

Polyhedral Oligomeric Silsesquioxane in Poly Lactic Acid and Poly Butylene Adipate-Co-Terephthalate Blend

Authors : Elahe Moradi, Hoseinali A. Khonakdar

Abstract : The escalating interest in renewable polymers is undeniable, albeit accompanied by inherent challenges. In our study, we endeavored to make a significant contribution to environmental conservation by introducing an eco-friendly structure, developed through an innovative approach. Specifically, we enhanced the compatibility between two immiscible polymers, namely poly (lactic acid) (PLA) and poly (butylene adipate-co-terephthalate) (PBAT). Our strategy involved the use of polyhedral oligomeric silsesquioxanes (POSS) nanoparticles, equipped with an epoxy functional group (Epoxy-POSS), to accomplish this objective with solution casting method. The incorporation of 1% nanoparticles into the PLA blend resulted in a decrease in its cold crystallization temperature. Furthermore, these nanoparticles possess the requisite capability to enhance molecular mobility, facilitated by the induction of a lubrication effect. The emergence of a PLA-CO-POSS-CO-PBAT structure at the interface between PLA and PBAT led to a significant amplification of the interactions at the interface of the matrix and the dispersed phase.

Keywords : compatibilization, thermal behavior, structure-properties, nanocomposite, PLA, PBAT

Conference Title : ICCMP 2024 : International Conference on Composite Materials and Polymerization

Conference Location : Zurich, Switzerland

Conference Dates : January 11-12, 2024