Synthesis and Characterization of Ni^{2+} and Cu^{2+} Schiff-base Complexes and Their Study for Electrical Properties

Muhanned Jawad Kadhim Al-Assadi
Department of Chemistry-College of Education-University of Basrah
Basrah-Iraq
E-Mail: **dr.muhanned75@yahoo.com**
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Abstract

Thiourea derivative Schiff base ligand and their Ni^{2+} and Cu^{2+} complexes have been synthesized. The ligand and their complexes were identified by FTIR, U.V and CHN. The electrical properties for preparing compounds were studied before and after doping with I_2 at temperature (30-110°C) for (72 hrs). The maximum value of the conductivity was $1.23*10^{-4}ohm^{-1}.cm^{-1}$ after doping with I_2.

Key Words: Thiourea derivatives, Schiff-base complexes, Antibacterial activity.

Introduction

The condensation of an amine and an aldehyde to give an imine or isomethine group is well known to be reversible; the removal of water to drive this reaction to completion is often essential to obtain a good yield [1].

Industrial production and the use of Fe, Co, Cu, Ni, Zn, Cd, and Pb elements can cause environmental pollution. On the other hand, some of these metals are present in tracing amounts as essential elements for biological system and these metal ions also play an important role in bioinorganic chemistry. In order to understand the role of these metal ions in biological system, structural studies of the biological compounds and their metal complexes are extremely important [2].

Compounds containing carbonyl and thio carbonyl group occupy an important position among organic reagents as potential donor ligand for transition metal ions [3, 4]. Among these thiourea derivatives are potentially very versatile ligand, able to coordinate to a range of metal centers as neutral ligands, monoanions or dianions [5, 6].

The oxygen, nitrogen and sulfur donor atoms of thiourea derivatives provide a multitude of binding possibilities. Both the ligand and their metal complexes display a wide range of biological activity [7, 8].

The aim of this work is to elucidate the geometry structures and electrical properties of the Schiff base chelates derived from benzoyl chloride and potassium thiocyanate in chelating with divalent transition metal ions cupper and nickel.

Experimental

A- Chemicals

Benzoyl chloride (BDH), Acetone (BDH), Potassium thiocyanate (Fluka), Diethyl amine (Fluka), Hydrochloric acid (BDH), Ethanol (BDH), Dichloromethane (BDH), Cupper acetate monohydrate (Fluka), Nickel acetate dihydrate (Fluka) and distillated water.

B- Instruments

1. FTIR-Infrared photometer (8400s) made by (SHIMADZU) the range (4000-400)cm^{-1} in the State Company for Petrochemical Industries (SCPI).
2. Elemental analysis (CHN) from Science College-Tehran University.
3. Electrical conductivity (JENWQY) made by (UK) which consists of (voltmeter, sample