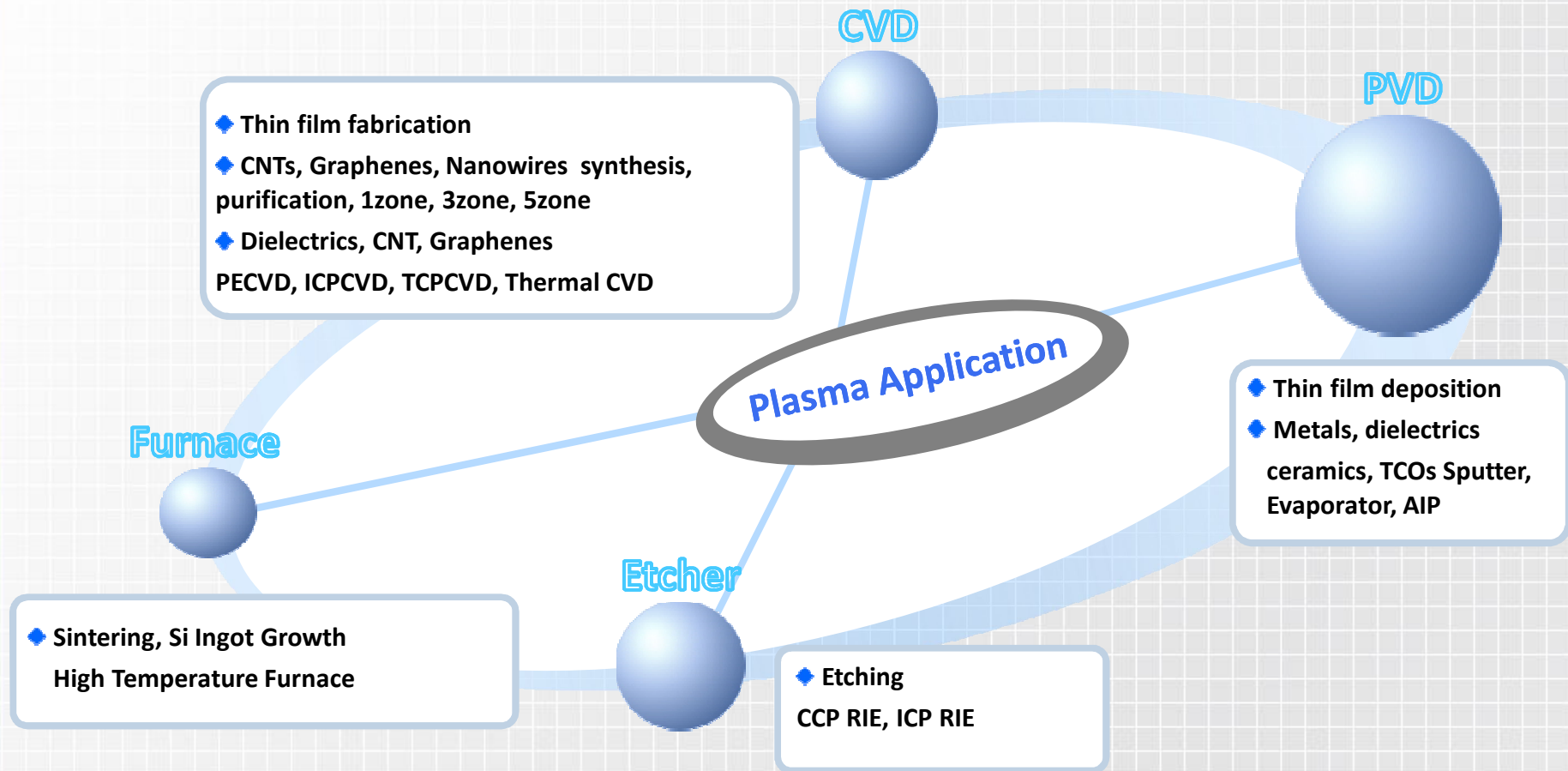


Products group



PVD : Physical Vapor Deposition

Sputter

Magnetron sputter (Cluster, Inline, Batch)
Ion beam sputter (Batch)
Sputter & E-beam evaporator (Roll to Roll)

Vacuum Evaporator

E-beam evaporator (Inline)
Thermal evaporator (Roll to Roll)
E-beam & thermal evaporator (Batch)

Cathodic Arc Deposition (AIP, Arc Ion Plating)

Non-filtered (Inline, Batch)
Filtered (Batch)

Arc Discharge

CNT synthesis (Batch)

CVD : Chemical Vapor Deposition

PECVD

PECVD (Cluster, Batch)
ICPCVD (Cluster, Batch)
TCPCVD (Cluster, Batch)

Thermal CVD

Low pressure CVD Furnace (Batch)

RIE : Reactive Ion Etcher

Dry etcher

CCP RIE, ICP RIE, TCP RIE (Cluster, Batch)

Customized manufacturing

Products; CVD

Cluster System

ATS-CVD Series
Cluster System for Graphene Synthesis

Cluster lab-200



Special Features and Application

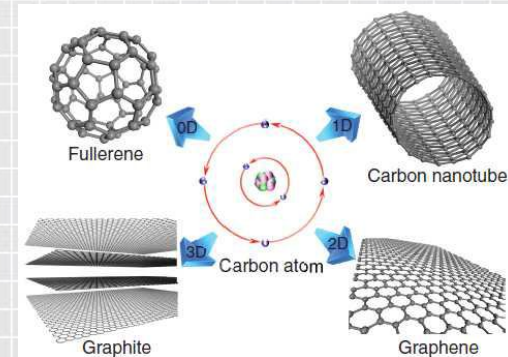
Multi-functional cluster system combined with PECVD, sputter and E-beam evaporation for high quality graphene synthesis

Maximum substrate heater temperature: 1,000 °C for PECVD, 800 °C for Sputter and 500 °C for e-beam evaporation, respectively

Automatic loading transfer chamber around which PECVD, Sputter and E-beam evaporation chambers are attached

Wafer capacity: 8" x1

Average throughput: 2,000 wafer/year



PECVD, Batch

ATS-CVD Series
PECVD System for Low Temp. CNTs Synthesis

PECVD Lab- 100N



Special Features and Application

Small RF-PECVD system for CNT(Carbon Nano Tube) synthesis

Low temperature synthesis of CNTs(under about 400 °C)

Heating range 400 ~ 600 °C

Average throughput
Up to 5,000 wafers per year

CNTs growth

System Dimension

1,100L x 900W x 1,500H [mm³]

PECVD, Batch

ATS-CVD Series
Large Scale of Plasma Surface Modification and
PECVD System

PECVD – B2600



Special Features and Application

Batch type of large area plasma treatment , plasma nitriding & PECVD system
(chamber size: ID:2,100mm, L:3,100mm, sample loading: max. 10tons)

Specialized in sequential process of plasma treatment (or plasma nitriding) and
diamondlike carbon deposition using bias plasma

Automatically controlled with PC interface

Convenient sample loading with sample loading carrier

Base pressure : ~10-6Torr

Selectable working pressure (~mTorr to ~Torr)

Plasma modifications and PECVD of injection mold surface for forming
automobile plastic parts

Low friction and wear-resistant applications using plasma nitriding and DLC
deposition to various types of metal products

System Dimension

9,900L x 2,600W x 4,200H [mm³]

PECVD, High temperature

ATS-CVD Series
HDP CVD System for Nanowire Synthesis

PECVD Nano Lab- 100



Special Features and Application

Multi-functional thermal CVD system for nanowire synthesis

Combined with plasma treatment and probe station

Maximum substrate temperature: 900 °C

Growth direction controllable

Automatic loading available during susceptor heating

High density plasma source for chamber cleaning

PC-based control system

Average throughput 4,800 wafer / year

Nanowires (Si & doped Si)

Nanotubes

System Dimension

1,200L x 900W x 1,600H [mm³]

Thermal CVD

ATS-CVD Series
Thermal CVD System with Uniform Heating Zone

CVD Lab-50N



Special Features and Application

Small thermal CVD system for carbon nano tube synthesis

Economical R&D system for CNTs synthesis

Uniform heating zone

Heating range 500 ~ 950 °C

Average throughput

Up to 15,000 wafers per year

CNTs growth for field emission display device

System Dimension

1,500L x 700W x 1,450H [mm³]

Dry Etcher

ATS-CVD Series
High Density Plasma Etching System for Magnetic Materials

Etcher-100M



Special Features and Application

TCP etching system for R&D and small scale production

Automatic robot transporting system

Mechanical chuck and He backside cooling system

Average throughput
Up to 14,400 wafers per year

Metal, oxide, magnetic materials etching

System Dimension

1,100L x 900W x 1,850H [mm³]

Silicon Growth

R&D Scale of Multicrystalline Silicon Ingot Grower for Solar Cell Applications

SIG Lab-1700



Special Features and Application

Silicon melting and ingot growing system for solar cell applications.

Lab scale of ingot growing (50kg/batch)

Highly efficient and rapid heating

Automatic PC control system with user-friendly interface

Multi crystalline Si ingot for solar cell

Vacuum chamber

- Chamber body : $\Phi 880 \times 1,200$ (mm²)

- Crucible size : $200 \times 200 \times 300$ (mm³)

Pump

- Rotary Pump : 1,600 ℓ /min

- Booster Pump : 10,000 ℓ /min

- Diffusion Pump : 1,950 ℓ /sec

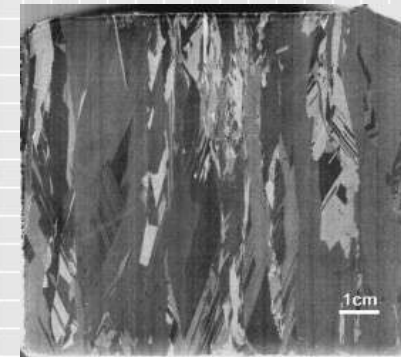
Others

- Power : 3 Φ , 70KVA, 60Hz

- Heater : Max. 1700 $^{\circ}$ C (Graphite)

- Gas : Ar

- Color video camera



Multicrystalline silicon ingot

System Dimension

1,600L x 1,200W x 1,700H [mm³]

Products; Surface treatment

Surface Treatment

ATS-CVD Series
Plasma Nitriding & PECVD System

NPPN-120DTS



Special Features and Application

Batch type of NPPN system for a large area surface treatment
($\Phi 1,000 \times 2,000H$)

Plasma nitriding system minimizing ion bombardment using a mesh type of cathode

Automatically control with PC interface

Convenient sample loading with sample tray

Average throughput
Up to 120 ton per year

Plasma surface treatment of various materials
PECVD process
DLC coating
Silicon coating from liquid source

System Dimension

3,000L x 2,500W x 3,000H [mm³]

Surface Treatment

ATS-CVD Series
Gas Nitriding & PECVD System

GN-900



Special Features and Application

Batch type of gas nitriding system from low pressure to atmospheric
(Working zone : $\Phi 900 \times 1,000H$)

Max. nitriding temperature : 700°C
(Uniformity : $< \pm 5^{\circ}\text{C}$ over $400 \sim 600^{\circ}\text{C}$)

Automatically controlled by PLC based PC

Recipe controlled in nitriding process automatic pumping

Sample loading capacity : up to 1 ton

Thermally well-insulated chamber wall

Two separate heating zones.

Efficient nitriding of steel and stainless steel, etc

Efficient control of compound layer during nitriding process

System Dimension

3,000L x 4,000W x 4,200H [mm³]

Products; PVD

Magnetron Sputter, Inline

ATS-PVD Series
Cluster System for Oxide and Metal Sputtering

Inline SPT-370



Special Features and Application

In-line sputter system with 8ea linear sputter guns for R&D and a small-scale production

Automatic process control through PLC interfacing

Carrier loading capability : 2x24" sheets/carrier

Standard tact time: depends on processing

Automatic jig moving system

Ion cleaning system with linear ion gun

Sheet capacity : 300 × 24" per day

Average throughput Up to 90,000 sheets per year

System Dimension

5,000L x 2,500W x 1,900H [mm³]

Magnetron Sputter, Cluster

ATS-PVD Series
Cluster System for Oxide and Metal Sputtering

ClusterSPT-200



Special Features and Application

Cluster sputtering system for TCO deposition with two sputtering chambers and one glove box

Robot transfer chamber between chambers and glove box

Cassette loading type with glass holder

Three tiltable 8" sputter guns and extra sputter gun ports in each chamber

Available in multilayer deposition as well as co-deposition

Automatic control in substrate rotation and substrate to cathode distance

Precision mask aligner with laser focusing

Substrate temperature uniformity : $\leq \pm 2\%$ over 200x200 glass

System operation by PLC-based PC control

Metal, ceramic, and alloy depositions for R&D in OLED fields

System Dimension

5,000L x 5,000W x 2,400H [mm³]

Standard Sputter System

ATS-PVD Series
Standard System Manufactured by A-Tech System

FlexLab System 100



*Up or Down Types of DC & RF
Magnetron Sputter with 4x3" or 3x4" Guns
for R&D to Various Fields*

Special Features and Application

Deposition of metallic and inorganic layers is not only available, but partially applicable to organic materials deposition by adopting both rf and dc sources

Multilayer and codeposition in up or down -sputtering mode can be selectively chosen

Automatic loadlock system, which is compactly designed for space saving

Optimized configurations of sputter gun and shutter for minimizing cross-contamination between installed targets

Typical process data of various materials can be delivered on request

Metal, ceramic, and alloy deposition for basic research in various fields

System Dimension

1,800L x 1,100W x 1,500H [mm³]

Magnetron Sputter, FTS

ATS-PVD Series
FTS System for TCO Deposition in OLED Display

FTS -200



Special Features and Application

- Faced target sputtering system for TCO deposition in OLED display
- Equipped with two tiltable FTS guns and four ITO targets
- Multilayer deposition and codeposition available
- Substrate heated up to optimum value in a short period, using SiC heater
- Designed with appropriate heat protection for other parts, except for substrate
- Substrate rotation (0~60 rpm)
- Fully automation system using Labview and PLC
- TCO deposition for cathode in top emission OLED and anode in bottom emission OLED
- IMI(ITO/metal/ITO) multilayer available
- Ferro-magnet material deposition

System Dimension

800L x 1,200W x 2,400H [mm³]

Web Coater, Roll to Roll

ATS-PVD Series
Web Coater System

R2RSPT-WEB2



Special Features and Application

Roll to Roll System for mass production

PC control based on PLC

Metal deposition on flexible film

Flexible film thickness: $2\mu\text{m}$

Speedy deposition and throughput

Loading capacity : 5km per day

Average throughput 1,800km per year

Diaphragm Metallizations

System Dimension

2,800L x 3,400W x 1,800H [mm³]

Cathodic Arc, Inline

ATS-PVD Series
In-line Cathodic Vacuum Arc Deposition System

Inline CVA – 70P



Special Features and Application

In-line system with 4 arc guns for dielectric materials deposition on 70 inch glass
(base pressure: 1×10^{-6} Torr)

Equipped with mechanical, booster and cryogenic pumping system

Automatically controlled in substrate moving

Average throughput : Up to 30,000 sheets per year

Coatings for PDP electrode protection
(eg. MgO etc.)

System Dimension

3,000L x 1,000W x 2,000H [mm³]

Cathodic Arc, Batch

ATS-PVD Series
Vacuum Arc System with 12 Arc Guns

Vacuum Arc Pilot – 12H



Special Features and Application

Arc ion plating system for a functional coating

Low temperature coating is possible

High deposition rate and ionization degree, good adhesion

Easy process control and cost effective

Metal coating

Metal Nitride coating

System Dimension

2,300L x 1,600W x 1,800H [mm³]

Arc Discharge, Batch

ATS-PVD Series
Arc Discharge System for SWCNTs Production

Arc Pilot – 200



Special Features and Application

Arc discharge synthesis of high quality SWCNTs

Automatically controlled sequential process of electrode loading, discharge, CNTs synthesis and their recovery

Equipped with specially designed CNTs recovery chamber in main chamber

Catalyst loading into drilled anode

Cassette loading of anodes (up to 10ea)

Highly crystalline SWCNTs synthesis

System Dimension

3,000L x 1,400W x 2,400H [mm³]

Customer service

Process equipment for costumer requirements

■ Magnetron Sputter System
with 4X6" Guns



■ Magnetron Sputter System
with 3X3" Guns



■ Magnetron Sputter with 1x3"
2x4" Guns and Ion Gun 1x3"



■ Reactive Sputter System for
Ophthalmic Lens Coatings



Process equipment for costumer requirements

■ FVAS
(Filtered Vacuum Arc Source)



■ Arc Discharge System

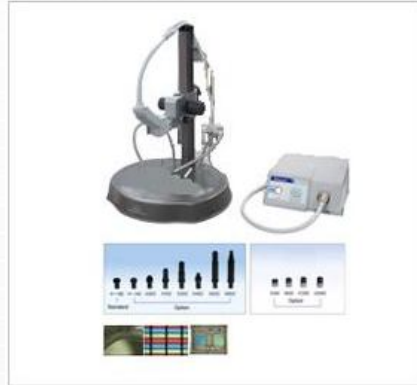


■ Plasma Nitriding
& PECVD System



Measurement & analysis tools for customers

Video Microscope



Metallurgical Microscope



Filmetrics F20



Sheet Resistance Meter



UV-1650PC



Alpha Step - 300

