



What is Chemical Vapor Deposition

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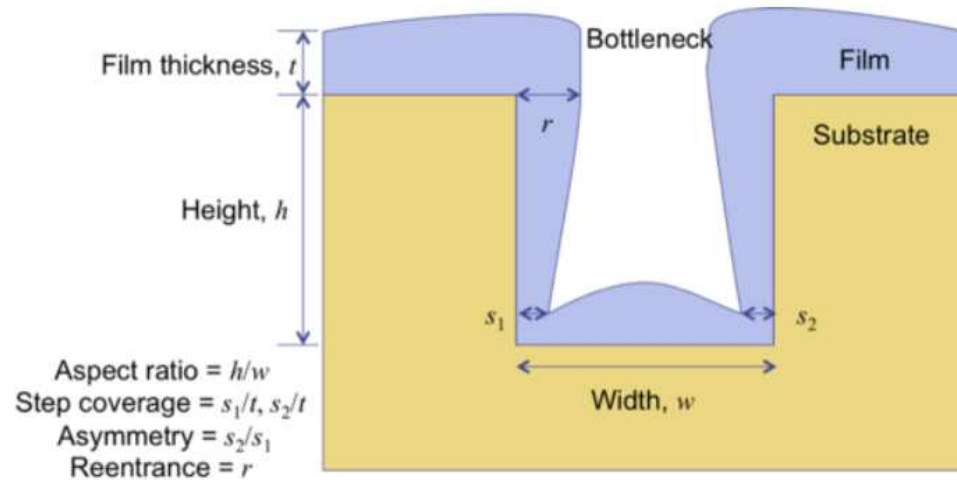
01

What is CVD

What is CVD (Chemical Vapor Deposition) ?

*It forms Thin film on the surface of substrate
By thermal decomposition or reaction of gaseous compounds*

For great Deposition, What we need?



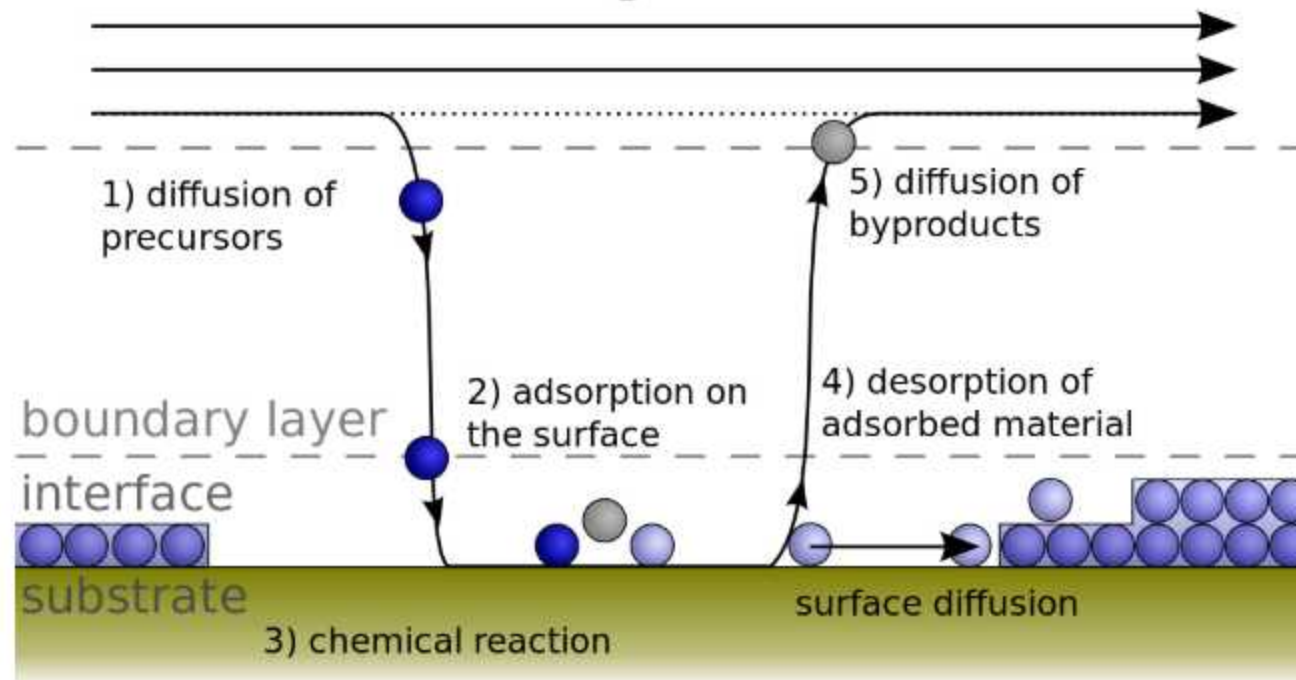
a. Quality

b. Thickness Uniformity

c. Step Coverage

01

What is CVD

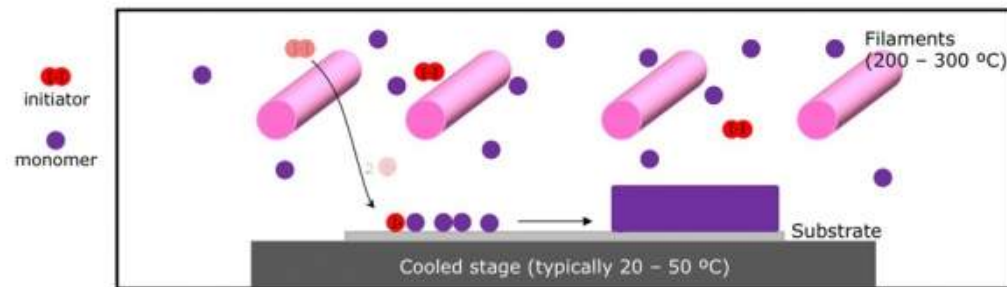
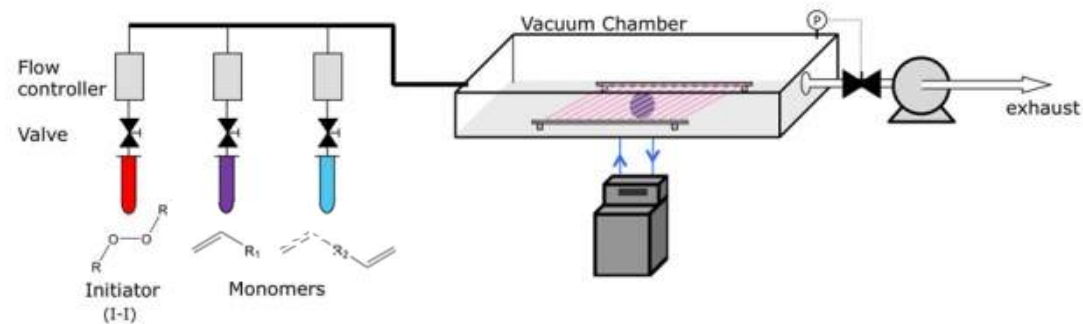


The CVD process, google image

CVD Process

Process of CVD

: Initiator material → Vaporizing → Link up in chains to form polymers



The CVD process, MIT News

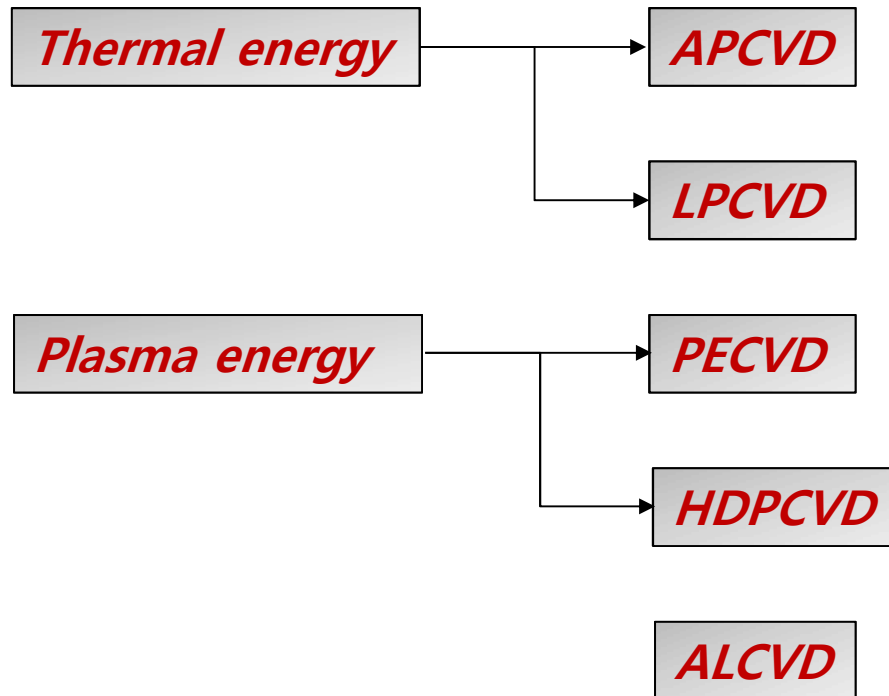
Advantage

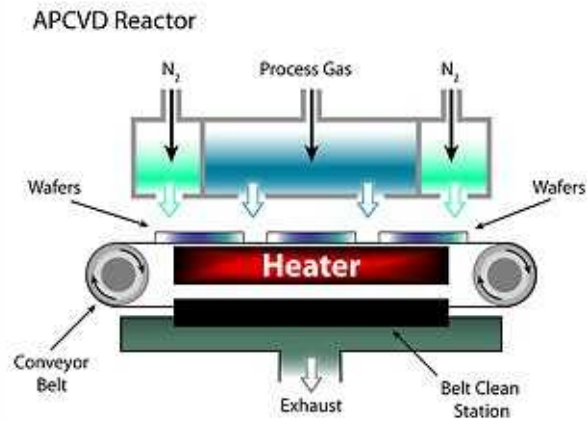
- Wide variety of material
- High purity
- Good quality
- Cheap

Disadvantage

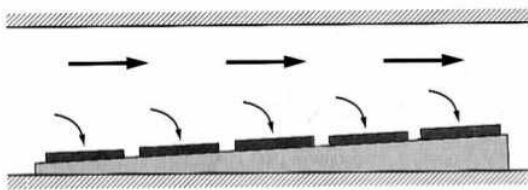
- In High temperature
- Byproduct can be hazardous
- Lead to stresses in films deposited on materials with different thermal expansion coefficients

Classification of CVD





The APCVD Reactor, Google Image



Array of Wafer in chamber, Google Image

APCVD

: Atmospheric Pressure CVD

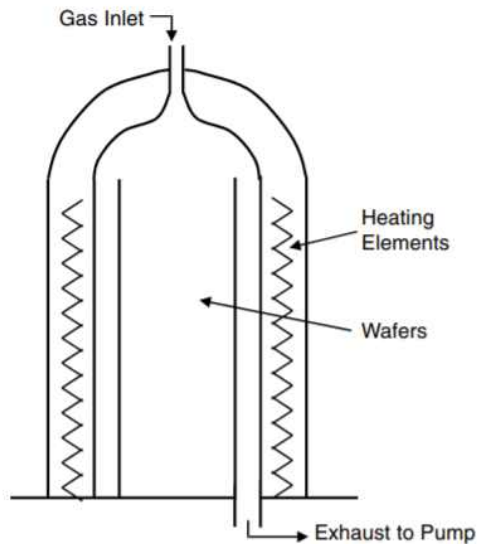
>> By heating the RF induction Coil,
It can transfer heat to the Wafer !

>> Not used recently

Why we used this Slope?

>> To regulate the film thickness felt by air flow

>> Bigger Wafer Size → Unused recently



The LPCVD Furnace for Batch process, Google Image

LPCVD

: Low Pressure CVD

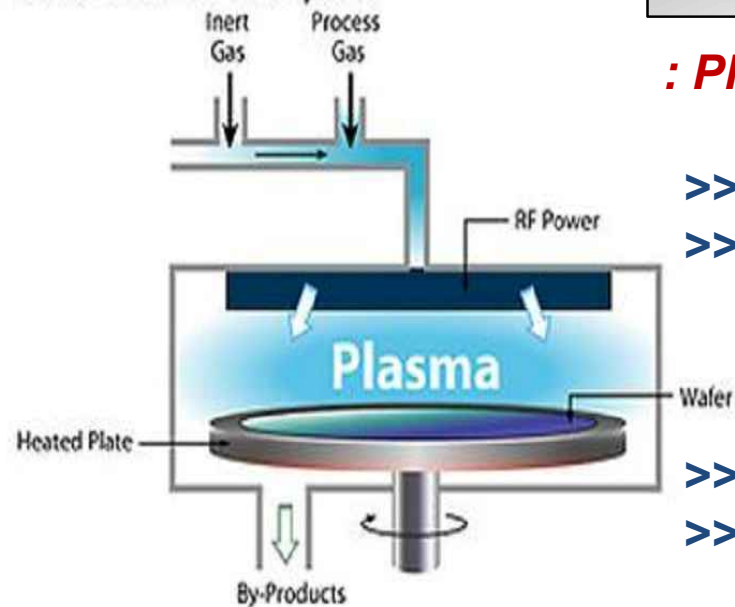
*Low Pressure → Reduce collisions → Well Diffusion
Well Diffusion leads Well Deposition*

- Good Step coverage
- Suitable for mass production
- But Long Deposition time

LPCVD can be classified into 3 categories !

- Horizontal type
- Vertical type
- Single Wafer type

Plasma Enhanced CVD System

**PECVD****: Plasma Enhanced CVD**

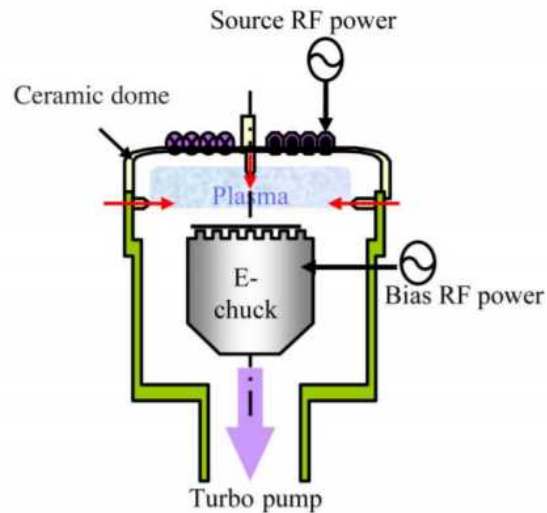
- >> Can be used at the **Low Temperature**
- >> One of the **Most widely used** method

Because of High Throughput !

- >> **But, Low Quality film**
- >> **Poor Step Coverage**

The PECVD Reactor, Google Image

Classification of CVD



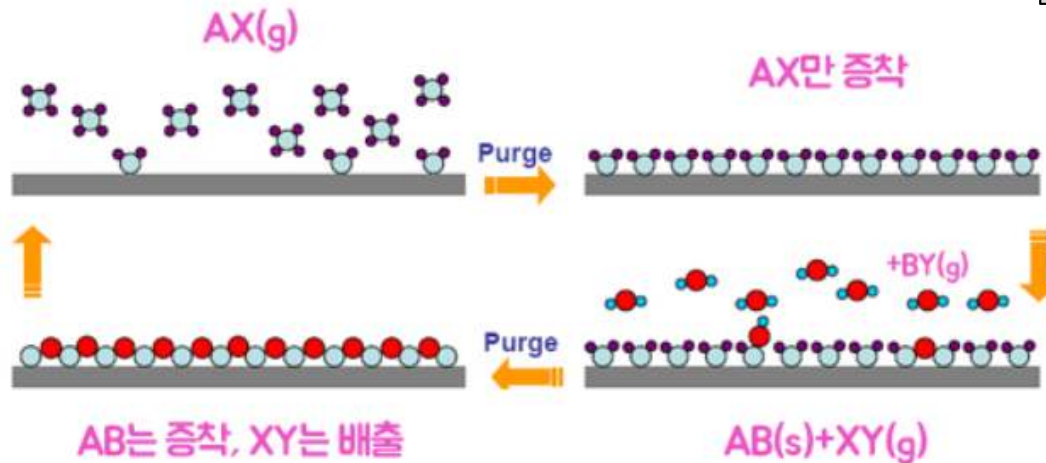
The HDPCVD Reactor, Google Image

HDPCVD

: High Density Plasma CVD

- Can be achieved in *Low temperature*
- Superior *trench-fill capability* to provide more *planarized films*

- >> **Lower temperature, Higher Quality**
- >> **Better Step Coverage**
- >> **Deposition + Sputtering(Etching)**



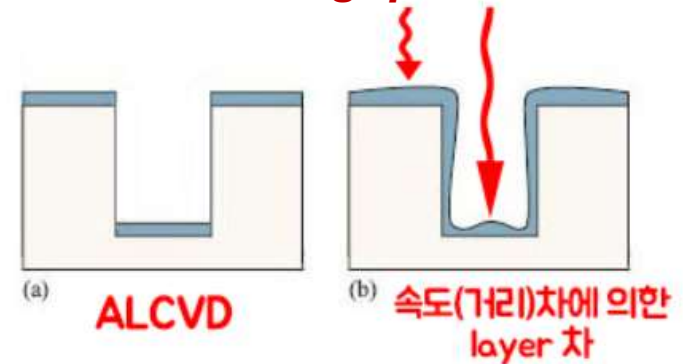
The ALCVD Process, Google Image

ALCVD

: Atomic Layer CVD

- >> Good Step Coverage
- >> Good Quality
- >> For interconnect

But, Low Throughput !



| Thank You for listening !