



SNS COLLEGE OF ENGINEERING

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Unit - V New Engineering Materials

Topic:3 Physical Vapour Deposition

6.3.2 Physical Vapour Deposition (PVD)

Physical vapour deposition is the latest technique adopted for the preparation of carbon nanomaterials. The technique of laser heat treatment is used in the preparation of carbon nanomaterials. In general ruby laser, Nd YAG laser and Co₂ laser are used for this

purpose.

Construction

It consists of a quartz tube containing a graphite target kept in argon gas region as shown in fig. 6.12. The graphite target contains small amount of cobalt and nickel that act as catalyst to nucleate the formation of nanomaterials.

The tube is surrounded by an electric furnace in order to heat the target. An intense pulsed laser beam is incident on target, evaporating carbon from graphite. A water cooled copper collector is fitted at the other end of the tube.

Working

Initially the graphite is heated upto 1200°C with the help of the electric furnace. The laser source is switched on. Due to laser heating the graphite gets heated and evaporate carbon atoms.

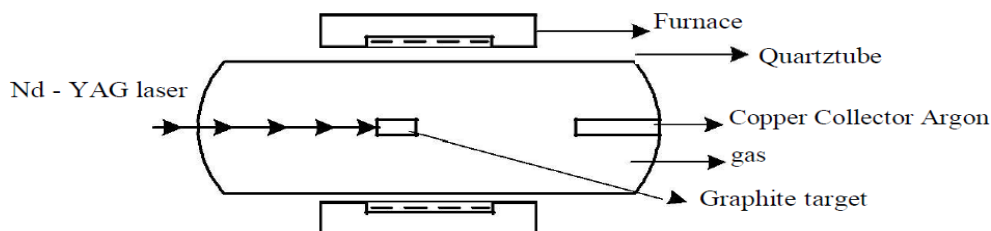


Fig. 6.12 Pulsed Laser Deposition

The argon gas present inside the quartz tube is used to sweep the carbon atoms towards the cold copper collector rod.

Thus due to the movement of carbon atoms from a higher temperature region to a lower temperature region it gets condensed and hence carbon nanomaterials are coated over the collector rod.