catalysts

MDPI

Supplementary Materials

New In Situ Catalysts Based on Nitro Functional Pyrazole Derivatives and Copper (II) Salts for Promoting Oxidation of Catechol to *o*-Quinone

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1. Characterization

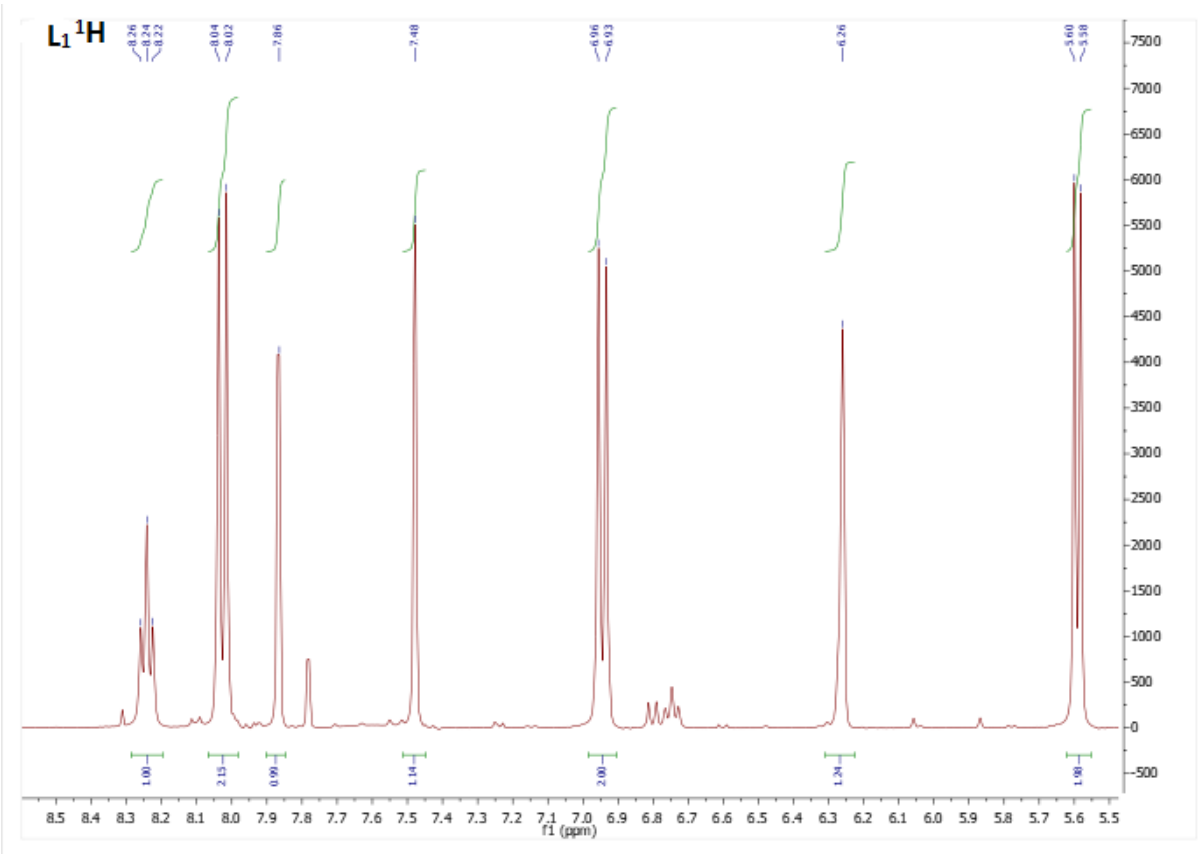

Figure S1. ^{1}H NMR spectrum of **L**$_{1}$ in DMSO (400 MHz).

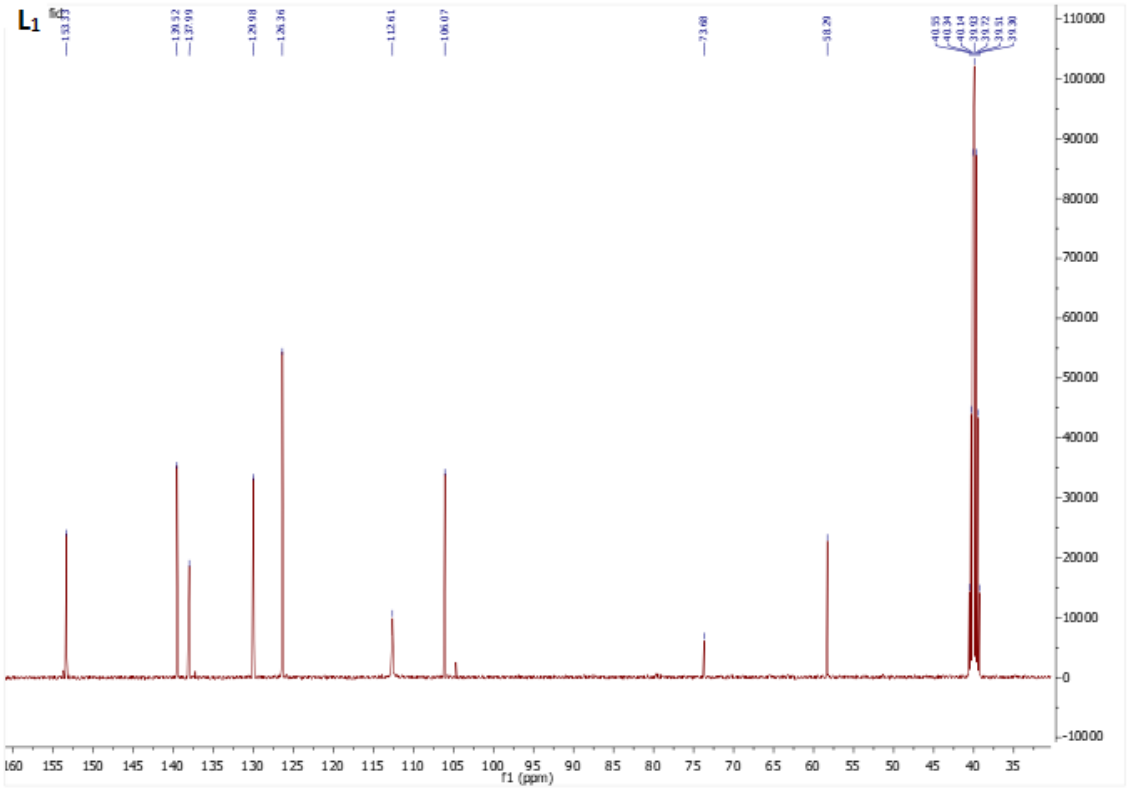

Figure S2. ^{13}C NMR spectrum of **L**1 in DMSO (400 MHz).

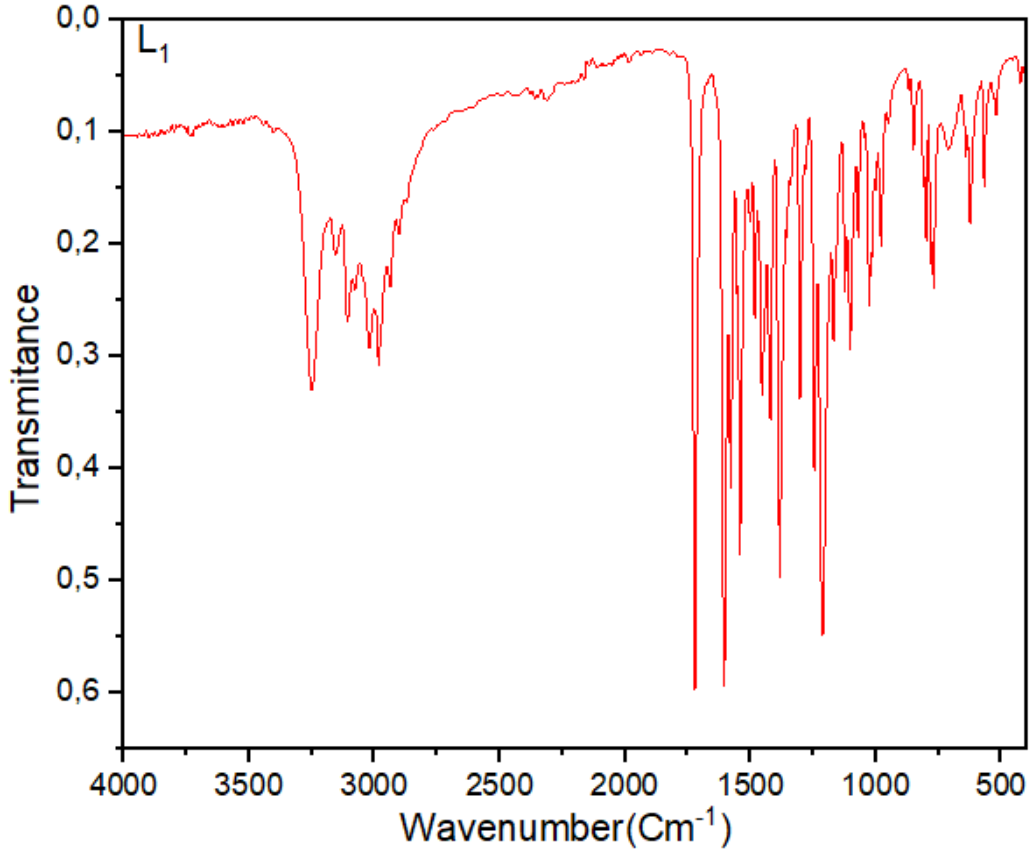

Figure S3. FT-IR spectrum of **L**1.

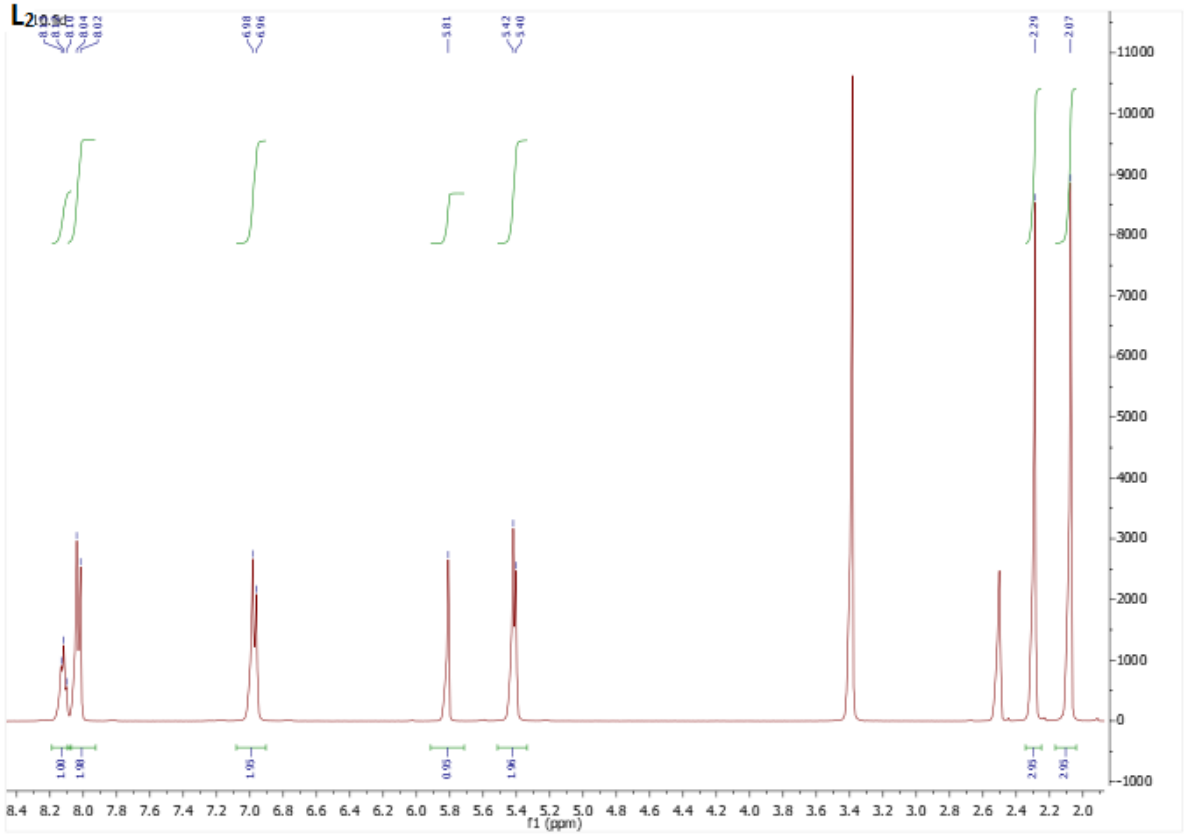

Figure S4. [1]H NMR spectrum of **L2** in DMSO (400 MHz).

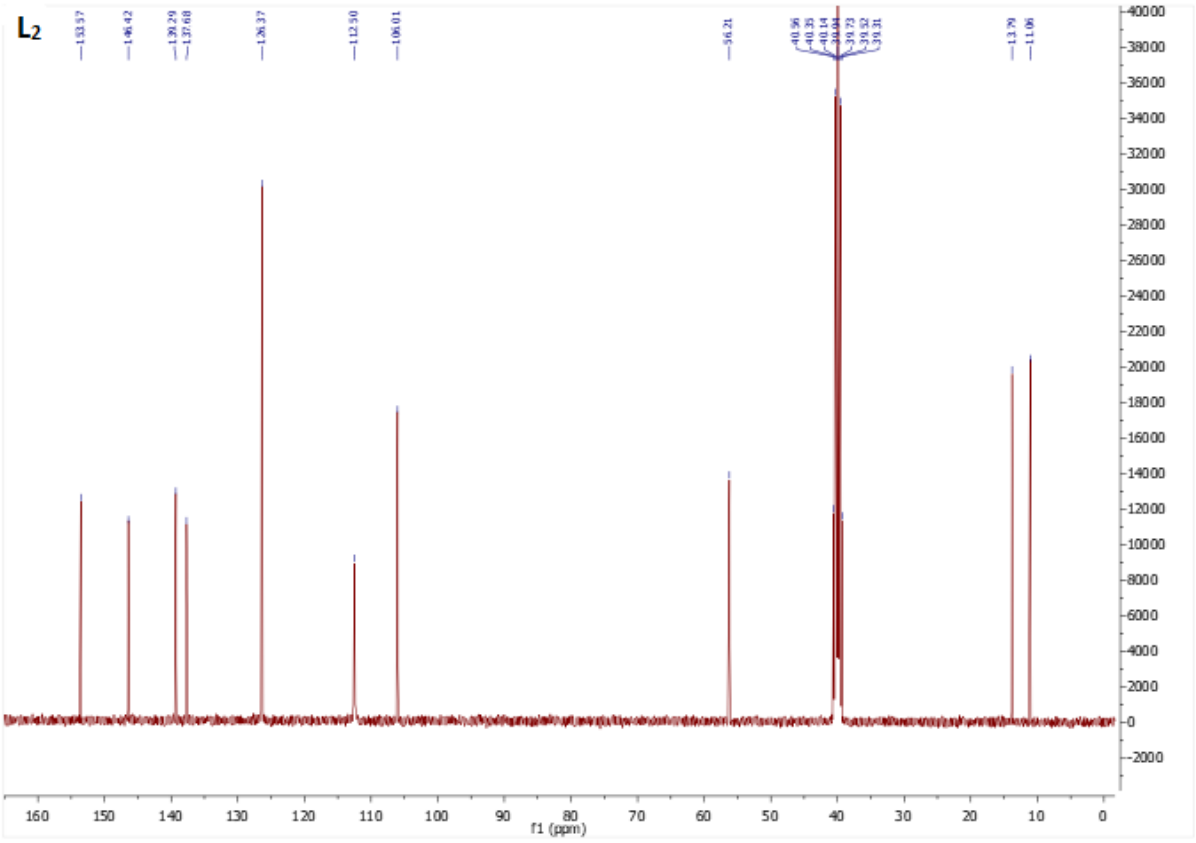

Figure S5. [13]C NMR spectrum of **L2** in DMSO (400 MHz).

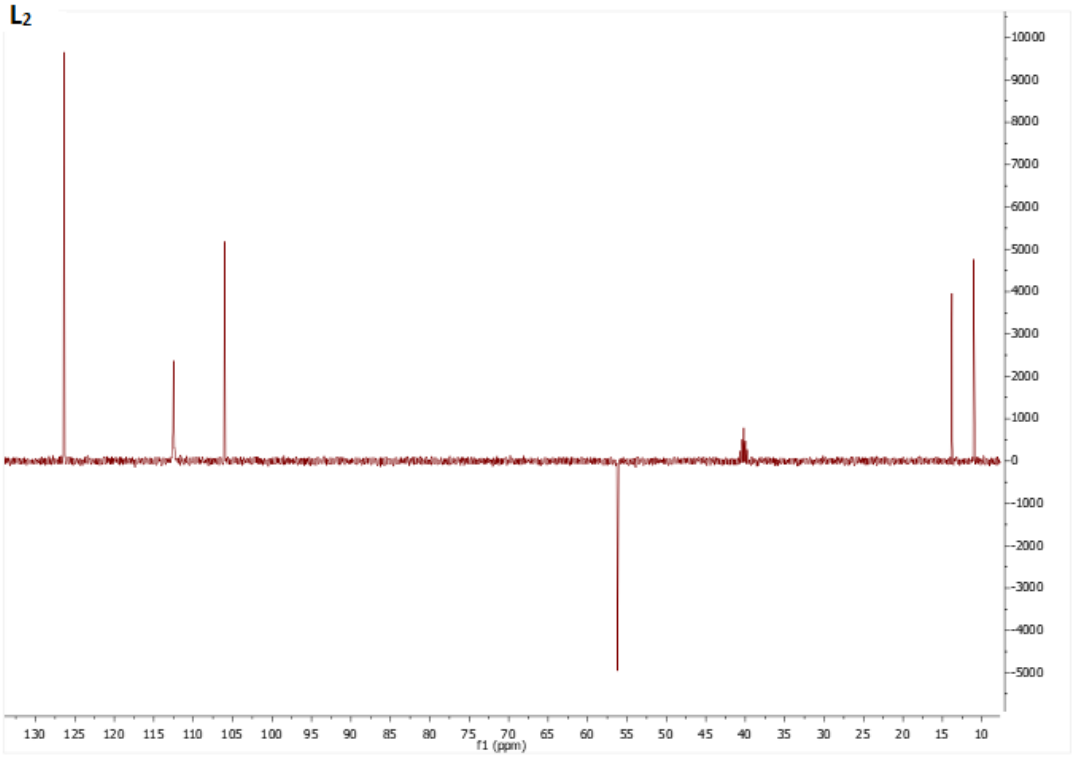

Figure S6. DEPT- 135 NMR spectrum of **L2** in DMSO (400 MHz).

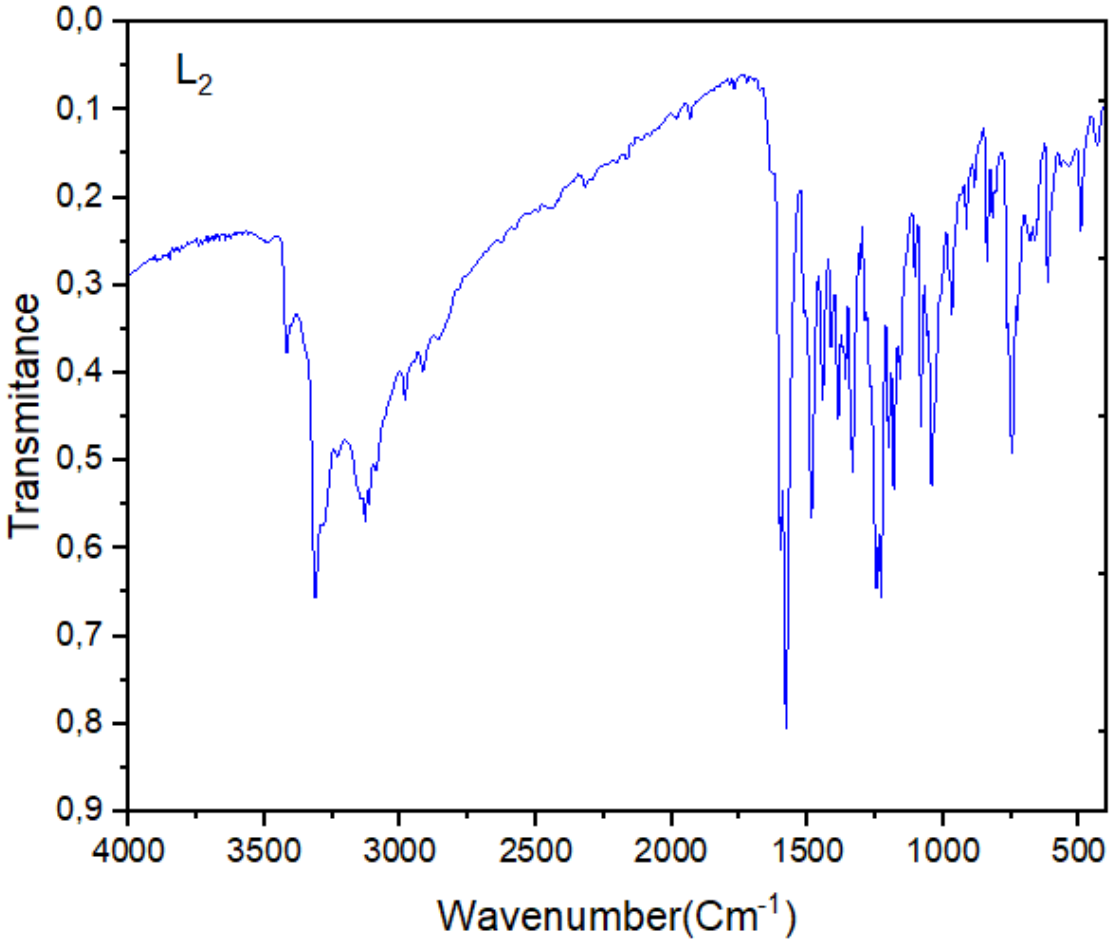

Figure S7. FT-IR spectrum of **L2**.

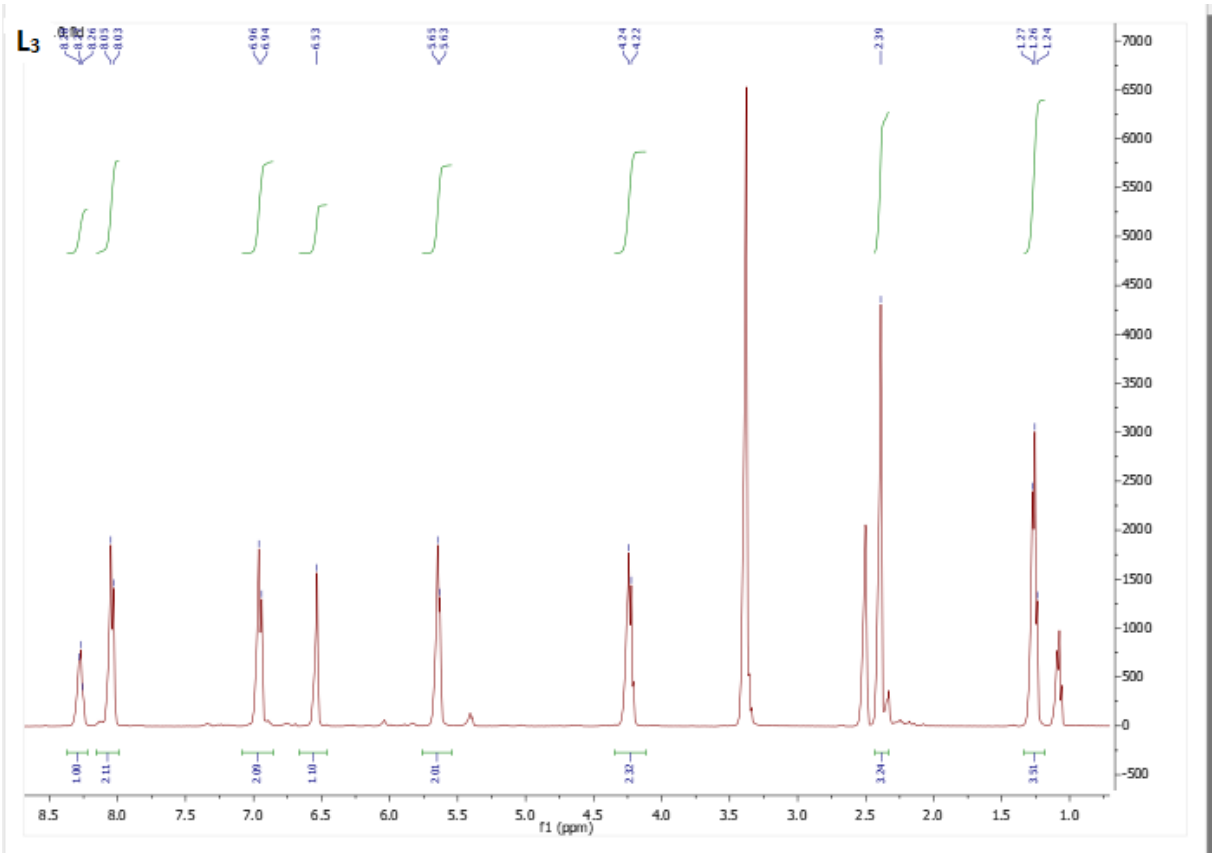

Figure S8. ^{1}H NMR spectrum of **L**$_3$ in DMSO (400 MHz).

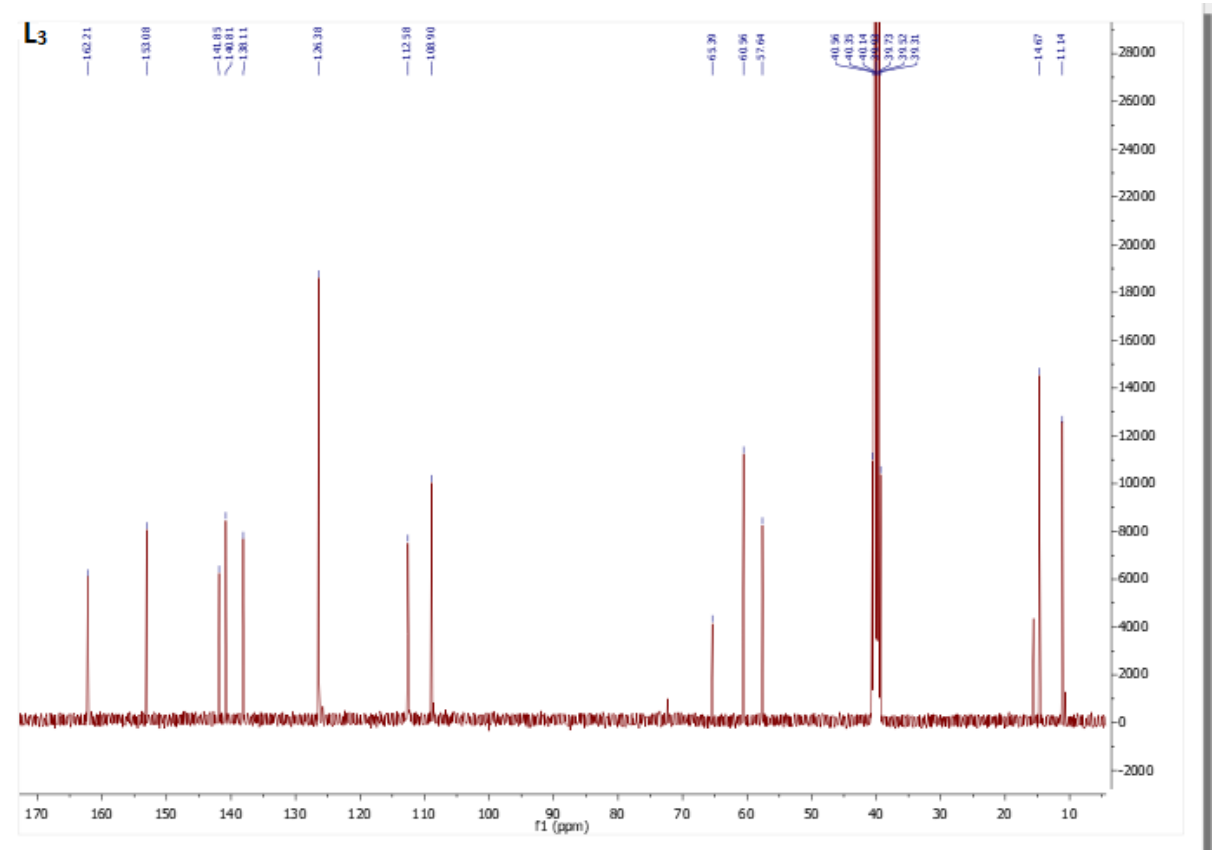

Figure S9. ^{13}C NMR spectrum of **L**$_3$ in DMSO (400 MHz).

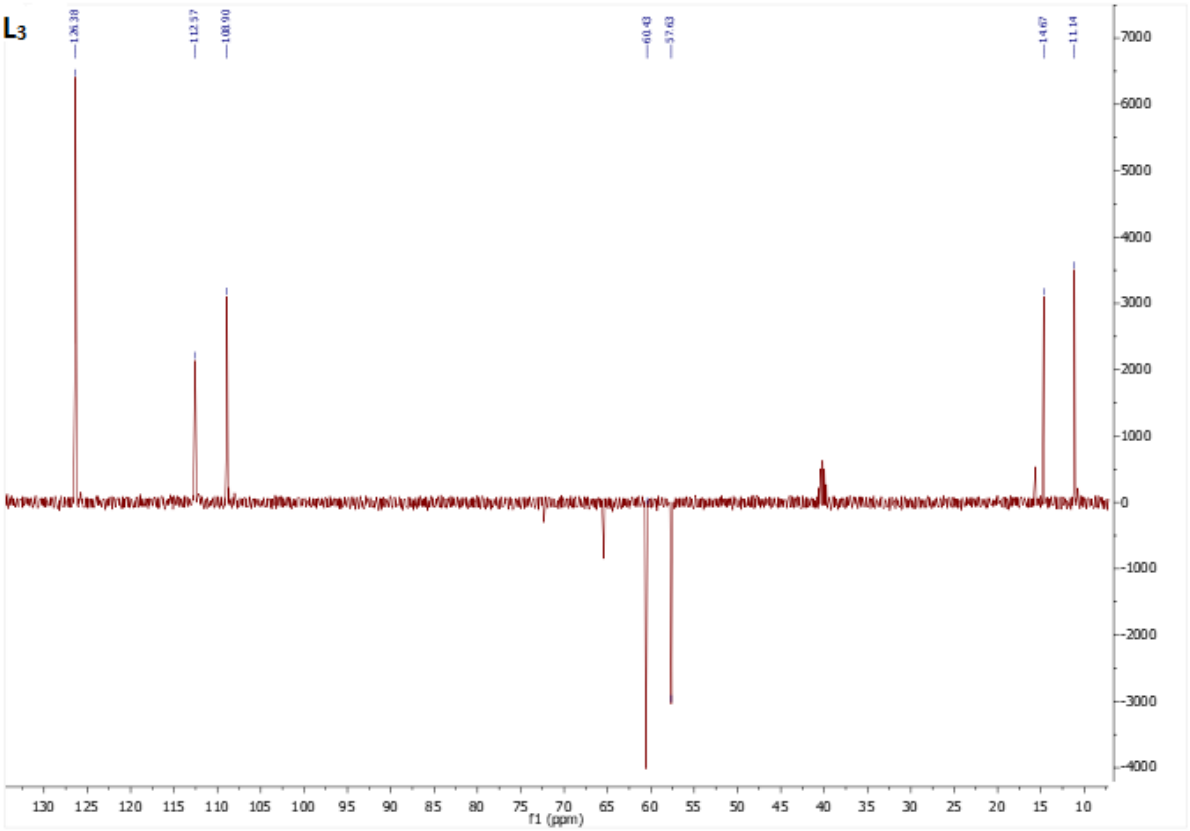

Figure S10. DEPT- 135 NMR spectrum of **L**3 in DMSO (400 MHz).

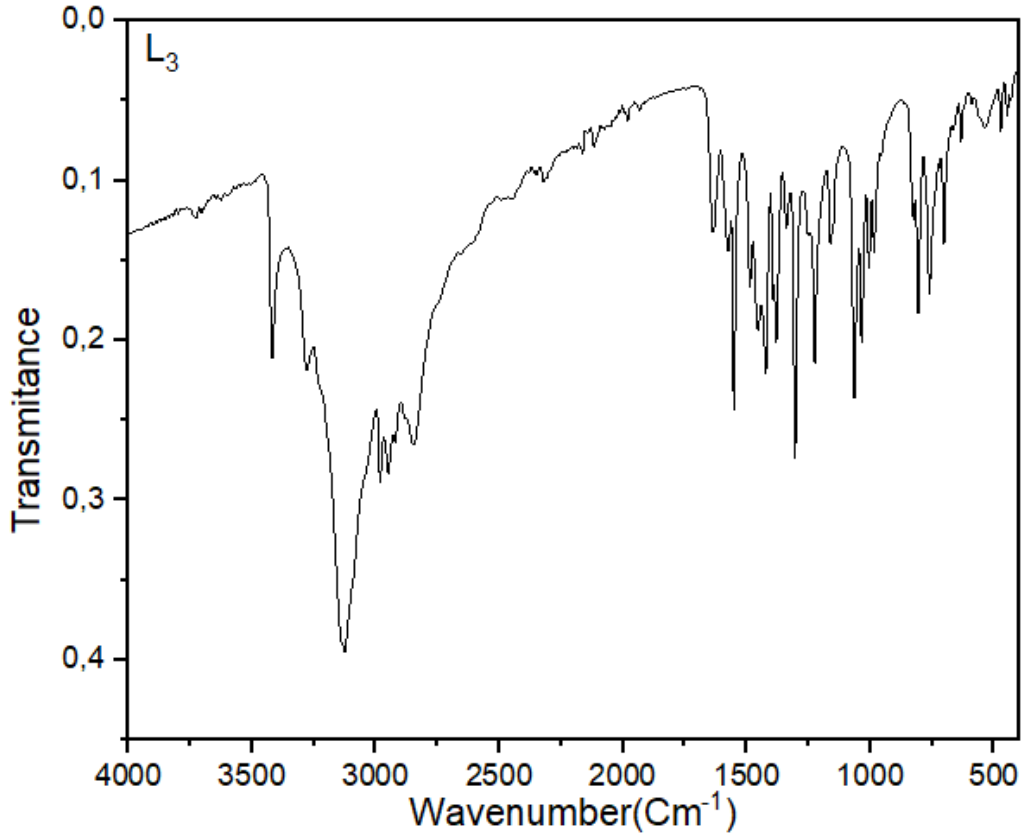

Figure S11. FT-IR spectrum of **L**3.

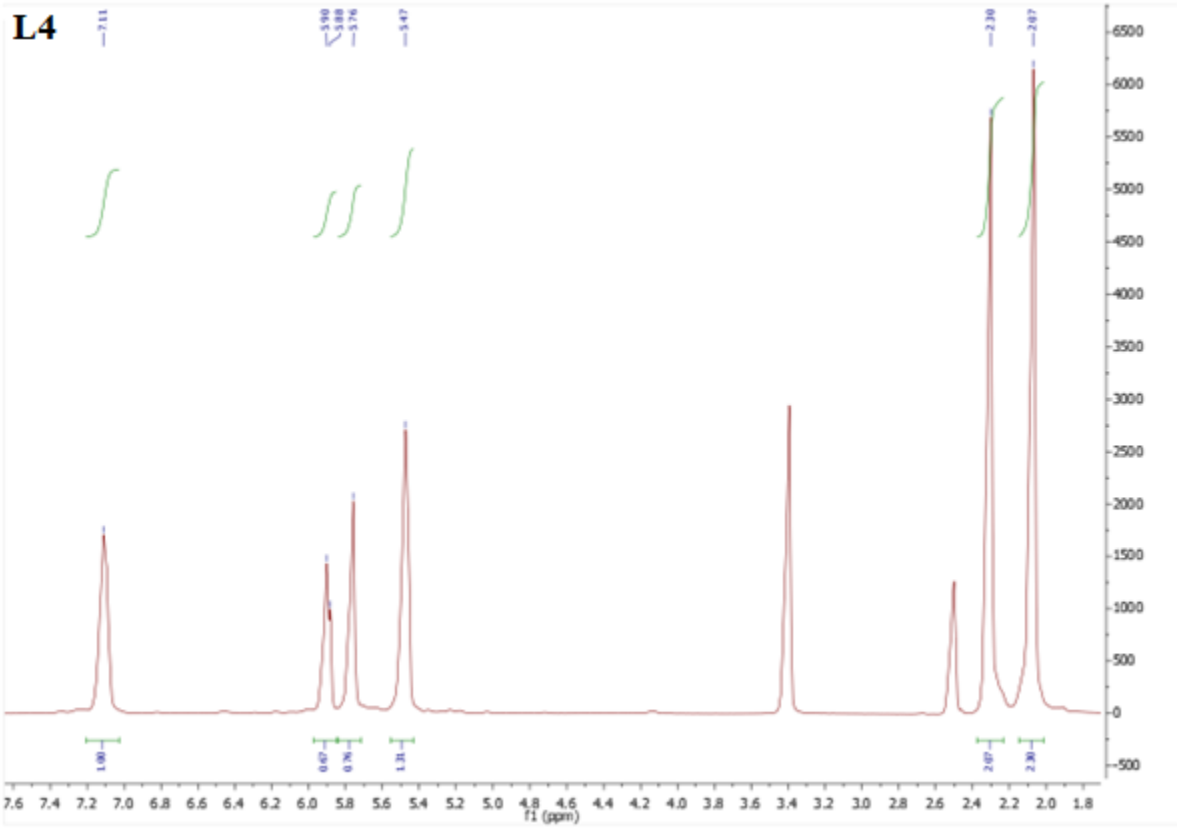

Figure S12. ^{1}H NMR spectrum of **L**$_4$ in DMSO (400 MHz).

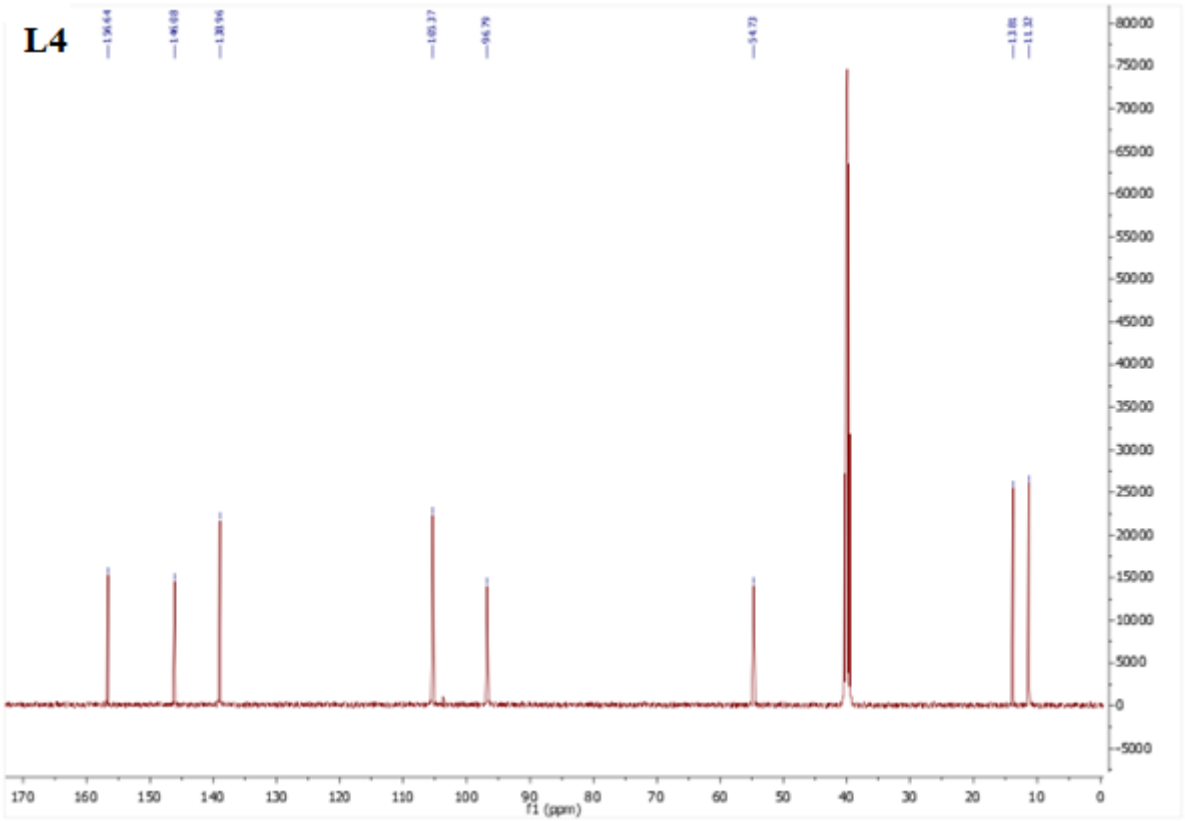

Figure S13. ^{13}C NMR spectrum of **L**$_4$ in DMSO (400 MHz).

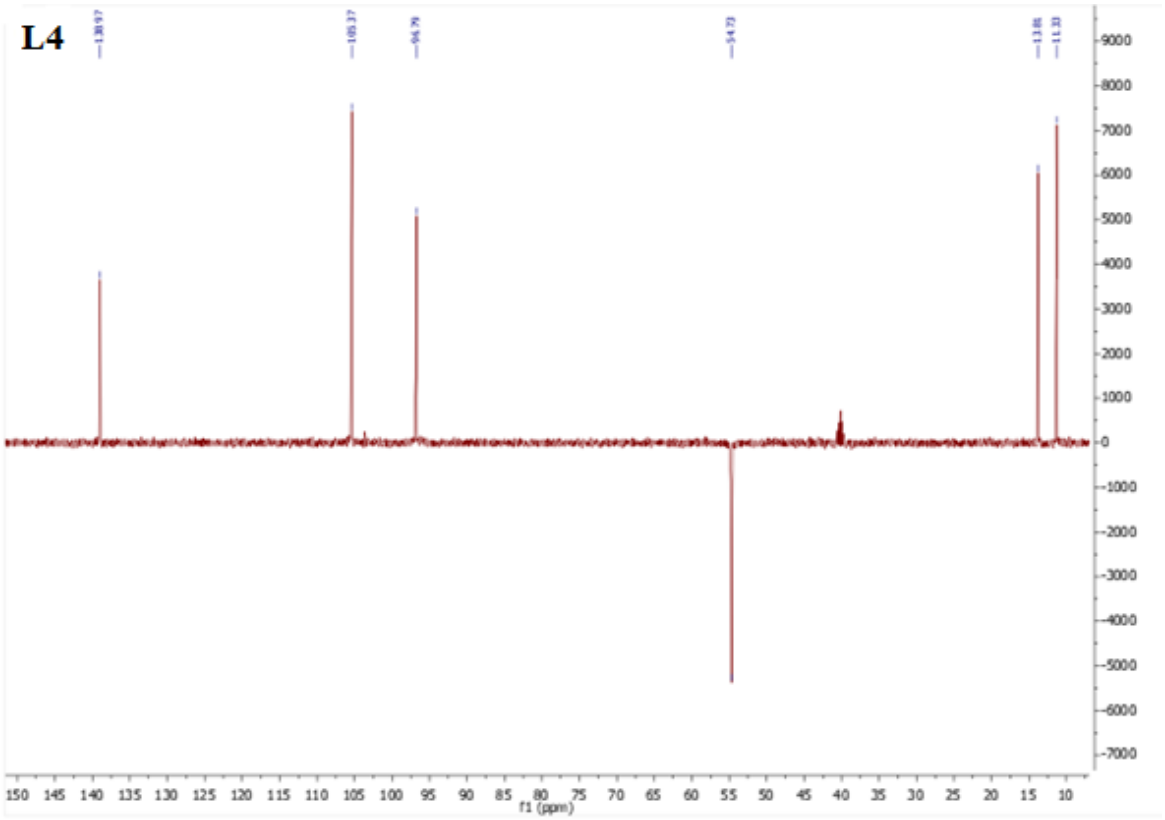

Figure S14. ^{13}C NMR spectrum of **L4** in DMSO (400 MHz).

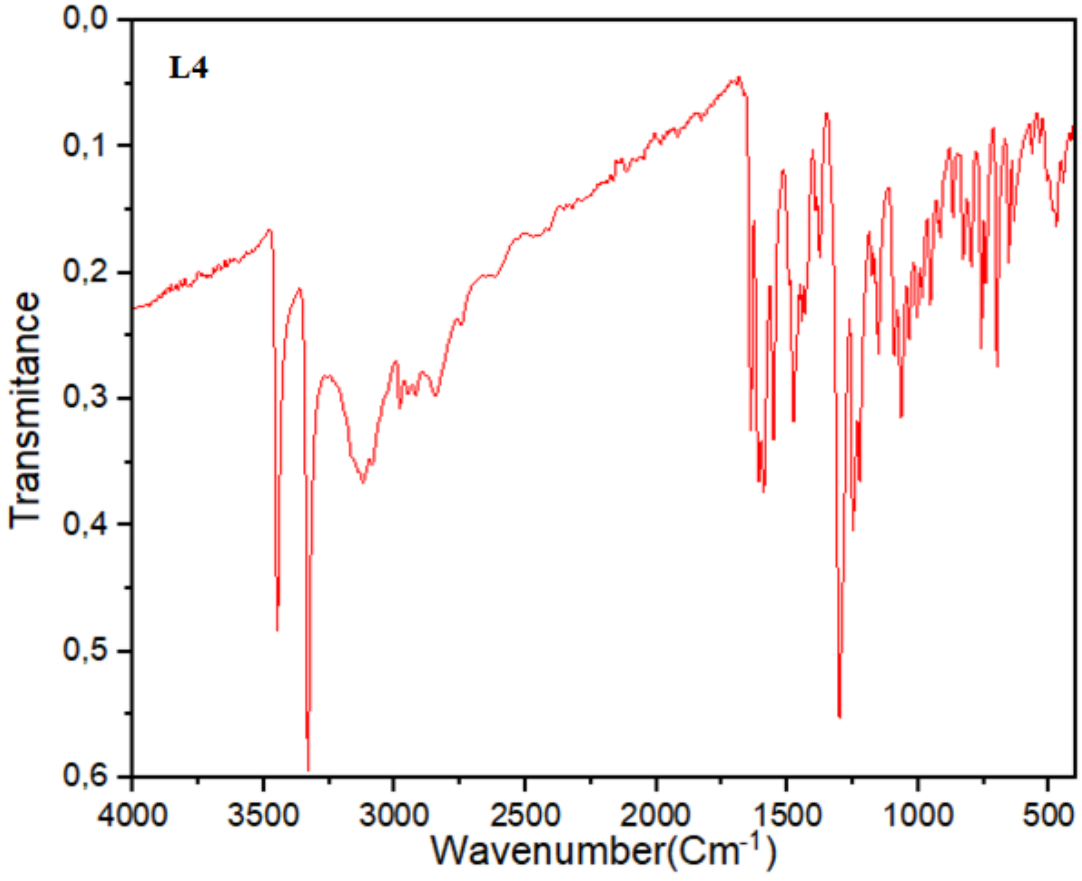

Figure S15. FT-IR spectrum of **L4**.

2. Effect of concentration

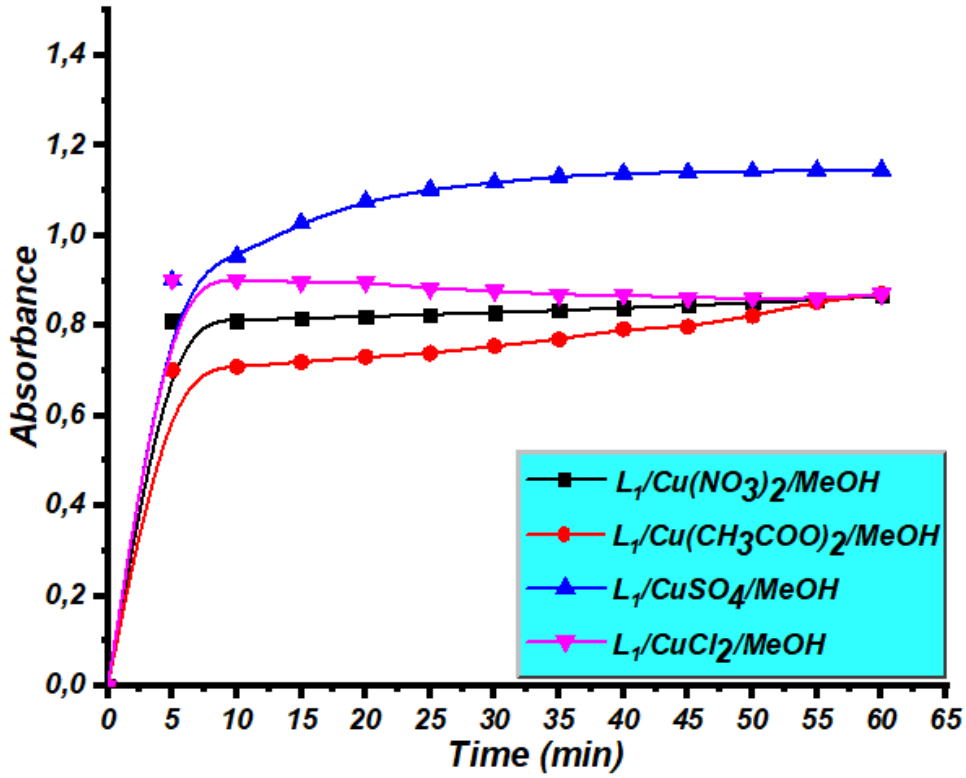

Figure S16. Absorbance evolution of *o*-quinone in presence of complexes formed by **L**1 and different copper salts in MeOH.

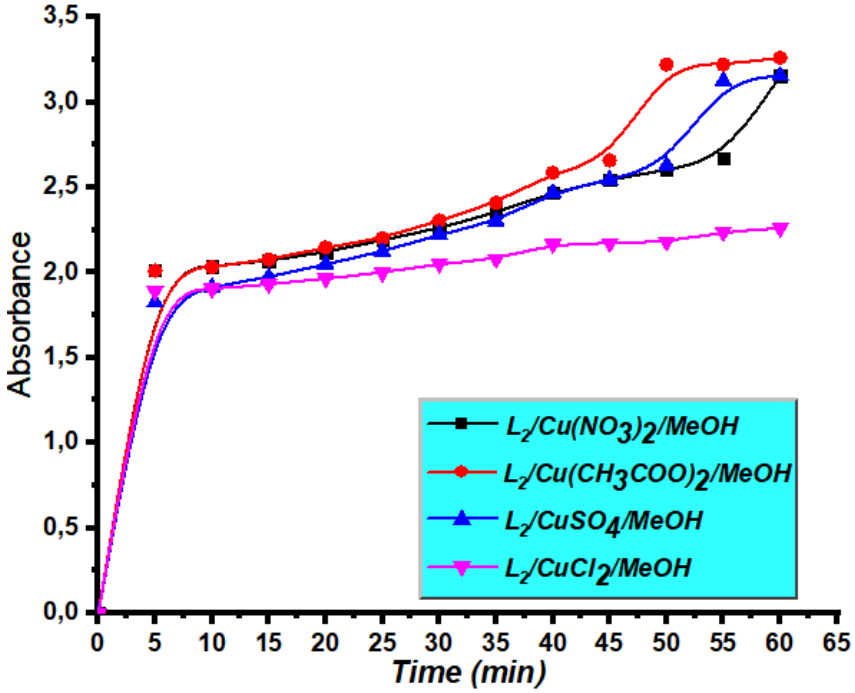

Figure S17. Absorbance evolution of *o*-quinone in presence of complexes formed by **L**2 and different copper salts in MeOH.

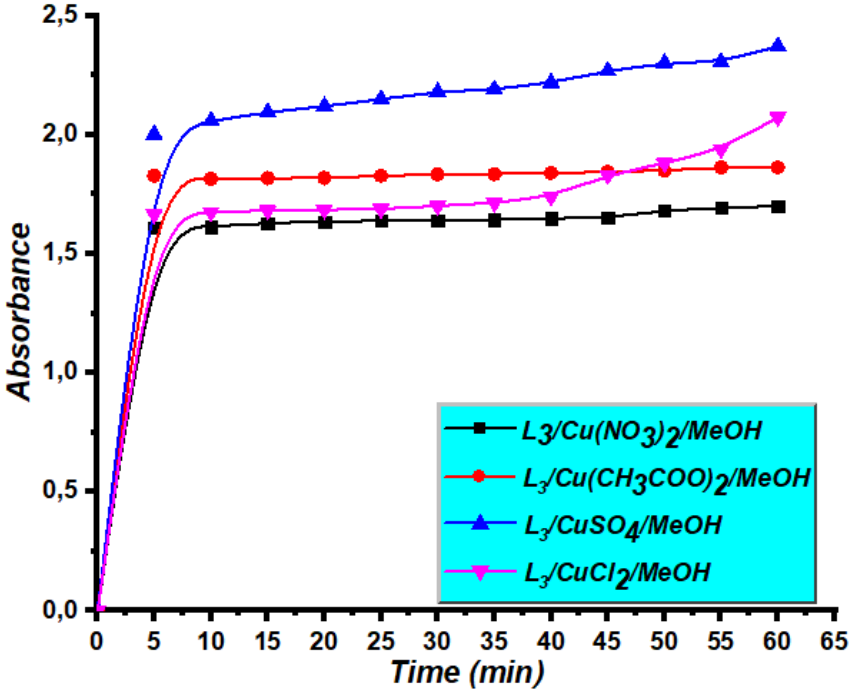

Figure S18. Absorbance evolution of *o*-quinone in presence of complexes formed by L3 and different copper salts in MeOH.

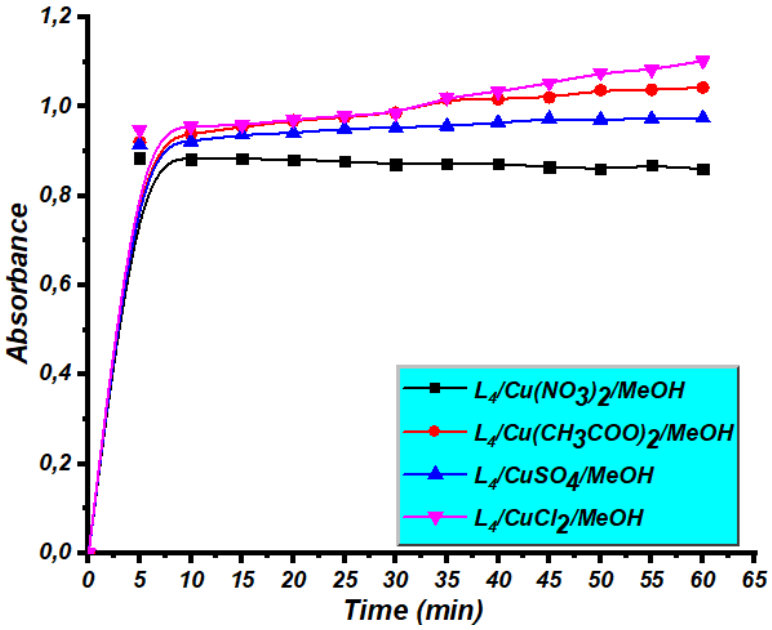

Figure S19. Absorbance evolution of *o*-quinone in presence of complexes formed by L4 and different copper salts in MeOH.

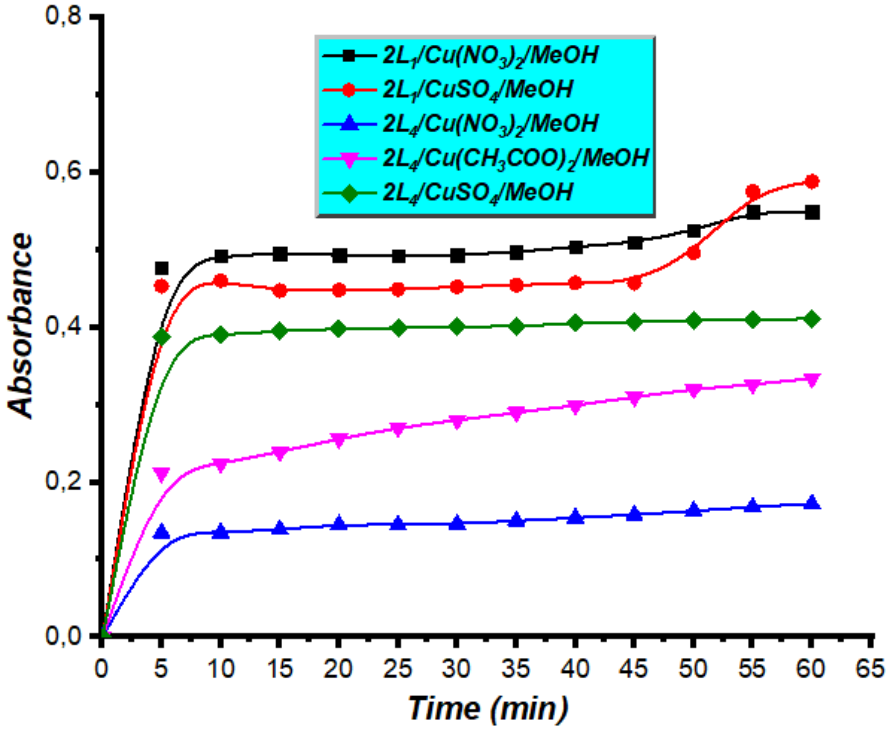

Figure S20. Absorbance evolution of *o*-quinone in presence of complexes formed by **L**1 and **L**4 with different copper salts in MeOH.

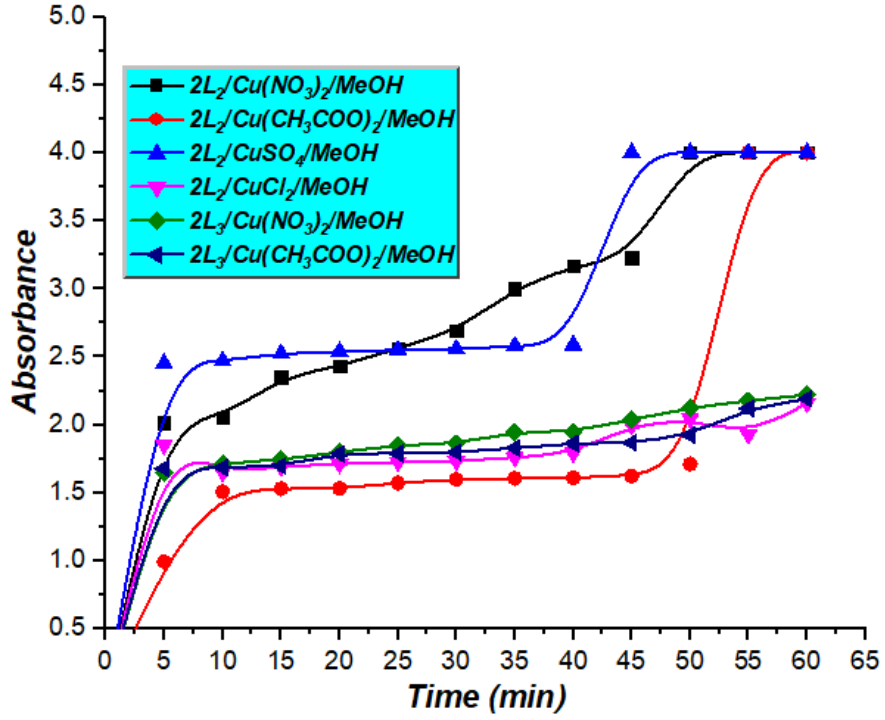

Figure S21. Absorbance evolution of *o*-quinone in presence of complexes formed by **L**2 and **L**3 with different copper salts in MeOH.

3. Solvent effect

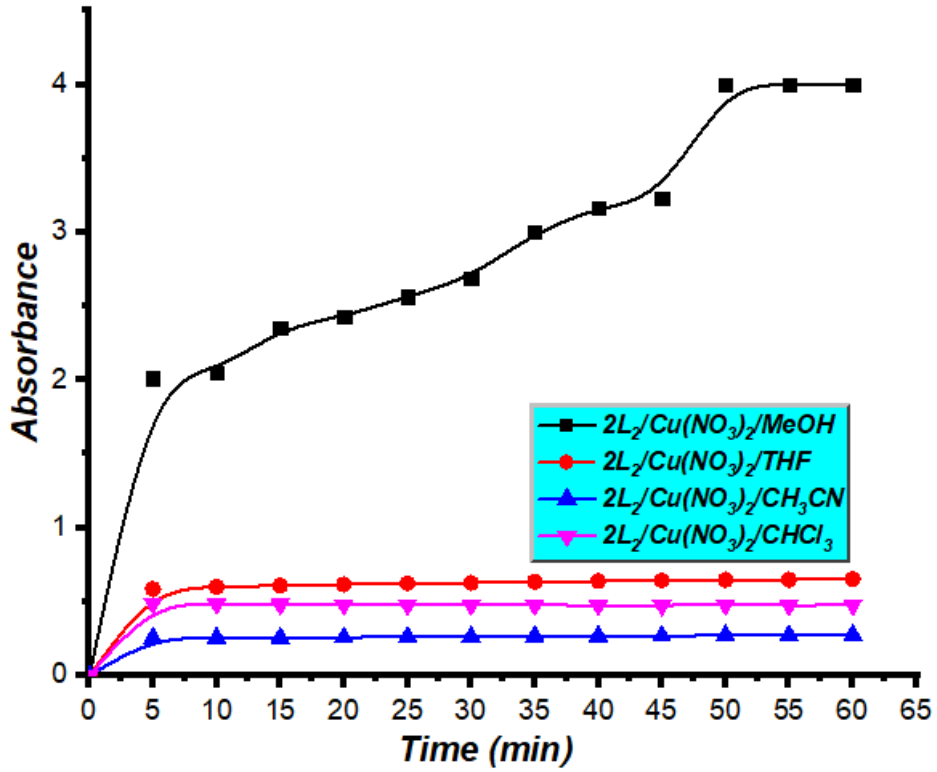

Figure S22. Absorbance evolution of *o*-quinone in presence of complexes formed by 2**L**2/Cu(NO3)2 in different solvents.

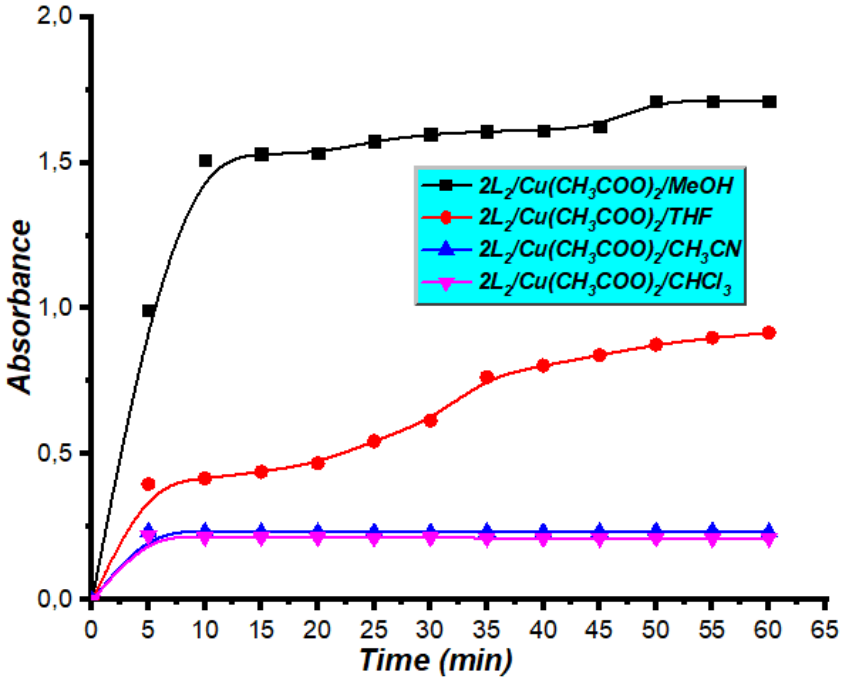

Figure S23. Absorbance evolution of *o*-quinone in presence of complexes formed by 2**L**2/Cu(CH3COO)2 in different solvents.

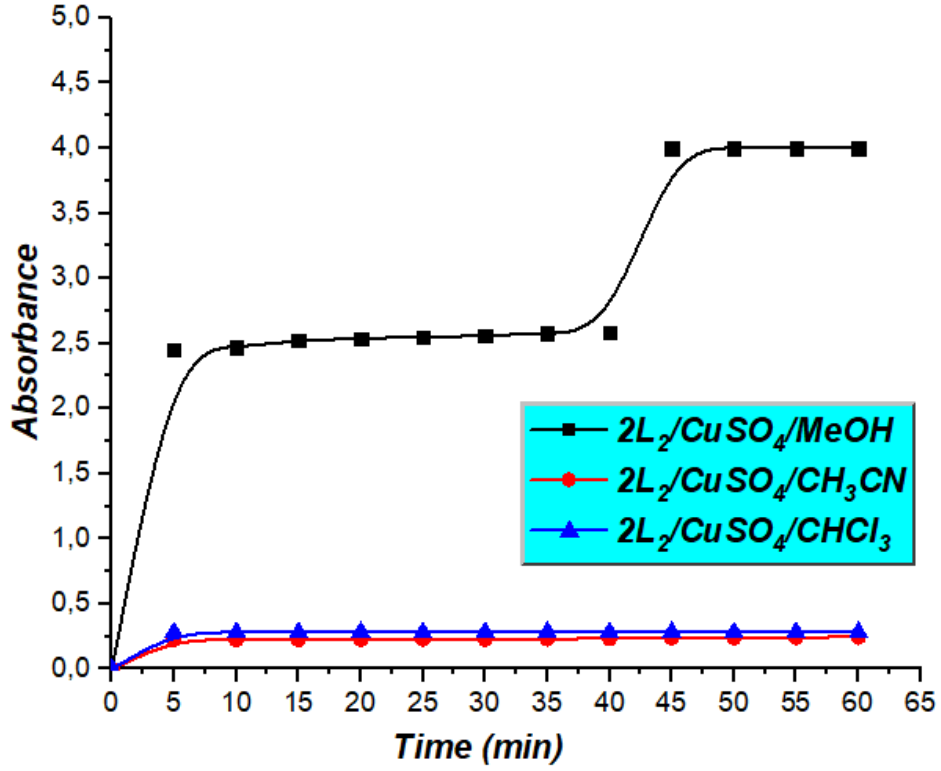

Figure S24. Absorbance evolution of *o*-quinone in presence of complexes formed by 2**L**2/CuCuSO4 in different solvents.

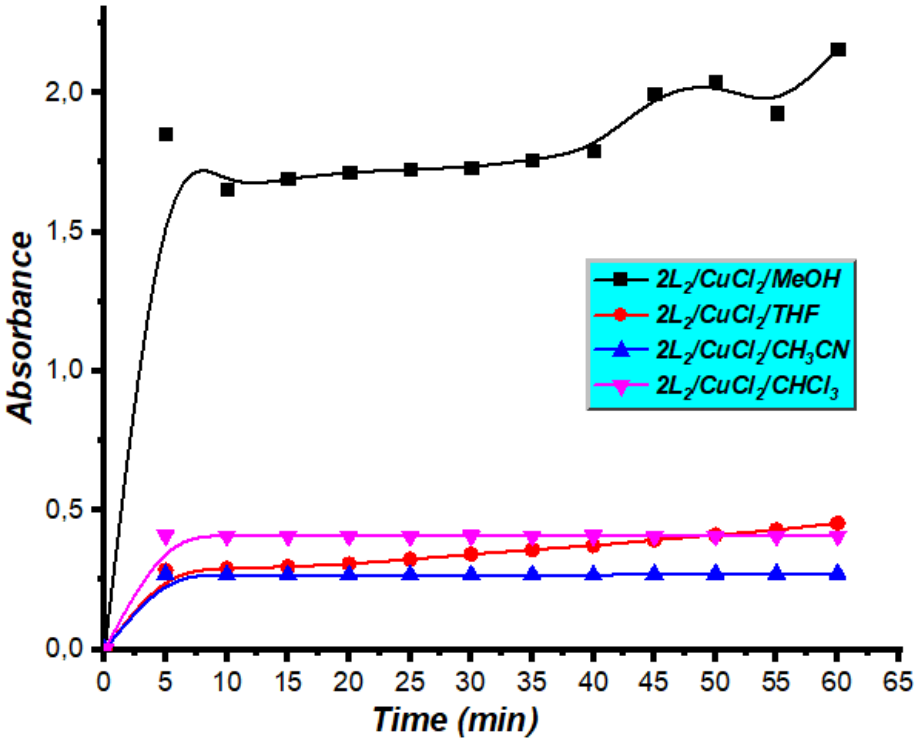

Figure S25. Absorbance evolution of **o-quinone** in presence of complexes formed by 2**L**2/CuCl2 in different solvents.

4. Kinetic study

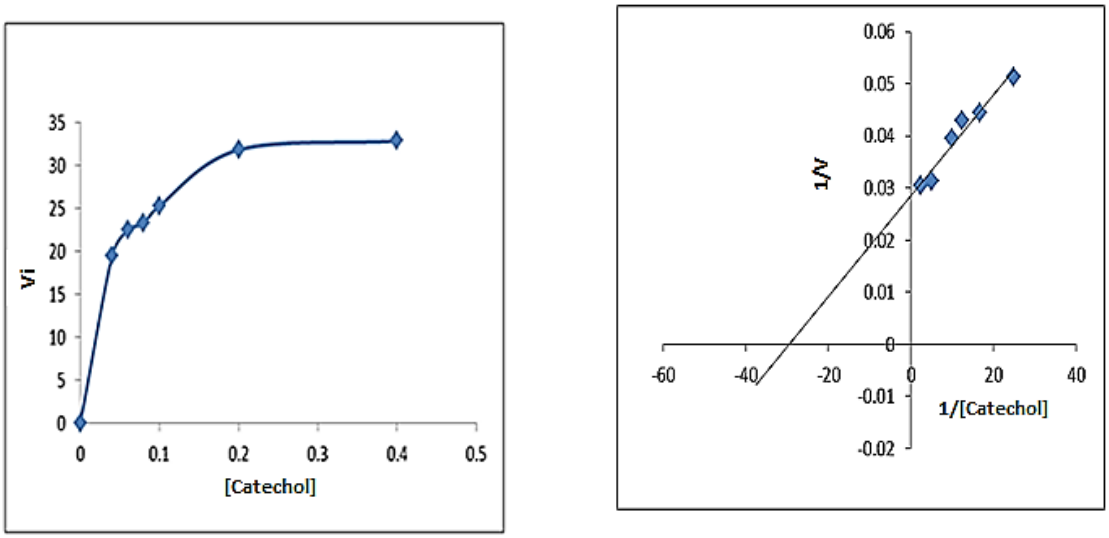

Figure S26. Reaction dependence on the concentration of catechol using **2L2/Cu(NO3)2**.

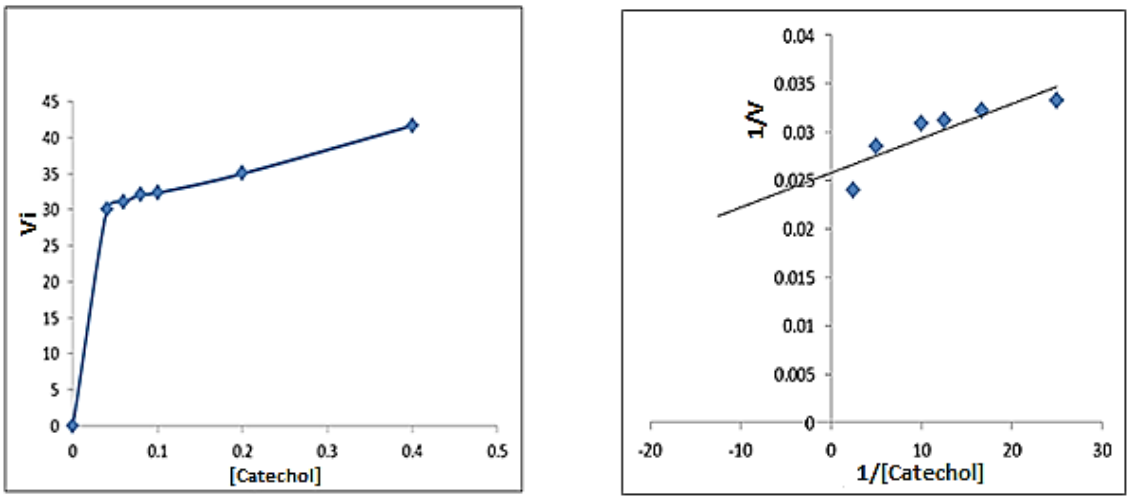

Figure S27. Reaction dependence on the concentration of catechol using **2L2/Cu(CH3COO)2**.

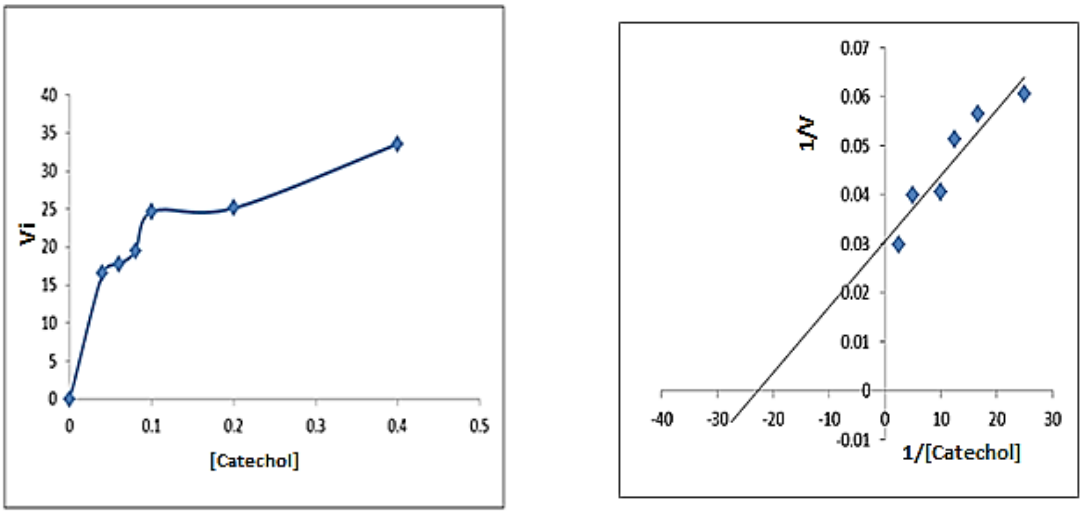

Figure S28. Reaction dependence on the concentration of catechol using **2L2/CuSO4**.