



USE OF CARBON NANOTUBES FUNCTIONALIZED VIA PLASMA FOR THE PREPARATION OF PA6-BASED NANOHYBRIDS.

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The possibility to obtain CNT/polyamide 6 nanocomposites with excellent properties in a simple, rapid, cheap and practicable on industrial scale way was investigated. Carbon nanotubes (CNTs) were plasma functionalized in order to prevent their tendency to aggregate in bundles and to improve their interaction with the polymer matrix in a simple and rapid way. Polyamide 6 underwent drying pre-treatment to overcome the problems related to hydrolytic chain scission during processing. The morphology and the rheological, mechanical, thermomechanical properties of various types of polyamide 6/CNTs (neat and functionalized) nanocomposites (by changing temperature, mixing speed, nanotubes concentration) were tested in order to optimize the processing and to obtain tunable performances. A two-level full-factorial statistic method was adopted in order to assess the influence of some parameters and their binary interactions. The mechanical tests recorded a dramatic increase of both tensile and impact properties, due to the achievement of a good wettability and an efficient dispersion of the CNTs in the polymer matrix, as confirmed by SEM observations. Also the heat deflection temperature (HDT) resulted higher for nanocomposites outcome from F-CNTs.