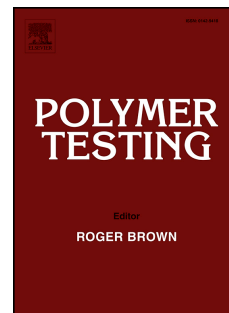


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**EFFECT OF THE ELONGATIONAL FLOW ON MORPHOLOGY AND PROPERTIES
OF POLYPROPYLENE/GRAPHENE NANOPATELETS NANOCOMPOSITES**

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Abstract

In this work the effect of the presence of graphene nanoplatelets (GnP) on the morphology and mechanical properties of polypropylene/GnP nanocomposites has been investigated when these polymer systems are subjected to non-isothermal elongational flow in a melt spinning operation. The presence of the GnP magnifies the effect of the elongational flow. Indeed, the elastic modulus and the tensile strength of nanocomposites increases with the orientation more than that observed for the pure matrix. Moreover, the elongation at break increases at low values of the draw ratio for the nanocomposites, while, the matrix shows the expected decrease in deformability. These effects have been correlated with the decrease in the dimensions of the nanoplatelets caused by the elongational flow. The increase of contact surface between matrix and dispersed phase is responsible for these behaviours since the larger contact area improves the transfer of the stress from matrix to GnP. The best performance was observed for the nanocomposite with the lower GnP content and this phenomenon has been again correlated with the minor size of the GnP in this nanocomposite sample.

Keywords: nanocomposites; graphene nanoplatelets (GnP); polypropylene; fibers

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