

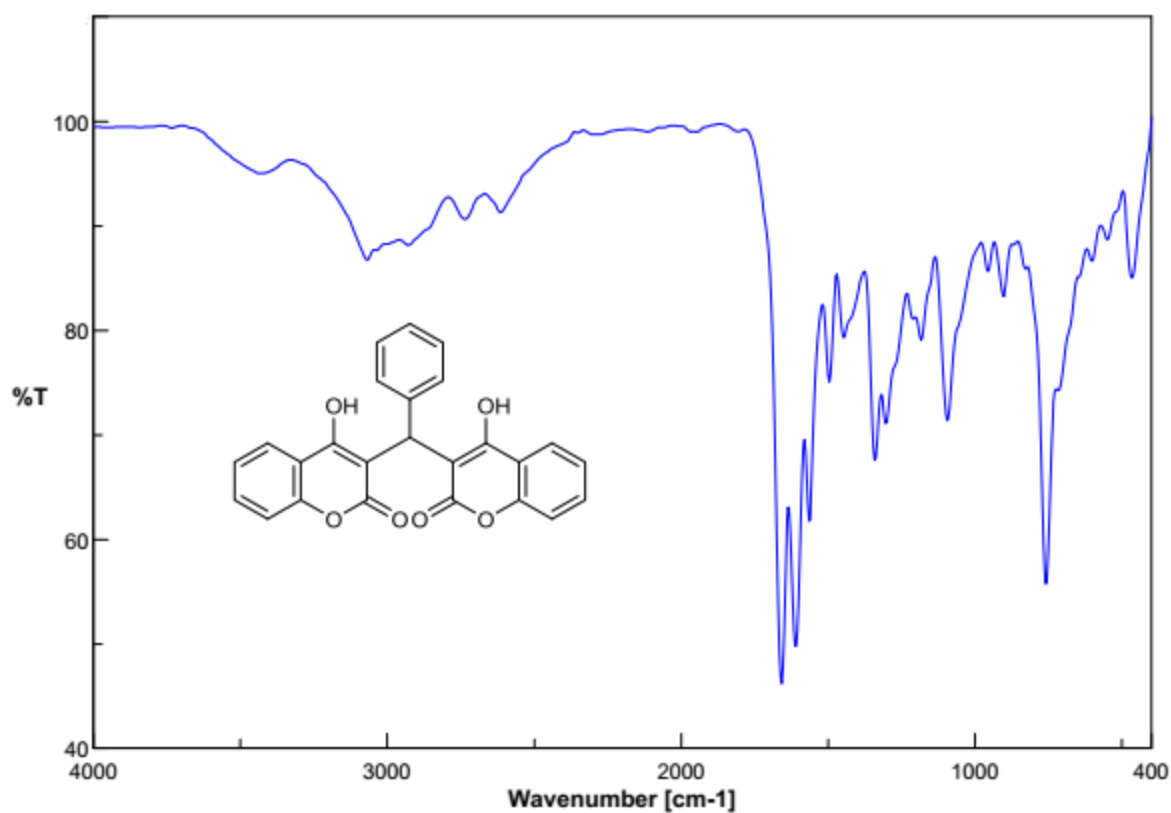
Supporting Information

Novel ionic liquid immobilized on FSM-16: A novel recoverable nanocatalyst for the synthesis of biscoumarins

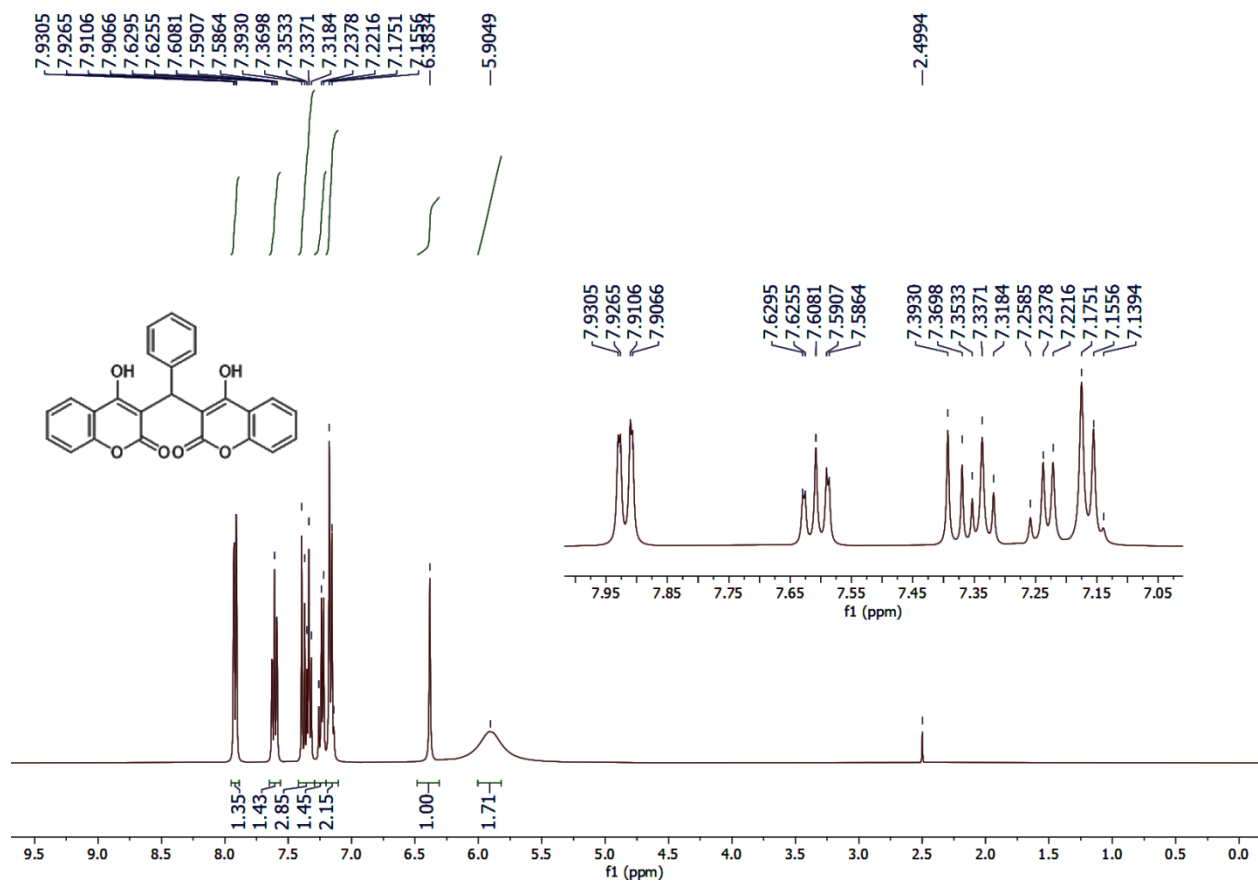
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Department of Chemistry, Yasouj University, P. O. Box 353, Yasouj 75918-74831, Iran

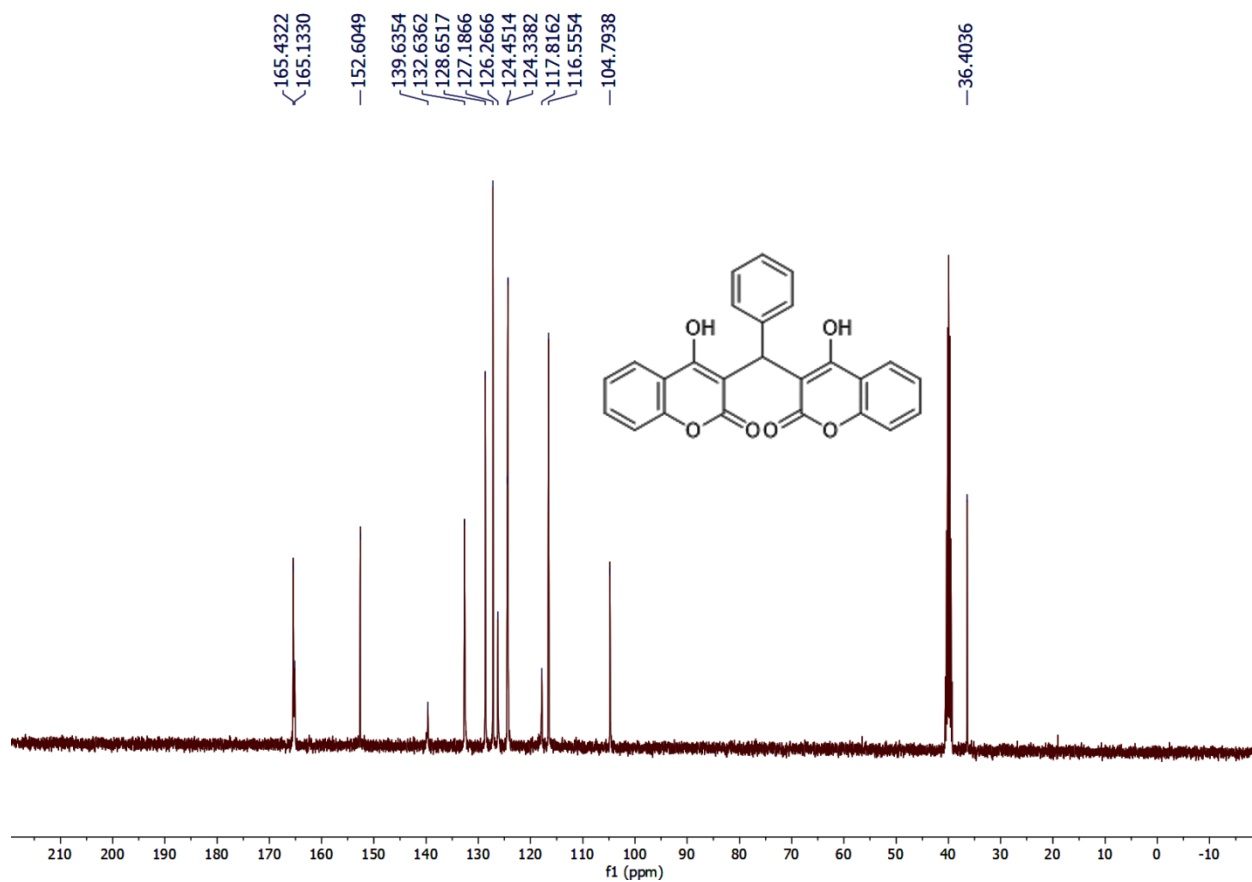
*Corresponding author: E-mail: farahimb@yu.ac.ir



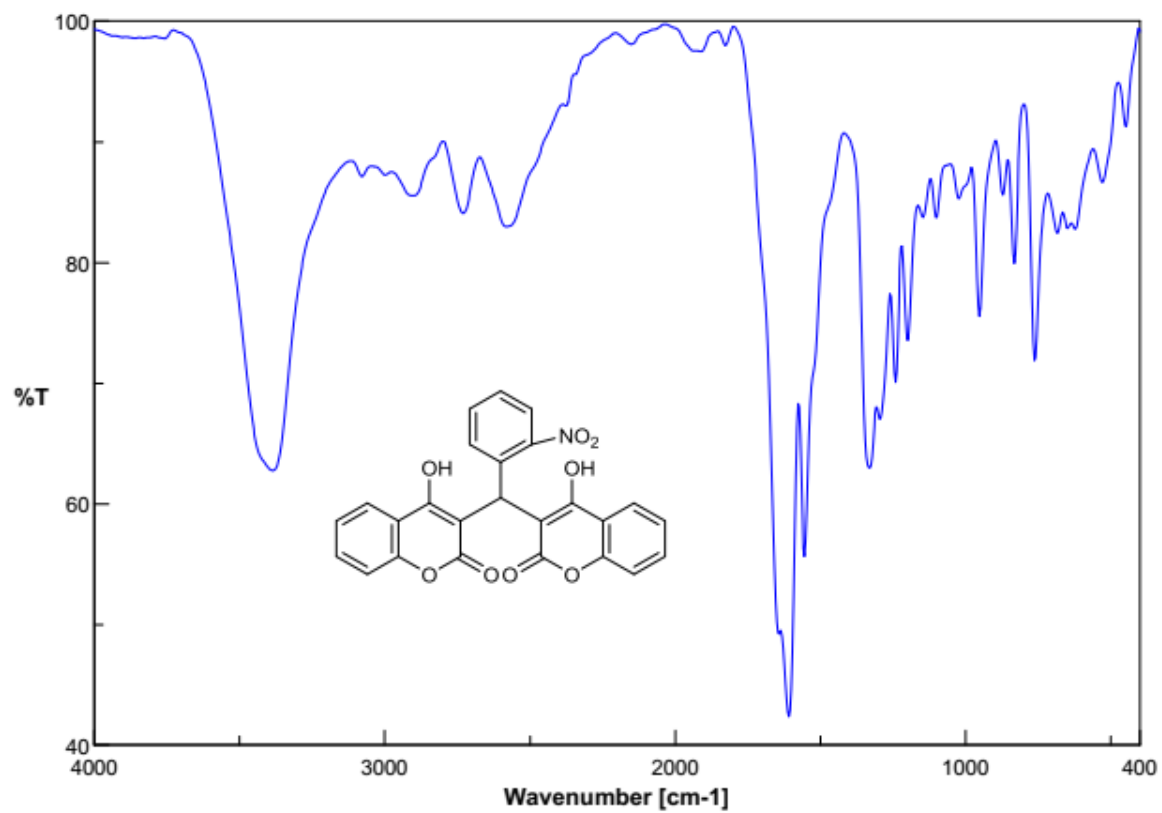
FT-IR spectrum of 3,3'-(phenylmethylene)bis(4-hydroxy-2H-chromen-2-one) (**4a**).



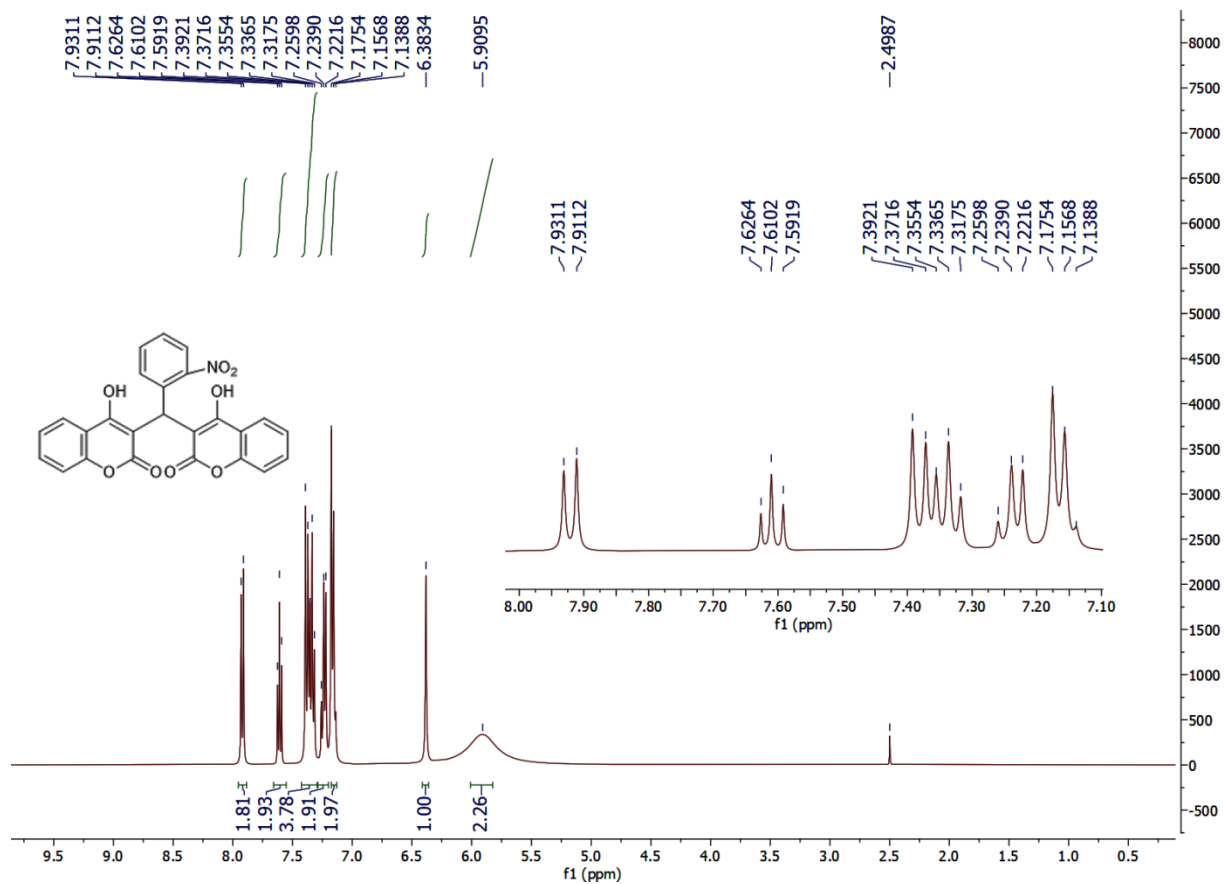
¹H NMR spectrum of 3,3'-(phenylmethylene)bis(4-hydroxy-2H-chromen-2-one) (**4a**).



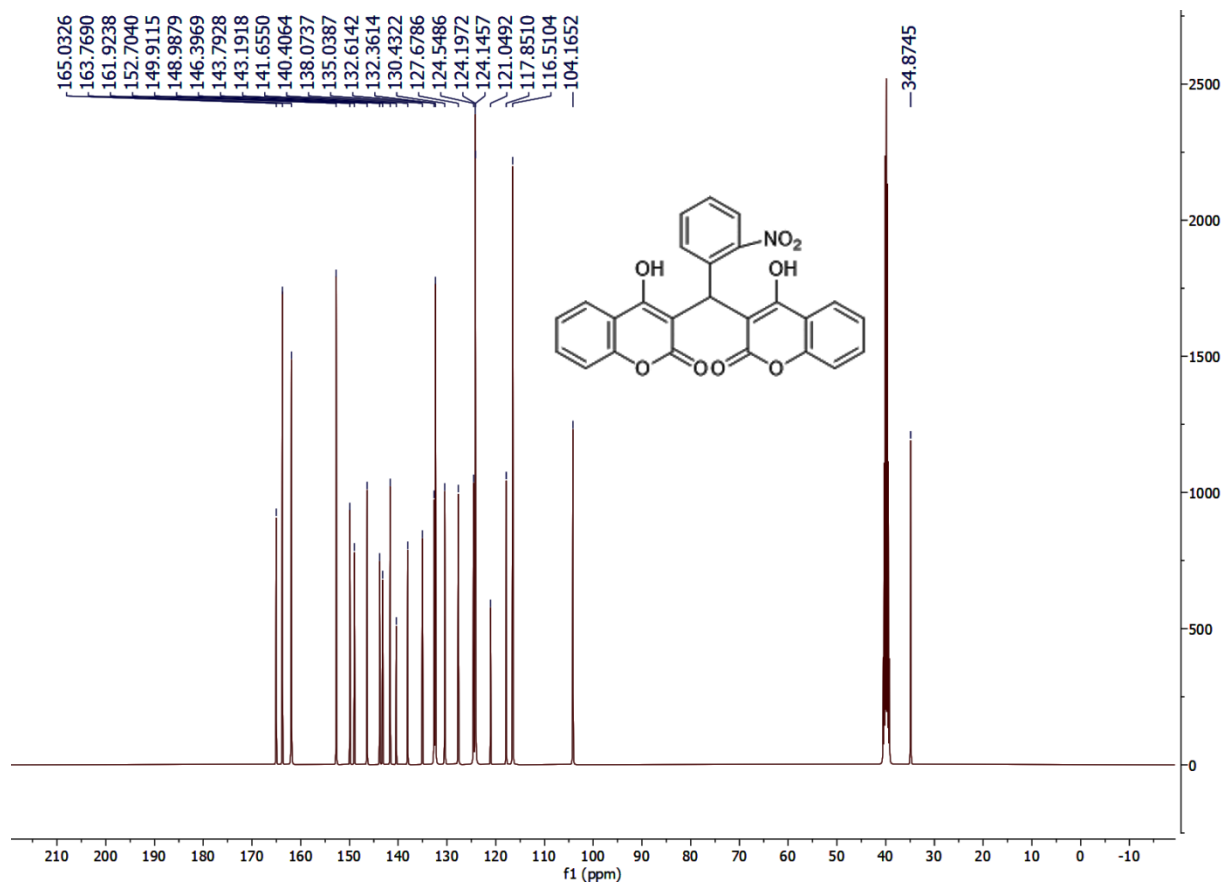
^{13}C NMR spectrum of 3,3'-(phenylmethylene)bis(4-hydroxy-2H-chromen-2-one) (**4a**).



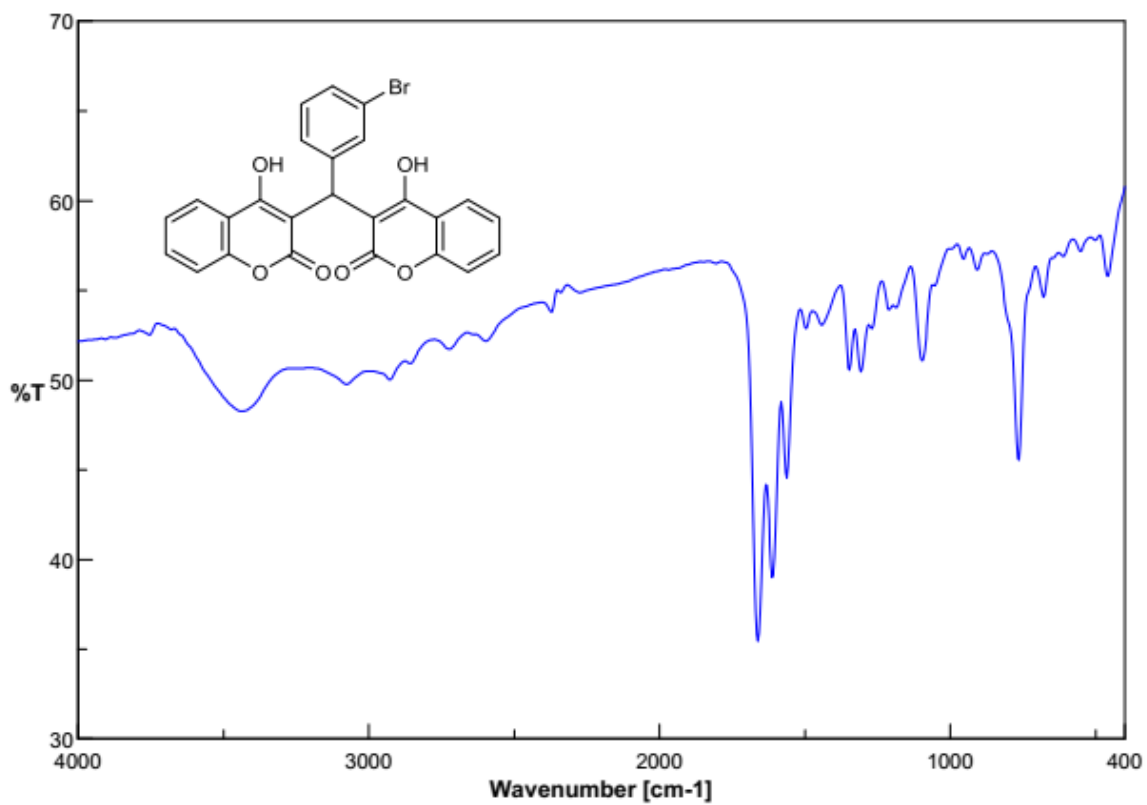
FT-IR spectrum of 3,3'-((2-nitrophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4b**).



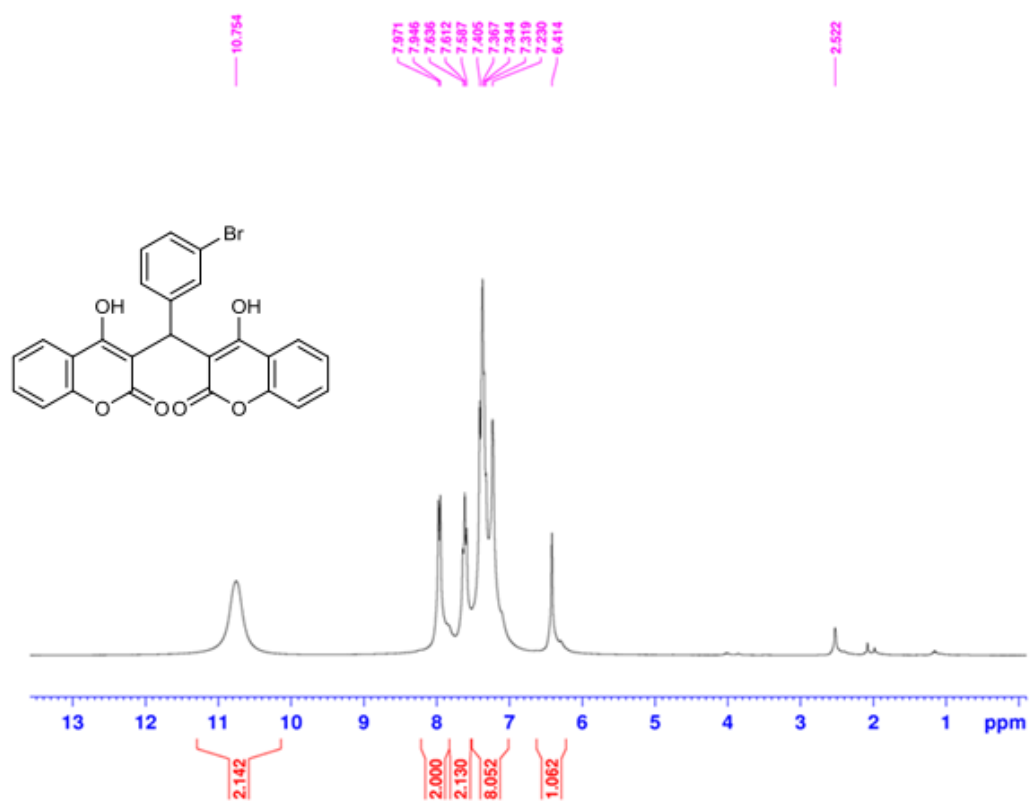
¹H NMR spectrum of 3,3'-((2-nitrophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4b**).



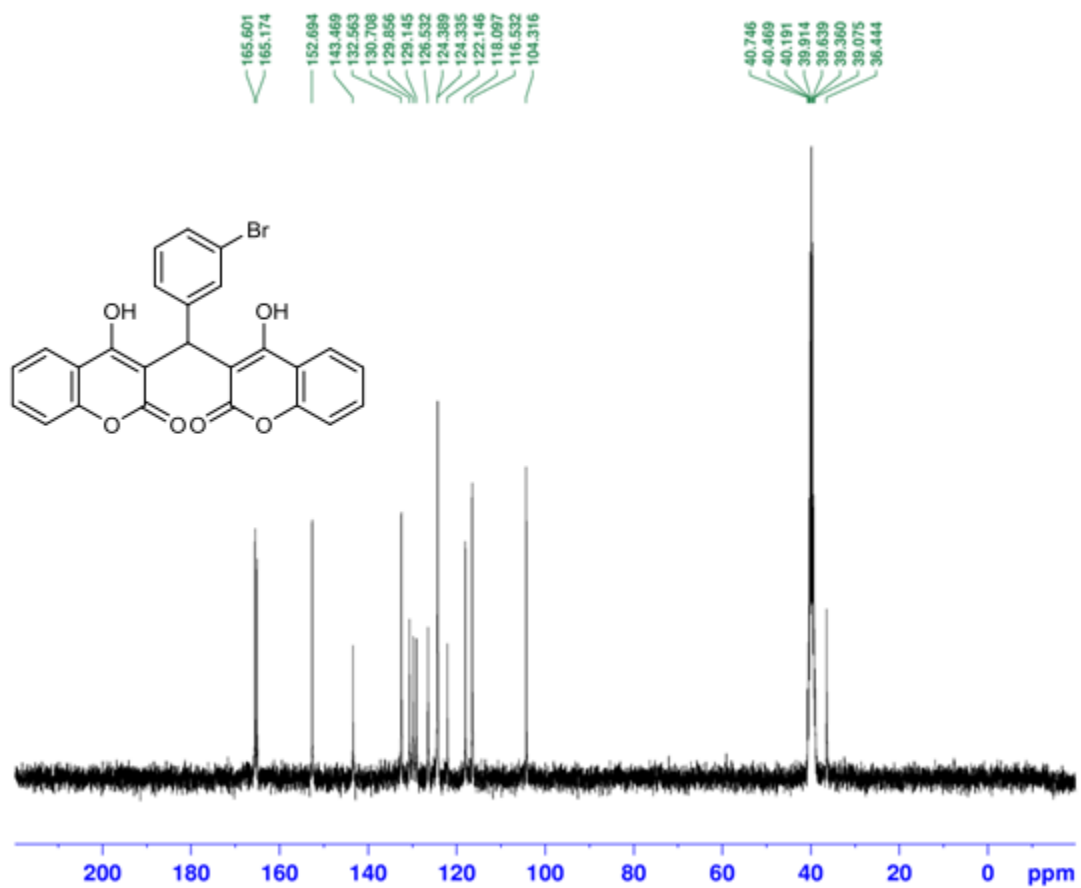
^{13}C NMR spectrum of 3,3'-((2-nitrophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4b**).



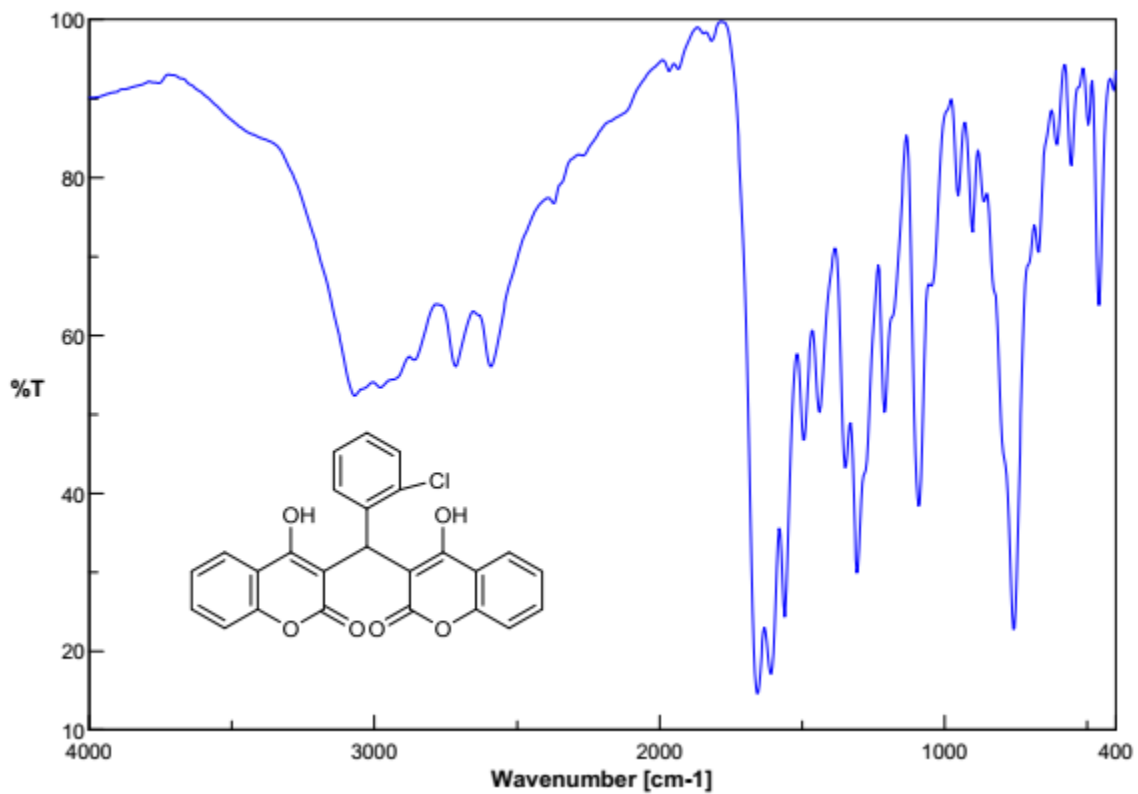
FT-IR spectrum of 3,3'-((3-bromophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4c**).



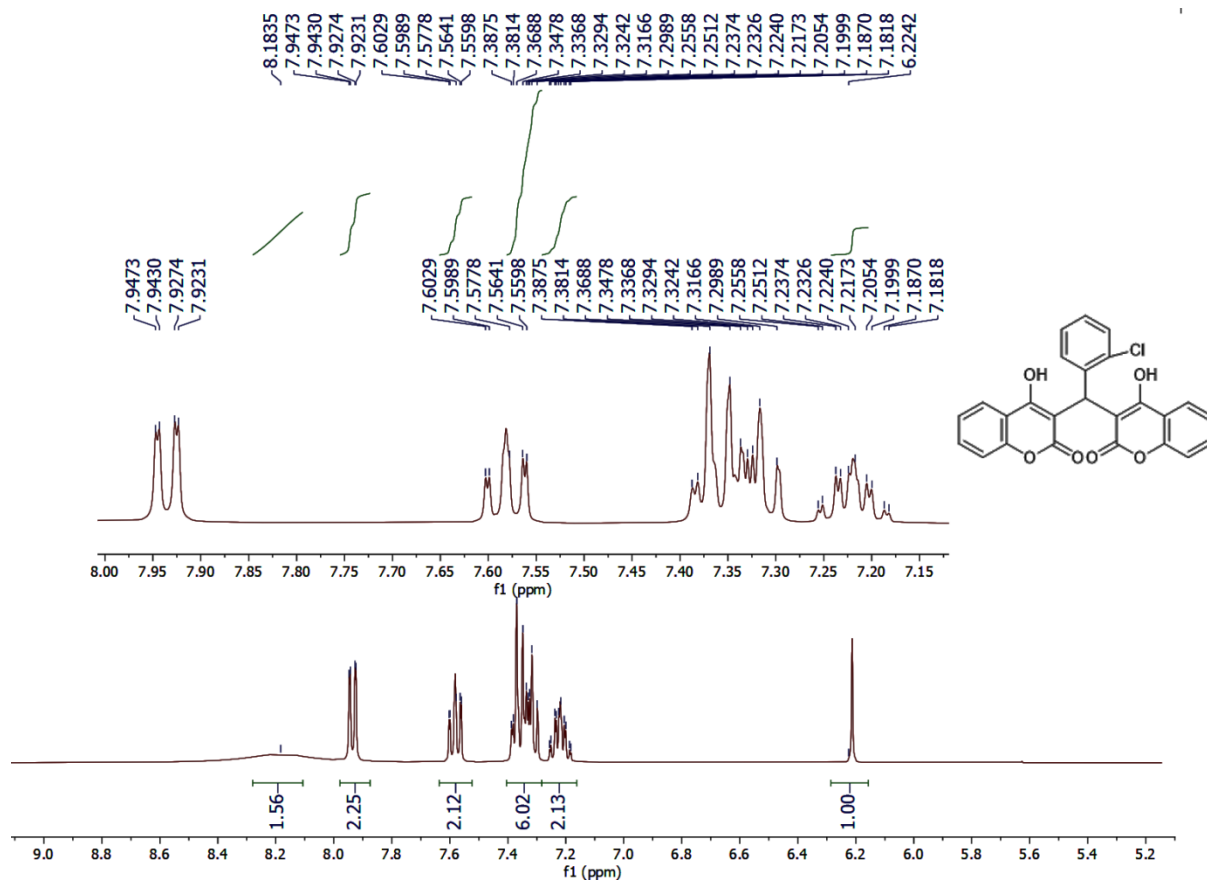
¹H NMR spectrum of 3,3'-((3-bromophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4c**).



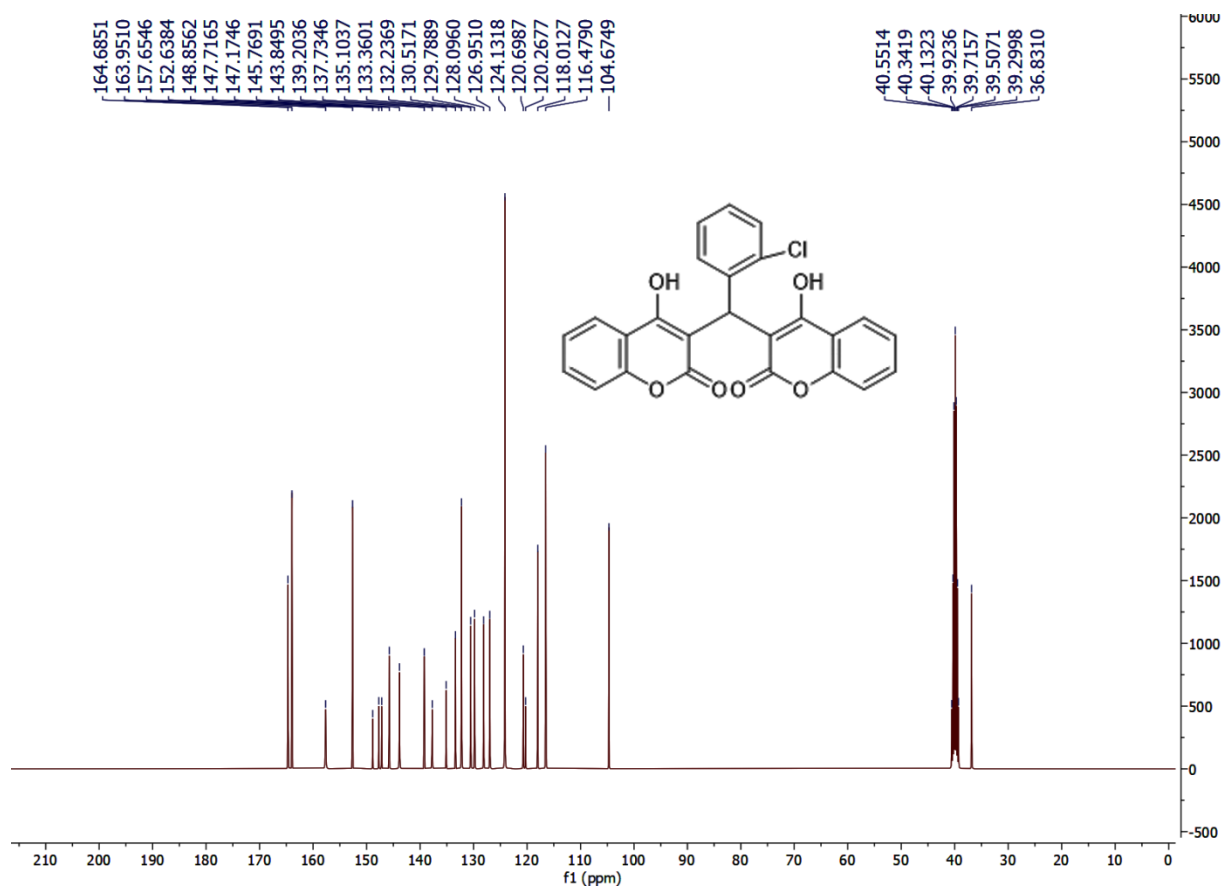
¹³C NMR spectrum of 3,3'-((3-bromophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4c**).



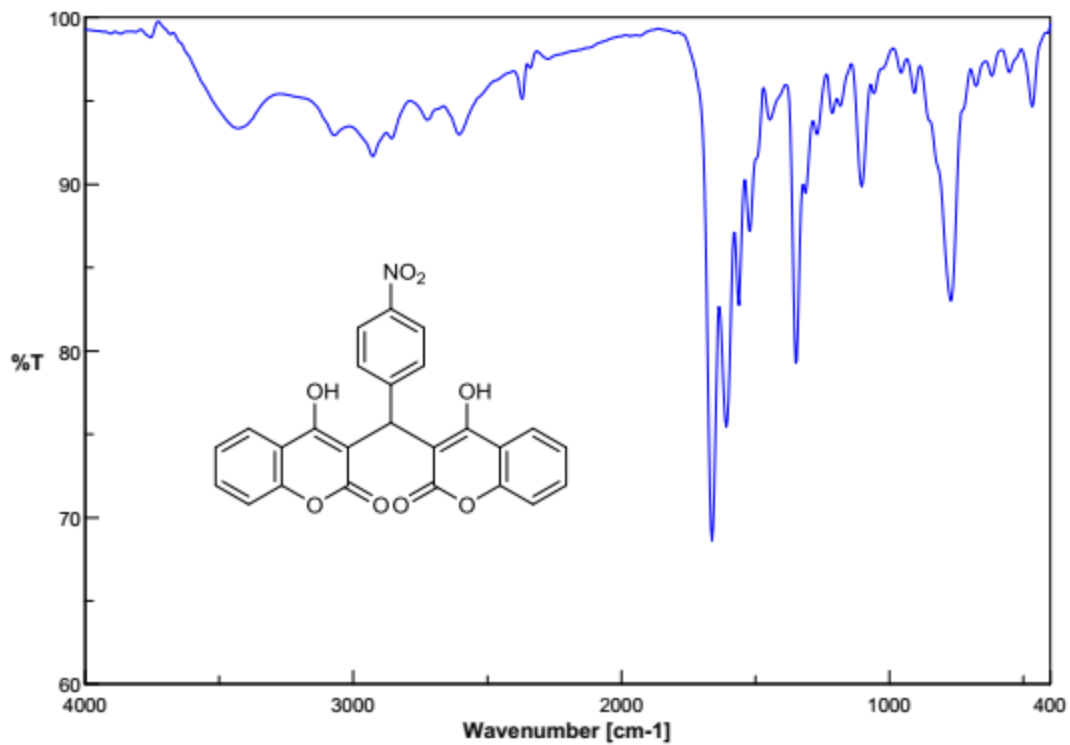
FT-IR spectrum of 3,3'-((2-chlorophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4d**).



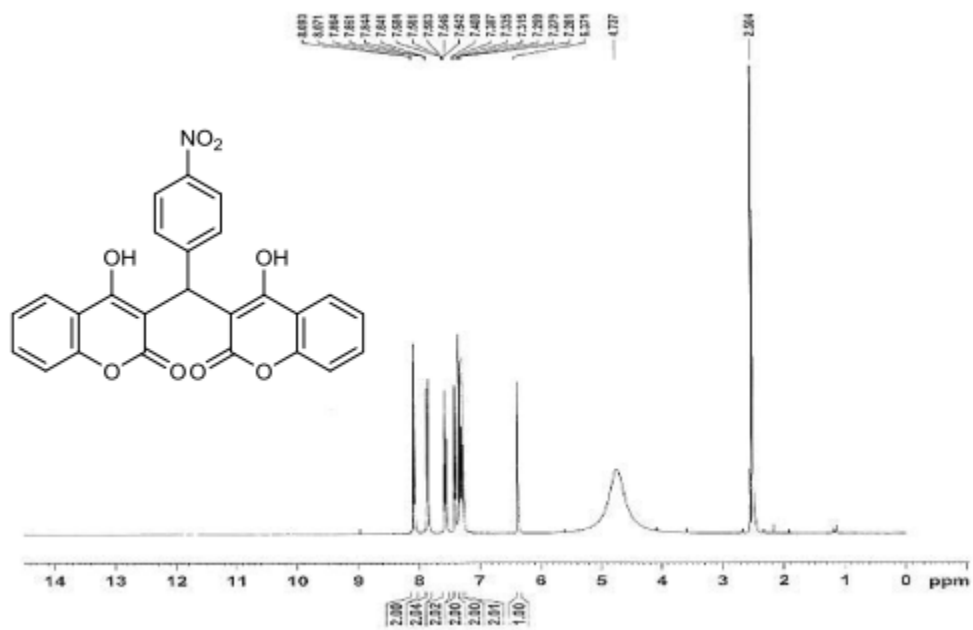
^1H NMR spectrum of 3,3'-((2-chlorophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4d**).



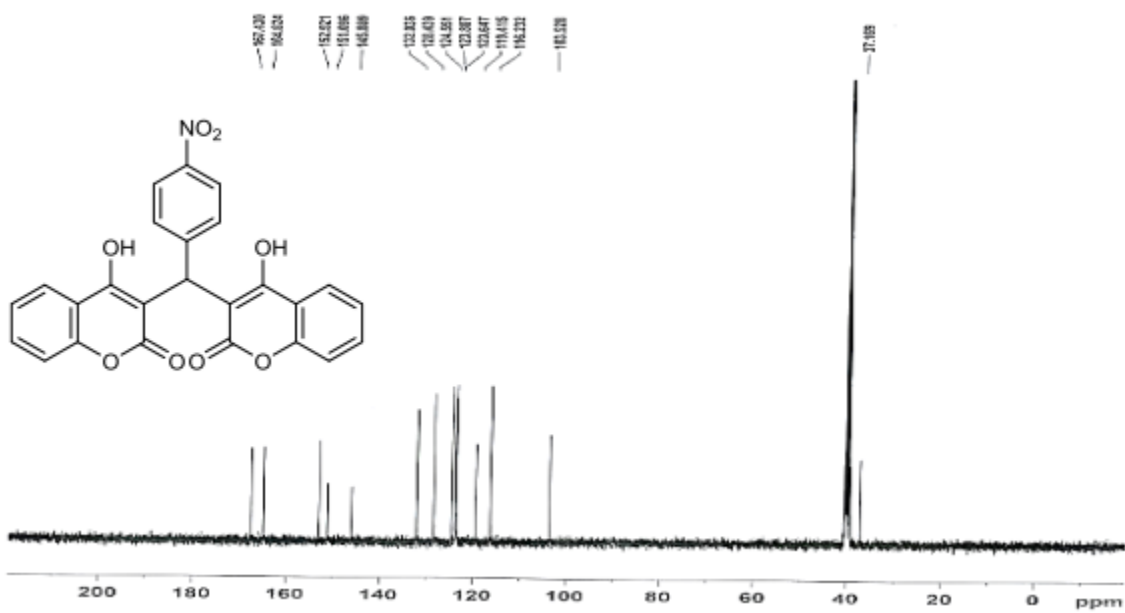
^{13}C NMR spectrum of 3,3'-((2-chlorophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4d**).



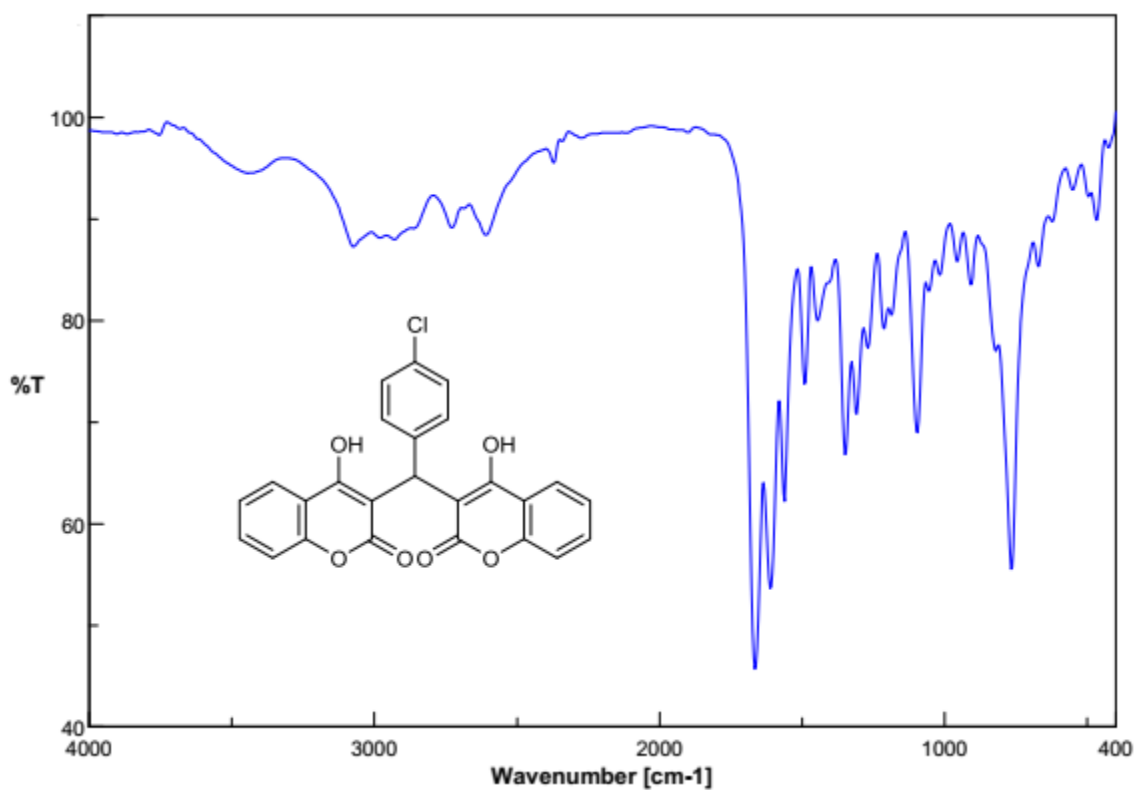
FT-IR spectrum of 3,3'-((4-nitrophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4e**).



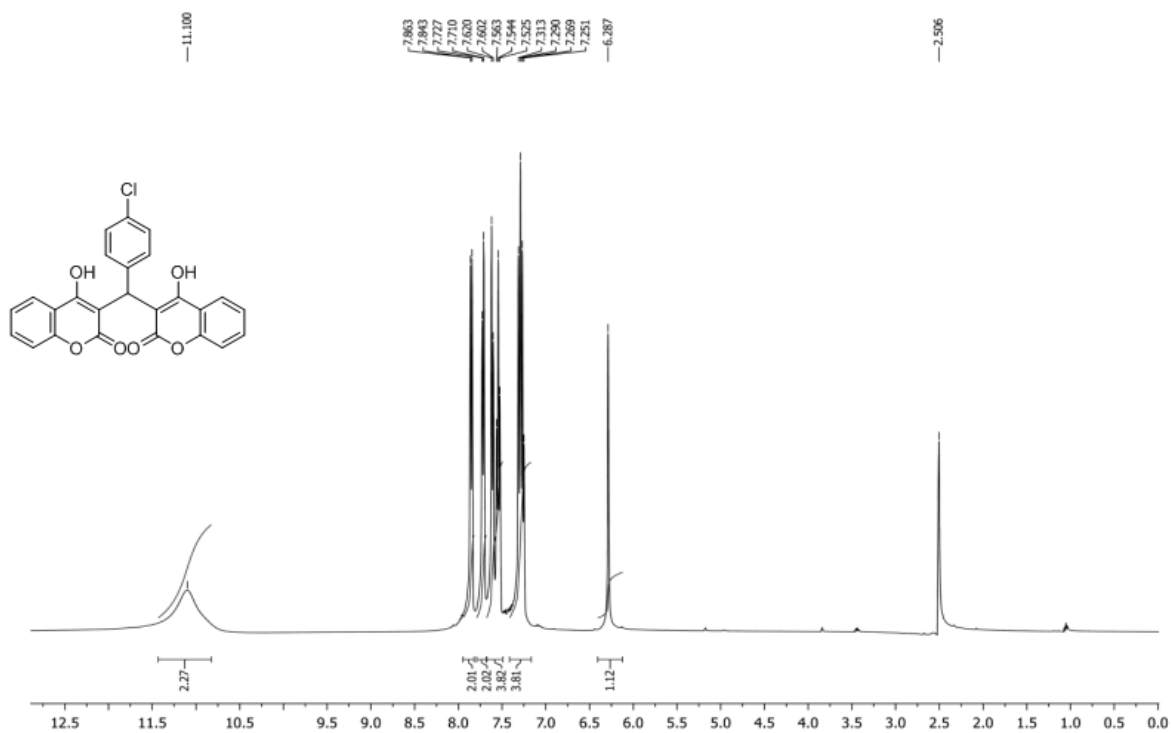
¹H NMR spectrum of 3,3'-((4-nitrophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4e**).



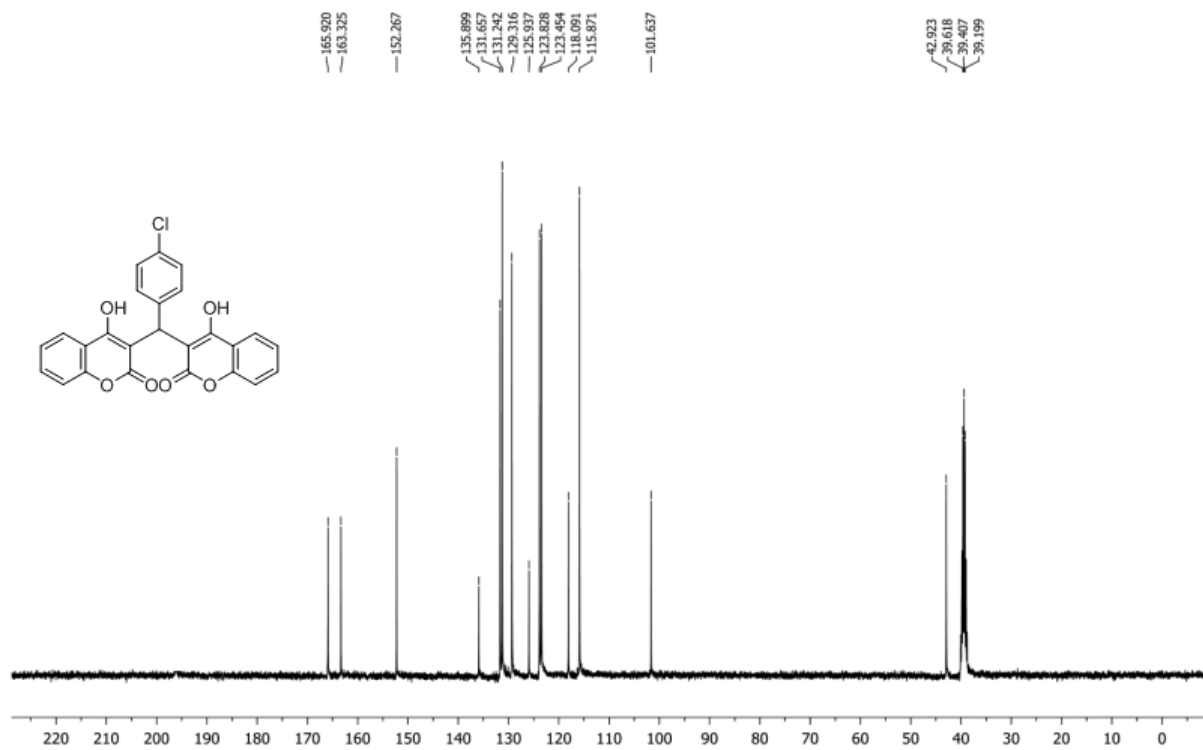
^{13}C NMR spectrum of 3,3'-((4-nitrophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4e**).



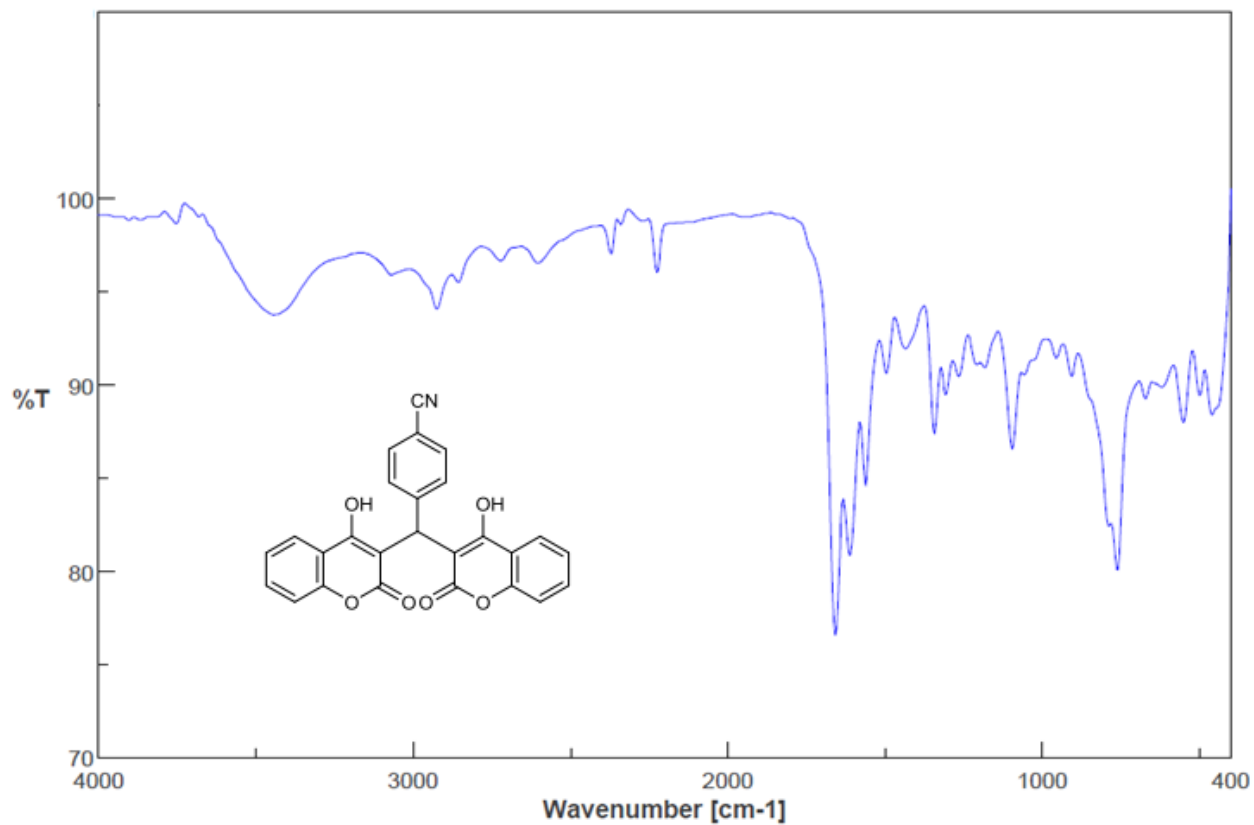
FT-IR spectrum of 3,3'-((4-chlorophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4f**).



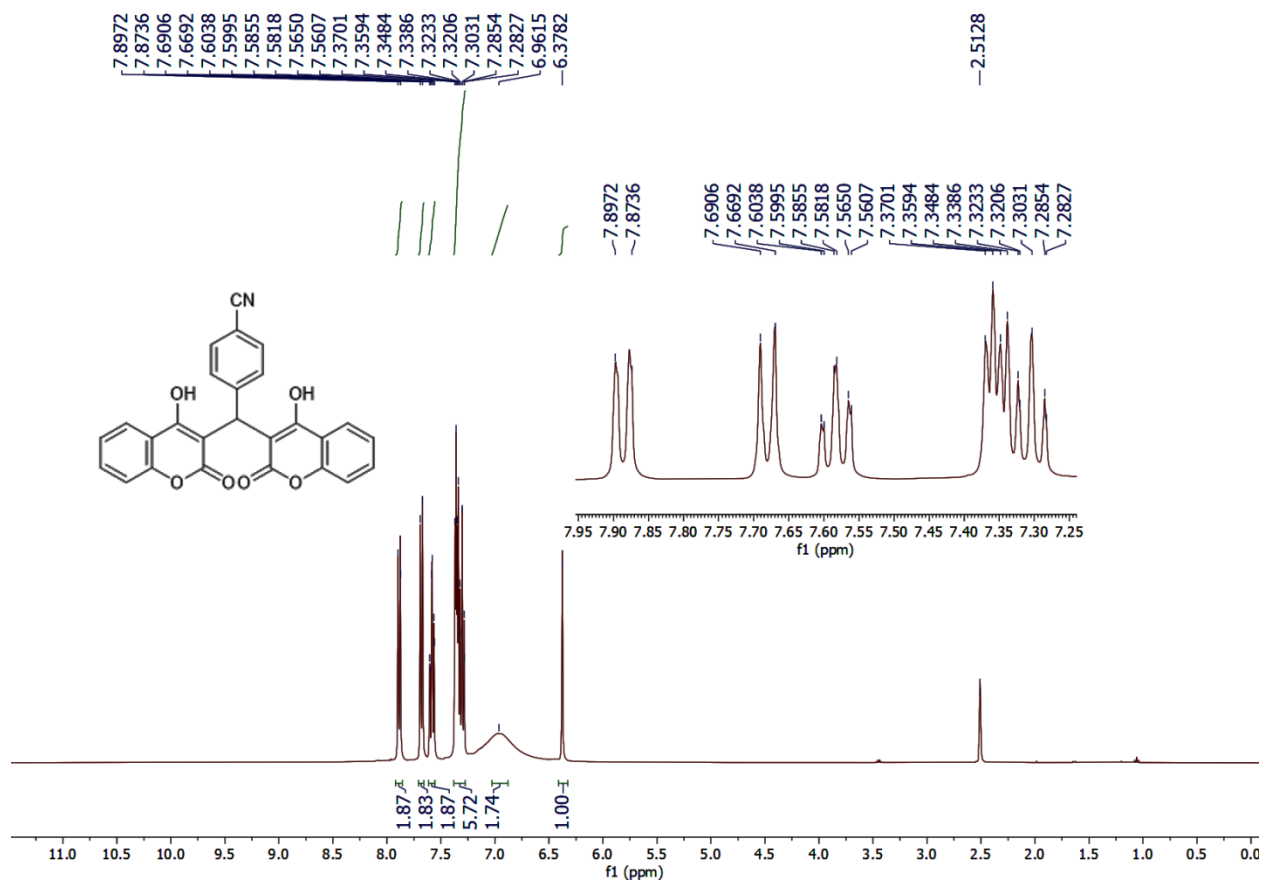
¹H NMR spectrum of 3,3'-((4-chlorophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4f**).



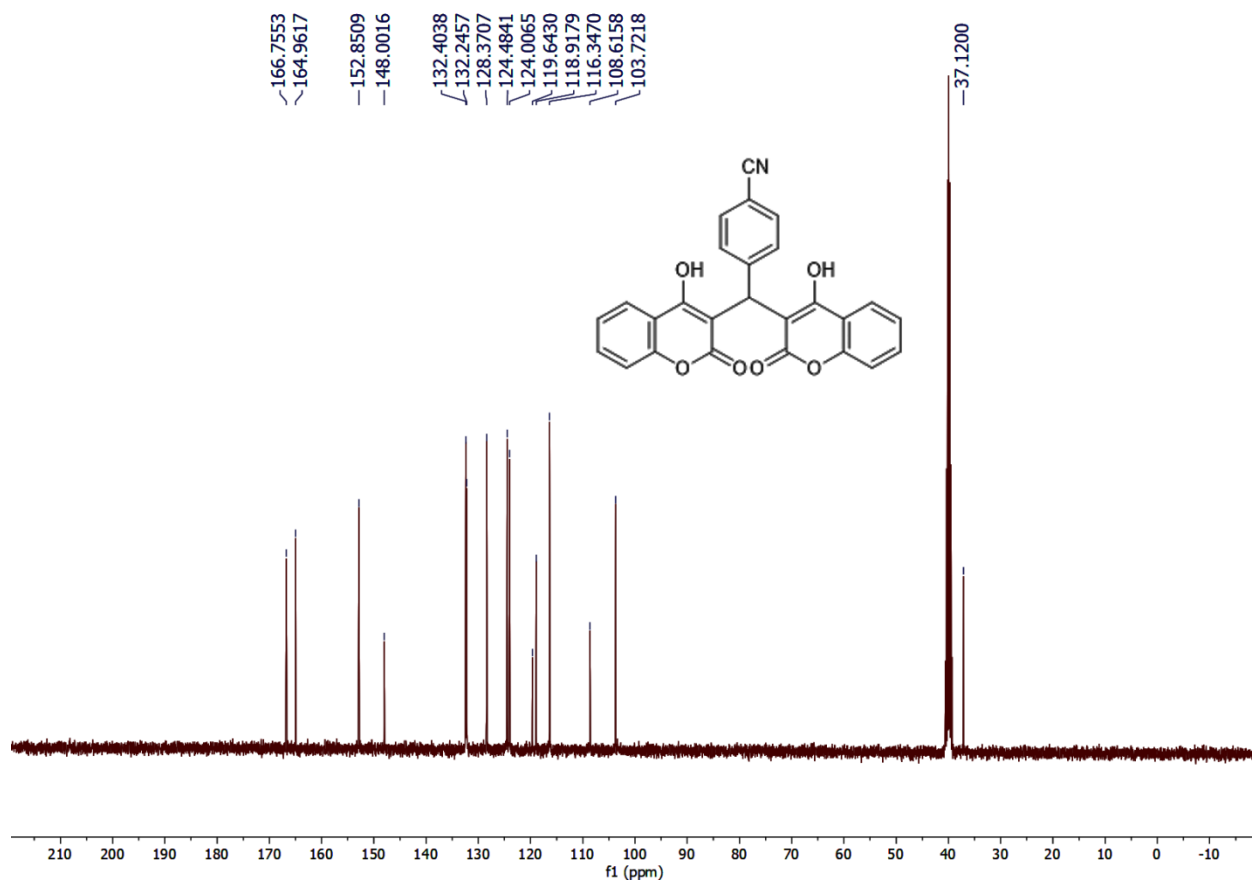
¹³C NMR spectrum of 3,3'-((4-chlorophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4f**).



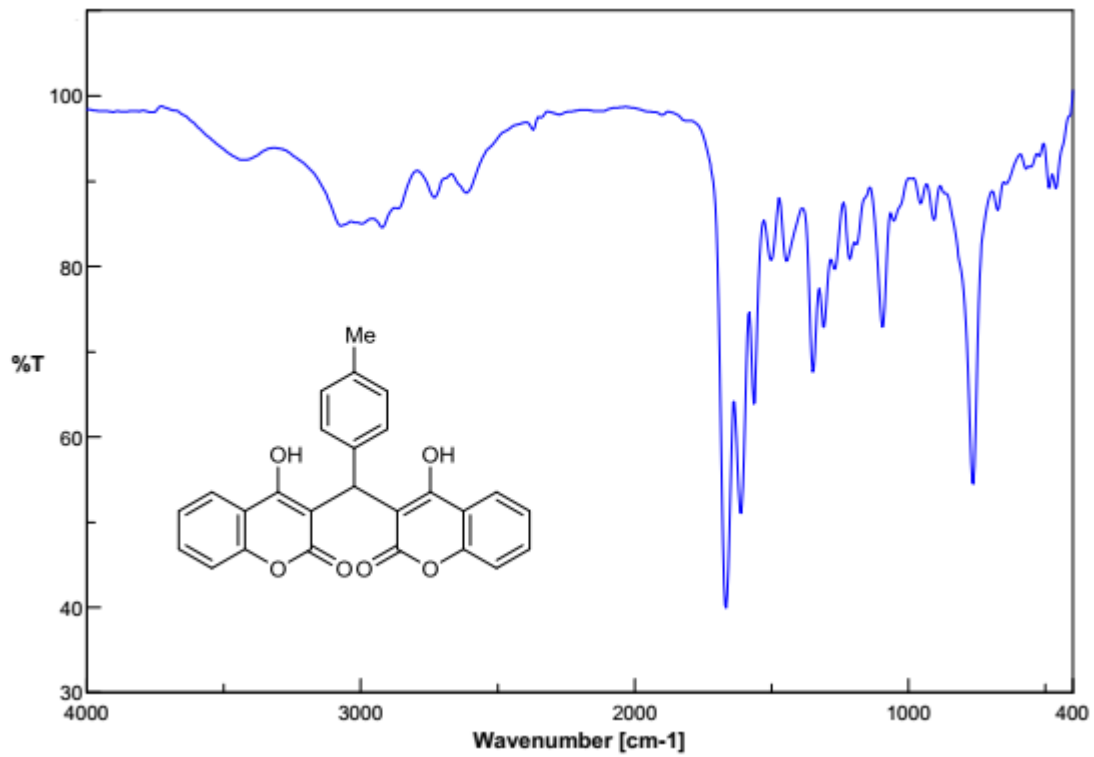
FT-IR spectrum of 4-(bis(4-hydroxy-2-oxo-2H-chromen-3-yl)methyl)benzonitrile (**4g**).



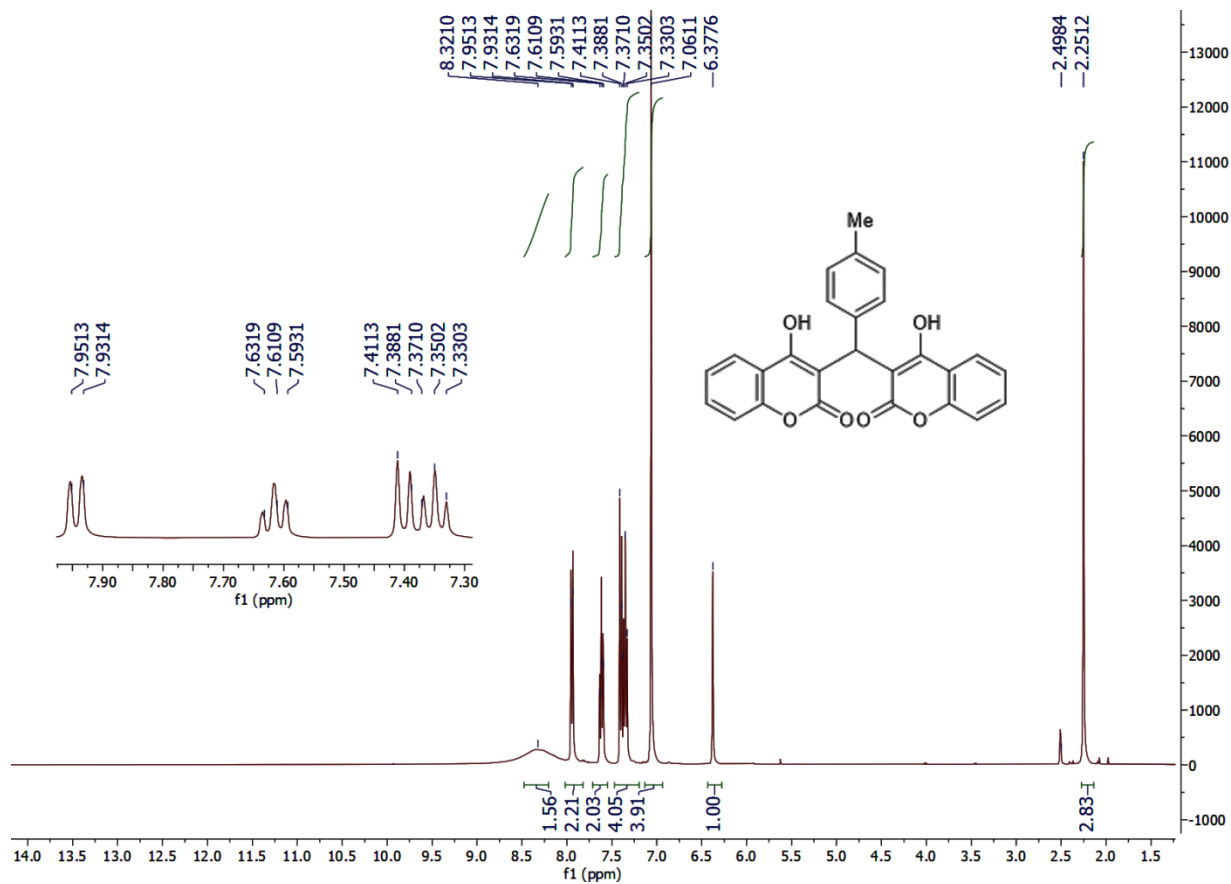
¹H NMR spectrum of 4-(bis(4-hydroxy-2-oxo-2H-chromen-3-yl)methyl)benzonitrile (**4g**).



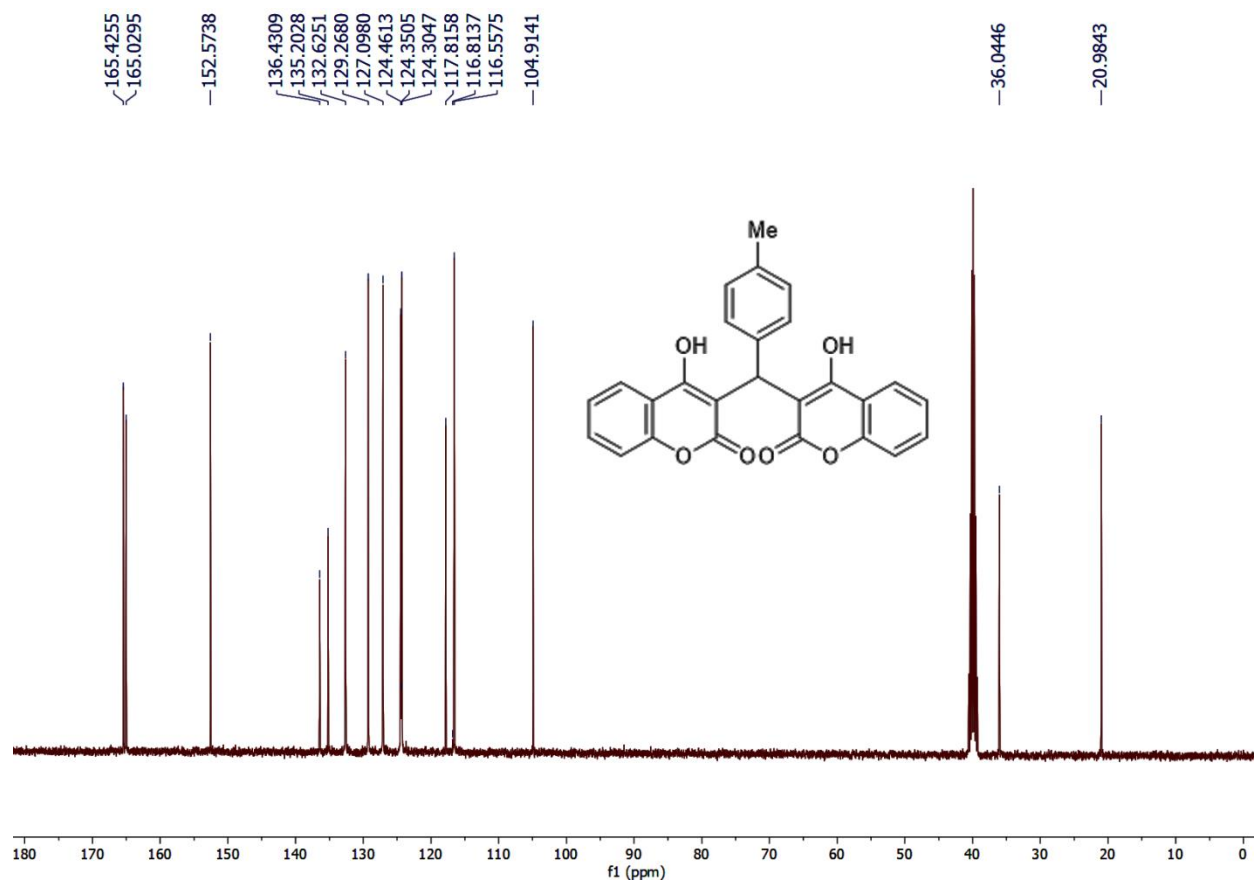
¹³C NMR spectrum of 4-(bis(4-hydroxy-2-oxo-2H-chromen-3-yl)methyl)benzotrile (**4g**).



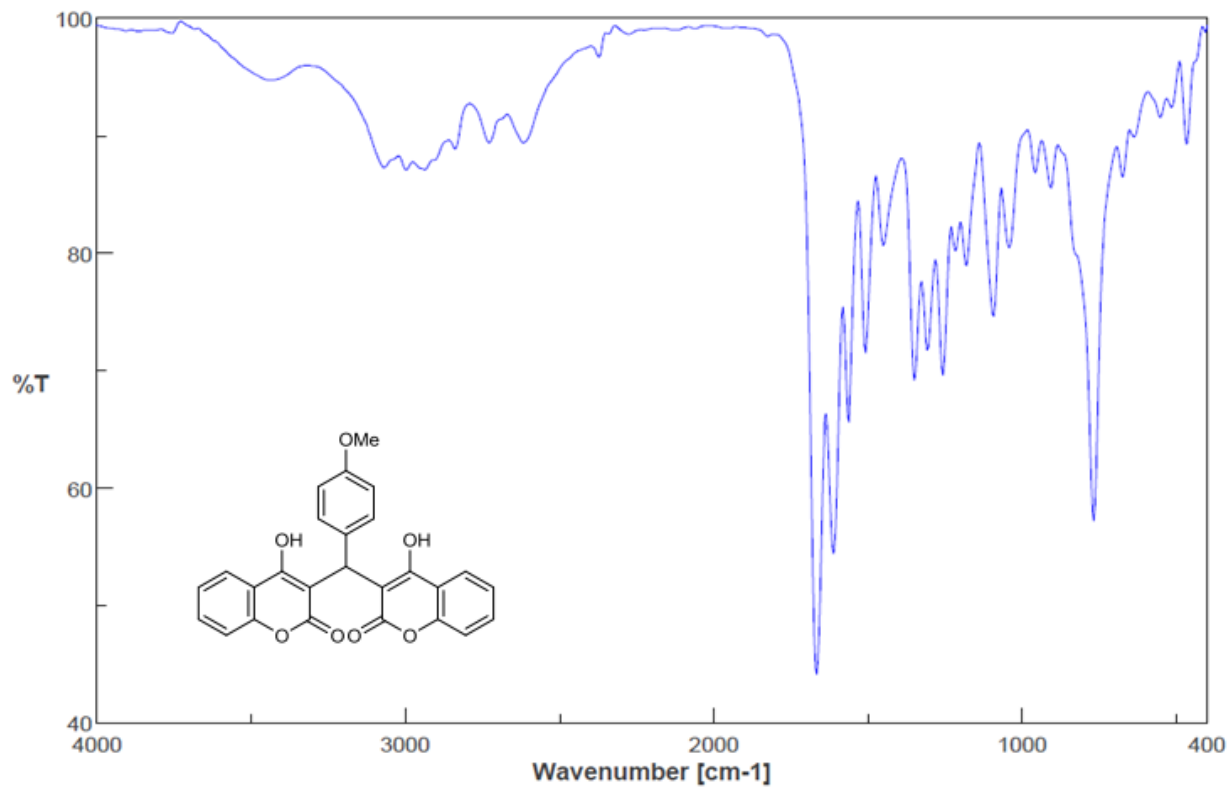
FT-IR spectrum of 3,3'-(p-tolylmethylene)bis(4-hydroxy-2H-chromen-2-one) (**4h**).



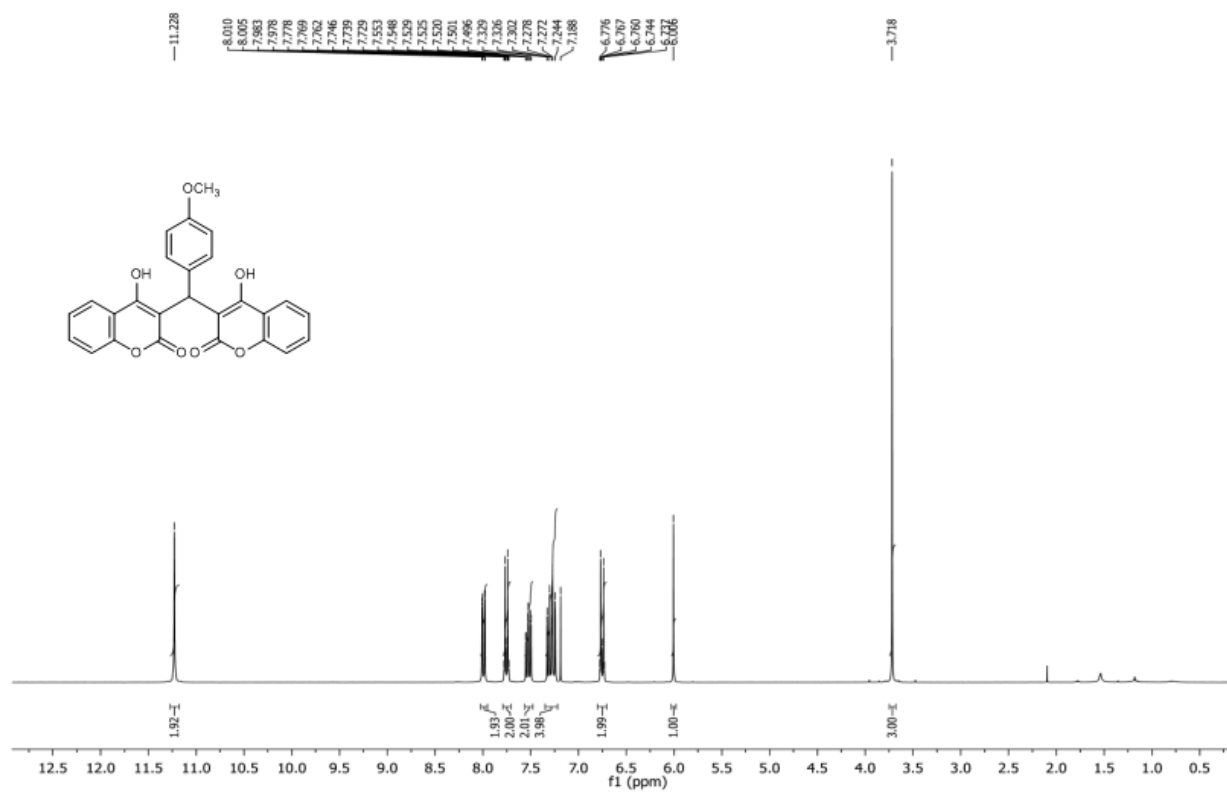
¹H NMR spectrum of 3,3'-(p-tolylmethylene)bis(4-hydroxy-2H-chromen-2-one) (**4h**).



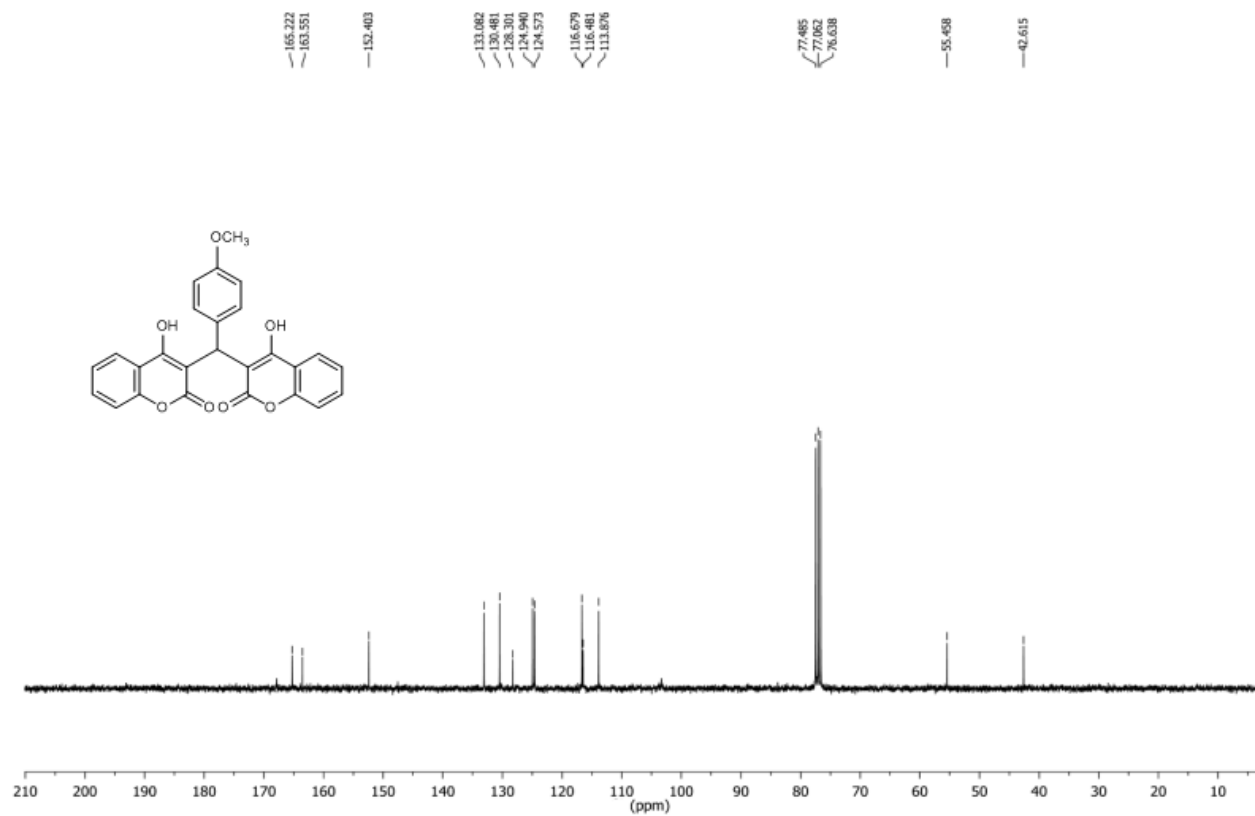
^{13}C NMR spectrum of 3,3'-(p-tolylmethylene)bis(4-hydroxy-2H-chromen-2-one) (**4h**).



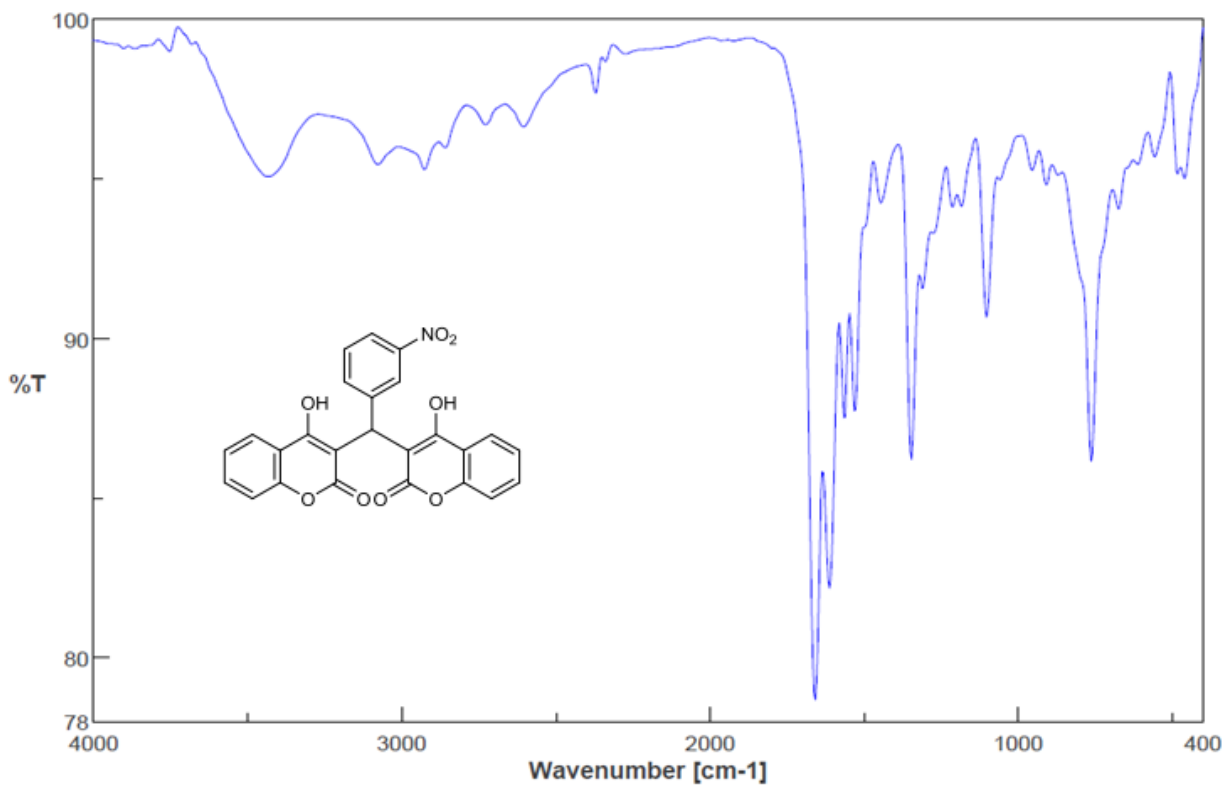
FT-IR spectrum of 3,3'-((4-methoxyphenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4i**).



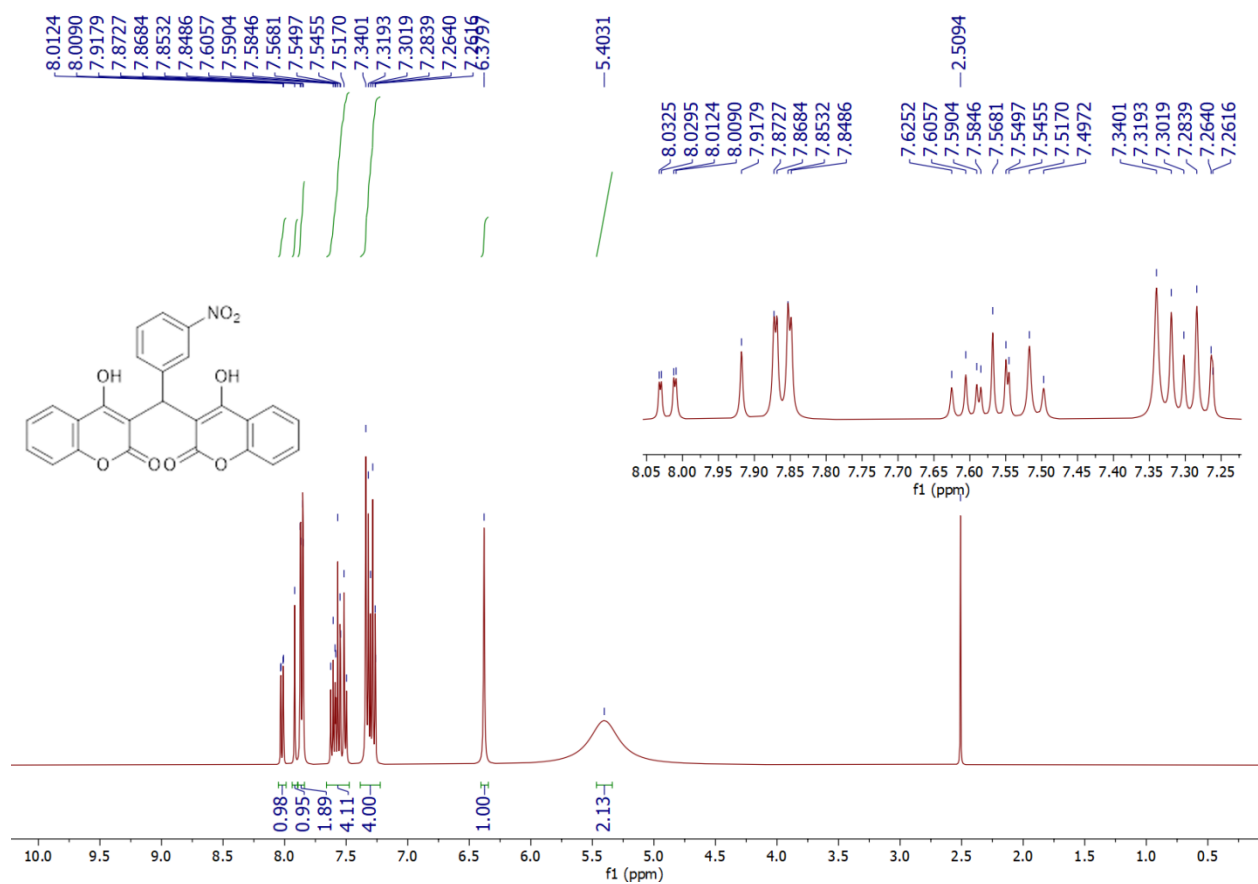
¹H NMR spectrum of 3,3'-((4-methoxyphenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4i**).



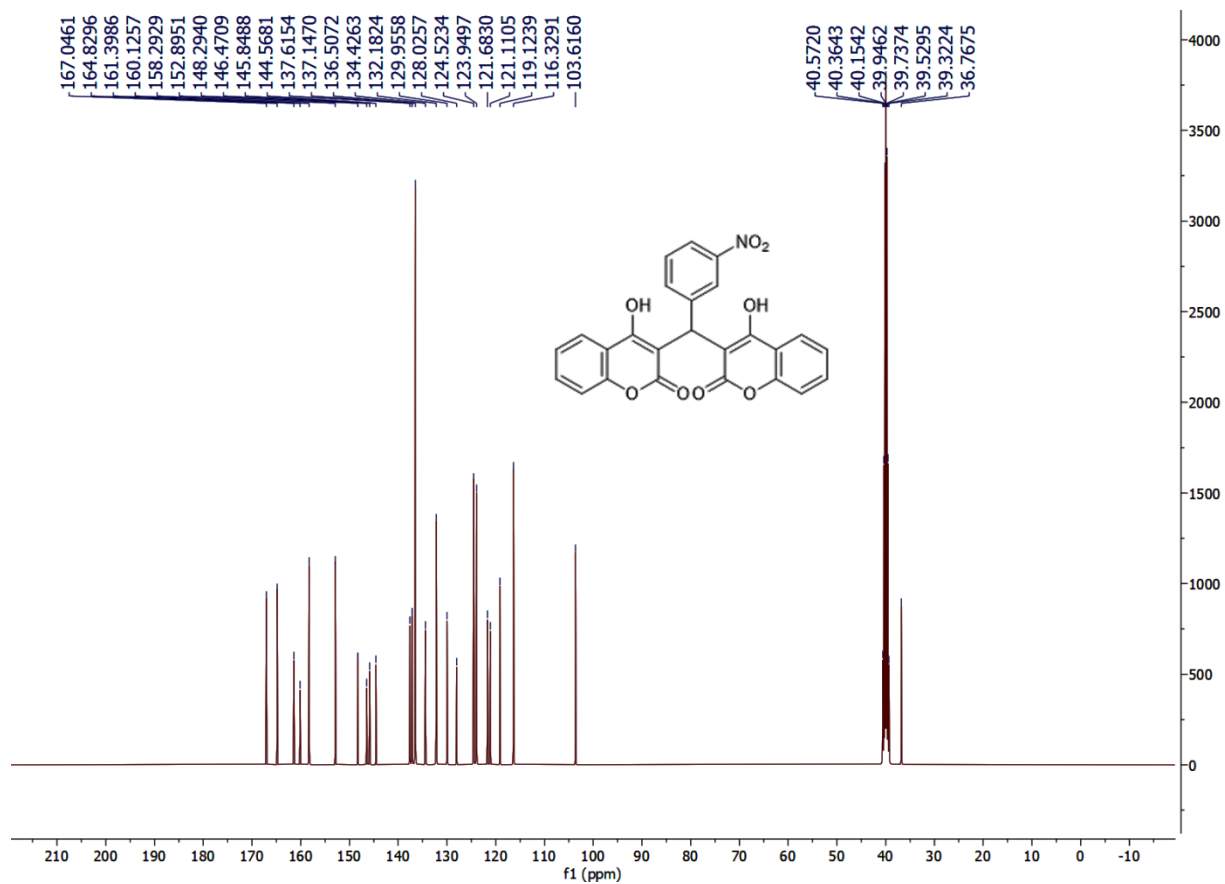
¹³C NMR spectrum of 3,3'-((4-methoxyphenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4i**).



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



¹H NMR spectrum of 3,3'-((3-nitrophenyl)methylene)bis(4-hydroxy-2H-chromen-2-one) (**4j**).



^{13}C NMR spectrum of 3,3'-(3-nitrophenyl)methylenebis(4-hydroxy-2H-chromen-2-one) (**4j**).