عنوان مقاله:

Study of Morphological, Mechanical and Rheological Properties of Polycarbonate/Polyethylene (Terephthalate/Nanoclay Nanocomposites Produced via 3D Printing Technology (FDM

محل انتشار:

شانزدهمین کنگره ملی مهندسی شیمی ایران (سال: 1397)

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خلاصه مقاله:

In this study, different polycarbonate (PC) polyethylene terephtalate (PET) blends and their composites with nanocaly were extruded through a proper die as filament for fused deposition molding (3D printing). The 3D printed samples were cut, gold coated and viewed using scanning electron microscopy technique to visualize the morphology and intra-layer adhesion; the prepared test specimens were stretched to investigate mechanical properties and rheologically tested to study the viscosity and elasticity of PC/PET composites in various percentages including PET-rich (25/75), PC-rich (75/25) and 50/50 as well as pure PC and PET. These samples were compared with each other in two conditions: absence of nanoclay and the presence of 0.5% nanoclay. SEM images showed that intra-layer adhesion is higher in pure PET sample which decreased by increase of PC content and the layers became more detectable. Results of tensile test indicated the highest strength and toughness for PET-rich blend. Rheological investigation of the samples revealed that increase of polycarbonate resulted in significant enhancement in storage modulus. Addition of 0.5% nanoclay to PET-rich sample resulted in a better inter-layer adhesion and significant enhancement of strength and modulus. Then 3D printer and compression molded specimens were compared, showing that application of 3D printer can be a good alternative for conventional methods.

کلمات کلیدی:

Polycarbonate (PC), Polyethylene terephthalate (PET), Nanocomposite, Mechanical & Rheological properties, Fused deposition method (FDM), 3D Printing Technology.