CHAPTER V

CONCLUSIONS AND SUGGESTIONS

5.1 Conclusions

From the experimental results, it can be concluded as follows:

1. In order to achieve UHMW PVC resin, the polymerization can be carried out at the elevated polymerization temperature by addition of multiunsaturated comonomer.

2. At a given polymerization temperature, molecular weight increases with increases of the comonomer amount. The higher the polymerization temperature from the normal condition, the higher the amount of comonomer is needed to give the same level of molecular weight.

3. The advantages of using the comonomer is a property improvement such as elongation, electrical volume resistivity, and dynamic heat stability.

4. The disadvantages of using the comonomer is the lower tensile strength. Moreover, there is an indirect effect of the higher polymerization temperature in producing the lower porosity PVC.

This polymerization method offers both advantages and disadvantages. The optimum polymerization temperature and comonomer amount vary depending on each application. However, there would be a limit in increasing comonomer amount since the reaction needs to increase the polymerization

temperature, which is the main attribute to produce undesirable properties, such as, too dense PVC particles to reduce its ability to absorb PVC additives.

5.2 Suggestions

Based on the finding of this work, the following considerations are given for future work.

5.2.1 Since the hardness and volume resistivity depend on the type and concentration of the plasticizer, other PVC plasticizers should be studied. The optimum compounding formulation based on this new plasticizer may produce a satisfactory property.

5.2.2 In order to improve the porosity which is directly affected by higher polymerization temperatures, it is interesting to

5.2.2.1 study other suspending agent systems such as poly(vinyl alcohol) with a degree of hydrolysis of lower than 60 %. Since the secondary suspending agent is responsible to control the porosity.

5.2.2.2 study other types of comonomer which is of higher efficiency than that of diallyl ester. At same $\overline{DP}$ value of UHMW PVC, the higher efficient comonomer can polymerize at even lower temperatures.

5.2.3 Since UHMW PVC can be used in many applications, other compounding formulations should be studied such as medical and automotive.

5.2.4 Synthesize UHMW PVC resin with different $\overline{DP}$ values by an addition of diallyl esters or other types of multiunsaturated comonomer and compare advantages and disadvantages of these system to obtain the best formulation.

5.2.5 Study the tacticity of the above homopolymer and copolymers of UHMW PVC by ^{13}C NMR to find relationship between tacticity and properties.