

Melt rheological behavior and thermal properties of low-density polyethylene/palm kernel shell composites: Effect of polyethylene acrylic acid

Abstract

The melt flow behavior and thermal properties of low-density polyethylene (LDPE)/palm kernel shell (PKS) composites were studied. Polyethylene acrylic acid (PEAA) was used as a compatibilizer in the composites. The results showed that the increasing of PKS loading had decreased MFI values of LDPE/PKS composites. The presence of PEAA increased the MFI values of the LDPE/PKS composites. The apparent viscosity of the composites was found to exhibit a linear relationship with the reciprocal of the temperature. Thermal properties showed that higher filler loading tended to reduce the onset temperature as the PKS possessed lower degradation temperature compared to the LDPE. The presence of the PKS in the LDPE polymeric matrix improved the thermal stability of the composites. The addition of PEAA into the composites provided better interfacial bonding between the LDPE matrix and PKS filler, while higher onset temperature and lower total weight loss were observed of LDPE/PKS composites. The activation energy of the LDPE/PKS composites was increased with increasing filler loading. At similar filler loading, the presence of PEAA increased the activation energy of the LDPE/PKS composites.