# Supplementary Information

# *N*-Tosylhydrazone directed annulation *via* C-H/N-N bond activation in Ru(II)/PEG-400 as homogeneous recyclable catalytic system: a green synthesis of isoquinolines

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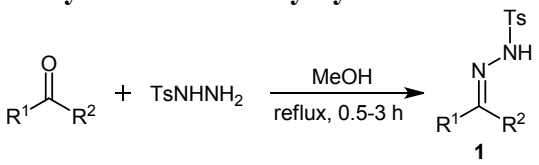
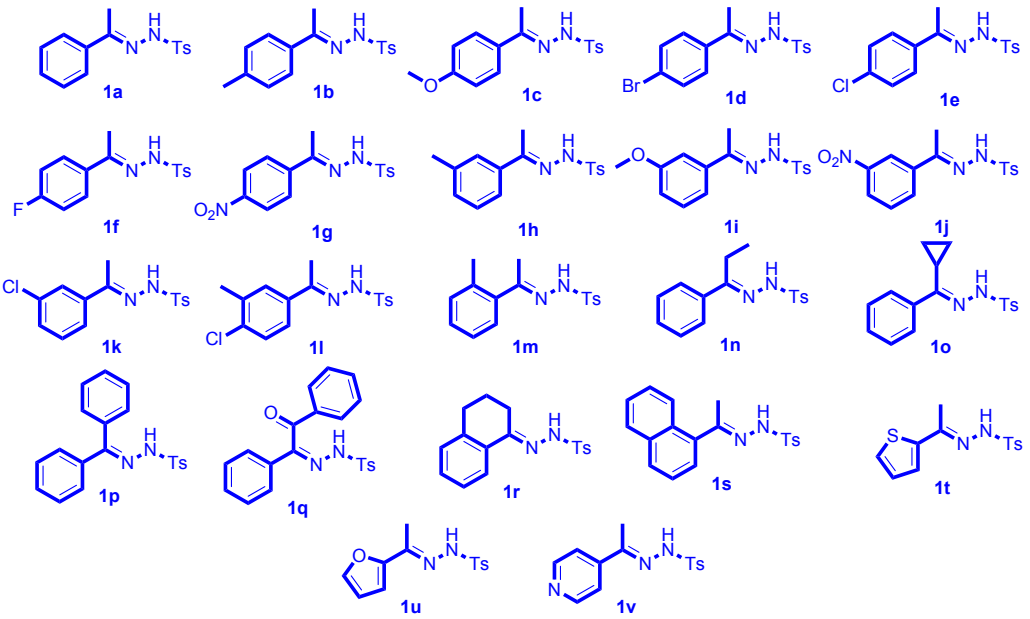
## 1. General experimental procedure for synthesis of *N*-tosylhydrazones:




**1**

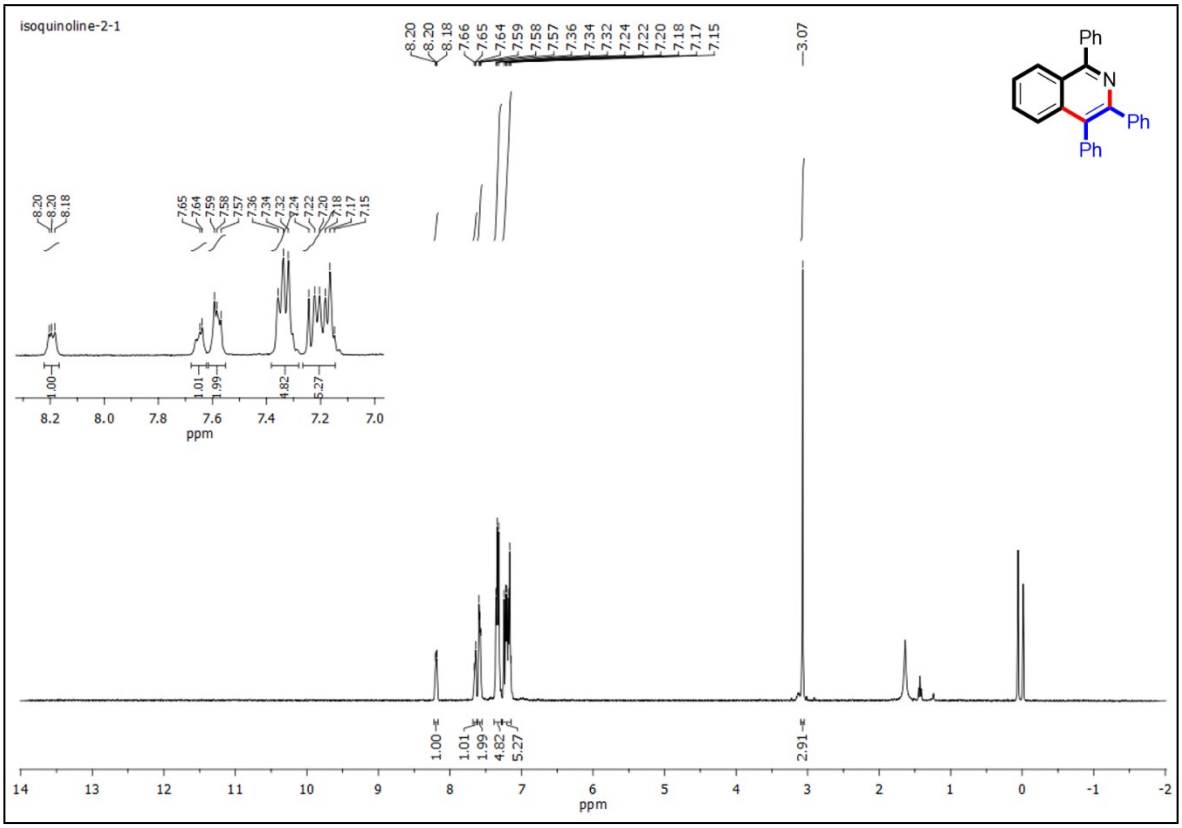
A mixture of carbonyl compound (10 mmol) and tosylhydrazide (10 mmol) in MeOH (15 mL) were heated at 65 $^{o}$C for 0.5-3 h to obtain the corresponding *N*-tosylhydrazone as white precipitate. After completion of reaction, the solvent was evaporated under reduced pressure. The crystalline product was washed thoroughly with 30 mL of hexane (4-5 times) and dried to afford pure product.

*N*-tosylhydrazones (**1a** – **1v**) were synthesized using the above method:

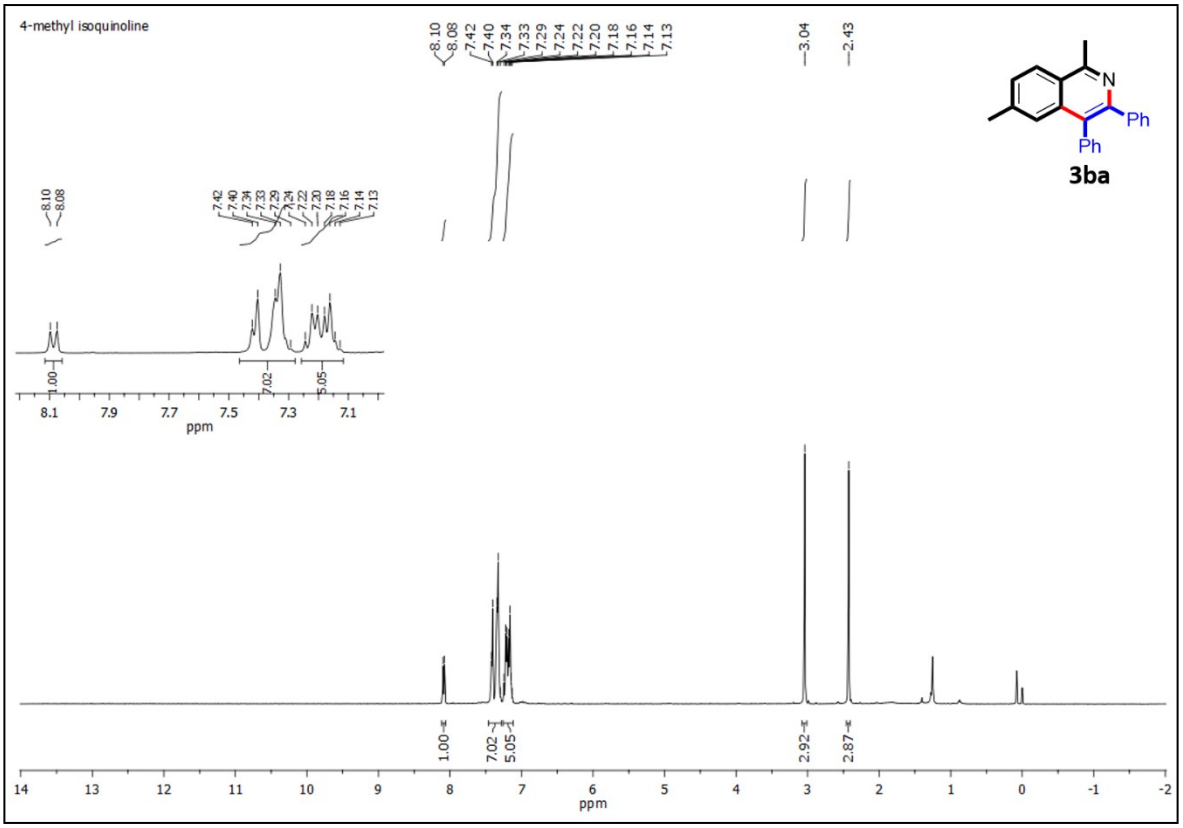


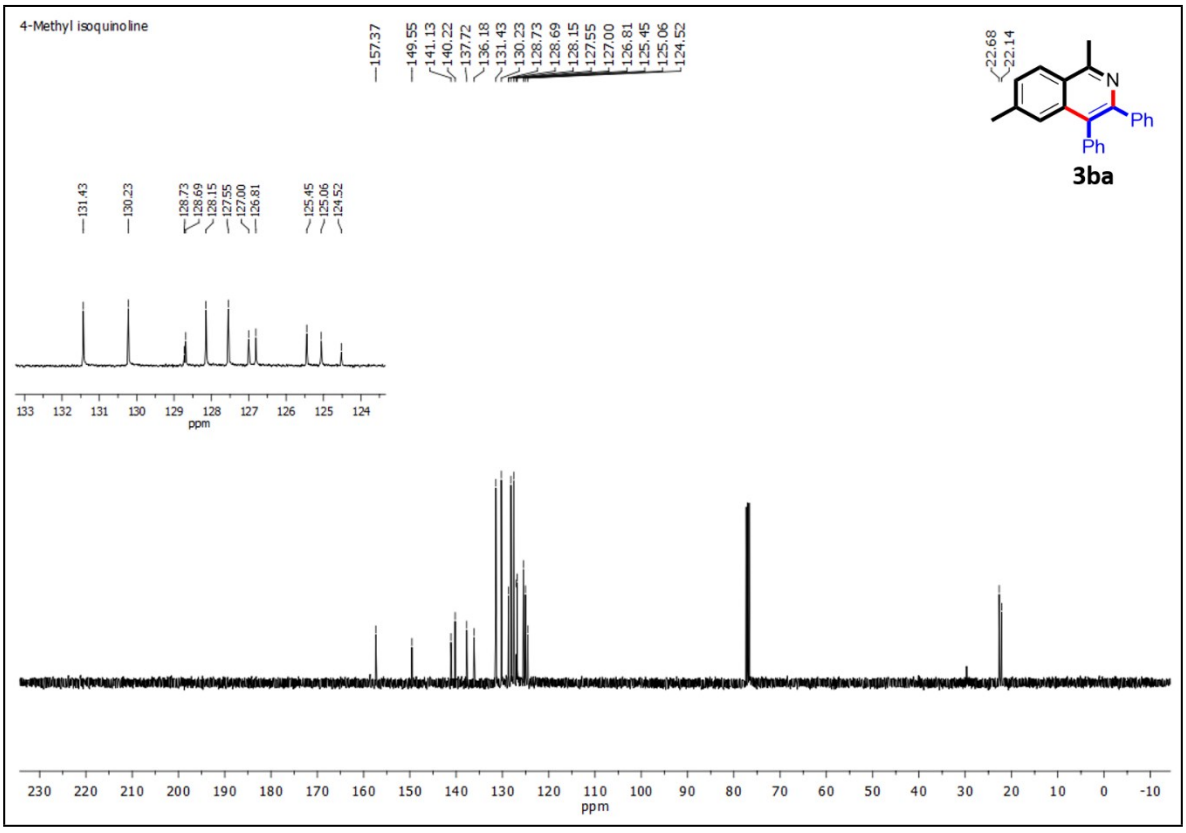

## 2. Copies for $^{1}$H NMR and $^{13}$C NMR of the isoquinoline products (3)

**$^{1}$H NMR of 1-Methyl-3,4-diphenylisoquinoline (3aa)**

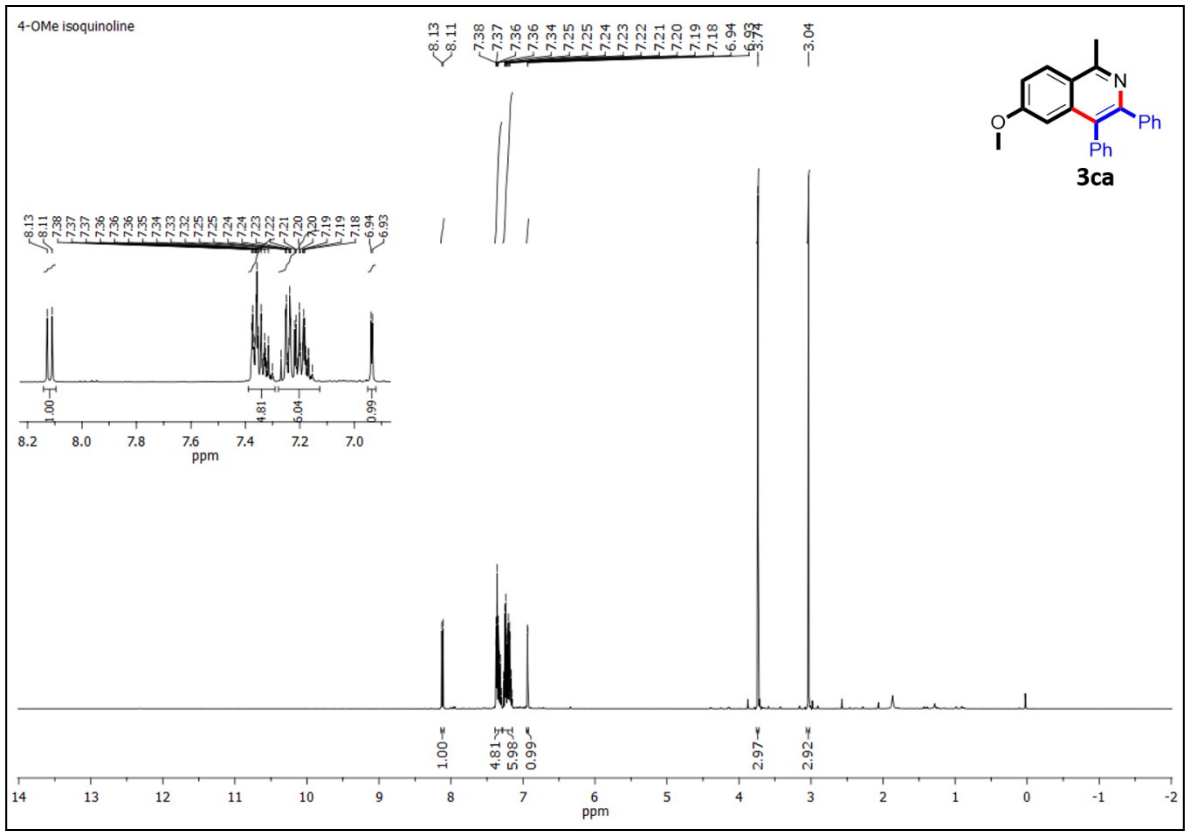


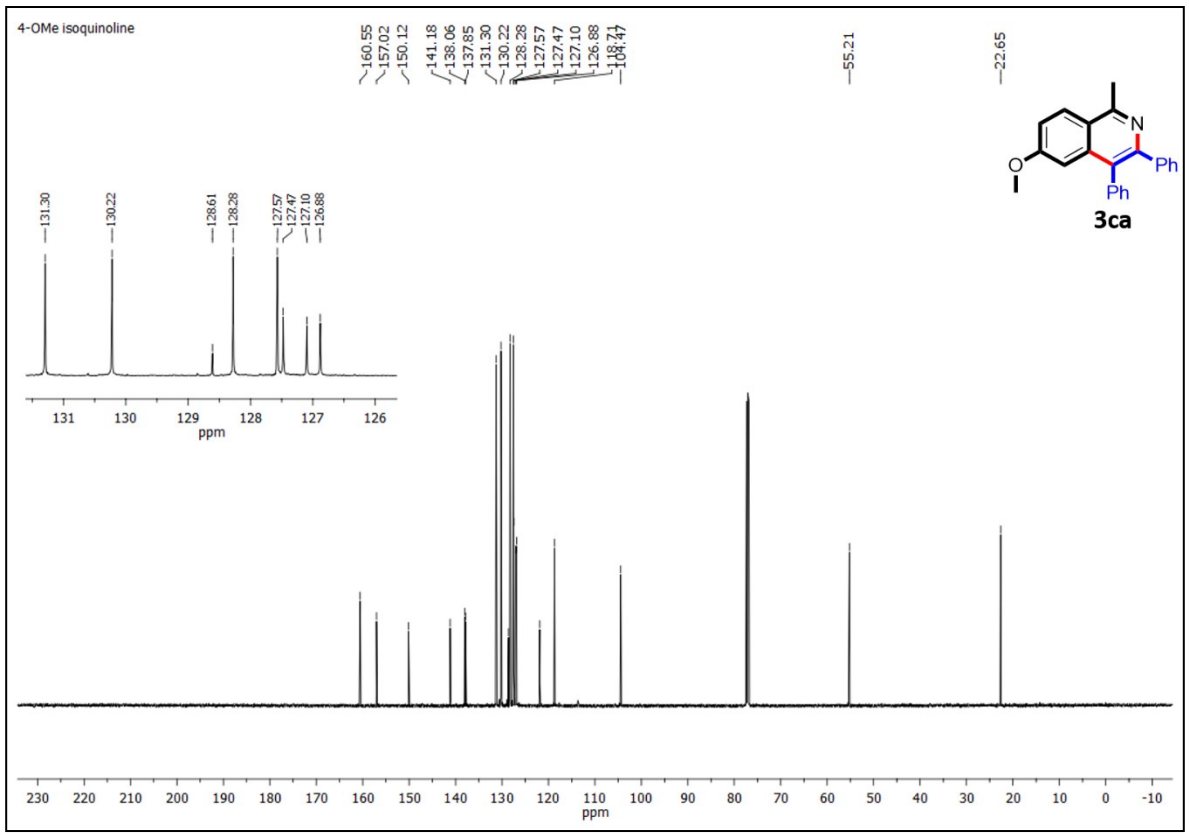
**$^{1}$H & $^{13}$C NMR of 1,6-Dimethyl-3,4-diphenylisoquinoline (3ba)**



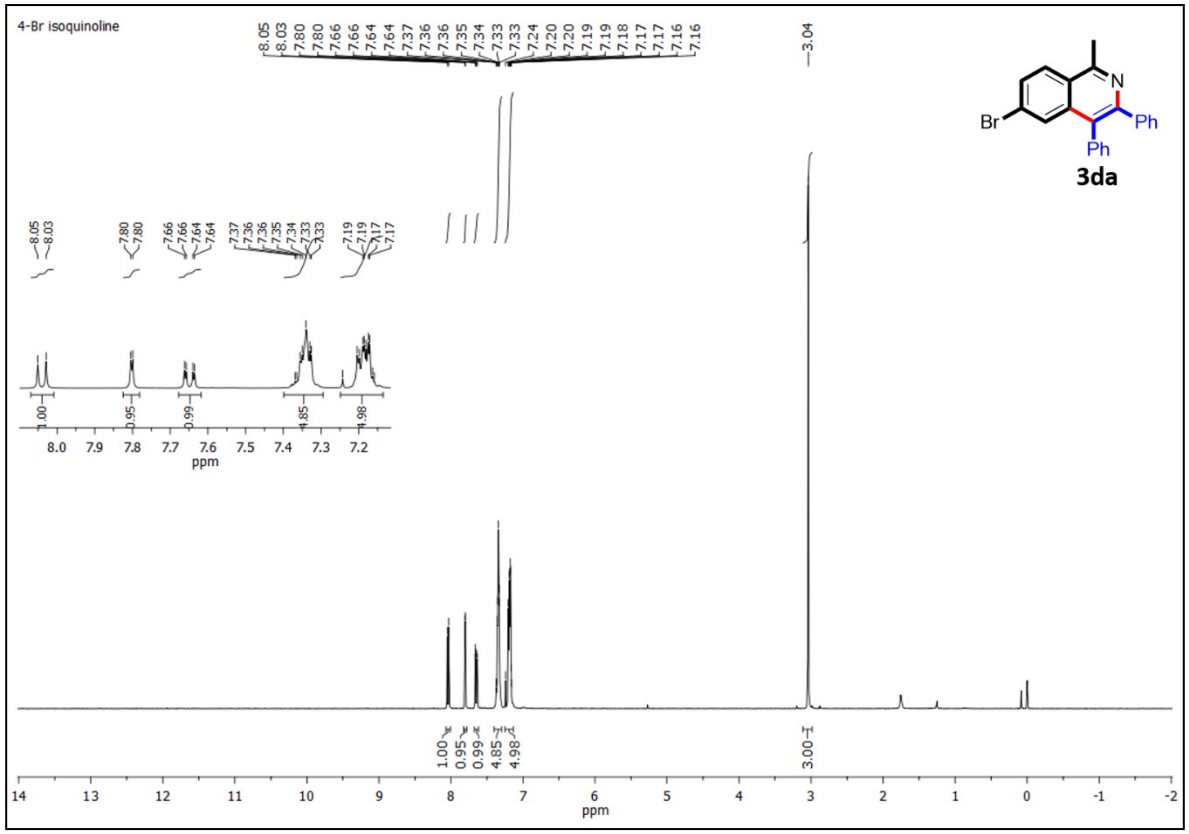



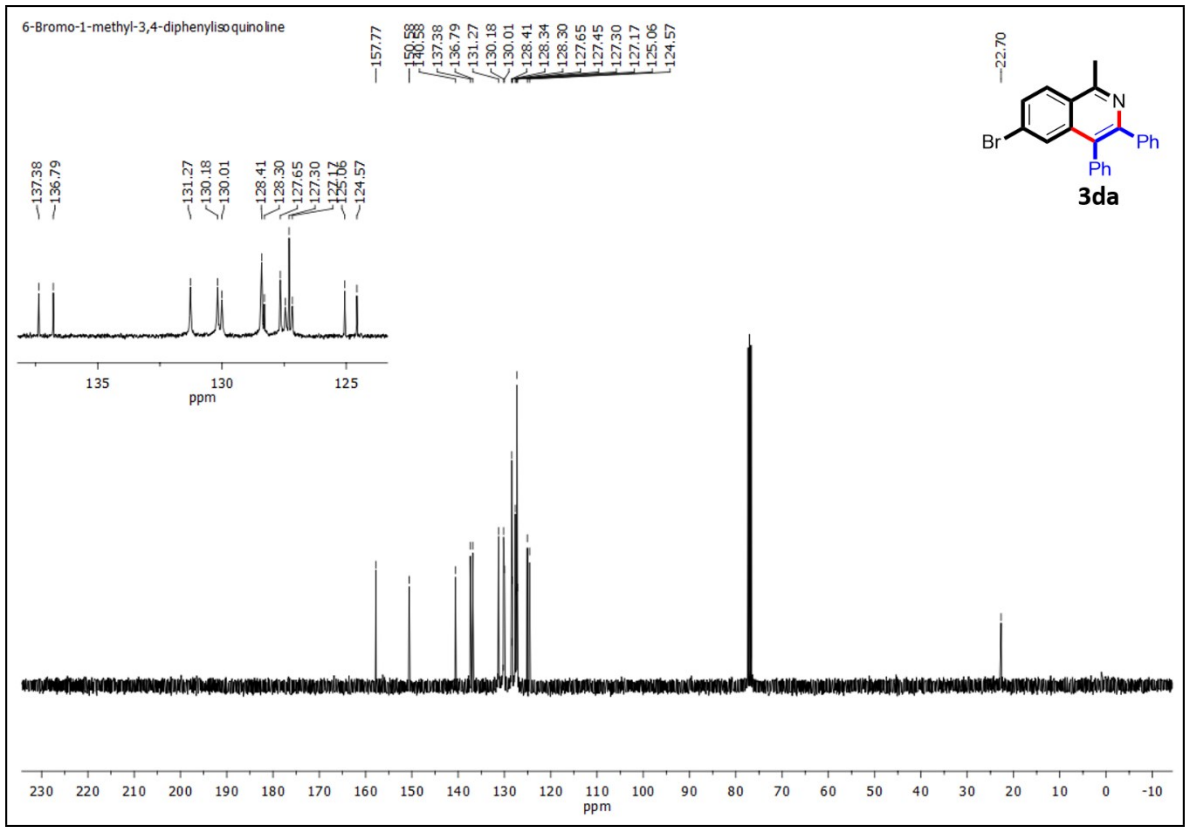
**$^{1}$H & $^{13}$C NMR of 6-Methoxy-1-methyl-3,4-diphenylisoquinoline (3ca)**



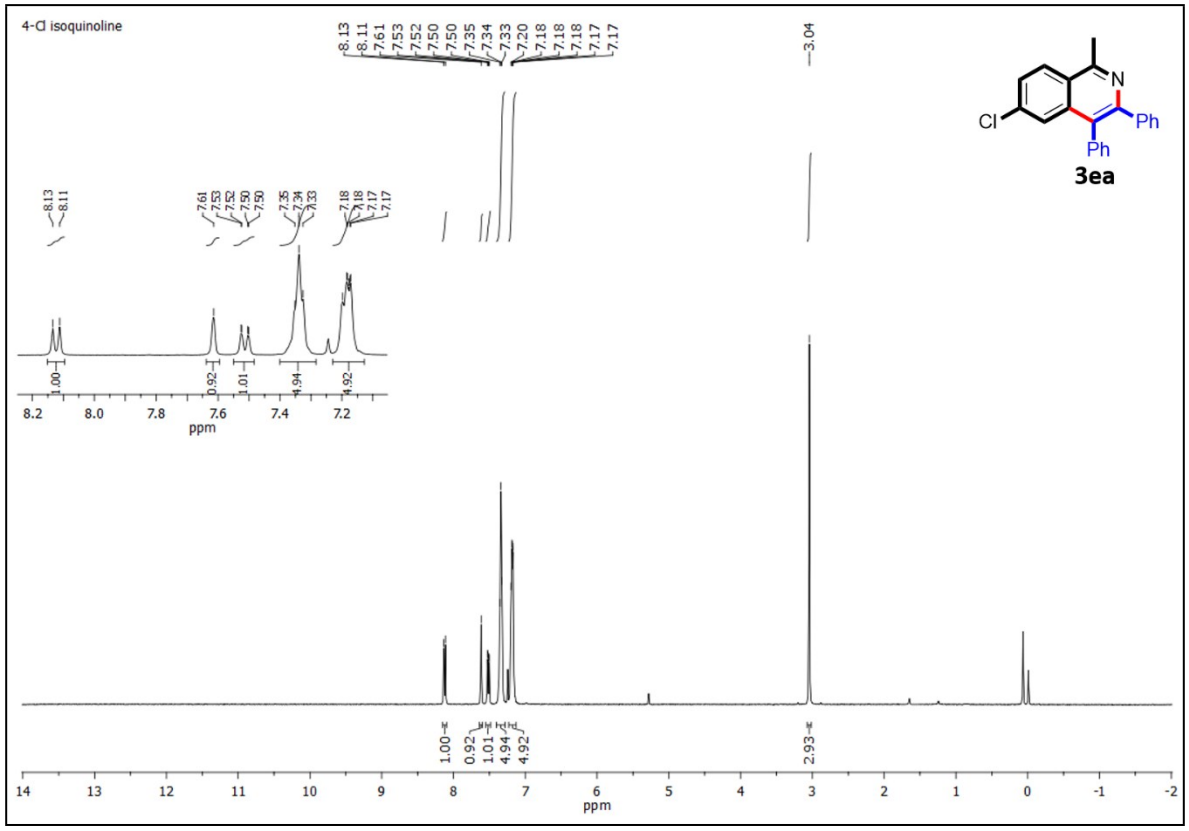



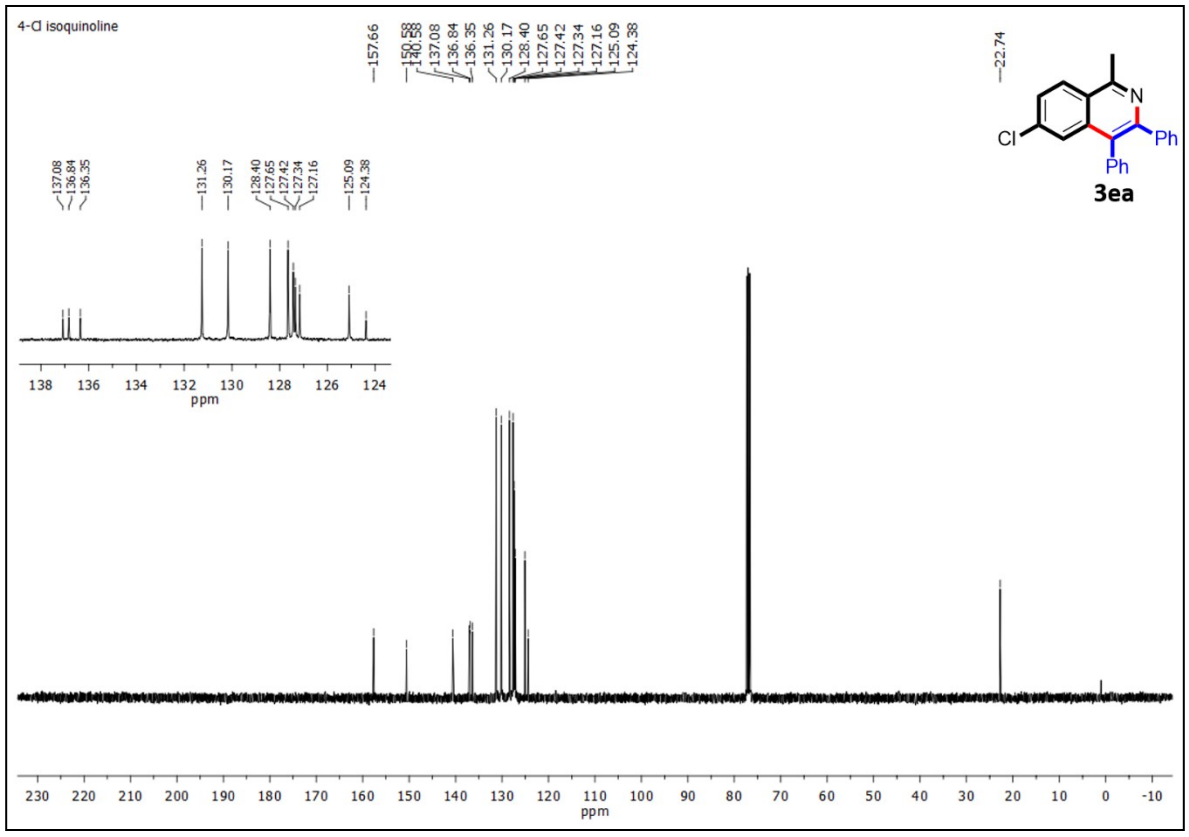
**$^{1}$H & $^{13}$C NMR of 6-Bromo-1-methyl-3,4-diphenylisoquinoline (3da)**



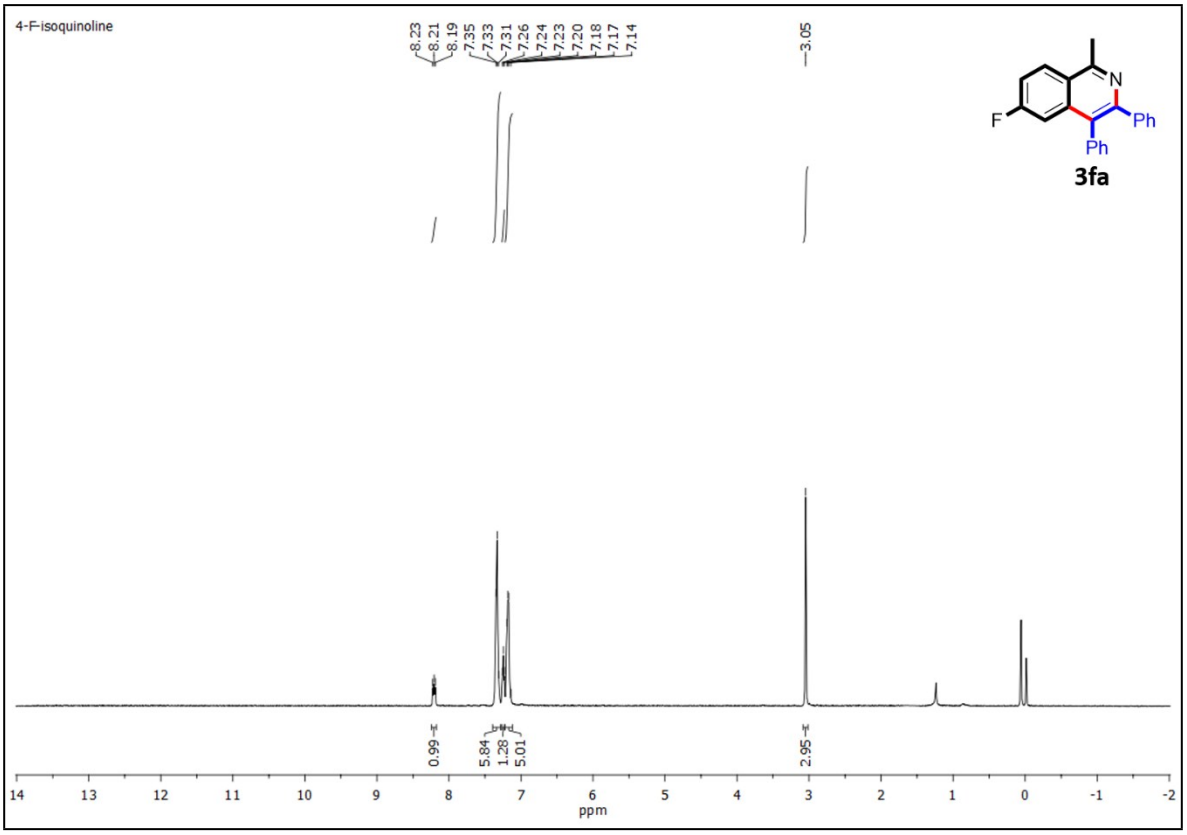



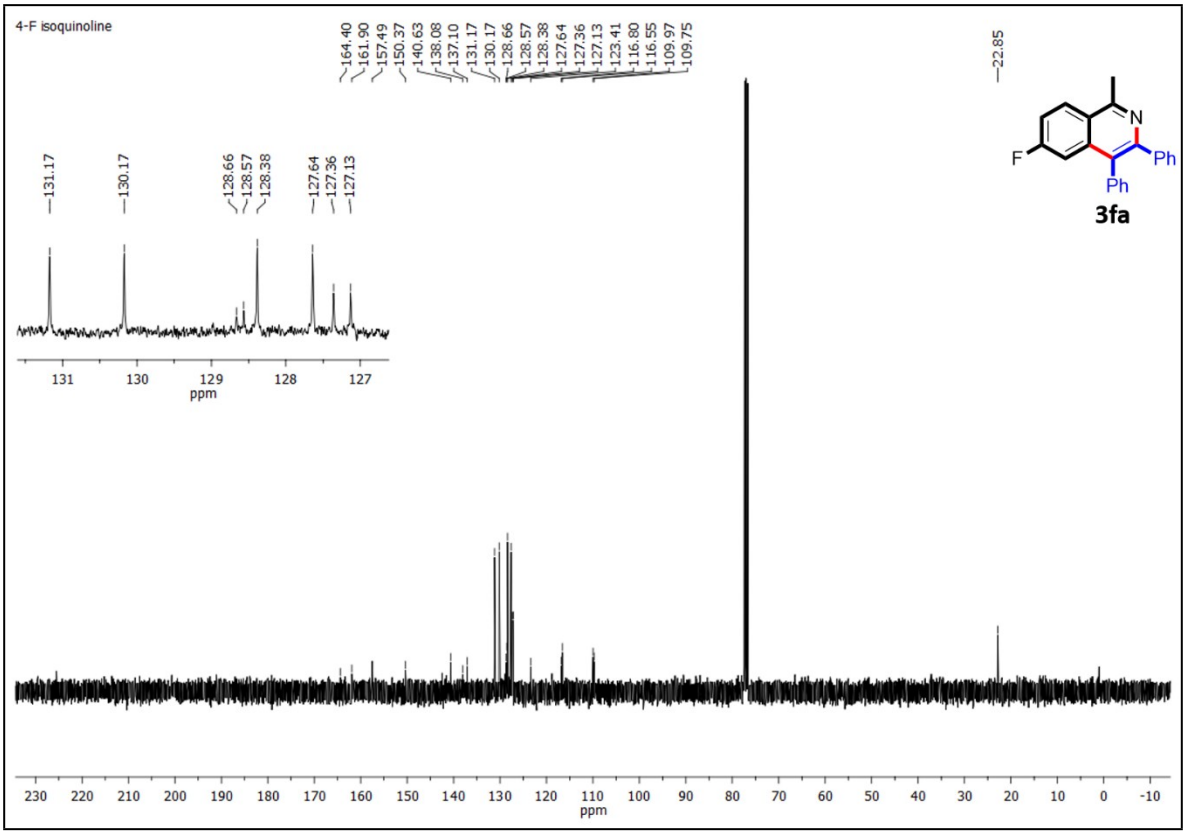
**$^{1}$H & $^{13}$C NMR of 6-Chloro-1-methyl-3,4-diphenylisoquinoline (3ea)**



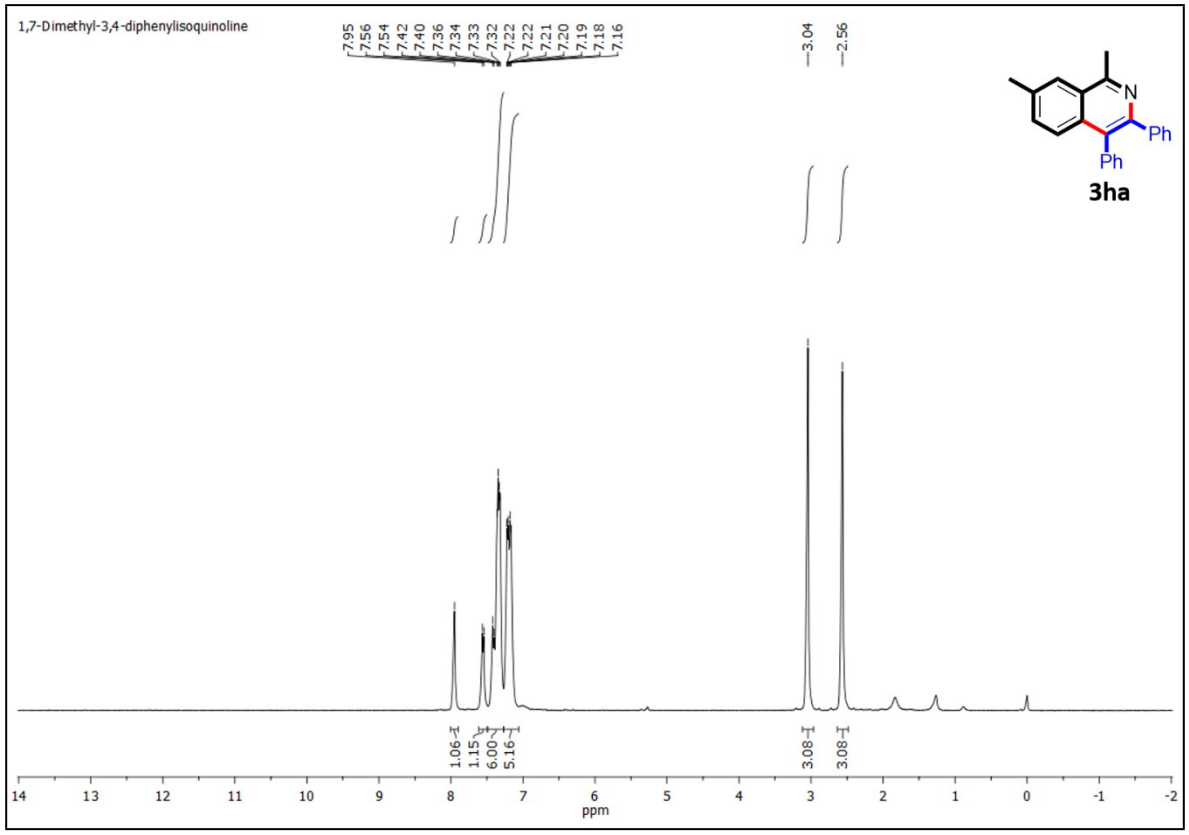



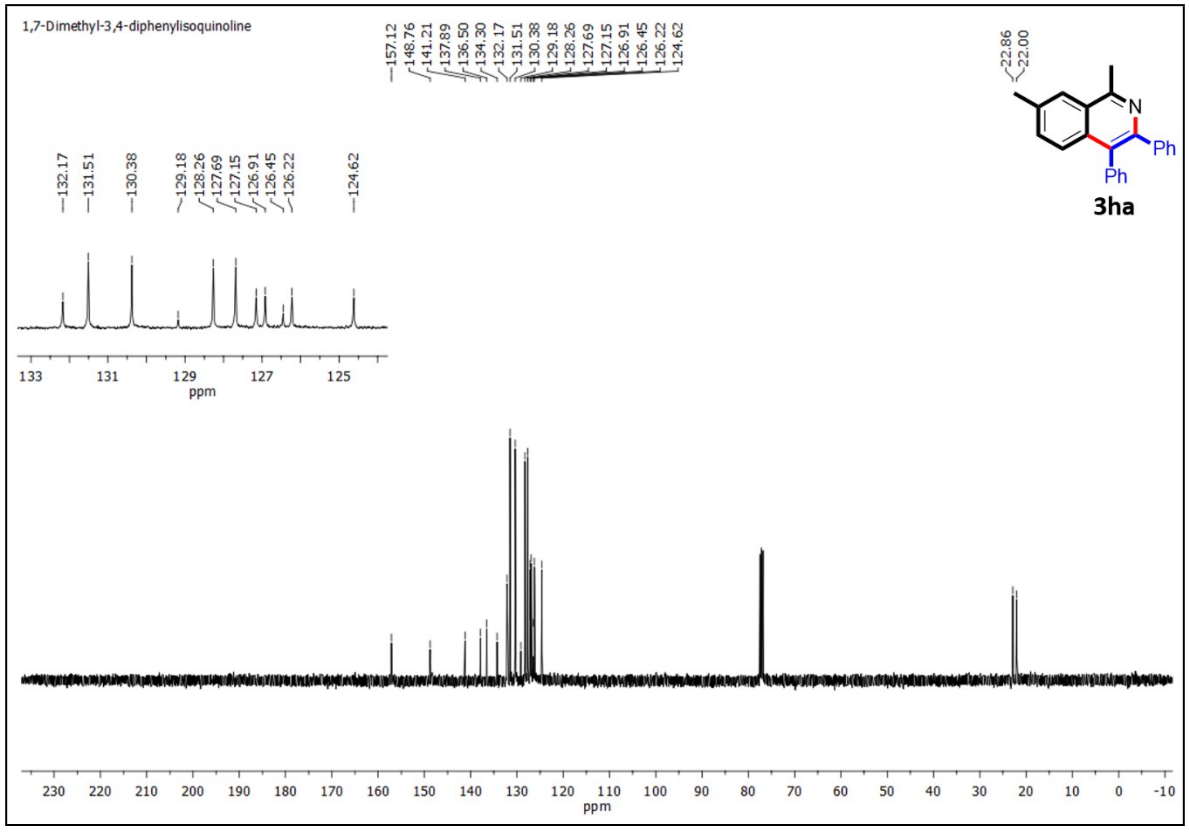
**$^{1}$H & $^{13}$C NMR of 6-Fluoro-1-methyl-3,4-diphenylisoquinoline (3fa)**



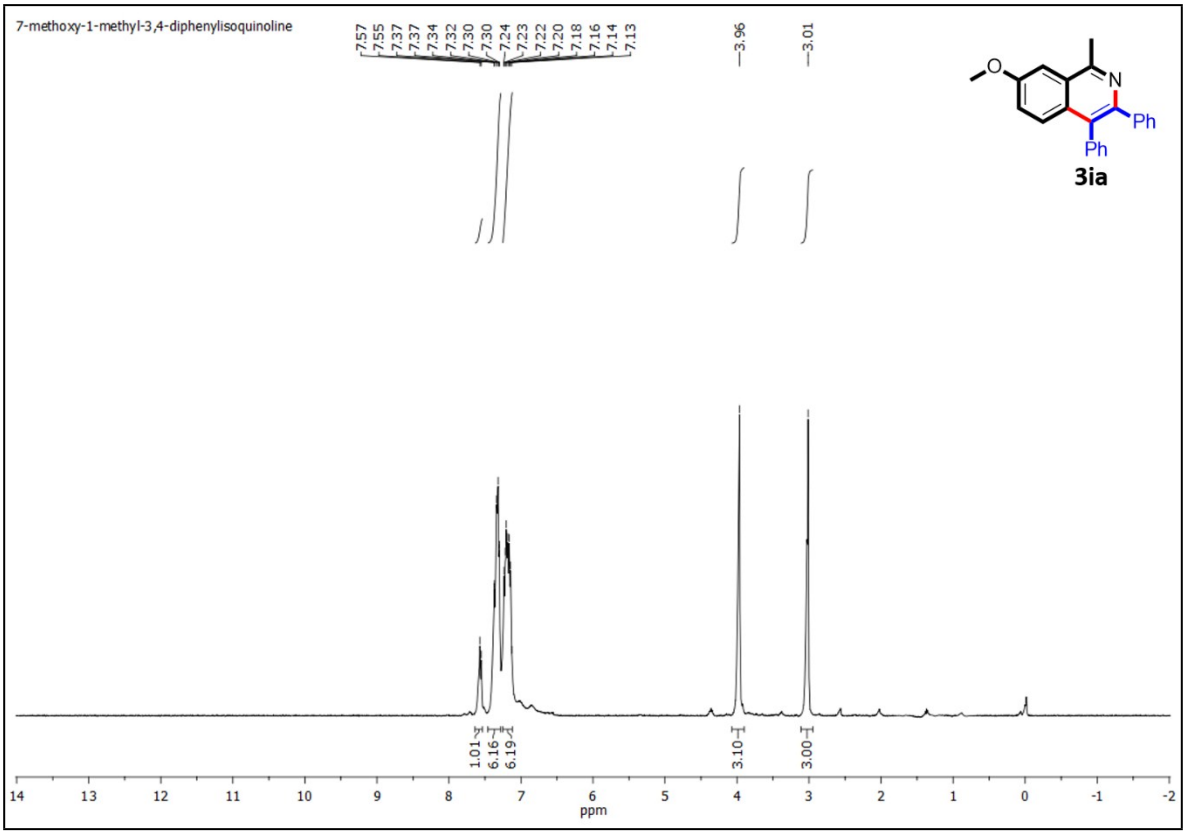



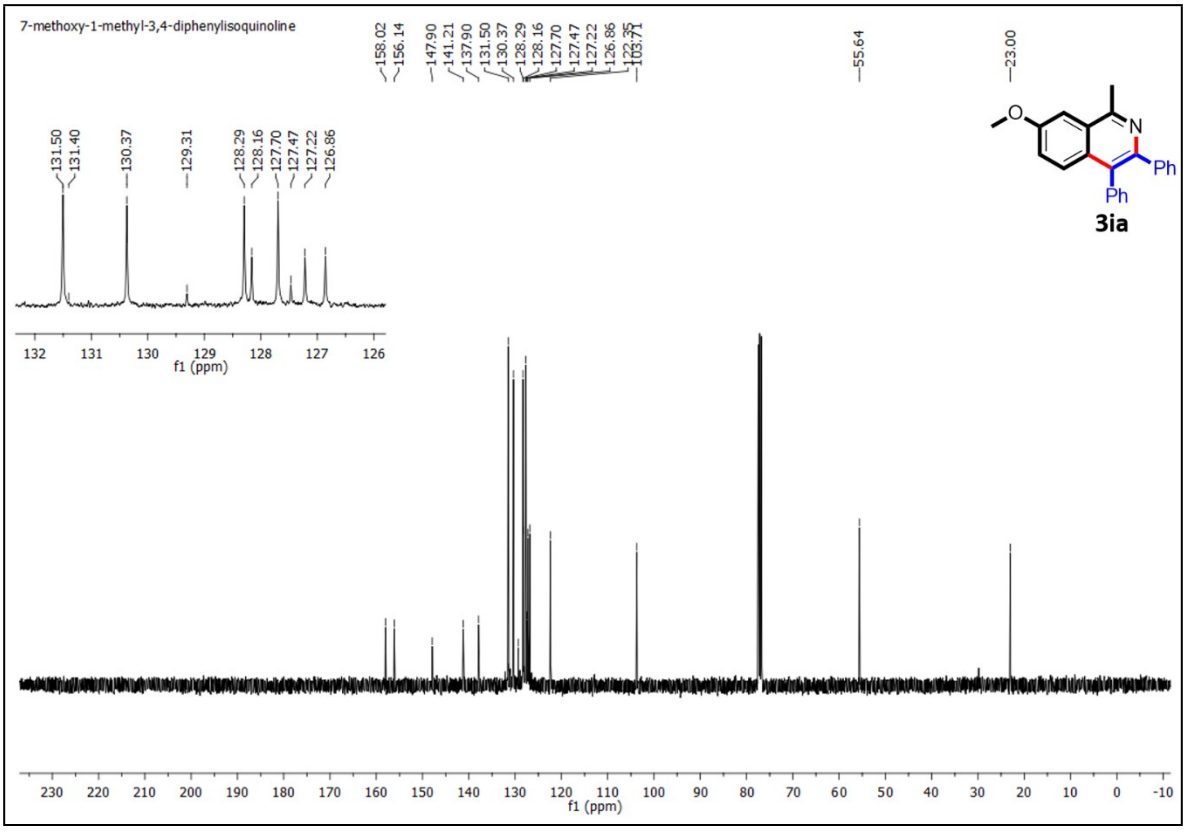
**$^{1}$H & $^{13}$C NMR of 1,7-Dimethyl-3,4-diphenylisoquinoline (3ha)**



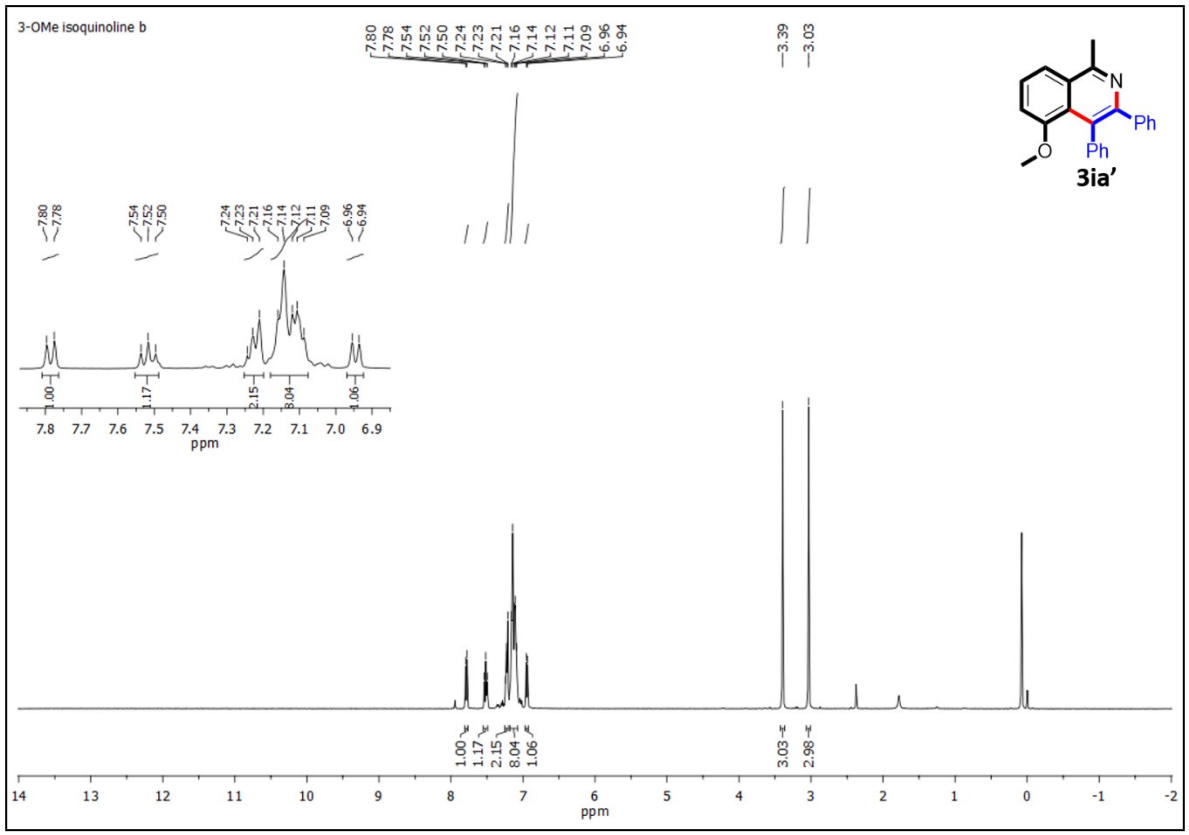



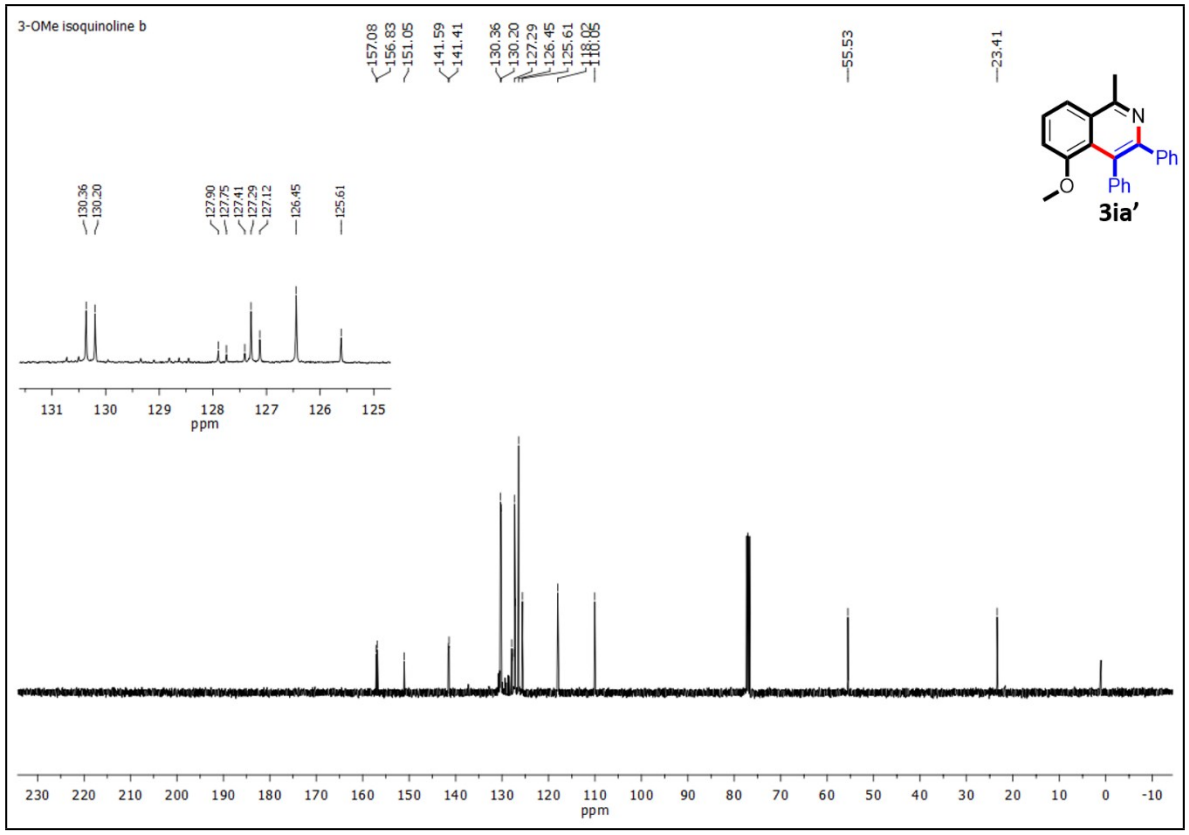
**$^{1}H$ & $^{13}C$ NMR of 7-methoxy-1-methyl-3,4-diphenylisoquinoline (3ia)**



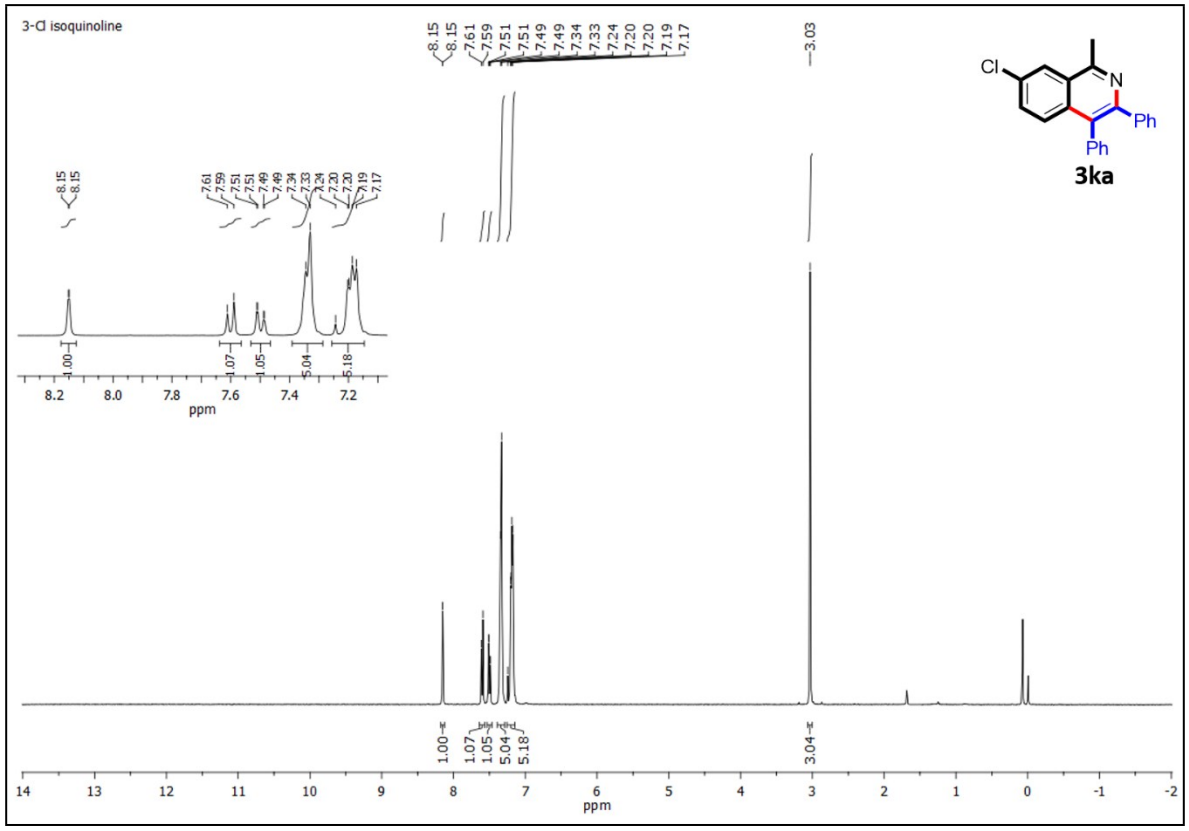



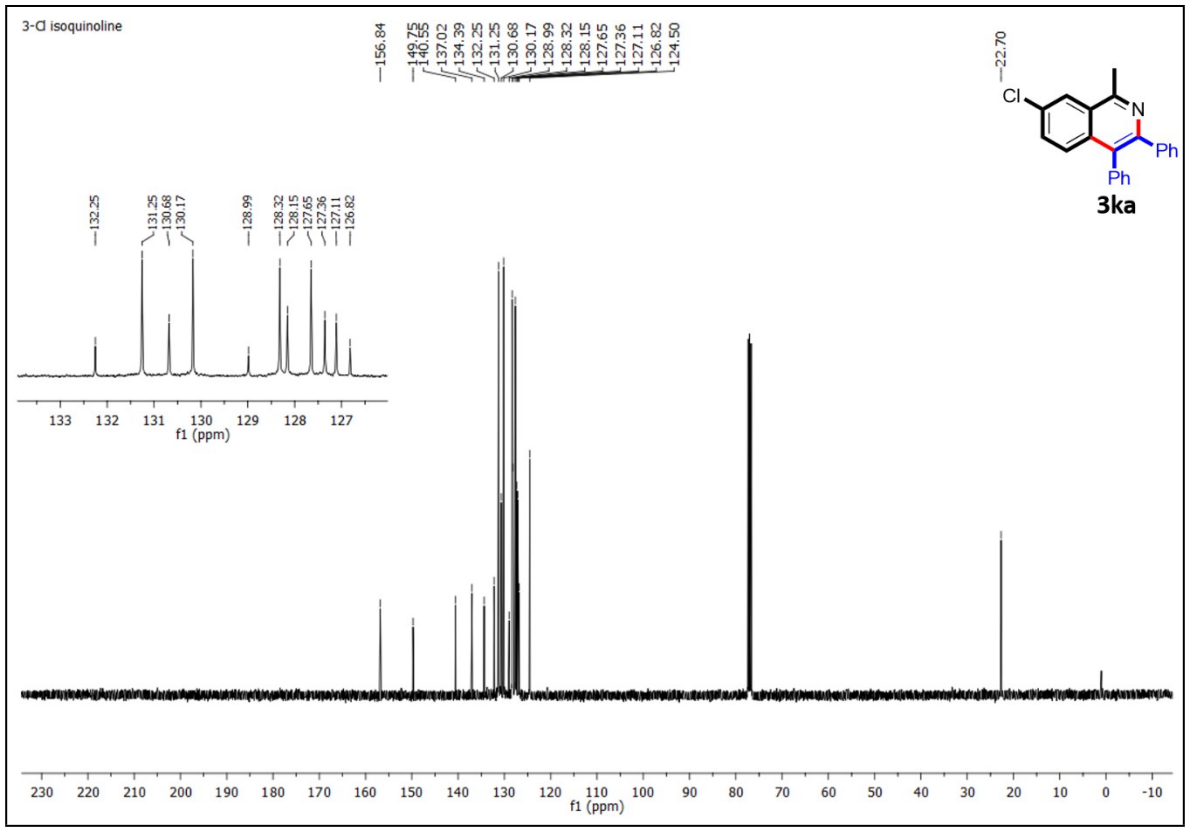
**$^{1}$H & $^{13}$C NMR of 5-Methoxy-1-methyl-3,4-diphenylisoquinoline (3ia')**



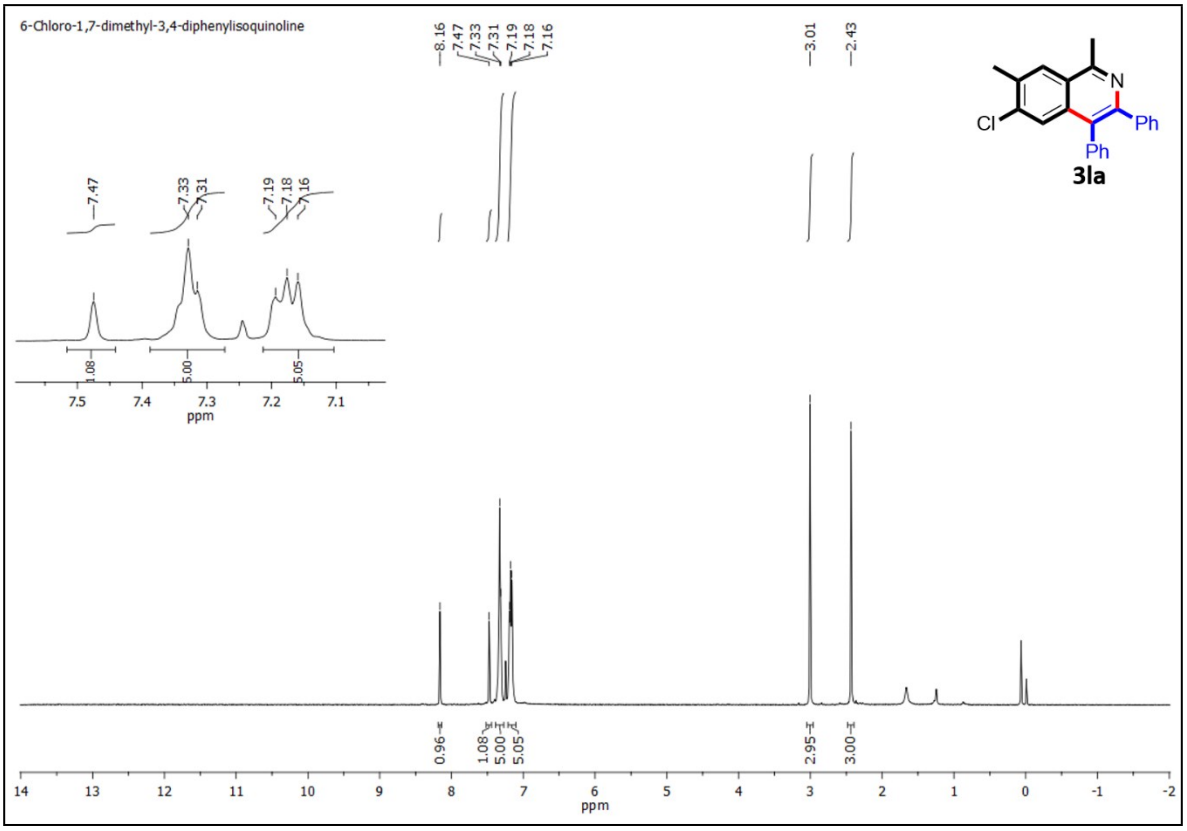



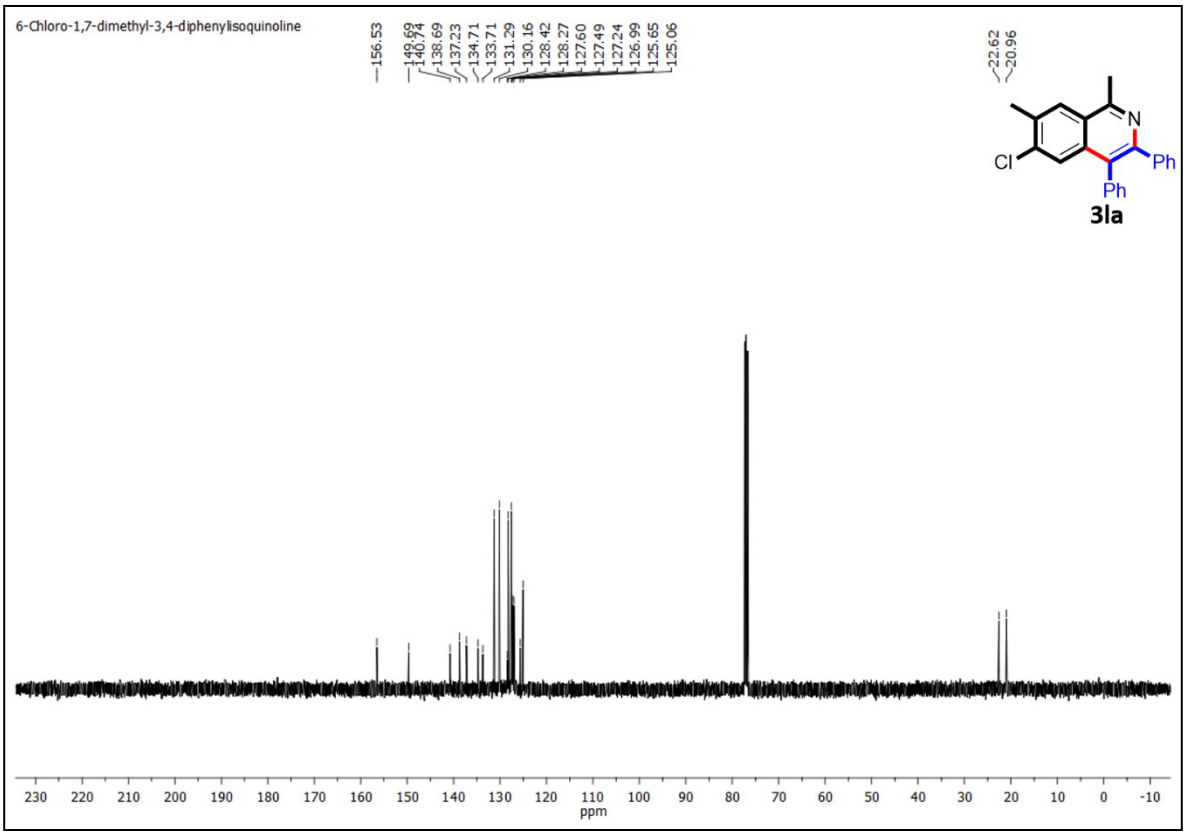
**$^{1}$H & $^{13}$C NMR of 7-Chloro-1-methyl-3,4-diphenylisoquinoline (3ka)**



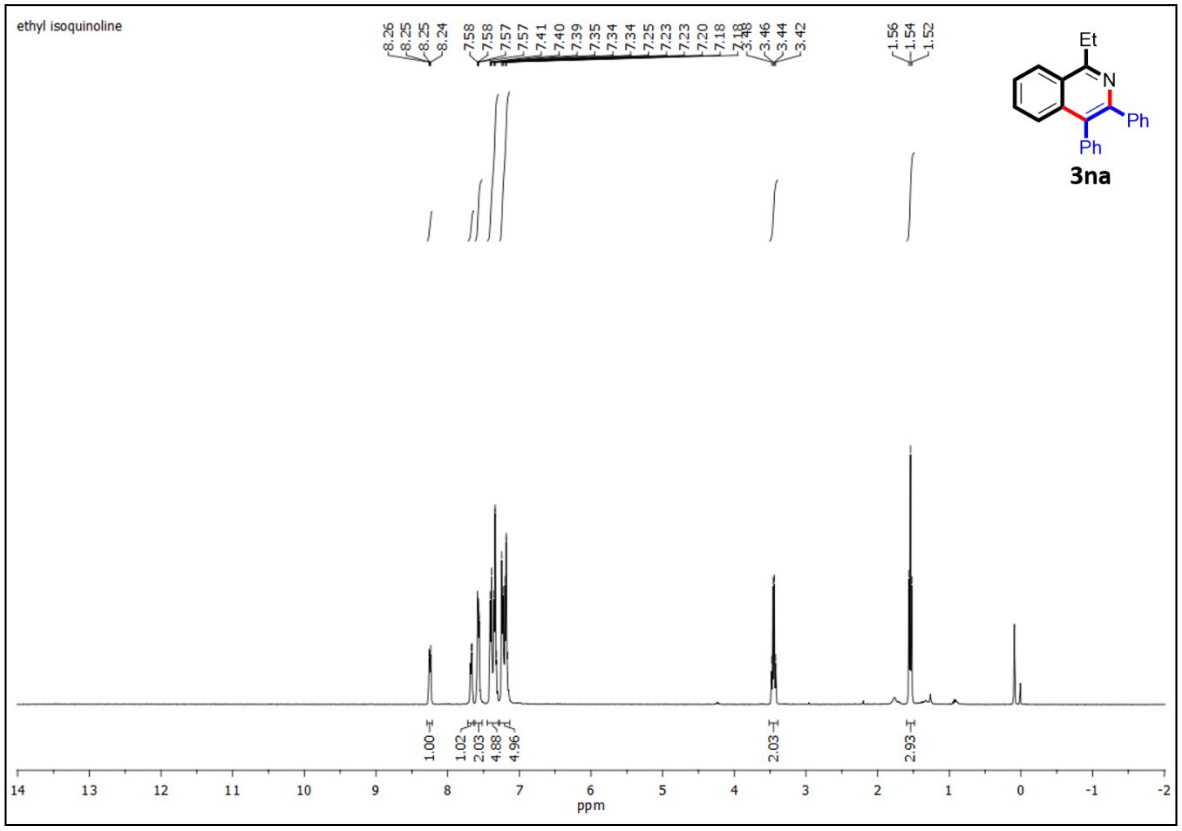



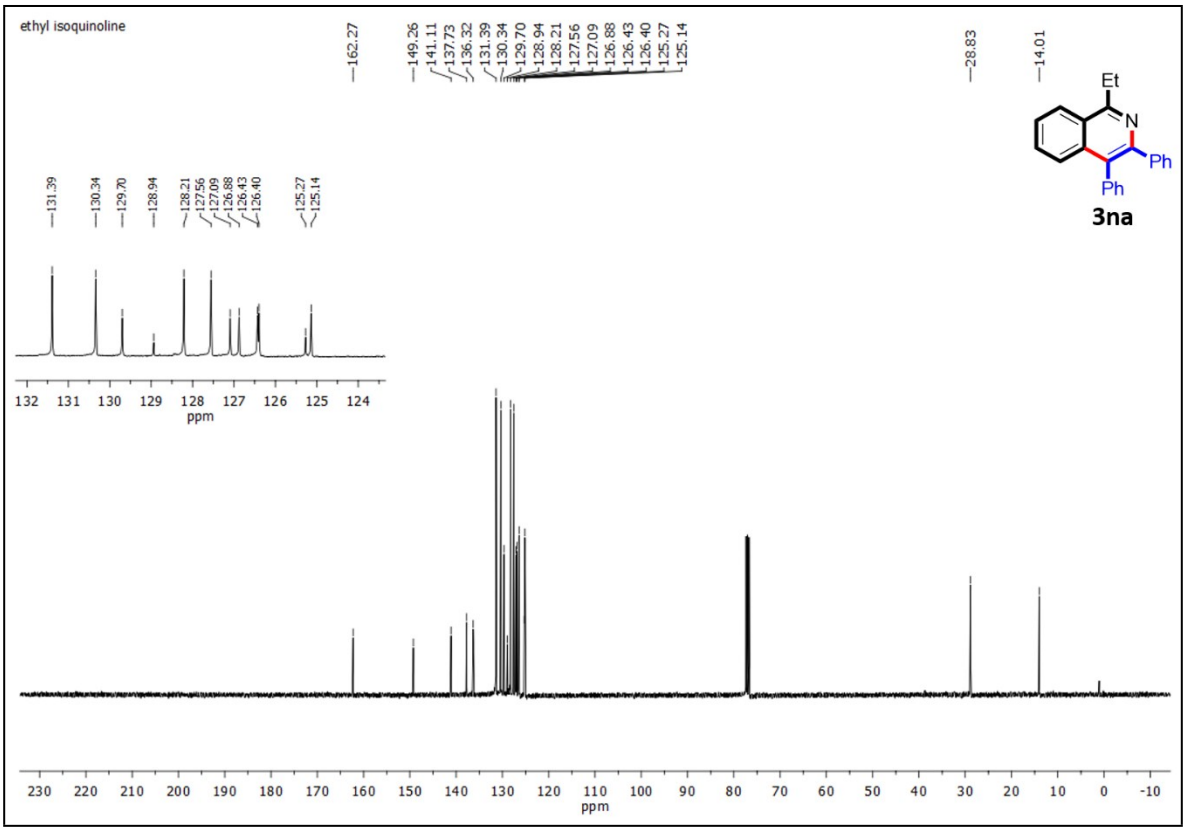
**$^{1}H$ & $^{13}C$ NMR of 6-Chloro-1,7-dimethyl-3,4-diphenylisoquinoline (3la)**



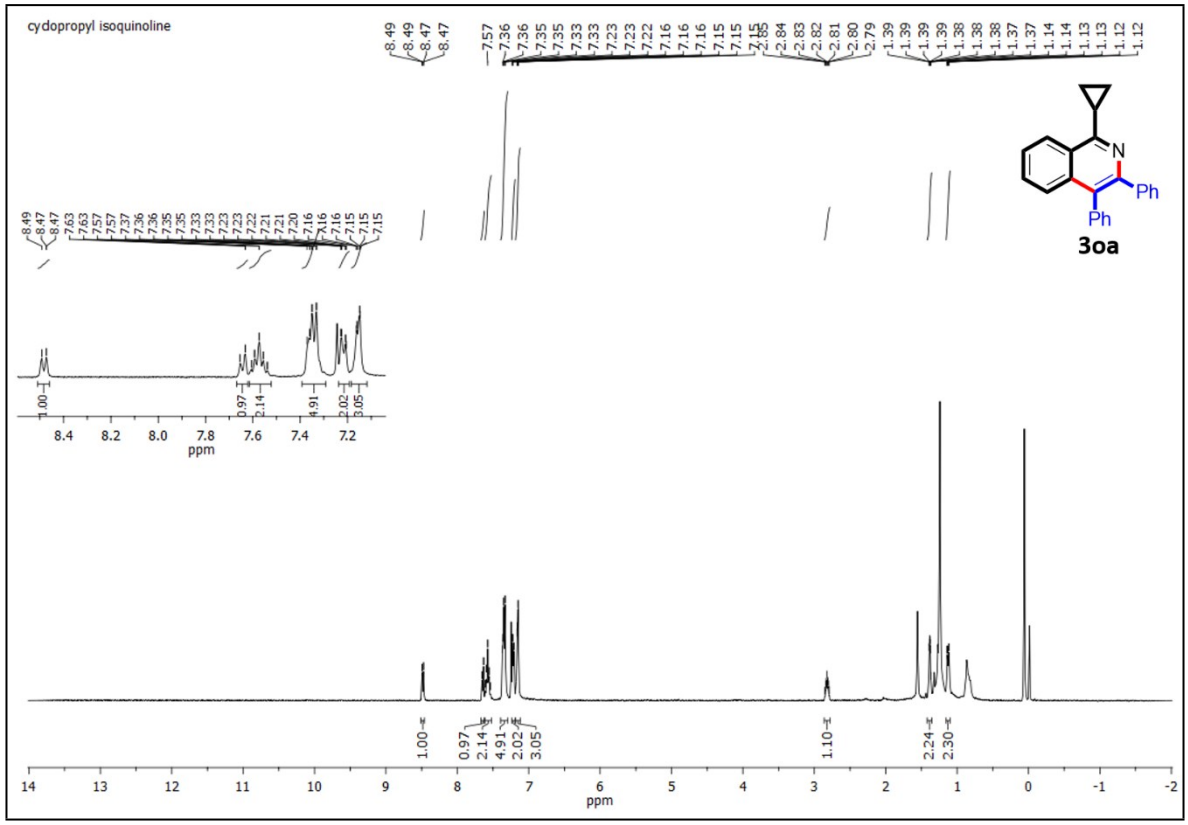



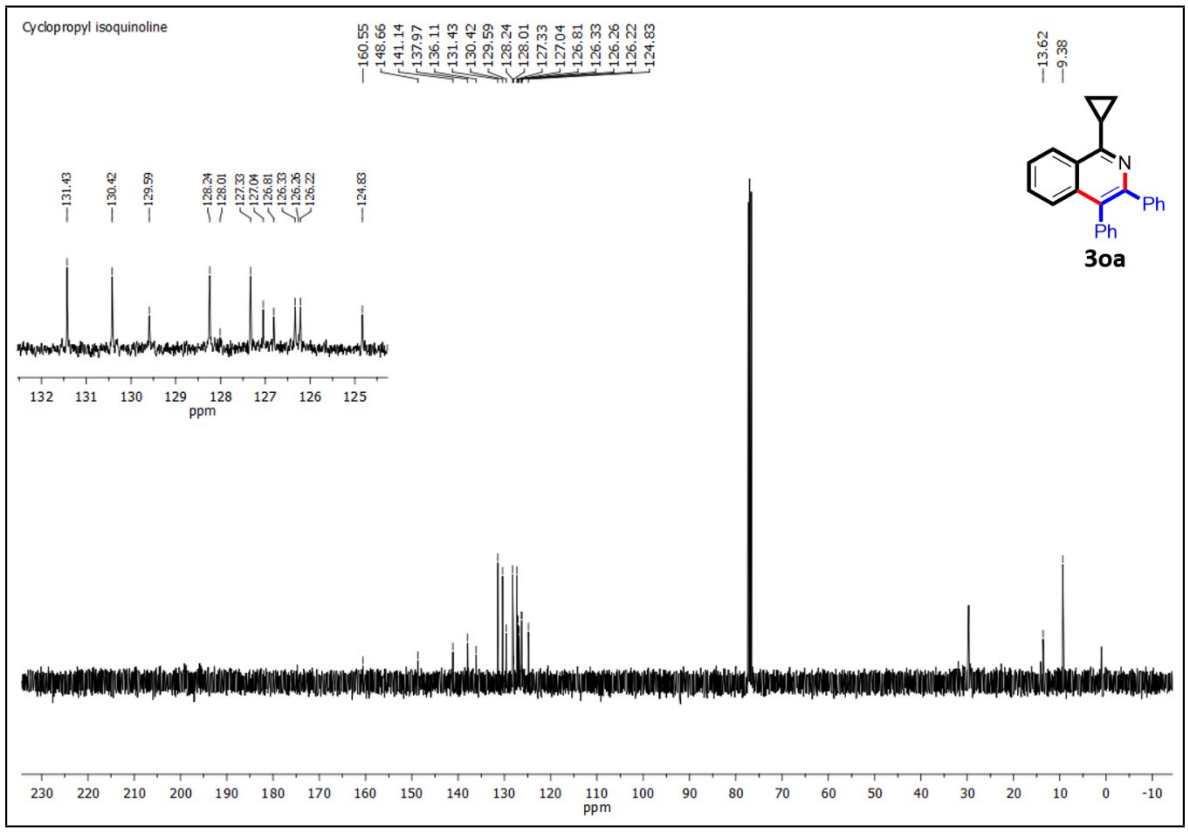
**$^{1}$H & $^{13}$C NMR of 1-Ethyl-3,4-diphenylisoquinoline (3na)**



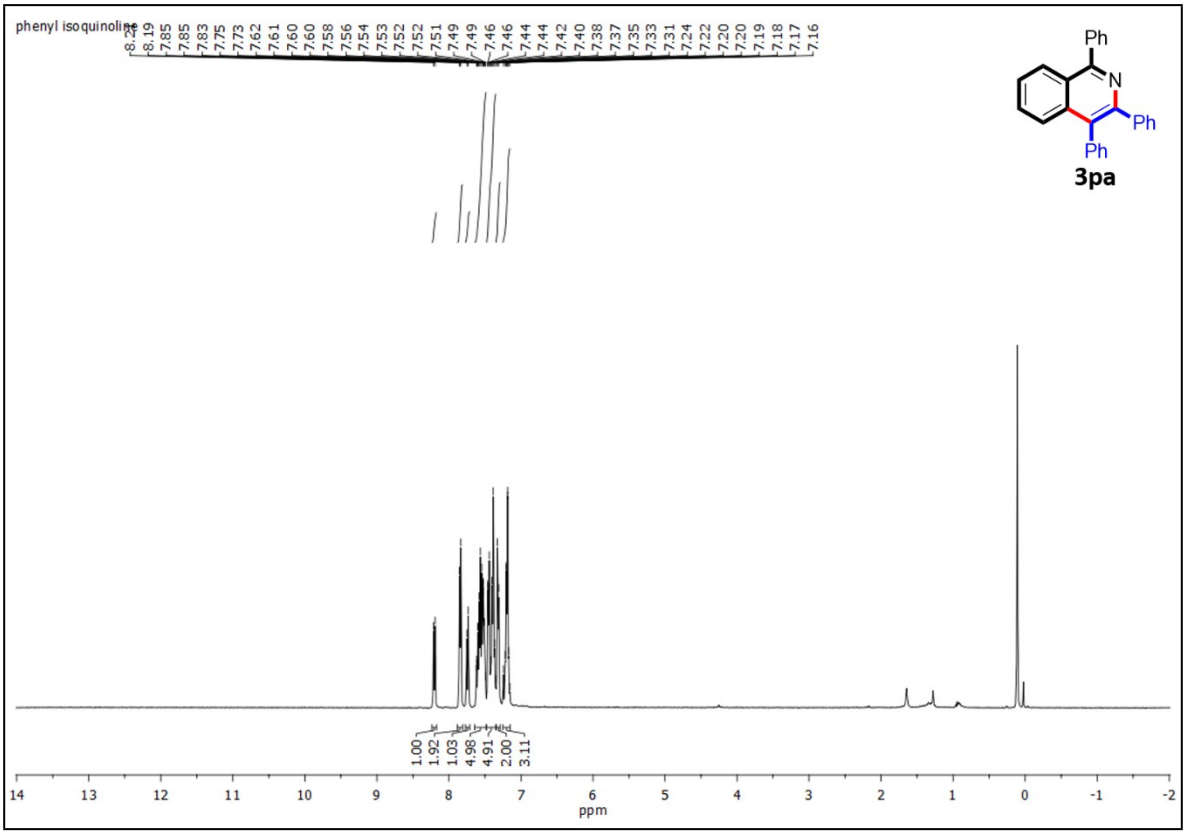



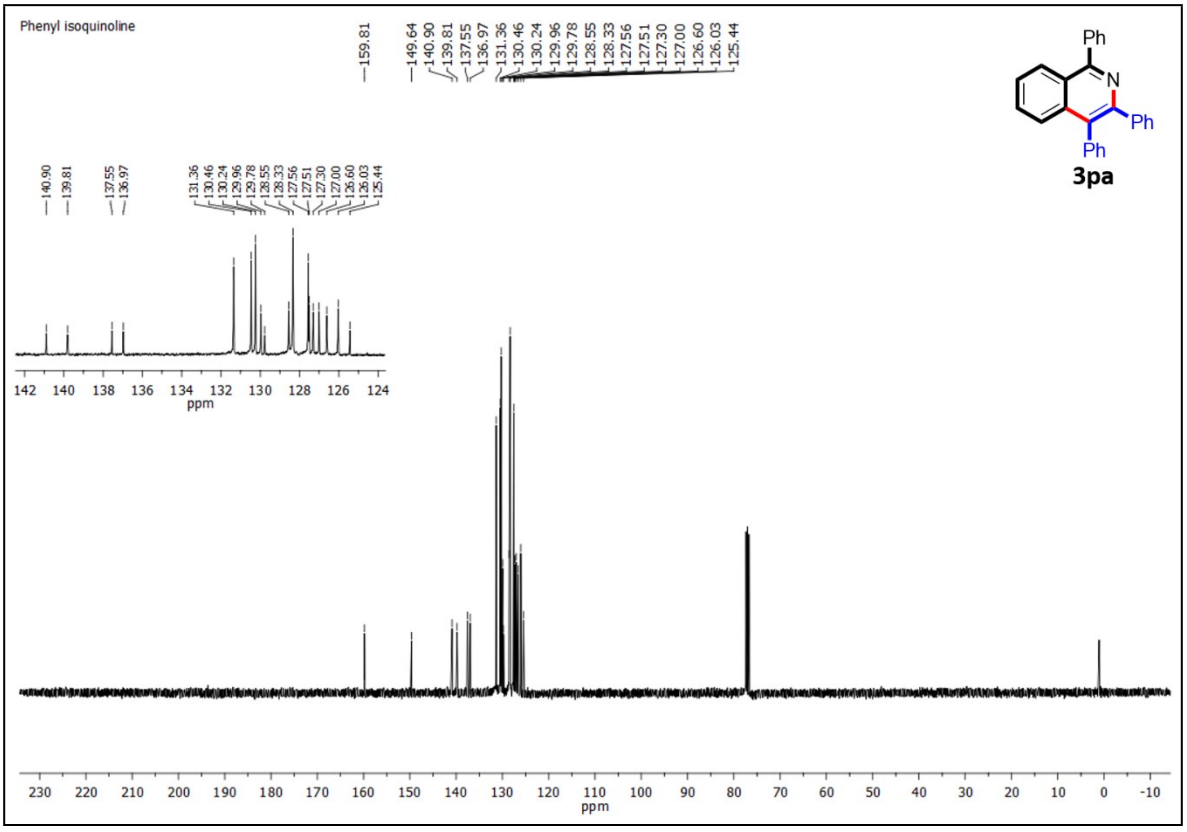
**$^{1}H$ & $^{13}C$ NMR of 1-Cyclopropyl-3,4-diphenylisoquinoline (3oa)**



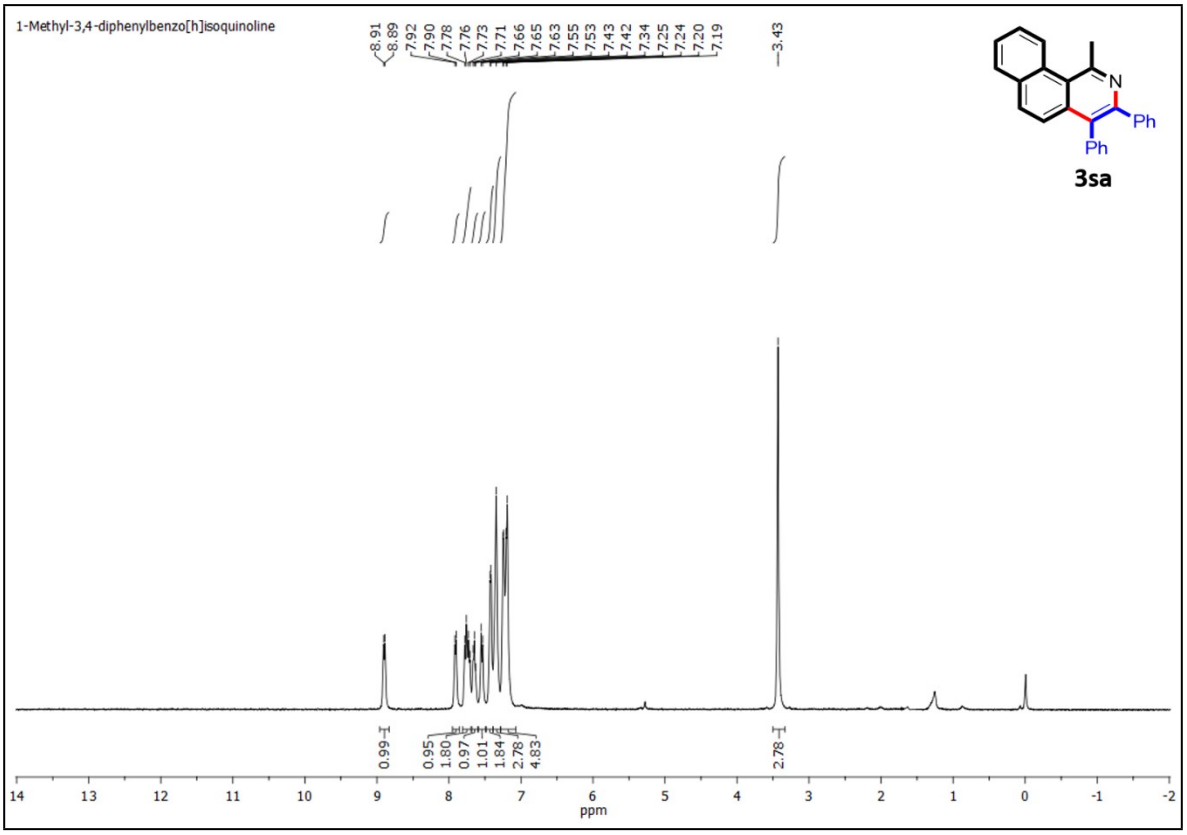



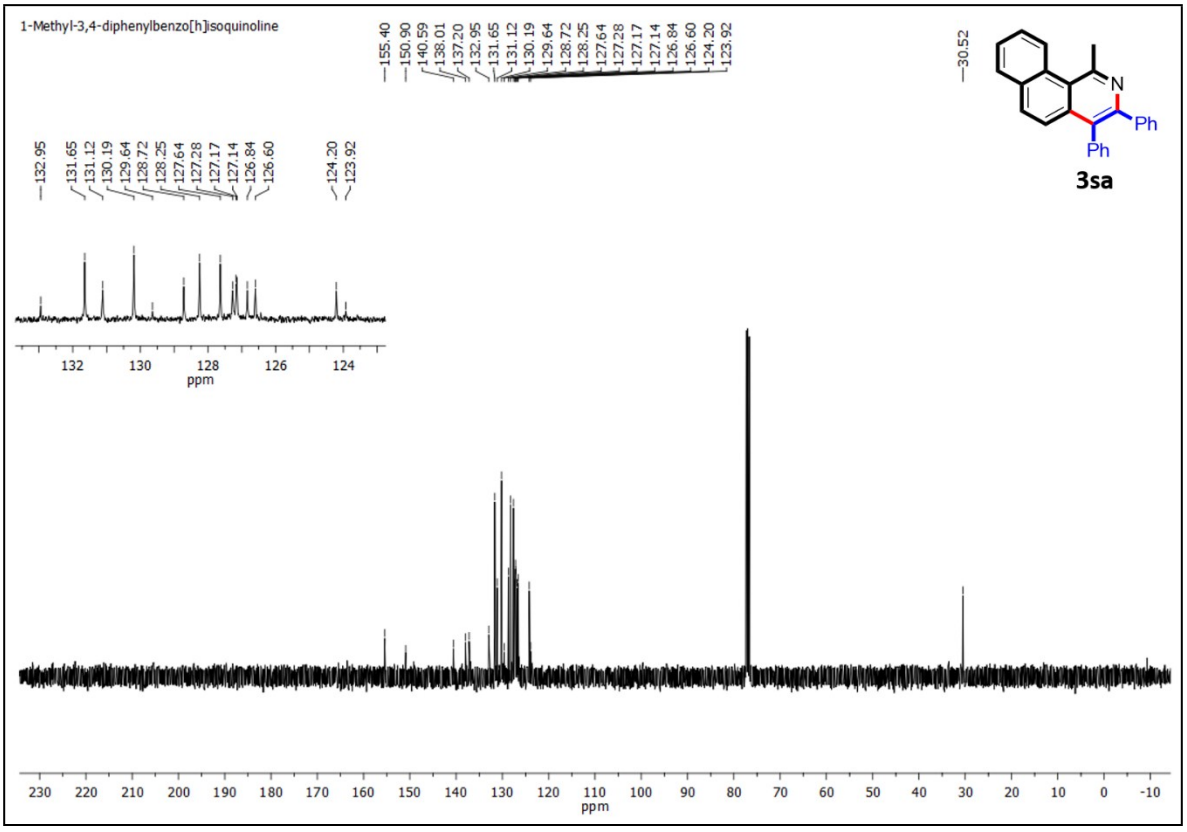
**$^{1}H$ & $^{13}C$ NMR of 1,3,4-Triphenylisoquinoline (3pa)**



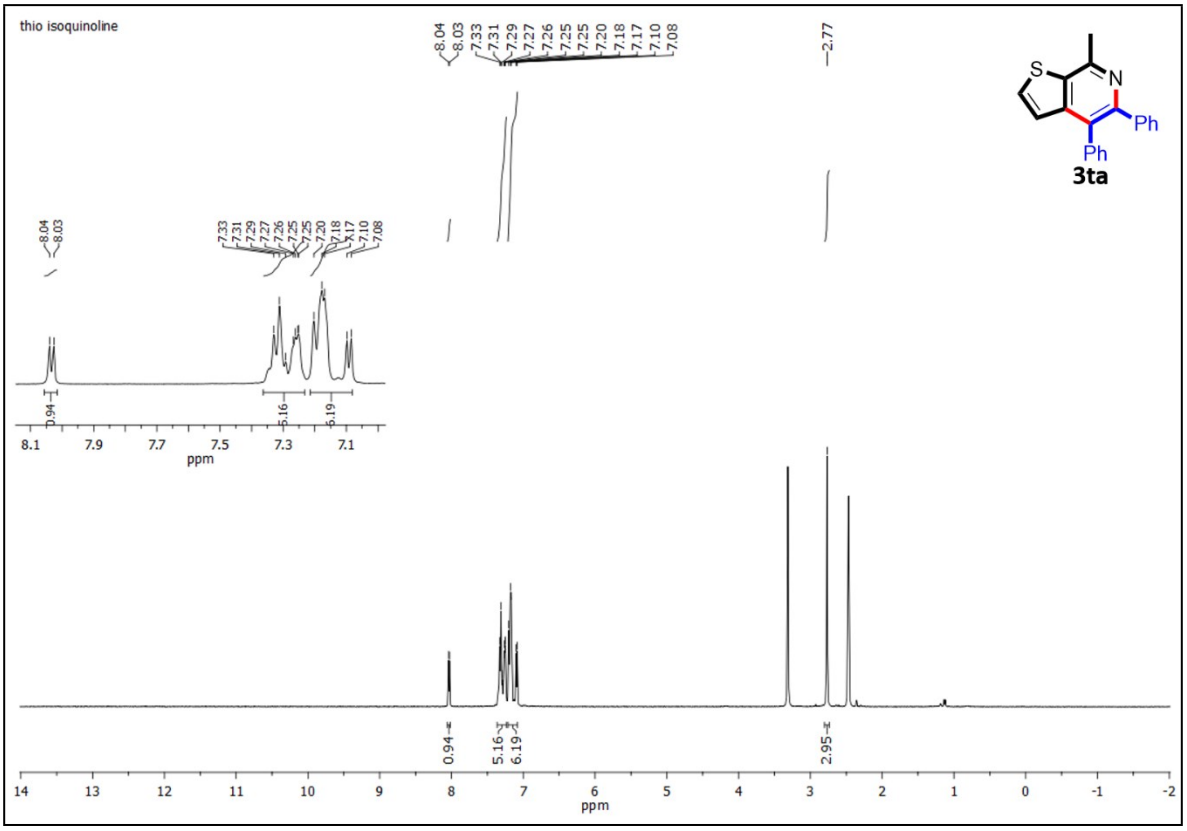



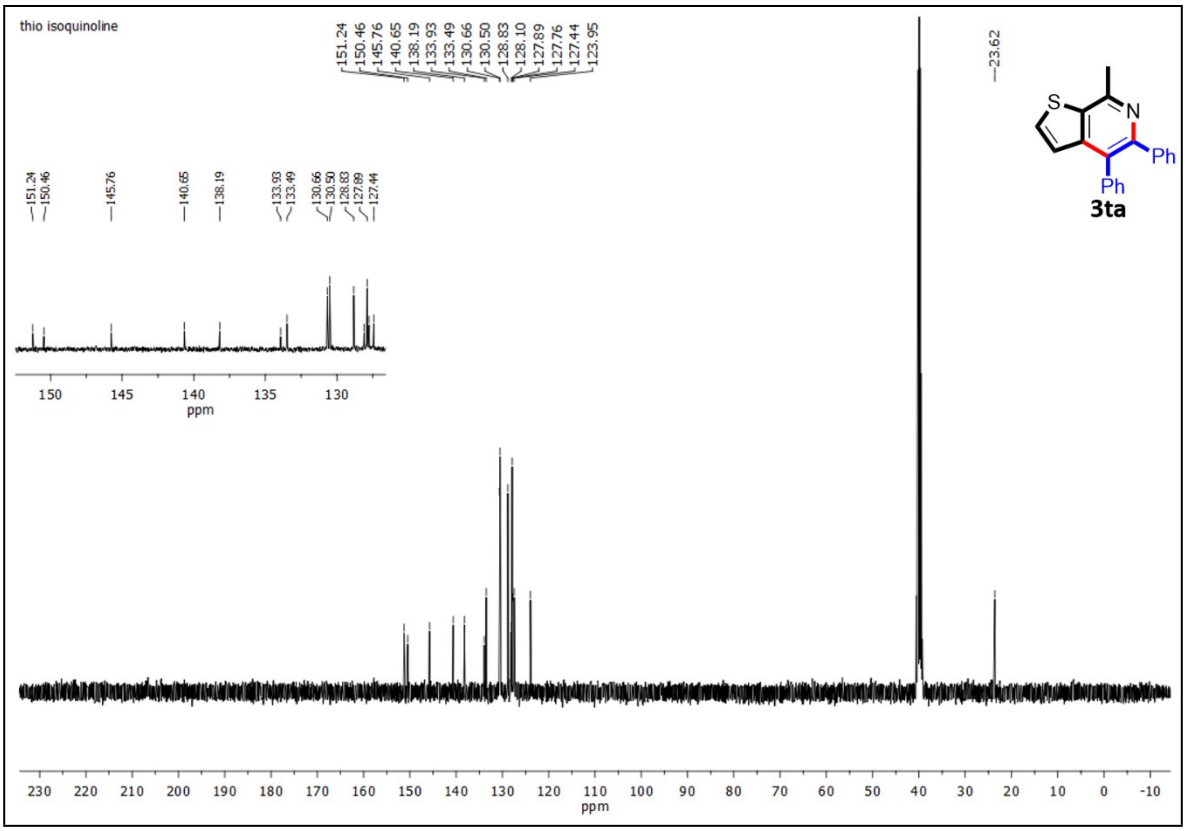
**$^{1}$H & $^{13}$C NMR of 1-Methyl-3,4-diphenylbenzo[h]isoquinoline (3sa)**



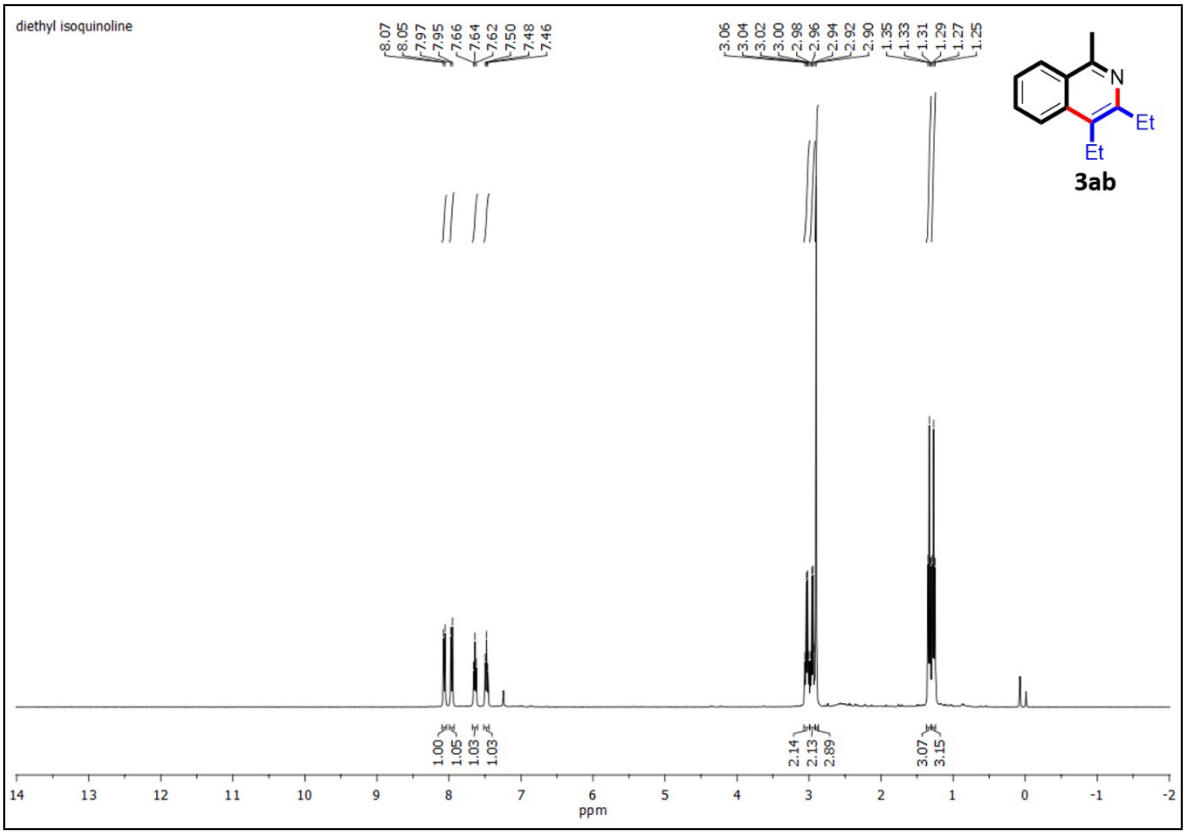



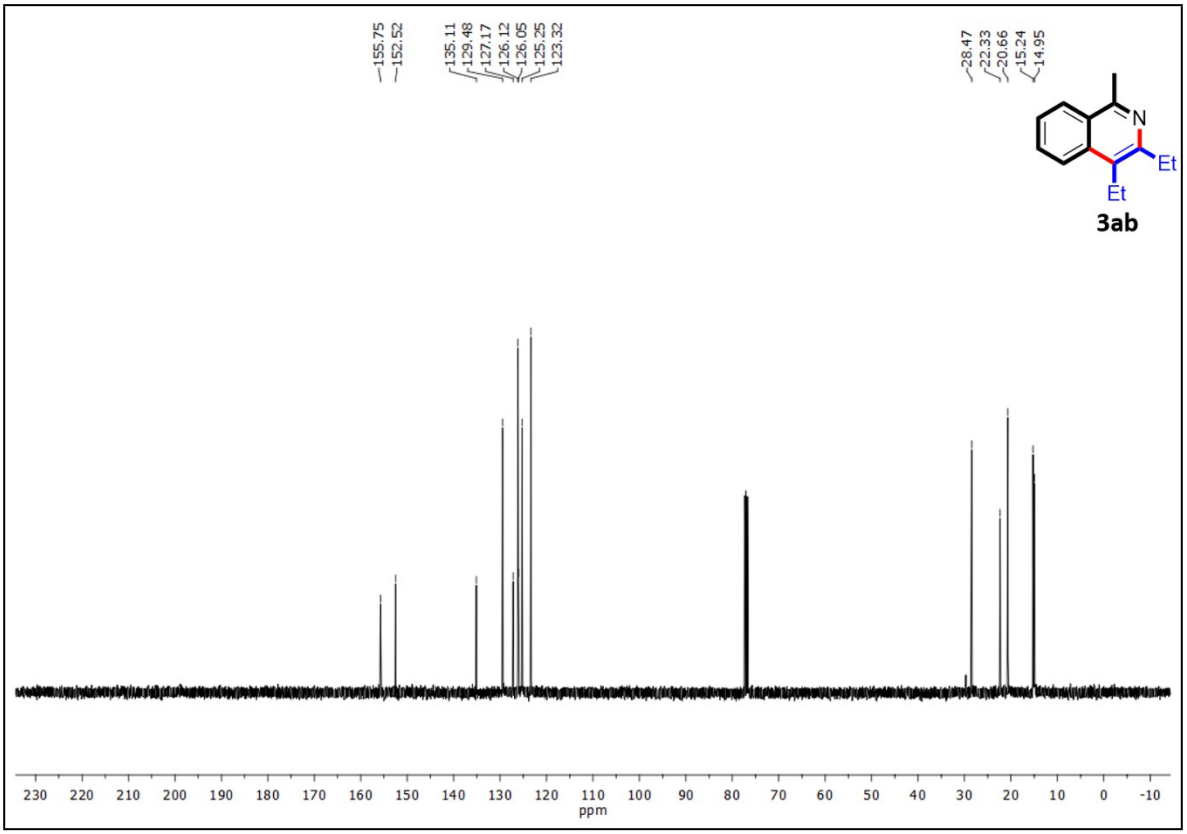
**$^{1}$H & $^{13}$C NMR of 7-Methyl-4,5-diphenylthieno[2,3-c]pyridine (3ta)**



**$^{1}H$ & $^{13}C$ NMR of 3,4-Diethyl-1-methylisoquinoline (3ab)**



**$^{1}$H & $^{13}$C NMR of 4-ethyl-1-methyl-3-phenylisoquinoline (3ac)**