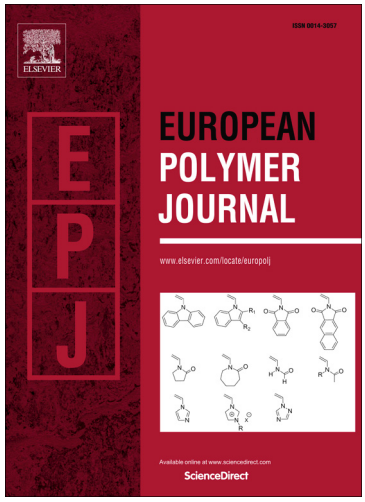

Thermoplastic elastomers reinforced with poly(tetrafluoroethylene) nanofibers

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Abstract

The effect of poly(tetrafluoroethylene) (PTFE) nanofibers content on the rheological and mechanical properties of thermoplastic elastomer/low density polyethylene (TPE/LDPE) blends was investigated. The PTFE nanofibers were generated *in situ* during compounding of crystalline PTFE grains with molten matrix based on TPE/LDPE blends. The studies revealed that PTFE nanofibers produced by solid-state deformation of PTFE crystals formed an entangled network which significantly improved both rheological and mechanical properties of TPE/LDPE blends. The maximum strain hardening coefficient was found to depend on the concentration of the PTFE nanofibers. The material based on TPE/LDPE blend containing 5 wt.% of PTFE nanofibers (75/20/5) exhibited strain hardening coefficient about three times higher as compared to conventional TPE/LDPE blend (60/40). Also, the mechanical properties of the blends depended on the content of PTFE nanofibers. Higher the content of PTFE nanofibers the stiffer TPE/LDPE blend. At 8 wt.% of PTFE nanofibers (60/32/8) the modulus of elasticity was two times higher in comparison to 60/40 blend.

Keywords: Polymer blends, thermoplastic elastomer, poly(tetrafluoroethylene) nanofibers, rheological properties, mechanical properties