JSWAFTY

Solid-Source ECR
Plasma Deposition System

AFTEX-6200 Mark II

- Low-temperature Process
- High Controllability of Refractive Index
- High-speed Reactive Deposition
- Multilayer Films

A solid-source electron cyclotron resonance (ECR) plasma deposition system forms high-quality thin films by directly reacting a low-pressure, high-density ECR plasma flow with particles sputtered from a solid source (target) placed at the outlet of the plasma flow. AFTEX-6200 is equipped with two ECR plasma sources and enables automatic transfer and deposition, which is optimal for multilayer film deposition. As an option, the system can be equipped with a spectrometer in the deposition chamber which enables the in-situ measurement of film thickness and refractive index.

System Features

- Automatic transfer system for 75 mmϕ trays. 5 trays can be set in the load-lock chamber.
- High throughput by continuous deposition of 5 trays in the deposition chamber.
- Suitable for high-vacuum with a 3-chamber system
- Two microwave branching/coupling type ECR plasma sources make it suitable for massproduction
- Multilayer of max. 22 layers can be automatically formed.
- Electric system
  Indication of details of error information/Large operation display/Backup function of deposition recipes
- Options
  Data logging system/Vdc plotter/Spectrometer for in-situ measurement of film thickness and refractive index/Additional magnetron sputtering units (max. 2 units)/Additional gas lines (max. 2 units)

Deposition Characteristics

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. For example, if Si is used as the solid source, it is possible to form single layer and multilayer films of SiO2, Si3N4, and Si.

High-speed reactive deposition

High-speed deposition is possible by the reaction between a solid source and a large-current ECR plasma of a gas such as oxygen or nitrogen.

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.

Low-temperature, low-damage and surface cleaning effect

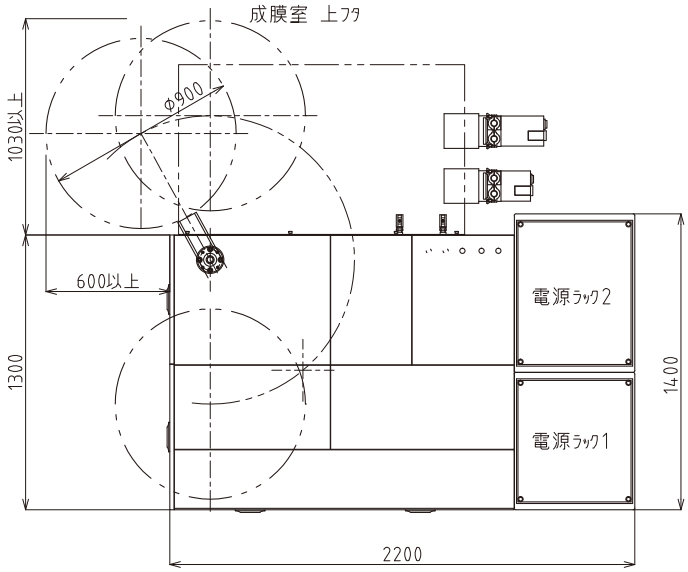
Deposition using the ion-assist effect at a low energy but high current enables to form high-quality and highly crystalline thin films at low temperatures and with low damage in comparison with conventional deposition methods. Cleaning of substrates and grown surfaces can also be accomplished.

AFTEX-6200 Mark Ⅱ

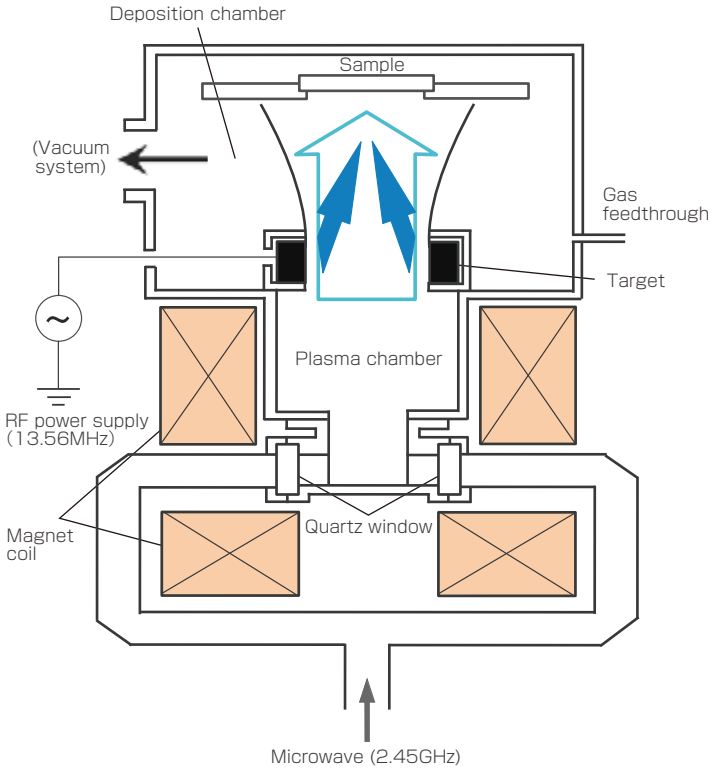
AFTEX-6200 Standard Specifications

Item		Specification
Ultimate pressure		Process chamber: < 3x10^{-5}Pa Load-lock chamber: < 3x10^{-4}Pa
Vacuum pump		Process chamber: TMP (1000L/sec) Load-lock chamber: TMP
Deposition chamber	Sputtering source	ECR: 2 sets Magnetron: 2 sets (option)
	Substrate holder	Planar type, stepping rotation Substrate size: Max. 3inch
	Substrate heating	Max. 400℃
	Substrate position	Target-Substrate distance: 170mm
Load-lock chamber	Transfer system	Automatic tray transfer Batch processing of 5 trays
	Number of samples	5 trays can be set.
ECR plasma source	Quantity	2 sets
	Plasma source	Microwave branching/coupling type
	Plasma chamber	ID Φ150mm, With water-cooling jacket
	Cylindrical target	ID Φ100 × 40 mm Direct cooling system of backing-tube
Gas feed system		Mass flow controller: 3sets Gas type: Ar, O2, N2
Operations	Vacuum	Automatic
	Substrate transfer	Automatic
	Deposition	Automatic/Manual (selectable)
Power supply controller	ECR ion source	Microwave power supply (2 sets): 2.45GHz, 1kW Coil power supply (2 sets): DC1.5kW
	ECR sputtering	Target power supply (2 sets): RF 13.56MHz, 1kW
Utilities	Foot print	Approx. 3.5 × 3 m (including maintenance area)
	Electrical supply	3-phase 200VAC 50/60Hz 75A
	Cooling water	Flow: 20L/min, Pressure: 0.3MPa
	System weight	2000kg

Dimensional Drawing



Schematic



JSW AFTY Corporation
2-35-2,Hyoue, Hachioji-shi, Tokyo, 192-0918 JAPAN
TEL:+81-42-632-8840 FAX:042-632-8841 www.jsw-afty.co.jp