CHAPTER I

INTRODUCTION

The world nowadays become industrialized. Many industrial equipment, automobiles also the household tools become more important. All of these needs lubricating agent in order to reduce friction from contact between 2 surfaces while they are being used, even in their maintenance to keep them in the good efficiency for a long lifetime.

The majority of lubricant base fluid are produced by the refining of crude oil. The reason for the predominance of refined petroleum base oils are simple and obvious performance, availability and price. Large scale oil refining operations can produce base oils which have excellent performance in modern lubricant formulation where special properties are necessary, where petroleum base oils are in short supply or where substitution by natural products is practicable or desirable.

Modern lubricants are formulated from a range of base fluids and chemical additives. The base fluid has several functions but primarily it is the lubricant, providing a fluid layer separating moving surfaces or removing heat and wear particles while keeping friction at a minimum. Many of the properties of the lubricant are enhanced or created by the addition of special chemical additives to the base fluid. For example, stability to oxidation and degradation in and engine oil can be improved by the addition of antioxidants while the extreme pressure (EP), anti-wear properties needed in gear lubrication are created by the addition of special EP additives. The base fluid also function as the carrier for those additives and must therefore be able to keep the additives in solution under all normal working conditions.

For automotive lubricant, producing a lubricant can be a simple process. Refineries produce lubricating basestock of an appropriate viscosity. Additive companies produce chemical components and additive packages which contain a specially developed

blend of these components. Chemical companies produce polymers which help to maintain the viscosity for the oil at elevated temperatures. Sometimes two or three of the above are produced by the same companies who attempt to play a coordinating role in the lubricating industry, supplying additive packages and recommending the basestocks and polymers required for the formulation. Contacting an additive company can be the first step in the formulation of a lubricant. Following this, the necessary business agreements or contracts can be decided, arrangements made for the additive package, basestocks and polymer to be supplied, blended and packaged, a quality control system developed, and the result is a lubricant that can be soid and used. This product would be a generic lubricant suitable for some but not all applications. However, this is unlikely to be what the lubricant supplier, the distributor to the consumer, or the consumer actually wants.

In order to get the suitable quality needed for any types of lubricants, most of the commercial lubricant manufacturers, such as :- Exxon, Shell, Mobil, PTT. etc., have to blend their base oils together with the additives, which are developed continuously from their laboratories, to improve the finished products performance. In the extremely-competing markets, these manufacturers have to keep their lubricants formulations secret, or issue these formulation in the patents to claim their intellectual rights. On the other hand, the data from the patents, copywriters are also useful for this academic research.

All of the lubricating knowhows, nowadays, belong to international firms. Therefore, it is very interesting to study and to analyze the composition of additive in lubricating oil in order to be able to follow, compete and effectively negotiate for technology transfer. Thus, a very efficient and fast analysis of additive must be developed. Since, the IR spectra of additives are commercially available and the TLC which is very rapid has been fully developed for lubricating oil. Therefore, TLC-FTIR technique was proposed for this study.

Objectives and scope of this study

This thesis objective is to determine those formulations of the commercial lubricants by isolating and characterizing the additives. Many analytical methods (such as chromatography, spectroscopy, etc.,) were employed systematically to disclose the formulations. Since the TLC-FTIR technique is more effective than the old conventional methods (such as less time consumed). Therefore, this research could be applied in the industrial production or the quality control process. The goal of this study is to propose the new method, TLC-FTIR, for analyzing and characterizing the additives used in the commercial lubricants. This technique was supposed to be the most rapid method for analyzing the lubricants.

This research scope was to compare the data obtained from the ordinary techniques (chromatography, spectroscopy, etc...) with the data from the TLC-FTIR techniques, then the drawbacks or the improvements of the techniques were determined.