

Supporting Information

Palladium-Catalyzed Directed Halogenation of Bipyridine *N* -oxides

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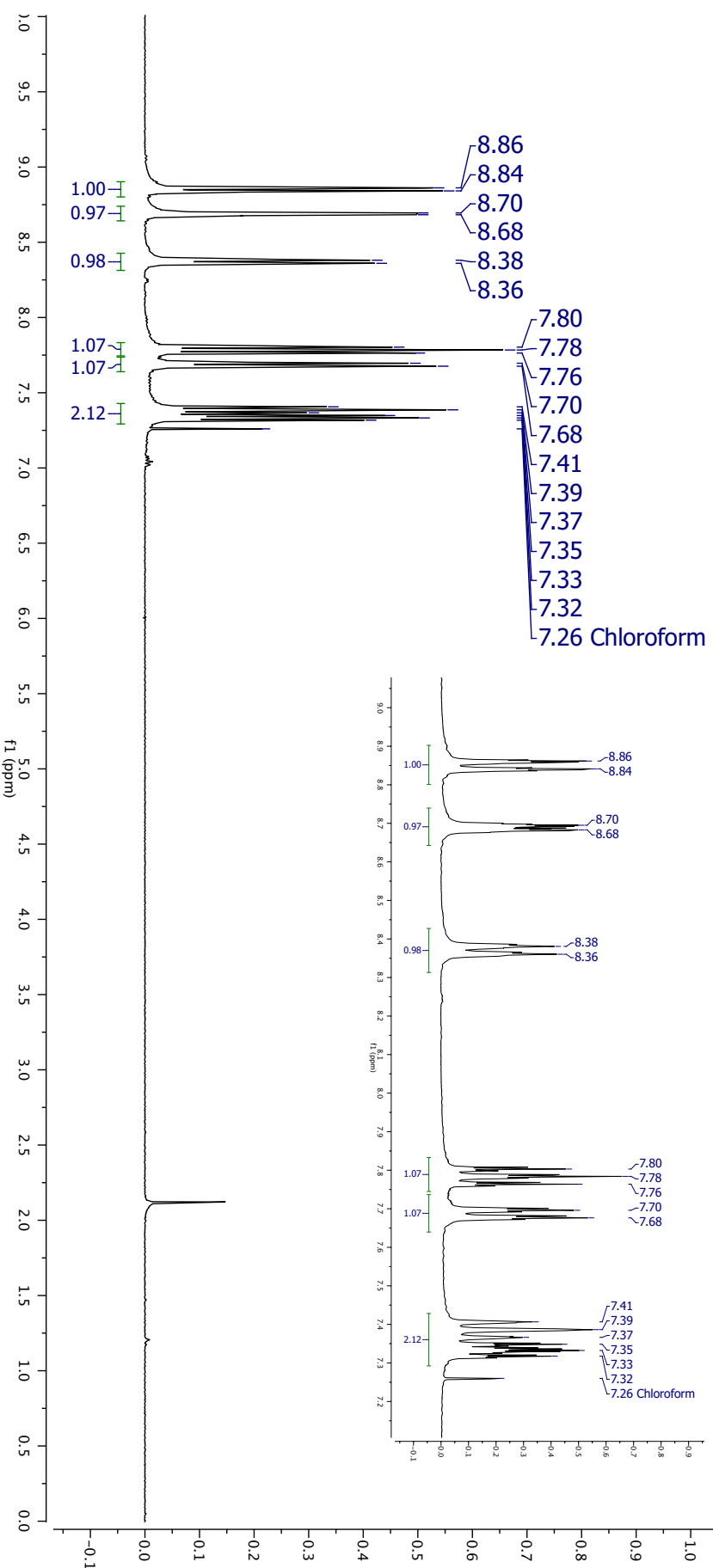
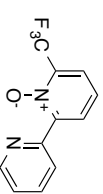
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Bipyridine N-oxide starting materials (1) and terpyridine N-oxides (6)

6-Trifluoromethyl-2,2'-bipyridine N-oxide (1d)

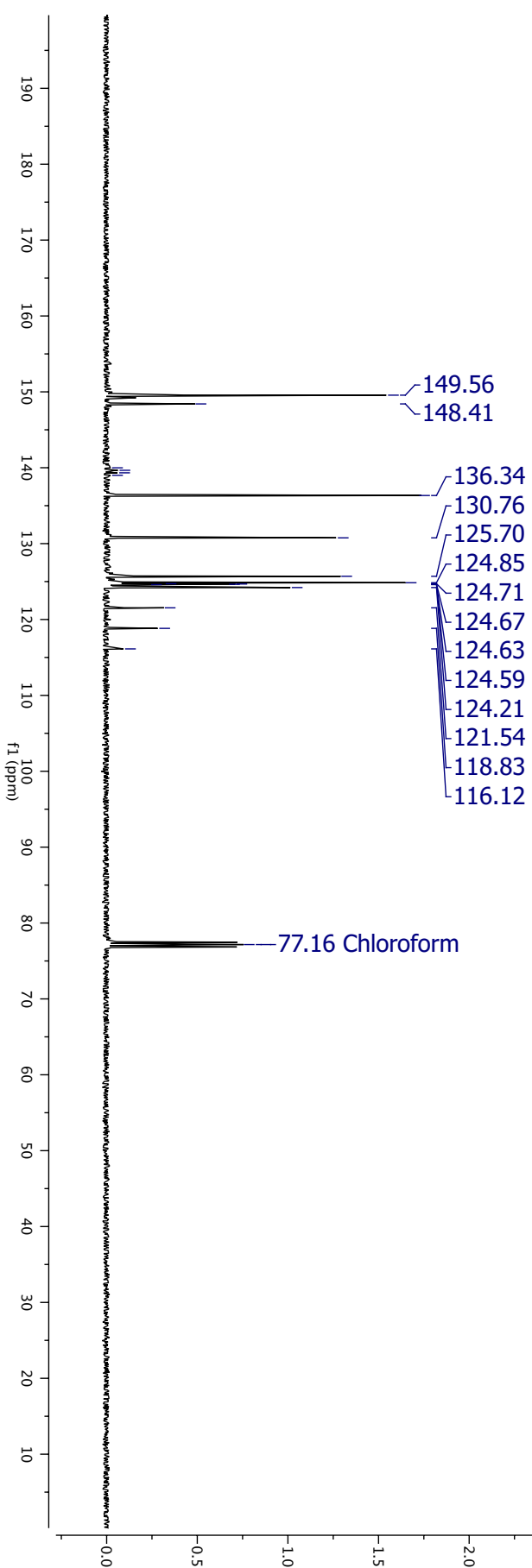
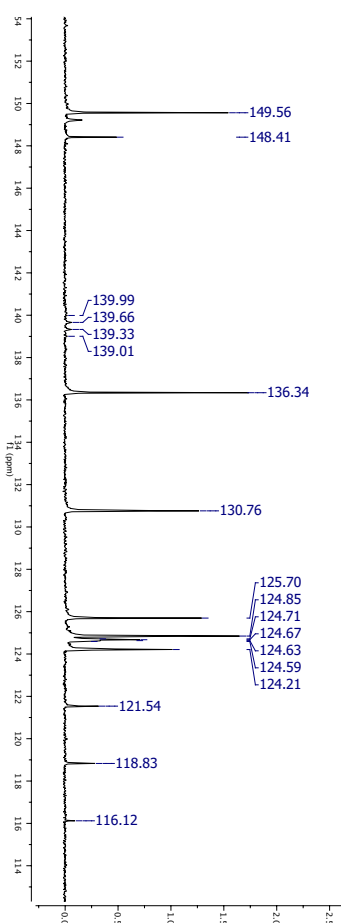
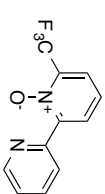
¹H NMR (400 MHz, CDCl₃)



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6-Trifluoromethyl-2,2'-bipyridine *N*-oxide (1d)

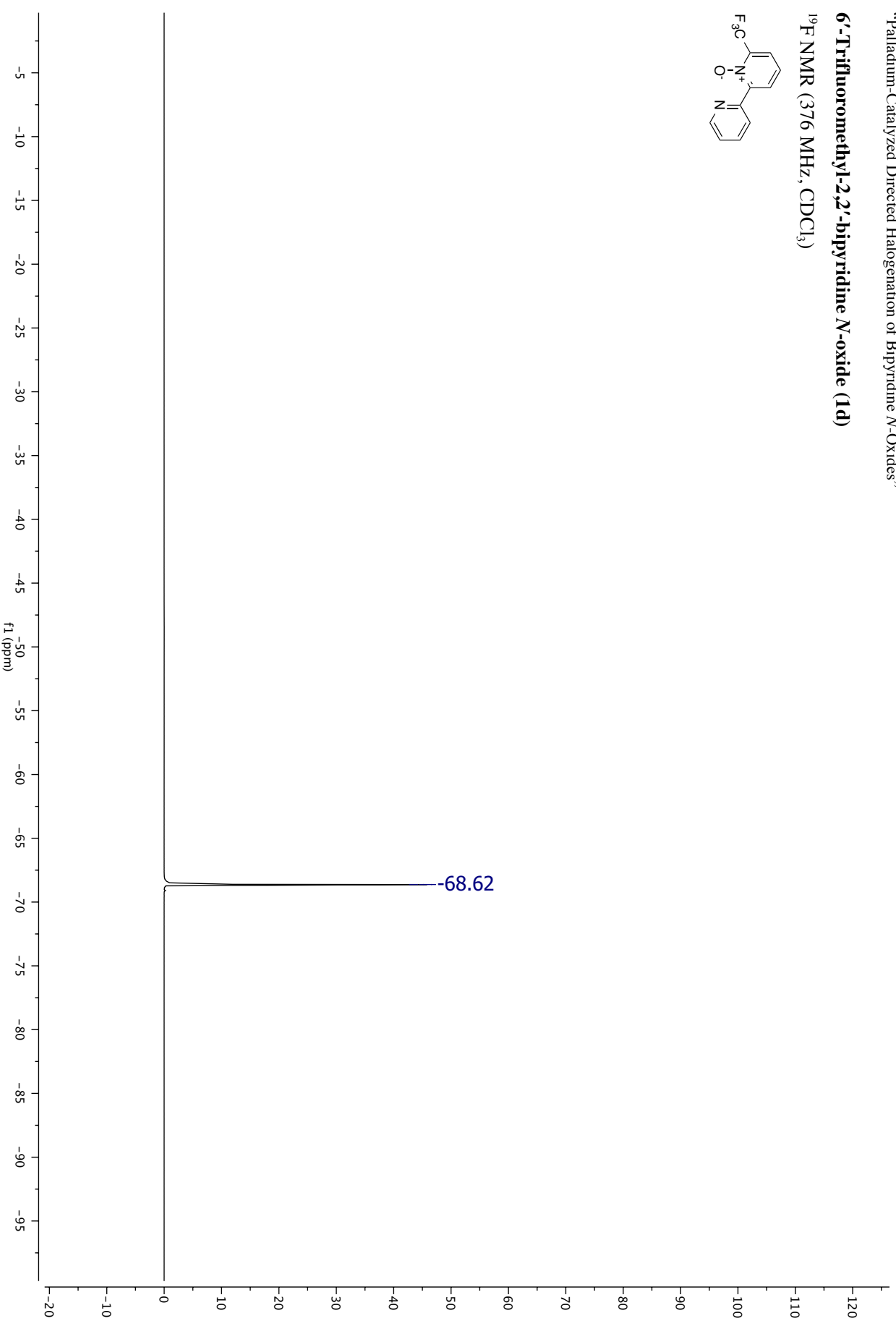
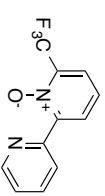
¹³C NMR (101 MHz, CDCl₃)



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6'-Trifluoromethyl-2,2'-bipyridine *N*-oxide (1d)

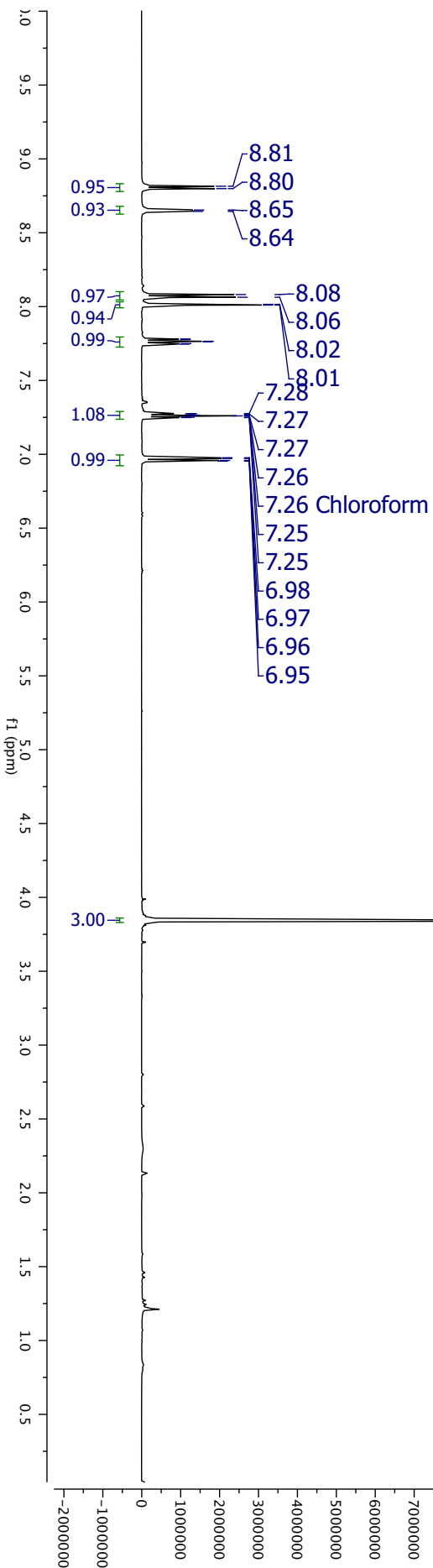
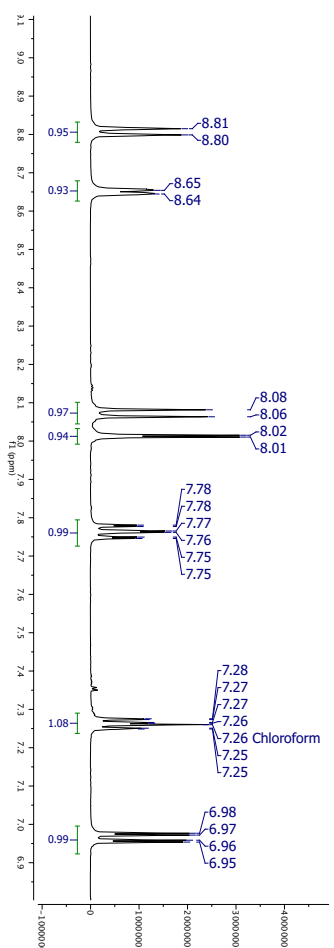
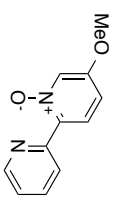
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5-Methoxy-2,2'-bipyridine *N*-oxide (1f)

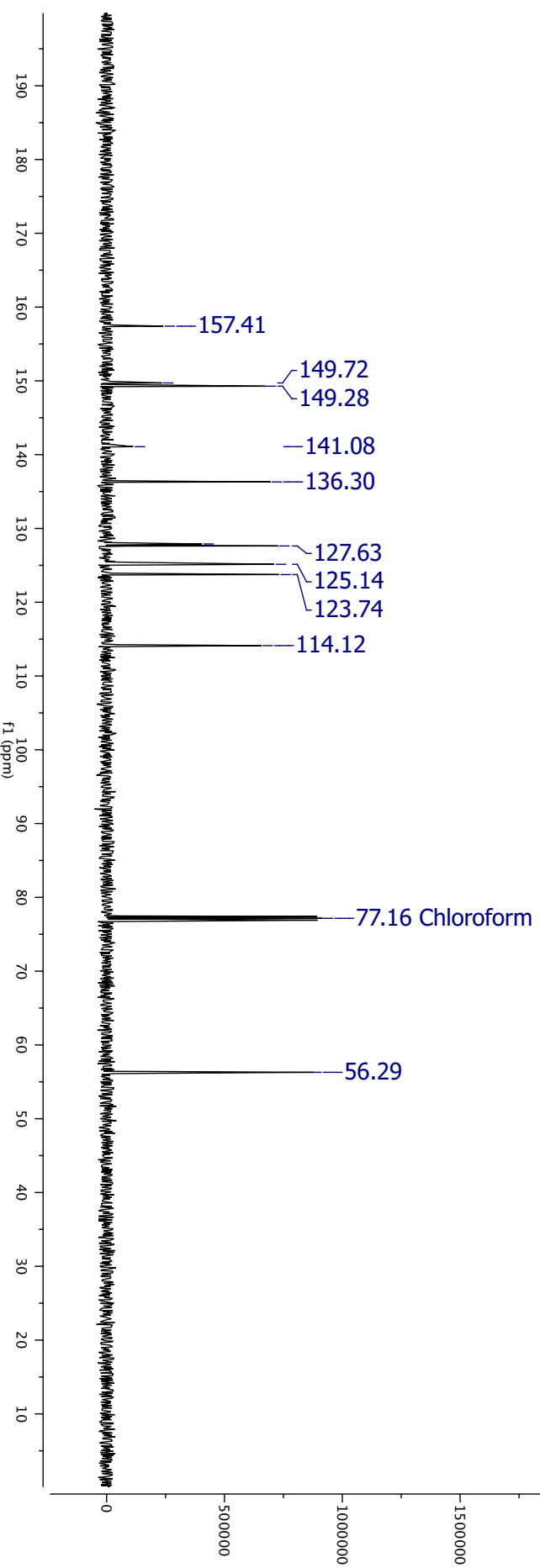
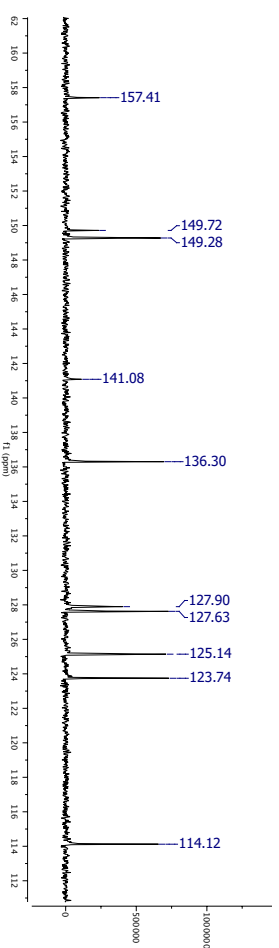
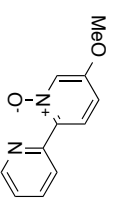
¹H NMR (500 MHz, CDCl₃)



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5-Methoxy-2,2'-bipyridine *N*-oxide (1f)

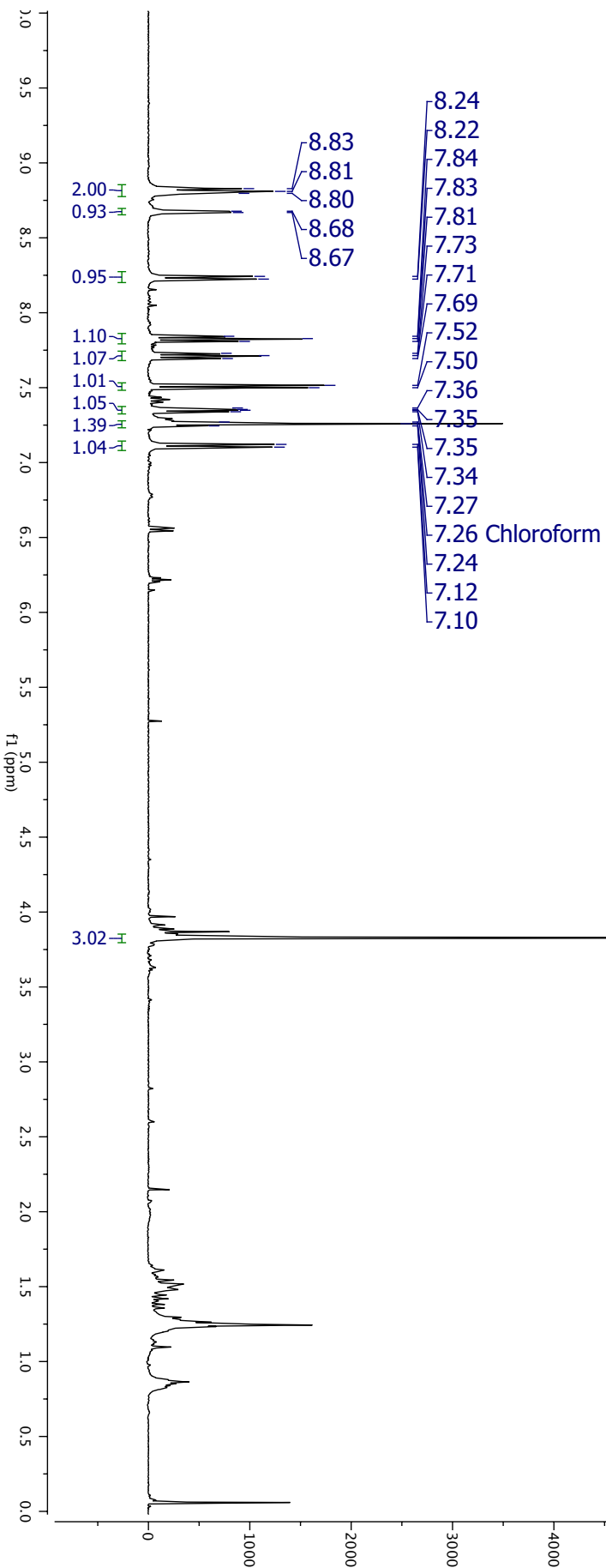
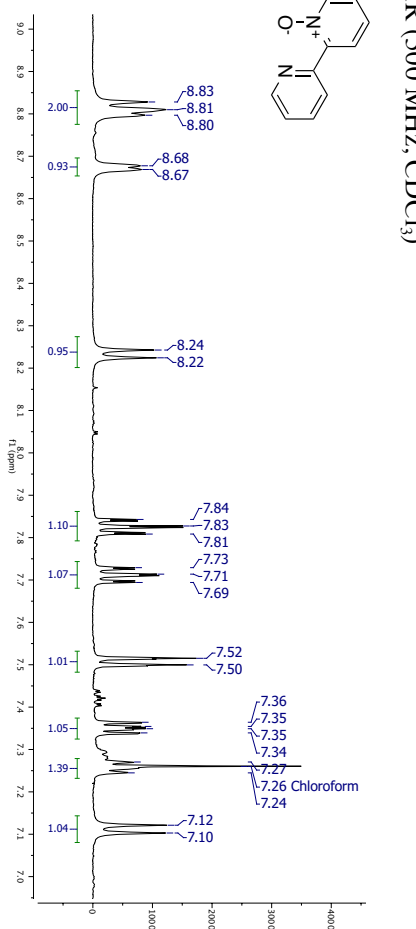
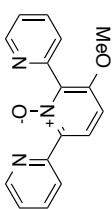
^{13}C NMR (126 MHz, CDCl_3)



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5'-Methoxy-2,2':6',2''-terpyridine *N*-oxide (6f)

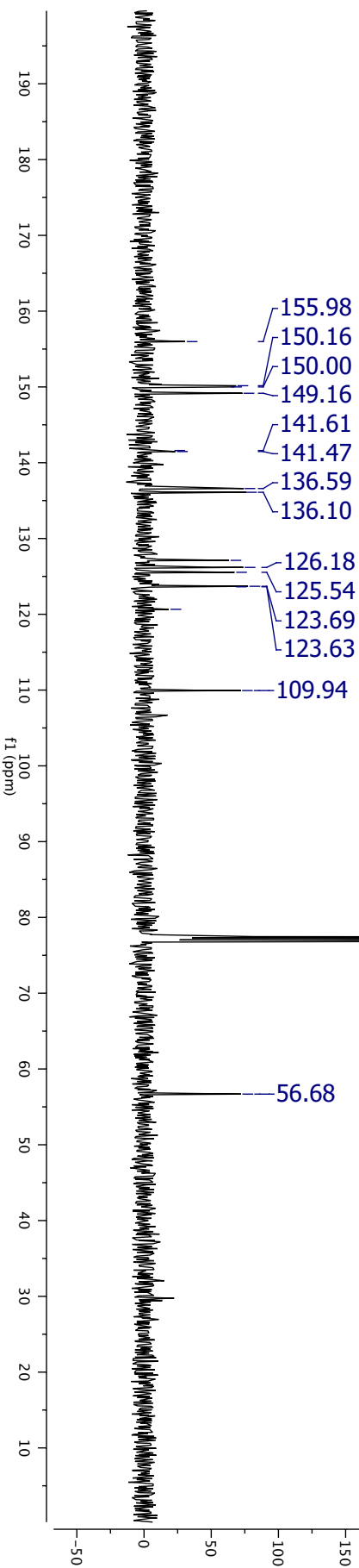
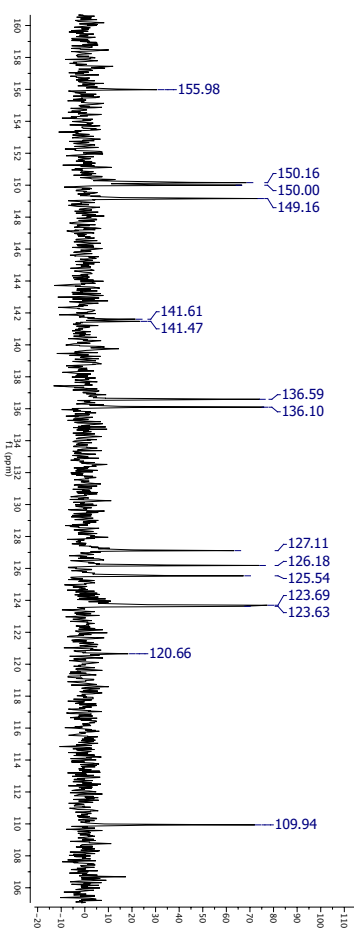
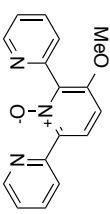
¹H NMR (500 MHz, CDCl₃)



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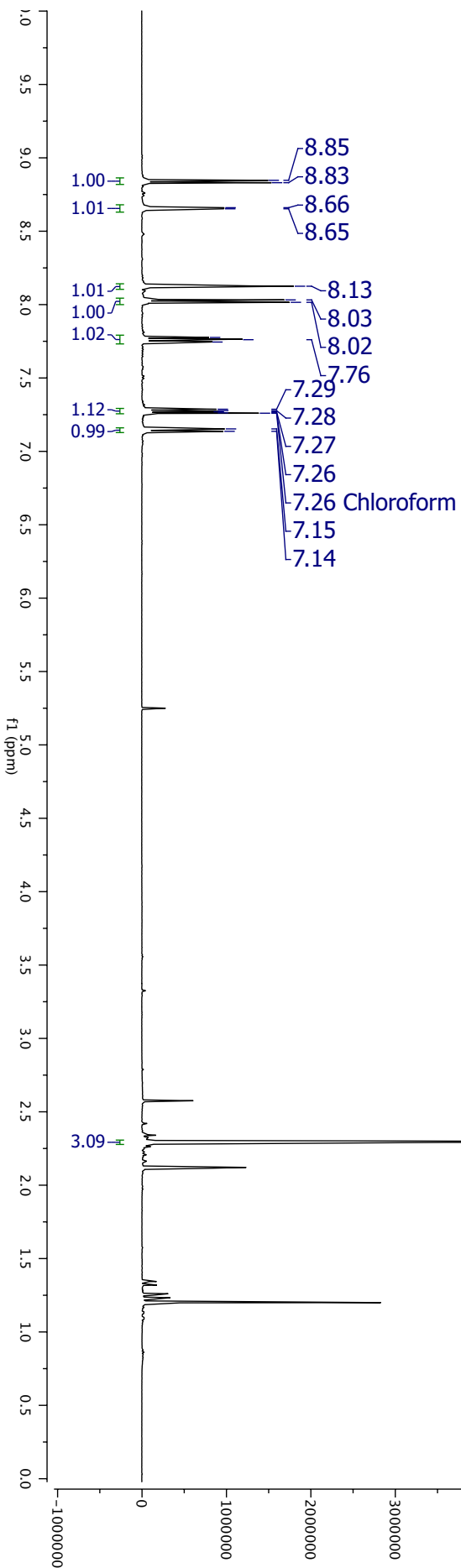
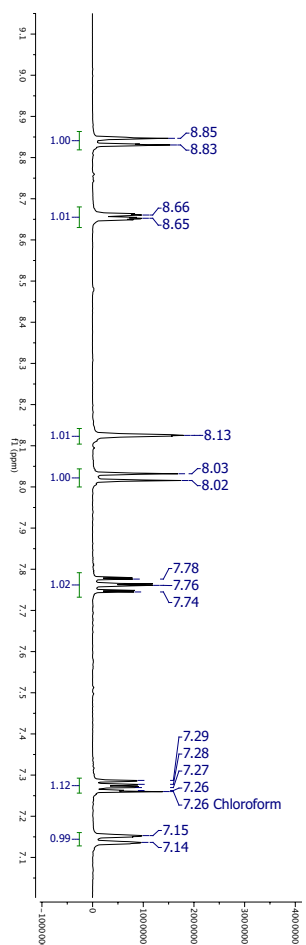
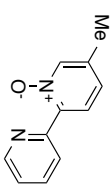
^{13}C NMR (126 MHz, CDCl_3)



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5-Methyl-2,2'-bipyridine *N*-oxide (1g)

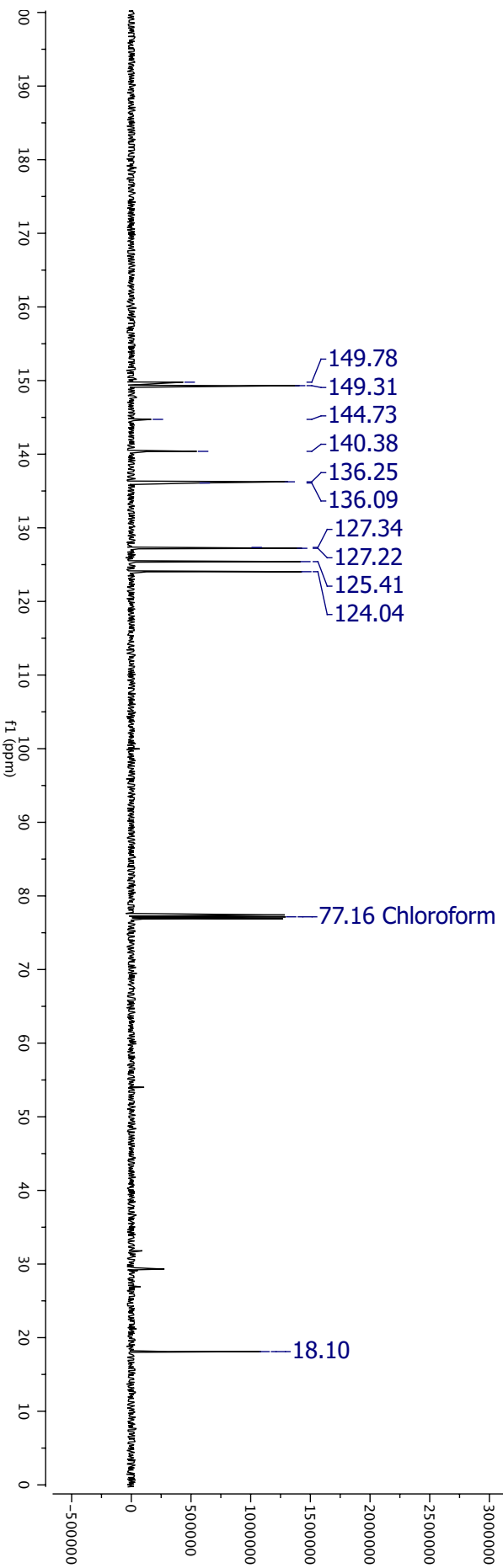
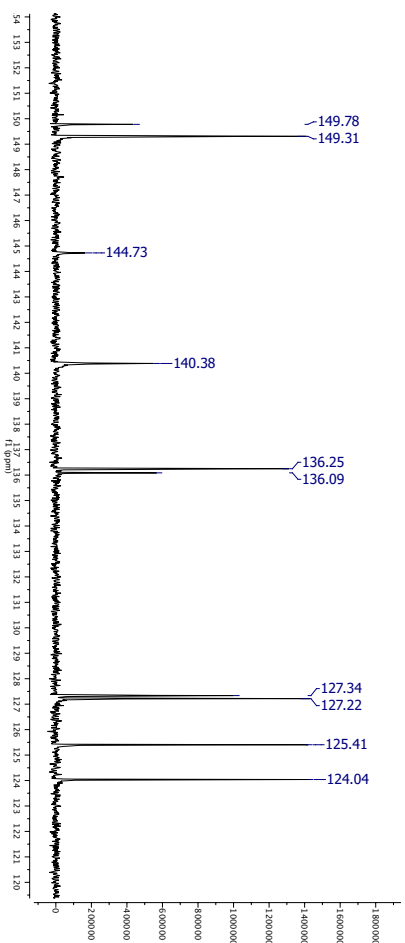
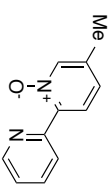
¹H NMR (500 MHz, CDCl₃)



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5-Methyl-2,2'-bipyridine *N*-oxide (1g)

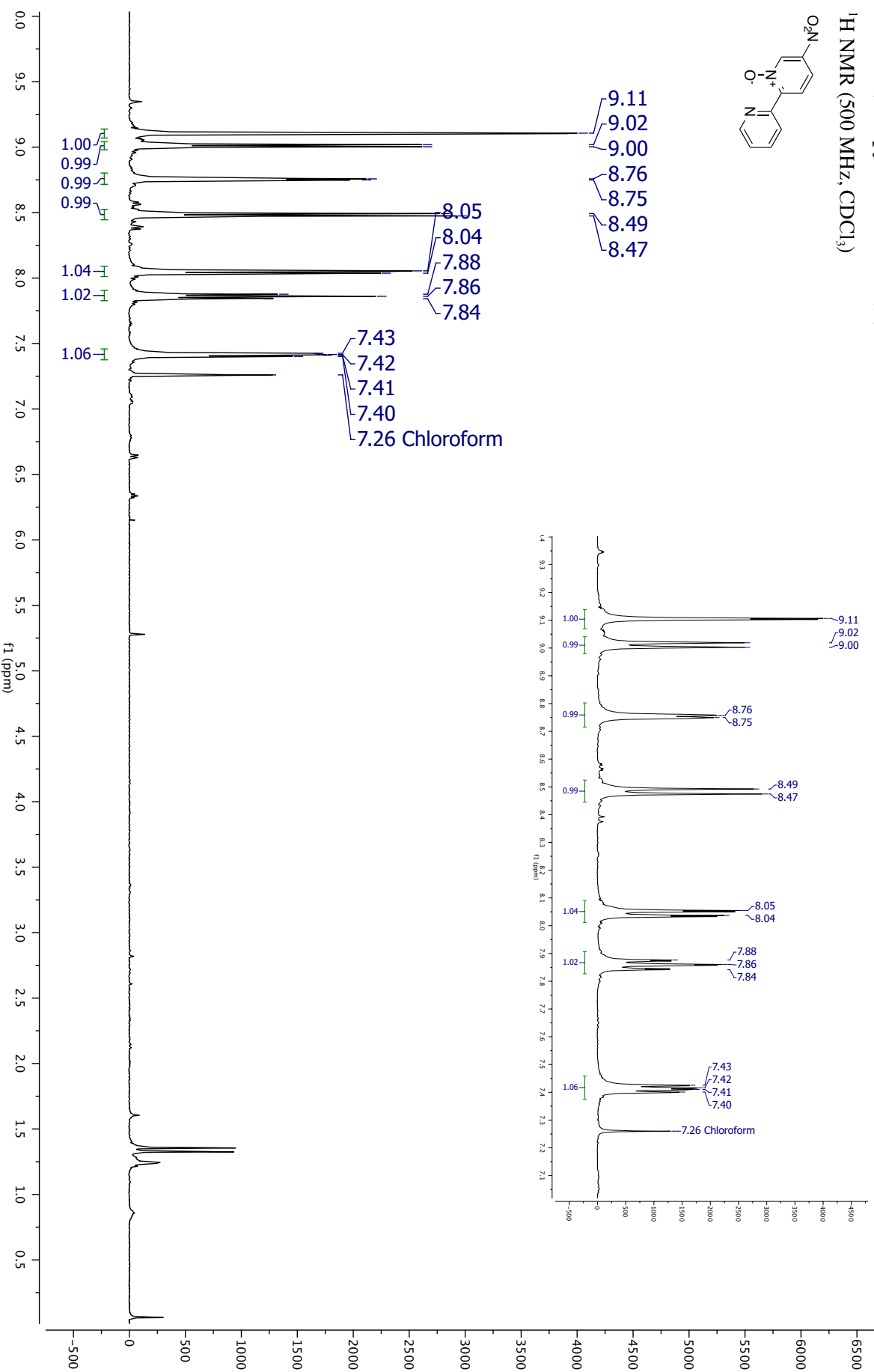
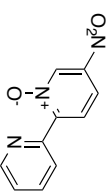
¹³C NMR (126 MHz, CDCl₃)



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5-Nitro-2,2'-bipyridine *N*-oxide (1i)

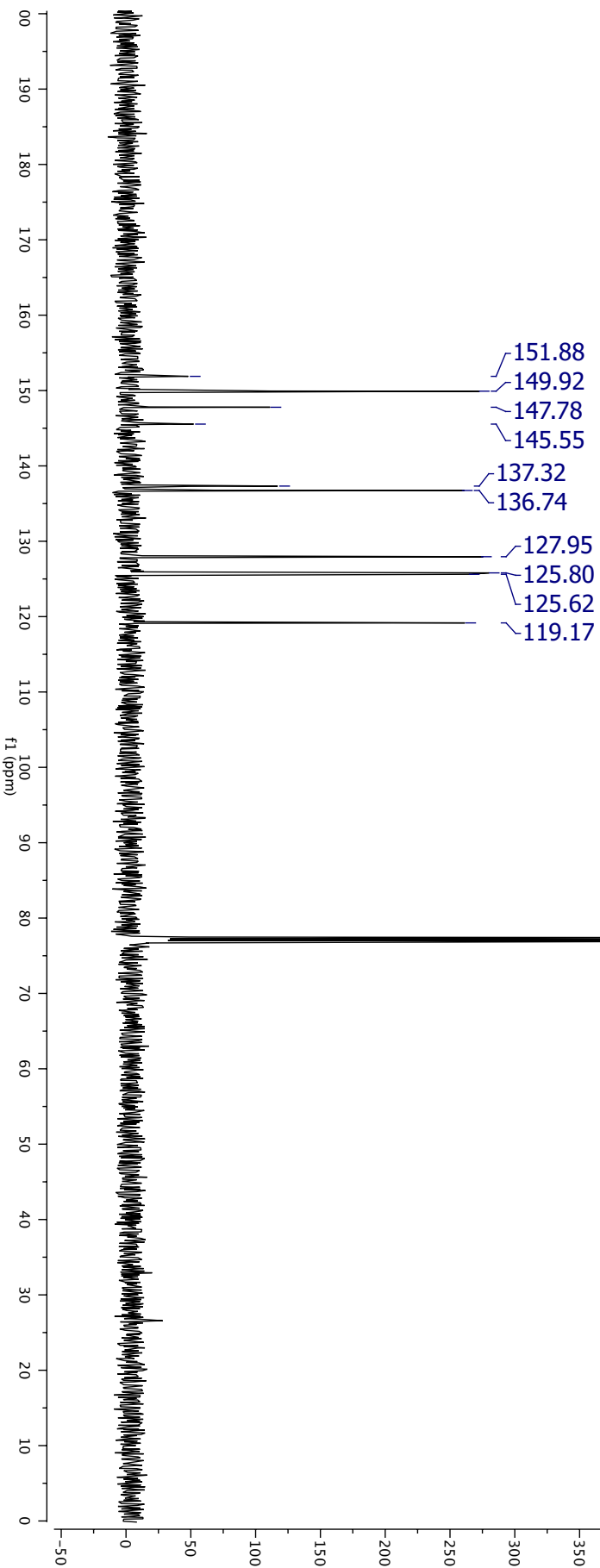
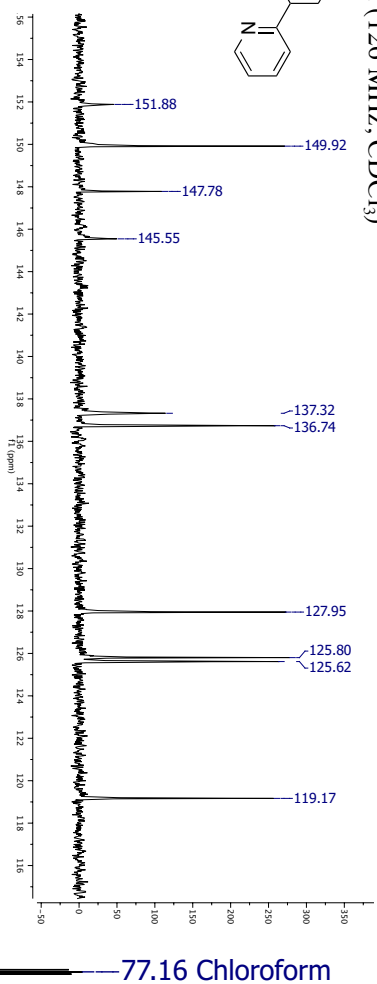
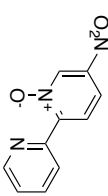
¹H NMR (500 MHz, CDCl₃)



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5-Nitro-2,2'-bipyridine *N*-oxide (1i)

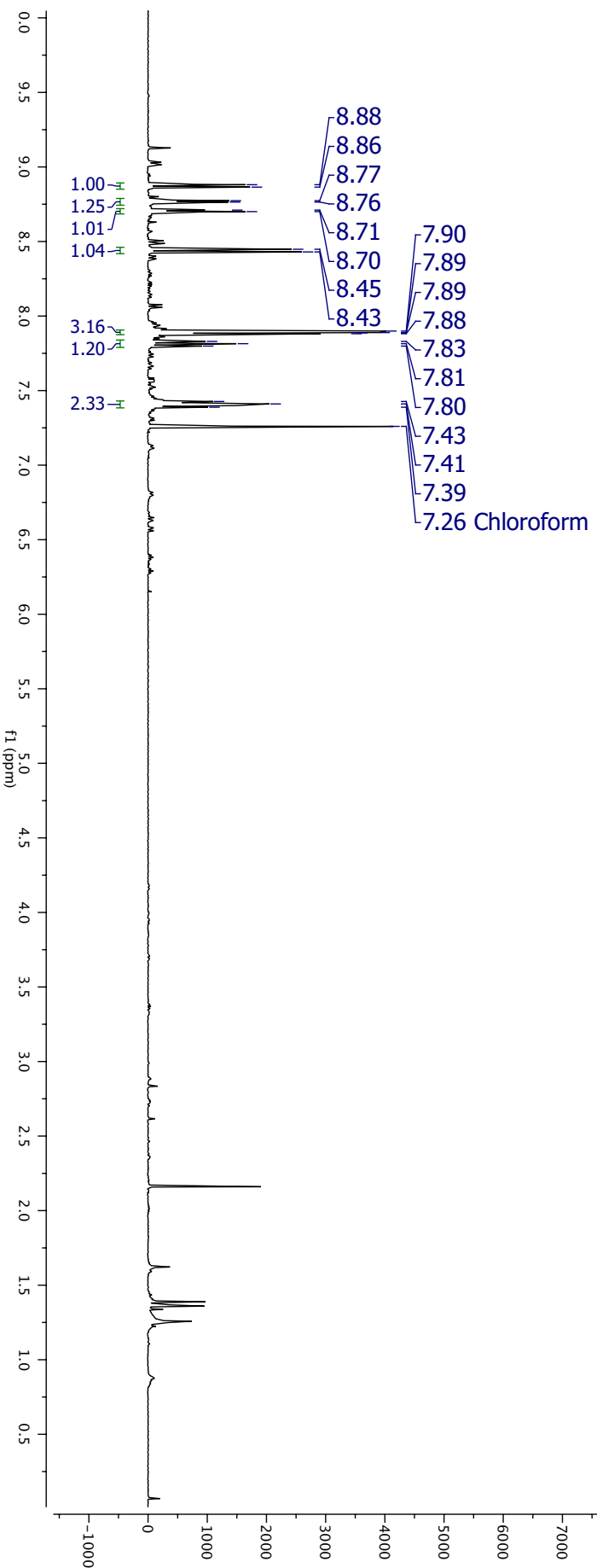
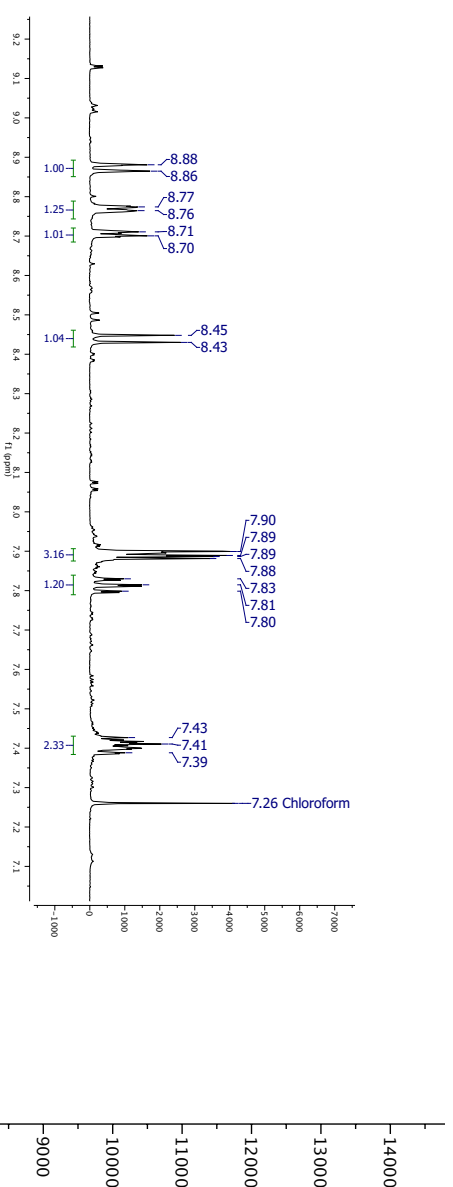
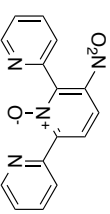
^{13}C NMR (126 MHz, CDCl_3)



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5'-Nitro-2,2':6,2''-terpyridine *N*-oxide (6i)

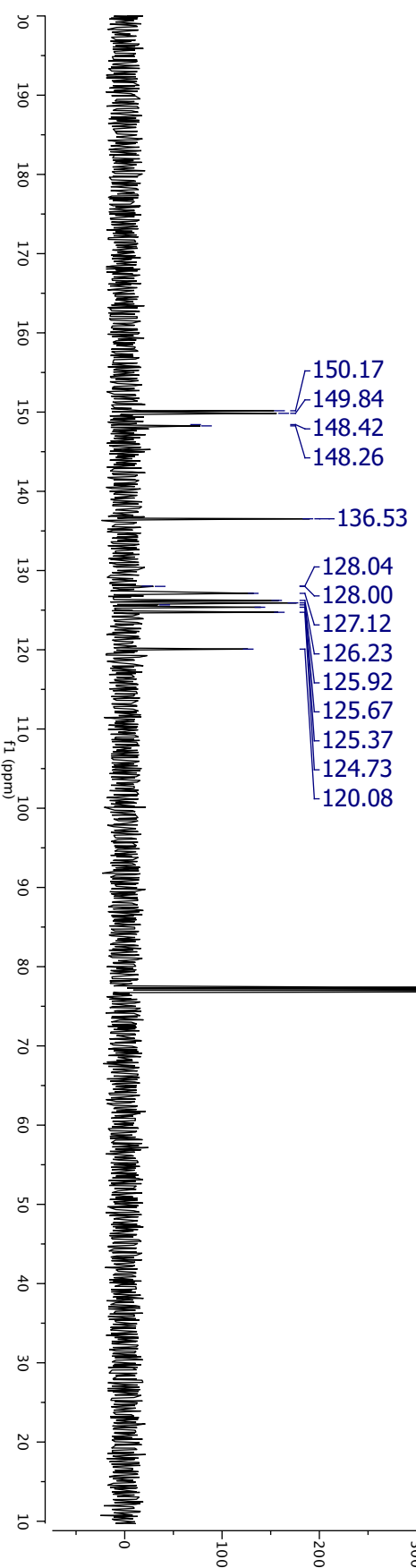
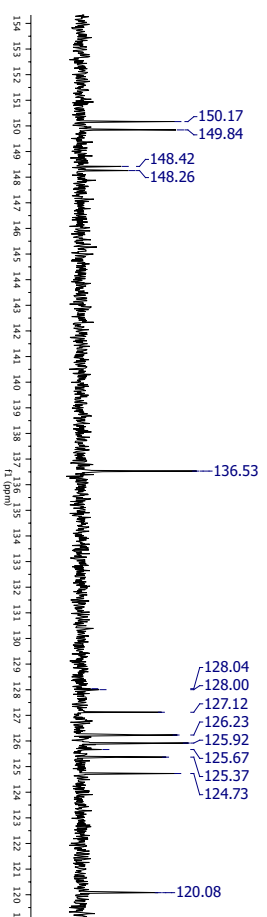
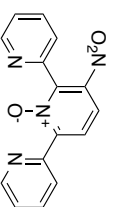
¹H NMR (500 MHz, CDCl₃)



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5'-Nitro-2,2':6,2''-terpyridine *N*-oxide (6i)

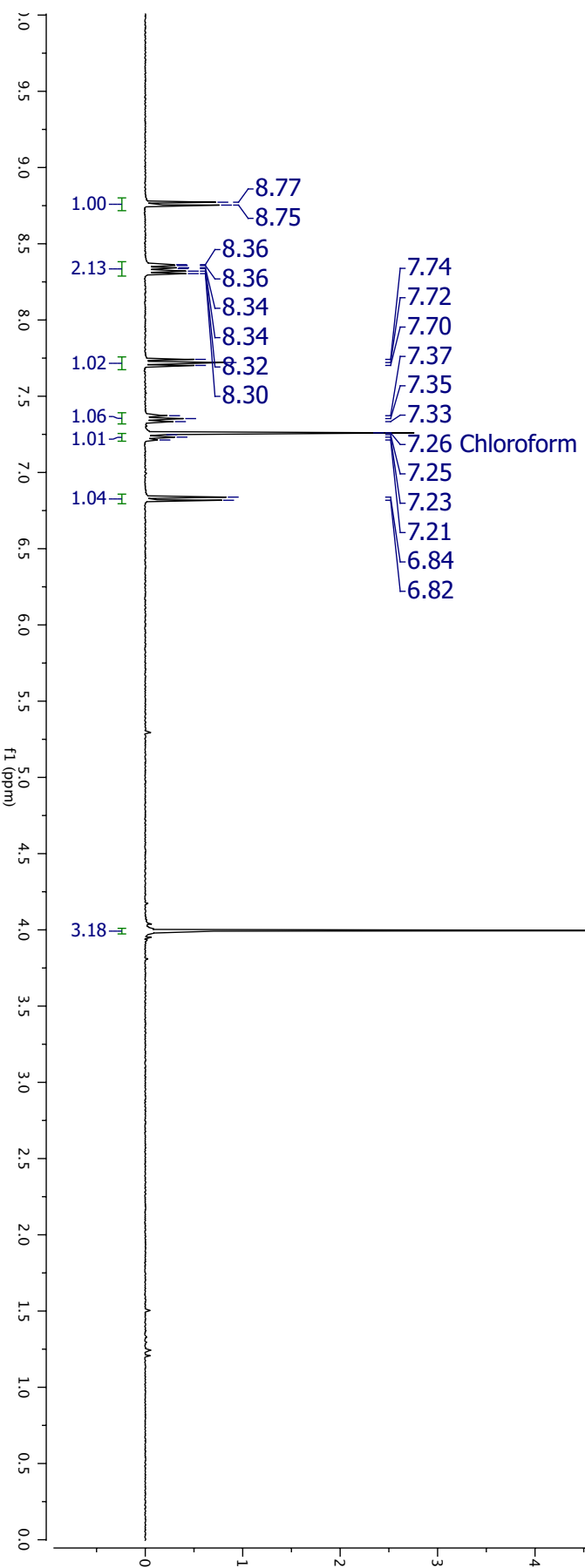
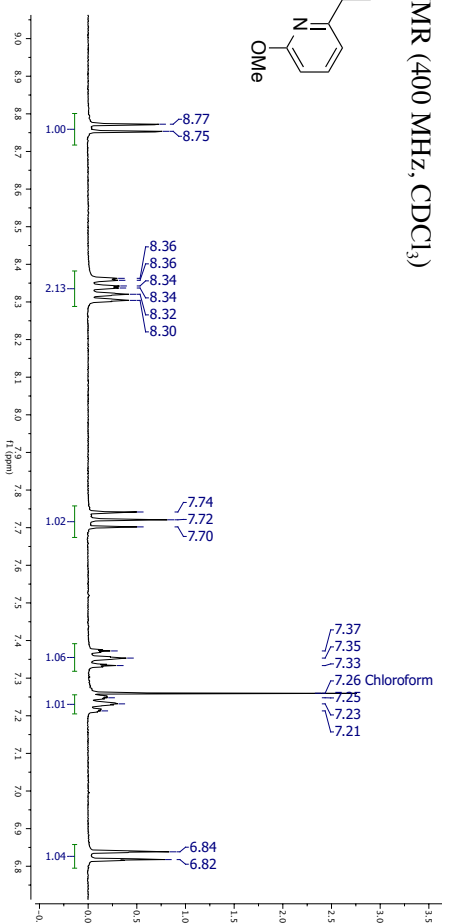
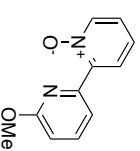
¹³C NMR (126 MHz, CDCl₃)



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6'-Methoxy-2,2'-bipyridine *N*-oxide (1p)

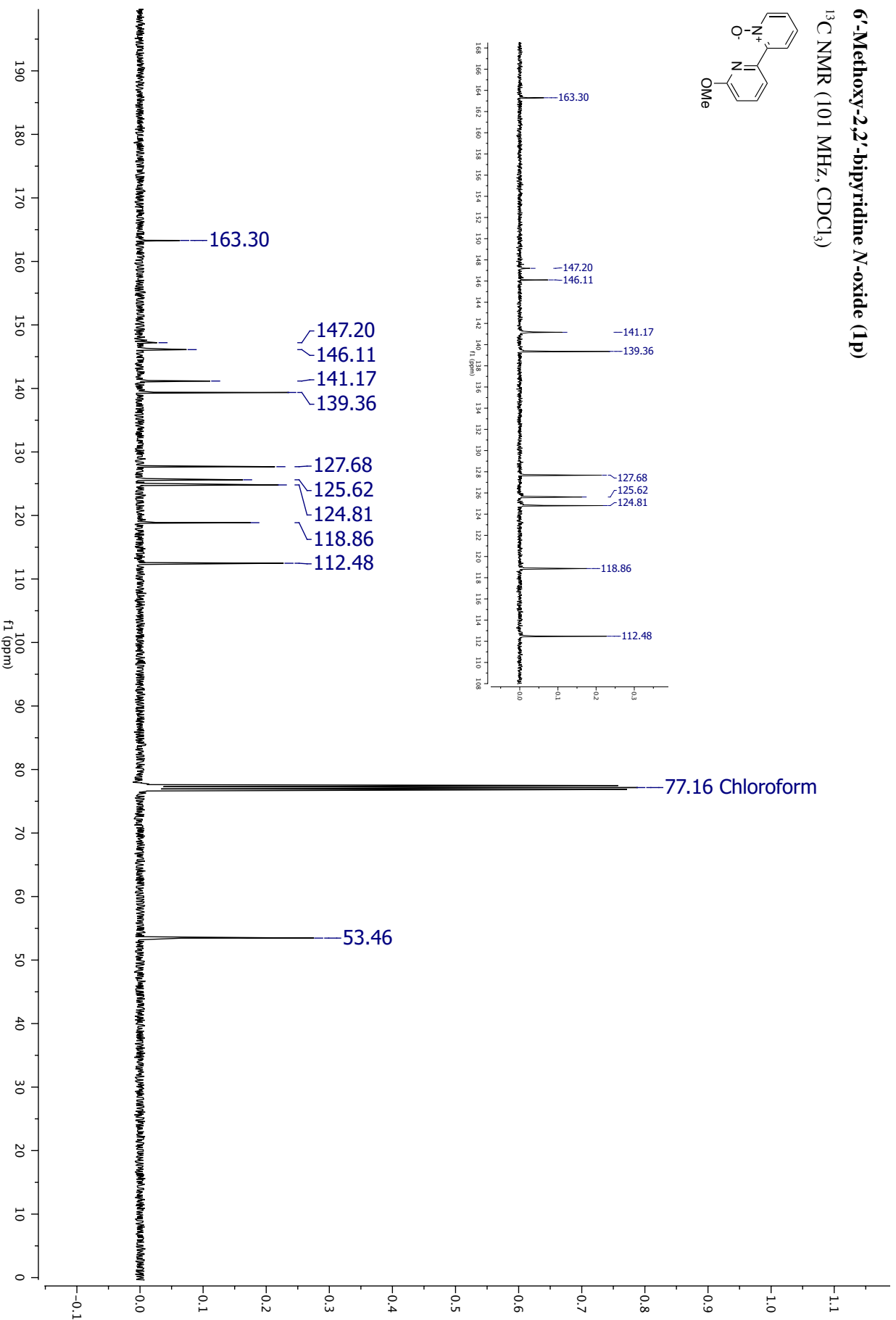
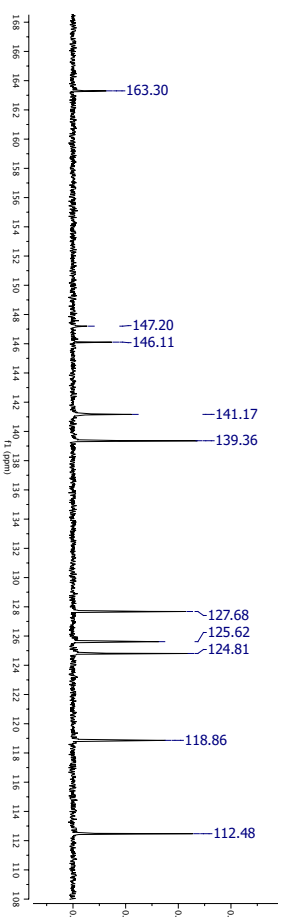
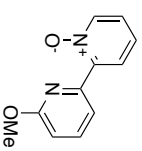
¹H NMR (400 MHz, CDCl₃)



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6'-Methoxy-2,2'-bipyridine *N*-oxide (1p)

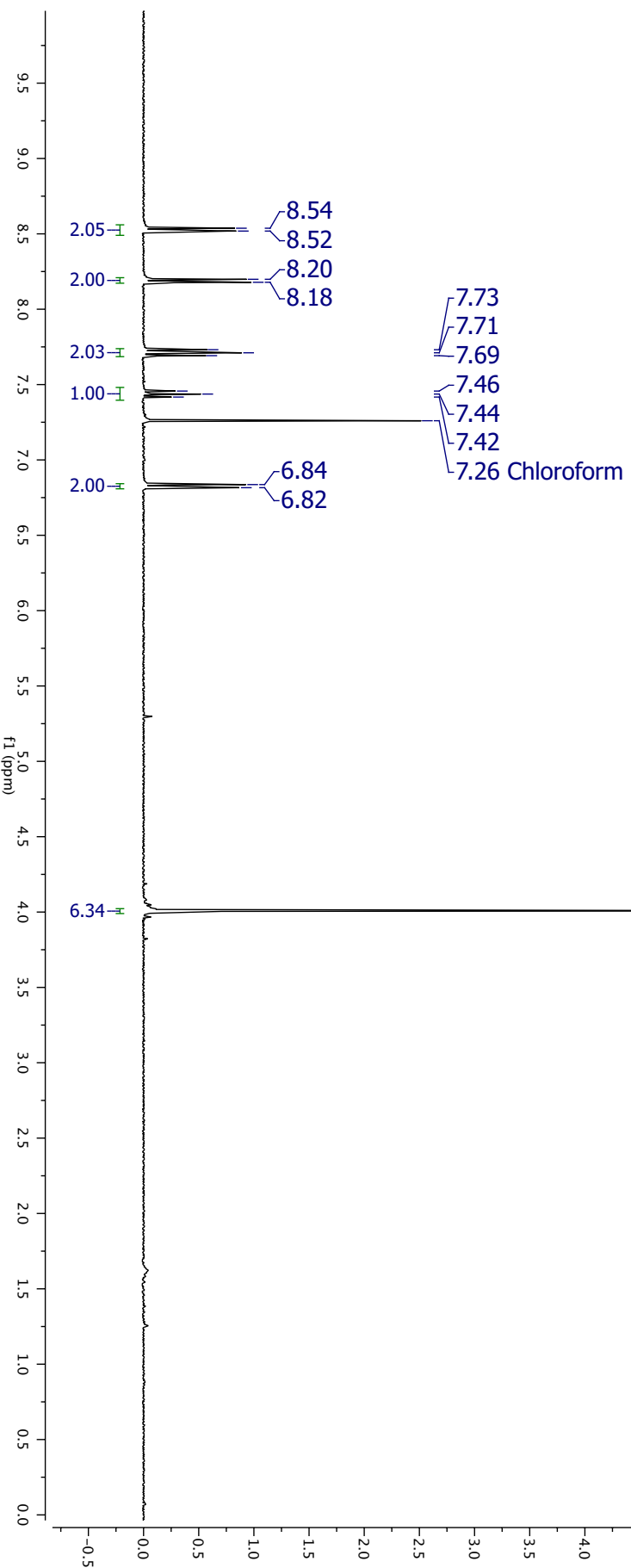
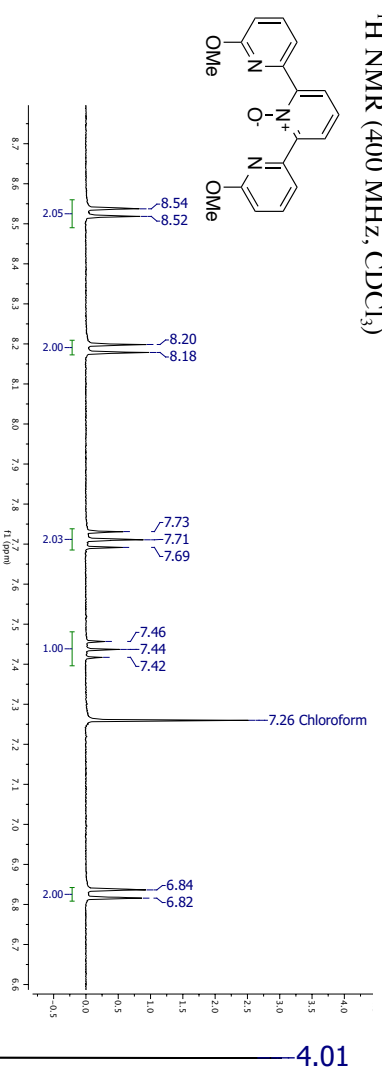
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6,6''-Dimethoxy-2,2':6,2''-terpyridine *N*-oxide (6p)

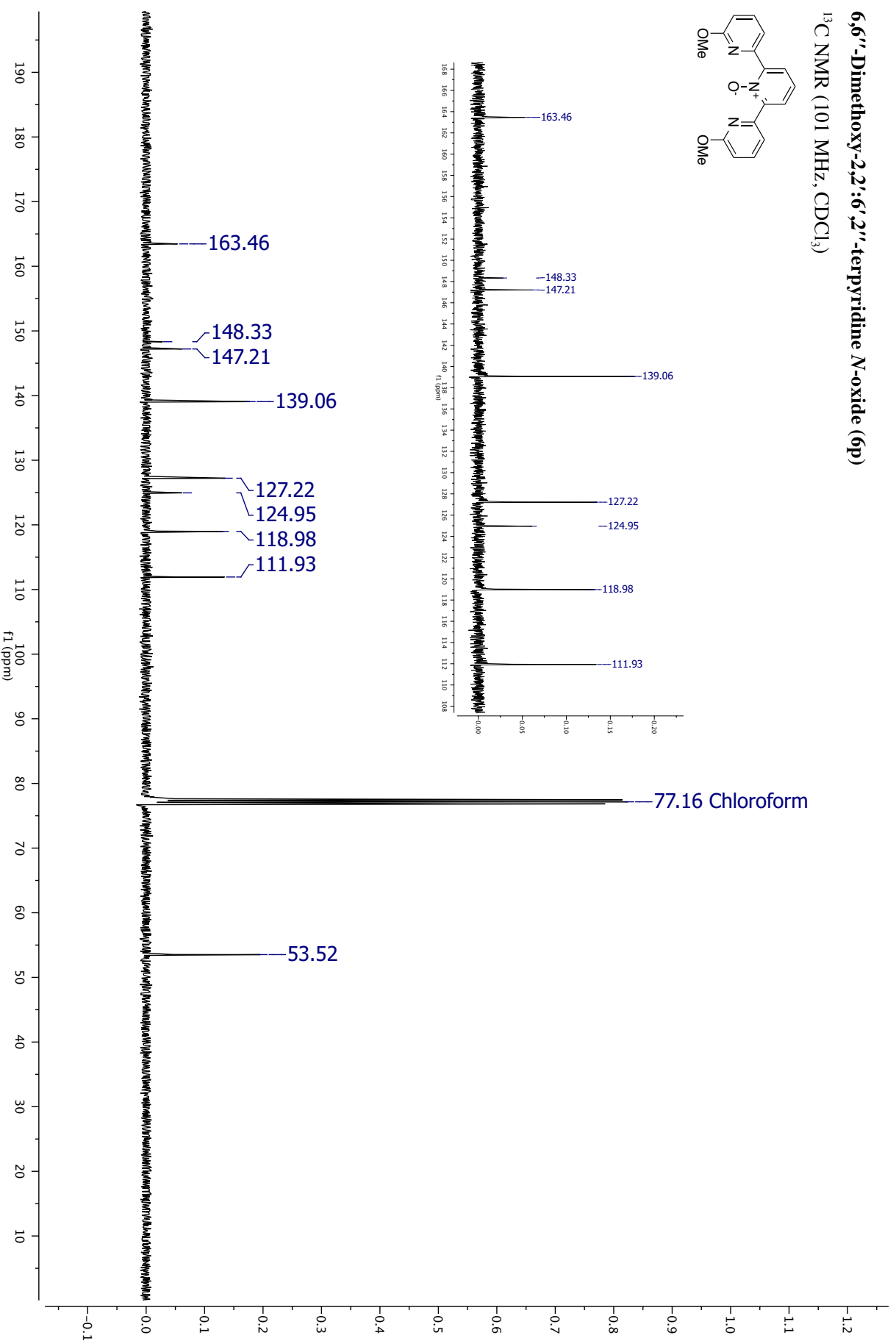
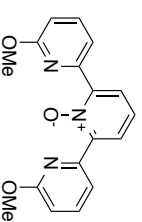
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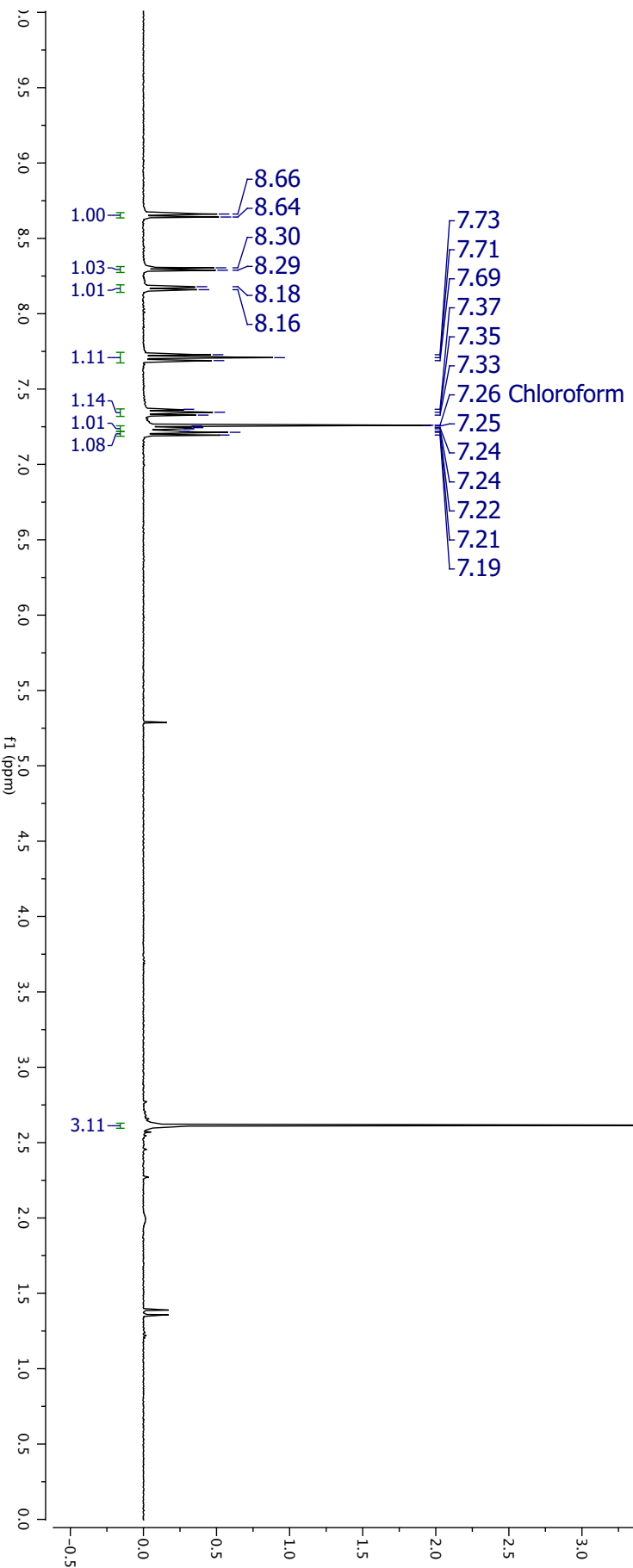
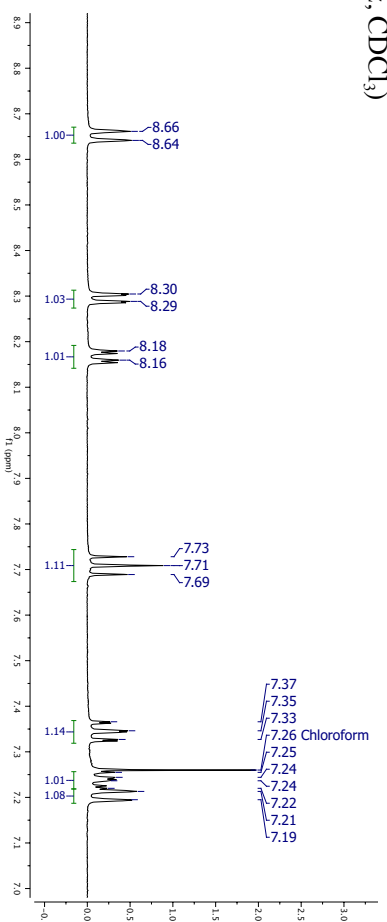
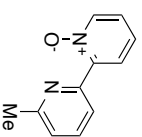
^{13}C NMR (101 MHz, CDCl_3)



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6-Methyl-2,2'-bipyridine *N*-oxide (1q)

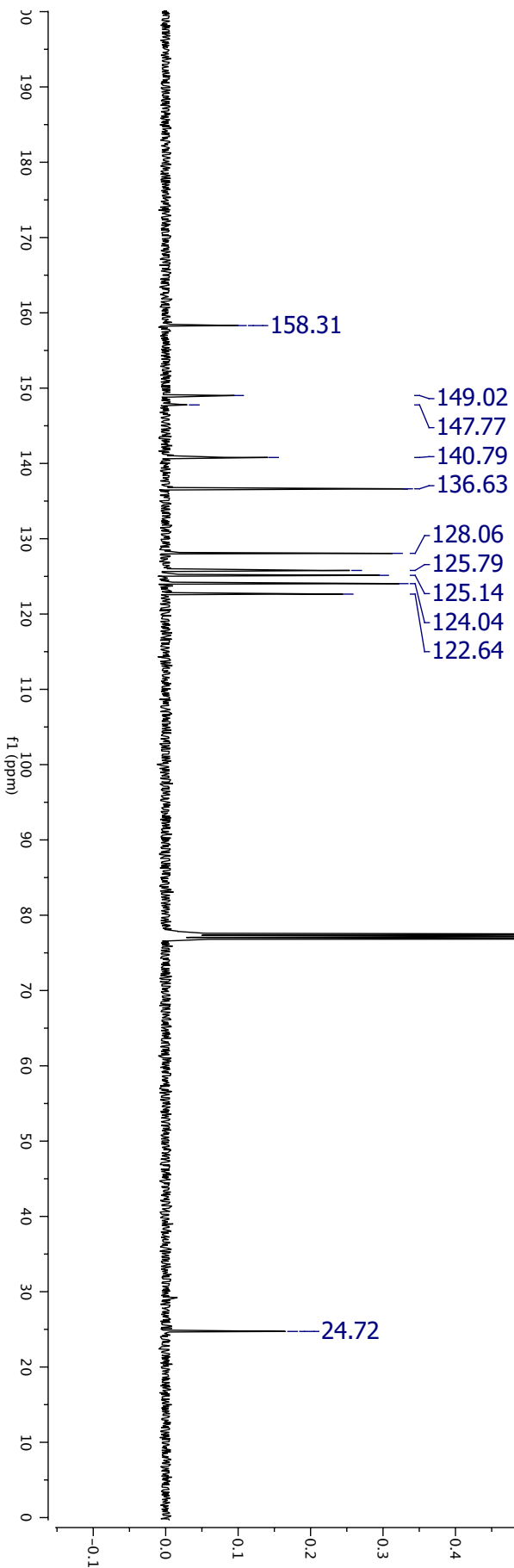
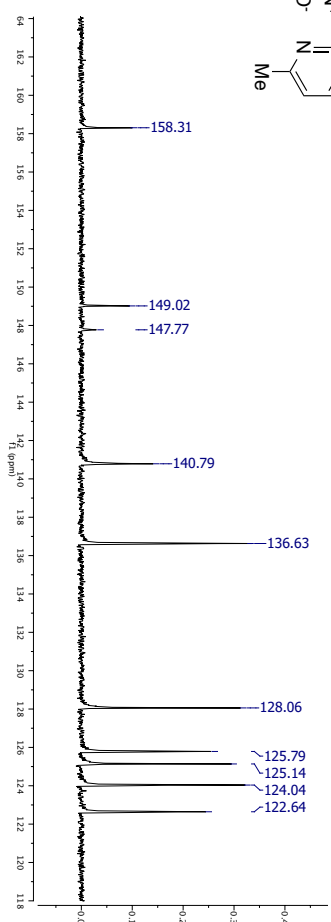
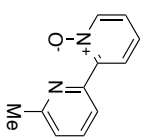
¹H NMR (400 MHz, CDCl₃)



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6-Methyl-2,2'-bipyridine *N*-oxide (1q)

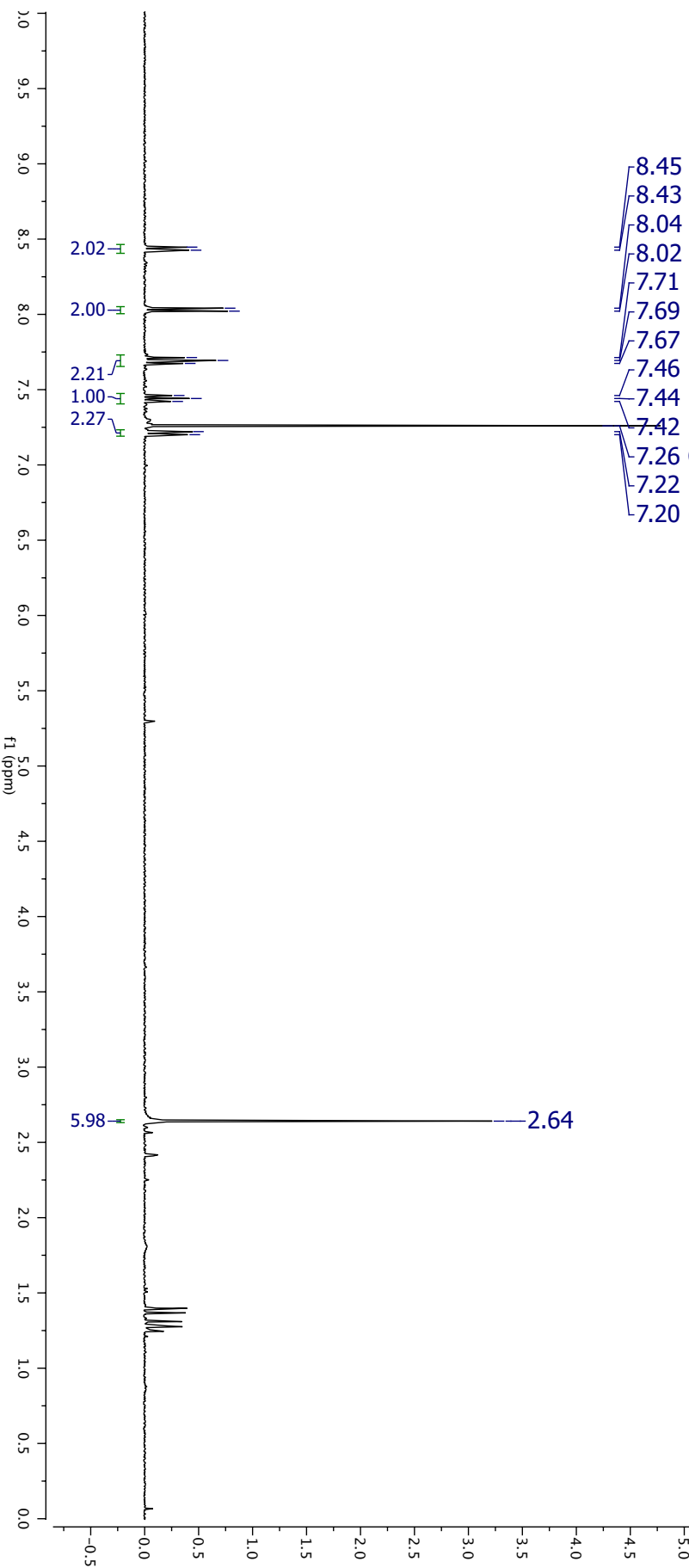
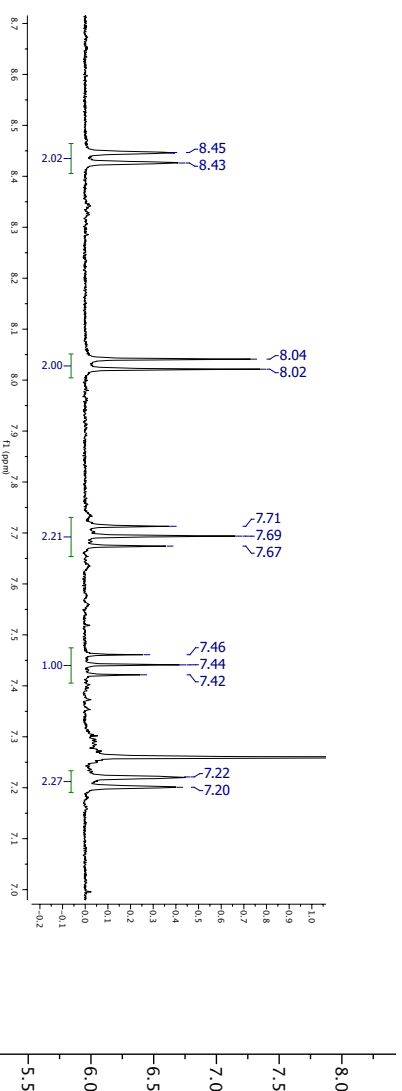
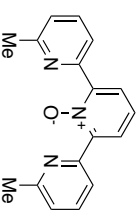
^{13}C NMR (101 MHz, CDCl_3)



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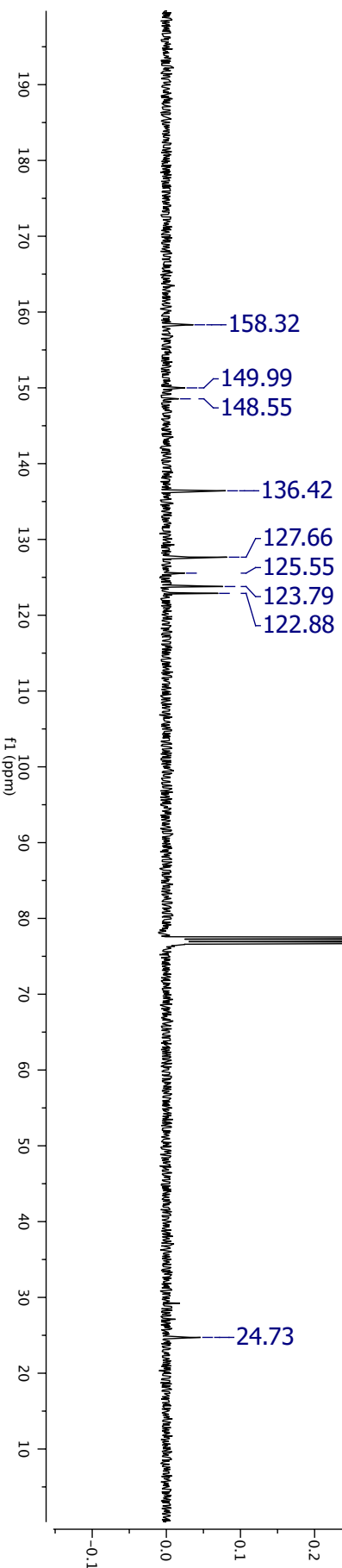
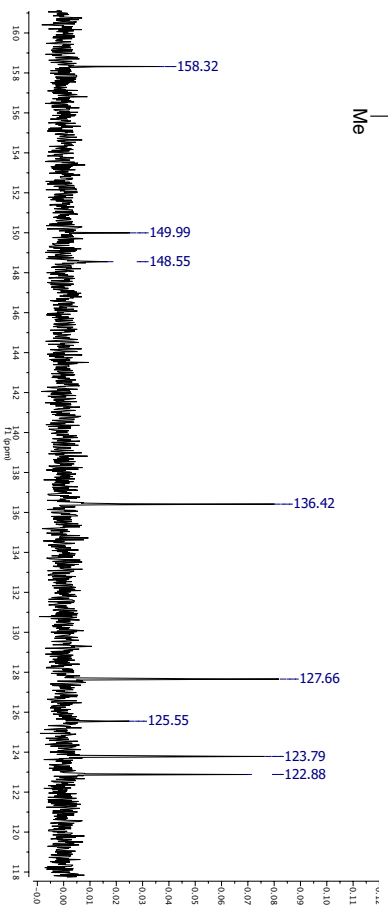
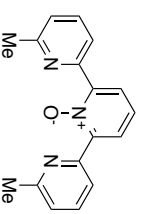
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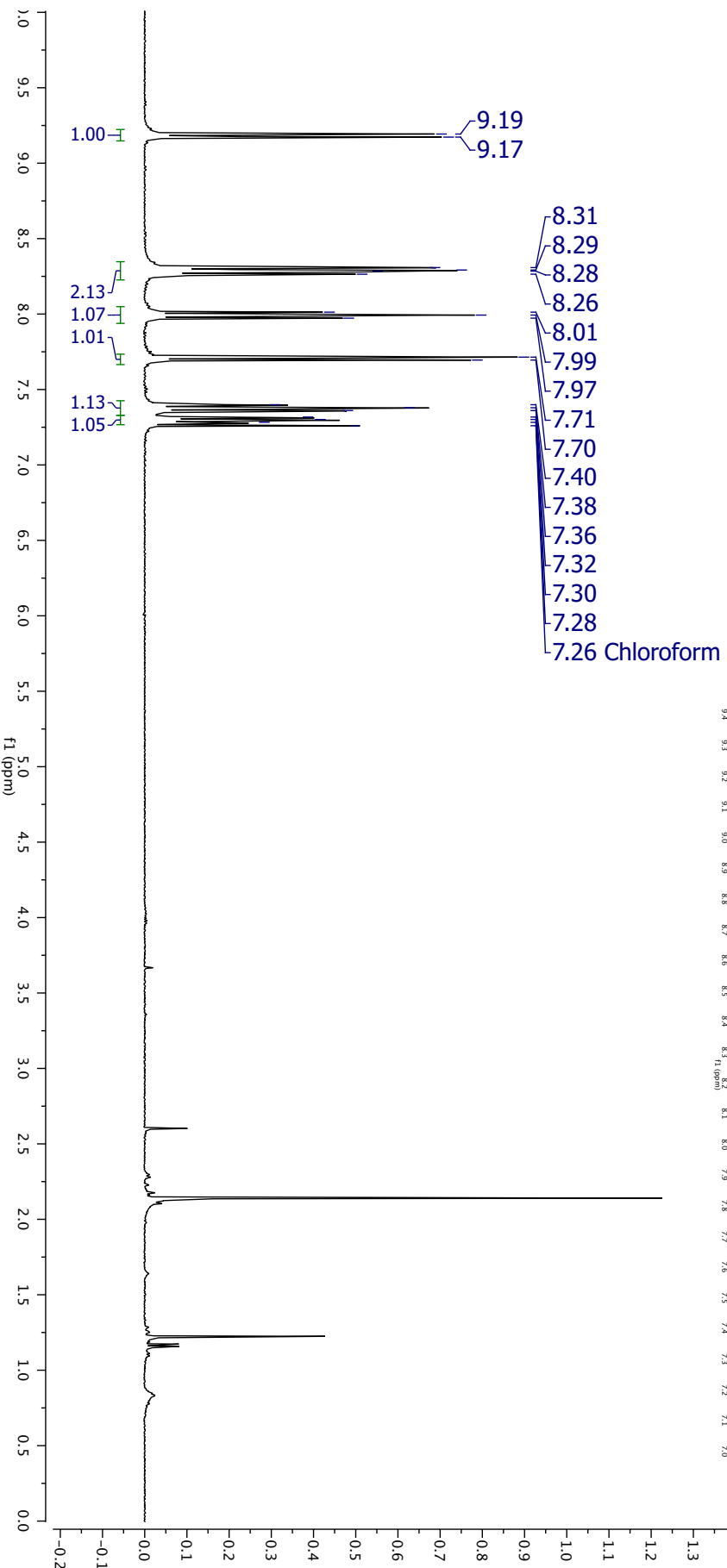
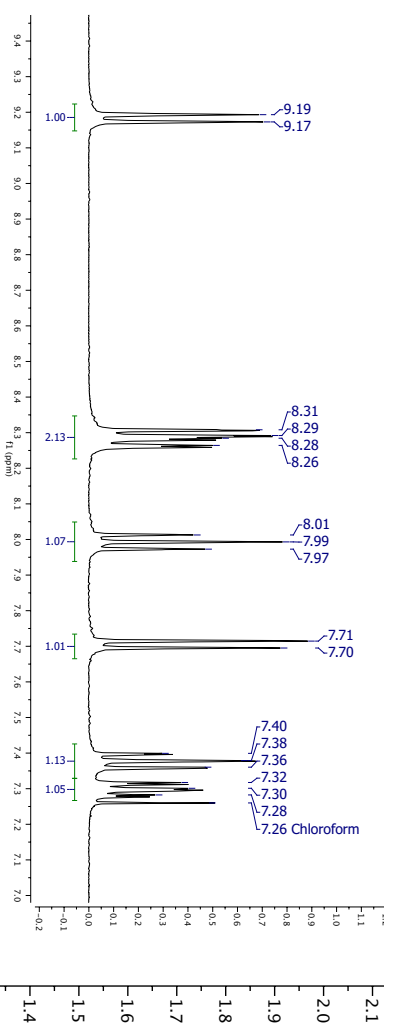
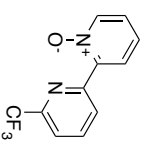
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6'-Trifluoromethyl-2,2'-bipyridine *N*-oxide (1r)

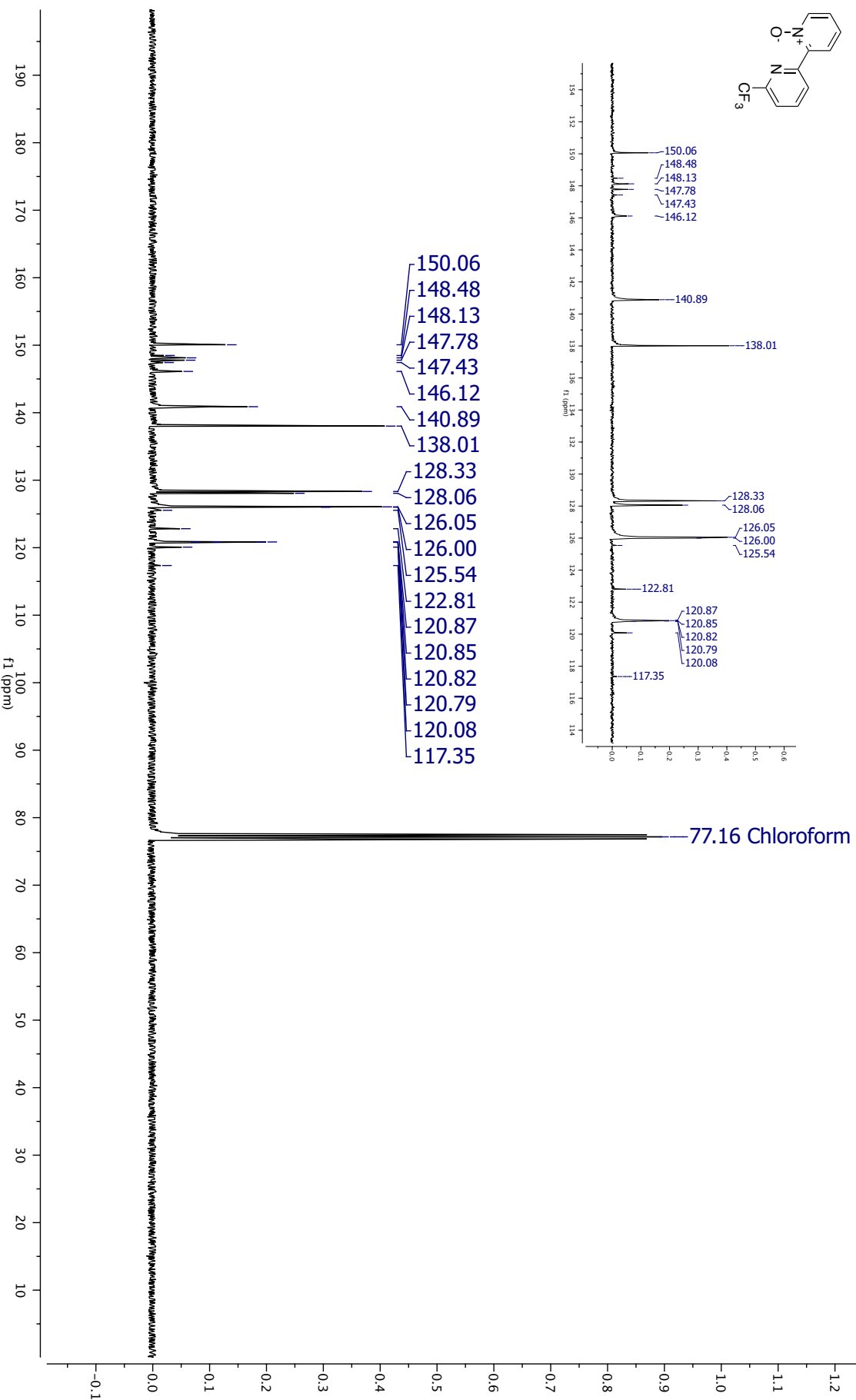
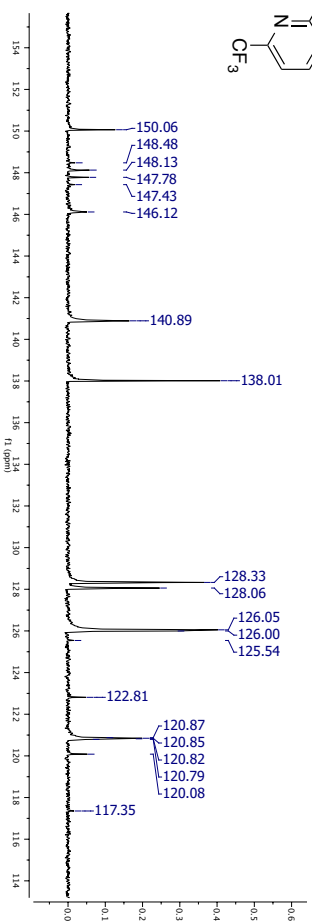
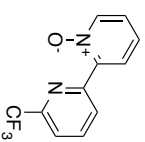
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6'-Trifluoromethyl-2,2'-bipyridine *N*-oxide (**1r**)

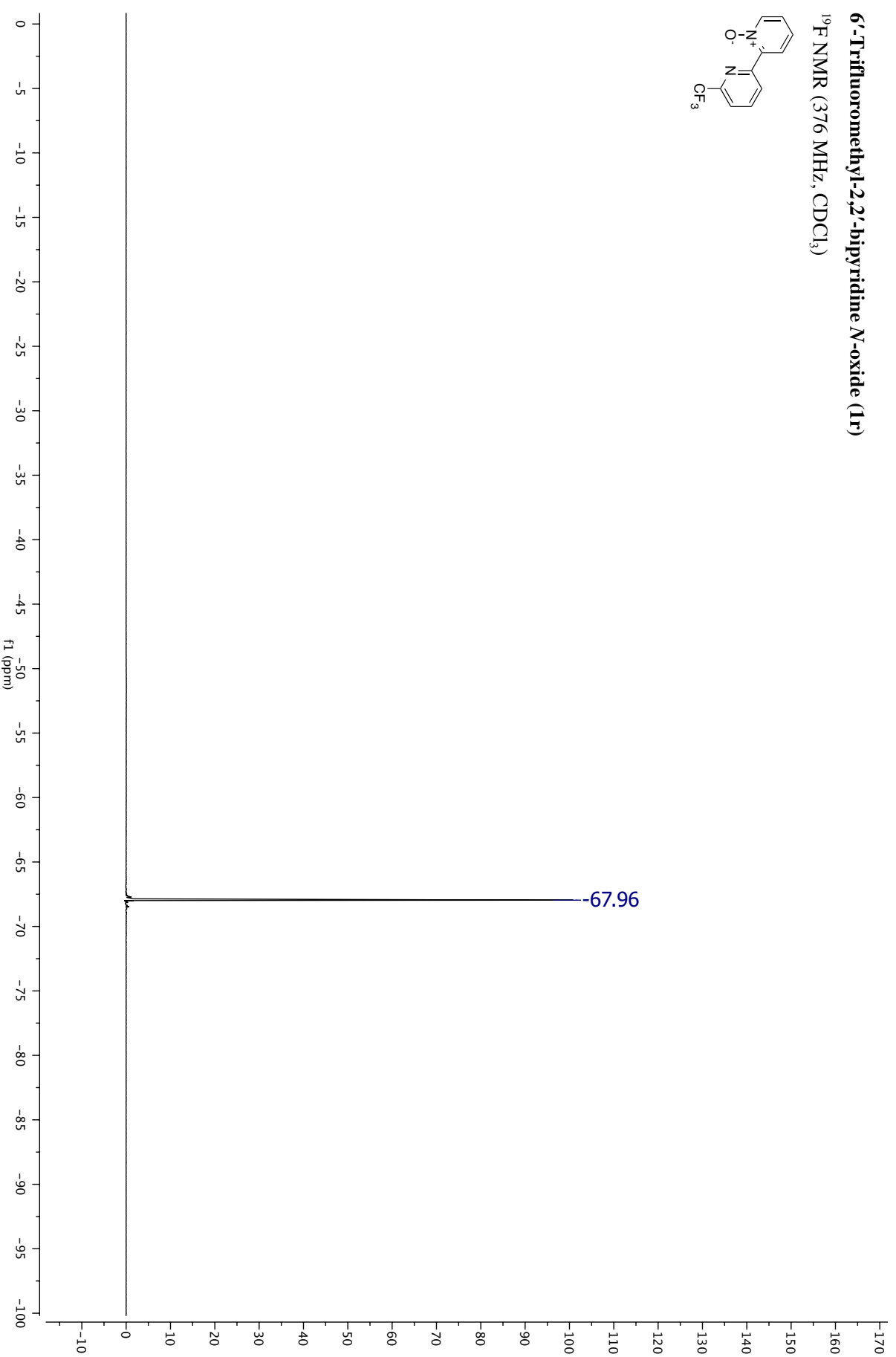
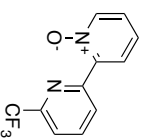
¹³C NMR (101 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

6'-Trifluoromethyl-2,2'-bipyridine *N*-oxide (1r)

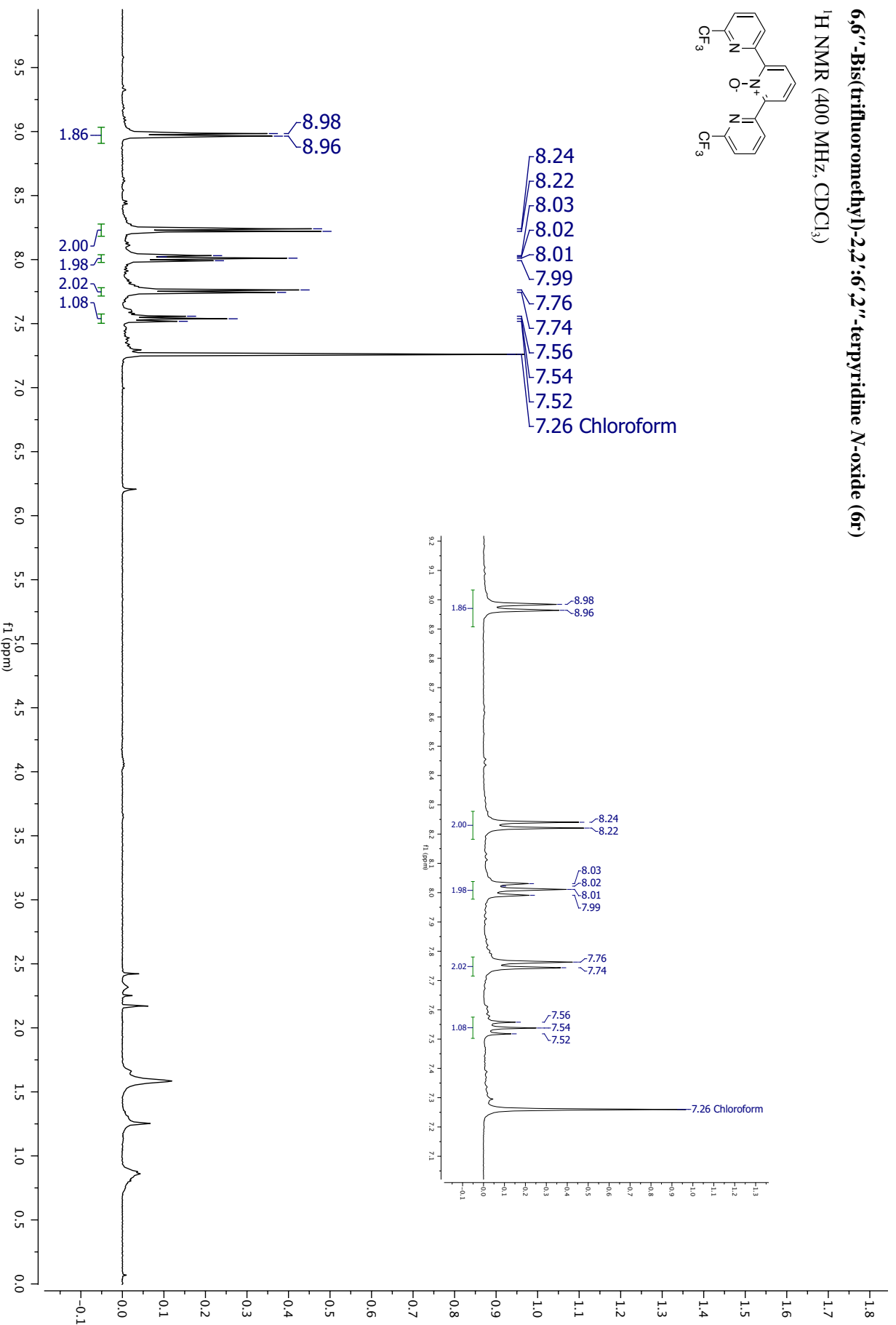
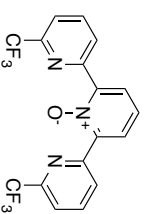
¹⁹F NMR (376 MHz, CDCl₃)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

6,6''-Bis(trifluoromethyl)-2,2':6',2''-terpyridine *N*-oxide (6r)

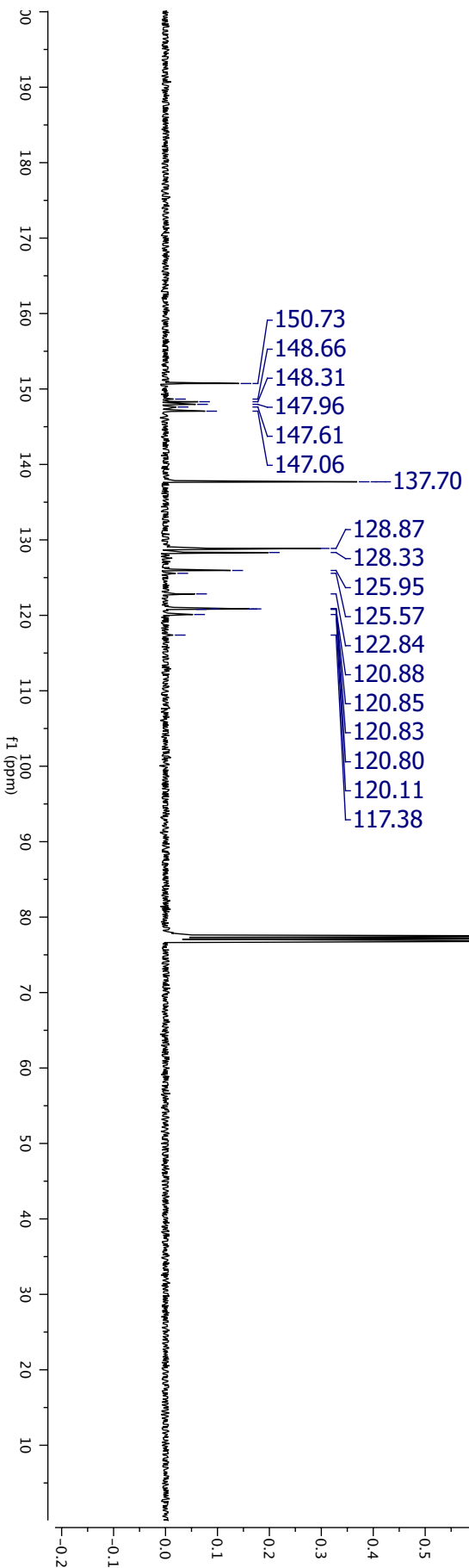
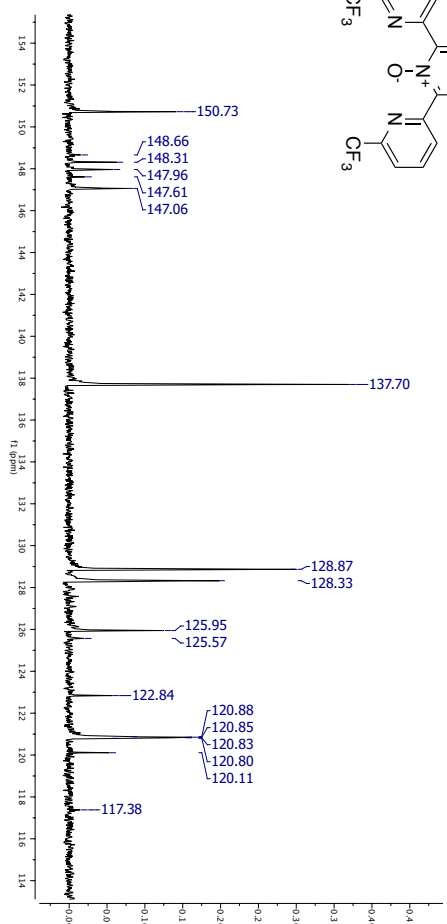
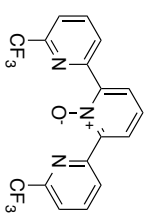
¹H NMR (400 MHz, CDCl₃)



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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

6,6''-Bis(trifluoromethyl)-2,2':6',2''-terpyridine *N*-oxide (6r)

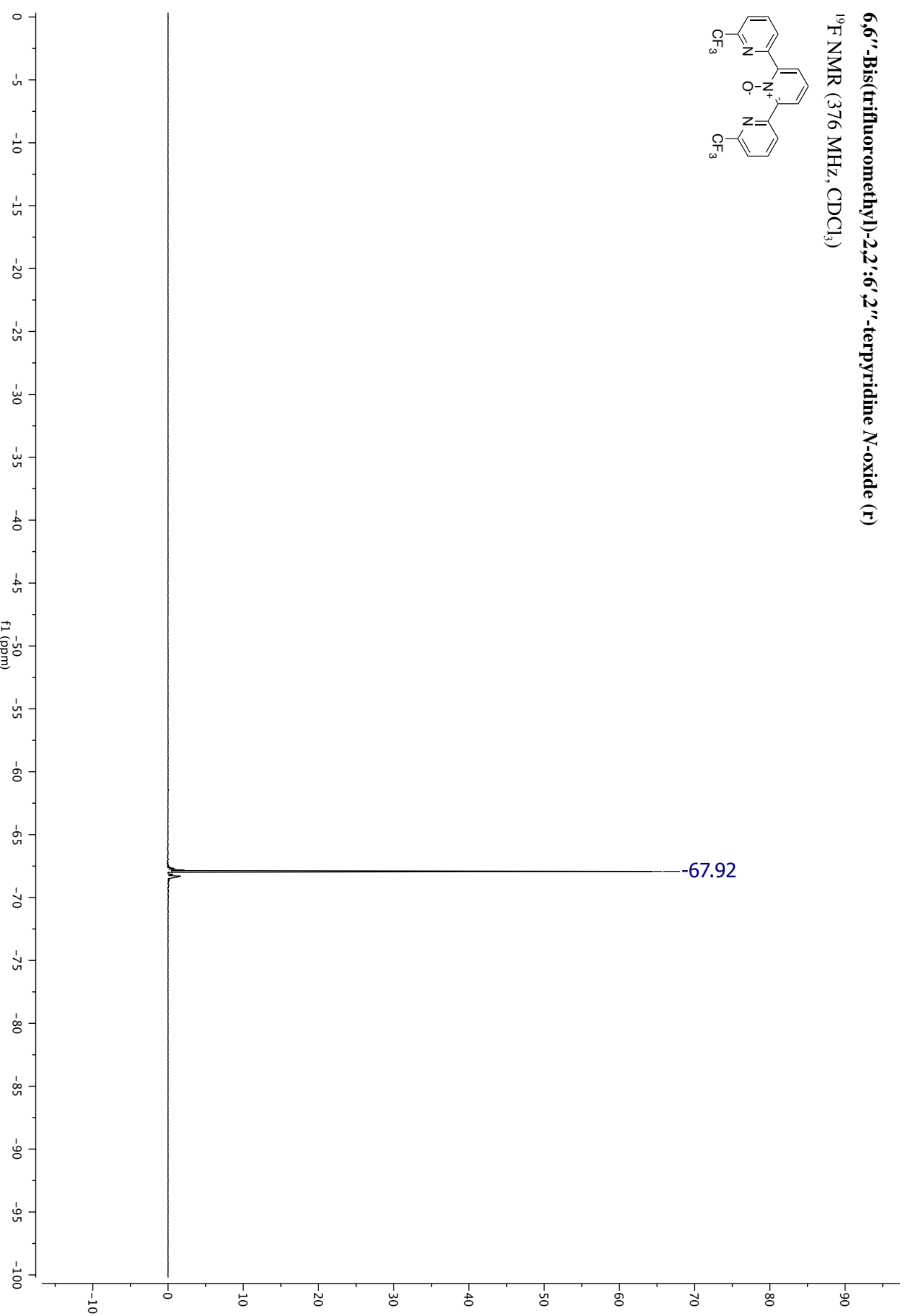
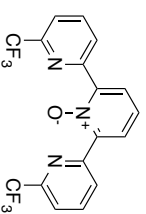
^{13}C NMR (101 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

6,6''-Bis(trifluoromethyl)-2,2':6',2''-terpyridine *N*-oxide (r)

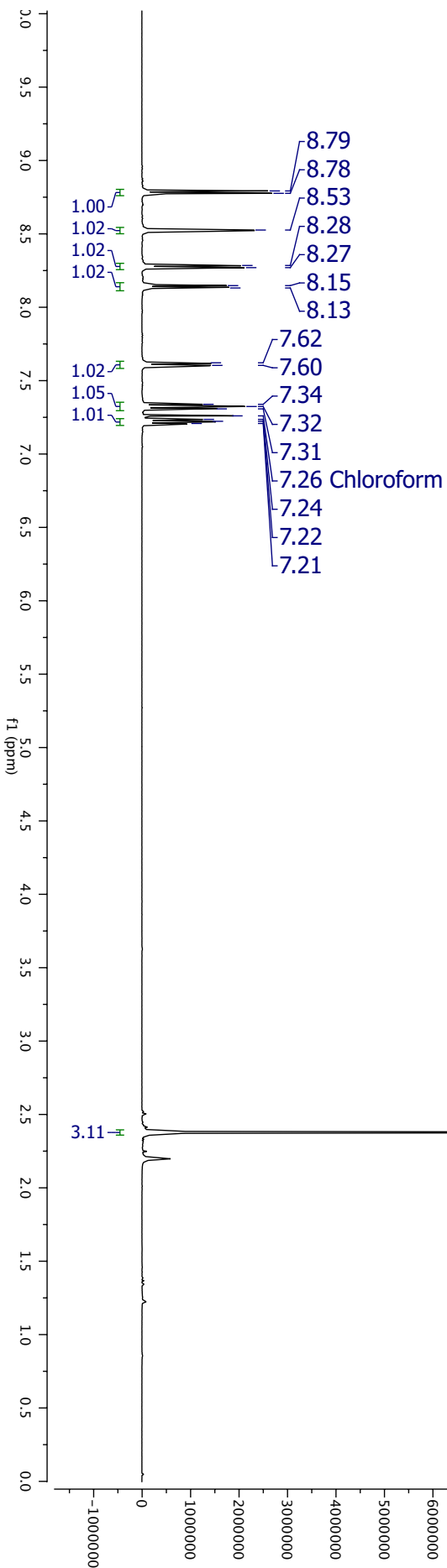
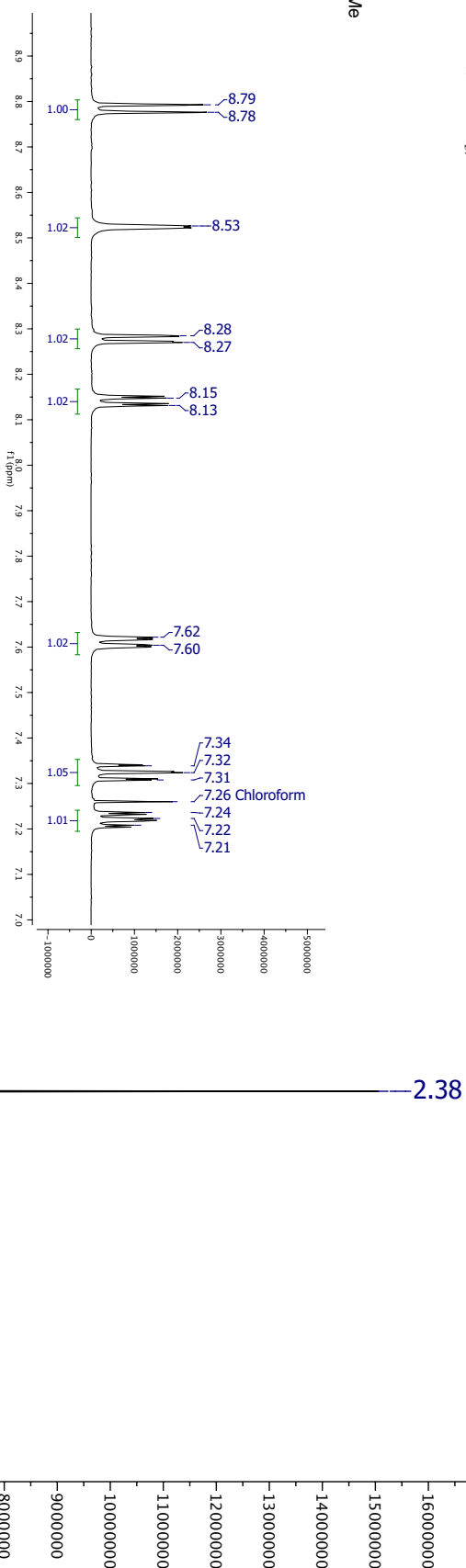
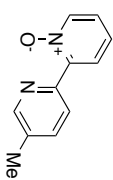
¹⁹F NMR (376 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

5'-Methyl-2,2'-bipyridine *N*-oxide (1s)

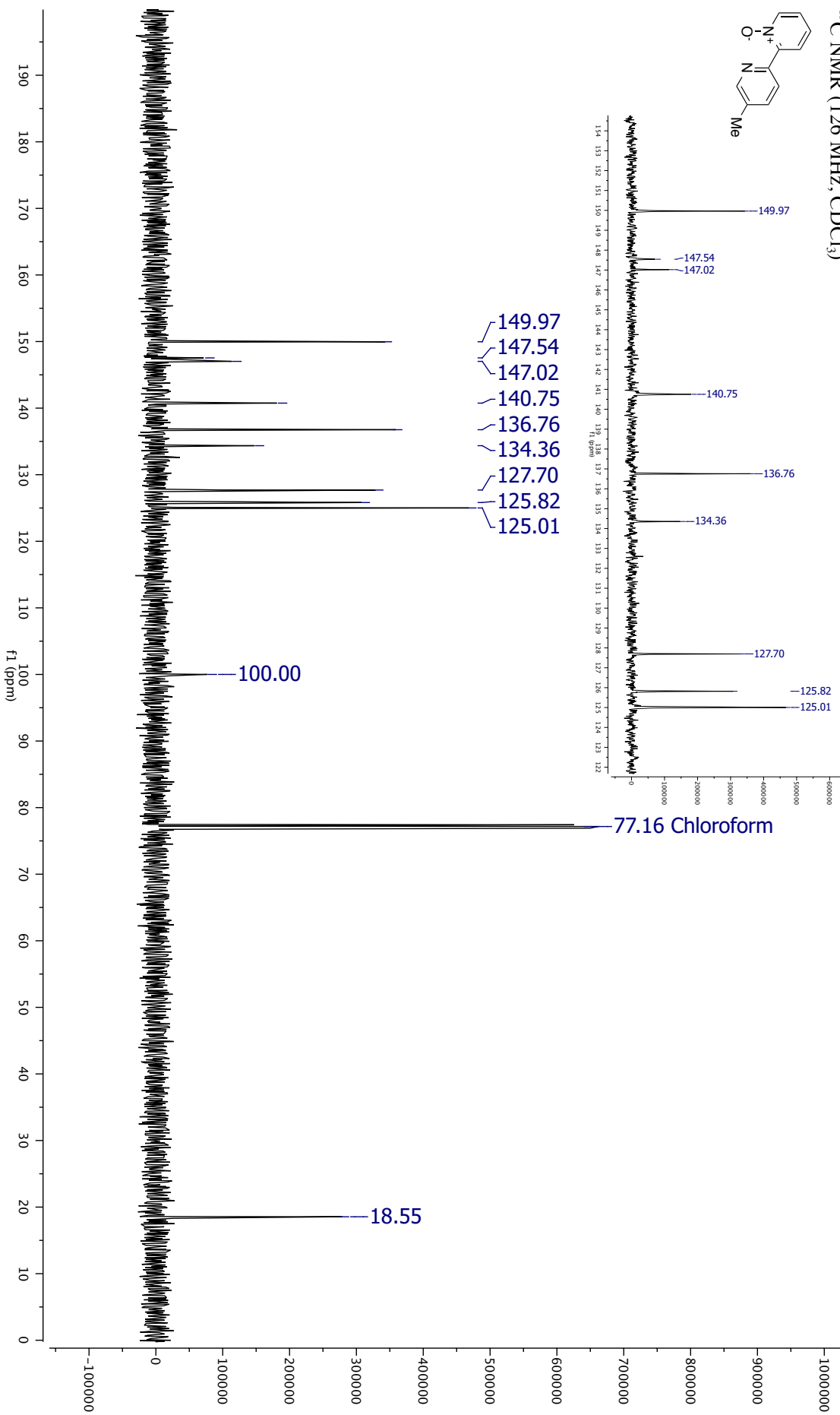
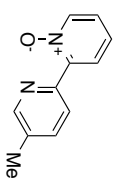
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

5'-Methyl-2,2'-bipyridine *N*-oxide (1s)

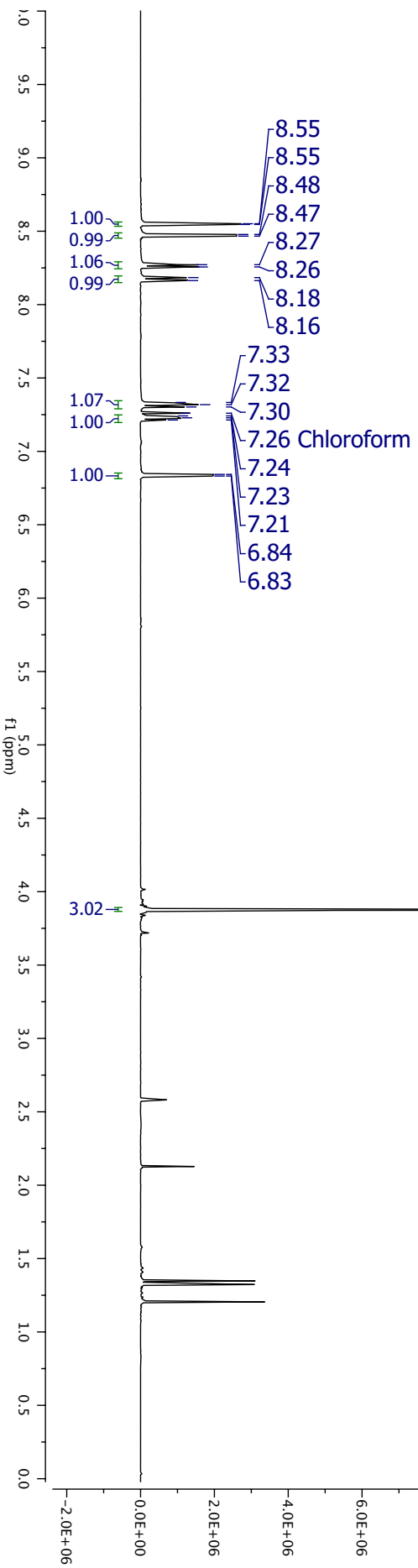
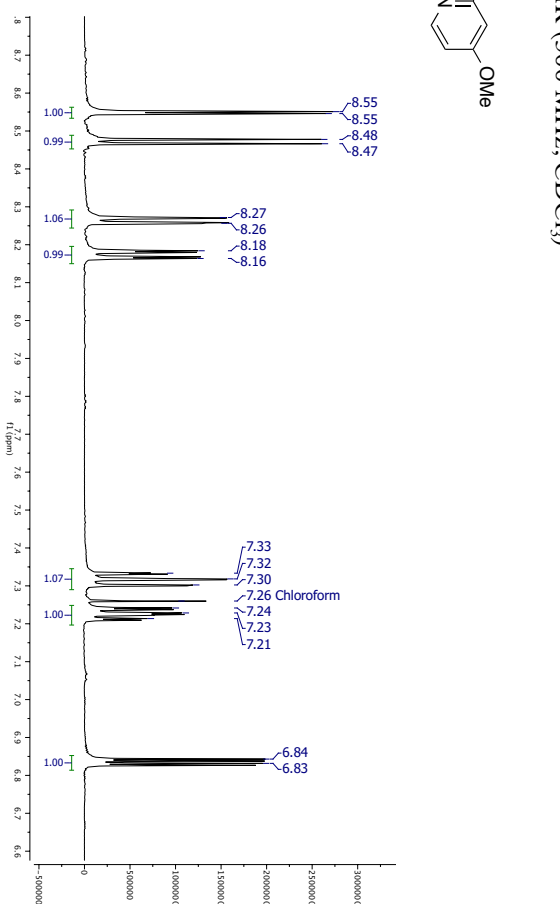
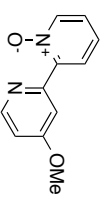
^{13}C NMR (126 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

4'-Methoxy-2,2'-bipyridine *N*-oxide (1t)

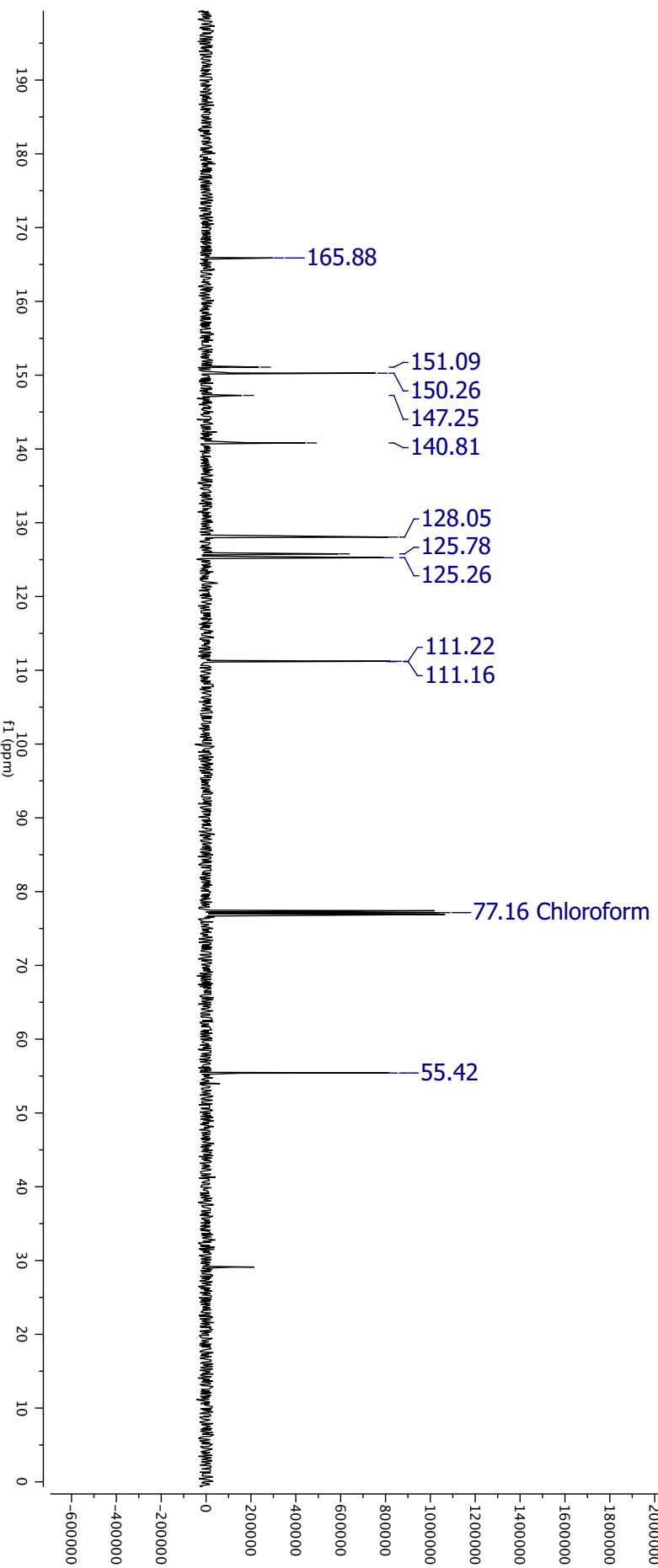
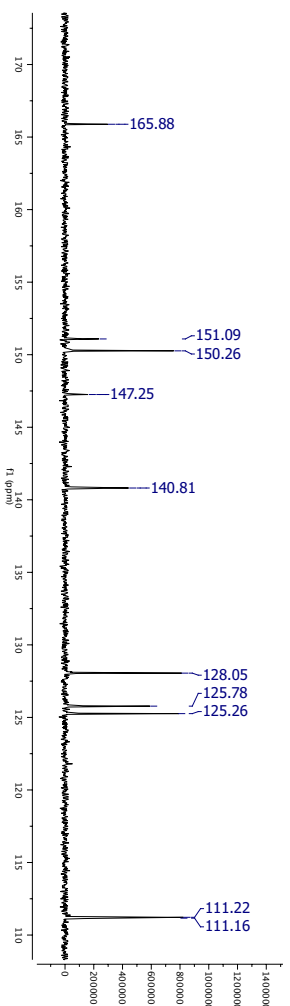
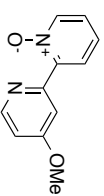
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

4'-Methoxy-2,2'-bipyridine *N*-oxide (1t)

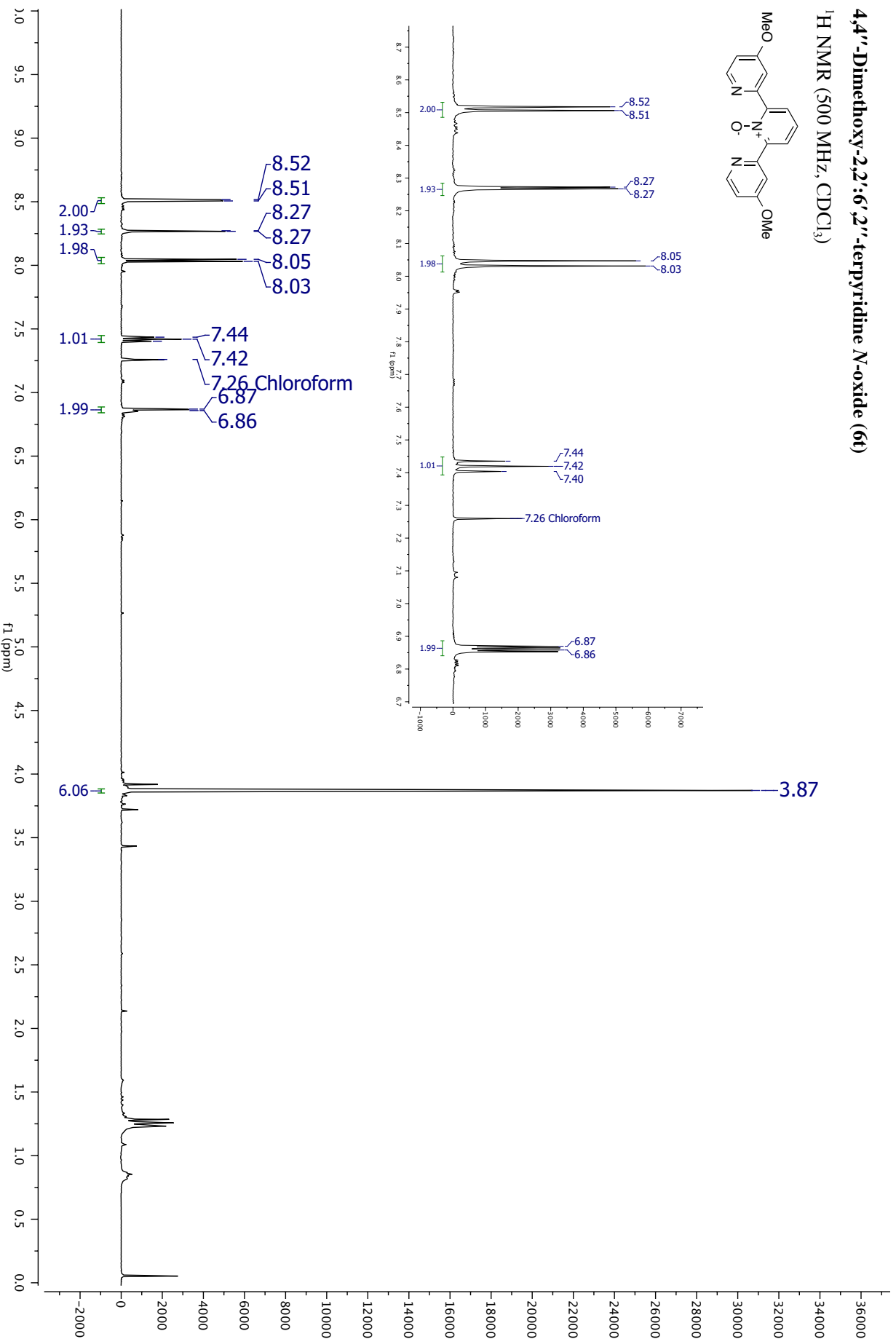
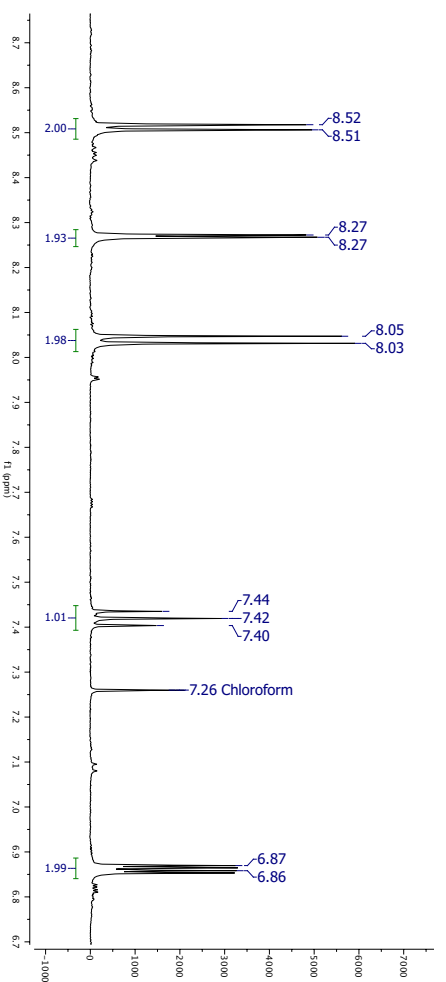
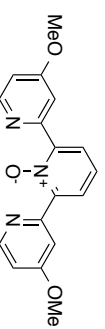
^{13}C NMR (126 MHz, CDCl_3)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

4,4''-Dimethoxy-2,2':6,2''-terpyridine *N*-oxide (6t)

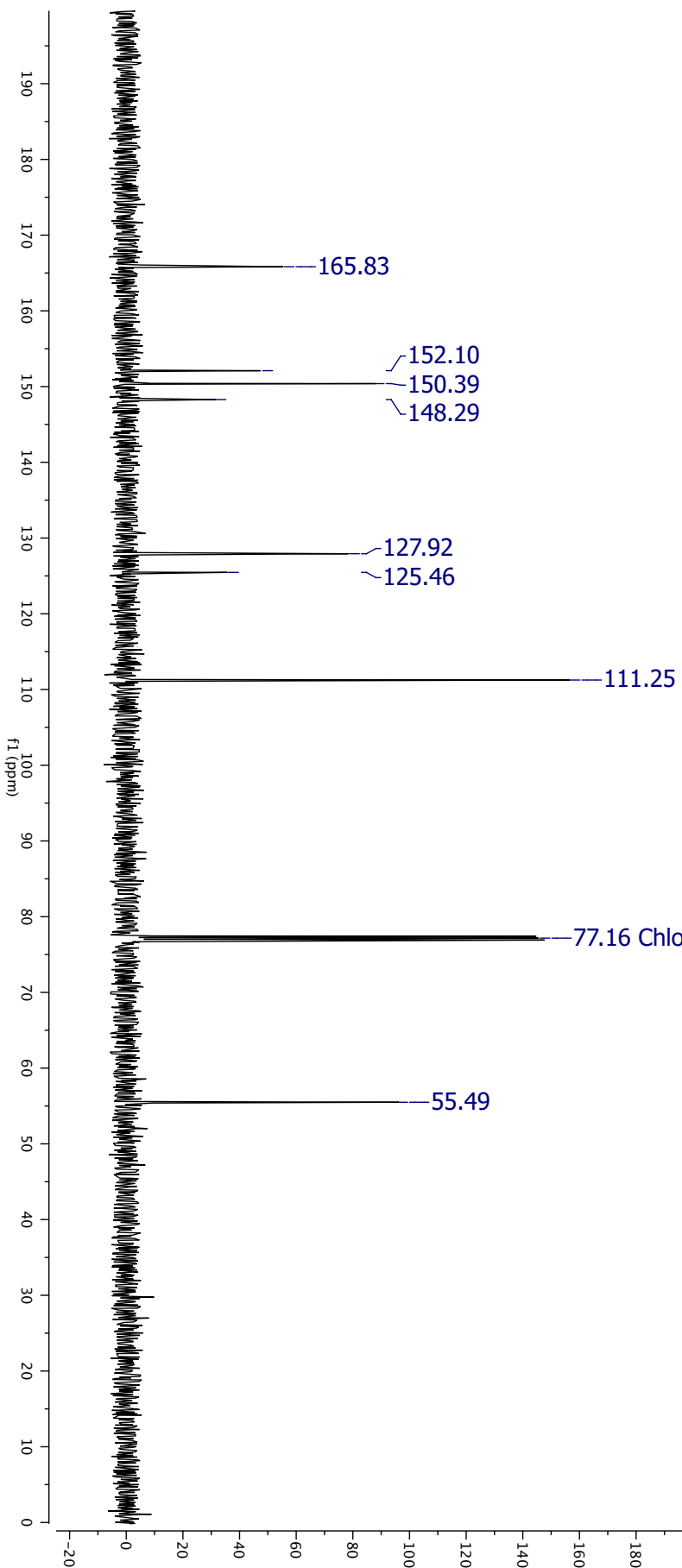
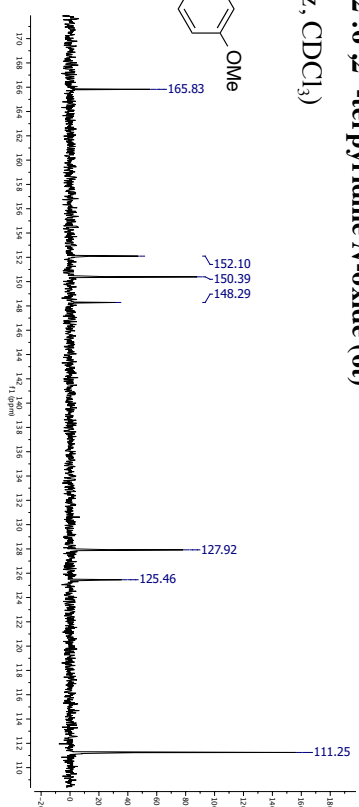
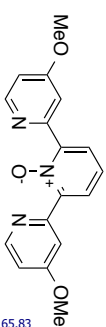
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

4,4''-Dimethoxy-2,2':6,2''-terpyridine *N*-oxide (6t)

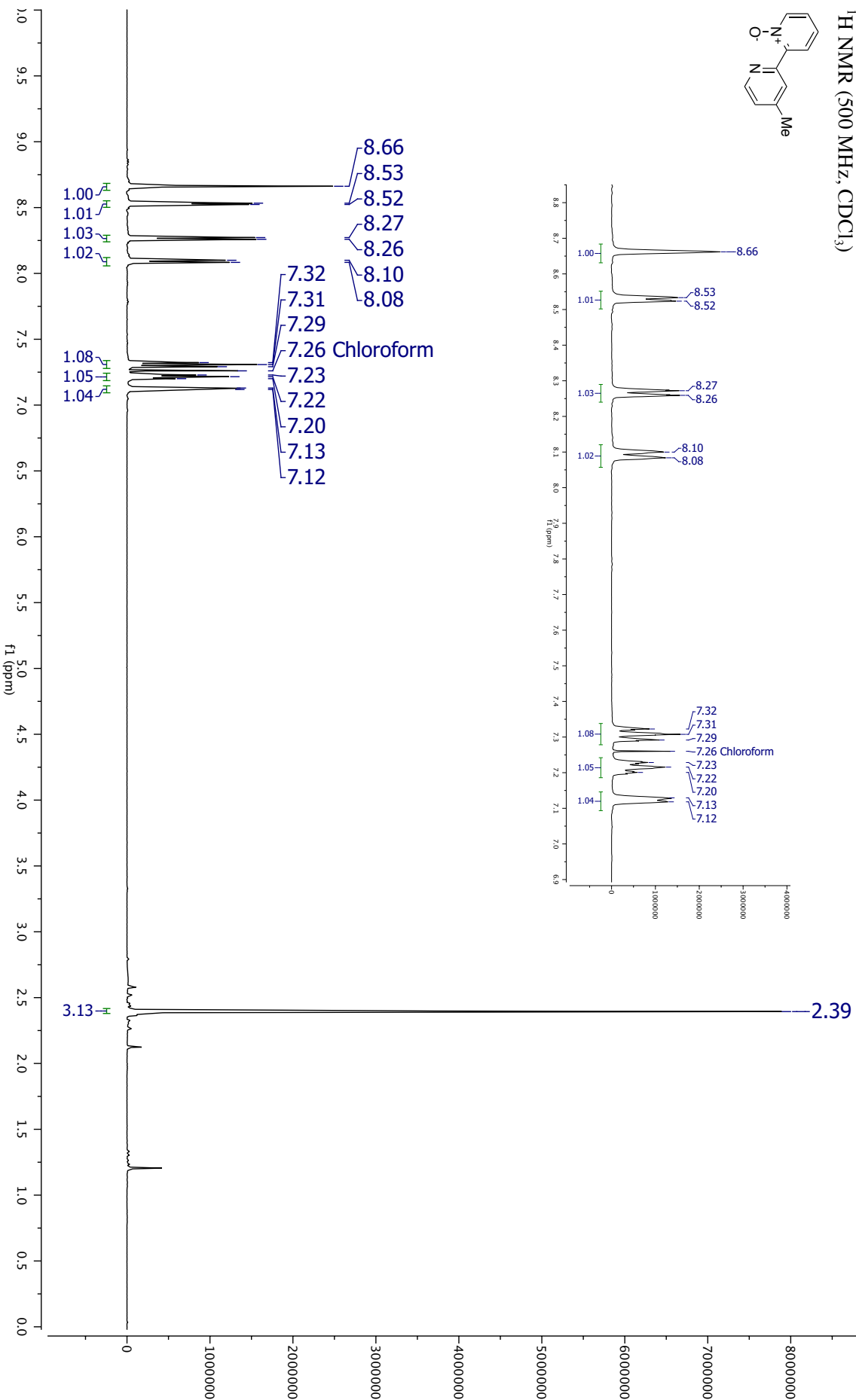
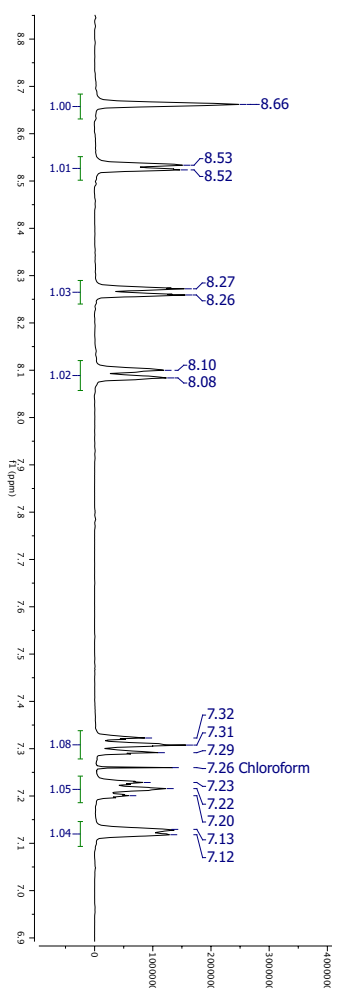
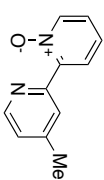
¹³C NMR (126 MHz, CDCl₃)



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 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

4'-Methyl-2,2'-bipyridine *N*-oxide (1u)

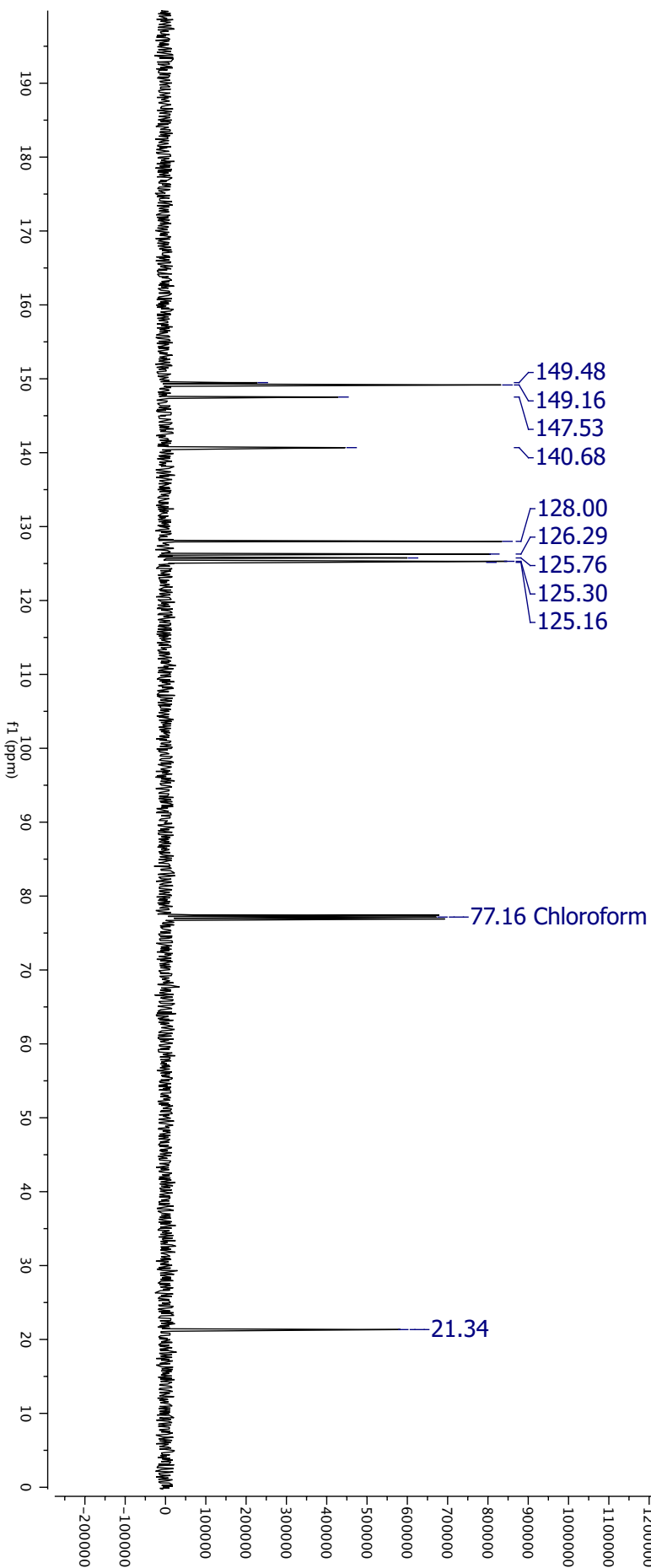
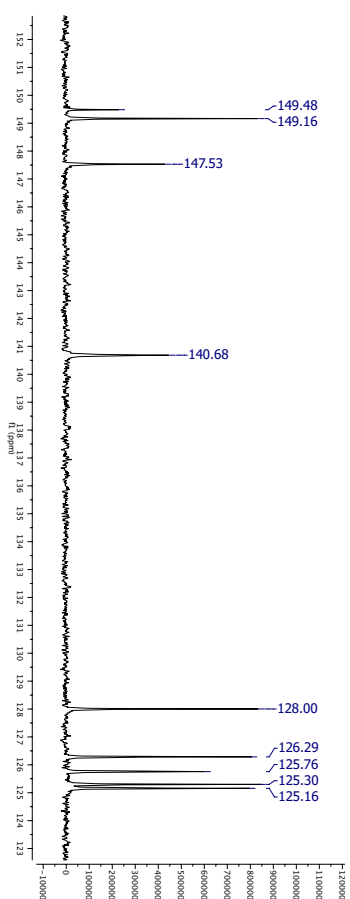
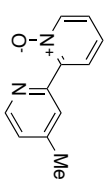
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

4'-Methyl-2,2'-bipyridine *N*-oxide (1u)

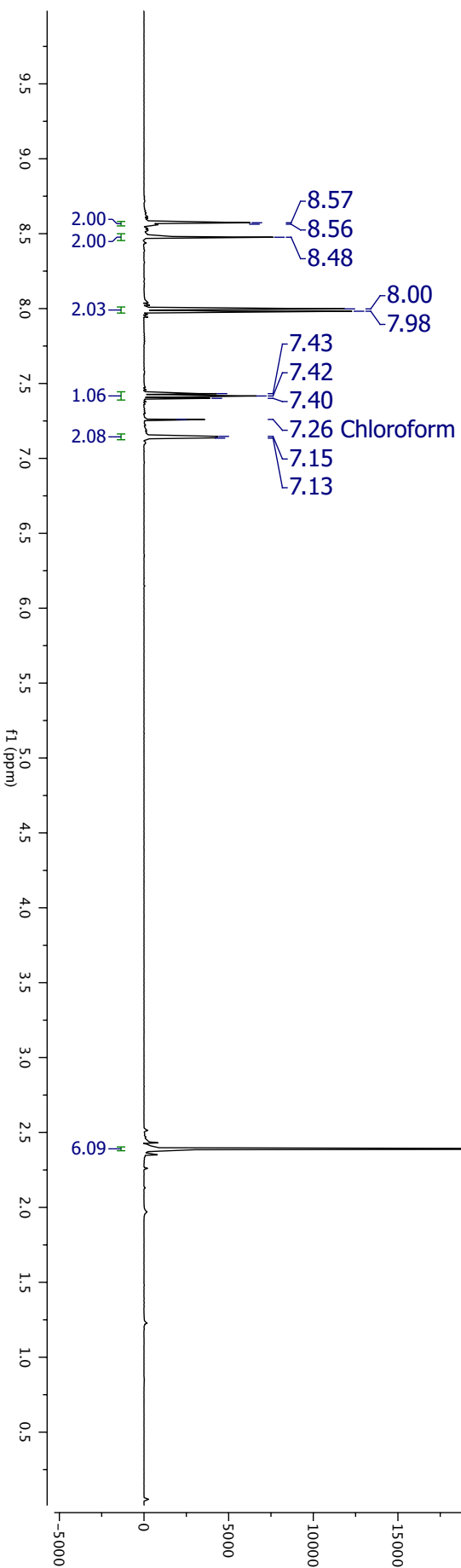
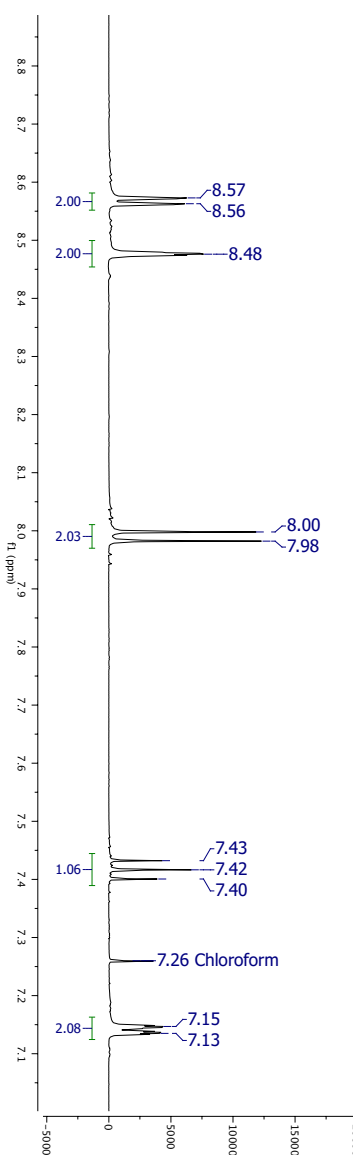
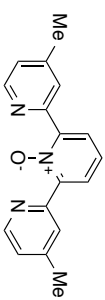
¹³C NMR (126 MHz, CDCl₃)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

4,4''-Dimethyl-2,2':6',2''-terpyridine *N*-oxide (6u)

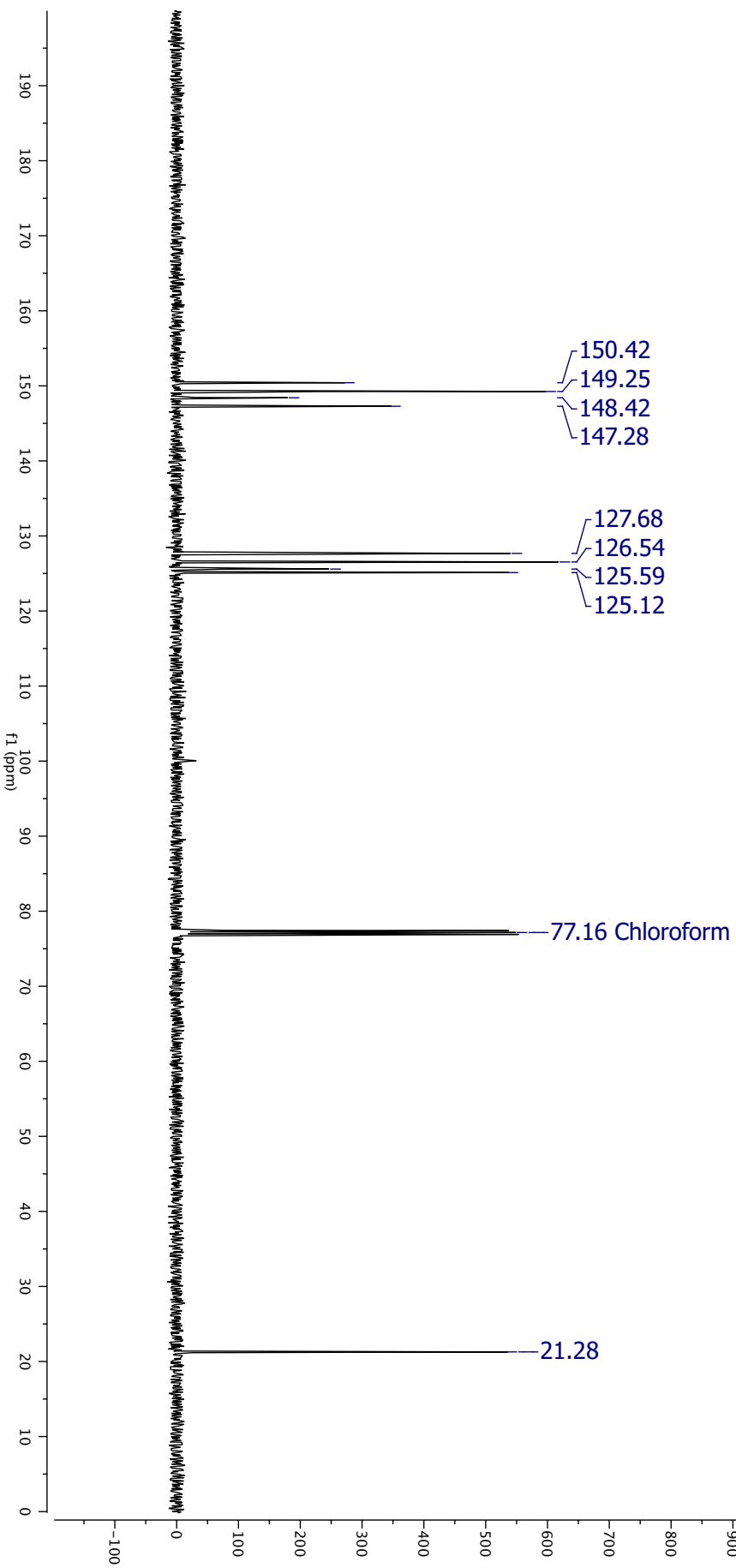
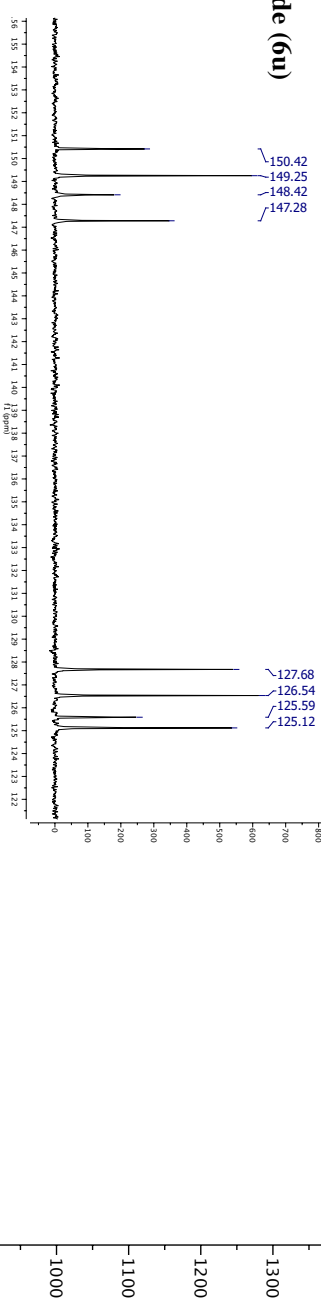
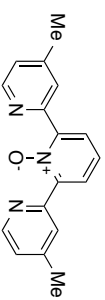
¹H NMR (500 MHz, CDCl₃)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

4,4''-Dimethyl-2,2':6',2''-terpyridine *N*-oxide (6u)

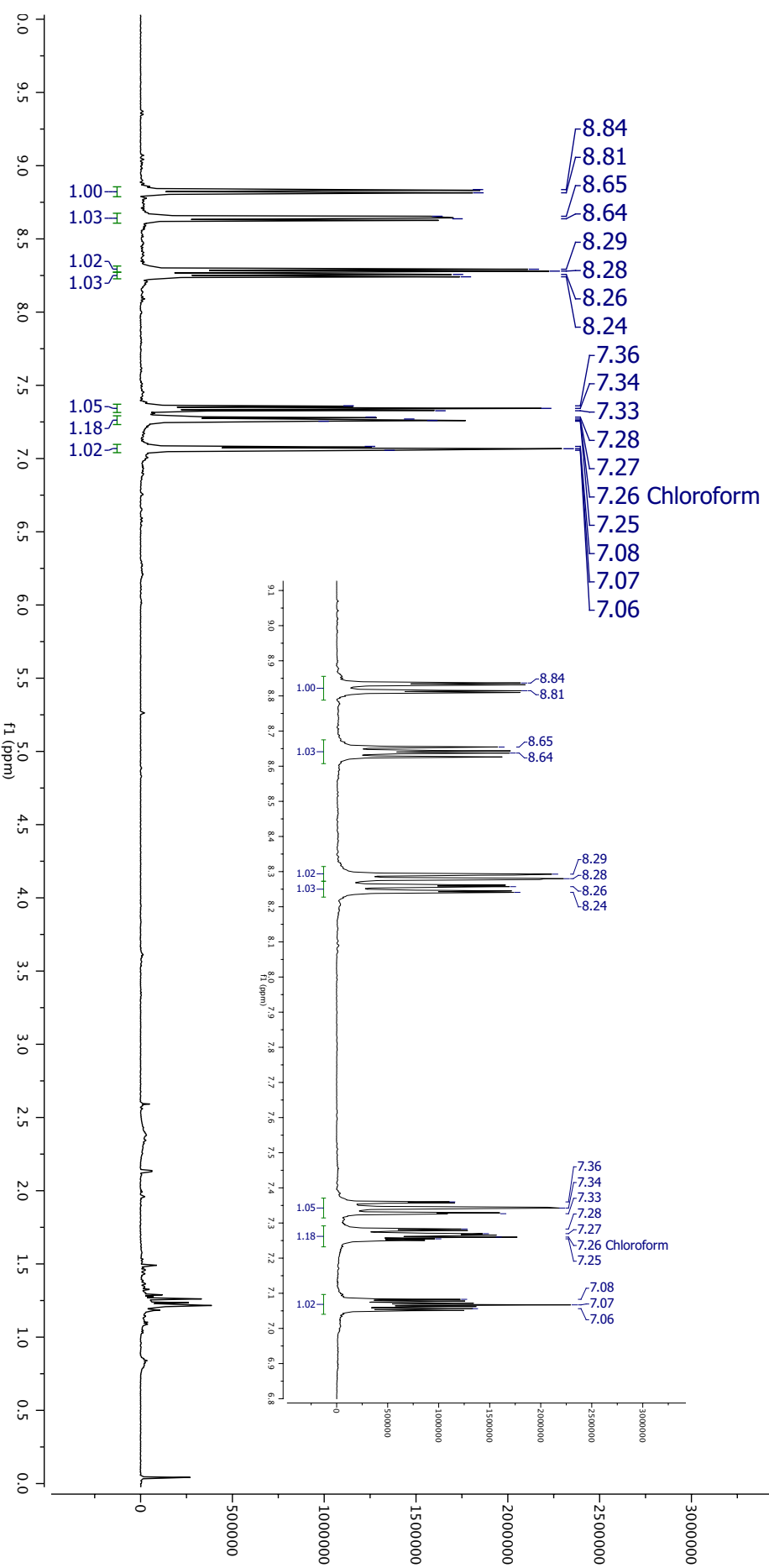
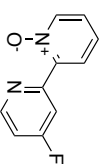
^{13}C NMR (126 MHz, CDCl_3)



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 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

4-Fluoro-2,2'-bipyridine *N*-oxide (1v)

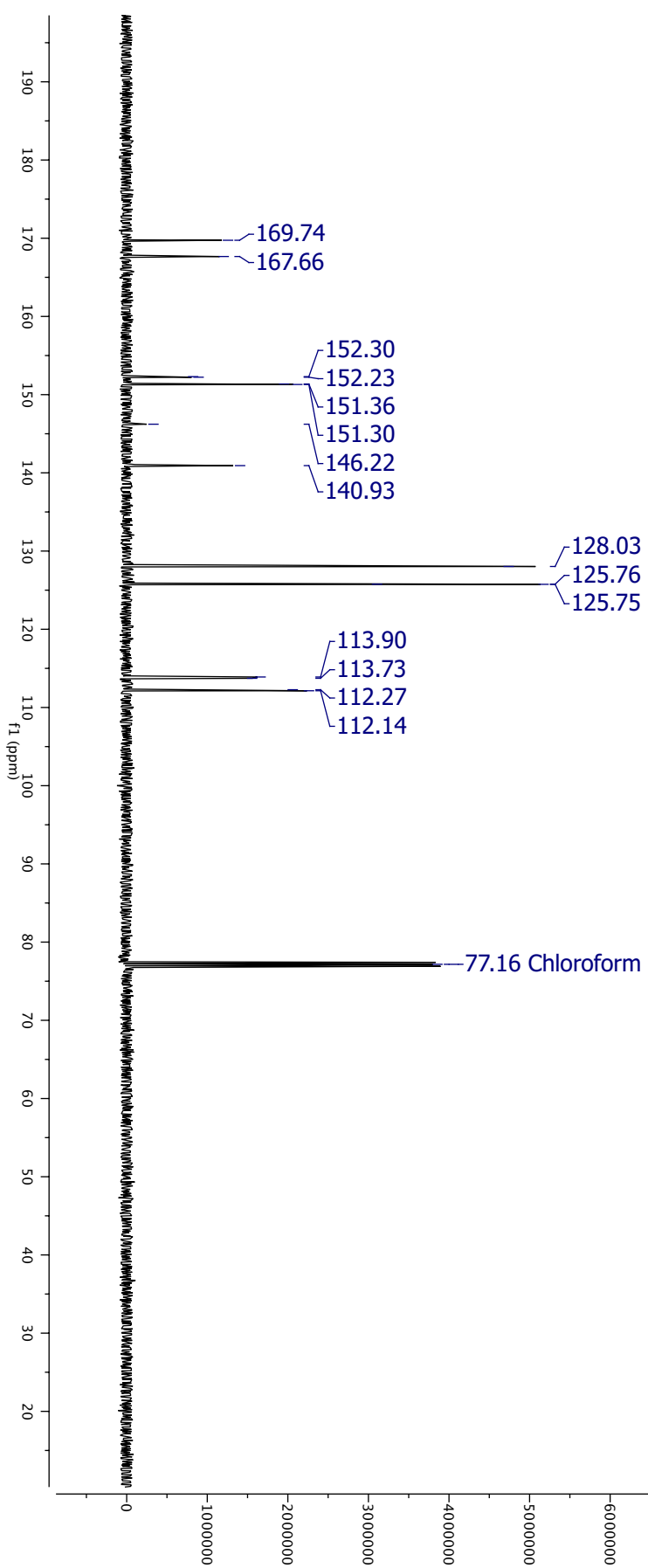
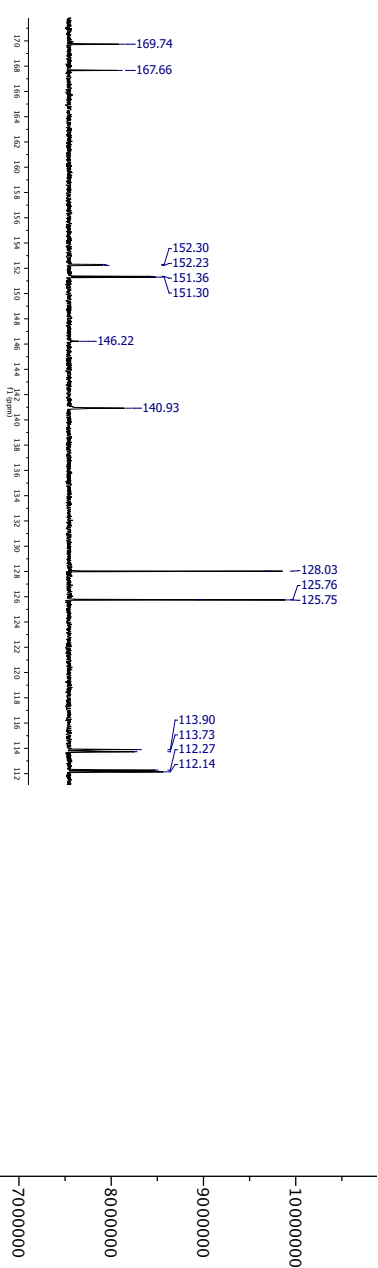
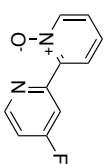
¹H NMR (500 MHz, CDCl₃)



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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

4-Fluoro-2,2'-bipyridine *N*-oxide (1v)

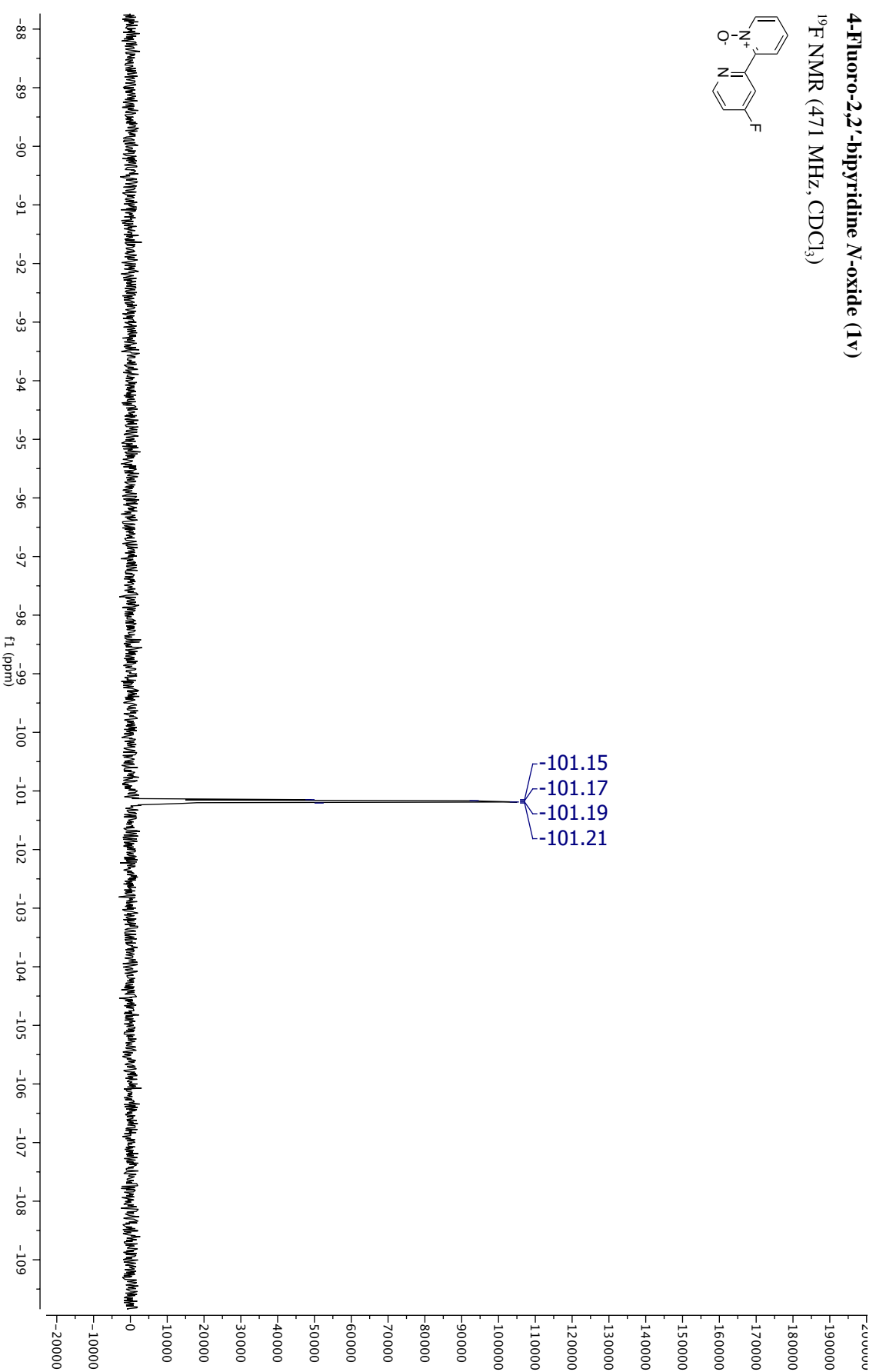
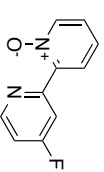
¹³C NMR (126 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

4-Fluoro-2,2'-bipyridine *N*-oxide (1v)

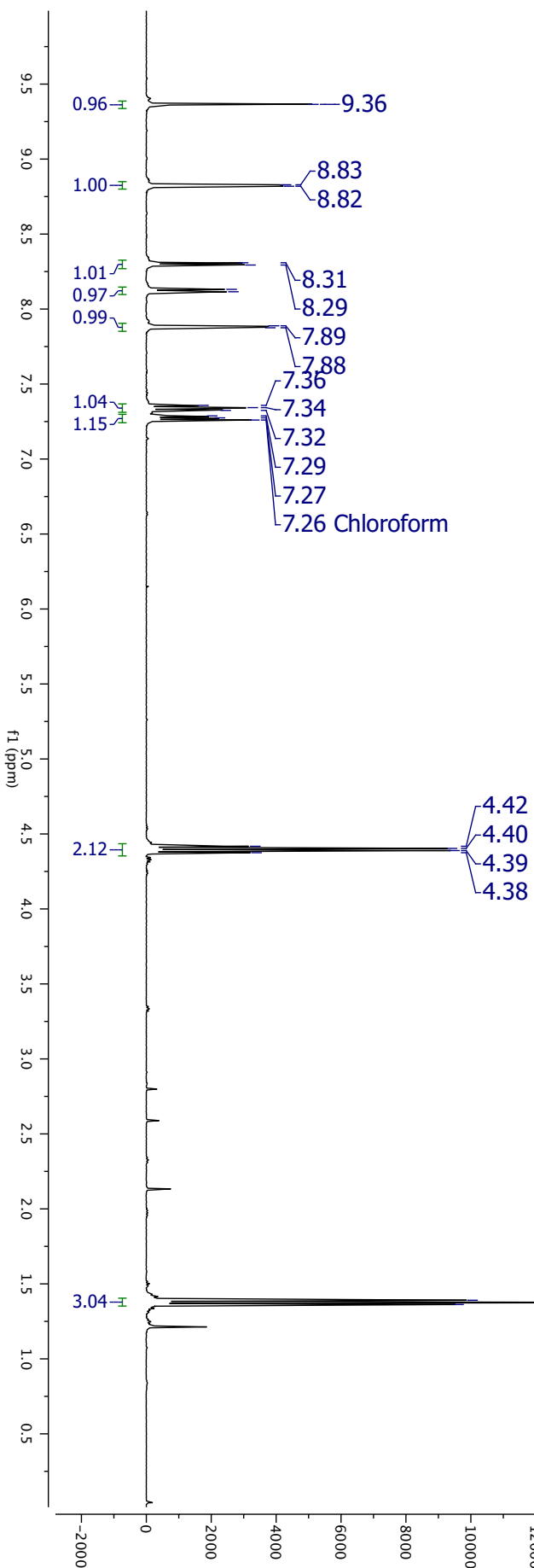
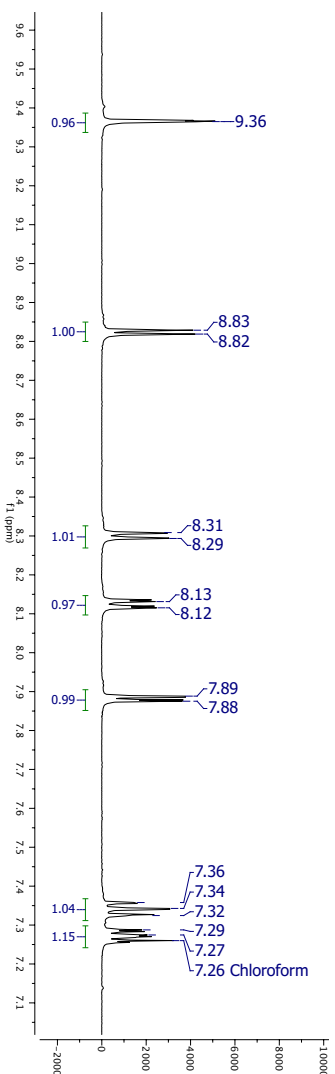
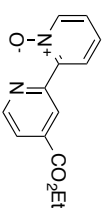
^{19}F NMR (471 MHz, CDCl_3)



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 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

4'-(Ethoxycarbonyl)-2,2'-bipyridine *N*-oxide (1w)

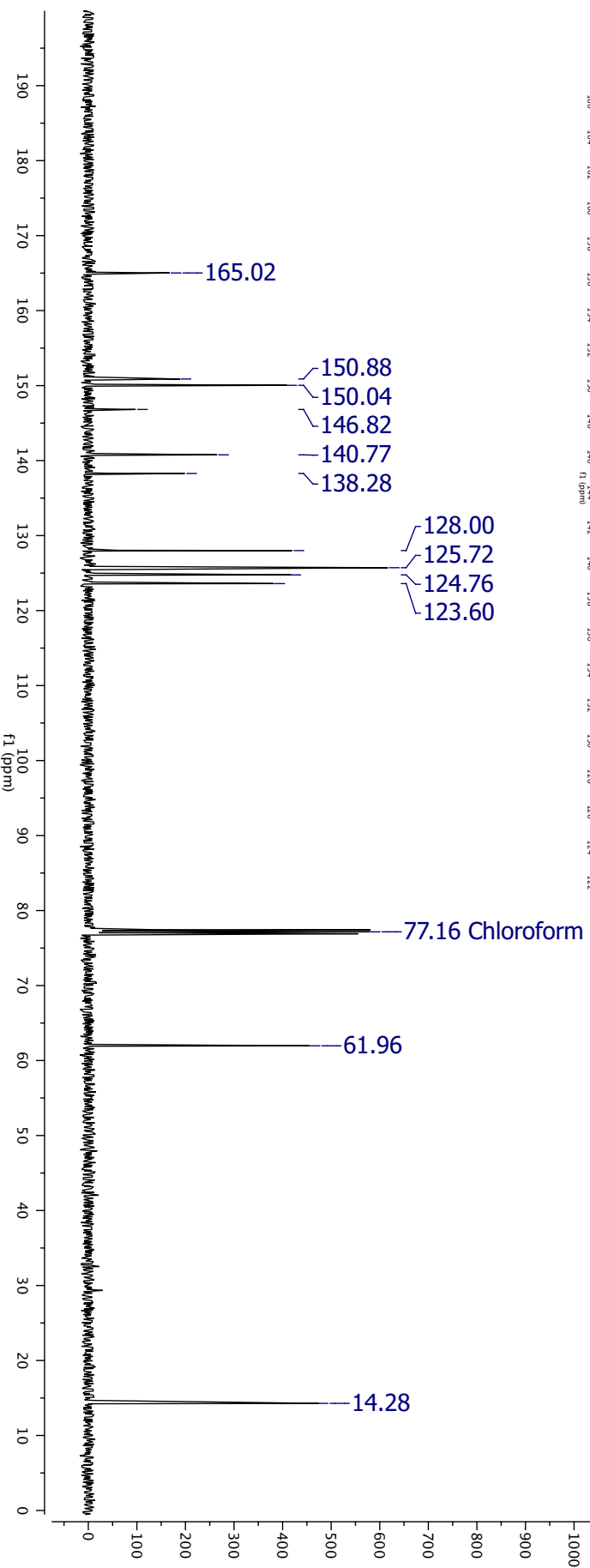
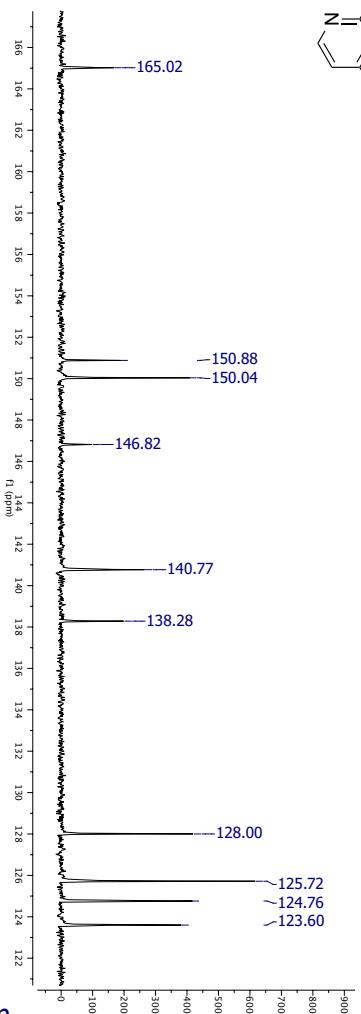
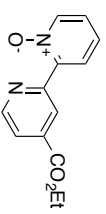
¹H NMR (500 MHz, CDCl₃)



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 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

4'-Ethoxycarbonyl-2,2'-bipyridine *N*-oxide (**1w**)

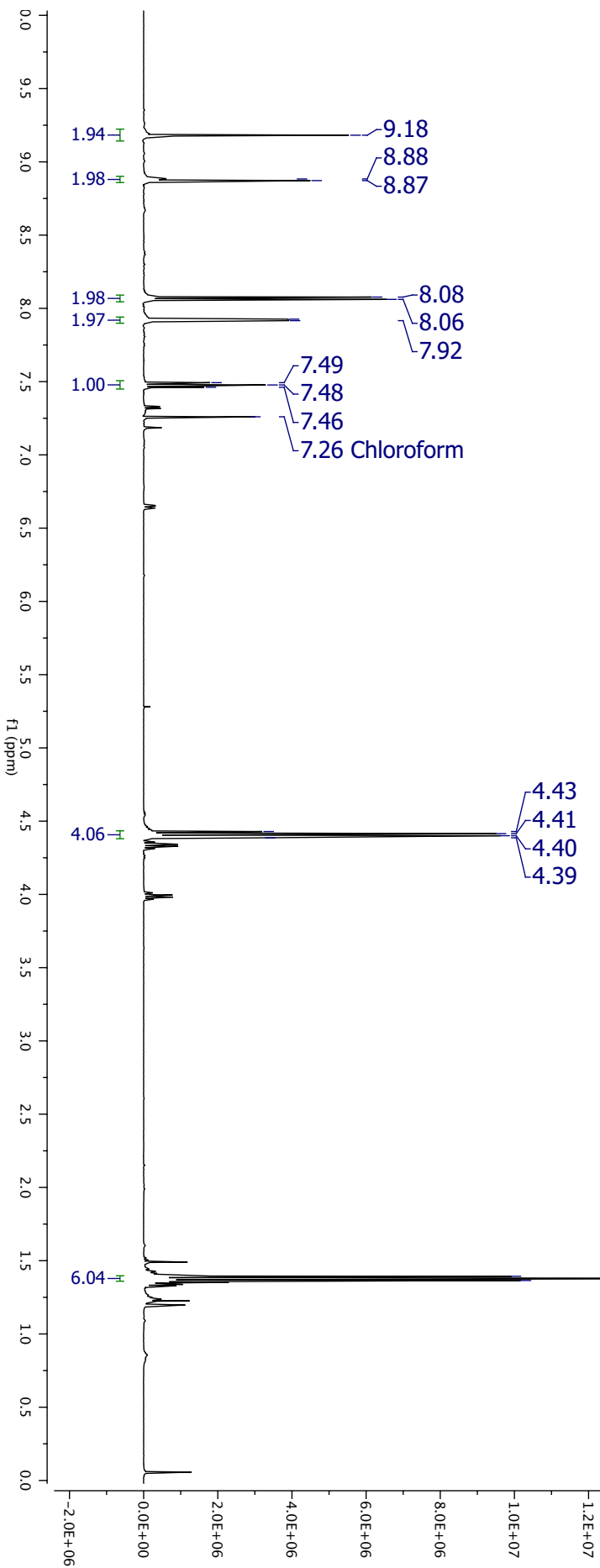
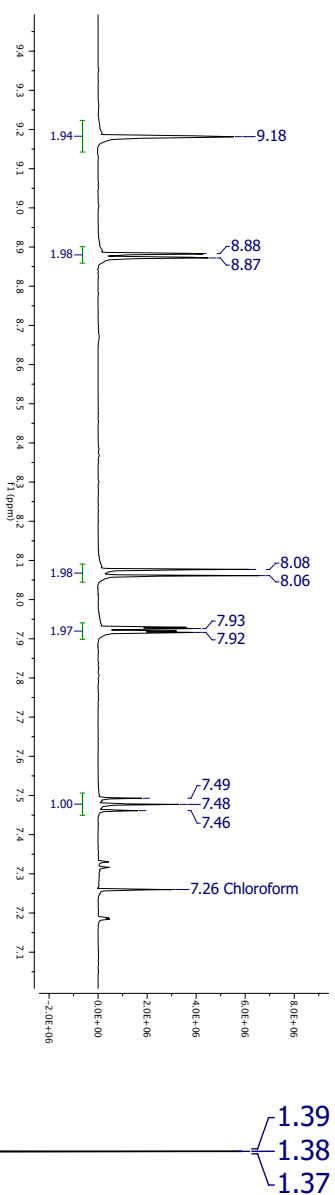
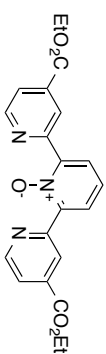
¹³C NMR (126 MHz, CDCl₃)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

4,4''-Bis(ethoxycarbonyl)-2,2':6,2''-terpyridine *N*-oxide (6w)

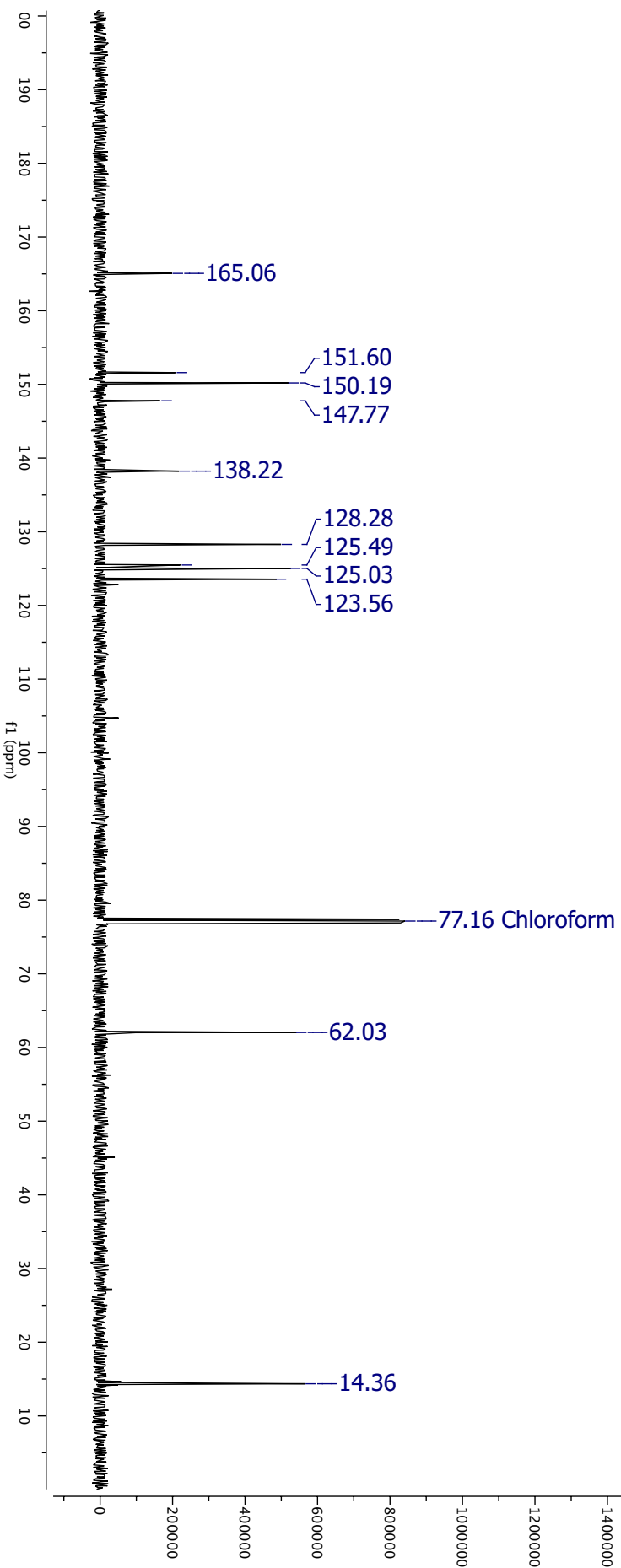
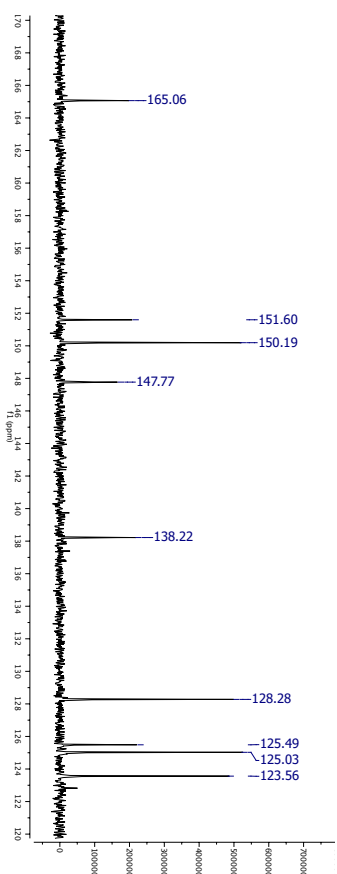
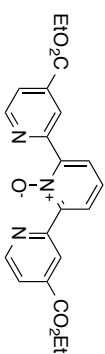
¹H NMR (500 MHz, CDCl₃)



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 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

4,4''-Bis(ethoxycarbonyl)-2,2':6,2''-terpyridine *N*-oxide (6w)

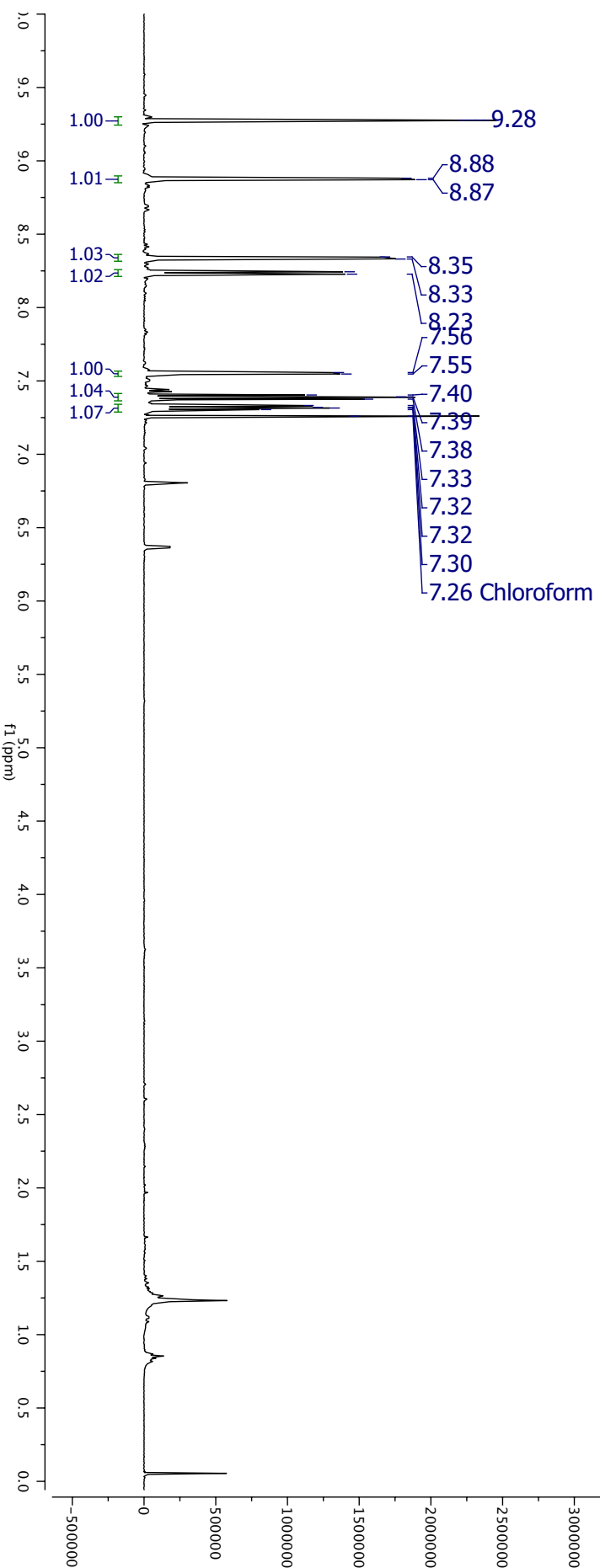
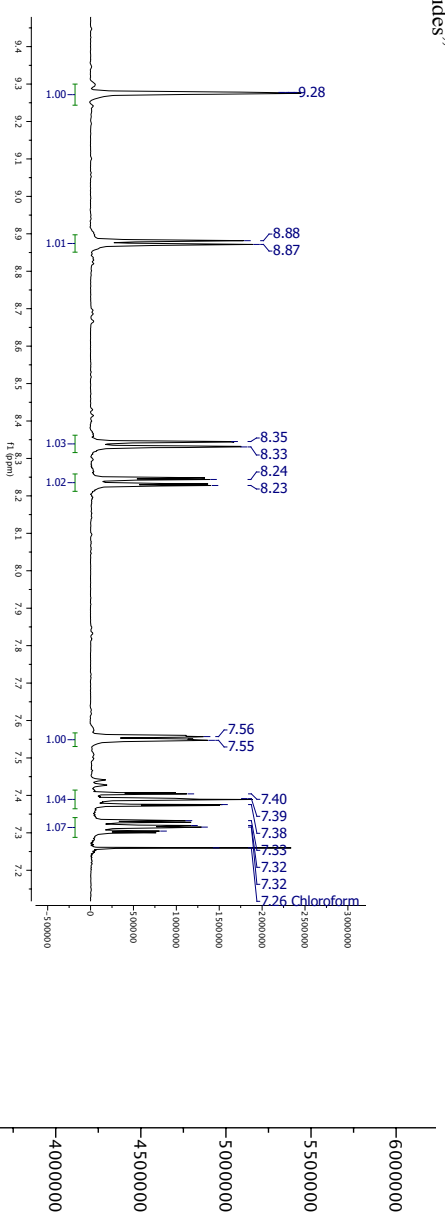
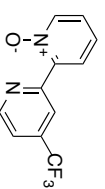
¹³C NMR (126 MHz, CDCl₃)



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 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

4'-Trifluoromethyl-2,2'-bipyridine *N*-oxide (1x)

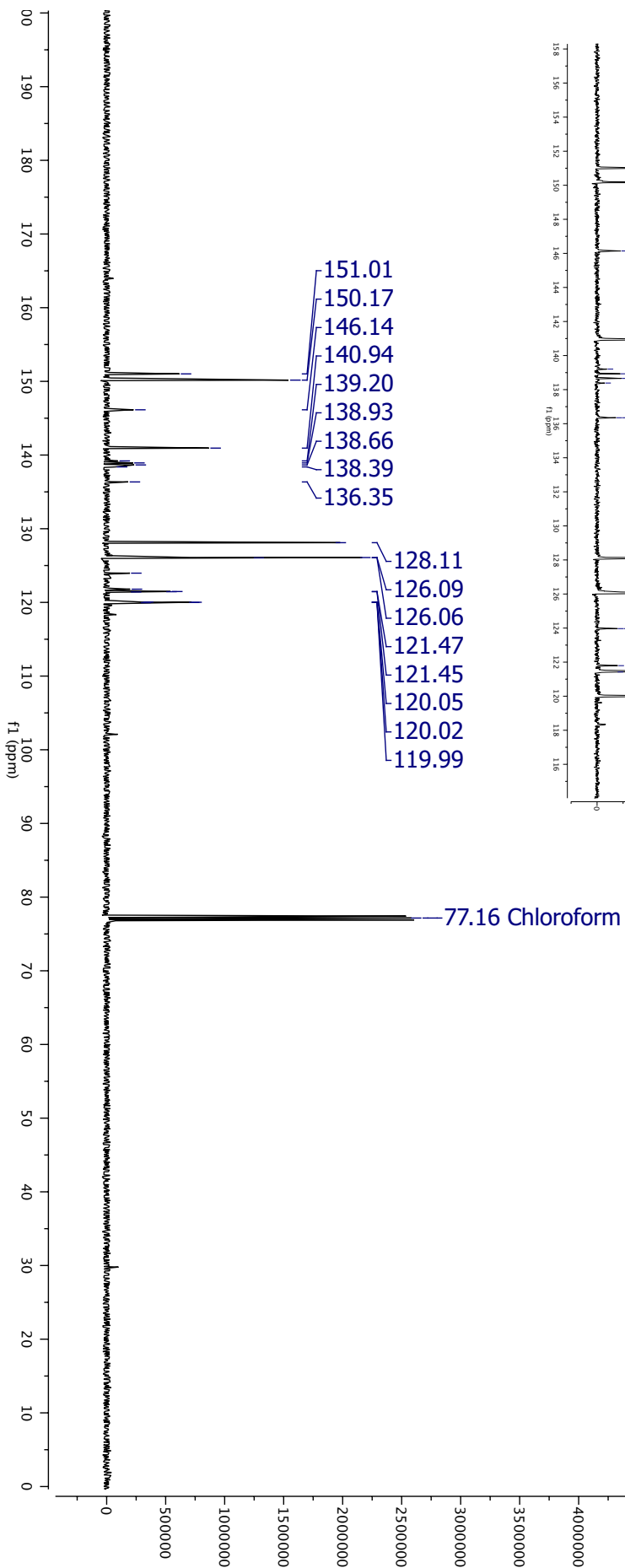
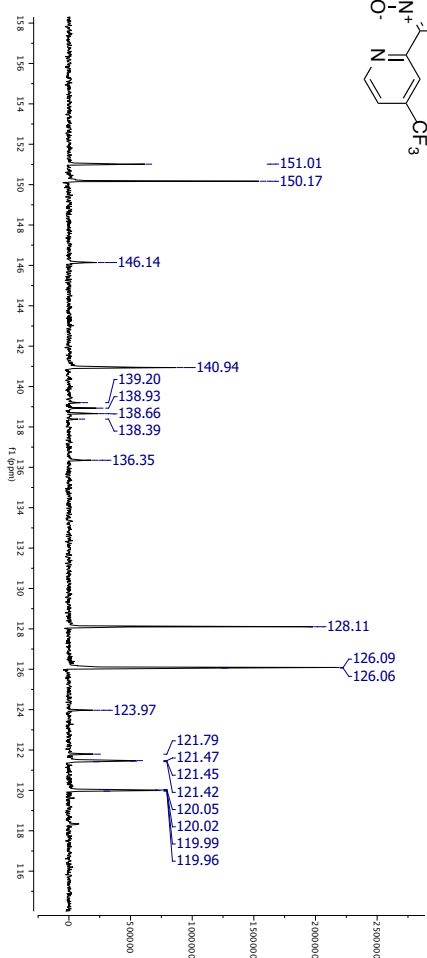
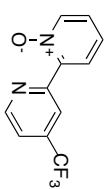
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

4'-Trifluoromethyl-2,2'-bipyridine *N*-oxide (1x)

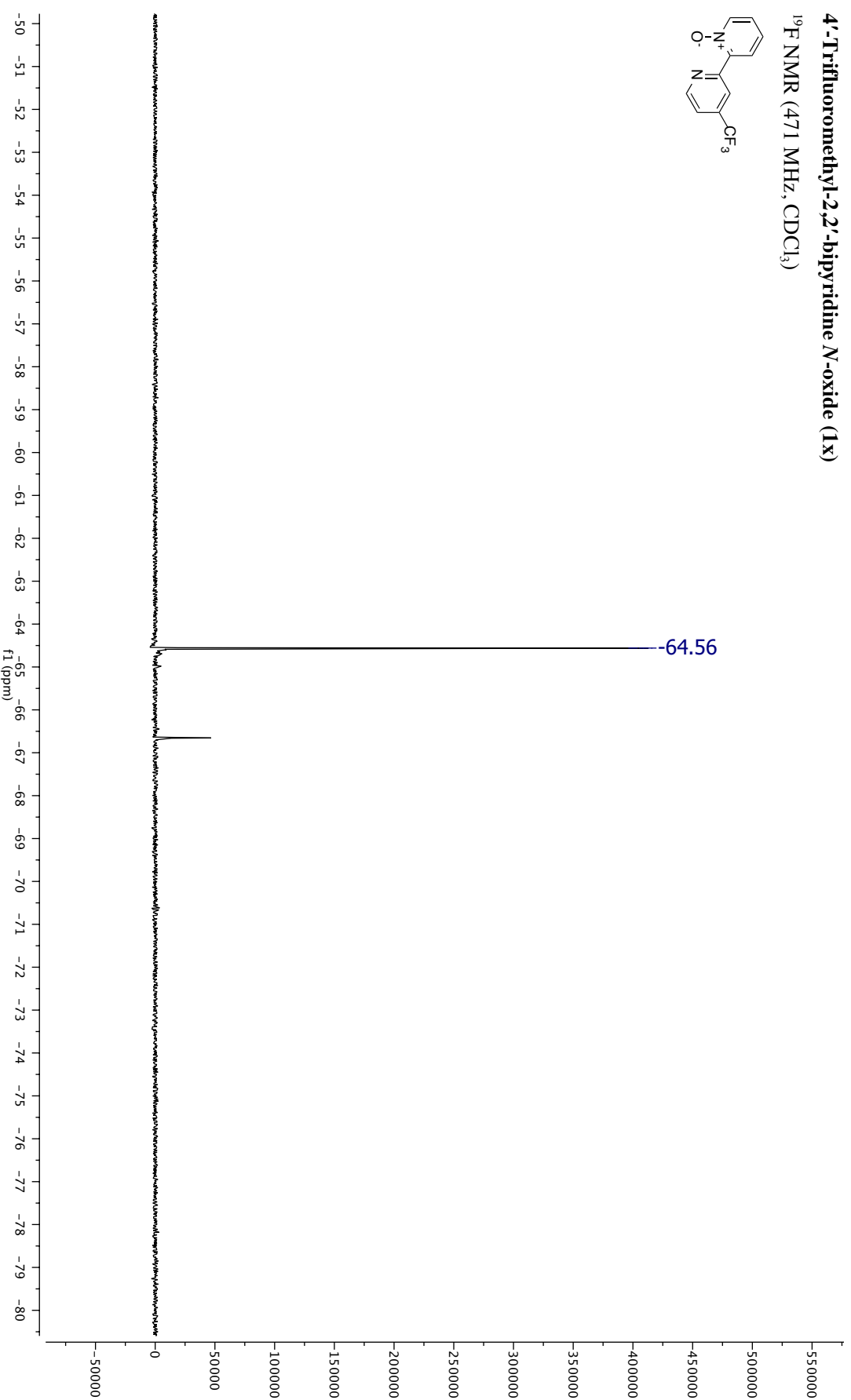
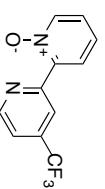
^{13}C NMR (126 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

4'-Trifluoromethyl-2,2'-bipyridine *N*-oxide (1x)

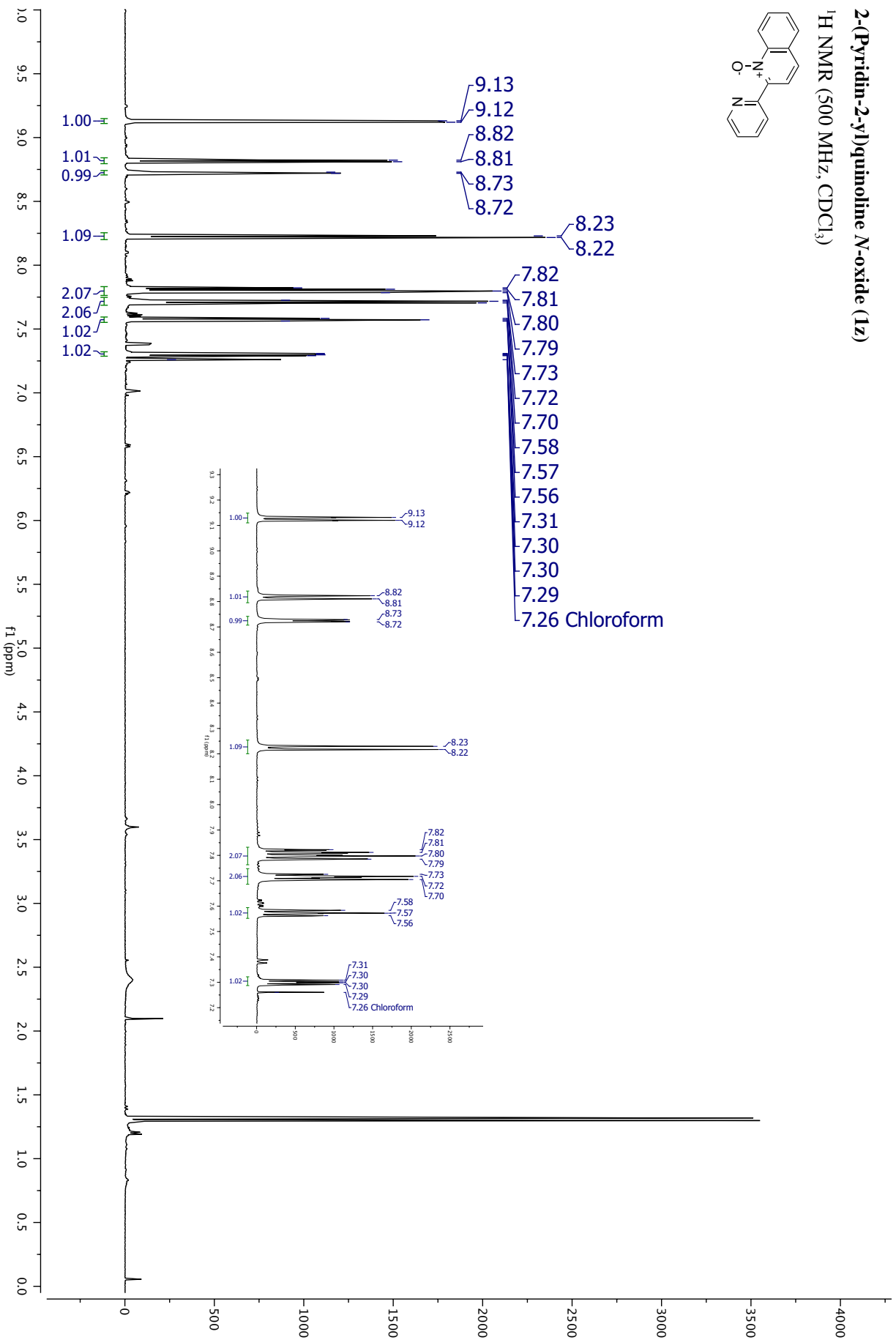
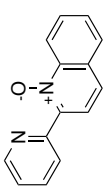
¹⁹F NMR (471 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

2-(Pyridin-2-yl)quinoline *N*-oxide (1z)

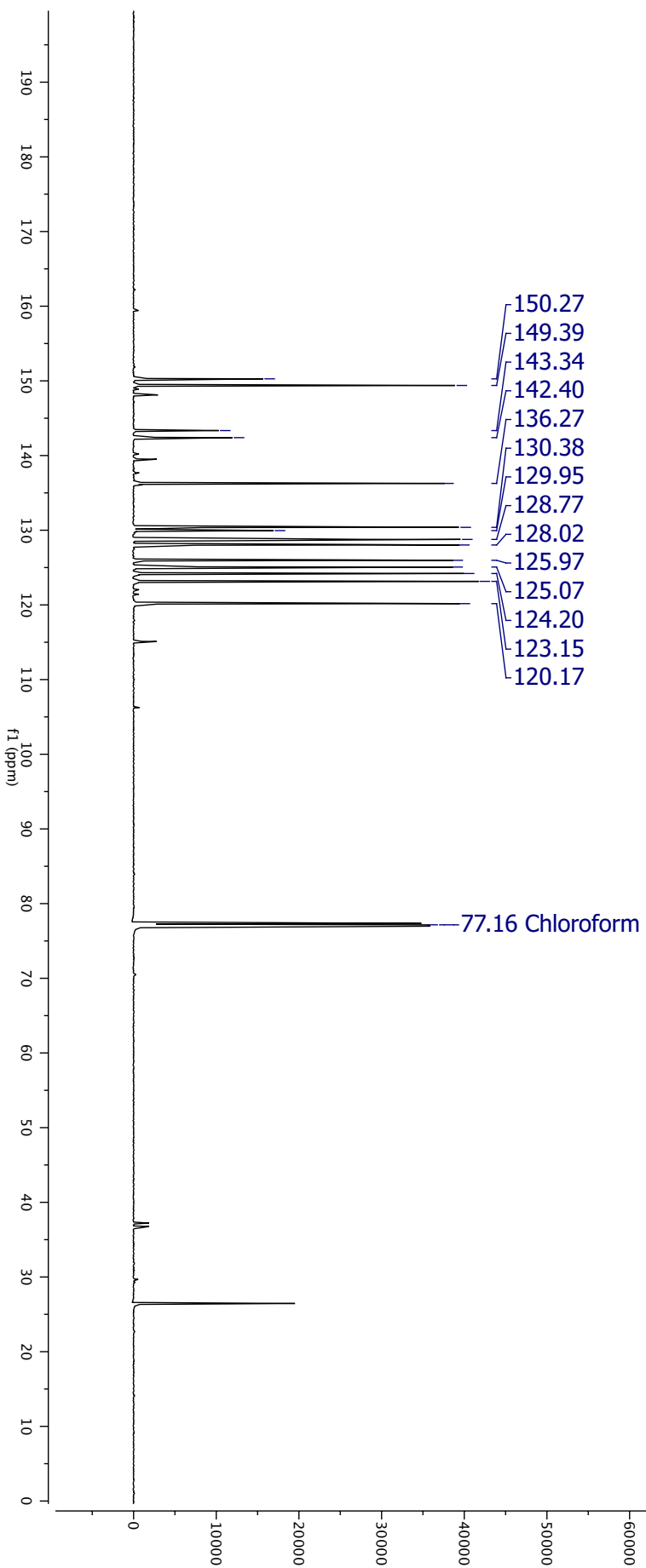
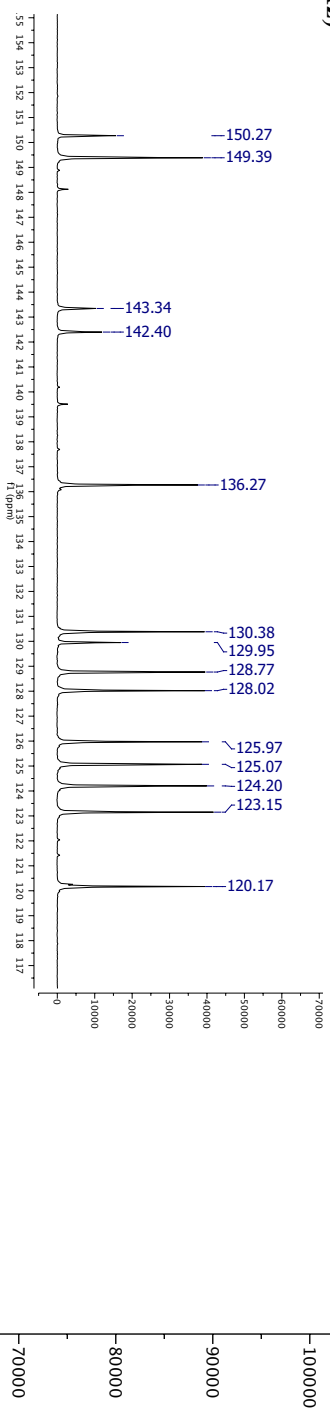
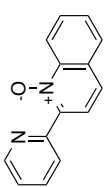
¹H NMR (500 MHz, CDCl₃)



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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

2-(Pyridin-2-yl)quinoline *N*-oxide (1z**)**

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

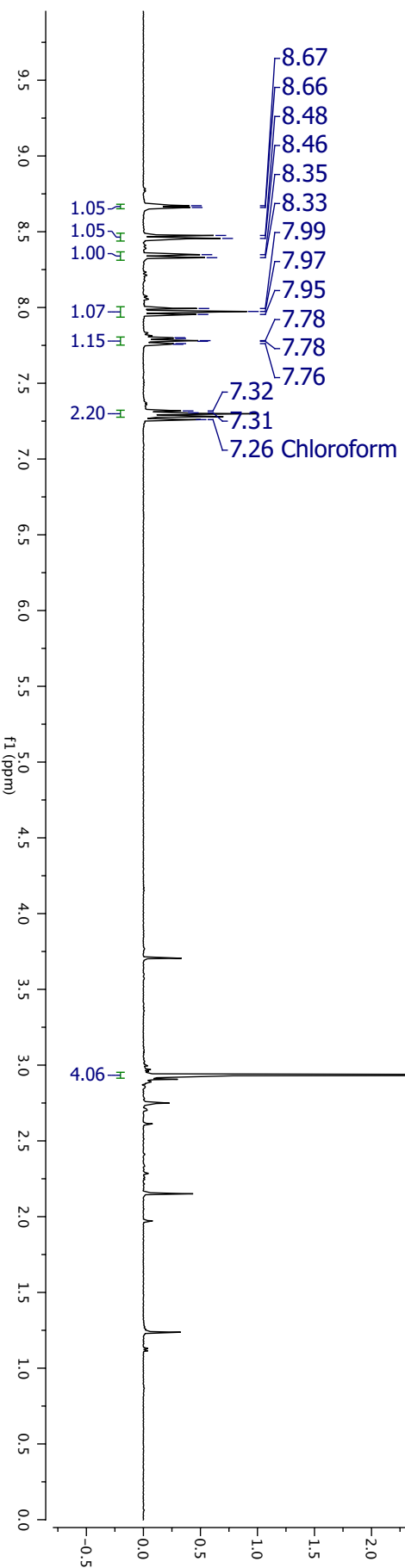
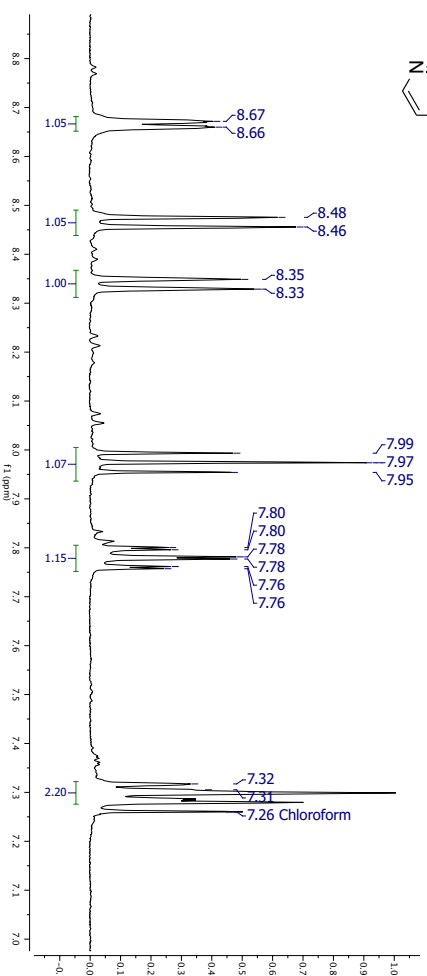
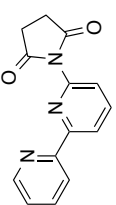


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Observed side products from directed 3-halogenations

6-(2,5-Pyrrolindion-1-yl)-2,2'-bipyridine (3)

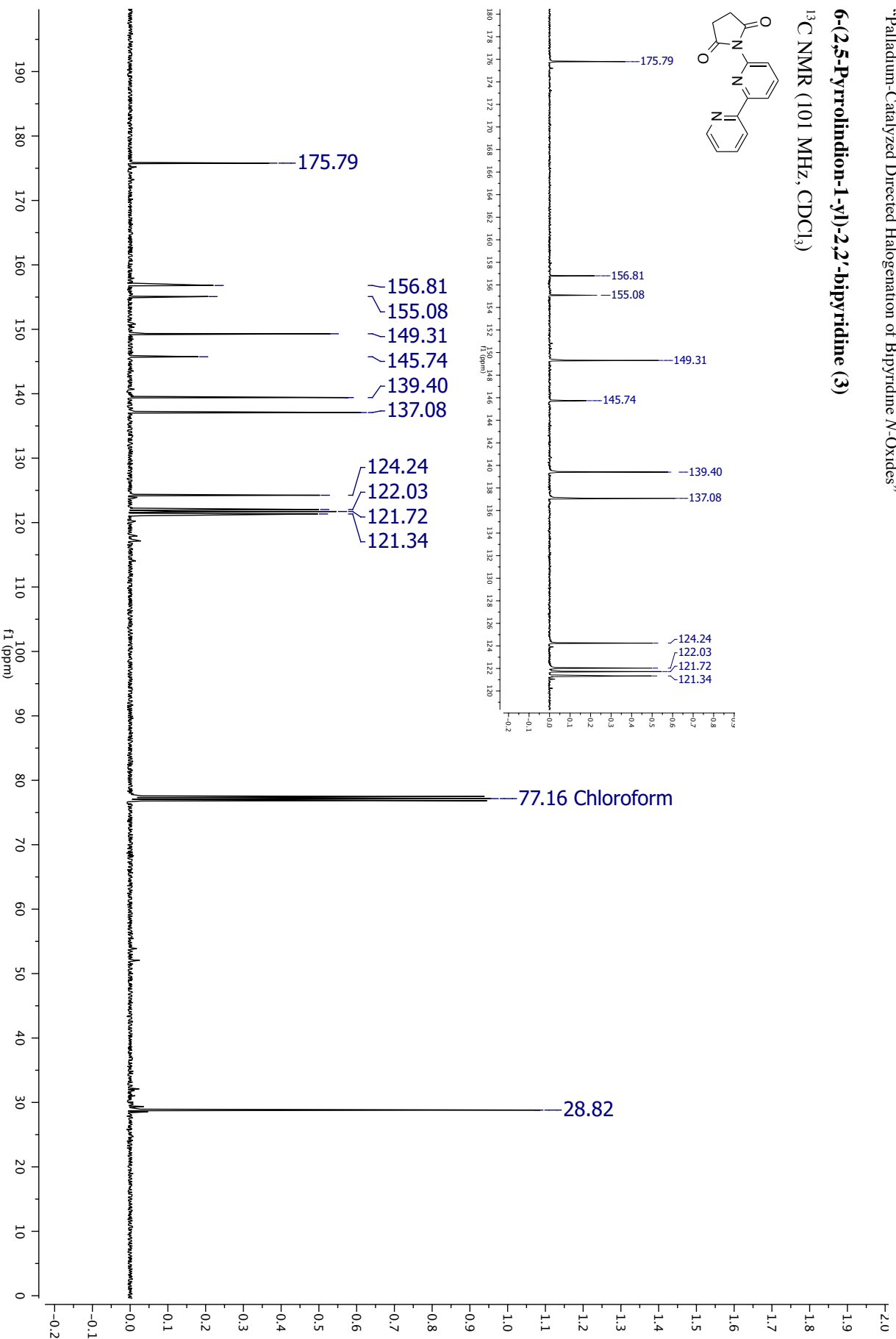
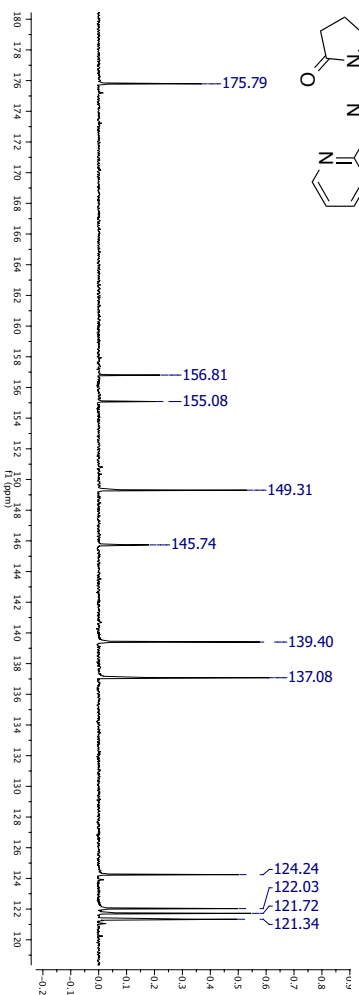
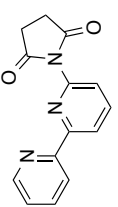
¹H NMR (400 MHz, CDCl₃)



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6-(2,5-Pyrrolindion-1-yl)-2,2'-bipyridine (3)

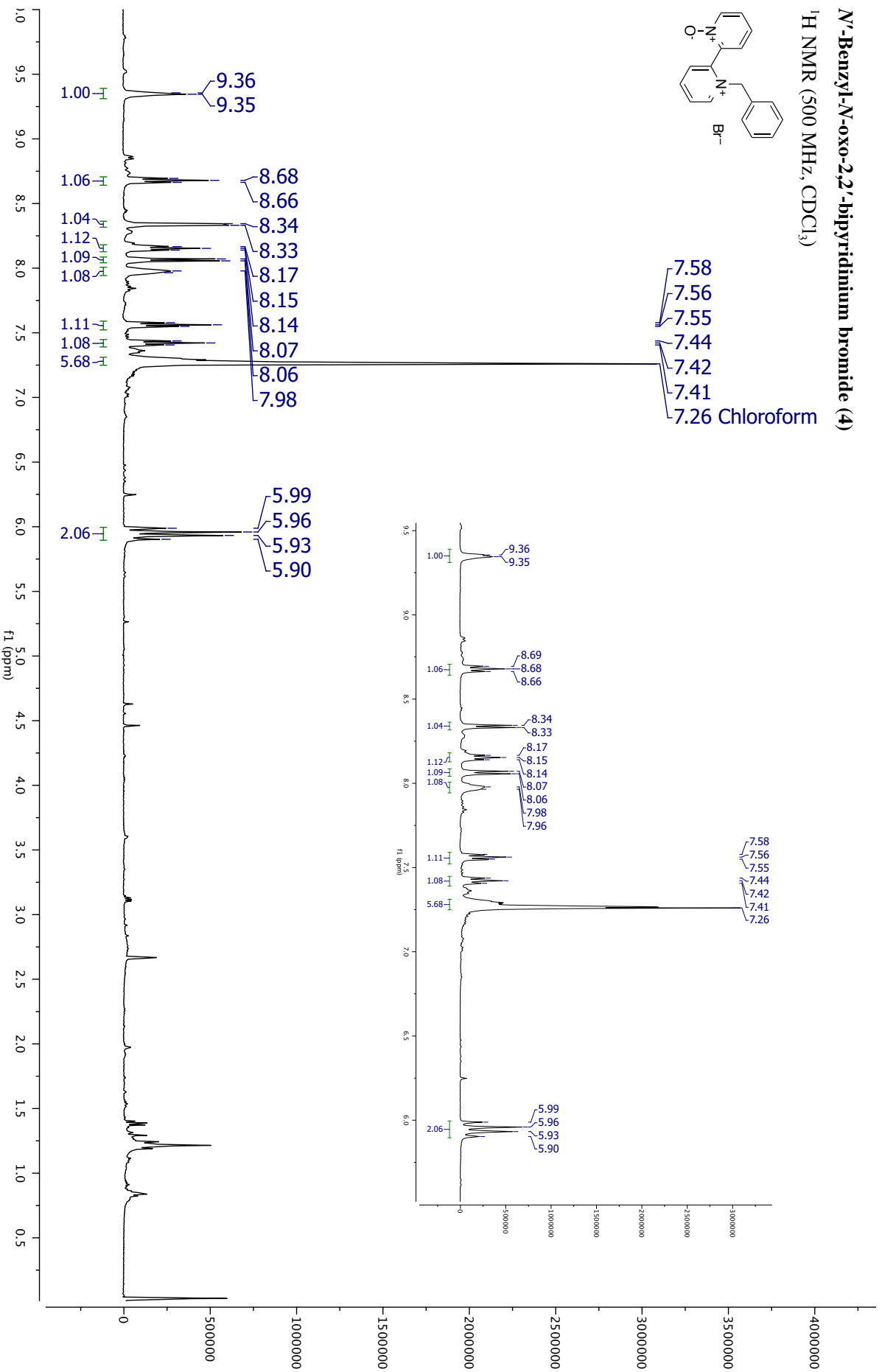
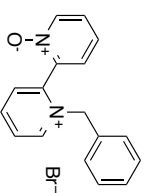
^{13}C NMR (101 MHz, CDCl_3)



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***N'*-Benzyl-*N*-oxo-2,2'-bipyridinium bromide (4)**

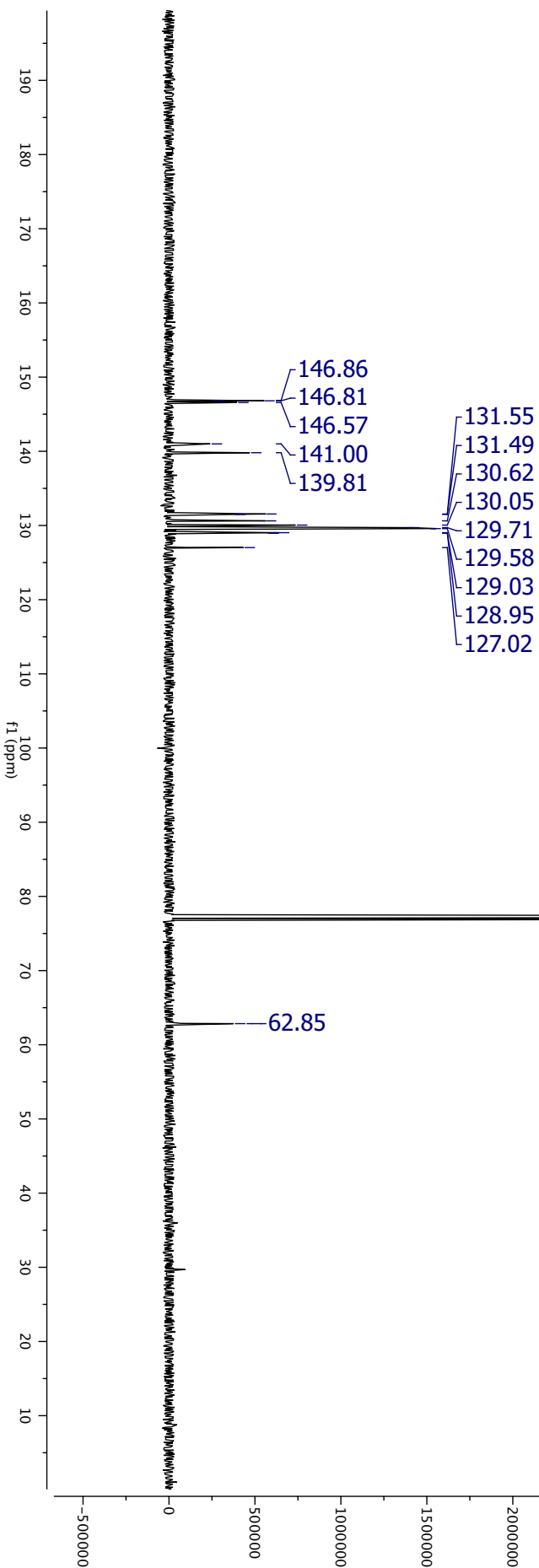
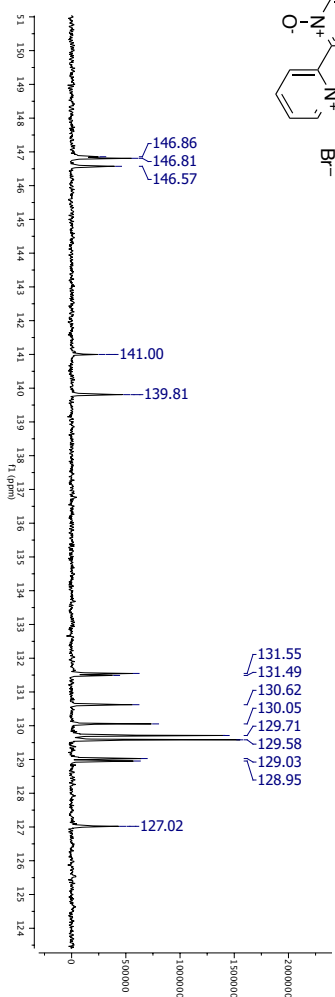
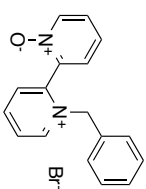
¹H NMR (500 MHz, CDCl₃)



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***N*'-Benzyl-*N*-oxo-2,2'-bipyridinium bromide (4)**

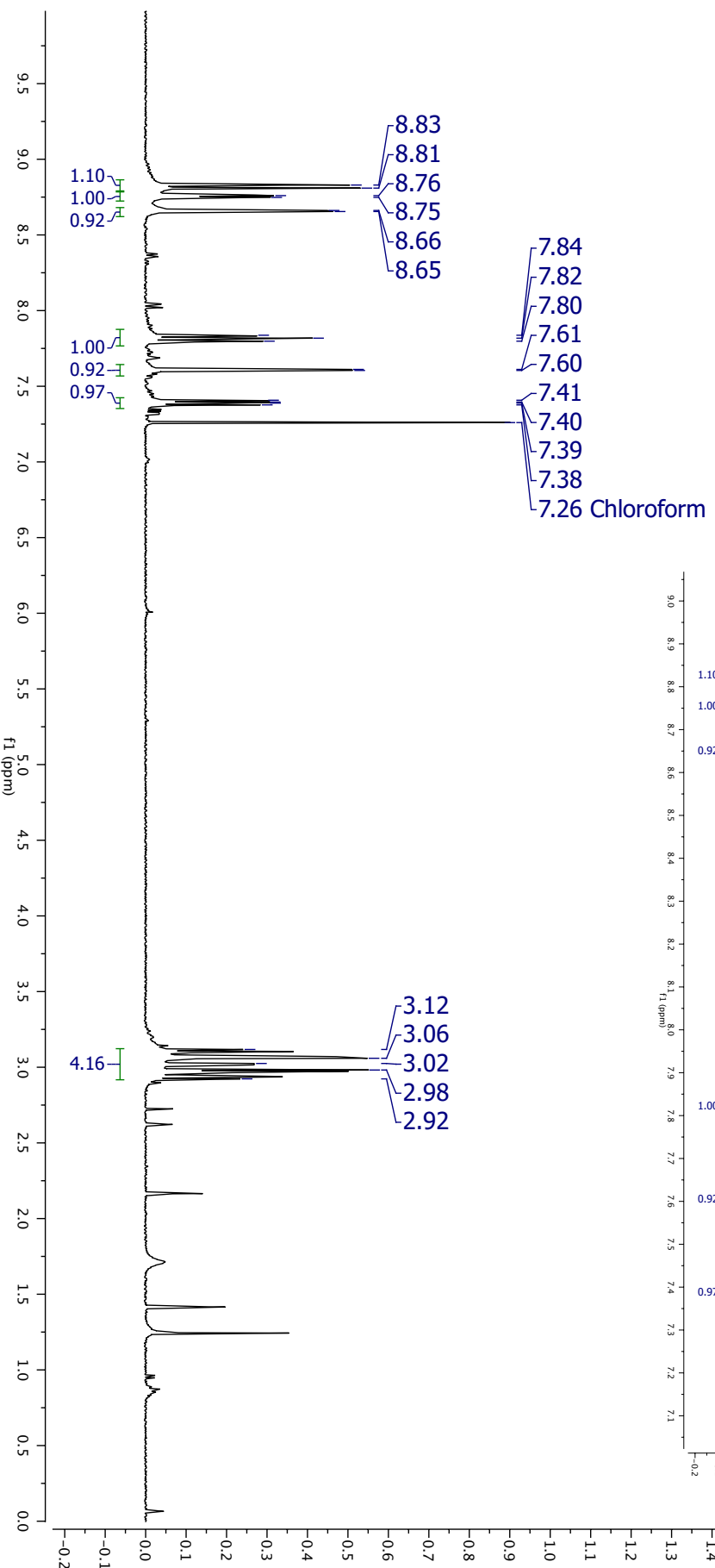
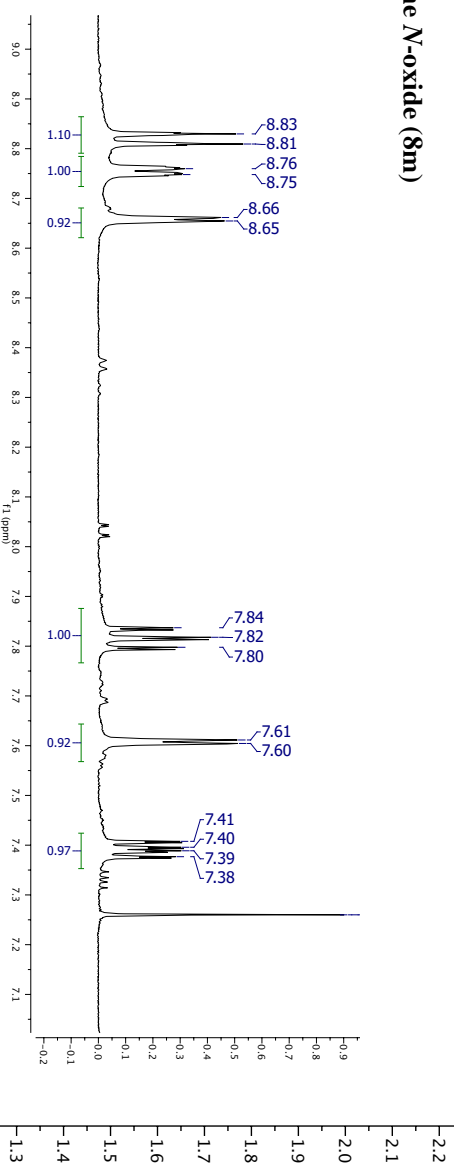
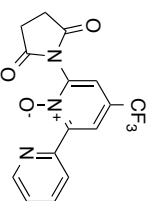
^{13}C NMR (126 MHz, CDCl_3)



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4-Trifluoromethyl-6-dioxopyrrolidinyl-2,2'-bipyridine *N*-oxide (8m)

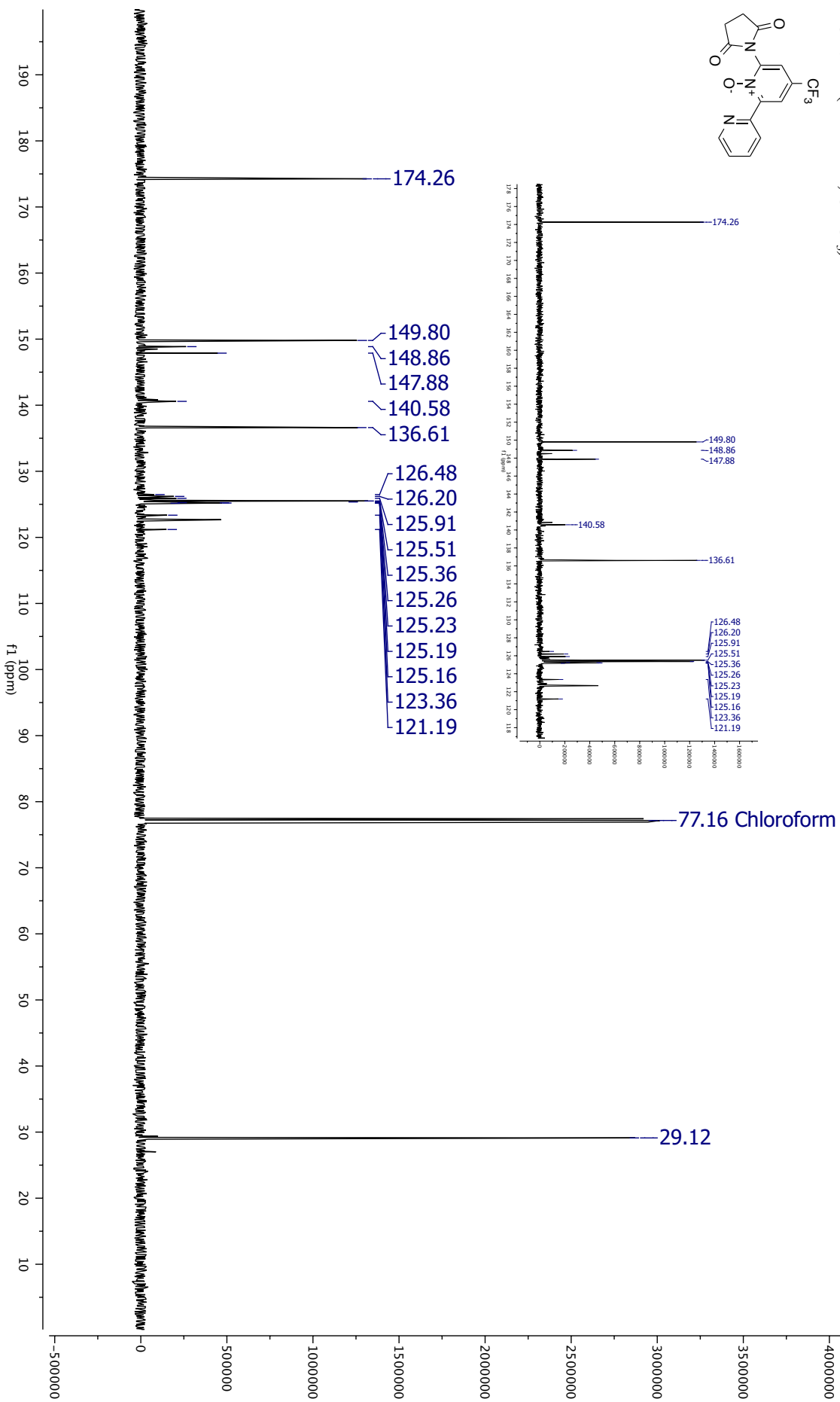
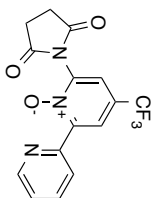
¹H NMR (500 MHz, CDCl₃)



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4-Trifluoromethyl-6-dioxopyrrolidinyl-2,2'-bipyridine *N*-oxide (8m)

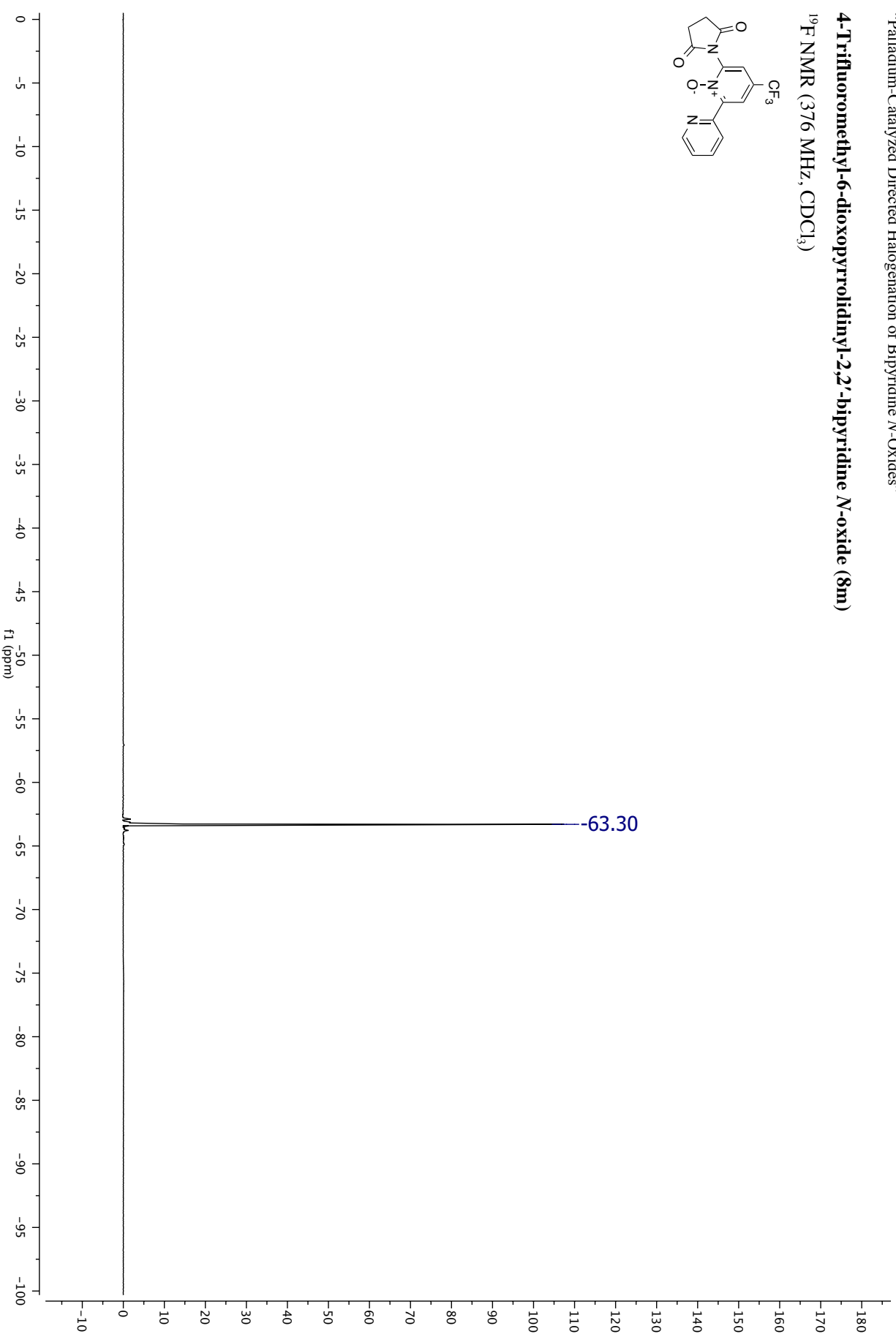
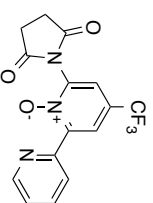
^{13}C NMR (126 MHz, CDCl_3)



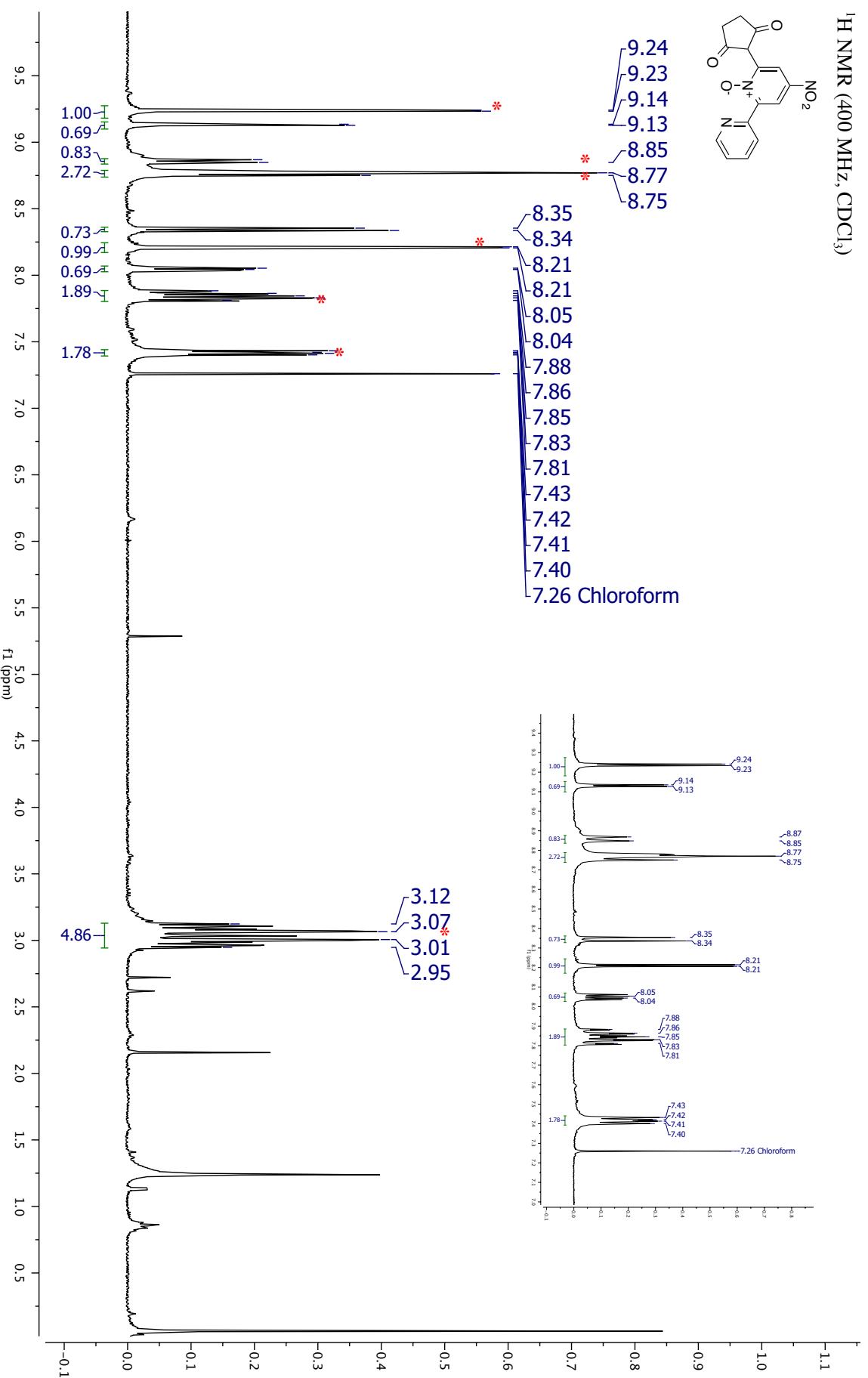
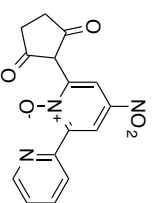
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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

4-Trifluoromethyl-6-dioxypyrrolidinyl-2,2'-bipyridine *N*-oxide (8m)

¹⁹F NMR (376 MHz, CDCl₃)



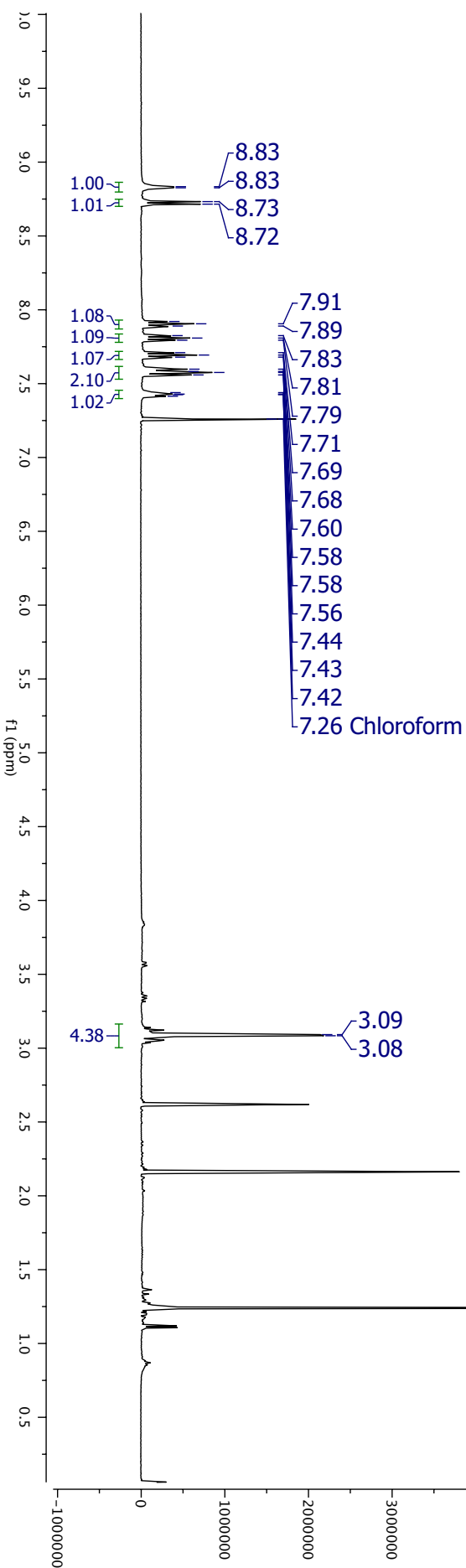
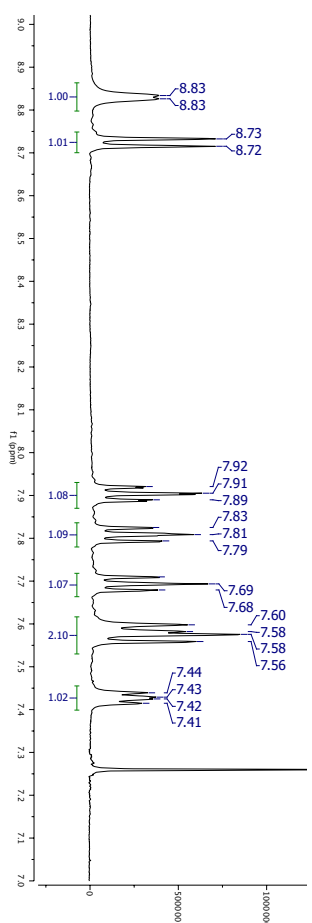
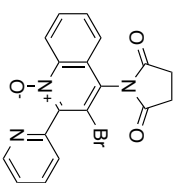
Mixture of 4-nitro-6-dioxopyrrolidinyl-2,2'-bipyridine *N*-oxide (8o, *) and 4-nitro-2,2'-bipyridine *N*-oxide (1o)
¹H NMR (400 MHz, CDCl₃)



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3-Bromo-4-dioxopyrrolidinyl-2-(pyridin-2-yl)quinoline *N*-oxide (8z)

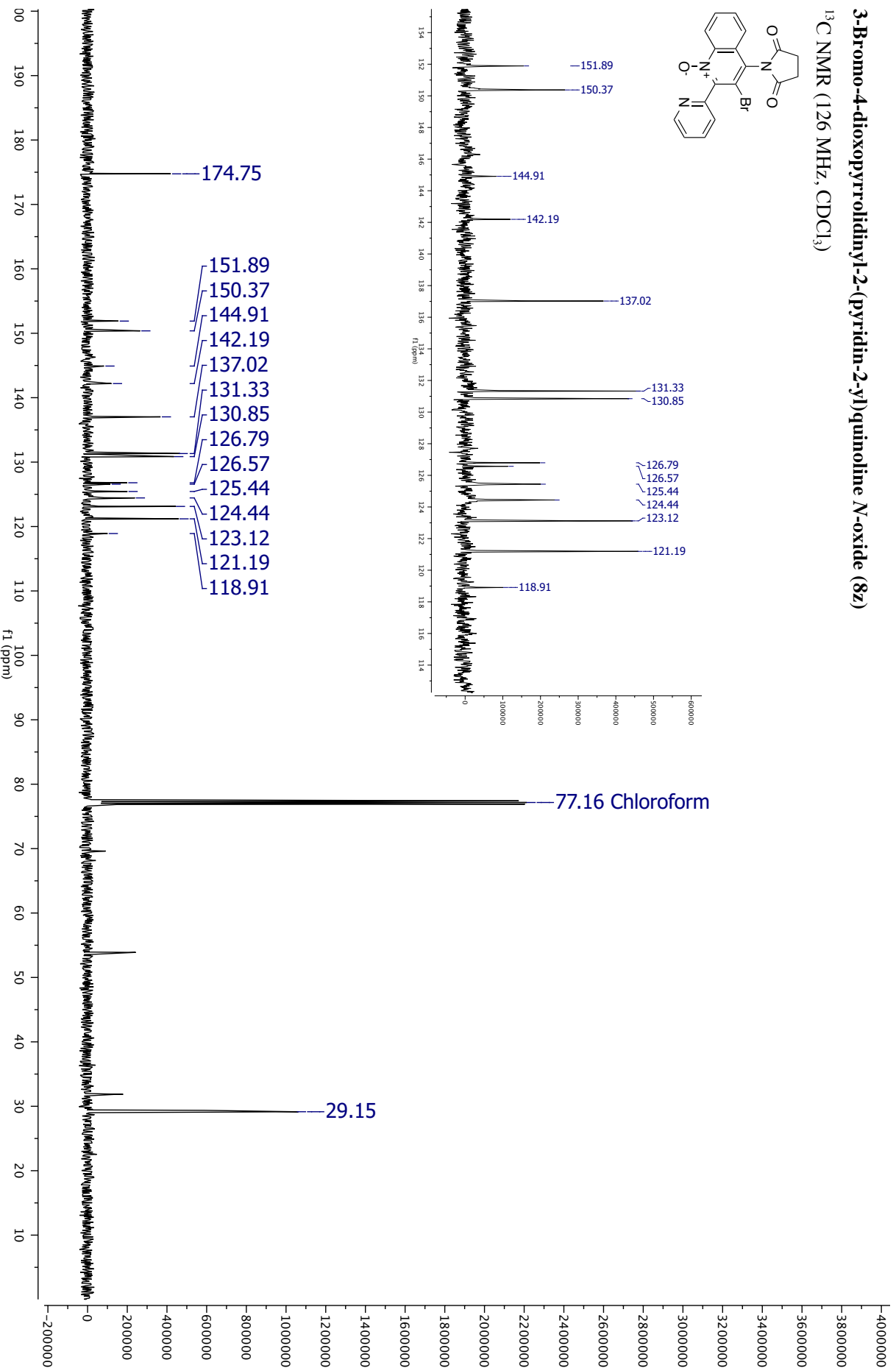
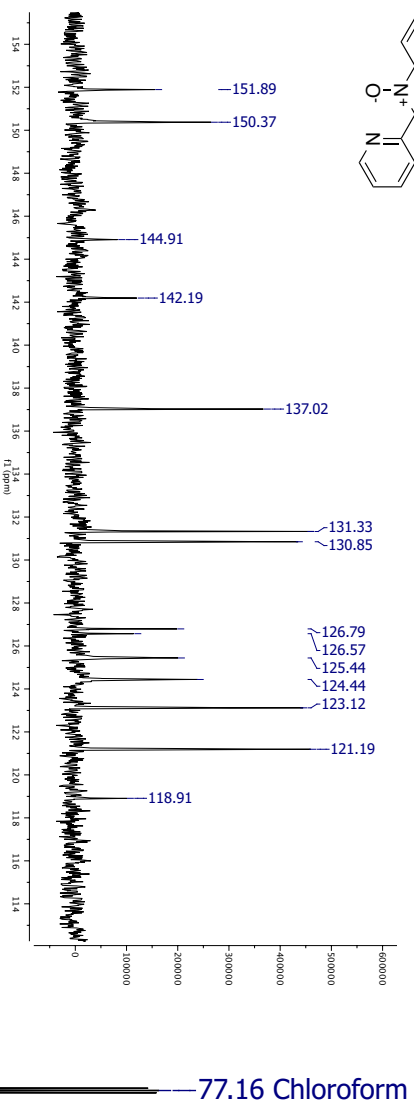
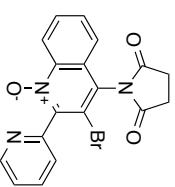
¹H NMR (500 MHz, CDCl₃)



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3-Bromo-4-dioxopyrrolidinyl-2-(pyridin-2-yl)quinoline *N*-oxide (8z)

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

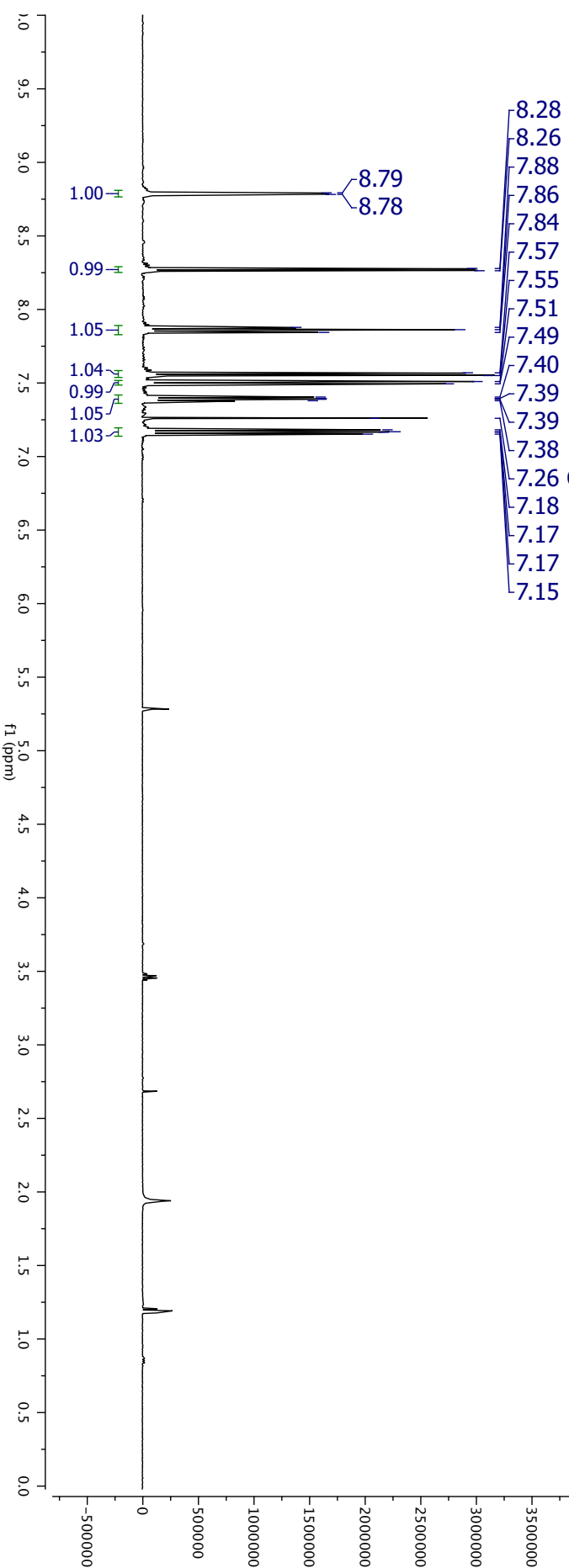
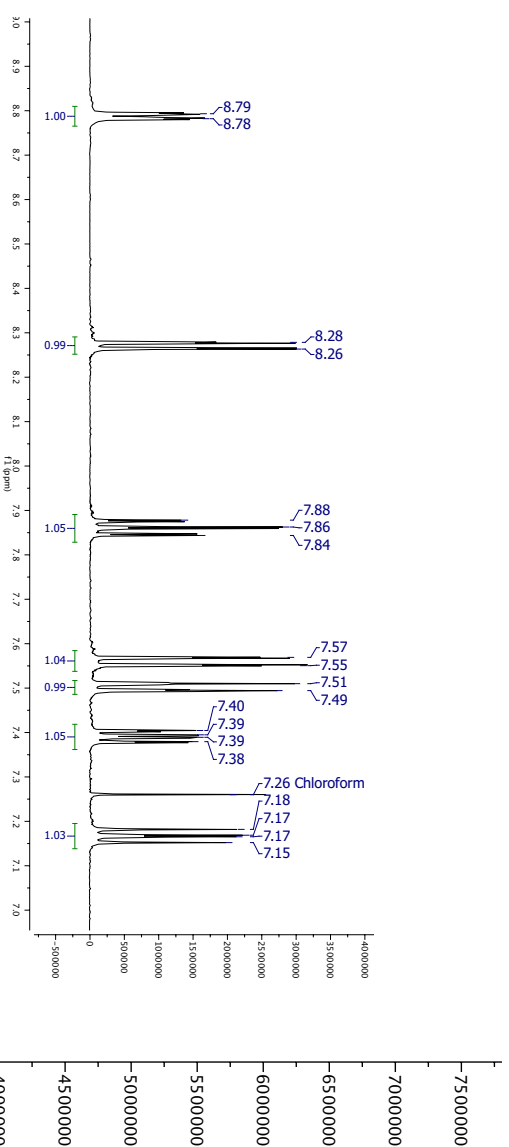
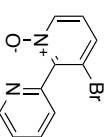


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Brominated bipyridine N-oxides (2)

3-Bromo-2,2'-bipyridine *N*-oxide (2a)

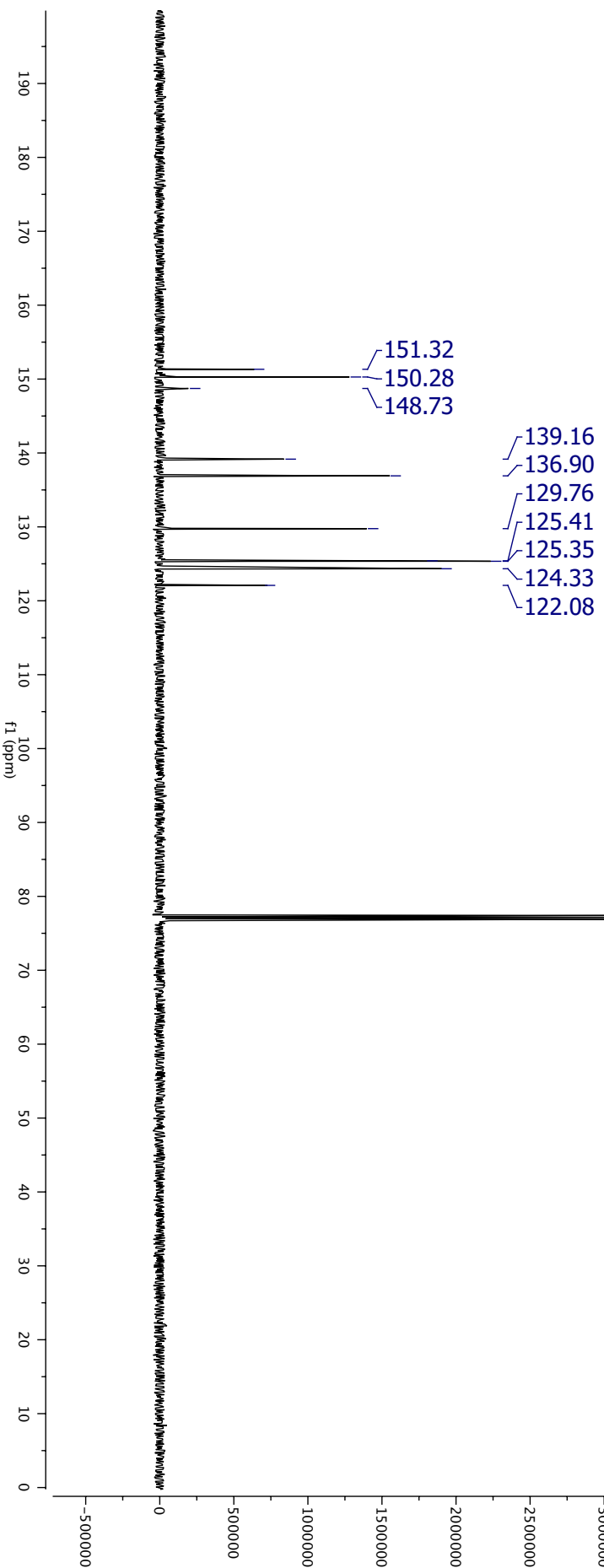
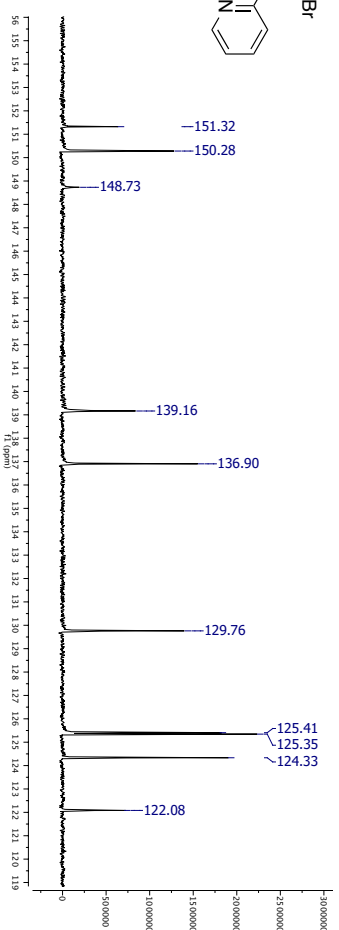
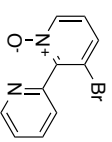
¹H NMR (500 MHz, CDCl₃)



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3-Bromo-2,2'-bipyridine *N*-oxide (2a)

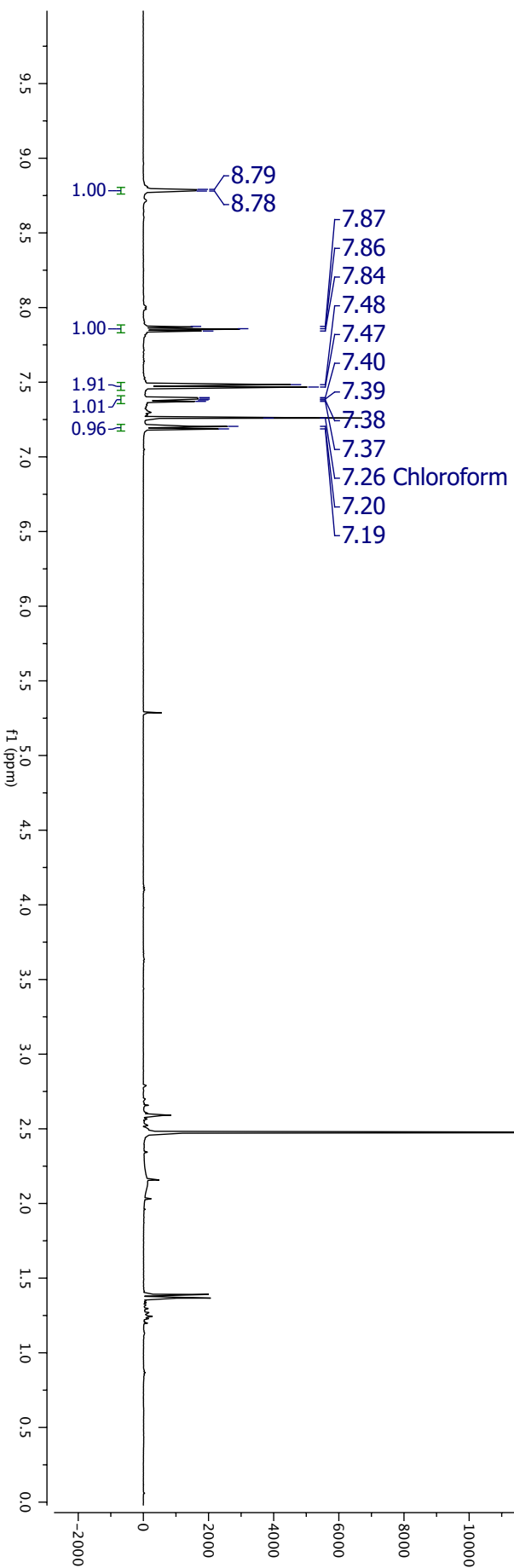
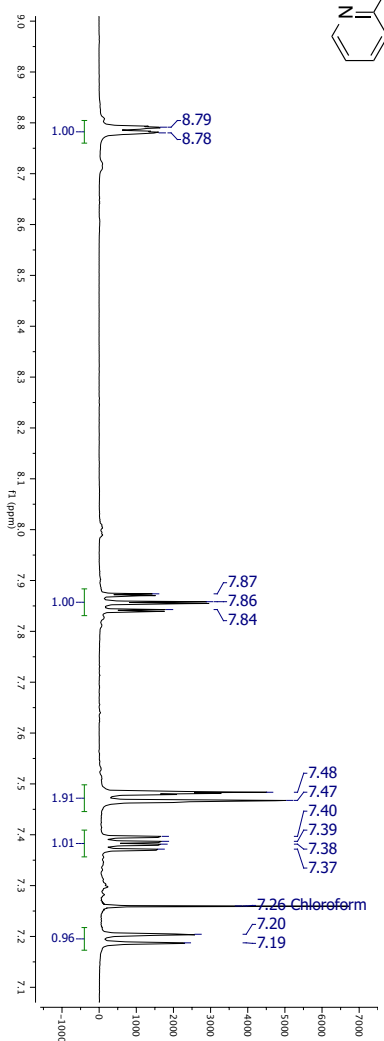
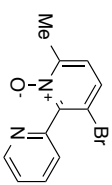
^{13}H NMR (126 MHz, CDCl_3)



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3-Bromo-6-methyl-2,2'-bipyridine *N*-oxide (2b)

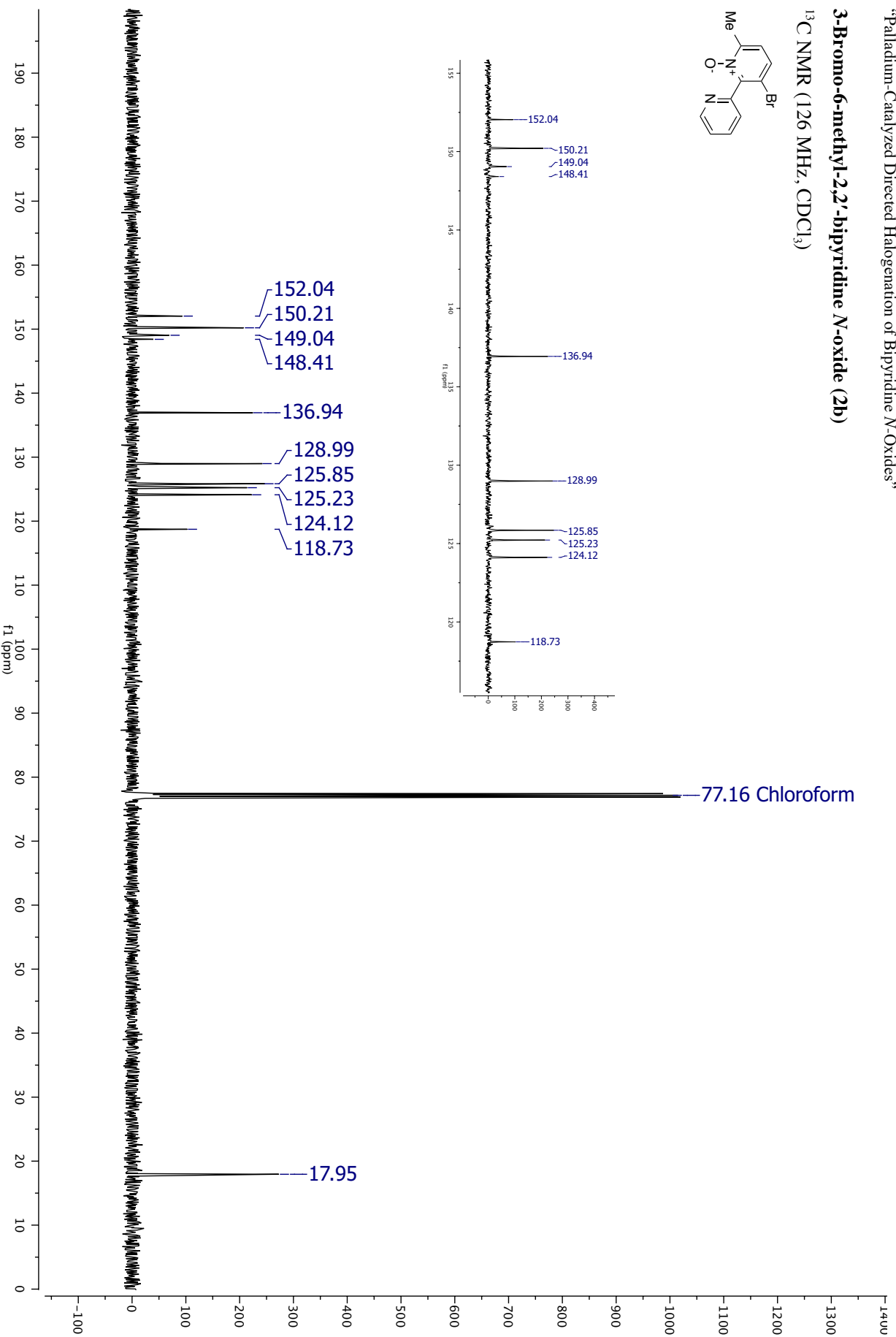
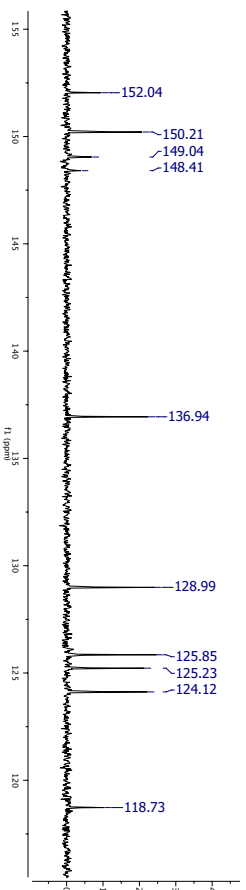
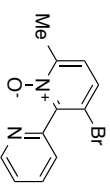
¹H NMR (500 MHz, CDCl₃)



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3-Bromo-6-methyl-2,2'-bipyridine *N*-oxide (2b)

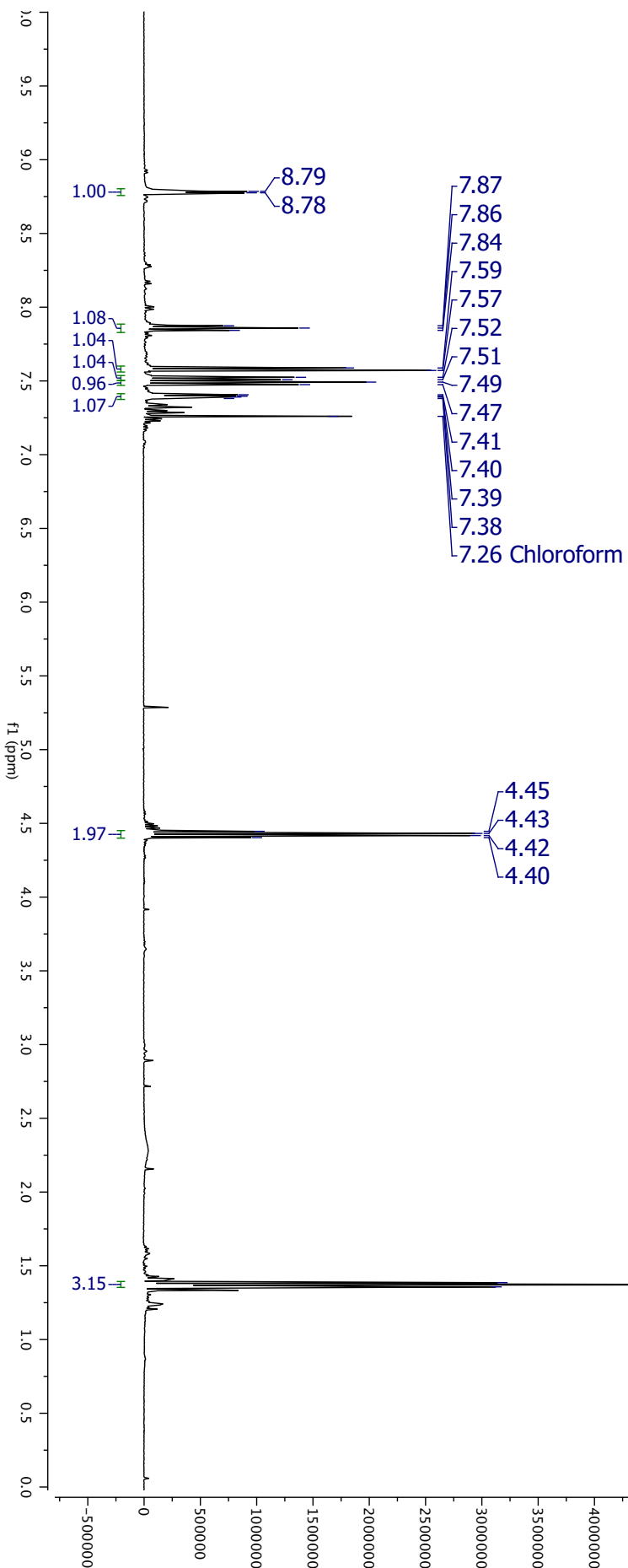
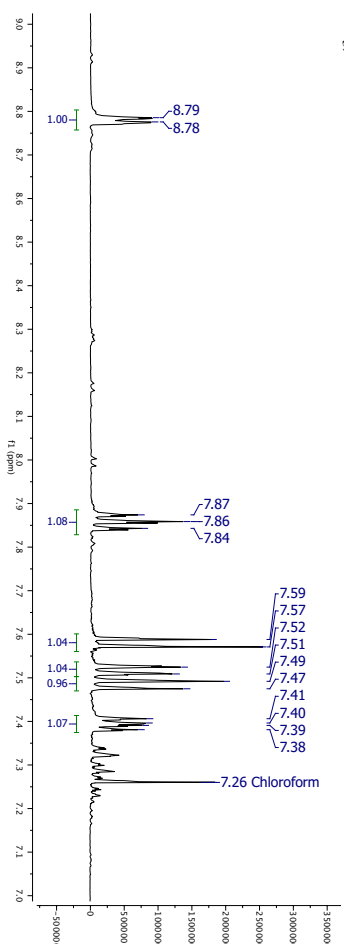
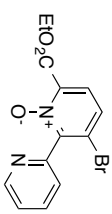
¹³C NMR (126 MHz, CDCl₃)



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3-Bromo-6-ethoxycarbonyl-2,2'-bipyridine *N*-oxide (2c)

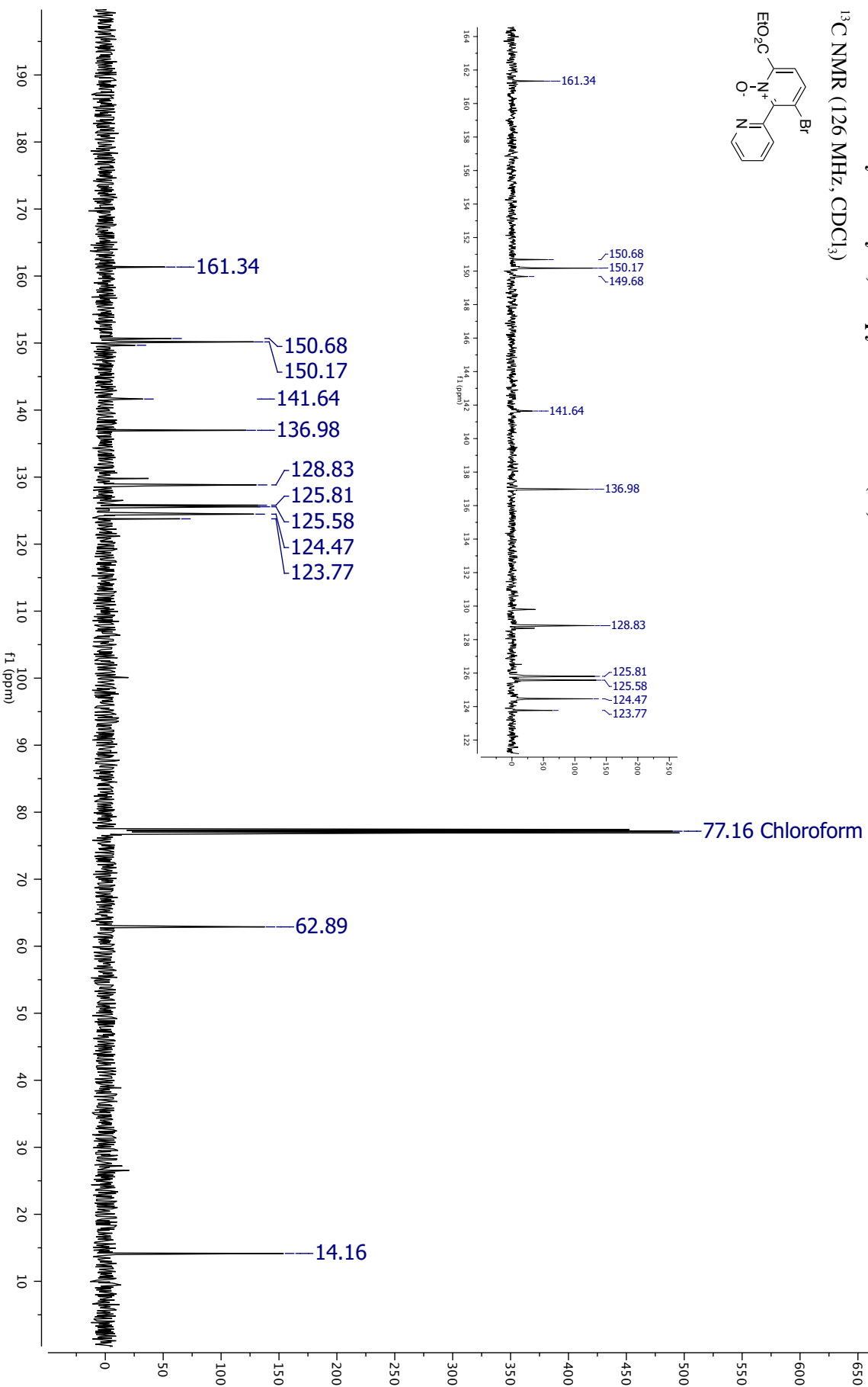
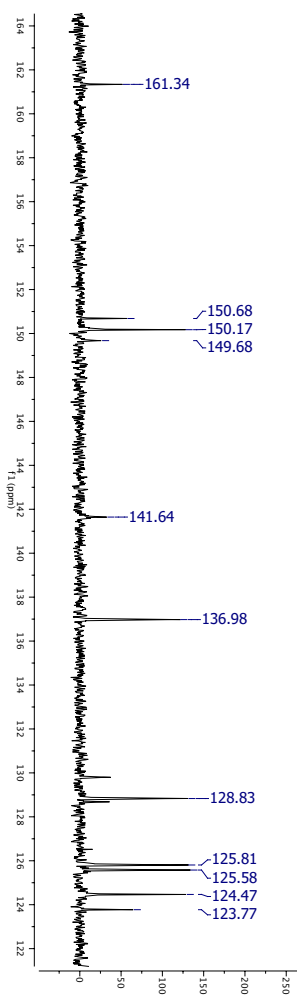
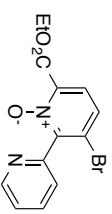
¹H NMR (500 MHz, CDCl₃)



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3-Bromo-6-ethoxycarbonyl-2,2'-bipyridine *N*-oxide (2c)

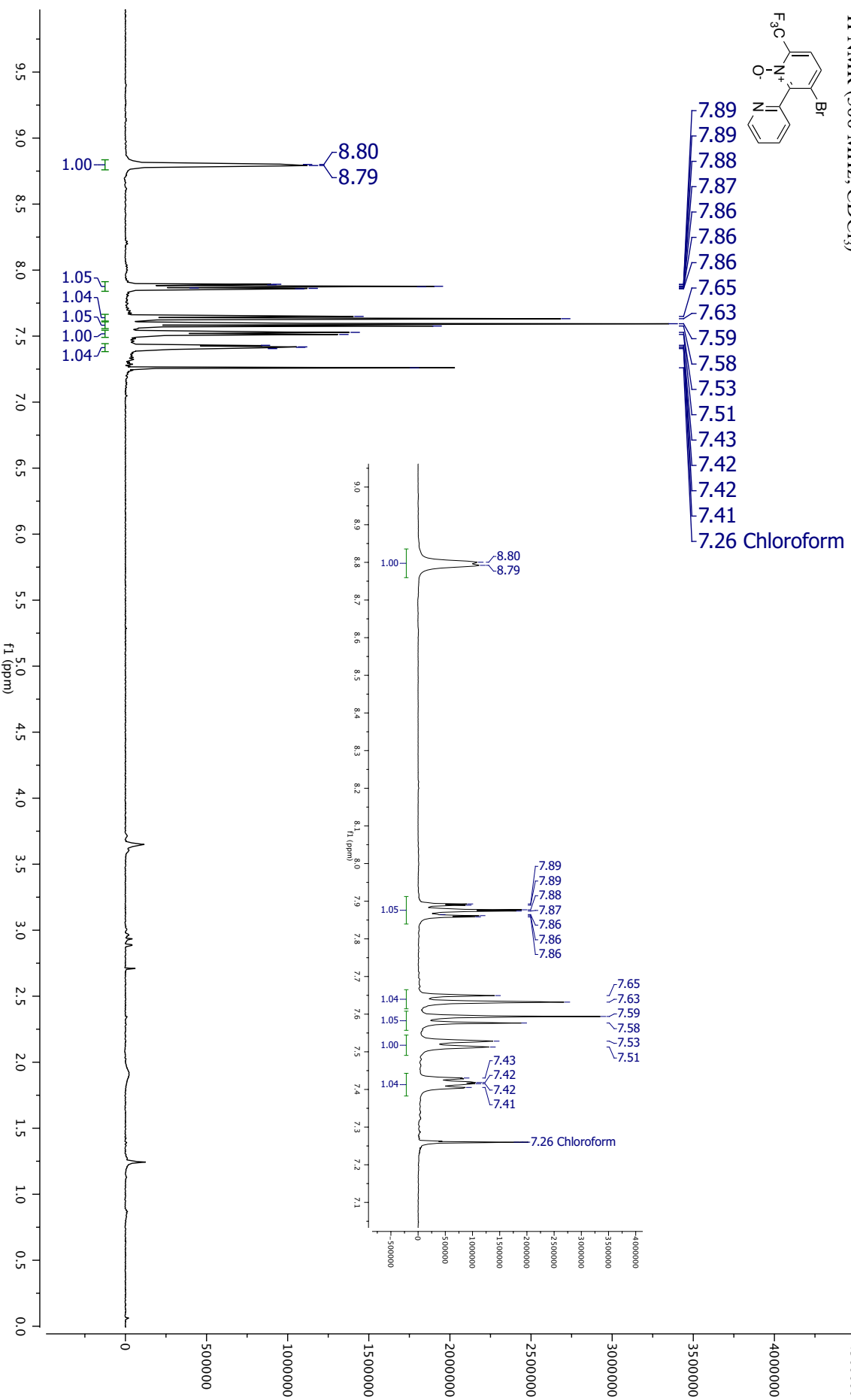
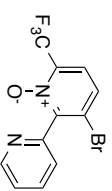
^{13}C NMR (126 MHz, CDCl_3)



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3-Bromo-6-trifluoromethyl-2,2'-bipyridine *N*-oxide (2d)

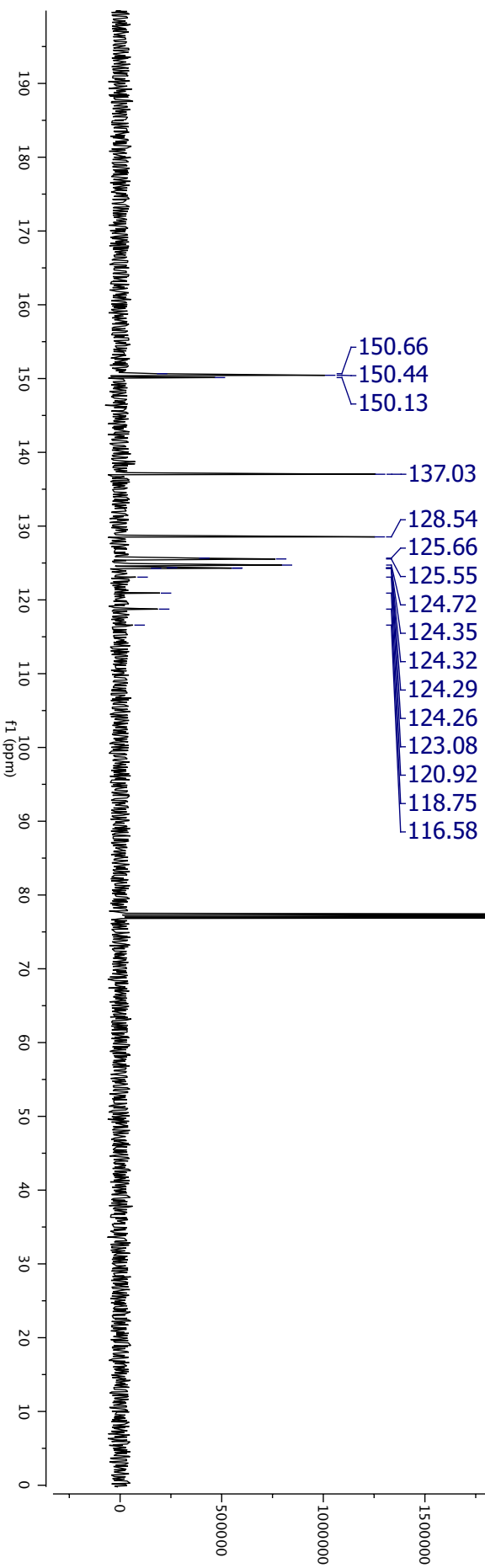
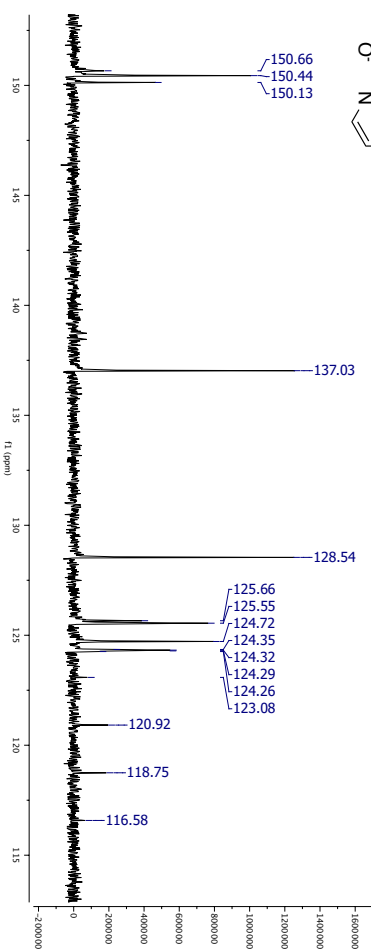
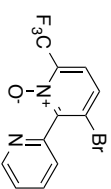
¹H NMR (500 MHz, CDCl₃)



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3-Bromo-6-trifluoromethyl-2,2'-bipyridine *N*-oxide (2d)

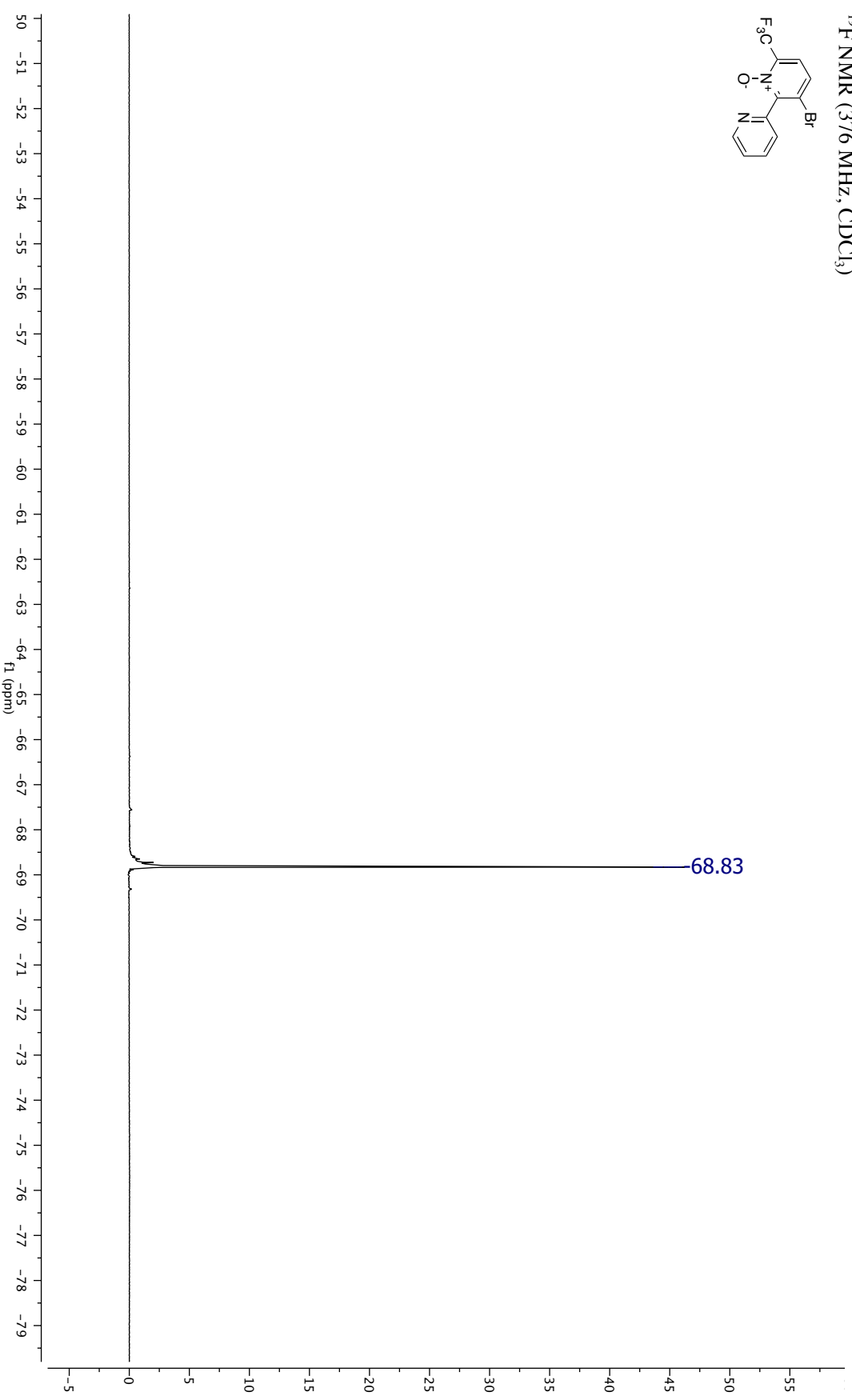
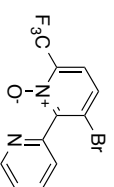
^{13}C NMR (126 MHz, CDCl_3)



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3-Bromo-6-trifluoromethyl-2,2'-bipyridine *N*-oxide (2d)

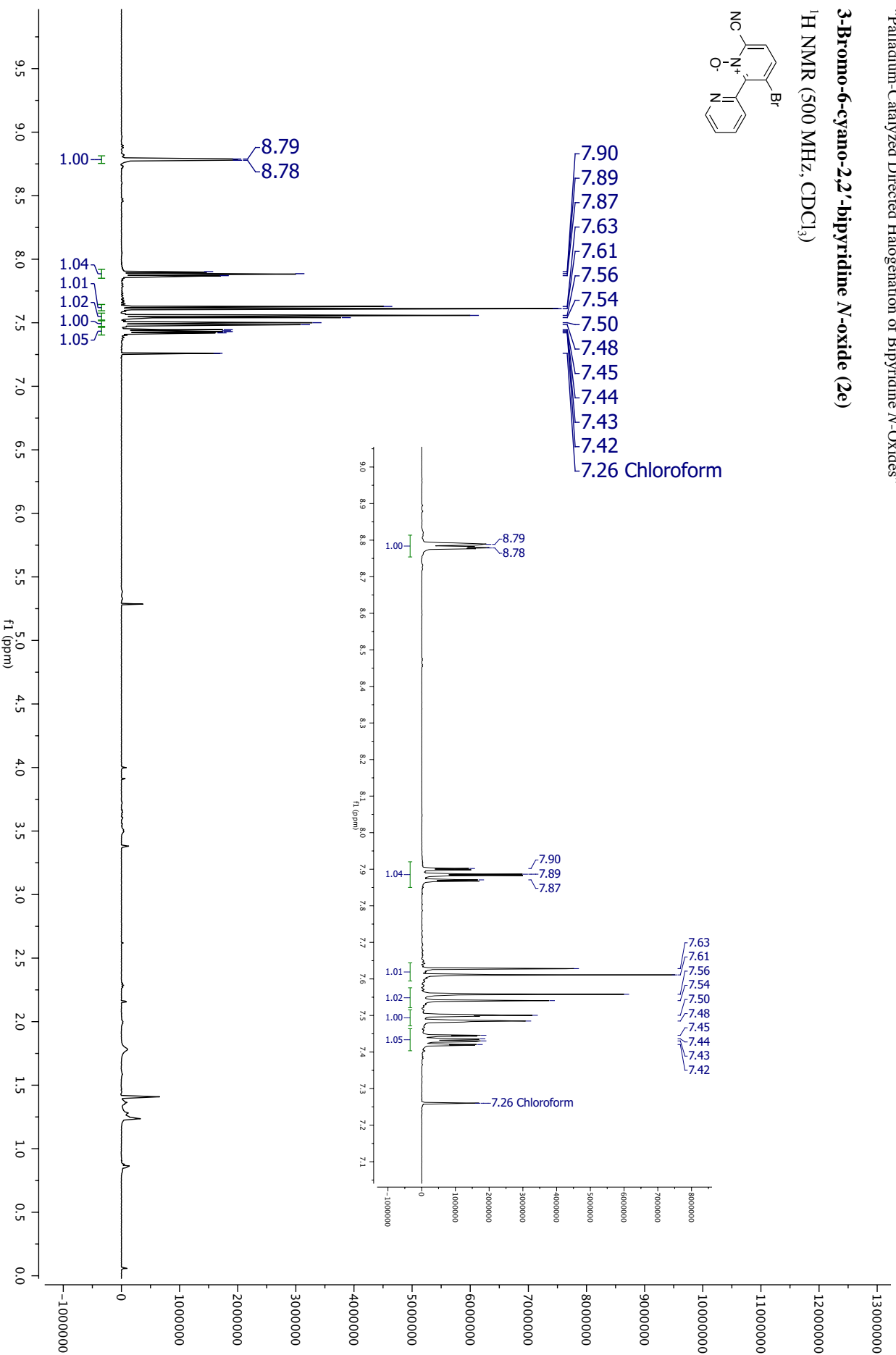
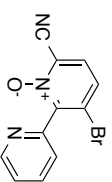
^{19}F NMR (376 MHz, CDCl_3)



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3-Bromo-6-cyano-2,2'-bipyridine *N*-oxide (2e)

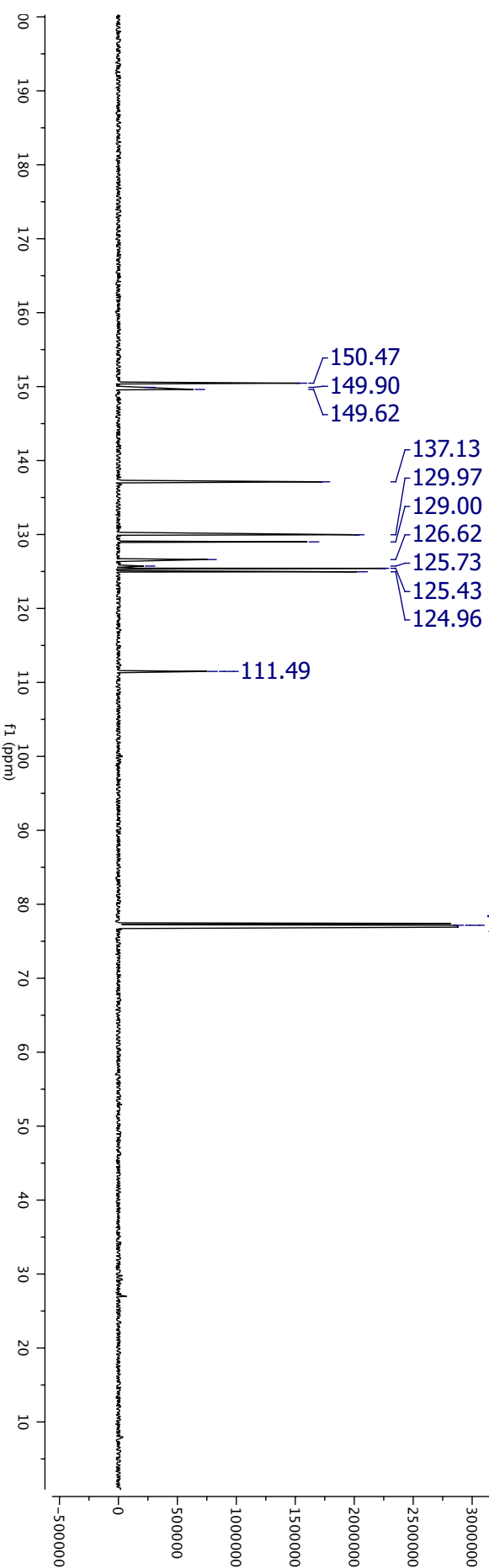
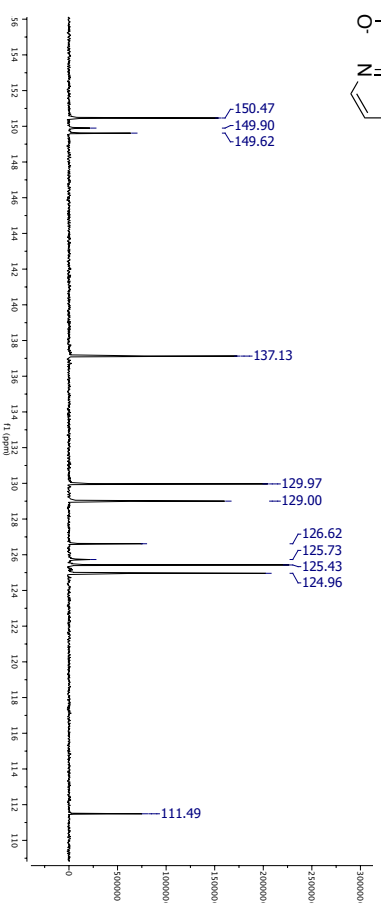
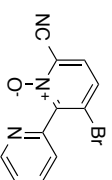
¹H NMR (500 MHz, CDCl₃)



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3-Bromo-6-cyano-2,2'-bipyridine *N*-oxide (2e)

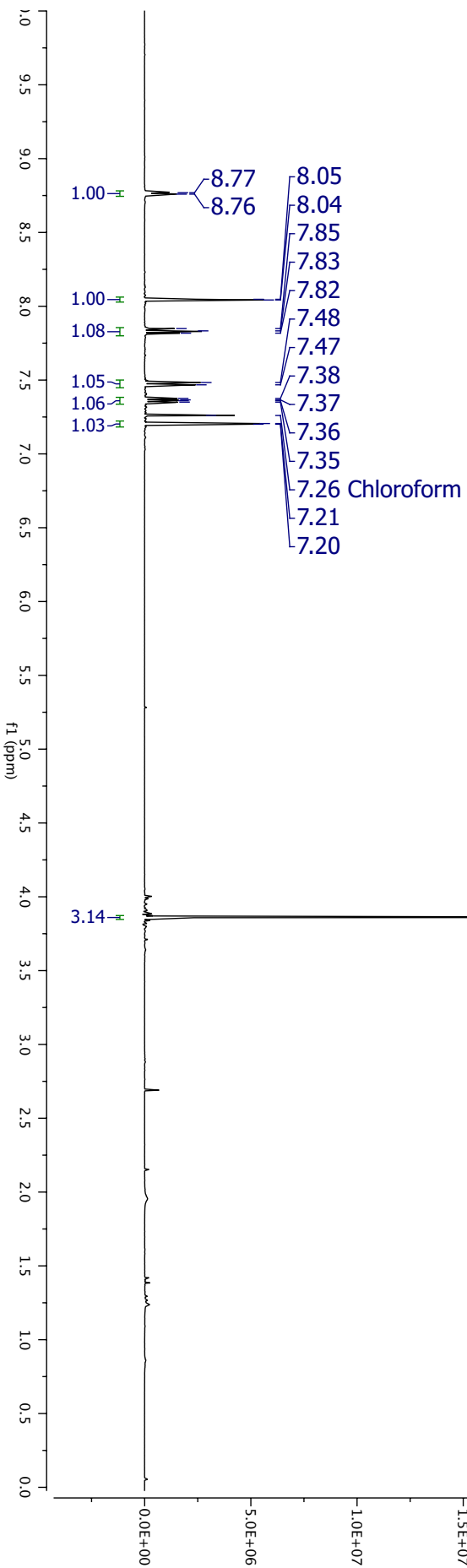
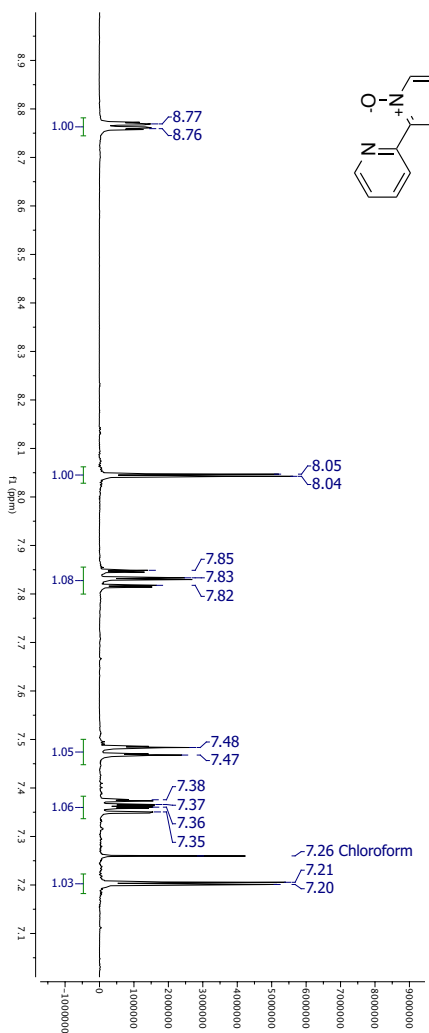
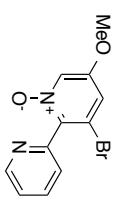
^{13}C NMR (126 MHz, CDCl_3)



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3-Bromo-5-methoxy-2,2'-bipyridine *N*-oxide (2f)

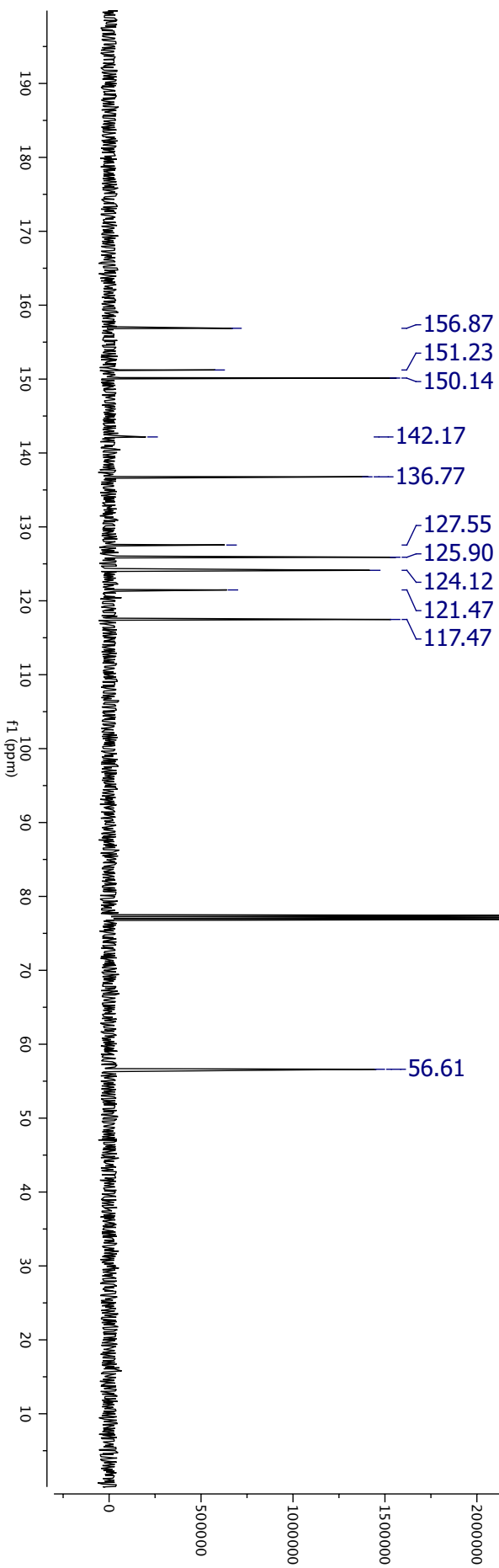
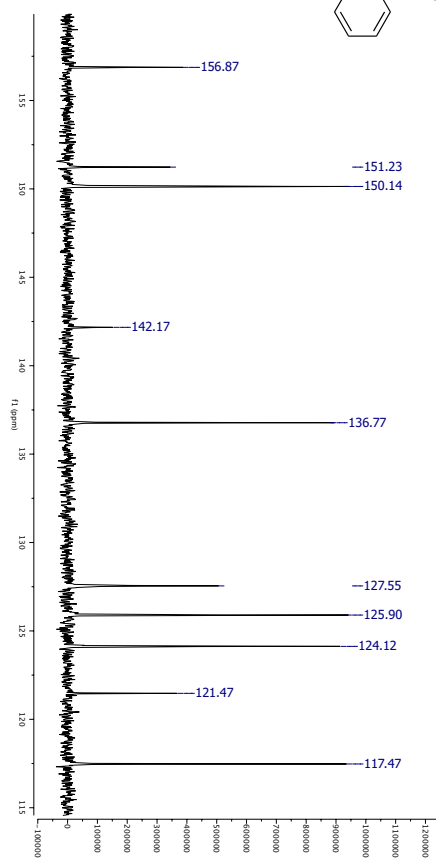
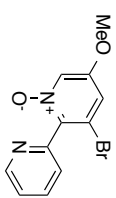
¹H NMR (500 MHz, CDCl₃)



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3-Bromo-5-methoxy-2,2'-bipyridine *N*-oxide (2f)

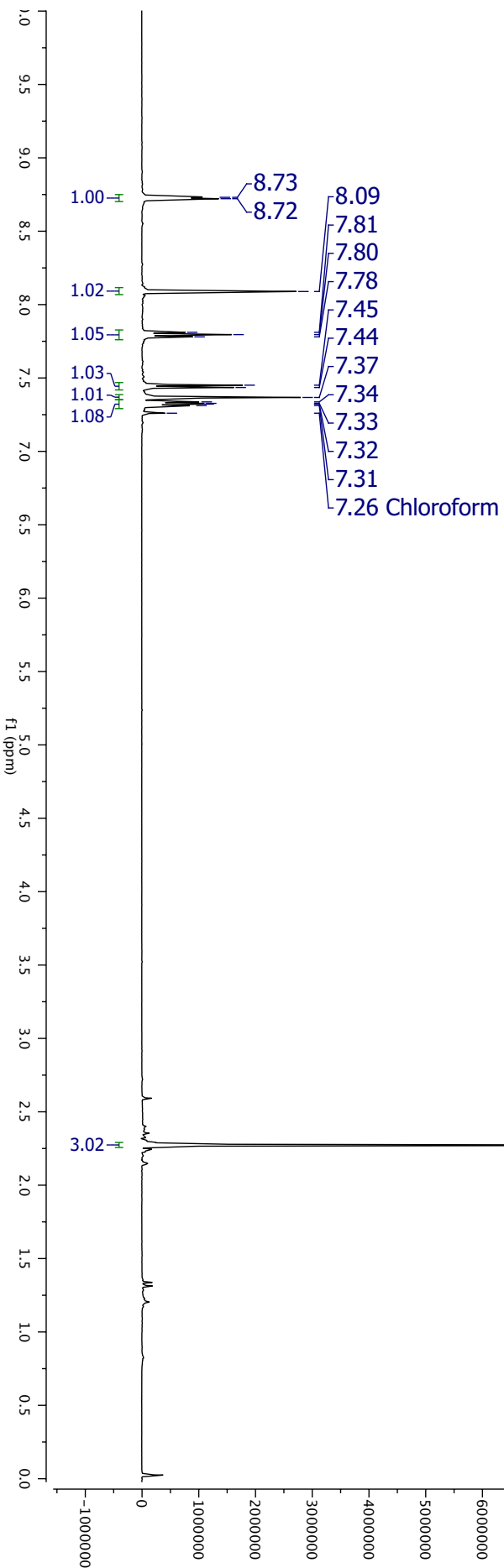
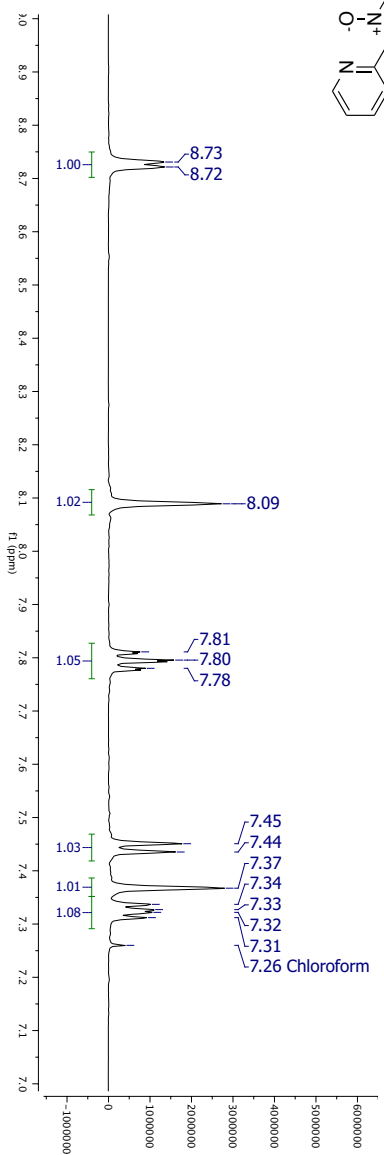
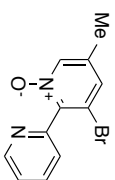
^{13}C NMR (126 MHz, CDCl_3)



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3-Bromo-5-methyl-2,2'-bipyridine *N*-oxide (2g)

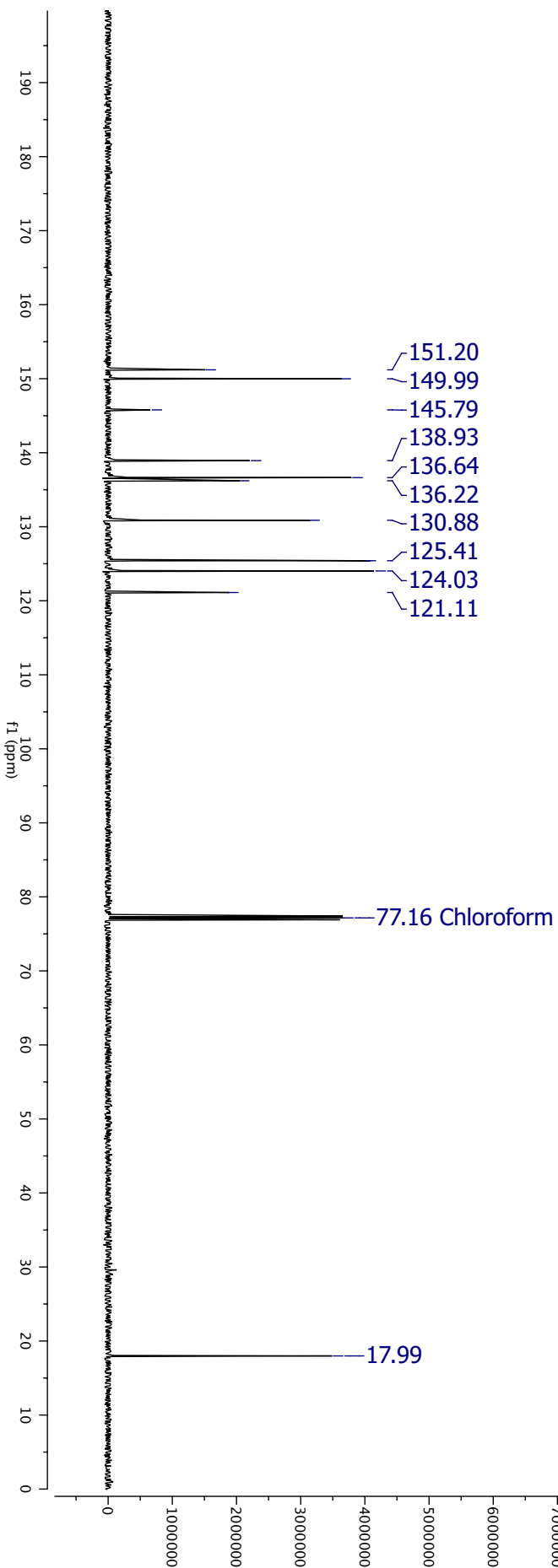
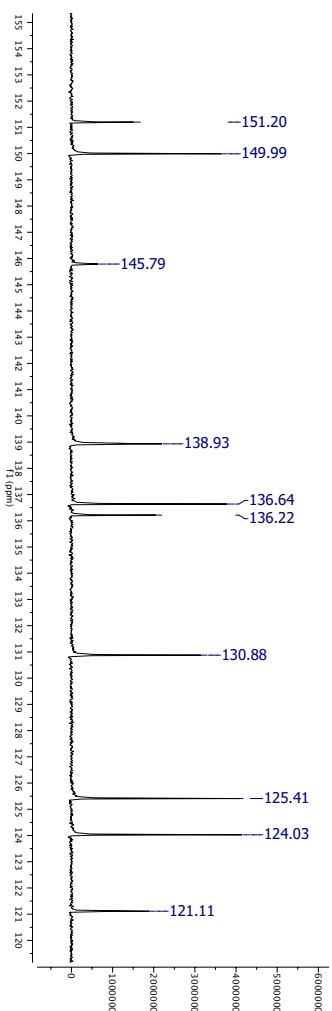
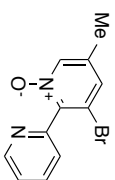
¹H NMR (400 MHz, CDCl₃)



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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-5-methyl-2,2'-bipyridine *N*-oxide (**2g**)

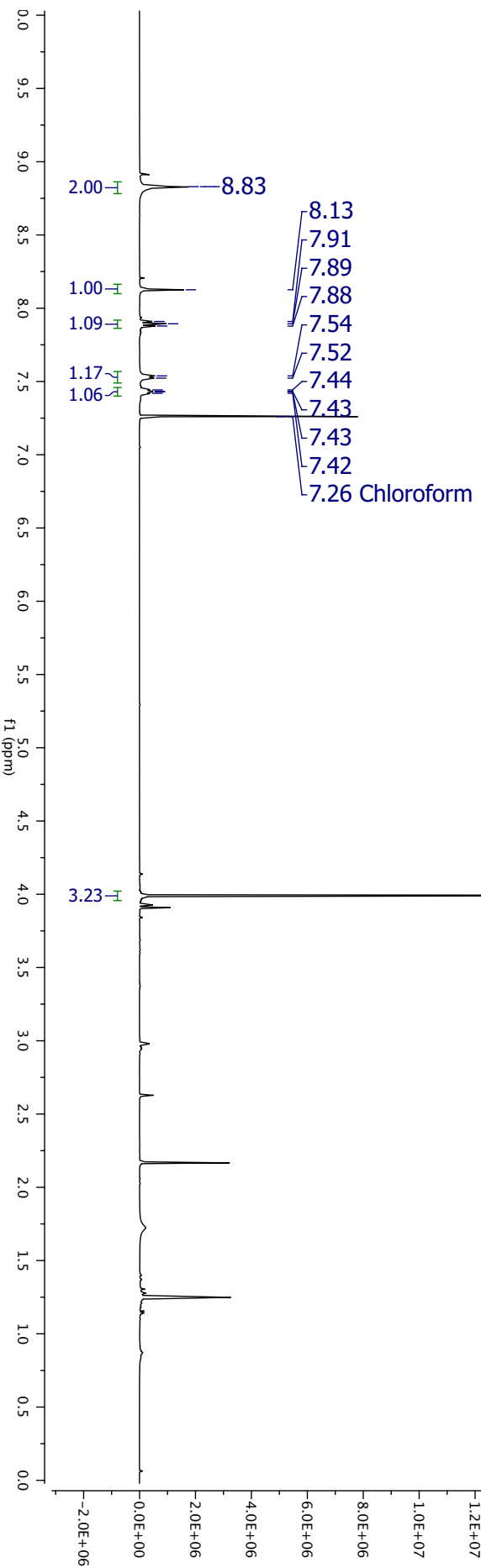
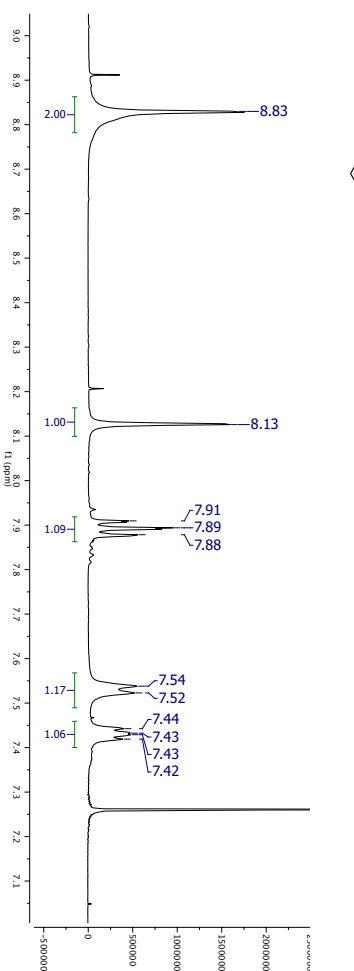
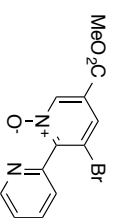
^{13}C NMR (126 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-5-methoxycarbonyl-2,2'-bipyridine *N*-oxide (2h)

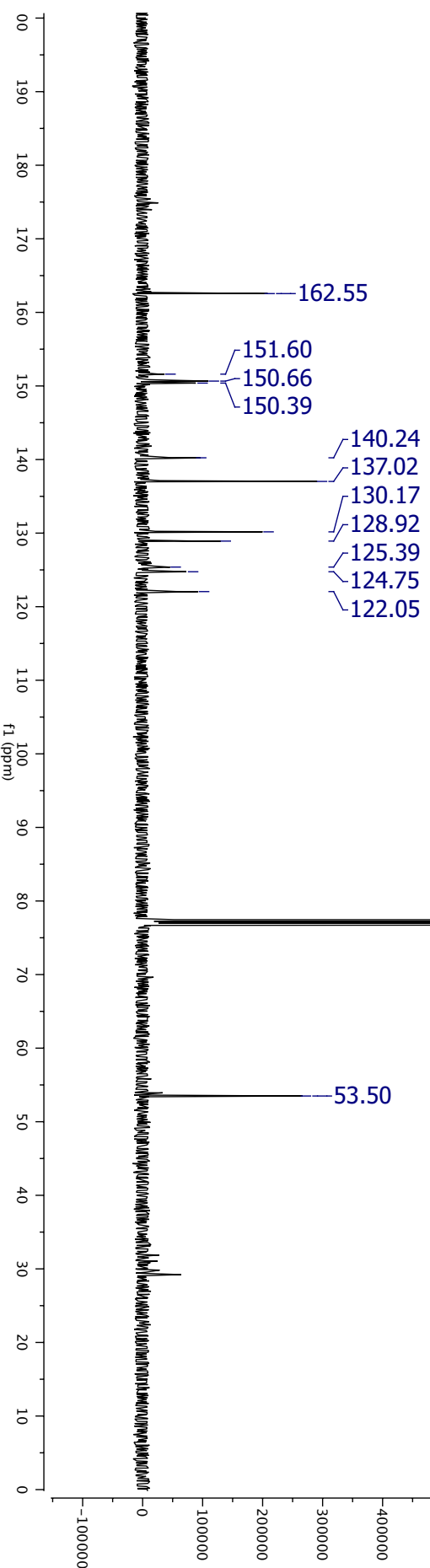
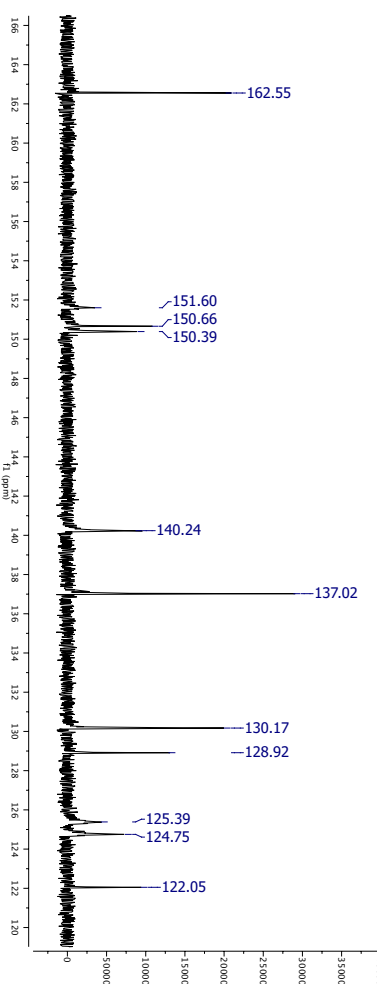
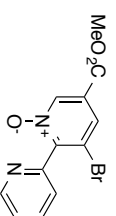
¹H NMR (500 MHz, CDCl₃)



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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-5-(methoxycarbonyl)-2,2'-bipyridine *N*-oxide (2n)

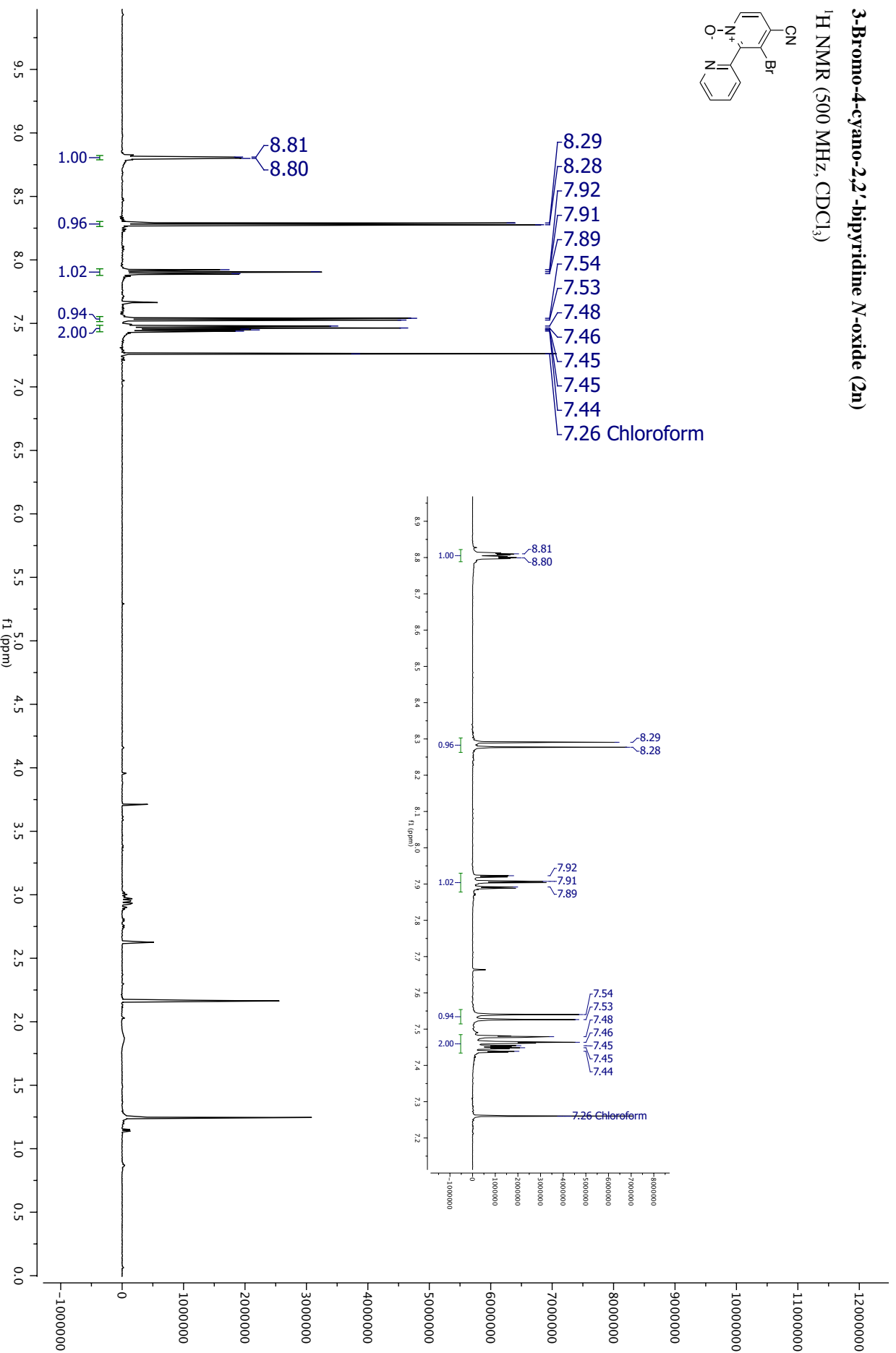
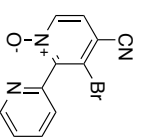
^{13}C NMR (126 MHz, CDCl_3)



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3-Bromo-4-cyano-2,2'-bipyridine *N*-oxide (2n)

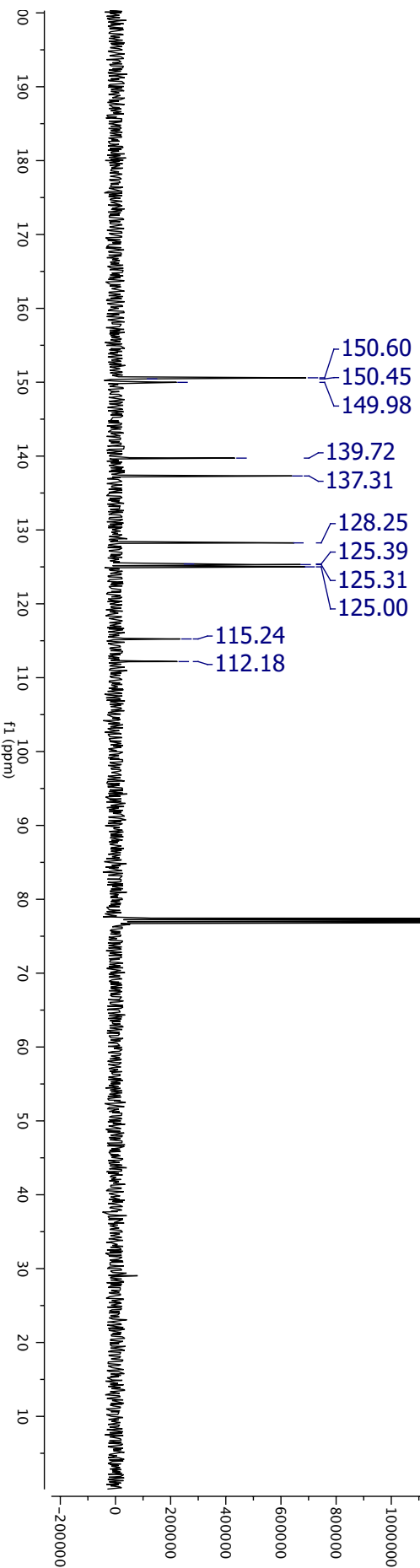
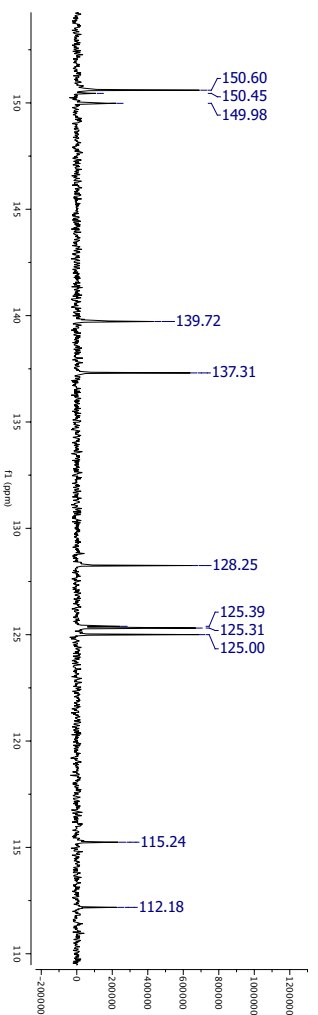
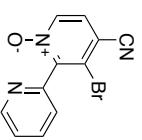
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-4-cyano-2,2'-bipyridine *N*-oxide (2n)

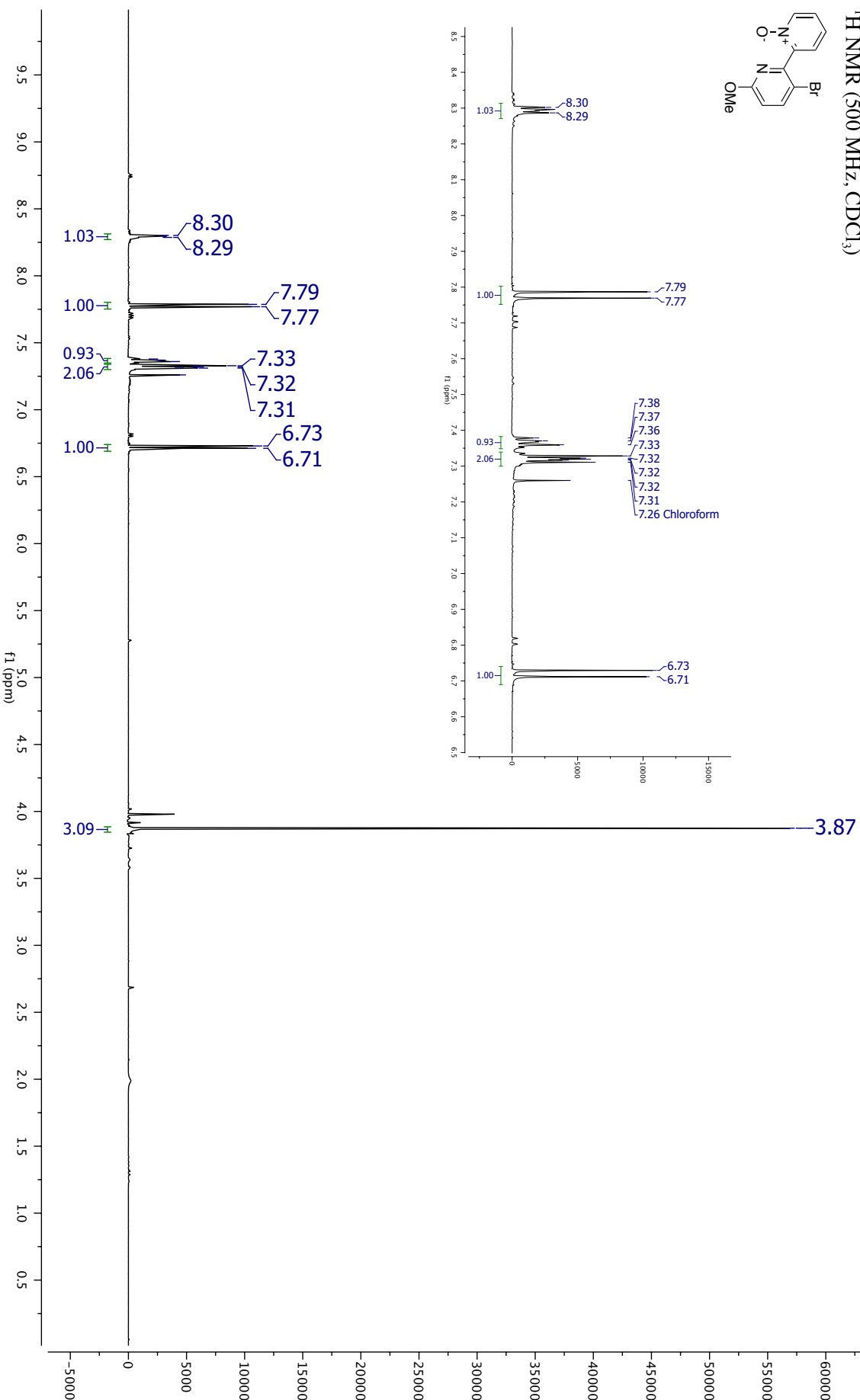
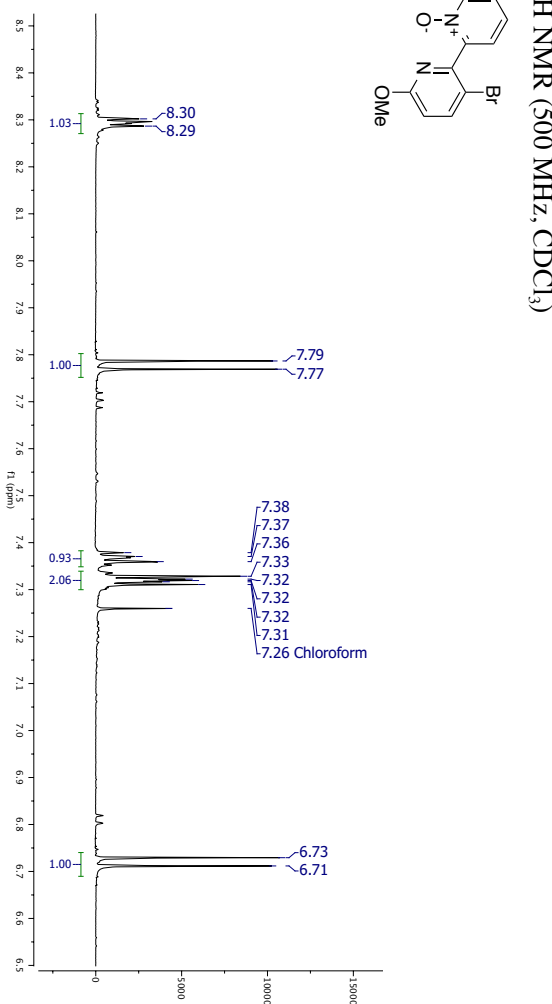
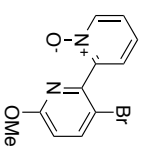
^{13}C NMR (126 MHz, CDCl_3)



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 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

3'-Bromo-6'-methoxy-2,2'-bipyridine *N*-oxide (2p)

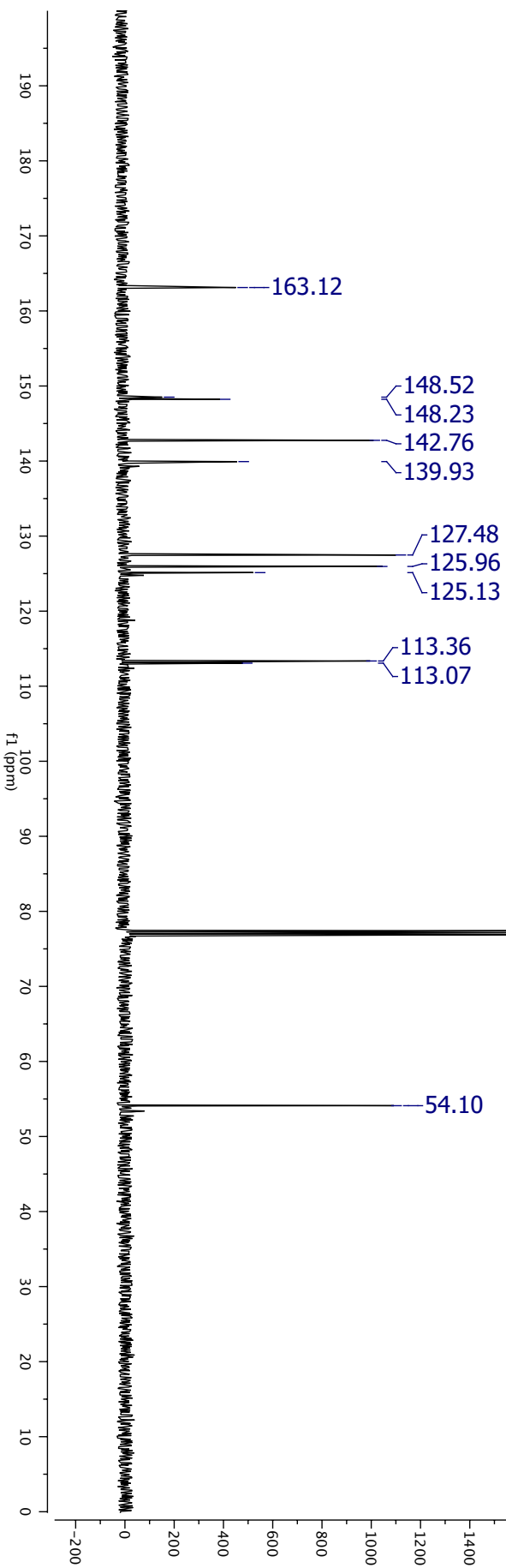
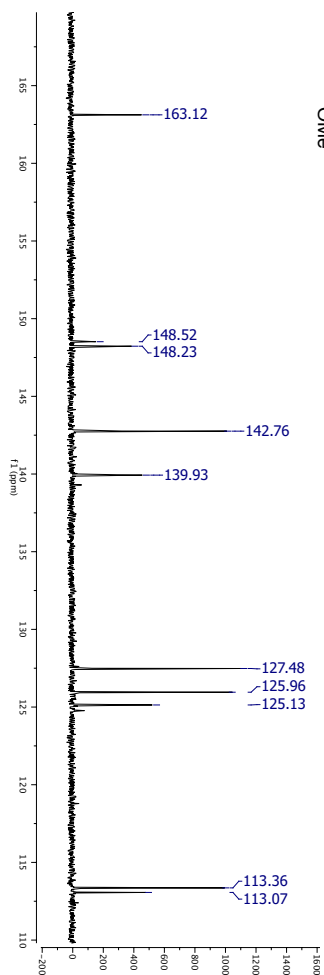
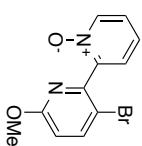
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3'-Bromo-6'-methoxy-2,2'-bipyridine *N*-oxide (2p)

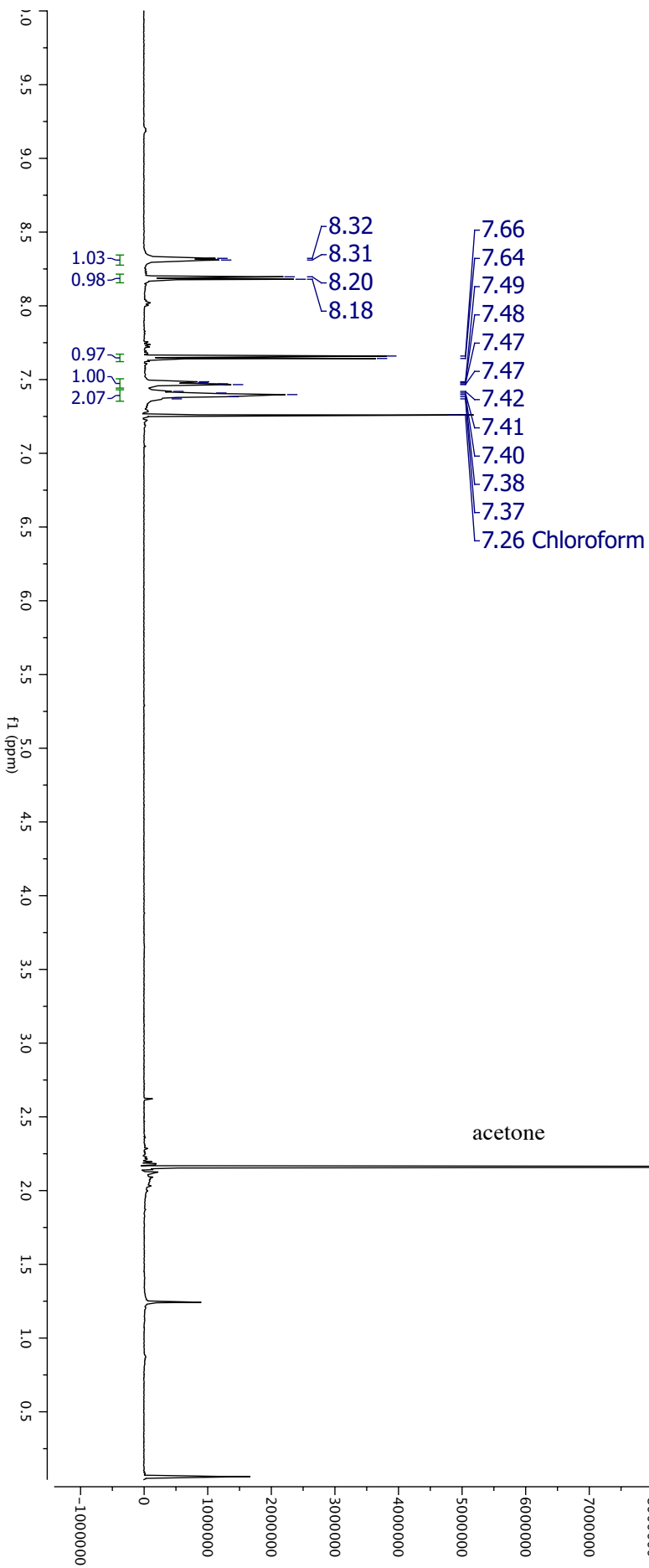
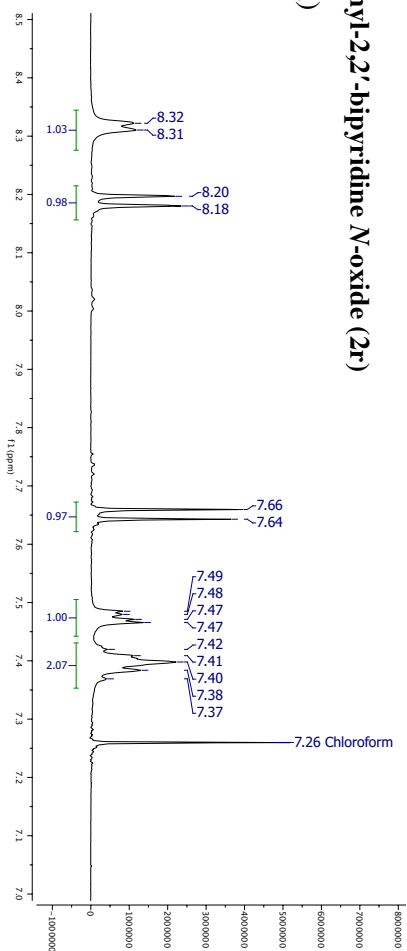
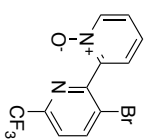
^{13}C NMR (126 MHz, CDCl_3)



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3'-Bromo-6'-trifluoromethyl-2,2'-bipyridine *N*-oxide (2r)

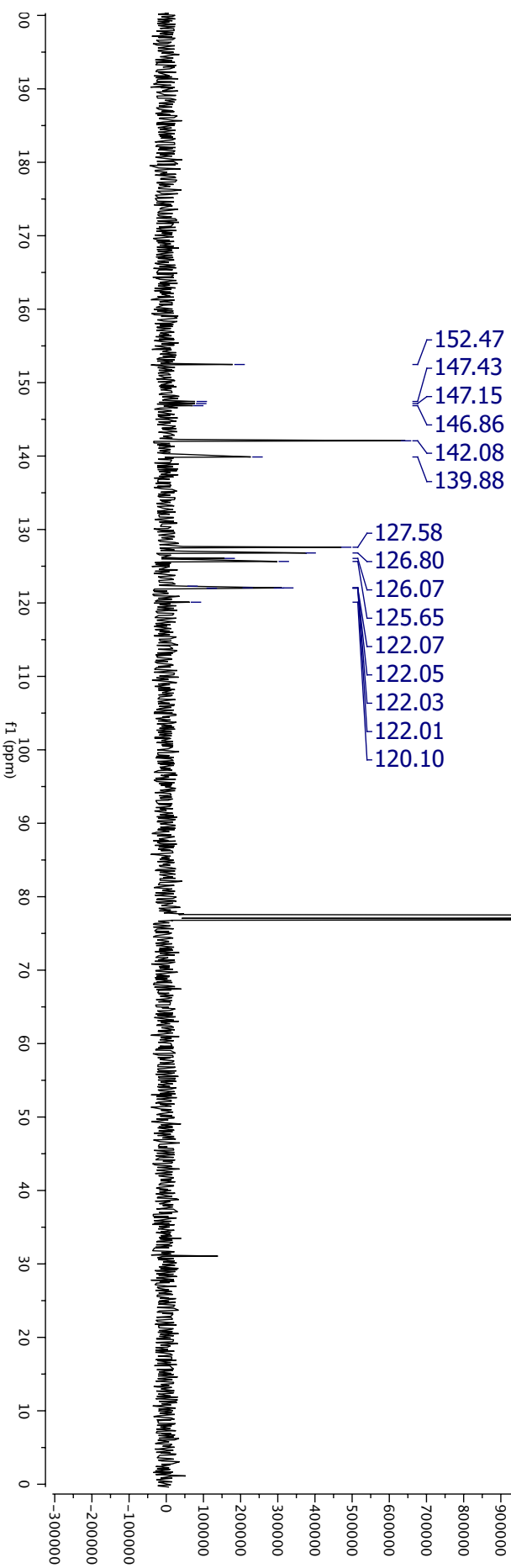
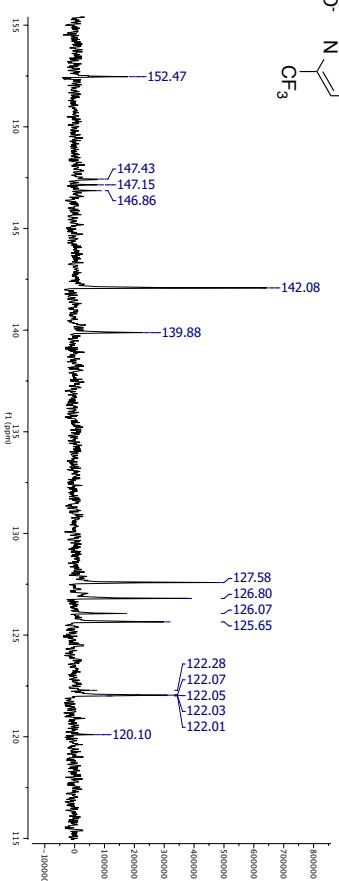
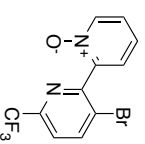
¹H NMR (500 MHz, CDCl₃)



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3'-Bromo-6'-(trifluoromethyl)-2,2'-bipyridine *N*-oxide (2r)

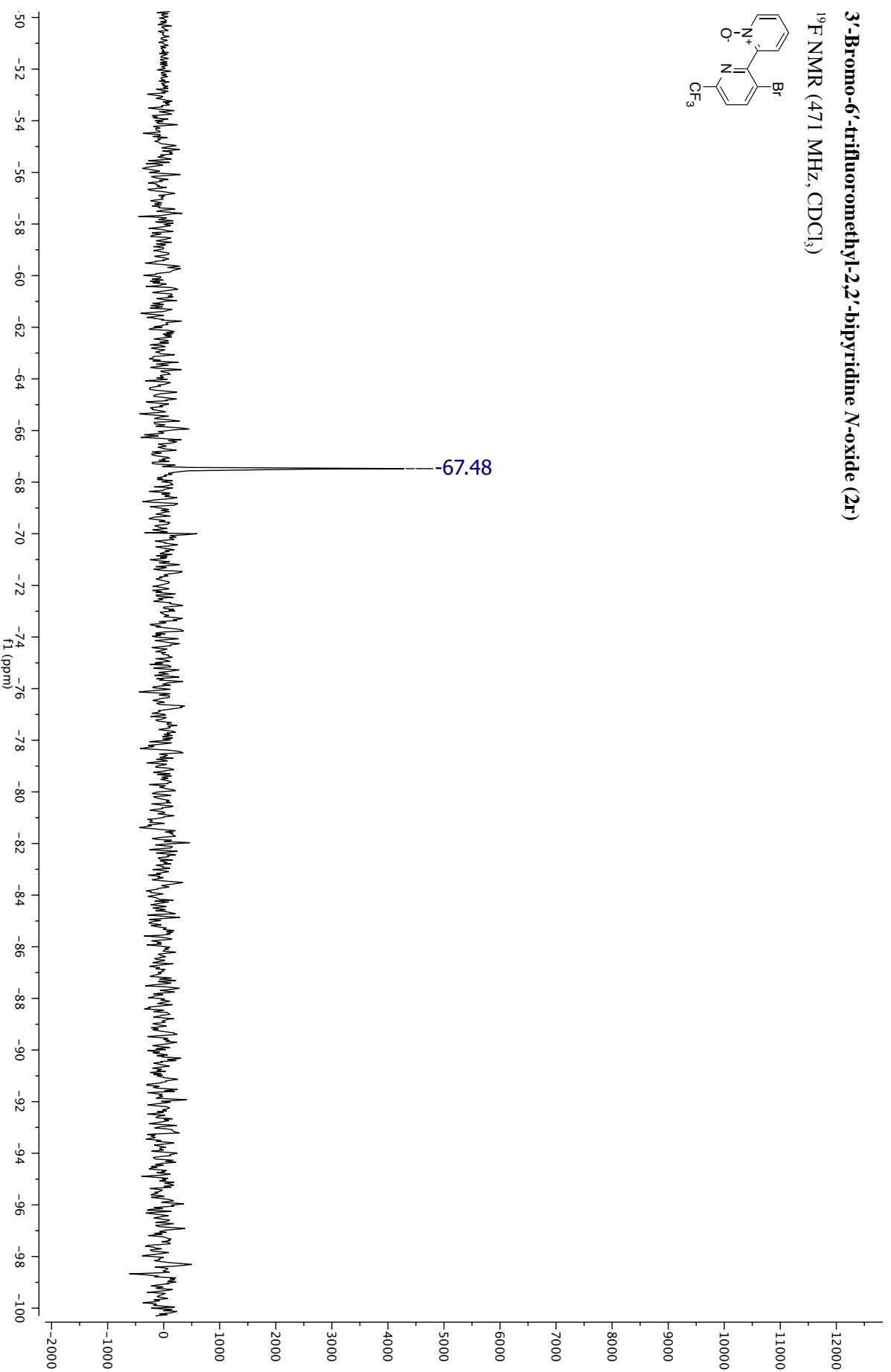
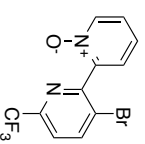
^{13}C NMR (126 MHz, CDCl_3)



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3'-Bromo-6'-trifluoromethyl-2,2'-bipyridine *N*-oxide (2r)

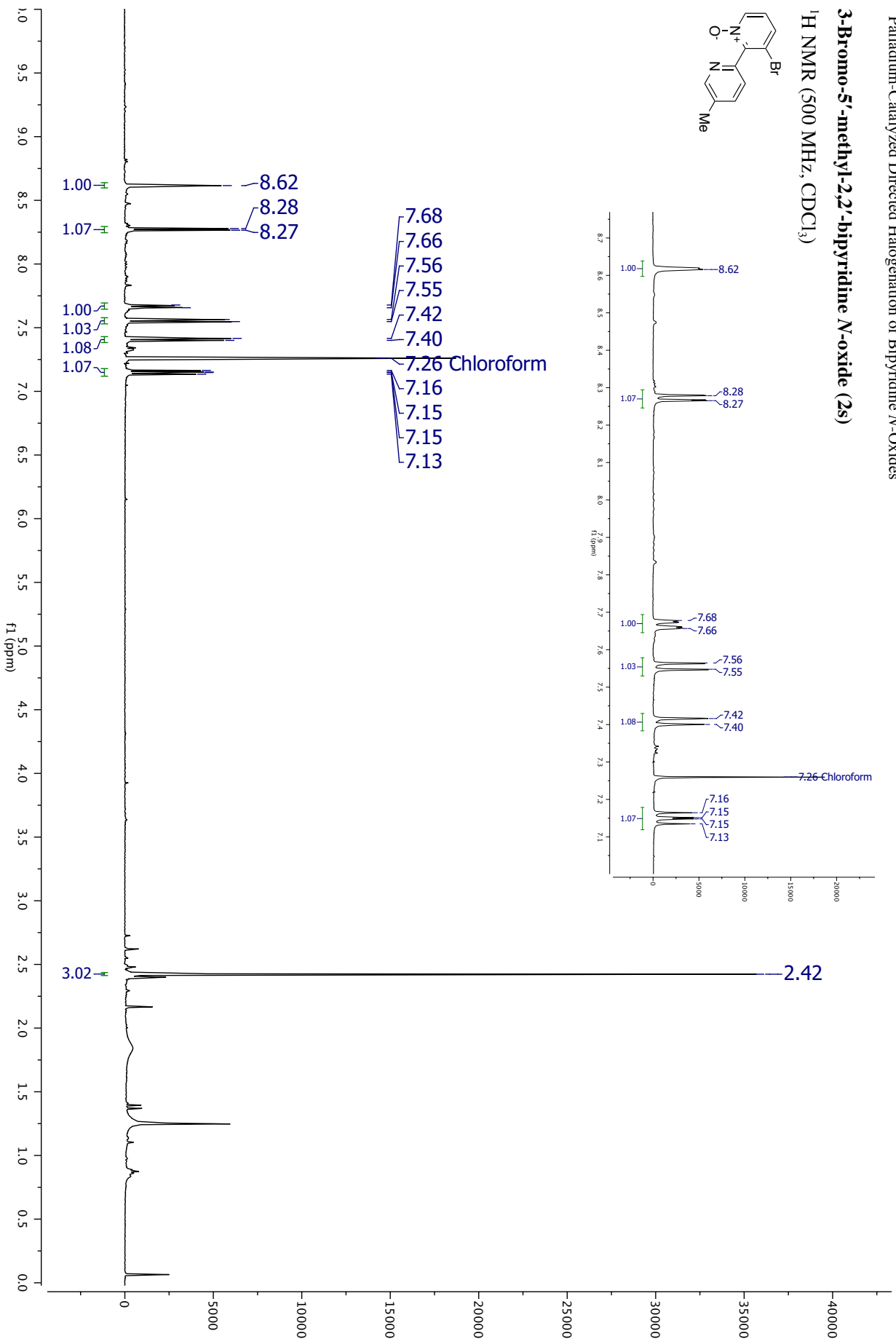
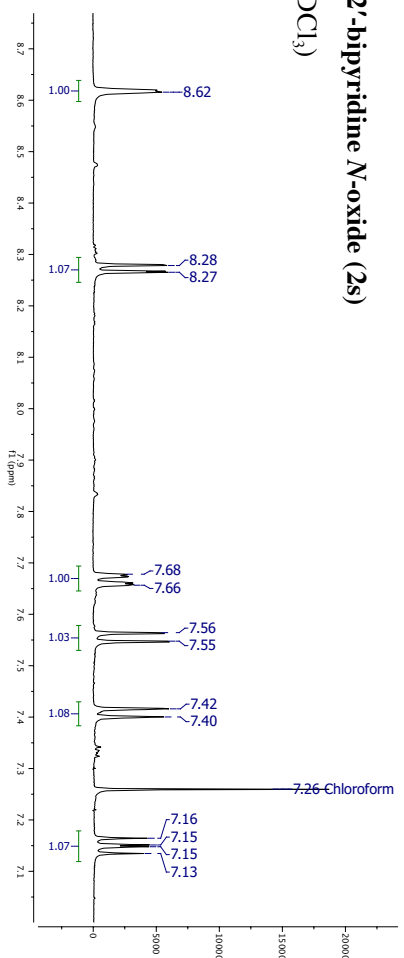
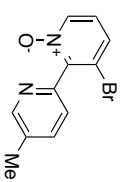
¹⁹F NMR (471 MHz, CDCl₃)



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3-Bromo-5'-methyl-2,2'-bipyridine *N*-oxide (2s)

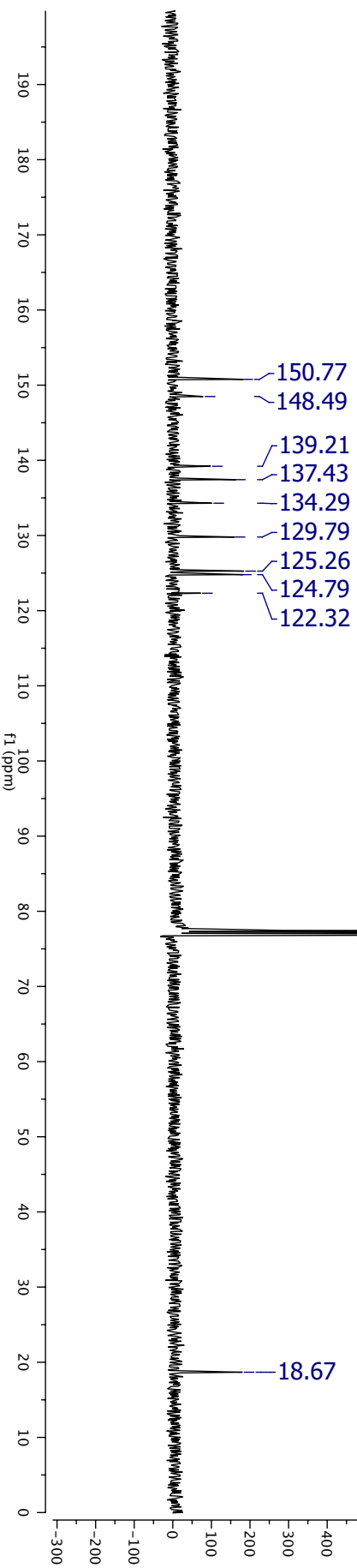
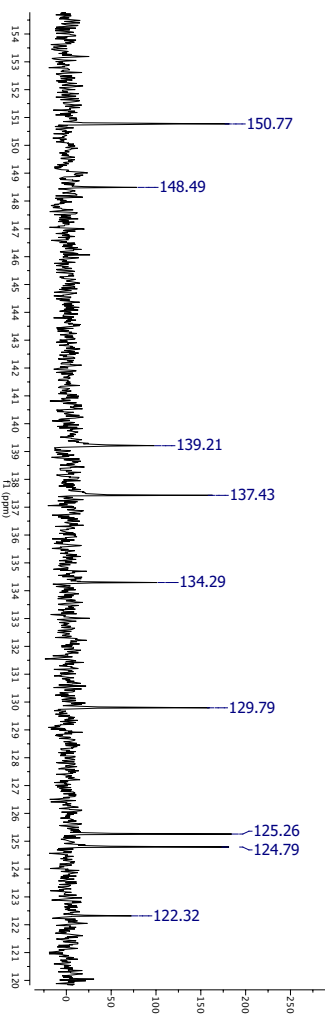
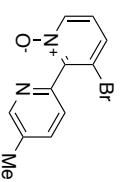
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-5'-methyl-2,2'-bipyridine *N*-oxide (**2s**)

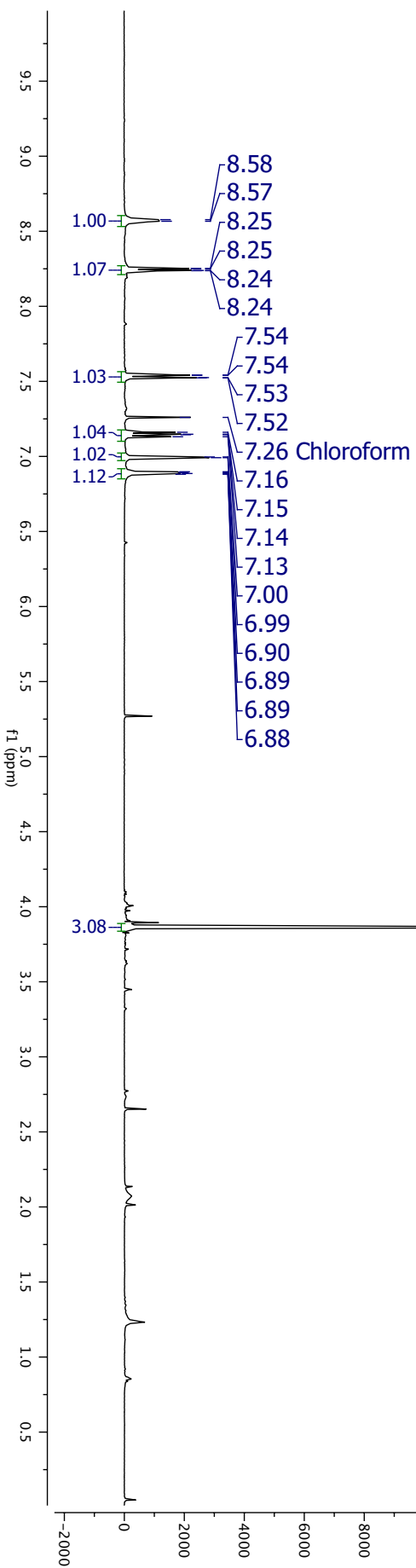
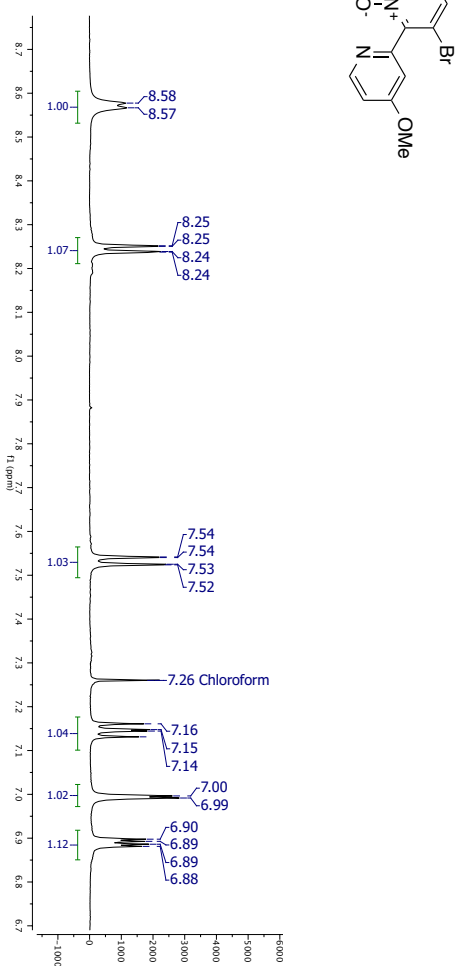
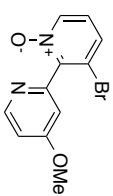
^{13}C NMR (126 MHz, CDCl_3)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

3-Bromo-4'-methoxy-2,2'-bipyridine *N*-oxide (2t)

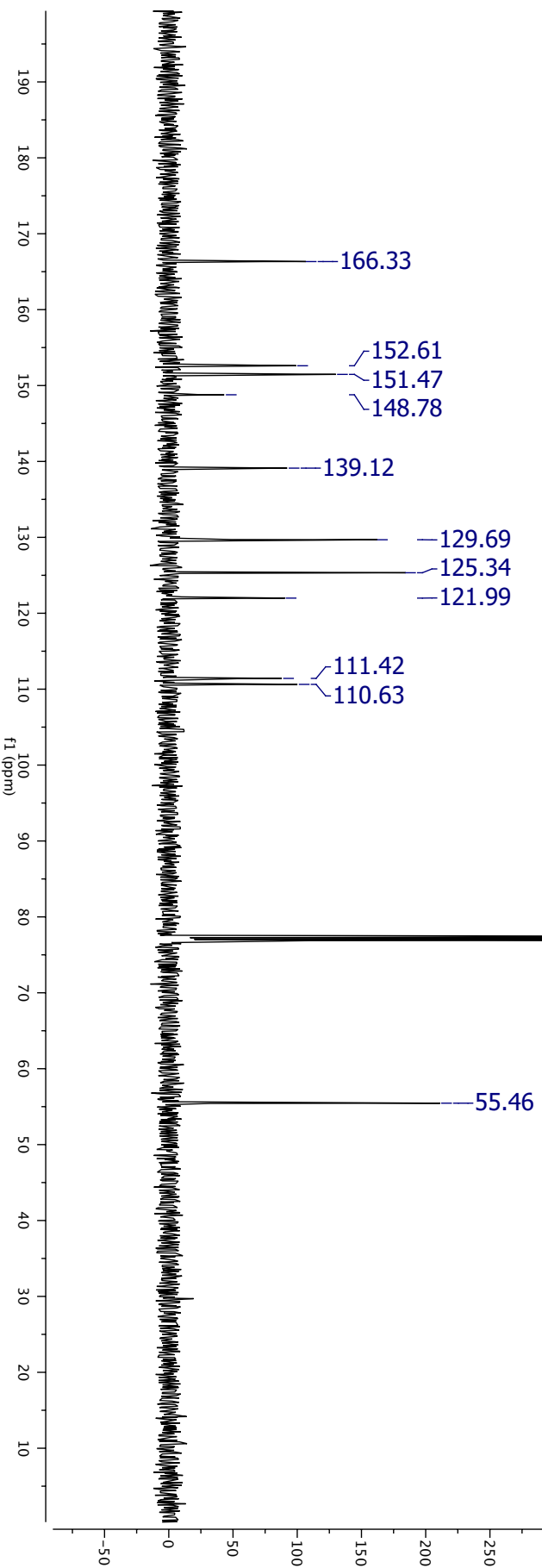
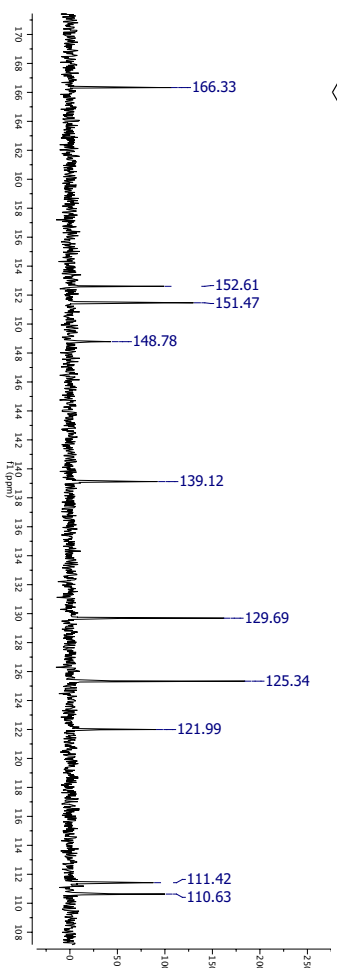
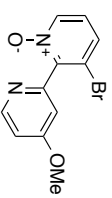
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-4'-methoxy-2,2'-bipyridine *N*-oxide (2t)

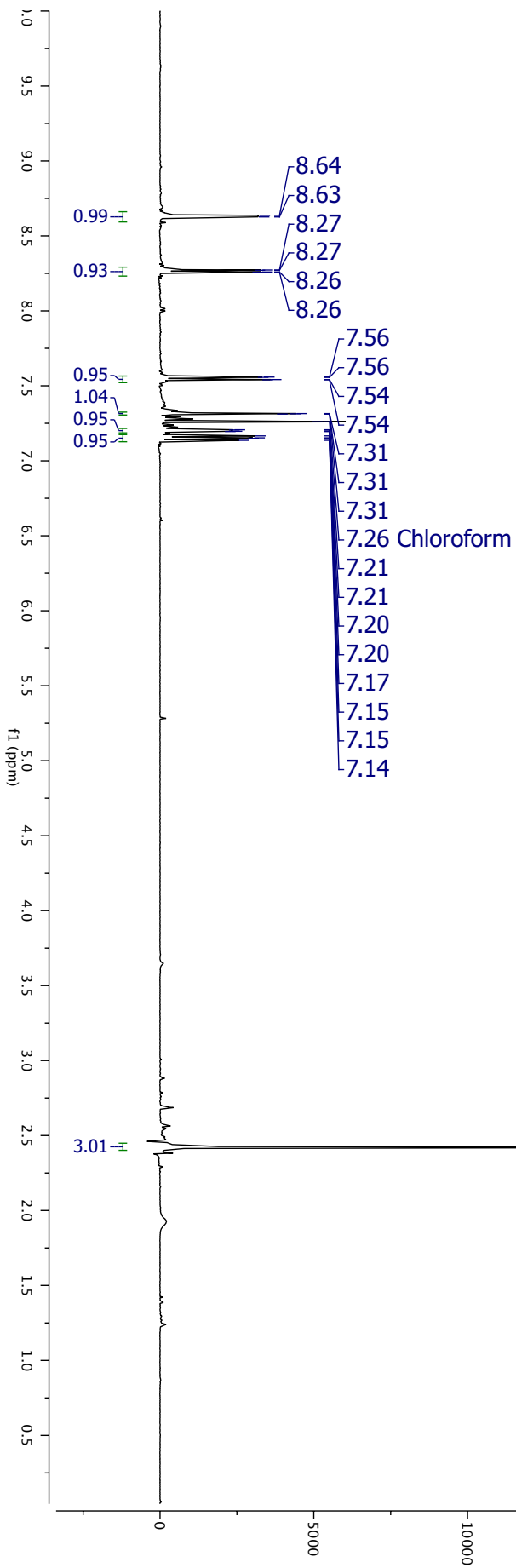
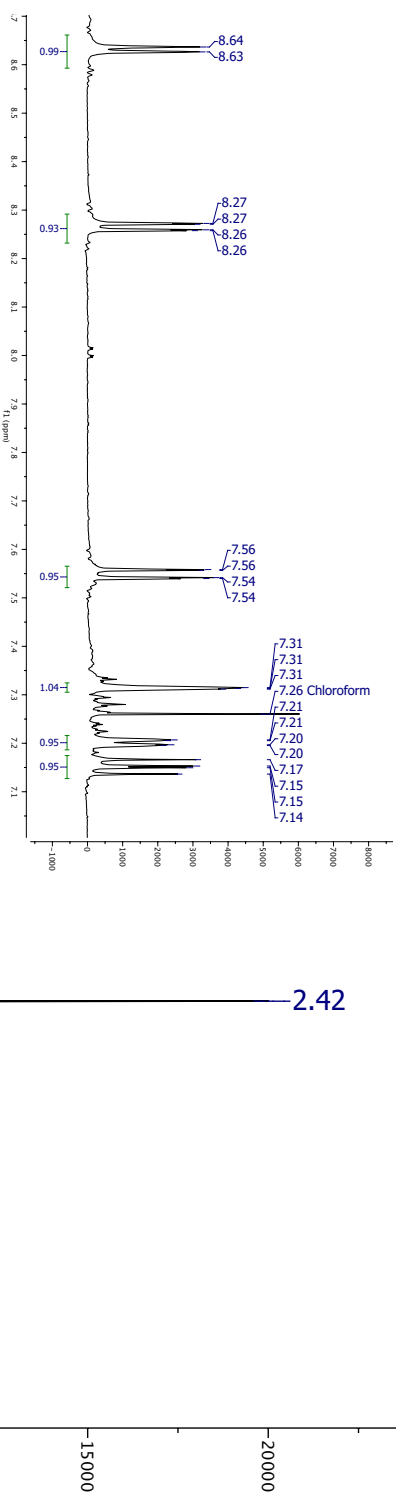
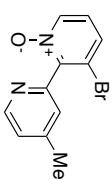
^{13}C NMR (126 MHz, CDCl_3)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

3-Bromo-4'-methyl-2,2'-bipyridine *N*-oxide (2u)

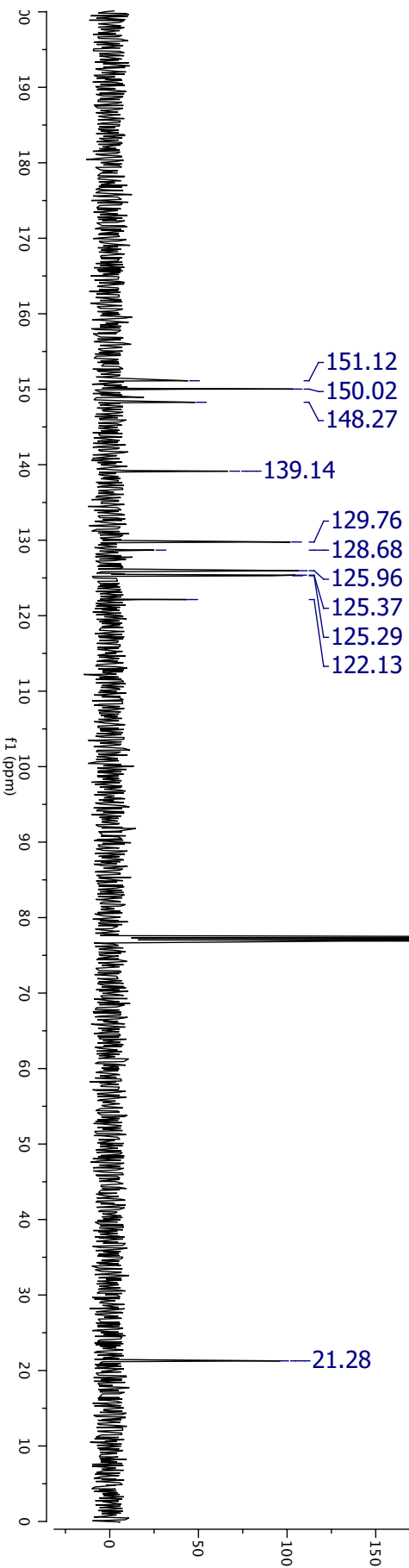
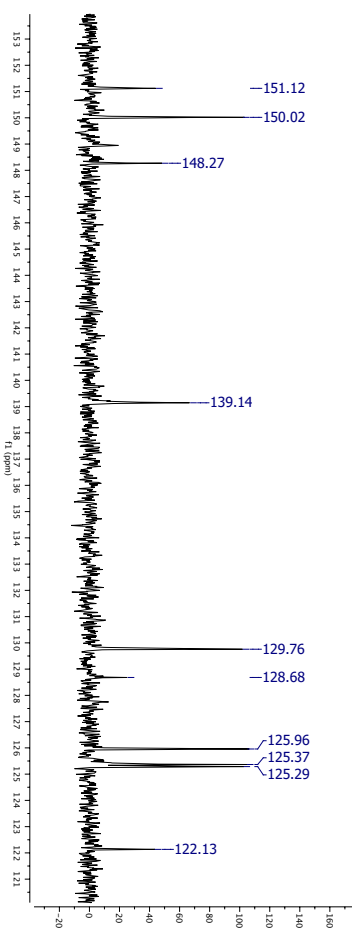
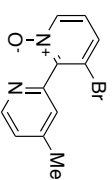
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-4'-methyl-2,2'-bipyridine *N*-oxide (2u)

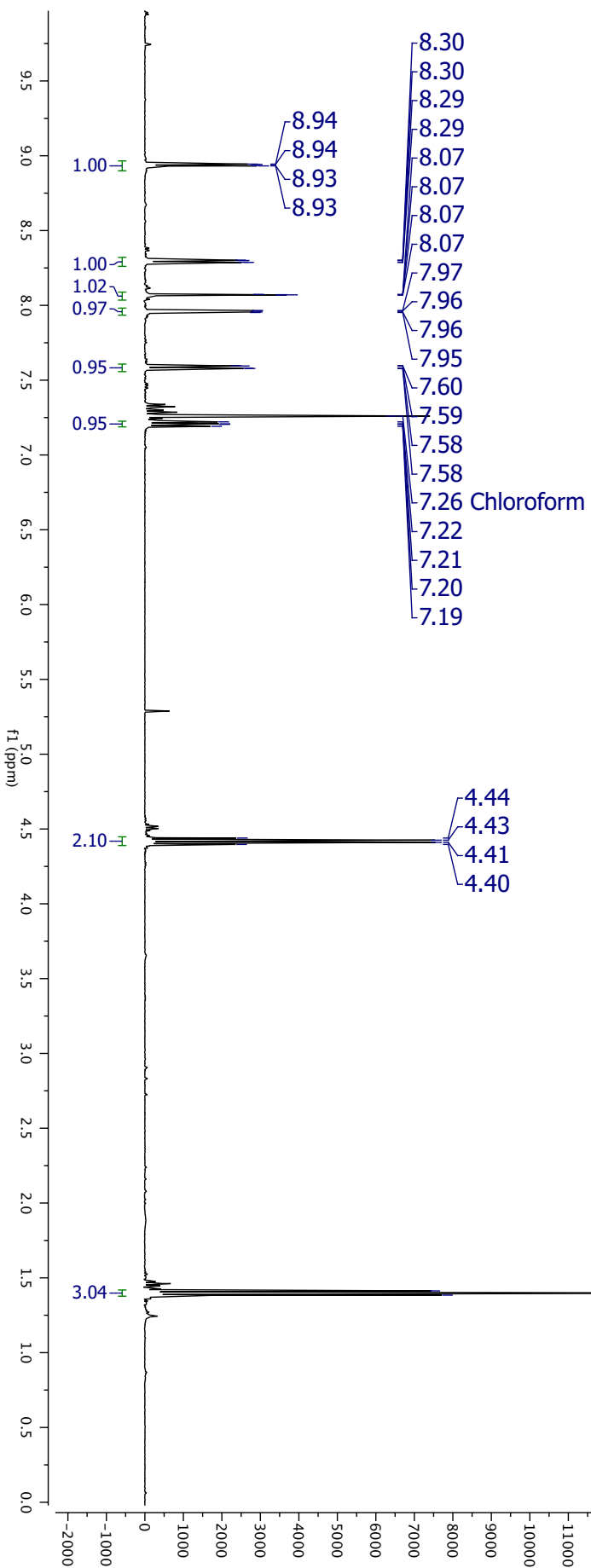
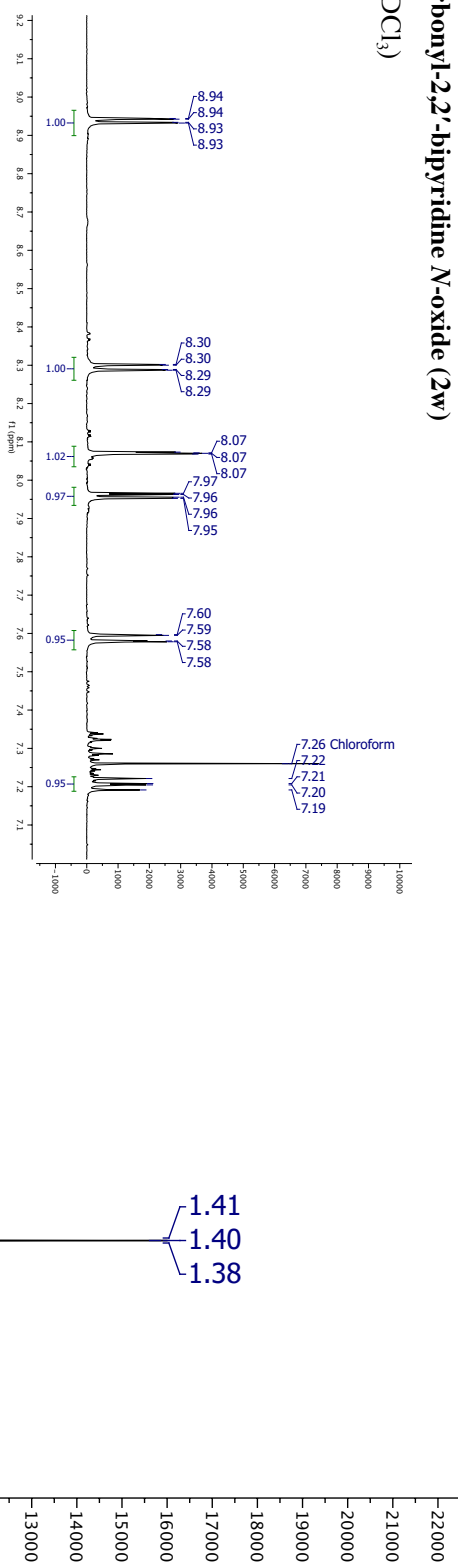
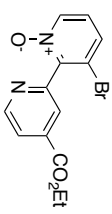
¹³C NMR (126 MHz, CDCl₃)



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 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

3-Bromo-4'-ethoxycarbonyl-2,2'-bipyridine *N*-oxide (2w)

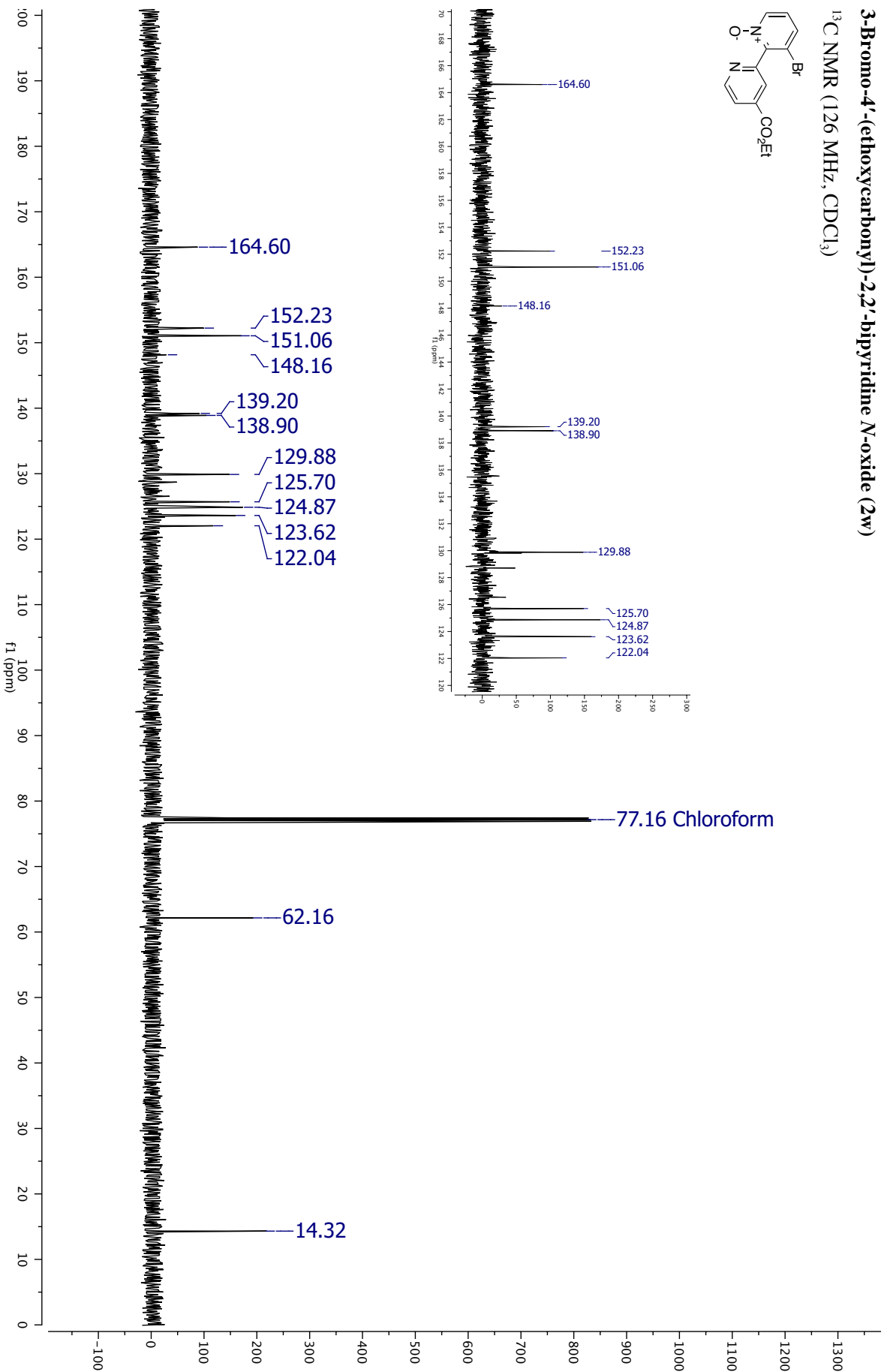
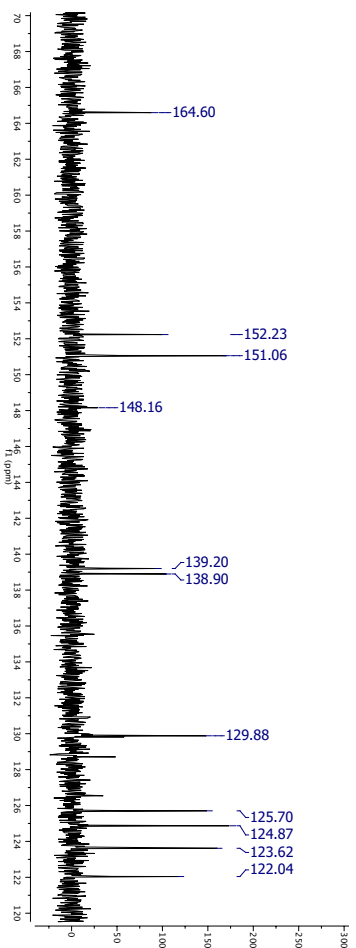
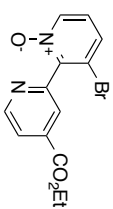
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-4'-(ethoxycarbonyl)-2,2'-bipyridine *N*-oxide (2w)

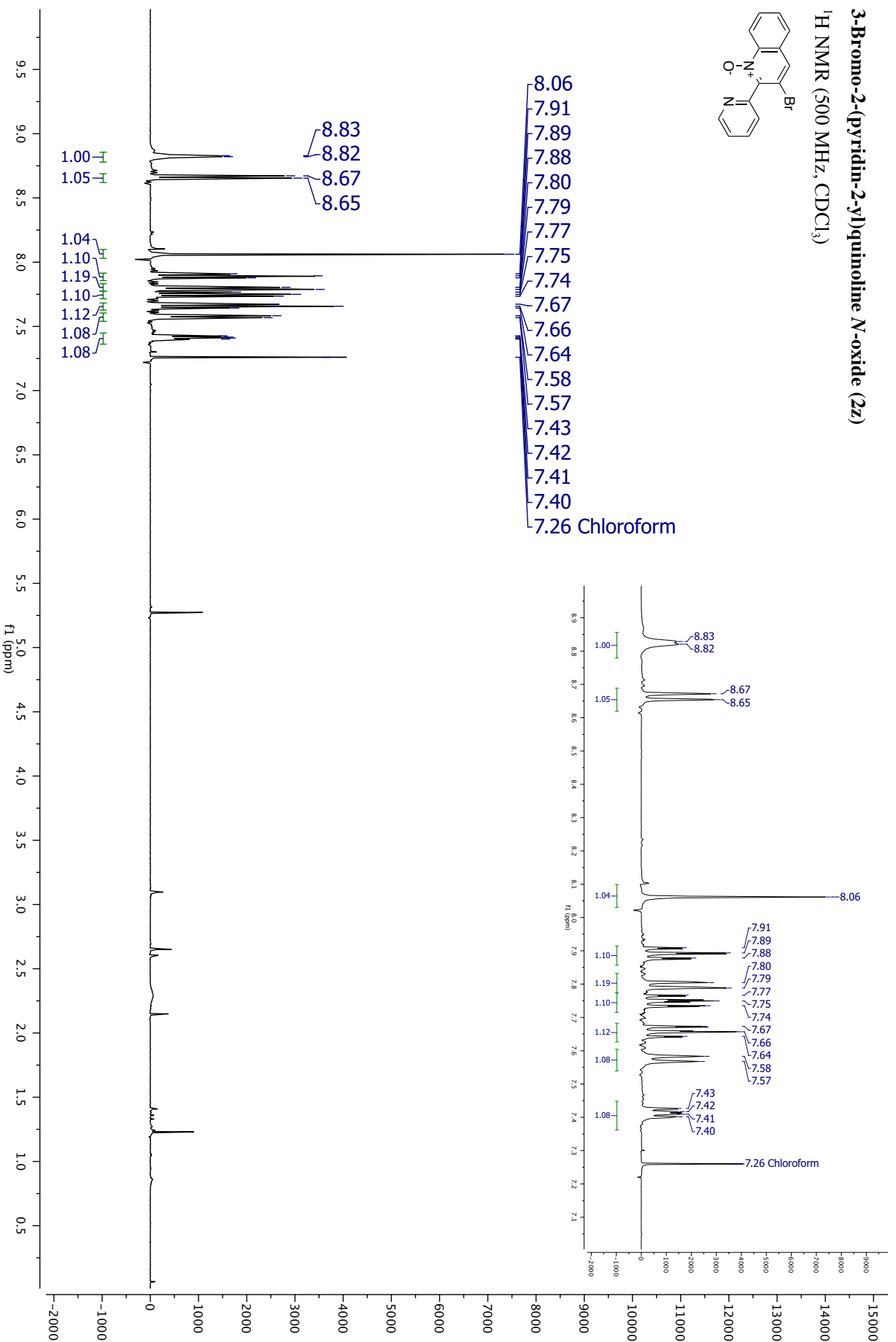
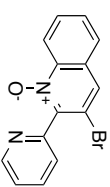
¹³C NMR (126 MHz, CDCl₃)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

3-Bromo-2-(pyridin-2-yl)quinoline *N*-oxide (2z)

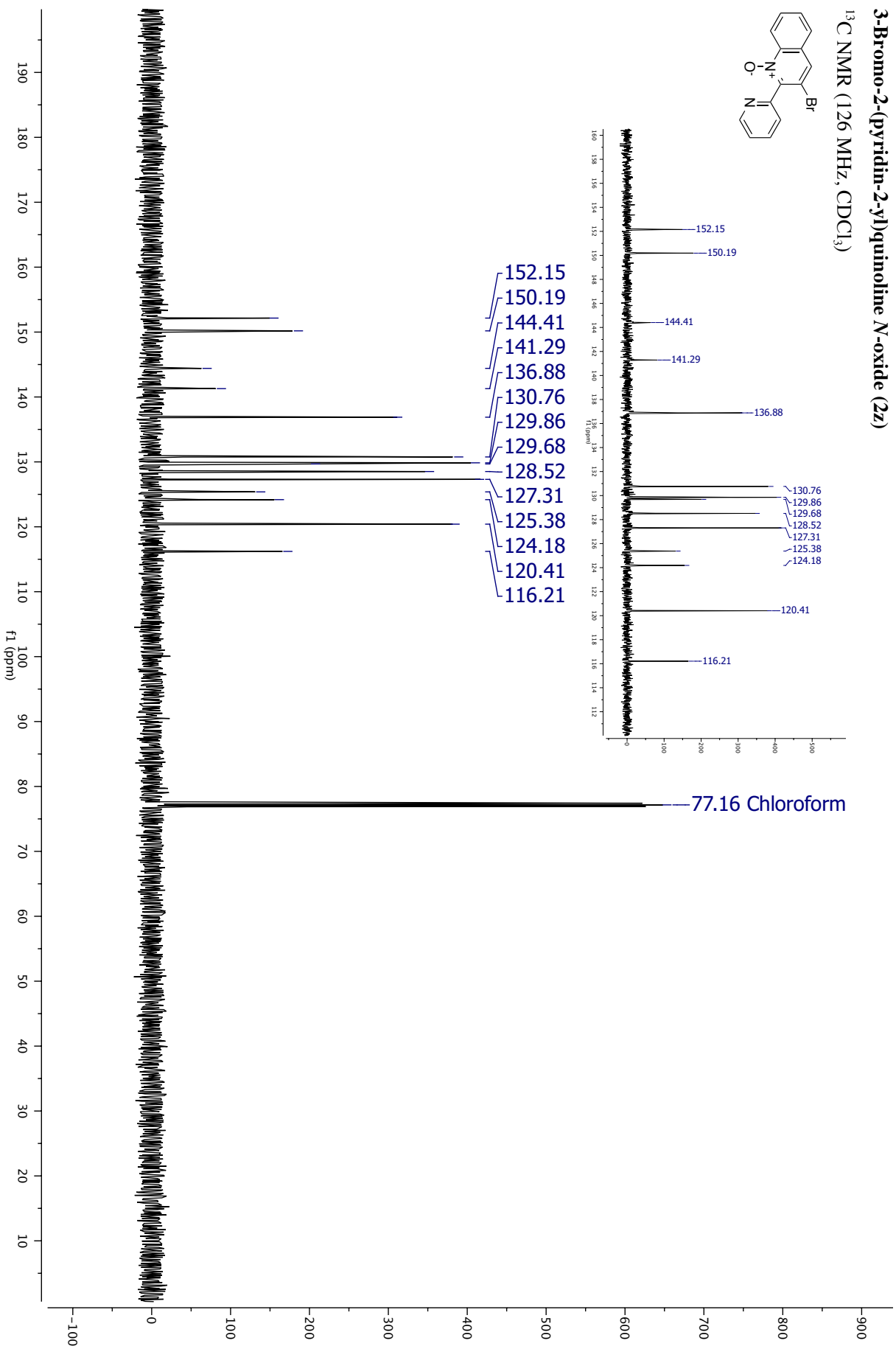
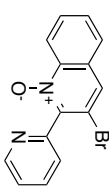
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-2-(pyridin-2-yl)quinoline *N*-oxide (2z)

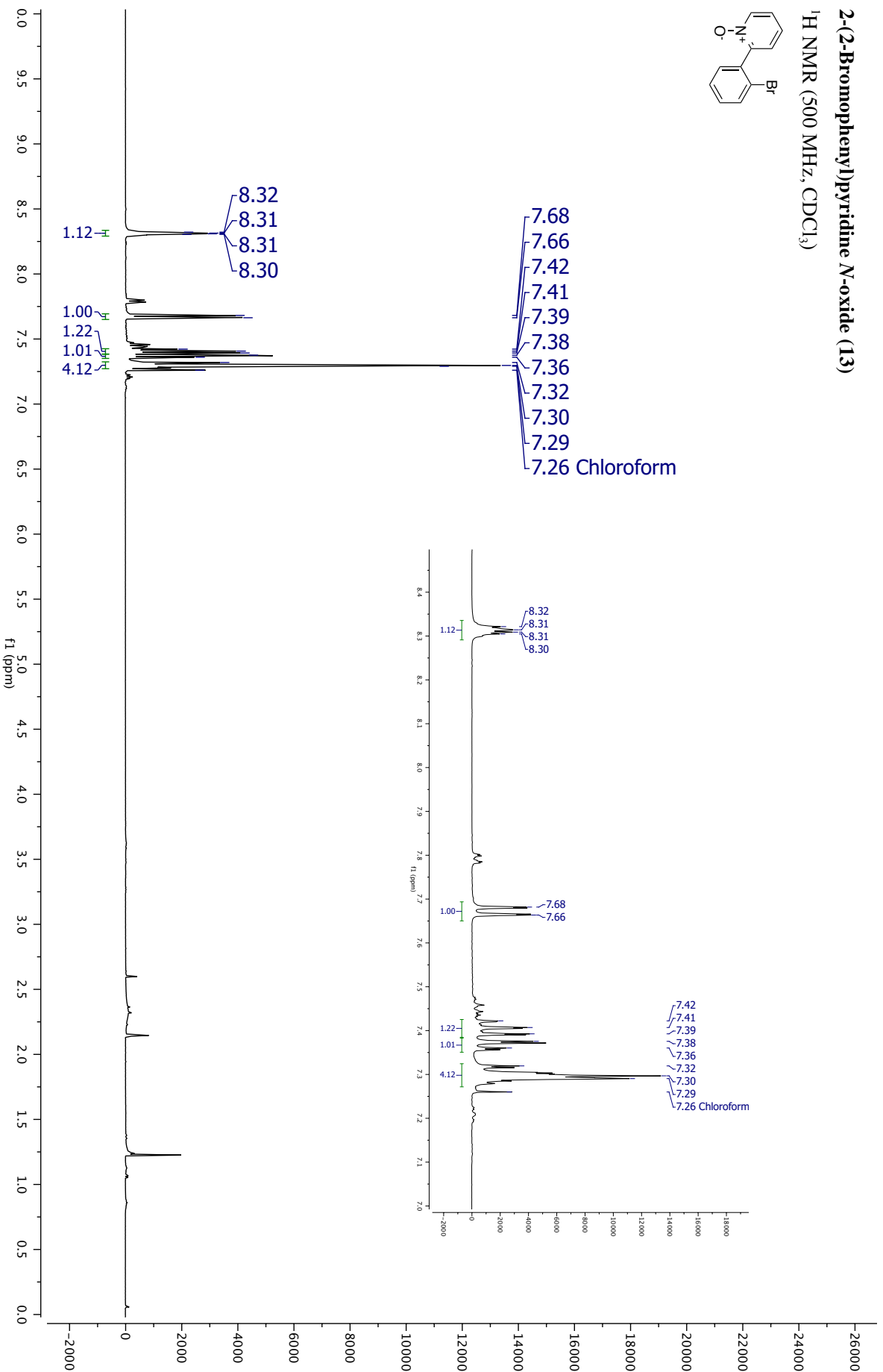
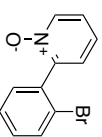
^{13}C NMR (126 MHz, CDCl_3)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

2-(2-Bromophenyl)pyridine *N*-oxide (13)

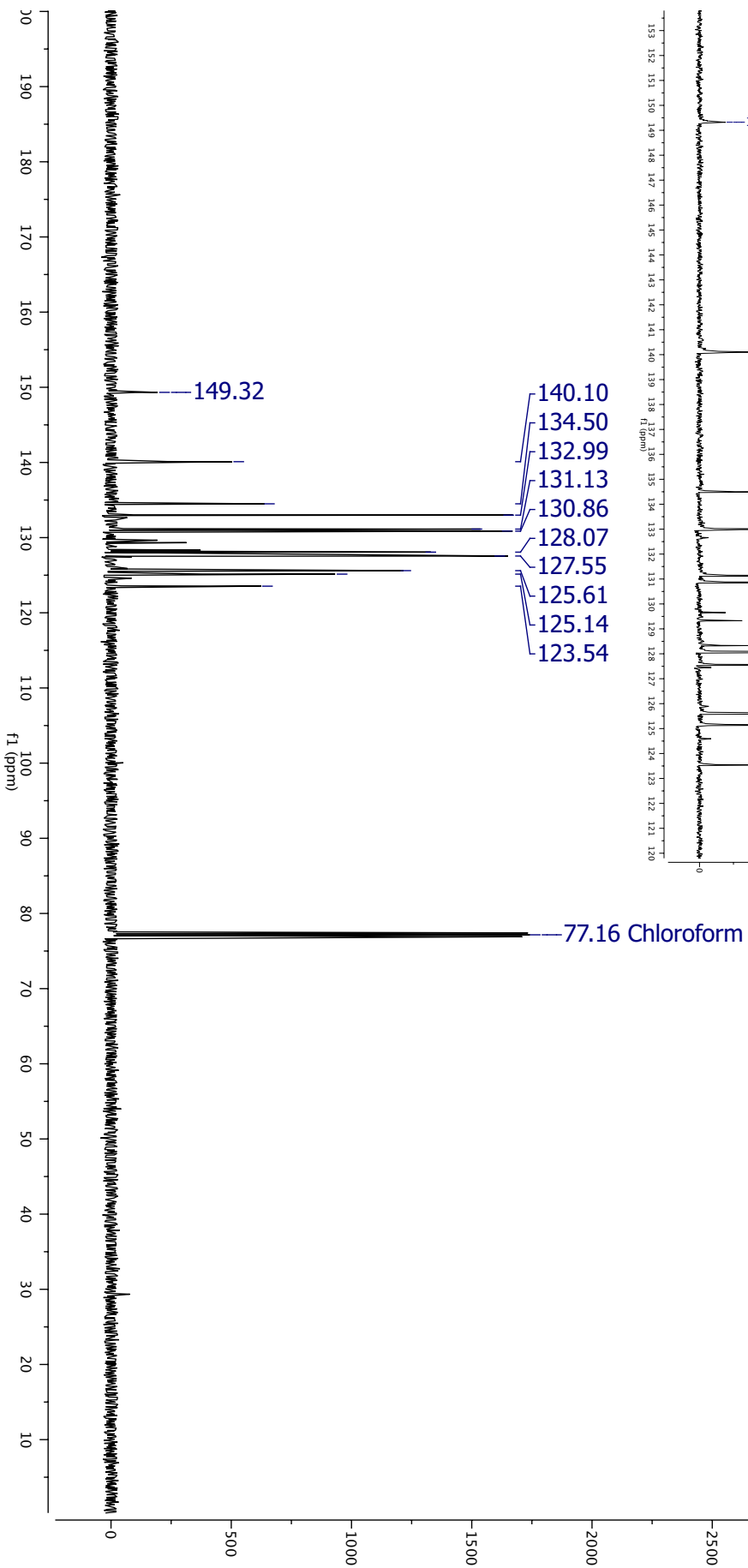
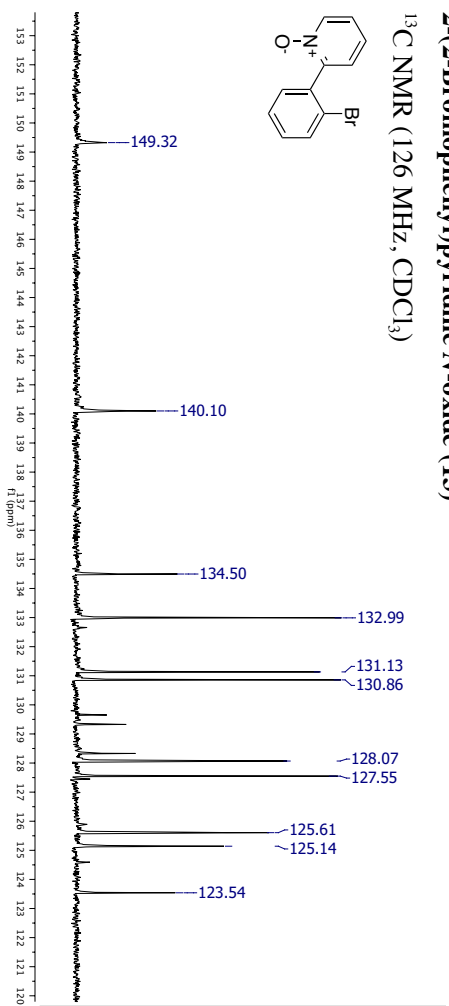
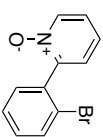
¹H NMR (500 MHz, CDCl₃)



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2-(2-Bromophenyl)pyridine *N*-oxide (13)

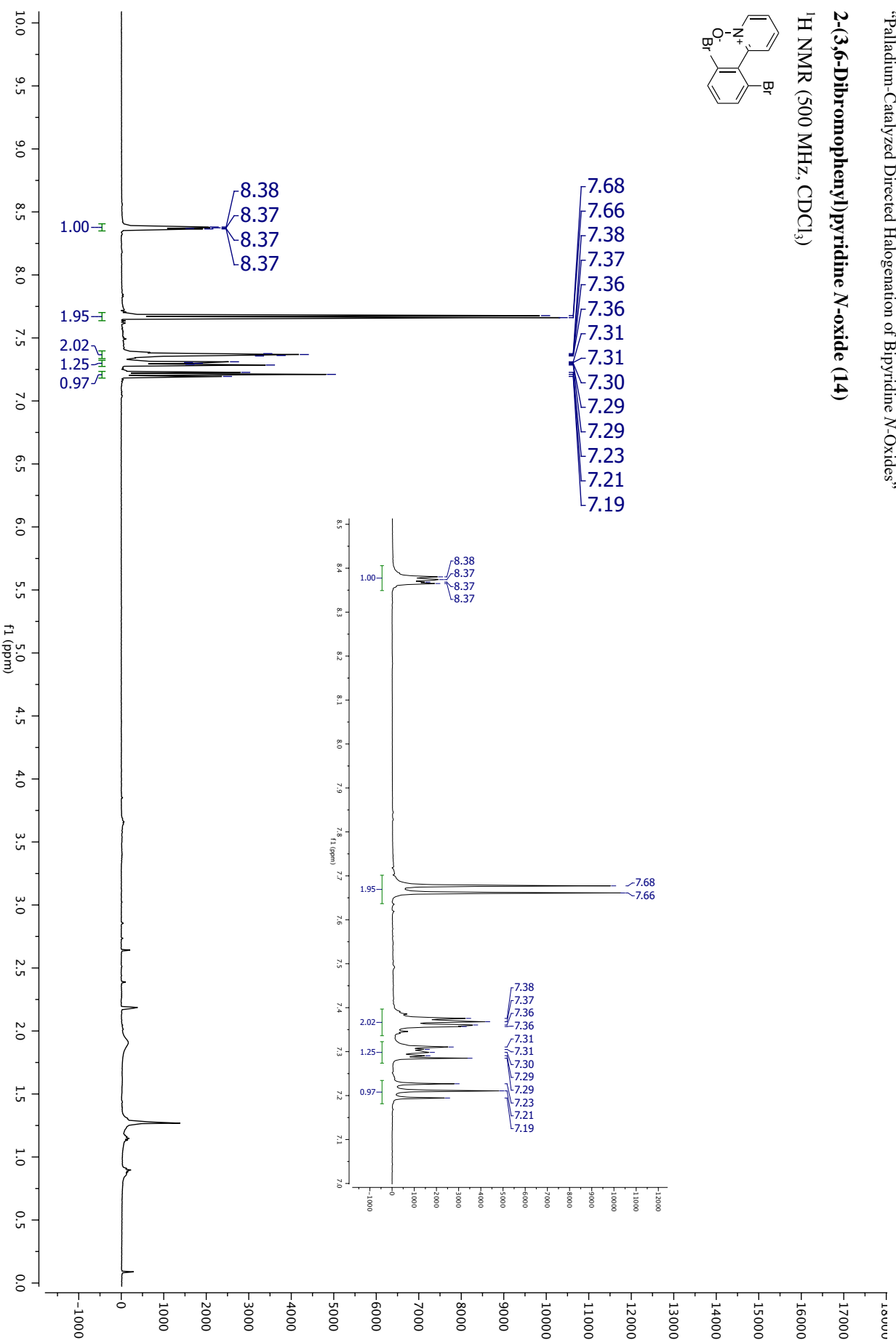
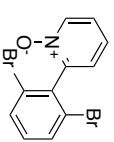
^{13}C NMR (126 MHz, CDCl_3)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

2-(3,6-Dibromophenyl)pyridine *N*-oxide (14)

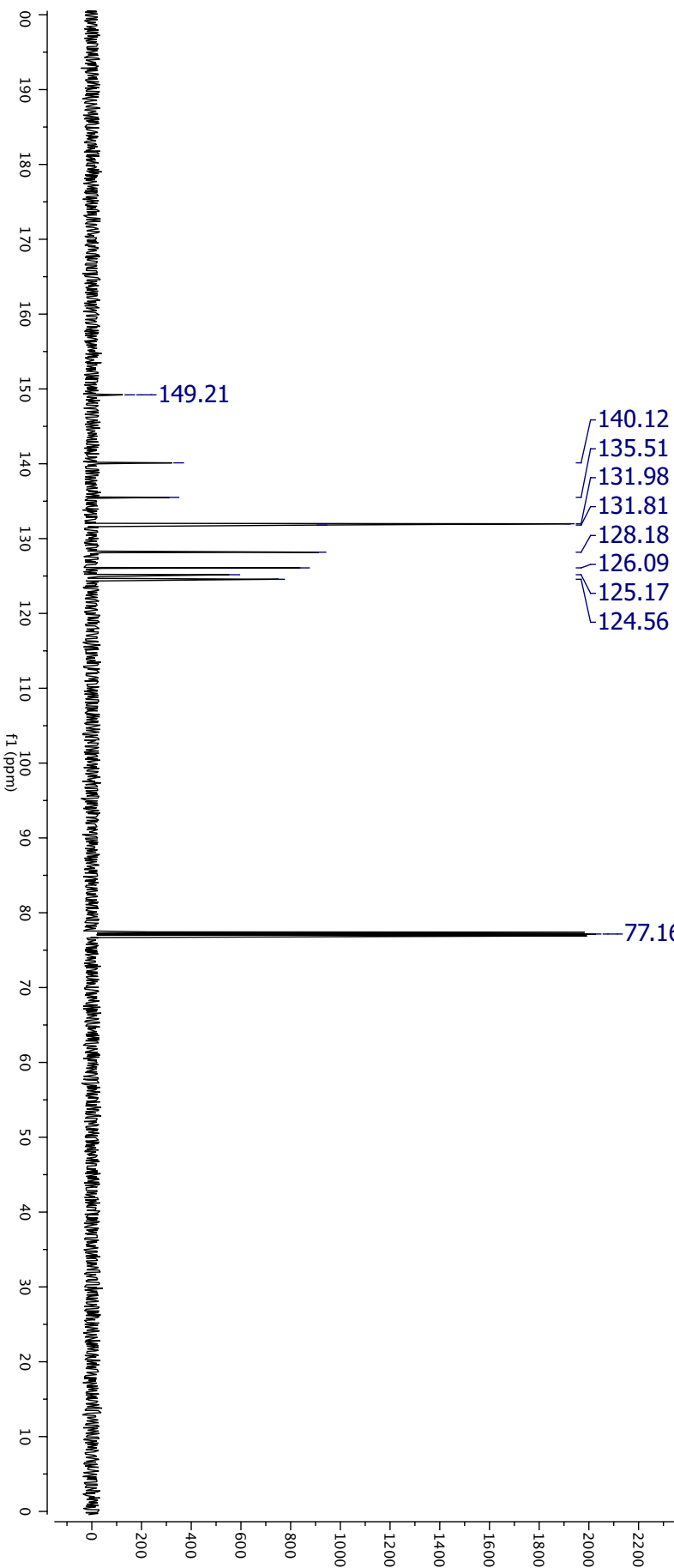
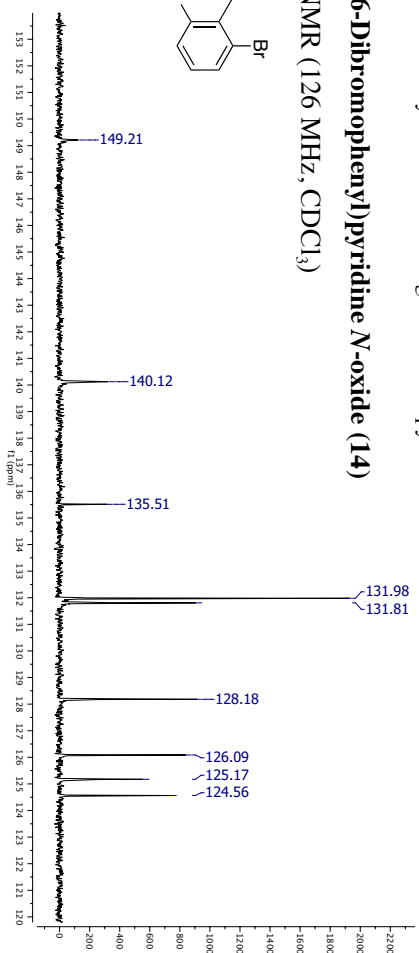
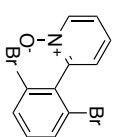
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

2-(3,6-Dibromophenyl)pyridine *N*-oxide (14)

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

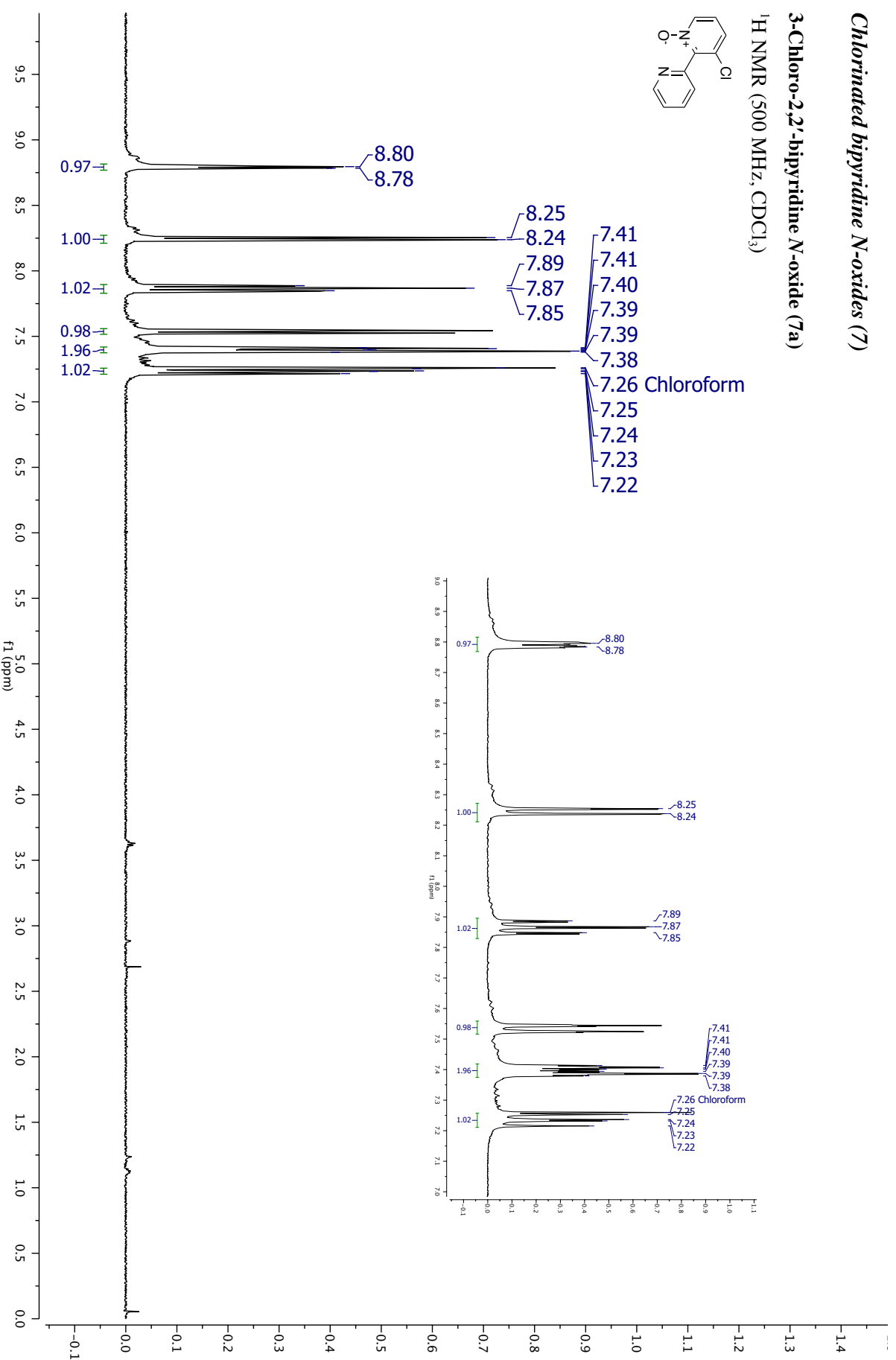
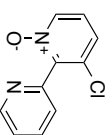


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Chlorinated bipyridine N-oxides (7)

3-Chloro-2,2'-bipyridine *N*-oxide (7a)

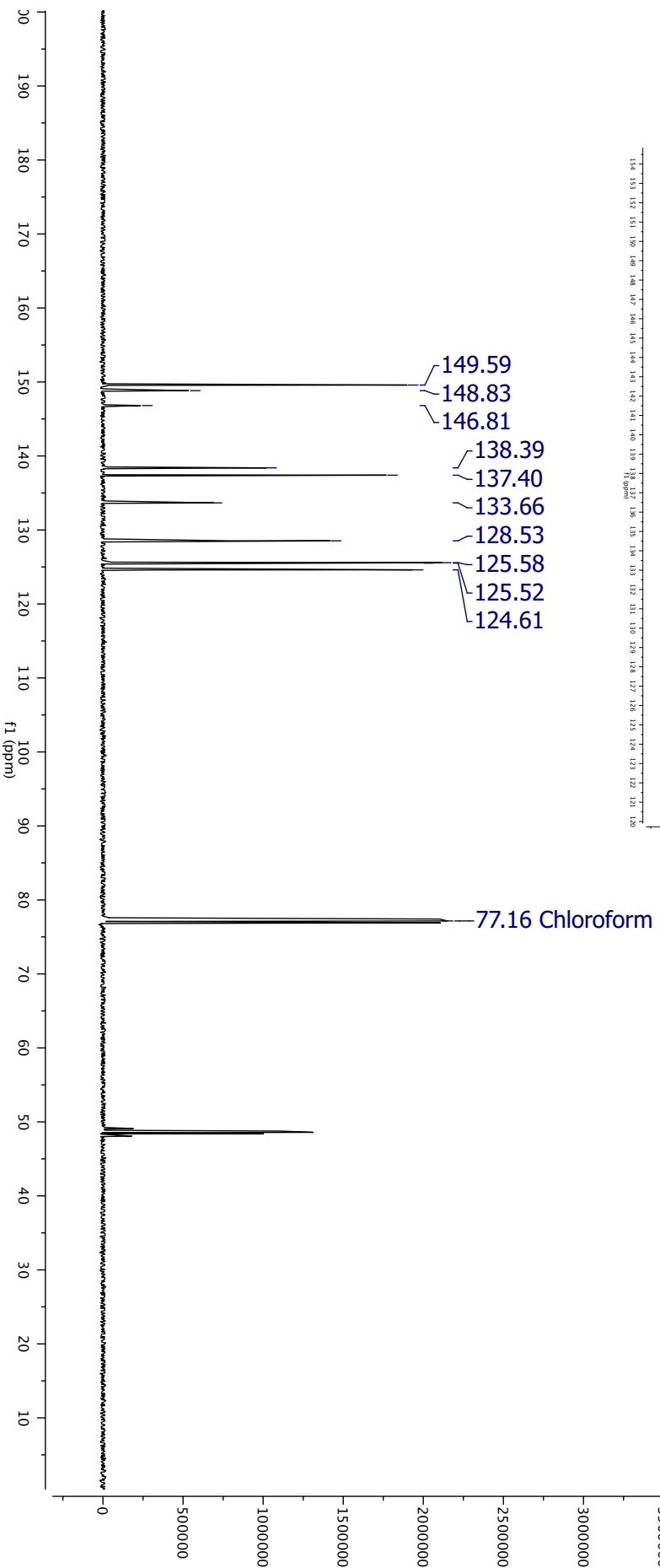
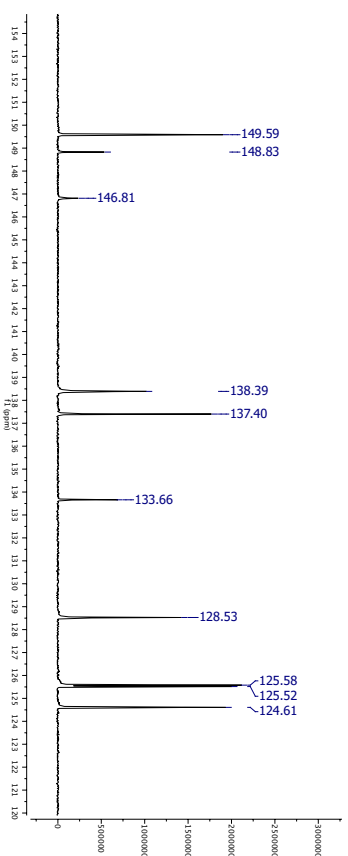
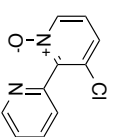
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-2,2'-bipyridine *N*-oxide (7a)

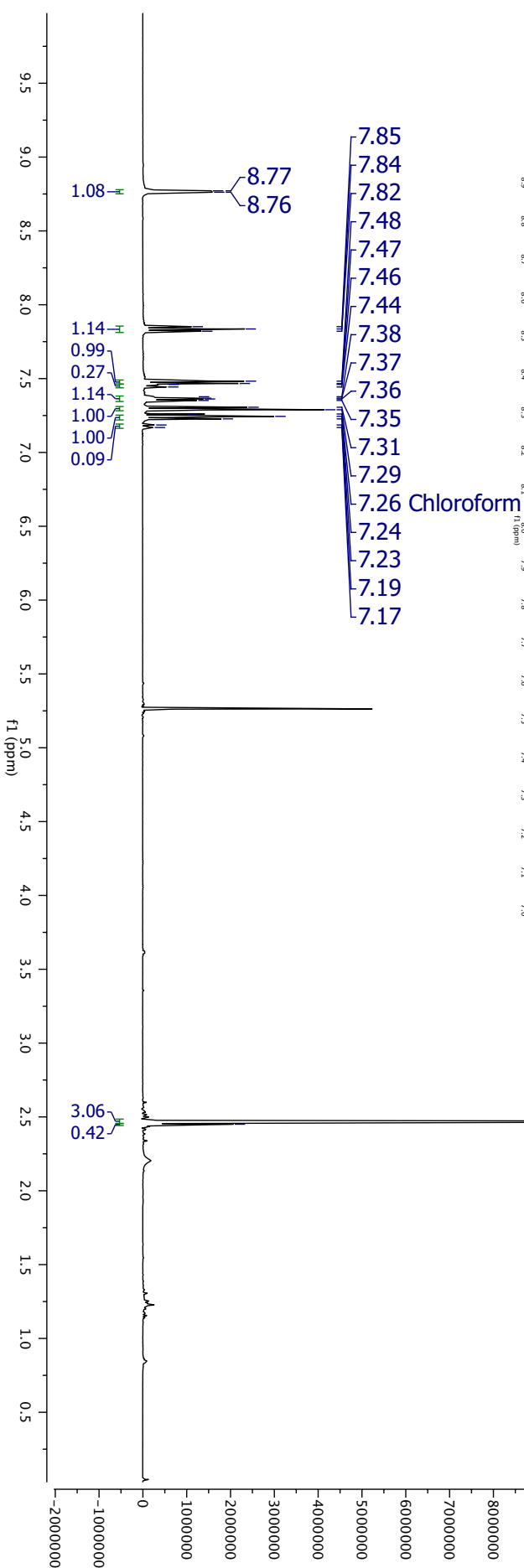
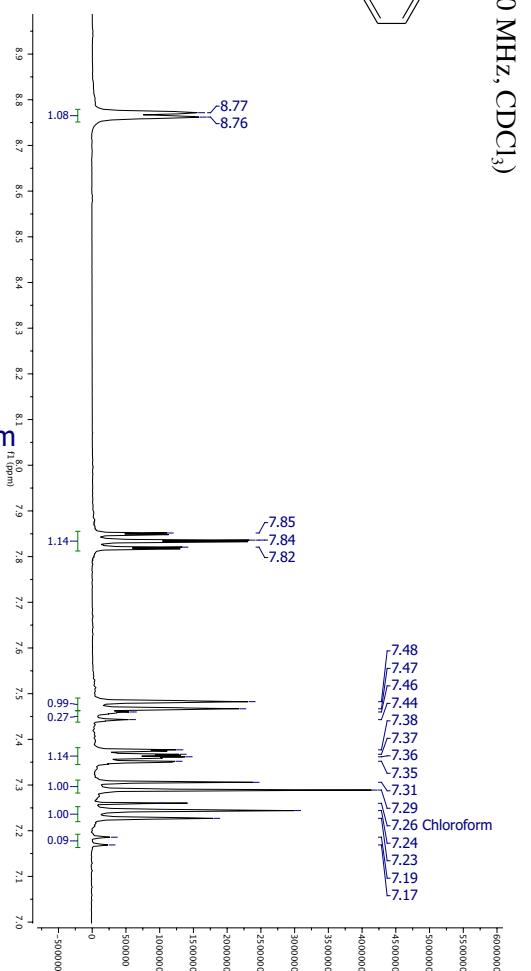
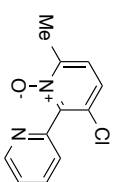
^{13}C NMR (126 MHz, CDCl_3)



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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-6-methyl-2,2'-bipyridine *N*-oxide (7b)

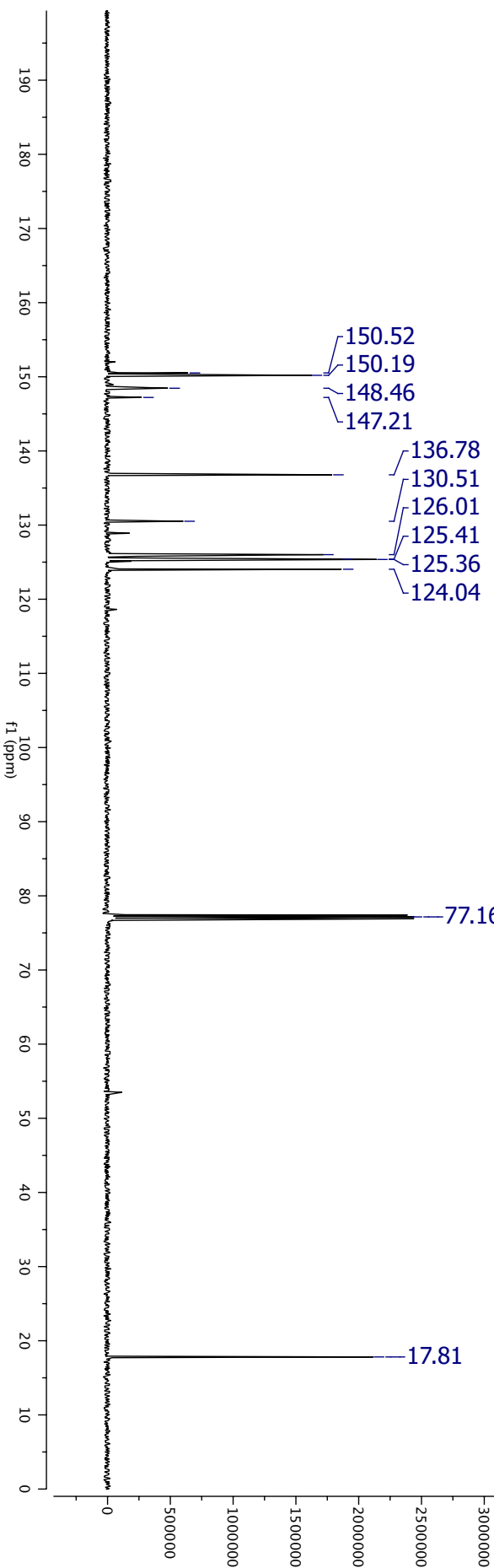
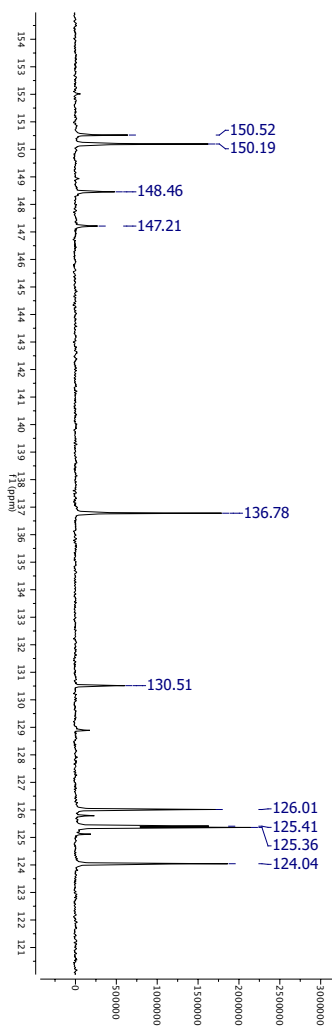
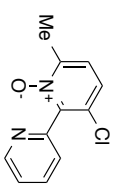
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-6-methyl-2,2'-bipyridine *N*-oxide (7b)

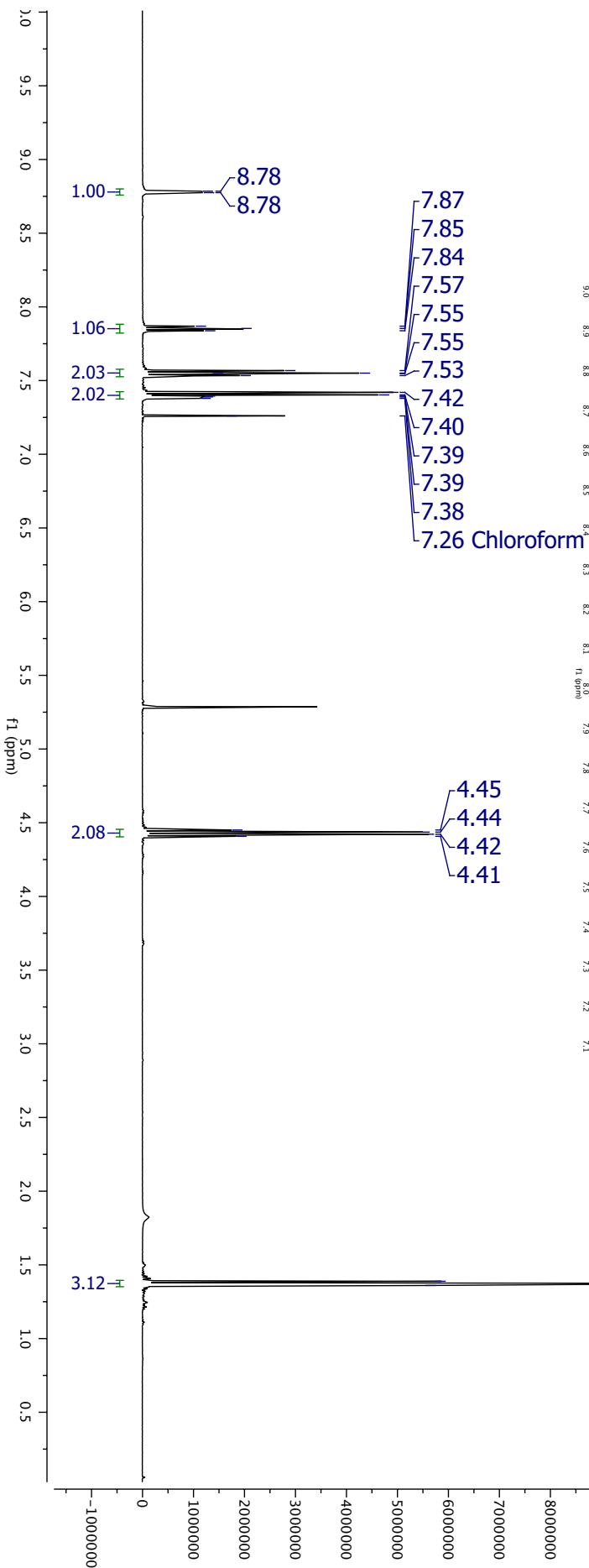
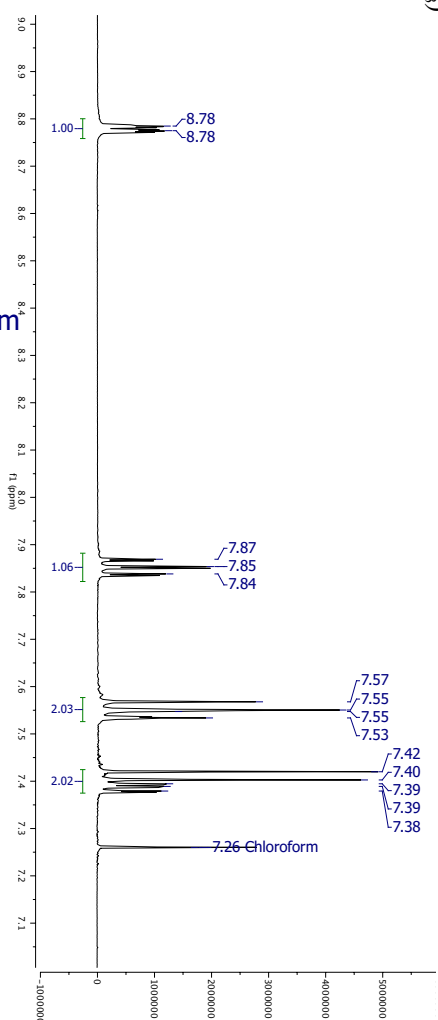
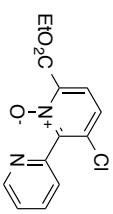
¹³C NMR (126 MHz, CDCl₃)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

3-Chloro-6-(ethoxycarbonyl)-2,2'-bipyridine *N*-oxide (7c)

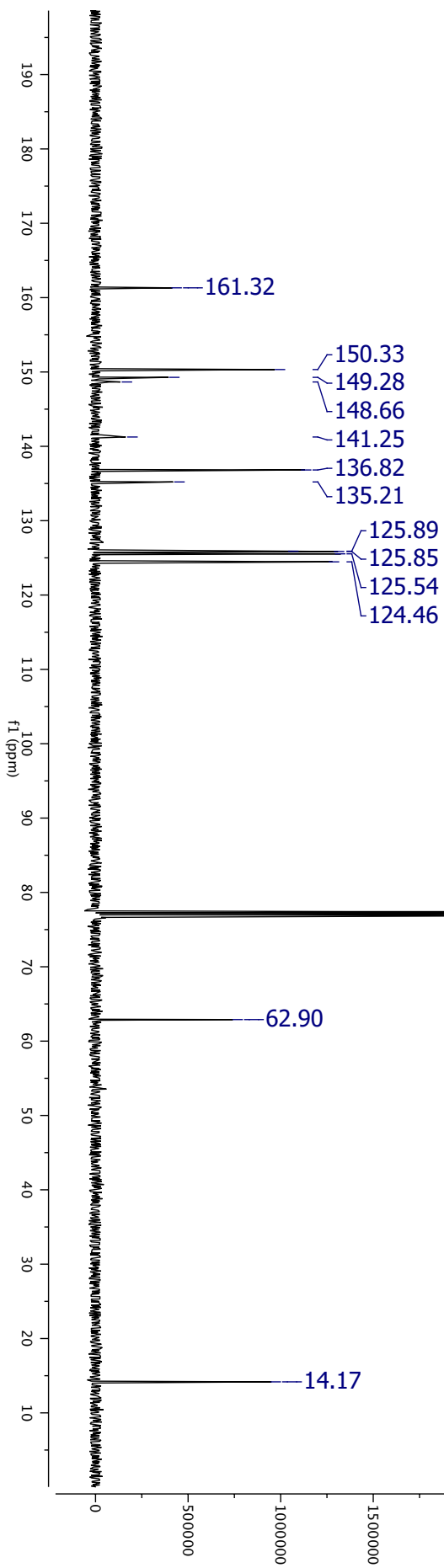
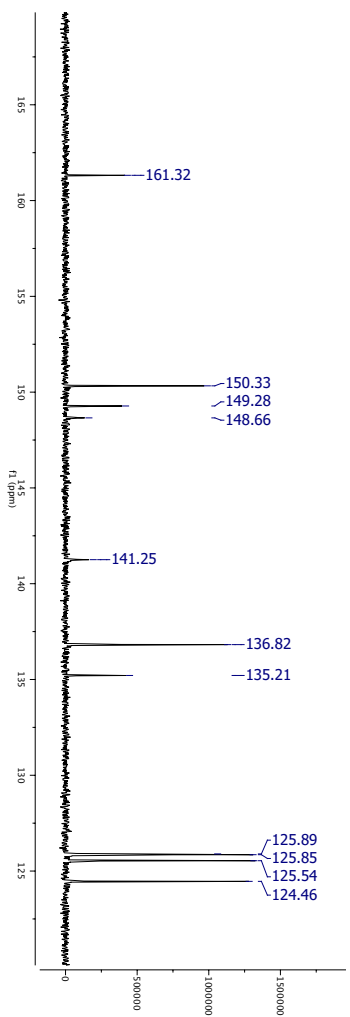
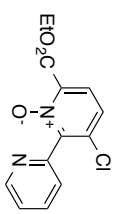
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-6-(ethoxycarbonyl)-2,2'-bipyridine *N*-oxide (7c)

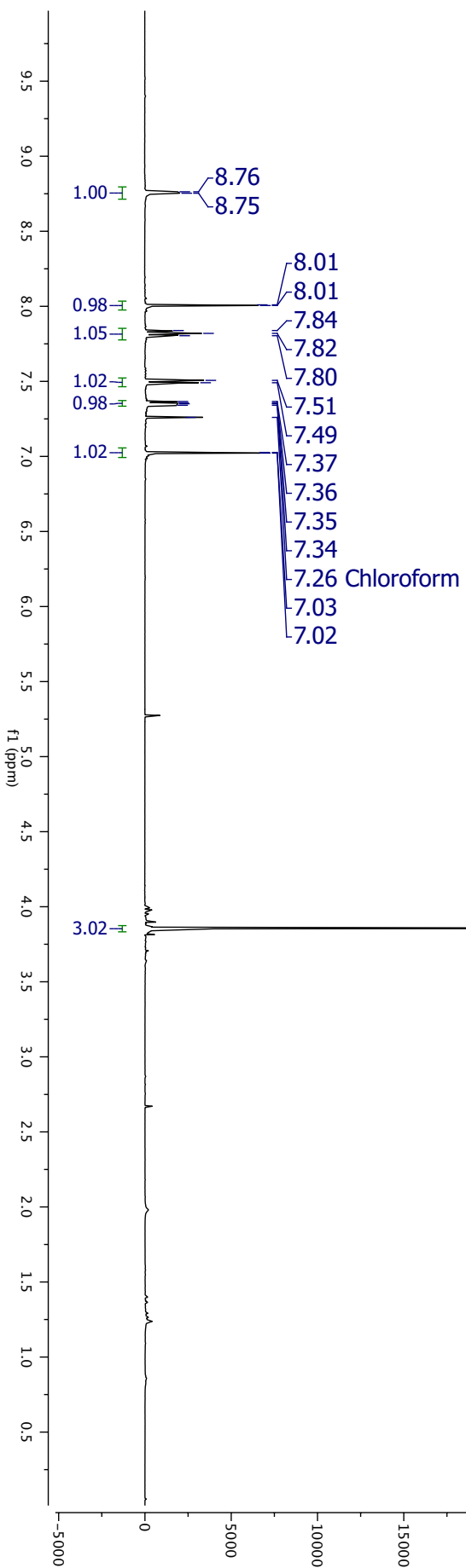
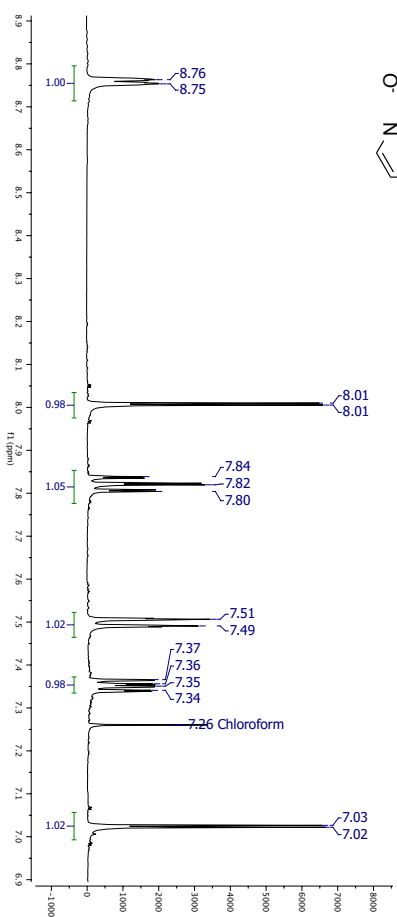
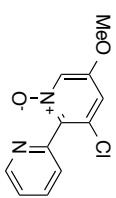
^{13}C NMR (126 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-5-methoxy-2,2'-bipyridine *N*-oxide (7f)

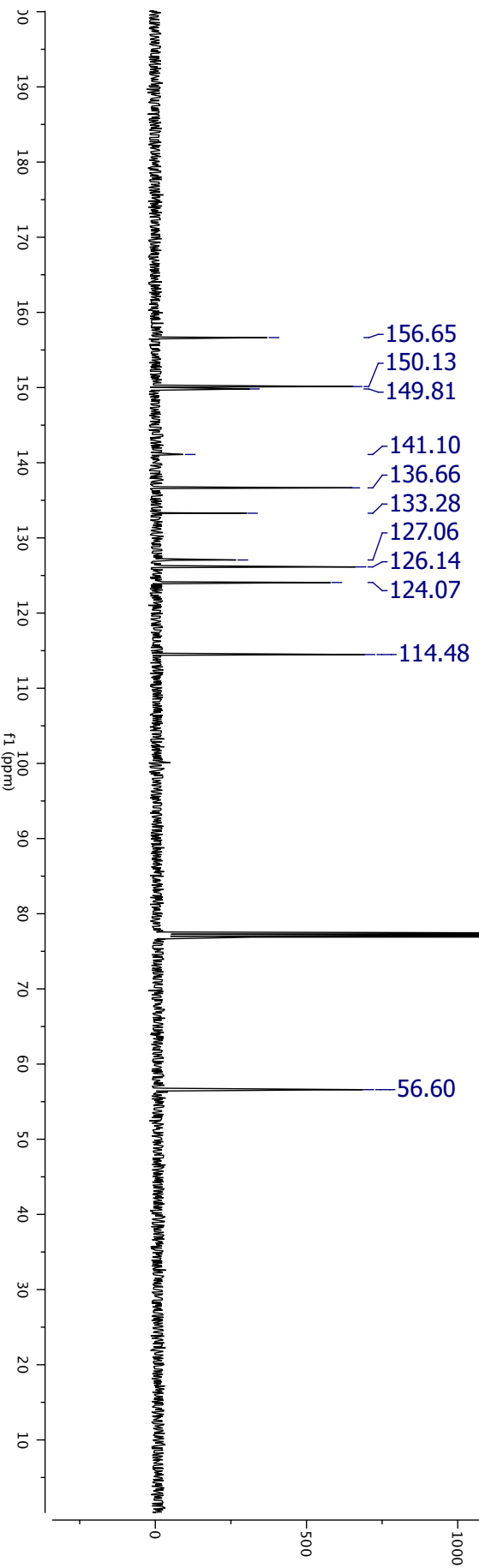
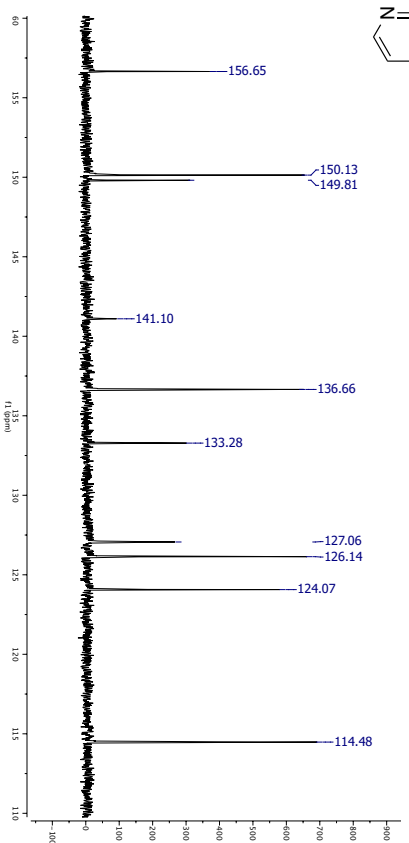
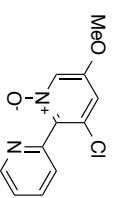
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-5-methoxy-2,2'-bipyridine *N*-oxide (7f)

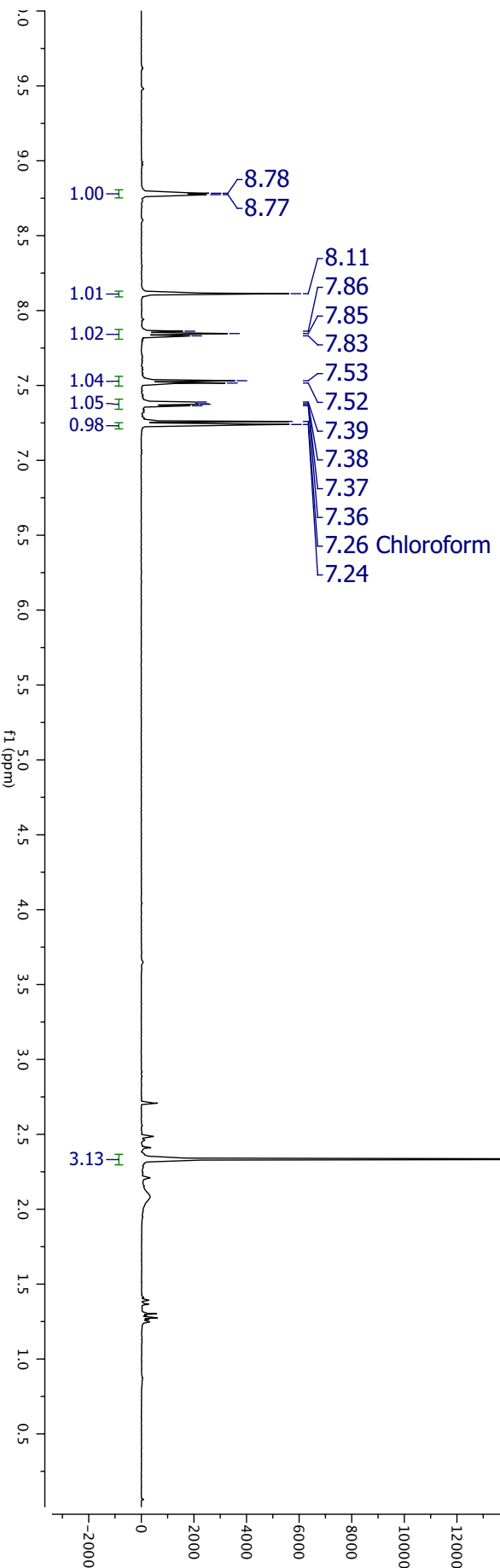
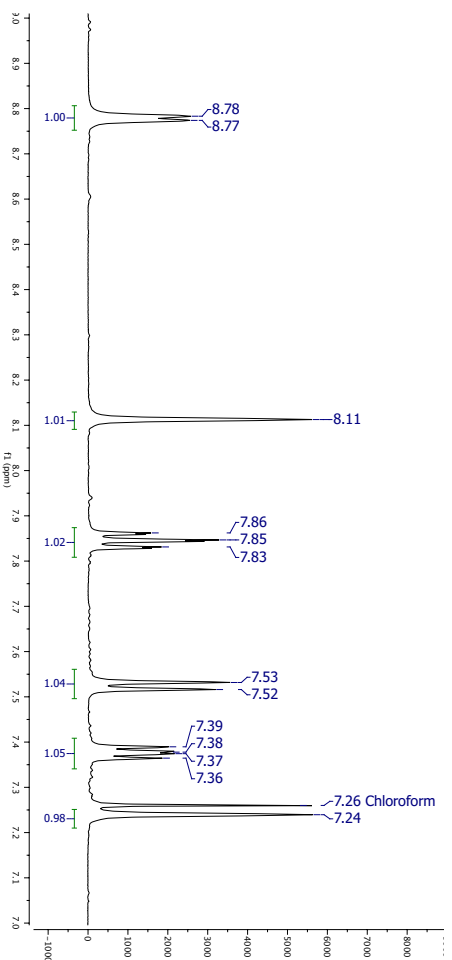
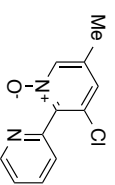
^{13}C NMR (126 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-5-methyl-2,2'-bipyridine *N*-oxide (7g)

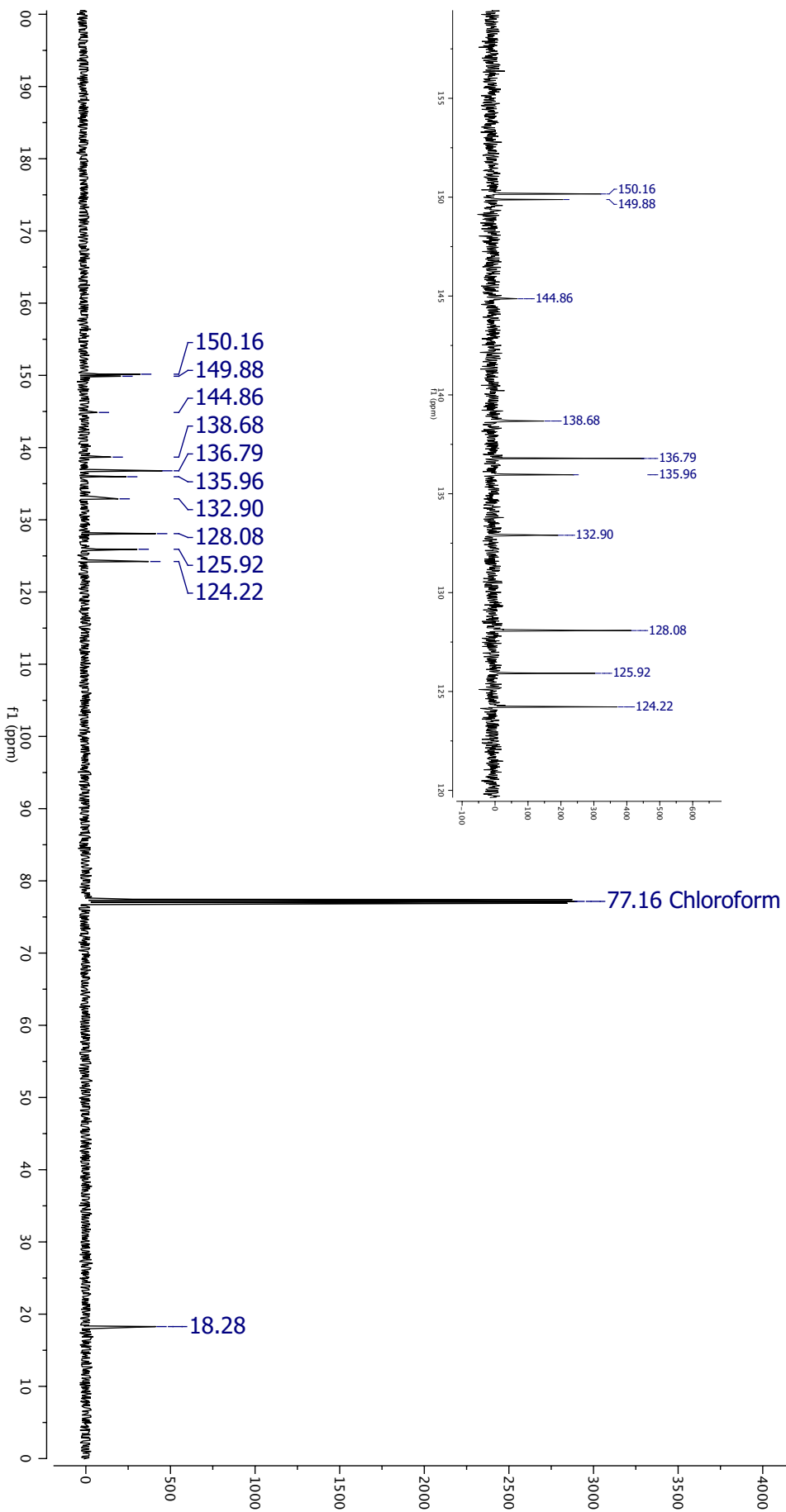
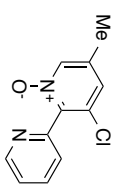
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-5-methyl-2,2'-bipyridine *N*-oxide (7g)

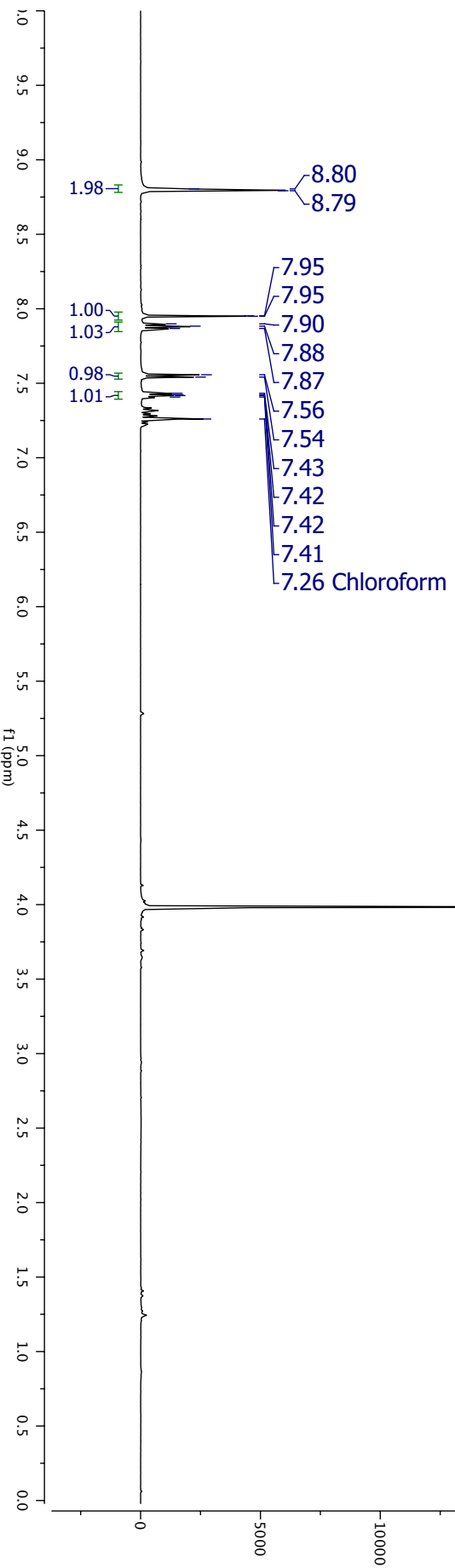
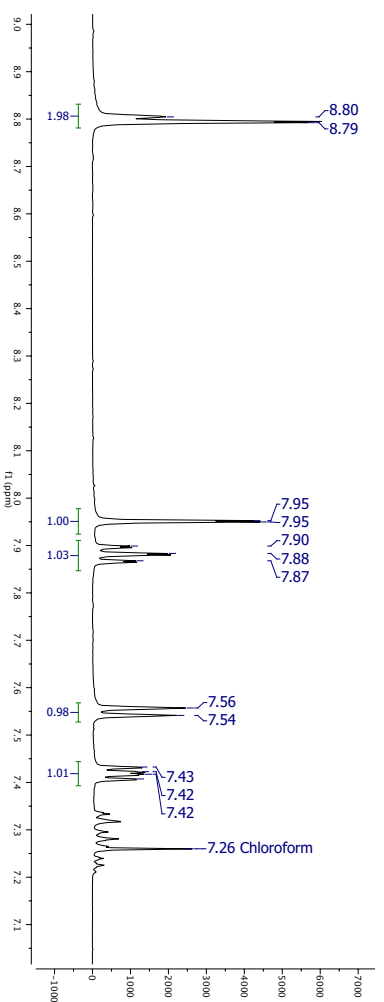
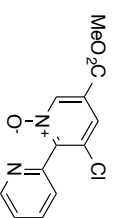
^{13}C NMR (126 MHz, CDCl_3)



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3-Chloro-5-methoxycarbonyl-2,2'-bipyridine *N*-oxide (7h)

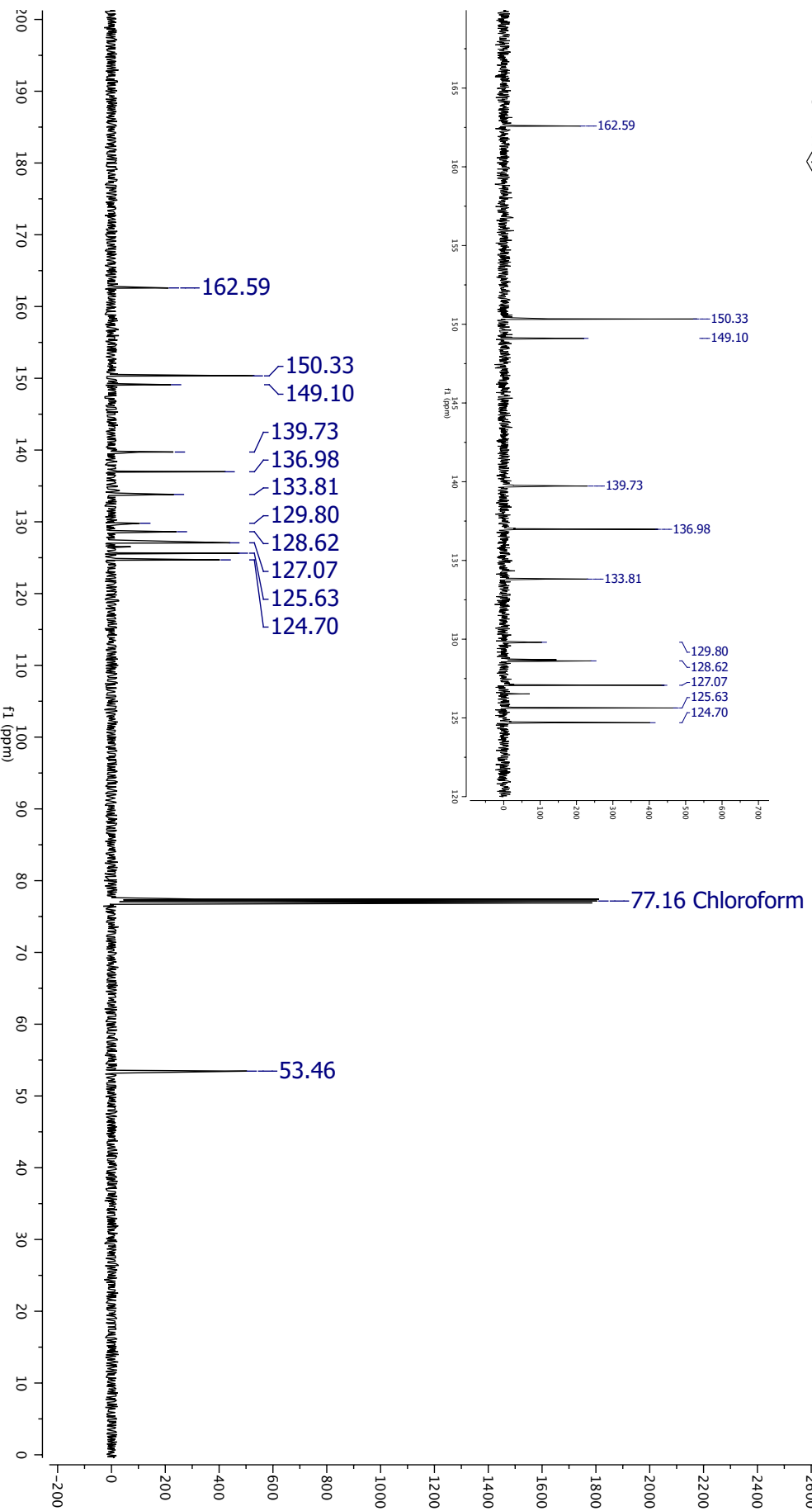
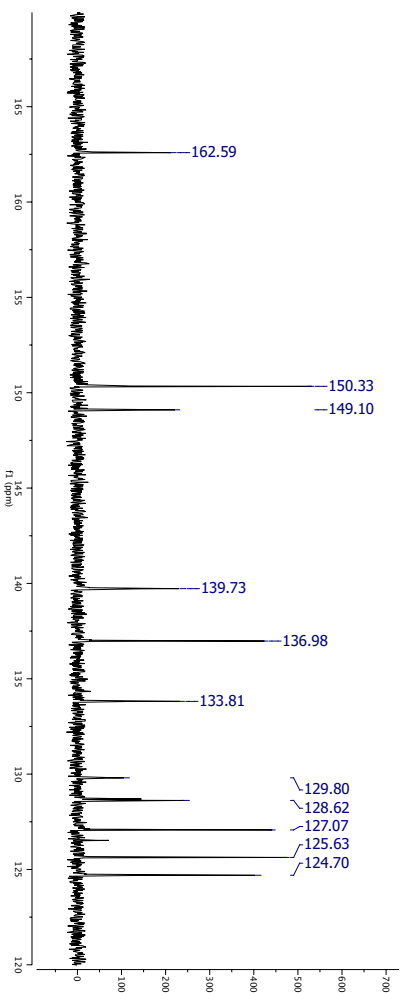
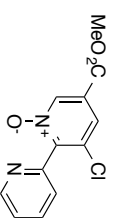
¹H NMR (500 MHz, CDCl₃)



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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-5-methoxycarbonyl-2,2'-bipyridine *N*-oxide (7h)

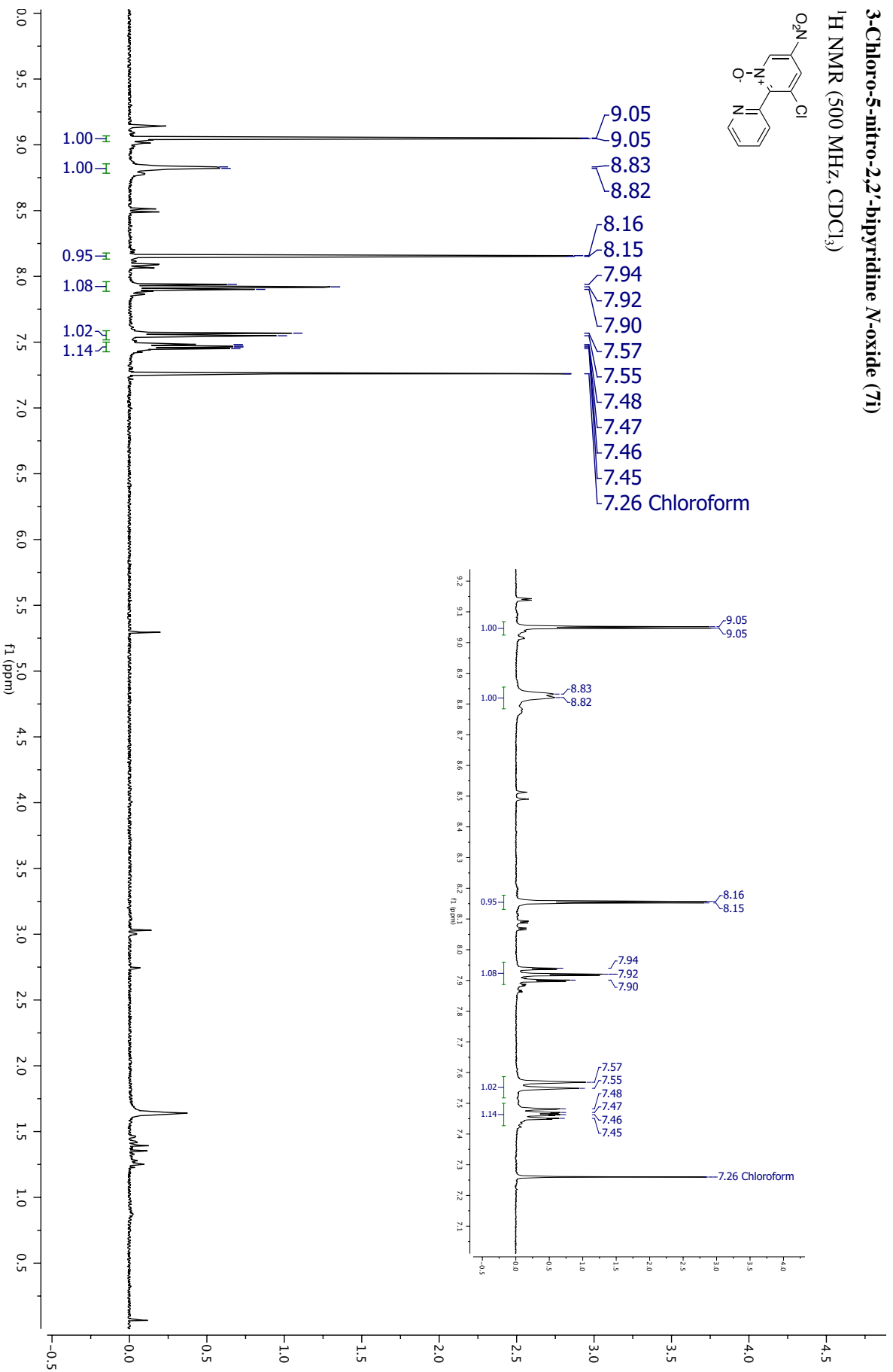
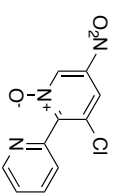
^{13}C NMR (126 MHz, CDCl_3)



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3-Chloro-5-nitro-2,2'-bipyridine *N*-oxide (7i)

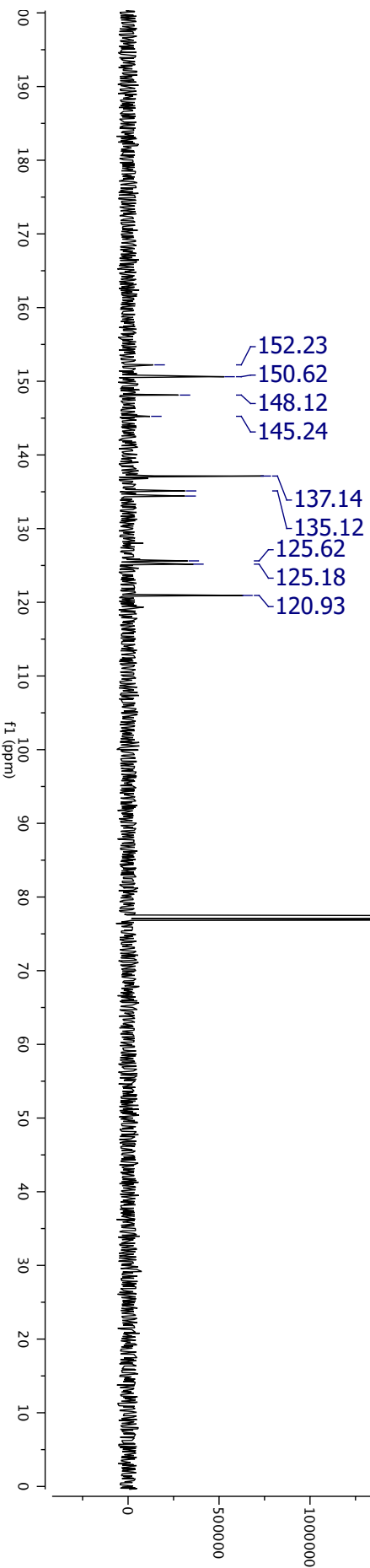
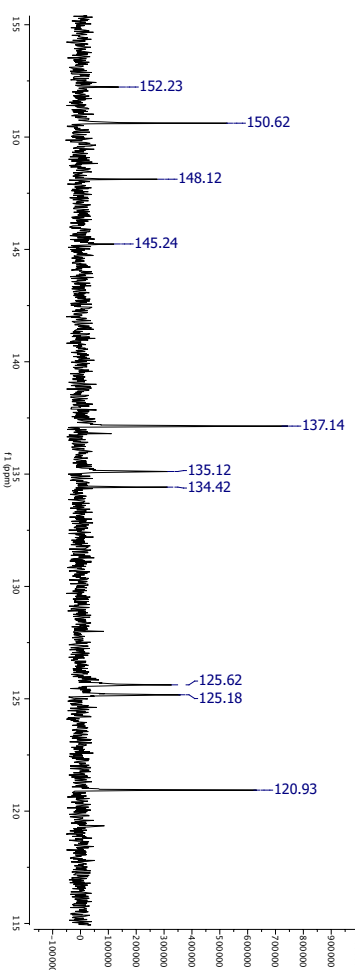
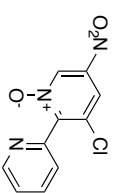
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-5-nitro-2,2'-bipyridine *N*-oxide (7i)

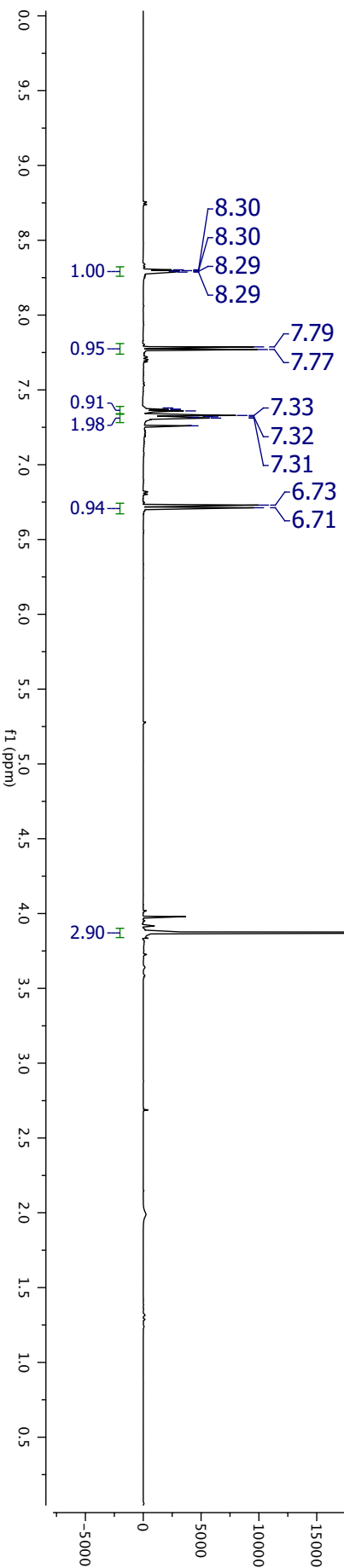
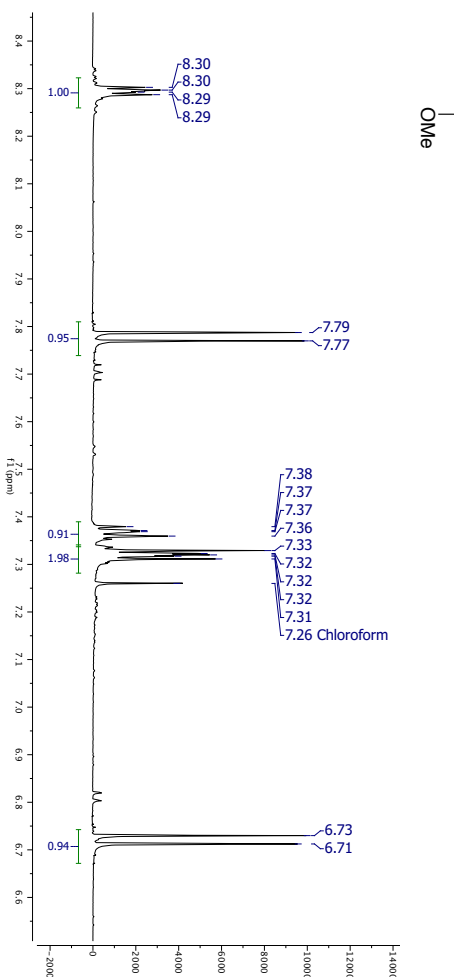
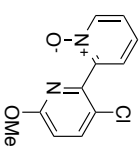
^{13}C NMR (126 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3'-Chloro-6'-methoxy-2,2'-bipyridine *N*-oxide (7p)

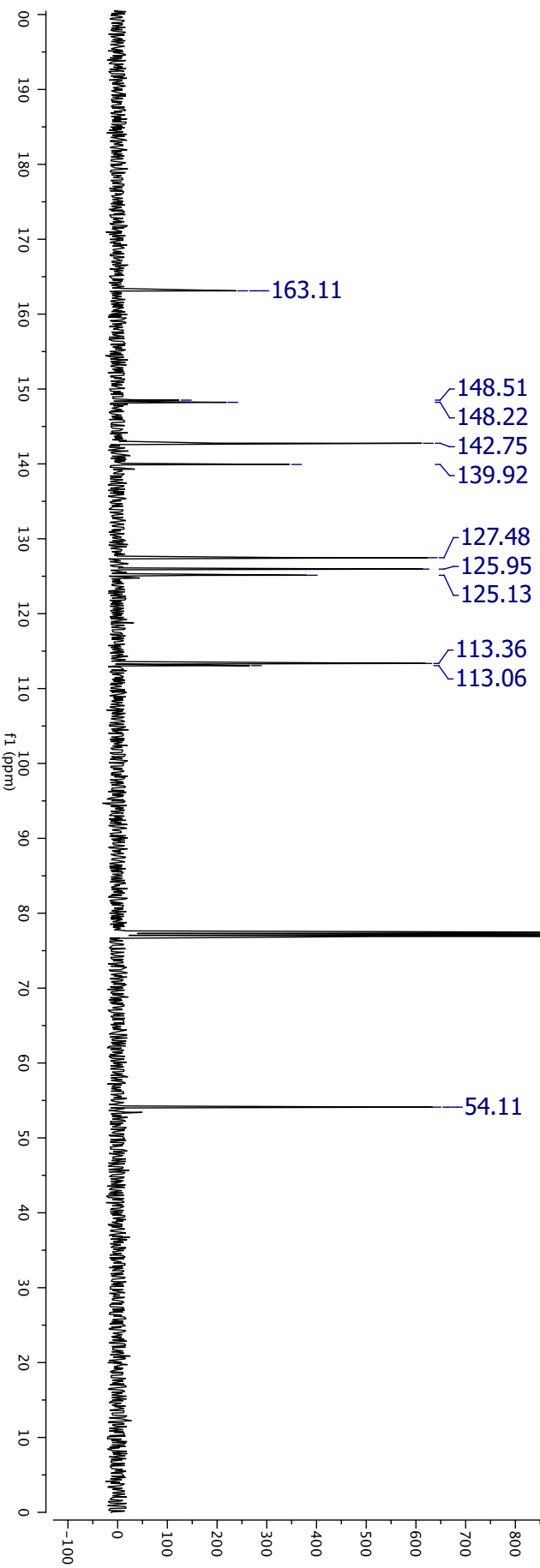
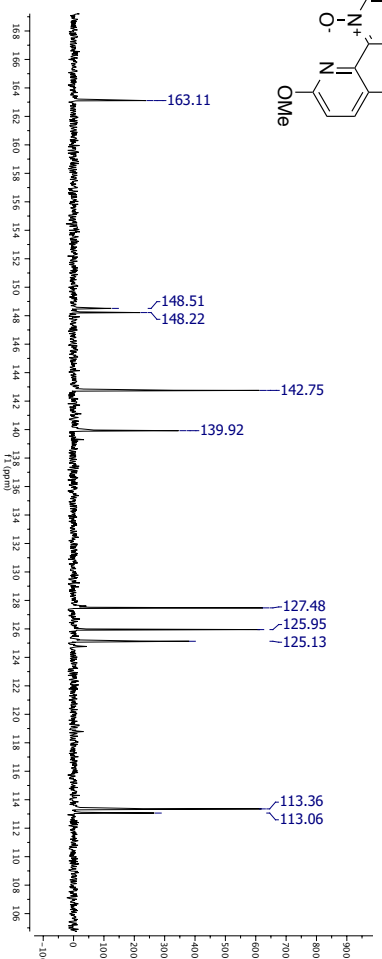
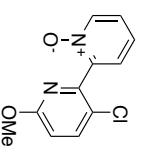
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3'-Chloro-6'-methoxy-2,2'-bipyridine *N*-oxide (7p)

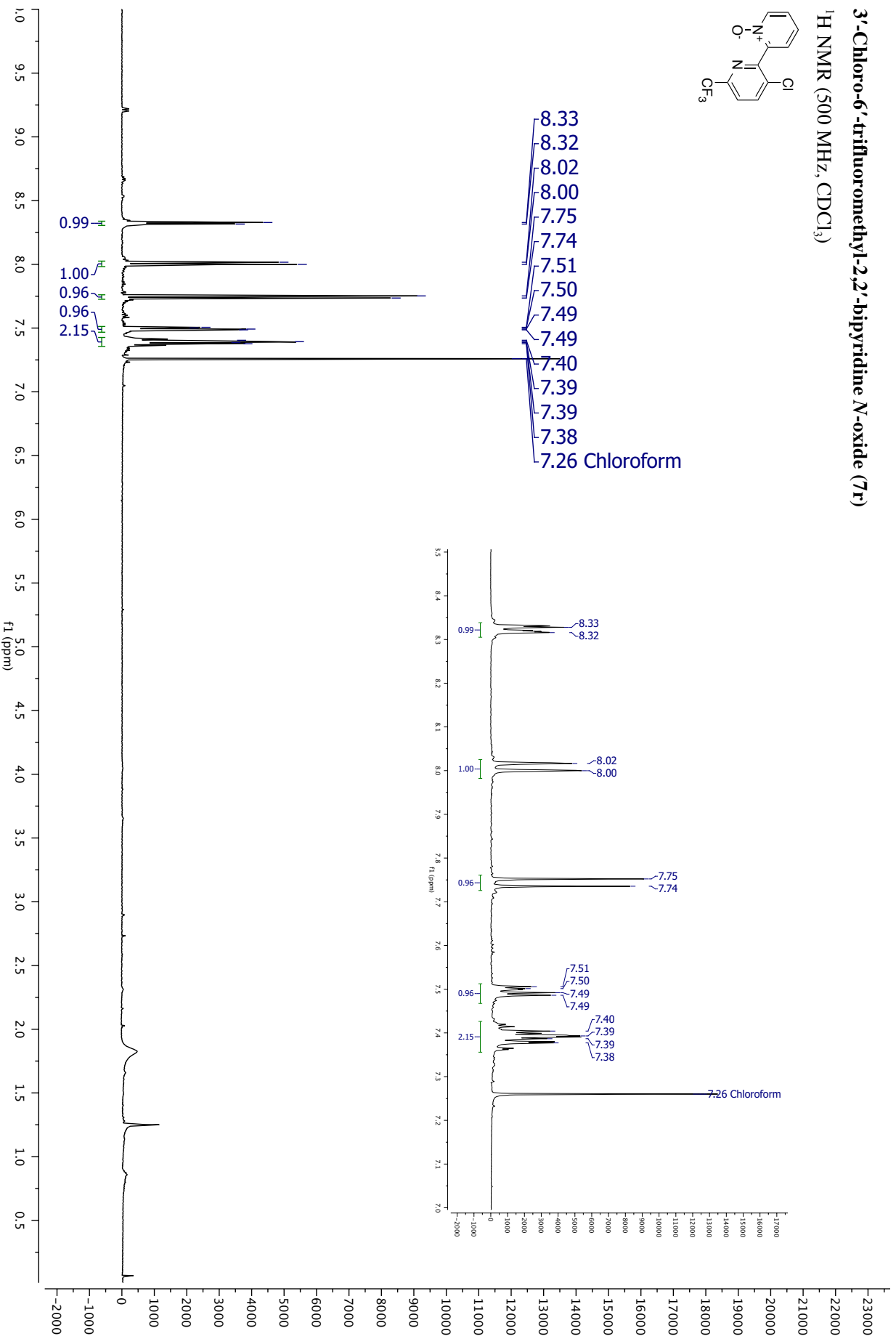
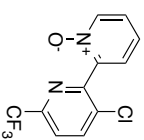
^{13}C NMR (126 MHz, CDCl_3)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

3'-Chloro-6'-trifluoromethyl-2,2'-bipyridine *N*-oxide (7r)

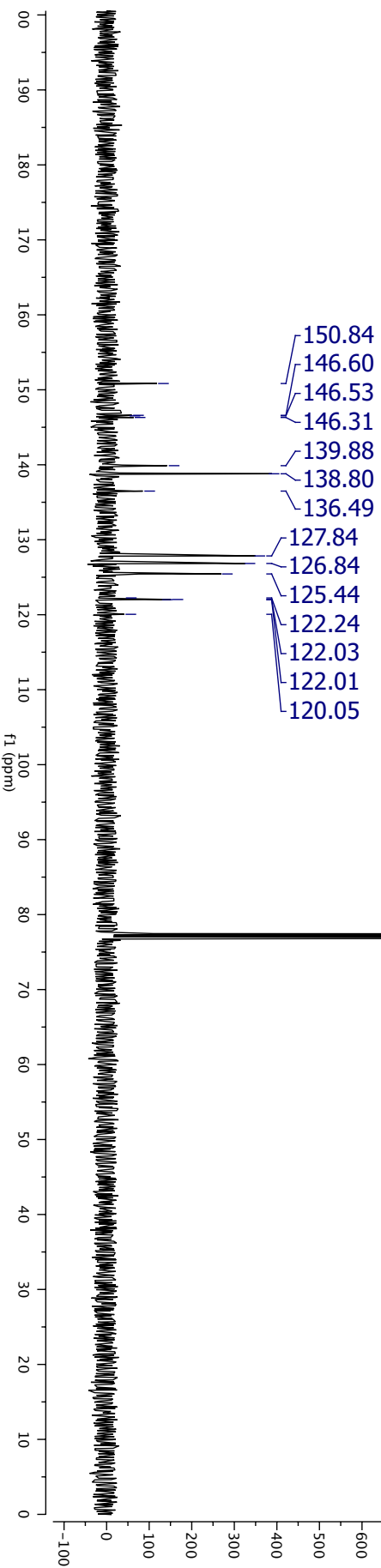
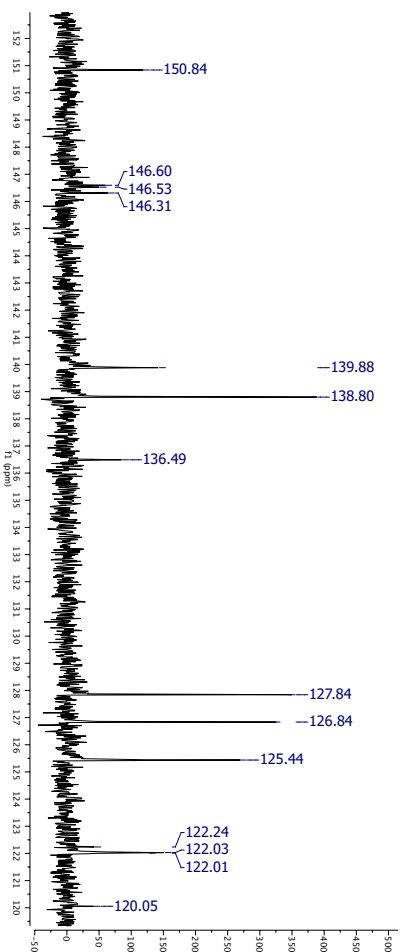
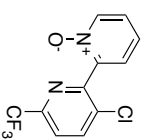
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3'-Chloro-6'-trifluoromethyl-2,2'-bipyridine *N*-oxide (7r)

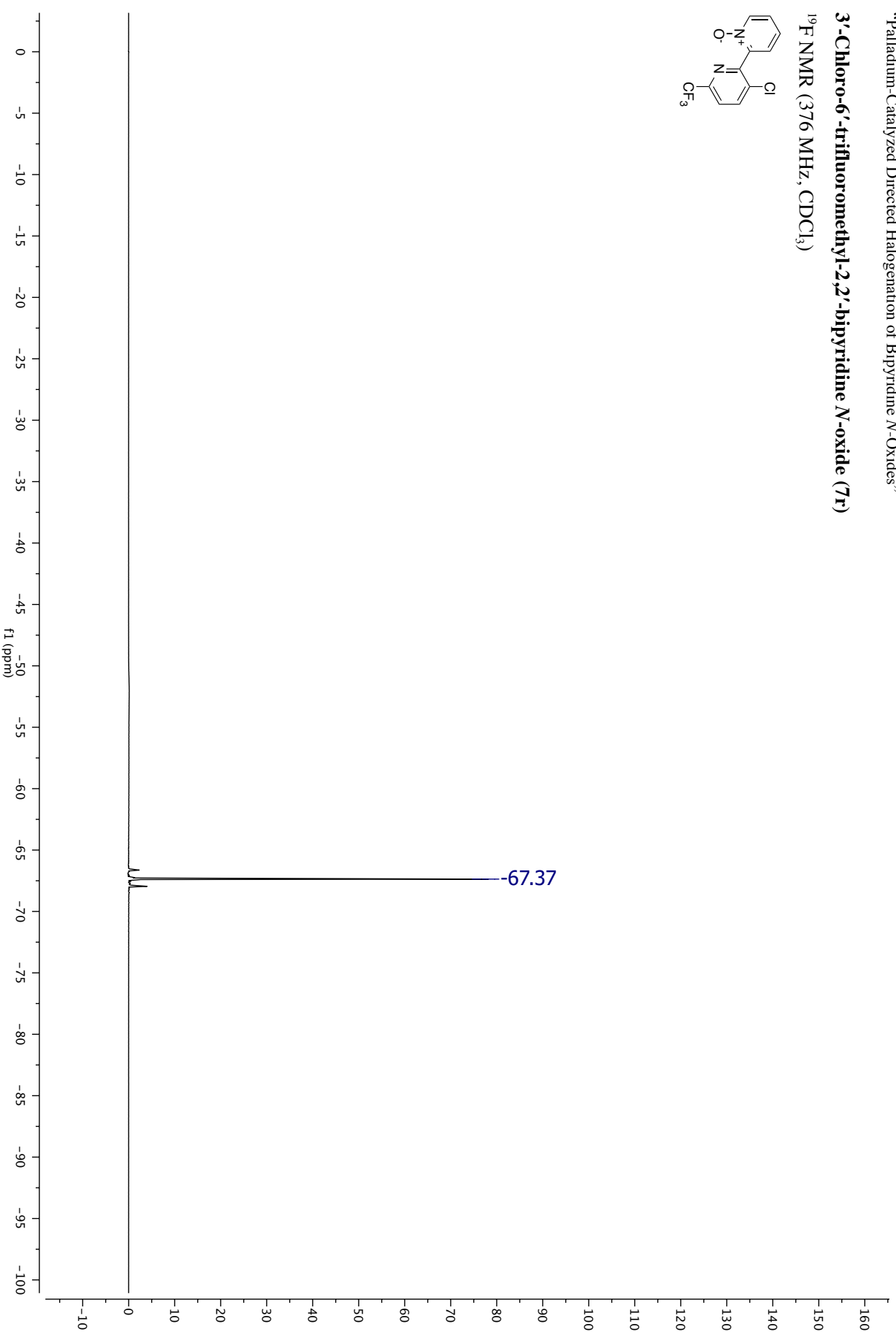
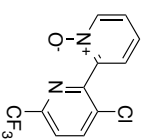
^{13}C NMR (126 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3'-Chloro-6'-trifluoromethyl-2,2'-bipyridine *N*-oxide (7r)

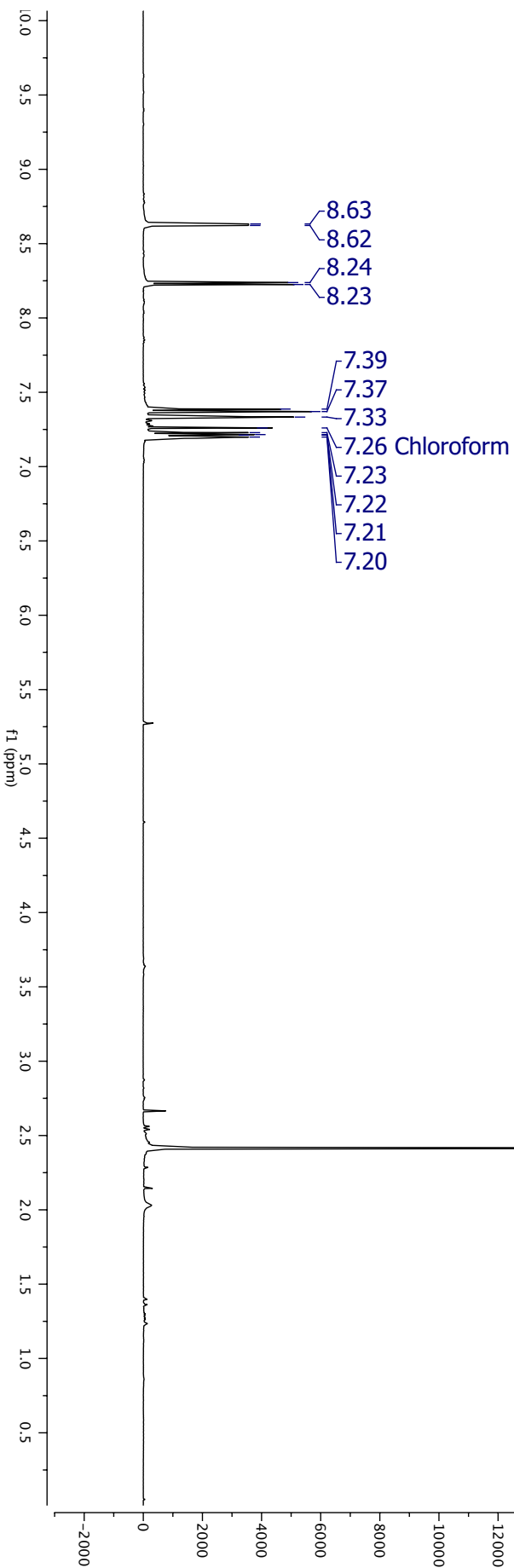
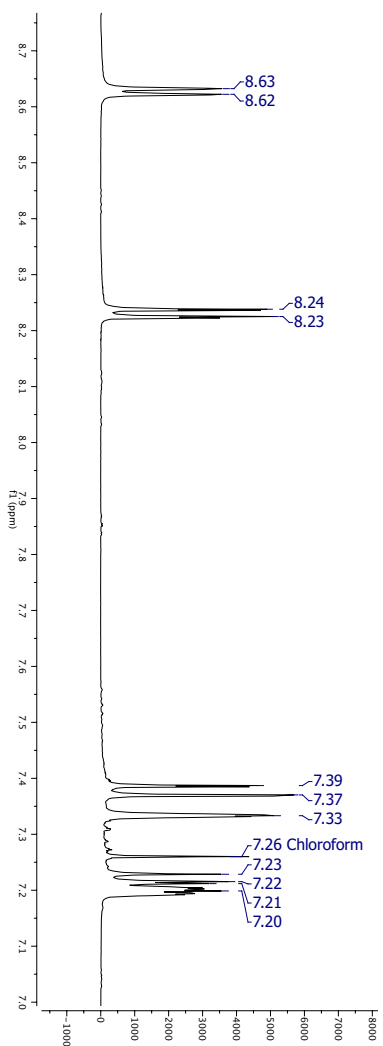
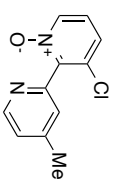
^{19}F NMR (376 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-4'-methyl-2,2'-bipyridine *N*-oxide (7u)

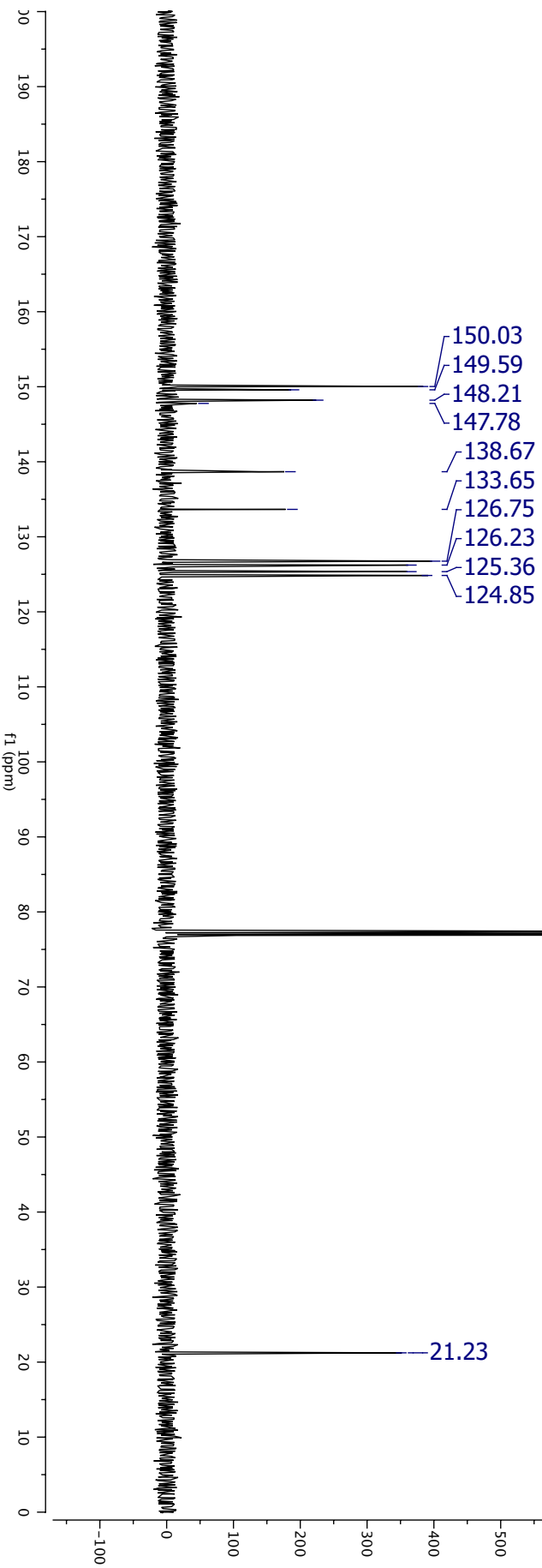
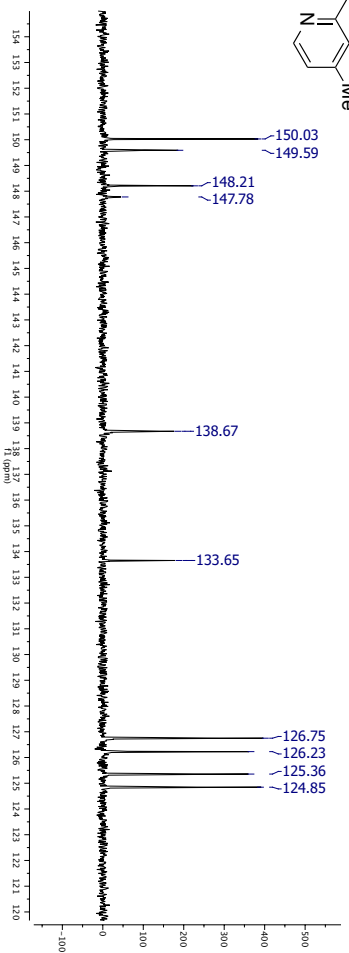
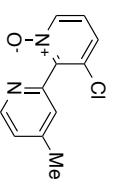
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-4'-methyl-2,2'-bipyridine *N*-oxide (7u)

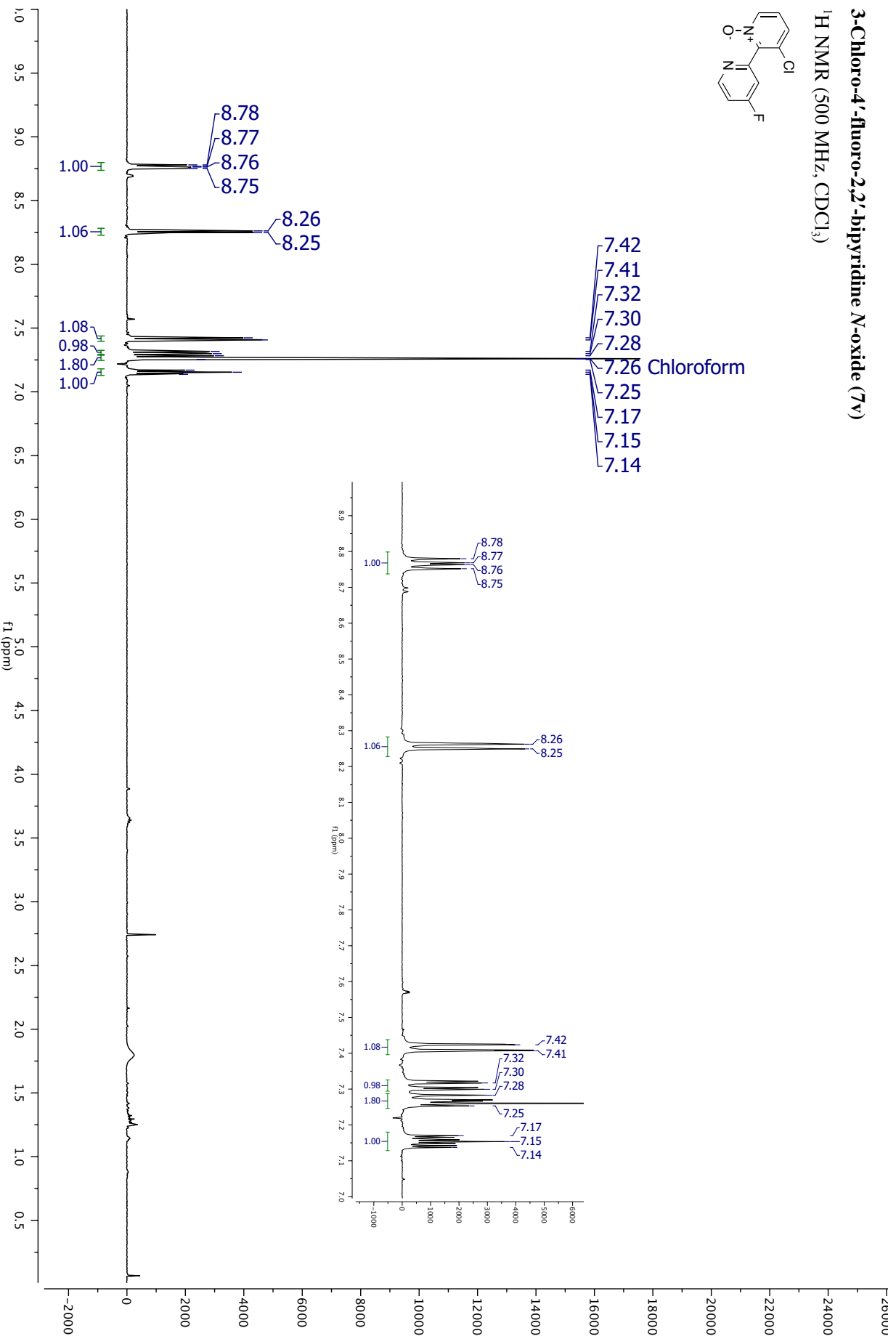
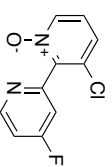
¹³C NMR (126 MHz, CDCl₃)



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3-Chloro-4'-fluoro-2,2'-bipyridine *N*-oxide (7v)

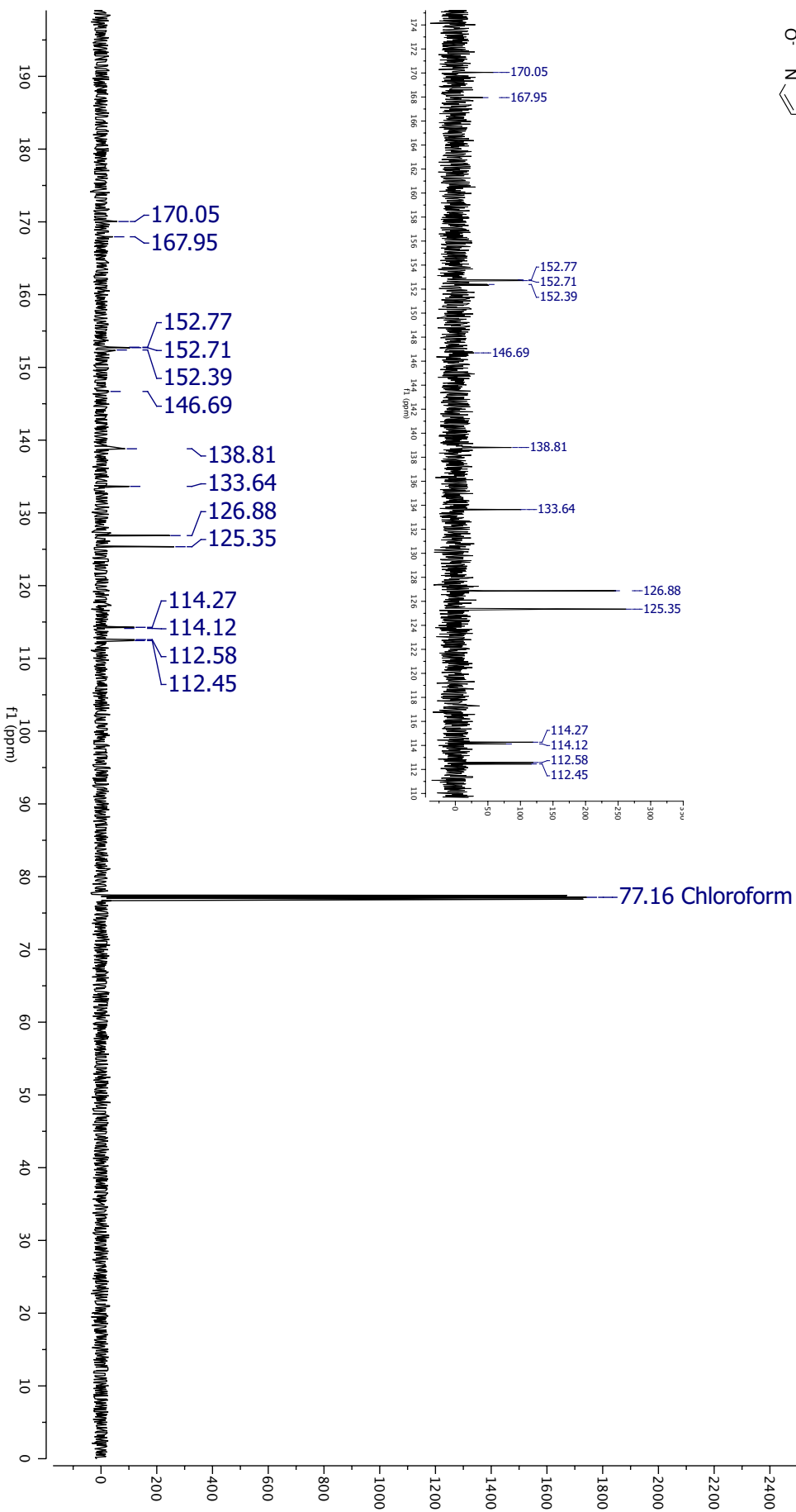
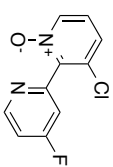
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-4'-fluoro-2,2'-bipyridine *N*-oxide (7v)

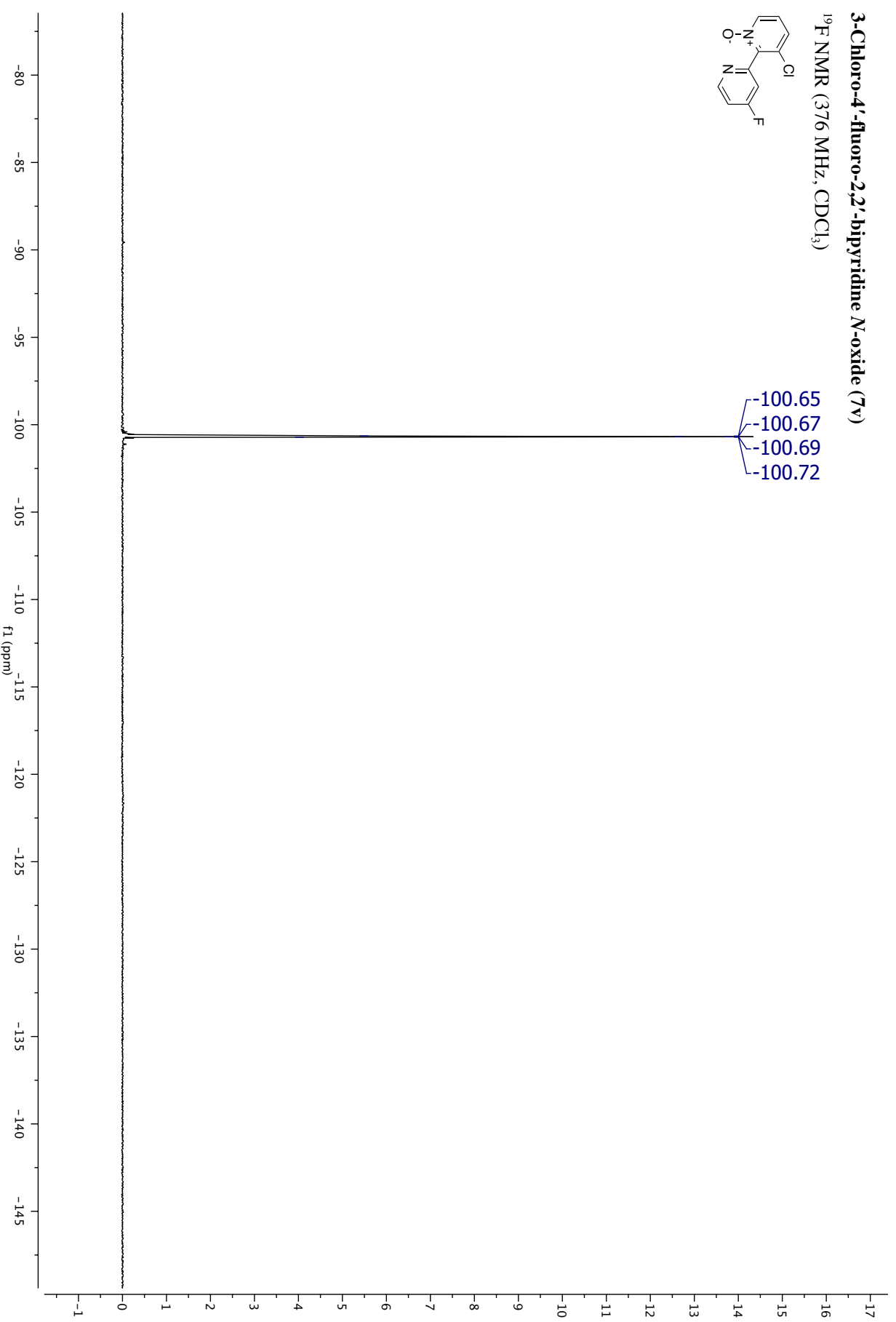
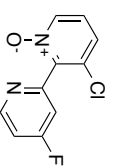
¹³C NMR (126 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-4'-fluoro-2,2'-bipyridine *N*-oxide (7v)

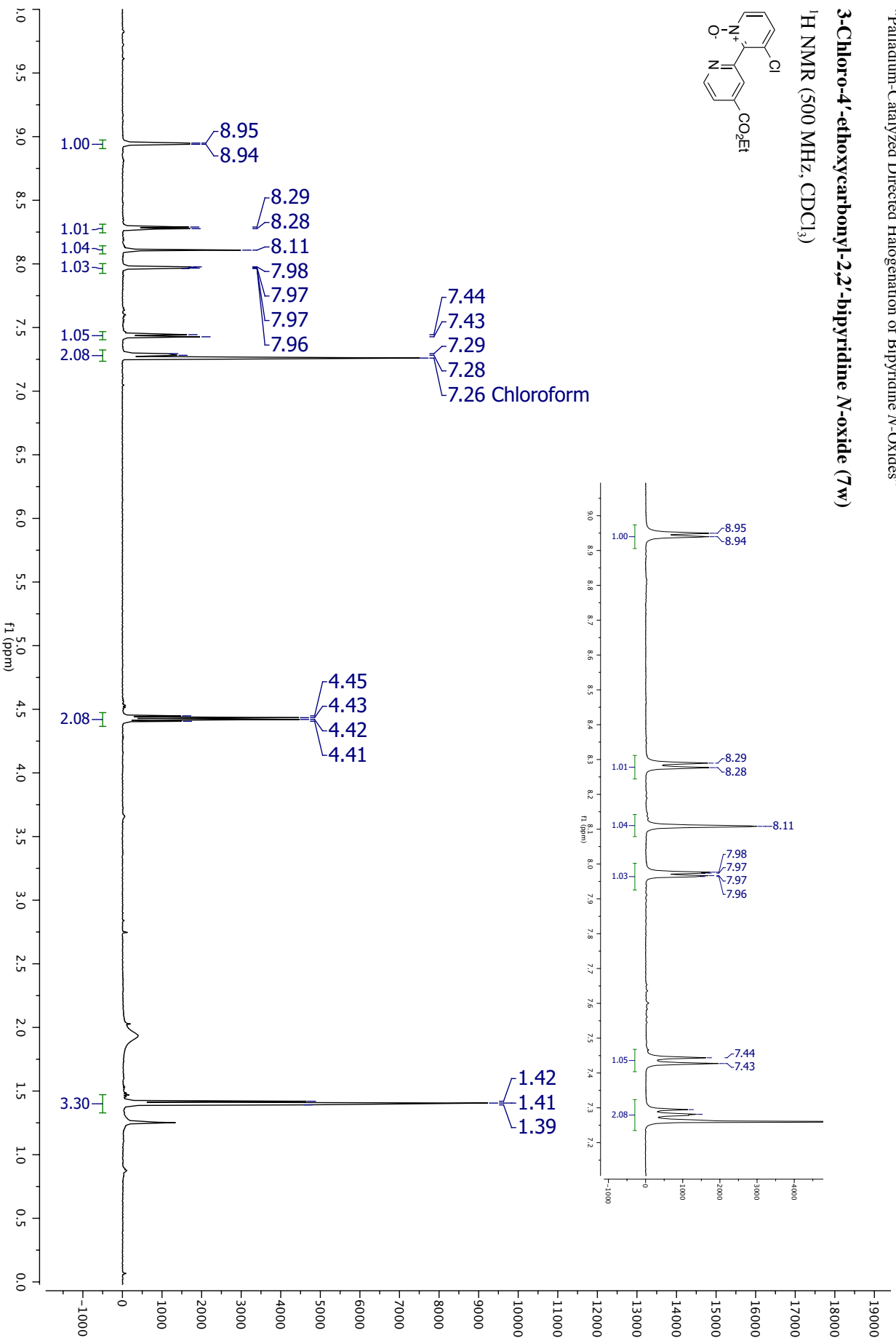
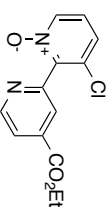
^{19}F NMR (376 MHz, CDCl_3)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

3-Chloro-4'-ethoxycarbonyl-2,2'-bipyridine *N*-oxide (7w)

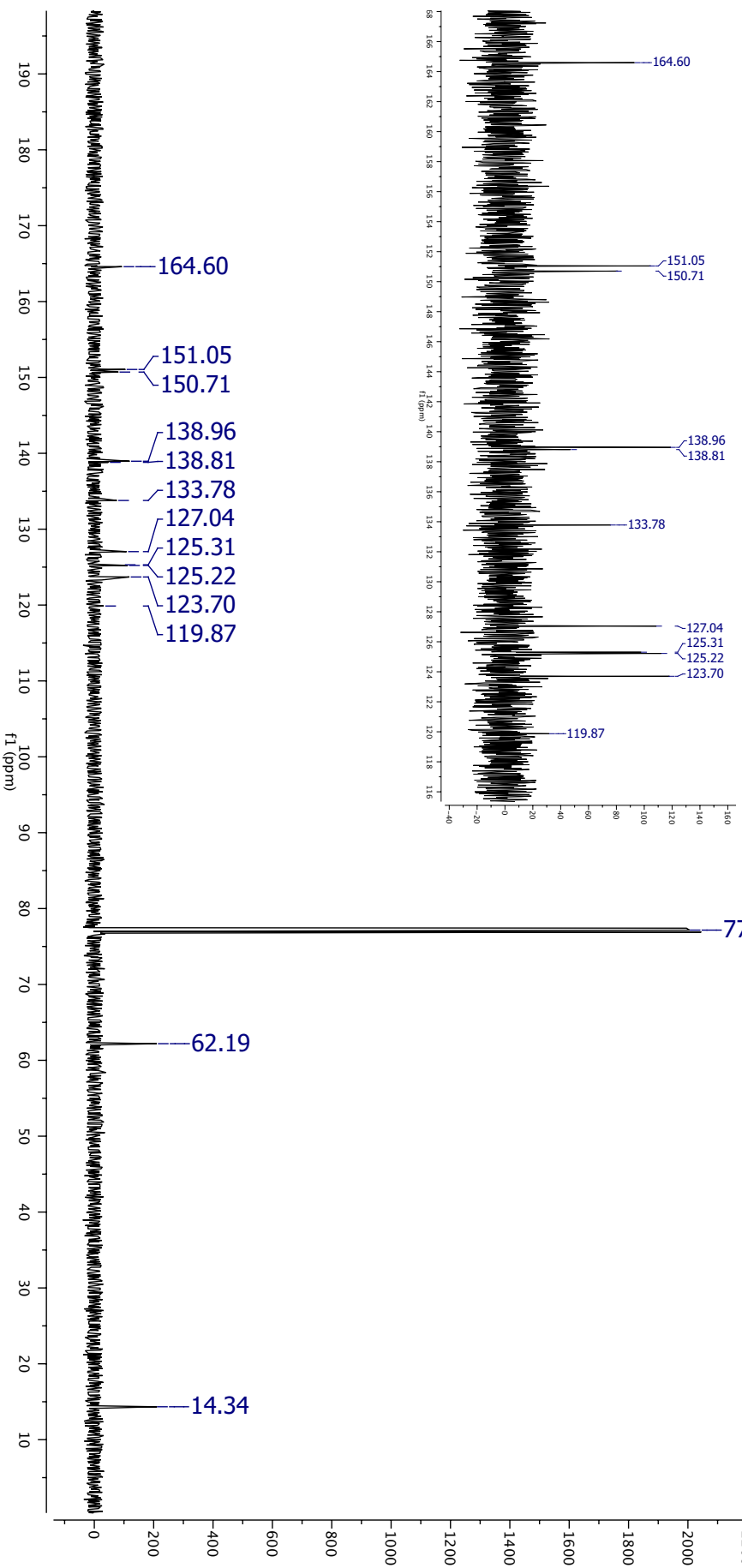
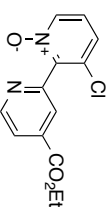
¹H NMR (500 MHz, CDCl₃)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

3-Chloro-4'-ethoxycarbonyl-2,2'-bipyridine *N*-oxide (7w)

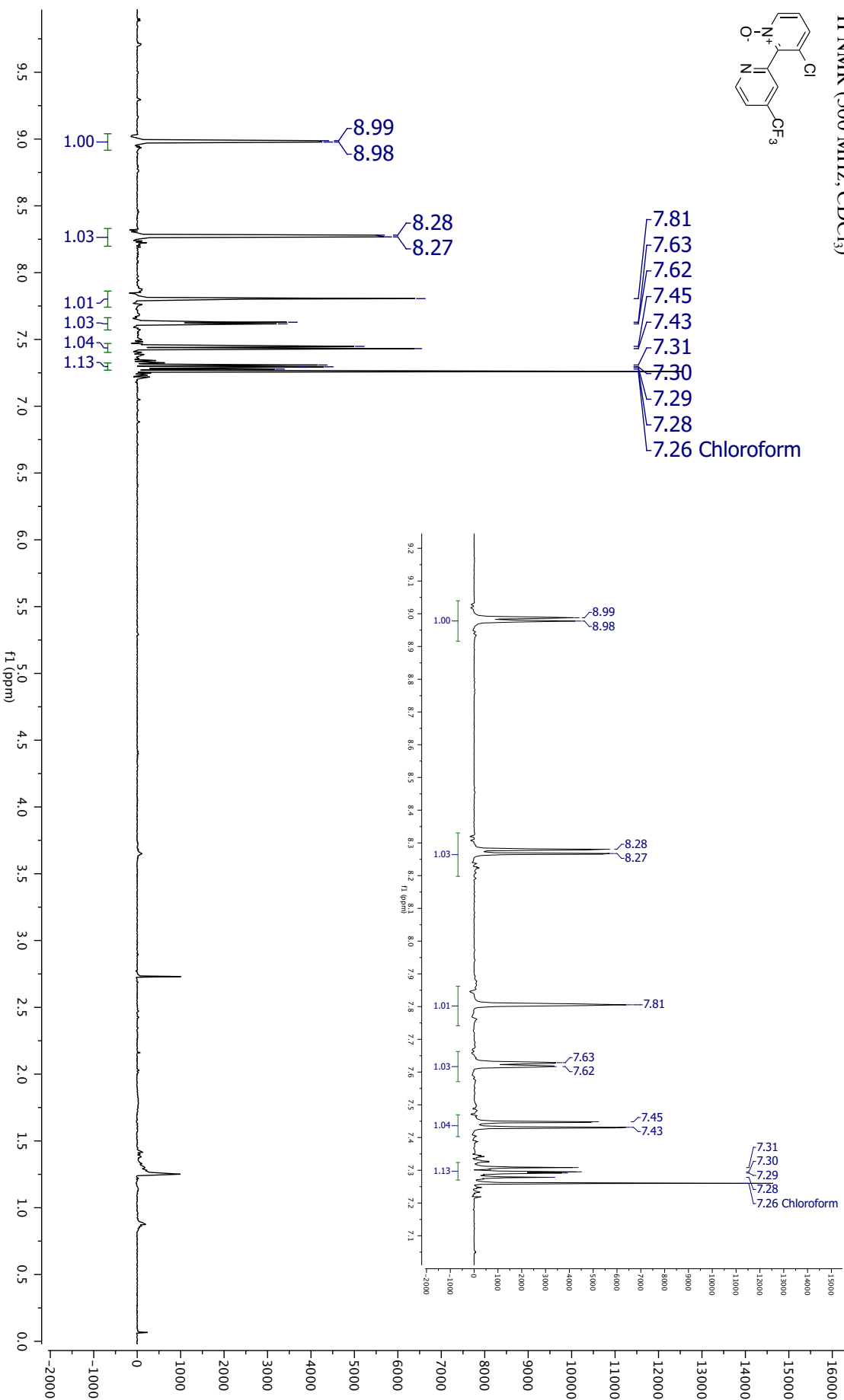
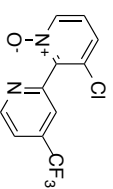
^{13}C NMR (126 MHz, CDCl_3)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

3-Chloro-4'-trifluoromethyl-2,2'-bipyridine *N*-oxide (7x)

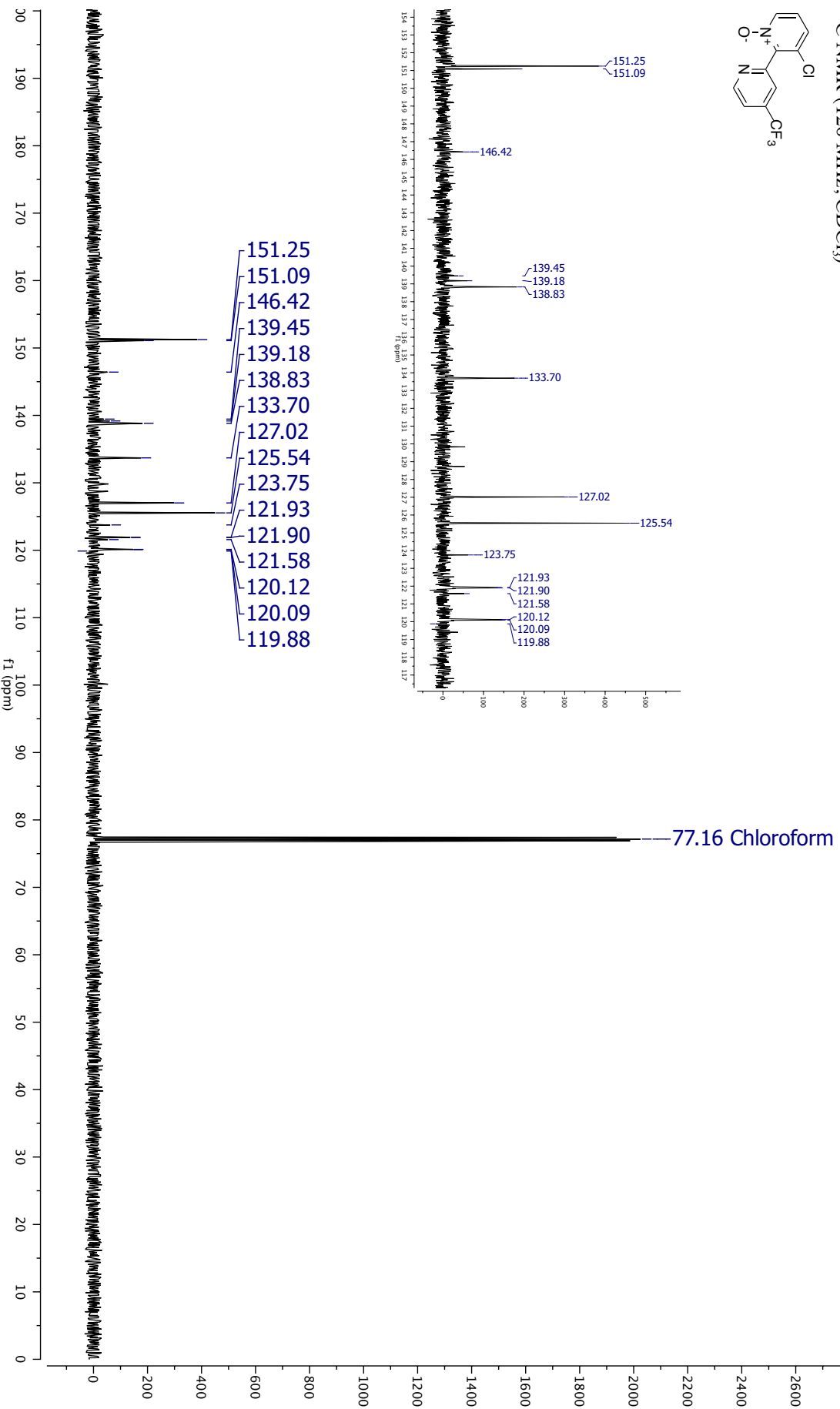
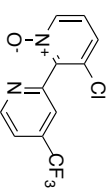
¹H NMR (500 MHz, CDCl₃)



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3-Chloro-4'-trifluoromethyl-2,2'-bipyridine *N*-oxide (7x)

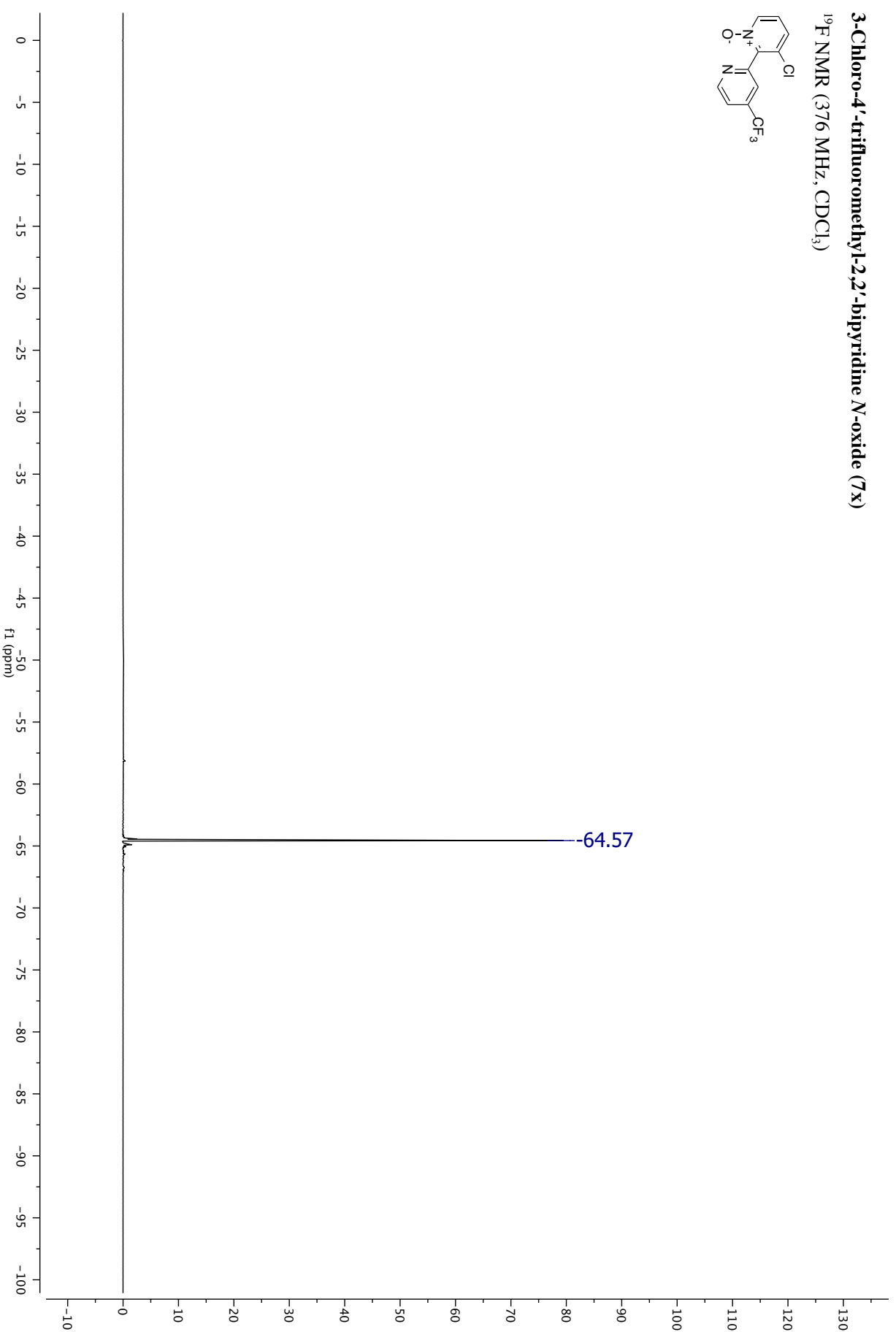
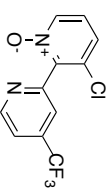
^{13}C NMR (126 MHz, CDCl_3)



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3-Chloro-4'-trifluoromethyl-2,2'-bipyridine *N*-oxide (7x)

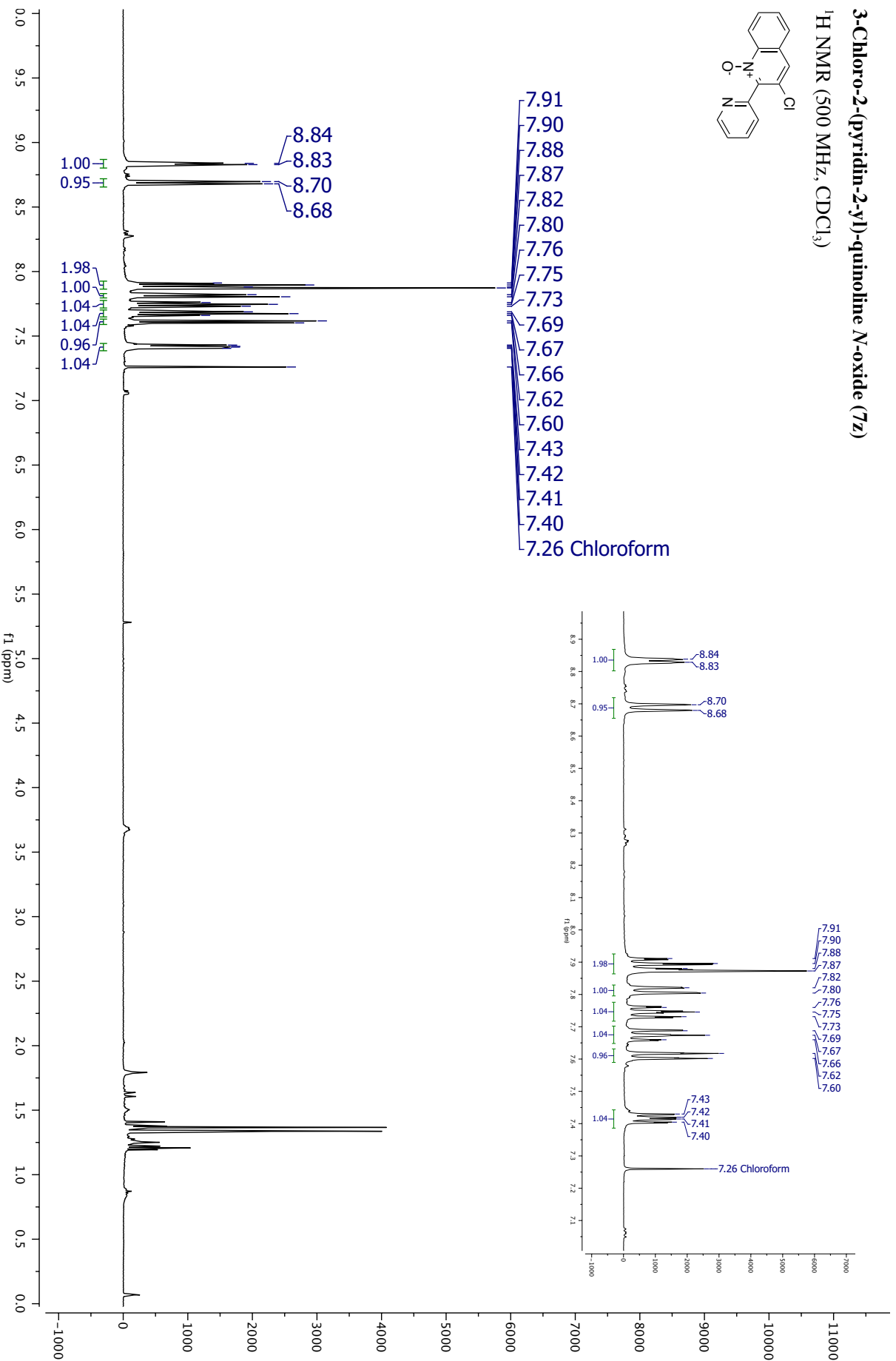
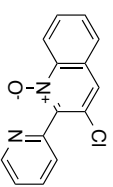
¹⁹F NMR (376 MHz, CDCl₃)



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3-Chloro-2-(pyridin-2-yl)-quinoline *N*-oxide (7z)

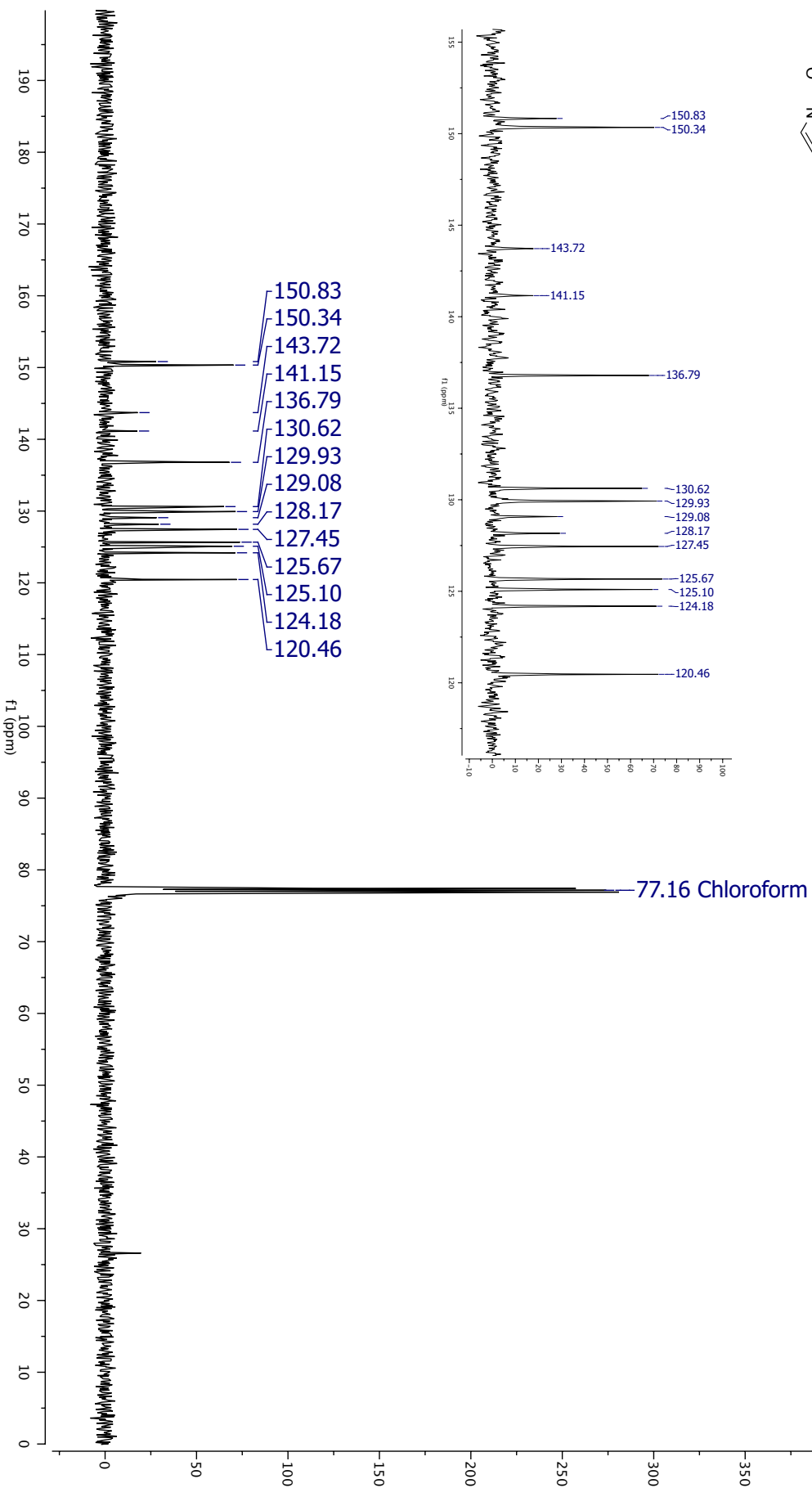
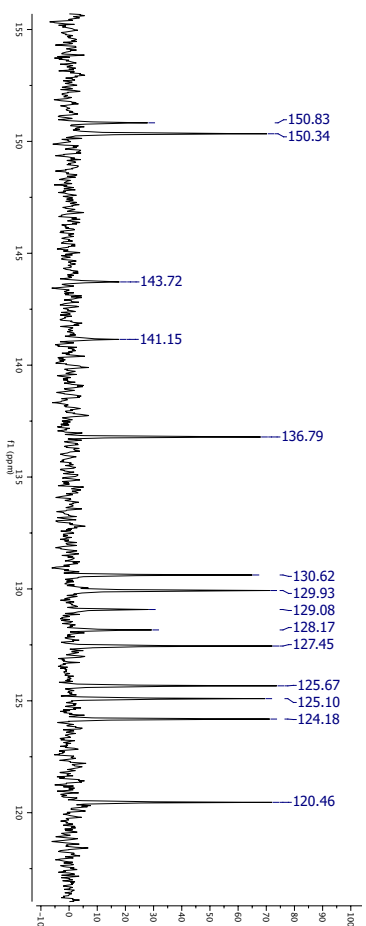
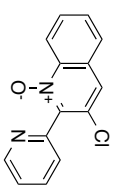
¹H NMR (500 MHz, CDCl₃)



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3-Chloro-2-(pyridin-2-yl)-quinoline *N*-oxide (7z)

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

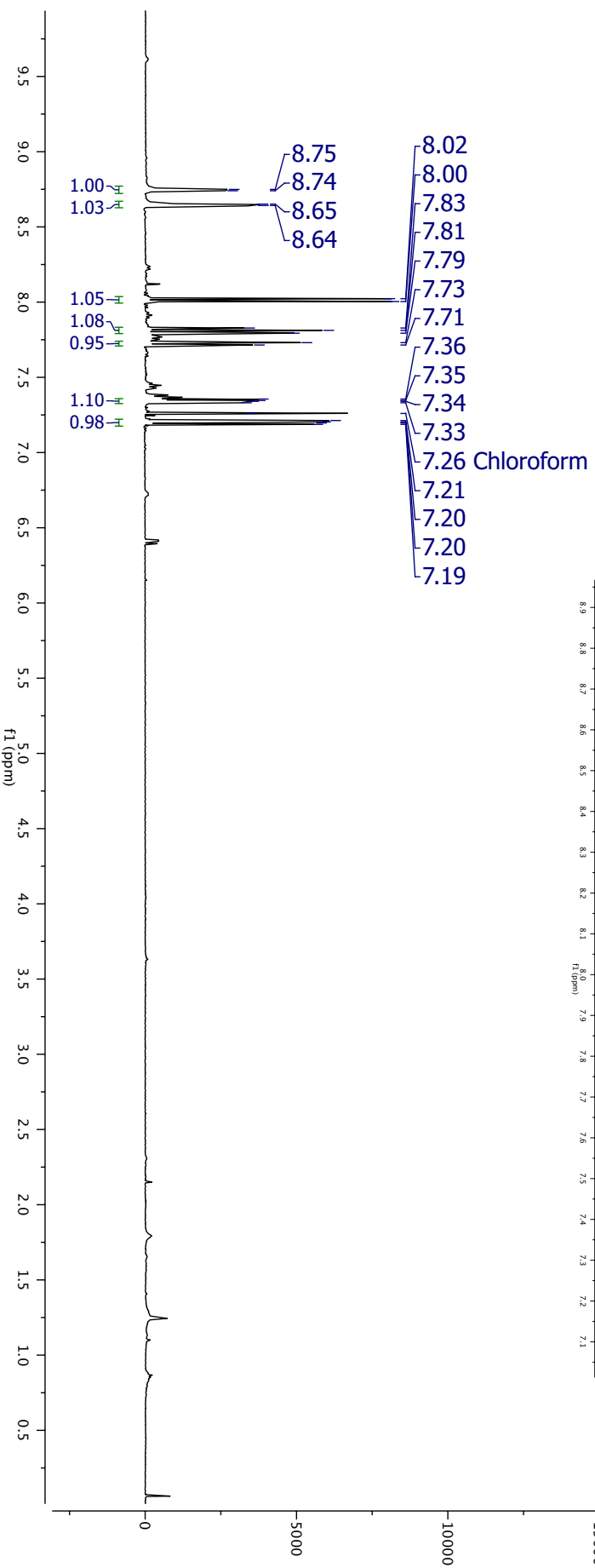
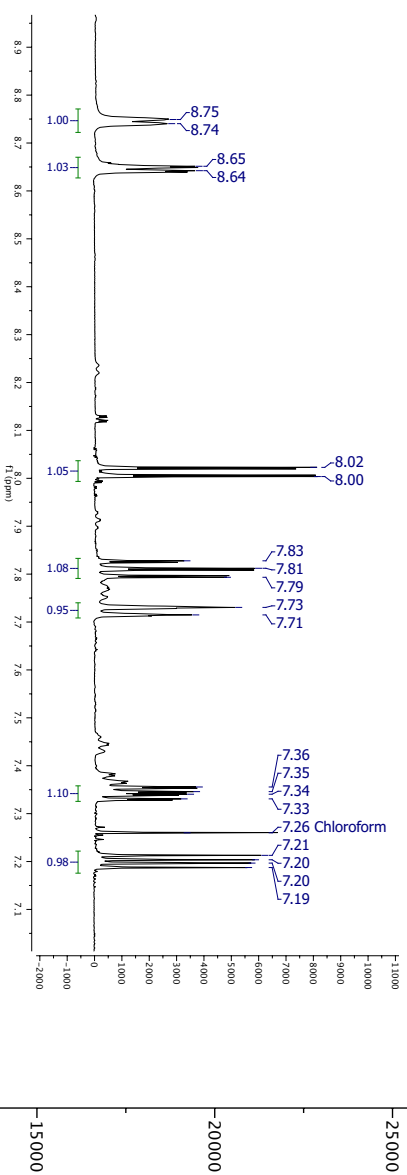
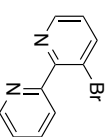


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Deoxygenated 3-bromobipyridines (5)

3-Bromo-2,2'-bipyridine (5a)

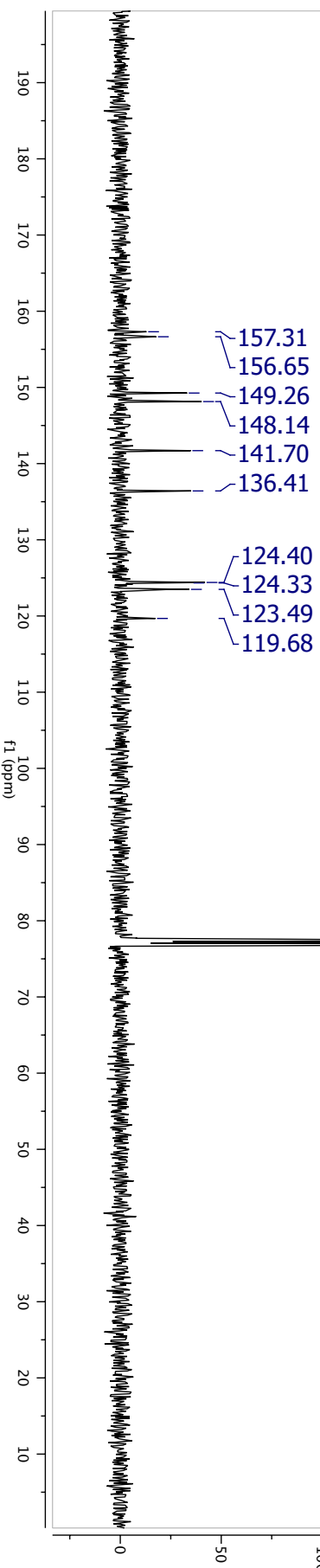
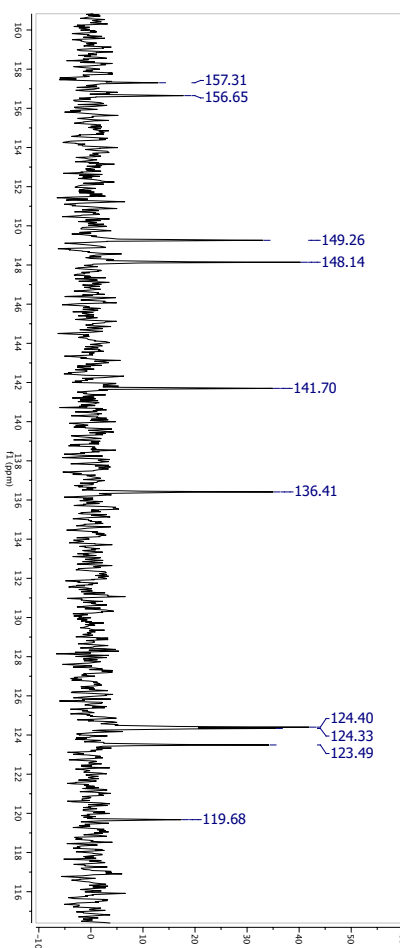
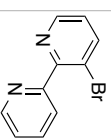
¹H NMR (500 MHz, CDCl₃)



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3-Bromo-2,2'-bipyridine (5a)

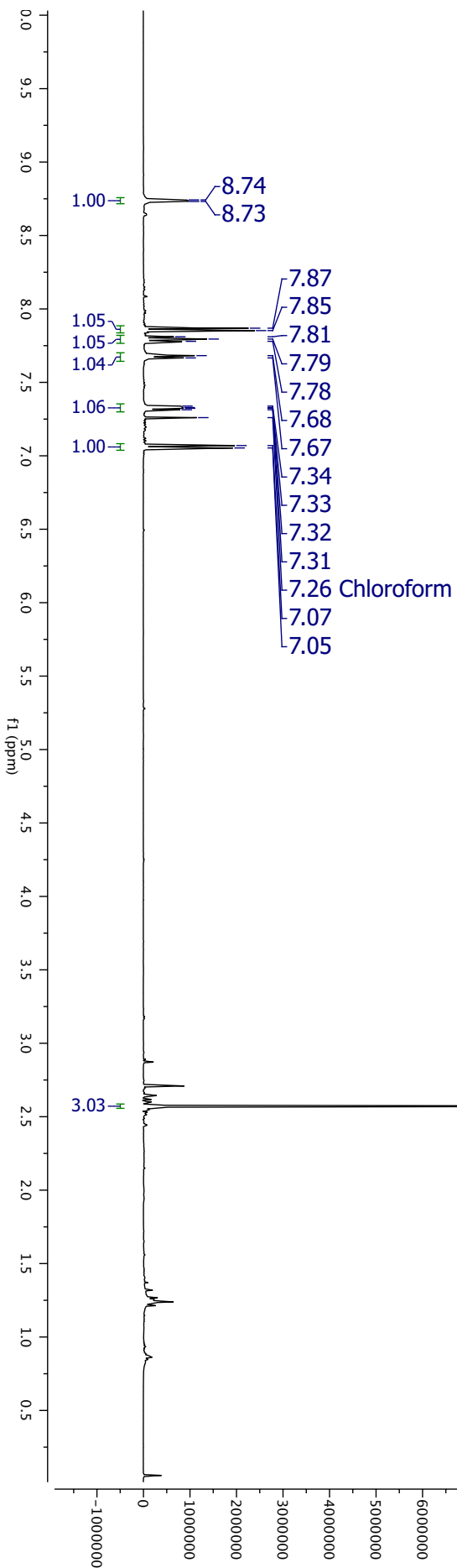
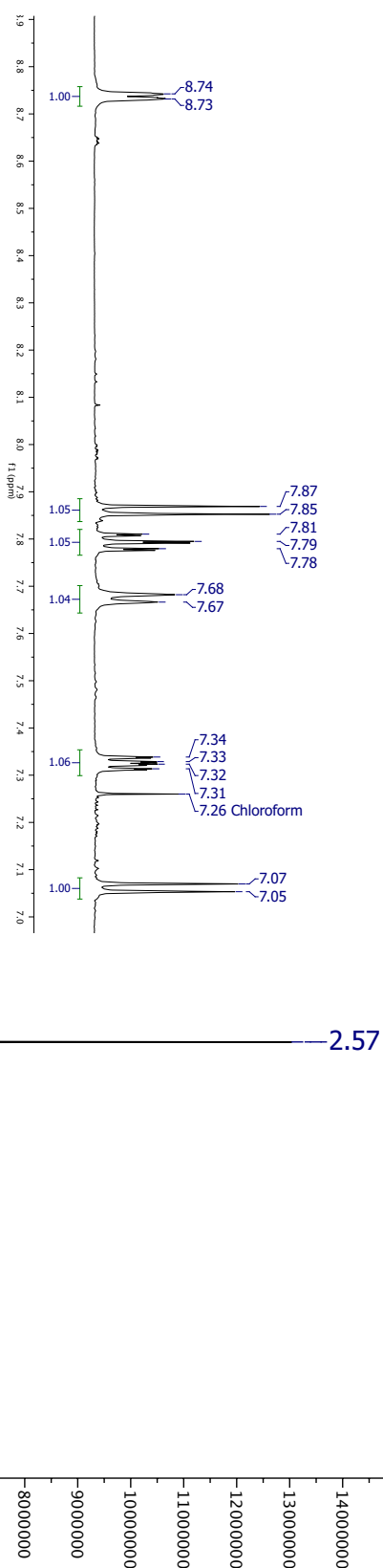
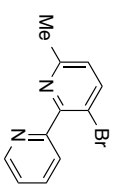
^{13}C NMR (126 MHz, CDCl_3)



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3-Bromo-6-methyl-2,2'-bipyridine (5b)

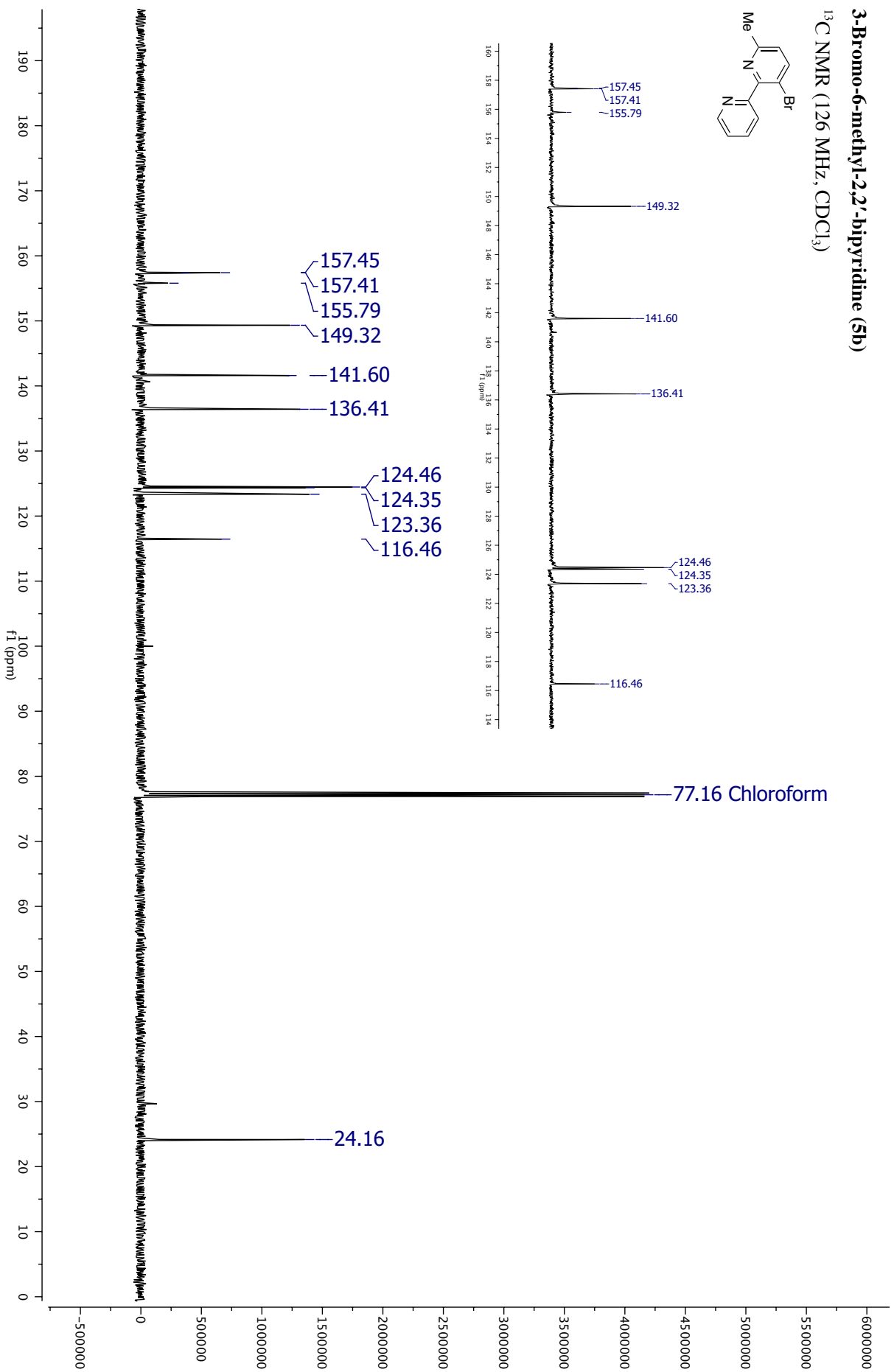
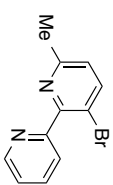
¹H NMR (500 MHz, CDCl₃)



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3-Bromo-6-methyl-2,2'-bipyridine (5b)

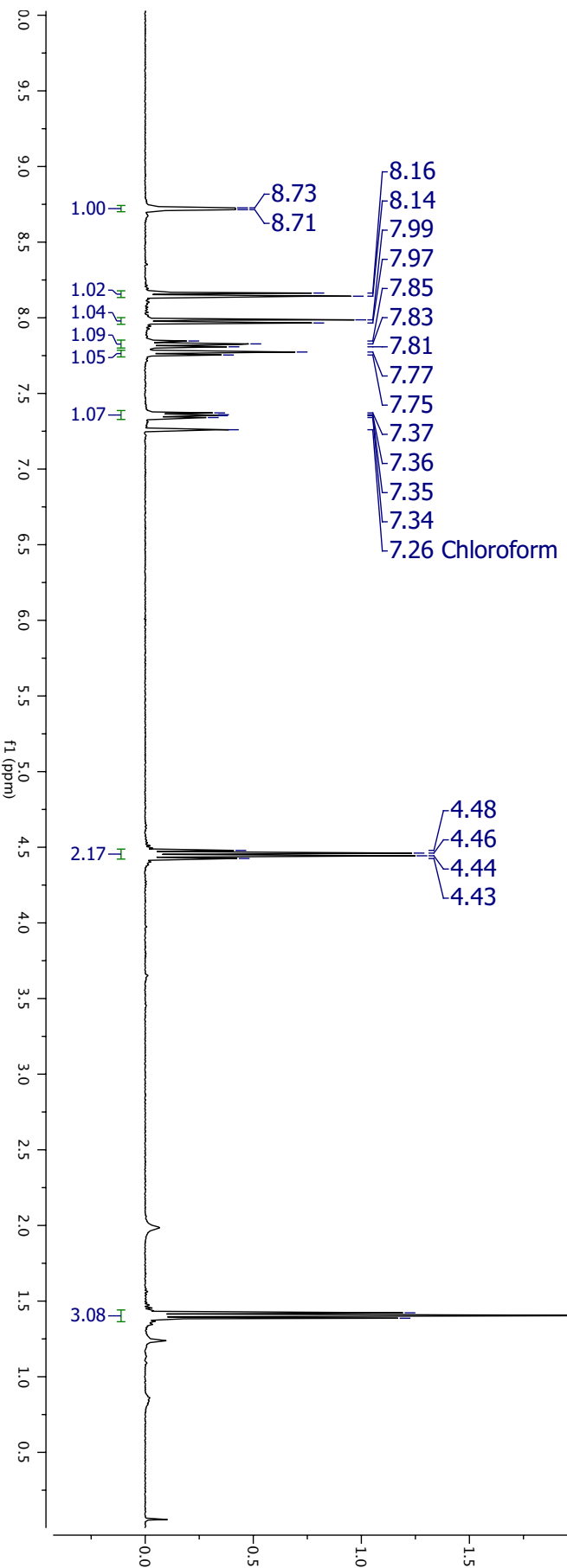
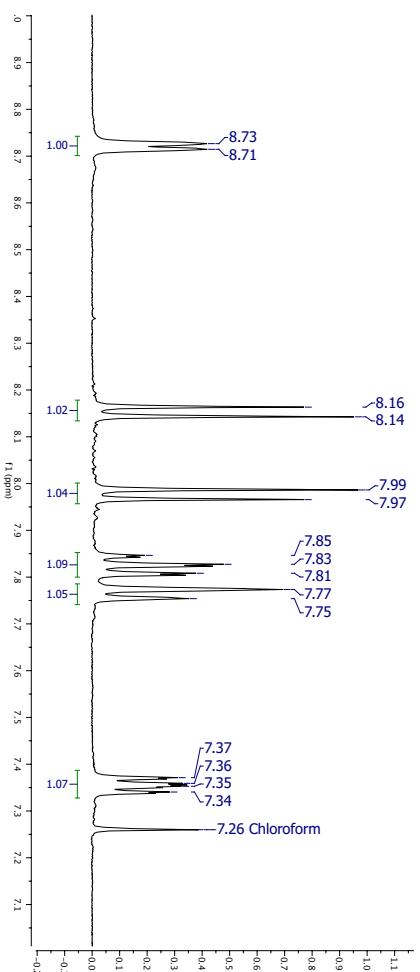
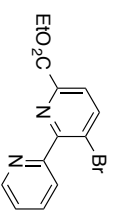
^{13}C NMR (126 MHz, CDCl_3)



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3-Bromo-6-ethoxycarbonyl-2,2'-bipyridine (5c)

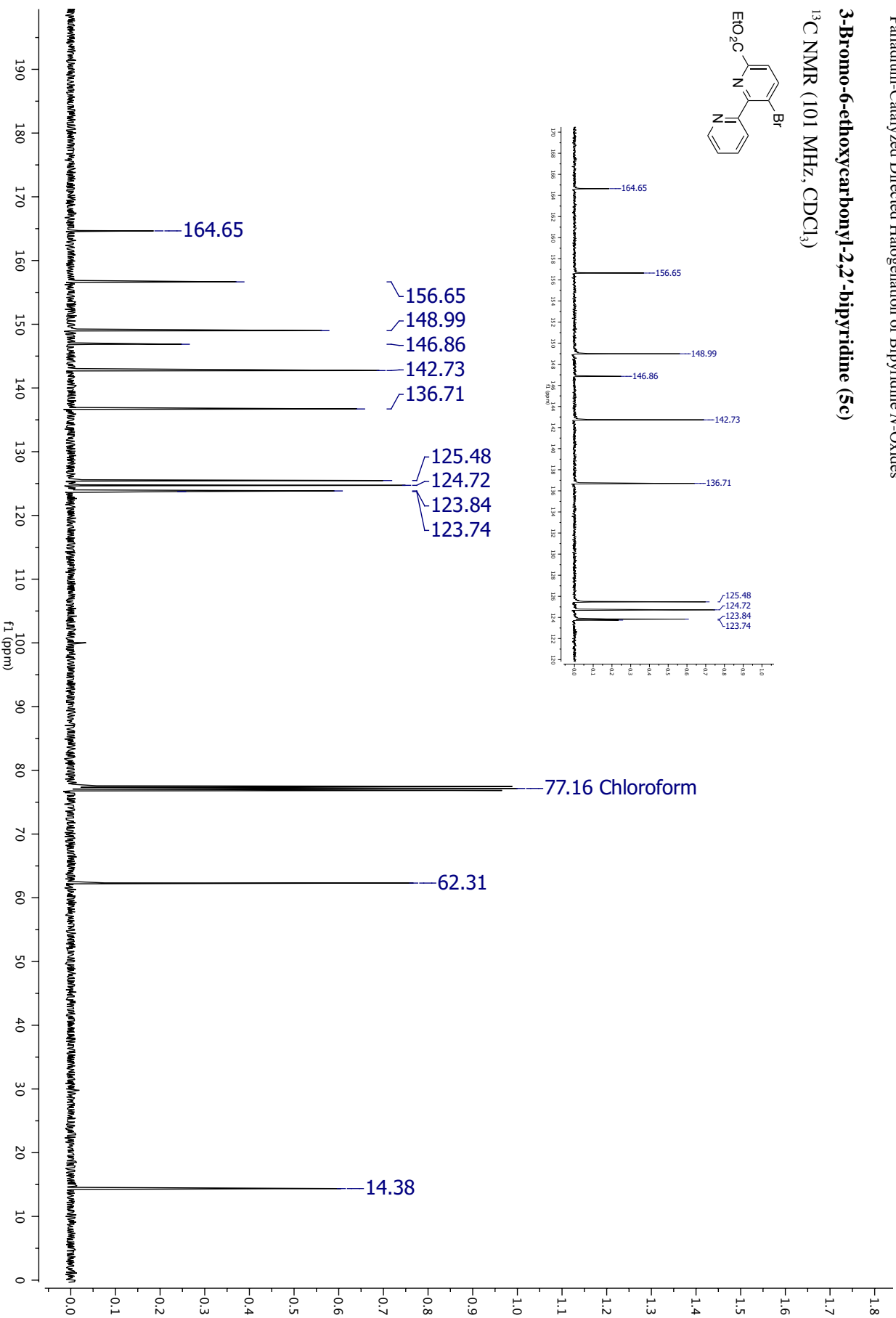
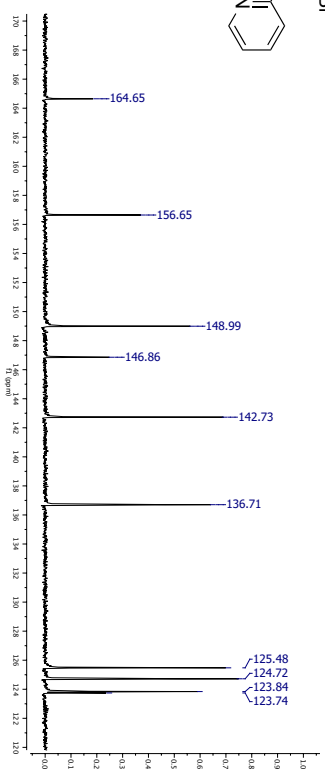
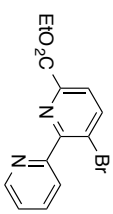
¹H NMR (400 MHz, CDCl₃)



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3-Bromo-6-ethoxycarbonyl-2,2'-bipyridine (5c)

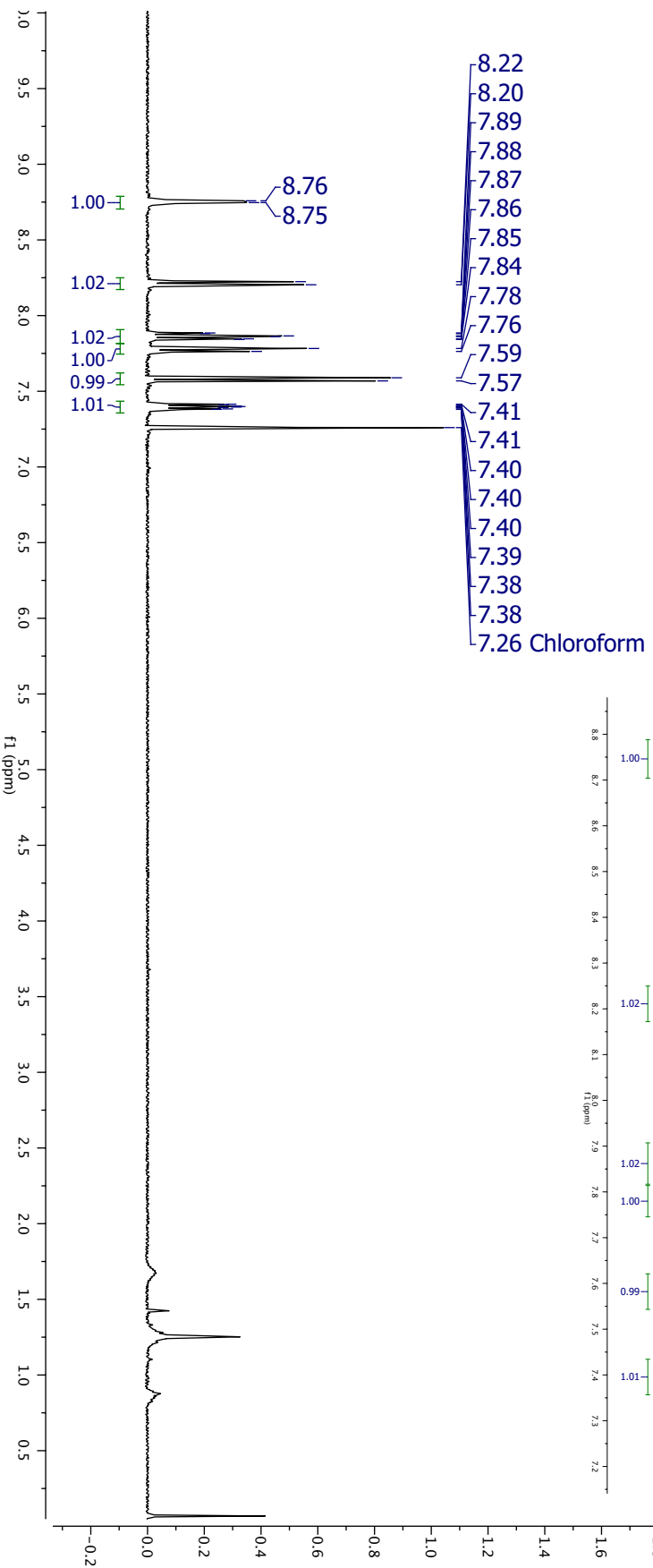
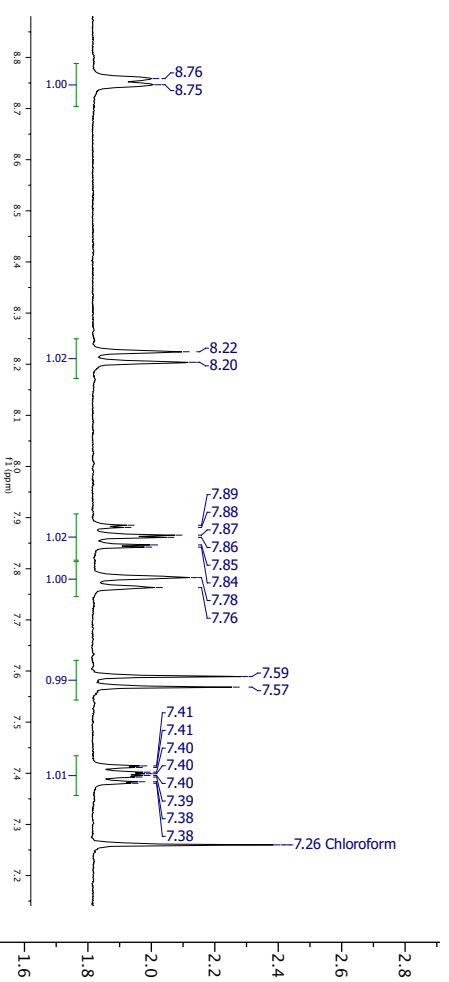
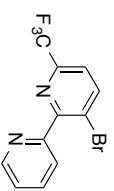
^{13}C NMR (101 MHz, CDCl_3)



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3-Bromo-6-trifluoromethyl-2,2'-bipyridine (**5d**)

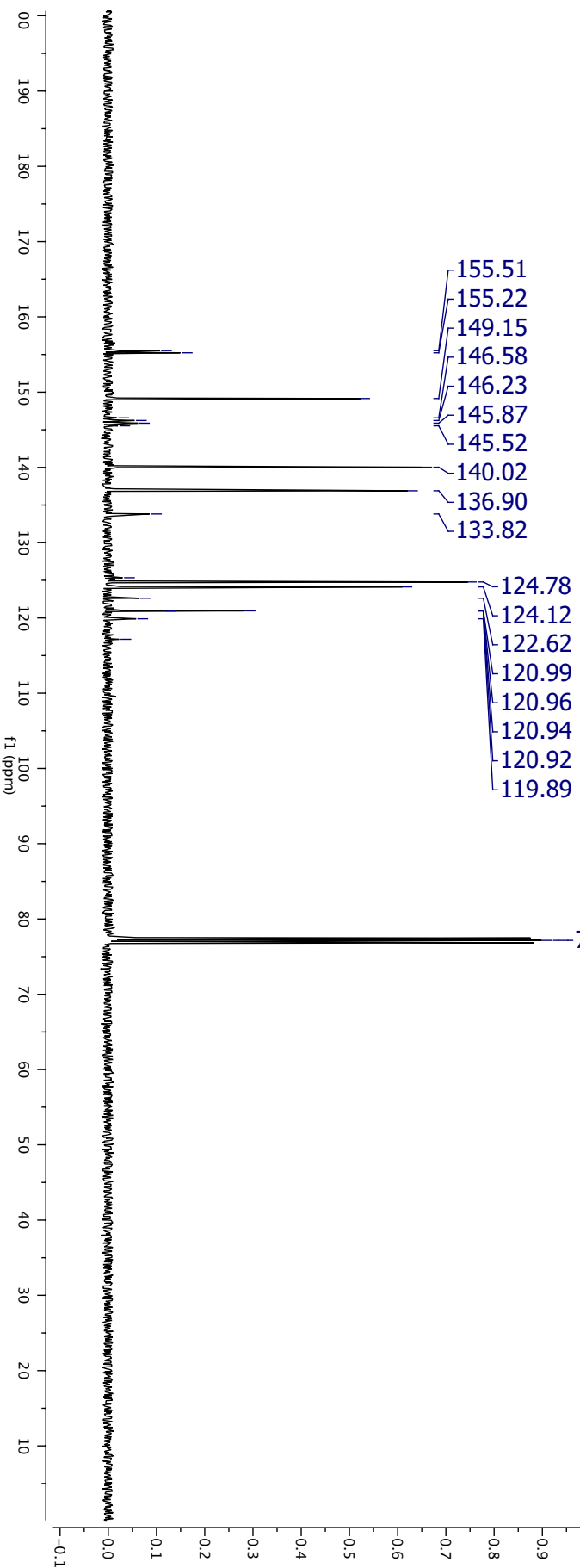
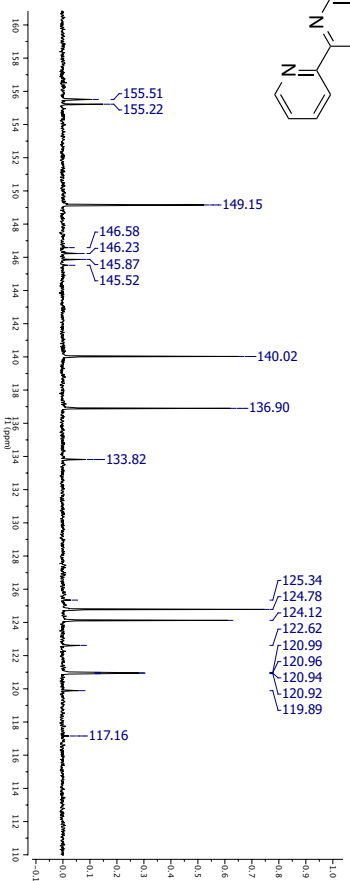
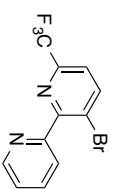
¹H NMR (400 MHz, CDCl₃)



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3-Bromo-6-trifluoromethyl-2,2'-bipyridine (5d)

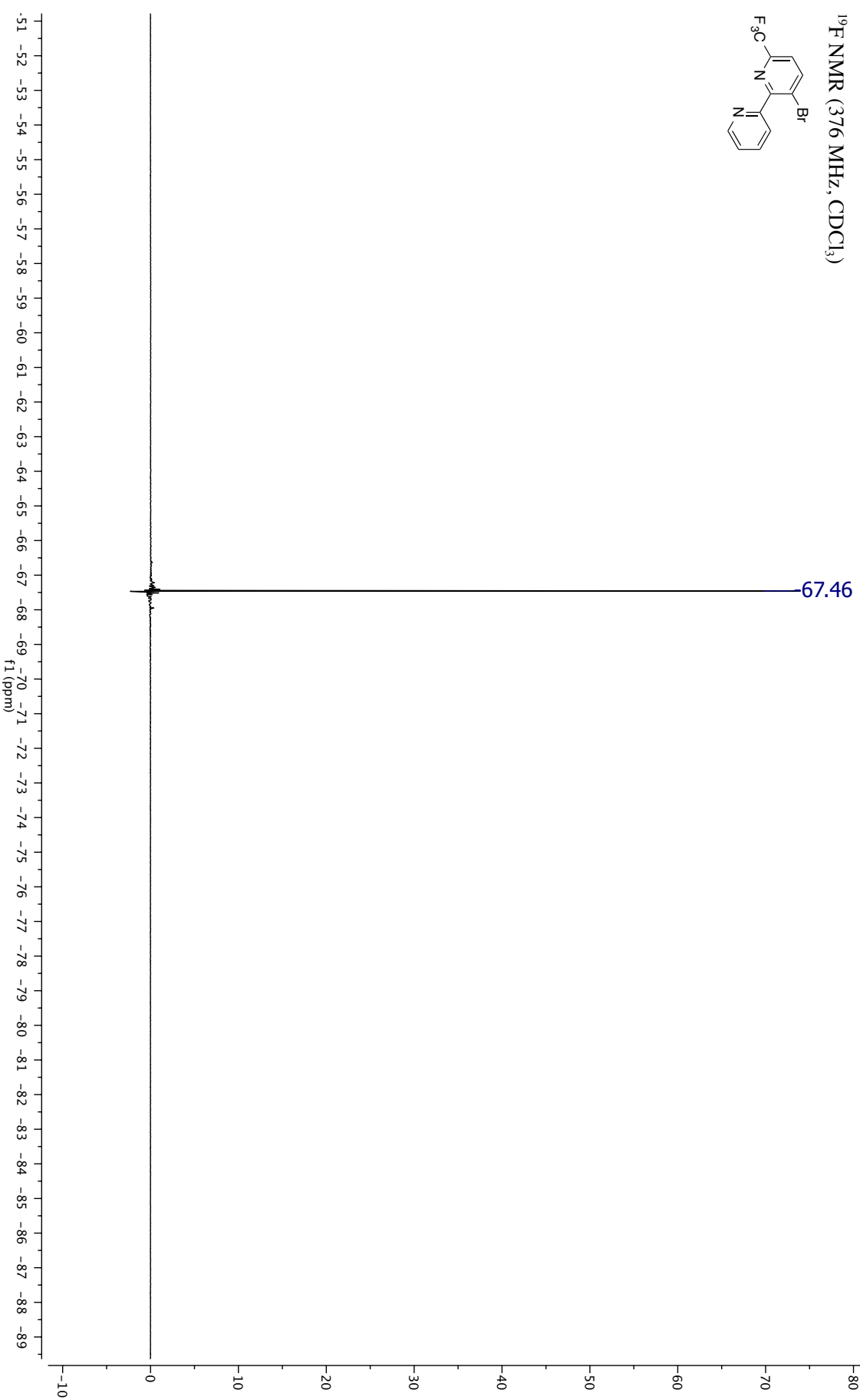
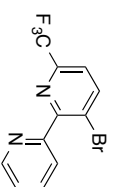
^{13}C NMR (126 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-6-trifluoromethyl-2,2'-bipyridine (5d)

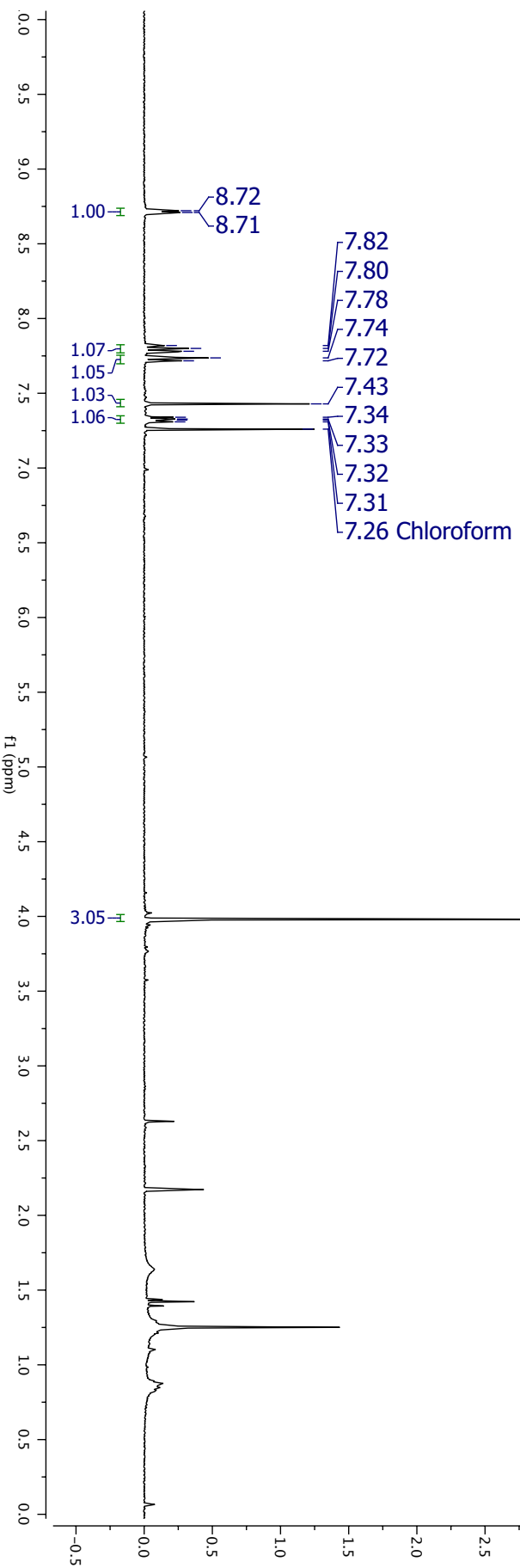
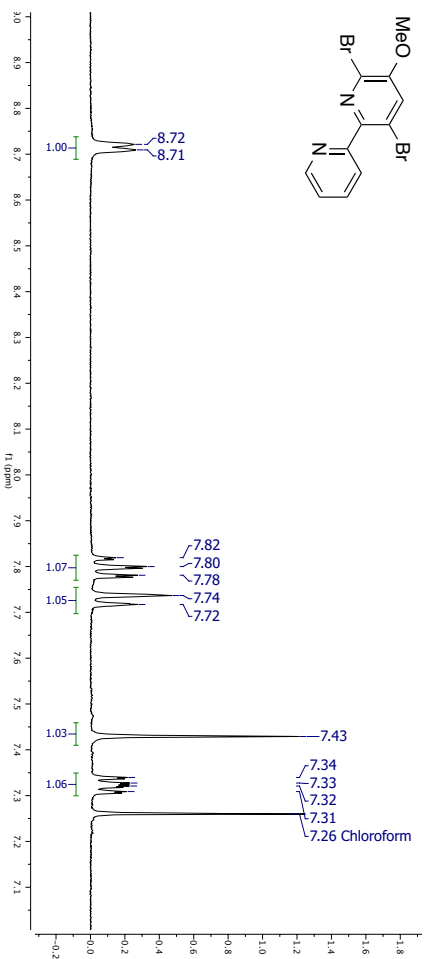
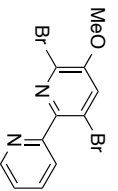
^{19}F NMR (376 MHz, CDCl_3)



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3,6-Dibromo-5-methoxy-2,2'-bipyridine

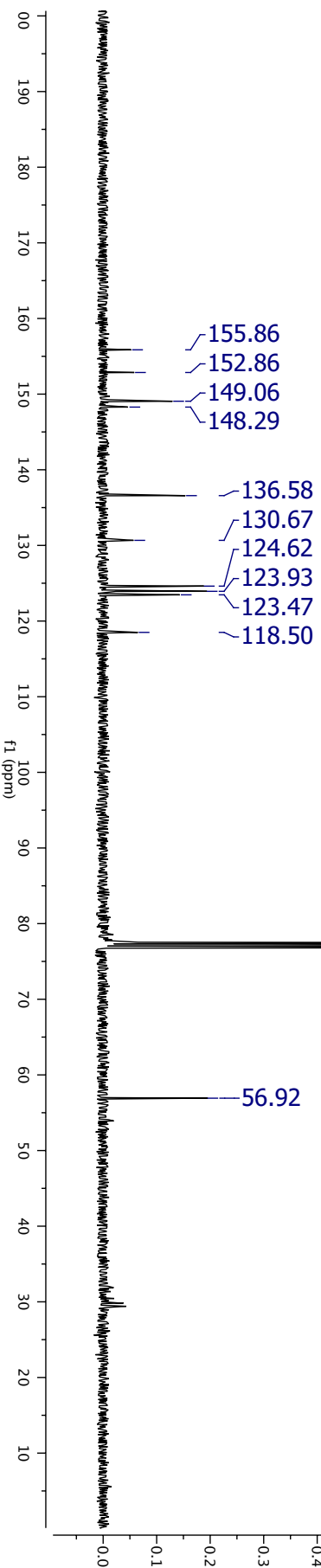
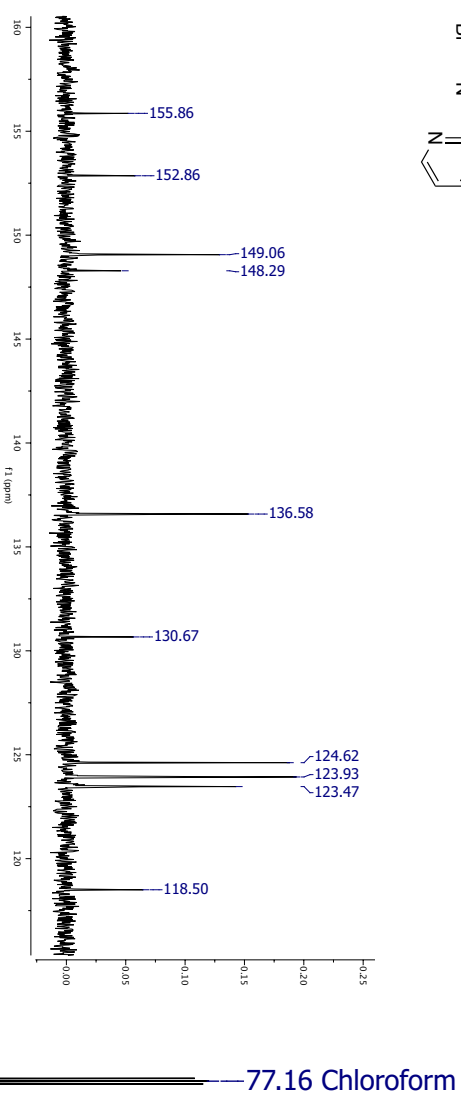
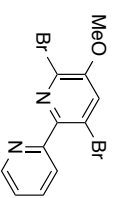
¹H NMR (400 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3,6-Dibromo-5-methoxy-2,2'-bipyridine

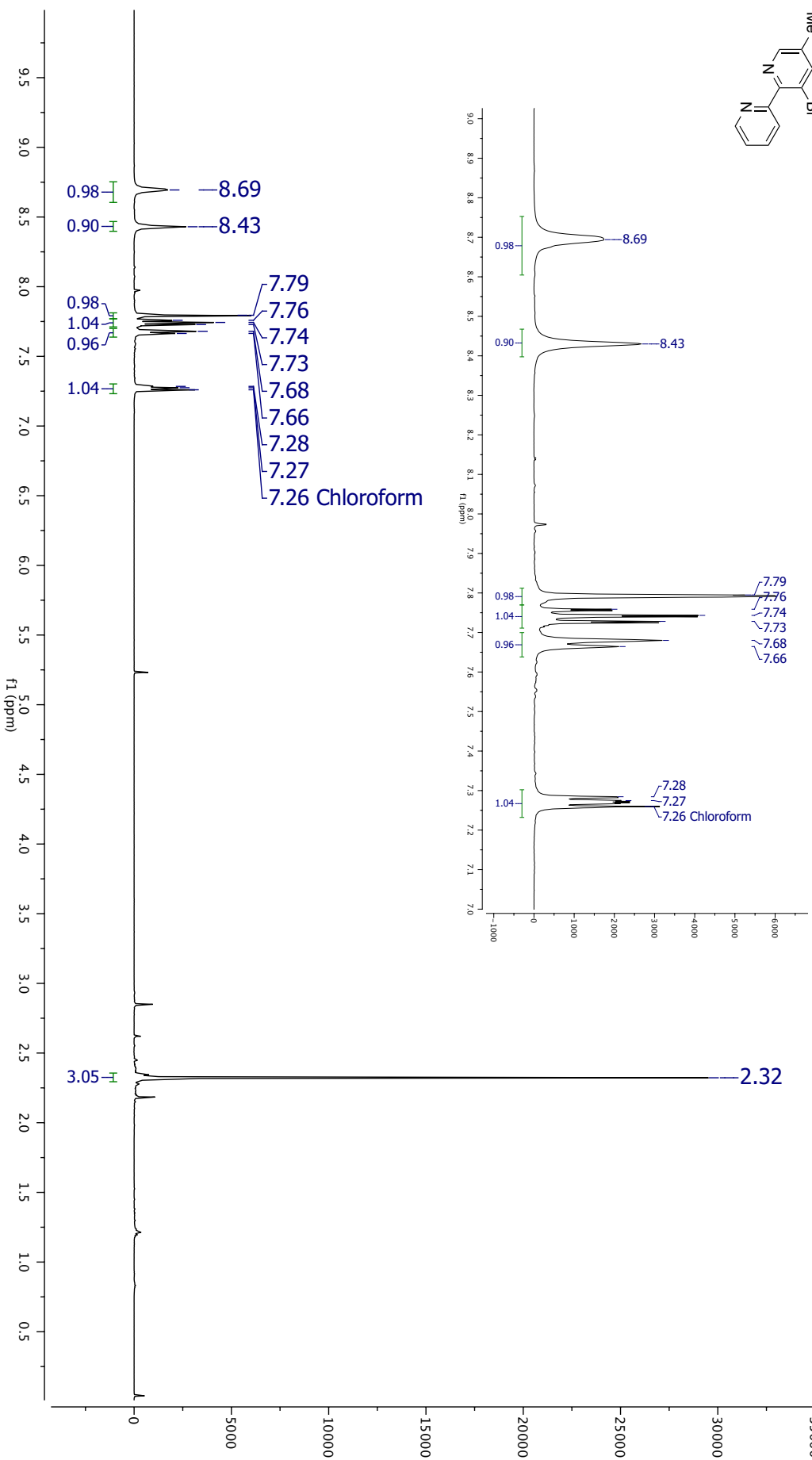
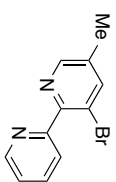
^{13}C NMR (101 MHz, CDCl_3)



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3-Bromo-5-methyl-2,2'-bipyridine (5g)

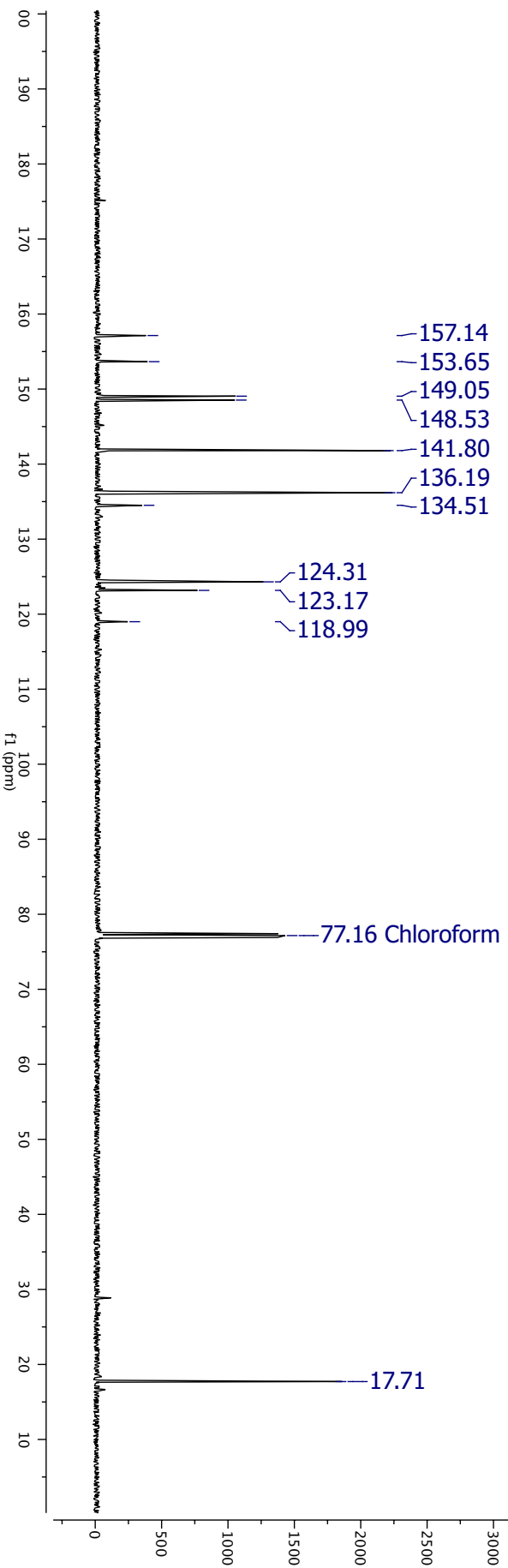
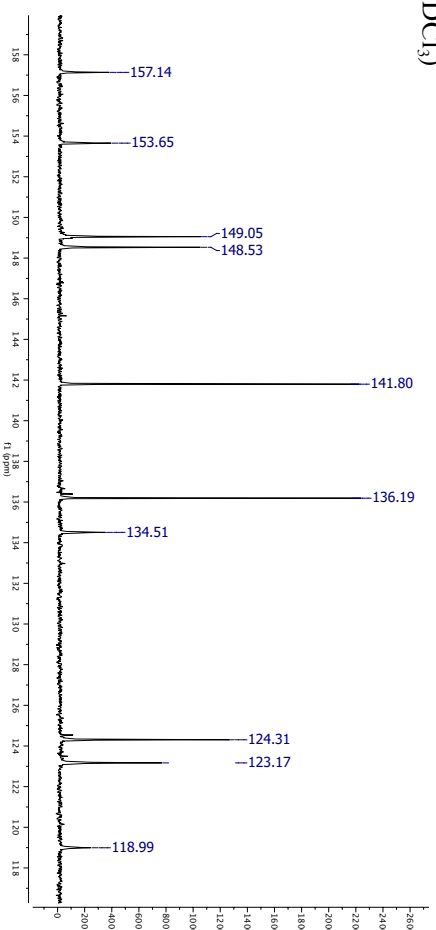
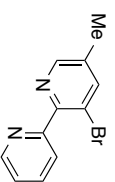
¹H NMR (500 MHz, CDCl₃)



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3-Bromo-5-methyl-2,2'-bipyridine (5g)

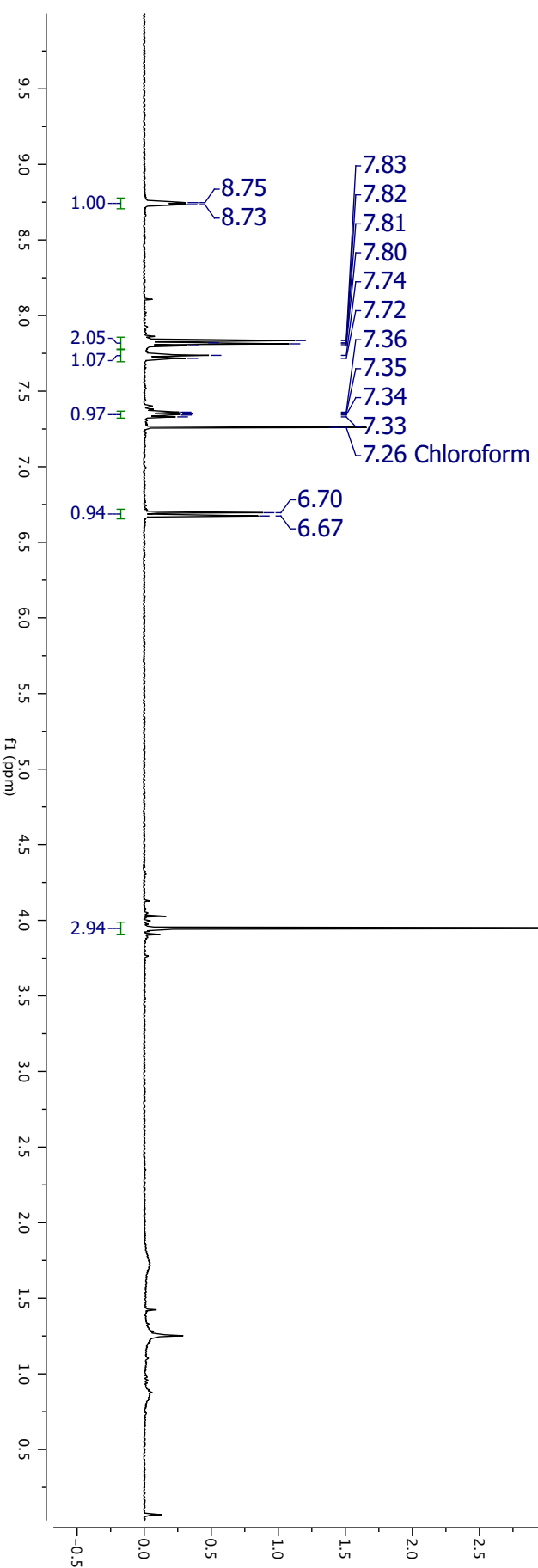
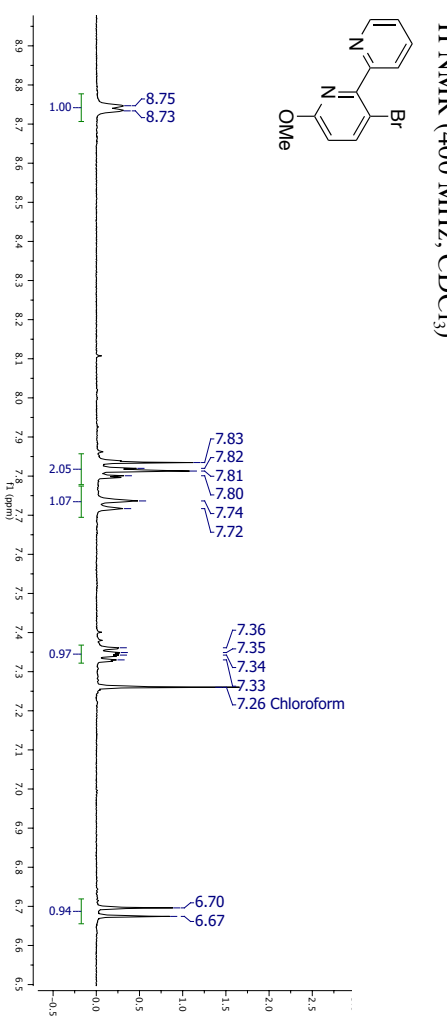
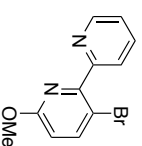
^{13}C NMR (126 MHz, CDCl_3)



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3-Bromo-6-methoxy-2,2'-bipyridine (5p)

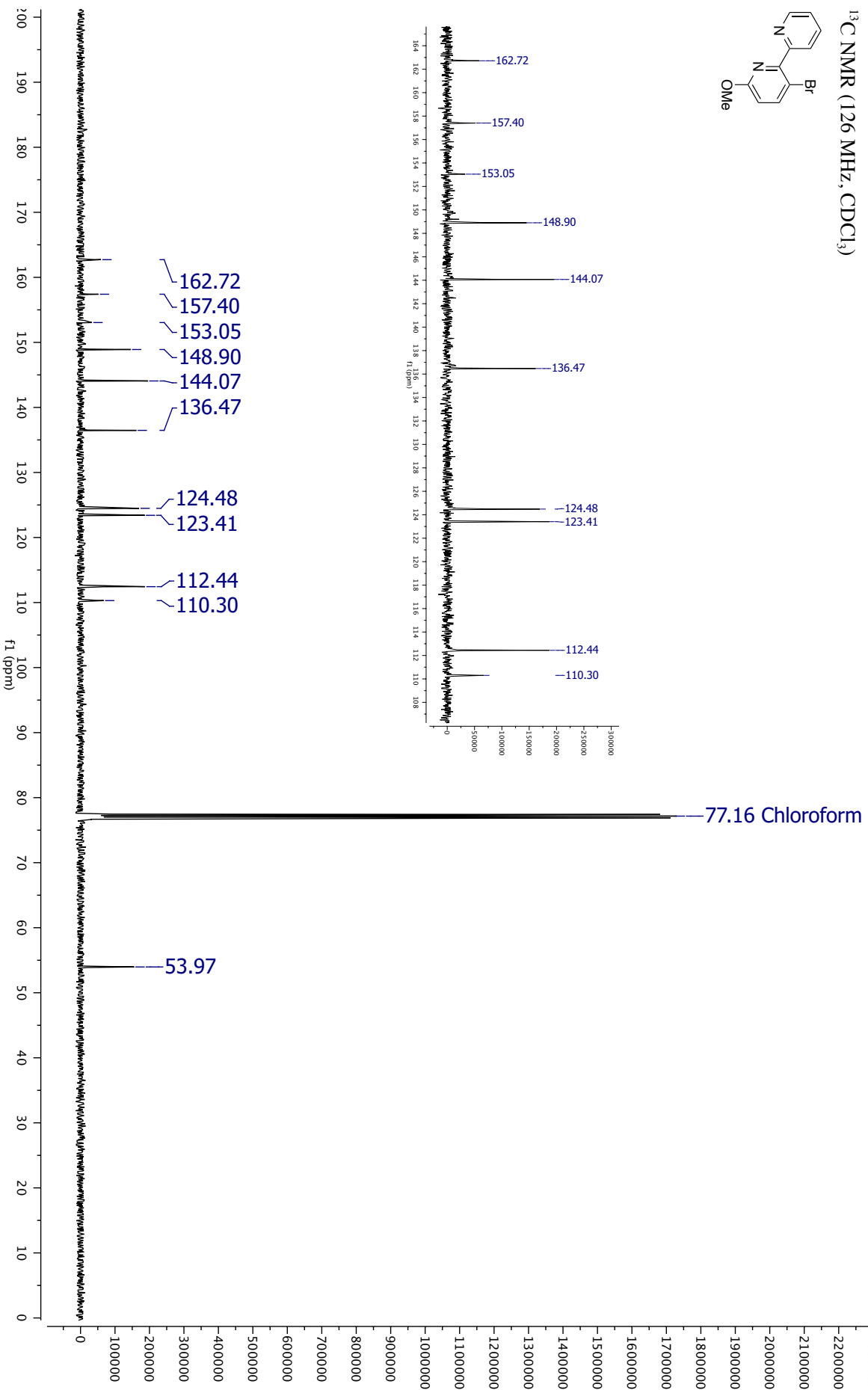
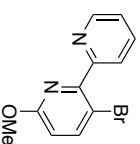
¹H NMR (400 MHz, CDCl₃)



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3-Bromo-6-methoxy-2,2'-bipyridine (5p)

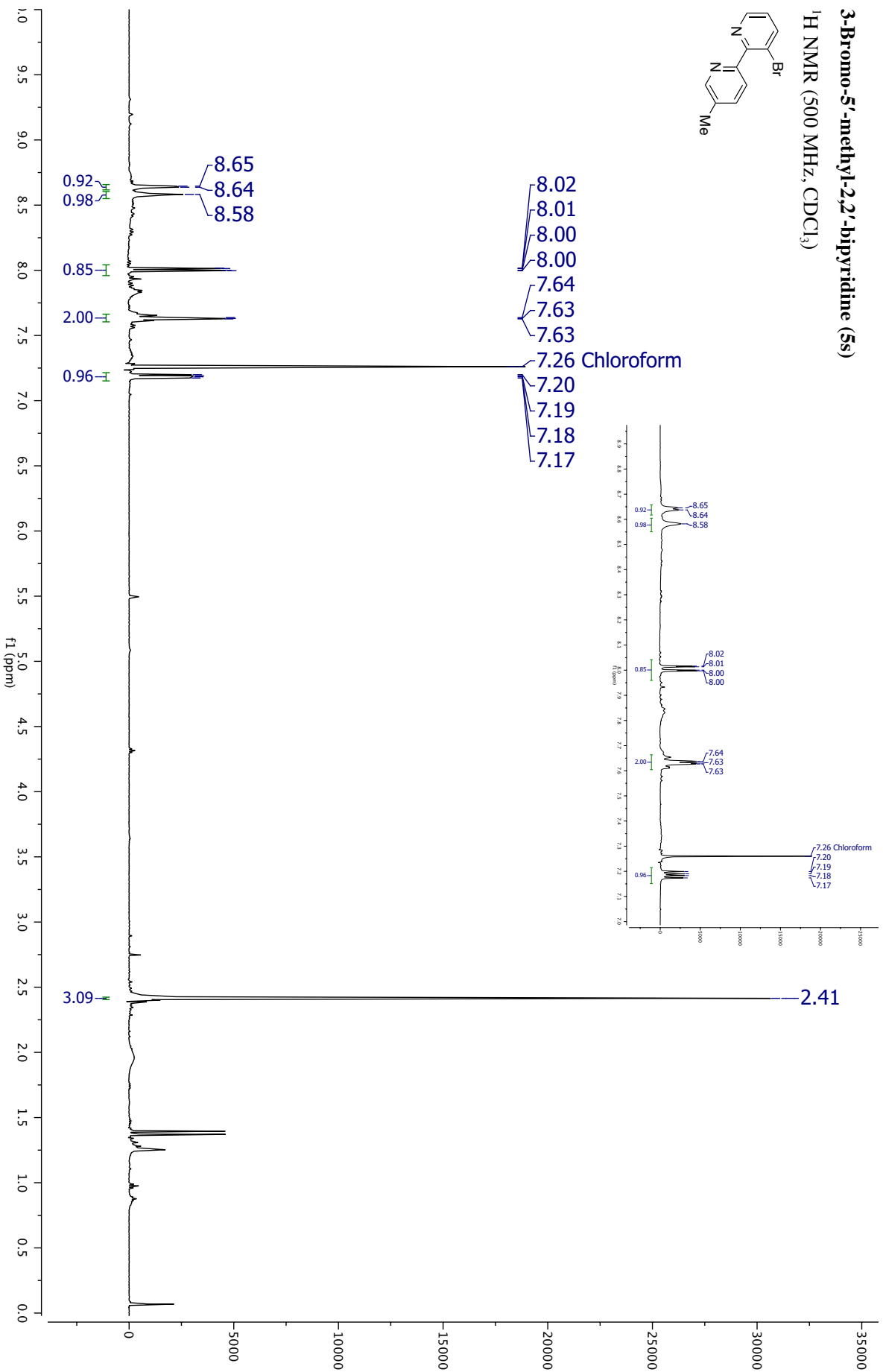
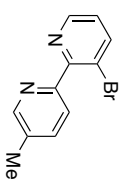
^{13}C NMR (126 MHz, CDCl_3)



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3-Bromo-5'-methyl-2,2'-bipyridine (5s)

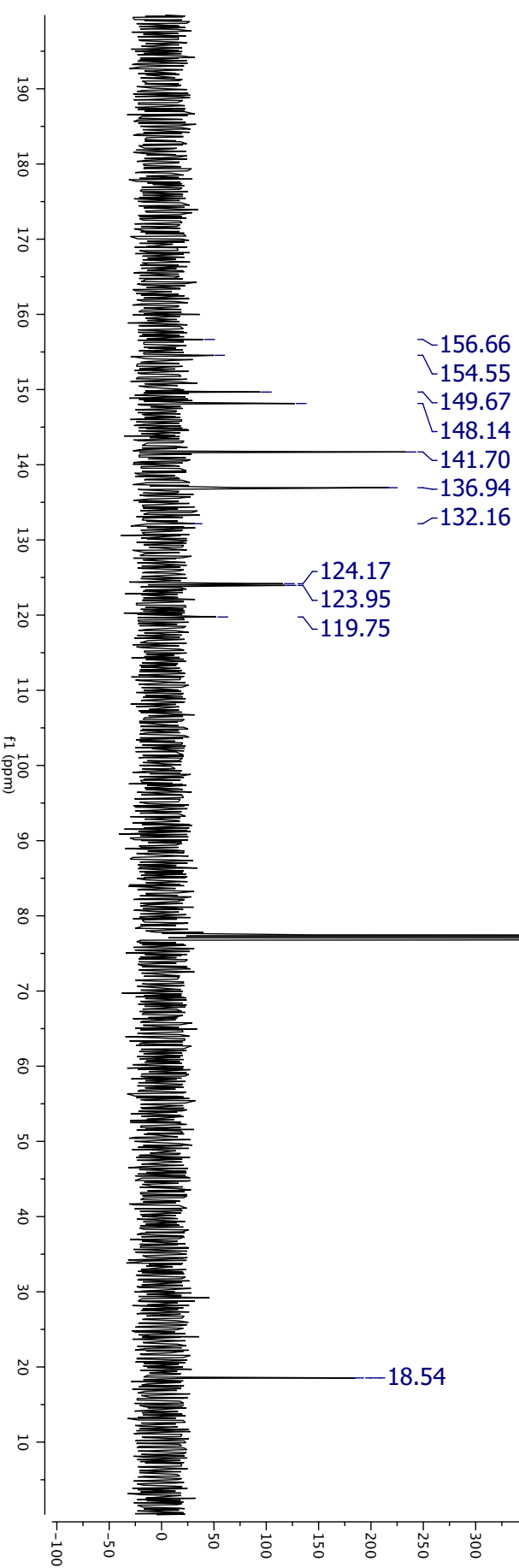
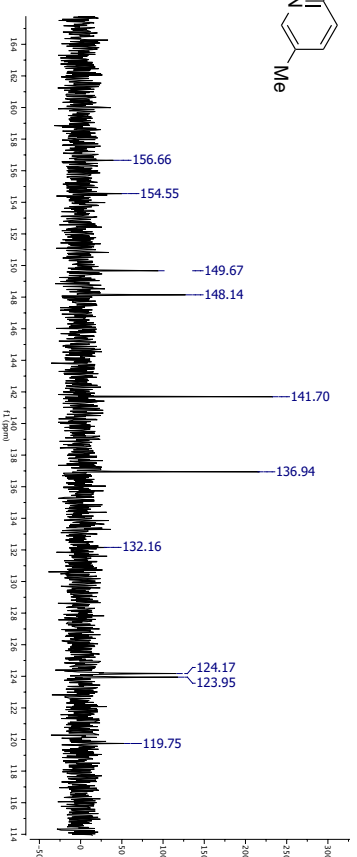
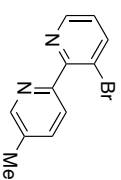
¹H NMR (500 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-5'-methyl-2,2'-bipyridine (5s)

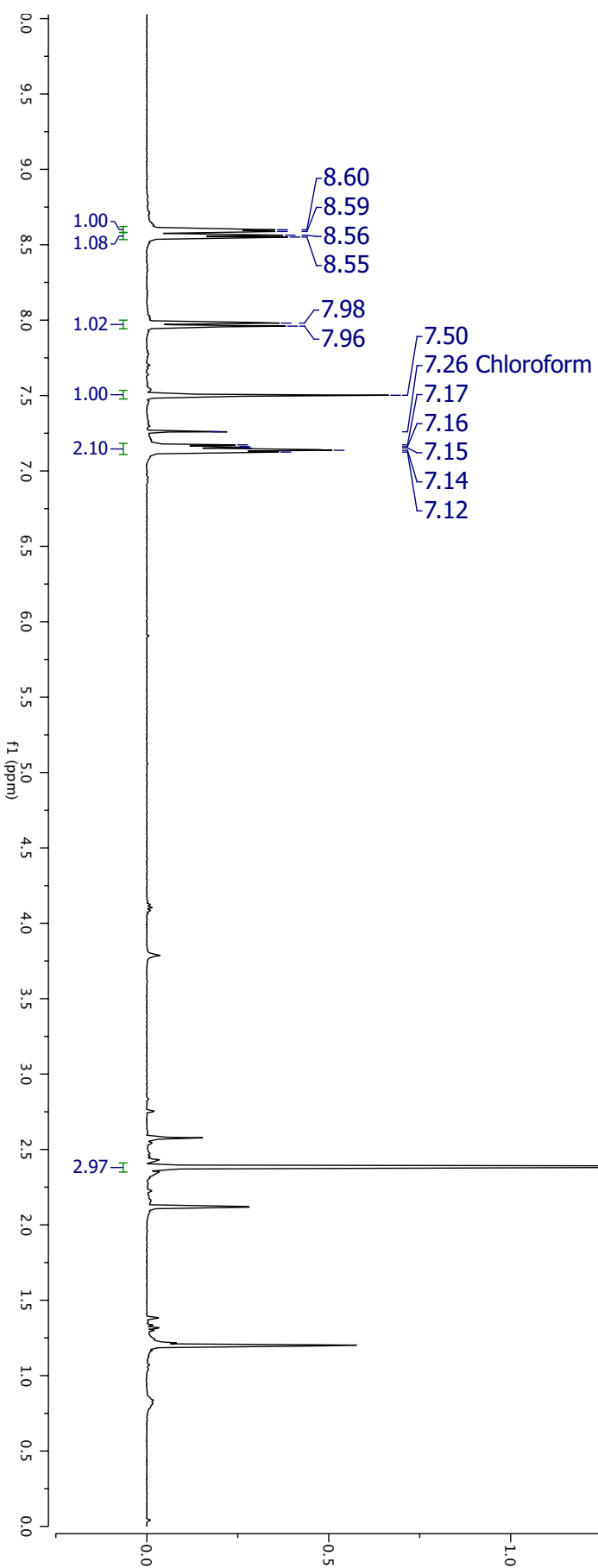
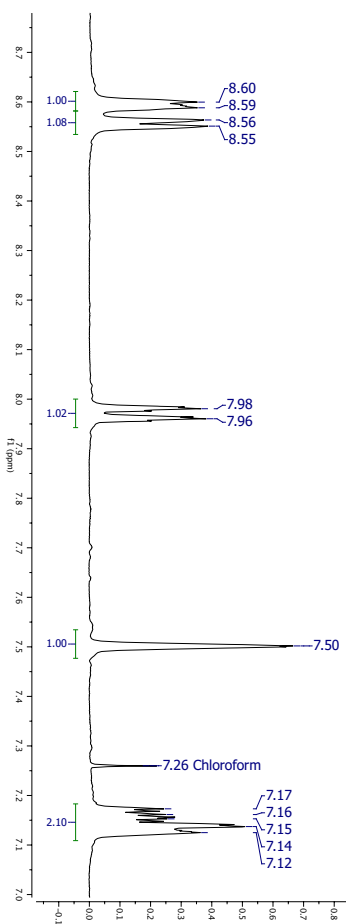
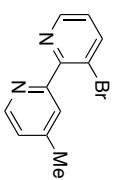
^{13}C NMR (126 MHz, CDCl_3)



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3-Bromo-4'-methyl-2,2'-bipyridine (5u)

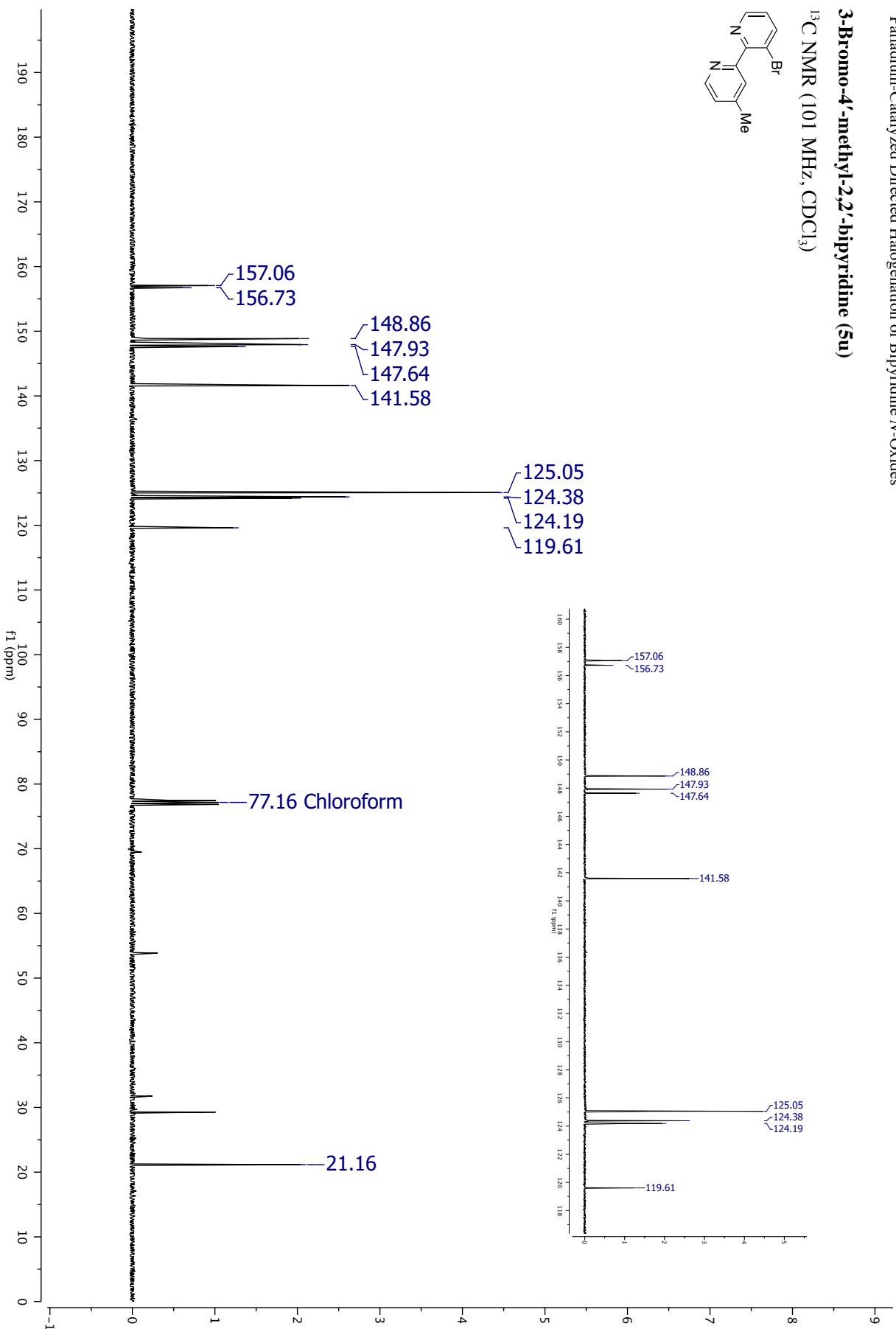
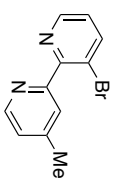
¹H NMR (400 MHz, CDCl₃)



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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-4'-methyl-2,2'-bipyridine (5u)

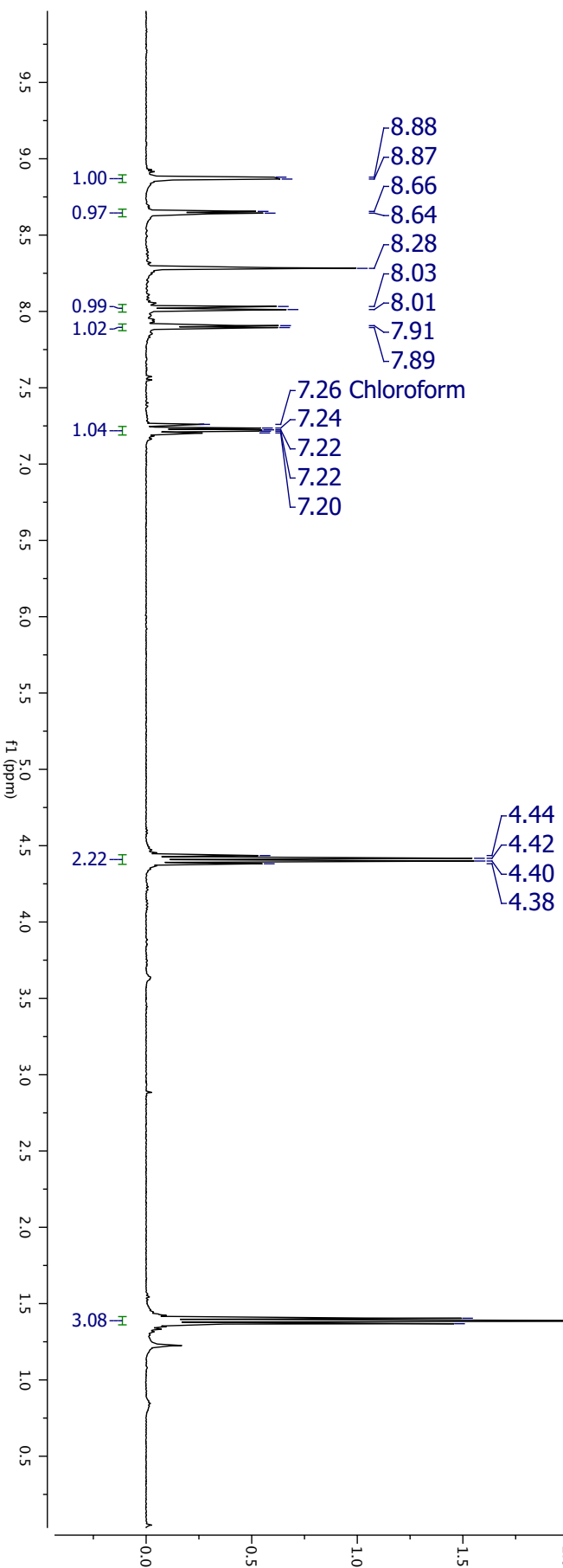
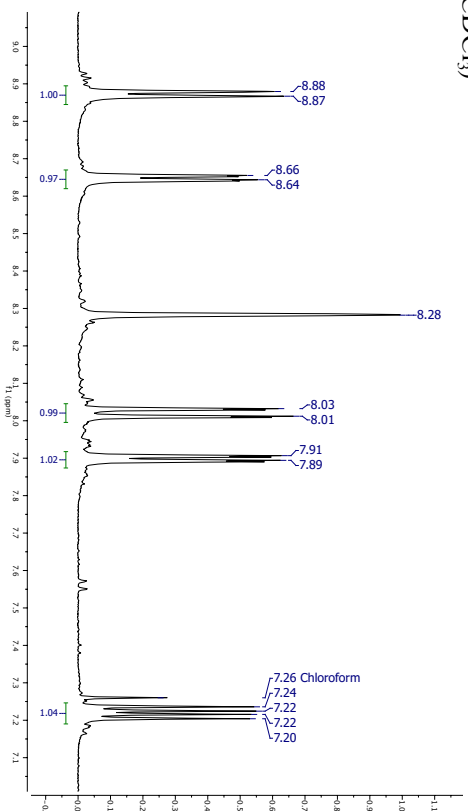
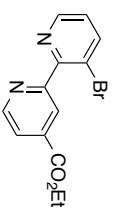
^{13}C NMR (101 MHz, CDCl_3)



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3-Bromo-4'-ethoxycarbonyl-2,2'-bipyridine (**5w**)

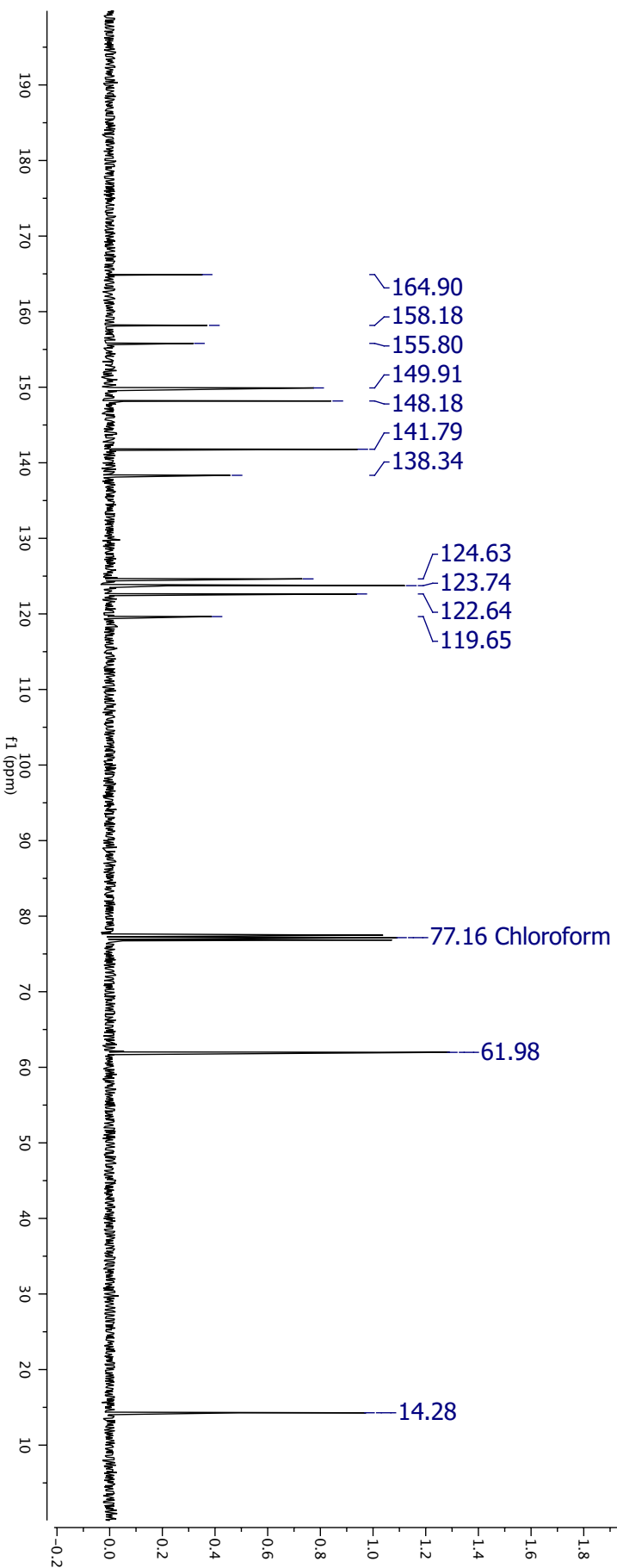
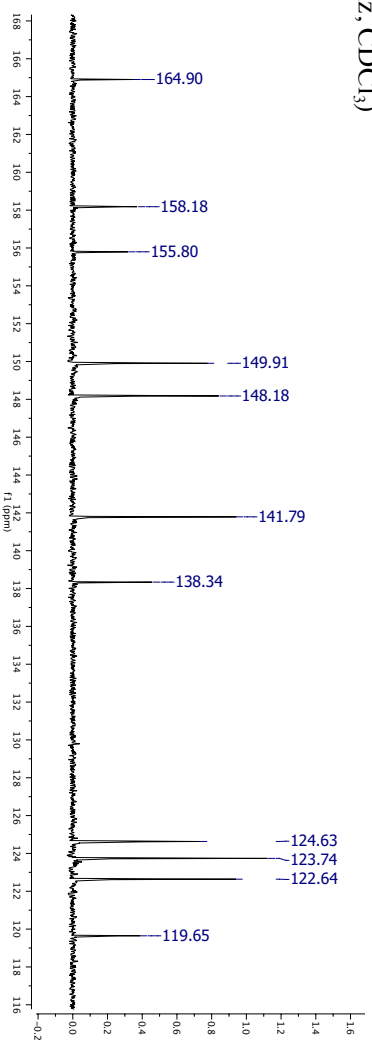
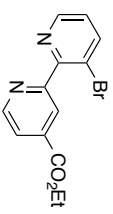
¹H NMR (400 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Bromo-4'-ethoxycarbonyl-2,2'-bipyridine (5w)

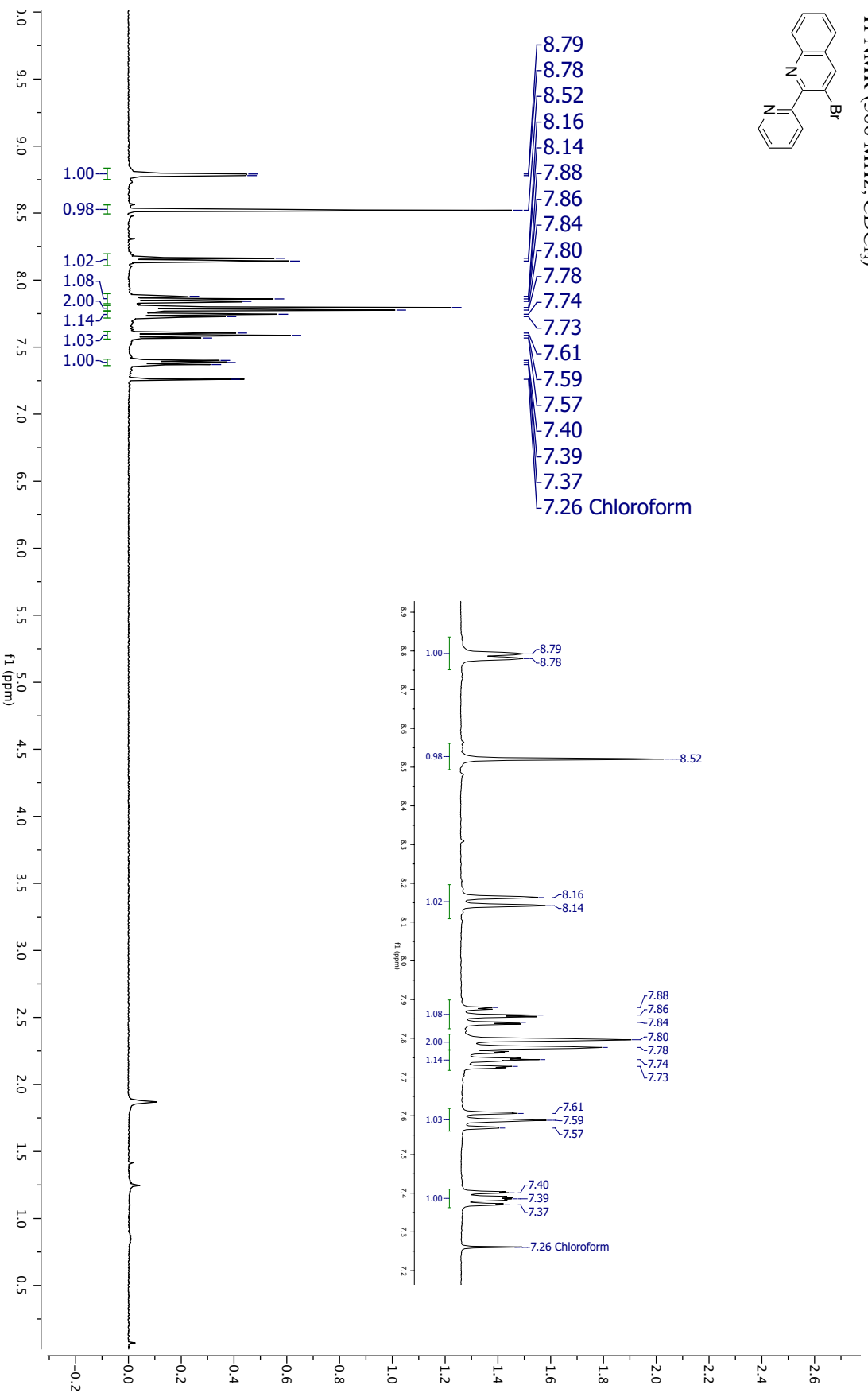
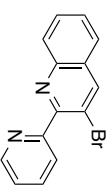
^{13}C NMR (101 MHz, CDCl_3)



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 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

3-Bromo-2-(pyridin-2-yl)quinoline (5z)

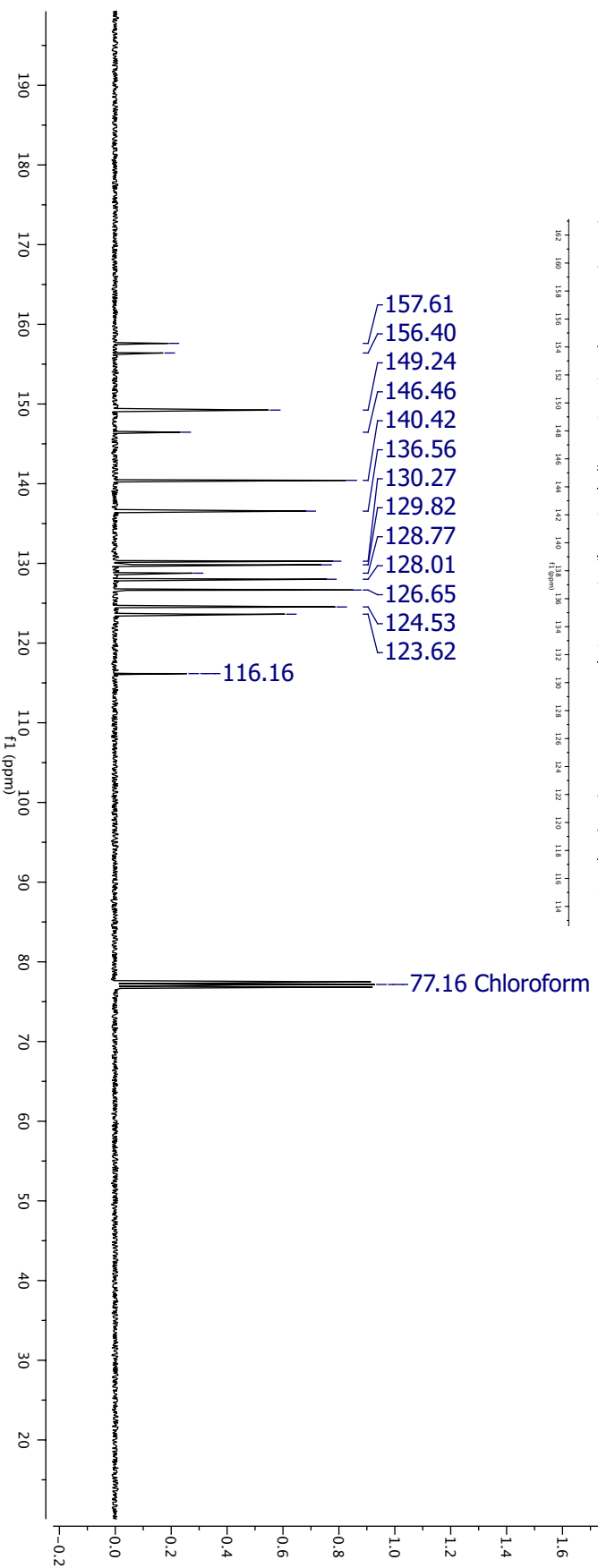
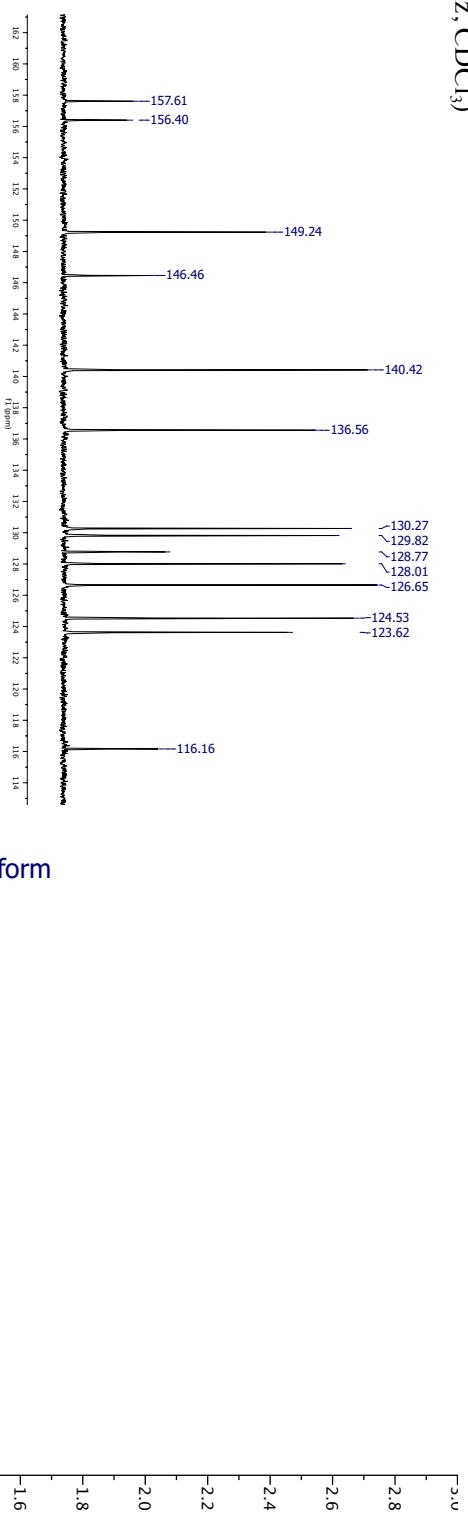
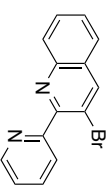
¹H NMR (500 MHz, CDCl₃)



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3-Bromo-2-(pyridin-2-yl)quinoline (**5z**)

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

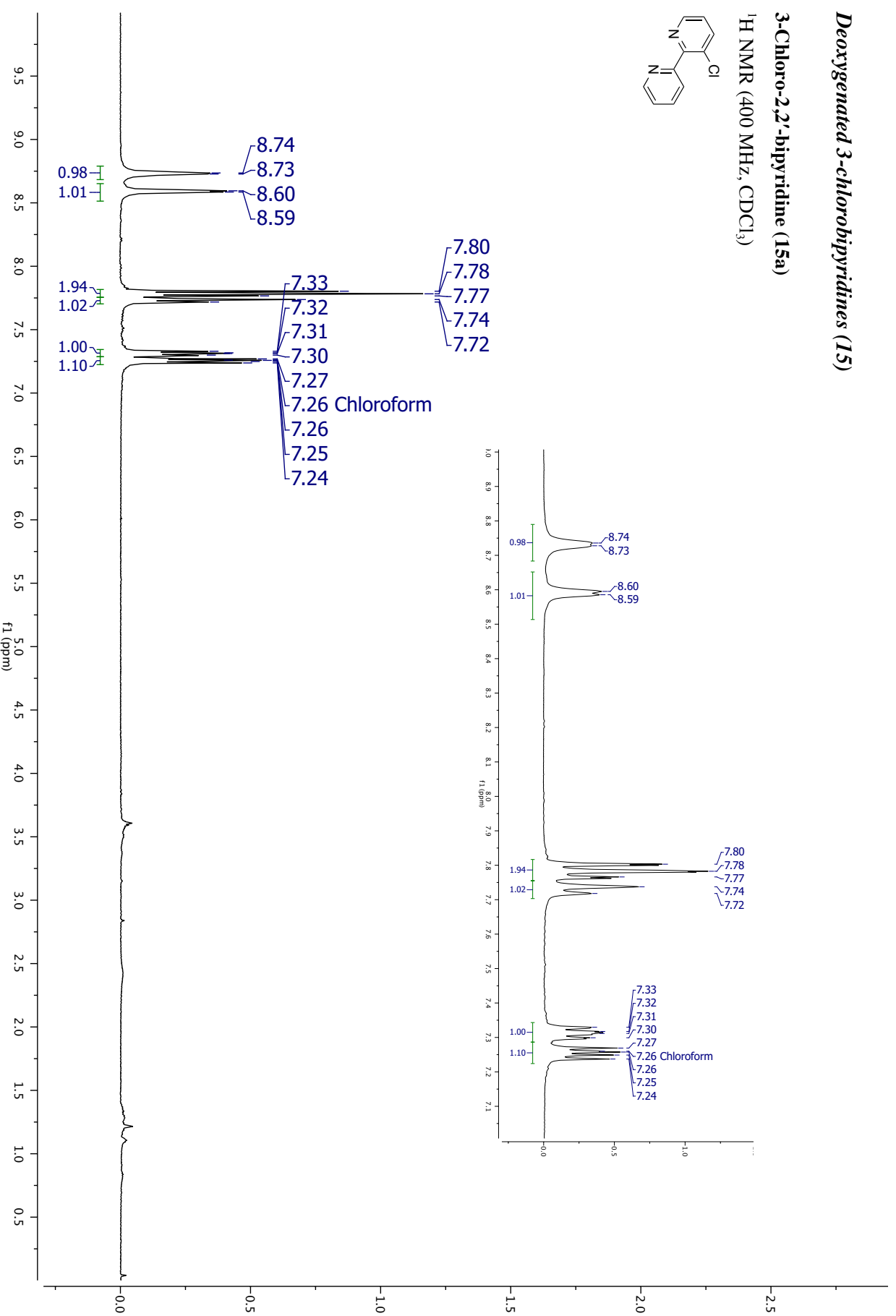
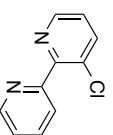


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Deoxygenated 3-chlorobipyridines (15)

3-Chloro-2,2'-bipyridine (15a)

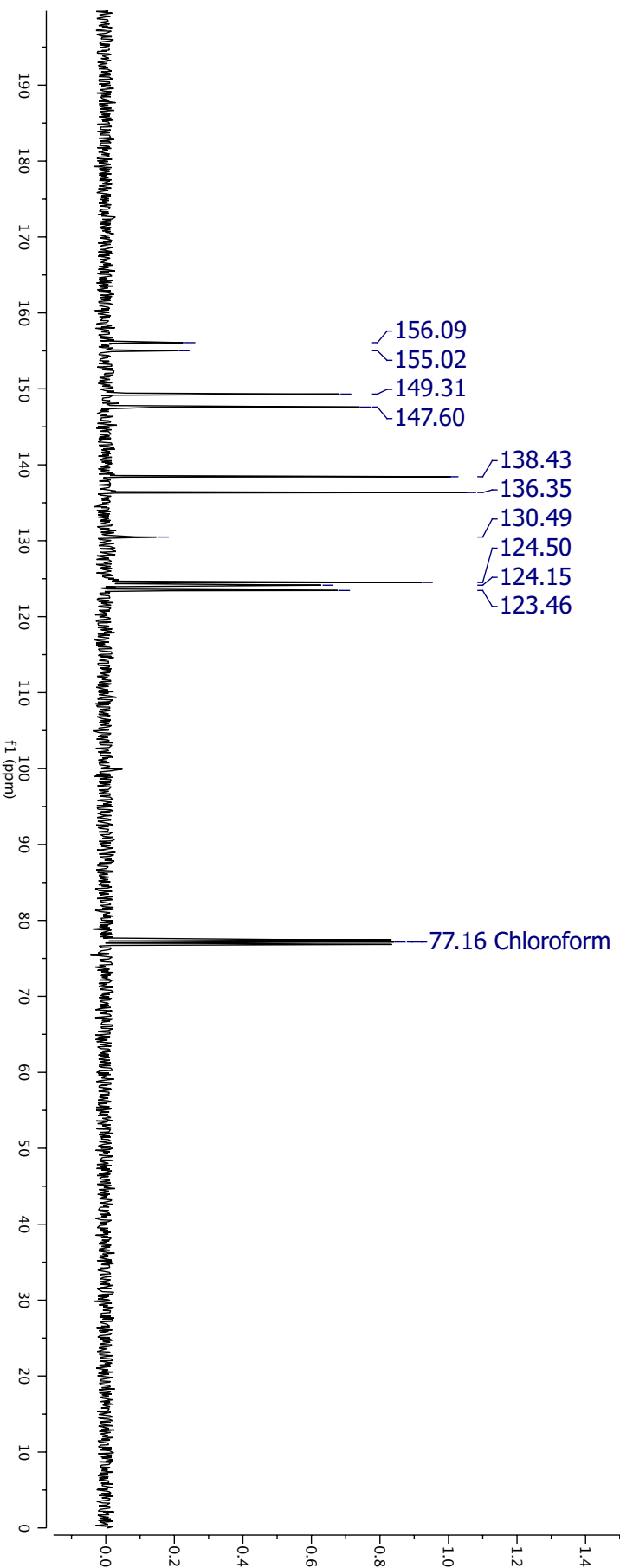
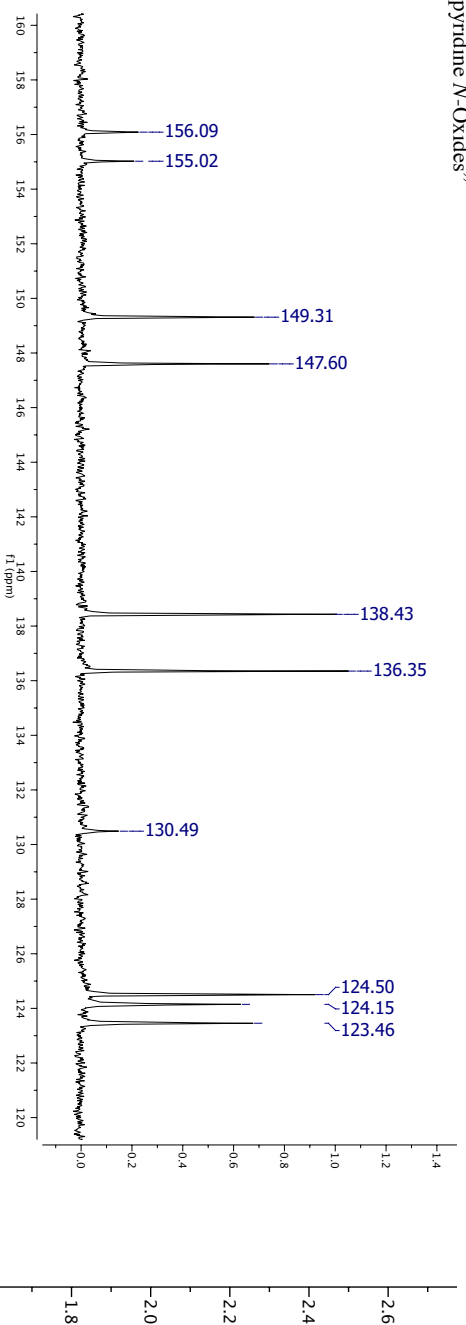
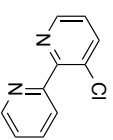
¹H NMR (400 MHz, CDCl₃)



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3-Chloro-2,2'-bipyridine (15a)

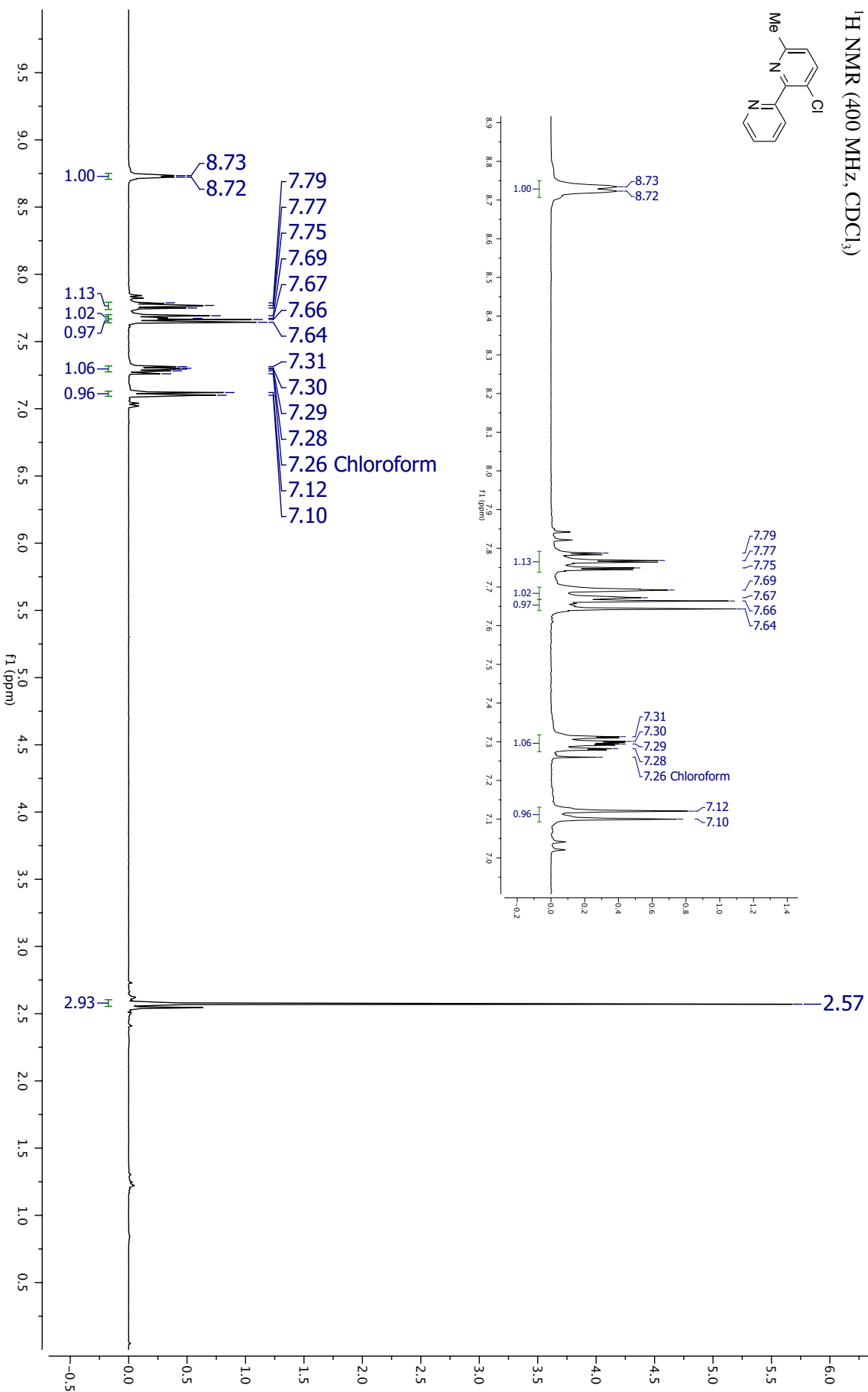
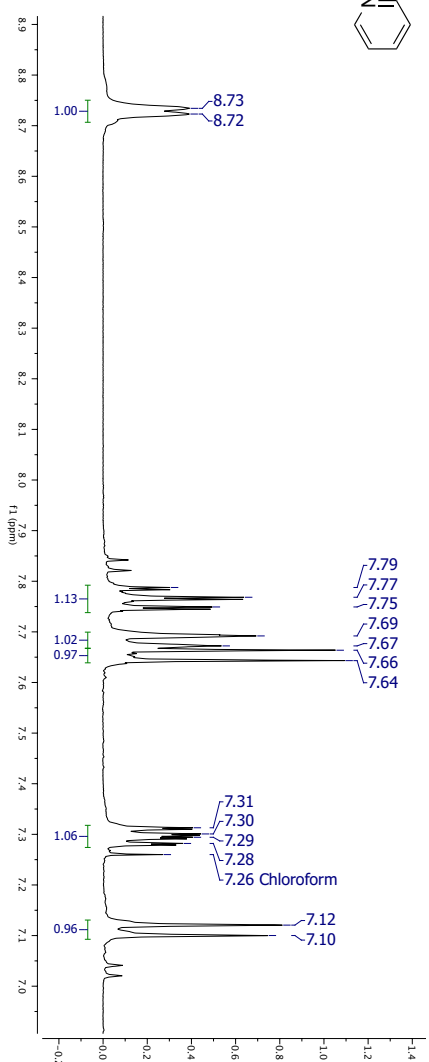
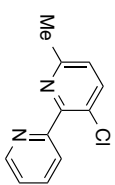
^{13}C NMR (101 MHz, CDCl_3)



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3-Chloro-6-methyl-2,2'-bipyridine (15b)

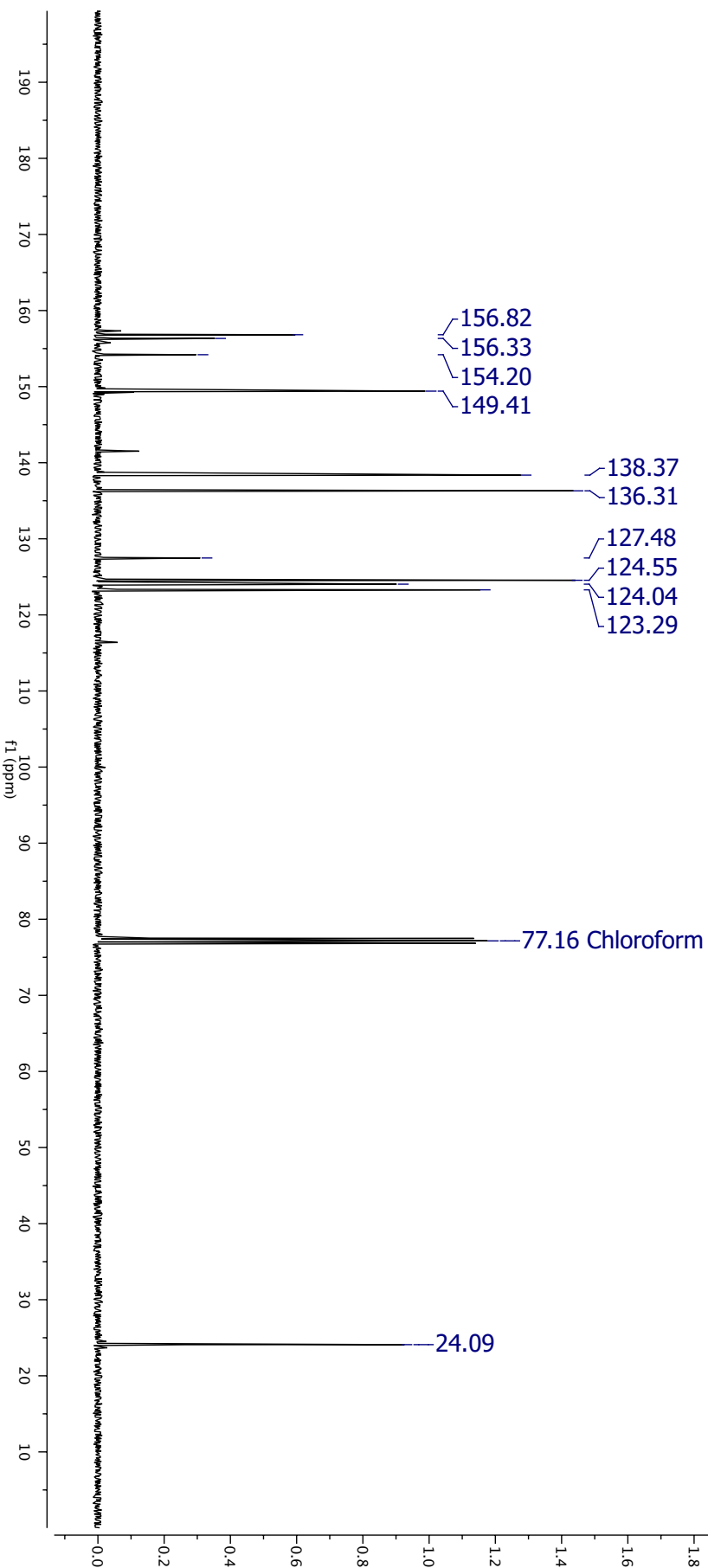
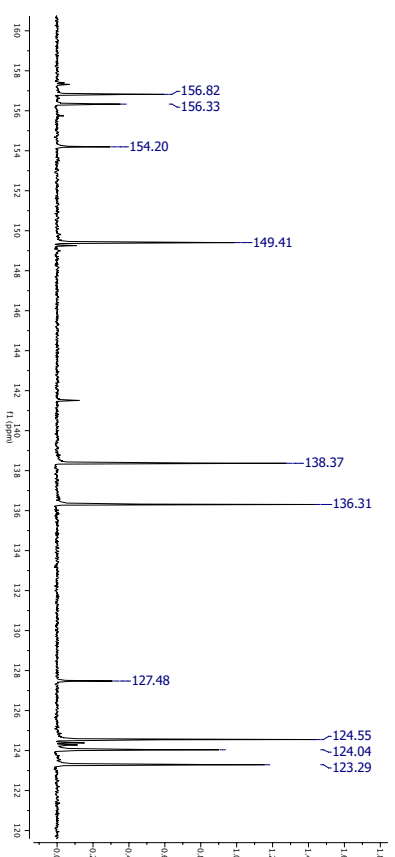
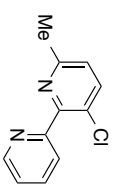
¹H NMR (400 MHz, CDCl₃)



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3-Chloro-6-methyl-2,2'-bipyridine (15b)

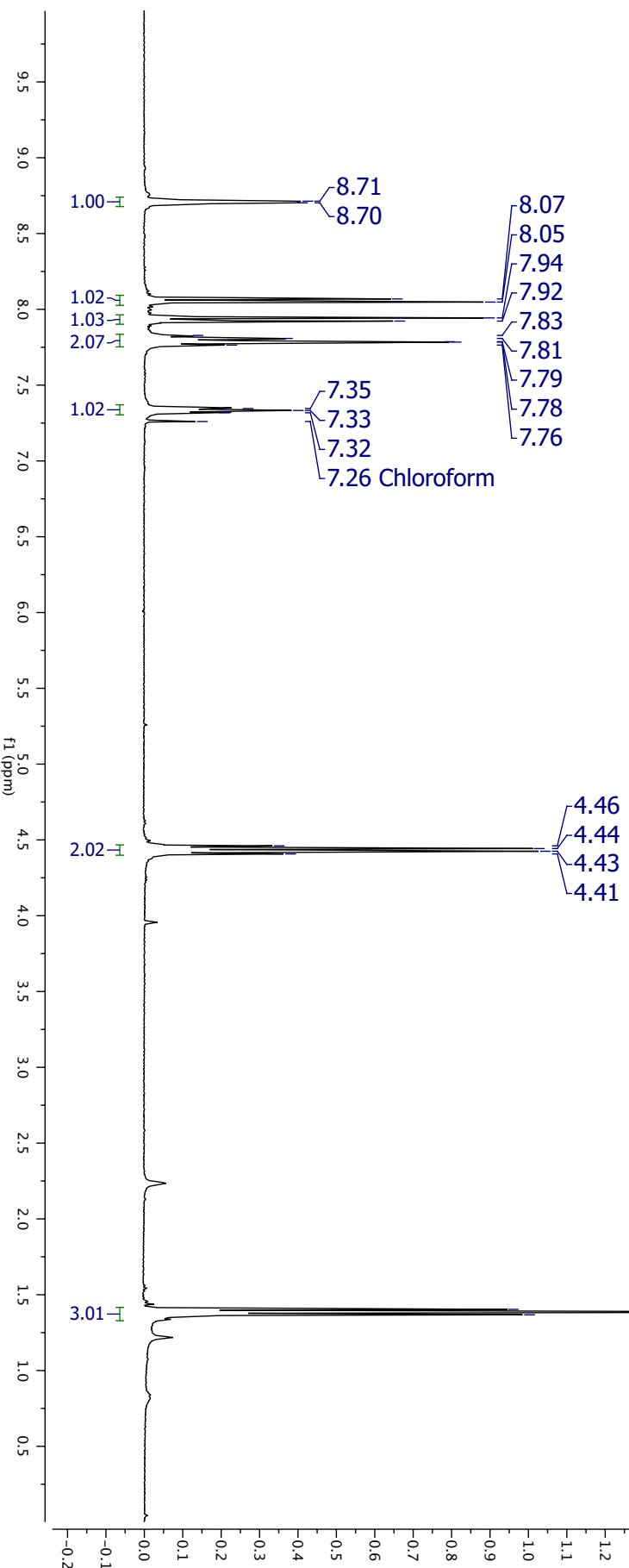
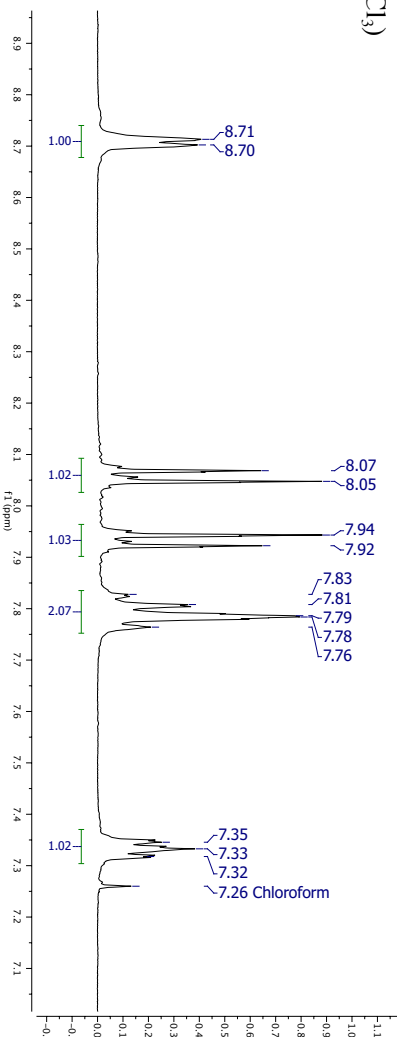
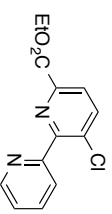
^{13}C NMR (101 MHz, CDCl_3)



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3-Chloro-6-ethoxycarbonyl-2,2'-bipyridine (15c)

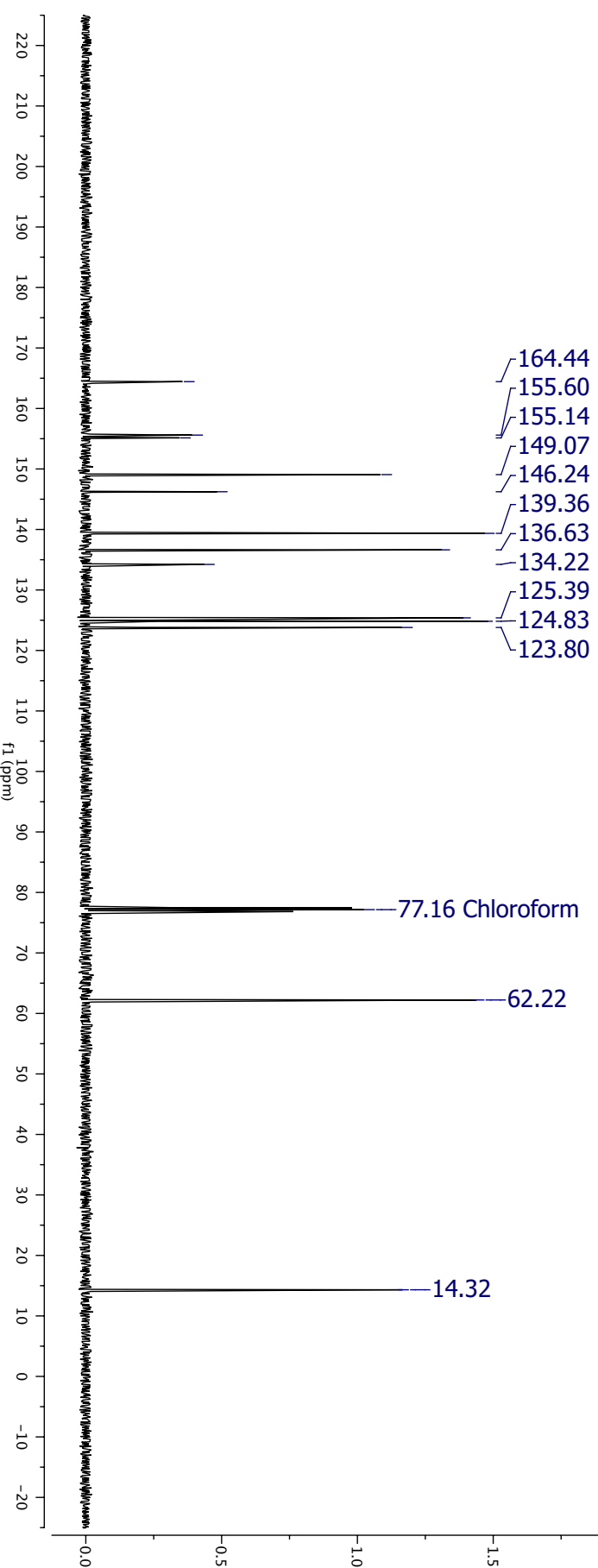
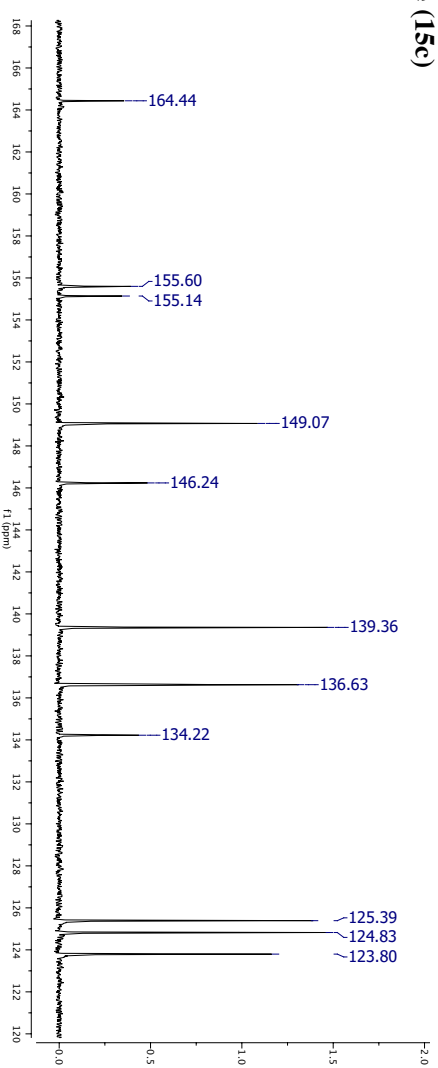
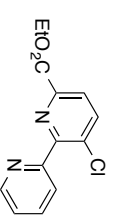
¹H NMR (400 MHz, CDCl₃)



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3-Chloro-6-ethoxycarbonyl-2,2'-bipyridine (15c)

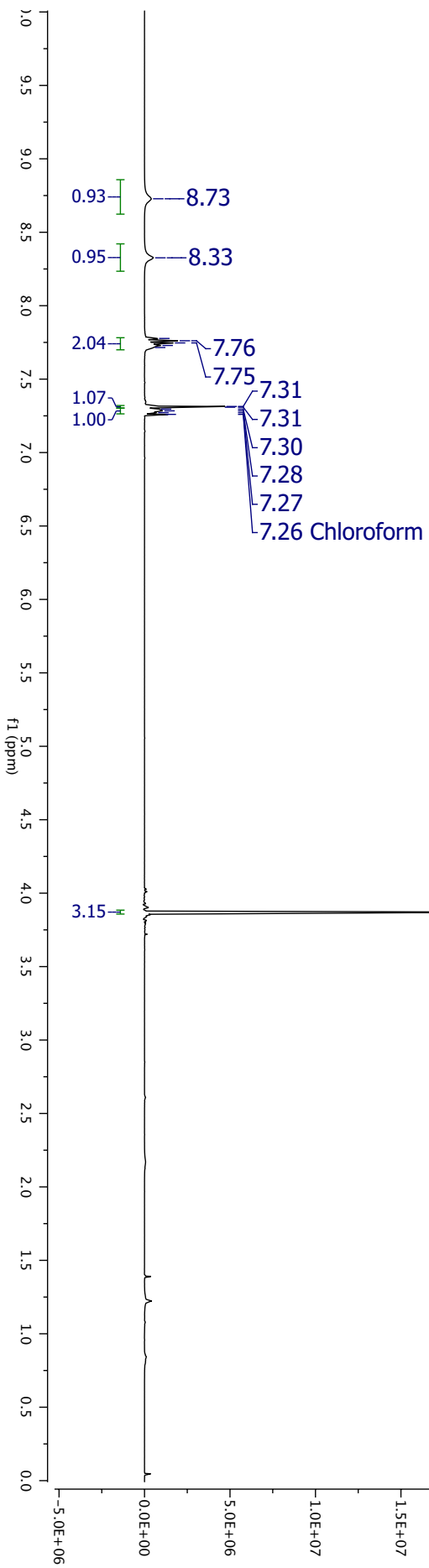
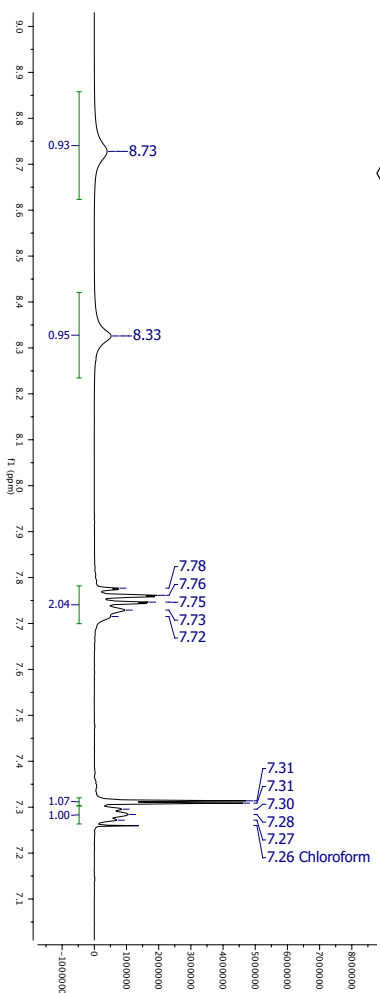
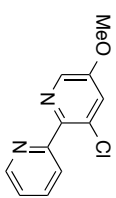
^{13}C NMR (101 MHz, CDCl_3)



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3-Chloro-5-methoxy-2,2'-bipyridine (15f)

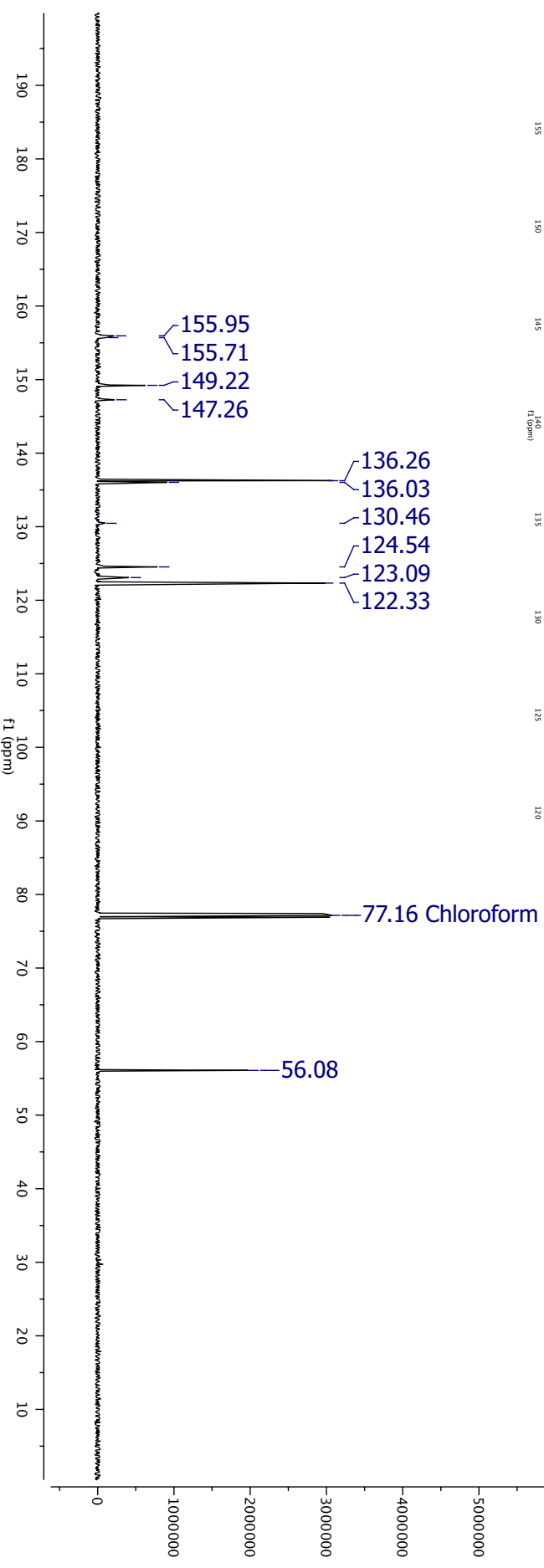
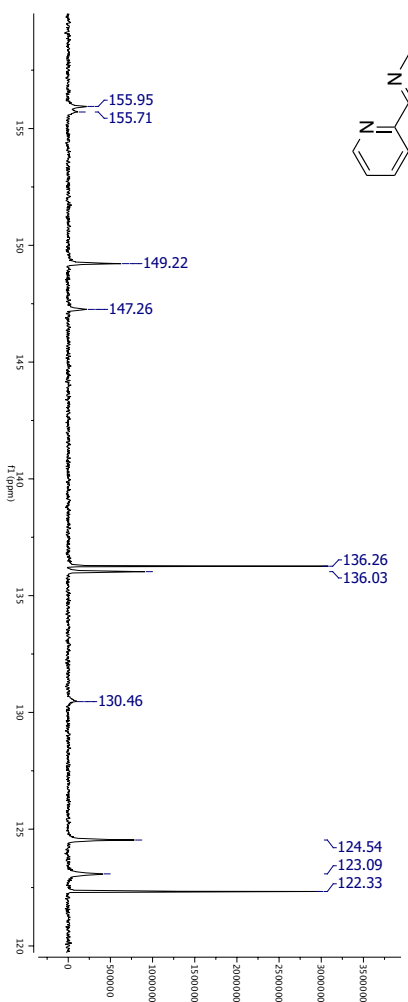
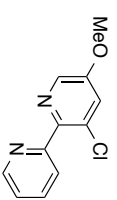
¹H NMR (500 MHz, CDCl₃)



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3-Chloro-5-methoxy-2,2'-bipyridine (15f)

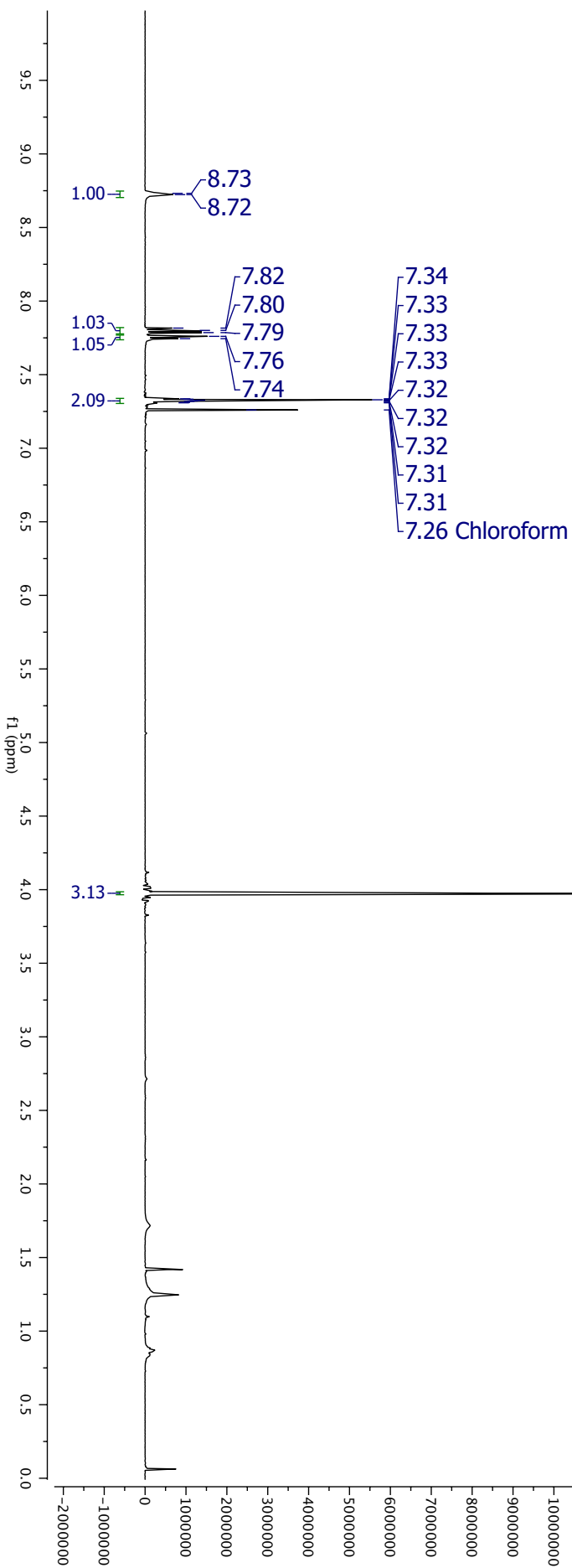
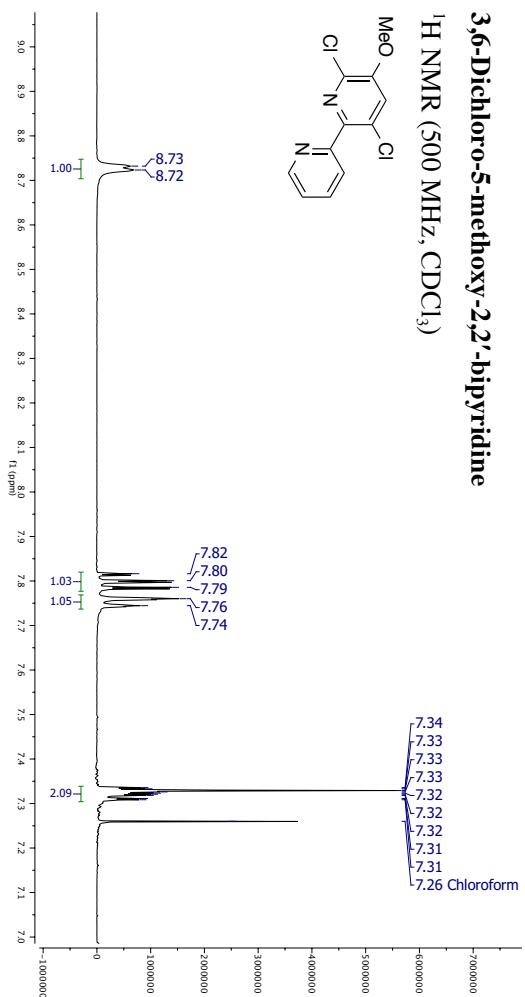
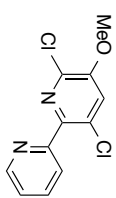
^{13}C NMR (126 MHz, CDCl_3)



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3,6-Dichloro-5-methoxy-2,2'-bipyridine

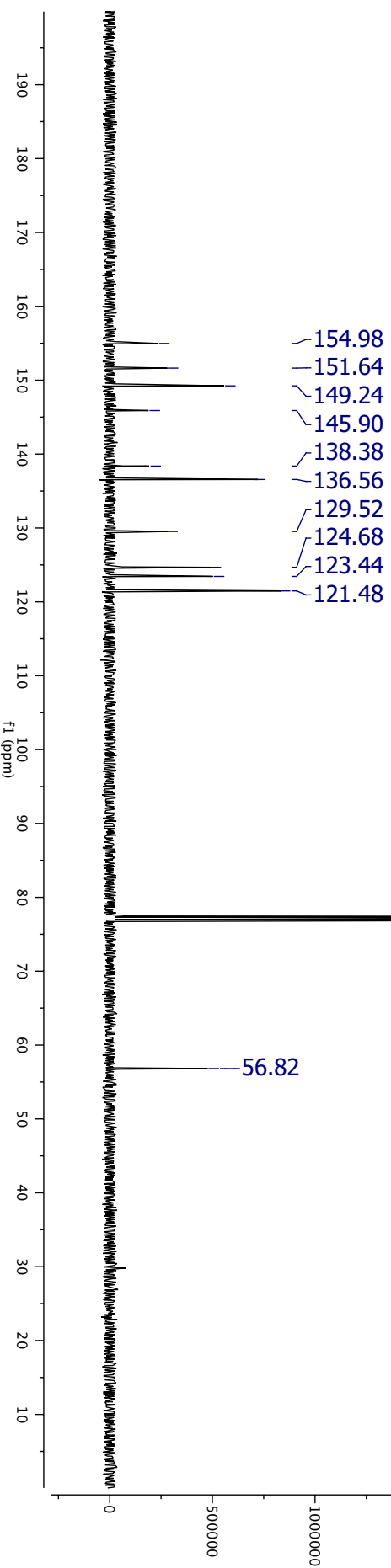
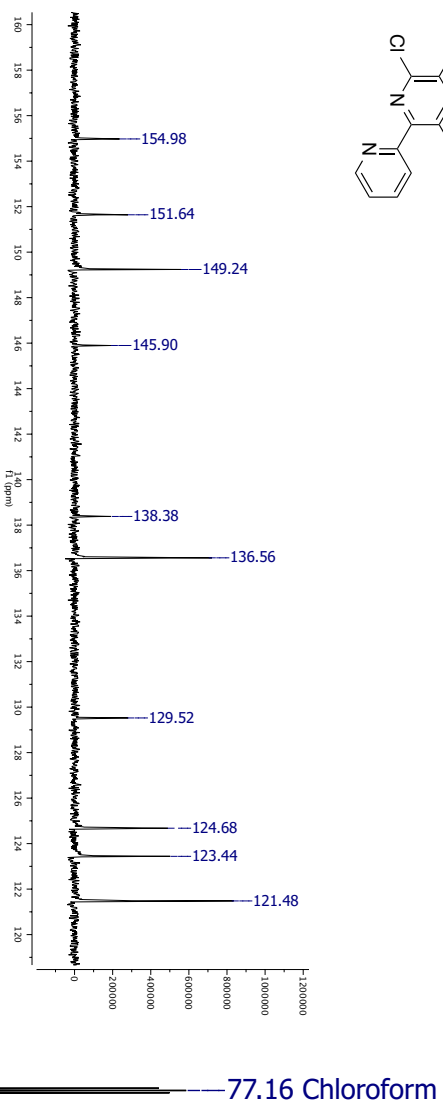
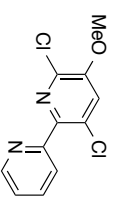
¹H NMR (500 MHz, CDCl₃)



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3,6-Dichloro-5-methoxy-2,2'-bipyridine

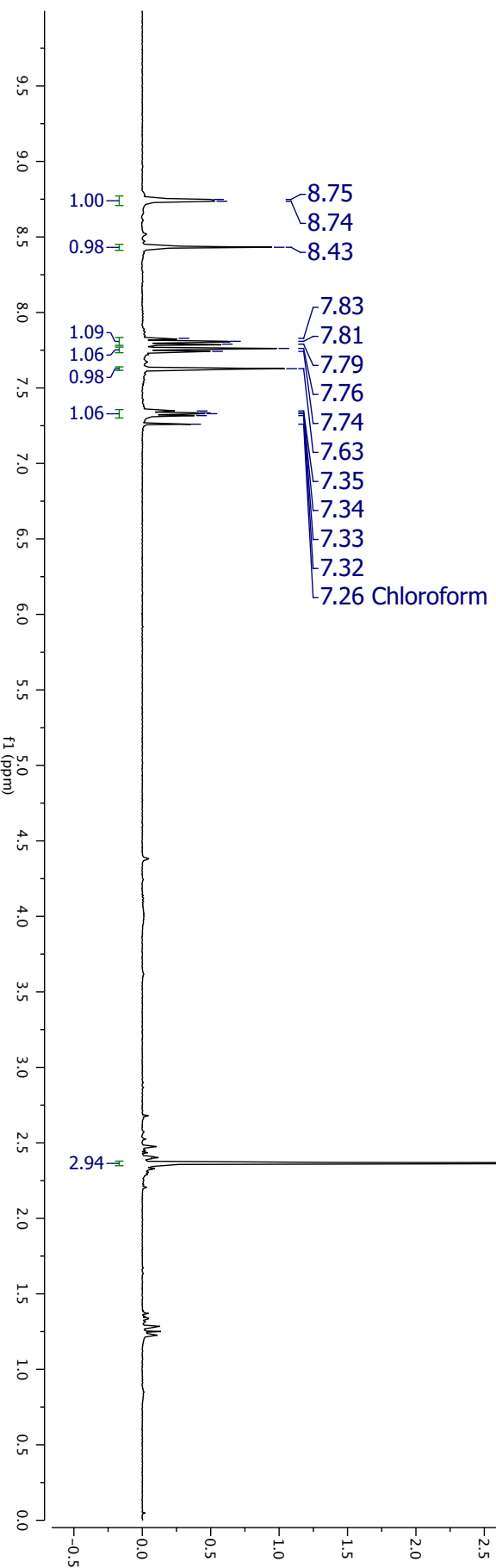
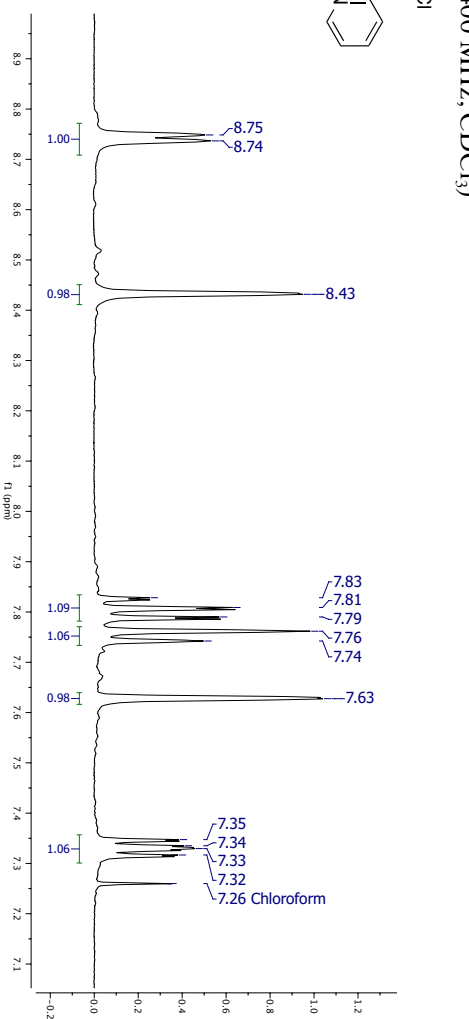
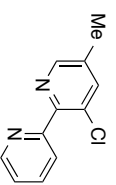
^{13}C NMR (126 MHz, CDCl_3)



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3-Chloro-5-methyl-2,2'-bipyridine (15g)

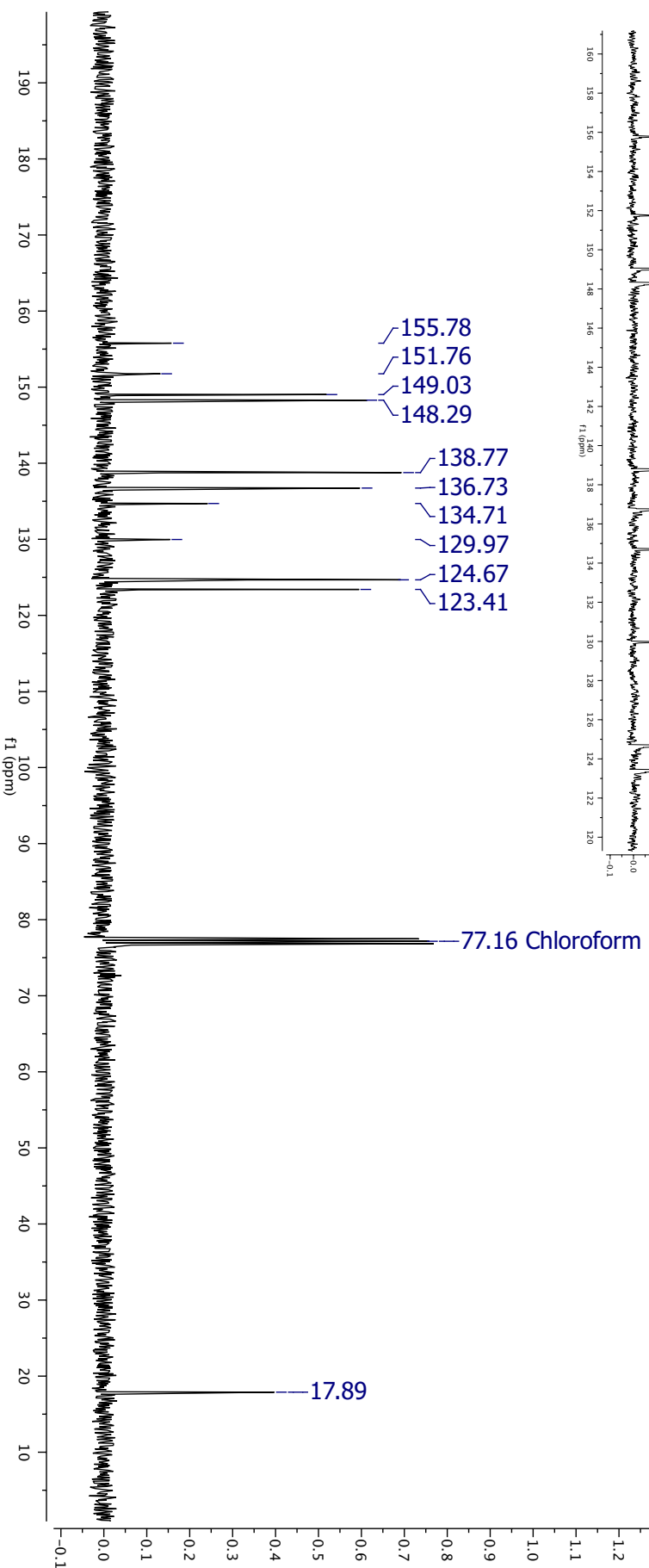
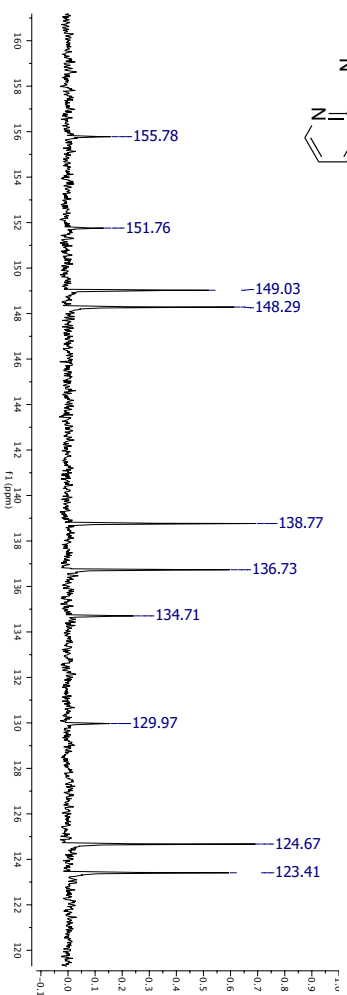
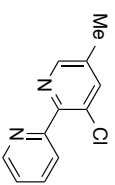
¹H NMR (400 MHz, CDCl₃)



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3-Chloro-5-methyl-2,2'-bipyridine (15g)

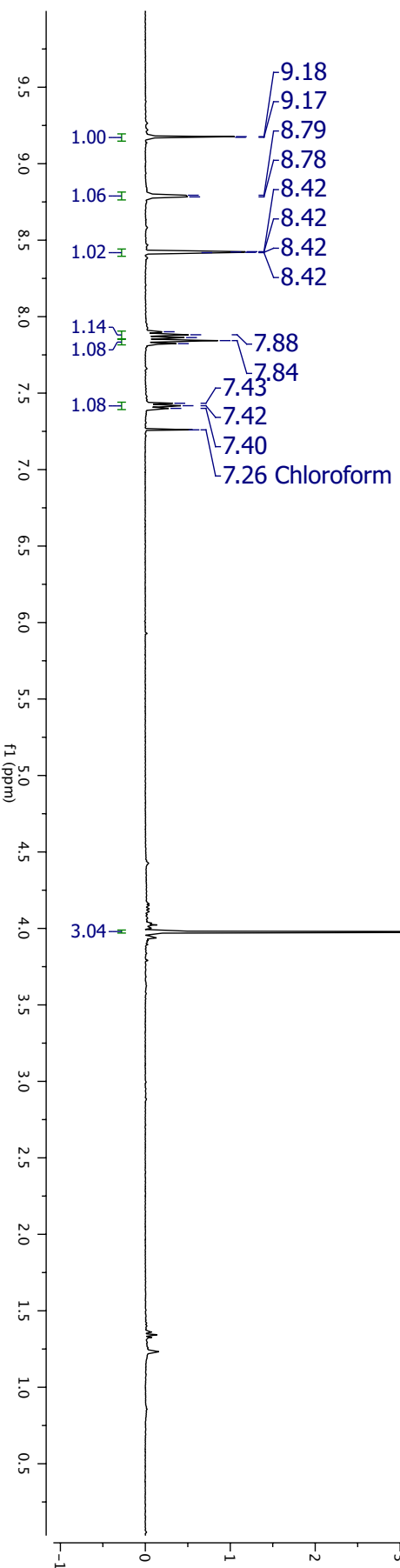
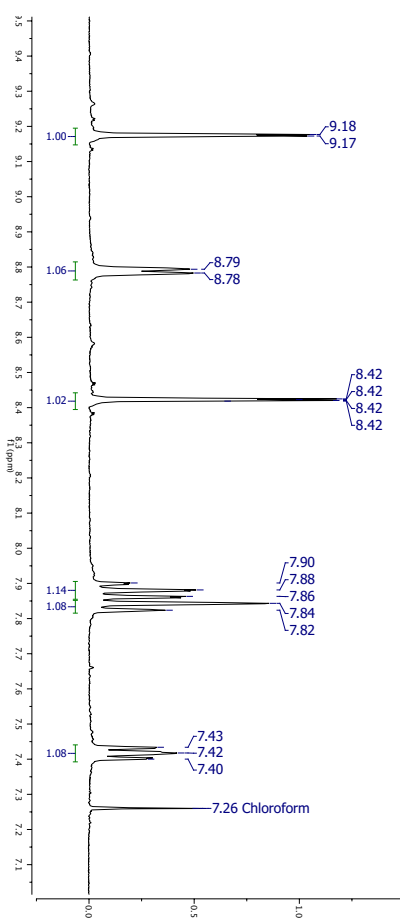
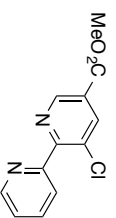
^{13}C NMR (101 MHz, CDCl_3)



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3-Chloro-5-methoxycarbonyl-2,2'-bipyridine (15h)

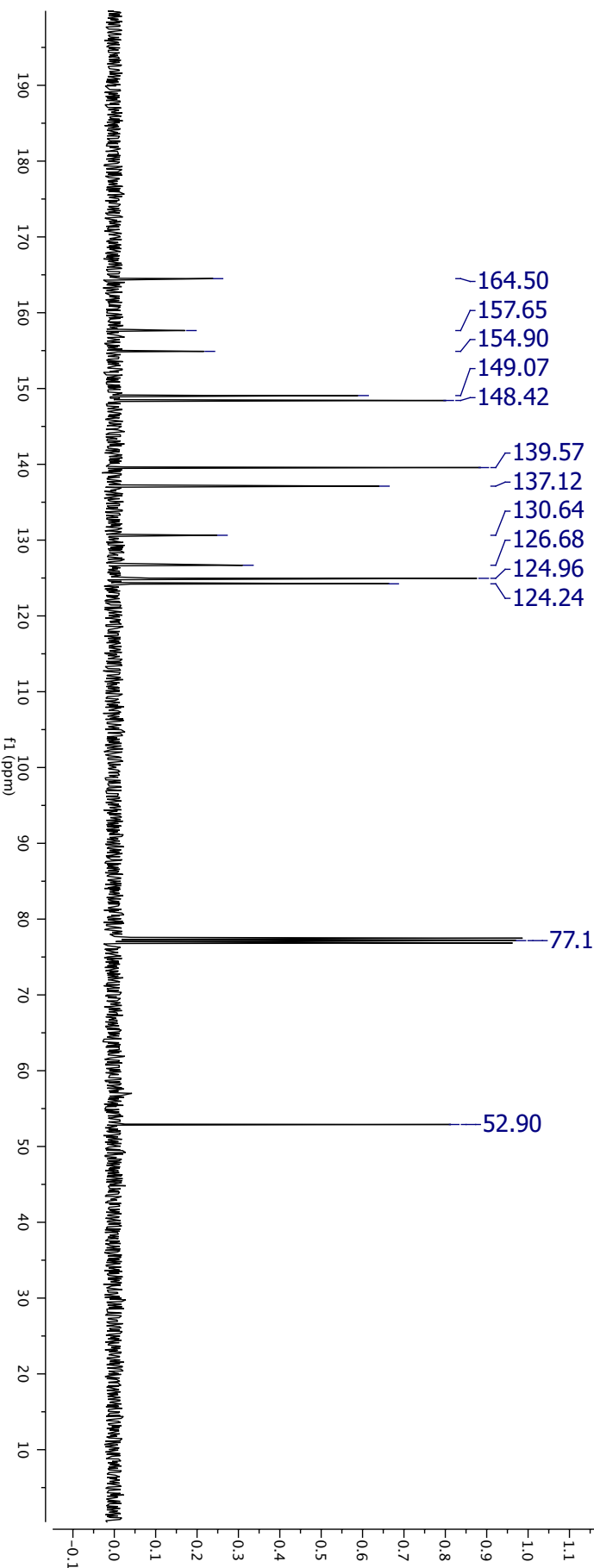
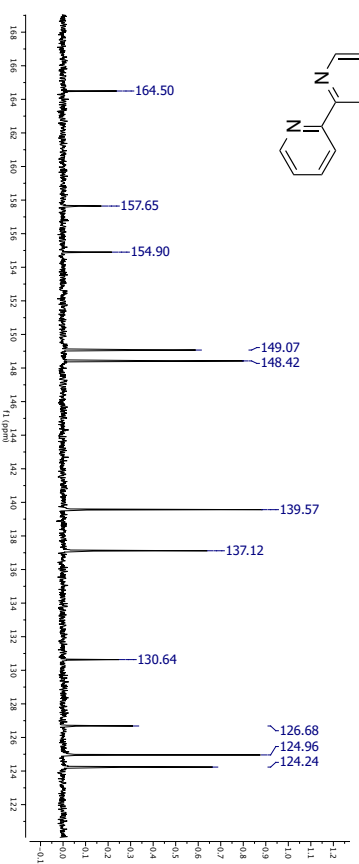
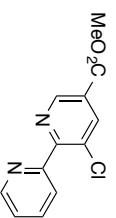
¹H NMR (400 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-5-methoxycarbonyl-2,2'-bipyridine (15h)

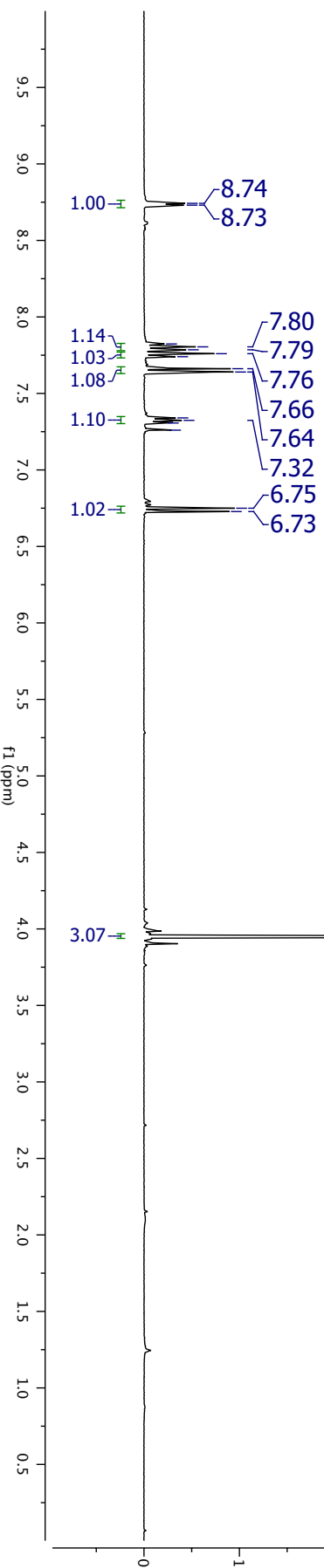
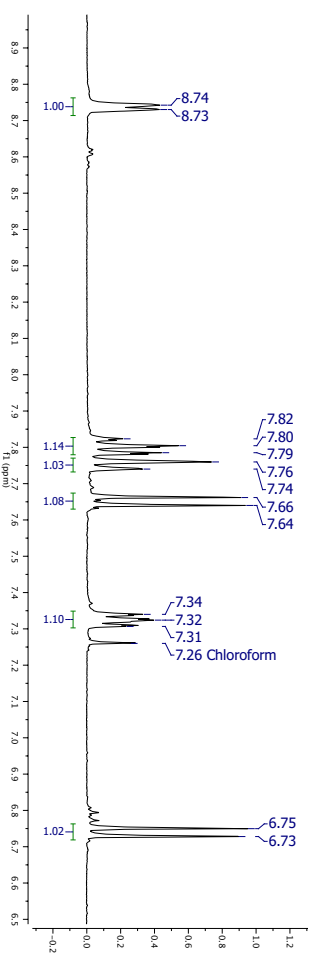
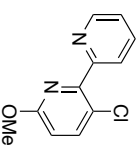
^{13}C NMR (101 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-6-methoxy-2,2'-bipyridine (15p)

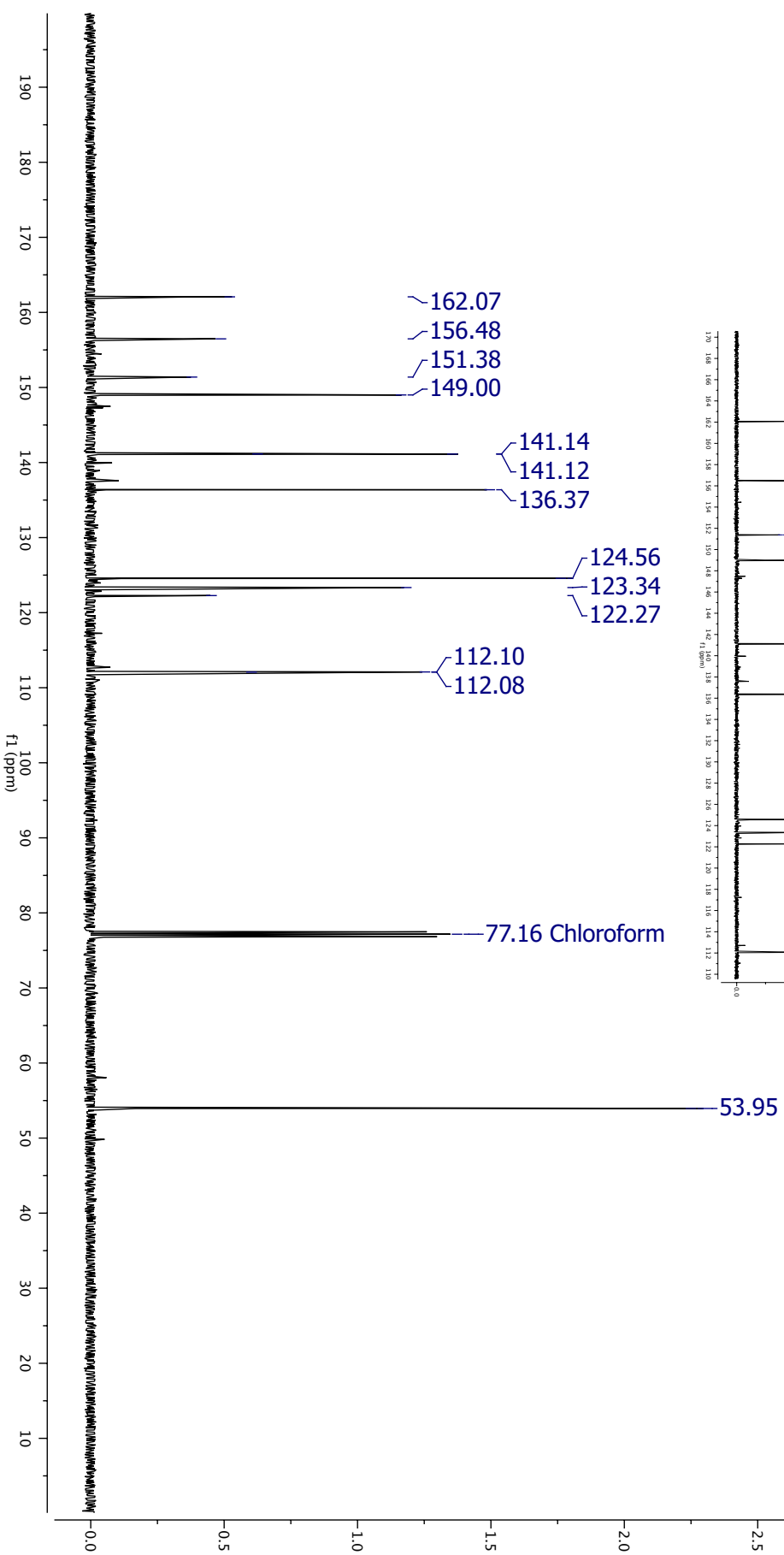
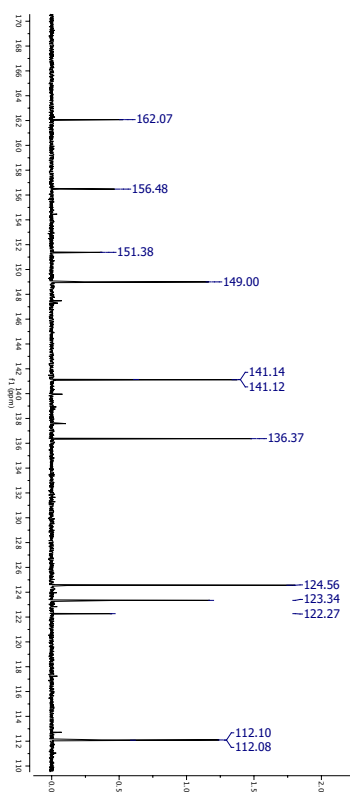
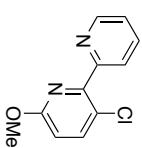
¹H NMR (400 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-6-methoxy-2,2'-bipyridine (15p)

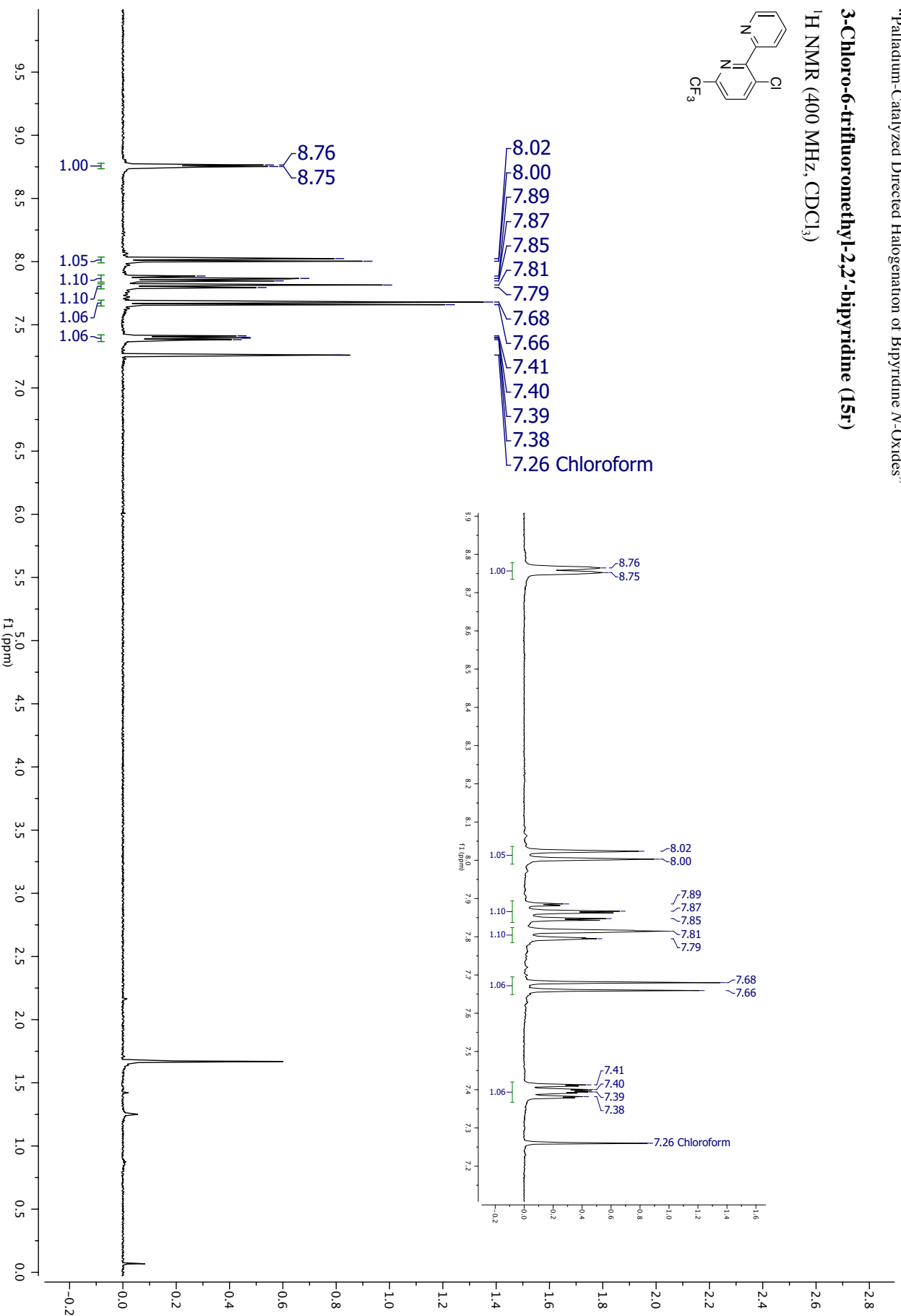
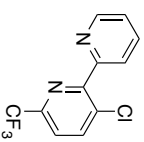
^{13}C NMR (101 MHz, CDCl_3)



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3-Chloro-6-trifluoromethyl-2,2'-bipyridine (15r)

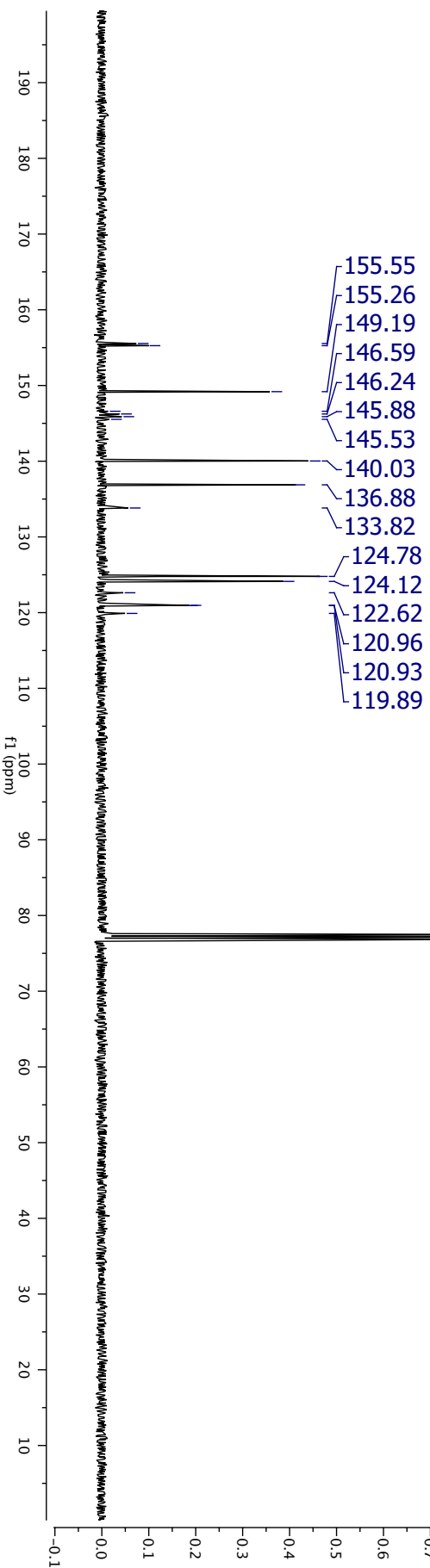
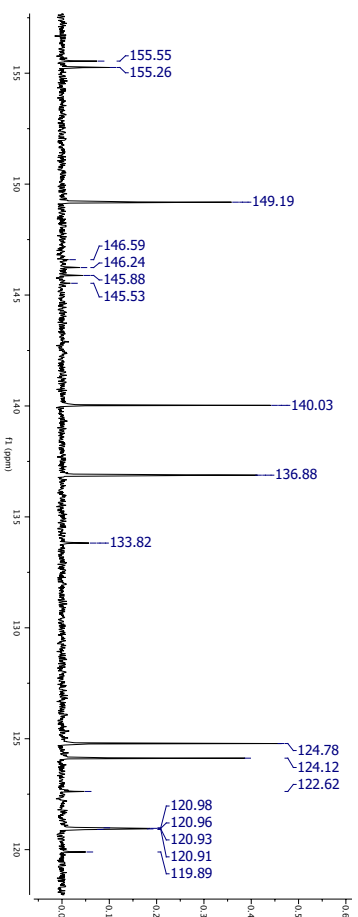
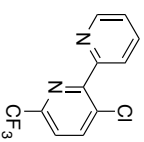
¹H NMR (400 MHz, CDCl₃)



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3-Chloro-6-trifluoromethyl-2,2'-bipyridine (**15r**)

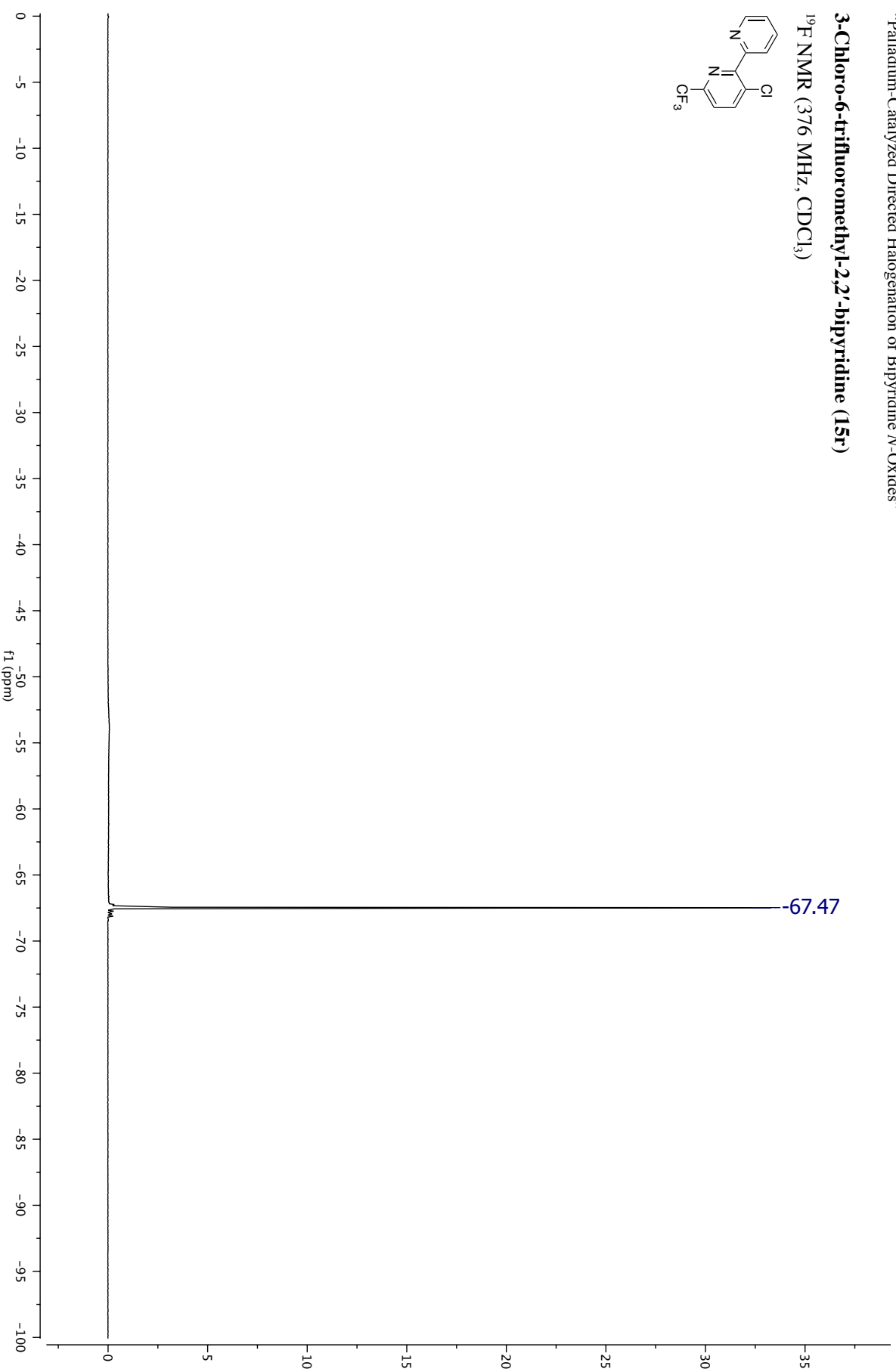
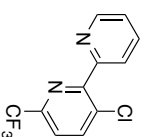
^{13}C NMR (101 MHz, CDCl_3)



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3-Chloro-6-trifluoromethyl-2,2'-bipyridine (15f)

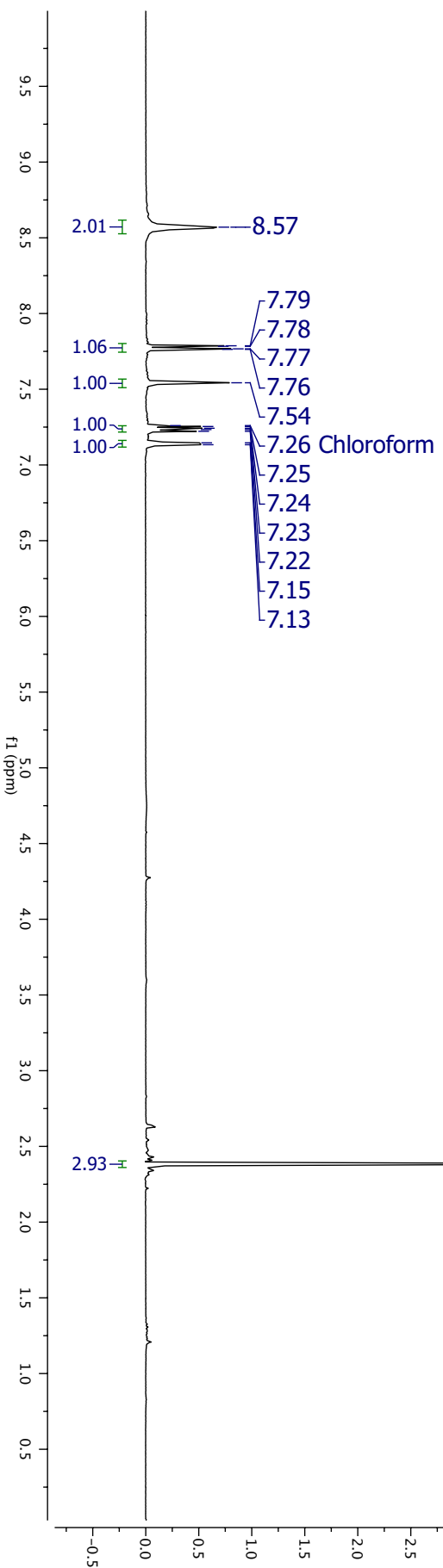
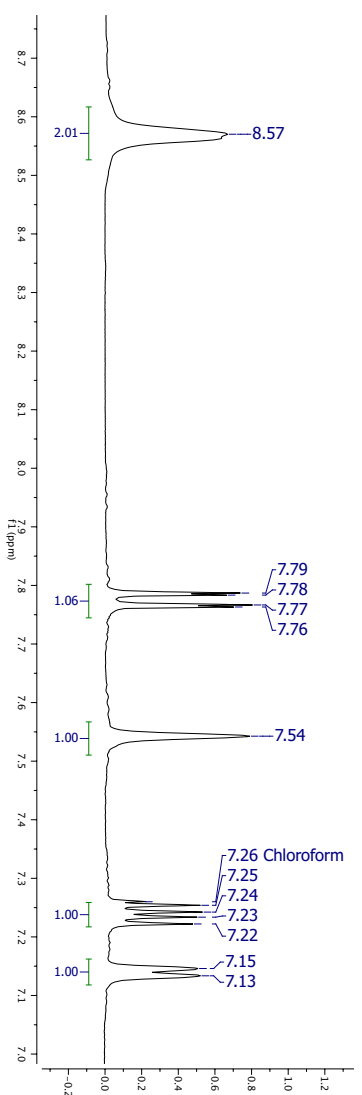
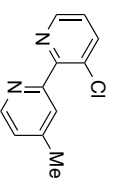
¹⁹F NMR (376 MHz, CDCl₃)



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3-Chloro-4'-methyl-2,2'-bipyridine (15u)

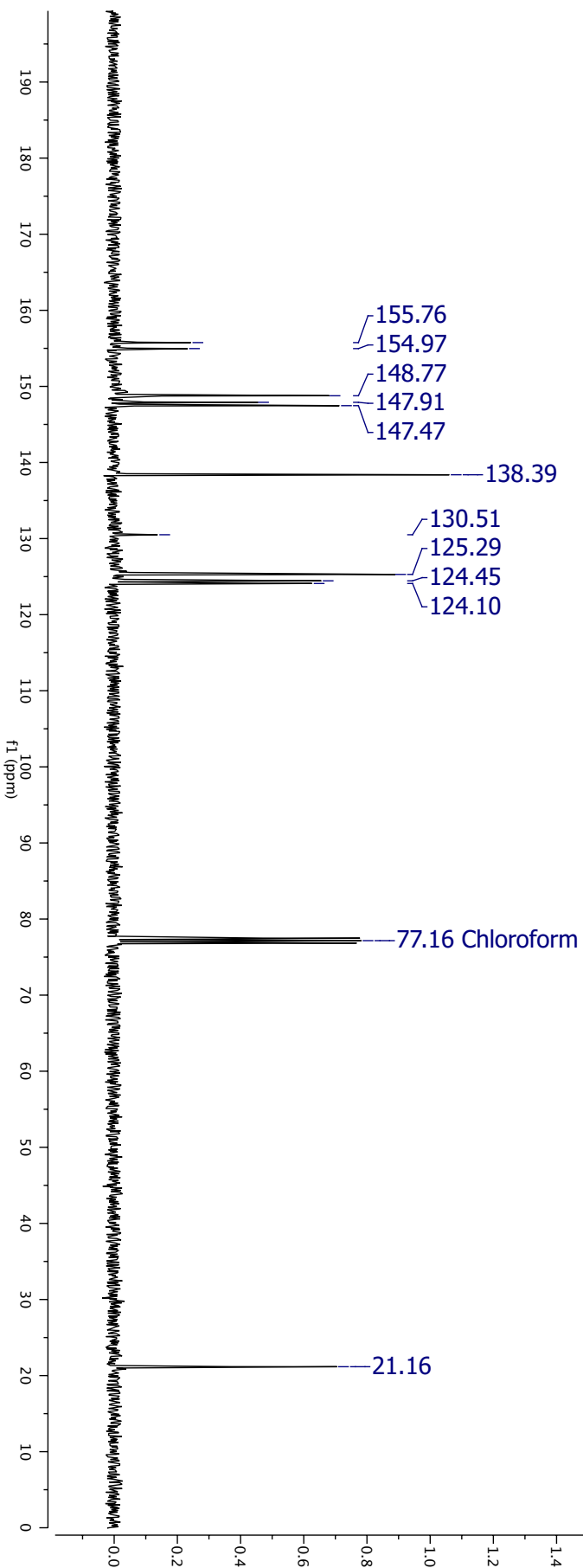
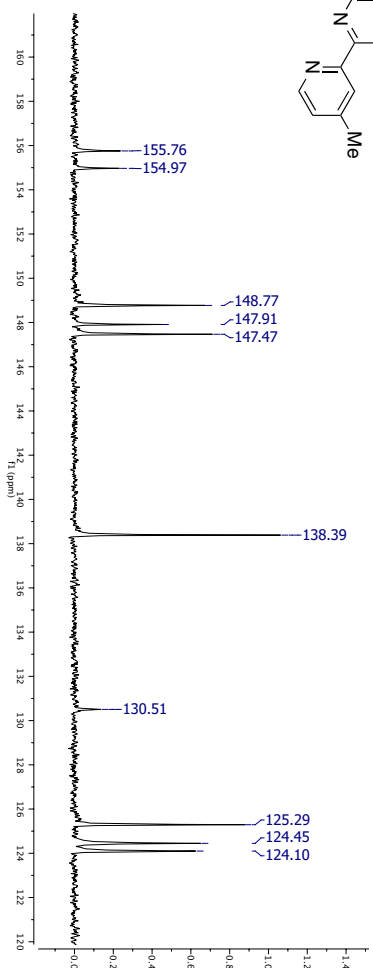
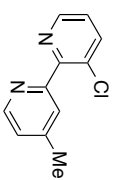
¹H NMR (400 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-4'-methyl-2,2'-bipyridine (15u)

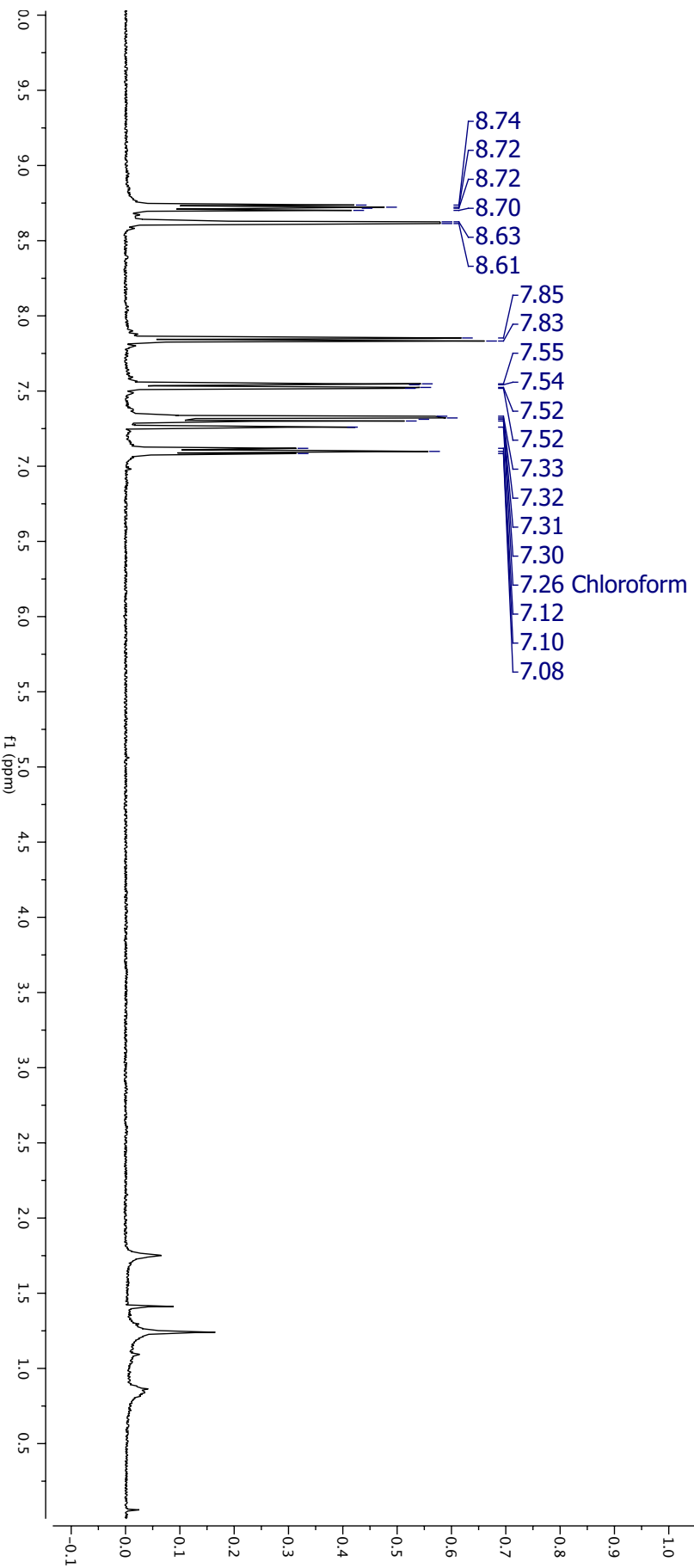
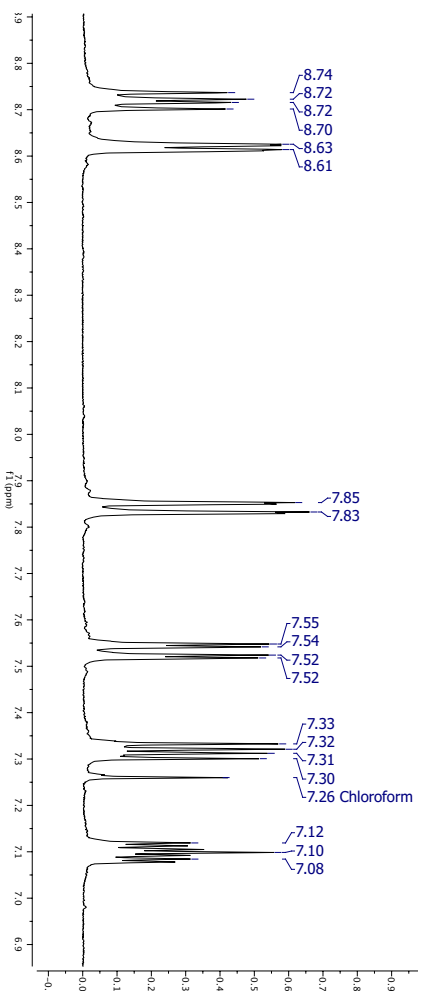
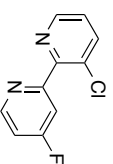
^{13}C NMR (101 MHz, CDCl_3)



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3-Chloro-4'-fluoro-2,2'-bipyridine (15v)

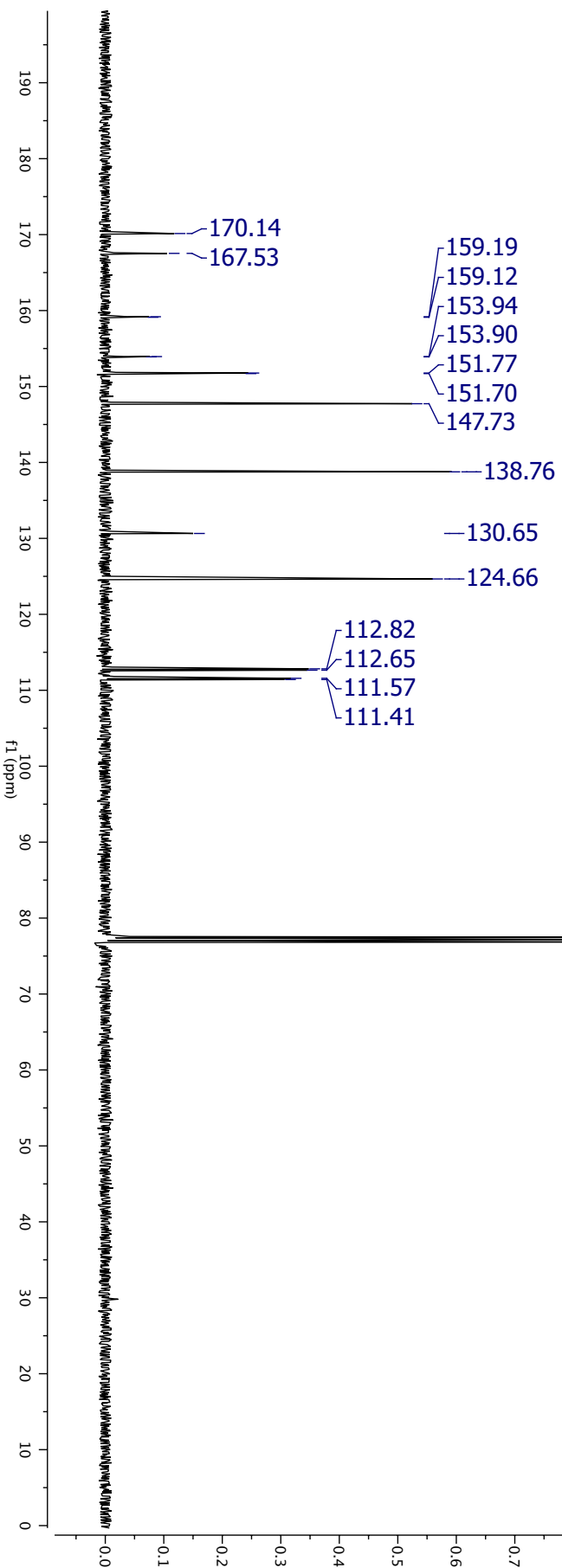
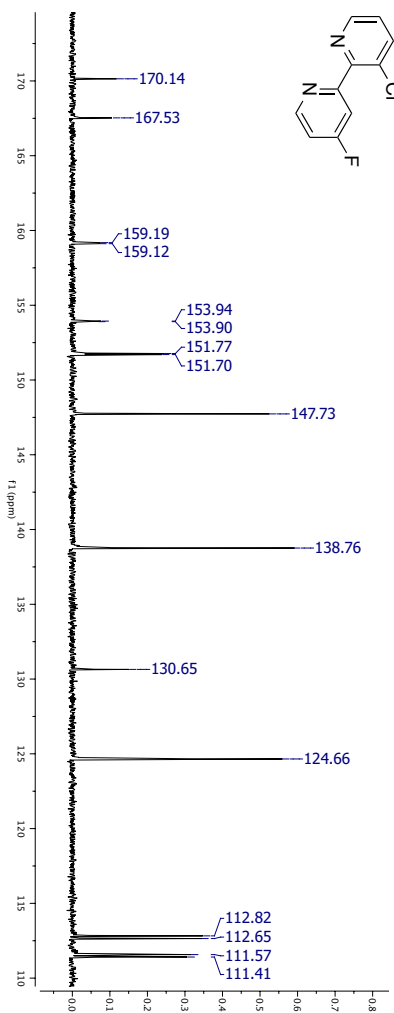
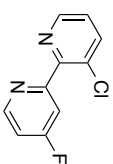
¹H NMR (400 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-4'-fluoro-2,2'-bipyridine (15v)

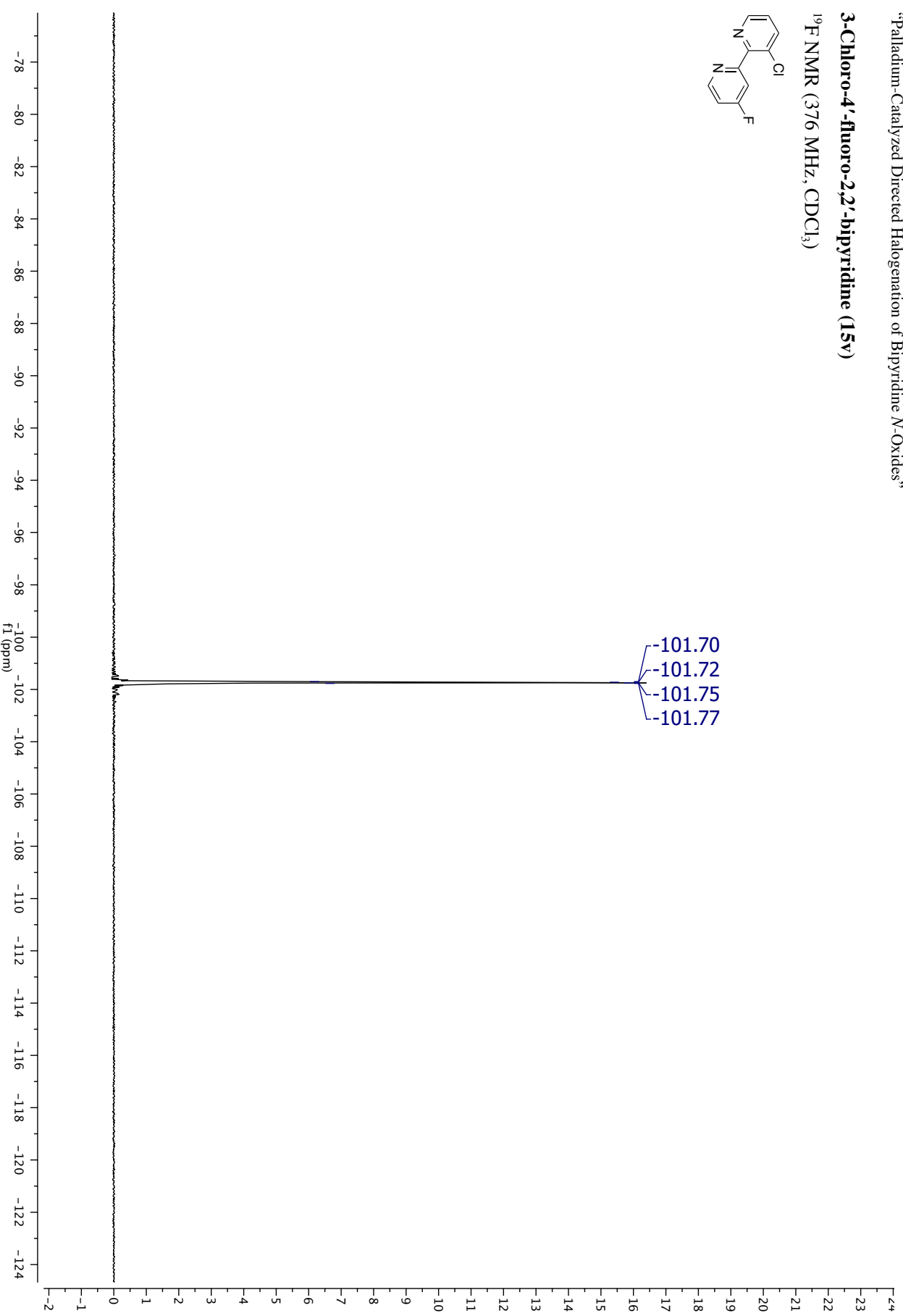
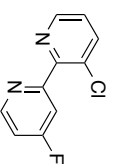
^{13}C NMR (101 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-4'-fluoro-2,2'-bipyridine (15v)

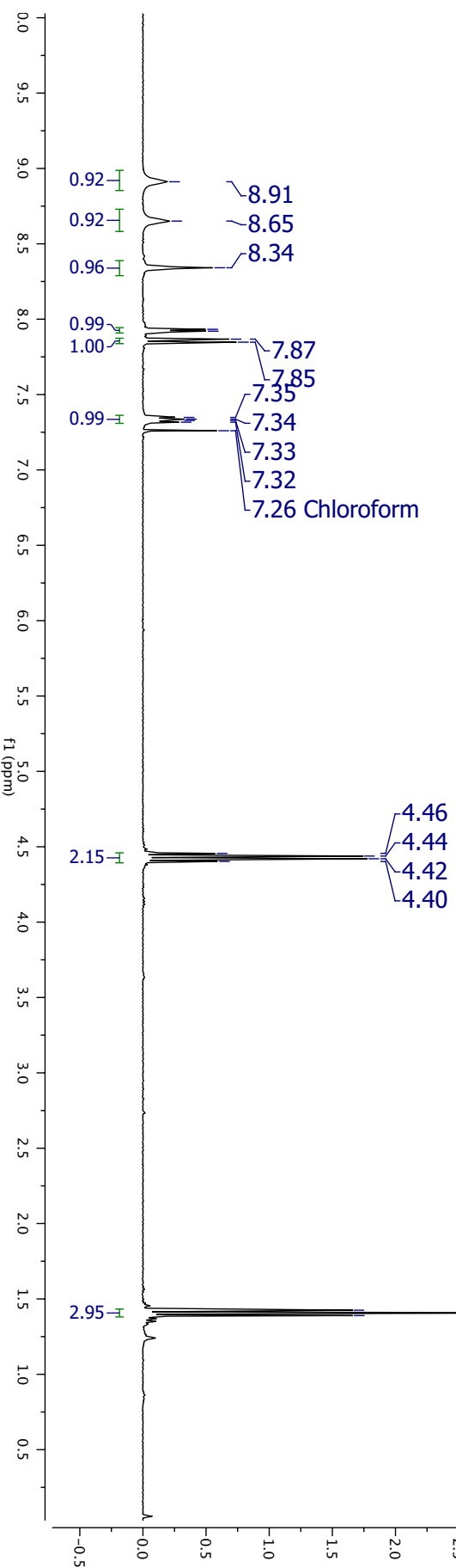
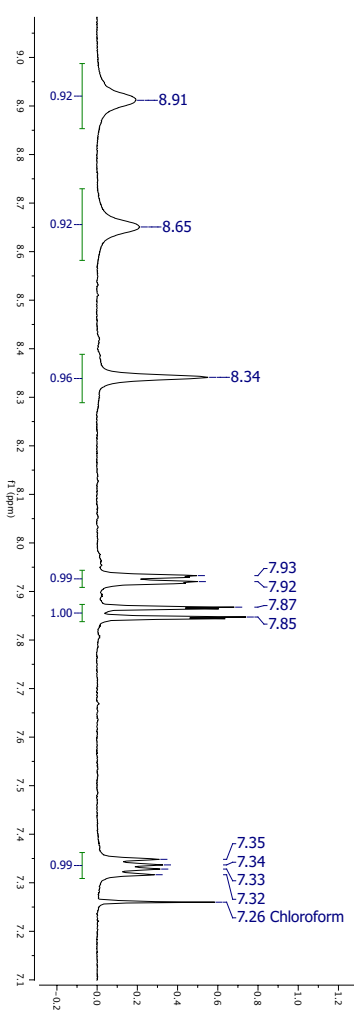
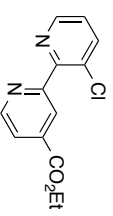
^{19}F NMR (376 MHz, CDCl_3)



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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

3-Chloro-4'-ethoxycarbonyl-2,2'-bipyridine (15w)

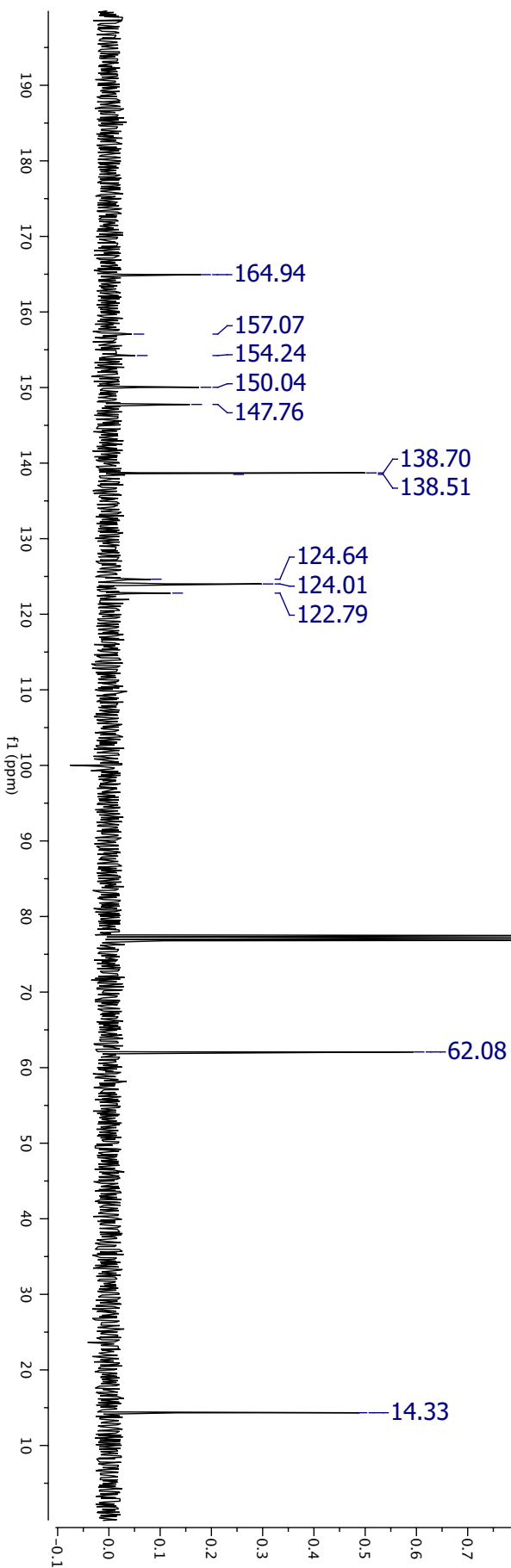
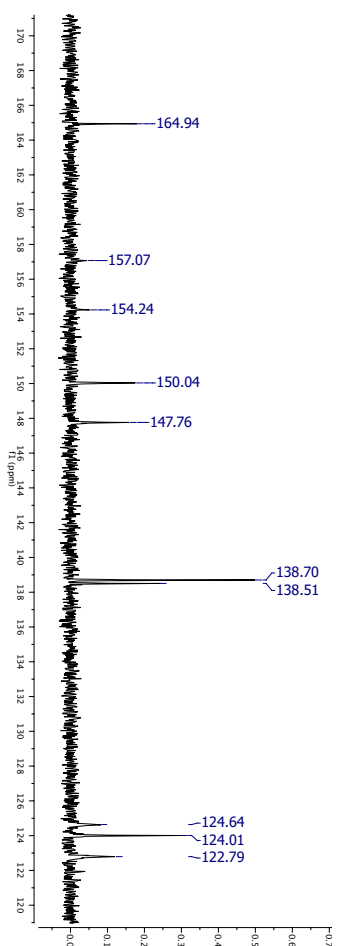
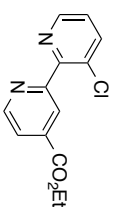
¹H NMR (400 MHz, CDCl₃)



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3-Chloro-4'-ethoxycarbonyl-2,2'-bipyridine (15w)

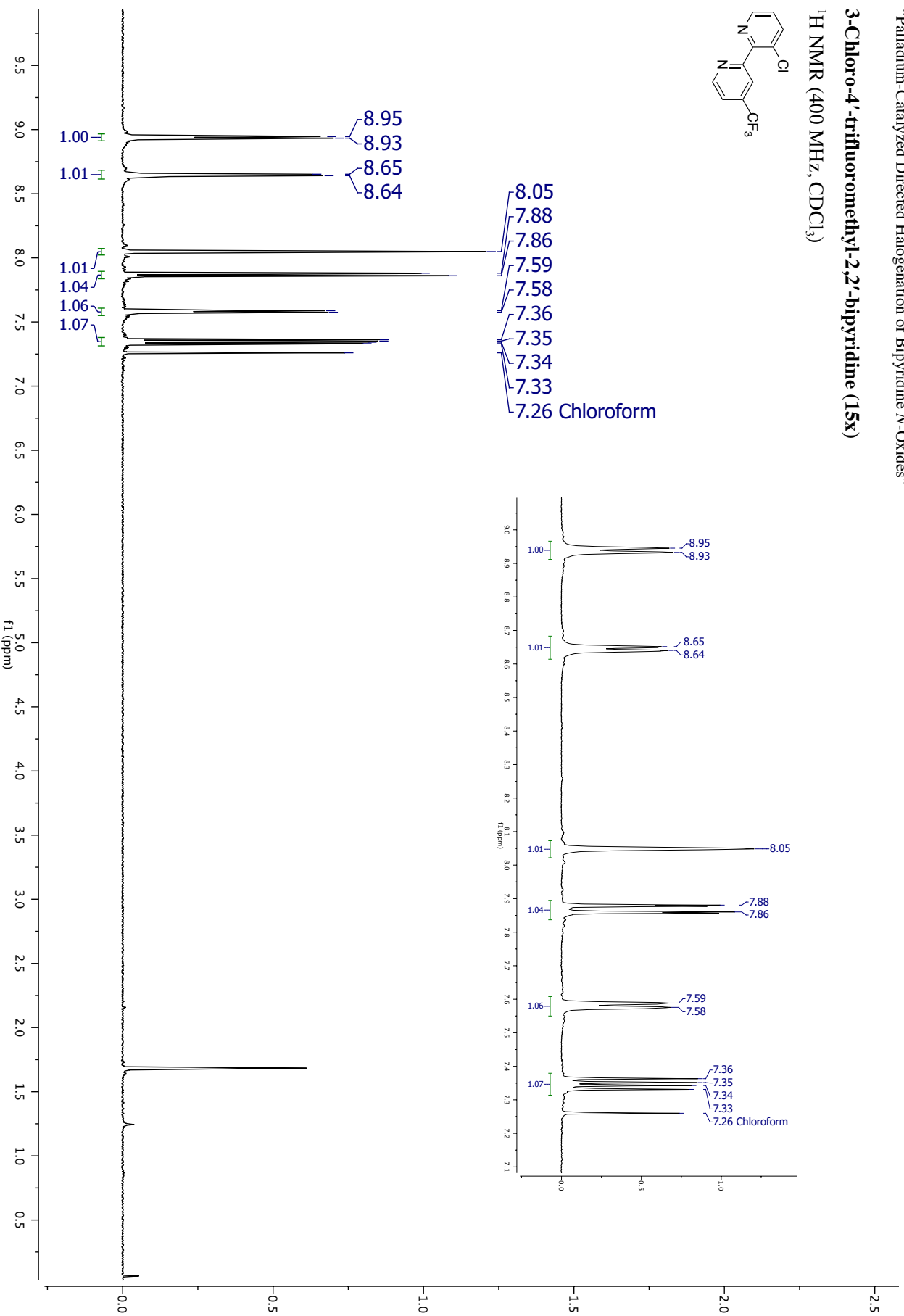
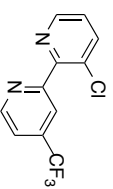
^{13}C NMR (101 MHz, CDCl_3)



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3-Chloro-4'-trifluoromethyl-2,2'-bipyridine (15x)

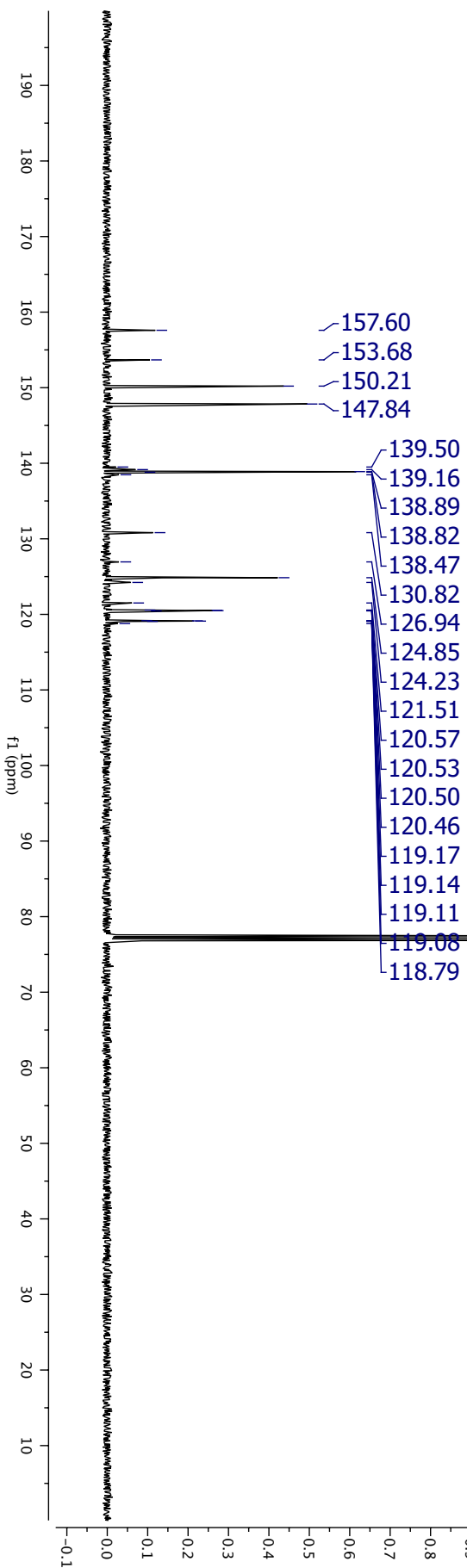
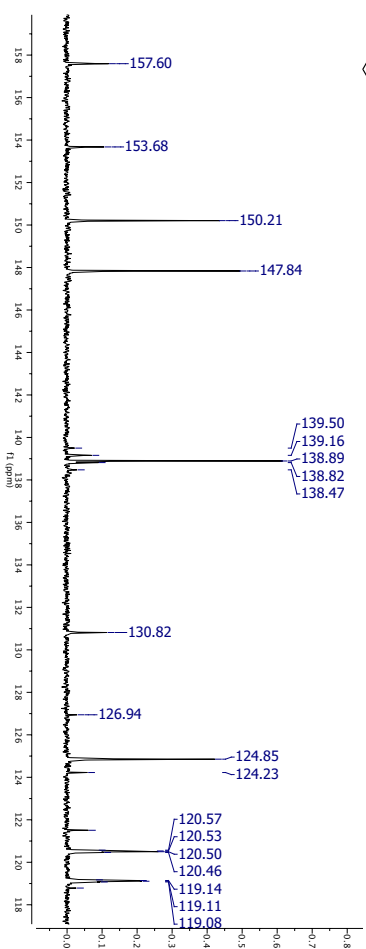
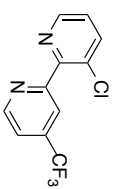
¹H NMR (400 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-4'-trifluoromethyl-2,2'-bipyridine (15x)

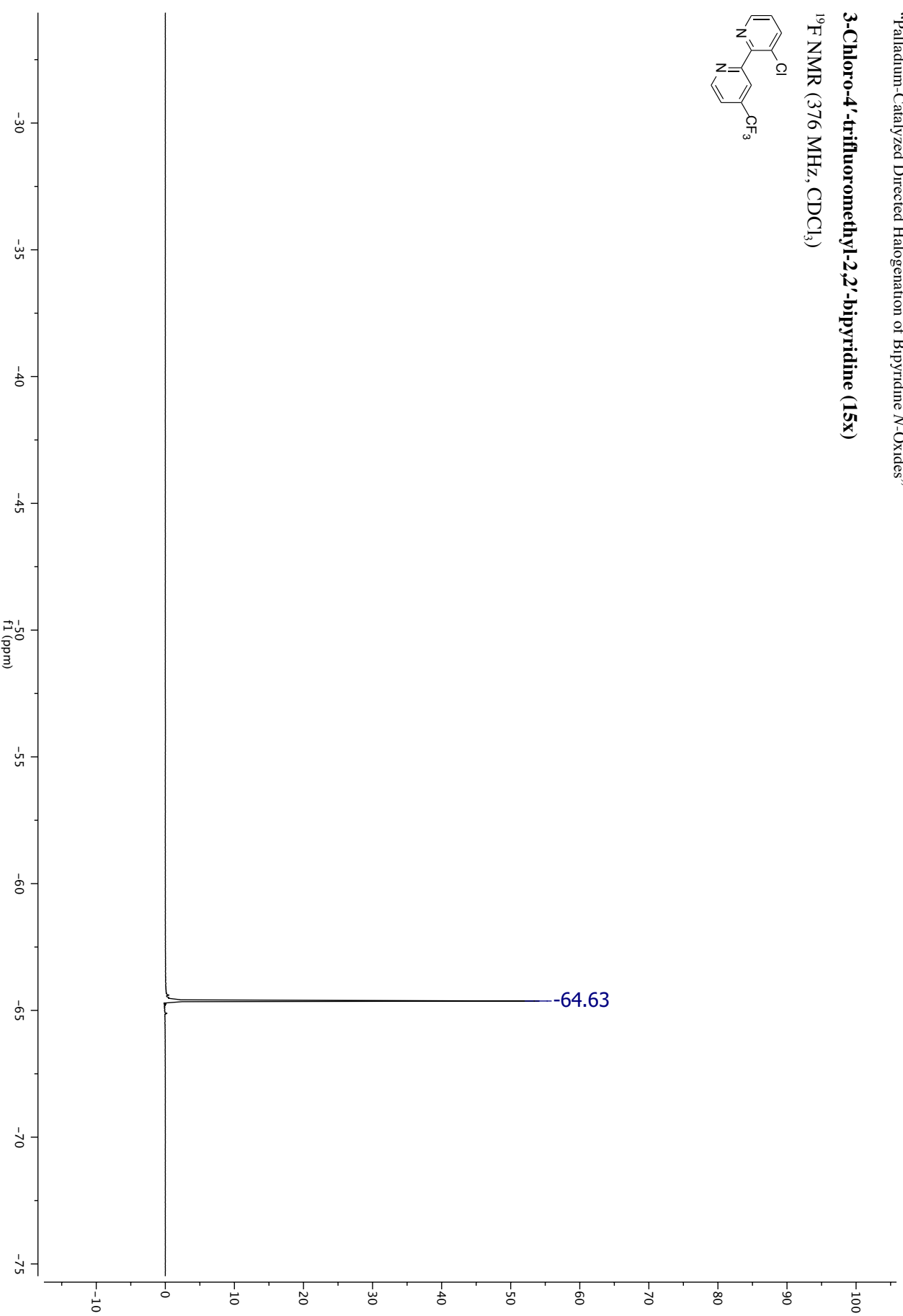
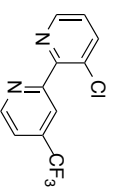
^{13}C NMR (101 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-4'-trifluoromethyl-2,2'-bipyridine (15x)

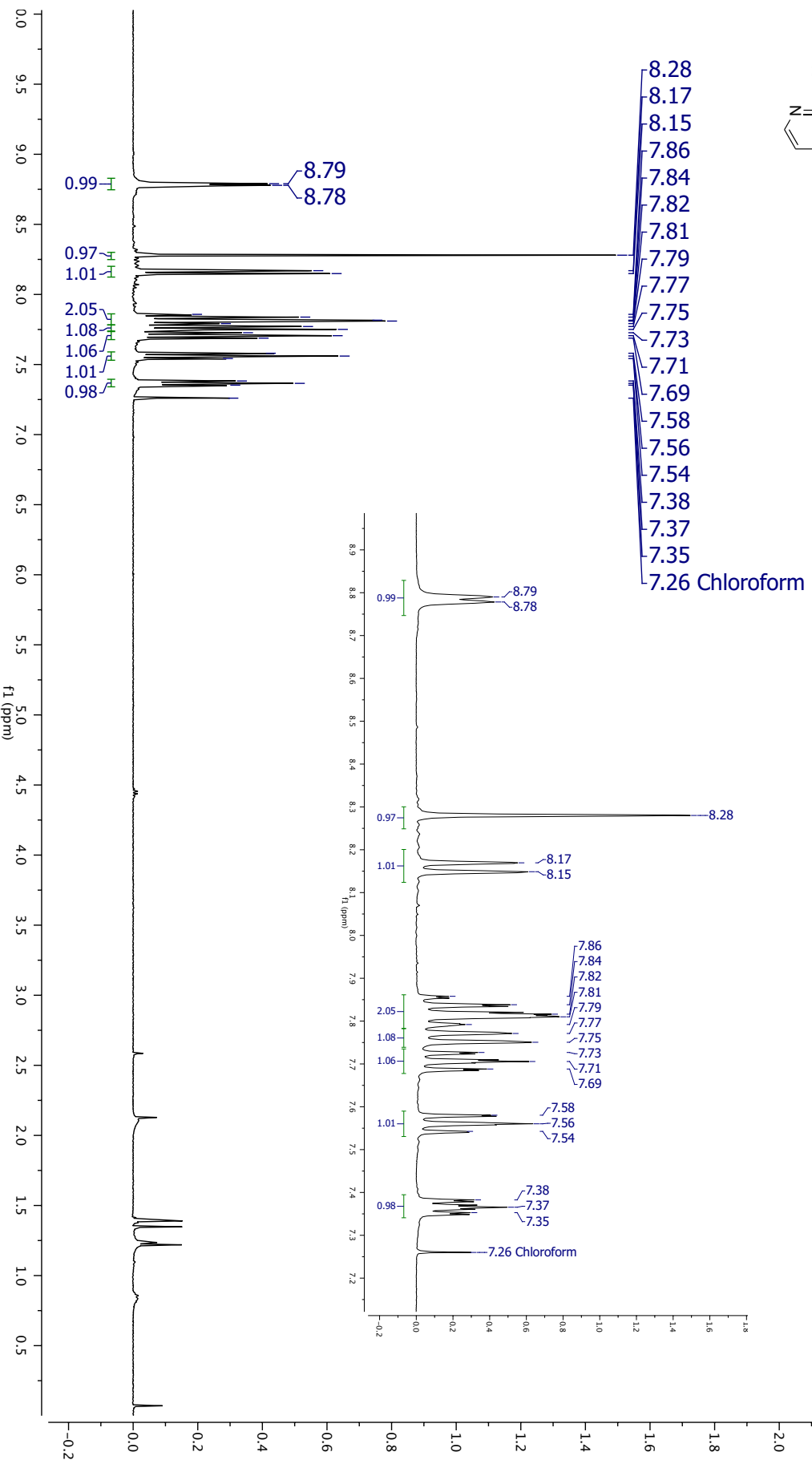
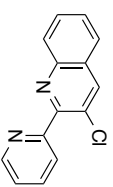
^{19}F NMR (376 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-2-(pyridin-2-yl)quinoline (15z)

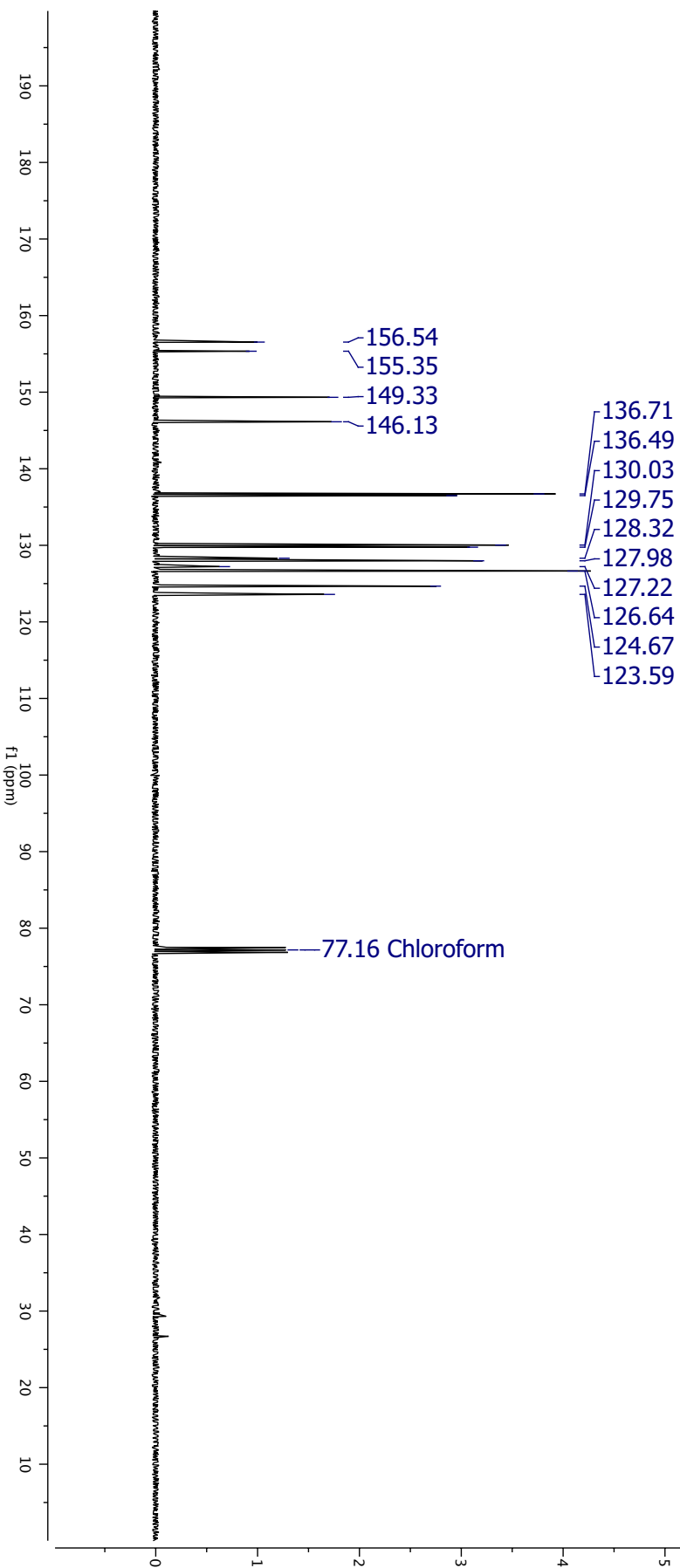
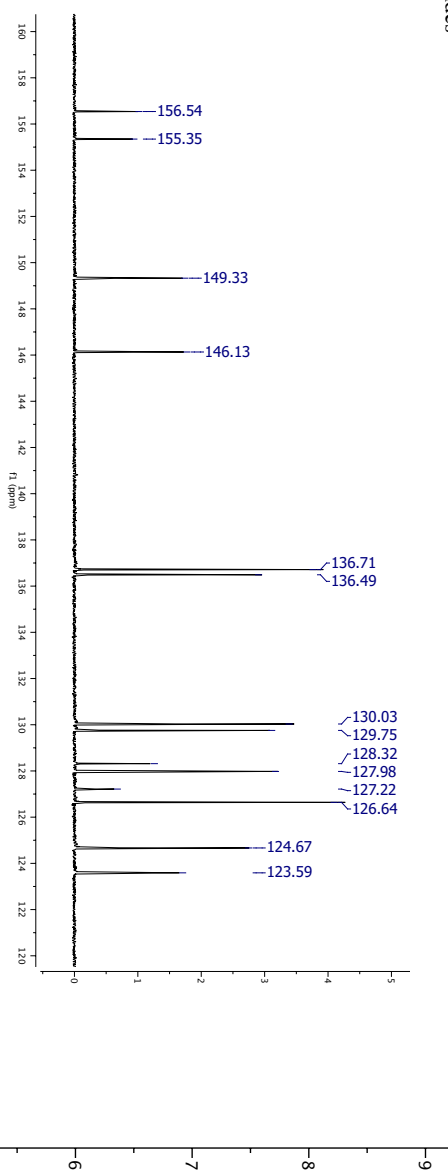
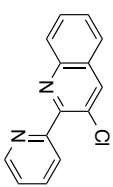
¹H NMR (400 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3-Chloro-2-(pyridin-2-yl)quinoline (15z)

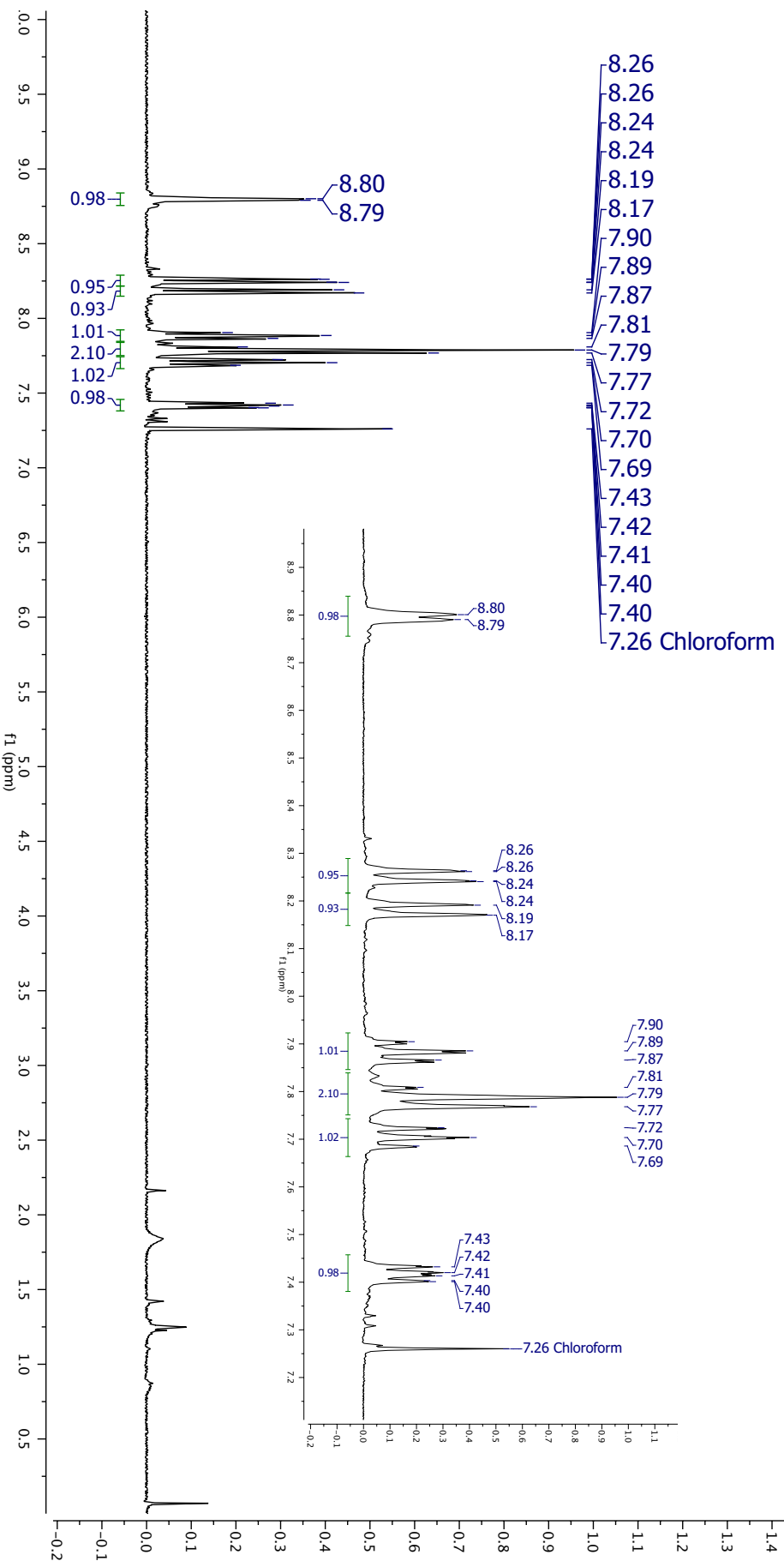
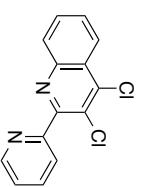
^{13}C NMR (101 MHz, CDCl_3)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3,4-Dichloro-2-(pyridin-2-yl)quinoline

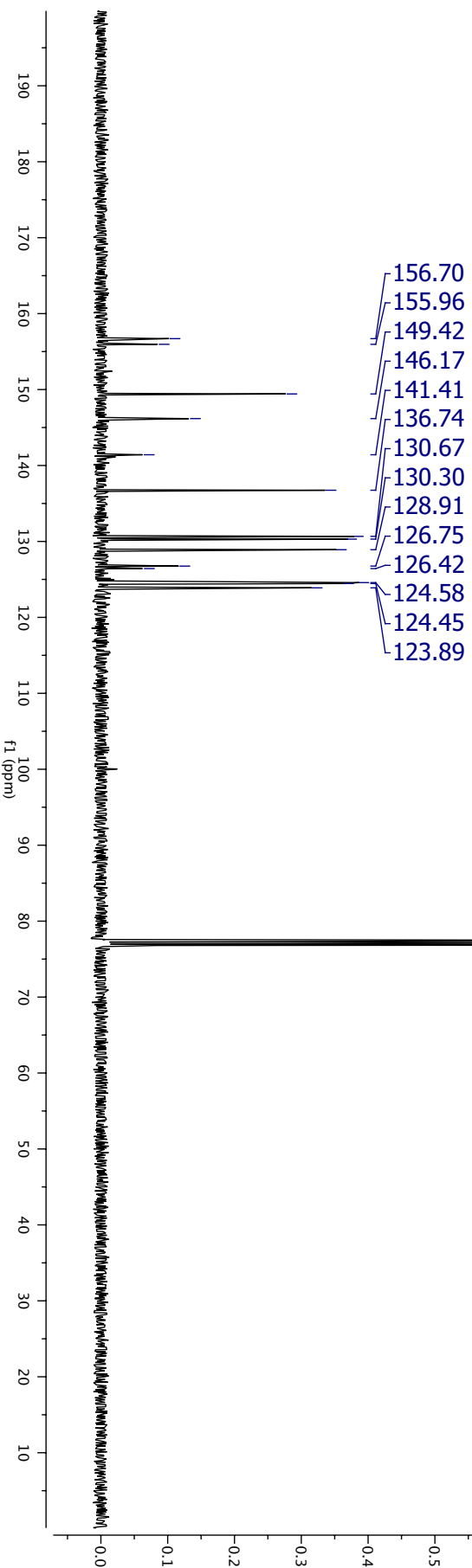
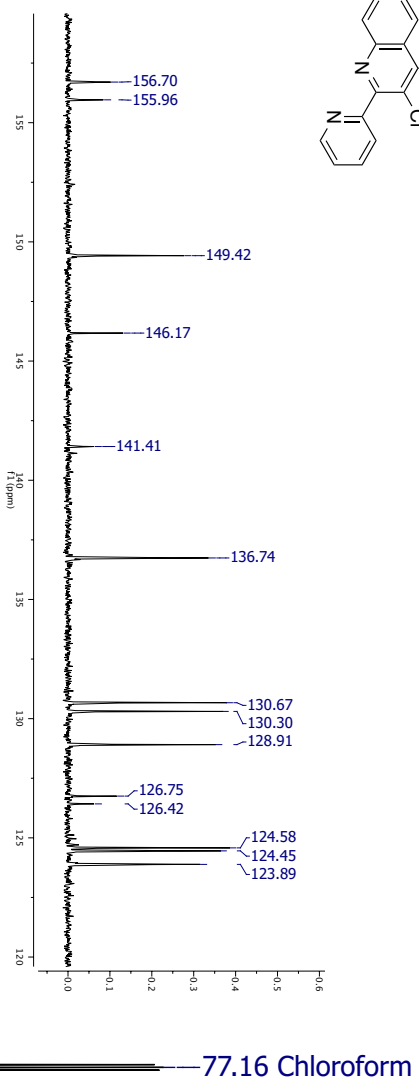
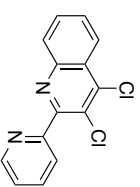
¹H NMR (400 MHz, CDCl₃)



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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

3,4-Dichloro-2-(pyridin-2-yl)quinoline

^{13}C NMR (101 MHz, CDCl_3)

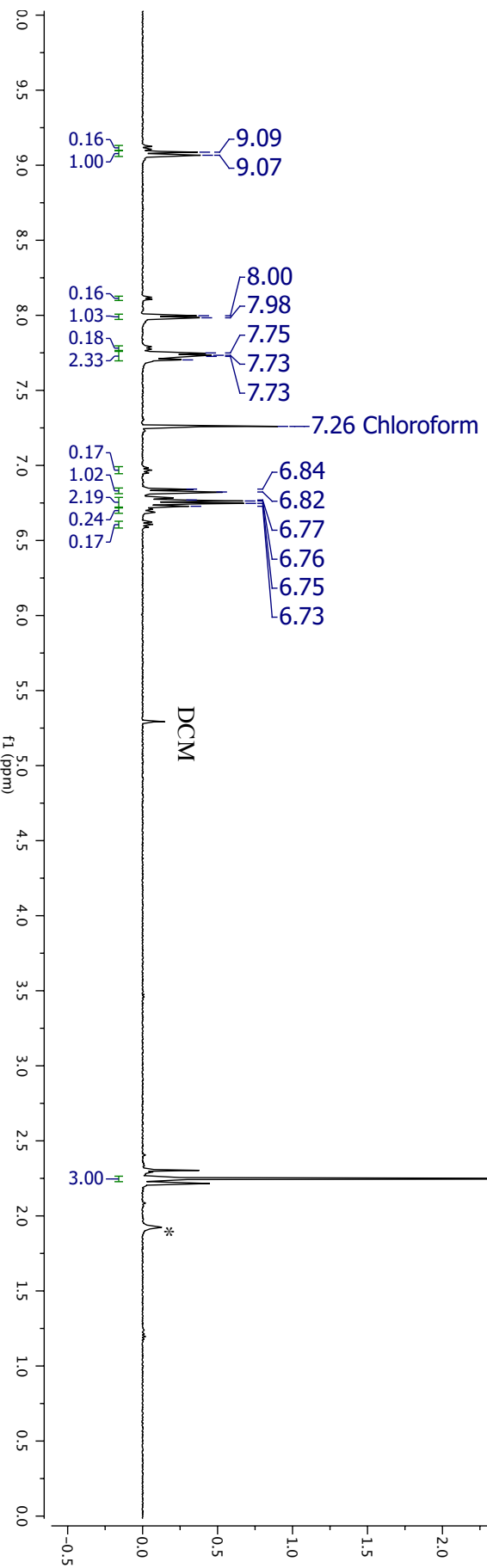
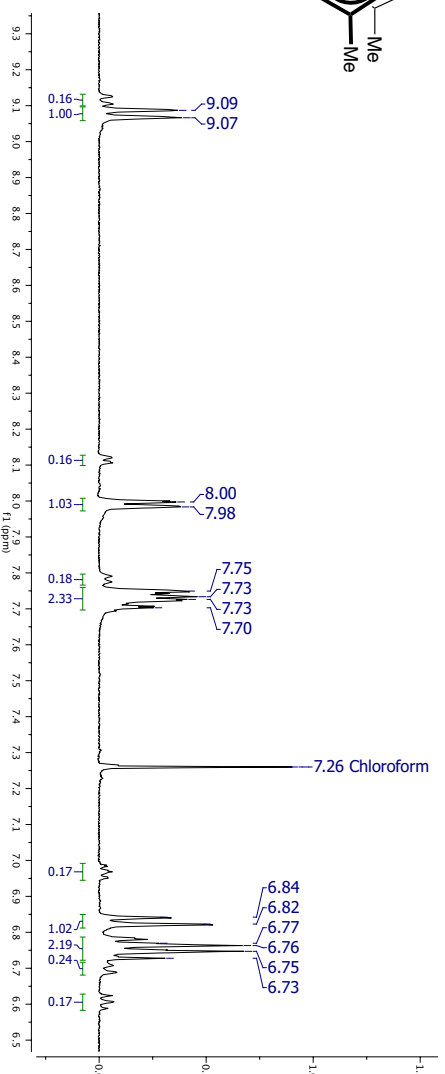
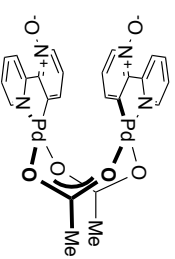


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"Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

Palladium complexes

(2,2'-Bipyridin-3-yl-*N*-oxide)palladium acetate (dimer A)

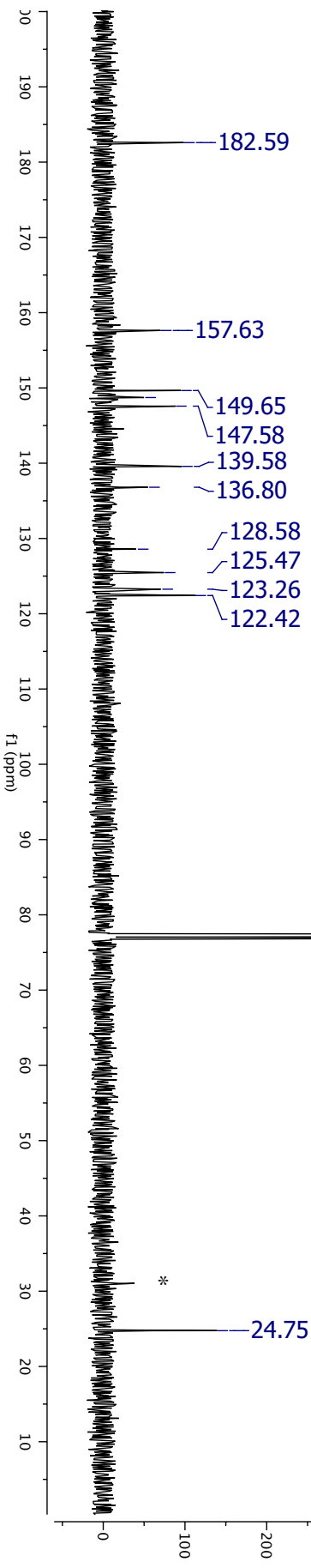
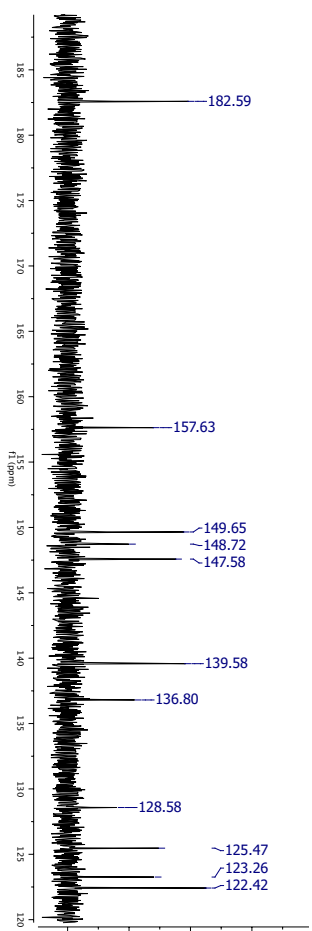
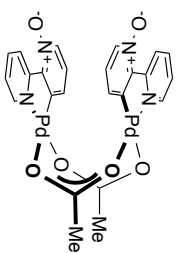
¹H NMR (400 MHz, CDCl₃)



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 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

(2,2'-Bipyridin-3-yl-*N*-oxide)palladium acetate (dimer A)

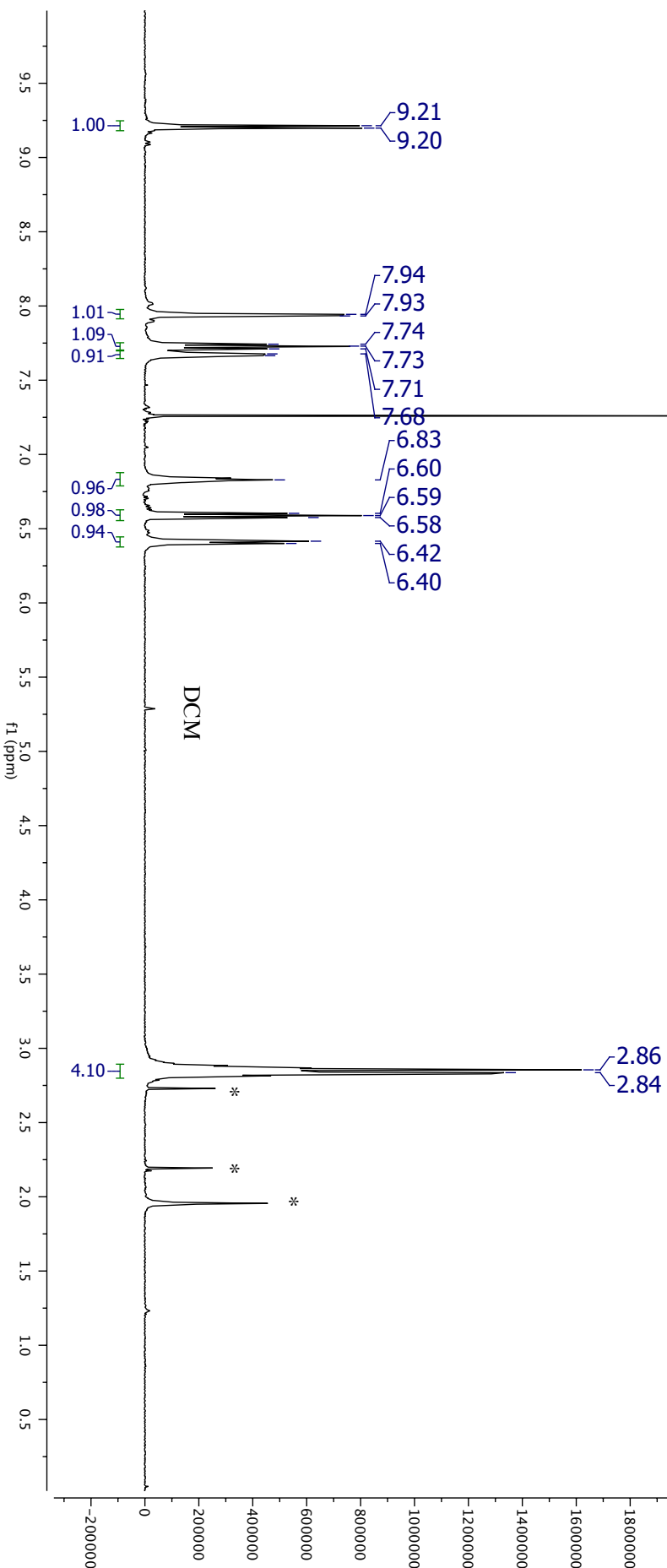
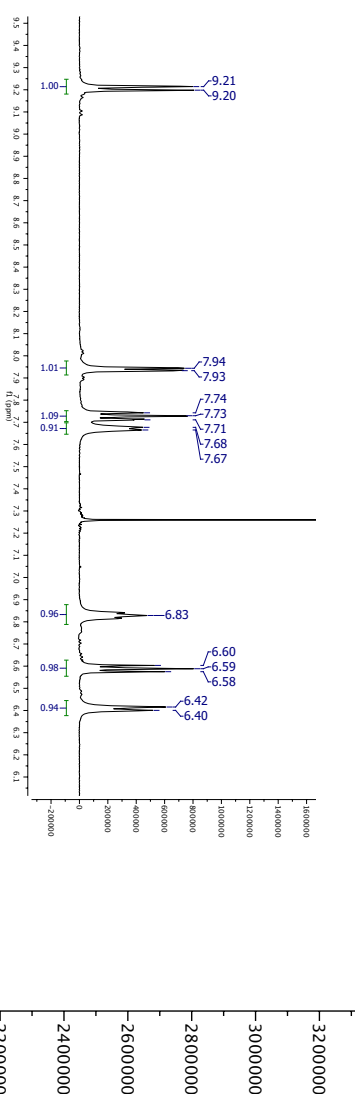
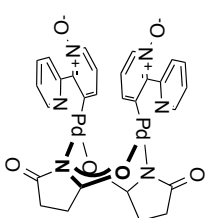
^{13}C NMR (126 MHz, CDCl_3)



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(2,2'-Bipyridin-3-yl-*N*-oxide)palladium succinate (dimer B)

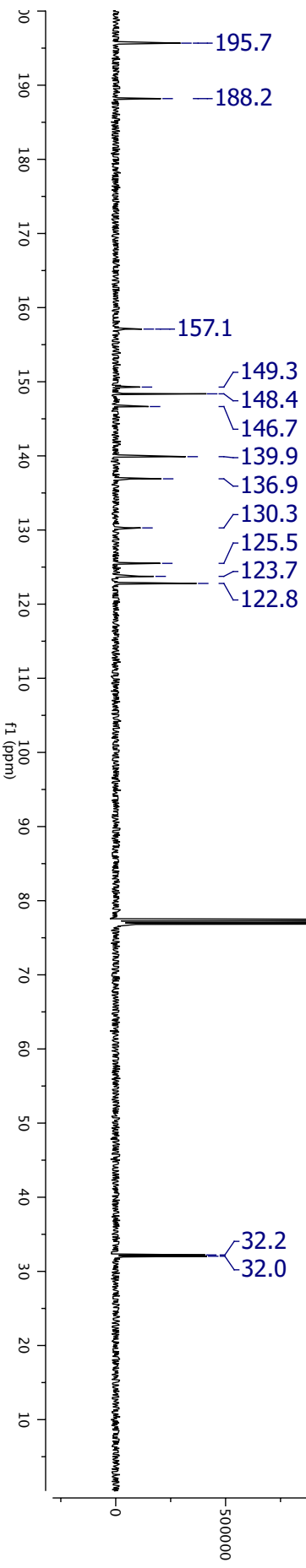
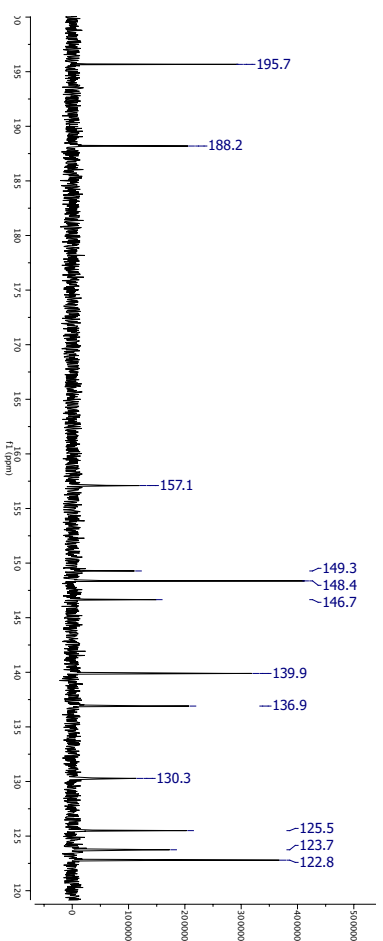
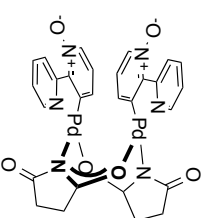
¹H NMR (400 MHz, CDCl₃)



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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

(2,2'-Bipyridin-3-yl-*N*-oxide)palladium succinate (dimer B)

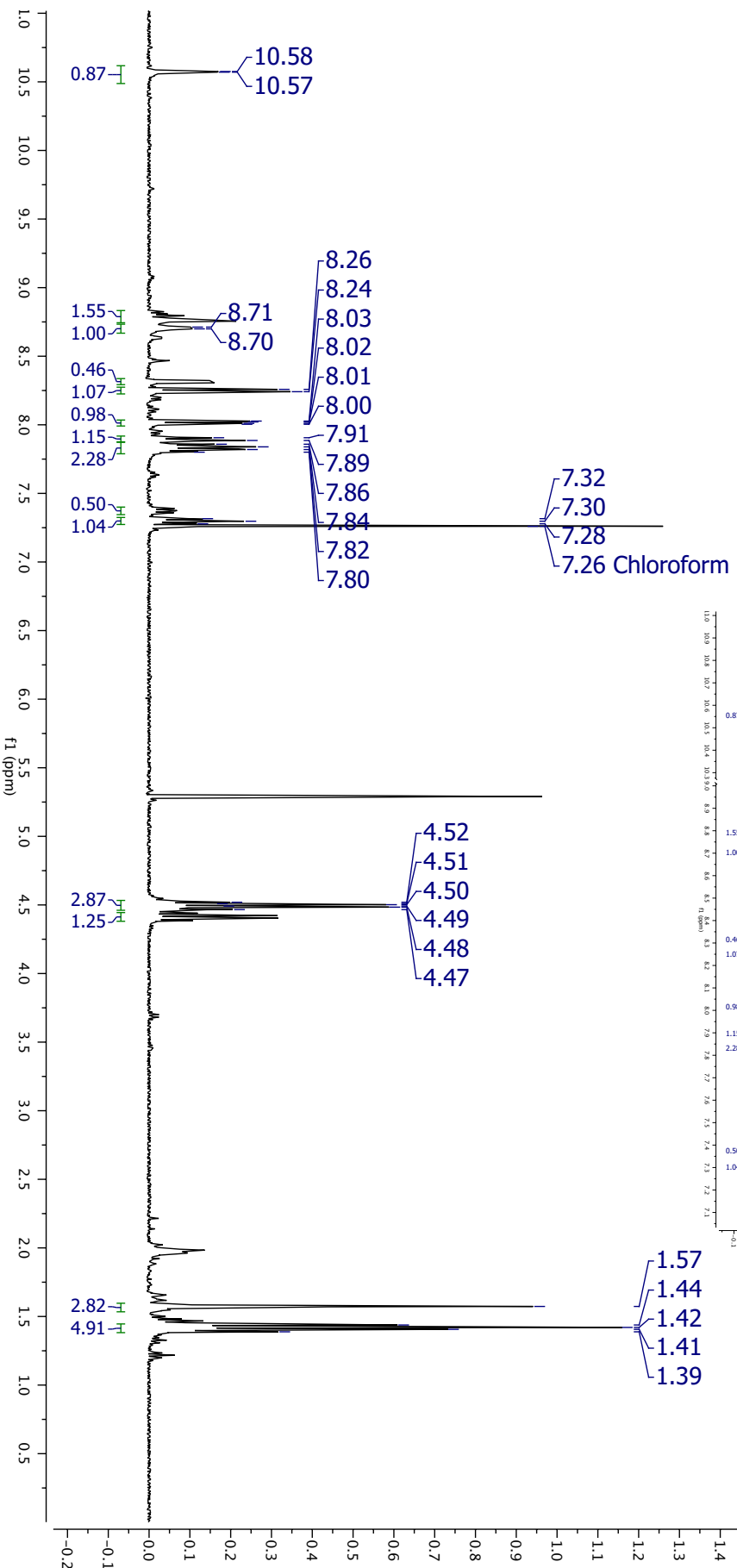
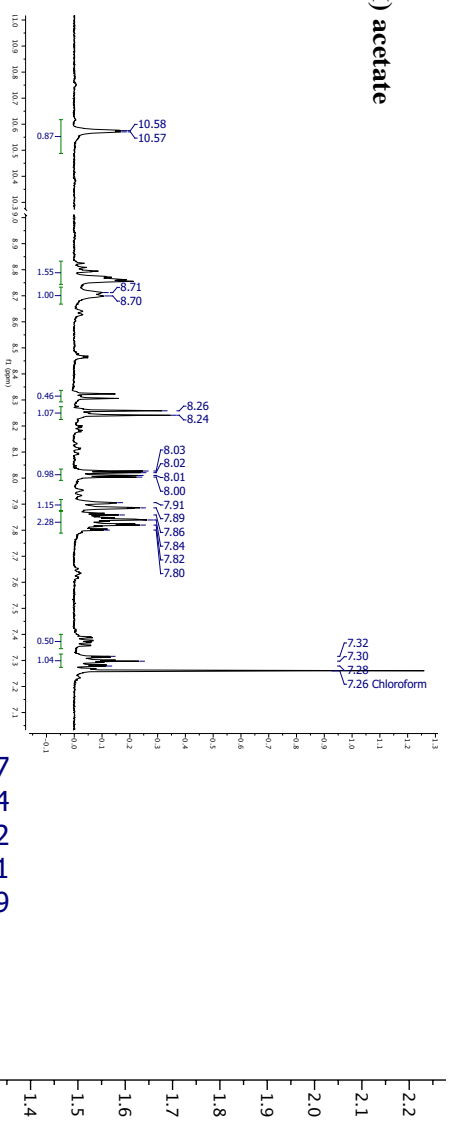
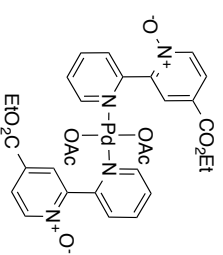
¹³C NMR (126 MHz, CDCl₃)



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(4-Ethoxycarbonaryl-2,2-bipyridine-*N*-oxide)palladium(II) acetate

¹H NMR (400 MHz, CDCl₃)



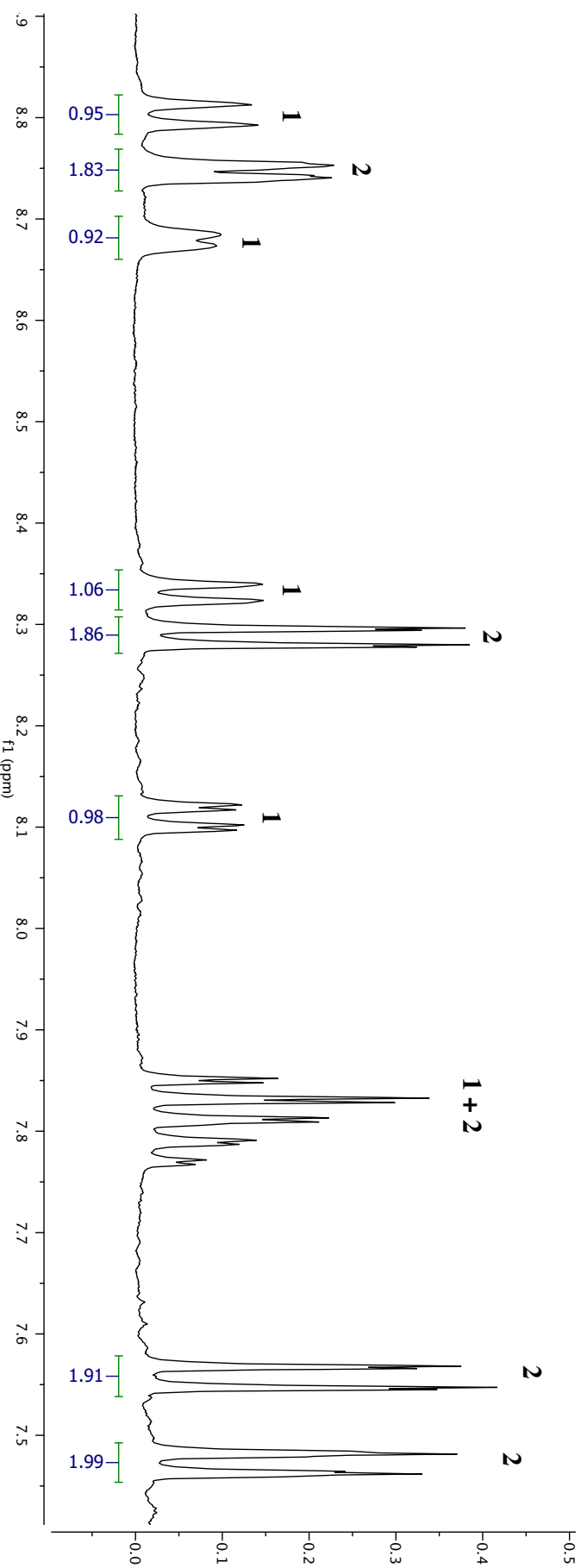
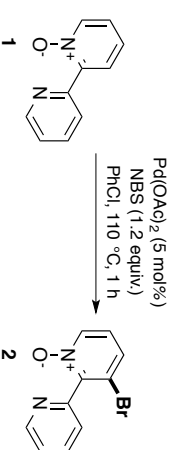
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“Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

Experimental spectra obtained from reactions for mechanistic studies

¹H NMR (400 MHz, CDCl₃)

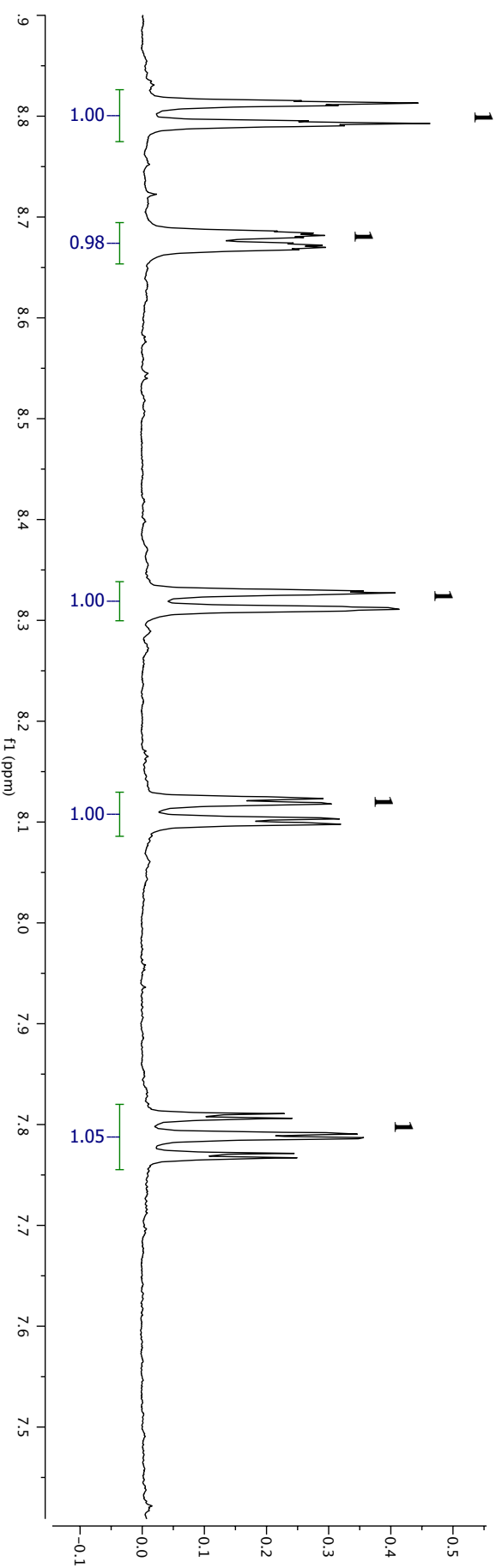
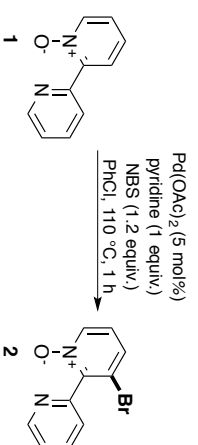
Only the relevant aromatic regions are shown for clarity.

Catalytic reactions



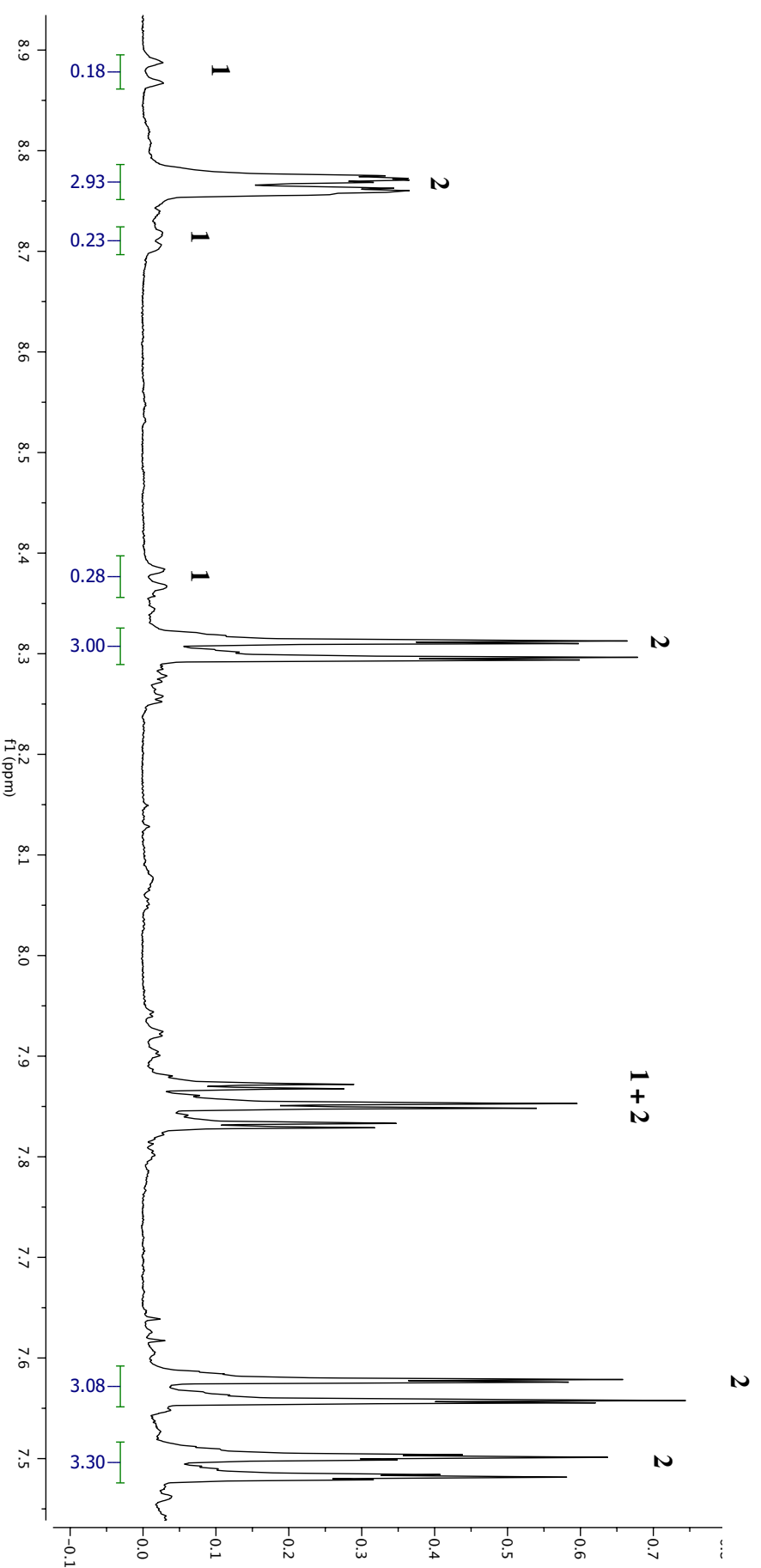
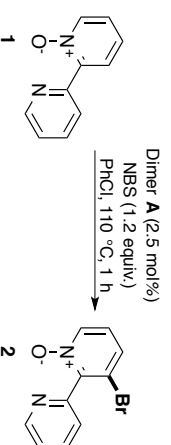
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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

^1H NMR (400 MHz, CDCl_3)



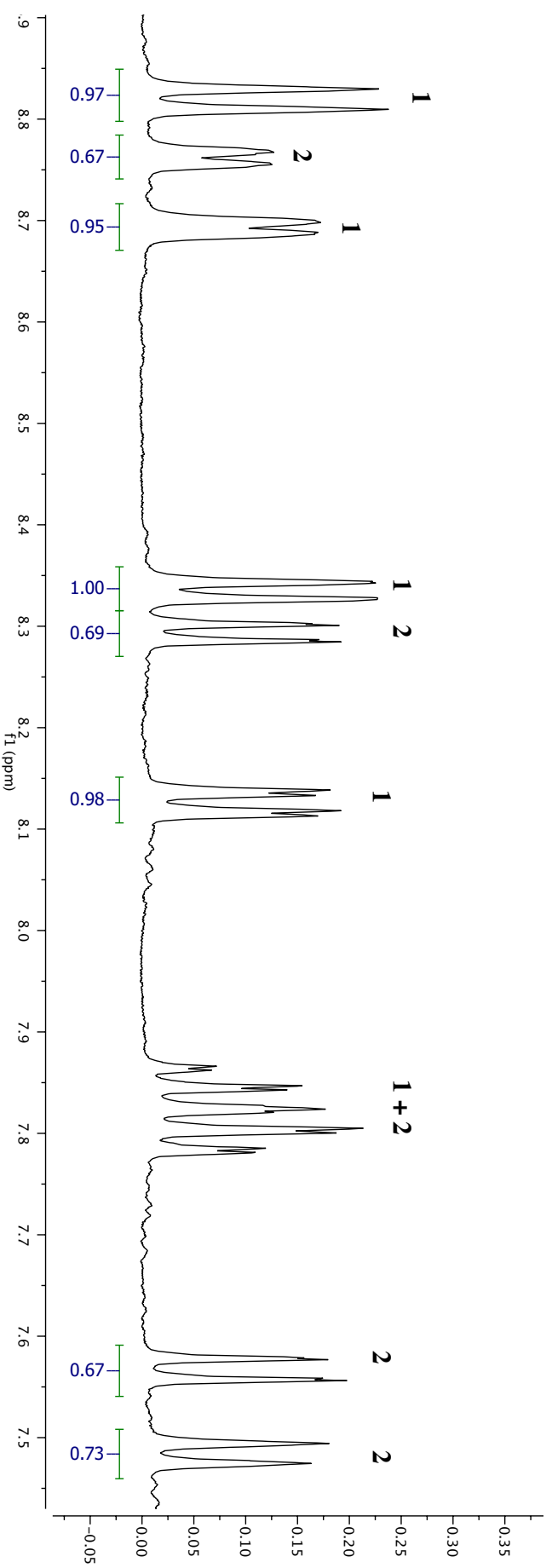
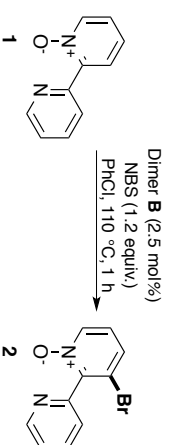
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^1H NMR (400 MHz, CDCl_3)



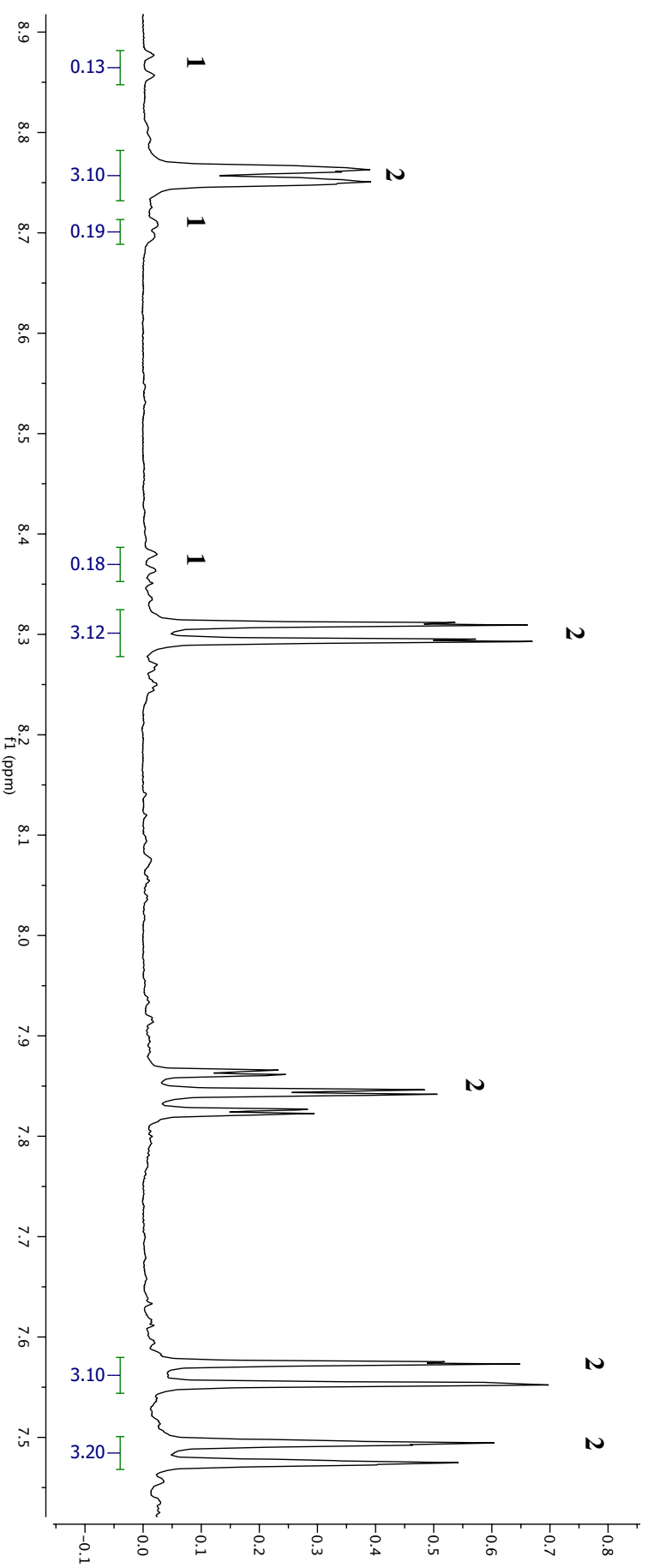
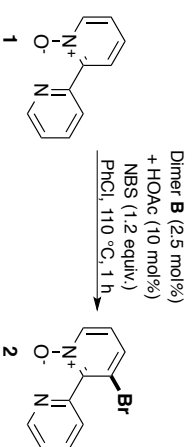
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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

^1H NMR (400 MHz, CDCl_3)



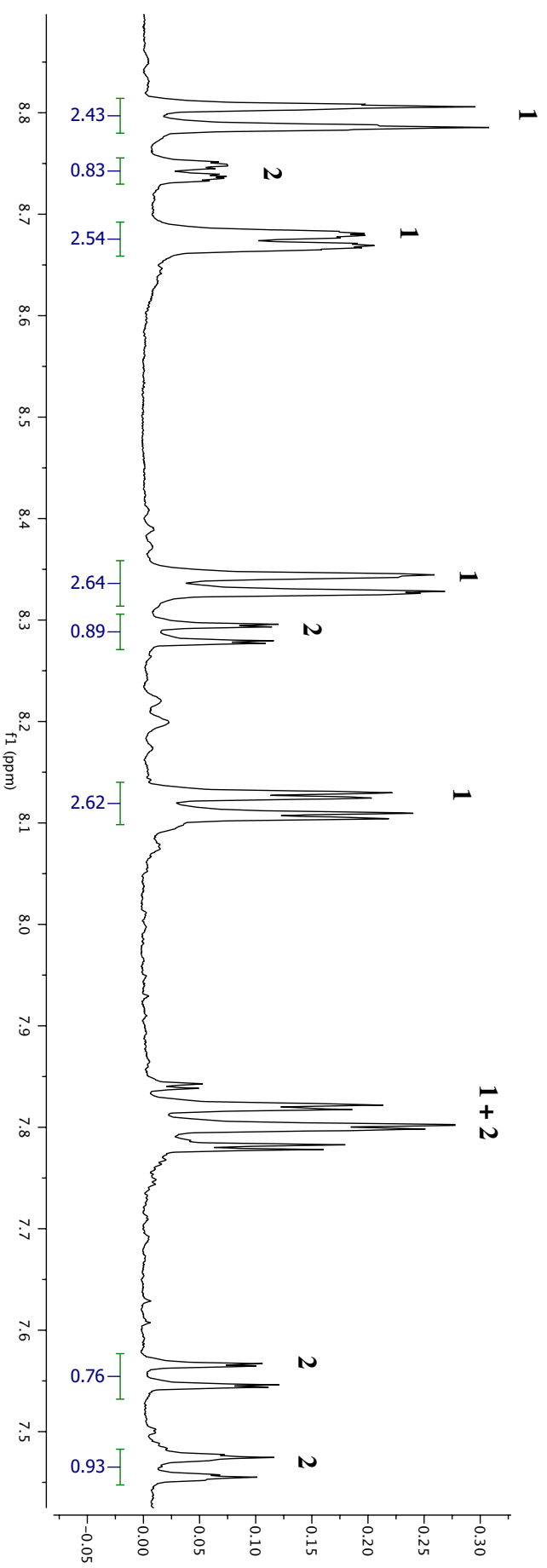
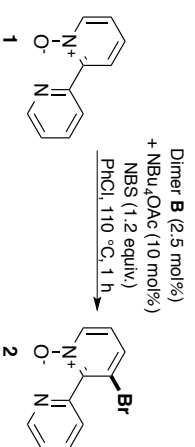
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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

^1H NMR (400 MHz, CDCl_3)



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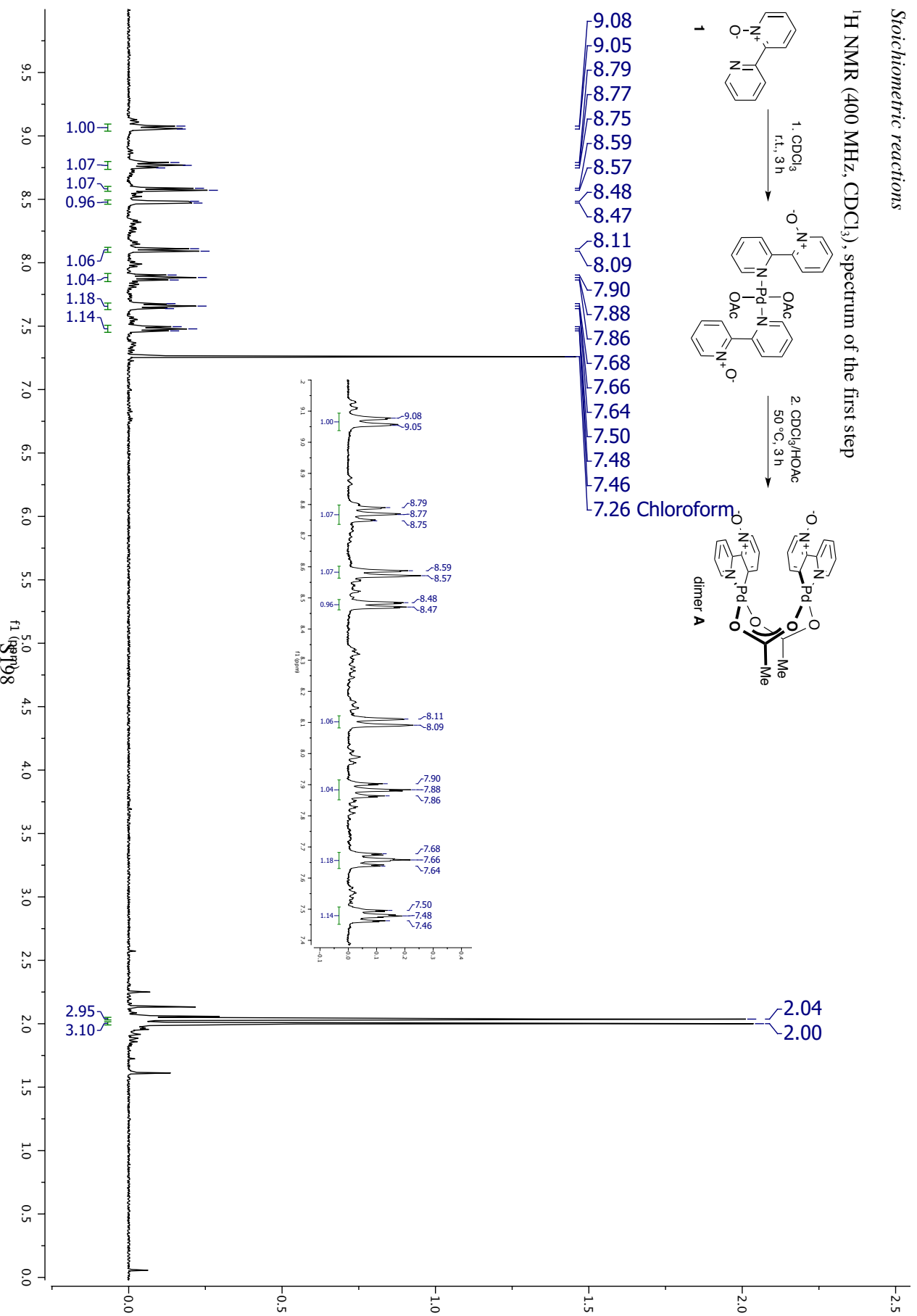
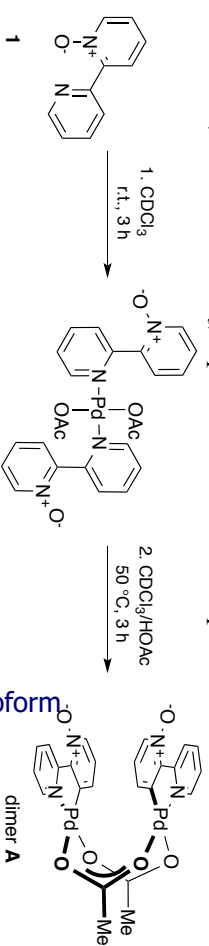
^1H NMR (400 MHz, CDCl_3)



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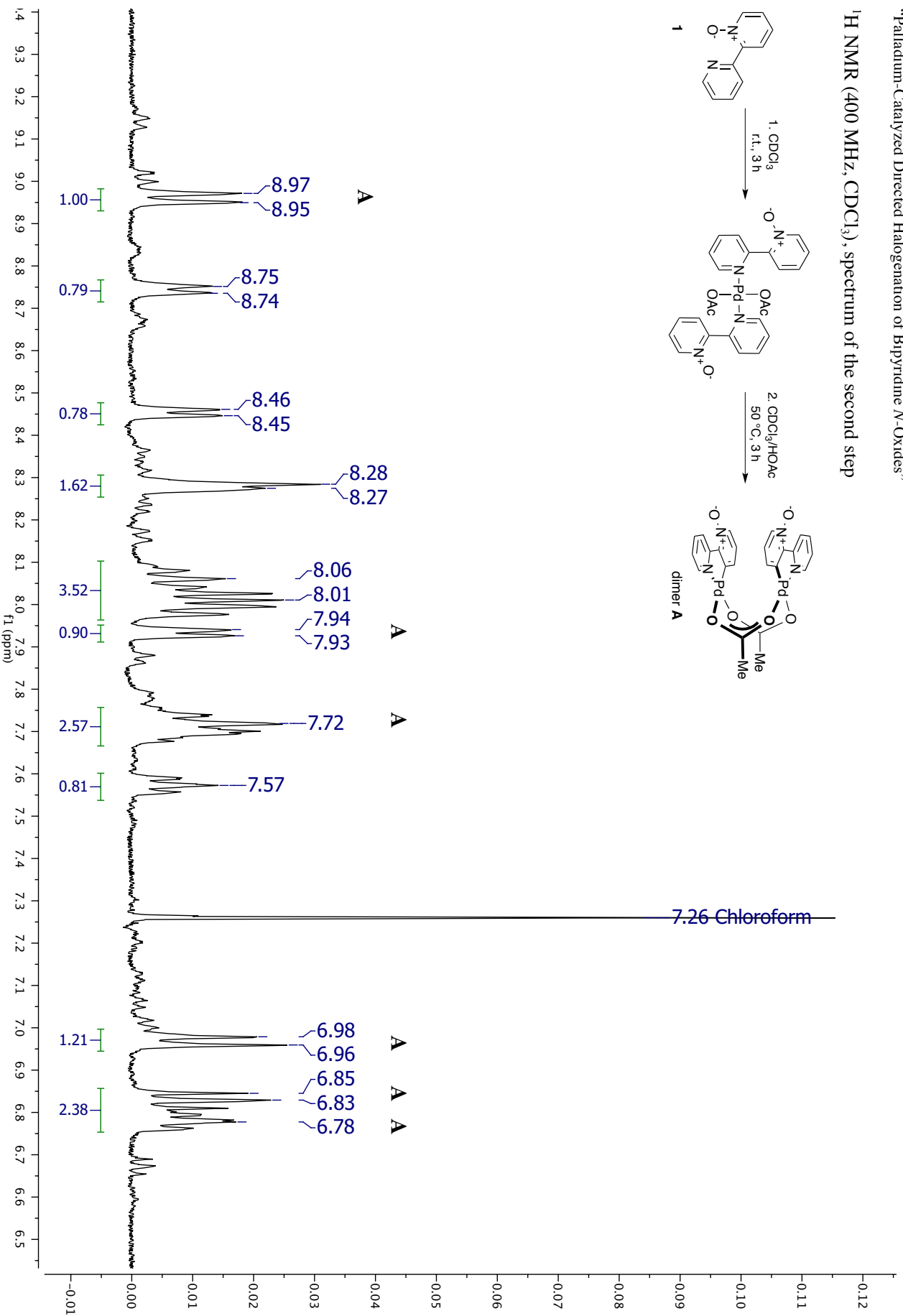
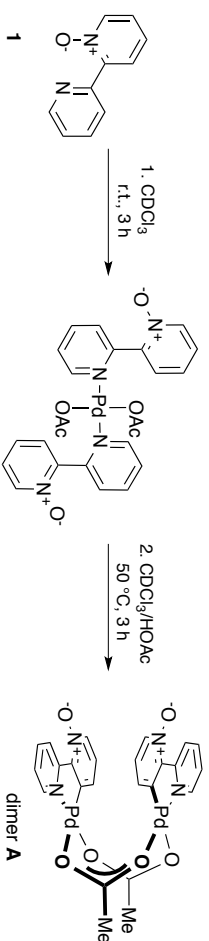
Stoichiometric reactions

¹H NMR (400 MHz, CDCl₃), spectrum of the first step



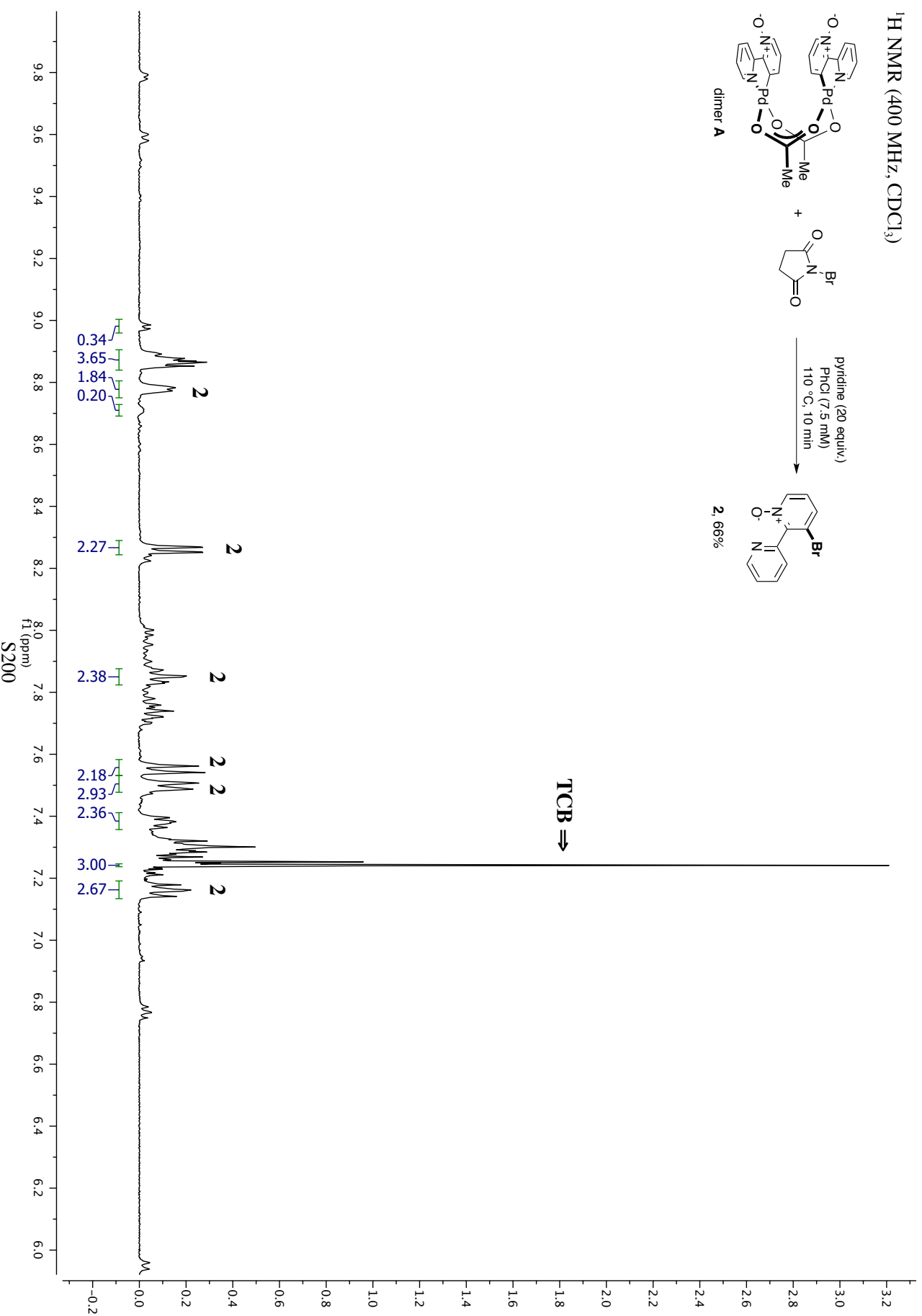
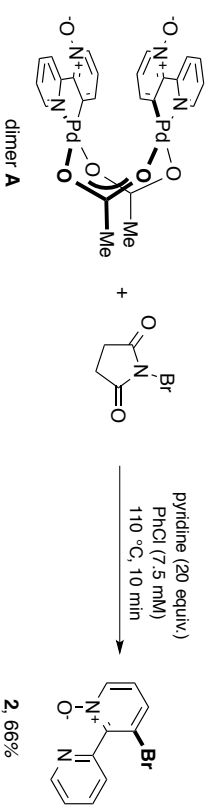
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 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

¹H NMR (400 MHz, CDCl₃), spectrum of the second step



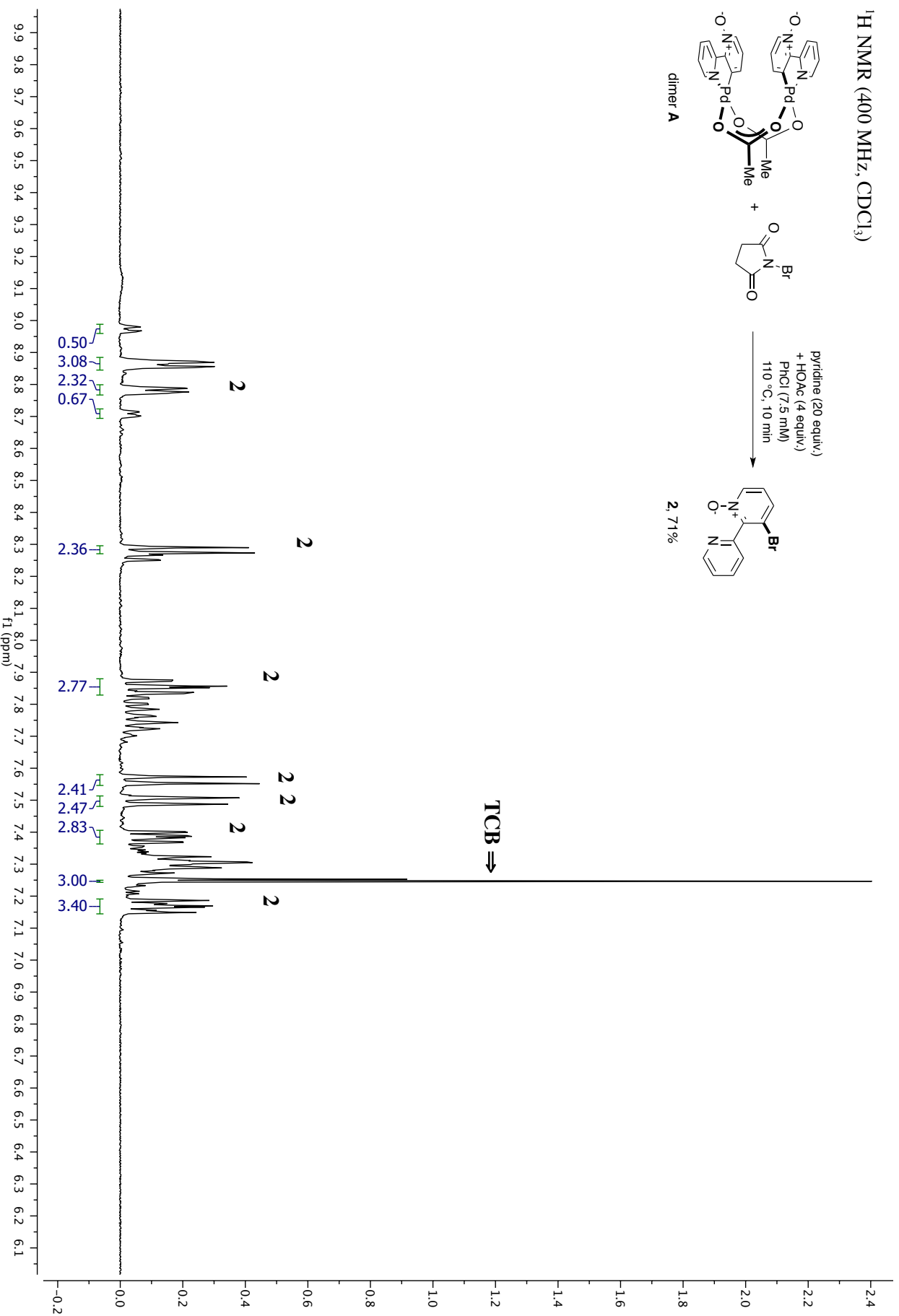
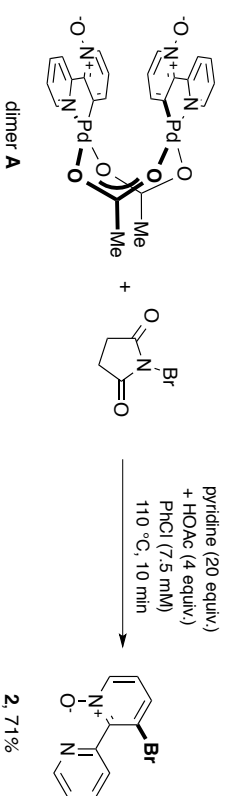
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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

^1H NMR (400 MHz, CDCl_3)



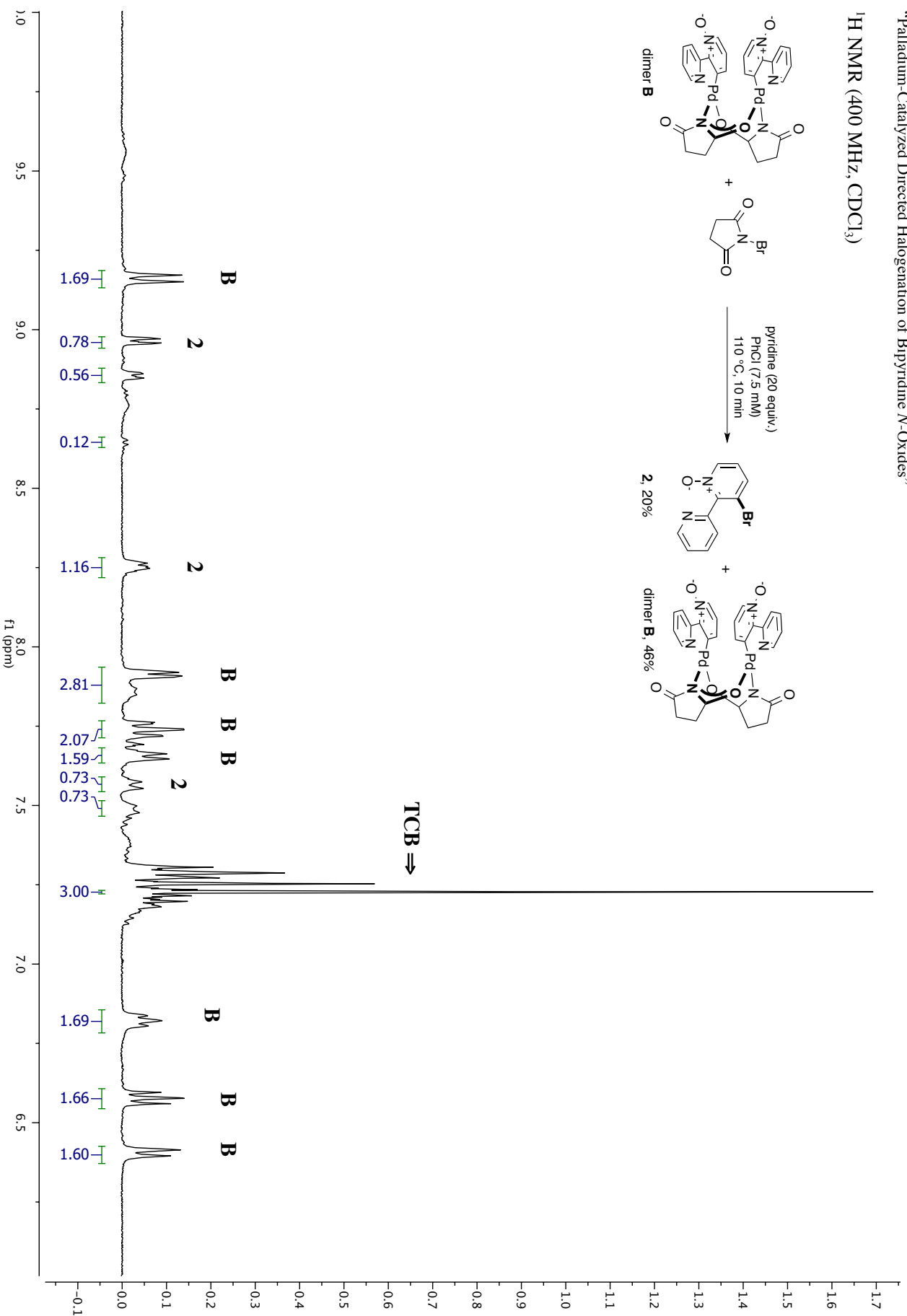
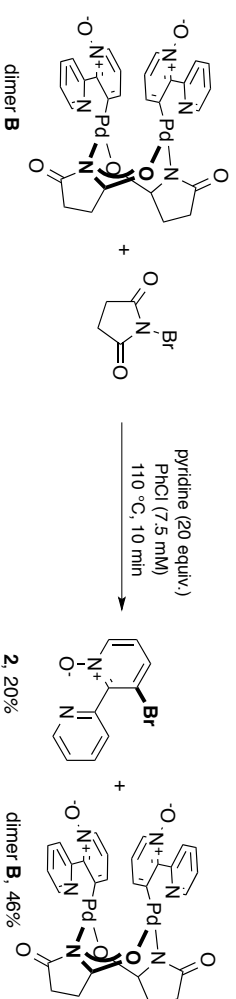
Sina P. Zucker, Friedrich Wossido, Manuela Weber, Dieter Lentz, C. Christoph Tzschucke
 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

¹H NMR (400 MHz, CDCl₃)



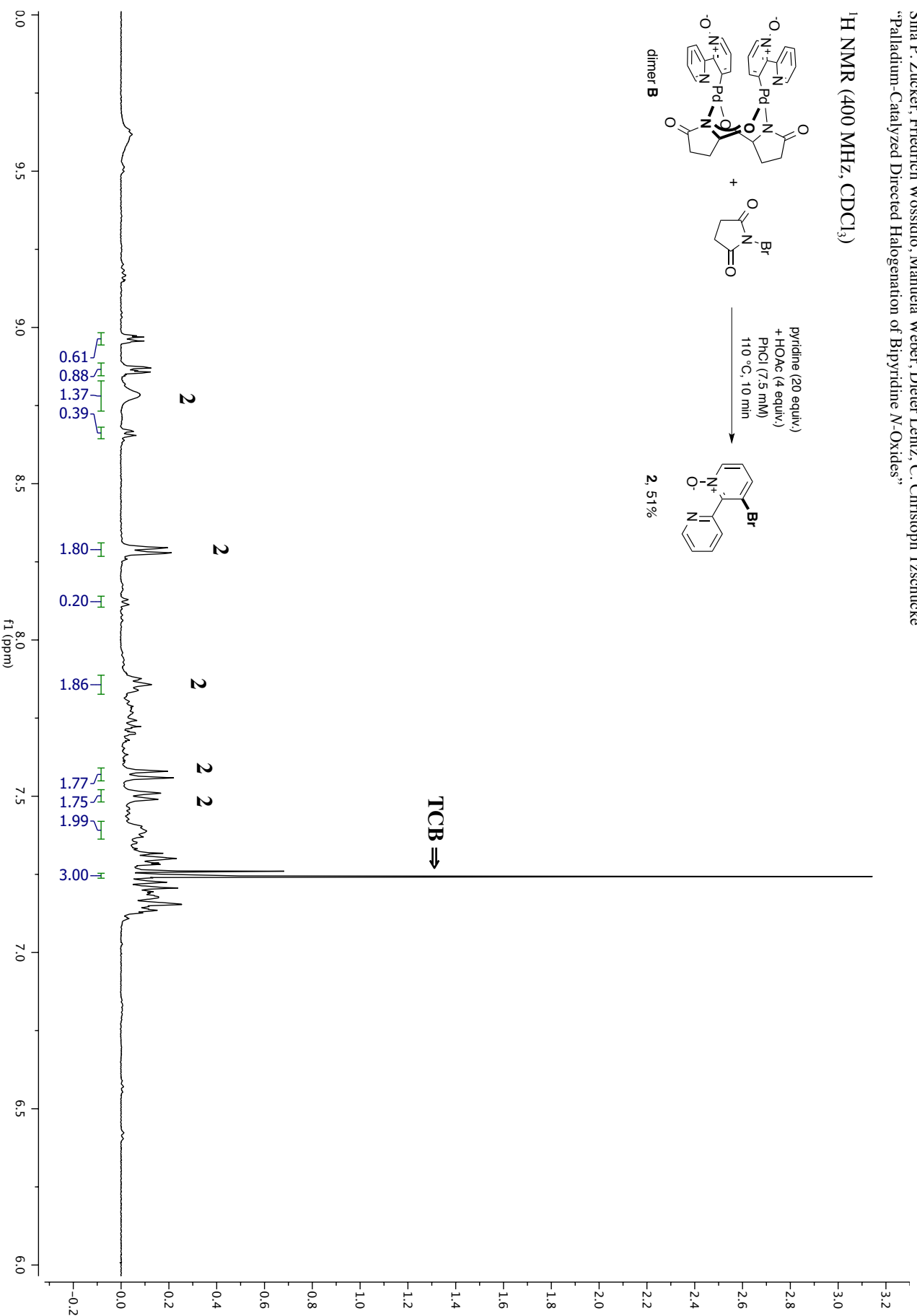
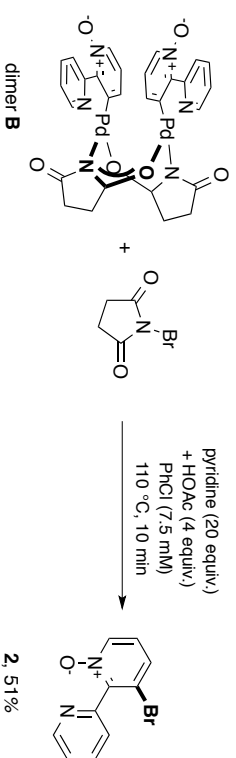
Sina P. Zucker, Friedrich Wossidlo, Manuela Weber, Dieter Lentz, C. Christoph Tzschucke
 "Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides"

^1H NMR (400 MHz, CDCl_3)

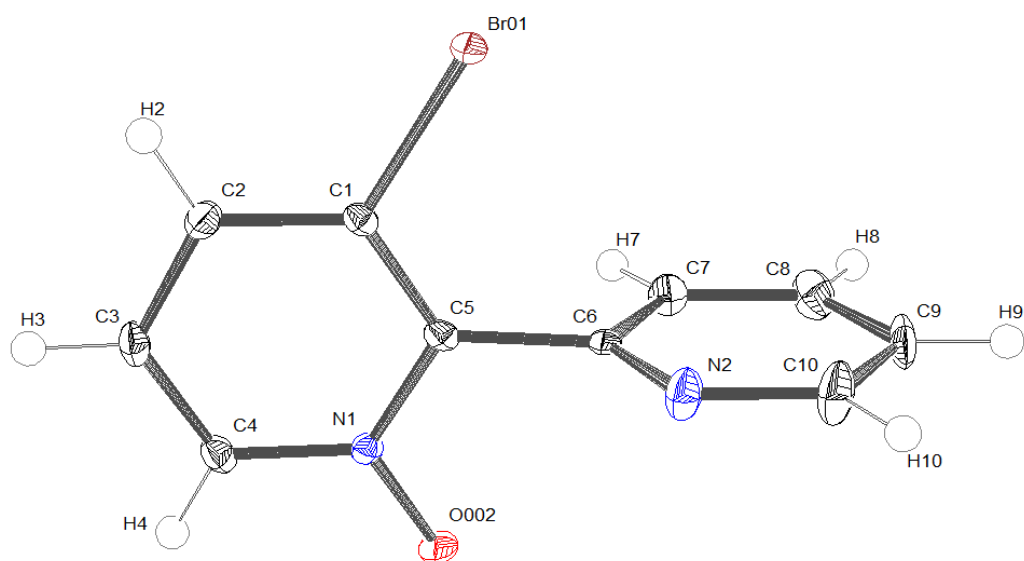


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 “Palladium-Catalyzed Directed Halogenation of Bipyridine *N*-Oxides”

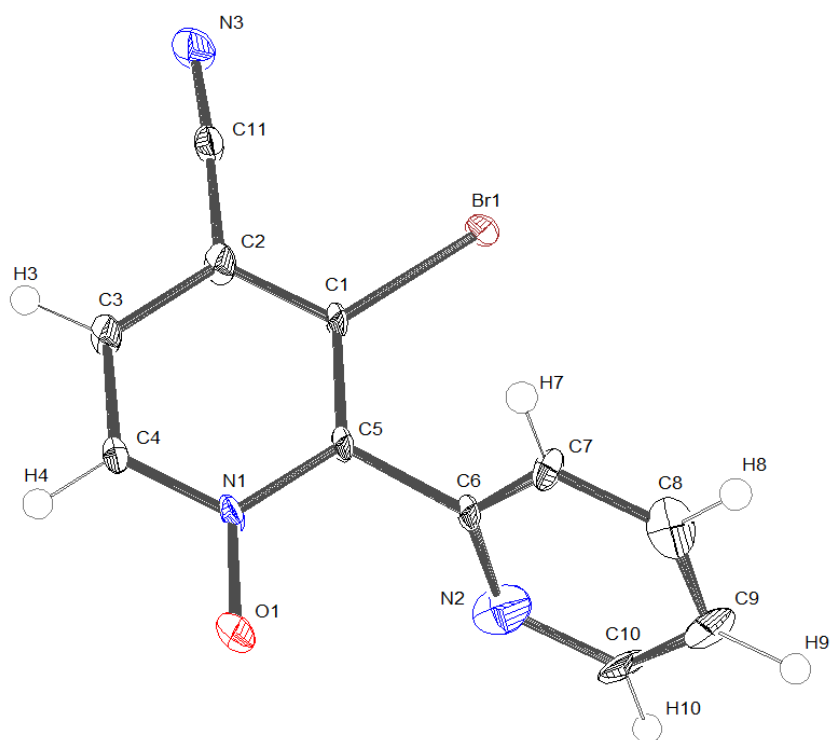
^1H NMR (400 MHz, CDCl_3)



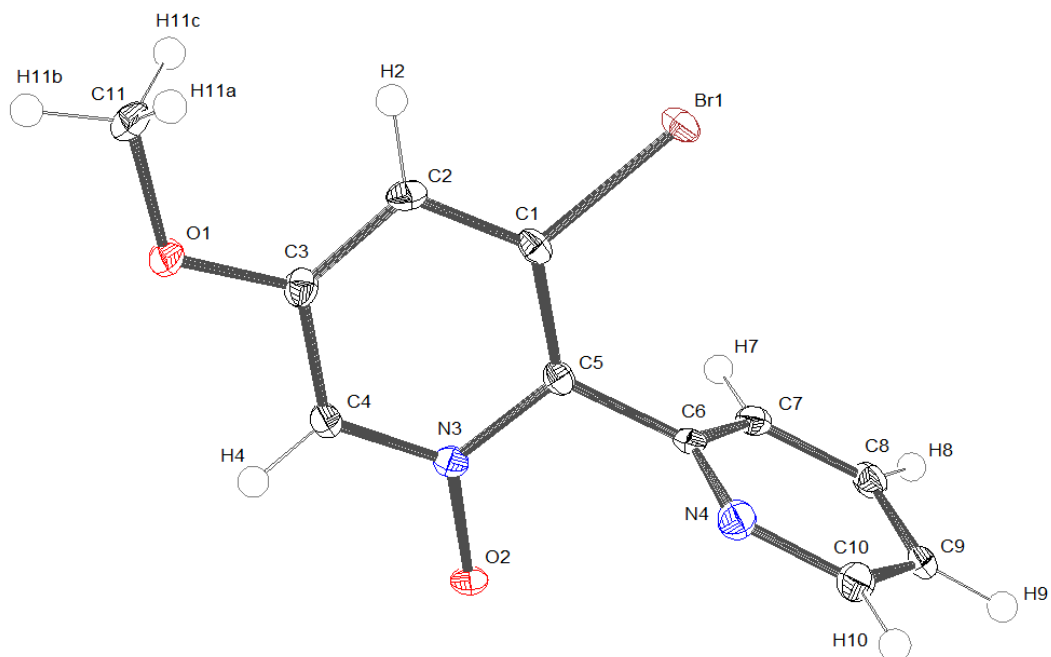
Ortep diagrams of crystal structures



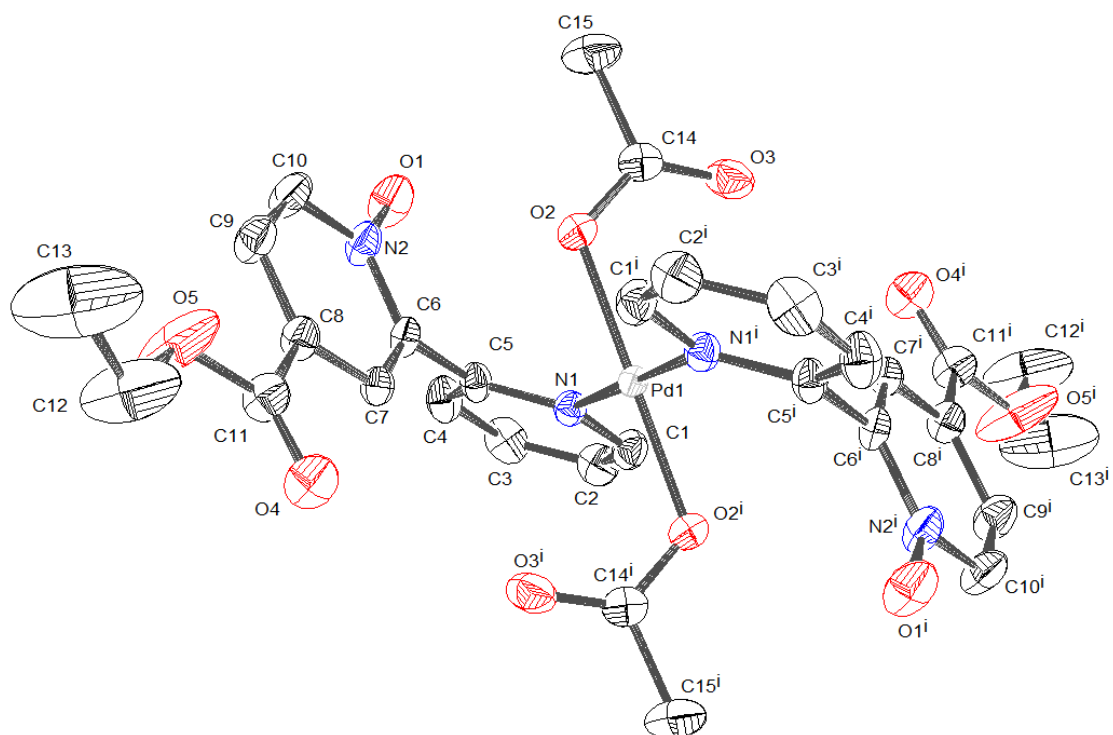
3-Bromo-2,2'-bipyridine *N*-oxide (**2a**) (CCDC-1476436). Thermal ellipsoids are drawn at 50% probability level. Dihedral angle N(1)-C(5)-C(6)-N(2) 98.19 °.



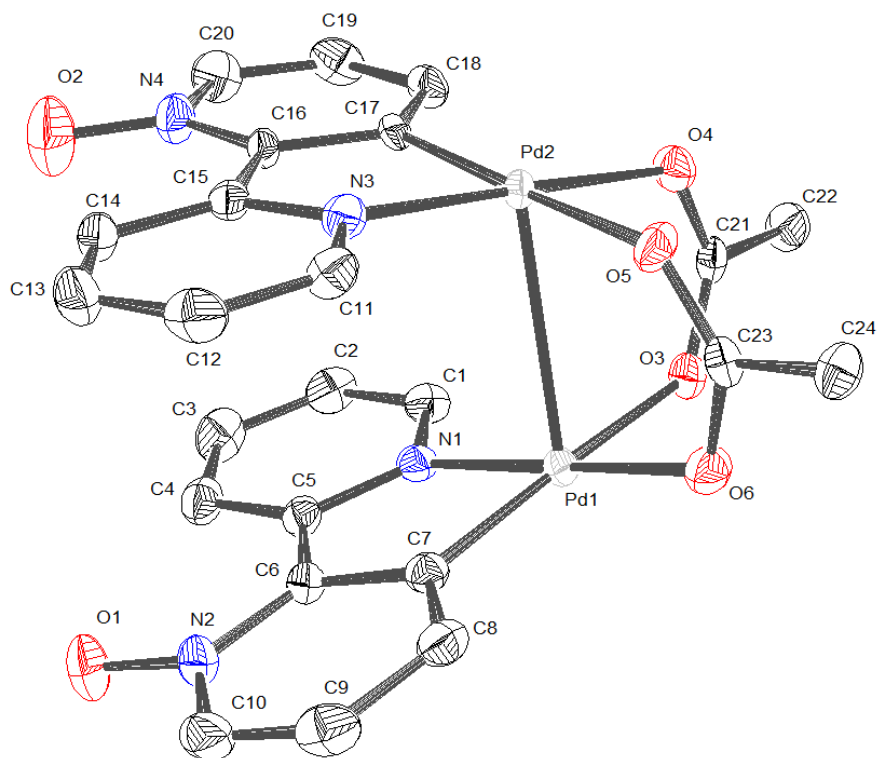
3-Bromo-4-cyano-2,2'-bipyridine *N*-oxide (**2n**) (CCDC-1476429). Thermal ellipsoids are drawn at 50% probability level. Dihedral angle N(1)-C(5)-C(6)-N(2) 68.77 °.



3-Bromo-5-methoxy-2,2'-bipyridine *N*-oxide (**2f**) (CCDC-1476430). Thermal ellipsoids are drawn at 50% probability level. Torsion angle N(3)–C(5)–C(6)–N(4) 72.50 °.



Monomer C (CCDC-1476437). Thermal ellipsoids are drawn at 50% probability level. Hydrogen atoms were omitted for clarity. Dihedral angle N(1)–C(5)–C(6)–N(2) 124.61 °.



Dimer **A** (CCDC-1476427). Thermal ellipsoids are drawn at 50% probability level. Hydrogen atoms were omitted for clarity. Dihedral angles N(4)–C(16)–C(15)–C(14) 5.21 °, and C(4)–C(5)–C(6)–N(2) 9.27 °. Bond distance Pd–Pd 2.863 Å.