CHAPTER V
CONCLUSION

Uncompatibilized PC/PMMA Alloys

Uncompatibilized PC/PMMA alloys were melted blending in twin screw extruder at 220-270°C with screw speed at 20 rpm. These alloys are white, opaque and pearlescent. The flowability was improved by the addition of PMMA according to MFI measurement. From DSC and DMA results, there were partly interactions between PC and PMMA led to the slight inward-shifted in glass transition temperature. Although some interactions between PC and PMMA were occurred, it was not enough to produce the miscible blend. Hence, they exhibited the phase separation, which can be confirmed by SEM. The immiscible PC/PMMA blends did not enhance the mechanical properties significantly. In addition, their impact strength was dramatically dropped down comparing with neat PC due to the addition of PMMA. The degradation temperature of the blends gradually shifted to lower temperature of the blends for higher PMMA content. Finally, the scratch resistance of PC can be improved by blending PC with PMMA. the scratch resistance of alloys increased with increasing PMMA content.

Compatibilized PC/PMMA Alloys

The immiscibility of uncompatibilized PC/PMMA alloys resulted in opaque materials and the large drop of impact strength. Thus, the compatibilizers (EMA, EMG, EMAA and EMAA(Zn)) and catalysts (SMACA and $SnCl_2.2H_2O$) were required to improve those properties.

- Optical transparency

The appearance of alloys pellets still was opaque after adding all compatibilizers. However, the transparency of alloys pellets can be improved by using catalysts especially the composition of PC50/PMMA50 in the presence of $SnCl_2.2H_2O$, it appeared better transparent with color stain due to the effect of catalysts.

- Flowability

The addtion of EMMA and $SnCl_2.2H_2O$ into PC/PMMA system can be improved the flowability of the alloys according to MFI results. Their MFI considerably increased when compared with uncompatibilized system.

- Miscibility

The miscibility of PC/PMMA alloys was improved by using EMAA or $SnCl_2.2H_2O$ confirmed by DSC. From DSC results, the single Tg was observed at all compositions after EMAA or $SnCl_2.2H_2O$ was added. In opposite, two distinct T_g were observed for other compatibilizers.

- Thermal stability

The use of compatibilizers and catalysts did not significantly affect to the decomposition temperature of alloys. Their T_d were in the same range of alloys without compatibilizer excepted the system containing EMAA as a compatibilizer. Its decompostion temperature was likely to decrease.

- Impact strength

PC/PMMA alloys with compatibilizers, either 5 phr of EMA or 1 phr of EMG, yield the high impact strength which comparable to that of PC.

- Scratch resistance

The scratch resistance of PC/PMMA with EMA was lower than the uncompatibilized alloys because EMA can acted as a softener for PC/PMMA alloys led the surface hardness became softer.

Benchmarking

The preparation of PC/PMMA alloys were achieved for the aim of commecially available products. PC80/PMMA20/EMA5 and PC80/PMMA20/EMG1 alloys were selected to compare with the benchmarkings because they had the outstanding properties in impact strength that could be comparable to neat PC and commercial PC/PMMA alloys. Additionally, the selected PC/PMMA alloys showed the better mechanical properties than commercial PC and PC/PMMA.