PREPARATION AND CHARACTERIZATION OF EVA/CLAY/TIO2 FLEXIBLE FILM MODIFIED BY ELECTRON BEAM RADIATION

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Since the advent of the food can in the 19th century, protection, hygiene, product quality and convenience have been major drivers of food technology and packaging innovation. In recent years, there has been a rising demand for packaging that offers both ease of use and high quality food to consumers with busy lifestyles. The objective of this study is to prepare and caracterize EVA/Clay flexible film for application as food packaging materials. EVA with 1 wt % of TiO_2 and 1-3 wt. % of green Brazilian Clay, from Cubati, Pb, Brazil were prepared by melt extrusion, using a twin screw extruder machine and blown extrusion process. Part of EVA/CLAY/TiO_2 flexible film were irradiated at radiation dose range 100-250 kGy using a 1.5 MeV electron beam accelerator, at room temperature in presence of air. The irradiated and non-irradiated specimens tests samples were submitted to mechanical tests, XRD, UV-VIS, DSC, TG and FE-SEM analysis. The results showed significant changes on mechanical and thermal properties of EVA/CLAY/TiO_2 flexible film due to nanoparticle addition and electron-beam irradiation. These results showed that it is possible to get interesting property gains in EVA flexible films by using nanoparticle and electron-beam radiation treatment.

Table I – Mechanical and Thermal Properties of EVA/CLAY/TiO_2 flexible film

Flexible Films	Tensile strength at break (MPa)	Elongation at break (%)	Melting Temperature (Tm, °C)	Melting Enthalpy (ΔHm,Jg-1)
EVA flexible films	6,263	81,6892	94,50	72,92
EVA flexible films irradiated	11,282	304,1816	-	-
EVA/CLAY (1%)/TiO_2 flexible films	6,136	182,2232	94,99	93,26
EVA/CLAY (1%)/TiO_2 flexible films irradiated	9,188	304,868		

[(a)] 1= EVA/CLAY/TiO2 flexible film; [(b)] Vapor transmission rate; [(c)] Oxygen transmission rate; [(d)]iPLA (5 wt. %) electron-beam irradiated at 150 kGy; [(e)]0 % Relative Humidity; [(f)] 90 % Relative Humidity; [(g] 90 % Relative Humidit.; [(g)]2= PBAT/PLA/$CaCO_3$; thickness: 60 μm

References

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