

A BRIEF STUDY OF PREPARATION OF Cu(II) COMPLEXES.**Rakesh Kumar Ranjan****Research Scholar J.P.University. Chapra) Bihar**

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Abstract :- This paper is related to preparation of Cu(II) complexes. This available research paper deal with preparation of Cu(II) Complexes with the ligand 1, 3- bis (O- hydroxy anilino) propane, (LH₂) As we know that Cu(II) is the transition metal cations to form the complexes depends upon the following factors :-

1. The transition metal cations are relatively very small in size and hence high positive charge density which makes it easy for the transition metal cations to accept the lone pair of electron donated by the ligand.
2. The transition metal cations have vacant 3d-orbitals which are approxmetely the right type of energy to accept lone pair of electrons from the ligand.
3. The transition metals are capable for several oxidation states.

Transition metal complexes with Schiff bases as ligand have amongst the most widely studies coordination compounds most of the transition metal complexes have been formed with such Schiff bases which contain nitrogen and oxygen donar atoms chemists all over the world have long been studying the co-ordination behaviour of multidentate ligands containing nitrogen, oxygen and sulphar donar ligands, these days, It have been live field of studies due to it's indivisible relation with human life. Co-ordination compounds are well being used in chemotherapy.

Key Words:- Preparation, procedure, elemented analysis electrical conductivity, magnetic moment.

Introduction :- Preparation of Cu (II) Complexes: Preparation of Cu(II) complexes with the ligand 1, 3-bis (o-hydroxy anilino) Propane were carried out in presence of various bases like ammonia, quinoline phenyl isocyanide, pyridine and different picolines, nitrogen donar molecules by a general procedure described below;

Procedure :- 2.6 grams (0.001 mole) of the ligand dissolved in the minimum volume of alcohol was added to 0.24 gram (0.001 mole) of Cu(II) chloride hexahydrate (BDH) dissolved in ethanolic-aqueous solution with regular shaking and stirring. The resulting solution was then reflux for one hour on water bath. The colour of the solution was gradually changed during the course of refluxion and green crystal separated out by allowing the solution to stand for three days at room temperature. The product was separated by filtration, washed with a small amount of acetone and the dried over KOH in a desiccator. The complexes of Cu(II) ions with 1, 3-bis(0-hydroxy anilino) propane as the ligand (LH₂) were prepared separately with nitrogen containing bases like ammonia, quinoline, phenyl-isocyanide, pyridine, α -picoline, β - picoline and γ - picoline having the metal ligand ration as 1:1 in each case. On the basis of elemental analysis the complexes were found to posses the general molecular formula [Cu(L)B₂].

Where,

| | | |
|-----|---|---------------------|
| B | = | Water |
| | = | Ammonia |
| | = | Quinoline |
| | = | Phenyl isocyanide |
| | = | Pyridine |
| | = | α – picoline |
| | = | β – picoline |
| And | = | γ - picoline |

Elemental analysis of Cu(II) complexes with 1, 3-bis (o-hydroxy anilino) propane.

| Complex | Metal | Carbon | Hydrogen | Nitrogen |
|---|------------------|------------------|----------------|------------------|
| 1. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(H ₂ O) ₂] | 16.96 (17.27) | 45.26 (45.71) | 4.40 (4.35) | 15.25 (15.23) |
| 2. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(NH ₃) ₂] | 17.10 (17.37) | 45.56 (45.96) | 4.96 (4.92) | 23.04 (22.98) |
| 3. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₉ H ₇ N) ₂] (Quinoline) | 10.60 (10.99) | 68.20 (68.57) | 5.20 (5.19) | 9.72 (9.69) |
| 4. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₆ H ₅ NC) ₂] (Phenyl isocyanide) | 11.80 (12.08) | 61.90 (62.22) | 4.96 (4.94) | 10.70 (10.65) |
| 5. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₅ H ₅ N) ₂] (Pyridine) | 12.96 (13.29) | 62.40 (62.82) | 5.46 (5.44) | 11.76 (11.72) |
| 6. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₅ H ₄ NCH ₃) ₂] (α -picoline) | 12.36 (12.56) | 63.70 (64.09) | 5.95 (5.93) | 11.12 (11.07) |
| 7. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₅ H ₄ NCH ₃) ₂] (α -picoline) | 12.40 (12.56) | 63.76 (64.09) | 5.94 (5.93) | 11.14 (11.07) |
| 8. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₅ H ₄ NCH ₃) ₂] (γ -picoline) | 12.30 (12.56) | 63.63 (64.09) | 5.96 (5.93) | 11.10 (11.07) |

Electrical conductance of the [Cu(L)B₂] complexes :- These complexes are insoluble in common organic solvent viz, carbon tetrachloride, methanol ethanol, dioxane, THF (tetrahydrofuran), pyridine, acetone but they are partially soluble in DMSO (dimethyl sulphoxide) and appreciable in DMF (dimethyl formamide). The molar conductance of the complexes of Cu(II) ions with 1, 3-bis (o-hydroxy anilino) propane at 10⁻³ M DMF solution at room temperature.

Data of electrical conductivity of the [Cu(L)B₂] Complexes.

| Complexes | OMh-1 cm ² mole ⁻¹ | Solvent |
|---|--|---------|
| 1. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(H ₂ O) ₂] | 24 | DMF |
| 2. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(NH ₃) ₂] | 18 | DMF |
| 3. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₉ H ₇ N) ₂] (Quinoline) | 14 | DMF |
| 4. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₆ H ₅ NC) ₂] (Phenyl isocyanide) | 12 | DMF |
| 5. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₅ H ₅ N) ₂] (Pyridine) | 16 | DMF |
| 6. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₅ H ₄ NCH ₃) ₂] (α -picoline) | 14 | DMF |
| 7. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₅ H ₄ NCH ₃) ₂] (α -picoline) | 12 | DMF |
| 8. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₅ H ₄ NCH ₃) ₂] (γ -picoline) | 16 | DMF |

Data of Magnetic moment of the [Cu(L)B₂] Complexes :-

| Complexes | Colour | μ_{eff} (B.M) | Magnetic Properties |
|---|--------------|--------------------------|---------------------|
| 1. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(H ₂ O) ₂] | Green | 1.91 | Paramagnetic |
| 2. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(NH ₃) ₂] | Parrot green | 1.97 | Paramagnetic |
| 3. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₉ H ₇ N) ₂] (Quinoline) | Parrot green | 1.96 | Paramagnetic |
| 4. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₆ H ₅ NC) ₂] (Phenyl isocyanide) | Parrot green | 1.98 | Paramagnetic |
| 5. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₅ H ₅ N) ₂] (Pyridine) | Parrot green | 2.02 | Paramagnetic |
| 6. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₅ H ₄ NCH ₃) ₂] (α -picoline) | Deep green | 2.00 | Paramagnetic |
| 7. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₅ H ₄ NCH ₃) ₂] (β -picoline) | Deep green | 1.97 | Paramagnetic |
| 8. [Cu(C ₁₅ H ₁₆ N ₂ O ₂)(C ₅ H ₄ NCH ₃) ₂] (γ -picoline) | Deep green | 1.96 | Paramagnetic |

Conclusion :- In this paper we may be suggested that Cu(II) cation form octahedral complexes with the ligand, 1, 3-bis (O-hydroxyl aniline)propane in presence of bases compairing oxygen and nitrogen atoms as their donar sites. There is a good deal of works available in this field, how ever, there is vast scope for the preparation of novel chelates of organic ligands with metal ions.

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