ABSTRACT

In this work, a graft copolymer was synthesized with the aim to serve as a compatibilizer in the modification of poly(ethyleneterephtalate) (PET) with a thermoplastic elastomer.

The aim of this functionalization is to improve the mechanical properties of PET and give to Dynasol Elastómeros S.A. de C.V. the opportunity to count with appropriated technology to obtain compatibilization and expand its trade and its possibilities to incursionate in the PET functionalization.

The raw materials used in this research work were selected after a search bibliographic selecting the C-501 whose structure is based on butylene and styrene for which is considered an excellent material to improve the mechanical properties of PET. On the other side, the glycidil methacrylate (GMA) has been used in commercial compatibilizers due to its bifunctionality and its improvement of the mechanical properties of the polymer.

The C-501 elastomer was used as the main backbone and the glycidil methacrylate (GMA) as the grafted monomer. The GMA supplied crystalinity to the thermoplastic elastomer, thus obtaining a graft copolymer with bifunctionality.

The higher grafted resulting copolymer was characterized by Fourier Transform Infrared Spectrometry (FTIR), Dynamic Mechanical Analysis (DMA), Gel Permeation Chromatography (GPC), Nuclear Magnetic Resonance (RMN) and Transmission Electronic Microscopy (TEM). In the copolymer FTIR spectra was observed the carbonyl groups which are characteristic of the GMA monomer and the C-C, C=C, C-H characteristic groups of C-501. In the thermograms obtained with DMA, a glass transition (T_g) is recognized around -47^{o}C, this T_g is higher 30^{o}C than that one of the commercial C-501.

In order to establish the optimal reaction conditions, a FTIR analysis was carried out in base to the peak intensities due to the carbonyl groups to the different samples at different temperatures and reaction times obtaining a temperature of 60^{o}C and a time of 3.5 hours.

By GPC, a molecular weight of 173200 g/mol and a polydispersity of 1.7 were obtained. The amount of grafted monomer GMA in the PET matrix obtained by RMN is 17% in weight.

PET modification was made using the thermoplastic elastomer SEBS Kraton G1651 (Styrene/Ethylene/Butylene/Styrene) as modifier agent. Blends were realized by the extrusion method.

Blends without and with compatibilizers were made (commercials and the C-501-GMA); both were characterized by TEM. Blends containing the C-501 GMA compatibilizer showed higher dispersity of SEBS Kraton G1651 in the PET matrix than the blend that no contains additive compatibilizer.

Mechanical tests were realized to these blends as Izod impact and processing tests. These results were compared with those of the same tests realized to the pure PET, obtaining that the synthesized copolymer C-501 GMA improves the impact resistance in 250%, reduces the energy necessary for the processing in 9% and presents a polydispersity of 1.7 of the SEBS Kraton G1651 in the PET matrix.