Electronic Supplementary Material (ESI) for New Journal of Chemistry.

A Novel Phenyl and Thiophene Dispiro Indenoquinoxaline Pyrrolidine Quinolones Induced Apoptosis via G1/S and G2/M Phase Cell Cycle Arrest in MCF-7 Cells

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Spectral data

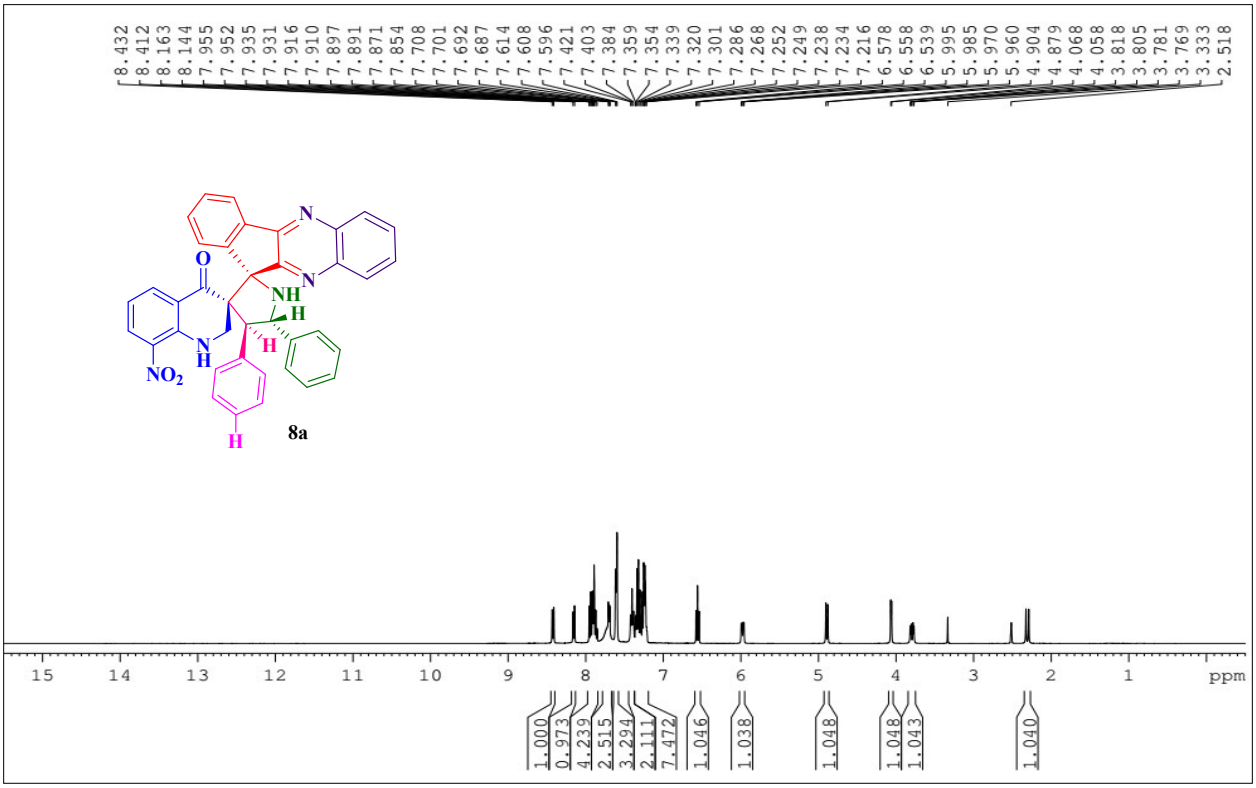

Figure S1. ^{1}H NMR spectrum of compound 8a

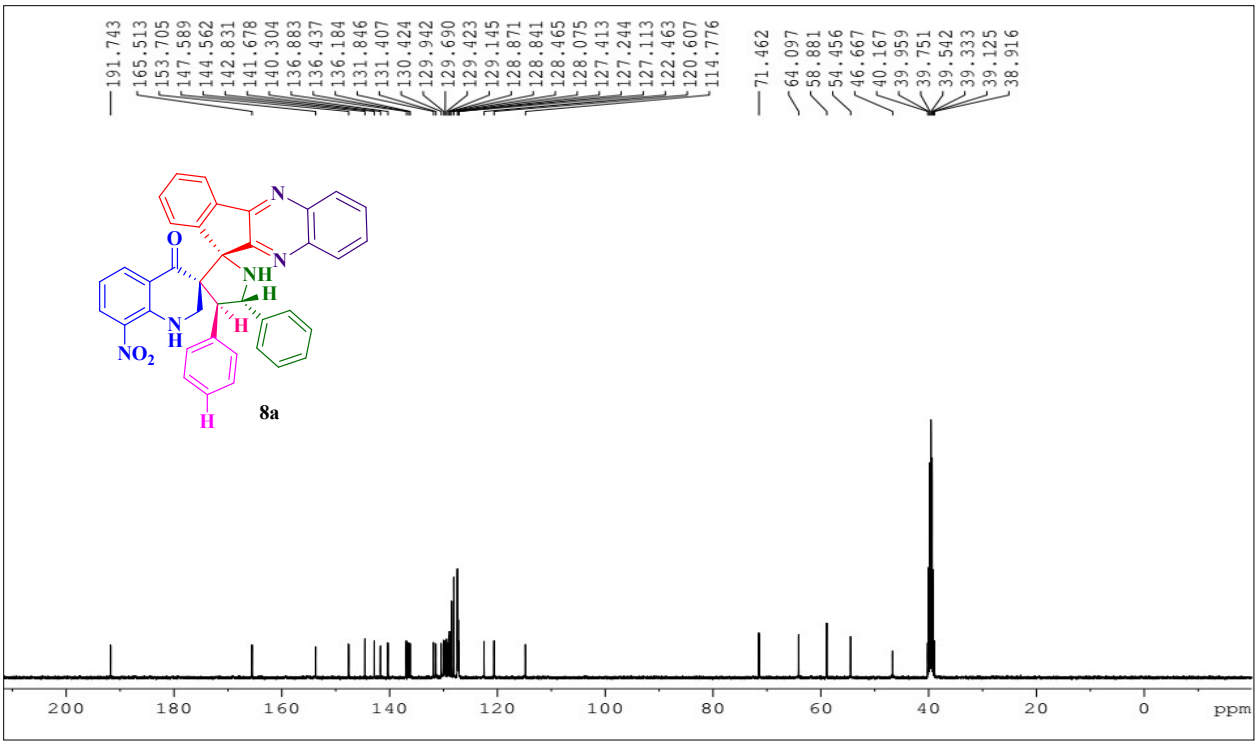

Figure S2. ^{13}C NMR spectrum of compound 8a

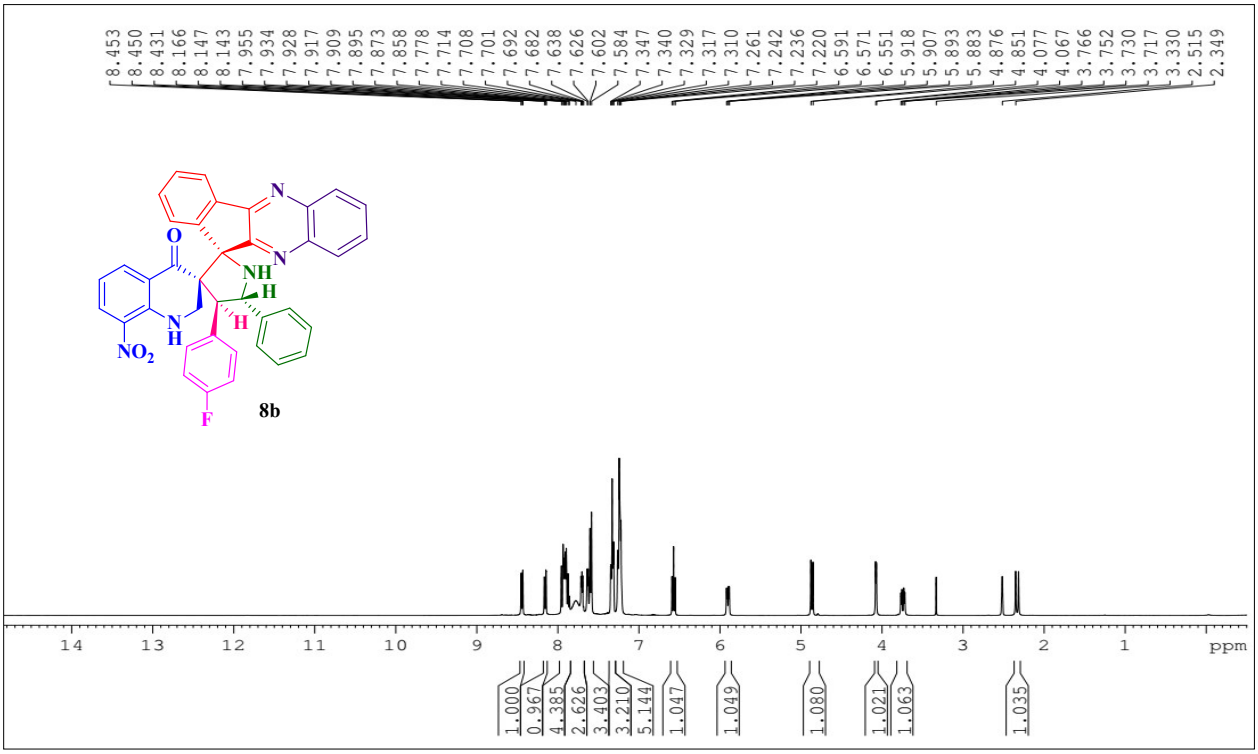

Figure S3. ^{1}H NMR spectrum of compound 8b

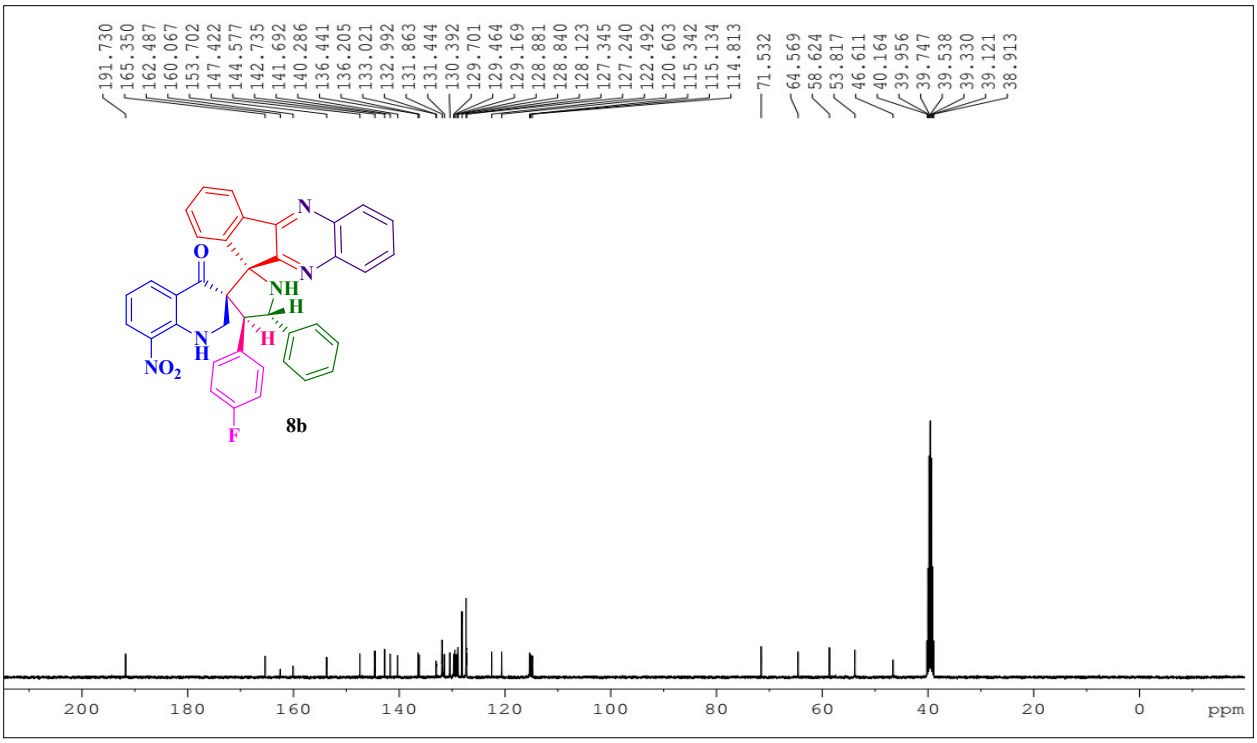

Figure S4. ^{13}C NMR spectrum of compound 8b

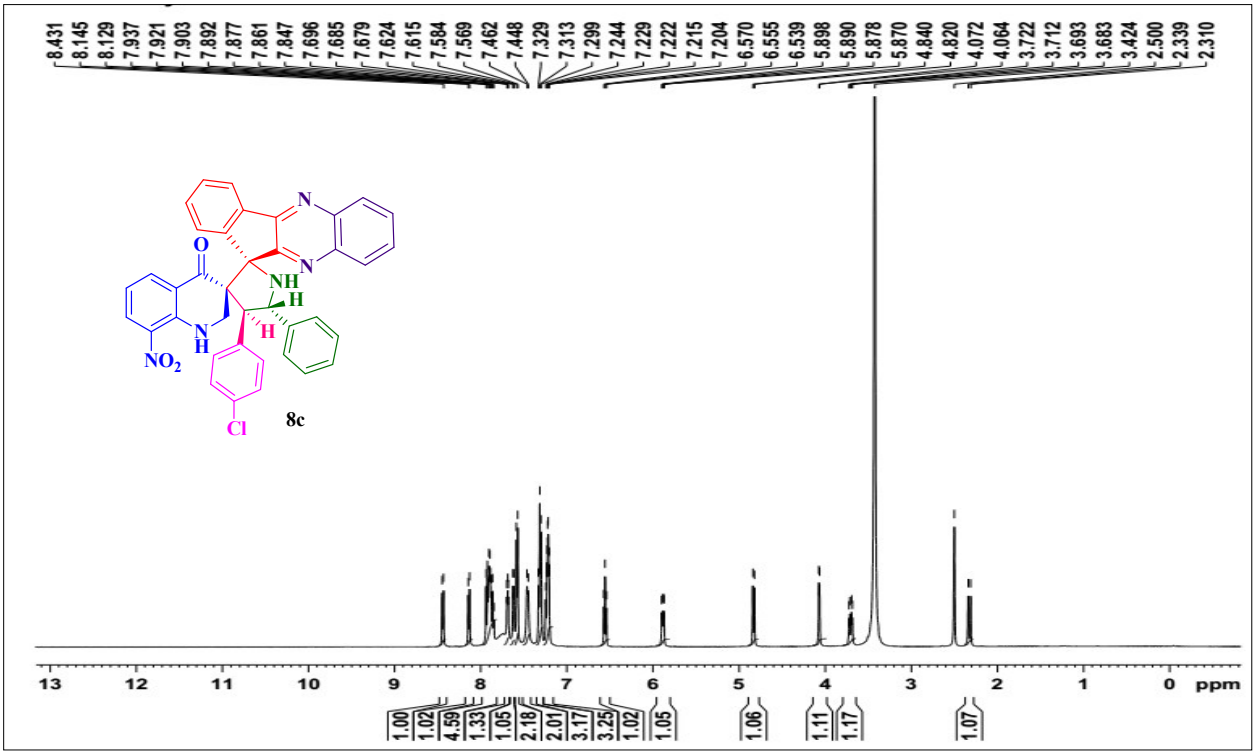

Figure S5. ^{1}H NMR spectrum of compound 8c

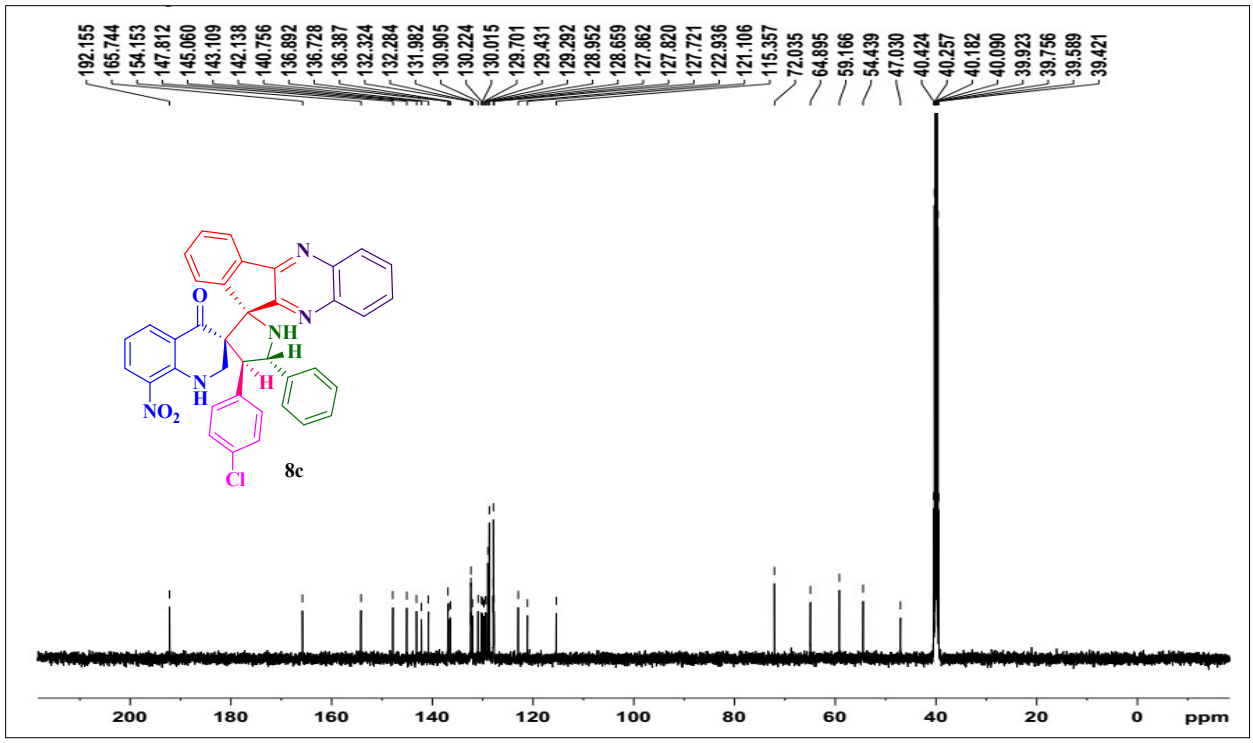

Figure S6. ^{13}C NMR spectrum of compound 8c

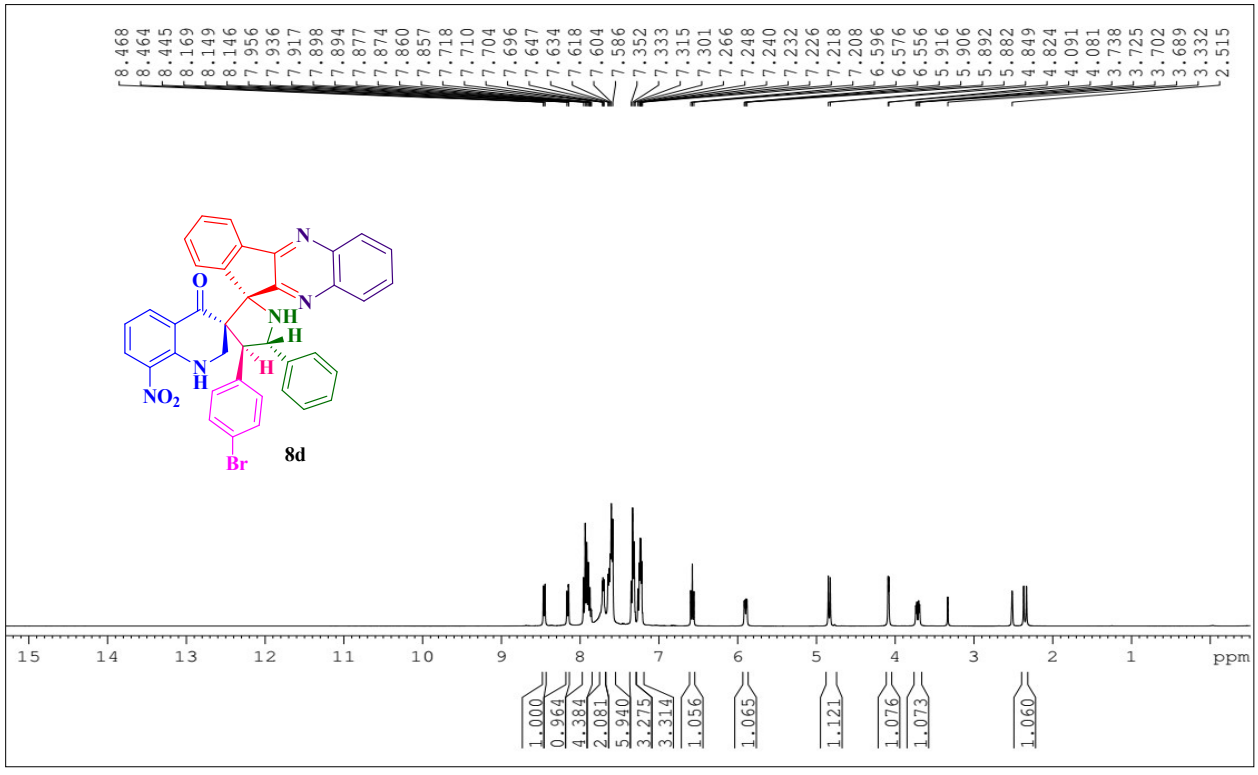

Figure S7. ^{1}H NMR spectrum of compound 8d

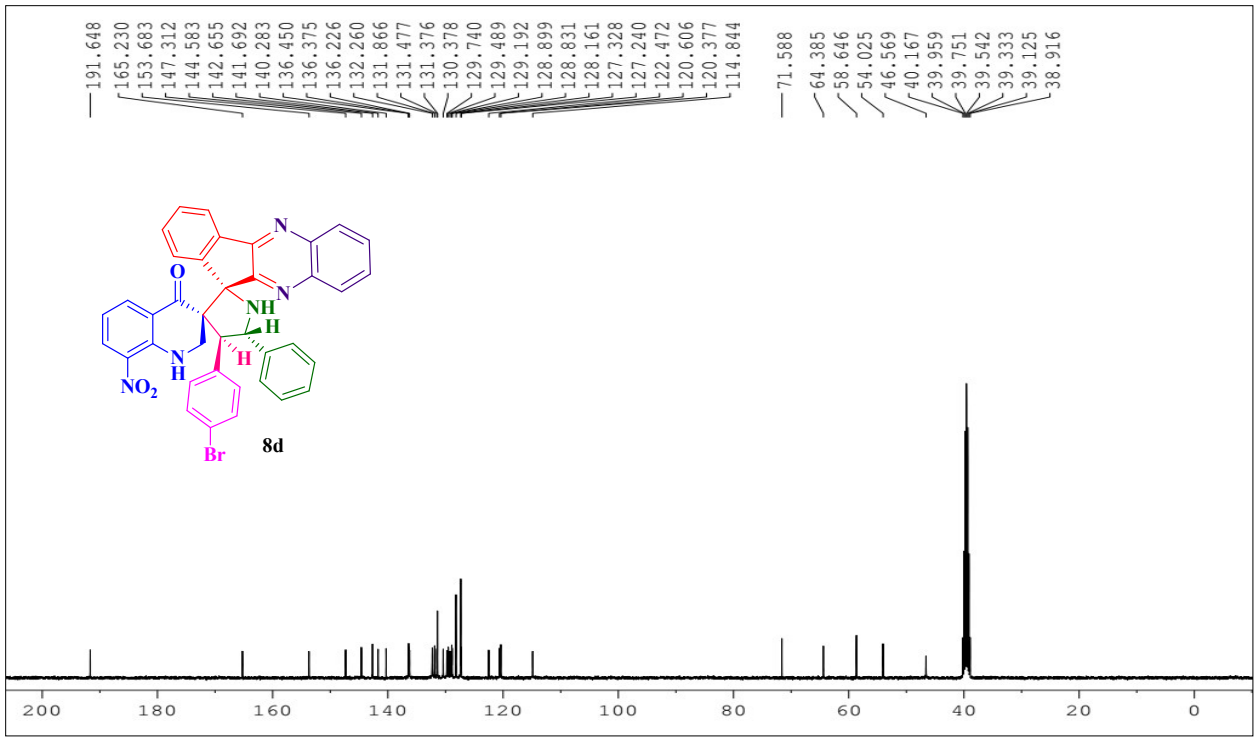

Figure S8. ^{13}C NMR spectrum of compound 8d

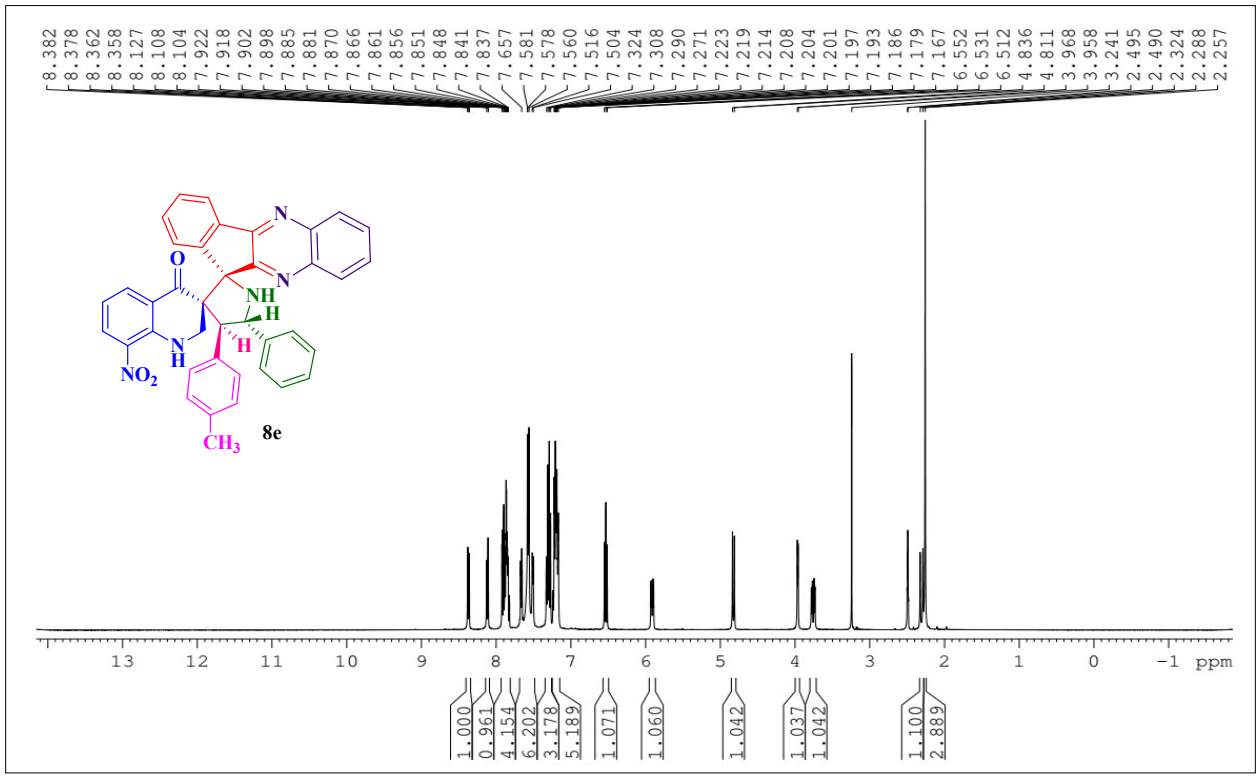

Figure S9. ^{1}H NMR spectrum of compound 8e

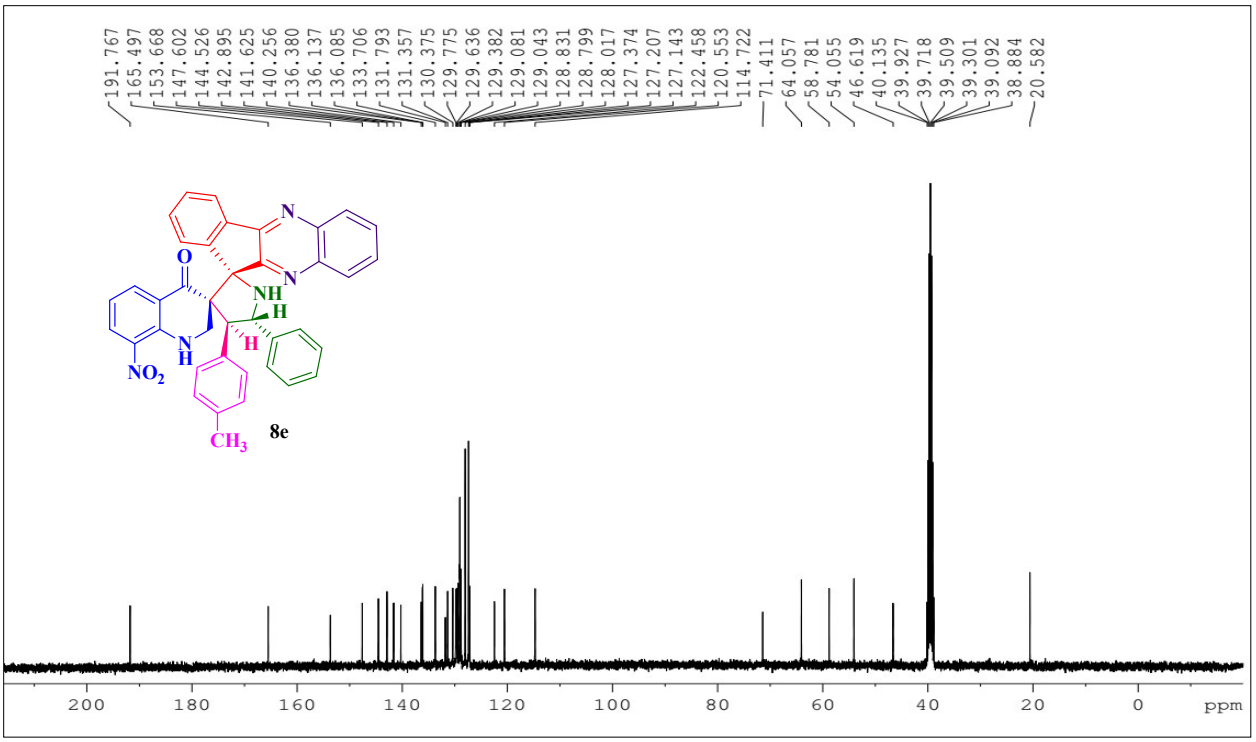

Figure S10. ^{13}C NMR spectrum of compound 8e

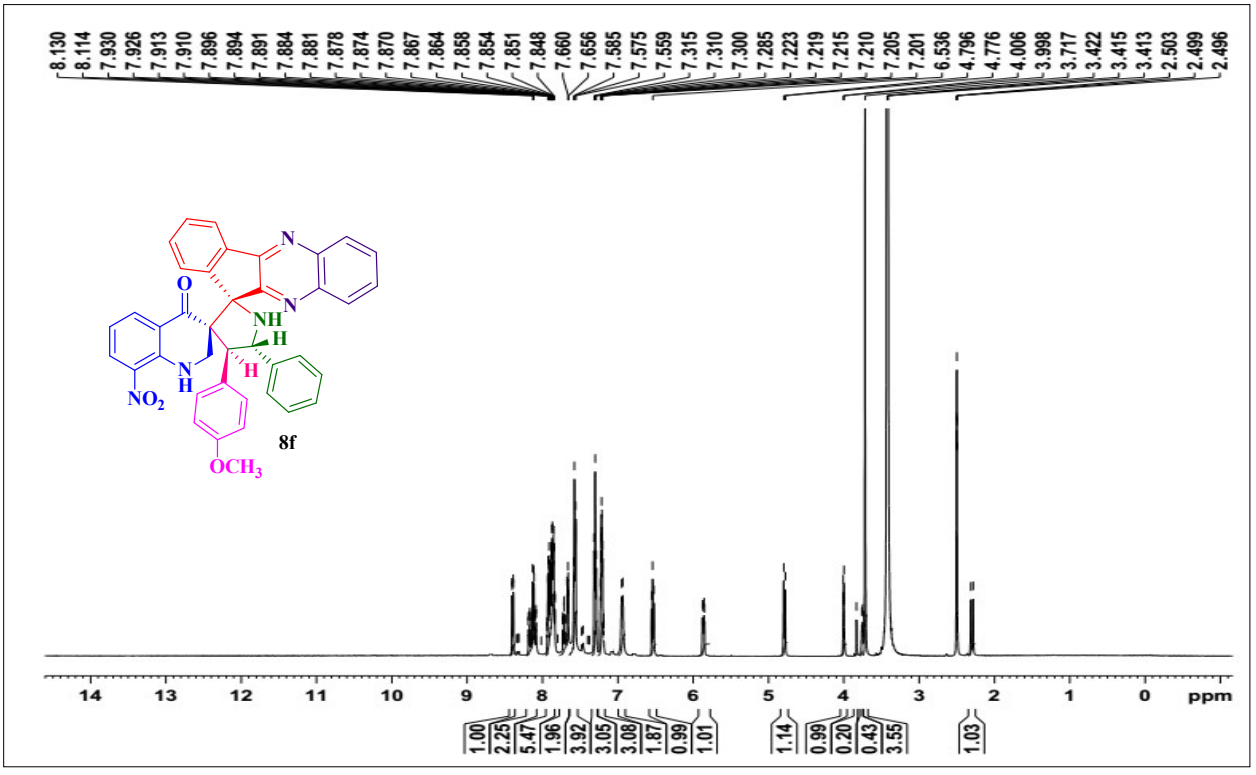

Figure S11. ^{1}H NMR spectrum of compound 8f

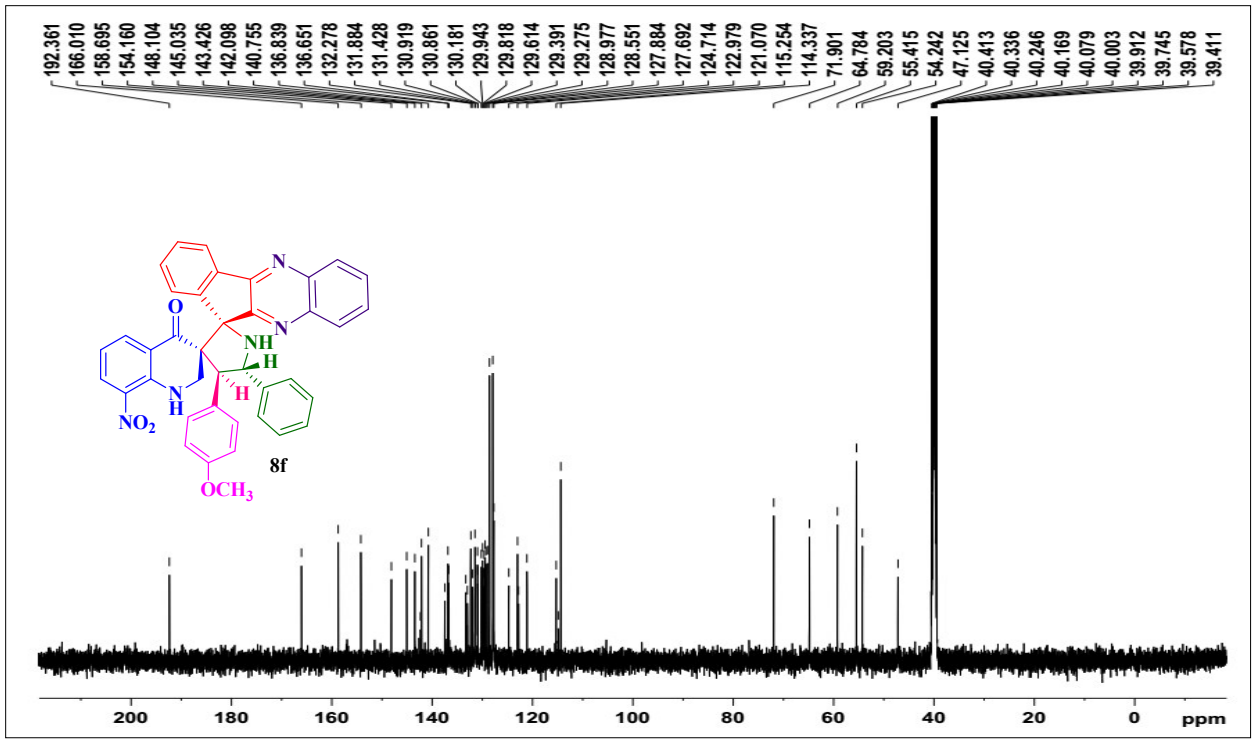

Figure S12. ^{13}C NMR spectrum of compound 8f

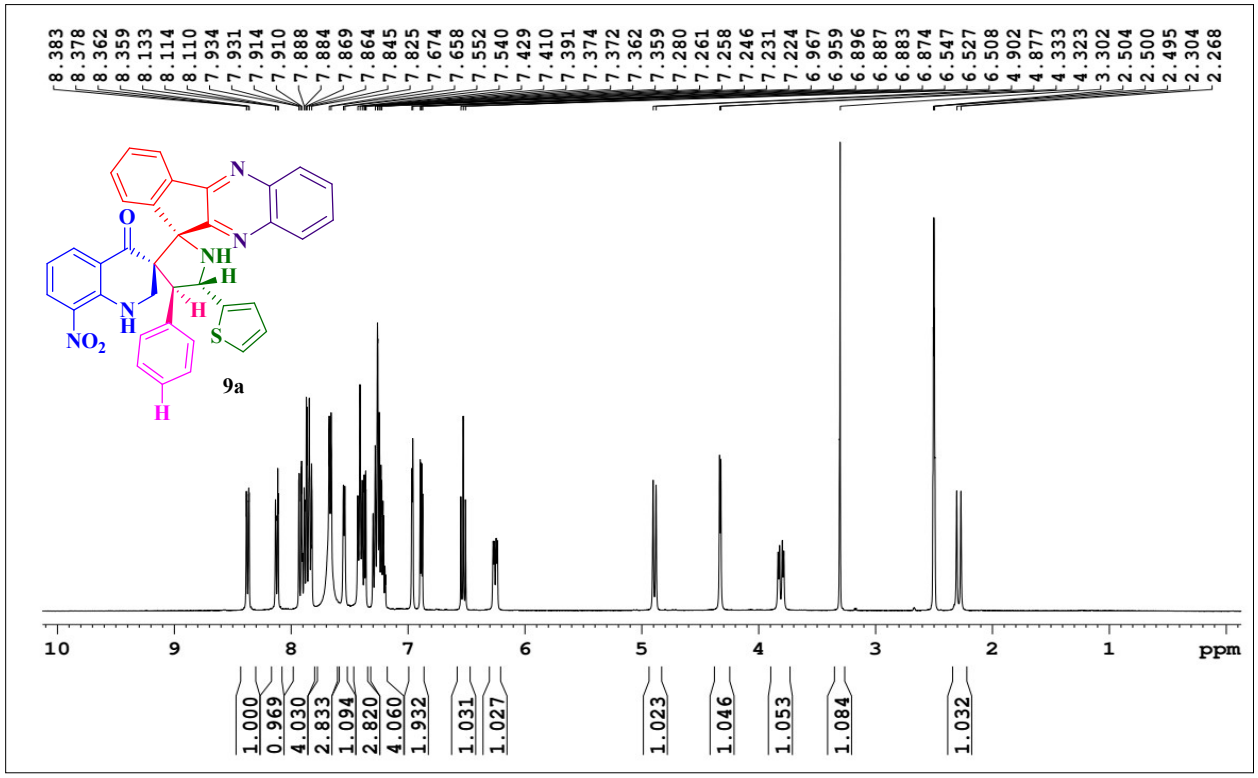

Figure S13. ^{1}H NMR spectrum of compound 9a

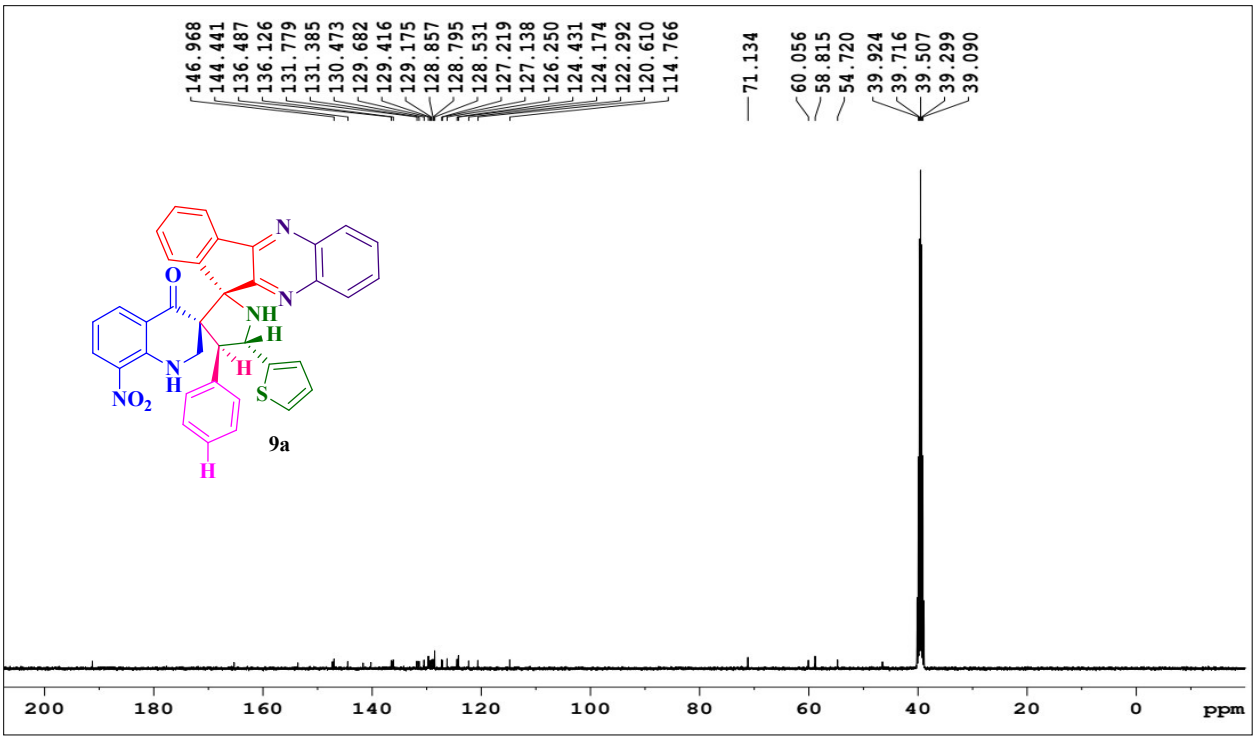

Figure S14. ^{13}C NMR spectrum of compound 9a

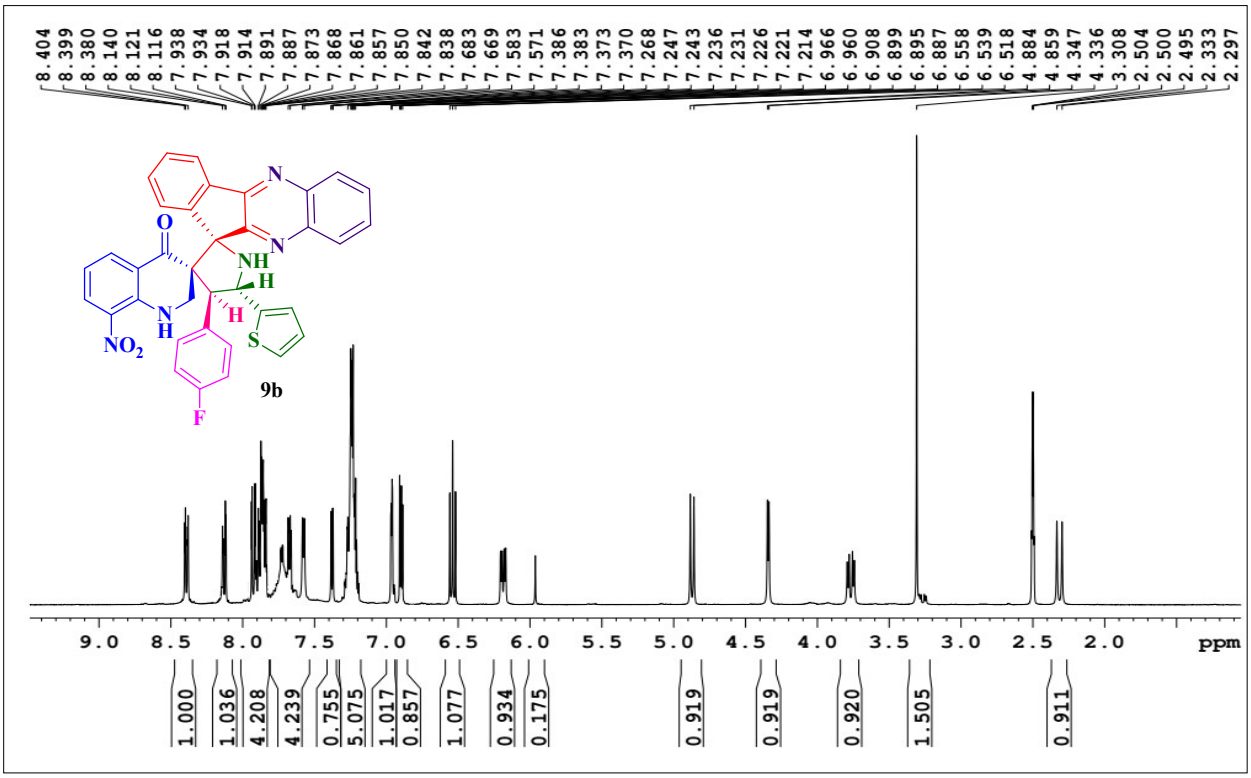

Figure S15. ^{1}H NMR spectrum of compound 9b

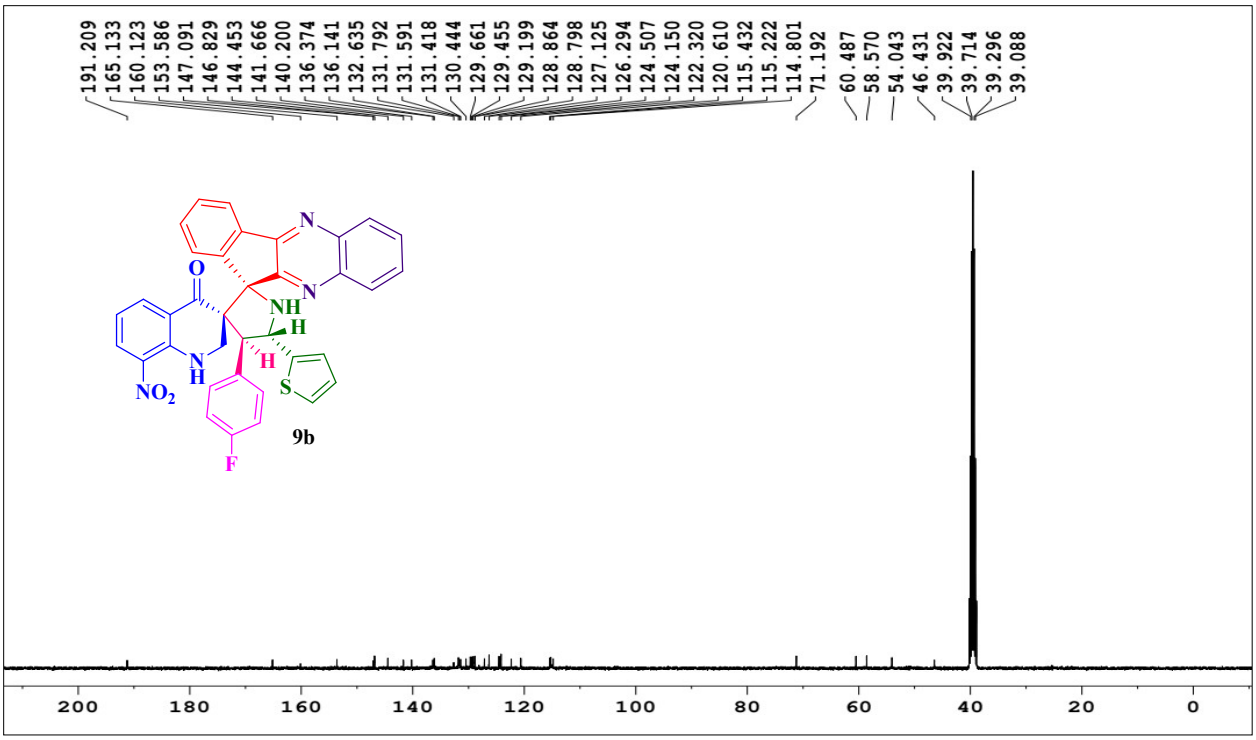

Figure S16. ^{13}C NMR spectrum of compound 9b

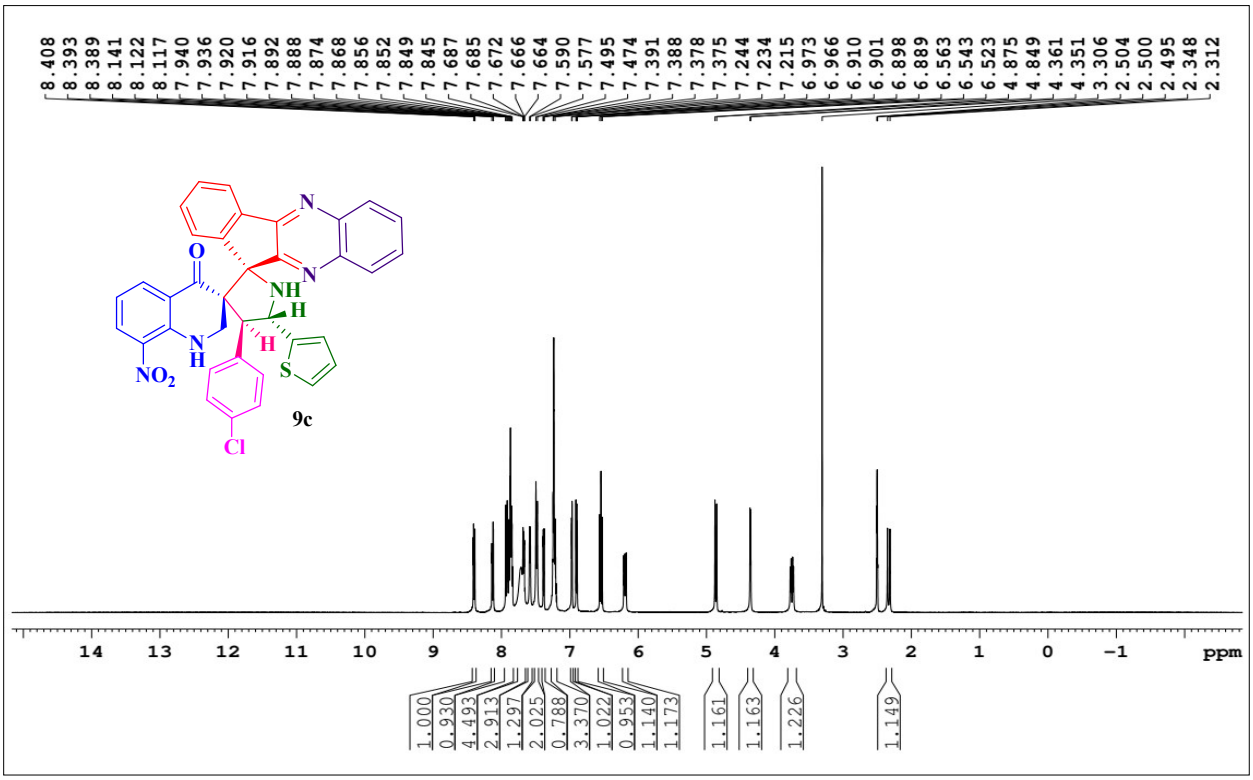

Figure S17. ^{1}H NMR spectrum of compound 9c

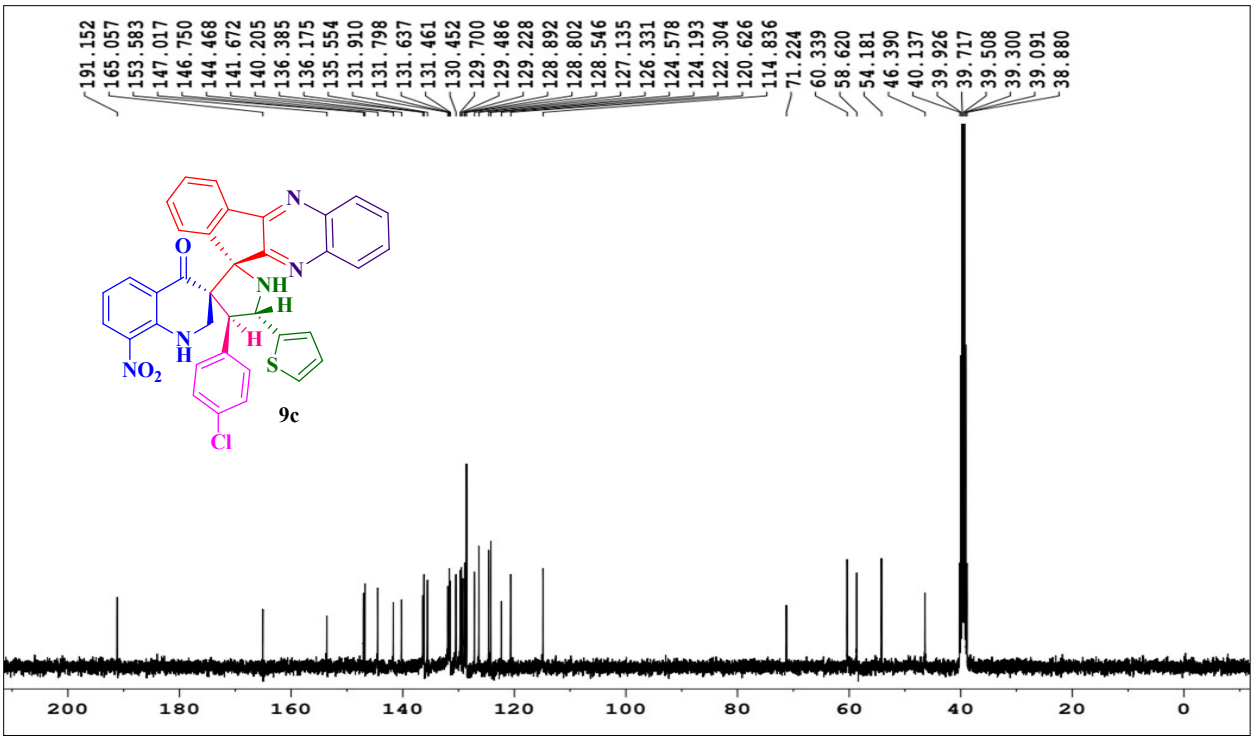

Figure 18. ^{13}C NMR spectrum of compound 9c

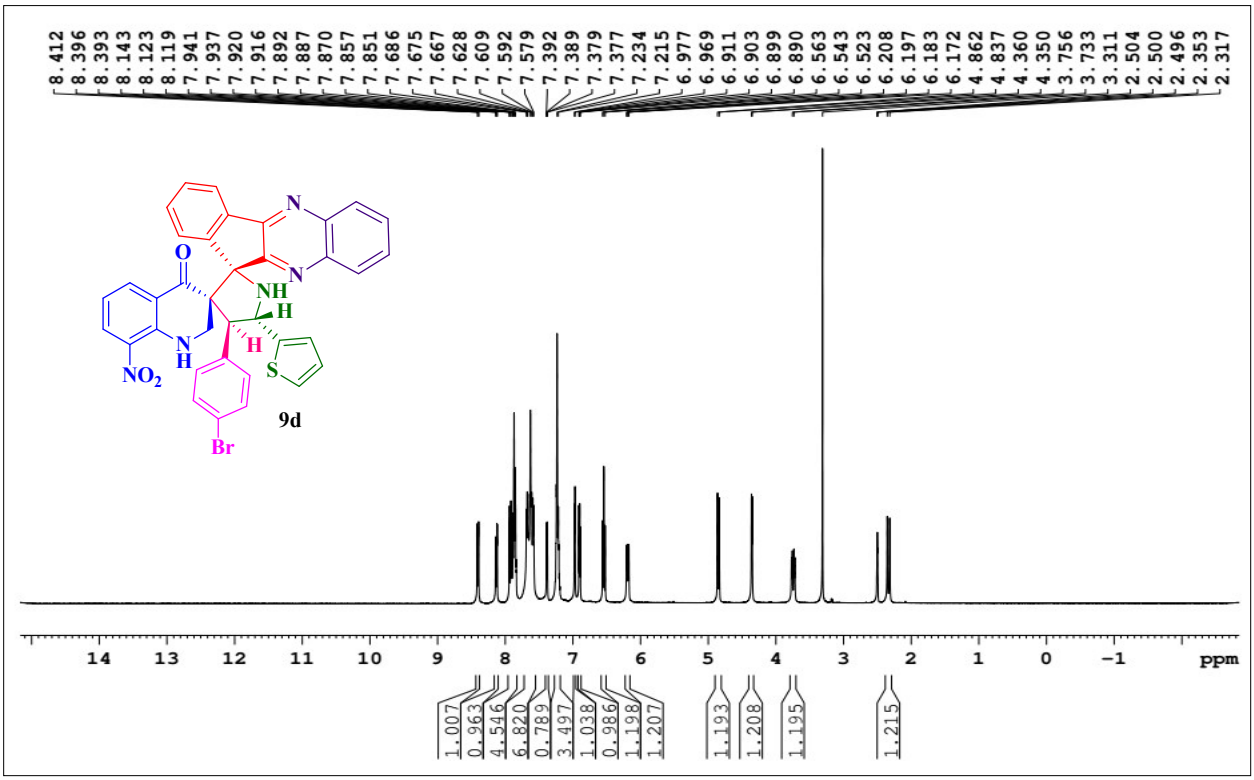

Figure 19. ^{1}H NMR spectrum of compound 9d

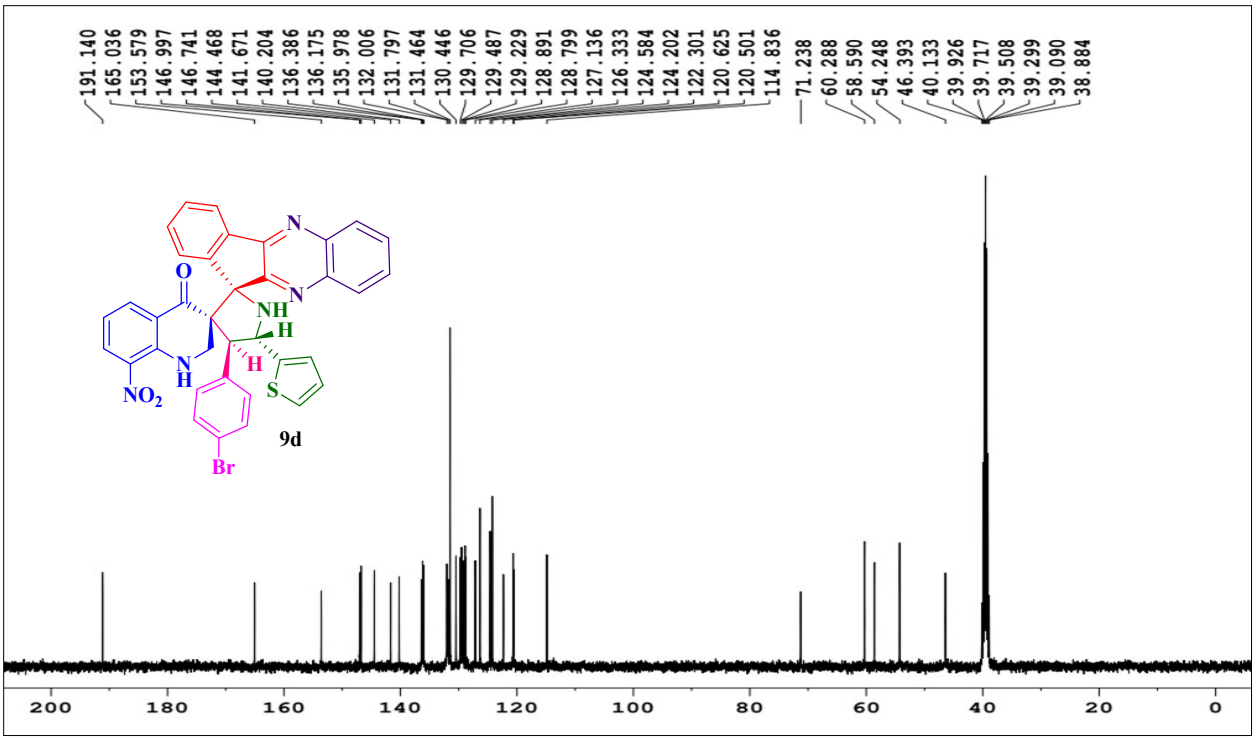

Figure 20. ^{13}C NMR spectrum of compound 9d

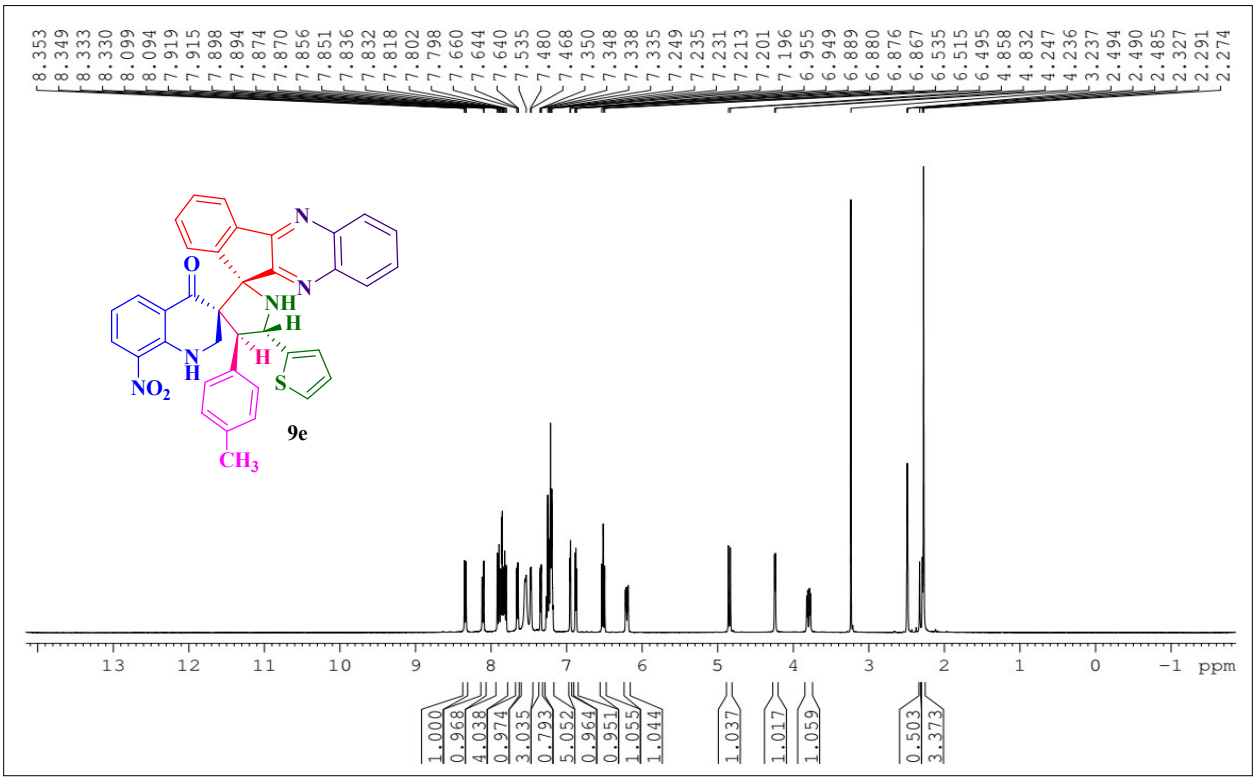

Figure 21. ^{1}H NMR spectrum of compound 9e

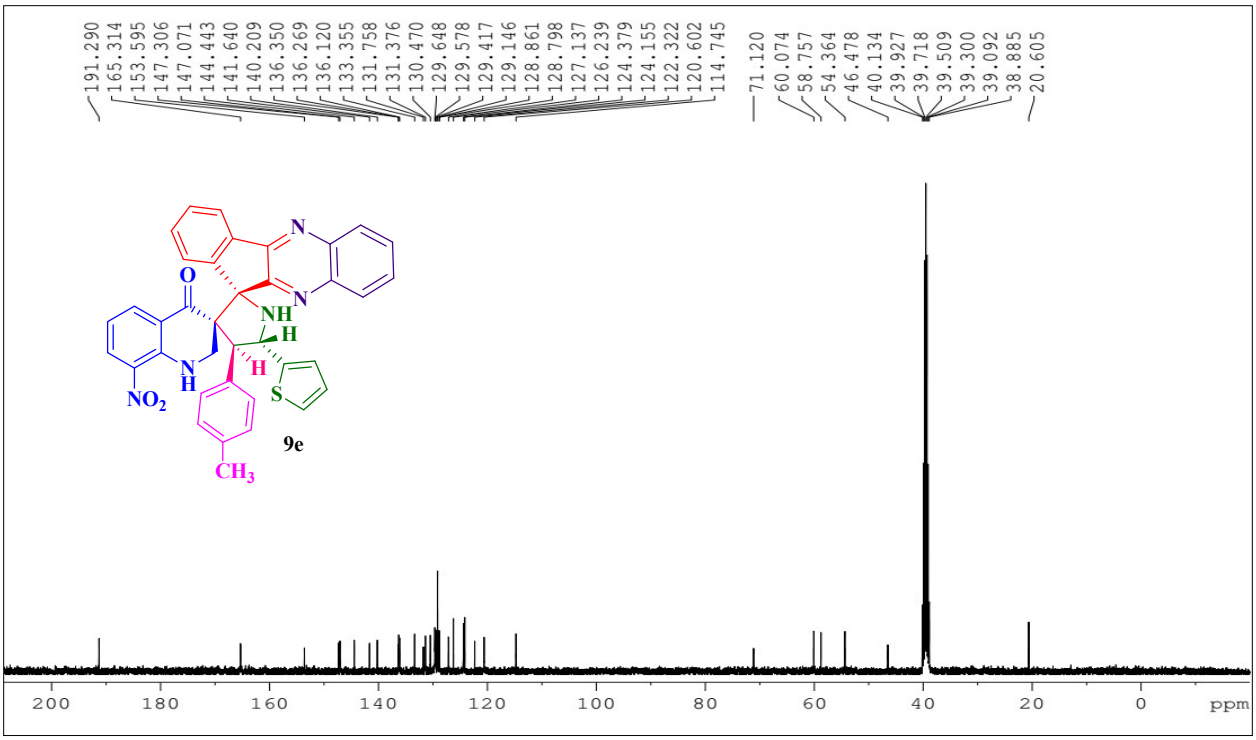

Figure 22. ^{13}C NMR spectrum of compound 9e

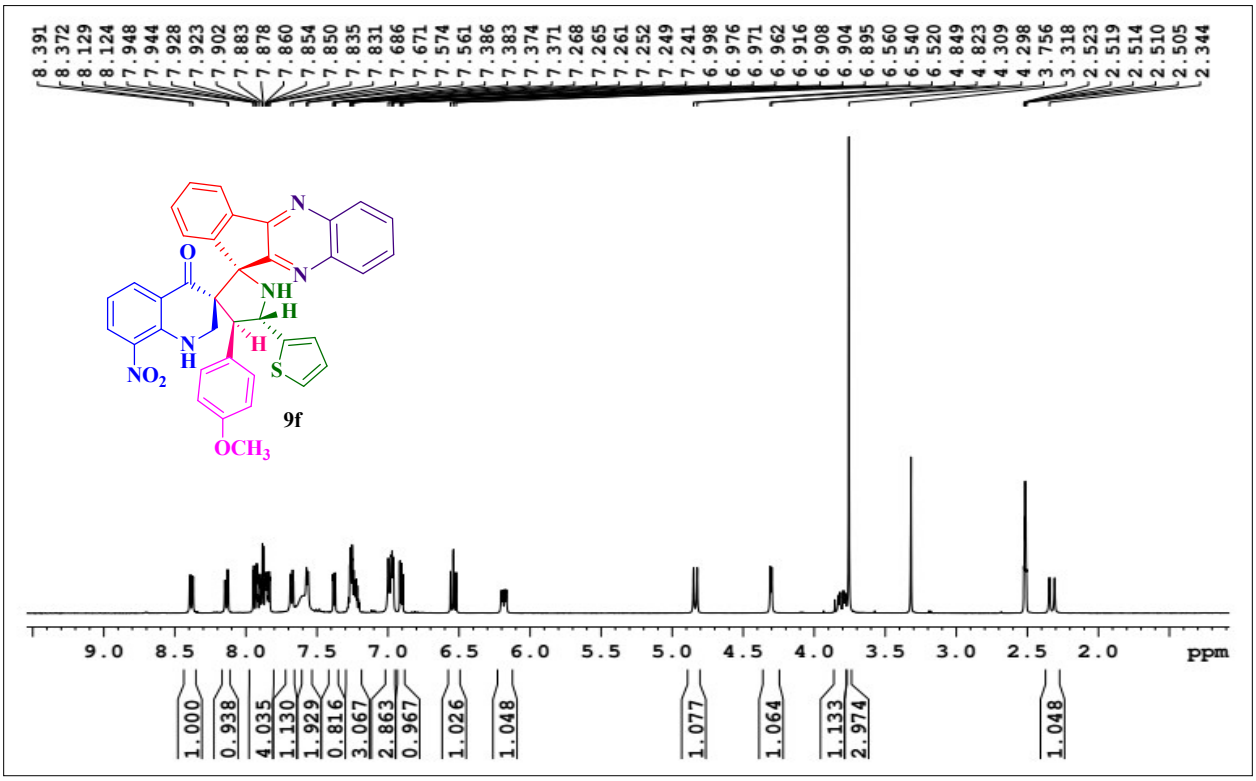

Figure 23. ^{1}H NMR spectrum of compound 9f

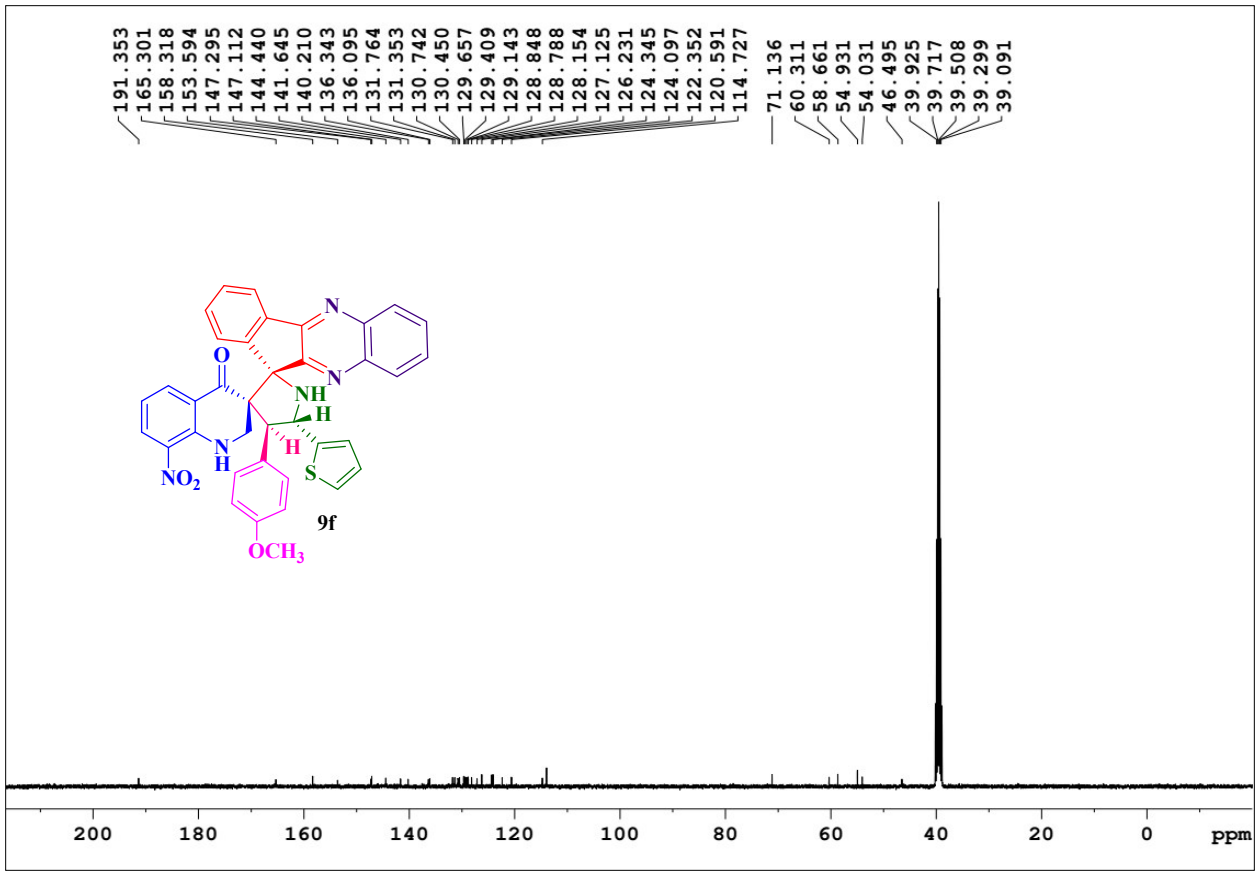

Figure 24. ^{13}C NMR spectrum of compound 9f

Table S1 Crystallographic details of the compound **9f**

Empirical formula	$C_{37}H_{27}N_5O_4S$
Formula weight	637.69
Temperature	293(2) K
Wavelength	0.71073 Å
Crystal system	Monoclinic
Space group	P 2_1/c
Unit cell dimensions	a = 13.472(3) Å; α = 90
	b = 16.568(3) Å; β = 93.40(3)°
	c = 13.524(3) Å; γ = 90
Volume	3013.5(11) Å^3
Z	4

Density (calculated)	1.406 Mg/m^3
Absorption coefficient	0.160 mm^{-1}
F(000)	1328
Crystal size	0.22 × 0.18 × 0.14 mm^3
Theta range for data collection	2.410 to 23.933°.
Index ranges	$-14 \leq h \leq 14$, $-17 \leq k \leq 17$, $-14 \leq l \leq 14$
Reflections collected	23334
Independent reflections	3888 [R(int) = 0.0241]
Completeness to theta = 25.242°	71.40%
Refinement method	Full-matrix least-squares on F^2
Data / restraints / parameters	3888 / 3 / 443
Goodness-of-fit on F2	1.045
Final R indices [I>2sigma(I)]	R1 = 0.0349, wR2 = 0.0888
R indices (all data)	R1 = 0.0396, wR2 = 0.0948
Largest diff. peak and hole	0.184 and -0.291 $e.Å^{-3}$