

Effect of epoxidized natural rubber on thermal properties, fatigue life, and natural weathering test of styrene butadiene rubber/recycled acrylonitrile-butadiene rubber (SBR/NBRr) blends

Abstract

The utilization of waste rubber powder in polymer matrices provides an attractive strategy for polymer waste disposal. Addition of recycled acrylonitrile-butadiene rubber (NBRr) in rubber compounds gives economic (lowering the cost of rubber compounds) as well as processing advantages. In this study, the properties of styrene butadiene rubber (SBR)/NBRr blends with and without epoxidized natural rubber (ENR-50) as a compatibilizer were determined. The results such as thermal gravimetric analysis (TGA), fatigue life, and natural weathering test of SBR/NBRr blends with and without ENR-50 were carried out. Results showed that TG thermograms of SBR/NBRr blends with ENR-50 show lower thermal stability compared blends without ENR-50. The incorporation of ENR-50 into SBR/NBRr blends has reduced char residue compared SBR/NBRr blends without ENR-50. The incorporation of ENR-50 in SBR/NBRr blends has increased the rigidity of the blends thus lowering the fatigue life. The increment in tensile properties retention of SBR/NBRr blends with ENR-50 indicated the enhancement on weathering resistant. The surfaces of SBR/NBRr blends with ENR-50 after 6 months exposure showed a minimal severity of crack compared with SBR/NBRr blends without ENR-50. It revealed that the scale of cracks has reduced indicating well-retaining interfacial adhesion between SBR and NBRr with the presence of ENR-50 as a compatibilizer.