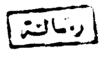


PREPARATION AND INVESTIGATION OF COMPLEXES OF SOME TRANSITION METALS WITH SCHIFF'S BASES

A THESIS

PRESENTED TO FACULTY OF SCIENCE AIN SHAMS UNIVERSITY (Cairo)





By
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PREPARATION AND INVESTIGATION OF COMPLEXES OF SOME TRANSITION METALS WITH SCHIFF'S BASES

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The following two manuscripts which were extracted from this work were accepted for publication and are in print:

- Mono-, di- and tri- nuclear metal complexes of new pentadentate schiff bases.
 - Kamal A.R. Salib, Salah B. El-Maraghy and Saled M. El-Sayed. Indian Journal of Chemistry. In print.
- Preparation and properties of Metal Complexes with New Asymmetric Pentadentate Schiff Base Ligands.

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ARABIC ST	JMMARY				

CHAPTER I INTRODUCTION

1. Importance of Schiff Base Complexes

Schiff base complexes have received considerable attention as biomimic model compounds [1-5]. N,N-bis(salicylidene)ethylenediaminato cobalt(II), Co(SALEN), absorbs molecular oxygen reversibly in the solid state [6]. Fe(SALEN) has become attractive as the model compound of natural iron protein, hemerythrin which binds molecular oxygen reversibly [7]. Cu(SALEN) is also a potential model compound of hemocyanin.N,N-bis(acetylacetone) ethylenediaminato cobalt(II), Co(ACACEN), has been reported to bind molecular oxygen reversibly in N,N-dimethylformamide [2,8]. Schiff base complexes incorporating two similar or different metal ions are also of special interest. They are similar to those found in the living organisms, e.g. enzymes and proteins which develop their activity in the presence of two or more metal ions [9-11]. These complexes are also useful in catalysis [12].

2. Half Unit Schiff Base Ligands

Usually the condensation of one molecule of the diamines with two molecules of ketonic compounds produce symmetrical Schiff bases such as ACACEN and SALEN.

In recent years chemists succeeded in preparing half unit Schiff base compounds by reacting one molecule of both the diamine and the ketonic compounds under certain conditions, e.g. half units (a) [13] and (b) [14] as shown in the following figure:

Tridentate half unit ligand Tetradentate half unit ligand

The half unit prepared from acetylacetone and 1,2-diaminoethane is unstable for a long time and hydrolyses slowly [13]. However, it could be used for preparing unsymmetrical Schiff bases.

Not all half units derived from 8-diketones could be easily prepared by direct condensation with diamines [15]. In this case, they may be obtained via their metal complexes which are initially prepared. Partial hydrolysis of the tetradentate Schiff bases derived from 6-methylpyridine-2-carbaldehyde [16] or thiophene-2-carbaldehyde [17] and 1,2-diaminoethane in the presence of metal ions (Fe(III) or Cu(II)) led to the isolation of metal complexes of the tridentate half units L_1 and L_2 as shown in the following figure:

Tridentate half unit ligands

Similarly, partial hydrolysis of pentadentate Schiff base derived from 1,1,1-trifluoropentane-2,4-dione and 1,5-diamino-3-azapentane in the presence of Cu(II) or Ni(II) gives the metal complexes of L_3 as shown in the following figure:

Tetradentate half unit ligand

The half unit L $_4$, as shown in the following figure, was not isolated by the reaction of 2-hydroxybenzaldehyde with an excess of 1,3-diaminopropane due to separation problems [18]. It was obtained through the formation of $[Ni(L_4-H)_2]$.

 $L_{\underline{A}}$

Tridentate half unit ligand

The nickel(II) ion in the complex could be removed from the complex using dimethylglyoxime as precipitant to give the free half unit.