Ain Shams University
Faculty of Science
Chemistry Department

The Preparation and Evaluation of Modified Zirconia Pillared Clay Catalysts for Refining Processes

Submitted by
Dalia Radwan Abd-El Hafiz
Assistance researcher-Egyptian Petroleum Research Institute
M.Sc. (Chemistry)
Faculty of Science, Benha University

For

"Ph. D" Degree in chemistry
(Physical Chemistry)

To

Chemistry Department
Faculty of Science
Ain Shams University
Cairo, Egypt

2010

Ain Shams University
Faculty of Science
Chemistry Department

The Preparation and Evaluation of Modified Zirconia Pillared Clay Catalysts for Refining Processes

Submitted by

Dalia Radwan Abd-El Hafiz

Assistance researcher-Egyptian Petroleum Research Institute
M.Sc. (Chemistry)
Faculty of Science, Benha University

For

"Ph. D" Degree in Chemistry (Physical Chemistry)
Faculty of Science, Ain Shams University

Supervised by

Prof. Dr. Suzy A. Sleim
Prof. of Physical Chemistry
Faculty of science
Ain Shams university

Prof. Dr. Sara Mikhail
Prof. (Refining Department)
Egyptian Petroleum Research institute

Prof. Dr. Lamia saad
Prof. (Refining Department)
Egyptian Petroleum Research institute

2010

بسم الله الرحمن الرحيم

MOWJELDOHA.COM

(وَقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ
عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ
وَسَتُرَدُّونَ إِلَى عَالِمِ الْغَيْبِ
وَالشَّهَادَةِ فَيُنَبِّئُكُمْ بِمَا كُنْتُمْ
تَعْمَلُونَ)

صدق الله العظيم

صدق الله العظيم

ACKNOWLEDGMENT

First of all, thanks to Allah.

The author wishes to express her deepest gratitude to **Prof. Dr. Suzy A. Sleim** Professor of Physical Chemistry, Faculty of Science Ain Shams University for her interest in the work, for her encouragement, and for her support.

Deep thanks and gratitude to **Prof. Dr. Sara Mikhail** Professor Refining Department, Egyptian Petroleum Research institute (EPRI), for suggesting the problem, supervising, helpful discussion and constructive criticism.

Deep thanks and gratitude to **Prof. Dr. Lamia Saad** Professor Refining Department, Egyptian Petroleum Research institute (EPRI), for suggesting the problem, supervising, and helpful discussion.

It is a pleasant duty of the author to express her gratitude to all of her colleagues at the Refining Division especially in catalysis laboratory for their willing help and encouragement and to all the members of EPRI.

Approval Sheet

Title of thesis: **The Preparation and Evaluation of Modified Zirconia Pillared Clay Catalysts for Refining Processes**

Submitted by: **Dalia Radwan Abd-El Hafiz**
M.SC. (Chemistry) Faculty of Science, Benha University.

Supervisors:

Prof. Dr. Suzy A. Sleim	Prof. of Physical Chemistry Faculty of Science Ain Shams University
Prof. Dr. Sara Mikhail	Prof. (Refining Department), Egyptian Petroleum Research Institute (EPRI).
Prof. Dr. Lamia saad	Prof. (Refining Department), Egyptian Petroleum Research Institute (EPRI).

Head of Chemistry Department

Prof. Dr. Fakhry A. El-Bassiouny

Qualification

Name: Dalia Radwan Abd El-Hafiz

Scientific Degree: Ph.D.

Department: Chemistry

College: Faculty of Science

Univeristy: Ain Shams

B. Sc: 1997

M. Sc: 2002

Job: Assistance researcher- Refining Department Egyptian Petroleum Research Institute.

CONTENTS

List of Figures