

The degradation mechanisms of organo-montmorillonite (O-MMT) ahead of to melt compounding process in polymer nanocomposites

Abstract

Organic surface modifier in organo-clays are known to go through the degradation during the melt compounding process in polymer nanocomposites. Development of completely exfoliated nanocomposites based on polymer/clay is decisive for achieving the actual value of nanoscale reinforcement in the polymer matrix. In this paper, Thermogravimetric Analysis or Thermal Gravimetric Analysis (TGA) and Field Emission Scanning Electron Microscopes (FeSEM) were applied to study the degradation mechanism by involving the commercial organo-montmorillonite (O-MMT) thermal treated. This O-MMT white powder samples were heated for 3 minutes by using the Muffle furnace in variable temperature from 150 celsius to 600 celsius (150 °C, 250 °C, 350 °C and 600 °C). The thermogravimetric curve and morphology of FeSEM showed that the organic molecular within the galleries first undergoes the degradation process during thermal heating and the organic surface modifier molecules are the main problem when the organic clays are treated at high temperatures. The results indicate that in thermal resistant capacity the silicate clay structure can protect the organic surface modifier molecules from degradation below 200 °C temperature range.