

Smart Materials

Modern materials

Carbon fibre is a material that has several advantages including high stiffness, high tensile strength, low weight, high temperature tolerance, high chemical resistance, low thermal expansion and resistance to corrosion. Carbon fibre is created when carbon atoms are bonded together in crystals and can be woven into fabric. Carbon fibres are usually combined with other materials to form a composite. Commonly, fabrics or matting made from woven carbon is bonded in layers to create complex shapes for performance products like racing bicycles, Formula One cars, aerospace vehicles and many sporting products where strength, lightweight properties and speed are essential.

Kevlar is another newer material with special performance characteristics. Kevlar is a heat resistant and strong synthetic fibre with the ability to stop bullets and knives from penetrating it. Kevlar is often described as being five times stronger than steel for its weight. It can be woven into different shapes and remains lightweight and flexible, which is ideal for protective vests.

GRP or Glass Reinforced Polymer is also called fibreglass. Fibre strands are embedded into a polymer resin matrix, resulting in high compressive and tensile strengths in the finished products. Many products are made from fibreglass including fun water slides, jacuzzis, car body panels, boats and roofing products.

Smart materials

A smart material is a category of materials that react when something triggers them. It can be a change in temperature or light for example.

QTC or **Quantum Tunnelling Composite** is a black rubbery material which is an electrical insulator, but when placed under compression, it becomes a conductor. It is used in clothing, smart phones and outdoor equipment, normally as a material to make an electrical switch.

Differences between modern and smart materials

Modern materials are designed to have specific properties and characteristics, so that they can be used to improve existing materials used in products. Smart materials have unique changes that occur in response to external stimuli, making the smart material react in a clever way.

