

Degradation of epoxidized natural rubber compatibilized linear low density polyethylene/soya powder blends: The effect of natural weathering

Abstract

In the present study, linear low density polyethylene (LLDPE)/soya powder blends were compatibilized with epoxidized natural rubber (ENR 50) and exposed to natural weathering. The exposure period for the blends was 1 year. It was found that the degradability of the compatibilized blends was higher than that of uncompatibilized blends. Fourier transform infrared (FTIR) spectra, the tensile test, scanning electron microscopy (SEM), and differential scanning calorimetry (DSC) were applied to analyze the degradability of the blends. IR spectra showed that the carbonyl index (CI) of the blends increased as a function of exposure period and soya powder content. The compatibilized blends gave higher carbonyl indices. The retention tensile strength and elongation at break (Eb) of the compatibilized blends after weathering was generally lower than for the uncompatibilized blends. The increase of crystallinity also indicated a reduction of the amorphous portion after degradation. The higher crystallinity in compatibilized blends further confirms the higher degradability of ENR 50 compatibilized blends. The weight loss and molecular weight change indicated that the incorporation of ENR 50 into LLDPE/soya powder blends can enhance the degradability of the blends upon outdoor exposure.

Keywords

ENR 50; LLDPE; Natural weathering; Soya powder