UNIVERSITI TEKNOLOGI MARA

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

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This thesis is submitted in partial fulfilment of the requirement for the degree of

Bachelor of Engineering

(Chemical)

Faculty of Chemical Engineering

JULY 2019

Acknowledgement

First and foremost, I am grateful to Allah for the good health and well-being that were necessary to complete this research.

I wish to express my sincere thanks to the dean of faculty, Prof. Dr. Norazah Abd Rahman for providing me all the facilities and necessities needed in completing this research.

I am also grateful to Ir Normadyzah Ahmad, lecturer in the Faculty of Chemical Engineering as my supervisor. I am extremely thankful and indebted to her for sharing her encouragement and sincere, valuable guidance extended to me.

I place on the record, my sincere thank you to Dr Siti Wahidah Puasa, my co-supervisor for sharing her expertise and knowledge along the completion of this research.

I also would like to take this opportunity to thank my fellow researchers, Noor Azzila Zulkupli and Nik Nur Ainan Rasyidah Abd Rahim whom have been a reliable teammate in discussing difficulties and challenges regarding this study.

Lastly, I would like to thank my family for their never-ending support to me, financially and emotionally along the course of this study's completion. Without their constant support, I wouldn't be able to finish this course.

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 60^0C. The heavy metal removal test conducted at 30^0C 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

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 is world 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

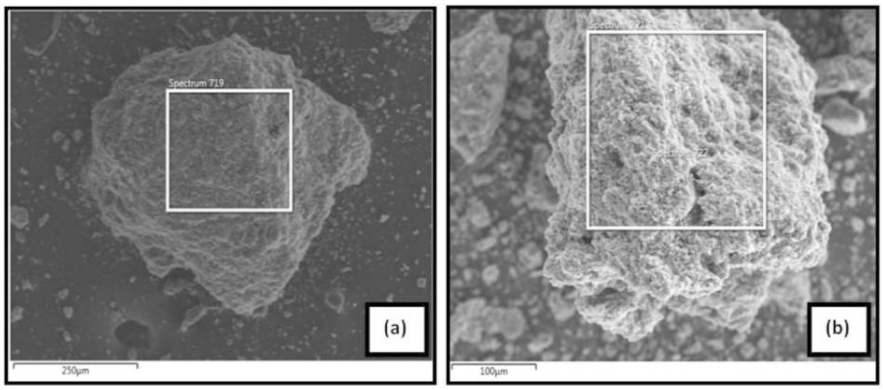

Figure 2: a) fresh activated carbon b) exhausted activated carbon