

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Two types of polyamide (PA), PA6 and PA11, were mixed with bacterial cellulose (BC) not higher than 1 wt%, respectively. This solution was casted using formic acid as a solvent. The PA/BC nanocomposite films were casted by hot-pressing process. The TEM images indicated that BC structure was a fiber network with fiber diameter around 30-50 nm. In addition, results from XRD, DSC and TGA confirmed that this bacterial cellulose was successfully prepared. For PA/BC nanocomposite, it was found that there was a combination of crystalline forms, monoclinic α -crystalline form and monoclinic γ -crystalline form for PA6 and the triclinic α -form for PA11 which was confirmed by XRD. These nanocomposite films showed that there was phase of α -phase crystallinity of both PA that was increased as increasing BC content. Young's modulus of nanocomposite films was higher than neat PA as increasing BC content. BC effected on PA crystallinity (X_c) but it was no effect on T_m and T_d as well. The modulus of the nanocomposite films was higher than neat PA. The partially interactions between the interface of BC and PA yielded the enhance of dielectric properties and the poling process which caused the increasing in dielectric constant. However, the optical property, the incorporated of BC decreased the percentage of transmittance in all visible light range.

The comparisons between PA11/1%BC and PA6/1%BC were based on the mechanical and dielectric properties. For mechanical behavior, the interaction between PA6 and BC was better than PA11 and BC that was observed from SEM image and mechanical properties. For dielectric properties, BC induced the polarity of PA11 more than PA6 because of noncentrosymmetric structure of PA11.

6.2 Recommendations

1. Dissolution of PA pellet should be use other solvent due to the formic acid is very strong acid that can cause hurt or accident and it's hard to remove in short time.
2. Compressed films shows bubbles and voids which quite difficult to control. Therefore, the machine should be considered such as blown films extruder or film extruder.