Rf Pecvd System Radio Frequency Plasma-Enhanced Chemical Vapor Deposition Rf Pecvd

Item Number: KT-RFPE

Introduction

RF-PECVD is an acronym for "Radio Frequency Plasma-Enhanced Chemical Vapor Deposition." It deposits DLC (Diamond-like carbon film) on germanium and silicon substrates. It is utilized in the 3-12um infrared wavelength range.

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Equipment form	• Box type: the horizontal top cover opens the door, and the deposition chamber and the exhaust chamber are integrally welded; • The whole machine: the main engine and the electric control cabinet are integrated design (the vacuum chamber is on the left, and the electric control cabinet is on the right).
Vacuum chamber	• Dimensions: Φ420mm (diameter) × 400 mm (height); made of 0Cr18Ni9 high-quality SUS304 stainless steel, the inner surface is polished, fine workmanship is required without rough solder joints, and there are cooling water pipes on the chamber wall; • Air extraction port: Double-layer 304 stainless steel mesh with 20mm front and rear intervals, anti-fouling baffle on the high valve stem, and air equalization plate at the exhaust pipe mouth to prevent pollution; • Sealing and shielding method: the upper chamber door and the lower chamber are sealed by a sealing ring to seal the vacuum, and the stainless steel network tube is used outside to isolate the radio frequency source, shielding the harm caused by radio frequency signals to people; • Observation window: Two 120mm observation windows are installed on the front and side, and the anti-fouling glass is resistant to high temperature and radiation, which is convenient for observing the substrate; • Air flow mode: the left side of the chamber is pumped by the molecular pump, and the right side is the air inflated to form a convective working mode of charging and pumping to ensure that the gas flows evenly to the target surface and enters the plasma area to fully ionize and deposit the carbon film; • Chamber material: the vacuum chamber body and the exhaust port are made of 0Cr18Ni9 high-quality SUS304 stainless steel material, the top cover is made of high-purity aluminum to reduce the weight of the top.
Host skeleton	• Made of section steel (material: Q235-A) , the chamber body and the electric control cabinet are integrated design.
Water cooling system	• Pipeline: The main inlet and outlet water distribution pipes are made of stainless steel pipes; • Ball valve: All cooling components are supplied with water separately through 304 ball valves, and the water inlet and outlet pipes have color distinctions and corresponding signs, and the 304 ball valves for the water outlet pipes can be opened and closed separately; The target, RF power supply, chamber wall, etc. are equipped with water flow protection, and there is a water cut-off alarm to prevent the water pipe from being blocked. All water flow alarms are displayed on the industrial computer; • Water flow display: The lower target has water flow and temperature monitoring, and the temperature and water flow are displayed on the industrial computer ; • Cold and hot water temperature: when the film is deposited on the chamber wall, cold water is passed through 10-25 degrees to cool the water, and it is advanced when the chamber door is opened. Pass hot water 30-55 degrees warm water.
Control cabinet	• Structure: vertical cabinets are adopted, the instrument installation cabinet is a 19-inch international standard control cabinet, and the other electrical component installation cabinet is a large panel structure with a rear door; • Panel: The main electrical components in the control cabinet are all selected from manufacturers that have passed CE certification or ISO9001 certification. Install a set of power sockets on the panel; • Connection method: the control cabinet and the host are in a conjoined structure, the left side is the room body, the right side is the control cabinet, and the lower part is equipped with a dedicated wire slot, high and low voltage, and the RF signal is separated and routed to reduce interference; • Low-voltage electrical: French Schneider air switch and contactor to ensure reliable power supply of equipment; • Sockets: Spare sockets and instrumentation sockets are installed in the control cabinet.

Ultimate vacuum	• Atmosphere to 2×10-4 Pa≤24 hours, (at room temperature, and the vacuum chamber is clean).
Restore vacuum time	• Atmosphere to 3×10 -3 Pa≤15 min (at room temperature, and the vacuum chamber is clean, with baffles, umbrella stands, and no substrate).
Pressure rise rate	• ≤1.0×10 -1 Pa/h
Vacuum system configuration	• The composition of the pump set: backing pump BSV30 (Ningbo Boss) + Roots pump BSJ70 (Ningbo Boss) + molecular pump FF-160 (Beijing); • Pumping method: pumping with soft pumping device (to reduce the pollution to the substrate during pumping); • Pipe connection: the vacuum system pipe is made of 304 stainless steel, and the soft connection of the pipe is made of; • Metal bellows; each vacuum valve is a pneumatic valve; • Air suction port: In order to prevent the membrane material from polluting the molecular pump during the evaporation process and improve the pumping efficiency, a movable isolation plate that is easy to disassemble and clean is used between the air suction port of the chamber body and the working room.
Vacuum system measurement	• Vacuum display: three lows and one high (3 groups of ZJ52 regulation + 1 group of ZJ27 regulation); • High-vacuum gauge: ZJ27 ionization gauge is installed on the top of the pumping chamber of the vacuum box near the working chamber, and the measuring range is 1.0×10 -1 Pa to 5.0×10 -5 Pa; • Low-vacuum gauges: one set of ZJ52 gauges is installed on the top of the pumping chamber of the vacuum box, and the other set is installed on the rough pumping pipe. The measuring range is 1.0×10 +5 Pa to 5.0×10 -1 Pa; • Working regulation: CDG025D-1 capacitive film gauge is installed on the chamber body, and the measuring range is 1.33×10 -1 Pa to 1.33×10 +2 Pa, vacuum detection during deposition and coating, used in conjunction with constant vacuum butterfly valve use.
Vacuum system operation	There are two modes of vacuum manual and vacuum automatic selection; • Japan Omron PLC controls all the pumps, the action of the vacuum valve, and the interlocking relationship between the work of the inflation stop valve to ensure that the equipment can be automatically protected in case of misoperation; • High valve, low valve, pre-valve, high valve bypass valve, in-position signal is sent to PLC control signal to ensure more comprehensive interlock function; • The PLC program can carry out the alarm function of each fault point of the whole machine, such as air pressure, water flow, door signal, over-current protection signal, etc. and alarm, so that the problem can be found quickly and conveniently; • The 15-inch touch screen is the upper computer, and the PLC is the lower computer monitoring and control valve. Online monitoring of each component and various signals are sent back to the industrial control configuration software in time for analysis and judgment, and recorded ; • When the vacuum is abnormal or the power is cut off, the molecular pump of the vacuum valve should return to the closed state. The vacuum valve is equipped with an interlock protection function, and the air inlet of each cylinder is equipped with a cut-off valve adjustment device, and there is a position set the sensor to display the closed state of the cylinder;
Vacuum test	• According to the general technical conditions of GB11164 vacuum coating machine.