



CHAPTER 1

INTRODUCTION

Over the past decade, the world economy has many times been upset by oil price changes and oil shortages. To protect themselves from the volatile oil market situation, Thailand, has achieved reasonable success in developing its own energy sources, crude oil and natural gas. This discovery did not only help the country to become less dependent on imported energy but also led to further development of the local oil and gas industry.

As the abundant volume of gas reserves in the Gulf of Thailand led to the development of a fully-integrated petroleum industries, the first petroleum complex known as NPC I was established at Mab Ta Put, Rayong, as a part of the Eastern Seaboard Development Program. NPC I comprises of one upstream plant (Olefin plant) which uses ethane and propane from the Gas Separation plant as raw material to produce ethylene and propylene and supply this feedstock to four downstream plants for producing polyethylene, polypropylene, vinyl chloride monomer/poly(vinyl chloride). At present, the polyvinyl chloride production capacity will be $1.8 * 10^5$ ton/year or equal to 14.28 % of the entire polymer production ($12.6 * 10^5$ ton/year).

Poly(vinyl chloride) now has a sales volume varying between the sales volumes of Polyethylene and polystyrene. This widespread use arises from poly(vinyl chloride)'s high degree of chemical resistance and its truly unique ability to be mixed with additives to give a large number of reproductable poly(vinyl chloride) compounds with a wider range of physical, chemical and biological properties than any other plastic material. Poly(vinyl chloride) products have been known and welcomed by consumers for several applications such as

pipng and conduits of all kinds, siding, gutter, window and door frame, plumbing and other construction uses, gaskets, raincoats, toys, garden hose, electrical insulation, magnetic tape, films and sheeting, containers for cosmetic and household chemicals, wire and cable protection, etc.

Since the advent of plastics has given rise to improve method of processing, the increasing use of plastic material has also created a serious waste disposal problem. However, burning of these products is unsatisfactory because it adds to air pollution problems. Burying it is not an effective means of disposal and can be expensive as it is very difficult to degrade using microorganisms. Thus, one mean suggested for combating this problems is to develop plastics that can be self degradable upon exposure to sunlight.

For this work, the proposal is to study the changes in mechanical and physical properties of a photodegradable blow moulding poly(vinyl chloride) with and without introducing a photosensitizer. The preferred photosensitizers are anthraquinone and benzophenone. Since physical strength changes are being directly related to molecular weight and a loss in this property is taken as indicating a reduction in chain length. Optical measurement such as ultra-violet spectroscopy and Fourier transform infrared absorption (FT-IR) measurements are used for observing the changes of the interested functional group contents during the degradation processes.