

CONTENTS

Certificate	
Declaration	i
Acknowledgements	ii-v
List of Abbreviations	vi-vii
Chapter 1:	[1-33]
<i>General Introduction</i>	
1.1. History and properties.	1-2.
1.2. Pseudohalides coligands	1-4.
1.3. Present status of the chemistry of pyrazolyl containing N ₄ -coordinate tetradentate ligands and their compounds.	1-7.
1.4. Review of the chemistry of Pyrazole nitrogen and thioether containing ligands and their compounds.	1-17.
1.5. Project outline of this work	1-23.
1.6. References	1-27.
Chapter 2:	[1-29]
<i>Binuclear Copper(II) Complexes with azide and carboxylate bridging ligands: Synthesis, Crystal structures and Magnetic properties.</i>	
Abstract	2-1.
2.1. Introduction	2-2.
2.2. Experimental	2-3.
2.2.1. Materials	2-3.
2.2.2. Physical Measurements	2-3.
2.2.3. Syntheses of Ligand	2-4.
2.2.4. Syntheses of Complexes	2-4.
2.3. X-ray Crystallography	2-6.
2.4. Results and Discussions	2-9.
2.4.1. Syntheses	2-9.
2.4.2. ¹ H NMR, IR and UV-Visible spectral data.	2-11.

2.4.3.	Description of Crystal Structures	2-15.
2.4.4.	Magnetic study.	2-24.
2.5.	Conclusion	2-26.
2.6.	References	2-27.
<u>Chapter 3(A):</u>		[1-40]
<i>Syntheses, Structures, DNA cleavage and antimicrobial study of Copper(II) and Nickle(II) Halide Complexes with Pyrazolyl Containing N₃S-coordinate Tripodal Ligands.</i>		
	Abstract	3(A)-1.
3(A).1.	Introduction	3(A)-2.
3(A).2.	Experimental	3(A)-3.
3(A).2.1.	Materials	3(A)-3.
3(A).2.2.	Physical Measurements	3(A)-3.
3(A).2.3.	Antimicrobial activity assay	3(A)-4.
3(A).2.4.	Cleavage experiment	3(A)-4.
3(A).2.5.	Preparation of ligand	3(A)-4.
3(A).2.6.	Syntheses of the complexes	3(A)-6.
3(A).3.	X-ray Crystallography	3(A)-10.
3(A).4.	Results and Discussions	3(A)-13.
3(A).4.1.	Synthesis	3(A)-13.
3(A).4.2.	IR Spectral data	3(A)-15.
3(A).4.3.	UV-Visible spectra, EPR and magnetic data.	3(A)-20.
3(A).4.4.	Descriptions of Crystal Structures	3(A)-23.
3(A).4.5.	Cleavage experiment	3(A)-33.
3(A).4.6.	Antimicrobial activity	3(A)-35.
3(A).5.	Conclusions	3(A)-37.
3(A).6.	References	3(A)-38.
<u>Chapter 3(B):</u>		[1-26]
<i>Synthesis, characterization and structures of copper(II) and cobalt(II) complexes containing azide/ thiocyanate/ nitrite and flexible N₃S-coordinated ligand.</i>		
	Abstract	3(B)-1.
3(B).1.	Introduction	3(B)-2.
3(B).2.	Experimental	3(B)-3.
3(B).2.1.	Materials	3(B)-3.

3(B).2.2.	Syntheses of Complexes	3(B)-3.
3(B).3	X-ray Crystallography	3(B)-6.
3(B).4.	Results and Discussions	3(B)-9.
3(B).4.1.	Syntheses	3(B)-9.
3(B).4.2.	IR, UV-Visible spectra, EPR and magnetic spectral data	3(B)-10.
3(B).4.3.	Descriptions of Crystal Structures	3(B)-15.
3(B).5.	Conclusions	3(B)-23.
3(B).6.	References	3(B)-24.
Chapter 4:		[1-38]

Metal(II) halides Complexes with a New Tetradentate N-Heterocyclic tripodal

Ligand: Synthesis, Characterization, Structures and Bioactivities.

	Abstract	4-1.
4.1.	Introduction	4-2.
4.2.	Experimental	4-3.
4.2.1.	Materials	4-3.
4.2.2.	Physical Measurements	4-3.
4.2.3.	Antimicrobial activity assay	4-3.
4.2.4.	Cell line and culture	4-3.
4.2.5.	Cell Proliferation assay (MTT)	4-4.
4.2.6.	Cleavage experiment	4-4.
4.2.7.	Synthesis of ligand	4-5.
4.2.8.	Syntheses of Complexes	4-6.
4.3.	Crystal structure determination	4-8.
4.4.	Results and Discussions	4-11.
4.4.1.	Synthesis	4-11.
4.4.2.	Spectral Data	4-12.
4.4.3.	UV-Visible spectra, EPR and magnetic data	4-18.
4.4.4.	Crystal Structures	4-21.
4.4.5.	Antimicrobial activity	4-30.
4.4.6.	Anti-proliferative activities of Copper and Cobalt salts and its complexes.	4-31.
4.4.7.	Cleavage experiment	4-33.

4.5.	Conclusions	4-35.
4.6.	References	4-36.

Chapter 5(A): [1-52]

Synthesis, Characterization and Structures of Copper(II), Nickel(II), Cobalt(II), Zinc(II) and Cadmium(II) complexes involving N₄-donor ligand and NCO/NCS as coligand.

	Abstract	5(A)-1.
5(A).1.	Introduction	5(A)-2.
5(A).2.	Experimental	5(A)-3.
	5(A).2.1. Materials	5(A)-3.
	5(A).2.2. Syntheses of Complexes	5(A)-3.
5(A).3.	X-ray Crystallography	5(A)-8.
5(A).4.	Results and Discussions	5(A)-14.
	5(A).4.1. Syntheses	5(A)-14.
	5(A).4.2. IR Spectra	5(A)-15.
	5(A).4.3. UV-Visible spectra and magnetic data	5(A)-24.
	5(A).4.4. Descriptions of Crystal Structures	5(A)-25.
5(A).5.	Conclusions	5(A)-48.
5(A).6.	References	5(A)-49.

Chapter 5(B): [1-37]

Coordination behaviour of N₄-coordinate pyrazolyl containing tetradentate ligand and selenocyanate / thiocyanate ion in the transition metal complexes.

	Abstract	5(B)-1.
5(B).1.	Introduction	5(B)-2.
5(B).2.	Experimental	5(B)-3.
	5(B).2.1. Materials	5(B)-3.
	5(B).2.2. Syntheses of Complexes	5(B)-3.
5(B).3.	X-ray Crystallography	5(B)-6.
5(B).4.	Results and Discussions	5(B)-9.
	5(B).4.1. Syntheses	5(B)-9.
	5(B).4.2. IR and ¹ H NMR data.	5(B)-12.
	5(B).4.3. UV-Visible spectra and magnetic data	5(B)-17.
	5(B).4.4. Description of Crystal Structures	5(B)-18.

5(B).4.5. Computational study	5(B)-31.
5(B).5. Conclusions	5(B)-34.
5(B).6. References	5(B)-35.
List of Publications	I-II
Conferences attended.	III