## TABLE OF CONTENTS

	Page
List of Figures	ix
List of Table	xi
List of Symbol and Abbreviations	xii
List of Appendices	xiv
Chapter 1: Introduction	1
1.1 Introduction	1
1.2 Aim and Scope of Work	3
1.3 Electrodeposition	5
1.4 Electrodeposition of Alloy	7
1.5 Structure of Electrodeposited Metal / Alloys	10
1.6 Selection of Substrate	11
1.7 Methanesulfonic Acid Electrolyte	11
1.7.1 Some Pertinent Properties of MSA	12
1.7.2 MSA in Electrochemical Process Involving Lead	13
1.8 Common Uses	15
Chapter 2: Experimental Methods	18
2.1 Chemical and Reagents	18
2.2 Preparation of Cathodes and Anodes	18
2.2.1 Preparation of Steel Cathodes Substrate	18
2.2.2 Cleaning and Bright Dipping of Cathodes	18
2.2.3 Polishing and Degreasing of Cathode	19
2.2.4 Final Preparation, Rinsing and Drying of Cathode	19
2.2.5 Graphite Anodes	20
2.3 Preparation of Electrolyte Bath For Plating	20

2.4	Electroplating Experiment	20
2.5	Effect of Current Density on Cu-Pb Alloys Deposition Weigth	23
2.6	X-Ray Diffraction	23
2.7	Scanning Electron Microscopy (SEM)	24
2.8	Energy Dispersive X-Ray(EDX) Analysis	24
2.9	Cyclic Voltammetry	25
2.10	Instrumentations	28
2.10	0.1 Electrodeposition of Cu-Pb Alloys by WonATech	28
2.10	0.2 X-Ray Diffraction (XRD)	29
2.10	0.3 Scanning Electron Microscopy (SEM) study	31
2.10	0.4 EDX analysis	32
2.10	0.5 Cyclic Voltammery of Cu-Pb Alloys by means of Autolab	33
Cha	pter 3: Result and Discussion	34
3.1	Electrodeposition Cu-Pb Alloys from MSA Bath	34
3.2	Physical Appearances of Quiescent Bath at a room temperature	35
3.3	Mass Electrodeposition	37
3.4	Current Efficiency	38
3.5	X-Ray Diffraction	42
3.6	Scanning Electron Microscopy / Energy Dispersive X-Ray (SEM/ EDX) Analysis	49
3.7	Cyclic Voltammery	60
Cha	pter 4: Conclusion	66
Refe	erences	69
App	endix	73