

Supplementary Information

Fe₃O₄@SiO₂.HM.SO₃H as a recyclable heterogeneous nanocatalyst for microwave-promoted synthesis of 2,4,5-trisubstituted imidazoles under solvent free condition

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Copy of ¹H NMR, ¹³C NMR & FT IR spectrums of the synthesized compounds:

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2,4,5-triphenyl-1H-imidazole (**3a**)

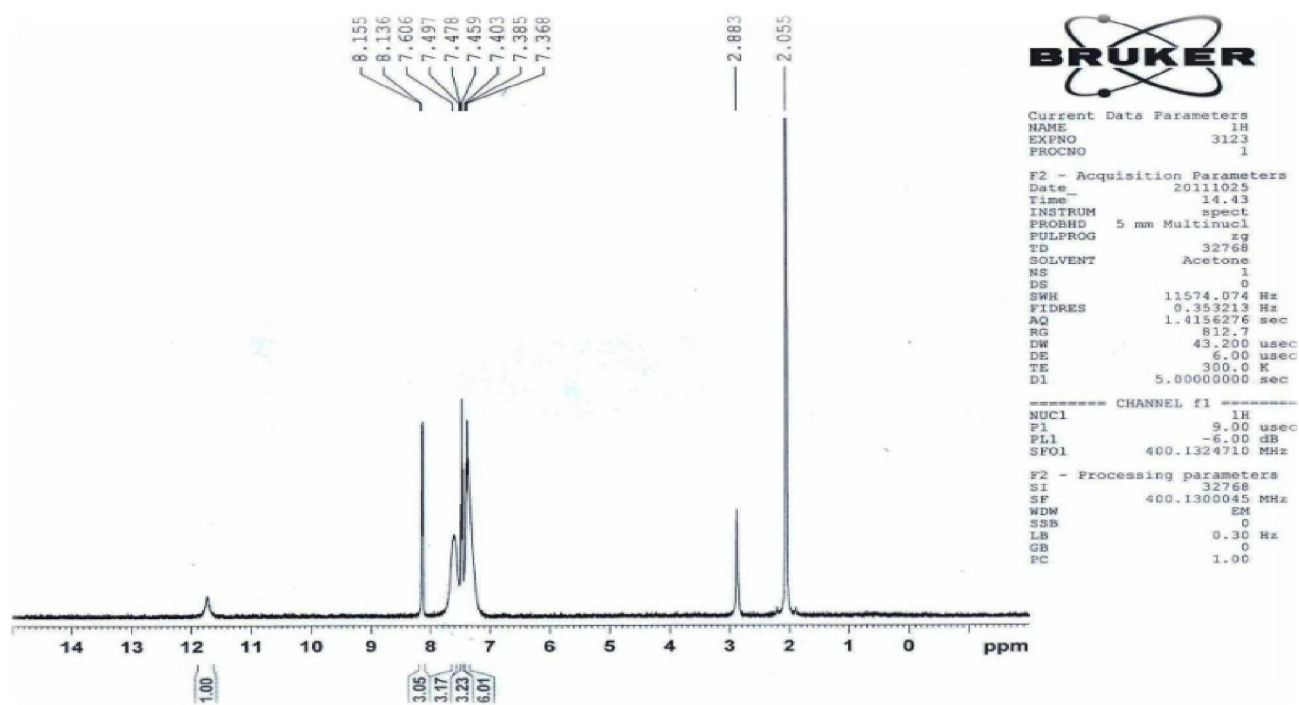


Figure 1. ¹H NMR spectrum of **3a**

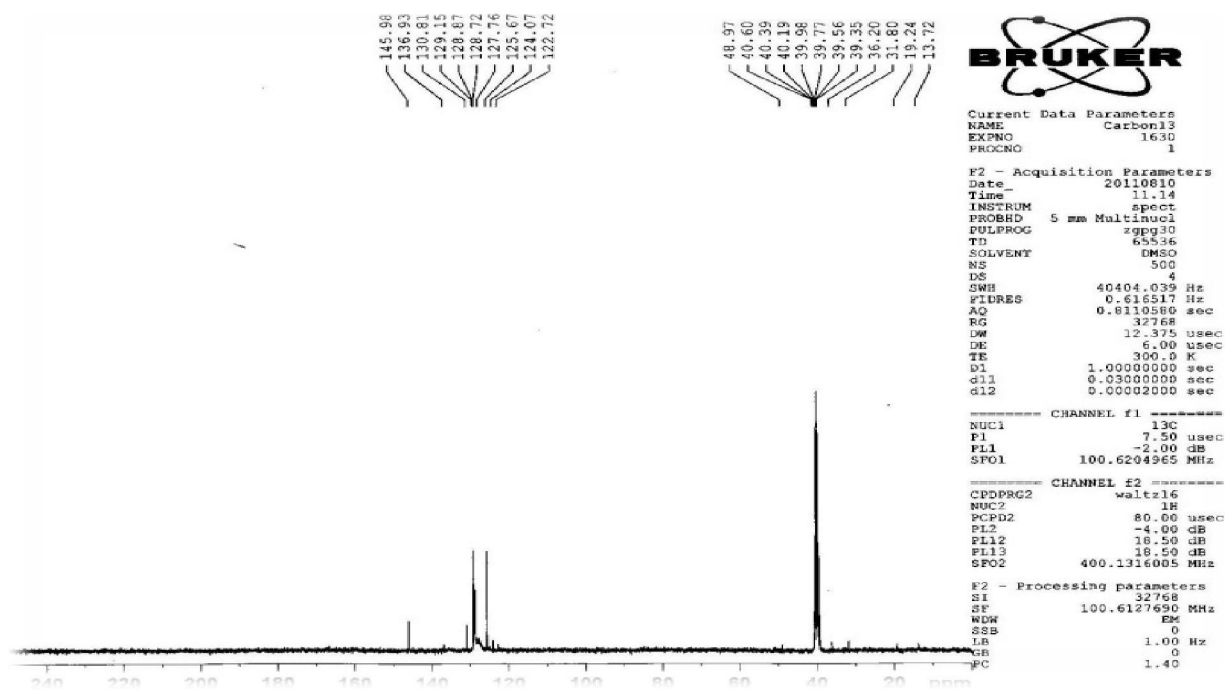


Figure 2. ¹³C NMR spectrum of **3a**

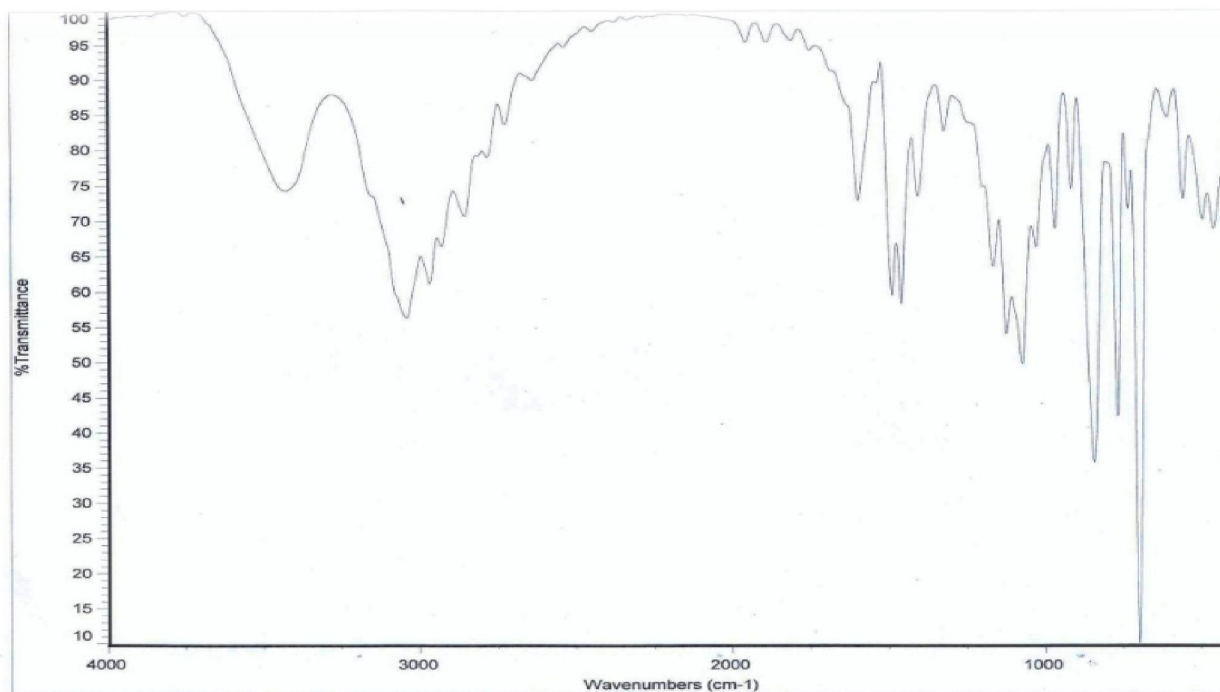


Figure 3. FT IR spectrum of 3a

2-(3-methoxy phenyl)-4,5-di phenyl-1H-imidazole (**3b**)

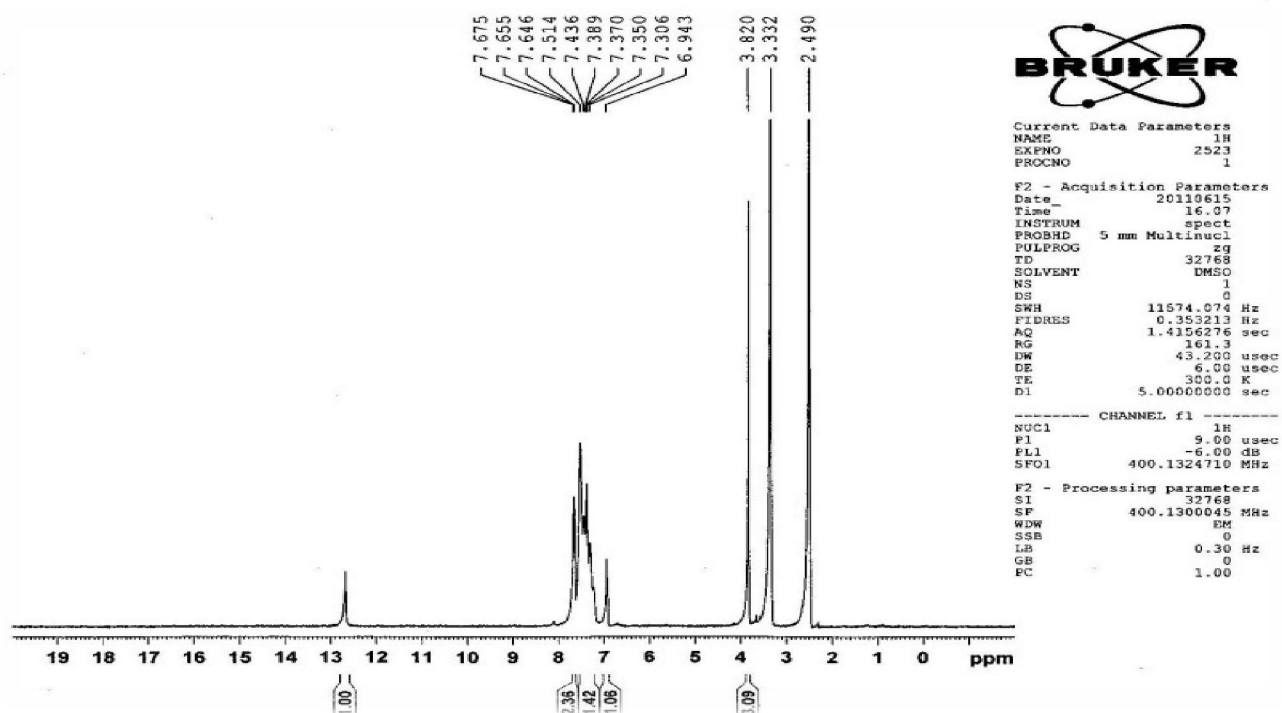


Figure 4. ¹H NMR spectrum of 3b

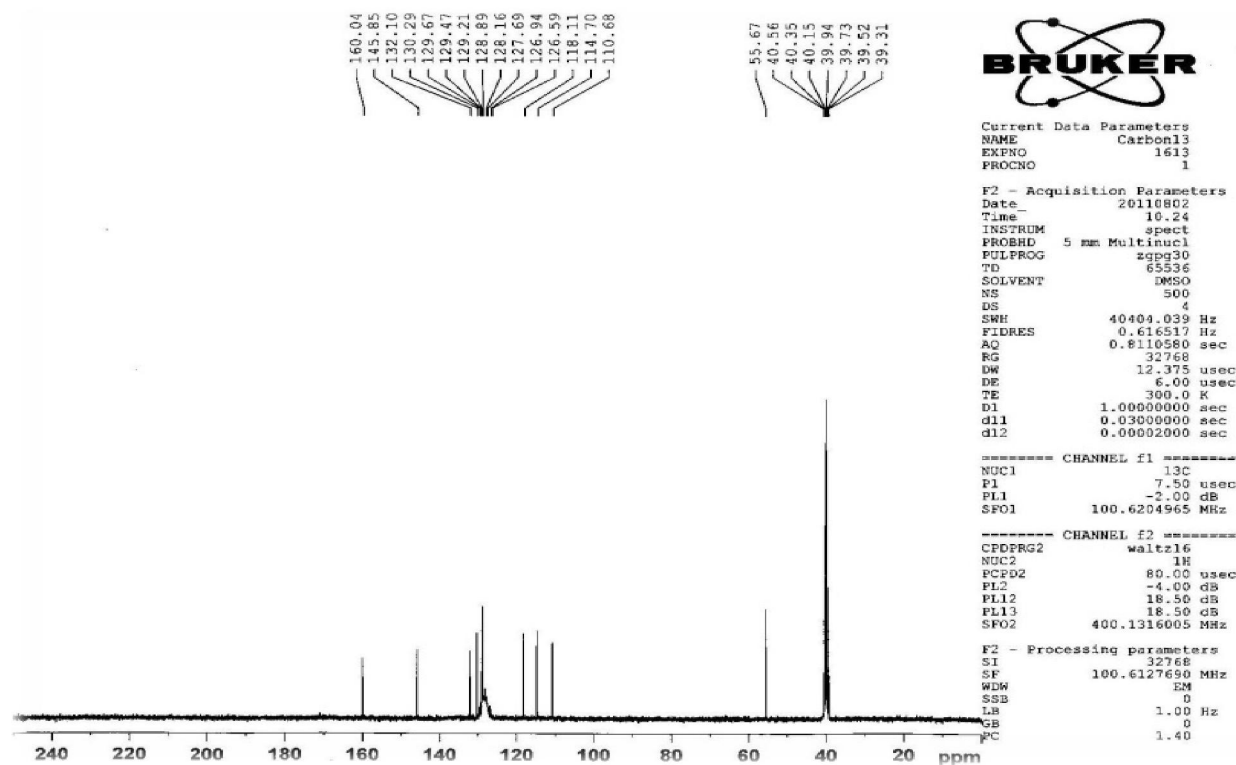


Figure 5. ^{13}C NMR spectrum of 3b

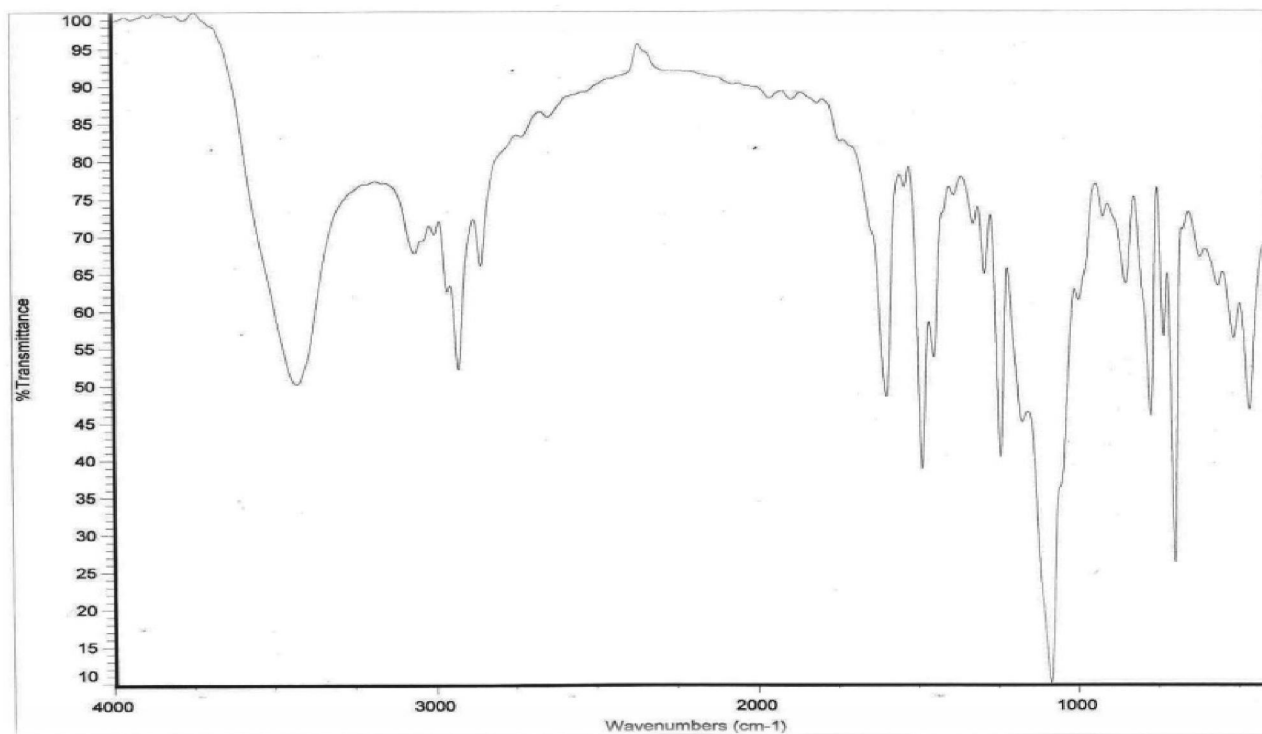


Figure 6. FTIR spectrum of 3b

2-(3,4-dimethoxyphenyl)-4,5-diphenyl-1H-imidazole (**3c**)

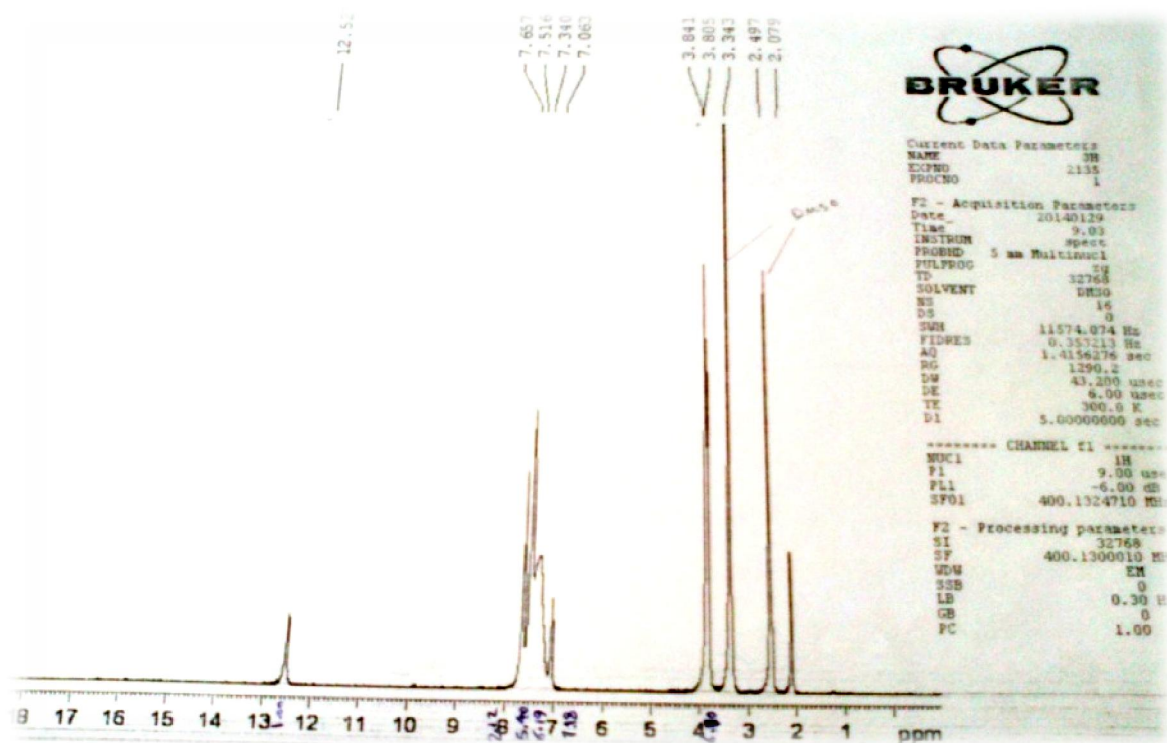


Figure 7. ¹H NMR spectrum of **3c**

2-(4-methoxyphenyl)-4,5-diphenyl-1H-imidazole (**3d**)

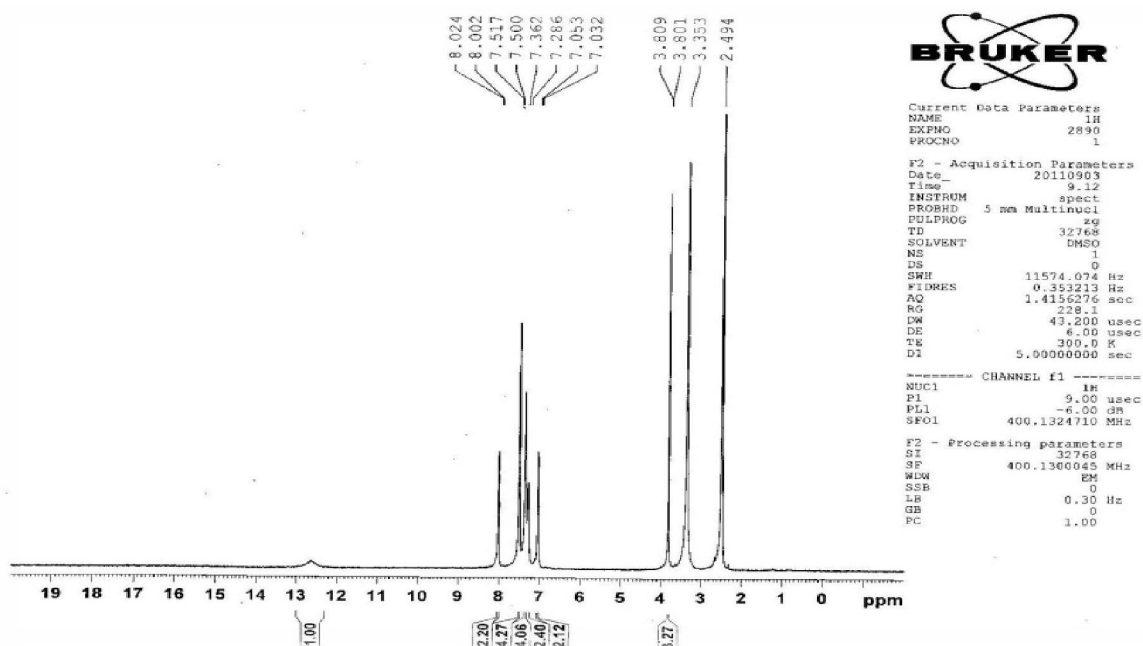


Figure 8. ¹H NMR spectrum of **3d**

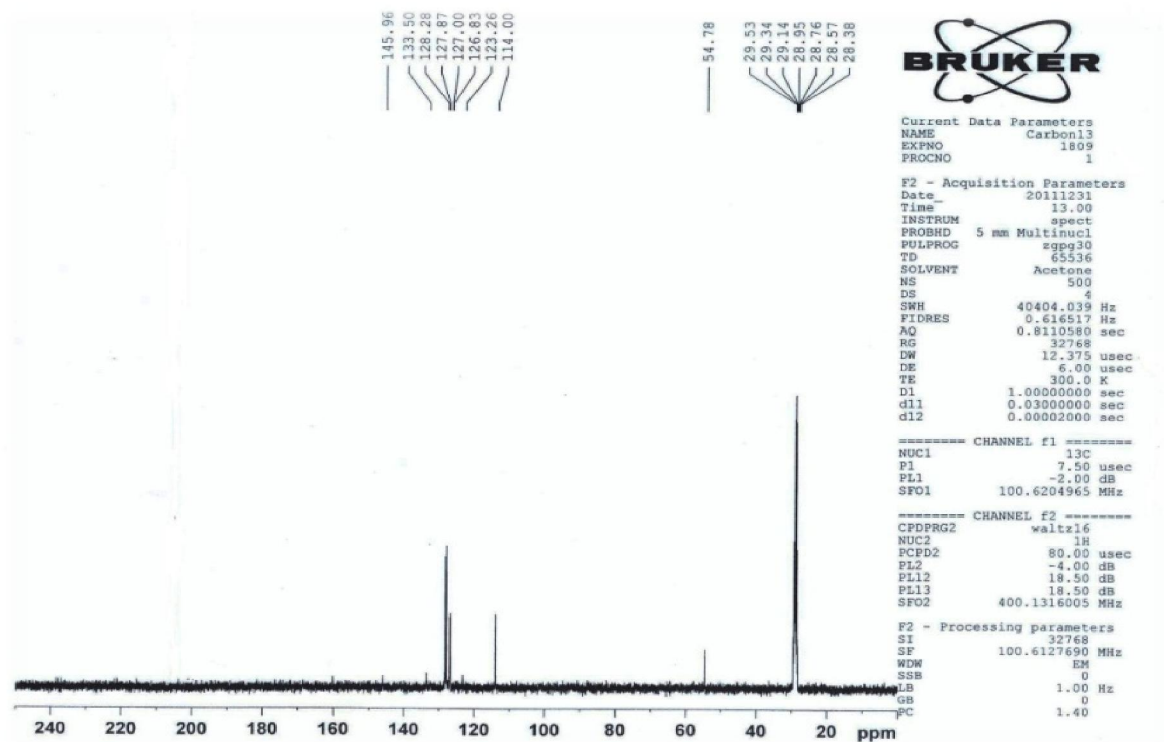


Figure 9. ^{13}C NMR of 3d

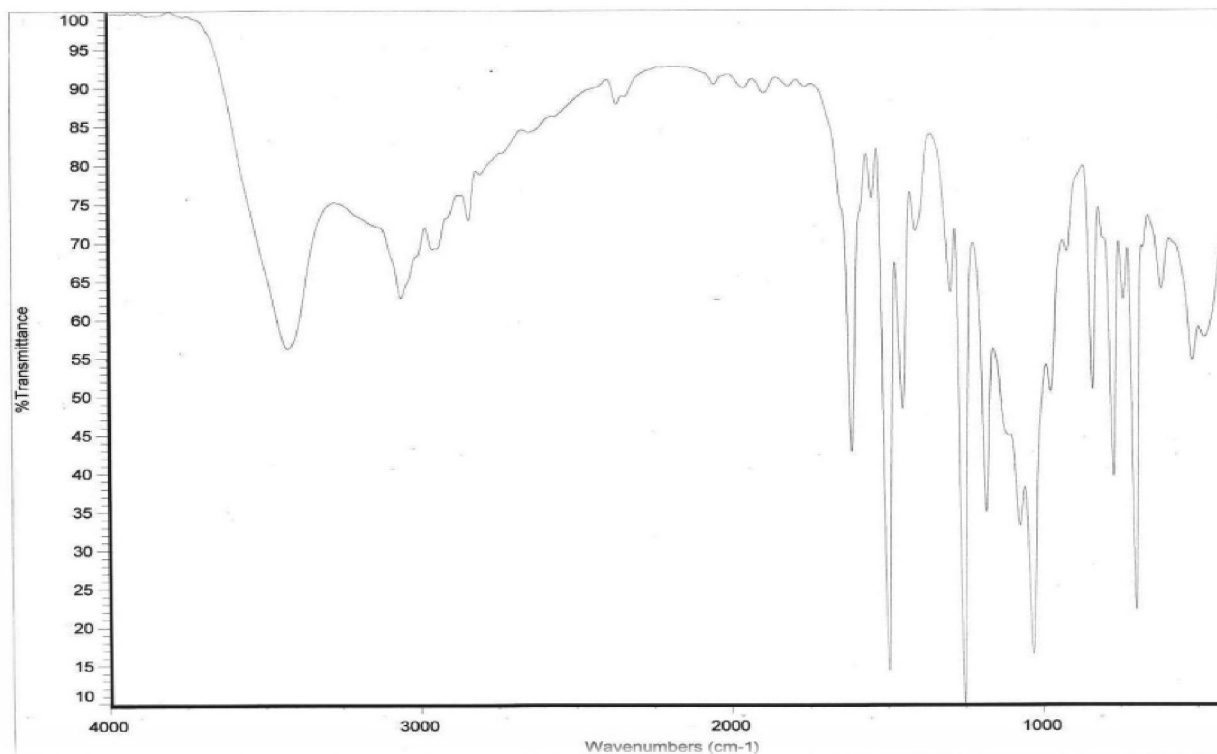


Figure 10. FT IR spectrum of 3d

2-(2,3-dimethoxyphenyl)-4,5-diphenyl-1H-imidazole (3e)

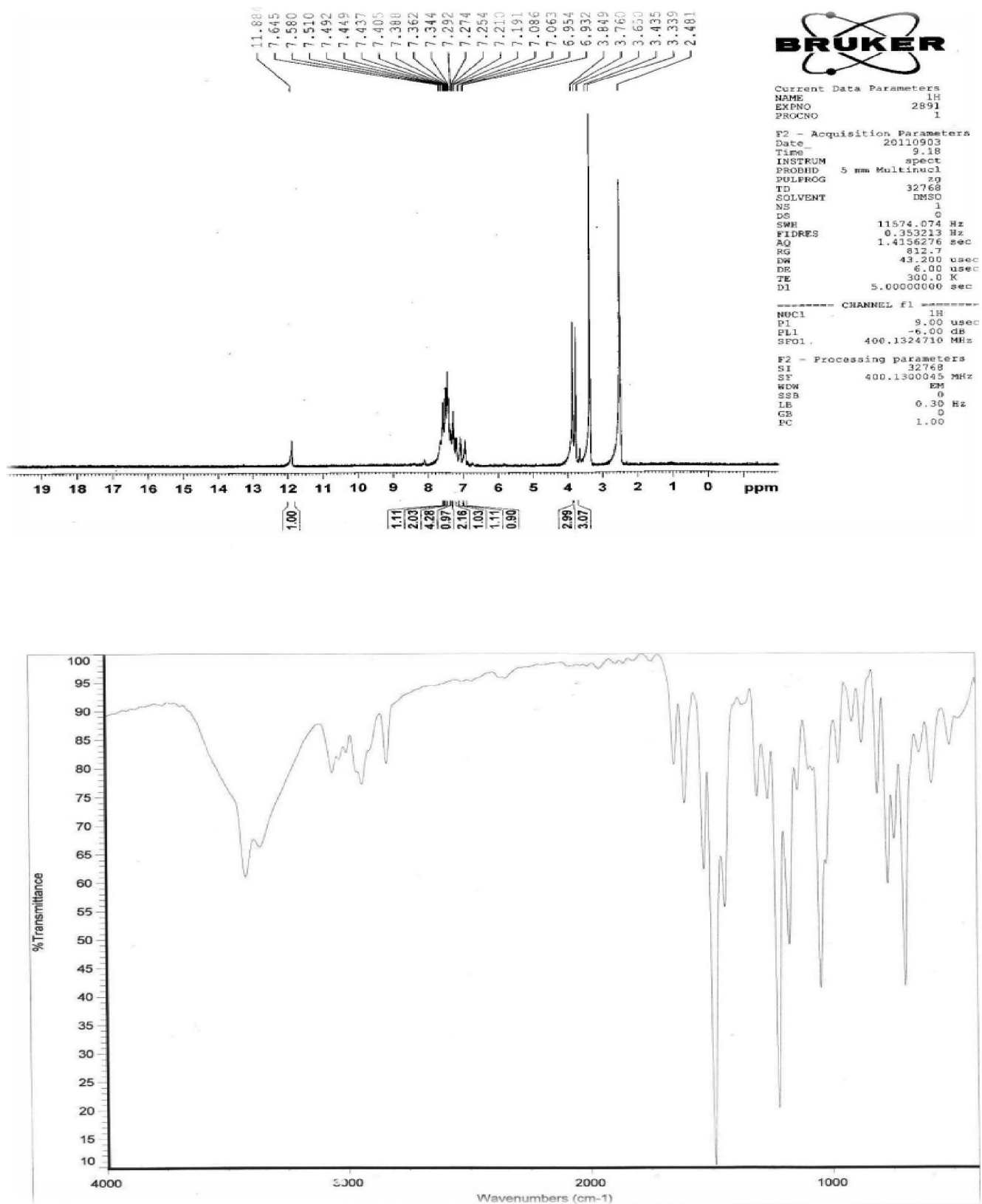


Figure 12. FT IR spectrum of 3e

2-(4-methylphenyl)-4,5-diphenyl-1H-imidazole (**3f**)

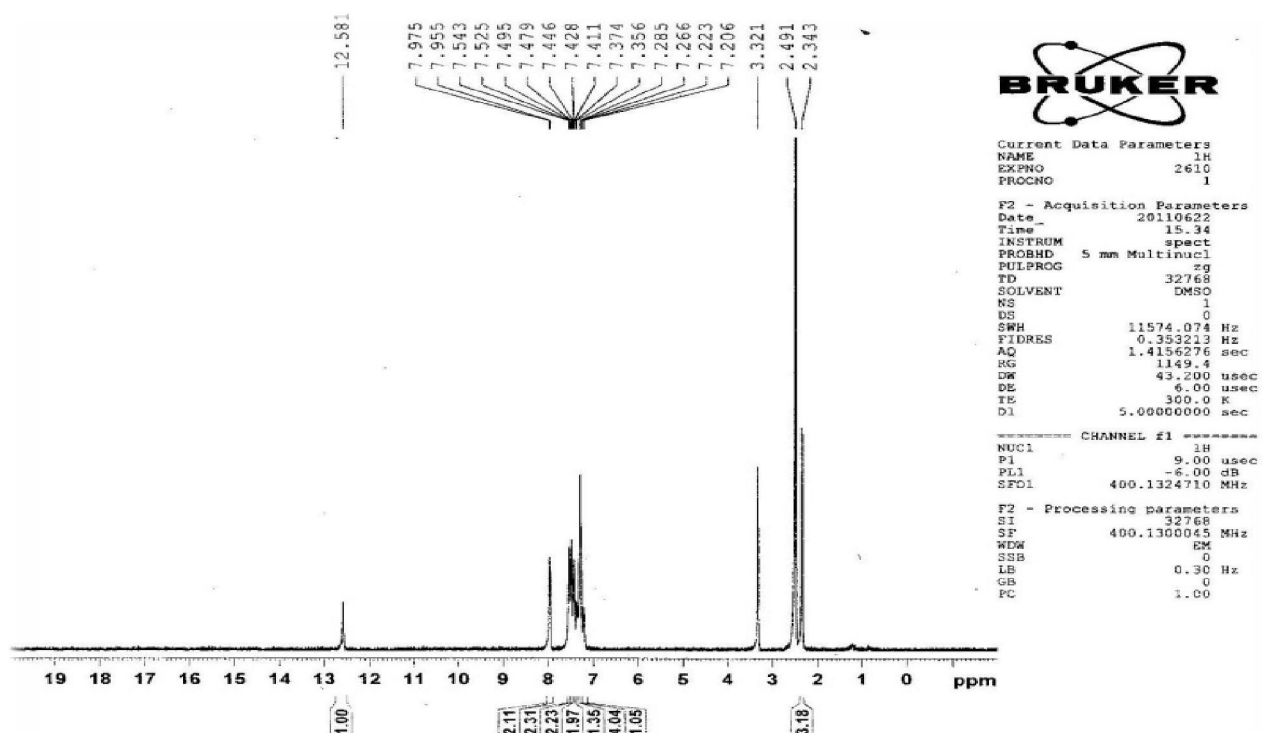


Figure 13. ¹H NMR spectrum of **3f**

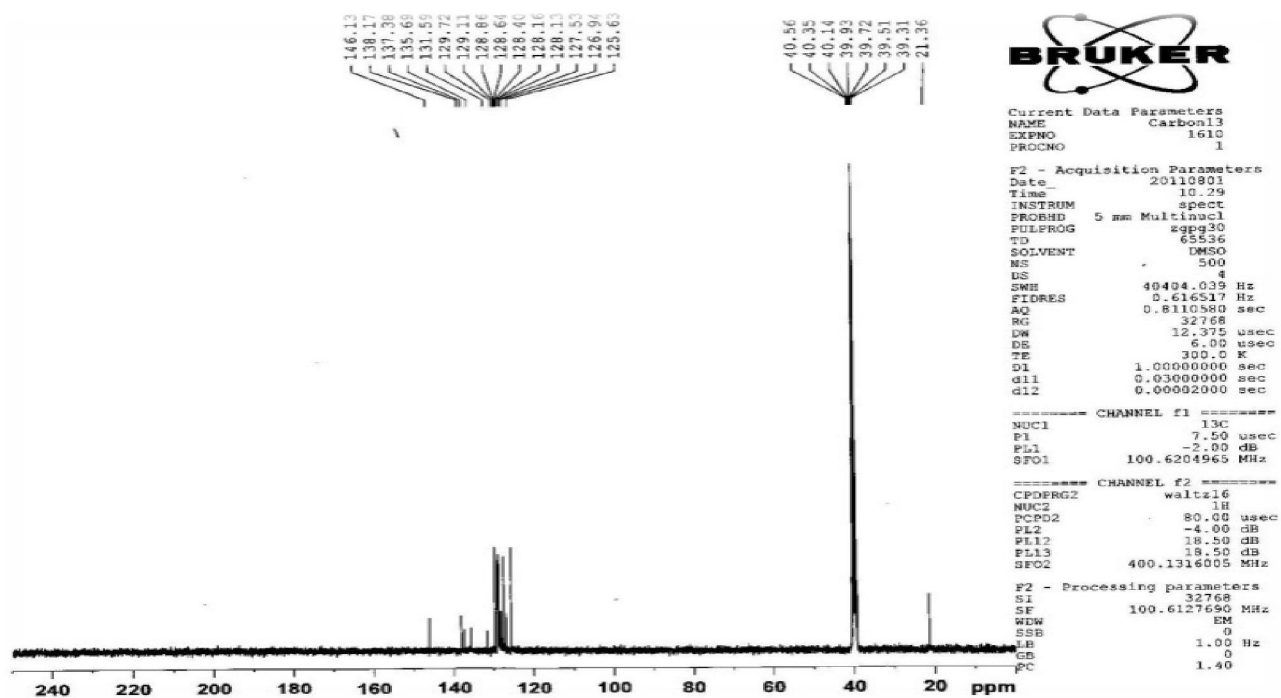


Figure 14. ¹³C NMR of **3f**

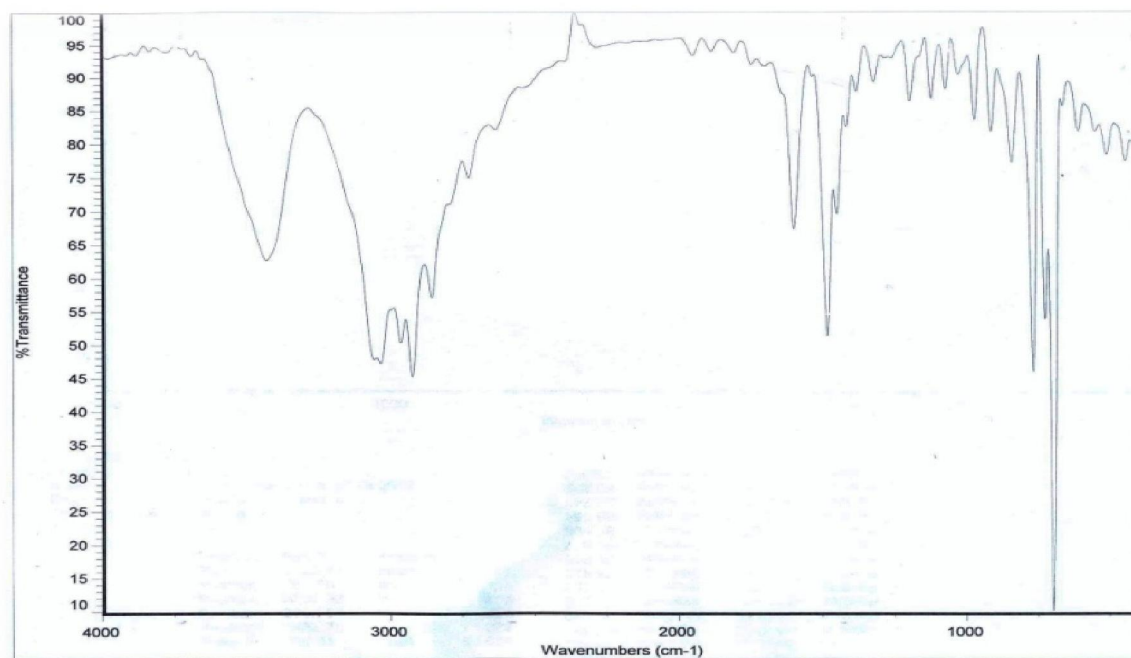


Figure 15. FT IR spectrum of 3f

2-(4,5-diphenyl-1H-imidazole-2-yl) phenol (**3g**)

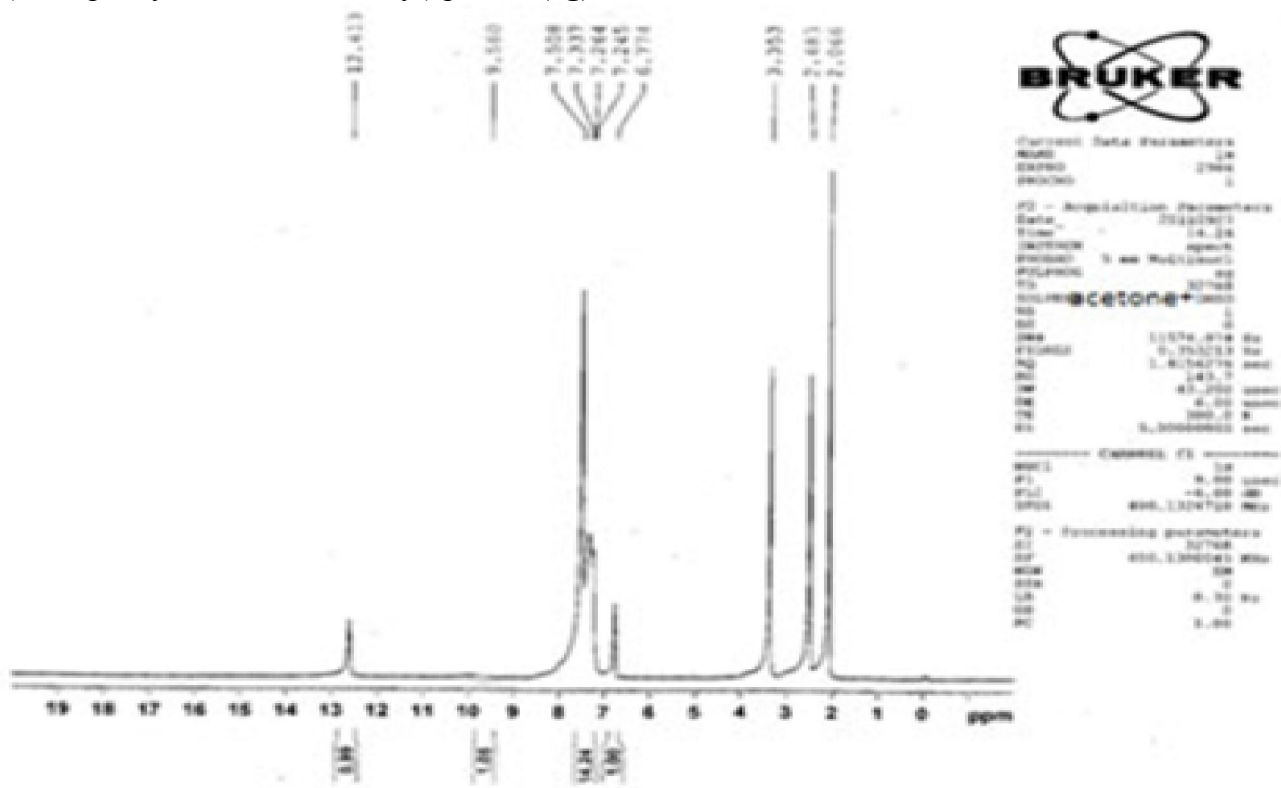


Figure 16. ¹H NMR spectrum of 3g

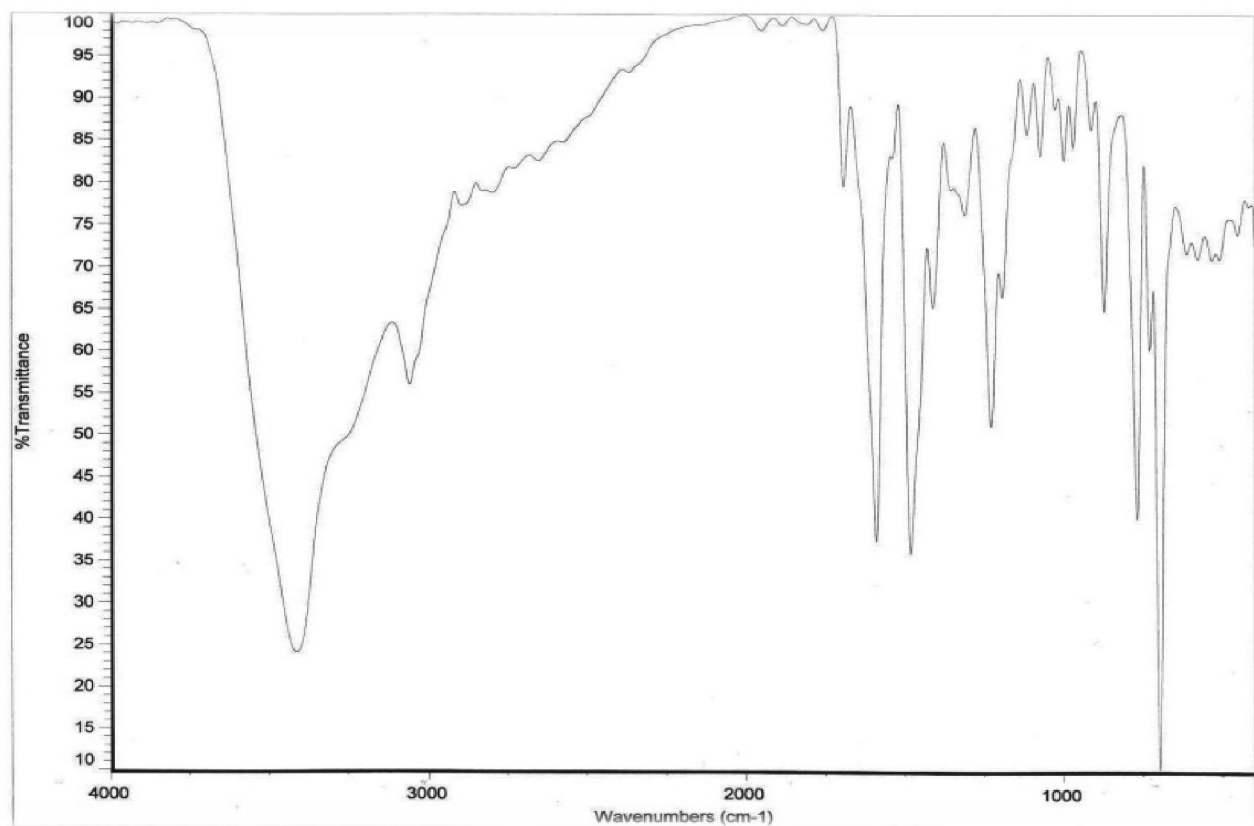


Figure 17. FT IR spectrum of 3g

4-(4,5-diphenyl-1H-imidazole-2-yl) phenol (**3h**)

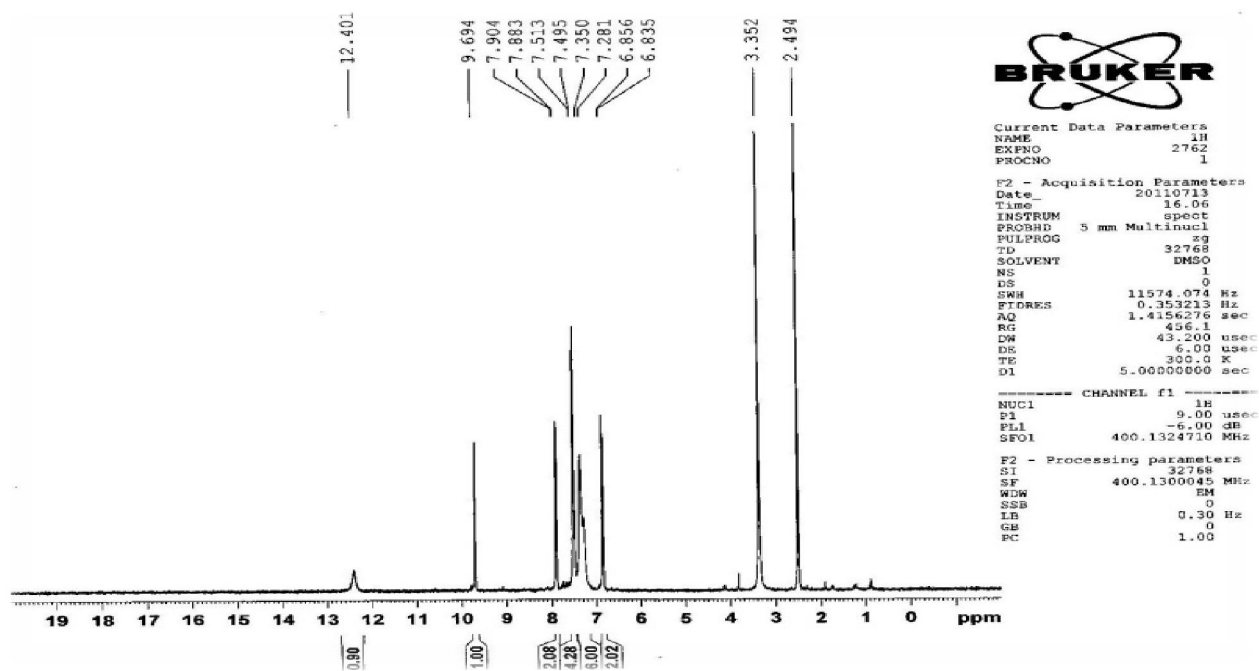


Figure 18. ¹H NMR spectrum of 3h

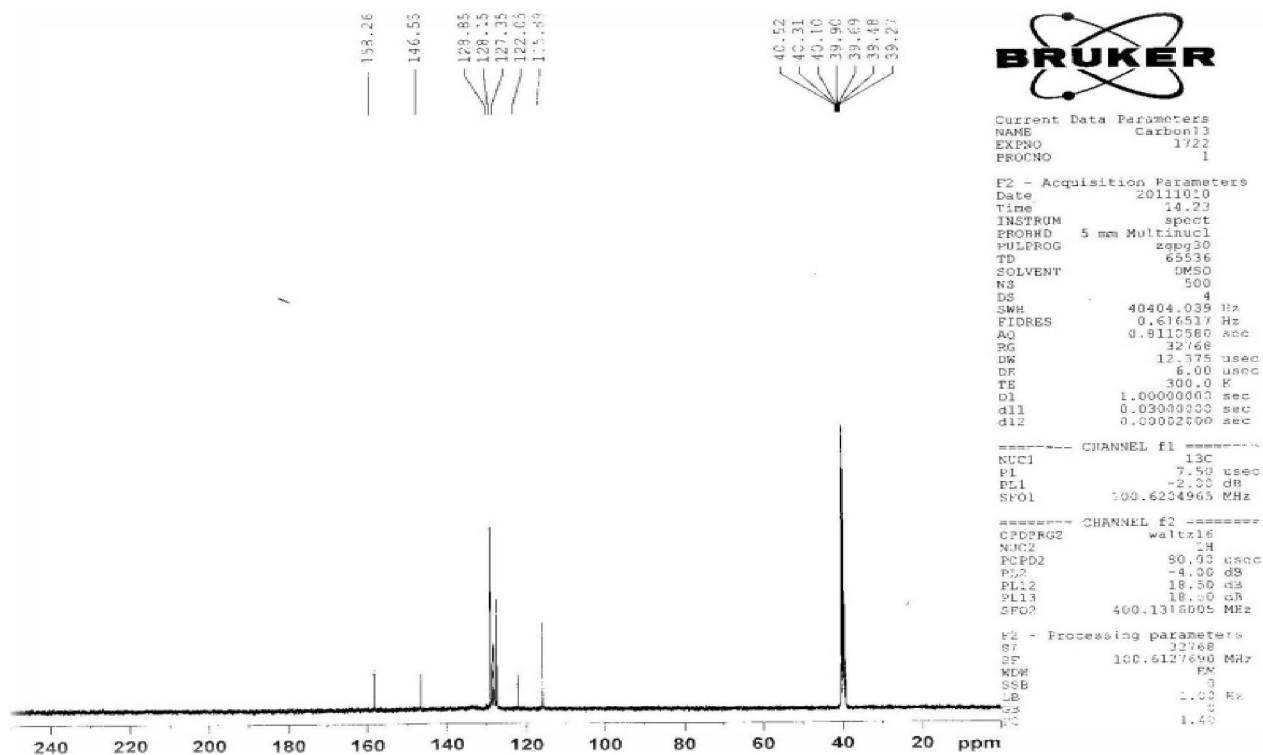


Figure 19. ^{13}C NMR spectrum of 3h

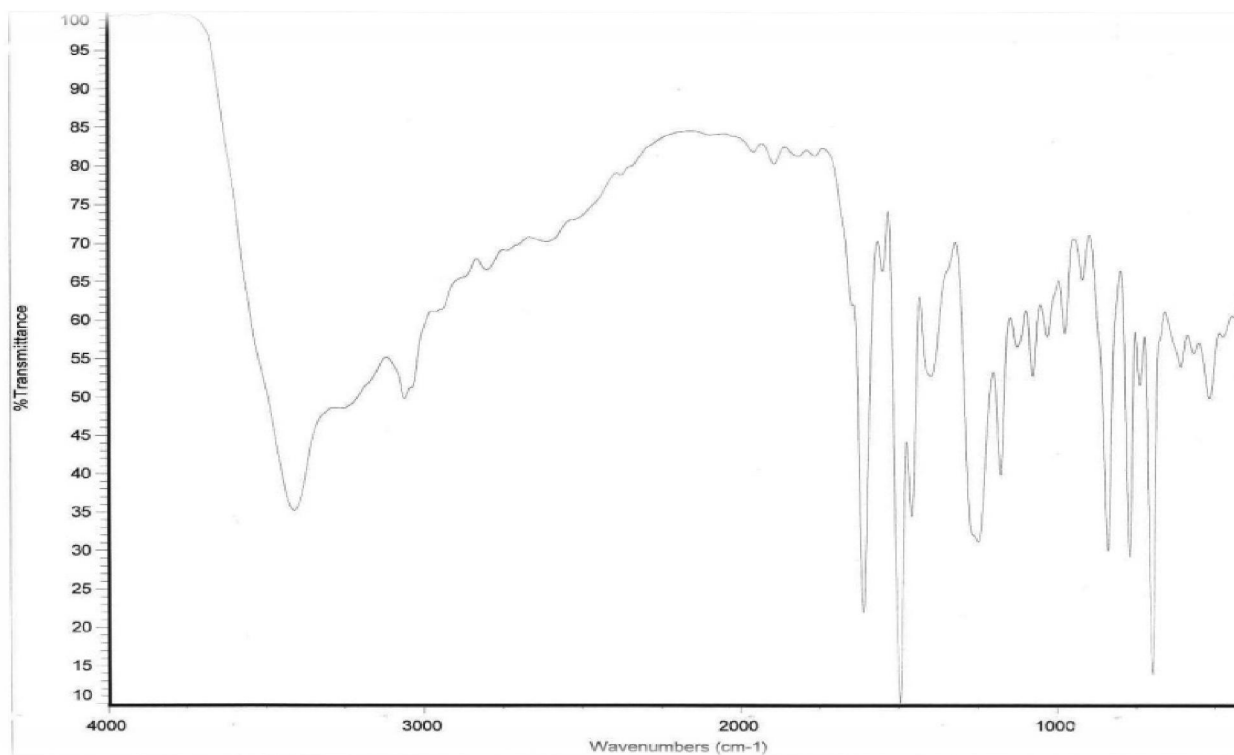


Figure 20. FT IR spectrum of 3h

2-(3-methylphenyl)-4,5-diphenyl-1H-imidazole (**3i**)

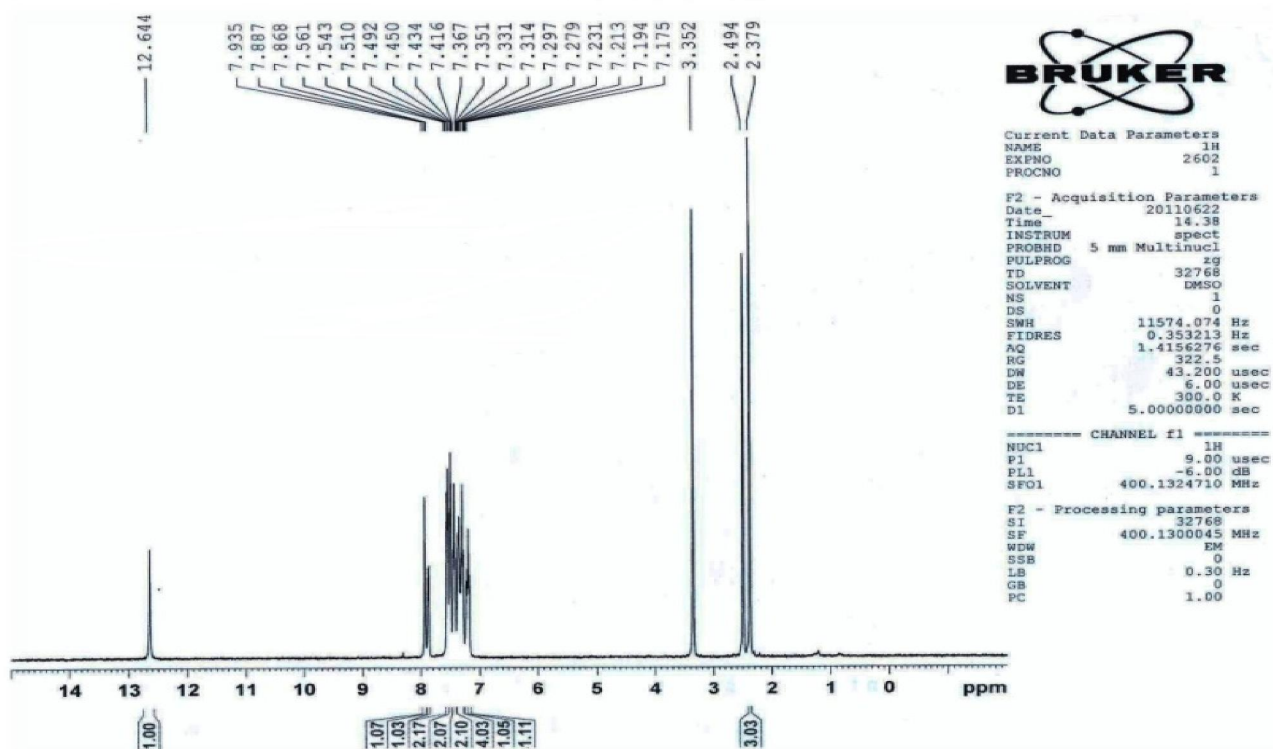


Figure 21. ¹H NMR spectrum of **3i**

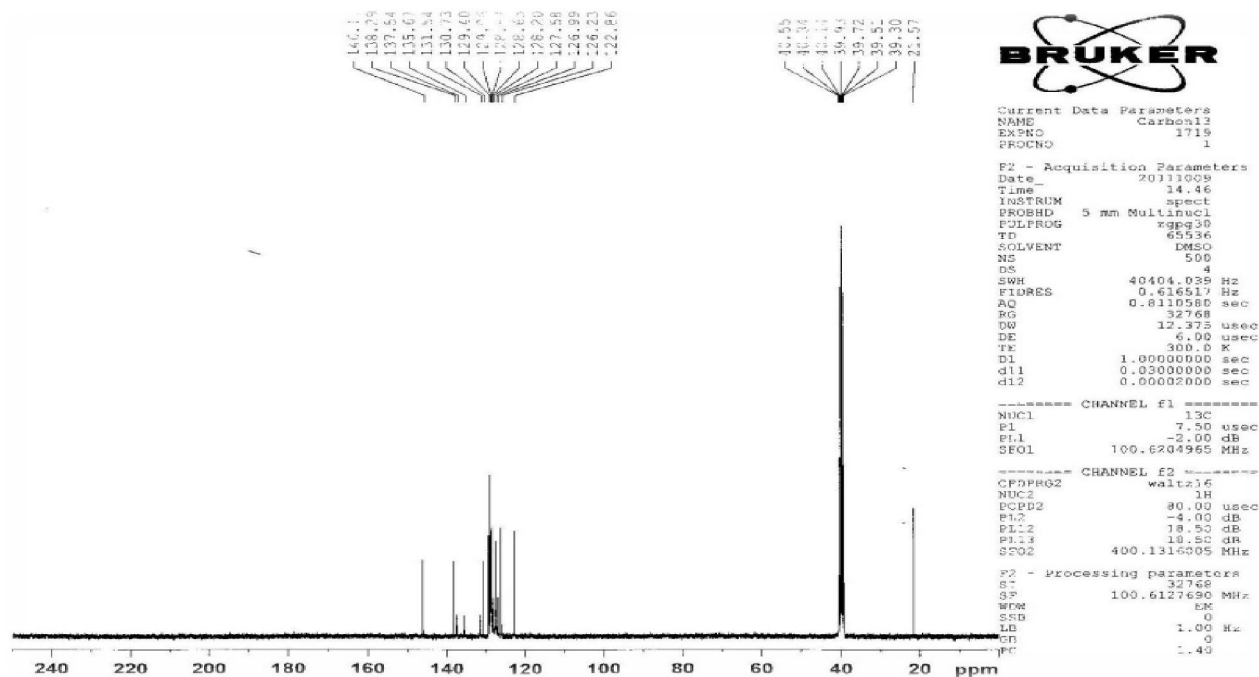


Figure 22. ¹³C NMR spectrum of **3i**

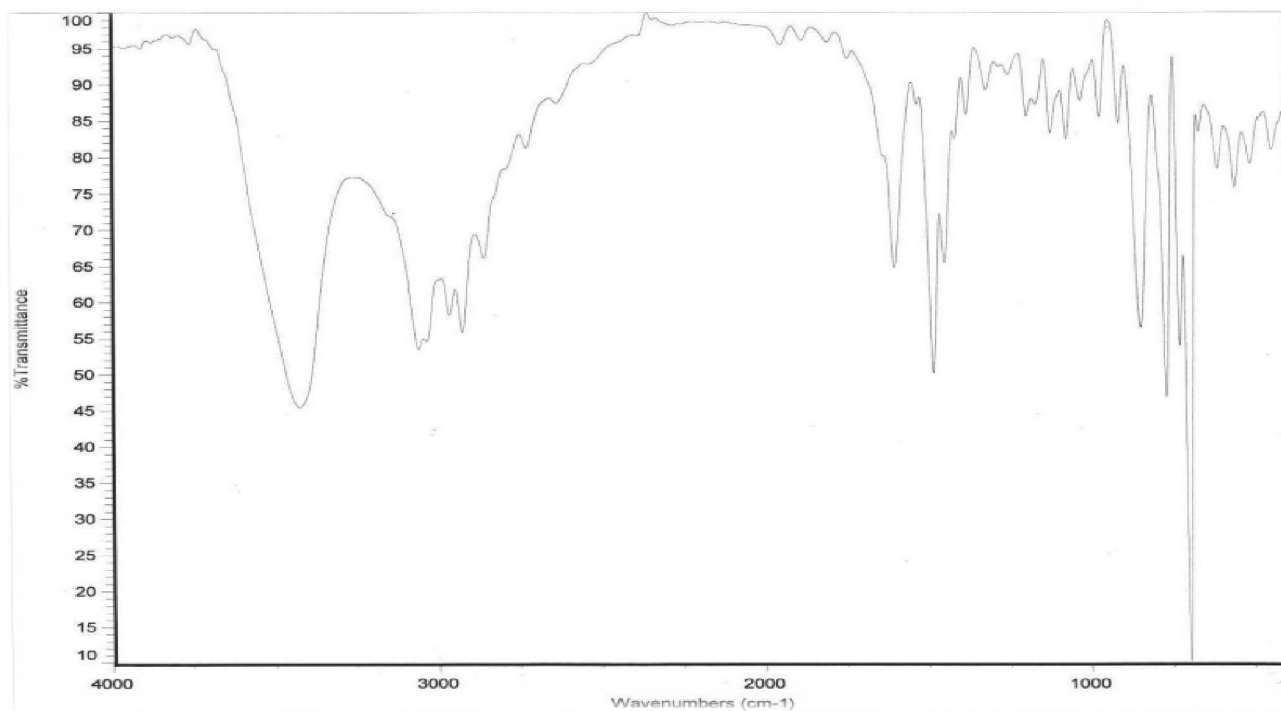


Figure 23. FT IR spectrum of 3i

2-(4-isopropyl phenyl)-4,5-diphenyl-1H-imidazole (**3j**)

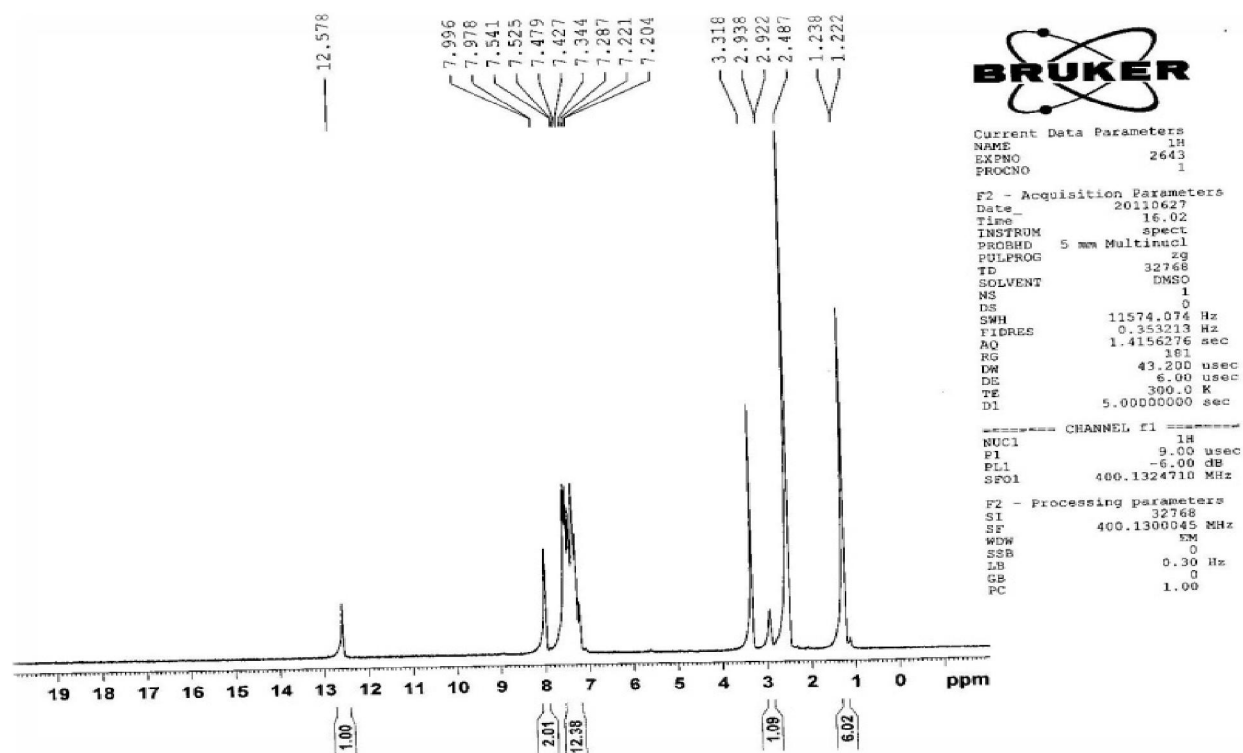


Figure 24. ¹H NMR spectrum of 3j

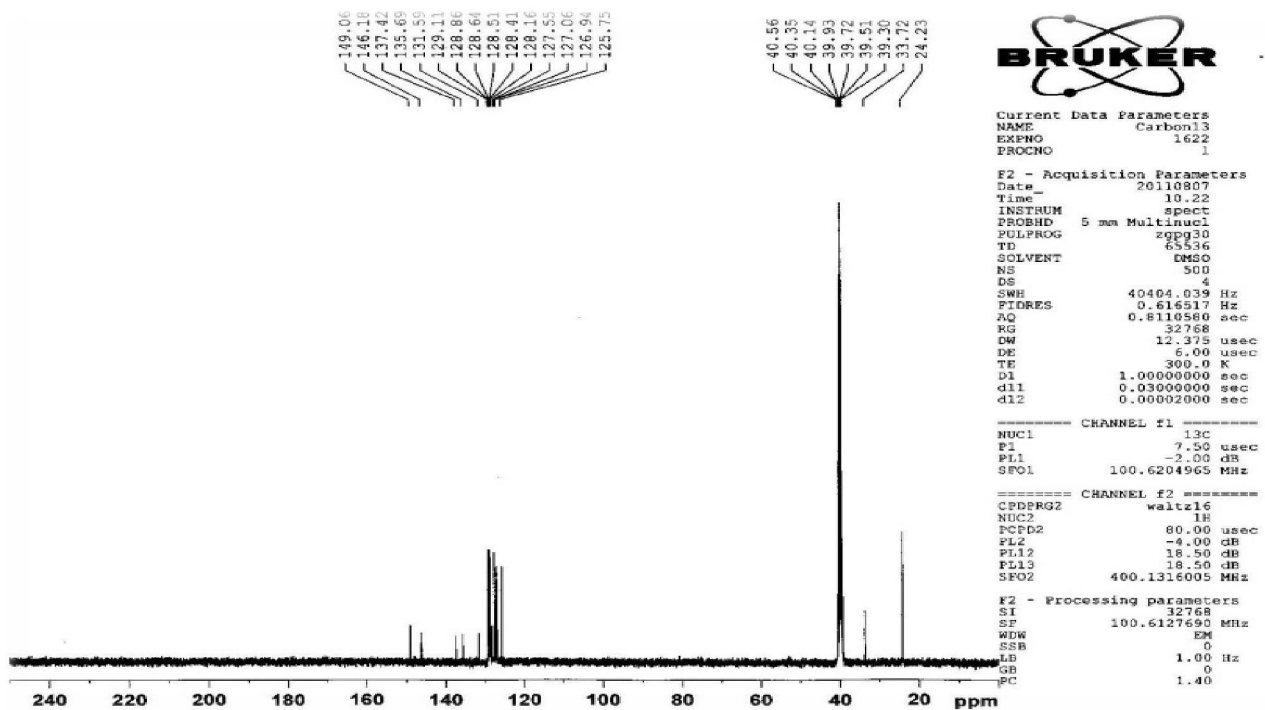


Figure 25. ^{13}C NMR spectrum of 3j

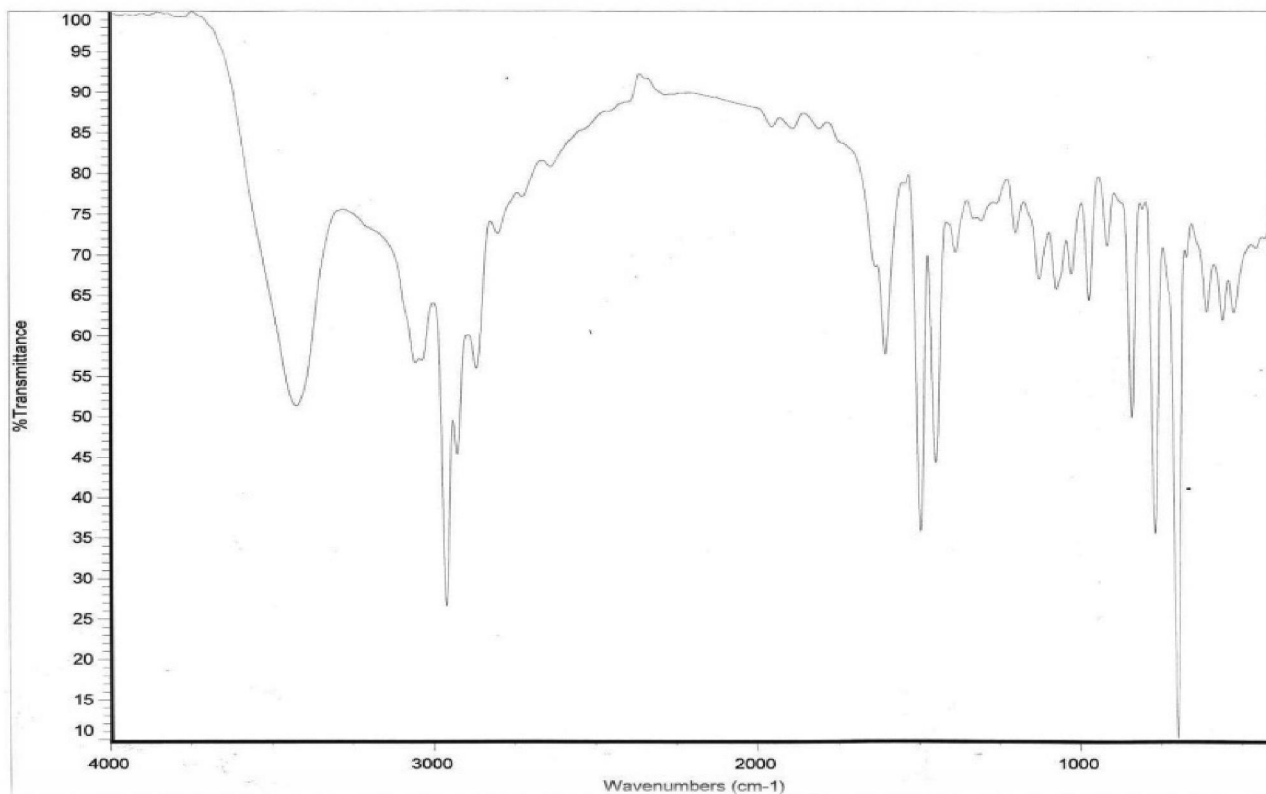


Figure 26. FT IR spectrum of 3j

2-(2-chlorophenyl)-4,5-diphenyl-1H-imidazole (**3k**)

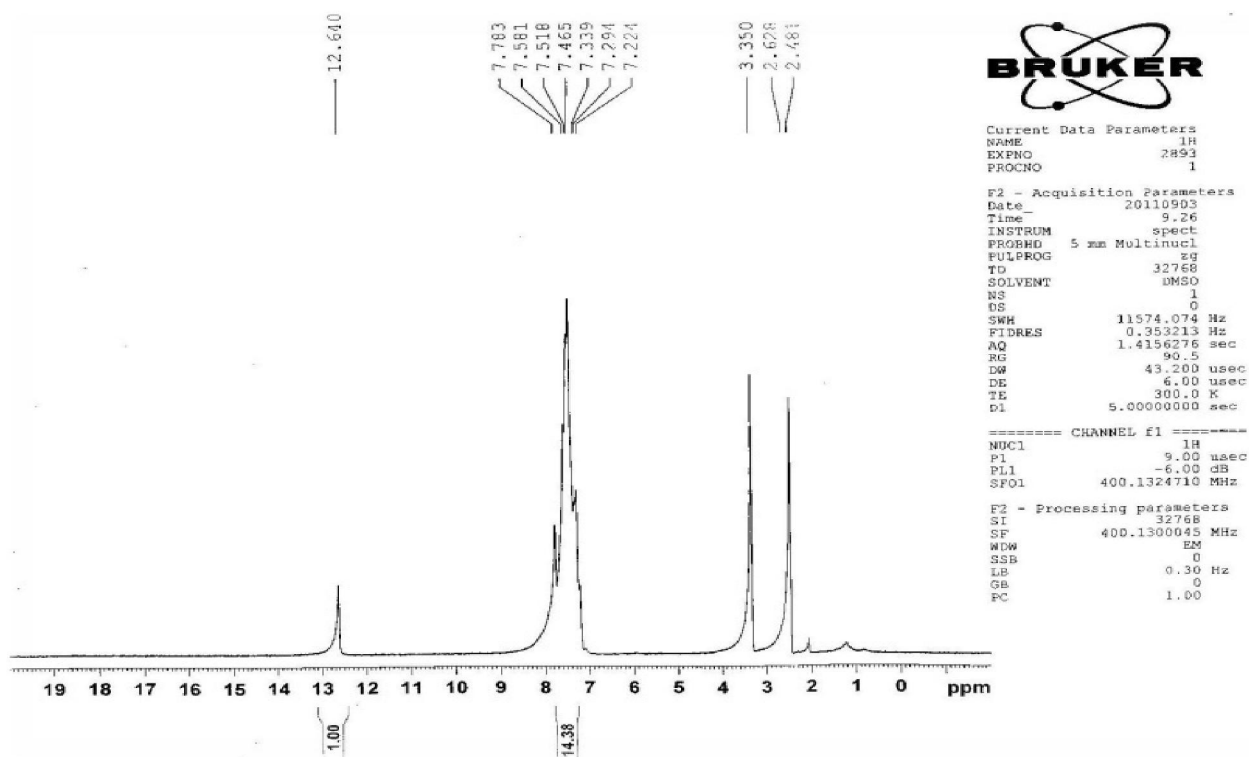


Figure 27. ¹H NMR spectrum of **3k**

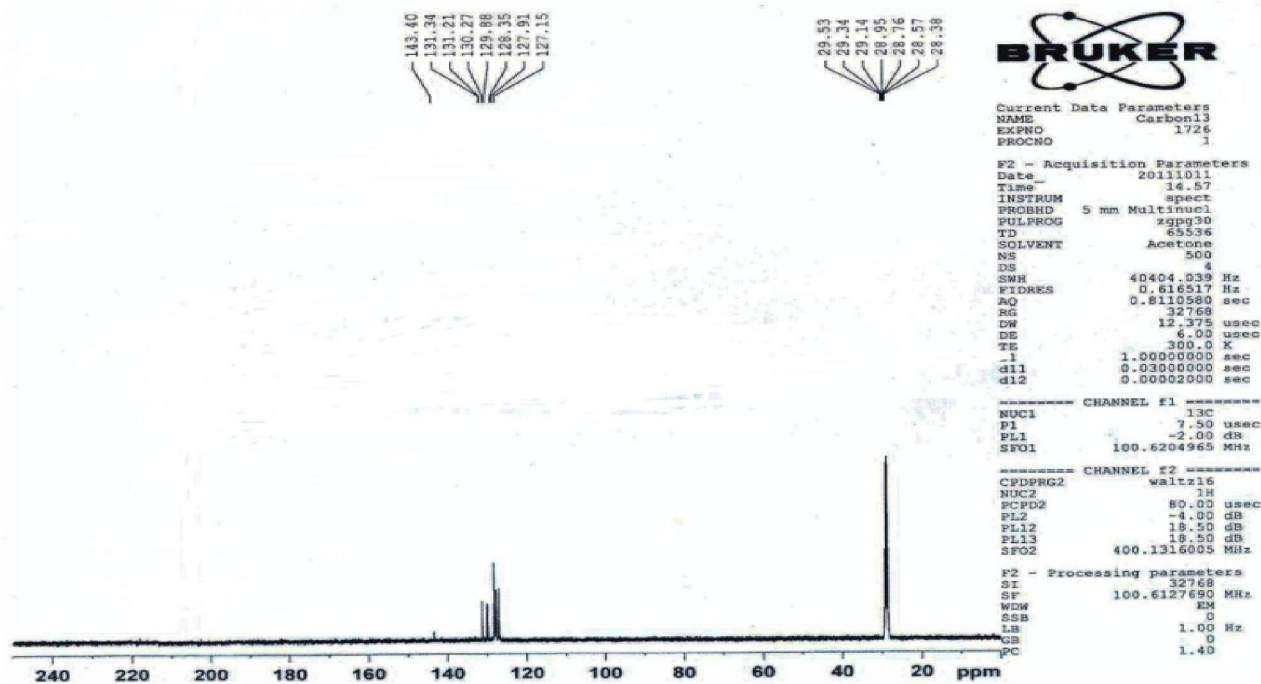


Figure 28. ¹³C NMR spectrum of **3k**

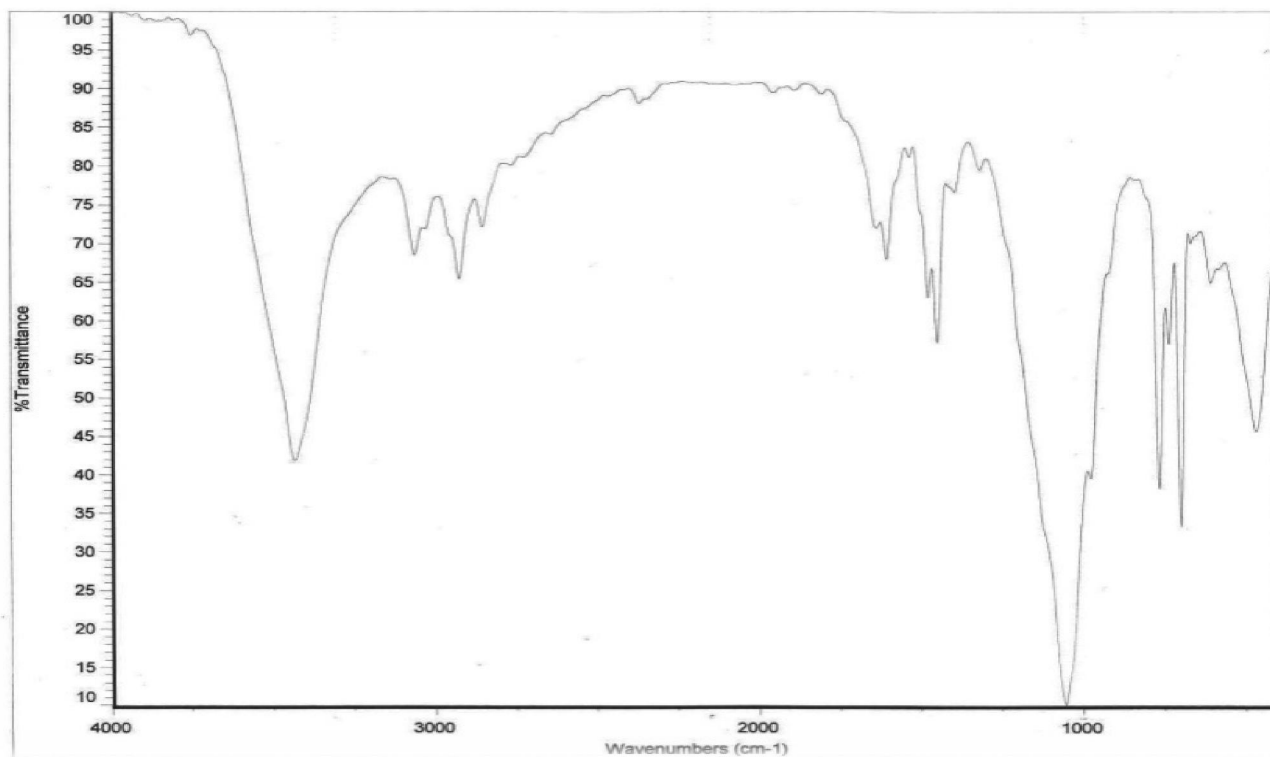


Figure 29. FT IR spectrum of 3k

2-(2,3-dichlorophenyl)-4,5-diphenyl-1H-imidazole (**3l**)

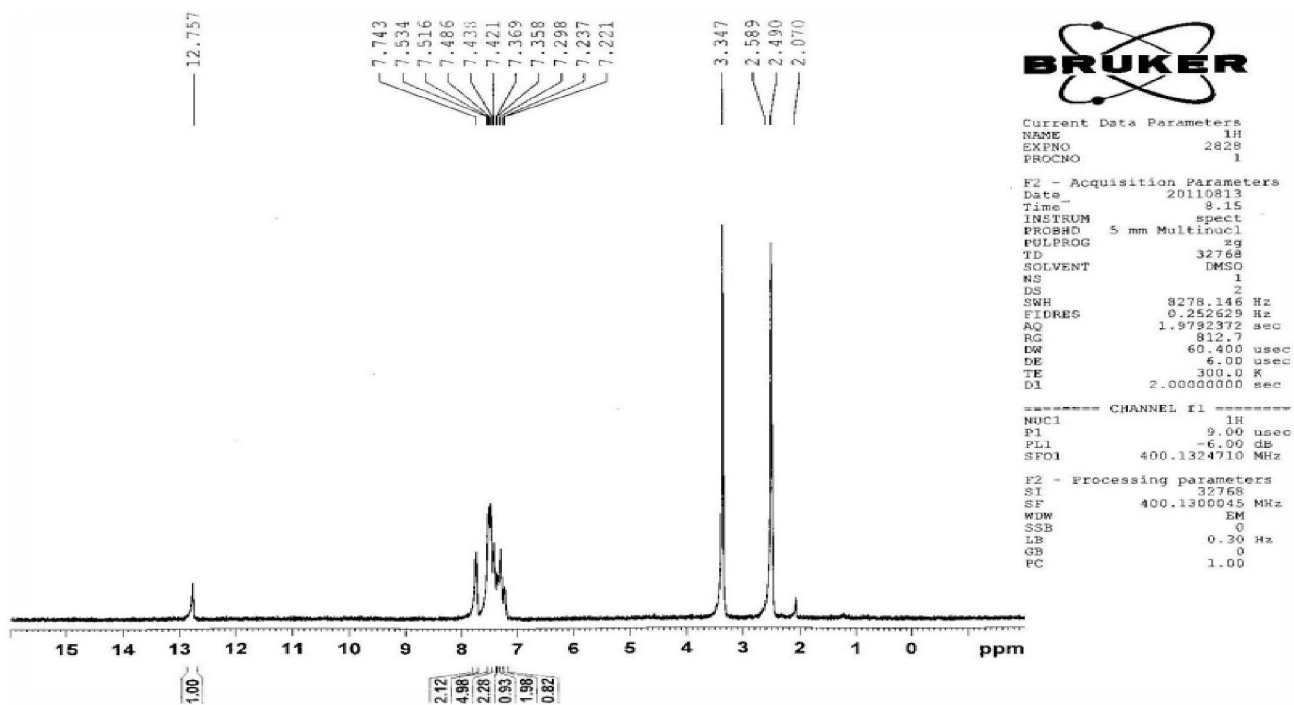


Figure 30. ¹H NMR spectrum of 3l

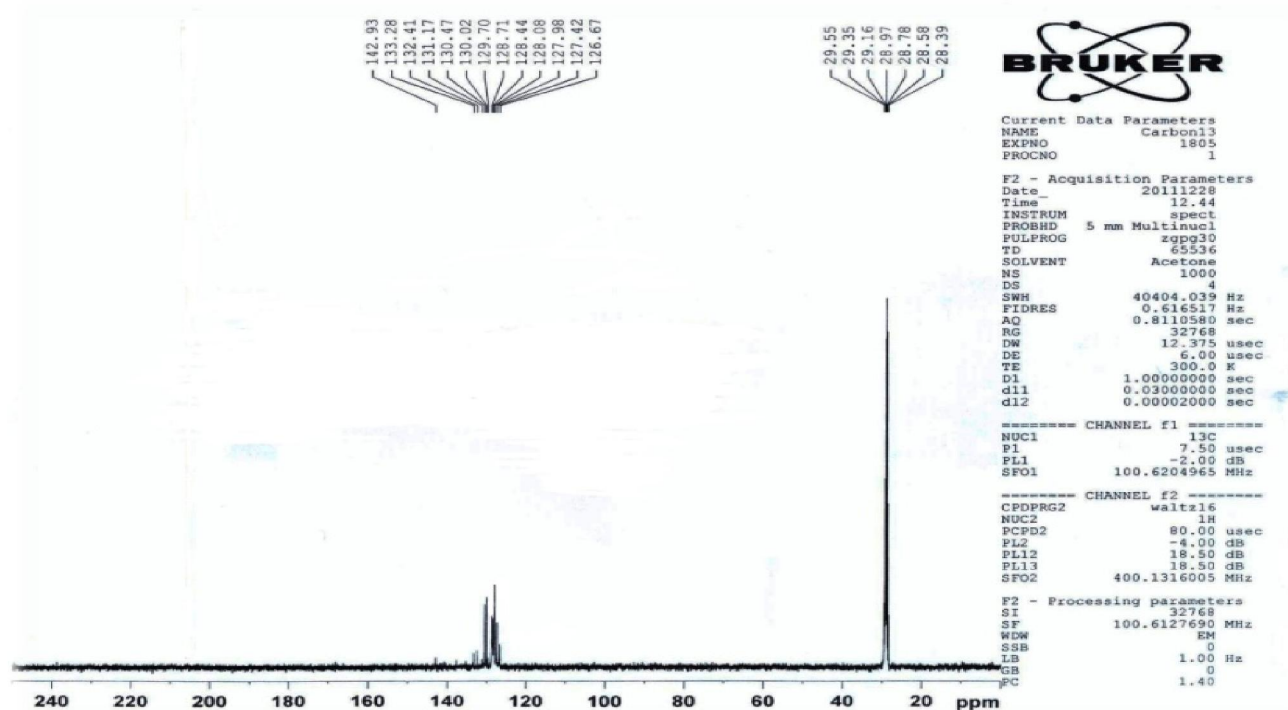


Figure 31. ^{13}C NMR spectrum of 31

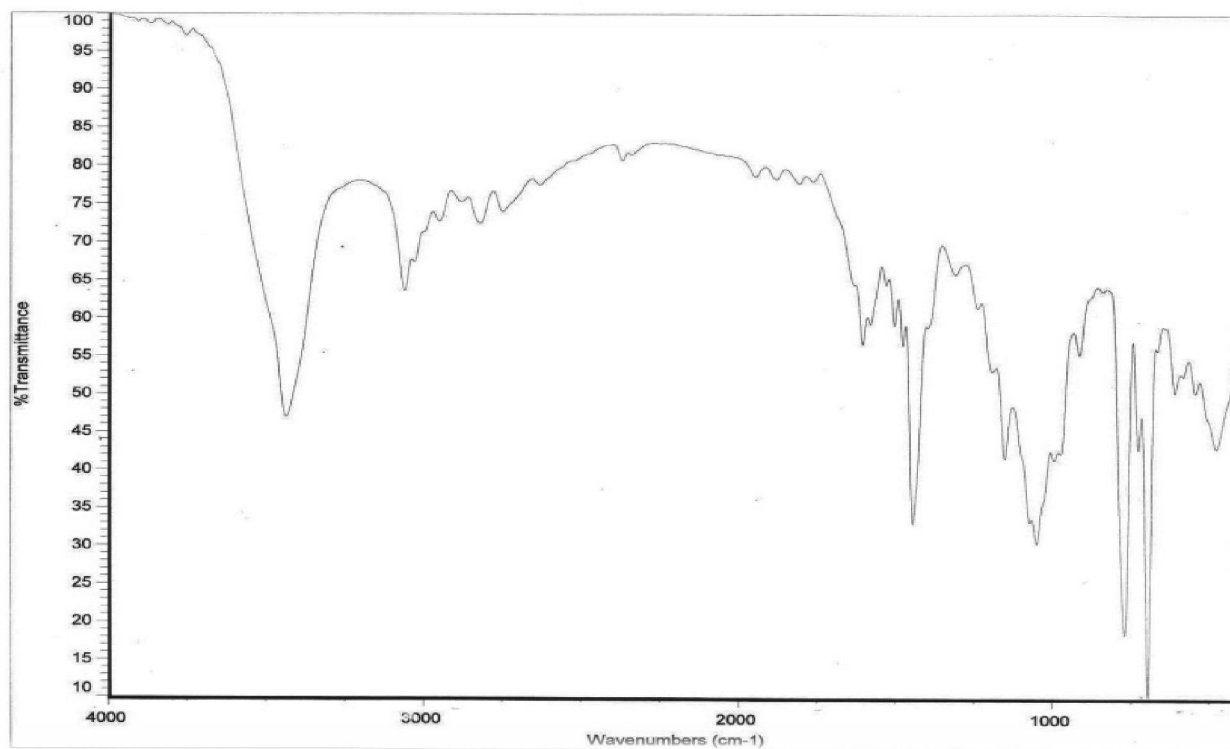


Figure 32. FT IR spectrum of 31

2-(4-chlorophenyl)-4,5-diphenyl-1H-imidazole (**3m**)

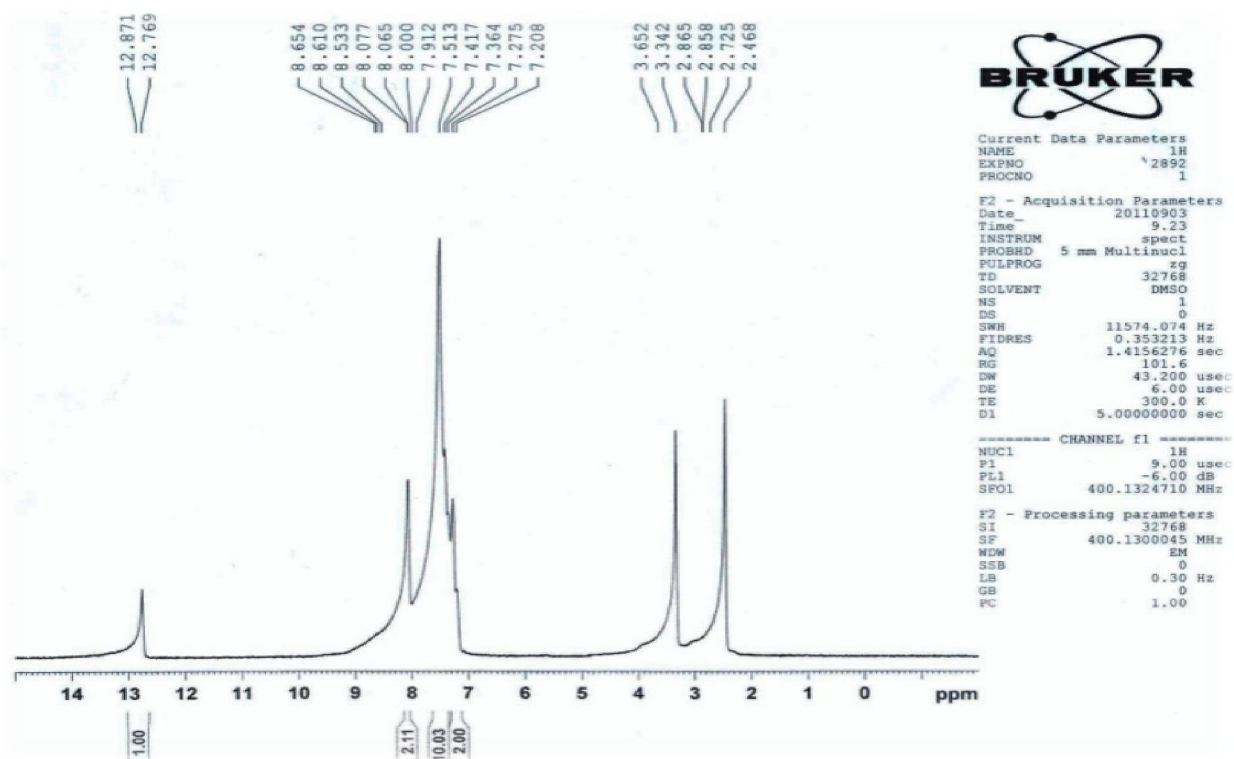


Figure 33. ¹H NMR spectrum of **3m**

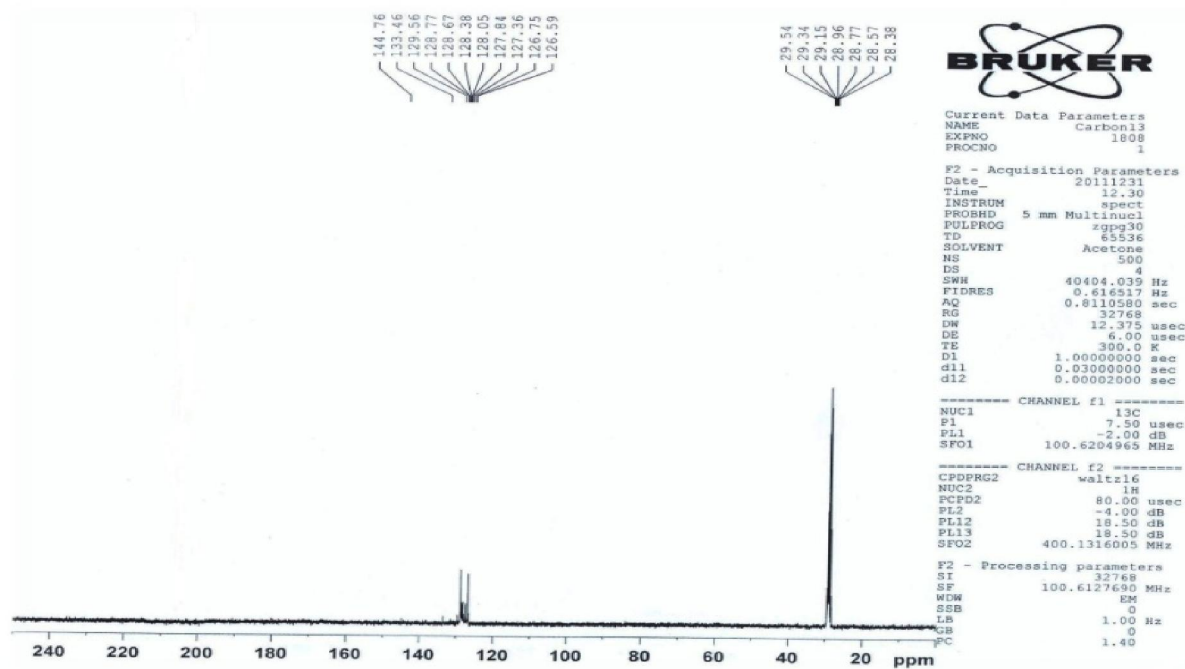


Figure 34. ¹³C NMR spectrum of **3m**

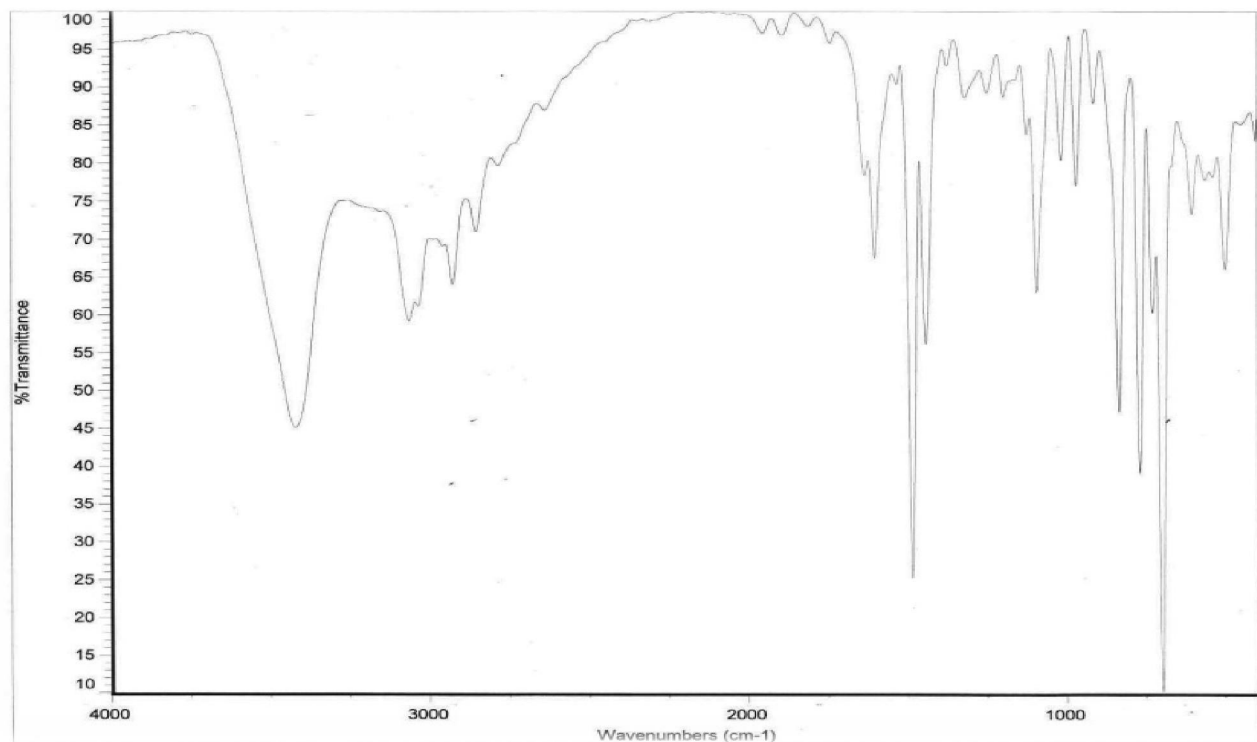


Figure 35. FT IR spectrum of 3m

2-(2,4-dichlorophenyl)-4,5-diphenyl-1H-imidazole (**3n**)

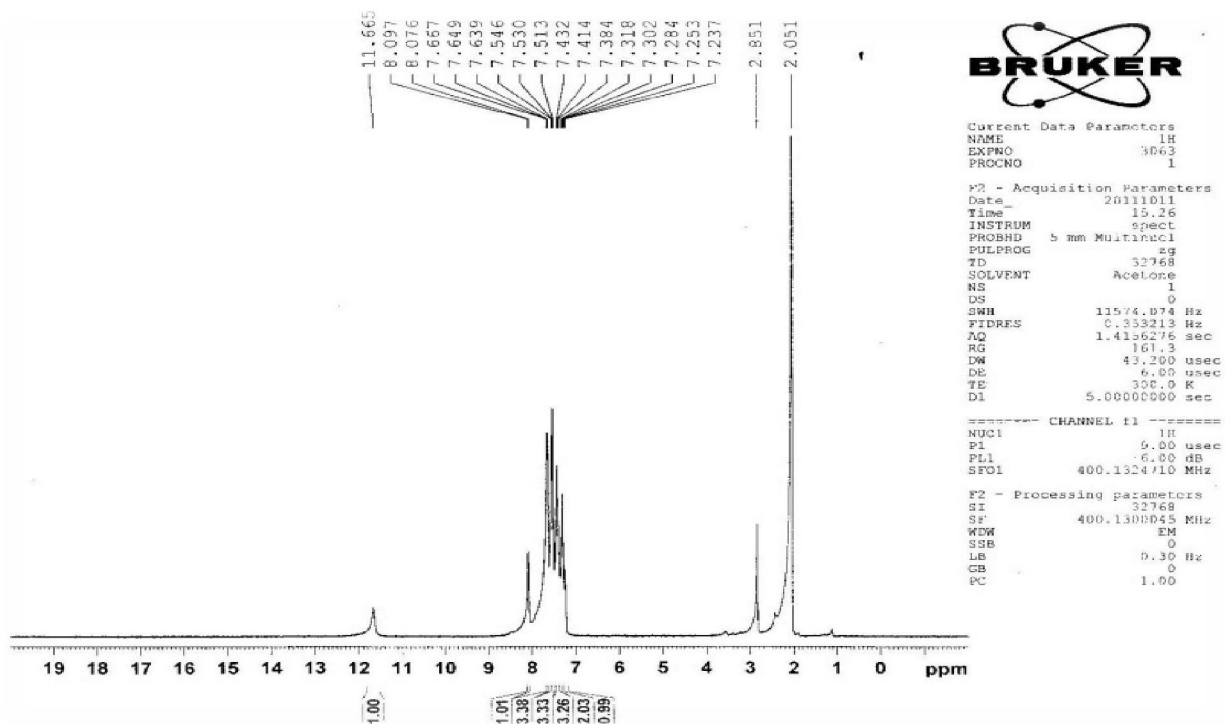


Figure 36. ¹H NMR spectrum of 3n

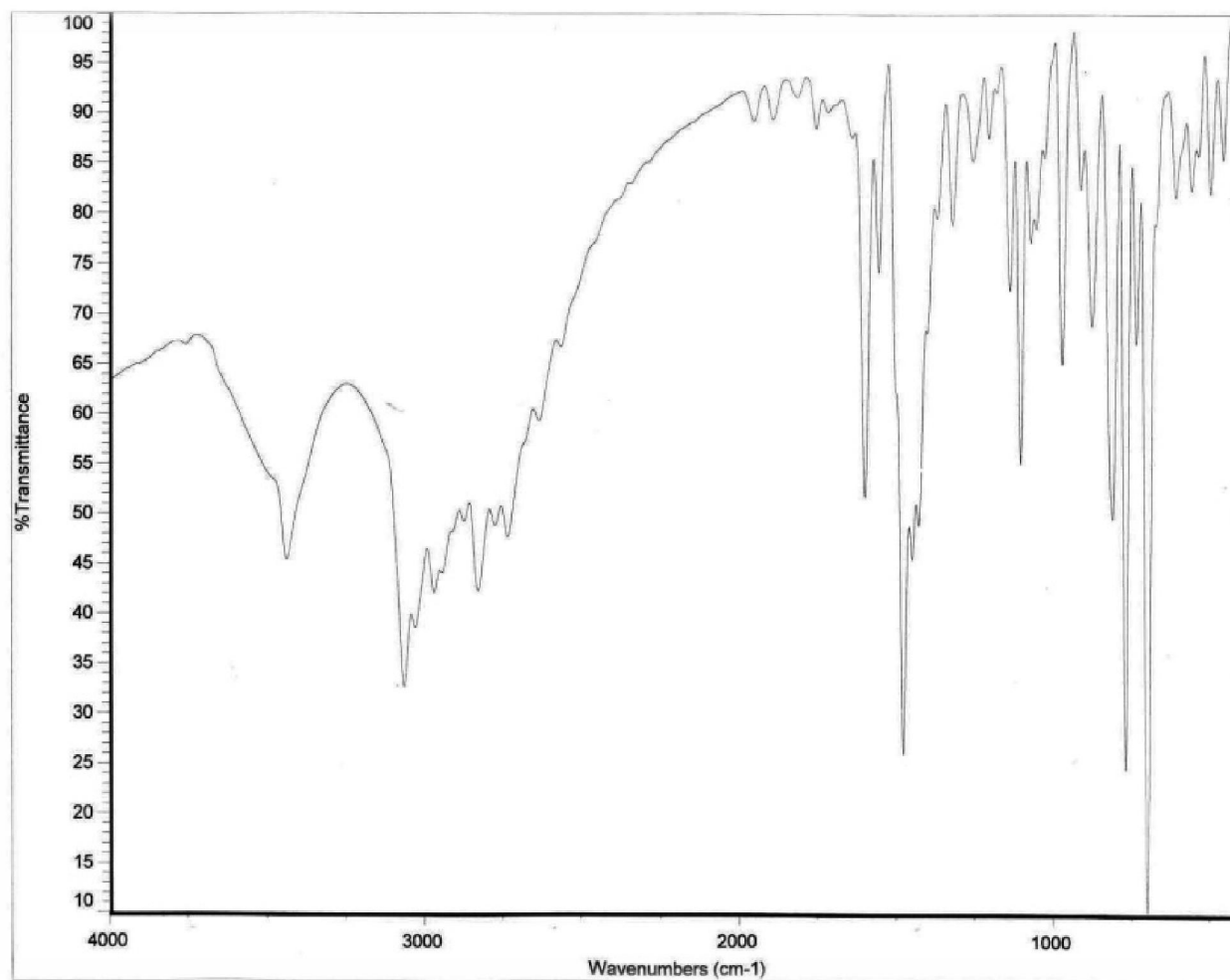


Figure 37. FT IR spectrum of 3n