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DISPERSION EFFECT ON PROPERTIES AND MORPHOLOGY IN PC/ABS-MWCNT NANOCOMPOSITES OBTAINED BY EXTRUSION

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The outstanding mechanical and electronic properties of carbon nanotubes (CNTs) make them attractive materials for fabricating next generation composites. Although significant progress has been made on development of polymer-CNT nanocomposites, in many cases the application of industrial melt mixing processes is still limited by nonuniform CNT-dispersion throughout the polymer matrix. Such nanocomposites are expected to combine processability of plastics and excellent nanofiller properties, with the special interest on electrical conductivity.
In this study, PC/ABS with small amounts of multi-wall carbon nanotubes (MWCNT) was prepared by using a laboratory-scale co-rotating twin-screw extruder. The work is focused on studying the influence of processing parameters such as screw speed, barrel temperature and different methods for CNT's addition on the morphology and final properties.
Unoriented sheets with ~1.5 mm thickness of nanocomposites were prepared by compression moulding for characterization testing. Nanocomposites morphology was confirmed with optical and scanning electron microscopy and Raman spectroscopy. Additionally agglomerate size distribution was calculated in representative samples with poor dispersion. Electrical conductivity was measured as well as rheological properties. Thermal and mechanical properties were evaluated by DSC, TGA, DMA and tensile tests. The results showed that nanocomposites obtained with high screw speed, lower processing temperature and nanofiller addition by suspension in ethyl alcohol had a better dispersion.