

Advanced Green Composites: Where Are We?

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Abstract

Fiber reinforced composites have replaced metals in diverse applications from aerospace to sports gear and from satellites to windmill blades where lowering weight is critical. At present petroleum is used to manufacture all fibers and resins used in advanced composites. These composites are designed not to degrade so they can last long. However, that makes their disposal at the end of their useful life difficult, at best. In addition, petroleum is not sustainable. 'Green composites' made from fibers and resins derived from sustainable plants, on the other hand, are fully biodegradable and can be composted at the end of their life.

Significant progress in fully green composites of various functions has been made already. The development of high strength liquid crystalline cellulosic fibers has made it possible to make 'advanced green composites' with high strength and toughness that can be comparable to conventional advanced composites. These composites are suitable for use in primary structural applications. Many green composites with special functional characteristics such as fire resistance, transparency, self-healing, etc., have now been developed. They all fit the label 'Advanced' because of their functionality. This talk will review the development of high strength advanced green composites and briefly present some of the latest developments in this field including fire-resistant, self-healing, all-cellulose and transparent green composites.

About the speaker

Prof. Netravali is a member of the American Chemical Society (ACS), the Fiber Society, American Association of Textile Chemists and Colorists (AATCC), and the American Nano Society. He is an Adjunct Professor in the Dept. of Materials Science & Engineering at Tuskegee University. He is an Editor of the Reviews of Adhesion and Adhesives, and Associate Editor of AATCC Journal of Research. He also serves on the Editorial Advisory Boards of Composites Science and Technology, Journal of Biobased Materials and Bioenergy, Journal of Renewable Materials, and Textile Research Journal. He is a founding member of the International Conference on Green Composites. He has authored more than 150 refereed papers and book chapters, edited or co-edited 4 books and has presented more than 200 Keynote and Plenary lectures at international conferences and organizations. His group focuses on the areas of Fiber Reinforced Composites, Green Materials and Processes.

~ALL ARE WELCOME~