MODULE -III

PHASE RULE AND COMPOSITES

3.5 Hybrid composites

3.8.3 Hybrid composites

Hybrid composites are materials that are fabricated by combining two or more different types of fibers with in a common matrix.

These composite materials used in so many areas like aerospace, automotive, construction and household purposes , due to their high mechanical properties. But for these composites there are some drawbacks like high cost, high density, high weight. The most common hybrid composites are carbon-aramid reinforced epoxy (which combines strength and impact resistance) and glass-carbon reinforced epoxy (which gives a strong material at a reasonable price).

Bone and oyster are among the hybrid materials found in nature, whose inorganic part causes the overall strength of the composite structure and its organic part leads to the bond between inorganic blocks and soft tissue.

Properties:

- Hybrid composites possess very good properties compared to their single fibre composites.
- They possess strong ,tough and higher impact resistance.
- When hybrid composites are stressed in tension, failure does not occur suddenly.
- They possess balanced strength and stiffness
- They exhibit superior mechanical and tri biological properties than other composites.

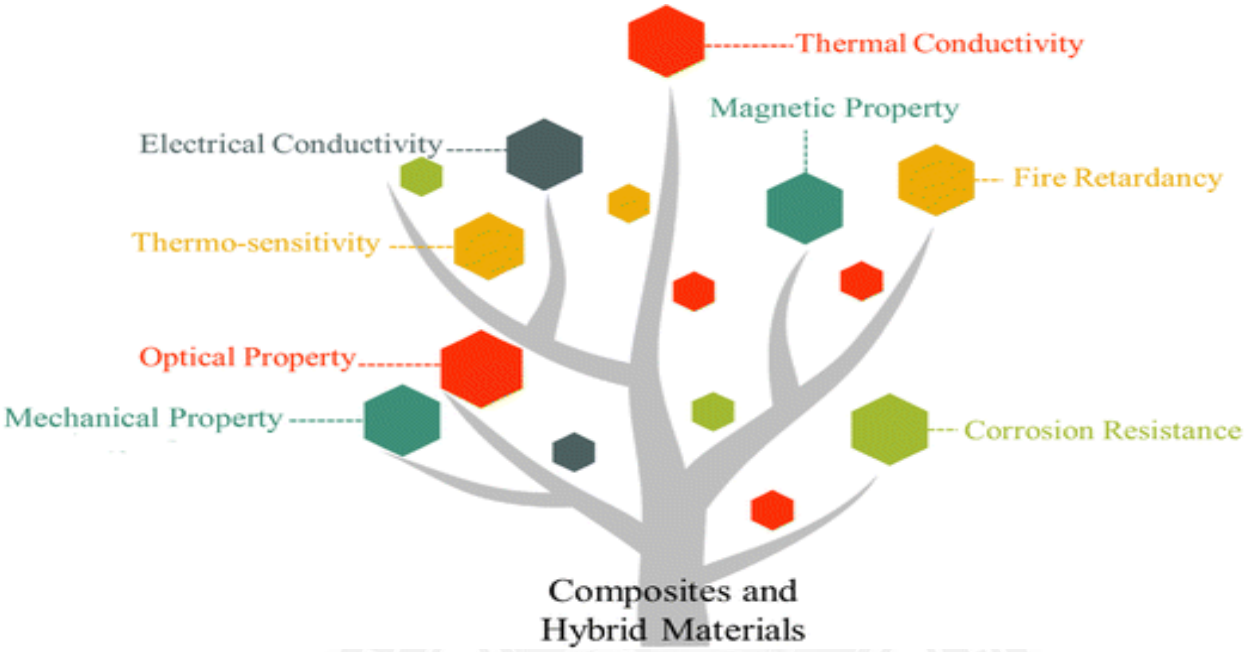

Fig-1-Properties of Hybrid composities

Source: Online Sources

Uses

- It is used in light weight transport structural components(land ,water)
- Used in light weight orthopedic components and sporting goods.
- Used to make furniture like chair, table and bath tubs.
- Used in railway coach interiors. Auto mobile industry utilizes hybrid composites in many of the interior and exterior applications

Fig-2-Applications of Hybrid composities

Source: Online Sources

Some of the specific advantages of hybrid composites over conventional composites include balanced strength and stiffness, balanced bending and membrane mechanical properties, balanced thermal distortion stability, reduced weight and/or cost, improved fatigue resistance, reduced notch sensitivity, improved fracture.

Difference between Composites and Hybrid composites.

Hybrid materials are composites consisting of two constituents at the nanometer or molecular level. Commonly one of these compounds is inorganic and the other one organic in nature. Thus, they differ from traditional composites where the constituents are at the macroscopic (micrometer to millimeter) level.