

OLED

Organic Electroluminescence Deposition System



OLED System

-Organic Electroluminescence Deposition System-

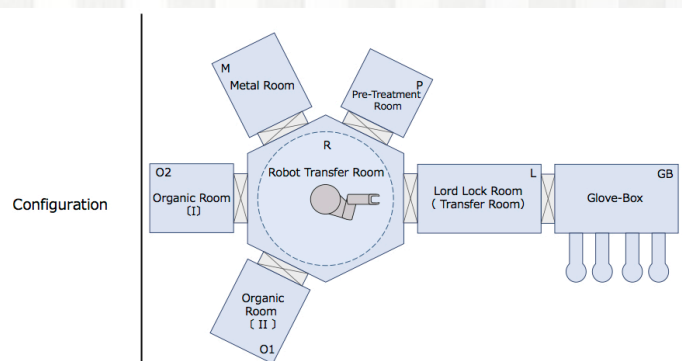
CS-1000

Organic electroluminescence deposition system of Cosmo-Science (CS-1000) is the best experimental equipment for research and development of organic electroluminescence materials and device development. 3-axis cylindrical coordinate clean robot is installed in the transfer room. It is possible to control by microcomputer and programmable logic controller. It arranged very compact. (Plasma pre-treatment room(with substrate heating system : MAX 200°C), Organic deposition room, Metal(electrode) deposition room Load lock room, and Glovebox.) It is possible to experiment of the OLED device without exposing atmosphere from introducing substrate to encapsulation process. It is possible to experiment for highly-reproducible as the research and development of device evaluation and material evaluation of various materials with little quantities. The system can study efficiently for fundamental researches and the development of the OLED.

▼ Characteristic

- It is possible to connect the Glovebox at the load lock room (transfer system is clean robot)
- It has the stocker system of 18 steps in the load lock room (3 lines × 6 steps)
- The organic deposition cell has 16 units in the organic deposition room (1 room each)
(Organic deposition source: cell type, crucible capacity: 2cc usable capacity: 1cc)
- It is possible to preheat the organic deposition cell of 16 units at the same time (single control)
- It is possible to experiment for OLED device of 4 conditions by one batch process (using by original mask mechanism)
- The transfer is possible a substrate tray and a mask tray separately
- The exhaust system is controlled by dry environment

▼ Standard Specification



Substrate Size	100mm×100mm
Load-Lock Room	18 Step Up and Down System (Possible Tray (Substrate, Mask) Position) ※At connection Glovebox, introduce the robot transfer system in Nitrogen Purge
Transfer Room	3 axis Vacuum Robot for Transfer
Pre-Treatment Room	RF Plasma (Gas Species : O ₂ / Ar MFC) with Substrate Heating System (MAX : 200°C)
Organic Deposition Room (I)	Deposition Source by Cell Type 16 units (Co-Deposition : MAX 4 units) (with Shutter System)
Organic Deposition Room (II)	Deposition Source by Cell Type 16 units (Co-Deposition : MAX 4 units) (with Shutter System)
Metal Deposition Room	Deposition Source by Resistance Heating 3 units (with Shutter System) Deposition Source by Cell Type 2 units (with Shutter System)
Control	Transfer : Automation Control by PC Deposition : Automation Control by Original Software
Option	Glove-Box (Possible Type)

▼ Configuration

- Load Lock Room (18 steps stocker)
- Pre-Treatment Room (O₂/Ar Plasma Cleaning)
- Organic Deposition Room (2 rooms, 16 units of Organic Deposition Cell / 1 room)
- Metal Deposition Room (1 room)
- Glovebox (Possible Type)
- Control Tower (Power Supply)

Configuration	Exhaust System	Ultimate Vacuum
Load Lock Room	Cryopump (8 inch)	Under 5×10 ⁻⁴ Pa
Transfer Room	Cryopump (8 inch)	Under 5×10 ⁻⁴ Pa
Pre-Treatment Room	Turbo Molecular Pump	Under 5×10 ⁻⁴ Pa
Organic Deposition Room (I)	Cryopump (8 inch)	Under 9×10 ⁻⁵ Pa
Organic Deposition Room (II)	Cryopump (8 inch)	Under 9×10 ⁻⁵ Pa
Metal Deposition Room	Cryopump (8 inch)	Under 9×10 ⁻⁵ Pa
Roughing Pump	Dry Pump	—

Cosmo Science Inc.

7-3-10 Shinomiya Hiratsuka Kanagawa 254-0014 Japan

<https://cosmo-science.co.jp/>

Phone +81-463-51-2031

Purpose : OLED of Experiment

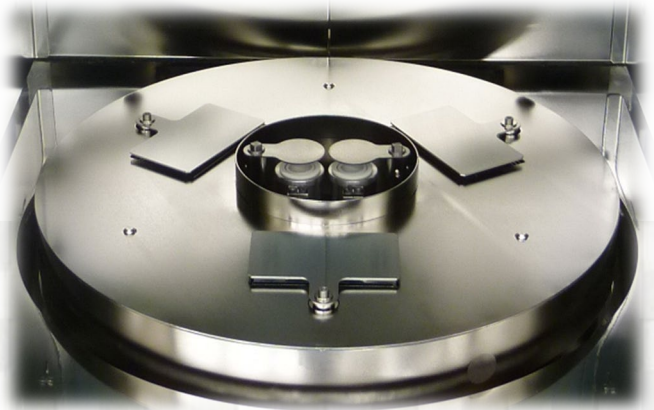
OPV of Experiment

Development of OLED Material

▼ Organic Deposition Room

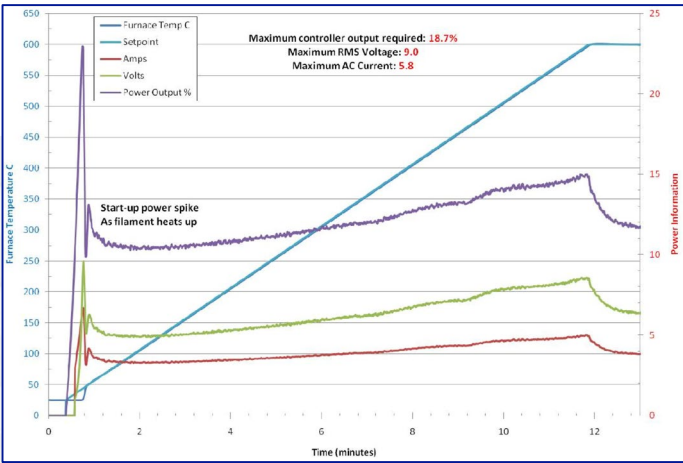


Position of OLED Cell



Position of Metal Evaporation Source

- The organic deposition cell of 16 units (LUXEL Corporation)
- The cell type source by filament and crucible
- It makes a turn set of source at 4 units (motor drive)
- It is possible to deposit an one source inside position (MAX: 4 sources co-deposition)
- The shutter system has each source (It can be driven alone)
- It can heat at 16 source same time (Pre-heating)
- Crucible capacity : 2cc (usable capacity : 1cc)
- Crucible material : Al₂O₃, Quartz, AlN-BN)
- Thermocouple : K (Al/Cr)



Relationship of Temperature and Time for OLED Cell



Deposition Room



Load Lock Room

OLED System

-Organic Electroluminescence Deposition System-

▼ Automation Deposition Software

The automatic deposition software of Cosmo Science is built by microcomputer control and personal computer control. It performs user interface and date(recipe, logging, parameter) control with a PC. It performs the control of the OLED system with a microcomputer. All-night action and consecutive movement are possible. The process stop by the failure of the control system leads to the loss time and material. It transfer the date during a process to a microcomputer by the software. The system is such the automatic deposition continues it normally when a disorder comes out to a PC during automatic deposition.

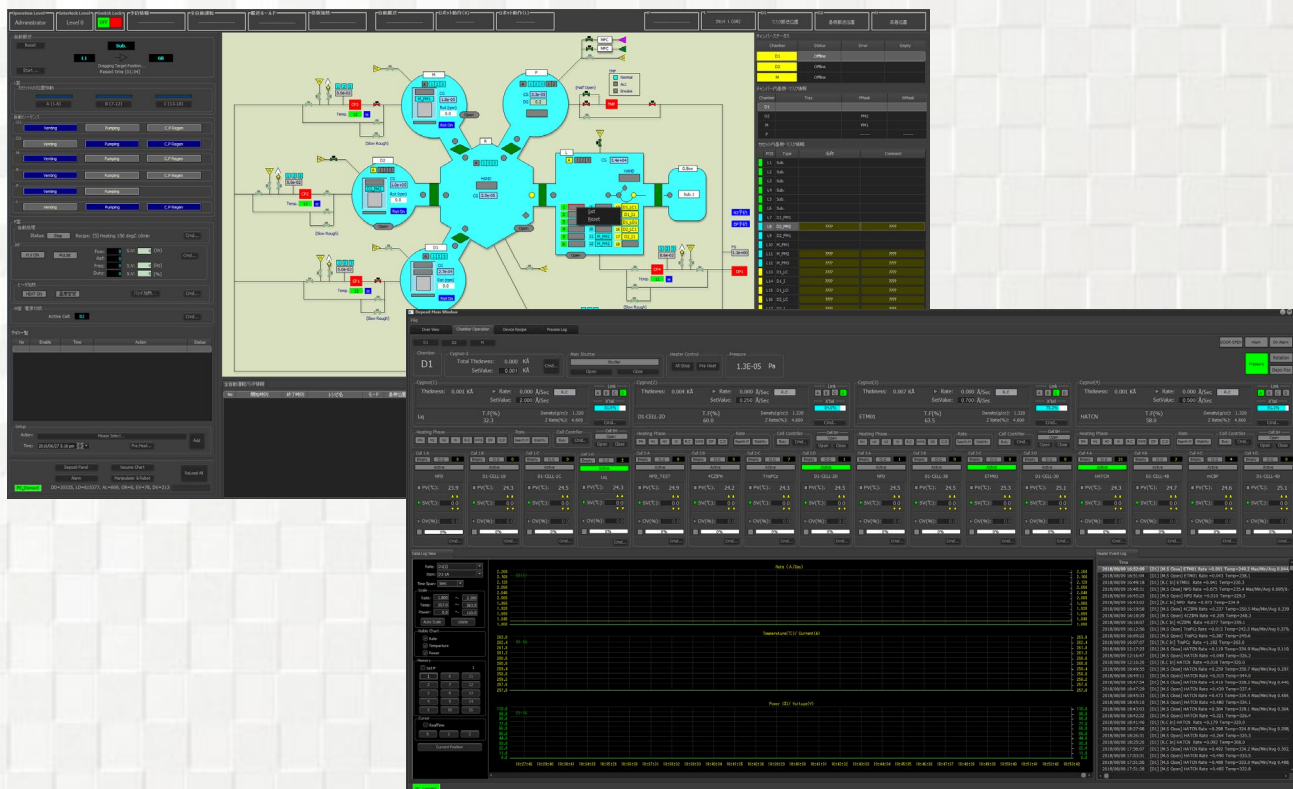
When the control method of the automatic deposition software clicks materials name of each deposition source, the temperature of the deposition source, shutter information, a control screen exit; become software.

It displays each channel state of the film thickness monitor (Cygnus2) on a PC screen and the system which can perform each operation from the PC display. The method of the deposition rate control reaches by PID control.

A parameter enters automatically and it is automatic and is input into the film thickness controller in total if it save a deposition source, the parameter information of materials to a PC when it really called materials in a recipe to make. (It can edit the parameter about materials by choosing material library among a PC.) The automatic deposition is parallel to automatic transfer, and a program is executed. It can carry out the preliminary heating of predetermined materials even since before an automatic transfer sequence beforehand.

It sets a timing and apply it so that automatic deposition is software, and deposition starts preliminary heating with a substrate and a mask having been introduced into a designated deposition room as a required item.

By the present software, the data of the logging can display in real time or past logging by a chart method. As for the kind of the logging, it is with the constitution that a change, deposition temperature, output power, a film thickness, a film thickness rate are saved since use materials, automatic deposition status, an automatic deposition start automatically for each phase until the end at end time in the start time each layer for automatic deposition.



Display of Auto Deposition Software