

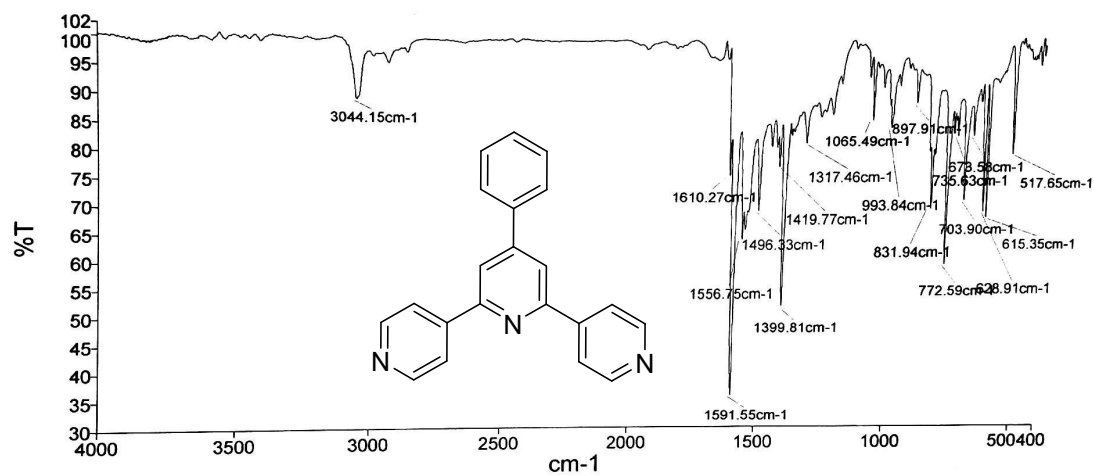
A convenient method for synthesis of terpyridines *via* a cooperative vinylogous anomeric based oxidation

Fatemeh Karimi, Meysam Yarie, Mohammad Ali Zolfigol*

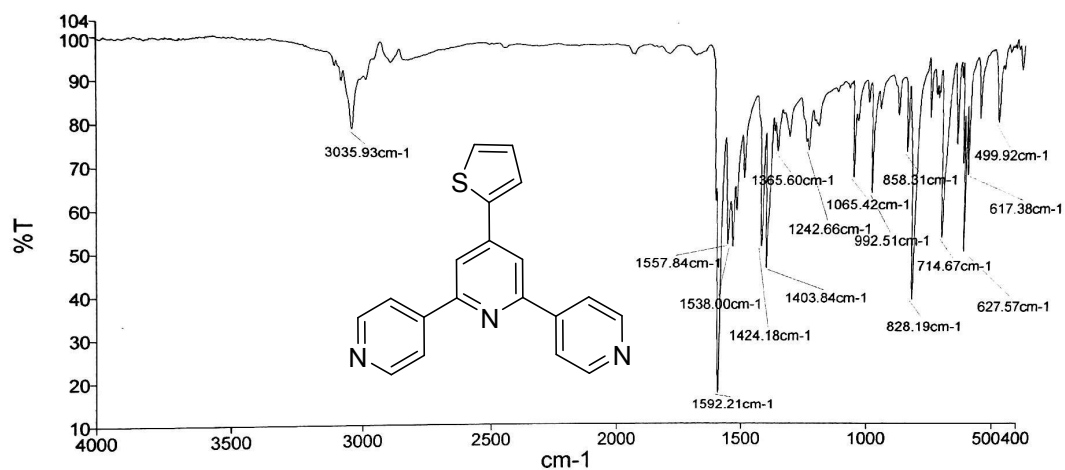
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1. FT-IR spectrum of 4'- Phenyl-4,2':6',4''-terpyridine (**1a**)
2. FT-IR spectrum of 4'- (2-Thiophenyl)-4,2':6',4''-terpyridine (**1b**)
3. ¹H NMR spectrum of 4'- (2-Thiophenyl)-4,2':6',4''-terpyridine (**1b**)
4. ¹³C NMR spectrum of 4'- (2-Thiophenyl)-4,2':6',4''-terpyridine (**1b**)
5. FT-IR spectrum of 4'- (4-Chlorophenyl)-4,2':6',4''-terpyridine (**1e**)
6. ¹H NMR spectrum of 4'- (4-Chlorophenyl)-4,2':6',4''-terpyridine (**1e**)
7. ¹³C NMR spectrum of 4'- (4-Chlorophenyl)-4,2':6',4''-terpyridine (**1e**)
8. FT-IR spectrum of 4'- (3-Pyridyl)-4,2':6',4''-terpyridine (**1f**)
9. FT-IR spectrum of 4'-Phenyl-3,2':6',3''-terpyridine (**2a**)
10. ¹H NMR spectrum of 4'-Phenyl-3,2':6',3''-terpyridine (**2a**)
11. ¹³C NMR spectrum of 4'-Phenyl-3,2':6',3''-terpyridine (**2a**)
12. FT-IR spectrum of 4'-(2- Thiophenyl)-3,2':6',3''-terpyridine (**2b**)
13. ¹H NMR spectrum of 4'-(2- Thiophenyl)-3,2':6',3''-terpyridine (**2b**)
14. ¹³C NMR spectrum of 4'-(2- Thiophenyl)-3,2':6',3''-terpyridine (**2b**)
15. FT-IR spectrum of 4'-(4- Methoxyphenyl)-3,2':6',3''-terpyridine (**2c**)
16. ¹H NMR spectrum of 4'-(4- Methoxyphenyl)-3,2':6',3''-terpyridine (**2c**)
17. ¹H NMR spectrum of 4'-(4- Methoxyphenyl)-3,2':6',3''-terpyridine (**2c**)
18. FT-IR spectrum of 4'-(4- Chlorophenyl)-3,2':6',3''-terpyridine (**2e**)
19. ¹H NMR spectrum of 4'-(4- Chlorophenyl)-3,2':6',3''-terpyridine (**2e**)
20. ¹³C NMR spectrum of 4'-(4- Chlorophenyl)-3,2':6',3''-terpyridine (**2e**)
21. FT-IR spectrum of 4'-Phenyl-2,2':6',2''-terpyridine (**3a**)
22. FT-IR spectrum of 4'-(3- Pyridyl)-2,2':6',2''-terpyridine (**3b**)
23. FT-IR spectrum of 4'-(2- Hydroxyphenyl)-2,2':6',2''-terpyridine (**3c**)
24. FT-IR spectrum of 4'-(4- Chlorophenyl)-2,2':6',2''-terpyridine (**3d**)
25. FT-IR spectrum of 4'-(4- Methylphenyl)-2,2':6',2''-terpyridine (**3e**)
26. ¹H NMR spectrum of 4'-(4- Methylphenyl)-2,2':6',2''-terpyridine (**3e**)
27. ¹³C NMR spectrum of 4'-(4- Methylphenyl)-2,2':6',2''-terpyridine (**3e**)

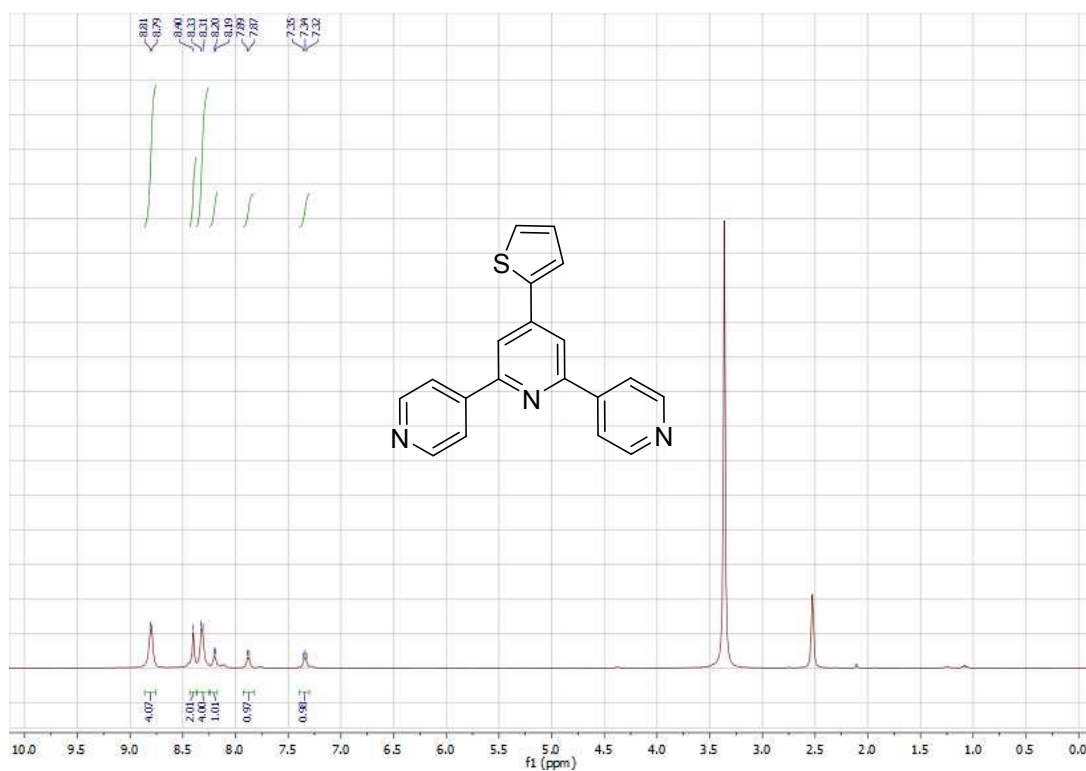
1. FT-IR spectrum of 4'-Phenyl-4,2':6',4''-terpyridine (1a)



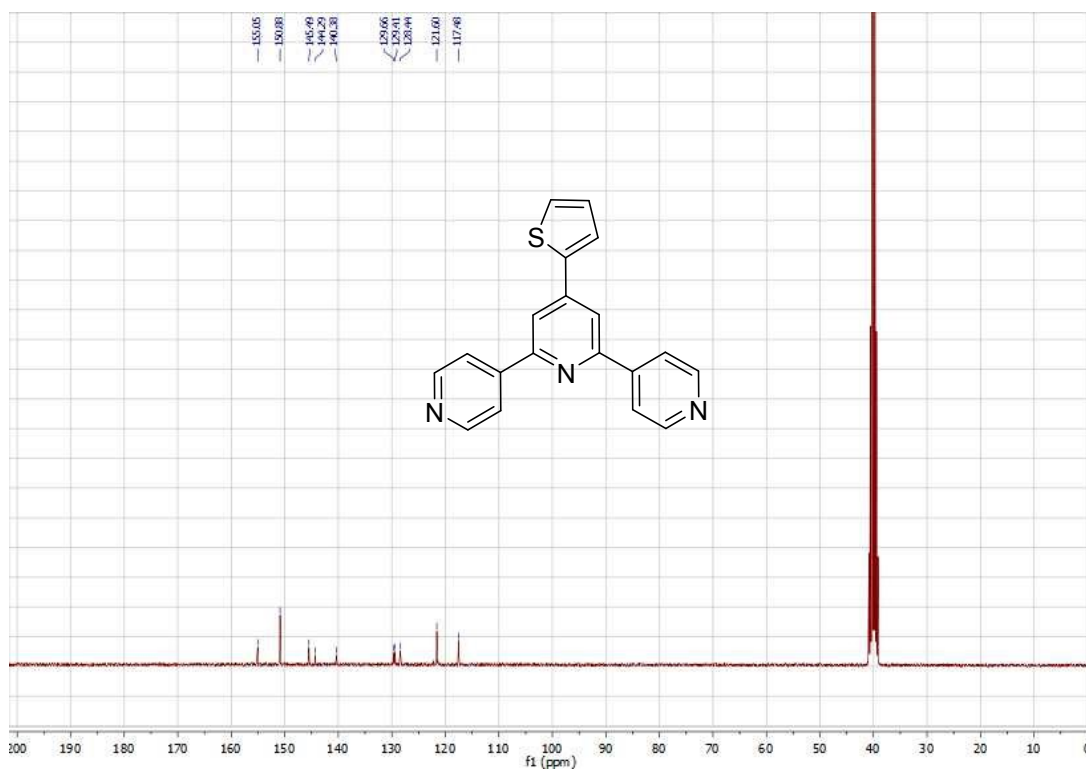
2. FT-IR spectrum of 4'-(2-Thiophenyl)-4,2':6',4''-terpyridine (1b)



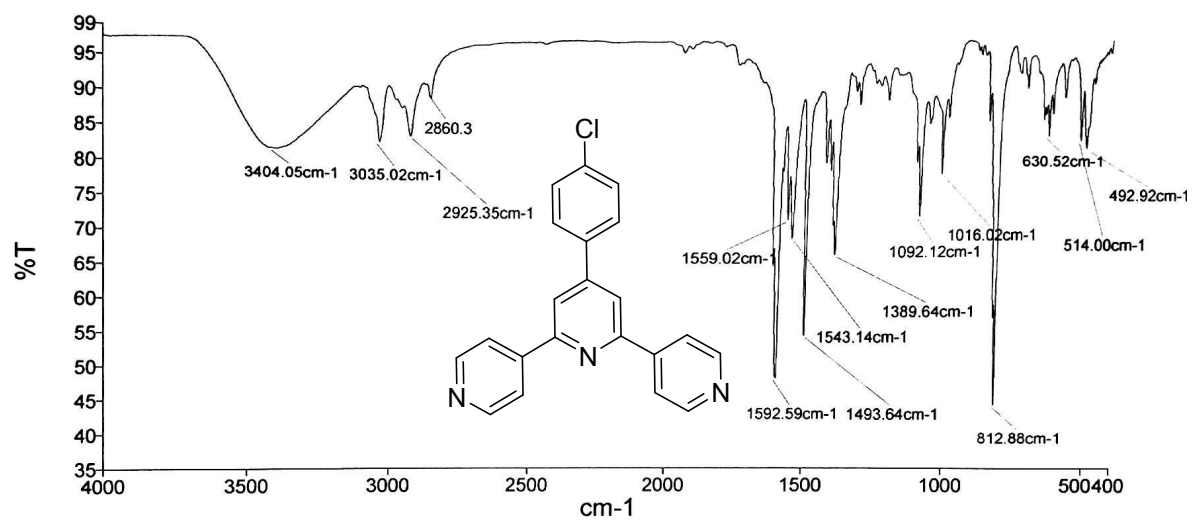
3. ^1H NMR spectrum of 4'-(2-Thiophenyl)-4,2':6',4''-terpyridine (1b)



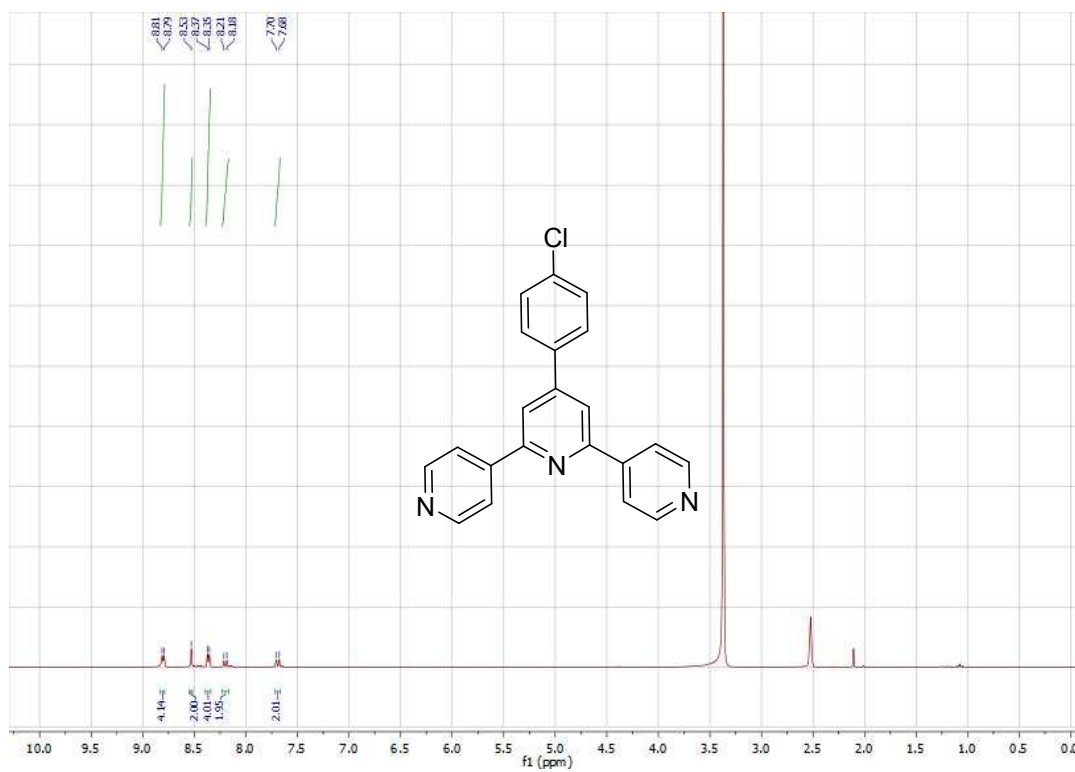
4. ^{13}C NMR spectrum of 4'-(2-Thiophenyl)-4,2':6',4''-terpyridine (1b)



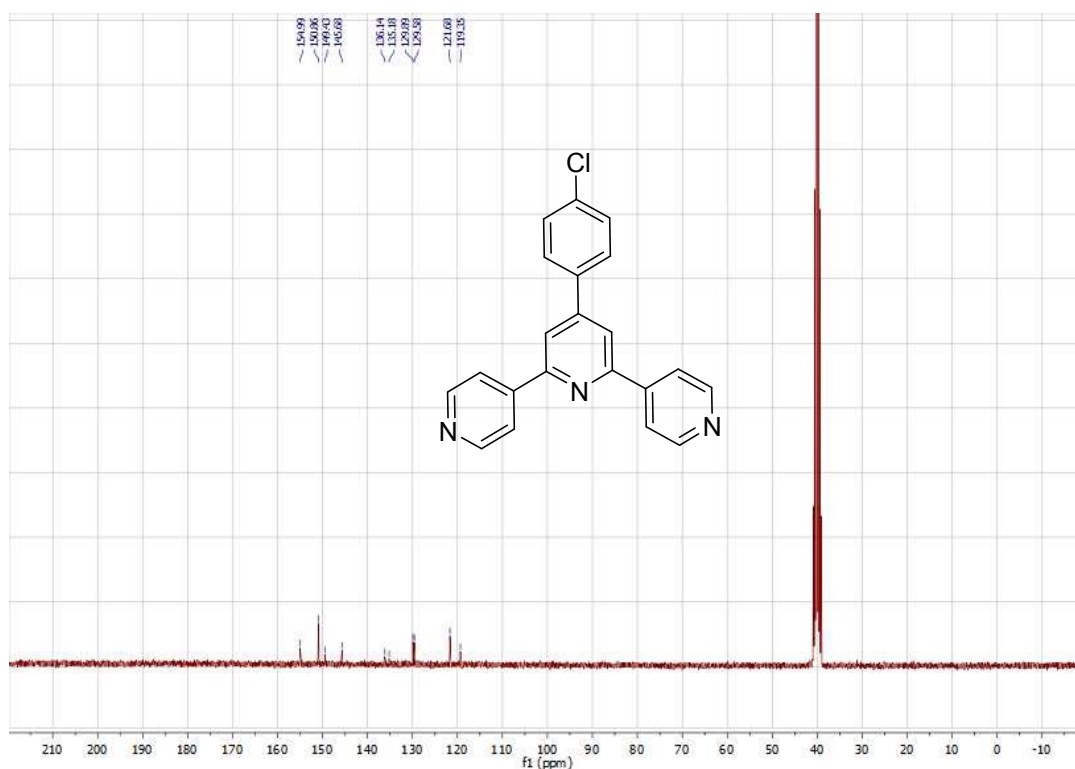
5. FT-IR spectrum of 4'-(4-Chlorophenyl)-4,2':6',4''-terpyridine (1e)



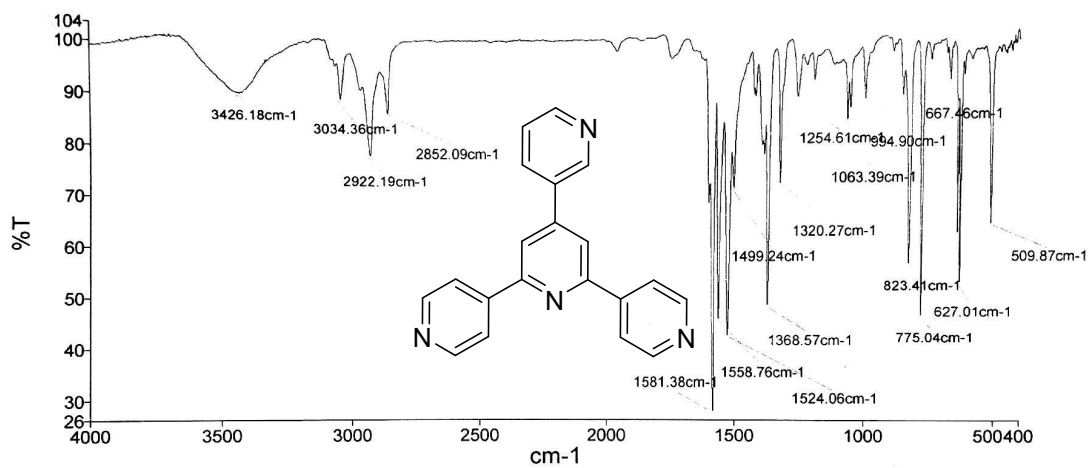
6. ¹H NMR spectrum of 4'-(4-Chlorophenyl)-4,2':6',4''-terpyridine (1e)



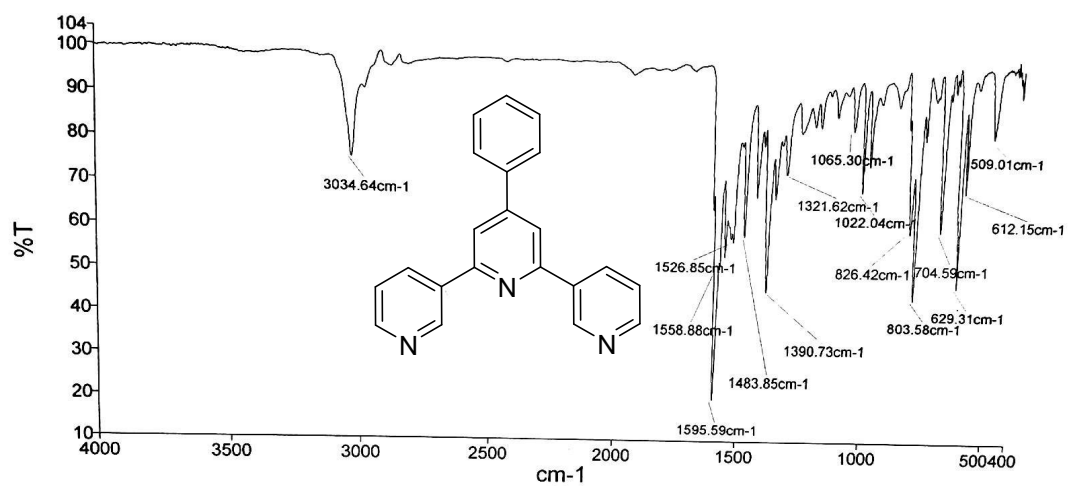
7. ^{13}C NMR spectrum of 4'-(4-Chlorophenyl)-4,2':6',4''-terpyridine (1e)



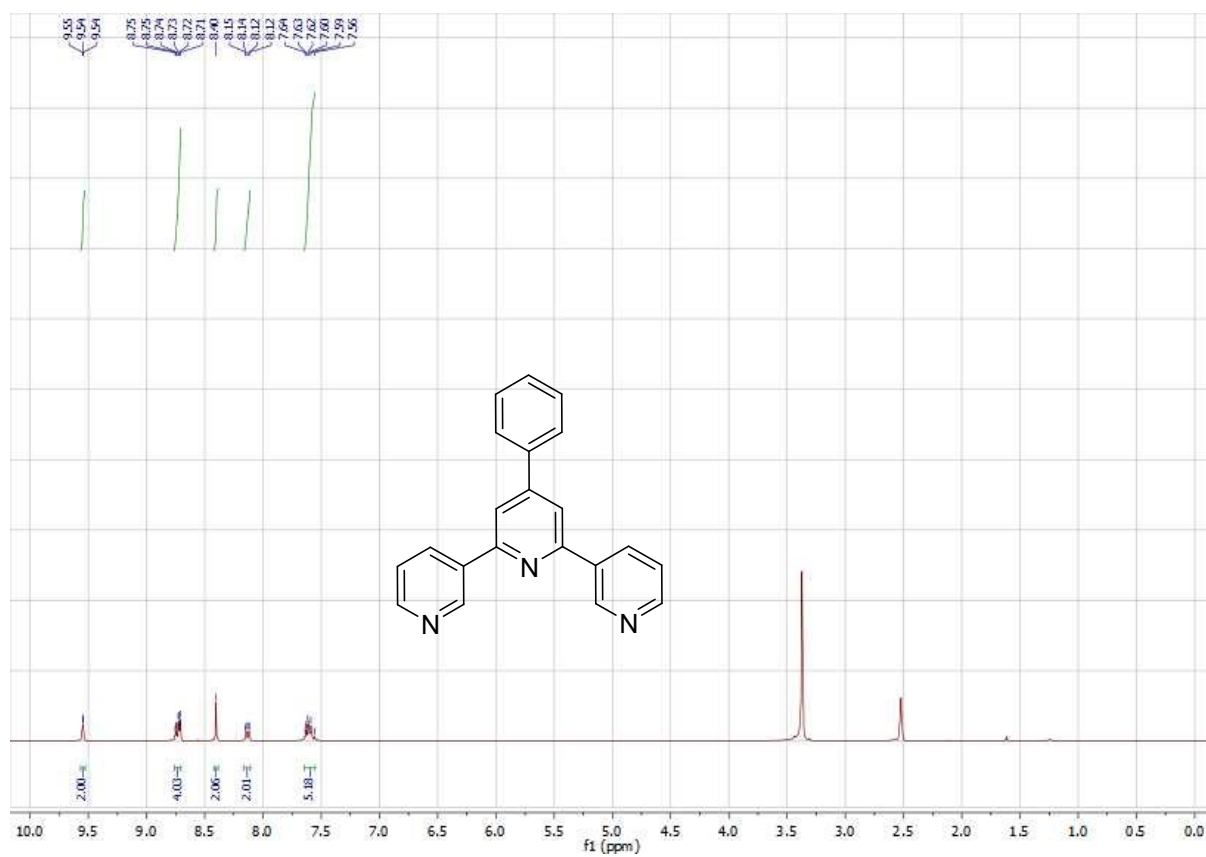
8. FT-IR spectrum of 4'-(3-Pyridyl)-4,2':6',4''-terpyridine (1f)



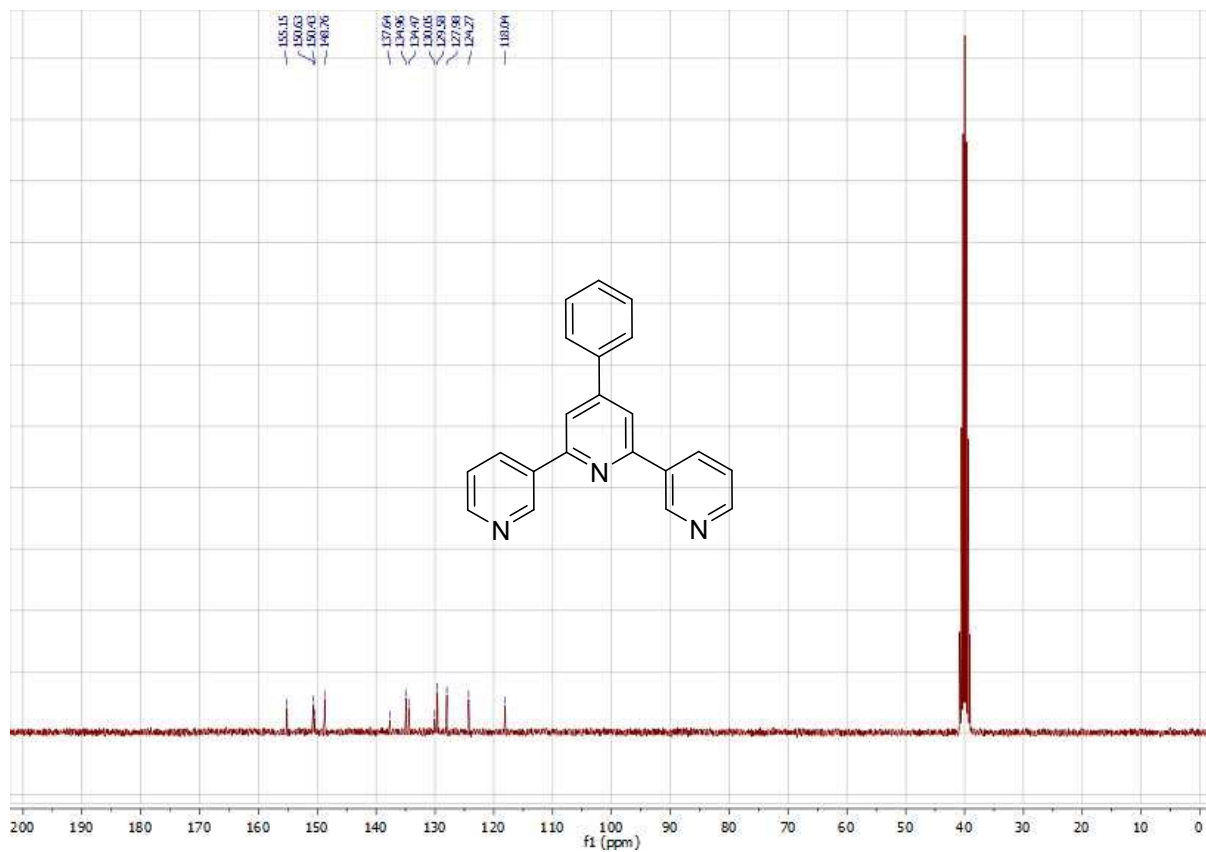
9. FT-IR spectrum of 4'-Phenyl-3,2':6',3''-terpyridine (2a)



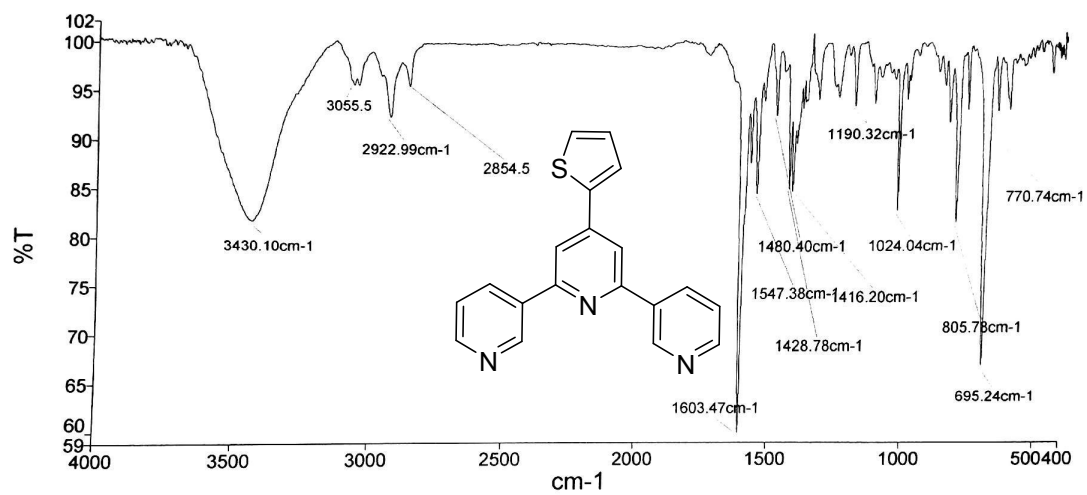
10. ¹H NMR spectrum of 4'-Phenyl-3,2':6',3''-terpyridine (2a)



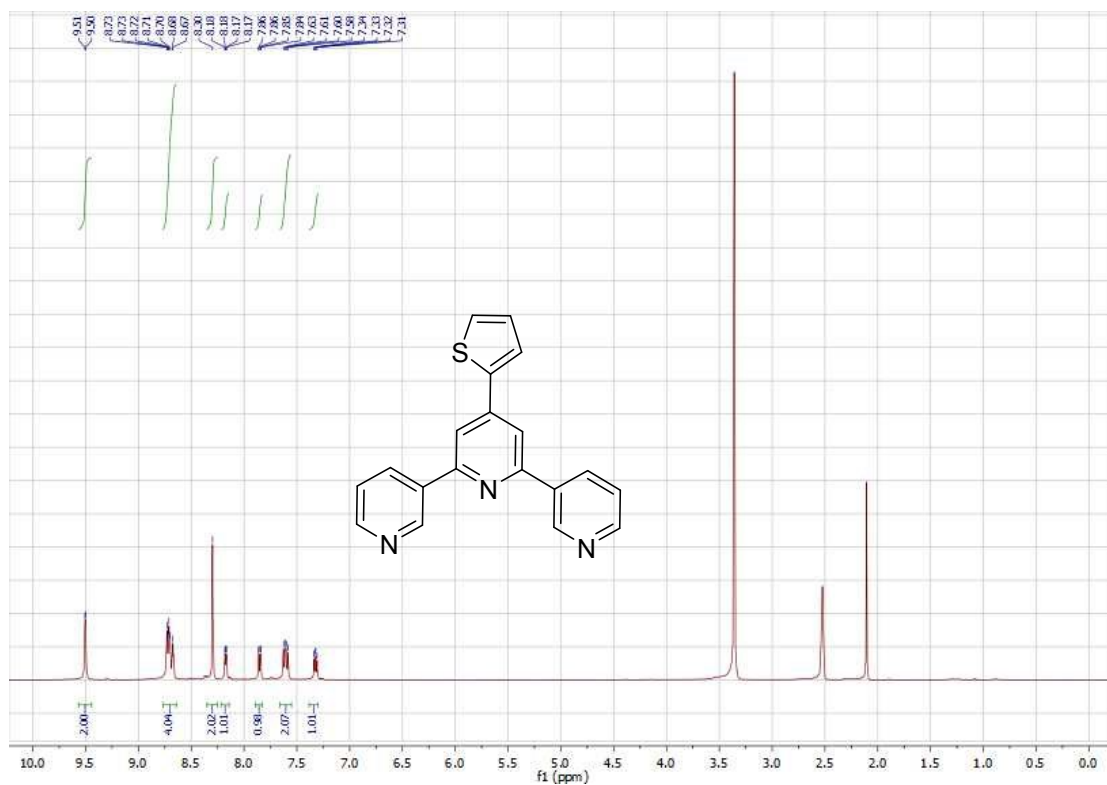
11. ^{13}C NMR spectrum of 4'-Phenyl-3,2':6',3''-terpyridine (2a)



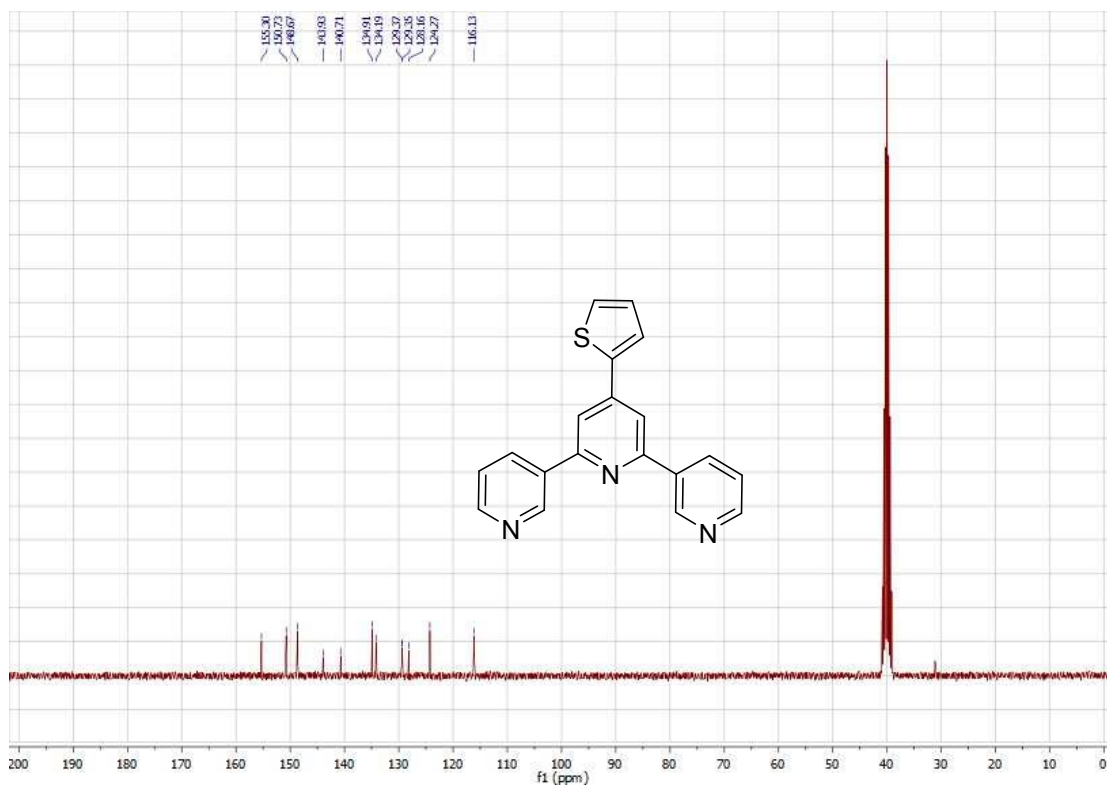
12. FT-IR spectrum of 4'-(2-Thiophenyl)-3,2':6',3''-terpyridine (2b)



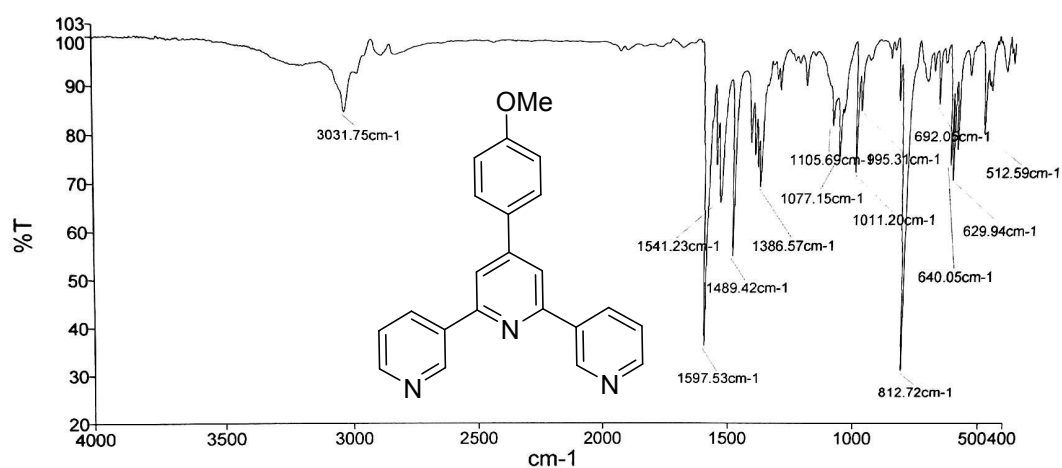
13. ^1H NMR spectrum of 4'-(2- Thiophenyl)-3,2':6',3''-terpyridine (2b)



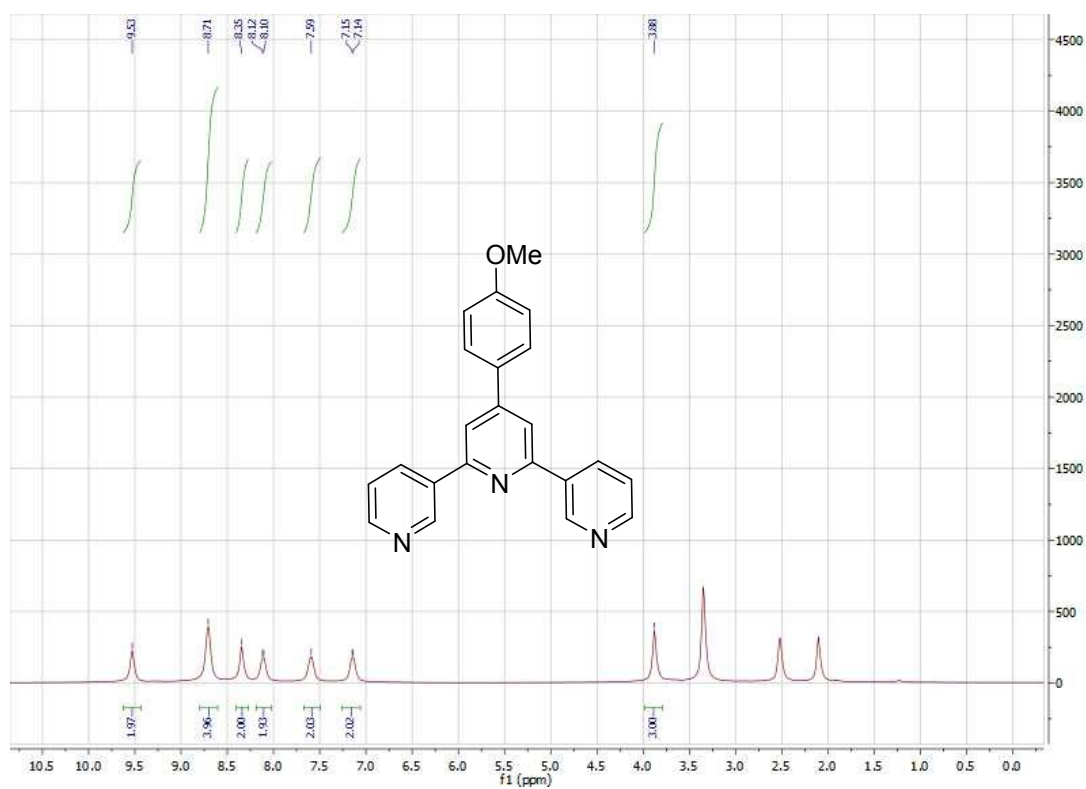
14. ^{13}C NMR spectrum of 4'-(2- Thiophenyl)-3,2':6',3''-terpyridine (2b)



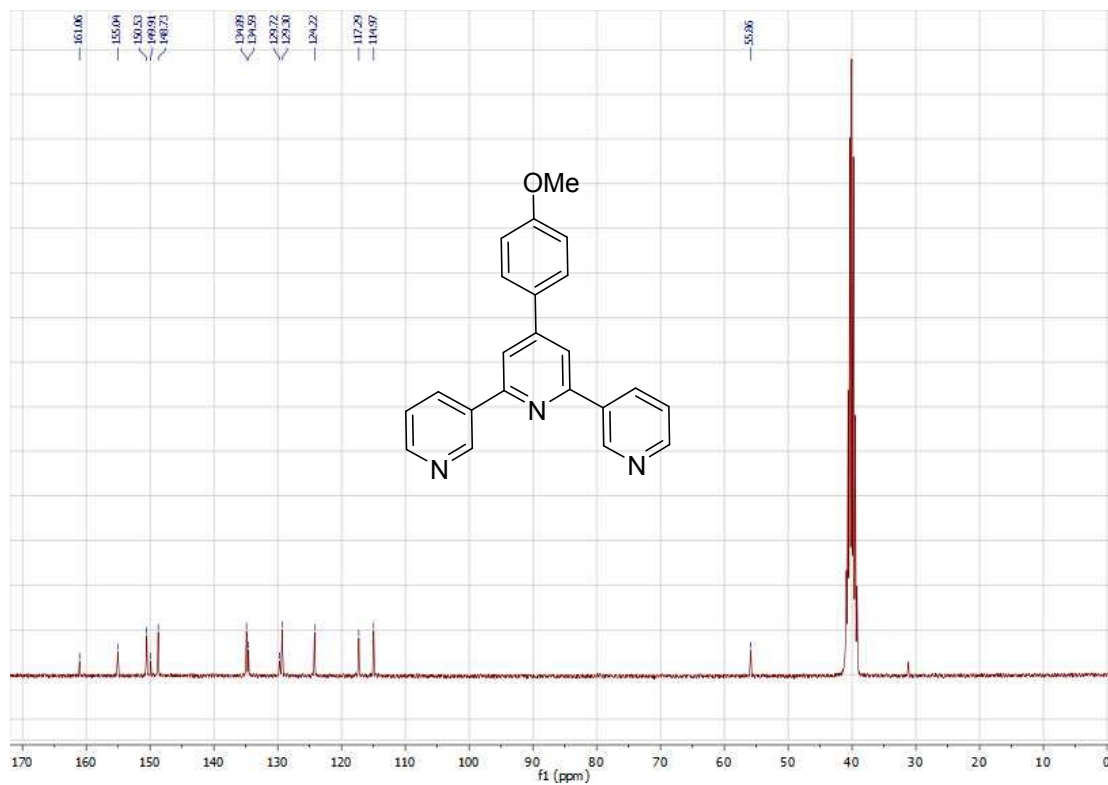
15. FT-IR spectrum of 4'-(4-Methoxyphenyl)-3,2':6',3"-terpyridine (2c)



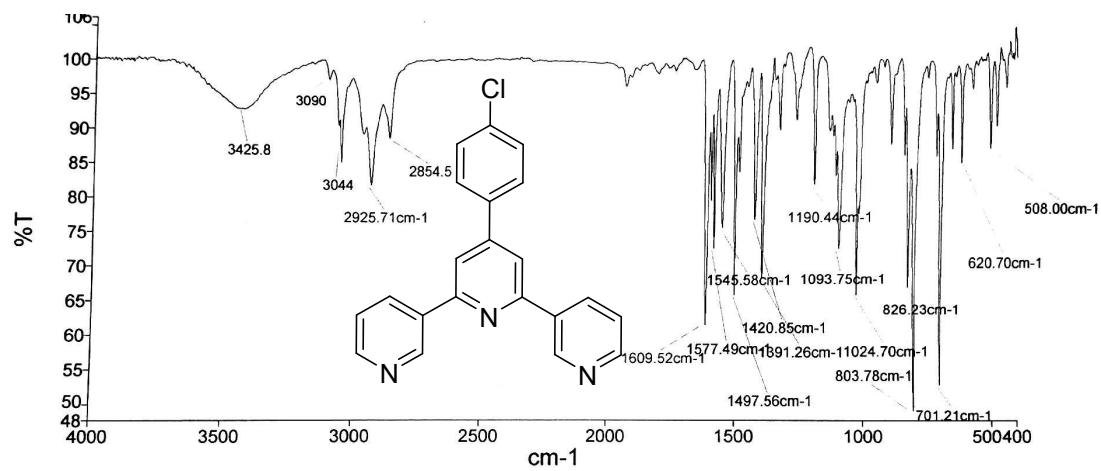
16. ¹H NMR spectrum of 4'-(4-Methoxyphenyl)-3,2':6',3"-terpyridine (2c)



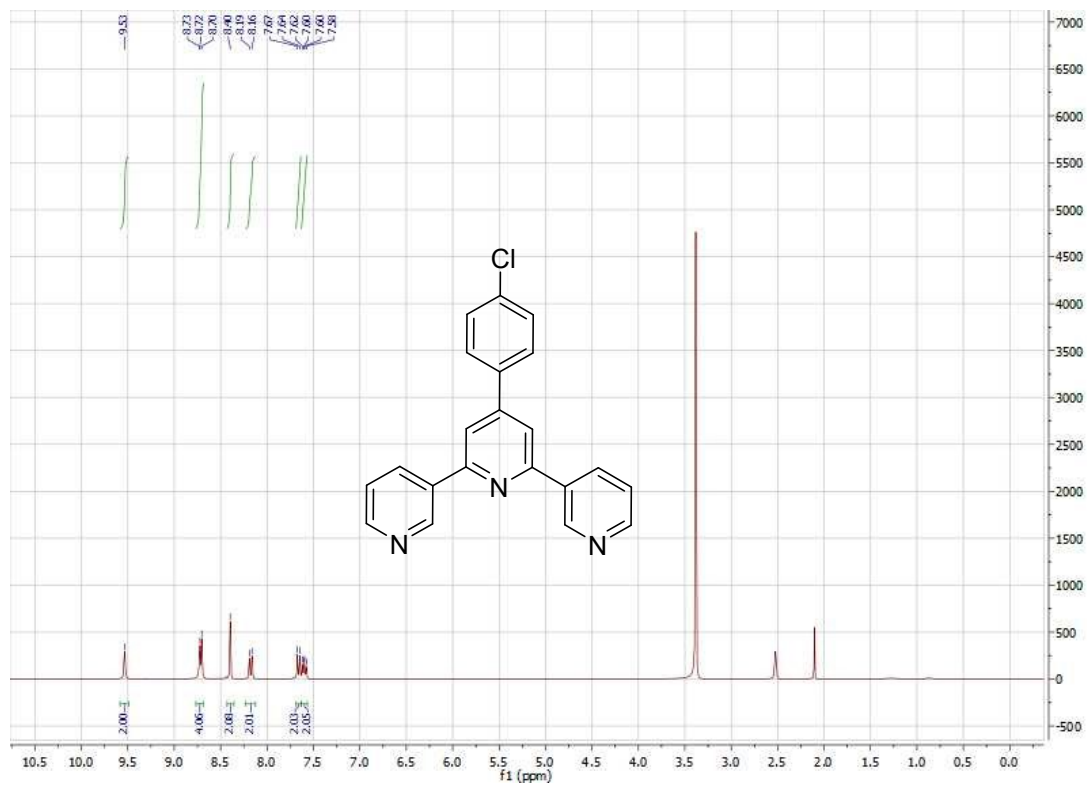
17. ^{13}C NMR spectrum of 4'-(4-Methoxyphenyl)-3,2':6',3"-terpyridine (2c)



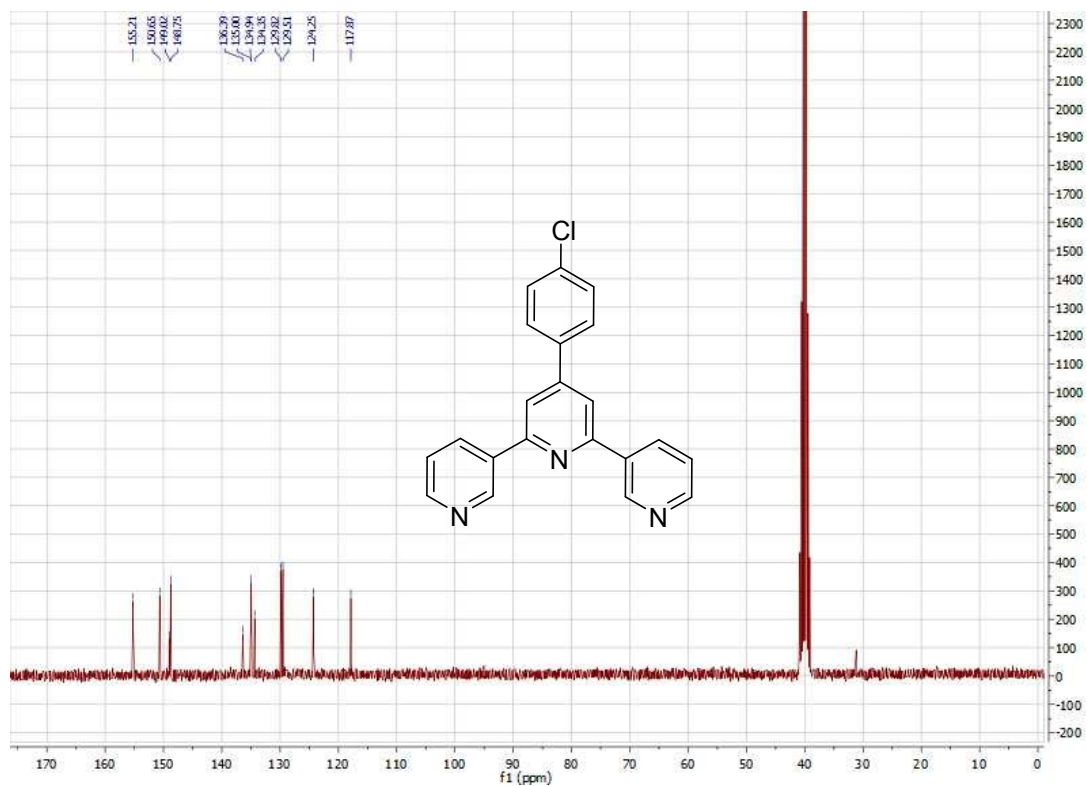
18. FT-IR spectrum of 4'-(4-Chlorophenyl)-3,2':6',3"-terpyridine (2e)



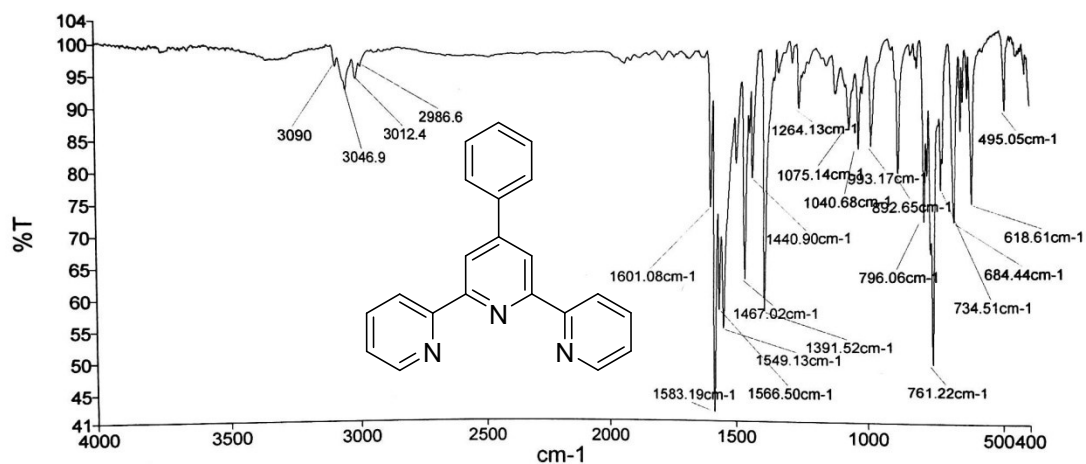
19. ^1H NMR spectrum of 4'-(4-Chlorophenyl)-3,2':6',3''-terpyridine (2e)



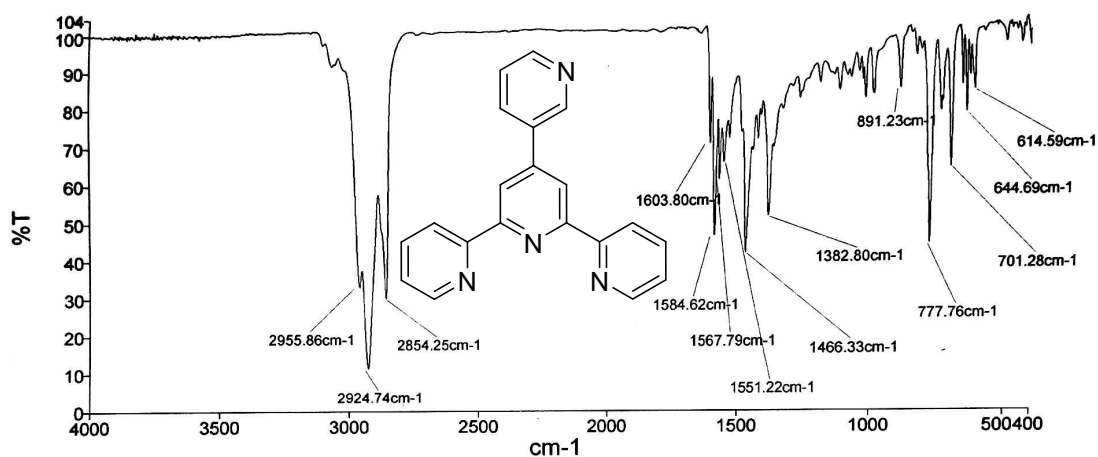
20. ^{13}C NMR spectrum of 4'-(4-Chlorophenyl)-3,2':6',3''-terpyridine (2e)



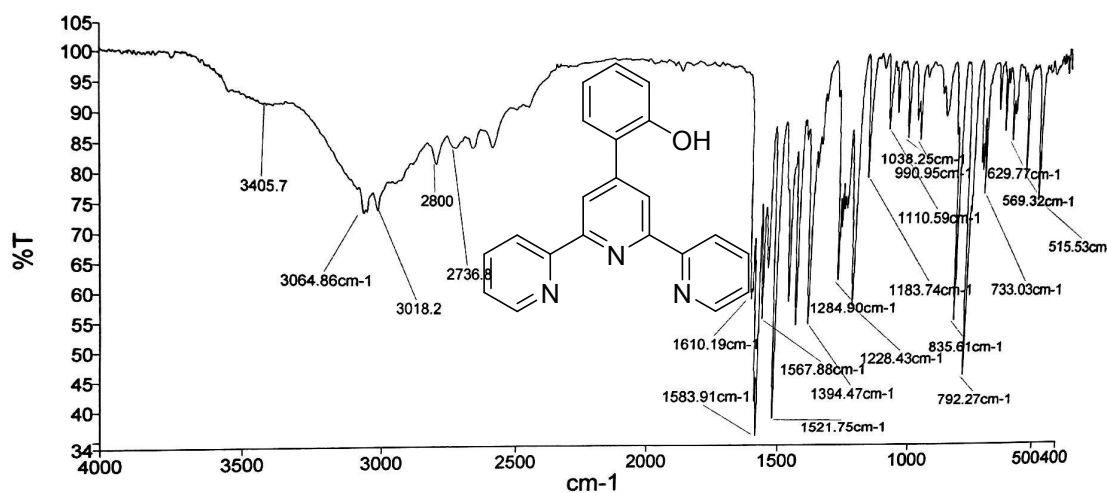
21. FT-IR spectrum of 4'-Phenyl-2,2':6',2''-terpyridine (3a)



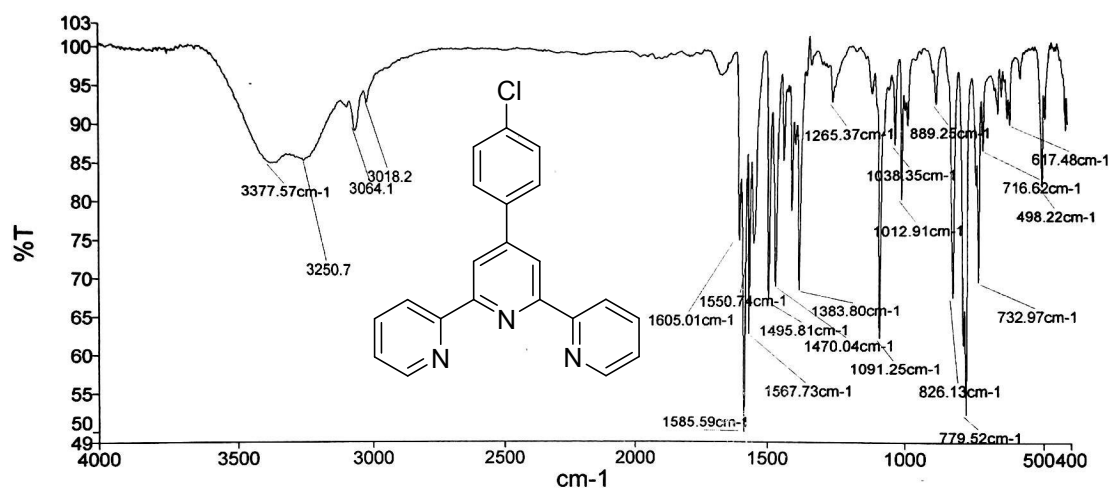
22. FT-IR spectrum of 4'-(3-Pyridyl)-2,2':6',2''-terpyridine (3b)



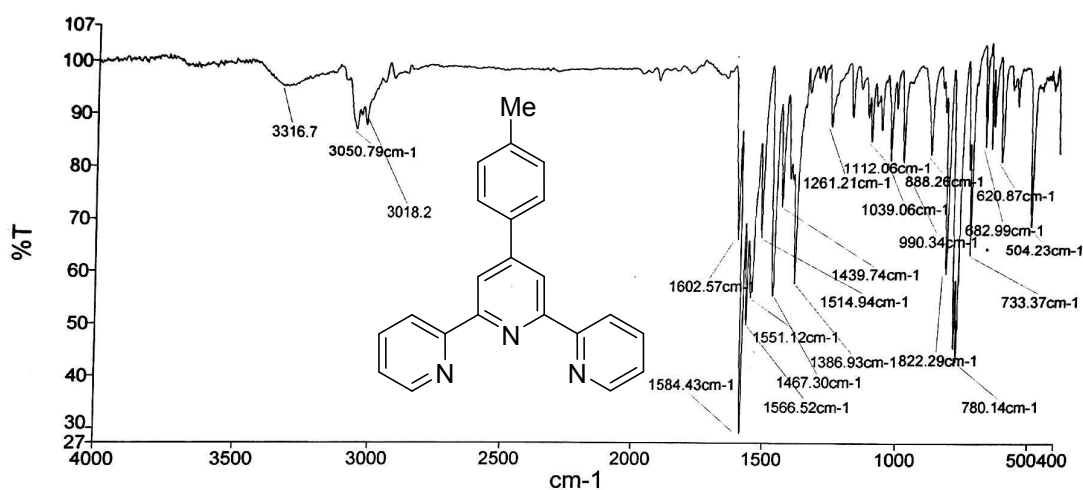
23. FT-IR spectrum of 4'-(2- Hydroxyphenyl)-2,2':6',2''-terpyridine (3c)



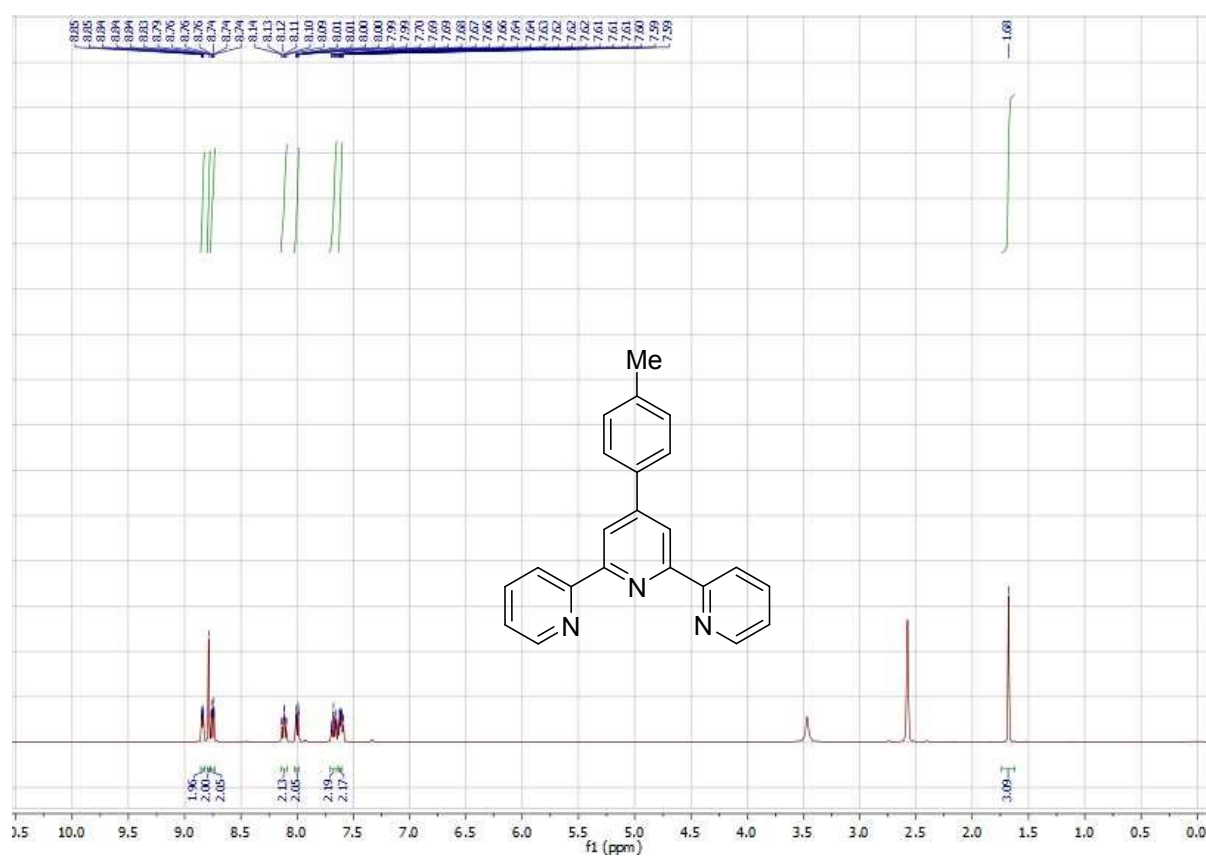
24. FT-IR spectrum of 4'-(4- Chlorophenyl)-2,2':6',2''-terpyridine (3d)



25. FT-IR spectrum of 4'-(4- Methylphenyl)-2,2':6',2''-terpyridine (3e)



26. ^1H NMR spectrum of 4'-(4-Methylphenyl)-2,2':6',2''-terpyridine (3e)



27. ^{13}C NMR spectrum of 4'-(4- Methylphenyl)-2,2':6',2''-terpyridine (3e)

