

Thermal Conductivity Characterization of Natural Fiber Reinforced Epoxy Composites

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Abstract

In recent years, researchers are taking much interest in natural fibers because of their low weight, low cost, biodegradability, and sustainability to the environment. The substitution of synthetic fibers with natural plant based fibers has been taken a keen interest in various applications in automobile, construction, aerospace, and sports industry. There are various types of plant origin fibers, for instance, coir, pineapple, banana, sisal, wheat straw, bagasse, etc. Various combinations of these natural fibers with different thermosetting, thermoplastic, and biodegradable polymers were developed and characterized for their different properties for specific application. Among all these fibers, the highest cellulose content is observed in pineapple leaf fibers, i.e. 70-80%. In this research paper, pineapple leaf fibers were used to reinforce with epoxy resin before and after surface treatment with alkali. Thermal conductivity of these composites were analysed for their automobile and electrical applications where thermal insulation or poor conductivity is required. Thermal conductivity of composites decreases with the increase in fiber content in the composites because of the poor conductivity of natural fibers in compared to epoxy polymer. So, with the increase in the concentration of natural fibers, it starts decreasing. The same factor applies true for alkali concentration, with the increase in alkali concentration, the hemicellulose and lignin content of natural fibers decreased or totally removed, which results in further more concentration of cellulosic material in composites which again helps in poor conductivity of composites. Scanning Electron Microscope of these composites shows the better compatibility after mercerization process.



Biography:

Jyoti Jain is an active researcher of the field, fiber reinforced composites. She has done her B.tech in Food Technology from SHUATS, formerly Allahabad Agricultural Institute, in 2012, M.Tech Chemical Engineering from MNIT Jaipur in 2014 and currently pursuing her Ph.D. from Indian Institute of Technology Roorkee, India. She has currently over 18 publications in reputed International and National journals and conferences. She also has an active membership of the Institution of Engineers (IE) and IChE. She is an active reviewer of world class esteemed journals like Journal of Applied Polymer Science, Food Research International, Polymer and Polymer Composites.

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