

## CHAPTER V

### CONCLUSION AND SUGGESTIONS

#### 5.1 Conclusion

##### Impact and Tensile Strength

Each type of polyolefin possessed different structure, therefore, preferred different vulcanization system.

- RTR/HDPE blend at ratio 50:50 and using sulphur vulcanizing agent showed the highest physical properties.

- RTR/LDPE or LLDPE blend at ratio 50:50 and using mix vulcanizing agent showed the highest physical properties.

- RTR/PP blend at ratio 60:40 and using peroxide vulcanizing agent showed the highest physical properties.

##### Solvent Swelling

The degree of crosslinking determined by solvent swelling ratio agreed well with the results from mechanical tests.

- RTR/HDPE blended with sulphur vulcanizing agent had the lowest swell ratio.

- RTR/LDPE or LLDPE blended with mix vulcanizing agent had the lowest swell ratio.

- RTR/PP blended with peroxide vulcanizing agent had the lowest swell ratio.

##### Thermogravimetric Analysis

The TGA scan of RTR/polyolefin blends show degradation at 400°C increased but at 500°C decreased with increasing RTR content in the RTR/polyolefin blends.

This indicated that Thermogravimetric analysis can be used to determine the ratio of component polymers in RTR/polyolefin blends.

#### Differential Scanning Calorimetry Analysis

- RTR/HDPE blend at ratio 50:50 and using sulphur vulcanizing agent showed the highest Tg.

- RTR/LDPE or LLDPE blend at ratio 50:50 and using mix vulcanizing agent showed the highest Tg.

- RTR/PP blend at ratio 60:40 and using peroxide vulcanizing agent showed the highest Tg.

#### Phase Morphology of Blends

For all RTR/polyolefin blends, the RTR aggregates in the blend without vulcanizing agent appears to be larger in size than those in the blends with vulcanizing agents.

- RTR/HDPE blend at ratio 50:50 and using sulphur vulcanizing agent showed the best dispersion of RTR particles in HDPE matrix.

- RTR/LDPE or LLDPE blend at ratio 50:50 and using mix vulcanizing agent showed the best dispersion of RTR in LDPE or LLDPE matrix.

- RTR/PP blend at ratio 60:40 and using peroxide vulcanizing agent showed the best dispersion of RTR in PP matrix.

#### Rheological Behavior

- RTR/HDPE blend at ratio 50:50 and using sulphur vulcanizing agent showed the highest viscosity and storage modulus.

- RTR/LDPE or LLDPE blend at ratio 50:50 and using mix vulcanizing agent showed the highest viscosity and storage modulus.

- RTR/PP blend at ratio 60:40 and using peroxide vulcanizing agent showed the highest viscosity and storage modulus.

This indicated that the highest viscosity might be due to the influence of the vulcanization system which results in high degree of crosslink.

From all blends prepared, RTR/LLDPE blend using mix vulcanizing agent showed the highest ultimate elongation, with high impact strength and tensile strength. This blend has similar properties to thermoplastic elastomer which have mechanical properties as rubber and can be compressed into sheets as thermoplastic.

## 5.2 Suggestion for Further Work.

1. Employ internal mixer to prepare RTR/polyolefin blends in order to obtain more intimate mixing of the rubber and plastic phases.
2. Determine the processibility and reprocessibility of the blends.



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