STABILITY OF CONTINUOUS PHASE MORPHOLOGIES IN ENSLUMED POLYESTER-POLYURETHANE BLENDS

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Introduction

The functional activity of block copolymers in incompatible polymer blends is generally and primarily evaluated in terms of decrease of the particle size distribution of the dispersed phase and improvement of the mechanical properties. All these features are indirect evidences of the compatibility of the blend which is a result of the block copolymers' interfacial effects. An important consequence of the block copolymer is able to be present the phenomenon of microphase separation, by breaking the extent of that protective effect when the emulsified blends are annealed at temperatures as shown previously the Tp or Tm of the component. Additional informations should be paired on the interfacial activity of the copolymer emulsifier in particular in its location, temperature, and temperature-induced rearrangements in the blend interfaces. In addition, these morphological analysis might be a convenient and simple method for comparing the efficiency of various emulsifiers and designing their optimal molecular characteristics.

In this context, polyester-polymethylene blend (P/E-P/S) containing small amounts of P(30-20-3) constitute very suitable models since they display co-continuous phase morphology which is very unstable in the absence of an emulsifier. Therefore, the kinetics of co-continuous phase formation is a natural consequence of the emulsion process (1) and the high temperature is expected to be sufficient to allow the formation of various domains in the presence of increasing temperature. The ternary mixtures and P/E-P/S blends respectively. We have identified an interfacial tension in the case of low interfacial tension that is observed for the blends containing the terpolymer (2). The difference between the two values obtained with standard and opening sharp interfacial tension (2) may lead to the geometry of a binary copolymer differs from a circle. Recently, we have found that the concept of fractal distribution is relevant to quantify the co-continuous structure of polyester blends. Figure 5 shows the fractal dimensions of the blends with a 30-20-30 structure. The fractal dimension is defined as the number of points on a line segment of length d, as d approaches 0. fractal dimension is greater than the topological dimension of the object but less than the topological dimension of the object plus one.}

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References


Figure 1: Distilled images of 20WP/05PS+10 Tapered Cop. (a) initial sample after (b) 5 min (c) 10 min (d) 90 min. annealing at 180°C

Figure 2: Opened size distribution as a function of the size 1, for various annealing times at 180°C (a) initial sample, (b) 10 min, and (c) 90 min.

Figure 3: Variation of the apparent particle size (50) of 20WP/05PS +10 Tapered Cop. and (b) 10 Pure Cop.

Figure 4: Opening size distribution as a function of the size 1, for various annealing times at 180°C (a) initial sample, (b) 10 min, and (c) 90 min.

Figure 5: Spectra of singularities f (s) before annealing for: (a) 20WP/05PS+10 Tapered Cop. and (b) 20WP/05PS+10 Pure Cop.