**Galvanic corrosion protection of Al-alloy in contact with carbon fibre reinforced polymer through plasma electrolytic oxidation treatment**

By

**Md. Riazul Islam**

**(Roll No. 1827XXX)**

Supervisor: Samiul Islam

A thesis/project report submitted in fulfilment of the requirements for the degree of Bachelor of Science in Materials Science and Engineering



Department of Materials Science and Engineering

Khulna University of Engineering & Technology

Khulna-9203, Bangladesh

DECLARATION

This is to certify that the thesis work entitled "(Name of Thesis Title)" has been carried out by (Name of the Student) under the supervision of (Name of the Supervisor) in the Department of Biomedical Engineering, Khulna University of Engineering & Technology, Khulna, Bangladesh. The above thesis work or any part of this work has not been submitted anywhere for the award of any degree.

The above declarations are true. Understanding these, this work has been submitted for the evaluation of an undergraduate thesis.

Signature of Supervisor

Signature of Candidate

Date: (07 February 2024)

APPROVAL

This is to certify that the thesis work submitted by (Name of the Student) entitled " (Name of Thesis Title)" has been approved by the board of examiners for the partial fulfilment of the requirements for the degree of Bachelor of Science in the Department of Biomedical Engineering, Khulna University of Engineering & Technology, Khulna, Bangladesh in February 2024.

**BOARD OF EXAMINERS**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Chairman (Supervisor)

Name:

Designation:

Department:

Khulna University of Engineering & Technology

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ External

Name:

Designation:

Department:

Khulna University of Engineering & Technology

ABSTRACT

Velit scelerisque in dictum non consectetur a erat. Feugiat sed lectus vestibulum mattis. Commodo viverra maecenas accumsan lacus vel facilisis volutpat est velit. Lorem ipsum dolor sit amet. A erat nam at lectus urna. Ut morbi tincidunt augue interdum. Egestas quis ipsum suspendisse ultrices gravida dictum fusce ut. In massa tempor nec feugiat nisl pretium fusce id. Eget gravida cum sociis natoque penatibus et magnis dis. Maecenas sed enim ut sem viverra aliquet eget sit amet. Eget duis at tellus at. Tincidunt nunc pulvinar sapien et. Quisque id diam vel quam elementum pulvinar etiam. Neque convallis a cras semper auctor.

TABLE OF CONTENTS

|  |  |
| --- | --- |
| **Particulars** | **Page** |
| Title Page | i |
| Declaration | ii |
| Approval | iii |
| Abstract | iv |
| Table of Contents | v |
| Index | vi |
| List of Tables | vii |
| List of Figures | viii |
| List of Illustrations | ix |
| List of Abbreviations & Symbols | x |

INDEX

[CHAPTER I Introduction 1](#_Toc146918379)

[1.1 Introduction 1](#_Toc146918380)

[1.2 Al Alloy 1](#_Toc146918381)

[1.2.1 Galvanic Corrosion 1](#_Toc146918382)

[1.2.1.1 Galvanic Al Alloy Corrosion 1](#_Toc146918383)

[CHAPTER II Methodology 2](#_Toc146918384)

[2.1 Pre-requisites 2](#_Toc146918385)

[2.2 Methods 2](#_Toc146918386)

[2.2.1 Warning 2](#_Toc146918387)

[CHAPTER III Result and Discussion 3](#_Toc146918388)

[3.1 Result and Discussion 3](#_Toc146918389)

[References 4](#_Toc146918390)

LIST OF TABLES

[Table 2.1: Methods Table 2](#_Toc146917858)

[Table 3.1: Result Table 3](#_Toc146917859)

LIST OF FIGURES

[Fig. 1.1: Galvanic Corrosion 1](#_Toc146918097)



# Introduction

## Introduction

Velit scelerisque in dictum non consectetur a erat. Feugiat sed lectus vestibulum mattis. Commodo viverra maecenas accumsan lacus vel facilisis volutpat est velit. Lorem ipsum dolor sit amet. A erat nam at lectus urna. Ut morbi tincidunt augue interdum. Egestas quis ipsum suspendisse ultrices gravida dictum fusce ut.

## Al Alloy

Velit scelerisque in dictum non consectetur a erat. Feugiat sed lectus vestibulum mattis. Commodo viverra maecenas accumsan lacus vel facilisis volutpat est velit. Lorem ipsum dolor sit amet. A erat nam at lectus urna. Ut morbi tincidunt augue interdum. Egestas quis ipsum suspendisse ultrices gravida dictum fusce ut. In massa tempor nec feugiat nisl [1]

### Galvanic Corrosion

pretium fusce id. Eget gravida cum sociis natoque penatibus et magnis dis. Maecenas sed enim ut sem viverra aliquet eget sit amet. Eget duis at tellus at. Tincidunt nunc pulvinar sapien et. Quisque id diam vel quam elementum pulvinar etiam. Neque convallis a cras semper auctor.

A close-up of a rusted nut

Description automatically generated

Fig. .: Galvanic Corrosion

#### Galvanic Al Alloy Corrosion

n massa tempor nec feugiat nisl pretium fusce id. Eget gravida cum sociis natoque penatibus et magnis dis. Maecenas sed enim ut sem viverra aliquet eget sit amet. Eget duis at tellus at. Tincidunt nunc pulvinar sapien et.

# Methodology

## Pre-requisites

Velit scelerisque in dictum non consectetur a erat. Feugiat sed lectus vestibulum mattis. Commodo viverra maecenas accumsan lacus vel facilisis volutpat est velit. Lorem ipsum dolor sit amet. A erat nam at lectus urna. Ut morbi tincidunt augue interdum. Egestas quis ipsum suspendisse ultrices gravida dictum fusce ut.

## Methods

1. Velit scelerisque in dictum non consectetur a erat.
2. Feugiat sed lectus vestibulum mattis.
3. Commodo viverra maecenas accumsan lacus vel facilisis volutpat est velit.
4. Lorem ipsum dolor sit amet. A erat nam at lectus urna. Ut morbi tincidunt augue interdum.
5. Egestas quis ipsum suspendisse ultrices gravida dictum fusce ut.

### Warning

Velit scelerisque in dictum non consectetur a erat. Feugiat sed lectus vestibulum mattis. Commodo viverra maecenas accumsan lacus vel facilisis volutpat est velit. Lorem ipsum dolor sit amet. A erat nam at lectus urna. Ut morbi tincidunt augue interdum. Egestas quis ipsum suspendisse ultrices gravida dictum fusce ut.

Table .: Methods Table

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

# Result and Discussion

## Result and Discussion

Table .: Result Table

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |

# References

[1] J. Liu, X. Huang, Y. Ren, L. M. Wong, H. Liu, and S. Wang, “Galvanic corrosion protection of Al-alloy in contact with carbon fibre reinforced polymer through plasma electrolytic oxidation treatment,” *Sci. Rep.*, vol. 12, no. 1, p. 4532, Mar. 2022, doi: 10.1038/s41598-022-08727-7.