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PREPARATION AND CHARACTERIZATION OF PET-MMT/I NANOCOMPOSITES THROUGH THE SPRAY DRYING PROCESS

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The objective of this work was to investigate the modification of montmorillonite (MMT) by colloidal dispersion process and its use in the preparation of polyethylene terephthalate (PET) nanocomposites. A new technique based on the use of spray drying process to obtain polymer nanocomposites was developed and evaluated. An aqueous suspension of MMT clay was prepared and used in the preparation of a stable mixture with a hydrosoluble polyester ionomer (I). The colloidal dispersion of MMT/I was spray dried to obtain a dry powder and then incorporated in PET matrix. The modified MMT/I was isolated during the evaporation in spray drying conditions and no agglomeration was observed. The powder was characterized by X-ray diffraction (XRD), scanning electron microscopy (SEM) and thermogravimetric analysis (TGA). The results showed that the spray drying process is an innovative and powerful way to obtain nanocomposites with high MMT clay content. Films of PET-MMT/I nanocomposites were obtained via melting mixing with clay concentration of 0.5 to 5wt %. The effects of polyester ionomer in the nanocomposites were studied by XRD, TGA and dynamic mechanical analysis (DMA).