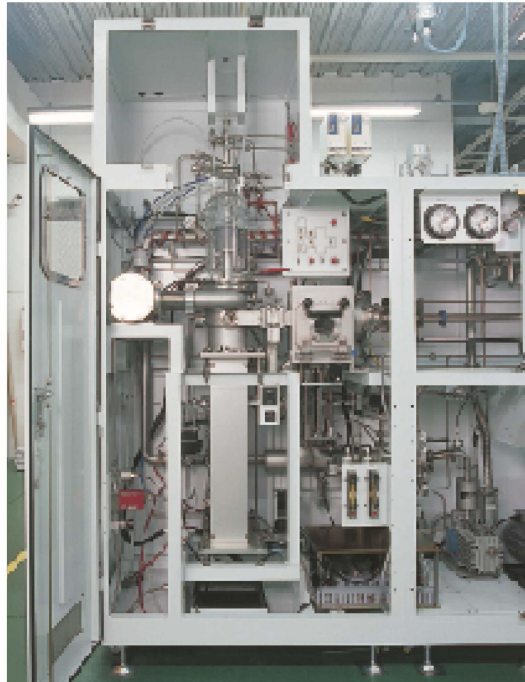


## Features of EpiQuest's MOCVD system

### SV2001/SV3001/SV4001 (SV2003)



#### Features

SV series adopts a vertical quartz reactor designed to the optimal level based on our outstanding simulation technology and years of experience. For GaAs series and InP series materials, this reactor is the best selling item for more than 30 years.

SVS series also features a water-cooled close showerhead structure.

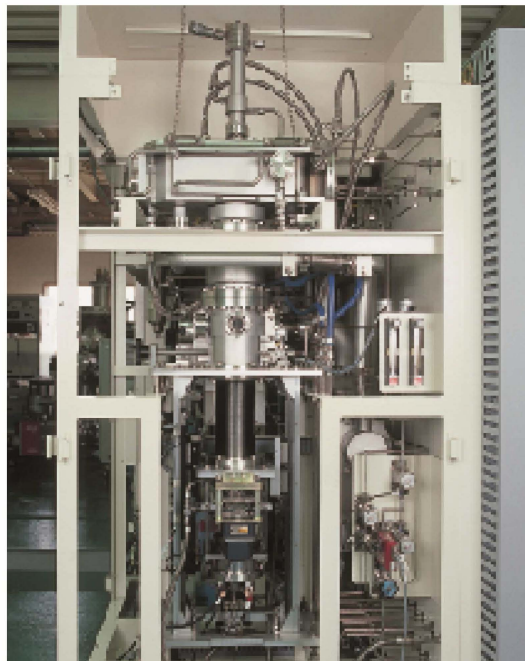
Highly efficient growth is achieved by separately supplying highly reactive gas to the nearest wafer.

This reactor can be used for oxide growth such as Ga<sub>2</sub>O<sub>3</sub>.

#### Specifications

- Reactor : Vertical type
- Substrate size : 1 ×  $\phi$  2" (SV2001, SVS2001)  
1 ×  $\phi$  3" (SV3001, SVS3001)  
1 ×  $\phi$  4" (SV4001, SVS4001)  
(3 ×  $\phi$  2" (SV2003, SVS2003))
- Substrate heating : Resistance heating type
- Maximum heating temperature : 900°C (T.C. Value for control)
- Applications : GaAs, GaInNAs, InP, Ga<sub>2</sub>O<sub>3</sub> etc

### SH2001/SH3001/SH4001 (SH2003)



#### Features

SH series adopts a horizontal stainless steel reactor specifically developed for the nitride semiconductor. Manufactured products have outstanding uniformity owing to the optimization of internal quartz flow channel, designed by the simulation technology. We have abundant track record in materials for GaN and AlGaIn for research and development.

#### Specifications

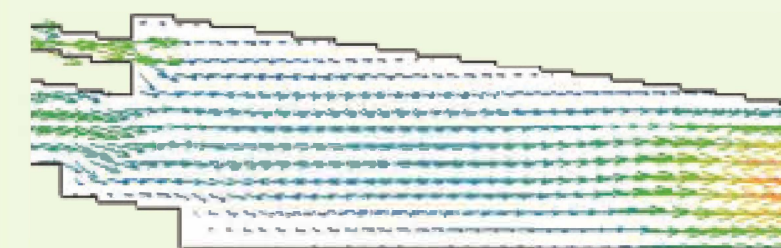
- Reactor : Horizontal type,  
Made of stainless steel
- Substrate size : 1 ×  $\phi$  2" (SH2001)  
1 ×  $\phi$  3" (SH3001)  
1 ×  $\phi$  4" (SH4001)  
(3 ×  $\phi$  2" (SH2003))
- Substrate heating : Resistance heating type
- Maximum heating temperature : 1300°C (T.C. Value for control)
- Applications : GaN, AlGaIn, InGaIn, etc.

MOCVD system for GaN, supplied to Mie University

#### Optimized reactor shape

The pattern of gas flow in the reactor greatly impacts epitaxial growth. We optimize the shape of reactor using a computerized gas flow simulation technology.

#### Examples of gas flow analysis results for horizontal MOCVD system



Flow rate vector

#### Resistance heating system

To manufacture thin epitaxial films of high quality and uniformity, we need a heating mechanism with superior uniformity of temperature on the substrate surface. To achieve this mechanism, we have adopted a resistance heating system in which our know-how has been accumulated for years.

- Users may select any desired shape for susceptor that meets the gas flow pattern.
- Simplified layout around the reactor, ensuring easy reactor maintenance
- Higher heating efficiency than other heating systems

#### Excellent control system

A compact and reliable control system is used. It is easy to create and execute a recipe for automatic growth program on the Windows™ screen with the standardly equipped automatic growth system.





# MOCVD system

Metal Organic Chemical Vapor Deposition SYSTEM

## Liquid delivery MOCVD system

### MOCVD System Specifications

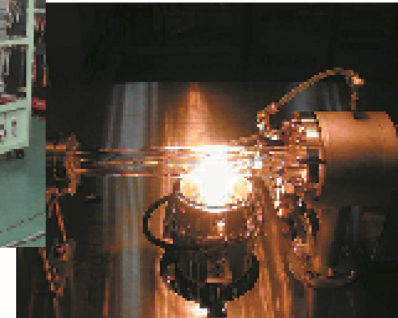
Model	SV2001/SV3001/SV4001 (SV2003)	SH2001/SH3001/SH4001 (SV2003)
Reactor type	Vertical, Made of Quartz	Horizontal, Made of stainless steel
Substrate (wafer) size	1 × φ2", 1 × φ3", 1 × φ4" (3 × φ2")	1 × φ2", 1 × φ3", 1 × φ4" (3 × φ2")
Wafer face	Face up	Face up
Heating system	Resistance heating	Resistance heating
Rotation system	0 to 30rpm	0 to 30rpm
Substrate temperature (standard)	900°C	1300°C
Vacuum exhaust system for process	Rotary pump (standard) *Dry pump (optional)	Rotary pump (standard) *Dry pump (optional)
Load lock Chamber	Vacuum exhaust system for load-lock system	Turbo Molecular Pump + Rotary pump (standard) *Dry pump (optional)
	Substrate stock stage (for up to 3 trays)	Standard
Transfer system	Transfer Rod or Rail transfer system	Transfer Rod or Rail transfer system
Source material supply control system (Available on request)	Metal-organic: 6 lines	Metal-organic: 6 lines
	Hydride gas: 3 lines	Hydride gas: 3 lines
	Carrier gas: 2 lines	Carrier gas: 2 lines
	Vent gas: 2 lines	Vent gas: 2 lines
	Dummy gas line	Dummy gas line
Cylinder cabinet (Available on request)	Three(3) 47-liter(10-liter)cylinders (2 cylinders for gas and one for N <sub>2</sub> )	Three(3) 47-liter(10-liter)cylinders (2 cylinders for gas and one for N <sub>2</sub> )
Control system	Operation panel	Standard
	Alarm system	Standard
	Inter lock system	Standard
	Automatic Growth system	Standard
	Power supply for back up	Standard
Others	Safety system (Detection and Warning and Inter-lock system of gas leakage, earthquake, abnormal temperature and pressure)	Standard
	H <sub>2</sub> gas purifier	Optional
	N <sub>2</sub> gas purifier	Optional
	Exhaust gas treatment system	Optional
	In-Situ monitoring system	Optional

### MPC1100V



Liquid delivery MOCVD system (MPC1100V) supplied to National Institute of Advanced Industrial Science and Technology

- Reactor : Horizontal type, Made of quartz
- Substrate size : 1 × φ 1"
- Substrate heating : Lamp heating type
- Maximum heating : 800°C temperature (T.C. Value for control)
- Flow control : Liquid mass flow control
- Vaporizer : Heating type
- Applications : Oxidize, etc.



### MPC2100H



Liquid delivery MOCVD system (MPC2100H) supplied to National Institute of Advanced Industrial Science and Technology

- Reactor : Vertical type, Made of stainless steel
- Substrate size : 1 × φ 2"
- Substrate heating : Resistance heating type
- Maximum heating : 800°C(T.C. Value for control) temperature
- Flow control : Liquid mass flow control
- Vaporizer : Heating type
- Applications : Oxidize, etc.

## Exhaust gas treatment system for Ammonia



### Features

This system uses a high performance catalyst to promote reaction of ammonia and hydrogen with oxygen from the atmosphere at low temperature (about 300°C) to decompose them into environmentally friendly water. The system is small in size and requires low running cost.

### Specifications

- Throughput : 5 SLM of ammonia  
20 SLM of hydrogen  
The actual value of throughput may be selected through consultation.
- Concentration in exhaust gas : NH<sub>3</sub> <25 ppm

### MPC6100



Liquid delivery MOCVD system (MPC6100) supplied to Nara Institute of Science and Technology

- Reactor : Vertical type, Made of stainless steel
- Load-lock system : With transfer rod
- Substrate size : 1 × φ 6"
- Substrate heating : Resistance heating type
- Maximum heating : 800°C(T.C. Value for control) temperature
- Flow control : Liquid mass flow control
- Vaporizer : Heating type
- Applications : Oxidize including PZT, etc.