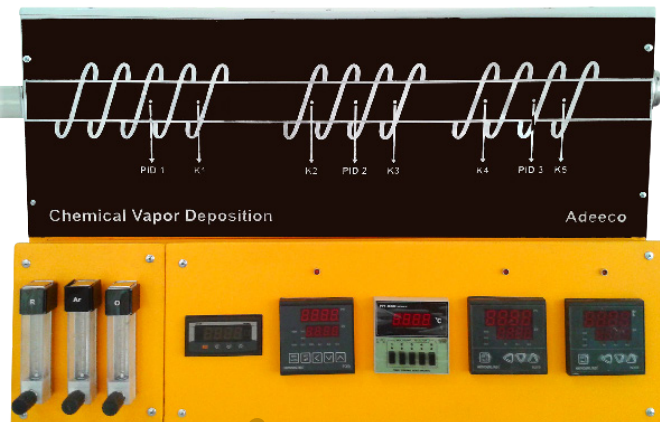


Thermo-Chemical Vapor Deposition (TCVD)

Nowadays, Chemical Vapor Deposition, CVD, is considered as one of the fundamental method of manufacturing in various industries especially electronics. In a typical form of CVD process, the coating material is vaporized by heating, then it is introduced into a vacuum chamber containing the sample to be coated. Finally, the gaseous reactants is deposited on the substrate via condensation, forming a uniform coating. Frequently, volatile by-products are also produced, which are removed by gas flow through the reaction chamber.

Microfabrication processes widely use TCVD to deposit materials in various forms, including: monocrystalline, polycrystalline, amorphous, and epitaxial.

TCVD system is a cost efficient and high performance chemical vapor deposition system. It consists of a precision bench-top furnace using high-quality heating elements.



Application

Material Science

- Polymerization
- Carbon nanotubes
- Ceramic
- Supper thin coating

Electronics/photronics

- Integrated Circuits (IC)
- Optoelectronic devices
- Fiber optics and DWDM components
- Semiconductor devices

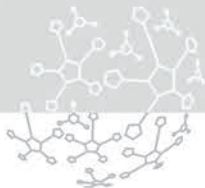
Biotechnology

Advantages:

- Versatility- Any kinds of elements and compounds can be deposited on the substrate
- High Purity – typically 99.99-99.999%
- High Density – nearly 100% of theoretical one
- Material Formation well below the melting point
- Coatings Deposited by CVD are conformal and near net shape
- Economical production, since many parts can be coated simultaneously

General Specification

Temperature control	PID with 10 thermal program
Pressure control	Digital /Pirani /Penning gauge
Control of gases	Mass flow controller
Reactor	Quartz
Structure	1 mm thickness metallic sheet
Insulation	Alumina insulated material
Vacuum	Rotary pump with 10^{-2} mbar pressure
Voltage	220 V



TCVD system has three models including single zone, double zone and triple zone, each of which has two types of heating source: element and lamps. The specification of each model is given in following tables:

Models	Single zone (ATCVD-1Z)		Double zone (ATCVD-2Z)		Triple zone (ATCVD-3Z)
	Element type	Lumpy	Element type	Lumpy	Element type
Characteristics	1 zone program control: One deposition zone-Powder and sample at the same temperature		2 zone program control: Two deposition zones-Able to set the Powder and sample temperature at different levels		3 zone program control: Two deposition zones-Able to set the Powder and sample temperature at different levels
					5 channel reader-Able to read the temperature online
Power (kW)	2.5		3		3.5
Dimension (H×L×W)	85×50×60 cm		85×60×60 cm		85×70×60 cm

Specification of Element type series

Heating system	Elements made of Fe-Cr-Al alloy doped by Mo
Temperature	Up to 1100 °C
Heating rate	Up to 25 °C/min

Specification of Lumpy series

Heating system	4500 Watt thermal lamp
Temperature	Up to 750 °C
Heating rate	Up to 200 °C/min