

UNIVERSITI TEKNOLOGI MARA

**REMOVAL OF CADMIUM ION FROM AQUEOUS
SOLUTION USING PLANT BASED ANIONIC
SURFACTANT IMPREGNATED ACTIVATED
CARBON**

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Abstract

Activated carbon is modified by impregnating it with sodium lauryl sulfoacetate (SLSA), a plant-based anionic surfactant and tested to determine whether the surfactant will increase the effectiveness of cadmium ion removal from aqueous solution of cadmium chloride (CdCl_2) by activated carbon. The activated carbon used is industrial grade granular type tested without grinded or sieved. The surfactant preparation and the impregnation were done at 60°C . The heavy metal removal test conducted at 30°C to mimic normal weather temperature of Malaysia. The granular activated carbon was characterized using BET (Brunauer-Emmet-Teller) while the surfactant chemical properties analyzed using FTIR. The aqueous solutions before and after the test were analyzed using AAS (atomic absorption spectroscopy). The result obtained has shown that SIAC at 125ppm has the highest cadmium removal averaging 37.87% of cadmium removed. The lowest removal shown by SIAC at 10ppm with an average of 7.70%.

TABLE OF CONTENTS

	Page
Plagiarism form	i
Author's declaration	ii
Supervisor's certification	iii
Head of Programme and Coordinator's signature	iv
Acknowledgement	vi
Abstract	viii
List of tables and figures	x
List of abbreviation	xi
List of nomenclature	xi
Chapter 1 (Introduction)	1-4
- 1.1 Problem statement	4
- 1.2 Research objectives	4
- 1.3 Scope of research	4-5
Chapter 2 (Literature review)	6
- 2.1 Factory effluent with high cadmium content	6-7
- 2.2 Harm brought by lead contamination in water	7-8
- 2.3 Thesis studies in heavy metal removal	8-11
- 2.4 Surface modification of activated carbon	11-12
- 2.5 Critical micelle concentration	12-14
- 2.6 Impregnation method and impregnation ratio of surfactant	14-15
- 2.7 Characterization of modified activated carbon	16-18
- 2.8 Metal ion removal from synthetic wastewater	18-19
Chapter 3 (Methodology)	20-22
Chapter 4 (Result and discussion)	23
- 4.1 FTIR analysis result	23
- 4.2 Adsorption mechanism	24
- 4.3 Pore volume of impregnated activated carbon (SIAC)	24-25
- 4.4 Result obtained based on AAS test	25-28
- 4.5 Mechanism of cadmium removal	28-30
- 4.6 Isotherm study	30-33
Chapter 5 (Conclusion and recommendation)	34
References	35-37
Appendices	41

CHAPTER 1(introduction)

Water is human's most important source that seemingly on the verge of unsustainability. The usage and demand of water are often high and will only increase with time. Soon the current capacity and technology of wastewater treatment will have trouble coping in fulfilling the demand. As the world is modernized, factories are discharging more and more wastes to water that if not controlled or treated, will have catastrophic consequences.

Activated carbon has been a good alternative in removing many dangerous wastewater contaminants like organic and inorganic pollutant. It is a carbonaceous compound with high porosity, as shown in (Figure 1), that is treated to improve its adsorptive properties. Activated carbon can be exhausted over a period of usage due to the surface area are filled with adsorbate, leaving no more space for adsorption to occur. Figure 2 shows the difference between fresh activated carbon and the exhausted one.



Figure 1: SEM image of activated carbon

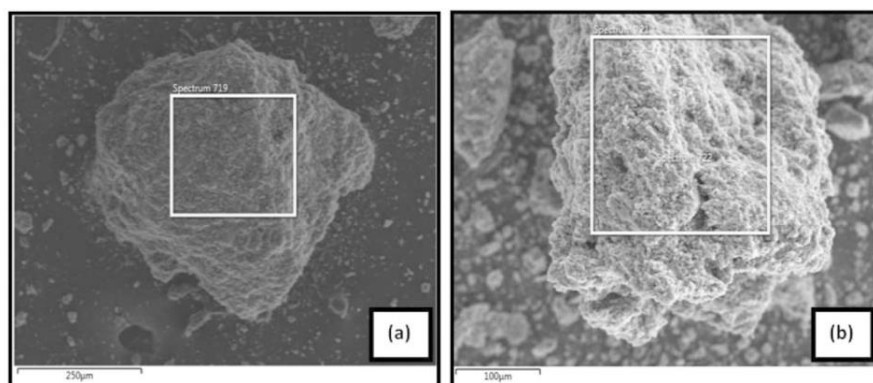


Figure 2: a) fresh activated carbon b) exhausted activated carbon