

SYNTHESIS, CHARACTERIZATIONS AND ANTI-CORROSION SCREENING OF SALPPHEN AND SALOPHEN

NUR SYAHIRAH BINTI MOHD NORDIN

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

JANUARY 2017

This Final Year Project Report entitled “**Synthesis, Characterizations and Anti-Corrosion Screening of Salpphen and Salophen**” was submitted by Nur Syahirah binti Mohd Nordin, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Chemistry, in the Faculty of Applied Sciences, was approved by

Siti Noriah binti Mohd Shotor
Supervisor
B. Sc. (Hons.) Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
72000 Kuala Pilah
Negeri Sembilan Darul Khusus

Dr. Tn. Sheikh Ahmad Izaddin
bin Sheikh Mohd Ghazali
Project Coordinator
B. Sc. (Hons.) Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
72000 Kuala Pilah
Negeri Sembilan Darul Khusus

Mazni binti Musa
Head of Programme
B. Sc. (Hons.) Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
72000 Kuala Pilah
Negeri Sembilan Darul Khusus

Date: _____

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix
ABSTRAK	x
CHAPTER 1 INTRODUCTION	1
1.1 Background of study	1
1.2 Problem statements	5
1.3 Significance of study	6
1.4 Objectives of study	7
1.5 Scope of study	7
CHAPTER 2 LITERATURE REVIEW	9
2.1 Synthesis of Schiff base ligands	9
2.2 Characterizations of Schiff base ligands	12
2.2.1 Elemental analysis	12
2.2.2 Infrared spectroscopy	13
2.2.3 UV-Visible spectroscopy	17
2.3 Corrosion inhibition of Schiff base ligands	20
CHAPTER 3 METHODOLOGY	24
3.1 Materials and reagents	24
3.2 Instruments	24
3.2.1 Melting points measurement	24
3.2.2 Elemental analysis	25
3.2.3 Infrared spectroscopy	25
3.2.4 UV-Visible spectroscopy	25
3.3 Methodology	27
3.3.1 Synthesis of Salpphen	27
3.3.2 Synthesis of Salophen	28
3.3.3 Anti-corrosion screening of Salpphen and Salophen	29
3.3.3.1 Preparation of 1 M hydrochloric acid	29
3.3.3.2 Preparation of inhibitor solutions	30

3.3.3.3 Anti-corrosion screening	30
CHAPTER 4 RESULTS AND DISCUSSION	32
4.1 Synthesis of Salpphen and Salophen	32
4.2 Characterizations of Salpphen and Salophen	33
4.2.1 Elemental analysis	33
4.2.2 Infrared spectroscopy	34
4.2.3 UV-Visible spectroscopy	37
4.3 Anti-corrosion screening of Salpphen and Salophen	39
CHAPTER 5 CONCLUSION AND RECOMMENDATIONS	43
5.1 Conclusion	43
5.2 Recommendations	43
CITED REFERENCES	45
APPENDICES	49
<i>CURRICULUM VITAE</i>	61

ABSTRACT

SYNTHESIS, CHARACTERIZATIONS AND ANTI-CORROSION SCREENING OF SALPPHEN AND SALOPHEN

N,N-bis(salicylidene)-*p*-phenylenediamine (Salpphen) and *N,N*-bis(salicylidene)-*o*-phenylenediamine (Salophen) which known as Schiff base ligand were synthesized from the reaction between salicylaldehyde and each *p*-phenylenediamine and *o*-phenylenediamine respectively. From the melting point measurement, it showed significant differences because Salpphen is more stable with melting point at 214 °C, while Salophen is less stable with melting point at 165 °C. The elemental analysis exhibit close values between experimental value and theoretical value. The IR spectrum of Salpphen detected the frequency vibrations of $\nu(C=N)$ at 1609 cm^{-1} and $\nu(p\text{-substitute})$ at 828 cm^{-1} , while the spectrum of Salophen detected the frequency of $\nu(C=N)$ at 1612 cm^{-1} and also $\nu(o\text{-substitute})$ at 760 cm^{-1} . These data indicated the formation of azomethine group and different substituents positions on the benzene ring. Finally, the UV-Visible spectra of both ligands showed the $n-\pi^*$ transition which also confirmed the formation of Schiff base ligand through the azomethine group. The anti-corrosion screening was done at various inhibitor concentrations in 1 M hydrochloric acid (HCl) diluted from 37 % of HCl. The screening was done in the presence and absence of inhibitor to compare the ability of Schiff base ligands to act as corrosion inhibitor on mild steel. The results show that Salpphen was better inhibitor of corrosion compared to Salophen due to the different of substituents position in the benzene ring from amine used because Salpphen provide greater stability. Therefore, Salpphen was found to exhibit better protection on the mild steel from corrosion in acidic condition.