BE-O6

Influence of alkaline treatment on the morphological, tensile and thermal properties of Alfa fibers reinforced biocomposite

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Abstract

This work focuses on investigating the effect of alkaline treatments on Alfa fibers reinforced biocomposite. Natural fibers extracted from plants are receiving more attention from researchers, scientists and academics due to their use in polymer composites and also their environmentally friendly nature and sustainability. However, natural fibers have certain core problems such as poor adhesion between the fiber and resin and a relatively high degree of moisture absorption. Alkaline treatment of natural fibers is aimed at improving the adhesive strength so that effective stress transferability takes place in the composite. In the present work, Alfa fibers (*Stipa tenacissima*) were treated with sodium hydroxide (NaOH) at 5wt% and biocomposites were prepared with synthetic resins prepared from modified sunflower oil (*Helianthus annuus)* and reinforced with different weight ratios of Alfa fibers reinforced. The Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), thermal gravimetry analysis (TGA) and tensile properties of treated, untreated and biocomposites were investigated. The experimental results showed that the alkaline treatment can effectively remove non-cellulosic materials and the interfacial adhesion properties between the fibers and the resin was increased. It was found that the alkaline treatment enhance the tensile strength and improve the thermal properties of biocomposites.

Keywords: Alkaline treatement, Alfa fiber, Biocomposites, Sunflower oil, Interfacial adhesion.