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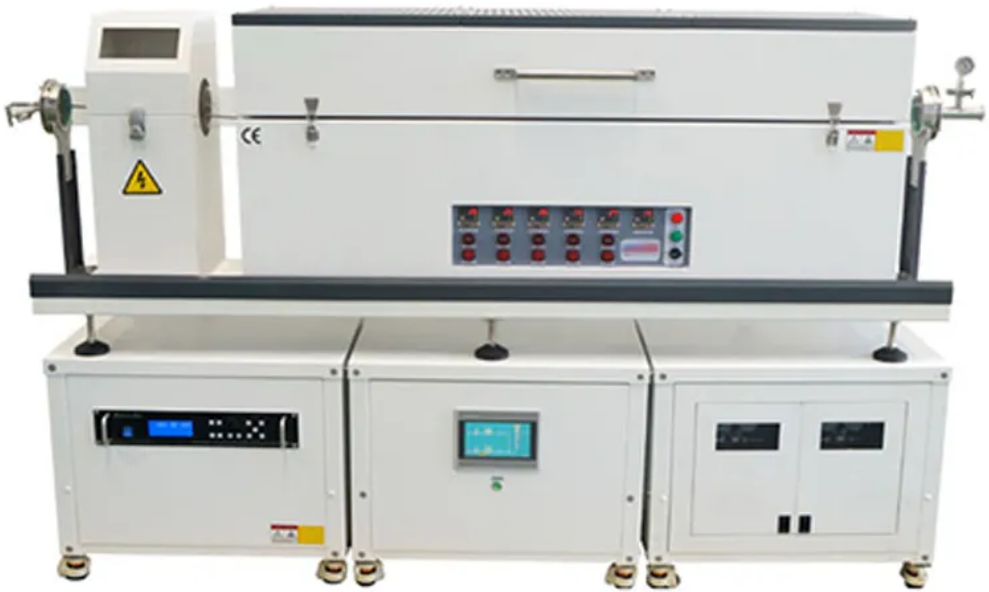

PECVD TUBE FURNACE – TT-CVDTF-60-1200

PECVD system (Plasma Enhanced Chemical Vapor Deposition System) consists of four main components: a tube furnace, vacuum system, gas flow controller, and radio frequency (RF) power supply. This setup uses a 13.56 MHz RF output to ionize gases that contain the desired film-forming atoms, generating plasma. The highly reactive plasma environment enhances the chemical reactions, allowing gas-phase materials to form thin films on a substrate. This process enables advanced thin-film fabrication techniques, suitable for depositing SiO_2 and SiNx films at temperatures up to 1200°C.

APPLICATIONS

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- **Semiconductor Device Fabrication** – Enables low-temperature deposition of SiO_2, SiNx, and dielectric thin films essential for integrated circuits, transistors, and optoelectronic devices. Ensures uniformity, adhesion, and defect-free layers critical to high-performance microelectronics.

- **Nanomaterials Research** – Supports plasma-enhanced growth of graphene, carbon nanotubes, and nanostructured coatings. Delivers precise control over film thickness, composition, and morphology for next-generation nanotechnology applications.

- **Thin Film Optics & Photonics** – Facilitates PECVD deposition of optical coatings, anti-reflective layers, and passivation films. Ensures controlled refractive index and optical transparency for advanced sensors, lenses, and photonic devices.

- **Energy & Battery Materials** – Provides deposition of protective coatings and functional films for lithium-ion and solid-state batteries. Ensures enhanced stability, ion conductivity, and extended cycle life of advanced energy storage systems.

- **Solar Cell Research** – Widely used for PECVD deposition of passivation and anti-reflective coatings on photovoltaic substrates. Improves light absorption, carrier lifetime, and overall efficiency in crystalline silicon and thin-film solar cells.

- **MEMS & Microfabrication** – Supports plasma-enhanced film deposition for microelectromechanical systems (MEMS), biosensors, and microfluidic devices. Offers fine control over film properties critical to miniaturized device performance.

- **Aerospace & Defense Applications** – Provides advanced protective and functional thin films on high-performance alloys and ceramics. Enhances durability, corrosion resistance, and thermal stability under extreme aerospace and defense conditions.

- **Universities & Research Institutes** – Ideal for advanced academic studies in plasma processing, materials science, nanotechnology, and applied physics. Combines precision, safety, and flexibility for laboratory-scale innovation and teaching.

- **Industrial Quality Control & Certification** – Delivers reproducible, high-precision PECVD processes for product validation and compliance testing. Conforms to ISO, CE, SGS, and TÜV standards to meet regulated industry requirements.

FEATURES

- The CVD tube furnace system includes a tube furnace, vacuum system, gas flow controller, and RF power supply.
- The tube furnace supports various tube diameters and constant temperature zone lengths. Both ends are fitted with high-vacuum stainless steel sealing flanges.
- The vacuum system supports multiple pump configurations based on testing needs. Rotary vane mechanical pumps achieve a vacuum level of ≤5 Pa, while molecular pump systems reach up to 1×10^{-4} Pa.
- The gas delivery system is available with a 3-channel manual float flow controller or a 3-channel automatic mass flow controller.
- Vacuum levels are measured using either a digital composite vacuum gauge or a Pirani vacuum gauge.
- A 13.56 MHz RF power supply is used for plasma discharge, with selectable power outputs of 200 W, 300 W, or 500 W.
- The tube furnace offers options such as a single 440 mm temperature zone, or multi-zone configurations for temperature gradient testing.
- An optional RS485 digital communication port and USB adapter on the temperature controller allow for PC connectivity—enabling remote monitoring and control, as well as data saving and export.
- The product is CE certified and meets EU safety standards.

Vacuum Atmosphere Function

- The system includes 304 stainless steel sealing flanges to create either vacuum or controlled atmospheric conditions inside the tube.
- A high-quality quartz working tube is standard. Metal or alumina tubes are also available to suit different application needs.
- A high-performance dual-stage rotary vane pump achieves a vacuum level of 5 Pa, with vacuum status displayed via a digital gauge.
- The air circuit control unit offers 1–3 channel options for automated control using a mass flow controller (MFC) system.

TECHNICAL SPECIFICATIONS

Item	TT-CVDTF-40-1200	TT-CVDTF-60-1200	TT-CVDTF-80-1200	TT-CVDTF-100-1200
Tube Size	Φ40 x 1200mm	Φ60 x 1200mm	Φ80 x1200mm	Φ100 x 1200mm
Max Temperature	1200℃			
Work Temperature	1100℃			
Heating Zone	440mm			
Voltage/Power	220V/1.8KW (110V is also available)	220V/2.6KW (110V is also available)	220V/2.6KW (110V is also available)	220V/2.6KW (110V is also available)
Heating Element	HRE iron chromium aluminum alloy resistance wire			
Chamber Material	Polycrystalline inorganic alumina ceramic fiber material prepared by wet vacuum filtration			
Tube Material	Quartz Tube			
Temperature Accuracy	±1℃			
Heating Element	N type thermocouple			
Temperature Controller	Intelligent microcomputer PID temperature control instrument, SCR/SSR control, PID parameter self-tuning function; programmable 30 program segments, program heating, program heat preservation, program cooling			
Heating Rate	1-25℃/min freely set			
Furnace Structure	Furnace temperature control integrated structure, furnace opening and closing; double-layer shell, air circulation and heat insulation			
Sealing Function	Both ends of the furnace tube are equipped with stainless steel metal flanges, matched with high-temperature PTFE gaskets, which can work under vacuum with a vacuum degree of ≤5pa (rotary vane vacuum pump)			
RF power	Frequency: 13.56 MHz±0.005%, power: 5W-500W, power stability: ±0.5%			
Gas Controller	Optional 3-way float manual flowmeter, range 60-600ml/min; 3-way automatic mass flowmeter, range 1-500sccm			

Atmopshere Function	There are air inlets and outlets at both ends of the flange. The pressure gauge is installed on the metal flange. The precision needle valve can adjust the air intake and output, and can be fed with protective gases such as nitrogen, argon, and hydrogen.
Gas Interface	KF25 vacuum baffle valve and KF25 stainless steel bellows connect vacuum pump; protective atmosphere 6mm stainless steel ferrule joint and PTFE pipeline
Equipment Protection	Modular control, sound and light alarm signal will be sent out for over temperature and broken coupler in the working process, and the protection action will be completed automatically
Safety Protection	The equipment is equipped with a circuit breaker, which will automatically pop open in case of short circuit leakage, which can protect the safety of equipment and operators
Furnace Shell	High-quality cold-rolled steel plate CNC machine tool blanking processing, after welding, grinding, polishing, phosphating, pickling, surface electrostatic spraying plastic powder
Quality Certificate	ISO9001 CE SGS TUV

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