

Allotropes of carbon

Allotropes are different physical forms in which an element can exist, at same temperature

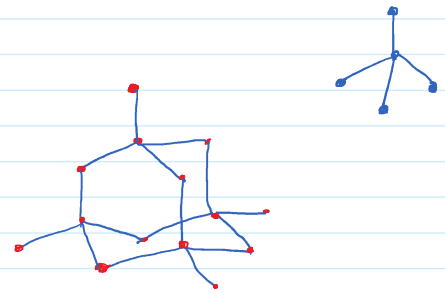
- Structure different
- Same chemical properties
- Different physical properties

Examples: Graphite, diamond, Buckminster fullerene are allotropes of carbon.

Diamond

Structure

Each carbon atom is bonded to four other carbon atoms forming a rigid three-dimensional structure.



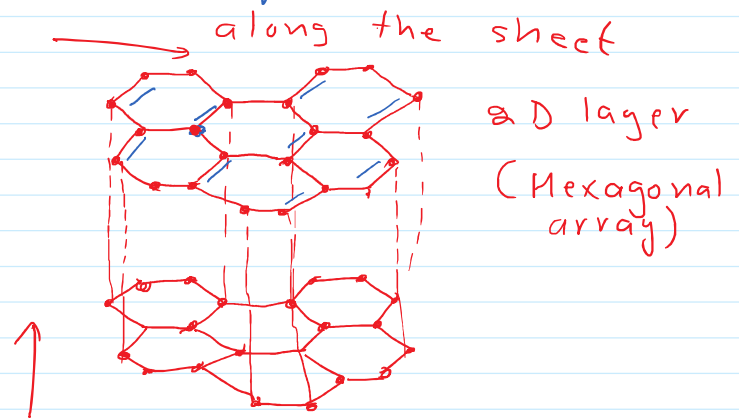
Properties:

- i) Diamond is hardest substance known
- ii) It is bad conductor of electricity

Graphite

Structure

i) Each carbon atom is bonded to three other carbon atoms in the same plane giving a hexagonal array.



- ii) One of these bonds is a double bond and thus the valency of carbon is satisfied.
- iii) Graphite structure is formed by the hexagonal array being placed in layers, one over the other.

Properties

- i) It conducts heat and electricity.
- ii) It is smooth and slippery and is used in pencils and as dry lubricant.

Note:

- i) Diamond and graphite have same chemical properties.
- ii) Diamonds can be synthesised by subjecting pure carbon to very high pressure and temperature.

Fullerenes

It is an allotrope of carbon whose molecule consists of carbon atoms connected by single and double bonds so as to form a closed or partially closed mesh

eg: C_{60} (Buckminster fullerene)