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Influence of carbon black in commercial SBS rubbers on their adhesion properties after plasma-modification

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Our earlier study (Mater. Sci-Medzg 18 (2), 132-7, 2012) has shown that the low-temperature plasma treatment is a very promising method of improving the adhesive properties of commercial SBS rubbers and it can replace the wet chemical methods in industry. To better characterize the plasma treatment process, it is necessary, however, to determine the role of the rubber additives in the process. The studies have focused attention on the effect of carbon black content on the adhesive properties of plasma modified rubber.The carbon black content was changed from 0 to 80%w/w. The plasma-treatment was performed using plasma generated by an RF discharge (13.56 MHz) in argon (Ar), oxygen (O_2) or carbon dioxide (CO_2). The 180°-peel test, analysis of surface energy and scanning electron microscopy (SEM) with EDX microanalysis, FTIR–ATR and XPS spectroscopy were employed to investigate the molecular structure, morphology and adhesive properties of the rubber surface. The obtained results indicate that the increase in carbon black content in the SBS rubber has a significant impact on the adhesive properties of its plasma-treated surface. This paper attempts to explain influence of carbon content on the peel strength after plasma treatment.
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