

Question:

Classify the following as amorphous or crystalline solids :  
Polyurethane, naphthalene, benzoic acid, teflon, potassium nitrate, cellophane, polyvinyl chloride, fibre glass, copper.

Answer.

Amorphous solids:

Polyurethane, teflon, cellophane, polyvinyl chloride, fibre glass

Crystalline solids:

Naphthalene, benzoic acid, potassium nitrate, copper.

Question

Why is glass considered as super cooled liquid?

Answer:

Glass is an amorphous solid. Like liquids amorphous solids have a tendency to flow, though very slowly. Hence glass is considered as super cooled liquid.

Glass panes fixed to windows or doors of old buildings are invariably found to be slightly thicker at the bottom than at the top. This is because the glass flows down very slowly and makes the bottom portion slightly thicker.

Question

Refractive index of a solid is observed to have the same value along all directions. Comment on the nature of this solid. Would it show cleavage property.

Answer:

As refractive index of the solid is observed to have the same value along all directions, the given solid is isotropic.

This is property of amorphous solid.

Amorphous solids, when cut with a sharp edged tool, they cut into pieces with irregular surfaces.

Question

Define the term amorphous. Give a few examples of amorphous solids.

Answer:

An amorphous solid (Greek amorphous  $\rightarrow$  no form) consists of particles of irregular shape. The arrangement of constituent particles (atoms, molecules or ions) in such a solid has only short range order. In such an arrangement, a regular and periodically repeating pattern is observed over short distance only.

Example: Glass, rubber, plastics, amorphous silicon.

Question:

What makes a glass different from a solid such as quartz? Under what conditions could quartz be converted into glass?

Answer:

Quartz is a crystalline solid i.e. there is a regular pattern of arrangement of particles which repeats itself periodically over the entire crystal.

Glass is an amorphous solid i.e. it has short range order, a regular and periodically repeating pattern is observed over short distances only.

Quartz can be converted into glass by heating and then cooling it rapidly.