

**GRAVIMETRIC AND SURFACE STUDIES ON CORROSION  
OF ALUMINIUM ALLOY TOWARDS INHIBITORY EFFECT  
BY GLYCINE**

**NURLIYANA ATHILAH BINTI NORHASLAN**

**BACHELOR OF SCIENCE (Hons.) APPLIED CHEMISTRY  
FACULTY OF APPLIED SCIENCES  
UNIVERSITI TEKNOLOGI MARA**

**JULY 2023**

**GRAVIMETRIC AND SURFACE STUDIES ON CORROSION OF ALUMINIUM  
ALLOY TOWARDS INHIBITORY EFFECT BY GLYCINE.**

**NURLIYANA ATHILAH BINTI NORHASLAN**

**Final Year Project Report Submitted in  
Partial Fulfilment of the Requirements for the  
Degree of Bachelor of Science (Hons.) Applied Chemistry  
in the Faculty of Applied Sciences,  
Universiti Teknologi MARA**

**JULY 2023**

This Final Year Project entitled “**Gravimetric and Surface Studies on Corrosion of Aluminium Alloy Towards Inhibitory Effect by Glycine**” was submitted by Nurliyana Athilah binti Norhaslan in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Science, in the Faculty of Applied Sciences, and was approved by.

---

Dr. Solhan Binti Yahya  
Supervisor  
B. Sc. (Hons.) Applied Science  
Faculty of Applied Sciences  
Universiti Teknologi MARA  
02600 Arau  
Perlis

---

Dr Siti Nurlia binti Ali  
Project Coordinator  
B. Sc. (Hons) Applied  
Chemistry  
Faculty of Applied Science  
Universiti Teknologi MARA  
02600 Arau  
Perlis

---

Dr. Nasulhah Binti Kasim  
Head of Programme  
B. Sc. (Hons.) Applied  
Chemistry  
Faculty of Applied Science  
Universiti Teknologi MARA  
02600 Arau  
Perlis

Date: 4<sup>th</sup> August 2023

## ABSTRACT

### GRAVIMETRIC AND SURFACE STUDIES OF CORROSION ON ALUMINIUM ALLOY TOWARDS INHIBITORY EFFECT BY GLYCINE

Corrosion is a major issue in many industries, causing significant economic losses and safety issues. Acids used during the production or cleaning process in industries may contribute to metal corrosion. In this research, gravimetric and surface studies have been performed on aluminium alloy (Al alloy). Standard Glycine powder was used and characterized using Fourier-Transform Infrared Spectroscopy (FT-IR). The result shows that Glycine has important functional groups such as N, C and O which may contribute to anti corrosion properties. Corrosion inhibition of Al alloy was studied in different corrosive media in various concentrations (0.10 M, 0.25 M and 0.50 M). The inhibitor solution used was at different concentrations of 1,2,3,4,5 g/L at room temperature. From the result, as the inhibitor concentration increased, the corrosion rate decreases while the inhibition efficiency increases. The corrosion activity of Al alloy in all concentrations of HCl is higher than H<sub>2</sub>SO<sub>4</sub>. As for corrosion inhibition efficiency, H<sub>2</sub>SO<sub>4</sub> shows a higher percentage of 90.40% at concentration 0.25 M compared to HCl. Surface morphology shows significant corrosion effect in HCl compared to H<sub>2</sub>SO<sub>4</sub>. The finding from this study could be a good reference in determining the corrosion behavior of amino acid-based corrosion inhibitor in variation of acid solution.

# TABLE OF CONTENTS

	<b>Page</b>
<b>ABSTRACT</b>	iii
<b>ABSTRAK</b>	iv
<b>ACKNOWLEDGEMENT</b>	iv
<b>TABLE OF CONTENT</b>	v
<b>LIST OF FIGURES</b>	viii
<b>LIST OF TABLES</b>	x
<b>LIST OF ABBREVIATIONS</b>	xi
<b>CHAPTER 1 INTRODUCTION</b>	
1.1 Background of study	1
1.2 Problem statement	5
1.3 Research question	6
1.4 Significance of study	7
1.5 Objectives of study	7
1.6 Scope and limitation of study	7
<b>CHAPTER 2 LITERATURE REVIEW</b>	
2.1 Pitting Corrosion	9
2.1.1 Pitting Corrosion Mechanism by Chloride Ion	11
2.1.2 Pitting Corrosion Processes	12
2.1.3 Pitting Shape Formation	14
2.1.4 Stage of Pitting	15
2.1.4.1 Passive Film Breakdown and Pit Initiation	16
2.1.4.2 Metastable Pitting	20
2.1.4.3 Pit Propagation (Stable Pitting)	21
2.2 Alloy	22
2.3 Inhibitor	23