شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

جامعة عين شمس

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Cairo University

A COMPARATIVE STUDY FOR THE ADSORPTION OF LEAD SALTS RESULTING FROM THE DISPOSAL OF METAL INDURTRIAL WASTES USING METAL OXIDES

By

AHMAD FATHY YUNNUS SENUSSI AHMAD

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
IN
CIVIL ENGINEERING –PUBLIC WORKS

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
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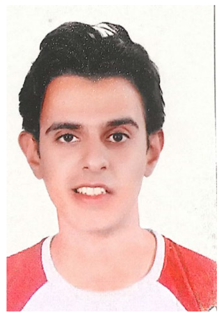

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Title of Thesis:

A COMPARATIVE STUDY FOR THE ADSORPTION OF LEAD SALTS RESULTING FROM THE DISPOSAL OF METAL INDURTRIAL WASTES USING METAL OXIDES

Key Words:
Adsorption; Lead; Adsorption Kinetics; Adsorption Equilibrium; Thermodynamics

Summary:

The aim of this thesis is to verify the applicability of manufactured oxides (titanium dioxide, aluminum oxide, and zinc oxide) for removing lead salts from aqueous solutions by conducting a number of batch experiments on the effect of pH, dose, contact time, initial concentration, and temperature. As well as the analyses of adsorption kinetics, adsorption mechanisms, and adsorption thermodynamics are studied. The adsorption efficiencies were found to be dependent on the parameters which were investigated through the experiments. The adsorption kinetics of Pb (II) were studied by common models, the experiments were found that lead uptake using all adsorbents can be fitted by PSO model. The adsorption isotherms of Pb (II) were studied by common models. The experiments were found that lead uptake using all adsorbents can be well fitted by Langmuir model in the case of titanium dioxide and zinc oxide. But in the case of aluminum oxide, D-R was well fitted. Also the heat of adsorption of Pb (II) for all adsorbents implied that the adsorption was endothermic in nature due to the positive values of enthalpy ($\Delta H°$). The absorbents were characterized using (SEM) and (EDX) in order to conduct investigation on adsorbents with results ensuring adsorption occurrence. Therefore, based on practical experiences, it was found that the best adsorbent to uptake lead from synthetic waste water is zinc oxide followed by titanium dioxide and aluminum oxide.

Disclaimer

I hereby declare that this thesis is my own original work and that no part of it has been submitted for a degree qualification at any other university or institute.

I further declare that I have appropriately acknowledged all sources used and have cited them in the references section.

Name: Ahmad Fathy Yunnus Senussi Ahmad Date: …./…./2021

Signature:

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Table of Contents

List of Tables

List of Figures