

**EXTRACTION AND STRIPPING OF CU(II) IONS  
FROM REAL INDUSTRIAL EFFLUENT BY  
CONTINUOUS LIQUID MEMBRANE**

**ANNE MITCHELLE ANAK ASAP**

**BACHELOR OF CHEMICAL ENGINEERING  
(ENVIRONMENT) WITH HONOURS  
UNIVERSITY TEKNOLOGI MARA**

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## AUTHOR'S DECLARATION

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

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


Signed : ..... *Anne Mitchell M.* .....  
Date : ..... *29/12/16.* .....

**Anne Michelle Anak Asap**

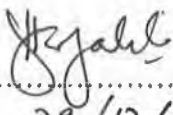
Student ID : 2013575563

## 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 : 29/12/2016

Main Supervisor  
**Dr. Chang Siu Hua**  
Faculty of Chemical Engineering  
Universiti Teknologi MARA  
Cawangan Pulau Pinang  
13500 Permatang Pauh  
Pulau Pinang

Signed :   
Date : 29/12/2016

Co-Supervisor  
**Noorzalila Muhammad Niza**  
Faculty of Chemical Engineering  
Universiti Teknologi MARA  
Cawangan Pulau Pinang  
13500 Permatang Pauh  
Pulau Pinang

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## **ABSTRACT**

The type of liquid membrane used in this work is the combination of bulk liquid membrane and emulsion liquid membrane operating in continuous mode. The existing method in of copper extraction such as solvent extraction, adsorption and chemical precipitation require additional step for removal and recovery of Cu(II). This drawback is overcome by using liquid membrane separation technique. The objective of this study is to remove and recover Cu(II) using liquid membrane. The feed phase is a real industrial wastewater that contain high amount of copper ions. The organic phase consist of waste cooking oil loaded with tributylphosphate (TBP) and di-2-ethylhexylphosphate (D2EHPA) and sulfuric acid as stripping phase. The parameter is feed flow rate at 3.79 L/hr, membrane flow rate at 2.73 l/hr and stripping phase at stagnant. The percent of extraction is evaluate at different reaction time and analyzed using inductive coupled plasma optical emission spectrometer (ICP-OES). The percent of extraction of Cu(II) is 44.22% at reaction time of 210 minute.