

**Republic of Iraq
Ministry of Higher Education
and Scientific Research
University of Babylon
College of Materials Engineering
Department of Metallurgical Engineering**



physical vapor deposition

project

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requirements of the Bachelor of Engineering Materials in /
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By

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By Super visor

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

{ يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ }

صَدَقَ اللَّهُ الْعَلِيِّ الْعَظِيمِ

DEDICATION

Dedicate My Project to My Supervisor

Asst. Prof. Dr Nabaa Sattar Radhi Also to

My Father, My Mother, My Brothers & My Sisters

*Who always encouraged and supported me, and without
them this work would not have been possible.*

Zainab Salem Obaid

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Abstract

DC plasma sputtering: DC plasma spraying was done by a machine made in Korea at the College of Materials Engineering at the University of Babylon, Two types of targets, silver and copper, were used (2). Diameter (48 mm) and (1.2 mm) thick with a purity of 98.9999% Practical steps Sample chemical analysis. Sample preparation. painting method. conductivity. SEM .roughness. Cotact angle Salad Al-alloy used in this work The sample is required to be coated of aluminum alloy (2024-T4) THE Composition of alloy is tested In this paper the samples were prepared with dimensions (diameter 25 mm and 5 mm in thickness) preparation steps as shown first grinding by silicon carbide paper with a softness (1000, 1200, 1400, and 2000) Light Optical Microscope (LOM) The microscopic structure was studied using optical microscopy in order to identify the existing phases and to see the shape and size of the grains, after grinding, polishing, and etched in a solution for base substrate before coating, coating thickness (cross-section), wear test results and after corrosion test. After coating, This test was done at specimens preparation laboratory, the microscope is type (BEL PHOTONICS). Located in the Laboratories of the Department of Metallurgical - University of Babylon DC plasma sputtering: DC plasma spraying was done by a machine made in Korea at the College of Materials Engineering at the University of Babylon, .Two types of targets, silver and copper, were used .Diameter (48 mm) and (1.2 mm) thick with a purity of 98.9999%. Thermal treatment of thin films The annealing process was carried out in Ar gas atmosphere to avoid or minimize sample oxidation or contamination. The heating ramp was adjusted to 2 °C/min during thermal treatment process until the target temperature was reached, kept for 60 min. The sample was preheated at 200 °C for 15 min. In the last stage, the sample was left in the furnace to cool down to room temperature Thermal conductivity device is a compact, operator-friendly hot wire instrument that facilitates a fast determination of the thermal conductivity, thermal diffusivity and specific heat capacity in a wide temperature and pressure range by means of the transient hot wire (THW) method, according Conclusion The rate of deposition of aluminum is higher than that of silver and copper, and thus the hardness is higher We noticed that the surface roughness of copper is higher than that of silver and aluminum, and therefore the surface of aluminum is smoother than that of silver and copper



جمهورية العراق
وزارة التعليم العالي والبحث العلمي
جامعة بابل
كلية هندسة المواد: قسم هندسة المعادن

ترسيب البخار الفيزيائي

مشروع تخرج مقدم لكلية الهندسة المواد

الاستيفاء جزء من متطلبات بكالوريوس هندسة المواد في كلية الهندسة

الطالبة

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المشرفة

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