

A review of PhD thesis entitled

„Rheology-Structure-Processability of Multiphase Polymer Systems“

The PhD thesis is aimed on the current areas of polymer manufacturing. The thesis contains short “Theoretical background” to the topic, essential for the general understanding of the research tasks, and five papers (3 already published, 1 accepted for publication, 1 submitted).

The thesis is devoted to the study of immiscible synthetic polymers and natural polymers based on starch. To carry out an appropriate use and development of these materials, a comprehensive rheological characterization is essential, especially if it is connected to the structure and processability.

Concerning immiscible blends of PC/ABS, the effect of the different processing parameters is considered, and their effect is quantified via viscoelastic response. In this section, the authors mentioned the importance of molecular weight of blends composition in cases, where the immiscible blends are used without addition of compatibilizer.

- Have you consider the effect of molecular weight for PC/ABS blends?

The theoretical background and summary of papers on the starch part of the work briefly summarises structure, properties and thermoplastic processing of starch. The work seems to be rather unique judging from the small amount of papers dealing with film-blowing of starch materials and elongation properties of the starch melts that has been published. The complexity of thermoplastic processing in general and more specific that of starch is highlighted in paper V and should be a relevant paper for anyone wishing to further continue with film blowing of starch or starch containing materials. However, most if not all of these questions are answered and dealt with in the papers, the summary might leave the reader with a few questions unanswered.

- As indicated in paper V it can not be ruled out that there is un-molten crystalline regions in the film blowing material. How would residual crystallinity effect the film-blowing?
- In the theoretical background it is mentioned that moisture content of starch is influenced by crystallinity, in what way?
- Although perhaps outside the scope of this work, but how does the addition of glycerol effect the barrier properties the thermoplastic starch material?

In conclusion I would like to point out that the PhD thesis contains an extensive amount of results of systematic experiments providing original data of a particular importance for practice. The papers deal with processing and processing related properties which can be easily scaled up or used for understanding processing. The quality of preparation of manuscripts is high, the results are clearly interpreted.

I may suggest the student for successful defense of PhD degree.

In Zlín November 17, 2008


Ing. Tomáš Belza, Ph.D.