ADSORPTION OF CADMIUM USING REGULAR $MgAlCO_3$ – LAYERED DOUBLE HYDROXIDE (LDHs)

NORZUYATI MOHD ARIS

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

APRIL 2009

This Final Year Project Report entitled **"Adsorption of Cadmium Using Regular $MgAlCO_3$ – Layered Double Hydroxide (LDHs)"** was submitted by Norzuyati Mohd Aris, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Applied Chemistry, in the Faculty of Applied Sciences, and was approved by

Miss Nurul Izza Taib
Supervisor
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Miss Sabrina M. Yahaya
Project Coordinator
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi Mara
40450 Shah Alam
Selangor

Dr. Yusairie Mohd
Head of Programme
B. Sc. (Hons.) Applied Chemistry
Faculty of Applied Sciences
Universiti Teknologi MARA
40450 Shah Alam
Selangor

Date: 19 MAY 2009

ACKNOWLEDGEMENTS

Upon completion of this project, I would like to express my gratitude to many parties. My heartfelt thanks go to my supervisor, Miss Nurul Izza Taib for all helps and advices given. I also want to give my appreciations to my family who always there when I'm in need. Other than that, I want to thanks my friends who involve in this project. Knowledge gained during this project will be shared with my other friends so that they can now understand and apply that knowledge gained in the future.

Norzuyati Binti Mohd Aris

TABLE OF CONTENTS

ABSTRACT

ADSORPTION OF CADMIUM USING REGULAR $MgAlCO_3$ – LAYERED DOUBLE HYDROXIDE (LDHs)

Heavy metal pollution had become one of the environmental problems which cause several diseases either to human, animal or plant. In this study, $MgAlCO_3$ layered double hydroxide was investigated as an alternative low-cost adsorbent for the removal of cadmium (Cd) from aqueous solution. $MgAlCO_3$ was synthesized by using co-precipitation method at room temperature. X-ray diffractogram showed the presence of sharp and intense line with d-spacing 7.87215 Å and the interlayer spacing of the sample was found to be 3.92687 Å showed general features of hydrotalcite. The contact time required to obtain the maximum adsorption of cadmium was 180 min at the concentration of 150 ppm. The adsorption increases gradually as the pH and adsorbent dosage increase. However, the adsorption is inversely proportional with the increase of temperature which showed that this reaction is an exothermic reaction. The data on cadmium fit well on Langmuir and Freundlich. This study indicates that $MgAlCO_3$-LDHs has the ability to remove cadmium from aqueous solution.