سامية محمد مصطفى

شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

سامية محمد مصطفى

شبكة المعلومات الجامعية

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التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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بعض الوثائق الأصلية تالفة

سامية محمد مصطفى

بالرسالة صفحات لم ترد بالأصل

CHARACTERISATION OF MIXED OXIDE CATALYSTS USED IN OXIDATION REDUCTION REACTIONS

Thesis
Submitted in partial fulfillment
For the Degree of Master of Science
In
Chemistry

By

Waleed Mokhtar Shaheen

Chemistry Department
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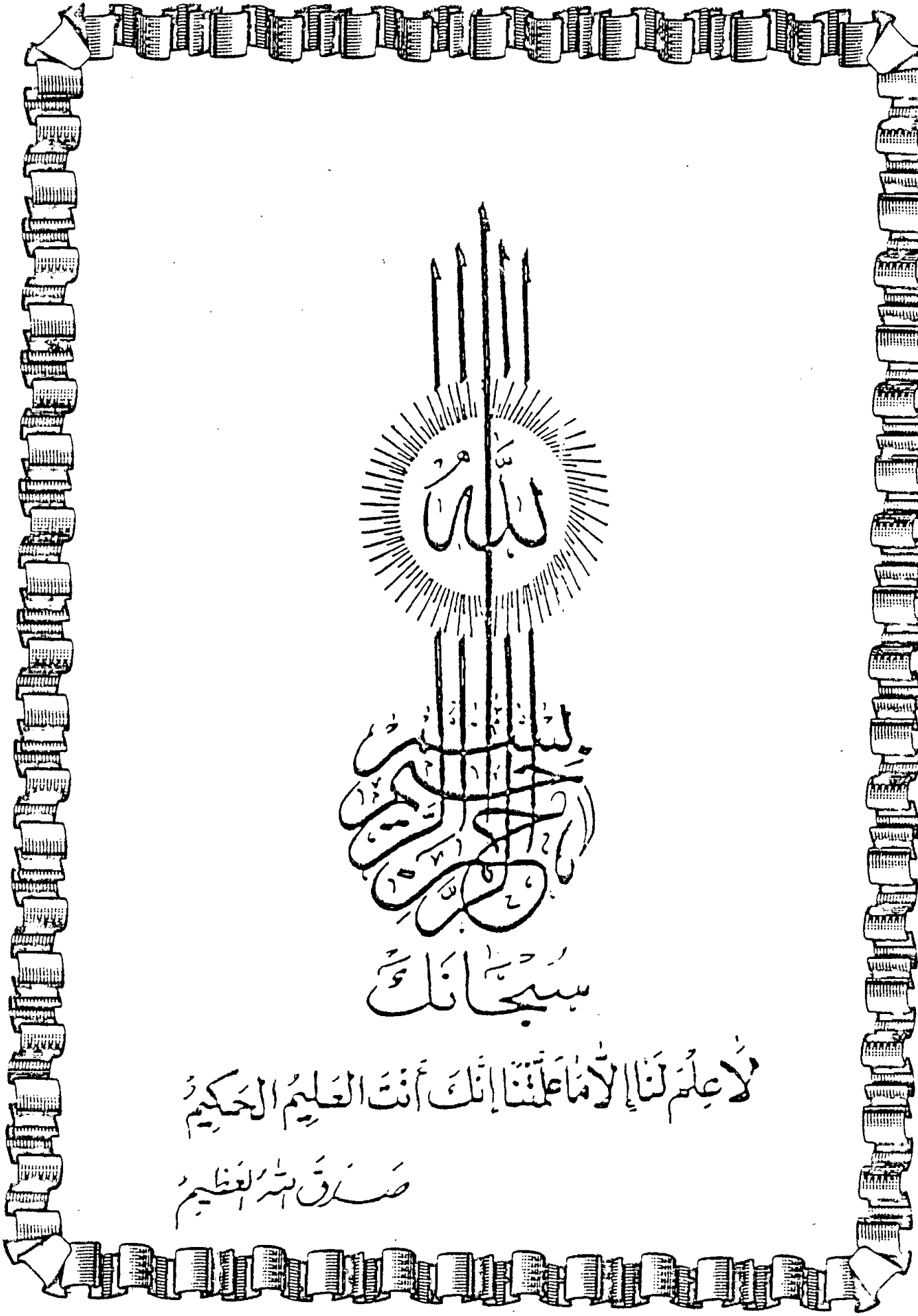
بسم الله الرحمن الرحيم
سبحانك
لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم
صدق الله العظيم

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تحية طيبة وبعد :-

إيماء إلى البحث المقدم من سيادتكم وموضوعه :

Catalytic Decomposition of H_2O_2 on the Thermal Products of Pure and Mixed Ni and Mn-Carbonates.

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أفيد سيادتكم أن هذا البحث قد حكم وقبل للنشر في مجموعة بحوث المجلة

وختاماً أكرر التحية ،،

سكرتير التحرير

١٩٩٤/٢/٢٨

Bull. Fac. Sci - Zagazig Univ.

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CHAPTER 1

CHAPTER I

INTRODUCTION

Historical Review:

The discovery of catalysis is considerably earlier than the discovery of the metallurgies of bronze and iron. It can be set with some degree of certainity at the begining of the Neolithic age. One of the most ancient catalytic processes is the biocatalysis in the alcoholic fermentation. The manufacture of soap and the hydrolysis of animal fats catalysed by bases was known 2500 years ago in the Mediterranean world.

By the early part of the last century there had been discovered a number of reactions whose rates were influenced by the presence of a substance that remained unchanged at the end of the process. These reactions include the conversion of starch into sugers, the rate of which was influenced by acids; the decomposition of alcohols and of hydrogen peroxide, influenced by metallic surfaces; and the formation of ammonia in the presence of spongy platinum[1].

Berzelius in 1936 realised that there are substances which increase the rate of a reaction without themselves being consumed.

He believed that the function of such a substance was to loosen the bonds which hold the atoms in the reacting molecules together. Thus he coined the term catalysis (Greek kata = wholly, lein = to loosen)[2]. It has already been stressed that a chemical reaction can not be of practical use unless it proceeds at a suitable speed. If a reaction is too slow it can be speeded up by raising the temperature, but this may have undesirable results; for example, if the reaction is exothermic the equilibrium constant will decrease, so that the yield of products will be less. However, it is also found that the rates of very many reactions are considerably increased by the presence of quite small amounts of another substance, which is not itself used up during the reaction. This phenomenon is described as catalysis[3].

In view of the large number of processes that have been described as "catalyzed", it is appropriate to consider the various definitions of catalysis that have been proposed from time to time. An early definition due to Ostwald[4] was that a catalyst is "any substance that alters the velocity of chemical reaction without modification of the energy factors of the reaction". Later he proposed an alternative definition which has been widely quoted: "A catalyst is any substance that alters the velocity of a chemical reaction without appearing in the end product of the reaction". A slightly different way of saying the same thing is to say that "a

catalyst alters the velocity of a chemical reaction and is both a reactant and a product of the reaction"[5]. A definition due to Bell is very similar: "A substance is said to be a catalyst for a reaction when its concentration occurs in the velocity expression to a higher power than it does in the stoichiometric equation[6].

All these definitions were intended to exclude from the category of catalysts substances that accelerated the rate of a reaction by entering into reaction and in this way disturbing the position of equilibrium; such substances are reactants in the ordinary sense. It is to be noted that in the definations of catalysis there is no reference to the fact that a small amount of a catalyst has a large effect on the rate; this is frequently the case, but is not an essential characteristic of a catalyst.

Although by definition the amount of catalyst should be unchanged at the end of the reaction, it does not follow that the catalyst does not enter into chemical reaction as the reaction proceeds. Mitscherlich was one of the earliests chemists to recognize catalytic action which he called contact action. If the rate of a chemical reaction is accelerated by the added substance, it is said to be a positive catalyst and when the added substance retards the reaction it is called a negative catalyst. Therefore, a catalyst may

be defined as a substance which influences the rate of a chemical reaction without itself undergoing any paramount chemical change[1].

Progress in catalysis was very poor during the nineteenth century whether from the scientific or technical standpoints. Discovery of new catalysts depended on lucky chances, when Groebe broke a thermometer in a mixture of hot sulphuric acid and naphthalene to phthalic anhydride. Also application of laboratory discoveries in the field of industry was delayed by serious difficulties. Fredric Kuhlman tried unsuccessfully to industrialize the oxidation of sulphur dioxide and ammonia over divided platinum. The lack of knowledge of poisons was the reason for these setbacks.

Catalysis has been made a true scientific discipline by the chemical kinetic research which includes the precise study of catalytic reactions and analysis of their mechanisms. This has really got developed in the decade between 1920 and 1930. Since then, several new catalytic transformations and synthesis are being discovered with ever increasing rapidly. The synthesis of methanol and its homologous, the synthesis of liquid fuels, petroleum