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Synthesis, Spectral Study of Demi-macrocycles of Ligand N2O2 with Zn (II) Ion

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Abstract: *The synthesized complex has been characterized with the aid of elemental analysis by FTIR, UV spectra, conductance measurements the magnetic susceptibility.*

Keywords: *Spectra, susceptibility, aid, conductance.*

1. INTRODUCTION

Demi-macrocycles have additional sterochemical constrains resulting from the cyclic nature, which depend up on several factors such as macrocyclic ring size,[1-13] number and nature of chelate rings formed on co-ordination influence position of donor and central metal ion Zn(II) provides a number of coordination compounds because of its affinity towards different types of ligands and flexible coordination number ranging from two to eight the filled and shall does not offer crystal field stabilization on Zn(II) in this synthesis Zn(II) complex shows octahedral geometry demi-macrocyclic systems in a template reaction Zn(II) complex has a vitro, antibacterial activities. Zn(II) functions as an antioxidant. It is essential for protein synthesis.

2. MATERIALS AND METHODS

All the chemicals and solvents were employed in there studies are of AR-grades viz. Loba, Aldrich Fisher scientific and Rankem bond the C,H, and N elemental analysis of the sample was carried out micro analytically. Oxygen was determined different methods, Zn(II) and chloride were determined gravimetrically. Experimental the IR spectra (4000—400 cm^{-1}) were recorded on a Jasco Model 4100 FTIR spectrophotometer as Kbr. Disc. Where as UV-visible spectra was recorded on Shimezu 1700. The conductivity measurements was made in DMSO or nitro methane (10^{-3} mho) at room temperature on systyronic conductivity meter at 8000 G in a Evans as magnetic susceptibility balance using $Co[CHg(SCN)_4]$ as celibrant. The experimental suspactibility were corrected for diamagnetic complex as Pascal constants.

2.1. Synthesis of Ligand N_2O_2

Ethane 1, 2-diamine (30 g) was added to acetone (300 ml) in a 500 ml flask and the solution cooled in a ice bath perchloric acid (71 %) keeping the temperature below 20^0C. After few hours, five crystals of the product was obtained which is insoluble in acetone, washed and vanished. The product was remained colourless and was air dried. The yield was obtained 85 % (Table 1).

3. RESULTS AND DISCUSSION

IR spectra of the complex exhibit a strong sharp to medium intensity bond at 500-457 cm^{-1} region which may be assigned to metal oxygen stretching vibrations. The UV (M-O) stretching frequencies the intensity of some the vibrations are decreased which may be attributed to the hindred vibrations. The characteristic V (C-O) vibration frequencies undergo a negative shift by about 50 cm^{-1} in the complexes which may be ascribed to the relaxation effect caused to the lone pair donation by the oxygen atom to the metal ion the V ($M\text{-}ClO_4$) stretching frequency sharp band at 535-500 cm^{-1} is assigned to the metal nitrogen starching frequency. The order the non appearance of Vs (N-H), Vas

(N-H) and (N-H) vibrations in the complex confirm the co-ordination of the metal ion by the deprotonation of the internal protons (Fig.1). UV-vis. electronic spectra Zn(II) complex shows MLCT bands due to completely filled d-orbital, d-d transitions are not expected in Zn(II). Complex show absorption band at 9700 cm^{-1} and 8690 cm^{-1} due to $\pi - \pi^*$ transition and $\pi - \pi^*$ transitions electronic spectra data of the complex indicates an octahedral geometry around entire metal ion the metal complex has been synthesized by the reaction of the respective metal perchlorates with the demi-macrocyclic ligand according to the following reactions (Fig.2).

$M(ClO_4)_2 + L \rightarrow ML(ClO_4)_2$

where M = Zn(II).

The molar conductance values υm = 5.15 $cm^2\ mol^{-1}$) of the complex in DMSO (10-3N) indicate their non-electrolyte nature. Magnetic susceptibility indicate diamagnetic nature of these complex and it indicates the d^{10} electronic configuration of Zn(II).

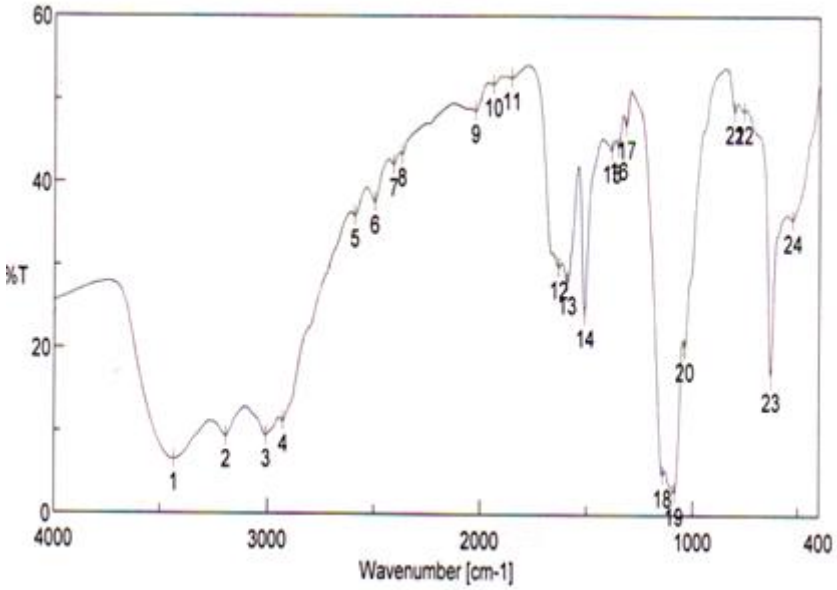

Fig1.

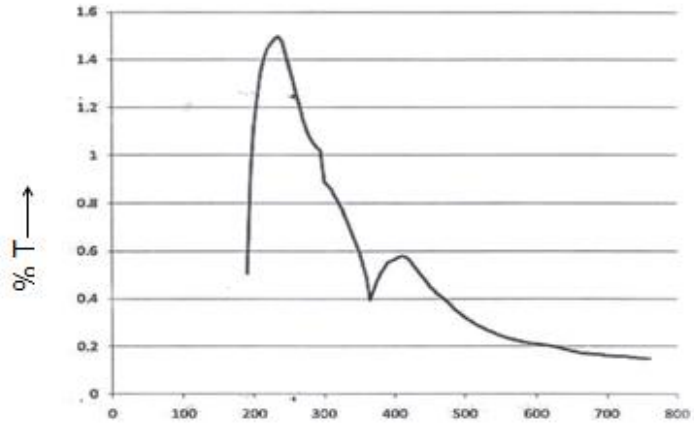

Fig2. *Wave number (cm^{-1}) UV Spectra of Zn (II) Complex*

Table1. *Elemental analysis of $C_{14}H_{28}O_{10}Cl_2Zn$ Demi macrocyclic complex of Zn(II) ion*

Calculated Mass %	% Observed Mass
C = 48.06	C = 47.83
H = 3.45	H = 3.60
N = 7.99	N = 8.06
O = 32.04	0 = 31.08
Cl = 13.50	Cl =13.54
Zn = 11.20	Zn = 11.30

IR KBr

(Zn – N) (Zn-O)

565 470

MLCT

25000 – 29000 cm^{-1}

Conductivity ohm^{-1} mol^{1} = 11.0

4. CONCLUSION

Zn(II) complex has been synthesized and characterized by elemental analysis, spectra data and magnetic. The complex exhibits octahedral geometry. Zn(II) has been prepared from template condensation reaction with ligand N_2O_2 which are in good conformity with our experimental results.

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