

Removal of Cu from Printed Circuit Board (PCBs) Leachates using Activated Carbon Derived from Foxtail Palm Fruit

Abstract

Printed circuit boards (PCBs) are the e-waste generated from the end-of-life electronic equipment such as laptops and mobile phone. PCBs contain relatively abundant of valuable metals such as gold and platinum. However, e-waste is considered as an environmental contaminant as it consists plenty of hazardous materials such as cadmium and copper which can pose health threat to human and also environment. It has been reported that PCBs contain a large amount of copper (Cu) in the circuit boards as it is used as a base metal. Moreover, exposure to Cu will lead to adverse impact of human health. Therefore, the objective of the study is to determine the Cu concentration using FAAS and also to remove the Cu from PCBs leachate using activated carbon derived from foxtail palm fruits. In order to remove the Cu, hydrometallurgical process on PCBs will be conducted to leach the metal into solution. Once the metal has been leached to the solution, the metal removal process using activated carbon through adsorption process was conducted. In this study, foxtail palm fruit was tested as an effective low-cost adsorbent for Cu removal. The effect of adsorbent dosage (1 g and 5 g) with fix contact time (40 min) of the prepared activated carbon in selected metal removal were investigated. The Cu in PCBs leachate solution before and after metal removal process were quantified using flame atomic absorption spectrophotometer (FAAS). Result obtained showed that, the percentage removal of Cu was recorded to be higher at high adsorbent dosage which was 14.417% in 5 g dose and 11.219% in 1 g dose. Thus, it can be concluded that the higher the adsorbent dosage used, the greater the percentage removal of Cu metal.