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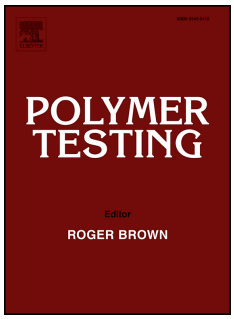

Effects of heat treatment on electrical conductivity of HDPE/CB composites

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Material Properties

Effects of Heat Treatment on Electrical Conductivity of HDPE/CB Composites

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ABSTRACT

The influence of heat treatment on the electrical conductive behavior of carbon black (CB) filled high density polyethylene (HDPE) composites was investigated. The results showed that the effects of annealing temperature on the resistivity and the PTC intensity of the HDPE/CB composites were significant; the resistivity and the PTC intensity of the composites varied with increasing number of thermal cycles; while the variation became small after the third thermal cycle. Furthermore, the variation of the resistivity was 1.7 times higher than that of the composites without annealing, and the variation of the PTC intensity of the composites was 0.22, which were smaller than those of the specimens without heat treatment. A suitable annealing heat treatment could reduce the resistivity and enhance the PTC intensity of the composites; it was also helpful to improve the stability of the properties of the composites and the repeatability of the PTC effect.

Key words: polymer-matrix composites; nanoparticles; electrical properties; microstructural analysis; heat treatment.