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Abstract

Composites made of polypropylene and short lignocellulosic fibers are usually produced by compounding in a twin-screw extruder. During processing, fibers are submitted to stress and strain and they undergo severe degradations, i.e. a reduction of both length and diameter, affecting the final properties of the composites. In this paper, which is the second of a series, we have systematically studied the changes in the dimensions of four types of fibers (hemp, miscanthus, sisal, flax) under different processing conditions, using an internal mixer to mimic the extrusion process. We show that the fibers' length and diameter decrease with the strain cumulated during the process. These changes may be described using exponential laws, the parameters of which differ from one fiber type to another. Based on these evolution laws, we propose to define a "breakage index" to discriminate the behavior of the different types of fibers.

Keywords: A. Polymer-matrix composites; A. Short-fibers composites; B. Fragmentation; E. Compounding