

Evaluation on Properties of Hybrid Kevlar Fibre-Jute Reinforced Epoxy Composites

Adarsh Kulkarni, Nagamadhu M., Anil Pol, and Kivade S. B

Abstract

Now a day's all are moving towards composite materials because high strength to stiffness ratio and other tailored properties. In the present work a Kevlar fibre of grade 29 with woven jute fibre hybrid composites reinforced with epoxy. Woven fabrics are produced by the interlacing of warp (0°) fibres and weft (90°) fibres using hand loom machine by twill weave style or pattern. The fabric's integrity is maintained by the mechanical interlocking of the fibres. Prepare the composite for 3 mm thickness with different orientation, chemical treatment of jute fibre and changing the layer positions- two different types of composites are prepared. The aim of this study is to evaluate mechanical properties such as tensile and flexural properties of hybrid Kevlar-Jute-Kevlar (KJK) Composite and Kevlar-Jute-Kevlar-Jute-Kevlar (KJKJK) Composite. Composite material is developed with 60 wt% of fibre and 40 wt % of reinforcement with different percentage of chemical treatment. Jute fibre was treated for 4% and 6% for 4 hours and developed composite by three different treatments. Microscopic examinations are carried out to analyze the interfacial characteristics of materials, internal structure of the fractured surfaces and material failure morphology by using Scanning Electron Microscope (SEM). The results indicated that the incorporation of middle Kevlar layer exhibited superior mechanical properties than the Kevlar fiber reinforced with skin layers. The results indicated that the incorporation of jute fiber with Kevlar can improve the properties and used as an alternate material for Kevlar/glass fiber reinforced polymer composites.

Keywords

Kevlar, Hybrid composites, Jute woven, Twill woven composite