

A study of fibre breakage during compounding of glass fibre reinforced composites

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The main problem in the preparation of glass fibre reinforced composites by twin screw extrusion is the reduction of the fibre length by mechanical breakage. In this study, we have characterized the influence of processing conditions (screw speed, feed rate, screw profile...) on the breakage of glass fibres in a polyamide matrix, in order to optimize these conditions to limit fibre degradation. Experiments were carried out in different equipments (internal mixer, twin screw extruder, Buss co-kneader) and fibre length distribution was measured by image analysis. Modelling at different levels (1D and 3D) was used to quantify the flow conditions and to establish relationships between macroscopic parameters and fibre length (average length and length distribution). Comparisons with experiments are proposed and breakage mechanisms and models are discussed.