بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

شبكة المعلومات الجامعية
التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

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

MONA MAGHRABY

Cairo University

OPTIMIZING THE PROCESS PARAMETERS IN THE PRODUCTION OF ALUMINA

By

Sohair Taha Aly

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY
in
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Under the Supervision of

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Title of Thesis:

OPTIMIZING THE PROCESS PARAMETERS IN THE PRODUCTION OF ALUMINA

Key Words:
Acid Leaching , Statistical Study, Aluminum chloride, Alumina

Summary:

The calcined clay was treated using HCl (32%) to obtain aluminum chloride hexa- hydrate. Three parameters were optimized using response surface methodology approach. Alumina recovery of 83.2% was predicted on using 1.4 stoichiometric acid to solid ratio, a reaction temperature of 104ºC and a reaction time of 3 hours. This result was then assessed experimentally. The obtained hexa hydrate was prepared in crystalline form through injection of hydrogen chloride in the saturated solution of aluminum chloride. The hexahydrate crystals obtained were subsequently purified in a three stage process to increase their purity to 99.961%. Roasting of these crystals up to 800ºC under flow of argon steam then roasting the produced amorphous aluminum oxide at 1250ºC in a continuous flowing of Ar gas and keeping at this temperature for 4 hours, then cooling down to room temperature. Highly crystalline alumina was produced with purity 99.9%.

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: Sohair Taha Aly Date: / /

Signature:

Dedication

I dedicate my dissertation work to my dear husband who is the main partner in this work in each step. His words of encouragement and push were always giving me the force to complete this work.

I also dedicate my dissertation work to my loving parents, my sister Kawther and my brother Saad who are not in our world today. Their words of encouragement and push for tenacity ring in my ears. I also dedicate this dissertation to my brothers Mohamed and Kamal and to my family who have supported me throughout the process.

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