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Spectro Chemical Studies of Co (II) Complexes with Triazoles at- different PH

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Abstract

Complexes of Co (II) with Triazoles prepared at PH. 3,7,10 and structural assessment of the complexes have been made on the basis of results of magnetic moment, electronic and IR spectral studies.

Key words : IR UV visible Magneticmeasurement Elementalanalysis Structure Determination Triazoles.

Introduction

The Triazoles are of Great biological significance[1-3]. The present communication reports the results of spectrophotochemical studies of the complexes formation of Co (II) with 5-Mercapto 4- Amino-3- Methyl 1,2,4, Triazole prepared at- PH. 3,7, and 10

Experimental

The crystals were dried and kept for further studies.

Isolation of the Complexes :

A mixture of metalchloride $CoCl_2$ and ligand in ration 1:2 were taken the mixture PH were

adjusted 3,7 and 10 by the addition of NH_4OH Solution.

Table 1.

Compound	PH	Colour	Analysis % found (Caled)					Meff
			N	C	H	S	M	B.M.
$C_3 H_6 N_4 S$			42.82 43.57	27.59 27.69	4.28 4.61	24.38 24.61		
$[Co (L_2) Cl_2].2H_20$	10	Blue	27.5 27.03	16.58 17.39	2.91 3.79	14.39 15.01	13.88	4.5
$[Co (L_2) Cl_2].3H_20$	3	Blue	27.98 28.79	18.12 18.5	4.35 4.62	15.71 16.45	14.89 15.86	4.6
$[Co (L_2) H_20].2H_20$	7	Blue	27.32 28.52	15.66 16.68	3.15 3.70	13.59 14.47	12.50 13.55	4.7

L=$C_3 H_6 N_4 S$ deprotoneted anion satisfactory analysis were found.

Table 2.
Electronic Spectral data and ligand field parameters of complexes.

Compound	Mex. Cm.	Assignment	10 dg	D	B
$[Co (L_2) Cl_2].2H_20$	33444	$M \rightarrow Lor L \rightarrow M$			
$[Co (L_2) Cl_2].3H_20$	31446	$^4T_{1g} (F) \rightarrow {}^4T_{1g} P$	10482	1747	1.5
$[Co (L_2) H_20].2H_20$	23209	$^4T_{1g} (F) \rightarrow {}^4T_{2g} (F)$			

The mixture were refluxed over water bath for four hours. The precipitate of the complexes were Filtered and washed with hot water, ethyl alcohal, ether and then precipitates were dried over anhydrous $Cacl_2$ in a Vacuum desiccator.

Result and Discussion

The metal complexes obtained were found to be insoluble in chloroform DMF and DMSO. These complexes were insoluble in water and most of the common organic solvents, so their conductivity and molecular weight could not be determined.

The magnetic suseptibility of the complexes were measured by gangmethod using Hg $[Co (SCN)_4]$

As calebrants Electronic spectra of the complexes were recorded in solidstate by UV-160A. UV Visible spectrophotometer in the range of 260-4000 cm^{-1}. The Colour elemental analysis and magnetic moments are listed in table (I). If the complexes were heated at 120°C they loss water molecules, so the water molecules were present as water of crystallization or coordinated water molecules in the complexes.

The observed magnetic moments for Co(II) complexes were 4.5 B.M in comparable with

assignment of octahedral Configuration.

The Electronic Specto of the complexes were shown into Table-2. The Electronic Spectra of Co(II) complexes strong band obtained at 33444 cm^{-1} which is due to M→Lor L→M mode of vibration. The medium and week band obtained at 31444 cm^{-1} and23209 cm^{-1} are due to $^4T_{1g}$ (F)→$^4T_{1g}$ P,$^4T_{1g}$ (P)→$^4T_{1g}$ (F)mode of splittingrespectively. The ratio for Co(II) complexes in octahedral was found to be in the range of (1.8-2.20). However for the present Co (II) complexes the ratio appear to lie (1:3). Thus the spectral data indicated octahedral geometry for the Co(II) complexes.

Infrared Spectra :

The IR spectra of Co(II) complexes contained broad band in the region of 3140-3500 cm^{-1} 1600-1630 cm^{-1}, which may be due to coordinated or lattice water in the complexes. The Pattern of metal ligand bonding in the complexes are revealed from the mode of shifting of $\sqrt{}_{NH2}$, $\sqrt{}_{S-H}$, $\sqrt{}_{-N}$, $\sqrt{}_{-s}$ band of the ligand on coordination.

The band present at 3280 cm^{-1} and 2515 $cm^{-1(9-10)}$ in the spectrum of the ligand which is assigned and $\sqrt{}_{NH2}$, and $\sqrt{}_{S-H}$, mode of vibration respectively. They are not present in the spectrum of the complexes so coordination will be held from 'N' of NH_2 and 'S' of the ligand or H of S-H group of the ligand has been replaced by Co(II) ion resulting the formation of Co(II)-S bond. Band present at 1290 cm^{-1} in the spectrum of ligand assigned of $\sqrt{}_{S-H}$ mode of vibration on the band red shifted to 1220 cm^{-1} in the spectrum of the complexes indicating further coordinate on by sulphur atom.

In the far IR Spectrum of the Complexes the $\sqrt{}_{M-N}$, $\sqrt{}_{M-0}$, $\sqrt{}_{M-X}$ and $\sqrt{}_{M-S}$ band identifies at 580-585, 560-450, 300 and 282-230 cm^{-1} respectively. Thus it may be concluded that (LH) acts as X (N-S) bidenatate ligand to Co (II) ion.

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Table 3

Compound	$\sqrt{}_{NH2}$	$\sqrt{}_{S-H}$	$\sqrt{}_{C-S}$	$\sqrt{}_{M-N}$	$\sqrt{}_{M-S}$	$\sqrt{}_{M-X}$	$\sqrt{}_{M-S}$
LH	3280	2515	1480	1290			
[Co (L_2) Cl_2].2H_20			1480	1220	580	450	300-280-230
[Co (L_2) Cl_2].3H_20			1480	1220	580	450	300-280-230
[Co (L_2) H_20].2H_20			1480	1220	585	450	220

Conclusion and scope of future :

The complexes have various biological applications such that as alalagesic, antiviral.

antiinflametric and so many patent drugs. The complexes have also various catelytic charector also anti-microbial effects. Anti-fungal properties of these complexes can also be studied.

In this study the new complexes prepared based on 1, 2, 4 - Triazole were designed and synthesized. The physiochemical properties of all compounds were studied using spectroscopic technique, magneticmovement, IR studies. The medicinal properties of ‘’the complexes were also studied. The complexes also have antiviral and antiflamentry properties. There is further need to study anticancerous character of the complexes. The substituted Triazoles complexes is to be also prepared and to be conducted for further study. In future the NMR C^{13}NMR FTIR study of the complexes is to be done. The complex of Triazole will proved very effective for new medicinal world.

Reference

1. K. S. Dheka, J. Mohen, V.K. Chandra and H.K. Pujeri, *Indian J. Chem. 12,* 288 (1979).
2. R.V. Gaday and M.R. Gajendra Gad Ibid-16A, 703 (1978).
3. Lewis and B.N. Figgis, modern coordination chemistry Edit R.G WilKins and I. Lewis Inter Science Publisher New York 403 (1968).
4. F. P. Tradevletal in Analytical chemistry Vol. I. J. Wiley and Sons Inc. New York P. 334 (1935).
5. C. J. Bilhausen, I. Amar chem, 50c *81,* 538 (1989).
6. S. A. Patil B.H. Badigertetal I chem Soc. VI LXI (1989).
7. N. sate and K. M. Datta I. Indian chem Soc *58,* 990 (1981).
8. Baren Singh *et al* J. Inorgchem *63,* 271 (1975).
9. B. Dash *et al.* I Inorg new chem *37,* 271 (1975).
10. S.P. Gosh *et al* I. Inorgchem Soc. *60,* 213 (1983).
11. T. Liue *et al* Inorganic Chem Acta (2023).
12. B.A. Bavisketefal sutain. chem. pharm (2023).
13. A.R. Hejpur, *et al*. cetal.commum (2018).
14. M.C. Joseph et al polyhedran (2022).
15. M. Bost *et al* J. trance Elem Biol (2016).
16. J. Vaterntave *et al* Inorg Chem. Acta (2019).
17. Paolmaja R.D. Chanla *et al*, Refinamide, an antiseptic drug process Res Dev., *22,* 457-466 (2018).
18. Marti Revjas J. Geo *et al* Reaction in second sphere Co-ordination complexes Delton trans, *50,* 11665-11168 (2021).
19. Badine, A. Freson, S. Daigue born C. *et al* inorg. Chem. Vol. *57,* P 3399 (2018).
20. Das. D. and Biradha K. Cryst. Growth Des., Vol. *18,* P-3683 (2018).
21. Liyp Ju Fy *et al* Russ J. Coord. Chem, Vol. *44,* P 214 (2018).
22. Kaur J. Seyena M. Risi *et al* an over view of recent advance in Biormedical application of click chemistry Bioconjugat chem. 1455-1471 (2021).
23. S.H. Sumrra. A. Suleman Z. H. Chohem et al. Russ. J. Gen. Chem. *87,* 1281 (2017).

Abbreviation used in research paper

1. B.M. Bhormagnetom.
2. M- Metallic
3. D, B are electronic spectral parameters.