

Supplementary Information

Silica coated magnetic NiFe₂O₄ nanoparticles supported phosphomolybdic acid; synthesis, preparation and its application as a heterogeneous and recyclable catalyst for the one-pot synthesis of tri and tetra-substituted imidazoles under solvent free conditions

Behrooz Maleki^{*a}, Hossein Eshghi^b, Amir Khojastehnezhad^b, Reza Tayebee^a, Samaneh Sedigh Ashrafi^a, Golnoosh Esmailian Kahoo^a, Farid Moeinpour^c

**Correspondence to: Department of Chemistry, Hakim Sabzevari University, Sabzevar, 96179-76487, Iran; *E-mail:b.maleki@hsu.ac.ir, Tel: +98-44013324 Fax: +98-514401300*

^aDepartment of Chemistry, Hakim Sabzevari University, Sabzevar, 96179-76487, Iran

^bDepartment of Chemistry, Faculty of Sciences, Ferdowsi University of Mashhad, Mashhad, Iran

^cDepartment of Chemistry, Bandar Abbas Branch, Islamic Azad University, Bandar Abbas 7915893144, Iran

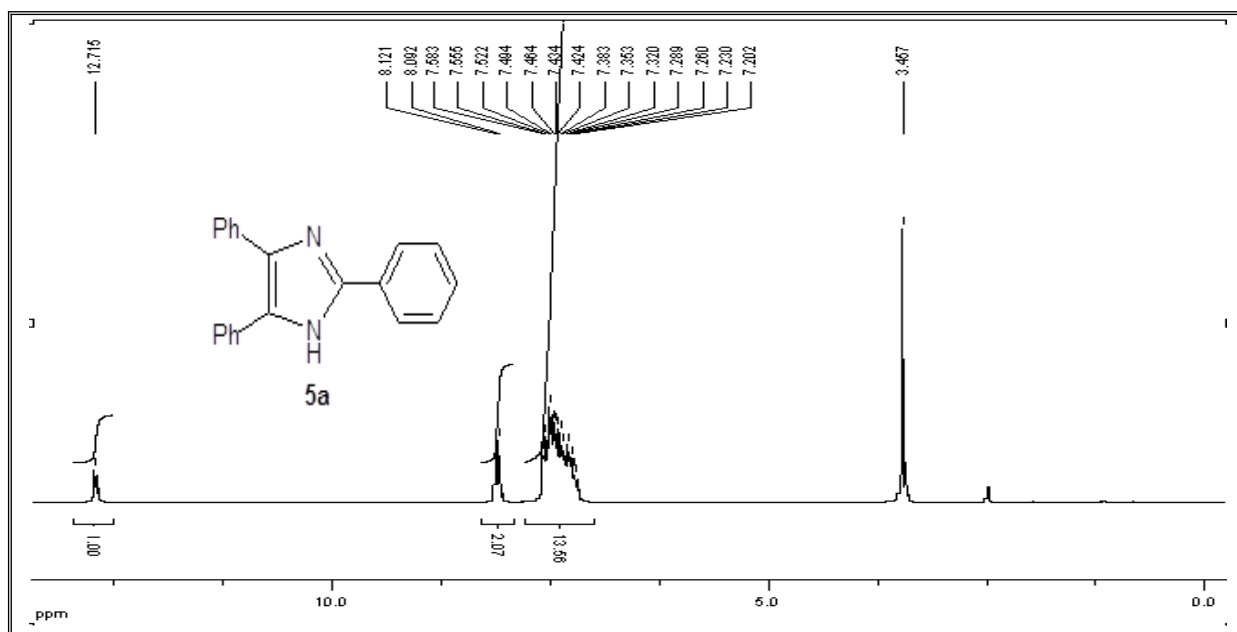


Fig. S1. ¹H NMR (DMSO-d₆, 250 MHz) of **5a**

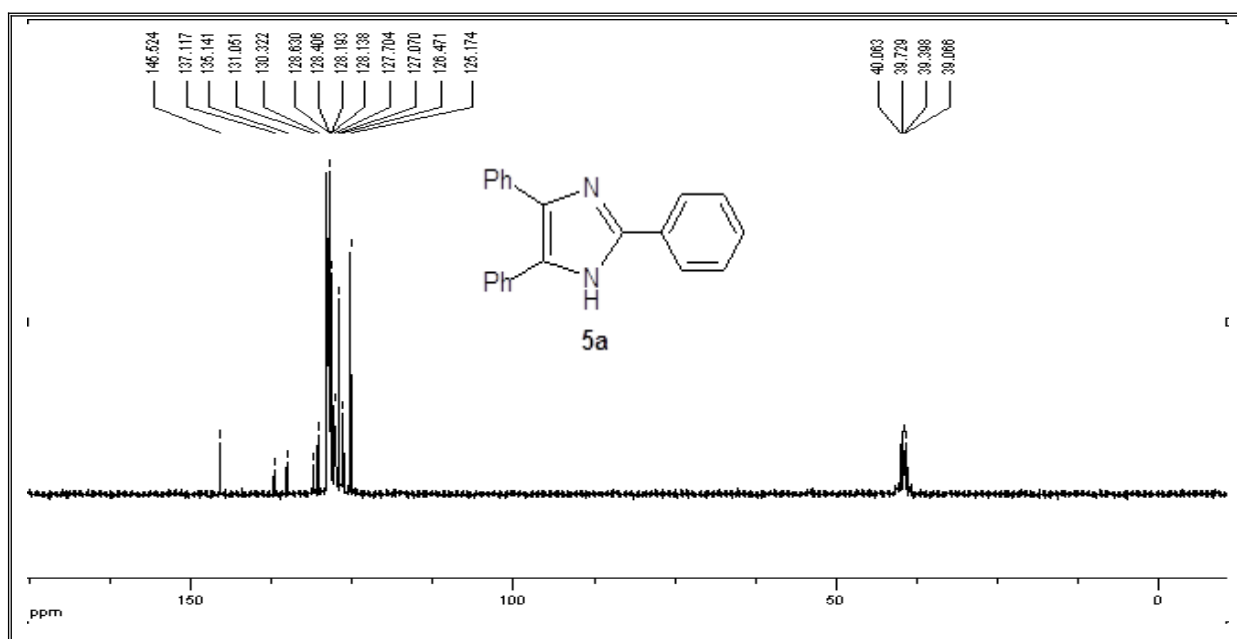


Fig. S2. ¹³C NMR (DMSO-d₆, 70 MHz) of **5a**

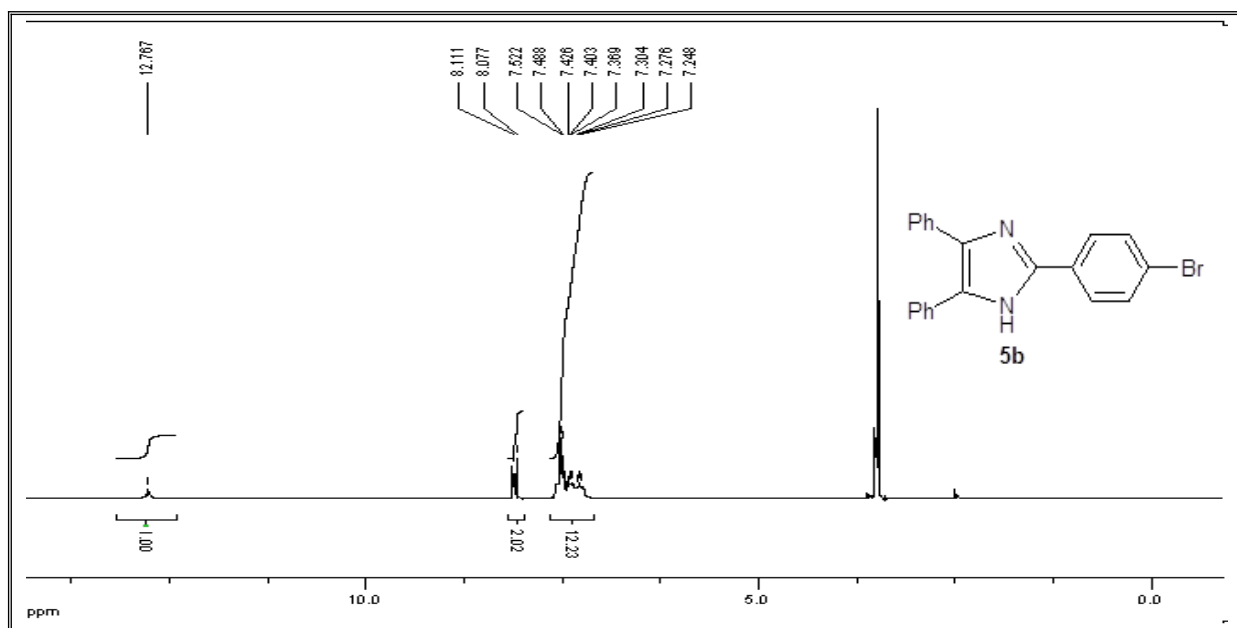


Fig. S3. ^1H NMR (DMSO- d_6 , 250 MHz) of **5b**

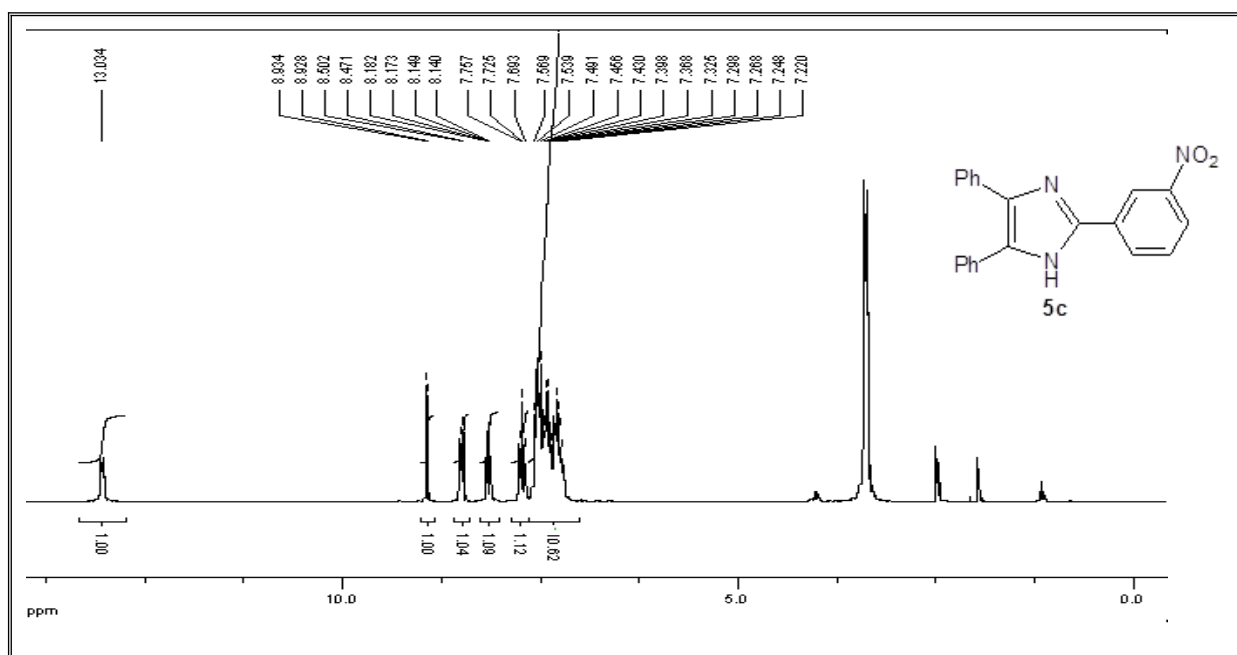


Fig. S4. ^1H NMR (DMSO- d_6 , 250 MHz) of **5c**

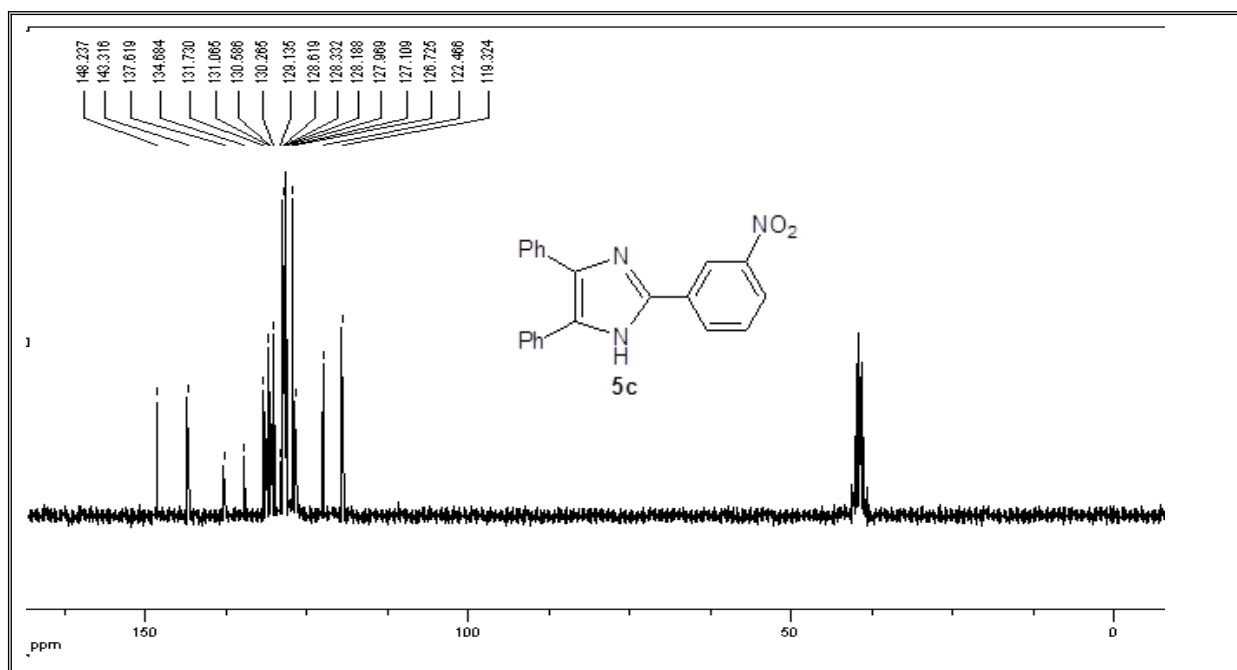


Fig. S5. ¹³CNMR (DMSO-d₆, 70 MHz) of **5c**

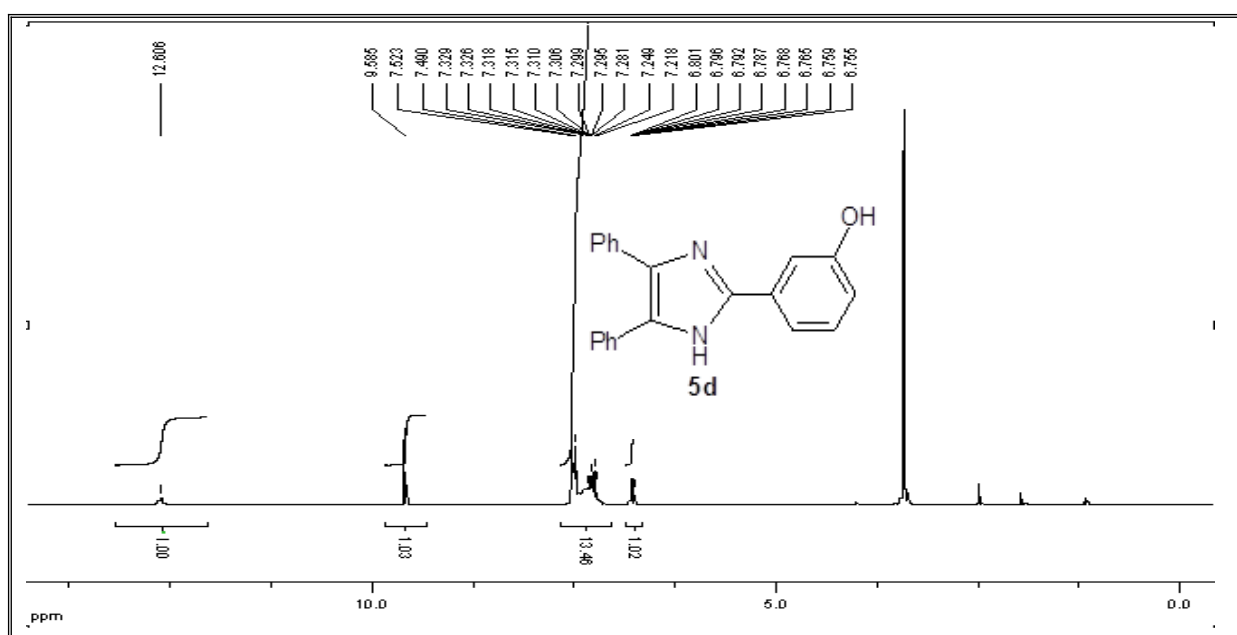


Fig. S6. ¹H NMR (DMSO-d₆, 250 MHz) of **5d**

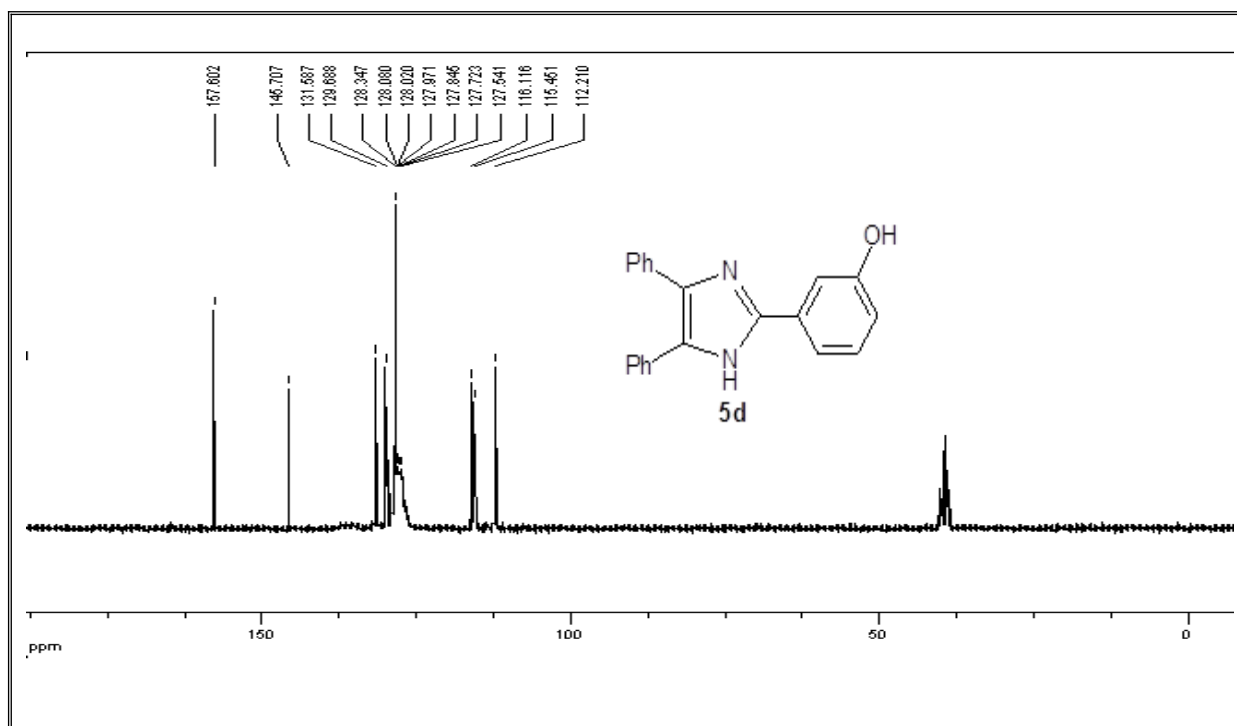


Fig. S7. ¹³CNMR (DMSO-d₆, 70 MHz) of **5d**

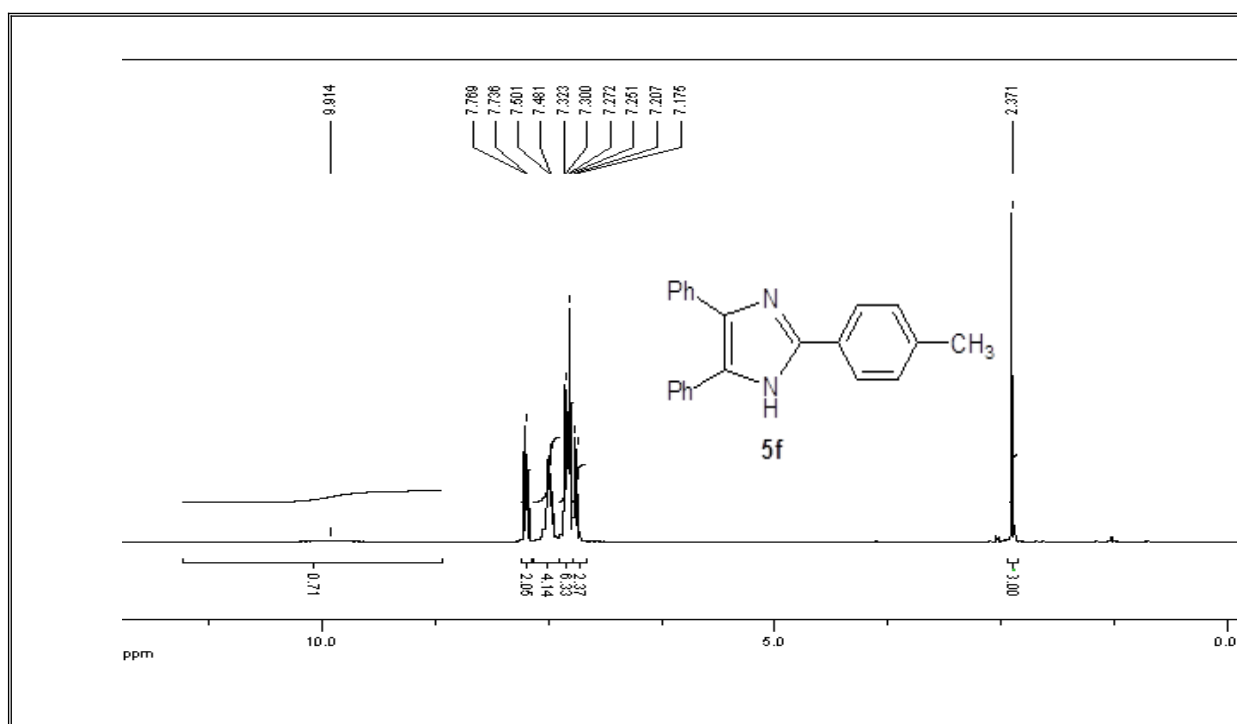


Fig. S8. ¹HNMR (CDCl₃, 250 MHz) of **5f**

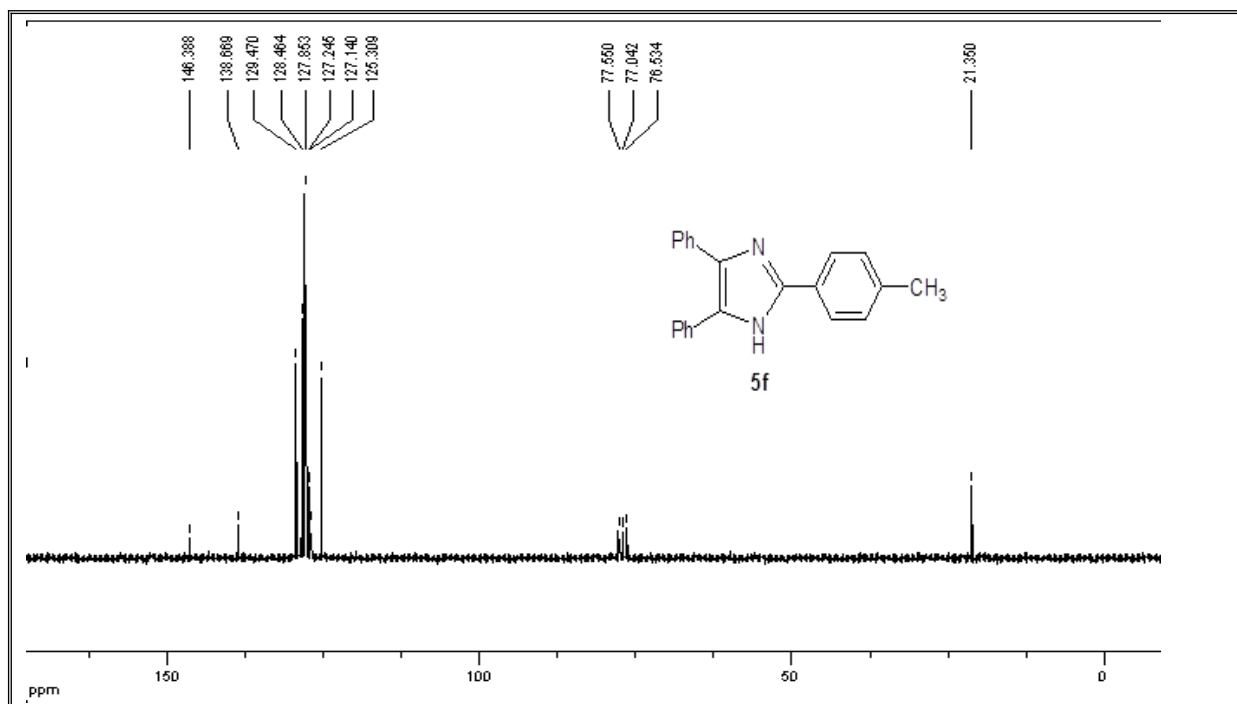


Fig. S9. ¹³CNMR (CDCl₃, 70 MHz) of **5f**

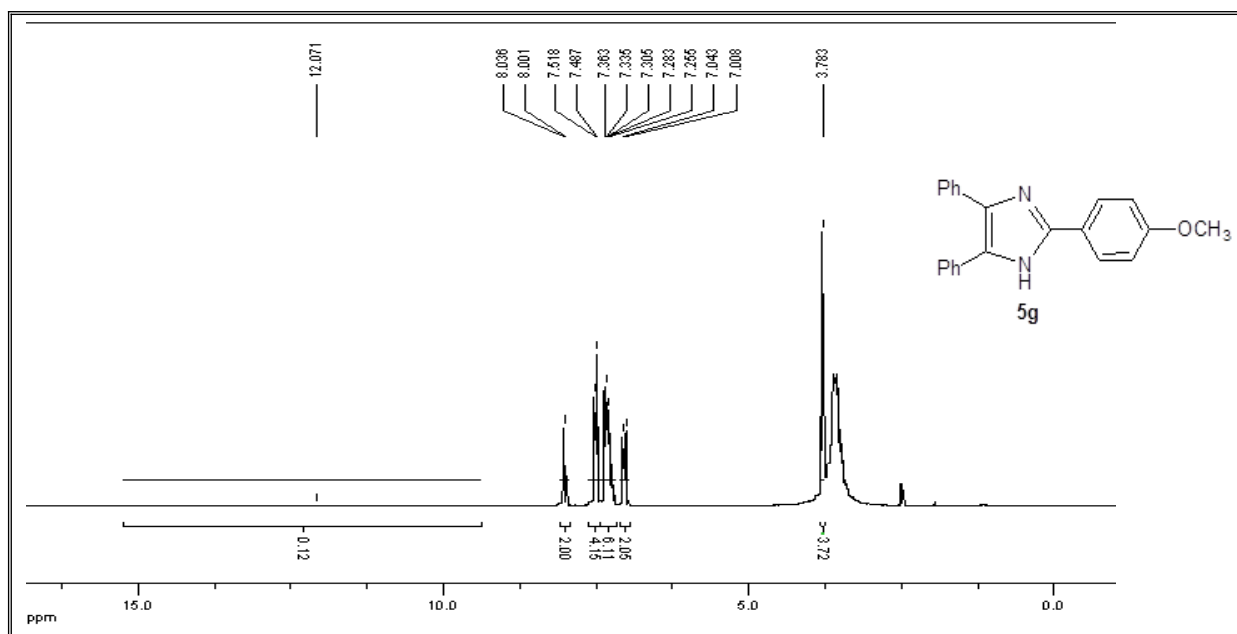


Fig. S10. ¹HNMR (DMSO-d₆, 250 MHz) of **5g**

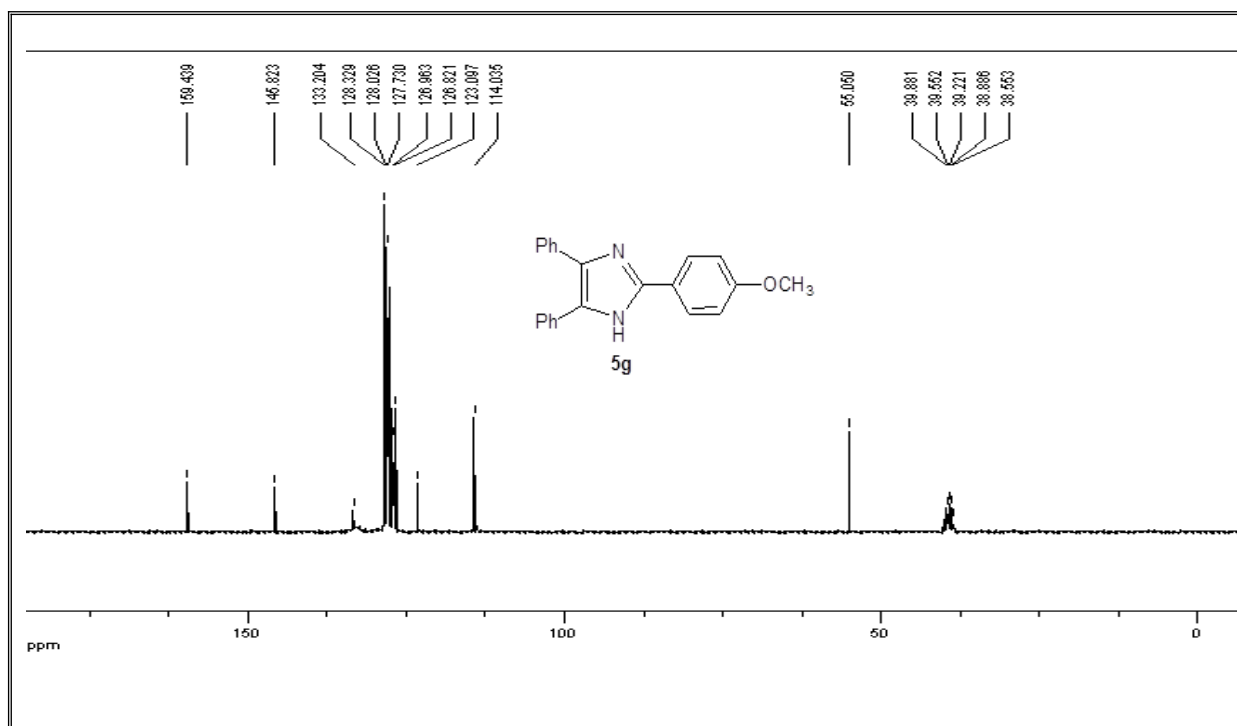


Fig. S11. ¹³CNMR (DMSO-d₆, 70 MHz) of **5g**

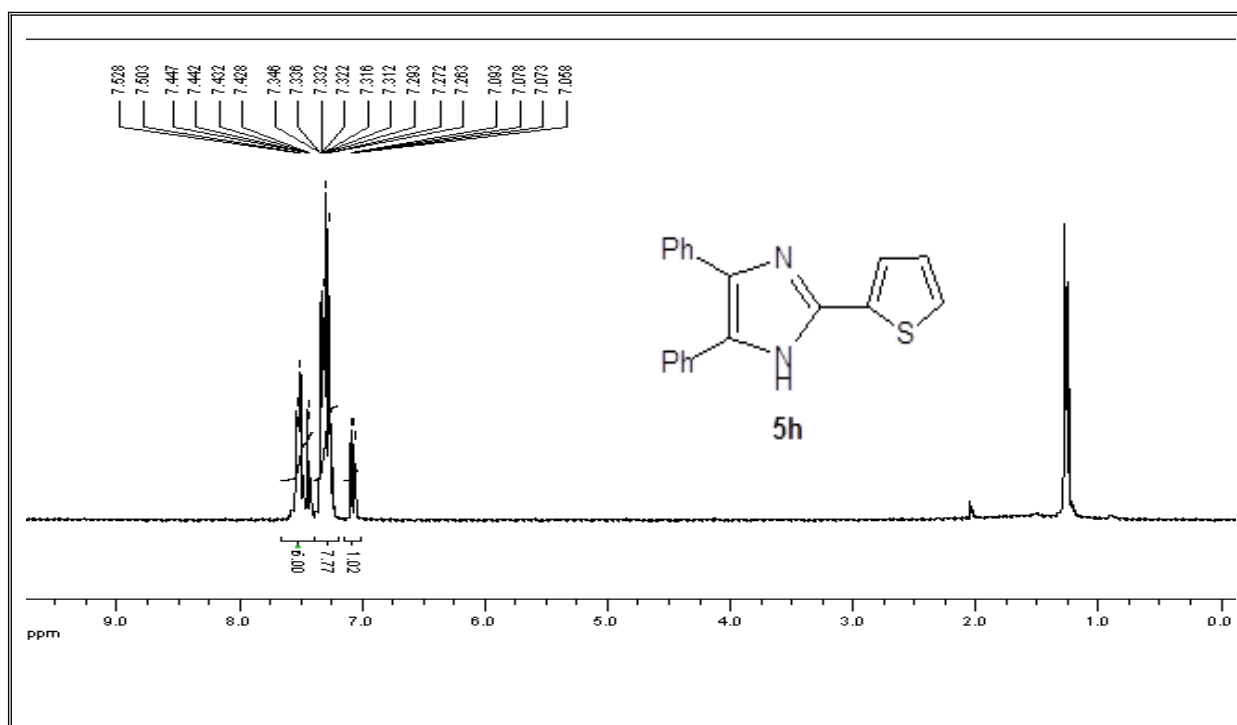


Fig. S12. ¹HNMR (DMSO-d₆, 250 MHz) of **5h**

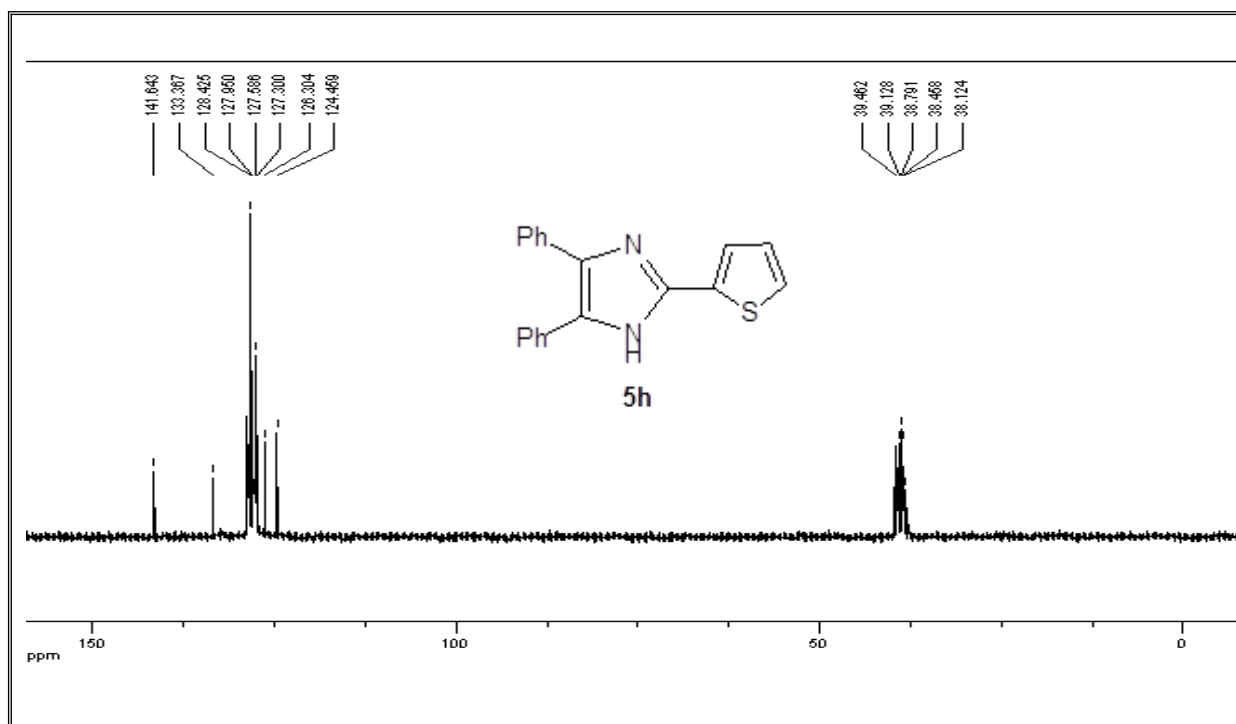


Fig. S13. ¹³CNMR (DMSO-d₆, 70 MHz) of **5h**

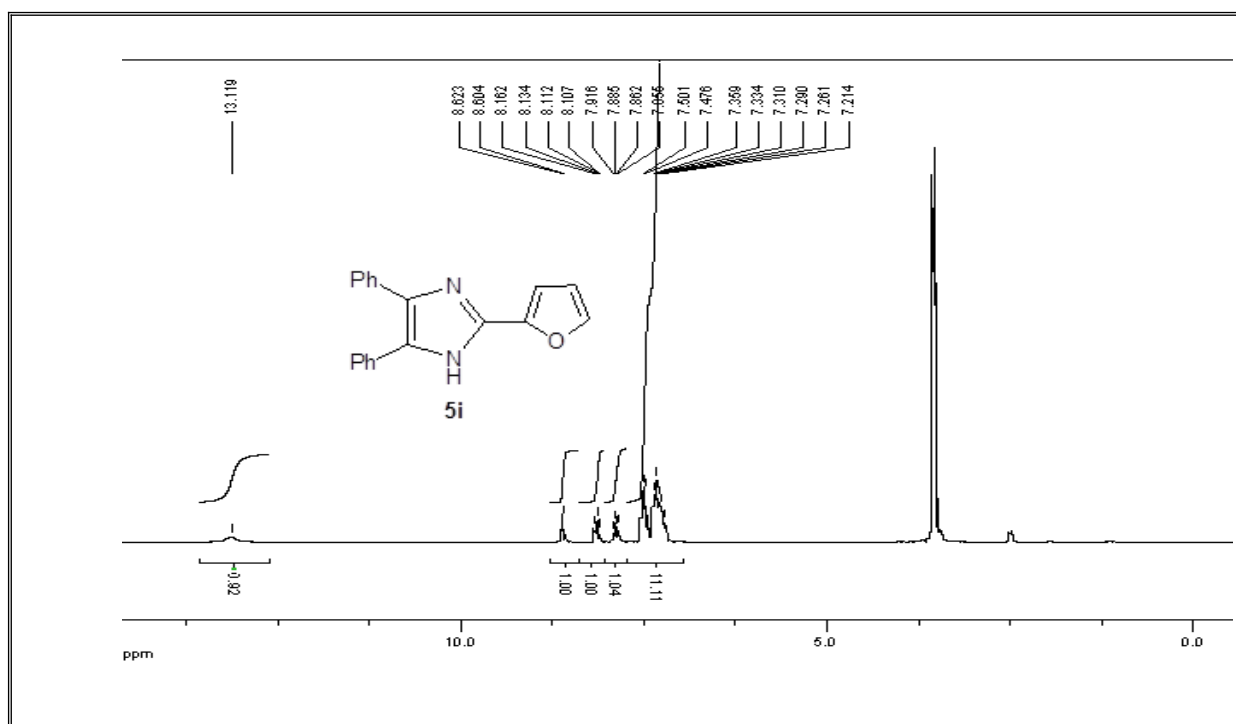


Fig. S14. ¹HNMR (DMSO-d₆, 250 MHz) of **5i**

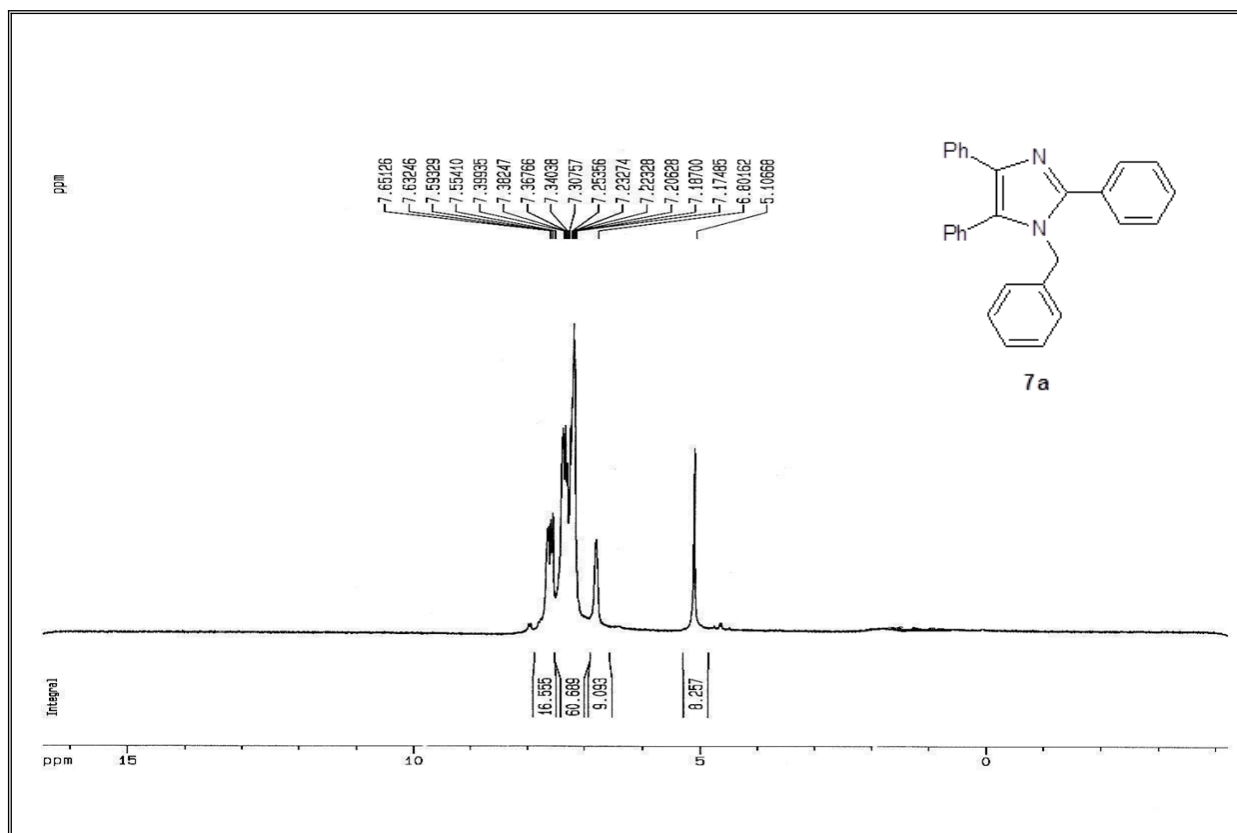


Fig. S15. ¹H NMR (CDCl₃, 300 MHz) of 7a

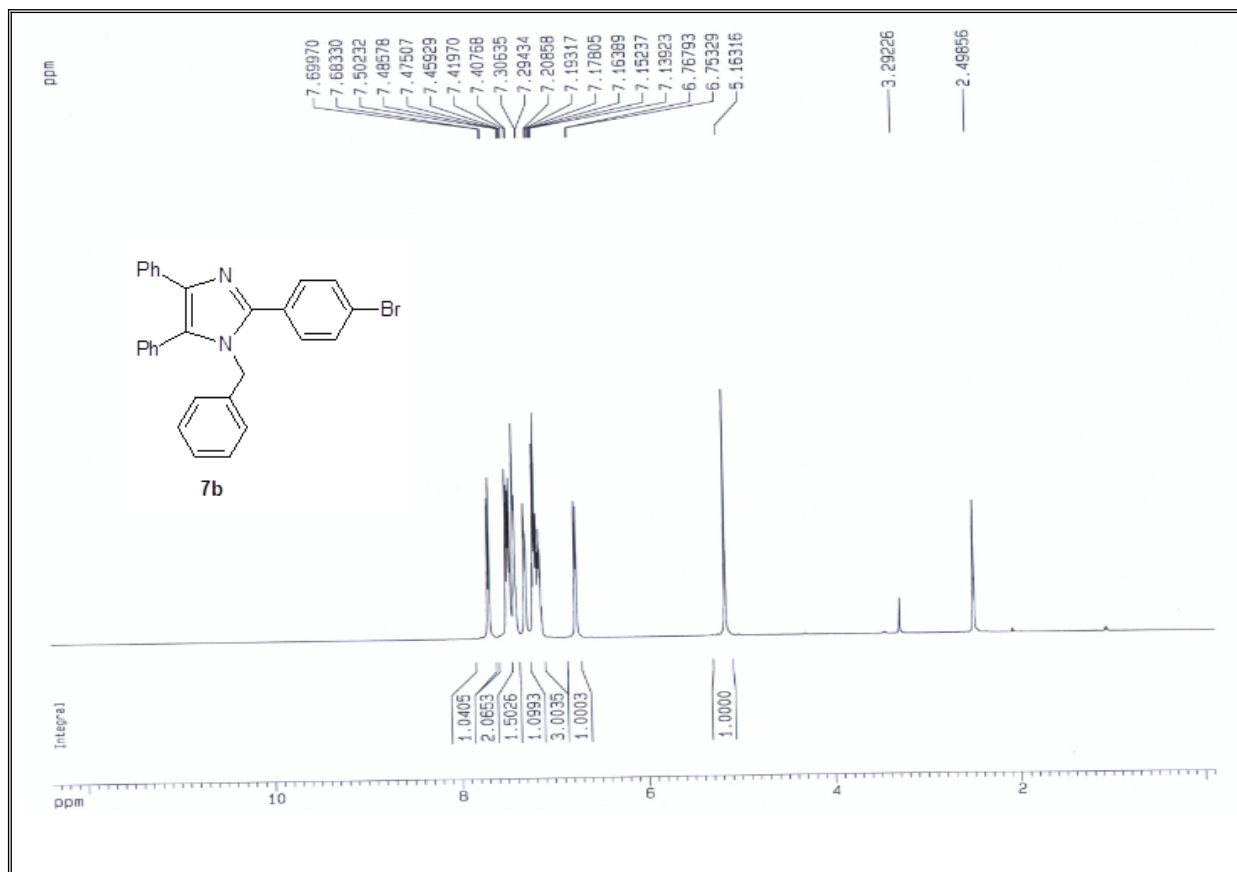


Fig. S16. ¹H NMR (DMSO-d₆, 300 MHz) of **7b**

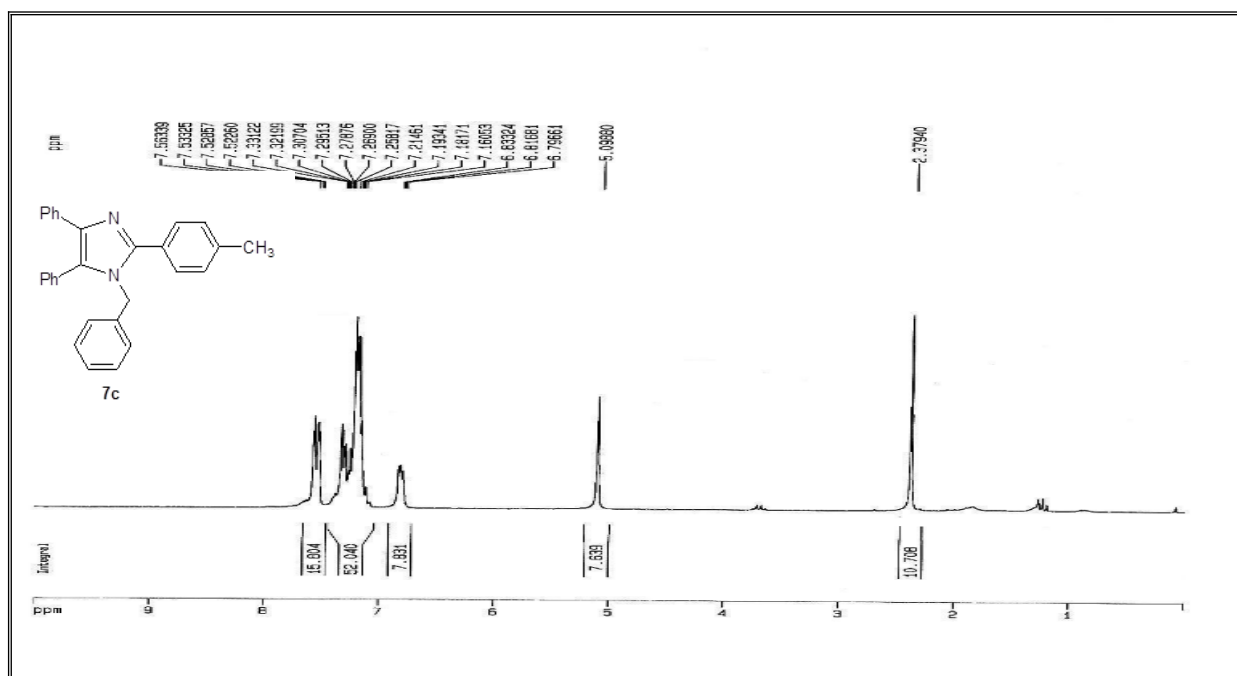


Fig. S17. ¹H NMR (CDCl₃, 300 MHz) of **7c**

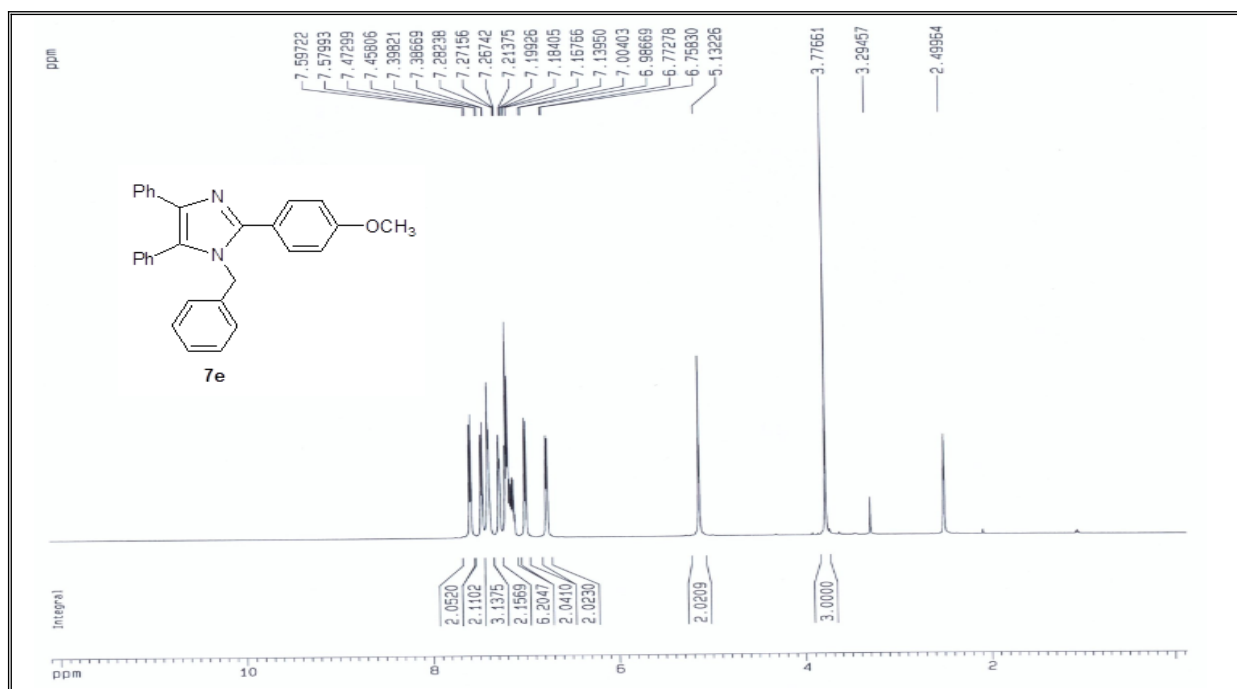


Fig. S18. ¹H NMR (DMSO-d₆, 300 MHz) of **7e**

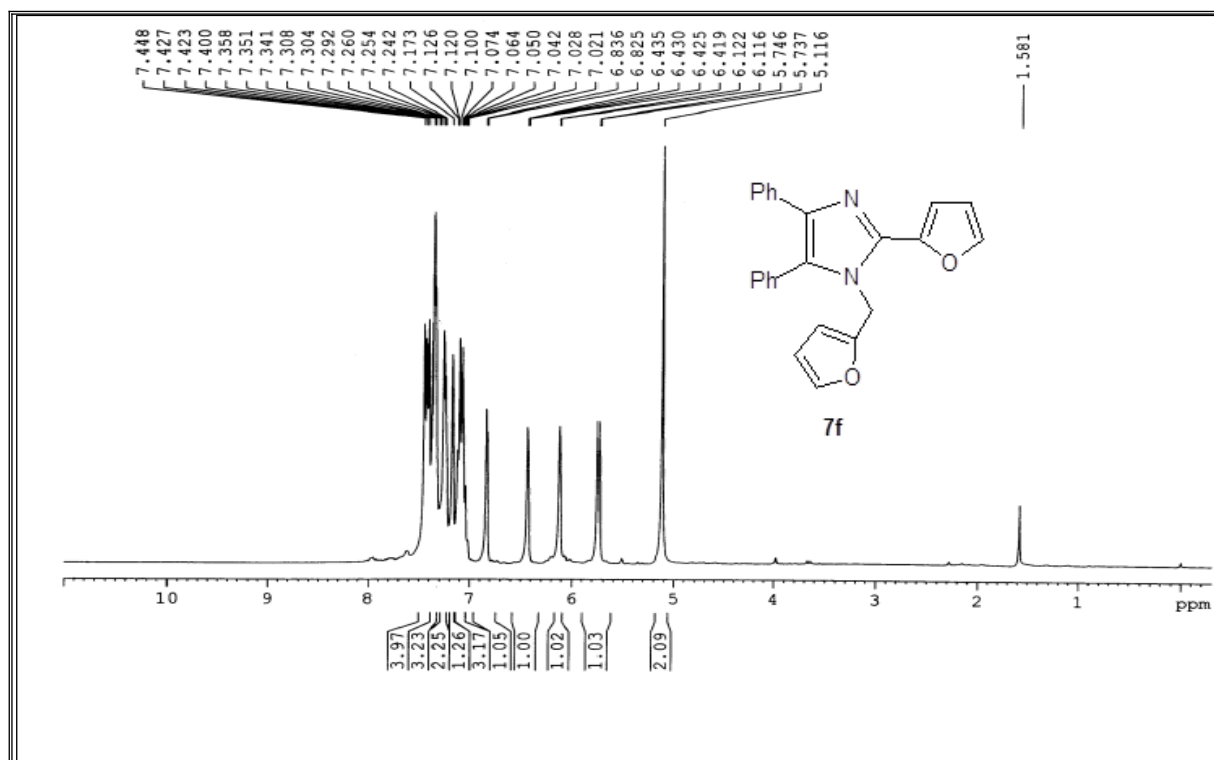


Fig. S19. ¹H NMR (CDCl₃, 300 MHz) of **7f**

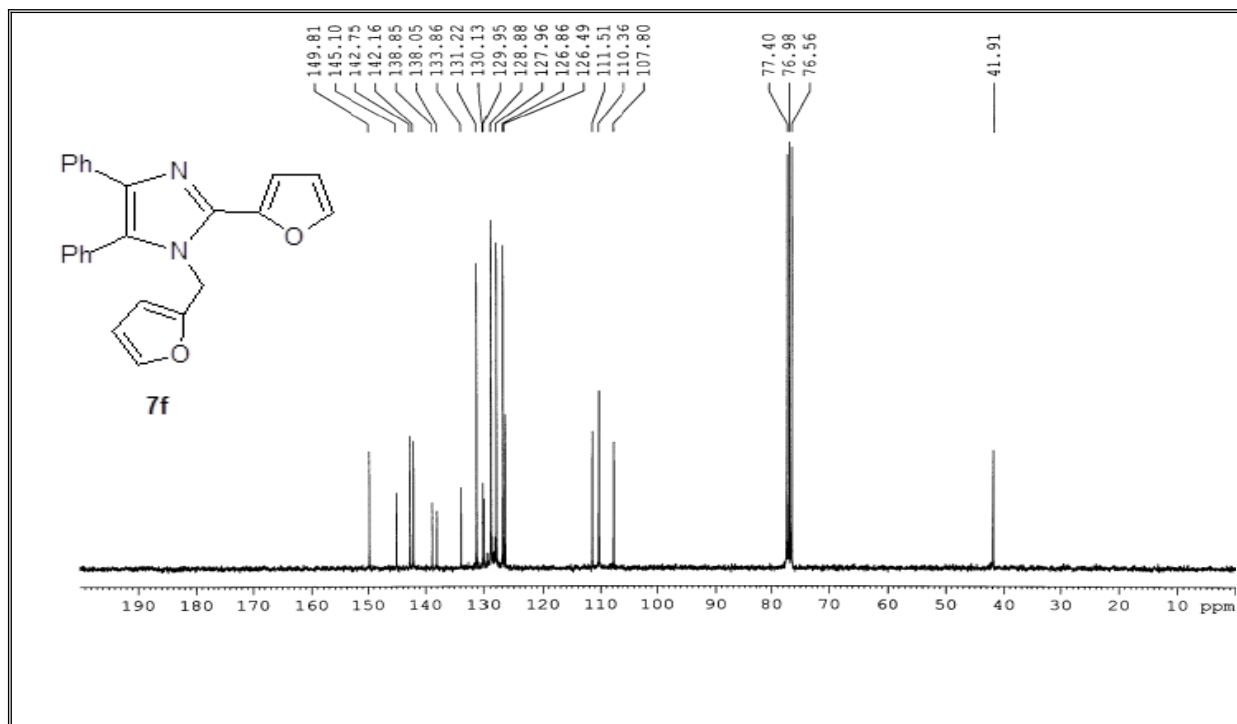


Fig. S20. ¹³CNMR (CDCl₃, 75MHz) of **7f**

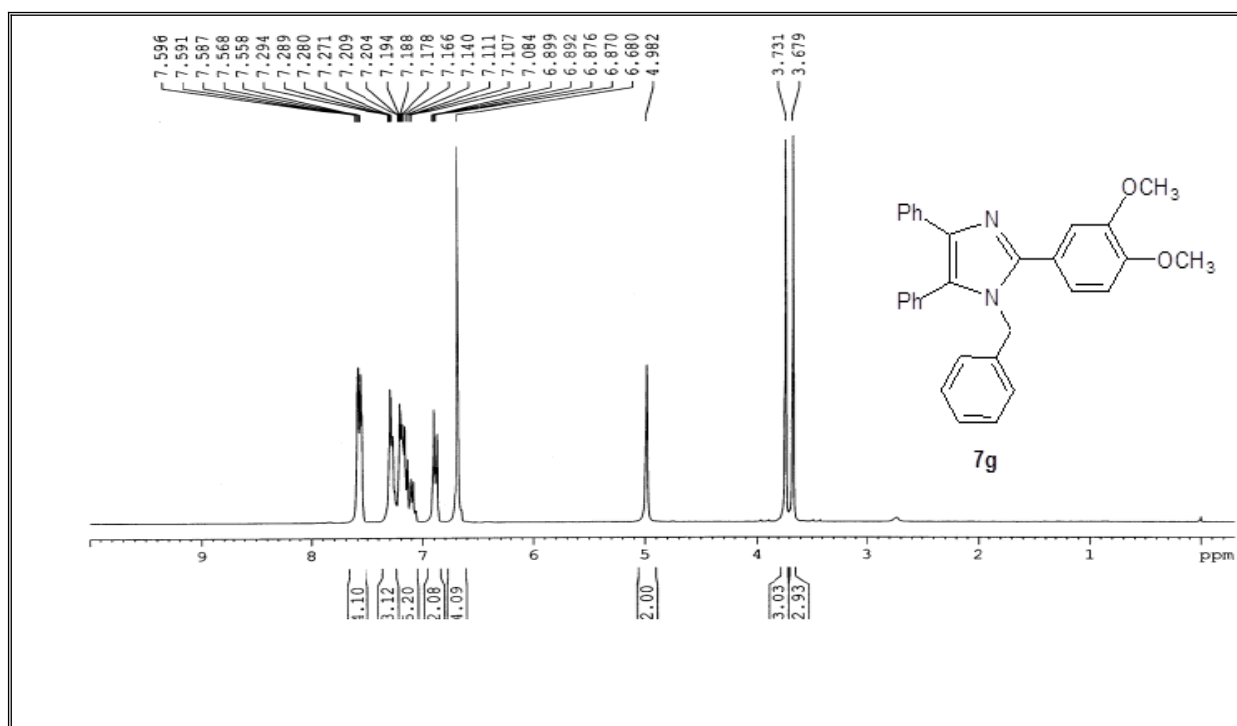


Fig. S21. ¹HNMR (CDCl₃, 300 MHz) of **7g**

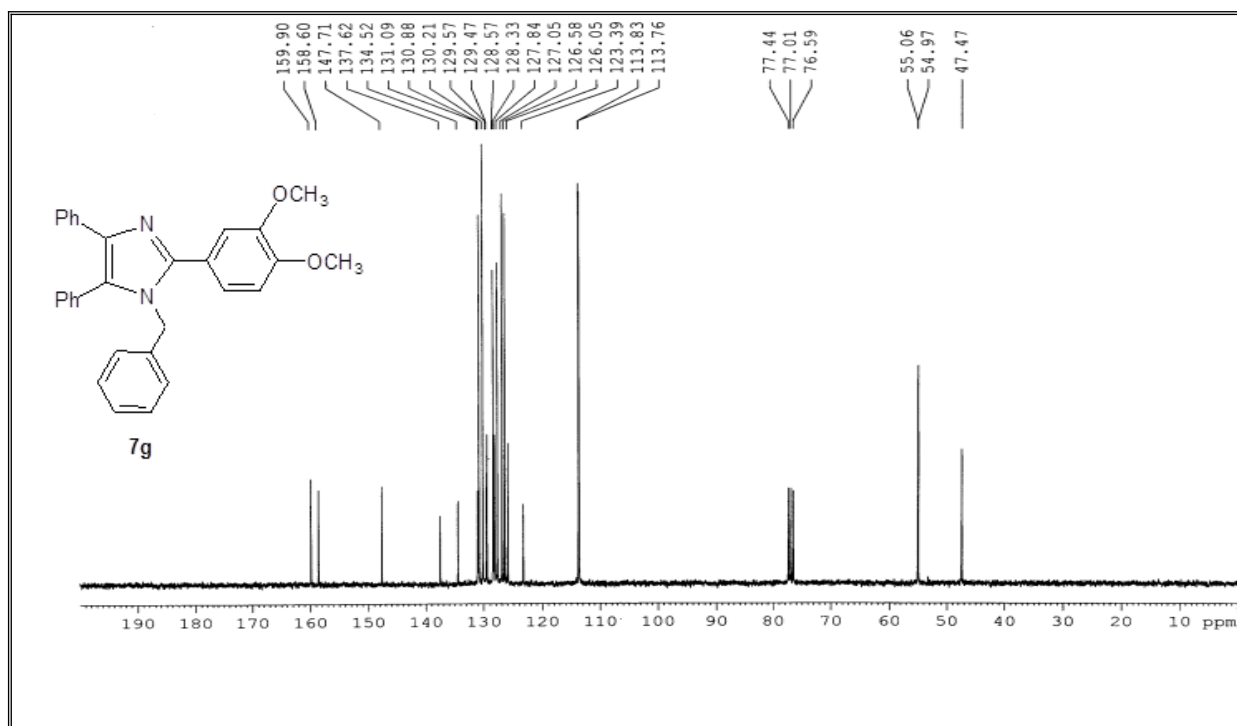


Fig. S22. ¹³CNMR (CDCl₃, 75MHz) of **7g**

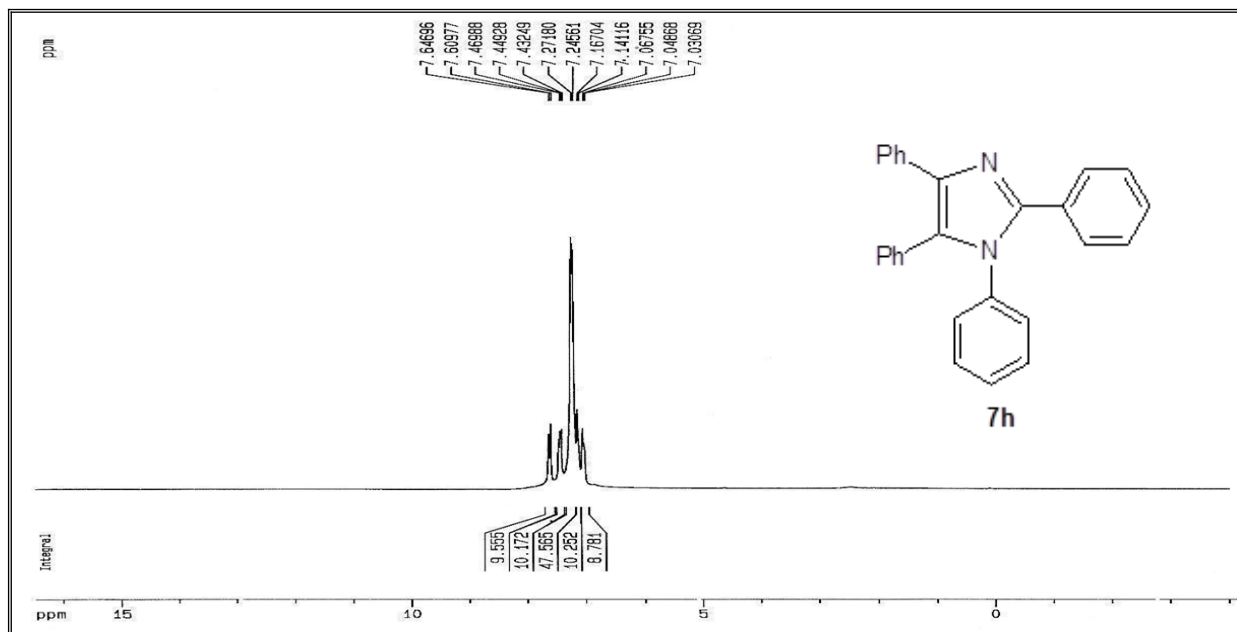


Fig. S23. ¹HNMR (CDCl₃, 300 MHz) of **7h**

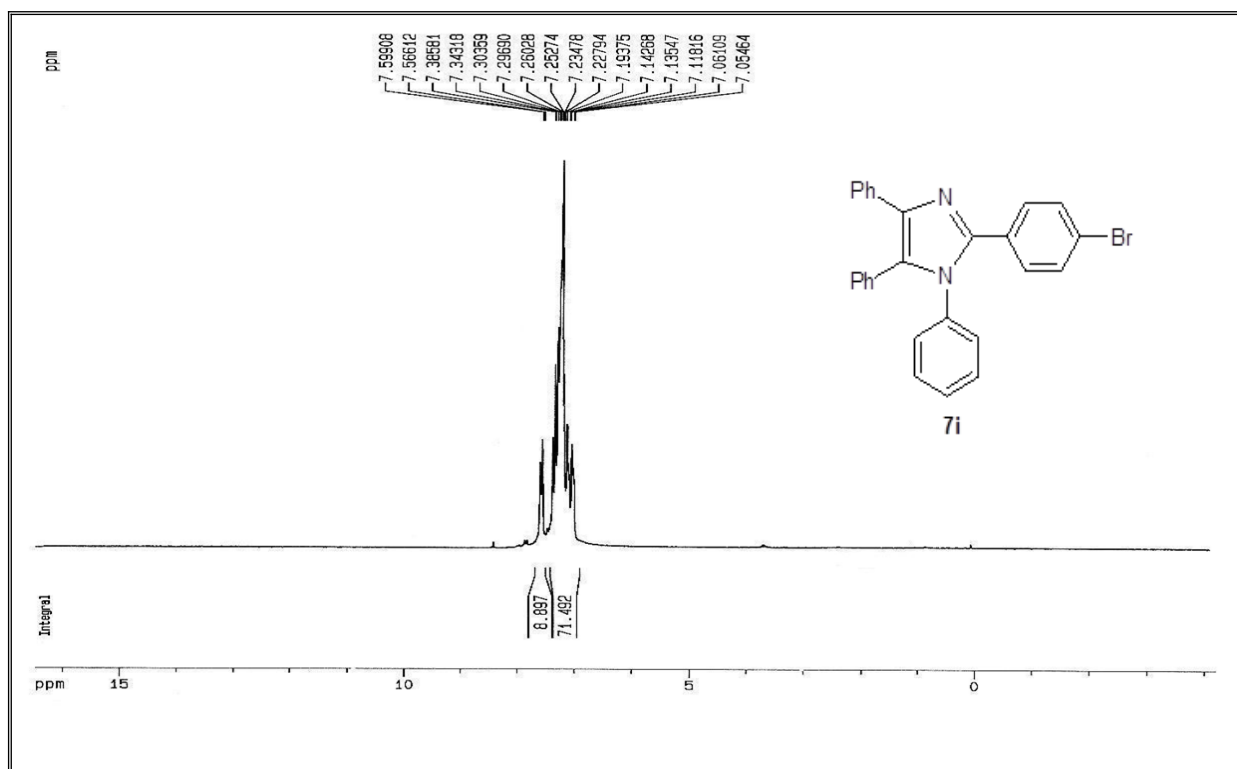


Fig. S24. ¹H NMR (CDCl₃, 300 MHz) of **7i**

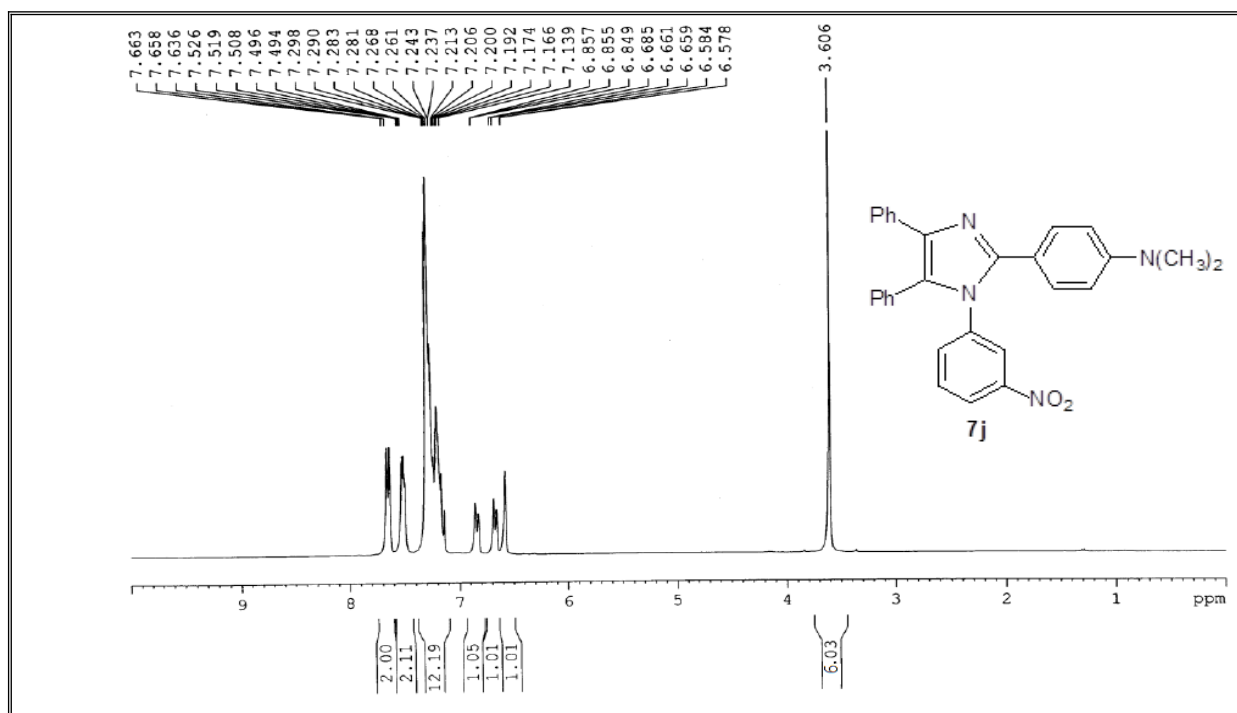


Fig. S25. ¹H NMR (CDCl₃, 300 MHz) of **7j**