International Journal of Polymeric Materials and Polymeric Biomaterials, vol. 62(5), 2013, pages 252-259

Effect of carbon black/silica hybrid filler on thermal properties, fatigue life, and natural weathering of SBR/recycled NBR blends

Abstract

The utilization of nitrile glove waste will spark a great deal of interest in the rubber industry in developing cost-effective techniques to convert waste and used rubber into a processable form. Blends of styrene butadiene rubber/recycled acrylonitrile butadiene rubber (SBR/NBRr) reinforced at 85/15 blend with different ratios of a carbon black/silica (CB/Sil) hybrid filler (50/0, 40/10, 30/20, 20/30, 40/10, 0/50 phr) were tested either with or without the silane coupling agent, Si69. Results showed that the increased thermal stability of blends with Si69 is highly related to the formation of crosslinks between the filler. Thermogravimetric (TG) thermograms showed that the percentage of char residue for blends with Si69 was higher than without Si69. The differential scanning calorimetry (DSC) thermograms of both blends revealed a glass transition temperature (Tg) between 65.0°C and 66.9°C. At all blend ratios, the fatigue life of blends with Si69 was better than blends without Si69. After six months exposure to natural weather, blends with Si69 exhibited better tensile properties, retention, and morphology compared to blends without Si69.

Keywords — CB/Sil, fatigue, natural weathering, SBR/NBRr, Si69, thermal properties