# CHAPTER V

# CONCLUSIONS AND FUTURE DIRECTION

## 5.1 Conclusions

NR/CB compound was prepared by shear-induced coagulation of the NR latex. The shear force was generated by a lab-scale high speed mixer, which was operated at 2,800 rpm for 3 minutes to obtain solidified NR/CB mixture. It was however found that the coagulation by such method was not obtained from the latex mixed with CB having small particle size (grade N220). The CB content must be also high enough to induce the coagulation of the latex. The dispersion of CB in the NR matrix was investigated by SEM, showing that the CB was poorly dispersed in the shear-induced composites. Additionally, shear from a two-roll mill was required to obtain a better CB dispersion.

The exact CB content in the vulcanizates was less than the added amount. It was believed that the loss of CB in fact caused the mechanical properties of the vulcanizates to be lower than expected. Nevertheless the mechanical properties of shear-induced NR/CB vulcanizates and from conventional solid NR mixing method showed the same response to change in CB content. The highest tensile strength was obtained from the sample having 30 phr of CB and the highest tear strength was achieved from the sample having 40 phr of CB.

## 5.2 Future Direction

Suggestions for future researches are

- Using higher shear force machine to achieve homogeneous carbon black slurry and completed shear-induce coagulation of latex
- To start with field latex which has lower MST than concentrated NR latex in order to get shorter coagulation time and better mechanical properties
- To prepare solid NR from the same source of latex coagulation
- To study other dispersing agents to get homogeneous CB slurry
- To develop the batch process to semi-continuous process