UV Barrier influence according to the amount of TiO2 in PBAT biodegradable flexible film

Reference	Presenter	Authors (Institution)	Abstract
04-020	Marcio Rubens Xavier Bartolomei	Bartolomei, M.R.(Instituto de Pesquisas Energéticas e Nucleares); Ishikawa, O. (Instituto de Pesquisas Energéticas e Nucleares); Bartolomei, S.S.(FATEC - Sorocaba); MOURA, E.M. (INSTITUTO DE PESQUISAS ENERGÉTICAS E NUCLEARES);	Manufacturing and consumption of polymeric products and packaging continues to grow despite concerns about environmental contamination due to improper post-consumer disposal, causing polymeric waste to emerge in increasingly remote places, polluting seas and soil, affecting flora, fauna and human health. Among these wastes are flexible food packaging. One of the alternatives to reduce this problem is the use of biodegradable materials, such as poly (butylene adipate-terephthalate) (PBAT), but the properties of this material do not meet all the needs of a food packaging, focus of this work. Additives and / or fillers must be added to improve the properties of this polymer, such as mechanical, thermal and barrier properties. One of the important features of a food packaging is the UV light barrier, as many products have shortened shelf life due to interaction with light. This work studies the effect of the addition of titanium dioxide (TiO2) particles to improve UV light barrier in biodegradable flexible PBAT films, with clay addition to improve mechanical properties. The films were obtained by melt processing so that the application is industrially and economically viable. For this, known amounts of TiO2 (0.1, 0.2 and 0.3 wt%) were added in a poly (vinyl alcohol) (PVA) solution, along with 0.5 wt% organophilized light green clay. This mixture was sonicated, poured onto PBAT pellets and oven dried. Then, the particle coated pellets were processed in a twin screw extruder, cooled and pelleted. Then the flexible film was produced in a flat die single screw extruder, thus producing 4 nanocomposites (PBAT + 0.5wt% Clay; PBAT + 0.5wt% Clay + 0.1wt% TiO2; PBAT + 0.5wt% Clay + 0.2wt% TiO2; PBAT + 0.5wt% Clay + 0.3wt% TiO2). The results of X Rays Diffraction (XRD), Scanning Electron Microscopy (SEM) and tensile test showed that the clay was exfoliated in the polymer matrix, allowing improvements in the mechanical strength and elongation of the films. UV-vis absorption assays showed that the higher the TiO2 concentration the higher the UV barrier.

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