— We aim to be a one-of-a-kind manufacturer. —

Solid-Source ECR Plasma Deposition System

AFTEX-2300

In answer to strong demands from those involved in thin-film research, we have developed the competitively priced AFTEX-2300. While inexpensive, it has a microwave branch coupling type of ECR ion source installed and is equipped with a load lock mechanism and turbo molecular pump, to provide top performance. This is the optimal system for research into thin films of materials such as oxides and nitrides.

Product Features

- Adhesion of films to the microwave introduction port is prevented and a branch coupling type of ECR plasma source that implements long-term stable operation is installed
- To ensure there are direct reactions between sputtering particles from the solid source and a low-energy, high-current ECR plasma flow (of oxygen or nitrogen, etc.), an environment-adapted system which makes exhaust gas processing unnecessary is used
- A clean deposition environment has been implemented by the adoption of a turbo molecular pump for the main exhaust from the deposition chamber, as well as a load lock mechanism
- The vacuum exhaust sequence is automated, and various interlock mechanisms have been adopted

High-quality thin deposition: Since the thin-deposition occurs under the bombardment of high-density ions controlled at a low energy level of 10-30 eV, precise, high-quality thin films that are flat at the atomic level can be formed. In addition to SiO2 films that exhibit resistance to extreme conditions of 10 MV/cm, films of other materials can be obtained, such as Si3N4, which is as hard as diamond and has superior moisture blocking properties, and Al2O3, which provides a good barrier to hydrogen.

Low temperature, low damage: The ion-assist effect makes it possible to form thin films of chemical compounds such as oxides or nitrides without any high-temperature heating, and also makes it possible to obtain highly crystalline thin films at low temperatures. Since the ion energy is low, a soft cleaning effect with low damage to the substrate can be expected.

High-reactivity deposition: Any solid material that can be fabricated into a sputtering target can be used as the raw material, so thin films of various chemical compounds can be formed easily by combining them with introduced gases such as oxygen or nitrogen. For example, if Si is used as the solid source, Si, SiO2, and Si3N4 films can be formed, and if Al is used, Al2O3 and AlN films can be formed. We have also had results with Ta2O5, HfO2, and ZrO2 films, as well at ITO and STO films.

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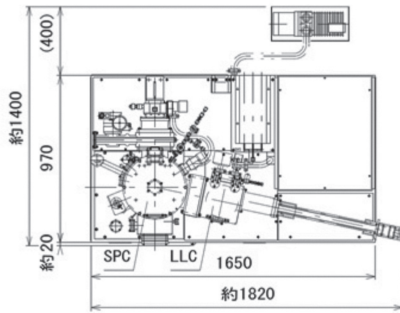
aFTeX-2300

Dimensional Drawing



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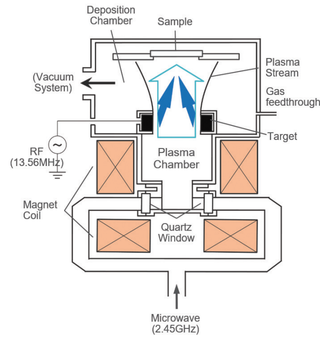
Conceptual Diagram



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Standard Specification

Item		Specifications
Vacuum exhaust system		Deposition chamber: TMP (450L/s) Load lock chamber: RP (250L/min) TMP in common
Deposition chamber	Chamber dimensions	φ570 x 340mm
	Substrate size	4" diameter
	Substrate heating	Optional
	Distance from target to substrate	200mm
Load lock chamber	Conveyor method	Transfer load
	Number accommodated	1
ECR plasma source	Quantity	1 (microwave branch coupling type)
	Plasma chamber	φ150mm
	Cylindrical target	φ100 x 40mm
Gas introduction lines		2
Control power source		Microwave power source (1): 2.45 GHz, 1 kW Coil power sources (2): DC 1.5 kW Target power source (1): RF 13.56 MHz
Operations	Exhaust	Automatic
	Substrate conveying	Automatic
	Deposition	Automatic

Item		Specifications
External dimensions		1.8 × 1m
Options		DC sputtering Substrate heating Substrate bias Additional gas introduction line possible Microwave auto-tuner
Performance	Achieved vacuum pressure	10-5 Pa level
	Deposition, film thickness distribution	3" diameter ± 10%
Utilities	Electrical power	3φ AC200V 20KVA
	Coolant water	10L/min 0.3MPa
	Weight	1000kg

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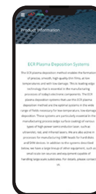

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