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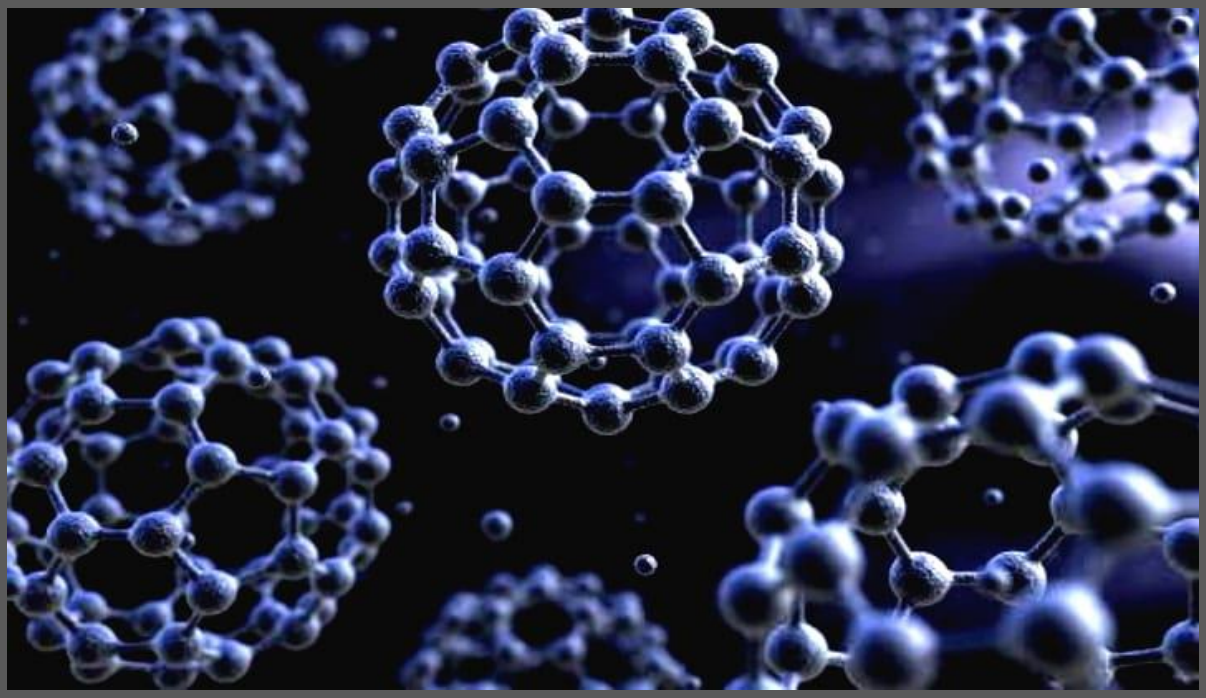
NANOTUBES MATERIALS

1 FULLERENES

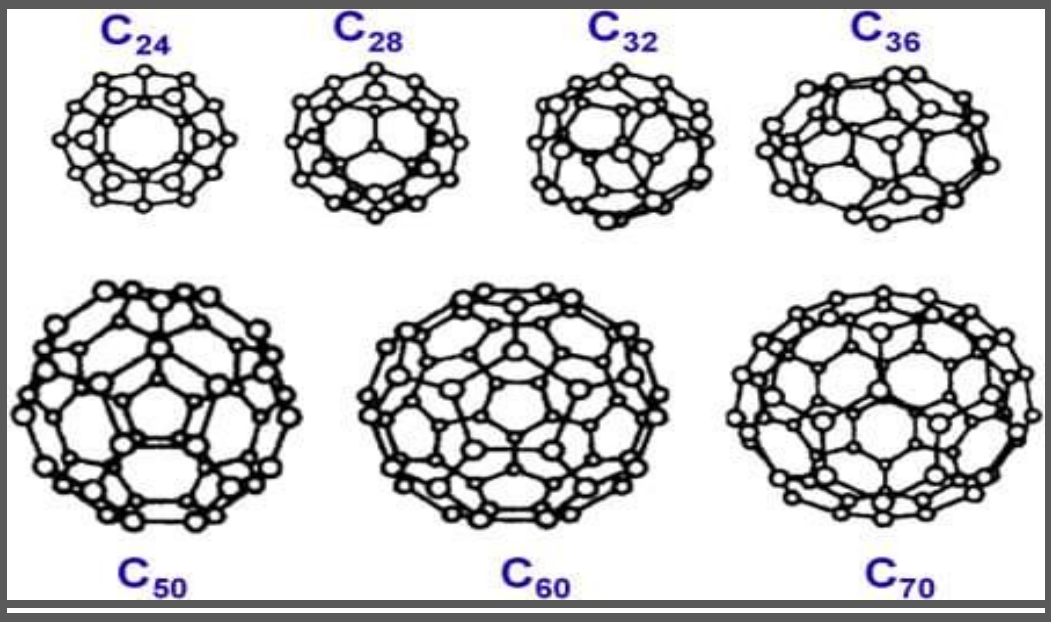
2 CNT's

FULLERENES

- Are pure substances made entirely of carbon atoms.
- They are of different shapes like tubes, cubes, spheres etc spherical fullerenes are called ***bucky balls.***
- The important member of fullerenes is fullerene C60, which is a cage-like carbon compound containing 60 carbon atoms, looks just like socker ball (football).



FULLERENE CARBON ATOMS



FULLERENES SYNTHESIS

- Fullerenes are produced by heating graphite in an electric arc in the presence of inhert gas such as helium and argon.
- The carbon vapours are condensed to get the fullerenes mainly C60, small amount of C70 and the traces of fullerenes with even number of carbon atoms upto 350.

PROPERTIES OF FULLERENES

I. High tensile strength
II. High electrical conductivity
III. High heat conductivity
IV. High ductility
V. The fullerene C60 can acts as semi-conductor, conductor and super conductor under specific conditions.
VI. They are impenetrable to all the elements under normal circumstances.

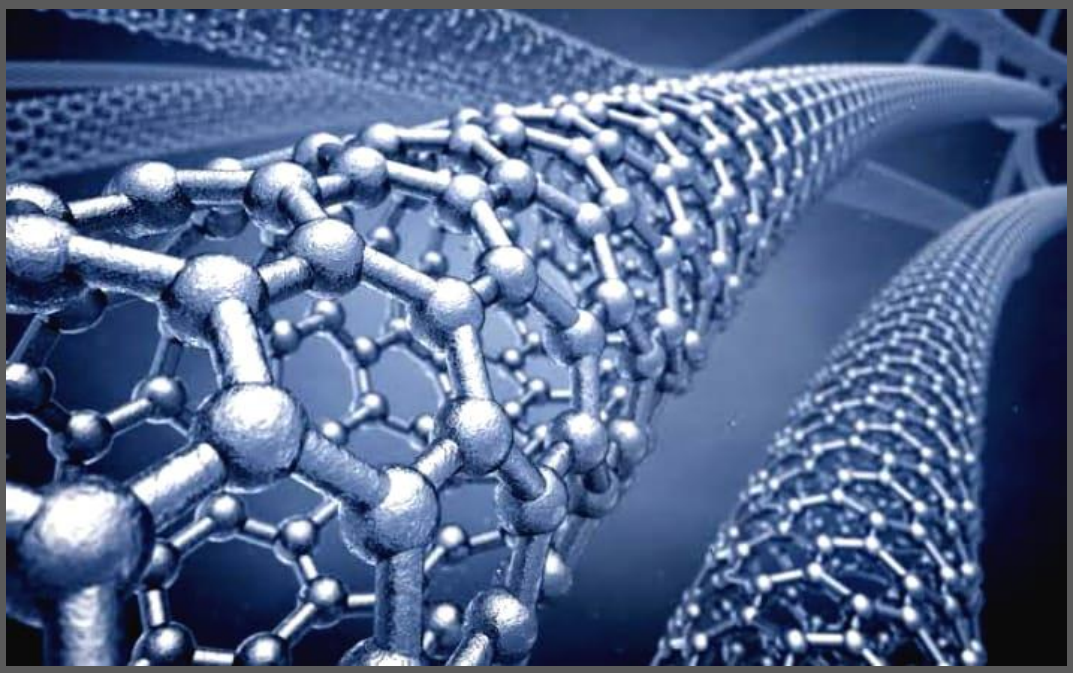
APPLICATIONS OF FULLERENES

- Used as lubricants, cosmetics, catalysts and adhesives.
- Used as electrodes in fuel cells.
- Used as drug delivers.
- Used in preparation of super conductors.
- Used as sensors such as gas and temperature sensors.

CNT's (CARBON NANOTUBES)

CNT is one atom thick sheet of carbon, rolled to make a tube.

- The diameter of the tube is in few nanometres, while the length of the tube is in micrometres.
- CNT's are classified as
  - ✓ Walled-carbon nanotubes
  - ✓ Multi-walled carbon nanotubes
- CNT's are also called as ***bucky tubes.***



PROPERTIES OF CARBON NANOTUBES

I. High thermal conductivity
II. High electrical conductivity
III. High tensile strength
IV. Very elastic
V. High flexible, they can bent considerably without damage.

APPLICATIONS OF CARBON NANOTUBES

- Used to make base balls, golf clubs, car parts and swords.
- CNT's are used to store hydrogen, to be used as source of fuel.
- CNT's are used to make CNT based transistors, solar cells and ultra-capacitors.
- Used as drug delivers.