

Ozone Treatment of Carbon Blacks on Adhesion Behaviors between Carbon Blacks and NBR

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In this work, the specific role of filler-rubber interactions in dynamic properties was investigated. The surface of carbon blacks (CBs) was modified through ozone treatment in the solid phase. The surface characteristics of the CBs were determined by the surface free energy and X-ray photoelectron spectroscopy (XPS). Interactions of CBs with Nitrile Butadiene Rubber (NBR) were studied by measurements of bound rubber and the mechanical properties of the composites were evaluated by the crosslink density (V_e) and tearing energy (T). As a result, the O_{1s}/C_{1s} ratio of the CBs surfaces was increased with the increase of treated time in the interval of about 6~8 hour, resulting in improving the crosslink density (V_e) and tearing energy (T) of the composites. The results can be explained that ozone treatment makes possibly suitable for CBs to be incorporated in a polar matrix due to the increase in oxygen-containing functional groups of the CBs surfaces.