Effect of microstructure on multifunctional properties of natural fiber composites

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Abstract

This paper deals with multifunctional properties of natural fiber-reinforced green composites, such as strengthening characteristics, biodegradation behavior and thermal insulating properties. These functionalities are mainly derived from inherent physical and chemical natures of natural fiber used as a reinforcement. High-strength green composites can be fabricated by using strong natural fibers such as abaca fiber. The biodegradation speed of the green composites is faster than that of neat biodegradable resin material used as matrix. The enhanced biodegradation properties are attributed to a preferential biodegradation reaction at interfaces between natural fiber and polymer matrix. Better thermal insulation performance is easily attained by using natural fibers with large lumen, which is the hollow middle area in the natural fiber. Therefore the thermal properties of green composites can be easily controlled not only by changing the thermal conductivity values of matrix phase but also by changing the internal microstructure of the reinforcing natural fiber.

Keywords: Green composites, Natural fiber, Multifunctionality, Heat insulation, Biodegradation

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