



Sivasubramanian Palanisamy

PTR College of Engineering and Technology
India

Examine the effects of acacia caesia bark fibers on various properties of epoxy composites

Abstract:

In recent years, there has been growing interest in utilizing bark fibers as reinforcements for polymer composites. This study focused on the characterization of epoxy composites reinforced with Acacia caesia bark (ACB) fibers, considering their mechanical, morphological, and thermal properties. Various amounts of ACB fibers with three different lengths (10, 20, and 30 mm) were incorporated into the composites, ranging from 10 to 35 wt.% in 5% increments. This resulted in 18 sample categories, which were compared to neat epoxy samples. The findings demonstrated that the introduction of ACB fibers, even at the highest fiber content, led to improved mechanical performance. However, a transition in fiber length from 20 to 30 mm exhibited conflicting effects on the composite, likely due to the tendency of bark fibers to bend and split into fibrils during loading. Regarding thermal degradation, the advantages over neat epoxy were evident, particularly for 20 mm fibers, suggesting enhanced interfacial bonding between the matrix and the reinforcement. The epoxy adequately protected the bark fibers, enabling the composite to withstand degradation at temperatures comparable to pure resin, with minimal structural damage below 320 °C.

Biography

Sivasubramanian Palanisamy currently serves as an Professor (Asst) in the Department of Mechanical Engineering at P T R College of Engineering and Technology, located in Madurai, Tamil Nadu, India. He holds a Ph.D. in the field of Mechanical Engineering from Kalasalingam Academy of Research and Education (KARE) situated in Krishnankovil, Srivilliputhur, Tamil Nadu, India. His research expertise encompasses a wide range of areas, including biocomposite materials, the characterization of fibers, fiberreinforced polymer composites, hybrid composites, fiber-reinforced elastomer composites, the study of tribological behavior in composite materials, and 3D printing. He has an impressive publication record, having authored over 55 research papers in renowned international journals and contributed to 10 book chapters. Additionally, he has delivered 20 keynote / invited talks in his specialized research domains. In recognition of his expertise, He serves as a referee for numerous esteemed journals, including but not limited to Fibers, Biomass Conversion and Biorefinery, Engineering Science and Technology—an International Journal, Applied Science and Engineering Progress, Tribology in Industry, Buildings, Processes, Sustainability, and Energies.