

Photothermal and Physical Characterization of PLA/PCL polymer blends

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Nowadays, some synthetic polymers have been replaced by biodegradable polymers in order to avoid environmental contamination. Among these biodegradable polymers, aliphatic polyesters like Polylactic Acid (PLA) and Polycaprolactone (PCL) have been widely used. In the present study solvent casting films of PLA, PCL and polymer blends with and without compatibilizer (PLA grafted with maleic anhydride) were prepared. The thermal diffusivity (α) of each sample was obtained by using the open photoacoustic cell (OPC) technique. Morphology, degree of crystallinity and thermal properties were determined by using Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), X-Ray Diffraction (XRD) and Differential Scanning Calorimetry (DSC), respectively. The PLA/PLA-g-MA/PCL (80/10/10) blend was more homogeneous and better adhesion between the two polymers was observed. The degree of crystallinity was similar for the blends without compatibilizer, being higher for the compatibilized blend. The PLA/PLA-g-MA/PCL (80/10/10) blend showed cold crystallization with the highest value of enthalpy of fusion (ΔH_m) and the highest value of thermal diffusivity (α). PLA-g-MA as compatibilizer enhanced thermal properties like thermal diffusivity which was increased due to more interactions between polymeric phases (PLA and PCL) was improved. To our knowledge this is the first time that the thermal diffusivity of these biodegradable polymer blends is reported.