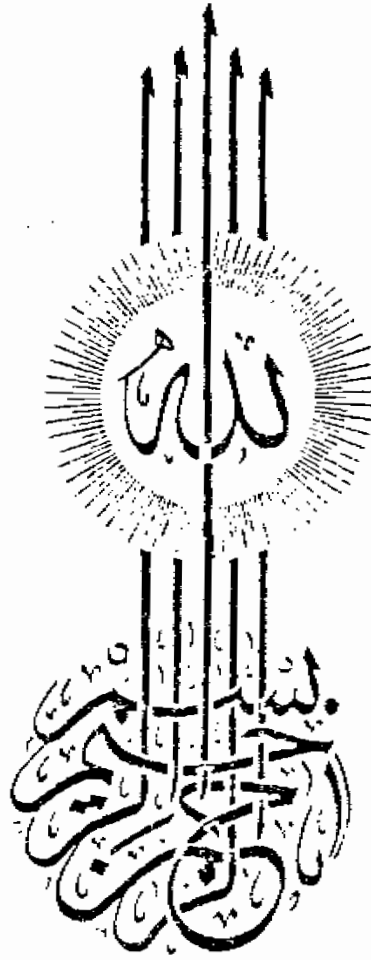




« علم الانسان في عالم يعلم »
صدق الله العظيم

سورة الفلق آية ٥٠

***PRESENTMENT TO
MY MOTHER
AND
MY FATHER***



**STUDIES ON SOME POLY
FUNCTIONAL
FLUIDS AND THEIR USES**

THESIS

**SUBMITTED IN PARTIAL FULFILMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE IN CHEMISTRY**

BY

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**STUDIES ON SOME
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Besides the work carried out in this thesis, the candidate has attended postgraduate courses in the following topics.

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AIM OF THE WORK



AIM OF THE WORK

Many different types of materials are utilized as functional fluids and Functional fluids are used in many different types of applications. Thus, such fluids have been used as electronic coolants, diffusion pump fluids, lubricants, damping fluids, bases for greases, power transmission and hydraulic fluids, heat transfer fluids, heat pump fluids , refrigeration equipment fluids and filter medium for air-conditioning systems.

A particular important application of such functional fluids are their utilization as hydraulic fluids and engine lubricants in aircraft, requiring successful operation of such fluid over a wide temperature range. An especially valuable and highly desirable property of such fluids being fire resistance.

Phosphate esters have long been used as functional fluids⁽¹⁾. They have been used alone in wholly synthetic compositions as additives to mineral oil compositions to impart extreme pressure properties thereto. The volume of production of triarylphosphate as flame retardant plasticizers and fire resistant hydraulic fluids, is approximately 100 million pounds per years [MRI 1977]⁽¹⁾ and now it seems to be more than the double.

The needs of the local market from the hydraulic brake fluids exceeds 300 imported tons per year. The Egyptian petroleum Research Institute [EPRI] has encouraged this work, which deals with hydraulic brake fluids. Therefore this research program covers a study of some functional fluids needed for the local market.

The aim of this study covers the following :

- Synthesis of some triphosphate esters .
- Study of some parameters which affect the esterification reactions for the aim of optimization.
- Characterization of the prepared compounds using the recent methods and different tools of analysis.
- Laboratory testing for the prepared esters to outline their suitability as base for hydraulic brake fluids in connection with some of the international standard specifications.