CHAPTER VII
CONCLUSIONS AND RECOMMENDATIONS

The present dissertation focuses on the application of chitin-chitosan modification for the rubber in the form of flocculants and biofillers including the novel technique to obtain chitosan in nanoscale. CHAPTER III related to the flocculation capability of a series of water-soluble chitosans, i.e., chitosan- hydroxybenzotriazole (CS-HOBt), carboxymethyl chitosan (CM-CS), chitosan-acetate (CS-Acetate), and iodochitosan (Iodo-CS). These water-soluble chitosans induce phase separation of rubber particles in natural rubber latex judging from the increase in agglomerated particle size of rubber. The factors inducing flocculation such as dissociation constants and zeta-potentials are also discussed in this chapter.

CHAPTER IV emphasizes on the utilization of microwave technique for improving production of nanoscale chitosan. This technique stimulates the change of not only chemical structure but also morphology as observed by FTIR, ^{1}H-NMR, SEM, and TEM. In another word, chitosan nanoscaffold is obtained from chitin whisker by using shorter (1/7 time) treating time compared to the conventional method.

In CHAPTER V and VI, the application of chitosan as nano-biofillers in rubber product was studied. Nano-fibrous structure of chitosan was prepared and used as fillers in epoxidized natural rubber (ENR). The mechanical properties such as tensile strength and hardness improved after ENR incorporating with nano-fibrous chitosan.

Although the application of chitosan modification in rubber area has been carried out here, there are some interesting points to be further investigated; for example, the study on integrated utilization of chitosan derivatives as a flocculant and biofiller in these systems such as the structure-property relationship in chitosan-rubber system, and so on.