

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

Na-bentonite clay (local clay mineral) and Na-montmorillonite were treated with several kinds of quaternary alkylammonium cations by ion exchange reaction. The effect of the molecular structure and functional groups of the surfactant on the organoclays was investigated by XRD, TGA and FT-IR spectrometer. It was shown that the different molecular structure and the functional groups of the surfactant influence the interlayer spacing of the clay layer and the interlayer structure of the intercalated alkylammonium silicate.

For the preparation of nanocomposites, obtained organoclays were melt-blended with polypropylene in a twin screw extruder and Surlyn<sup>®</sup> ionomer was used as a reactive compatibilizer. XRD spectra indicated that the silicate clay layer has a nearly exfoliated dispersion in the polymer matrix. The presence of organomodified bentonite and montmorillonite was not affect the crystal structure of PP matrix. The degradation temperature of nanocomposites was higher than that of PP compatibilized system. The results of mechanical properties showed that the modulus of nanocomposites was improved significantly compared with the PP compatibilized system.

#### **Recommendations**

For suggested future work, Na-bentonite should be purified before organomodification to remove some impurity and obtain the colorless nanocomposites. The nanocomposites will blend with varying the clay content and study the gas barrier properties. Finally, the nanocomposites will be introducing to the fabrication of the application products.