CHAPTER I

INTRODUCTION

Petroleum is the largest single source of the hydrocarbon waxes. Petroleum waxes are by-products of the petroleum industry in that the wax must be removed from the oil to produce lubricants with proper low-temperature characteristics. This gives petroleum waxes the advantage of a low price. Wax is useful for candles and many other products, such as wax paper, crayons, coatings for paper cups, corrugated cardboard containers, board sizing, mold releases, base stock for poor point depressants, *etc.*

Petroleum wax is primarily comprised of branched and straight chain paraffin. Paraffin wax is often present in intermediate and heavy oils and separates upon cooling. The removal of paraffin wax is desirable to obtain lubricating oils with satisfactory low poor points. The main product of the dewaxing process is a dewaxed oil with the desired poor point and the by-product is slack wax. The wax process in the dewaxing step can be deoiled and upgraded to produce saleable wax, such as food grade wax. In the past, wax was mainly considered as a by-product of dewaxing of lubricating oils and lubricants. Today, wax is itself a valuable product.

Slack wax is a mixture containing isoparaffin, normal paraffin and also lower melting point constituents usually referred to as oils and naphthenic constituents. It can be deoiled by sweating or solvent dewaxing. Wax sweating is the least common method in use today. During conventional wax sweating, a warm liquid oil-wax mixture, called "slack wax", is chilled to a semi-solid state. Oil is entrapped in the solid wax. The solid wax is subsequently slowly heated in a sweating oven, pan sweater, tank, furnace, or heat exchanger. During sweating, the temperature of the wax in the oven is slowly

raised to liquefy part of the wax. The liquid wax is referred to as liquid drippings and comprises wax and oil. The initial liquid drippings are relatively rich in oil.

During sweating, the liquid drippings are continuously drained from the oven. The remaining solid wax in the oven is learner in oil. As sweating continues, the oil content of the bed of solid wax remaining in the oven decreases and the melting temperature of the solid wax increases. Concurrently, the oil content of the liquid dripping decreases and the melting point of the liquid drippings increases. Significantly, the oil and wax contents of the liquid drippings are substantially different than the oil and wax contents of the bed of solid wax remaining in the oven.

Microcrystalline waxes are obtained as by-product from the de-waxing of "lube oil raffinates", the deoiling of petrolatum produced from deasphaltic residual oil, or the deasphalting and deoiling of settlings of tanks holding crude oil in the field. These types of microcrystalline waxes are sometimes referred to as "micro wax", "petrolatum wax", and "petroleum ceresin" respectively. Today, the method for deoiling this wax is the solvent extraction procedure because it more expeditious than the sweating process. Although the solvent extraction procedure for deoiling of wax is more expeditious and compatible but the equipment cost for production process is high, solvents are expensive and there is a problem for drain solvents which they are pollution for environmental. If it drags the method to the sweating process which it uses low energy for separating the oils and waxes. This method be substituted the solvent extraction procedure because each waxes have difference melting point. This process may reduce problem and decrease economic price from using the solvent that is poison the environment

In Thailand, bright stock is a by-product from lube oil refining industry, and there have been only few applications of it. In this research, bright stock was used as a

substrate for the production of microcrystalline wax by sweating process, and these wax was oxidized to improved the physical properties of them.

Objectives and Scope of the Research

Objective

1. To prepare of microcrystalline wax by sweating process.
2. To improve the property of microcrystalline wax by oxidation method
3. To study the physical properties of microcrystalline wax as melt as its oxidation product.

Scope of the research

1. Literature survey of the relevant research work.
2. Preparation of chemicals and equipment.
3. Deoiling fo petroleum waxes by sweating process and investigate the optimum temperature for separating rich oils from petroleum wax.
4. Purification of wax by sweating process.
5. Determination of drop melting point of wax following the ASTM D127 method.
6. Determination of the optimum temperature and time for wax sweating process.
7. Improving the property of microcrystalline wax by oxidation method.
8. Determination of the optimum % catalyst and time for oxidation.
9. Characterization of wax and determine the physical property of waxes.

Expecting out come of this research work

1. To obtain the microcrystalline waxes.
2. To reduce solvent usage and energy in producing microcrystalline waxes.