

Unit

1

The Solid State

The three important states of matter are solids, liquids and gases.

- The three states of matter are inter convertible with changes in temperature and pressure.

Characteristics of Solids:

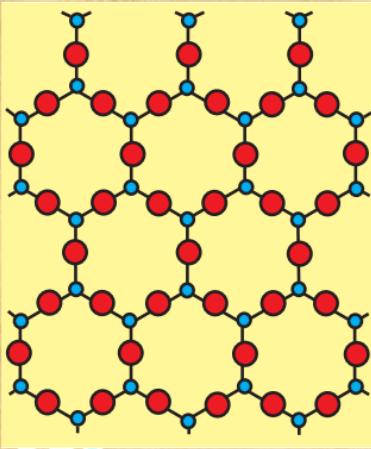
- They possess definite mass, volume and shape.
- Inter molecular forces are strong.
- Inter molecular distances are small.
- Particles are arranged in fixed positions and can only oscillate about their mean positions.
- They are rigid and incompressible.
- Based on the arrangement of constituent particles solids are classified as Amorphous and crystalline solids.
- Differences between crystalline and amorphous solids can be explained as below.

Difference between crystalline & amorphous:

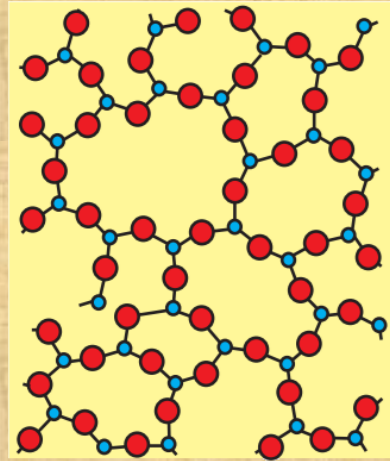
Crystalline Solids	Amorphous solids
Possess definite geometrical shape	Possess irregular shape
Melt at a sharp characteristic temperature	Do not possess sharp melting point soften over a range of temperature
Possess definite heat of fusion	Doesn't have definite heat of fusion
Anisotropic in nature(Showing different values from physical properties like refractive index,	Isotropic in nature(Possess short range orders hence give same values in all directions)

electrical resistance in different directions)	
They are true solid	These are pseudo solids or super cooled liquids
Ex. NaCl, CaCl ₂ , CuSO ₄ .5H ₂ O etc	Glass, Rubber, Gelatoneous Al(OH) ₃ etc.

Quartz has both crystalline and amorphous forms.



(a)



(b)

Fig. Two dimensional structure of (a) quartz and (b) quartz glass

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