22nd Iranian Inorganic Chemistry Conference, 23-25 August, 2023
University of Kurdistan

Synthesis and crystal structure of a dinuclear Cu(II) complex with multidentate Schiff base ligand

Elaheh Shahmoradi,[a] Rahman Bikas,[b,*] and Nader Noshiranzadeh[a]

[a]*Department of Chemistry, Faculty of Science, University of Zanjan, 45371-38791 Zanjan, Iran*
[b]*Department of Chemistry, Faculty of Science, Imam Khomeini International University, 34148-96818 Qazvin, Iran*

[*] *E-mail: bikas@sci.ikiu.ac.ir*

In this research we report synthesis, characterization, crystal structure and spectroscopic properties of a new dinuclear copper(II) complex with polyamines ligand. The complex was synthesized by the reaction of $Cu(NO_3)_2.3H_2O$ and multidentate Schif base ligand (H_4L) and sodium azide in methanol solvent. The reaction mixture was heated to reflux for 12 hours and the green precipitates were obtained. The resutling precipitates were filtered off and washed with cold methanol and finally dried in air. The complex was characterized by FT-IR and UV-Vis spectroscopic methods and elemental analysis. Comparing FT-IR spectrum of complex with free ligand (see Fig. 1) confirmed the coordination of both azide and Schiff base ligands to the metal ion. The strong peak at 2038 cm^{-1} is related to azide ligand [1] and the band located at 1600 cm^{-1} is related to the C=N group of Schiff base ligand [2]. The single crystals of this complex was obtained in methanol by slow solvent evaporating during one week. Structural studies indicated that a dinucelar structure has been obtained and its general formula is $[Cu_2(L'^1)(N_3)_2]$ where H_4L is 2,2'-{ethane-1,2-diylbis[3-(2-{[(*1E*)-(2-hydroxyphenyl)methylene]amino}ethyl)imidazolidine-1,2-diyl]}diphenol. H_4L, is coordinated to the Cu(II) ion as $(H_2L)^{2-}$ ligand by elimination of two phenolic hydrogen during the formation of complex.

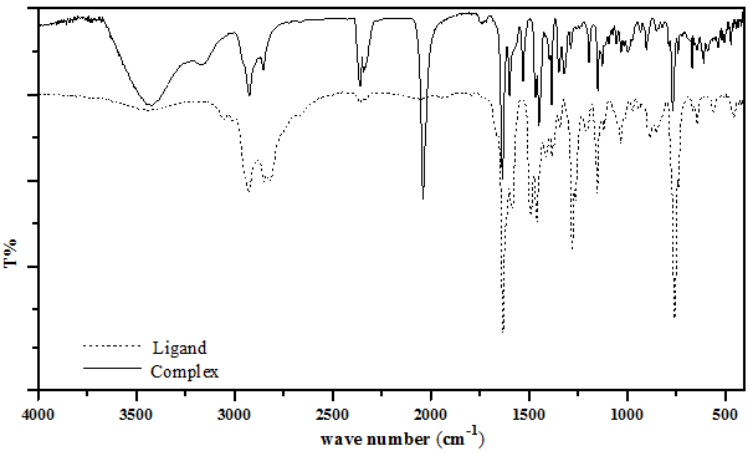


Fig. 1. FT-IR spectrum of ligand (dashed line) and complex (solid line)

Keywords: Cu complex, Crystal structure, Spectroscopic studies

References

[1] R. Bikas, M.-H. Rashvand, N. Heydari, A. Kozakiewicz-Piekarz, *J. Mol. Struct.*, **2023**, 1283, 135278.
[2] Ö. D. Kutlu, A. Erdoğmuş, P. Şen, S. Z. Yıldız, *J. Mol. Struct.*, **2023**, 1284, 135375.