World Academy of Science, Engineering and Technology
International Journal of Chemical and Materials Engineering
Vol:16, No:10, 2022

Synthesis and Characterization of Nanocellulose Based Bio-Composites

Authors : Krishnakant Bhole, Neerakallu D. Shivakumar, Shakti Singh Chauhan, Sanketh Tonannavar, Rajath S

Abstract : Synthesis of natural-based composite materials is state of the art. This work discusses the preparation and characterization of cellulose nanofibers (CNF) extracted from the bamboo pulp using TEMPO-oxidization and high-pressure homogenization methods. Bio-composites are prepared using synthesized CNF and bamboo particles. Nanocellulose prepared is characterized using SEM and XRD for morphological and crystallinity analysis, and the formation of fibers at the nano level is ensured. Composite specimens are fabricated using these natural sources and subjected to tensile and flexural tests to characterize the mechanical properties such as modulus of elasticity (MOE), modulus of rupture (MOR), and interfacial strength. Further, synthesized nanocellulose is used as a binding agent to prepare particleboards using various natural sources like bamboo, areca nut, and banana in the form of fibers. From the results, it can be inferred that nanocellulose prepared from bamboo pulp acts as a binding agent for making bio-composites. Hence, the concept of using matrix and reinforcement derived from natural sources can be used to prepare green composites that are highly degradable.

Keywords : nanocellulose, biocomposite, CNF, bamboo
Conference Title : ICAPME 2022 : International Conference on Advanced Polymers and Materials Engineering
Conference Location : New York, United States
Conference Dates : October 06-07, 2022