

Study of Mechanical Properties of Glutarylated Jute Fiber Reinforced Epoxy Composites

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Abstract : Natural fibers have attained the potential market in the composite industry because of the huge environmental impact caused by synthetic fibers. Among the natural fibers, jute fibers are the most abundant plant fibers which are manufactured mainly in countries like India. Even though there is a good motive to utilize the natural supplement, the strength of the natural fiber composites is still a topic of discussion. In recent days, many researchers are showing interest in the chemical modification of the natural fibers to increase various mechanical and thermal properties. In the present study, jute fibers have been modified chemically using glutaric anhydride at different concentrations of 5%, 10%, 20%, and 30%. The glutaric anhydride solution is prepared by dissolving the different quantity of glutaric anhydride in benzene and dimethyl-sulfoxide using sodium formate catalyst. The jute fiber mats have been treated by the method of retting at various time intervals of 3, 6, 12, 24, and 36 hours. The modification structure of the treated fibers has been confirmed with infrared spectroscopy. The degree of modification increases with an increase in retention time, but higher retention time has damaged the fiber structure. The unmodified fibers and glutarylated fibers at different retention times are reinforced with epoxy matrix under room temperature. The tensile strength and flexural strength of the composites are analyzed in detail. Among these, the composite made with glutarylated fiber has shown good mechanical properties when compared to those made of unmodified fiber.

Keywords : flexural properties, glutarylation, glutaric anhydride, tensile properties

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