

Effect of multiwalled carbon nanotube loading on the properties of Nafion(R) membranes

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Abstract

The dispersion of carbon nanotubes is one of the problems in the application of polymer nanocomposites. In this study, the effect of chemical functionalization of the carbon nanotube surface on the dispersion of the tubes within a polymer is reported. The effect of carbon nanotube weight loading on the properties of polymer membrane was also studied. Multiwalled carbon nanotubes were dispersed in Nafion(R) matrix by melt processing techniques to form nanocomposite membranes. The morphology, dc electrical conductivity, thermal stability, mechanical properties, and proton conductivity of these nanocomposites were investigated. Nitric acid functionalized carbon nanotubes were evenly dispersed with Nafion as observed by scanning electron microscopy. The measurements of mechanical properties indicate that this processing method and carbon nanotube loading can improve the modulus of the nanocomposites.