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EFFECT OF BLENDING SEQUENCE ON THE MICROSTRUCTURE AND PROPERTIES OF PA6/ABS/ORGANOCLAY TERNARY NANOCOMPOSITES

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Ternary nanocomposites based on polyamide 6 (PA6), acrylonitrile-butadiene-styrene (ABS) and organically modified montmorillonite (organoclay) were prepared through four different blending sequences in a twin-screw extruder, using the styrene-maleic anhydride (SMA) copolymer as compatibilizer: (1) PA6, ABS, SMA and organoclay were blended simultaneously; (2) PA6 was first reinforced with organoclay; to this blend was later added the ABS and SMA; (3) a pre-mixture of PA6, organoclay and SMA was made and then the PA6/SMA/organoclay nanocomposite was later blended with ABS; (4) for this system, the PA6/ABS/SMA blend was prepared, and the organoclay was added to this blend. The morphology and mechanical properties of the resulting materials were characterized by X-ray scattering (DRX), transmission electron microscopy (TEM) and tensile and impact tests. It was found that the blending sequence significantly influences the microstructure of PA6/ABS/SMA/organoclay ternary nanocomposites. The mechanical property results showed an increase in the elasticity modulus for the ternary nanocomposites compared to the matrix and the PA6/ABS and PA6/ABS/SMA blends. This increase was attributed to the dispersion and localization of clay layers in the interior of the continuous PA6 phase.