Structure Insensitive Properties

The **melting point** is usually defined as the **point** at which materials changes from a solid to a liquid. The temperature at which solid changes its state to liquid at atmospheric pressure is called the **melting point** of that liquid. This is the **point** at which both liquid and solid phase exists at equilibrium.

The **glass transition temperature** is the **temperature** range where the **polymer** substrate changes from a rigid glassy material to a soft (not melted) material, and is usually measured in terms of the stiffness, or modulus.

**Density** is a measure of mass per volume. The average **density** of an object equals its total mass divided by its total volume. An object made from a comparatively dense material (such as iron) will have less volume than an object of equal mass made from some less dense substance (such as water).

**Porosity** or void fraction is a measure of the void (i.e. "empty") spaces in a material, and is a fraction of the volume of voids over the total volume, between 0 and 1, or as a percentage between 0% and 100%.

modulus of elasticity : the ratio of the stress in a body to the corresponding strain (as in bulk modulus, shear modulus, and Young's modulus)

**Coefficient of Linear Thermal Expansion** (CLTE/CTE)

The **coefficient of linear thermal expansion** (CLTE) describes the length change of a material as a function of the temperature. ... The physical (differential) **coefficient of linear thermal expansion** is the slope of the **expansion** curve at a given temperature.

Thermal conductivity refers to the ability of a given material to conduct/transfer heat. It is generally denoted by the symbol ‘k’ but can also be denoted by ‘λ’ and ‘κ’. The reciprocal of this quantity is known as thermal resistivity. Materials with high thermal conductivity are used in heat sinks whereas materials with low values of λ are used as thermal insulators.

**Specific heat**, ratio of the quantity of **heat** required to raise the temperature of a body one degree to that required to raise the temperature of an equal mass of water one degree.

The **rate** of **corrosion** is the speed at which any given metal deteriorates in a specific environment. The **rate**, or speed, is dependent upon environmental conditions as well as the type and condition of the metal.

Structure sensitive Properties

Strength: the capacity of an object or substance to withstand great force or pressure.

Ductility is a mechanical property commonly described as a material's amenability to drawing. In materials science, ductility is defined by the degree to which a material can sustain plastic deformation under tensile stress before failure.

In materials science, fracture toughness is the critical stress intensity factor of a sharp crack where propagation of the crack suddenly becomes rapid and unlimited.

 In materials science, **fatigue** is the weakening of a material caused by cyclic loading that results in progressive and localized structural damage and the growth of cracks. ... **Fatigue** has traditionally been associated with the failure of metal components which led to the term metal **fatigue**.

**Damping capacity** is the ability of a material to absorb energy by converting mechanical energy into heat.

In materials science, creep is the tendency of a solid material to move slowly or deform permanently under the influence of persistent mechanical stresses. It can occur as a result of long-term exposure to high levels of stress that are still below the yield strength of the material.

Hardness is a measure of the resistance to localized plastic deformation induced by either mechanical indentation or abrasion.

**Wear rate** is volume loss per unit distance and its unit is (m3/m).