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EFFECT OF MODIFIED MONTMORILLONITE ON THE MORPHOLOGY AND MECHANICAL PROPERTIES OF POLY(ETHYLENETEREPHTALATE)/POLYETHYLENE BLENDS ROLE OF THE POLARITY AND THERMAL STABILITY OF THE SURFACTANT

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Effect of modified Montmorillonite on the morphology and mechanical properties of poly(ethyleneterephtalate)/polyethylen blends - Role of the polarity and thermal stability of the surfactant.

Polymer blends are of high interest for industrial applications as it gives the opportunity to obtain a new material that may combine the advantages of each polymer leading to higher performances in the case of miscible or compatible blends. Otherwise, the main resulting drawback is a decrease of the mechanical properties. The most frequently used solution is to compatibilize the blends to limit this lack of mechanical properties. Generally, copolymer or grafted polymers are used as compatibilizer which leads to better morphologies and interfacial properties. Recently, some authors reported interesting results in terms of morphologies and mechanical properties by adding different kind of nanofillers such as layered silicates (Montmorillonite) or carbon nanotubes. Particularly, the addition of Montmorillonite nanoplatelets provides both a reinforcing effect and improves the morphology of polymer blends reducing the size of the dispersed phase.

The aim of this work is to study the effect of modified Montmorillonite on the morphology and mechanical properties of poly(ethylene terephtalate) (PET) blends with polyolefins (polyethylene and polypropylene). Different types of unmodified and modified Montmorillonite, based on alkyl ammonium surfactant, were used to evaluate the influence of the surfactant on the blends properties. The results demonstrate that the modified Montmorillonite have a positive effect on the morphology of the blends decreasing the size of the dispersed phase while the effect of unmodified montmorillonite is limited. Moreover, the effect on morphology depends on the type of surfactant and therefore influences the mechanical properties of the blends. The effect of the surfactant seems to be related to its polarity but also to its thermal stability. To evaluate the role of the surfactant thermal stability, imidazolium and phosphonium surfactants of higher thermal stability were also used as a comparison.