AFTEX-9000 Family

JSWAFTY

Solid-Source ECR Plasma Deposition System

AFTEX-9000 Family

AFTEX-9600L

AFTEX-9800

Low-temperature Process

High Controllability of Refractive Index

High-speed Reactive Deposition

Dense and Smooth

More than 100 Solid Source ECR Plasma Deposition Systems has been introduced into production lines since they can form high-quality nano-thick thin films at low temperature and with low damage. Equipments of AFTEX-9000 family for max. 200mmφsamples can be equipped with up to three ECR plasma sources allowing simultaneous film deposition using all of them, which realize extremely high throughput.

System Features

- Full-scale automatic single wafer C to C system for 200mmφ samples which can be equipped with max. 3 ECR plasma deposition modules.
- High throughput by simultaneous deposition using 3 ECR plasma sources
- It is possible to set transfer flow, deposition chamber conditions and deposition process by recipes, and multilayer films of arbitrary materials can be automatically formed.
- Sample rotation and inclined ECR-source installation enables excellent uniformity and coverage.
- Optional spectrometer enables the in-situ measurement of film thickness and refractive index.
- Budget- and eco-friendly system eliminating the necessity of an expensive abatement system. It uses only the solid-source (target) and safe gases such as argon, oxygen or nitrogen.

Deposition Characteristics

Incomparable film characteristics

Solid-Source ECR Plasma Deposition realizes film characteristics which is difficult to achieve with other deposition methods. It comes from the fact that films are formed by the direct reactions between particles sputtered from a solid source and an oxygen or nitrogen ECR plasma flow.

Low-temperature, low-damage and surface cleaning effect

Deposition using the ion-assist effect at a low energy but high current enables to form high-quality and highly crystalline thin films at low temperatures and with low damage in comparison with conventional deposition methods. Cleaning of substrates and grown surfaces can also be accomplished.

Single layer and multilayer films of wide range of materials

Any solid material which can be formed into a sputtering target can be used as a raw material, and it is easy to form films of various oxides or nitrides as well as multilayer films by combining it with introduced gases. In addition, a nano carbon film having the hardness of Diamond as well as the conductivity of Graphite can be formed.

High controllability of refractive index

Refractive index can be easily controlled without generation of any intermediate product like in CVD. In addition, films having arbitrary refractive index can be created simply by running oxygen and nitrogen gas simultaneously. Near-ideal properties like high break down voltage, low leak current, etc. can be achieved as well.

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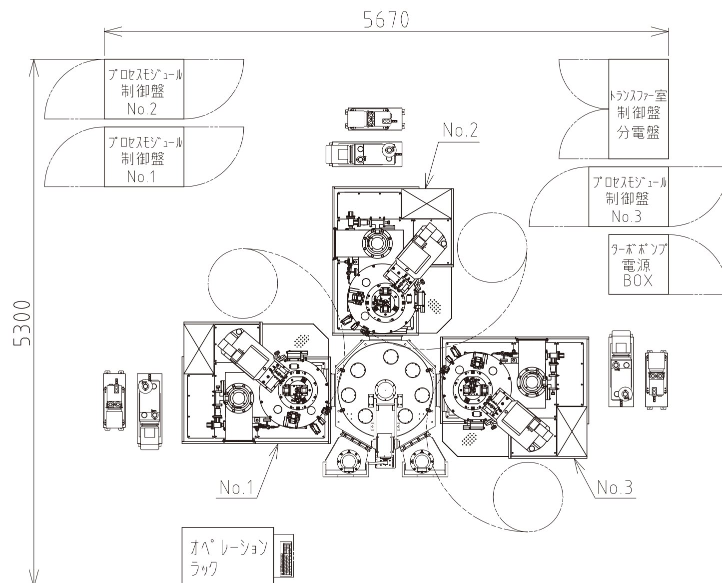
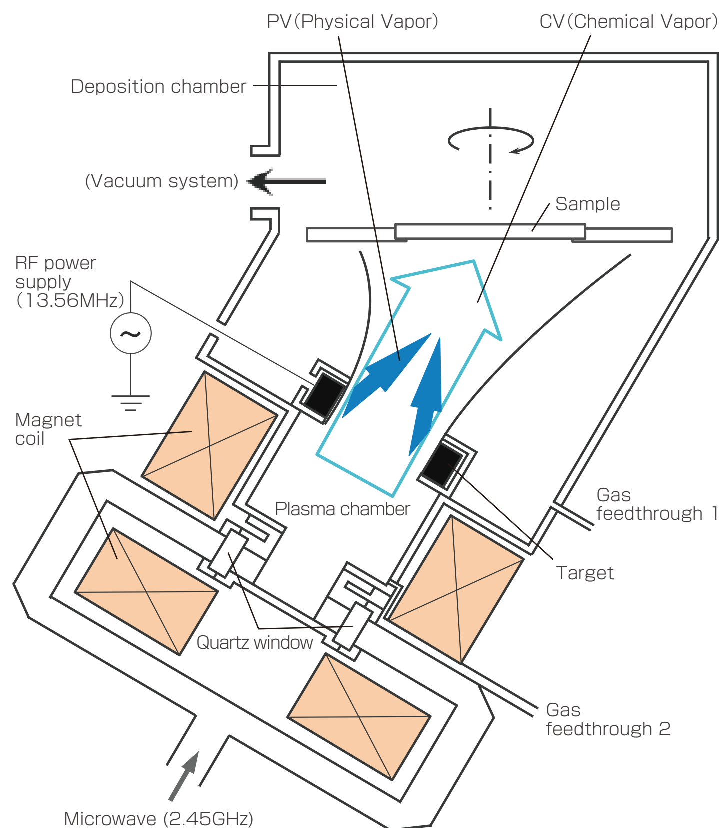
AFTEX-9800 Standard Specifications

Item		Specification
Ultimate pressure		Process chamber: < $3x10^{-5}$Pa Transfer chamber: < $9x10^{-5}$Pa Load-lock chamber: < $3x10^{-4}$Pa
Vacuum system		Process chamber: TMP 1300L/sec Rotary pump: 500L/min Transfer chamber: TMP 450L/sec Rotary pump: 250L/min Load-lock chamber: TMP 450L/sec Rotary pump: 250L/min
Load-lock chamber		Automatic front-door actuator: 1 set Cassette elevator mechanism: 1 set Sample sensing mechanism: 1 set
Transfer chamber		Vacuum transfer robot: 1 set Sample sensing mechanism: 1 set Face-down transfer type
Process chamber	Quantity	Max. 3 system
	Substrate size	Max. 8inch
	Substrate holder	Sample stage rotation and lifting mechanism: 1 set Temporary sample receiving stage: 1 set
	Deposition direction	Up-deposition
	Substrate heating	Max. 300℃
ECR sputtering source	Quantity	1 set
	Plasma chamber	Microwave branching/coupling type ECR plasma source Tilted against substrate holder
	Magnet coil	2 split type
	Target	Cylindrical type (with water cooling)
	Auxiliary mechanism	Coil tilting mechanism
Gas feed system		Mass flow controller: 3 set, Gas: Ar, O2, N2
Operations		C to C full automatic processing by recipe setting (Vacuum, Transfer, Deposition)
Control system		Microwave power supply 2.45GHz, 1kW: 1 set Microwave auto tuner: 1 set Coil power supply DC1.5kW: 2 set Sputtering power supply: 13.56MHz, 1kW: 1 set Automated RF matching unit and controller: 1 set PLC and computer: 1 set
Utilities	Foot print	Approx. 7×6m (including maintenance area)
	Electrical supply	3-phase 200VAC Max. 4 lines
	Cooling water	0.3~0.4MPa, 20L/min Max. 3 lines
	System weight	Approx. 7000kg

Dimensional Drawing



Schematic



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