

Effects of sodium hydroxide treatment on the properties of low-density polyethylene composites filled with chicken feather fiber

Abstract

The effects of alkali treatment with sodium hydroxide on the tensile properties, morphology, thermal degradation, and mass swell of low-density polyethylene (LDPE)/(chicken feather fibers (CFF)) composites were studied. The LDPE/CFF composites were prepared by using a Z-Blade mixer at 180°C and a rotor speed of 50 rpm. The LDPE/CFF-Treated composites exhibited higher tensile strength, Young's modulus, and final decomposition temperature but had lower mass swell percentage and elongation at break than the LDPE/CFF composites. An SEM morphology study showed that the CFF treatment could significantly improve adhesion at the interface and lead to ingress of the fiber into the LDPE phase. Thermogravimetric analysis indicated that the LDPE/CFF-Treated composites had higher thermal stability than the LDPE/CFF composites.

Keywords; Low-density polyethylene (LDPE), Chicken feather, Sodium hydroxide, Composite