

Thermoplastic Polyurethane/Barium Titanate Composites

Authors : Seyfullah Madakbaş, Ferhat Şen, Memet Vezir Kahraman

Abstract : The aim of this study was to improve thermal stability, mechanical and surface properties of thermoplastic polyurethane (TPU) with the addition of BaTiO₃. The TPU/ BaTiO₃ composites having various ratios of TPU and BaTiO₃ were prepared. The chemical structure of the prepared composites was investigated by FT-IR. FT-IR spectra of TPU/ barium titanate composites show that they successfully were prepared. Thermal stability of the samples was evaluated by thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC). The prepared composites showed high thermal stability, and the char yield increased as barium titanate content increased. The glass transition temperatures of the composites rise with the addition of barium titanate. Mechanical properties of the samples were characterized with stress-strain test. The mechanical properties of the TPU were increased with the contribution of the barium titanate it increased. Hydrophobicity of the samples was determined by the contact angle measurements. The contact angles have the tendency to increase the hydrophobic behavior on the surface, when barium titanate was added into TPU. Moreover, the surface morphology of the samples was investigated by a scanning electron microscopy (SEM). SEM-EDS mapping images showed that barium titanate particles were dispersed homogeneously. Finally, the obtained results prove that the prepared composites have good thermal, mechanical and surface properties and that they can be used in many applications such as the electronic devices, materials engineering and other emergent.

Keywords : barium titanate, composites, thermoplastic polyurethane, scanning electron microscopy

Conference Title : ICAPE 2016 : International Conference on Applications of Polymer Engineering

Conference Location : Amsterdam, Netherlands

Conference Dates : May 12-13, 2016