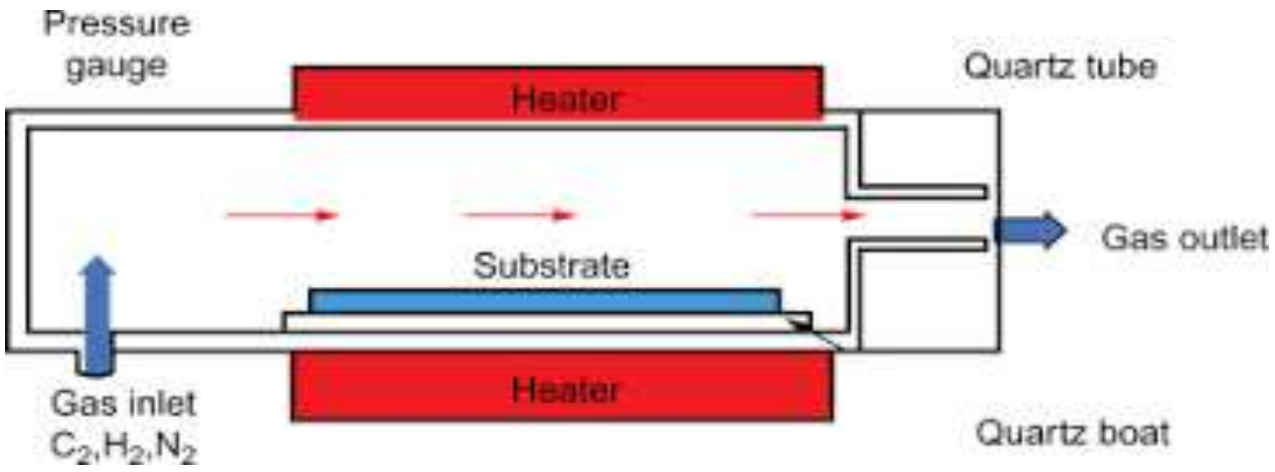
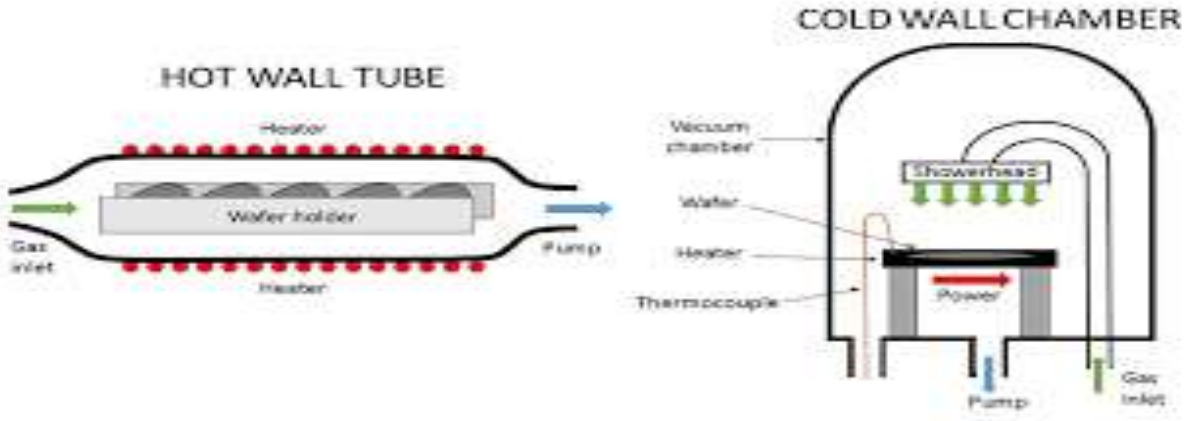
Chemical Vapour Deposition (CVD)

- The Solid materials are converted into gas phase and deposited as nanomaterials Consists of high temperature vacuum furnace .
- Formation of nanomaterials from the gas phase at elevated temperatures.
- Has a provision for maintaining the inert atmosphere
- The solid substrate contains catalyst such as Fe, Co and Ni supported on MgO or Al2O3
- Hydrocarbons such as methane ,ethylene, acetylene and nitrogen gas are connected to the furnace
- Carbon atoms are produced by decomposition of hydrocarbons at 1000°C ,Condenses and forms as nanotubes on the surface of solid surface



Types of CVD Reactor



1.Hot wall CVD:

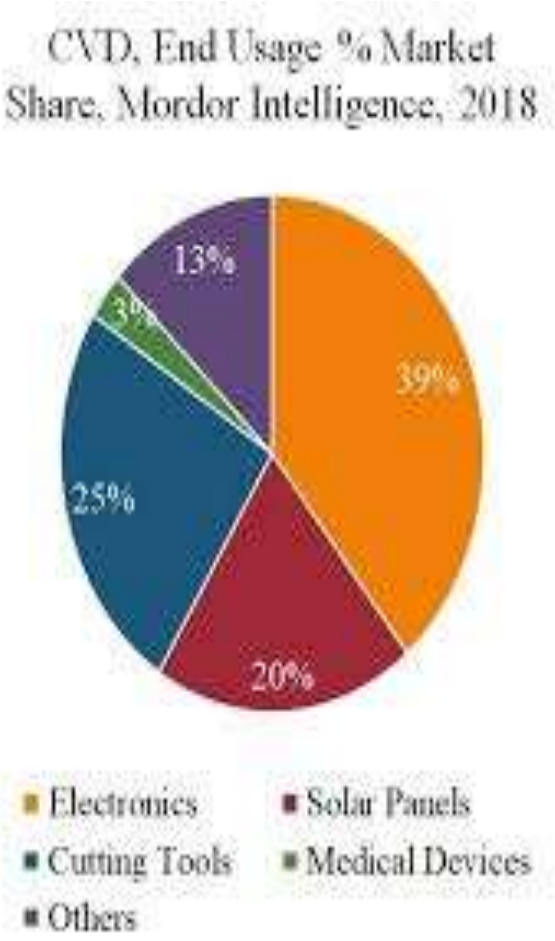
It Is usually in a tabular in form, heating is done by surroundings the reactor with Resistances elements.

2. COLD Wall CVD:

The substrate are directly heated inductively while chambers walls are air(or) water cooled.

Application of CVD

- Coatings – Coatings for a variety of applications such as wear resistance, corrosion resistance, high temperature protection, erosion protection and combinations thereof.
- Semiconductors and related devices – Integrated circuits, sensors and optoelectronic devices.
- Optical Fibres – For telecommunications.
- Powder production – Production of novel powders and fibres



Advantages:

1. It is Economical.
2. Nanomaterials produced by this method is defect free.
3. Since many parts can be coated at same time.
4. Purity & Density – nearly 100% of the theoretical values .

Disadvantages:

1. Chemical and safety hazards caused by the use of toxic, flammable and corrosive.
2. Restriction on the kind of substrate that can be coated.