@ ASUNET

شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

Ain Shams University Information Network

جامعة عين شمس

شبكة المعلومات الجامعية

@ ASUNET

شبكة المعلومات الجامعية

شبكة المعلومـــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

شبكة المعلومات الجامعية

Ain Shams University Information Network

جامعة عين شمس

شبكة المعلومات الجامعية

@ ASUNET

بعض الوثائق

الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

Some Applications of Chemical Sensors in Environmental and Industrial Analysis

A Thesis
Submitted for the Degree of Master of Science
(Chemistry)

By
Hisham Salah Mohammad
B. Sc. (1994)

To
The Department of Chemistry,
The Faculty of Science,
Ain Shams University

SUPERVISED BY
Prof. Dr. Saad S. M. Hassan
Dr. Ibrahim H. A. Badr

Ain Shams University
Faculty of Science
Chemistry Department

1999

Ain Shams University
Faculty of Science
Chemistry Department

M. Sc. THESIS Titled

Some Applications of Chemical Sensors in Environmental and Industrial Analysis

By

Hisham Salah Mohammad

Thesis Advisors

Prof. Dr. Saad S. M. Hassan
Dr. Ibrahim H. Ali Badr

Thesis Approved

Head of Chemistry Department

Prof. Dr. Saad S. M. Hassan

1999

Dedication

To my beloved family and sincere friends.

Hisham S. M. Abd-Rabboh

Acknowledgement

I would like to express my sincere gratitude and indebtedness to Prof. Dr. Saad S. M. Hassan, Professor of Analytical Chemistry and Head of Chemistry Department, Faculty of Science, Ain Shams University. He was always kind enough to suggest the lines of research and to follow the progress of the work with keen interest, guidance and valuable criticism.

Also, I wish to acknowledge with sincere gratitude Dr. Ibrahim H. A. Badr, Lecturer of Analytical Chemistry, Chemistry Department, Faculty of Science, Ain Shams University, for his valuable advice, encouragement and continuous helps during this research work.

Finally, my great and deep gratitude for all of my colleagues in the lab, Amr, Hossam, and for Dr. Ashraf A. Mohammad, for their kind help and valuable discussions.

Hisham S. M. Abd-Rabboh

Table of Contents

Chapter 1

Introduction

Chapter 2

Electrochemical Assay of Carrageenan in Food Products Using Polyion Sensors