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(57) Abstract :

An eco-friendly composite laminate for automobile applications is disclosed, comprising jute fibers embedded in an unsaturated polyester resin matrix and reinforced with micro-sized eggshell powder as an impact modifier. The jute fibers are pretreated via soaking and a 4% sodium hydroxide solution to remove impurities and enhance interfacial adhesion, and are mechanically chopped into uniform strand mats. The eggshells are collected, cleaned, thermally oxidized at 450°C, and ground to an average particle size of approximately 58 microns. The resin formulation, incorporating acetone, catalyst, and accelerator, ensures uniform curing and effective dispersion of the eggshell filler, optimally used at approximately 2.5% by weight. The resultant laminate exhibits significantly enhanced tensile, flexural, impact strength, and hydrophobicity, rendering it suitable for lightweight, cost-effective, and sustainable automotive components. Accompanied Drawings [Fig. 1-13]

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