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Preparation and characterization of palm kernel shell/ polypropylene biocomposites and their hybrid composites with nanosilica

Abstract

Hybrid composites are characterized by a variety of properties that are of interest to automotive applications, including strength, mechanical, and thermal properties. In this work, palm kernel shell-filled maleated polypropylene composites and palm kernel shell/nanosilica-filled maleated polypropylene hybrid composites were produced using a Brabender Internal Mixer. The results showed that the usage of the two types of filler in the PP matrix enhanced the tensile strength, elongation at break, and impact strength but reduced the tensile modulus of the PP composites. Thermal studies confirmed that the improved nucleating ability of the hybrid fillers contributed to the superb mechanical properties of the hybrid composites. A lower percentage of water absorption was observed in hybrid composites compared to the palm kernel shell/PP composite system.

Keywords — Biocomposites, hybrid, nanosilica, palm kernel shell, polypropylene