Synthesis and spectral characterization of carboxylate ligand derived from 2, 4-dnph

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DEPARTMENT OF CHEMISTRY
SCHOOL OF SCIENCE
UNIVERSITY OF MANAGEMENT AND TECHNOLOGY,
LAHORE, PAKISTAN

In the name of

Allah,

The most Compassionate,

The most merciful

The Prophet (Peace be upon him) said,
"Allah makes the way to Jannah easy for him who treads the path in search of knowledge.''

(Al-Muslim)

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I **ABUBAKAR** S/O **ABDUR-REHMAN** ID: **13004067009**

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Certified that the research work contained in this thesis titled, "SYNTHESIS AND SPECTRAL CHARACTERIZATION OF CARBOXYLATE LIGAND DERIVED FROM 2, 4-DNPH" has been carried out and completed by **ABU-BAKAR ABDURREHMAN,** ID: **13004067009**. The quantum and the quality of the work contained in this thesis is adequate for the award of Degree of BS in Chemistry.

_____

Supervisor

_____

Dr. Sammia Shahid
Chairperson,
Department of Chemistry,
UMT, Lahore.

Dedication

DEDICATE THIS REPORT TO HOLY PROPHET MOHAMMAD (PEACE BE UPON HIM)

THE GREAT TEACHER AND REFORMER.

MY FAMILY WHOSE COURAGE AND PRAYERS ENABLE ME TO COMPLETE THIS WORK.

ABU-BAKAR ABDURREHMAN

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May Allah bless all of them.

ABSTRACT

Most of the ligands have been synthesized from different aldehydes and amines with the continuous magnetic stirrer method. The ligand in this study is synthesized from the reaction of Maleic anhydride with 2, 4-Dinitrophenylhydrazine, which gives the yellow solid product of 2,4DNPH-M-P, with a sharp melting point that is insoluble in most of organic solvents.

The spectroscopic study helps to predict the structure of the product 2,4DNPH-M-P and confirm the results using the Fourier transform infrared spectroscopy **(**FTIR) technique which identifies the different bonding present in it.

The pH and conductivity of the synthesized carboxylate ligand 2,4DNPH-M-P is checked in different solvents. It has different pH and conductivity in different solvents. Methanol and Ethanol has high conductivity compared to other solvents, and the pH of the solvents changes from basic to acidic medium. The synthesized carboxylate ligand 2,4DNPH-M-P has many important applications in biomedical, complexes formation, and Metal Organic Frameworks (MOFs).

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Introduction

MALEIC ANHYDRIDE

Maleic anhydride with its formula C_2H_2 $(CO)_2O$, is a needle like, colorless crystalline. It is a versatile compound that it contains many applications itself. There are three active sites present in the maleic anhydride. It acts as an intermediate in the fine chemical industry, especially in the agriculture chemical synthesis and oil additive lubricants. Maleic anhydride is a classic Diels-Alder reagent. It has been used mostly in resin formulation.

1.1 Physical properties of Maleic anhydride

I. The chemical formula of Maleic anhydride is $C_4H_2O_3$ and has the molecular weight of 98.06 g/mol.

II. Maleic anhydride decomposes in water and forms colorless or white solid crystals.

III. The boiling point of maleic anhydride is 202°C and its melting point is 52.8°C.

IV. Maleic anhydride has the specific gravity 1.48 and its conversion factor is;
1 ppm = 4.0 mg/m^3.

V. Maleic anhydride has a pungent smell with the 0.32 ppm threshold odor.

VI. Vapor pressure of Maleic anhydride has been observed between 0.1_0.2 mm Hg at 25°C. ***(Jiang, Feng et al. 2014)***