

Supporting Information for

Copper-Catalyzed Tandem Radical Cyclization of 8-Ethynyl-1-naphthyl- amines for the Synthesis of 2H-benzo[e][1,2]thiazine 1,1-dioxides and its Fluorescence Properties

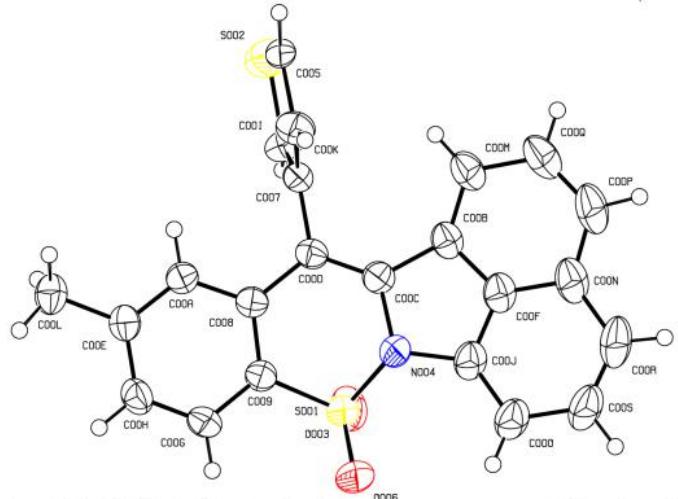
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1. X-Ray of **2m**
2. The deuterium labeling studies
3. The photophysical properties of products
4. NMR Data for the some compounds
5. Reaction scopes
6. Copies of the Products ^1H NMR, ^{13}C NMR

1. X-Ray of 2m



Bond precision: C-C = 0.0059 Å Wavelength=0.71073

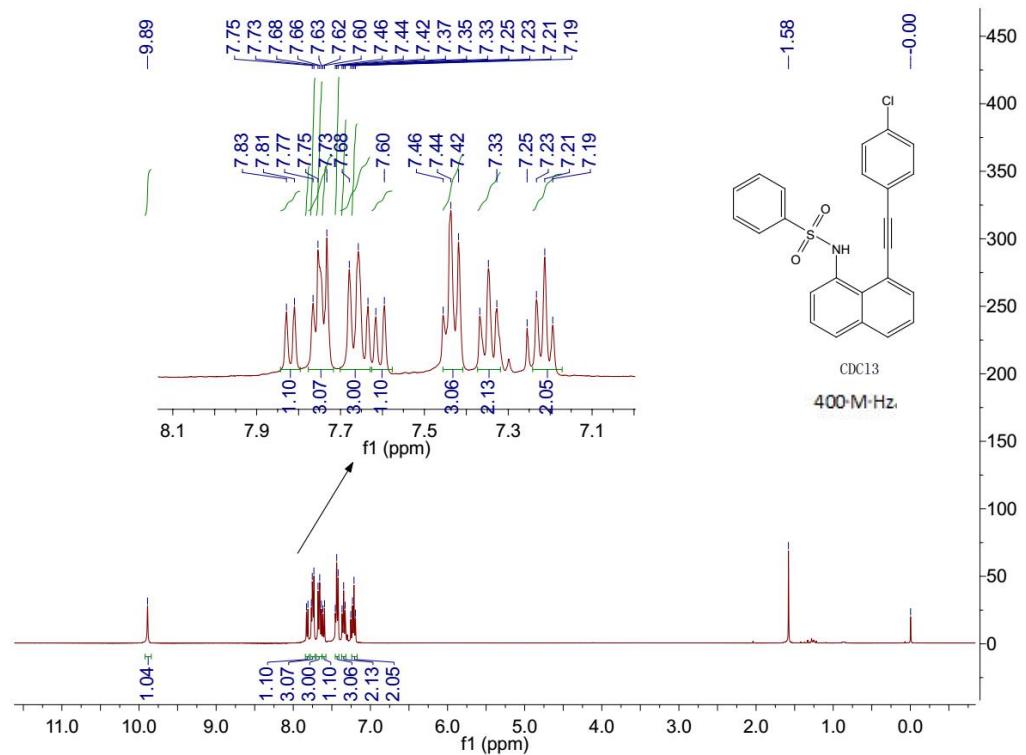
Cell: a=13.7554(19) b=7.8485(7) c=18.500(3)
alpha=90 beta=110.617(17) gamma=90

Temperature: 293 K

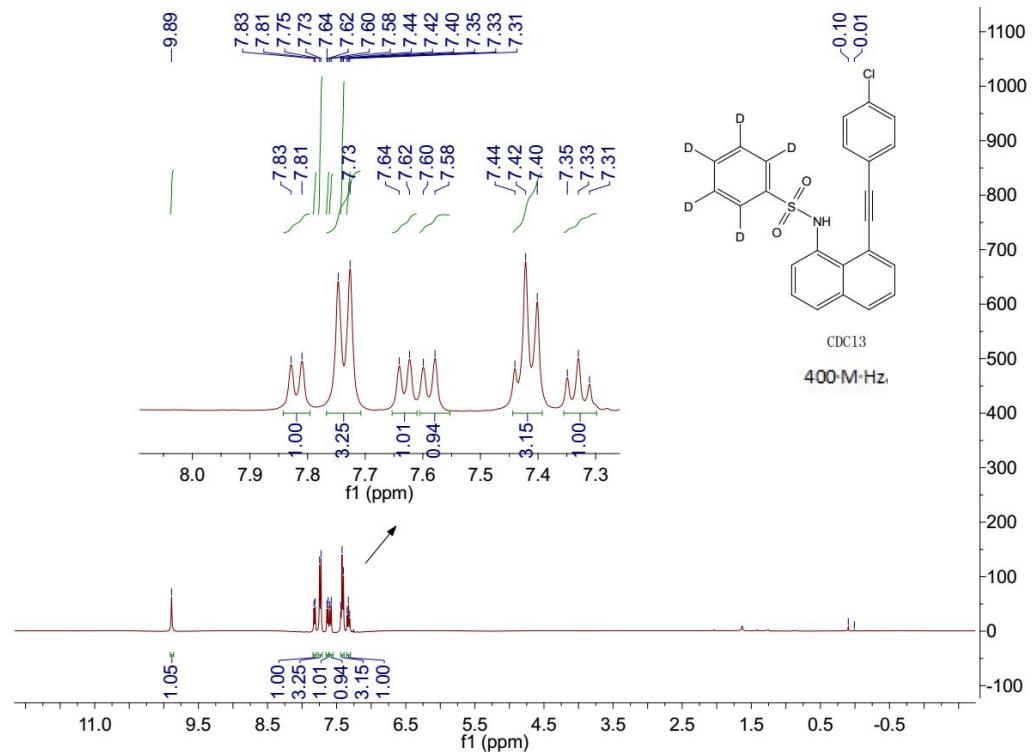
	Calculated	Reported
Volume	1869.3(5)	1869.3(5)
Space group	P 21/c	P 1 21/c 1
Hall group	-P 2ybc	-P 2ybc
Moiety formula	C23 H15 N O2 S2	C23 H15 N O2 S2
Sum formula	C23 H15 N O2 S2	C23 H15 N O2 S2
Mr	401.48	401.48
Dx, g cm ⁻³	1.427	1.427
Z	4	4
Mu (mm ⁻¹)	0.304	0.304
F000	832.0	832.0
F000'	833.31	
h, k, lmax	19,10,25	17,10,25
Nref	5166	4423
Tmin, Tmax	0.964, 0.973	0.939, 1.000
Tmin'	0.964	
Correction method= # Reported T Limits: Tmin=0.939 Tmax=1.000		
AbsCorr = MULTI-SCAN		
Data completeness= 0.856	Theta(max)= 29.422	
R(reflections)= 0.0772(3003)	wR2(reflections)= 0.2639(4423)	
S = 1.041	Npar= 257	

2. The deuterium labeling studies

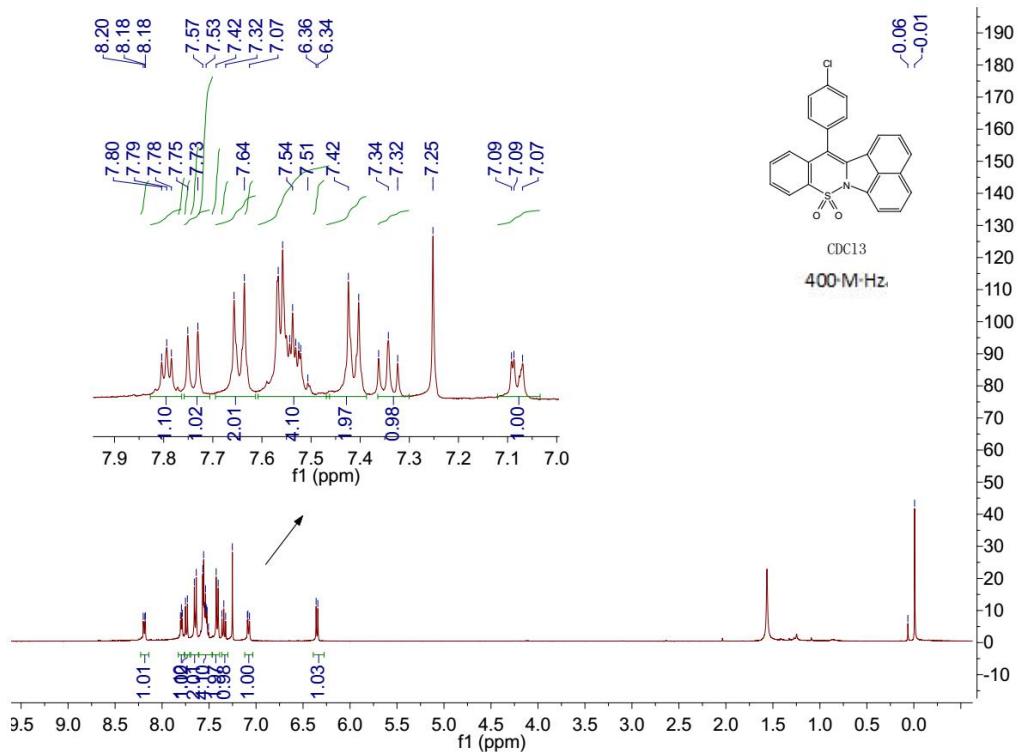
¹H NMR of **1s-H₅**



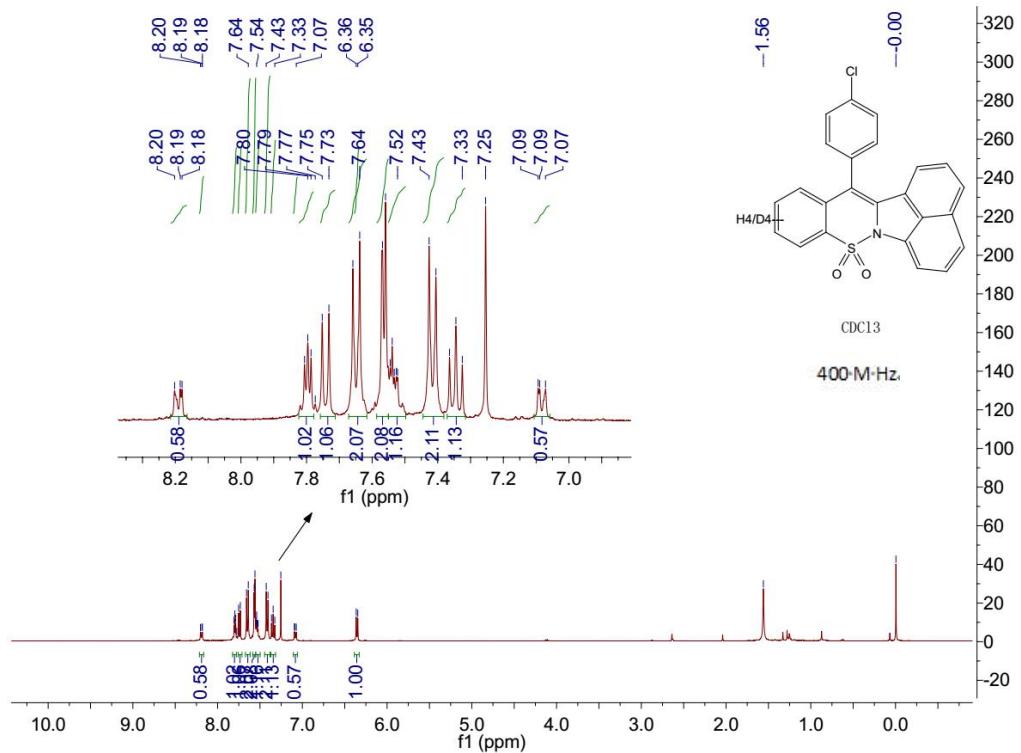
¹H NMR of **1s-D₅**



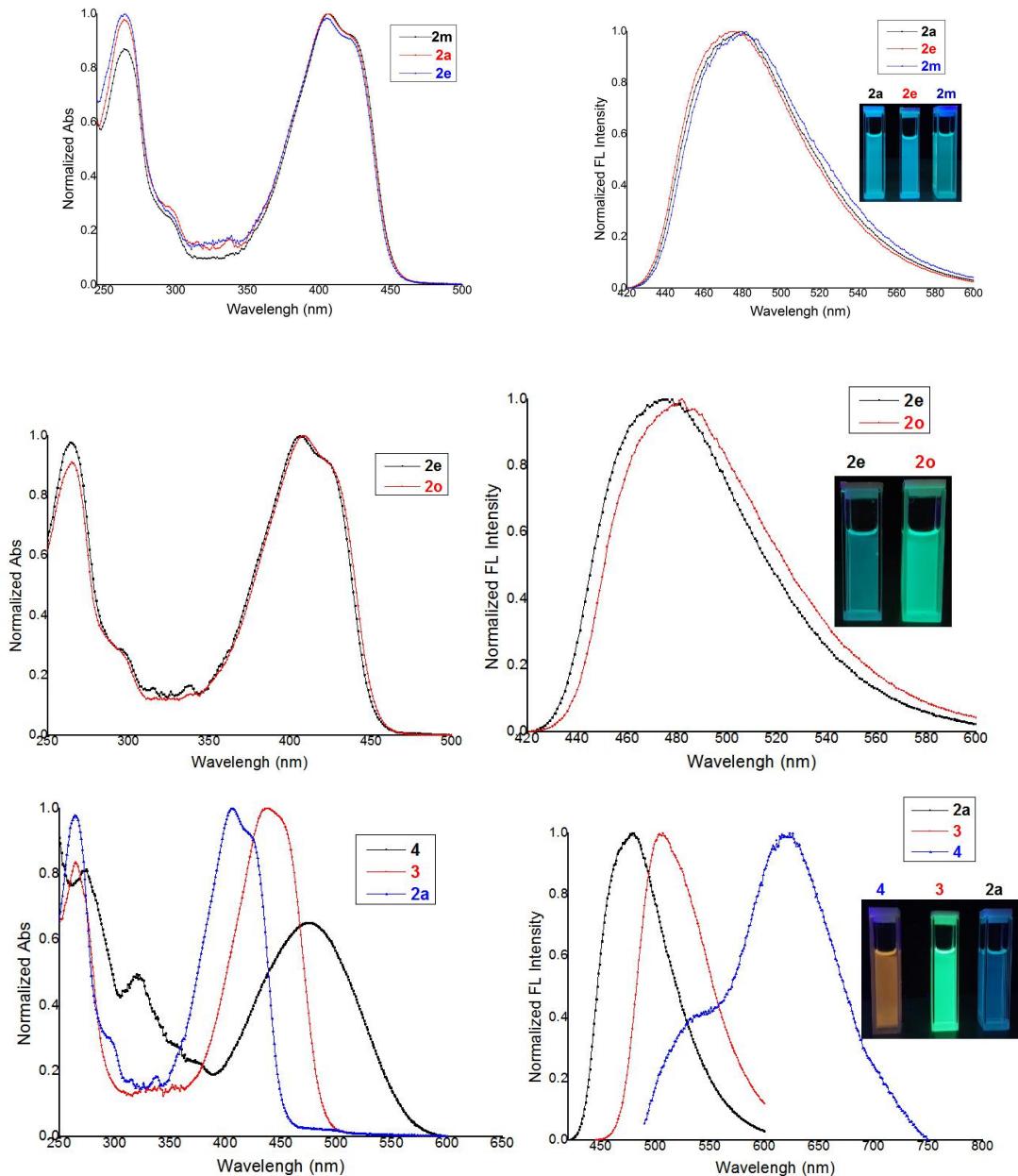
¹H NMR of **2s-H₅**



¹H NMR of **2s-D₅**

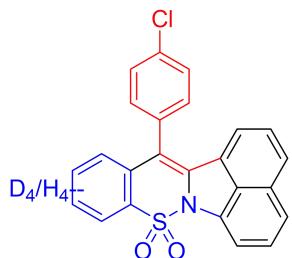


3. The photophysical properties of products



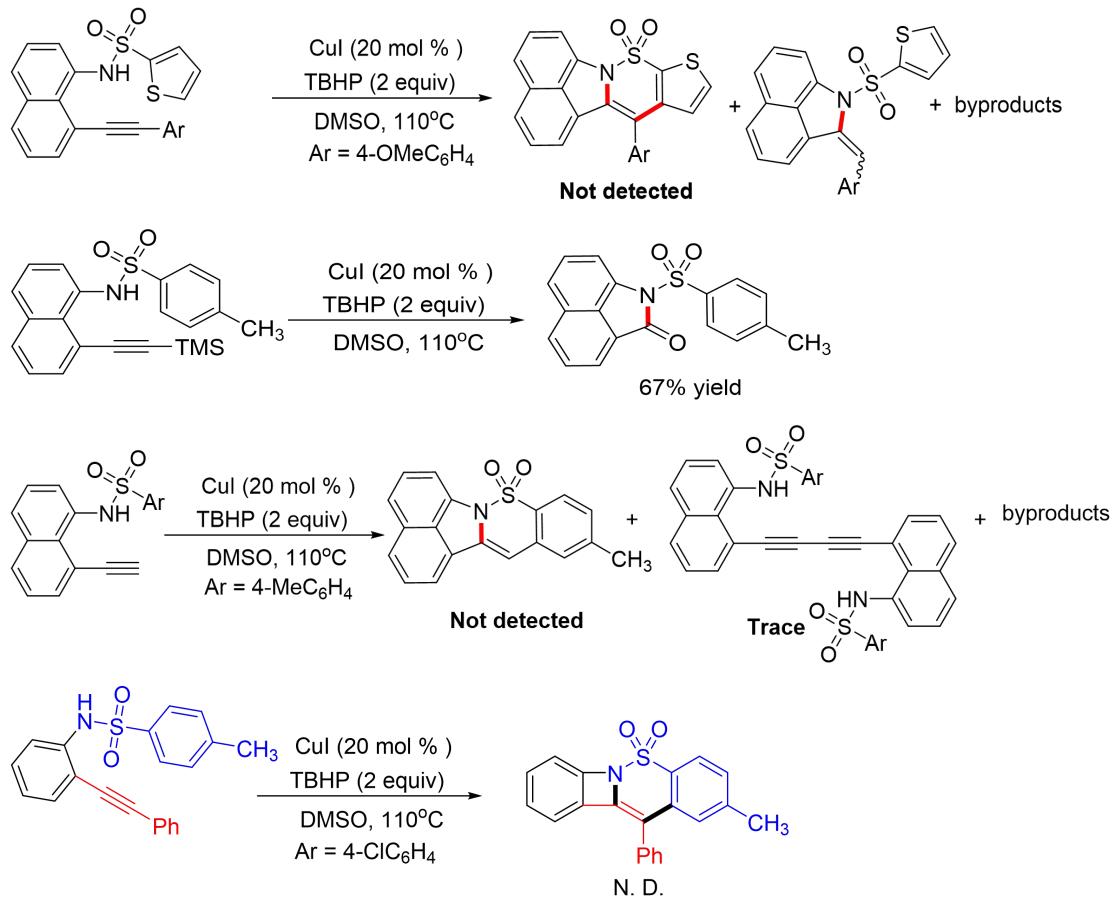
4. NMR Data for the some compounds

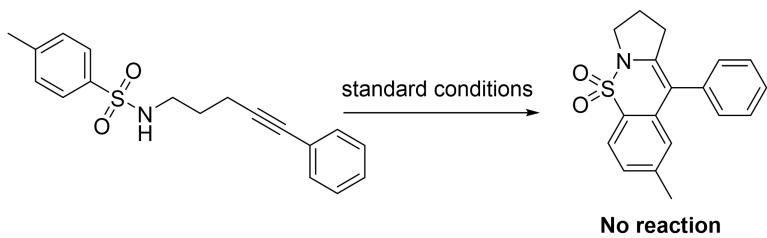
13-(4-chlorophenyl)benzo[cd]benzo[5,6][1,2]thiazino[2,3-a]indole 8,8-dioxide (2s-H₄/D₄)



¹H NMR (400 MHz, CDCl₃) δ 8.21 – 8.17 (m, 0.58H), 7.83 – 7.78 (m, 1H), 7.74 (d, *J* = 8.2 Hz, 1H), 7.65 (d, *J* = 8.3 Hz, 2H), 7.56 (d, *J* = 3.7 Hz, 2H), 7.55 – 7.49 (m, 1.16H), 7.42 (d, *J* = 8.3 Hz, 2H), 7.34 (t, *J* = 7.8 Hz, 1H), 7.11 – 7.06 (m, 0.57H), 6.36 (d, *J* = 7.3 Hz, 1H).

5. Reaction scopes





6. Copies of the Products ^1H NMR, ^{13}C NMR

Figure S1 ^1H -NMR spectrum of **2a**

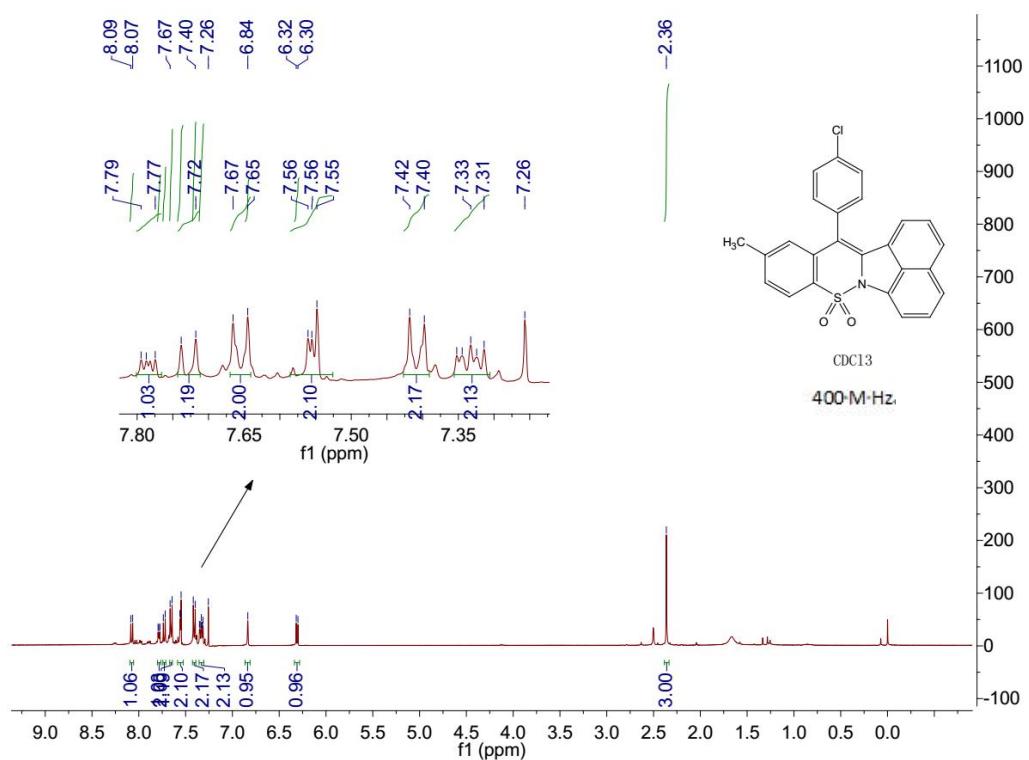


Figure S2 ^{13}C -NMR spectrum of **2a**

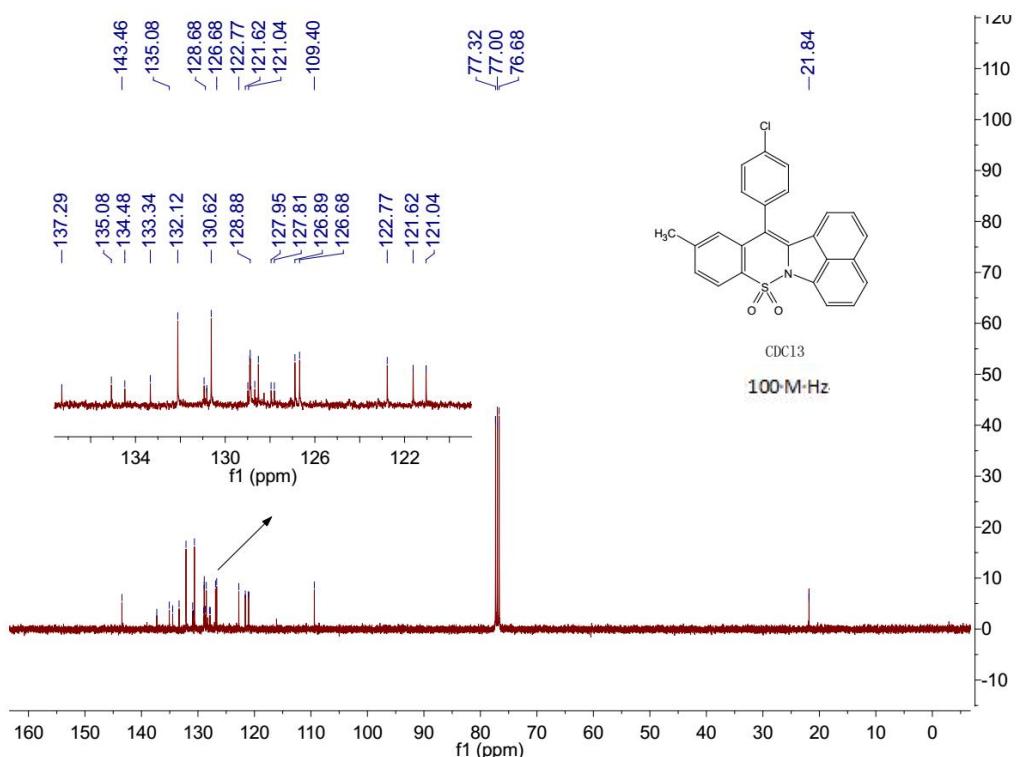


Figure S3 ¹H-NMR spectrum of **2b**

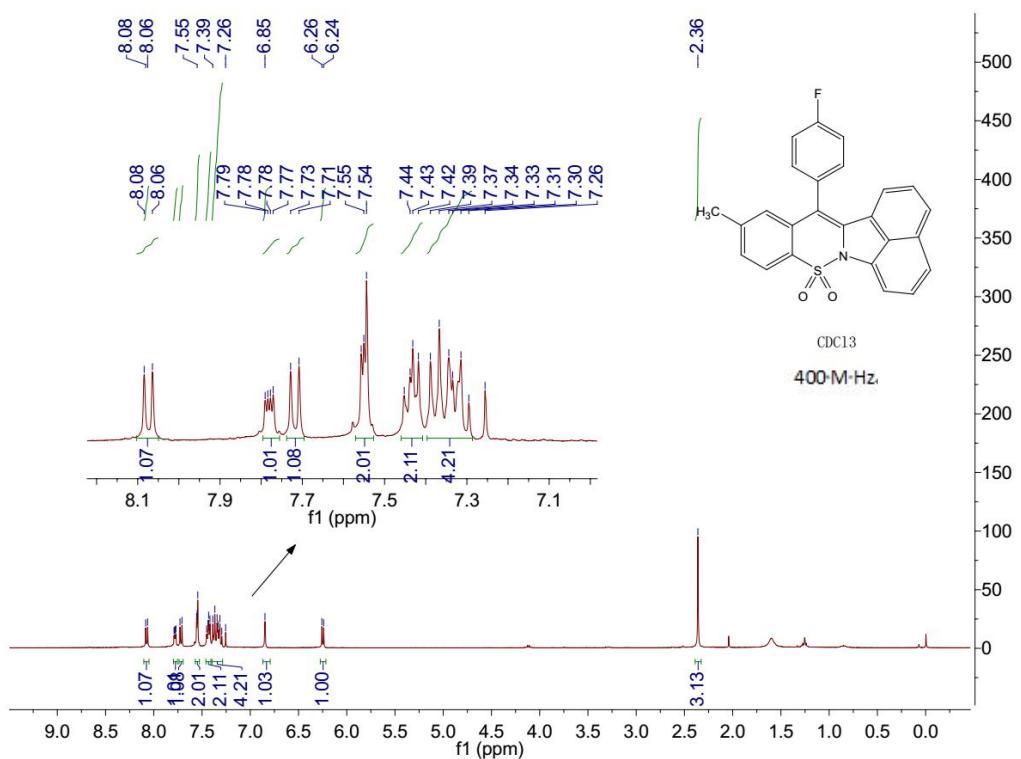


Figure S4 ¹³C-NMR spectrum of **2b**

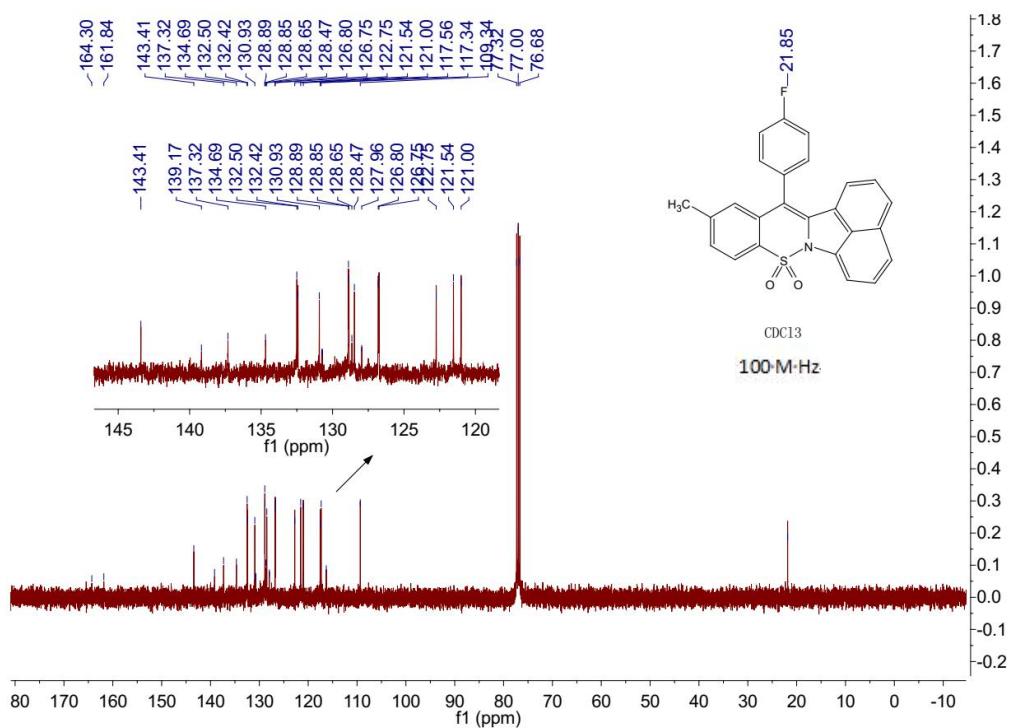


Figure S5 ¹H-NMR spectrum of **2c**

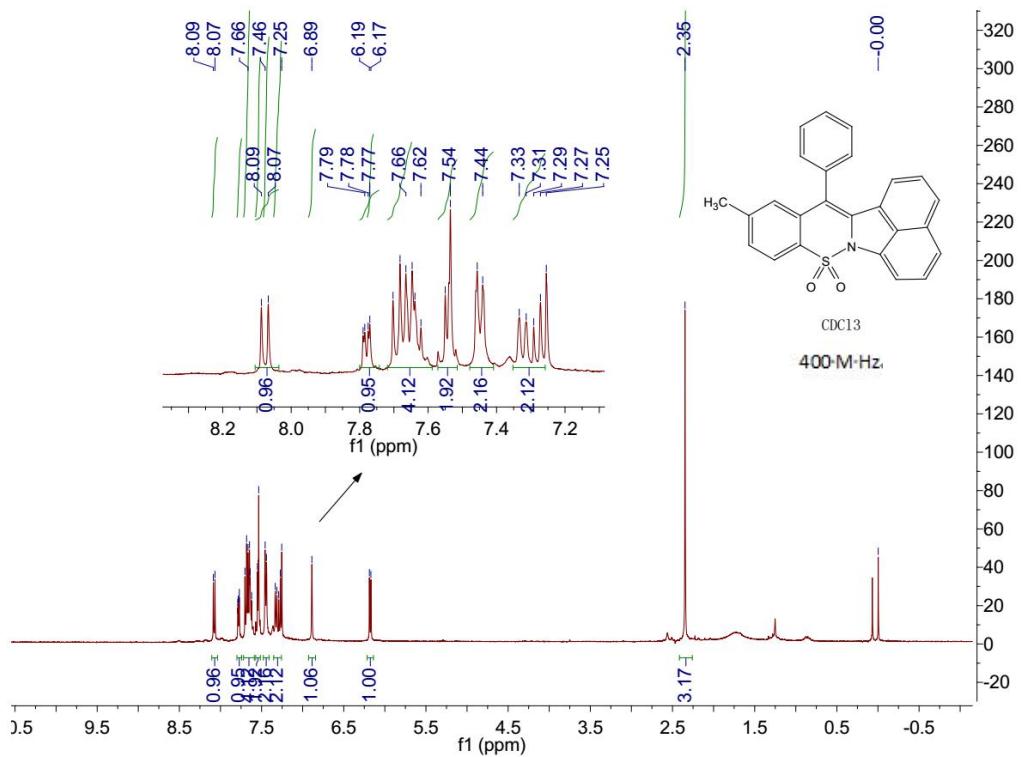


Figure S6 ¹³C-NMR spectrum of **2c**

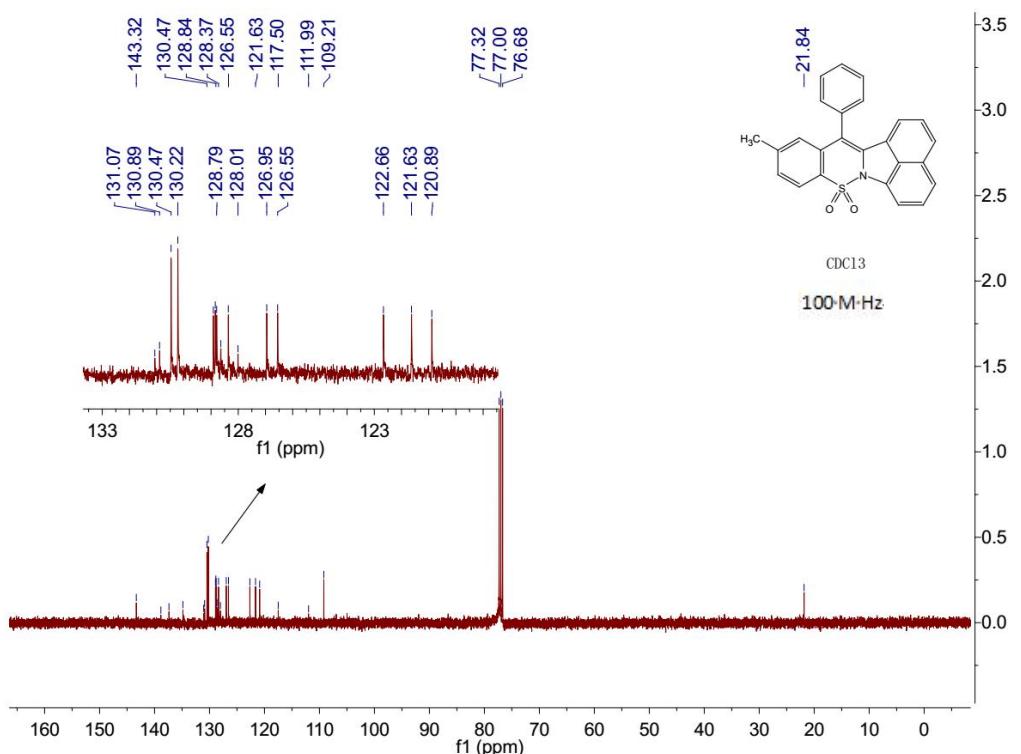
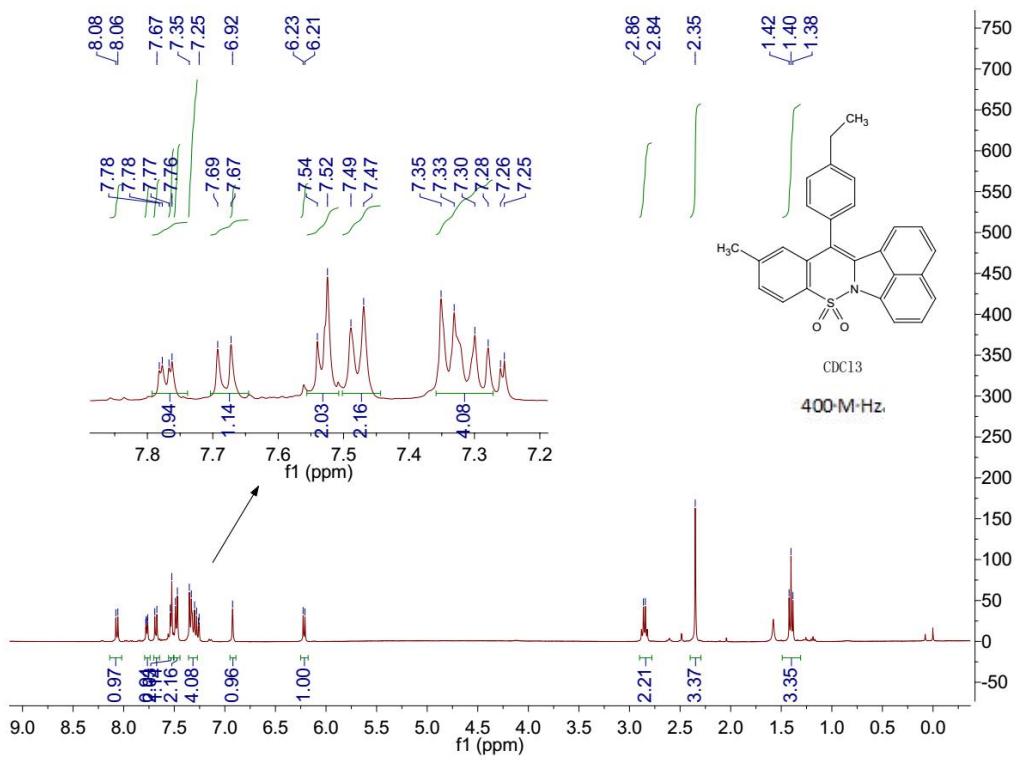


Figure S7 ¹H-NMR spectrum of **2d**



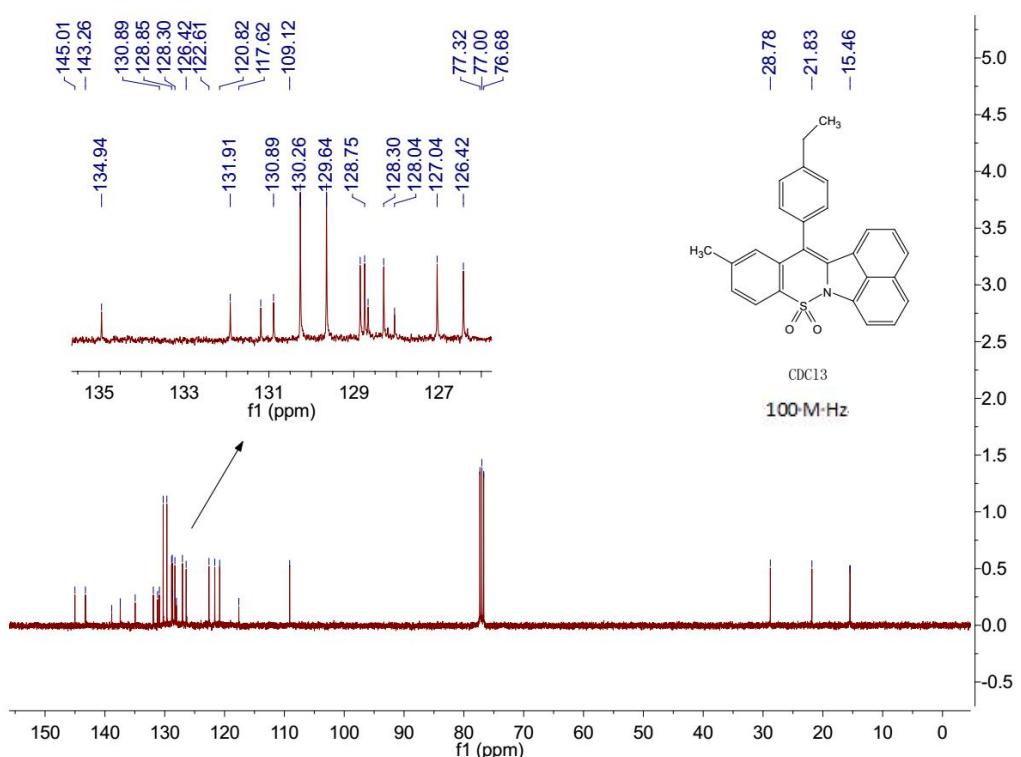


Figure S9 ¹H-NMR spectrum of 2e

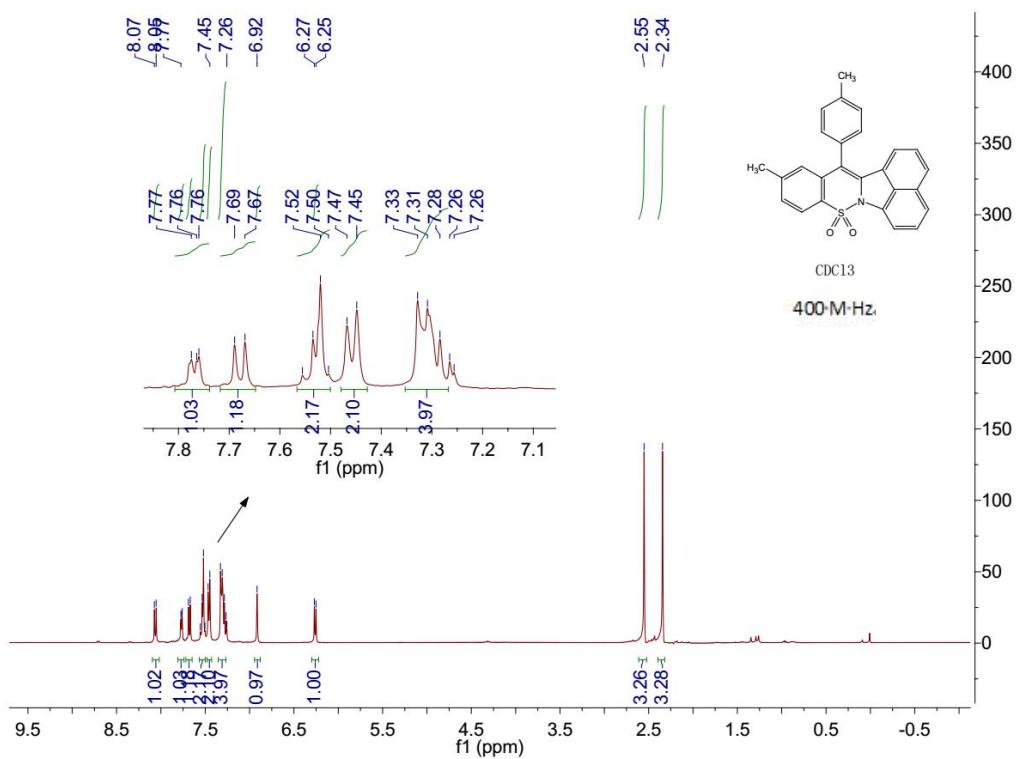


Figure S10 ¹³C-NMR spectrum of 2e

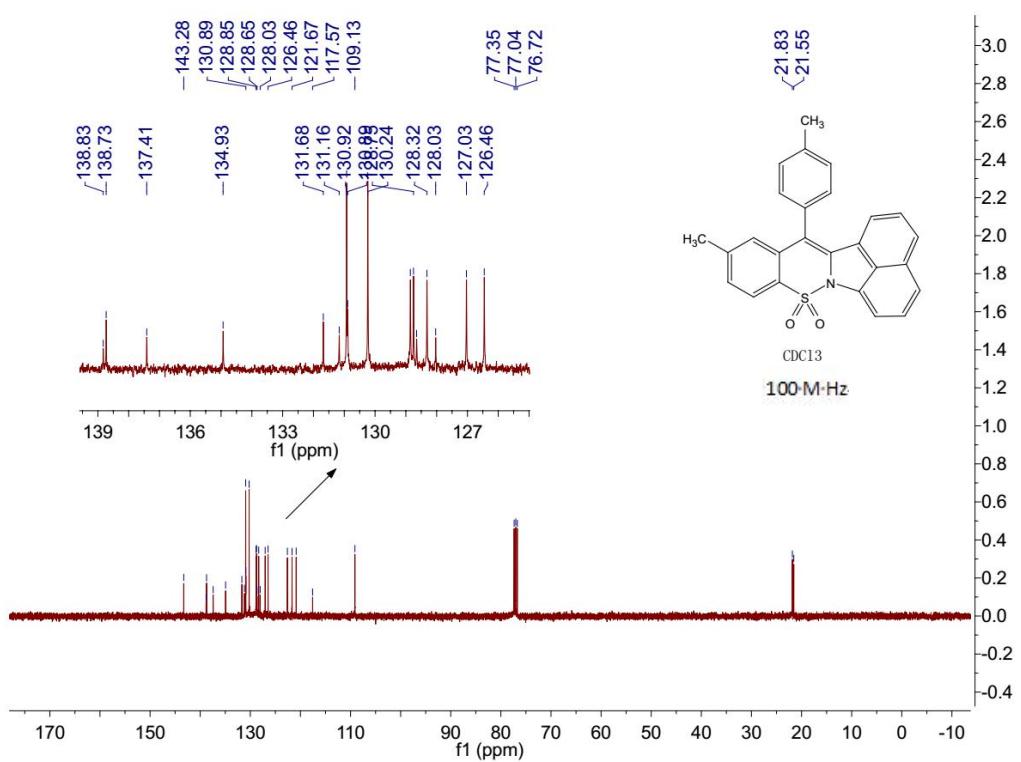


Figure S11 ¹H-NMR spectrum of **2f**

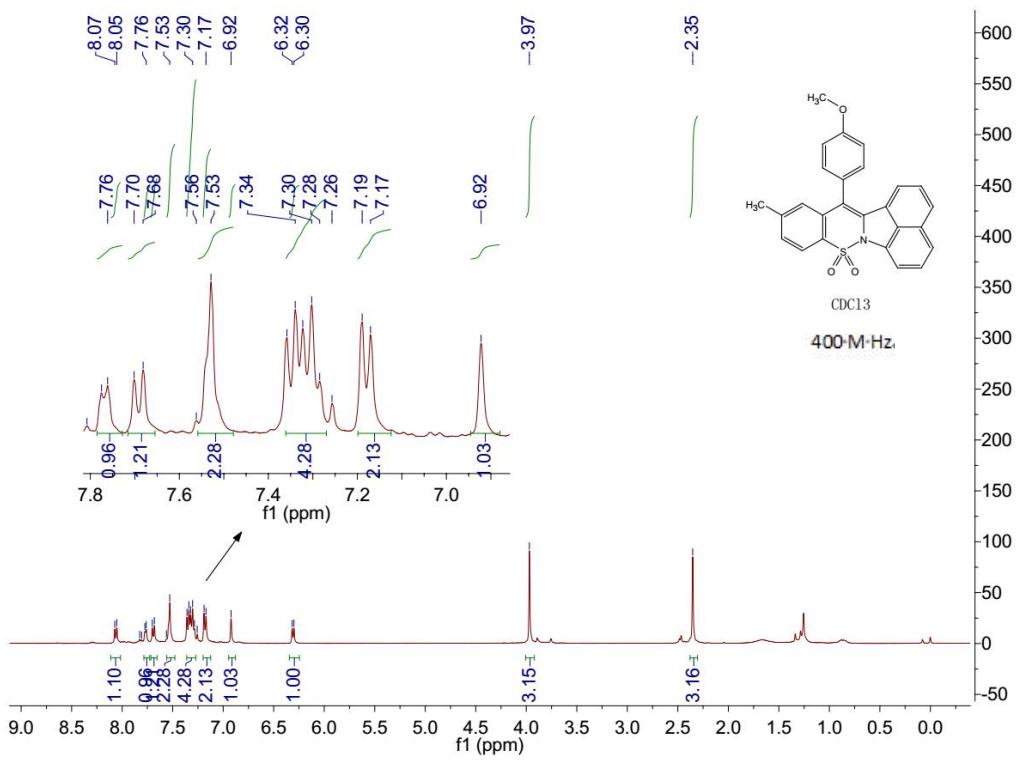


Figure S12 ¹³C-NMR spectrum of **2f**

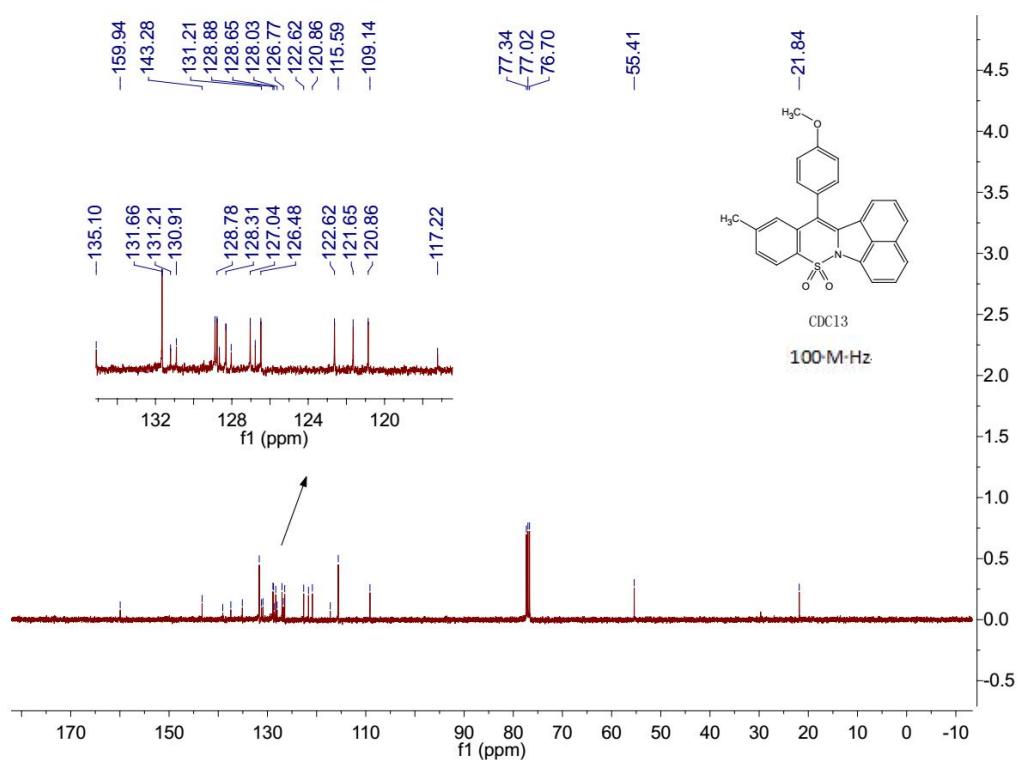


Figure S13 ^1H -NMR spectrum of **2g**

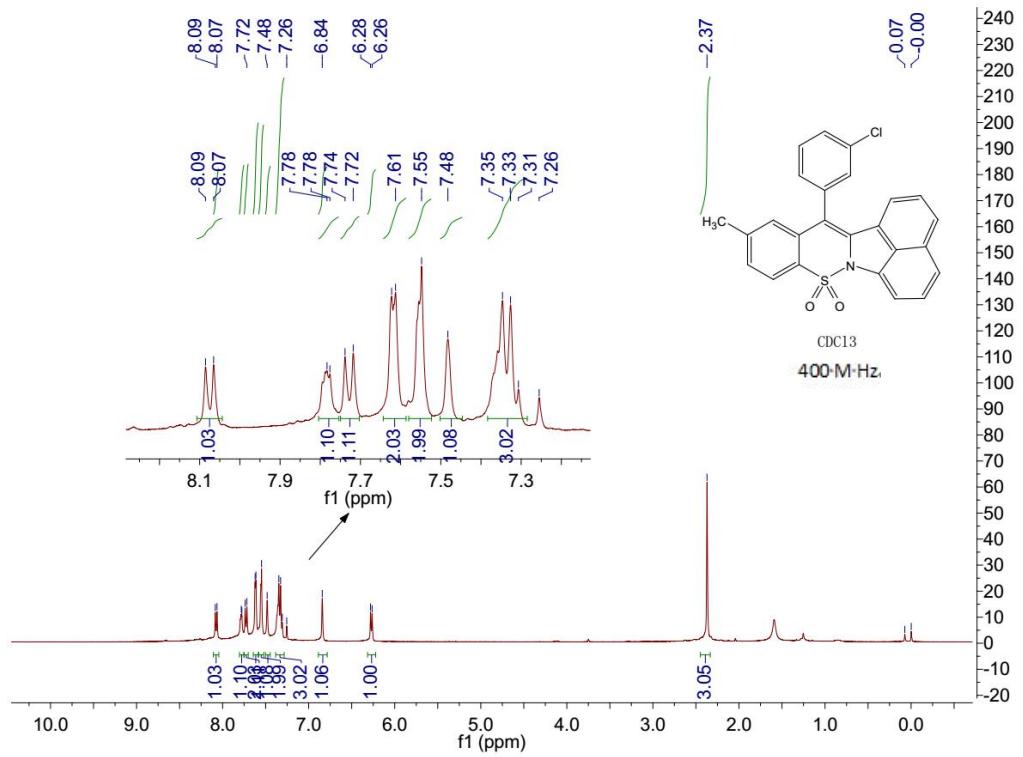


Figure S14 ^{13}C -NMR spectrum of **2g**

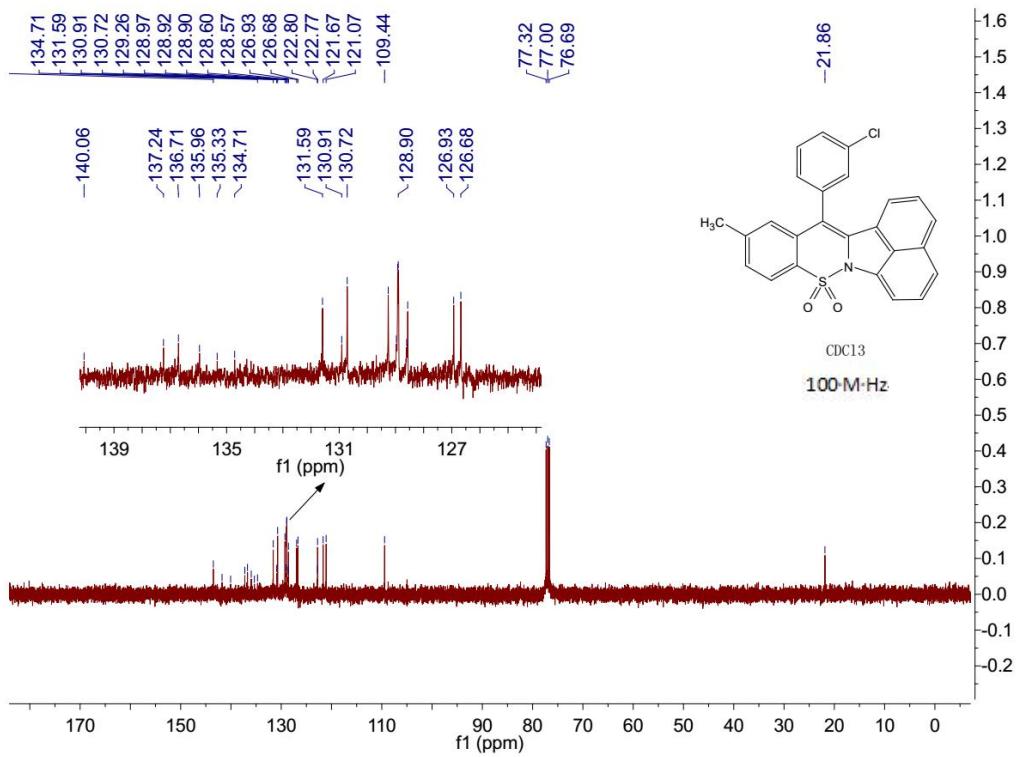


Figure S15 ^1H -NMR spectrum of **2h**

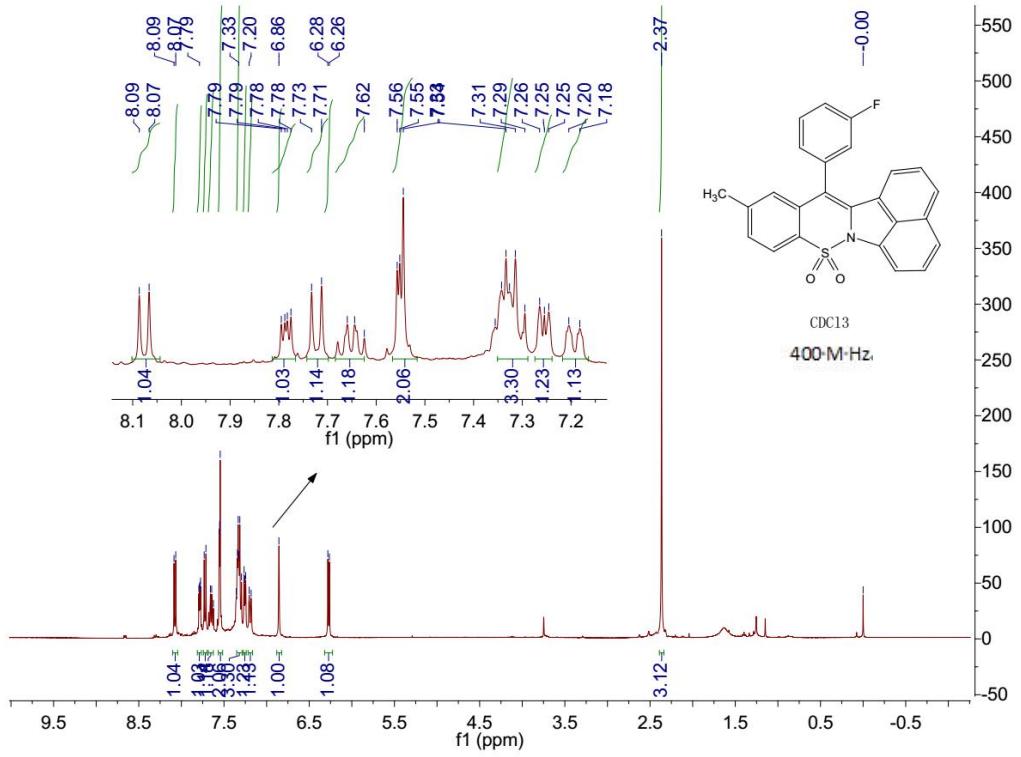


Figure S16 ^{13}C -NMR spectrum of **2h**

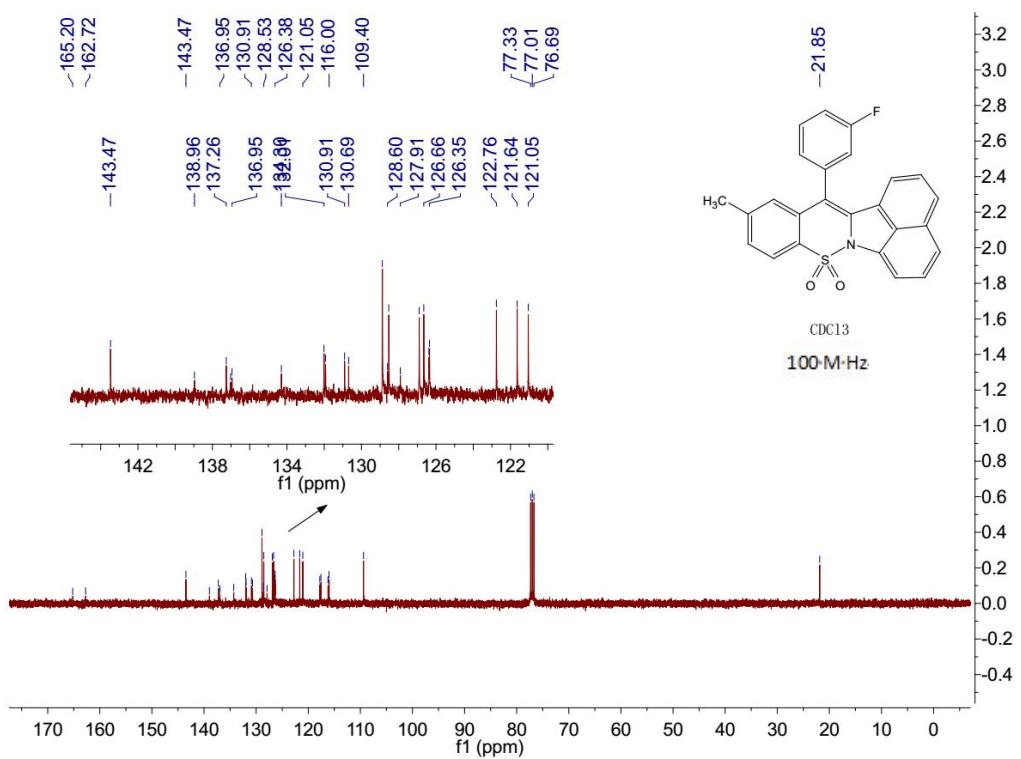


Figure S17 ^1H -NMR spectrum of **2i**

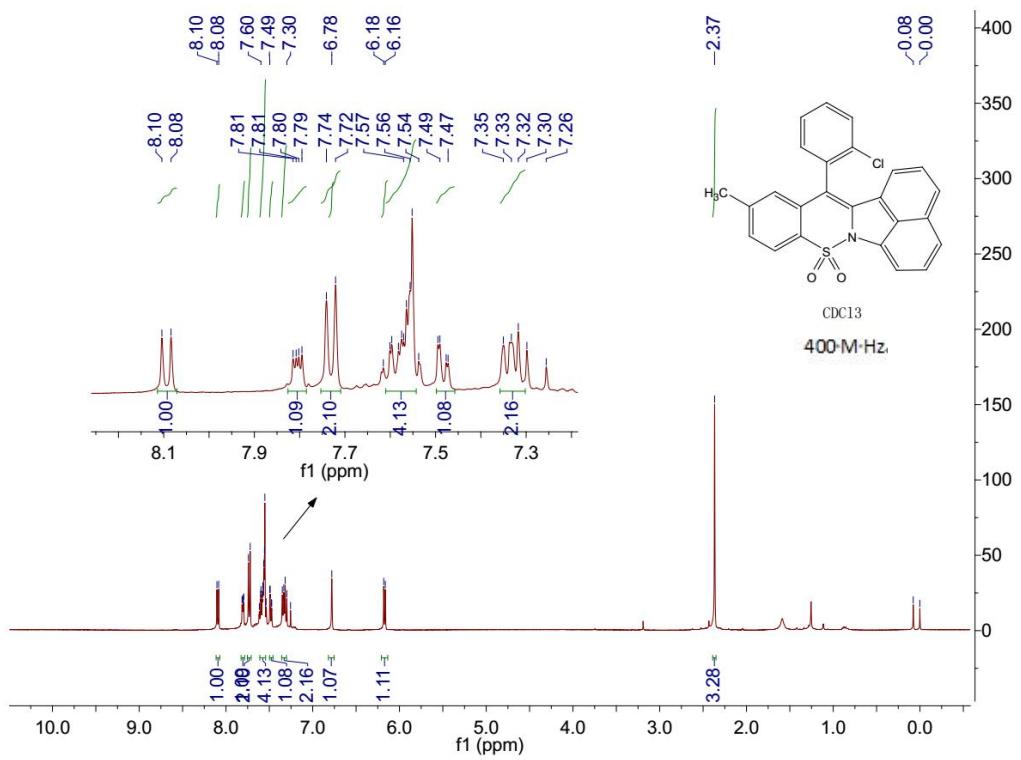


Figure S18 ^{13}C -NMR spectrum of **2i**

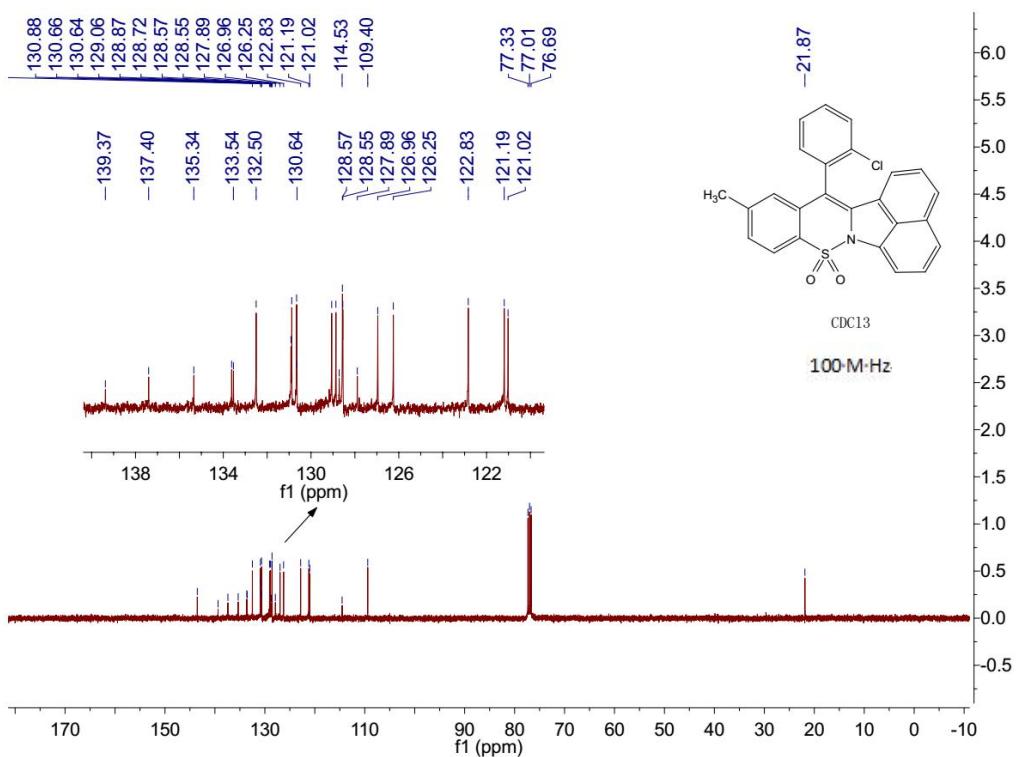


Figure S19 ¹H-NMR spectrum of **2j**

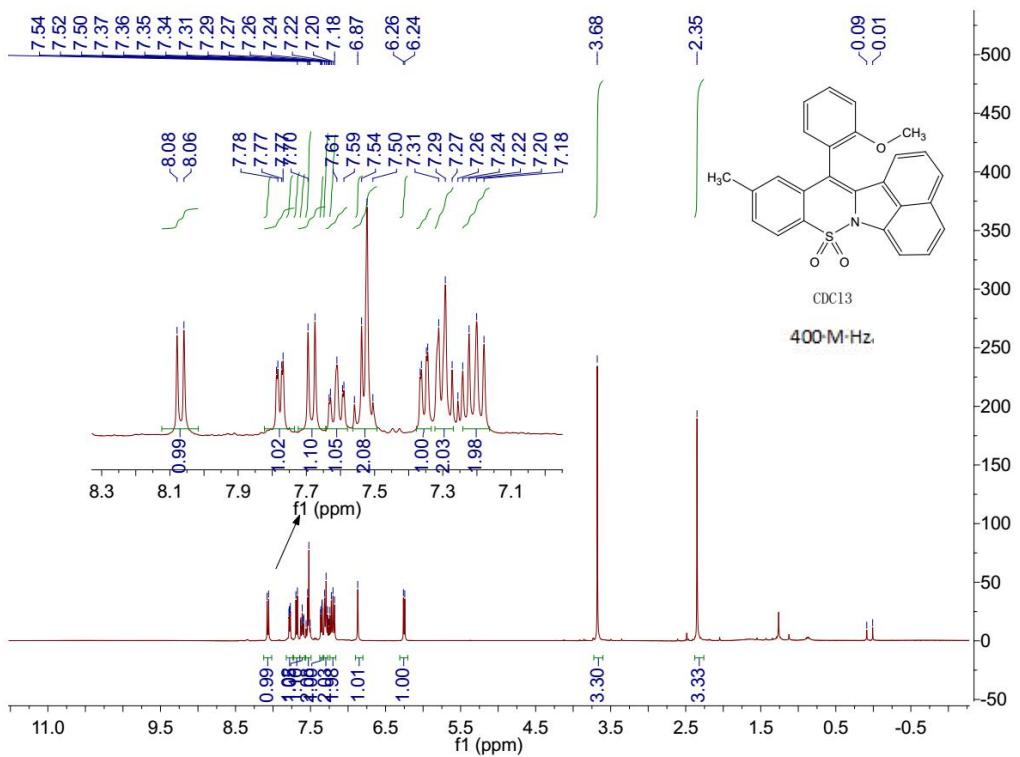


Figure S20 ¹³C-NMR spectrum of **2j**

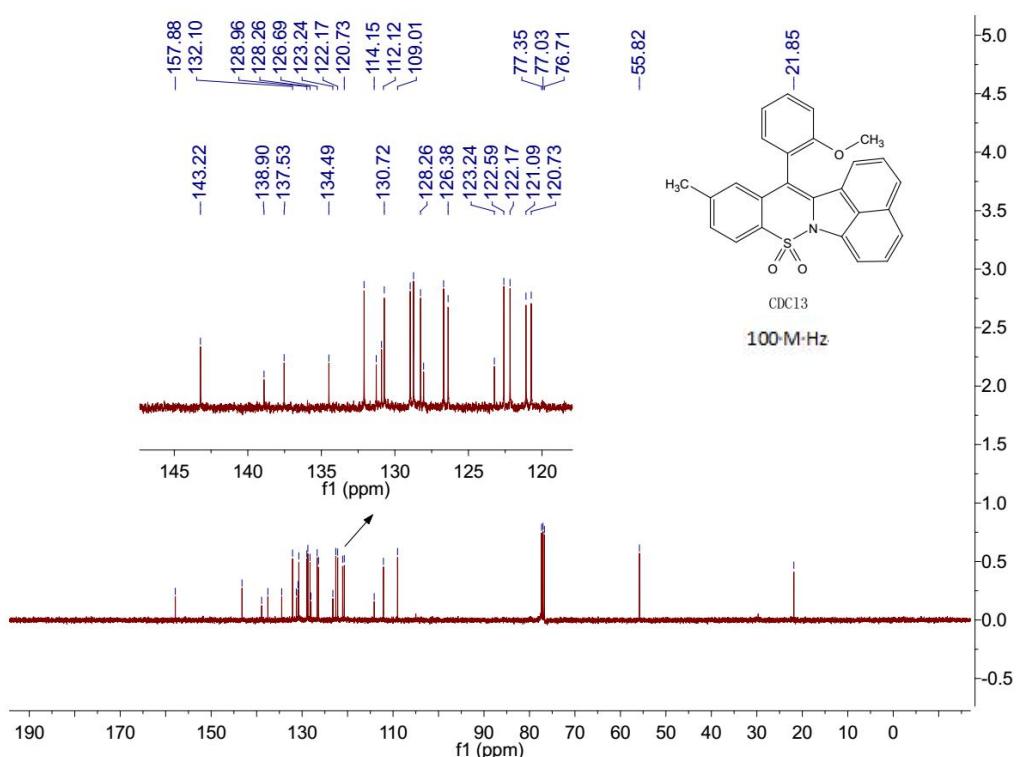


Figure S21 ¹H-NMR spectrum of **2k**

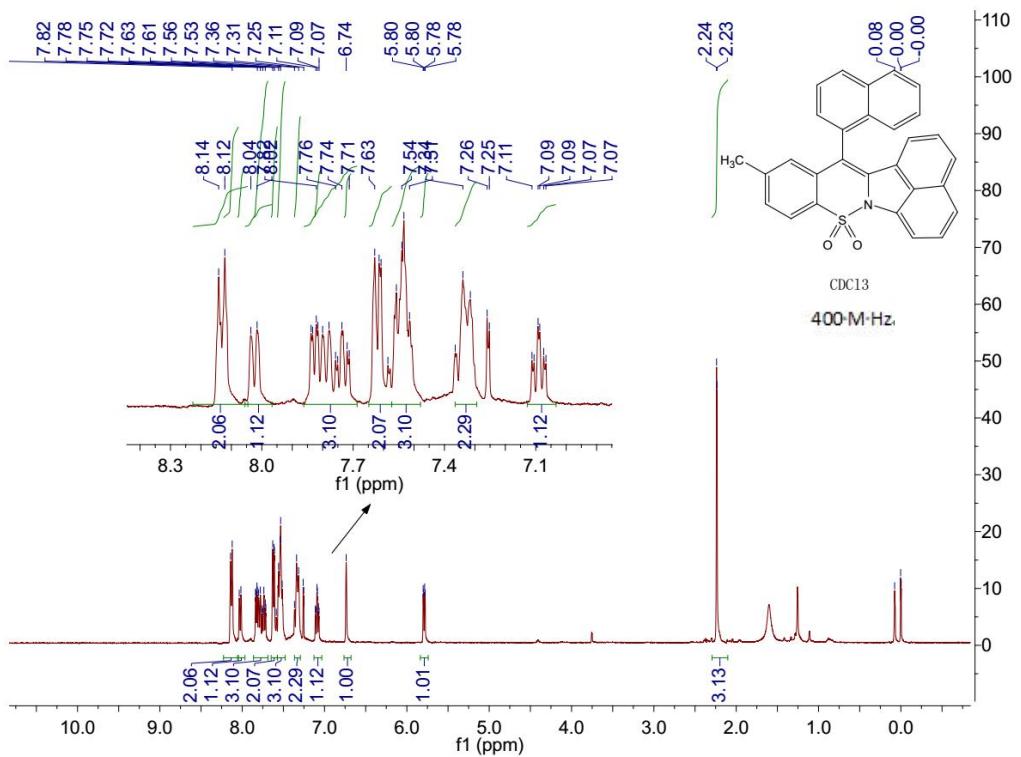


Figure S22 ¹³C-NMR spectrum of **2k**

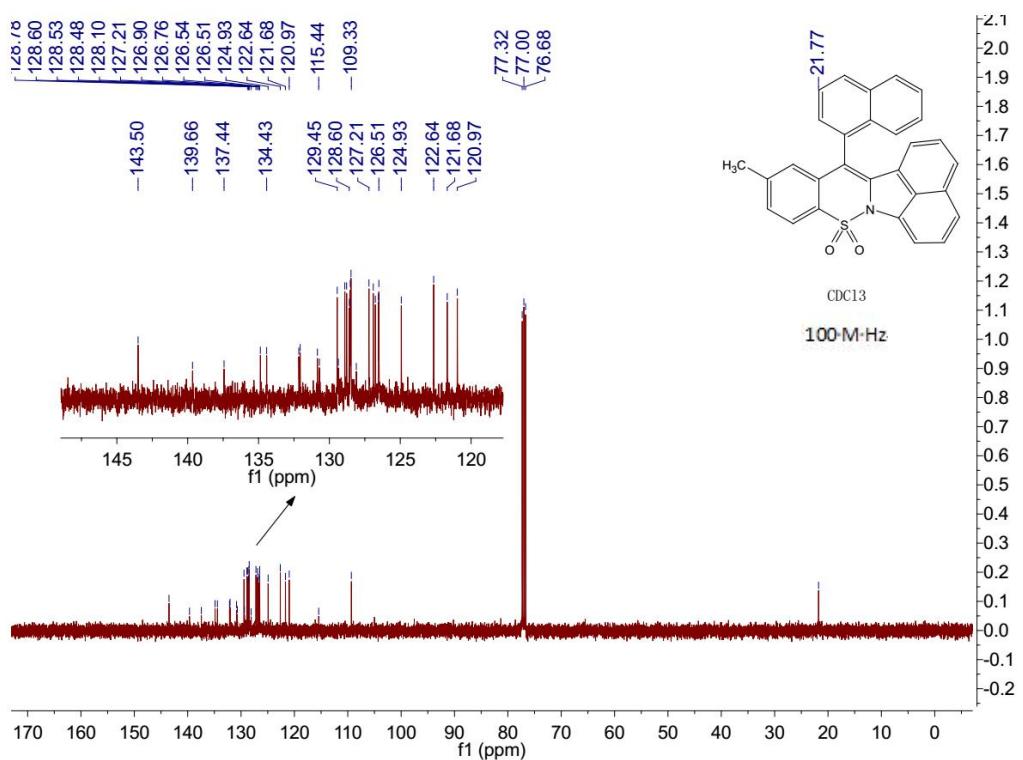


Figure S23 ¹H-NMR spectrum of **2l**

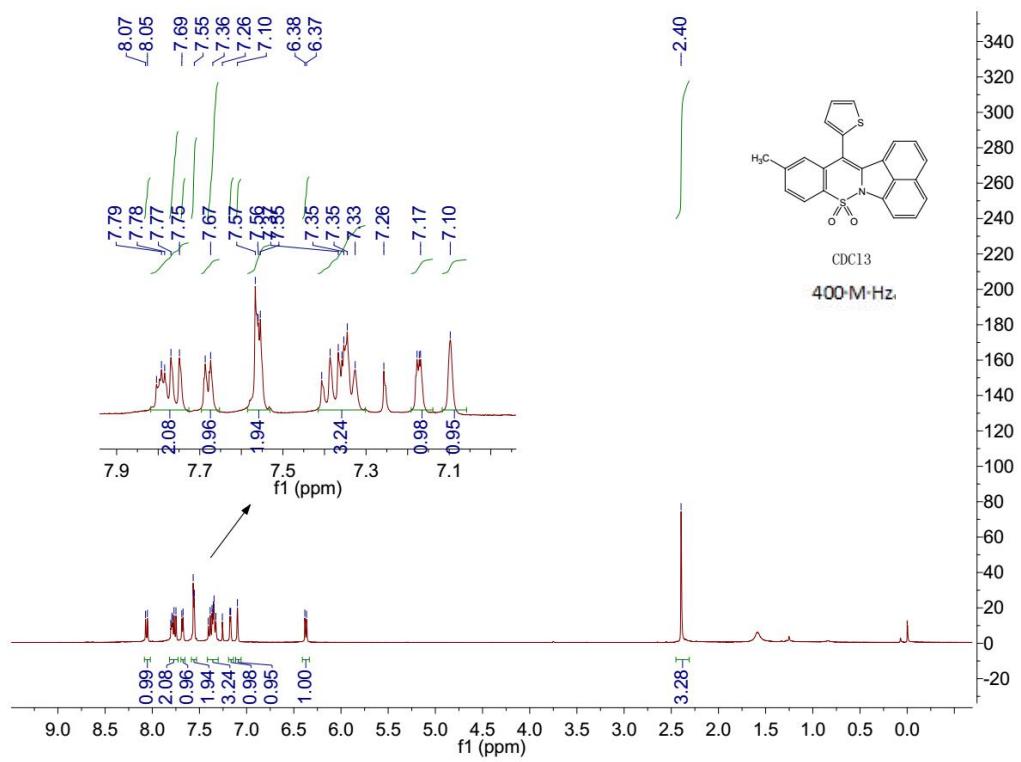


Figure S24 ^{13}C -NMR spectrum of **2l**

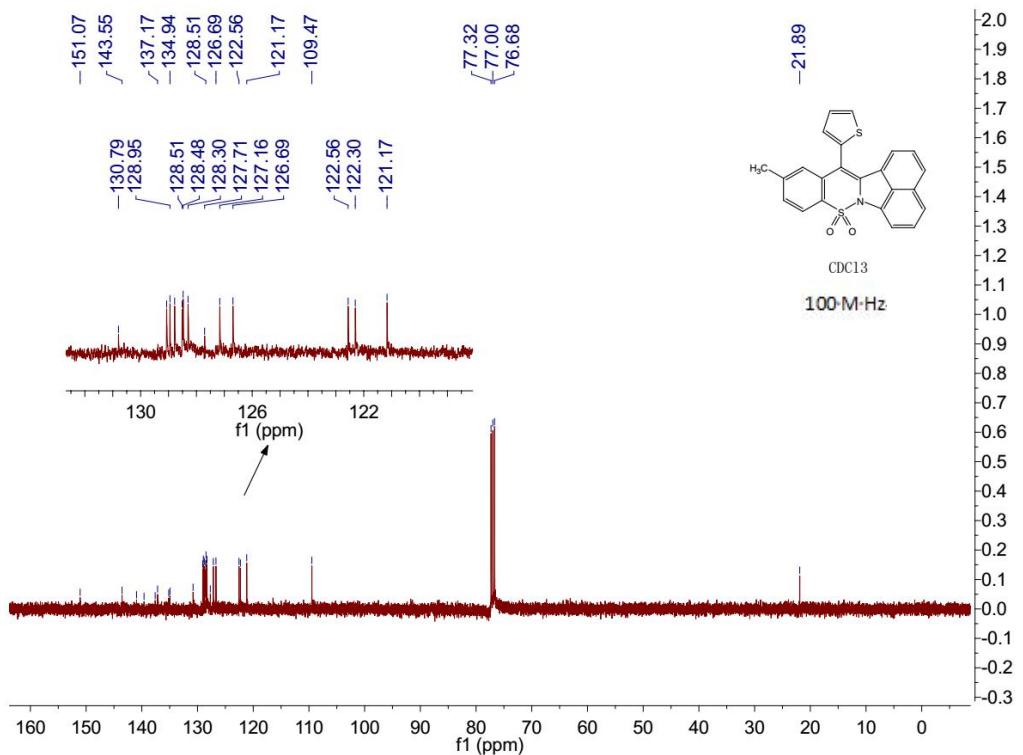


Figure S25 ^1H -NMR spectrum of **2m**

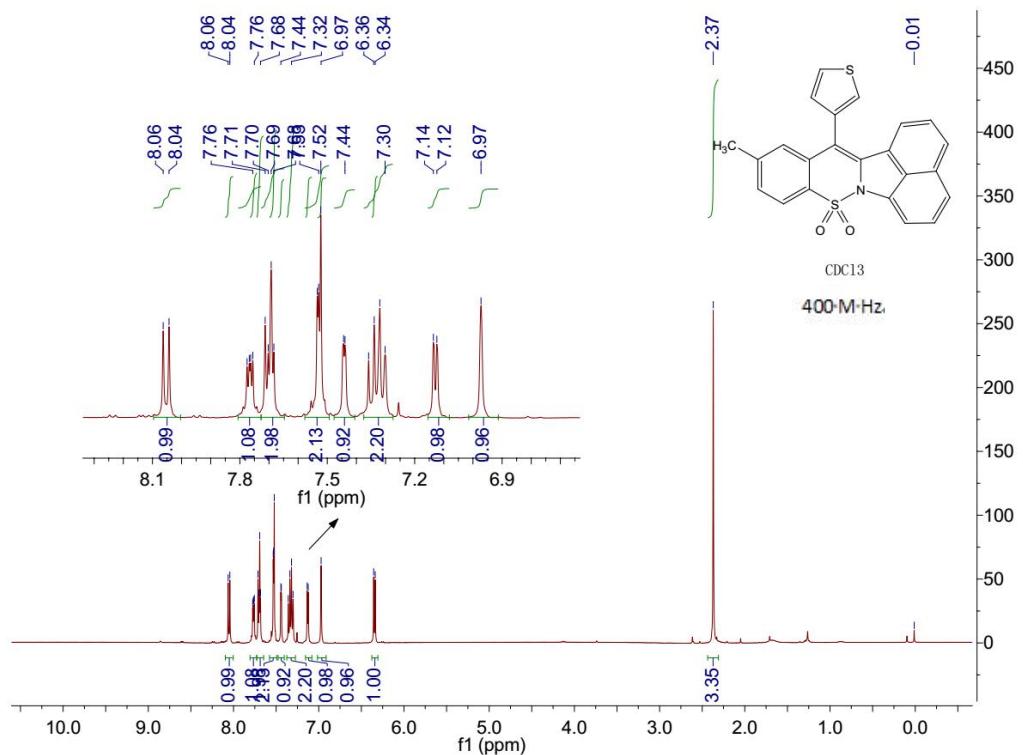


Figure S26 ^{13}C -NMR spectrum of **2m**

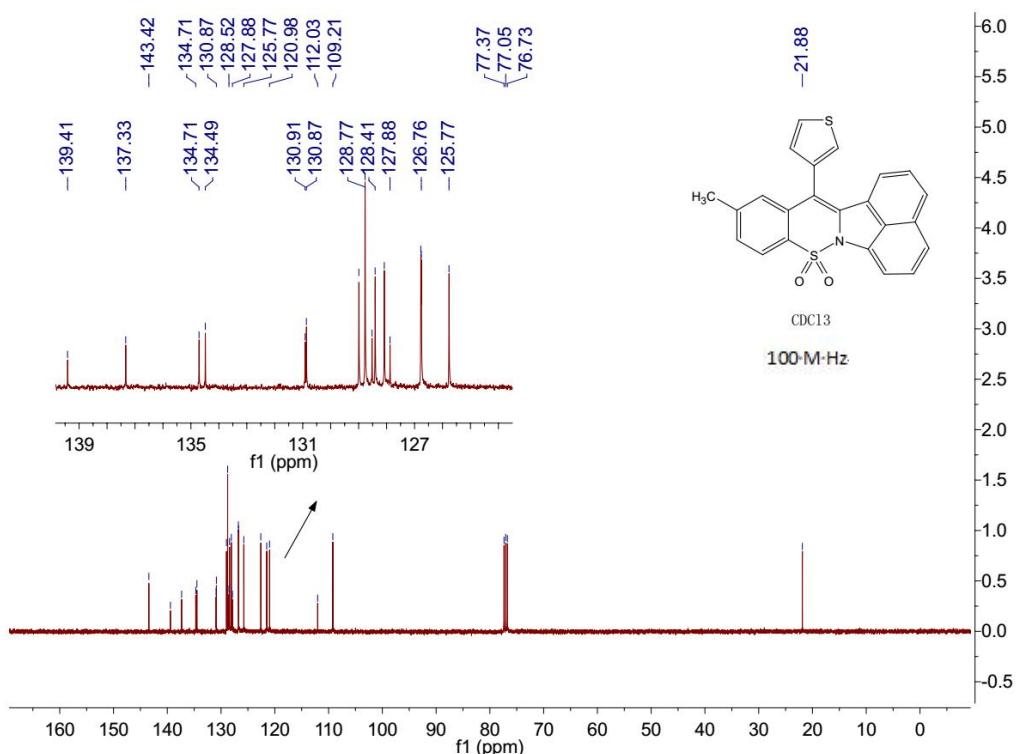


Figure S27 ^1H -NMR spectrum of **2n**

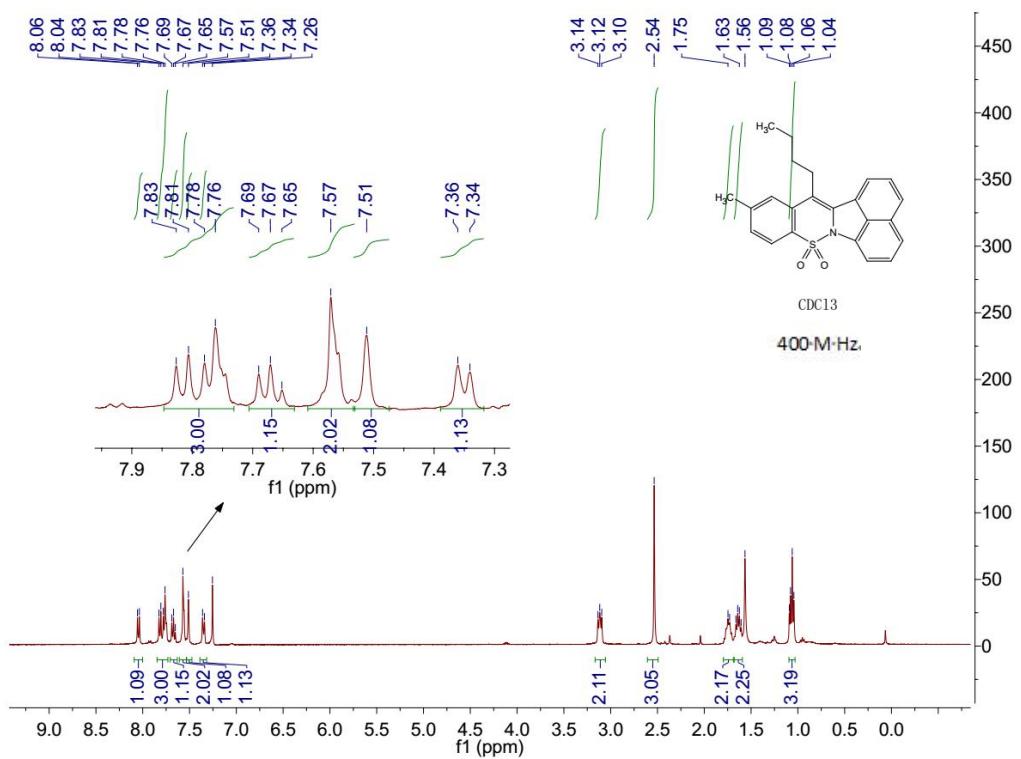


Figure S28 ^{13}C -NMR spectrum of **2n**

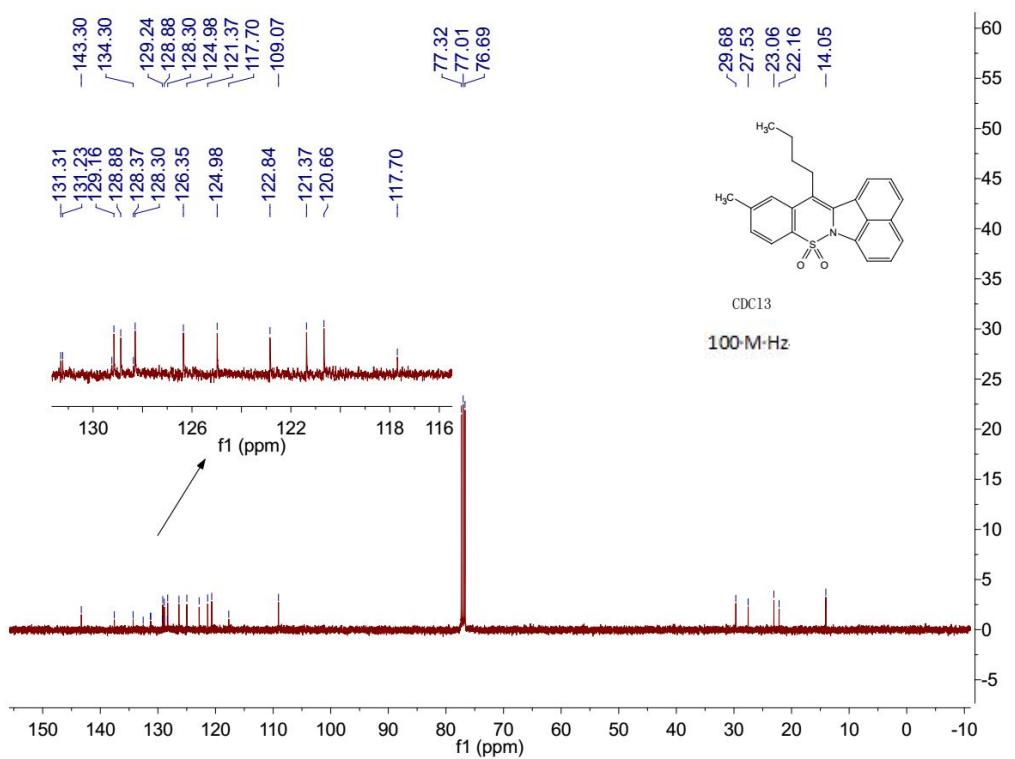


Figure S29 ¹H-NMR spectrum of **2o**

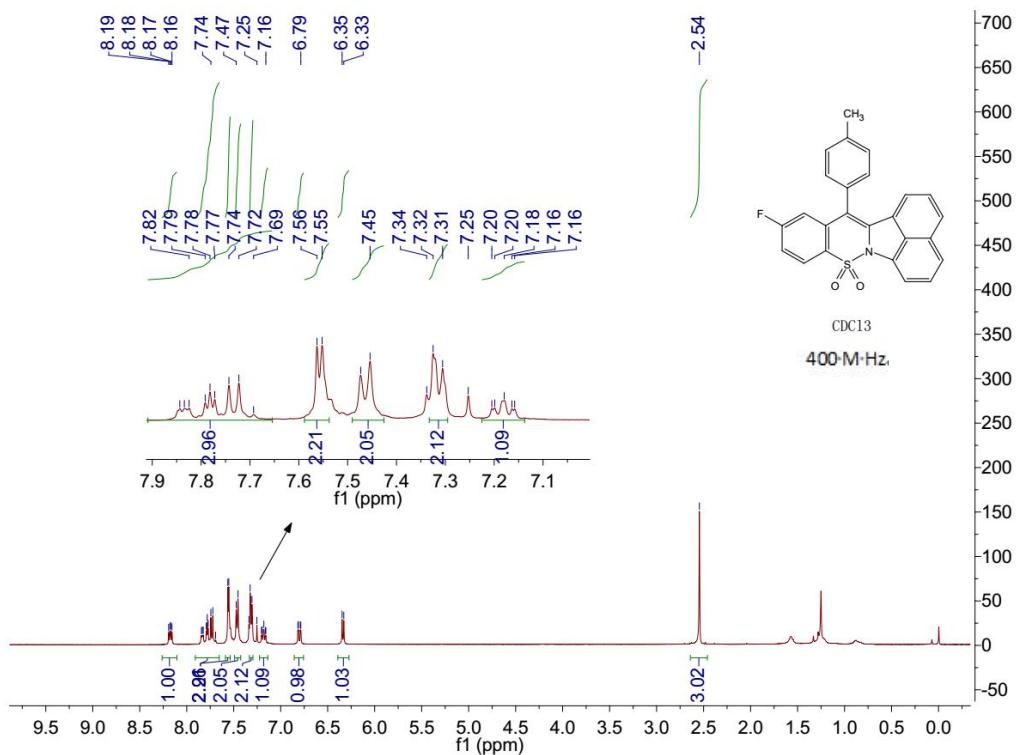


Figure S30 ¹³C-NMR spectrum of **2o**

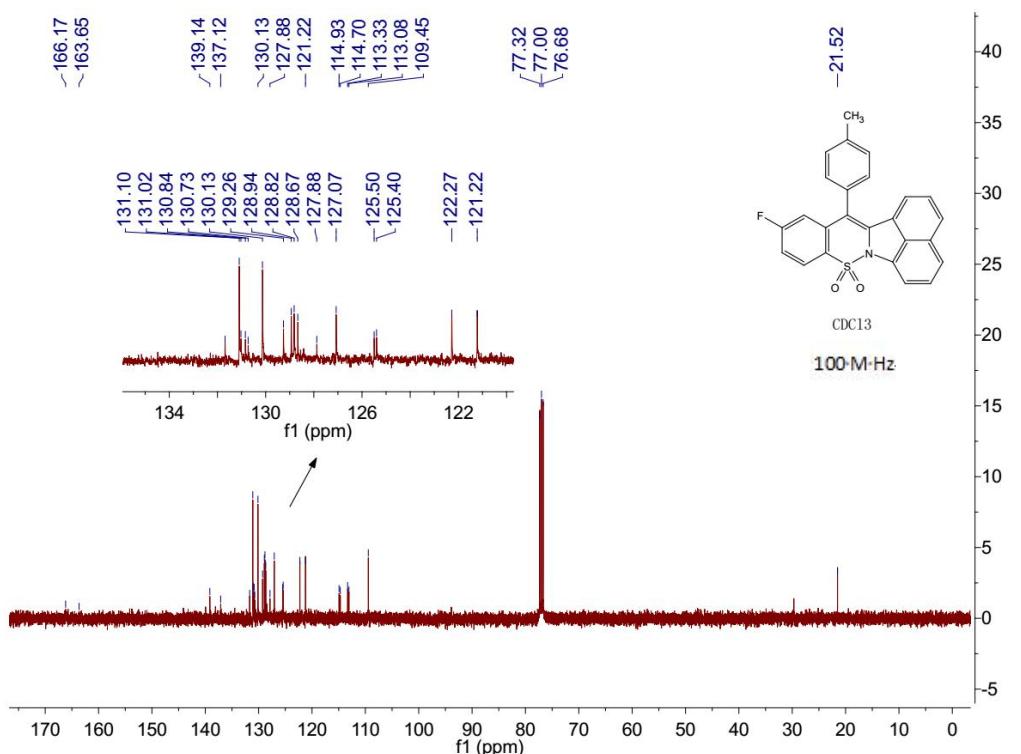


Figure S31 ¹H-NMR spectrum of **2p**

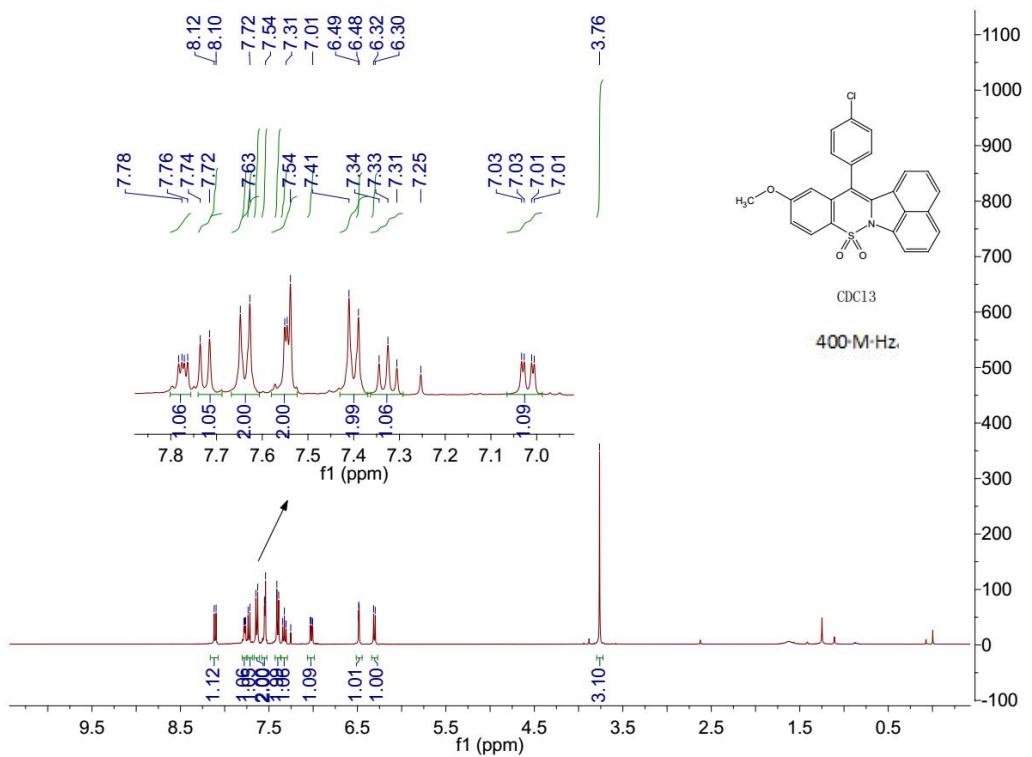


Figure S32 ¹³C-NMR spectrum of **2p**

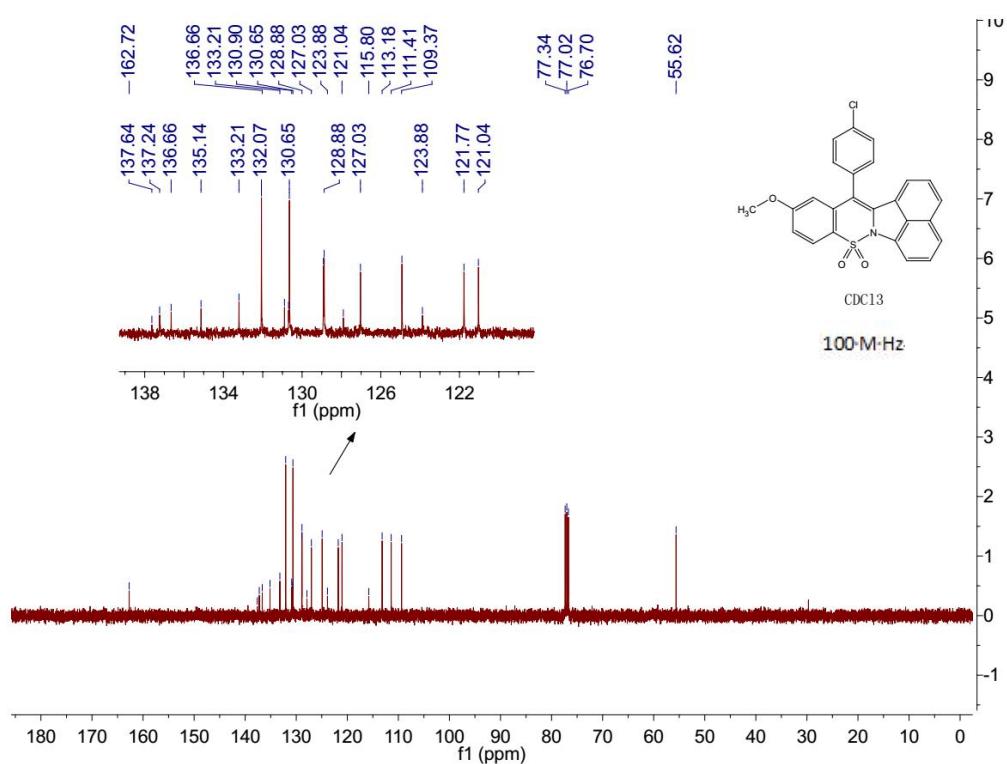


Figure S33 ¹H-NMR spectrum of **2q**

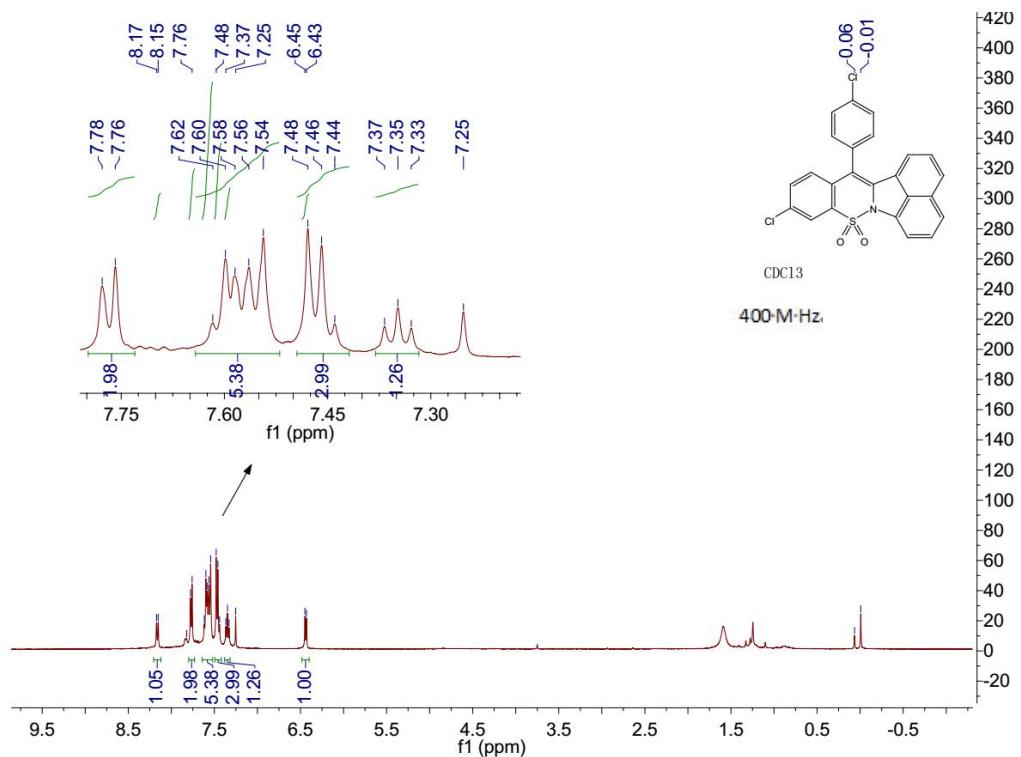


Figure S34 ¹³C-NMR spectrum of **2q**

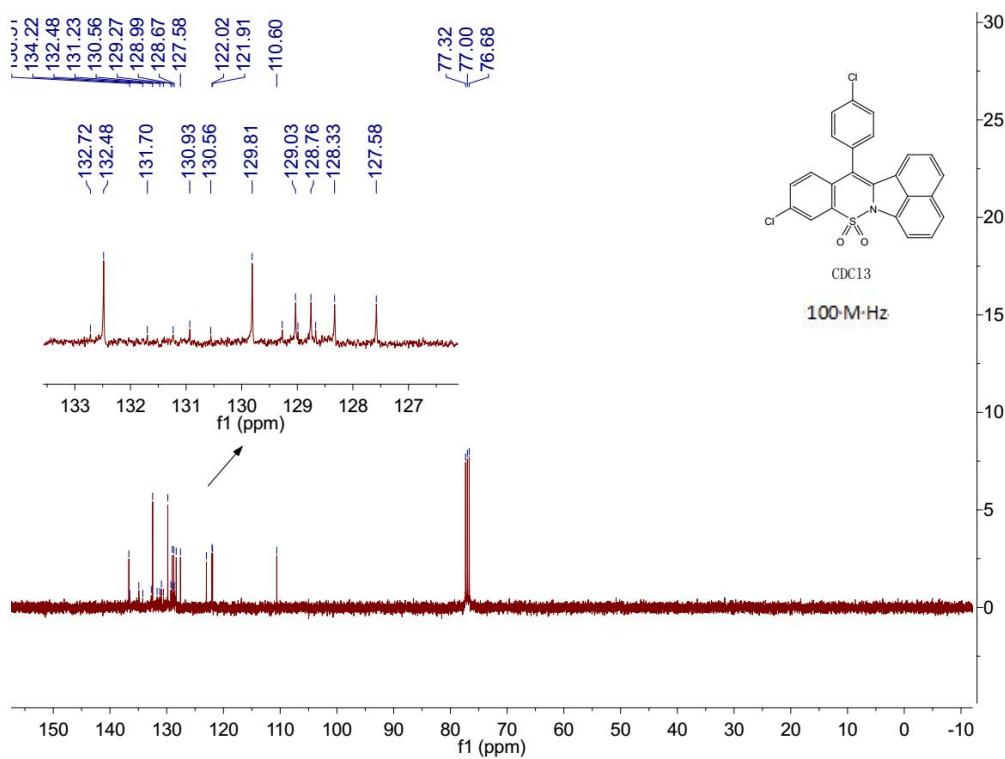


Figure S35 ¹H-NMR spectrum of **2r**

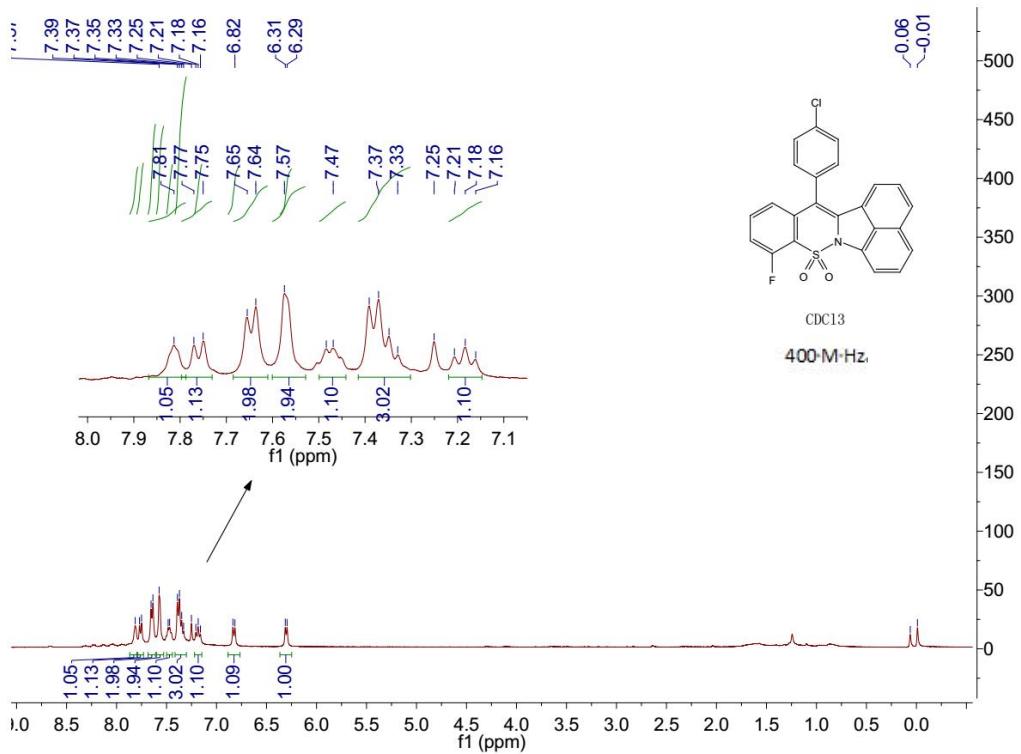


Figure S36 ¹³C-NMR spectrum of **2r**

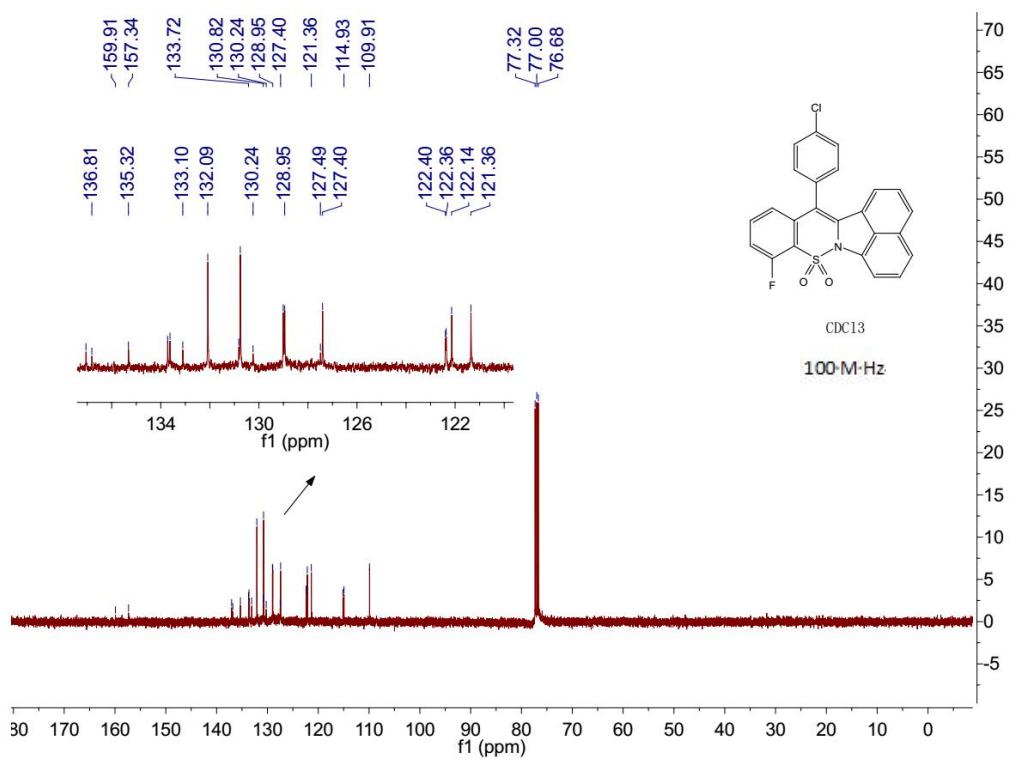


Figure S37 ^1H -NMR spectrum of **2s**

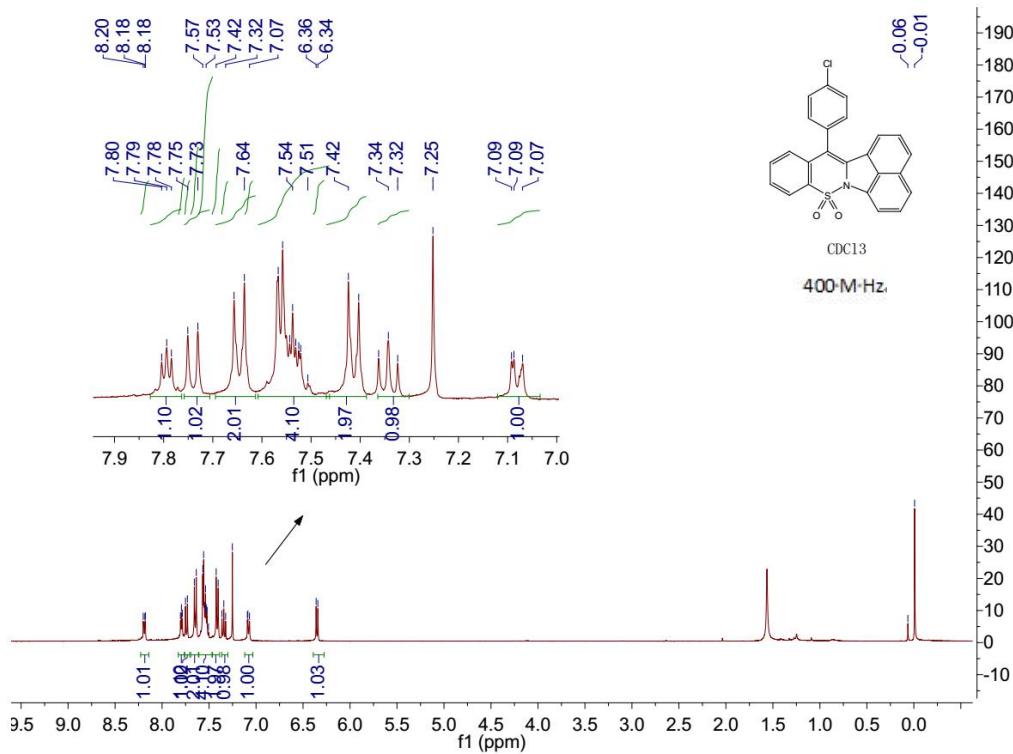


Figure S38 ^{13}C -NMR spectrum of **2s**

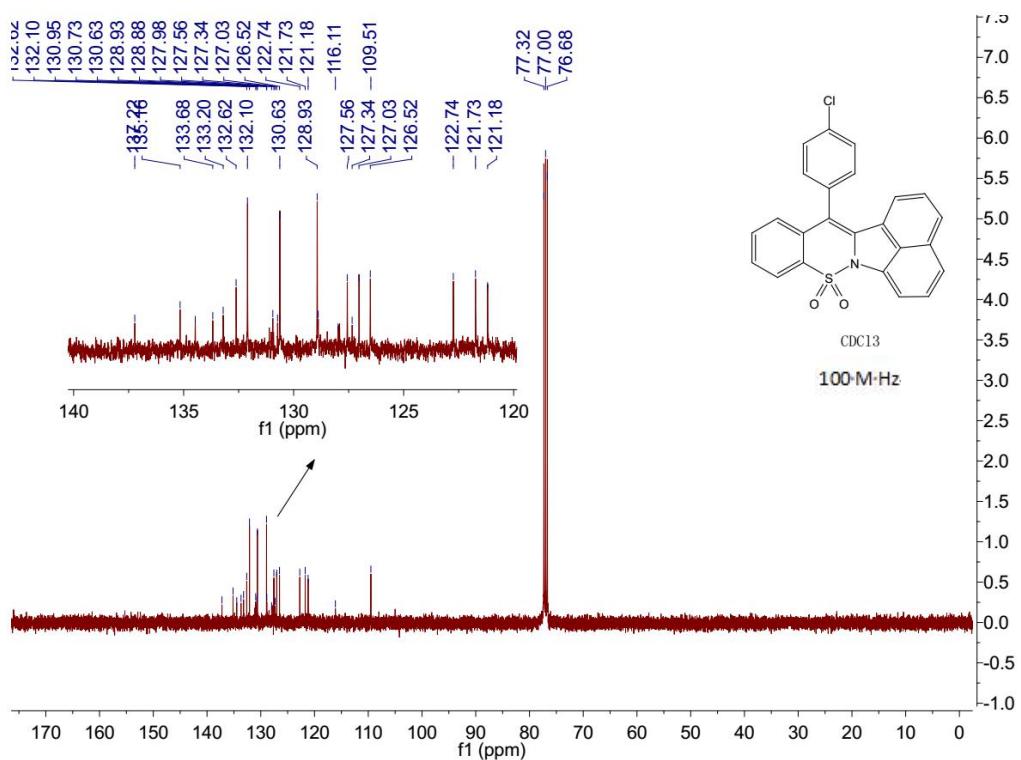


Figure S39 ¹H-NMR spectrum of **2t**

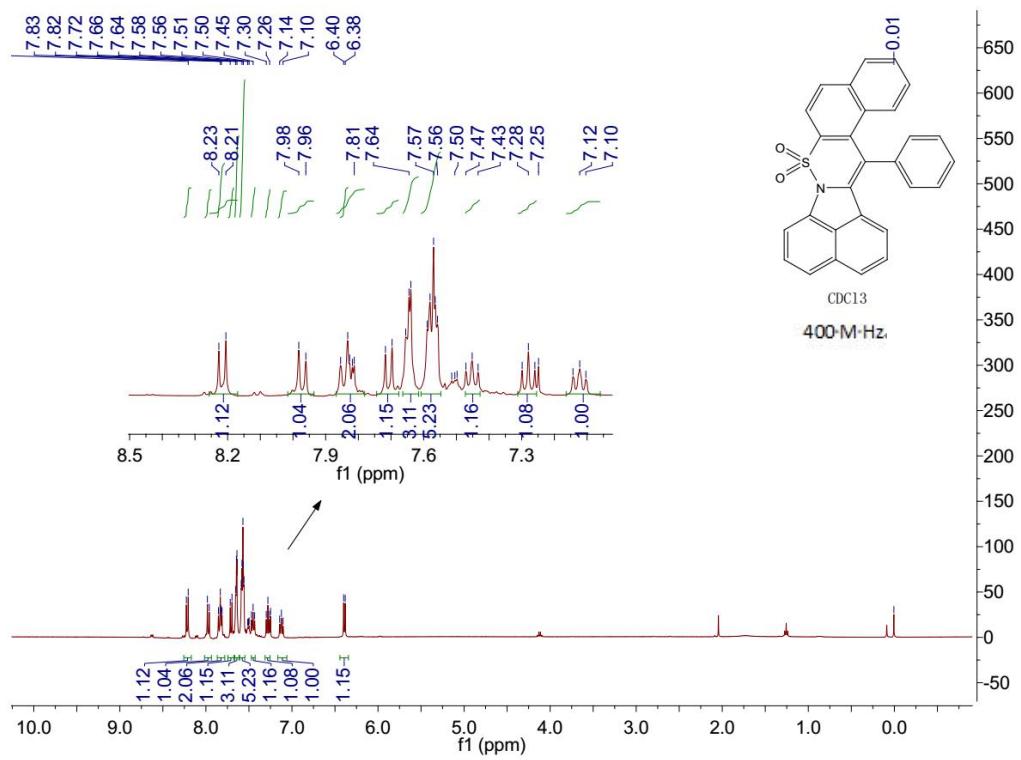


Figure S40 ¹³C-NMR spectrum of **2t**

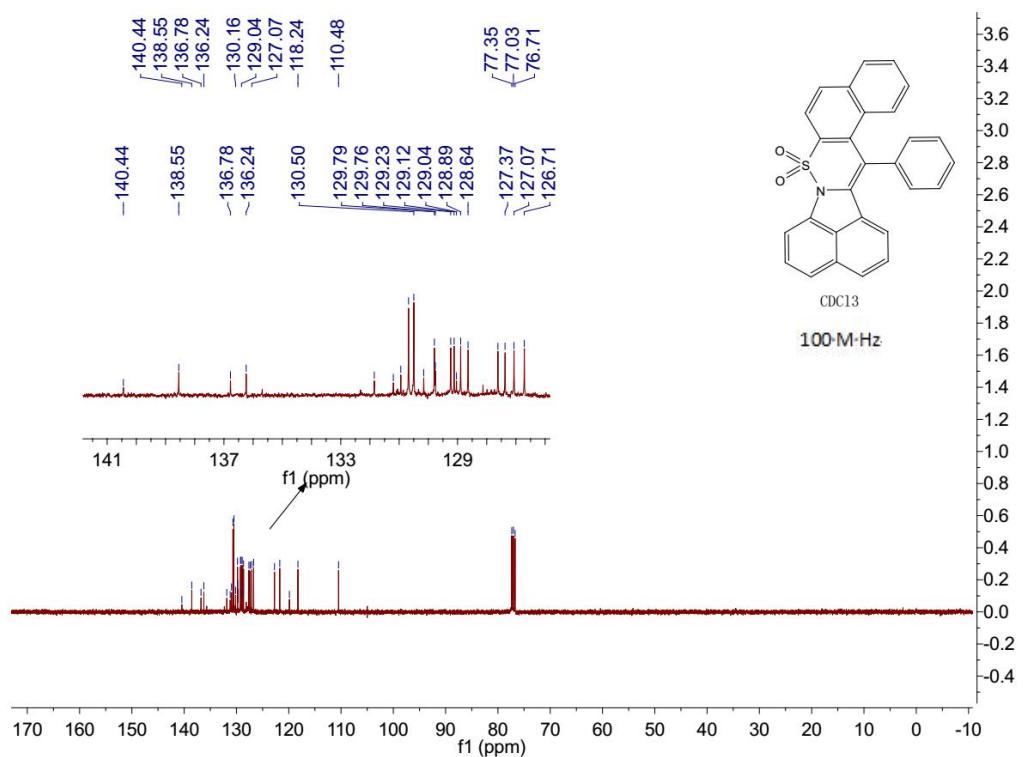


Figure S41 ¹H-NMR spectrum of **2u**

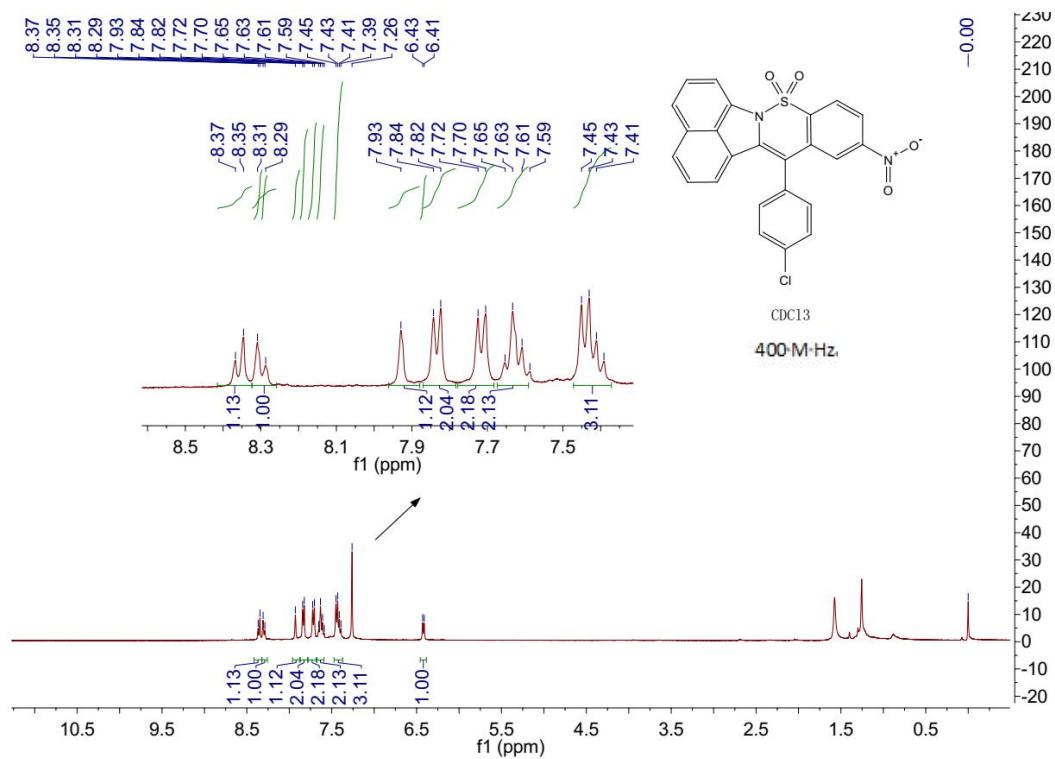


Figure S42 ¹³C-NMR spectrum of **2u**

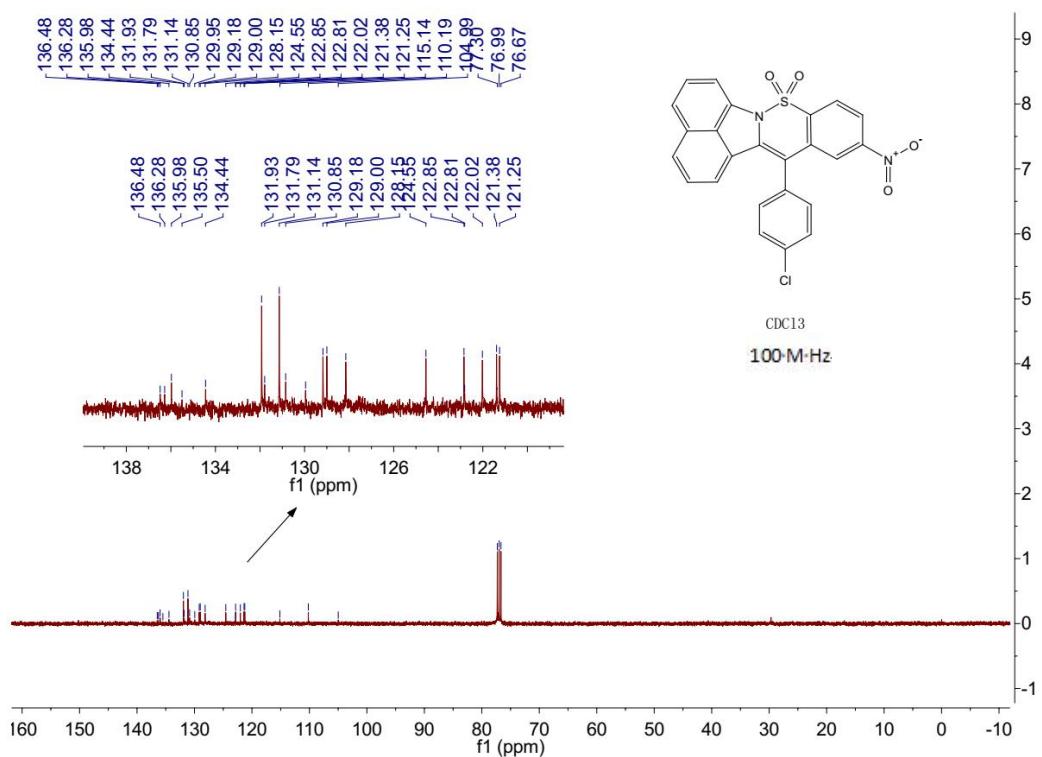


Figure S43 ¹H-NMR spectrum of **2v**

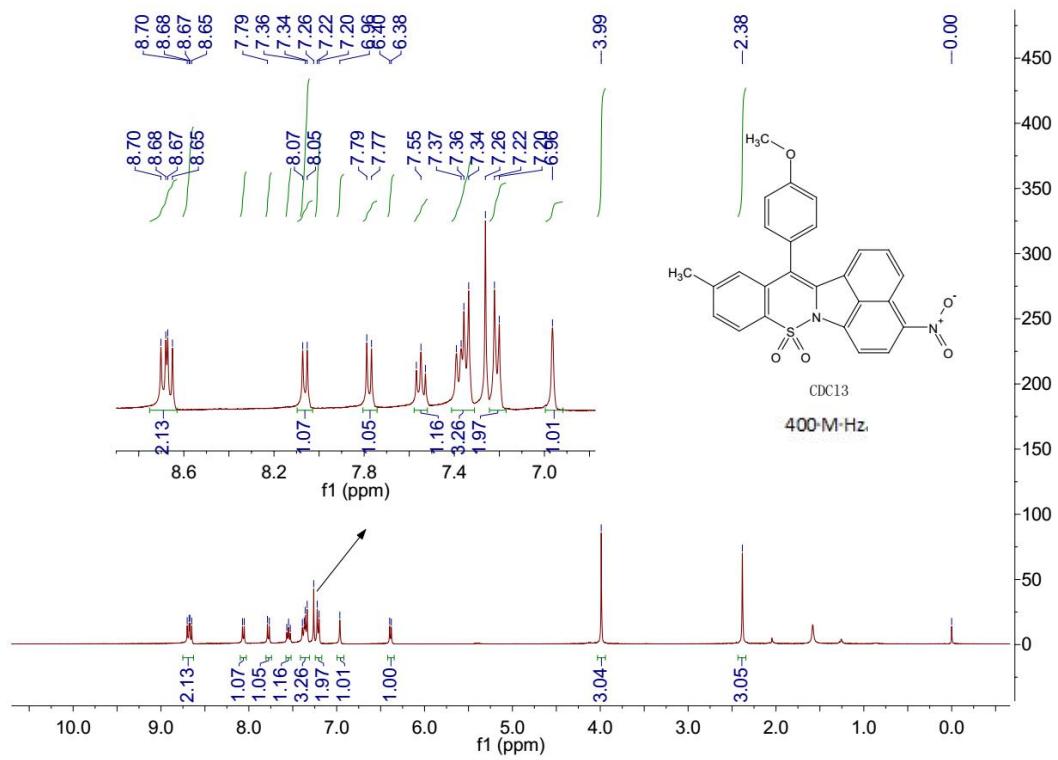


Figure S44 ¹³C-NMR spectrum of **2v**

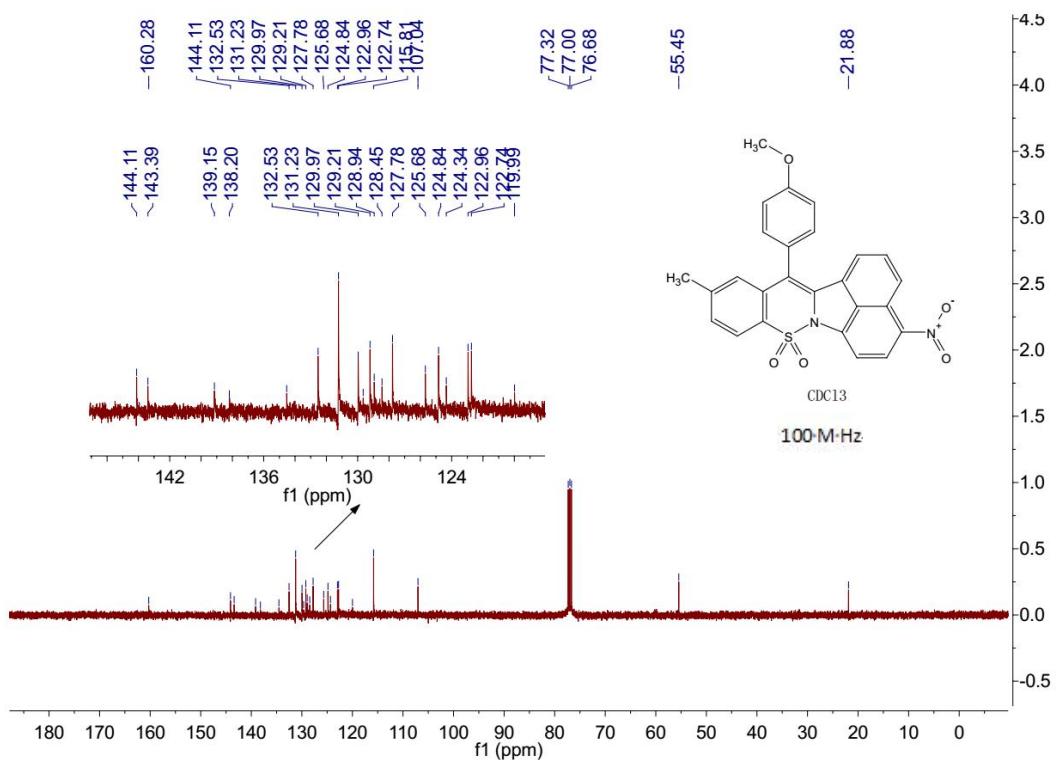


Figure S45 ^1H -NMR spectrum of 3

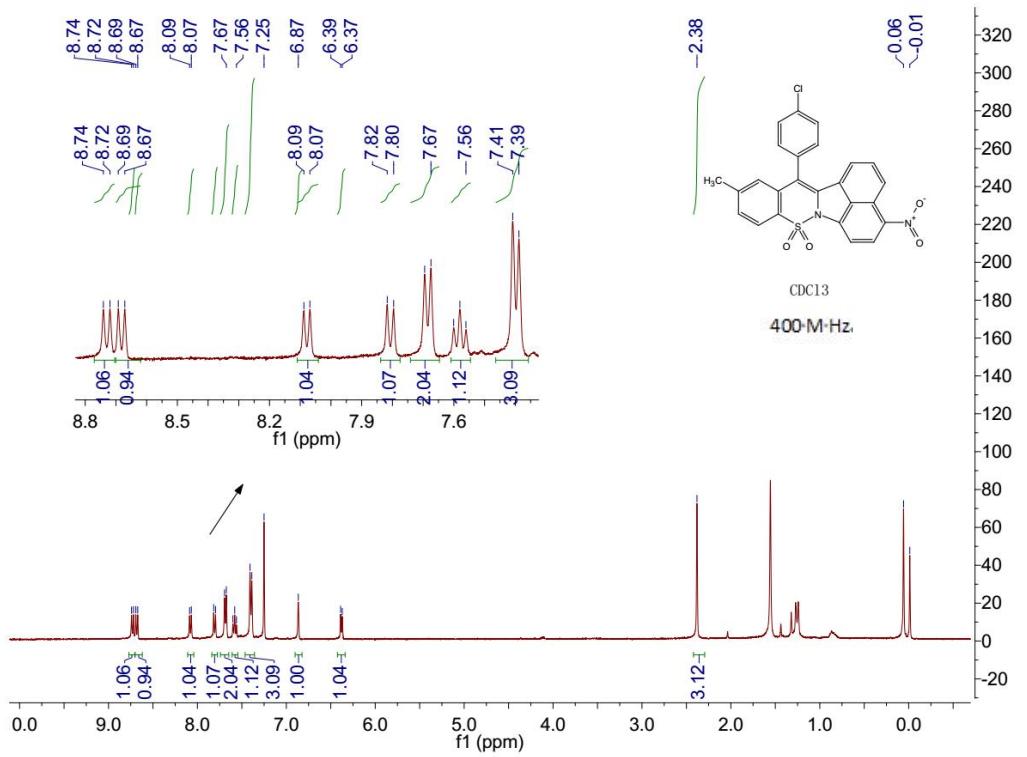


Figure S46 ^{13}C -NMR spectrum of 3

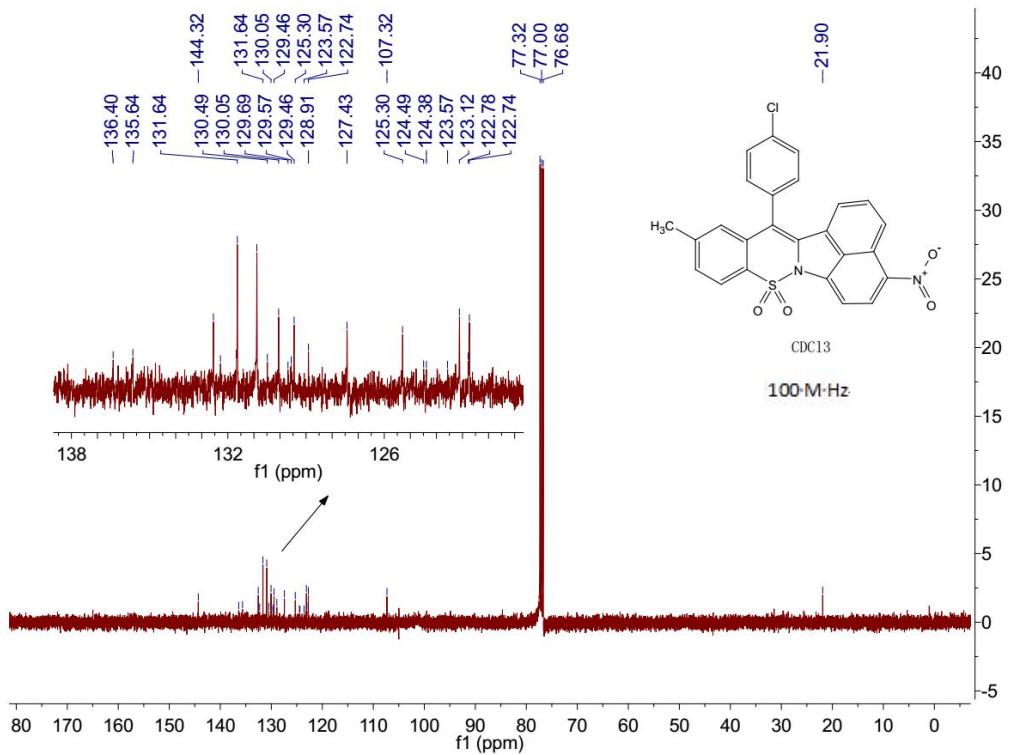


Figure S47 ^1H -NMR spectrum of **4**

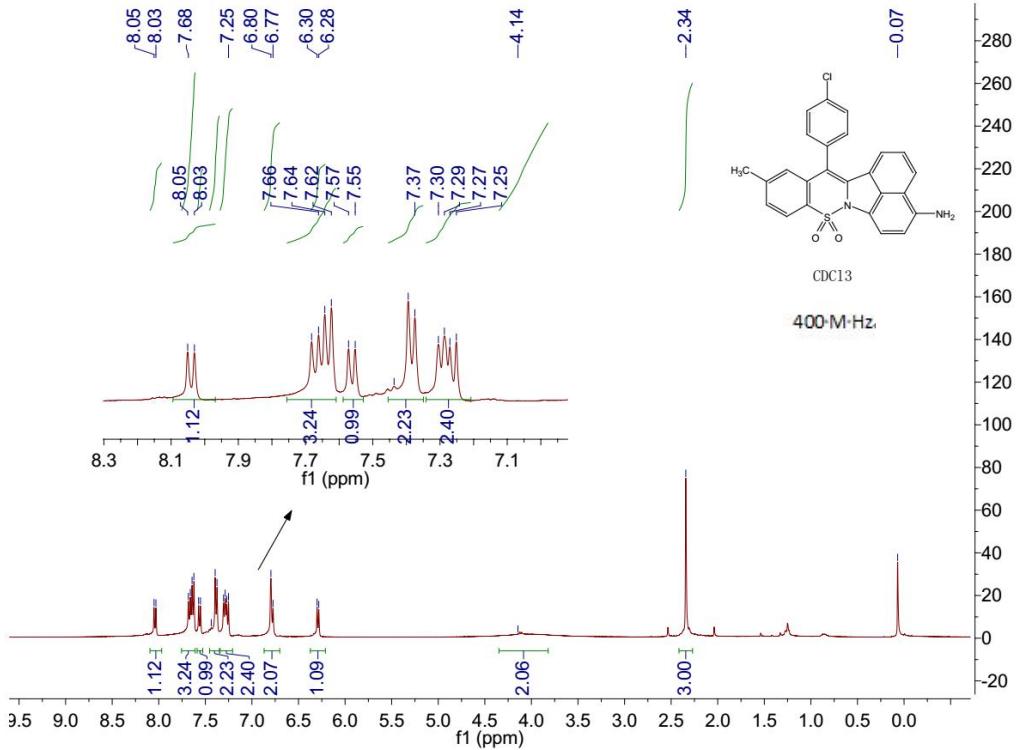


Figure S48 ^{13}C -NMR spectrum of 4

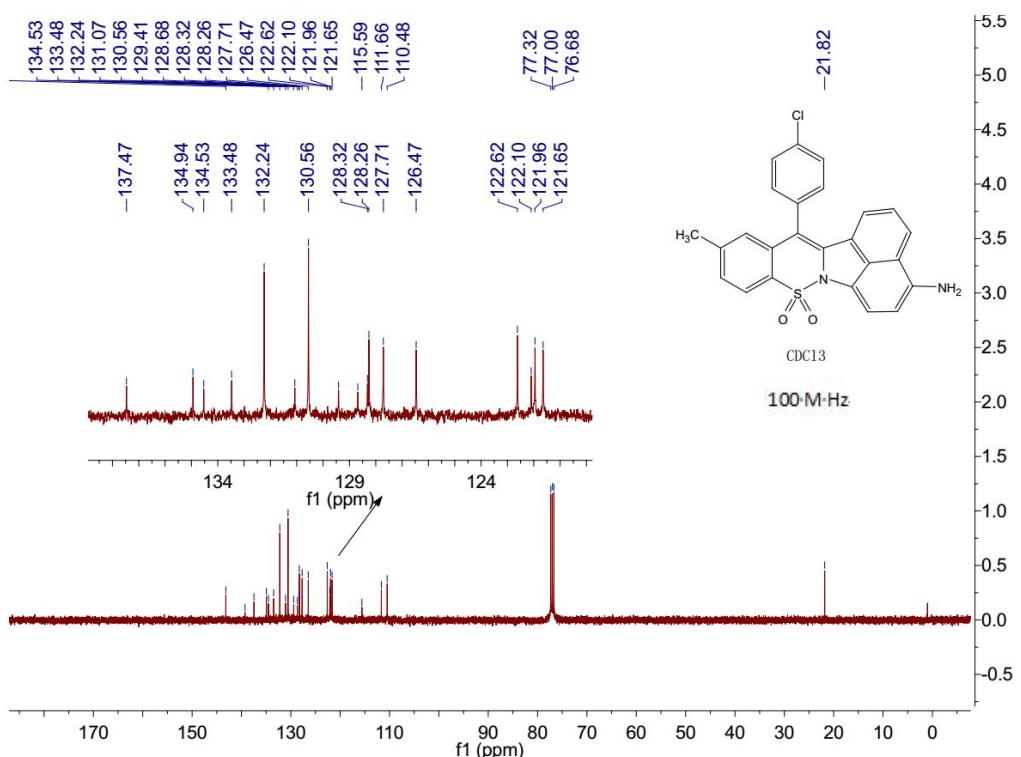


Figure S49 ¹H-NMR spectrum of **1a**

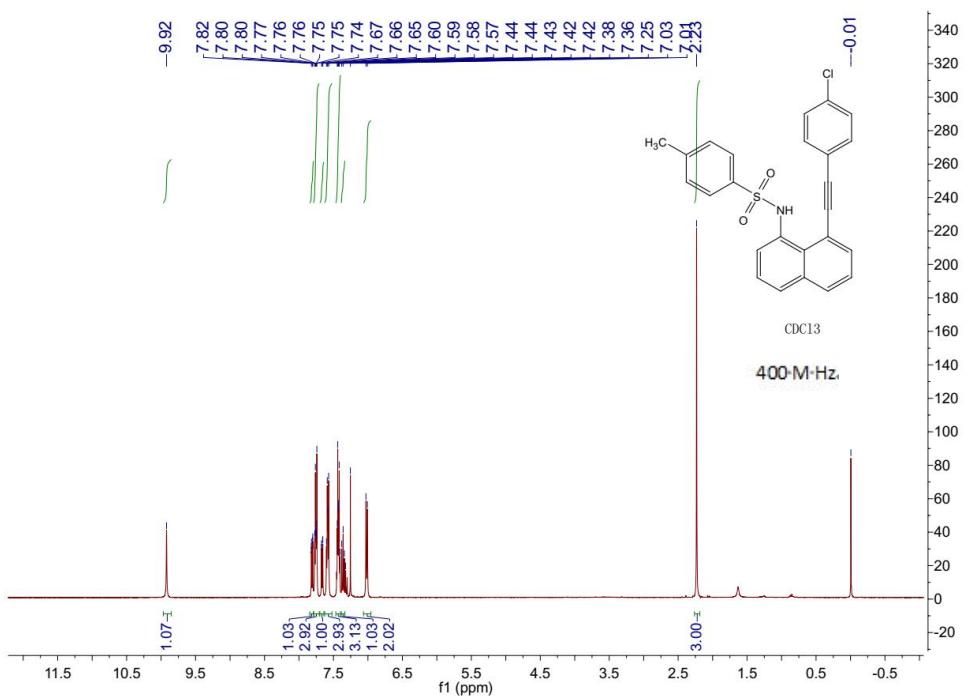


Figure S50 ¹³C-NMR spectrum of **1a**

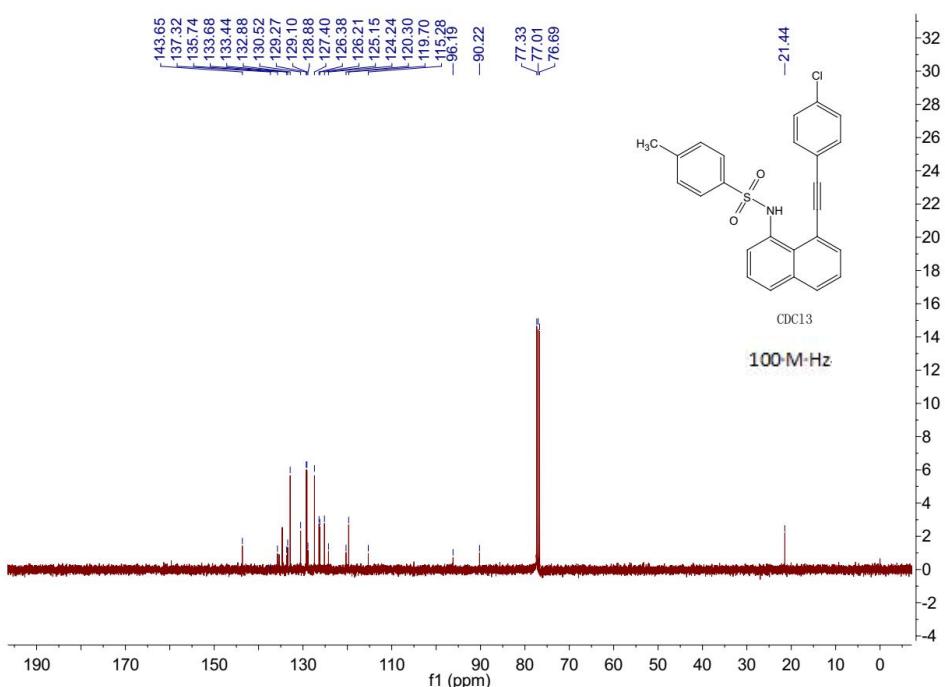


Figure S51 ¹H-NMR spectrum of **1f**

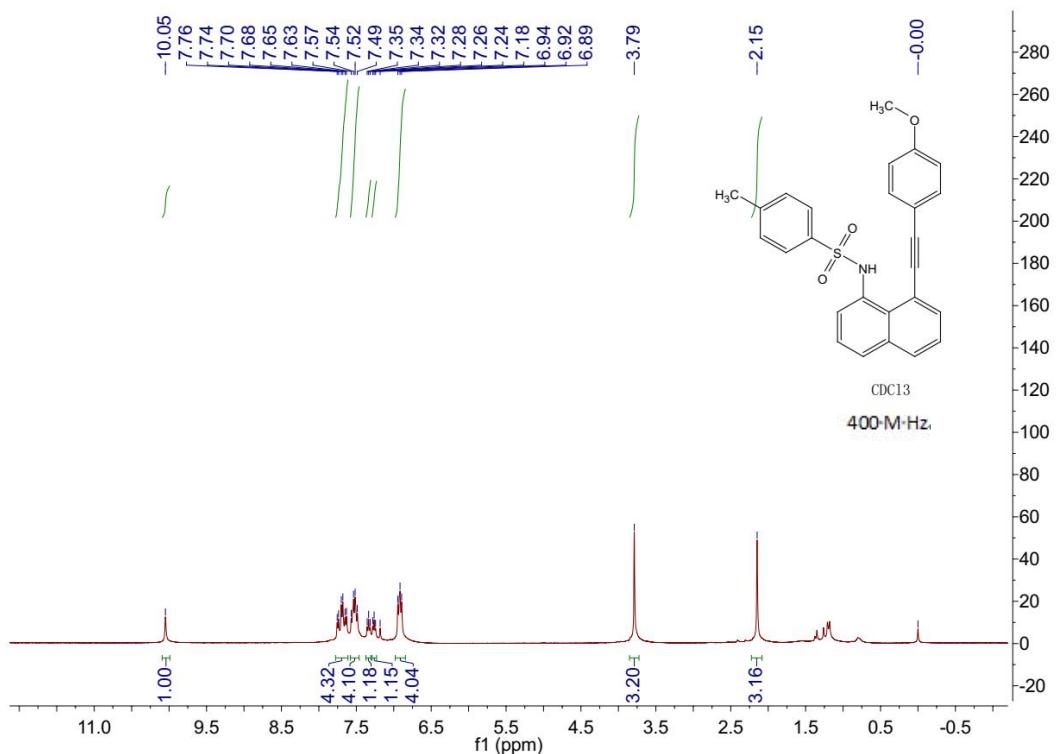


Figure S52 ^{13}C -NMR spectrum of **1f**

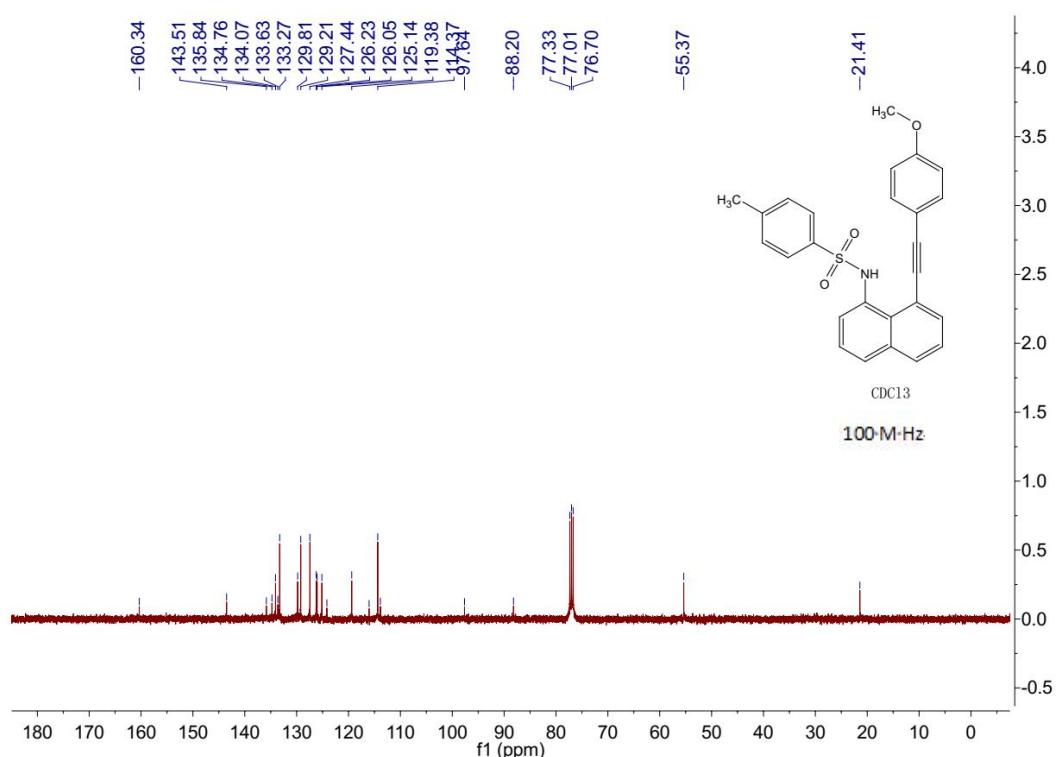


Figure S53 ^1H -NMR spectrum of **1s**

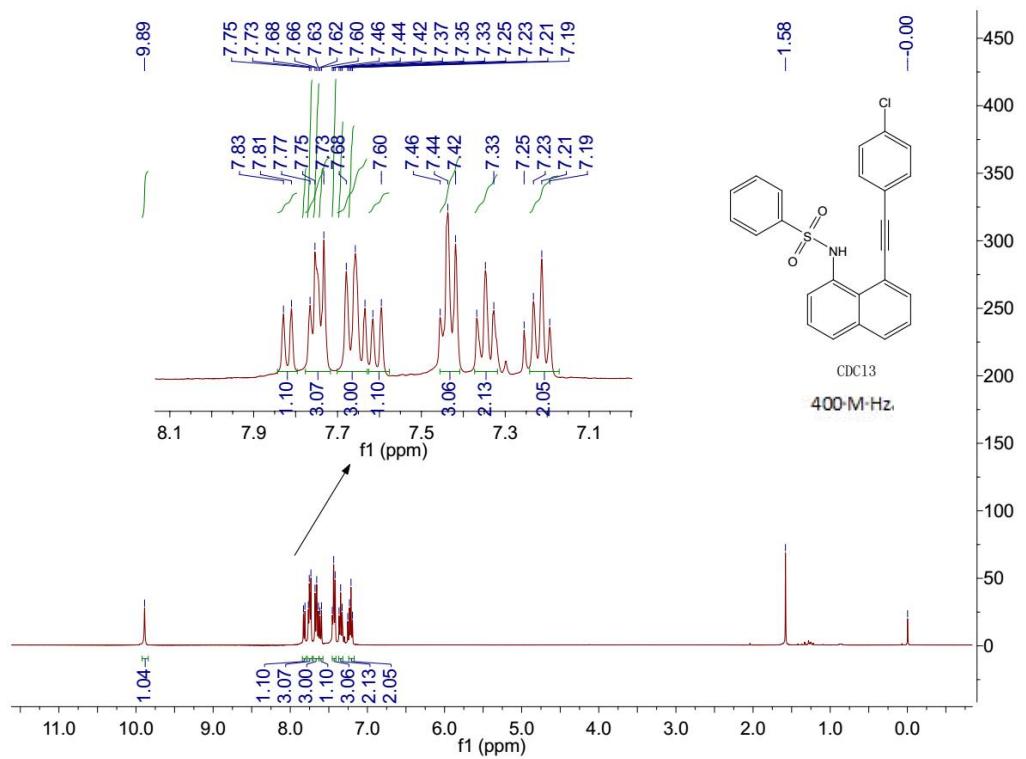


Figure S54 ^{13}C -NMR spectrum of **1s**

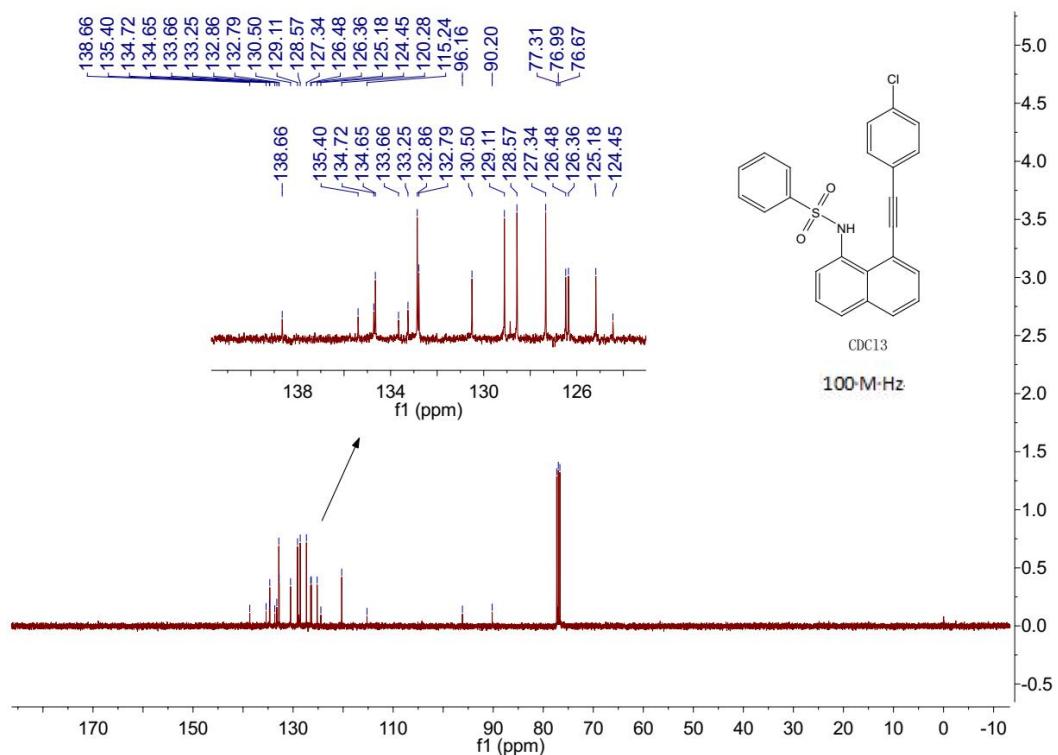


Figure S55 ^1H -NMR spectrum of **1u**

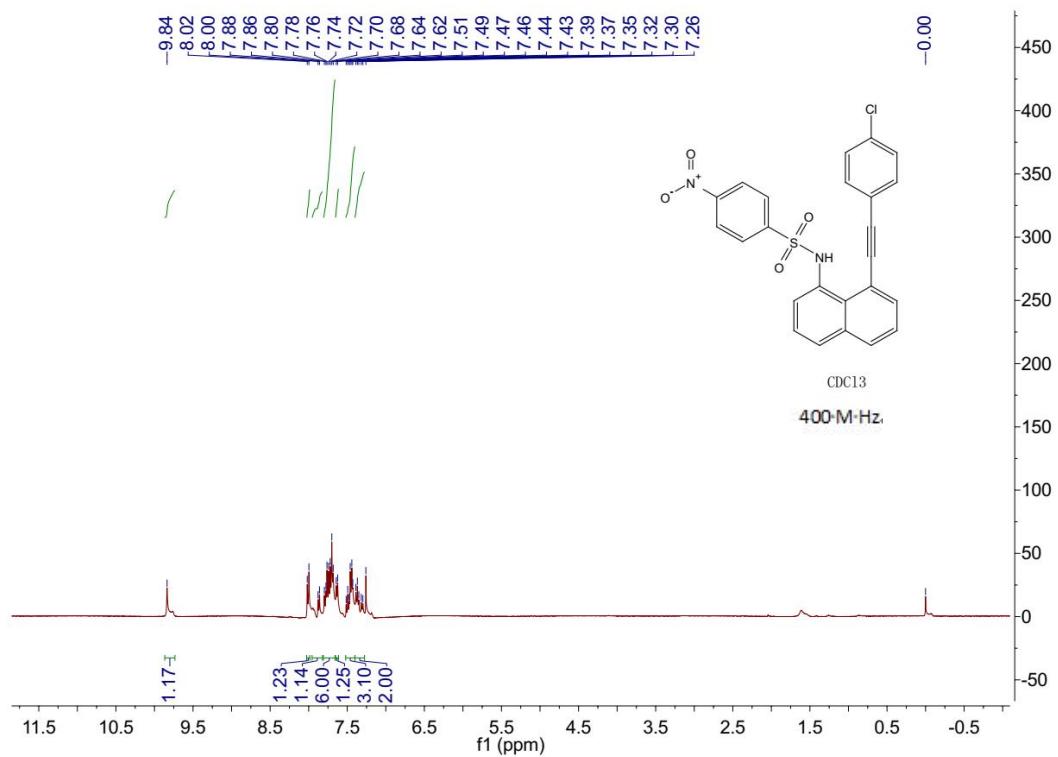


Figure S56 ^{13}C -NMR spectrum of **1u**

