SNS COLLEGE OF TECHNOLOGY

Vazhiamyampalayam,Coimbatore-35

(An Autonomous institution)

Accredited by **NBA-AICTE** and Re-Accredited by **NAAC-UGC with A+ Grade**

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DEPARTMENT OF CHEMISTRY

COURSE NAME : 19CHB101- CHEMISTRY FOR ENGINEERS

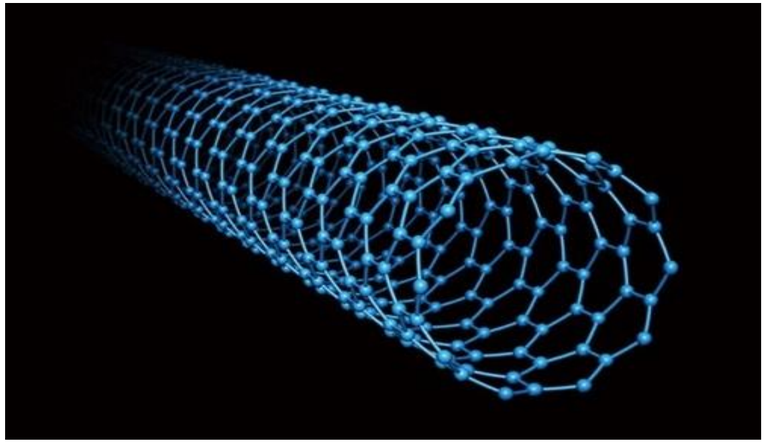
I YEAR / I SEMESTER

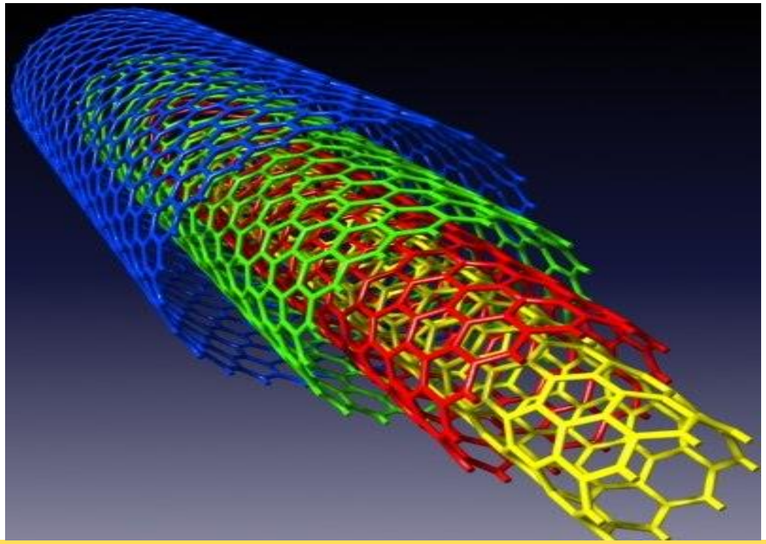
UNIT : 2. NANOCHEMISTRY

TOPIC : 3.CHEMICAL VAPOUR DEPOSITION

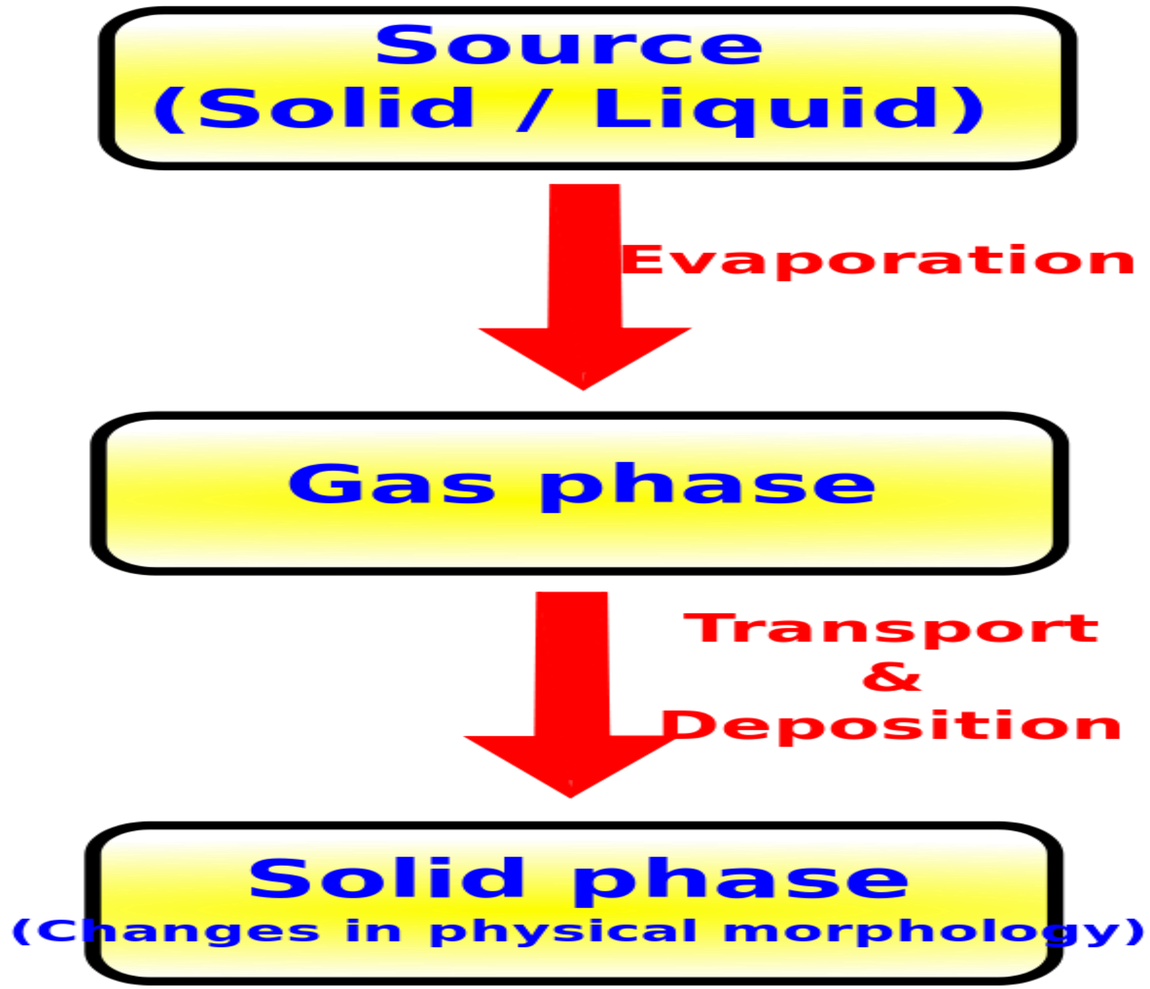
Why CVD?

- Bottom up method
- Low cost method
- Purity of nanomaterials are high
- Used for generating carbon nanotubes
- Single walled and multi walled nanotubes are produced by this method

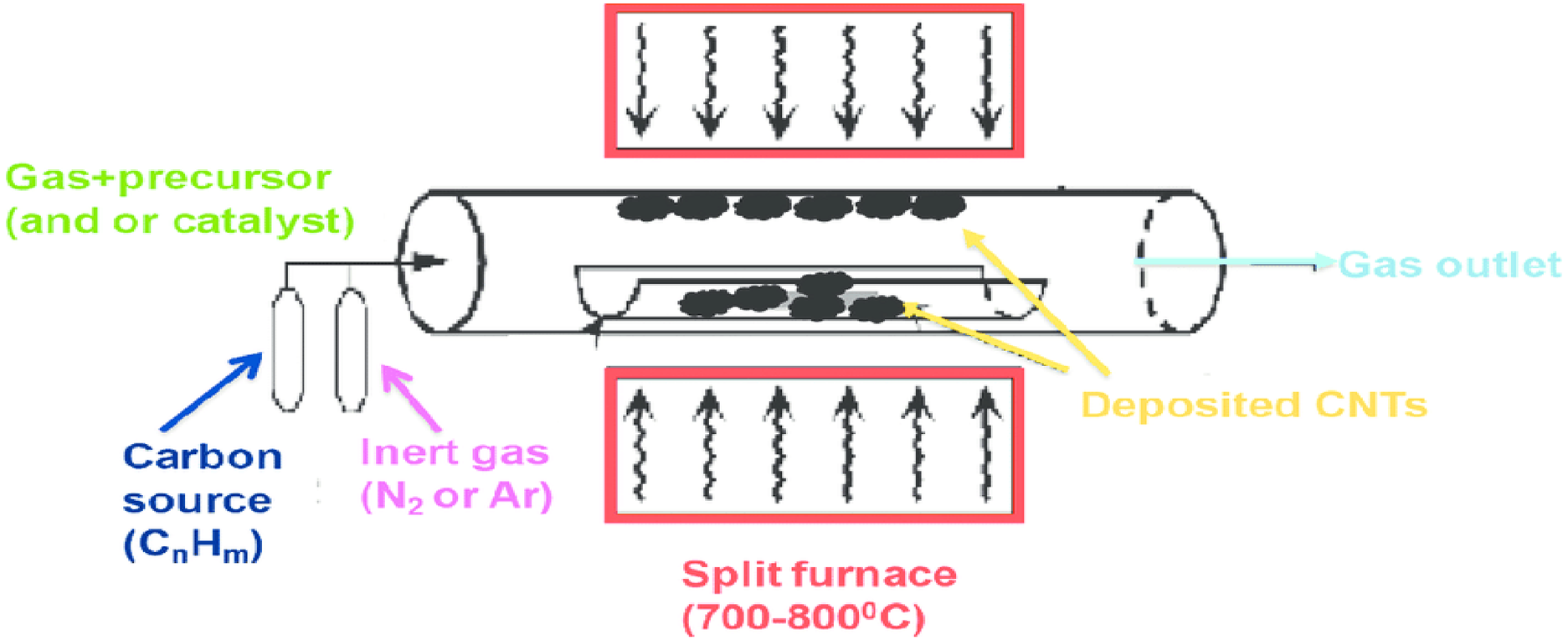




OUTLINE OF CVD PROCESS

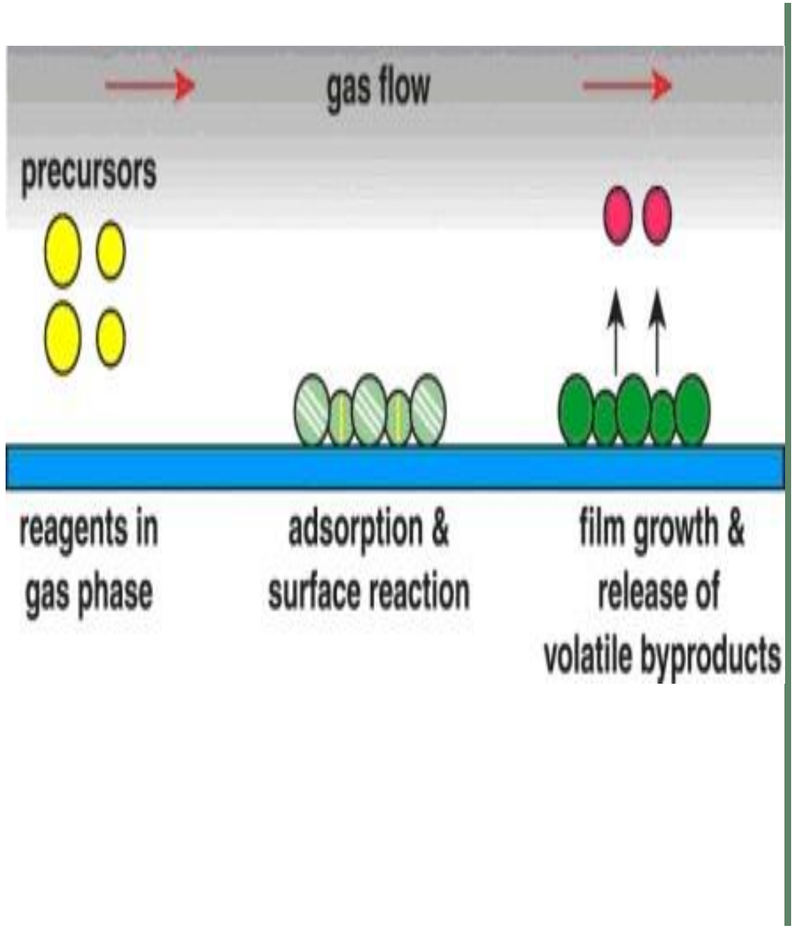


CHEMICAL VAPOUR DEPOSITION



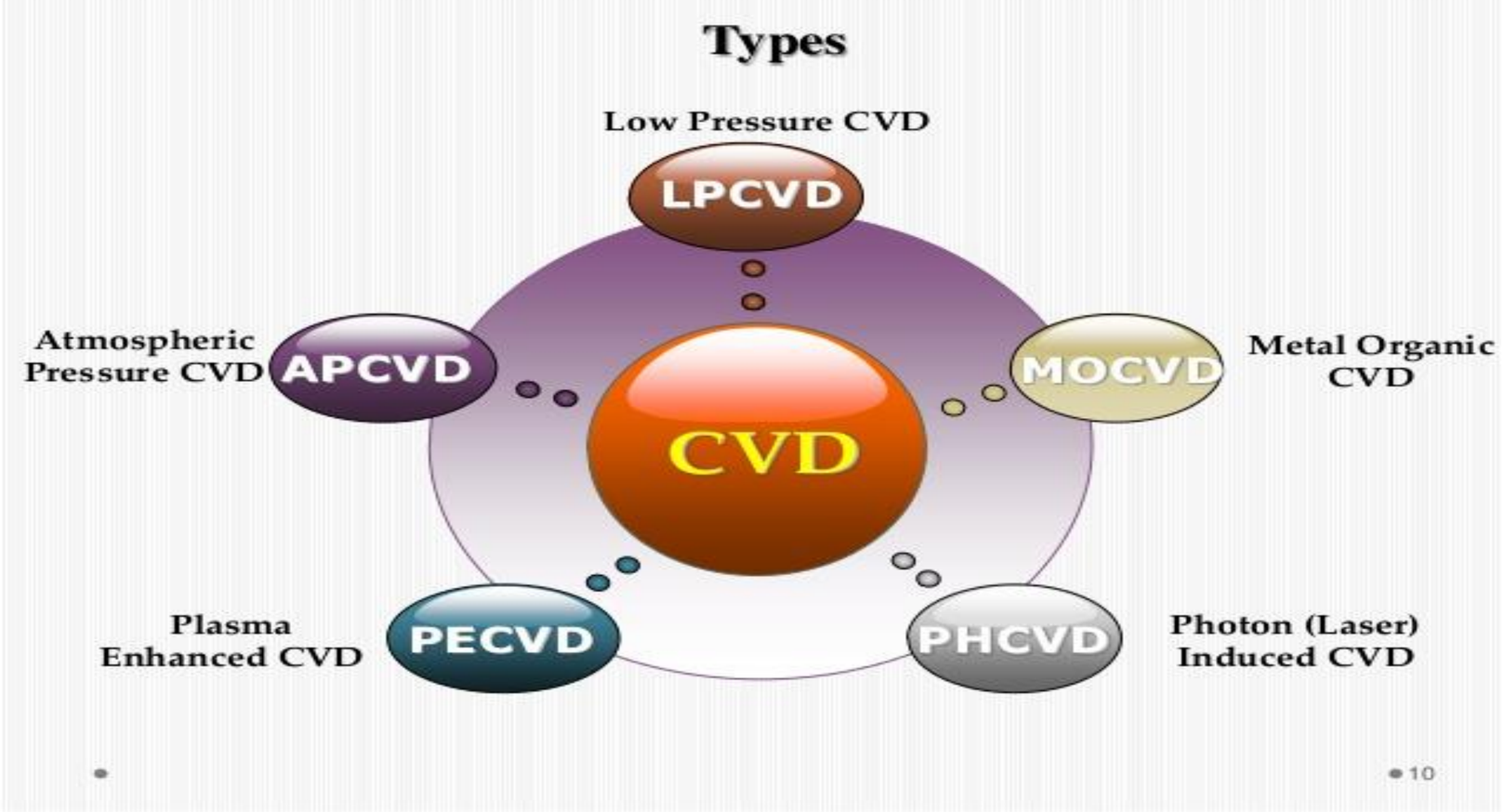
PROCESS

- Formation of nanomaterials from the gas phase at elevated temperatures
- Solid materials are converted into gas phase and deposited as nanomaterials
- Consists of high temperature vacuum furnace
- Has a provision for maintaining the inert atmosphere
- The solid substrate contains catalyst such as Fe, Co and Ni supported on MgO or Al_2O_3
- 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



ACTIVITY

TYPES OF CVD


Types
Low Pressure CVD
LPCVD
Atmospheric Pressure CVD
APCVD
CVD
MOCVD
Metal Organic CVD
Plasma Enhanced CVD
PECVD
PHCVD
Photon (Laser) Induced CVD
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MERITS AND DEMERITS OF CVD

- Merits
- High purity nanomaterials are produced
- Low cost
- Mainly used for carbon nanotubes preparation
- Demerits
- Requires high temperature
- Complex process
- Toxic gases can be released during the process
- Not ecofriendly in nature

APPLICATIONS OF CVD

ASSESSMENT

1.Which one of the following can be synthesized by CVD process?

a.CNT b..Ag-NPs c.Nanocomposites d.Zinc nano rods

2.Draw the outline of CVD process.

SUMMARY

REFERENCES

1. Dr.V.Veeraiyan, “Engineering Chemistry-II ”VRB Pub. Co. Ltd, Chennai.2016.
2. Wiley, “Engineering Chemistry”, John Wiley & Sons. InC, USA.
3. P.C.Jain & Monicka Jain, “Engineering Chemistry” , Dhanapat Rai Publising Company Pvt. Ltd. 2017.

THANK YOU