

CHAPTER V

CONCLUSIONS

The reaction time of poly (methyl methacrylate) is the most important for industry because high productivity means a profit for the industry. In theory, the reaction time of PMMA could be reduced by increasing initiator concentration and reaction temperature. However, in the real industry, the reaction time is affected by not only initiator concentration and reaction temperature but also the thickness and pigments. Therefore, in order to optimize the production time, the effects of sheet thickness, initiator concentration (specific for each thickness), and type of colorant on the production time and mechanical properties of the as-prepared sheets were studied by observing the temperature-evolution profile, monomer conversion, surface hardness, impact strength, and molecular weight averages. From our investigating, the reaction can be reduced by two factors, which are the reaction temperature and initiator concentration. The thickness, initiator concentration, reaction temperature, and colorants of the samples are strongly affected to the reaction time, especially some colorants showing the result in increasing the reaction time. The reaction time strongly depends on the conductivity of the syrup (result in the effect of thickness and the effect of the colorants). Moreover, it was found that after polymerization step, the mechanical properties are strongly depending on the monomer conversion (during polymerization step, the properties of product depend on the average molecular weight). However, it was found that the mechanical properties (surface hardness, impact resistant, and molecular weight) do not depend on the thickness, initiator concentration, reaction temperature, and the colorants.