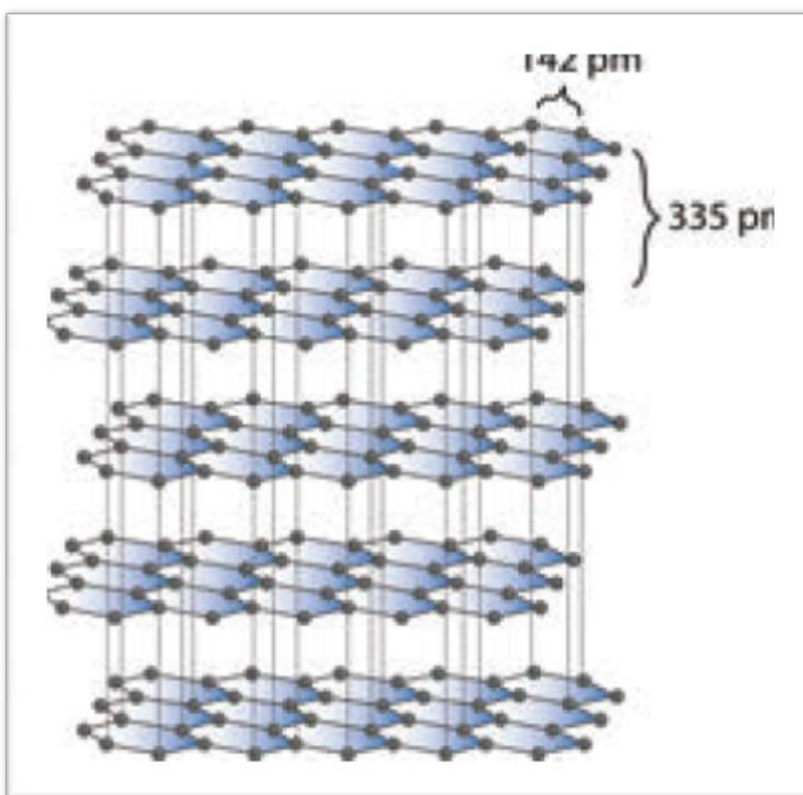


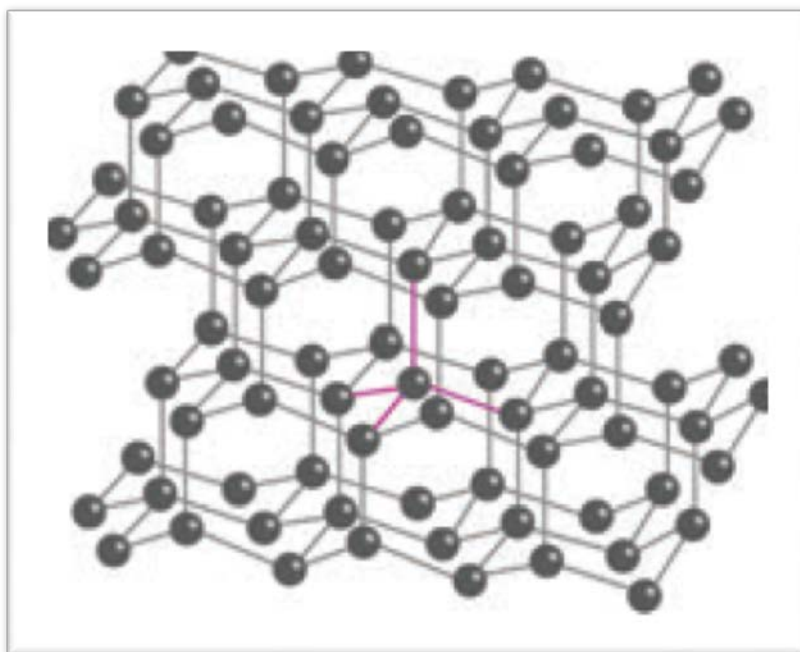
Allotropes of carbon

Carbon exists in many allotropic forms. Graphite and diamond are the most common allotropes. Other important allotropes are graphene, fullerenes and carbon nanotubes.

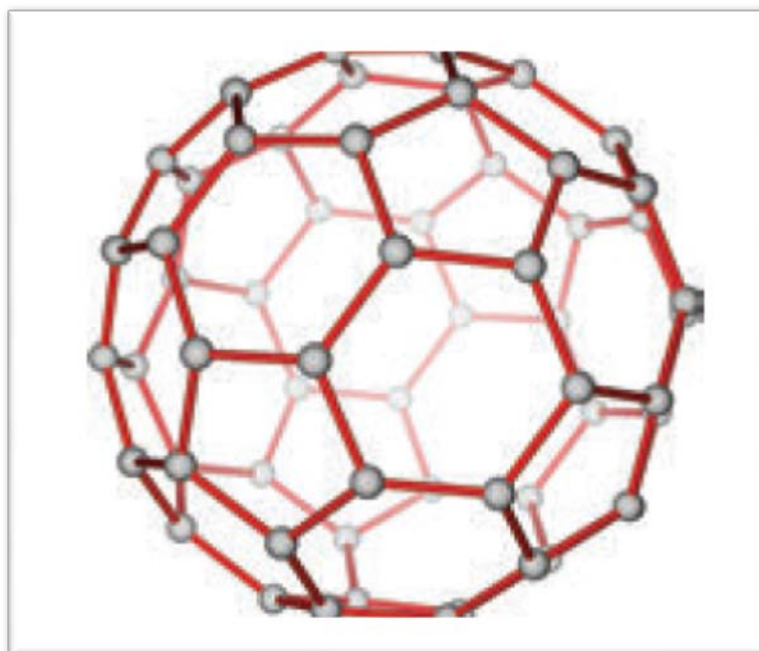
Graphite is the most stable allotropic form of carbon at normal temperature and pressure. It is soft and conducts electricity. It is composed of flat two dimensional sheets of carbon atoms.



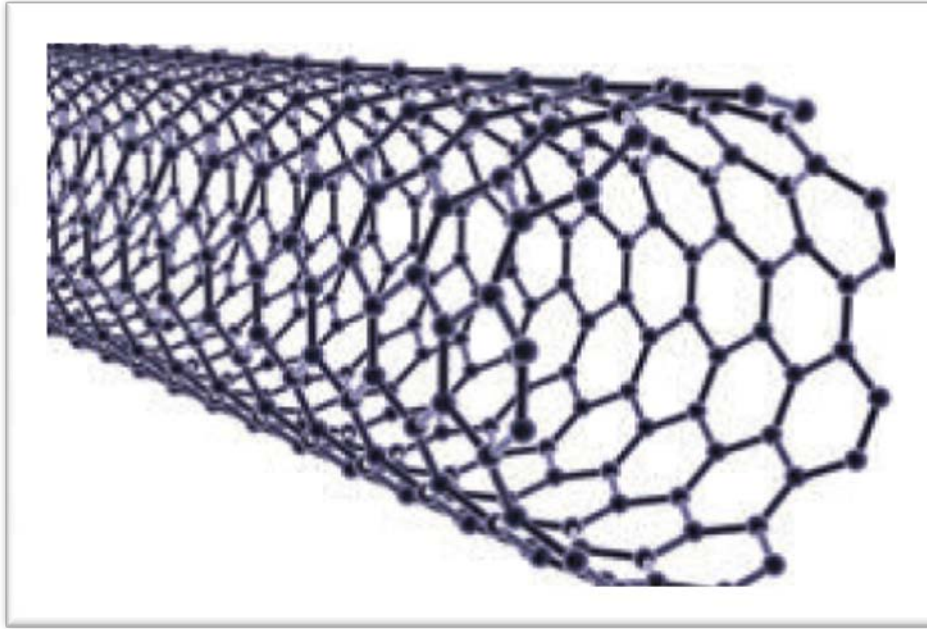
Unlike graphite the other allotrope **diamond** is very hard. The carbon atoms in diamond are sp^3 hybridised and bonded to four neighbouring carbon atoms by σ bonds with a C-C bond length of 1.54 Å.



Fullerenes are newly synthesised allotropes of carbon. Unlike graphite and diamond, these allotropes are discrete molecules such as C_{32} , C_{50} , C_{60} , C_{70} , C_{76} etc.. These molecules have cage like structures as shown in the figure.



Carbon nanotubes, another recently discovered allotropes, have graphite like tubes with fullerene ends. Along the axis, these nanotubes are stronger than steel and conduct electricity. These have many applications in nanoscale electronics, catalysis, polymers and medicine.



Another allotrophic form of **carbon** is **graphene**. It has a single planar sheet of sp^2 hybridised carbon atoms that are densely packed in a honeycomb crystal lattice.

