

# Synthesis and spectral characterization of carboxylate ligand derived from *p*-toluidine

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I Muhammad Mohsin Siddique S/O Muhammad Siddique ID: 14005067007 Session **2013-2017** Hereby declare that the matter printed in the thesis titled **“SYNTHESIS AND SPECTRAL CHARACTERIZATION OF CARBOXYLATE LIGAND DERIVED FROM *p*-TOLUIDINE”** is my own work and has not been printed, published and submitted as research work, thesis or publication in any form in any University, Research institution etc. in Pakistan or abroad.

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## **RESEARCH COMPLETION CERTIFICATE**

Certified that the research work contained in this thesis titled, “SYNTHESIS AND SPECTRAL CHARACTERIZATION OF CARBOXYLATE LIGAND DERIVED FROM *p*-TOLUIDINE” has been carried out and completed by Muhammad Mohsin Siddique, ID: 14005067007. The quantum and the quality of the work contained in this thesis are adequate for the award of Degree of BS in Chemistry

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## **Dedication**

DEDICATE THIS EFFORT TO HOLY PROPHET MOHAMMAD (PEASE BE UPON HIM) THE GREAT TEACHER AND REFORMER.

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

**MUHAMMAD MOHSIN SIDDIQUE**

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**May ALLAH bless all of them**

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## **ABSTRACT**

Many carboxylate ligands are derived from various amines and aromatic compounds. The carboxylate ligand that I have prepared is by reacting maleic anhydride with *p*-Toluidine which produces a light brown initial color and light yellow end product after continuous stirring on magnet stirrer overnight. It has very high melting point and is soluble and insoluble in different solvents. Its physical and chemical properties are tested by using different solvents like ethyl acetate, acetone, methanol, ethanol, chloroform, n-hexane, DMSO, distilled water, glacial acetic acid.

After obtaining the product I have calculated the %age yield of the product that I have obtained and characterized this carboxylate ligand by using FT-IR.

This ligand has many applications as an intermediate, as antifungal, anti-bacterial active compound, antimicrobial compound, in the synthesis of MOF's, as anti-drug, also as active catalysts.

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# CONTENTS

Acknowledgement		iv
Abstract		v
List of table's		vii
List of figures		ix
<b>CHAPTER 1: INTRODUCTION</b>		<b>1-12</b>
1.0	<i>p</i> -Toluidine	01
1.1	Synthesis	02
1.2	Properties of <i>p</i> -Toluidine	03
1.3	<i>p</i> -Toluidine Hazards	04
1.4	Precautions	05
1.5	Stability and reactivity	05
1.6	Source and potential exposure	05
1.7	<i>p</i> -Toluidine Market and consumption	06
1.8	<i>p</i> -Toluidine uses	07
1.9	Spectral characterization of <i>p</i> -toluidine	07
1.10	<i>p</i> -Toluidine Applications	08
1.11	Maleic anhydride	09
1.12	Synthesis of Maleic anhydride	09
1.13	properties of Maleic anhydride	09

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1.14	Uses of Maleic anhydride	10
1.15	Applications of Maleic anhydride	11
1.16	Hazards	11
1.17	Aims and objective	12

**CHAPTER 2: LITERATURE REVIEW 13-18**

**CHAPTER 3: EXPERIMENTAL WORK 19-26**

3.0	Experimental work	19
3.1	Materials	20
3.2	Apparatus and instruments	20
3.3	Analytical and Separation techniques	21
3.4	Solubility	21
3.5	Synthesis of carboxylate ligand	22
3.6	Percentage yield	23
3.7	Melting point	23
3.8	pH Test	24
3.9	Conductivity	25

**CHAPTER 4: RESULTS AND DISCUSSION 27- 33**

4.0	Results and discussions	28
4.1	FT-IR spectroscopy	29
4.2	Summary	32
4.3	Conclusion	32

**CHAPTER 5: REFERENCES 34-37**

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## LIST OF TABLES

Table 1.7	Market and world consumption of <i>p</i> -Toluidine	6
Table 1.13.2	Solubility of Maleic Anhydride	10
Table 3.4.1	Solubility of <i>p</i> -Toluidine	21
Table 3.4.2	Solubility of Carboxylate ligand	22
Table 3.7.1	Melting point and crystallization of carboxylate ligand	24
Table 3.9.1	Conductivity of solvent without ligand	25
Table 3.9.2	Conductivity of solvent with ligand	25

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## **LIST OF FIGURES**

Figure 3.8	pH test with and without ligand	24
Figure 4.1.1	FT-IR results of carboxylate ligand	29
Figure 4.1.2	FT-IR results of Maleic anhydride	30
Figure 4.1.3	FT-IR results of <i>p</i> -Toluidine	31

# **Chapter 1**

## **Introduction**

## Introduction

### 1.0 *p*-Toluidine

*p*-Toluidine is an aromatic compound that has one methyl and one amino group at the para position to each other on the aromatic ring. Toluidine itself has three types of isomers that are Meta, ortho and *p*-Toluidine. All of these have the same molecular structure only the methyl group position is changed.

*p*-Toluidine is usually present in various vegetables like peas, cabbage, carrots (*Neurath et al., 1977*). It is also evolved from biofilms in penicillium, viridicatum. It is synthesized from the degradation of *p*-nitro toluene (*Popat and Padhiyar 2013*). *p*-Toluidine is also obtained from gasoline (*Tomkins and Ho 1982*). It is also obtained as a side product from coal oil (*Tomkins and Ho 1982*).

*p*-Toluidine smells just like wine and is a colorless crystalline solid in appearance. It is stable at normal temperature but it has a very low melting point so it can catch fire easily. When it is heated it releases nitrogen oxides that are very harmful.