

Effect of curing on hydrolytic degradation of montmorillonite nanoclays filled biobased polyesters

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Abstract

Palm oil based polyester (POPE) reinforced with montmorillonite nano clays (MNCs) were investigated for curing kinetics and hydrolytic degradation analysis. Alcoholises and esterification process were followed to produce POPE. The prepared resins were cured thermally by using methyl ethyl ketone peroxide (MEKP), styrene and cobalt-naphthenate at 120°C. The curing kinetics was analysed by differential scanning calorimetry (DSC). The rate of reaction, activation energy and degree of conversion were measured by this analysis. The activation energy and reaction order were found to be decreased due to increase of heating rate of the curing process. Alkali solution was used for the hydrolytic degradation for different samples prepared at different curing conditions such as low period-high temperature (LPHT) and high period-low temperature (HPLT). The properties were affected due to the variation of curing process as confirmed by degradation behaviours in terms of tensile strength, melting point and surface morphology. The degradation of the composites were influential and faster at LPHT condition compared to HPLT condition. ©Smithers Information Ltd, 2017.

Author keywords

Curing kinetics; Hydrolytic degradation; Montmorillonite nanoclays (MNCs); Palm oil polyester (POPE)