

A Study on the Rheological Properties of Low-Density Polyethylene/Palm Kernel Shell Composites

Abstract

The rheological properties of the low density polyethylene (LDPE)/palm kernel shell (PKS) composites were studied by using a melt flow indexer. The silane treated and untreated composites were investigated. Both of the composites were further varied by amount of filler loading from 10 to 40 php. The testing temperature of composites varied from 180 to 210 °. It was found out that the MFI values of the composites increased with temperature but decreased with a rise of filler loading. The treated LDPE/PKS composites exhibited lower MFI values compared to untreated composites, which indicated the increase of viscosity. Thus, a better adhesion between the LDPE matrix and PKS was established. The effect of temperature on the viscosity of LDPE/PKS composites was found to obey the Arrhenius equation. The results showed that the activation energy of the composites increased with the increase of filler loading. However, at similar filler loading, the silane treated composites showed lower activation energy compared to untreated composites, leading to the reduction of their temperature sensitivity.

Keywords: Coupling Agent, Low Density Polyethylene, Palm Kernel Shell, Rheological, Silane