Drawing Die Nano-Diamond Coating Hfcvd Equipment

Item Number: MP-CVD-100

Introduction

The nano-diamond composite coating drawing die uses cemented carbide (WC-Co) as the substrate, and uses the chemical vapor phase method (CVD method for short) to coat the conventional diamond and nano-diamond composite coating on the surface of the inner hole of the mold.

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Comparation table between traditional and nano diamond coated drawing die

HFCVD technical composition		
Technical Parameters	Equipment composition	System Configuration
Bell Jar: Dia. 500mm, Height 550mm, SUS304 stainless steel chamber; inner stainless steel skin insulation, lifting height is 350mm;	A set of vacuum chamber (bell jar) main body (jacketed water-cooling structure)	Vacuum chamber (bell jar) main body;The cavity is made of high-quality 304 stainless steel; Vertical bell jar: the jacketed water-cooling jacket is installed on the overall periphery of the bell jar. The inner wall of the bell jar is insulated with stainless steel skin, and the bell jar is fixed on the side . Accurate and stable positioning ; Observation window: horizontally arranged in the middle of the vacuum chamber 200mm Observation window, water cooling, baffle, side and upper configuration 45 Degree bevel angle, 50° observation window (observe the same point as the horizontal observation window, and the sample supporting platform); the two observation windows maintain the existing position and size.Bell jar bottom is 20mm higher than the plane of the bench , set cooling; the holes reserved on the plane, such as large valves, air release valves, air pressure measurement, bypass valves, etc., are sealed with metal mesh and reserved for installing electrodes Interface;
Equipment table: L1550* W900*H1100mm	One set of drag sample table device (adopting double-axis drive)	Sample holder device: Stainless steel sample holder (welding water cooling) 6- position device; it can be adjusted separately, only up and down adjustment, the up and down adjustment range is 25mm, and the left and right shaking is required to be less than 3% when going up and down (that is, the left and right shaking of rising or falling by 1mm is less than 0.03mm) , and the sample stage does not rotate when rising or falling.
Ultimate vacuum degree: 2.0×10-1Pa ;	A set of vacuum system	Vacuum system: Vacuum system configuration: mechanical pump + vacuum valve + physical bleed valve + main exhaust pipe + bypass; (provided by the vacuum pump supplier), the vacuum valve uses a pneumatic valve; Vacuum system measurement: Membrane pressure.
Pressure rise rate : ≤5Pa/h;	Two channels mass flow meter gas supply system	Gas supply system: The mass flow meter is configured by Party B, two-way air intake, the flow rate is controlled by the mass flow meter, after the two-way meeting, it enters the vacuum chamber from the top , and the inside of the air intake pipe is 50mm
Sample table movement: up and down range is ± 25m; it is required to shake left and right ratio when up and down by ± 3%;	One set of electrode device (2 channels)	Electrode device: The length direction of the four electrode holes is parallel to the length direction of the support platform, and the length direction is facing the main observation window with a diameter of 200mm .
Working pressure: use membrane gauge pressure gauge, measuring range: 0 ~ 10kPa; work constant at 1kPa ~5kPa,the constant pressure value changes plus or minus 0.1kPa;	A set of cooling water system	Cooling water system: The bell jar, electrodes, and bottom plate are all equipped with circulating water cooling pipelines, and are equipped with insufficient water flow alarm device 3.7: control system. Switches, instruments, instruments and power supply for bell lifting, deflation, vacuum pump, main road, bypass, alarm, flow, air pressure, etc. are set on the side of the stand, and are controlled by a 14 -inch touch screen; the equipment has a fully automatic control program without manual intervention, and can store data and call data
Air intake position: air intake at the top of the bell jar, and the position of the exhaust port is located directly below the sample holder;	Control system	

Control System: PLC controller + 10-inch touch screen	A set of automatic pressure control system (original pressure control valve imported from Germany)	
Inflation system: 2 channels mass flow meter, flow range: 0-2000sccm and 0-200sccm; Pneumatic valve valve	Resistance Vacuum Gauge	
3.1.10 Vacuum pump: D16C vacuum pump		

Technical indicators	Traditional drawing die	Nano-diamond coated drawing die
Coating Surface Grain Size	none	20~80nm
Coating diamond content	none	≥99%
Diamond Coating Thickness	none	10 ~ 15mm
Surface roughness	Ra≤0.1mm	Class A: Ra≤0.1mm Class B: Ra≤0.05mm
Coating drawing die inner hole diameter range	Φ3 ~ Φ70mm	Φ3 ~ Φ70mm
Service life span	Life span depends on working conditions	6-10 times longer
Surface friction coefficient	0.8	0.1