CHEMISTRY STUDY MATERIALS FOR CLASS 10
(NCERT Based notes of Chapter -04)

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CARBON AND ITS COMPOUND

ALLOTROPY

Allotropy is defined as the property by which an element can exist in more than one form that are physically different but chemically similar.

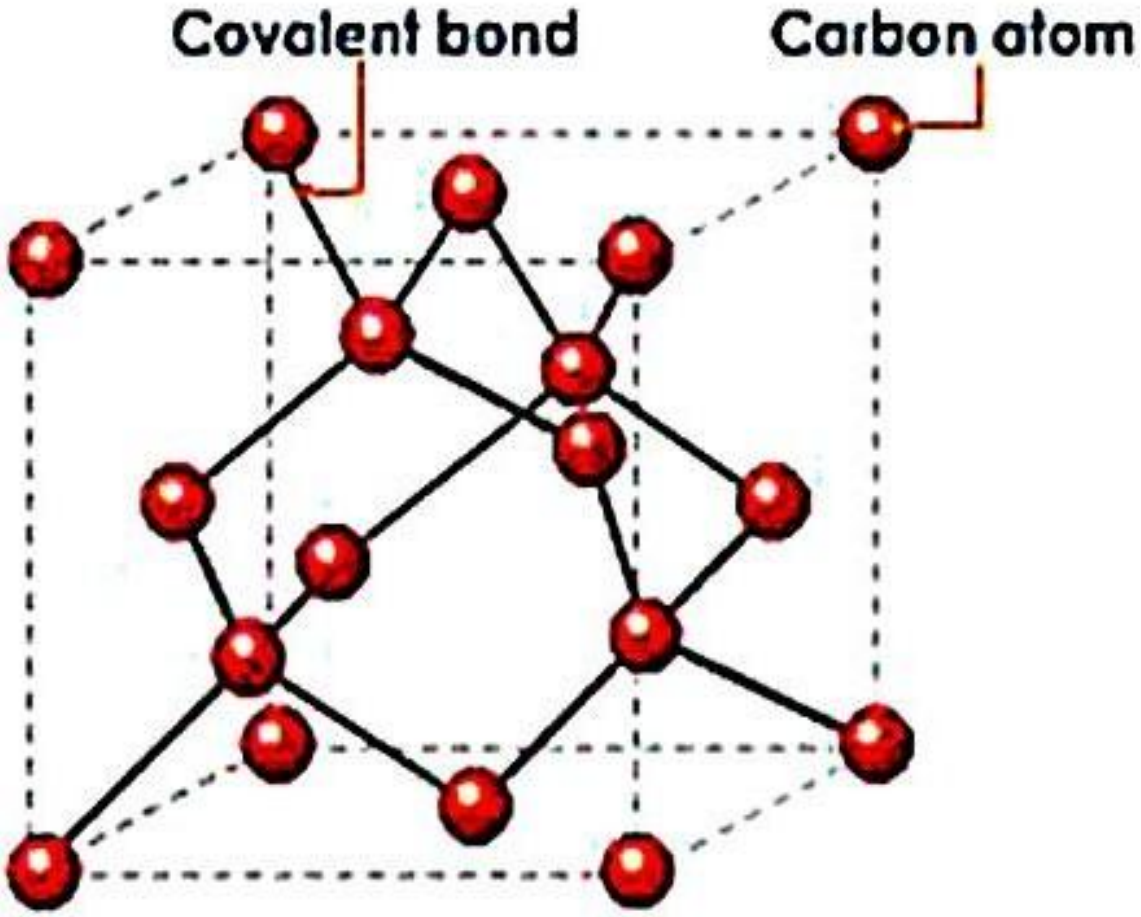
Allotropes of carbon

Carbon exists in three allotropic forms. They are crystalline form (diamond and graphite), amorphous form (coke, charcoal) and fullerene.

In diamond each carbon atom is bonded to four other carbon atoms forming a rigid three dimensional structure, accounting for its hardness and rigidity.

General properties of diamond are

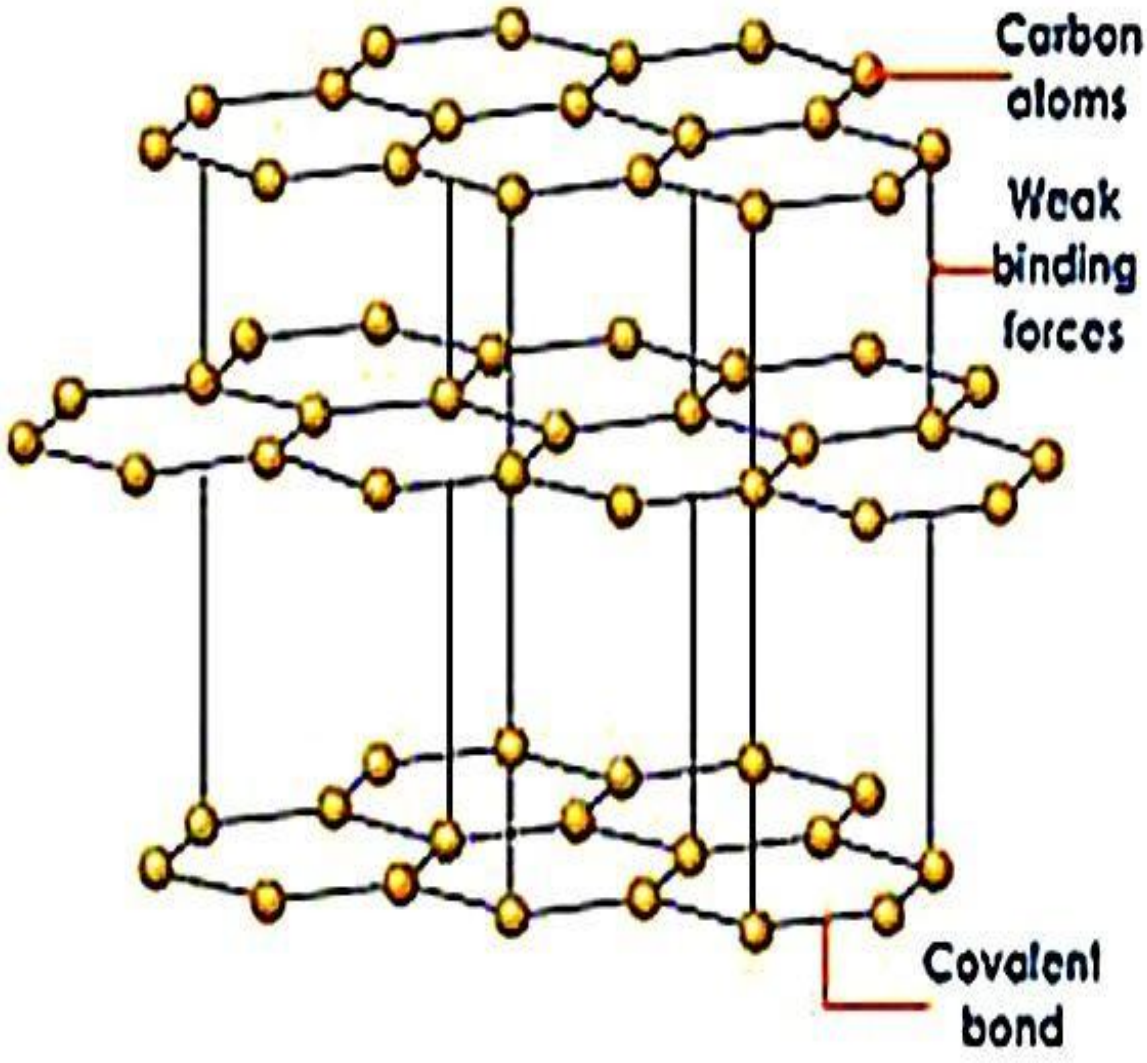
- It is a colourless transparent substance with extraordinary brilliance due to its high refractive index.
- It is quite heavy.
- It is extremely hard (hardest natural substance known).
- It does not conduct electricity (because of the absence of free electrons).
- It has high thermal conductivity and high melting point.
- It burns on strong heating to form carbon dioxide.



In graphite each carbon atom is bonded to three other carbon atoms in the same plane giving hexagonal layers held together by weak **Vander Waals forces** accounting for softness.

General properties of graphite are

- It is a greyish black opaque substance.
- It is lighter than diamond, feels soft and slippery to touch.
- It is a good conductor of electricity (due to the presence of free electrons) but bad conductor of heat.
- It burns on strong heating to form carbon dioxide.

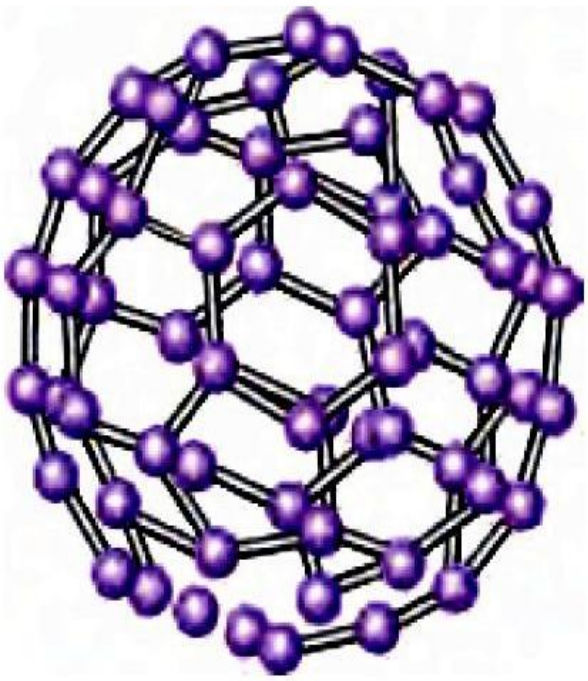


Fullerenes

Fullerenes form another type of carbon allotropes. The first one was identified to contain 60 carbon atoms in the shape of a football. (C-60). Since this looks like the geodesic dome designed by the US architectBuck Minster Fuller, it is named as **Buck Minster Fullerene.**

General Properties of fullerenes are

- These are dark solids at room temperature.
- These are neither too hard nor too soft.
- These are the purest allotropic forms of carbon because of the absence of free valencies or surface bonds.
- On burning, these produce only carbon dioxide gas.



Fullerene

Foot ball

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