

عنوان مقاله:

Effect of Multi-Walled Carbon Nanotube on Micro-phase separation behavior of Thermoplastic Polyurethane by Means of Rheology

محل انتشار:

کنفرانس بین المللی فرآورش پلیمرها (سال: 1390)

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نویسندگان:

Tahereh Hosseini Sianaki - *Department of polymer engineering and color technology, Amirkabir university of Technology Tehran, Iran*

Hossein nazockdast

خلاصه مقاله:

The micro-phase separation of Thermoplastic polyurethane (TPU)/ multi-walled carbon nanotube (MWNT) nanocomposites prepared by melt mixing was studied mainly via rheological technique. The kinetics of micro-phase separation of melted-quenched samples was followed by time evolution of the storage modulus at a fixed angular frequency under isothermal conditions at different temperatures. A delay time was found before the start of the phase separation process. The kinetics of phase separation and the delay time were found to be strongly dependent on temperature. The temperature at which maximum rate of phase separation occurs was found 110 for pure sample and 160 for nanocomposites whose extent was slightly increased by increasing MWNT loading. These results were also confirmed by traditional calorimetric techniques (DSC). The effect of MWNT on enhancing phase separation kinetics of the samples, in particular at elevated temperatures was found to be highly dependent on MWNT loadings; It had a greater enhancement effect at concentration below rheological percolation threshold (0.15%wt). This could be explained in terms of MWNT-matrix and MWNT-MWNT interconnectivity. The results of the isochronal dynamic temperature sweep experiments in the heating process showed three distinct transition temperatures corresponding to disruption temperature of short range order, micro-domain mixing of non-crystalline hard and soft micro-phases , and melting temperature of microcrystalline hard segments

کلمات کلیدی:

MWNT ,TPU, Phase separation, kinetics of phase separation, extent of phase separation

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