

Properties of SBR Nanocomposites dispersed Carbon Nanotubes by surfactant and its physical and chemical properties

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Surfactant has been successfully applied to enhance the dispersion of Carbon Nanotube (CNTs) in elastomers and the properties of nanocomposites. CNTs were treated with a metallic and non-metallic surfactant and its effects on dispersion state, surface chemistry, structure and morphology of CNTs, as well as mechanical, thermal and electrical properties of CNT nanocomposites were evaluated. The mechanical such as tensile strength and elongation, the electrical and thermal conductivity of the nanocomposites all showed significant improvement after the treatment. The above results are attributed to the bridging effects between the CNTs and elastomer, which are introduced by the hydrophobic and hydrophilic segments of the surfactant. The enhanced interfacial interactions gave rise to improved dispersion and wetting of CNTs in polymer matrix, enhancing the mechanical and fatigue properties of the nanocomposites. Unlike chemical functionalization techniques, however, the surfactant treatment exhibited little adverse effect on thermal and electrical properties.