CHAPTER V
CONCLUSIONS

1. The addition of $CaCO_3$ increased the crystallization rate and shortened the crystallization time of s-PP. The crystallization temperatures of $CaCO_3$-filled s-PP were shifted to a higher temperature than for neat s-PP. The results obtained from both isothermal and non-isothermal crystallization studies indicated that $CaCO_3$ acted as a good nucleating agent for s-PP. Both types of surface treatments, stearic acid and paraffin coating, on $CaCO_3$ reduced the nucleation efficiency of $CaCO_3$. Nucleation efficiency of $CaCO_3$ was found to depend strongly on its crystal structure, surface treatment, and size.

2. On mechanical properties, tensile strength was found to decrease, while Young's modulus increased, with increasing $CaCO_3$ content. Both types of surface treatments on $CaCO_3$ reduced the tensile strength and the Young's modulus, but helped improve impact resistance. Observations on fracture surface of $CaCO_3$-filled s-PP samples revealed an improvement of $CaCO_3$ dispersion in the s-PP matrix as a result of the surface treatments.

3. The presence of $CaCO_3$ enhanced the melt viscosity of s-PP. The extent of the viscosity enhancement increased with increasing filler content and decreasing particle size, especially at low shear rates. Both types of surface treatment on $CaCO_3$ resulted in the reduction in the melt viscosity, likely a result of the reduced inter-particular interactions and extent of agglomeration.