

Tensile properties, swelling behaviour, and morphology analysis of recycled high density polyethylene/natural rubber/chicken feather fibers (R-HDPE/NR/CFF) composites: the effects of caprolactam

Abstract

The effect of caprolactam as a coupling agent on the tensile properties, swelling behavior and morphology analysis of recycled high density polyethylene/ natural rubber/ chicken feather fiber (R-HDPE/ NR/ CFF) composites was studied. The R-HDPE/NR/CFF composites with and without caprolactam were prepared using Brabender Plasticorder at 160°C and rotor speed of 50 rpm. The results indicated that R-HDPE/NR/CFF with caprolactam showed higher value of tensile strength but lower elongation at break and mass swell percentage than R-HDPE/NR/CFF composites. SEM morphology showed that the addition of caprolactam improved the fiber matrix-interfacial adhesion and good dispersion of the fiber in the R-HDPE/NR blends.

Keywords—Caprolactam, chicken feather fiber, natural rubber, recycled high density polyethylene.