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COMPOSITES AND CERAMICS

2 MARKS

Q.1. State the application of ceramic?

Ans:-Ceramic material can be as sand, glass, brick, cement.

Ceramic material are corrosion resistance and be used as concrete, insulator, abrasives, refractories and plaster.

Q.2.Give four important characteristics of ceramics?

Ans:

- Brittleness
- Resistance to high temperature.
- Hardness
- It is insulator.

7 MARKS

Q.1. Explain fiber reinforced composites with their application?

Ans: **Fiber reinforced composite:**

- Fiber reinforce component involves three components namely, filament, a polymer matrix and a bonding agent. glass and metallic fibers commonly employed for this purpose. The fibers can be employed either in the form of continuous, lengths, staples or whiskers.

- Fibre in composites provides stiffness and also density of the composite, where metal matrix is used. Matrix provide toughness to the composite material, and it binds the fiber together.

The most familiar example of this category of composites is glass reinforced plastics, aluminum, boron composite, Boron has low density and is suitable for light weight application.

- The fiber rein forced composites possess superior properties like higher yield strength, fracture strength and fatigue life.to obtain composite having the maximum strength and elastic modulus. It is essential that there should be maximum number of fiber per unit volume so that each fiber takes its full share of load. The fiber reinforced composites are generally anisotropic and the maximum strength is in the direction of alignment of fibers.

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For preparing a fiber reinforced composite it is essential that:

The co efficient of expansion of the fiber matches closely that of the matrix.

The fiber and matrix should be chemically compatible with each other and no undesirable reaction takes place between them.

The fiber should be stable at room temperature and should retain a good percentage of strength at elevated temperature.

Q.2.What is composites? Explain particle reinforced and fiber reinforced composites. State their properties.

Ans: The material which is produced by combing of two dissimilar materials into a new material that may be better suited for a particular application then the original material is called composite.

The base material which is present in larger amount is called matrix. The other material is sometimes known as reinforcing phase.

Classification of composite:

- Particle reinforced composites
- Fiber reinforced composites

Particle reinforced composite:

particle reinforced composite are made by dispersing particles of varying size and shape of one material in the matrix of another material. The operation may be carried out by adding particles to a liquid matrix material, which later solidified (during age hardening) or may be pressed together (by the powder process) in such composites, the matrix as well as particles share the load bearing function. Example of such cermet (metal ceramic composites) used in cutting tools, concrete used in dams, building etc. the effective strength of such composites depends to a great extent on interparticles spinning.

As the volume fraction of the dispersion increases, the mechanical improve, reaching an optimum value and then begin to fall. At higher volume fractions of the disperiods, the brittle ceramic particles come closer to each other, thereby somewhat continuous brittle phase is formed which promotes premature failure. For ex.in tungsten carbide-cobalt composite cermet's, the maximum in tungsten carbide- cobalt composite cermet's., the maximum strength is attained around 66% volume percentage. If tungsten carbide, after which it benefits to fall.

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- The most similar example of this category of composites is glass-reinforced plastics, aluminum, boron composite. Boron has low density and is suitable for light weight applications.
- The fiber reinforced composites possess superior properties like higher yield strength, fracture strength and fatigue life. To obtain composite having the maximum strength and elastic modulus, it is essential that there should be maximum number of fiber per unit volume so that each fiber takes its full shares of load. The fiber reinforced composite are generally anisotropic and the maximum strength is in the direction of alignment of fibers.
- For preparing a fiber reinforced composite, it is essential that the coefficient of expansion of the fiber matches closely that of the matrix. The fiber and matrix should be chemically compatible with each other and no undesirable reaction takes place between them. The fiber should be stable at room temperature and should retain a good percentage of strength at elevated temperatures.