Ain Shams University
Faculty of Education
Chemistry Department

Synthesis and characterization of some metal complexes containing the chromone moiety

A Thesis Submitted
By

Noha Nabil Abdel Azim

Researcher
Department of Chemistry, Faculty of Education, Ain Shams University

B.Sc. & Ed. 2007
General diploma For the Teacher's Preparation
In Science (Chemistry) 2012
Special diploma For the Teacher's Preparation
In Science (Inorganic Chemistry) 2013

For
The Degree Of
Master of Teacher's Preparation In Science
(Inorganic Chemistry)

Supervisors

Prof. Dr.Ali Mahmoud Taha
Prof. of Inorganic Chemistry, Faculty of Education, Ain Shams University.
Prof. Dr. Magdy Shebl Saleh
Prof. of Inorganic Chemistry, Faculty of Education, Ain Shams University.
Dr.Omima Mohamed Ibrahim Adly
Assistant Prof. of Inorganic Chemistry, Faculty of Education, Ain Shams University.

Cairo -2018

Faculty of Education
Chemistry Department

Title sheet

Synthesis and characterization of some metal complexes containing the chromone moiety

Candidate: Noha Nabil Abdel Azim

Date of Birth:12/11/1986

First University Degree: B.Sc. & Ed., May 2007

Degree: Master of Teacher's Preparation in Science

(Inorganic Chemistry)

Department: Chemistry

Faculty: Education

Name of university: Ain Shams

Faculty of Education
Chemistry Department

Approval Sheet

Synthesis and characterization of some metal complexes containing the chromone moiety

Supervisors **Signature**

Prof. Ali Mahmoud Taha **…….**
Professor of Inorganic Chemistry, Faculty of Education, Ain Shams University.

Prof. Dr. Magdy Shebl Saleh **…….** Professor of Inorganic Chemistry, Faculty of Education, Ain Shams University.

Dr.Omima Mohamed Ibrahim Adly **……**
Ass. Professor of Inorganic Chemistry, Faculty of Education, Ain Shams University.

Head of Chemistry Department
Prof. Dr. M. M. Mashaly
……..……

Higher studies

The thesis was approved	Approved date / / 2018
Approved by Council of Faculty	Approved by Council of University
Date / / 2018	Date / / 2018

Acknowledgement

Thanking the most powerful and merciful Allah, I'd like to thank my dear professors, ***Prof. Dr. Ali Mahmoud Taha*** *(Prof. of Inorganic Chemistry, Department of Chemistry, Faculty of Education, Ain Shams University),* ***Prof. Dr. Magdy Shebl Saleh*** *(Prof. of Inorganic Chemistry, Faculty of Education, Ain Shams University) and* ***Dr. Omima Mohamed Ibrahim Adly*** *(Assistant Prof. of Inorganic Chemistry, Faculty of Education, Ain Shams University) for Suggesting the point of this work and continuous guidance throughout all the stages of this research.*

I wish to express my thanks to ***Prof. Dr. M. M. Mashaly****, (Head of the Chemistry Department, Faculty of Education, Ain Shams University) and* ***Prof. Dr. A. Taha*** *(formar Head of the Chemistry Department, Faculty of Education, Ain Shams University) for facilities provided during the course of research work.*

Also I'm thankful to all members of the staff in the Chemistry Department for their faithful cooperation.

Noha Nabil Abdel Azim

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List of Abbreviations

Hep-G2	Human hepatocelluar carcinoma
LD50	Lethal dose
TEM	Transition electron microscope
EAC	Ehrlich Ascites Carcinoma
MCF-7	Human breast cancer cell line
DPPH	2,2' Diphenyl-1-picrylhydrazyl
EDTA	Ethylene diamine tetraacetic acid
DMSO	Dimethylsulfoxide
TGA	Thermal gravimetric analysis
DrTGA	Derivative thermal gravimetric analysis
ΔS	Entropy change
ΔH	Enthalpy change
ΔG	Free energy change
8-HQ	8-Hydroxyquinoline
Phen	1,10-Phenanthroline
Bpy	2,2'-Bipyridyl
AcOH	Acetic acid
α	Weight loss
E_a	Heat of activation
TG	Thermogram
R	Universal gas constant (8.3144 J mol^{-1} k^{-1})
A	Pre-exponential factor
Φ	Heating rate
r	Correlation coefficient
k	Boltzman's constant (1.388×10^{-23}J K^{-1})

Name: Noha Nabil Abdel Azim

Title : Synthesis and characterization of some metal complexes containing the chromone moiety

Submitted to: Chemistry Department, Faculty of Education, Ain Shams University

Abstract

Reactions of 3-formylchromone with different salts of copper(II), nickel(II), cobalt(II), zinc(II) and cadmium(II) ions afforded binary complexes. Also, ternary complexes were synthesized by reaction of the ligand with these metal ions in the presence of secondary ligands: [8-hydroxyquinoline, 1,10-phenanthroline and 2,2'-bipyridyl]. The structures of the newly prepared complexes were identified by elemental analyses, IR, electronic, mass, ^{1}H-NMR and ESR spectra as well as molar conductivity, magnetic susceptibility measurements and thermal gravimetric analysis (TGA). The ligand acts as a neutral bidentate ligand and the metal complexes exhibited octahedral and square planar geometrical arrangements. The obtained complexes include neutral and cationic mononuclear complexes with different molar ratios; 1:3, 1:2 and 1:1; M:L for binary complexes and 1:2:1, 1:1:1 and 1:1:2; M:L:L′ for ternary complexes. Kinetic parameters (Ea, A, ΔH, ΔS and ΔG) of the thermal decomposition stages have been evaluated using Coats–Redfern equations. The structural parameters of the ligand and its metal complexes have been calculated and correlated with the experimental data. The ligand and its metal complexes showed antibacterial activity towards Gram–positive bacteria, Gram–negative bacteria, yeast and fungus.