

Supplementary Information

Ni^{II} NPs entrapped within a matrix of *L*-glutamic acid cross-linked chitosan supported on magnetic carboxylic acid-functionalized multi-walled carbon nanotube: A new and efficient multi-task catalytic system for the green one-pot synthesis of diverse heterocyclic frameworks

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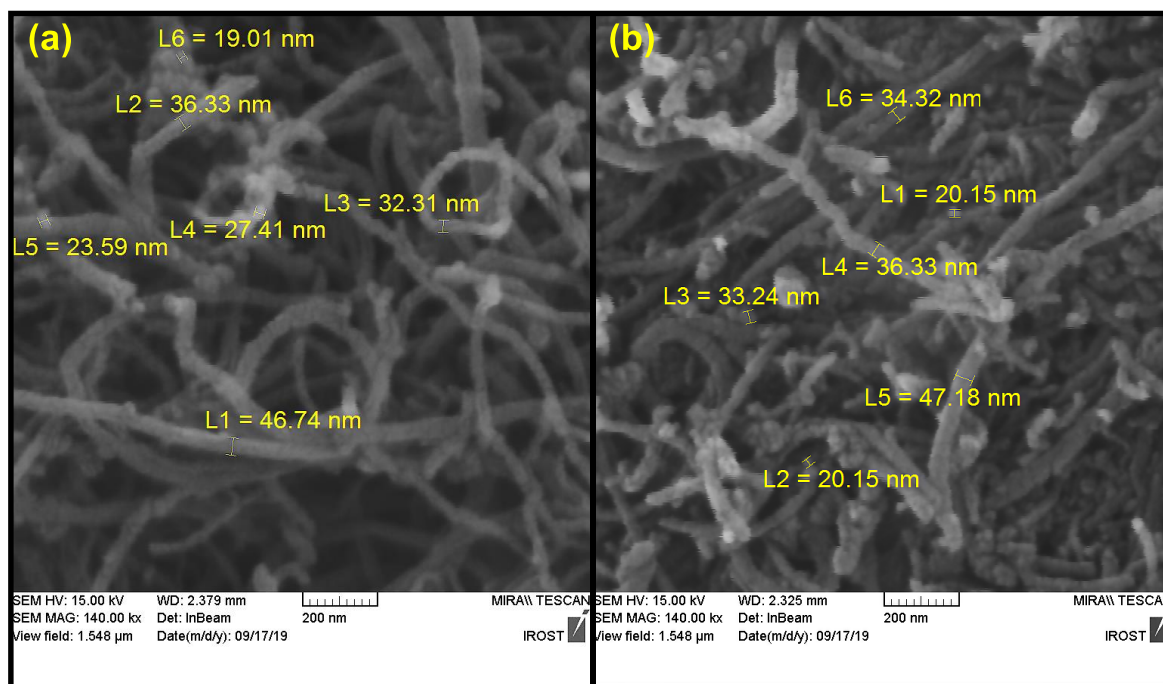
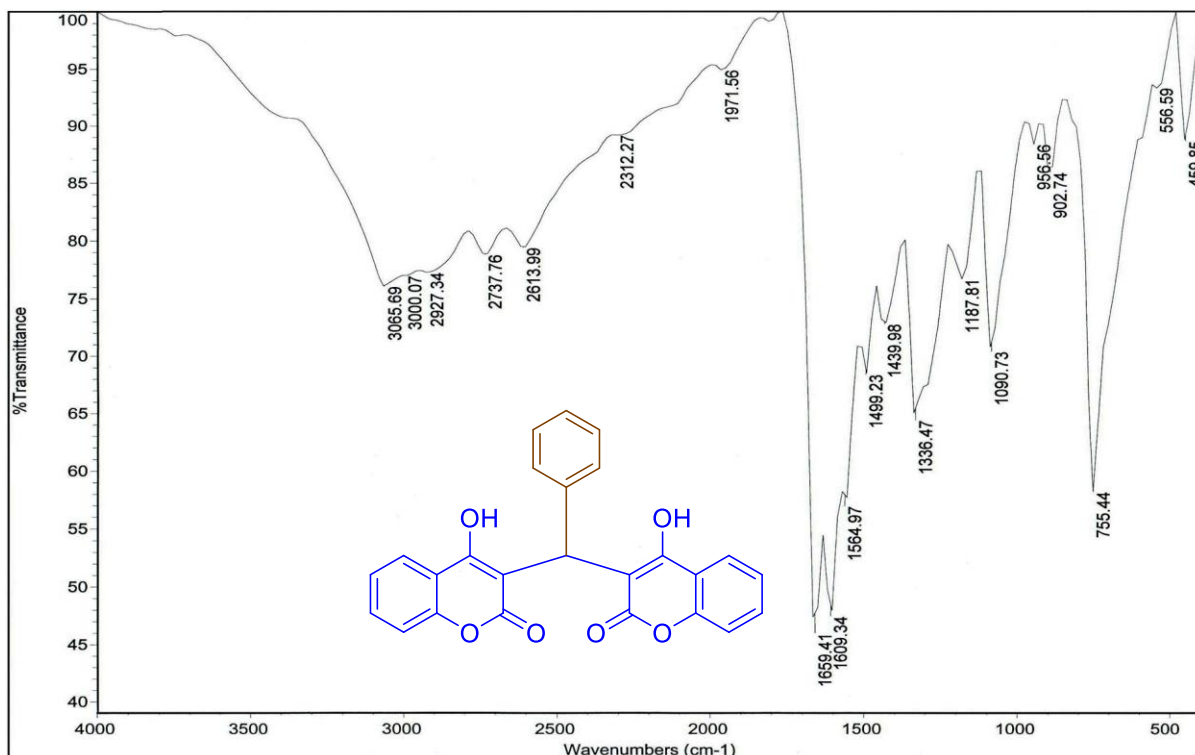
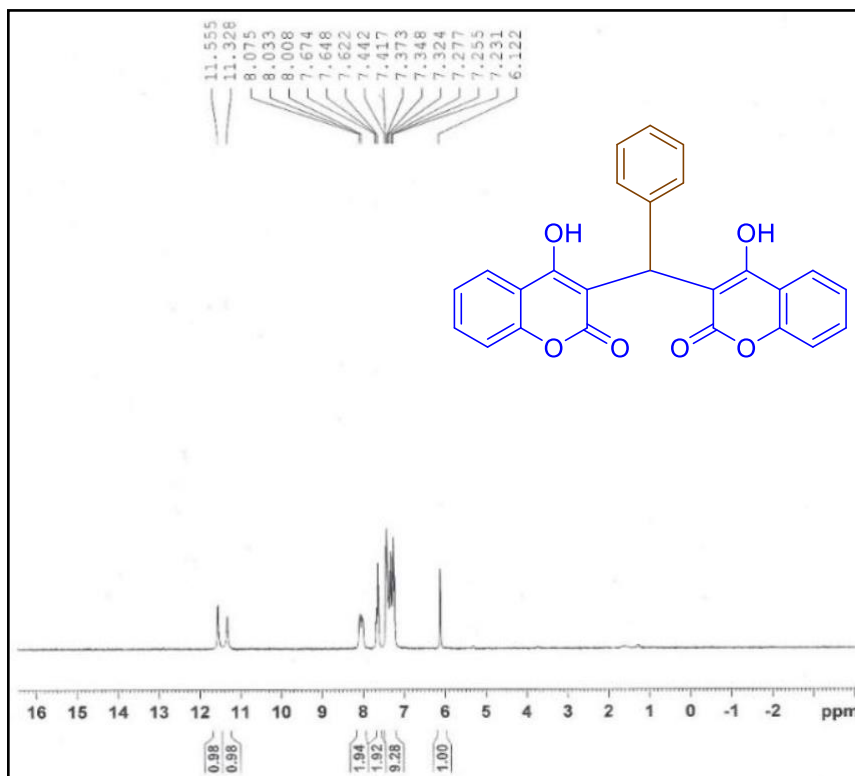


Figure S1. SEM images of (a) *f*-MWCNT and (b) Fe₃O₄/*f*-MWCNT.

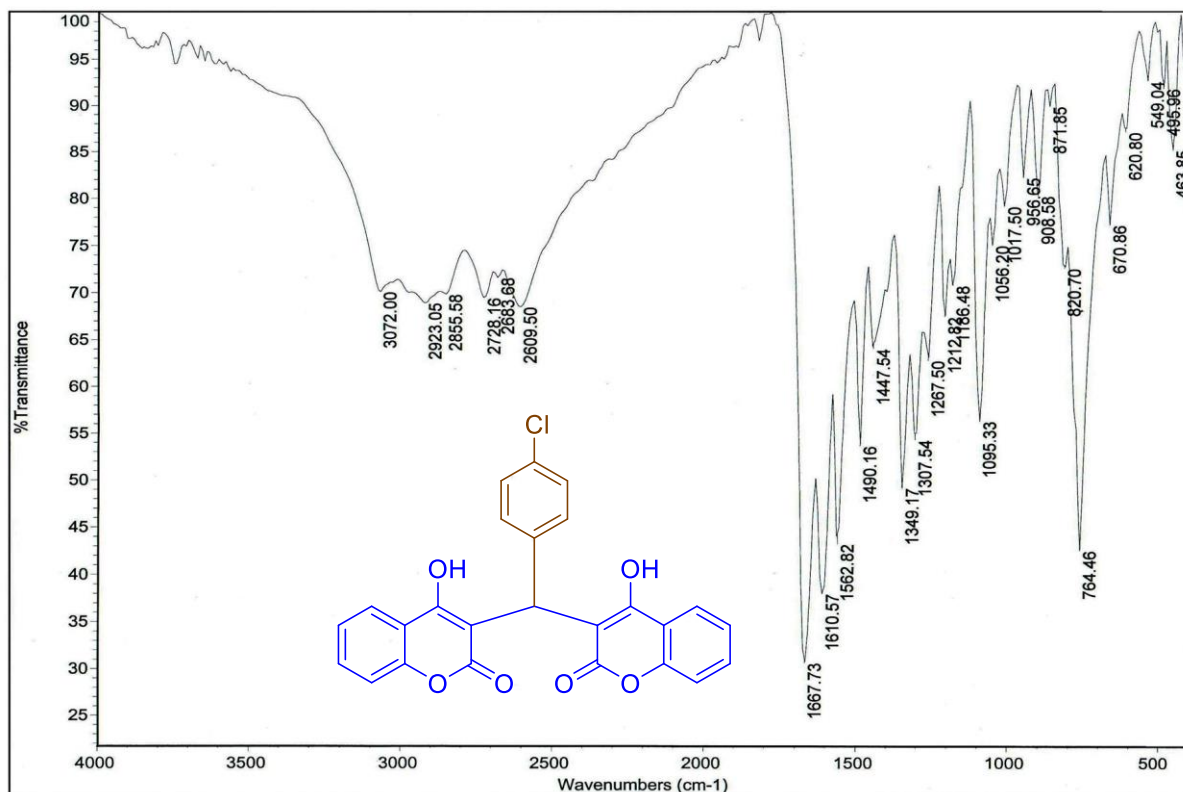
S2.1. FT-IR spectrum of 3,3'-(phenylmethylene)bis(4-hydroxy-2H-chromen-2-one)



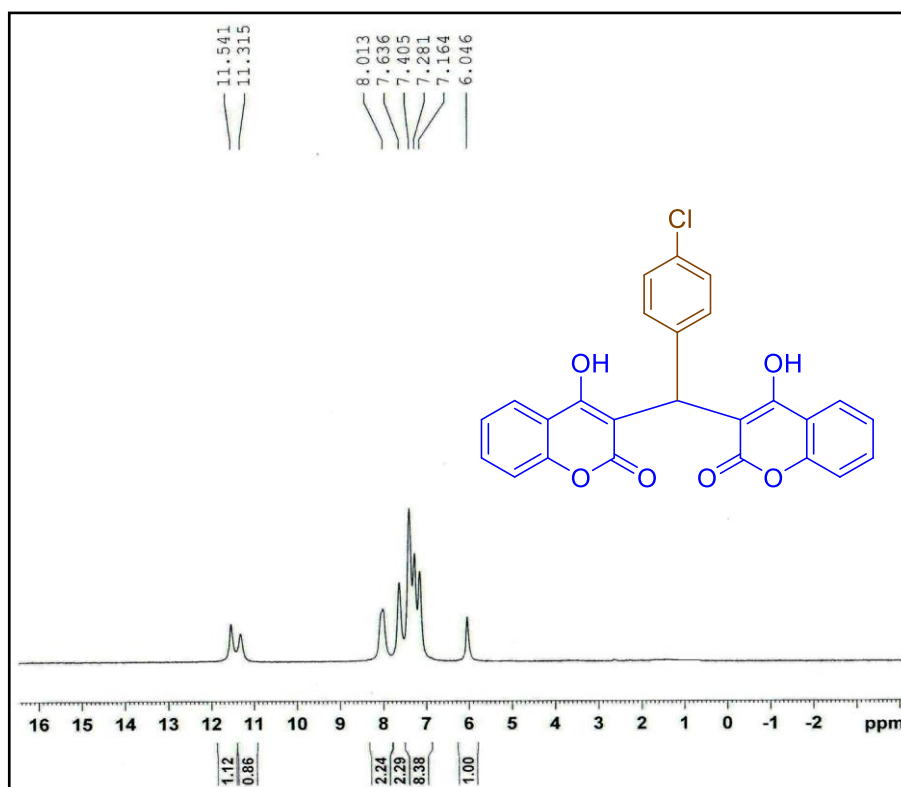
S2.2. ¹H NMR (300 MHz) spectrum of 3,3'-(phenylmethylene)bis(4-hydroxy-2H-chromen-2-one)



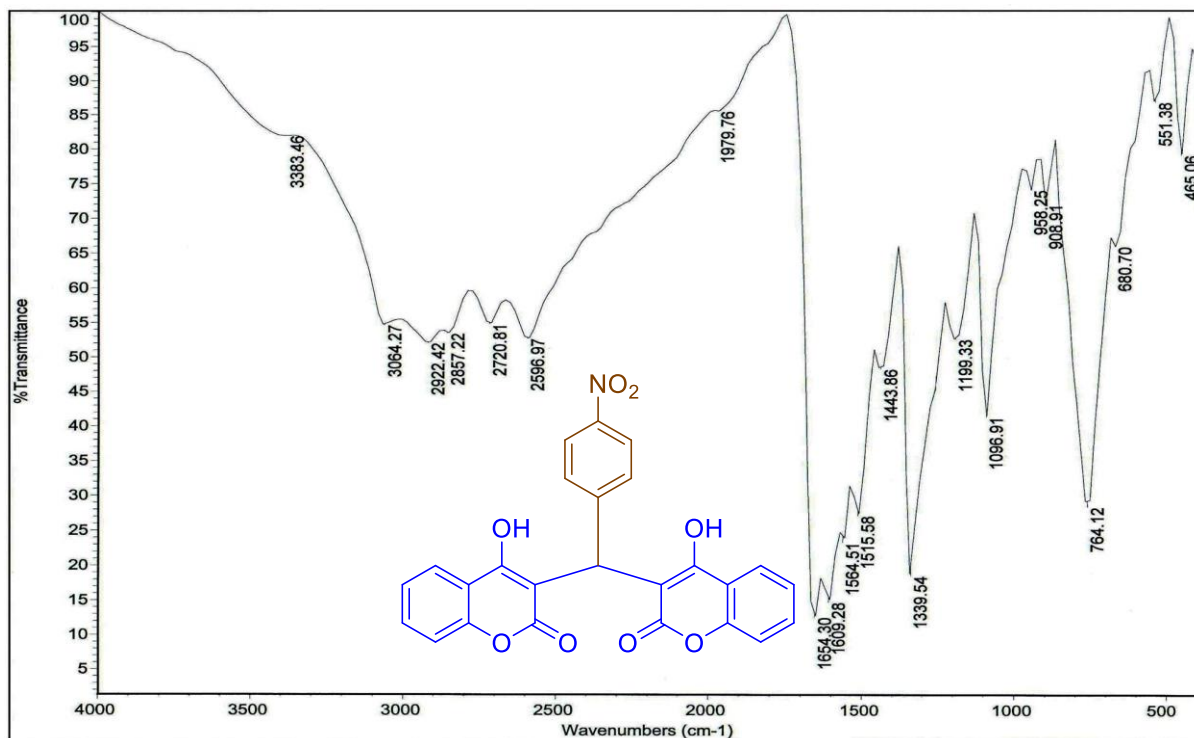
S2.3. FT-IR spectrum of 3,3'-((4-chlorophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one)



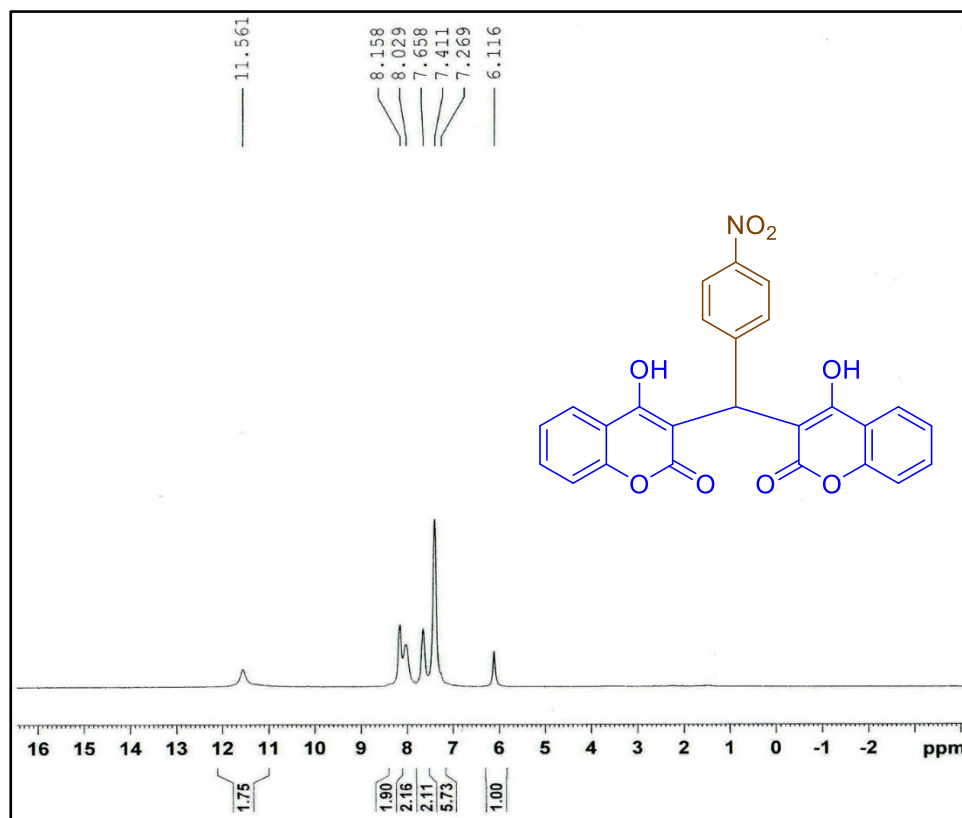
S2.4. ^1H NMR (300 MHz) spectrum of 3,3'-((4-chlorophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one)



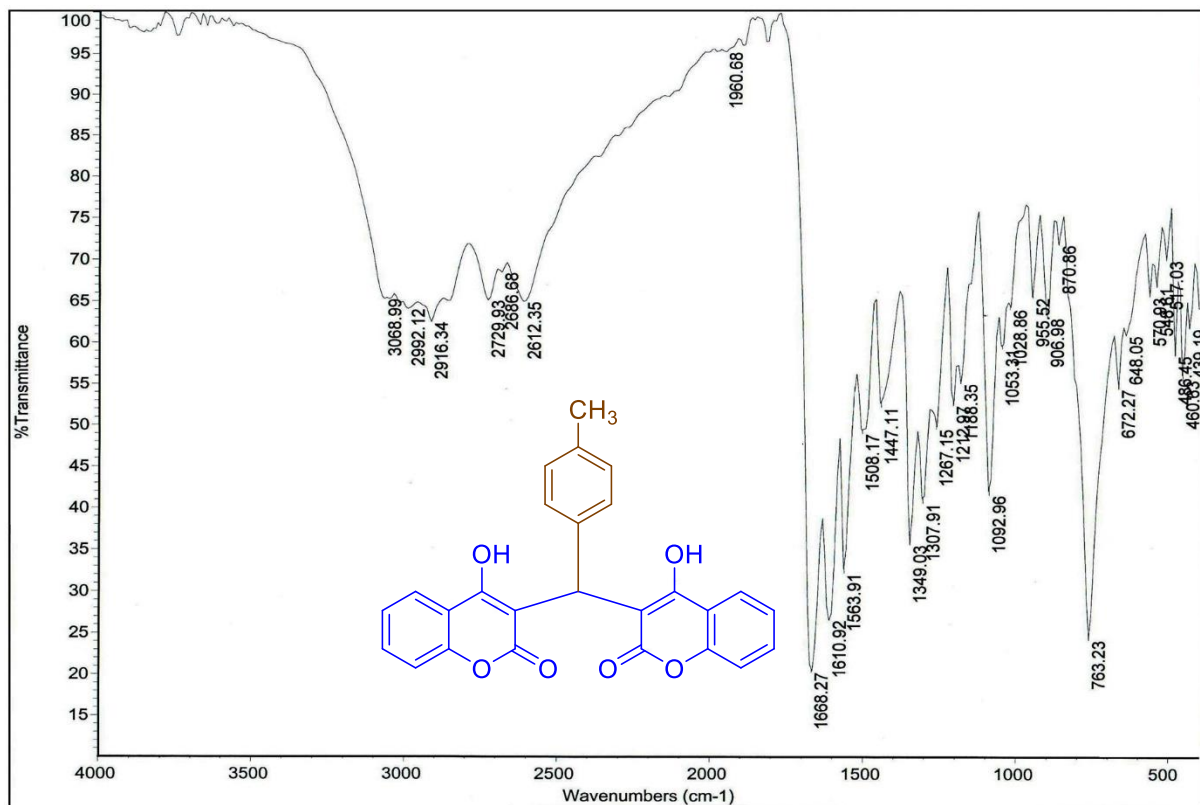
S2.5. FT-IR spectrum of 3,3'-((4-nitrophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one)



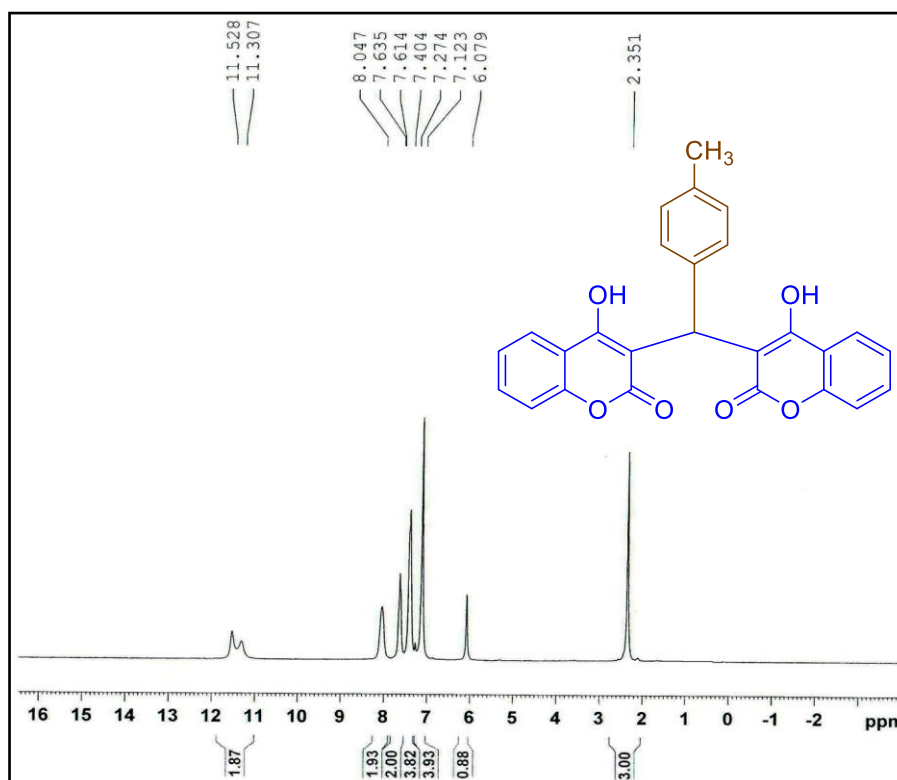
S2.6. ^1H NMR (300 MHz) spectrum of 3,3'-((4-nitrophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one)



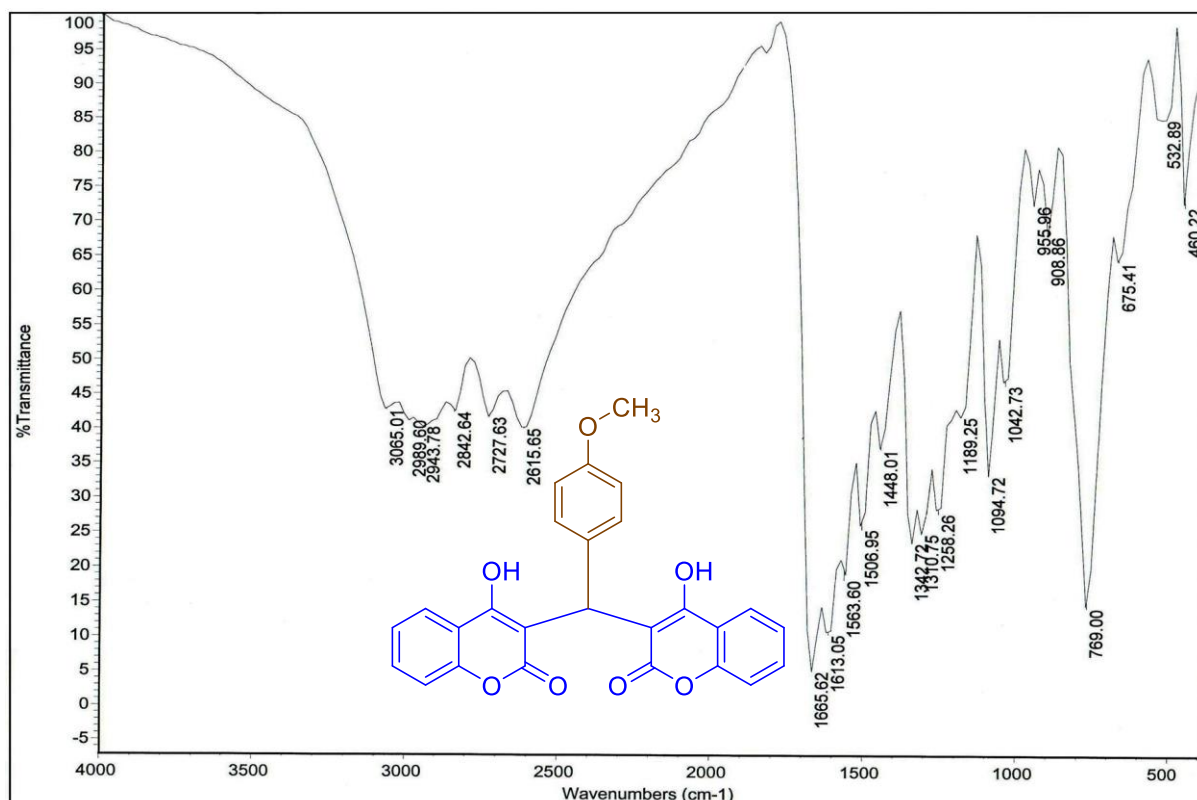
S2.7. FT-IR spectrum of 3,3'-(*p*-tolylmethylene)bis(4-hydroxy-2*H*-chromen-2-one)



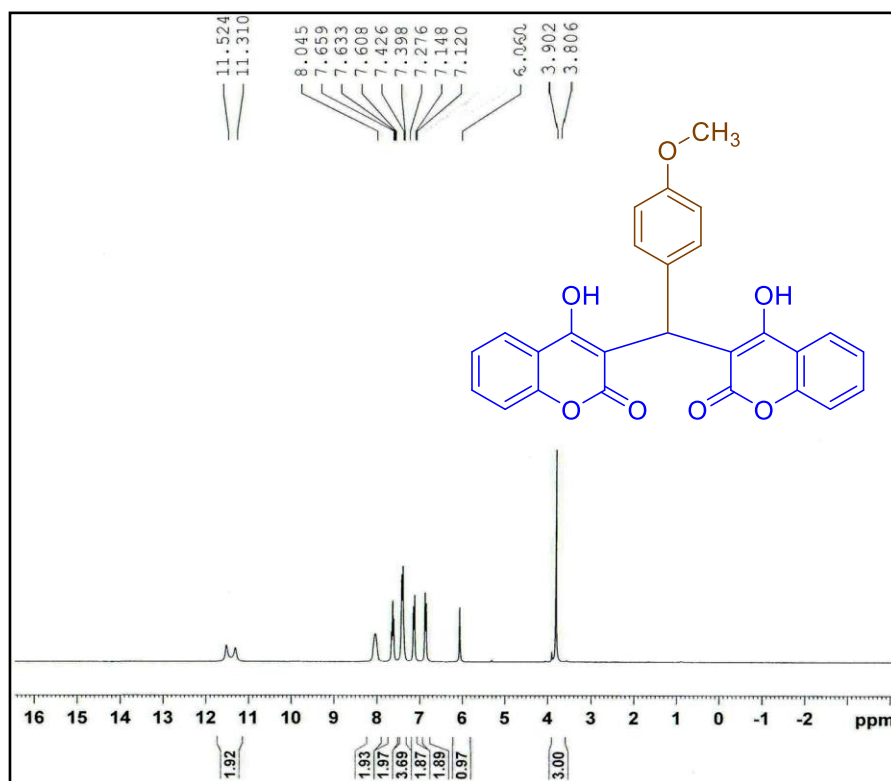
S2.8. ¹H NMR (300 MHz) spectrum of 3,3'-(*p*-tolylmethylene)bis(4-hydroxy-2*H*-chromen-2-one)



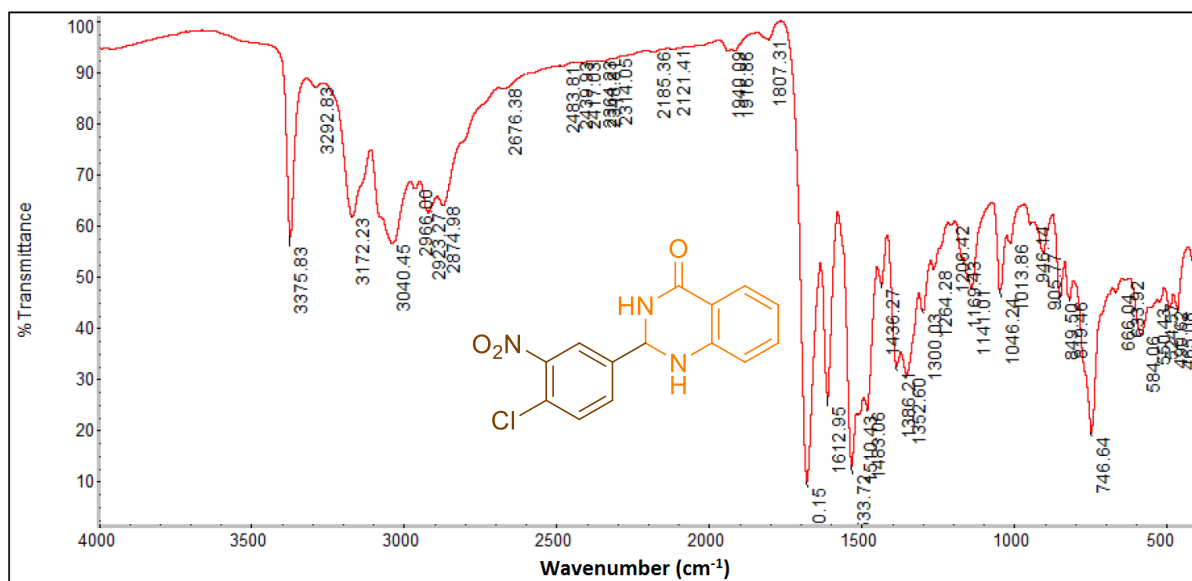
S2.9. FT-IR spectrum of 3,3'-((4-methoxyphenyl)methylene)bis(4-hydroxy-2H-chromen-2-one)



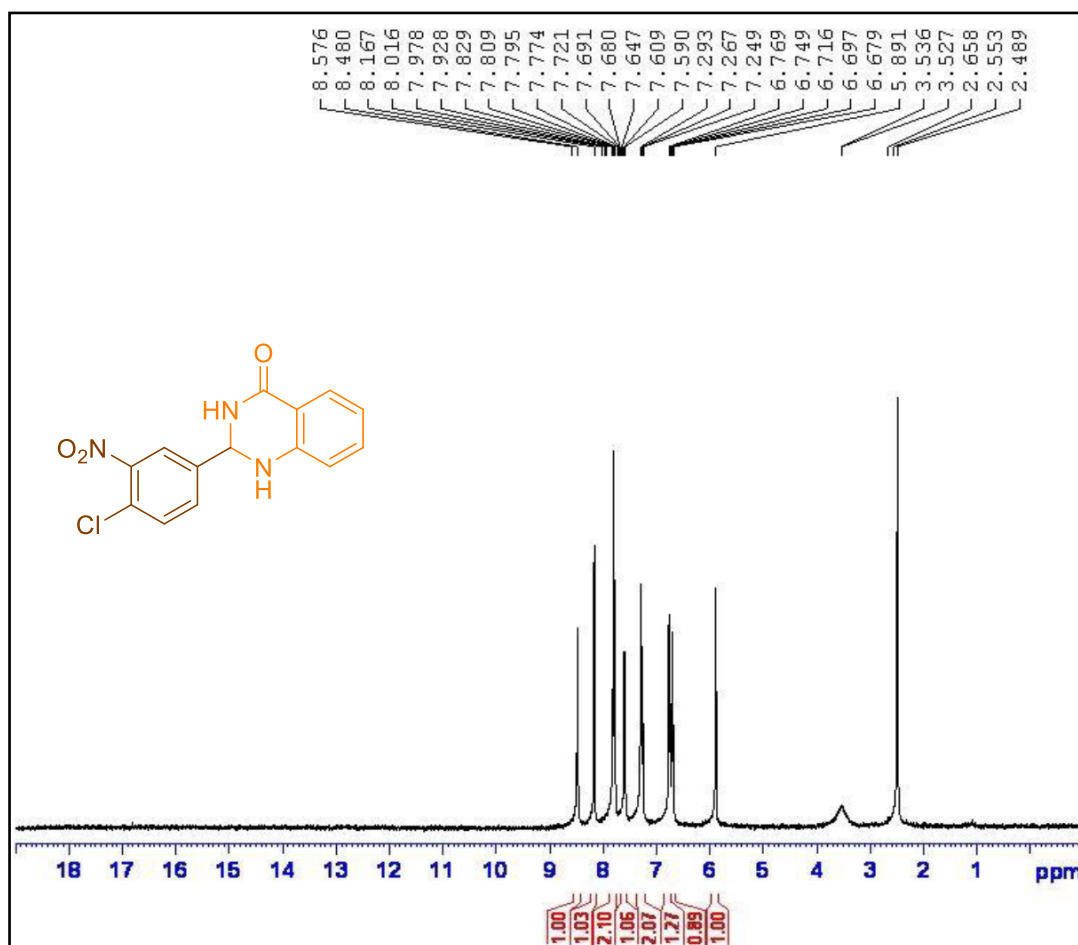
S2.10. ^1H NMR (300 MHz) spectrum of 3,3'-((4-methoxyphenyl)methylene)bis(4-hydroxy-2H-chromen-2-one)



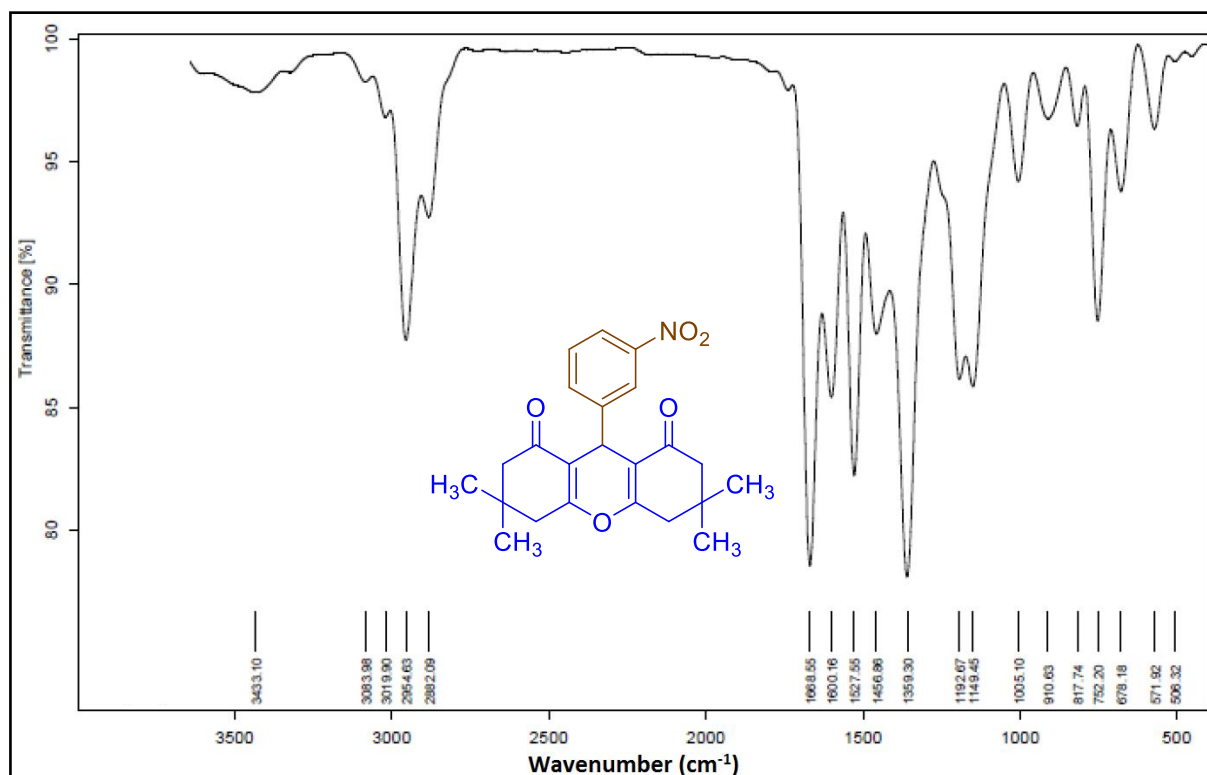
S2.11. FT-IR spectrum of 2-(4-chloro-3-nitrophenyl)-2,3-dihydroquinazolin-4(1*H*)-one



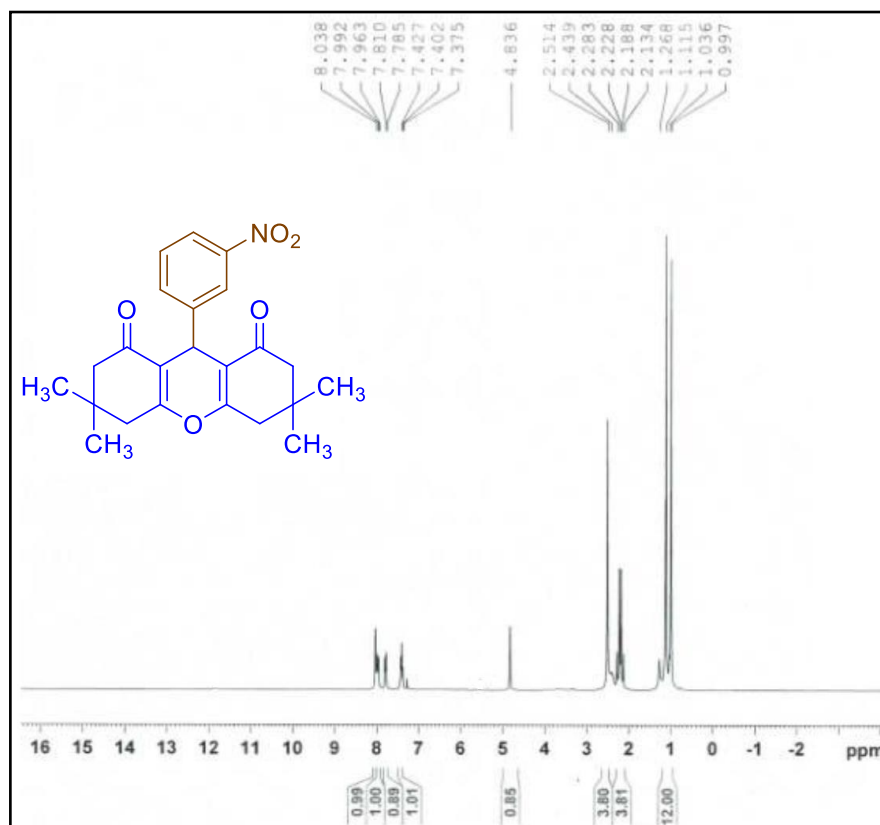
S2.12. ¹H NMR (400 MHz) spectrum of 2-(4-chloro-3-nitrophenyl)-2,3-dihydroquinazolin-4(1*H*)-one



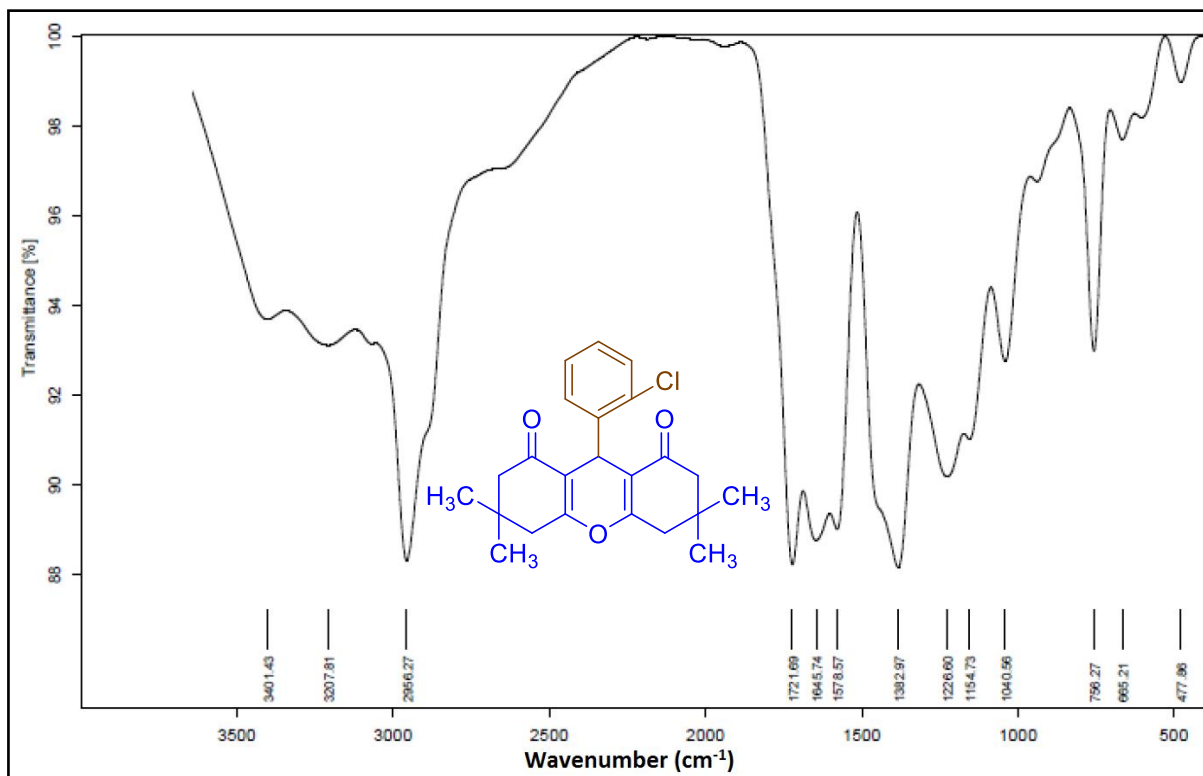
S2.13. FT-IR spectrum of 3,3,6,6-tetramethyl-9-(3-nitrophenyl)-3,4,5,6,7,9-hexahydro-1H-xanthene-1,8(2H)-dione



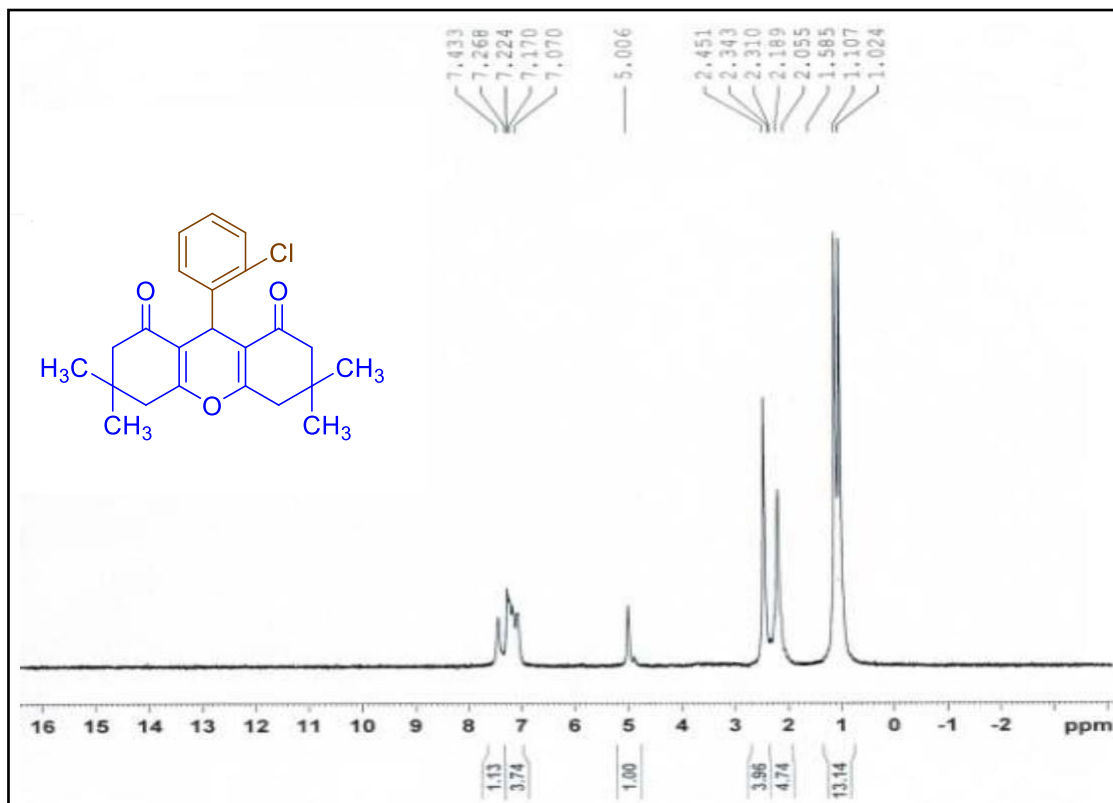
S2.14. ¹H NMR (300 MHz) spectrum of 3,3,6,6-tetramethyl-9-(3-nitrophenyl)-3,4,5,6,7,9-hexahydro-1H-xanthene-1,8(2H)-dione



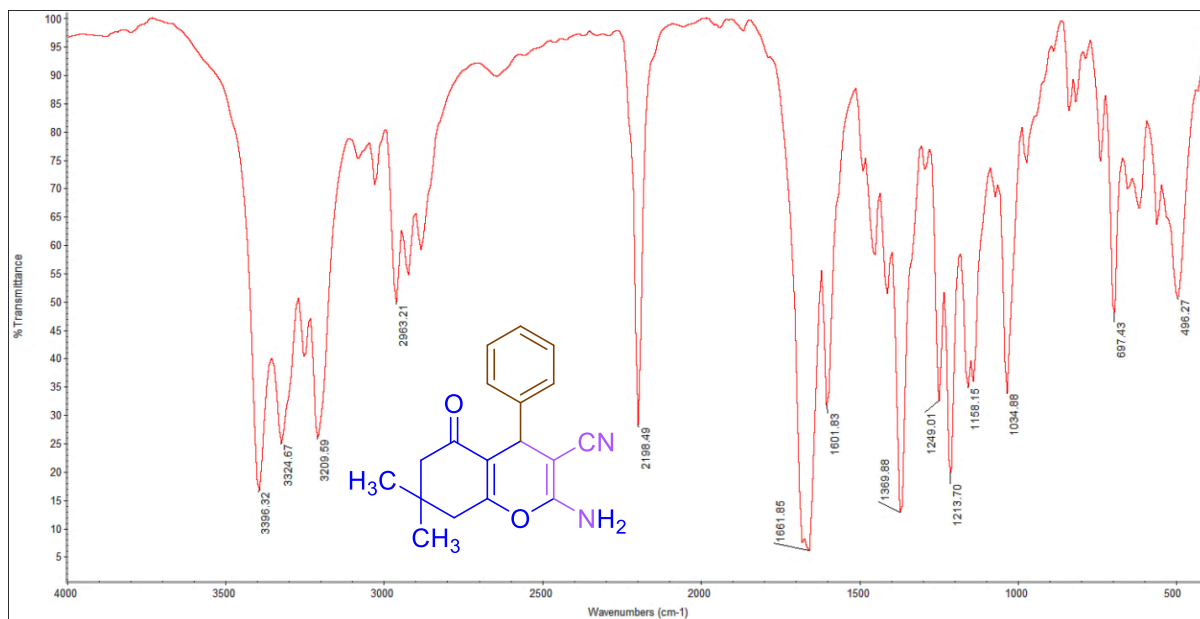
S2.15. FT-IR spectrum of 9-(2-chlorophenyl)-3,3,6,6-tetramethyl-3,4,5,6,7,9-hexahydro-1H-xanthene-1,8(2H)-dione



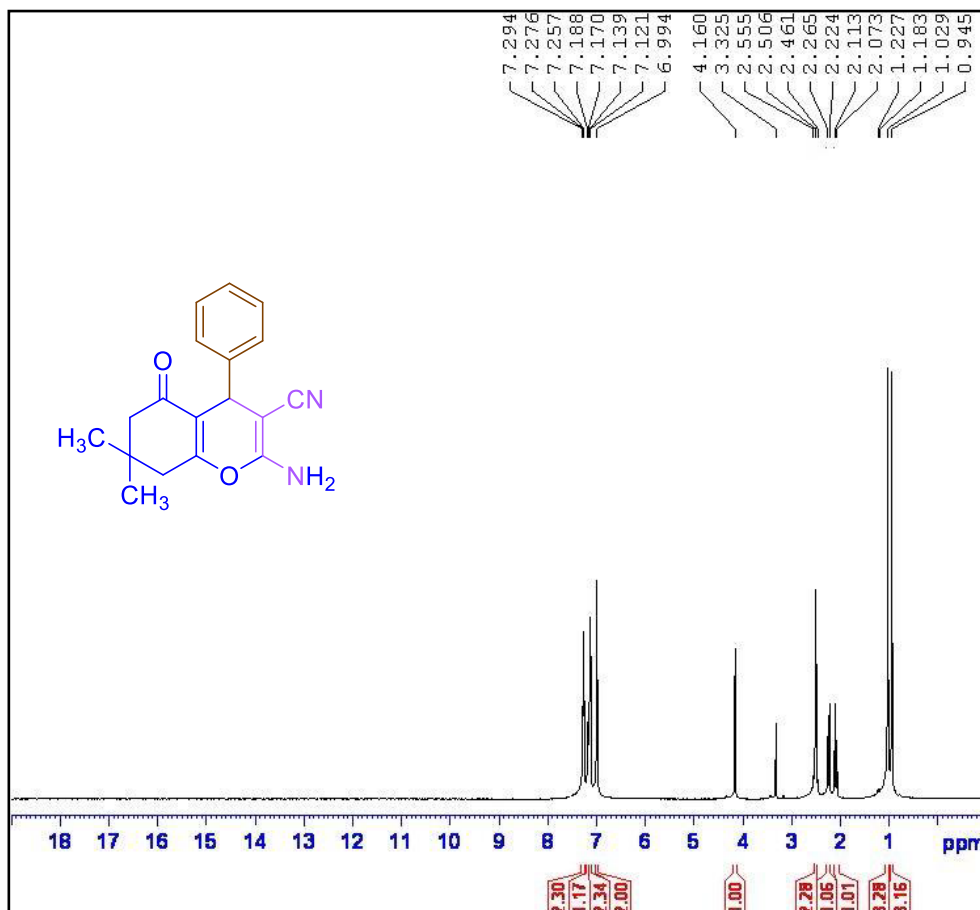
S2.16. ¹H NMR (300 MHz) spectrum of 9-(2-chlorophenyl)-3,3,6,6-tetramethyl-3,4,5,6,7,9-hexahydro-1H-xanthene-1,8(2H)-dione



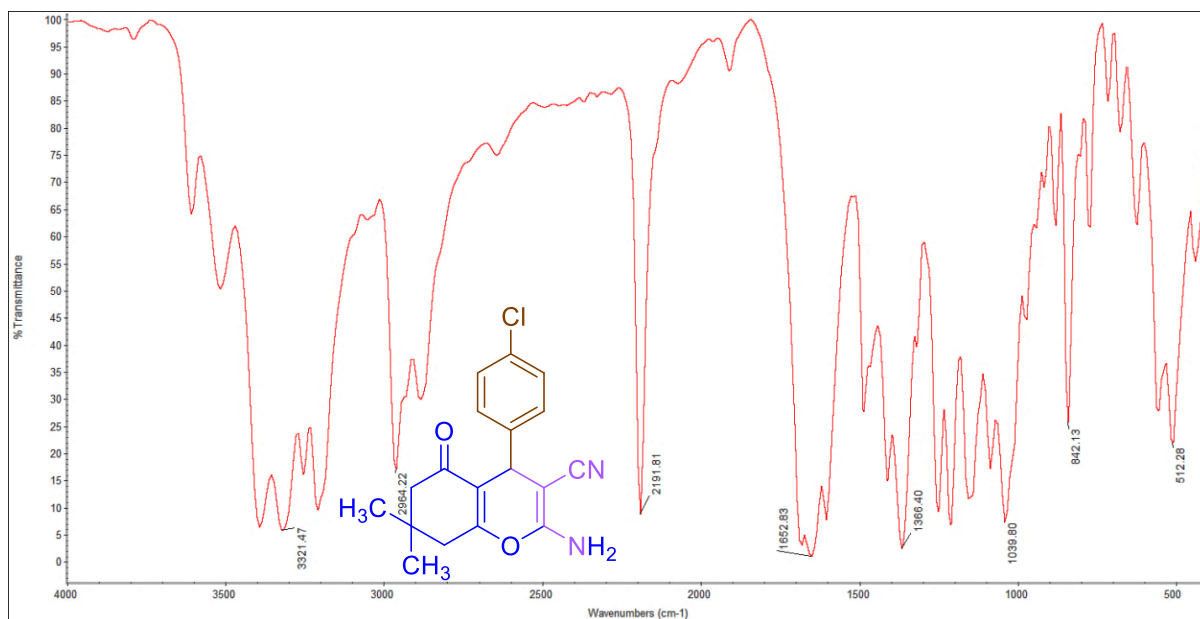
S2.17. FT-IR spectrum of 2-amino-7,7-dimethyl-5-oxo-4-phenyl-5,6,7,8-tetrahydro-4H-chromene-3-carbonitrile



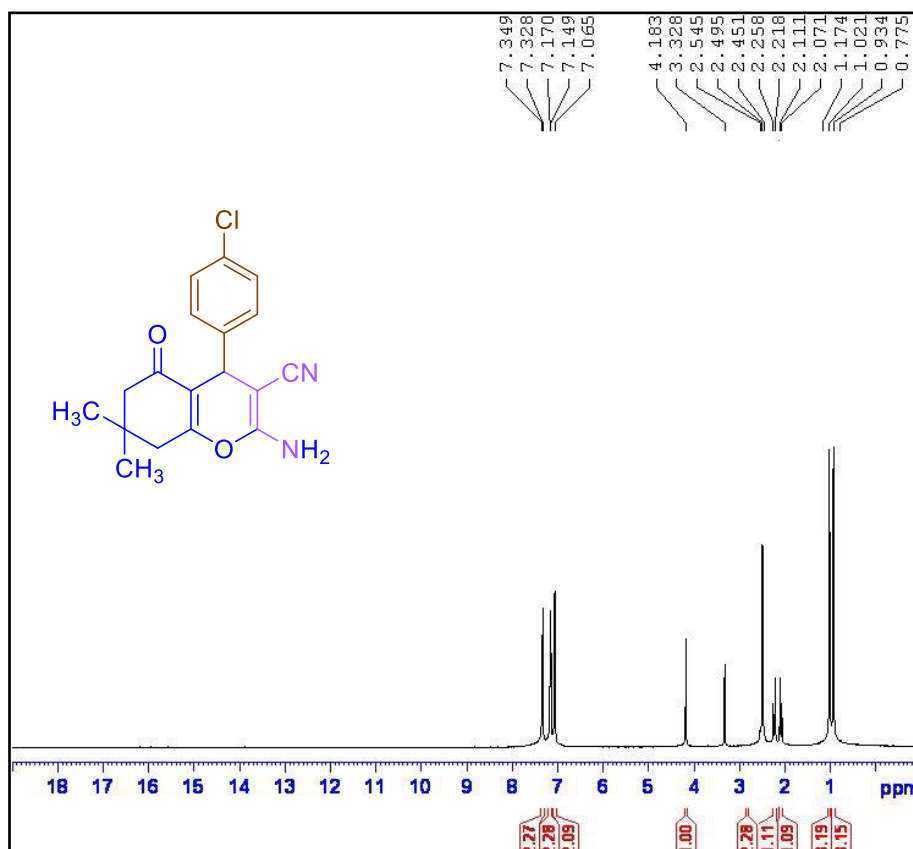
S2.18. ¹H NMR (400 MHz) spectrum of 2-amino-7,7-dimethyl-5-oxo-4-phenyl-5,6,7,8-tetrahydro-4H-chromene-3-carbonitrile



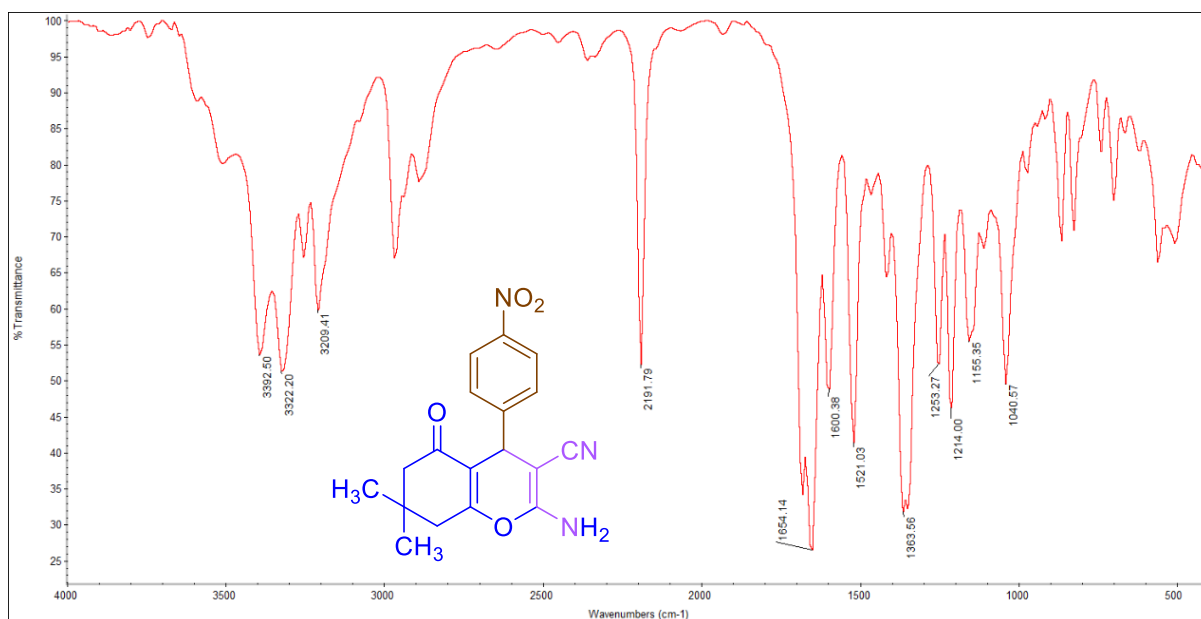
S2.19. FT-IR spectrum of 2-amino-4-(4-chlorophenyl)-7,7-dimethyl-5-oxo-5,6,7,8-tetrahydro-4H-chromene-3-carbonitrile



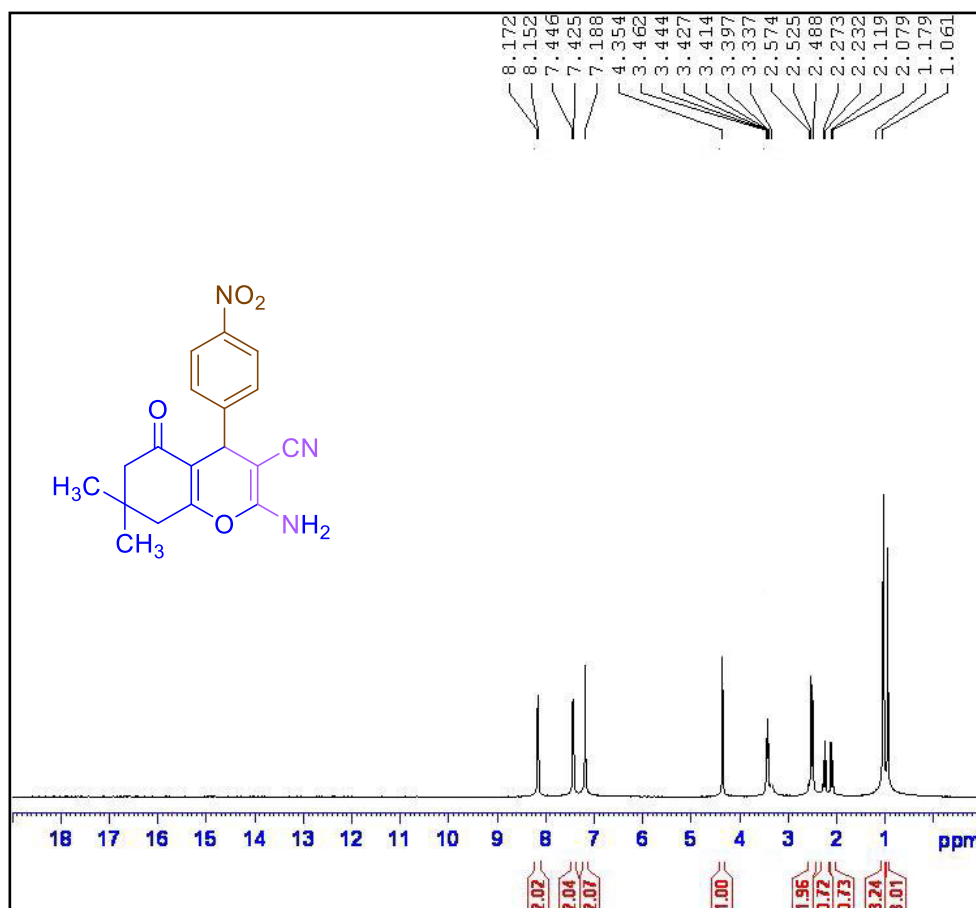
S2.20. ¹H NMR (400 MHz) spectrum of 2-amino-4-(4-chlorophenyl)-7,7-dimethyl-5-oxo-5,6,7,8-tetrahydro-4H-chromene-3-carbonitrile



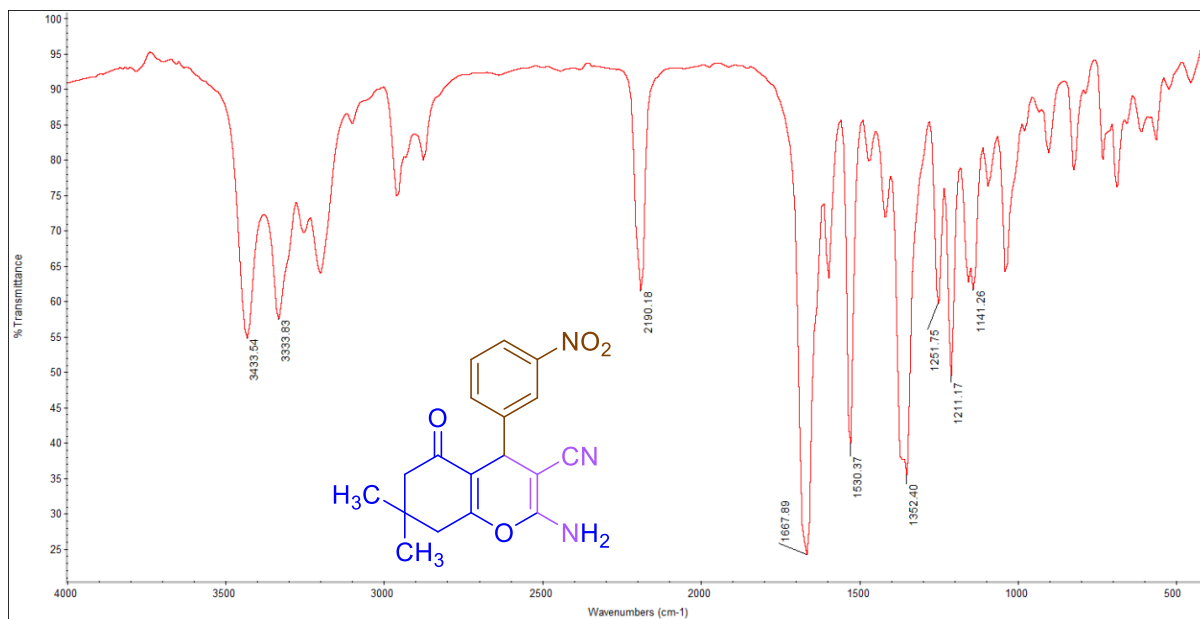
S2.21. FT-IR spectrum of 2-amino-7,7-dimethyl-4-(4-nitrophenyl)-5-oxo-5,6,7,8-tetrahydro-4H-chromene-3-carbonitrile



S2.22. ¹H NMR (400 MHz) spectrum of 2-amino-7,7-dimethyl-4-(4-nitrophenyl)-5-oxo-5,6,7,8-tetrahydro-4H-chromene-3-carbonitrile



S2.23. FT-IR spectrum of 2-amino-7,7-dimethyl-4-(3-nitrophenyl)-5-oxo-5,6,7,8-tetrahydro-4H-chromene-3-carbonitrile



S2.24. ¹H NMR (400 MHz) spectrum of 2-amino-7,7-dimethyl-4-(3-nitrophenyl)-5-oxo-5,6,7,8-tetrahydro-4H-chromene-3-carbonitrile

