

SUPPORTING INFORMATION AVAILABLE

Discrimination of fluorescence light-up effects induced by pH and metal ion chelation on a spirocyclic derivative of rhodamine B

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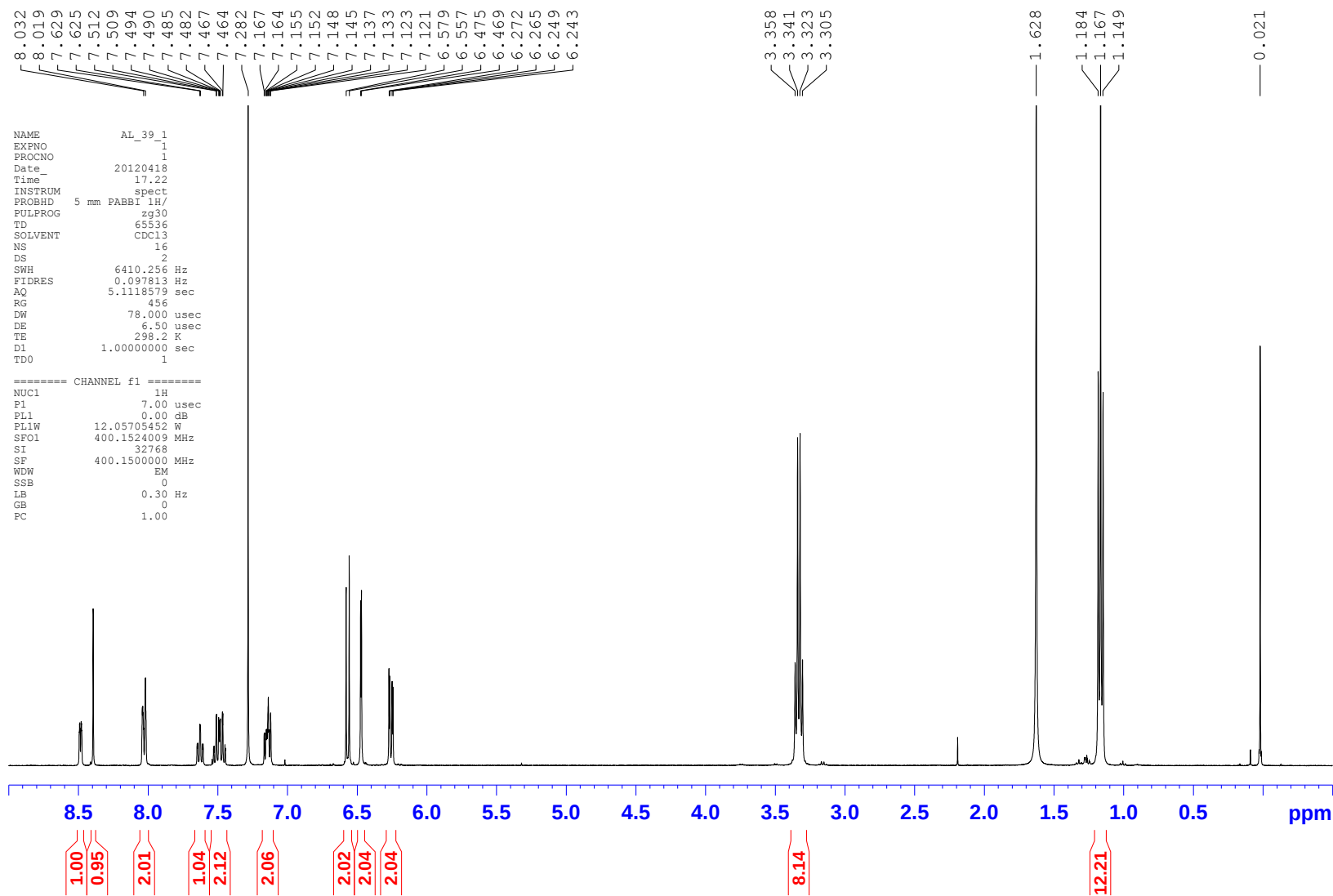
Synthesis of rhodamine B hydrazide 2 using conventional heating protocol

Rhodamine B **1** (1.20 g, 2.5 mmol) was dissolved in 30 mL ethanol. Then an excess of hydrazine hydrate (80%) (3.0 mL) was added dropwise with vigorous stirring at room temperature. After the addition, the stirred mixture was refluxed for 2 h. The solution changed from dark purple to light orange and became clear. Then the mixture was cooled and solvent was removed under reduced pressure. 1 M HCl (about 50 mL) was added to the solid in the flask to generate a clear red solution. After that, 1 M NaOH (about 70 mL) was added slowly with stirring until the pH of the solution reached 9~10. The resulting precipitate was filtered and washed 3 times with 15 mL water. After drying, the reaction afforded 0.83 g of **2** (75%) as pink solid.

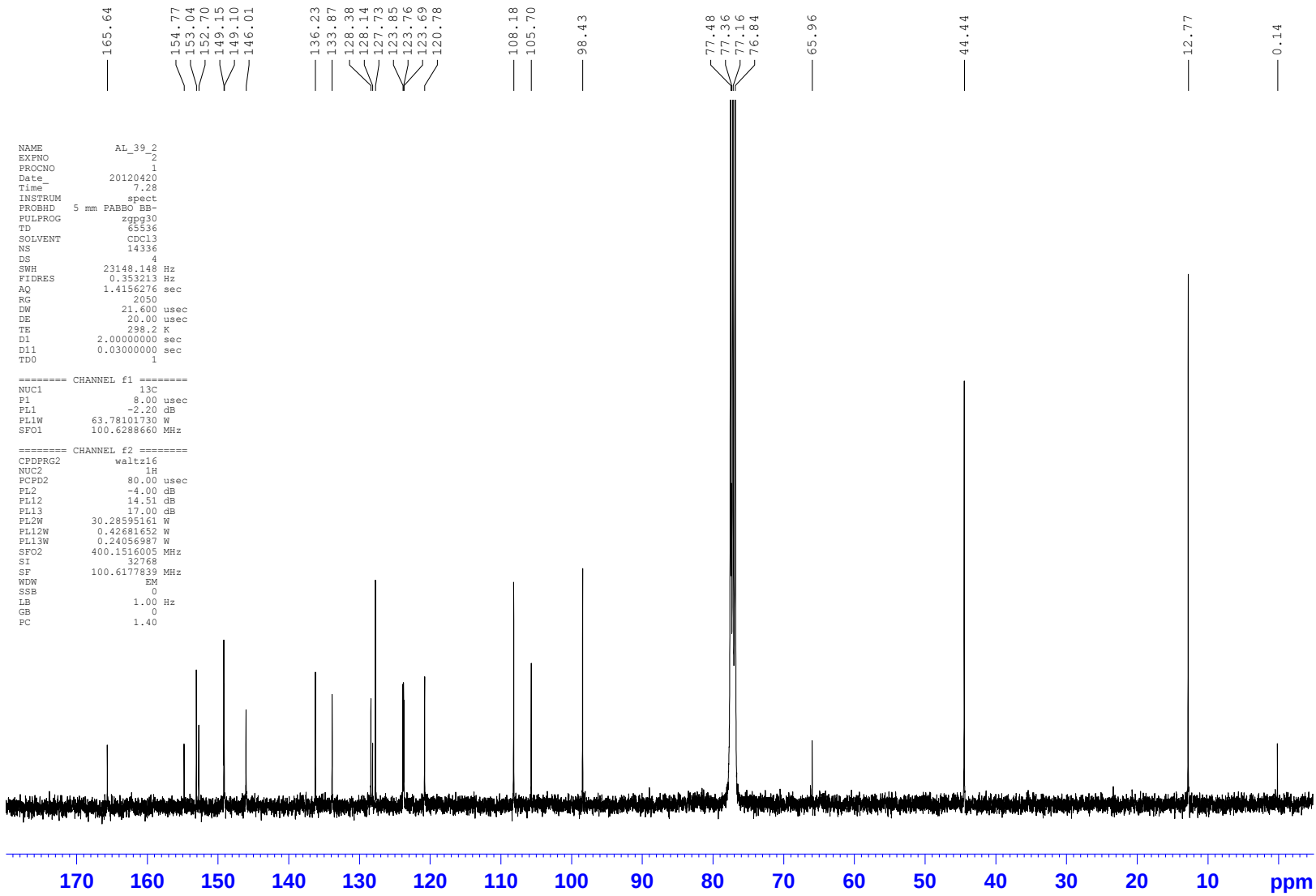
Synthesis of ligand L using conventional heating protocol

Rhodamine B hydrazide **2** (0.46 g, 1 mmol) was dissolved in absolute ethanol (20 mL). An excess of 2-pyridinecarboxaldehyde (4 mmol) was added and the mixture was refluxed for 6 h. After that, the solution was cooled, concentrated to 10 mL and allowed to stand at room temperature overnight. The precipitate which appeared next day was filtered and washed 3 times with 10 mL of cold ethanol. After drying under reduced pressure, the reaction afforded 0.31 g **L** (57%) as a white solid.

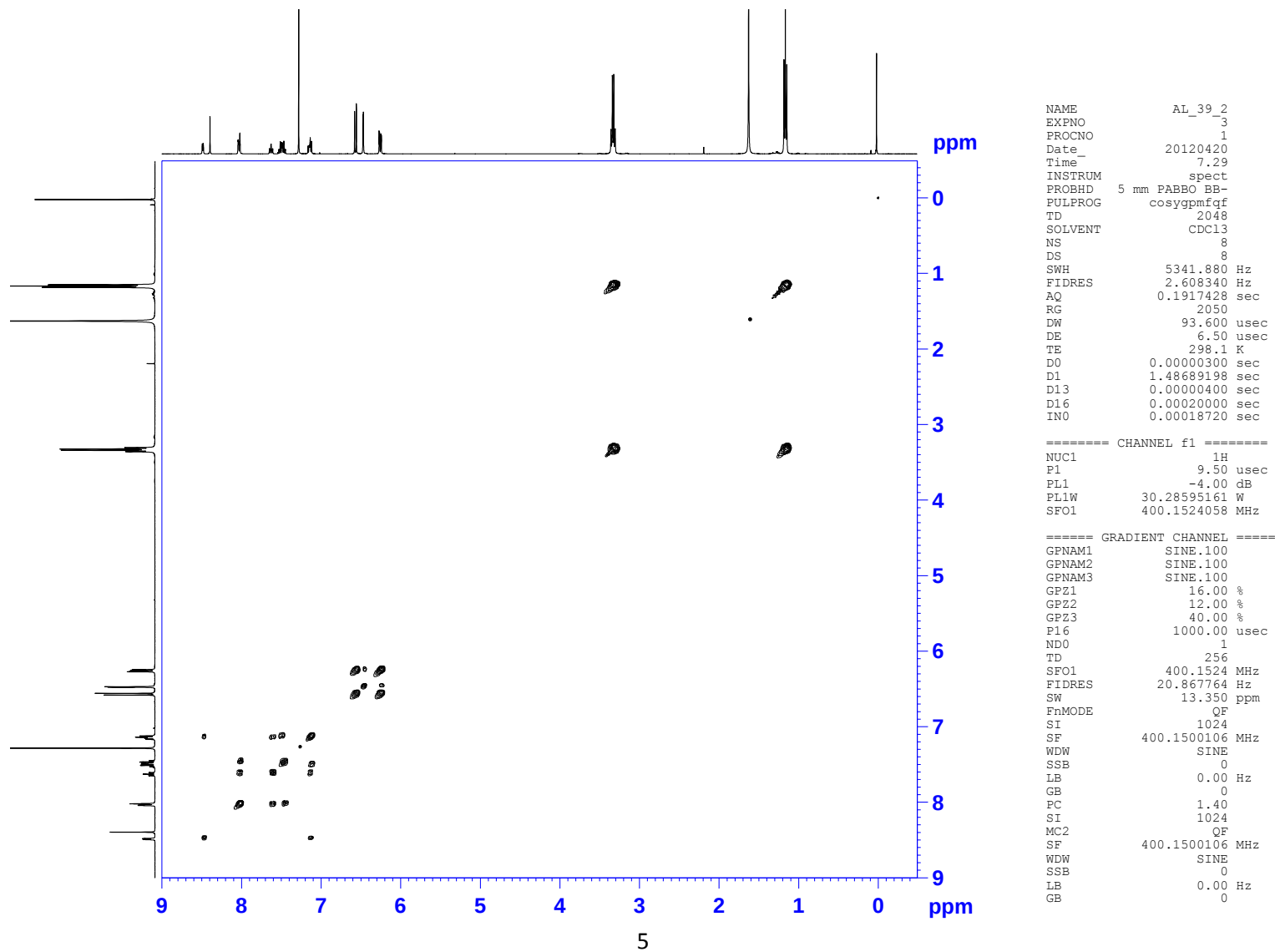
¹H NMR (CDCl₃) spectra of the ligand L



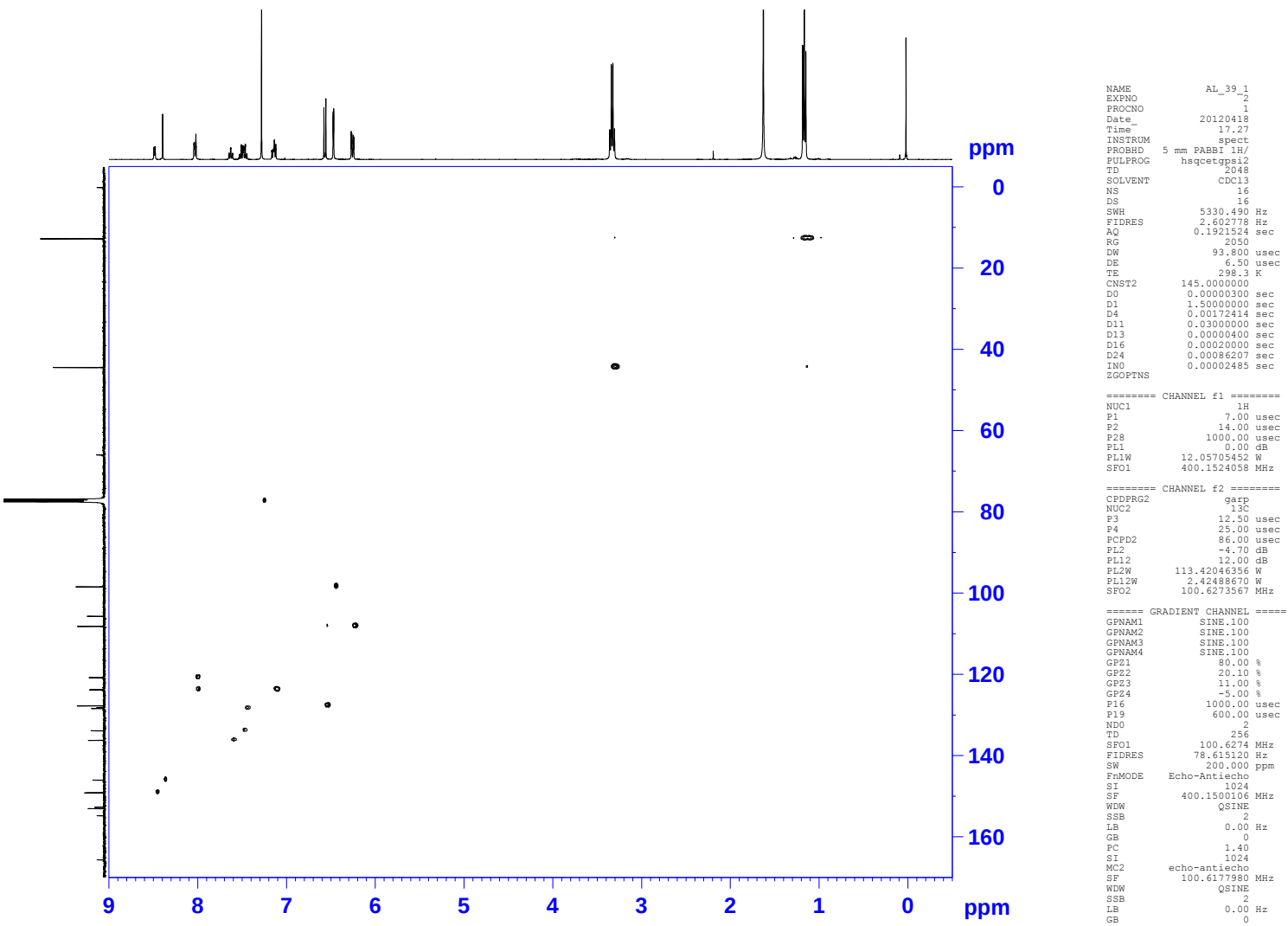
¹³C NMR (CDCl₃) spectra of the ligand L



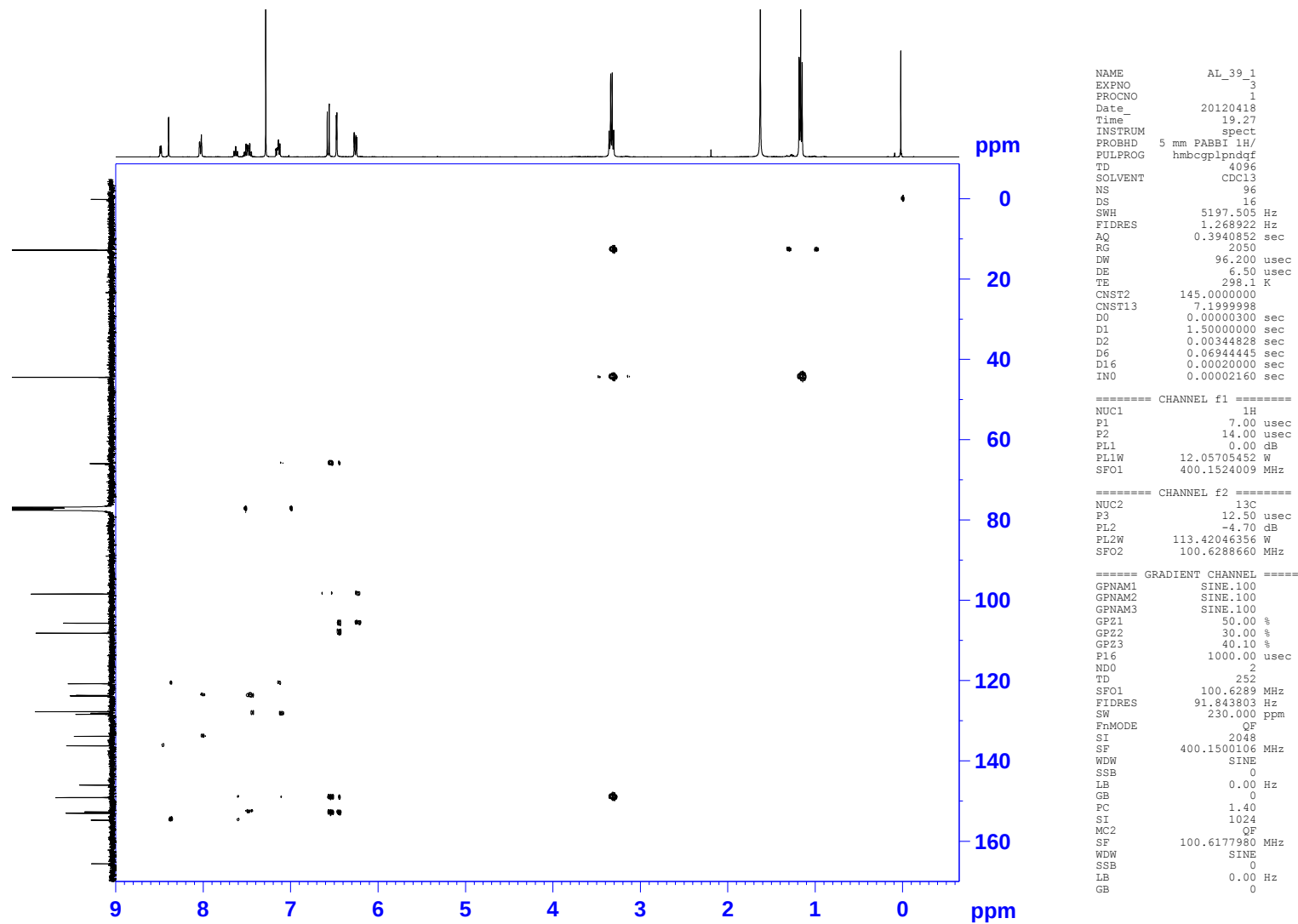
COSY (CDCl₃) spectra of the ligand L



HSQC (CDCl₃) spectra of the ligand L



HMBC (CDCl₃) spectra of the ligand L



Crystal structure of the ligand **L**

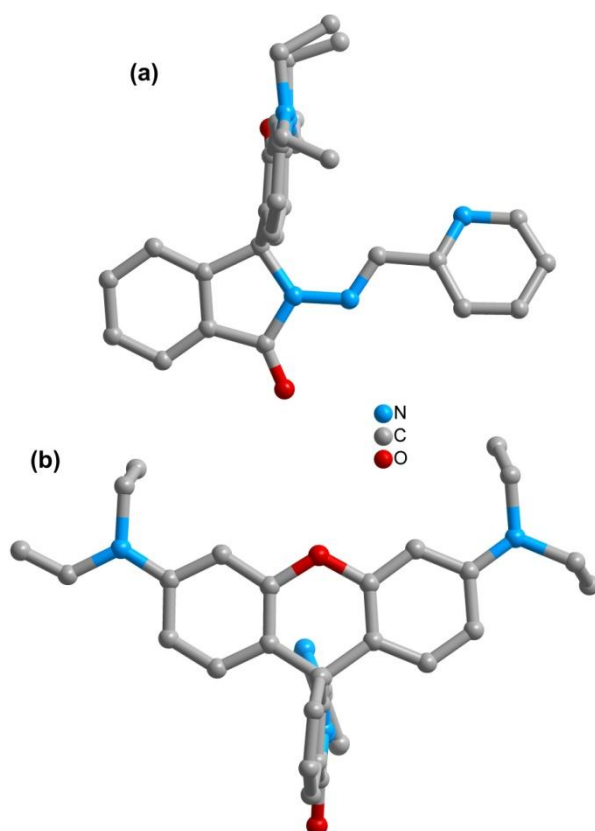


Figure S1. The ligand **L** viewed in the plan of the benzene spirolactam-ring group and the pyridine ring (a) and in the plan the xanthene group (b), clearly revealing the relative orthogonal position between the groups.

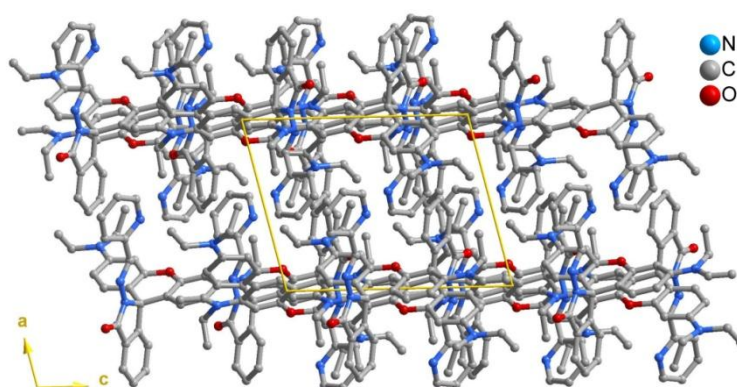


Figure S2. Crystal packing of ligand **L** viewed in the [010] direction of the unit cell. H-atoms were omitted for clarity reasons.

Interaction of ligand **L** with Fe^{3+} , Fe^{2+} , Cu^{2+} and Zn^{2+}

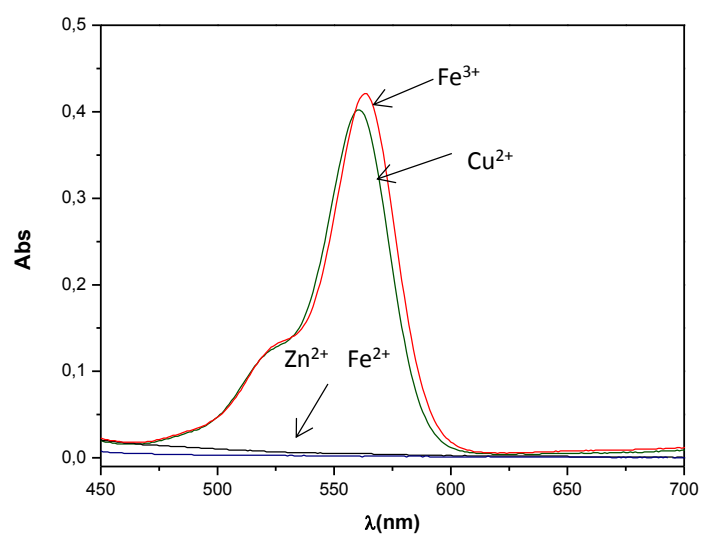


Figure S3. UV-Vis spectra of **L** in presence of Fe^{3+} , Fe^{2+} , Cu^{2+} and Zn^{2+} in DMSO/ H_2O .