REMOVAL OF COPPER IONS IN AQUEOUS SOLUTION BY USING REGULAR HYDROTALCITE ($MgAlCO_3$)

NURDINI BINTI NOORDIN

BACHELOR OF SCIENCE (Hons.) CHEMISTRY

FACULTY OF APPLIED SCIENCES

UNIVERSITY TEKNOLOGY MARA

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ABSTRACT

REMOVAL OF COPPER IONS FROM AQUEOUS SOLUTION BY USING SYNTHESIZED REGULAR HYDROTALCITE ($MgAlCO_3$)

The regular hydrotalcite compound was synthesized by co-precipitation method. Characterization of the compound was demonstrated by using X-Ray Diffraction and Fourier Transform InfraRed (FTIR). XRD result demonstrated good crystalline structure with basal spacing (d_{003}) which is 7.9 A^0 and interlayer spacing corresponding to the (d_{006}) was found to be 3.9 A^0. FTIR spectroscopy study showed the strong and broad band observed around 3600–3200 cm^{-1} centered at 3468.39 cm^{-1} corresponds to the O–H stretching vibration, bending vibration of H_2O at 1630 cm^{-1}, CO_3 shows bands around 1382.15 cm^{-1} and 618.47 cm^{-1} which corresponds to Mg-O-Al. The removal of heavy metal of copper by regular hydrotalcite compound was investigated at parameters of contact time, initial copper concentration and adsorbent dosage. The optimum adsorption of copper by using synthesized regular hydrotalcite is observed with 3 hours contact time (77.46% adsorption), adsorbent dosage of 0.2g (98.52% adsorption) and initial concentration of 60 ppm (63.72% adsorption).

CHAPTER 1

INTRODUCTION

1.1 Background of study

Commonly, heavy metals can be found in wastewater from industries. Heavy metals are one of the major classes of pollutants in industrial effluent. Among them are Cadnium (II), Pb(II), Cu(II), Ni(II), Mn(II) and Zn(II). Absorption of wastewater (containing heavy metal) by marine animals and indirectly enter the human food, present a high risk to consumer. Heavy metals can also contaminate and accumulate in the soil for a long term and it is held in the soil as a result of adsorption, chemical reaction and ion exchange of soil (Cavani *et al.*, 1991). Although some heavy metals are necessary for the growth of plants, but after certain concentration, the heavy metals become poisonous for both plant and organisms. There are a lot of toxic heavy metals in metallurgical, tannery, chemical manufacturing, mining, battery manufacturing, etc. All of these will generate wastewater contaminated with hazardous heavy metals.

Disposal of heavy metals to environment will cause pollution of water resources. It is because, the heavy metals have toxic or harmful effects on many forms of life such as human beings and ecological environment. For example, corrosion of domestic copper plumbing is now a serious health problem. Copper corrosion is widespread throughout eastern Australia. In the year 1999, Queensland