



SMART MATERIALS

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Smart materials are materials that receive, transmit, or process a stimulus and respond by producing a useful effect that may include a signal that the materials are acting upon it. **Examples of stimuli that act on these materials are: *Strain, stress, temperature, chemicals (including pH), electric field, magnetic field, hydrostatic pressure, different types of radiation, and other forms of stimuli.***

The concept of smart structures is developed from smart materials. Smart structures are simply structures with at least one smart material incorporated within its structure to perform a particular action. Smart structures comprise of composite materials embedded with fibre optics, actuators, sensors, microelectromechanical systems (MEMS), vibration control, sound and shape control. etc.



Applications of Smart Materials and Structures

Smart materials have been used for applications such as glass windows coated with titanium oxide nanoparticles that respond to sunlight to remove dirt, hydrophones, gas igniters, smart clothes, cosmetics, artificial muscles, batteries, solar cells, actuators, shock absorbers, etc.

Manufacturing Methods

Additive Manufacturing / 3D Printing (a technology that builds 3D objects by adding layer-upon-layer of material, whether the material is plastic, metal, concrete or one day human tissue)

4D printing (the process through which a 3D printed object transforms itself into another structure over the influence of external energy input as temperature, light or other environmental stimuli).

Chemical Vapour deposition is the process of synthesising a material, often as a coating on another material, from vapour precursors that are caused to react by heating)

