REMOVAL OF AMMONIUM ION FROM AQUEOUS SOLUTION USING GRAPHITE ADSORBENT

HASZALINA ABDUL HALIM

BACHELOR OF CHEMICAL ENGINEERING (ENVIRONMENT) WITH HONOURS

UNIVERSITI TEKNOLOGI MARA

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AUTHOR'S DECLARATION

I declare that the work in the thesis was carried out in accordance with the regulation of Universiti Teknologi MARA. It is original and is the results of my own, unless otherwise indicated or acknowledge as reference work.

I, hereby acknowledge that I have been supplied with the Academic Rules and Regulations, Universiti Teknologi MARA, regulating the conduct of my study and research.

Signed : .....
Date : 28/12/2016

Haszalina Abdul Halim
Student ID : 2013136151

SUPERVISOR'S CERTIFICATION

We declared that we read this thesis and in our point of view this thesis is qualified in terms of scope and quality for the purpose of awarding the Bachelor of Chemical Engineering (Environment) with Honours.

Signed : .....
Date : 28/12/2016

Main Supervisor
Dr. Norhusna Mohamad Nor
Faculty of Chemical Engineering
Universiti Teknologi MARA
Cawangan Pulau Pinang
13500 Permatang Pauh
Pulau Pinang

Signed : .....
Date : 28/12/2016

Co-Supervisor
Nur Alwani Ali Bashah
Faculty of Chemical Engineering
Universiti Teknologi MARA
Cawangan Pulau Pinang
13500 Permatang Pauh
Pulau Pinang

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ABSTRACT

The excessive discharge of polluted wastewater consists of ammonium ion that comes from various industries was threatened the environment due to its toxicity and hazardous effects at low concentration. There are various researches studies have been carried out for the ammonium ions removal using different types of adsorbents. Graphite was used as the adsorbent for the removal of ammonium ion in this study and it was investigated that graphite has the ability to remove NH_4^+ ions from aqueous solutions. This project aimed to study the operating parameters and the adsorption isotherms. Various operating parameters such as contact time, temperature, initial concentration and adsorbent dosage were studied and optimized by a batch adsorption of ammonium removal from aqueous solution. The effect of contact time was optimized at 50 minutes, the temperature was effective at 25 ^oC, the initial ammonium ion concentration in solutions was gained a high removal percentage at 100 mg/L and the adsorbent dosage was effective at 0.5 g. From the various operating parameter study, it can be conclude that graphite has a rapid equilibrium for the adsorption of ammonium ions. The characterization of FTIR showed that small significance changes on the peak before and after the adsorption and thus, there were no changes in the chemical bond but the intensity or the percentage transmittance is change where the reaction was occurred at the peak. Freundlich and Langmuir adsorption isotherms were used to model the equilibrium adsorption data for adsorption of ammonium ion onto graphite. The adsorption process was executed by equilibrating various parameters in ammonium ion solutions. Correlation coefficient was best fitted for both isotherms which are 0.9186 and 0.985 for Langmuir and Freundlich respectively.