Supporting Information

$AgNO_3$-catalyzed direct C-H arylation of quinolines by oxidative decarboxylation of aromatic carboxylic acids

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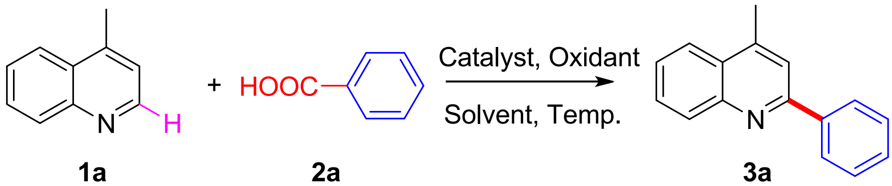
Contents

1. Screening the reaction condition



1a **2a** **3a**

Table S1 Screening the different oxidants[a]

Entry	Oxidant (0.3 eq)	Yields (%)[b]
1	$K_2S_2O_8$	46
2	$(NH_4)_2S_2O_8$	32
3	TBHP	0
4	DTBP	0
5	H_2O_2	0

[a] Reaction conditions: 4-methyl quinoline **1a** (0.3 mmol, 44.9 mg), benzoic acid **2a** (0.6 mmol, 73.2 mg), $AgNO_3$ (0.1 eq, 16.9 mg) as a catalyst, oxidant (0.3 eq), TFA (0.3 mmol, 34.2 mg) and solvent (3.0 mL), at 90 °C for 20 min.
[b] Isolated yield.

Table S2 Screening the amount of the oxidant[a]

Entry	The amount of Oxidant $K_2S_2O_8$	Yields (%)[b]
1	1.0	<5
2	2.0	20
3	3.0	46
4	4.0	18

[a] Reaction conditions: 4-methyl quinoline **1a** (0.3 mmol, 44.9 mg), benzoic acid **2a** (0.6 mmol, 73.2 mg), $AgNO_3$ (0.1 eq, 16.9 mg) as a catalyst, $K_2S_2O_8$ for an oxidant, TFA (0.3 mmol, 34.2 mg) and solvent (3.0 mL), at 90 ^oC for 20 min.

[b] Isolated yield.

Table S3 Screening the molar ratio of the reaction substrates[a]

Entry	The molar ratio of **1a** and **2a**	Yields (%)[b]
1	2:1	26
2	1:1	30
3	1:2	46
4	1:3	32

[a] Reaction conditions: 4-methyl quinoline **1a** (0.3 mmol, 44.9 mg), benzoic acid **2a** (0.6 mmol, 73.2 mg), $AgNO_3$ (0.1 eq, 16.9 mg) as a catalyst, $K_2S_2O_8$ for an oxidant, TFA (0.3 mmol, 34.2 mg) and solvent (3.0 mL), at 90 ^oC for 20 min.

[b] Isolated yield.

2. NMR spectra of products

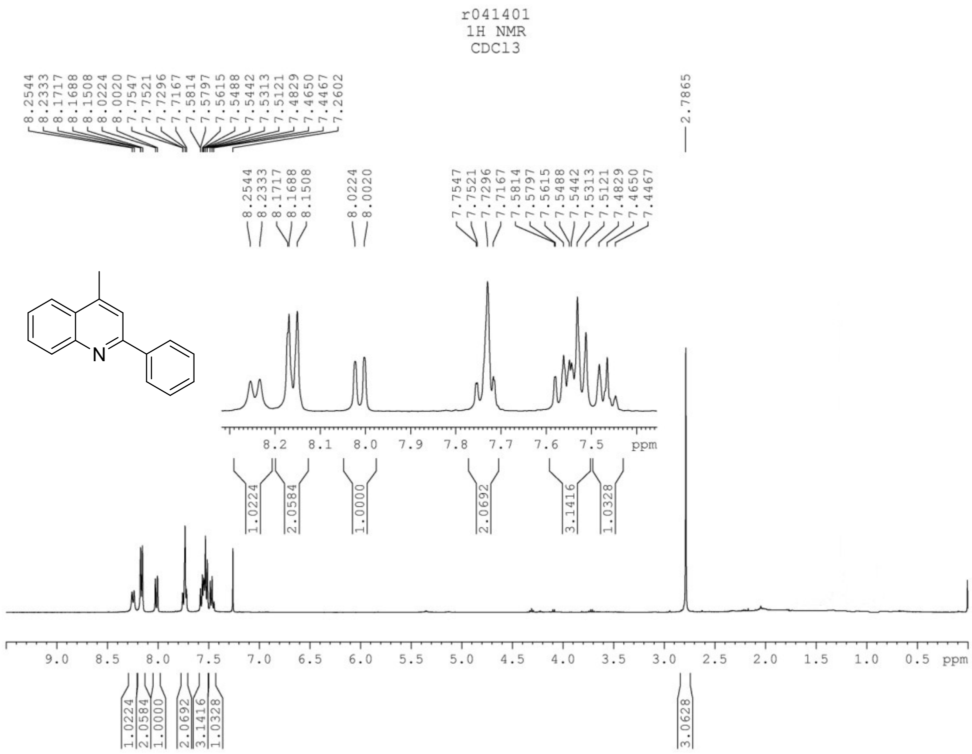


Fig. 1 ^{1}H NMR spectrum of 3a

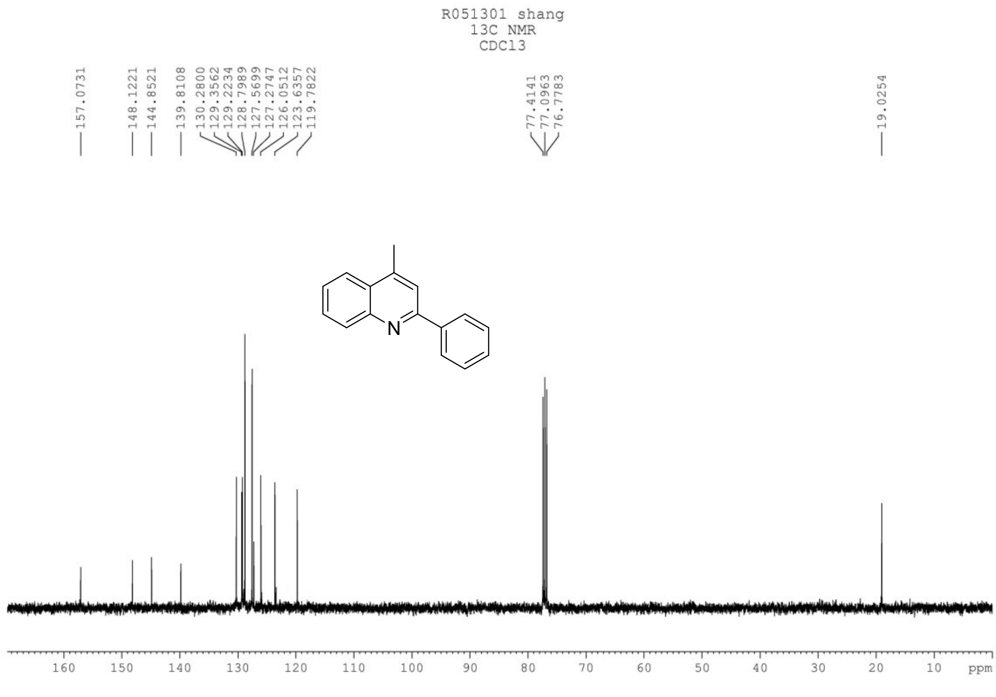


Fig. 2 ^{13}C NMR spectrum of 3a

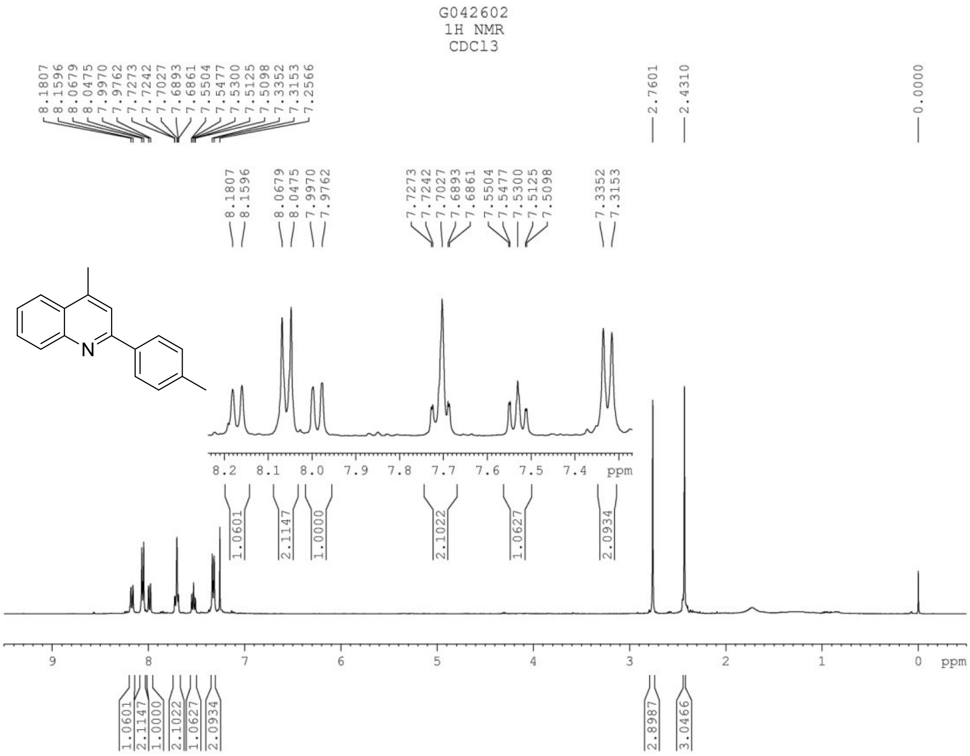


Fig. 3 ^{1}H NMR spectrum of 3b

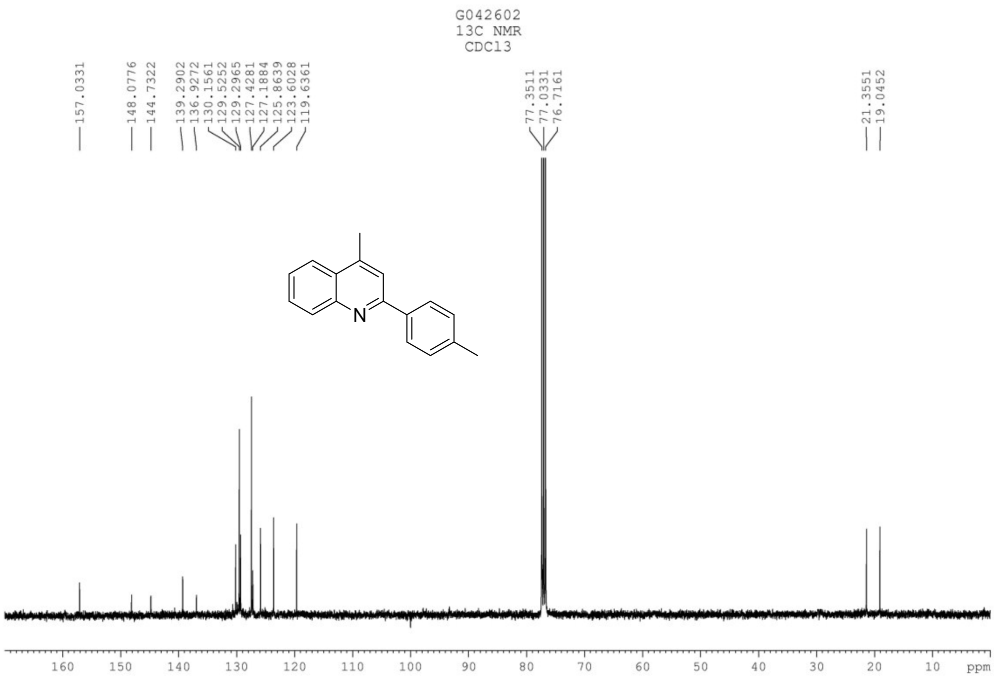


Fig. 4 ^{13}C NMR spectrum of 3b

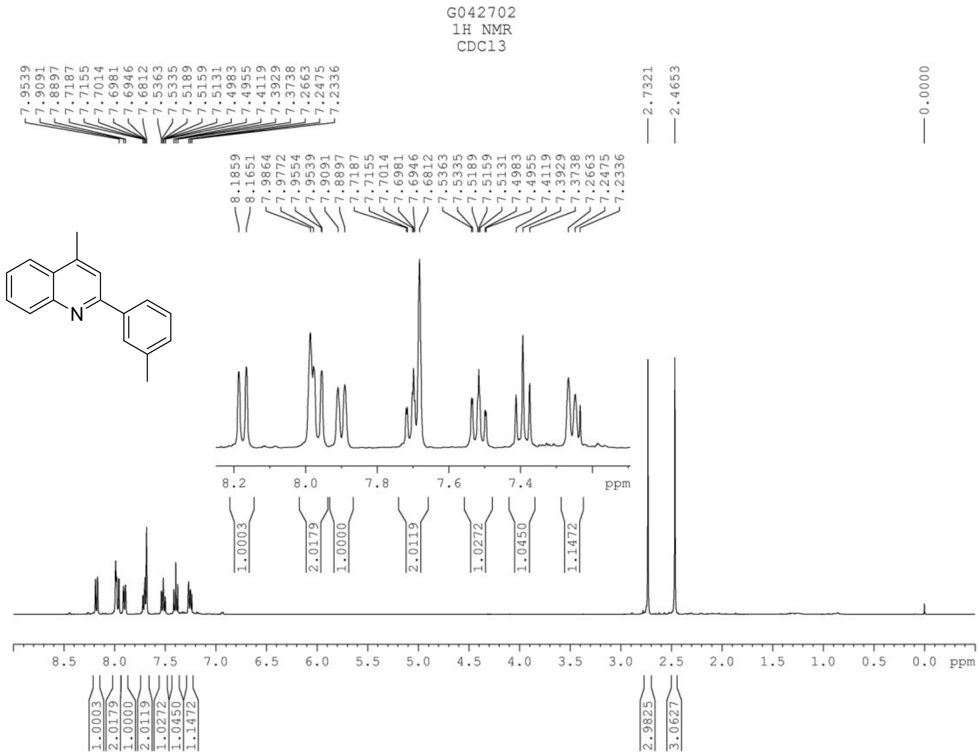


Fig. 5 ^{1}H NMR spectrum of 3c

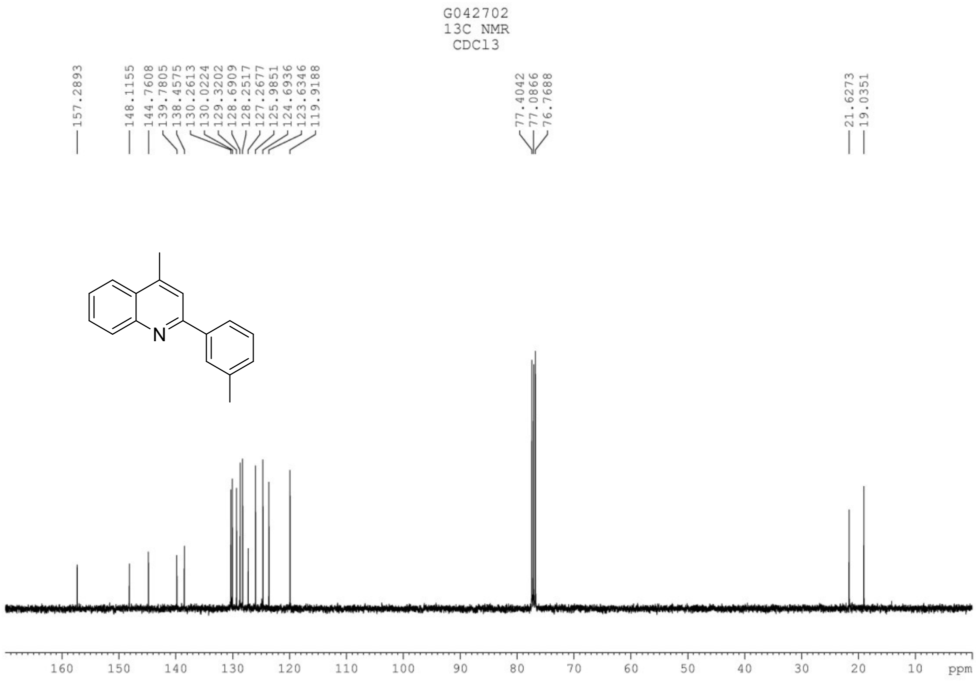


Fig. 6 ^{13}C NMR spectrum of 3c

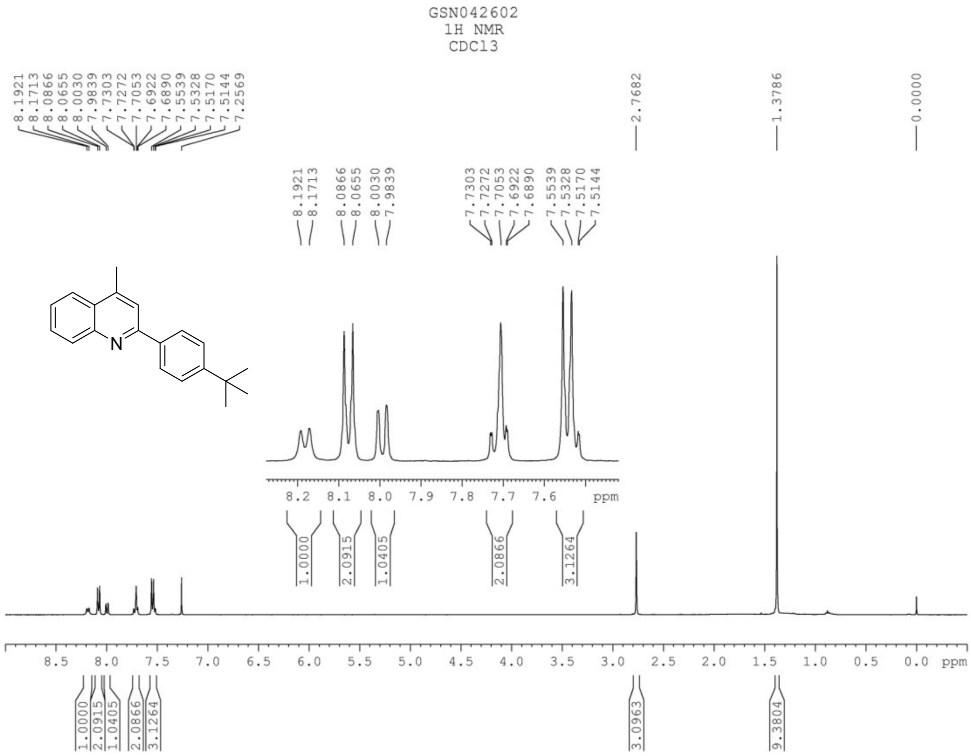


Fig. 7 ^{1}H NMR spectrum of 3d

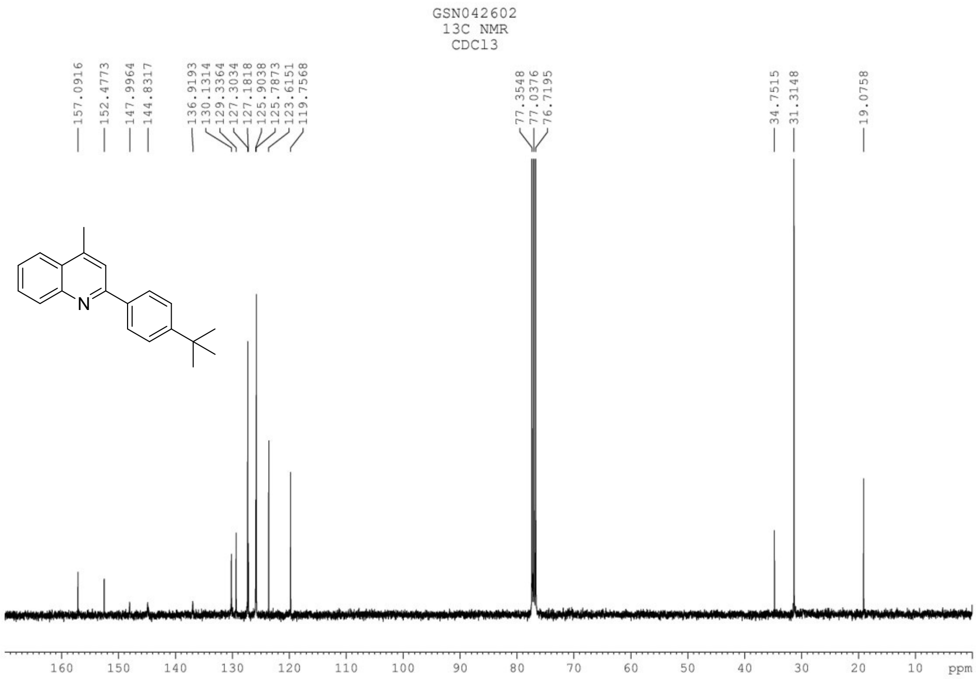


Fig. 8 ^{13}C NMR spectrum of 3d

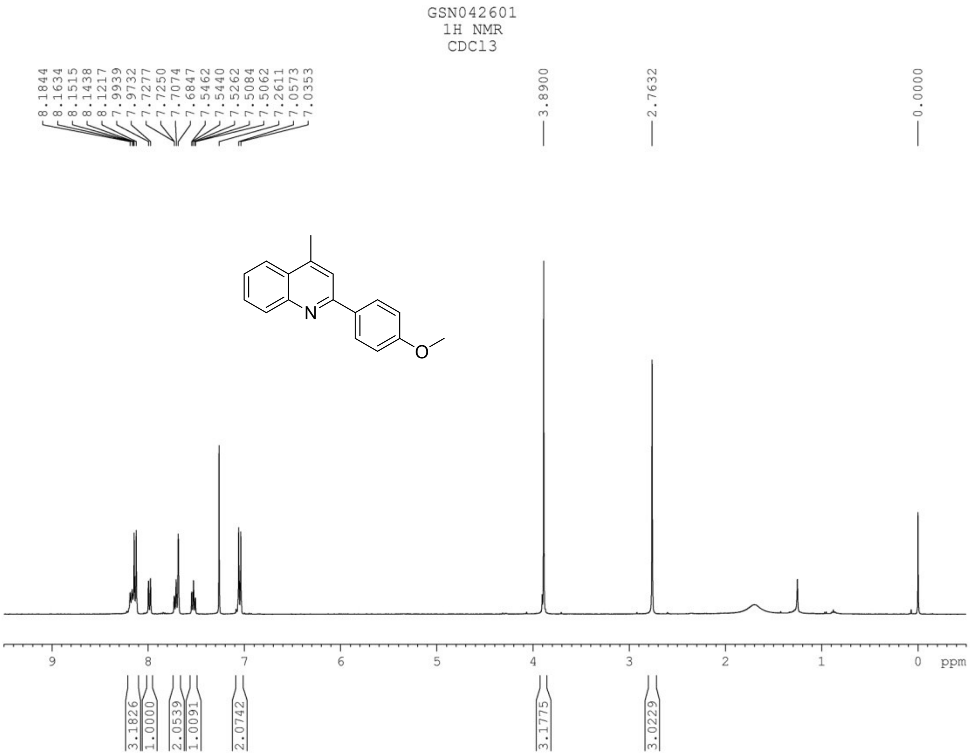


Fig. 9 ^{1}H NMR spectrum of 3e

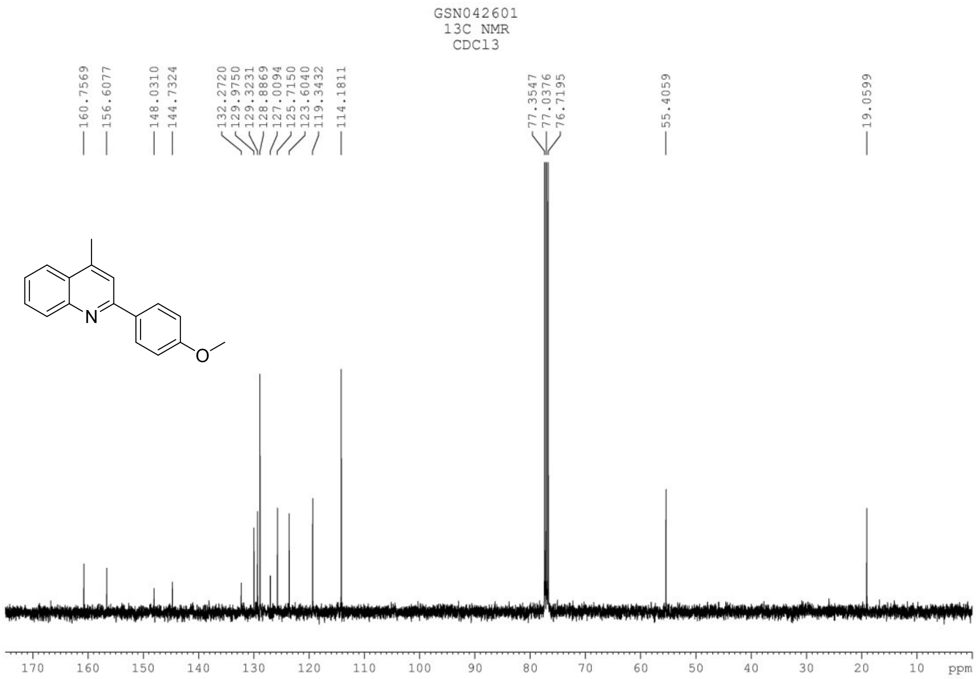


Fig. 10 ^{13}C NMR spectrum of 3e

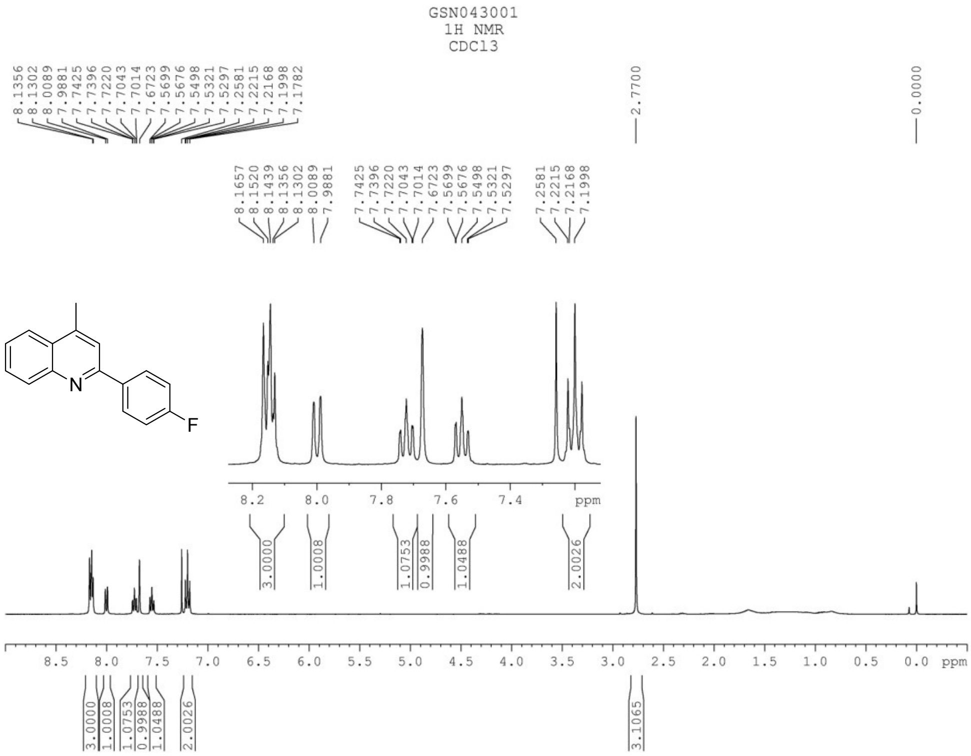


Fig. 11 ^{1}H NMR spectrum of 3f

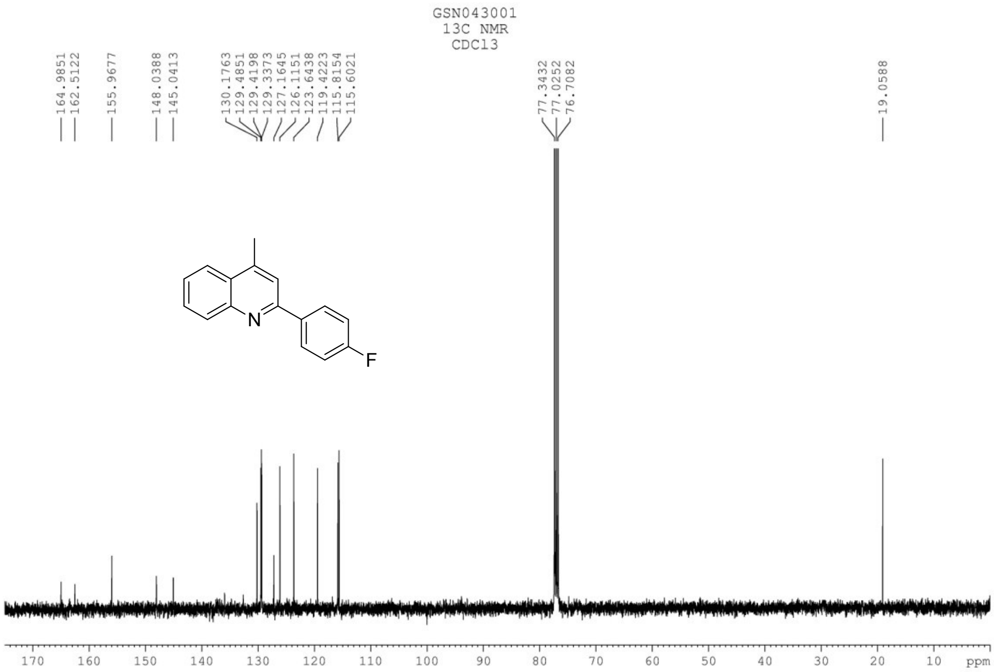


Fig. 12 ^{13}C NMR spectrum of 3f

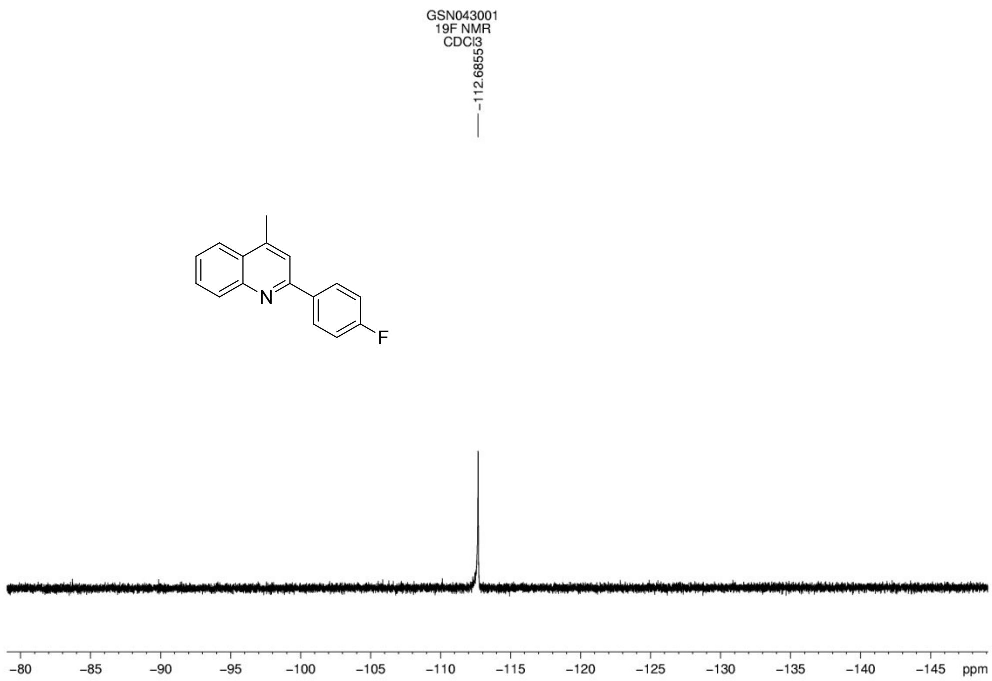


Fig. 13 ^{19}F NMR spectrum of 3f

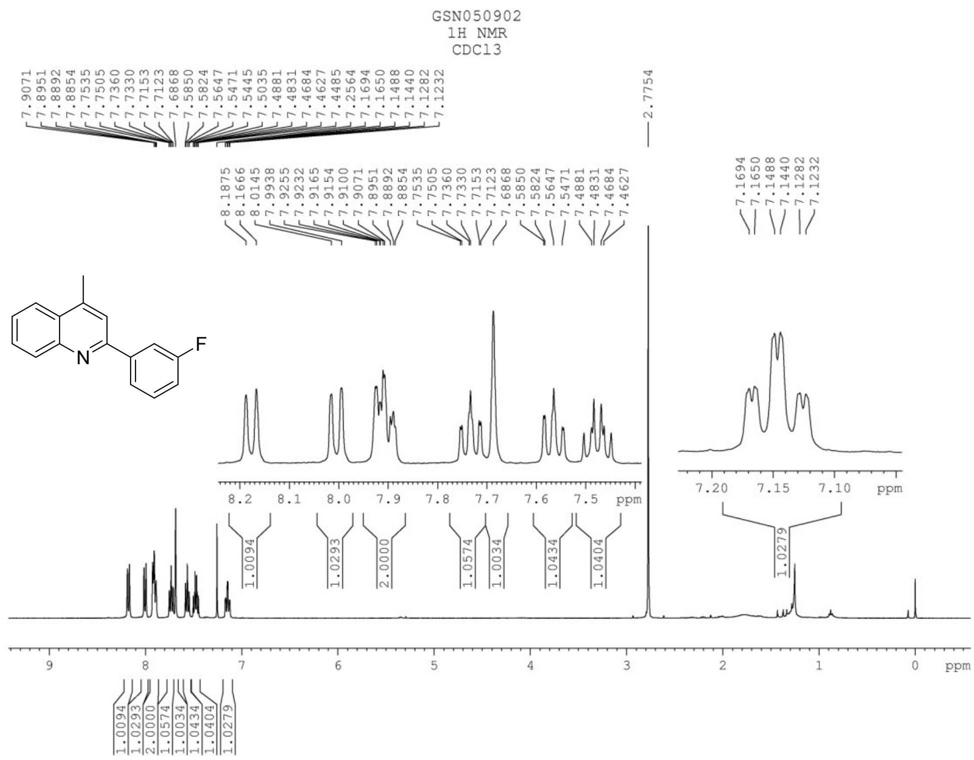


Fig. 14 ^{1}H NMR spectrum of 3g

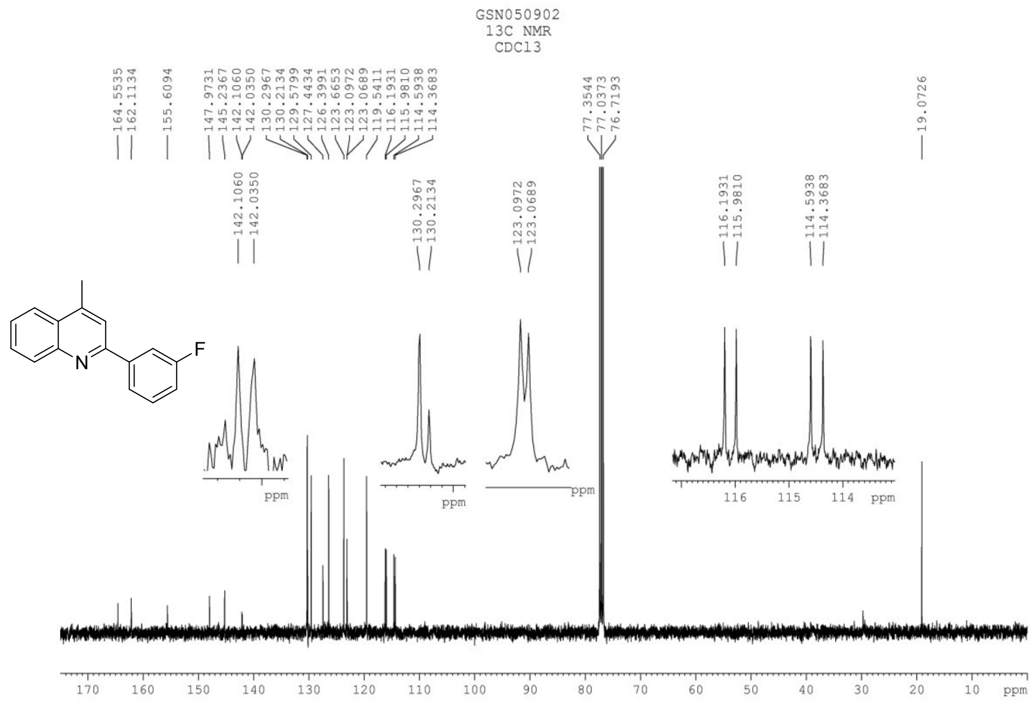


Fig. 15 ^{13}C NMR spectrum of 3g

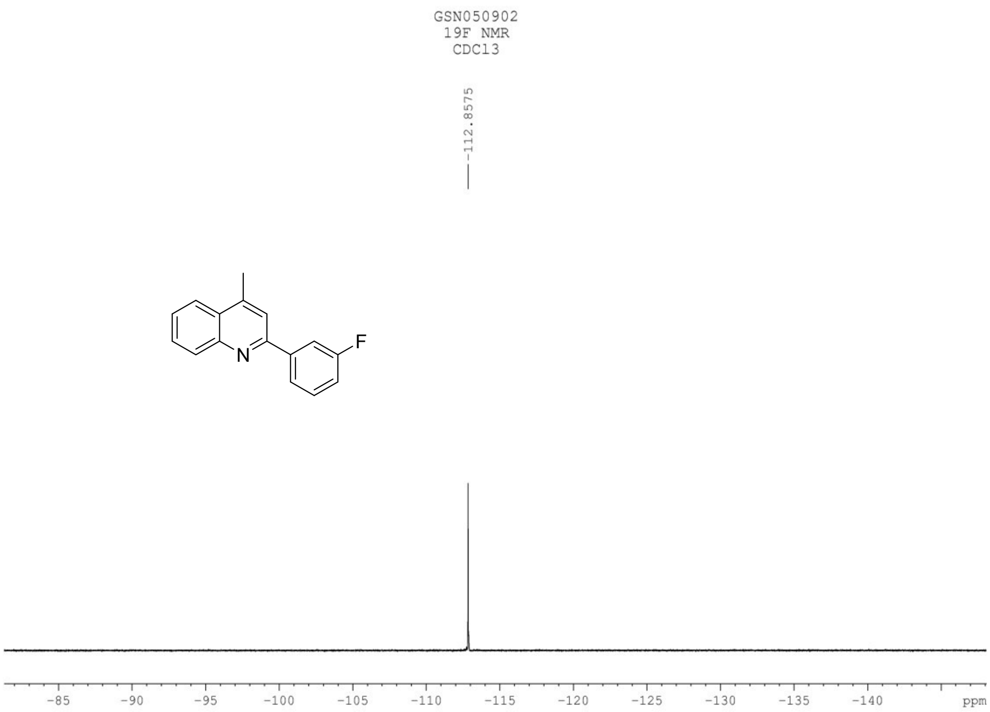


Fig. 16 ^{19}F NMR spectrum of 3g

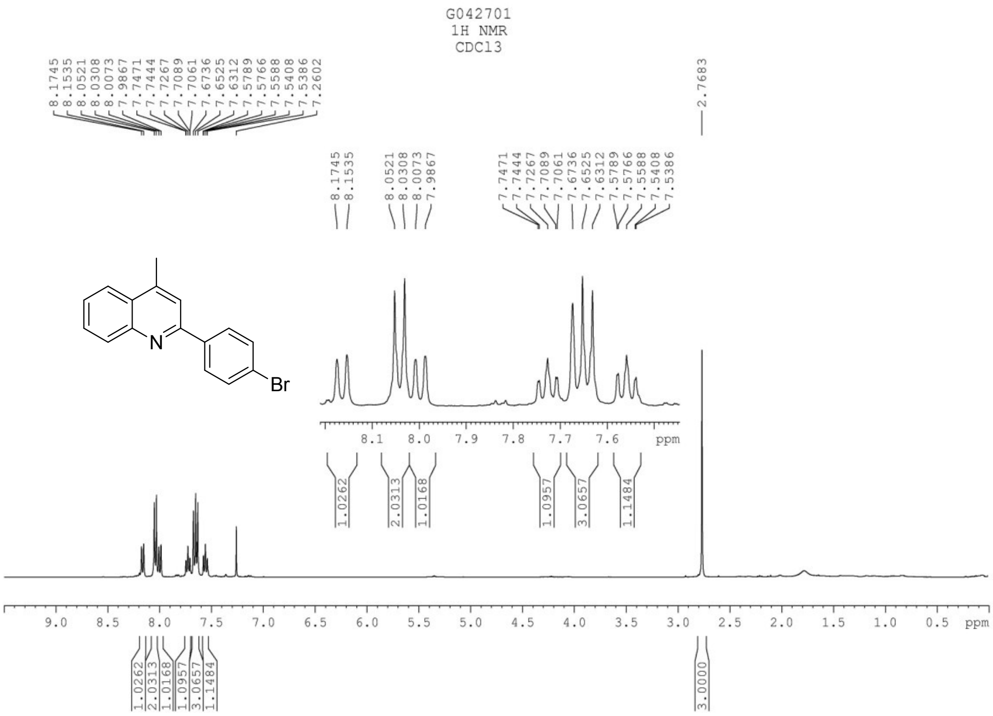


Fig. 17 ^{1}H NMR spectrum of 3h

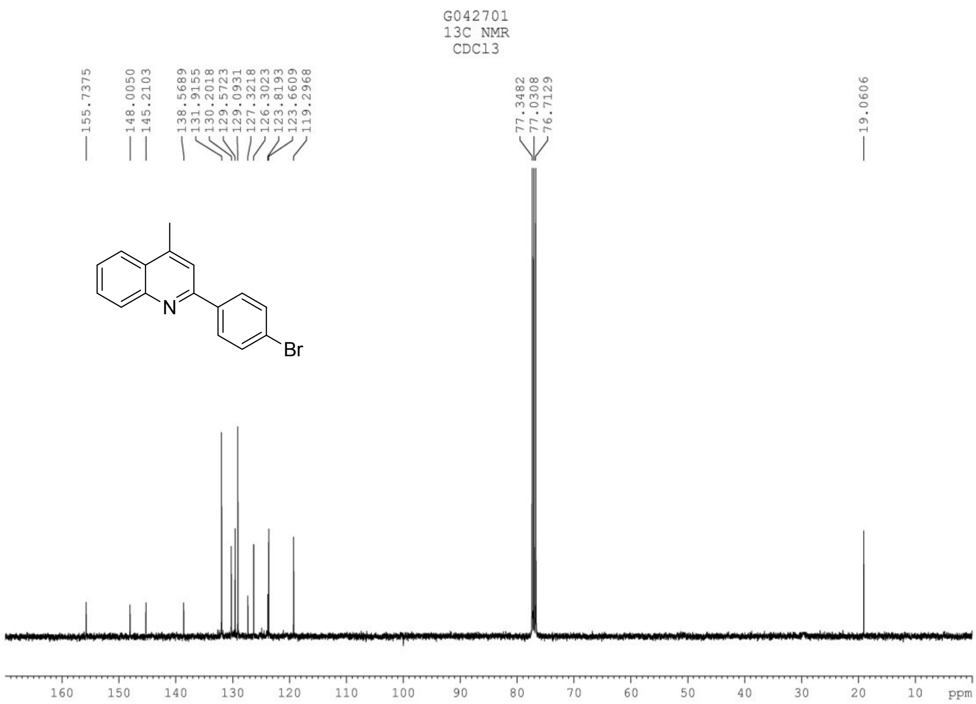


Fig. 18 ^{13}C NMR spectrum of 3h

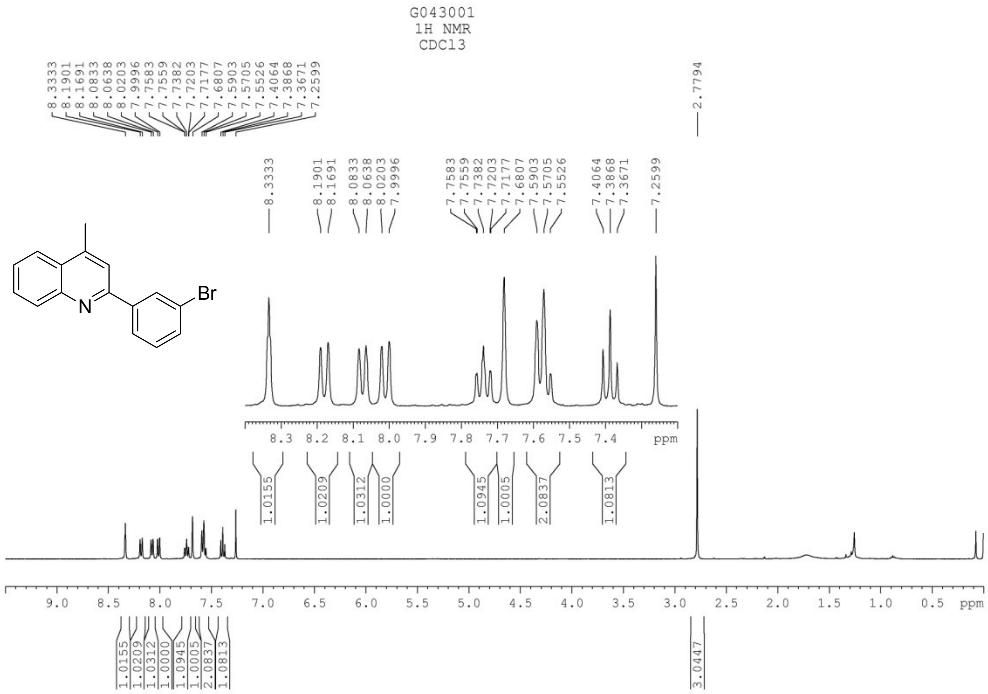


Fig. 19 ^{1}H NMR spectrum of 3i

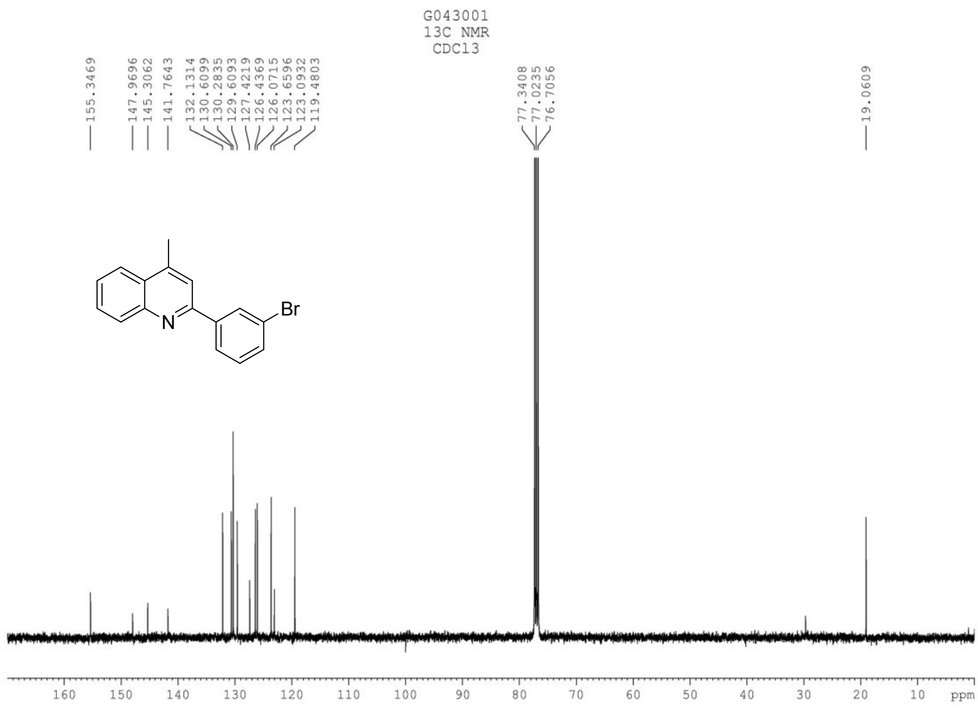


Fig. 20 ^{13}C NMR spectrum of 3i

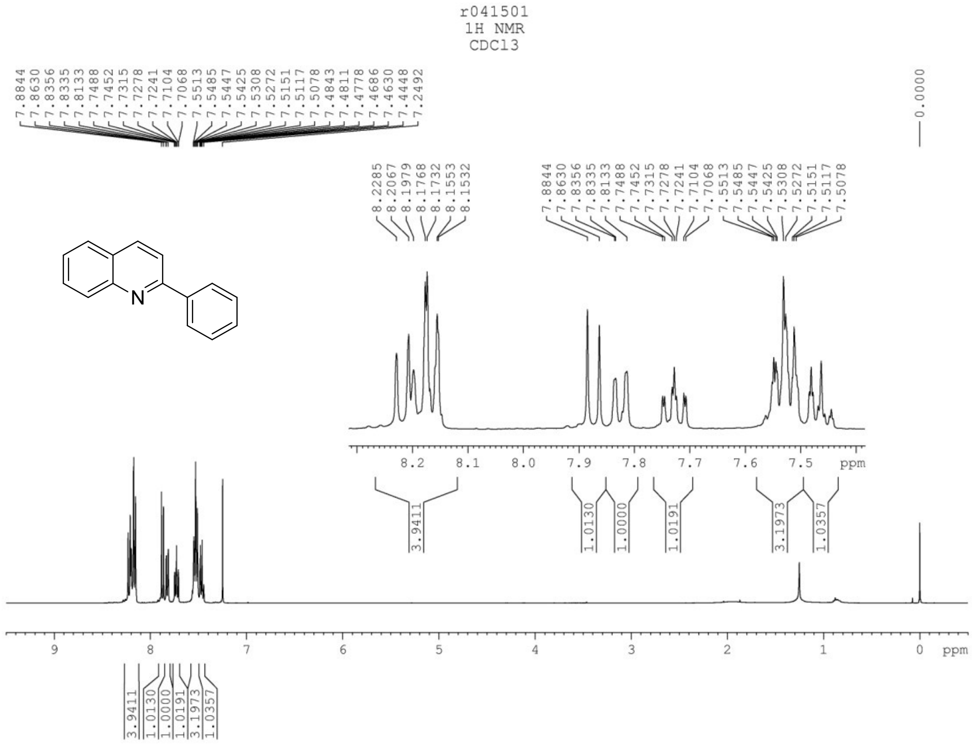


Fig. 21 ^{1}H NMR spectrum of 3j

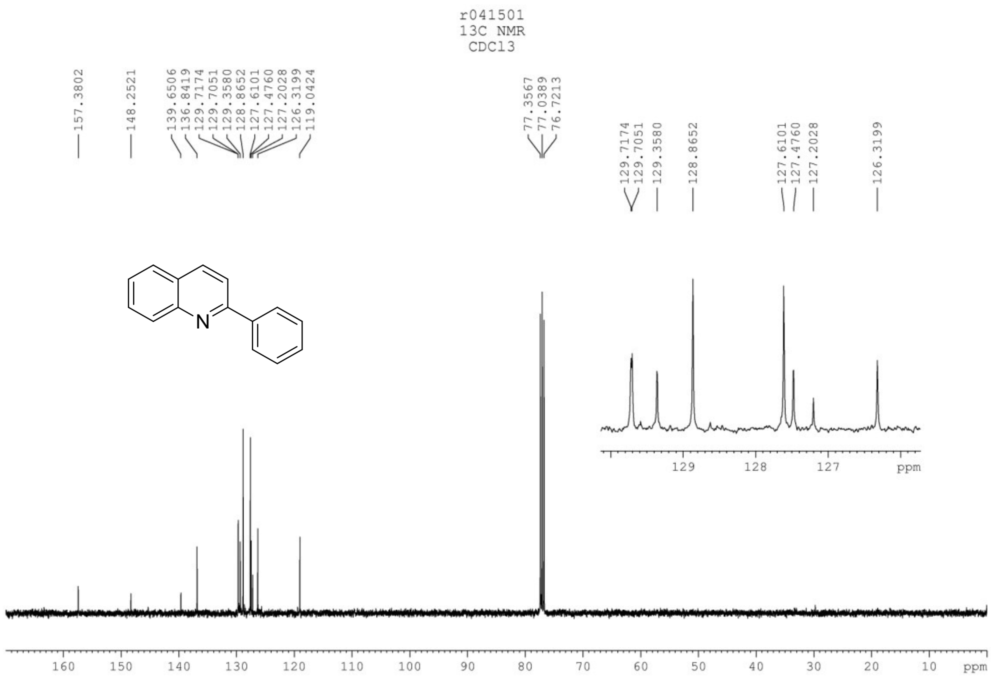


Fig. 22^{13}C NMR spectrum of 3j

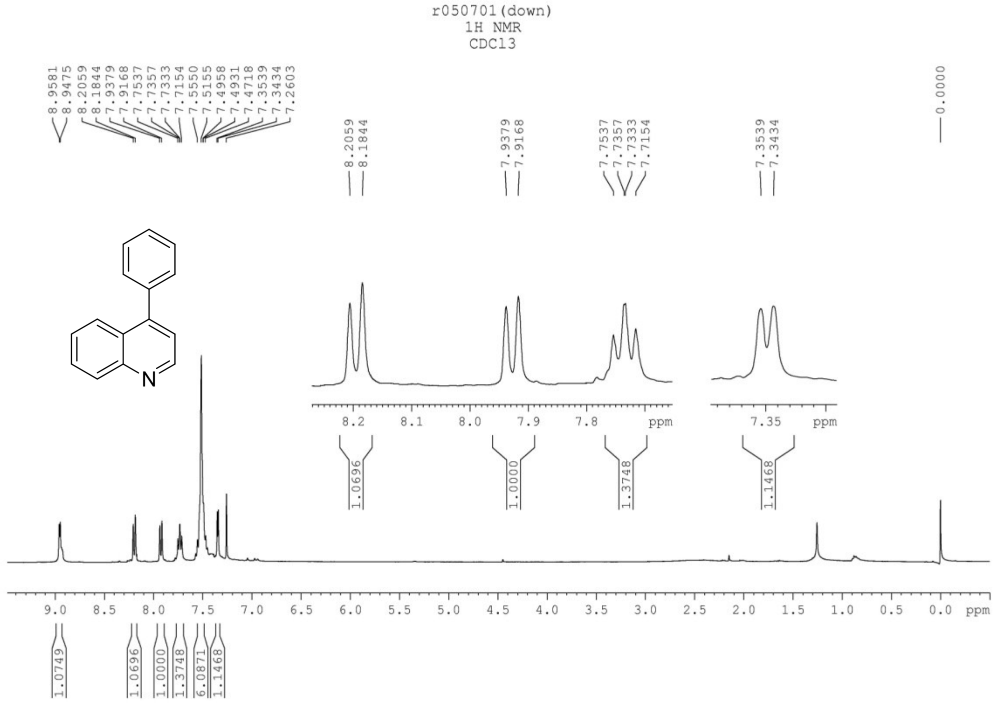


Fig. 23 ^{1}H NMR spectrum of 3j'

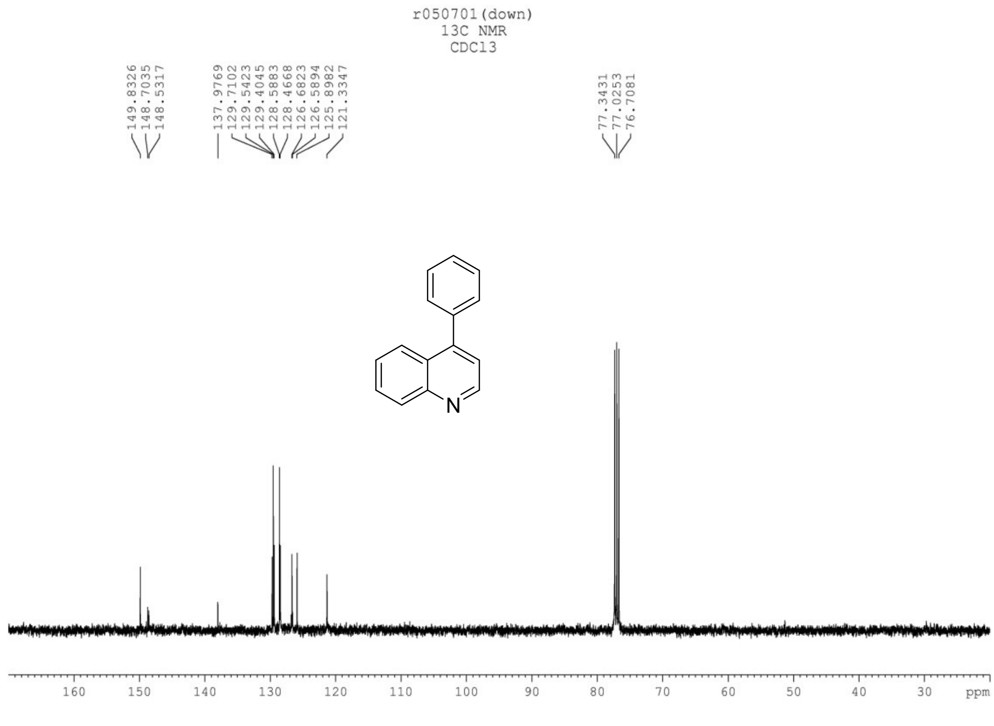


Fig. 24 ^{13}C NMR spectrum of 3j'

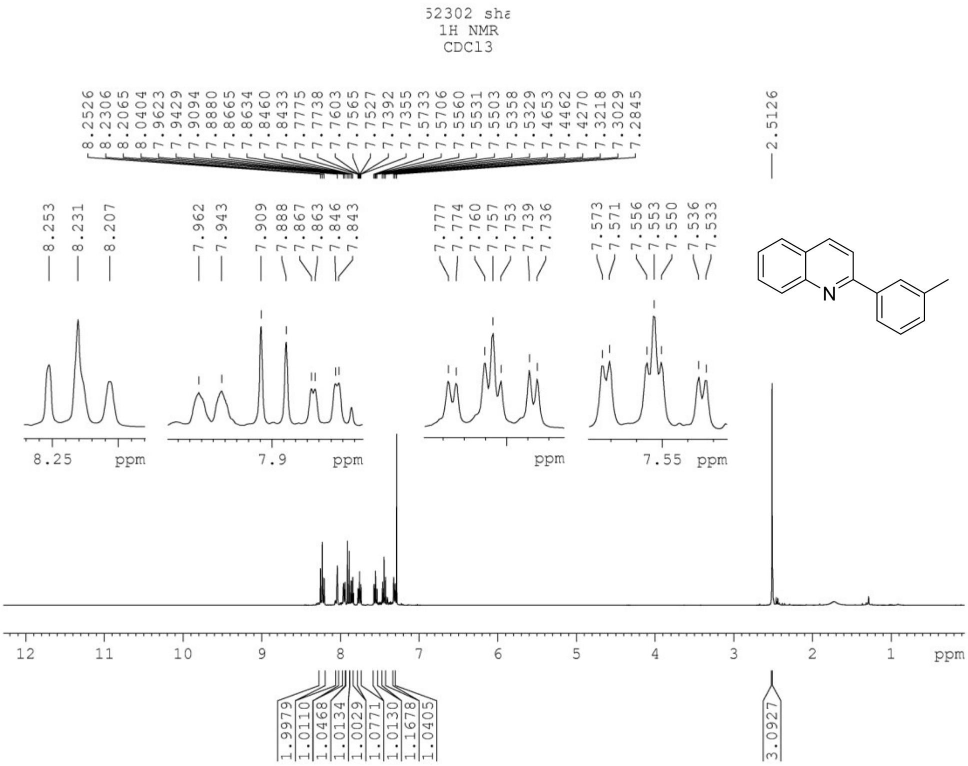


Fig. 25 ^{1}H NMR spectrum of 3k

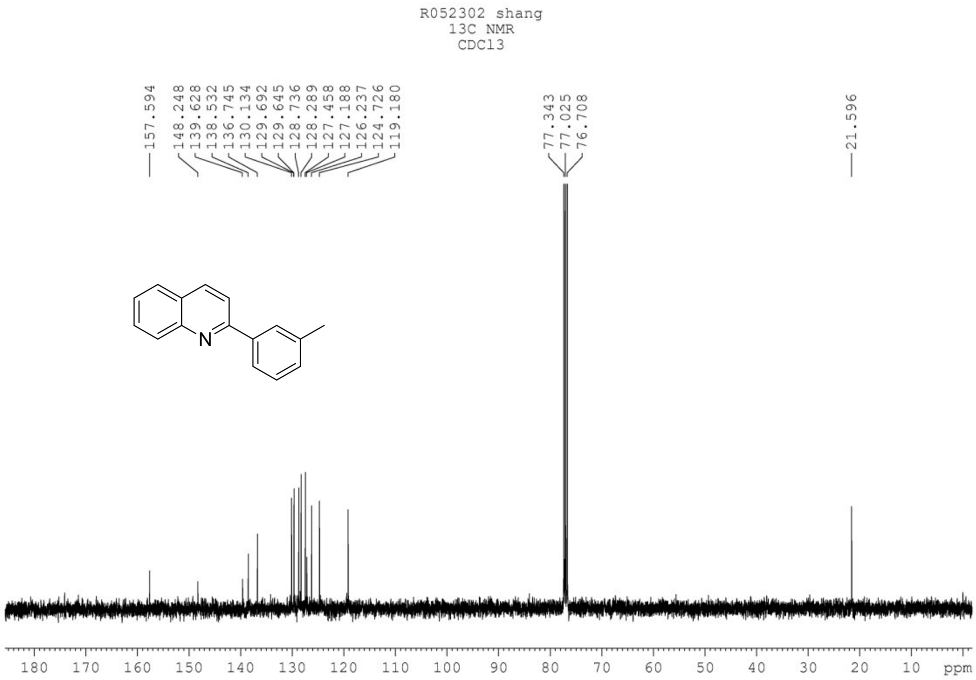


Fig. 26 ^{13}C NMR spectrum of 3k

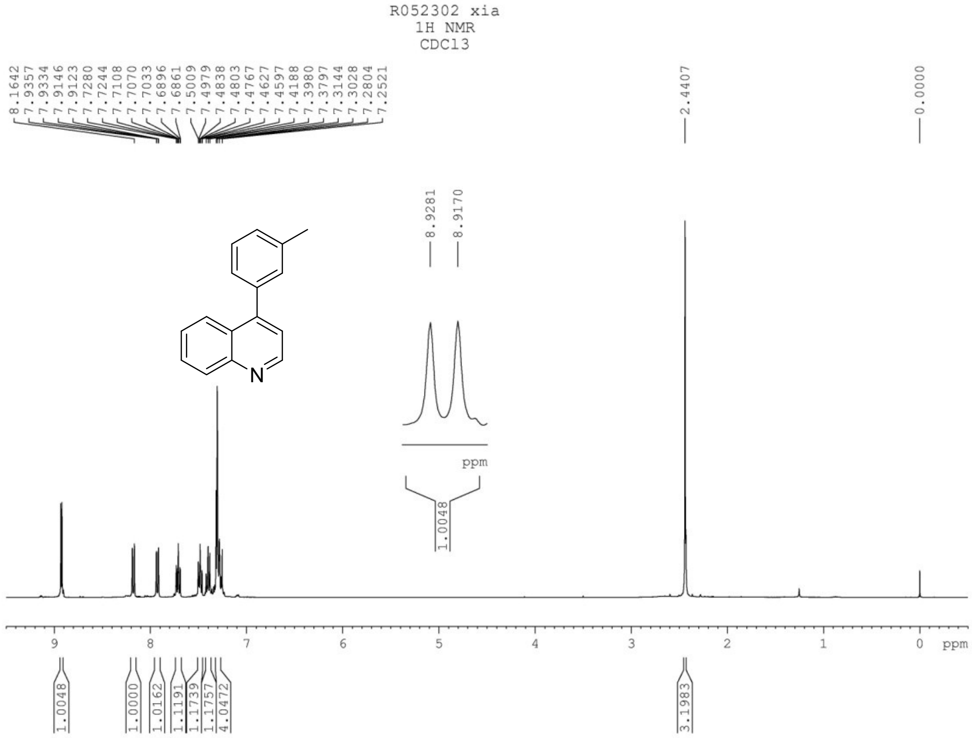


Fig. 27 ^{1}H NMR spectrum of 3k’

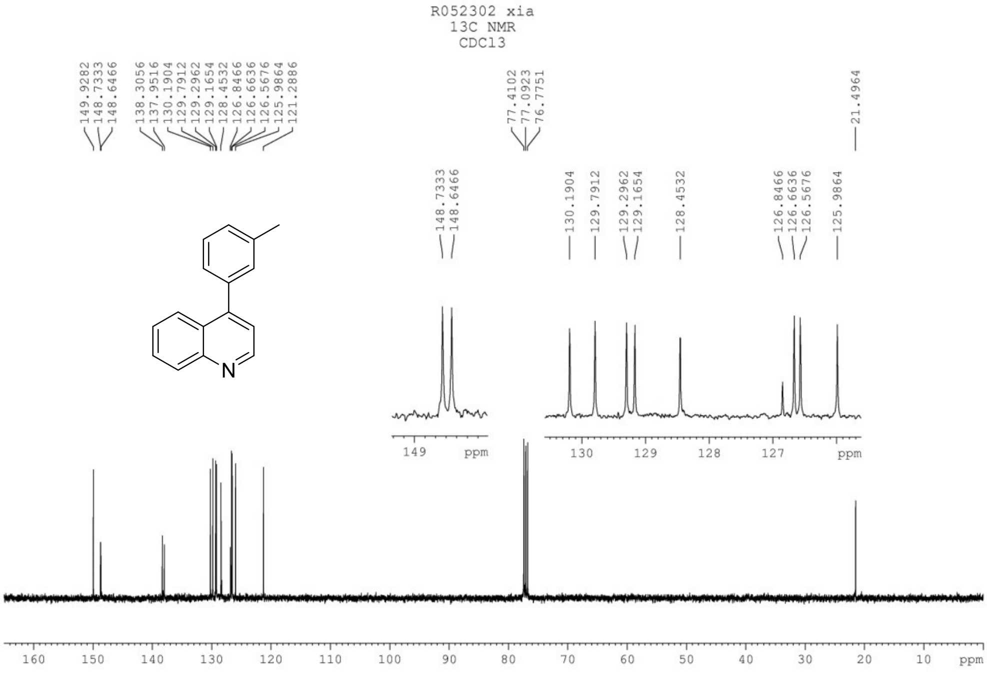


Fig. 28 ^{13}C NMR spectrum of 3k’

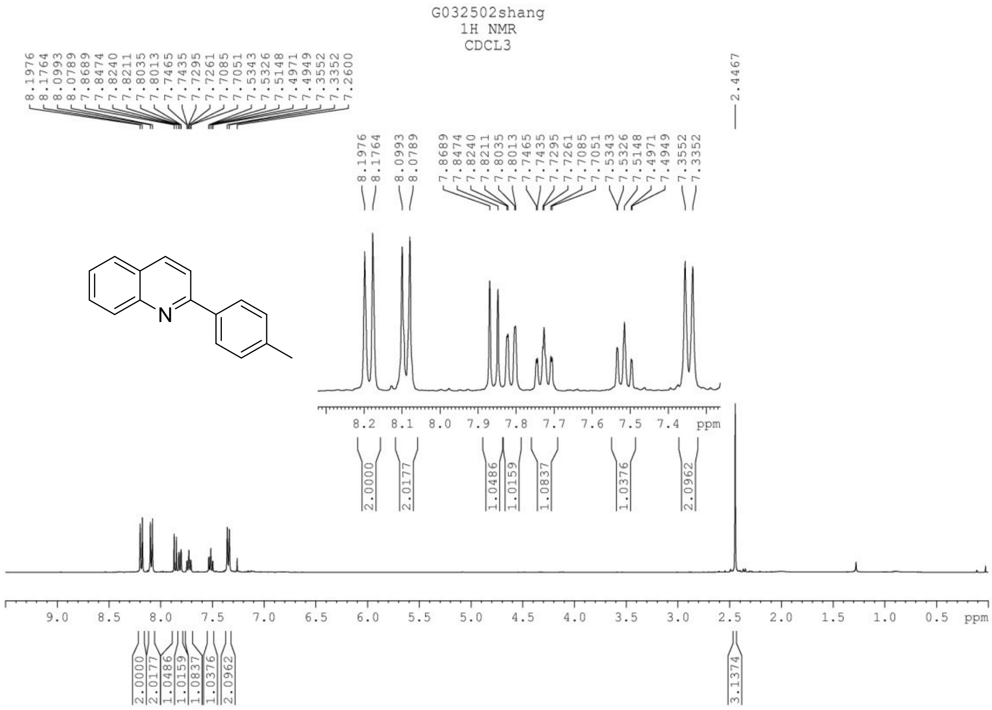


Fig. 29 ^{1}H NMR spectrum of 3l

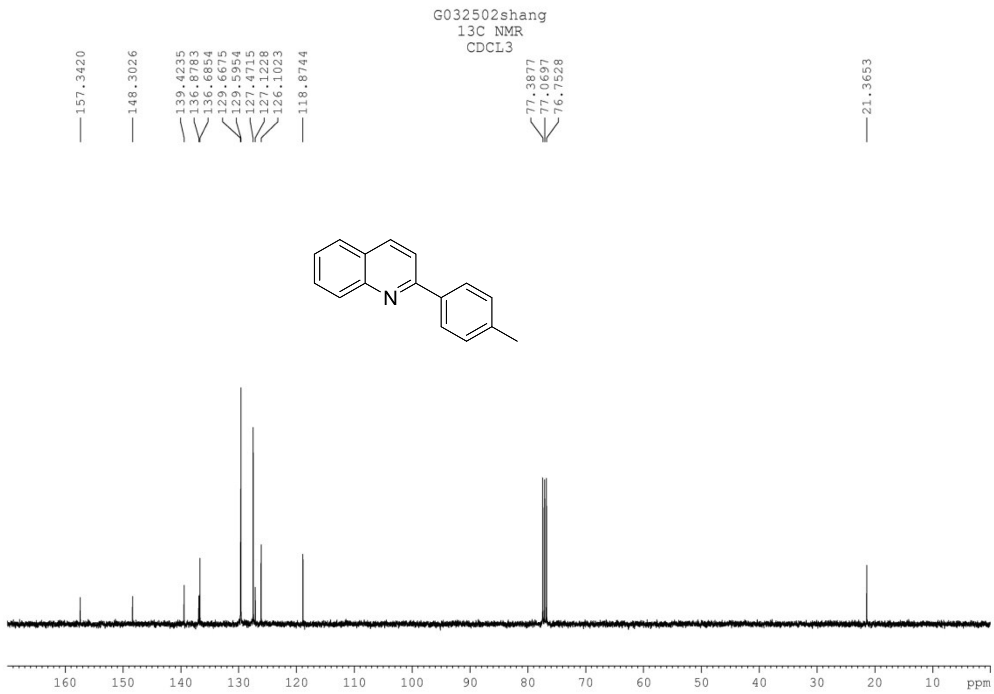


Fig. 30 ^{13}C NMR spectrum of 3l

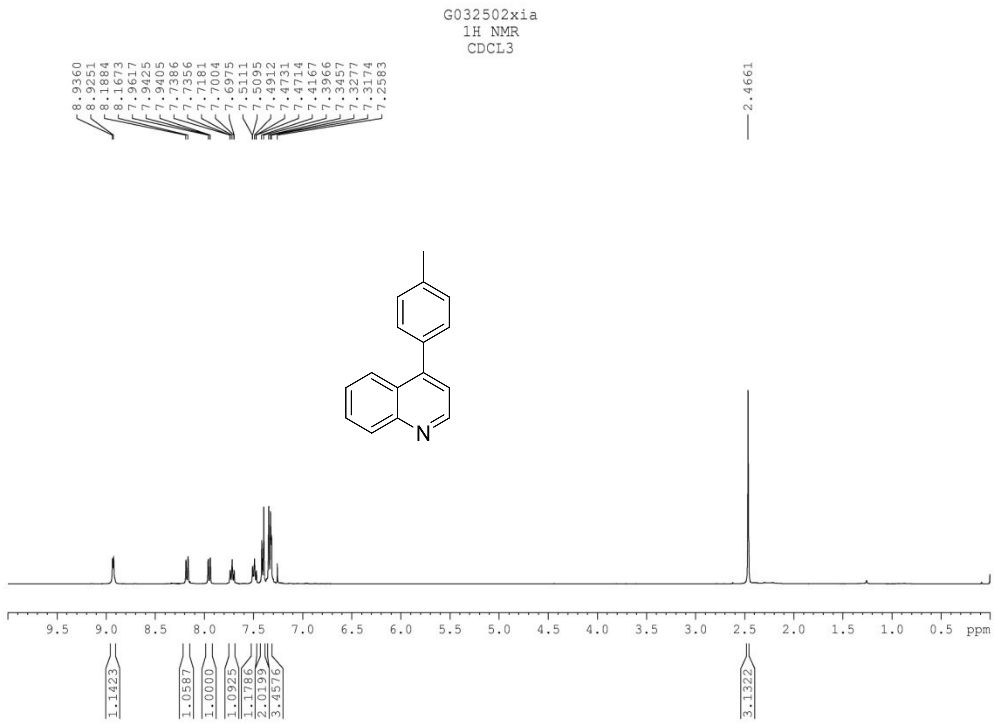


Fig. 31 ^{1}H NMR spectrum of 3l’

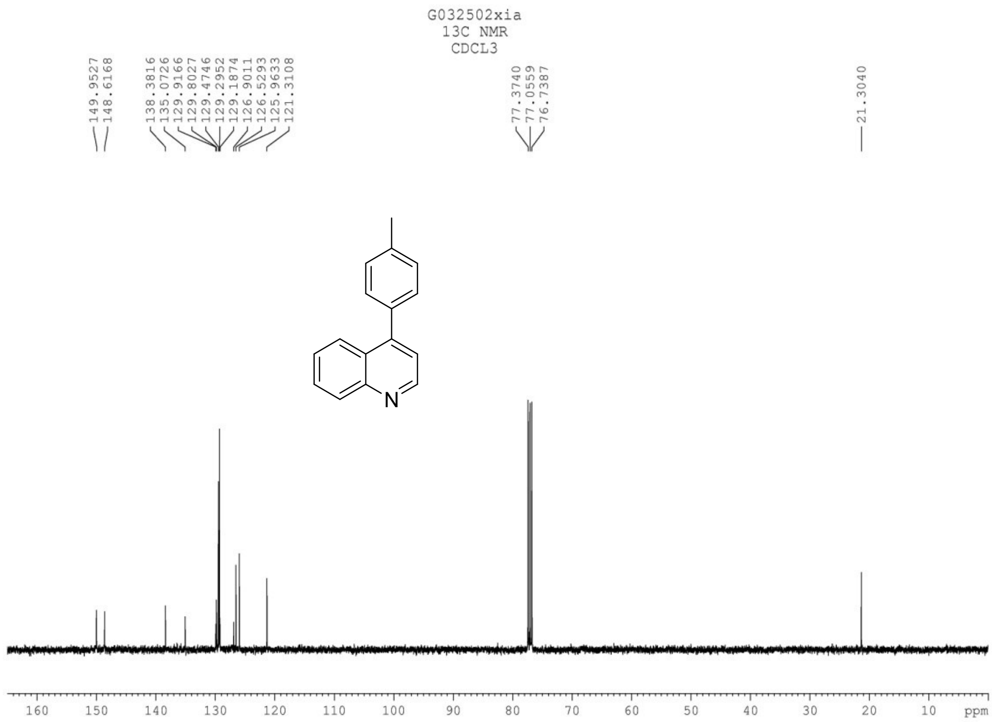


Fig. 32 ^{13}C NMR spectrum of 3l’

Fig. 33 ^{1}H NMR spectrum of 3m

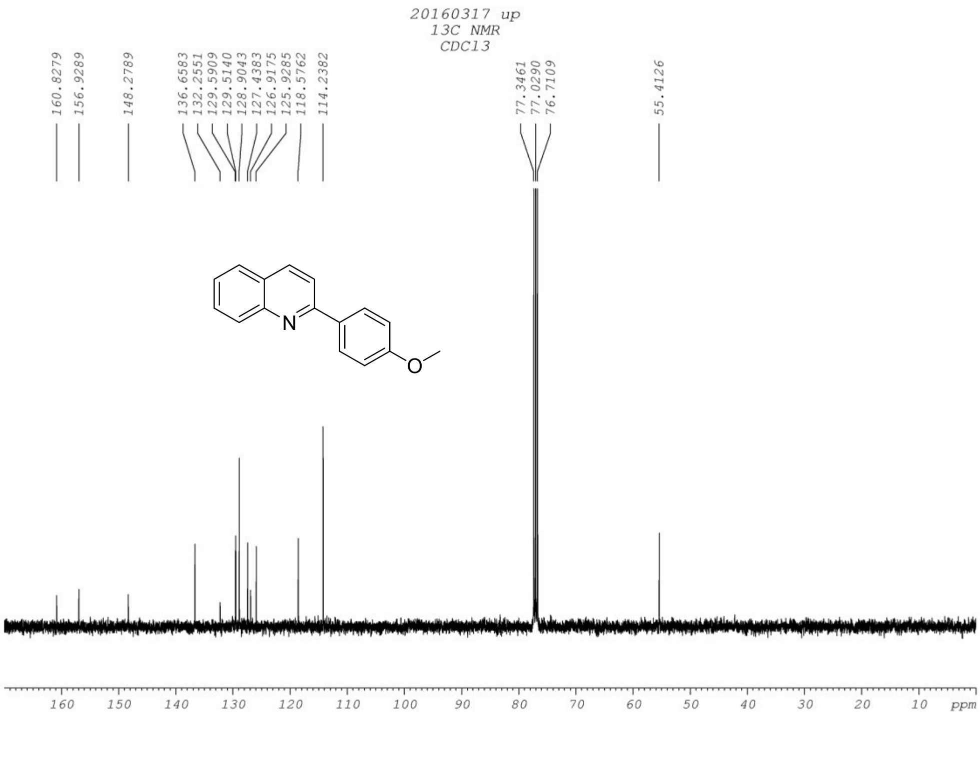


Fig. 34 ^{13}C NMR spectrum of 3m

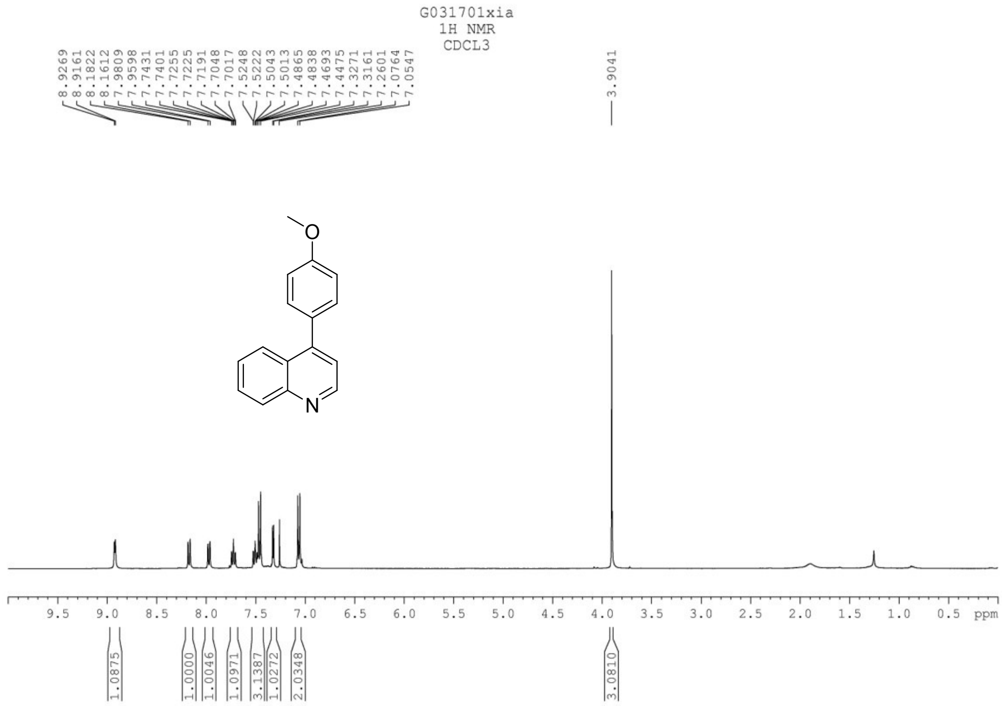


Fig. 35 ^{1}H NMR spectrum of 3m'

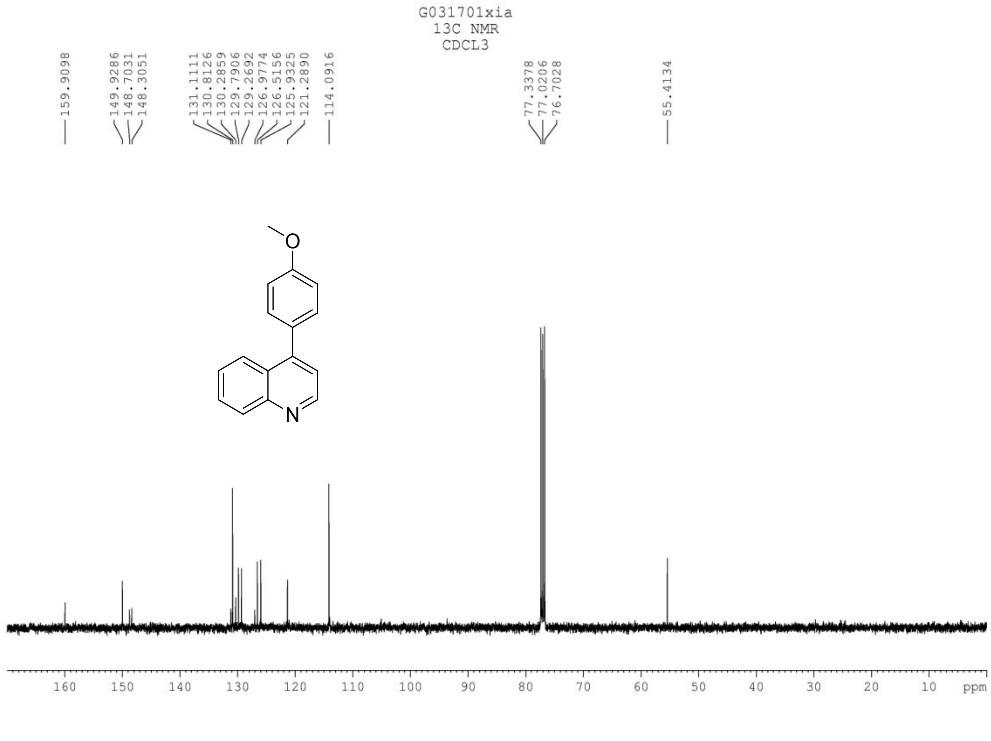


Fig. 36 ^{13}C NMR spectrum of 3m'

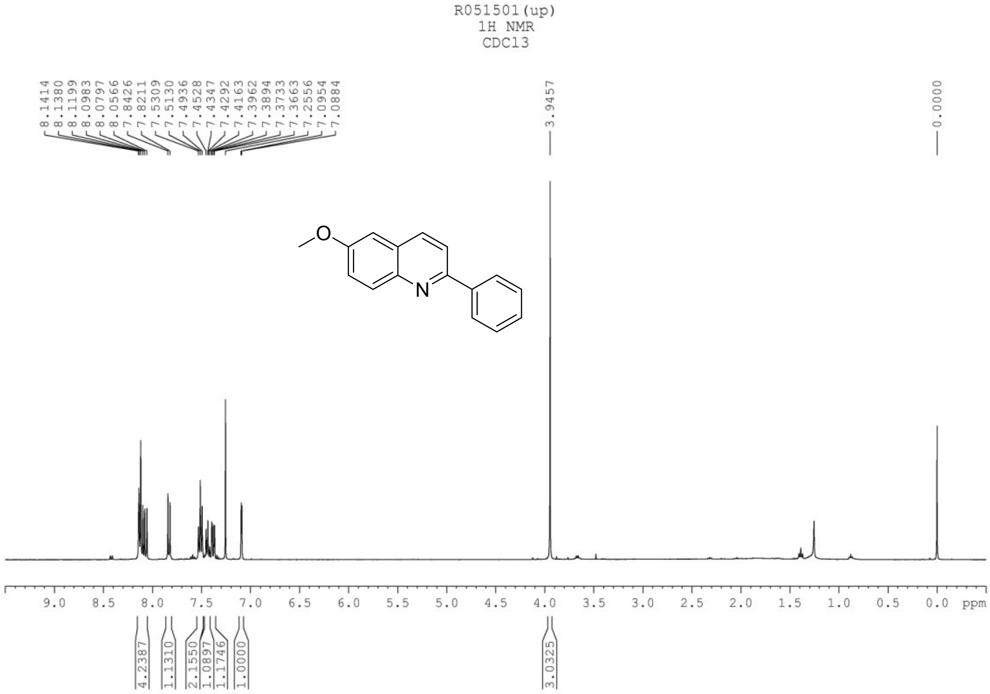


Fig. 37 ^{1}H NMR spectrum of 3n

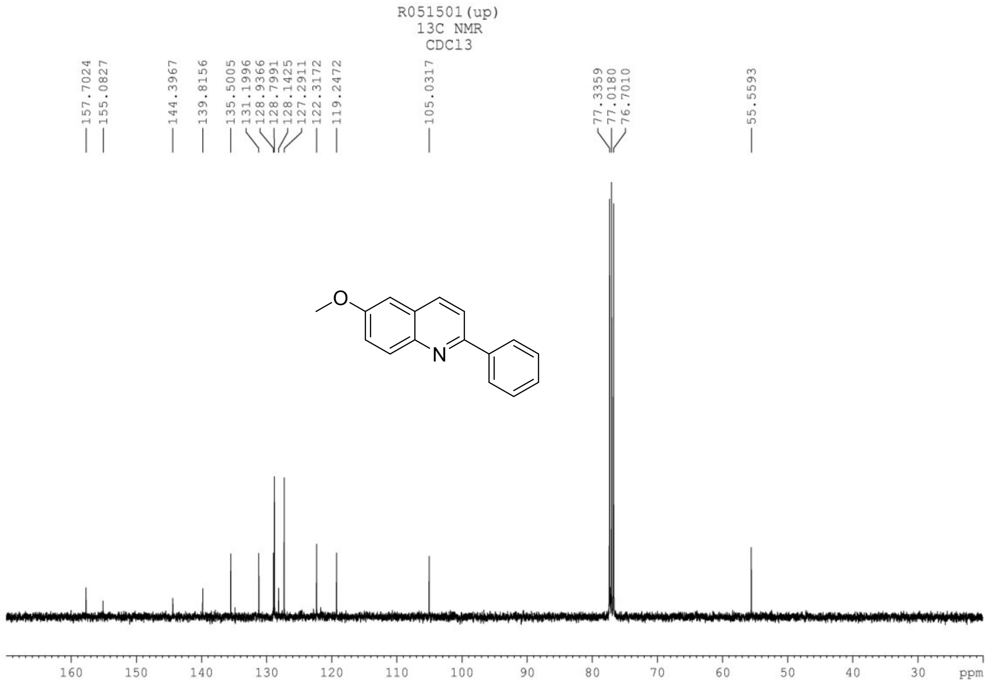


Fig. 38 ^{13}C NMR spectrum of 3n

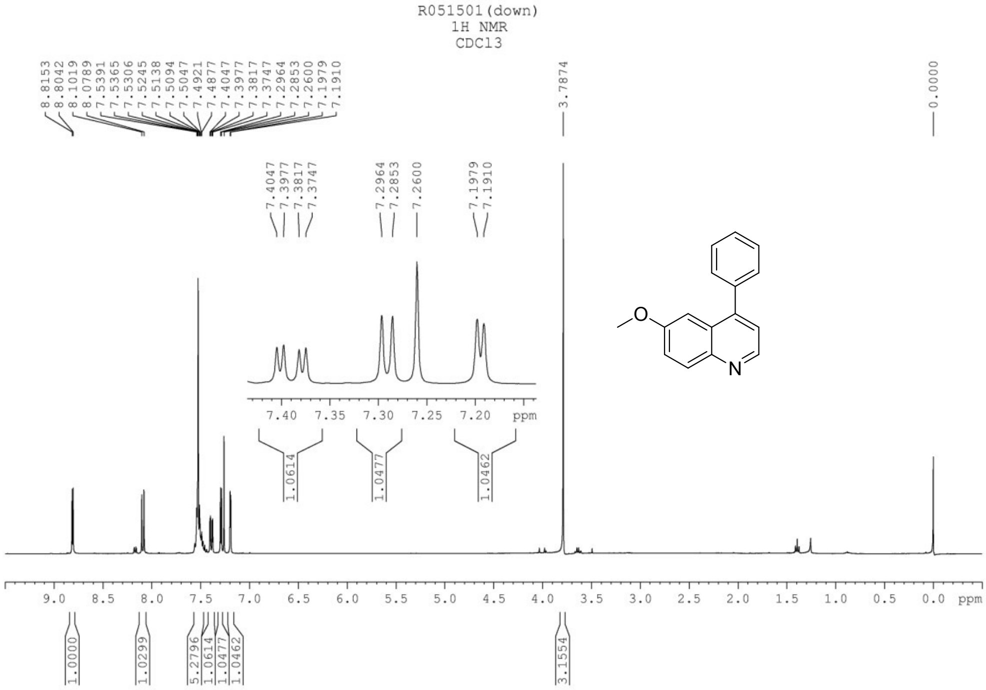


Fig. 39 ^{1}H NMR spectrum of 3n'

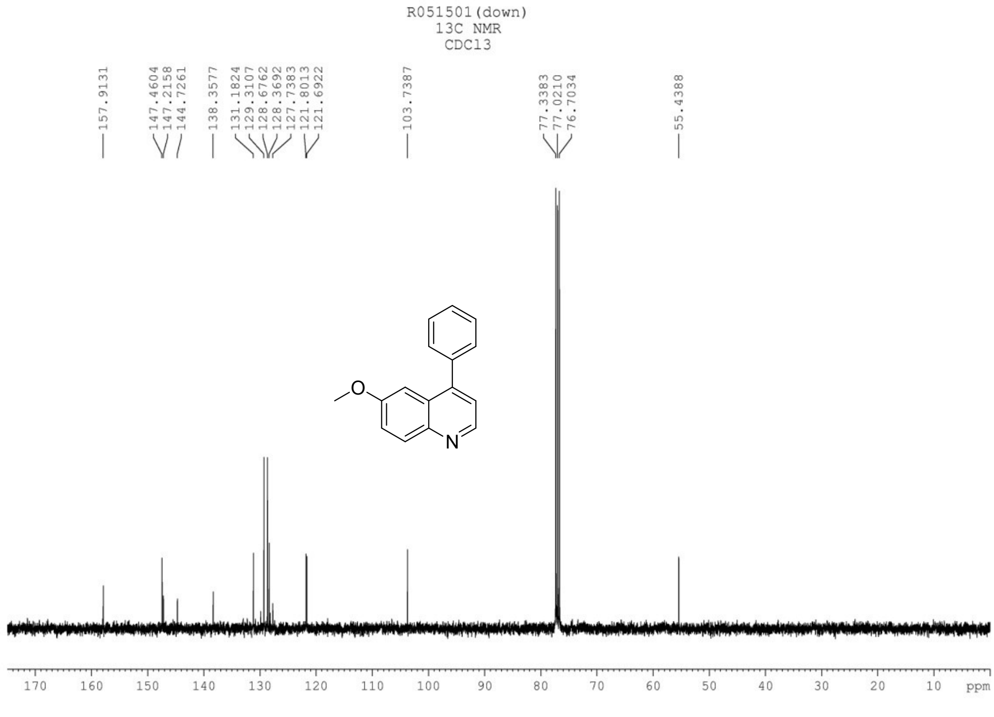


Fig. 40 ^{13}C NMR spectrum of 3n'

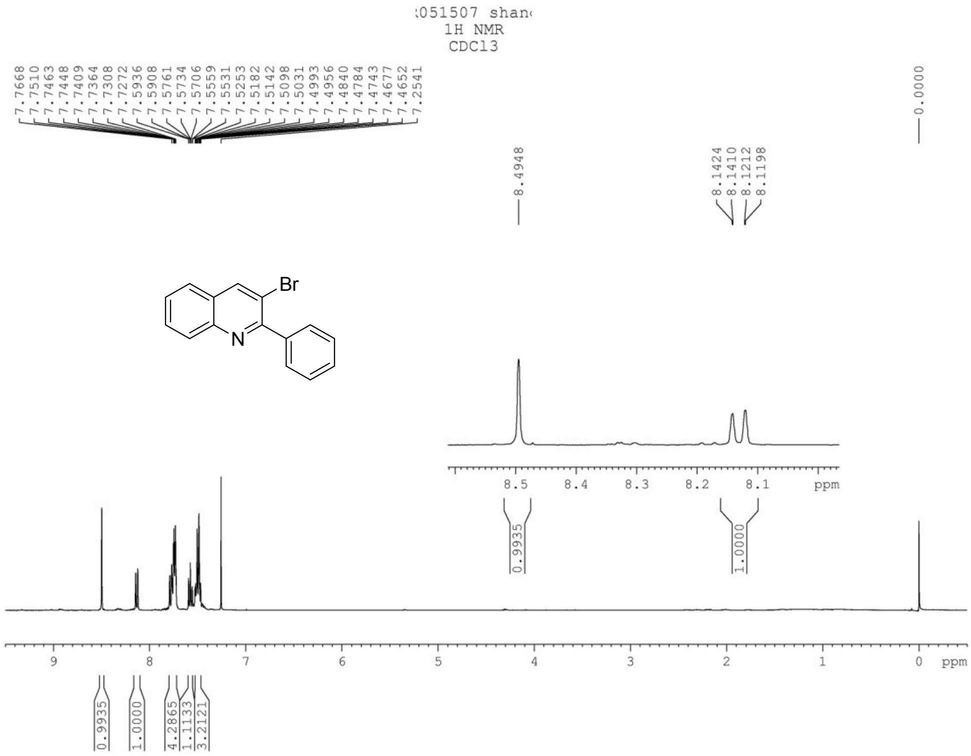


Fig. 41 ^{1}H NMR spectrum of 3o

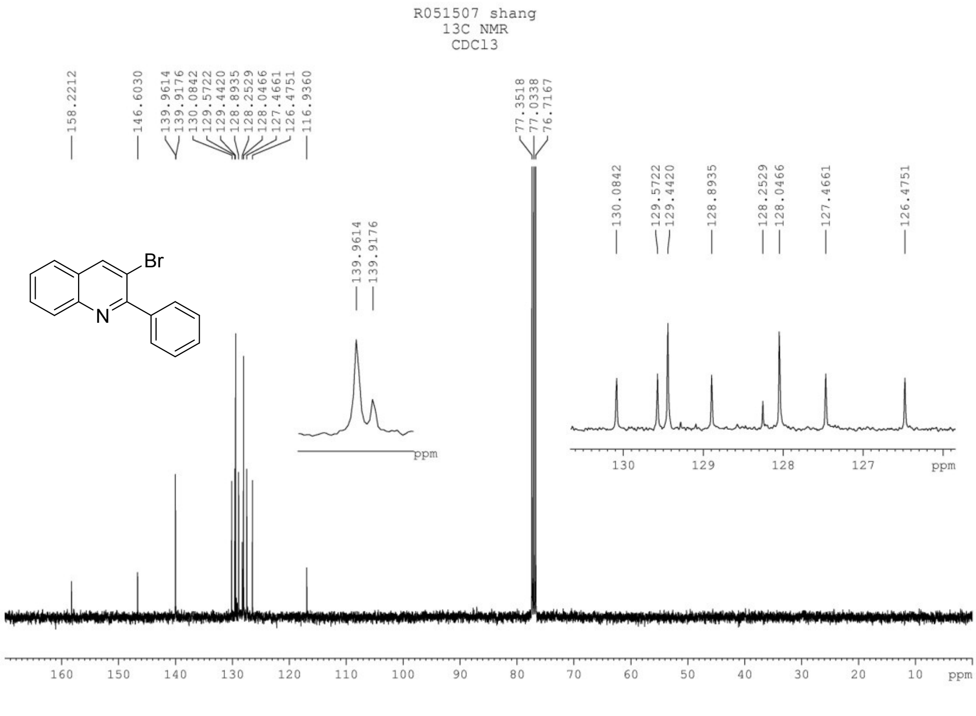


Fig. 42 ^{13}C NMR spectrum of 3o

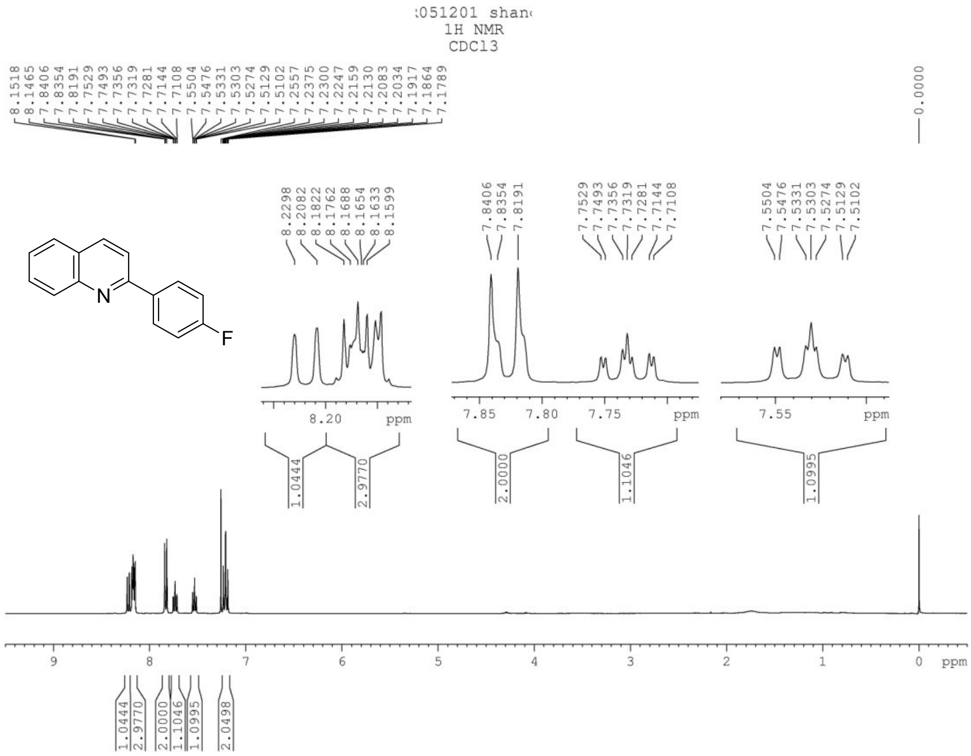


Fig. 43 ^{1}H NMR spectrum of 3p

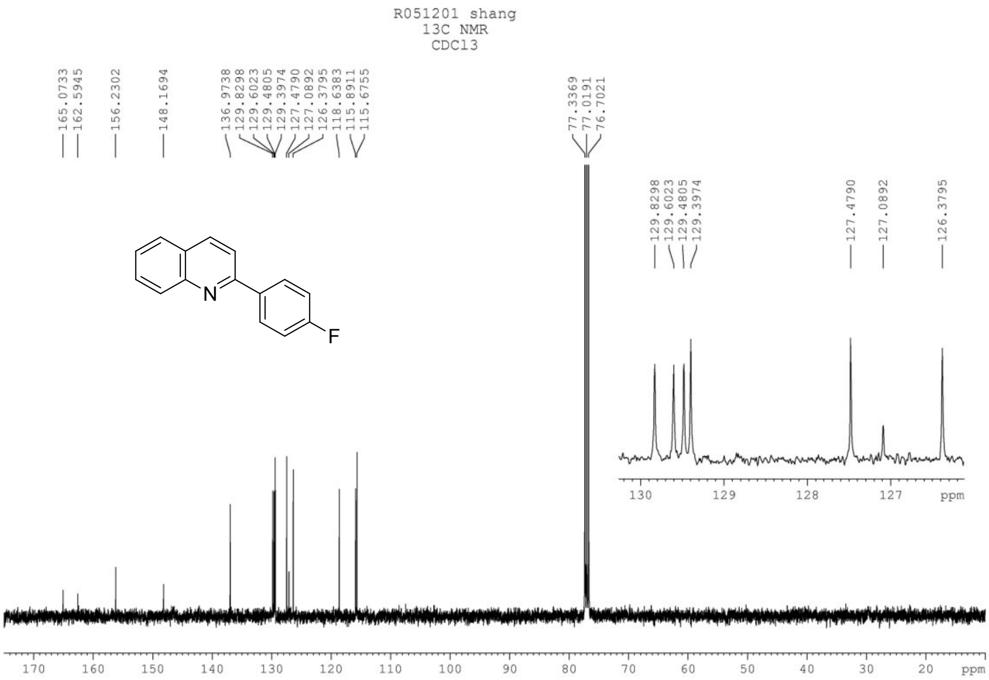


Fig. 44 ^{13}C NMR spectrum of 3p

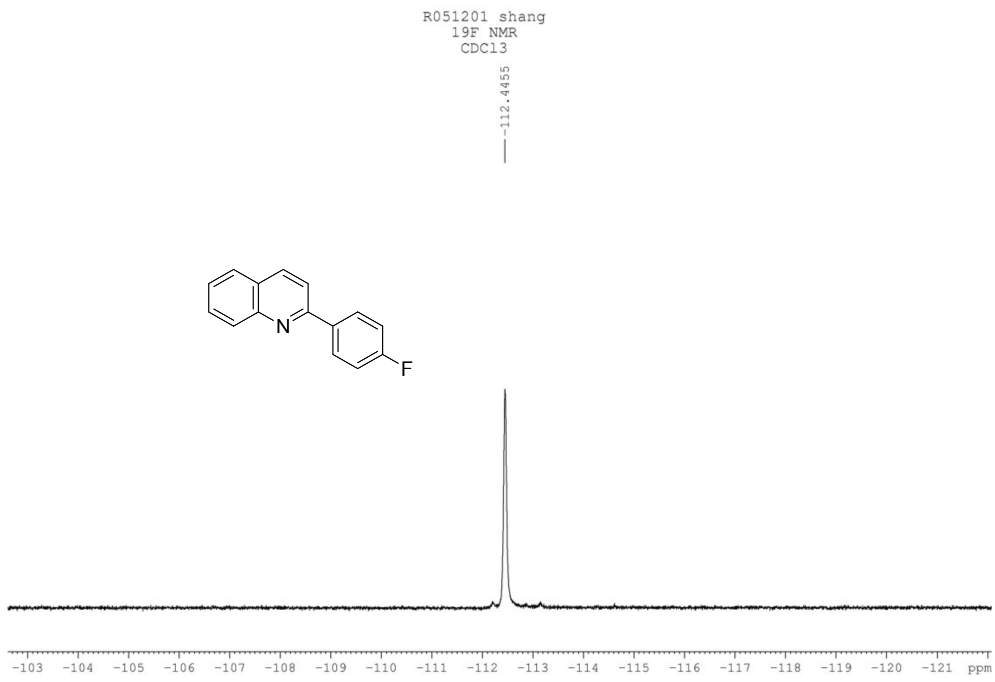


Fig. 45 ^{19}F NMR spectrum of 3p

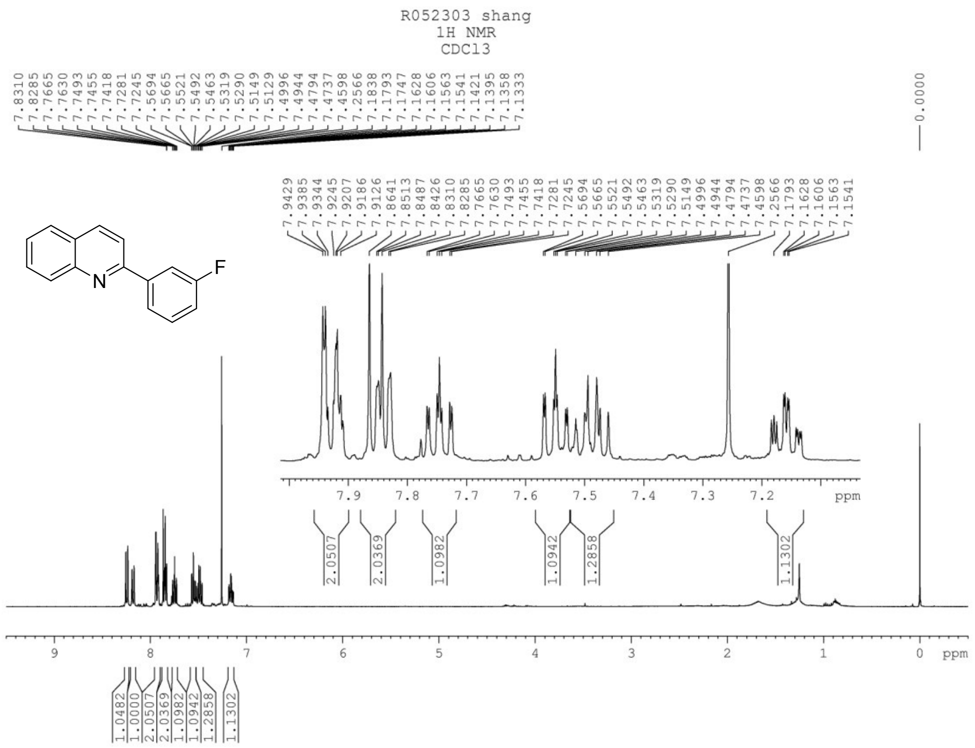


Fig. 46 ^{1}H NMR spectrum of 3q

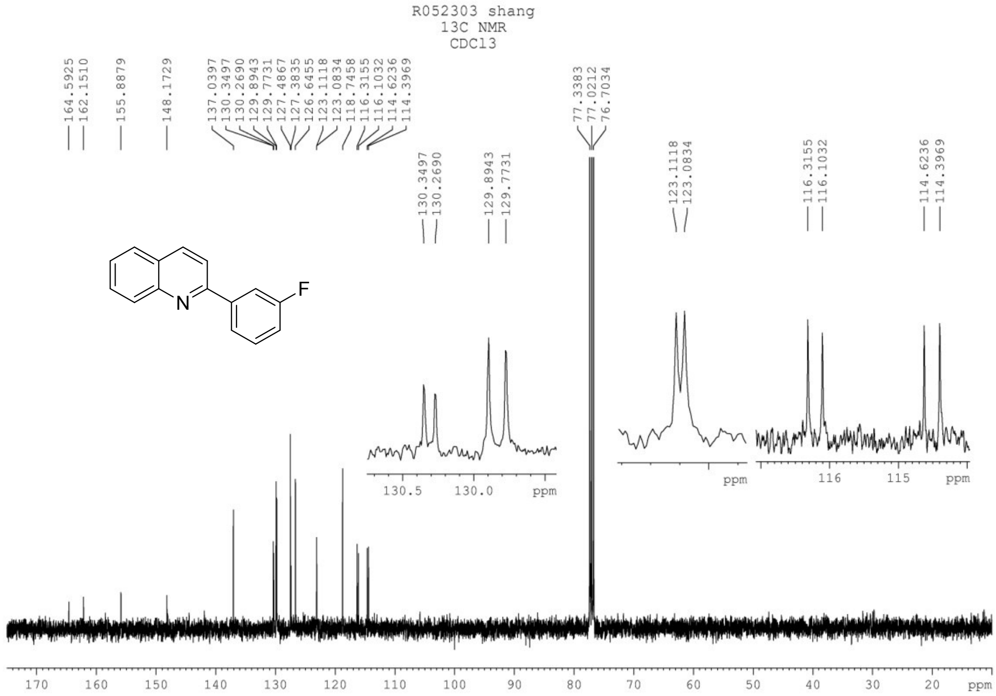


Fig. 47 ^{13}C NMR spectrum of 3q

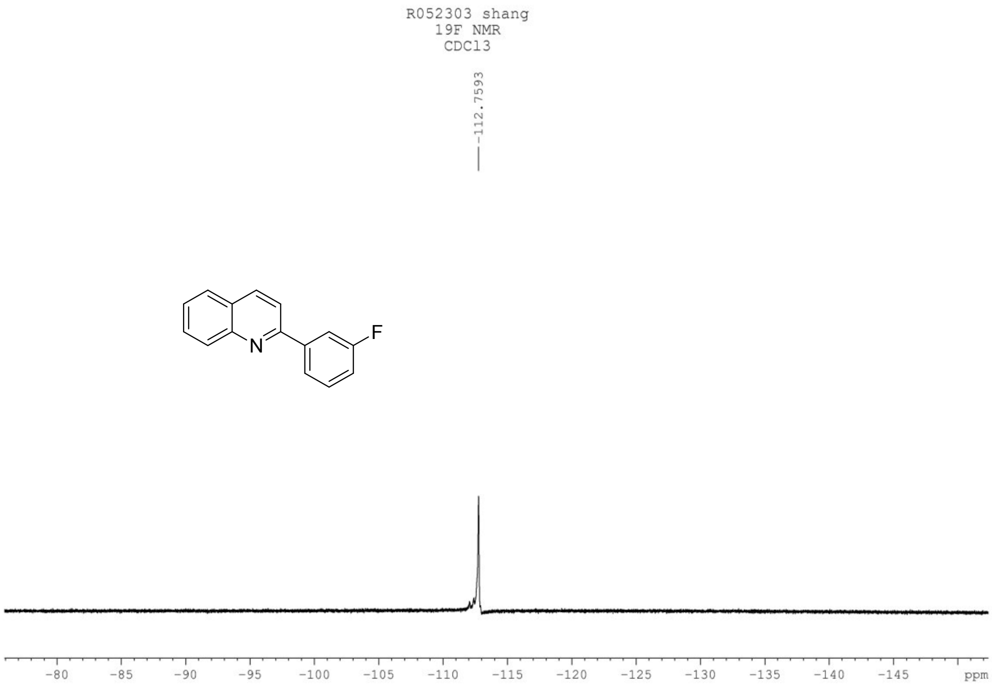


Fig. 48 ^{19}F NMR spectrum of 3q

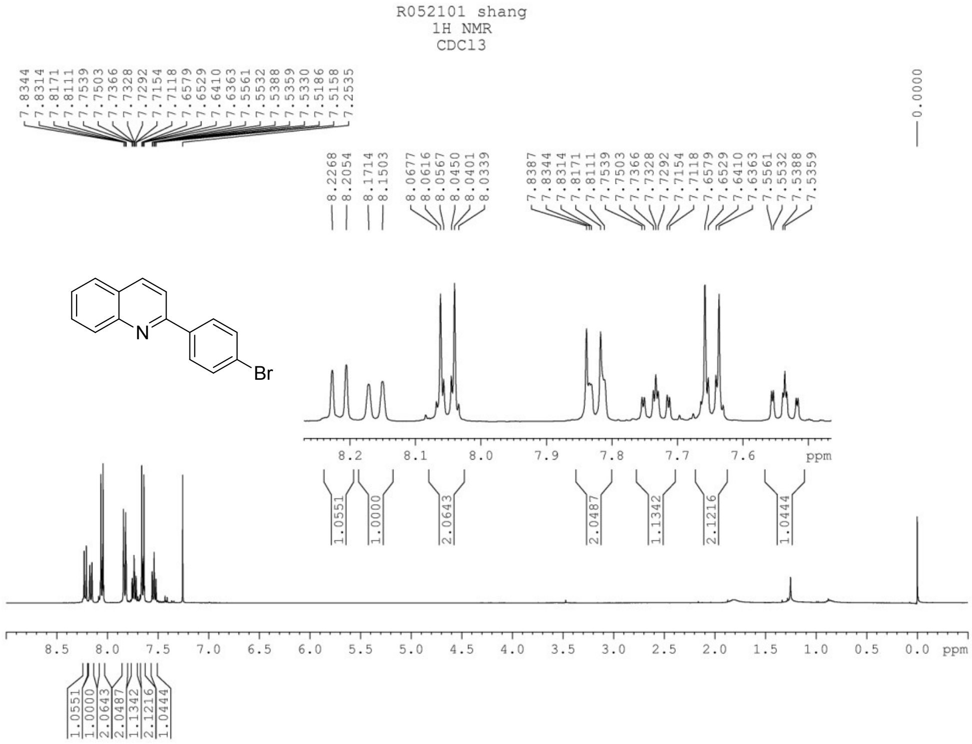


Fig. 49 [1]H NMR spectrum of 3r

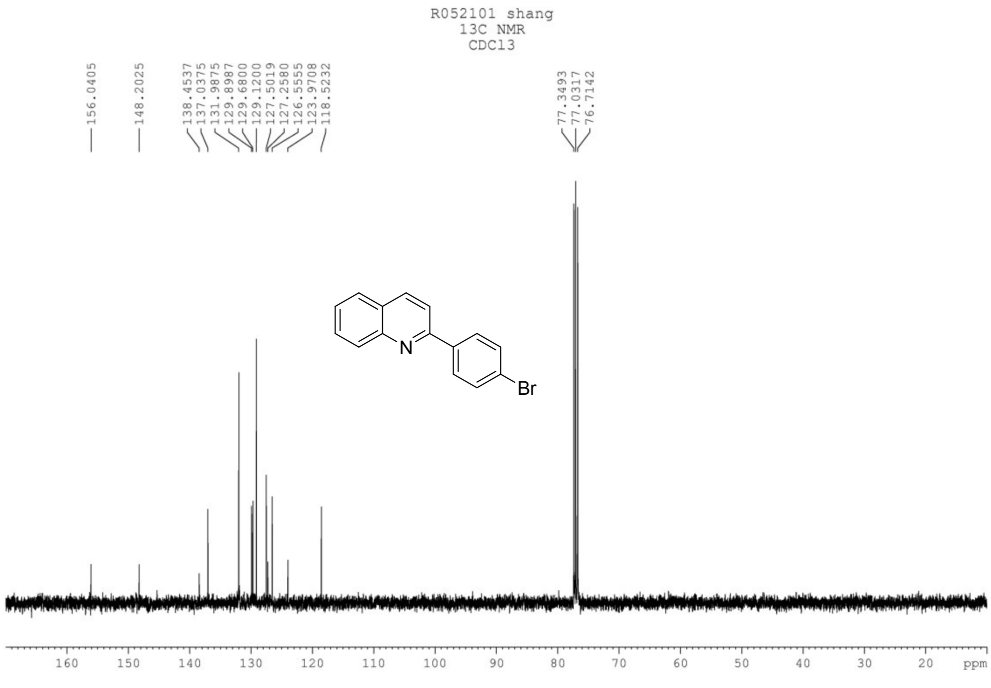


Fig. 50 [13]C NMR spectrum of 3r

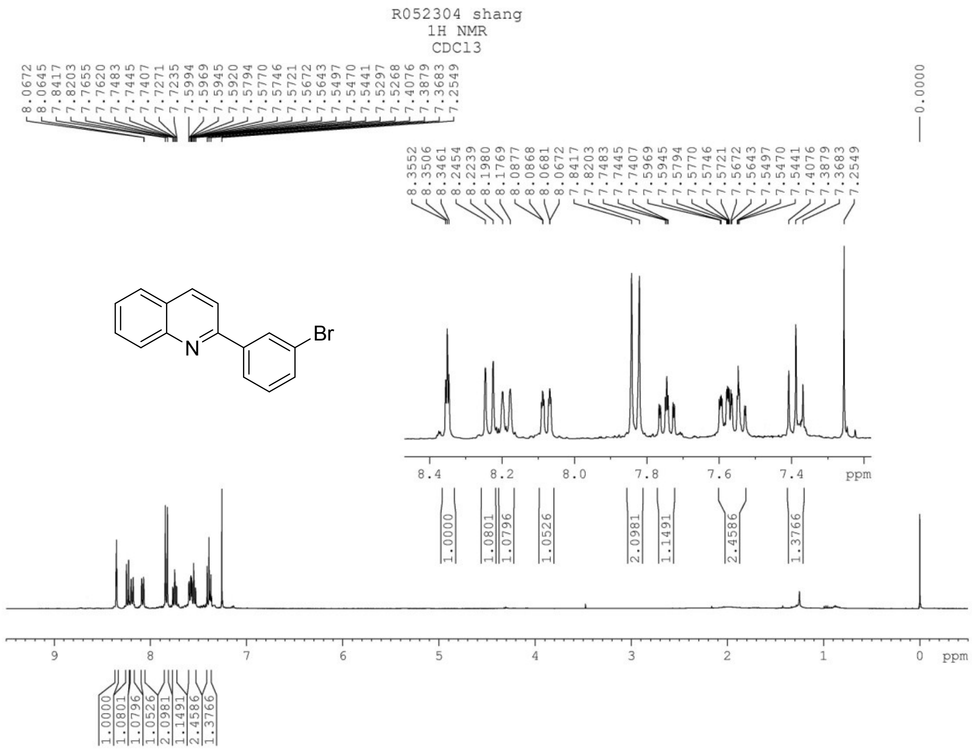


Fig. 51 ^{1}H NMR spectrum of 3s

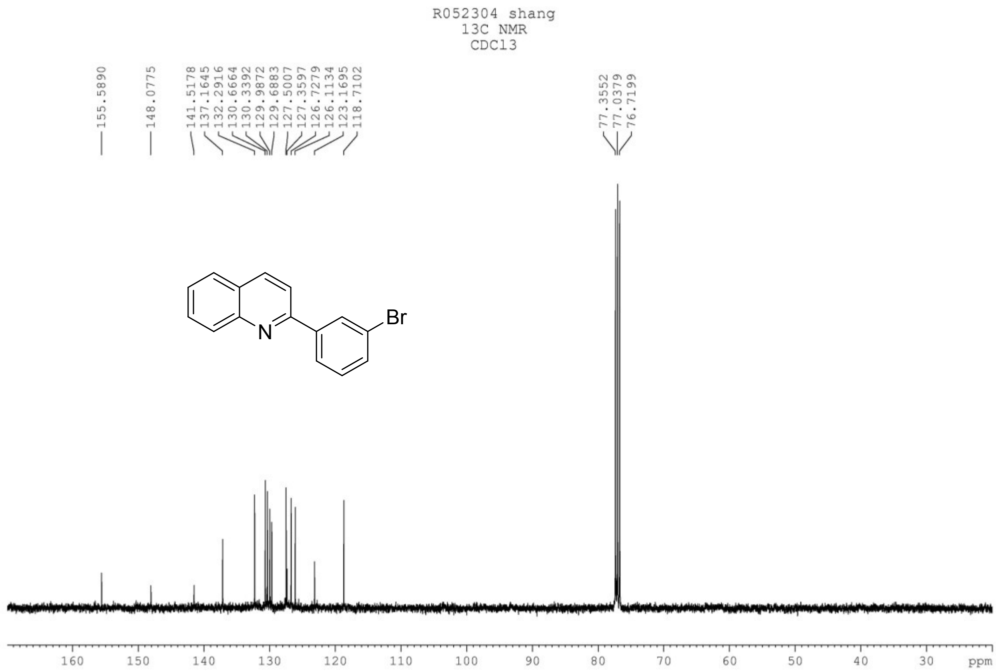


Fig. 52 ^{13}C NMR spectrum of 3s

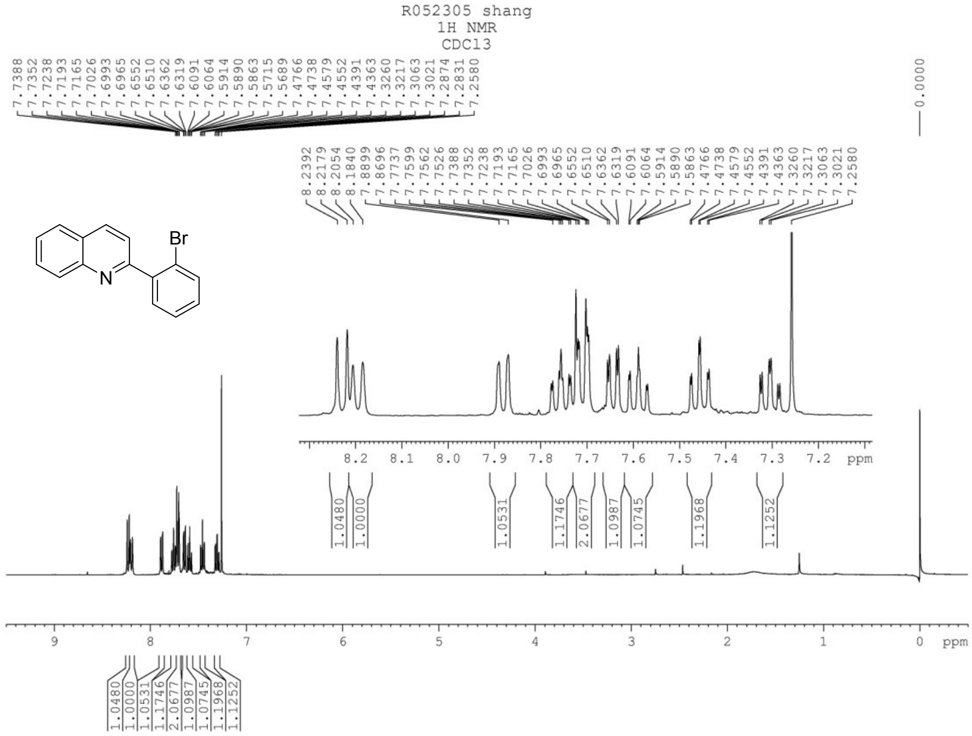


Fig. 53 ^{1}H NMR spectrum of 3t

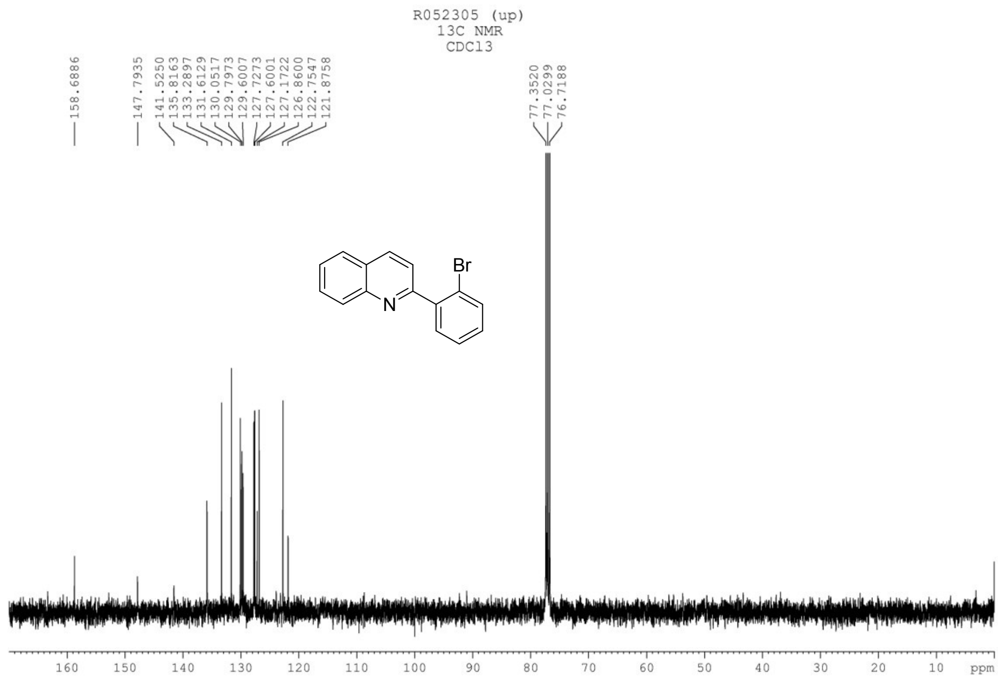


Fig. 54 ^{13}C NMR spectrum of 3t

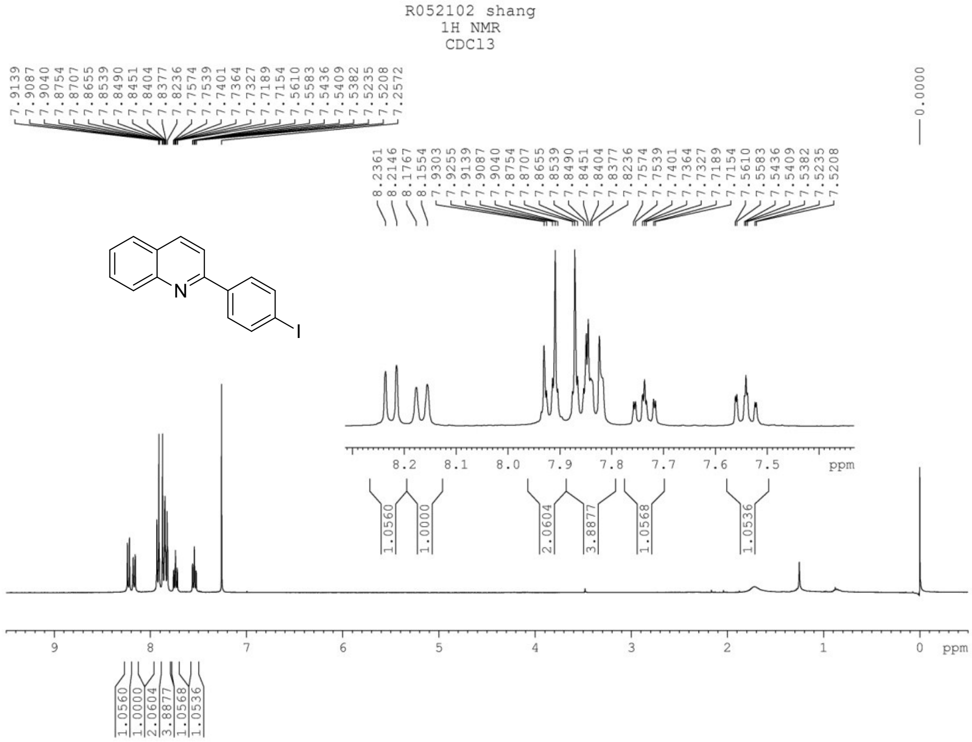


Fig. 55 ^{1}H NMR spectrum of 3u

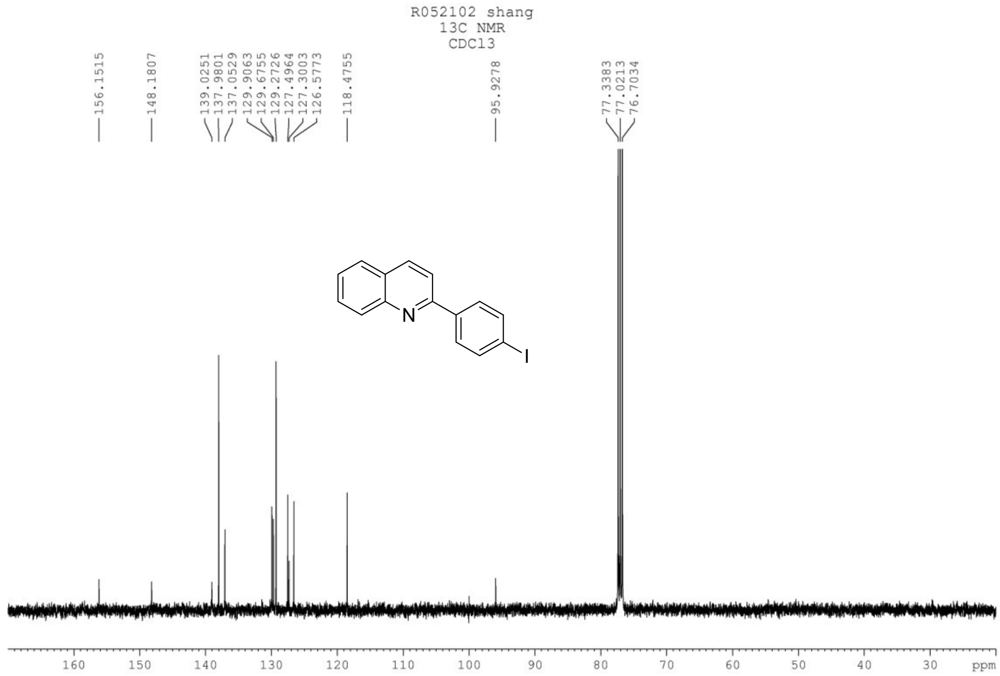


Fig. 56 ^{13}C NMR spectrum of 3u

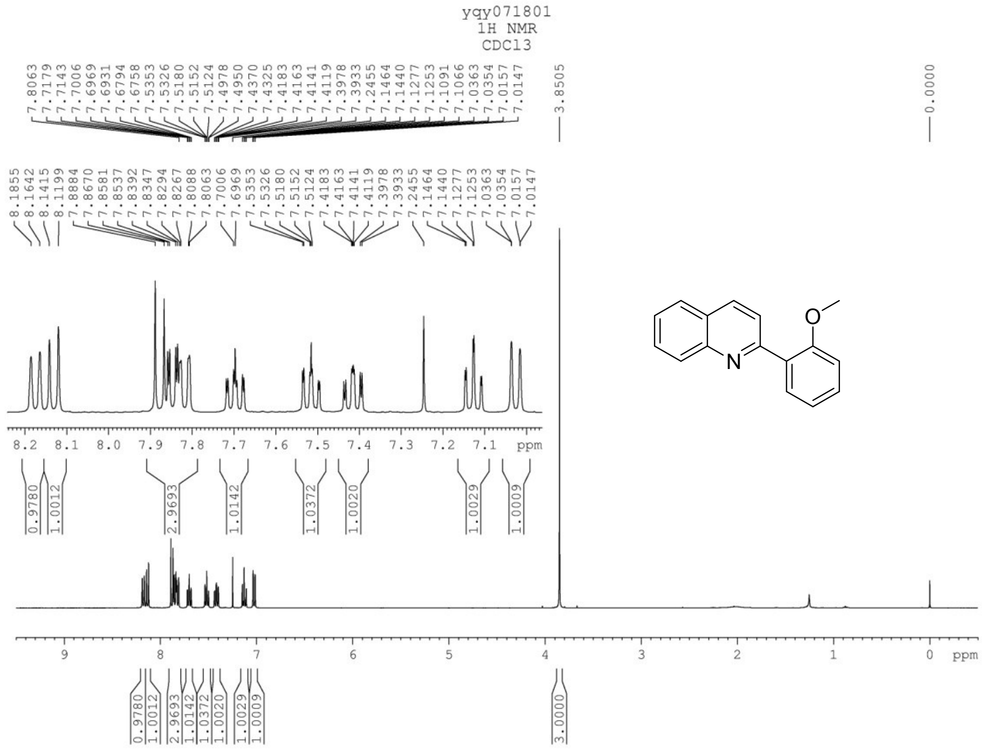


Fig. 57 ^{1}H NMR spectrum of 3v

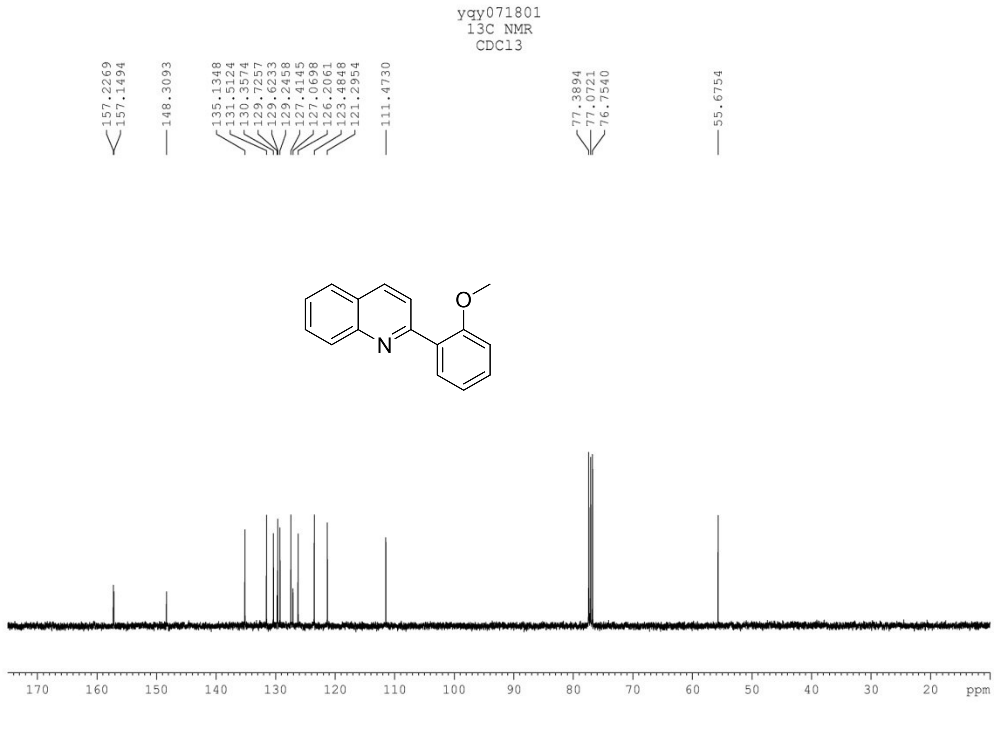


Fig. 58 ^{13}C NMR spectrum of 3v

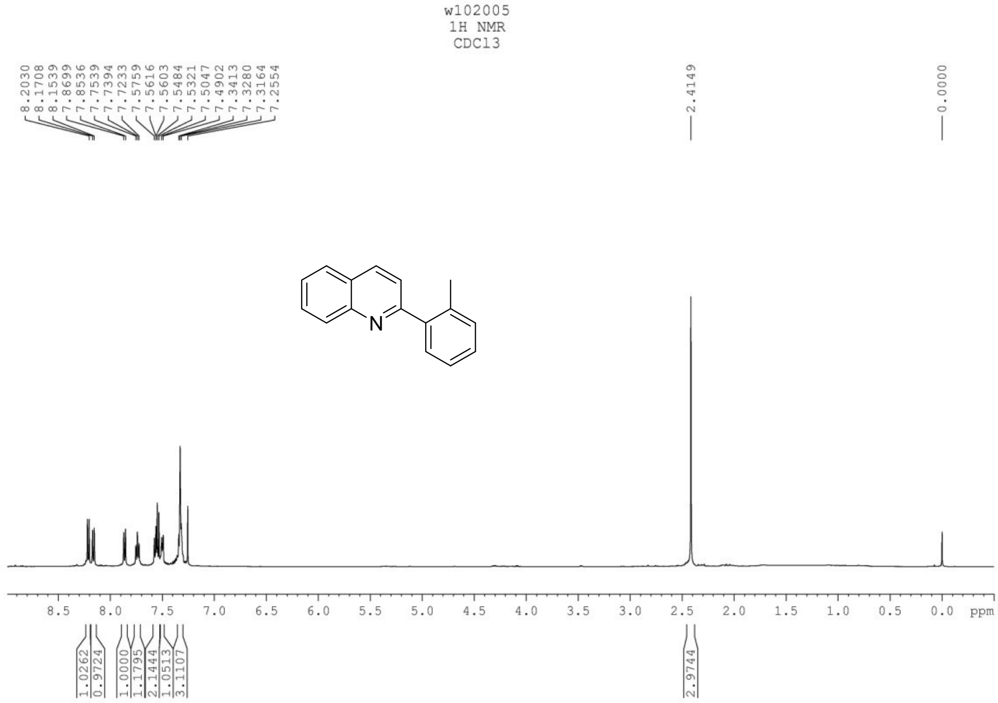


Fig. 59 ^{1}H NMR spectrum of 3w

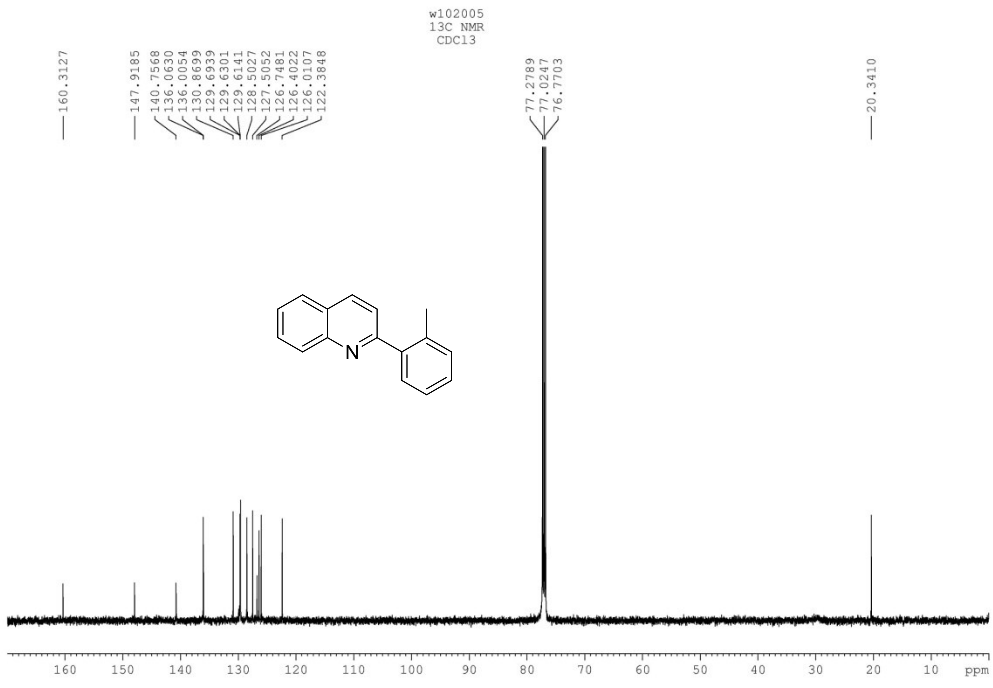


Fig. 60 ^{13}C NMR spectrum of 3w

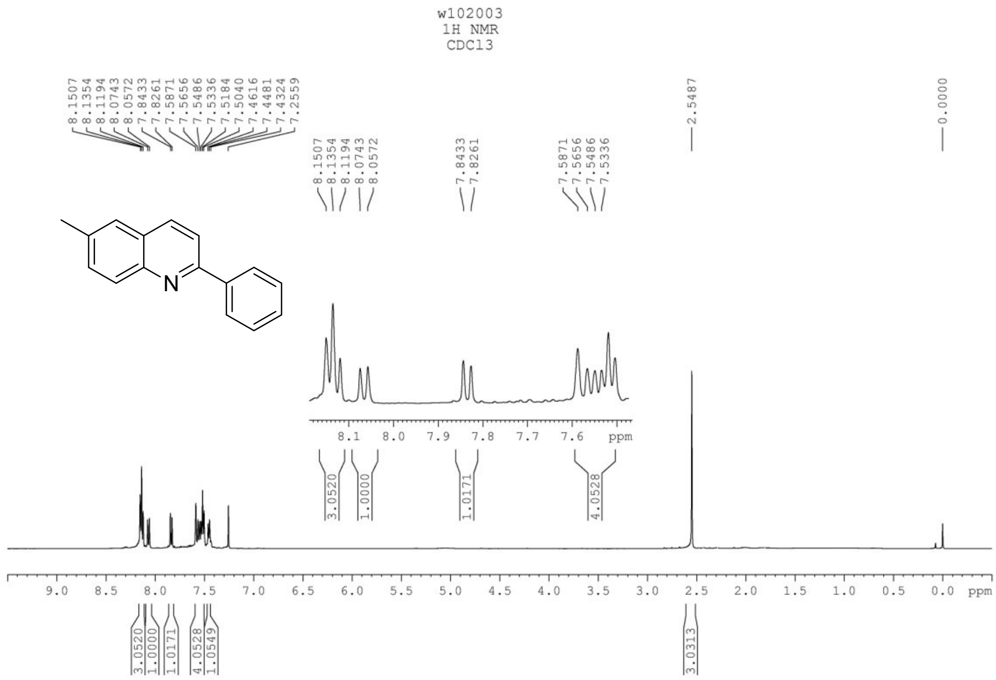


Fig. 61 ^{1}H NMR spectrum of 3x

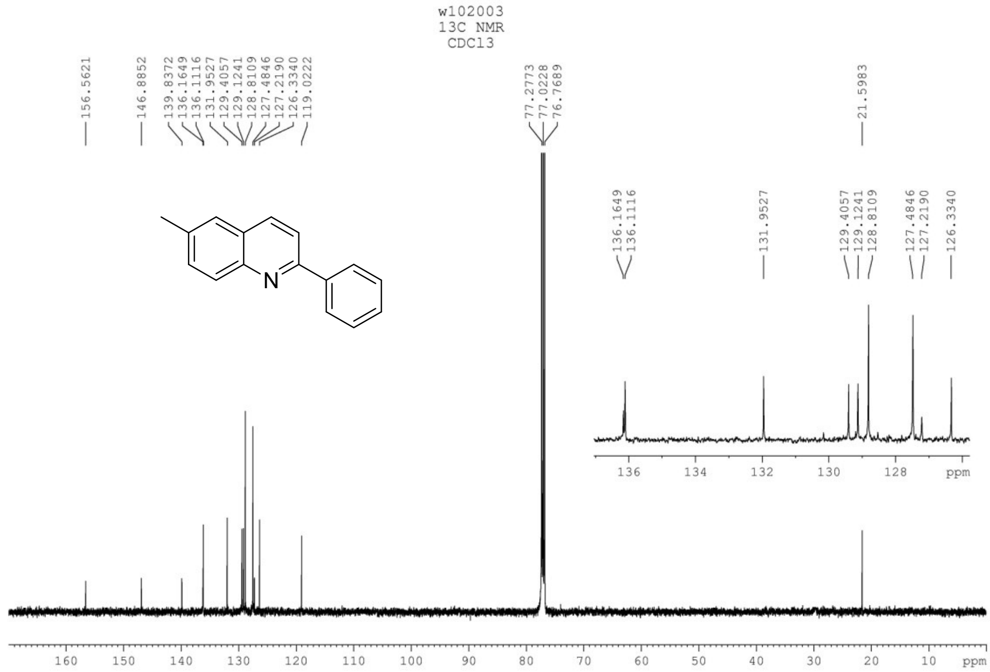


Fig. 62 ^{13}C NMR spectrum of 3x

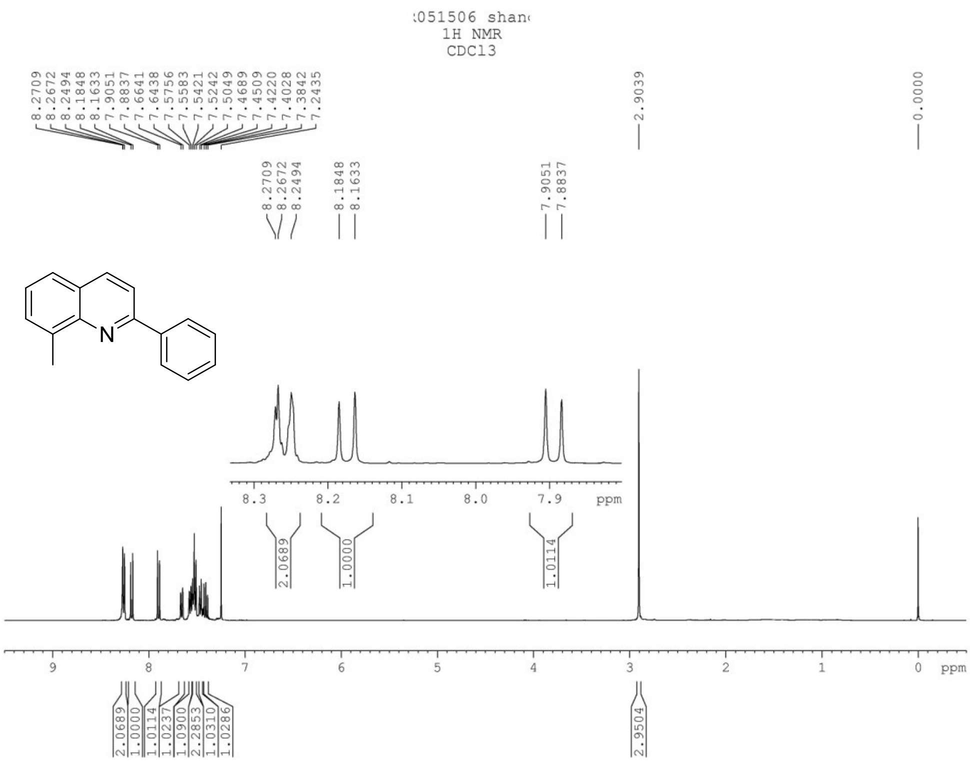


Fig. 63 ^{1}H NMR spectrum of 3y

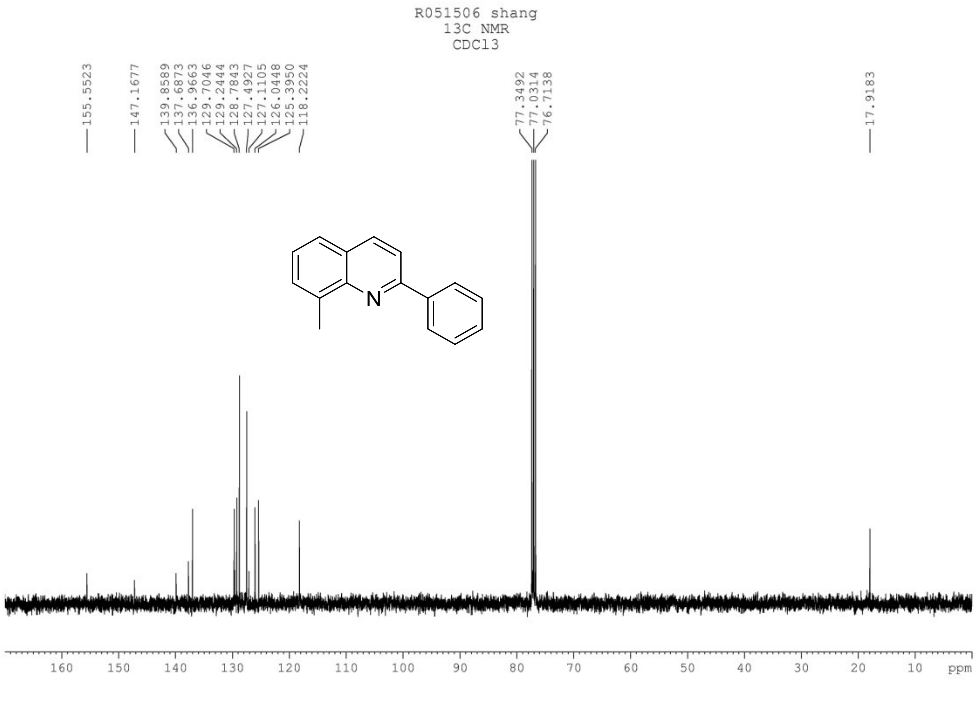


Fig. 64 ^{13}C NMR spectrum of 3y

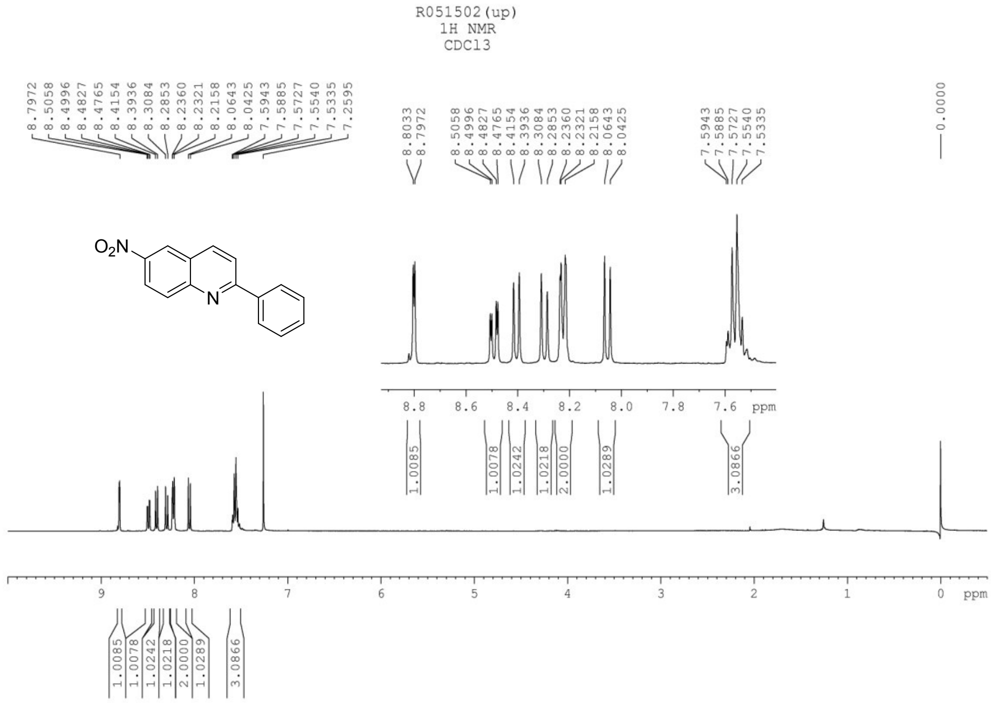


Fig. 65 ^{1}H NMR spectrum of 3z

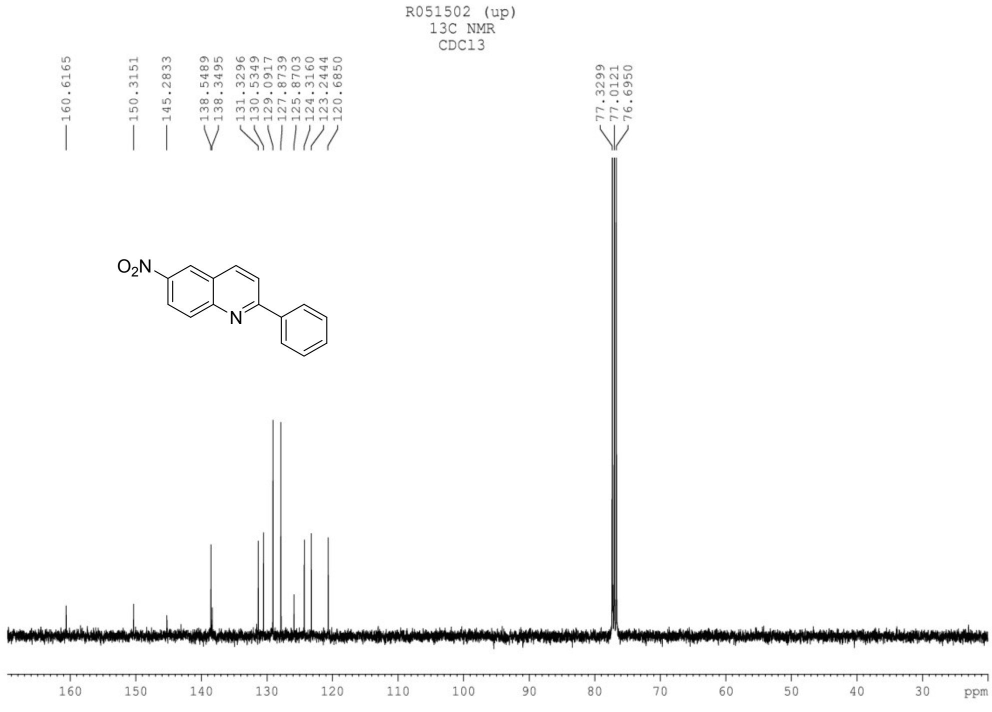


Fig. 66 ^{13}C NMR spectrum of 3z

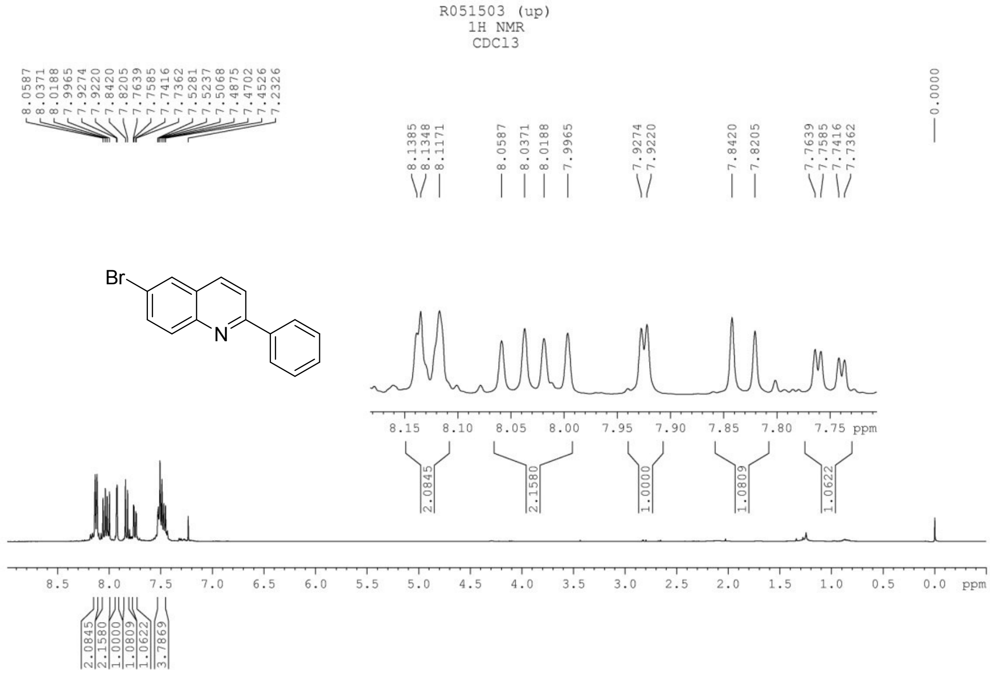


Fig. 67 ^{1}H NMR spectrum of 3az

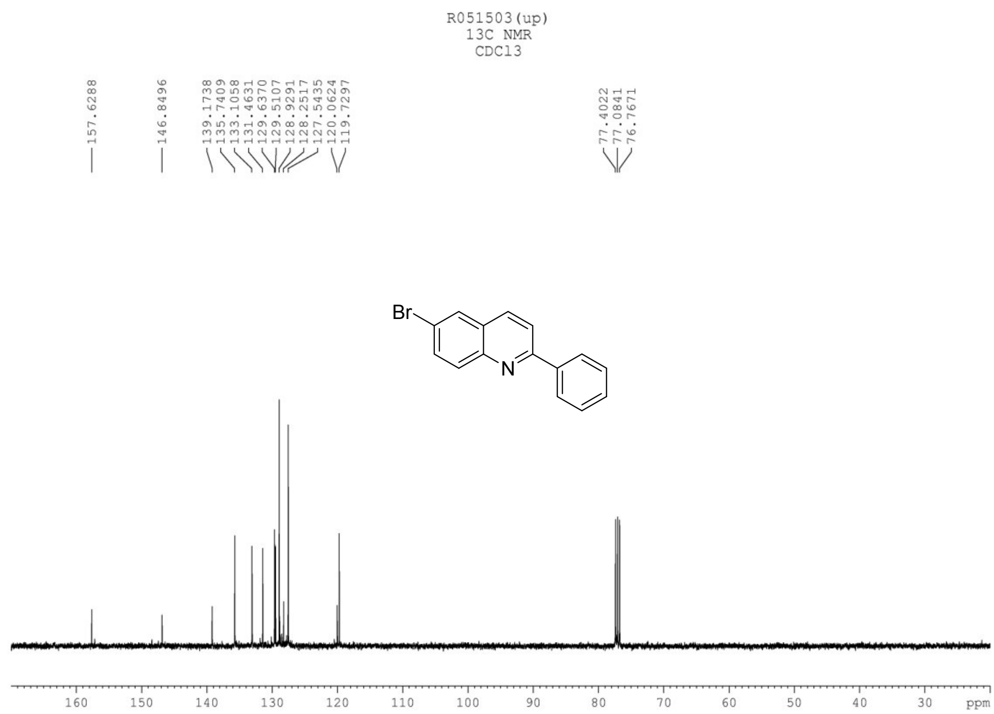


Fig. 68 ^{13}C NMR spectrum of 3az

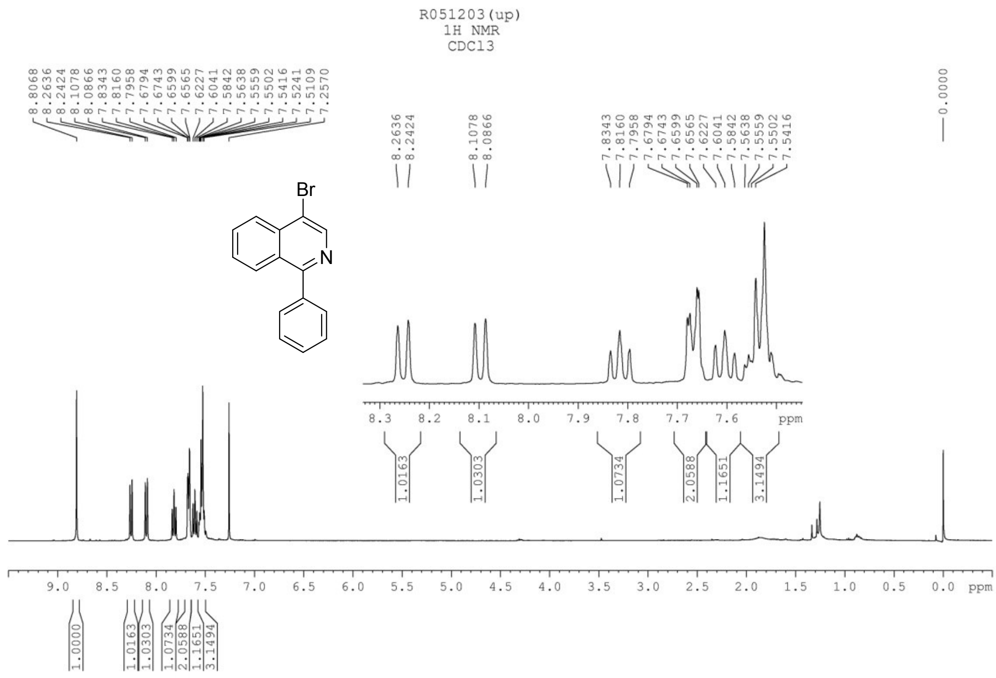


Fig. 69 ^{1}H NMR spectrum of 3bz

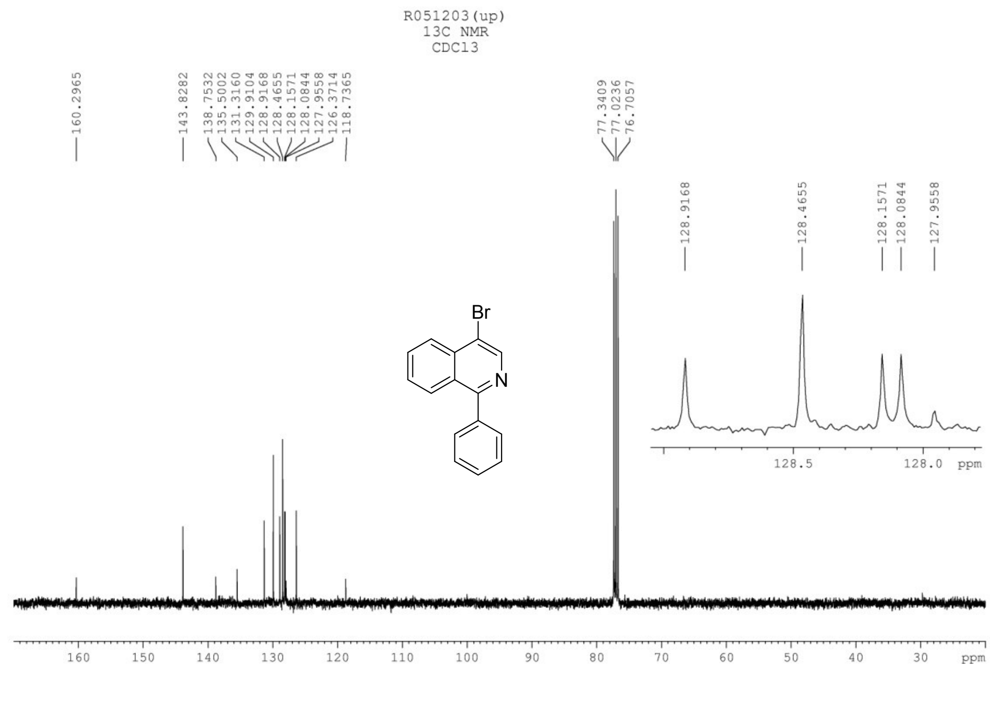


Fig. 70 ^{13}C NMR spectrum of 3bz