

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

Incorporation of organoclay into polypropylene fiber resulted in an improvement of the thermal, mechanical, and dyeing properties. Organoclay can act as the active sites in non polar structure of polypropylene for attaching with dye molecules. When the organoclay content increased, the dye absorption also increased. Structure of surfactant used to modify nanoclay also played an important role on the dyeability of the fiber because most of dye molecules consist of aromatic structure so it has more efficient to interact with aromatic groups of BTC-organoclay than the polar and ester groups of DOEM-organoclay. Fiber extruded with higher draw ratios resulted in the higher crystallinity, orientation, and surface morphology that impacted to the dyeing properties of fibers. Fiber with higher crystallinity and orientation caused more difficult for dye molecules to penetrate into the fiber resulted in the reduction of dyeability. On the other hand, the greater surface roughness led to better dye absorption due to more flaws and grooves as the channels for dye penetration were obtained. The result shown that the dyeability decreased as the draw ratio increased. It was indicated that the effect from crystallinity and orientation was more significant than effect from surface roughness on the dyeability. Although acid dye shown good dyeing properties due to the ionic force between dye can cationic surfactant of organoclay. Only small amount of dye can penetrated inside the fiber resulted in the poor wash fastness properties. Disperse dye is the best dye for this fiber because it can be absorbed not only on the fiber surface but also inside the fiber by hydrophobic interaction and Van der Waals force. In addition, it also gave the good wash fastness properties.

Recommendations

1. Bubbles can be occurred in the fiber during melt spinning process. This problem can be solved by packing material tighly in the barrel and pre-heating.
2. Dyeing machine finish dyeing process slower than time programmed in cool down step so time for dyeing fiber will be extended from programmed time with the same value for every batch.
3. Due to the disperse dye is non water soluble dye. The fiber dyed with this type of dye should be wash by reducing agent before wash fastness analysis.
4. Due to the hot draw in the fiber preparation process. So the mechanical properties do not good. Fiber may draw in the cold draw to give good mechanical properties.