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Synthesis and Characterization Complex of Group 12 Iminopyridin

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ABSTRACT

In this work, Complexes of the group 12 iminopirydin is synthesized along with the spectrometry using the ligand. Vibration spectrums are provided by the use of the BUCKER apparatus. Also, the ^{1}HNMR and ^{13}CNMR spectrums are provided using the Avance BURKER-300MHz. Therefore, resulted spectrums are an indication of the formation of the complex

KEYWORDS: Schiff base, Complex, Ligand, 2,3 Dimethyl Aniline.

INTRODUCTION

The chemistry of the carbon-nitrogen double bond plays a vital role in the progresses of chemistry science [1]. Schiff bases have often been used as chelating ligands in the field of coordination chemistry and their metal complexes are of great interest for many years [2].

The Schiff base ligands with sulphur and nitrogen donor atoms in their structures act as good chelating agents for the transition and non-transition metal ions [3]. Schiff bases [4] were still regarded as one of the most potential group of chelators for facile preparations of metallo-organic hybrid materials. The interest in Schiff base compounds as analytical reagents is increasing since they enable simple and unexpensive determinations of different organic and inorganic substances [5].

Schiff base metal complexes have been known since the nineteenth century. Investigation on metal-organic complexes represents one of the most active areas of material science and chemical esearch [6] Schiff bases form a class of compounds with azomethin group, which are usually synthesized from the condensation of primary amines and active carbonyl groups by the elimination of water molecule.

2. Experimental

2.1. Complex Syntheses by $HgCl_2$

For the preparation of the title compound, a solution of 2-[(2,3-dimethylphenyl) iminomethyl] pyridine (0.210 g, 1.00 mmol) in acetonitril (10 ml) was added slowly to a solution of $HgCl_2$ (0.271 g, 1.00 mmol) in acetonitril (10 ml) and the resulting yellow solution was stirred for 45 min at room temperature. Then the yellow precipiate was filtered and dissolved in acetonitril and left to evaporate slowly at -18°C. After a few days, yellow crystals of the title compound were isolated (yield: 0.272 g, 56.5%; m.p. 489 K).

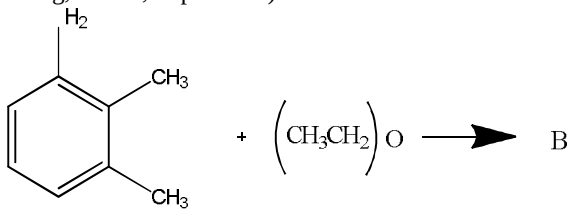

Figure 1. Solution of the 2,3 Dimethil Anilineine the ether (B)

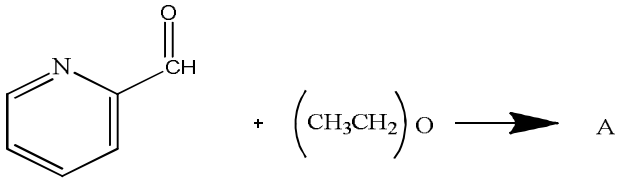

Figure 2. Solution of the pyridin carbaldehid in the ether (A)

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Email address: sjalal135m@yahoo.com

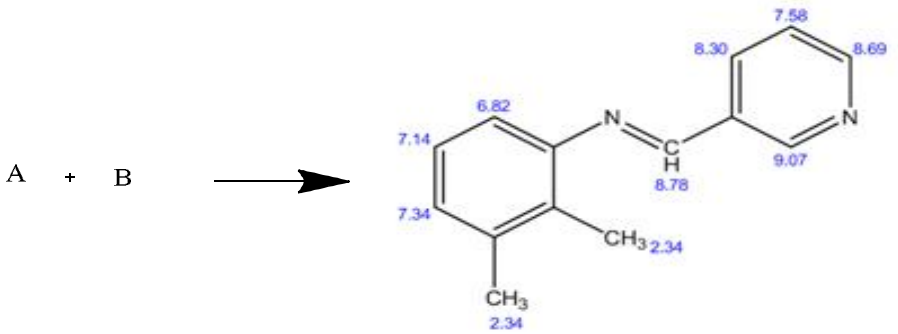

Figure 3. Mixing A and B for forming the Ligand

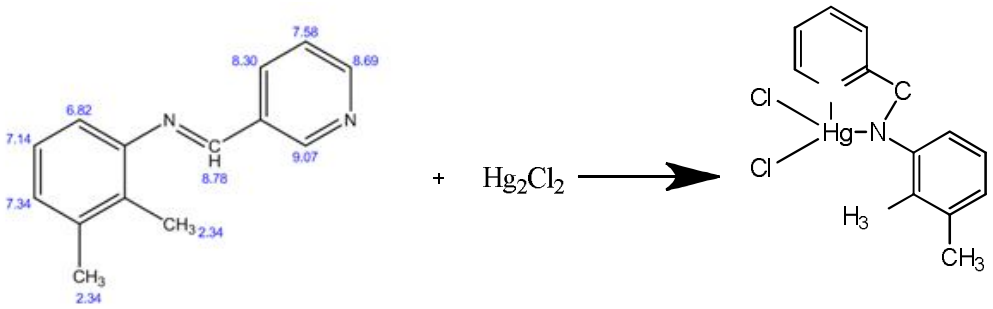

Figure 4. Formation of the complex using the additional of the metal to the ligand

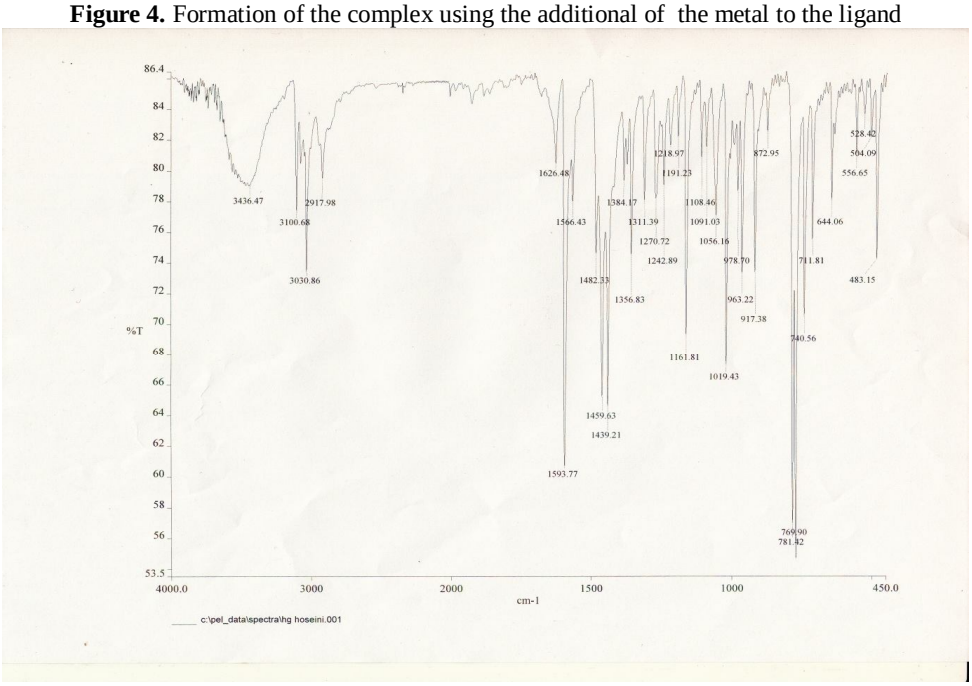

Figure 5. Spectrum of the IR for the Complex

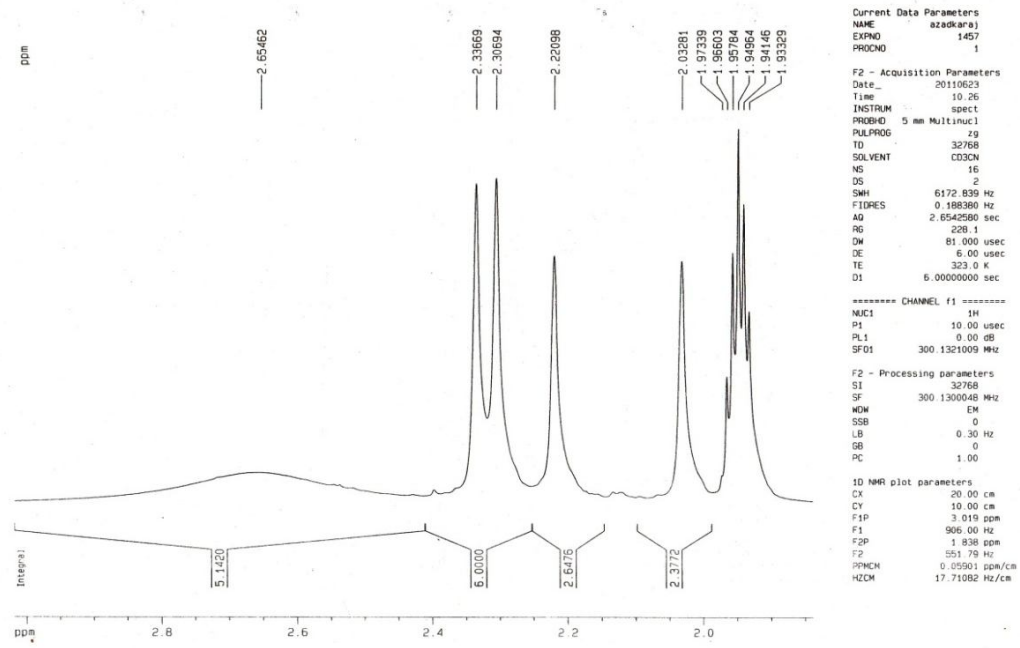

Figure 6. Spectrum of the NMR for the Complex

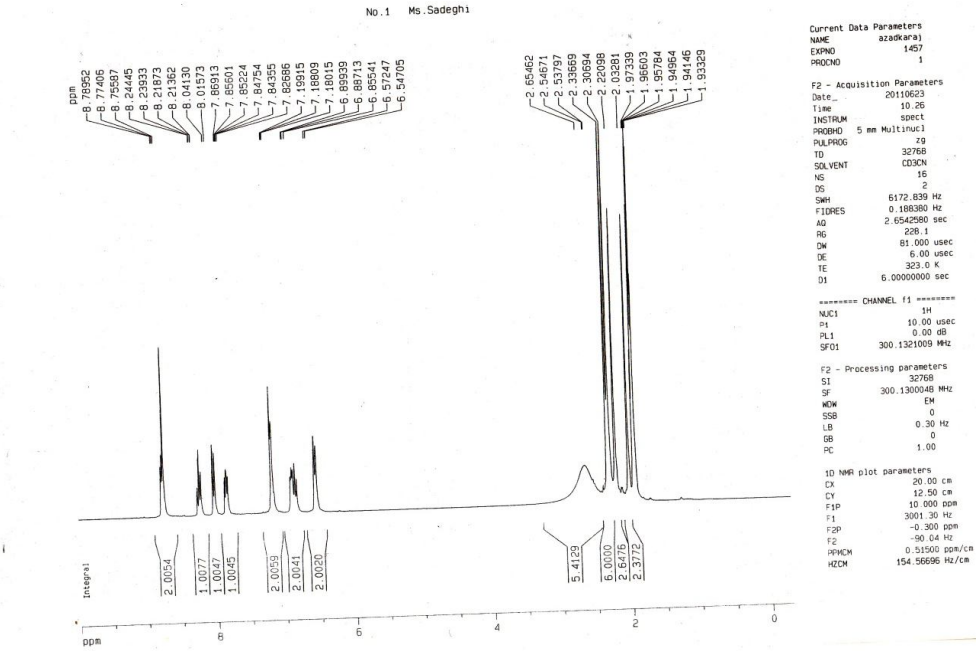

Figure 7. Spectrum of the $^{1}HNMR$ for the Complex

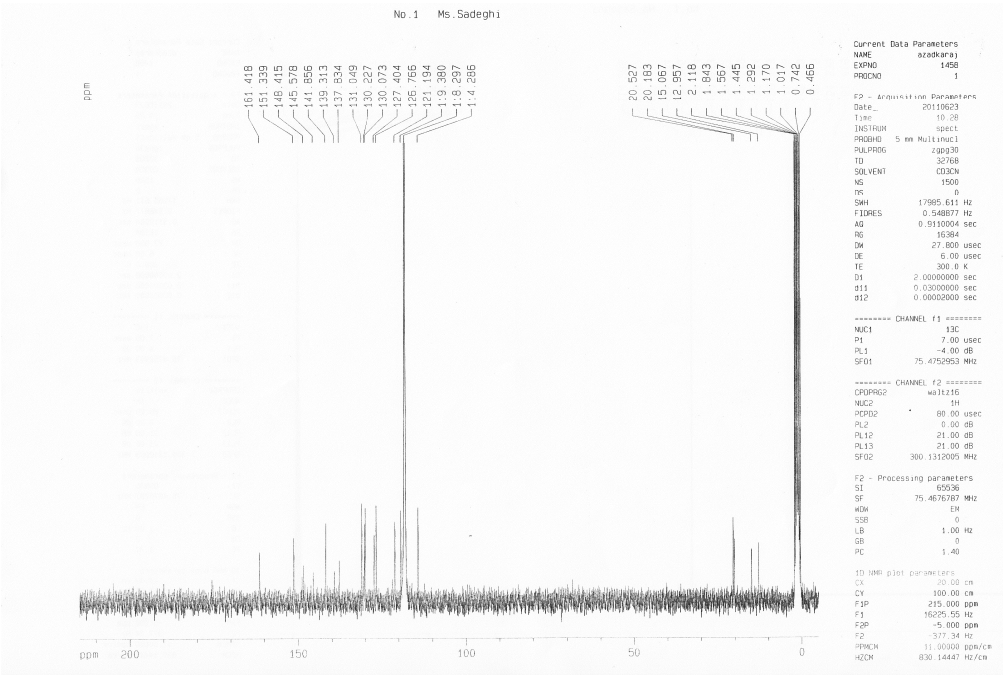

Figure 8. Spectrum of the $^{13}CNMR$ for the Complex

According to Fig. 5, the band of 3436 cm^{-1} is related to frequency of C-H Aromatic. The band of 1593 cm^{-1} is respected to C=N which is verified the imin. The bands of 1356-1566 cm^{-1} is related to the C=C benzen. The strong bands of 740-978 cm^{-1} is related to the bending frequency of Aromatic.

In accordance with Figs. 6 and 7, the region of 8.75ppm indicates the hydrogen imin. the regions of 7.15-7.19ppm indicates the hydrogens Aromatic. the regions of 1.94-1.96ppm indicates the hydrogens methyl.

Based on Fig. 8, the region of 15.52ppm indicates the carbon methyl. the region of 20.52ppm indicates the carbon methylen. the region of 161ppm indicates the carbon imin. the regions of 114-121ppm indicates the carbons Aromatic. the regions of 137-151ppm indicates the carbons pyridin.

2.2. Complex Syntheses by $ZnCl_2$

For the preparation of the title compound, a solution of 2-[(2,3-dimethylphenyl) iminomethyl] pyridine (0.210 g, 1.00 mmol) in acetonitril (10 ml) was added slowly to a solution of $ZnCL_2$ (0.014 g, 1.00 mmol) in methanol (10 ml) and the resulting yellow solution was stirred for 45 min at room temperature. Then the yellow precipiate was filtered and dissolved in acetonitril

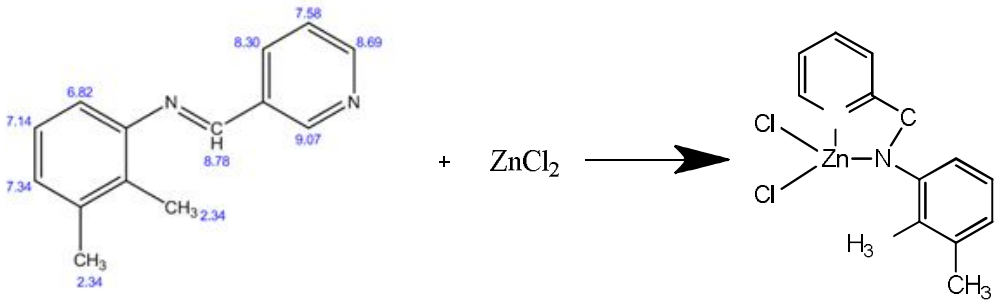

Figure 9. Formation of the complex using the additional of the metal to the ligand

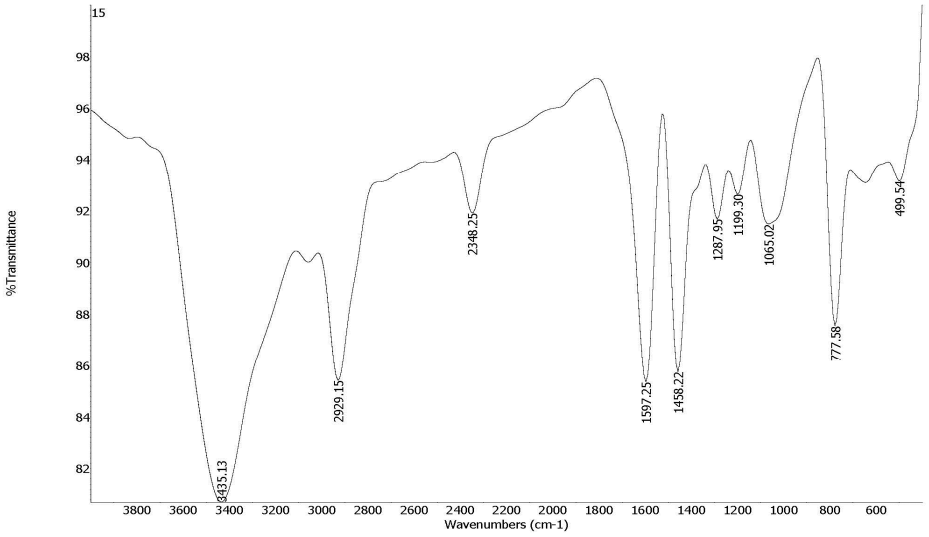

Figure 10. Spectrum of the IR for the Complex

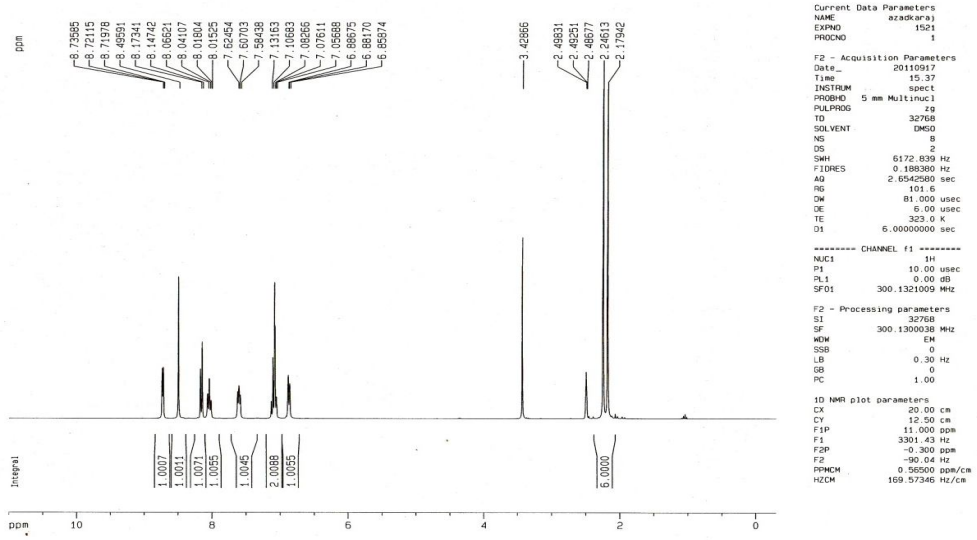

Figure 11. Spectrum of the $^{1}HNMR$ for the Complex

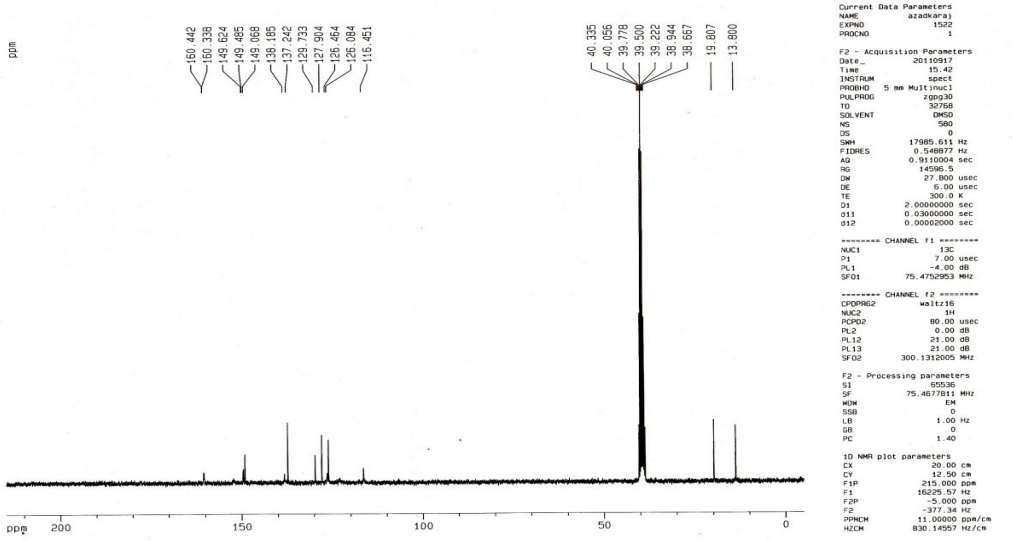

Figure 12. Spectrum of the $^{13}CNMR$ for the Complex

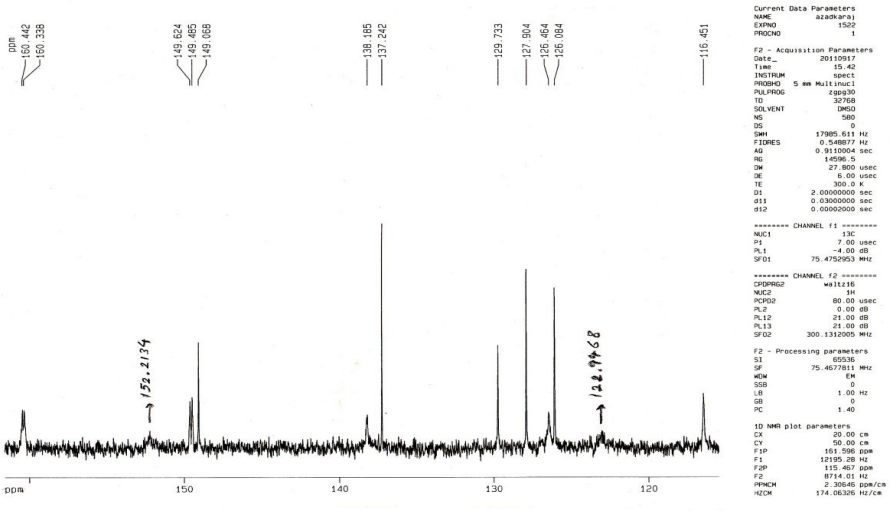

Figure 13. Spectrum of the $^{13}CNMR$ for the Complex

According to Fig. 10, the band of 3620 cm^{-1} is related to frequency of C-H Aromatic. The band of 1597 cm^{-1} is respected to C=N which is verified the imin. The bands of 1065-1287 cm^{-1} is related to the C=C benzen. The strong band of 777.58 cm^{-1} is related to the bending frequency of Aromatic.

In accordance with Figs. 11, the region of 8.49ppm indicates the hydrogen imin. the regions of 7.58-8.17ppm indicates the hydrogens Aromatic. the region of 2.24ppm indicates the hydrogens methyl.

Based on Fig. 12 and 13, the region of 13.8ppm indicates the carbon methyl. the region of 19.8ppm indicates the carbon methylen. the region of 149.62ppm indicates the carbon imin. the regions of 116-129ppm indicates the carbons Aromatic. the regions of 149.06-149.62ppm indicates the carbons pyridin.

2.3. Complex Syntheses by $CdCl_2$

For the preparation of the title compound, a solution of 2-[(2,3-dimethylphenyl) iminomethyl] pyridine (0.210 g, 1.00 mmol) in acetonitril (10 ml) was added slowly to a solution of $CdCl_2$ (0.182 g, 1.00 mmol) in H_2O (10 ml) and the resulting yellow solution was stirred for 45 min at room temperature. Then the yellow precipiate was filtered and dissolved in acetonitrile.

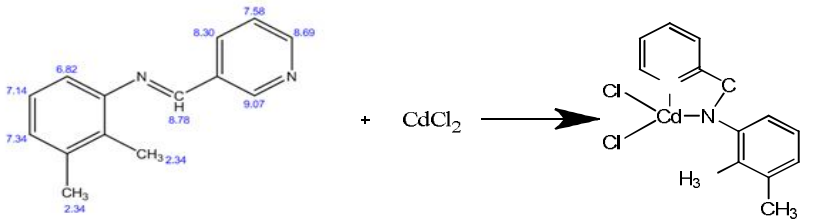

Figure 14. Formation of the complex using the additional of the metal to the ligand

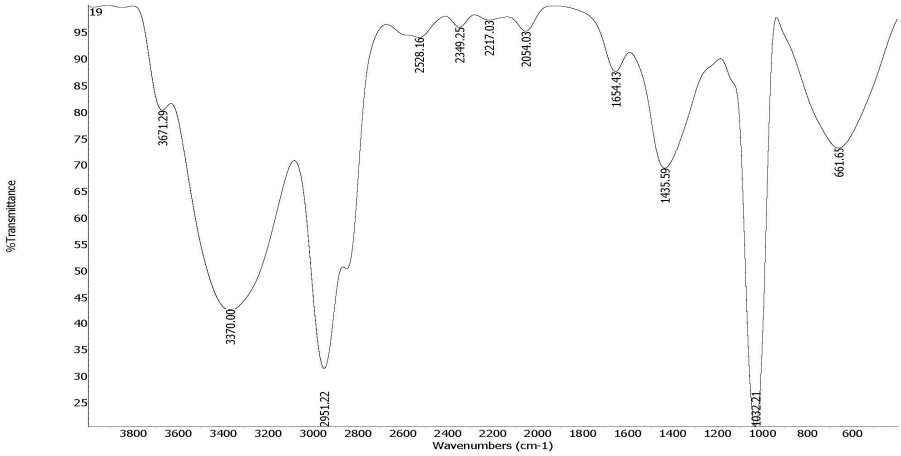

Figure 15. Spectrum of the IR for the Complex

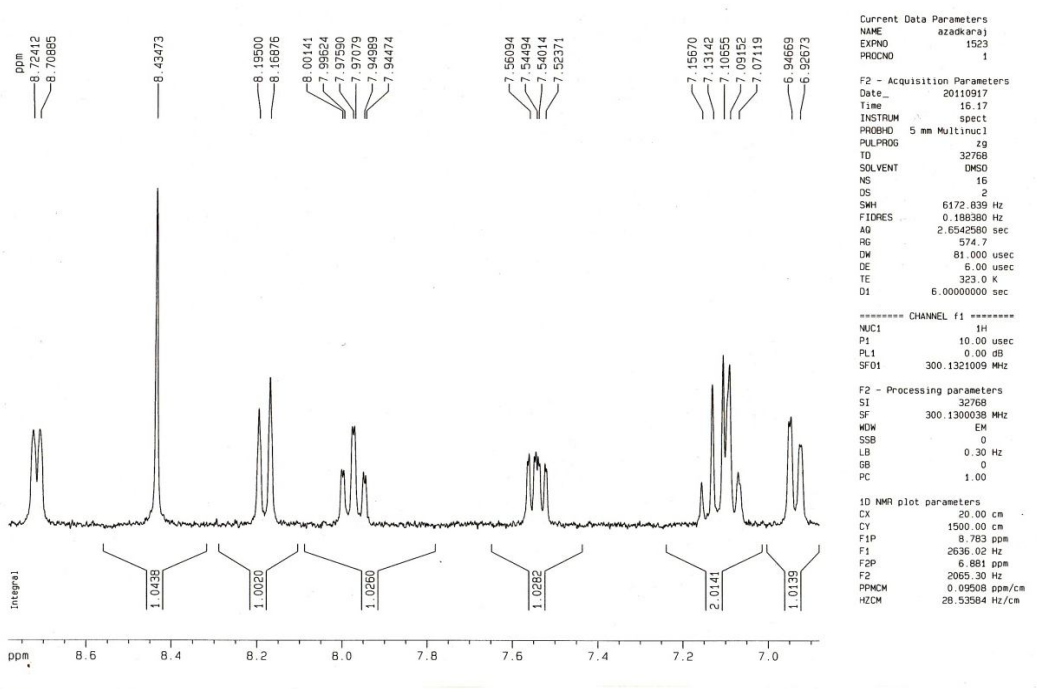

Figure 16. Spectrum of the $^{1}HNMR$ for the Complex

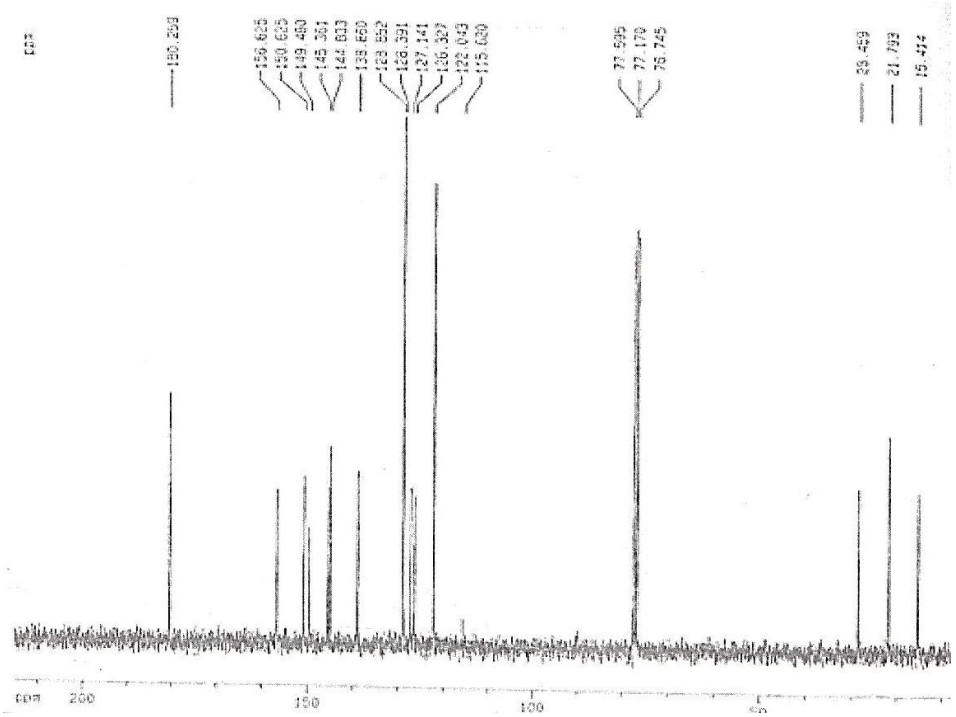

Figure 17. Spectrum of the $^{13}CNMR$ for the Complex

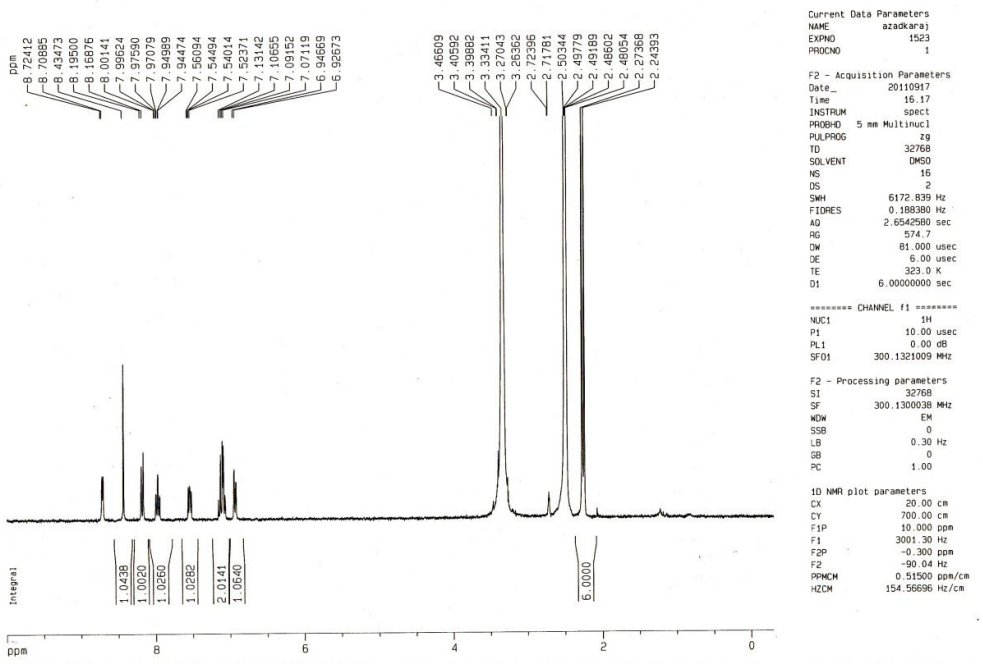

Figure 18. Spectrum of the $^{1}HNMR$ for the Complex

According to Fig. 15, the band of 3348 cm^{-1} is related to frequency of C-H Aromatic. The band of 1612 cm^{-1} is respected to C=N which is verified the imin. The bands of 1400-1600 cm^{-1} is related to the C=C benzen. The strong bands of 742-776 cm^{-1} is related to the bending frequency of Aromatic.

In accordance with Figs. 16 and 18, the region of 8.19ppm indicates the hydrogen imin. the regions of 7.52-8.16ppm indicates the hydrogens Aromatic. the region of 3.33ppm indicates the hydrogens methyl.

Based on Fig. 17, the region of 15ppm indicates the carbon methyl. the region of 28ppm indicates the carbon methylen. the region of 156ppm indicates the carbon imin. the regions of 115-128ppm indicates the carbons Aromatic. the regions of 137-151ppm indicates the carbons pyridin.

3. Conclusion

In this paper, we synthesizes the Complexes of the group 12 iminopirydin experimentally along with the spectrometry of them using the ligand. the BUCKER apparatus provides the vibration spectrums and the Avance BURKER-300MHz provides the ^{1}HNMR and ^{13}CNMR. Consequently, the obtained spectrums verifies the complex formation.

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