

8 - 28 Research Progress on Planar DC Magnetron Sputtering Non-evaporable Getter (NEG) Films

Wei Ningfei, Meng Jun, Luo Cheng, Yang Weishun, Xie Wenjun, Jiao Jiqiang and Ma Xiangli

Based on the technology of DC magnetron sputtering, the Vacuum Technology Group at IMP have developed a large-scale multi-target magnetron sputtering coating device. As shown in Fig. 1, it is mainly composed of four parts, *i.e.* the coating chamber, the evacuation system, the cooling system and the control system. The coating chamber is installed with compound vacuum gauge and temperature sensor, which can accurately measure the pressure and temperature. The evacuation system ensures that the pressure of the coating chamber is better than 3×10^{-4} Pa. The cooling system guarantees that the water temperature is constant at 24 °C. And the control system includes the control unit of ion source power supply, target power supply, substrate bias power supply, *etc.* Also, a new fixture system was designed to enable the sample holder rotation and the sample rotation function, which can realize the simultaneous coating of multiple workpieces. At the same time, the system can be installed with multiple sputtering targets (four cylindrical targets and one planar target), which can realize the function of simultaneous deposition of multiple materials. The Ti-Zr-V and Ti-Zr atomic ratio planar non-evaporable getter targets were fabricated, and Ti-Zr-V NEG films were deposited on stainless steel tubes with CF150 flanges, and their pumping performance was tested by the constant volume method and orifice conductance method. The pumping speed for hydrogen is 0.4 L/s/cm².

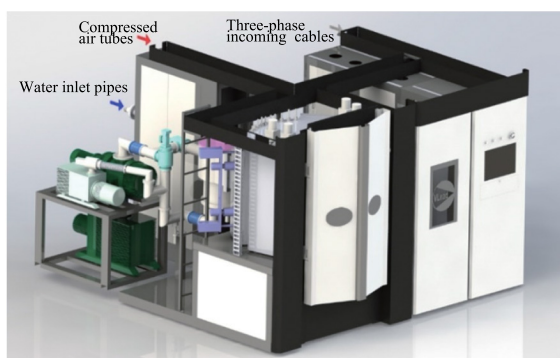


Fig. 1 (color online) The Multi-target DC magnetron sputtering coating device.

The activation temperature of Ti-Zr NEG films is higher than that of Ti-Zr-V NEG films. In the future, the deposition parameters and pumping performance of Ti-Zr NEG films will be further investigated. A NEG film compatible with the baking temperature for XHV will be developed. In addition, the deposition of NEG films will be performed on a thin-walled arc vacuum chamber with titanium alloy liner to increase the system vacuum level and improve the pressure distribution.