

Glove Box Integrated Vacuum Coating System For Advanced Thin Film Deposition

Item Number: ST16

Introduction

Discover the integrated glove box vacuum coating system designed for perovskite solar cells, OLEDs, and advanced semiconductor fabrication. Achieve contamination-free thin film deposition, sample preparation, encapsulation, and characterization within a continuous, ultra-pure inert atmosphere with zero atmospheric exposure.

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Application	Description	Key Benefit
Perovskite Solar Cell Fabrication	Deposition of top metal contacts (Au, Ag, Al), electron/hole transport layers, and halide precursors directly inside an inert glove box environment.	Eliminates moisture-induced phase degradation and pinhole formation, ensuring high power conversion efficiency and extended operational stability.
OLED & PLED Display Development	Evaporation of small-molecule organic emissive layers, charge injection layers, and low-work-function cathode metals without air exposure.	Prevents organic layer oxidation and quenching centers, resulting in superior luminance, uniform pixel output, and prolonged device lifespan.
Semiconductor & Microelectronics R&D	Synthesis of high-purity metal contacts, interconnects, barrier layers, and semiconductor thin films on silicon, quartz, and flexible substrates.	Delivers atomically smooth interfaces, minimal defect densities, and precise film stoichiometry under ultra-clean vacuum conditions.
Functional Dielectric & Optical Coatings	Sputtering and thermal deposition of optical interference filters, anti-reflective coatings, passivation oxides, and high-k dielectric thin films.	Ensures uniform refractive index, tight thickness tolerance, and low scattering losses across large-area substrates.
Advanced Sensor & Transducer Fabrication	Growth of gas-sensing functional films, piezoelectric thin layers, magnetic sensor stacks, and bio-compatible transducer coatings.	Enhances signal-to-noise ratios and transducer sensitivity through ultra-clean layer interfaces and repeatable microstructural morphology.
Superconducting & Magnetic Thin Films	Precise sputtering of transition metals, rare-earth alloys, and superconducting layered compounds under controlled process atmospheres.	Maintains sharp magnetic domain boundaries and high critical transition temperatures without atmospheric impurity contamination.
Device Encapsulation & Packaging	Application of barrier coatings, UV-curable epoxy seals, and cover glass attachment directly within the glove box following thin film growth.	Completes end-to-end device fabrication in a unified envelope, preventing moisture ingress prior to final exterior testing.

System Parameter	ST16 Base Specification	ST16 Advanced Sputtering / Co-Evaporation Configuration
Base Vacuum Level	$\leq 5.0 \times 10^{-4}$ Pa (Chamber pre-evacuated)	$\leq 8.0 \times 10^{-5}$ Pa (Bakeout enabled)
Glove Box Atmosphere Purity	H ₂ O < 1 ppm, O ₂ < 1 ppm	H ₂ O < 0.1 ppm, O ₂ < 0.1 ppm
Glove Box Gas Working Medium	High-purity Nitrogen (N ₂) / Argon (Ar)	High-purity Argon (Ar) / Nitrogen (N ₂) / Helium (He)
Glove Box Leak Rate	< 0.001 vol%/h	< 0.001 vol%/h
Chamber Structure Material	SUS304 Austenitic Stainless Steel, Electropolished	SUS304 / SUS316L Stainless Steel, High-Vacuum Mirror Finish
Deposition Source Configuration	4 × Thermal Resistance Evaporation Boats / Crucibles	4-6 × Thermal Sources + 2-3 × Magnetron Sputtering Guns (DC/RF)
Substrate Holder Size	Up to 100 mm diameter (or customized multi-wafer)	Up to 200 mm diameter (or customized matrix carrier)
Substrate Motion & Rotation	0 to 30 RPM continuously adjustable	0 to 50 RPM reversible with motorized height adjustment
Substrate Heating Range	Ambient to 300°C (±1°C PID control)	Ambient to 500°C / 800°C (Radiant / Ceramic heater, ±0.5°C)

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Film Thickness Monitoring	Single/Dual Quartz Crystal Monitor (Resolution 0.1 Å)	Multi-channel QCM with automated rate control & tooling factor calibration
Vacuum Pumping Architecture	Molecular Turbopump + Rotary Vane / Dry Scroll Pump	High-speed Magnetic Levitation Turbopump + Oil-Free Scroll Roughing Pump
Glove Box Antechamber Dimensions	Main: Φ360 mm × L600 mm; Mini: Φ150 mm × L300 mm	Main: Φ400 mm × L600 mm; Mini: Φ150 mm × L330 mm with auto-vacuum
Power Supply Compatibility	220V AC / 380V AC, 3-Phase, 50/60 Hz	380V AC, 3-Phase, 50/60 Hz, 15-25 kW
Control Architecture	Central PLC + Industrial Color Touchscreen HMI	Integrated PC / PLC System with Data Logging & Recipe Management