

**A REVIEW ON SYNTHESIS AND MODIFICATION OF
DOLOMITE-BASED ADSORBENT FOR HEAVY METAL
REMOVAL**

NUR NATASHA ALIA BINTI MOHD ZAWAWI

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

FEBRUARY 2024

**A REVIEW ON SYNTHESIS AND MODIFICATION OF DOLOMITE-BASED
ADSORBENT FOR HEAVY METAL REMOVAL**

NUR NATASHA ALIA BINTI MOHD ZAWAWI

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

FEBRUARY 2024

This Final Year Project Report entitled “**A Review on the Synthesis and Modification of Dolomite Based Adsorbent for Heavy Metal Removal**” was submitted by Nur Natasha Alia Binti Mohd Zawawi in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Sciences, and was approved by

Mohd Lias bin Kamal

Supervisor

B.Sc. (Hons.) Applied Chemistry

Faculty of Applied Sciences

Universiti Teknologi MARA

02600 Arau,

Perlis

Dr Siti Nurlia Binti Ali

Final Year Thesis Coordinator

B. Sc. (Hons.) Applied Chemistry

Faculty of Applied Sciences

Universiti Teknologi MARA

02600 Arau

Perlis

Dr Nur Nasulhah Binti Kasim

Head of School

B. Sc. (Hons) Applied Chemistry

Faculty of Applied Sciences

Universiti Teknologi MARA

02600 Arau

Perlis

Date: 12 February 2024

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	ii
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF ABBREVIATIONS	vi
ABSTRACT	vii
ABSTRAK	ix
CHAPTER 1 INTRODUCTION	
1.1 Background of study	1
1.2 Problem statement	6
1.3 Research question.	8
1.4 Significance of study	9
1.5 Objectives of study	11
1.6 Scope and limitation of study	12
CHAPTER 2 LITERATURE REVIEW	
2.1 Introduction to Heavy Metal Pollution	13
2.2 Source of Heavy Metals	15
2.2.1 Natural source	15
2.2.2 Anthropogenic source	15
2.3 Impact of Heavy Metal Pollution	17
2.4 Types of Adsorbents	24
2.5 Dolomite as an Adsorbent	31
2.5.1 Composition and Chemical Characteristics	31
2.5.2 Surface Area and Porosity	33
2.5.3 Chemical Stability and Durability	34
2.5.4 Cost-Effectiveness and Abundance	35
2.6 Synthesis Methods of Dolomite-based Adsorbents	37
2.6.1 Chemical Precipitation	37
2.6.2 Hydrothermal Synthesis	41
2.6.3 Sol-gel Techniques	44

2.6.4	Template-Assisted	48
2.7	Modification Strategies	54
2.7.1	Chemical Modification	54
2.7.2	Physical Modification	59
2.7.3	Biological Modification	63
2.7.4	Composite Modification	66
2.8	Optimization of Synthesis and Modification Methods	71
2.8.1	Chemical Precipitation Synthesis	71
2.8.2	Hydrothermal Synthesis	74
2.8.3	Sol Gel Synthesis	77
2.8.4	Template Assisted Synthesis	79
2.8.5	Chemical Modification Methods	82
2.8.6	Physical Modification	85
2.8.7	Biological Modification	88
2.8.8	Composite Modification	89

CHAPTER 3 CONCLUSION & RECOMMENDATION

3.1	Conclusion	94
3.2	Recommendation	96

CITED REFERENCES	99
-------------------------	----

CURRICULUM VITAE

Error! Bookmark not defined.