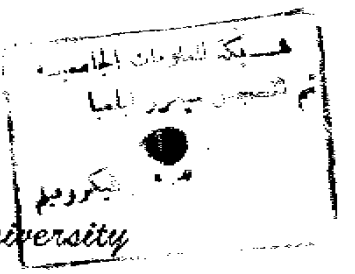
A STUDY ON THE EXTRACTION OF AROMATIC HYDROCARBONS FROM LIGHT PETROLEUM FRACTIONS WITH POLAR SOLVENTS



A THESIS

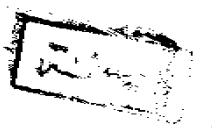
Submitted To

Faculty of Science, Ain Shams University

By

Magdy Tadrous Zaky Ayoub

B.Sc. (Honour, 1983)



For

The Degree of Master of Science

In

Physical Chemistry

EGYPTIAN PETROLEUM RESEARCH INSTITUTE

Refining Department

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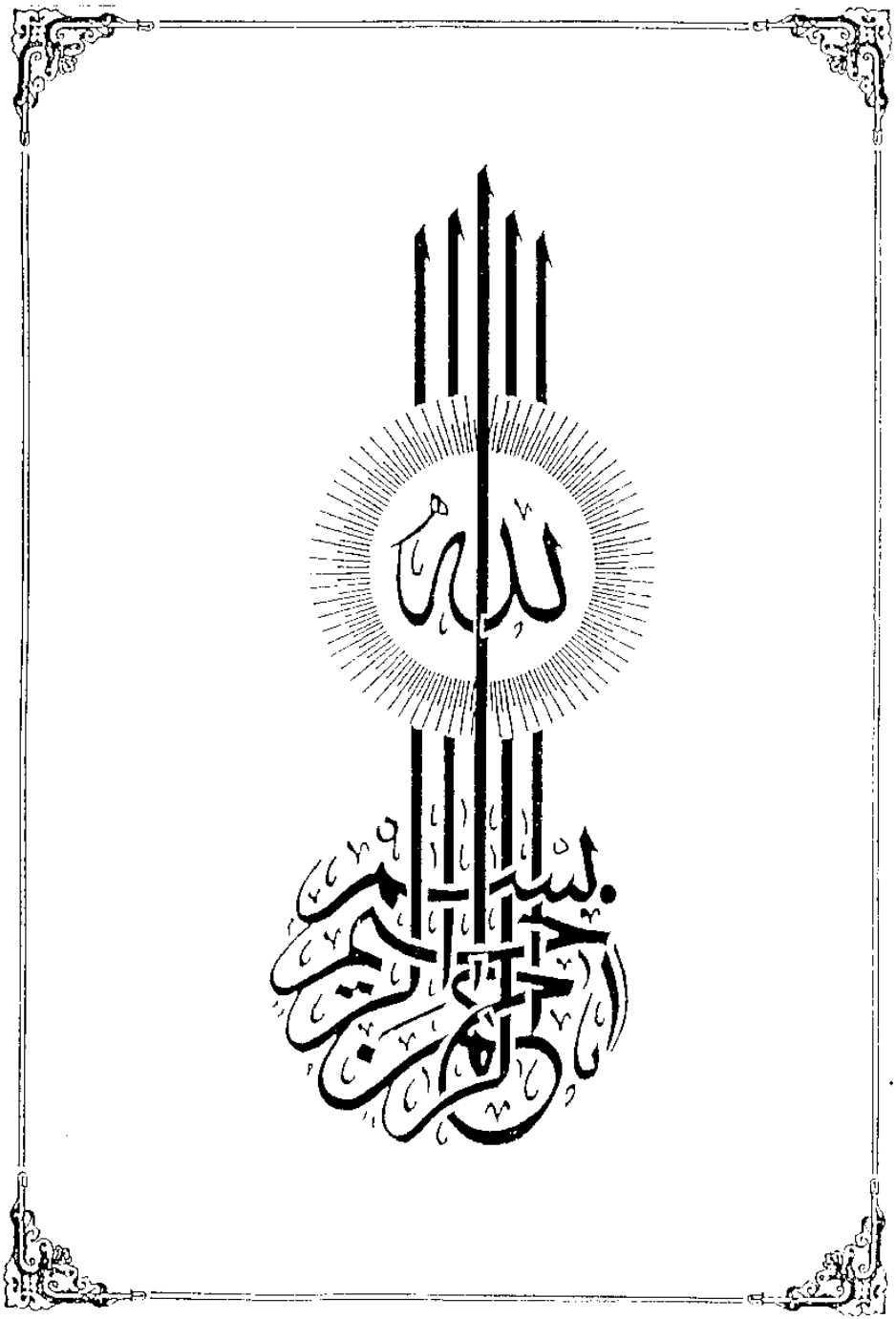

A STUDY ON THE EXTRACTION OF AROMATIC HYDROCARBONS FROM LIGHT PETROLEUM FRACTIONS WITH POLAR SOLVENTS

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ARABIC SUMMARY

CHAPTER I

INTRODUCTION AND OBJECT OF INVESTIGATION

INTRODUCTION

CHAPTER I

INTRODUCTION AND OBJECT OF INVESTIGATION

I.A - INTRODUCTION

The demand for aromatic derivatives will continue its relatively rapid growth over the next ten years due to the increasing number of uses being discovered for the products derived from aromatics[1], and according to the new report[2], global benzene demand reached 22.3 MMton in 1992. Now this market represents a significant business interest to most petroleum and chemical companies. Since most of the aromatics used today are derived from petroleum refining operations.

In the petrochemical industry, aromatics are obtained from two primary sources : (1) catalytic reforming of naphtha, and (2) naphtha obtained from an olefins plant operation[1].

The aromatic hydrocarbons benzene, toluene and xylene (BTX) are amongst the most important raw materials in the petrochemical industry. The greatest demand is for benzene, of which 40 % is processed to styrene, 20 % to caprolactam and to phenol, and the remainder to maleic anhyride, aniline and a large number of other chemical compounds. The consumption of xylene, which is almost exclusively processed to o-phthalic acid and teraphthalic acid, takes second place. The considerably lower demand for toluene is reflected by its distinctly lower price[3].

The production structure[4] of (BTX) in Western European is represented in Fig. 1.

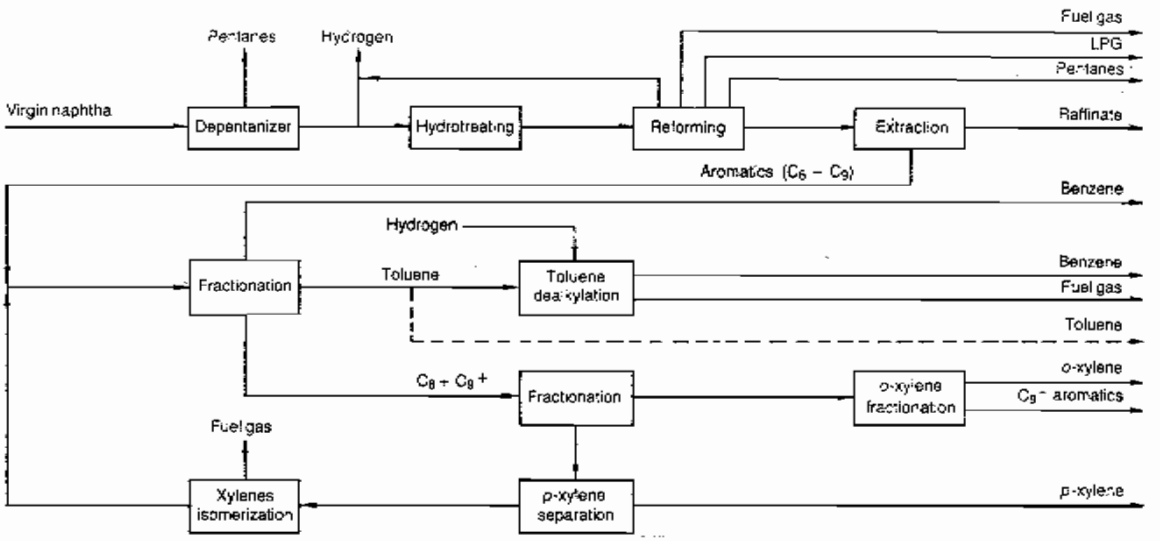

Fig . 1 - Basic Western European BTX production scheme

The chemicals made from petroleum are very important to the world's economy. While they constitute only 7% of the volume of petroleum used, their high value and very broad utilization in manufactured end-products make them an important contributor to world employment and GNP (Gross National Product)[5].

The C_6-C_8 fraction can be sent to solvent extraction where the BTX is physically separated from the non-aromatics. Solvent extraction processes have been invented to extract aromatics from the feed with solvents which preferentially dissolve the aromatics. Some of the most popular solvents in major use today are sulfolane, N-methylpyrrolidone and various glycols such as mono-di-tri and tetra-ethylene glycols. The cost of an aromatics extraction process is related directly to the quantity of solvent required for a given feedstock. In recent years, process improvements have been aimed at reducing the solvent- to-feed ratio. These improvements were made primarily with catalytic reformate as a feedstock that contained aromtics in about 50 percent concentration. The increased aromatics concentrations will tend to force the solvent - to - feed ratios back to higher values. Research activities may soon