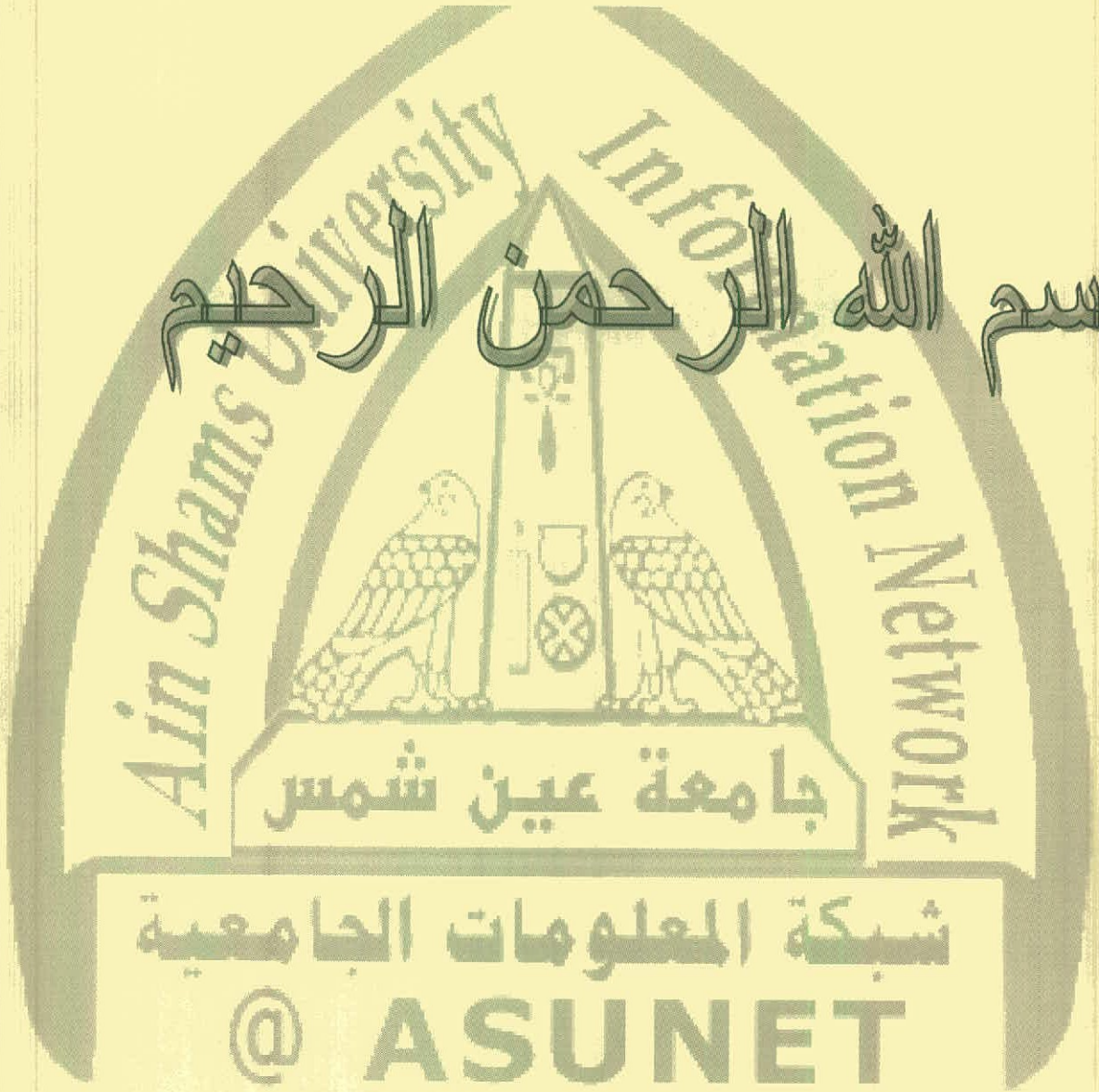
شبكة المعلومات الجامعية



بسم الله الرحمن الرحيم

شبكة المعلومات 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 أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

بعض الوثائـــــــق الاصليـــــة تالفـــة

بالرسالة صفحات لم ترد بالاصل

Physico-Chemical Studies of the Evaluation of some Stabilizers for Solid Rocket Propellants

Presented by

Mahmoud Ahmed Mabrouk Said

A Thesis Submitted
To
Faculty of Science

In Partial Fulfillment of the
Requirements for
The Degree of
Master of Science
(Chemistry)

Chemistry Department
Faculty of Science
Cairo University

(2010)

APPROVAL SHEET FOR SUBMISSION

Thesis Title: Physico-Chemical Studies of the Evaluation of some Stabilizers for Solid Rocket Propellants

Name of candidate: Mahmoud Ahmed Mabrouk Said

This thesis has been approved for submission by the supervisors:

1- Prof. Dr. Mohamed Mohamed Shoukry.

Signature:

2- Dr. Hussien Alwany Abd Elrahman.

Signature:

Prof. Dr. Mohamed Mohamed Shoukry

Chairman of Chemistry Department
Faculty of Science- Cairo University

ABSTRACT

Student Name: Mahmoud Ahmed Mabrouk Said

Title of the thesis: Physico-Chemical Studies of the Evaluation of some Stabilizers for Solid Rocket Propellants

Degree: The Master of Science (Chemistry)

The present work deals with the study of effect of stabilizer ratio on stability of solid rocket propellant by using different techniques. Several Double-Base Propellant samples have been prepared using different ratios of Centralite 1 (as Stabilizer).

Traditional methods for study of Stability are carried out after manufacture and after aging. The results are consistent with the Control Laboratory of Bofors. HPLC is used to determine the composition of DBP samples after manufacture and after aging.

The mechanical properties of solid rocket propellants are very important for the good functioning of rocket motors. Compression test, as Mechanical analysis, is applied at two different temperatures (25 and 50°C). Mechanical properties are improved with the increase of stabilizer ratio but until certain amount of stabilizer ratio.

Ballistic tests were carried out (at -20 and +50°C), all the ballistic properties decrease with the increase of stabilizer ratio.

Thermal analysis methods for study of thermal stability are carried out. The TGA and DTG were carried out under Non-isothermal and Isothermal conditions, the thermal stability are increasing by increase the ratio of stabilizer until certain ratio of stabilizer. DTA results show that, the increase of Stabilizer ratio (C1) is associated with a shift of decomposition temperature, and these results are consistent with the results of non-isothermal TGA.

Keywords: Double-Base Propellant, Stabilizer (Centralite 1), Stability Tests, HPLC, Mechanical properties, Ballistic properties, Thermal Analysis.

Supervisors:

Signature

1- Prof. Dr. Mohamed Mohamed Shoukry. ( )

2- Dr. Hussien Alwany Abd Elrahman ( )

Prof. Dr. Mohamed M. Shoukry

( )

Chairman of chemistry Department

Faculty of Science- Cairo University

Acknowledgment

First I would like to express my grateful appreciation to my supervisor

Prof. Dr. Mohamed Mohamed Shoukry.

For his considerable discussions and guidance.

I introduce my grateful appreciation to my supervisor

Dr. Hussien Alwany Abd Elrahman

for his help and guidance

Mahmoud Ahmed Mabrouk Said

Cairo University
Faculty of Science
Chemistry Department

To whom it may concern

Besides the work carried out in this thesis, the candidate **Mahmoud Ahmed Mabrouk Said** had studied the following post-graduate courses during the academic year 2006-2007 and passed their exams successfully.

- Colloids and Catalysis
- Thermal Analysis
- Solar Energy
- Electro Chemistry
- Group Theory
- Metallurgy
- Analytical Chemistry
- Polymer Chemistry
- Quantum Chemistry
- Nuclear Chemistry
- Advanced Inorganic Chemistry
- Techniques of Molecular Determination
- German Language
- Adsorption
- Cyclic Voltammetry
- Electrode Kinetics
- Thermodynamics
- Statistical Thermodynamics
- Chelatimetry
- X-ray Thermal Analysis
- Inorganic Reaction Mechanism

Prof. Dr. Mohamed M. Shoukry
( )
Chairman of Chemistry Department
Faculty of Science- Cairo University

Contents

Chapter III Results and Discussions

List of table

List of figures