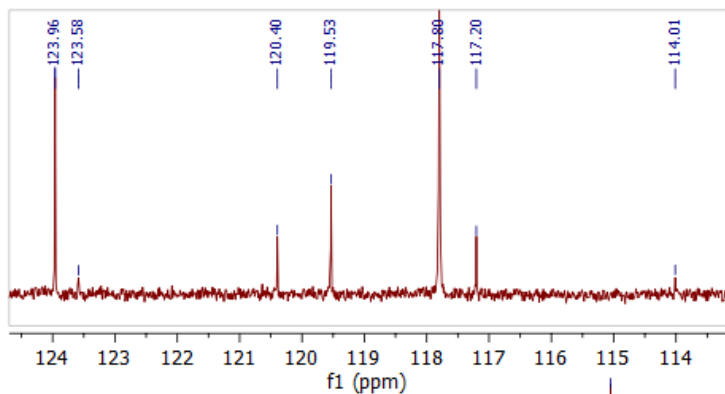


ab537a_CARBON_01

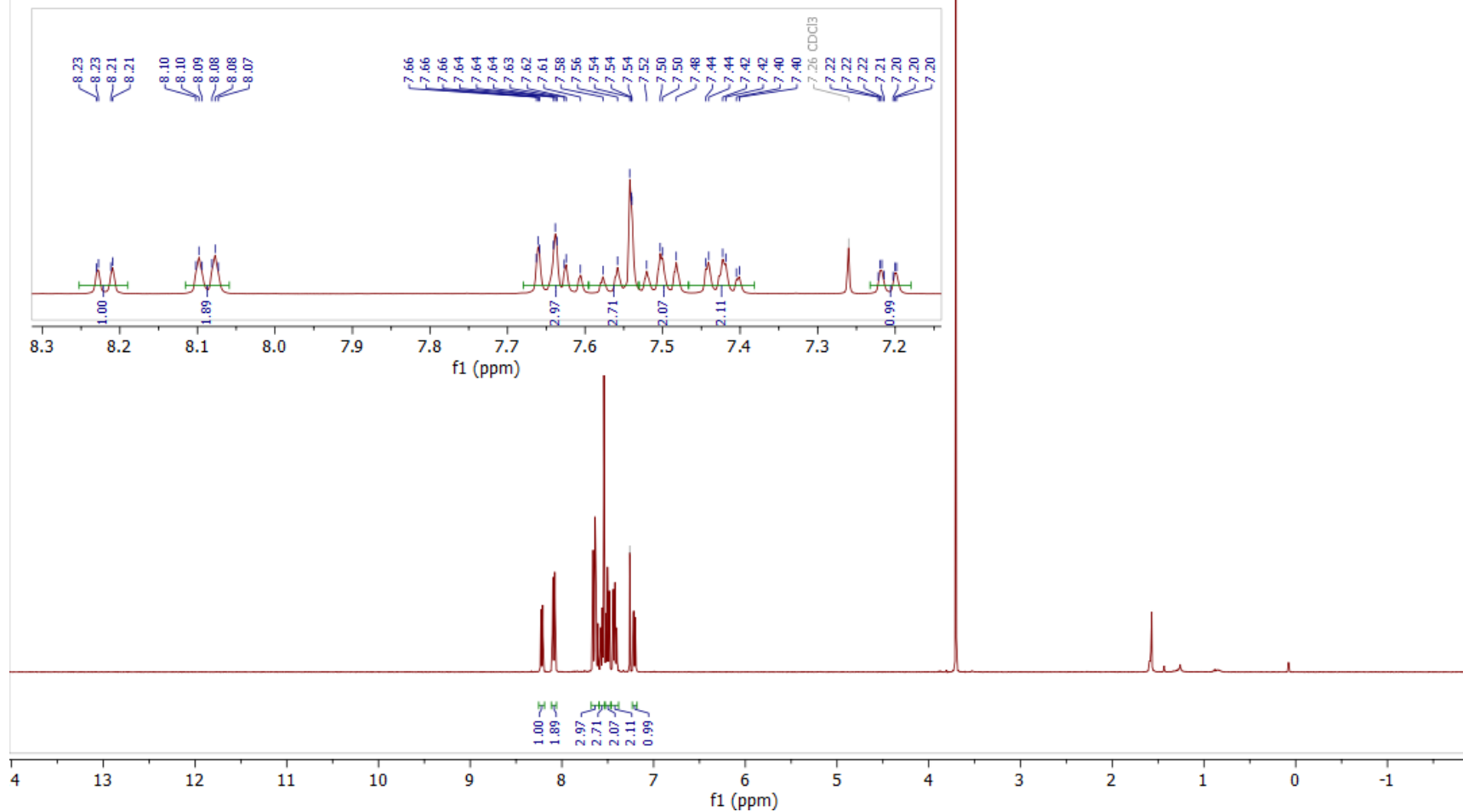
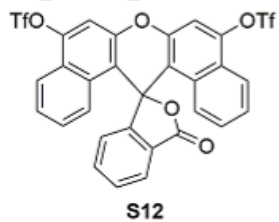


161.45
150.04
150.01
134.64
133.92
132.09
131.19
130.76
128.54
128.22
127.71
127.29
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123.96
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120.40
119.53
117.80
117.20
114.01

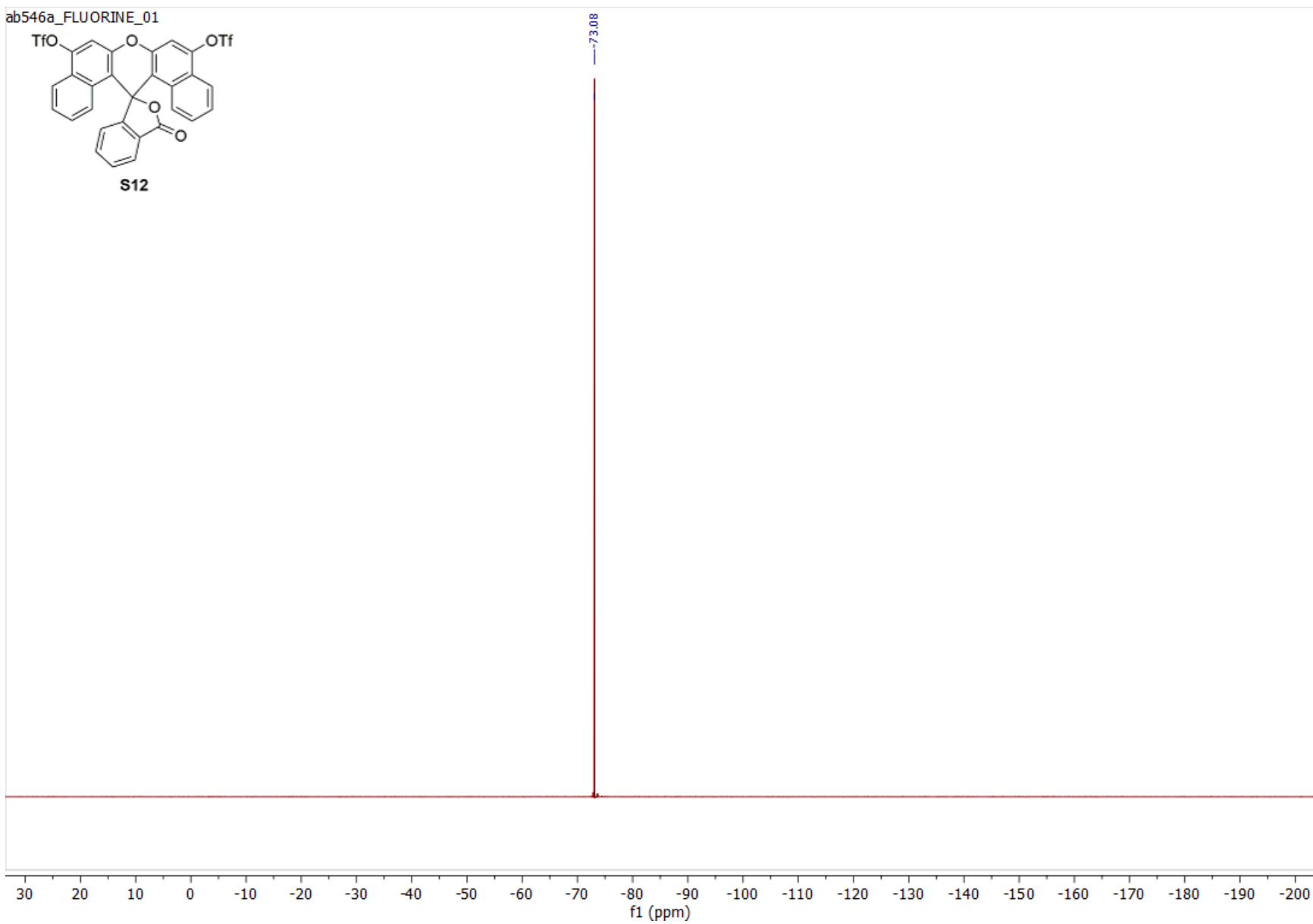
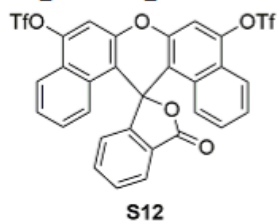
80.53
77.16 CDCl₃



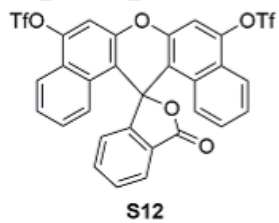
ab546a_PROTON_01



ab546a_FLUORINE_01



ab546a_CARBON_01



— 170.87

— 153.92

— 147.57

— 147.47

— 136.13

— 132.06

— 130.76

— 129.48

— 127.96

— 126.26

— 125.00

— 124.96

— 124.32

— 124.12

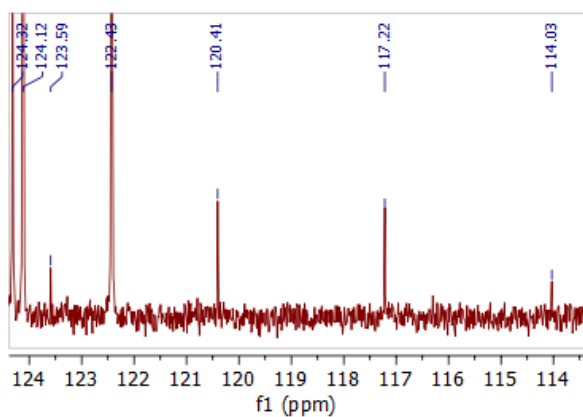
— 122.43

— 111.17

— 109.90

— 84.74

— 77.16 CDCl₃

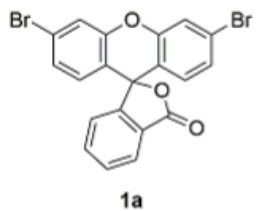


dioxane

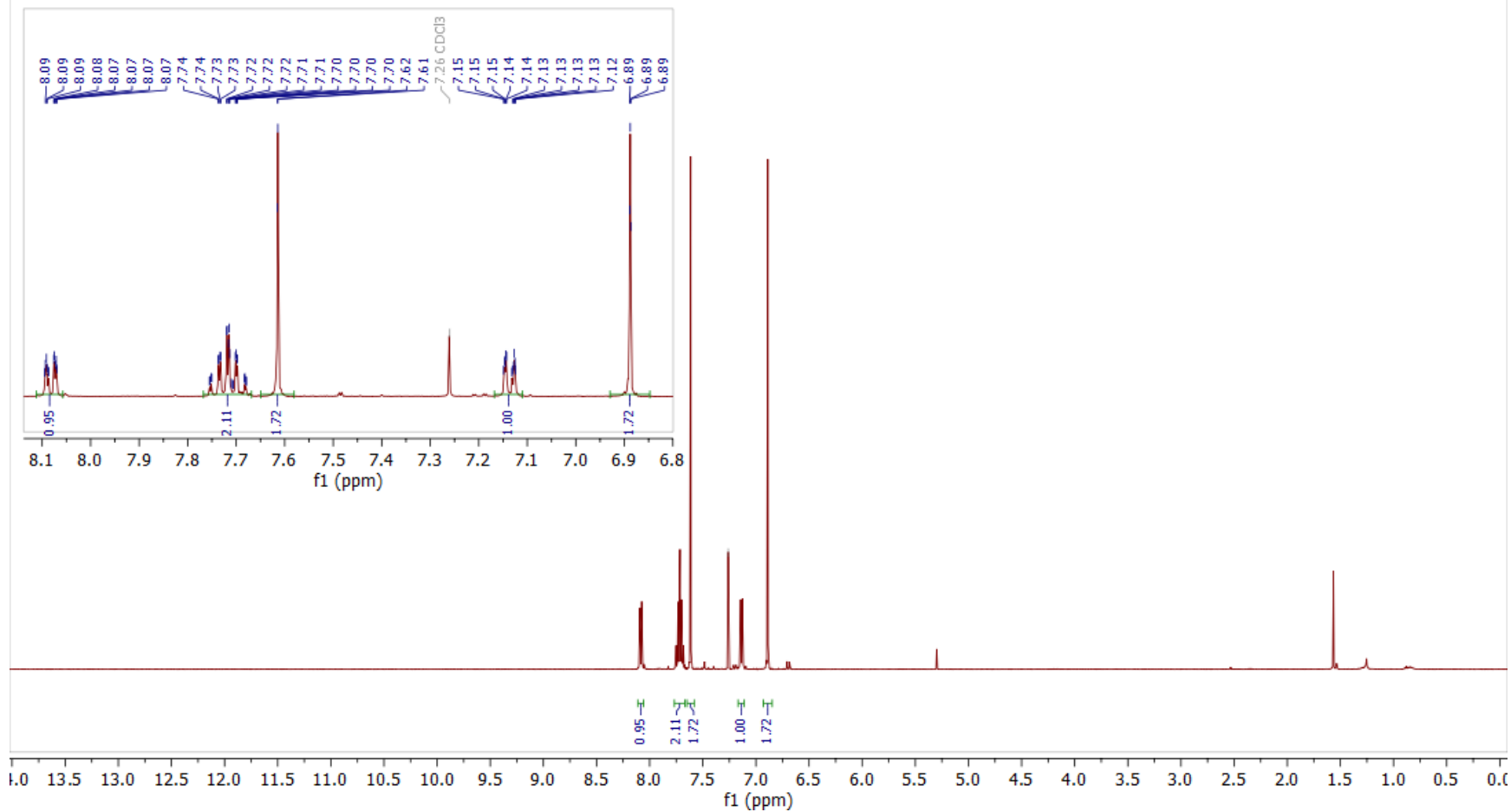
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f1 (ppm)

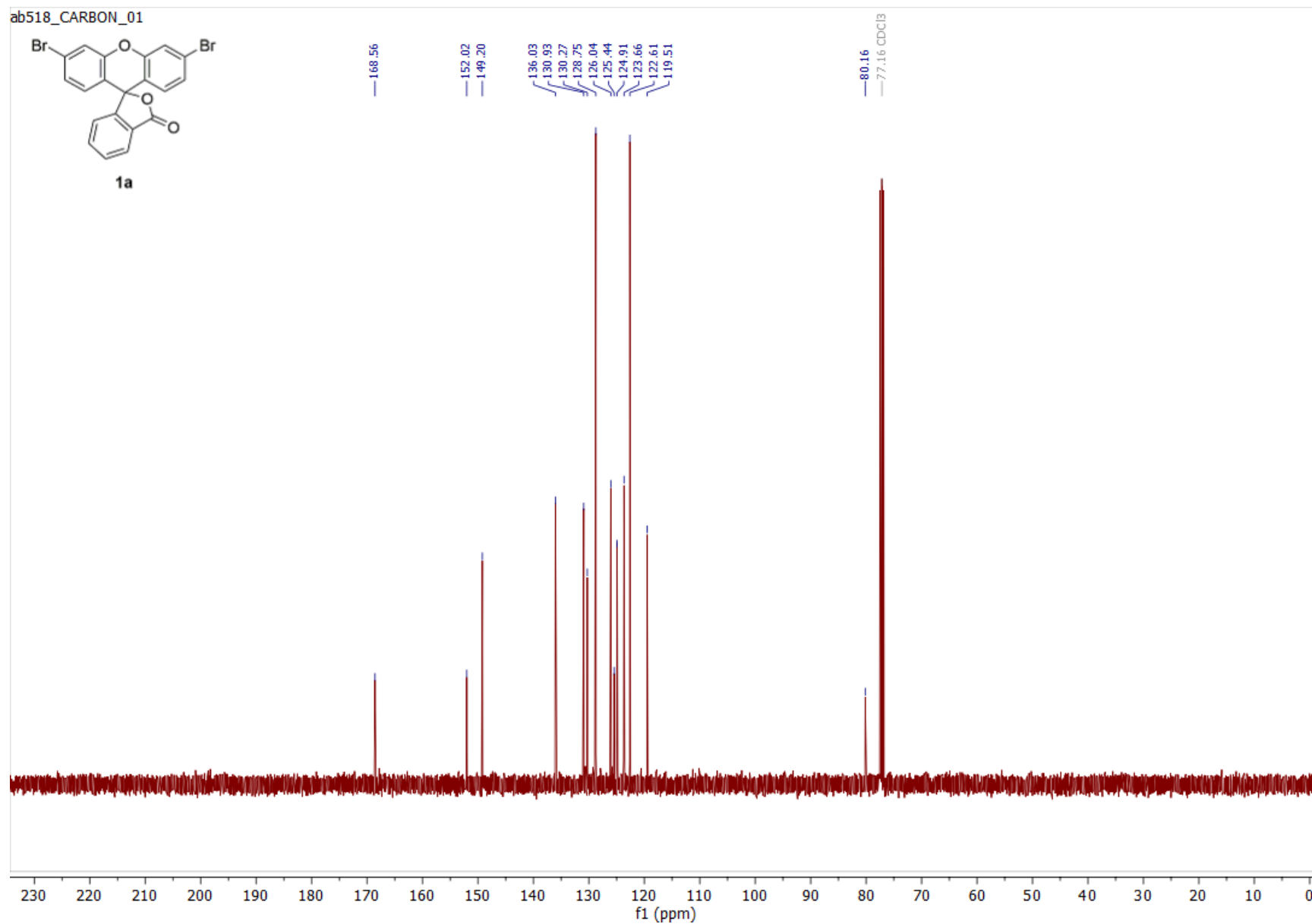
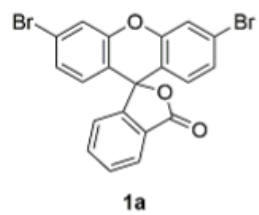
ab518_PROTON_01



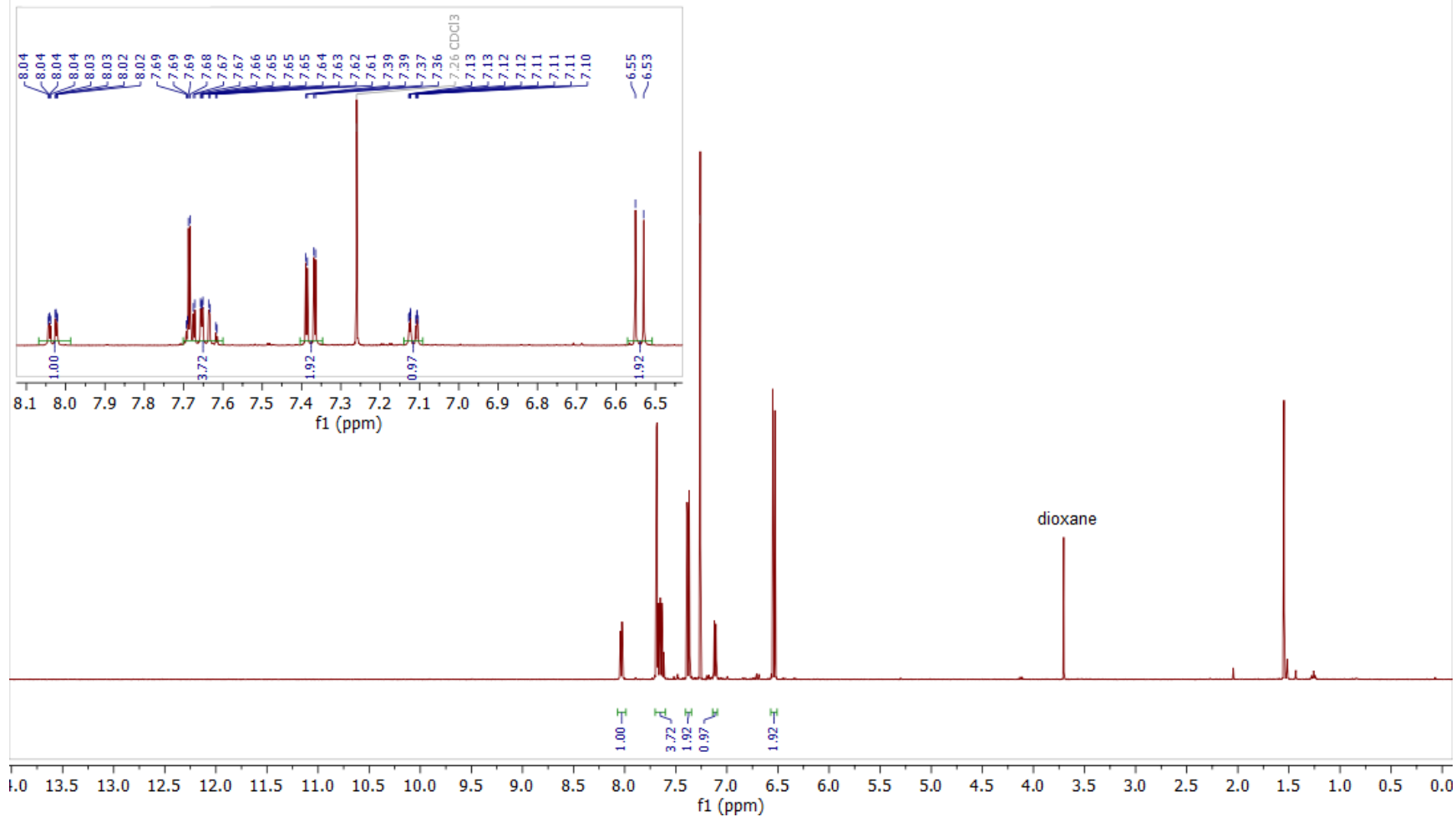
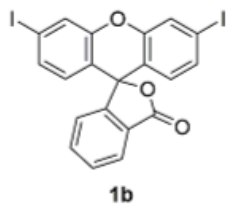
—7.26 CDCl₃



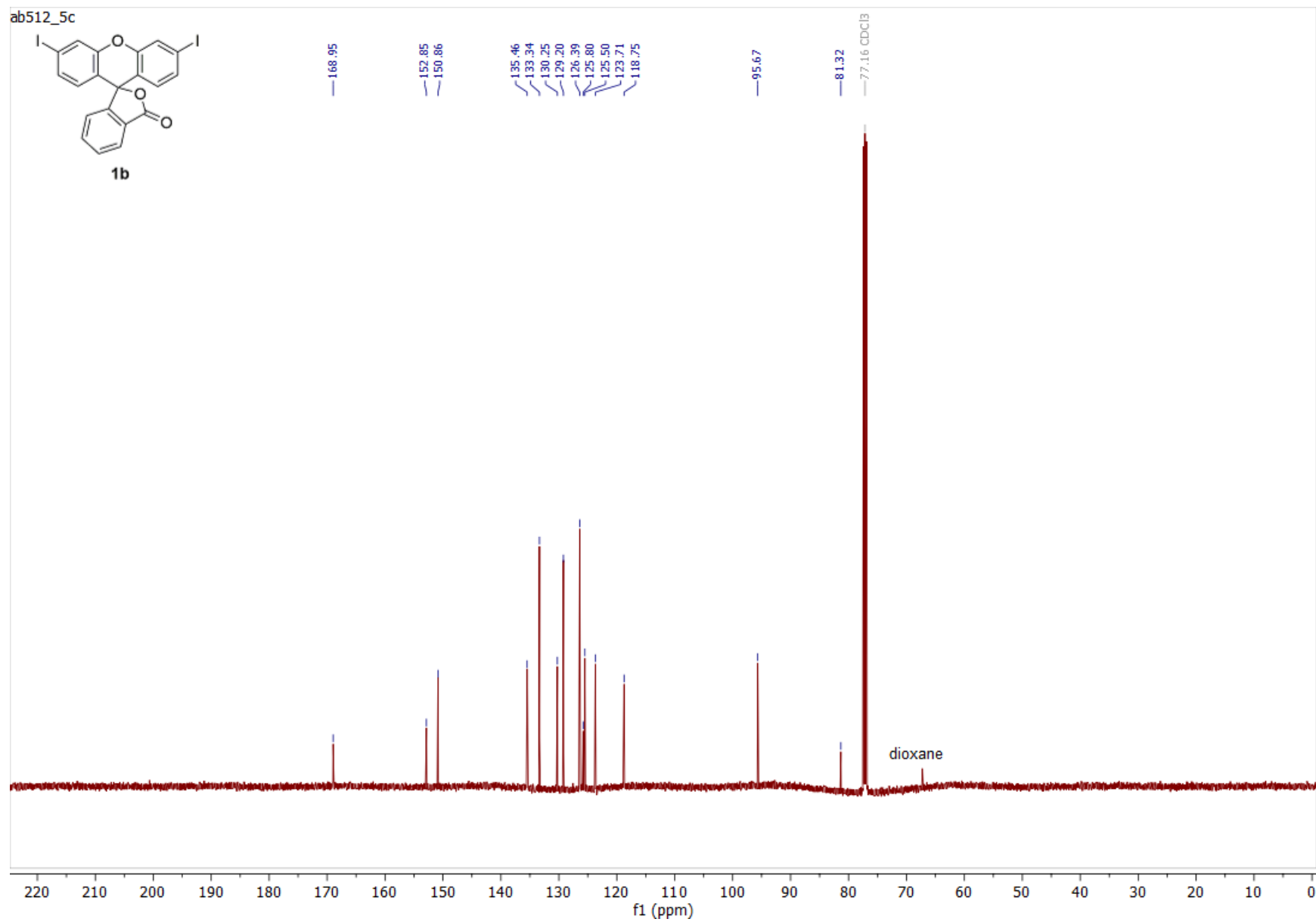
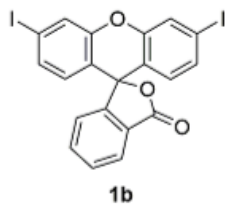
ab518_CARBON_01



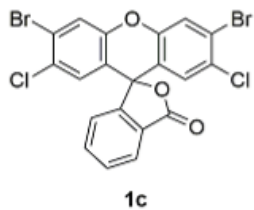
ab512_PROTON_01



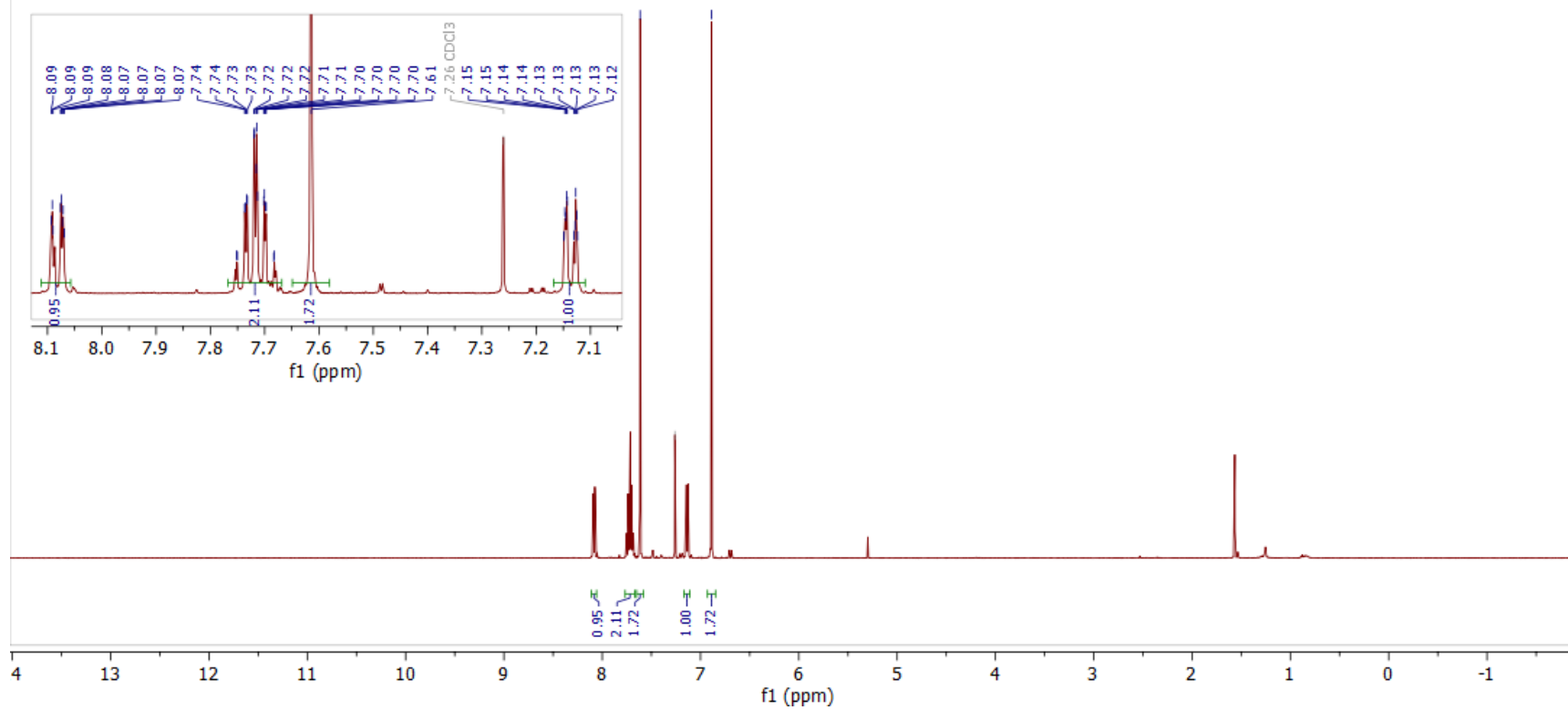
ab512_5c



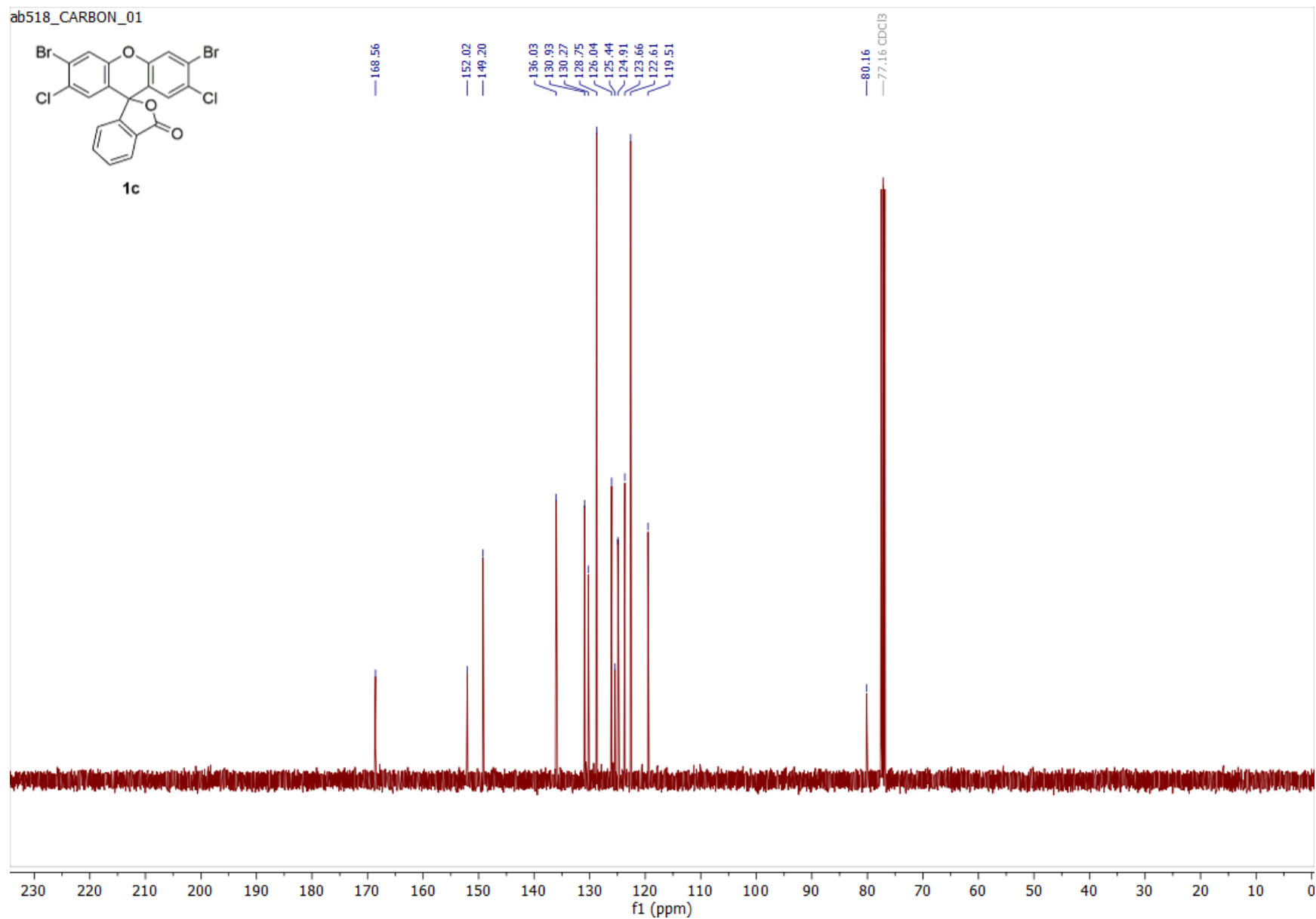
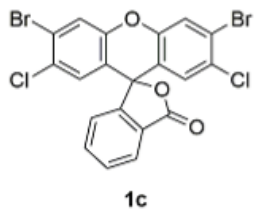
ab518_PROTON_01



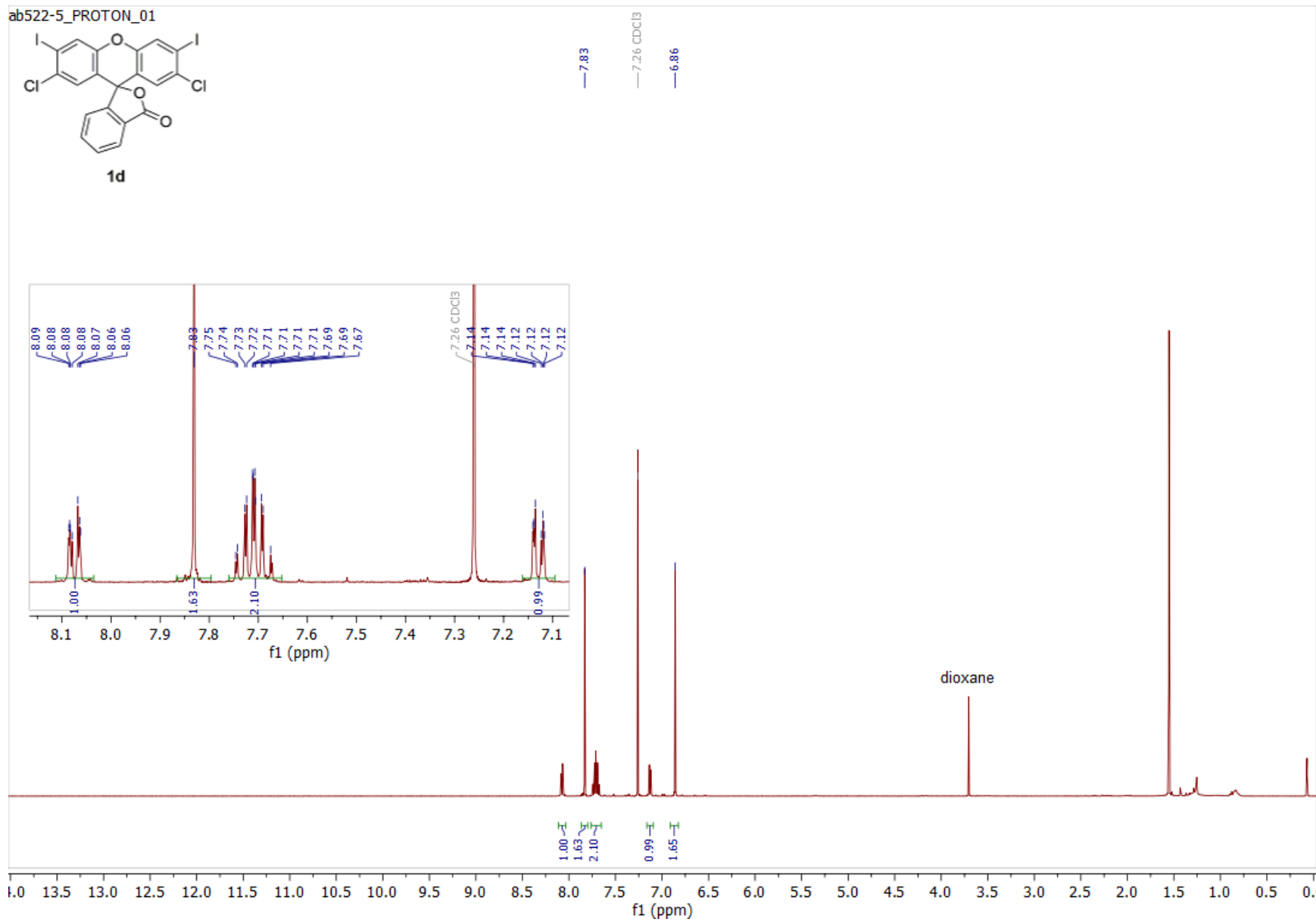
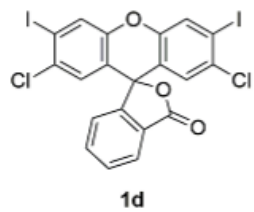
—7.61
—7.26 CDCl₃
—6.89



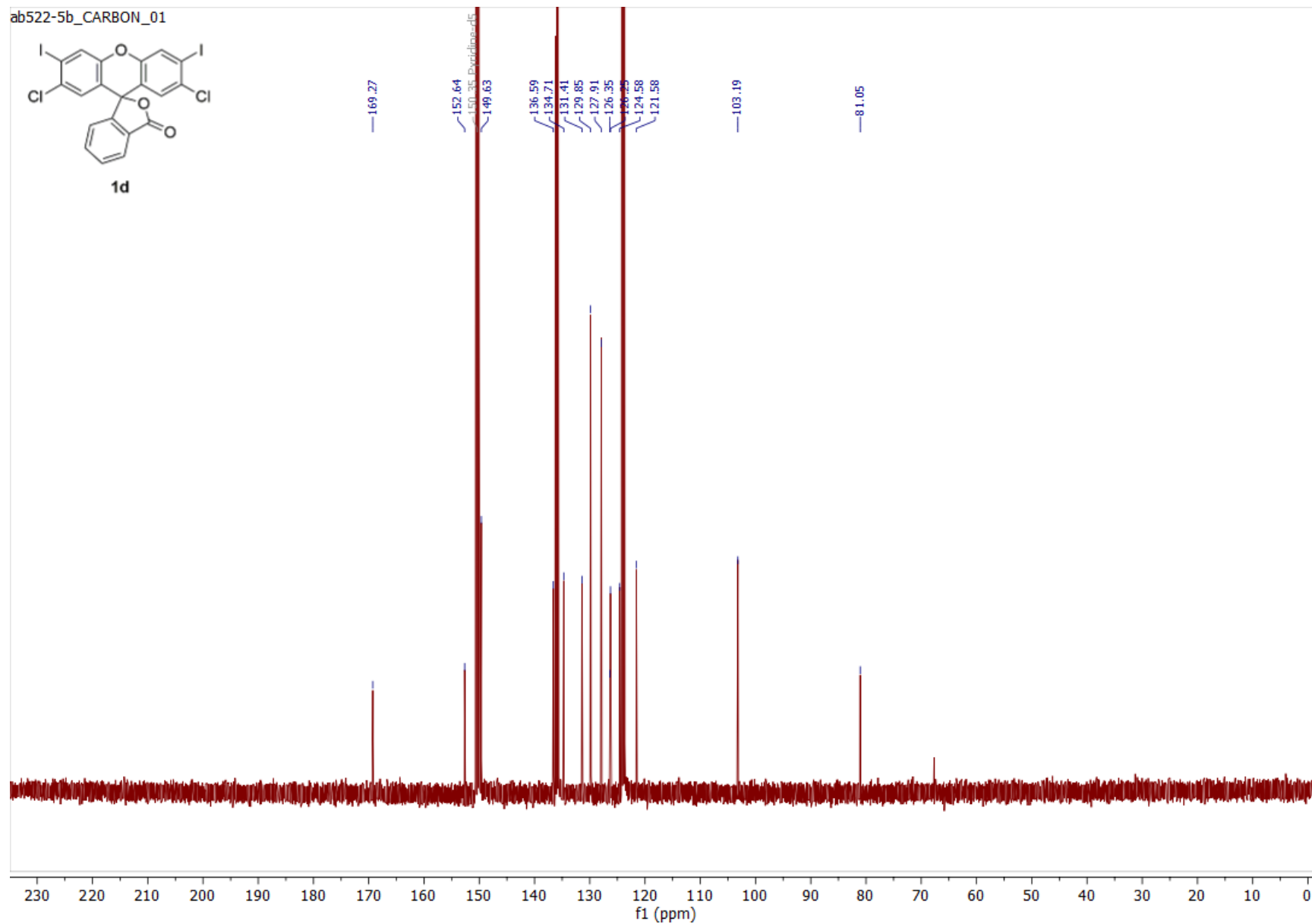
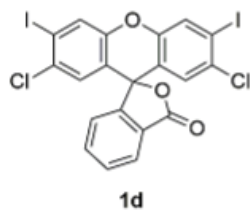
ab518_CARBON_01



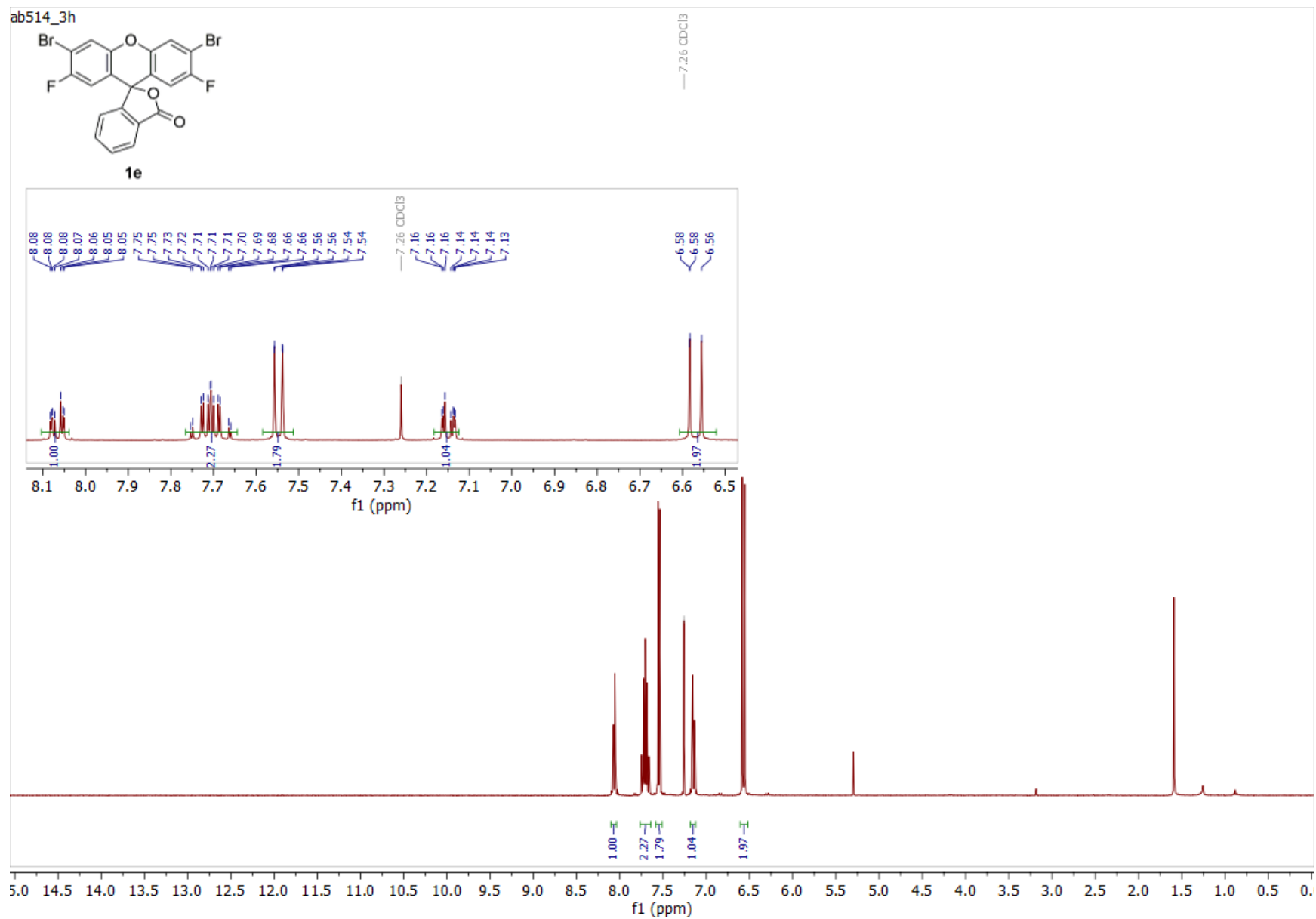
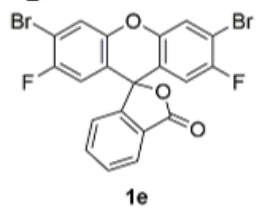
ab522-5_PROTON_01



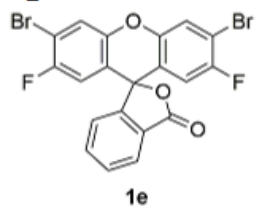
ab522-5b_CARBON_01



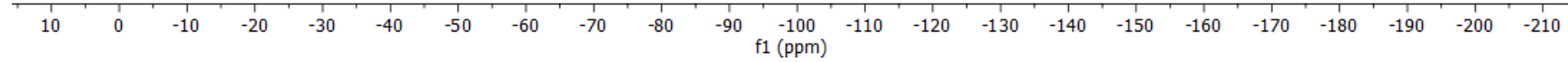
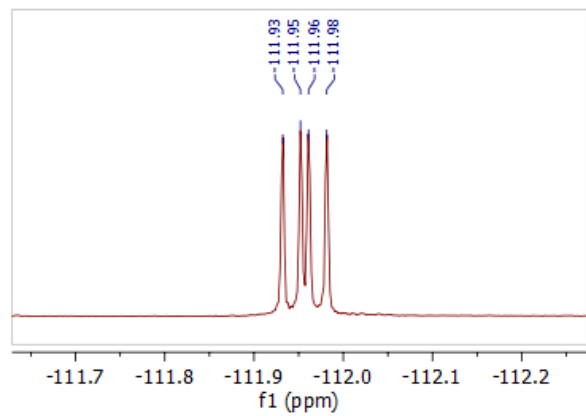
ab514_3h



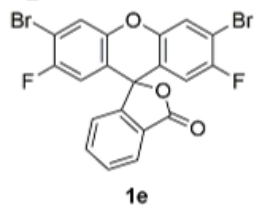
ab514_3f



-111.93
-111.95
-111.96
-111.98



ab514_5c



168.31

156.44

154.49

151.92

147.08

147.06

135.82

130.81

125.90

125.48

123.59

122.29

118.82

118.77

114.35

114.15

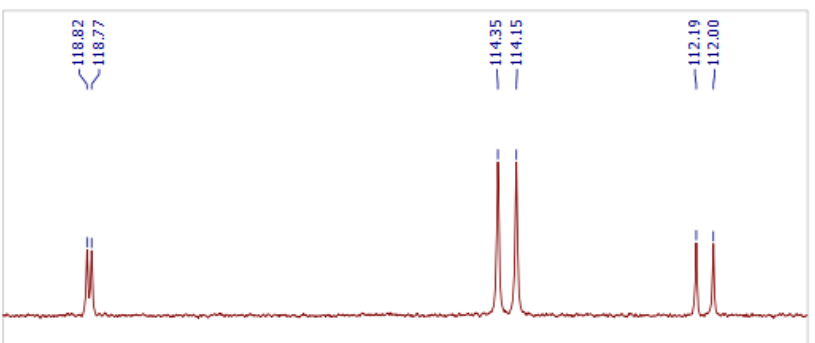
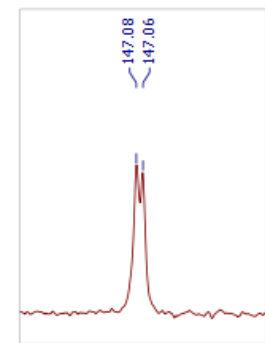
114.15

112.19

112.00

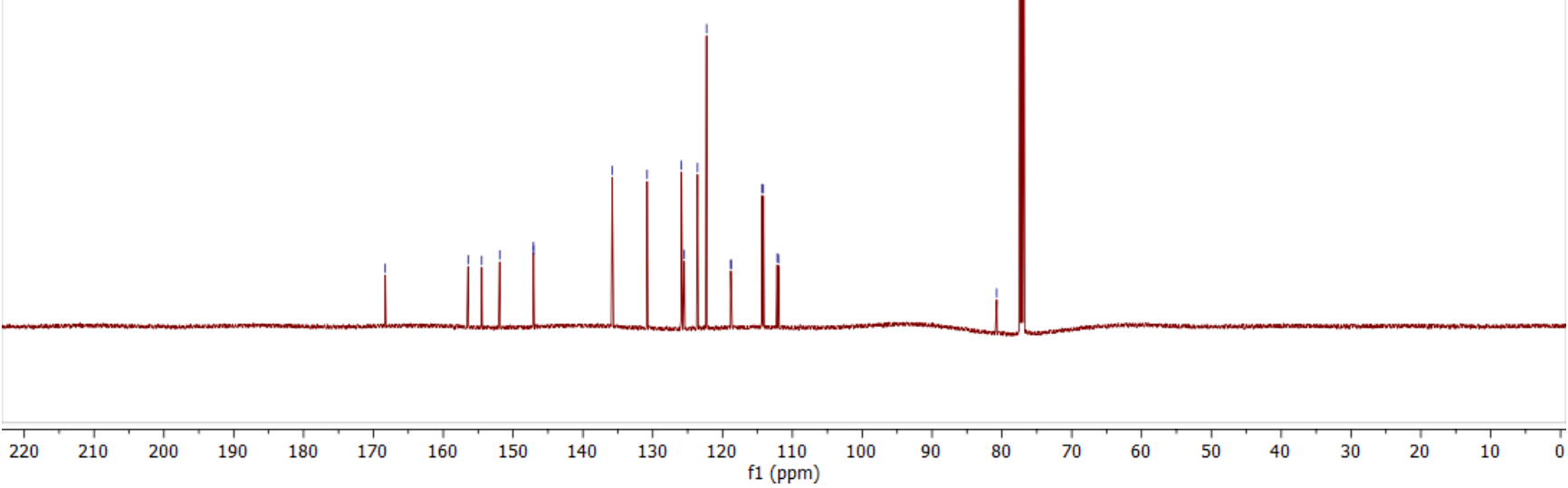
80.75

77.16 CDCl₃

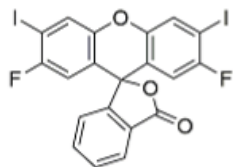


147.4 147.2 147.0 146.8
f1 (ppm)

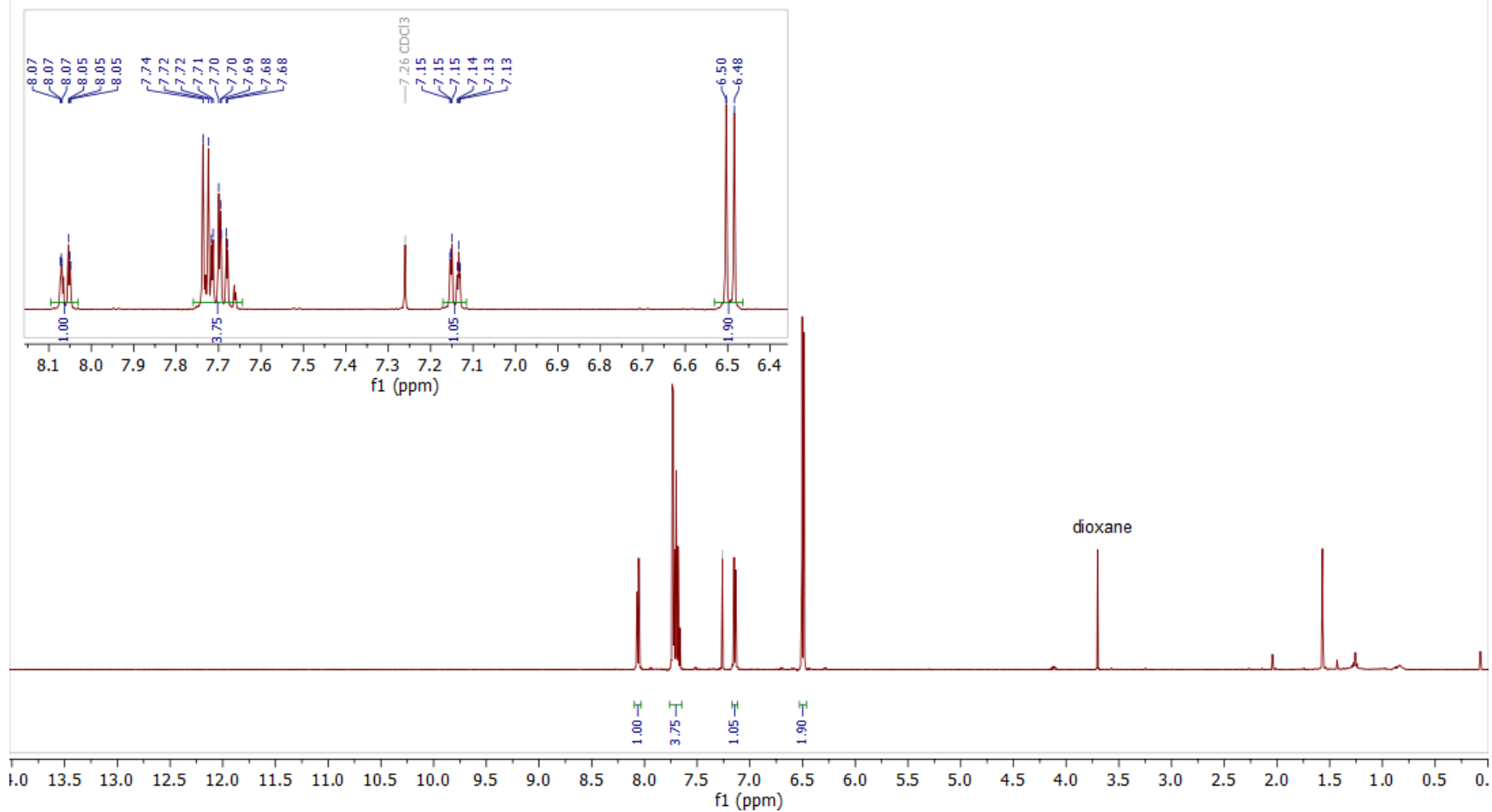
119 118 117 116 115 114 113 112 111
f1 (ppm)



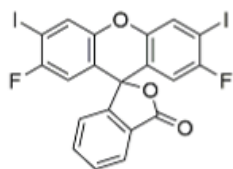
ab543_PROTON_01



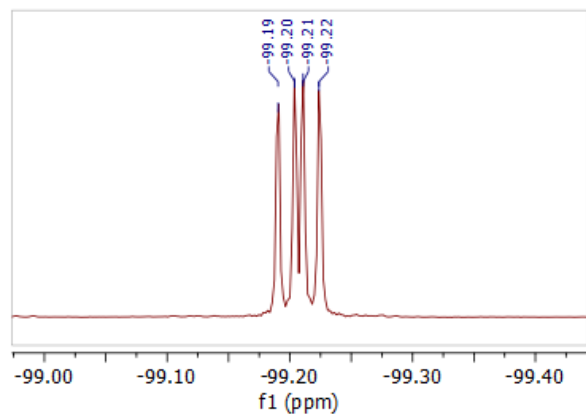
1f



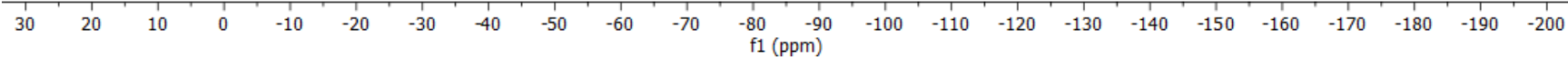
ab543_FLUORINE_01



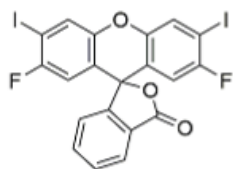
1f



99.19
99.20
99.21
99.22

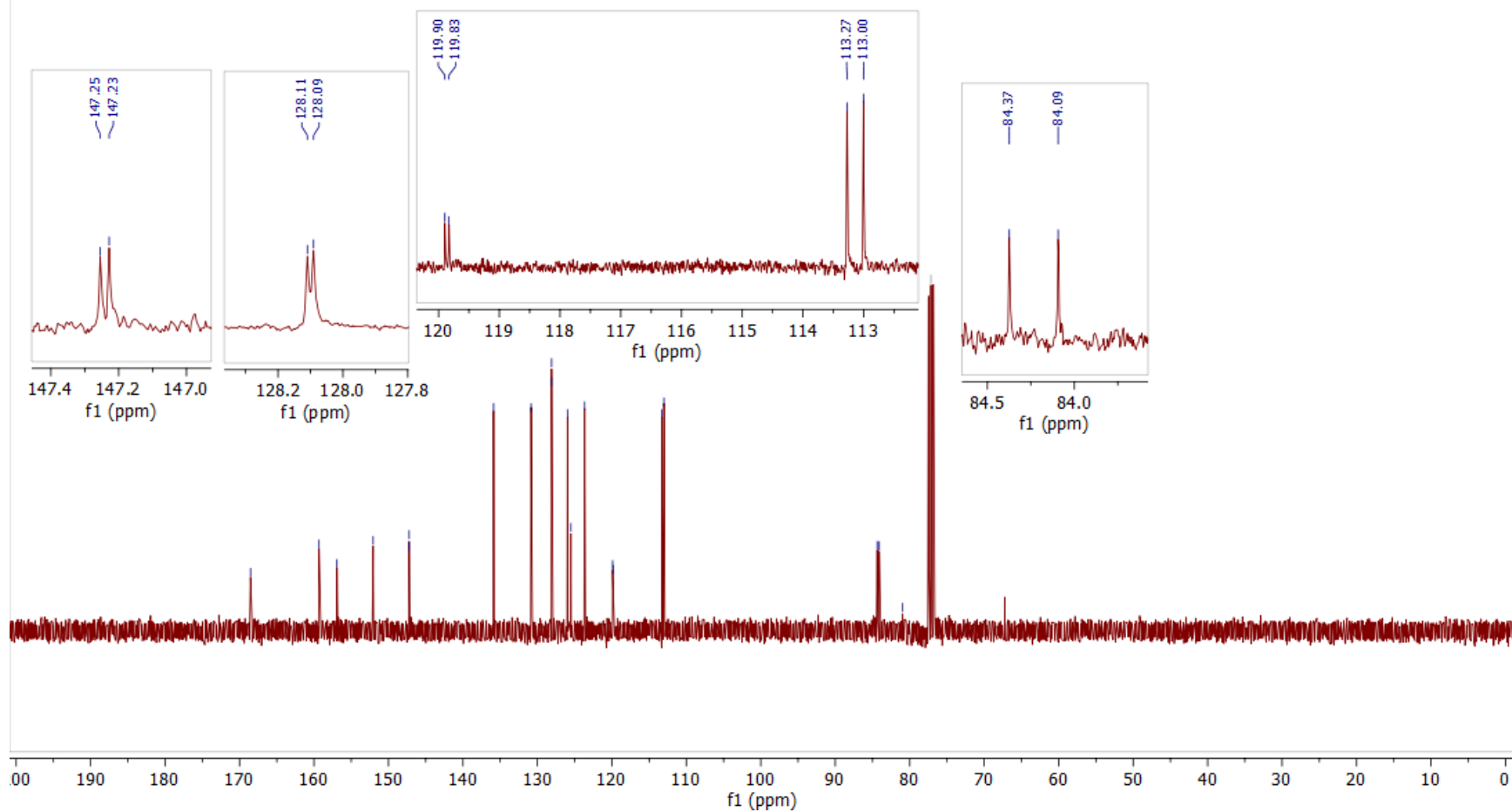


ab543_CARBON_01

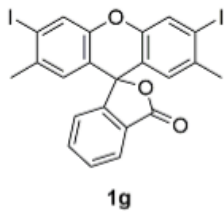


1f

168.52
159.33
156.91
152.06
147.25
147.23
135.88
130.85
128.11
128.09
125.96
125.51
123.65
119.90
119.83
113.27
113.00
84.37
84.09
80.95
77.16 CDCl₃

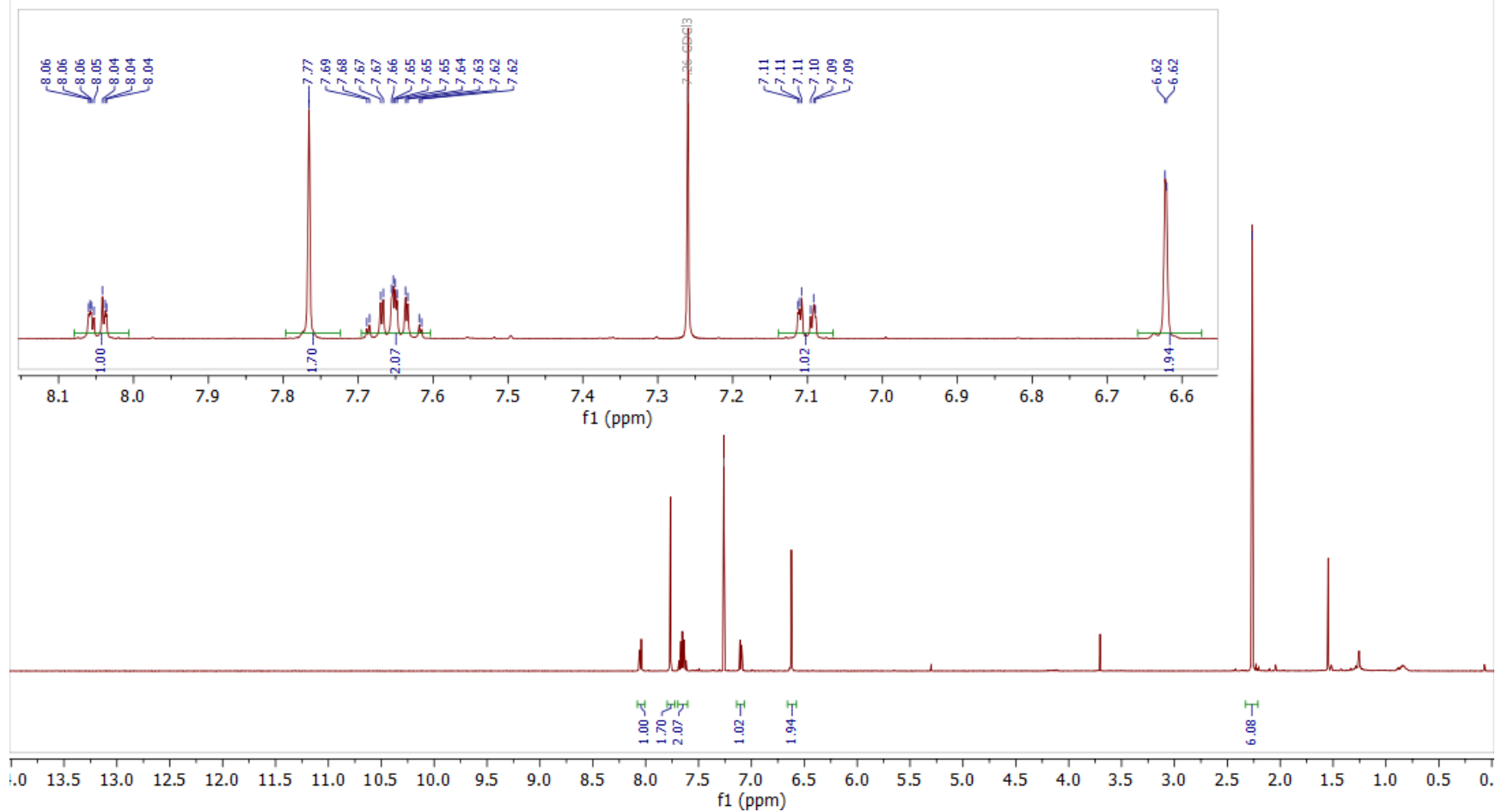


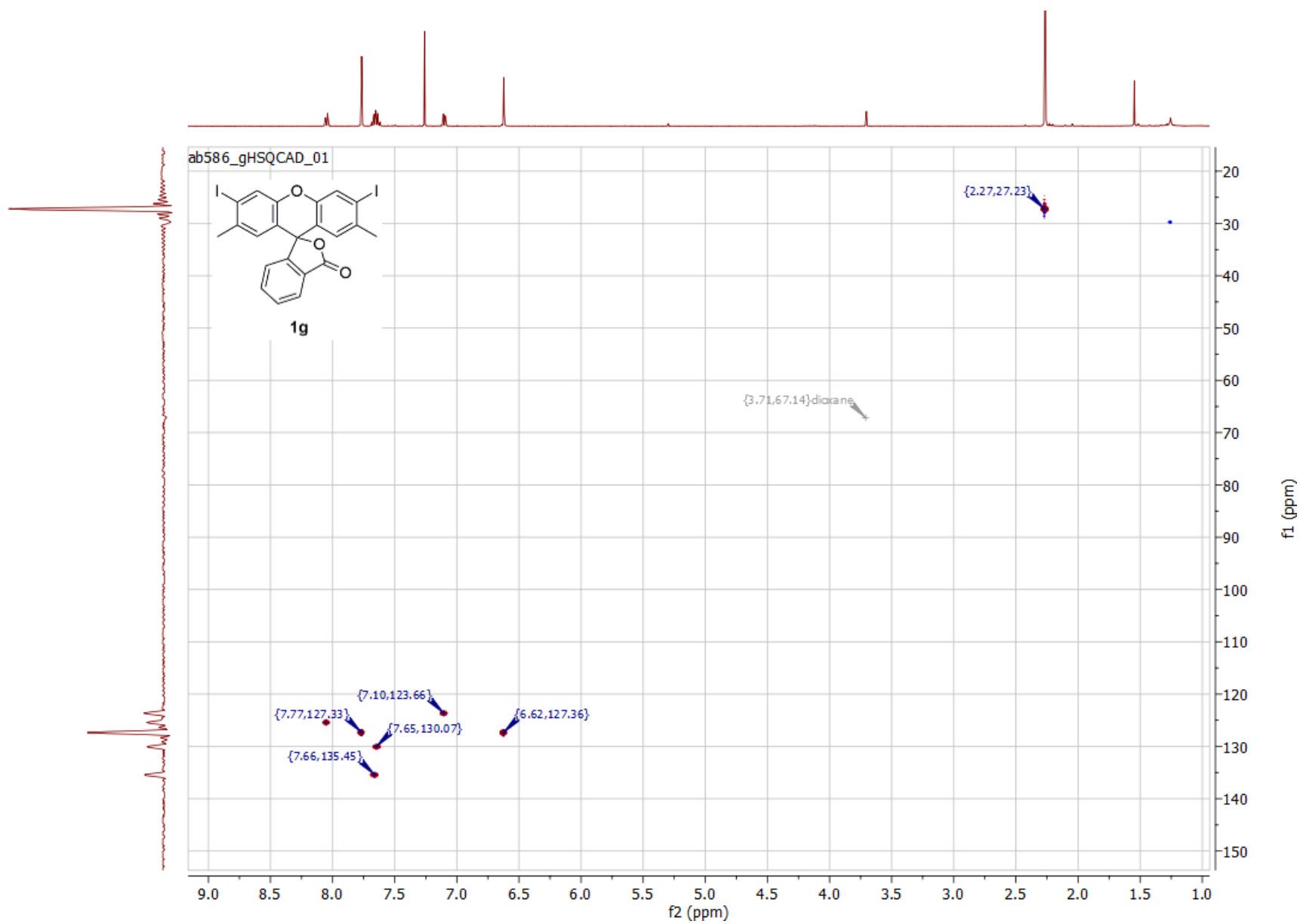
ab586_PROTON_01



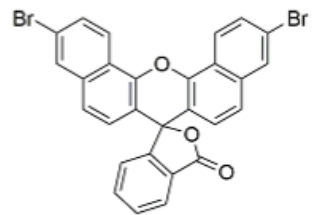
—7.26 CDCl₃

—2.27

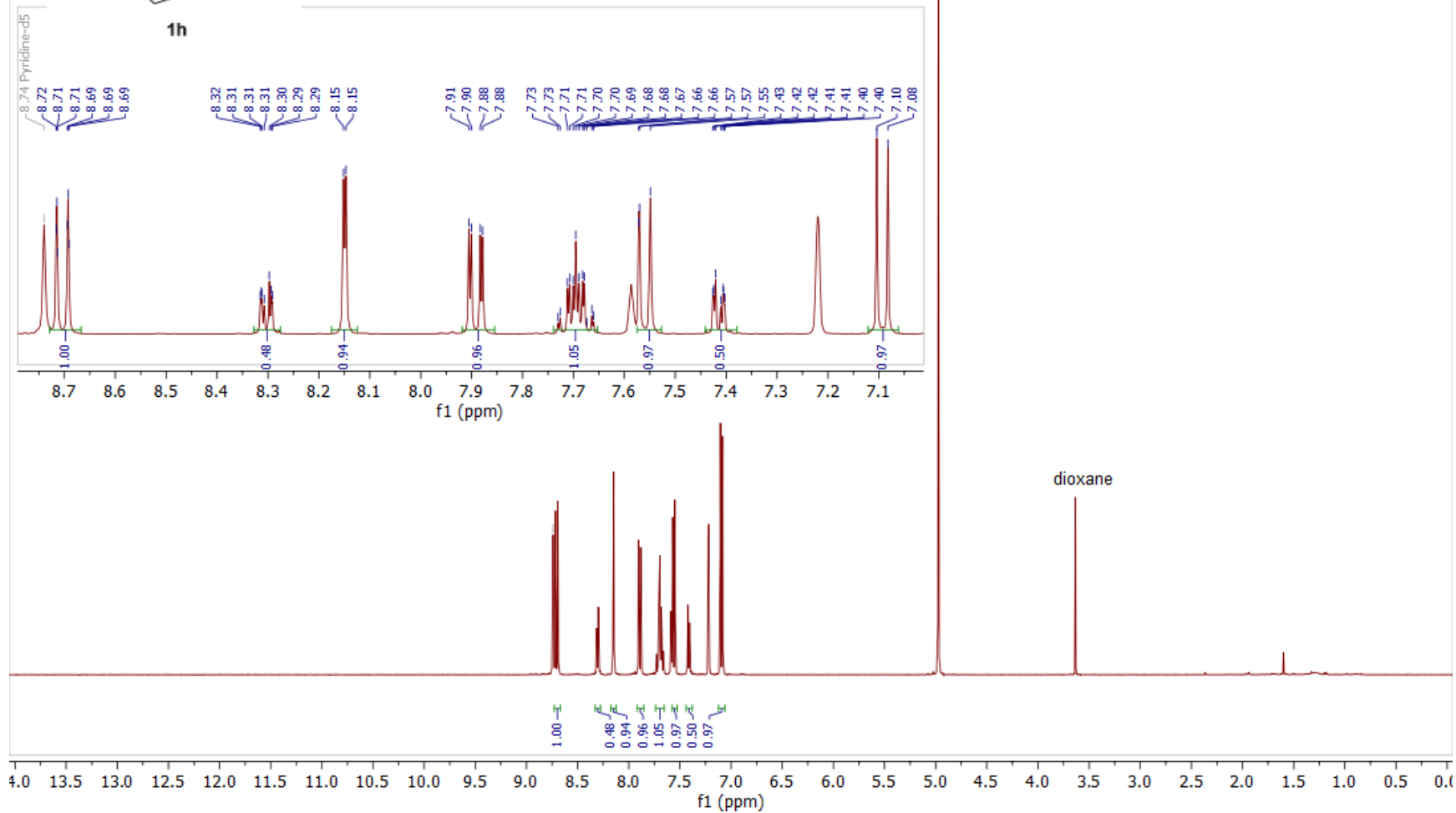




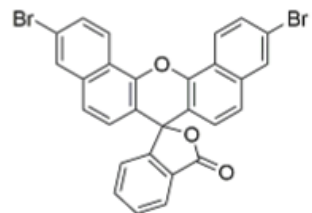
ab517-2_PROTON_01



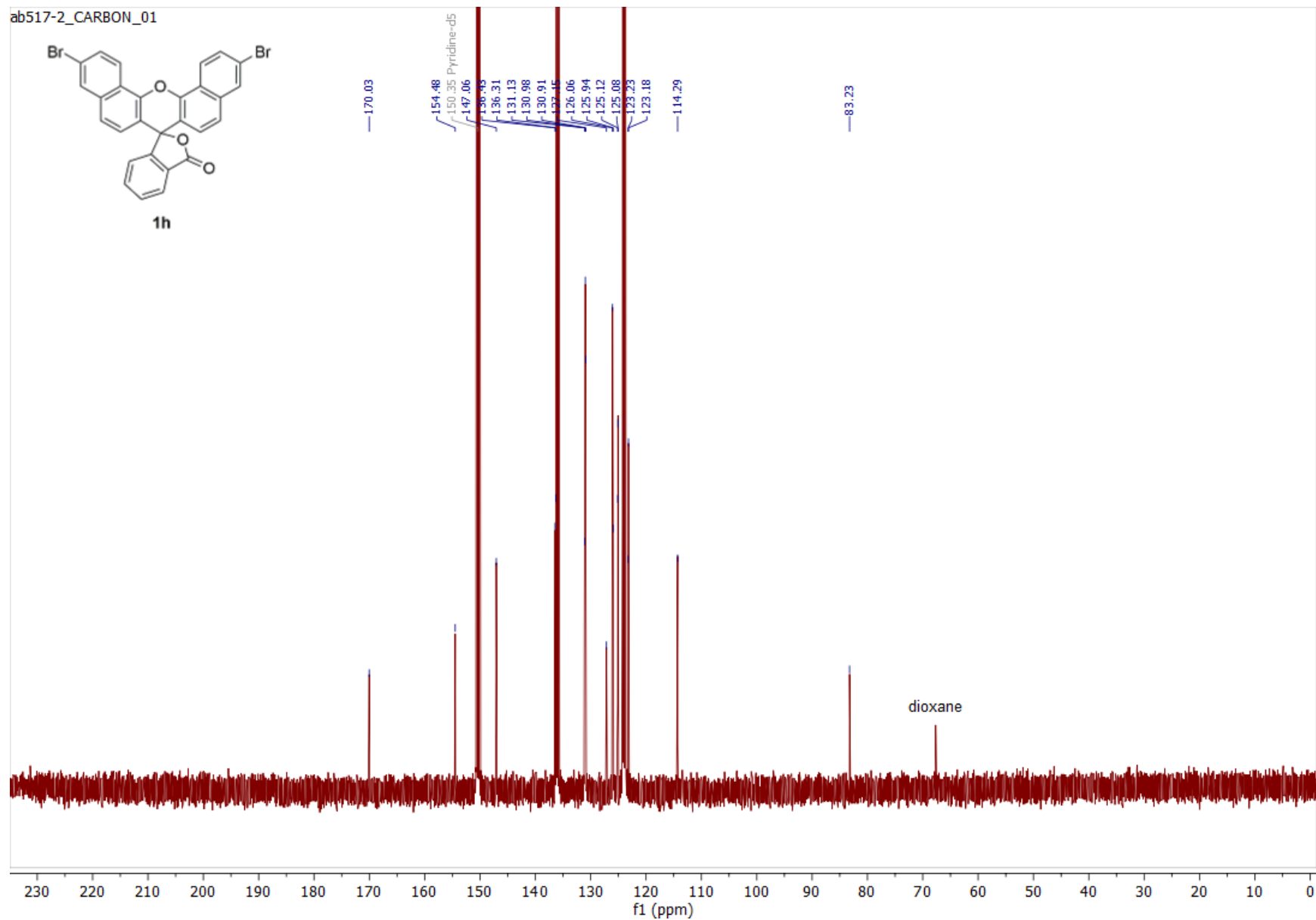
1h



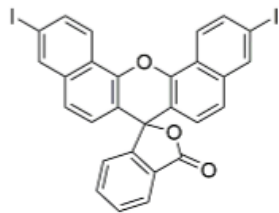
ab517-2_CARBON_01



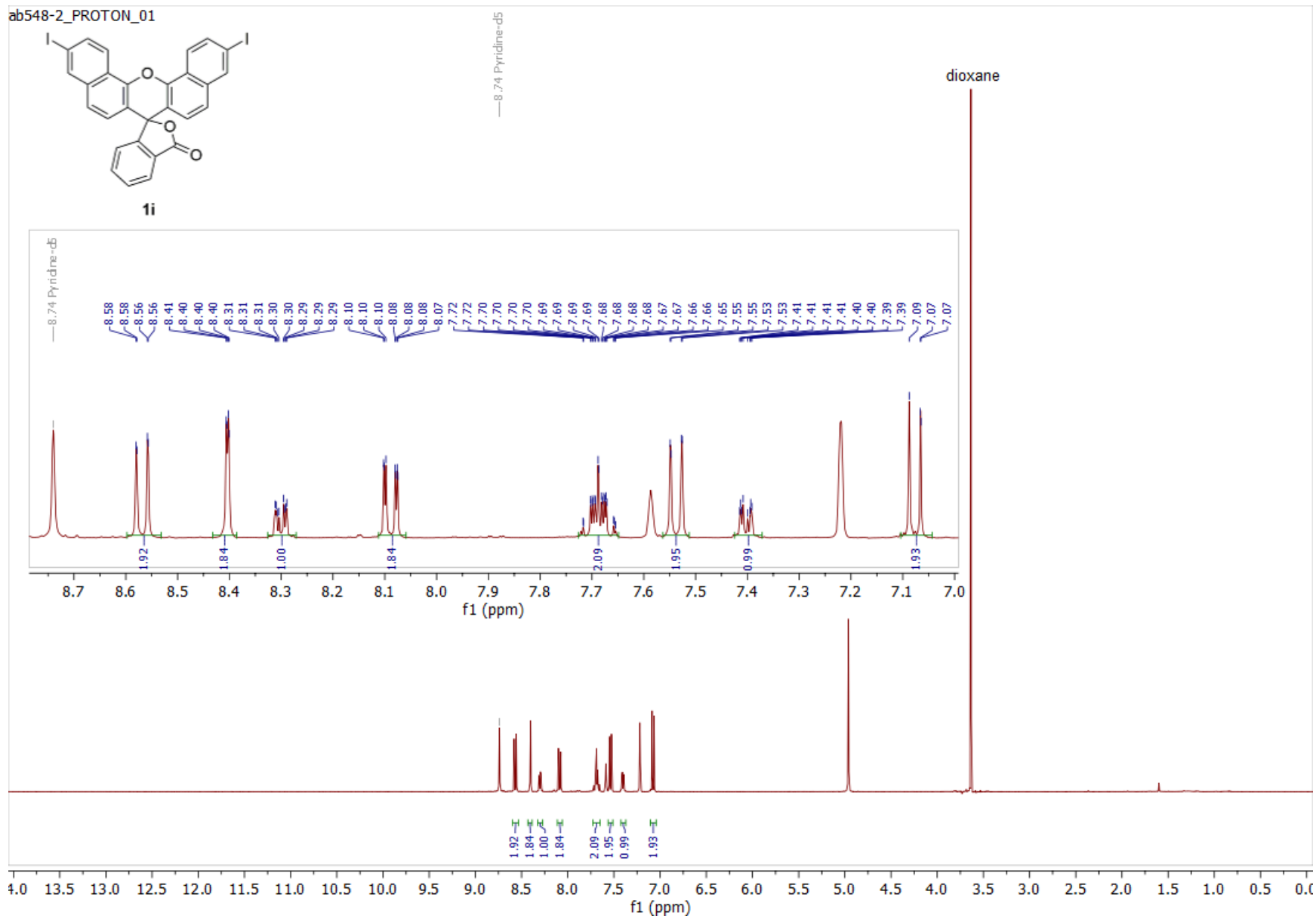
1h



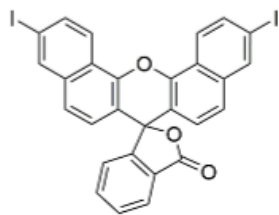
ab548-2_PROTON_01



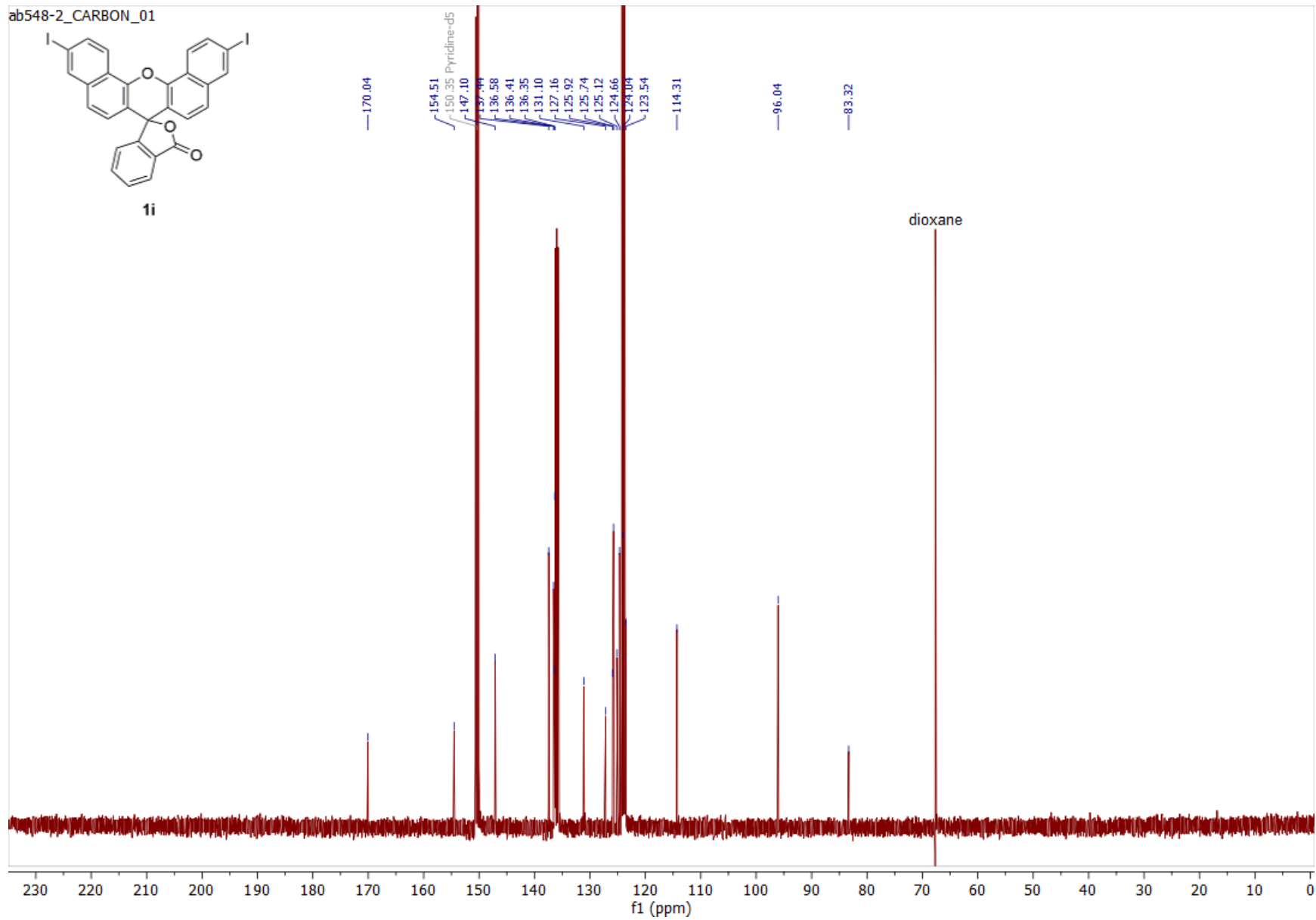
1i



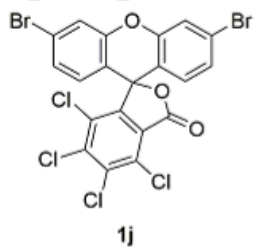
ab548-2_CARBO_N_01



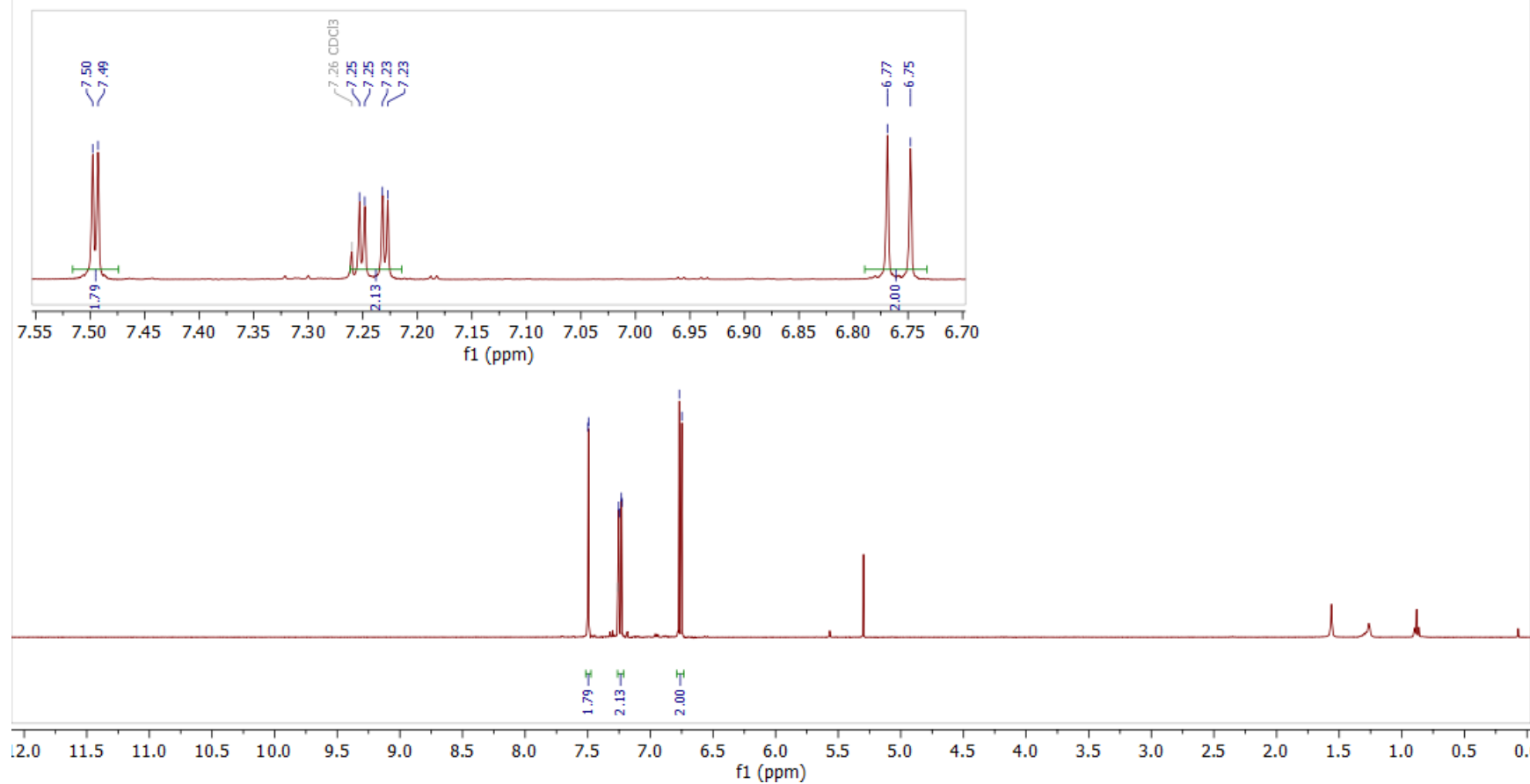
1i



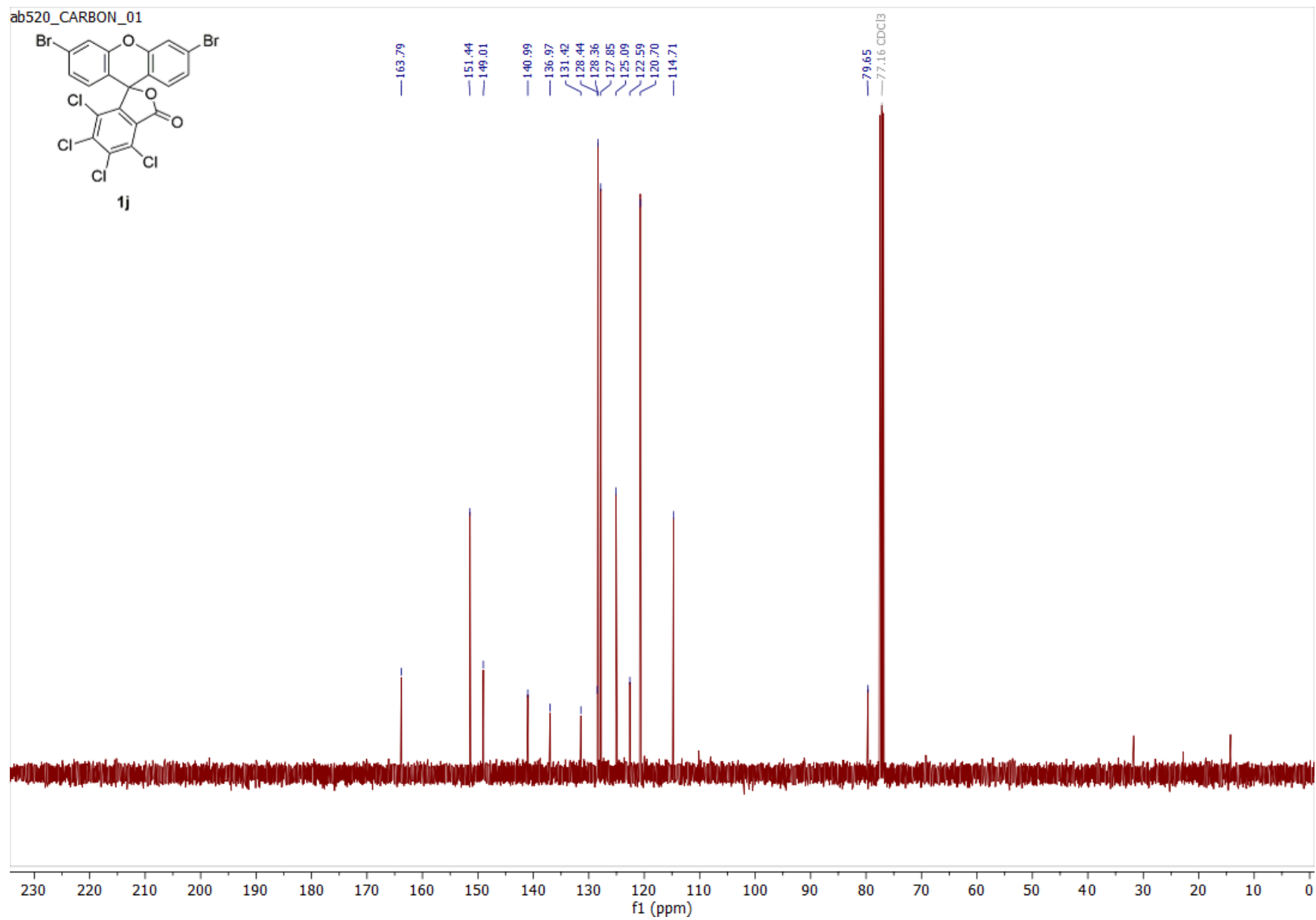
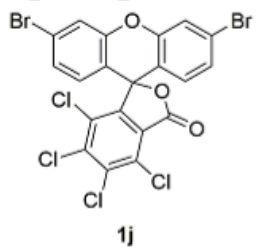
ab520_PROTON_01



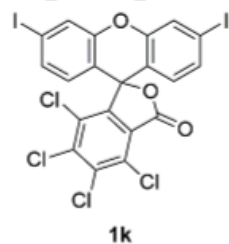
7.50
7.49
7.26 CDCl3
7.25
7.23
7.23
6.77
6.75



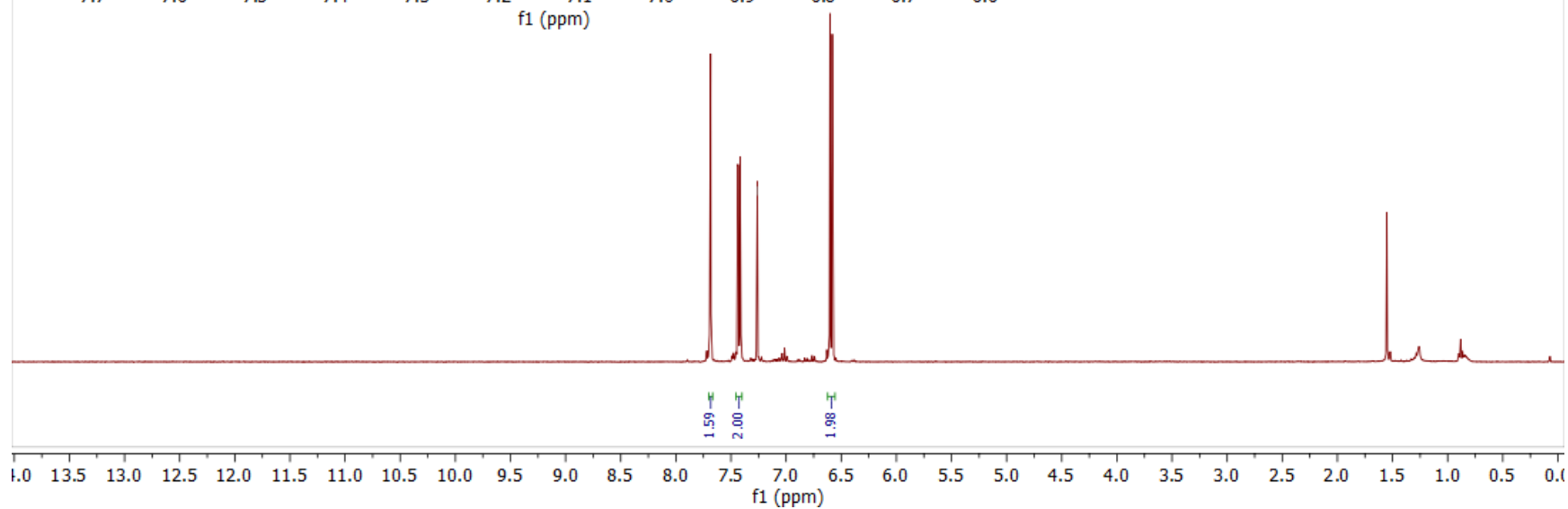
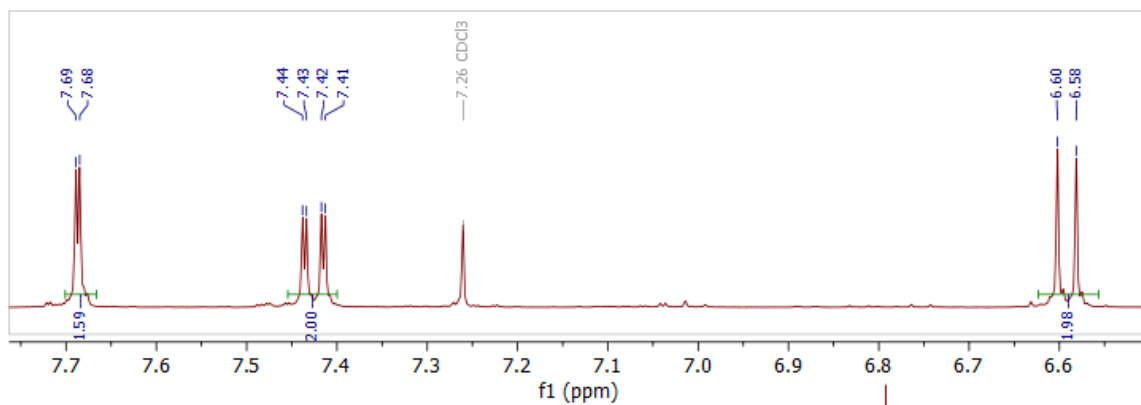
ab520_CARBON_01



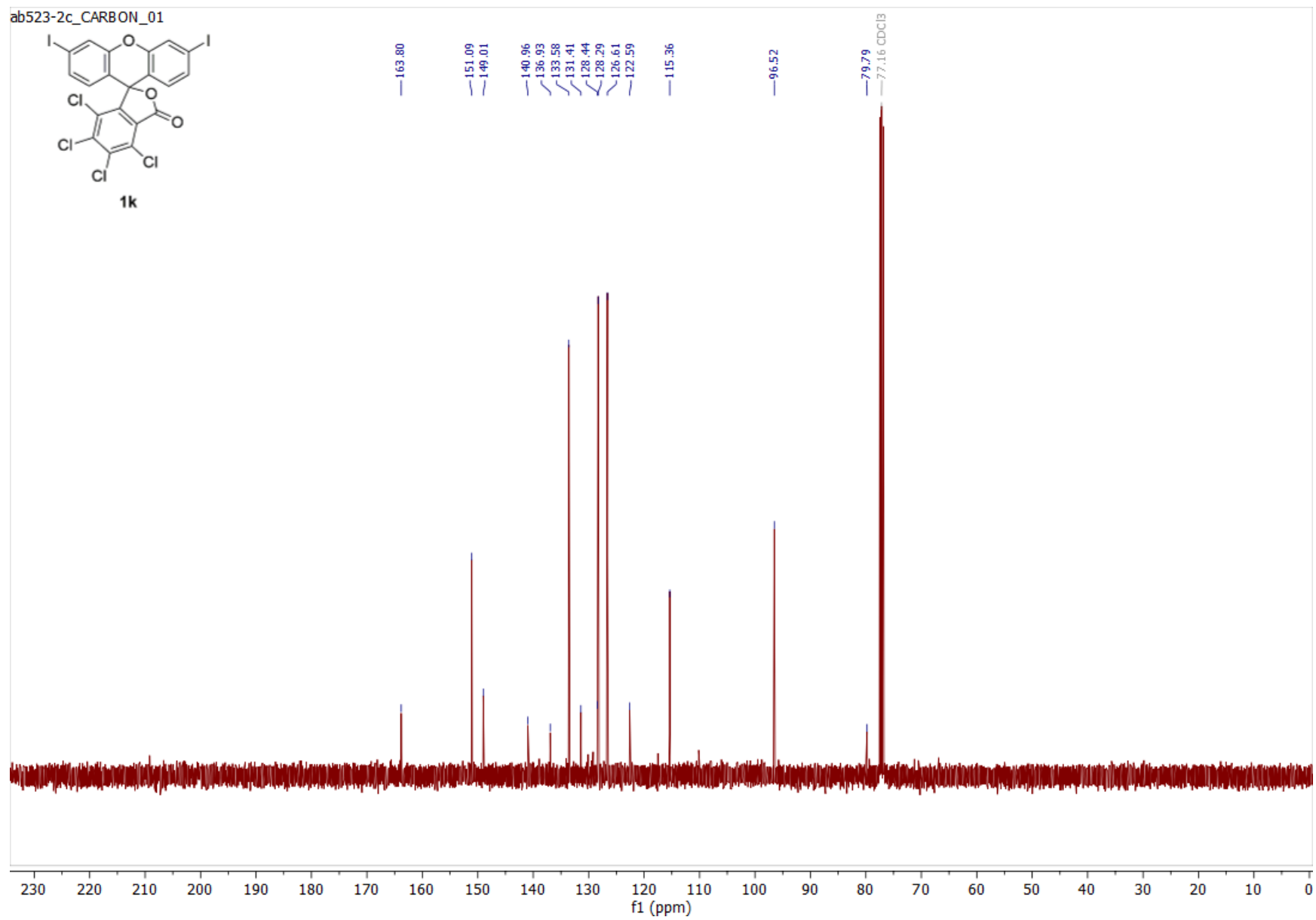
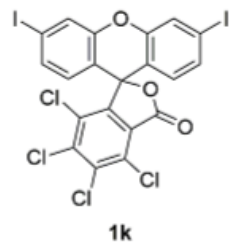
ab523-2c_PROTON_01



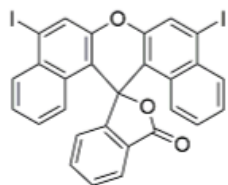
—7.26 CDCl₃



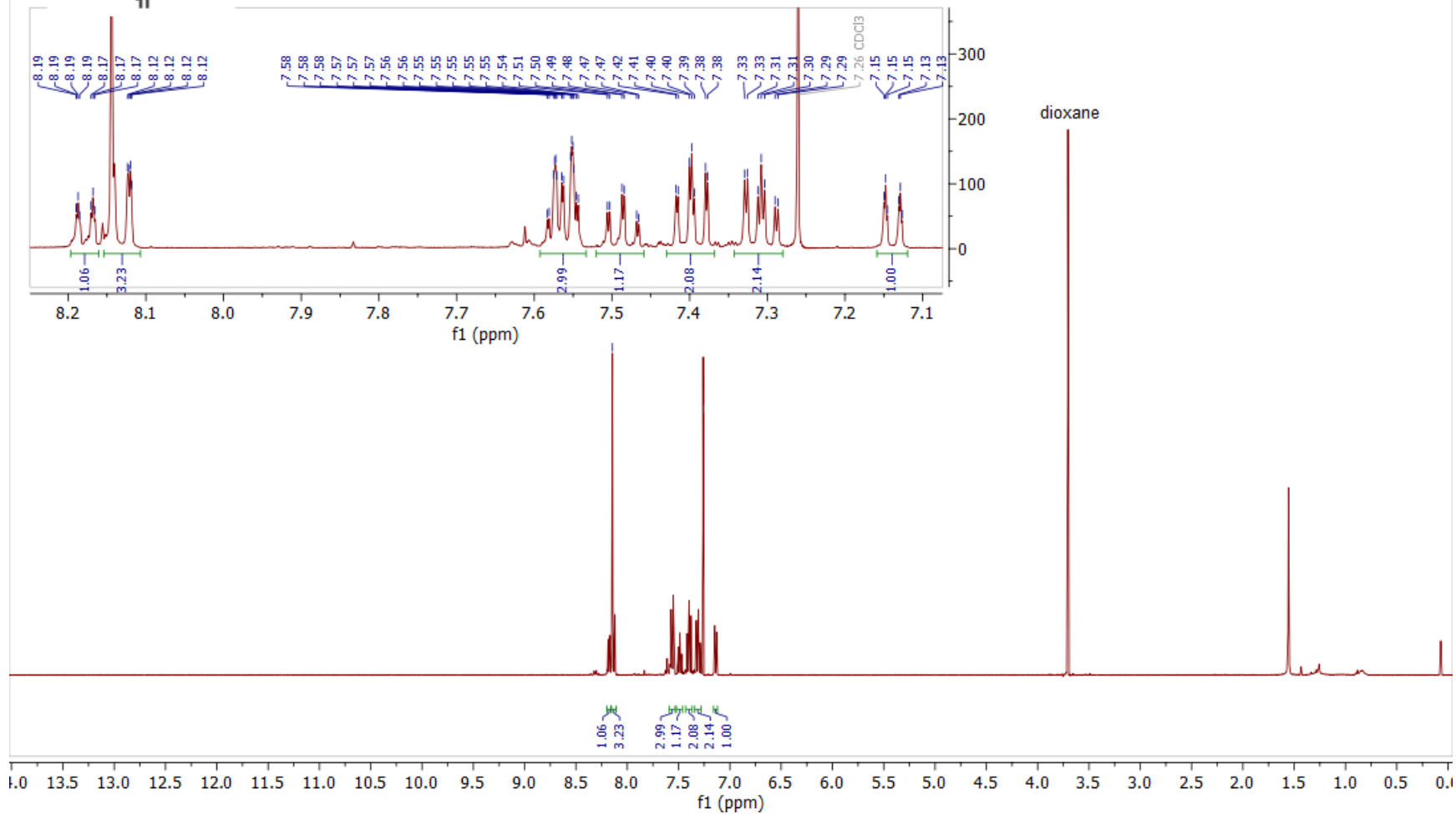
ab523-2c_CARBON_01



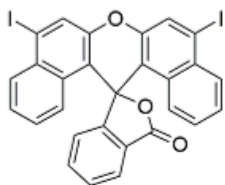
ab549_PROTON_01



11

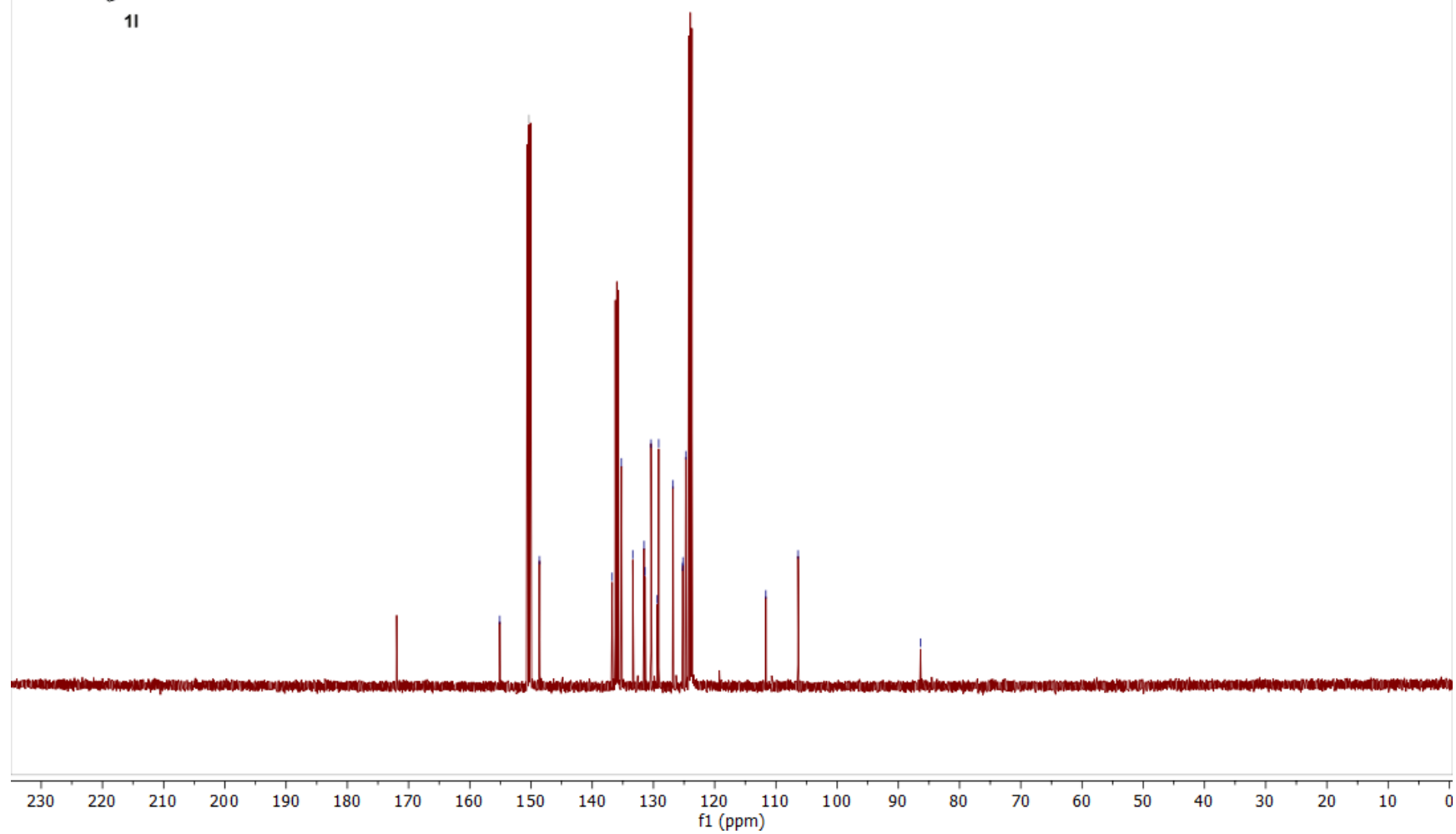


ab549_CARBON_01

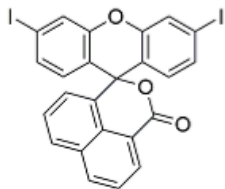


11

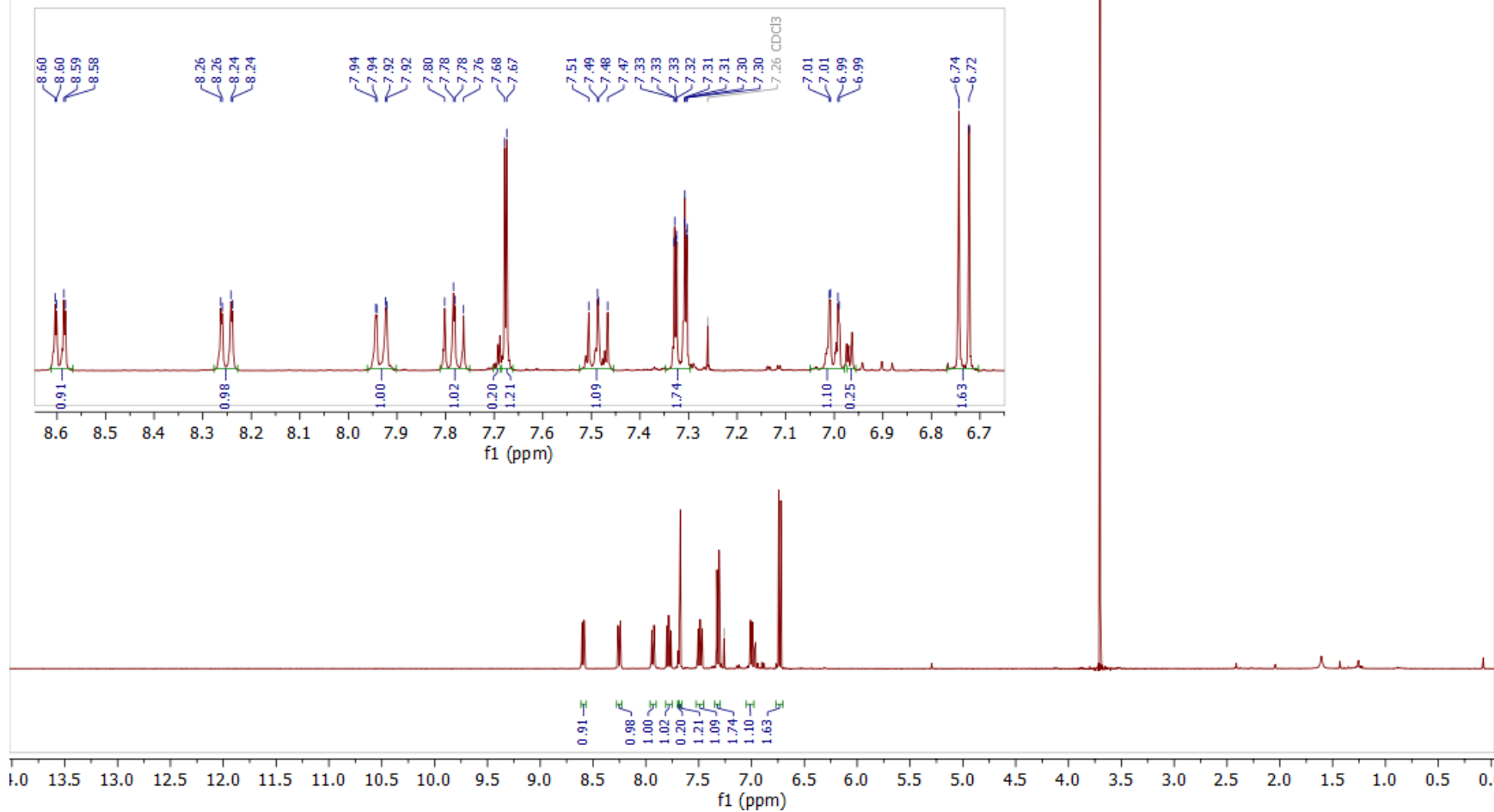
155.11
150.35 Pyridine-d5
148.62
136.75
135.22
133.38
131.52
131.35
130.40
129.38
129.14
126.80
125.23
124.72
111.64
106.38
86.38



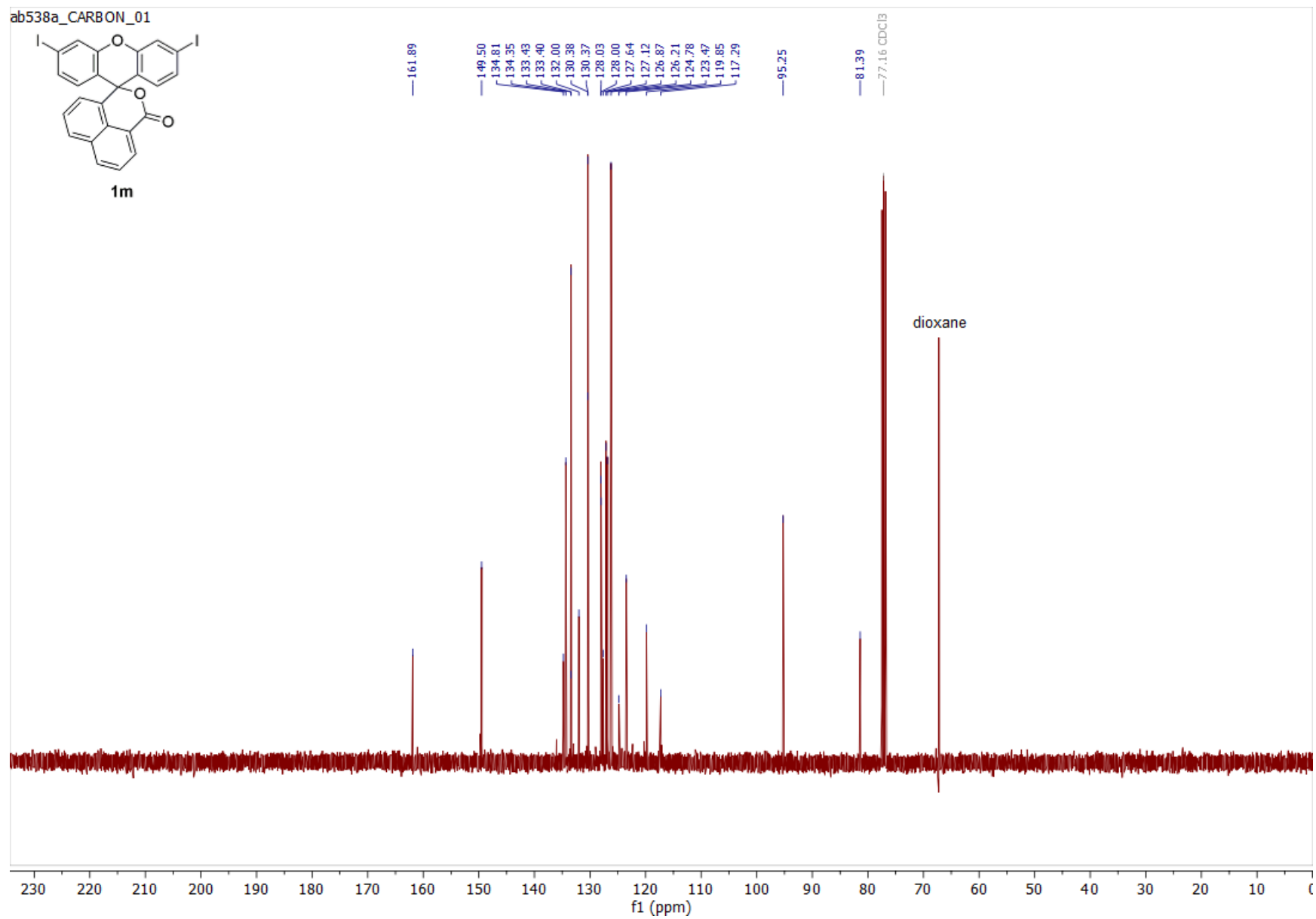
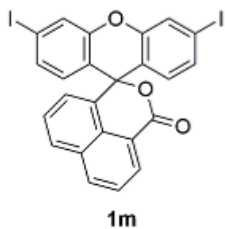
ab538a_PROTON_01



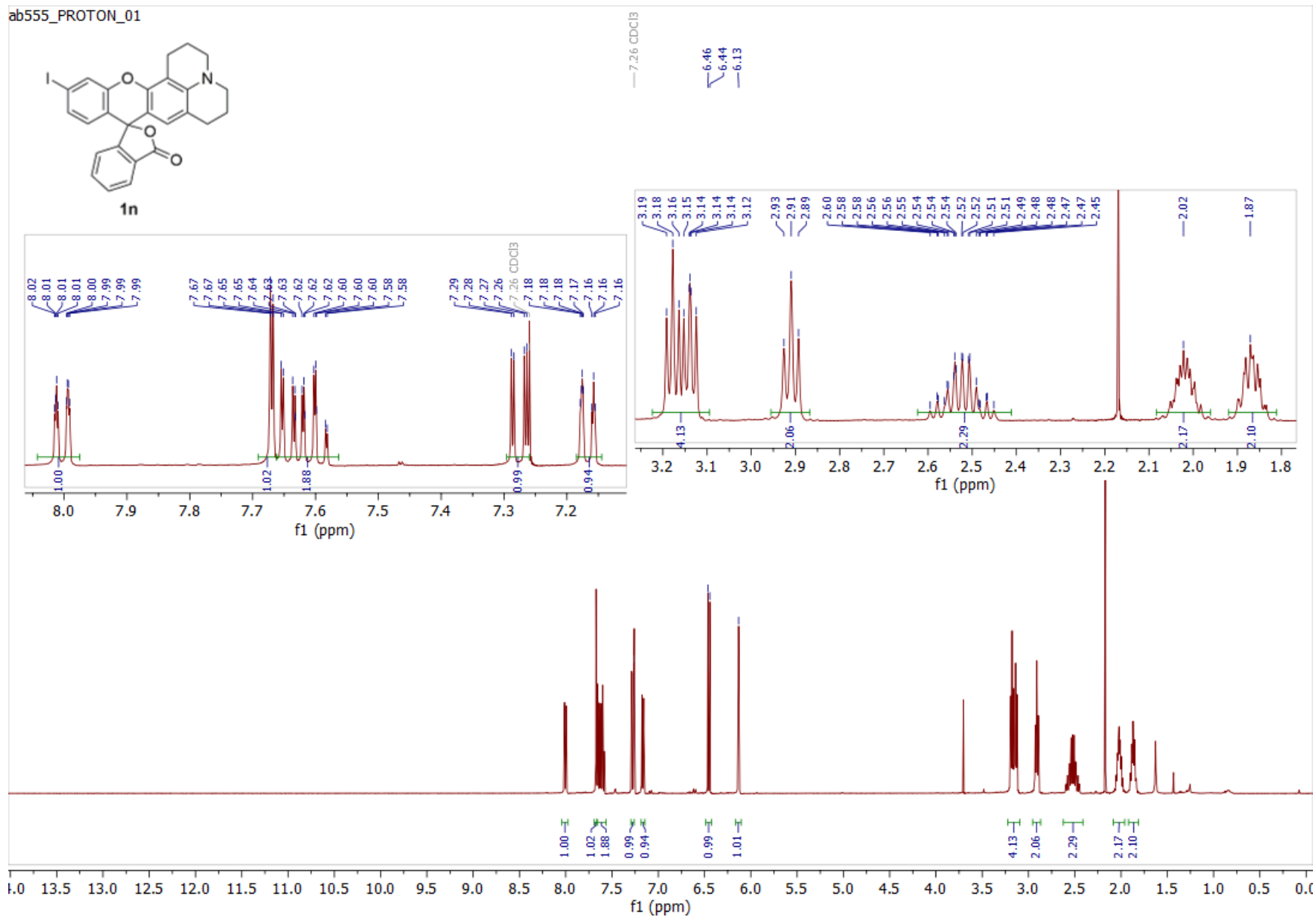
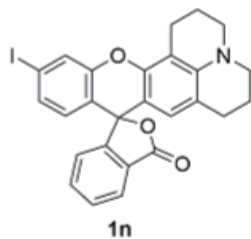
1m



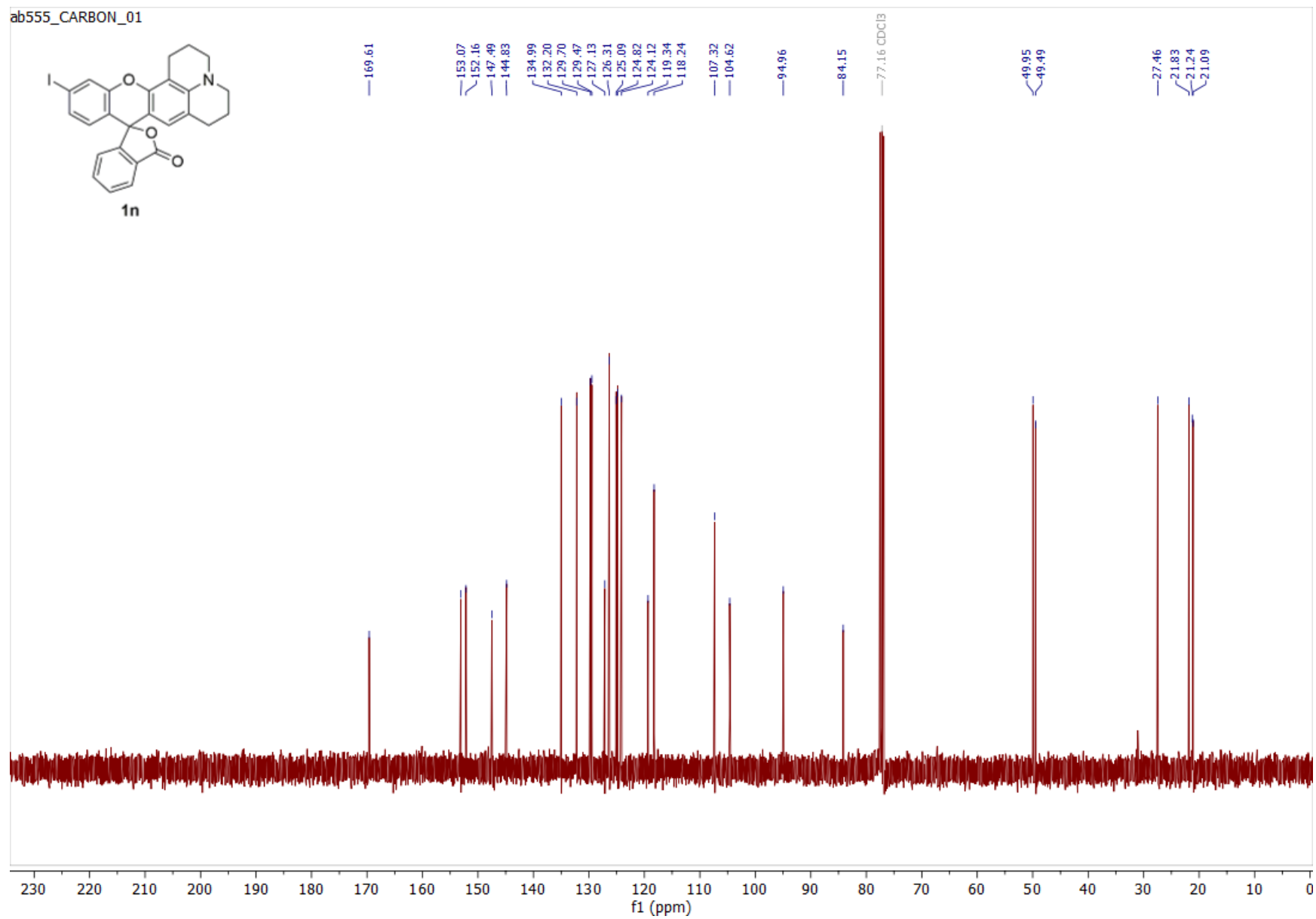
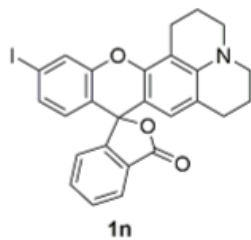
ab538a_CARBON_01



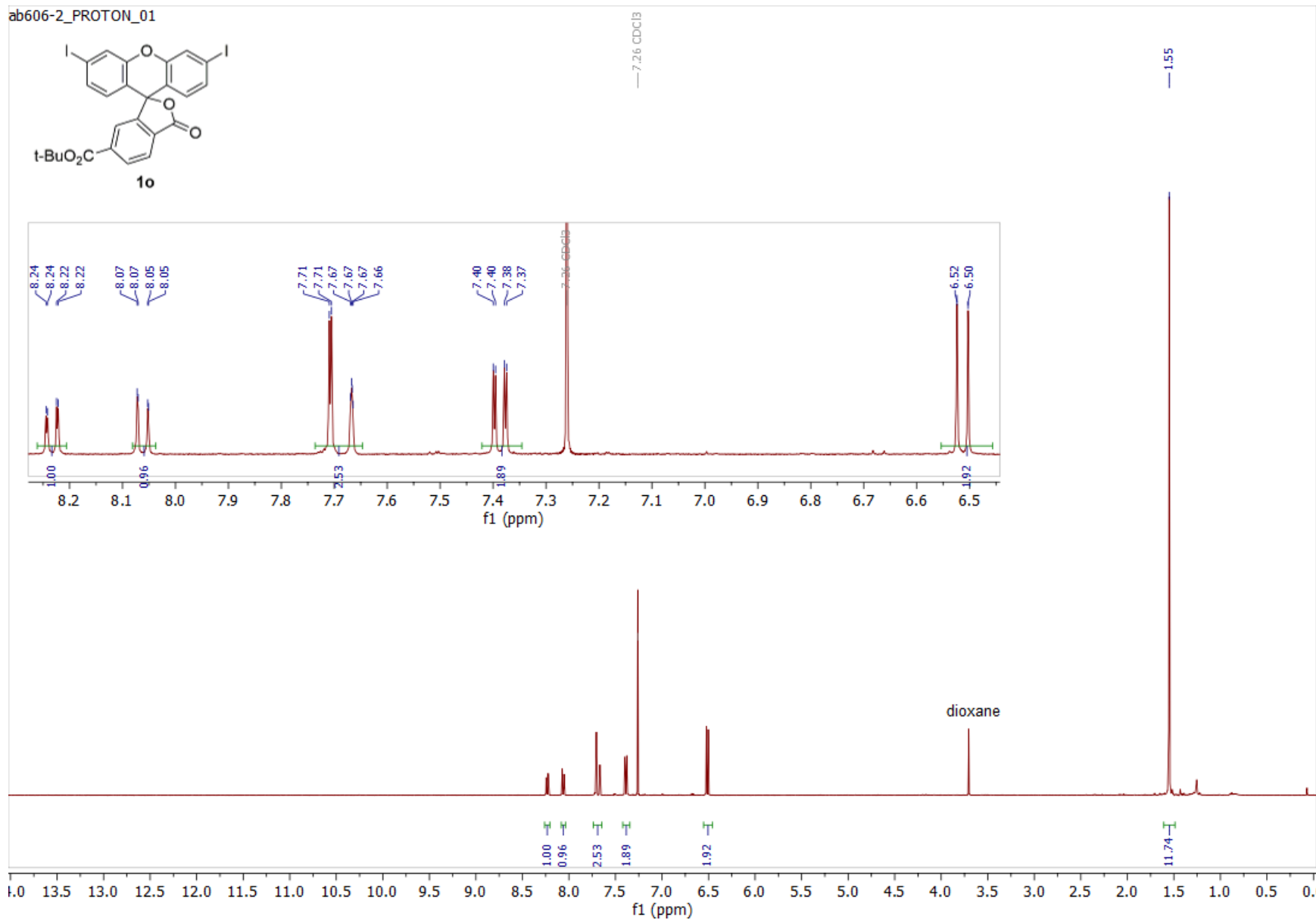
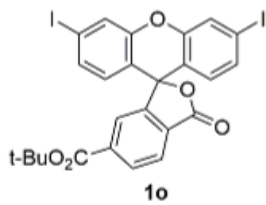
ab555_PROTON_01



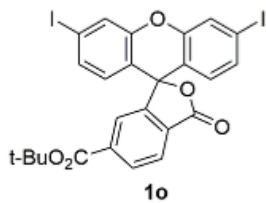
ab555_CARBON_01



ab606-2_PROTON_01



ab606_CARBON_01



168.27

163.91

152.88

150.90

138.92

133.52

131.45

129.24

128.86

126.60

125.46

124.78

118.17

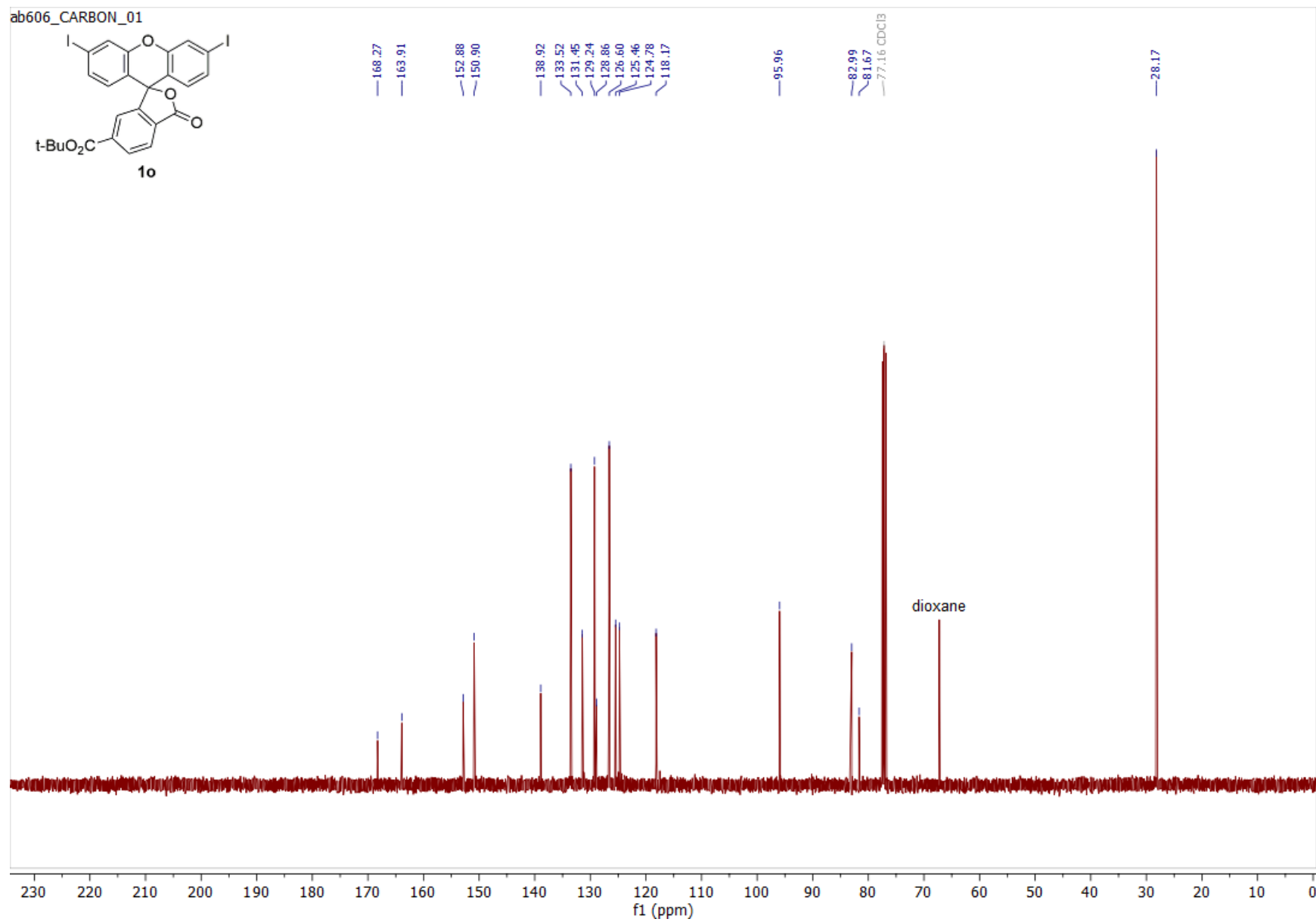
95.96

82.99

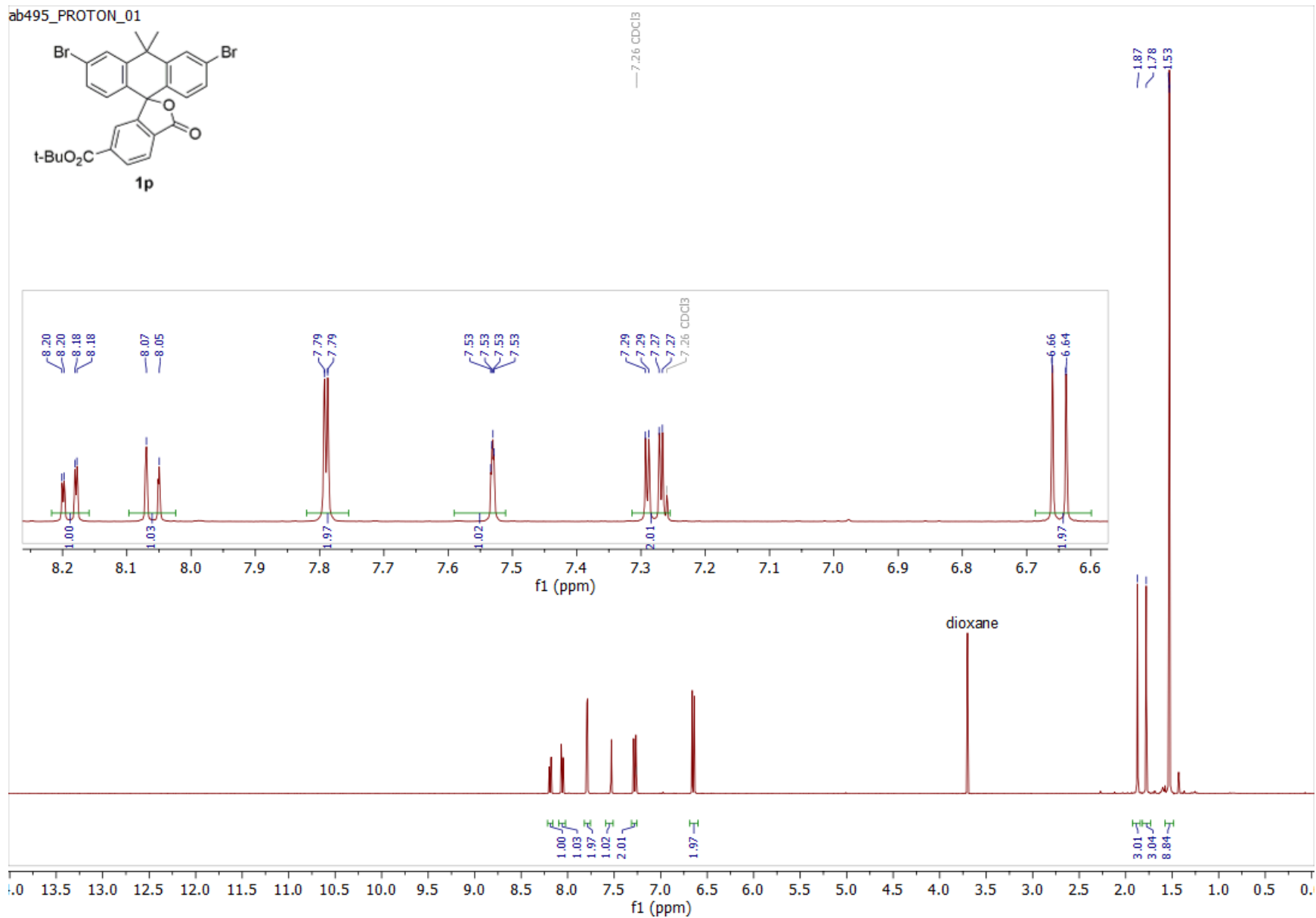
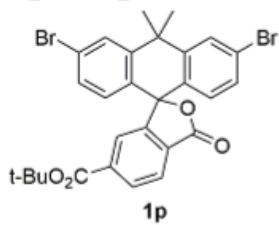
81.67

77.16 CDCl₃

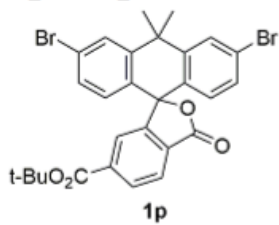
28.17



ab495_PROTON_01



ab495_CARBON_01



169.39

163.94

154.81

146.51

138.55

130.89

130.57

130.10

129.72

129.43

128.63

125.62

124.50

124.15

85.11

82.83

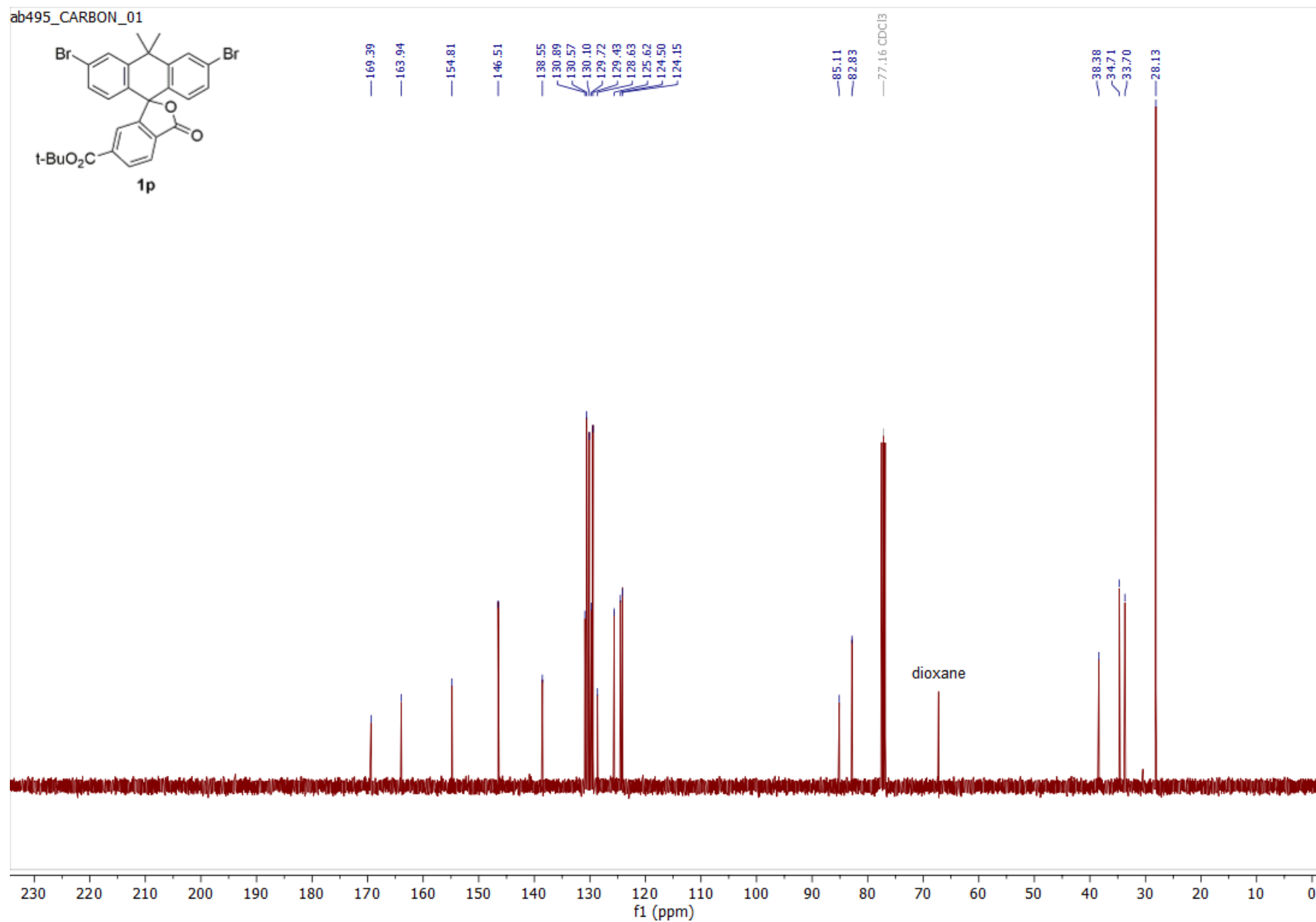
77.16 CDCl₃

38.38

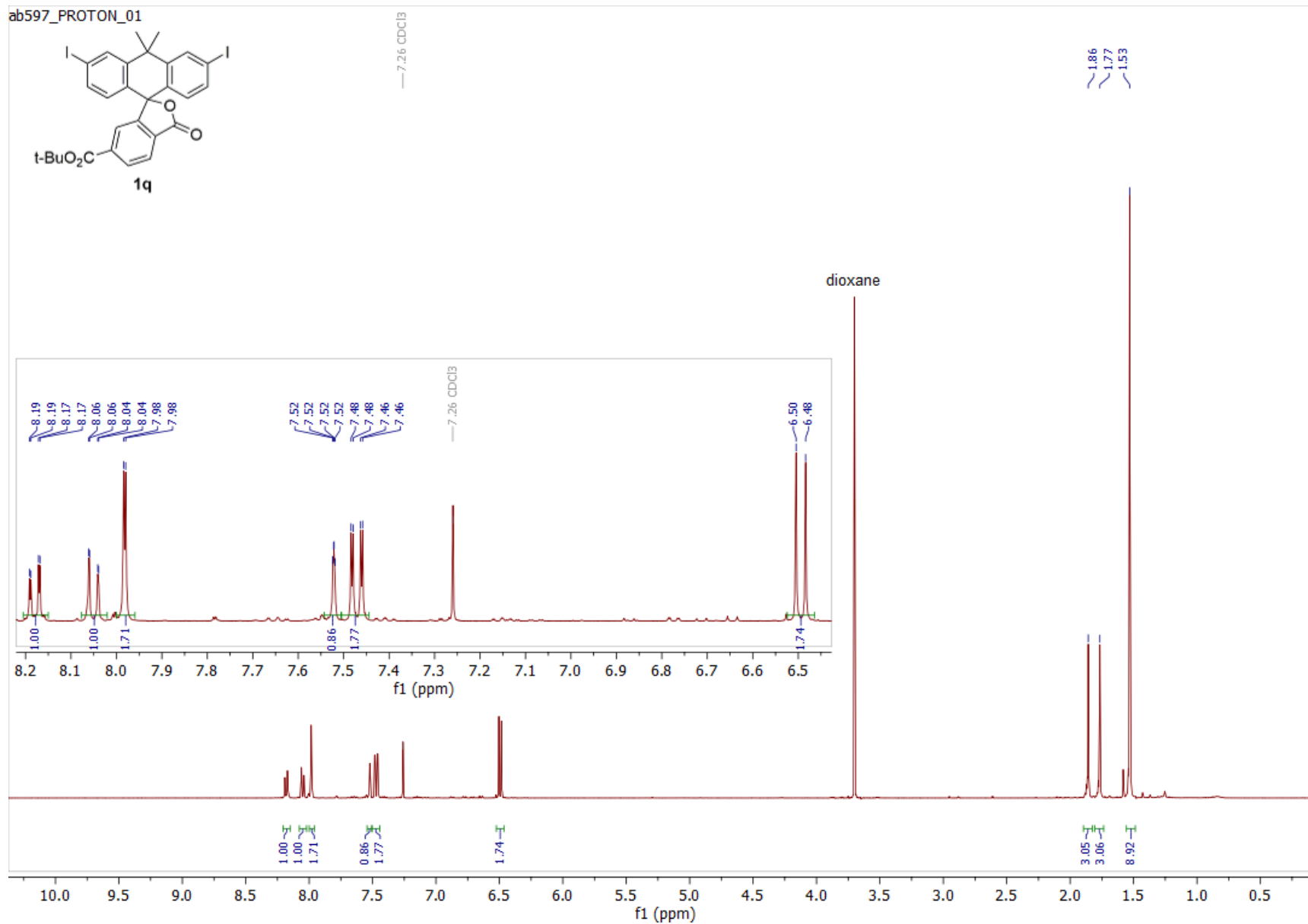
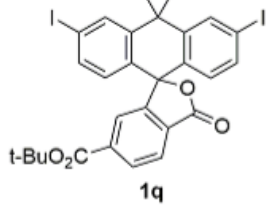
34.71

33.70

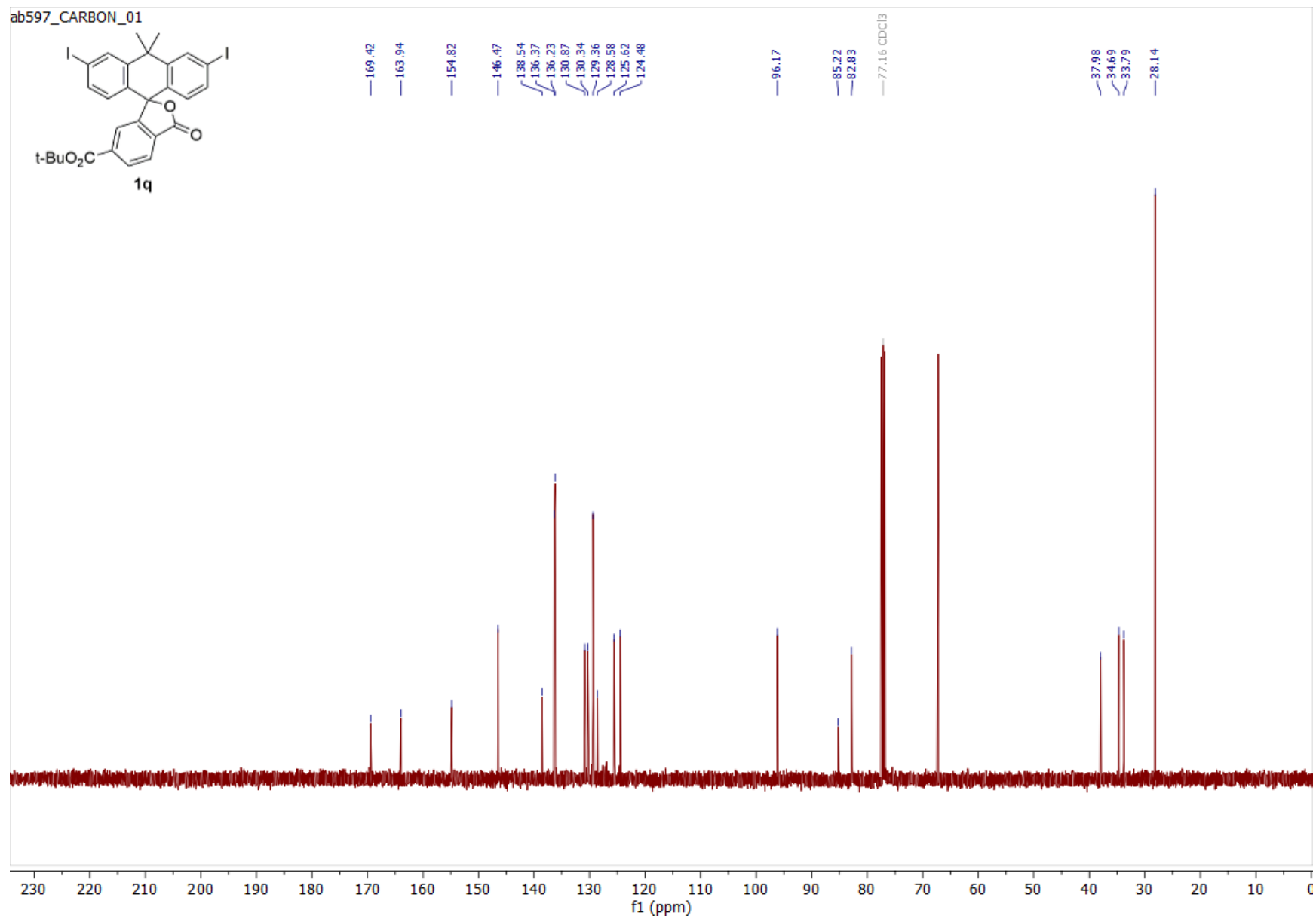
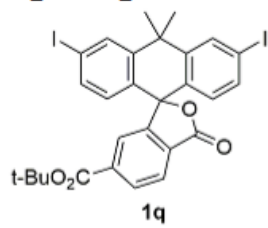
28.13



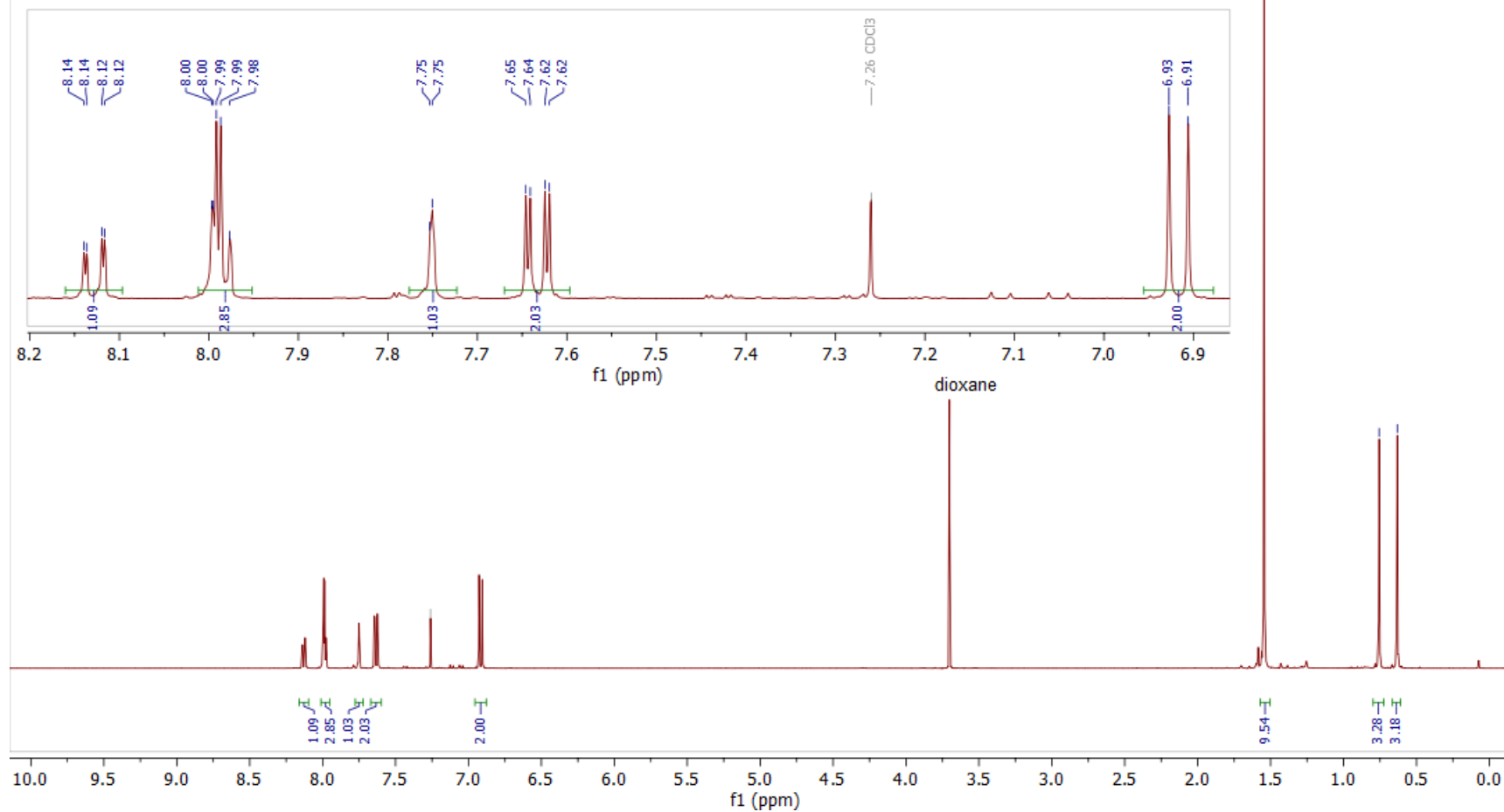
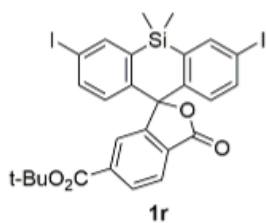
ab597_PROTON_01



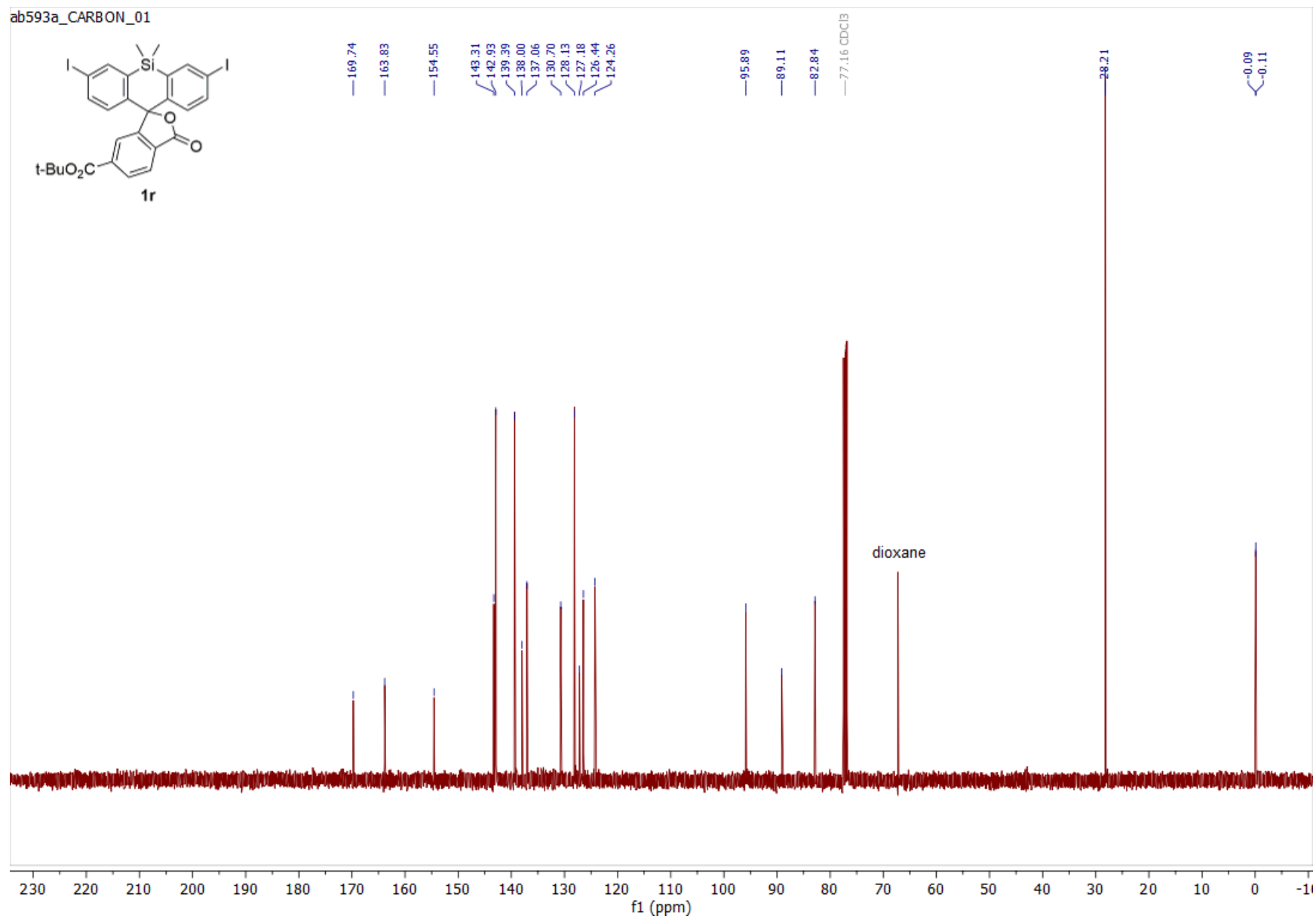
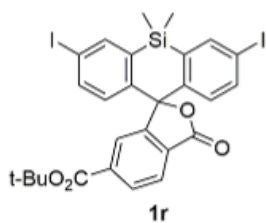
ab597_CARBON_01



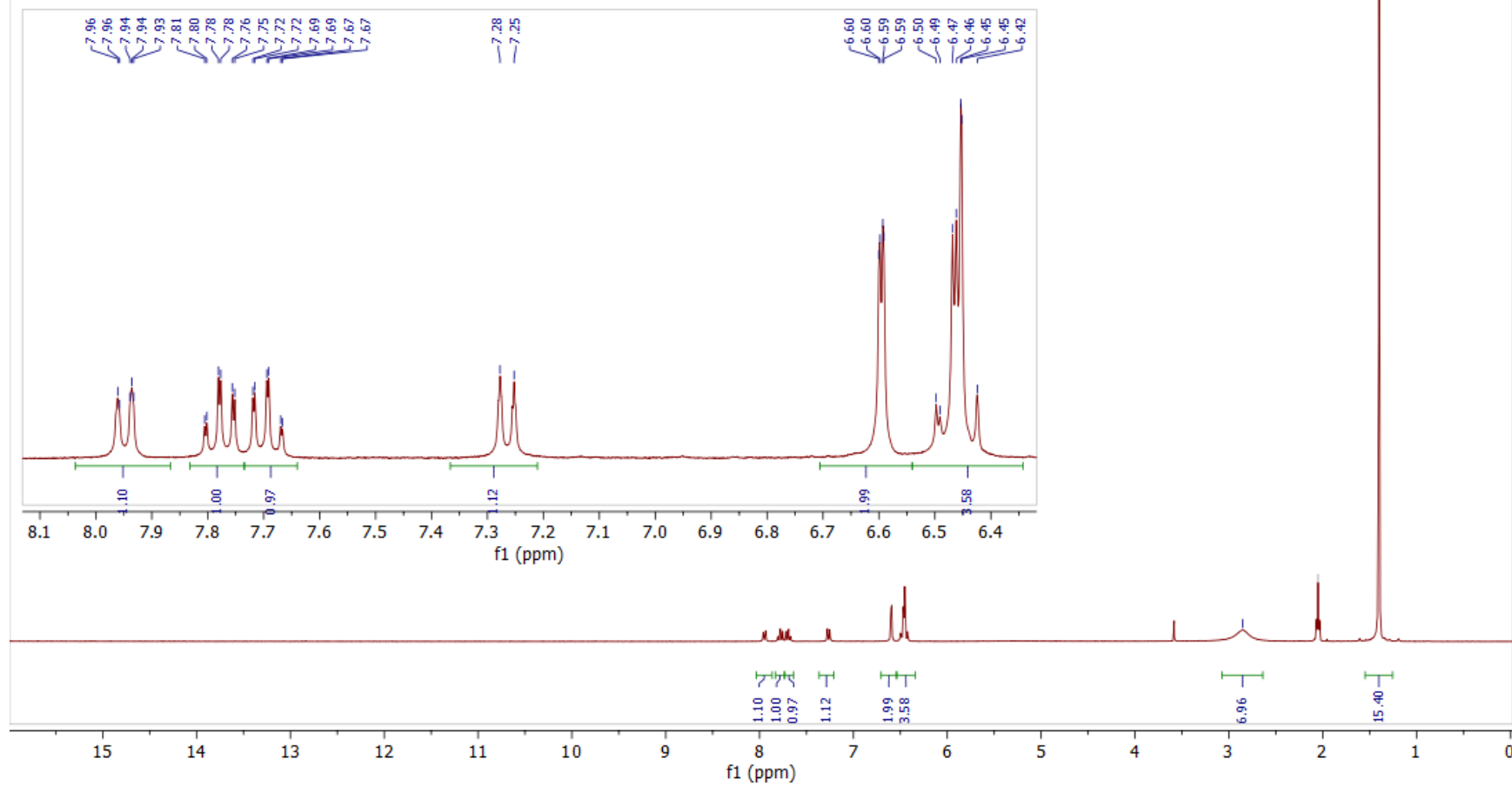
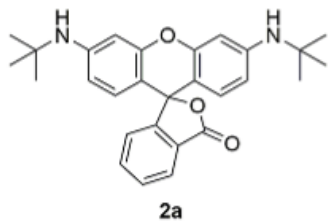
ab593a_PROTON_01



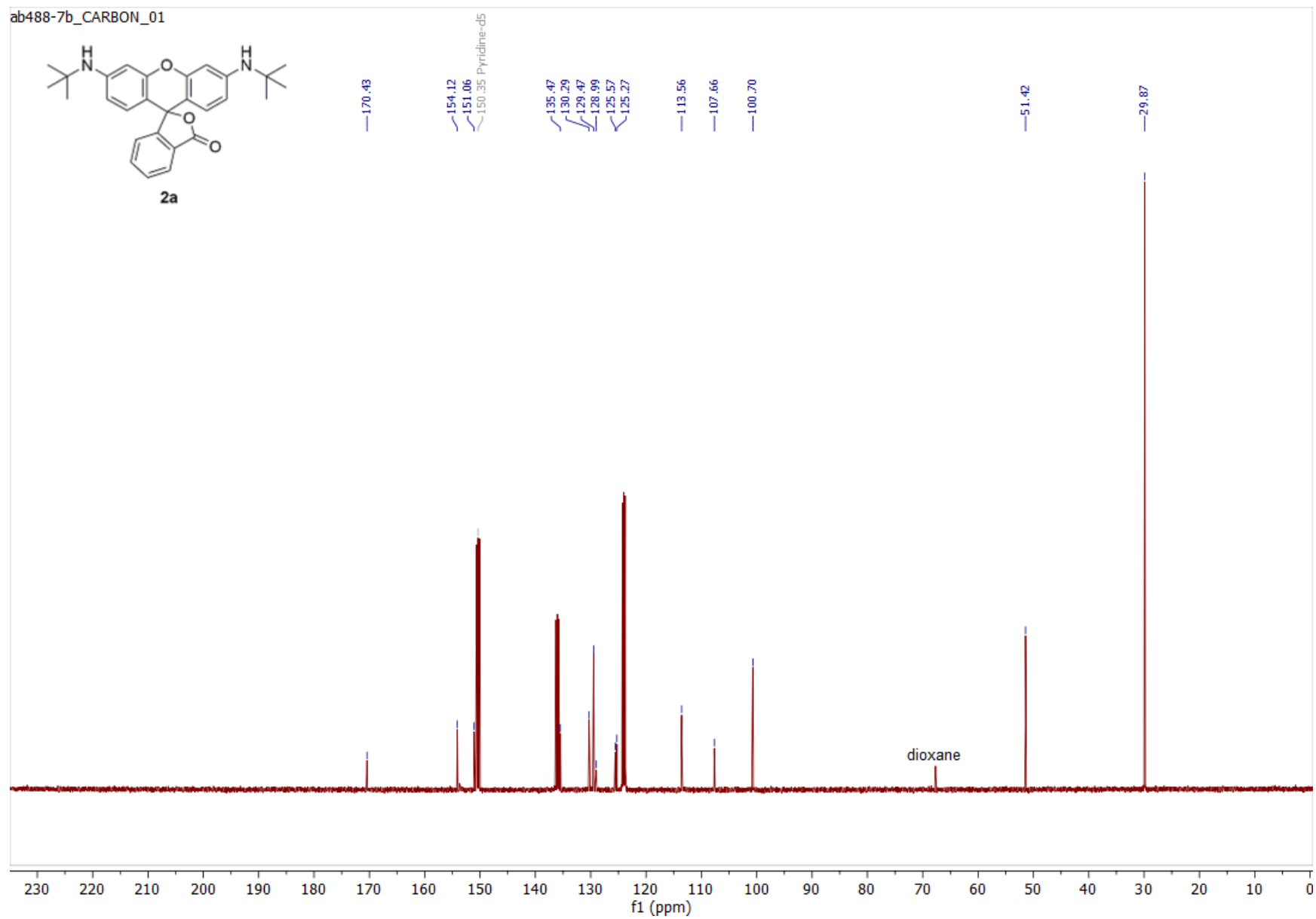
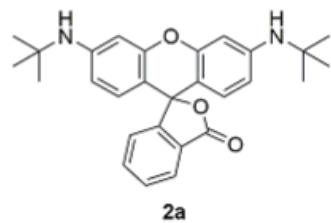
ab593a_CARボン_01



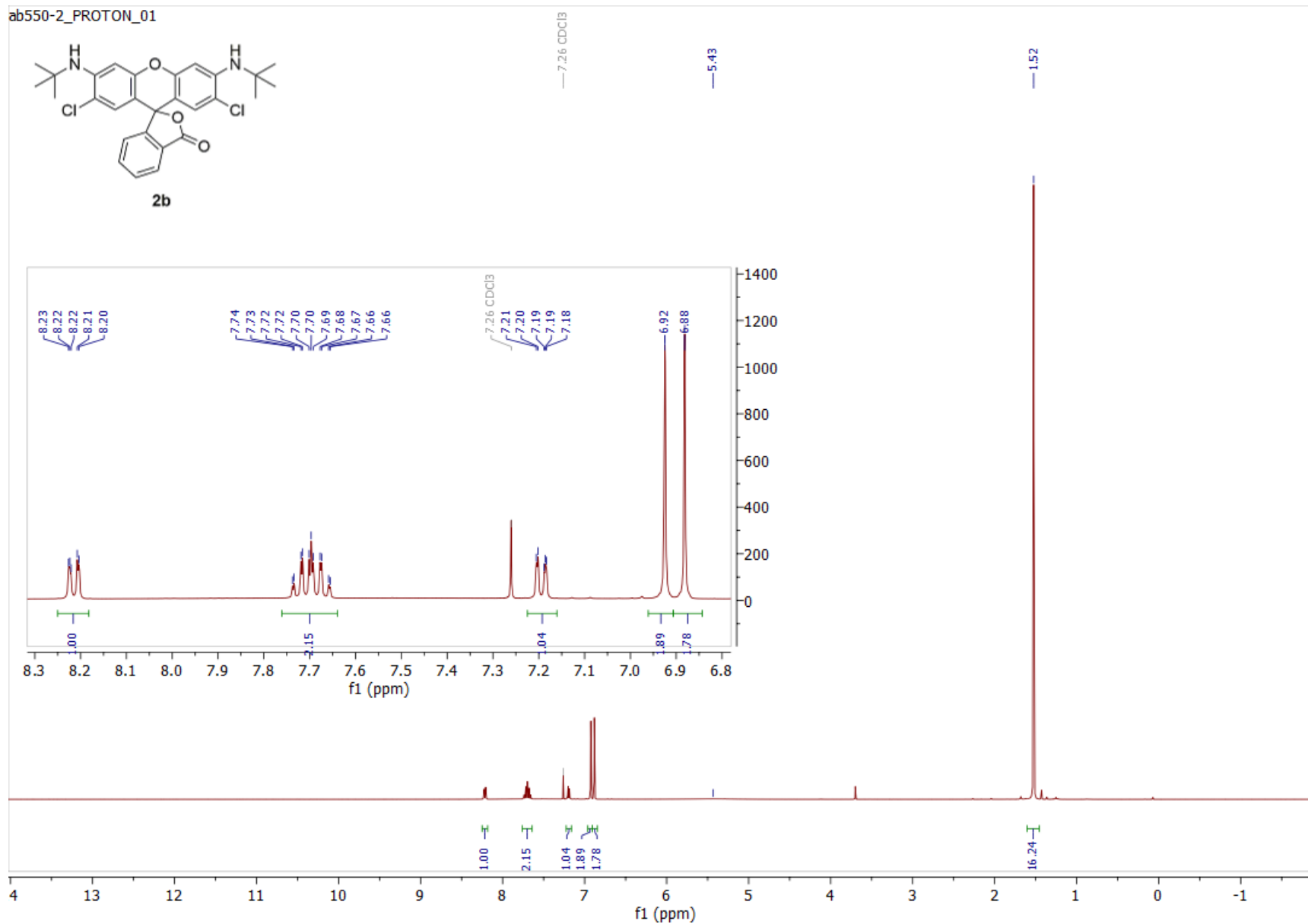
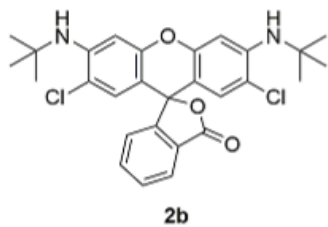
ab488-8_3h



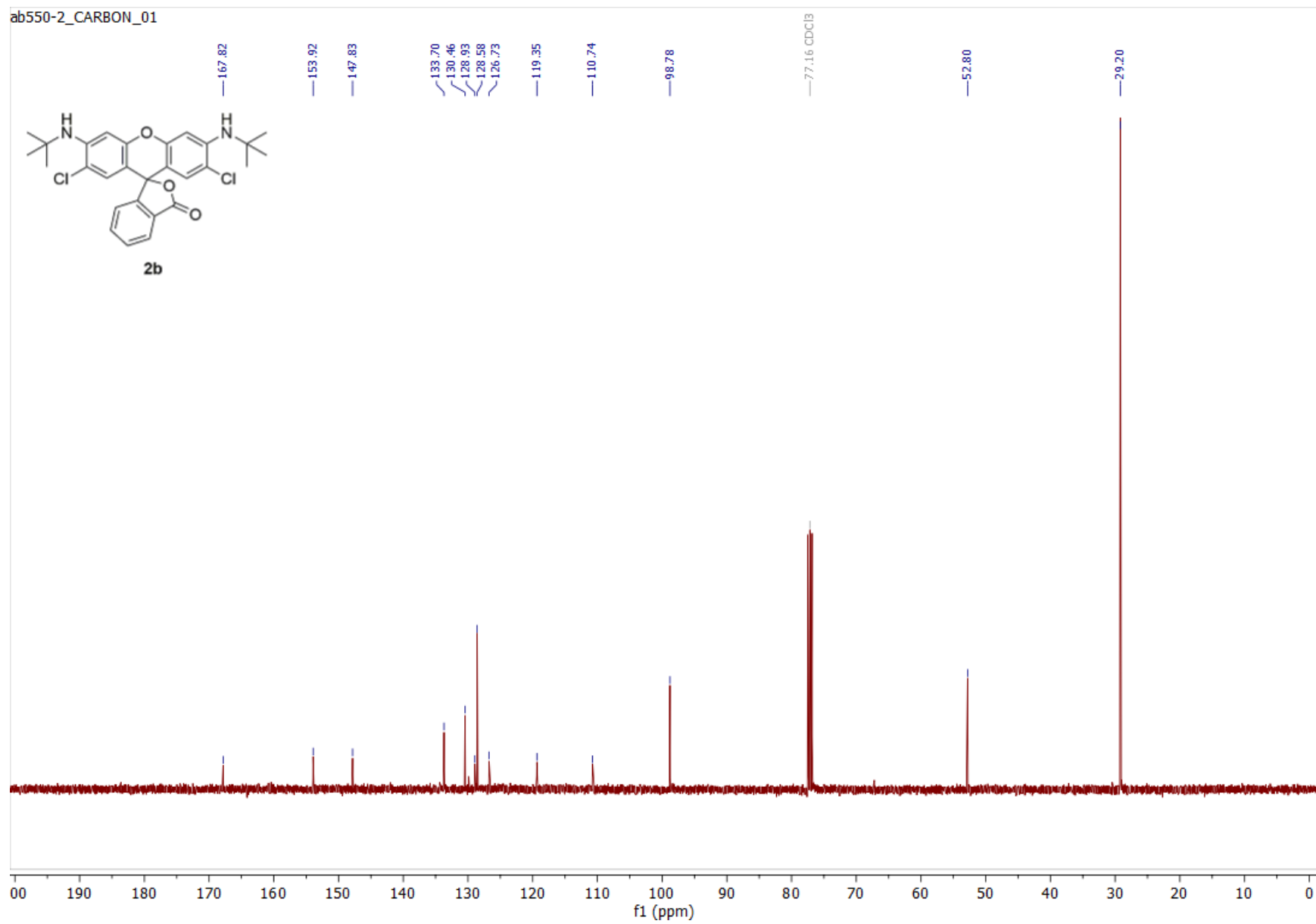
ab488-7b_CARBOON_01



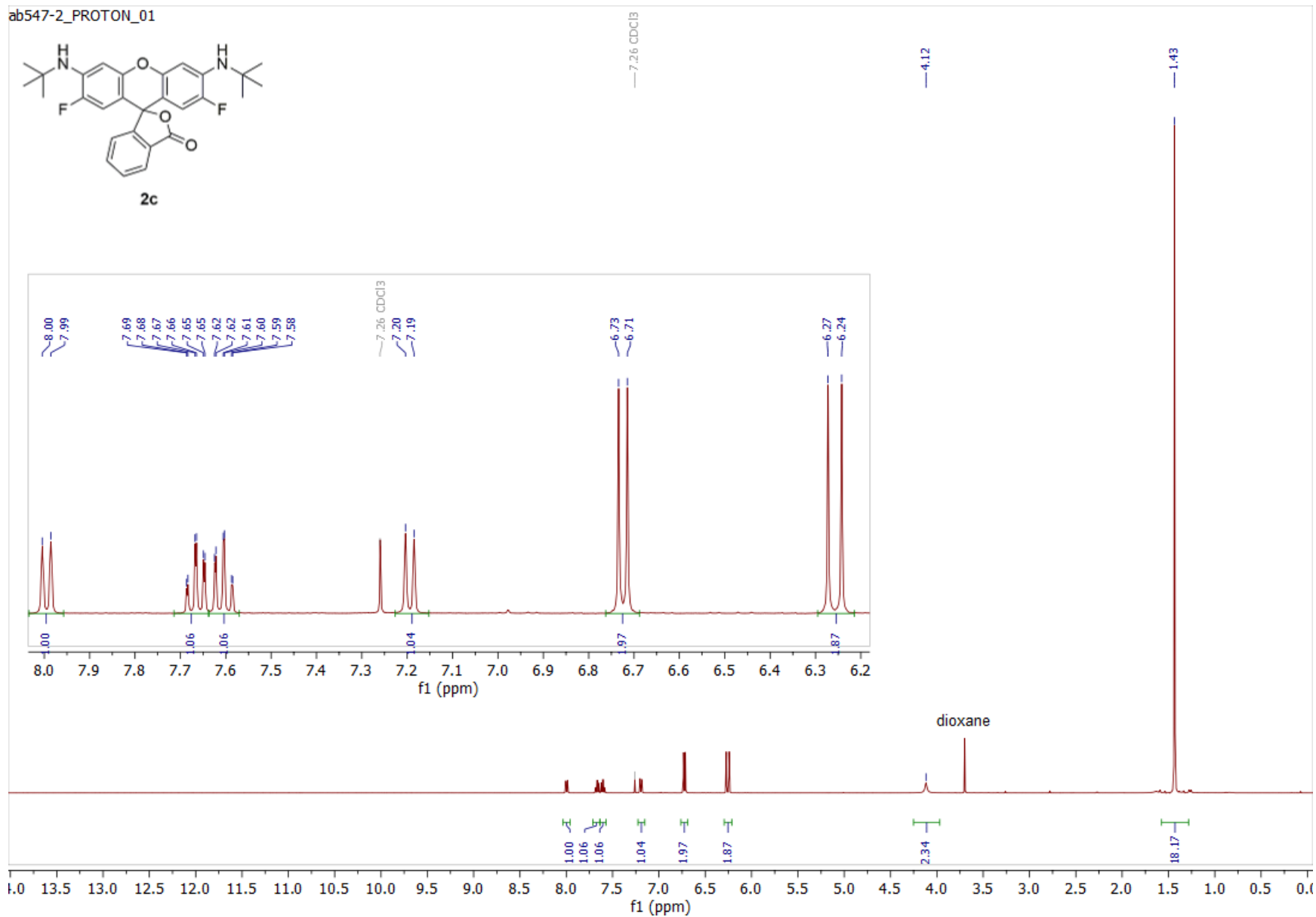
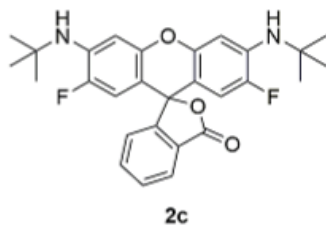
ab550-2_PROTON_01



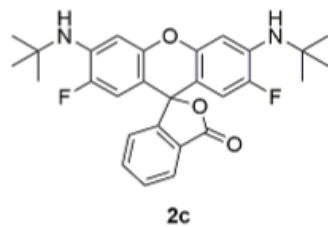
ab550-2_CARBO_01



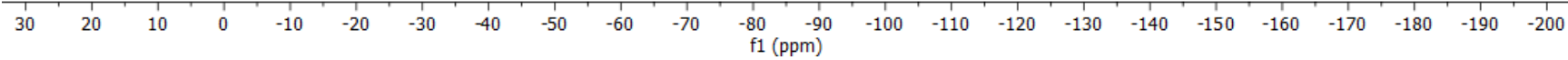
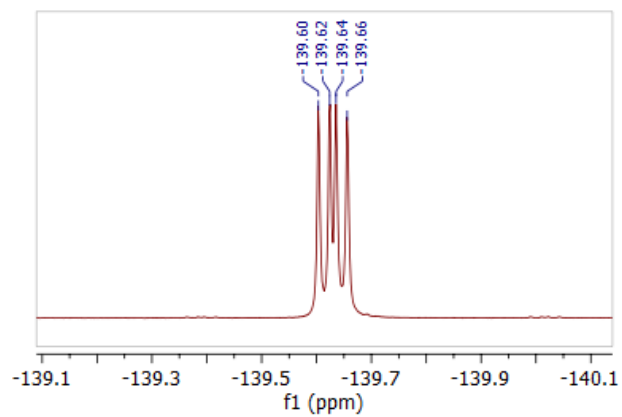
ab547-2_PROTON_01



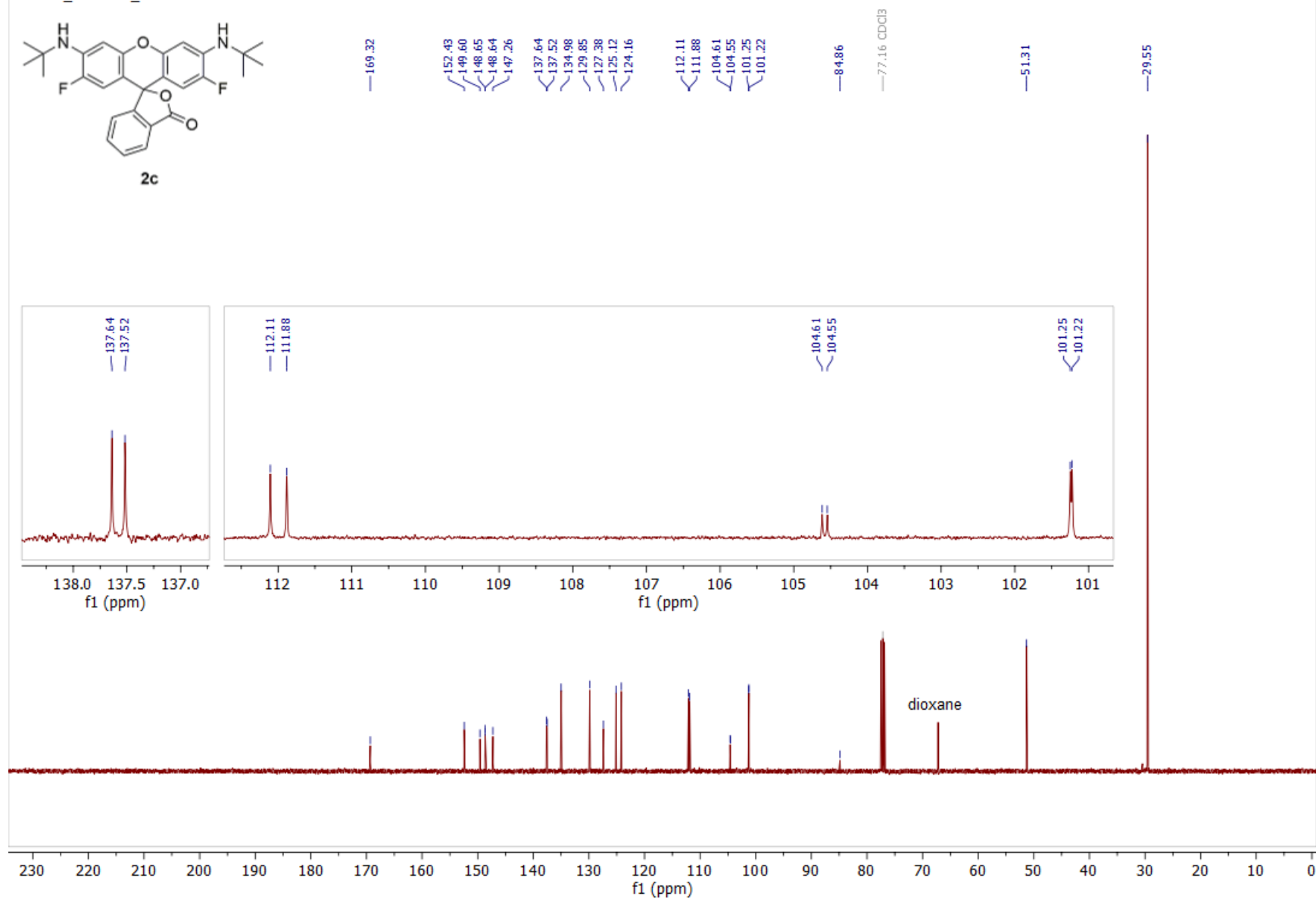
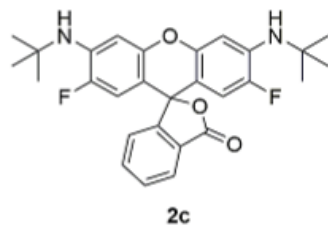
ab547-2_FLUORINE_01



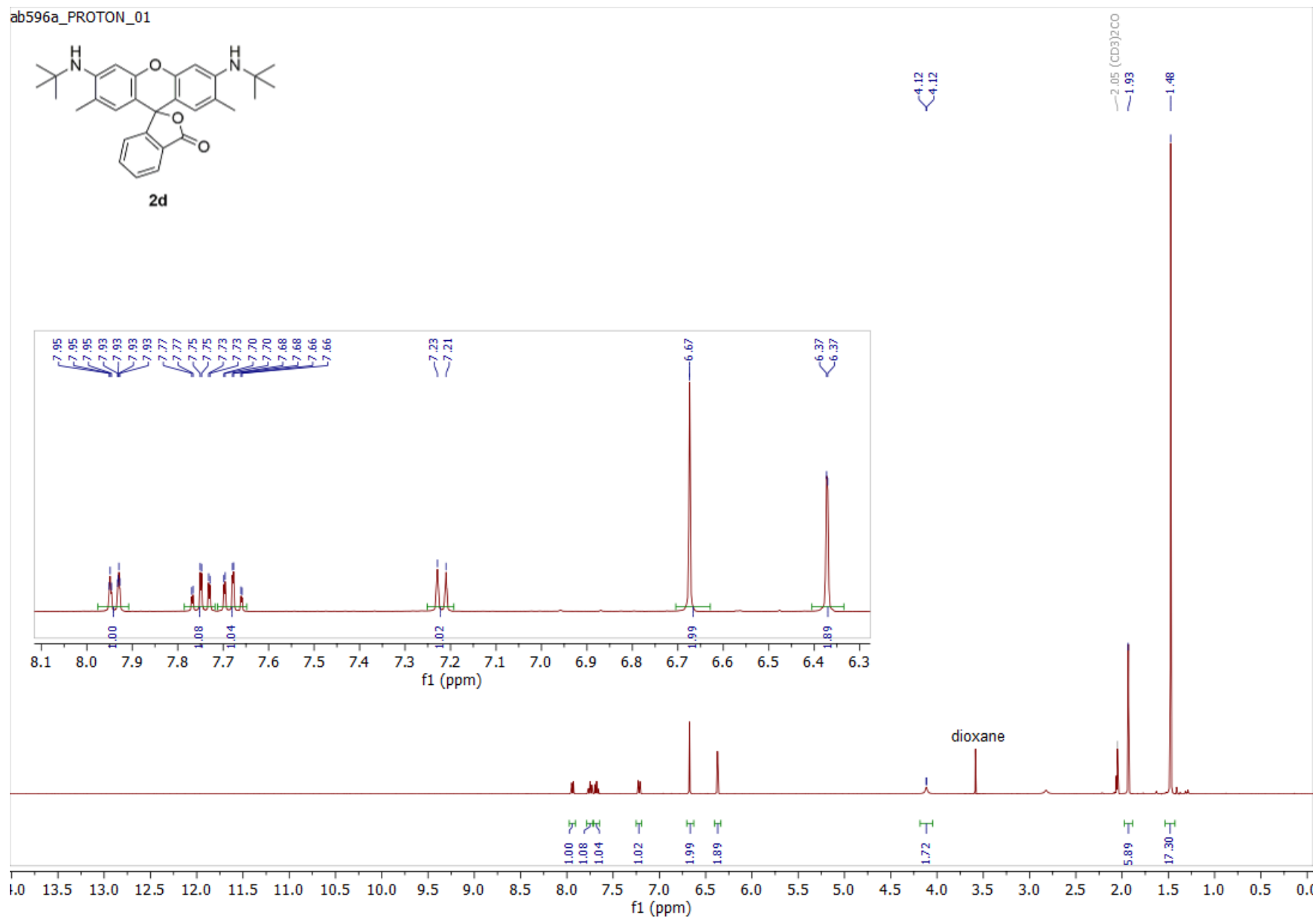
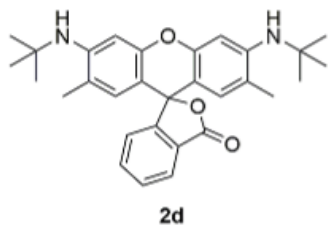
-139.60
-139.62
-139.64
-139.66



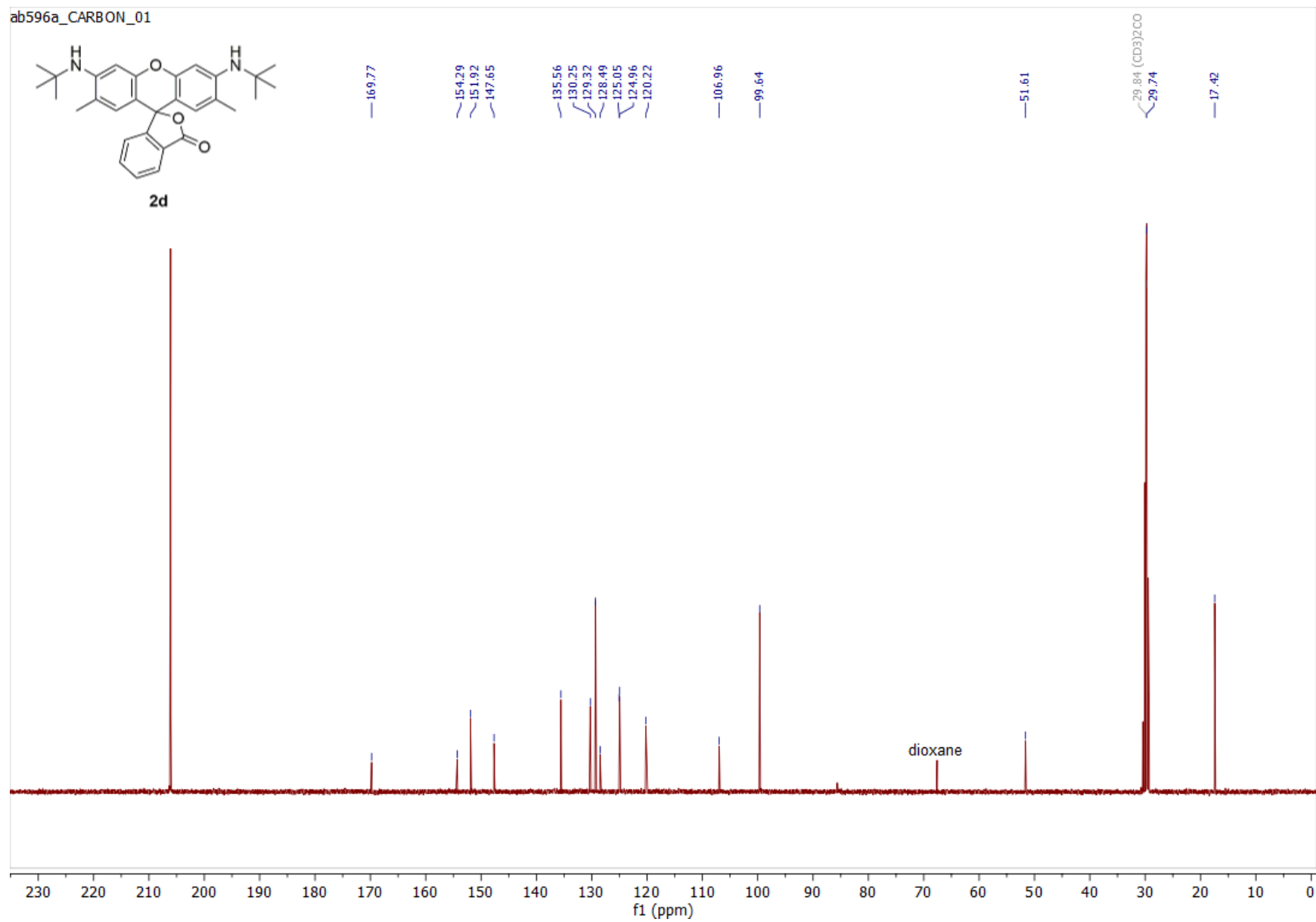
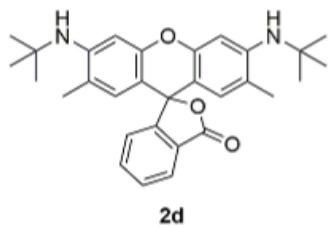
ab547-2_CARBON_01



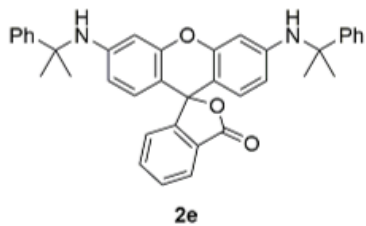
ab596a_PROTON_01



ab596a_CARBON_01



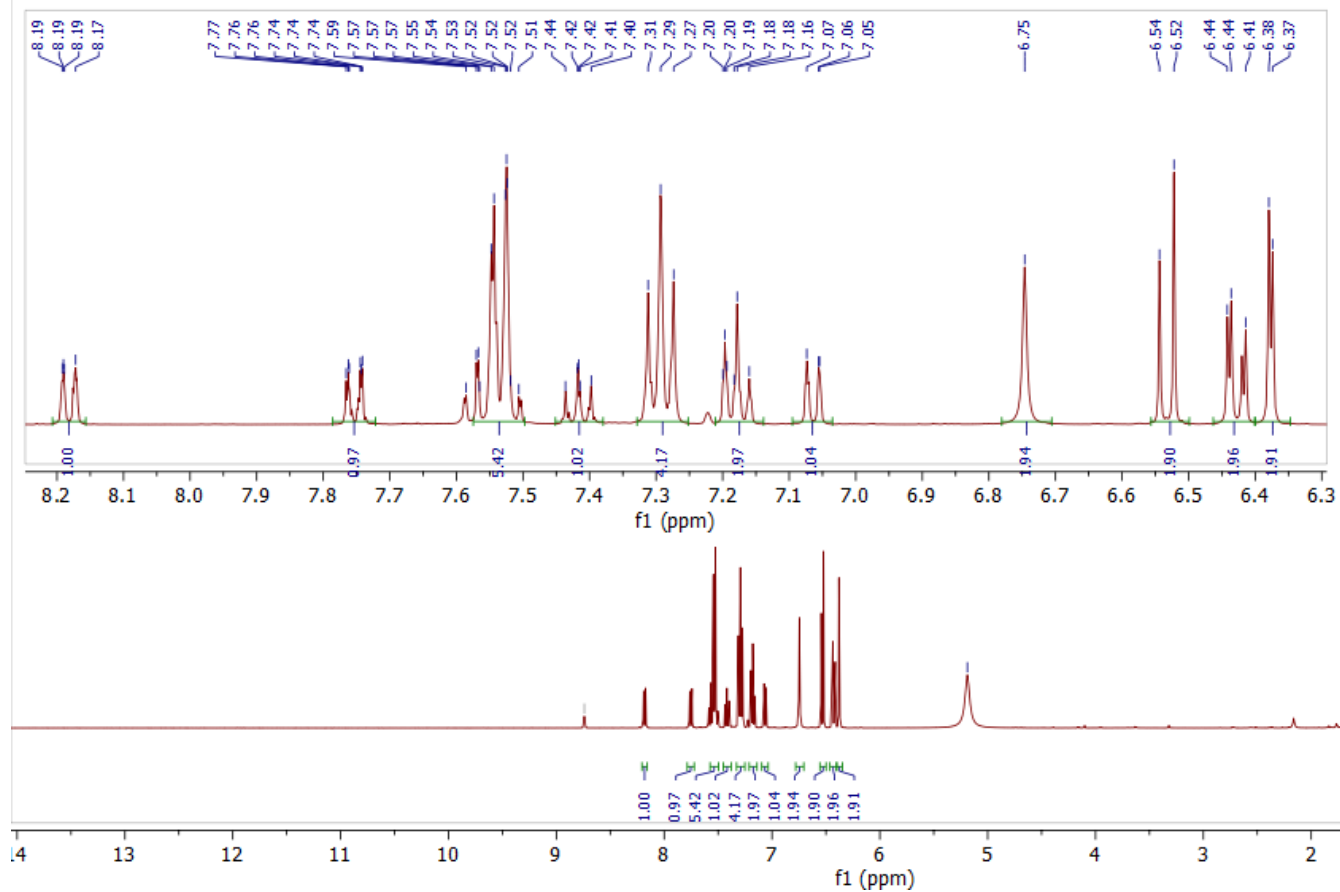
ab539p_PROTON_01



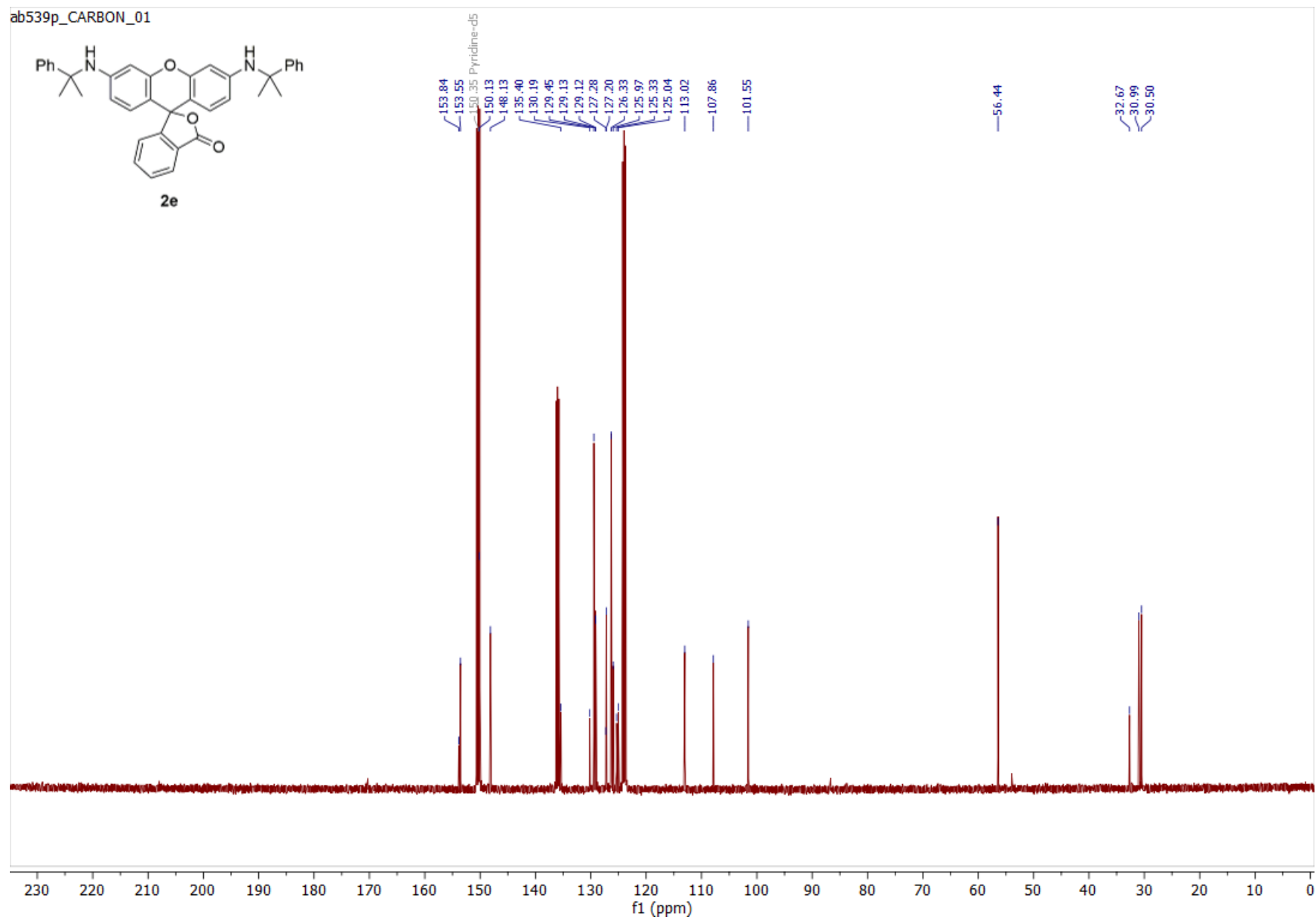
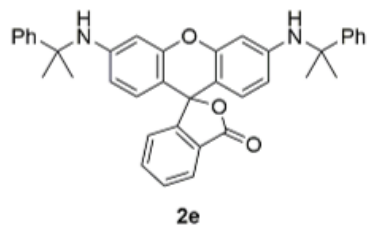
8.74 Pyridine-d5

5.19

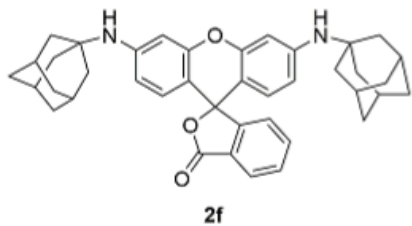
1.61



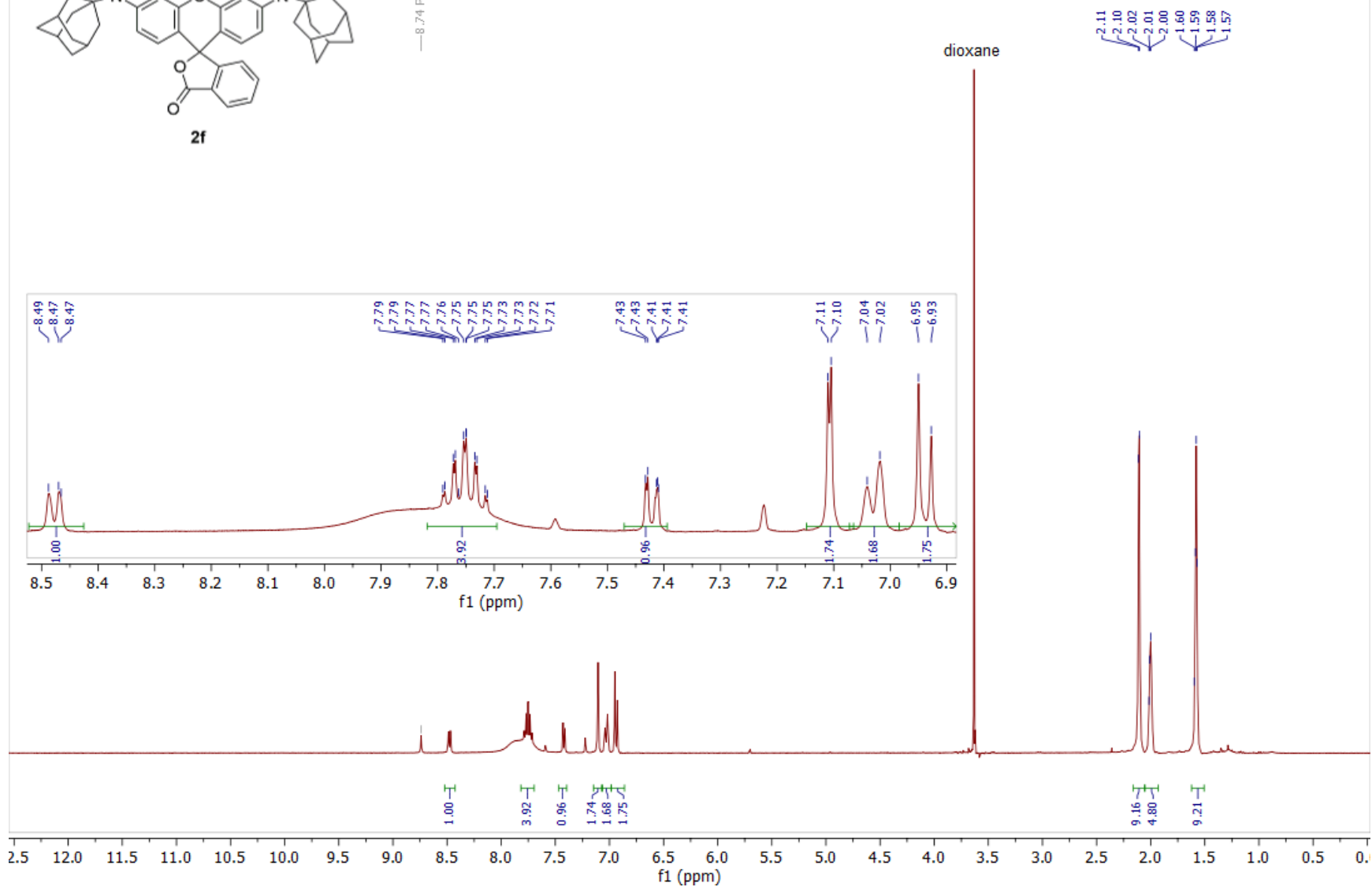
ab539p_CARBO_01

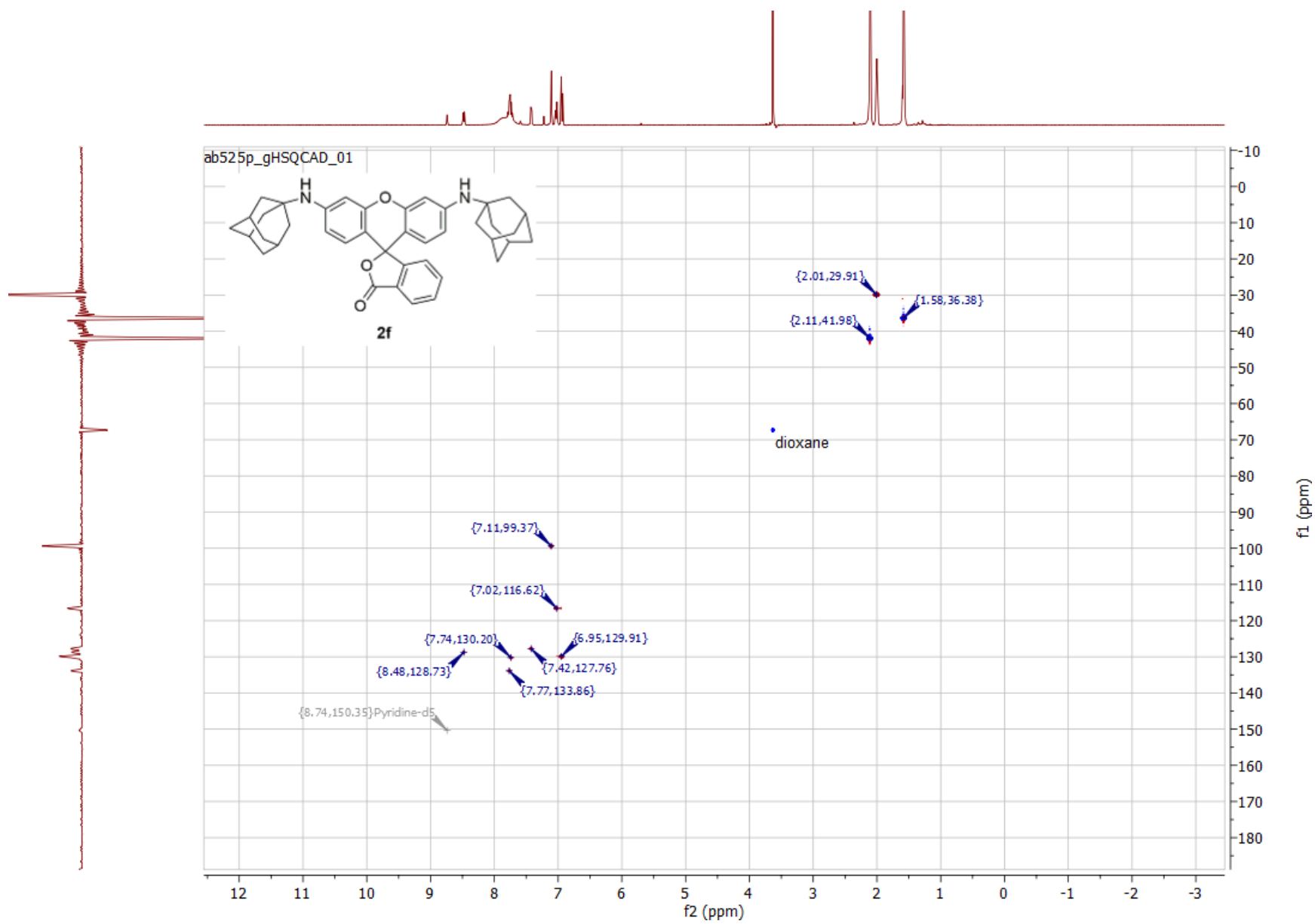


ab525p_PROTON_01

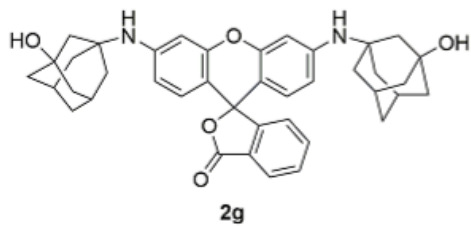


—8.74 Pyridine-d5

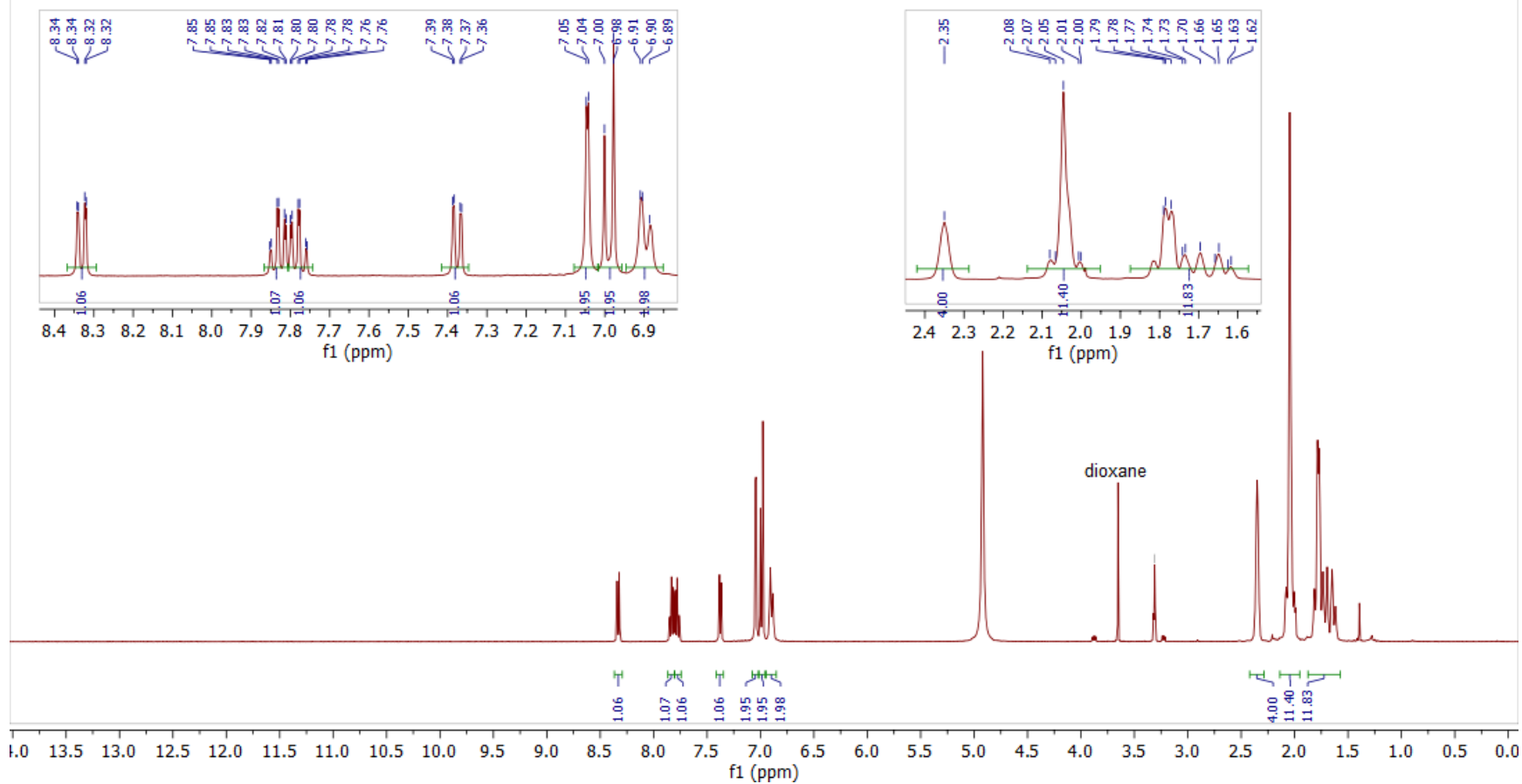




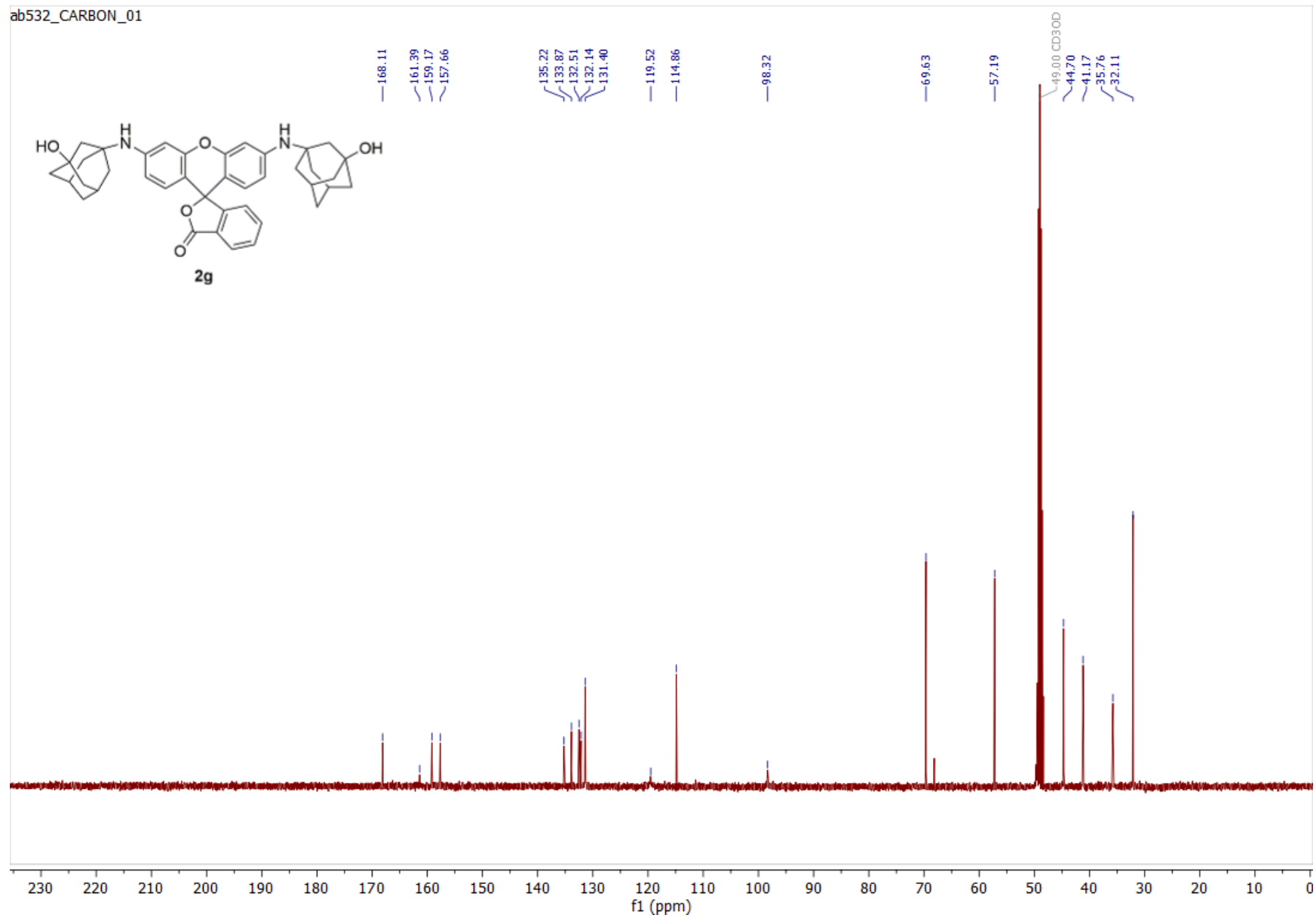
ab532_PROTON_01



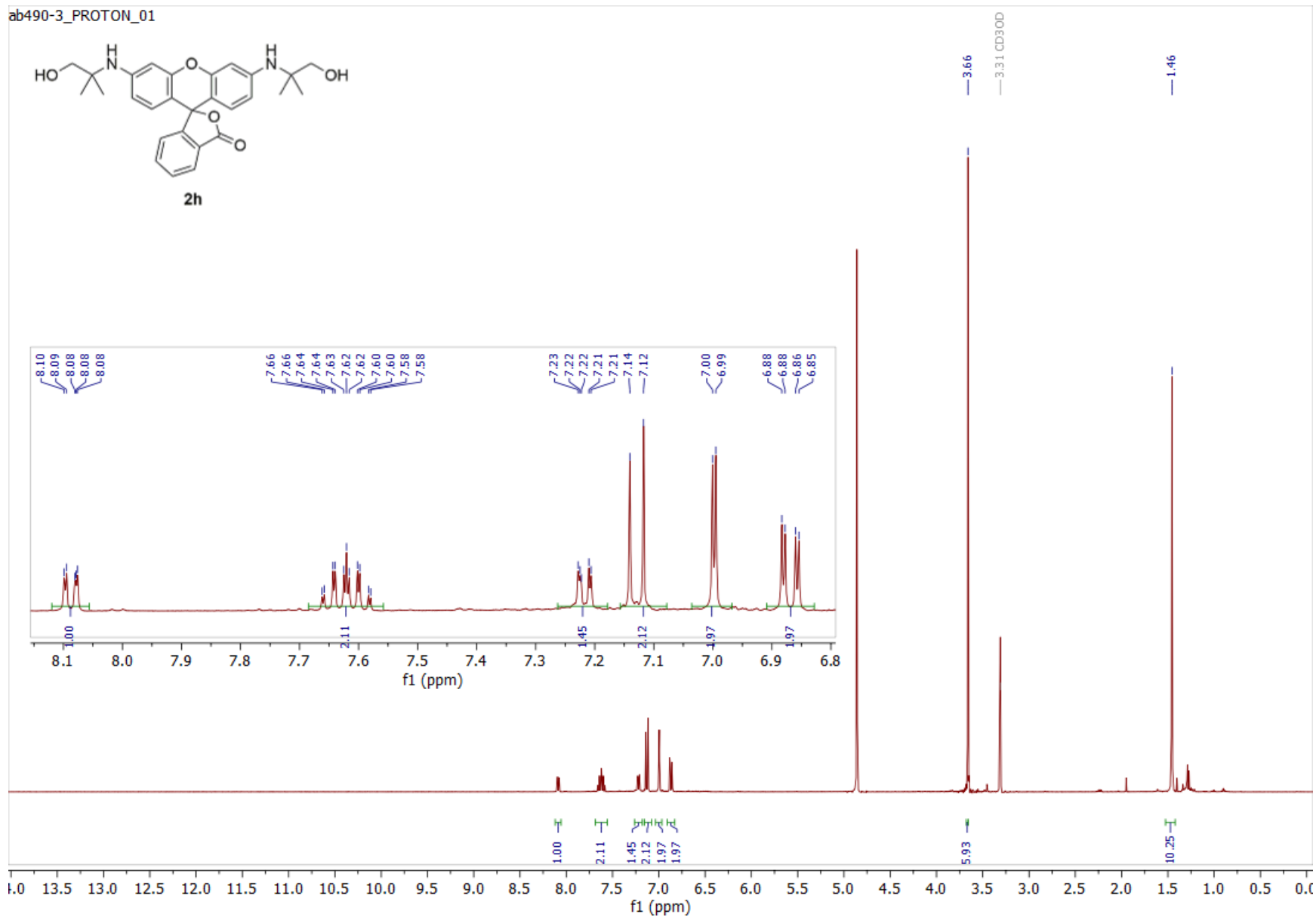
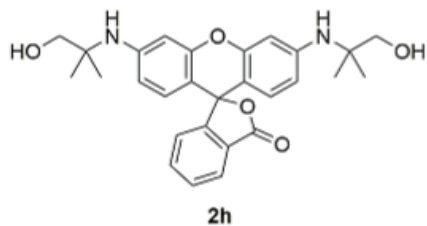
— 3.31 CD3OD



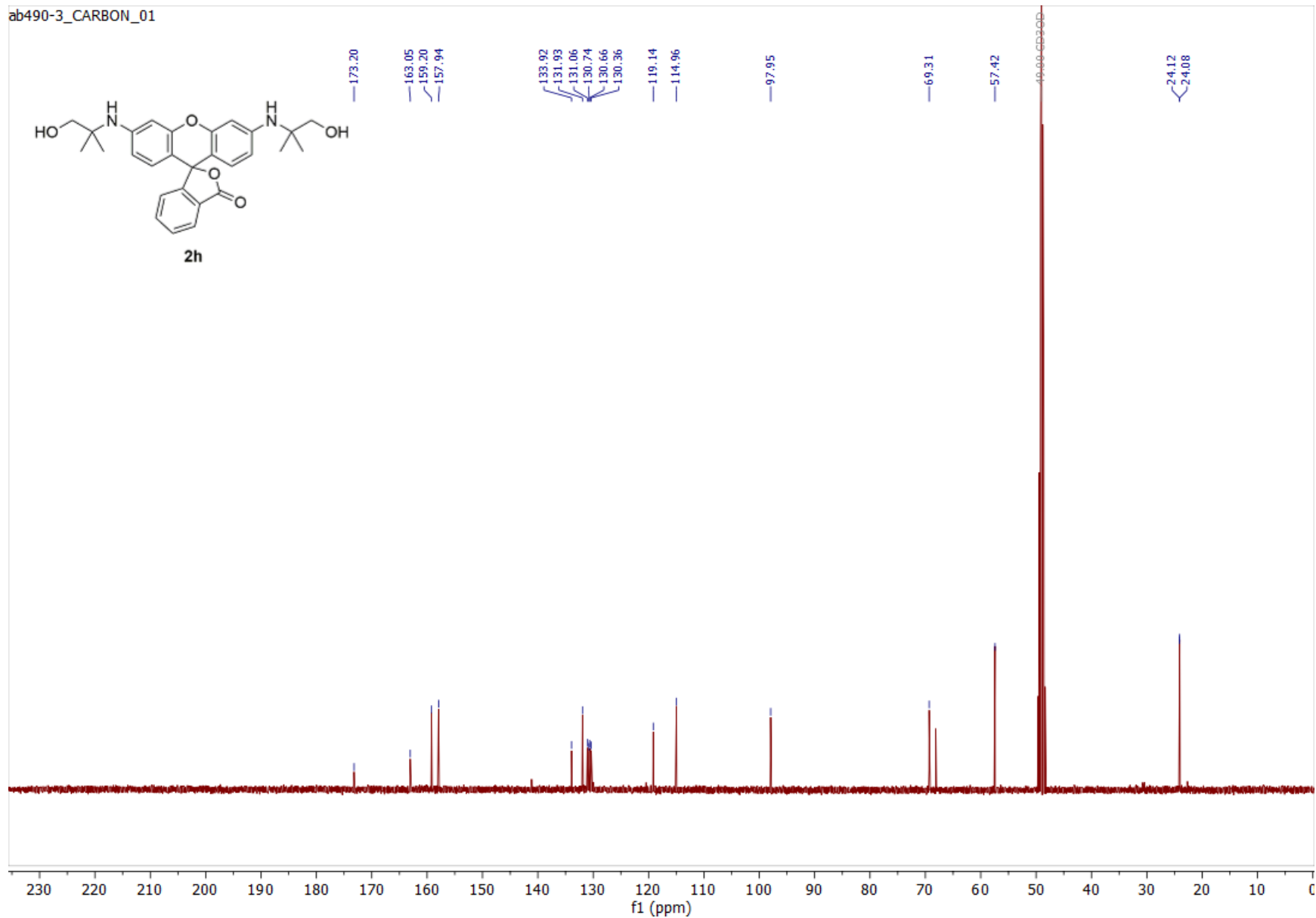
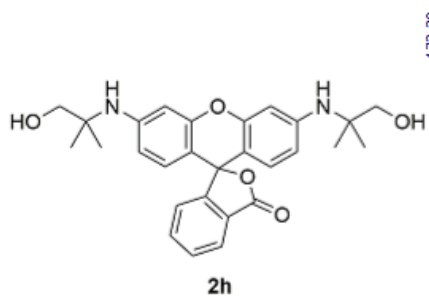
ab532_CARBON_01



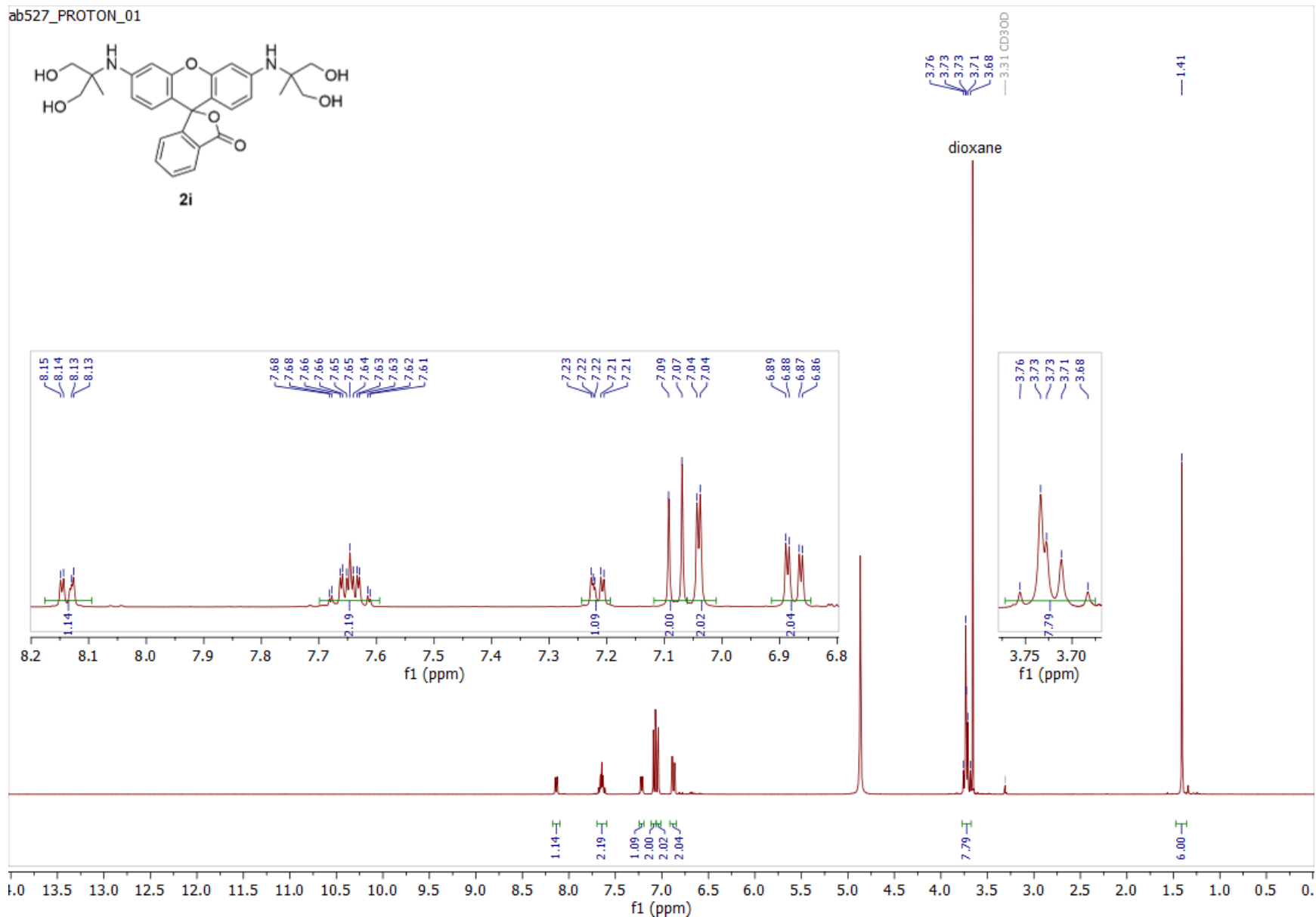
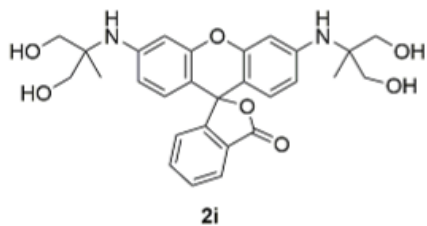
ab490-3_PROTON_01



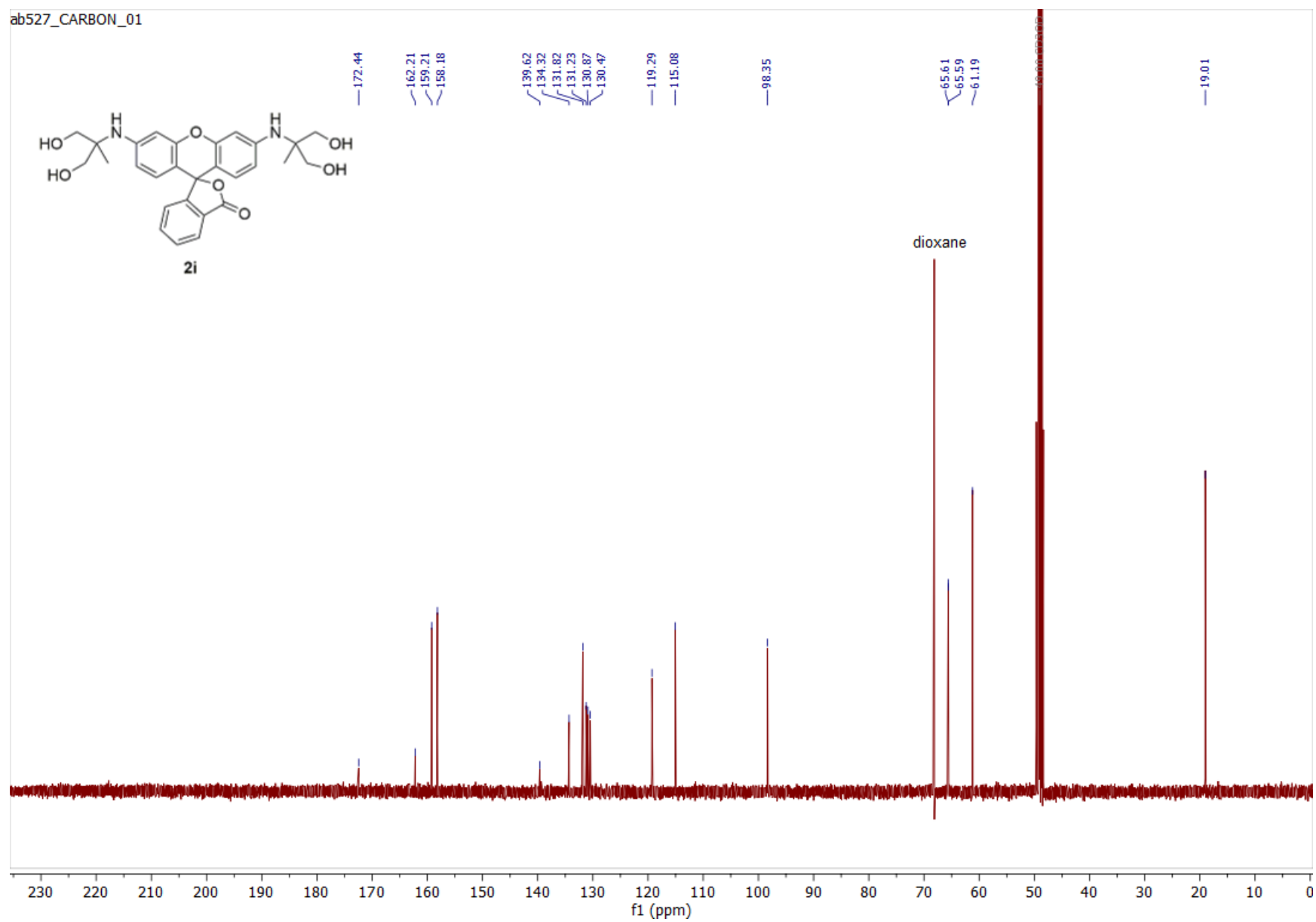
ab490-3_CARBOON_01



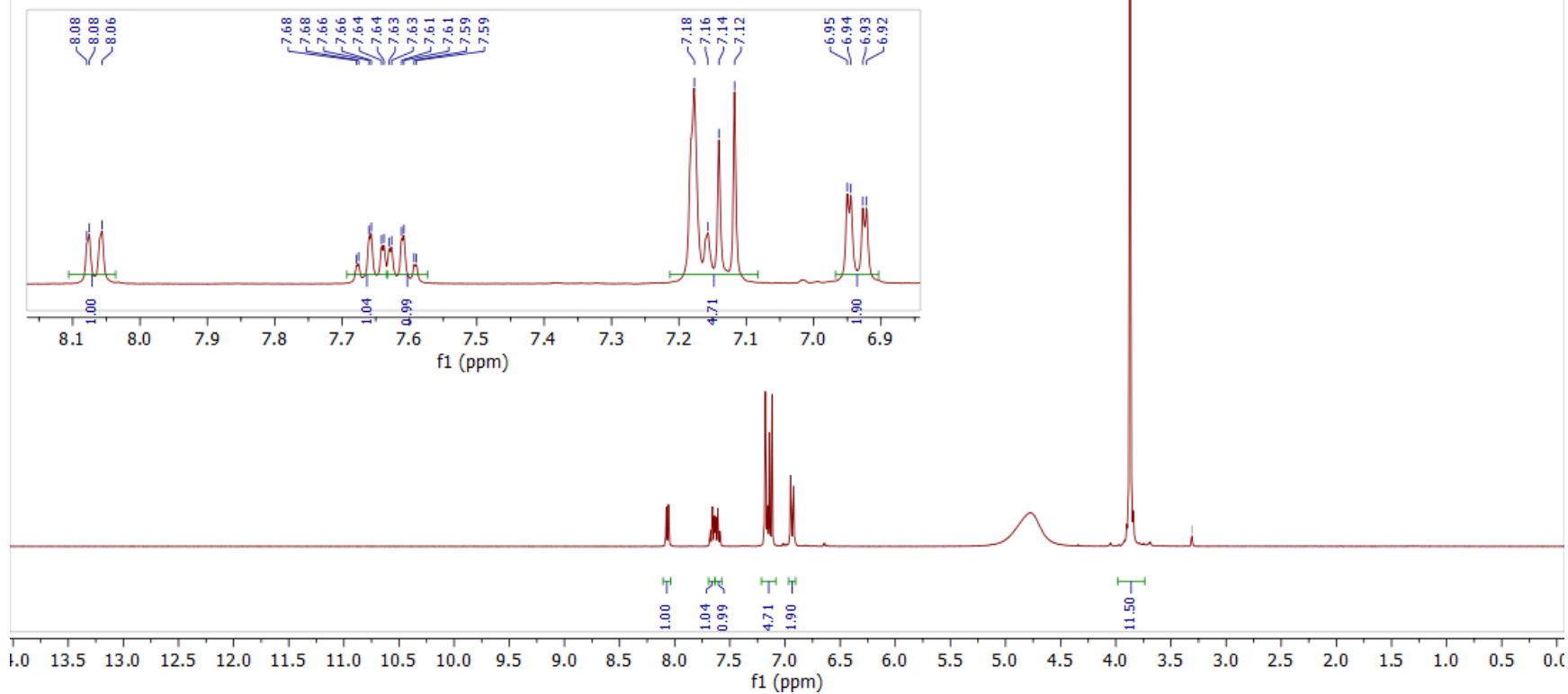
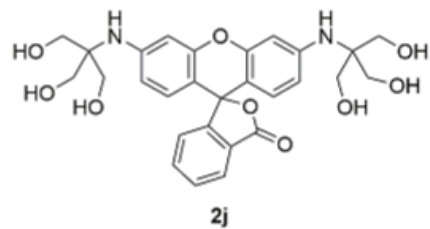
ab527_PROTON_01



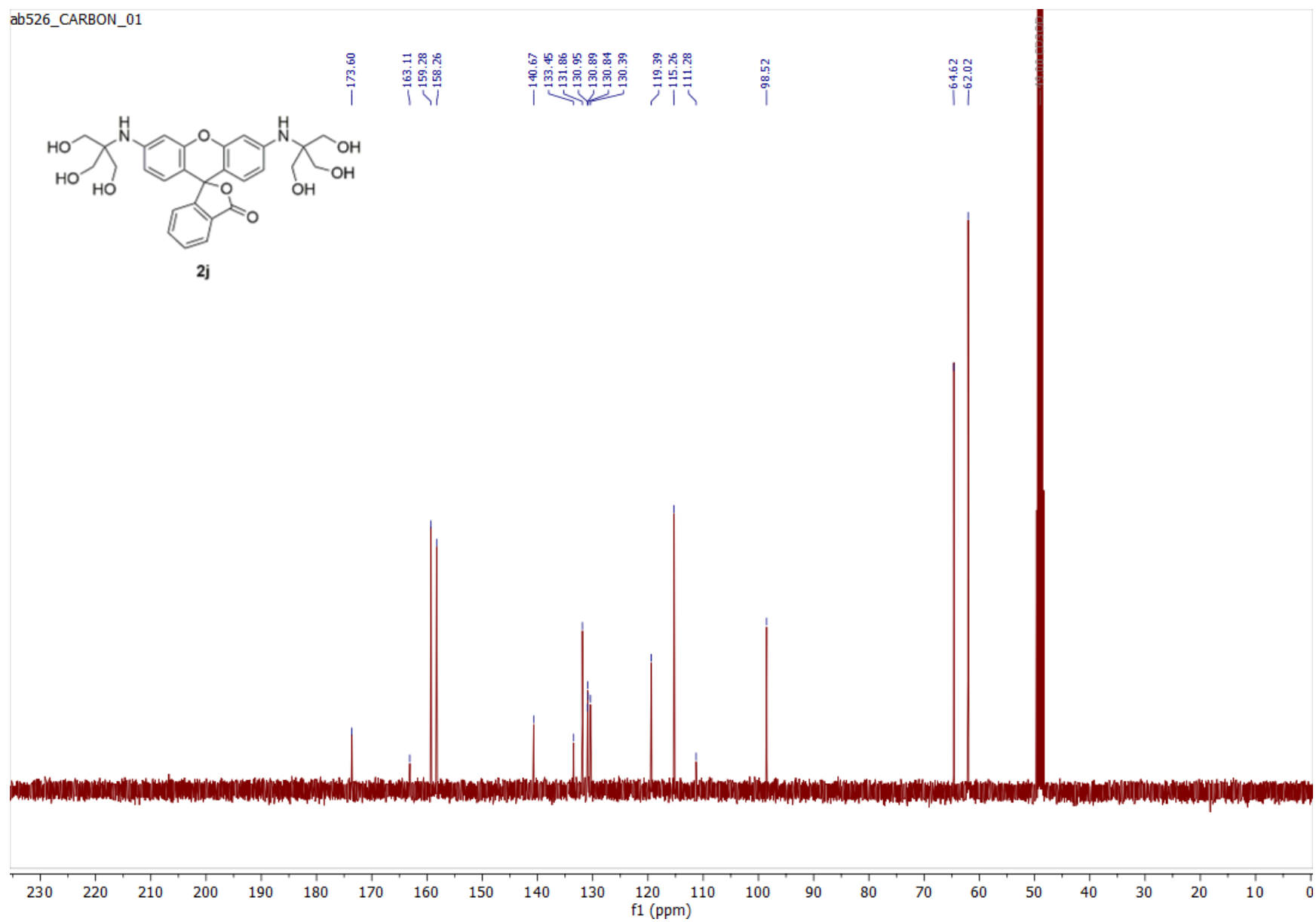
ab527_CARBON_01



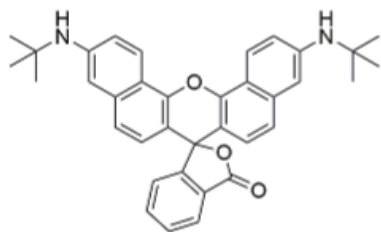
ab526_PROTON_01



ab526_CARBON_01

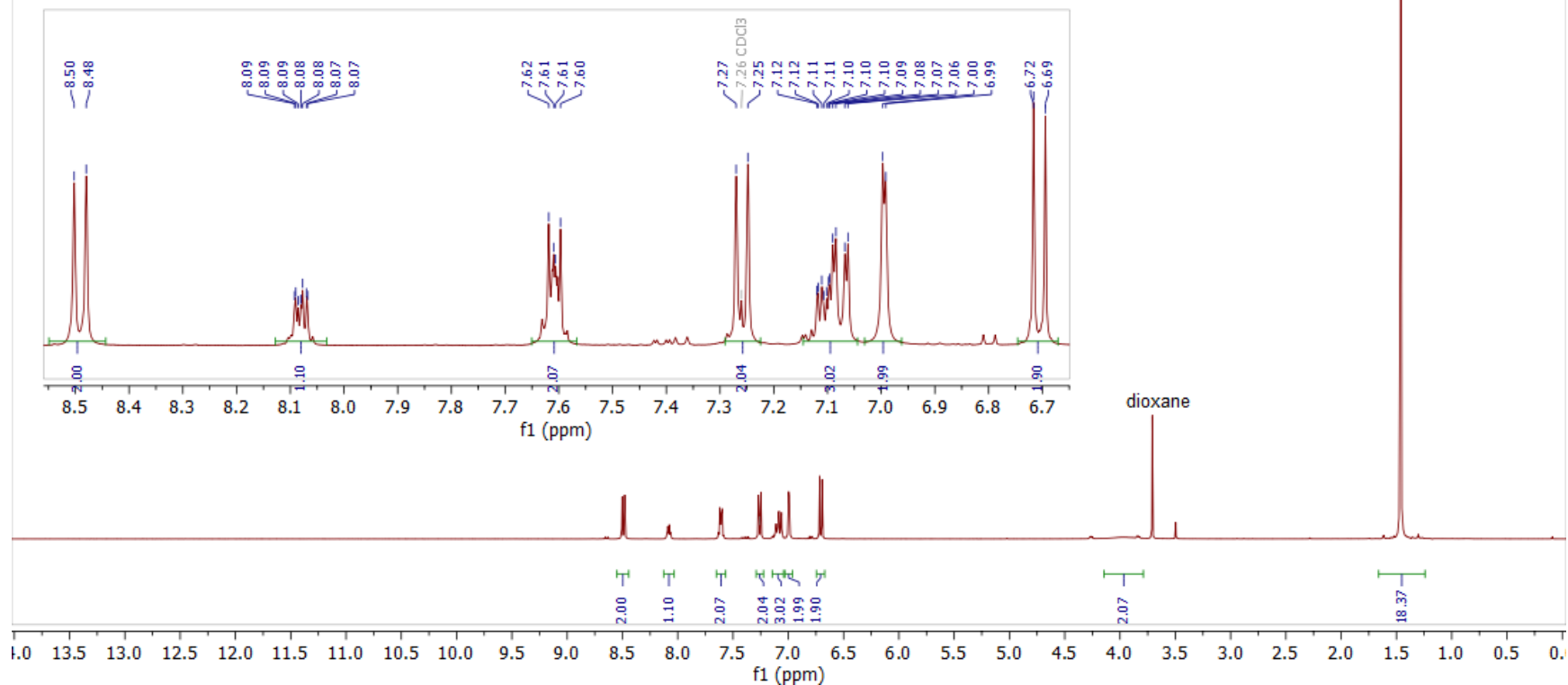


ab530a_PROTON_01

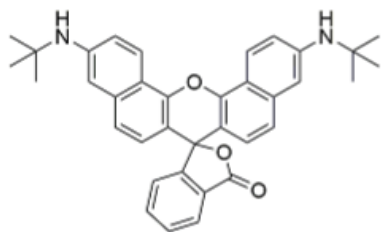


2k

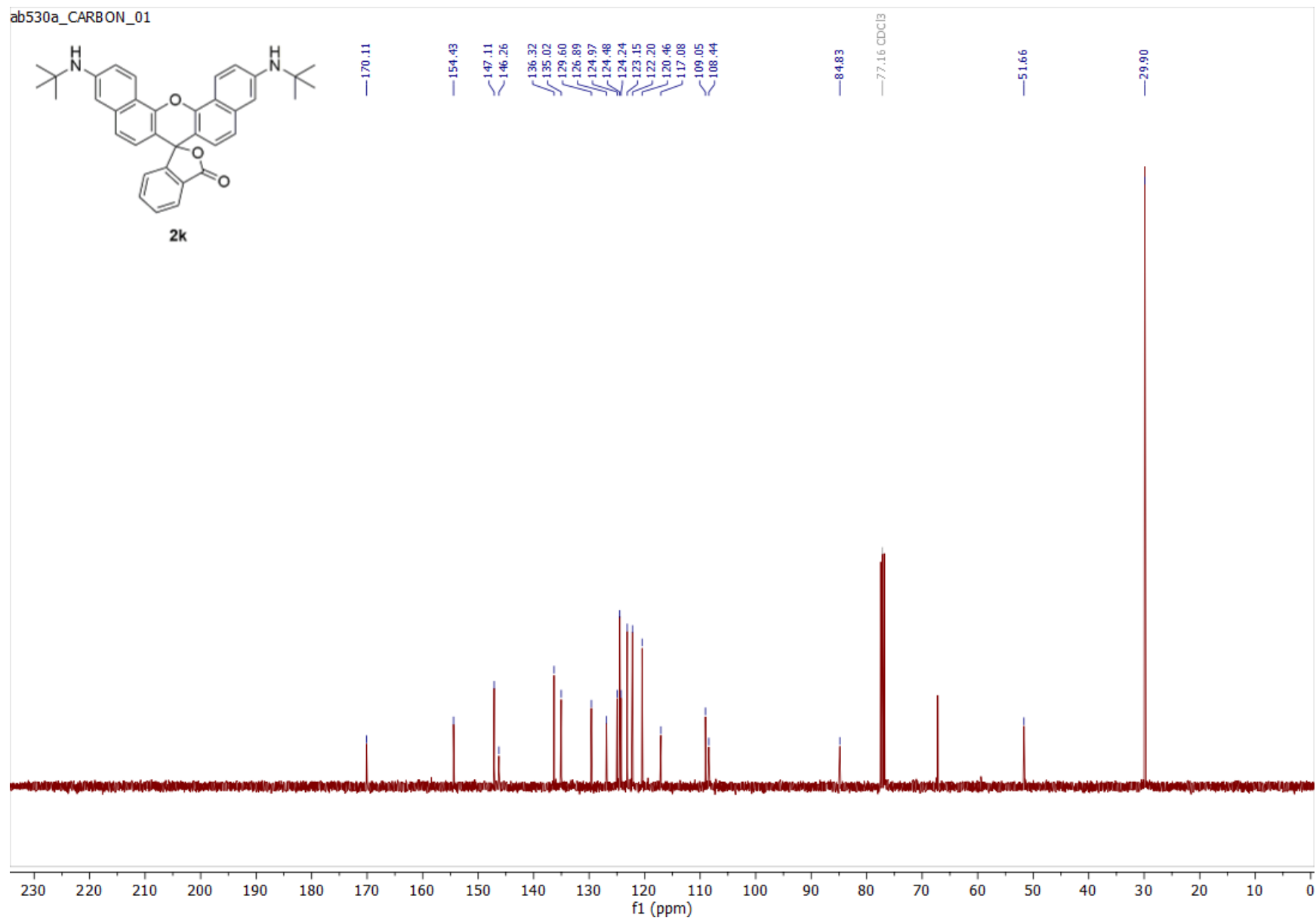
—7.26 CDCl₃



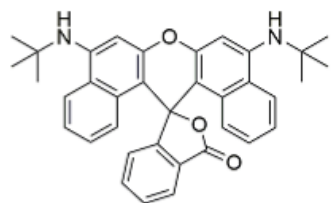
ab530a_CARBON_01



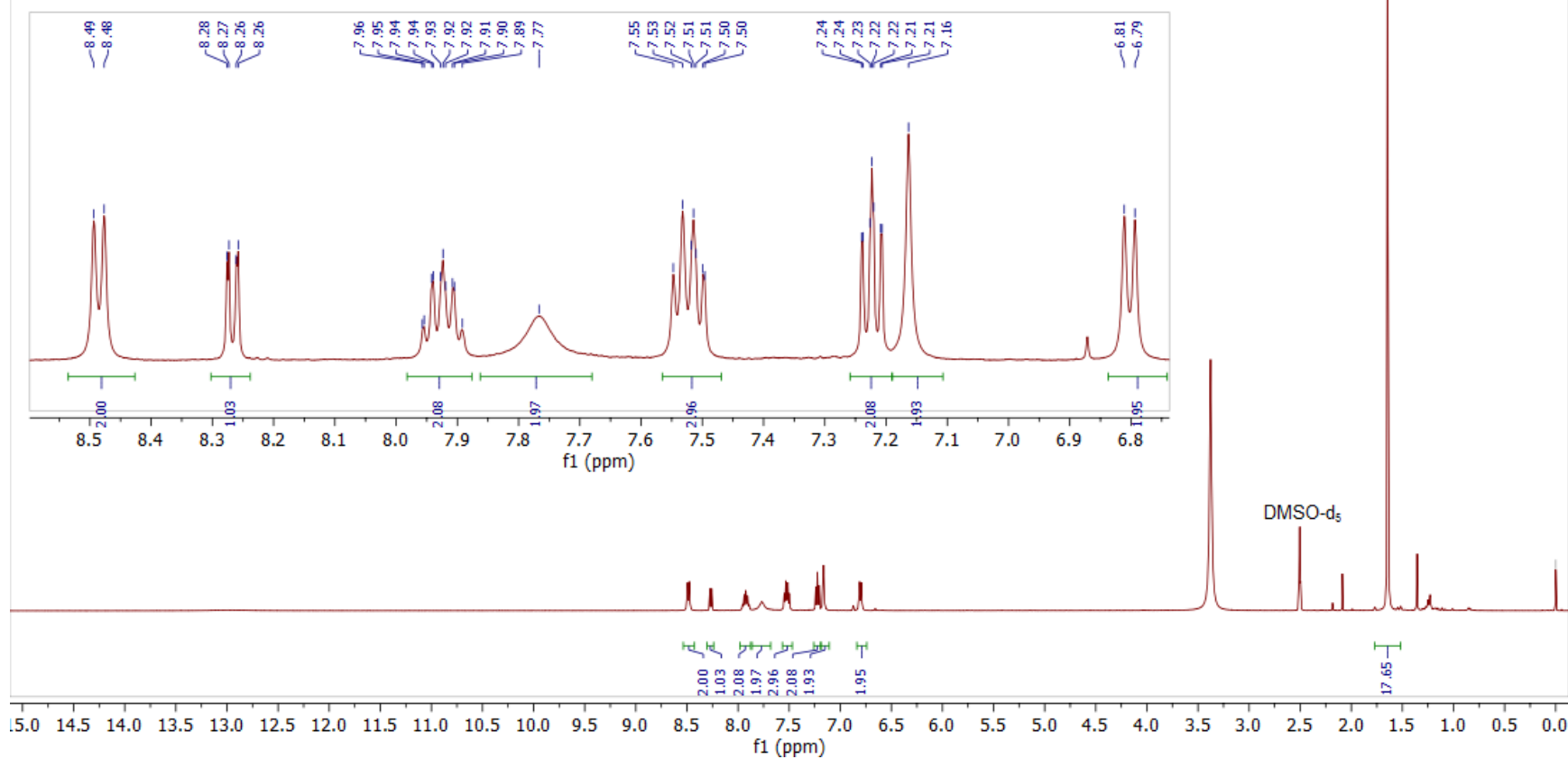
2k



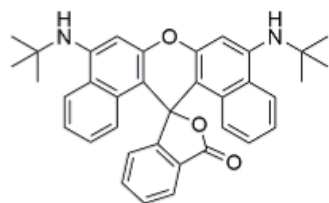
ab551a2_5h.1.fid



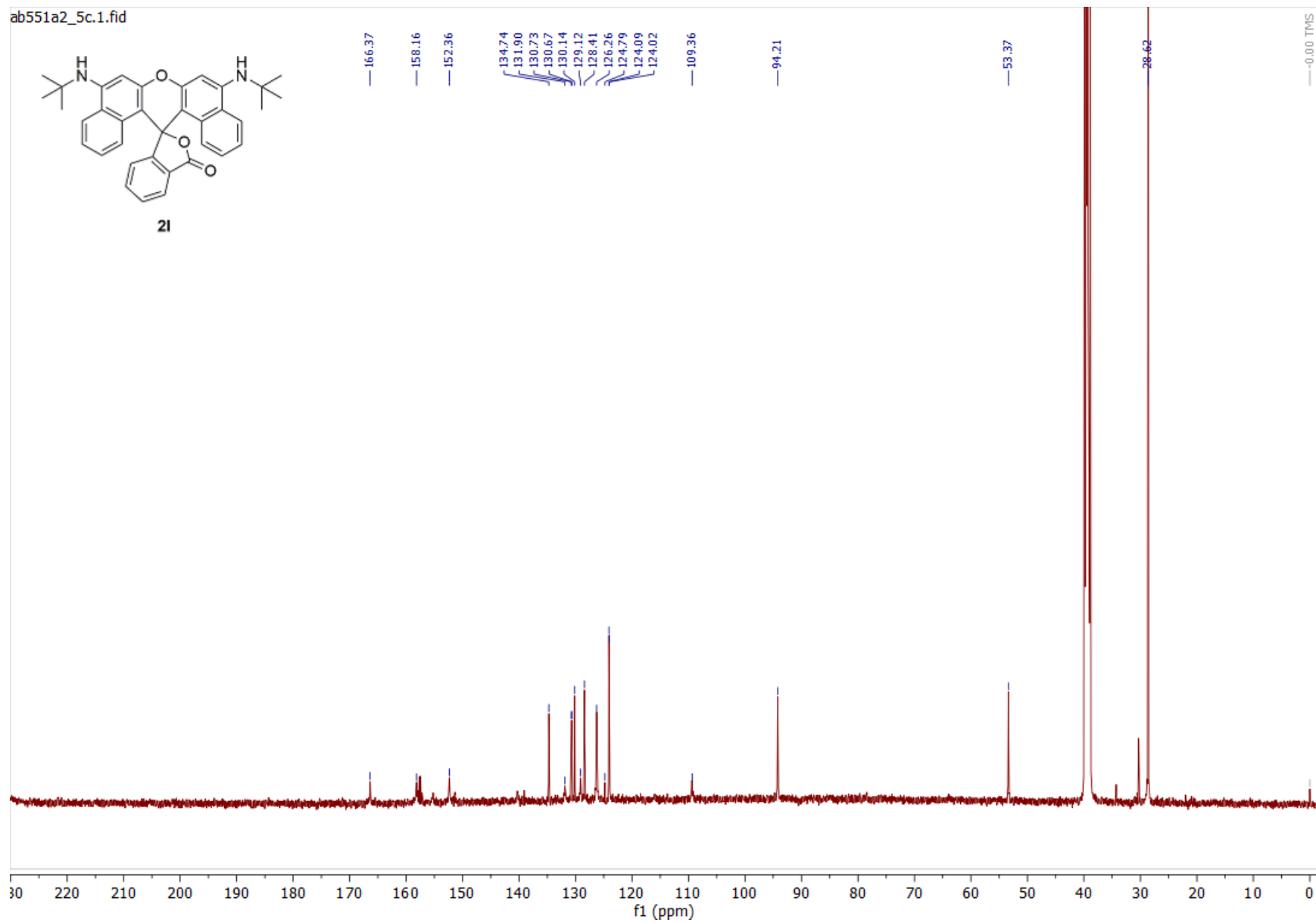
21



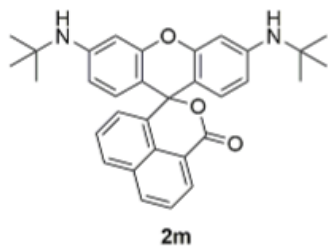
ab551a2_5c.1.fid



21

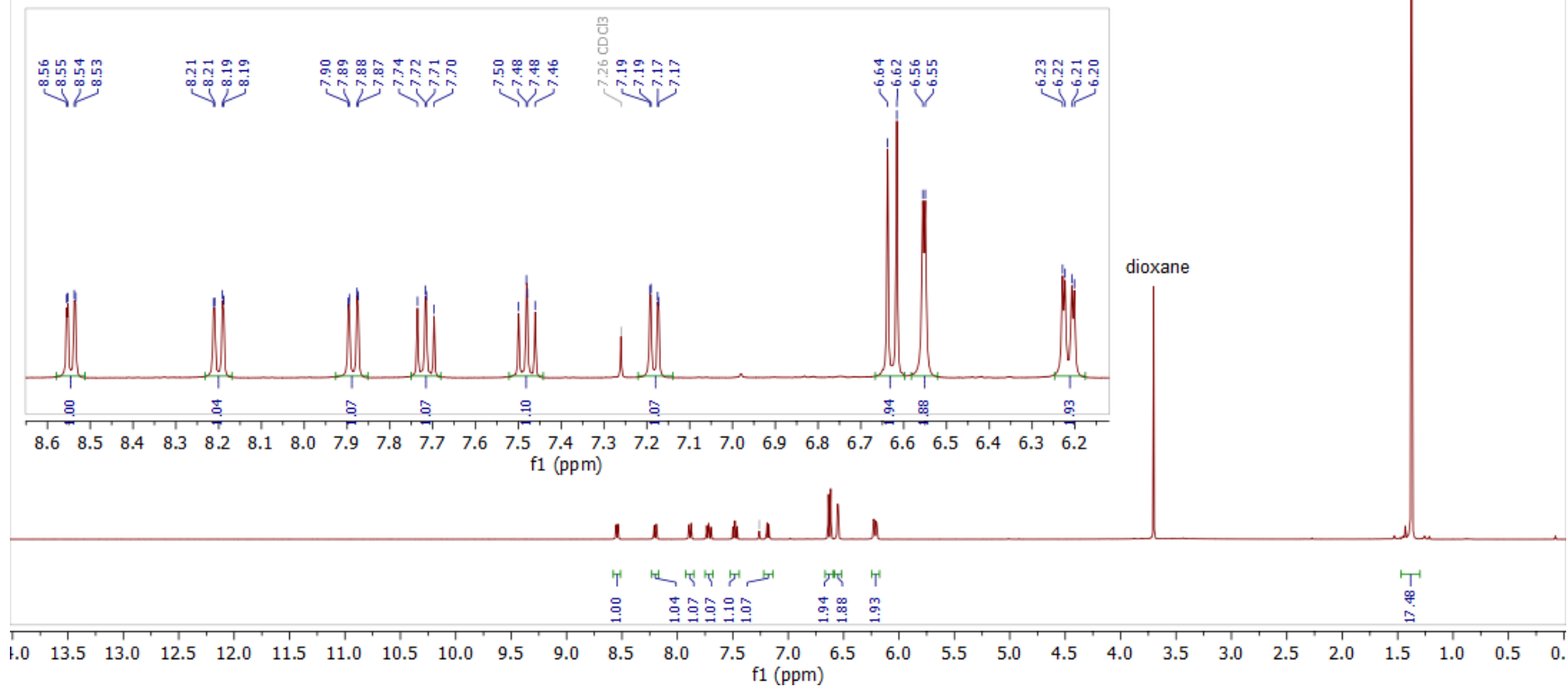


ab544_PROTON_01

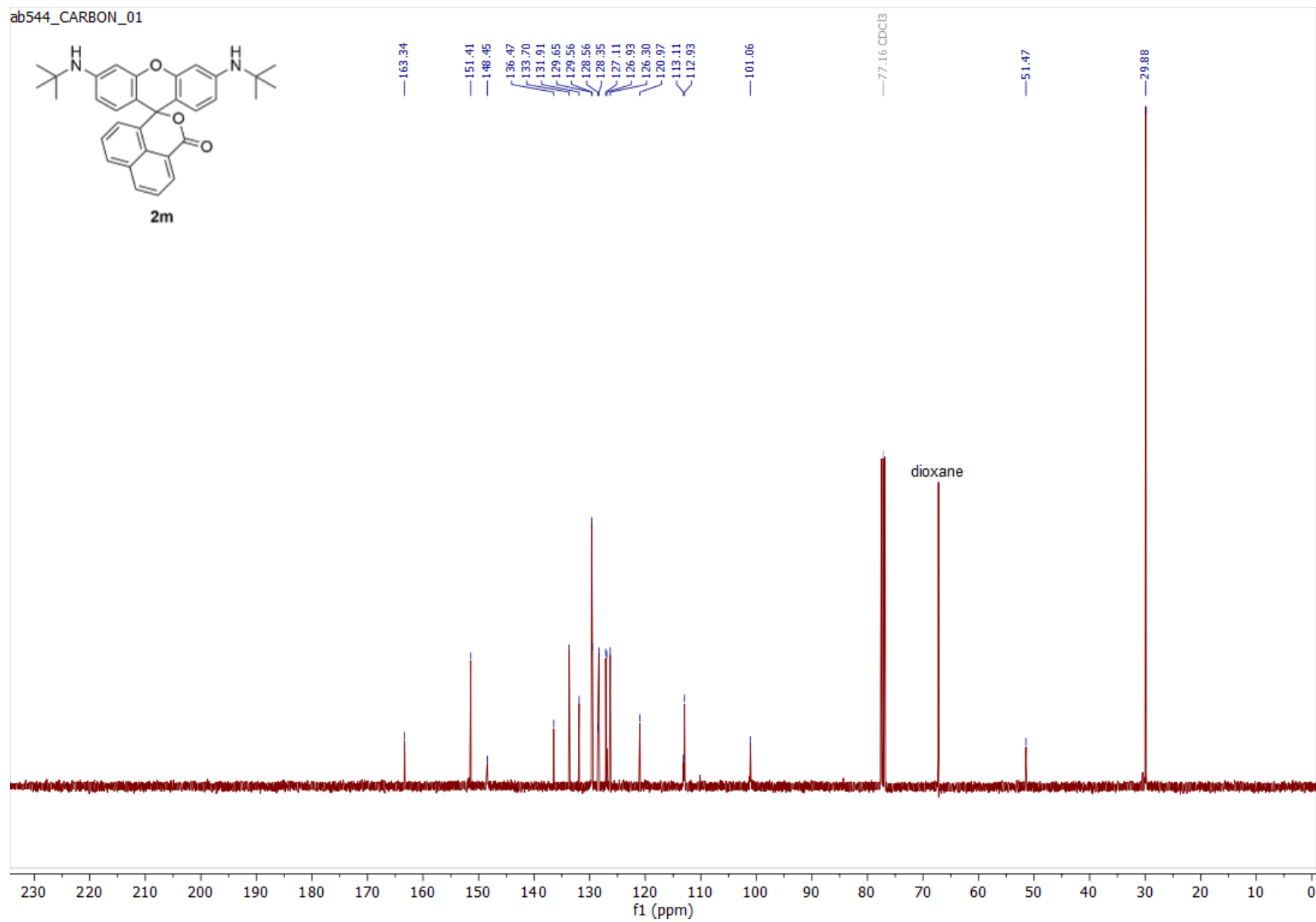
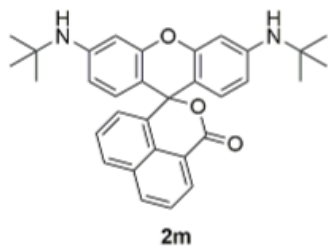


—7.26 CDCl₃

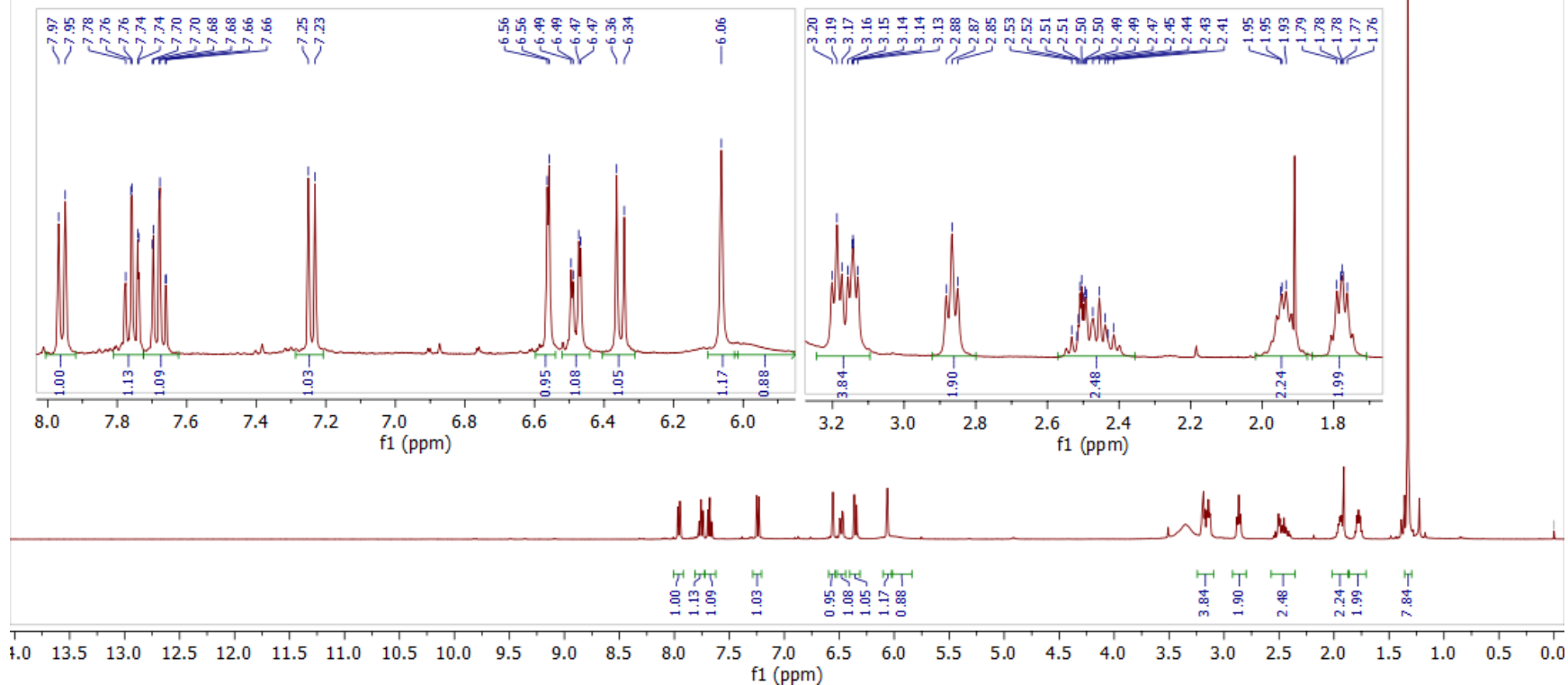
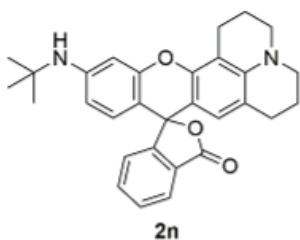
—1.37



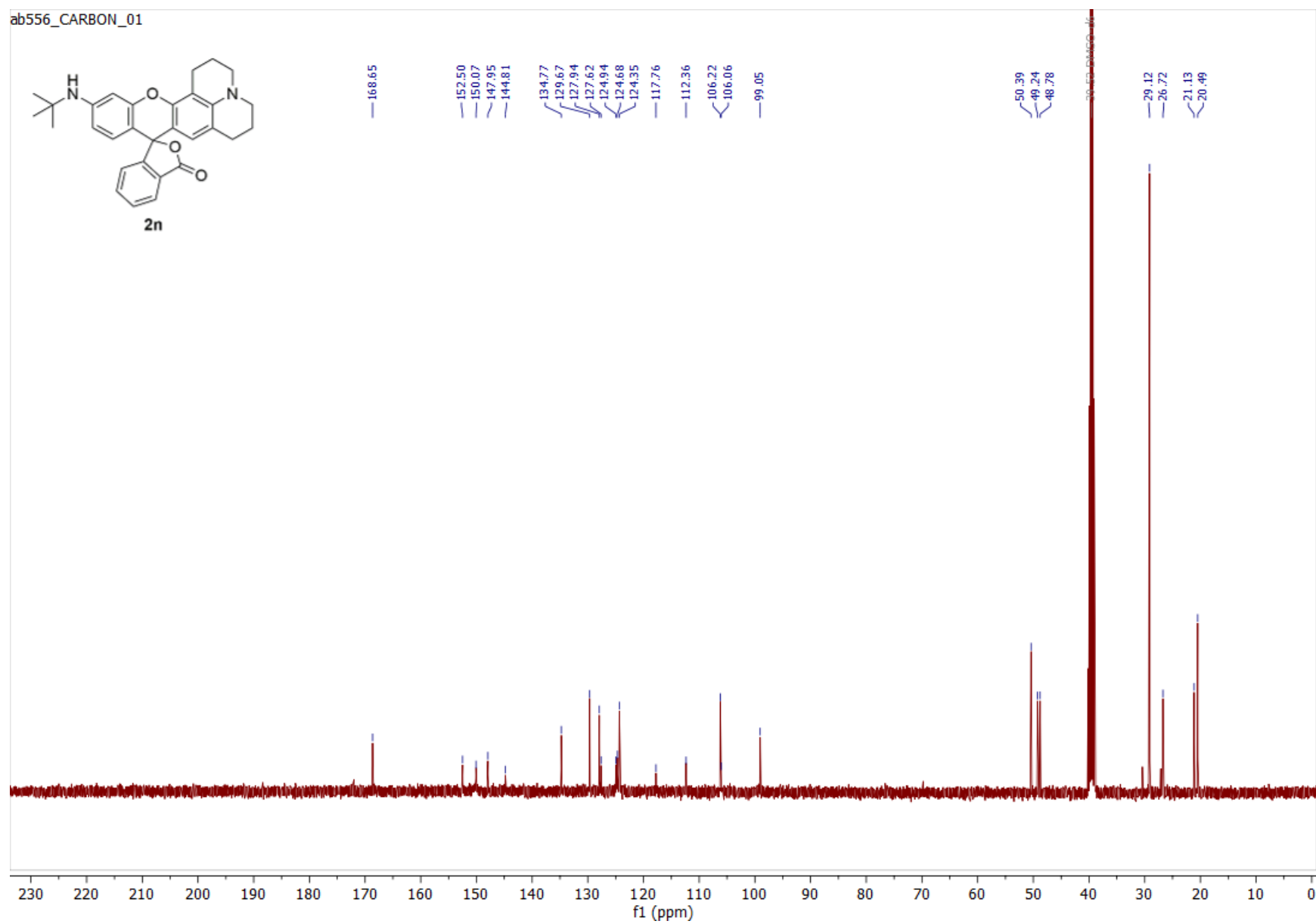
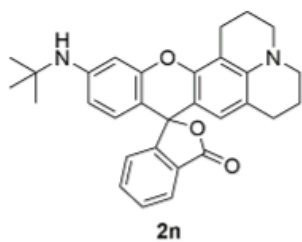
ab544_CARBON_01



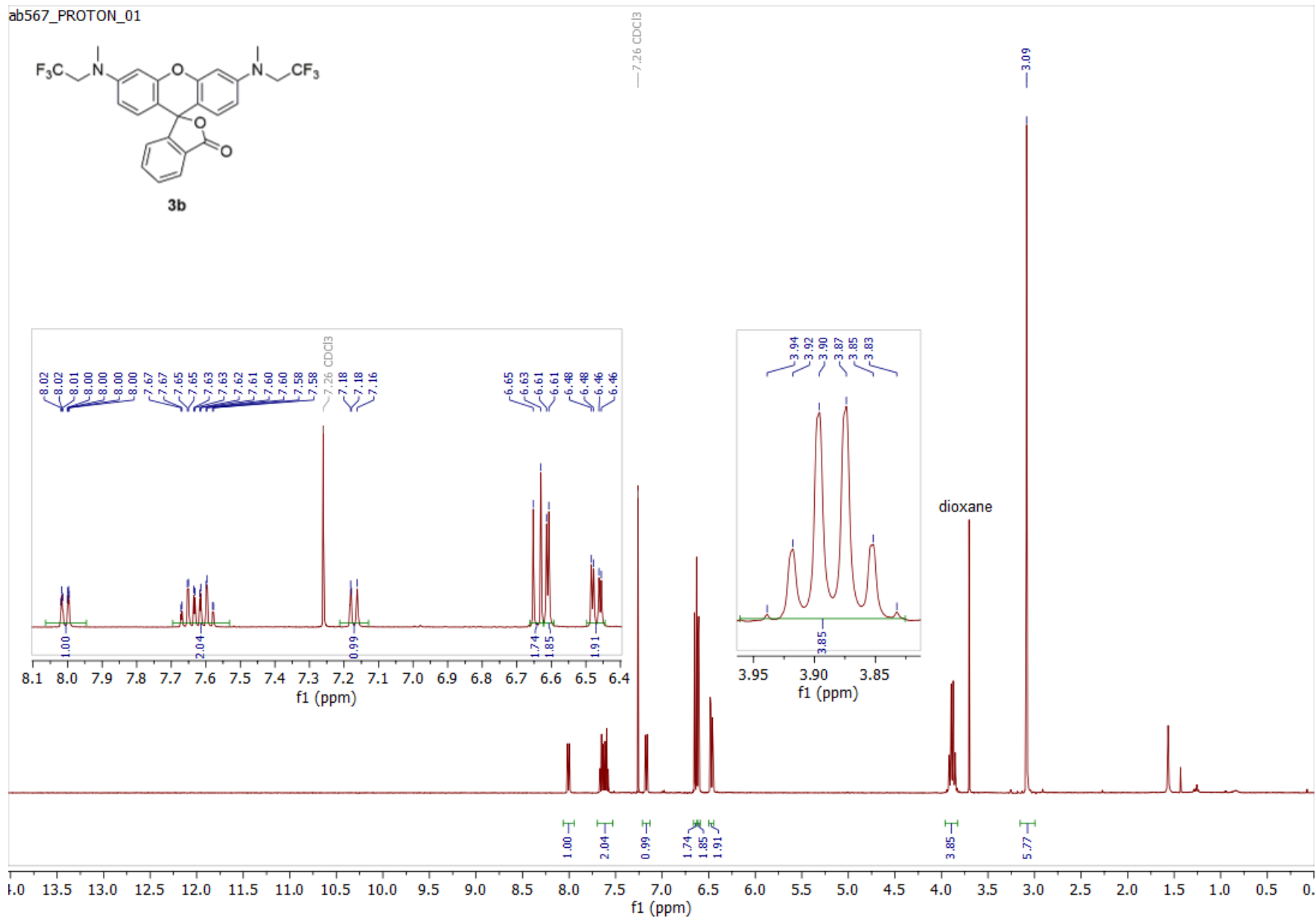
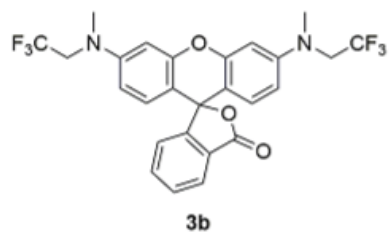
ab556_PROTON_01



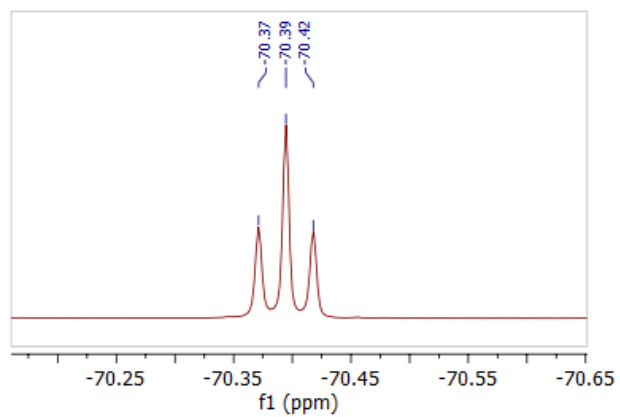
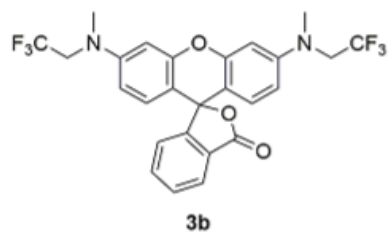
ab556_CARBON_01



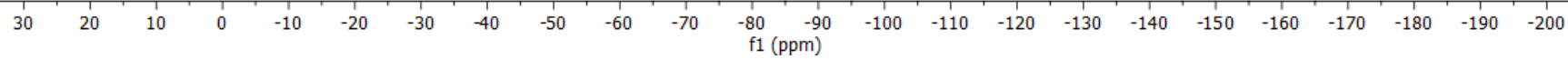
ab567_PROTON_01



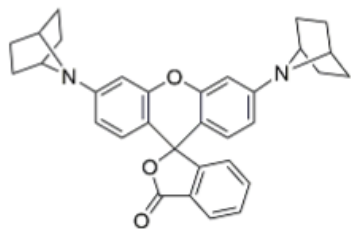
ab567_FLUORINE_01



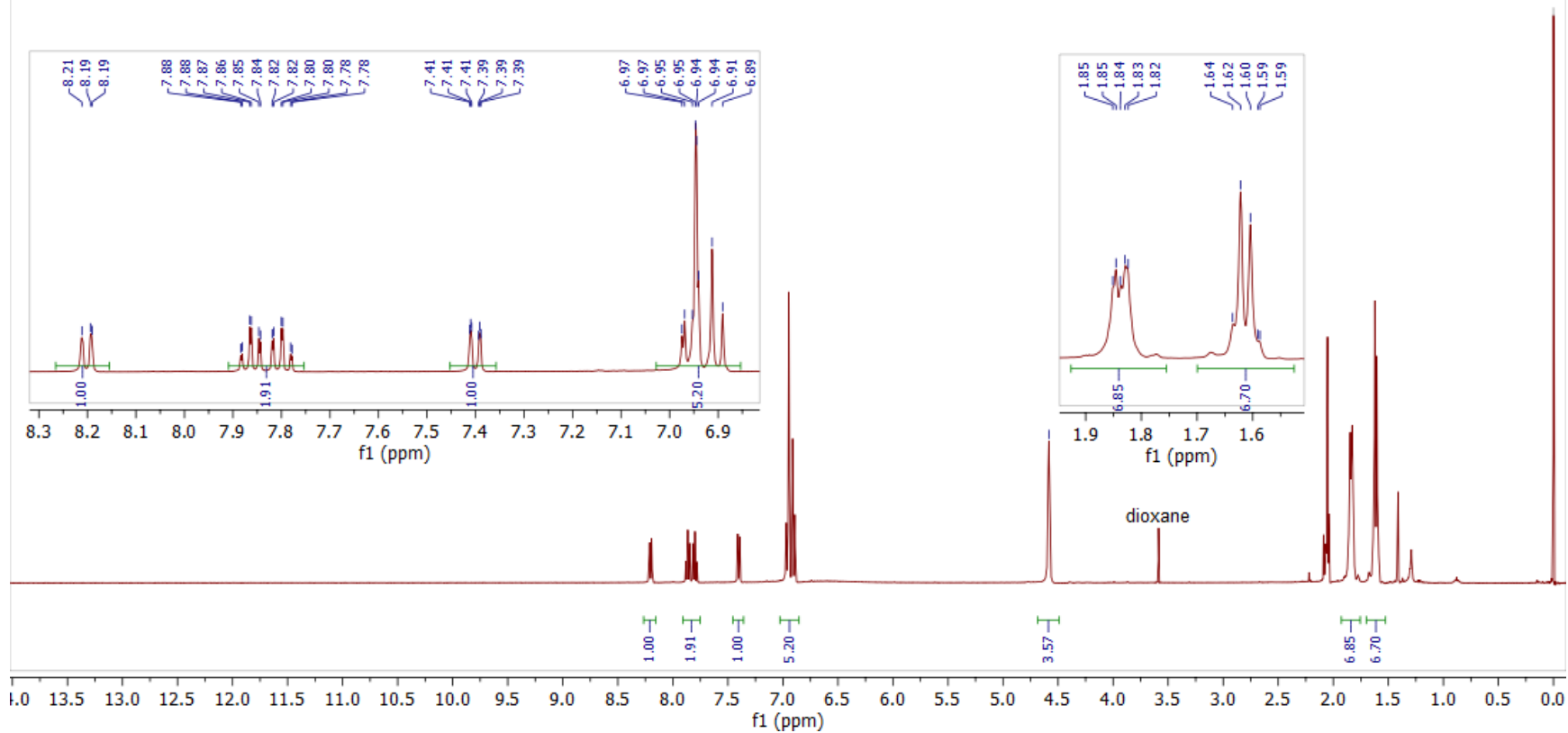
-70.37
-70.39
-70.42



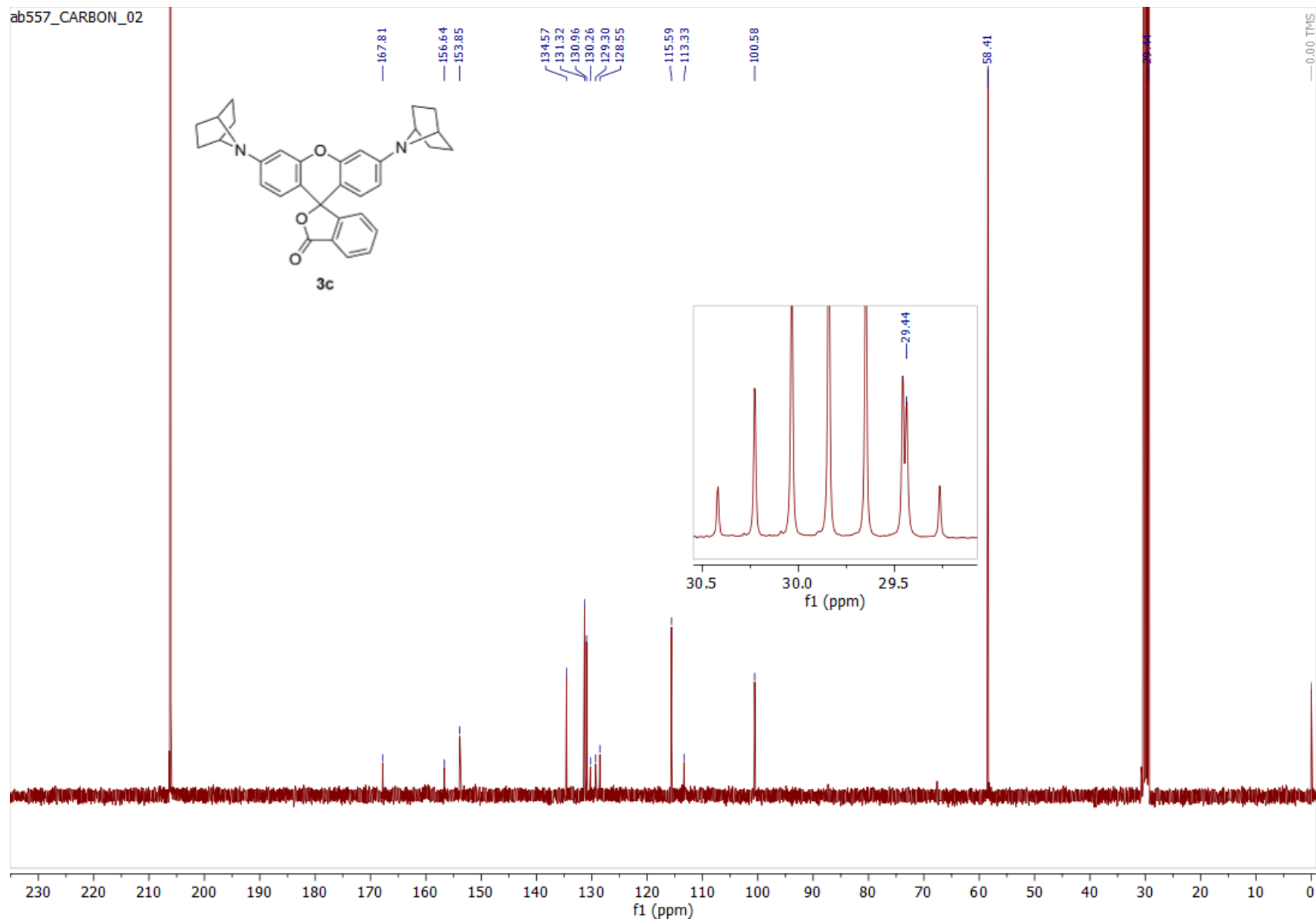
ab557_PROTON_02



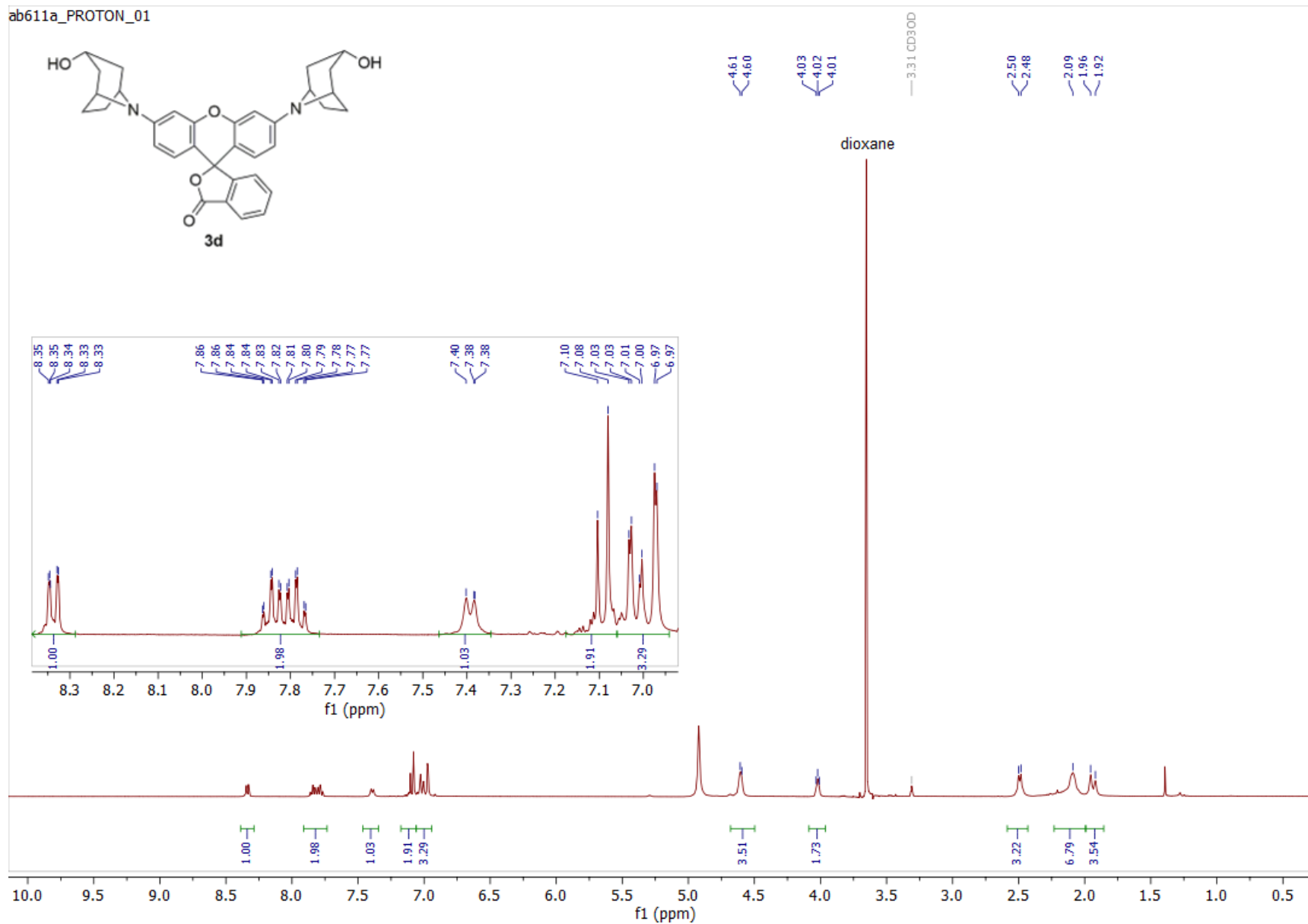
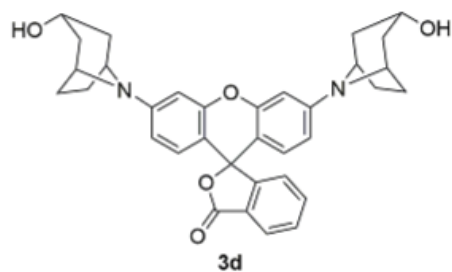
3c



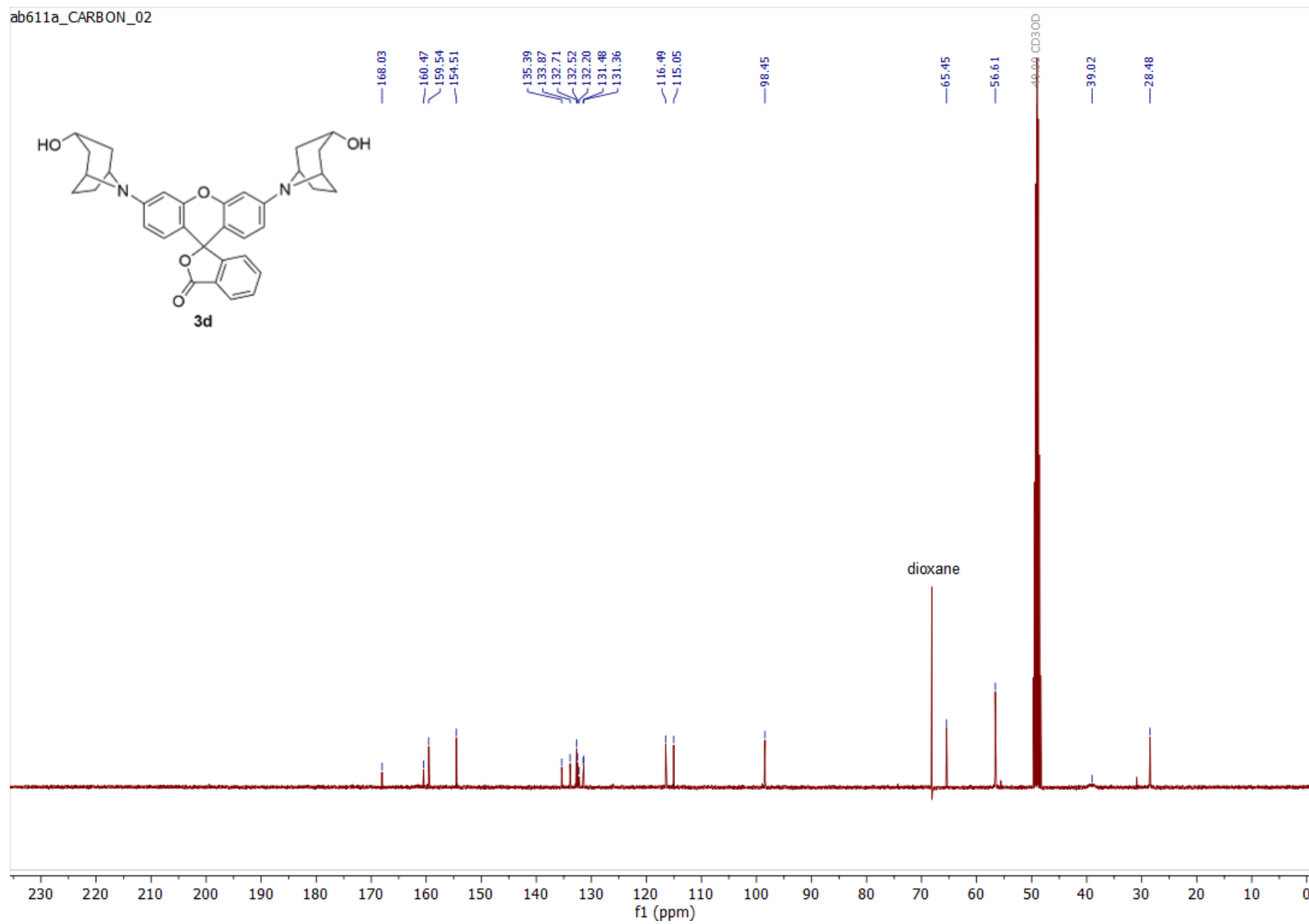
ab557_CARBON_02



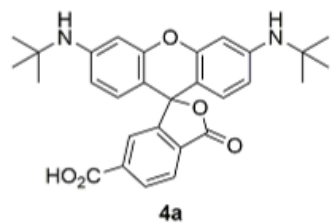
ab611a_PROTON_01



ab611a_CARBON_02



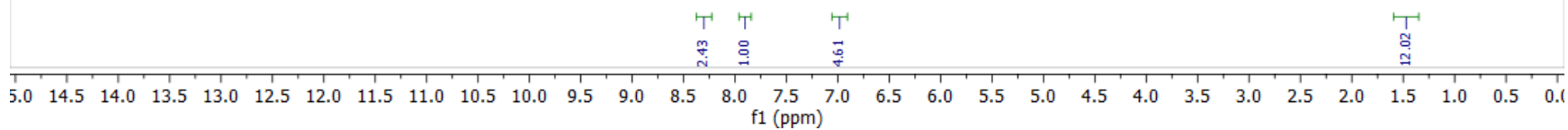
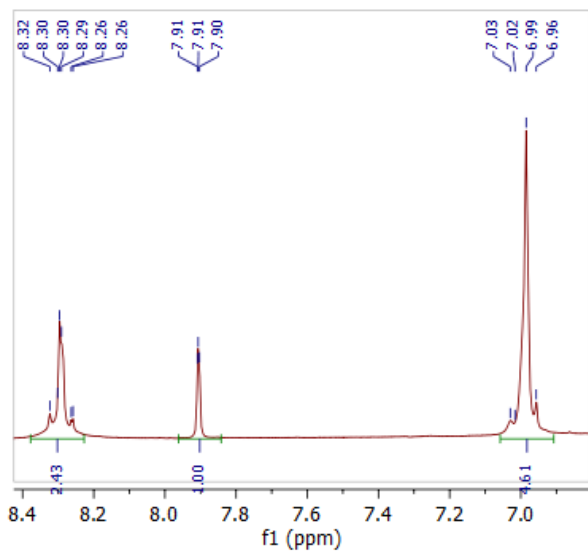
ab619a_3h



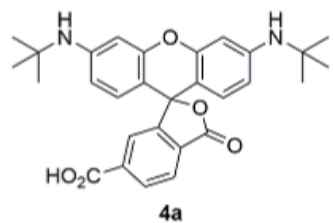
— 2.50 DIMSO-d6

— 1.45

dioxane



ab619a_5c



165.78
165.56
157.88
157.58
157.05
156.01

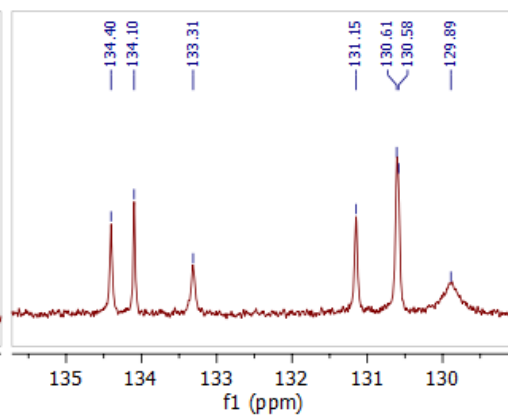
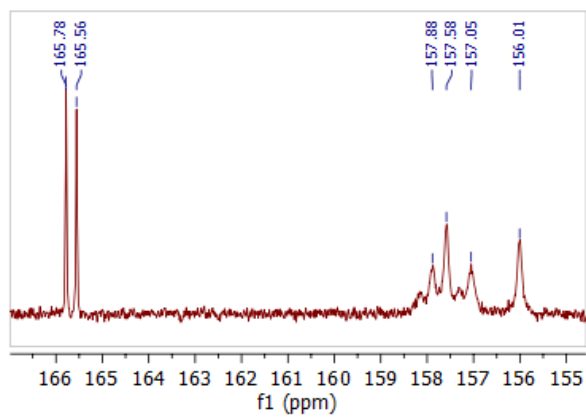
134.40
134.10
133.31
131.15
130.61
130.58
129.89

112.73

96.05

52.39

28.55

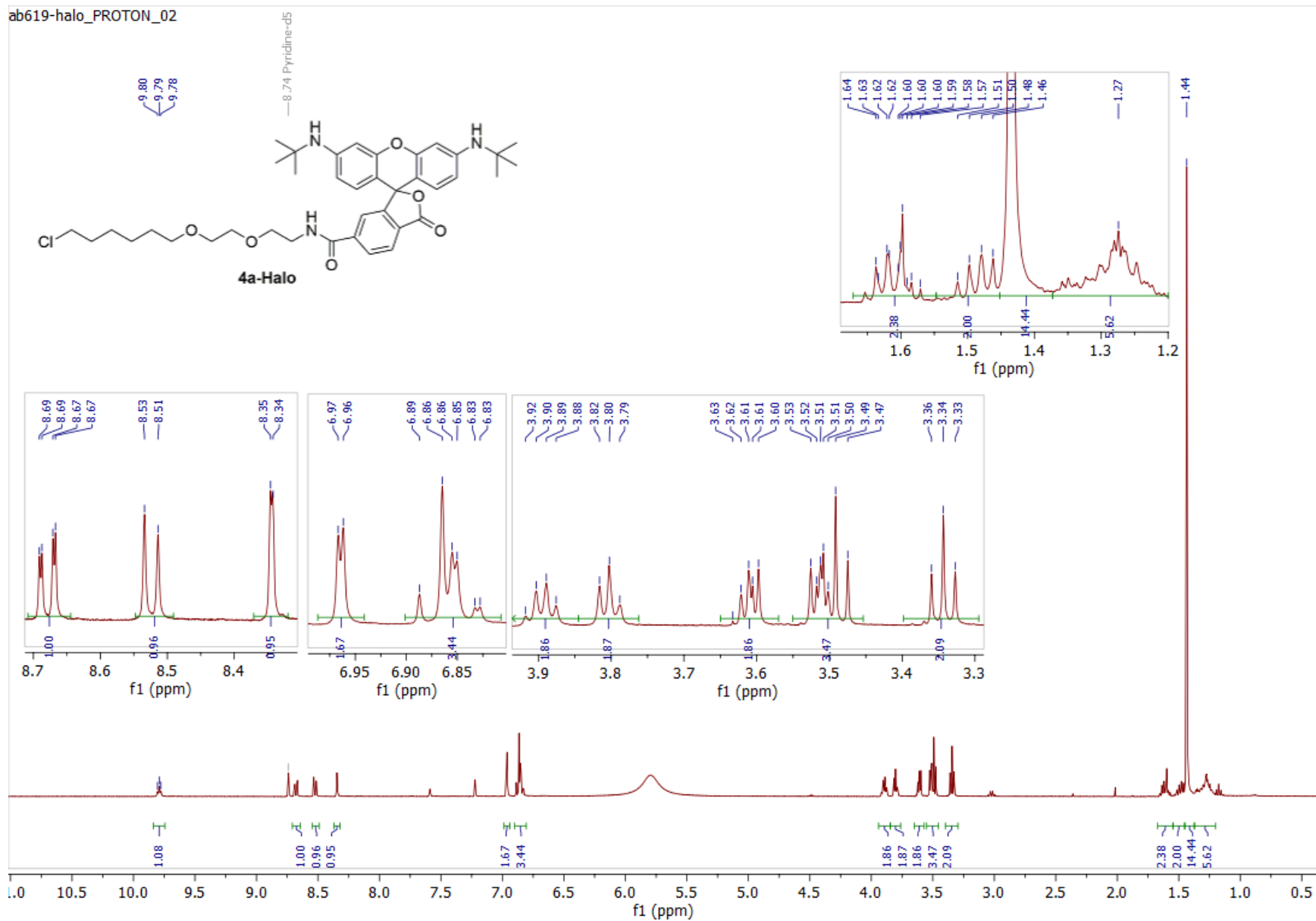


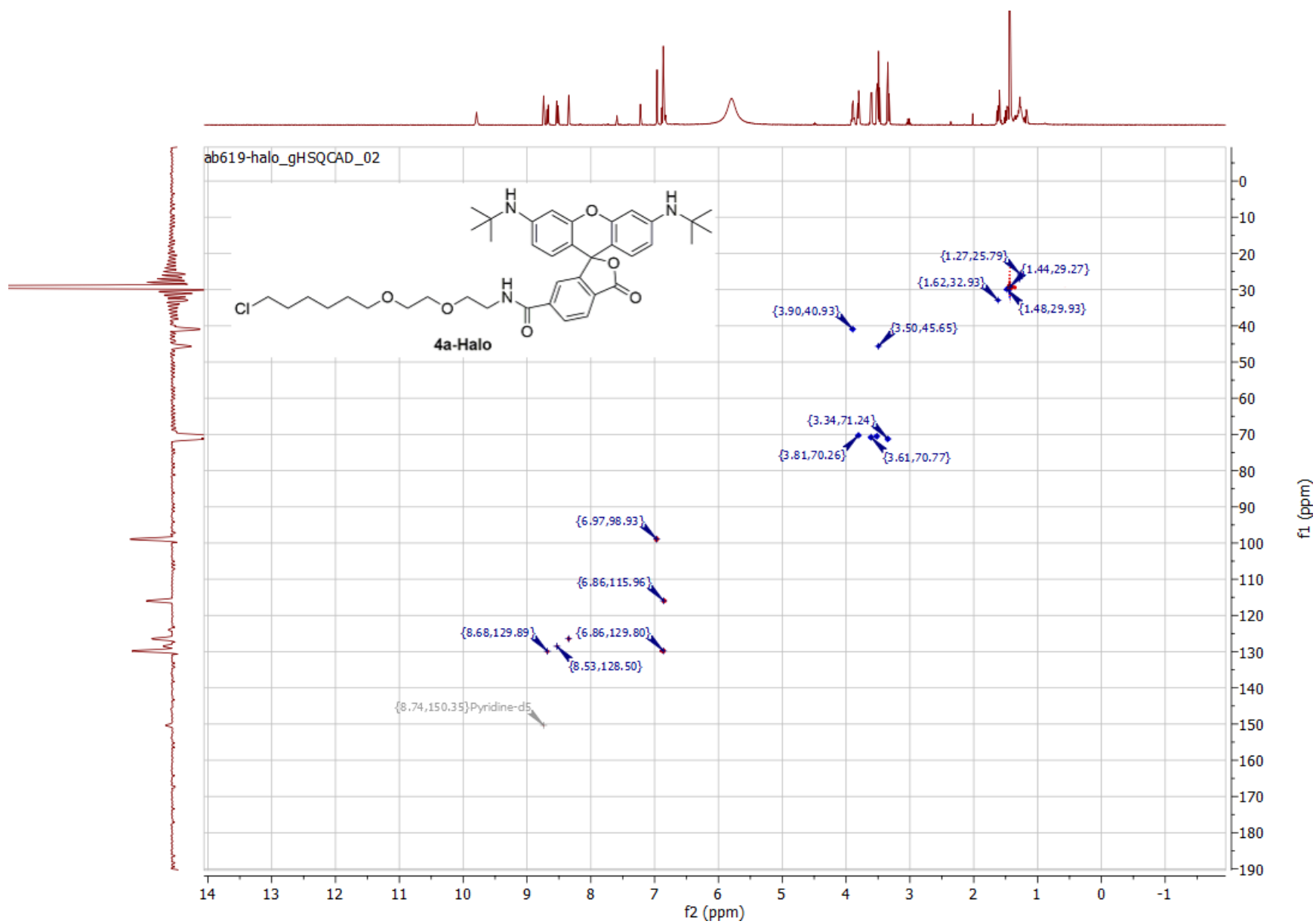
dioxane

220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

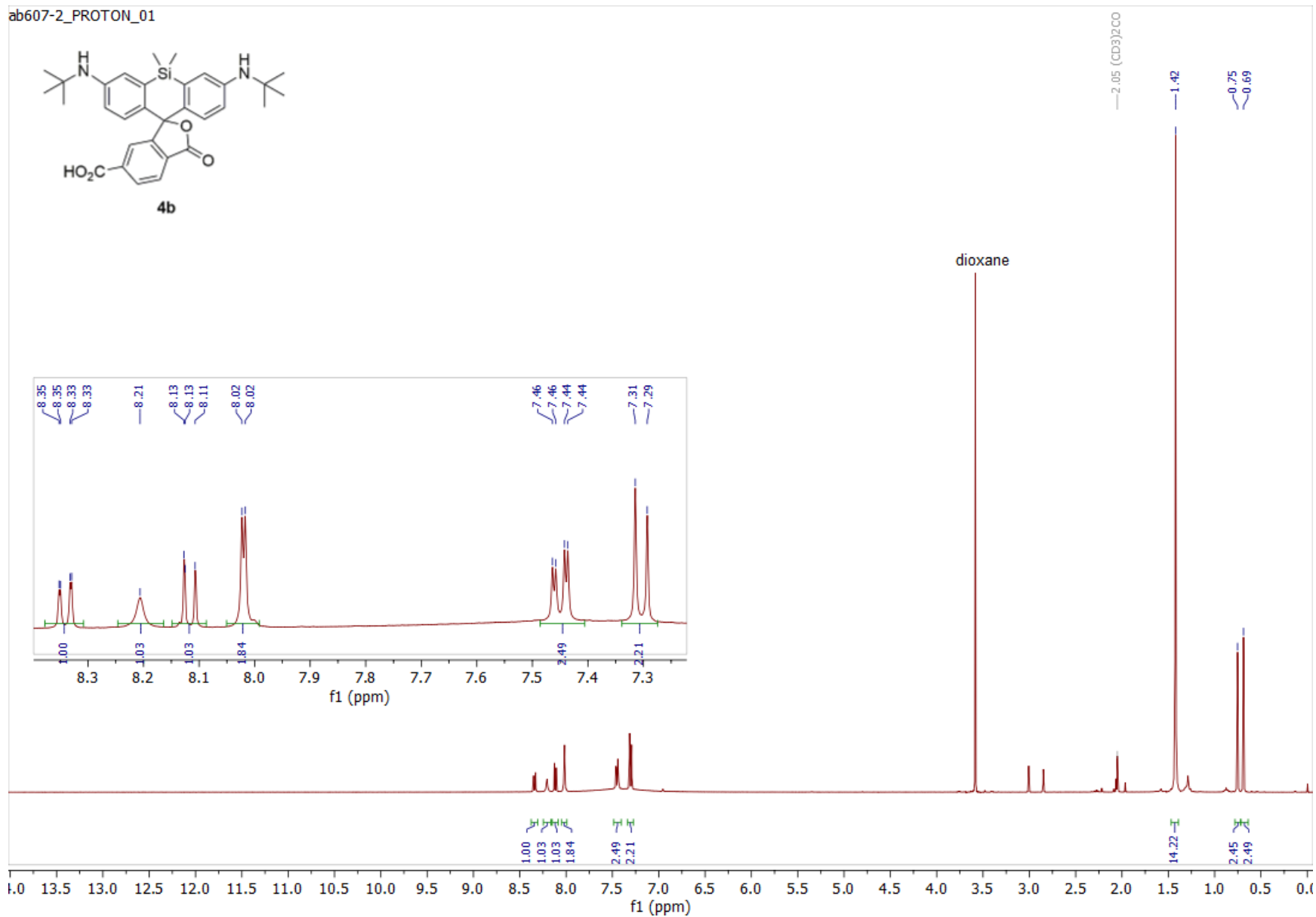
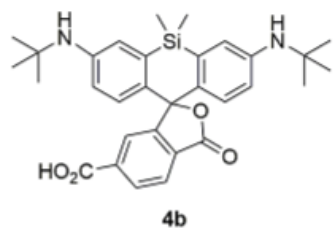
f1 (ppm)

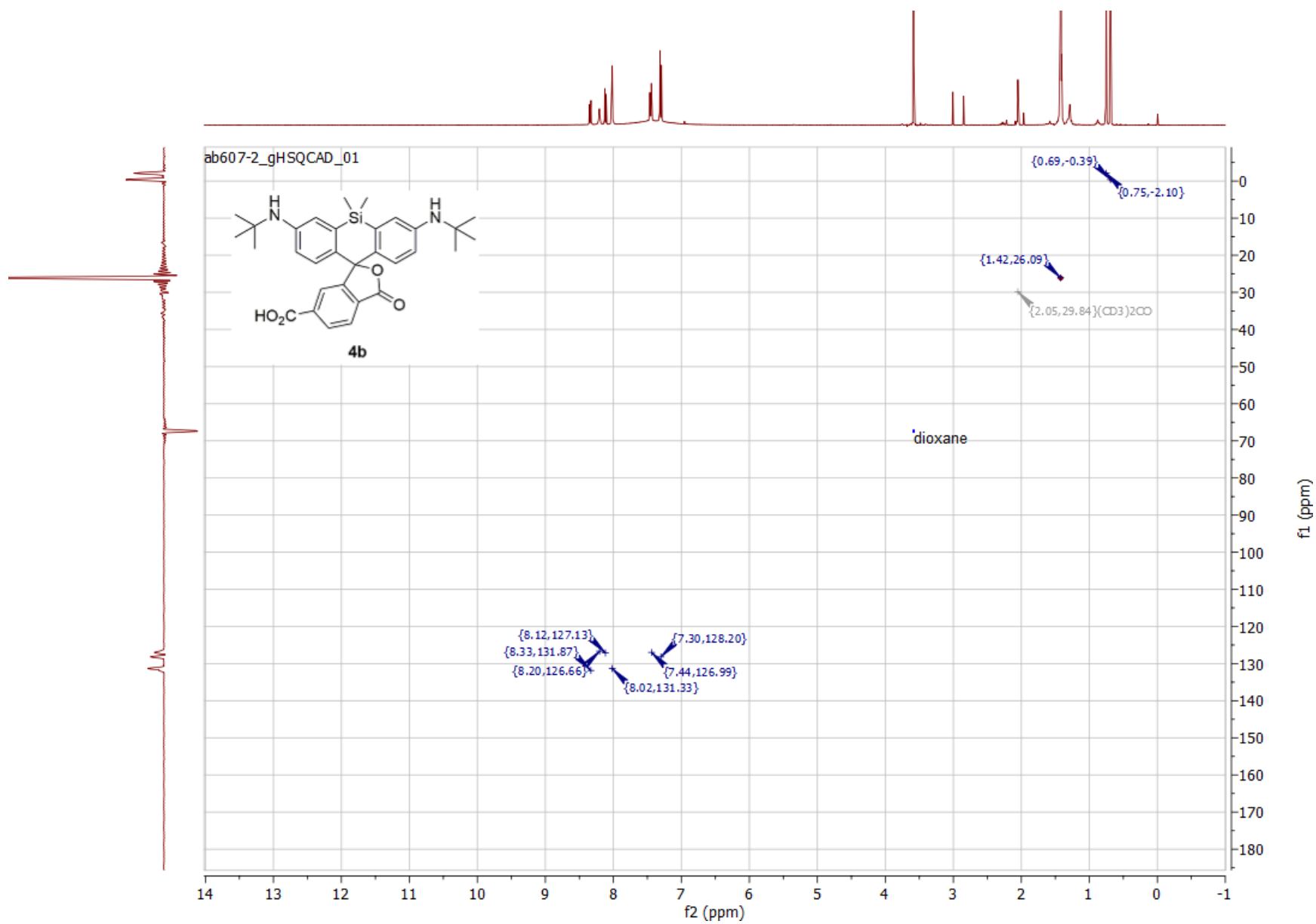
ab619-halo_PROTON_02





ab607-2_PROTON_01





ab607-halo_PROTON_01

