

CONTENTS

Abstract	ii
Abstrak	iii
Acknowledgement	iv
Table of Contents	v
List of Figures and Schemes	viii
List of Tables	ix
1.0 INTRODUCTION	1
1.1 A Short Introduction of the Schiff Base Ligands	2
1.2 A Short Introduction of Dioxomolybdenum(VI) Schiff Base Complexes	6
1.3 Spectroscopic Techniques for Structural Analysis	
1.3.1 IR Spectroscopy	8
1.3.2 NMR Spectroscopy	11
1.3.3 UV-Vis Spectroscopy	12
1.3.4 Thermogravimetric Analysis (TGA)	13
1.3.5 Cyclic Voltammetry (CV)	14
1.4 Oxomolybdenum Compounds as Catalysts/ Molybdoenzyme	15
2. EXPERIMENTAL METHODOLOGY	17
2.1 Synthesis	17
2.2 Physical Measurement	29

2.3 Preparation of Mononucleating Ligands	31
2.4 Preparation of Binucleating Ligands	36
2.5 Preparation of Mononuclear Dioxomolybdenum(VI) Complexes	37
2.6 Preparation of 4,4-Bipyridine Solvated Dioxomolybdenum(VI) Complexes	44
2.7 Preparation of Dinuclear Dioxomolybdenum(VI) Complexes	45
2.8 Catalytic Property of the Oxomolybdenum(VI) Complexes on Oxidation of Benzyl Alcohol	50
2.8.1 Instrumentation	50
2.8.2 Preparation of Standard Reference Solution	51
2.8.3 Screening for Suitable Catalyst for Oxidation of Alcohol after 24 hours	51
2.8.4 Influence of Catalyst Loading on Oxidation of Alcohol	51
2.8.5 Influence of Concentration of Substrate	52
2.8.6 Influence of Reaction Temperature	53
3. RESULT AND DISCUSSION	54
3.1 General Synthesis	54
3.1.1 Synthesis of Mononuclear Dioxomolybdenum(VI) Complexes with –ONO and ONS Ligands	58
3.1.2 Synthesis of Binuclear and Polynuclear Dioxomolybdenum(VI) Complexes	60
3.2 Infra Red Spectra	61
3.2.1 IR Spectral Studies of Mononuclear Dioxomolybdenum(VI) Complexes	62
3.2.2 IR Spectra Studies of Mononuclear Complexes with –ONO Ligand System	64

3.2.3 IR Spectra Studies on Binuclear and Polynuclear Complexes	67
3.3 ^1H and ^{13}C NMR Spectroscopy	69
3.3.1 NMR Description for L1-L3 & C1-C3	84
3.3.2 NMR Description L4-L9 & C4-C15	86
3.3.3 NMR Description L10-L14 & C16-C24	87
3.4 Electronic Spectra	89
3.4.1 Interpretation of UV-Vis Spectra For Mononuclear Dioxomolybdenum(VI) Complexes	90
3.4.2 Interpretation of UV-Vis Spectra For Bi-& Polynuclear Dioxomolybdenum(VI)	92
3.5 Thermogravimetric Analysis	93
3.5.1 Thermal properties for Mononuclear Dioxomolybdenum(VI) Complexes with - <i>ONS</i> Donor Ligands System	93
3.5.2 Thermal properties for Mononuclear Dioxomolybdenum(VI) Complexes with- <i>ONO</i> Donor Ligands System	95
3.5.3 Thermal properties of Binuclear and Polynuclear Complexes	98
3.6 Cyclic Voltammetry Analysis	102
3.6.1 Electrochemical Studies for Mononuclear Complexes with - <i>ONS</i> Donor Ligands	102
3.6.2 Electrochemical Studies for Mononuclear Complexes with - <i>ONO</i> Donor Ligands	105
3.6.3 Electrochemical Studies for Dinuclear and Polynuclear Complexes	109
3.7 Crystal Structures	112
3.7.1 Introduction	112
3.7.2 Crystallographic Description of the Mononuclear	

	Dioxomolybdenum(VI) Complexes with –ONS Donor Ligands system	112
3.7.3	Crystallographic Description of the Mononuclear Dioxomolybdenum(VI) Complexes with –ONO Donor Ligands System	120
3.7.4	Crystallographic Description of the Complex C16	138
3.7.5	Crystallographic Description of the Complex C17	141
3.7.6	Crystallographic Description of the Binuclear and Polynuclear Complexes	143
3.7.7	Crystallographic Description for C18 and C19	151
3.7.8	Crystallographic Description for C20-C23	157
3.7.9	Crystallographic Description for C24	161
3.8	Catalytic Property of Dioxomolybdenum(VI) Complexes: Oxidation of Alcohol	164
3.8.1	Oxidation of Alcohol with Hydrogen Peroxide Catalyzed by Some Cis Dioxomolybdenum(VI) Tridentate Schiff Base Complexes.	164
3.8.2	Description of Oxidation Reaction Catalyzed by Different Type of Dioxomolybdenum(VI) Complexes	165
3.8.3	Influence of Catalyst Loading on Oxidation of Alcohol	167
3.8.4	Influence of Concentration of Substrate	172
3.8.5	Influence of Temperature	175
4.0	CONCLUSION	178
	REFERENCES	180
	APPENDIX	186