

A Comparative Study on Composite Materials Behavior and Applications

ABSTRACT

Feather shafts have been found to be made of a multi-layered fibrous composite material, much like carbon fiber. It has evolved to be some of the lightest, strongest and most fatigue resistant natural structures. However, relatively little work has been done on their morphology, especially from a mechanical perspective and never at the nano scale. Fiberglass is a common type of fiber-reinforced plastic (FRP) where glass fiber acts as the reinforced fiber. The glass fiber can be randomly arranged, flattened into a sheet (called a chopped strand mat), or woven into a fabric. The matrix may be a thermosetting plastic – most often epoxy, polyester resin – or vinyl ester, or a thermoplastic. Glass fibers are considered the predominant reinforcements for polymer matrix composites due to their high electrical insulating properties, low susceptibility to moisture and high mechanical properties. Fiberglass had a wide range of applications, from marine and construction to pipe and tank. Hair is elastic and it is capable of regaining its original position on the removal of the deformation load. The component of hair is keratin which is tough, insoluble and incredibly strong. The objective of the present work is to evaluate the impact of fiber loading in composite material. Hair fibers are mixed with modified polyester at 5, 10, 15, 20 and 25% by volume fraction method using hand layup technique. Human hair act as a reinforcing constituent and modified polyester act as matrix constituent.

In this study, composite material from bird feather, fiber glass and human hair is prepared. Then mechanical properties are studied