Research & Reviews: Journal of Material Sciences e-ISSN: 2321-6212

An Overview on Uses of Composite Materials

Rachana Vudata*

Department of Applied Physics, Andhra University, Visakhapatnam, India

Perspective

Received: 06-Mar-2022, Manuscript No. JOMS-22-57512; **Editor assigned:** 08- Mar -2022, PreQC No. JOMS -22-57512 (PQ); **Reviewed:** 20- Mar -2022, QC No. JOMS -22-57512; **Revised:** 23- Mar -2022, Manuscript No. JOMS -22-57512 (R); **Published:** 30- Mar -2022, DOI: 10.4172/2321-6212.10.3.004

***For Correspondence:**

Rachana Vudata, Department of Applied Physics, Andhra University, Visakhapatnam, India.

E-mail: rachana@gmail.com

DESCRIPTION

A composite material is one that is made up of two or more constituent materials. These constituent materials have markedly different chemical or physical properties, and when combined, they form a material having features that are not found in the individual constituents. Individual constituents stay separate and distinct inside the finished construction, distinguishing composites from mixes and solid solutions. New material may be preferred for a variety of reasons. When contrasted to ordinary materials, examples include materials that are less expensive, lighter, stronger, or more durable.

Researchers have lately begun to actively incorporate sensing, actuation, computing, and communication into composites known as robotic materials. Boat hulls, swimming pool panels, racing car bodies, shower stalls, bathtubs, storage tanks, and imitation granite and cultured marble sinks and countertops are all examples of composite materials utilised in buildings, bridges, and constructions. They're also becoming more common in non-automotive applications.

The most advanced examples are used on spaceships and aircraft in harsh conditions on a regular basis. Concrete is the most prevalent manmade composite material, and it is made up of loose stones (aggregate) bound together by a cement matrix. Concrete is a low-cost material that will neither collapse nor break even when subjected to a significant compressive force. Concrete, on the other hand, cannot withstand tensile loads. Steel bars, which can withstand strong stretching (tensile) stresses, are frequently added to concrete to produce reinforced concrete to give it the ability to resist being stretched. Carbon fibre reinforced polymer and glass-reinforced plastic are examples of fibre-reinforced polymers. Thermoplastic composites, short fibre thermoplastics, long fibre thermoplastics, and long fibre-reinforced thermoplastics are the four types of thermoplastics classified by matrix. Thermoset composites, such as paper composite panels, are available in a variety of forms. In an epoxy resin matrix, several modern thermoset polymer matrix solutions often include aramid and carbon fiber.

Shape memory polymer composites are high-performance composites made with fiber or fabric reinforcements and a matrix of shape memory polymer resin. These composites may be easily manipulated into numerous forms when heated above their activation temperatures and will demonstrate exceptional strength and stiffness at lower temperatures since a shape memory polymer resin is utilized as the matrix. They can be repeatedly reheated and reshaped without losing their material qualities. Lightweight, rigid, deployable structures; rapid production; and dynamic reinforcement are just a few of the uses for these composites. High-strain composites are another type of high-performance composite that is designed to perform in a high-deformation environment and are frequently utilized in deployable systems where structural bending is beneficial. Although high strain composites are comparable to shape memory polymers in many ways, their performance is mostly determined by the fibre architecture rather than the resin content of the matrix.

Metal fibres can be used to reinforce other metals in composites, such as Metal Matrix Composites (MMC) and Ceramic Matrix Composites (CMC), which include bone (hydroxyapatite reinforced with collagen fibres), cermet (ceramic and metal), and concrete. Fracture toughness is the primary goal of ceramic matrix composites, not strength. Woven fabric composites with longitudinal and transverse laced yarns are another type of composite material. Woven fabric composites are flexible due to their fabric-like appearance.

Asphalt concrete, polymer concrete, mastic asphalt, mastic roller hybrid, dental composite, syntactic foam, and mother of pearl are examples of organic matrix/ceramic aggregate composites. Chobham armor is a type of composite armor used for military purposes. Thermoplastic composite materials can also be manufactured using particular metal powders, resulting in materials with densities ranging from 2 to 11 g/cm^3. High Gravity Compound (HGC) is the most popular designation for this sort of substance, however "lead substitute" is sometimes used. These materials can be utilized in weighting, balancing, vibration damping, and radiation shielding applications in place of typical materials including aluminum, stainless steel, and brass, bronze, copper, lead, and even tungsten. Where certain materials are judged toxic and banned or when secondary operations expenses are a factor, high density composites are an economically viable solution.