"SYNTHESIS OF MESOPOROUS MOLECULAR SIEVES AND THEIR USE IN PARAFFINS HYDROCONVERSIONS"

A Thesis Submitted

For the M. Sc. Degree (Chemistry)
(In Partial fulfillment)

To

The Department of Chemistry
Faculty of Science
Cairo University

By

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٢٠٠٩

بسم الله الرحمن الرحيم

"يرفع الله الذين ءامنوا منكم والذين أوتوا العلم درجات

والله بما تعملون خبير"

صدق الله العظيم

DEDICATED

TO

MY Mother

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APPROVAL SHEET FOR SUBMISSION

Title of the M. Sc. Thesis:

"Synthesis of mesoporous molecular sieves and their use in paraffins hydroconversions"

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ABSTRACT

Name: Samar Said Muhammed Abdelaal

Title of thesis: "Synthesis of mesoporous molecular sieves and their use in paraffins hydroconversions".

Degree: M.sc., Faculty of Science, Cairo University, ٢٠٠٩

Nowadays, isomerization of n-paraffins plays an important role in the petroleum industry. Isomerization reaction generally takes place over bifunctional metal /acid catalysts.

Pure siliceous SBA-١٥ and AlSBA-١٥ of different n_{Si}/n_{Al} ratios (٥, ٧ and ١٤) were synthesized by well- known procedures and used as supports for preparation of Ni and Pt catalysts with different percentage. The catalysts were prepared by impregnation technique.

Supports and the prepared catalysts were characterized by X-ray diffraction (XRD), Nitrogen physisorption, Differential Scanning Calorimetry (DSC) and Thermal Gravimetric Analysis (TGA).The results showed that by Ni or Pt loading, both SBA-١٥ and AlSBA-١٥ supports preserve their hexagonal porous arrangement. All the samples are thermally stable up to ٦٠٠ ^{o}C. BET surface area, pore volume and pore diameter were decreased as the Ni or Pt loading increased, also the intensities of $d_{١٠٠}$ diffraction peaks were affected.

The catalytic activity and selectivity of the prepared catalysts were studied through the dehydrogenation of cyclohexane and through the hydroconversion (hydroisomerization and hydrocracking) of n-hexane in pulse flow system.

٠.٦ wt%Pt/SBA-١٥ and ٠.٣ wt%Pt/AlSBA-١٥(٥) catalysts were active and selective toward cyclohexane dehydrogenation into benzene. Also the latter one showed high activity for n-hexane isomerization. Whereas Ni/SBA-١٥ and Ni/AlSBA-١٥ catalysts showed high activity for cyclohexane and n-hexane hydrocracking.

Keywords: *SBA-١٥; AlSBA-١٥; Pt catalysts; Ni catalysts; hydroconversion; Dehydrogenation; n-hexane; cyclohexane.*

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INTRODUCTION