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Lignocellulosic fibrous reinforcements for sustainable polymeric composites

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Composite materials are composed of two or more materials combined at the macroscale and exhibit characteristics not depicted by any of their components. The matrix binds the reinforcement, which is the actual load-bearing part of the composite. Industrialization and technological developments in the last century have benefited human beings. But at the same time, it has been a destructive force on the planet, resulting in the utilization of resources at an unsustainable rate, enormous carbon emissions, and the addition of toxic waste. It has caused a huge burden on the world ecosystem, and there is a dire need to develop materials and processes that work within the natural capacity of the ecosystem. Green composite materials have emerged as the next-generation sustainable materials, offering advantages of biodegradation, renewability, low carbon emissions, and environmental friendliness, leading to a circular economy.

The constituents of a green composite include a bio-based polymer matrix and natural fibers as sustainable reinforcement. The matrix material is obtained usually from plants, animals or microbes, while lignocellulosic fibers obtained from plants are used as reinforcement. The end user awareness and legislative support have been the key drive for development of sustainable green composite materials. The eco-friendliness of these materials have eased their application in various sectors, and countries rich in these resources have the potential to grow this segment in order to create a green economy and strengthen the world's efforts toward sustainability

Biography

Khubab Shaker is one of the most productive researchers in textiles and composite materials at the National Textile University Pakistan, with 63 impact factor publications, 3 edited books, 12 book chapters, and more than 25 conference papers and keynote talks. He is currently serving as Chairman, Department of Materials at National Textile University, Pakistan. His areas of research include natural fibers, biopolymers, green composites, and their applications as potential replacements for synthetic composites.

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