



CHAPTER I INTRODUCTION

In Thailand, the production of rubber parts is a big market because the rubber parts have been highly consumed due to the increase in car production.

For the rubber parts in automotive industries, there are many rubber part products such as, gasket, suspension bush, hose air, rubber radiator hose, hose breather, oil tank plug, drain pipe, engine mounting, weather strips door sponge. The invented rubbers, usually used for special applications, show some prominent properties such as, flexibility, thermal resistance, chemical and oil resistance, compressibility, impact resistance, and friction resistance.

Due to the desire of special properties, especially those used in fuel transportation system, the synthetic rubbers play a big role as major raw materials in production of rubber parts for automobile because they can be compounded to meet the required properties. Although, Thailand is the largest producer of natural rubber and exports natural rubber to all over the world, but still lots of synthetic rubber are imported. So the production cost of automobile rubber part is increasing.

Generally, rubber has very high viscosity which is difficult to fabricate in some processes such as, injection molding, extrusion and blow molding. In addition, the highly use of synthetic rubber will make the products difficult to degrade at the end of life time. This causes the environmental problems later.

Nowadays, people have a big concern about the global warming and do the things to keep the world. The rise in use of gasohol is so obvious with the aim to reduce global warming. This leads to the revolution of many kinds of products also the rubber parts used in fuel system. There are many environmental friendly products that produce to save the world or reduce the chance to destroy the environment. Thus, a new thermoplastic vulcanizate (TPV)—or thermoplastic elastomer with a cross-linked rubber phase (TPE-V)—of high performance is developed as an alternative with a cheaper cost.

To solve these problems, the novel thermoplastic vulcanizate is prepared to replace the neat synthetic rubber for the automotive rubber parts. Attempt is made to create the rubber parts that have an oil resistance, in fact gasohol and biodiesel resis-

tance because gasohol and biodiesel are used largely in Thailand. In order to do so, dynamic vulcanization of rubber in plastic is employed. Poly(vinylidene fluoride) (PVDF) and natural rubber (NR) are the good candidates for reducing cost. Poly(vinylidene fluoride) was used as the plastic phase to provide the properties of oil and thermal resistance. Natural rubber was used as the rubber phase to get the elastomeric properties and to reduce cost. This thermoplastic vulcanizate will be a green plastic by adding Poly(3-hydroxybutyrate-co-hydroxyvalerate) (PHBV), which is one of the biodegradable polymers, to make it environmental unharmed. This broadens the use of bioplastics and increases value to the bioplastic too.

The objective of this work is to produce the thermoplastic vulcanizates via dynamic vulcanization technique at various vulcanization systems which are conventional vulcanization system (CV system), efficient vulcanization system (EV system) and peroxide system; and, to study the cure characteristic for vulcanizing TPV as well as mechanical and oil resistant properties of TPV for the applications of rubber parts used in fuel system, where such of those properties are considerable.