

Electronic Supplementary Information

A Regioselective [4+2] Annulation Approach to 5-Acylindolizine-7-carbonitriles: Generation of Poly-substituted Pyridines

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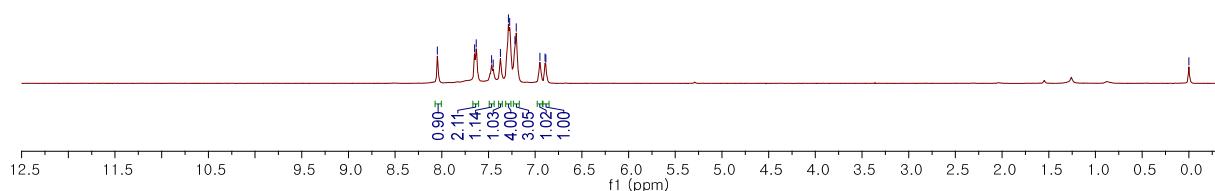
ikyonkim@yonsei.ac.kr

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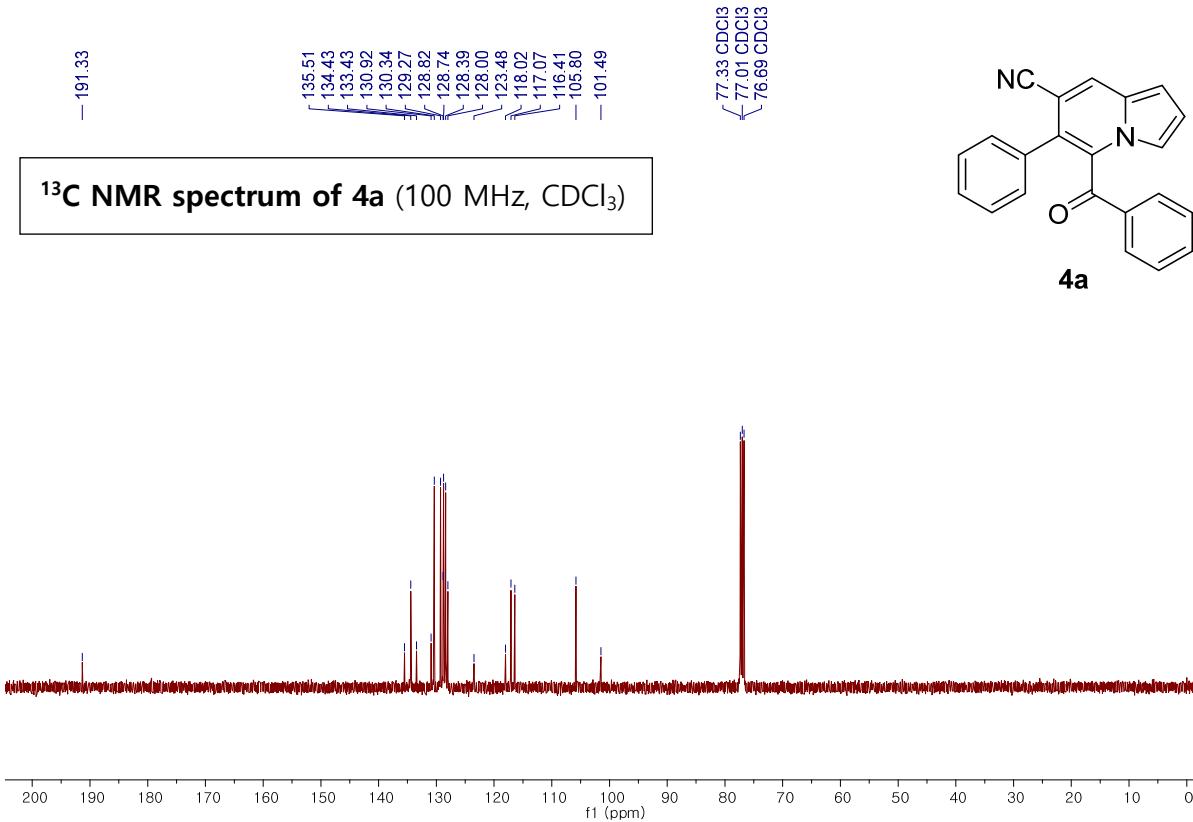
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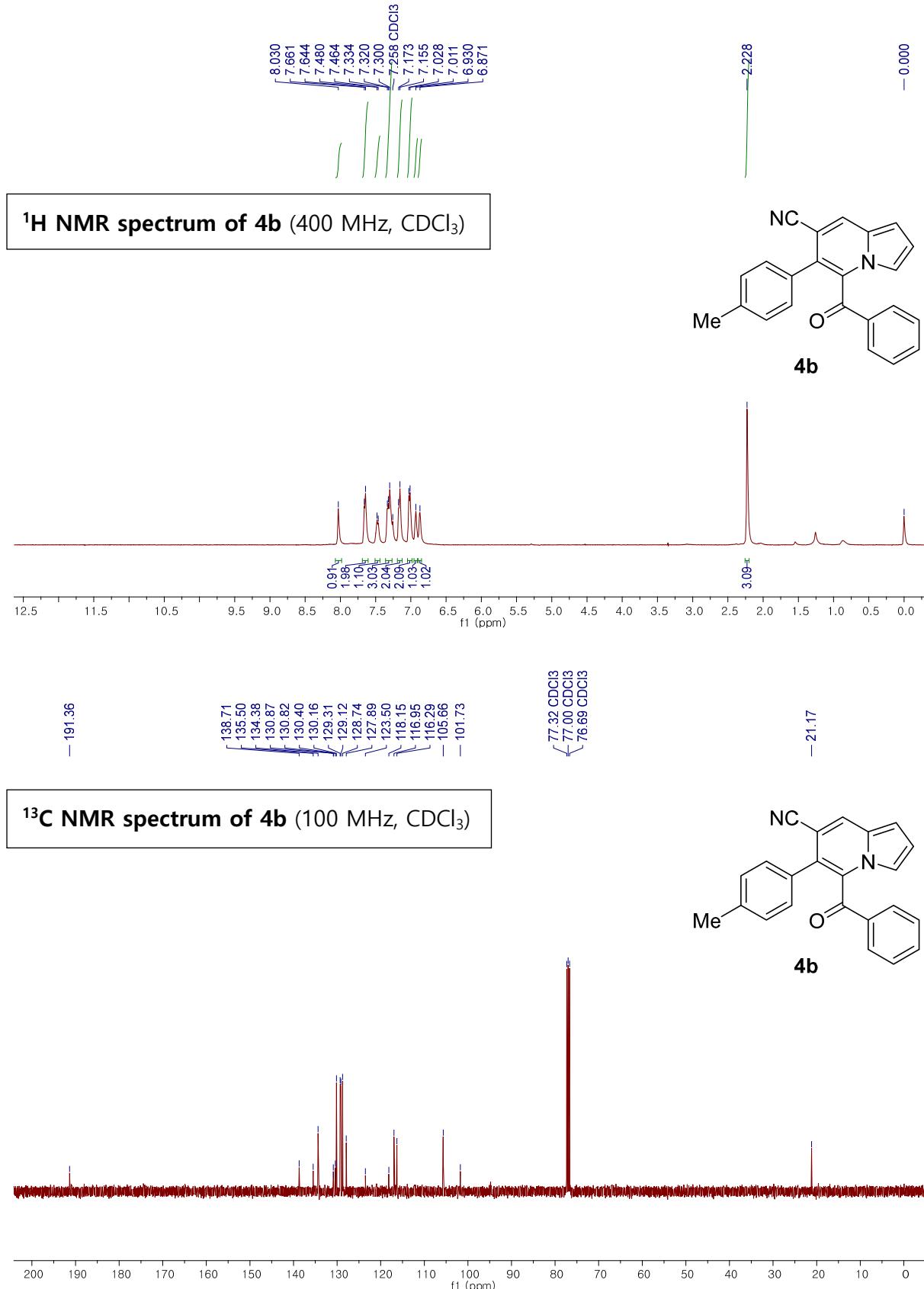


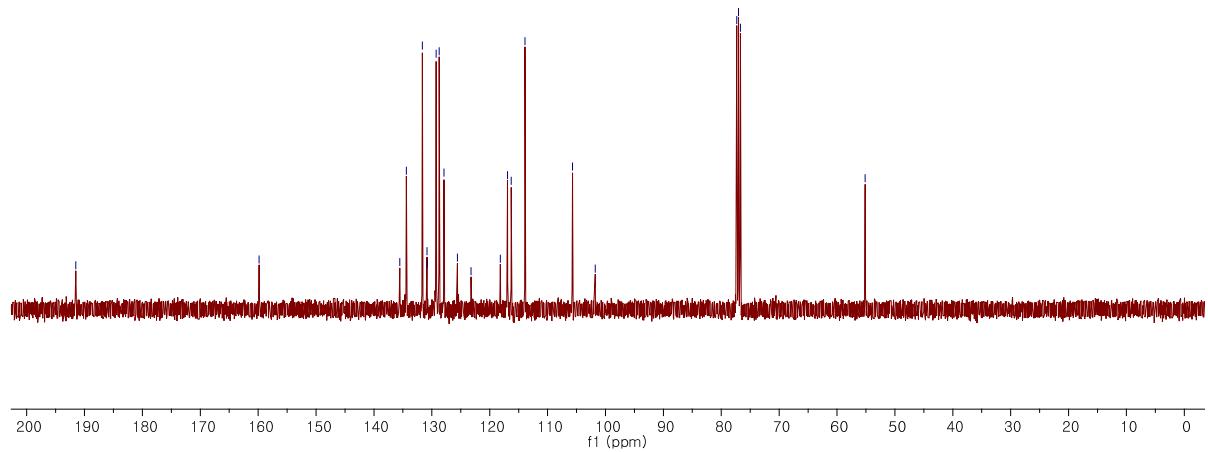
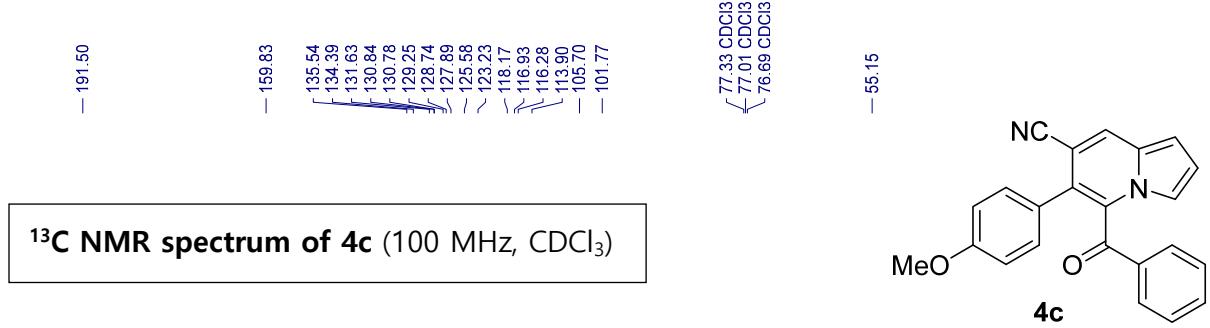
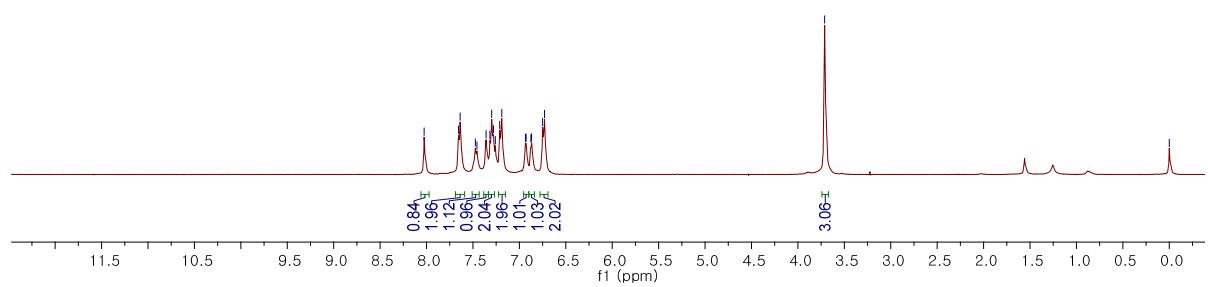
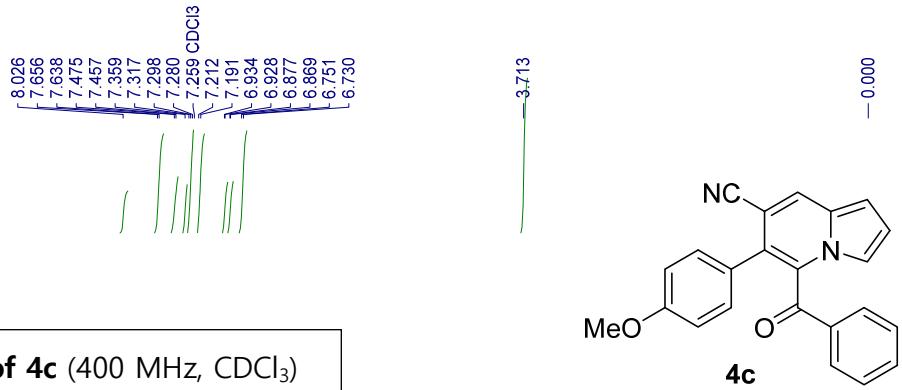
¹H NMR spectrum of 4a (400 MHz, CDCl₃)

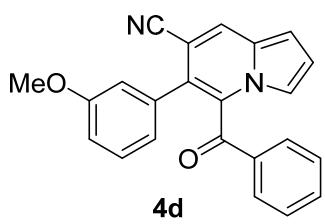


¹³C NMR spectrum of 4a (100 MHz, CDCl₃)

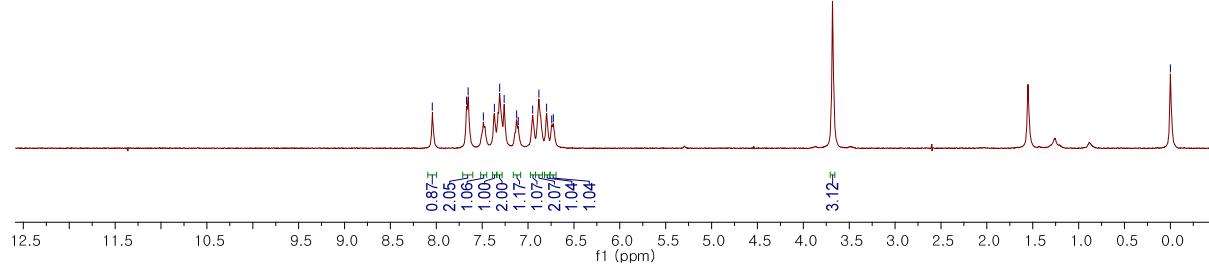




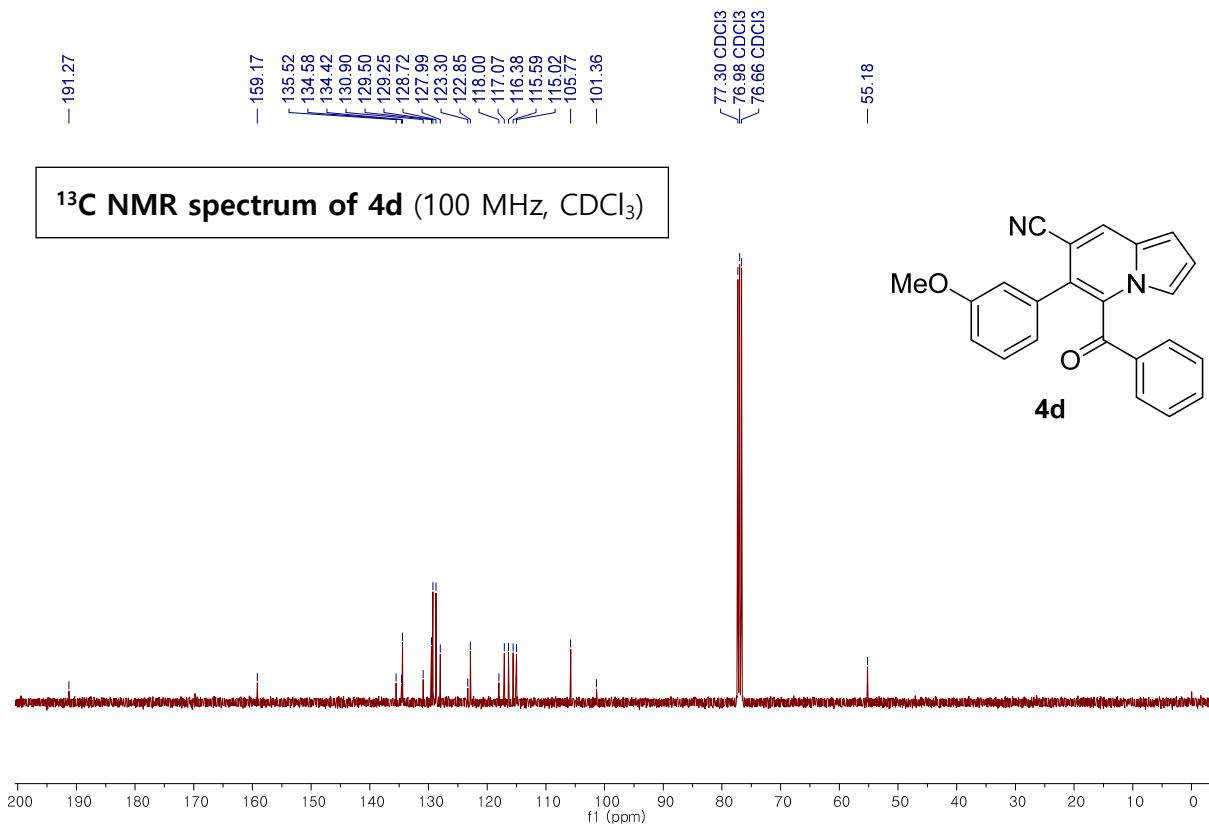


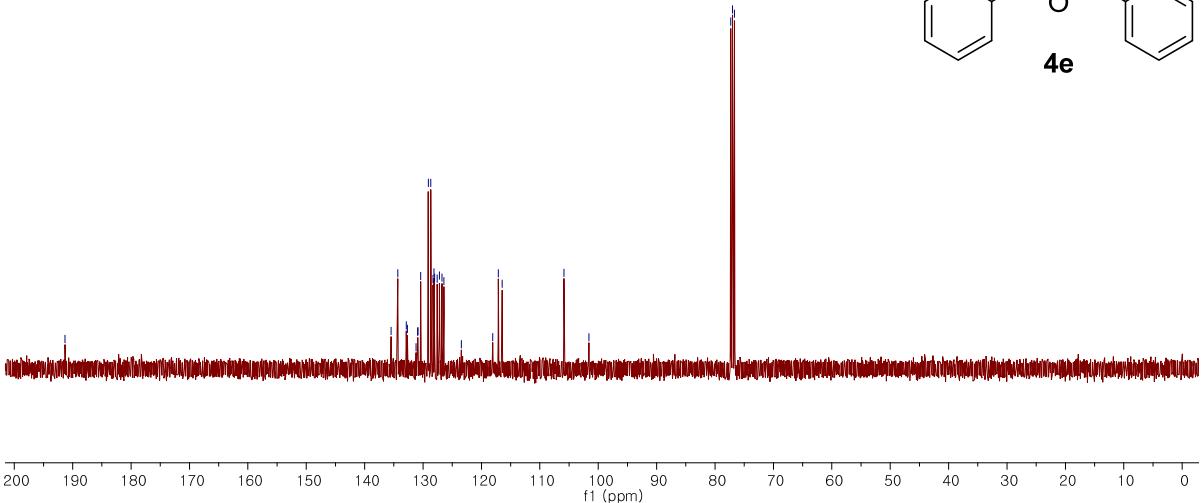
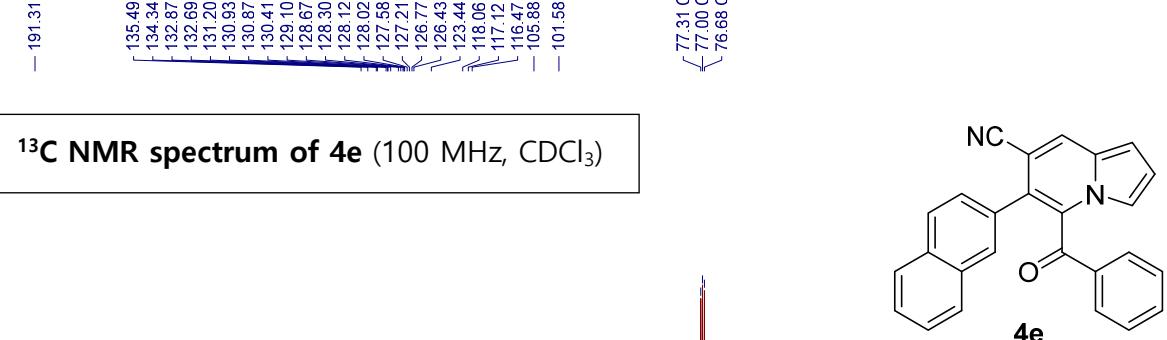
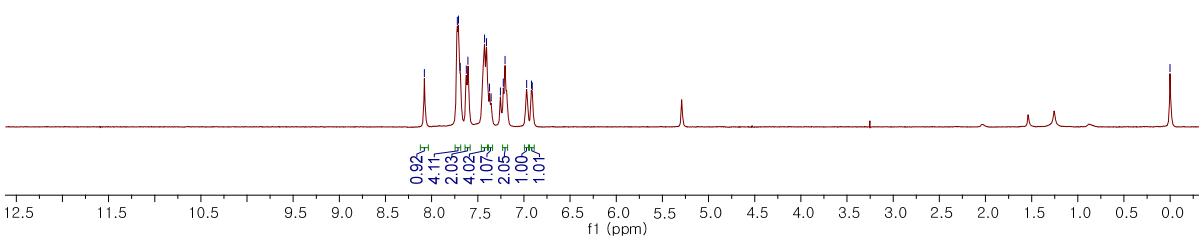


¹H NMR spectrum of 4d (400 MHz, CDCl₃)



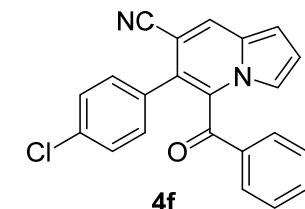
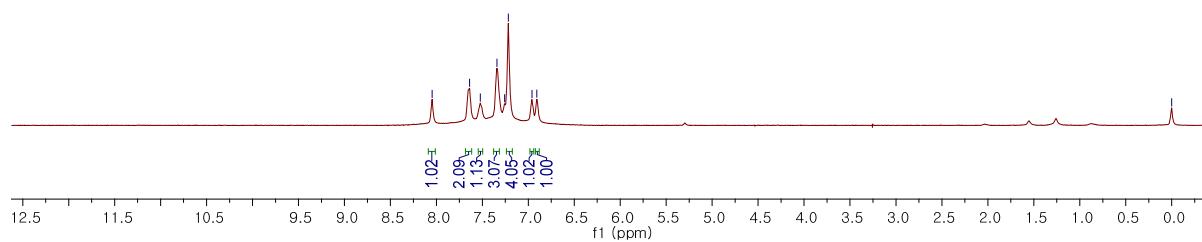
¹³C NMR spectrum of 4d (100 MHz, CDCl₃)



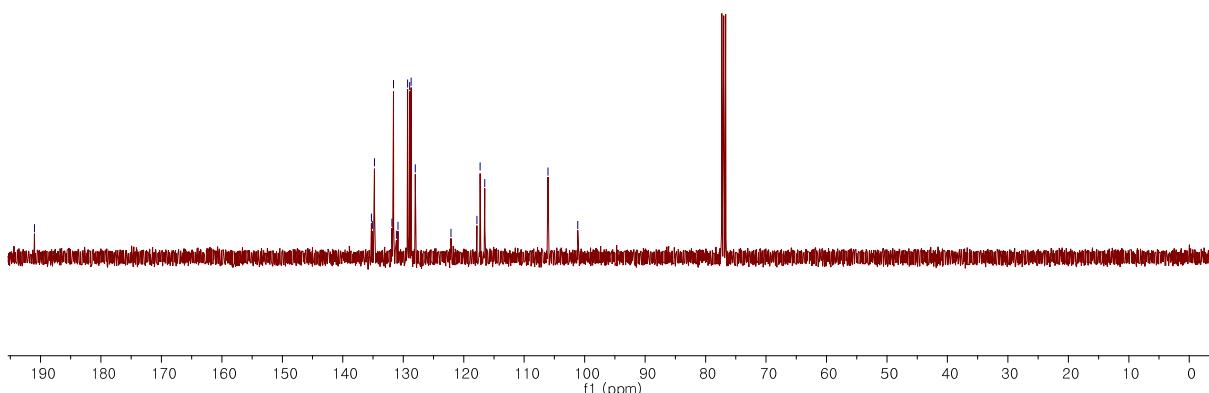




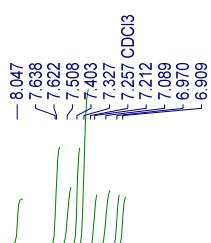
¹H NMR spectrum of 4f (400 MHz, CDCl₃)



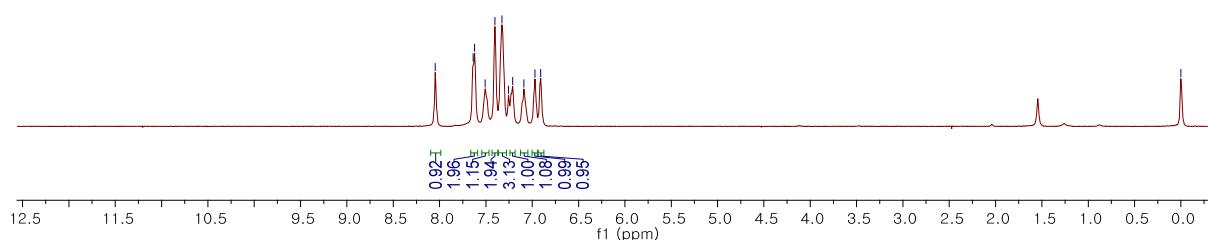
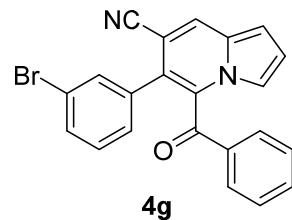
¹³C NMR spectrum of 4f (100 MHz, CDCl₃)



MH-I-11

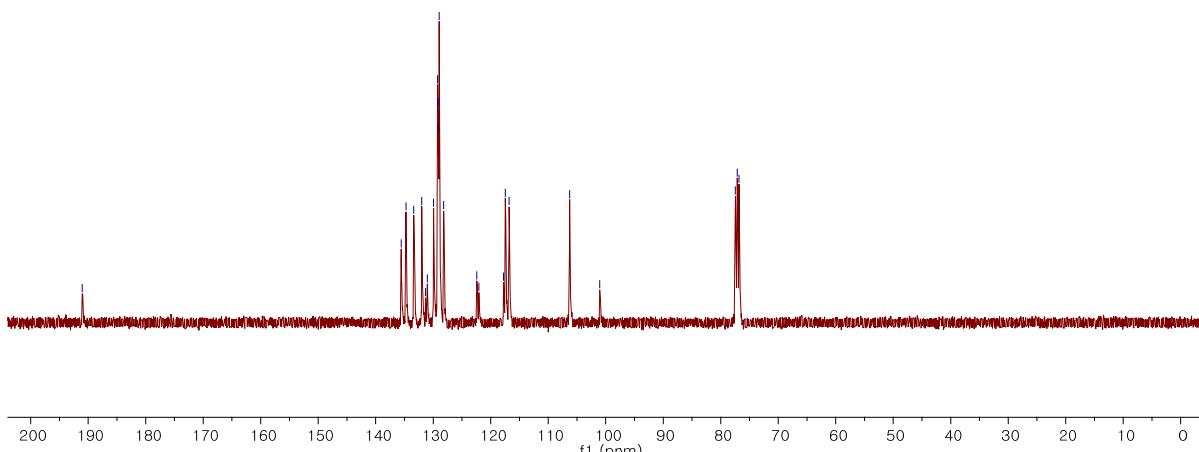
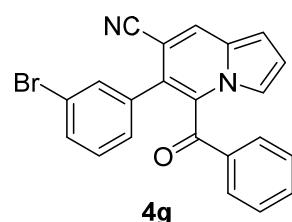


¹H NMR spectrum of 4g (400 MHz, CDCl₃)



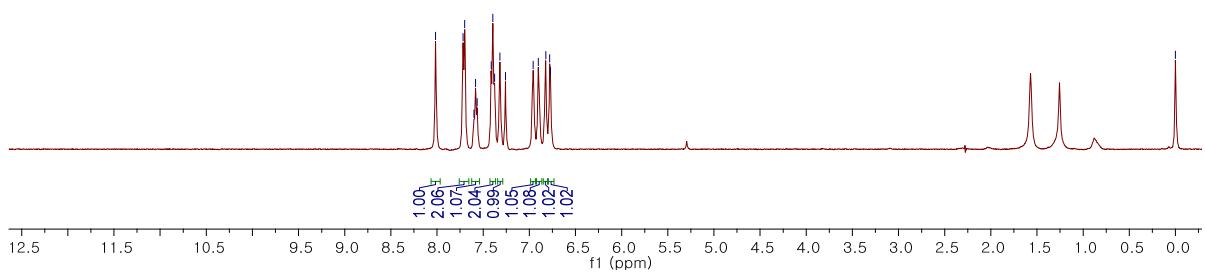
¹³C NMR spectrum of 4g (100 MHz, CDCl₃)

— 191.04
— 135.57
— 134.74
— 133.39
— 131.99
— 131.33
— 131.02
— 129.95
— 129.25
— 129.10
— 129.16
— 128.97
— 128.19
— 122.41
— 122.07
— 117.77
— 117.47
— 108.88
— 106.28
— 101.08

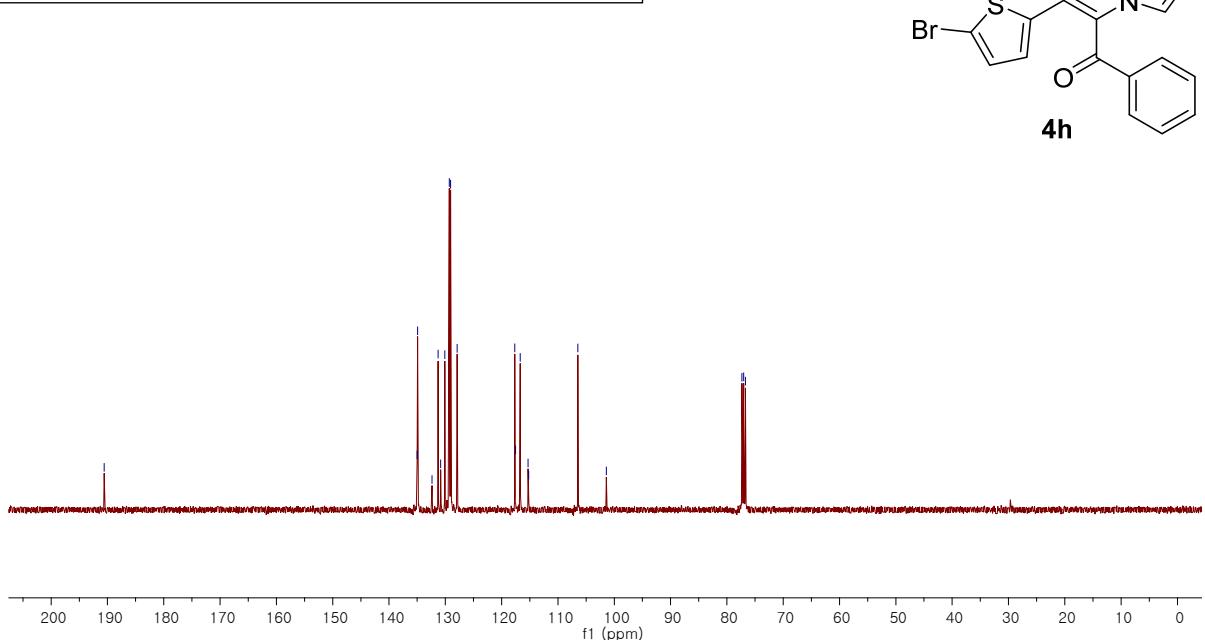


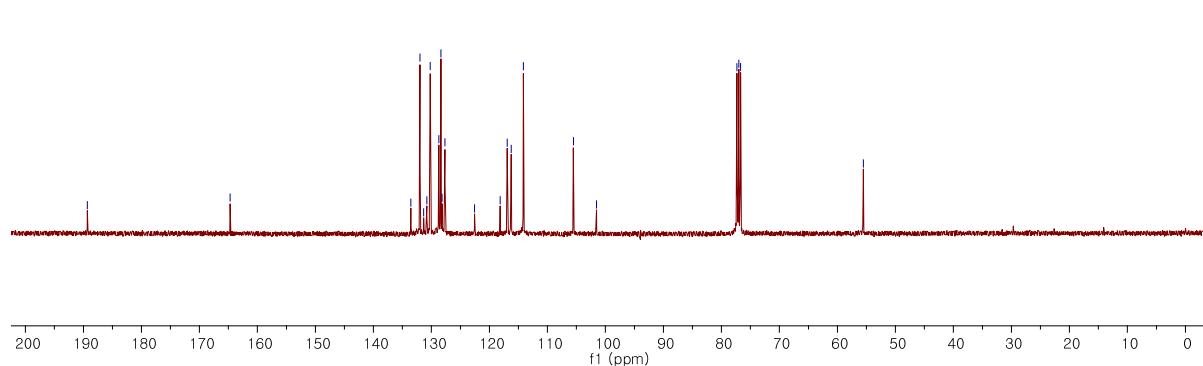
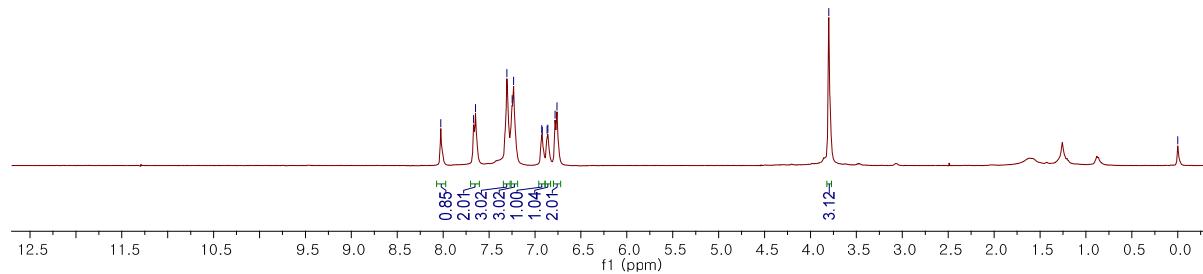
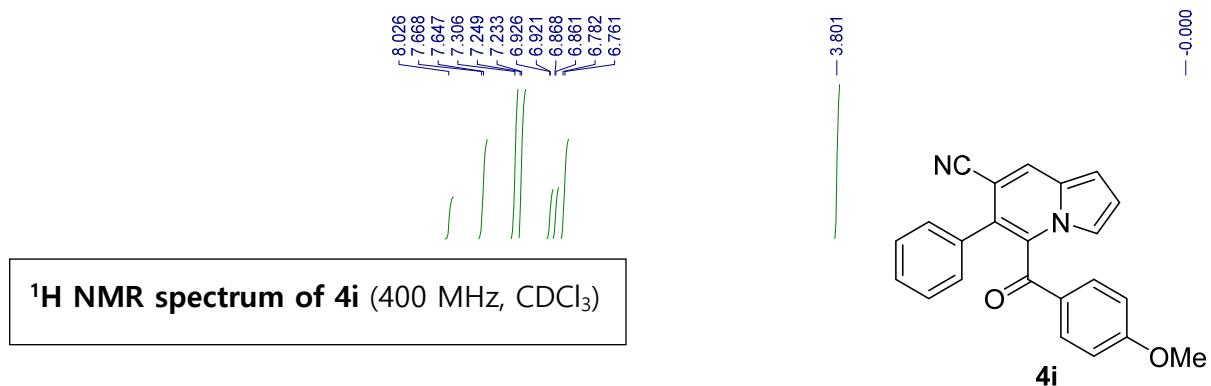


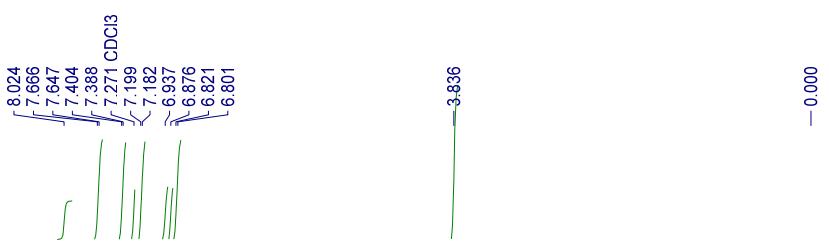
¹H NMR spectrum of **4h** (400 MHz, CDCl₃)



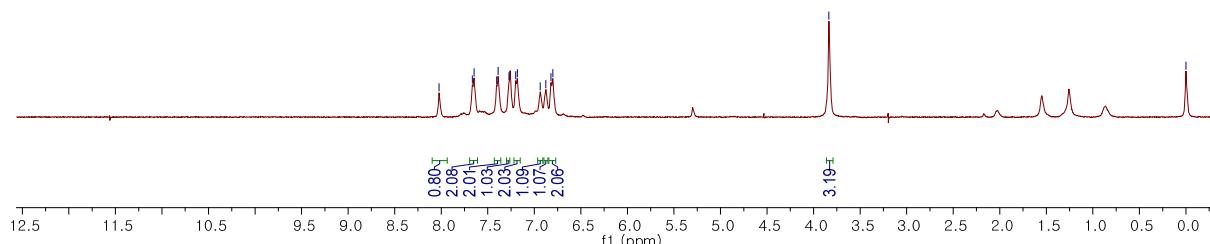
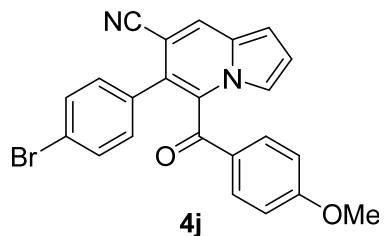
¹³C NMR spectrum of **4h** (100 MHz, CDCl₃)



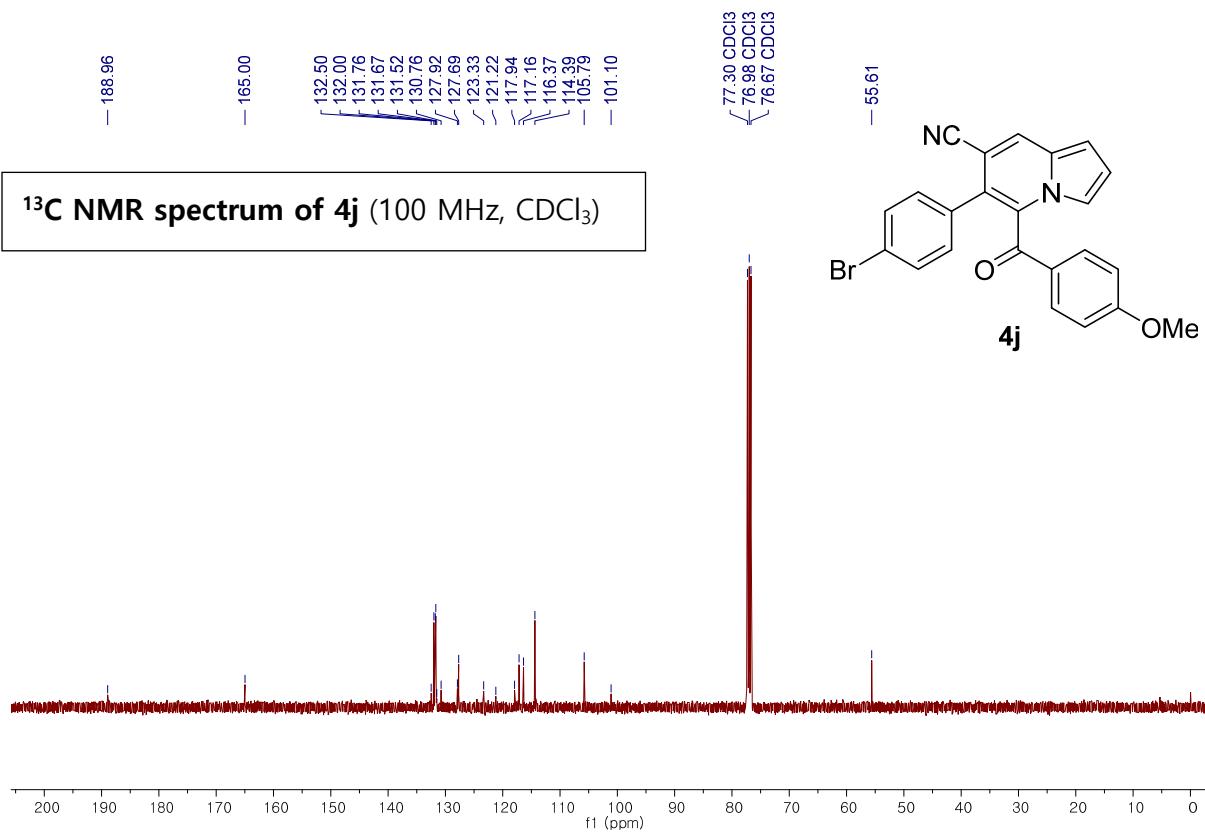
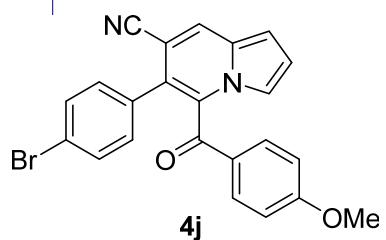




¹H NMR spectrum of 4j (400 MHz, CDCl₃)

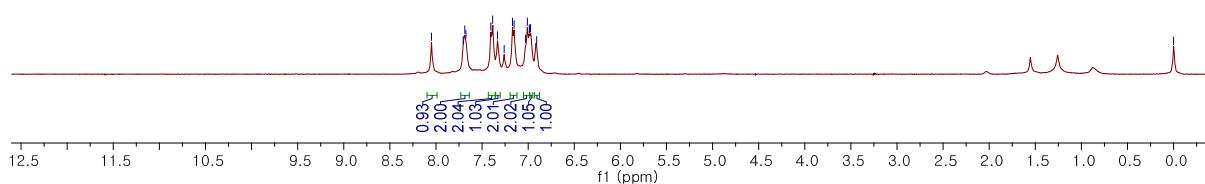
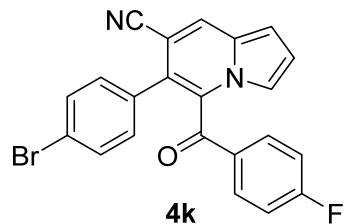


¹³C NMR spectrum of 4j (100 MHz, CDCl₃)



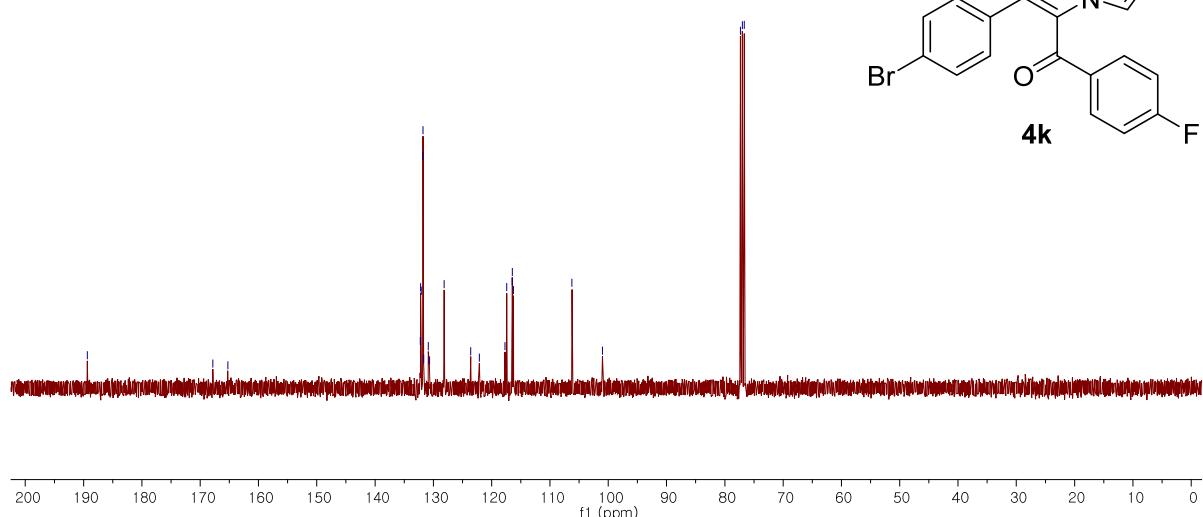
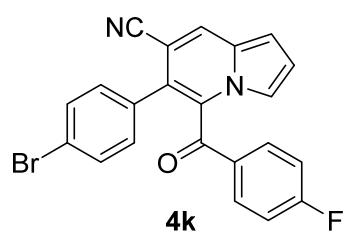


¹H NMR spectrum of 4k (400 MHz, CDCl₃)



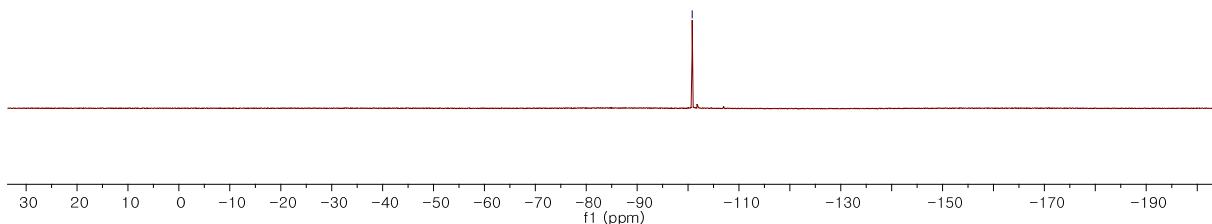
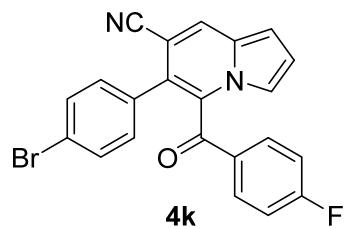
¹³C NMR spectrum of 4k (100 MHz, CDCl₃)

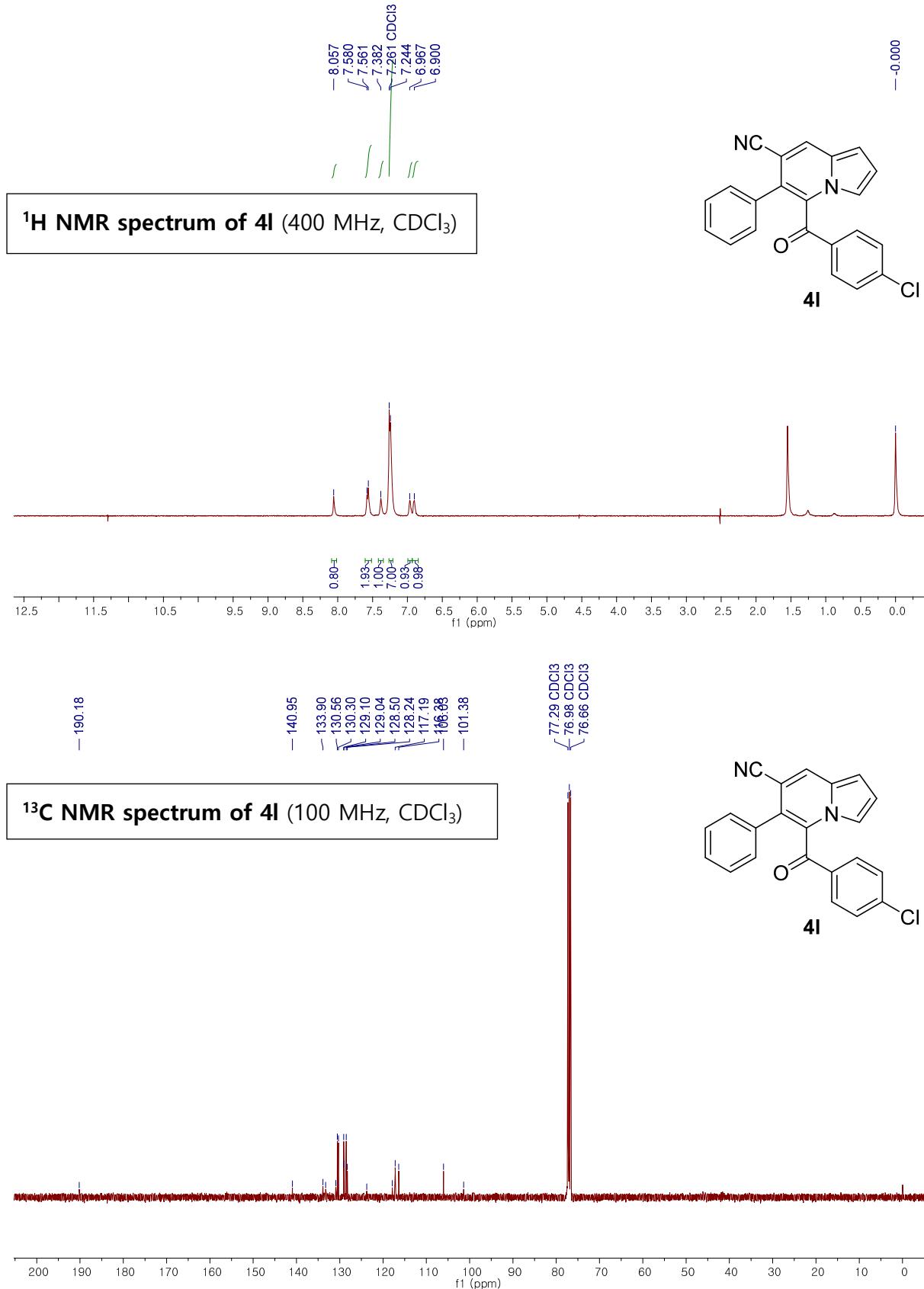
77.31 CDCl₃
76.99 CDCl₃
76.68 CDCl₃



¹⁹F NMR spectrum of 4k (376 MHz, CDCl₃)

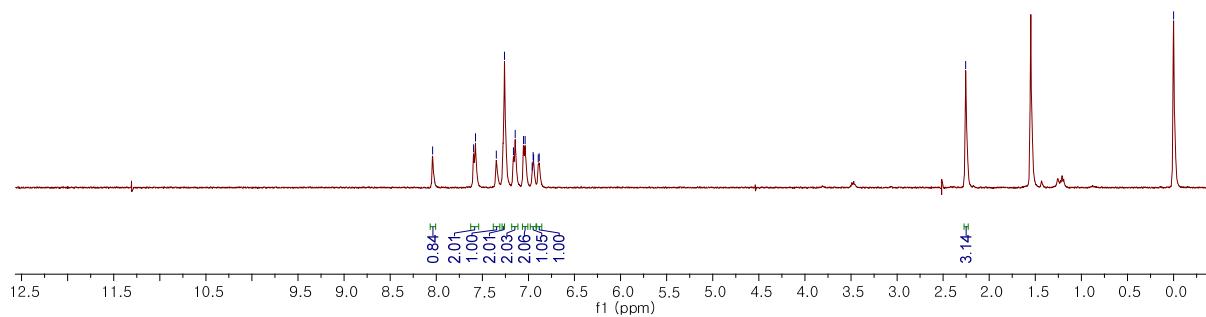
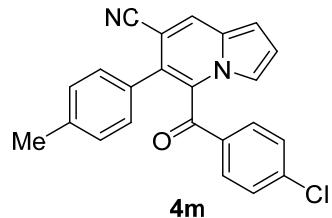
— -100.803







¹H NMR spectrum of 4m (400 MHz, CDCl₃)

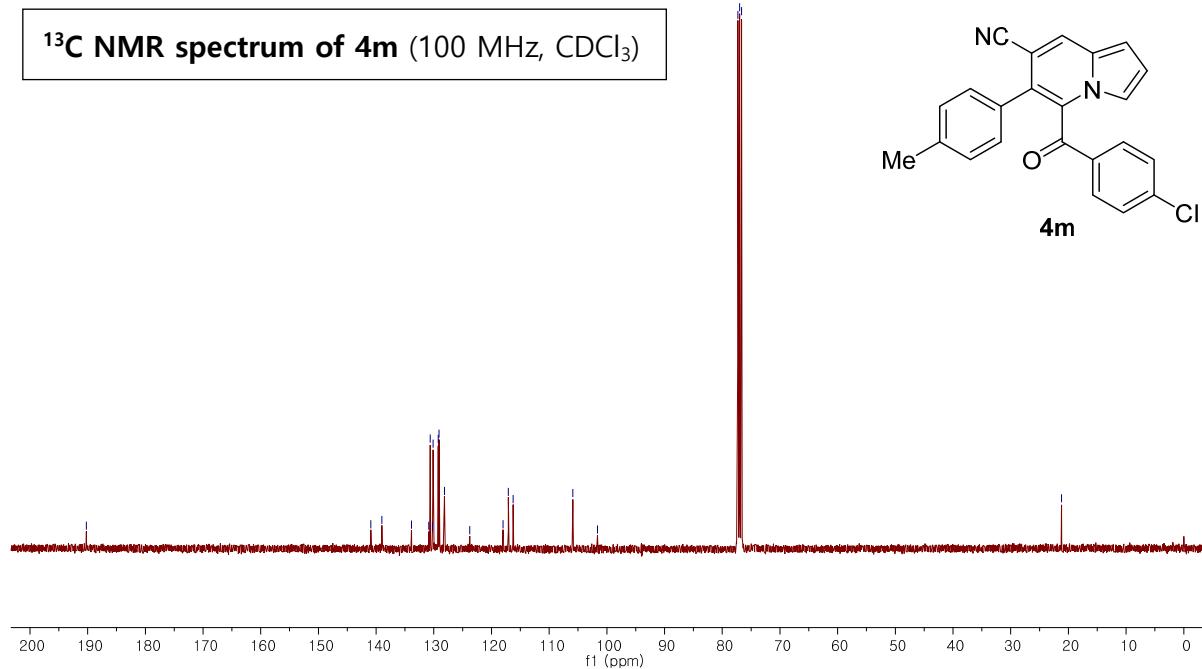
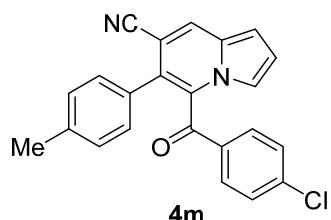


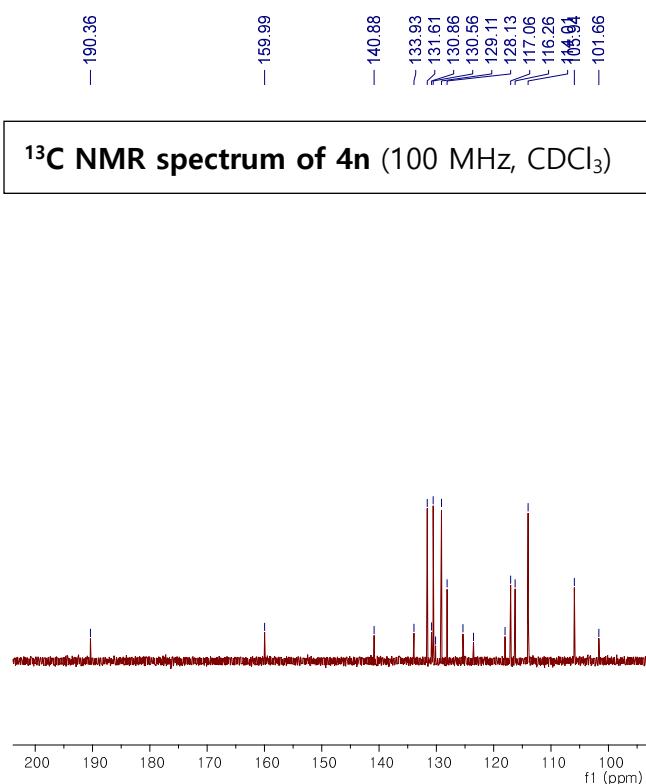
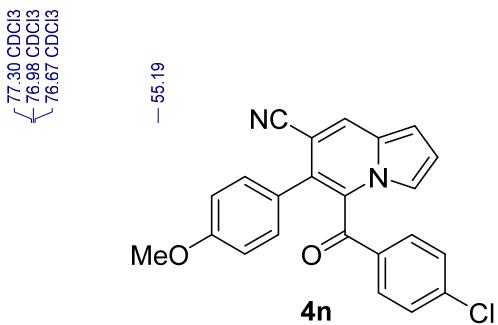
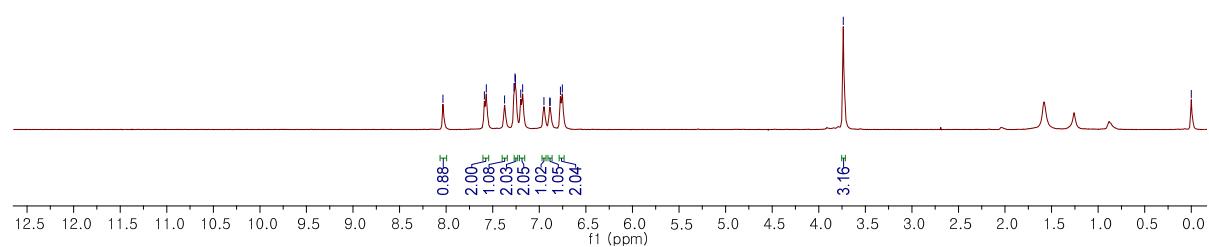
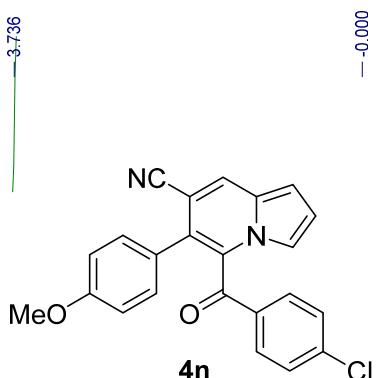
N	avg_deg
140.91	1.88
139.00	1.87
133.87	1.86
130.88	1.85
130.61	1.84
130.23	1.83
130.12	1.82
129.25	1.81
129.11	1.80
128.14	1.79
123.76	1.78
118.01	1.77
117.08	1.76
116.26	1.75
105.90	1.74
	1.62

77.30 CDCI₃
76.98 CDCI₃
76.66 CDCI₃

— 21.20

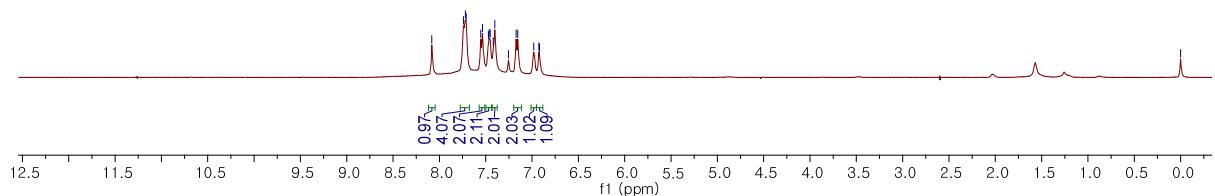
¹³C NMR spectrum of 4m (100 MHz, CDCl₃)



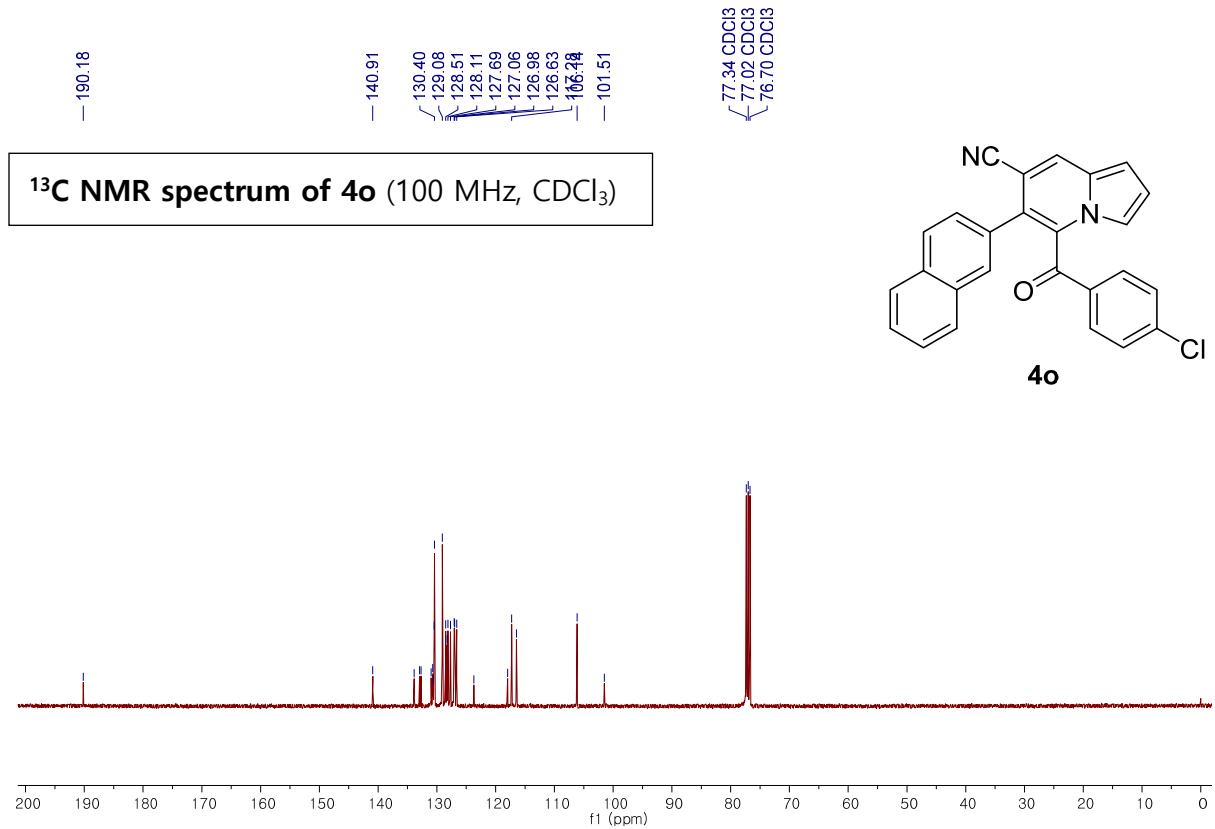


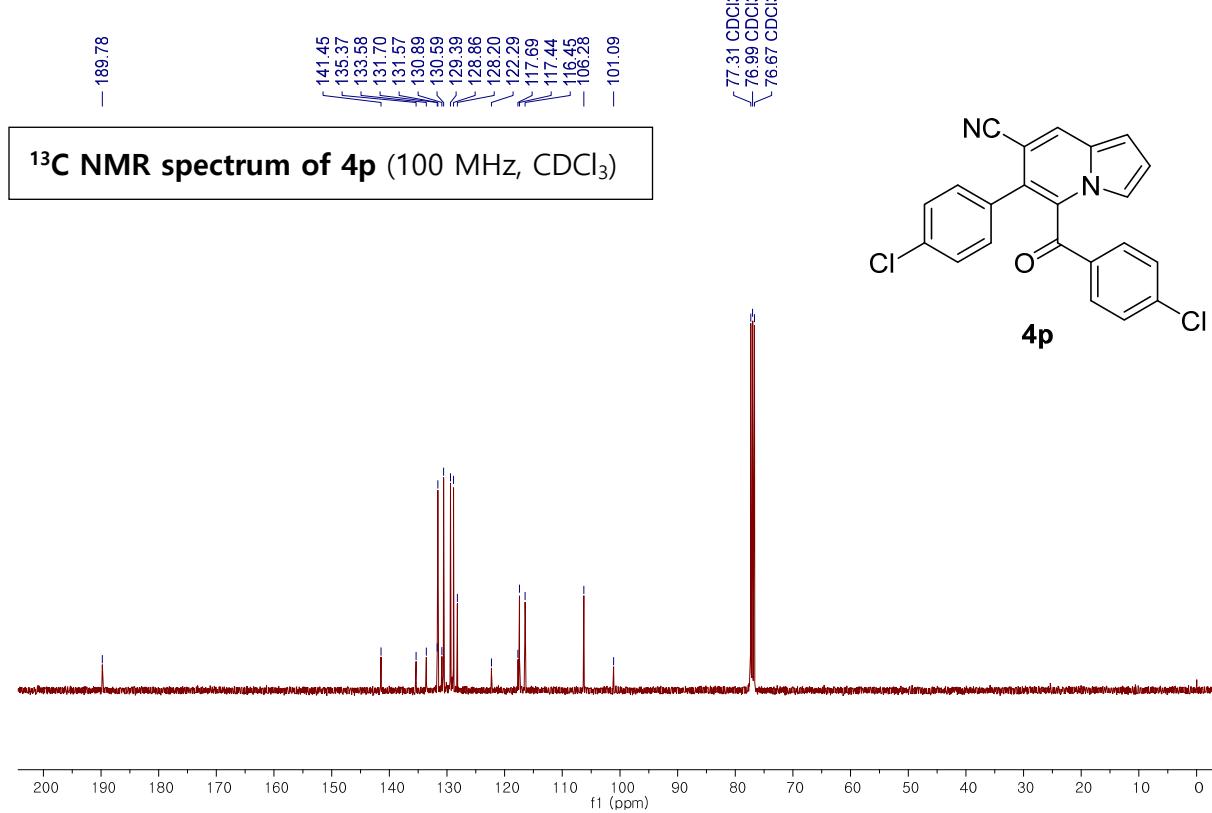
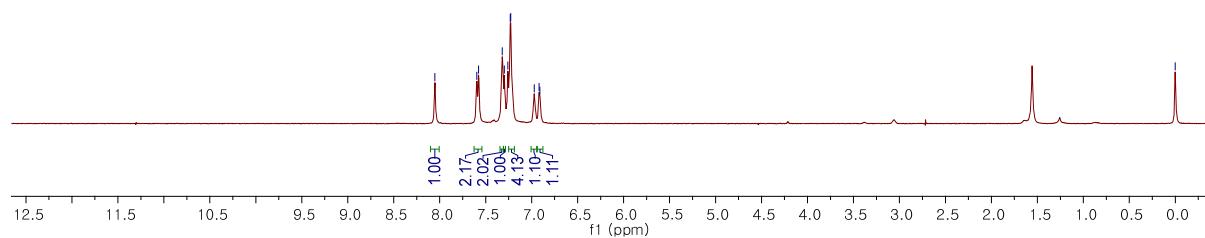
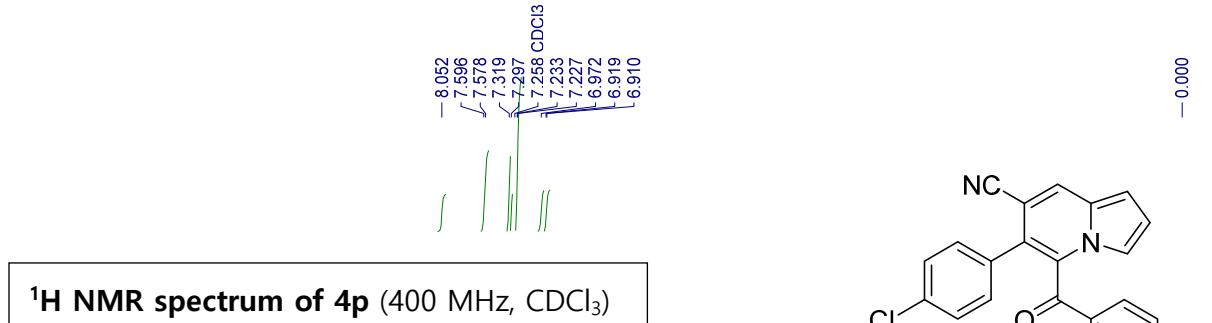


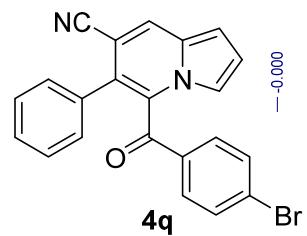
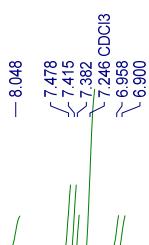
¹H NMR spectrum of **4o** (400 MHz, CDCl₃)



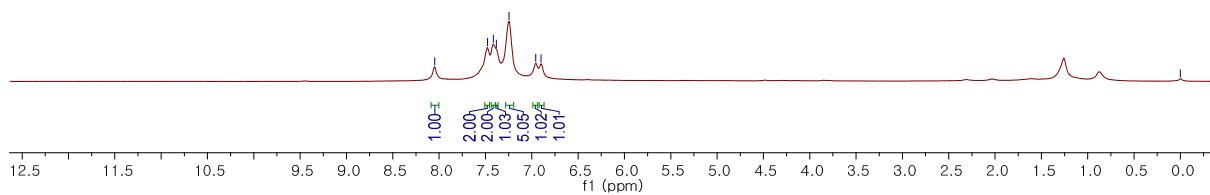
¹³C NMR spectrum of **4o** (100 MHz, CDCl₃)



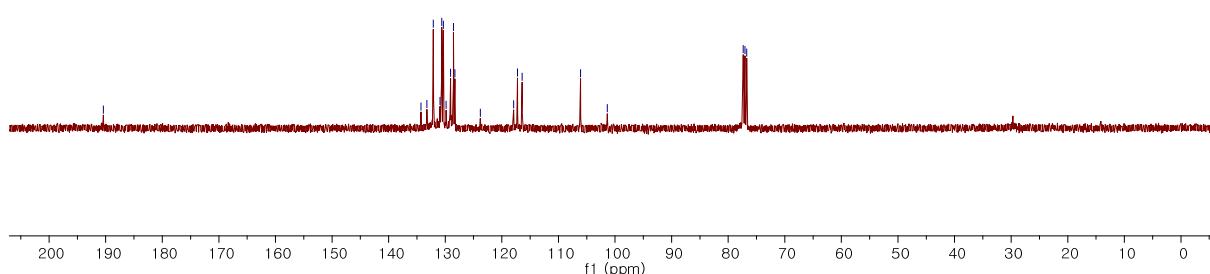
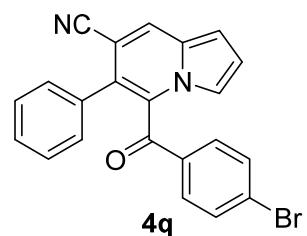
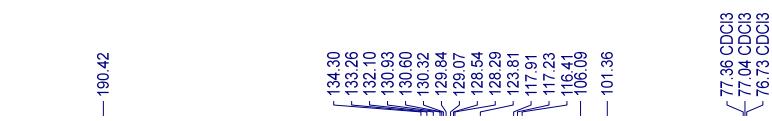




¹H NMR spectrum of 4q (400 MHz, CDCl₃)



¹³C NMR spectrum of 4q (100 MHz, CDCl₃)

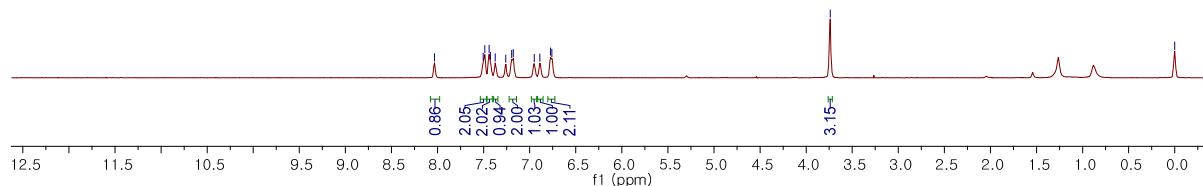
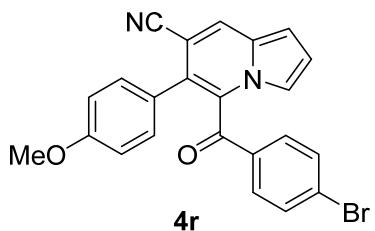


-8.033
-7.505
-7.488
-7.427
-7.374
-7.259 CDCl₃

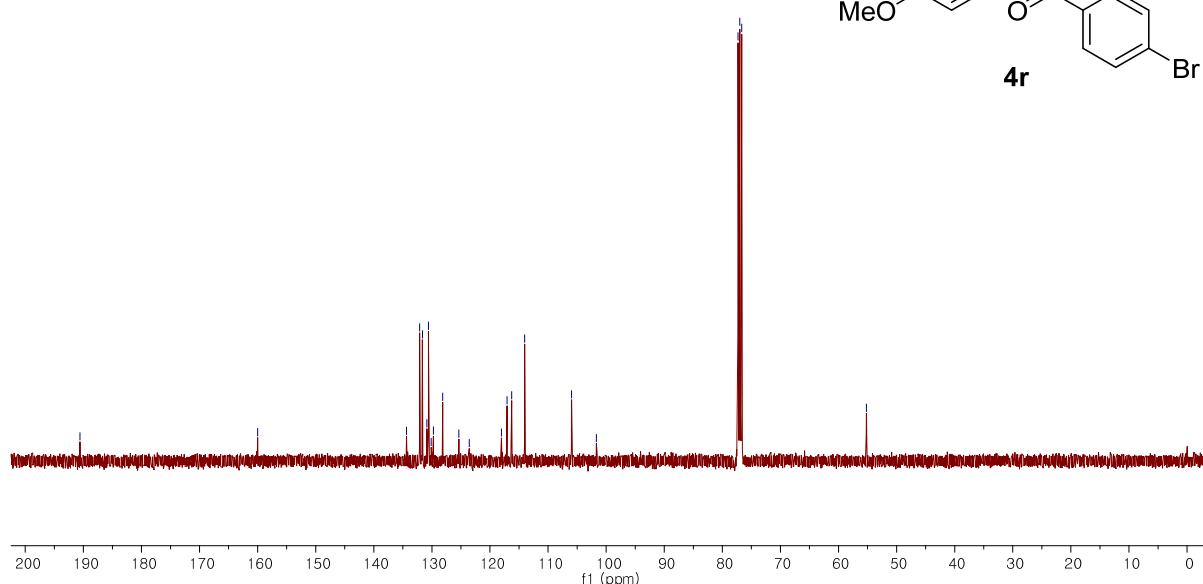
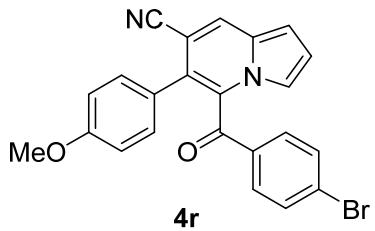
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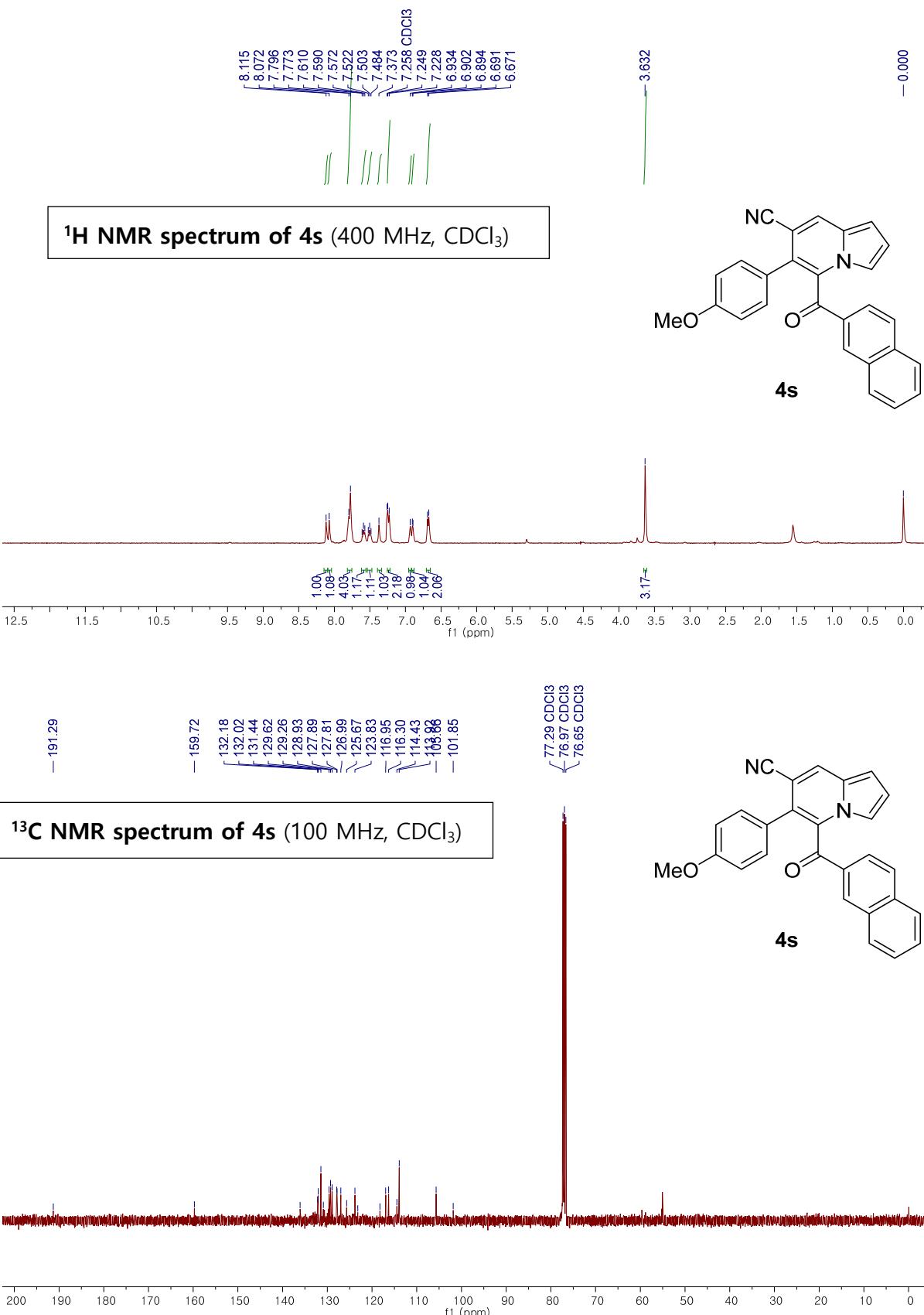
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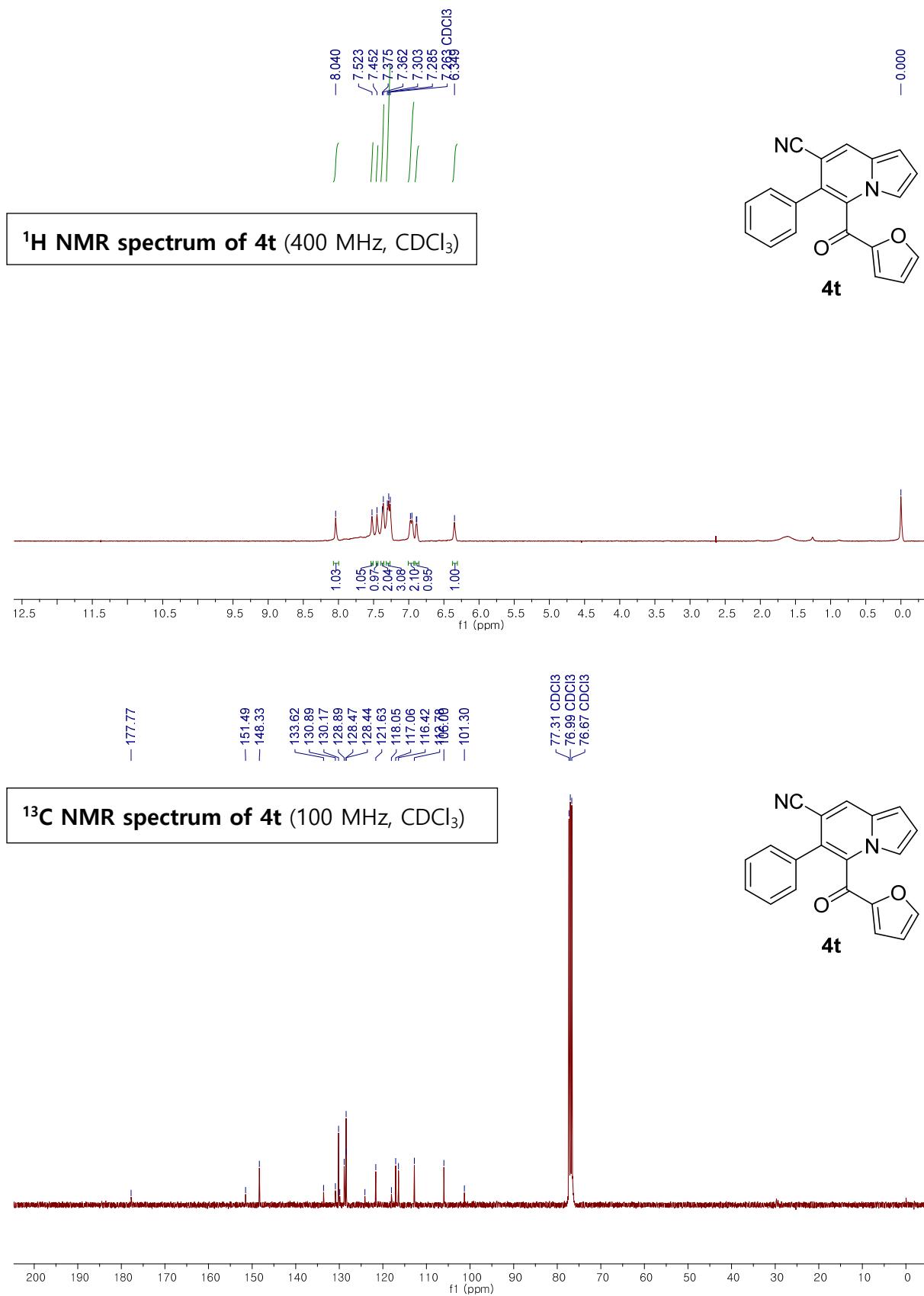
¹H NMR spectrum of 4r (400 MHz, CDCl₃)



¹³C NMR spectrum of 4r (100 MHz, CDCl₃)

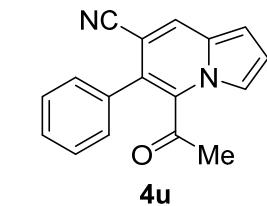
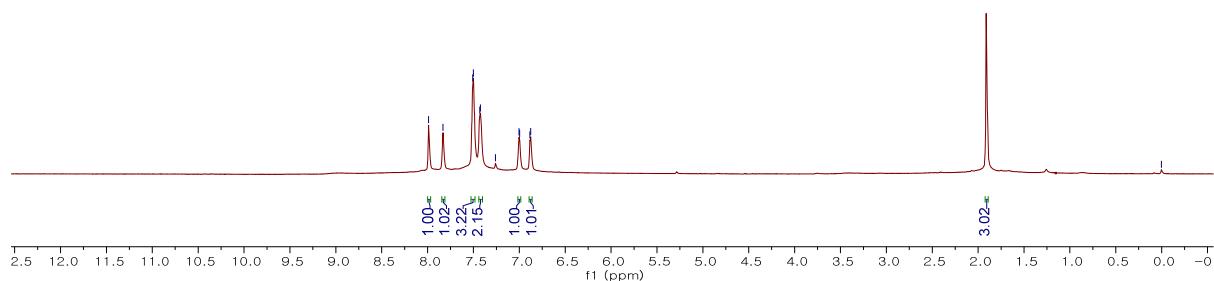




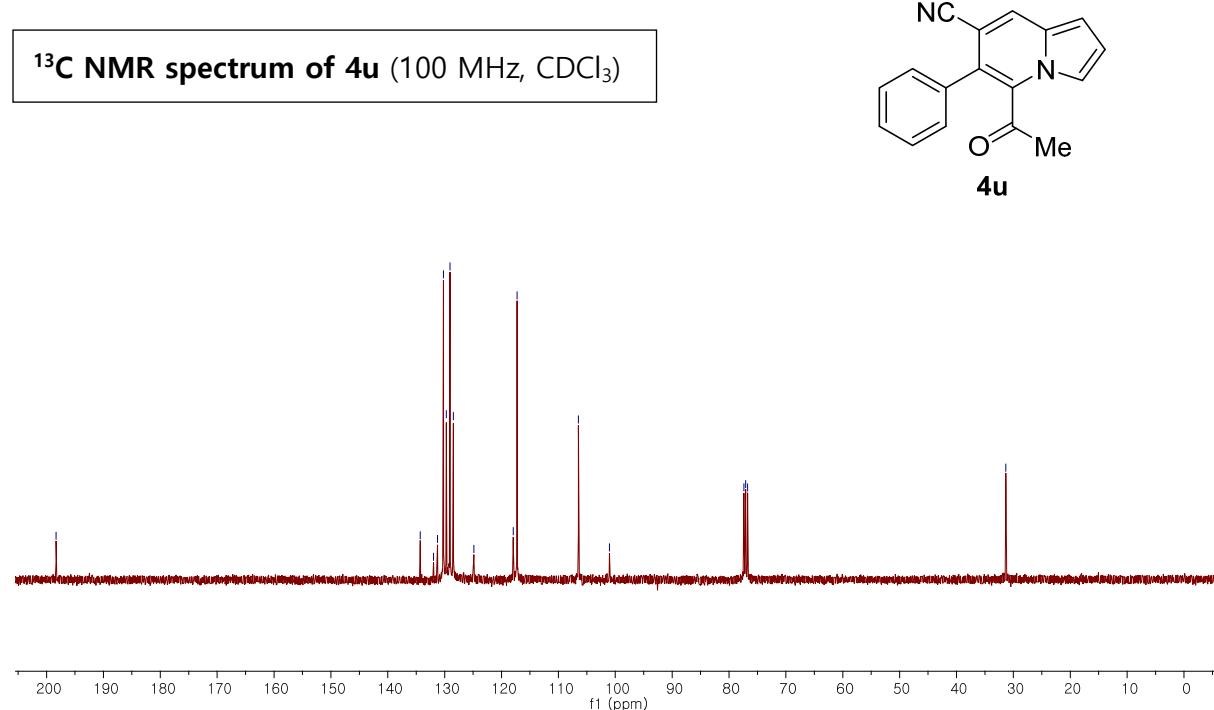


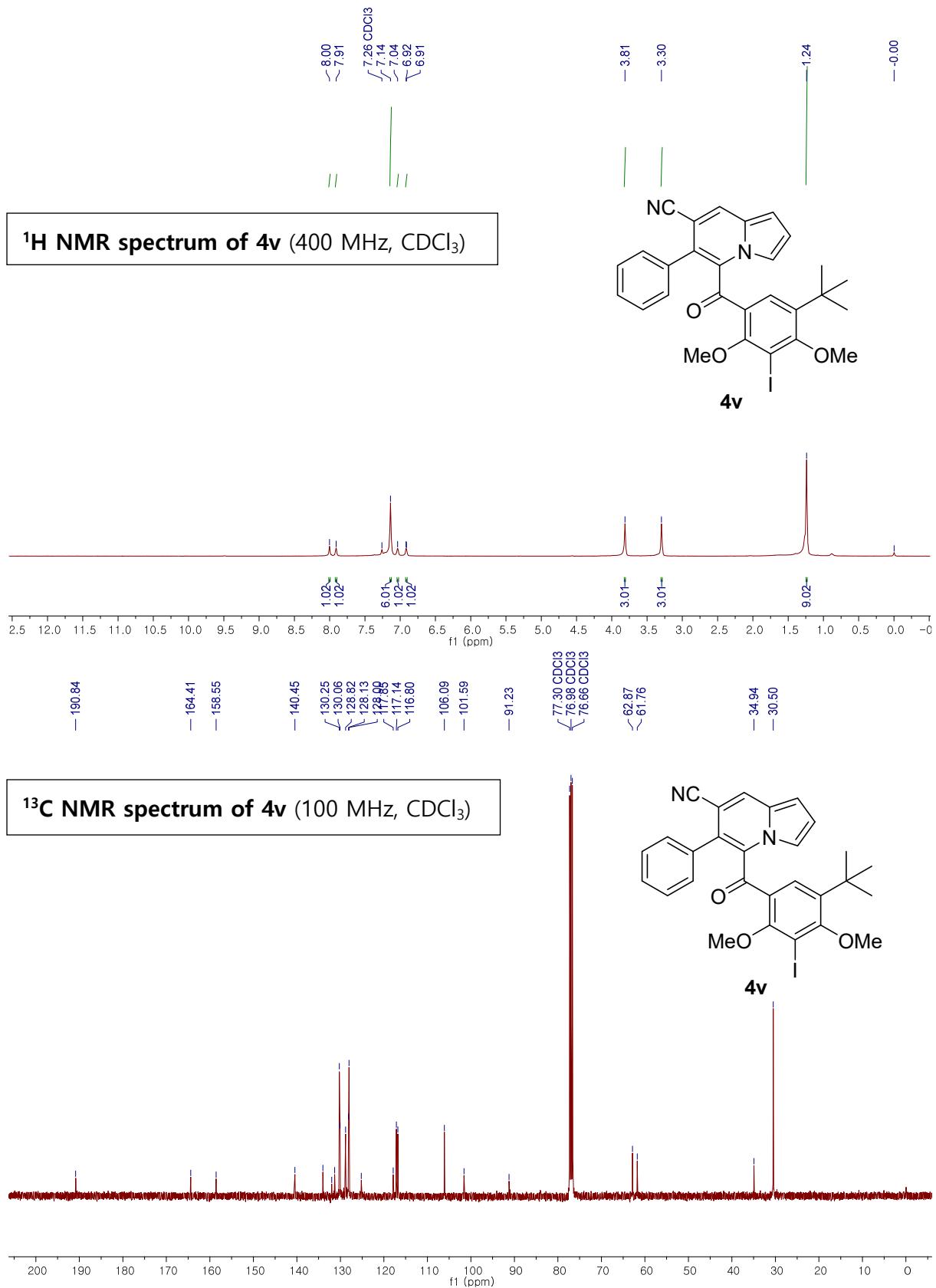


¹H NMR spectrum of 4u (400 MHz, CDCl₃)

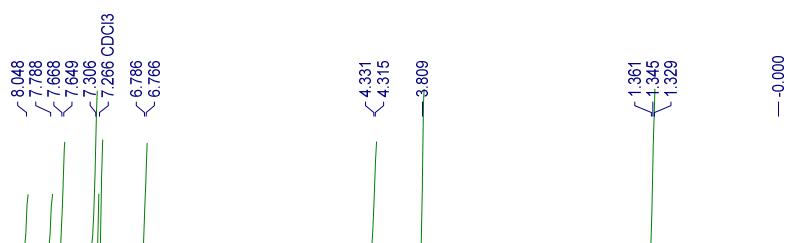


¹³C NMR spectrum of 4u (100 MHz, CDCl₃)

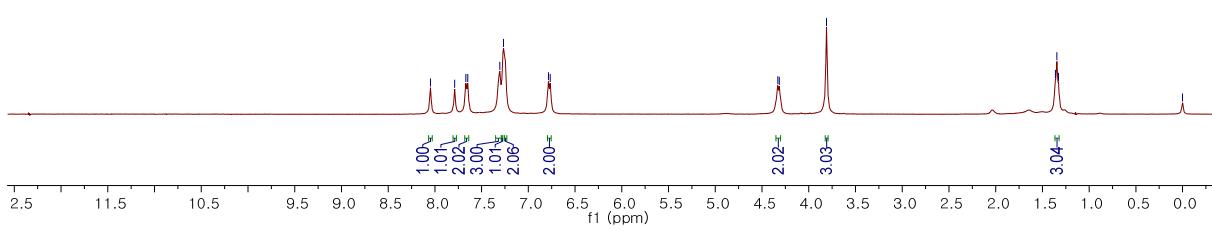




KSM-II-138



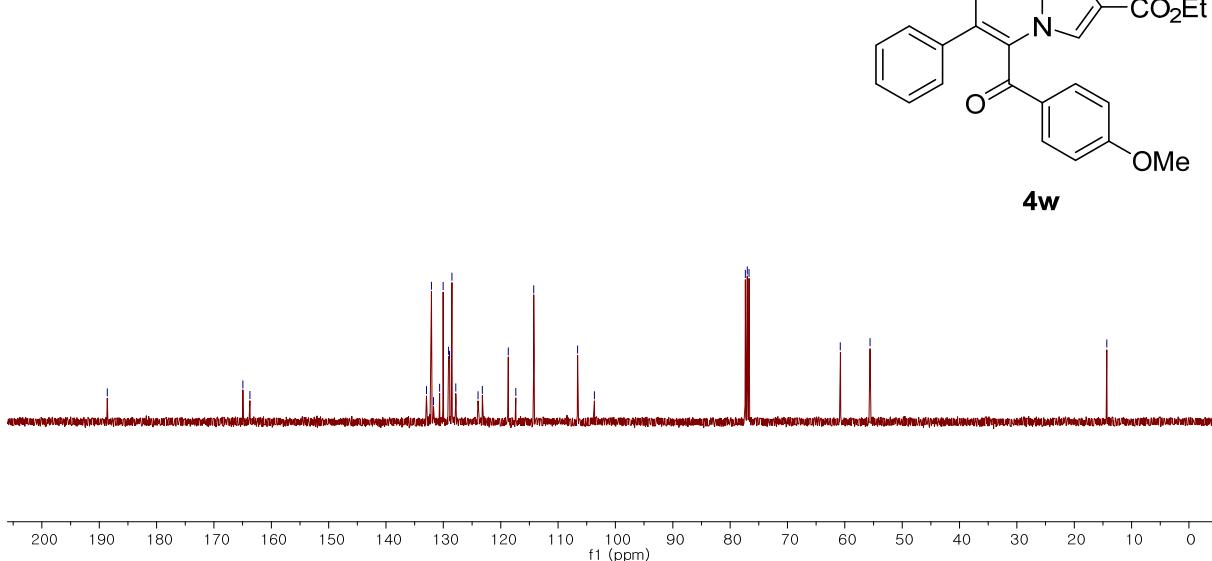
¹H NMR spectrum of **4w** (400 MHz, CDCl₃)



KSM-II-138



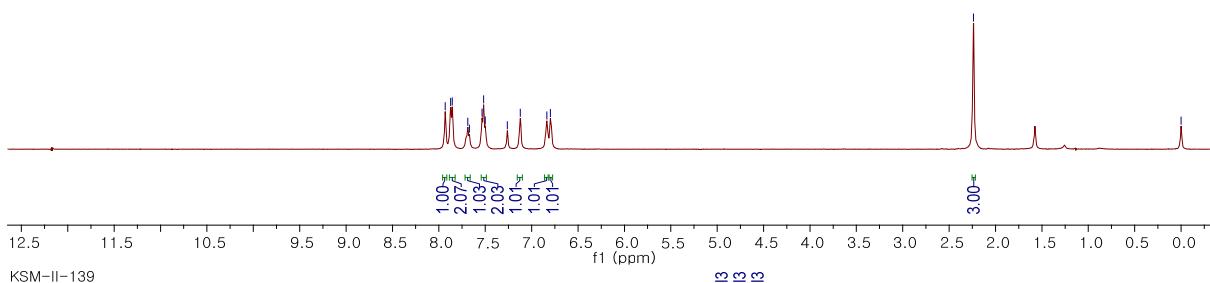
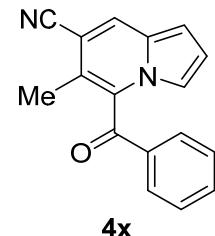
¹³C NMR spectrum of **4w** (100 MHz, CDCl₃)



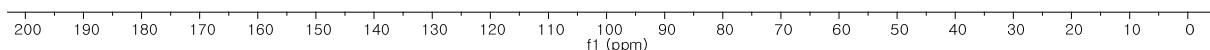
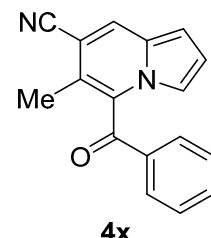
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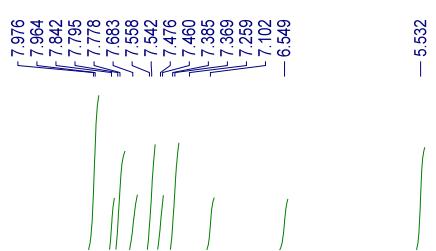


¹H NMR spectrum of 4x (400 MHz, CDCl₃)

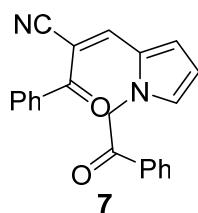
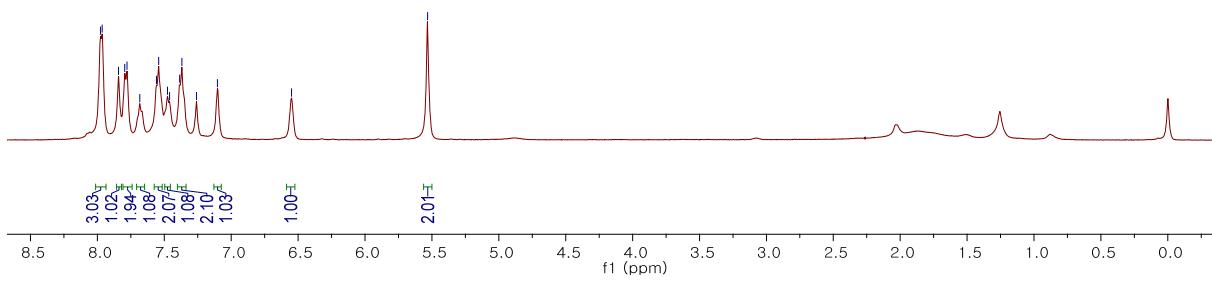


¹³C NMR spectrum of 4x (100 MHz, CDCl₃)

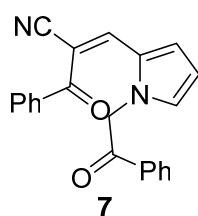
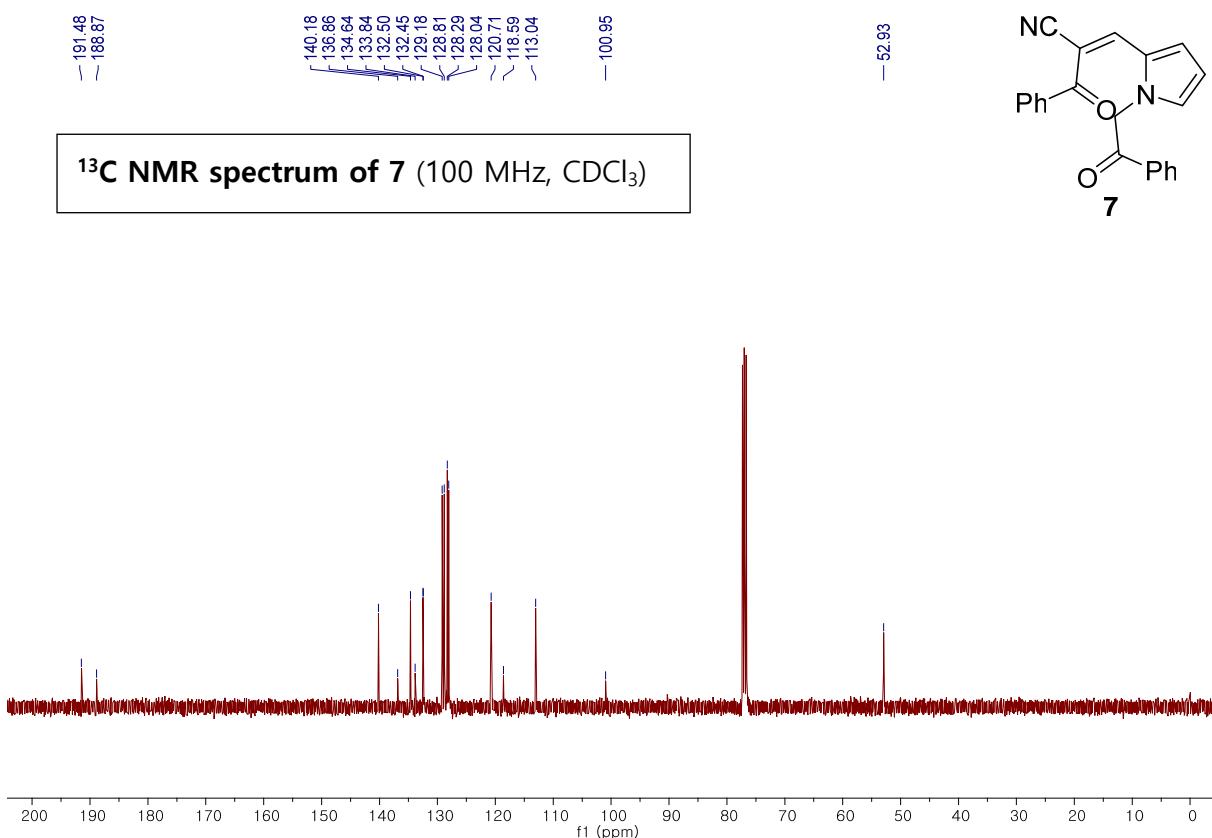


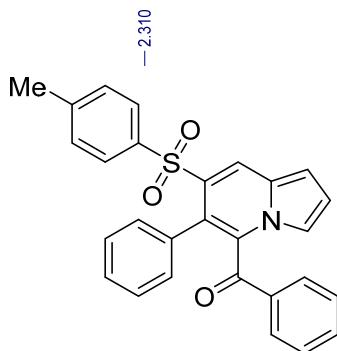


¹H NMR spectrum of 7 (400 MHz, CDCl₃)

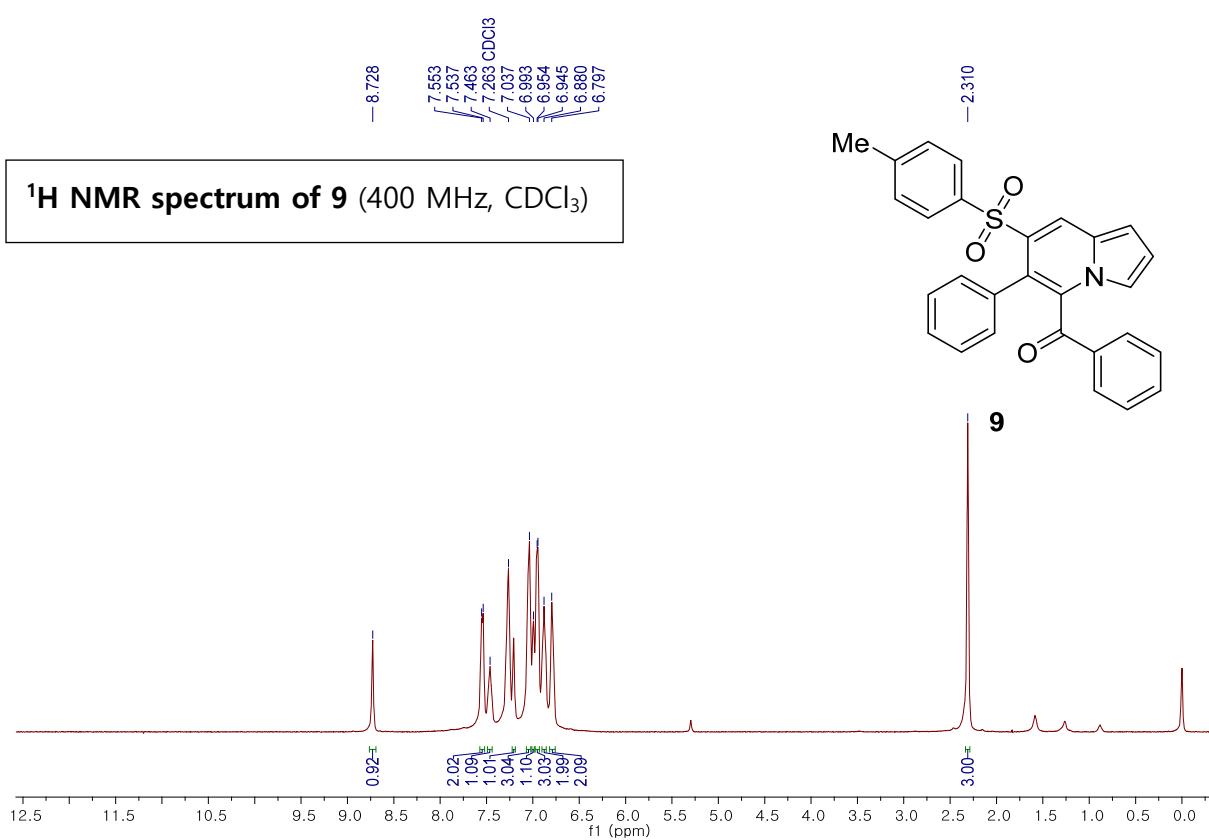


¹³C NMR spectrum of 7 (100 MHz, CDCl₃)

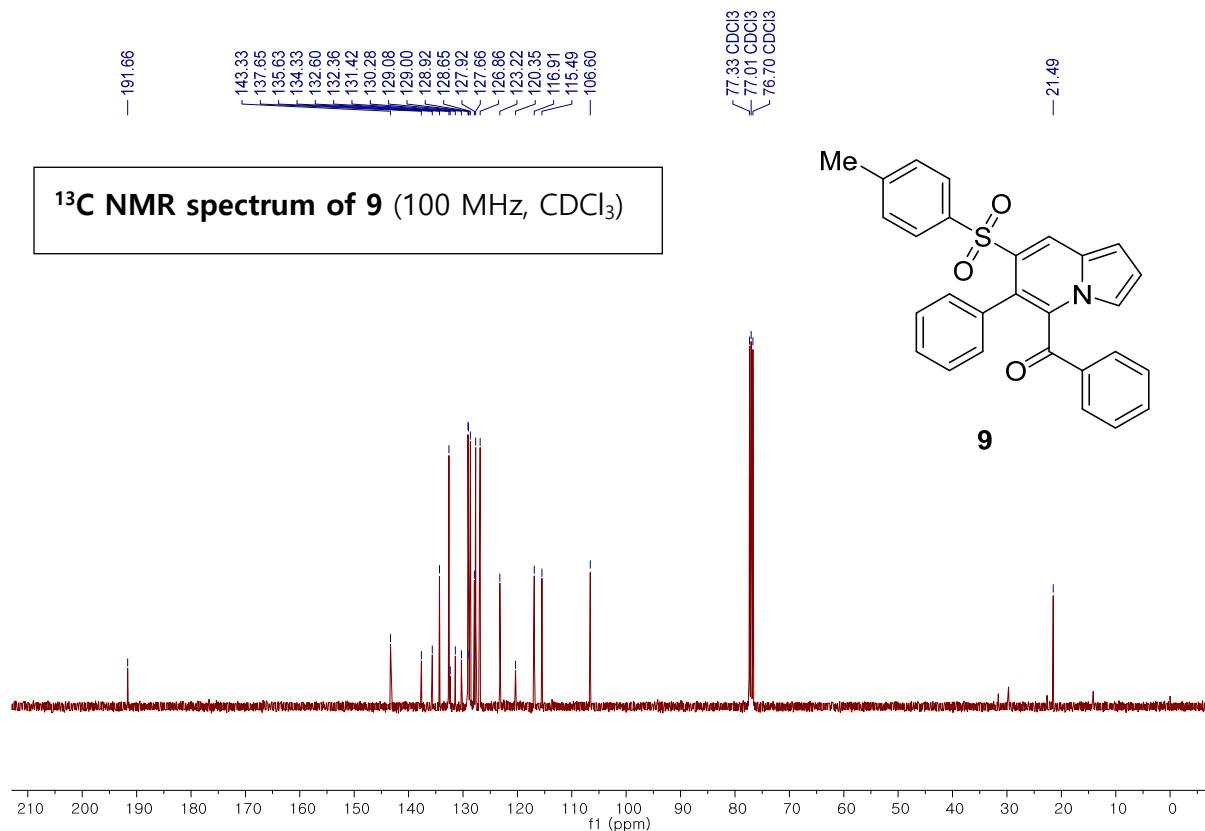




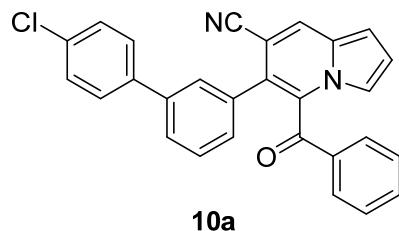
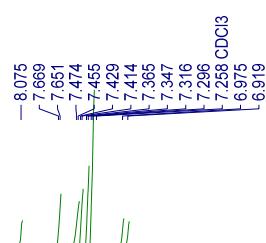
¹H NMR spectrum of 9 (400 MHz, CDCl₃)



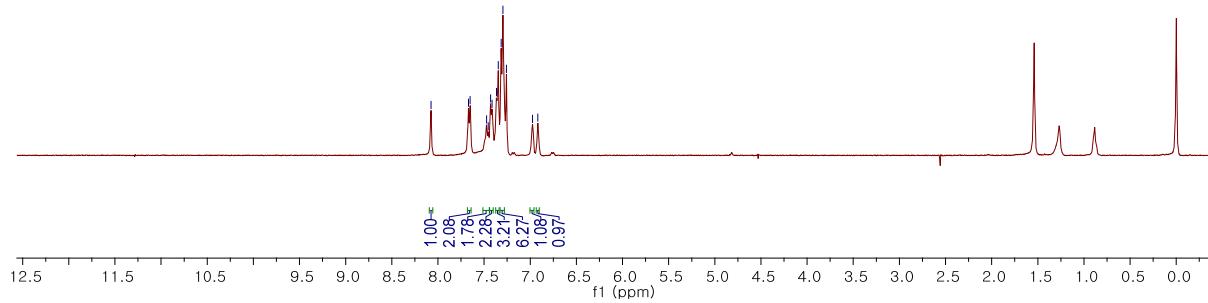
¹³C NMR spectrum of 9 (100 MHz, CDCl₃)



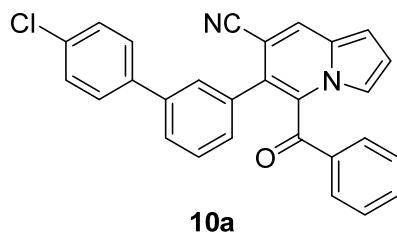
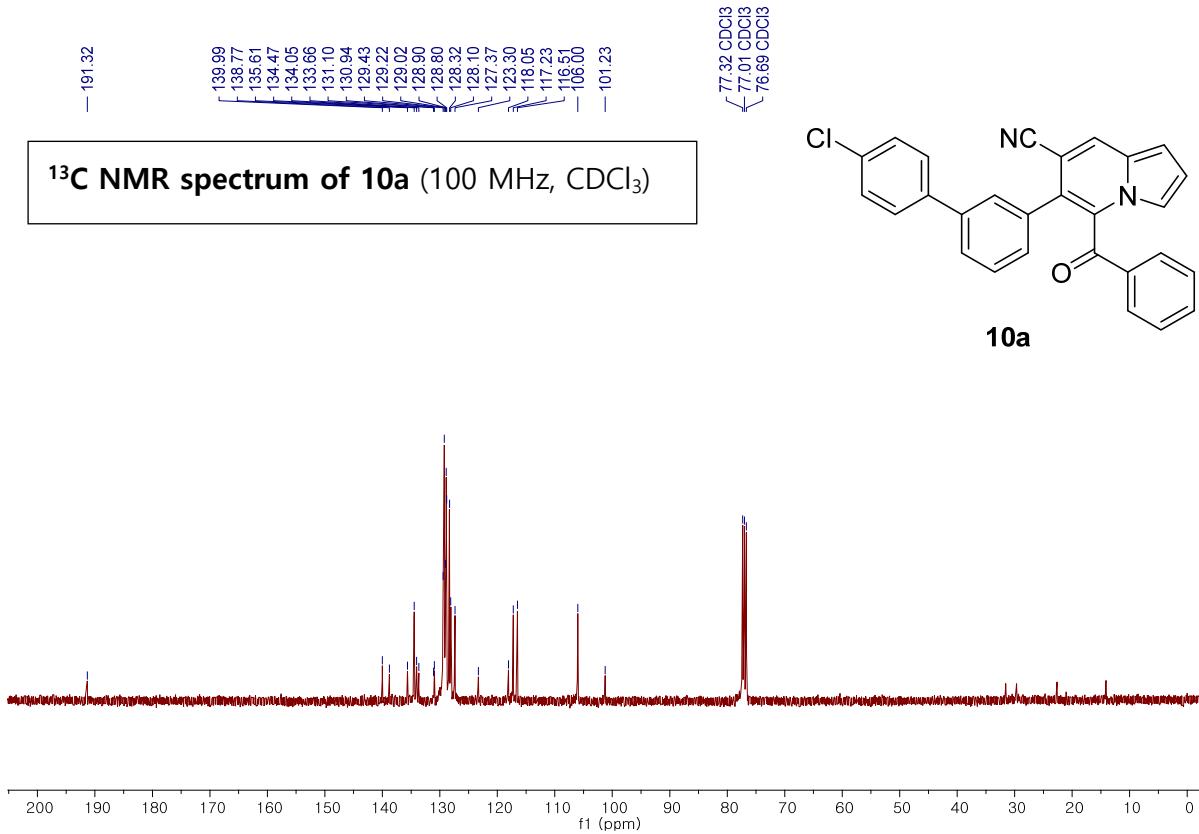
MH-I-12

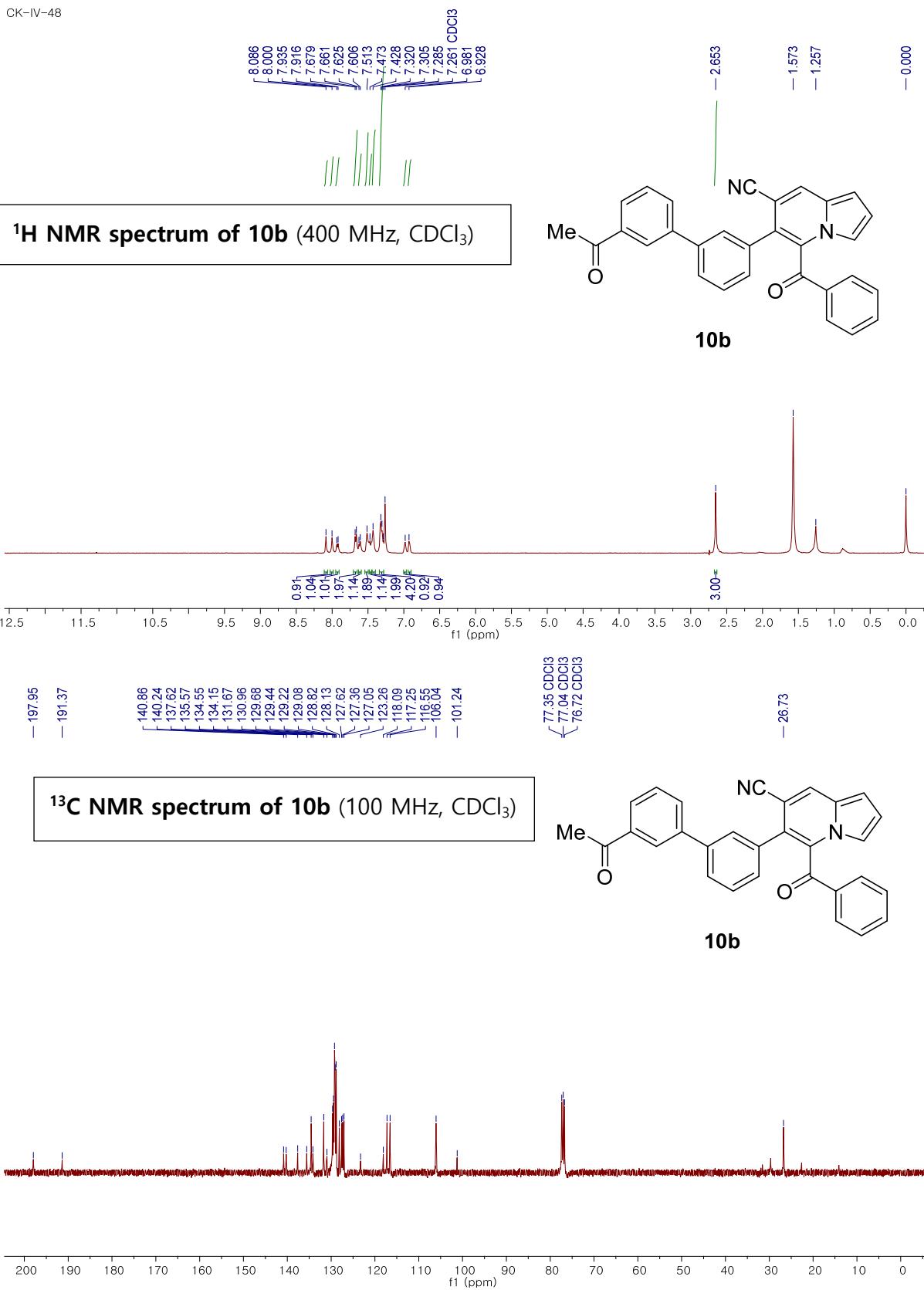


^1H NMR spectrum of 10a (400 MHz, CDCl_3)



^{13}C NMR spectrum of 10a (100 MHz, CDCl_3)

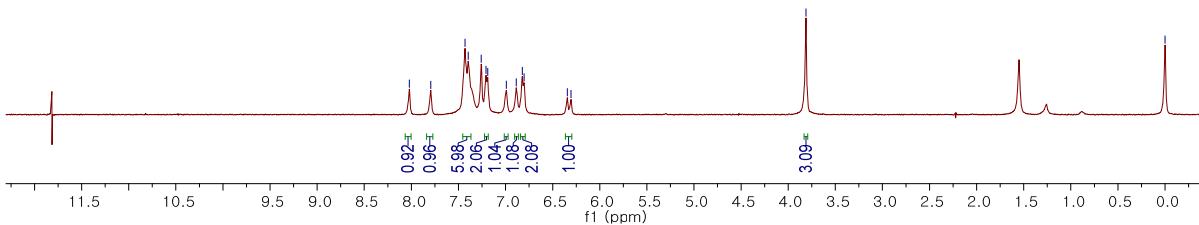




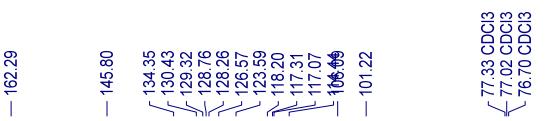
CK-IV-66



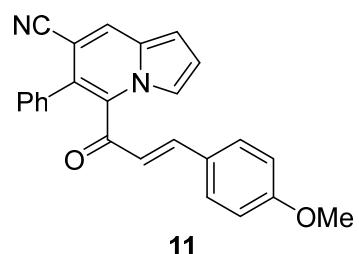
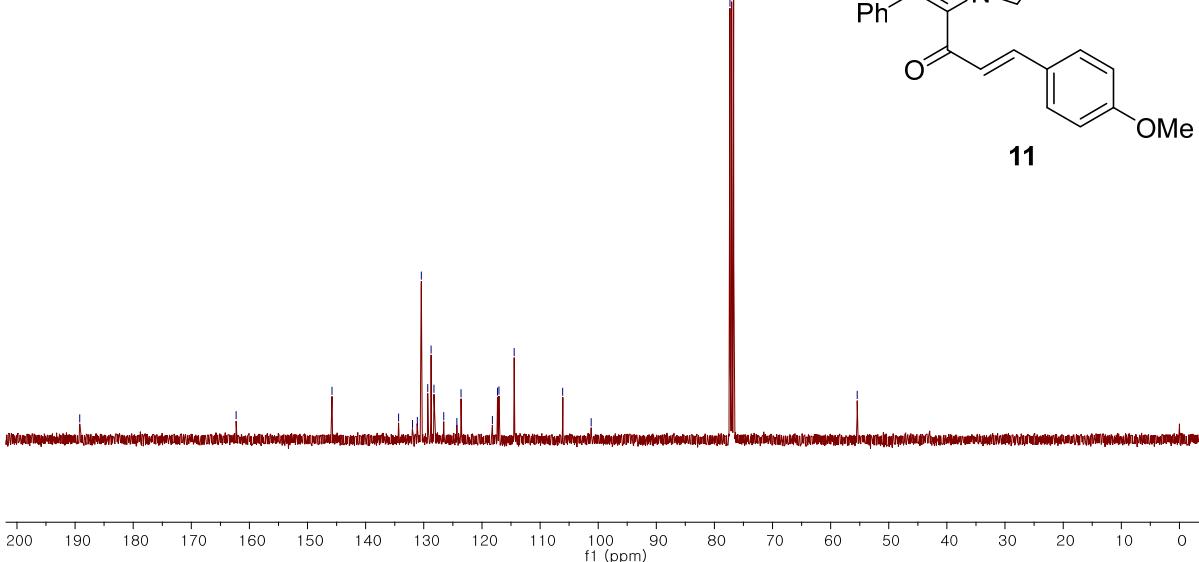
¹H NMR spectrum of 11 (400 MHz, CDCl₃)

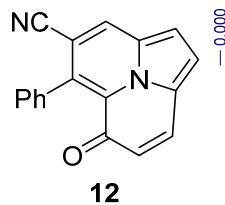
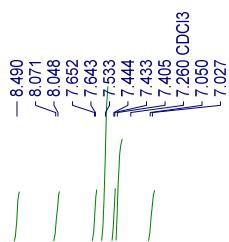


CK-IV-66C

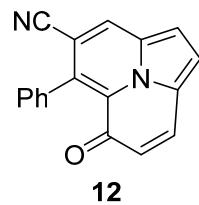
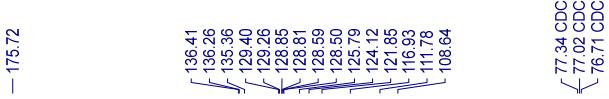
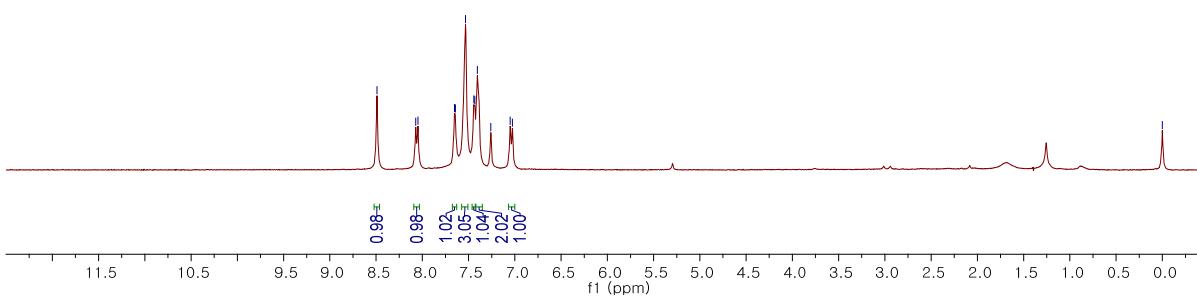


¹³C NMR spectrum of 11 (100 MHz, CDCl₃)





¹H NMR spectrum of 12 (400 MHz, CDCl₃)



¹³C NMR spectrum of 12 (100 MHz, CDCl₃)

