

Leybold SYRUSpro™ PIAD Coating System

Our Leybold SYRUSpro™ plasma ion-assisted deposition (PIAD) coating system features an advanced plasma source (APS) composed of a hot cathode, a cylindrical anode tube, and a solenoid magnet. During operation, the plasma system is energized by applying a dc voltage between the large heated cathode and surrounding anode. The dc voltage between the cathode and anode creates a glow discharge plasma, which is supplied with a noble gas such as argon. The energetic plasma is extracted in the direction of the substrate holder and fills the evaporation chamber. A high flux of energetic ions bombard the growing thin film increasing the packing density of the condensed molecules via momentum transfer. Simultaneously, electrons in the plasma provide an effective source of charge neutralization allowing excellent plasma process uniformity through the chamber. To ensure the growth of fully stoichiometric films, reactive gasses such as oxygen can be introduced in the plasma facilitating film growth rates as high as 1.5 nm/sec depending upon the evaporant material. Expert use of the PIAD process allows fine control of packing density, stoichiometry, refractive index, and film stress. Unlike conventionally coated substrates, PIAD can produce thin films that are highly insensitive to changes in environmental humidity levels and temperature.

The Leybold SYRUSpro coating system's advanced optical monitoring system works in conjunction with a redundant quartz-crystal thickness-measurement system to enable complex multiwavelength monitoring strategies, trigger-point control (non-quarter wavelength layers), and multiple redundant test or witness sample strategies. In quartz-crystal film-thickness monitoring systems, deposition rate is based upon the measurement of the changing frequency of oscillation of a natural quartz crystal as the accumulating evaporated thin-film increases the crystal's mass, changing its natural frequency (oscillation frequency decreases as the film thickness increases). This changing frequency is typically monitored every 100 msec, providing the utmost in accuracy and product-to-product coating uniformity.



SYRUSpro™ coater