شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

# بسم الله الرحمن الرحيم


HANAA ALY

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# جامعة عين شمس

# التوثيق الإلكتروني والميكروفيلم

# قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

# يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

# UTILIZATION OF SLUDGE RESULTED FROM CHLORINE INDUSTRY IN WASTWATER TREATMENT

(Enviromental Chemistry Study)

Submitted By

**Alaa Ibrahim Mohamed Said**

***B.Sc. of Chemistry, Faculty of science, Ain Shams Universty, (1997)***

*A Thesis Submitted in partial fulfillment*
*Of*
*The Requirement the Master Degree*
*In*
*Enviromental Sciences Chemistry*

Department Of Enviromental Basic Sciences

Inistitute Of Enviromental Studies And Research

Ain Shams University

**Cairo – 2020**

**APPROVAL SHEET**

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Alaa Ibrahim Mohamed Said

## ABSTRACT

The purpose of this study is to check and investigate the efficiency of using the burnt brine sludge (BBS), and the non burnt brine sludge (NBBS) which resulted from chlorine industry by the chemical processing of the ultra pure brine (295-300 gm/l) which is decomposes in the electrolytic cell as low-cost solid waste adsorbents materials for the removal of the heavy metal ions like lead, cadmium and copper ions from aqueous solution. The physicochemical characteristics of each solid waste are checked and investigated by using X- ray diffraction (XRD), X-ray fluorescence (XRF), $N_2$ adsorption technique and scanning electron microscopy (SEM). Beside batch experiments are carried out as effect of contact time, initial pH of solution, initial heavy metal ion concentrations, adsorbent sludge dose and competition of metal ions on the adsorption of heavy metal ions was studied. Removal efficiency at optimum conditions was approximately 100% for $Pb^{+2}$, $Cd^{+2}$ and $Cu^{+2}$ (28.7, 11.2, 8.9 mg/g respectively) by using burnt brine sludge (BBS) and from 90 – 100 % for $Pb^{+2}$, $Cd^{+2}$ and $Cu^{+2}$ and from 70 – 90 % , 75 – 98 % (125.2, 18.63, 8.09 mg/g respectively) for non burnt brine sludge (NBBS). The kinetics description of adsorption for ions was followed this model (pseudo-second-order) based on amounts of heavy metal ions sorbed at different time intervals.



**Keywords:** Chlorine industry sludge, heavy metals, wastewater, sludge, low cost adsorbent.

# List of contents

# List of contents

# List of content

# List of content

# List of content

# List Of Tables