

Effect of processing route on the morphology of thermoplastic polyurethane (TPU) nanocomposites incorporating organofluoromica

Abstract

In the production of polymer nanocomposites, the processing method determines the dispersion of the nanofiller and hence, the final nanocomposite properties. In this work, the potential of high energy milling of the organofluoromica to improve the platelet dispersion and exfoliation in both solvent cast and melt processed thermoplastic polyurethane (TPU)/organofluoromica nanocomposites was investigated. The potential of high energy milling of the organofluoromica to improve the platelet dispersion and exfoliation in both solvent cast and melt processed thermoplastic polyurethane (TPU)/organofluoromica nanocomposites was investigated. The applied high energy milling process has successfully reduced this nanofiller platelet length from 640 nm to 400 nm and 250 nm after 1 hour and 2 hours respectively. These lower aspect ratio milled nanofillers resulted in improved quality of dispersion and delamination when incorporated into the TPU and hence interacted more preferentially with the TPU matrix.

Keywords; Morphology, Nanocomposite, Processing, Thermoplastic Polyurethane (TPU)