

Electronic Supplementary Information

A quinoline-malononitrile-based fluorescent probe with aggregation-induced emission effect for the monitoring of viscosity *in vivo*

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Materials

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Bromocarbazole was received from Acme Biochemical Technology Co., Ltd. (Shanghai, China). 2-Methylquinoline, 4-Formylphenylboronic acid was received from Macklin Biochemical Co., Ltd. (Shanghai, China). Iodomethane was received from J&K SCIENTIFIC. (Hebei, China). Malononitrile, acetonitrile, ethanol, dichloromethane, tetrahydrofuran, sodium ethoxide, hydrochloric acid, piperazine, Potassium carbonate (K_2CO_3) were purchased from Sinopharm Chemical Reagent Co., Ltd. (China). Ethyl bromide was received from Aladdin reagent Co. (Shanghai, China). All of the experimental live nude mice (6 to 8-week-old) and zebrafish were obtained from Liaoning Changsheng Biotechnology Co., Ltd., and the experiments were performed in compliance with the relevant laws and guidelines. Unless otherwise stated, solvents and reagents were of analytical grade from commercial suppliers and were used without further purification.

Apparatus

1H NMR and ^{13}C NMR spectra were recorded with an AVANCE 400 MHz spectrometer (Bruker) with chemical shifts reported as ppm (in $DMSO-d_6$). Mass spectra were recorded on an Agilent 6530 QTOF spectrometer. Absorption spectra were tested with a Perkin Elmer Lambda 900 UV/VIS/NIR spectrophotometer. Fluorescence spectra were recorded with a Spectrofluorometer FS5 luminescence spectrometer. All pH measurements were made with an OHAUS Starter 3100/f meter. Viscosity values measured with LVDV-1T touch screen rotational viscometer. Imaging of Viscosity in zebrafish and mice were performed on a SPECTRAL Ami

Imaging Systems (Spectral Instruments Imaging, LLC, Tucson, AZ) with an excitation filter 465 nm and an emission filter 630 nm. Amiview Analysis software (Version 1.7.06) was used to calculate fluorescence intensity in region of interest (ROI), and values are presented as the mean \pm SD for each group of three experiments.

Table S1 The viscosity values of probe **QM-C2** (10 μ M) in different ratios of ethanol/glycerol systems.

Ethanol/Glycerol (v/v)	η (cP) (QM-C2)
10:0	1.85
9:1	2.43
8:2	4.27
7:3	17.02
6:4	32.14
5:5	42.15
4:6	76.65
3:7	123.16
2:8	234.28
1:9	457.03
0:10	930.85

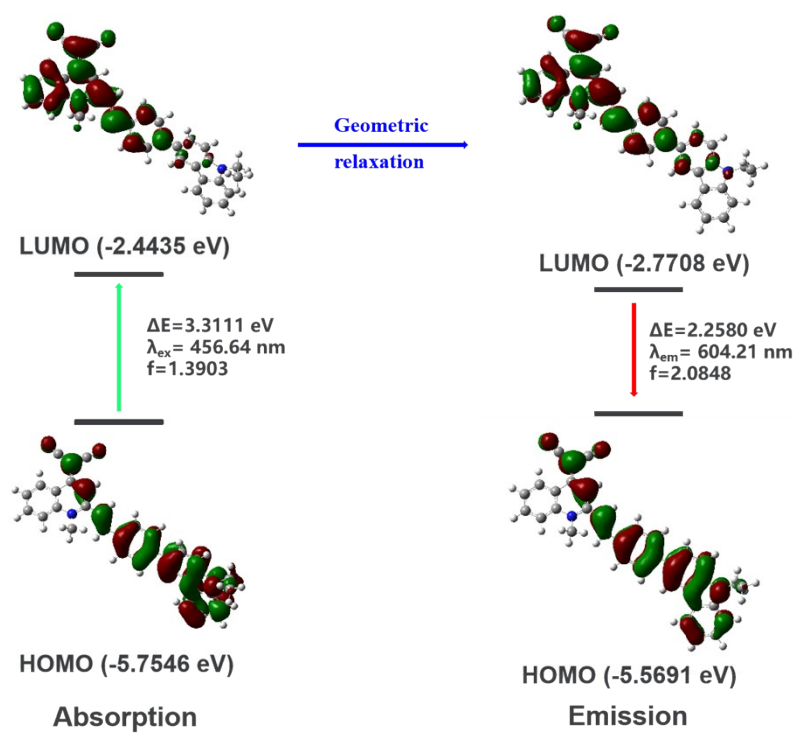


Fig. S1 Frontier molecular orbitals (HOMO and LUMO) in the **QM-C2** excited state.

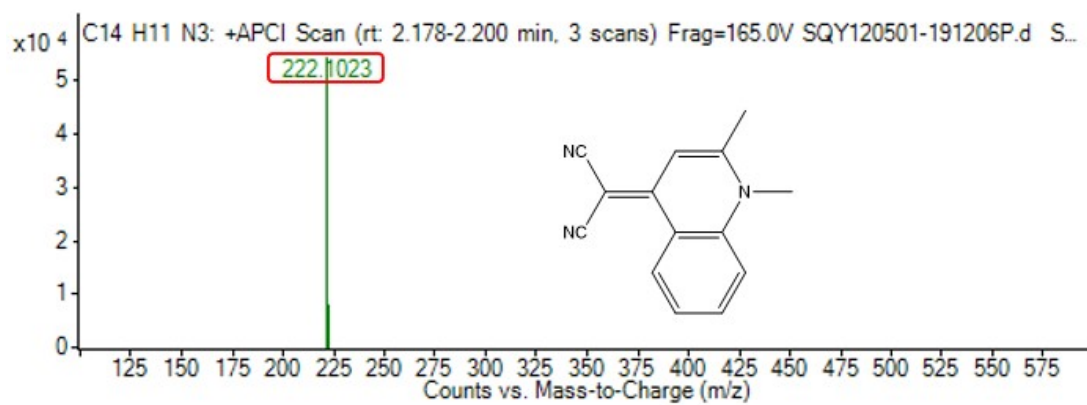


Fig. S2 HR-MS of compound **2**.

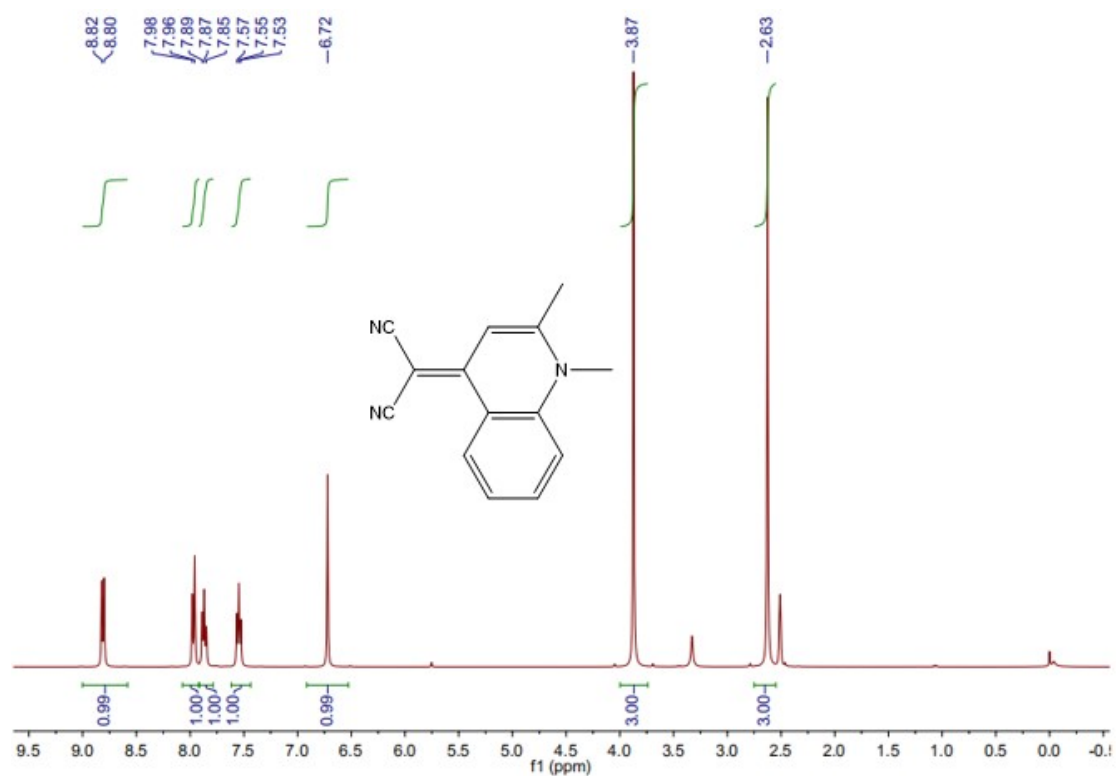


Fig. S3 ^1H NMR of compound 2 (DMSO- d_6 , 400 MHz).

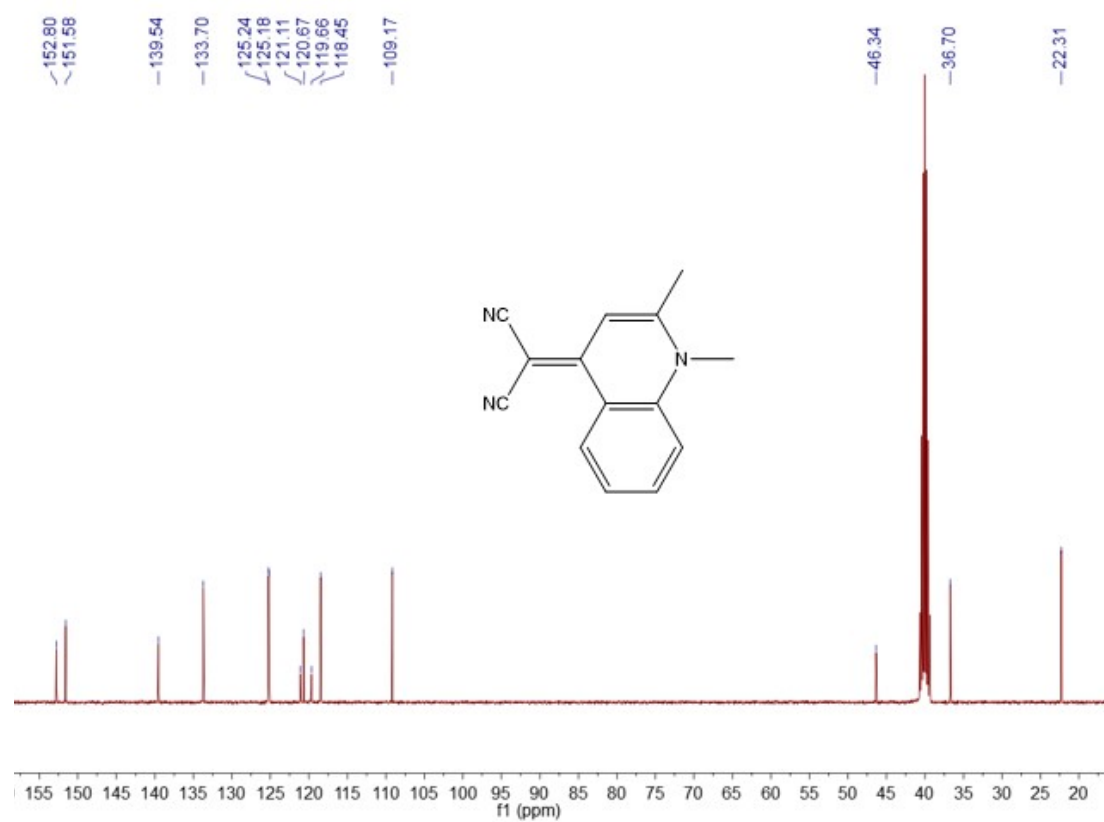


Fig. S4 ^{13}C NMR of compound 2 (DMSO- d_6 , 101 MHz).

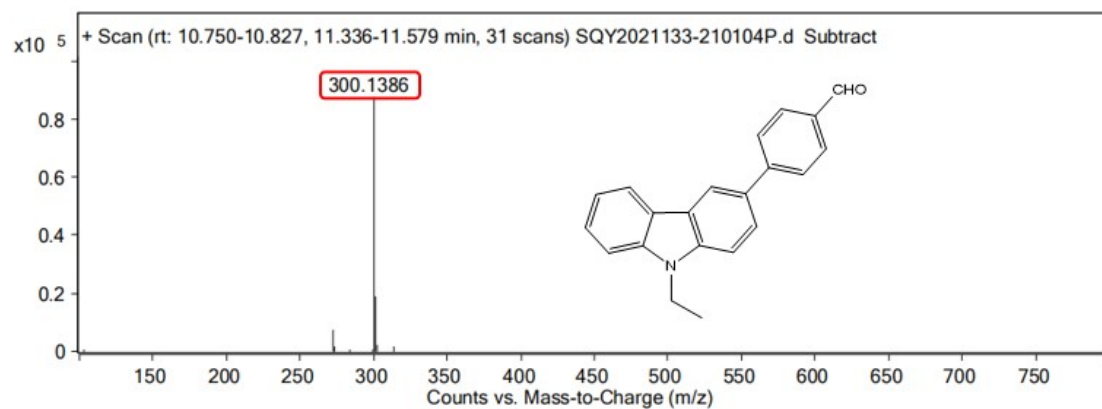


Fig. S5 HR-MS of compound **4**.

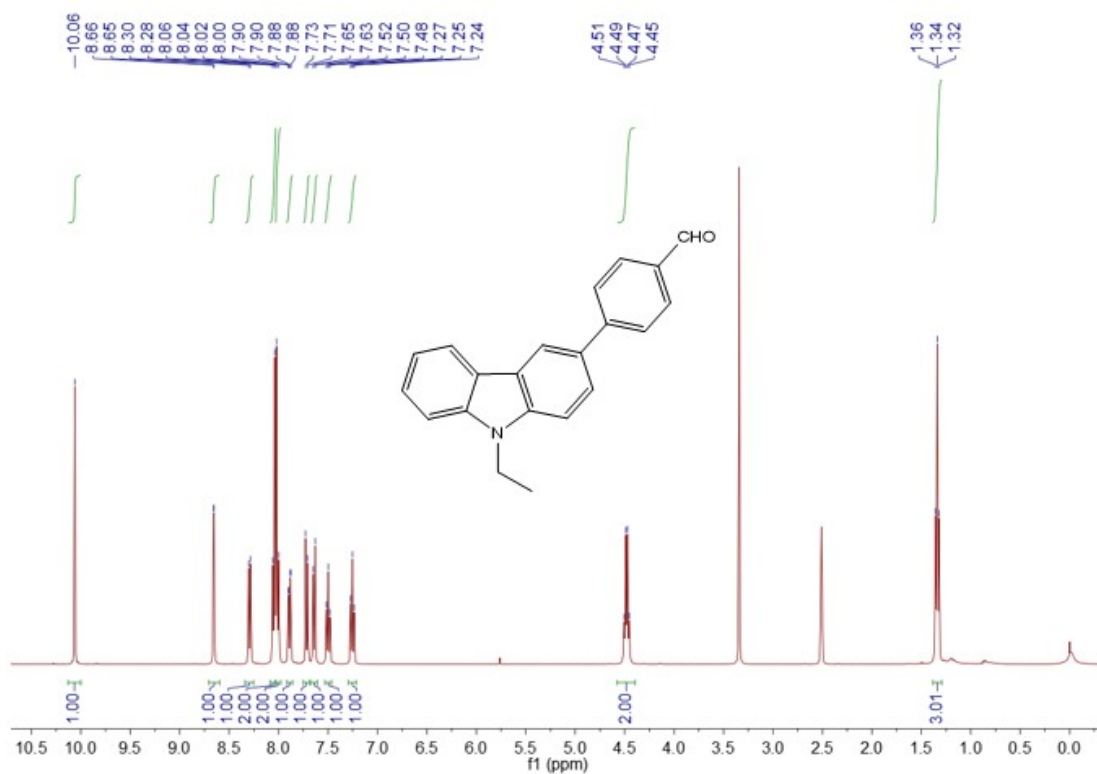


Fig. S6 ^1H NMR of compound **4** ($\text{DMSO-}d_6$, 400 MHz).

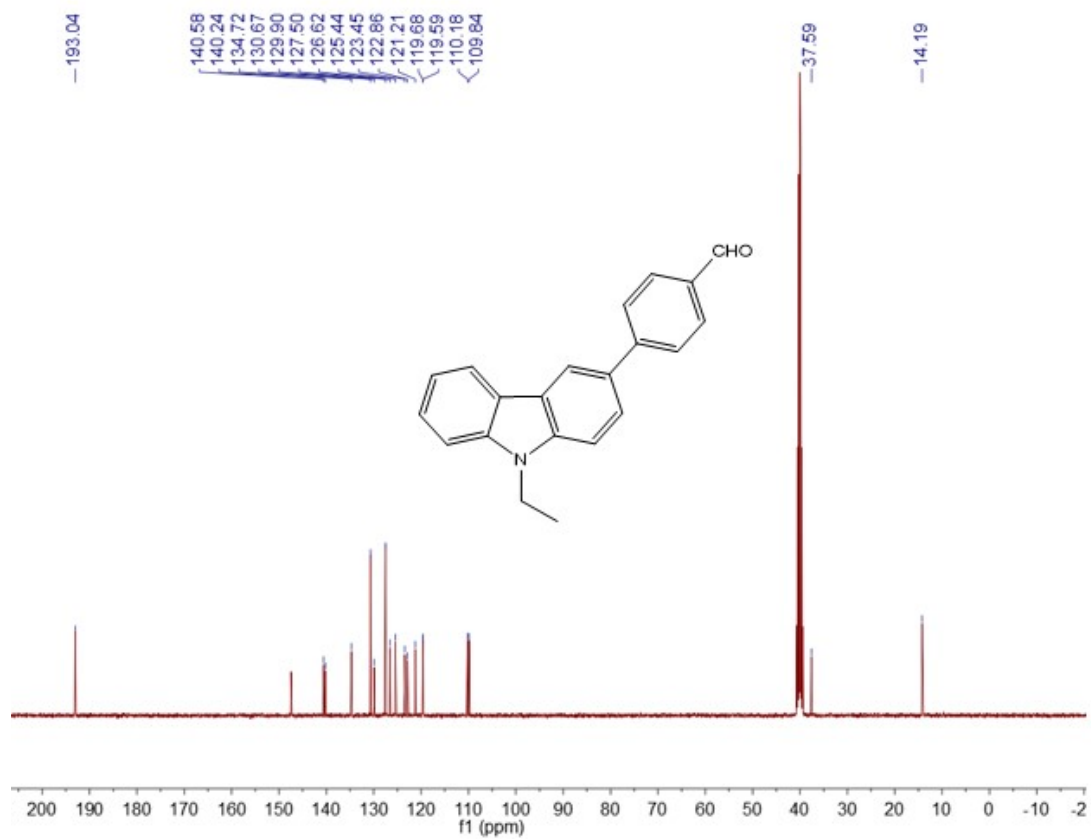


Fig. S7 ^{13}C NMR of compound 4 (DMSO- d_6 , 101 MHz).

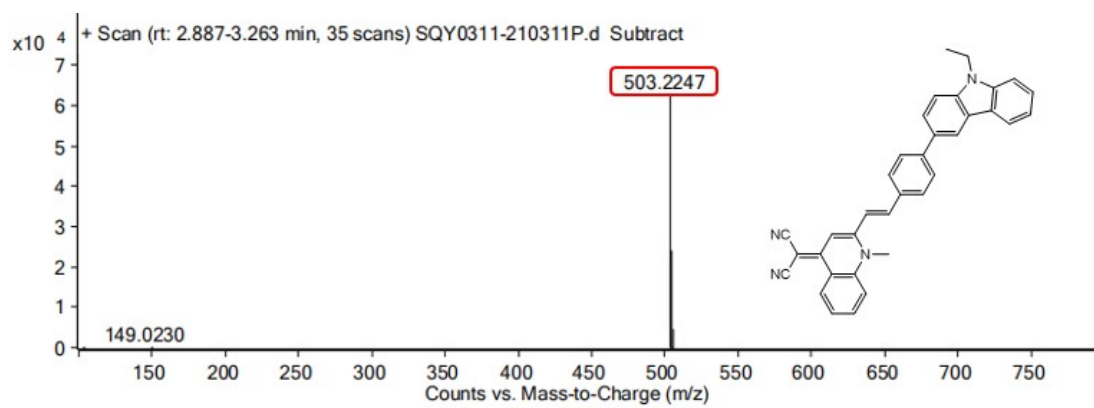


Fig. S8 HR-MS of QM-C2.

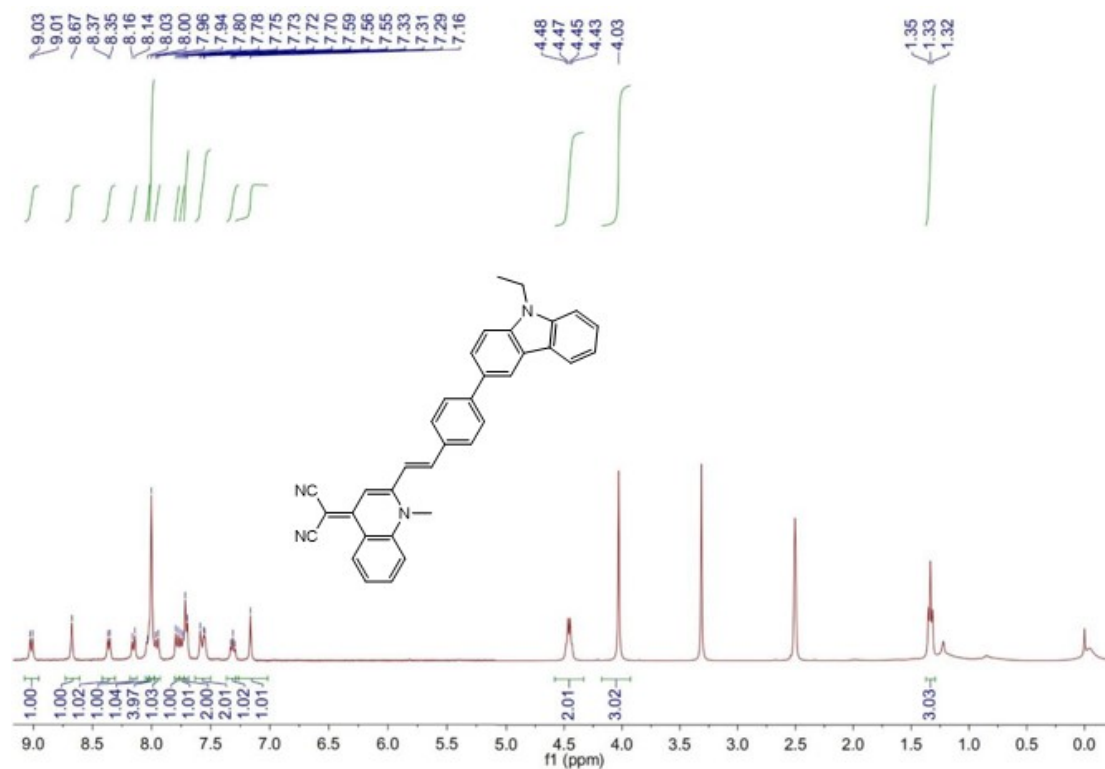


Fig. S9 ¹H NMR of QM-C2. (DMSO-*d*₆, 400 MHz).

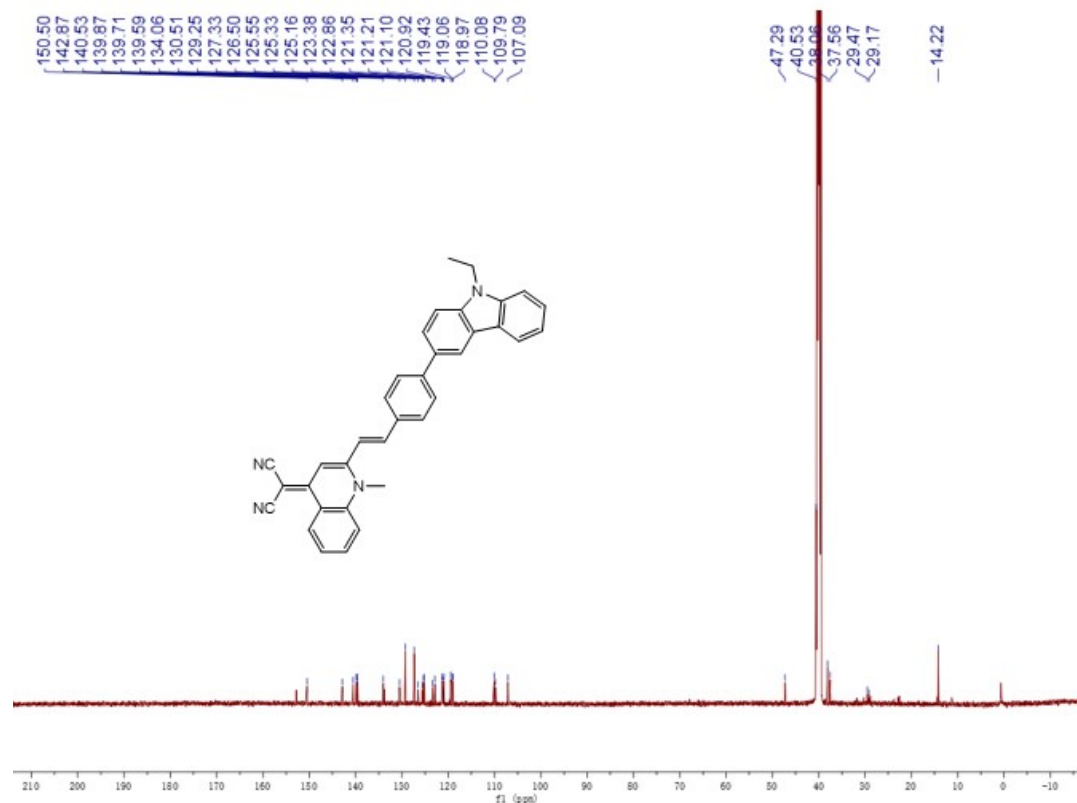


Fig. S10 ¹³C NMR of QM-C2. (DMSO-*d*₆, 101 MHz).