

Rheological and electrical properties of PS/modified-CNT nanocomposites prepared by latex technology

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Carbon nanotubes (CNTs) are used as nanofillers to improve the physical properties of polymers due to their excellent mechanical, thermal and electrical properties. However, CNTs exist as agglomerates due to strong van der Waals force between CNTs. In this study, PS/CNT nanocomposites were prepared by modifying the CNT surface with hydrophilic polymers to improve dispersibility. For preparing polymer nanocomposites, latex technology, which is a method of dispersing nanofiller in polymer particle suspension followed by freeze drying, was used. Polyvinyl pyrrolidone (PVP) and polystyrene sulfonate (PSS) were used as hydrophilic polymers, and sodium dodecylsulfate (SDS), a surfactant, was also used. PS/SDS-CNT exhibited excellent electrical conductivity but low rheological properties due to a low MW surfactant. In the case of PS/PVP-CNT, conductivity improvement was not so high due to insulating PVP. PS/PSS-CNT showed good rheological and electrical properties. Finally, P(St-BA)/PSS-CNT nanocomposites were prepared by using P(St-BA) particles to improve the brittle properties. As an application of the nanocomposites, EMI shielding effectiveness of the molded films was examined.