



VDS500 Thin Film Deposition System is a compact tool for Electron Beam Evaporation, RF/DC magnetron sputtering, thermal evaporation or Low Temperature Evaporation (LTE) organic deposition and is glove box compatible.

The system is fully integrated, performance tested and supported.

Vacuum Techniques offers the VDS500 Thin Film Deposition System, which is a versatile deposition tool for electron beam evaporation, RF/DC magnetron sputtering, thermal evaporation or Low Temperature Evaporation (LTE), or any combination of these methods. It is widely deployed in research, academia and pilot production facilities.

These systems are designed with advanced automation and the flexibility for customization for applications with various options or with OEM equipment.

With a robust gas and pneumatic system combined with advanced automated features, these systems deliver significant value and time savings. They are in use in a wide spectrum of applications from rugged environments to advanced sophisticated clean room use cases.

With a wide variety of deposition options, these systems are versatile and configurable as per the application and customer requirements. These systems can be optimized for the OEM equipment or other vacuum apparatus inside the deposition system.

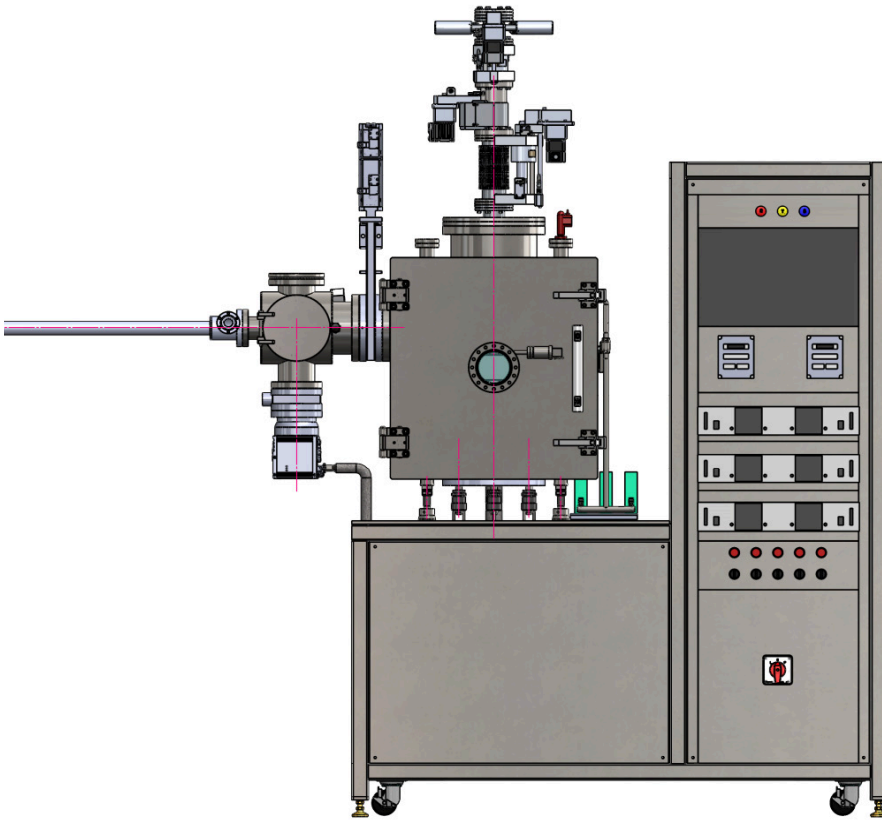
These systems are backed with remote and onsite support, and dedicated spare parts and accessories availability.

KEY FEATURES

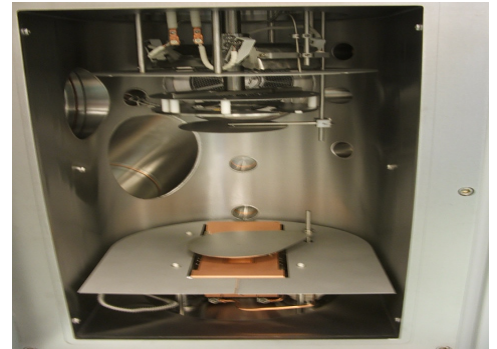
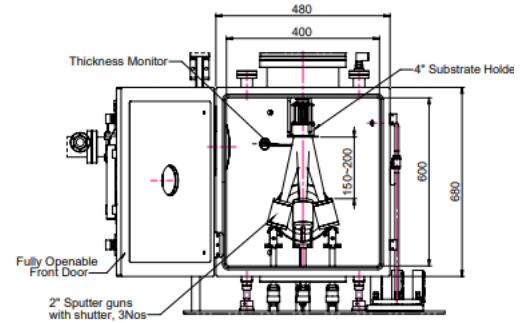
- Fully integrated deposition system
- Supports electron beam evaporation, RF/DC magnetron sputtering, thermal evaporation or LTE sources
- Ion source substrate cleaning or assisted deposition
- Multiple sources sequential or co-deposition modes
- Multiple process gas capability
- Supports up to 100mm x 100mm or 150mm diameter substrates or smaller
- High deposition rate & high efficiency cathode
- Simple and easy maintenance
- Wide configuration options & customizable to the application requirements

VDS 500 THIN FILM DEPOSITION SYSTEM

SYSTEM FRONT VIEW



SYSTEM INTERNAL VIEW



ELECTRON BEAM EVAPORATION SOURCES

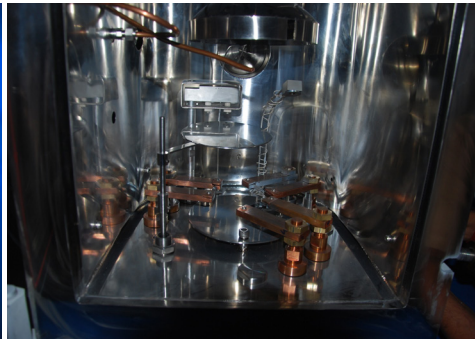
Electron Beam with multi-pocket electron beam evaporation source with 6kW solid state power supply with programmable sweep and automatic crucible indexing



MAGNETRON SPUTTERING SOURCES

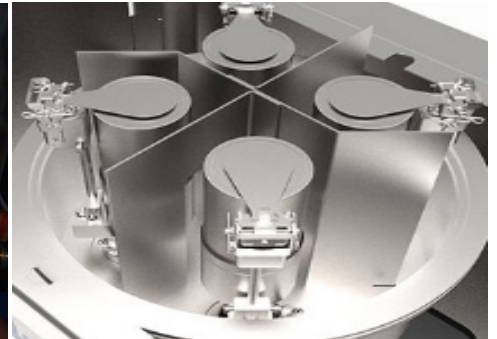
Magnetron sputtering option offers water cooled magnetron cathodes with the ability to tilt, adjust the height and orientations from target to substrate.

The magnetrons can be configured for magnetic and non-magnetic materials and are powered with DC or RF power sources allowing for a wide range of materials to be deposited. Typically, the configuration is sputter up. However, with magnetron sputtering only configured, sputter down is possible as well. Substrate heating up to 800°C and can be optionally RF or DC biased. The system includes controlled gas manifold for up to four process gases.



THERMAL EVAPORATION SOURCES

Thermal Evaporation option offers source assembly to hold different types of sources (spirals, baskets, filaments and boats of different materials of standard lengths). The target material is heated to its evaporation point by joule heating of a resistive boat where the target is placed. The vapourized material travel to the substrate where they nucleate together forming a thin film coating. This process can be used for a wide variety of materials such as Aluminum, Silver, Nickel, Chromium, Magnesium, and so on.



LOW TEMPERATURE EVAPORATION SOURCES

Low Temperature Evaporation (LTE) option offers organic material evaporation source with integrated flip shutter. This method deposits volatile organic materials for thin film formation needed to produce organic light emitting devices (OLEDs), photovoltaic cells, and other organic material-based devices. Vapourization of these materials usually take place at <600°C. Organic materials under vacuum conditions are extremely sensitive to temperature (small temperature increase can increase the deposition rate).

SYSTEM SPECIFICATIONS

Chamber Geometry	Stainless steel AISI 304L D-Shaped Chamber with front hinged door
Dimensions	400mm (Width) x 400mm (Dia) x 600mm (Height)
Inside & outside surface	Electro-polished finish inside with grit blast finish outside
Leak rate	$< 10^{-9}$ mbar ltr./sec
Deposition Sources	Up to (4) 2" or 3" Circular Magnetron Sputtering Cathodes
	Up to (4) 2" or 4" Thermal Evaporation Sources
	Up to (2) LTE Organic Material Evaporation Sources
	(1) Electron beam source (Telemark) with 4-pocket 8cc, or 6-pocket 7cc, or 8-pocket 4cc Combination Baseplate of (2) 4" Thermal & (2) Magnetron Sputtering
Deposition Orientation	Sputter up, Evaporation up
	Co-deposition options
Substrate cleaning	Ion Source or 100W RF bias
Substrate size	Typical 50mm x 50mm
	Max up to 100mm x 100mm, 150mm (Diameter) with up to 20 RPM max variable rotation
Substrate heating	(Optional) Up to 800°C or water cooled
Standard Vacuum Pumping	800 l/s turbo pump with backing 35m ³ /h: 2×10^{-7} mbar ultimate vacuum in process chamber
	(Optional) 1500 l/s cryo pump with backing 35m ³ /h: 6×10^{-8} mbar ultimate vacuum in process chamber
Vacuum Measurement	Pirani & Penning gauges in the chamber, and Pirani gauge in the vacuum pumping line
View Port	DN 150 View Port on the chamber door with manual shutter
Process Gas	Up to (4) Mass Flow Controllers with Swagelok like fittings
Process Pressure	Motorized throttle valve
Deposition Controller	Thin-film Deposition Controller with digital display
System Base	Fully enclosed system base cabinet with leveling pads and caster wheels
System Control	HMI based semi-automatic control system, with optional recipe control and data logging

MAGNETRON SPUTTERING SOURCES

Assembly	High strength, NdFeB (Neodymium Iron Boride)
Magnet Options	Magnets are not exposed to cooling water
	Balanced and Unbalanced magnet options
Target Sizes & Thickness	Sizes of 2", 3" and 4" OD, and up to 0.375" thickness
Power Supply	RF: 13.56 MHz 300W RF Generator, RF Auto Matching Network, Matching Network Controller, connectivity between Units and Cathode, Output Impedence: 50 Ohms, +/- 5 Ohms Nominal
	DC: 1000 W DC Output Power, with 230V, 50Hz Single Phase AC Input

THERMAL EVAPORATION SOURCES

Thermal Source	Source is capable of accommodating spirals, baskets, filaments and boats of Tungsten/Molybdenum of standard lengths
	Programmable DC Supply 200A - 400A
	Water-cooled evaporation feedthrough

LOW TEMPERATURE EVAPORATION ORGANIC SOURCES

Temperature Range	50°C to 600°C with PID control with fine temperature control
	Programmable DC Supply 100A - 400A
Crucible & Charge Capacity	5 - 15cc Alumina

OPTIONS/UPGRADES	
Chamber	Box, Cylindrical, and Spherical Options with various dimensions and ports Sputter down Option
Ports	Additional ports, view ports, and other hardware configurations can be made
Load lock	Load Lock Subsystem with sample transfer adaptability
Vacuum Pumping System	Diffusion pump backed with rotary vane pump (various capacity options) Scroll backing up or Cryo pumping or other pumping options (various capacity options)
Vacuum Measurement	Capacitance gauge, Hot Ionization gauge
Source Shutters	Manual or automated shutters
DC Power Supply Options	500W, 1000W or 1500W DC Power Supply
DC Pulsed Power Supply	1000 W DC Output Power, with 230V, 50Hz Single Phase AC Input Output voltage, output current, pulse width, and pulse frequency are all controllable Frequency: 1Hz to 100kHz, Output Voltage: 800V, Negative or Positive Polarity
RF Power Supply Options	13.56 MHz 600W RF Generator, RF Auto Matching Network, Matching Network Controller, connectivity between unit and cathode, output impedance: 50 Ohms, +/- 5 Ohms nominal
Contamination Shielding	Removable stainless steel contamination shielding on the chamber walls
Substrate cleaning	RF based etching to clean chamber and substrate
System Automation	Fully-automatic with SCADA and recipes
Substrate	Adjustable size & height available for substrate stage Motorized shutter assembly Water cooled substrate stage
Cooling System	Water chiller of appropriate capacity with PID control
Glovebox Integration	Integration with LABPRO glovebox systems
Pressure Control	Upstream and downstream pressure control with PID feedback loop
Deposition Control	Thin-film Thickness Controller with digital display and feedback Glancing Angle Deposition (GLAD) with rotation
Diagnostic tools	Residual Gas Analysis (RGA), Reflection High-Energy Electron Diffraction (RHEED), or ellipsometry

APPLICATIONS

R&D of Thin Film Deposition	OLED & Organic Electronics Applications
Perovskite Solar Cells Applications	Nanotechnology
Organics Field Effect Transistors	Optics & Decorative Coatings
Photovoltaics and Semiconductor Devices	Small batch production

Vacuum Techniques Pvt. Ltd is leading manufacturer of vacuum equipment, components and vacuum instruments for academic, research and industrial markets. With over 30 years of engineering experience and leading innovation, we continue to develop customer specific products and solutions.



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