



AinShamsUniversity
Faculty of Girls, Arts,
Science and Educationn
Cairo, Egypt

Electrochemical behavior of Aluminum coated with different alloys by electroless deposition

A Thesis

***Submitted for degree of Science (Physical
Chemistry)***

***Faculty of Girls for Arts, Science & Education
Ain Shams University***

Presented by

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Cairo, 2015



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BY

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السلوك الكهروكيميائي لشرائح الألومنيوم المغطاة بسبائك مختلفة عن طريق الطلاء اللاكهربى

رساله مقدمه الي

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من

مروة محمد محمد محمد اسماعيل

للحصول علي

درجه الماجستير فى الكيمياء (كيمياء فيزيائيه)

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Aim of the work

One of the most important functions of deposited coatings is to provide protection against corrosion of industrial machinery and plant are major sources of loss in a national economy. Not only do they reduce the life of such equipment and increase the amounts of down-time, but, they do also have implication in terms of maintenance casts and expenditure on replacement parts. The alternative strategy to avoid the use of low-cost materials of construction is not only expensive but can also involve materials which are less easy to work.

Aluminum alloys possess high mechanical strength, excellent thermal and electrical conductance, good reflectivity and low working cost.

Since such problem of corrosion occur at the surface, only by surface treatment can they be reduced or eliminated. This is where the deposition of metallic coatings from aqueous media offers practical solutions, such coating being capable of deposition at useful thickness and with defined properties appropriate to the problem.

Electroless nickel (EN) plating is used to deposit nickel without the use of an electric current.

Although a variety of metals can be electrolessly plated, electroless Ni-P coating has received widespread acceptance as it provides high hardness and excellent resistance corrosion. Electroless Ni-P coatings are widely used for corrosion protection application in a variety of environment. It is a barrier coating, protecting the substance by sealing it off from the corrosive environment, rather than by sacrificial.

Development of electroless nickel alloy deposits is considered as the most effective method to alter the chemical and physical properties of binary Ni-P alloy and ternary Ni-Sn-P alloy deposit. The choice of the additional element is made based on the chemical, physical propriety to be imparted in the deposit.

The aim of the present work is to study the properties of electroless plating coatings Ni-P and Ni-Sn-P (with two different concentrations of tin chloride 0.1g/l and 1g/l) alloys. The electrochemical corrosion behavior of substrate, electroless Ni-P and Ni-Sn-P alloys were examined. The solutions used for testing the corrosion protection are 3.5%NaCl, 0.1N HCl and a 0.1N NaOH solution, on aluminum substrate was investigated by electrochemical methods.

Also study the effect of heat treatment on microstructure of these coating.

CONTENTS

List of Tables	i-iv
List of Figures	v-xi
Aim of the Work	xii-xiii
CHAPTER I.	1
Introduction	1-40
CHAPTER II	41
Experimental Techniques	41
II.1- Materials.	41
II.1.1- Chemicals and Reagents.	41
II.1.1.1- Chemicals for pretreatment of various substrate materials for degreasing.	41
II.1.1.2. Chemicals for Electroless Nickel Baths.	42
II.1.1.3. Chemicals for solution tests.	42
II.1.1.4. Test specimens.	42
II.1.1.5 - Preparation of Electroless Nickel Bathes.	43-46
II.2 Experimental plan.	47
II.3 Kinetics of electroless Nickel deposition	47
II.3.1- Effect of Nickel salt (source of Nickel ion)	47
II.3.2- Effect of sodium citrate (complexing agent).	47
II.3.3 Effect of sodium hypophosphite (reducing agent).	47
II.3.4- Effect of time on deposition rate.	48
II.3.5- Effect of temperature on deposition rate.	48

II.3.6- Effect of pH.	48
II.4 Properties of Electroless Nickel Deposition	49
II.4.1- Microstructure study.	49
II.4.1.1- Thin film.	49-50
II.4.1.2- Chemical composition of coating.	50
II.4.1.3- Scanning electron microscope (SEM).	51-52
II.4.2- Corrosion Resistance	53
CHAPTER III	54
Results and discussion	54
<u>III.1. Electroless Deposition of Nickel-Phosphorus Alloys.</u>	54
III.1- Effect of Nickel sulfate salt (source of nickel ions).	54
III. 1.2- Effect of citric acid (complexing agent).	54
III. 1.3- Effect of sodium hypophosphite (reducing agent).	57-62
III. 1.4- Effect of time on deposition rate.	63
III.1.5- Effect of temperature on deposition rate.	63-66
III.1.6- Effect of pH on deposition rate.	66-61
III. 1.7- Effect of tin chloride concentration on deposition rate.	69
III.2. Thin film.	71-79
III.3. EDX Analysis.	79-80
III.4. Morphology.	81

III.5. Cross section	81
III.6. Electrochemical study	86-117
CONCLUSION	118
SUMMARY	119-121
REFERENCE	122-129
Arabic Summary	

List of Tables

Table	Subject	Page
Table (1)	Chemical composition of aluminum (wt %)	43
Table (2)	Optimum Bath composition and operating conditions of electroless plating Ni-P and Ni-Sn-P in alkaline bath.	46
Table (3)	Peak position (2θ) and crystalline size (from Depy-Sherrer formula [*]) for electroless Ni-P, Ni-Sn-P (0.1gm tin chloride) and Ni-Sn-P (1gm tin chloride) coatings from alkaline bath before and after heat treatment at pH=9.	77
Table (4)	The element percentage of the constituents in Ni-P and Ni-Sn-P deposits.	79
Table (5)	Chemical composition of (0.1 gm/l tin chloride) formed in the bath with different pH values.	80
Table (6)	Chemical composition of (1 g/l tin chloride) formed in the bath with different pH values.	80

Table (7)	The corrosion kinetic parameters E_{corr} , i_{corr} , MPY and R_p , determined from the polarization curves in the Tafel region, for different nickel sulphate concentration in 3.5% NaCl solution.	90
Table (8)	The corrosion kinetic parameters E_{corr} , i_{corr} , MPY and R_p , determined from the polarization curves in the Tafel region, for different nickel sulphate concentration in 0.1 N NaOH solutions.	91
Table (9)	The corrosion kinetic parameters E_{corr} , i_{corr} , MPY and R_p , determined from the polarization curves in the Tafel region, for different Nickel sulphate concentration in 0.1N HCl solutions.	92
Table (10)	The corrosion kinetic parameters E_{corr} , i_{corr} , MPY and R_p , determined from the polarization curves in the Tafel region, for different sodium hypophosphite concentration in 3.5% NaCl solution.	97
Table(11)	The corrosion kinetic parameters E_{corr} , i_{corr} , MPY and R_p , determined from the polarization curves in the Tafel region, for different sodium hypophosphite concentration in 0.1N NaOH solution.	98