

Transparent blend of poly (Methylmethacrylate) / cellulose acetate butyrate for the protection from ultraviolet

ABSTRACT

The use of transparent polymers as an alternative to glass has become widespread. However, the direct exposure of these materials to climatic conditions of sunlight and heat decrease the lifetime cost of these products. The aim of this study was to minimize the harm caused by ultraviolet (UV) radiation exposure to transparent poly (methylmethacrylate) (PMMA), which usually leads to changes in the physical and chemical properties of these materials and reduced performance. This was achieved using Environmentally friendly cellulose acetate butyrate (CAB). The optical, morphological, and thermal properties of CAB blended with transparent PMMA was studied using UV-VIS spectrophotometry, scanning electron microscopy, X-ray diffraction, dynamic mechanical analysis, and thermal gravimetric analysis. The results show that CAB was able to reduce the effects of UV radiation by making PMMA more transparent to UV light, thereby preventing the negative effects of trapped radiation within the compositional structure, while maintaining the amorphous structure of the blend. The results also show that CAB blended with PMMA led to some properties commensurate with the requirements of research in terms of a slight increase in the value of the modulus and the glass transition temperature for the PMMA/CAB blend.

Keyword: Absorbance; Amorphous; Optical properties; Thermal properties; Transmittance