Effects of zinc oxide on pretreated multiwalled-carbon-nanotube-reinforced biobased polyesters

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Abstract

In this study, the effects of the incorporation of microsized zinc oxide (ZnO) on multiwalled carbon nanotube (MWCNT)-reinforced palm-oil-based polyester (POPE) were investigated in terms of the UV absorbability, mechanical strength, thermal stability, surface resistivity, and morphology. POPE was prepared by alcoholysis and an esterification process with glycerol, palm oil, and phthalic anhydride. The MWCNTs were dispersed into POPE under in situ conditions during the esterification reaction, whereas ZnO was distributed into the MWCNT-filled POPE resin with an ultrasound technique. The surface morphology was examined to understand the dispersion of the fillers inside the polymer matrix with field emission scanning electron microscopy. In addition, UV absorbability was observed with a UV–visible spectrophotometer. From the results analysis, the surface resistivity was found to be unchanged by the presence of the ZnO particles. In addition, incorporation of ZnO improved the UV absorbability. Moreover, the tensile strength of the ZnO-based POPE was found to be slightly lower compared with that of the MWCNT-filled POPE. © 2016 Wiley Periodicals, Inc. J. Appl. Polym. Sci. 2017, 134, 44627. © 2016 Wiley Periodicals, Inc.

Author keywords

biopolymers and renewable polymers; coatings; synthesis and processing techniques

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