

Effects of dynamic vulcanization and acrylic acid on properties of recycled poly(vinyl chloride)/acrylonitrile butadiene rubber (PVCr/NBR) blends

Abstract

Effects of dynamic vulcanization and acrylic acid (AAc) on processability, mechanical properties, swelling behavior, morphology, and thermal stability of recycled poly(vinyl chloride)/acrylonitrile butadiene rubber (PVCr/NBR) blends were investigated. Blends were prepared in a Haake Rheomix at a temperature of 150°C and a rotor speed of 50 rpm. Recycled poly(vinyl chloride)/acrylonitrile butadiene rubber (PVCr/NBR) blends were also prepared as comparison. It was found that the dynamic vulcanization and the addition of acrylic acid improved the stabilization torque, mechanical energy, stress at peak, stress at 100% elongation (M_{100}), swelling resistance, and thermal stability but decreased the elongation at break of the blends. The introduction of a cross-link into the elastomer phase and better compatibility between PVCr and NBR are responsible for the enhancement of thermal stability and mechanical properties of dynamically vulcanized PVCr/NBR + AAc as evidence from the scanning electron microscopy (SEM) of the tensile fracture surfaces and infrared spectroscopy study of the dynamically vulcanized of PVCr/NBR + AAc shows.

Keywords: Acrylonitrile butadiene rubber; Dynamic vulcanization; Recycled poly(vinyl chloride)