

**ADSORPTION OF ZINC FROM AQUEOUS SOLUTION USING ZEOLITE**

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## ABSTRACT

In this study, the adsorption behavior of natural zeolite for zinc ion has been studied in order to consider its application to purity in metal finishing wastewater. The batch method has been employed using metal concentrations in solution ranging from 50 to 200 mg/L and different amount of natural zeolite ranging from 0.5 to 2.0 g. The percentage adsorption was determined for the adsorption system as a function of initial concentration and amount of zeolite. From this study, it was found that the percentage adsorption of zinc decreases with the increase in initial concentration of sample solution and it increases with the increasing amount of zeolite being introduced. The highest percentage of zinc adsorption is 91.94 % at the concentration of 50 ppm using 2.0 gram of zeolite while, the lowest percentage of adsorption of zinc is 57.74 % at the concentration of 200 ppm using 0.5 gram of zeolite. In conclusion, natural zeolite holds the great potential to remove zinc from industrial wastewater.

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 INTRODUCTION**

Zinc is a type of heavy metal that is naturally present in water. Heavy metal is a term that is used to describe more than a dozen elements that are metals or non metals characteristics. Generally, heavy metals have densities above  $5 \text{ gm/cm}^3$  and they are persistent in environment because they cannot be degraded or destroyed. Human activities affect natural geological and biological redistribution of heavy metal through pollution of the air, water and soil. The primary anthropogenic sources of heavy metals are point sources such as mines, foundries, smelters, and coal burning power plants. Diffuse sources such as combustion by-products and vehicle emissions are also sources of heavy metals. Humans also affect natural geological and biological redistribution of heavy metal by altering the chemical form of heavy metals released to the environment. Such alterations often affect a heavy metal's toxicity by allowing it to bioaccumulate in plants and animals, bioconcentrate in the food chain or attack specific organs of the body. Heavy metals can enter the water body by industrial and consumer waste, or even from acidic rain breaking down the soils and releasing heavy metals into streams, lakes, rivers, and groundwater (S.H. Lin et al, 2002).

Zinc manufacturing and other industries release large quantities of metals mainly Cadmium and zinc during production. The increasing demand for alkaline zinc manganese batteries instead of mercury based ones, brings serious problems when those batteries are not disposed off properly. Yet, another source of contamination can be due to the flooding of ore mines into the environment. Since heavy metals have toxic effects