DEFORMATION AND FAILURE BEHAVIOUR OF SUGARCANE BAGASSE REINFORCED PP

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ABSTRACT

Polypropylene composites were prepared from sugarcane bagasse fibers by extrusion and injection molding. Wood flour was used as reference filler in the study. The fiber content of the composites

changed between 0 and 30 wt% in 5 wt% steps. A maleated polypropylene was used as coupling agent to improve interfacial adhesion. Mechanical properties were characterized by tensile and fracture testing, while local deformation processes were followed by acoustic emission and instrumented impact testing as well as by the analysis of scanning electron micrographs. The results showed that sugarcane bagasse fibers reinforce polypropylene similarly to other natural fibers. They increases stiffness, but decreases tensile yield stress, tensile strength and deformability. Increased interfacial adhesion

nning electron micrographs. The average length of the fibers was 4560 μm, while their average diameter was 340 mμ. The wood flour used as reference was the Filtracell EFC 1000 grade produced by Rettenmaier and Sohne GmbH, Germany. The average size of the particles was about 210 μm and its aspect ratio, i.e. the ratio of its length and diameter, was 6.8. A polypropylene functionalized with maleic anhydride was used as coupling agent. The Scona 2112 grade maleated PP (MAPP) was supplied by Byk-Chemie GmbH, Germany, and it had a melt flow rate of 4-8 g/10 min at 190 °C and 2.16 kg, and a maleic anhydride content of 0.9-1.2 %. The fiber content of the composites changed from 0 to 30 wt% in 5 wt% steps. The ratio of MAPP/fiber was 0.1 in all composites.