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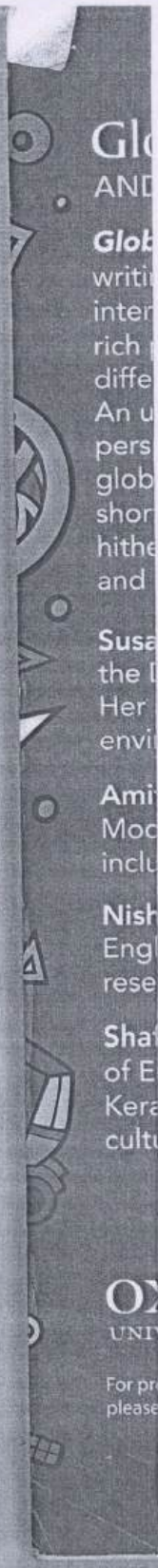

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Fiber Reinforced Composites

Constituents, Compatibility, Perspectives, and Applications

Woodhead Publishing Series in Composites Science and Engineering

2021, Pages 1-24

1 - An introduction to fiber reinforced composite materials

Jitha S. Jayan [a], Saritha Appukuttan [a], Runcy Wilson [b], Kuruvilla Joseph [c], Gejo George [d], Kristiina Oksman [d]

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Abstract

The present century has witnessed composite materials to be the most promising and shrewd material for a variety of applications. Among them fiber (natural or synthetic) reinforced composites (FRCs) have gained significant interest owing to the high demand for lightweight materials with high strength for specific applications. The advantages of FRCs include high strength to weight ratio, high durability and stiffness, good damping behavior, flexural strength and most importantly good resistance to corrosion, wear, impact and fire (depending on the matrix and fiber reinforcement). The presence of such wide array of properties for FRCs have led to them being used extensively in a number of applications including mechanical, aerospace, automotive, marine, sports, biomedical, construction etc. The past decades have visualized exciting research in the area of FRC's which helped to unveil the properties of these exciting materials further and consign them in appropriate applications. These FRCs have shown outstanding performance in different fields of applications and hence have been promoted by researchers as promising alternatives to solitary metals and alloys. The global demand for fiber reinforced composites is expected to grow at a faster pace with the aerospace industry occupying the top position in the years to come. Major driving factors for the rising

Recycling of Synthetic Fibre Reinforced Plastics

| Chapter | First Online: 02 October 2021

| pp 143–168 | Cite this chapter

Recent Developments in Plastic Recycling

Runcy Wilson, Gejo George, Tomlal Jose E & Kuruvilla Joseph

Part of the book series: Composites Science and Technology ((CST))

Abstract

Fibre reinforced polymer composite materials have been widely used in industries owing to their good strength, light weight nature and their remarkable mechanical properties. The increased use of synthetic fibre based composites have led to a large amount of composite waste being produced annually and that too globally and their management is becoming an important issue. The conservation of resources and environment is having a negative impact due to the current increasing amount and recycling of composite waste at their end of life cycle. This chapter focuses on the classification of various composites

ScienceDirect

Advanced Green Materials

Fabrication, Characterization and Applications of Biopolymers and Biocomposites

Woodhead Publishing in Materials

2021, Pages 257-277

12 - Fabrication and characterization of carrageenan-based green materials

Runcy Wilson [a], Gejo George [b], P.C. Thomas [c], Kuruvilla Joseph [d]

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Abstract

The chemical structure and ability to fine-tune its properties have made polysaccharide based composites a very attractive biomaterial. Polysaccharides are copious in nature and have good processability and hence have become one of the most commonly used biomaterial compared with other synthetic biomaterials. The biggest advantage of using polysaccharides in green composites is their environmental friendly nature. Among the different types of polysaccharides, carrageenan a sulfated polysaccharide extracted from red algae has recently received much attention. The applications of carrageenan-based materials include as gelling, stabilizing, and thickening agents in areas like food products. These materials have recently been explored in industrial applications, cosmetics, pharmaceutical applications, etc. Carrageenan-based materials are favorable alternative to fossil fuel-based polymers and are highly regarded as probable renewable and sustainable composite materials.

Fiber Reinforced Composites

Constituents, Compatibility, Perspectives, and Applications

A volume in Woodhead Publishing Series in Composites Science and Engineering

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Kuruvilla Joseph, Kristiina Oksman, ... Saritha Appukuttan

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About the book

Description

Polymer-based fibre-reinforced composites FRC's have now come out as a major class of structural materials being used or regarded as substituent's for metals in several critical components in space, automotive and other industries (marine, and sports goods) owing to their low density, strength-weight ratio, and fatigue...

Key Features

Focuses on the different types of FRC's that are currently available (e.g. from polymeric matrices to metallic and ceramic matrices, from carbon fibre to different types of natural fibres and from short to long fibre reinforced), their processing techniques, characterization of different properties, and how to improv...

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