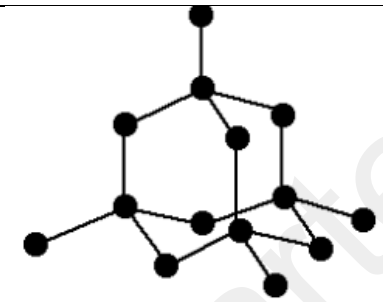
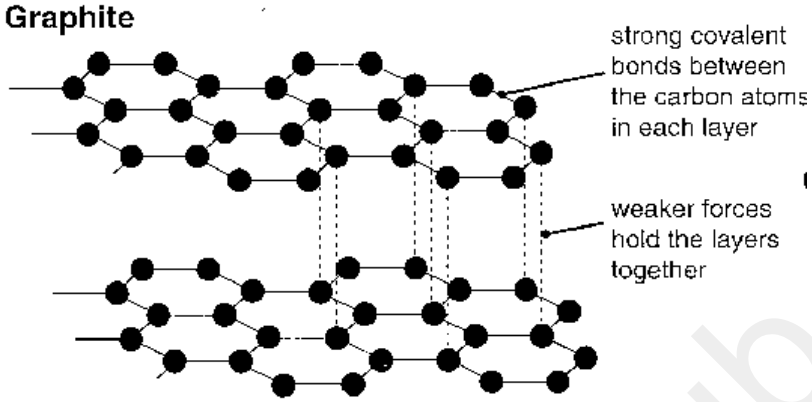
Macromolecules

Giant covalent structures of Diamond/Graphite/Silicon(IV) oxide

- Macromolecules are giant covalent structures
- They have a rigid three dimensional network of strong covalent bonds throughout the crystal.
- It takes a lot of energy to break the bond
- They have very high boiling and melting points.
- Example of giant covalent structures are: Graphite, diamond and [Silicon(IV) oxide-also called as silicon dioxide]

	Diamond	Silicon
Structure		
Bonding	One carbon atom is bonded to 4 other carbon atoms and no electrons are set free.	One silicon atom is bonded to 3 other oxygen atoms and no electron is set free.
Electrical Conductivity	Does not conduct electricity as it does not have any delocalised electrons	Does not conduct electricity as it does not have any delocalised electrons
Melting and boiling point	High-because a lot of energy is needed to break the strong covalent bonds.	High-because a lot of energy is needed to break the strong covalent bonds.
Hard	Very hard-It can't be scratched easily	Very hard-It can't be scratched easily
Colour	Colourless	Colourless

Graphite



- Graphite is a black shiny solid.
- It's carbon atoms are arranged in layers.
- Every layer consists of carbon atoms in hexagonal ring.
- Each carbon atom is covalently bonded to 3 other carbon atoms and one electron is set free. Thus in the entire lattice there is a sea of delocalised electrons. Hence graphite conducts electricity because the delocalised electrons can drift along the layers when voltage is applied. As graphite conducts electricity , it is used to make electrodes for electrolysis.
- Graphite has a slippery feel as the bonding between the layers in graphite is weak. hence the layers can slide past each other. Hence it has a slippery feel.
- The layers of graphite can flake off because of this weak bonding. hence it is used as a lubricant and in pencil leads.
