

CHAPTER I

INTRODUCTION



The Purpose of the Investigation

ABS polymers are widely used as construction materials. The main consumption is the automotive industry, the domestic appliances industry, the data technology and telecommunication area, producers of refrigeration equipment, toys, sport articles, and semi-finished articles. ABS polymers have a very favorable price-performance ratio. In the automotive industry ABS often competes with modified polypropylene, but in other applications it also replaces industrial thermoplastic and thermoplastic blends. For the period up to 1995 an annual growth rate of 3-4% is expected [1].

The preliminary survey of natural rubber and its applications revealed from the Industrial Economics & Planning, Division, Ministry of Industry showed that in 1992, Thailand produced 1,520,000 tons of natural rubber and exported 1,400,000 tons or 92.1% of total production, the remaining 7.9% was used in the country, which is the first rank of the world producers and world natural rubber exporters [2].

Unlike the synthetic butadiene rubber, natural rubber is not able to be used as raw material of thermoplastic ABS. Therefore, the objective of this research is to produce thermoplastic ABS from natural rubber and to replace the synthetic butadiene rubber by improving the quality of natural rubber. Graft copolymerization is the selective method for modification of the natural rubber, the graft natural rubber can be used as raw material in the thermoplastic

ABS type [3,4,5,6]. The graft copolymer of styrene and acrylonitrile onto natural rubber (acrylonitrile isoprene styrene copolymer) can be used to substitute the ABS (acrylonitrile butadiene styrene copolymer).

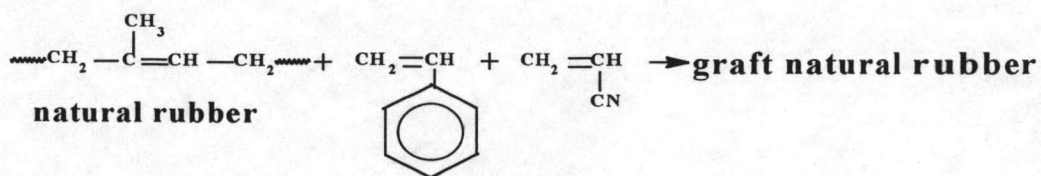
Objectives

1. To prepare the graft copolymer of styrene and acrylonitrile on natural rubber latex. Effect of such influential parameters as concentration of styrene and acrylonitrile monomers, emulsifier concentration and reaction temperature were studied.
2. To characterize the properties of the graft natural rubber.
3. To prepare the blends of the graft natural rubber and SAN. The mechanical properties of the blends were investigated.

Scope of the Investigation

For the preparation of graft natural rubber, the appropriate graft copolymerization conditions were studied. The suitable blend ratio of graft natural rubber and SAN which yielded the good mechanical properties was found. The necessary procedure may be as follows ;

1. Literature survey and in-depth study of this research work.
2. Preparing the graft copolymer of styrene and acrylonitrile onto natural rubber by means of emulsion polymerization by changing the following parameters so as to attain the appropriate reaction condition :
 - a) The optimum concentration of styrene and acrylonitrile and emulsifier.
 - b) The effect of reaction temperature.



3. Studying the effect of parameters on the degree of monomer conversion, grafting efficiency and copolymer composition.

4. The blends of graft natural rubber and SAN were prepared. The properties such as Izod impact strength, tensile strength, flexural strength, flexural modulus, hardness, heat distortion temperature, and melt flow index were investigated.

6. Summarizing the results.