Title

MECHANICAL CHARACTERIZATION OF COMPOUNDED GRAPHITE NANOPLATELET THERMOPLASTIC COMPOSITES

Abstract text

In recent years, materials researchers have focused their interested on polymers reinforced with nanosize materials. It has been demonstrated how the properties of a thermoplastic cab be significantly improve adding small amounts of nanofillers. Among all the these nanofillers, graphene platelets have attracted a lot of attention because of their mechanical, electrical and thermal properties. However, despite the potential properties of graphene platelet as a nanofiller, most of the approaches followed to integrate graphene in a thermoplastic (in situ polymerization, solvent dispersion) etc. are costly and time consuming techniques. Also graphene single platelet production is still really far to be scaled up, being neccesary to look for other alternatives.

In this work, we have used commercially available graphite nano platelets (GNP) to produce thermoplastic composites by compounding. This GNP are comprised by several layers of graphene (2x5 microns size and 10 nm in thickness). A standard extrusion process have been used to disperse the platelets in the thermoplastic and produce GNP/thermoplastic pellets. Different volume fraction specimens were fabricated (0, 0.5, 1, 2.5 and 5% wt.). Mechanical (tensile, 3 point bending and toughness) and thermomechanical characterization (DSC, TGA, DMA) have been carried out in order to analyze the effect of the GNP on the thermoplastic material. A data image correlation analysis have been performed to study the different fracture behavior of the nanocomposites. It have been demonstrated how using an optimized process to produce GNP/thermoplastic an improved in mechanical properties have been obtained with low volume fraction.

Keywords

GRAPHITE NANO PLATELETS

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