CHAPTER I

INTRODUCTION

With growth and development of car industries, refining industries have been steadily under pressure of demands for better fuels. To improve gasoline octane number, could seen by several methods such as: addition of tetraethyl lead (TEL) and tetra methyl lead (TML), thermal / Catalytic reforming of naphtha, thermal polymerization of olefin light ends to hexenes, heptenes & octenes and alkylation of olefins.

Isomerization of low molecular weight paraffins has been commercially applied for many years. The isomerization of *n*-butane has found widespread application for the preparation of alkylation feed. Fractions containing mainly pentanes and hexanes have not been isomerizes to any great extent because octane requirements of the motor gasoline can, in general, be met without isomerization of these fractions [1].

Abatement of air pollution from motor vehicles has initiated a worldwide drive to gradually remove the anti-knock additives such as TEL and TML from motor gasoline during the coming years. Some automobile manufactures have announced new car models with lower compression ratios, which will be able to run on gasoline with a lower octane number. The drop in octane number of the gasoline by the removal or reduction of the lead ant-knock additives, however, will have to be partially compensated for by replacing low-octane components principally by aromatics and isoparaffins. As a consequence, isomerization capacity for fractions containing C5/C6 paraffins will increase [2].

Through this afford, several widely different isomerization processes have been developed. One of the early processes used an acid halide type of catalyst, which supported on a solid with a hydrocarbon. The next major isomerization catalyst system was the dual-function catalyst which consisted of a hydrogenation-

dehydrogenation component (dispersed metal) on an amorphous solid support (cracking component) [1].

Zeolites are special class of crystalline aluminosilicates compounds which have specific pore dimensions and structure. In addition, the special acidic and adsorptive properties of zeolite surface promote specific conversion reactions such as hydrocracking and hydroisomerization.

Mordenite is an interesting zeolite support that contains Brønsted and Lewis acid sites. The problem is mordenite have too high total acidity for dehydrogenation step of reaction. So, worker tried to decrease acidity by addition alkali and mixed with basic-catalysts to improve catalytic activity.

Objective of this research

1. To prepare mordenite catalysts and modify acidity with K, and loaded with various types and concentrations of metal such as Pt, Pd, Ga, and Zn.
2. To study the effect of metal and reaction conditions that gave high octane number products selectivity.
3. To study catalytic activity of some catalyst mixtures.

The scopes of the thesis

Methods to modify acidity and to introduce some metals into mordenite: ion-exchange and impregnation methods were studied. The prepared catalysts were characterized by XRD, XRF, BET, NH_3-TPD and TGA techniques. The performance of the prepared catalysts on the conversion of *n*-hexane was investigated under various conditions.