

PERFORMANCE TEST ON COPPER (II) IONS REMOVAL BY USING FABRICATED THIN LAYER COMPOSITE

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ABSTRACT

The fabrication of thin film composite (TFC) membrane by casting the hybrid membrane on the surface hydrophobic support membrane provides a remarkable improvement to the mechanical and thermal properties of the TFC membrane. Nowadays, the pollution of copper metal is a critical problem for environment due to its persistence and toxicity. This research paper outlines the use of TFC composite as a new technology for removal of copper ions from wastewater obtained from electroplating industry. As for analysis purpose, polymer blend of PVA/chitosan was used for copper ions removal as well. The industrial wastewater was characterized in term of biochemical oxygen demand (BOD), chemical oxygen demand (COD), turbidity, total suspended solid (TSS), pH value and concentration. The performance testing only focus on the effect of pH to the percentage removal and flux rate. Therefore, the pH was varied at 2.35 (without adjustment), 7 and 10. The result shows that the highest removal achieved at pH 7 for both composite. While, in term of flux rate, both composite was decreased with time by increasing the pH of feed solution. Due to hybrid membrane shows a consistent in removal, therefore the hybrid membrane is more preferred.

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CHAPTER 1

INTRODUCTION

1.1 Background study

This research is to study the performance on the removal of the copper metal from industrial wastewater by using fabricated thin film composite membrane. These phenomena usually occurred in developing countries (Mohsen Arbabi & Golshani, 2016). Usually rapid development of industries such as electroplating industries, mining operation, fertilizer industries, batteries, paper industries and pesticides tend to heavy metal wastewater (Fenglian Fu & Wang, 2011). Unlike organic contaminants, heavy metals tend to accumulate in living organisms due to it is non-biodegradable (Mohsen Arbabi & Golshani, 2016). Therefore, numerous method of removing heavy metal ions had been introduced, for instances reverse osmosis, chemical precipitation, ion exchange, adsorption and photocatalysis (Katarzyna Jaros, Wladydlawkaminski, Jadwiga Albinska, & Nowak, 2005). However, higher cost is the major drawback for all those method.

Therefore, thin film composite (TFC) membrane is introduced as a new technology of removal heavy metal wastewater by applying integrated complexation method. TFC membrane was fabricated film hybrid membrane as the barrier layer and polysulfone as porous membrane (Barakat, 2010). According to Norin Zamiah Kassim Shaari, Nurul Aida Sulaiman, Norazah Abd Rahman, Mohammad Hafizh Abd Fathel, and Elangko (2016), the complexation will occur on hybrid membrane layer that consists of a polymer blend of polyvinyl alcohol (PVA)